Paper Book Part No. 67MBLE1MH

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the NT 650 V.

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.

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 20 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 start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedure.

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

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SERVICE PUBLICATIONS OFFICE

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IMPORTANT SAFETY NOTICE

⚠ WARNING **Indicates a strong possibility of severe personal injury or death if instructions are not followed.**

CAUTION **Indicates a possibility of equipment damage if instructions are not followed.**

NOTE *Gives helpful information.*

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda, might be done or of the possible hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda must satisfy himself thoroughly that neither personal safety nor vehicle safety will be jeopardized by the service method or tools selected.

Type Codes

•Throughout this manual, the following abbreviations are used to identify individual model.

Code	Area type
E	U. K.
F	France
SW	Switzerland
G	Germany
ED	European direct sales
II F	France: 25 Kw limited
II G	Germany: 50 PS limited
III G	Germany: 25 Kw limited
II ED	European direct sales: 25 Kw limited

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 grease (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

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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.

⚠ WARINNG

- **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.

⚠ WARINNG

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

Hot Components

⚠ WARINNG

- **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

⚠ WARINNG

- **Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Althoufh 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 brake assemblies. Use OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.

⚠ WARINNG

- **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.**

COOLANT

Under some conditions, the ethylene glycol in engine coolant is combustible and its flame is not visible. If the engine 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.**
- **Keep out of reach of pets. Some pets are attached to the smell and taste of coolant can die if they drink it.**
- **Do not remove the radiator cap when the engine is hot. The coolant is under pressure and could scaled you.**

It is contacts your skin, wash the affected areas immediately with soap and water. If it contacts your eyes, flush them thoroughly with fresh water and get immediate medical attention. If it is swallowed, the victim must be forced to vomit then rinse mouth and throat with fresh water before obtaining medical attention. Because of these dangers, away from the reach of children. Recycle used coolant in an ecologically correct manner.

Battery Hydrogen Gas & Electrolyte

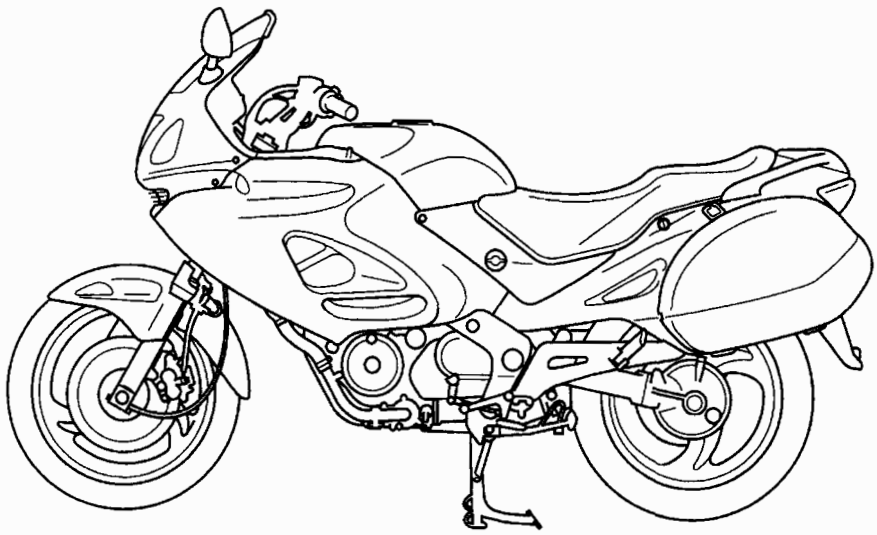
⚠ WARNING

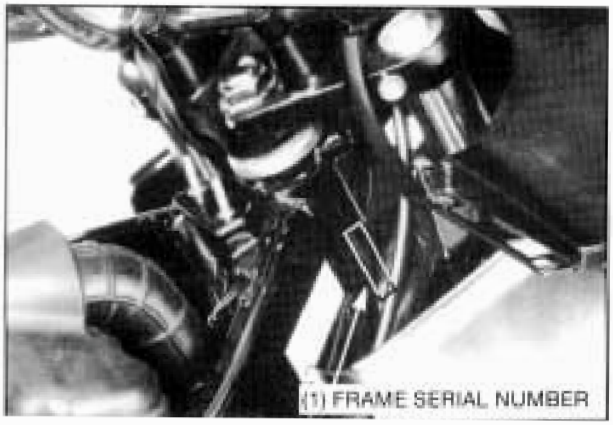
- **The battery gives of explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.**
- **The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and 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 vegetale oil and call a physician. KEEP OUT OF REACH OF CHILDREN.**

Service Rules

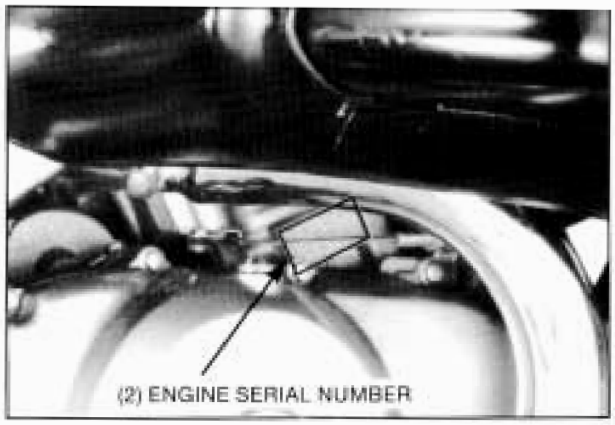
1. *Use genuine HONDA or HONDA - recommended parts and lubricants or their equivalents. Parts that don't meet* HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 shown on pages 1-24 through 1-29, Cable & Harness routing.

Model Identification



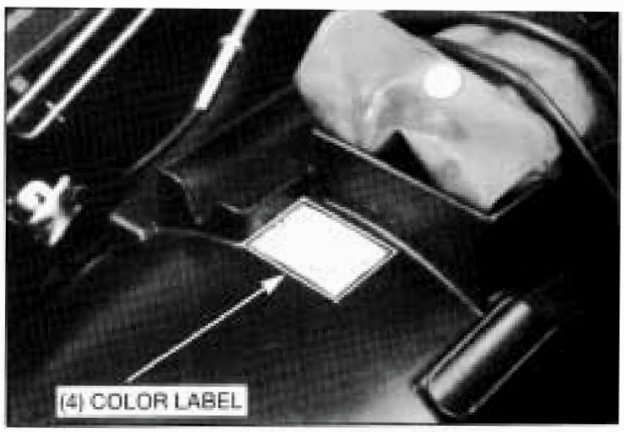


(1) The frame serial number is stamped on the right side of the steering head.



(2) The engine serial number is stamped on the right side of the crankcase below the rear cylinder

(3) The carburetor identification numbers are stamped on the intake side of the carburetor body as shown.



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

Specifications

Unit: mm (in)

General

Item		Specifications
Dimensions	Overall lenght	2,215 mm (87.2 in)
	Overall width	780 mm (30.7 in)
	Overall height	1,260 mm (49.6 in)
	Wheelbase	1,475 mm (58.1 in)
	Seat height	814 mm (32.0 in)
	Footpeg height	319 mm (12.6 in)
	Ground clearance	140 mm (5.5 in)
	Dry weight	223 kg (492 lb)
	Curb weight	243 kg (536 lb)
	Maximum weight capacity	192 kg (423 lb)
Frame	Frame type	Twin tube
	Front suspension	Telescopic fork
	Front wheel travel	130 mm (5.1 in)
	Rear suspension	Swingarm
	Rear wheel travel	122.5 mm (4.8 in)
	Rear damper	Nitrogen gas filled damper
	Font tire size	120/70 ZR17 (58W)
	Rear tire size	150/70 ZR17 (69W)
	Tire brand Dunlop	Front: D205FN/Rear: D205N
	Michelin	Front/Rear: MACADAM 90XB
	Front brake	Hydraulic double disc brake
	Rear brake	Hydraulic single disc brake
	Caster angle	28° 50'
	Trail lenght	120.5 mm (4.74 in)
	Fuel tank capacity	19.0 liters (5.02 US gal, 4.18 Imp gal)
	Fuel tank reserve capacity	3.2 liters (0.85 US gal, 0.70 Imp gal)
Engine	Bore and stroke	79.0 x 66.0 mm (3.11 x 2.60 in)
	Displacement	647 cm³ (39.5 cu-in)
	Compression ratio	9.2: 1
	Valve train	Silent, multi-link chain drive and OHC with rocker arm
	Intake valve opens	5° BTDC — at 1 mm (0.04 in) lift
	Intake valve closes	40° ABDC — at 1 mm (0.04 in) lift
	Exhaust valve opens	40° BBDC — at 1 mm (0.04 in) lift
	Exhaust valve closes	5° ATDC — at 1 mm (0.04 in) lift
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Paper filter
	Crankshaft type	Unit type, two main journals
	Engine dry weight	66.5 kg (146.6 lbs)
	Firing order	Front - 232° - Rear - 488° - Front
	Cylinder arrangement	Two cylinders, 52° V transverse
	Cylinder number	Front: #2, Rear: #1
Carburetor	Carburetor type	CV (Constant Velocity) dual carburetor with fuel pump
	Throttle bore	36.5 mm (1.4 in)

Unit: mm (in)

General (Cont'd)

	Item	Specifications
Drive Train	Clutch system	Multi-plate, wet
	Clutch operation system	Mechanical type
	Transmission	Constant mesh, 5-speeds
	Primary reduction	1.763 (67/38)
	Secondary reduction	0.820 (32/39)
	Third reduction	1.058 (18/17)
	Final reduction	3.090 (34/11)
	Gear ratio 1st	3.000 (33/11)
	2nd	1.941 (33/17)
	3rd	1.500 (30/20)
	4th	1.240 (31/25)
	5th	1.095 (23/21)
	Gearshift pattern	Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
Electrical	Ignition system	Full transistor digital ignition
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted/triple phase, full wave rectification
	Lighting system	Battery

Unit: mm (in)

Lubrication System

Item		Standard	Service Limit
Engine oil capacity	After draining	2.4 liters (2.52 U.S. qt, 2.11 Imp qt)	—
	After disassembly	3.0 liters (3.15 U.S. qt, 2.64 Imp qt)	—
	After oil filter change	2.6 liters (2.73 U.S. qt, 2.29 Imp qt)	—
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		441 kPa (4.5 kgf/cm^2, 64 psi) at 6,000 min^{-1} (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)
	End clearance	0.02 - 0.07 (0.001 - 0.003)	0.10 (0.004)

Unit: mm (in)

Fuel System

Item		Specifications
Carburetor identification number	Except SW type	VDK1D
	SW type	VDKAC
Main jet	Front	# 125
	Rear	# 125
Slow jet		# 45
Pilot screw	Initial/final opening	See page 5-21
Float level		9.2 mm (0.36 in)
Base carburetor (for synchronization)		Rear cylinder (#1)
Idle speed	Except SW type	1,200 ± 100 min^{-1} (rpm)
	SW type	1,200 ± 50 min^{-1} (rpm)
Carburetor vacuum difference		27 kPa (20 mm Hg. 0.7 in Hg)
PAIR control valve specified vacuum		320 mm Hg (12.6 in Hg)
Throttle grip free play		2 - 6 mm (1/12 - 1/4 in)
Fuel pump flow capacity		Minimum 600 cm^3 (20.3 US oz, 21.1 Imp oz) per minute at 13 V

Coolig System

Item		Specifications
Coolant capacity	Radiator and engine	1.8 liters (1.90 US qt, 1.58 Imp qt)
	Reserve tank	0.25 liters (0.26 US qt, 0.22 Imp qt)
Radiator cap relief pressure		88 - 127 kPa (0.9 - 1.3 kgf/cm², 13 - 18 psi)
Thermostat	Begin to open	80 - 84° C (176 - 183° F)
	Fully open	95° C (203° F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		50 % mixture with soft water

Unit: mm (in)

Clutch System

Item		Standard	Service Limit
Clutch lever free play		10-20 (3/8-3/4)	—
Clutch spring free length		42.3 (1.67)	43.9 (1.73)
Clutch disc thickness	A	2.62-2.78 (0.103-0.107)	2.3 (0.09)
	B	2.92-3.08 (0.115-0.121)	2.6 (0.10)
	C	2.62-2.78 (0.103-0.107)	2.3 (0.09)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I. D.	21.991-22.016 (0.8658-0.8668)	22.09 (0.870)
	O.D.	31.959-31.975 (1.2582-1.2589)	31.92 (1.257)
Oil pump drive sprocket I. D.		32.025-32.145 (1.2608-1.2655)	30.15 (1.187)
Mainshaft O. D. at clutch outer guide		21.967-21.980 (0.8648-0.8654)	21.95 (0.864)

Unit: mm (in)

Alternator/Starter Clutch

Item		Standard	Service Limit
Starter driven gear	I. D.	37.000-37.025 (1.4567-1.4577)	37.10 (1.461)
	O. D.	57.749-57.768 (2.2736-2.2743)	57.73 (2.273)

Unit: mm (in)

Cylinder Head/Valves

Item			Standard	Service Limit
Cylinder compression			1,324 ± 196 kPa (13.5 ± 2.0 kgf/cm², 192 ± 28 psi) at 400 min⁻¹ (rpm)	—
Cylinder head warpage			—	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.13-0.17 (0.005-0.007)	—
		EX	0.18-0.22 (0.007-0.009)	—
	Valve stem O.D.	IN	5.475-5.490 (0.2156-0.2161)	5.47 (0.215)
		EX	6.555-6.570 (0.2580-0.2587)	6.55 (0.258)
	Valve guide I.D.	IN	5.500-5.512 (0.2165-0.2170)	5.53 (0.218)
		EX	6.600-6.615 (0.2598-0.2604)	6.66 (0.262)
	Stem-to-guide clearance	IN	0.010-0.037 (0.0004-0.0015)	0.07 (0.003)
		EX	0.030-0.060 (0.0012-0.0024)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	19.4-19.6 (0.76-0.77)	—
		EX	17.9-18.1 (0.70-0.71)	—
	Valve seat width	IN/EX	0.90-1.10 (0.035-0.043)	1.5 (0.06)
Valve spring free length	Outer	IN	42.14 (1.659)	40.58 (1.598)
		EX	42.83 (1.686)	41.25 (1.624)
	Inner	IN	38.11 (1.500)	36.47 (1.436)
		EX	38.81 (1.765)	37.51 (1.477)
Camshaft	Cam lobe height	IN	38.189 (1.5035)	38.17 (1.503)
		EX	38.213 (1.5044)	38.19 (1.504)
	Journal O.D.		21.959-21.980 (0.8645-0.8654)	21.95 (0.864)
	Runout		0.030-(0.012)	0.05 (0.002)
	Oil clearance		0.040-0.093 (0.0015-0.0037)	0.11 (0.004)
	Identification marks		"F": Front, "R": Rear	—
Rocker arm I.D.		IN/EX	12.000-12.018 (0.4724-0.4731)	12.03 (0.474)
Rocker arm shaft O.D.		IN/EX	11.966-11.984 (0.4711-0.4718)	11.96 (0.471)
Rocker arm-to-rocker arm shaft clearance			0.016-0.052 (0.0006-0.0020)	0.07 (0.003)

Unit: mm (in)

Cylinder/Piston

Item			Standard	Service Limit
Cylinder	I. D.		79.000 - 79.015 (3.1102 - 3.1108)	79.05 (3.112)
	Out of round		—	0.06 (0.002)
	Taper		—	0.06 (0.002)
	Warpage		—	0.10 (0.004)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		78.97 - 78.99 (3.109 - 31.110)	78.92 (3.107)
	Piston O.D. measurement point		7-17 mm (0.3-0.7 in) from bottom of skirt	—
	Piston pin bore I.D.		20.002 - 20.008 (0.7874 - 0.7877)	20.02 (0.788)
	Piston pin O.D.		19.994 - 20.000 (0.7871 - 0.7874)	19.98 (0.787)
	Piston-to-piston pin clearance		0.002 - 0.014 (0.0001 - 0.0006)	0.03 (0.001)
	Piston ring-to-ring groove clearance	Top	0.025 - 0.055 (0.0010 - 0.0022)	0.11 (0.004)
		Second	0.015 - 0.045 (0.0006 - 0.0018)	0.10 (0.004)
	Piston ring end grap	Top	0.20 - 0.35 (0.008 - 0.014)	0.7 (0.03)
		Second	0.35 - 0.50 (0.014 - 0.020)	0.7 (0.03)
		Oil (side rail)	0.20 - 0.80 (0.008 - 0.031)	1.0 (0.04)
	Piston ring mark	Top	"R" mark	—
		Second	"RN" mark	—
Cylinder-to-piston clearance			0.010 - 0.035 (0.0004 - 0.0014)	0.13 (0.005)
Connecting rod small end I.D.			20.016 - 20.034 (0.7880 - 0.7887)	20.04 (0.789)
Connecting rod-to-piston pin clearance			0.016 - 0.040 (0.0006 - 0.0016)	0.06 (0.002)

Unit: mm (in)

Crankshaft/Transmission

Item			Standard	Service Limit
Crankshaft	Side clearance		0.05-0.20 (0.002-0.008)	0.30 (0.012)
	Runout		—	0.05 (0.002)
	Crankpin oil clearance		0.028-0.052 (0.0011-0.0020)	0.08 (0.003)
	Main journal oil clearance		0.025-0.041 (0.0010-0.0016)	0.05 (0.002)
Transmission	Gear I.D.	M4, M5, C1, C2, C3	28.000-28.021 (1.1024-1.1032)	28.03 (1.103)
	Bushing O.D.	M4, M5, C1, C2, C3	27.959-27.980 (1.1007-1.1016)	27.95 (1.100)
	Bushing I.D.	M4, C2, C3	25.000-25.021 (0.9843-0.9851)	25.03 (0.985)
	Gear-to-bushing clearance	M4, M5, C1, C2, C3	0.020-0.062 (0.0008-0.0024)	0.08 (0.003)
	Mainshaft O.D.	M4 bushing	24.959-24.980 (0.9826-0.9835)	24.95 (0.982)
		Case journal A	19.980-19.993 (0.7866-0.7871)	19.96 (0.786)
		Case journal B	21.967-21.980 (0.8648-0.8654)	21.94 (0.864)
	Countershaft O.D.	C2 bushing	24.959-24.980 (0.9826-0.9835)	24.95 (0.982)
		C3 bushing	24.959-24.980 (0.9826-0.9835)	24.95 (0.982)
		Case journal A	19.980-19.993 (0.7866-0.7871)	19.96 (0.786)
		Case journal B	19.980-19.993 (0.7866-0.7871)	19.96 (0.786)
	Bushing-to-shaft clearance	M4, C2, C3	0.020-0.062 (0.0008-0.0024)	0.08 (0.003)
Shift fork, fork shaft	Fork	I.D.	13.000-13.021 (0.5118-0.5126)	13.04 (0.513)
		Claw thickness	5.93-6.00 (0.0233-0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966-11.984 (0.5105-0.5112)	12.90 (0.508)
Shift drum O.D. (at left side journal)			11.966-11.984 (0.4711-0.4718)	11.94 (0.470)
Output drive train	Output gear I.D.		24.000-24.021 (0.9449-0.9457)	24.10 (0.949)
	Output gear bushing	O.D.	23.959-23.980 (0.9433-0.9441)	23.70 (0.933)
		I.D.	20.020-20.041 (0.7882-0.7880)	20.10 (0.791)
	Output drive gear shaft O.D.		19.979-20.000 (0.7866-0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020-0.062 (0.0008-0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020-0.062 (0.0008-0.0024)	0.082 (0.0032)
	Output gear damper spring free length		58.40 (2.299)	56.0 (2.20)
	Output drive gear backlash		0.08-0.23 (0.003-0.009)	0.4 (0.02)
	Backlash difference between measurements		—	0.10 (0.004)

Unit: mm (in)

Final Drive

Item	Standard	Service Limit
Recommended final drive oil	Hypoid gear oil, SAE #80	—
Final drive oil capacity at draining/disassembly	150 cm^3 (5.1 US oz, 5.3 Imp oz)	—
Final drive gear backlash	0.05-0.15 (0.002-0.006)	0.3 (0.01)
Backlash difference between measurements	—	0.10 (0.004)
Ring gear-to-stop pin clearance	0.3-0.6 (0.01-0.02)	—
Final drive gear assembly preload	0.2-0.4 N·m (2-4 kgf·cm, 1.7-3.5 lbf·in)	—

Unit: mm (in)

Front Wheel/Suspension/Steering

Item		Standard	Service Limit
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	245 kPa (2.50 kgf/cm², 36 psi)	—
	Up to maximum weight capacity	245 kPa (2.50 kgf/cm², 36 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Fork	Spring free length	416.9 (16.41)	408,6 (16.09)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Fork fluid	—
	Oil level	113 (4.4)	—
	Oil capacity	480 ± 2.5 cm³ (16.2 ± 0.08 US oz, 16.9 ± 0.09 Imp oz)	—
Steering head bearing preload		1.04 - 1.46 kgf (2.30 - 3.22 lbf)	—

Unit: mm (in)

Rear Wheel/Suspension

Item		Standard	Service Limit
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (100 lb) load	284 kPa (2.90 kgf/cm², 41 psi)	—
	Up to maximum weight capacity	284 kPa (2.90 kgf/cm², 41 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Shock absorber spring preload adjuster setting		4 turns (8 clicks) from lowest position	—

Unit: mm (in)

Hydraulic Brake

Item		Standard	Service Limit
Front	Specified brake fluid	DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc runout	—	0.25 (0.010)
Rear	Specified brake fluid	DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	5.0 (0.20)	4.0 (0.16)
	Brake disc runout	—	0.25 (0.010)
	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.	38.180 - 38.230 (1.5031 - 1.5051)	38.24 (1.506)
	Caliper piston O.D.	38.003 - 38.148 (1.4962 - 1.5019)	38.09 (1.500)

Battery/Charging System

Item			Specifications
Battery	Capacity		12 V - 8 Ah
	Current leakage		1.0 mA max.
	Voltaje (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 h max
Alternator	Capacity		308 W/ 5,000 min^{-1} (rpm)
	Charging coil resistance (20° C / 68° F)		0.1 - 1.0 Ω
Regulator/rectifier regulated voltage			14 - 15 V/ 5,000 min^{-1} (rpm)

Ignition System

Item		Specifications	
Spark plug		NGK	DENSO
	Standard	DPR8EA-9	X24EPR-U9
	For cold climate (below 5° C/41° F)	DPR7EA-9	X22EPR-U9
	For extended high speed riding	DPR9EA-9	X27EPR-U9
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 timig "F" mark		9.5° BTDC	
Advance	Start	10° / 1,500 min^{-1} (rpm)	
	Stop	29° / 9,000 min^{-1} (rpm)	
Full advance		29°	

Unit: mm (in)

Electric Starter

Item	Standard	Service Limit
Starter motor brush lenght	12.5 (0.49)	6.5 (0.26)

Lights/Meters/Switches

Item		Specifications
Bulbs	Headlight (High/low beam)	12 V - 60/55 W
	Position light	12 V - 4 W
	Brake/tail light	12 V - 21/5 W
	Turn signal light	12 V - 21 W x 4
	Instrument light	12 V - 1.7 W x 2
	Clock light	12 V - 1.7 W
	Turn signal indicator	12 V - 1.7 W x 2
	High beam indicator	12 V - 1.7 W
	Neutral indicator	12 V - 1.7 W
	Oil indicator	12 V - 1.7 W
Fuse	Main fuse	30 A
	Sub fuse	5 A x 2, 10 A x 2, 15 A x 2
Fan motor switch	Start to close (ON)	98 - 102° C (208 - 216° F)
	Start to open (OFF)	93 - 97° C (199 - 207° F)
Coolant temperature sensor	Start to close (ON)	112 - 118° C (259 - 270° F)
	Start to open (OFF)	Below 108° C (252° F)

Torque Values

Standard

Fastener Type	Torque N·m (kgf-m, lbf-ft)	Fastener Type	Torque N·m (kgf-m, lbf-ft)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head)	9 (0.9, 6.5)
10 mm hex bolt and nut	34 (3.5, 25)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
12 mm hex bolt and nut	54 (5.5, 40)	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 grease to the threads.
2. Apply oil to the threads and seating surface.
3. Apply sealant to the threads.
4. Apply a locking agent to the threads.
5. Stake.
6. CT bolt.
7. UBS bolt.
8. Left hand threads.
9. Self tapping screw.
10. ALOC bolt: replace with a new one.
11. U-nut.
12. Torx bolt.

Engine

Item	Q'Ty	Thread Dia. (mm)	Torque N·m (kgf-m, lbf-ft)	Remarks
MAINTENANCE:				
Spark plug	4	12	14 (1.4, 10)	
Engine oil drain bolt	1	14	29 (3.0, 22)	
Engine oil filter cartridge	1	20	10 (1.0, 7)	
Timing hole cap	1	14	10 (1.0, 7)	NOTE 1
Crankshaft hole cap	1	30	15 (1.5, 11)	NOTE 1
Valve adjusting screw lock nut	6	7	23 (2.3, 17)	NOTE 2
LUBRICATION SYSTEM:				
Oil pressure switch	1	PT1/8	12 (1.2, 9)	NOTE 3
Oil pressure switch wire terminal screw	1	4	2 (0.2, 1.4)	
Oil pump cover bolt	3	6	13 (1.3, 9)	NOTE 6
Engine oil filter boss (stud)	1	20	18 (1.8, 13)	NOTE 4
COOLING SYSTEM:				
Water pump cover bolt	2	6	12 (1.2, 9)	
CLUTCH/GEARSHIFT LINKAGE:				
Clutch lifter plate bolt	4	6	12 (1.2, 9)	
Clutch center lock nut	1	18	128 (13.0, 94)	NOTE 2, 5
Primary drive gear bolt	1	12	88 (9.0, 65)	NOTE 2
Gearshift return spring pin	1	8	23 (2.3, 17)	
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 4
ALTERNATOR/STARTER CLUTCH:				
Flywheel bolt	1	12	128 (13.0, 94)	NOTE 7, 8
Stator mounting socket bolt	4	6	12 (1.2, 9)	NOTE 4
Starter one-way clutch hosing socket bolt	6	8	29 (3.0, 22)	NOTE 4, 12
Stator wire holder socket bolt	1	6	12 (1.2, 9)	NOTE 4

Engine (Cont'd)

Item	Q'Ty	Thread Dia. (mm)	Torque N·m (kgf-m, lbf-ft)	Remarks
CYLINDER HEAD/VALVES:				
EVAP air injection reed valve cover bolt	4	5	5 (0.5, 3.6)	NOTE 6
Cylinder head cover bolt	4	6	10 (1.0, 7)	
Cam sprocket bolt	4	7	23 (2.3, 17)	NOTE 4
Camshaft holder 8 mm bolt	6	8	23 (2.3, 17)	
8 mm nut	4	8	23 (2.3, 17)	
Cam chain tensioner mounting bolt	4	6	10 (1.0, 7)	
Cylinder head 8 mm bolt	4	8	23 (2.3, 17)	NOTE 2
8 mm nut	2	8	23 (2.3, 17)	
10 mm nut	8	10	47 (4.8, 35)	
CRANKCASE/CRANKSHAFT/TRANSMISSION:				
Crankcase 8 mm bolt	15	8	23 (2.3, 17)	
Connecting rod bearing cap nut	8	8	33 (3.4, 25)	NOTE 2
Output gear case bolt: 8 x 110 mm	2	8	31 (3.2, 23)	NOTE 4,7
8 x 65 mm	1	8	31 (3.2, 23)	NOTE 4,7
8 x 60 mm	1	8	31 (3.2, 23)	NOTE 2, 7
8 x 45 mm	1	8	31 (3.2, 23)	NOTE 2, 7
Output drive gear bearing lock nut (inner)	1	30	69 (7.0, 51)	NOTE 2, 5
(outer)	1	64	98 (10.0, 72)	NOTE 2, 5
Output driven gear bearing lock nut (inner)	1	30	69 (7.0, 51)	NOTE 2, 5
(outer)	1	64	98 (10.0, 72)	NOTE 2, 5
Output driven gear bearing holder bolt	4	8	31 (3.2, 23)	NOTE 2
Output drive gear shaft bolt	1	10	49 (5.0, 36)	
ELECTRIC STARTER:				
Starter motor cable nut	1	6	10 (1.0, 7)	
Starter motor cable socket bolt	1	4	5 (0.5, 3.6)	
LIGHTS/METERS/SWITCHES:				
Neutral switch	1	10	12 (1.2, 9)	

Frame (Cont'd)

Item	Q'Ty	Thread Dia. (mm)	Torque N·m (kgf-m, lbf-ft)	Remarks
FRAME/BODY PANELS/EXHAUST SYSTEM:				
Saddle bag adjust bolt lock nut	2	14	59 (6.0, 43)	
Footpeg bracket bolt	4	8	26 (2.7, 20)	
Saddle bag lid bar	8	4	2 (0.2, 1.4)	
Saddle bag lid hinge	16	4	2 (0.2, 1.4)	
Saddle bag lid catch	8	4	2 (0.2, 1.4)	
MAINTENANCE:				
Air cleaner housing cover screw	10	5	0.1 (1, 0.7)	
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot lock nut	1	10	29 (3.0, 22)	
COOLING SYSTEM:				
Fan motor nut	3	5	3 (0.3, 2.2)	
Cooling fan nut	1	5	5 (0.5, 3.6)	NOTE 4
Cooling fan shroud bolt	3	6	9 (0.9, 6.5)	
Radiator filler bolt	2	6	9 (0.9, 6.5)	
Thermostat housing cover bolt	2	6	10 (1.0, 7)	
Fan motor switch	1	PT 1/8	10 (1.0, 7)	NOTE 4
Water pump cover bolt	4	6	13 (1.3, 9)	
ENGINE MOUNTING:				
Front engine mounting bolt	1	10	39 (4.0, 29)	
Rear engine mounting bolt	2	10	39 (4.0, 29)	
Engine bracket bolt	6	8	27 (2.8, 20)	
FINAL DRIVE:				
Final gear case assembly mounting nut	4	10	64 (6.5, 47)	NOTE 7
Final drive oil filler cap	1	30	12 (1.2, 9)	
Gear case cover bolt: 10 mm	2	10	47 (4.8, 35)	NOTE 4
Gear case cover bolt: 8 mm	6	8	25 (2.5, 18)	
Pinion retainer	1	64	108 (11.0, 80)	
Pinion retainer lock tab bolt	1	6	10 (1.0, 7)	
Pinion gear shaft nut	1	16	108 (11.0, 80)	
Dust guard plate bolt	1	6	10 (1.0, 7)	NOTE 9
FRONT WHEEL/SUSPENSION/STEERING:				
Steering stem nut	1	24	103 (10.5, 76)	See page 14-37
Top thread A	1	26	25 (2.5, 18)	NOTE 2
Top thread B	1	26	—	
Top bridge pinch bolt	2	8	23 (2.3, 17)	
Bottom bridge pinch bolt	2	10	39 (4.0, 29)	
Front axle	1	14	59 (6.0, 43)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Front brake disc bolt	12	8	42 (4.3, 31)	NOTE 4
Fork cap	2	37	23 (2.3, 17)	
Fork socket bolt	2	8	22 (2.2, 16)	NOTE 4
Handlebar upper holder bolt	4	8	27 (2.8, 20)	
REAR WHEEL/SUSPENSION:				
Rear axle nut	1	18	88 (9.0, 65)	NOTE 11
Rear axle pinch bolt	1	8	26 (2.7, 20)	
Rear brake disc bolt	6	8	42 (4.3, 31)	NOTE 4
Damper holder plate bolt	5	6	20 (2.0, 14)	NOTE 10
Final driven flange bolt	5	10	59 (6.0, 43)	
Rear shock absorber upper mounting nut	1	12	108 (11.0, 80)	NOTE 2, 11
Rear shock absorber lower mounting nut	1	10	44 (4.5, 33)	NOTE 11
Swingarm right pivot bolt	1	23	10 (1.0, 7)	
Swingarm right pivot lock nut	1	23	98 (10.0, 72)	
Swingarm left pivot bolt	1	23	98 (10.0, 72)	
Rear brake caliper stopper bolt	1	14	88 (9.0, 65)	

Frame (Cont'd)

Item	Q'Ty	Thread Dia. (mm)	Torque N·m (kgf-m, lbf-ft)	Remarks
HYDRAULIC BRAKE:				
Front brake caliper mounting bolt	4	8	30 (3.1, 22)	NOTE 4
Rear brake caliper mounting bolt	1	8	23 (2.3, 17)	
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	
Rear brake caliper bleeder	1	8	6 (0.6, 4.3)	
Rear brake pad pin	1	10	18 (1.8, 13)	
Rear brake pad pin plug	1	10	3 (0.3, 2.2)	
Front brake caliper bleeder	2	10	14 (1.4, 10)	
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Rear master cylinder holder bolt	2	6	12 (1.2, 9)	
Rear master cylinder joint lock nut	1	8	18 (1.8, 13)	
Rear brake reservoir holder bolt	1	6	12 (1.2, 9)	
Front master cylinder cover screw	2	4	1 (0.1, 0.7)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Brake hose oil bolt	5	10	29 (3.0, 22)	
Front brake hose guide bolt	1	6	12 (1.2, 9)	
Rear brake hose guide bolt	2	6	12 (1.2, 9)	
Rear brake hose joint screw	1	4	2 (0.2, 1.4)	NOTE 4
Front brake pipe	2	10	17 (1.7, 12)	Apply PZ100
LIGHTS/METERS/SWITCHES:				
Side stand switch mounting bolt	1	6	10 (1.0, 7)	
Thermosensor	1	16	18 (1.8, 13)	

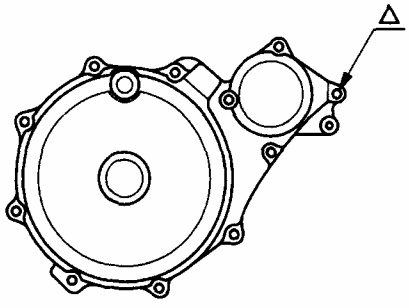
Tools

Description	Tool Number	Remarks	Ref. Section
Float level gauge	07401-0010000		5
Pressure guage	07506-3000000		4
Oil pressure gauge attachment	07510-4220100		4
Universal bearing puller	07631-0010000		13
Gear holder	07724-0010100		8
Flywheel holder	07725-0040000		9
Rotor puller	07733-0020001		9
Sliding remover weight	07741-0010201		12
Valve guide remover, 5.5 mm (IN)	07742-0010100		10
Valve guide remover, 6.6 mm (EX)	07742-0010200		10
Valve guide driver	07743-0020000		10
Attachment, 32 x 35 mm	07746-0010100		15
Attachment, 42 x 47 mm	07746-0010300		12, 13, 14, 15
Attachment, 52 x 55 mm	07746-0010400		12, 13, 14
Attachment, 62 x 68 mm	07746-0010500		12
Attachment, 24 x 26 mm	07746-0010700		15
Inner handle	07746-0030100		12, 13
Inner driver, 25 mm	07746-0030200		13
Inner driver, 30 mm	07746-0030300		12
Pilot, 17 mm	07746-0040400		12, 15
Pilot, 20 mm	07746-0040500		12, 14, 15
Pilot, 30 mm	07746-0040700		12
Bearing remover shaft	07746-0050100		14,15
Remover head, 20 mm	07746-0050600		14, 15
Driver	07749-0010000		12, 13, 14, 15
Valve spring compressor	07757-0010000		10
Seat cutter, 27.5 mm (45° EX)	07780-0010200		10
Seat cutter, 35 mm (45° IN)	07780-0010400		10
Flat cutter, 28 mm (32° EX)	07780-0012100		10
Flat cutter, 35 mm (32° IN)	07780-0012300		10
Interior cutter, 30 mm (60° EX)	07780-0014000		10
Interior cutter, 37.5 mm (60° IN)	07780-0014100		10
Cutter holder, 5.5 mm (IN)	07781-0010101		10
Cutter holder, 6.6 mm (EX)	07781-0010202		10
Valve adjusting wrench	07908-KE90000		3
Lock nut wrench	07908-ME90000		15
Retainer wrench	07910-MA10000		13
Snap ring pliers	07914-5670101		12
Snap ring pliers	07914-SA50001		16
Steering stem socket	07916-3710101		14
Lock nut wrench	07916-MB00001		12
Pinion holder	07924-ME40002		13
- Pinion holder plate	07724-ME40110		
- Set collar, 11 x 16 x 50	07924-ME40120		
Puller shaft	07931-ME40000		13
Bearing puller & driver attachment	07934-MB00000	or 07965 - 6920201	13
Remover handle	07936-3710100		12
Bearing remover set	07936-3710600		12
Valve guide driver attachment, 11.3 mm (IN)	07943-MF50100		10
Valve guide driver attachment, 12.3 mm (EX)	07943-MF50200		10
Ball driver attachment	07945-3330300		13
Ball race remover	07946-3710500		14
Steering stem driver	07946-MB00000		14
Driver shaft	07946-MJ00100		15
Slider weight	07947-KA50100		14
Seal driver attachment	07947-KF00100		14
Driver handle	07949-3710001		15

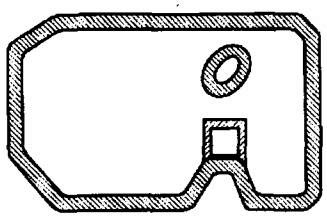
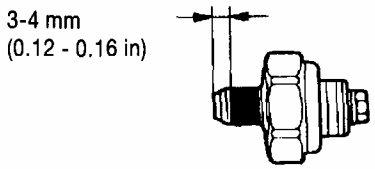
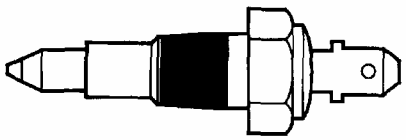
Description	Tool Number	Remarks	Ref. Section
Ball race remover	07953-MJ10000		14
Slider weight	07947-KA50100		14
Seal driver attachment	07947-KF00100		14
Drive handle	07949-3710001		15
Ball race remover	07953-MJ10000		14
Driver attachment	07953-MJ10100		14
Driver handle	07953-MJ10200		14
Damper spring compressor	07964-ME90000		12
Disassembly tool	07965-3710101		12
Seal driver attachment	07965-KE80200	*or* 07931 - 4630300	13
Valve guide reamer, 5.510 mm (IN)	07984-2000001		10
Valve guide reamer, (EX)	07984-ZE20001		10
Bearing driver attachment	07GAD-SD40101		13
Oil filter wrench	07HAA-PJ70100		3, 4
Peak voltage adapter	07HGJ-0020100		18
Pinion puller base	07HMC-MM80110		13
Bearing drive attachment	07HMF-MM90400		12
Clutch center holder	07JMB-MN50301		8
Pilot screw wrench, D	07KMA-MS60101		5
Holder A	07PAB-0010100		12

Lubrication & Seal Points

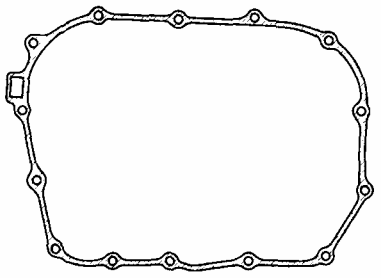
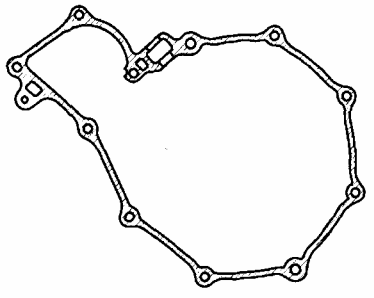
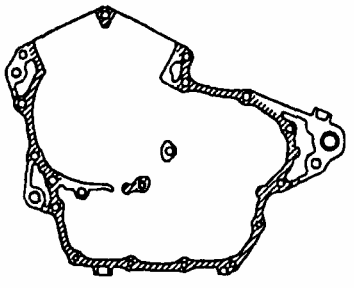
Engine

Location	Material	Remarks
Camshaft lobes/journals Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Crankshaft crank pin and journals Clutch outer guide outer surface Transmission gear shift fork groove Transmission collar inner and outer surface Transmission spline collar outer surface Connecting rod small end inner surface	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Piston outer surface Piston ring outer surface Piston pin outer surface Primary drive gear bolt threads and seating surface Flywheel bolt threads and seating surface Starter one-way clutch sliding lock surface Starter reduction gear shaft outer surface Clutch center lock nut threads Clutch lifter arm-to-right crankcase cover sliding surface Clutch disc outer surface Cylinder wall surface Cylinder stud bolt threads Cylinder 8 x 187 mm bolt threads Valve adjusting screw threads and seating surface Connecting rod bolt/nut threads and seating surface Cylinder head mounting bolt and nut seating surface Oil filter cartridge threads and O-ring Each bearings rolling area Each O-rings	Engine oil	
Crankshaft hole cap threads Timing hole cap threads Each oil seal lips	Multi-purpose grease	
Cam sprocket bolt threads Starter one-way clutch housing bolt threads Oil pump driven sprocket bolt threads Stator wire holder socket bolt threads Gearshift cam plate bolt threads Transmission bearing set plate bolt threads Countershaft oil seal set plate bolt threads Cam chain tensioner set plate bolt threads Stator mounting bolt threads Oil filter boss crankcase side threads Ignition pulse generator bolt threads Left crankcase cover bolt threads (marked "△") 	Locking agent 	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)

Engine (Cont'd)

Location	Material	Remarks
Cylinder head cover-to-gasket groove 	Honda Bond A or equivalent	
Output gear case bolt threads Oil pressure switch threads  Fan motor switch threads 	Sealant	

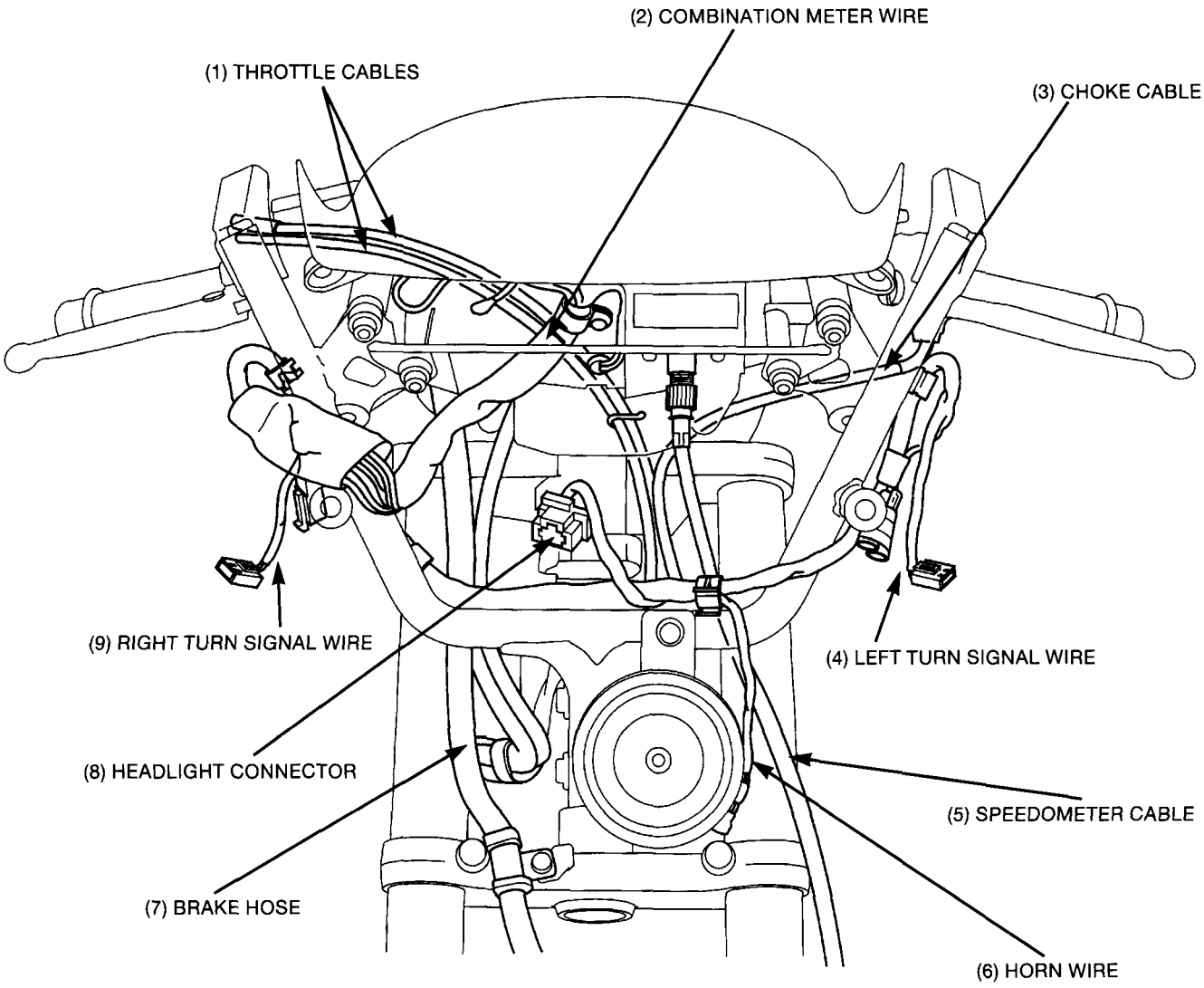
Engine (Cont'd)

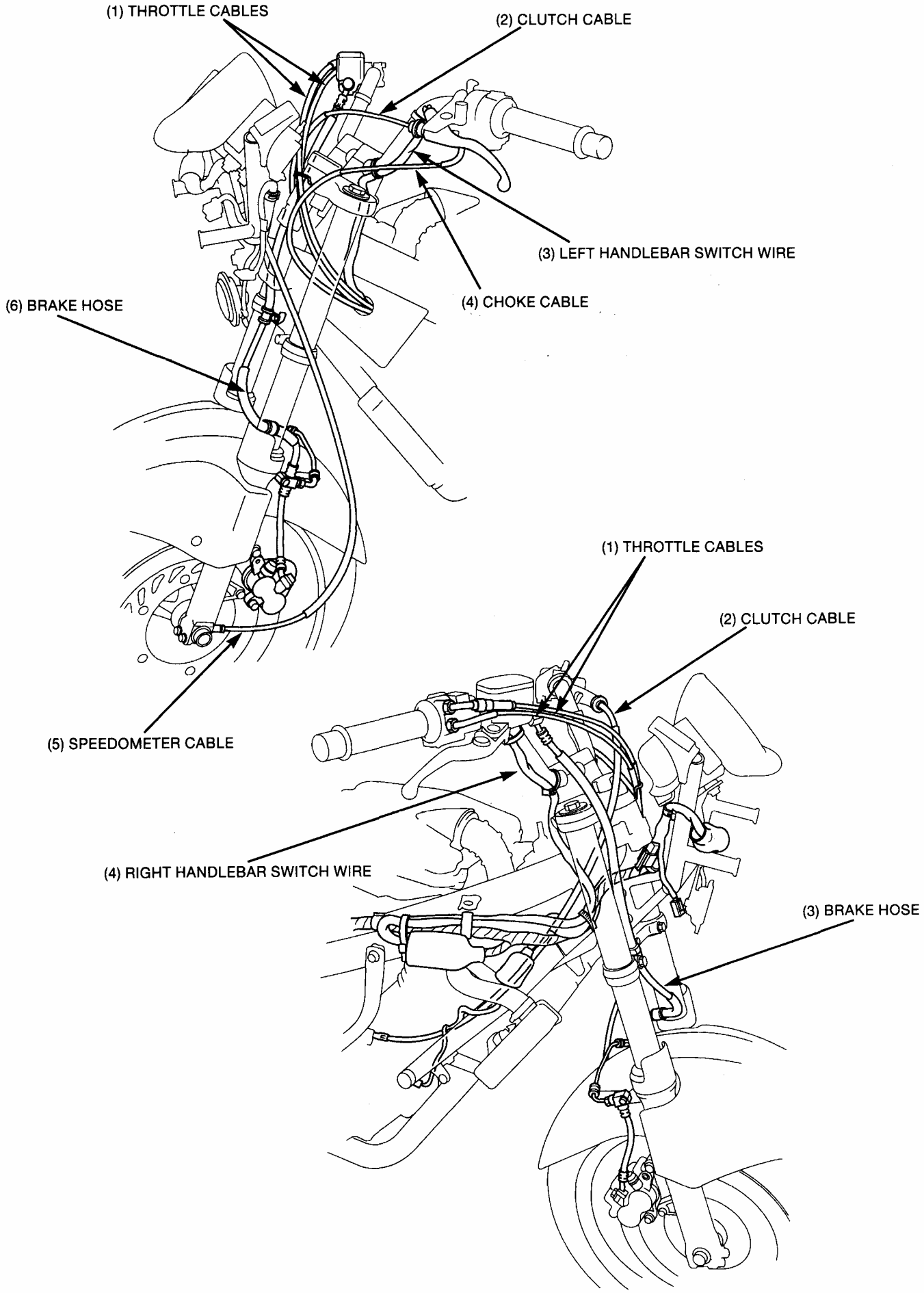
Location	Material	Remarks
Right crankcase-to-cover mating surface 	Sealant	
Left crankcase-to-cover mating surface 		
Right and left crankcase mating surface 		

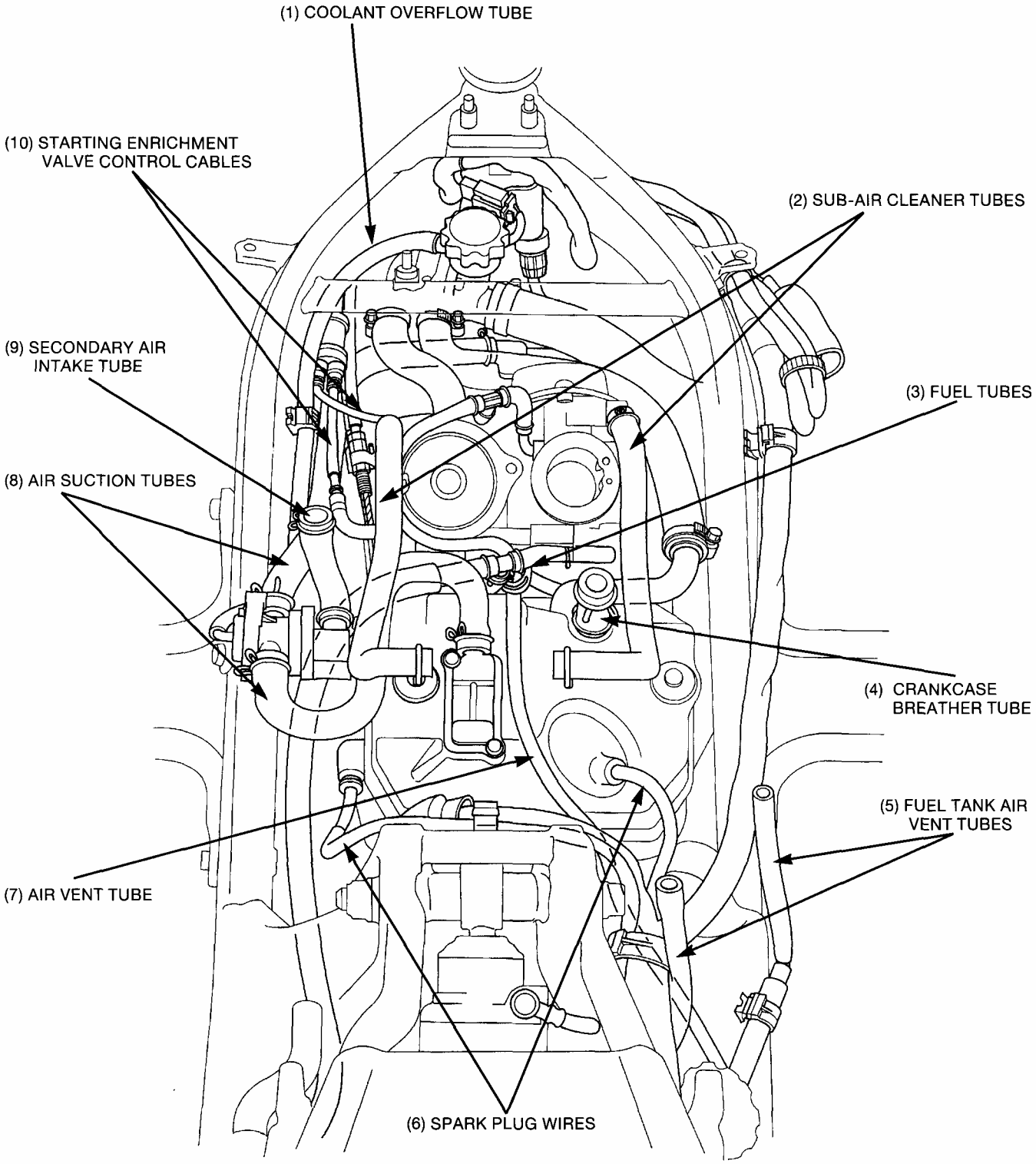
Frame

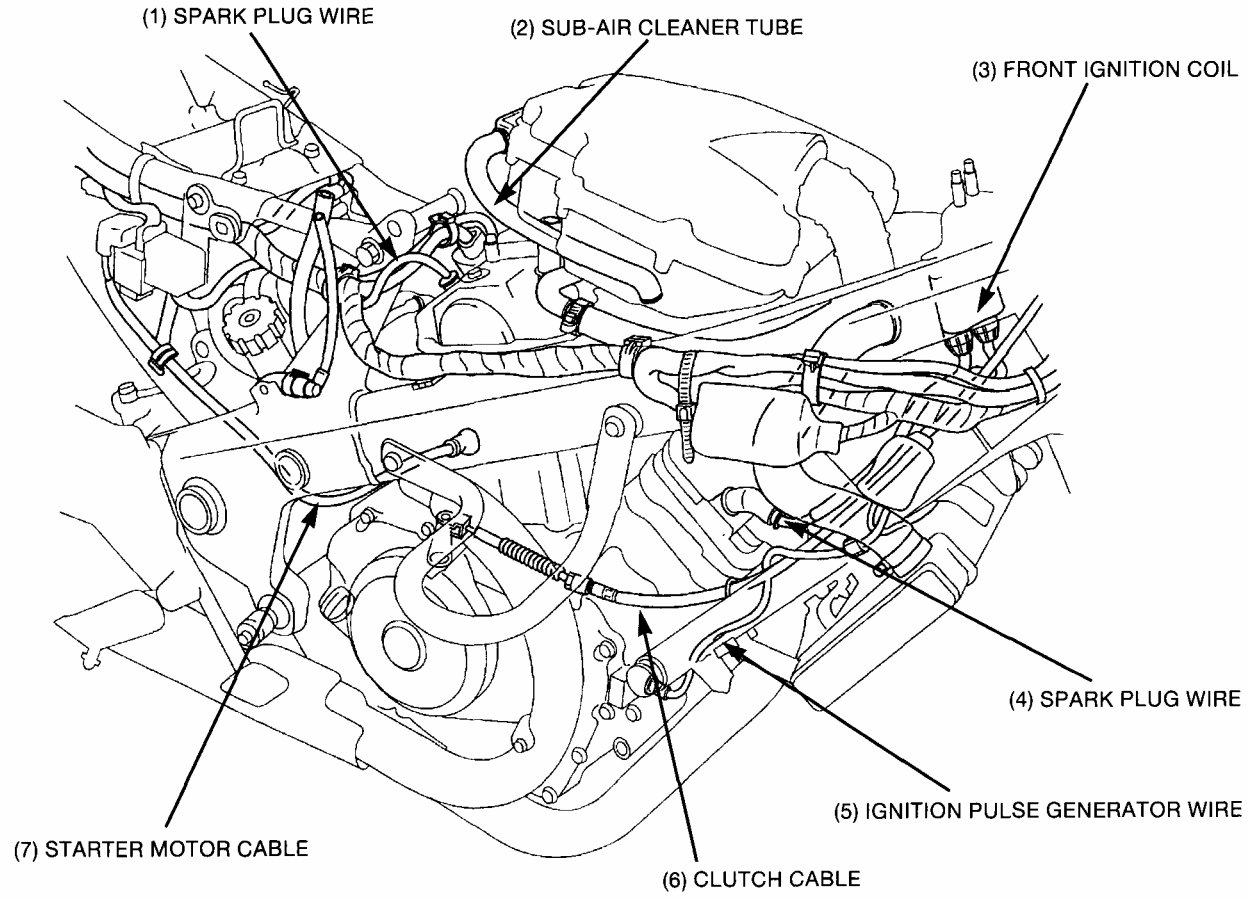
Location	Material	Remarks
Final gear case O-rings and oil seal lips Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot dust seal lips Swingarm pivot bearing rolling area Front and rear wheels dust seal lips Each dust seal lips Each oil seal lips	Multi-purpose grease	
Speedometer gear box inside Speedometer gear and pinion sliding surface Throttle pipe inner surface and rolled-up portion Clutch lever pivot bolt sliding surface Main and side stand pivot sliding surface Rear brake pedal pivot sliding surface Gearshift pedal pivot sliding surface Seat lock sliding area Final drive pinion joint spline Final drive shaft pline (universal joint side) Final drive shaft oil seal lips Output driven gear shaft spline (universal joint side) Universal joint bearings and dust seals	Molybdenum disulfide grease	 Spreading 2.0 g Spreading 1.0 g Spreading 0.5 g Spreading 1.0 g
Rear wheel hub-to-driven flange mating surface Rear wheel hub O-ring groove Final driven flange spline and O-ring groove Final driven flange-to-final gear case O-ring holder mating surface	Molybdenum disulfide paste	Spreading 3.0 g min. Spreading 5.0 g
Thermosensor threads Final gear case-to-case cover mating surface	Sealant	
Steering top threads Rear shock absorber upper bolt threads and sliding surface	Engine oil	
Brake master cylincer inside Brake master piston Brake caliper piston seals	DOT 4 brake fluid	
Brake lever pivot and piston tips Brake caliper dust seals Brake caliper slide pin sliding surface Brake caliper bracket pin sliding surface Rear master cylinder push rod rounded surface Rear master cylinder boot setting area	Silicone grease	Spreading 0.1 g Spreading 0.4 g in. Spreading 0.4 g min. Spreading 0.1 g Spreading 0.1 g
Brake cliper slide pin threads Brake caliper bracket pin threads Rear brake hose joint screw threads Front fork socket bolt threads Main stand bolt threads Pinion joint nut threads Final gear case cover 10 mm bolt threads Final gear case stud bolt threads (gear case side) Front brake caliper mounting bolt threads Rear brake caliper mounting bolt threads Front and rear brake disc bolt threads	Locking agent	
Handle grip rubber inside	Honda Bond A or equivalent	Spreading 80% min.
Front fork oil seal and dust seal lips	Fork fluid	

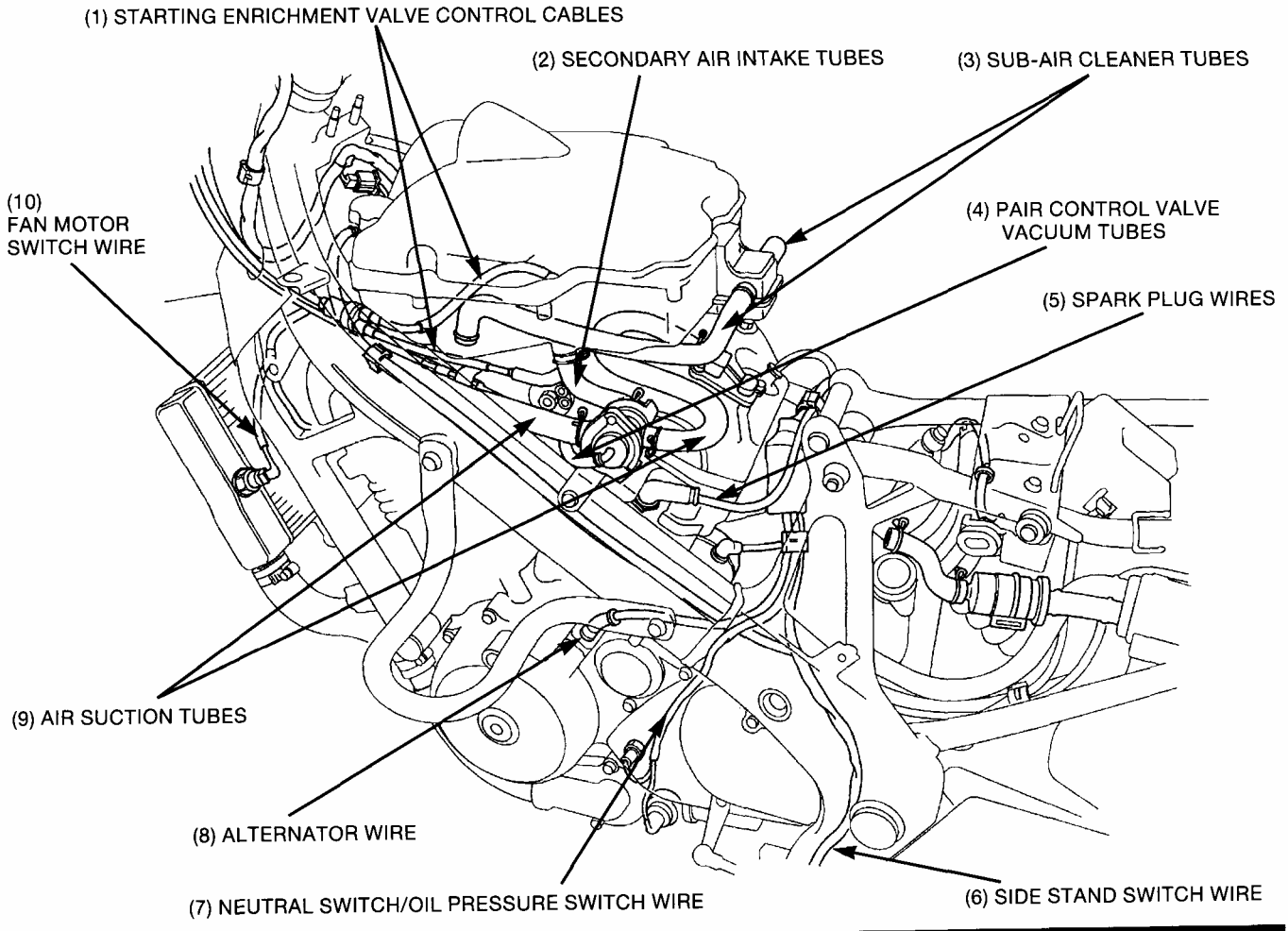
Cable & Harness Routing

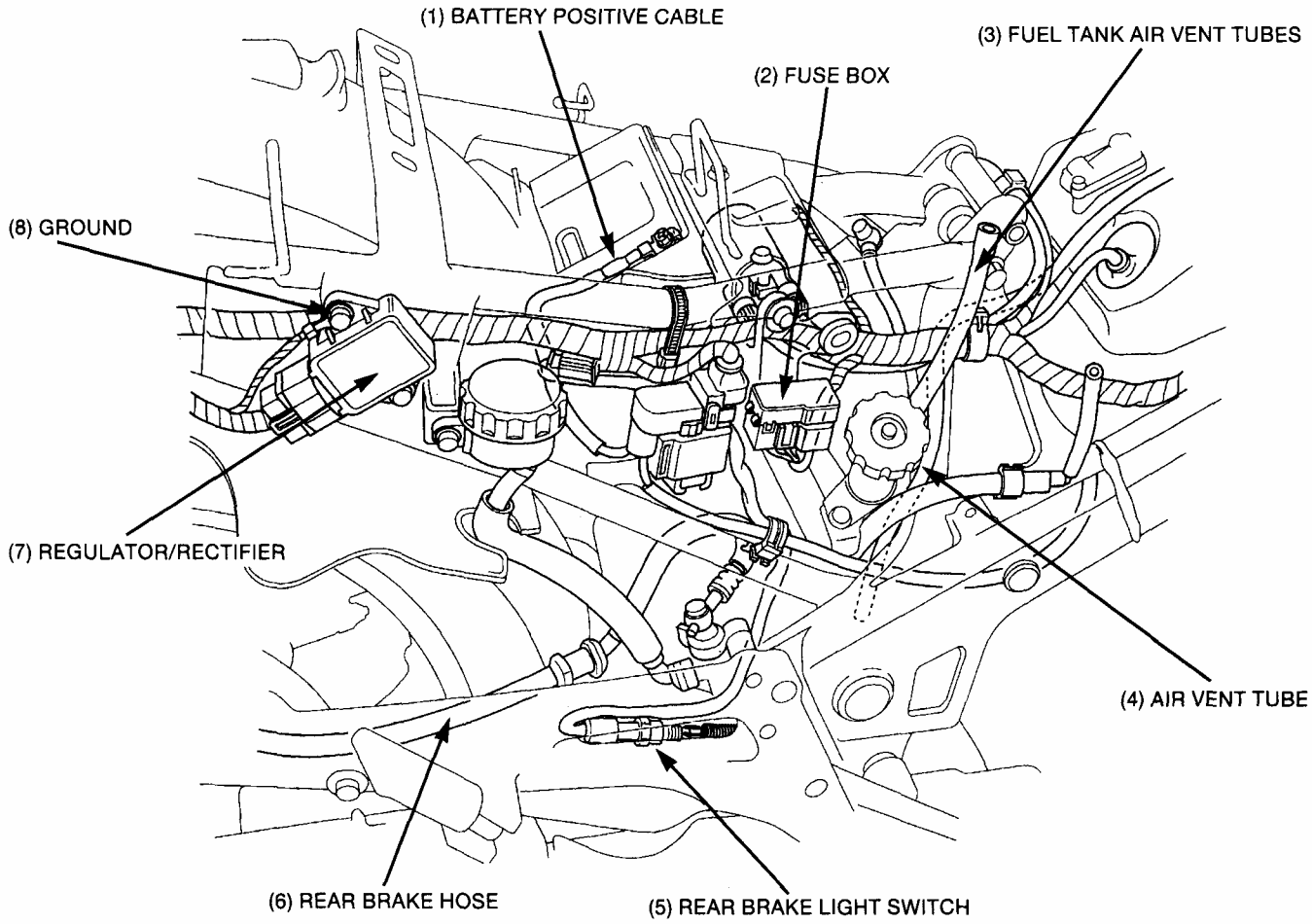


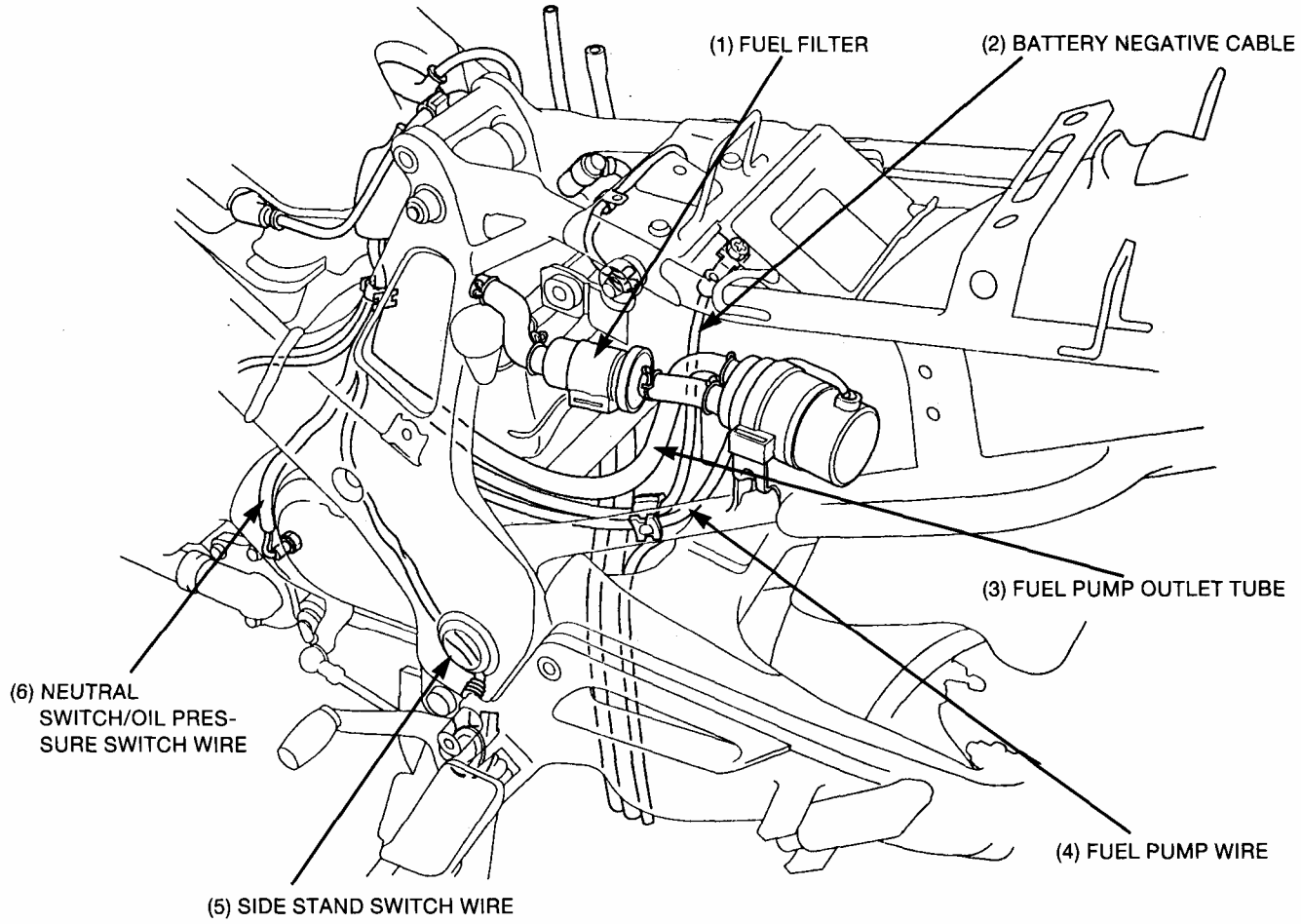

(1) THROTTLE CABLES
(2) CLUTCH CABLE
(3) LEFT HANDLEBAR SWITCH WIRE
(4) CHOKE CABLE
(6) BRAKE HOSE
(5) SPEEDOMETER CABLE
(1) THROTTLE CABLES
(2) CLUTCH CABLE
(4) RIGHT HANDLEBAR SWITCH WIRE
(3) BRAKE HOSE

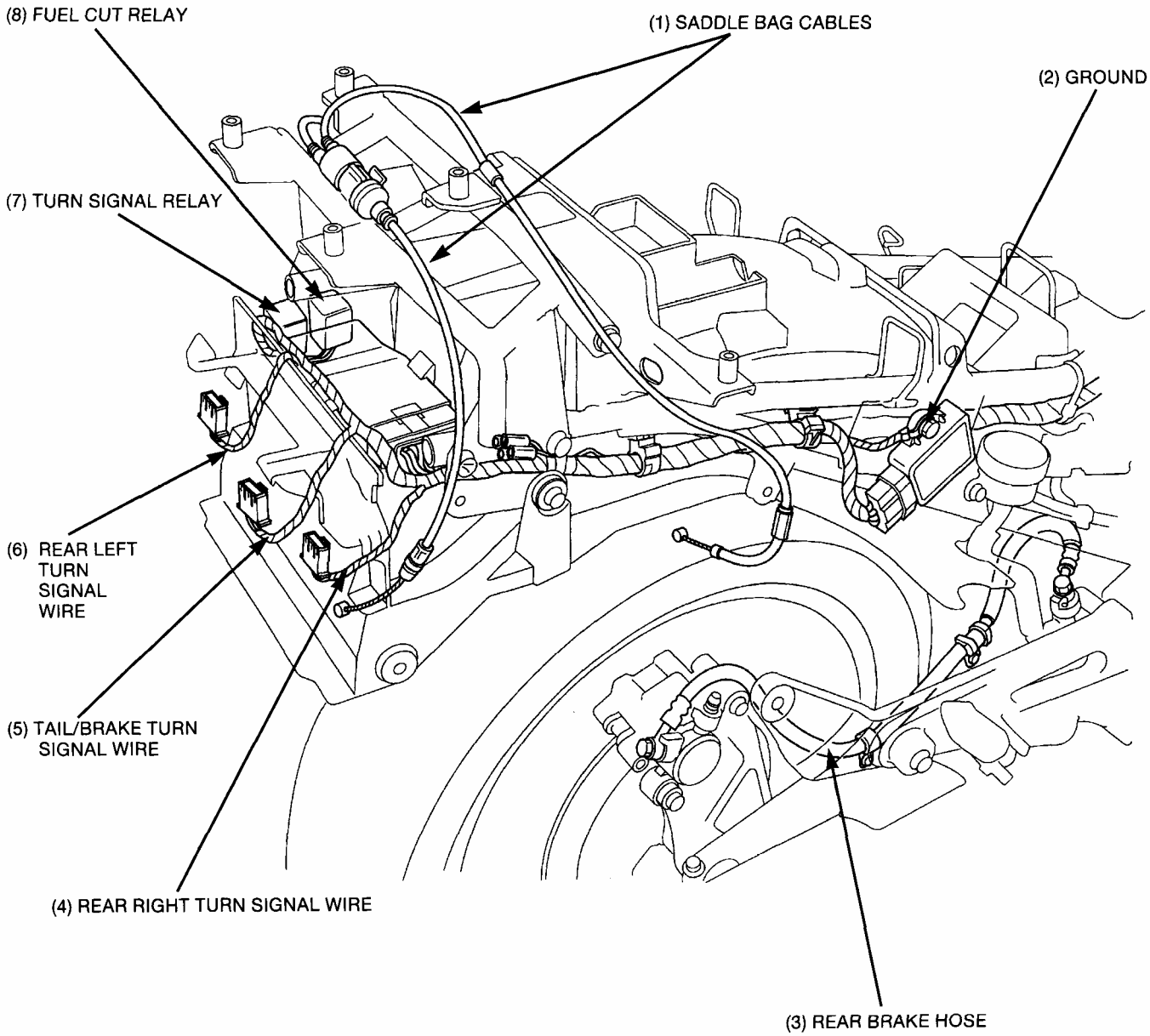

(1) COOLANT OVERFLOW TUBE
(10) STARTING ENRICHMENT VALVE CONTROL CABLES
(2) SUB-AIR CLEANER TUBES
(9) SECONDARY AIR INTAKE TUBE
(3) FUEL TUBES
(8) AIR SUCTION TUBES
(4) CRANKCASE BREATHER TUBE
(5) FUEL TANK AIR VENT TUBES
(7) AIR VENT TUBE
(6) SPARK PLUG WIRES


(1) SPARK PLUG WIRE
(2) SUB-AIR CLEANER TUBE
(3) FRONT IGNITION COIL
(4) SPARK PLUG WIRE
(5) IGNITION PULSE GENERATOR WIRE
(6) CLUTCH CABLE
(7) STARTER MOTOR CABLE


(1) STARTING ENRICHMENT VALVE CONTROL CABLES
(2) SECONDARY AIR INTAKE TUBES
(3) SUB-AIR CLEANER TUBES
(4) PAIR CONTROL VALVE VACUUM TUBES
(5) SPARK PLUG WIRES
(6) SIDE STAND SWITCH WIRE
(7) NEUTRAL SWITCH/OIL PRESSURE SWITCH WIRE
(8) ALTERNATOR WIRE
(9) AIR SUCTION TUBES
(10) FAN MOTOR SWITCH WIRE


(1) BATTERY POSITIVE CABLE
(3) FUEL TANK AIR VENT TUBES
(2) FUSE BOX
(8) GROUND
(7) REGULATOR/RECTIFIER
(4) AIR VENT TUBE
(6) REAR BRAKE HOSE
(5) REAR BRAKE LIGHT SWITCH


(1) FUEL FILTER
(2) BATTERY NEGATIVE CABLE
(3) FUEL PUMP OUTLET TUBE
(6) NEUTRAL SWITCH/OIL PRESSURE SWITCH WIRE
(4) FUEL PUMP WIRE
(5) SIDE STAND SWITCH WIRE


(8) FUEL CUT RELAY
(1) SADDLE BAG CABLES
(2) GROUND
(7) TURN SIGNAL RELAY
(6) REAR LEFT TURN SIGNAL WIRE
(5) TAIL/BRAKE TURN SIGNAL WIRE
(4) REAR RIGHT TURN SIGNAL WIRE
(3) REAR BRAKE HOSE

Emission Control Systems

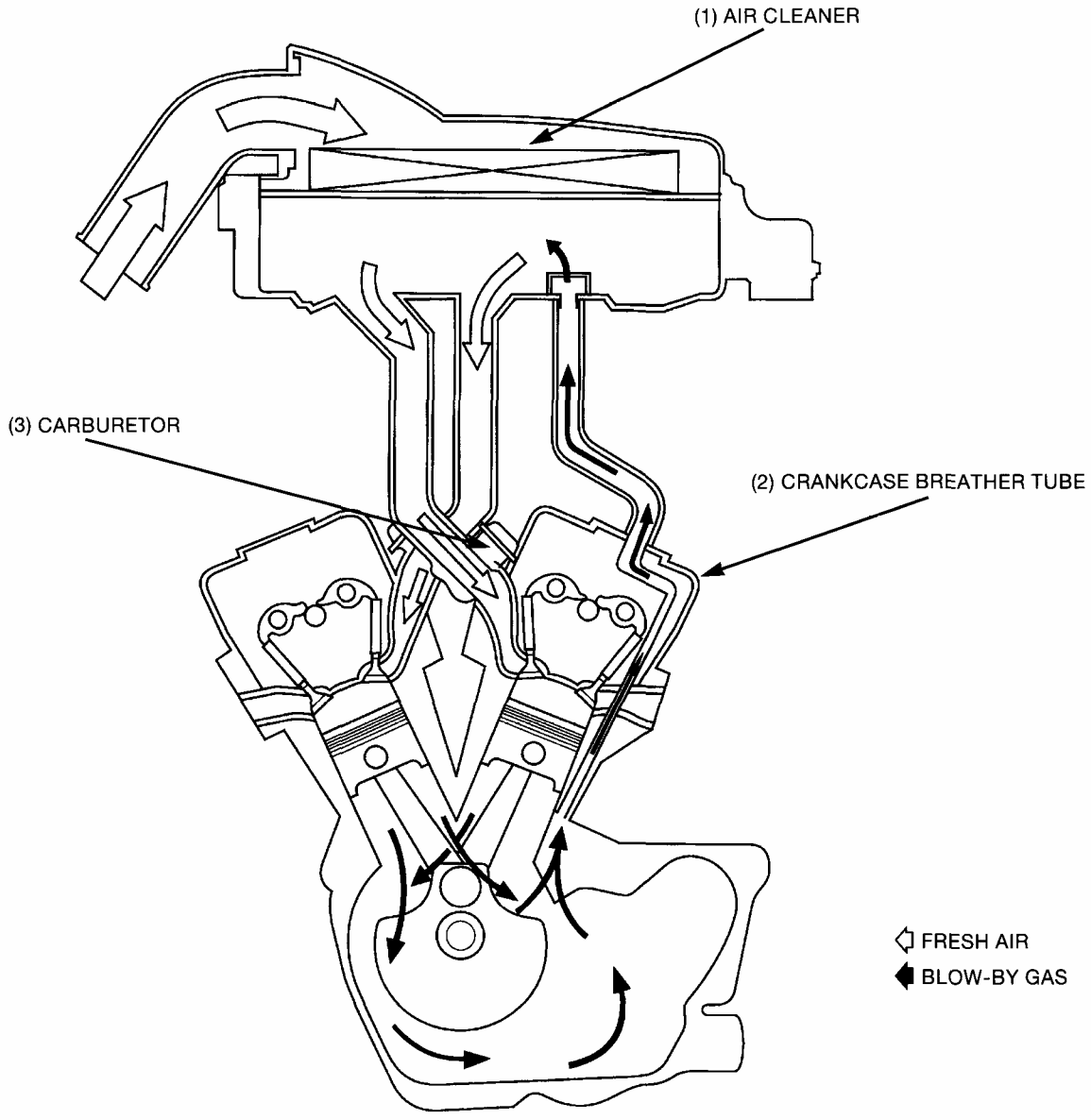
Source of Emissions

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons 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.

SW, AR Types
Honda Motor Co., Ltd. utilized lean carburetor setting as well as other systems, to reduce carbon monoxide and hydrocarbons.

Crankcase Emission Control System

The engine equipped with a closed crankcase system which routes crankcase emissions through the air cleaner into the combustion chamber.
Condensed crankcase vapors are accumulated in a crankcase storage tank and drain tube which must be emptied periodicaly (page 3-3). The drain tube needs to be checked for oil accumulation more frequently if the machine has been consistently ridden at high speeds or in rain.



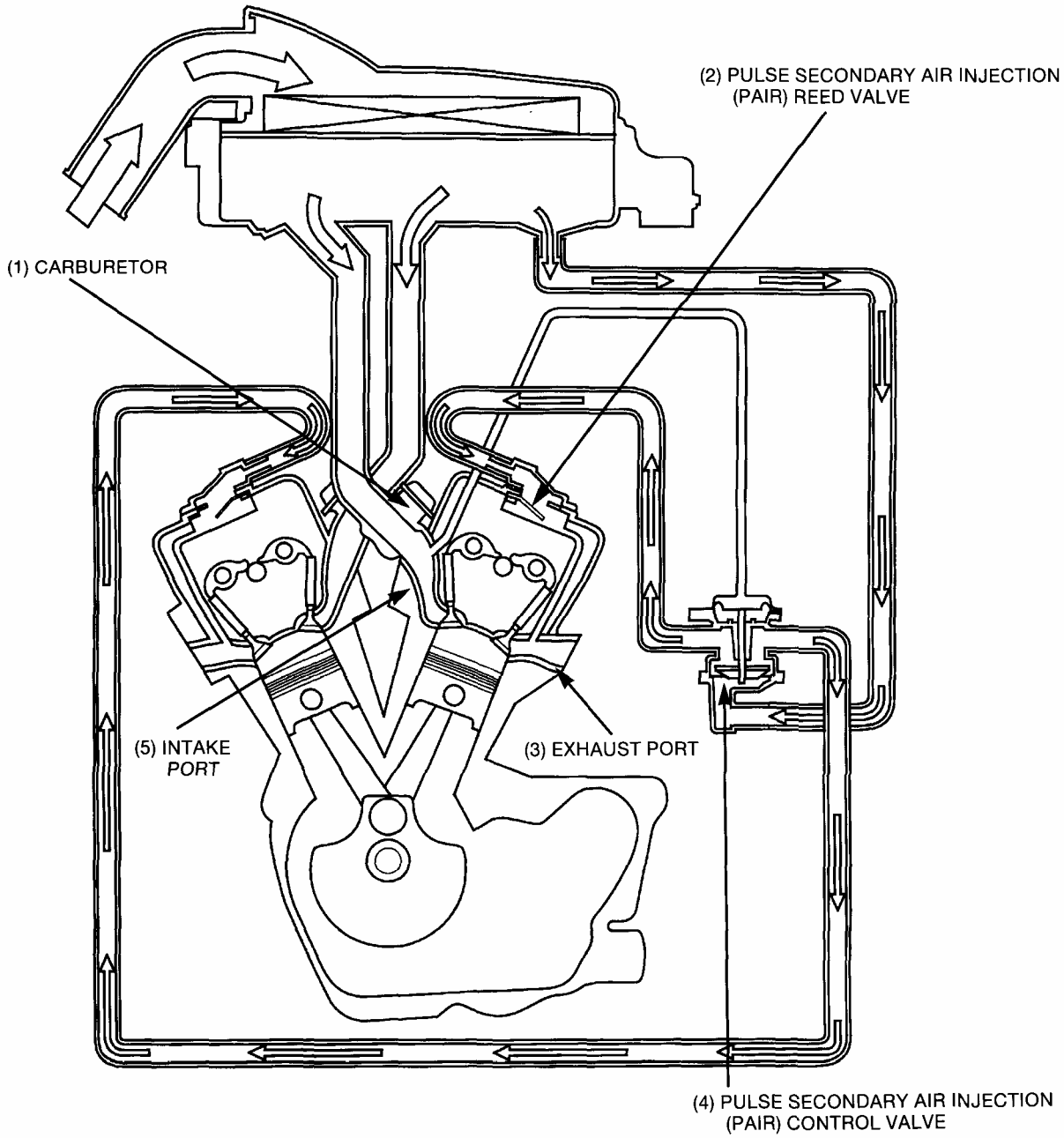
Exhaust Emission Control System (Secondary Air Supply System)

The exhaust emission control system is composed of a lean carburetor setting, and no adjustments should be made except idle speed adjustment with the throttle stop control knob. The exhaust emission control system is separate from the crankcase emission control 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 changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The reed valve prevents reverse air flow through the system. The air suction valve reacts to thigh intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing after burn in the exhaust system.

No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.



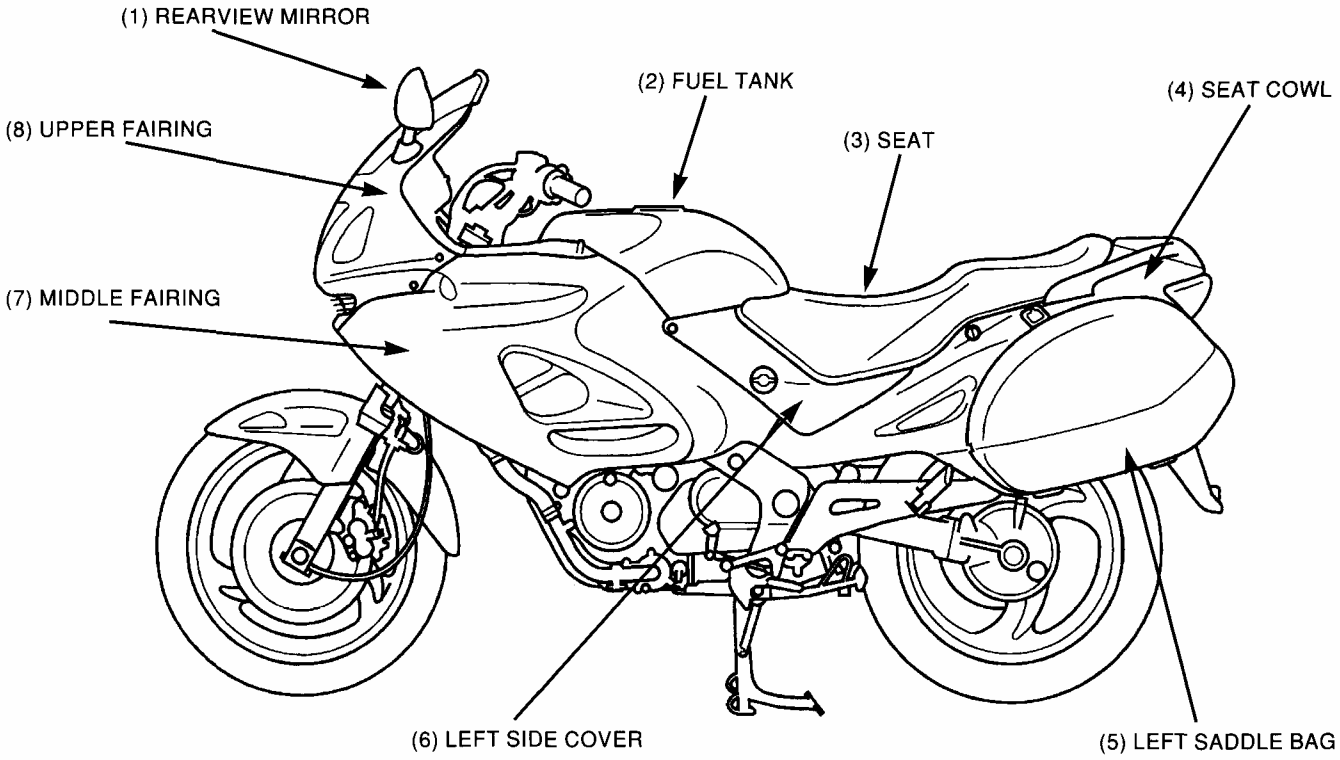
Noise Emission Control System (Ar Type Only)

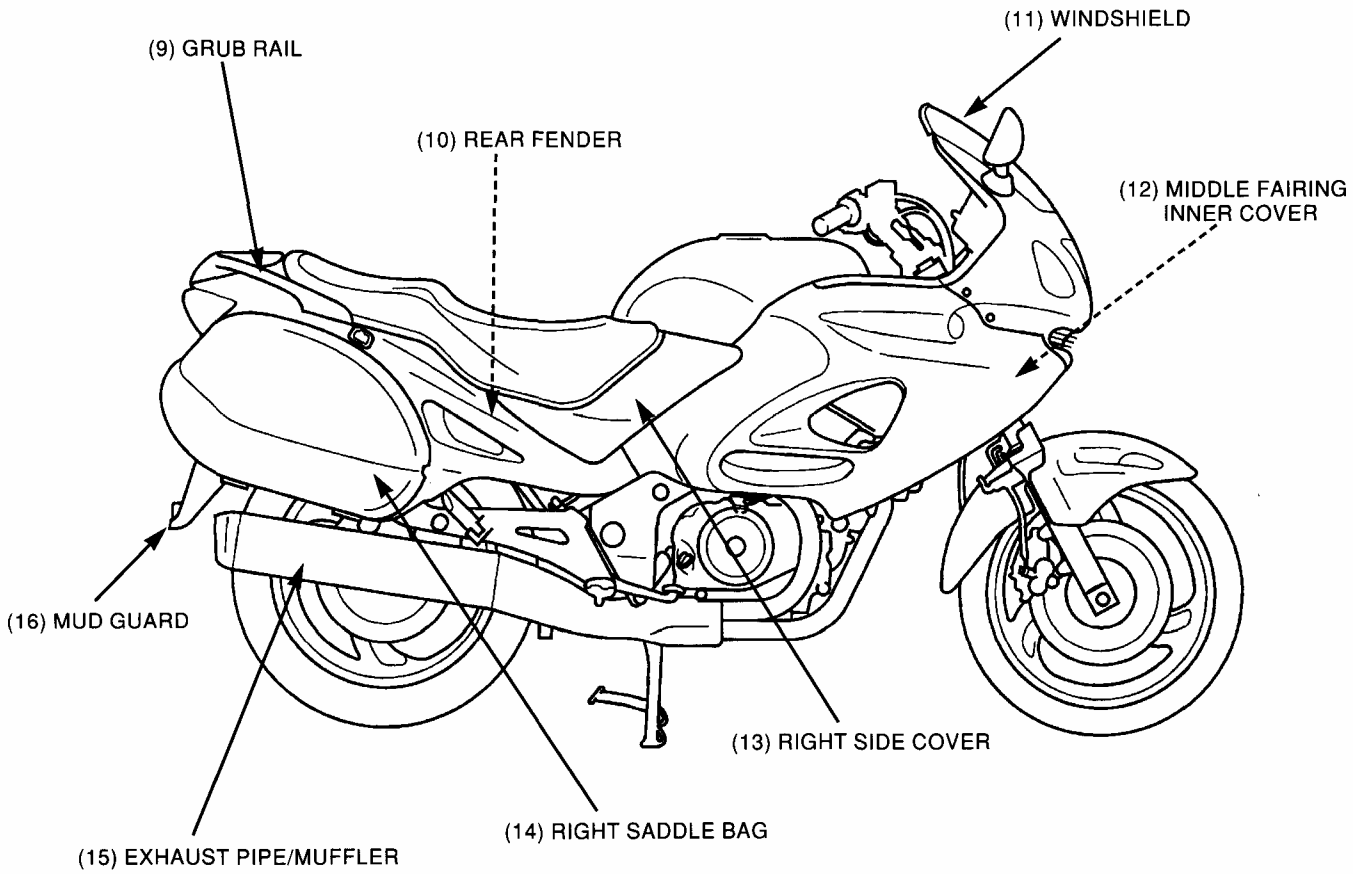
TAMPERING WITH THE CONTROL SYSTEM IS PROHIBITED: Local low prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into new any vehicle for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

Body Panel Locations





2. Frame/Body Panels/Exhaust System

SERVICE INFORMATION	2-1	UPPER FAIRING	2-7
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SEAT	2-2	GRUB RAIL	2-8
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RIGHT SIDE COVER	2-3	LEFT SADDLE BAG	2-9
MIDDLE FAIRING INNER COVER	2-3	SEAT COWL	2-10
MIDDLE FAIRING	2-4	REAR FENDER	2-10
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REARVIEW MIRROR	2-6	EXHAUST PIPE/MUFFLER	2-12
WINDSHIELD	2-6		

Service Information

GENERAL

⚠ 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.**
- **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.**
- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in enclosed area.**

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

TORQUE VALUES

Saddle bag adjust bolt lock nut	59 N·m (6.0 kgf-m, 43 lbf-ft)
Saddle bag lid bar	2 N·m (0.2 kgf-m, 1.4 lbf-ft)
hinge	2 N·m (0.2 kgf-m, 1.4 lbf-ft)
catch	2 N·m (0.2 kgf-m, 1.4 lbf-ft)
Footpeg holder bolt	26 N·m (2.7 kgf-m, 20 lbf-ft)

Troubleshooting

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

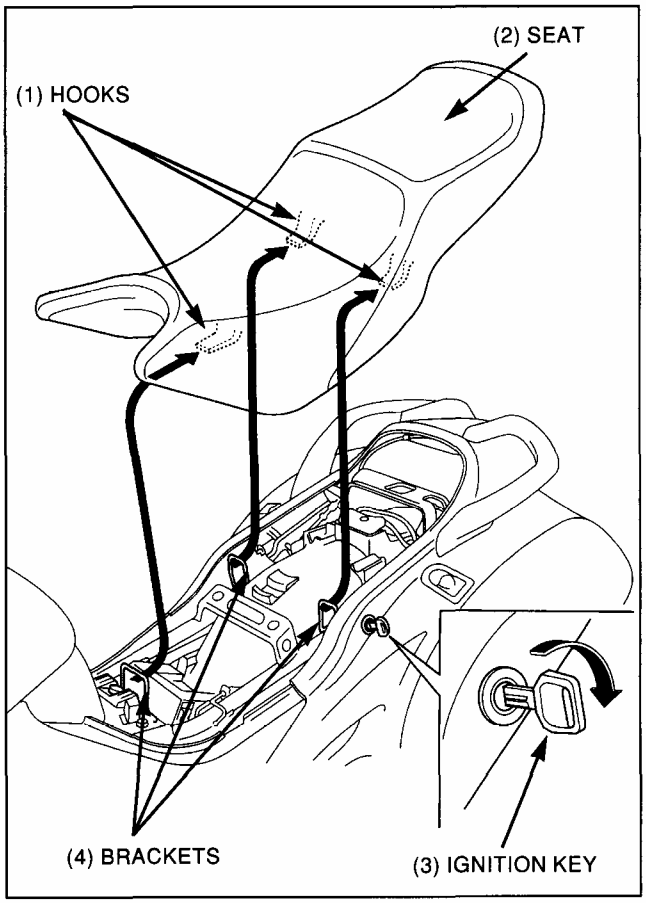
Poor performance
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

Seat

REMOVAL/ INSTALLATION

Unlock the seat using the ignition key.
Slide and remove the seat to the back.

Install the seat by aligning the hooks of the seat with the brackets on the frame and push the seat to the forward.



Left Side Cover

REMOVAL/ INSTALLATION

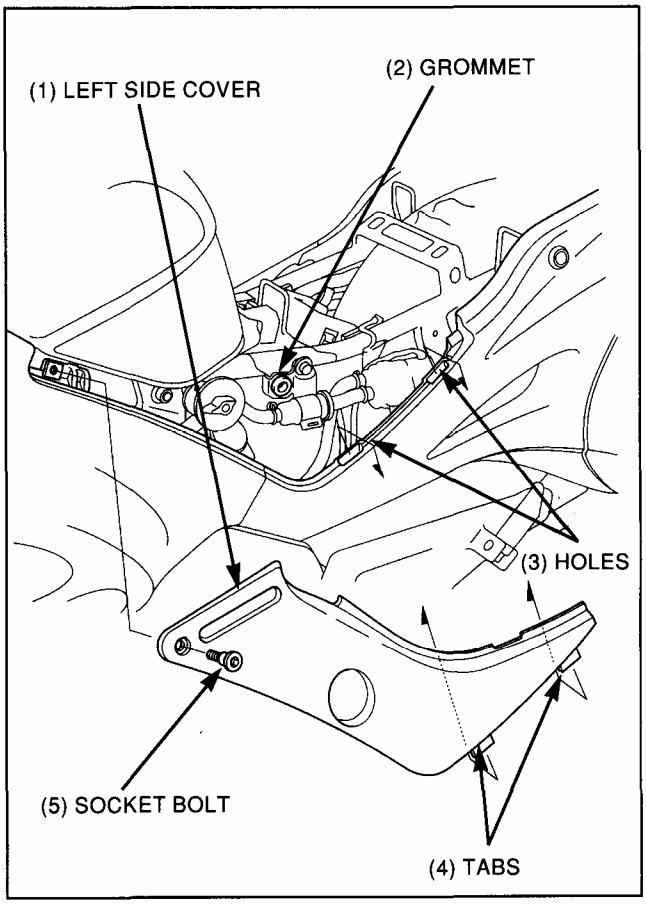
CAUTION

- **Be careful not to damage the left side cover tab.**

Remove the seat (see above).

Remove the socket bolt.
Release the three bosses from the grommet on the frame and holes on the left saddle bag and remove the left side cover.

Installation is in the reverse order of removal.



Right Side Cover

REMOVAL/ INSTALLATION

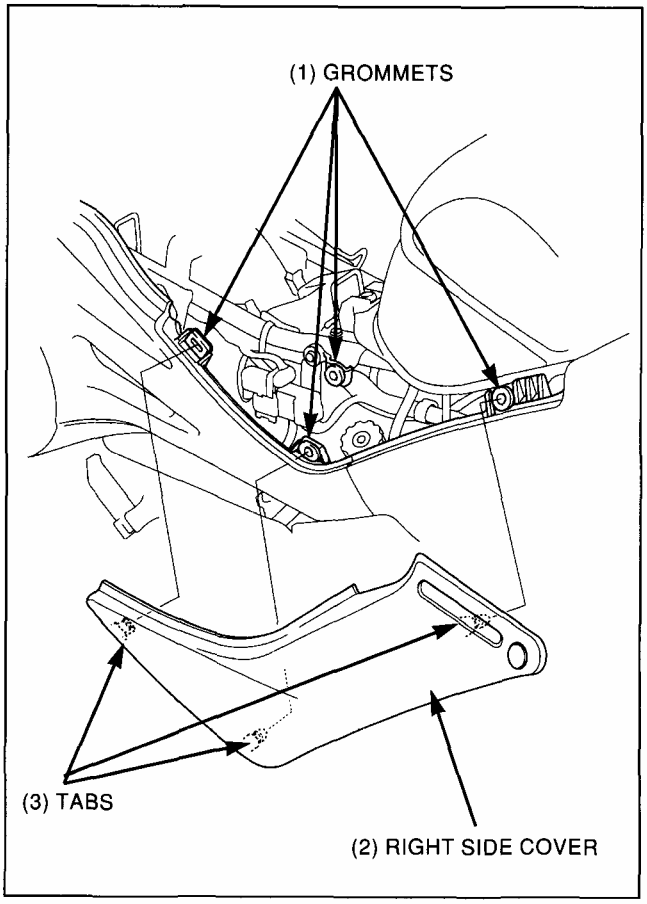
CAUTION

- **Be careful not to damage the left side cover tab.**

Remove the seat (page 2-2).

Release the four bosses from the grommets on the frame, right middle fairing and right saddle bag and remove the right side cover.

Installation is in the reverse order of removal.



Middle Fairing Inner Cover

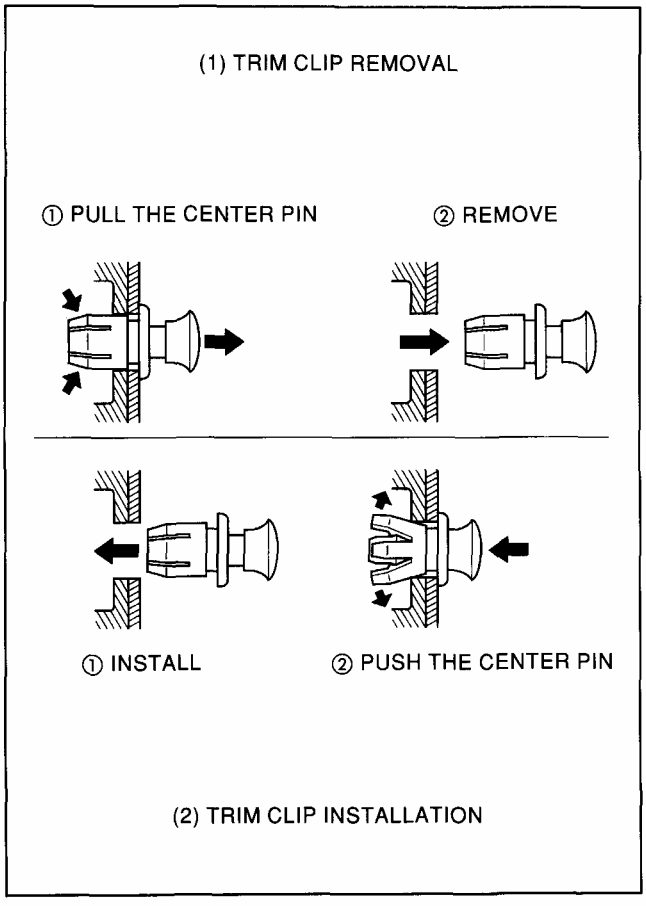
TRIM CLIP REMOVAL/ INSTALLATION

REMOVAL

① Pull the center pin and release the trim clip lock.
② Remove the trim clip.

INSTALLATION

① Install the trim clip.
② Push the center pin and lock the trim clip.



MIDDLE FAIRING INNER COVER REMOVAL/INSTALLATION

CAUTION

- **Be careful not to damage the tabs on the covers.**

REMOVAL

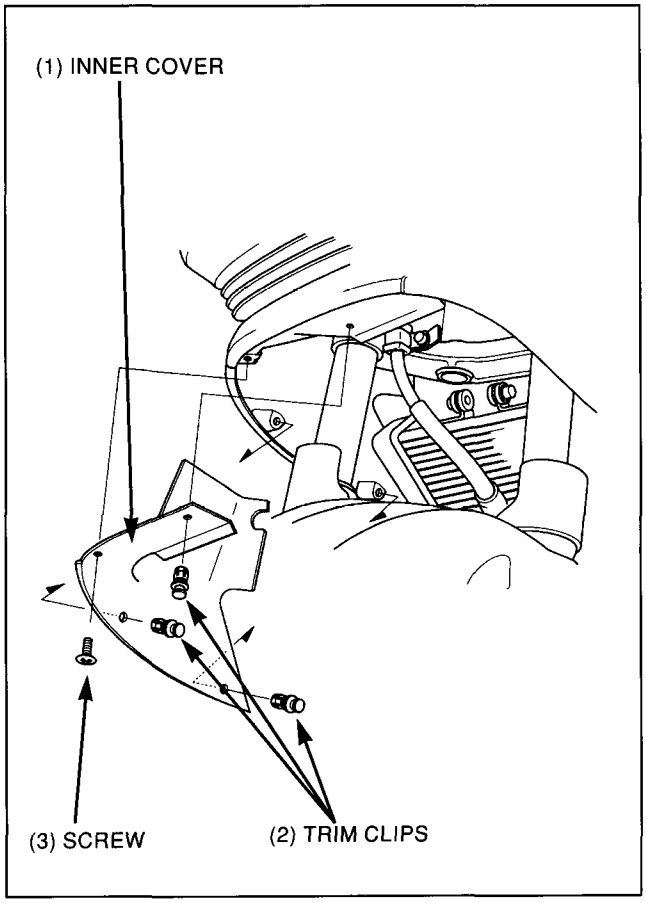
Remove the trim clips (page 2-3).

Remove the screw and middle fairing inner cover.

INSTALLATION

Install the middle fairing inner cover aligning the its front hole with the tab on the upper fairing and its grooves with the tabs on the fairing pocket.

Install and tighten the screw securely.
Install the trim clips (page 2-3).



Middle Fairing

CAUTION

- **Be careful not to damage the tabs on the covers.**

REMOVAL

Remove the middle fairing inner cover (see above).
Remove the side cover (page 2-4, 5).

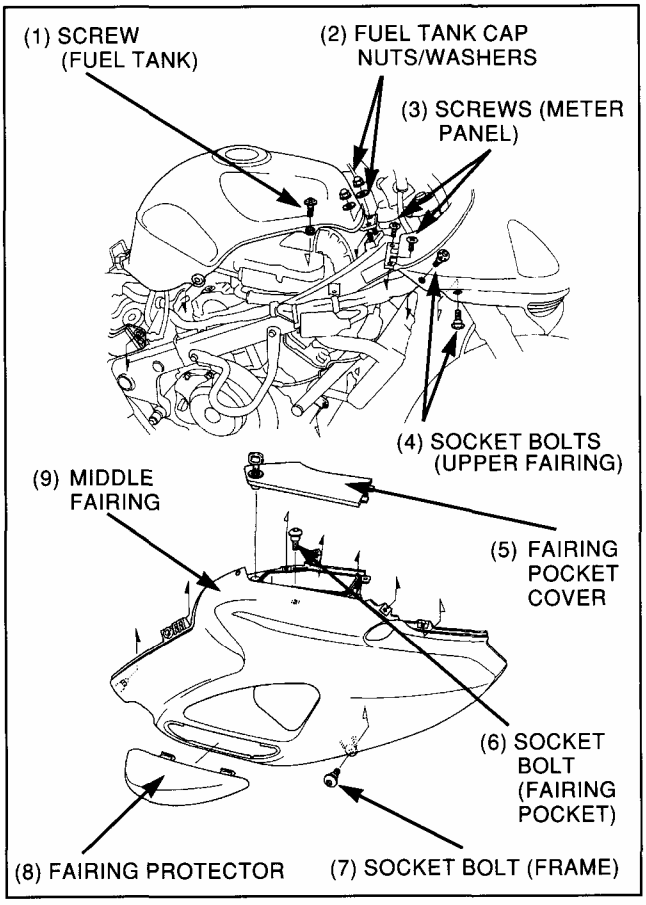
Remove the screw and remove the fairing protector releasing the its tabs from the middle fairing.

Remove the fairing pocket cover using the ignition key (Right side only).

Remove the screws (meter panel side, fuel tank side).
Remove the socket bolts (upper fairing side, frame side, fairing pocket side).

Remove the fuel tank cap nuts/washers.
Pull out the holes on the fuel tank and remove the bracket on the middle fairing.

Remove the tabs on the middle fairing from the grommets on the fuel tank and saddle bag.



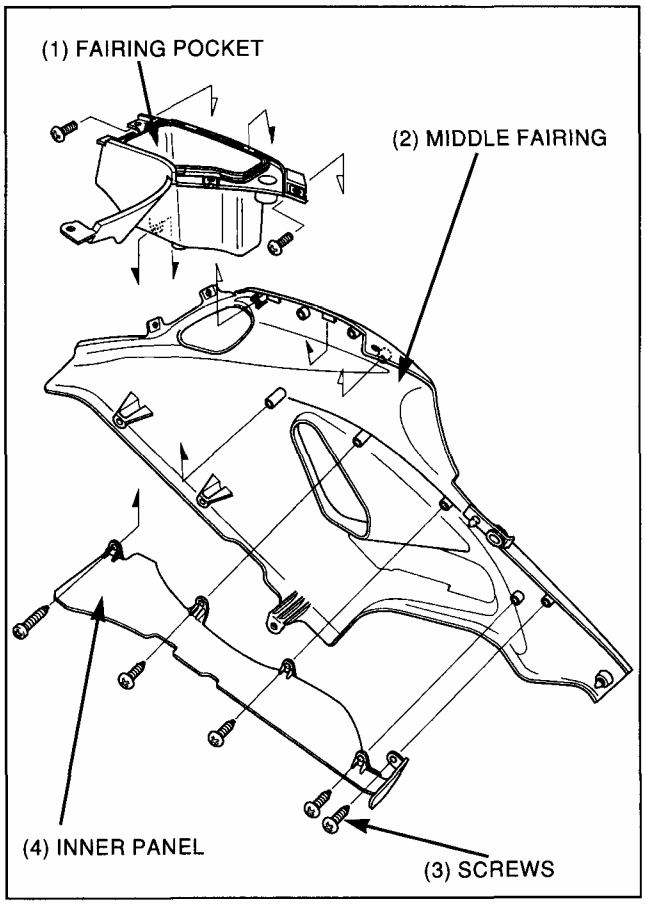
DISASSEMBLY/ASSEMBLY

Remove the screws and inner panel.
Remove the screws and fairing pocket.

Assembly is in the reverse order of disassembly.

INSTALLATION

Installation is in the reverse order of removal.



Meter Panel

CAUTION

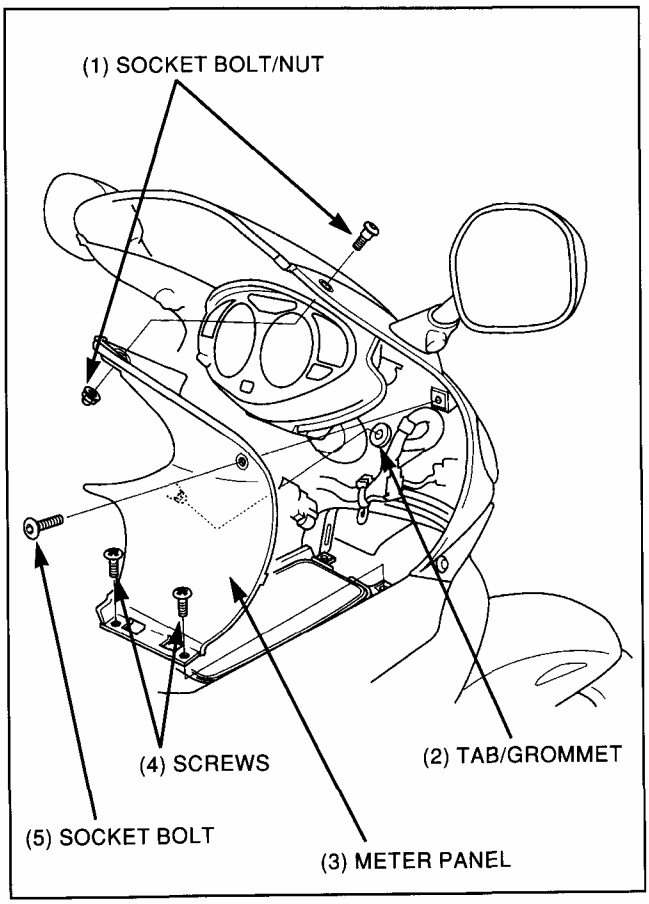
- **Be careful not to damage the tabs on the meter panel.**

REMOVAL/INSTALLATION

Remove the fairing pocket cover (page 2-4).

Remove the screws and socket bolt.
Remove the socket bolt and nut.
Remove the tab on the meter panel from the grommet on the frame and meter panel.

Installation is in the reverse order of removal.



Rearview Mirror

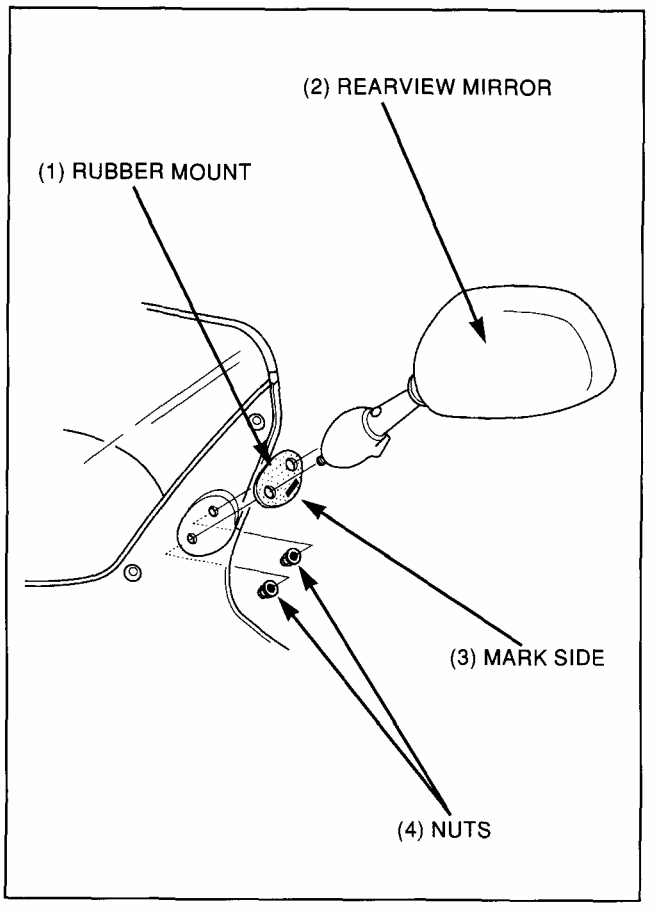
REMOVAL/INSTALLATION

Remove the nuts and rearview mirror.
Remove the rubber mount from the rearview mirror.

Installation is in the reverse order of removal.

NOTE:

- At installation, rubber mount marking side facing out side.



Windshield

CAUTION

- **Be careful not to damage the windshield.**

REMOVAL

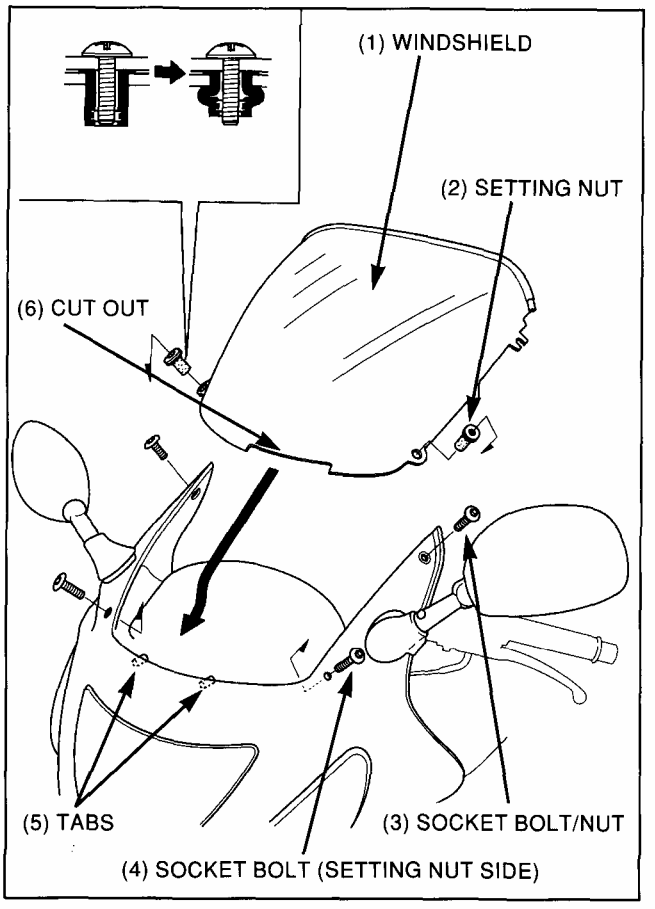
Remove the socket bolts and nuts.
Remove the socket bolts (setting nut side) and windshield.

INSTALLATION

Check for the setting nut installation is securely.

Install the windshield until cut out on the windshield seats the tabs on the upper fairing.

Install and tighten the socket bolts (setting nut side) securely as shown.
Install and tighten the socket bolts and nuts securely.



Upper Fairing

CAUTION

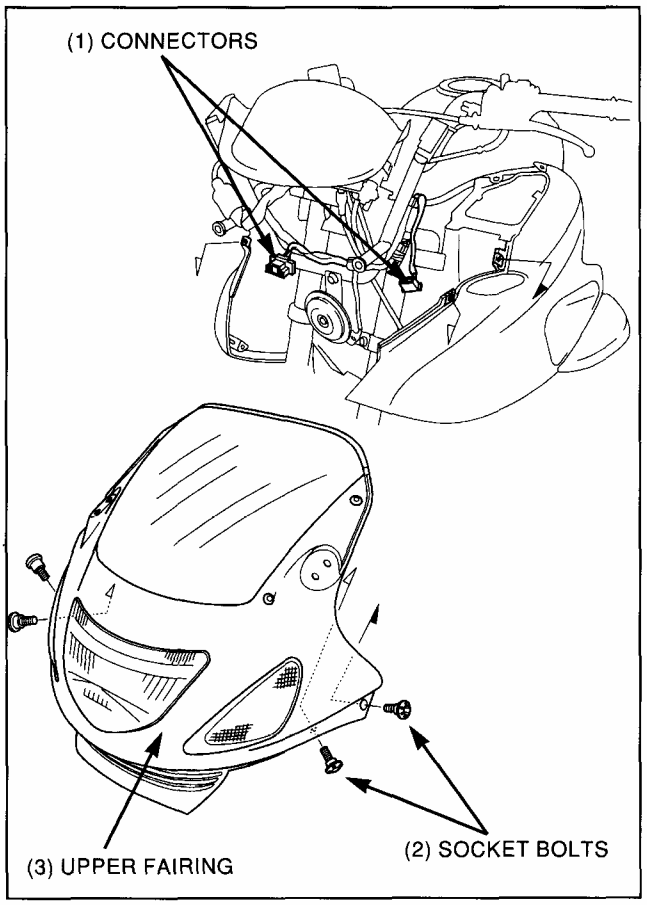
- **Be careful not to damage the windshield.**

REMOVAL/INSTALLATION

Remove the rearview mirror (page 2-6).
Remove the middle fairing inner cover (page 2-3).
Remove the meter panel (page 2-5).

Remove the socket bolts and upper fairing.
Disconnect the right/left turn signal and headlight connectors from the upper fairing.

Installation is in the reverse order of removal.

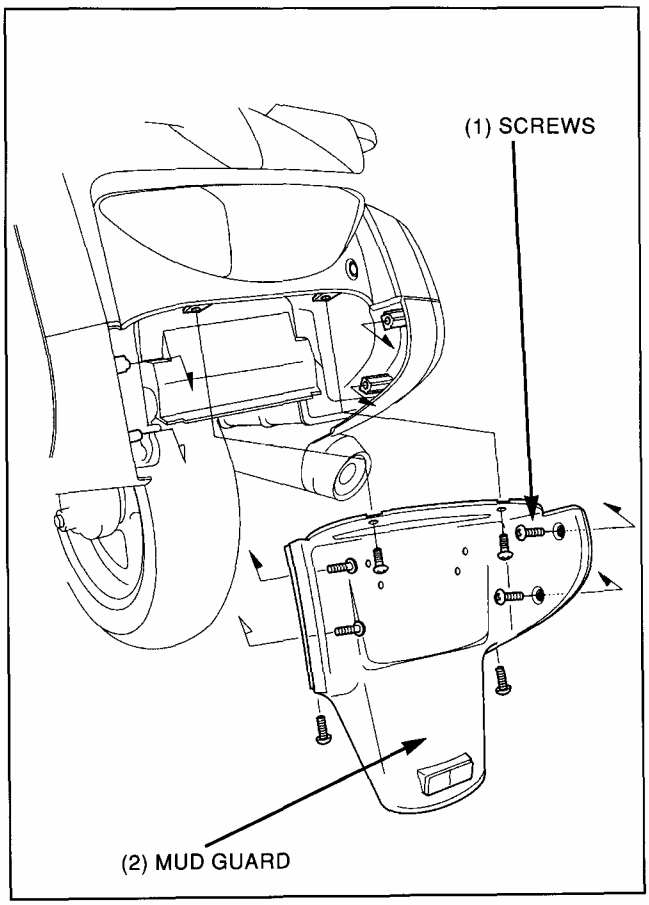


Mud Guard

REMOVAL/INSTALLATION

Remove the screws and mud guard.

Installation is in the reverse order of removal.



Grub Rail

REMOVAL/INSTALLATION

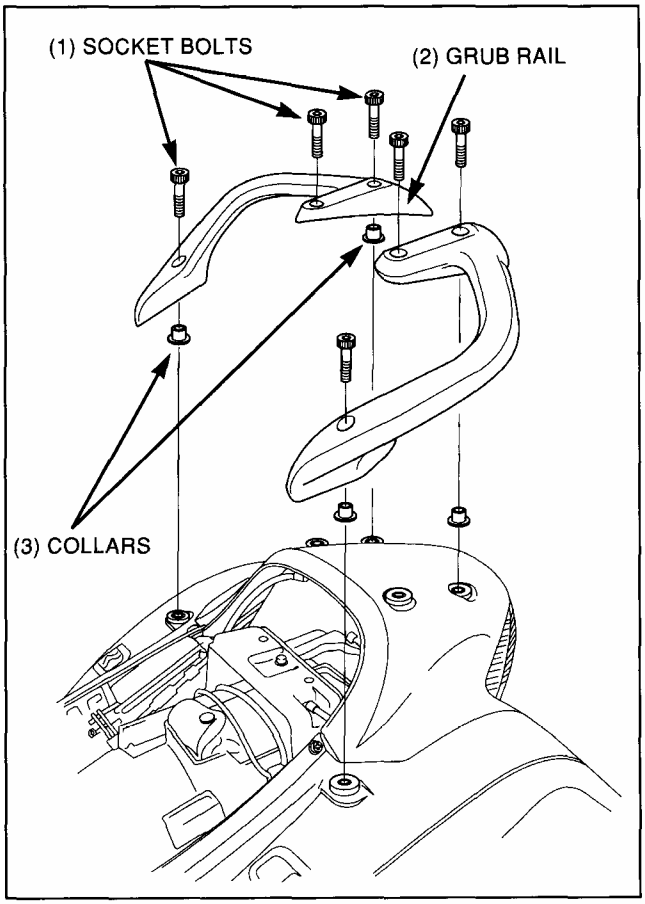
Remove the seat (page 2-2).

Remove the socket bolts, grub rail and collars.

Installation is in the reverse order of removal.

NOTE:

- Install the collars to its original positions.

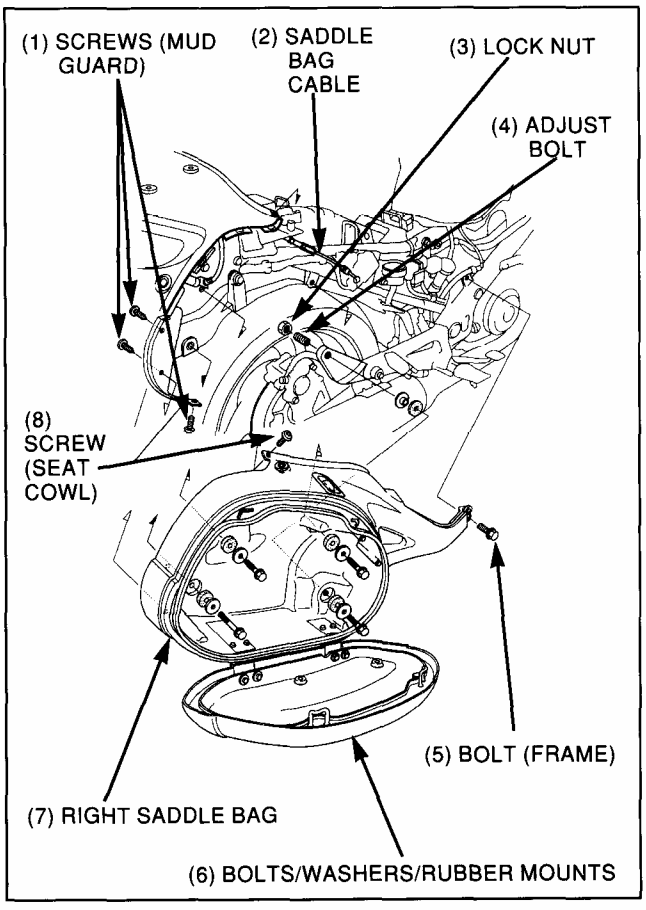


Right Saddle Bag

REMOVAL

Remove the seat (page 2-2).
Remove the right side cover (page 2-3).
Remove the grub rail (page 2-8).

Remove the screws (mud guard side, seat cowl side) and bolt (frame side).
Open the right saddle bag lid using the ignition key and saddle bag lock lever.
Remove the nut, bolts, washers and rubber mounts.
Disconnect the saddle bag cable and remove the right saddle bag.



INSTALLATION/ADJUSTMENT

Installation is in the reverse order of removal.

After installation, measure the length between the saddle bag and saddle bag lid.

Standard: 3 mm (0.1 in)

If there is out of specification, adjust the following:

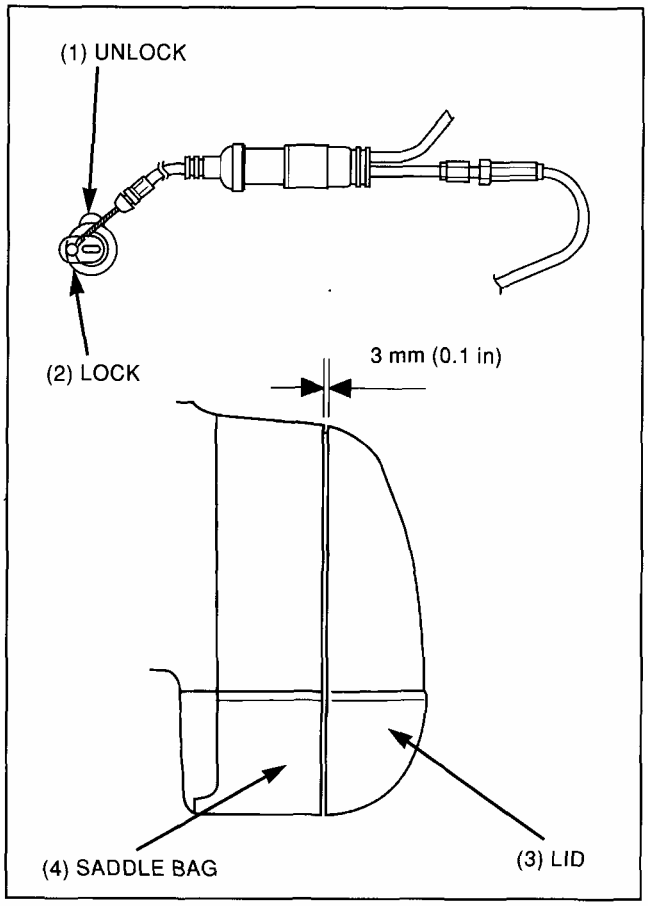
Remove the seat (page 2-2).

Turn the ignition key "UNLOCK" and pull the saddle bag lock lever.
Open the saddle bag lid.
Loosen the lock nut and tighten the adjust nut by hand.
Turn the adjust nut counterclockwise until 3 turns out from the slight drag to turn the adjust nut.
Tighten the lock nut to the specified torque.

Torque: 59 N·m (6.0 kgf-m, 43 lbf-ft)

Inspect the saddle bag lid operation again.

If the saddle bag lid operation is abnormal, turn the 3rd cam and open the lid and adjust again.



Left Saddle Bag

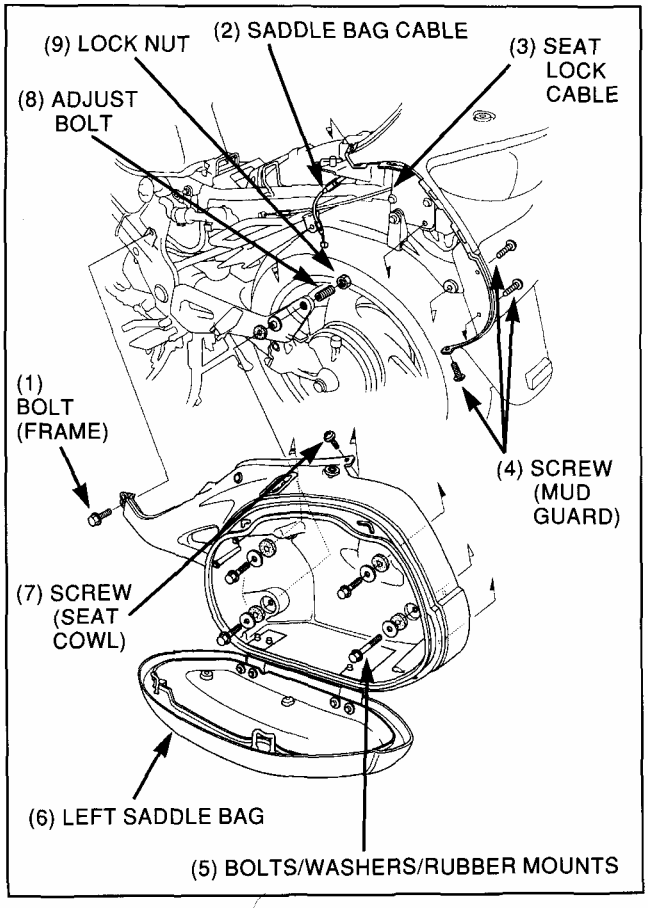
REMOVAL/INSTALLATION

Remove the seat (page 2-2).
Remove the left side cover (page 2-2).
Remove the grub rail (page 2-8).

Remove the screws (mud guard side, seat cowl side) and bolt (frame side).
Open the left saddle bag lid using the ignition key and saddle bag lock lever.
Remove the nut, bolts, washers and rubber mounts.
Disconnect the saddle bag cable and seat lock cable.
Remove the left saddle bag.

Installation is in the reverse order of removal.

Adjust the saddle bag cable (see above).



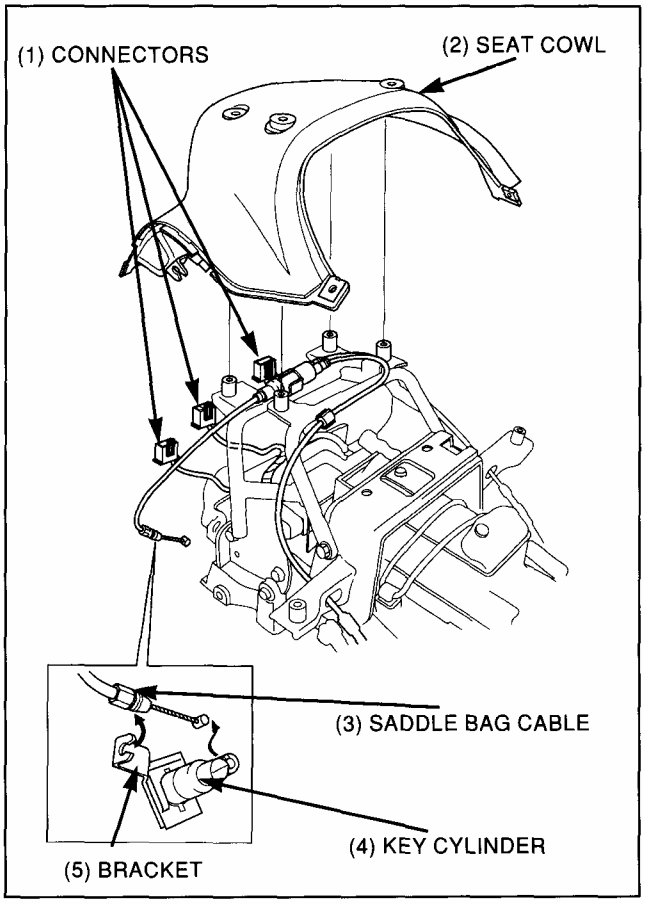
Seat Cowl

REMOVAL/INSTALLATION

Remove the right and left saddle bag (page 2-8, 9).
Remove the mud guard (page 2-7).

Disconnect the right/left turn signal and tail/brake light connectors.
Disconnect the saddle bag cable from the key cylinder and cable bracket.
Remove the seat cowl.

Installation is in the reverse order of removal.



Rear Fender

CAUTION

- **Be careful not to pinch the wire harness between the rear fender and the frame.**

REMOVAL/INSTALLATION

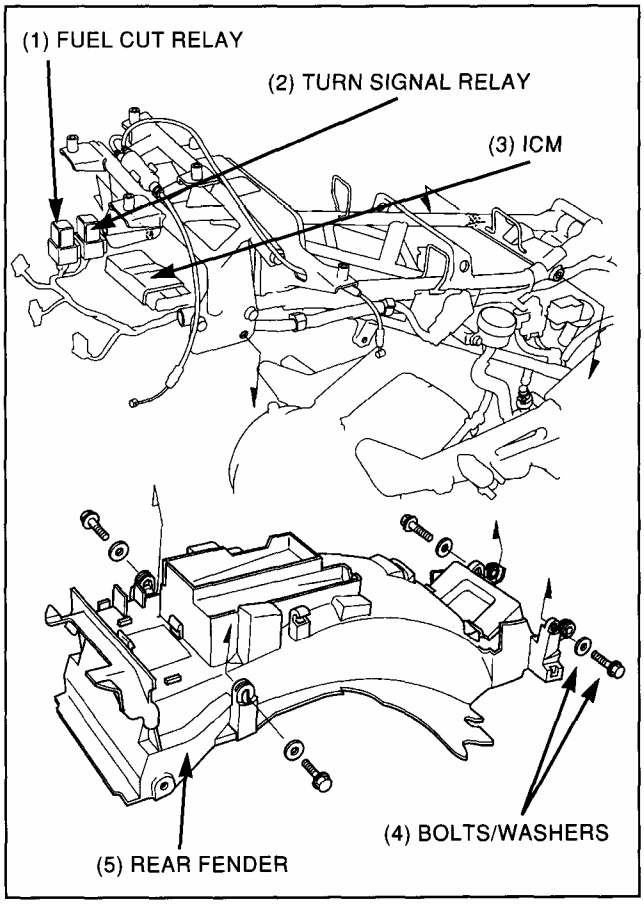
Remove the rear wheel (page 15-3).
Remove the seat cowl (see above).
Remove the battery (page 17-5).

Remove the turn signal relay, fuel cut relay and ignition control module (ICM) from the tabs on the rear fender.
Remove the bolts, washers and rear fender.

Installation is in the reverse order of removal.

NOTE:

- Route the wire harness, hoses and tubes properly (page 1-25).



Fuel Tank

⚠ WARNING

- **Gasoline is extremely flammable and is explosive under certain conditions.**

NOTE:

- Before disconnecting fuel tube, turn the fuel valve "OFF".

REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Disconnect the fuel tube and air vent tubes from the fuel tank.
Remove the fuel tank cap nuts, washers and screws.
Remove the fuel tank mounting bolt and collar.
Remove the tabs on the right/left side covers from the grommets on the fuel tank.
Remove the fuel tank.

Installation is in the reverse order of removal.

CAUTION

- **Be careful not to pinch the wire harness between the fuel tank and the frame.**

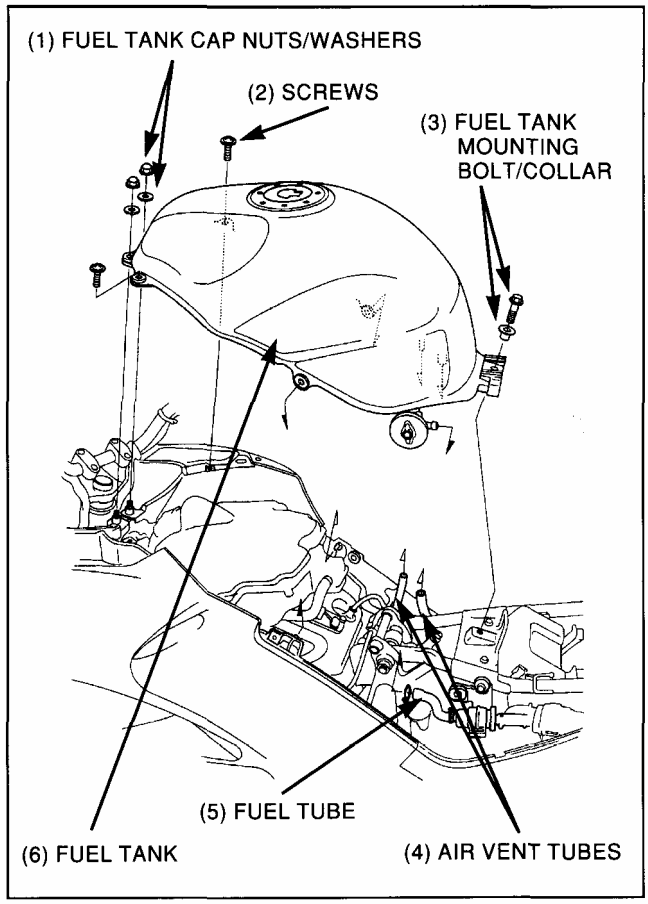
NOTE:

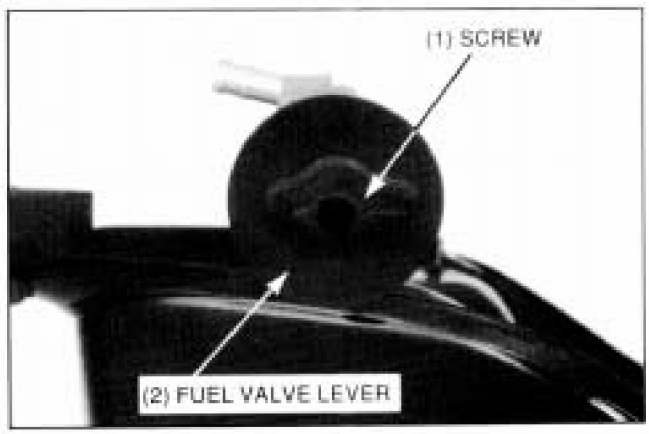
- After installation, turn the fuel valve "ON" and check the fuel line for leakage.

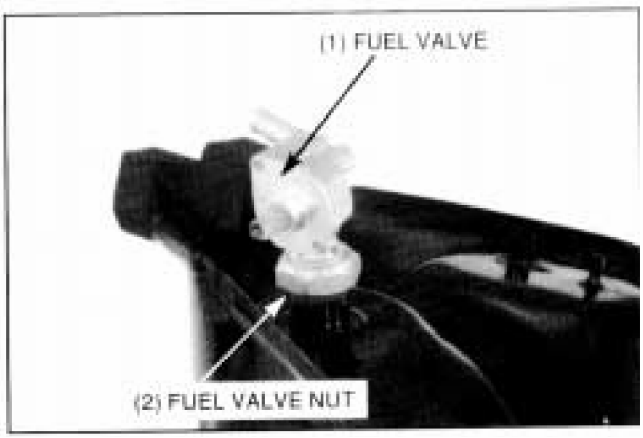
DISASSEMBLY/ASSEMBLY

Remove the screw and fuel valve lever.

Loosen the fuel valve nut and remove the fuel valve.

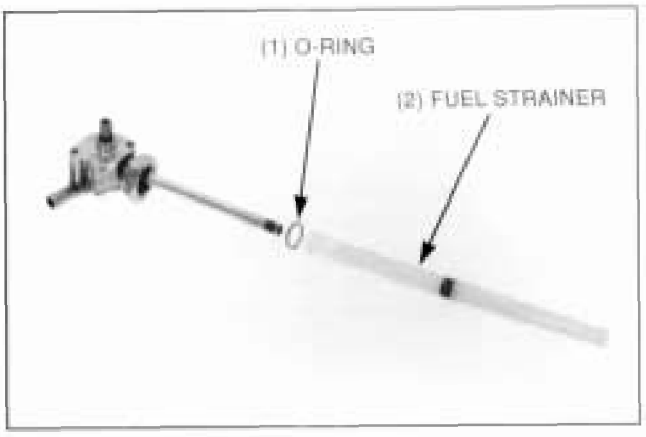






Remove the fuel strainer screen and O-ring.

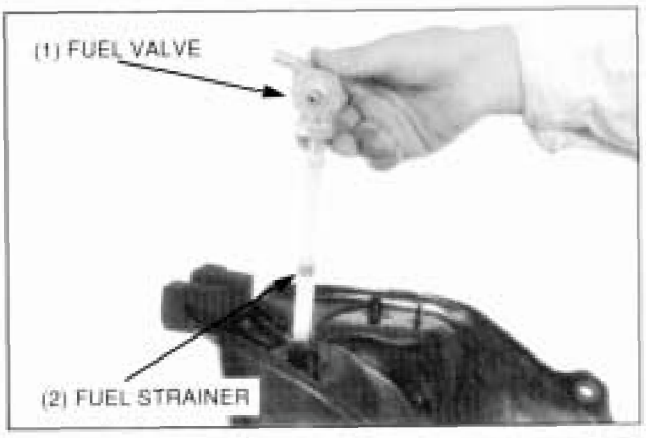
Check the fuel strainer screen clogged or damaged.
Clean or replace if it is necessary.



Assembly is in the reverse order of disassembly.

NOTE:

- Always replace the O-ring with new ones.



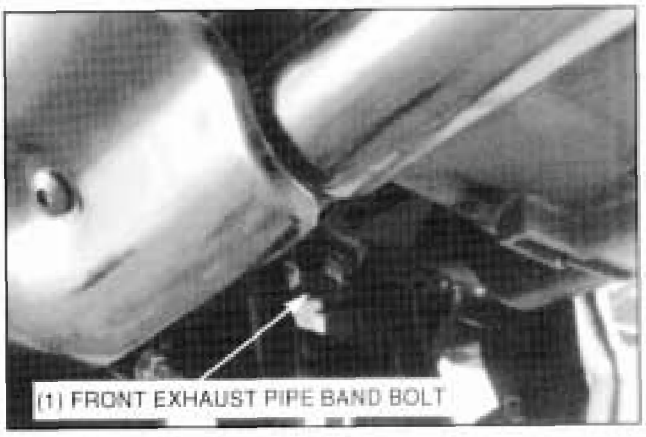
Exhaust Pipe/Muffler

⚠ WARNING

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

CAUTION

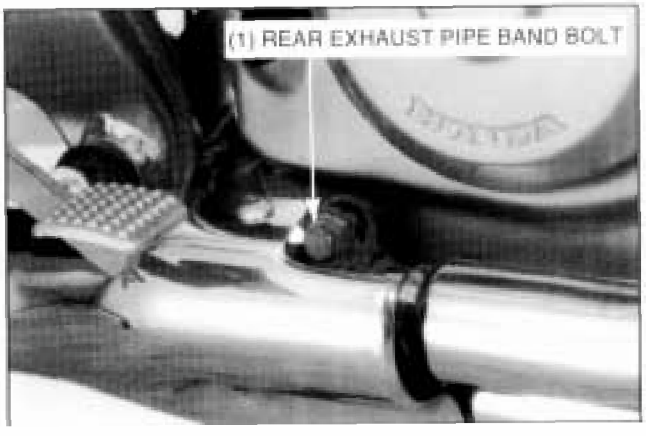
- **When removing/installing the exhaust pipe/muffler, loosen/tighten the exhaust system fasteners in the order as follows.**



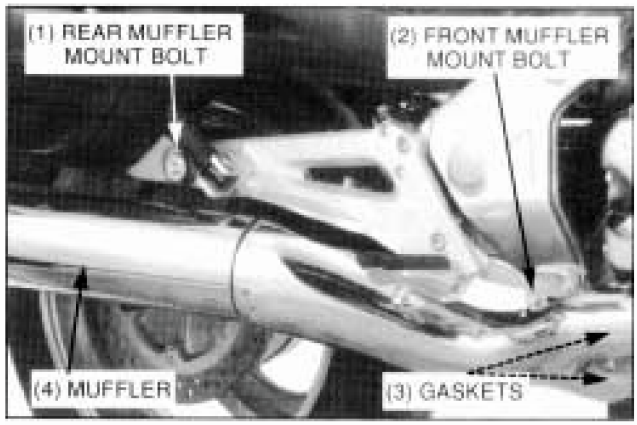
MUFFLER REMOVAL

Loosen the front exhaust pipe band bolt.

Loosen the rear exhaust pipe band bolt.

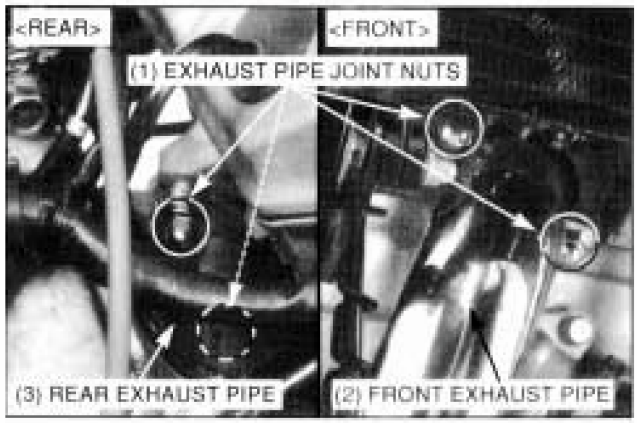


Remove the front and rear muffler mount bolts.
Remove the muffler and gaskets.

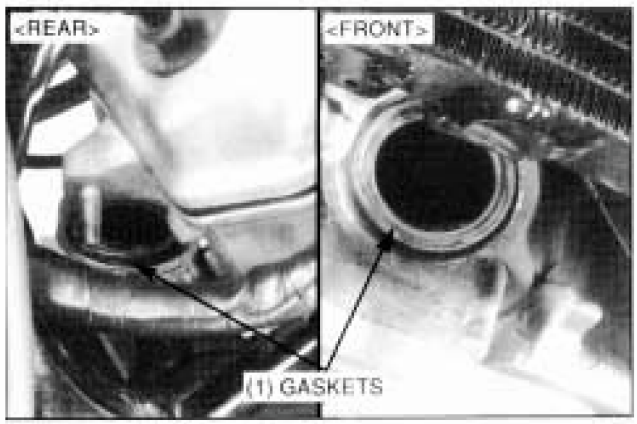


EXHAUST PIPE REMOVAL

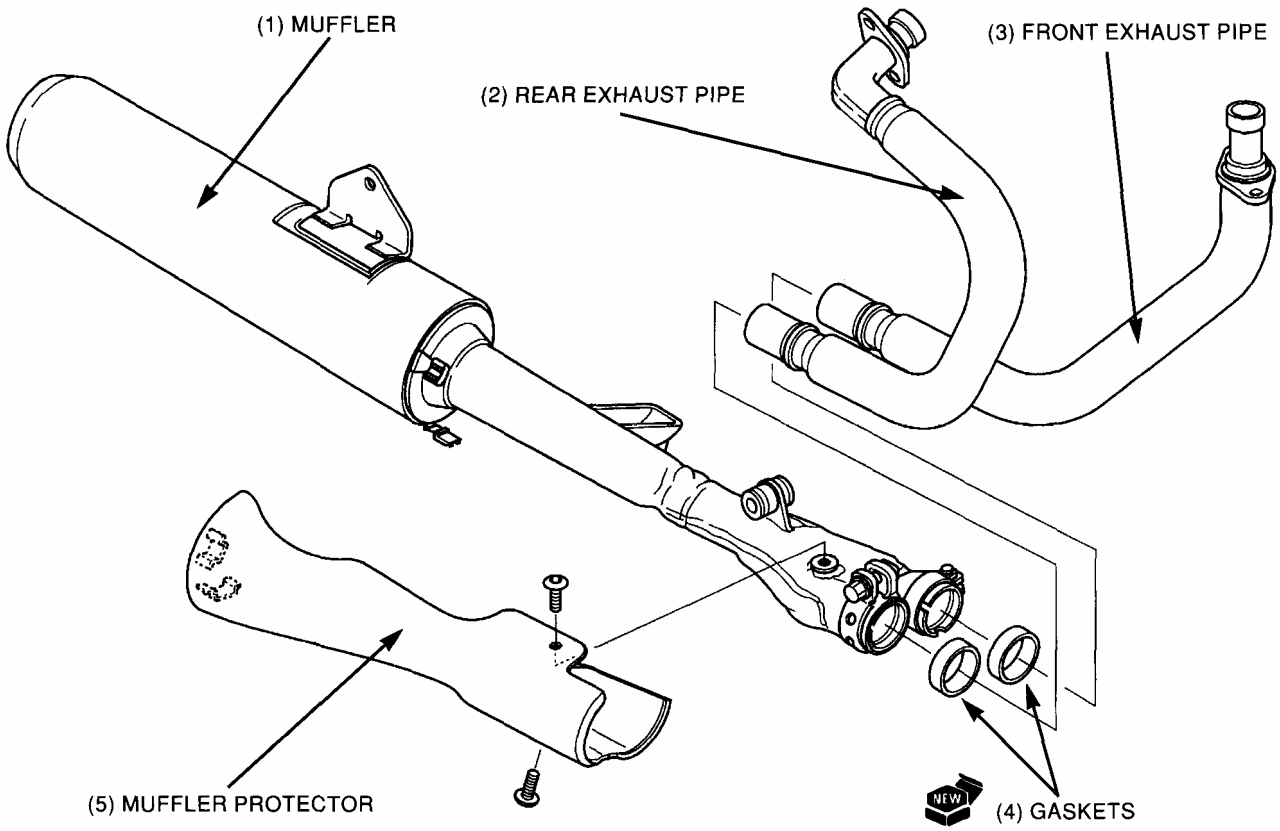
Remove the front and rear exhaust pipe joint nuts.
Remove the front and rear exhaust pipe.



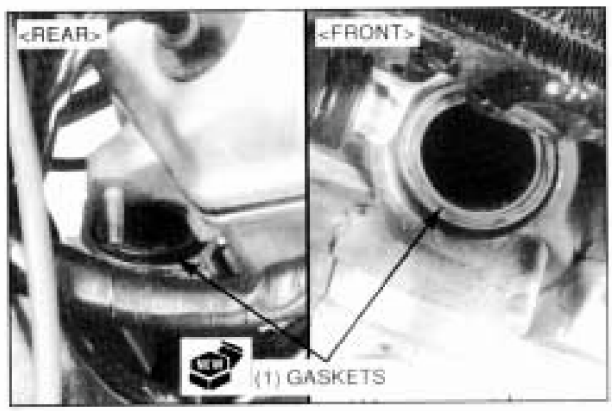
Remove the front and rear exhaust pipe gaskets.



EXHAUST PIPE/MUFFLER INSTALLATION



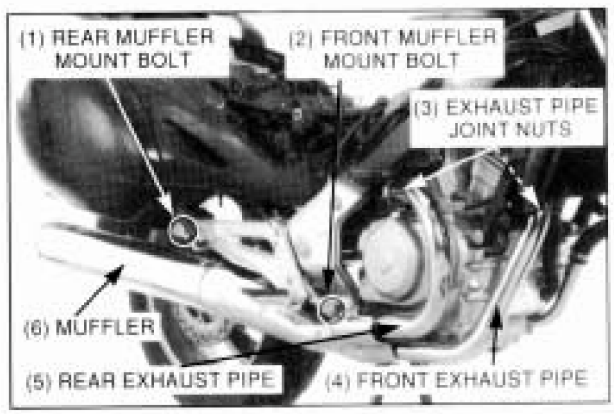
Install the new front and rear exhaust pipe gaskets.



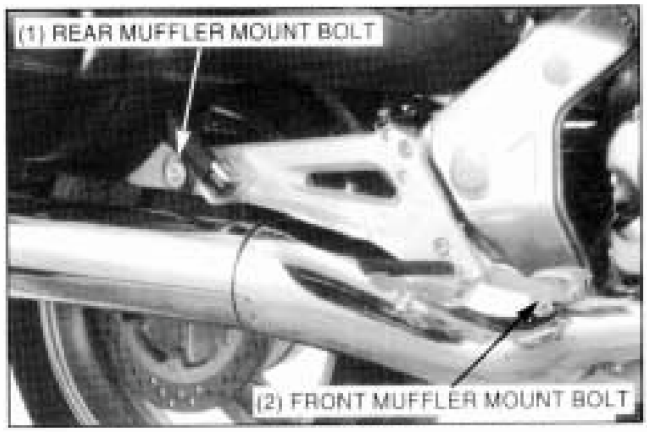
Install the front and rear exhaust pipe.
Temporally install the front and rear exhaust pipe joint nuts.
Install the new gaskets and muffler assembly.
Temporally install the front and rear muffler mount bolts.

NOTE:

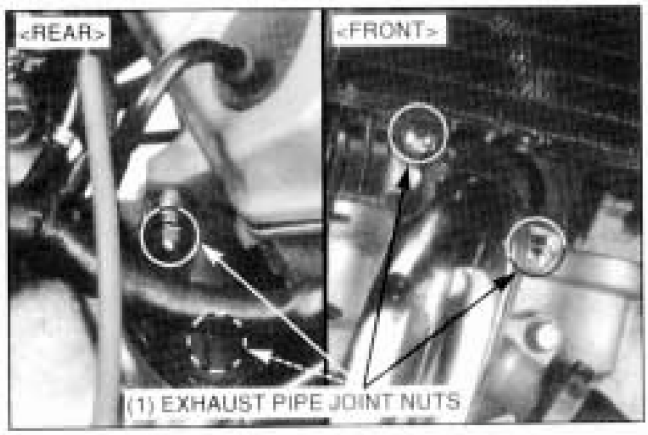
- Do not tighten the nuts yet.



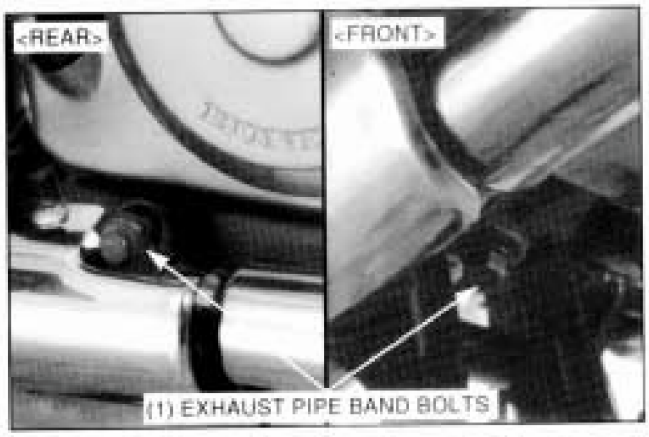
Tighten the front and rear muffler mount bolts securely.



Tighten the exhaust pipe joint nuts securely.



Tighten the front and rear exhaust pipe band bolts securely.



NOTE:

- Always inspect the exhaust system for leaks after installation.

3. Maintenance

SERVICE INFORMATION	3-1	SECONDARY AIR SUPPLY SYSTEM	3-17
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Service Information

GENERAL

⚠ 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.**
- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in enclosed area.**

- Place the motorcycle on a level ground before starting any work.

SPECIFICATIONS

Unit: mm (in)

Item		Specifications	
Throttle grip free play		2-6 mm (1/2 - 1/4 in)	
Spark plug		NGK	DENSO
	Standard	DPR8EA-9	X24EPR-U9
	For cold climate (below 5° C/41° F)	DPR7EA-9	X22EPR-U9
	For extend high speed riding	DPR9EA-9	X27EPR-U9
Spark plug gap		0.80 - 0.90 mm (0.031 - 0.035 in)	
Valve clearance	IN	0.13 - 0.17 mm (0.005 - 0.007 in)	
	EX	0.18 - 0.22 mm (0.007 - 0.009 in)	

Item			Specifications
Recommended engine oil			HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40
Engine oil capacity	at draining		2.4 liters (2.52 US qt, 2.11 Imp qt)
	at disassembly		3.0 liters (3.15 US qt, 2.64 Imp qt)
	at oil filter change		2.6 liters (2.73 US qt, 2.29 Imp qt)
Engine idle speed	Except SW type		1,200 ± 100 min^{-1} (rpm)
	SW type		1,200 ± 50 min^{-1} (rpm)
Carburetor vacuum difference			27 kPa (20 mm Hg, 0.7 in Hg)
Recommended final drive oil			Hypoid gear oil SAE # 80
Final drive oil capacity at draining/disassembly			150 cm^3 (5.1 US oz, 5.3 Imp oz)
Recommended brake fluid			DOT 4
Clutch lever free play			10 - 20 mm (3/8 - 3/4 in)
Tire size		Front	120/70 ZR17 (58W)
		Rear	150/70 ZR17 (69W)
Tire brand	Dunlop	Front/Rear	D205FN/D205N
	Michelin	Front/Rear	MACADAM 90XB
Tire air pressure	Up to 90 kg (200 lb) load	Front	245 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	284 kPa (2.90 kgf/cm^2, 41 psi)
	Up to maximum weight capacity	Front	245 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	284 kPa (2.90 kgf/cm^2, 41 psi)
Maximum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	14 N·m (1.4 kgf-m, 10 lbf-ft)	
Engine oil drain bolt	29 N·m (3.0 kgf-m, 22 lbf-ft)	
Engine oil filter cartridge	10 N·m (1.0 kgf-m, 7 lbf-ft)	
Timing hole cap	10 N·m (1.0 kgf-m, 7 lbf-ft)	Apply grease to the threads
Crankshaft hole cap	15 N·m (1.5 kgf-m, 11 lbf-ft)	Apply grease to the threads
Valve adjusting screw lock nut	23 N·m (2.3 kgf-m, 17 lbf-ft)	Apply oil to the threads and seating surfaces
Side stand pivot bolt	10 N·m (1.0 kgf-m, 7 lbf-ft)	
lock nut	29 N·m (3.0 kgf-m, 22 lbf-ft)	

TOOLS

Valve adjusting wrench	07908-KE90000
Oil filter wrench	07HAA-PJ70100

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 their authorized HONDA dealer.

	ITEM / FREQUENCY	WHICHEVER COMES FIRST ↓ NOTE	ODOMETER READING [(NOTE (1)] → X 1,000 km	1	6	12	18	24	30	36	Refer to page
			X 1,000 mi	0.6	4	8	12	16	20	24	
			MONTHS		6	12	18	24	30	36	
*	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	3-6
	SPARK PLUG				I	R	I	R	I	R	3-7
*	VALVE CLEARANCE			I		I		I		I	3-8
	ENGINE OIL			R		R		R		R	3-10
	ENGINE OIL FILTER			R		R		R		R	3-10
*	CARBURETOR SYNCHRONIZATION			I		I		I		I	3-13
*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-15
	RADIATOR COOLANT	NOTE 3				I		I		R	3-15
*	COOLING SYSTEM					I		I		I	3-16
*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-17
	FINAL DRIVE OIL					I		I		R	3-17
	BRAKE FLUID	NOTE 3			I	I	R	I	I	R	3-18
	BRAKE PAD WEAR				I	I	I	I	I	I	3-19
	BRAKE SYSTEM			I		I		I		I	3-20
*	BRAKE LIGHT SWITCH					I		I		I	3-20
*	HEADLIGHT AIM					I		I		I	3-21
	CLUTCH SYSTEM			I	I	I	I	I	I	I	3-21
	SIDE STAND					I		I		I	3-22
*	SUSPENSION					I		I		I	3-22
*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-23
**	WHEELS/TIRES					I		I		I	3-23
**	STEERING HEAD BEARINGS			I		I		I		I	3-24

* Should be serviced by an authorized HONDA 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 an authorized HONDA dealer.

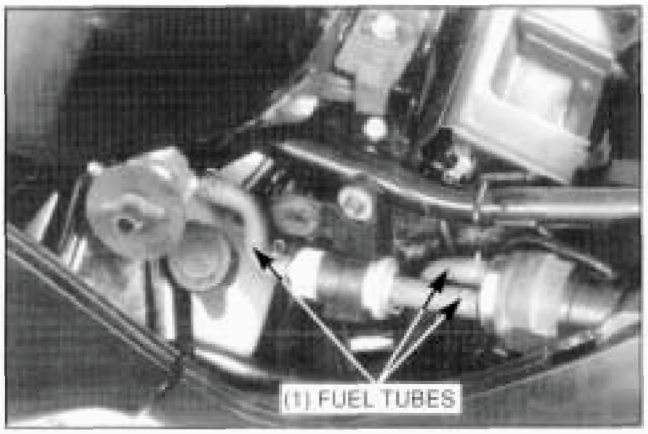
NOTES: 1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Replace every 2 years, or at indicated odometer interval, whichever cames first. Replacement requires mechanical skill.

Fuel Line

Remove the seat and left side cover (page 2-2).

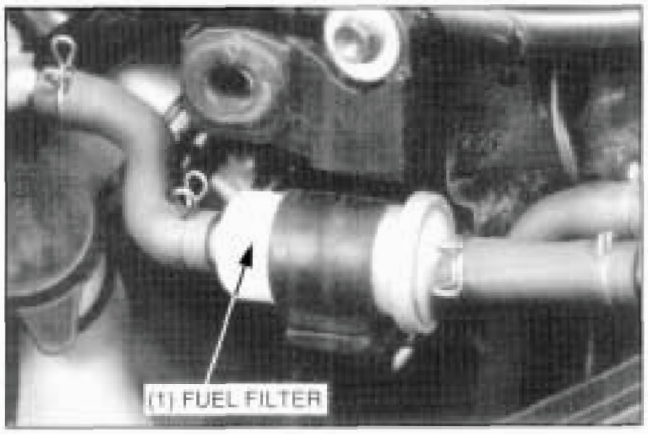
Check the fuel lines for deterioration, damage or leakage. Replace the fuel lines if necessary.

Also check the fuel valve vacuum tube for damage. Replace the vacuum tube if necessary.



FUEL FILTER

Pull the fuel filter out, clip the inlet line closed and remove the filter.
Replace the fuel filter with new one, if necessary (page 5-25).



Throttle Operation

Check for any deterioration or damage to the throttle cables.
Check the throttle grip for smooth operation. Check that the throttle grip returns from the full open to the full closed position smoothly and automatically in all steering positions.
If the throttle grip does not return properly, lubricate the throttle cable, overhaul and lubricate the throttle grip housing. For cable lubrication: Disconnect the throttle cables at their upper ends (page 14-7). 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.

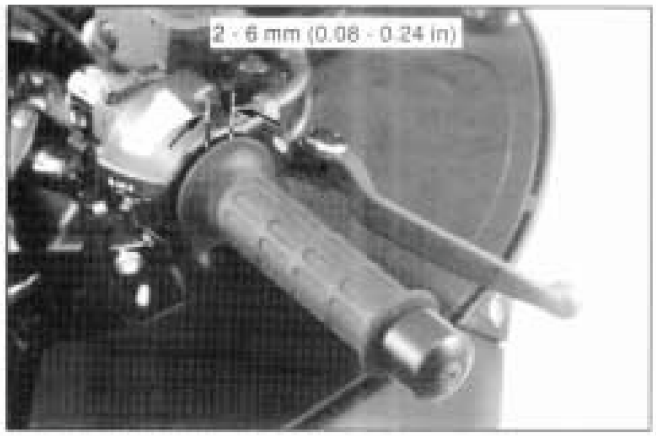
⚠ WARNING

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

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

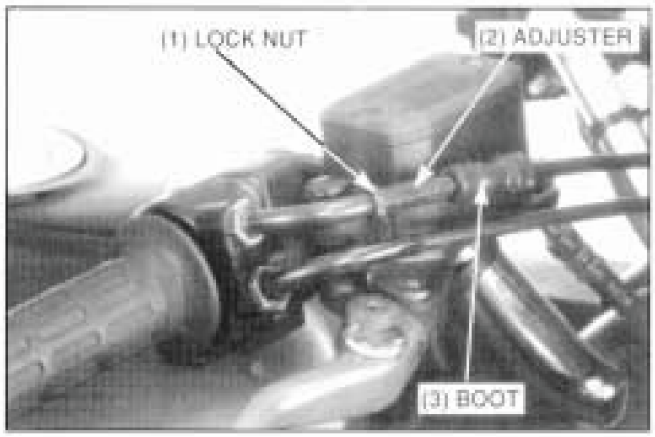
Measure the throttle grip free play at the throttle grip flange.

Free Play: 2 - 6 mm (1/12 - 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 and turn the adjuster to obtain the free play.
After the adjustment, tighten the lock nut securely and reposition the boot properly.

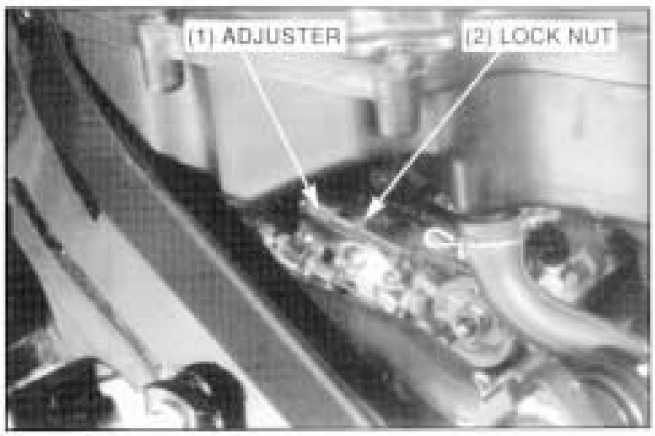


Major adjustments are made with the lower adjuster.

Remove the fuel tank (page 2-11).

Loosen the lock nuts and turn the adjusters to obtain the free play.
Tighten the lock nuts after the adjustment has been made.

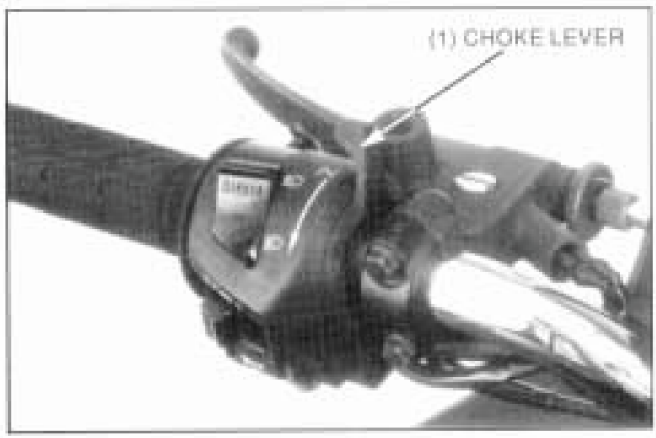
Recheck the free play.



Carburetor Choke

STARTING ENRICHMENT (SE) VALVE

The choke system uses a fuel enriching circuit controlled by an SE valve. The SE valve opens the enriching circuit via a cable when the SE valve knob on the right side of the carburetor is pulled.



Check for smooth operation of the choke lever.
Check for any deterioration or damage to the SE valve cable.
If the operation is not smooth, lubricate the SE valve cable and choke lever sliding surface with a commercially available cable lubricant or a light weight oil.

Starting enrichment system operation can be checked by the way the engine starts and runs:

- Difficulty in starting before the engine is warm-up (easy once it is warmed up): SE valve is not completely opened.
- Idle speed is erratic even after warm-up (imperfect combustion): SE valve is not completely closed.

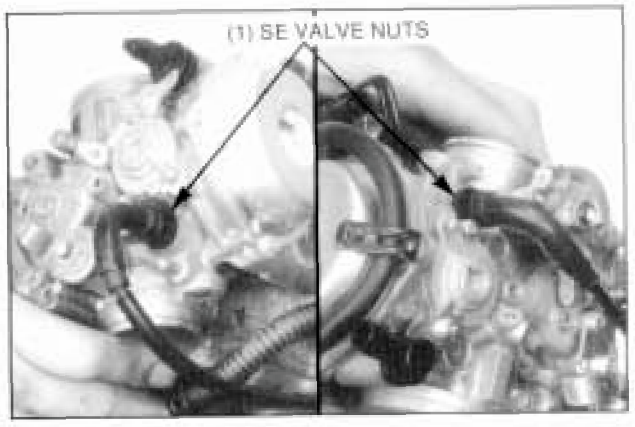
When the above symptoms occur, inspect the SE valve using the following procedure.

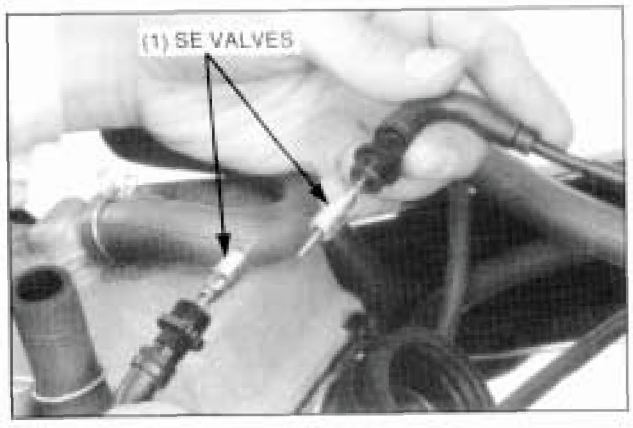
Remove the carburetor (page 5-6).

Loosen the SE valve nuts and remove them from the carburetors.

Pull the choke lever all the way out to fully open position and recheck for smooth operation of the choke lever.
There should be no free play.

Check valve seat on the SE valve for damage. Reinstall the SE valve in the reverse order of removal.





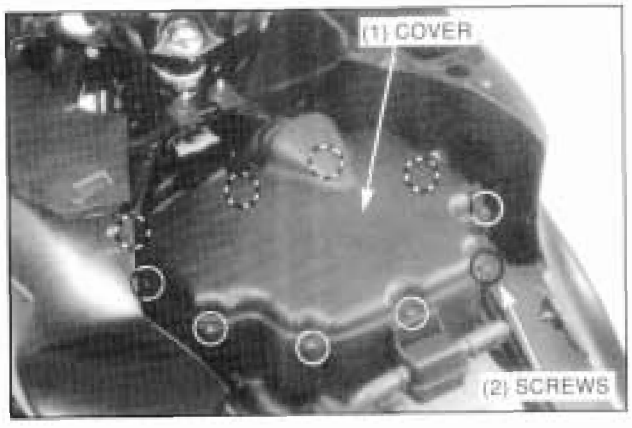
Air Cleaner

NOTE:

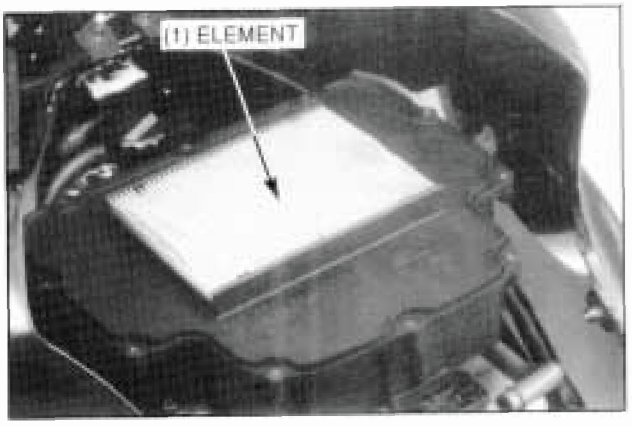
- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in wet or dusty areas, more frequent inspections are required.

Remove the fuel tank (page 2-11).

Remove the air cleaner housing cover screws and cover.



Remove the air cleaner element from the air cleaner housing.
Replace the element accordance with the maintenance schedule.
Also, replace the element any time it is excessively dirty or damaged.



Installation is in the reverse order of removal.

Torque:
Air cleaner housing cover screw:
1 N·m (0.1 kgf-m, 0.7 lbf-ft)

Spark Plug

Remove the middle fairing (page 2-4).

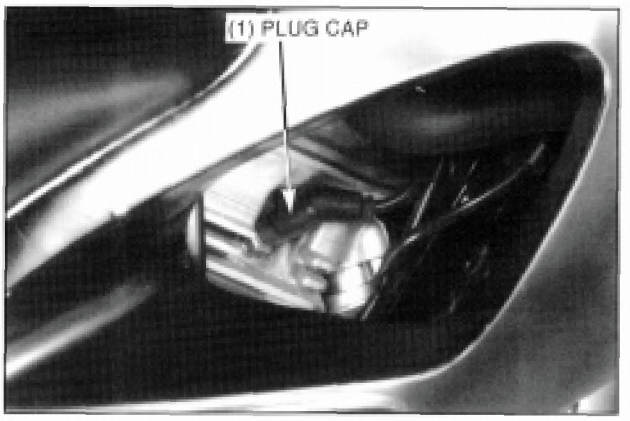
Disconnect the spark plug caps.

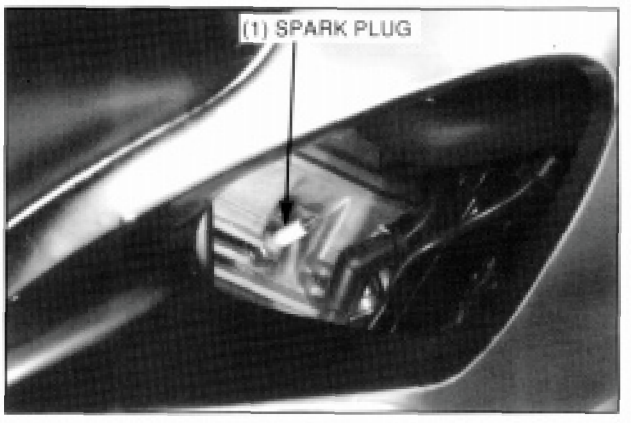
NOTE:

- Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plugs using the spark plug wrench or an equivalent.

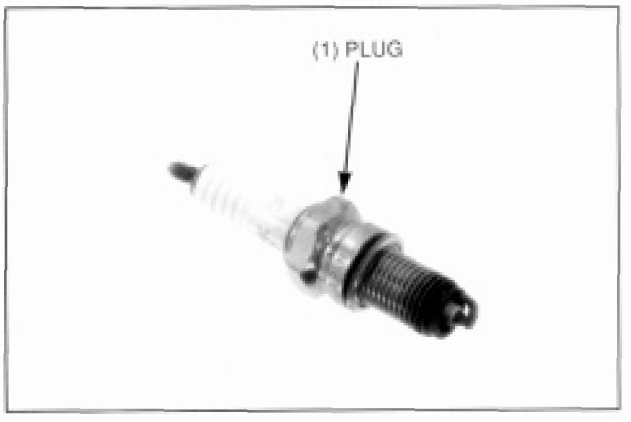
Inspect or replace as described in the maintenance schedule (page 3-3).





INSPECTION

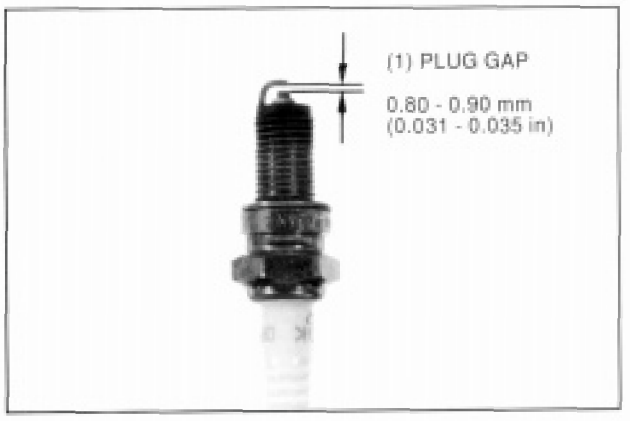
Check the following and replace if necessary (recommended spark plugs: page 3-1).
- Insulator for damage
- Electrodes for wear
- *Burning condition, coloration;*
  - Dark to light brown indicates good condition.
  - Excessive lightness indicates malfunctioning ignition system or learn mixture.
  - Wet or black sooty deposit indicates over-rich mixture.



REUSING A SPARK PLUG

Clean the spark plug electrodes with a wire brush or spark plug cleaner.
Check the gap between the center and side electrodes with a wire-type feeler gauge. If necessary, adjust the gap by bending the side electrodes carefully.

Spark Plug Gap: 0.80 - 0.90 mm (0.031 - 0.035 in)

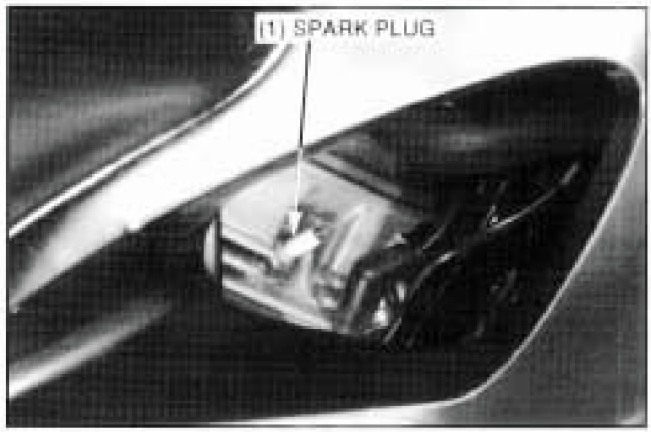


CAUTION

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

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

Torque: 14 N·m (1.4 kgf-m, 10 lbf-ft)



REPLACING A SPARK PLUG

Set the plug gap to specification with a wire-type feeler gauge (page 3-7).

CAUTION

- **Do not overtighten the spark plug.**

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

Valve Clearance

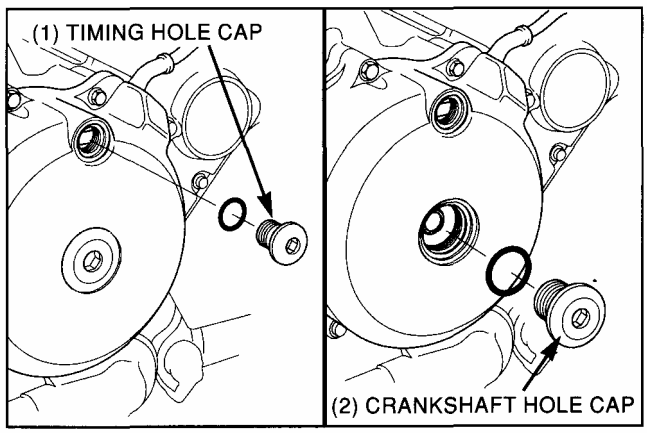
INSPECTION

NOTE:

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

Remove the cylinder head covers (page 10-5).

Remove the crankshaft hole cap and timing hole cap.



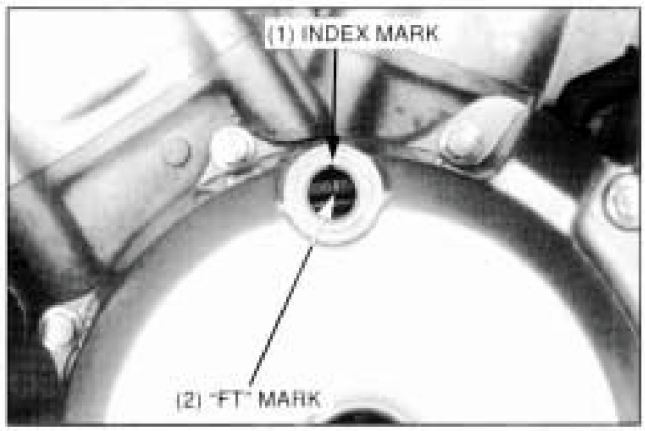
NOTE:

- Adjust the front cylinder valves first.

FRONT CYLINDER HEAD

Rotate the flywheel counterclockwise to align the "FT" mark with the index notch on the left crankcase cover.

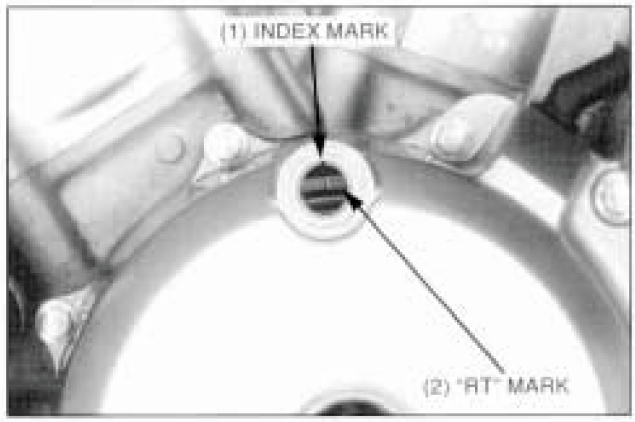
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.



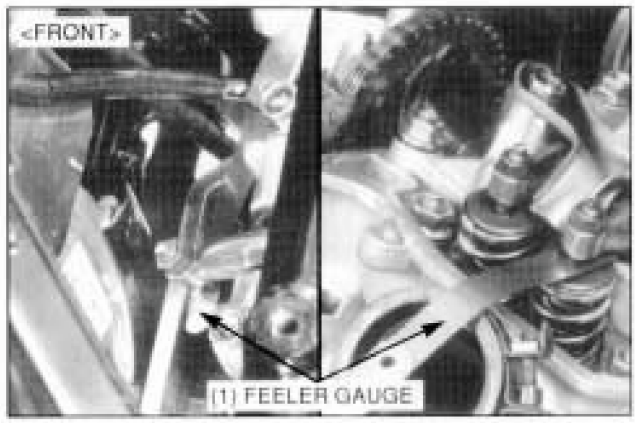
REAR CYLINDER HEAD

Rotate the flywheel counterclockwise to align the "RT" mark with the index notch on the left crankcase cover.

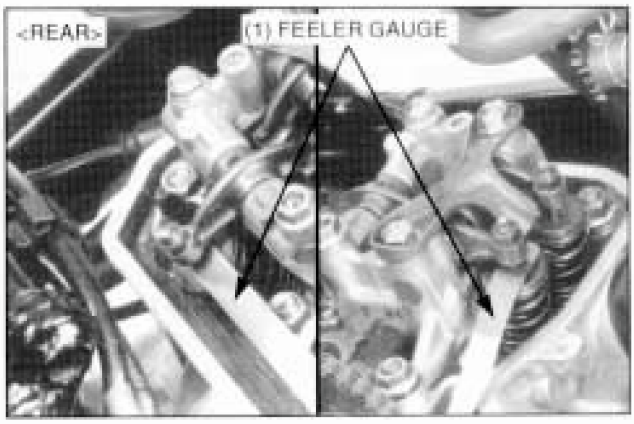
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.



Inspect the clearance of all three valve by inserting a feeler gauge between the adjusting screw and the valve.

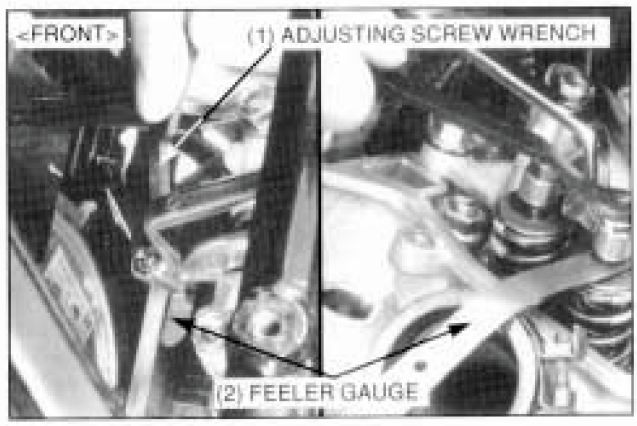


Valve Clearance:
IN: 0.13 - 0.17 mm (0.005 - 0.007 in)
Ex: 0.18 - 0.22 mm (0.007 - 0.009 in)



ADJUSTMENT

Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.



Hold the adjusting screw and tighten the lock nut.

Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

Tool:
Valve adjusting wrench **07908-KE90000**

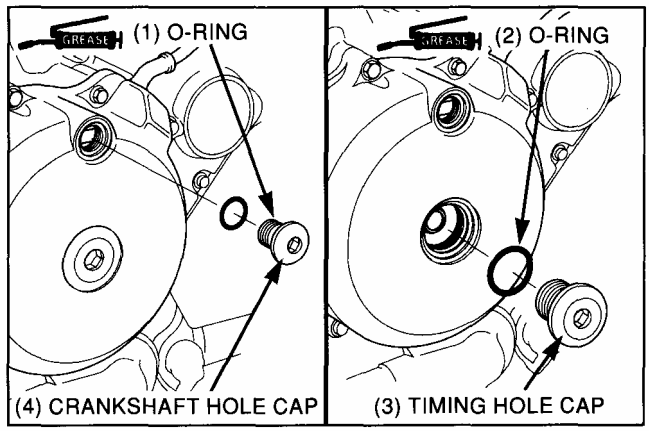
NOTE:

- Apply oil to the lock nut threads.

Install the cylinder head covers (page 10-33).

Apply grease to the timing hole cap and crankshaft hole cap threads.
Install and tighten the caps to the specified torque.

Torques:
Timing hole cap: **10 N·m (1.0 kgf-m, 7 lbf-ft)**
Crankshaft hole cap: **15 N·m (1.5 kgf-m, 11 lbf-ft)**



Engine Oil/Oil Filter

OIL LEVEL INSPECTION

⚠ WARNING

- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.**
- **Engine and exhaust system parts become very hot and remain hot for sometime after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.**

NOTE:

- Do not screw in the oil cap/level gauge when checking oil level.
- The oil level cannot be correctly measured if the motorcycle is not supported perfectly upright on a level surface.
- As the oil is gradually consumed, it is necessary to periodically check the oil level and replenish the oil volume to its proper level.
- If the oil level is too high, overall engine performance and the actuation of the clutch may be effected. Too little oil may cause engine overheating as well as premature wear to various parts.
- If a different brand or grade of oil or low quality oil is mixed when adding oil, the lubricating function deteriorates.

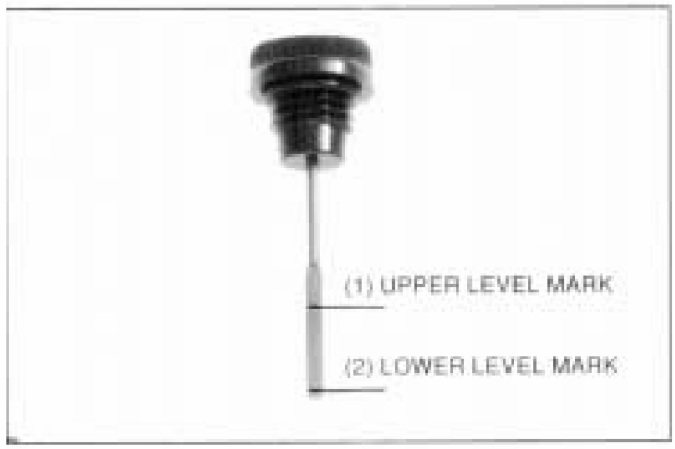
Place the motorcycle on its main stand.

Start the engine and let it idle for a few minutes.
Stop the engine and wait 2 - 3 minutes.

Remove the oil filler cap/dipstick and wipe off the oil from the dipstick with a clean cloth.

With the motorcycle upright on level ground, insert the oil filler cap/dipstick into the stick hole without screwing it in. Remove the oil filler cap/dipstick and check the oil level.

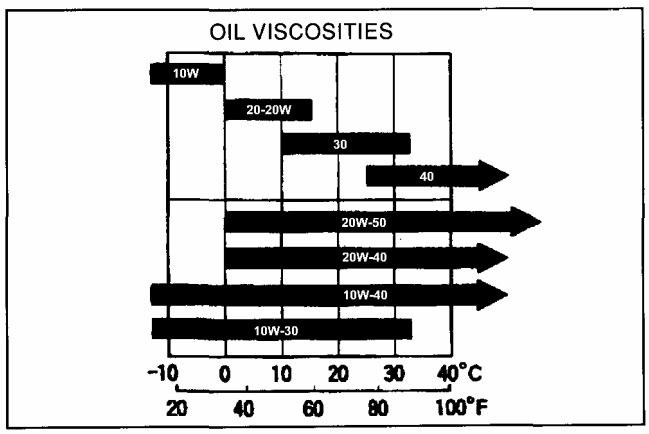
If the level is below or near the lower level mark on the dipstick, fill to the upper level mark with the recommended oil.



Recommended Engine Oil:
Honda 4-stroke Oil or equivalent motor oil
API service classification SE, 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.



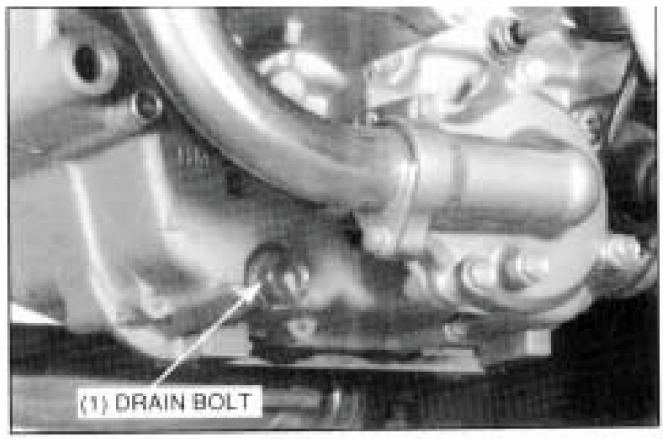
Check the O-ring for damage.

Reinstall the oil filler cap/dipstick.

ENGINE OIL CHANGE

⚠ WARNING

- **If the engine must be running to do some work, make sure the area well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.**
- **Engine and exhaust system parts become very hot and remain hot for sometime after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.**



NOTE:

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

Warm up the engine.
Place an oil drain pan under the engine to catch the oil, then remove the oil drain bolt and oil filler cap/dipstick.

With the engine stop switch OFF, push the starter button for a few seconds to drain any oil which may be left in the engine.

NOTE:

- Do not operate the motor for more than few seconds.

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

Tighten the drain bolt to the specified torque.

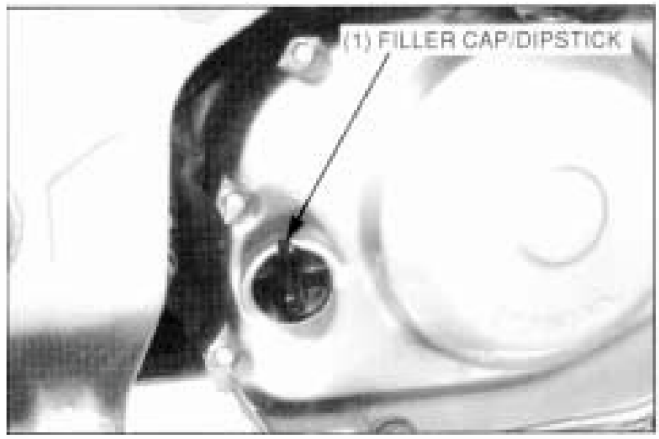
Torque: 29 N·m (3.0 kgf-m, 22 lbf-ft)

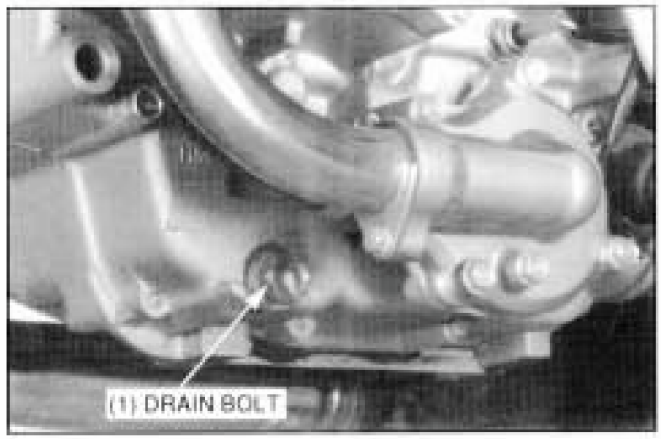
Fill the crankcase with the recommended engine oil.

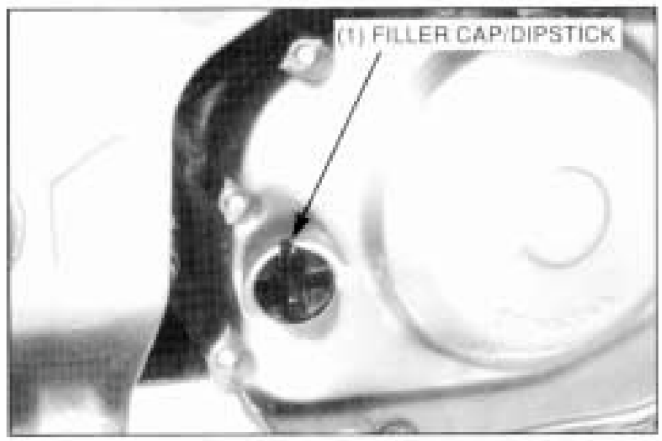
Oil Capacity:
2.4 liters (2.52 US qt, 2.11 Imp qt) at draining
3.0 liters (3.15 US qt, 2.64 Imp qt) at disassembly
2.6 liters (2.73 US qt, 2.29 Imp qt) at oil filter change

Install the oil filler cap/dipstick.
Start the engine and let it idle for 2 or 3 minutes.
Stop the engine and weight a few minutes, then check that the oil level is at the upper level mark with the motorcycle upright.

Check that there are no oil leaks.



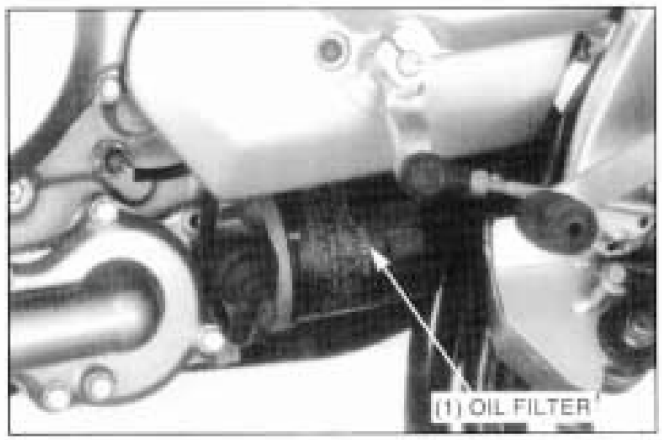




OIL FILTER CHANGE

⚠ WARNING

- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.**
- **Engine and exhaust system parts become very hot and remain hot for sometime after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.**



Drain the engine oil (page 3-11).

Remove the oil filter using the oil filter wrench.

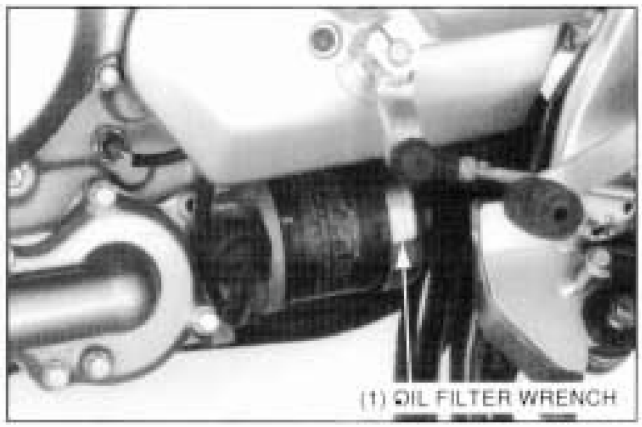
Tool:
Oil filter wrench **07HAA-PJ70100**

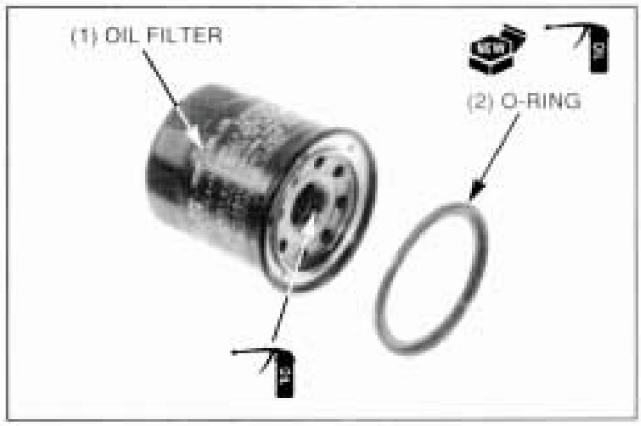
Apply oil to the new oil filter O-ring.

Apply oil to the new oil filter threads.
Install and tighten the new oil filter to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)

Fill the crankcase with the recommended engine oil (page 3-12).
Install the oil filter cap/dipstick.
Start the engine and recheck the oil level (page 3-10).
Make sure that there are no oil leaks.





Carburetor Synchronization

⚠ WARNING

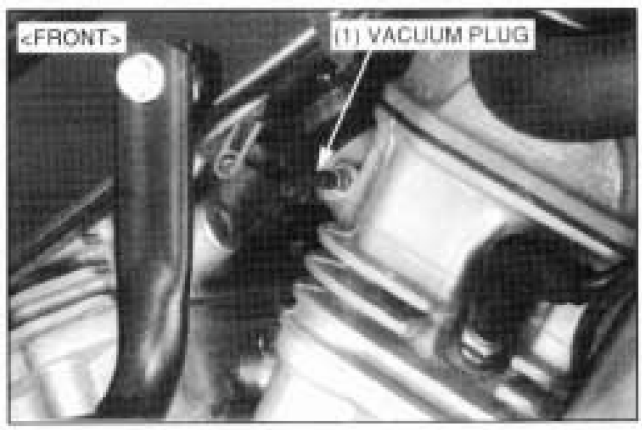
- **If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.**

NOTE:

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

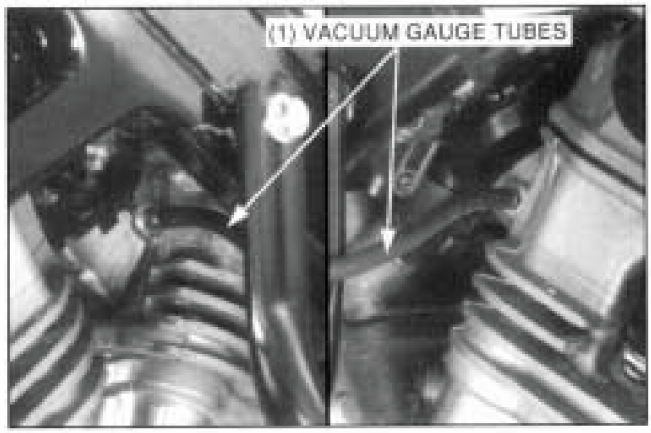
Remove the following:
- Middle fairing (page 2-4)
- Fuel tank (page 2-11)

Remove the vacuum plug from the front cylinder head intake port.
Disconnect the AICV vacuum tube from the rear cylinder head intake port.



Connect the vacuum gauge to the intake ports.

Connect the suitable tube between fuel tank and fuel tube.



1. Turn the fuel valve ON. Start the engine and adjust the idle speed to the specification.

Idle Speed: 1,200 ± 100 min-1 (rpm)

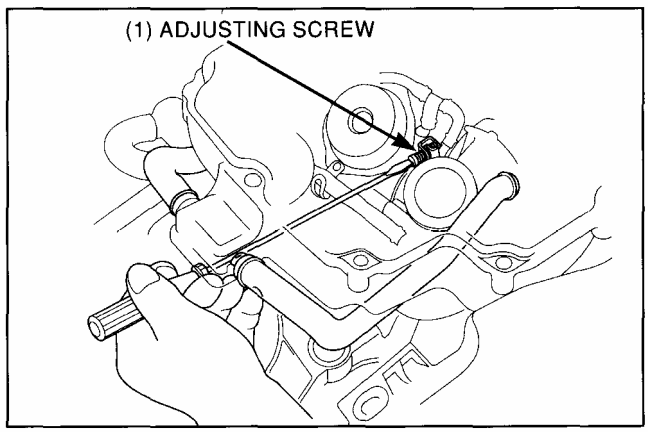
2. Check the difference in vacuum between each carburetor.

Carburetor Vacuum Difference:
27 kPa (20 mm Hg, 0.7 in Hg)

3. Stop the engine.
   Turn the throttle grip to fully and adjusting screw to the rearward.

NOTE:

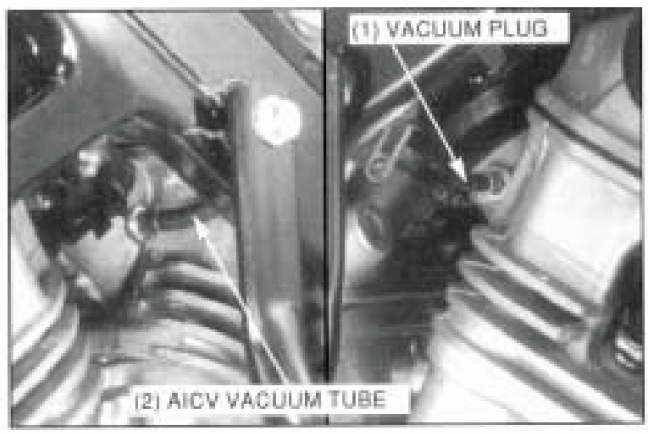
- The base carburetor is the Rear (No. 1) carburetor.



4. Synchronize to specification by turning the adjusting screw.
5. Start the engine.
   Be sure that the synchronization is stable by snapping the throttle grip several times.
6. Snap the throttle grip several times and recheck the idle speed and difference in vacuum between each carburetor.

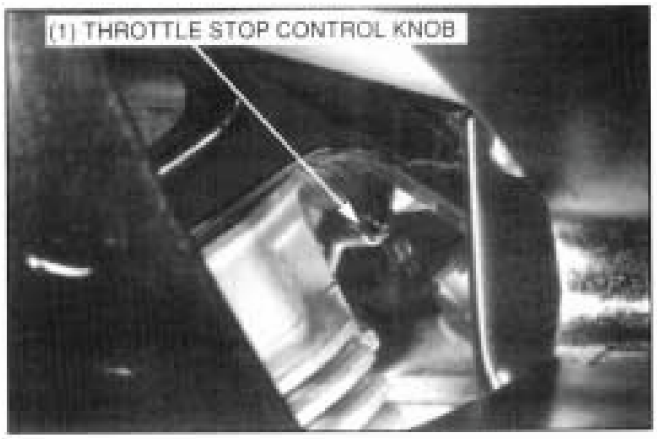
Disconnect the vacuum gauge.

Connect the AICV vacuum tube to the rear cylinder head intake port.
Install the vacuum plug to the front cylinder head intake port.



Install the following:
- Middle fairing (page 2-5)
- Fuel tank (page 2-11)

Engine Idle Speed



⚠ WARNING

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

NOTE:

- Perform this maintenance with the engine at normal operating temperature and transmission in neutral. Place the motorcycle on a level surface.
- Engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine and shift the transmission into neutral.
Place the motorcycle on its side stand.
Check the idle speed and adjust by turning the throttle stop control knob if necessary.

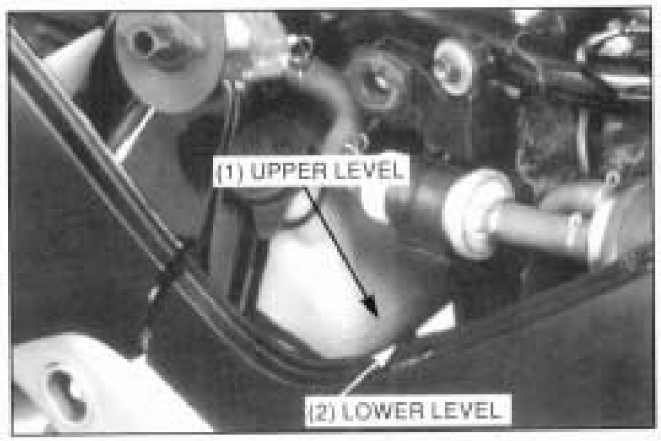
Idle Speed:
Except SW type: 1,200 ± 100 min^{-1} (rpm)
Sw type: 1,200 ± 50 min^{-1} (rpm)

Radiator Coolant

LEVEL CHECK

⚠ WARNING

- **Wait until the engine is cool before 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 poisonous. Take care to avoid getting coolant in your eyes, on your skin, or on your clothes.**
- **If coolant gets in your eyes, flush repeatedly with water and contact a doctor immediately.**
- **If coolant is accidentally swallowed, induce vomiting and contact a doctor immediately.**
- **KEEP OUT REACH OF CHILDREN.**



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 in a vertical position on a flat, level surface.

If necessary, remove the seat (page 2-2) and reserve tank cap. Fill to the "UPPER" level line with a 50-50 mixture of distilled water and antifreeze (coolant mixture preparation: page 6-4).

CAUTION

- **Be sure to use the proper mixture of antifreeze and distilled water to protect the engine.**
- **Use distilled water Tap water may cause the engine to rust or corrode.**

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

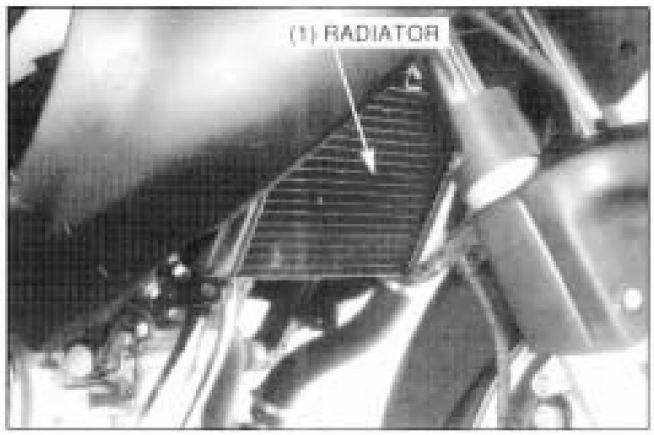
If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.
Be sure to remove all air from the cooling system as described on page 6-5.

Cooling System

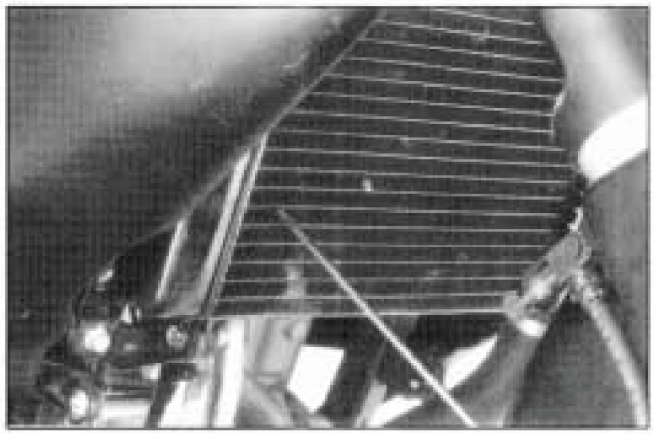
⚠ WARNING

- **The prevent injury, keep your hands and clothing away from the cooling fan. It may start automatically, without warning.**

Check the radiator air passage for clogging or damage.



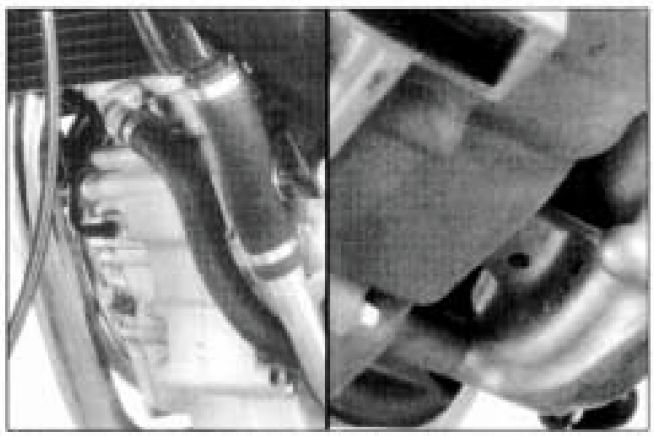
Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.
For radiator replacement, refer to page 6-8.



Remove the fuel tank (page 2-11).

Check for any coolant leakage from the water pump, water hose and hose joints.
Make sure the hoses are in good condition; they should not show any sings of deterioration.
Replace any hose that shows any sign of deterioration.
Check that all hose clamps are tight.

For radiator replacement, refer to page 6-8.



Secondary Air Supply System

NOTE:

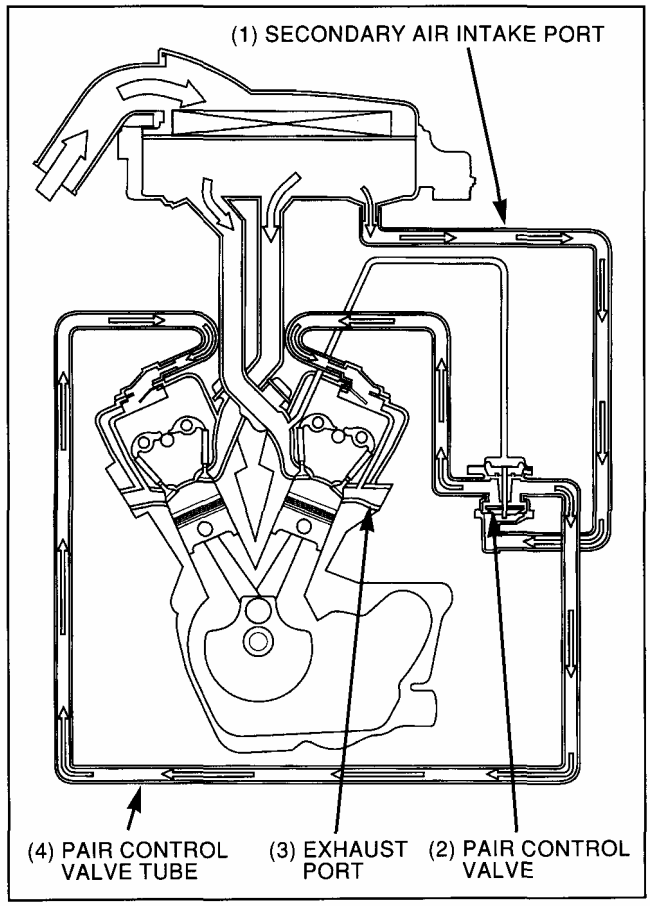
- This model is equipped built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there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

Remove the fuel tank (page 2-11).

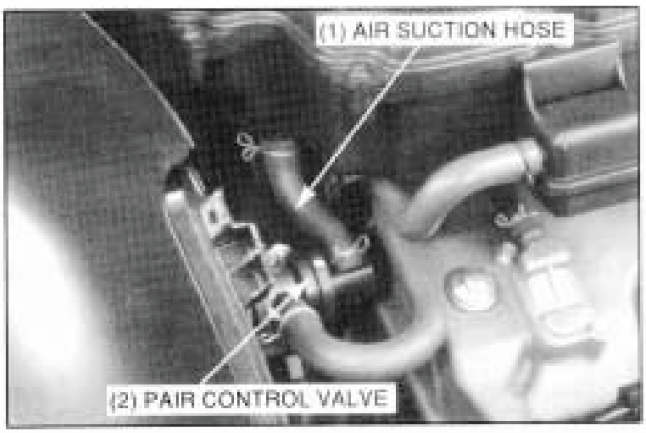
Check the air injection hoses and pipes between the pulse secondary air injection (PAIR) control valve and exhaust port for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

NOTE:

- If the hoses show any signs of heat damage, inspect the PAIR check valve in the PAIR control valve for damage.



Check the air suction hoses between the air cleaner and PAIR control valve for deterioration, damage or loose connections. Make sure that the hoses are not kinked, pinched or cracked.



Final Drive Oil

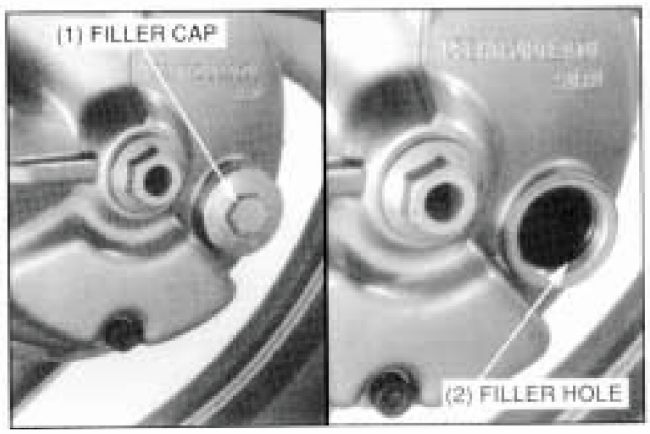
LEVEL CHECK

Place the motorcycle on its main stand.

Remove the oil filler cap.
Check that the oil level is up to lower edge of the oil filler hole.

Check for leaks, if the oil level is low. Pour the recommended oil through the oil filler hole until it reaches the lower edge of the hole.

Recommended Oil: Hypoid gear oil, SAE # 80



Coat a new O-ring with grease and install it onto oil filler cap.
Install and tighten the oil filler cap.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

OIL CHANGE

Remove the oil filler cap and drain bolt, slowly turn the rear wheel and drain the bolt.
When the oil is completely drained, clean the drain bolt, replace the sealing washer and tighten it.

Fill the gear case with the recommended oil up to correct level (see above).

Oil Capacity: 150 cm³ (5.1 US oz, 5.3 Imp oz) at drainnig

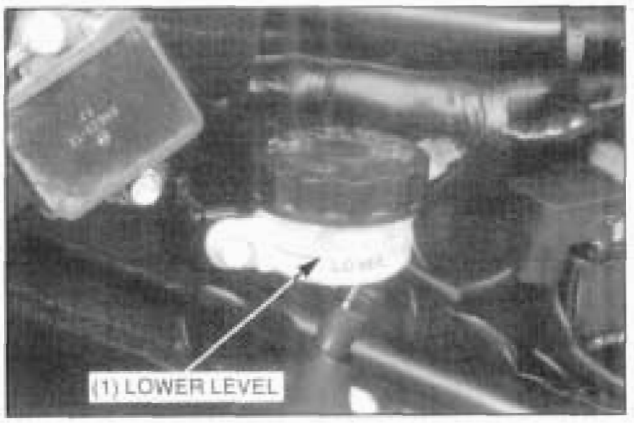
Brake Fluid

⚠ WARNING

- **Do not remove the cover or cap unless the reservoir is level because fluid may spill out.**
- **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 rug over these parts whenever the system is serviced.

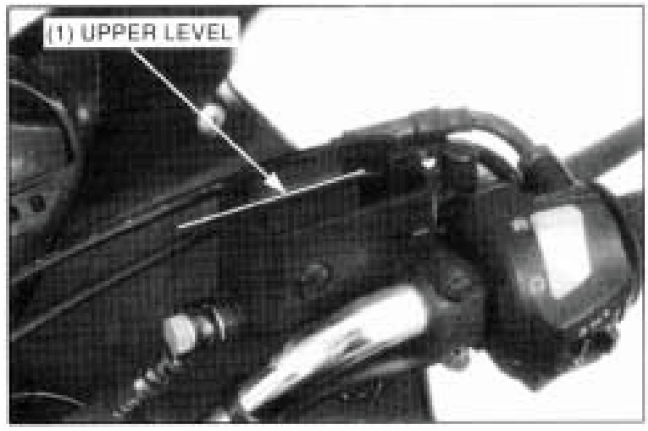
NOTE:

- When the fluid level is low, check the brake pads for wear (see after page). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is 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 3-20).
- Do not remove the level float from the reservoir when filling with brake fluid.



FRONT BRAKE

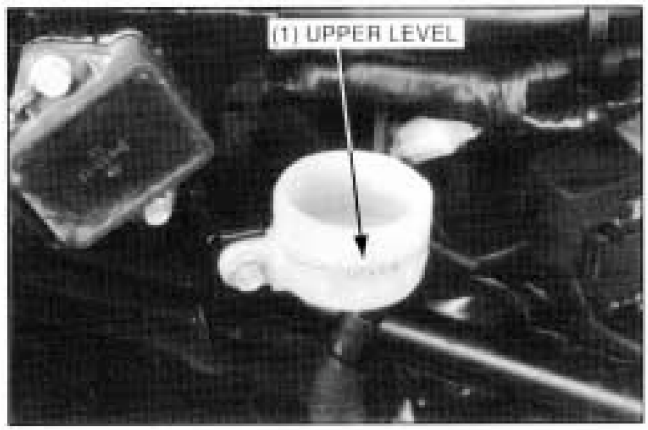
Turn the handlebar to the left side so that the reservoir is level and check the front brake reservoir level through the sight glass. If the level (float edge) is near the MIN level mark, remove the cover, set plate and diaphragm then fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.



REAR BRAKE

Remove the right side cover (page 2-3).
Place the motorcycle on a level surface, and support it upright. Check the rear brake fluid reservoir level.
If the level is near the reservoir to the upper level mark with DOT 4 brake fluid from a sealed container.

Refer to page 16-3 for brake fluid replacement/bleeding procedures.



Brake Pad Wear

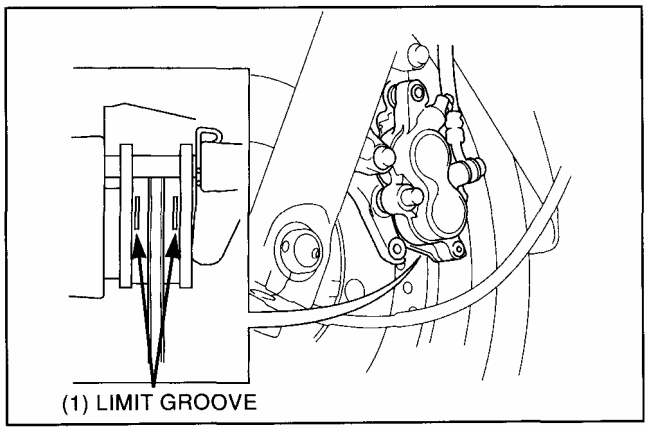
CAUTION

- **Always replace the brake pads as a set to assure even disc pressure.**

FRONT BRAKE

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

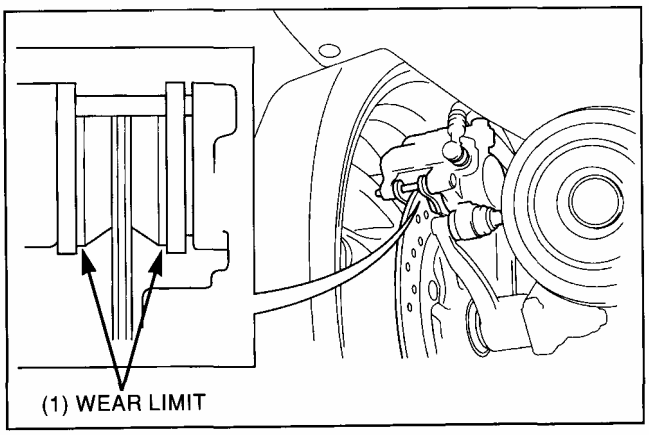
Refer to page 16-6 for brake pad replacement.



REAR BRAKE

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

Refer to page 16-8 for brake pad replacement.



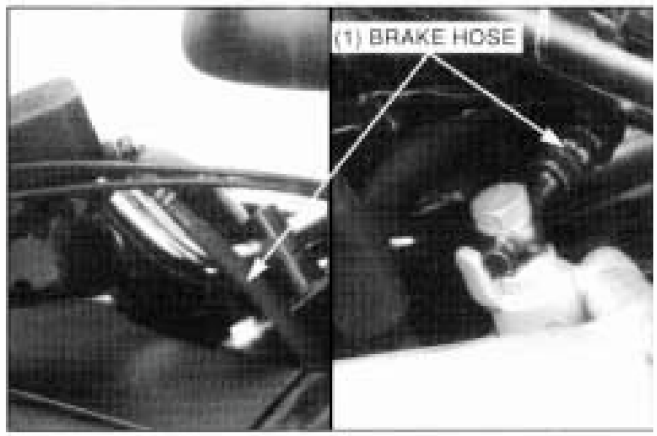
Brake System

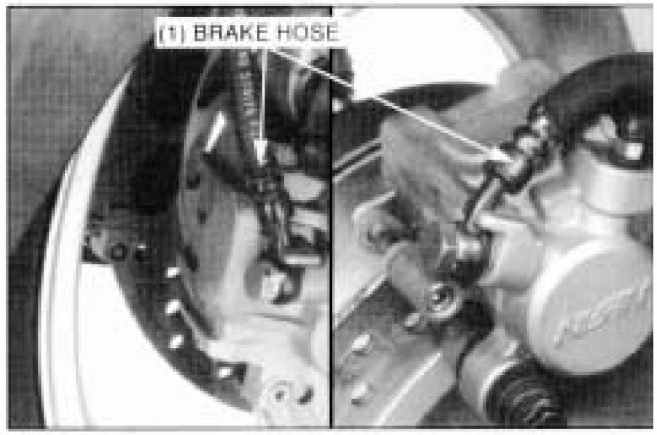
INSPECTION

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

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

Refer to page 16-4 for brake bleeding procedures.





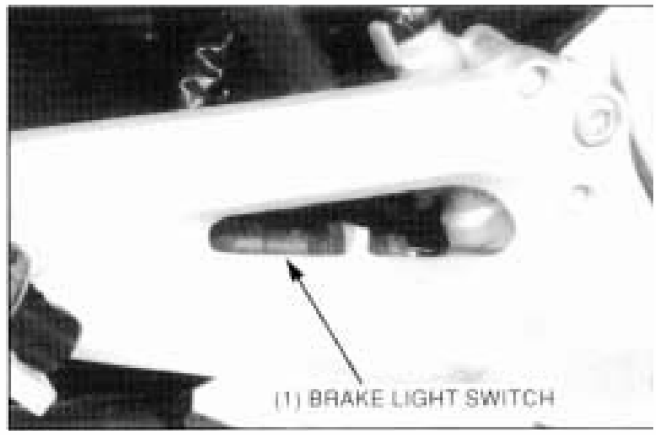
Brake Light Switch

CAUTION

- **Allowing the switch body to turn during adjustment can break the wires in the switch.**

NOTE:

- The brake light switch on the front brake lever 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.
- Make all rear brake light switch adjustments after the height adjustment and the brake pedal free play adjustment have been made.

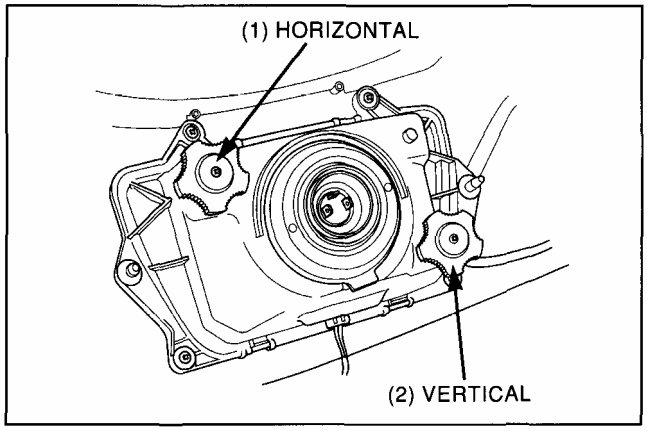


Check the brake light switch operation and adjustment by applying the brakes. Visually inspect for any damage and make sure the reflector plate is clean within the light.
Adjust the rear brake light switch so that the brake light comes on just prior to the brake actually being engaged. If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Turn the adjusting nut on the brake light switch and not the switch body and wires to make switch actuation adjustments.
Be sure to hold the switch body firmly while turning the adjusting nut.

After adjustment, recheck to be sure the brake light comes on at the proper time.

Headlight Aim



⚠ WARNING

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

NOTE:

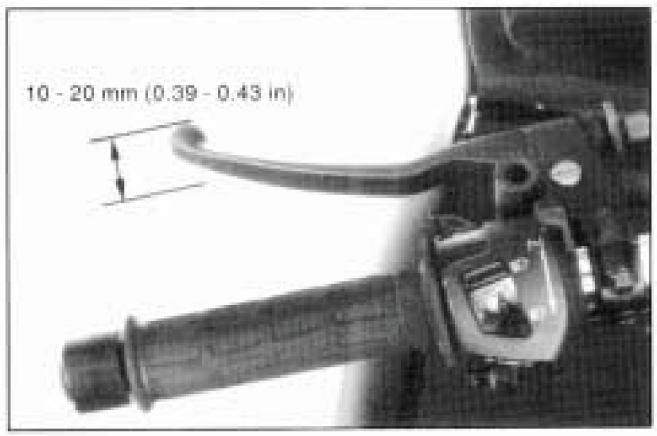
- Adjust the headlight beam as specified by local laws and regulation.

Place the motorcycle on a level surface.

Adjust the headlight beam vertically turning the vertical beam adjusting knob.
A clockwise rotation moves the beam up.

Horizontally beam adjustment are made using the horizontal beam adjusting knob.
A clockwise rotation moves the beam toward the right side of the rider.

Clutch System



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

Free Play: 10 - 20 mm (3/8 - 3/4 in)

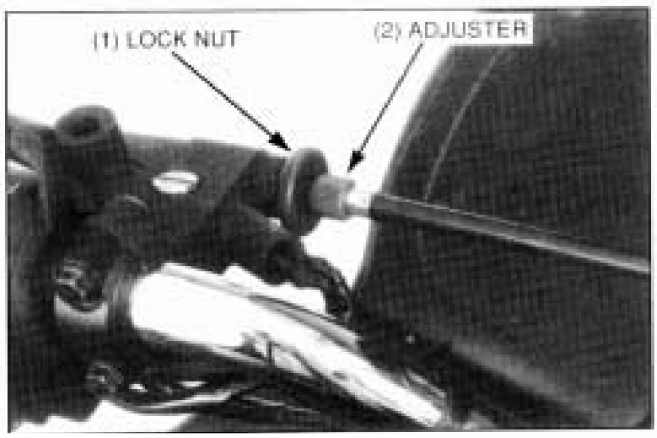
Adjust as follows:

Minor adjustments are made at the adjuster near the lever. Loosen the lock nut and turn the adjuster. Tighten the lock nut.

CAUTION

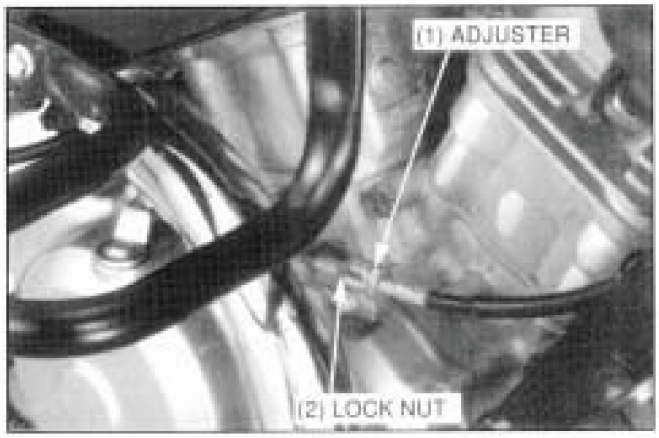
- **The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.**

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 adjustment is performed at the clutch arm.
Loosen the lock nut and turn the adjusting nut to adjust free play. Hold the adjusting nut securely while tightening the lock nut.

If proper free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (see section 8).



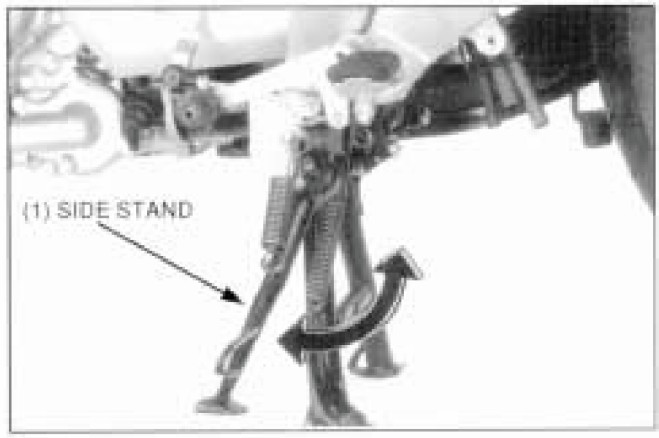
Side Stand

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.
Make sure that the side stand is not bent.

Check the side stand ignition cut-off system:
- Place the motorcycle on its main stand and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand fully down.
- The engine should stop as the side stand is lowered.

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



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

Check the action of the fork by operating the front brakes and compressing the front suspension several times.
Check the entire fork 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 front fork service.

REAR

Support the motorcycle on its main stand.
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 15).

Check the action of the shock absorber by compressing them 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 15 for shock absorber service.

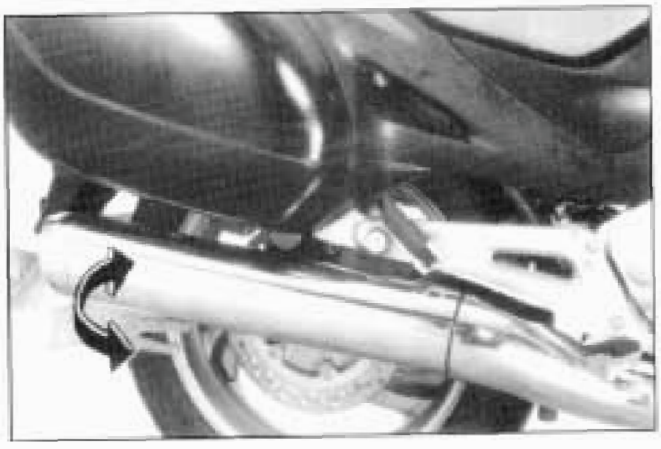
Nuts, Bolts, Fasteners

Check that all chassis nuts, bolts and screws are tightened to their correct torque values (page 1-14) at the interval shown in the Maintenance Schedule.
Check that all cotter pins, slip clips, hose clamps and cable stays are in place and properly secured.

Wheels/Tires

Making sure the fork is not allowed to move, raise the front wheel and check for play. Turn the wheel and check that it rotates smoothly with no usual noises.

If faults are found, inspect the wheel bearings.
Support the motorcycle securely and raise the rear wheel off the ground.
Check for play in either the wheel or the swingarm pivot.
Turn the wheel and check that it rotates smoothly with no unusual noises.



If abnormal conditions are suspected, check the rear wheel bearings.

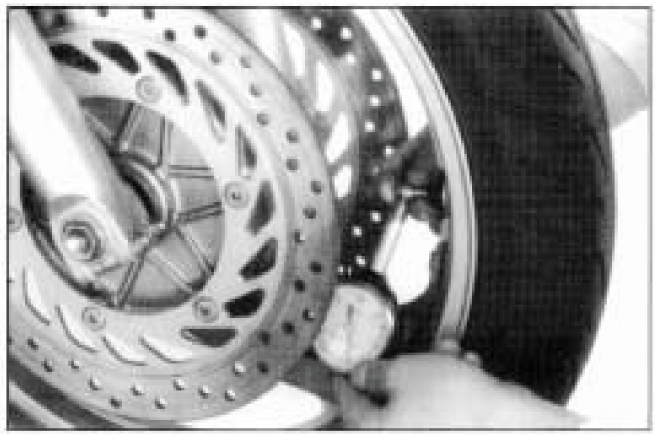
NOTE:

- As the swingarm pivot is included in this check, be sure to confirm the location of the play; i.e. from the wheel bearings or the swingarm pivot.

Check the pressure of each tire with a pressure gauge.

NOTE:

- Tire pressure should be checked when tires are COLD.



RECOMMENDED TIRE PRESSURE AND SIZE

		Front	Rear
Tire size		120/70 ZR17 (58W)	150/70 ZR17 (69W)
Cold tire pressures kPa (kgf/cm², psi)	Up to 90 kg (200 lb) load	245 (2.50, 36)	284 (2.90, 41)
	Up to maximum weight capacity	245 (2.50, 36)	284 (2.90, 41)
Maximum weight capacity			
Tire brand	Dunlop	D205FN	D205N
	Michelin	MACADAM 90XB	

Check the tires for cuts, embedded nails, or other damage. Check the front and rear wheels for trueness (refer to section 14 and 15).

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

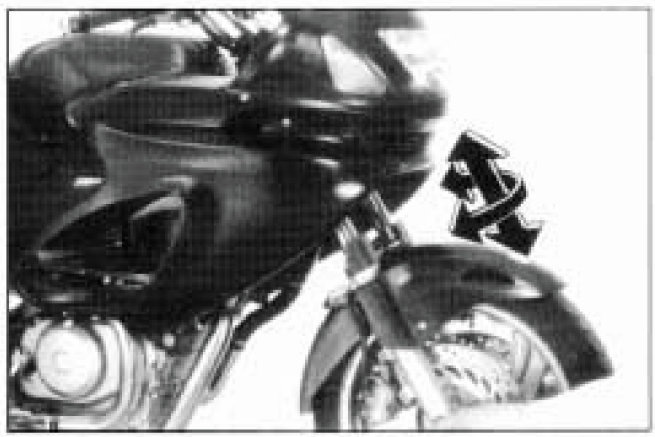
Minimum Tread Depth:
Front: 1.5 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

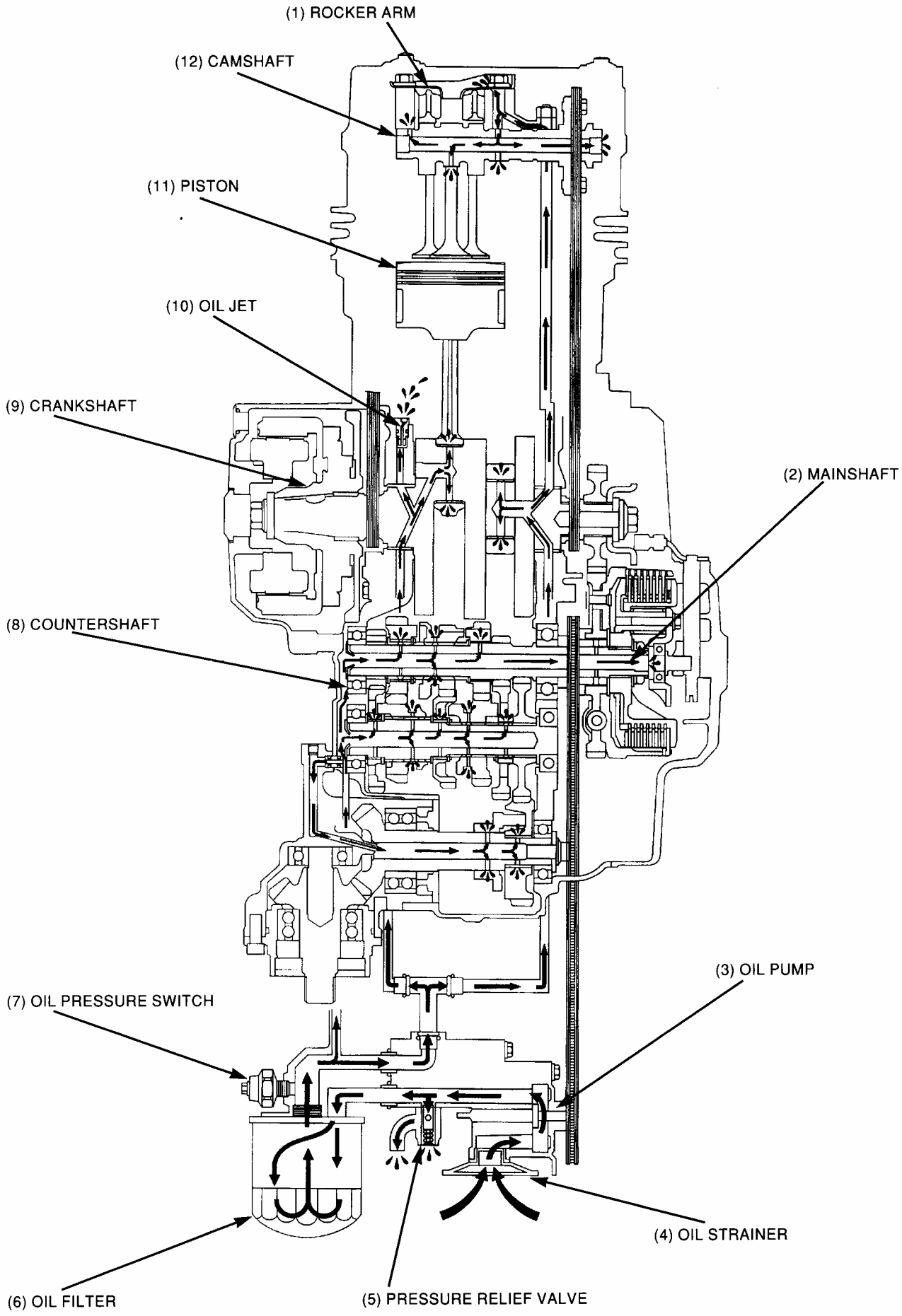
Steering Head Bearings

NOTE:

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

Support the motorcycle securely and raise the front wheel off ground 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 14).




(1) ROCKER ARM
(12) CAMSHAFT
(11) PISTON
(10) OIL JET
(9) CRANKSHAFT
(2) MAINSHAFT
(8) COUNTERSHAFT
(3) OIL PUMP
(7) OIL PRESSURE SWITCH
(4) OIL STRAINER
(6) OIL FILTER
(5) PRESSURE RELIEF VALVE

4. Lubrication System

SERVICE INFORMATION	4-1	ENGINE PRESSURE CHECK	4-3
TROUBLESHOOTING	4-2	OIL PUMP	4-4

Service Information

GENERAL

⚠ WARNING

- **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. 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 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 engine must be removed from the frame before servicing the oil pump.
- When removing and installing the oil pump use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the engine has been installed check that there are no oil leaks and that oil pressure is correct.
- For oil pressure indicator inspection, refer to section 20 of this manual.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Engine oil capacity	After draining	2.4 liters (2.52 U.S. qt, 2.11 Imp qt)	—
	After disassembly	3.0 liters (3.15 U.S. qt, 2.64 Imp qt)	—
	After oil filter change	2.6 liters (2.73 U.S. qt, 2.29 Imp qt)	—
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		441 kPa (4.5 kgf/cm², 64 psi) at 6,000 min⁻¹ (rpm) (80° C/176° F)	—
Oil pump rotor	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 pressure switch	12 N·m (1.2 kgf-m, 9 lbf-ft)	Apply sealant to the threads
Oil pressure switch wire terminal screw	2 N·m (0.2 kgf-m, 1.4 lbf-ft)	
Oil pump cover bolt	13 N·m (1.3 kgf-m, 9 lbf-ft)	CT bolt
Engine oil filter boss (stud)	18 N·m (1.8 kgf-m, 13 lbf-ft)	Apply a locking agent to the threads

TOOLS

Oil filter wrench	07HAA-PJ70100
Oil pressure gauge	07506-3000000
Oil pressure gauge attachment	07510-4220100

Troubleshooting

Oil level low
- Oil consumption
- External oil leak
- Worn piston ring or incorrect piston ring installation
- Worn valve guide or seal

Oil contamination (White appearance)
- From coolant mixing with oil
  - Faulty water pump mechanical seal
  - Faulty head gasket
  - Water leak in crankcase

No oil pressure
- Oil level too low
- Oil pump drive chain or drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure
- Pressure relief valve stuck open
- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level tool low

High oil pressure
- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Incorrect oil being used

Seized engine
- No or low oil pressure
- Clogged oil orifice/passage
- Internal oil leak
- Non-recommended oil used

Oil contamination
- Deteriorated oil
- Faulty oil filter
- Worn piston ring (White appearance with water or moisture)
  - Damaged water pump mechanical seal
  - Damaged head gasket
  - Oil relief not frequent enough

Oil pressure warning indicator does not work
- Faulty oil pressure switch
- Short circuit in the indicator wire
- Low or no oil pressure

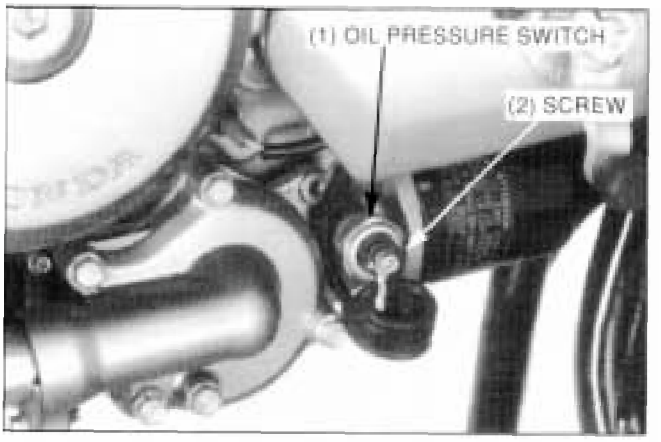
Engine Pressure Check

NOTE:

> • If the engine is cold, the pressure reading will be abnormally high. Warm up the engine to normal operating temperature before starting this test.

Warm up the engine.
Stop the engine.

Remove the screw cover and screw.
Disconnect the oil pressure switch cord.



Remove the oil pressure switch.
Connect the oil pressure gauge attachment and gauge to the pressure switch hole.

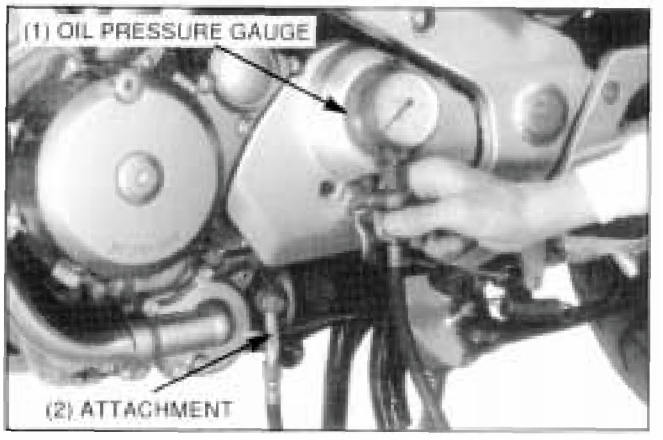
Tools:

Oil pressure gauge	**07506-3000000**
Oil pressure gauge attachment	**07510-4220100**

Check the oil level and add the recommended oil if necessary (page 3-10).

Start the engine and check the oil pressure at 6,000 min^{-1} (rpm)

Oil pressure: 441 kPa (4.5 kgf/cm², 64 psi) at 6,000 min^{-1} (rpm) (80° C/176° F)



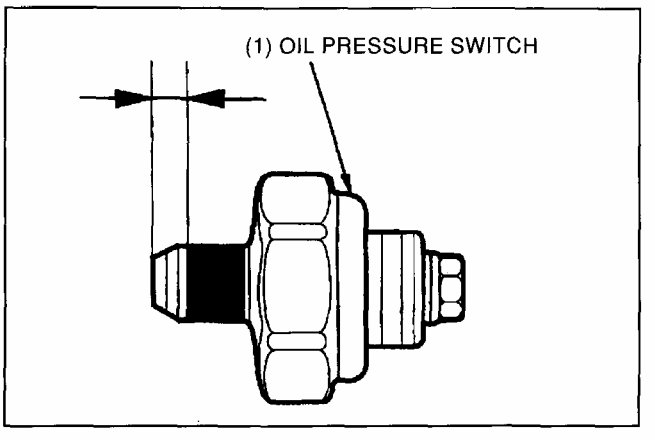
Stop the engine and remove the oil pressure gauge attachment and gauge from the pressure switch hole.

Apply sealant to the oil pressure switch threads as shown and tighten it to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

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

Torque: 2 N·m (0.2 kgf-m, 1.4 lbf-ft)



Start the engine.
Check the oil pressure indicator goes out after one or two seconds. If the oil pressure indicator stay on, stop the engine immediately and determine the cause (page 20-9).

Oil Pump

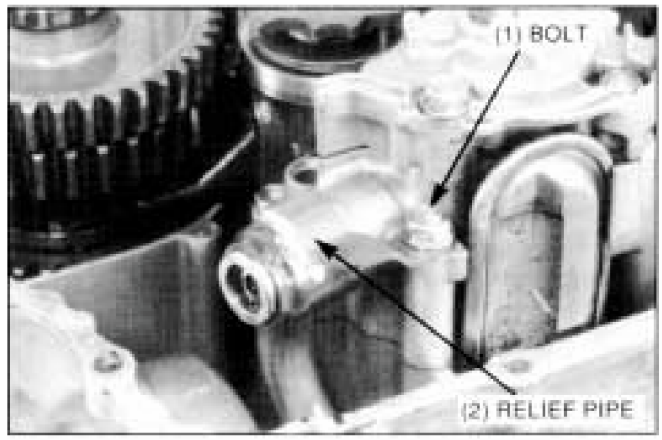
NOTE:

- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.

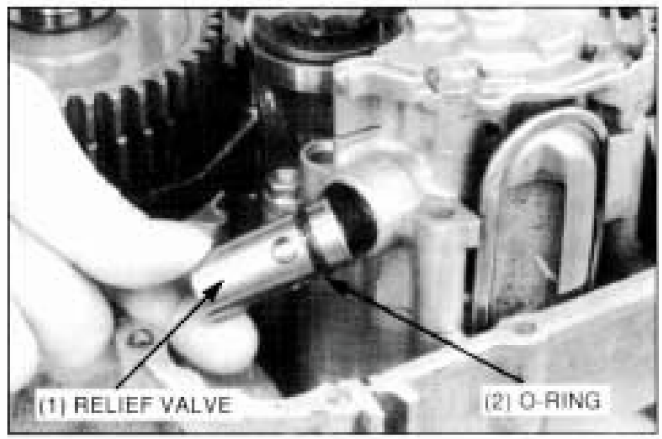
REMOVAL

Separate the crankcase (page 12-4).

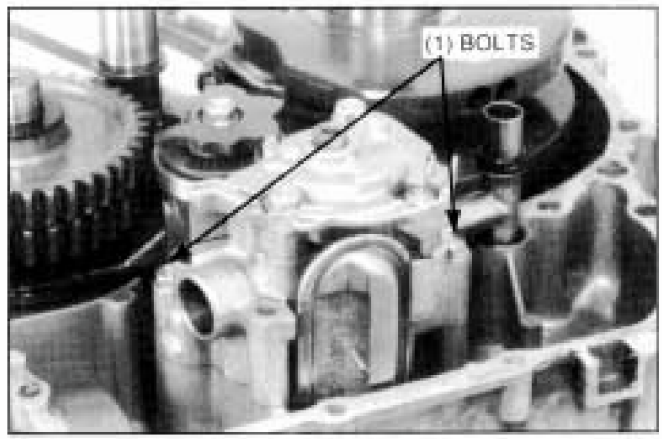
Remove the bolt and oil relief pipe.



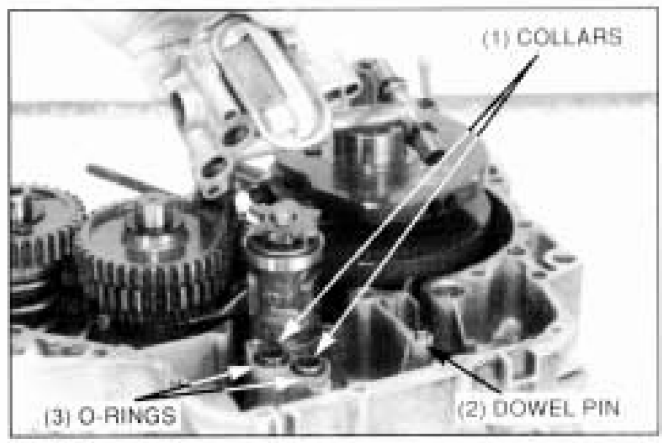
Remove the oil relief valve and O-ring.



Remove the oil pump mounting bolts.



Remove the oil pump.
Remove the collars and O-rings.
Remove the dowel pin.



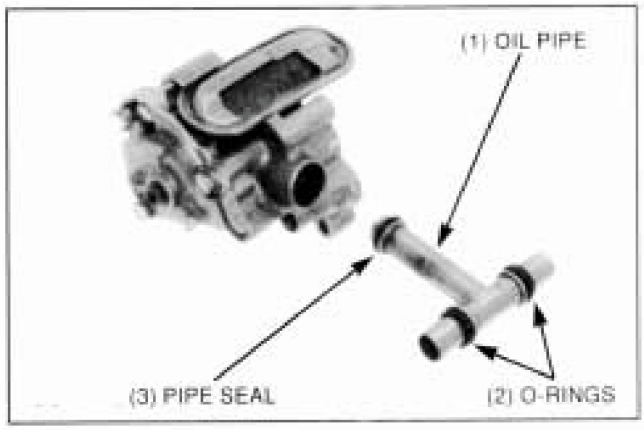
DISASSEMBLY

OIL PUMP DISASSEMBLY

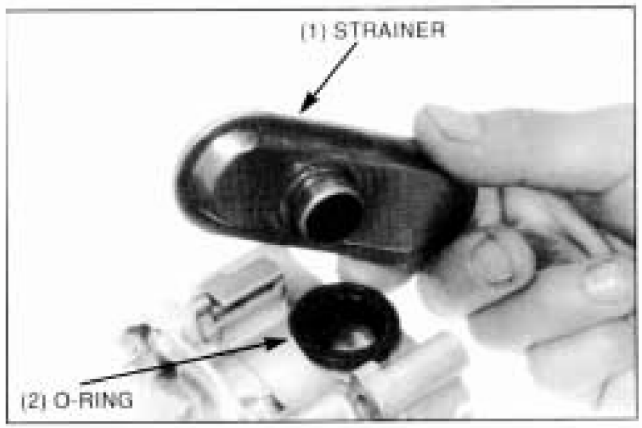
NOTE:

> • If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.

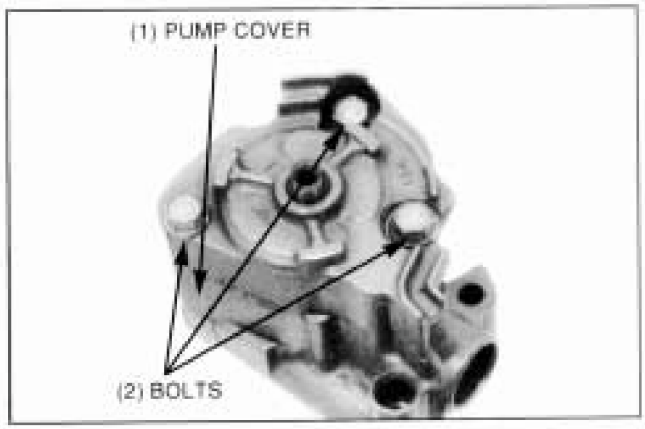
Remove the oil pipe, oil pipe seal and O-rings.



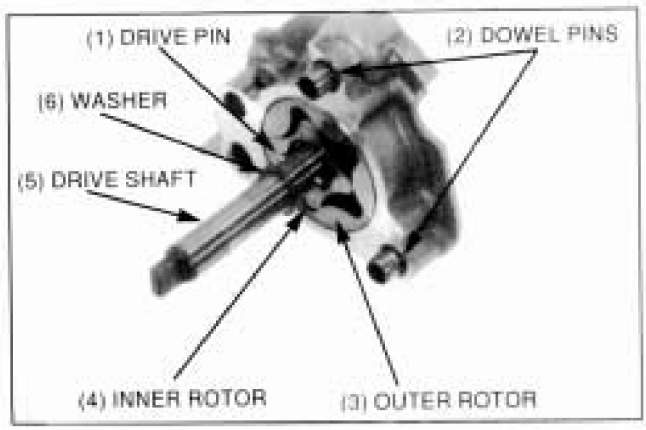
Remove the oil strainer and O-rings.



Remove the bolts and pump cover from pump body.



Remove the dowel pins.
Remove the washer, drive shaft, drive pin, inner rotor and outer rotor.



PRESSURE RELIEF VALVE CHECK

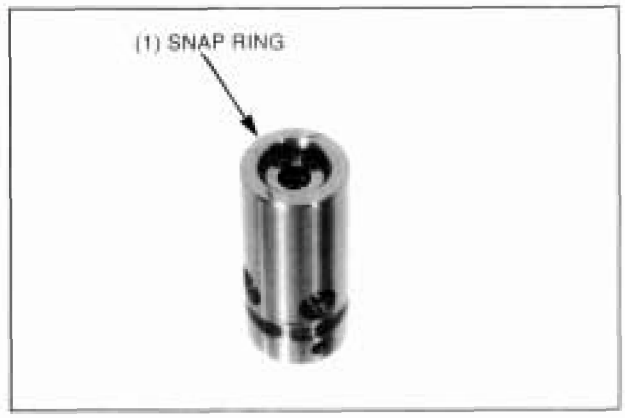
⚠ WARNING

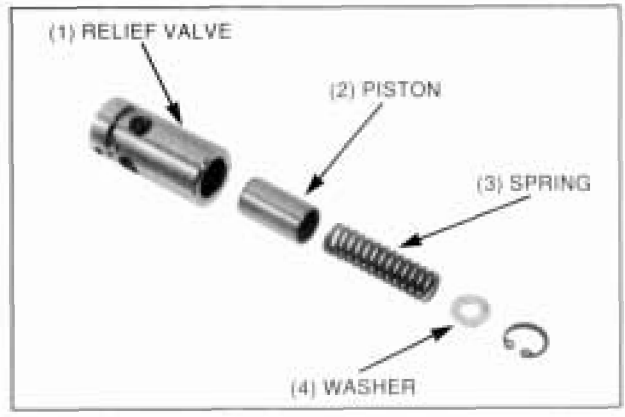
••The snap ring is under spring pressure. Use care when removing it and wear eye and face protection.

Check the operation of the pressure relief valve by pushing on the piston.
Remove the O-ring.
Remove the pressure relief valve snap ring and disassemble the pressure relief valve.

Check the piston for wear, sticking or damage.
Check the valve spring and piston for wear or damage.
Check the relief valve for clogging for damage.

Clean the remaining parts and assemble the relief valve in the reverse order of disassemble.





INSPECTION

NOTE:

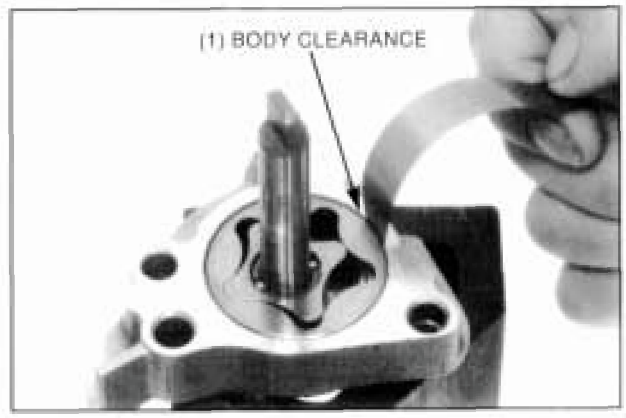
- •Measure at several places and use the largest reading to compare to the service limit.
- •If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly

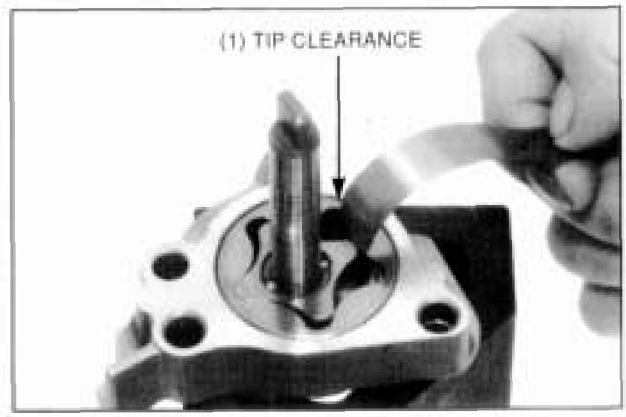
BODY CLEARANCE
Install the inner rotor and outer rotor to the pump body.
Install the drive shaft properly.
Measure the pump body-to-outer rotor clearance using the feeler gauge.

Service Limit: 0.35 mm (0.014 in)

TIP CLEARANCE
Install the inner rotor and outer rotor to the pump body.
Install the drive shaft properly.
Measure the outer rotor-to-inner rotor clearance using the feeler gauge.

Service Limit: 0.20 mm (0.008 in)

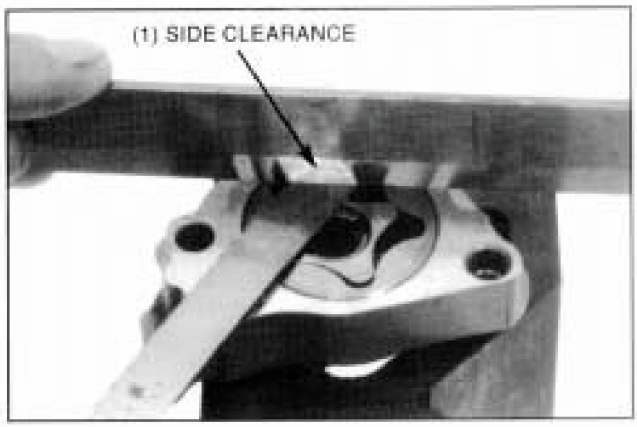




SIDE CLEARANCE

Install the inner rotor and outer rotor to the pump body. Measure the rotor side-to-pump body clearance using the feeler gauge and straight edge.

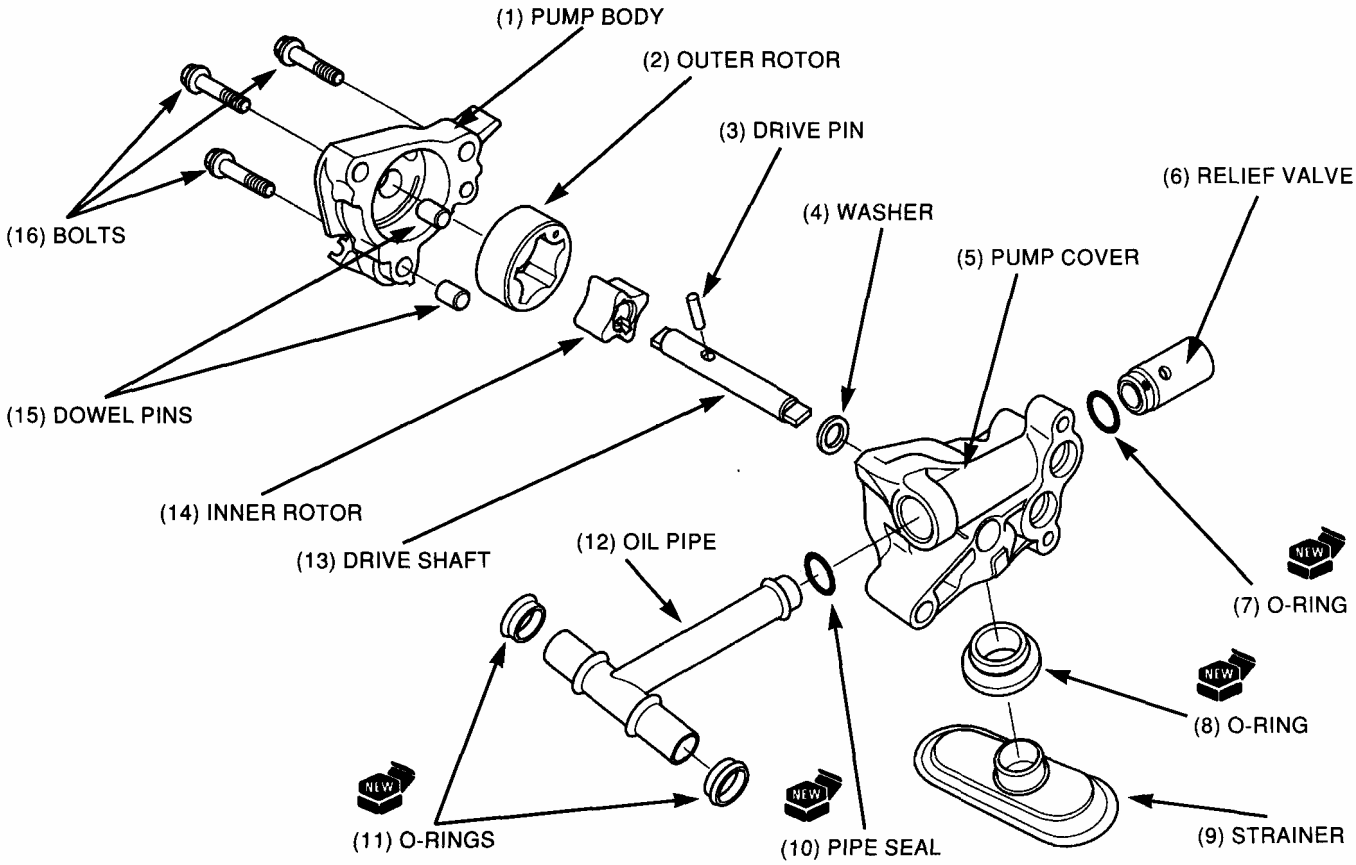
Service Limit: 0.10 mm (0.004 in)



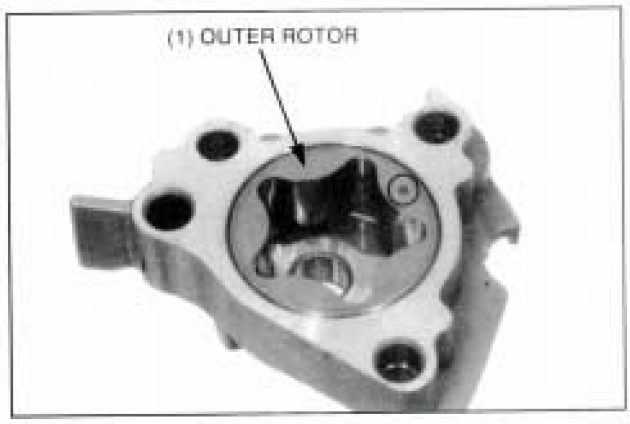
ASSEMBLY

NOTE:

- Before assembly, clean all disassembled parts thoroughly with clean engine oil.



Install the outer rotor to the pump body.

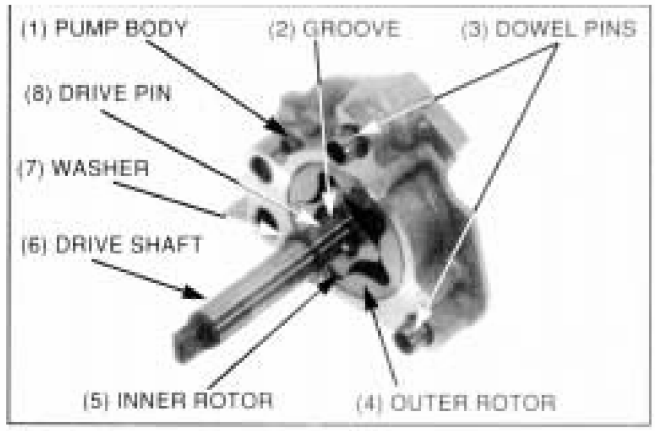


Install the inner rotor to the outer rotor.

NOTE:

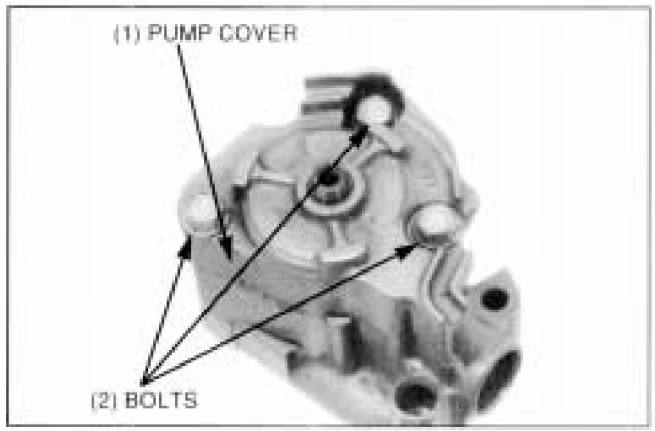
- When inner rotor installing, install it with the slots side facing the pump cover.

Install the drive shaft and drive pin by aligning the slots in the inner rotor.
Place the washer into the inner rotor groove.
Install the dowel pin to the pump cover.

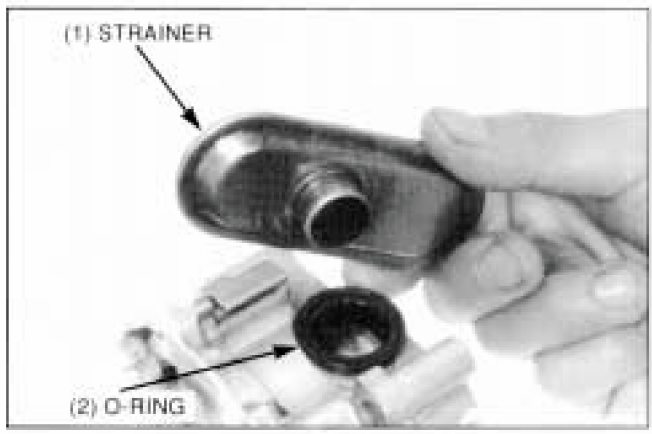


Install the pump body to the pump cover.
Install and tighten the bolts to the specified torque.

Torque: 13 N·m (1.3 kgf-m, 9 lbf-ft)

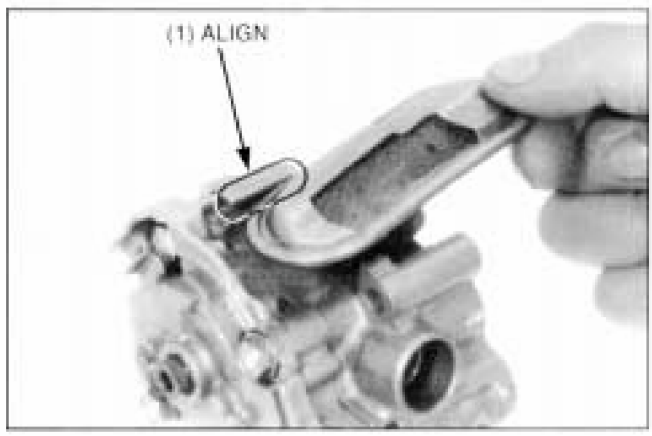


Clean the oil strainer.
Apply oil to the new O-ring and install the oil strainer.
Install the oil strainer to the oil pump aligning it to the groove on the oil pump.



NOTE:

- Install the oil strainer to the pump body groove securely.

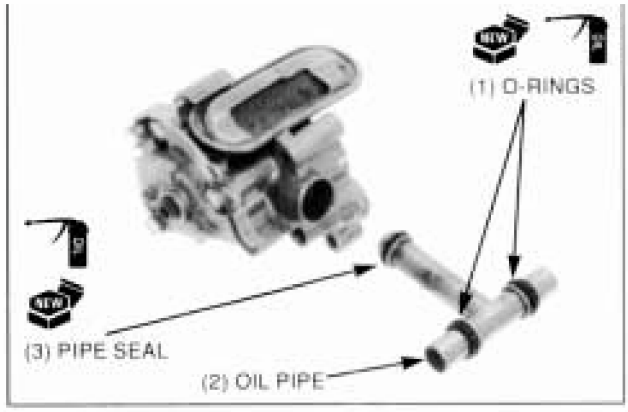


Apply oil to the new oil pipe seal and new O-rings, then install to the oil pipe.

NOTE:

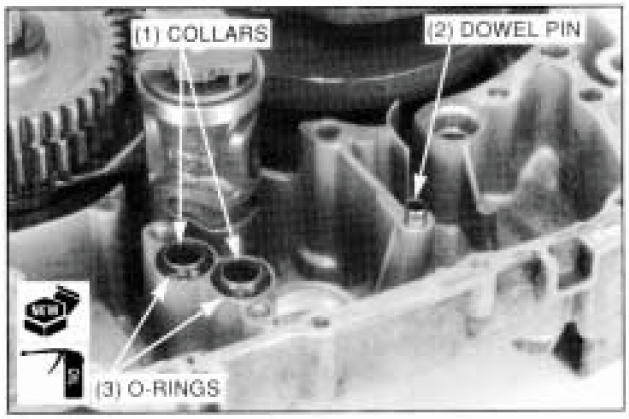
- Install the O-rings with their tapered side facing out.

Install the oil pipe to the oil pump securely.

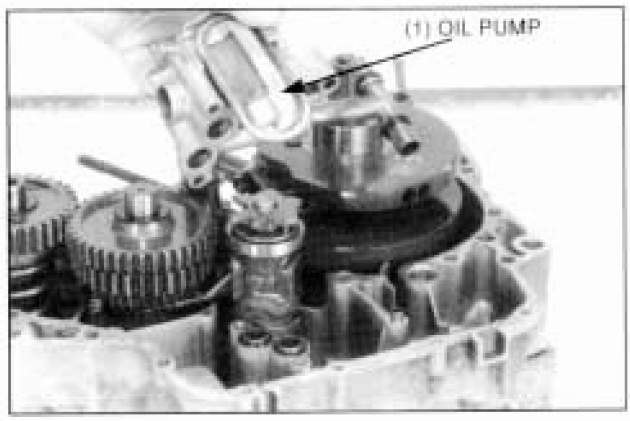


INSTALLATION

Install the dowel pin.
Install the collars.
Apply oil to the new O-rings and install onto the collars.

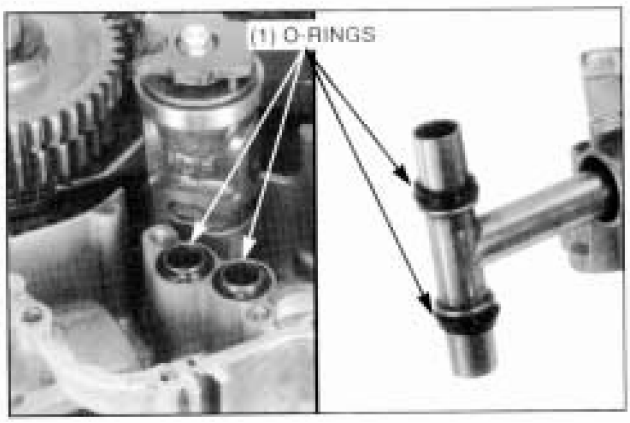


Install the oil pump into the crankcase securely.

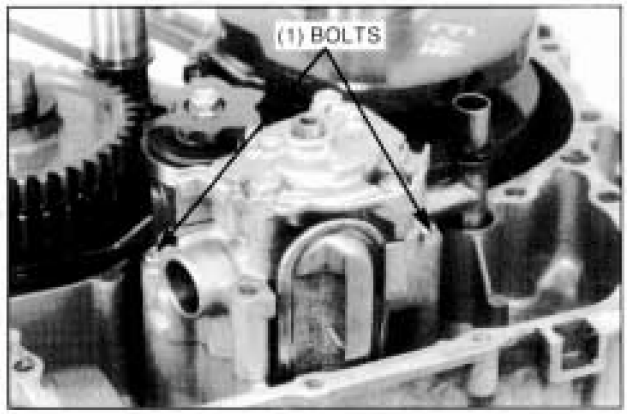


NOTE:

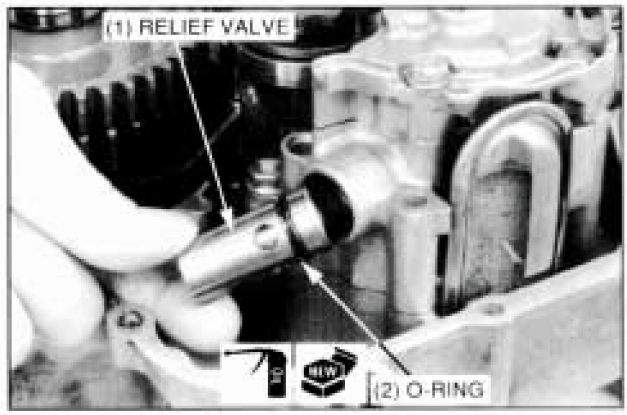
- Be careful not to damage the O-rings at oil pump installation.



Install and tighten the bolts securely.

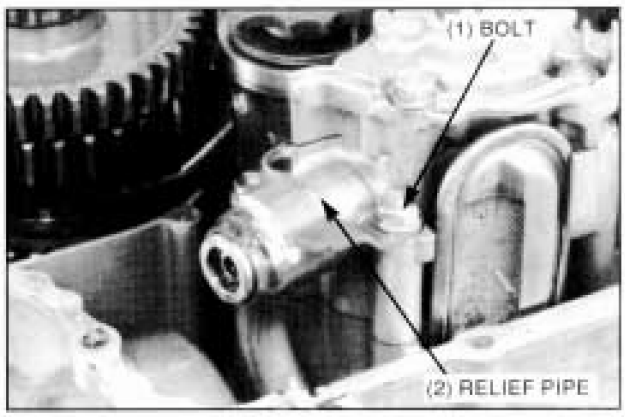


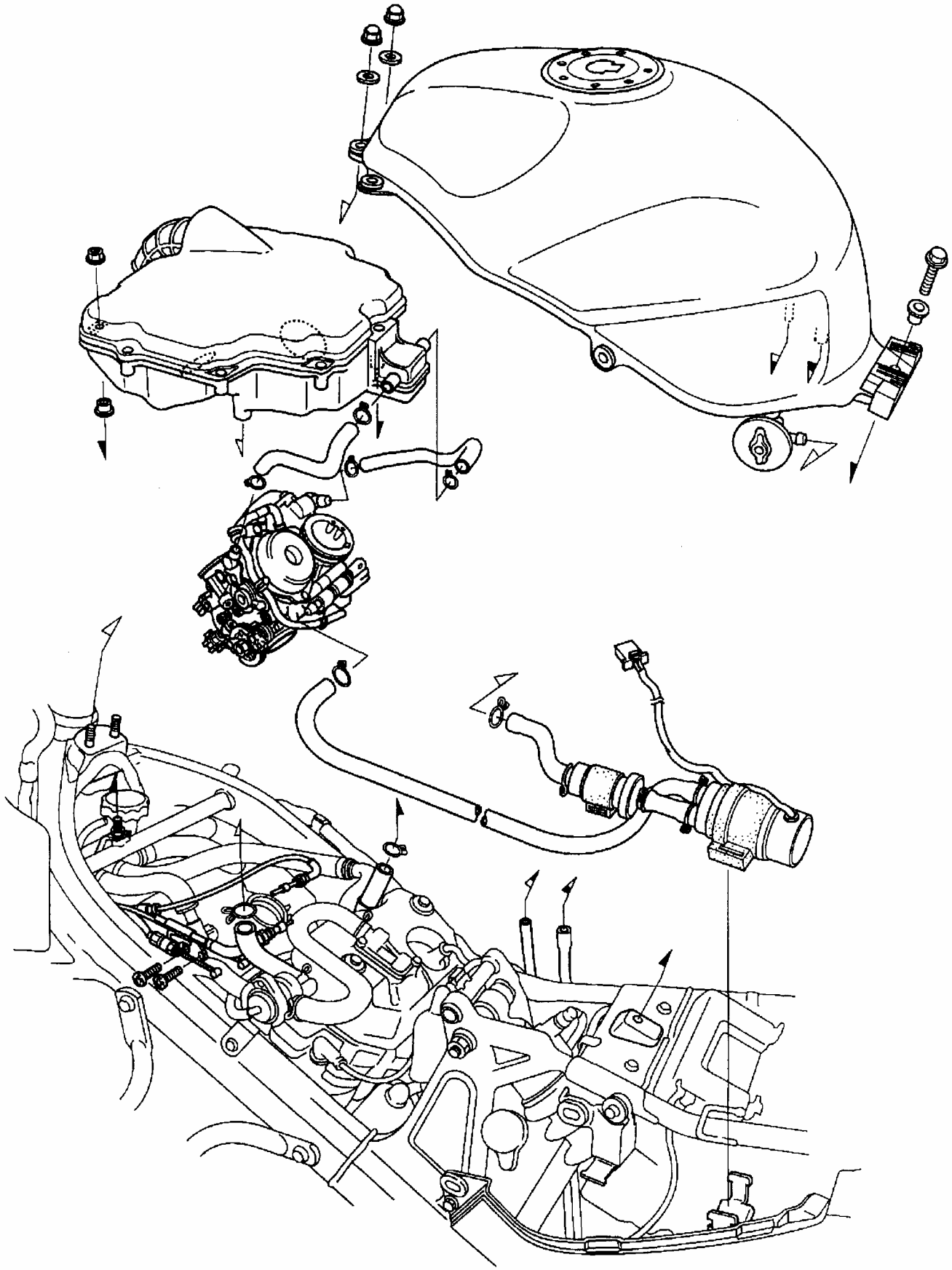
Apply oil to the new O-ring and install the pressure relief valve groove, and install the relief valve to the oil pump.



Install the oil relief pipe.
Install and tighten the bolt securely.

Combination the crankcase (page 12-37).
Check that there are no oil leaks and that oil pressure is correct.





5. Fuel System

SERVICE INFORMATION	5-1	CARBURETOR BODY CLEANING	5-14
TROUBLESHOOTING	5-3	CARBURETOR SEPARATION	5-15
AIR CLEANER HOUSING	5-4	CARBURETOR REASSEMBLY	5-16
SUB-AIR CLEANER ELEMENT	5-5	CARBURETOR INSTALLATION	5-18
CARBURETOR REMOVAL	5-6	PILOT SCREW ADJUSTMENT	5-20
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VACUUM CHAMBER	5-9	FUEL PUMP	5-22
FLOAT CHAMBER	5-11	FUEL FILTER	5-25
AIR CUT-OFF VALVE	5-14		

Service Information

GENERAL

⚠ WARNING

- **Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.**
- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of the consciousness and may 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 removal and installation, refer to Section 2.
- Before disassembling the carburetor, place an approved gasoline container under the carburetor drain tube, loosen the carburetor drain screw and drain the carburetor.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- After removing the carburetor, wrap the intake ports of the engine with a shop towel or cover them with a piece of tape to prevent any foreign material from dropping into the engine. Be sure to remove the cover when reinstalling the carburetor.

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 lets resulting in hard starting or poor driveability.

SPECIFICATIONS

Unit: mm (in)

Item		Specifications
Carburetor identification number	Except SW type	VDK1D
	SW type	VDKAC
Main jet	Front	# 125
	Rear	# 125
Slow jet		# 45
Pilot screw	Initial/final opening	See page 5-21
Float level		9.2 mm (0.36 in)
Base carburetor (for synchronization)		Rear cylinder (#1)
Idle speed	Except SW type	1,200 ± 100 min^{-1} (rpm)
	SW type	1,200 ± 50 min^{-1} (rpm)
Carburetor vacuum difference		27 kPa (20 mm Hg, 0.7 in Hg)
PAIR control valve specified vacuum		320 mm Hg (12.6 in Hg)
Throttle grip free play		2 - 6 mm (1/12 - 1/4 in)
Fuel pump flow capacity		Minimum 600 cm^3 (20.3 US oz, 21.1 Imp oz) per minute at 13 V

TOOLS

Carburetor float level gauge	07401-0010000
Pilot screw wrench	07KMA-MS60101 SW type only

Troubleshooting

Oil level low
- No fuel in tank
- No fuel to carburetor
  - Fuel strainer clogged
  - Fuel filter clogged
  - Fuel valve stuck
  - Fuel line clogged
  - Fuel tank breather clogged
  - Float level faulty
  - Fuel pump malfunction
- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated/deteriorated
  - Jet clogged
- Improper starting enrichment valve operation
- Slow circuit or starting enrichment valve circuit clogged
- Improper throttle operation
- No spark at plug (ignition system faulty)

Lean mixture
- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Intake air leak
- Throttle valve faulty
- Vacuum piston faulty
- Throttle valve faulty
- Fuel pump malfunction

Rich mixture
- Starting enrichment valve open
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner element contaminated
- Flooded carburetor

Engine stalls, hard to start, rough idling
- Fuel line restricted
- Ignition system malfunction
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
  - Jet clogged
- Intake air leak
- Idle speed misadjusted
- Float level misadjusted
- Fuel tank breather clogged
- Pilot screw misadjusted
- Slow circuit or starting enrichment valve circuit clogged
- Carburetor synchronization misadjusted
- Fuel pump malfunction
- Valve clearance misadjusted
- Cylinder compression too low

Afterburn when engine braking is used
- Lean mixture in slow circuit
- Air cut off valve malfunction

Backfiring or misfiring during acceleration
- Ignition system malfunction (Section 18)
- Fuel mixture too lean

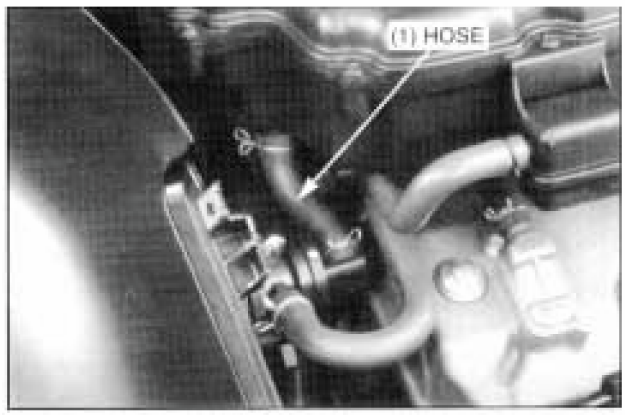
Poor performance (driveability) and poor fuel economy
- Fuel system clogged
- Ignition system malfunction (Section 18)

Air Cleaner Housing

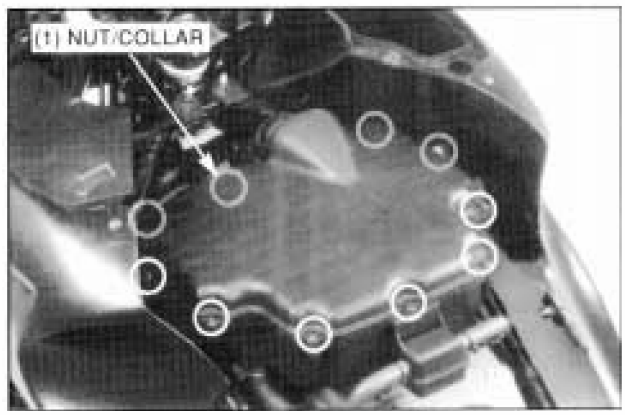
REMOVAL

Remove the fuel tank (page 2-11).

Disconnect the air suction hose from the air cleaner housing.



Remove the air cleaner housing mounting nut and collar.



Disconnect the AICV vacuum tubes and crankcase breather tube.
Loosen the connecting tube band.
Remove the air cleaner housing.

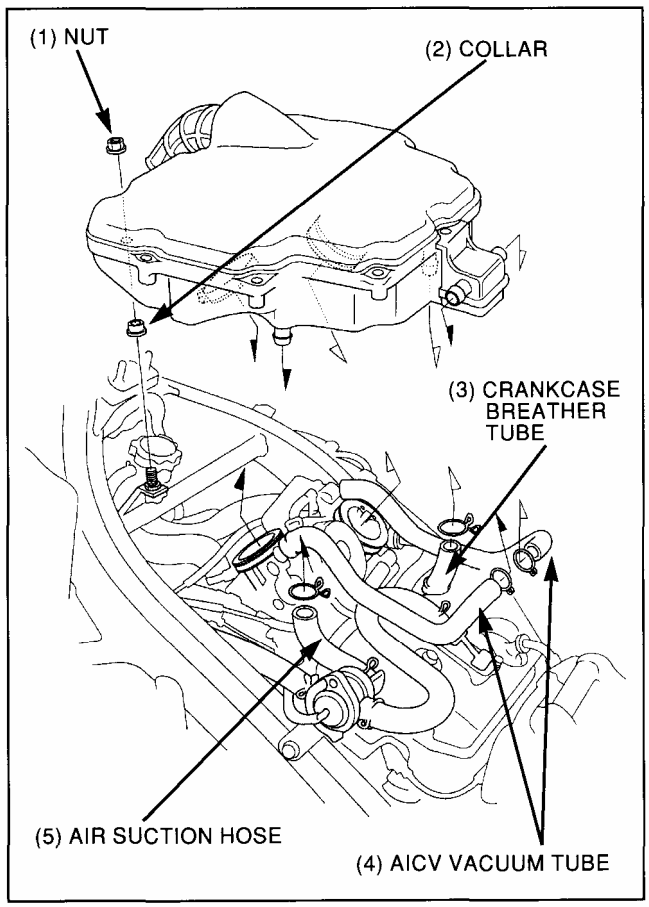
INSTALLATION

Install the air cleaner housing.

Tighten the connecting tube band screws securely.

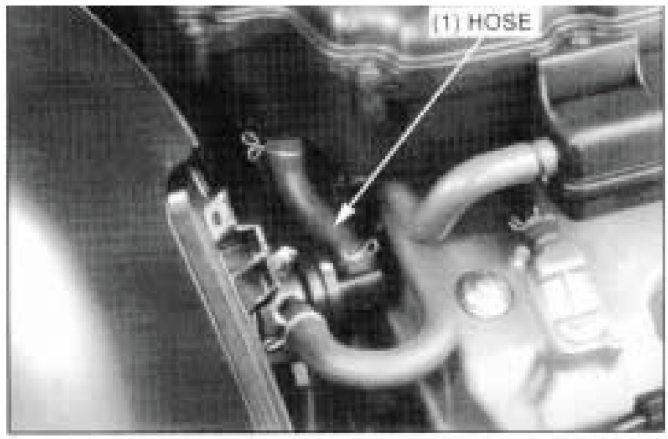
Connect the crankcase breather tube and AICV vacuum tubes.

Install the collar and air cleaner housing mounting nut.
Tighten the nut securely.



Connect the air suction hose.

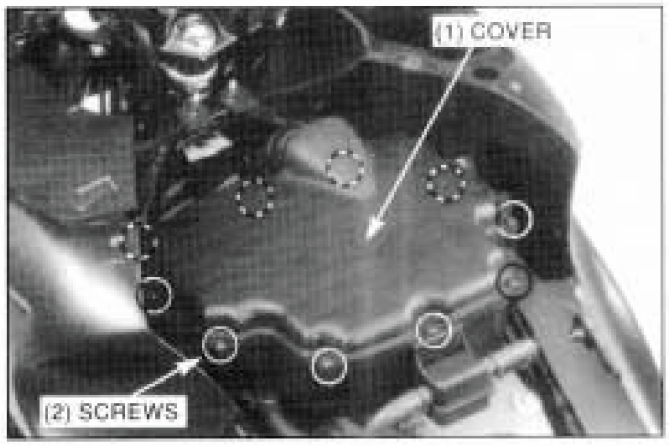
Install the fuel tank (page 2-4).



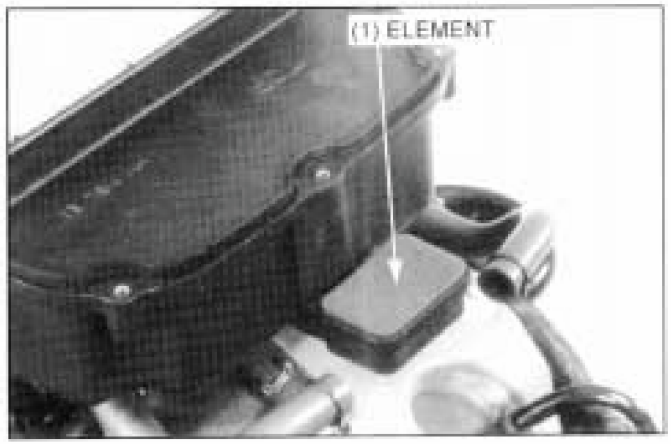
Sub-Air Cleaner Element

Remove the fuel tank (page 2-11).

Remove the air cleaner housing cover.



Remove the element.

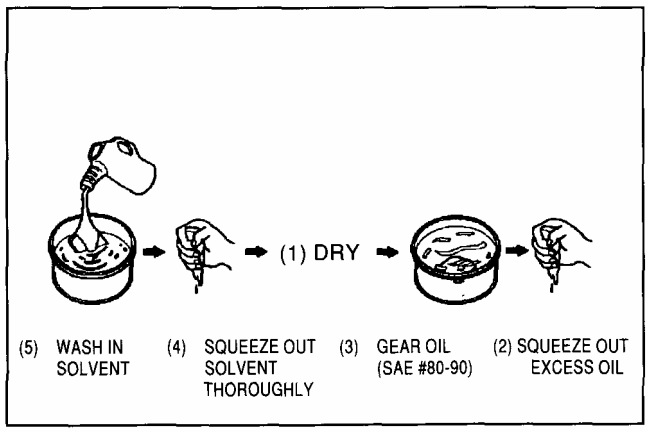


Wash the element in non-flammable or high flash point solvent, squeeze out the solvent thoroughly, and allow the element to dry.

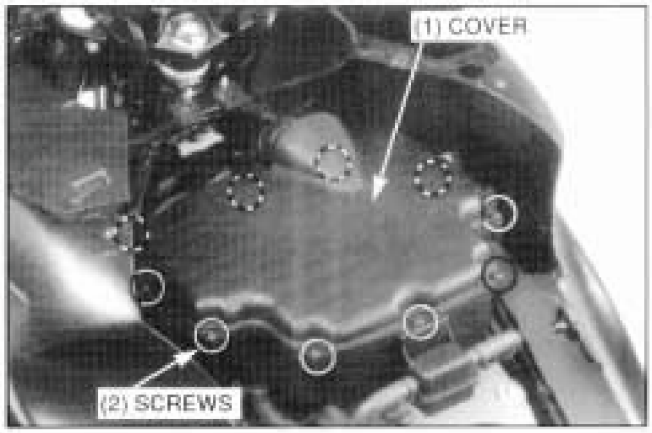
⚠ WARNING

- **Never use gasoline or low flash point solvents for cleaning the element. A fire or explosion could result.**

Allow the element to dry thoroughly.
Soak the element in gear oil (SAE #80-90) and squeeze out the excess.



Install the element and air cleaner housing cover.
Install the fuel tank (page 2-11).



Carburetor Removal

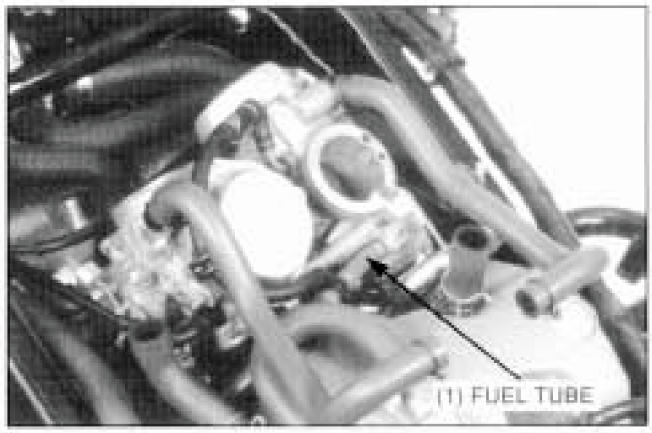
⚠ WARNING

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

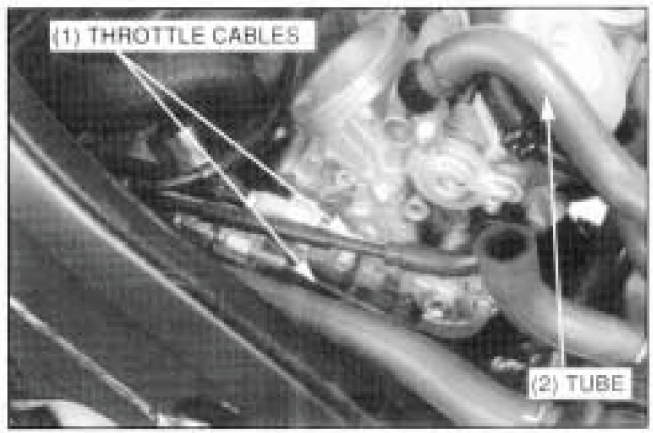
Remove the air cleaner housing (page 5-4).

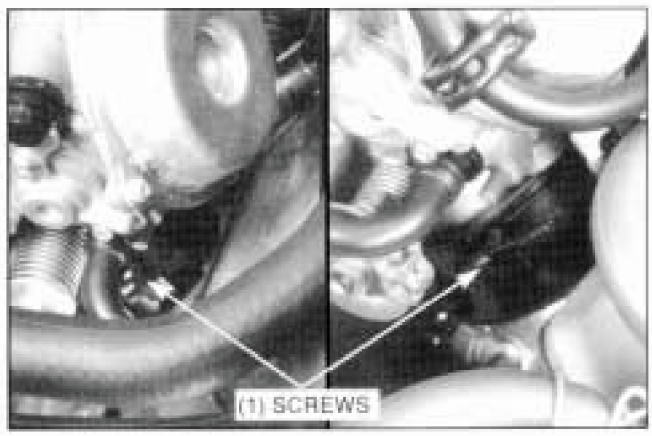
Loosen the carburetor drain screws and drain the carburetor.

Disconnect the fuel tube from the carburetor.

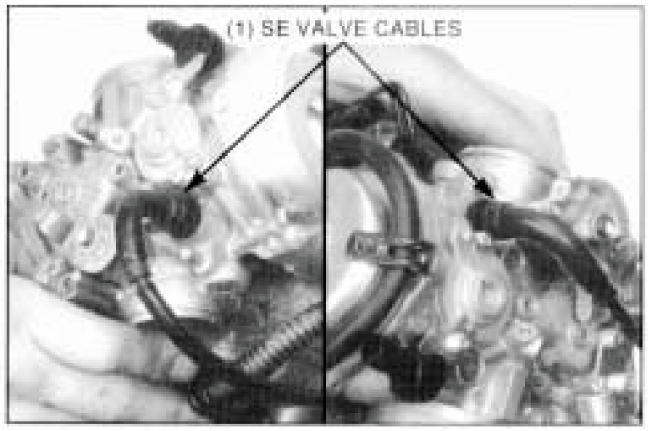


Disconnect the throttle cables from the throttle link.
Disconnect the sub-air cleaner tubes.
Loosen the insulator band screws and remove the carburetors.

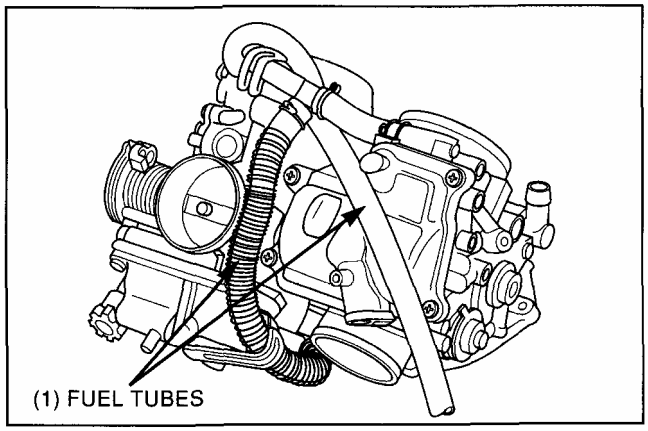


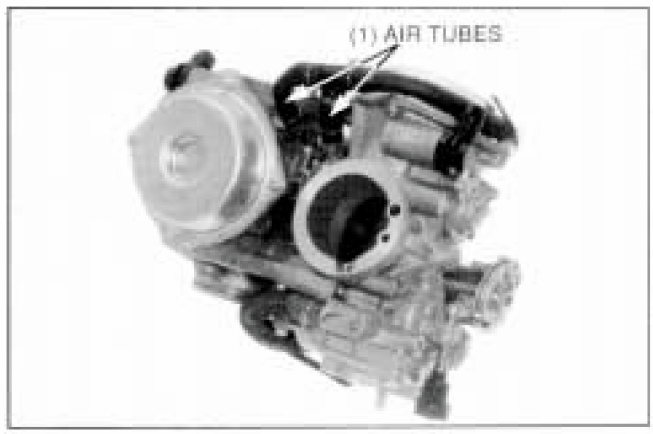


Remove the starting enrichment (SE) valve cables and SE valves from the carburetors by loosening each lock nuts.

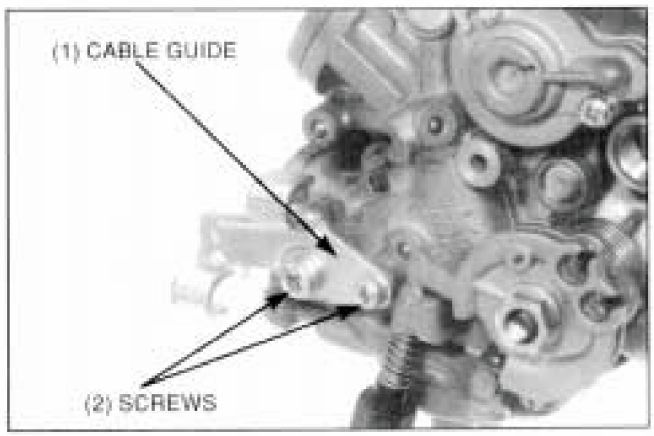


Remove the air tubes (carburetors-to-air cleaner) and fuel tubes from the carburetors.





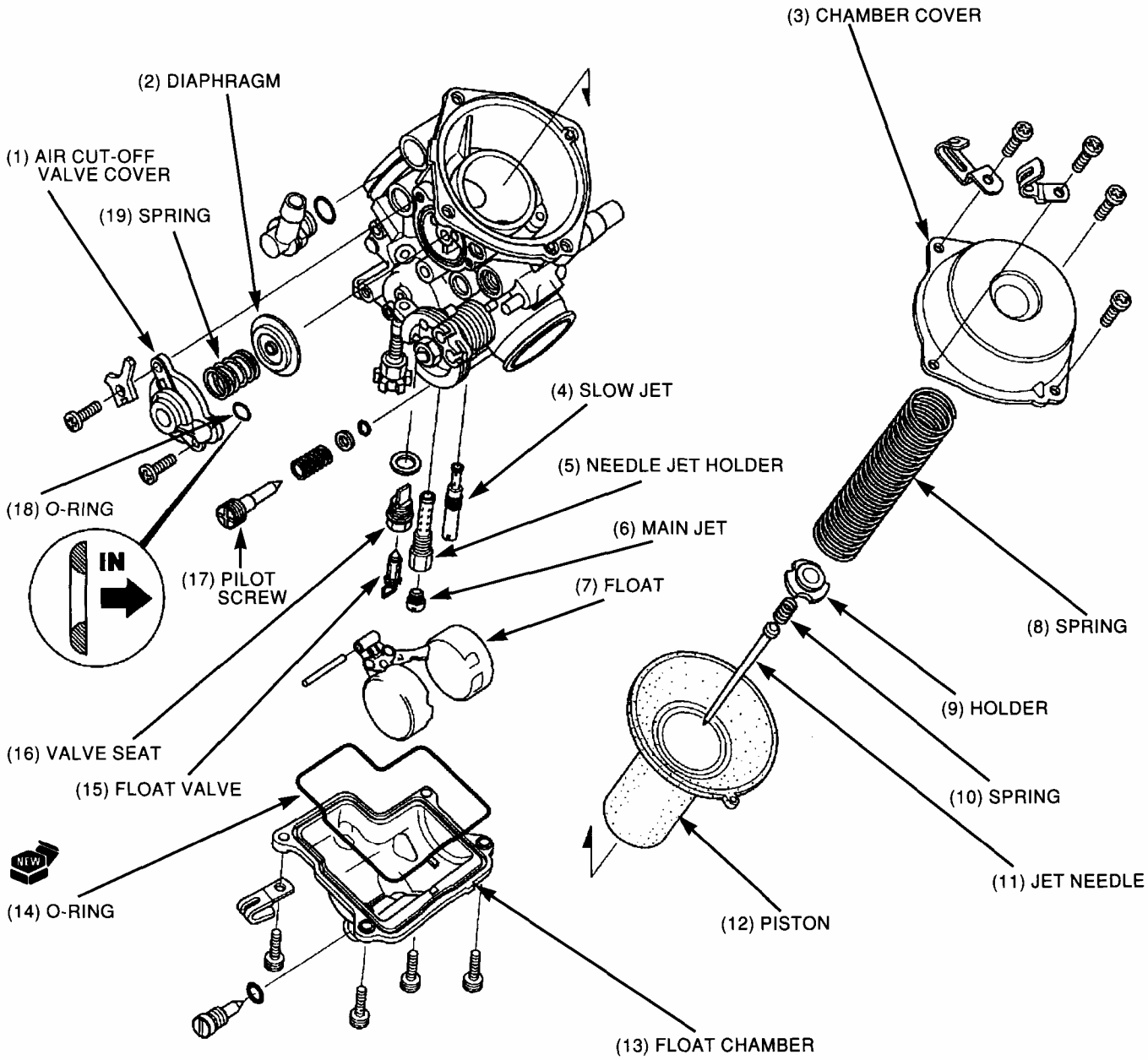
Remove the screws and throttle cable guide.



Carburetor Disassembly/Assembly

NOTE:

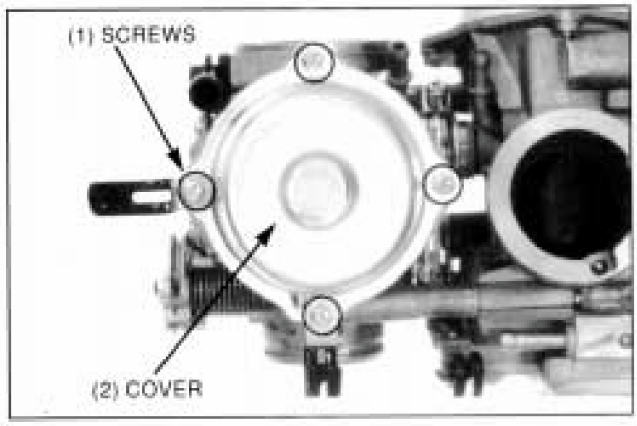
- Vacuum chamber, float chamber and jets can be serviced without separating the carburetors.
- Note: the location of the each carburetor parts so they can be back original location.
- Keep each carburetor's parts separate from the other's so you can install the parts in their original positions.
- For the following component inspections refer to the applicable pages.
  - Vacuum chamber (page 5-10)
  - Float chamber (page 5-12)
  - Pilot screw (page 5-12)
  - Jets (page 5-12)



Vacuum Chamber

DISASSEMBLY

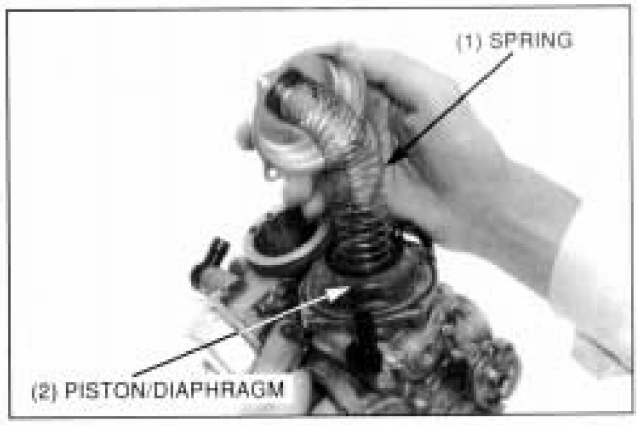
Remove the four screws and vacuum chamber cover.



Remove the spring, and diaphragm/vacuum piston.

Inspect the vacuum piston for wear, nicks, scratches or other damage.

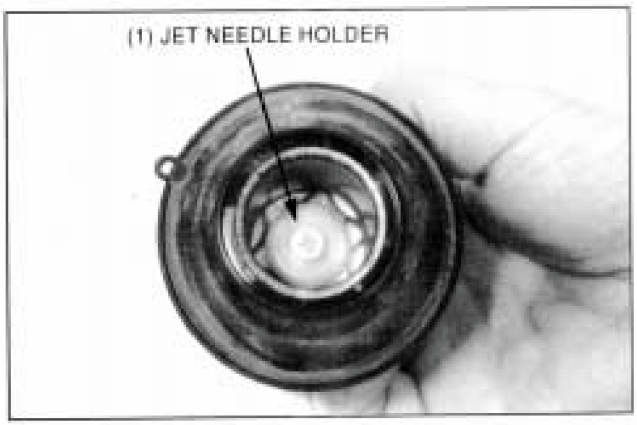
Make sure the piston moves up and down freely in the chamber.



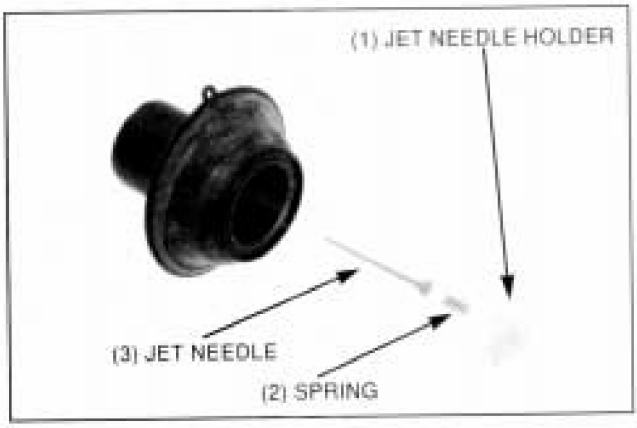
Push the jet needle holder in and turn it in 90 degrees counterclockwise.

CAUTION

- **Be careful not to damage the diaphragm.**



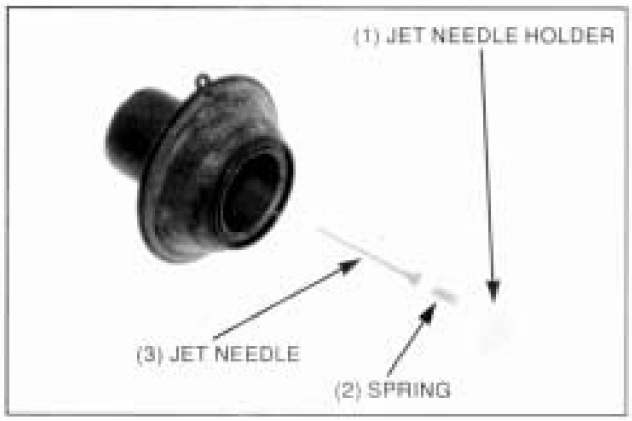
Remove the jet needle holder, spring and jet needle from the piston.



INSPECTION

Inspect the needle for excessive wear at the tip, bending or other damage.
Inspect the diaphragm for damage, fatigue or pin holes.
Inspect the vacuum piston for wear or damage.
Replace these parts if necessary.

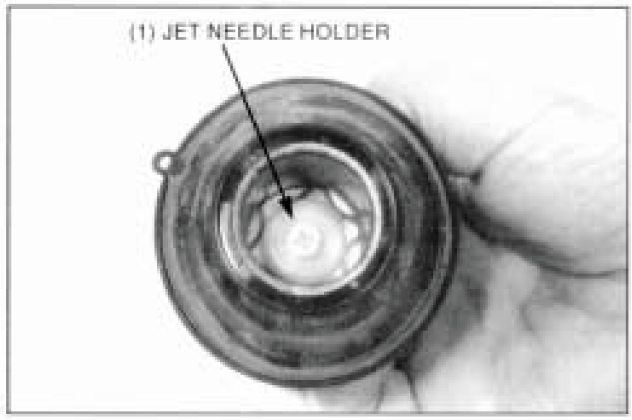
Air will leak out of the vacuum chamber if the diaphragm is damaged in any way-even a pin hole.



ASSEMBLY

Install the jet needle, spring and jet needle holder to the vacuum piston.

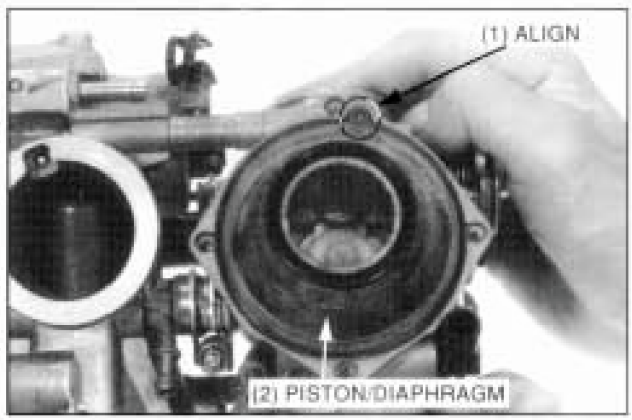
Push the jet needle holder in and turn it in 90 degrees clockwise.



Install the vacuum piston/diaphragm with the cavity.
Lift the bottom of the vacuum piston with your finger to set the diaphragm lip in the carburetor body.

NOTE:

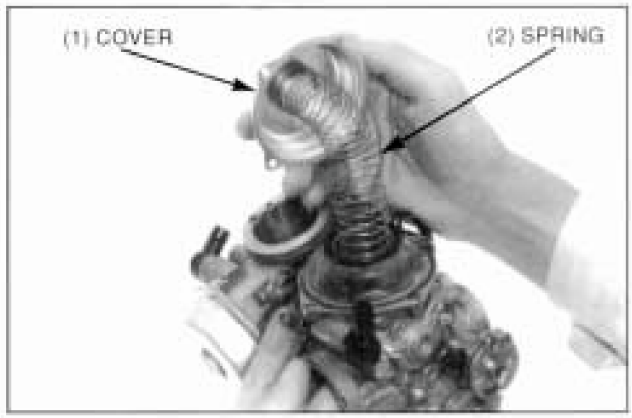
- Align the tab of the diaphragm with the cavity.



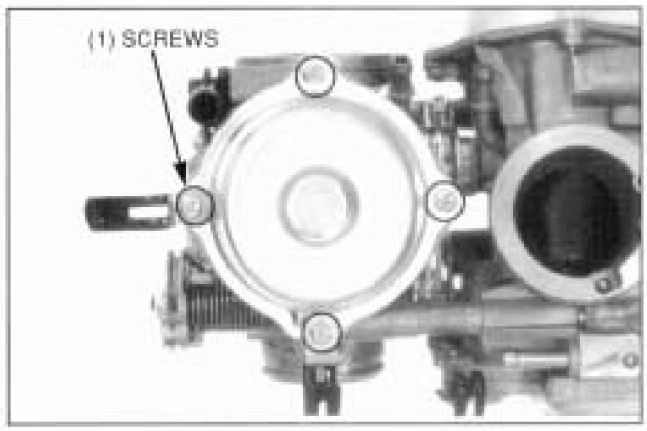
NOTE:

- Be careful not to pinch the diaphragm, and to keep the spring straight when installing the chamber cover by compressing the spring.

Install the spring and chamber cover while the piston remains in place.
Secure the cover with screws before releasing the vacuum piston.



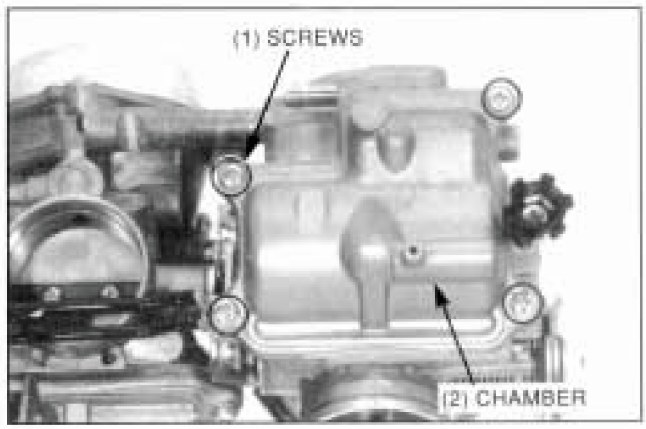
Install and tighten the screws securely.



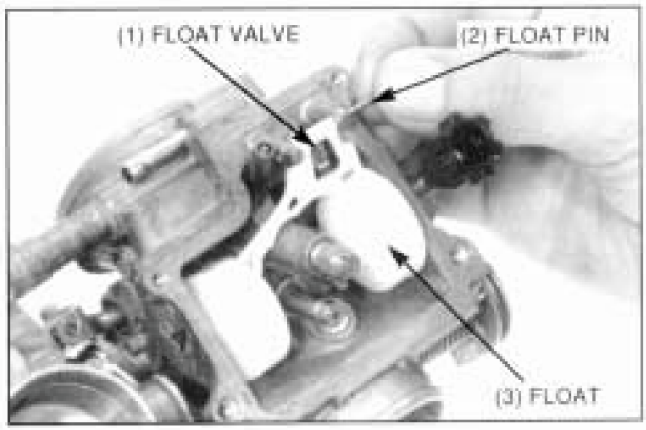
Float Chamber

DISASSEMBLY

Remove the screws, float chamber and O-ring.



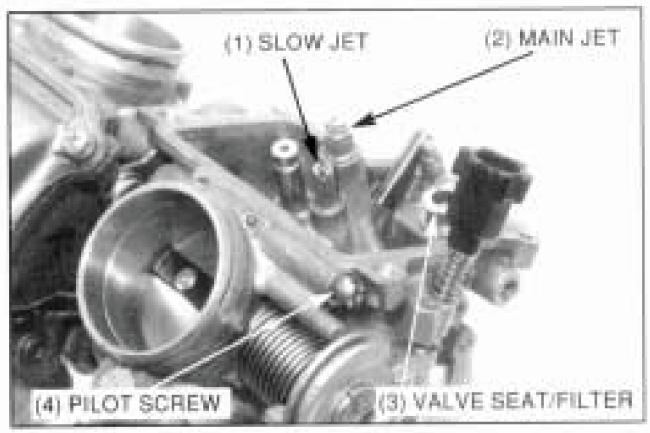
Remove the float pin, float and float valve.



CAUTION

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

Remove the main jet, needle jet holder, slow jet and valve seat/filter.



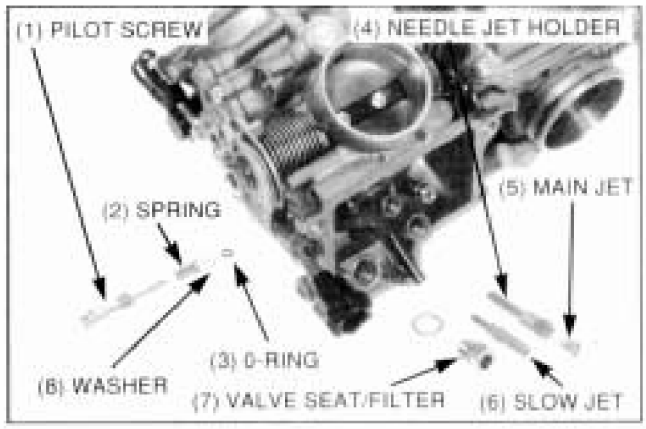
NOTE:

- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.

Turn each 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 screws.

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.

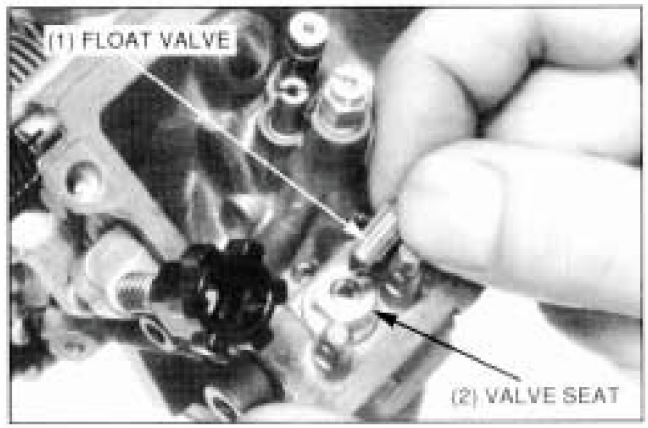
INSPECTION

FLOAT VALVE, VALVE SEAT

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.

NOTE:

- A worn or contaminated valve does not seat properly and will eventually flood the carburetor.



JETS

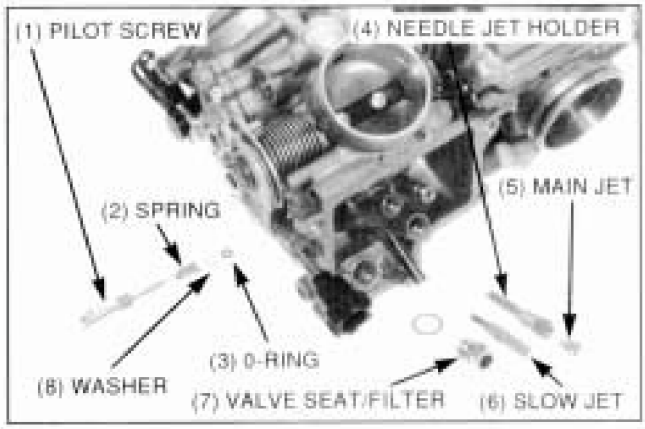
Check the each jets for wear or damage.
Clean the jets with non-flammable or high flash solvent and blow open with compressed air.

VALVE SEAT/FILTER

Check the float valve seat and filter to grooves, nicks or deposits.

PILOT SCREW

Check the pilot screw for stepped wear or damage.
Replace these parts if necessary.

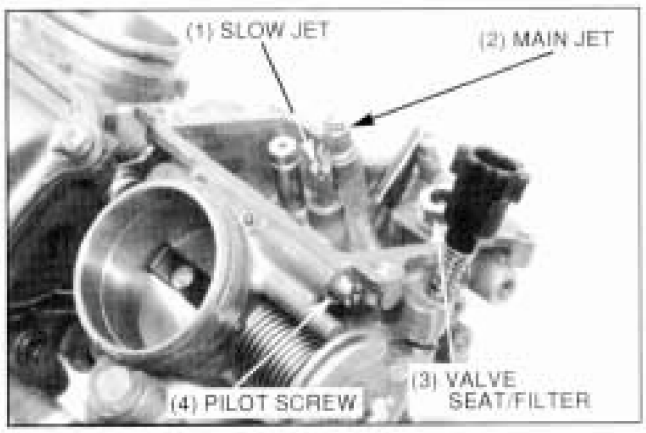


ASSEMBLY

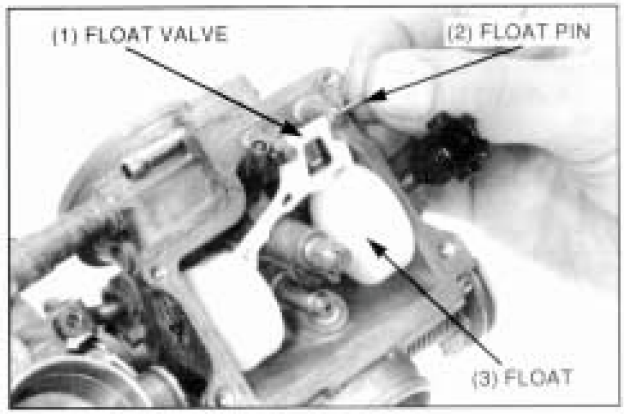
Install the main jet, needle jet holder, slow jet and valve seat/filter.
Install the O-ring, washer, spring, and pilot screw.

NOTE:

- Install the pilot screw and return it to its original position as noted during removal.
- Perform pilot screw adjustment if new pilot screw is installed (page 5-19).



Hang the float valve onto the float arm lip.
Install the float valve with the float in the carburetor body, then install the float pin through the body and float.

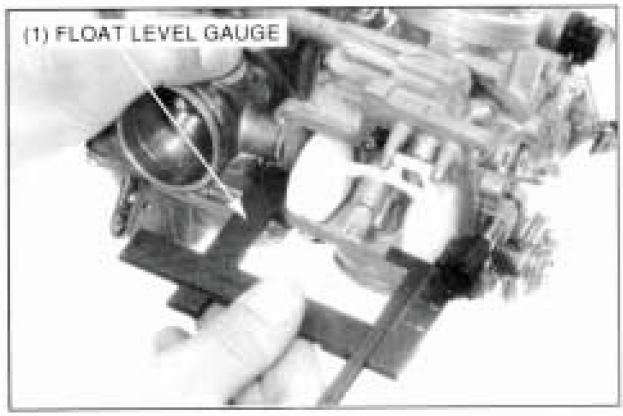


FLOAT LEVEL

NOTE:

- Check the float level after checking the float valve and float.
- Set the float level gauge so that it is perpendicular to the float chamber face and in line with the main jet.

Set the carburetor so that the float valve just contact the float arm lip. Be sure that the float valve tip is securely in contact with the valve seat.
Make sure the float label with the float level gauge.

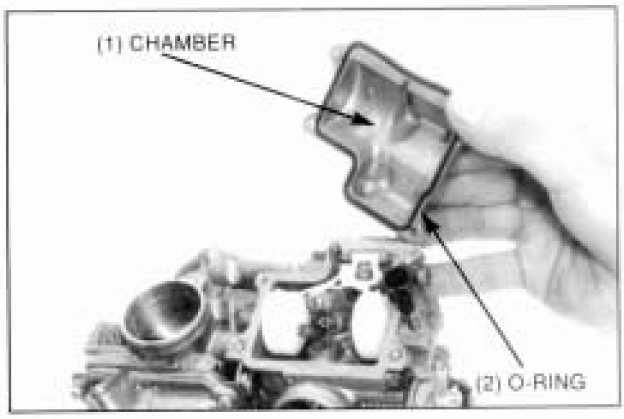


Tool:
Carburetor float level gauge: 07401-0010000

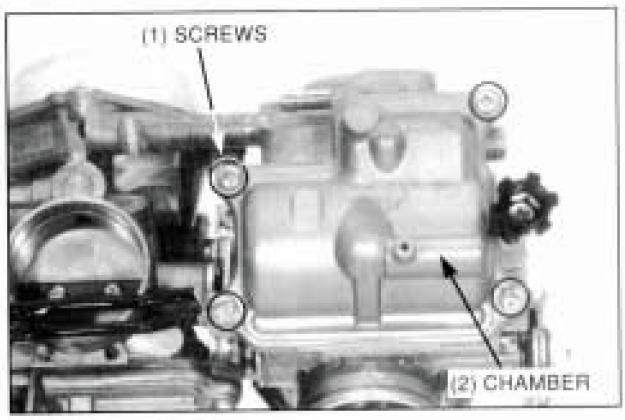
Float Level: 9.2 mm (0.36 in)

If the level is out of specification, replace the float.

Install the new O-ring into the float chamber groove.



Install the float chamber.
Install and tighten the screw securely.



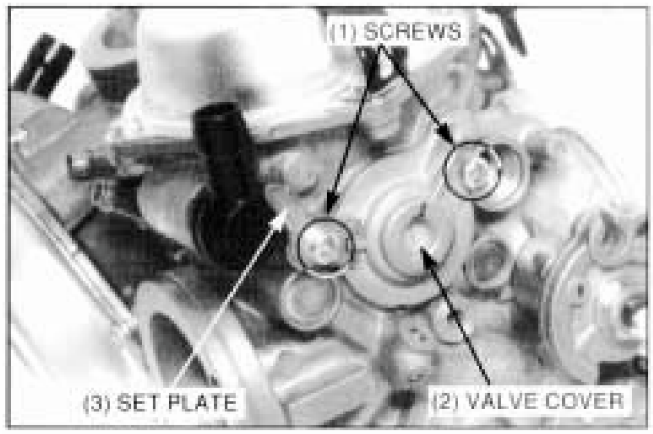
Air Cut-Off Valve

DISASSEMBLY

Remove the two screws, set plate and air cut-off valve cover.

NOTE:

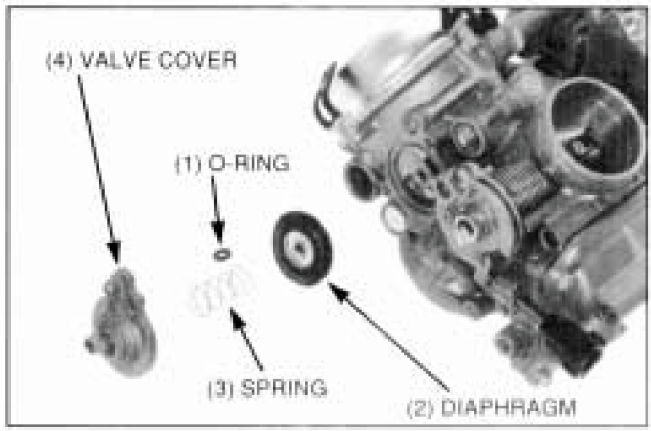
- The air cut-off valve cover is under spring pressure. Do not loose the spring and screws.



INSPECTION

Check the diaphragm for deterioration, pin hole or other damage.
Check the spring for deterioration or other damage.
Check the diaphragm needle for excessive wear at the tip or other damage.
Check the orifice of air vent for clogging.
Check the O-ring for damage.

Replace the air cut-off valve as an assembly, if necessary.

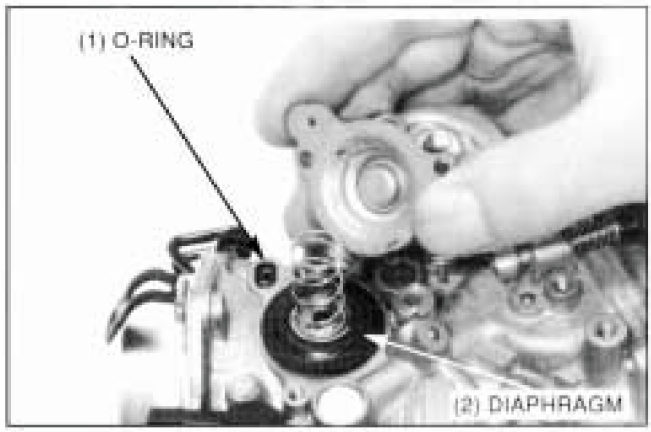


ASSEMBLY

Assembly is in the reverse order of disassembly.

NOTE:

- Install the O-ring with its flat side toward the carburetor body as shown.
- Be careful not pinch the diaphragm.
- Install the set plate aligning its cut-out with the tab on the valve cover.



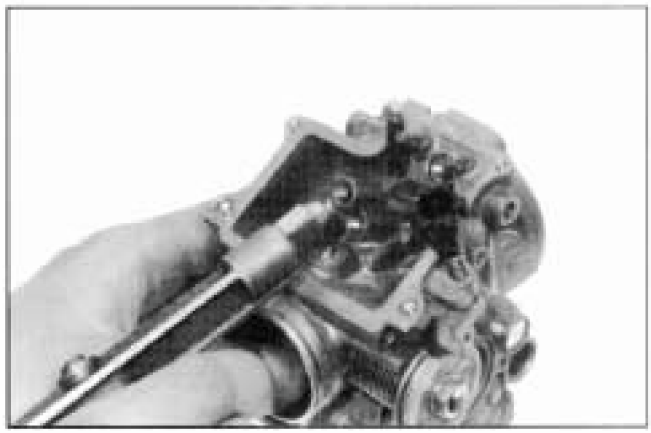
Carburetor Body Cleaning

CAUTION

- **Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.**
- **Remove the diaphragms to prevent damage to them before using air to blow open passage.**

Disassembled the carburetor (page 5-8).

Blow open all air and fuel passages in the carburetor body with compressed air.
Clean the fuel strainer in the float valve using compressed air from the float valve seat side.



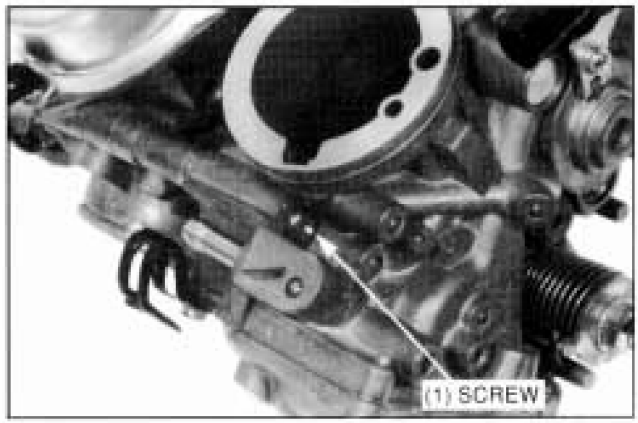
Carburetor Separation

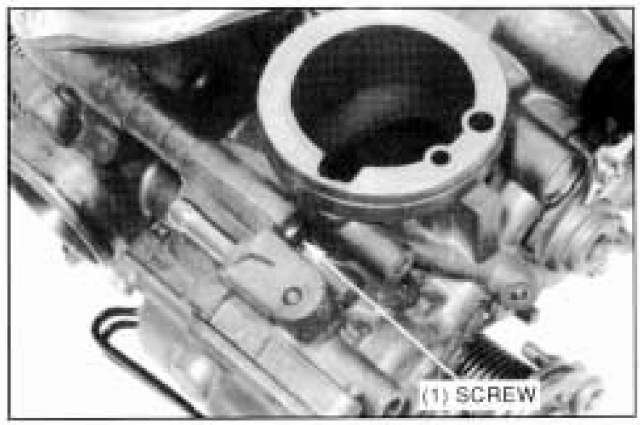
NOTE:

- The vacuum chamber, float chamber and jets can be serviced without separating the carburetors.
- When separating the carburetors, be careful not to loose the thrust spring and synchronization adjusting spring.

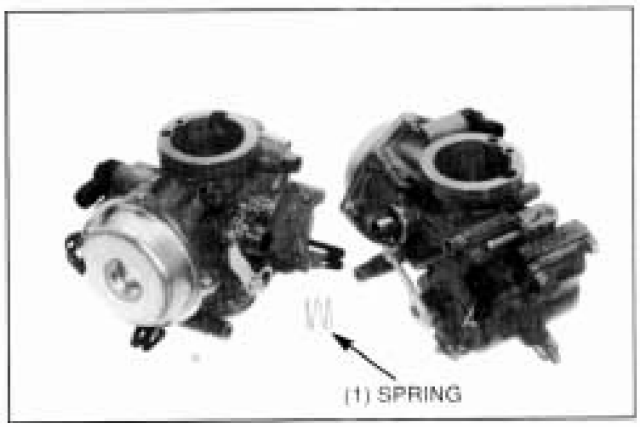
Loosen the synchronization adjusting screw.

Separate the carburetors by removing two attaching screws.

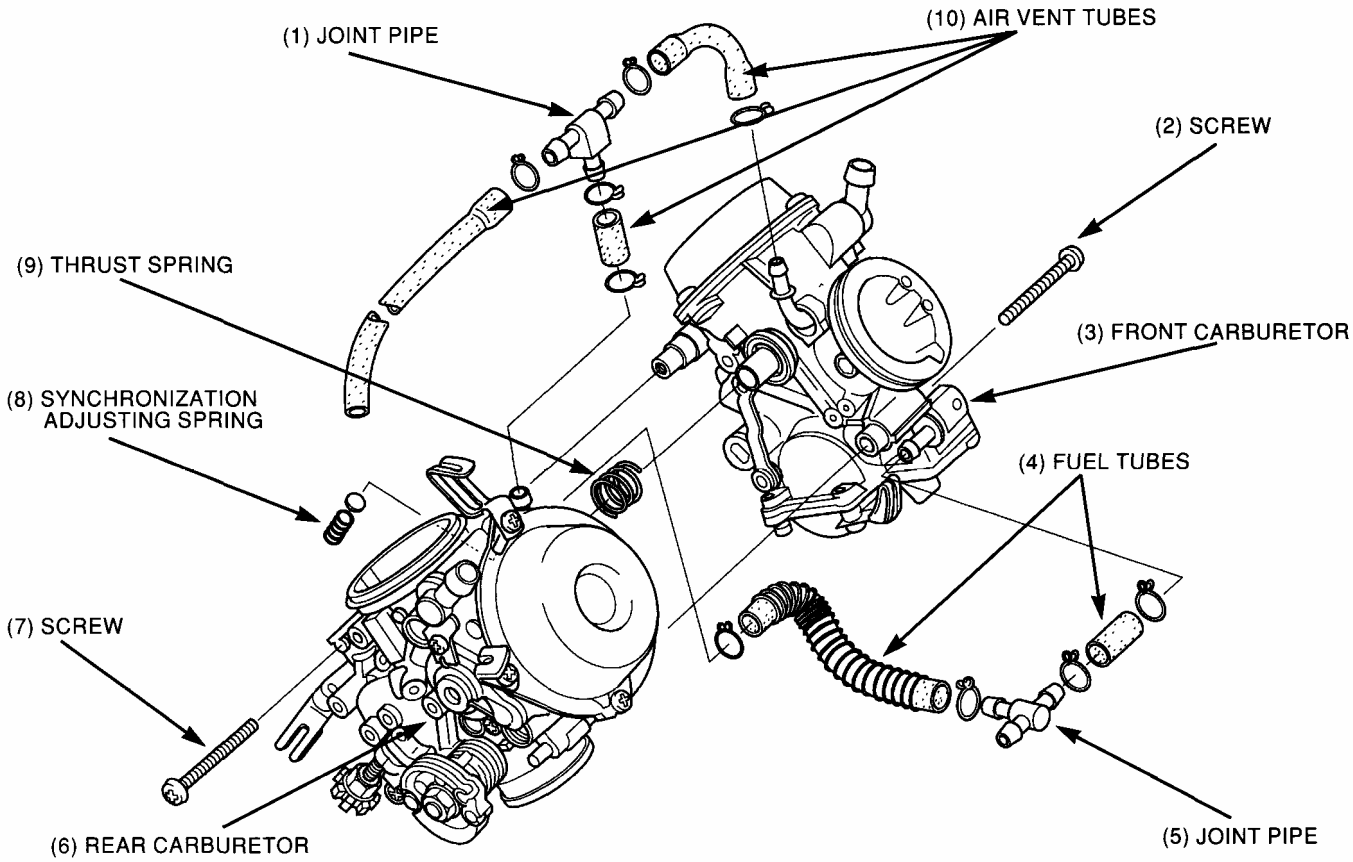




Remove the thrust spring.

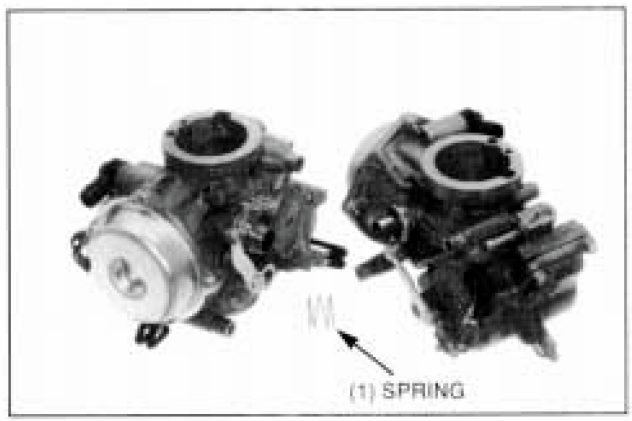


Carburetor Reassembly

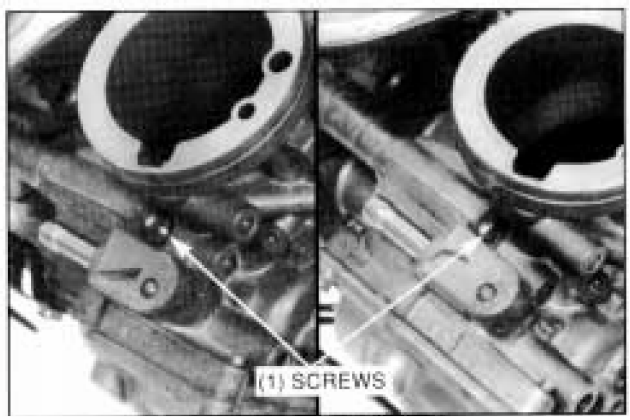


Loosen the synchronization adjusting screw until there is no spring tension.

Install the thrust spring between the throttle links.

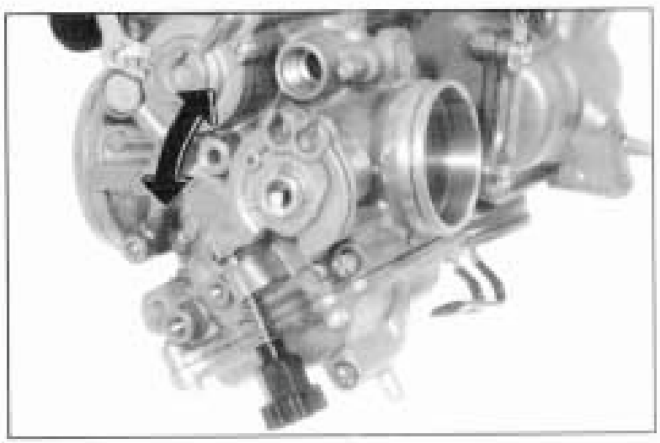


Secure the carburetors together with the two screws.

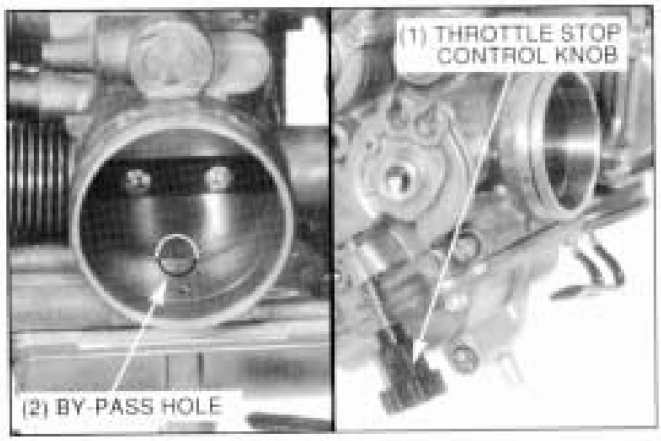


Install the synchronization spring and synchronization adjusting screw.

INSPECT THROTTLE OPERATION AS DESCRIBED BELOW:
Open the throttle slightly by rotating the throttle valve, then release the throttle. Make sure that there is no drag when opening and closing the throttle.

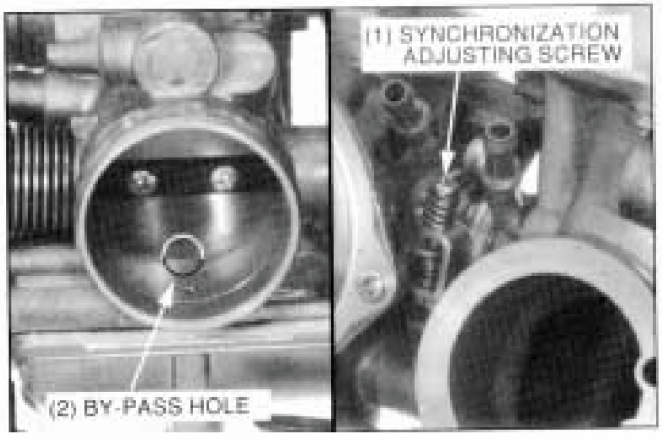


Turn the throttle stop control knob to align the rear cylinder carburetor throttle valve with the edge of the by-pass hole.



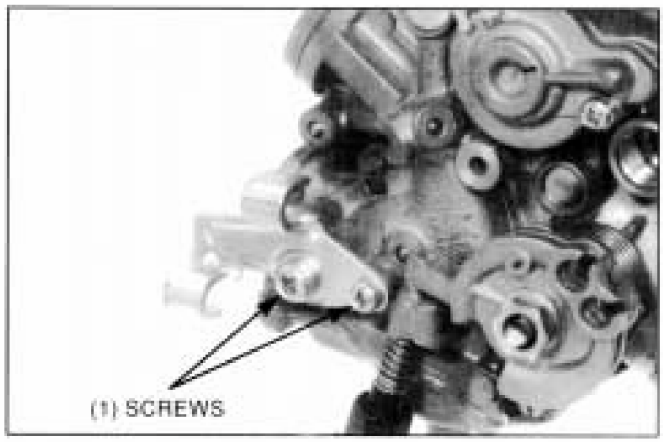
Align the front cylinder carburetor throttle valve with the by-pass hole edge by turning the synchronization adjusting screw.

Make sure the throttle returns smoothly.

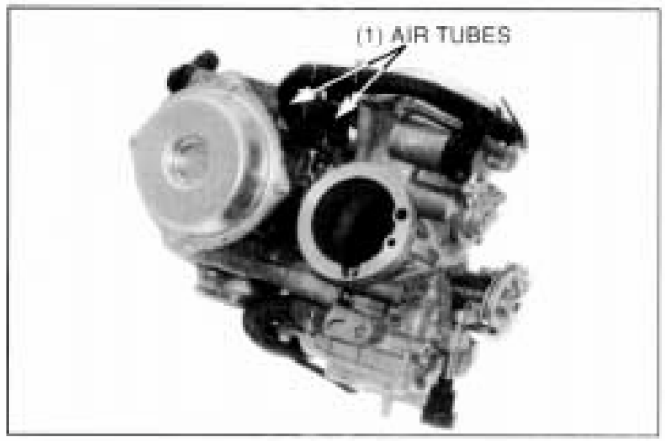


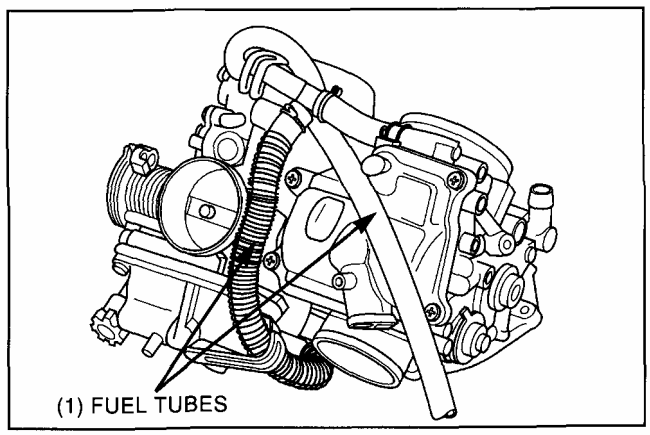
Carburetor Installation

Install the throttle cable guide.
Install and tigthen the screws securely.

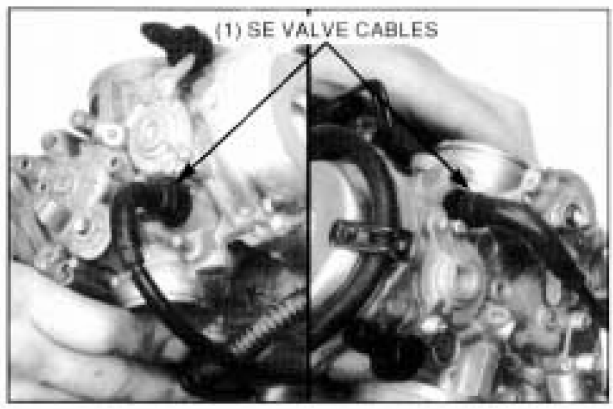


Install the fuel and air tubes (carburetors-to-air cleaner) as shown.





Install the starting enrichment (SE) valves to the carburetor as shown.
Tighten the lock nuts securely.



Install the carburetors to the insulators.
Tighten the insulator band screws securely.

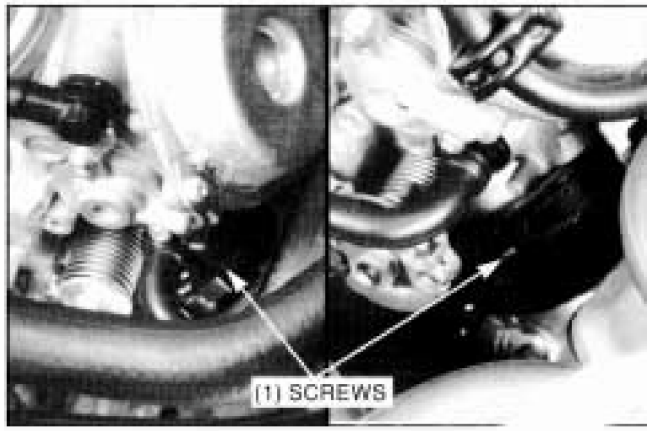
Connect the sub-air cleaner tubes to the carburetors.

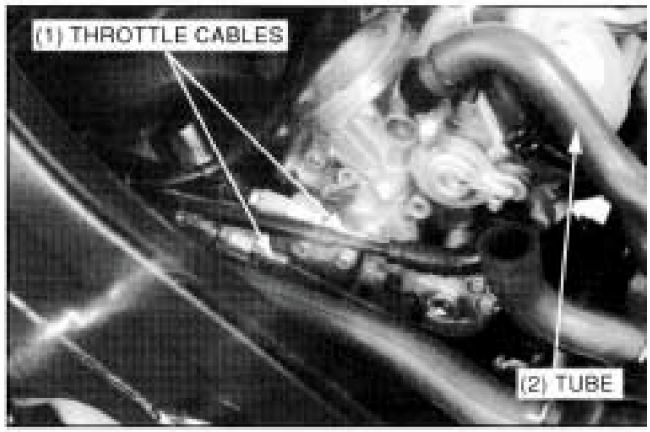
Connect the throttle cables to the throttle link.

Install the fuel tube to the clamp.
Connect the fuel tube.

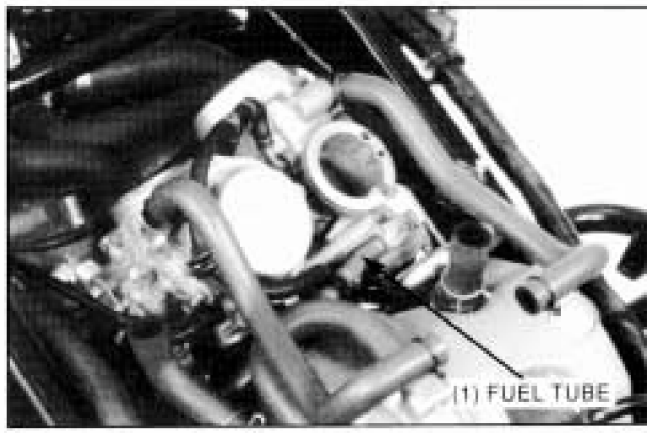
Install the following parts:
- Air cleaner housing (page 5-4)
- Fuel tank (page 2-11)

Perform the following inspections and adjustment.
- Pilot screw (see below)
- Carburetor synchronization (page 3-13)
- Throttle grip free play (page 3-4)
- Engine idle speed (page 3-15)
- Carburetor choke (page 3-5)





After installation, turn the ignition switch ON and check the fuel line for leakage.



Pilot Screw Adjustment

IDLE DROP PROCEDURE

⚠ WARNING

- **If the engine must be running 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 may lead to death.**

NOTE:

- Make sure the carburetor synchronization is within specification before pilot screw adjustment (page 3-14).
- The pilot screw factory pre-set and no adjustment can be done unless it is replaced.
- Use a tachometer with graduations of 50 min^{-1} (rpm) or smaller that will accurately indicate a 50 min^{-1} (rpm) change.

1. Turn each pilot screw clockwise until it seats lightly, then back it out to specification given.

Tool:
Pilot screw wrench (SW type only) **07KMA-MS60101**

Initial Opening: 1-1/4 turns out

CAUTION

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

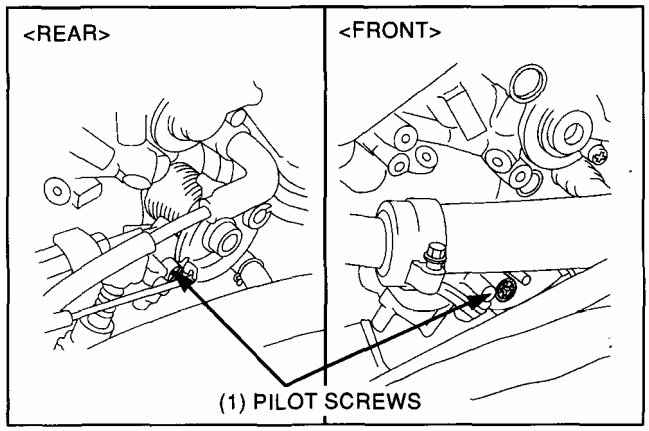
2. Warm up the engine to operating temperature. Stop and go riding for 10 minutes is sufficient.
3. Attach a tachometer according to the manufactures instructions.
4. Start the engine and adjust the engine idle speed to the specified min^{-1} (rpm) with the throttle stop control knob.

Idle Speed:
Except SW type: 1,200 ± 100 min^{-1} (rpm)
SW type: 1,200 ± 50 min^{-1} (rpm)

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increase by 50 min^{-1} (rpm) or more, turn each pilot screw out by successive 1/2 turn increments until engine speed does not increase.
7. Adjust the idle speed with the throttle stop control knob.
8. Turn the rear cylinder carburetor pilot screw in until the engine speed drops 50 min^{-1} (rpm).
9. Turn the rear cylinder carburetor pilot screw counterclockwise to the final opening from the position in step 8.

Final Opening: Except SW type: 1-1/4 turns out
SW type: 2-3/4 turns out

10. Adjust the idle speed with the throttle stop control knob.
11. Perform steps 8, 9 and 10 for the front cylinder carburetor pilot screw.



Secondary Air Supply System

SYSTEM INSPECTION

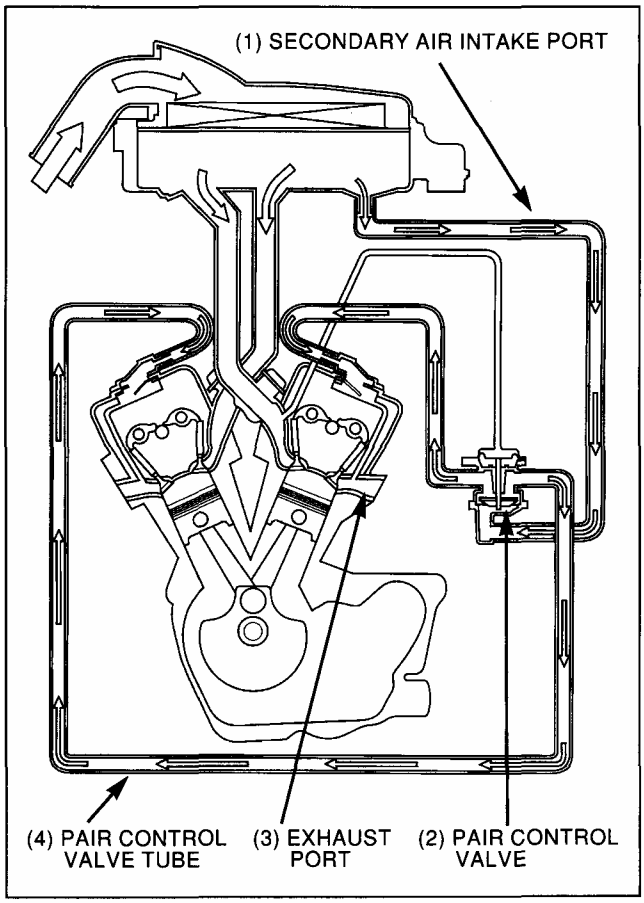
Start the engine and warm it up to normal operating temperature.

Check the secondary air intake ports are clean and free carbon deposits.

If the ports are carbon fauld, check the pulse secondary air injection (PAIR) control valve.

Disconnect the air cleaner housing-to-PAIR control valve tube from the air cleaner housing.
Disconnect the PAIR control valve vacuum tube from the control valve and plug it to keep air from entering.
Connect the vacuum pump to the PAIR control valve.

Tool:
Vacuum pump **Commercially available**

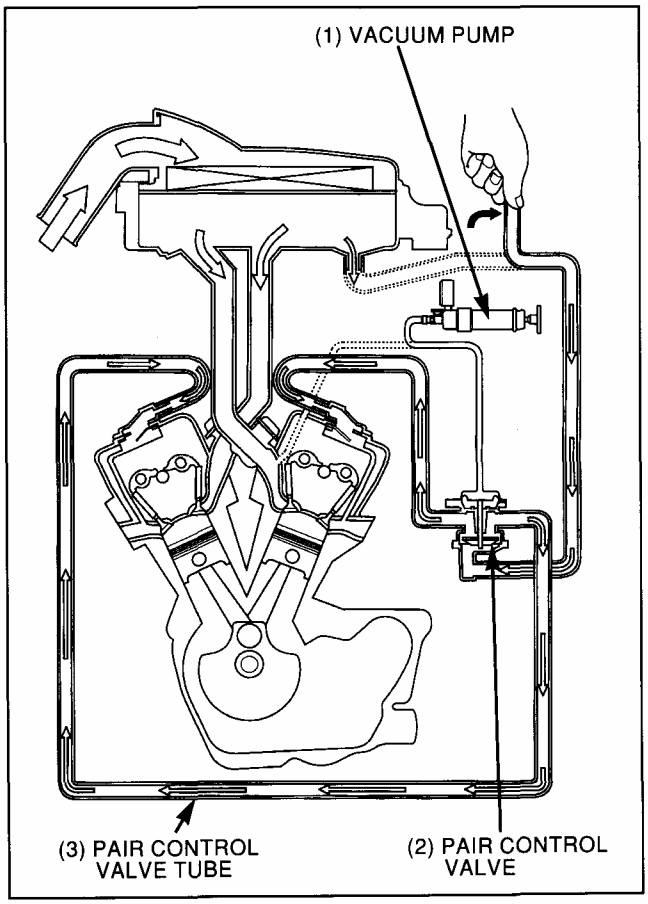


Start the engine and open the throttle slightly to be certain that air is sucked in through the vacuum tube.
If the air is not drawn in, check the tube for clogging.
With the engine running, gradually apply vacuum to the PAIR control valve.

Check that the air intake port stops drawing air, and that the vaccum does not bleed.

Specified Vacuum: **320 mm Hg (12.6 in Hg)**

If the air 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.



Fuel Pump

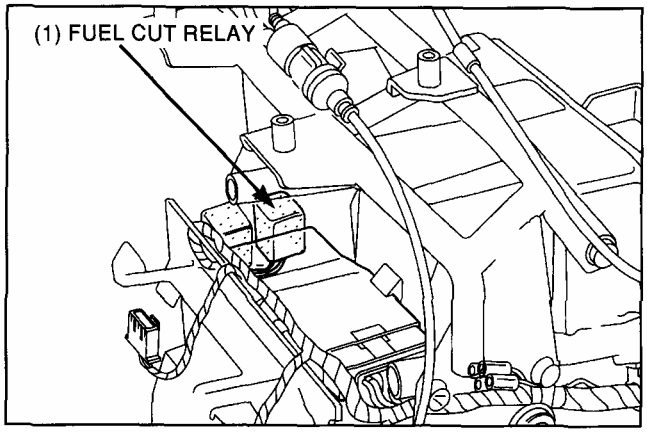
⚠ WARNING

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

SYSTEM INSPECTION

Remove the seat cowl (page 2-10).

Turn the ignition switch OFF.
Disconnect the fuel cut relay 3P connector and connect the voltmeter at the 3P connector wire harness side.

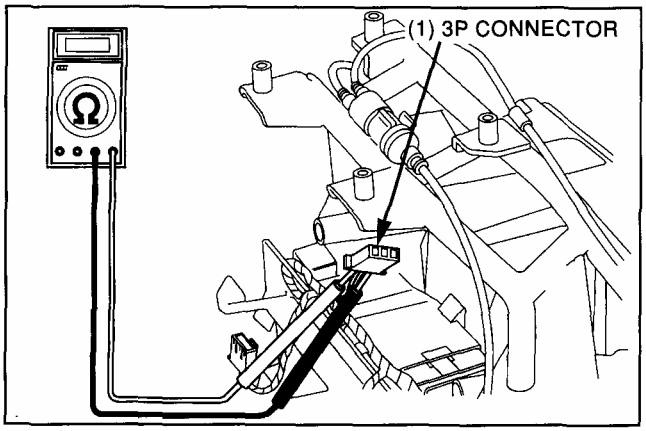


Connection: Black (+) — Body ground (-)

Turn the ignition switch ON.
There should be battery voltage.
If there is no voltage, check for an open circuit or loose connection in Black wire.
If there is battery voltage, check for continuity in the Black/Blue wire.

Check for continuity between the Black/Blue wire and ground at the 3P connector wire harness side.

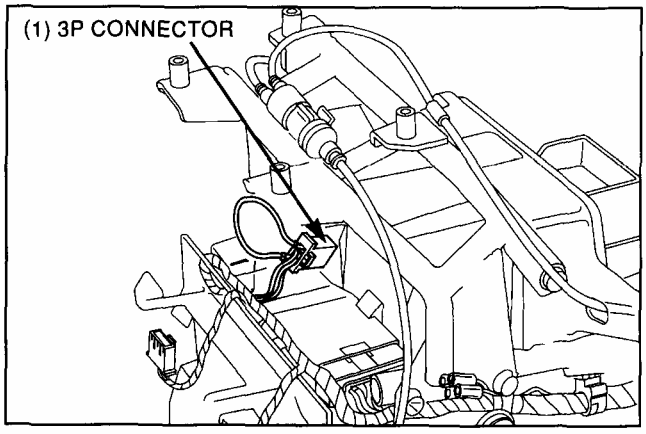
Connection: Black/Blue — Body ground
Standard: No continuity



If there is continuity, replace the fuel cut relay.

If there is no continuity, short the terminals of the 3P connector wire harness side with the suitable jumper wire.

Short Terminals: Black/Blue — Black



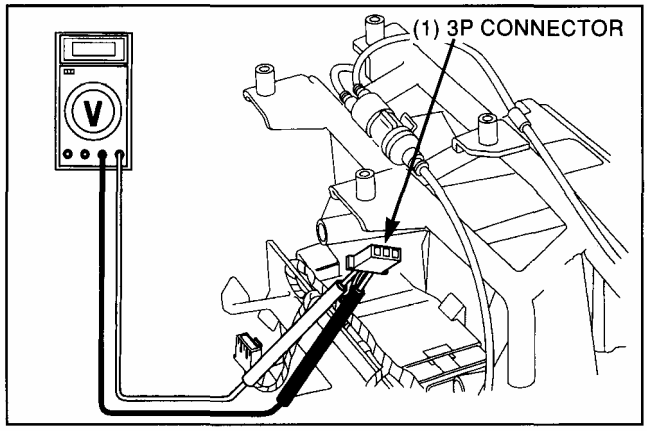
Disconnect the fuel pump 2P (White) connector and connect the voltmeter at the 2P (White) connector wire harness side.

Connection: Black/Blue (+) — Green (-)

Turn the ignition switch ON and measure the voltage at the 2P (White) connector.

Standard: Battery voltage

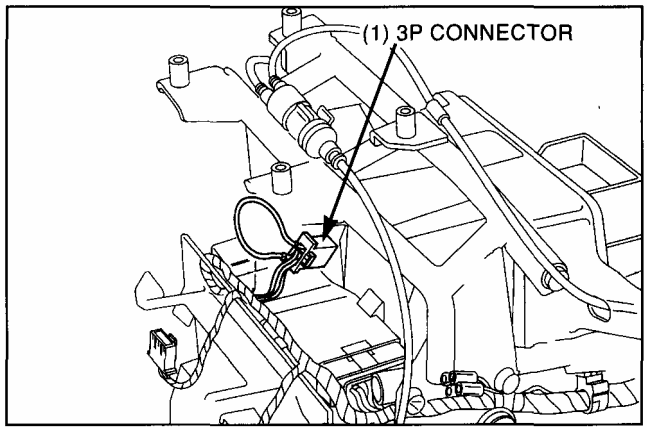
If there is no voltage, check for an open circuit or loose connection in Black/Blue and Green wires.
If there is battery voltage, replace the fuel pump.



DISCHARGE VOLUME INSPECTION

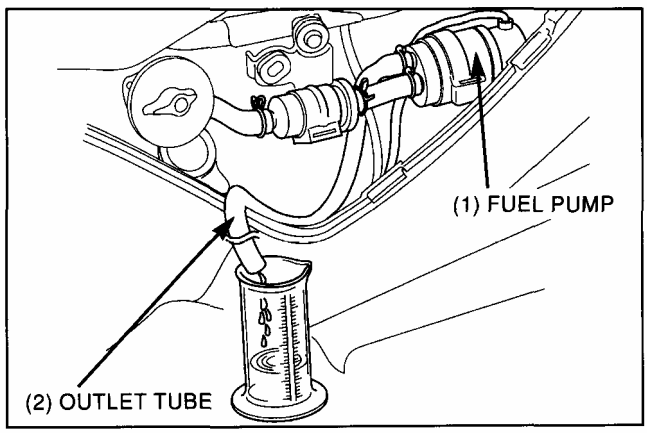
Remove the seat cowl (page 2-10).

Disconnect the fuel cut relay 3P connector.
Short the Black and Black/Blue terminals with a suitable jumper wire.
Disconnect the fuel pump outlet tube from the tube joint.
Hold a graduated beaker under the fuel pump outlet tube.



Turn the ignition switch ON 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.

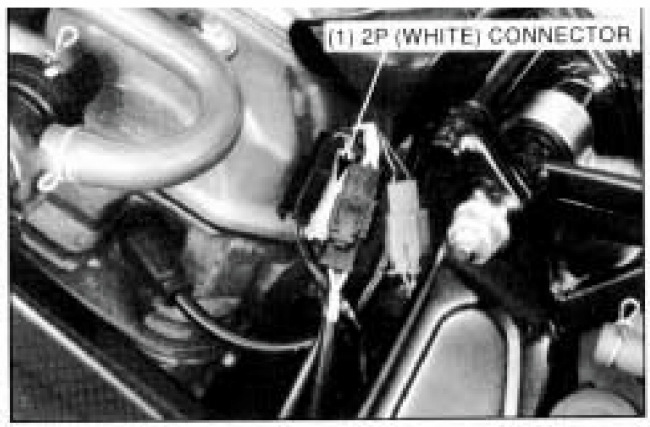
Fuel Pump Flow Capacity:
600 cm³ (20.3 US oz, 21.1 Imp oz) per minute at 13 V



REMOVAL

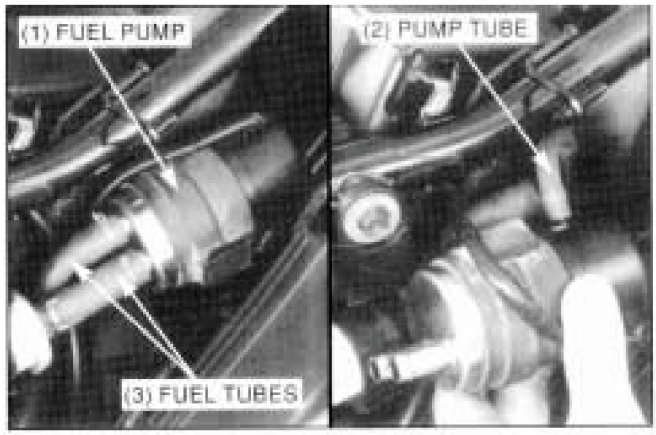
Remove the fuel tank (page 2-11).

Disconnect the fuel pump 2P (White) connector and remove the fuel pump wire from the clamps.



Disconnect the fuel tubes (pump-to-filter, pump-to-carburetor).

Disconnect the fuel pump tube.
Remove the fuel pump from the pump bracket.



INSTALLATION

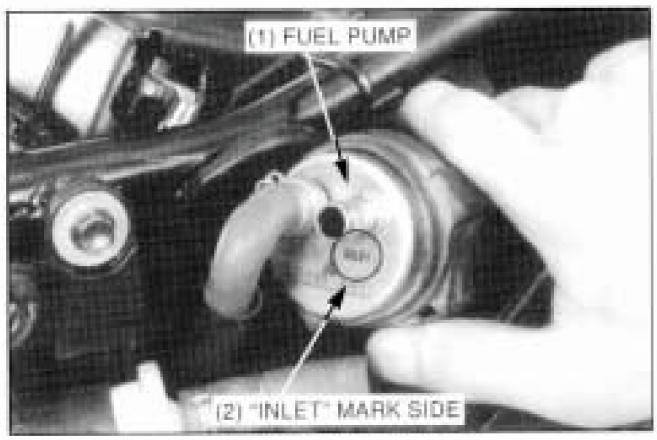
NOTE:

- Route the wire harness and tubes properly (page 1-24).

Connect the fuel pump tube to the fuel pump.
Install the fuel pump to the pump bracket.
Connect the fuel tubes (pump-to-filter, pump-to-carburetor).

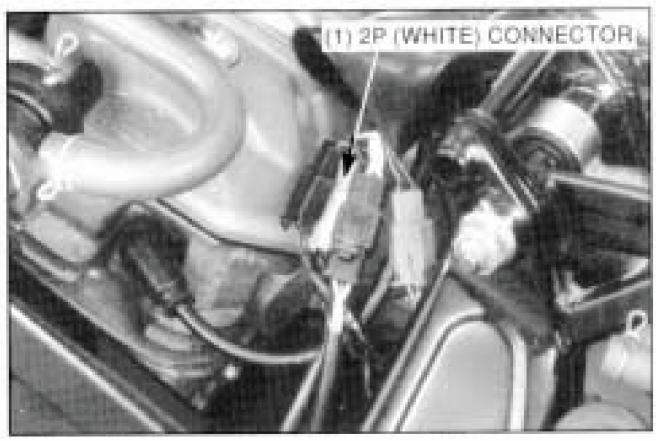
NOTE:

- Connect the fuel tube (pump-to-filter) to fuel pump "INLET" mark side.



Connect the fuel pump 2P (White) connector and install the fuel pump wire to the clamps.

Install the fuel tank (page 2-11).



Fuel Filter

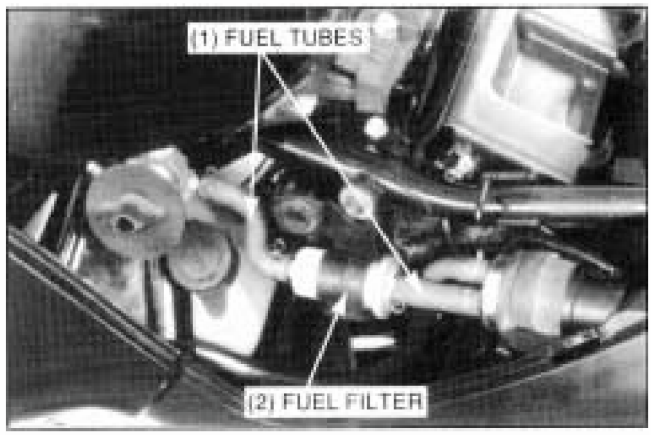
REMOVAL

Remove the seat (page 2-2).

Disconnect the fuel tube (pump-to-filter).
Remove the fuel filter and rubber cushion from the filter bracket.

Disconnect the fuel tubes from the fuel filter.
Remove the rubber cushion from the fuel filter.

Check the fuel filter for damage or contamination.
Replace the fuel filter if necessary.

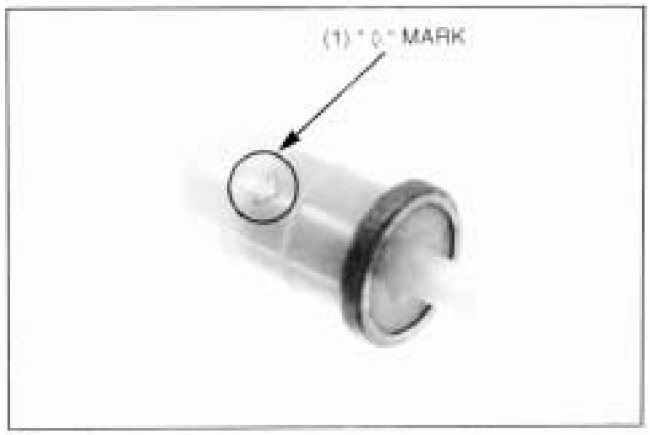


INSTALLATION

Installation is in the reverse order of removal.

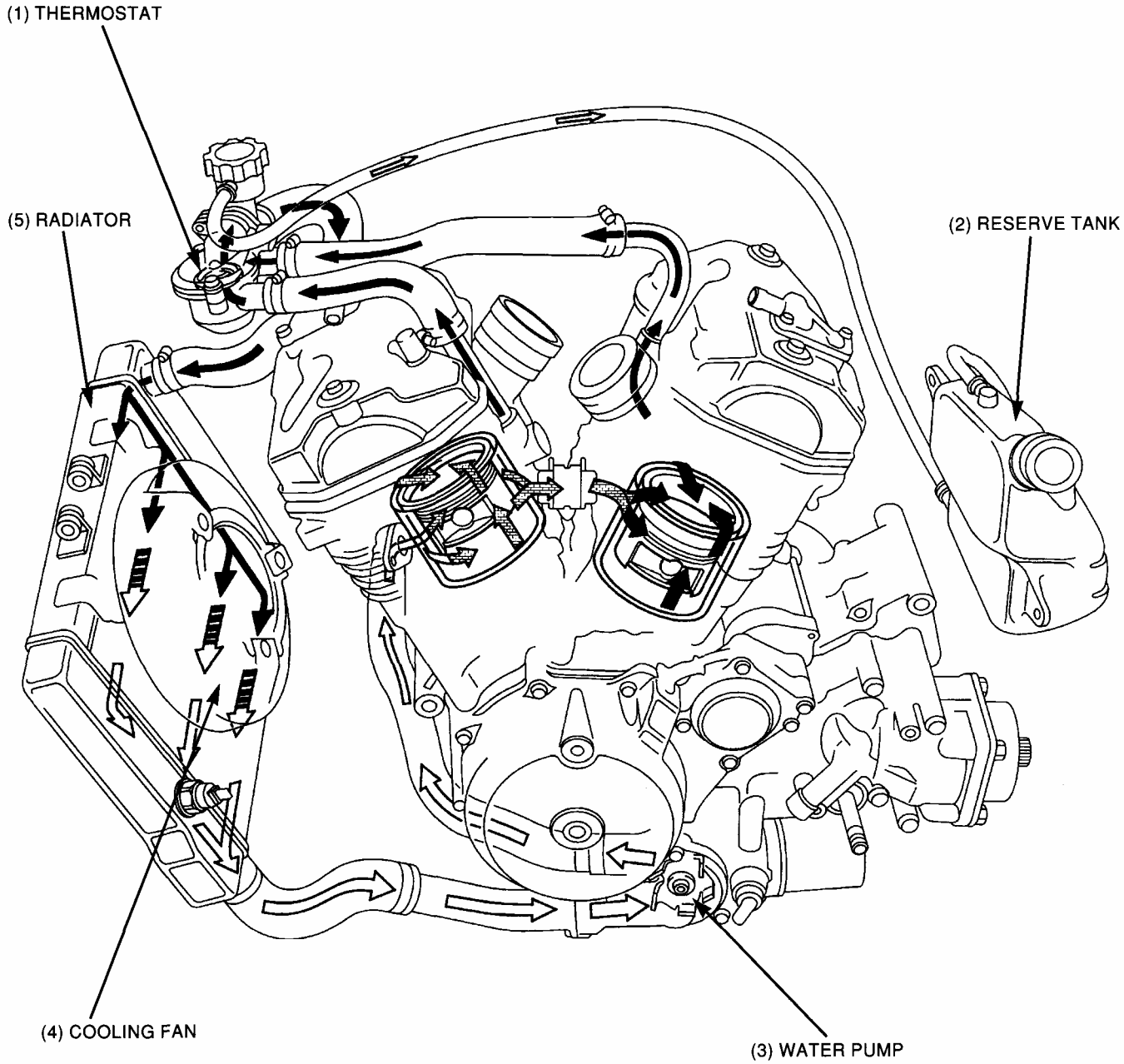
NOTE:

- At fuel filter and rubber cushion installation, install the filter with the " ▷ " mark facing the fuel pump.



Install the seat (page 2-2).

System Flow Pattern



6. Cooling System

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-6
SERVICE INFORMATION	6-1	RADIATOR/COOLING FAN	6-8
TROUBLESHOOTING	6-2	WATER PUMP	6-13
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-16
COOLANT	6-4		

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 CHILDEN**

- Use only distilled water and ethylene glycol in the cooling system. A 50-50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze or an antifreeze with self sealing properties.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services 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 20 for fan motor switch and thermosensor inspection.

SPECIFICATIONS

Item		Specifications
Coolant capacity	Radiator and engine	0.25 liters (0.26 US qt, 0.22 Imp qt)
	Reserve tank	1.8 liters (1.90 US qt, 1.58 Imp qt)
Radiator cap relief pressure		88 - 127 kPa (0.9 - 1.3 kgf/cm², 13 - 18 psi)
Thermostat	Begin to open	80 - 84° C (176 - 183° F)
	Fully open	95° C (203° F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		50 % mixture with soft water

TORQUE VALUES

Water pump cover bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Fan motor nut	3 N·m (0.3 kgf-m, 2.2 lbf-ft)	
Cooling fan nut	5 N·m (0.5 kgf-m, 3.6 lbf-ft)	Apply a locking agent to the threads
Cooling fan shroud bolt	9 N·m (0.9 kgf-m, 6.5 lbf-ft)	
Radiator filler bolt	9 N·m (0.9 kgf-m, 6.5 lbf-ft)	
Thermostat housing cover bolt	10 N·m (1.0 kgf-m, 7 lbf-ft)	
Fan motor switch	10 N·m (1.0 kgf-m, 7 lbf-ft)	Apply a locking agent to the threads
Water pump cover bolt	13 N·m (1.3 kgf-m, 9 lbf-ft)	

TOOLS

Pressure pump	Equivalent commercially available

Troubleshooting

Engine temperature too high
- Faulty temperature gauge or thermosensor (Section 20)
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty water pump
- Thermostat stuck closed
- Faulty cooling fan motor
- Faulty fan motor switch

Engine temperature too low
- Faulty temperature gauge or thermosensor (Section 20)
- Thermostat stuck open
- Faulty cooling fan motor switch

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

System Testing

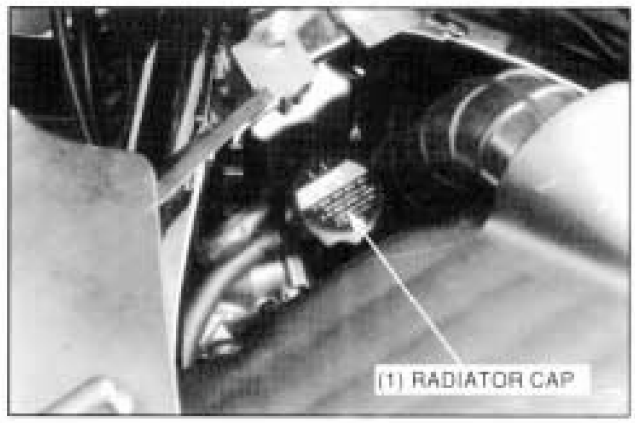
COOLANT (HYDROMETER TEST)

⚠ WARNING

- **Be sure the engine is cool before removing the cap or you may be severely scalded.**

Remove the fuel tank (page 2-11).

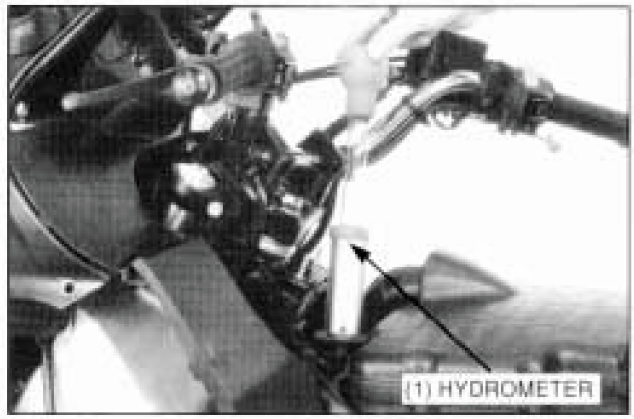
Remove the radiator cap.



Check the coolant gravity using a hydrometer.

Standard Coolant Concentration: 50 %

Look for contamination and replace the coolant if necessary.



Coolant gravity chart

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

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

⚠ WARNING

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

Remove the fuel tank (page 2-11).

Remove the radiator cap.

NOTE:

- Before installing the cap in the tester, wet the sealing surface.

Pressure test the radiator cap. Replace the radiator cap if 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:
88 - 127 kPa (0.9 - 1.3 kgf/cm², 13 - 18 psi)

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

CAUTION

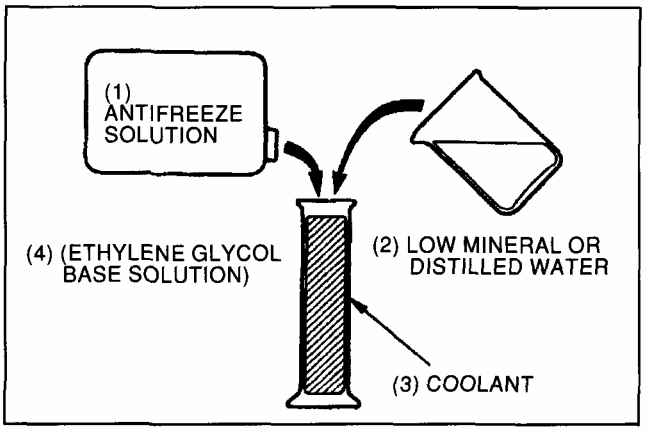
- **Excessive pressure can damage the cooling system components. Do not exceed 127 kPa (1.3 kgf/cm², 18 psi)**

Check the following components if the system will not hold specified pressure for at least 6 seconds.
- All hose and connections
- Water pump installation
- Water pump seal (for leakage)
- Deformed radiator filler neck

Coolant

⚠ WARNING

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



NOTE:

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

Recommended Mixture:
50 - 50 (Distilled water and anti freeze)

REPLACEMENT/AIR BREEDING

⚠ WARNING

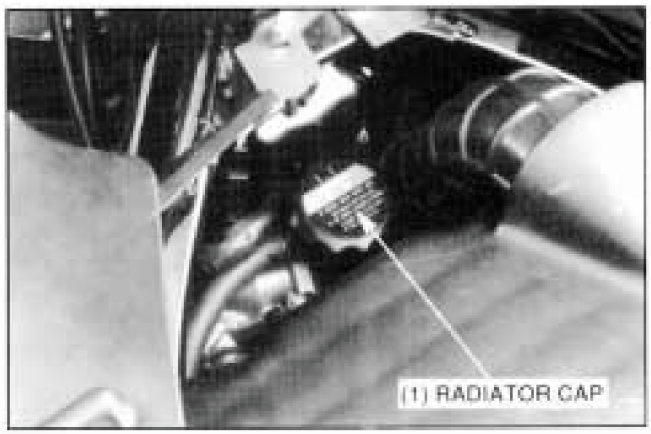
- **The engine must be cool before removing the radiator cap, or severe scalding may result.**

NOTE:

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

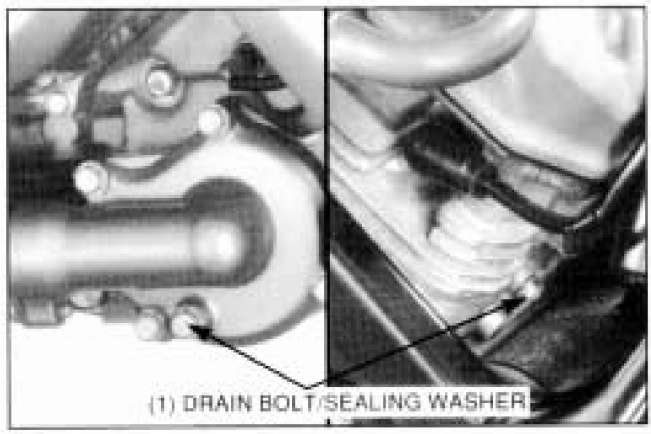
Remove the fuel tank (page 2-11).

Remove the radiator cap.



Drain the coolant from the system by removing the drain bolt and sealing washer on the water pump cover.
Remove the rear cylinder coolant drain bolt and drain the coolant.

Reinstall and tighten the drain bolts with a new sealing washer.

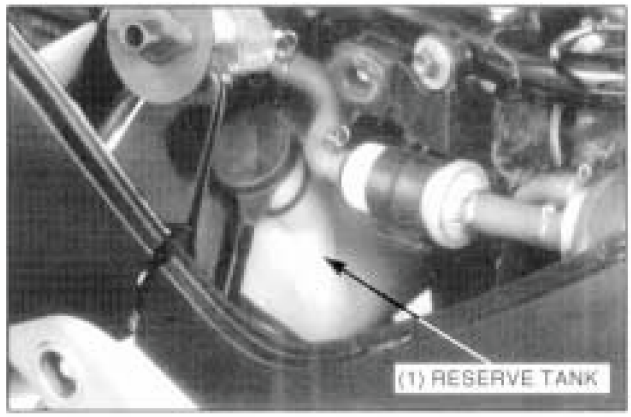


Remove the reserve tank (page 6-16).

Remove the reserve tank cap from the reserve tank and drain the reserve coolant.

Empty the coolant and rinse the inside of the reserve tank with water.

Install the reserve tank (page 6-16).



Fill the system with the recommended coolant through the filler opening up to filler neck.
Remove the reserve tank cap and fill the reserve tank to the upper level line.

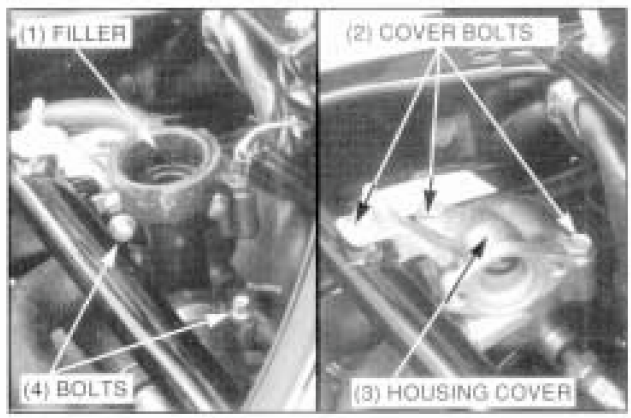
Bleed air from the system as follows:
1. Shift the transmission into neutral.
   Start the engine and let it idle for 2-3 minutes.
2. Snap the throttle 3-4 times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
   Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

Thermostat

REMOVAL

Remove the fuel tank (page 2-11).
Drain the coolant (page 6-5).

Remove the radiator filler mounting bolts.
Remove the thermostat housing cover bolts and cover.

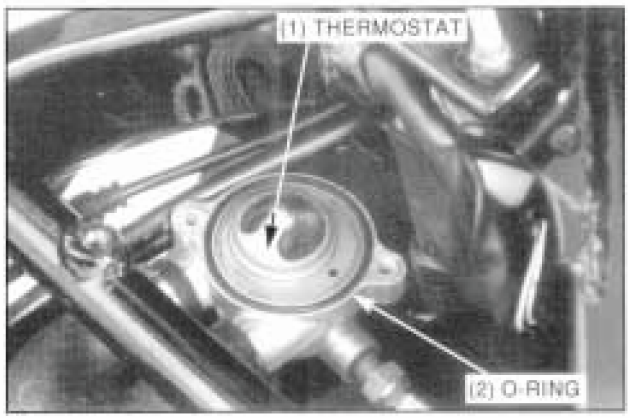


Remove the O-ring and thermostat from the housing.

NOTE:

- The thermosensor, may be damaged if dropped or conflicted to shock.
- If dropped or conflicted, inspect the thermosensor and replace if necessary (page 20-14).

Thermosensor inspection and removal (page 20-14).
Coolant temperature indicator inspection (page 20-13).



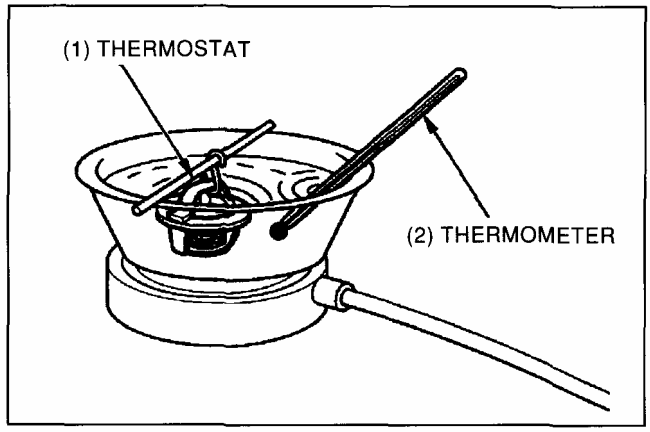
INSPECTION

⚠ WARNING

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

NOTE:

- Do not let the thermostat or thermometer touch the pan, or you will get false readings.
- Replace the thermostat if valve stays open at room temperature, or if it responds at temperatures other than those specified.



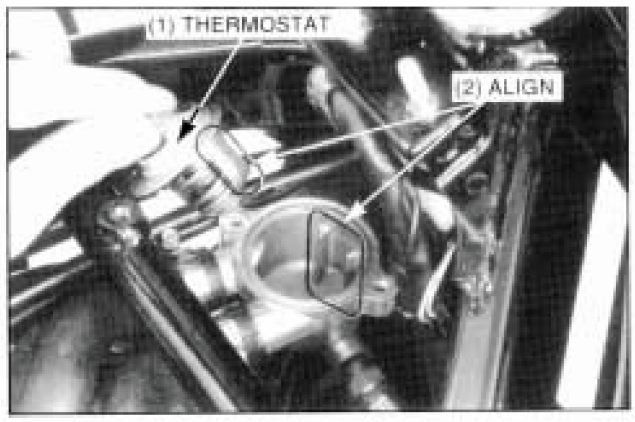
Visually inspect the thermostat for damage.

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

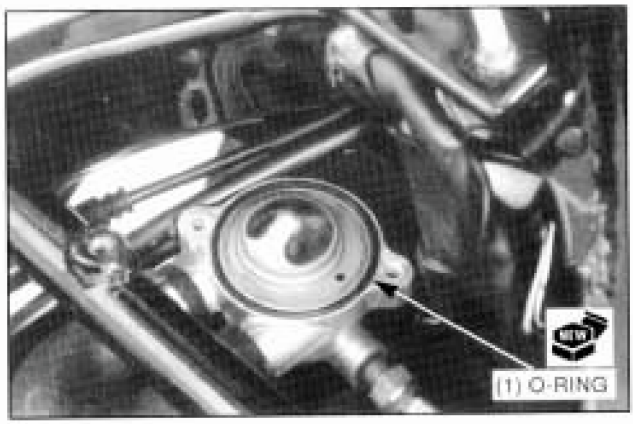
Thermostat Begins To Open: 80-84° C (176-183° F)
Valve Lift: 8 mm (0.3 in) minimum at 95° C (203° F)

INSTALLATION

Install the thermostat while aligning it with the groove in the housing.

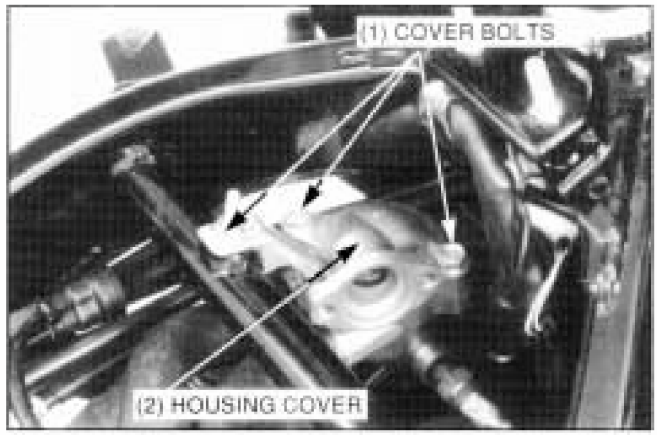


Install the new O-ring into the housing.



Install the thermostat housing cover.
Install and tighten the housing cover bolts to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



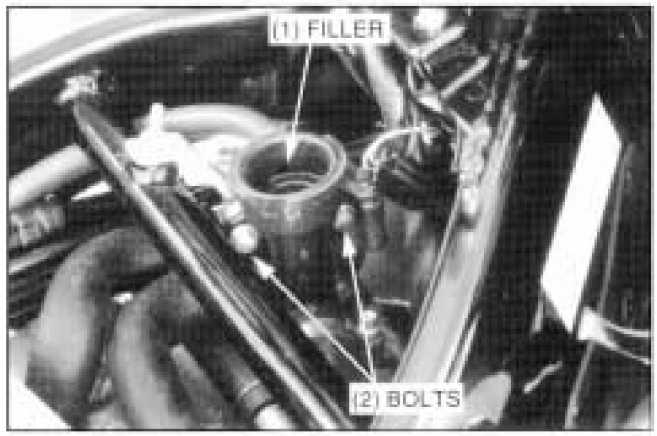
Install the new O-ring to the radiator filler.

Install and tighten the radiator filler mounting bolts to the specified torque.

Torque: 9 N·m (0.9 kgf-m, 6.5 lbf-ft)

Install the fuel tank (page 2-11).

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



Radiator/Cooling Fan

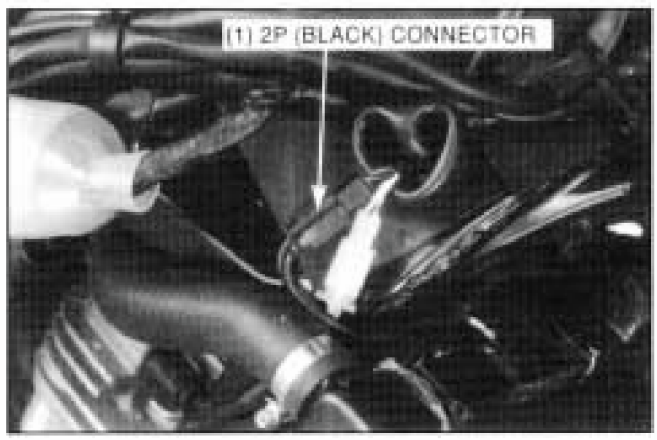
CAUTION

- **Be careful not to damage the radiator fins.**

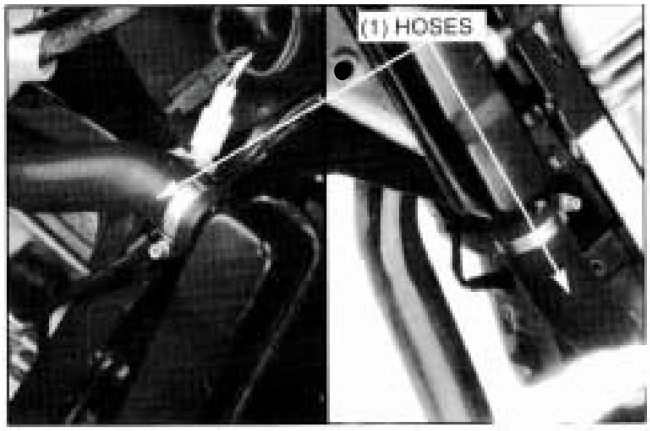
REMOVAL

Drain the coolant (page 6-5).
Remove the fuel tank (page 2-11).

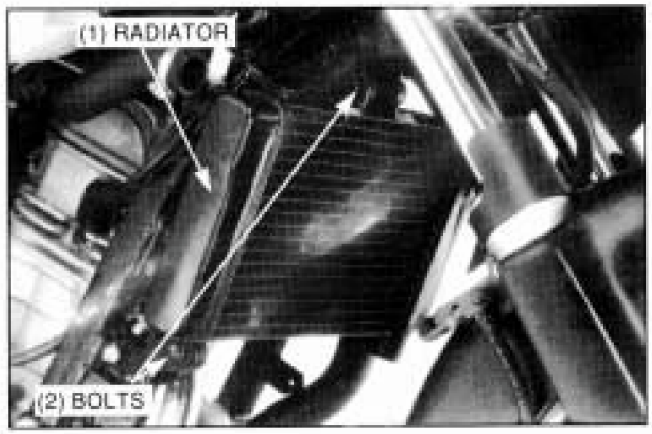
Disconnect the fan motor 2P (Black) connector.



Loosen the hose band and disconnect the upper and lower radiator hose from the radiator.

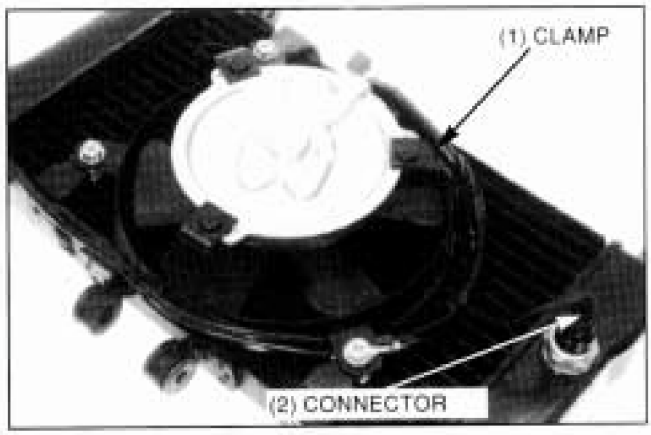


Remove the radiator mounting bolts and radiator.

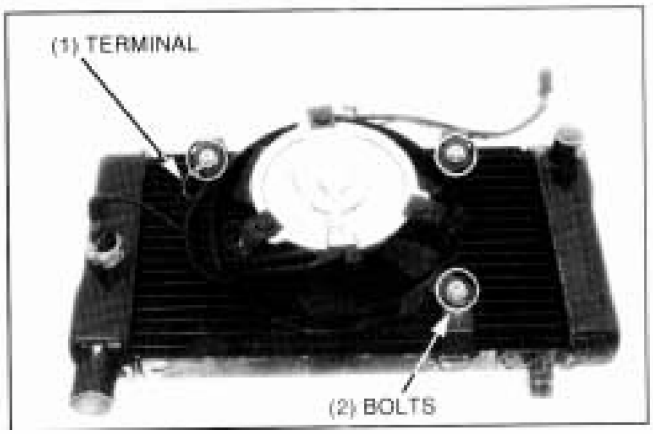


DISASSEMBLY

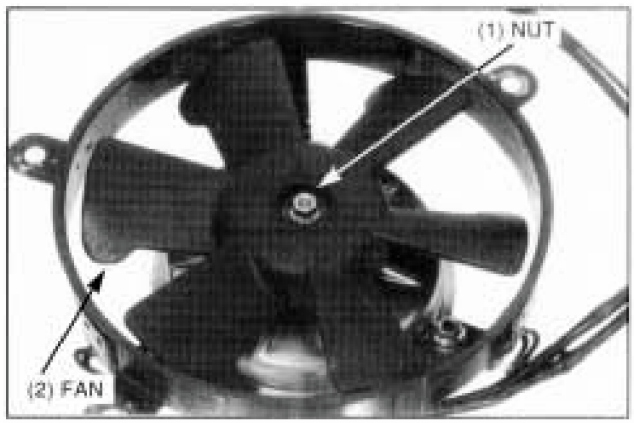
Disconnect the fan motor switch connector.
Remove the wires from the clamp.



Remove the bolts and ground terminal.
Remove the cooling fan assembly from the radiator.

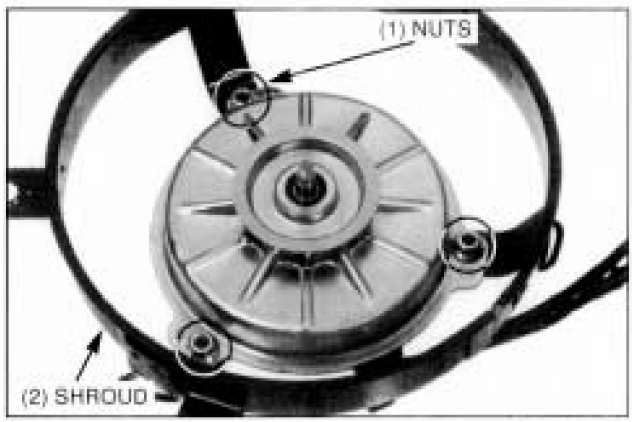


Remove the nut and cooling fan.

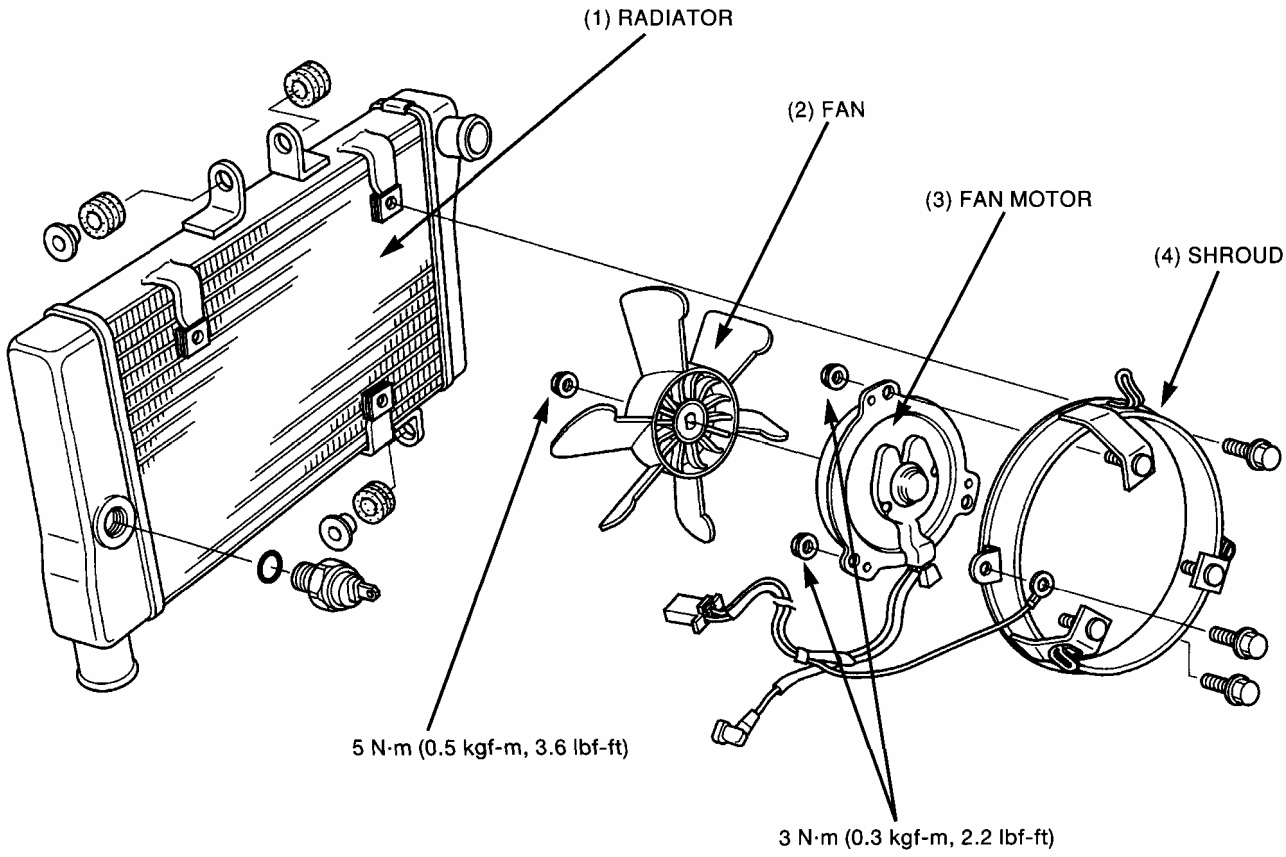


Remove the nuts and fan motor from the shroud.

The fan motor switch removal and inspection procedure is described on page 20-12.



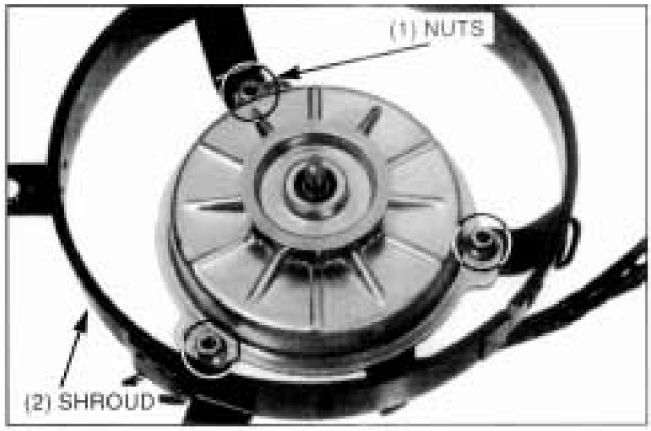
ASSEMBLY



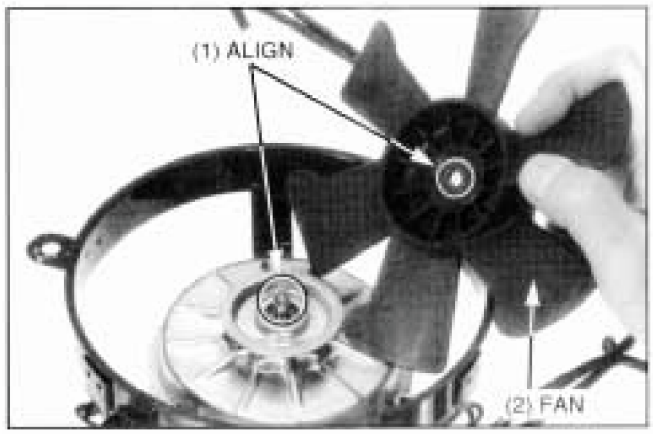
Install the fan motor to the shroud.

Install and tighten the nuts to the specified torque.

Torque: 3 N·m (0.3 kgf-m, 2.2 lbf-ft)

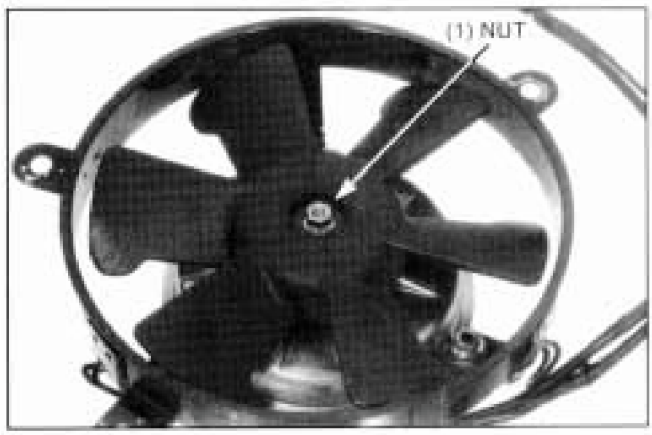


Install the cooling fan onto the motor shaft by aligning the flat surfaces.

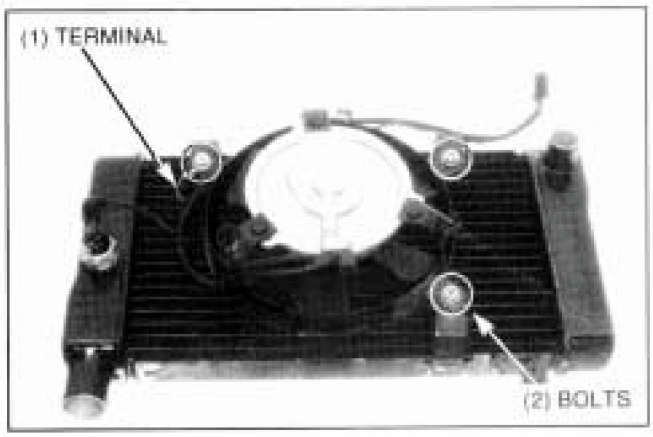


Install and tighten the nut to the specified torque.

Torque: 5 N·m (0.5 kgf-m, 3.6 lbf-ft)

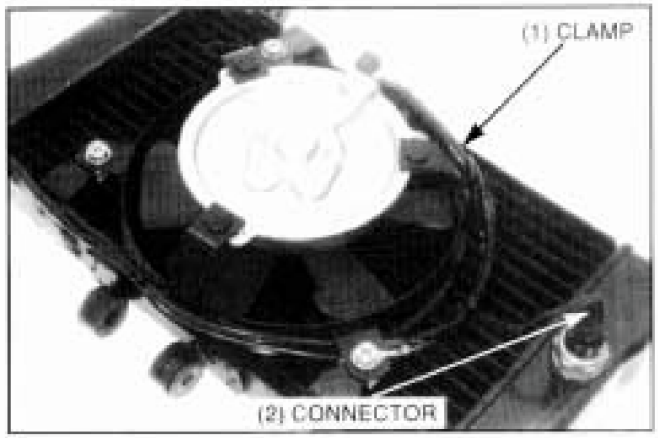


Install the cooling fan assembly to the radiator.
Install and tighten the bolts with the ground terminal.



Connect the fan motor switch connector.

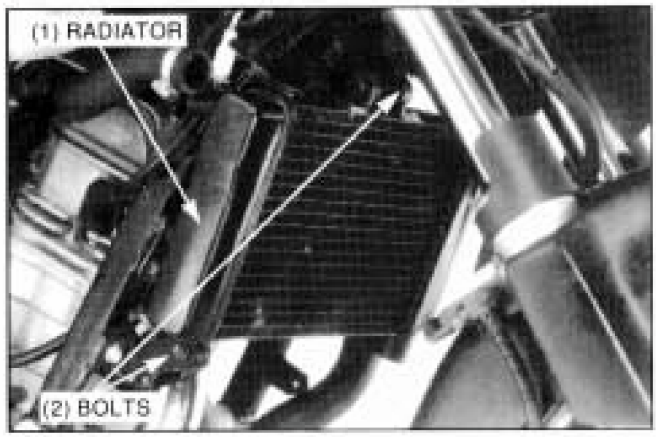
Route the ground wire and fan motor switch wire properly, clamp the wires.



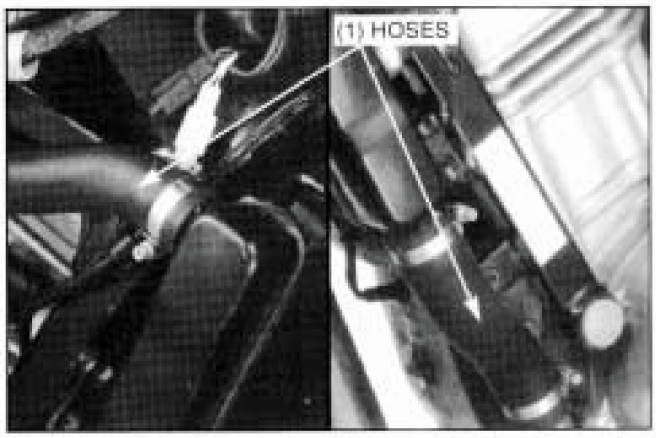
INSTALLATION

Install the radiator and mounting bolt.
Tighten the bolt to the specified torque.

Torque: 1 N·m (0.1 kgf-m, 0.7 lbf-ft)

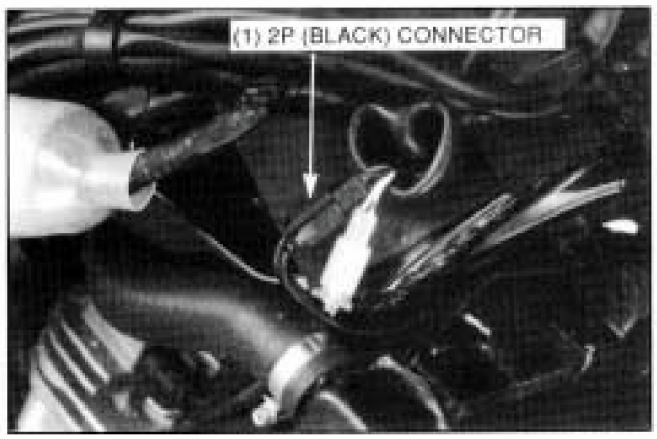


Connect the upper and lower radiator hoses and tighten the radiator hose band screws securely.



Connect the fan motor 2P (Black) connector.

Install the fuel tank (page 2-11).
Fill and bleed the cooling system (page 6-6).



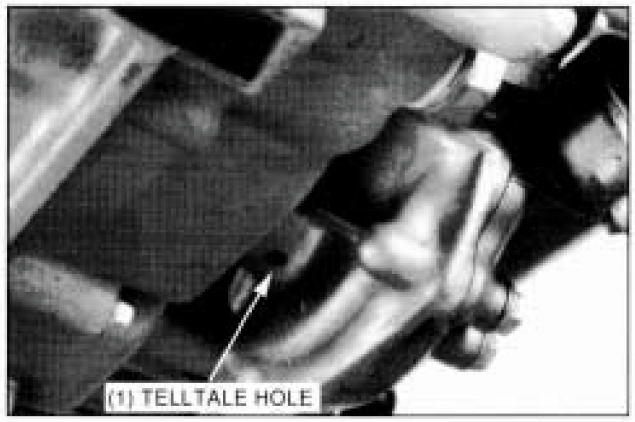
Water Pump

MECHANICAL SEAL INSPECTION

NOTE:

- The water pump cover and O-ring can be removed with engine in the frame.

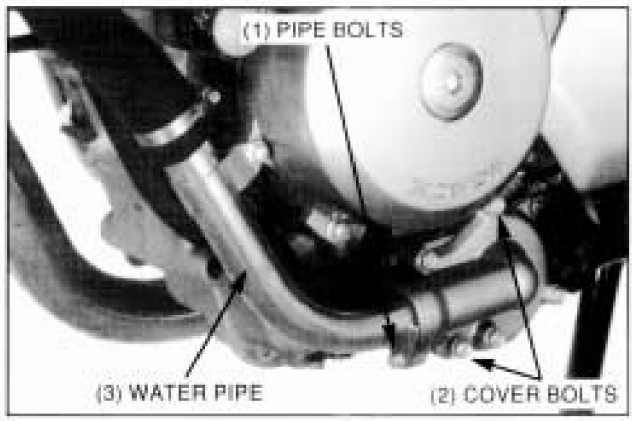
Inspect the telltale hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective and the water pump assembly must be replaced.



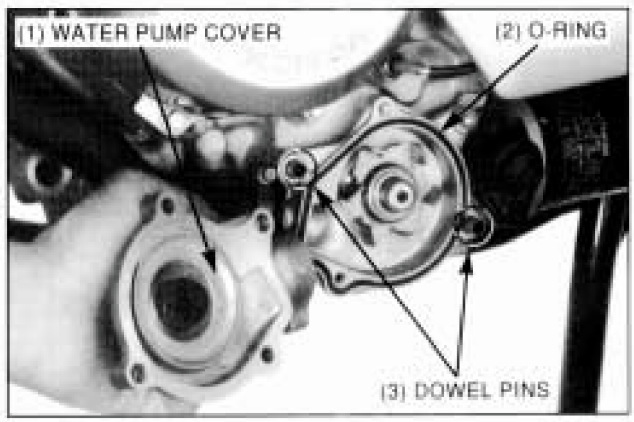
REMOVAL

Remove the bolts and water pipe from the water pump cover.

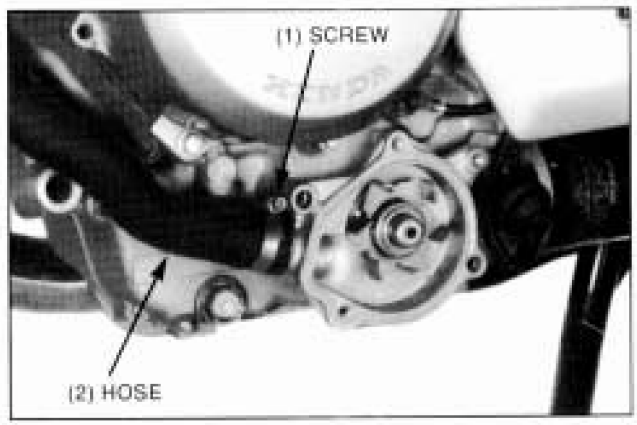
Remove the water pump cover mounting bolts.



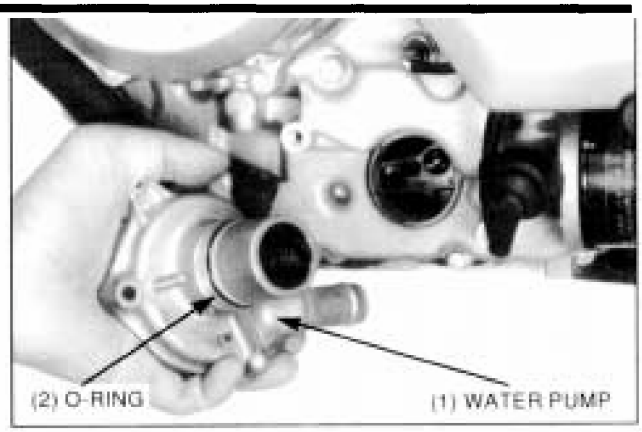
Remove the water pump cover, dowel pins and O-ring from the water pump.



Loosen the band screw and remove the water hose from the water pump.



Remove the water pump and O-ring from the crankcase.



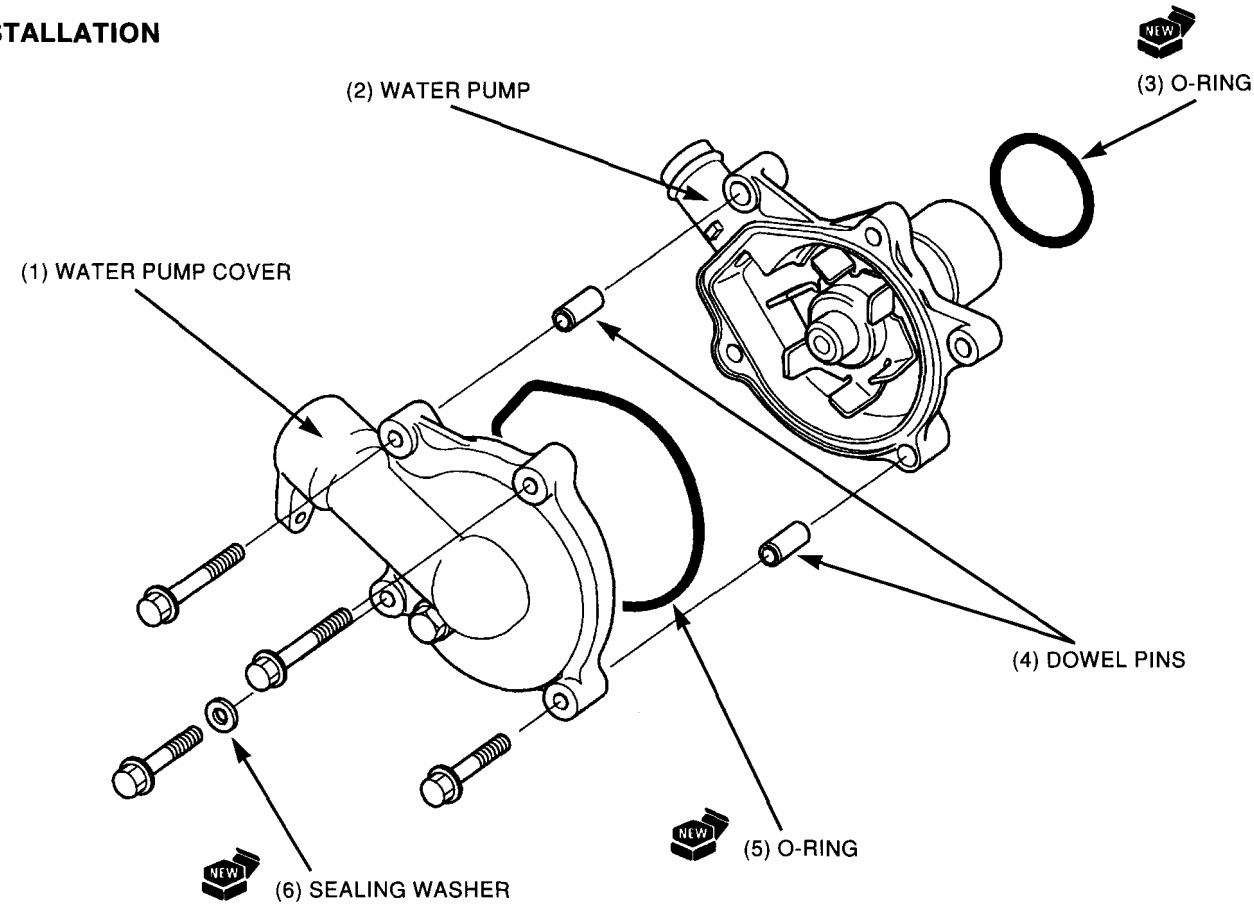
INSPECTION

CAUTION

- **Do not disassemble the water pump. Replace the pump as an assembly if it is damaged.**

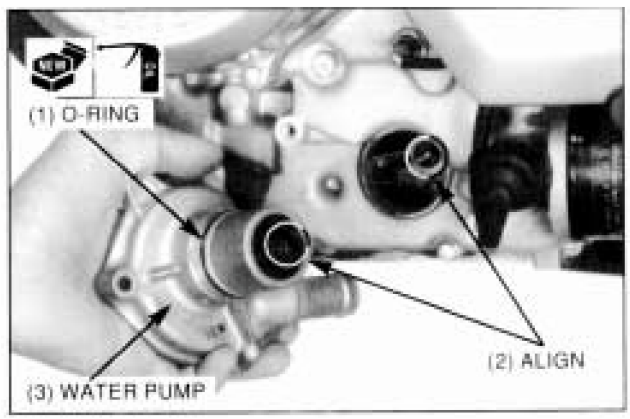
Check the water pump for mechanical seal leakage and bearing deterioration. Replace the water pump as an assembly if necessary.

INSTALLATION

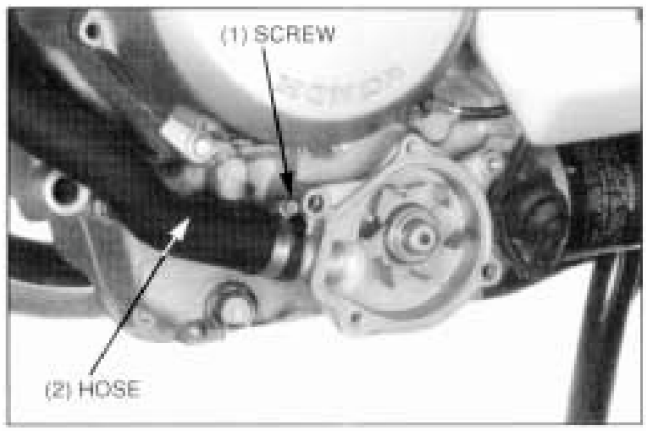


Apply a coat of clean engine oil to a new O-ring and install it in the water pump shaft housing groove.

Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.

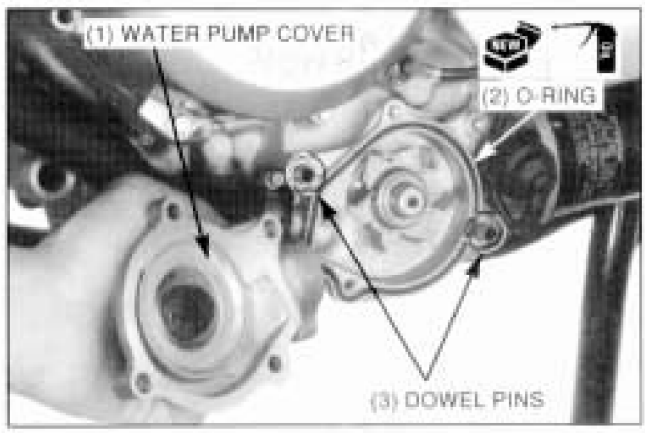


Connect the water hose to the water pump aligning the white paint on the hose with the boss on the water pipe then tighten the hose band securely.



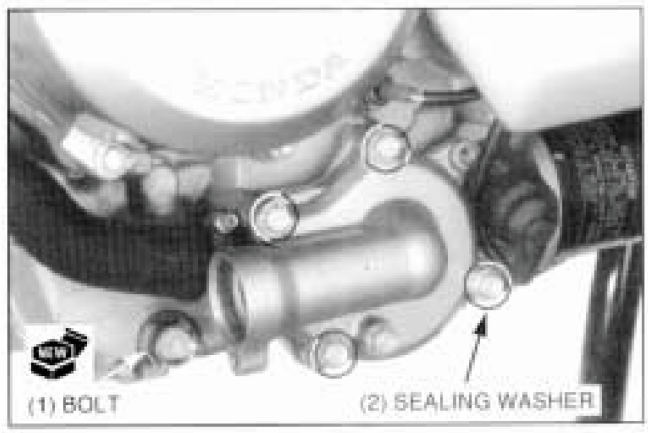
Apply a coat of clean engine oil to a new O-ring and install it around the impeller housing.

Install the dowel pins and water pump cover to the water pump.



Install the bolts and sealing washer as shown.
Tighten the cover bolts to the specified torque.

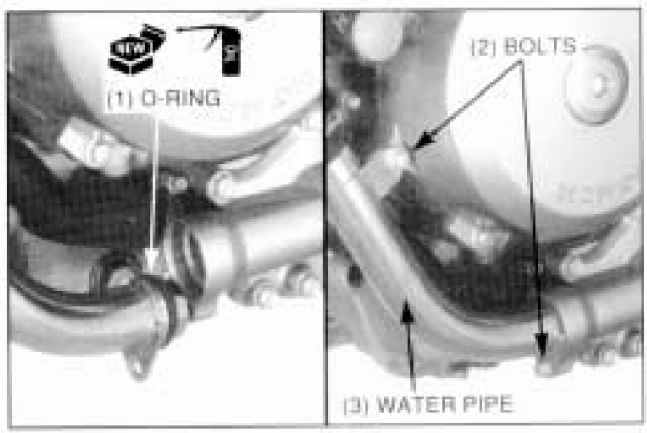
Torque: 13 N·m (1.3 kgf-m, 9 lbf-ft)



Apply a coat of clean engine oil to a new O-ring and install it to the water pipe.
Install the water pipe to the water pump cover and tighten the bolts securely.

Fill and bleed the cooling system (page 6-6).
Fill the engine with the recommended engine oil (page 3-12).

Check the cooling system for leakage.



Radiator Reserve Tank

REMOVAL/INSTALLATION

Remove the fuel tank (page 2-11).

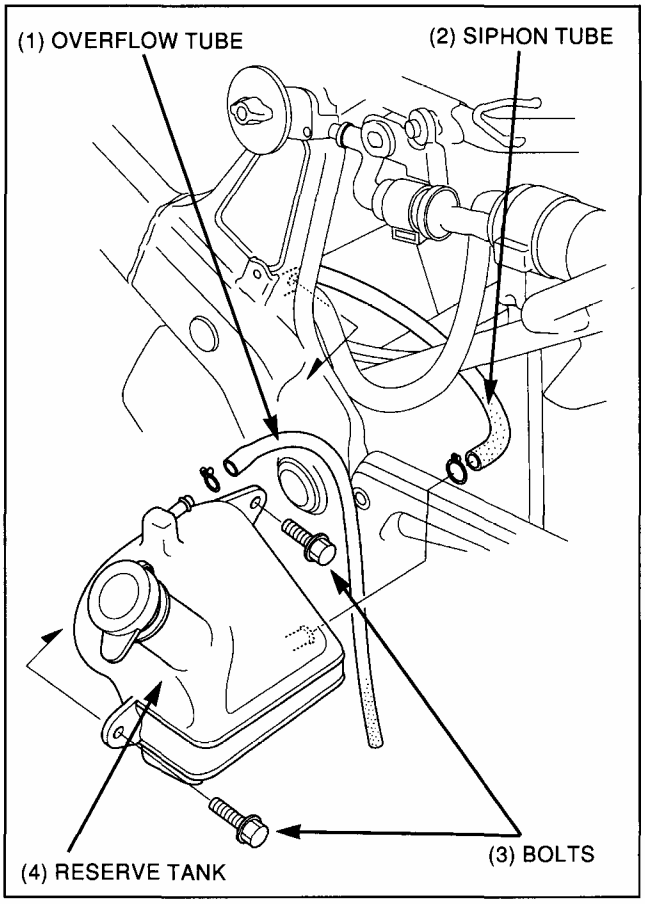
Place a suitable container under the siphon tube joint of the reserve tank.

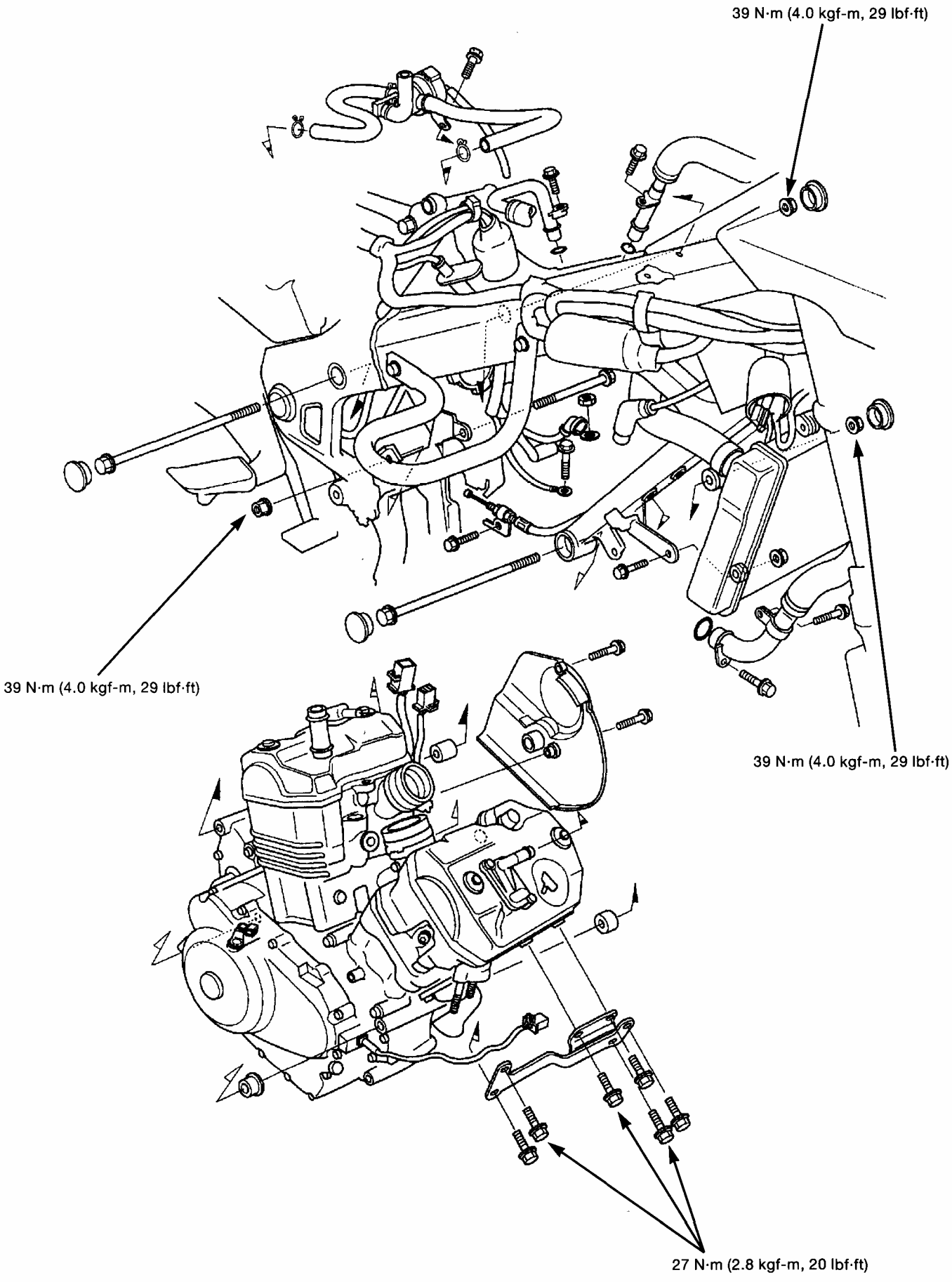
Disconnect the radiator siphon tube at the reserve tank.

Remove the reserve tank mounting bolt, filler mounting nut and reserve tank.

Installation is in the reverse order of removal.

Fill the reserve tank with coolant (page 6-4).




39 N·m (4.0 kgf-m, 29 lbf·ft)
39 N·m (4.0 kgf-m, 29 lbf·ft)
39 N·m (4.0 kgf-m, 29 lbf·ft)
27 N·m (2.8 kgf-m, 20 lbf·ft)

7. Engine Removal/Installation

SERVICE INFORMATION	7-1	ENGINE INSTALLATION	7-5
ENGINE REMOVAL	7-2		

Service Information

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.

CAUTION

- **Do not support the engine using the oil filter.**

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components can be serviced with the engine installed in the frame.
  - Alternator (Section 9)
  - Camshaft (Section 10)
  - Carburetor (Section 5)
  - Clutch/gearshift linkage (Section 8)
  - Rear cylinder head (Section 10)
  - Ignition pulse generator (Section 8)
  - Starter motor/starter clutch (Section 19)
- The following components require engine removal for service.
  - Cylinder/piston (Section 11)
  - Crankshaft (Section 12)
  - Oil pump (Section 4)
  - Front cylinder head (Section 10)
  - Shift fork, shift drum and shift spindle (Section 12)
  - Transmission (Section 12)
  - Output gear (Section 12)
  - Water pump body (Section 6)
- After engine installation, adjust the following.
  - Clutch cable (page 3-21)
  - Throttle cable (page 3-4)

ESPECIFICACIONES

Item	Specifications
Engine dry weight	66.5 Kg. (146.6 lbs)
Engine oil capacity at disassembly	3.0 liters (3.15 US qt, 2.64 Imp qt)
Coolant capacity	2.0 liters (2.11 US qt, 1.76 Imp qt)

TORQUE VALUES

Engine oil drain bolt	29 N·m (3.0 kg·m, 22 lbf·m)
Oil pressure switch terminal screw	2 N·m (0.2 kg·m, 1.4 lbf·m)
Front engine lower mounting bolt	39 N·m (4.0 kg·m, 29 lbf·m)
Front engine hanger bolt	27 N·m (2.8 kg·m, 20 lbf·m)
Rear engine upper mounting bolt	39 N·m (4.0 kg·m, 29 lbf·m)
Rear engine lower mounting bolt	39 N·m (4.0 kg·m, 29 lbf·m)

Engine Removal

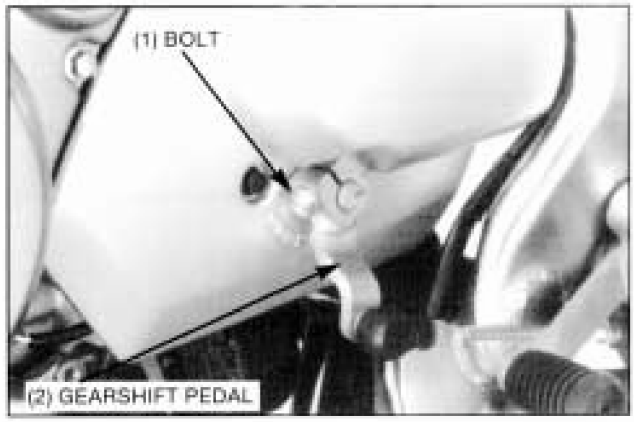
CAUTION

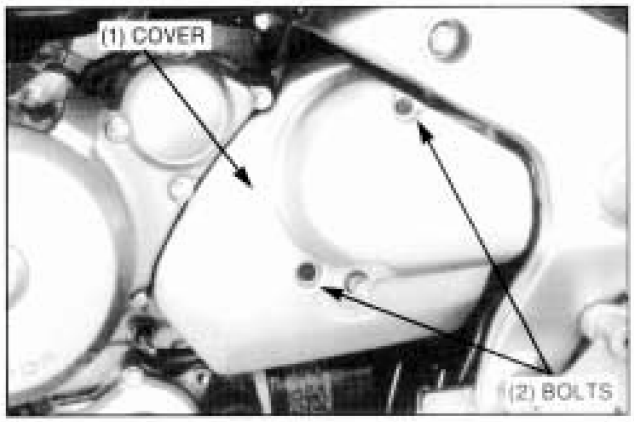
- **Do not support the engine using the oil filter.**

NOTE:

- Support the motorcycle on its main stand.
- A floor jack or adjustable support is required to support and maneuver the engine. The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Remove the bolt and gearshift pedal from the gearshift spindle.
Remove the bolts and left engine rear cover





Drain the engine oil (page 3-11) and radiator coolant (page 6-5).
Disconnect the battery negative cable from the battery terminal.

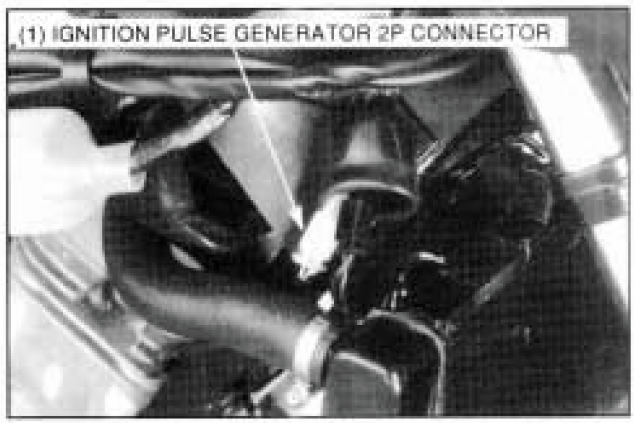
Remove the following:
- Fuel tank (page 2-11)
- Air cleaner housing (page 5-4)
- Carburetor (page 5-6)
- Exhaust pipe/muffler (page 2-12)

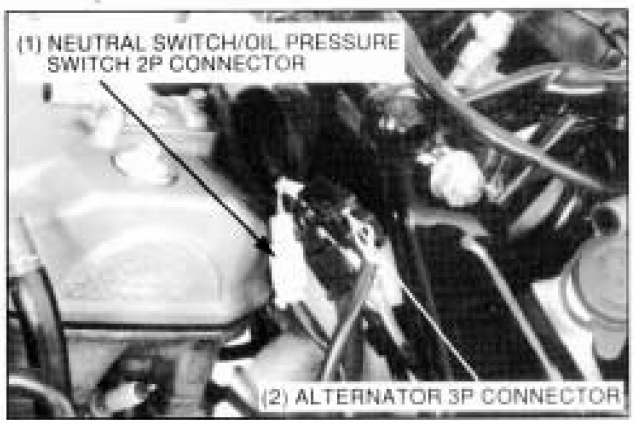
Disconnect the spark plug caps.
Remove the nut and bolt then disconnect the starter motor cable and ground cable from the starter motor.

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

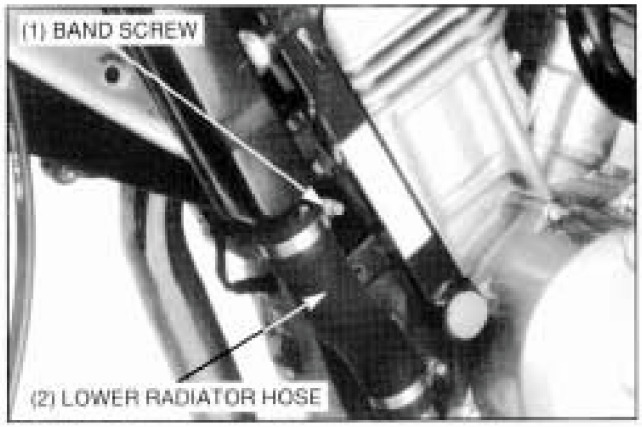
Disconnect the ignition pulse generator 2P connector and free the wire harness from the engine and frame.

Disconnect the neutral switch/oil pressure switch 2P connector.
Disconnect the alternator 3P connector.

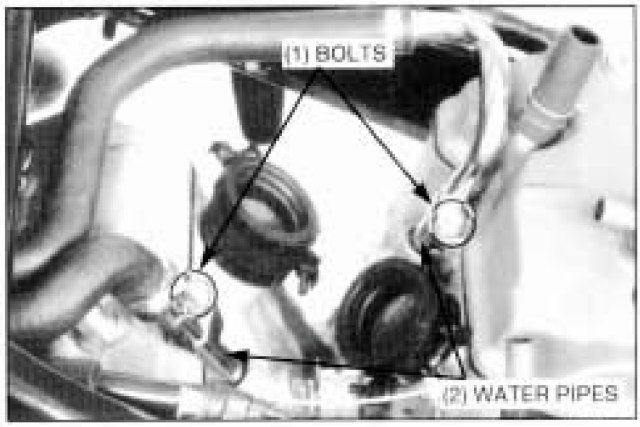




Loosen the band screw and disconnect the lower radiator hose from the water pump.
Remove the radiator bolt and swing the radiator.



Remove the bolts and disconnect the water pipes (thermostat housing-to-cylinder heads) from the cylinder heads.



Remove the engine mounting bolt/nut caps.

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

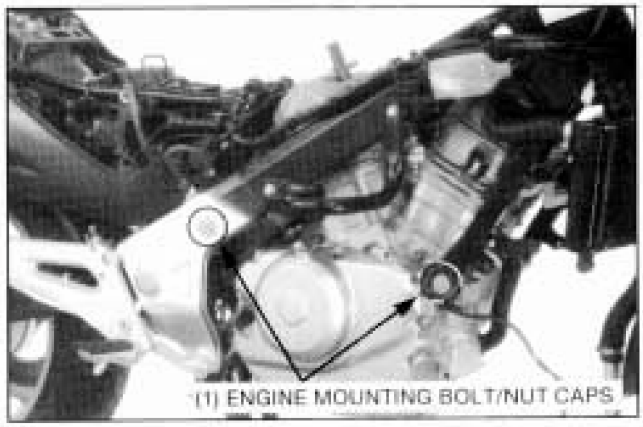
CAUTION

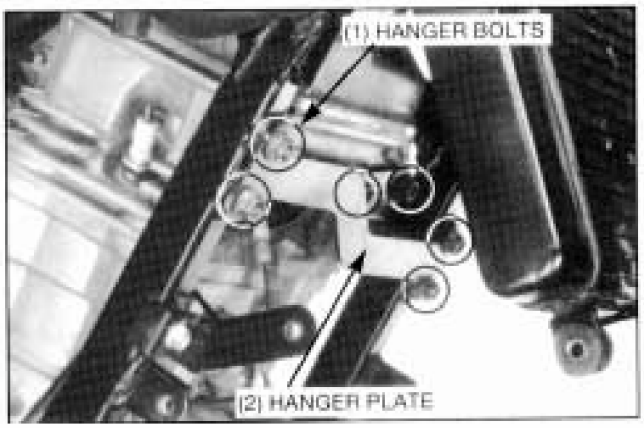
- **Do not support the engine using the oil filter. This may break the oil filter mount resulting in crankcase replacement.**

NOTE:

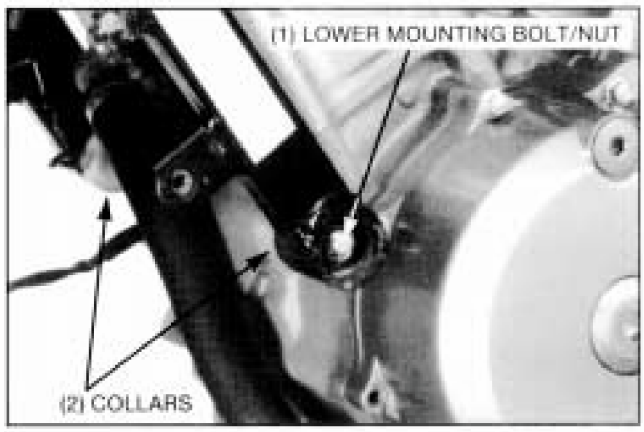
- The jack height must be continually adjusted to relieve stress for ease bolt removal.

Remove the front engine hanger bolts and hanger plate.

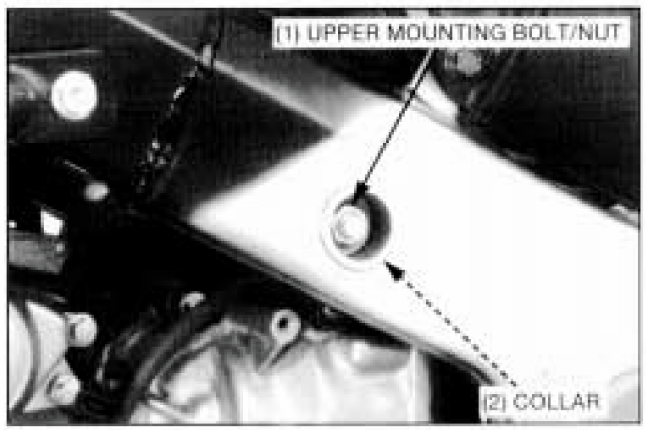




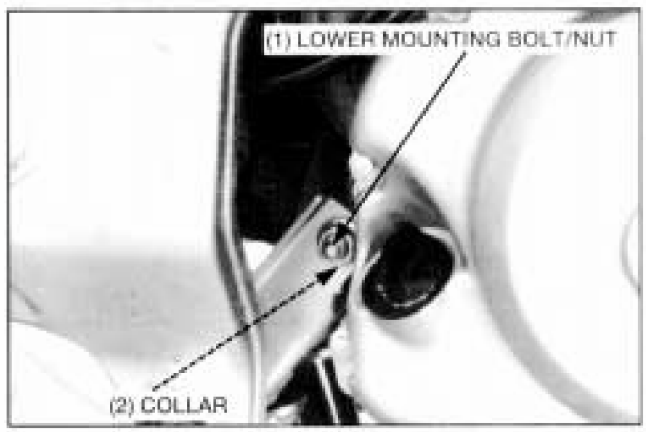
Remove the front engine lower mounting bolt/nut and collars.



Remove the rear engine upper mounting bolt/nut and collar.



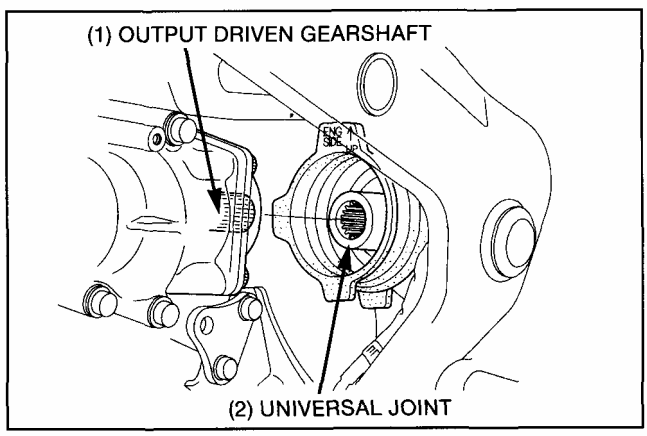
Remove the rear engine lower mounting bolt/nut and collar.



CAUTION

- **During engine removal, hold the engine securely and be careful not to damage the frame, engine and radiator fin.**

Remove the engine from the right side of the frame by releasing the output driven gear shaft from the universal joint in the swingarm.



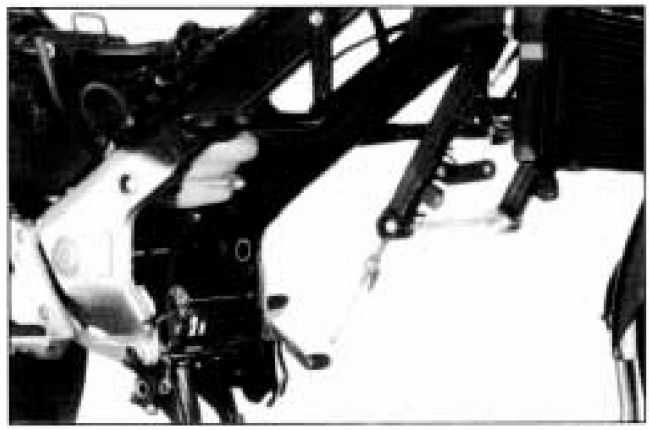
Engine Installation

CAUTION

- **Carefully align the mounting points with the jack to prevent damage to engine, frame, wires and cables.**

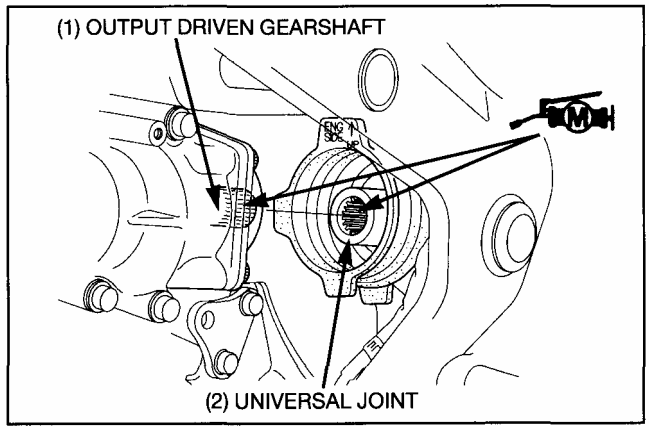
NOTE:

- All the engine mounting bolts and nuts loosely install, then tighten the bolts and nuts to the specified torque.
- Be sure to install the mounting collars in their correct positions.

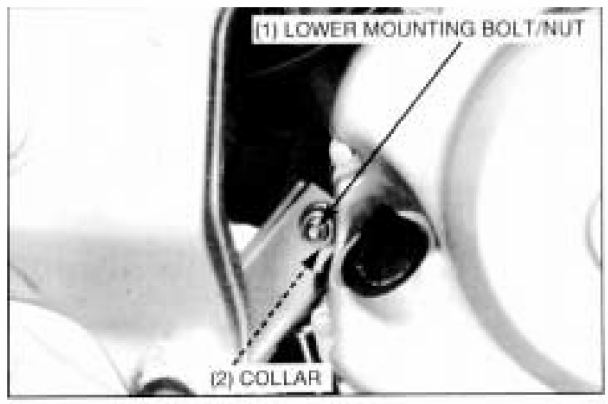


Apply 1g. (0.04 oz) of molybdenum disulfide grease to the output driven gear shaft spline.

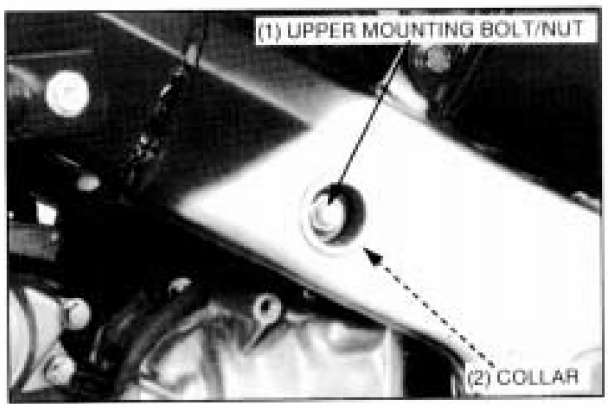
Use a floor jack or other adjustable support to carefully maneuver the engine in to place and insert the output driven gear shaft into the universal joint in the universal joint in the swingarm. Carefully align the bolt holes in the frame and engine.



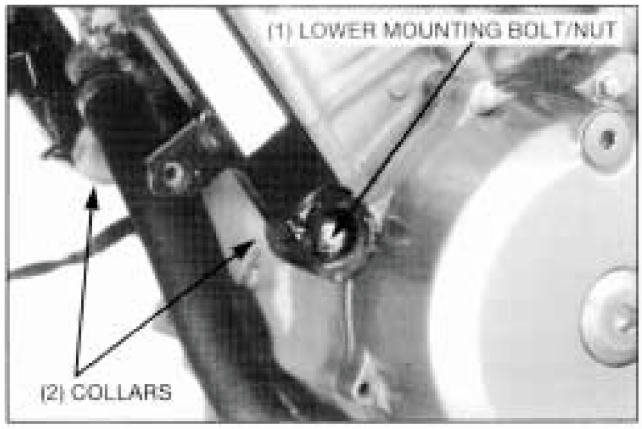
Install the collar and rear engine lower mounting bolt/nut.



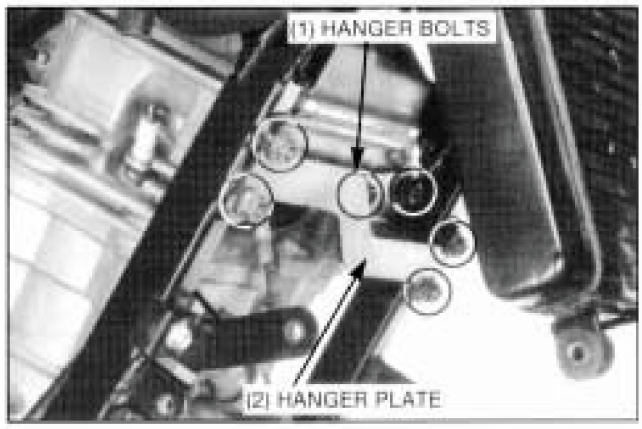
Install the collar and rear engine upper mounting bolt/nut.



Install the collars and front engine lower mounting bolt/nut.

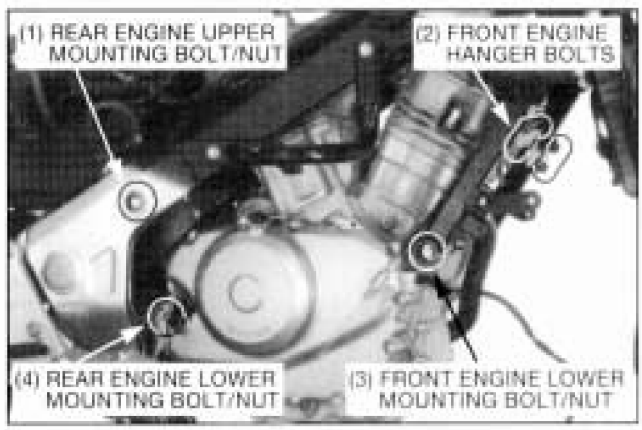


Install the front engine hanger and hanger bolts.

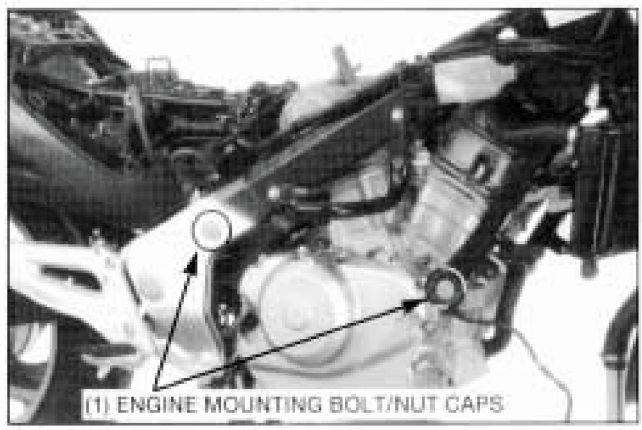


Tighten the engine hanger and mounting bolt/nut to the specified torque.

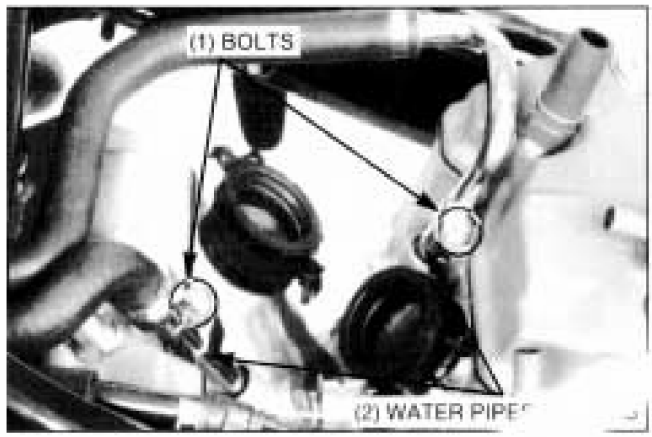
Torques:
Front engine lower mounting bolt
39 N·m (4.0 kgf·m, 29 lbf·ft)
Front engine hanger bolt
27 N·m (2.8 kgf·m, 20 lbf·ft)
Rear engine upper mounting bolt
39 N·m (4.0 kgf·m, 29 lbf·ft)
Rear engine lower mounting bolt
39 N·m (4.0 kgf·m, 29 lbf·ft)



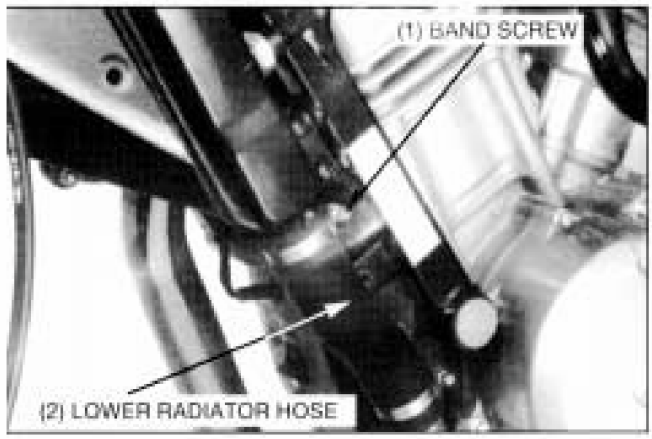
Install the engine mounting bolt/nut caps.



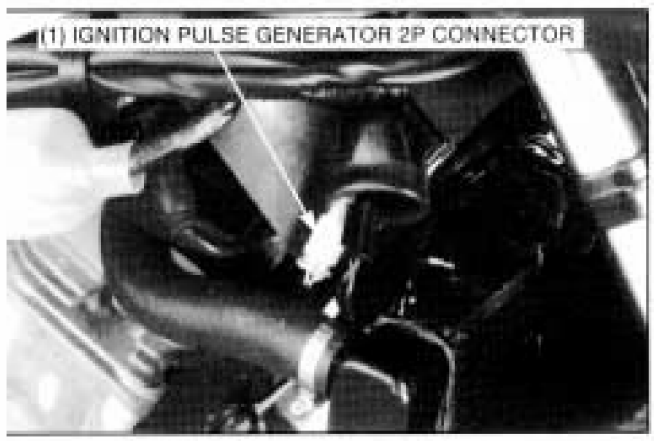
Connect the water pipes and O-rings (thermostat housing-to-cylinder heads) to the cylinder heads.
Install and tighten the mounting bolts securely.



Install and tighten the radiator bolt securely.
Connect the lower radiator hose to the radiator and tighten the radiator hose bad securely

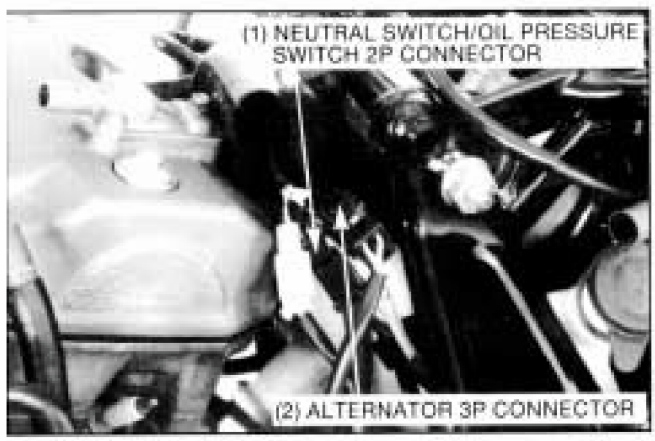


Route the ignition pulse generator wire harness properly (page 1-27).
Connect the ignition pulse generator 2P connector.



Route the alternator wire harness properly (page 1-27).
Connect the alternator wire 3P connector.

Route the neutral switch/oil pressure switch wire harness properly (page 1-27).
Connect the neutral switch/oil pressure switch 2P connector.



Connect the clutch cable to the clutch lifter arm.
Install the clutch cable holder and bolt.
Tighten the holder bolts securely.

Connect the starter motor cable and ground cable to the starter motor (page 19-12).

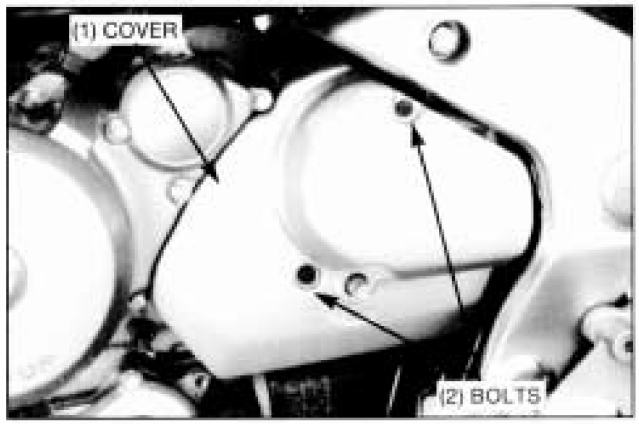
Connect the spark plug caps.

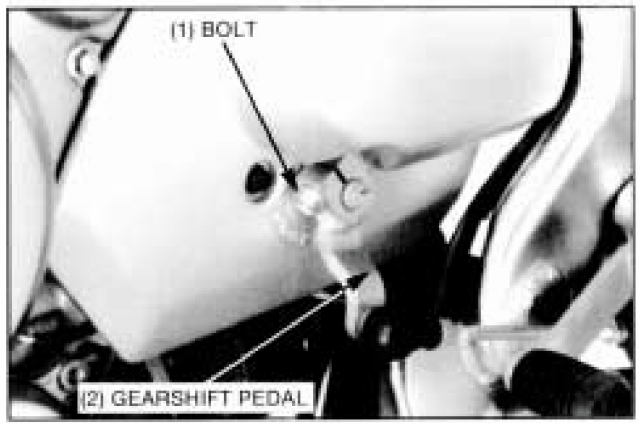
Install the following:
- Exhaust pipe/muffler (page 2-14)
- Carburetor (page 5-19)
- Air cleaner housing (page 5-4)
- Fuel tank (page 2-11)

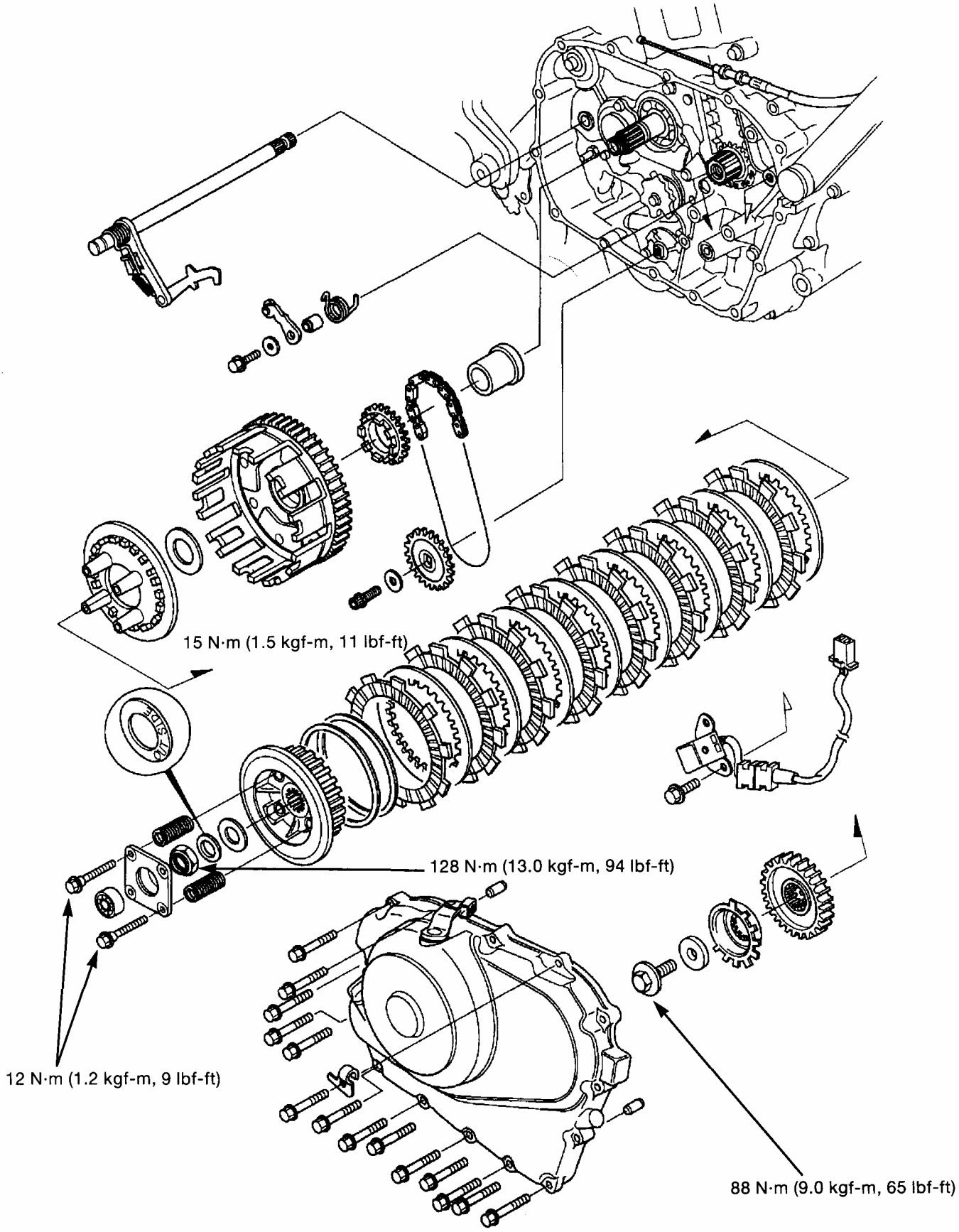
Fill the engine oil (page 3-11).
Fill and breed the cooling system (page 6-5).
Connect the battery negative cable to the battery terminal.

Install the left engine rear cover.
Install and tighten the bolts securely.

Install the gearshift pedal to the gearshift spindle.
Install and tighten the bolt securely.






15 N·m (1.5 kgf-m, 11 lbf-ft)
128 N·m (13.0 kgf-m, 94 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
88 N·m (9.0 kgf-m, 65 lbf-ft)

8. Clutch/Gearshift Linkage

SERVICE INFORMATION	8-1	PRIMARY DRIVE GEAR	8-9
TROUBLESHOOTING	8-2	GEARSHIFT LINKAGE	8-11
RIGHT CRANKCASE COVER REMOVAL	8-3	CLUTCH INSTALLATION	8-13
CLUTCH REMOVAL	8-4	RIGHT CRANKCASE COVER INSTALLATION	8-17

Service Information

GENERAL

- The clutch and gearshift linkage maintenance can be done with the engine in the frame.
- Engine oil viscosity and level, and the use of oil additives have an effect on clutch disengagement. Oil additives of kind are not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil viscosity and level before servicing the clutch system.
- Clean off any gasket material from the right crankcase cover surface.
- Be careful not to damage the crankcase cover mating surface when servicing.
- When removing or servicing the clutch and gearshift linkage, use care not to allow dust or dirt to enter the engine.
- The crankcase must be separated when the transmission requires service (Section 12).
- Refer to section 18 for ignition pulse generator inspection.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Clutch lever free play		10-20 (3/8-3/4)	—
Clutch spring free length		42.3 (1.67)	43.9 (1.73)
Clutch disc thickness	A	2.62-2.78 (0.103-0.107)	2.3 (0.09)
	B	2.92-3.08 (0.115-0.121)	2.6 (0.10)
	C	2.62-2.78 (0.103-0.107)	2.3 (0.09)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I. D.	21.991-22.016 (0.8658-0.8668)	22.09 (0.870)
	O.D.	31.959-31.975 (1.2582-1.2589)	31.92 (1.257)
Oil pump drive sprocket I. D.		32.025-32.145 (1.2608-1.2655)	30.15 (1.187)
Mainshaft O. D. at clutch outer guide		21.967-21.980 (0.8648-0.8654)	21.95 (0.864)

TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Clutch center lock nut	128 N·m (13.0 kgf-m, 94 lbf-ft)	Apply oil to the threads and seating surface Stake
Primary drive gear bolt	88 N·m (9.0 kgf-m, 65 lbf-ft)	Apply oil to the threads and seating surface
Gearshift return spring pin	23 N·m (2.3 kgf-m, 17 lbf-ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf-m, 11 lbf-ft)	Apply a locking agent to the threads

TOOLS

Gear holder	07724-0010100
Clutch center holder	07JMB-MN50301

Troubleshooting

Clutch lever too hard
- Damaged, kinked or dirty clutch cable
- Faulty clutch lifter plate bearing
- Damaged clutch lifter mechanism
- Improperly routed clutch cable

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Too much clutch lever free play
- Warped clutch plates
- Loose clutch center lock nut
- Engine oil too high, improper oil viscosity

Clutch slips
- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever free play

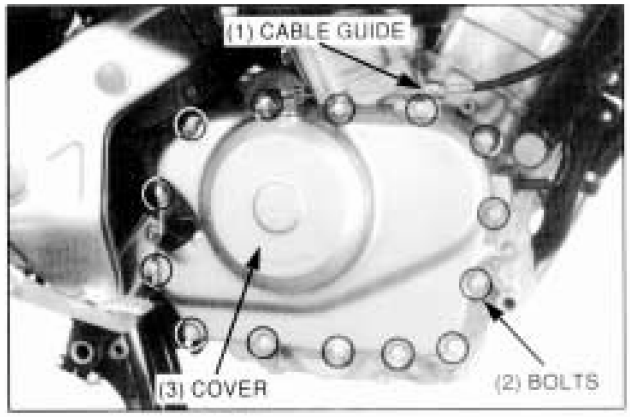
Hard to shift
- Improper clutch operation or incorrect clutch adjustment
- Bent or damaged shift forks (Section 12)
- Bent shift fork shaft (Section 12)
- Bent or damaged gearshift spindle
- Damaged shift drum cam grooves

Transmission jumps out of gear
- Worn gear dogs or slots
- Bent shift fork shaft (Section 12)
- Broken shift drum stopper arm
- Worn or bent shift forks (Section 12)
- Broken shift linkage return spring

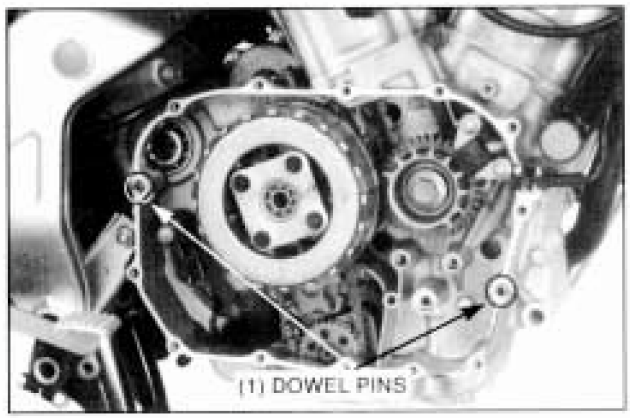
Right Crankcase Cover Removal

Drain the engine oil (page 3-11).
Remove the exhaust pipe/muffler (page 2-12).

Remove the right crankcase bolts, clutch cable guide and cover.
Disconnect the clutch cable from the clutch lifter arm.

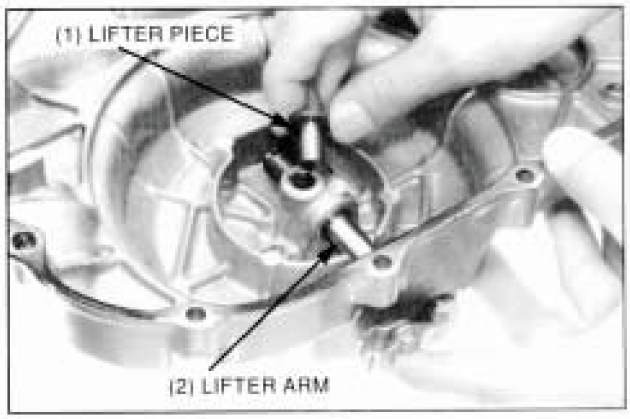


Remove the dowel pins.

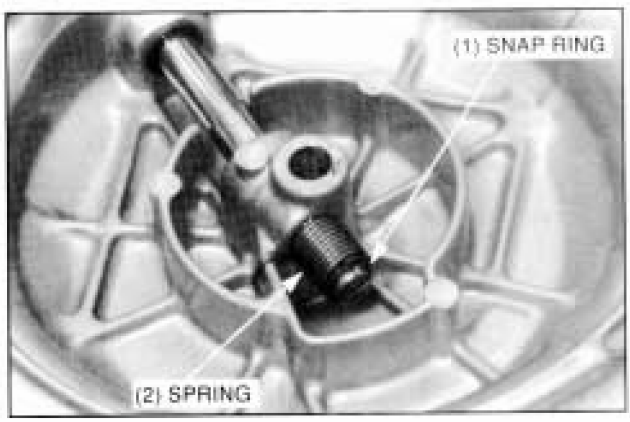


DISASSEMBLY

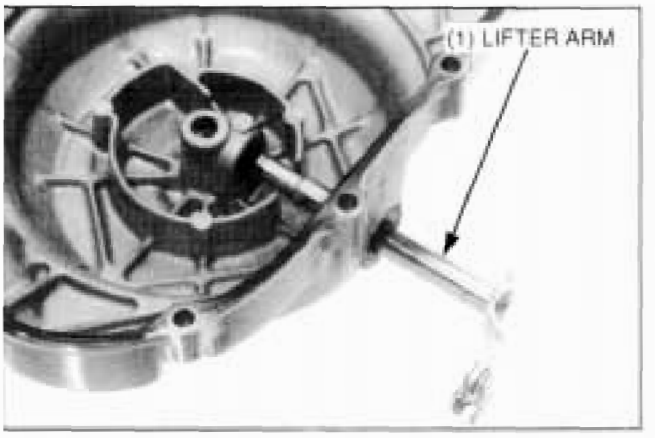
Remove the clutch lifter piece.



Remove the snap ring and return spring from the right crankcase cover.



Remove the clutch lifter arm.

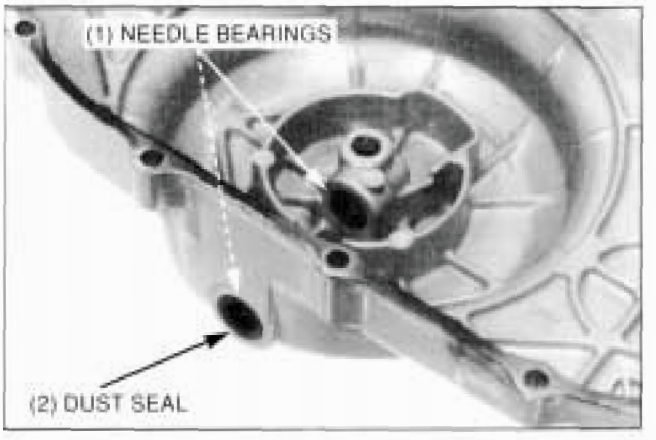


INSPECTION

Check the dust seal for fatigue or damage.
Check the needle bearing for wear, damage or loose fit.
Replace these parts if necessary.

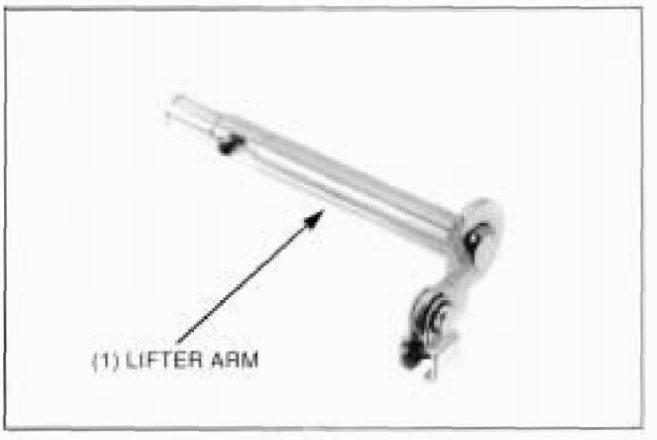
NOTE:

- If the dust seal replacement is required, press the dust seal to the case surface.



Check the clutch lifter arm for damage or bending.
Check the spring for fatigue or damage.
Replace these parts if necessary.

Apply engine oil to the clutch lifter arm sliding surface.
Apply engine oil to the dust seal lips and needle bearing.



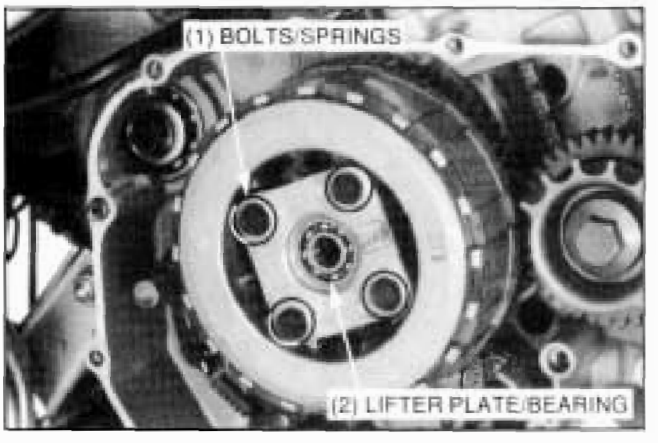
Clutch Removal

Remove the right crankcase cover (page 8-3).

NOTE:

- If the oil pump driven sprocket will be removed, loosen the driven sprocket bolt while the clutch is still installed.

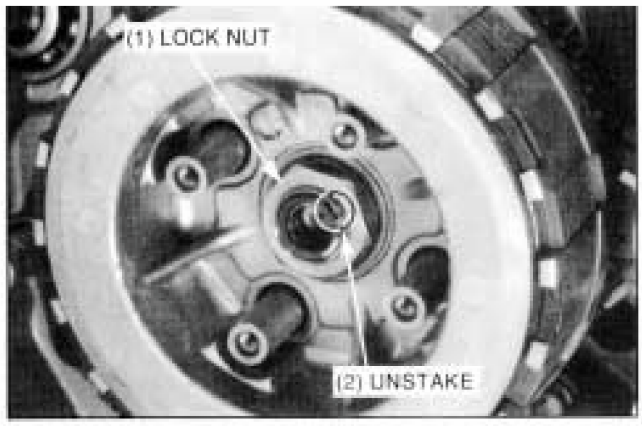
Loosen the clutch lifter plate bolts in a crisscross pattern in 2 or 3 steps.
Remove the lifter plate/bearing and clutch springs.



Unstake the clutch center lock nut.

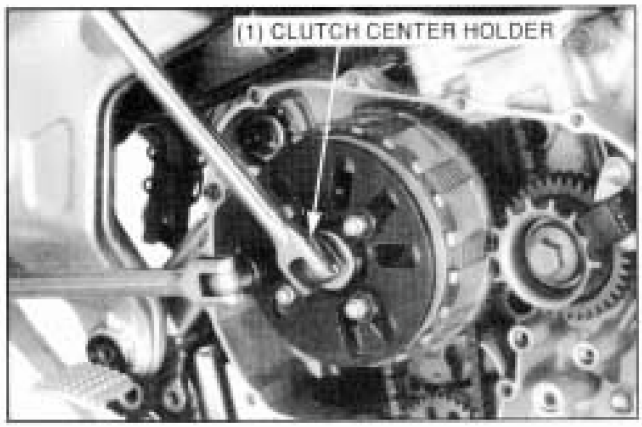
CAUTION

- **Be careful not to damage the mainshaft threads.**

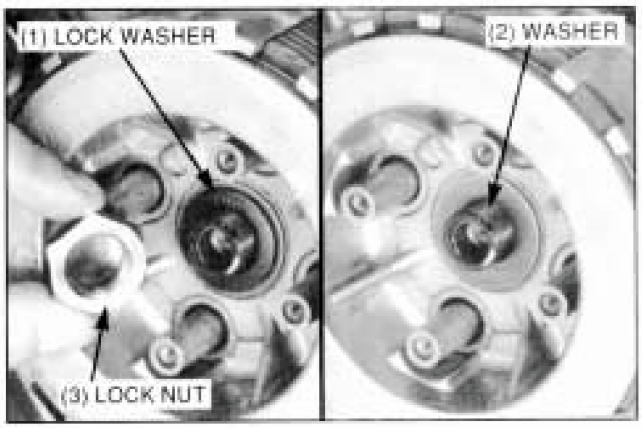


Hold the pressure plate with the clutch center holder and loosen the clutch center lock nut.

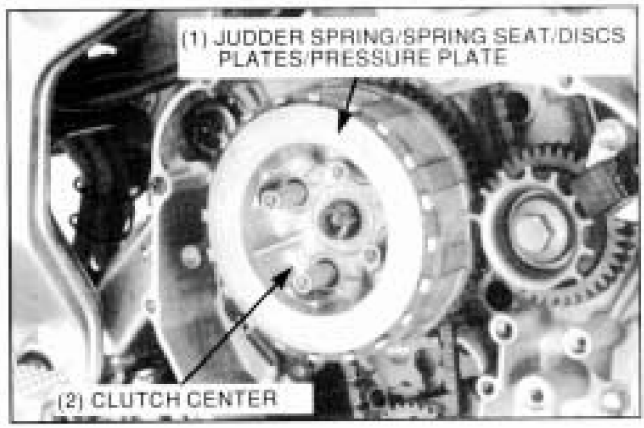
Tool:
Clutch center holder **07JMB-MN50301**



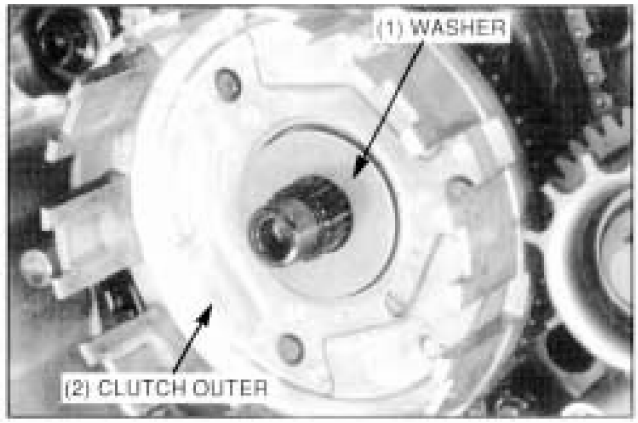
Remove the clutch center lock nut, spring washer and washer.



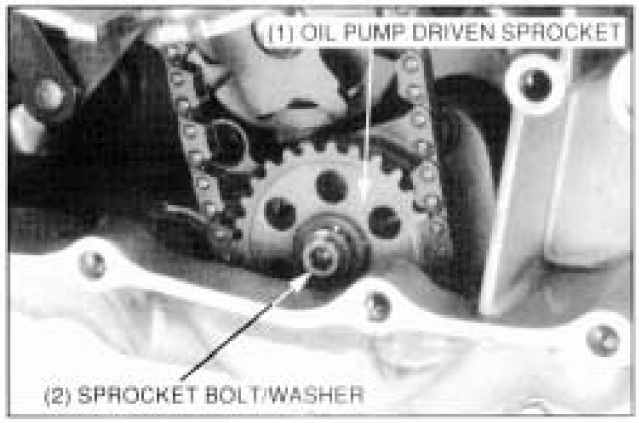
Remove the clutch center.
Remove the judder spring, spring seat, clutch discs and clutch plates.
Remove the pressure plate.



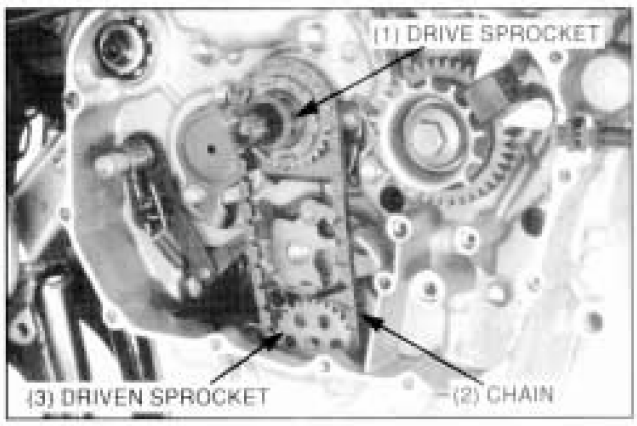
Remove the washer and clutch outer.



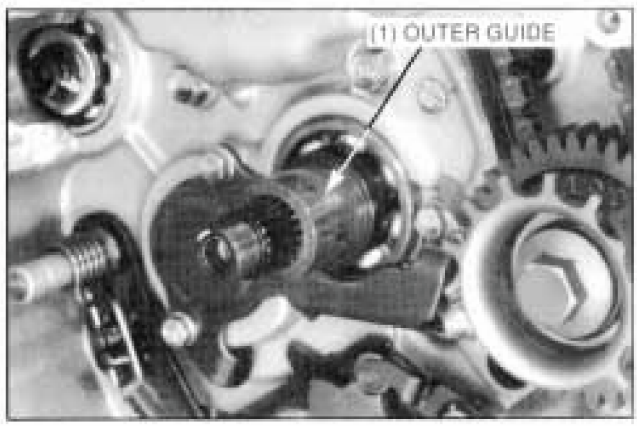
Remove the oil pump driven sprocket bolt and washer.



Remove the oil pump drive sprocket, driven sprocket and oil pump drive chain as a set.



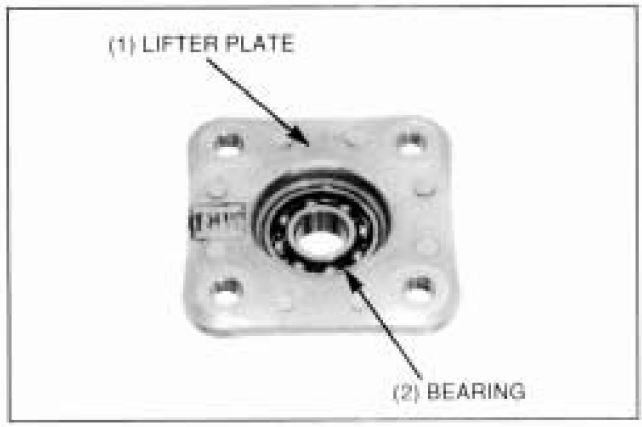
Remove the clutch outer guide.



INSPECTION

LIFTER PLATE BEARING

Check the lifter plate bearing for damage.
Turn the bearing inner race with your finger. The bearing should turn smoothly and quietly without play.
Also check that the bearing outer race fits in the plate.
Replace the bearing if necessary.



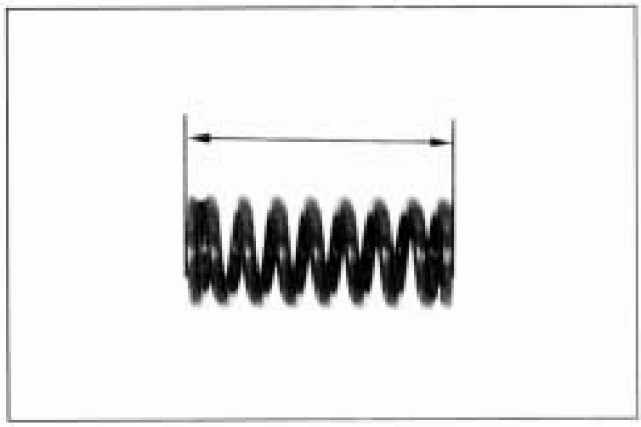
CLUTCH SPRING

Measure the clutch spring free length.

Service Limit: 43.9 mm (1.73 in)

NOTE:

- Replace the clutch spring as a set.



CLUTCH DISC

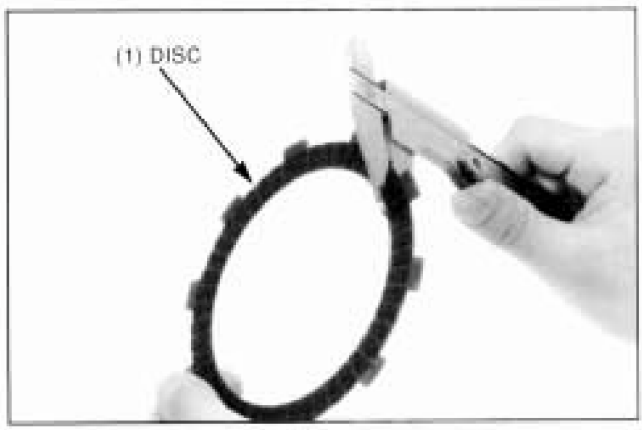
Check the clutch discs for signs of scoring or discoloration.

Measure the thickness of the discs.

Service Limits: Disc A: 2.3 mm (0.09 in)
Disc B: 2.6 mm (0.10 in)
Disc C: 2.3 mm (0.09 in)

NOTE:

- Replace the discs and plates as a set.



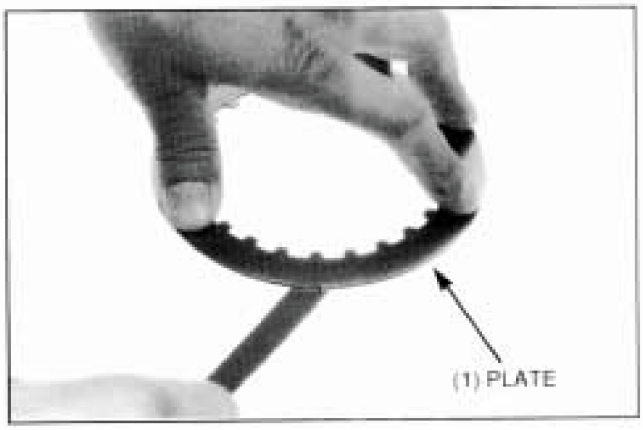
CLUTCH PLATE

Check the plate for excessive warpage or discoloration.
Check the plate warpage on a surface plate using a feeler gauge.

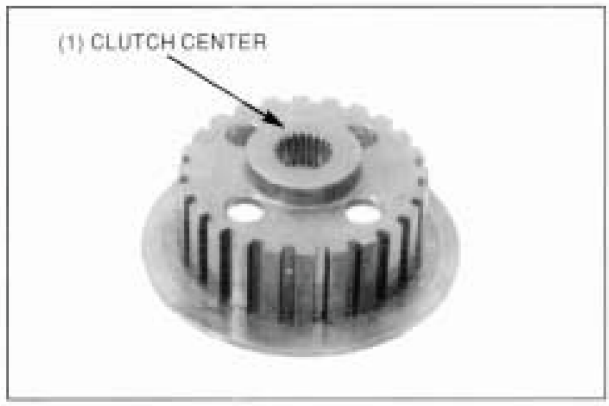
Service Limit: 0.30 mm (0.012 in)

NOTE:

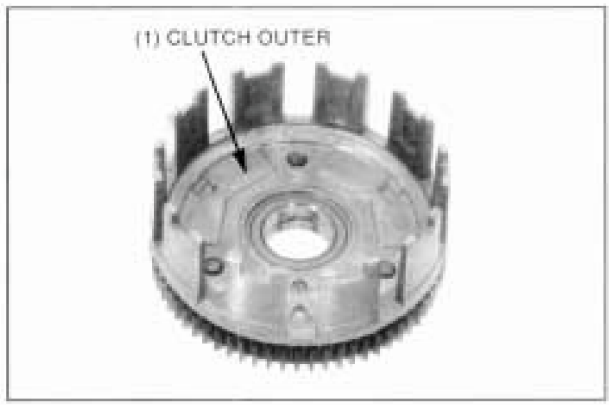
- Replace the discs and plates as a set.



CLUTCH CENTER
Check the clutch center for nicks, indentations or abnormal wear made by the clutch plates.

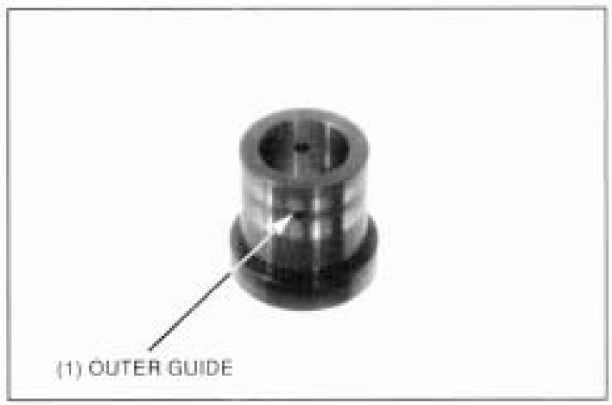


CLUTCH OUTER
Check the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.
Check the serrated teeth of the primary driven gear for wear or damage.



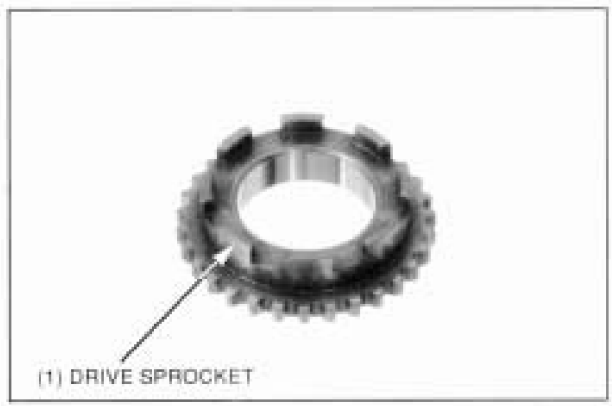
CLUTCH OUTER GUIDE
Measure the clutch outer guide.

Service Limits: I. D. : 22.09 mm (0.870 in)
O. D. : 31.92 mm (1.257 in)



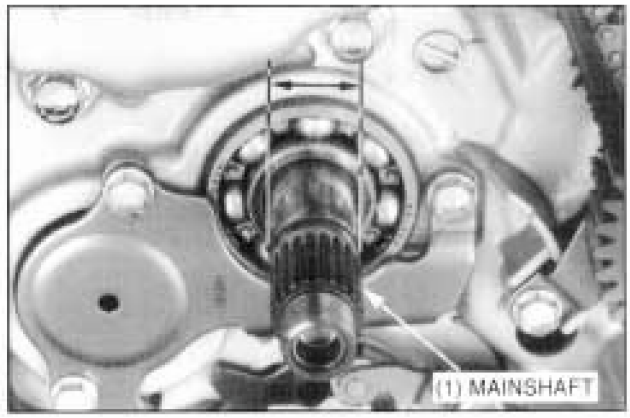
OIL PUMP DRIVE SPROCKET
Check the oil pump drive sprocket for damage.
Measure the I.D. of the drive sprocket.

Service Limit: 30.15 mm (1.187 in)

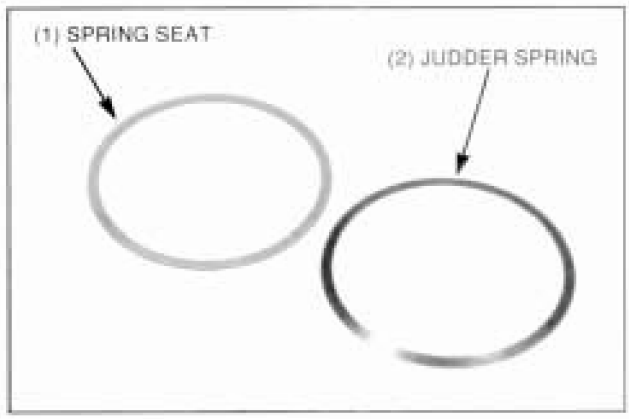


MAINSHAFT
Measure the mainshaft O.D. at the clutch outer guide.

Service Limit: 21.95 mm (0.864 in)



JUDDER SPRING, SPRING SEAT
Check the spring seat and judder spring for distortion, wear or damage.

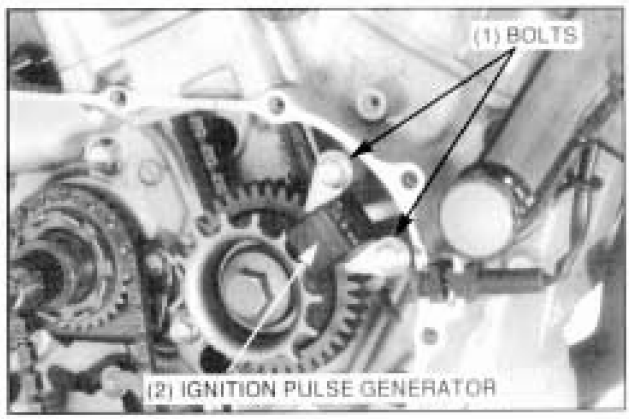


Primary Drive Gear

REMOVAL

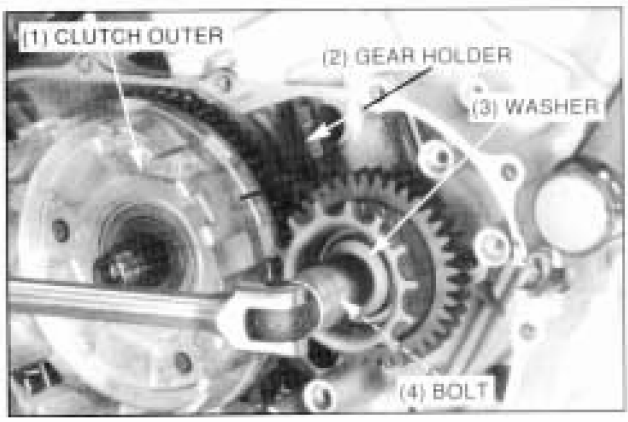
Remove the clutch (page 8-4).

Remove the ignition pulse generator mounting bolts.
Remove the ignition pulse generator and grommets.



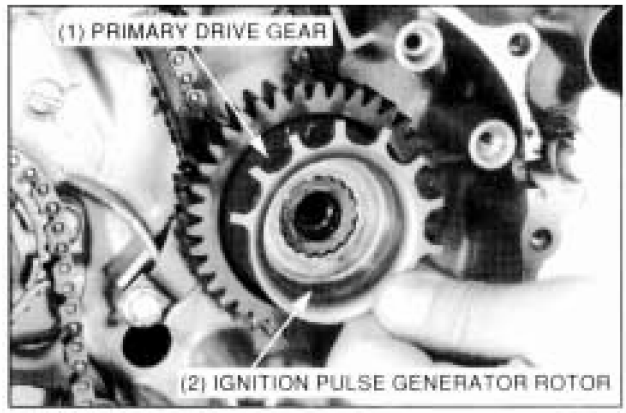
Temporarily install the clutch outer onto the mainshaft (page 8-13).
Hold the primary drive gear with the gear holder and remove the primary drive gear bolt and washer.

Tool:
Gear holder **07724-0010100**



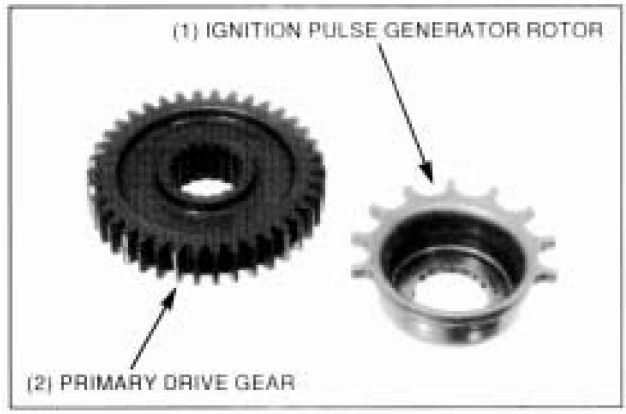
Remove the clutch outer and gear holder.

Remove the ignition pulse generator rotor and primary drive gear.



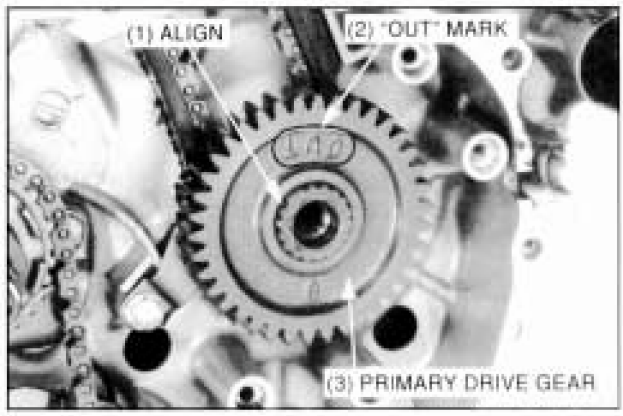
INSPECTION

Check the serrated teeth of the primary drive gear and ignition pulse generator rotor for wear or damage.



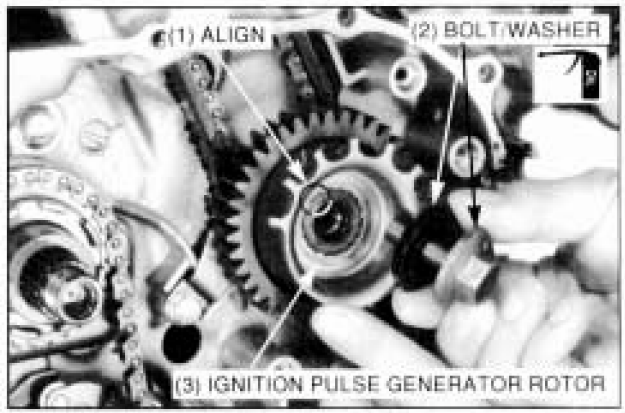
INSTALLATION

Install the primary drive gear with "OUT" mark facing outside and extra wide aligning spline.



Install the ignition pulse generator rotor with the extra wide aligning spline.

Apply engine oil to the primary drive gear bolt threads and seating surface.
Install the washer and primary drive gear bolt.



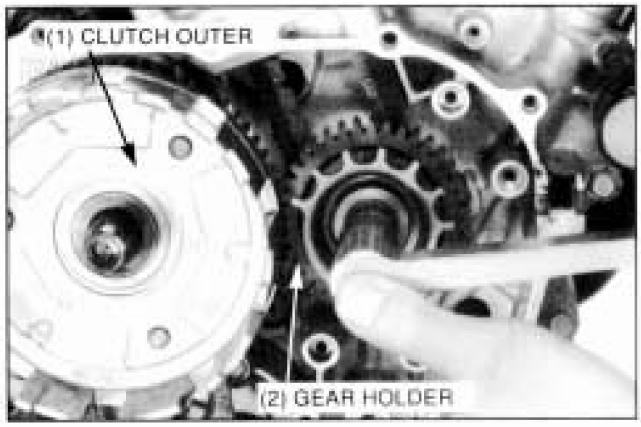
Temporarily install the clutch outer onto the mainshaft (page 8-13).
Hold the primary drive gear with the gear holder.

Tool:
Gear holder **07724-0010100**

Tighten the primary drive gear bolt to the specified torque.

Torque: 88 N·m (9.0 kgf-m, 65 lbf-ft)

Remove the gear holder.

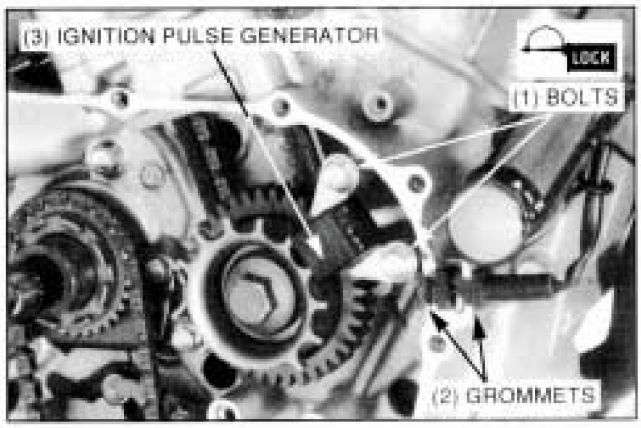


Apply a locking agent to the ignition pulse generator bolt threads.
Install the ignition pulse generator and tighten the bolts.

Install the clutch (page 8-13).

NOTE:

- If removed the ignition pulse generator wire grommets were removed from the case groove, reinstall them securely.

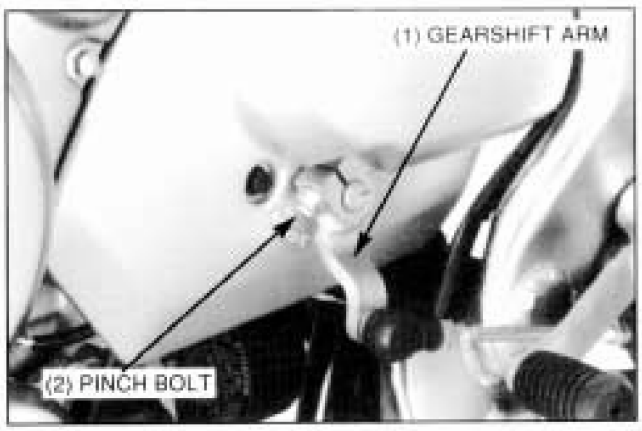


Gearshift Linkage

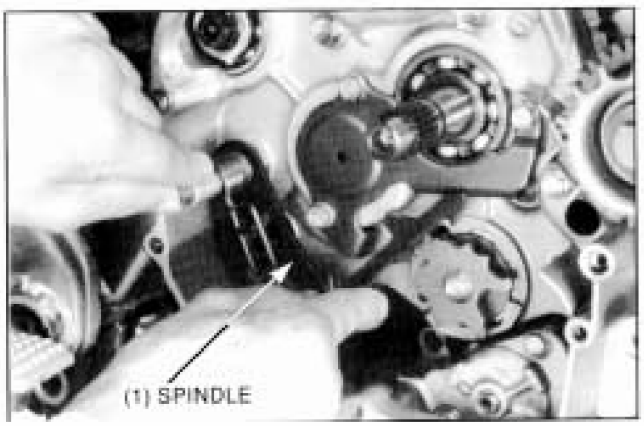
REMOVAL

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

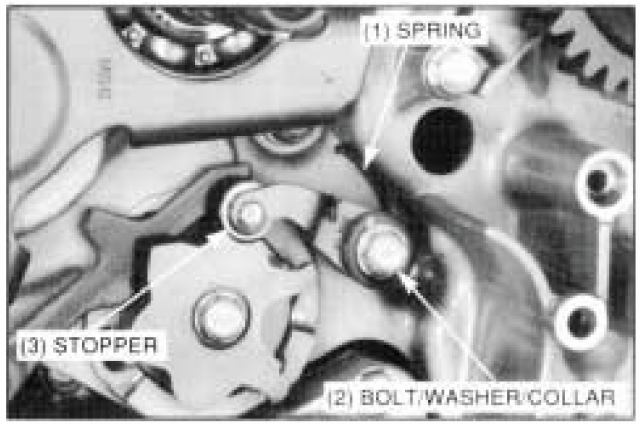
Remove the following:
- Right crankcase cover (page 8-3)
- Clutch (page 8-4)
- Oil pump drive chain (page 8-6)



Remove the gearshift spindle from the crankcase while unhooking the shifter arm from the gearshift cam plate.

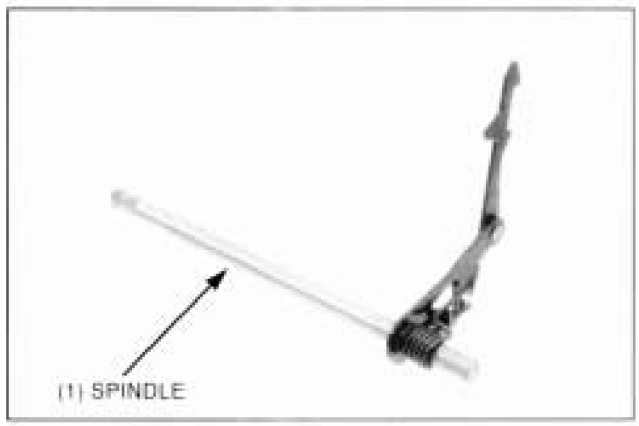


Renove the bolt, washer, gearshift drum stopper, collar and spring.



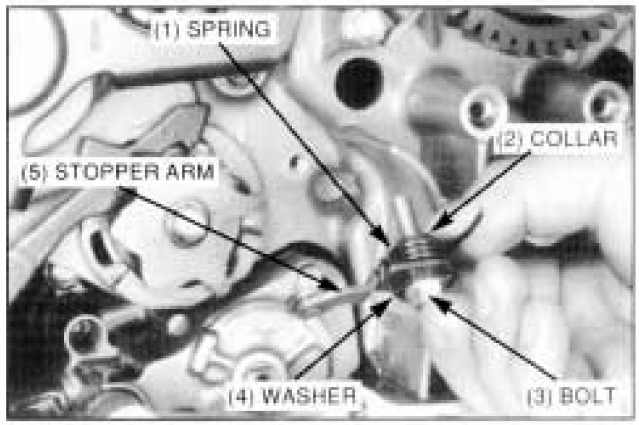
INSPECTION

Check the gearshift spindle for wear or damage.
Check the return spring for fatigue or damage.

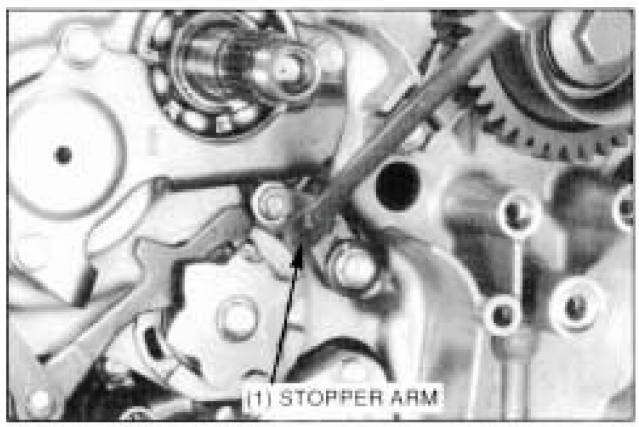


INSTALLATION

Install the collar, spring, gearshift drum stopper, washer and bolt as shown.

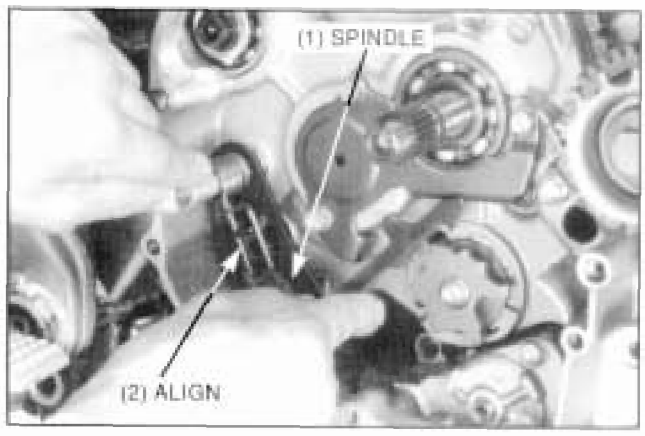


Hold the stopper arm with the screwdriver, and tighten the bolt securely as shown.

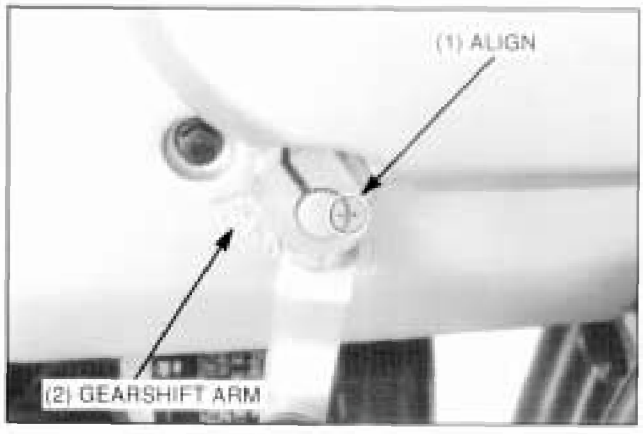


Install the gearshift spindle, aligning the return spring ends with the pin in the case.

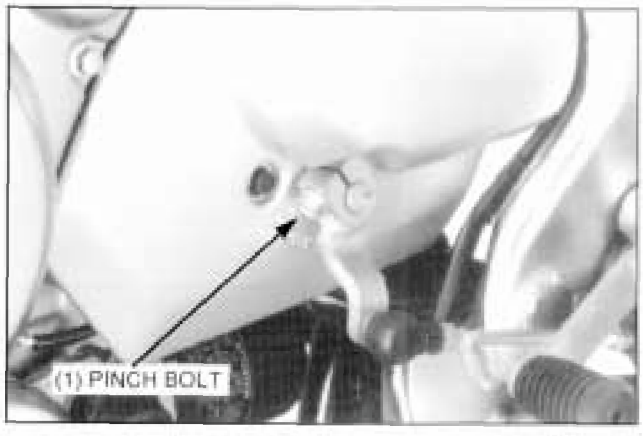
Install the following:
- Oil pump drive chain, clutch (page 8-13)
- Right crankcase cover (page 8-17)



Install the gearshift arm to the gearshift spindle aligning the punch mark on the spindle with the punch mark of the gearshift arm.



Install and tighten the gearshift arm pinch bolt.

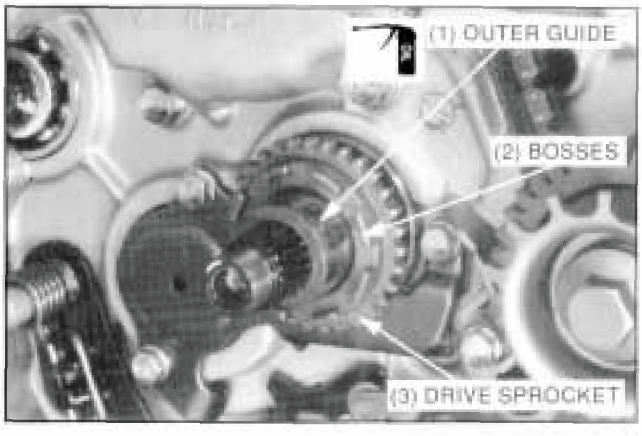


Clutch Installation

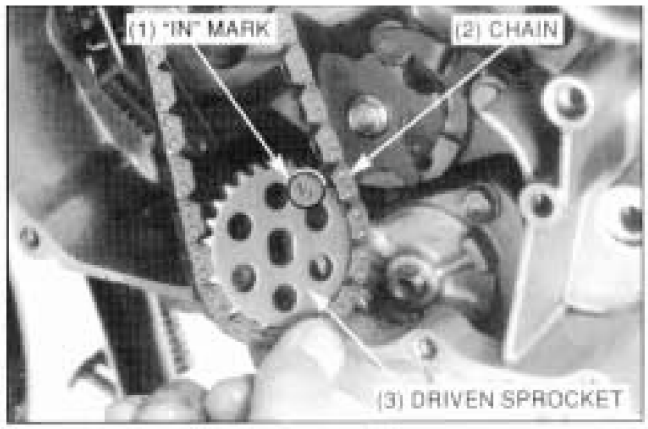
NOTE:

- If the oil pump driven sprocket is removed, tighten the driven sprocket bolt to the specified torque after clutch installation.
- •Install the oil pump drive sprocket with its boss side facing out.

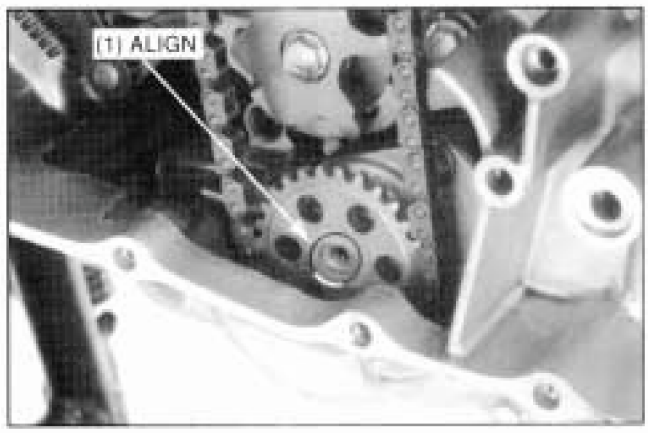
Apply molybdenum disulfide oil to the clutch outer guide outer surface.
Install the clutch outer guide to the mainshaft.
Install the oil pump drive sprocket to the clutch outer guide.



Install the oil pump drive chain to the oil pump drive and driven sprocket.
Install the oil pump driven sprocket with the "IN" mark on the driven sprocket facing inside.



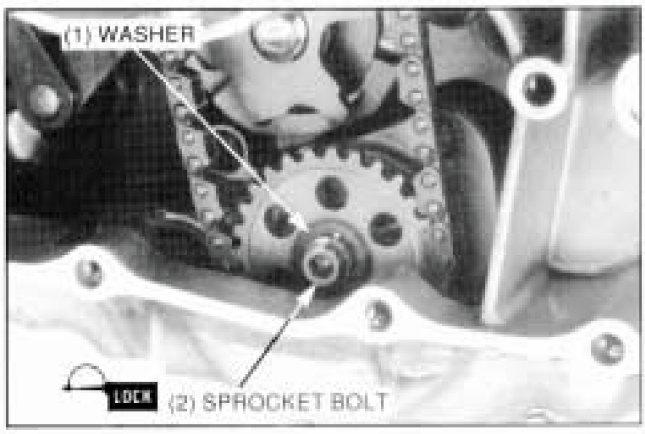
Align the flat surfaces of the driven sprocket hole and oil pump shaft end.



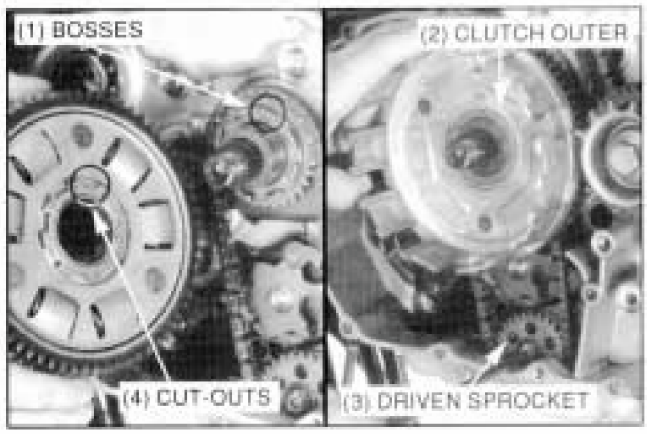
Clean and apply a locking agent to the oil pump driven sprocket bolt threads.
Install the oil pump driven sprocket bolt.

NOTE:

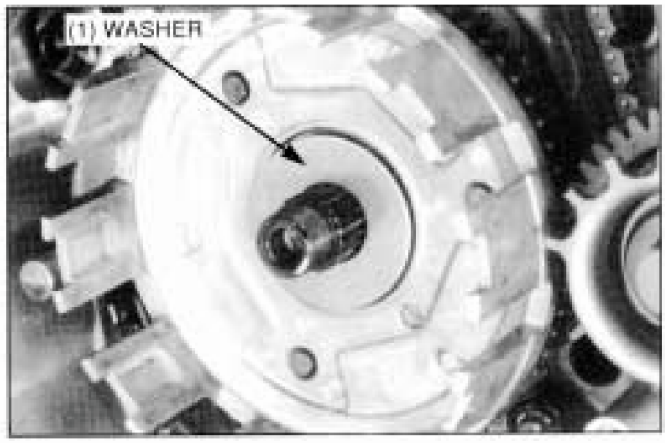
- If the oil pump driven sprocket is removed, tighten the driven sprocket bolt to the specified torque after clutch installation.



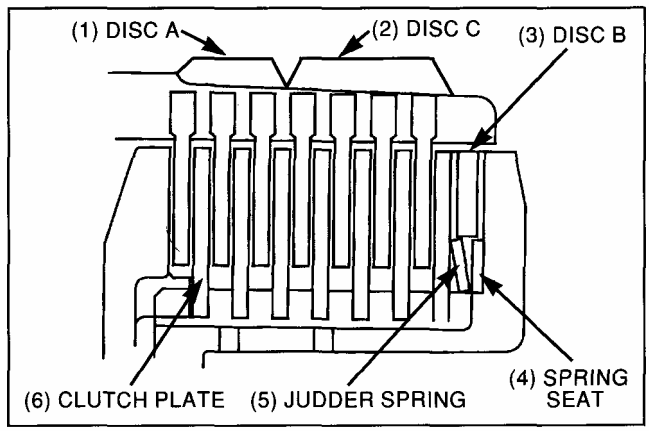
Align the cut-outs in the clutch outer with the bosses on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer onto the shaft.



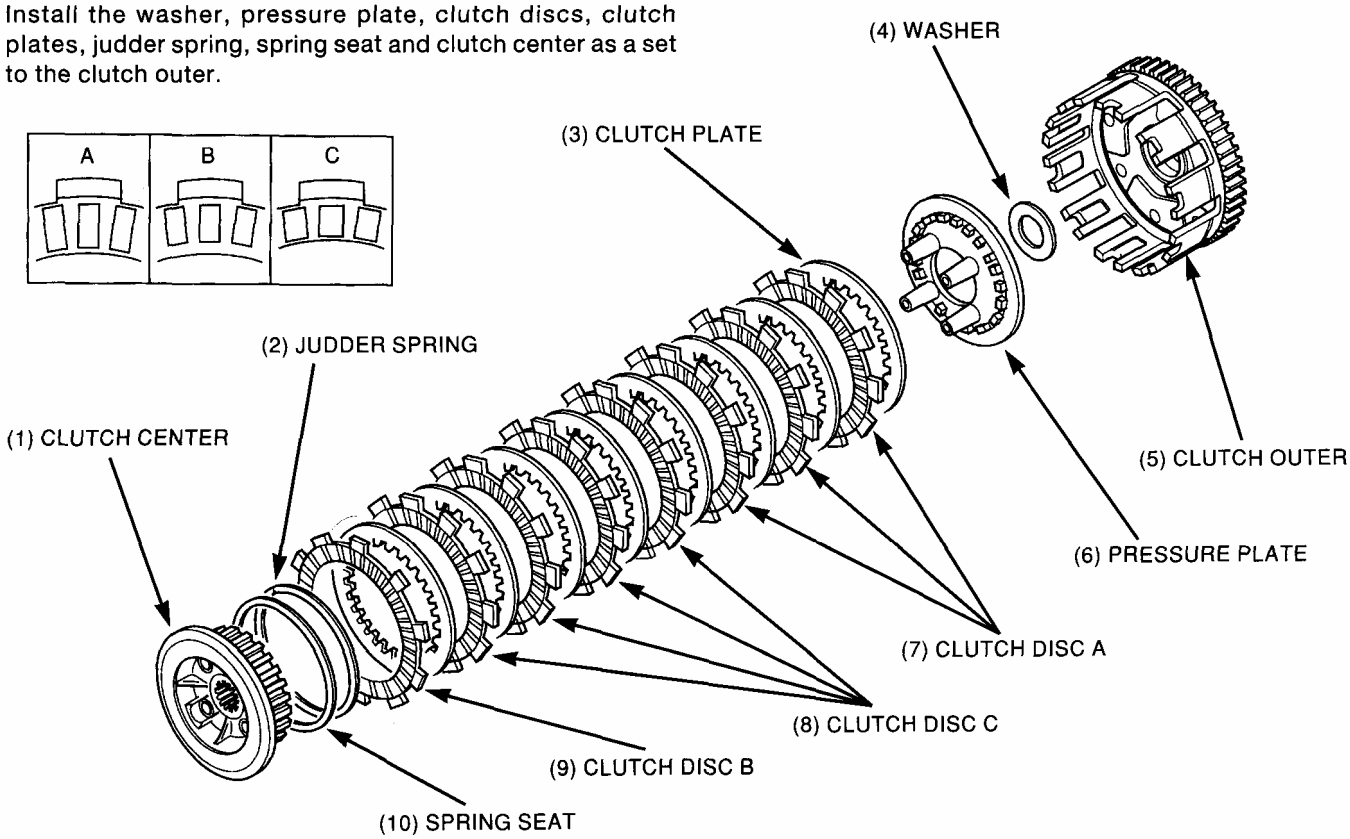
Install the thrust washer onto the mainshaft.



Coat the clutch discs and clutch plates with clean engine oil.
Install the clutch disc B (large I.D.: see below) spring seat and judder spring on the clutch center as shown.

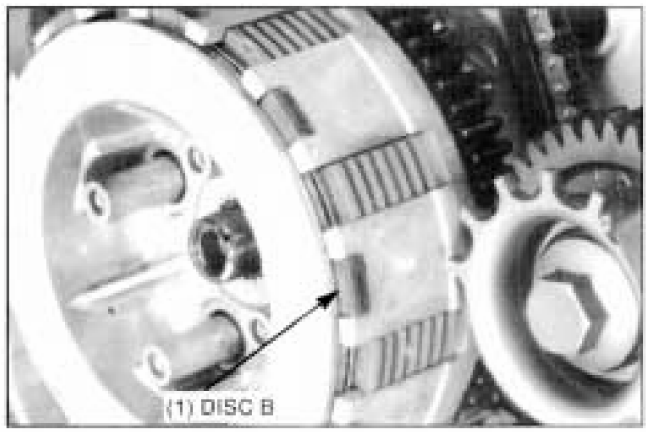


Install the eight clutch plates, three clutch discs A and four clutch discs C (see below), starting with a clutch plate to the clutch center.
Install the washer, pressure plate, clutch discs, clutch plates, judder spring, spring seat and clutch center as a set to the clutch outer.

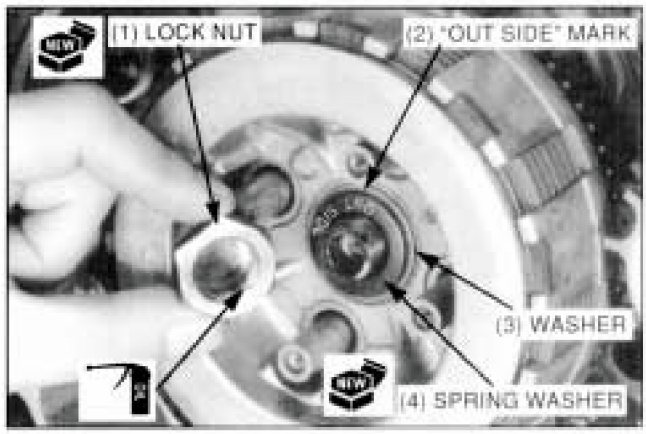


NOTE:

- Install the clutch disc B to the clutch outer as shown.



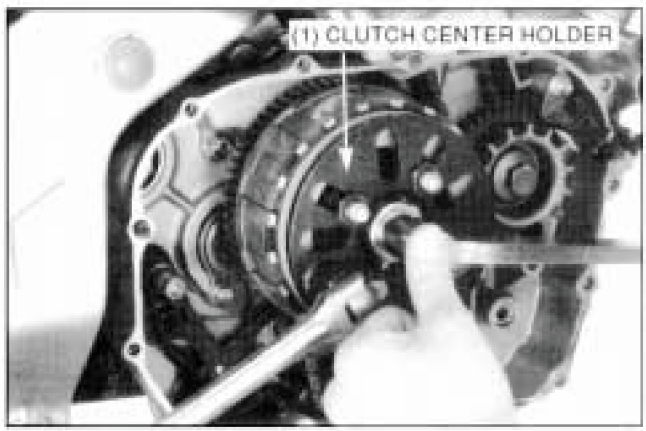
Install the clutch assembly to the mainshaft.
Install the washer.
Install the new spring washer with its "OUT SIDE" mark facing out.
Apply oil to the new clutch center lock nut threads.
Install the lock nut.



Hold the pressure plate with the clutch center holder and tighten the clutch center lock nut to the specified torque.

Tool:
Clutch center holder **07JMB-MN50301**

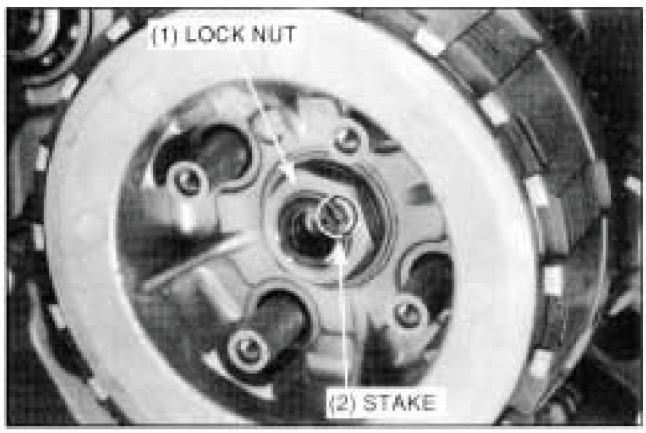
Torque: 128 N·m (13.0 kgf-m, 94 lbf-ft)



Remove the special tool and stake the lock nut into the mainshaft groove.

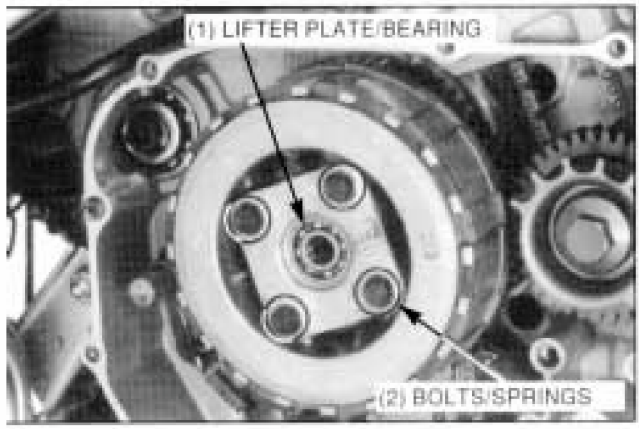
CAUTION

- **Be careful not to damage the mainshaft threads.**



Install the clutch springs and lifter plate/bearing.
Install and tighten the clutch lifter plate bolts in a crisscross pattern in several steps.

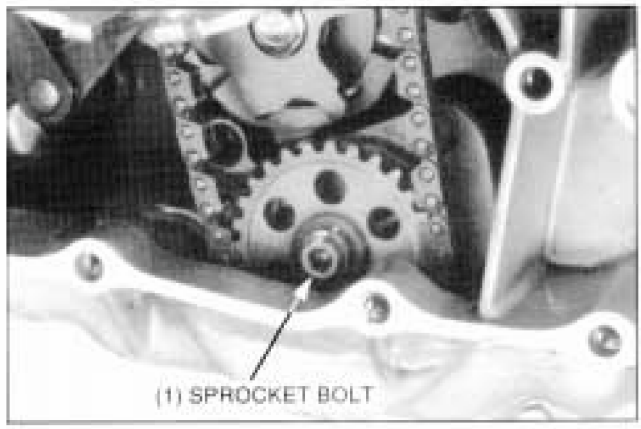
Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)



If the oil pump driven sprocket was removed, clean and apply a locking agent to the bolt threads then tighten the bolt to the specified torque.

Torque: 15 N·m (1.5 kgf-m, 11 lbf-ft)

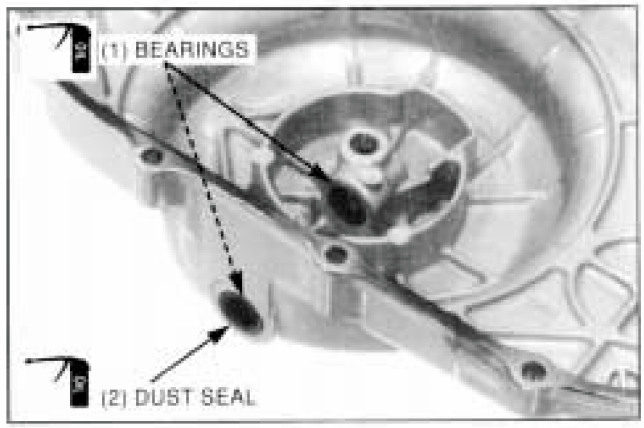
Install the right crankcase cover (see after page).



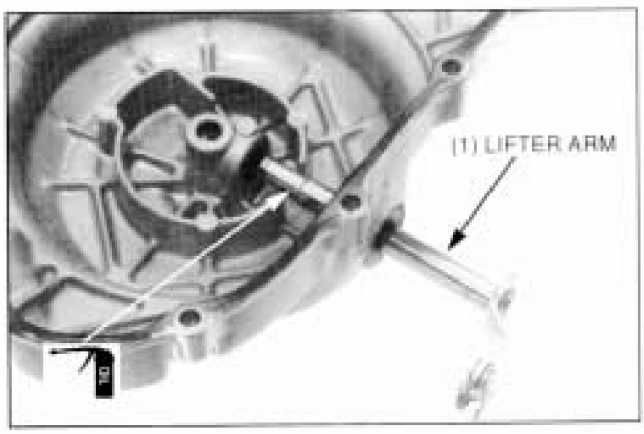
Right Crankcase Cover Installation

ASSEMBLY

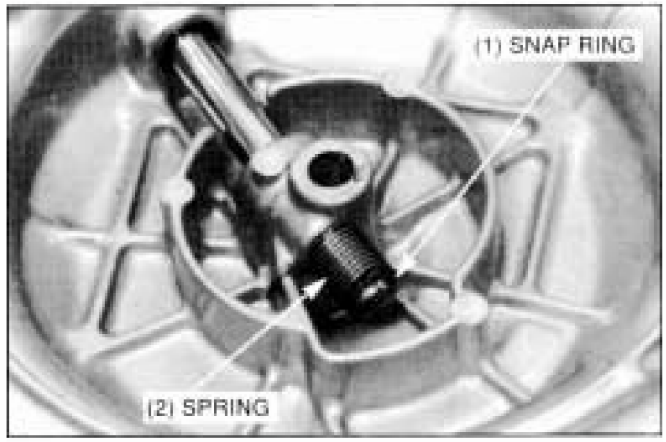
Apply engine oil to the clutch lifter arm pivot needle bearings and dust seal lips.



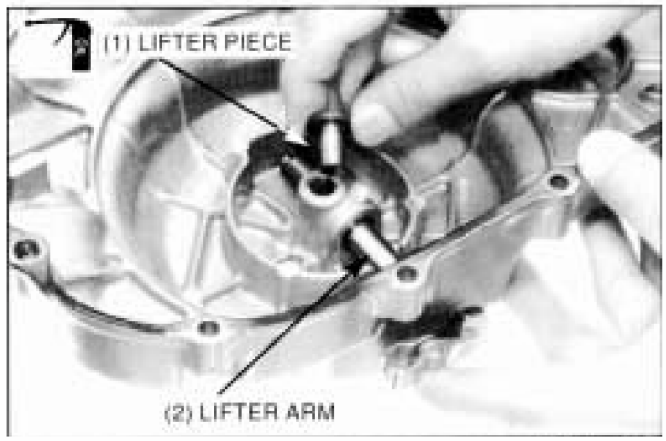
Apply engine oil to the clutch lifter arm sliding surfaces and slit.
Install the clutch lifter arm.



Install the return spring and snap ring.
Hook the spring end in the cover tab securely, and turn the shaft.

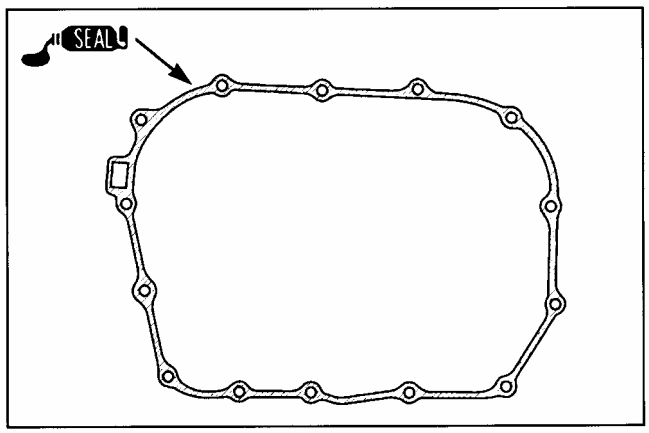


Apply engine oil to the clutch lifter piece.
Install the clutch lifter piece, aligning the piece end with the groove in the clutch lifter arm.

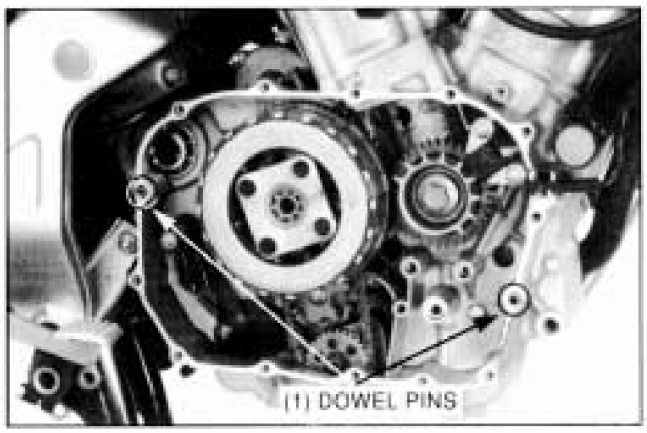


INSTALLATION

Clean and apply a sealant to the right crankcase-to-crankcase cover mating surface.



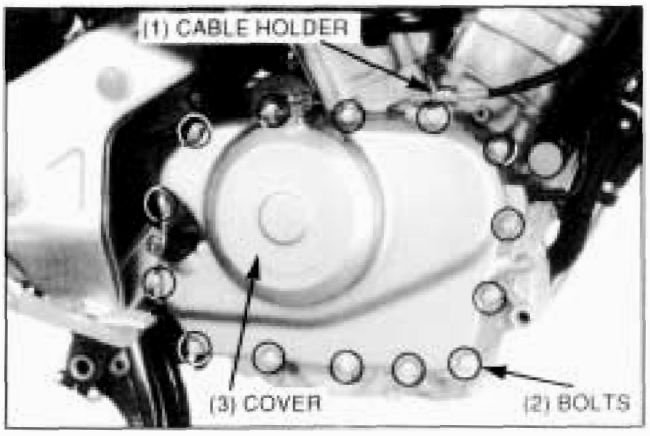
Install the dowel pins.

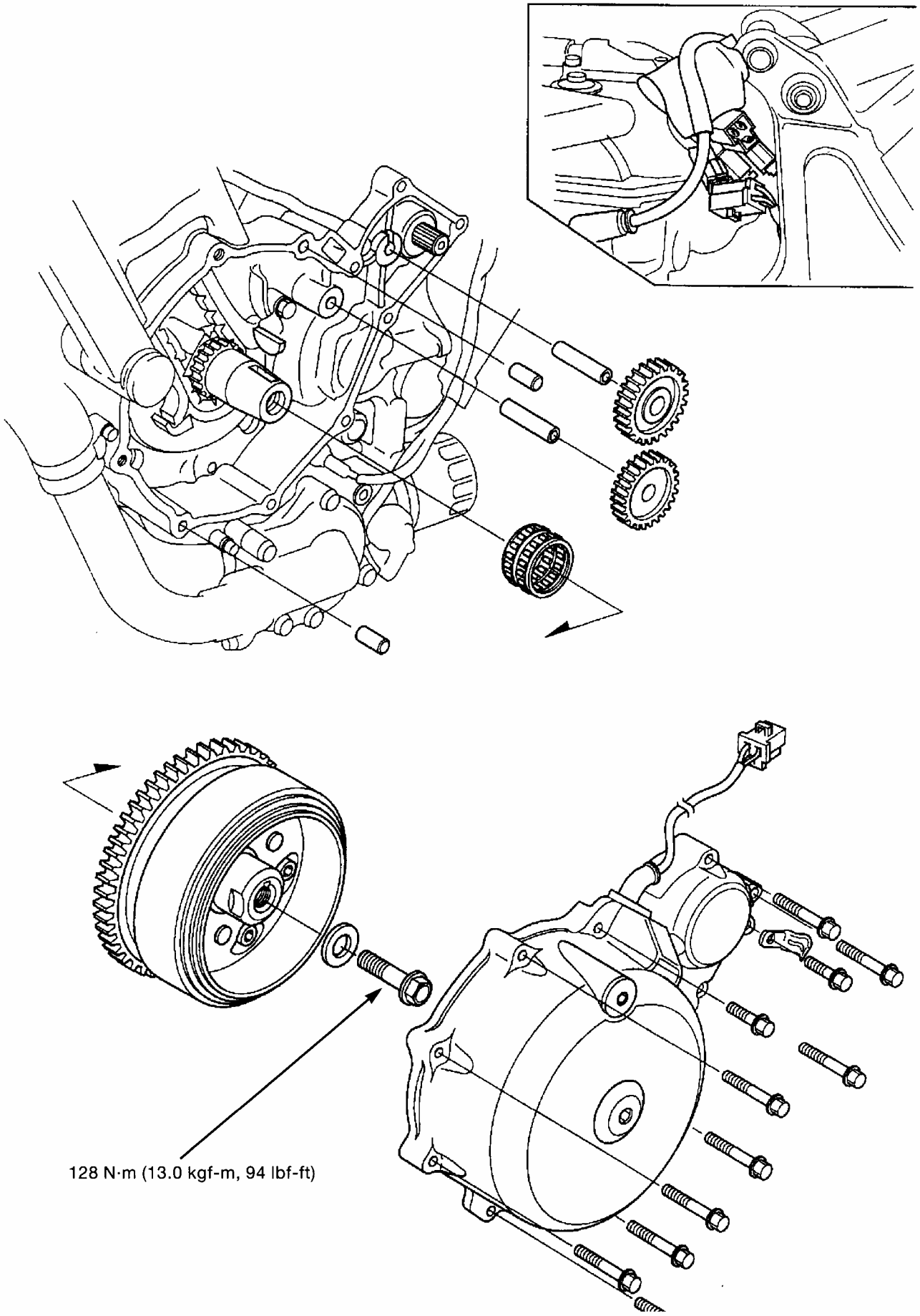


Install the right crankcase cover and clutch cable holder.
Install and tighten the right crankcase cover bolts in a criss-cross pattern in several steps.

Install the exhaust pipe/muffler (page 2-14).

Fill the engine oil (page 3-12).
Perform the clutch adjustment (page 3-21).




128 N·m (13.0 kgf-m, 94 lbf-ft)

9. Alternator/Starter Clutch

SERVICE INFORMATION	9-1	FLYWHEEL, STARTER CLUTCH	9-3
TROUBLESHOOTING	9-1	STATOR INSTALLATION	9-9
STATOR REMOVAL	9-2		

Service Information

GENERAL

- The alternator and starter clutch maintenance can be done with engine in the frame.
- Refer to section 17 for alternator inspection

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Starter driven gear	I. D.	37.000-37.025 (1.4567-1.4577)	37.10 (1.461)
	O. D.	57.749-57.768 (2.2736-2.2743)	57.73 (2.273)

TORQUE VALUES

Flywheel bolt	128 N·m (13.0 kgf-m, 93 lbf-ft)	UBS Bolt *Left hand threads*
Stator mounting socket bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	Apply a locking agent to the threads
Starter one-way clutch hosing socket bolt	29 N·m (3.0 kgf-m, 22 lbf-ft)	Apply a locking agent to the threads Torx bolt
Stator wire holder socket bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	Apply a locking agent to the threads

TOOLS

Flywheel holder	07725-0040000
Rotor puller	07733-0020001

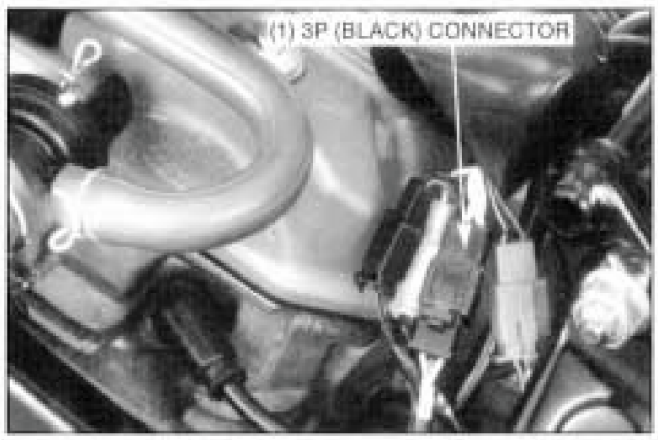
Troubleshooting

Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear

Stator Removal

Remove the fuel tank (page 2-4) and disconnect the alternator 3P (Black) connector.



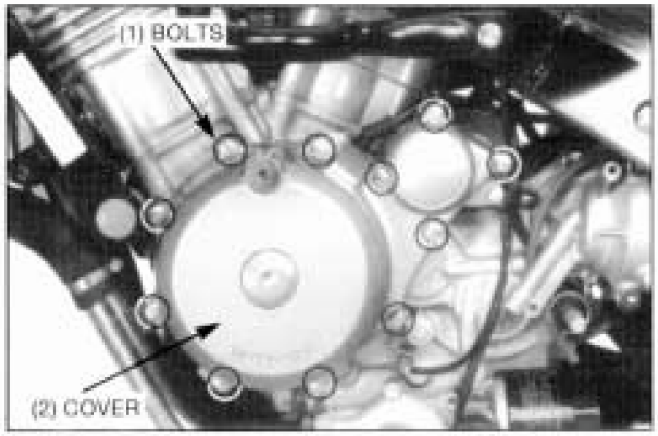
NOTE:

- Refer to page 17-9 for alternator (charging coil) inspection.

Remove the left rear cover (page 7-2).

Place a container under the left crankcase cover to catch the engine oil.

Remove the eleven left crankcase cover bolts and cover.



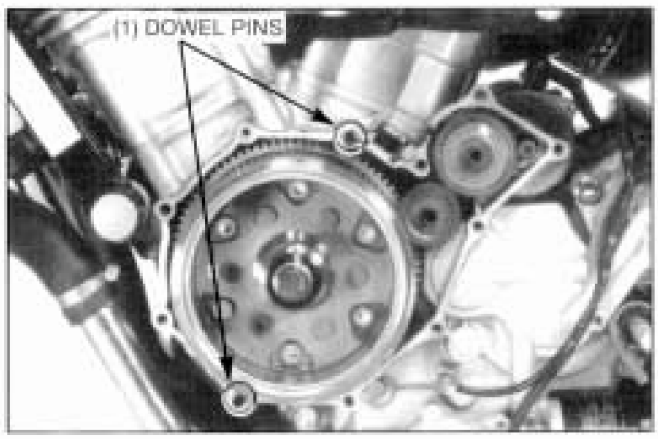
CAUTION

- **The left crankcase cover (stator) is magnetically attached to the flywheel, be careful to removal.**

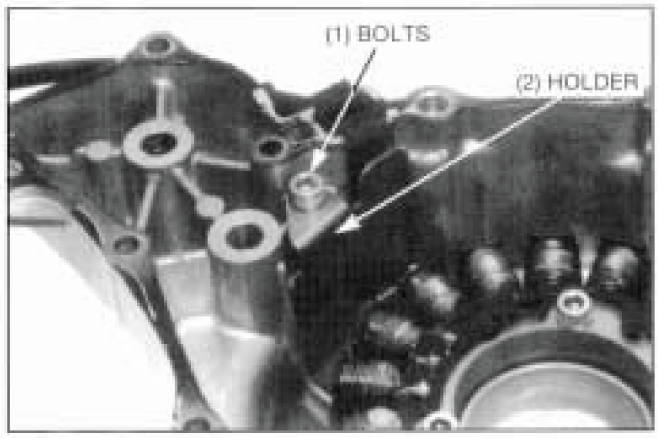
NOTE:

- Loosen the left crankcase cover bolts in a crisscross pattern in several steps.

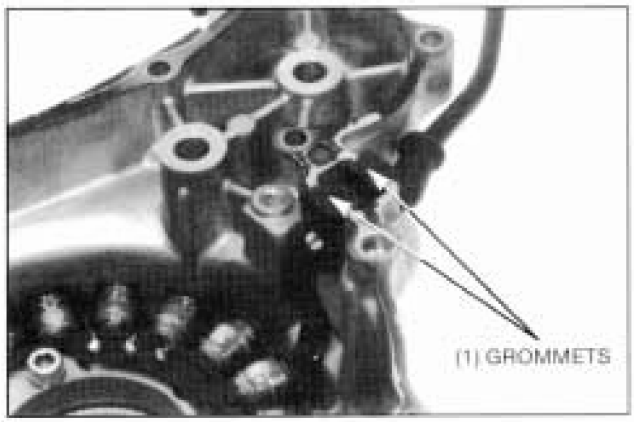
Remove the dowel pins.



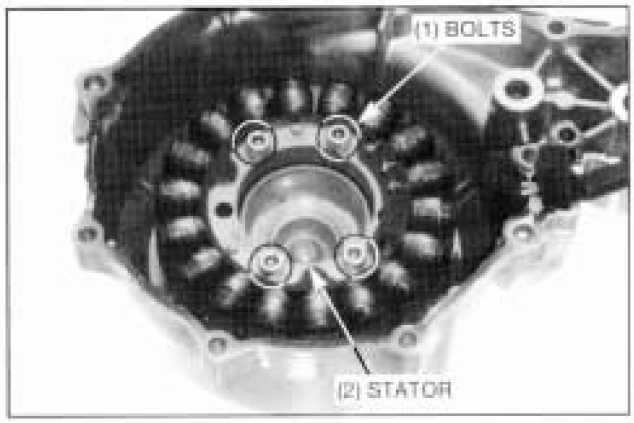
Remove the socket bolts and stator wire holder from the left crankcase cover.



Remove the stator grommets from the left crankcase cover.



Remove the socket bolts and stator from the left crankcase cover.

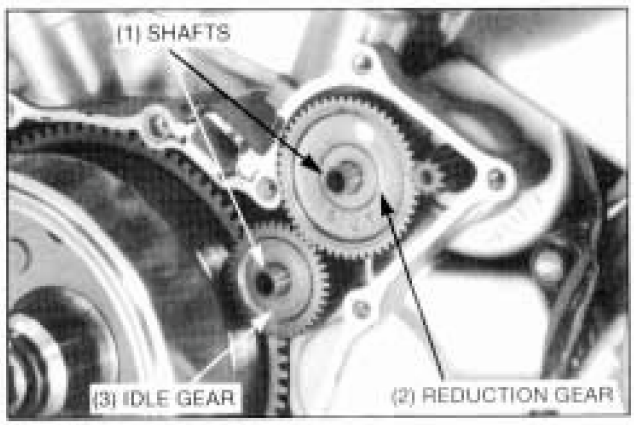


Flywheel, Starter Clutch

FLYWHEEL REMOVAL

Remove the left crankcase cover (page 9-2).

Remove the starter idle gear and shaft.
Remove the starter reduction gear and shaft.

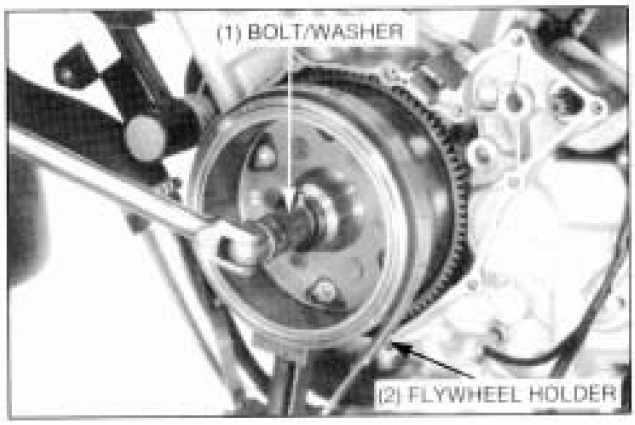


CAUTION

- **The flywheel bolt has left hand threads.**

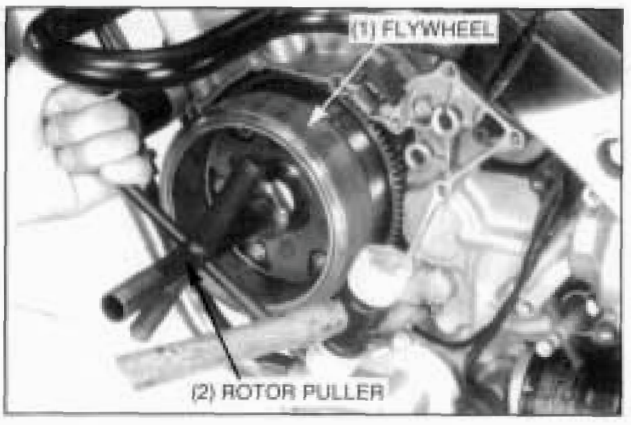
Remove the flywheel bolt and washer while holding the flywheel with a flywheel holder.

Tool:
Flywheel holder **07725-0040000**



Remove the flywheel using the rotor puller.

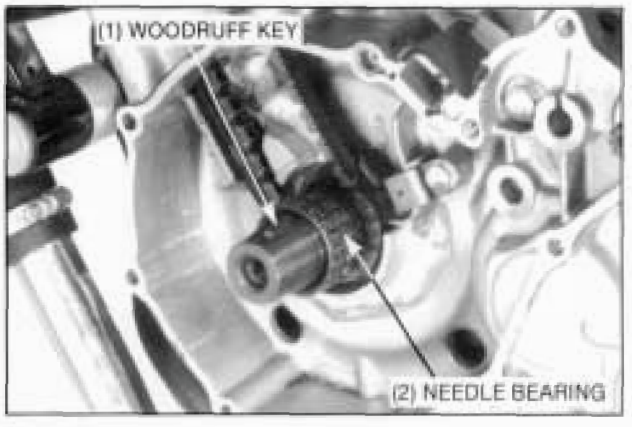
Tool:
Rotor puller **07733-0020001**



Remove the needle bearing and woodruff key from the crankshaft.

NOTE:

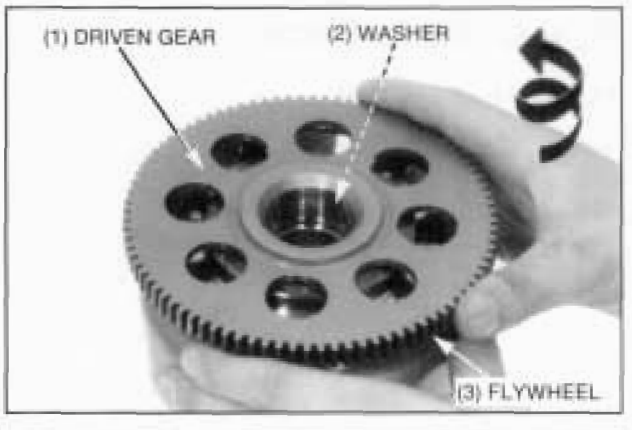
- When woodruff key removal, be careful not to damage the key groove or crankshaft.
- Do not loose the woodruff key.



STARTER DRIVEN GEAR, STARTER CLUTCH REMOVAL

Check that the driven gear turns smoothly in one direction and locks up in the other direction.

Remove the starter driven gear and washer from the flywheel while turning the driven gear counterclockwise.

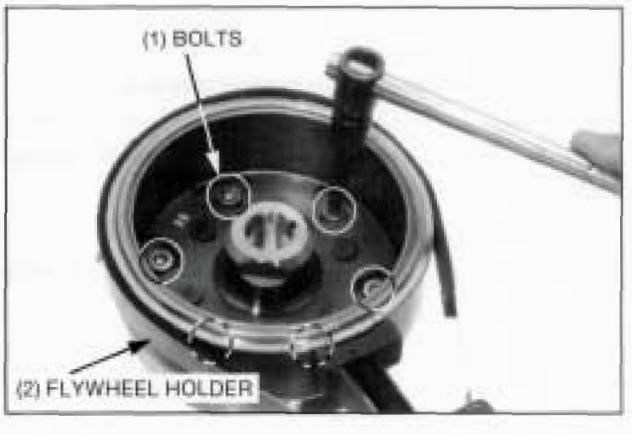


Remove the sarter one-way clutch torx bolts while holding the flywheel with a flywheel holder.

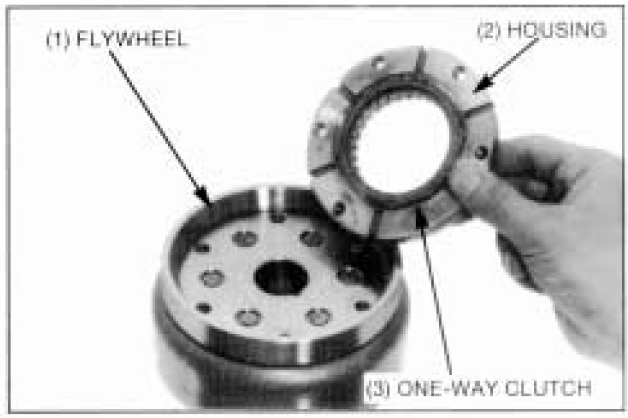
Tool:
Flywheel holder **07725-0040000**

NOTE:

- Do not remove the clutch housing and one-way clutch unless it is necessary to inspect them.



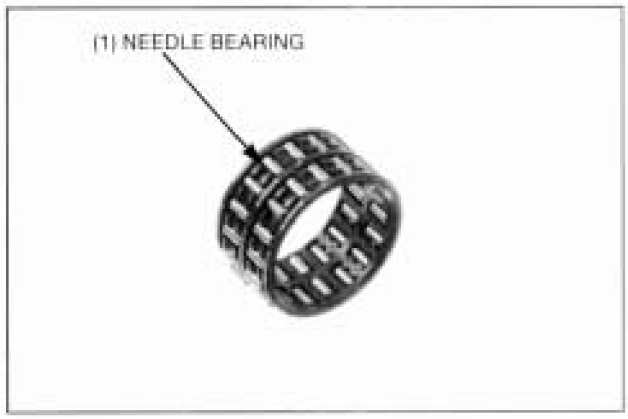
Remove the clutch housing and one-way clutch from the flywheel.



STARTER CLUTCH INSPECTION

NEEDLE BEARING

Check the needle bearing clutch sprag for abnormal wear, damage.

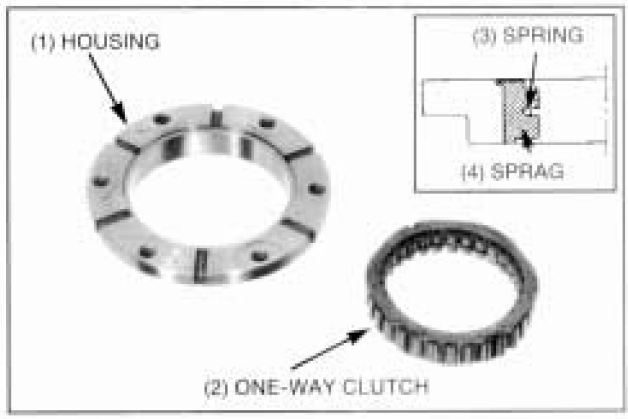


ONE-WAY CLUTCH

Check the one-way clutch sprag for abnormal wear, damage or irregular movement.

NOTE:

- Do not remove the one-way clutch from the clutch housing, unless it is necessary to replace with a new one.
- If removal the spring from the one-way clutch groove, replace the one-way clutch assembly (clutch spring) with a new one.



CLUTH HOUSING

Check the clutch inner contact surface for the housing for damage.

STARTER DRIVEN GEAR

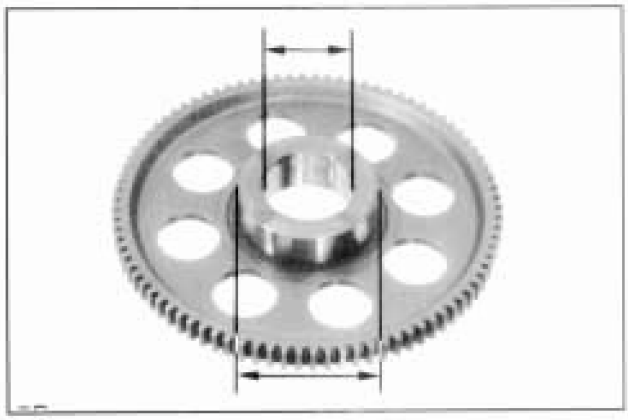
Check the roller contact surface for damage.

Measure the driven gear O.D.

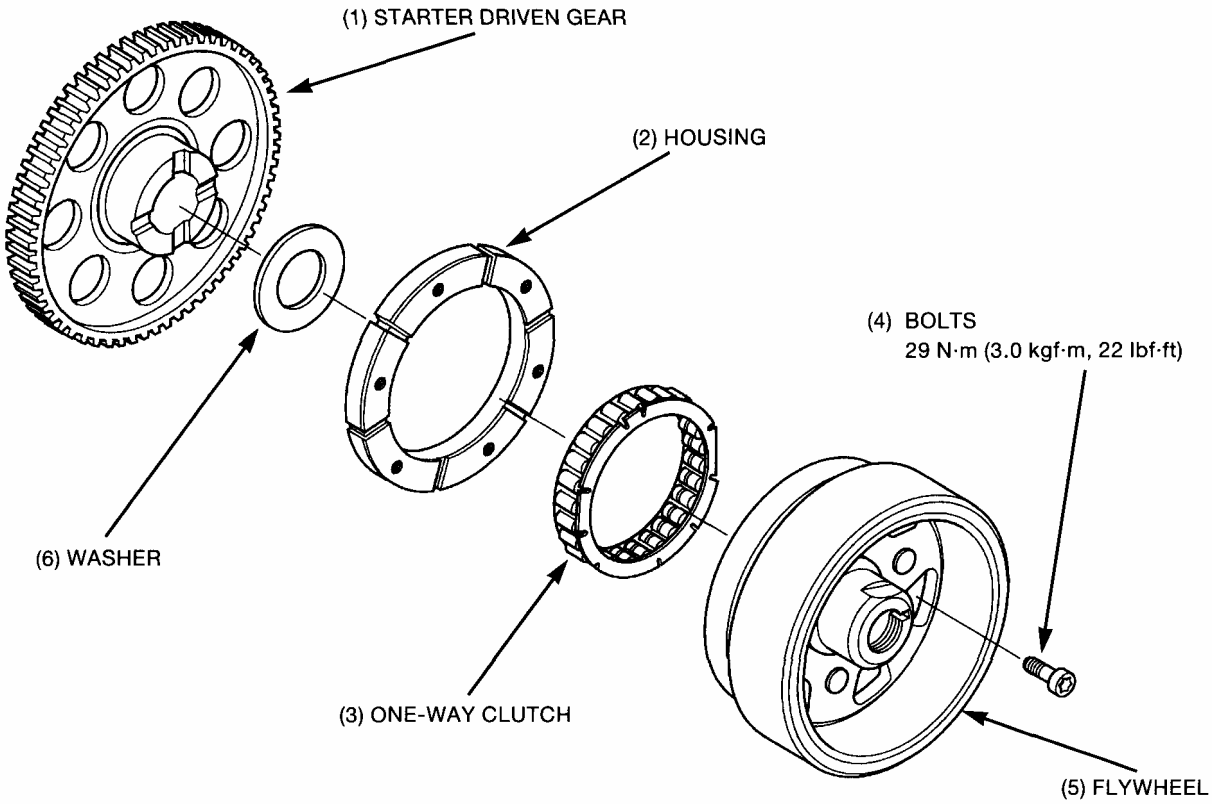
Service Limit: 57.73 mm (2.273 in)

Measure the driven gear I.D.

Service Limit: 37.10 mm (1.46 in)



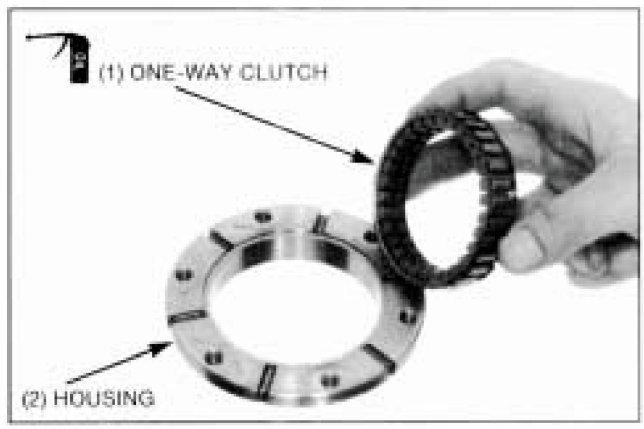
STARTER DRIVEN GEAR, STARTER CLUTCH INSTALLATION



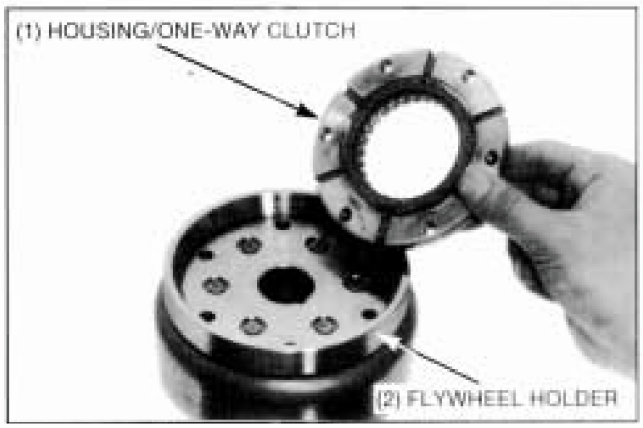
Clean the one-way clutch and apply engine oil to the sprag. Install the one-way clutch into the clutch housing with its flange side facing flywheel.

NOTE:

- If removed the spring from one-way clutch groove, replace the one-way clutch assembly (clutch and spring) with a new one.



Install the clutch housing/one-way clutch to the flywheel.

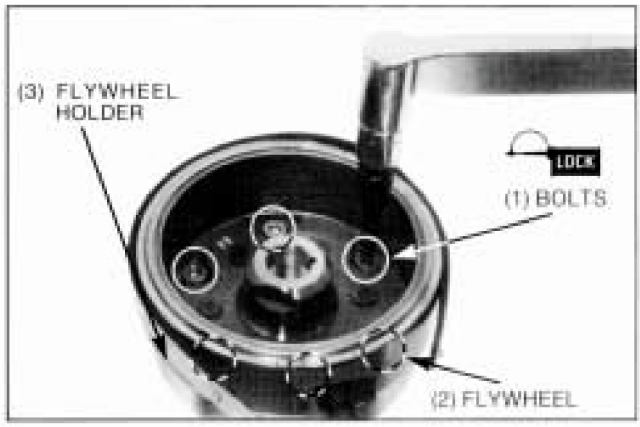


Hold the flywheel using the flywheel holder.

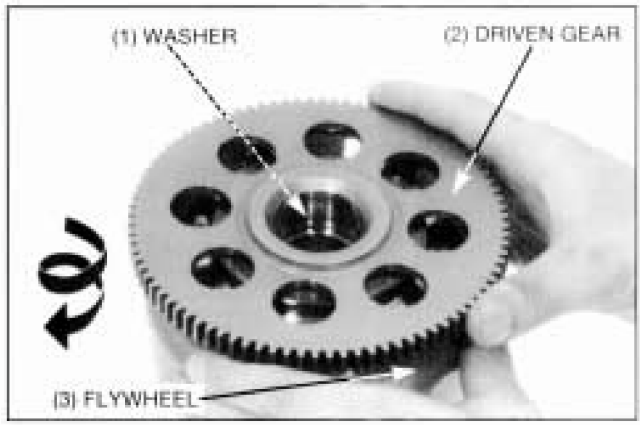
Tool:
Flywheel holder **07725-0040000**

Clean and apply a locking agent to the starter one-way clutch torx bolt threads.
Install and tighten the starter one-way clutch torx bolts to the specified torque.

Torque: 29 N·m (3.0 kgf-m, 22 lbf-ft)



Install the starter driven gear to the flywheel while turning the driven gear counterclockwise.



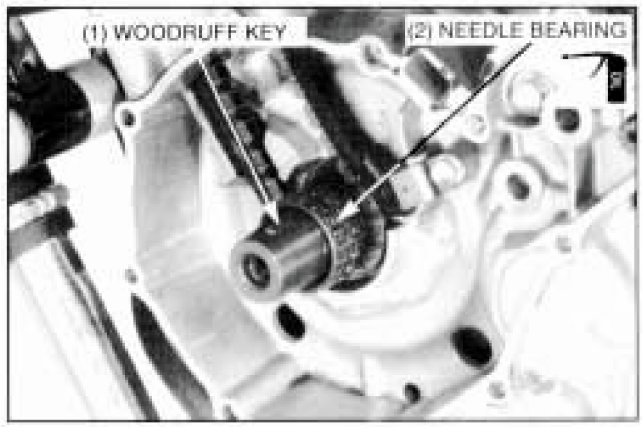
FLYWHEEL INSTALLATION

Apply engine oil to the needle bearing and install it to the crankshaft.

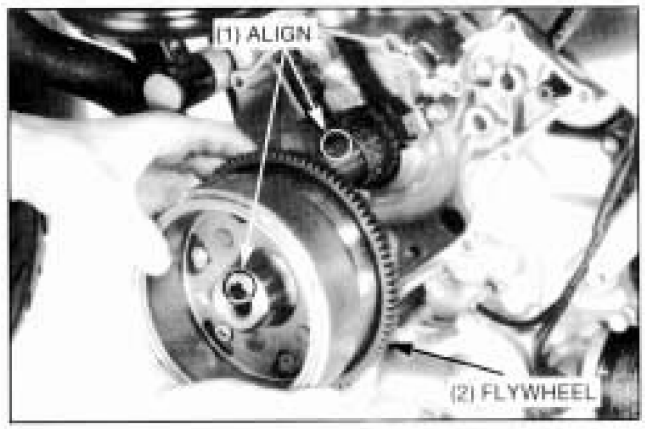
CAUTION

- **During woodruff key installation, be careful not to damage the key groove or crankshaft.**

Wipe any oil off the mating surface of the crankshaft.
Install the woodruff key to the key groove of crankshaft.

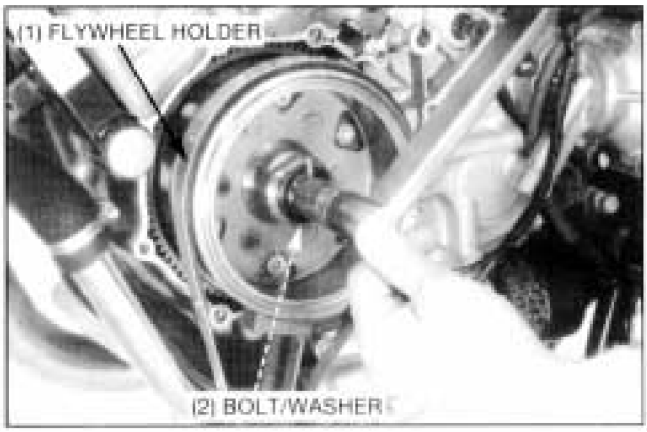


Wipe any oil off the mating surface of the flywheel.
Install the flywheel to the crankshaft aligning the key groove of the flywheel with the woodruff key on the crankshaft.



Hold the flywheel using the flywheel holder.

Tool:
Flywheel holder **07725-0040000**



Install the washer.

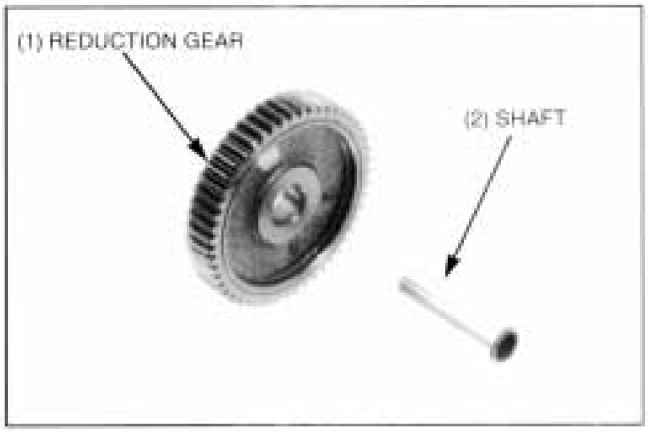
CAUTION

- **The flywheel bolt has left hand threads.**

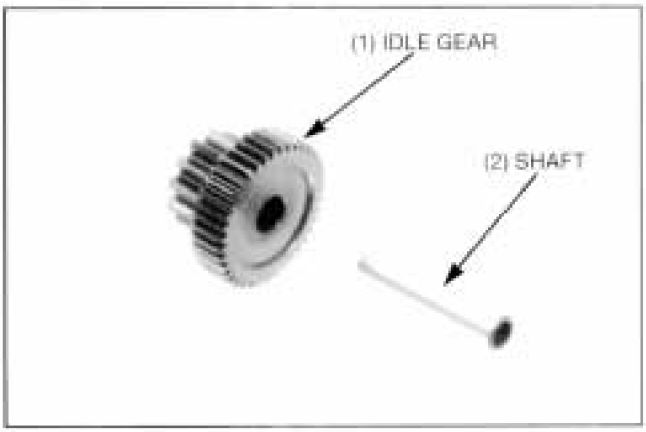
Apply engine oil to the flywheel bolt threads and seating surface.
Install and tighten the flywheel bolt to the specified torque.

Torque: 128 N·m (13.0 kgf-m, 94 lbf-ft)

Check the starter reduction gear, shaft and journal for wear or damage.



Check the starter idle gear, shaft and journal for wear or damage.

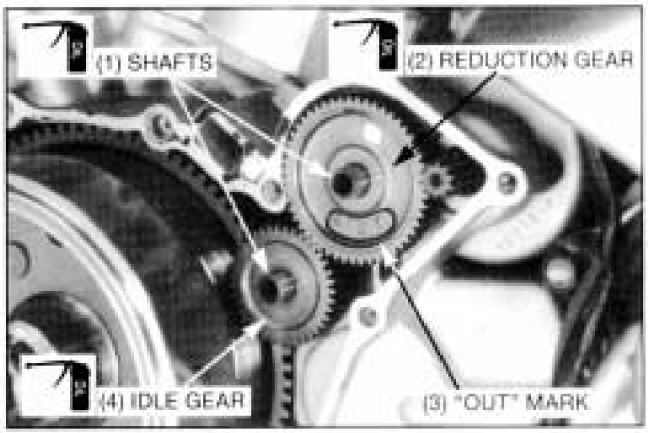


Apply engine oil to the starter reduction gear, starter idle gear and shafts.
Install the starter reduction gear, starter idle gear and shafts to the left crankcase as assembly.

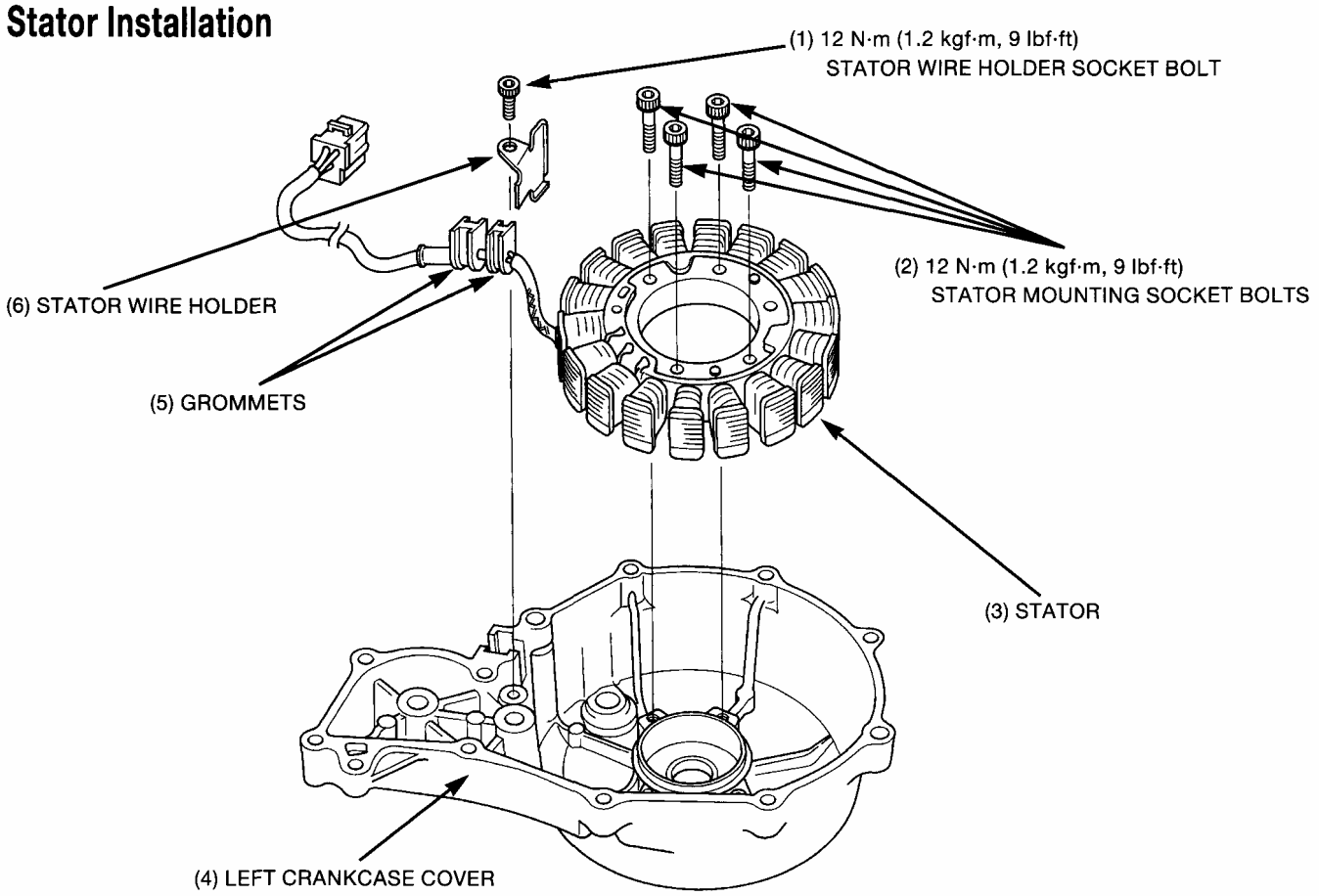
NOTE:

- Install the starter drive gear with its "OUT" mark facing out.

Install the stator and left crankcase cover (page 9-9).

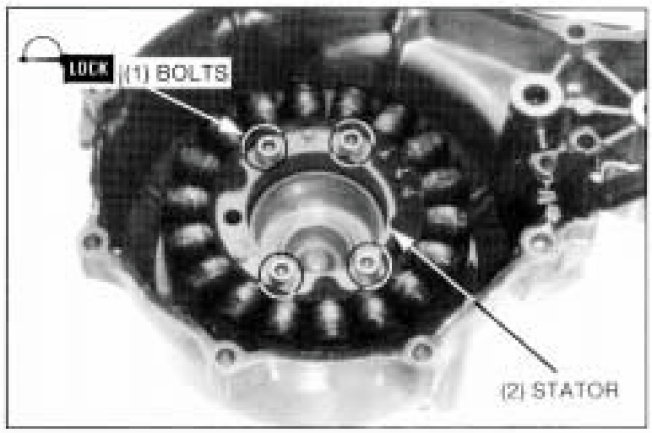


Stator Installation

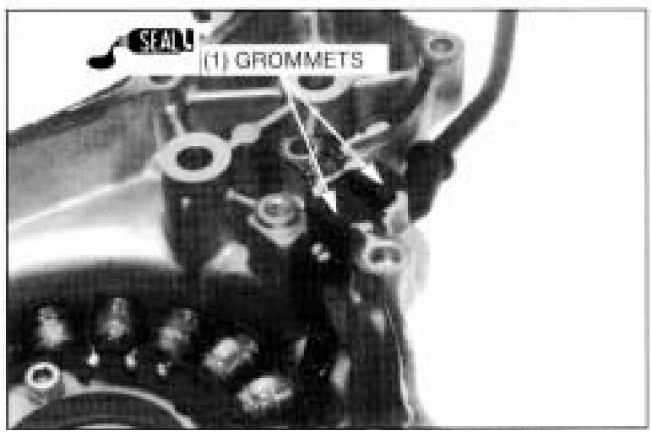


Install the stator to the left crankcase cover.
Clean and apply a locking agent to the stator mounting socket bolt threads.
Install and tighten the stator socket bolts to the specified the torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

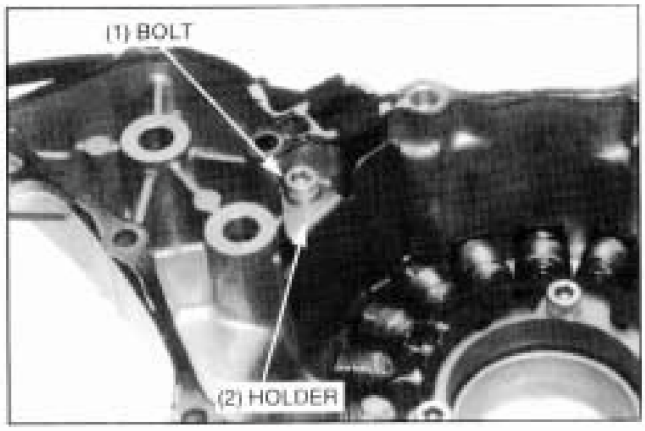


Clean and apply sealant to the wire grommets seating surface and install the grommets into the grooves in the left crankcase cover.

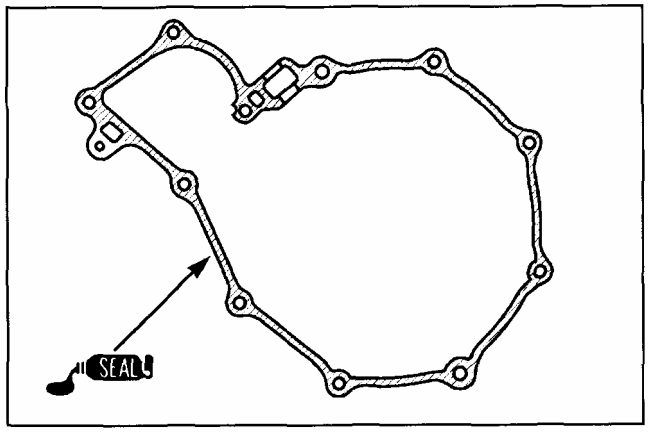


Clean and apply a locking agent to the wire holder socket bolt threads.
Install the stator wire holder to the left crankcase cover as shown.
Install and tighten the socket bolt to the specified torque.

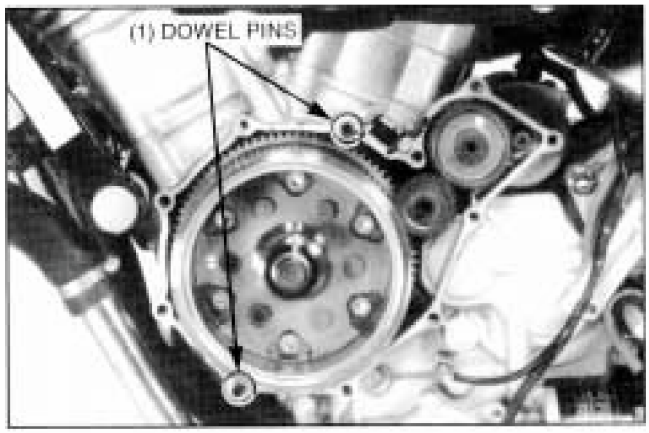
Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)



Clean and apply a sealant to the left crankcase-to-crankcase cover mating surface.



Install the dowel pins.



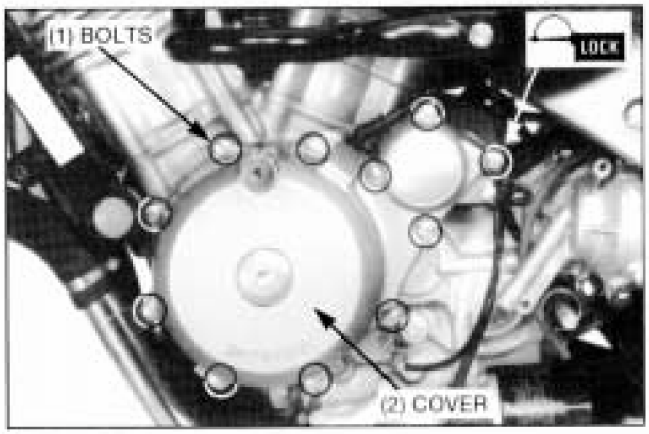
Install the left crankcase cover.

NOTE:

- *The left crankcase cover (stator) is magnetically attached to the flywheel, be careful to installation.*

Clean and apply a locking agent to the left crankcase cover bolt threads as shown.
Install and tighten the left crankcase cover bolts to the specified torque in a crisscross pattern in several steps.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)



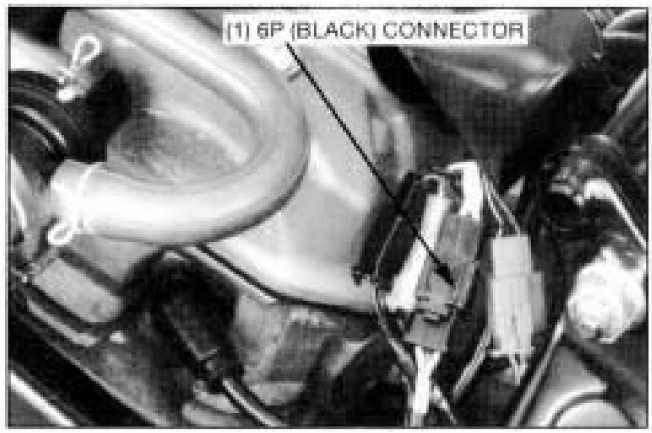
NOTE:

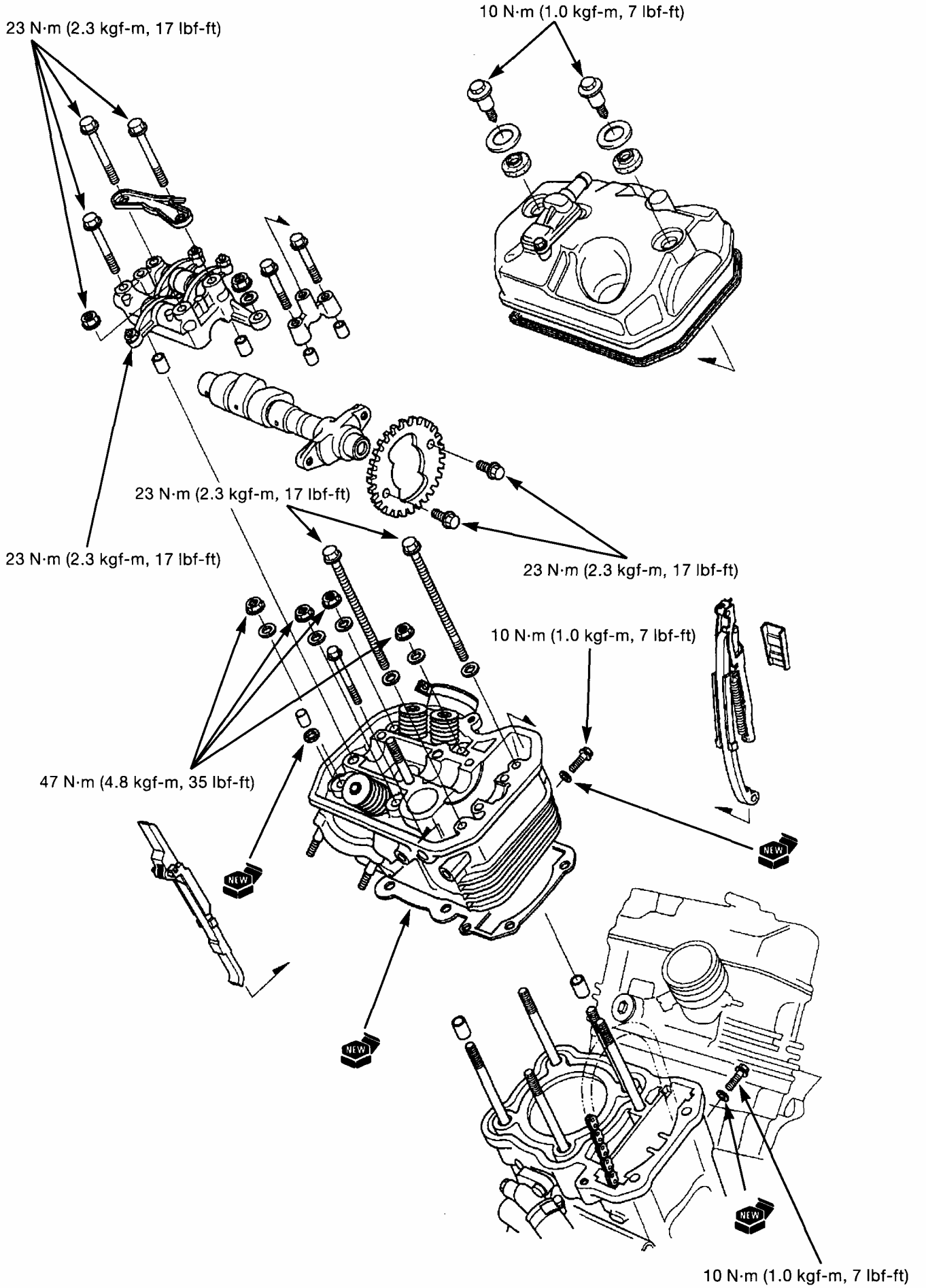
- Route the wire harness properly (page 1-20).

Connect the alternator 3P (Black) connector.

Install the left rear cover (page 7-8).

Check the engine oil level (page 3-10).




23 N·m (2.3 kgf-m, 17 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
47 N·m (4.8 kgf-m, 35 lbf-ft)
NEW
NEW
NEW
NEW
10 N·m (1.0 kgf-m, 7 lbf-ft)

10. Cylinder Head/Valves

SERVICE INFORMATION	10-1	CYLINDER HEAD DISASSEMBLY	10-16
TROUBLESHOOTING	10-3	VALVE GUIDE REPLACEMENT	10-19
CYLINDER COMPRESSION	10-4	VALVE SEAT INSPECTION/REFACING	10-21
CYLINDER HEAD COVER REMOVAL	10-5	CYLINDER HEAD ASSEMBLY	10-23
EVAP AIR INJECTION REED VALVE		CYLINDER HEAD INSTALLATION	10-25
INSPECTION	10-8	CAMSHAFT INSTALLATION	10-29
CAMSHAFT REMOVAL	10-9	CYLINDER HEAD COVER INSTALLATION	10-33
CYLINDER HEAD REMOVAL	10-15		

Service Information

GENERAL

- The engine must be removed from the frame before servicing the front cylinder head.
- The front and rear cylinder head cover and front cylinder head can be serviced with the engine in the frame.
- The camshaft can be serviced with the engine in the frame.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with clean solvent and dry them using compressed air before inspection.
- During assembly apply molybdenum disulfide oil to the camshaft holders, camshaft journals of the cylinder head, rocker arm shafts, rocker arm slipper faces and valve stems to provide initial lubrication.

10

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Cylinder compression			1,324 ± 196 kPa (13.5 ± 2.0 kgf/cm.^{2}, 192 ± 28 psi) at 400 min^{-1} (rpm)	—
Cylinder head warpage			—	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.13-0.17 (0.005-0.007)	—
		EX	0.18-0.22 (0.007-0.009)	—
	Valve stem O.D.	IN	5.475-5.490 (0.2156-0.2161)	5.47 (0.215)
		EX	6.555-6.570 (0.2580-0.2587)	6.55 (0.258)
	Valve guide I.D.	IN	5.500-5.512 (0.2165-0.2170)	5.53 (0.218)
		EX	6.600-6.615 (0.2598-0.2604)	6.66 (0.262)
	Stem-to-guide clearance	IN	0.010-0.037 (0.0004-0.0015)	0.07 (0.003)
		EX	0.030-0.060 (0.0012-0.0024)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	19.4-19.6 (0.76-0.77)	—
		EX	17.9-18.1 (0.70-0.71)	—
	Valve seat width	IN/EX	0.90-1.10 (0.035-0.043)	1.5 (0.06)
Valve spring free length	Outer	IN	42.14 (1.659)	40.58 (1.598)
		EX	42.83 (1.686)	41.25 (1.624)
	Inner	IN	38.11 (1.500)	36.47 (1.436)
		EX	38.81 (1.765)	37.51 (1.477)

Unit: mm (in)

(Cont'd)

Item			Standard	Service Limit
Camshaft	Cam lobe height	IN	38.189 (1.5035)	38.17 (1.503)
		EX	38.213 (1.5044)	38.19 (1.504)
	Journal O.D.		21.959-21.980 (0.8645-0.8654)	21.95 (0.864)
Valve, valve guide	Runout		0.030-(0.012)	0.05 (0.002)
	Oil clearance		0.040-0.093 (0.0015-0.0037)	0.11 (0.004)
	Identification marks		"F": Front, "R": Rear	—
Rocker arm I.D.		IN/EX	12.000-12.018 (0.4724-0.4731)	12.03 (0.474)
Rocker arm shaft O.D.		IN/EX	11.966-11.984 (0.4711-0.4718)	11.96 (0.471)
Rocker arm-to-rocker arm shaft clearance			0.016-0.052 (0.0006-0.0020)	0.07 (0.003)

TORQUE VALUES

Spark plug		14 N·m (1.4 kgf-m, 10 lbf-ft)	
Valve adjusting screw lock nut		23 N·m (2.3 kgf-m, 17 lbf-ft)	Apply oil to the threads and seating surface
EVAP air injection reed valve cover bolt		5 N·m (0.5 kgf-m, 3.6 lbf-ft)	CT bolt
Cylinder head cover bolt		10 N·m (1.0 kgf-m, 7 lbf-ft)	
Cam sprocket bolt		23 N·m (2.3 kgf-m, 17 lbf-ft)	Apply a locking agent to the threads
Camshaft holder	8 mm bolt	23 N·m (2.3 kgf-m, 17 lbf-ft)	
	8 mm nut	23 N·m (2.3 kgf-m, 17 lbf-ft)	
Cam chain tensioner mounting bolt		10 N·m (1.0 kgf-m, 7 lbf-ft)	
Cylinder head	8 mm bolt	23 N·m (2.3 kgf-m, 17 lbf-ft)	Apply oil to the threads and seating surface
	8 mm nut	23 N·m (2.3 kgf-m, 17 lbf-ft)	
	10 mm nut	47 N·m (4.8 kgf-m, 35 lbf-ft)	

TOOLS

Valve guide driver, 5.5 mm (IN)		07742-0010100
Valve guide driver, 6.6 mm (EX)		07742-0010200
Valve guide driver		07743-0020000
Valve spring compressor		07757-0010000
Valve seat cutter		
- Seat cutter	27.5 mm (45° IN)	07780-0010200
	35 mm (45° EX)	07780-0010400
- Flat cutter	28 mm (32° IN)	07780-0012100
	35 mm (32° EX)	07780-0012300
- Interior cutter	30 mm (60° IN)	07780-0014000
	37.5 mm (60° EX)	07780-0014100
- Cutter holder	IN 5.5 mm	07781-0010101
	EX 6.6 mm	07781-0010202
Valve guide driver attachment, 11.3 mm (IN)		07943-MF50100
Valve guide driver attachment, 12.3 mm (EX)		07943-MF50200
Valve guide reamer, 5.510 mm (IN)		07984-2000001
Valve guide reamer, 6.612 mm (EX)		07984-ZE20001

Troubleshooting

- Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracking noises to the top-end.
- If performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring.

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 heat
- Loose spark plug
- Cylinder, piston (Section 11)

Compression too high
- Excessive carbon build-up in cylinder head or on top of piston

Excessive smoke
- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder, piston (Section 11)

Excessive noise
- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Faulty cylinder, piston (Section 11)

Rough idle
- Low cylinder compression

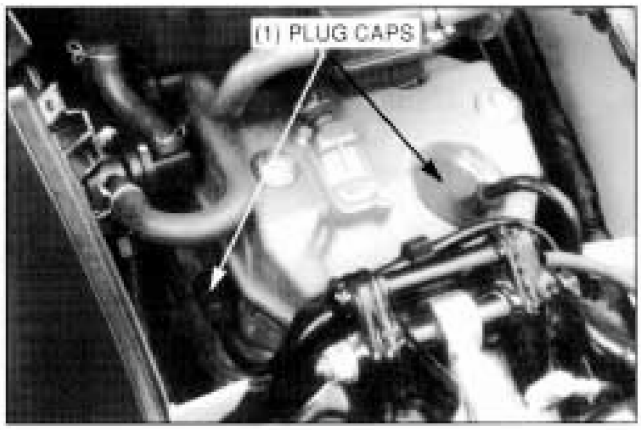
Cylinder Compression

⚠ WARNING

- **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.**

Warm up the engine to normal operating temperature.

Stop the engine, disconnect the spark plug caps and remove one spark plug cap at a time.



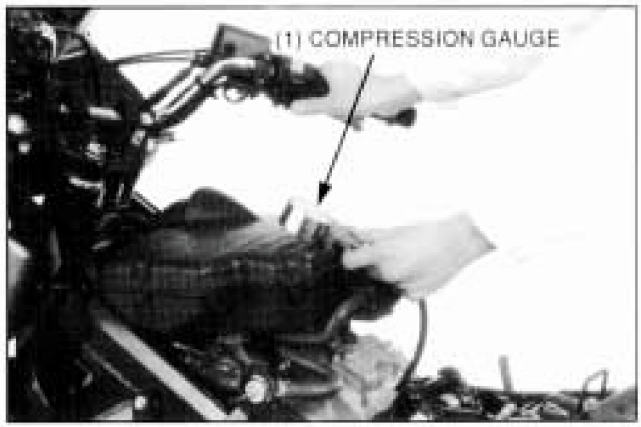
NOTE:

- To measure the cylinder compression of each cylinder, remove only one plug at a time.

Shift the transmission into neutral.

Rear cylinder compression as following:
- Remove the fuel tank (page 2-4).

Install the compression gauge attachment in a spark plug hole.



Connect the compression gauge to the attachment.
Open the throttle all the way and crank the engine with the starter motor.

NOTE:

- Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

Standard: 1,324 ± 196 kPa (13.5 ± 2.0 kgf/cm², 192 ± 28 psi) at 400 min⁻¹ (rpm)

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

If compression is low, pour 3 - 5 cm³, (0.1 - 0.2 oz) of clean engine oil into the cylinder through the spark plug hole and recheck the compression.

If the compression increases from the previous value, check the cylinder, piston and piston rings.
- Leaking cylinder head gasket
- Worn piston ring
- Worn cylinder and piston

If compression is the same as the previous value, check the values for leakage.

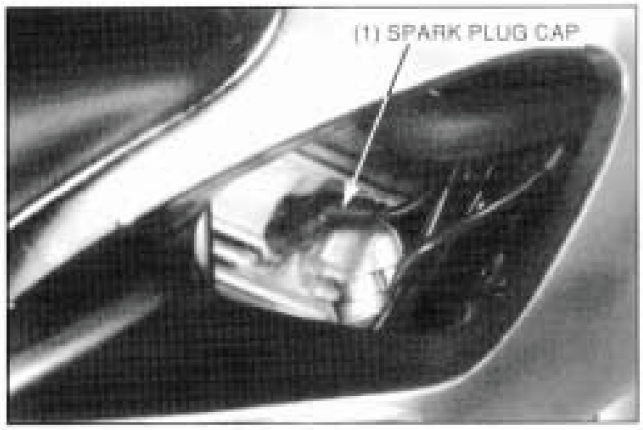
Cylinder Head Cover Removal

FRONT

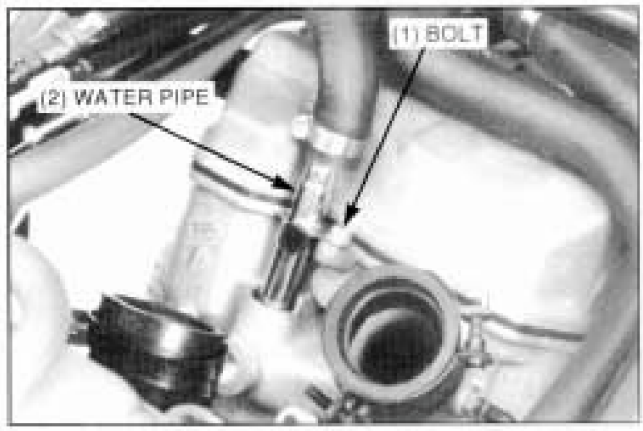
Drain de coolant (page 6-5).

Remove the following:
- Fuel tank (page 2-4)
- Air cleaner housing (page 5-4)
- Carburetors (page 5-6)

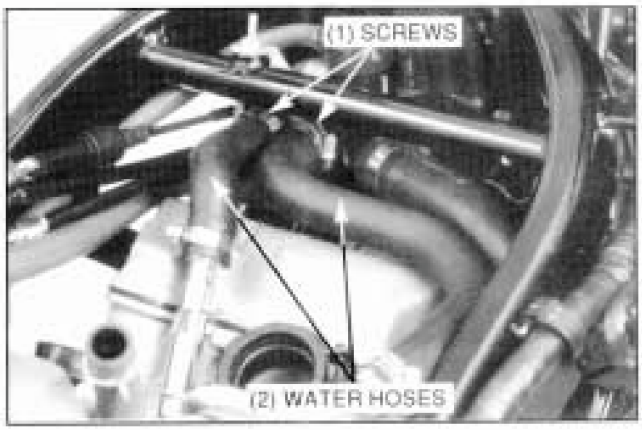
Disconnect the spark plug caps.



Remove the bolt and disconnect the water pipe.

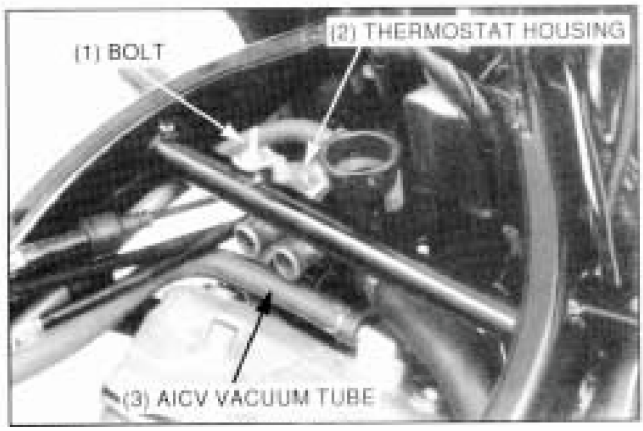


Loosen the water hose band screws and disconnect the water hoses from the thermostat housing.

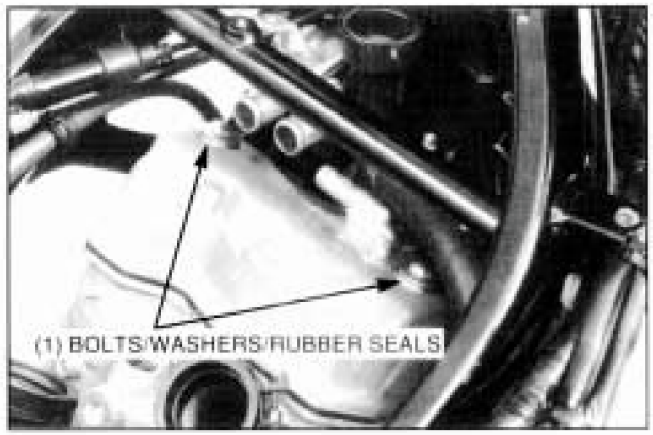


Remove the thermostat housing mounting bolt and move the thermostat housing to upward.

Disconnect the EVAP air injection control system (AICV) vacuum tube.



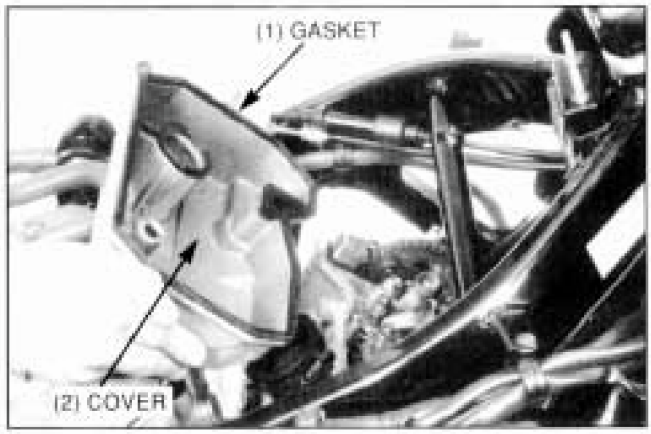
Remove the cylinder head cover bolts, washers and rubber seals.



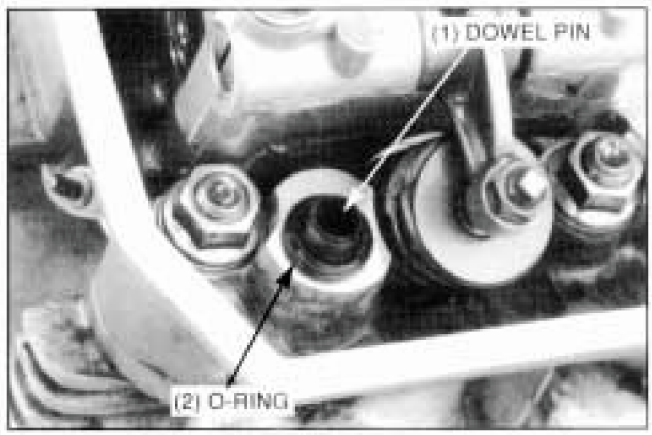
Remove the cylinder head cover and gasket.

NOTE:

- Be careful not to damage the wire harness and mating surfaces when removing the cylinder head cover.



Remove the dowel pin and O-ring.

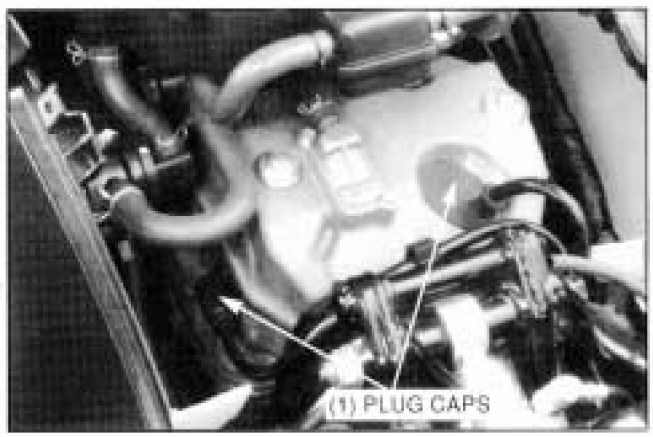


REAR

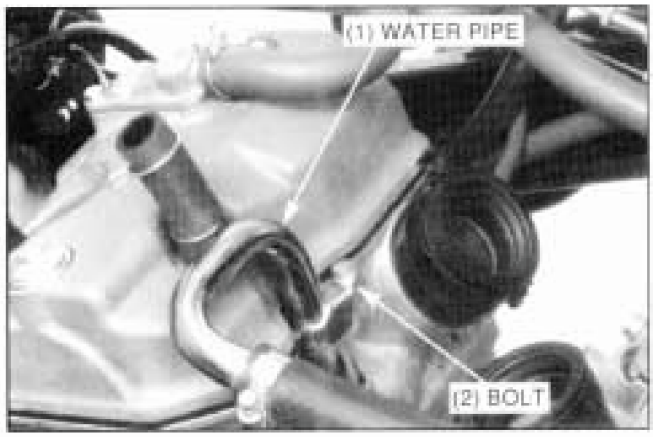
Drain the coolant (page 6-5).

Remove the following:
- Fuel tank (page 2-11)
- Air cleaner housing (page 5-4)
- Carburetors (page 5-6)

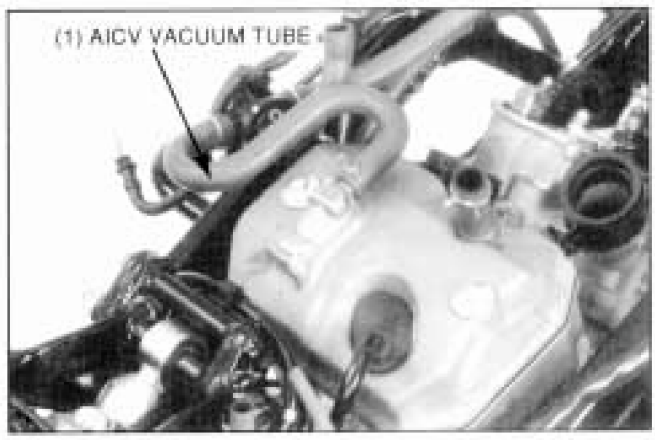
Disconnect the spark plug cap.



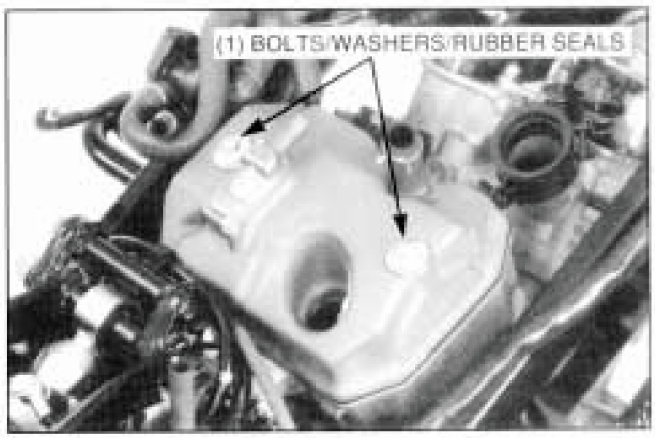
Remove the bolt and water pipe.



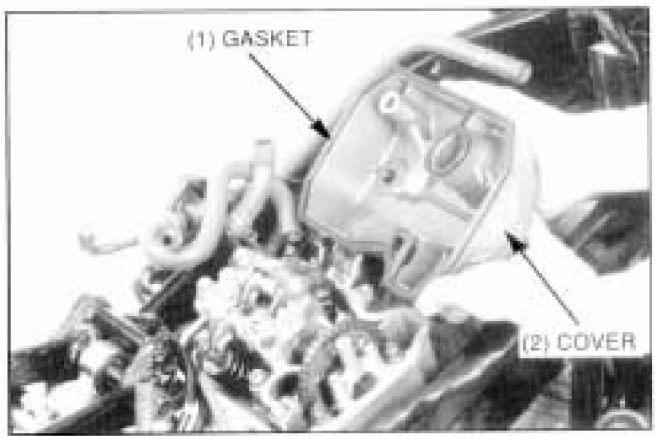
Disconnect the AICV vacuum tube from the intake port air joint.



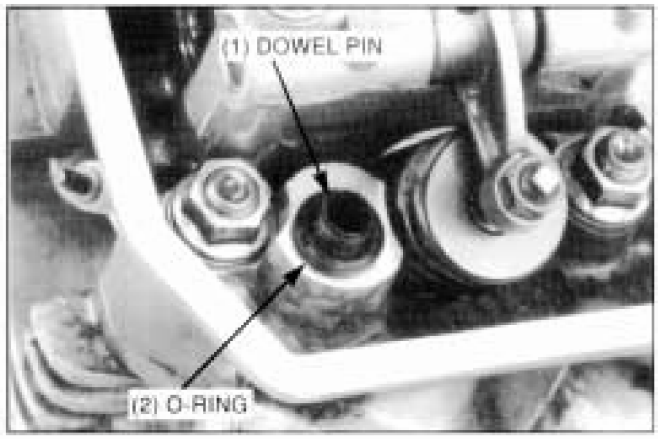
Remove the cylinder head cover bolts, washers and rubber seals.



Remove the cylinder head cover and gasket.

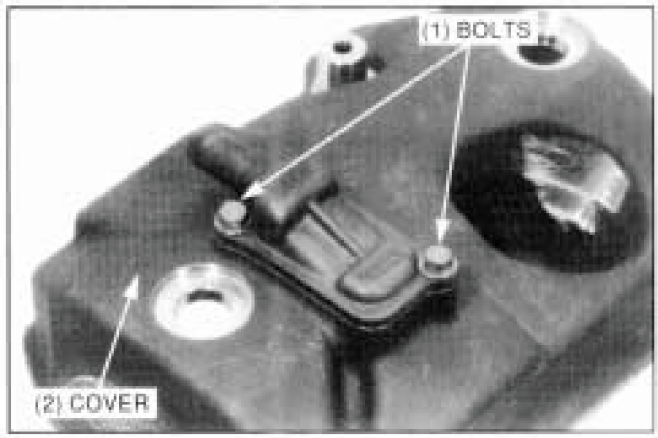


Remove the dowel pin and O-ring.

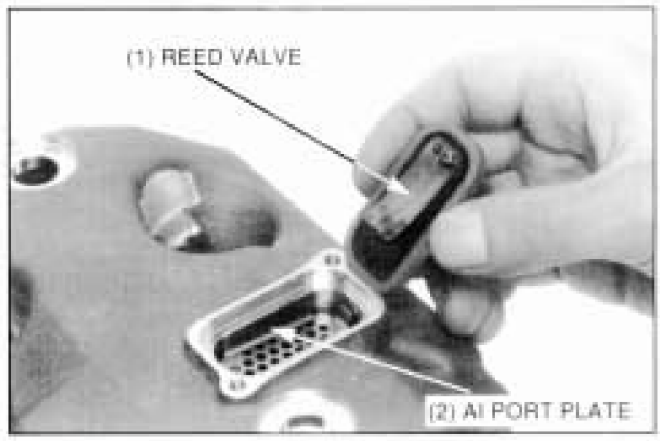


Evap Air Injection Reed Valve Inspection

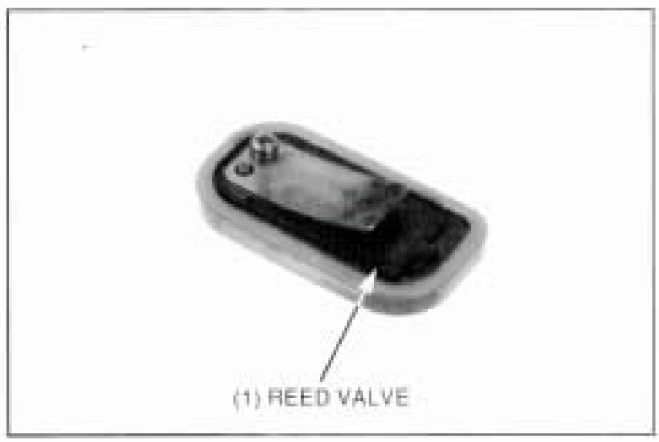
Remove the bolts and read valve cover.



Remove the EVAP air injection reed valve and AI port plate.

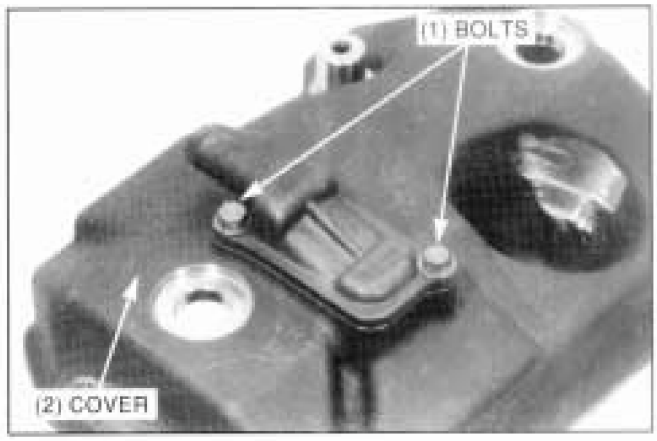


Check the EVAP air injection reed valve for wear or damage. Replace if necessary.



Installation is in the reverse order of removal.

Torque:
EVAP air injection reed valve cover bolt:
5 N·m (0.5 kgf-m, 3.6 lbf-ft)



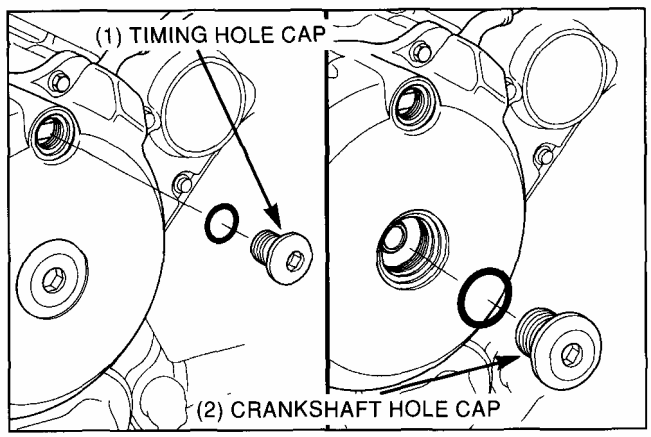
Camshaft Removal

NOTE:

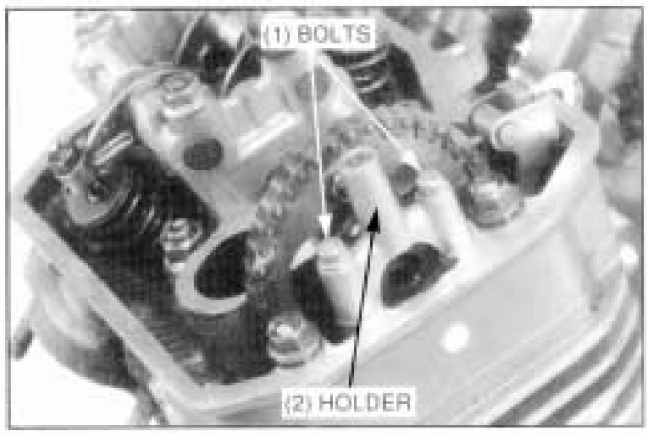
- The camshaft can be serviced with the engine in the frame.
- The front cylinder camshaft service using the same procedure as for the rear cylinder.

Remove the front cylinder head cover (page 10-5).

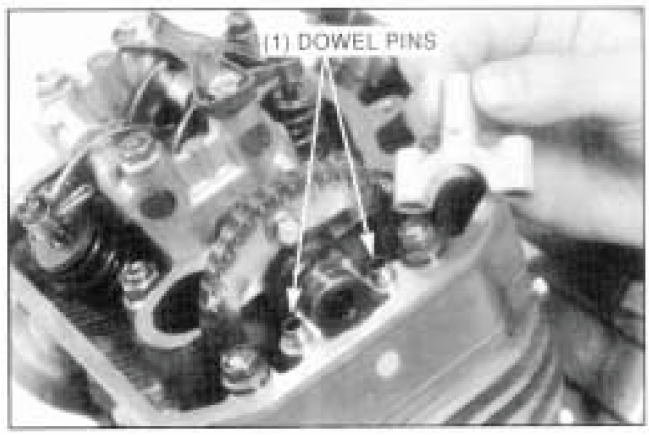
Remove the crankshaft hole cap and timing hole cap from the left crankcase cover.



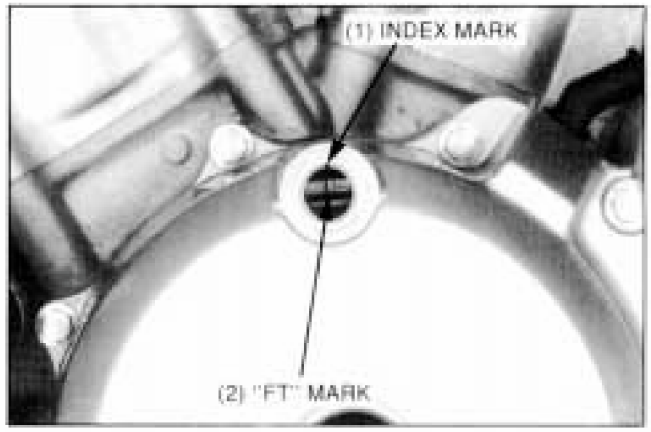
Remove the camshaft end holder bolts and camshaft end holder.



Remove the dowel pins.



Turn the crankshaft counterclockwise and align the "FT" mark (rear cylinder: "RT" mark) with the index mark on the left crankcase cover.
Make sure the rear cylinder is at TDC (top dead center).



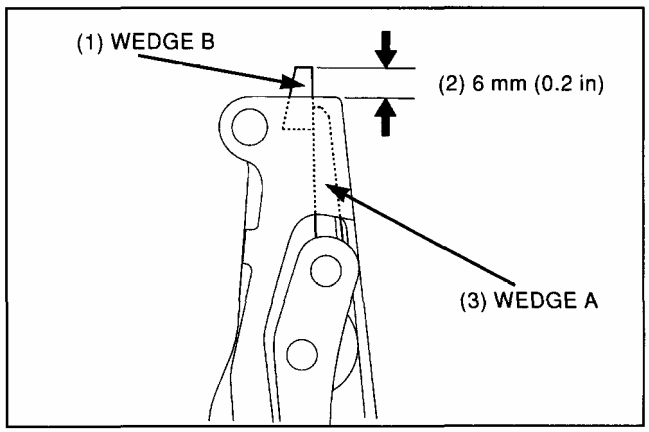
Measure the cam chain tensioner wedge B length as shown.

Service Limit: 6 mm (0.2 in)

When the service limit is exceeded, replace the cam chain.
Replace the cam chain is after following parts removal:

Front:
- Front camshaft
- Flywheel (Section 9)

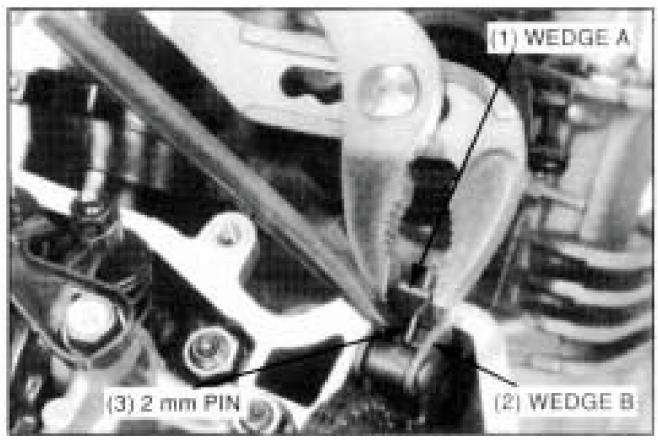
Rear:
- Rear camshaft
- Primary drive gear (Section 8)



Pull the cam chain tensioner wedge A straight up while holding wedge B push down.
Secure wedge A with a 2 mm pin as shown.

NOTE:

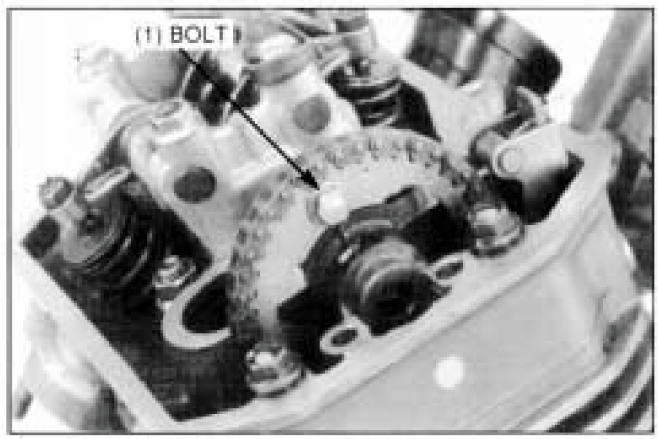
- Be careful not to let the 2 mm pin fall into the crankcase.



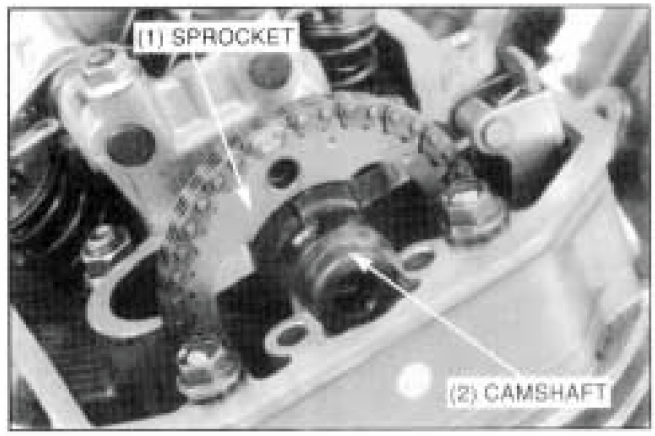
Remove the cam sprocket bolt, turn the crankshaft counterclockwise one full turn (360°) and remove the other cam sprocket bolt.

NOTE:

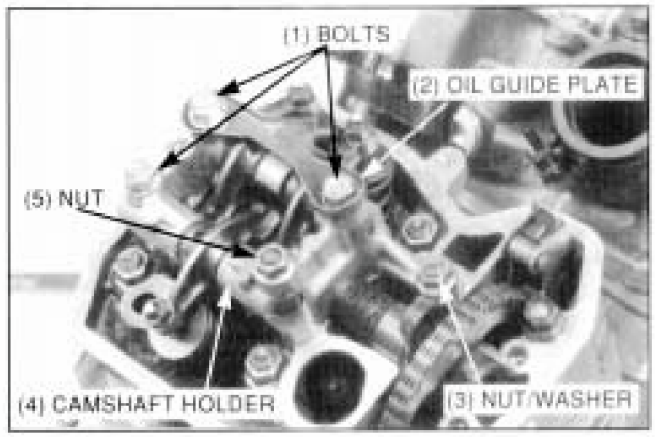
- Be careful not to let the cam sprocket bolts fall into the crankcase.



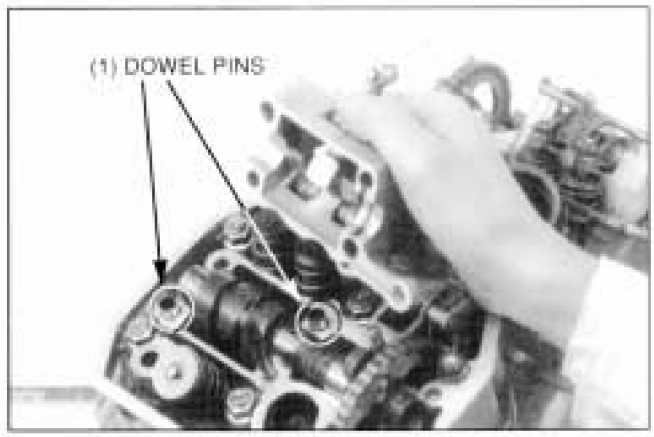
Remove the cam sprocket from the camshaft flange surface.



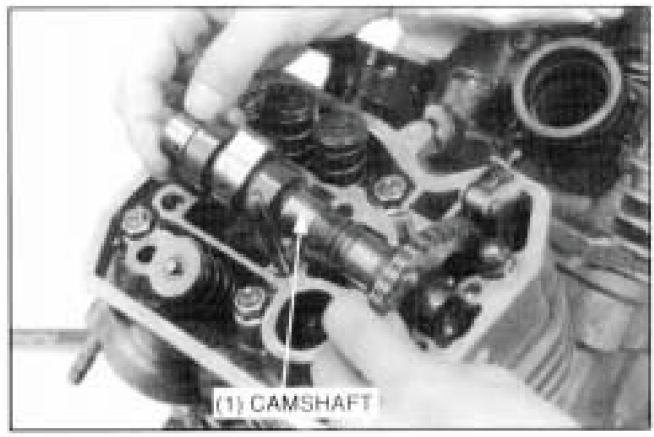
Remove the camshaft holder nuts/washer (8 mm).
Remove the camshaft holder bolts (8 mm) and oil guide plate.
Remove the camshaft holder assembly.



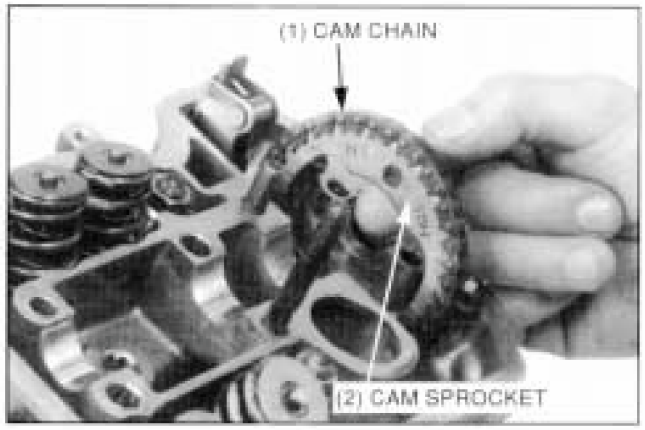
Remove the dowel pins.



Remove the camshaft.



Remove the cam sprocket from cam chain.
Attach a piece of mechanic's wire to the cam chain to prevent it form being dropped into the crankcase.

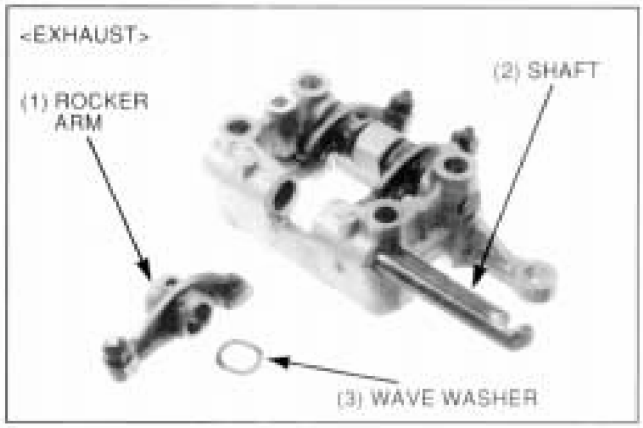


CAMSHAFT HOLDER DISASSEMBLY

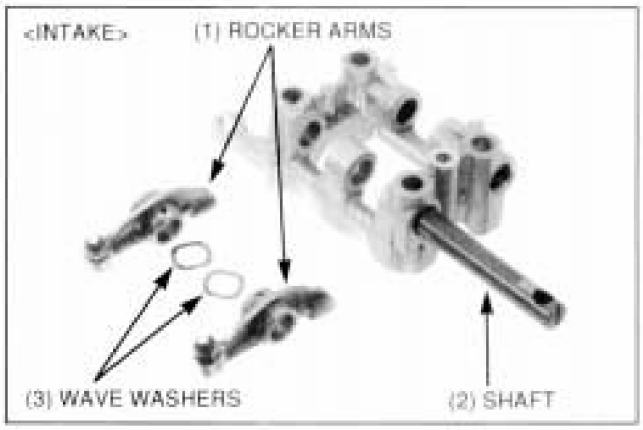
NOTE:

- The front cylinder camshaft holder service using the same procedure as for the rear cylinder camshaft holder.

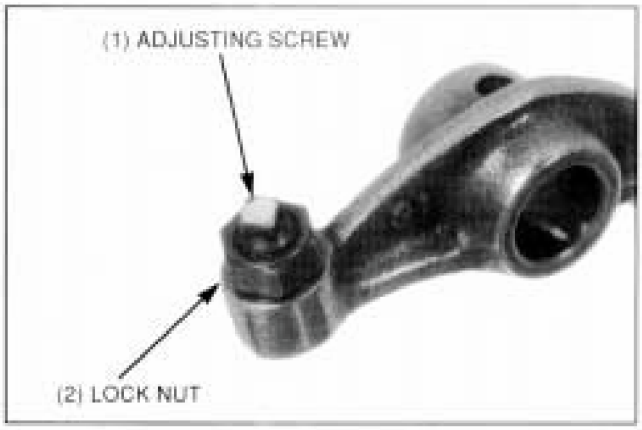
Remove the exhaust rocker arm shaft, exhaust rocker arm and wave washer (12 mm) from the camshaft holder.



Remove the intake rocker arm shaft, intake rocker arms and wave washers (12 mm) from the camshaft holder.



Remove the valve adjuster lock nut and valve adjusting screw.

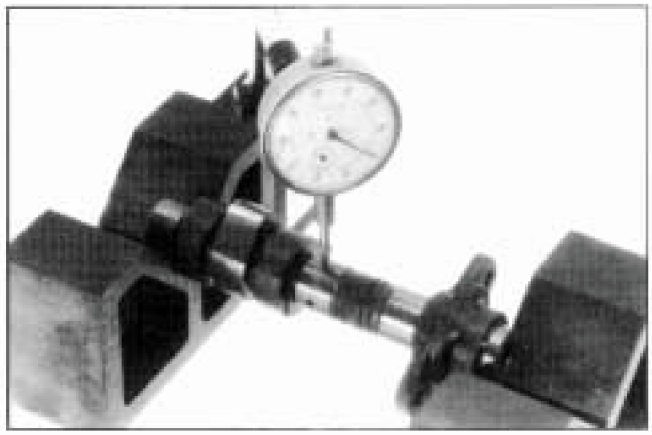


INSPECTION

CAMSHAFT RUNOUT

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

Service Limit: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

Inspect the cam lobe surfaces for scoring or evidence of insufficient lubrication.
Measure the height of each cam lobe using a micrometer.

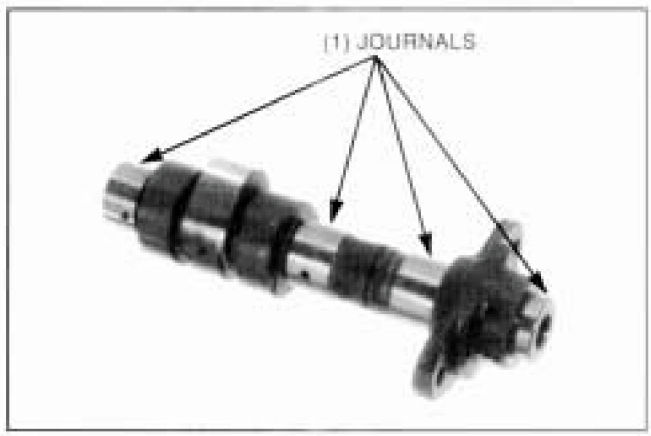
Service Limits: IN: 38.17 mm (1.503 in)
EX: 38.19 mm (1.504 in)

NOTE:

- Inspect the rocker arm if the cam lobe is worn or damaged.

CAMSHAFT JOURNAL

Inspect the camshaft journal surfaces for scoring or evidence of insufficient lubrication.

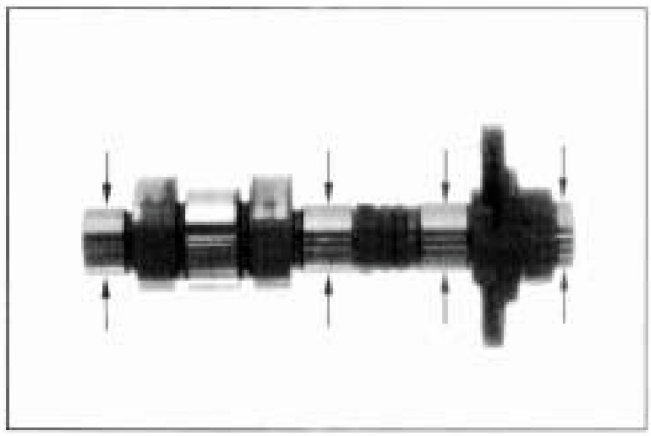


Measure the O.D. of each camshaft journal.

Service Limit: 21.95 mm (0.864 in)

NOTE:

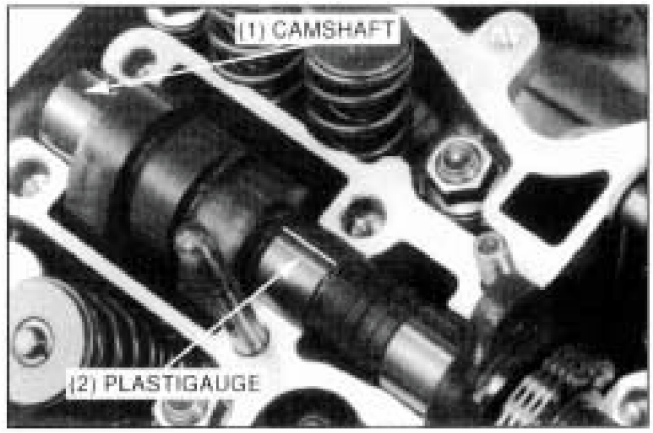
- Inspect the oil passages and camshaft holder for wear or damage if the journal surface is worn or damaged.



CAMSHAFT OIL CLEARANCE

Clean off any oil from the journals of the camshaft holders, head and camshafts.

Put the camshaft onto the cylinder heat and lay a strip of plastigauge lengthwise on the top of each camshaft journal.



NOTE:

- Do not block any oil holes with the plastigauge.
- Do not rotate the camshaft during inspection.

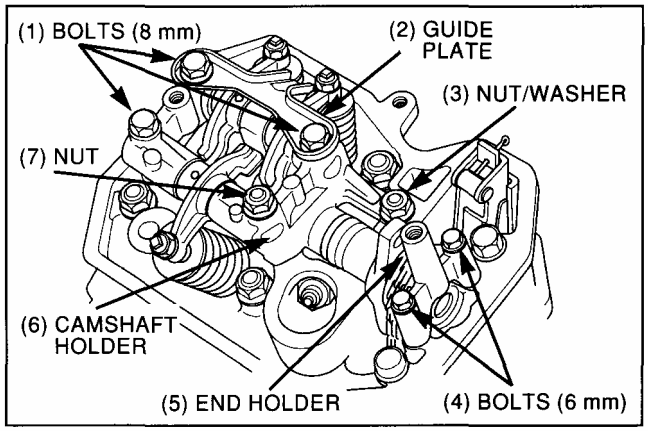
Install the camshaft holder and camshaft end holder.

Install and tighten the camshaft holder bolts/nuts (8 mm) to the specified torque in 2 - 3 steps.

Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

Install and tighten the camshaft end holder bolts (6 mm) to the specified torque in 2-3 steps.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



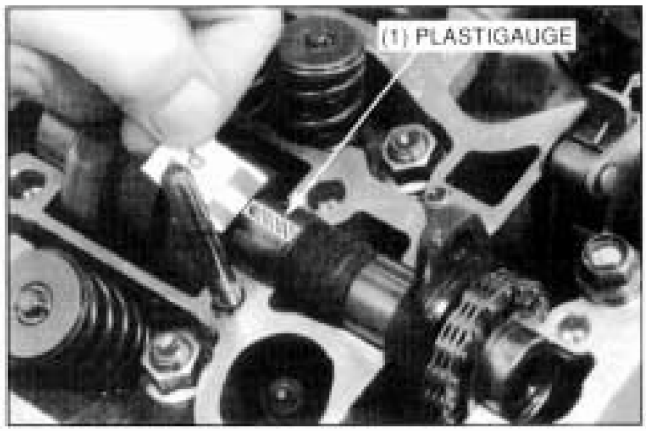
Remove the camshaft holder and measure the width of each plastigauge.

The widest thickness determines the oil clearance.

Service Limit: 0.11 mm (0.004 in)

When de service limit is exceeded replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holders if the clearance still exceeds the service limit.



ROCKER ARM, ROCKER ARM SHAFT

Inspect the sliding surface of the rocker arms for wear or damage where they contact the camshaft, or for clogged oil holes.

Inspect the contact surface of the valve adjusting screw for wear or damage.

Measure the I.D. of each rocker arm.

Service Limit: 12.03 mm (0.474 in)

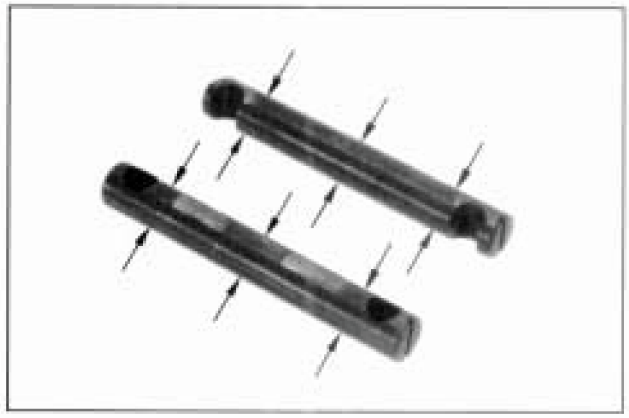
Measure the each rocker arm shaft O.D.

Service Limit: 11.96 mm (0.471 in)

Inspect the shaft for wear or damage and calculate the shaft to rocker arm clearance.

Service Limit: 0.07 mm (0.003 in)

Replace the rocker arm and/or shaft if necessary.

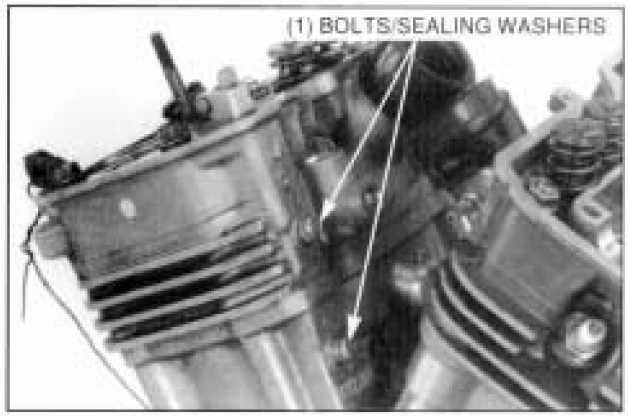


Cylinder Head Removal

NOTE:

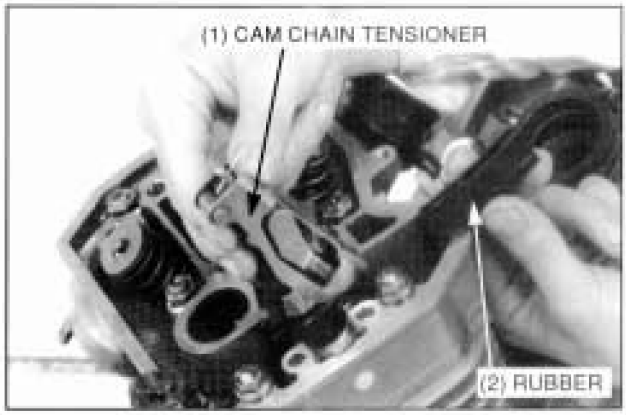
- The engine must be removed from the frame before servicing the front cylinder head.
- The rear cylinder head and each side cylinder head covers can be serviced with the engine in the frame.
- The rear cylinder head service using the same procedure as for the front cylinder head.

Remove the engine from the frame (front cylinder only/ Section 7).
Remove the cylinder head cover (page 10-5).
Remove the camshaft (page 10-9).



Remove the cam chain tensioner mounting bolts and sealing washers.
Remove the cam chain tensioner.

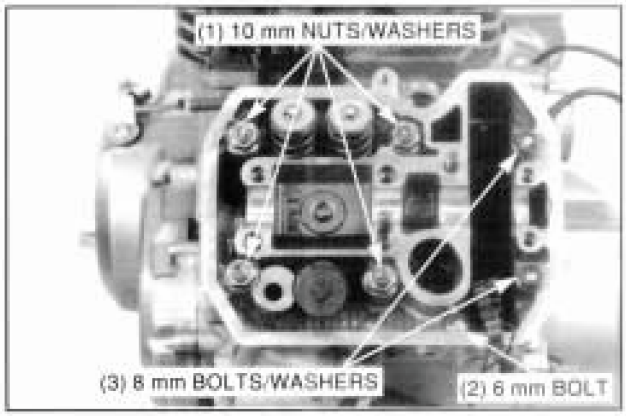
Remove the cushion rubber.



Remove the following cylinder head bolts and nuts:
- 8 mm bolts/washers
- 6 mm bolt
- 10 mm nuts/washers

NOTE:

- Loosen the bolts and nuts in a crisscross pattern in several steps.

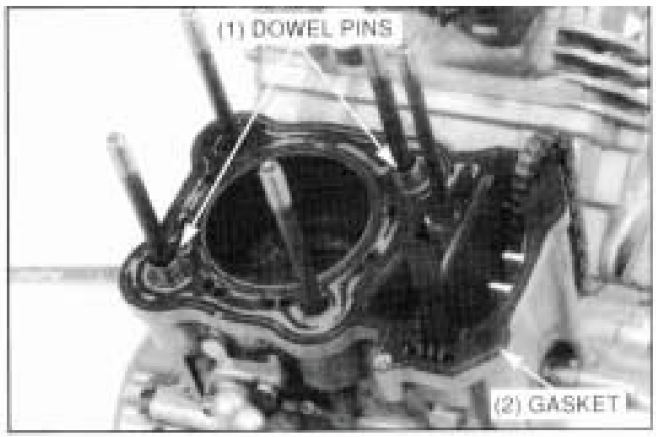


Remove the cylinder head.

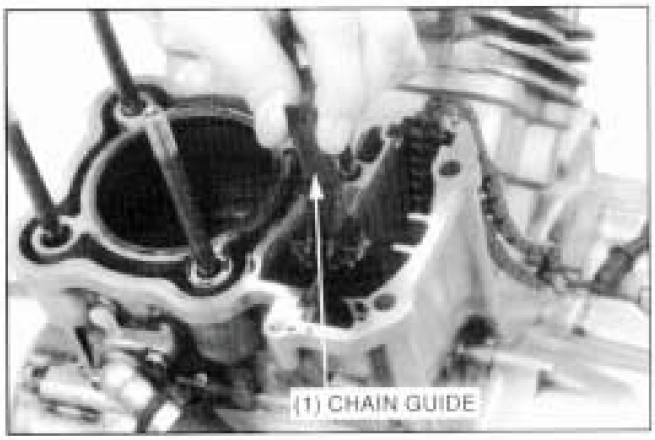
NOTE:

- Be careful not to damage the mating surfaces when removing the cylinder head.

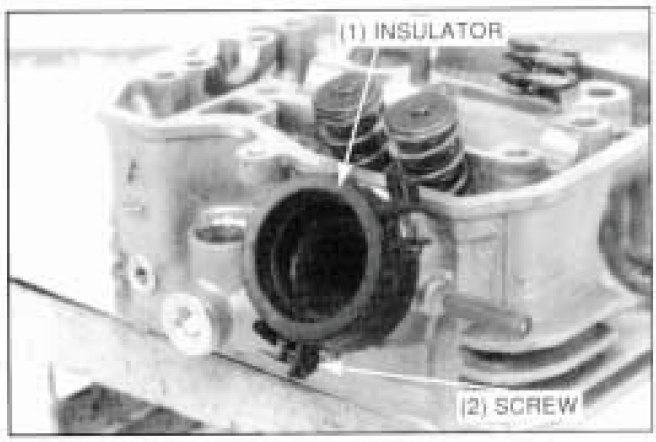
Remove the gasket and dowel pins.



Remove the cam chain guide.



Loosen the screw and remove the carburetor insulator.



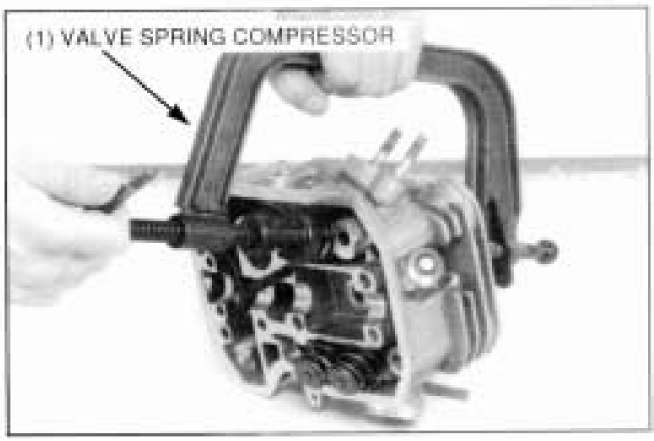
Cylinder Head Disassembly

NOTE:

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

Install the valve spring compressor onto the valve and compress the valve spring.

Tool:
Valve spring compressor **07757-0010000**



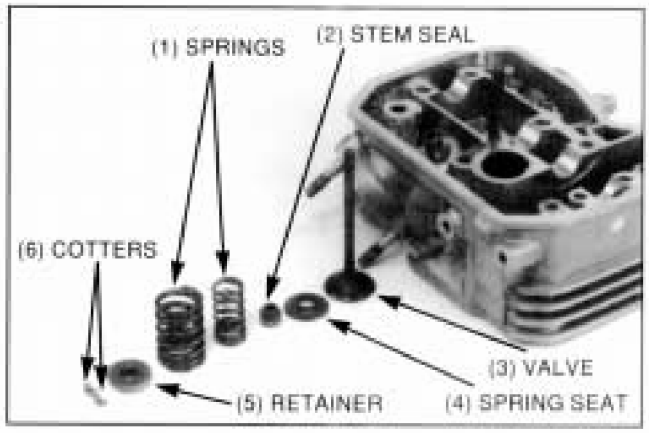
CAUTION

- **Compressing the valve spring more than necessary will cause loss of valve spring tension.**

Remove the valve spring compressor, then remove the retainers, springs and valves.
Remove the stem seals and spring seats.

NOTE:

- Do not reuse a removed stem seals.

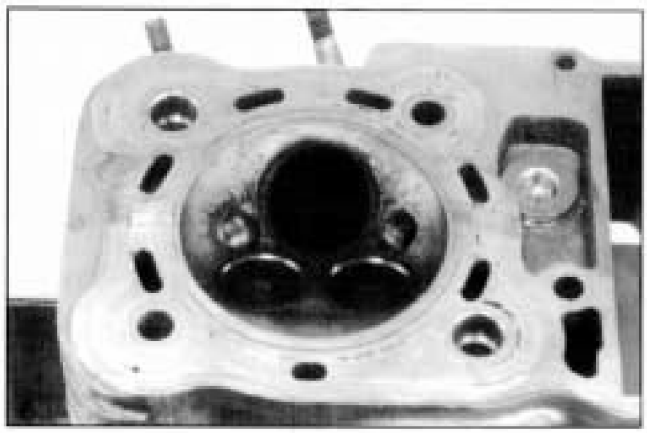


Remove carbon deposits from the combustion chamber and clean off the head gasket surface.

CAUTION

- **Avoid damaging the gasket and valve seat surface.**

Check the spark plug hole and valve areas for cracks.

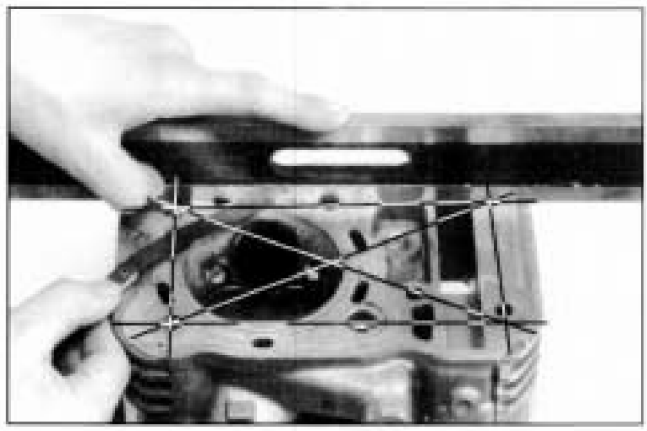


INSPECTION

CYLINDER HEAD

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

Service Limit: 0.10 mm (0.004 in)

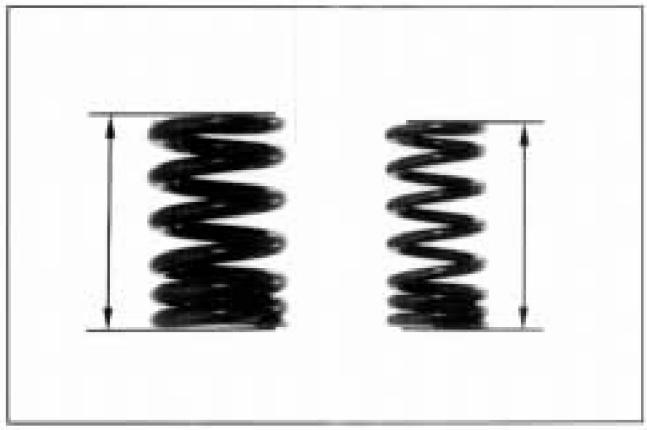


VALVE SPRING

Check the valve spring for fatigue or damage.
Measure the free length of inner and outer valve springs.

Service Limits:

Outer:	**IN:**	**40.58 mm (1.598 in)**
	EX:	**41.25 mm (1.624 in)**
Inner:	**IN:**	**36.47 mm (1.436 in)**
	EX:	**37.51 mm (1.477 in)**



VALVE STEM, VALVE GUIDE

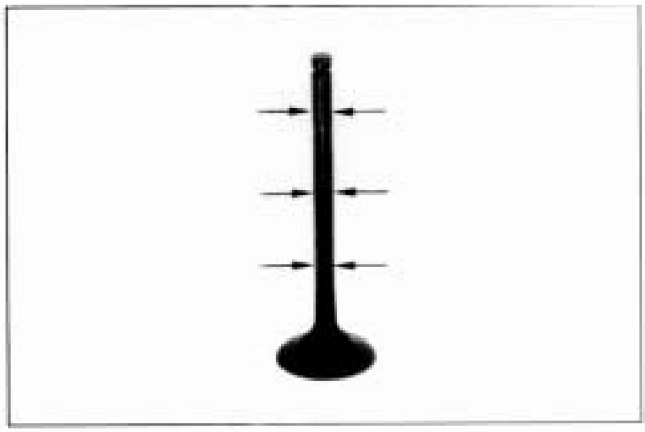
Inspect each valve for bending, burning, scratches or abnormal wear.

Insert the valves in their original positions in the cylinder head.

Check that each valve moves up and down smoothly, without binding.

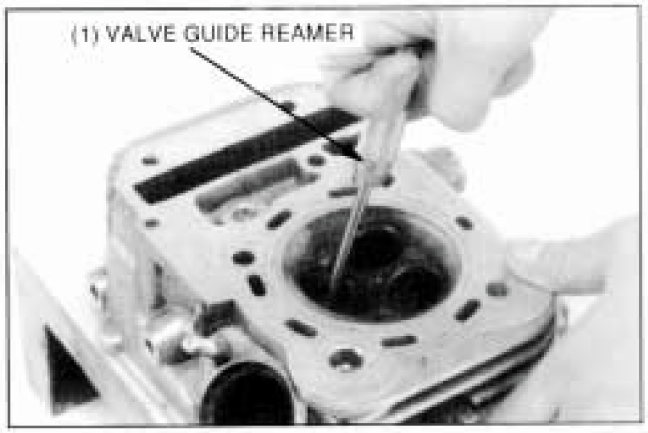
Measure the each valve stem O.D. and record it.

Service Limits: IN: 5.47 mm (0.215 in)
Ex: 6.55 mm (0.258 in)



Ream the valve guide to remove any carbon build-up before measuring the guide.

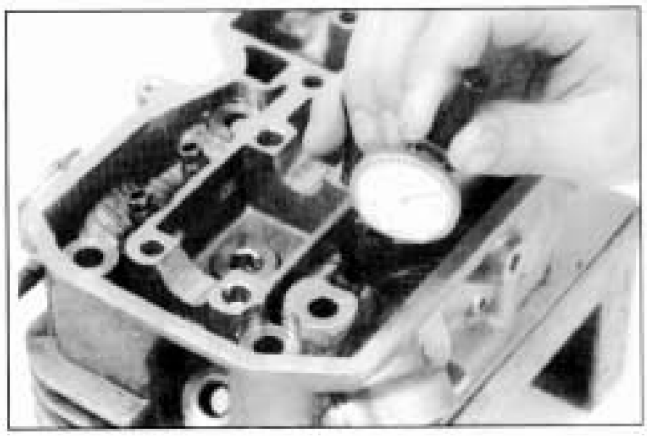
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.



NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming.
- If reaming irregular, oil will leak past the valve stem seal.
  If could cause improper seat contact that cannot be corrected by refacing.
- Rotate the reamer clockwise, never counterclockwise when inserting and removing.

Tools:
Valve guide reamer
5.510 mm (IN) 07984-2000001
6.612 mm (EX) 07984-ZE20001



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

Service Limits: IN: 5.53 mm (0.218 in)
EX: 6.66 mm (0.262 in)

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

Service Limits:
IN: 0.10 mm (0.004 in)
EX: 0.11 mm (0.004 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.

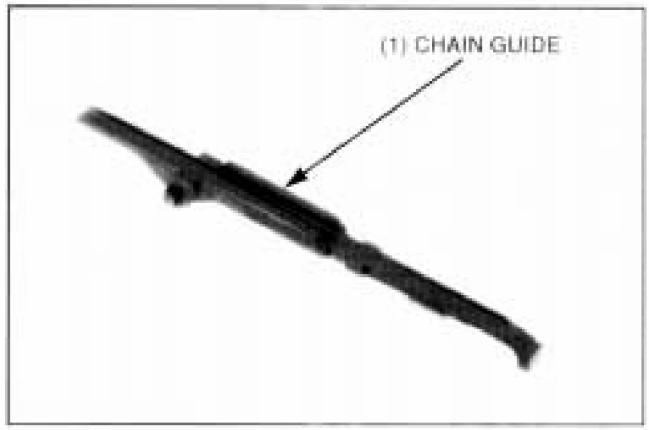
If so, replace any guides as necessary and ream to fit.

If the stem-to-guide clearance exceeds the service limit with new guide, also replace the valve.

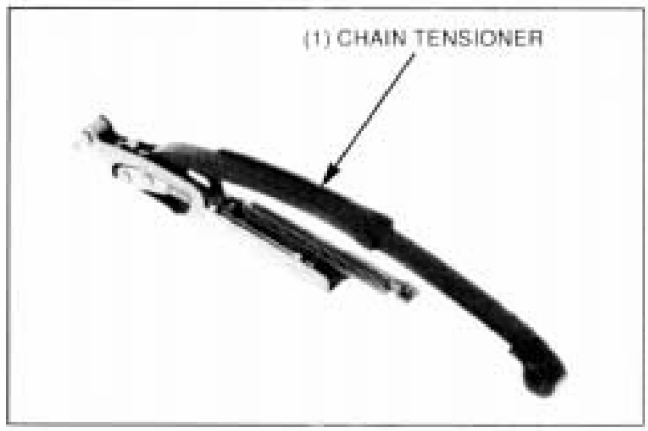
NOTE:

- Inspect and reface the valve seats whenever the valve guides are replaced (see after page).

CAM CHAIN GUIDE
Check the cam chain guide for wear or damage.
Replace the cam chain guide if necessary.



CAM CHAIN TENSIONER
Check the cam chain tensioner for wear or damage.
Replace the cam chain tensioner if necessary.



Valve Guide Replacement

NOTE:

- Refinish the valve seats whenever the valve guides are replaced to prevent uneven seating.

Chill the valve guides in the freezer section of refrigerator for about an hour.

⚠ WARNING

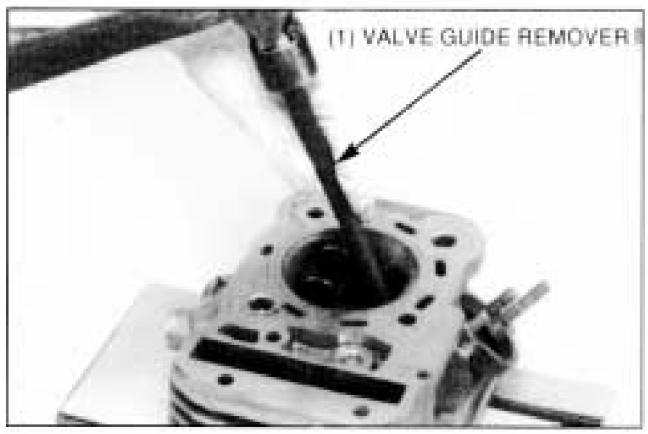
- **Wear insulated gloves to avoid burns when handling the heated cylinder head.**

Heat the cylinder head to 130 - 140° C (275 - 290° F) with a hot plate or oven. Do not heat the cylinder head beyond 150° C (300° F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to proper temperature.

CAUTION

- **Using a torch to heat the cylinder head may cause warping.**

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



Tools:
Valve guide remover

5.5 mm (IN)	**07742-0010100**
6.6 mm (EX)	**07742-0010200**

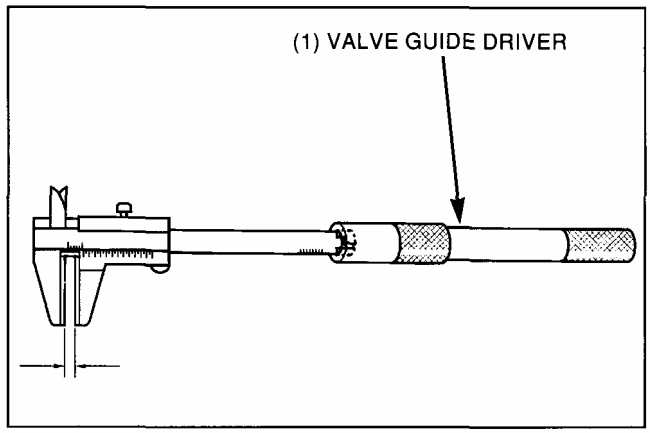
CAUTION

- **Be careful not to damage the cylinder head.**

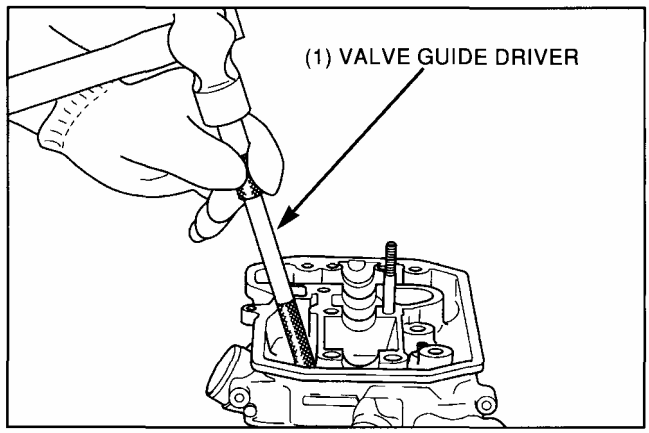
Adjust the valve guide driver to the valve guide height.

Tool:
Valve guide driver **07743-0020000**

Valve Guide Projection Above Cylinder Head:
IN: 19.4 - 19.6 mm (0.76 - 0.77 in)
EX: 17.9 - 18.1 mm (0.70 - 0.71 in)



Drive the new guides in from the camshaft side of the cylinder head to the valve guide height while the cylinder head is still heated.



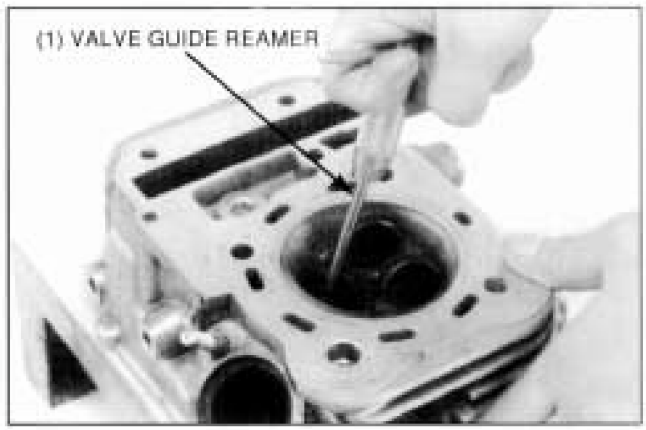
Let the cylinder head cool to room temperature, then ream the new valve guides.

Tools:
Valve guide reamer
5.510 mm (IN) **07984-2000001**
6.612 mm (EX) **07984-ZE20001**

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves is installed slanted, that causes oil leaks from the stem seal and improper valve seat contact and results in the valve seat refacing not able to be performed.
- Insert the reamer from the combustion chamber side of the heat and always rotate the reamer clockwise.

Clean the cylinder head thoroughly to remove any metal particles after reaming and refacing the valve seat.



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 face.
Tap the valve against the valve seat several times using a hand-lapping tool, without rotating valve, to make a clear pattern.
Remove the valve and inspect the valve seat face.

NOTE:

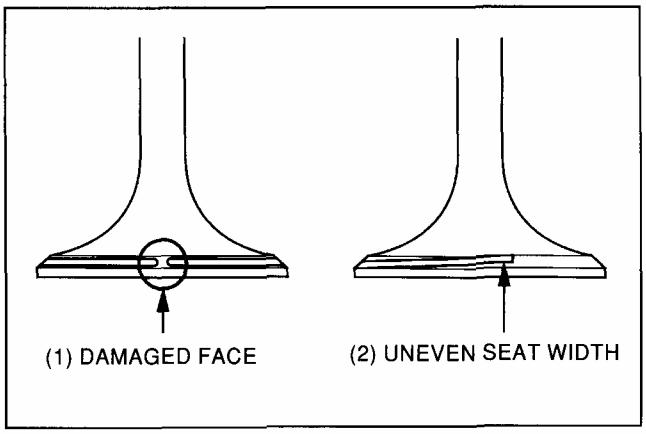
- The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

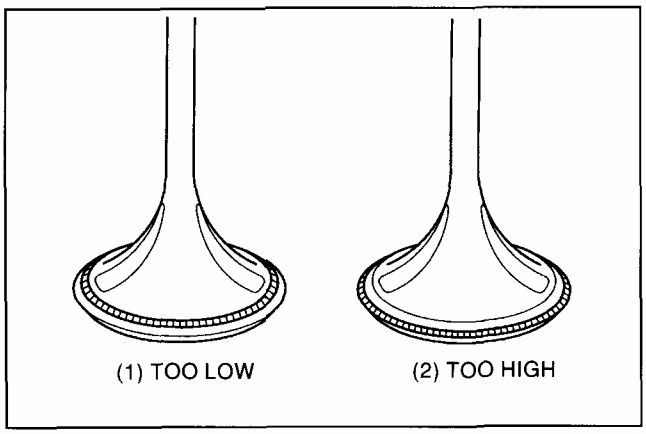
Inspect the valve seat face for:
- Uneven seat width:
  - Bent or collapsed valve stem;
    Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat.
- Contact area (too high or too low area):
  - Reface the valve seat.

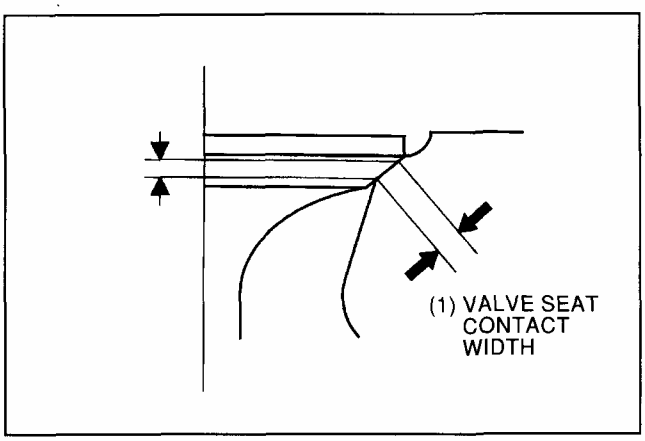
Inspect the width of the valve seat.
The valve seat contact should be within the specified width and even all around the circumference.

Standard: **0.90 - 1.10 mm (0.035 - 0.043 in)**
Service Limit: **1.5 mm (0.06 in)**

Valve seat width is not within specification, reface the valve seat.



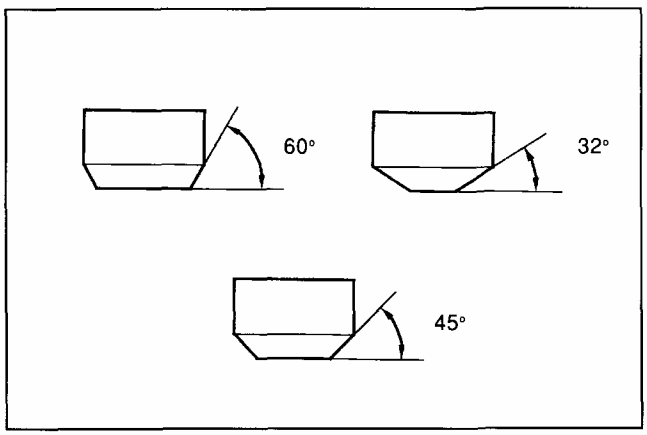




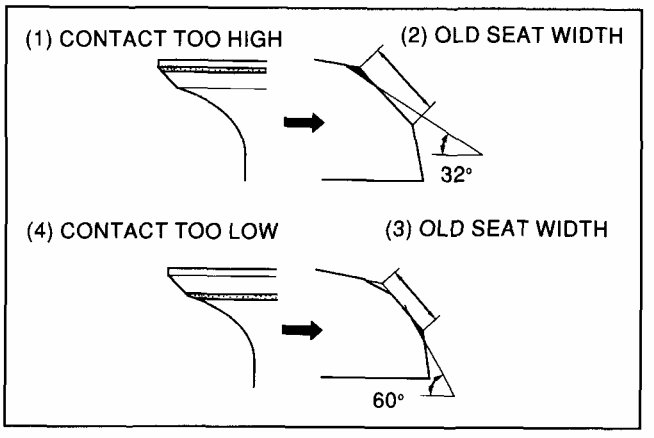
VALVE SEAT REFACING

NOTE:

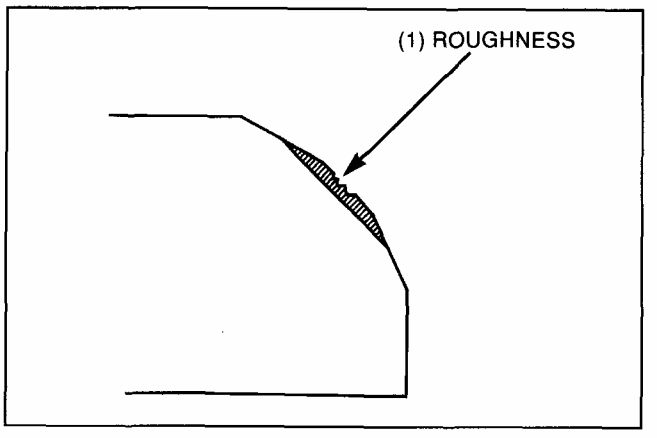
- Follow the refacer manufacturer's operating instruction.
- Reface the valve seat whenever the valve guide has been replaced.
- Be careful not to grind the seat more than necessary.



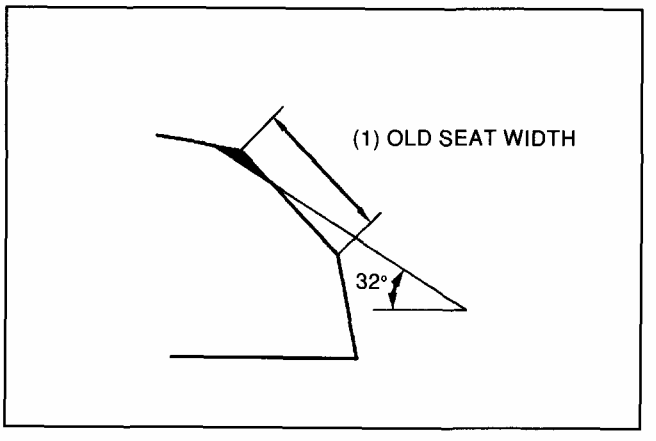
If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.
If the contact area is too low on the valve, the seat must be raised using a 60° inner cutter. Refinish the seat to specifications, using a 45° finish cutter.



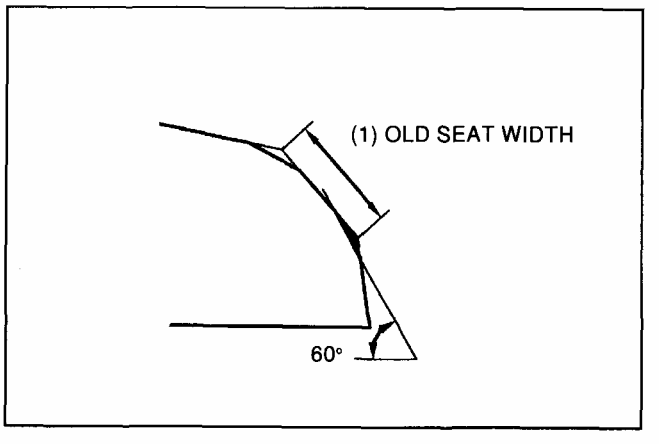
Using a 45° cutter, remove any roughness or irregularities from the seat.



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



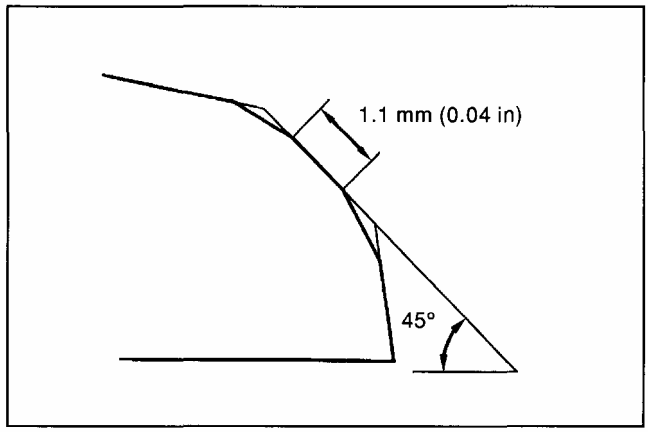
Using a 60° cutter, remove the bottom 1/4 of the old seat.



Using a 45° cutter, cut the seat to the proper width. Make sure that all pitting and irregularities are removed.

CAUTION

- **Excessive lapping pressure may deform or damage the seat.**
- **Change the angle of lapping tool frequently to prevent uneven seat wear.**
- **Lapping compound can cause damage if it enters between the valve stem and guide.**

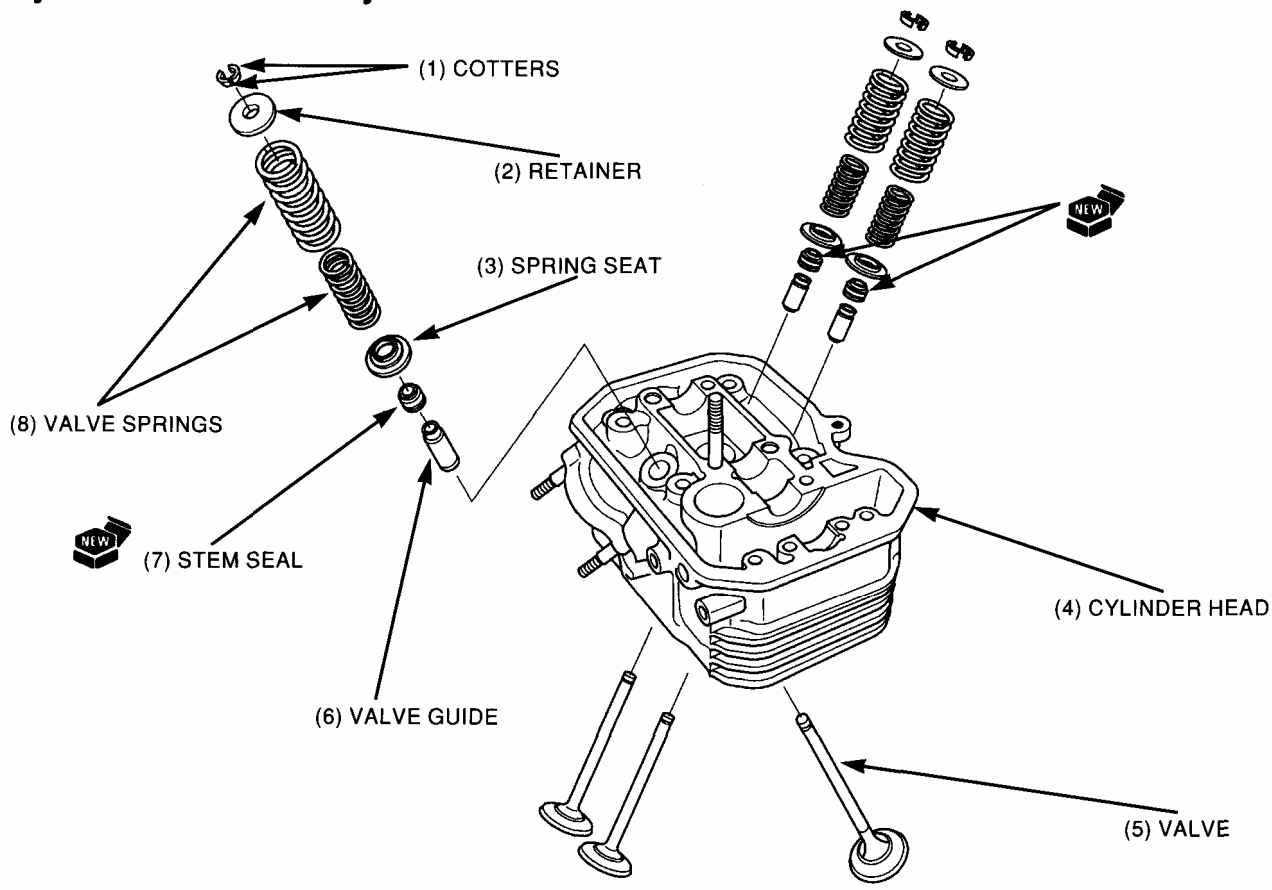


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

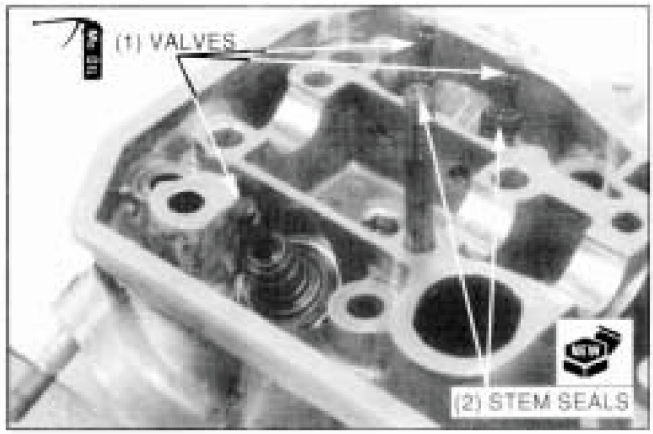
After lapping, wash any residual compound off the cylinder head and valve.

Recheck the seat contact after lapping.

Cylinder Head Assembly



Install the spring seats and new stem seals.
Lubricate each valve stems and valve guide inner surfaces with molybdenum disulfide oil.

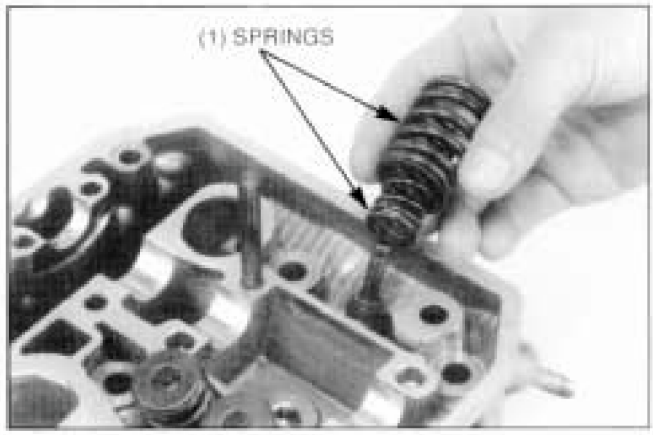


Install the valves into the valve guides.

NOTE:

- To avoid damage to the stem seal, turn the valve slowly when valve installing.

Install the valve spring with tightly would coils side facing the combustion chamber.

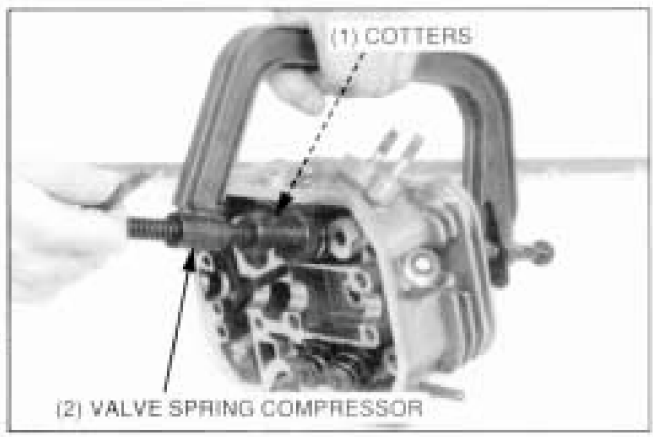


Install the retainers.
Install the valve spring compressor onto the valve and compress the valve springs.

Tool:
Valve spring compressor **07757-0010000**

CAUTION

- **Compressing the valve springs more than necessary will cause loss of valve spring tension.**

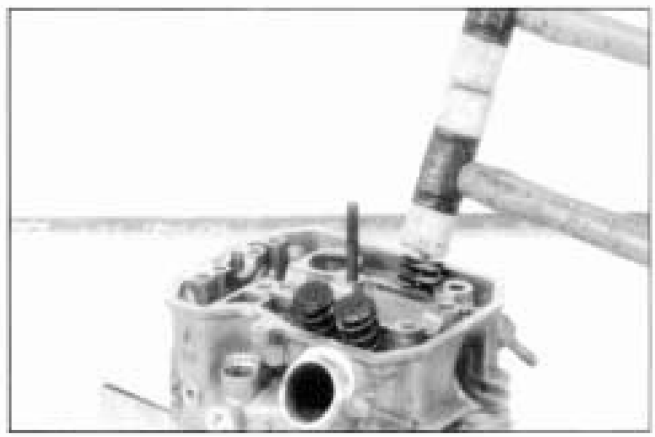


Install the valves cotters.

NOTE:

- To ease installation of the cotters, grease them first.
- Support the cylinder head so that the valve heads will not contact anything that causes damage.

Set the cotters firmly using two soft hammers as shown. Hold one hammer on the valve stem and gently tap it with the other hammer.



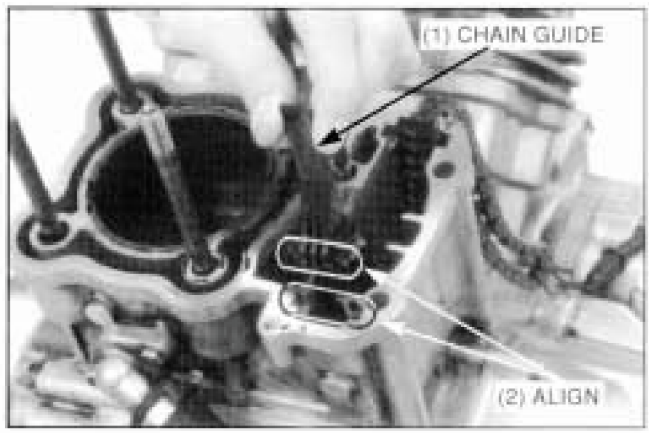
Cylinder Head Installation

NOTE:

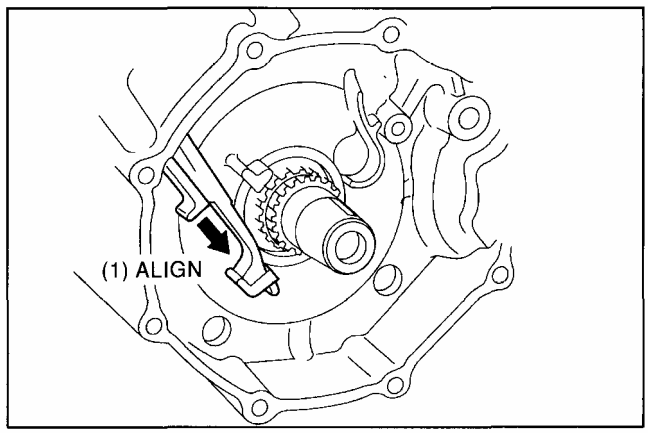
- The front cylinder head service using the same procedure as for the rear cylinder head.
- Be careful not to damage the mating surfaces when cleaning the cylinder mating surface.
- When cleaning the cylinder mating surface, place the shop towel over the cylinder opening to prevent dust or dirt enter the engine.

Clean any gasket material from the cylinder mating surfaces.

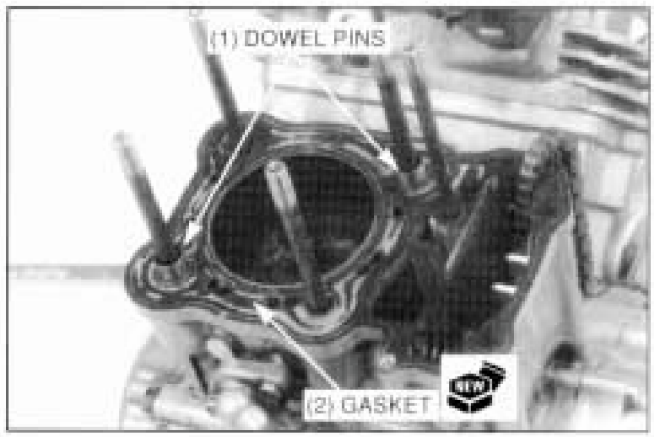
Install the cam chain guide aligning its tab with the groove on the cylinder.



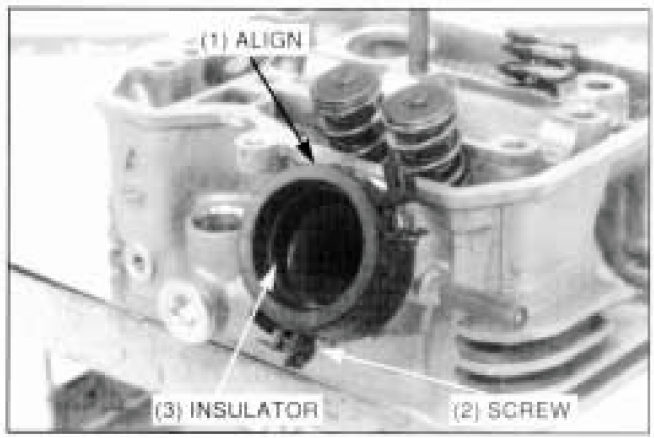
Make sure that the end of the guide is inserted into place in the crankcase.



Install the dowel pins and new gasket.



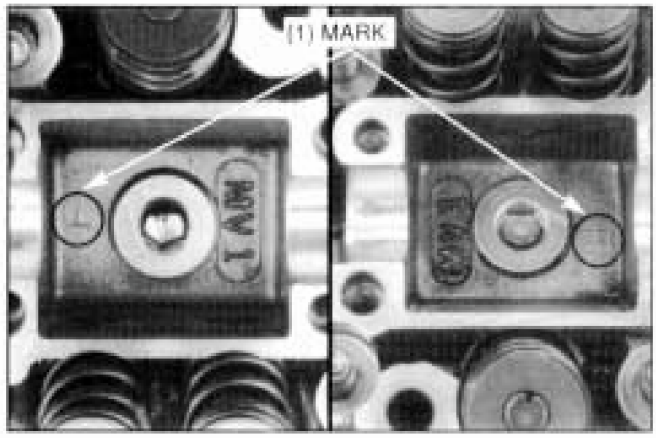
Install the insulator, aligning the boss on the cylinder head with the slot in the insulator as shown.
Install the insulator bands and tighten the screws securely.



Install the cylinder head to the cylinder.

NOTE:

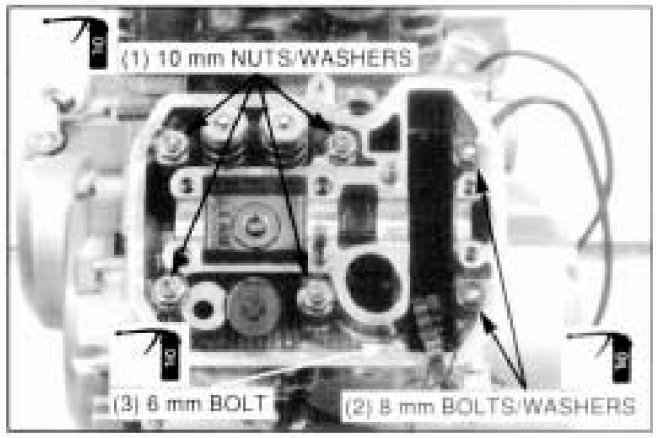
- The cylinder heads are identified by marks on its camshaft side.
  "F": Front cylinder head
  "R": Rear cylinder head



Apply oil to the cylinder head stud bolt threads.
Apply oil to the cylinder head 8 mm bolt threads.
Apply oil to the cylinder head each bolts and nuts seating surfaces.

Install and tighten the cylinder head bolts and nuts to the specified torque.

Torques:
10 mm nut: 47 N·m (4.8 kgf-m, 35 lbf-ft)
8 mm bolt/nut: 23 N·m (2.3 kgf-m, 17 lbf-ft)

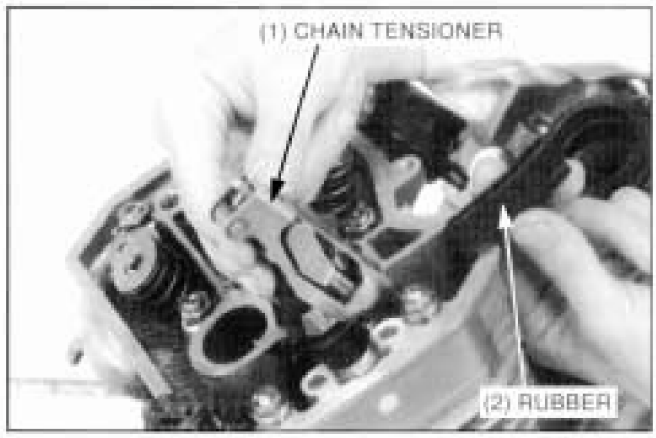


NOTE:

- Tighten all to hand-tight, then torque big fasteners before little fasteners.
- Tighten the bolts and nuts in a crisscross pattern in several times.

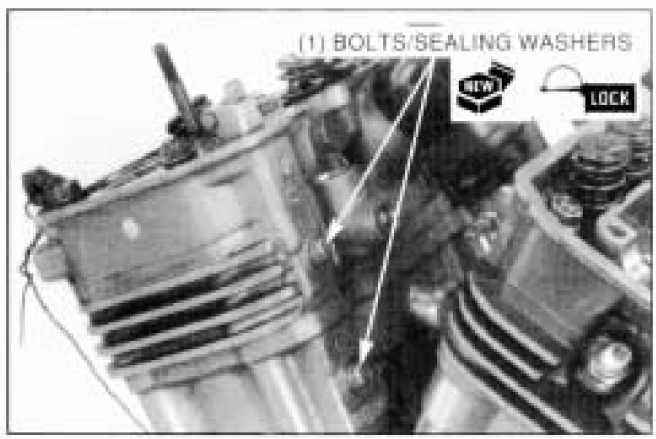
Install the cushion rubber.

Install the cam chain tensioner aligning its end with the groove on the crankcase.



Install the new sealing washers.
Clean and apply a locking agent to the cam chain tensioner bolt threads.
Install and tighten the cam chain tensioner mounting bolt to the specified torque.

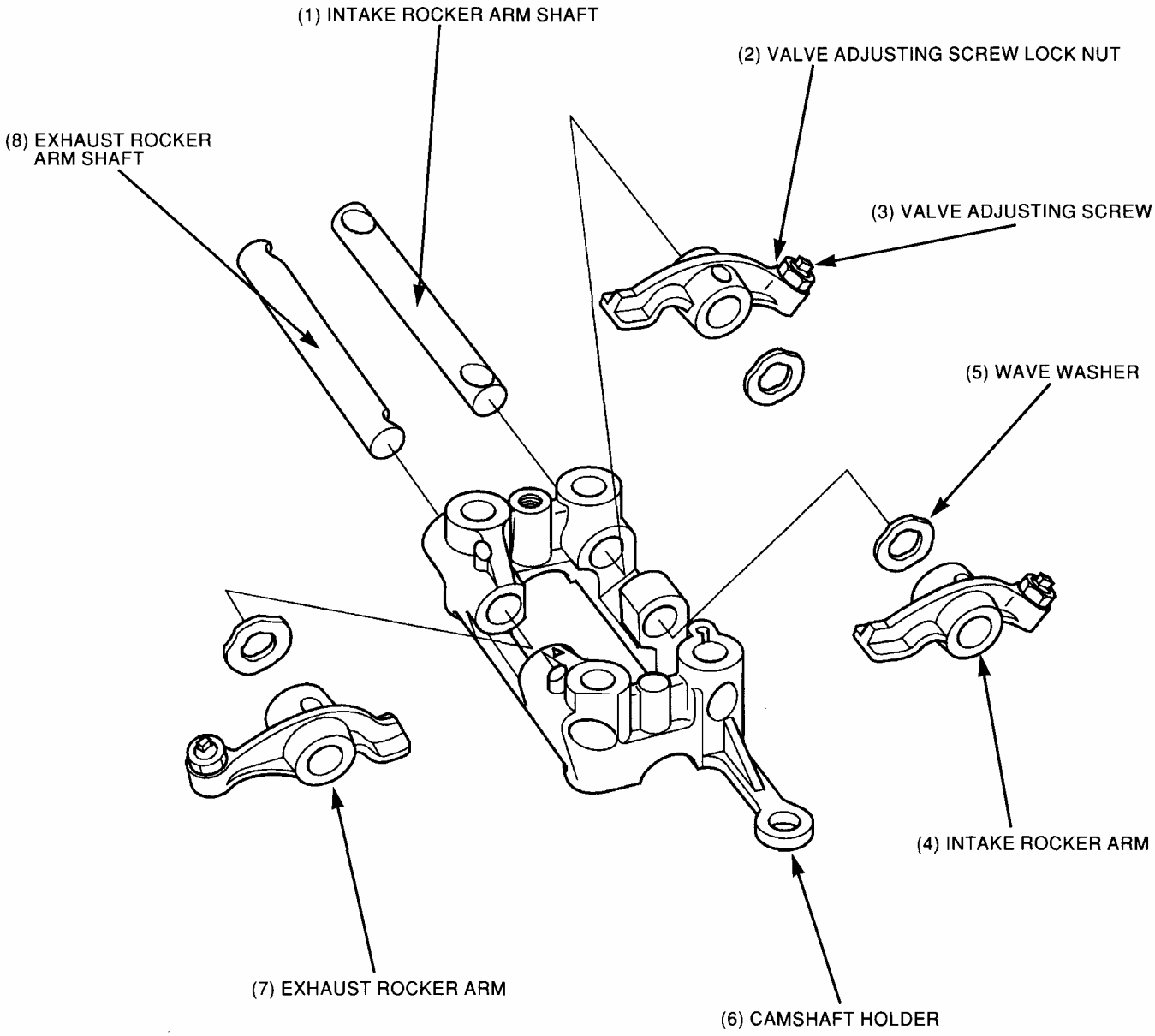
Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



Install the engine to the frame (front cylinder only/Section 7).
Install the camshaft (page 10-29).
Install the cylinder head cover (page 10-33).

Camshaft Installation

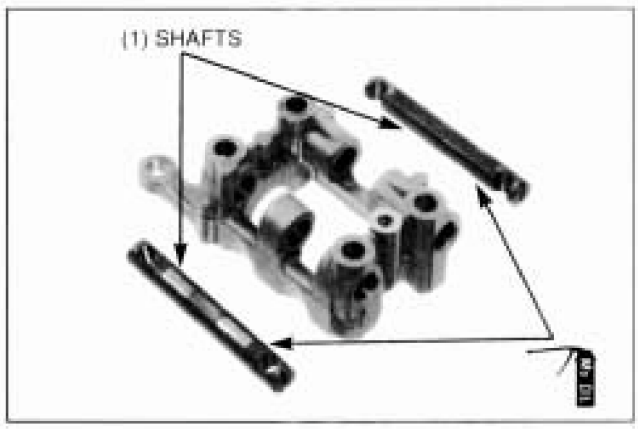
CAMSHAFT HOLDER ASSEMBLY



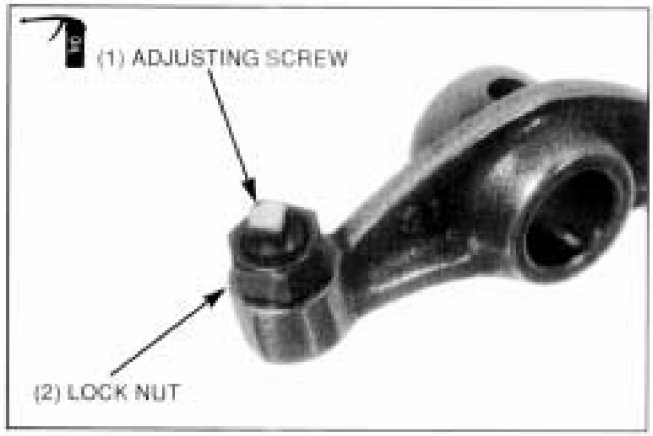
NOTE:

- Camshaft lubricating oil is fed through oil passages in the cylinder head and camshaft holder. Clean the oil passages before assembling the cylinder head and camshaft holder.

Lubricate each rocker arm shaft outer sliding surfaces with molybdenum disulfide oil.



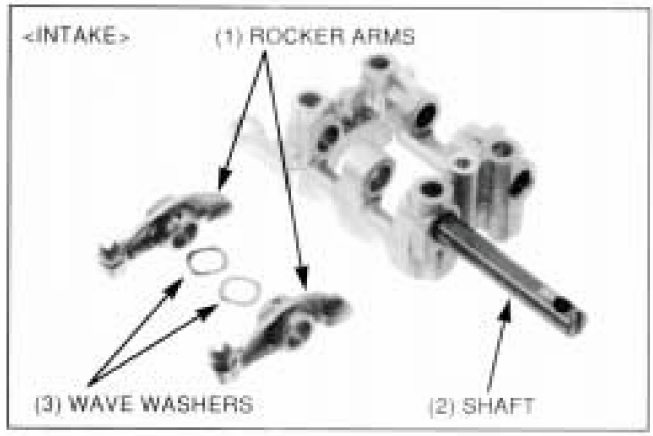
Apply engine oil to the valve adjusting screw threads and seating surface.
Install the valve adjusting screw and lock nut.



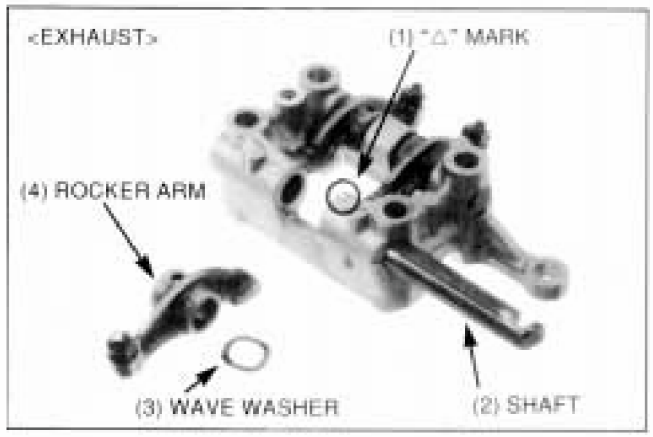
NOTE:

- The exhaust rocker arm has larger slipper face than the intake rocker arm.
- The intake rocker arm shaft has two holes on each end.
- The exhaust rocker arm shaft has two grooves on each end.

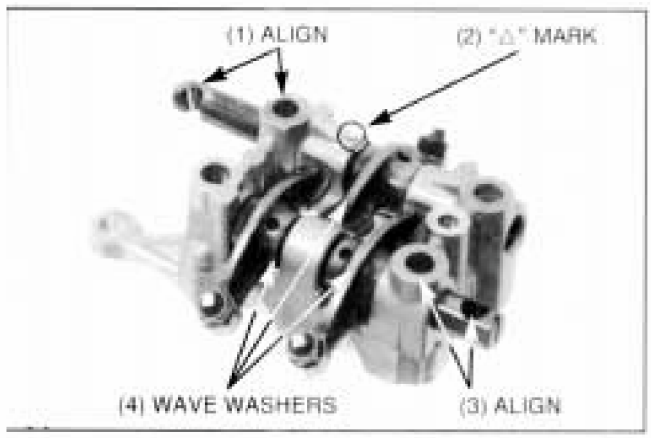
Install the wave washer (12 mm), intake rocker arm and intake rocker arm shaft to the camshaft holder.



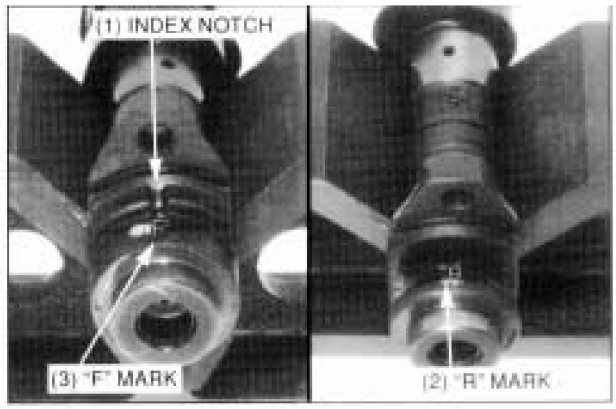
Install the wave washer (12 mm) to the "△" mark side on the camshaft holder.
Install the exhaust rocker arm and exhaust rocker arm shaft to the camshaft holder.



Position the grooves and holes in the rocker arm shafts vertically, aligning the bolt holes of the holder.



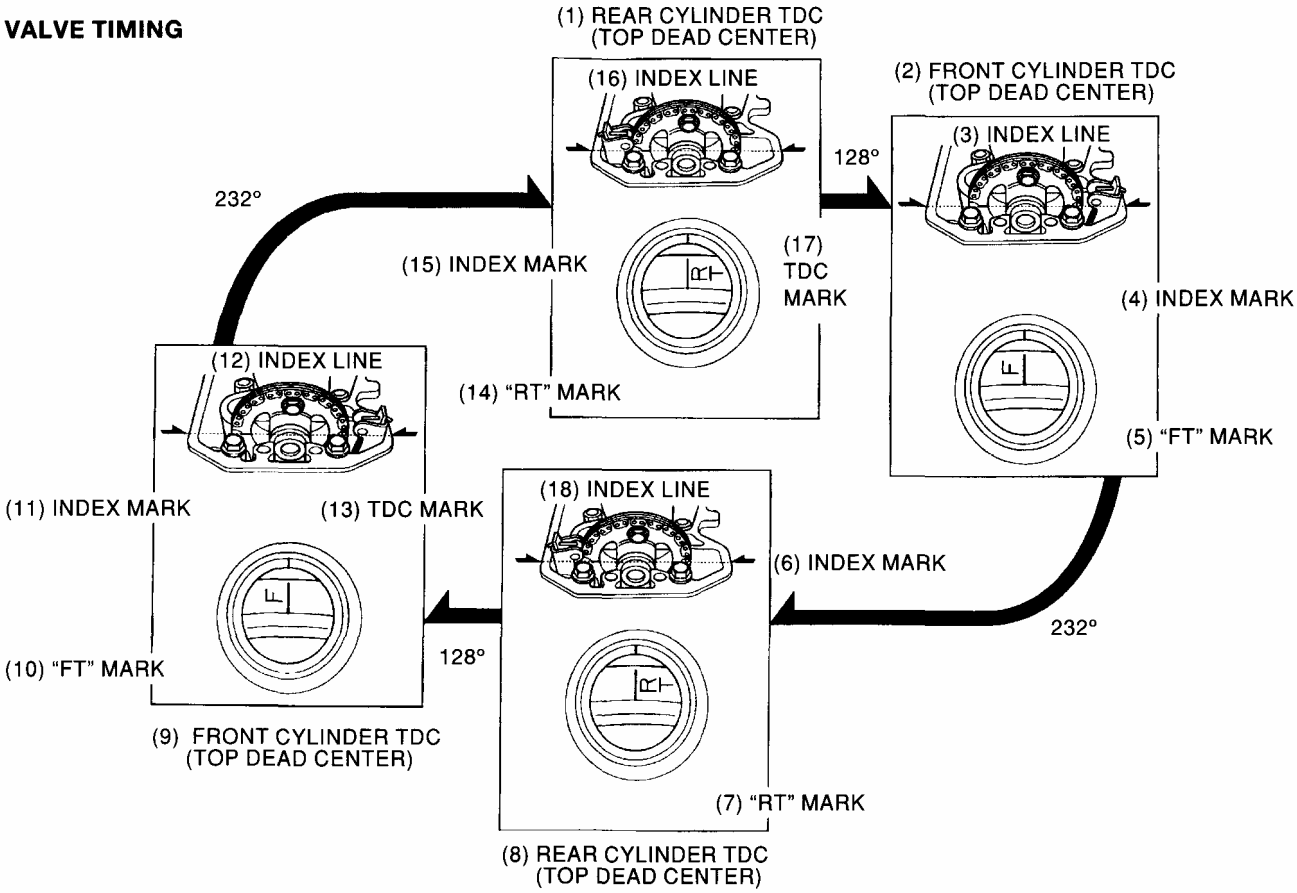
Camshaft Installation



NOTE:

- The camshafts are identified by marks on the their flanges:
  "F": Front cylinder camshaft
  "R": Rear cylinder camshaft
  "Index notch": TDC (Top Dead Center) mark
- If both (front and rear) camshaft is removed, install the front cylinder camshaft first, then install the rear cylinder camshaft.
- If the rear cylinder head was not serviced, remove the rear cylinder head cover to check the camshaft position.
- If the front cylinder head was not serviced, remove the front cylinder head cover to check the camshaft position.

VALVE TIMING

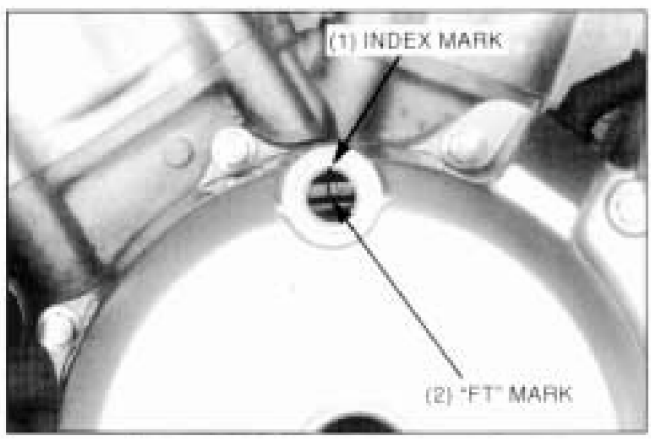


BOTH CYLINDER CAMSHAFT SERVICE

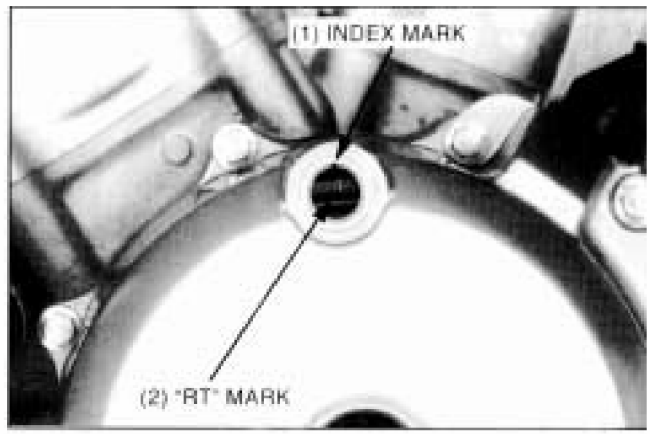
Remove the timing hole cap.

Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then check the front cylinder piston is "TDC (Top Dead Center)".

Install the front cylinder camshaft (page 10-30).



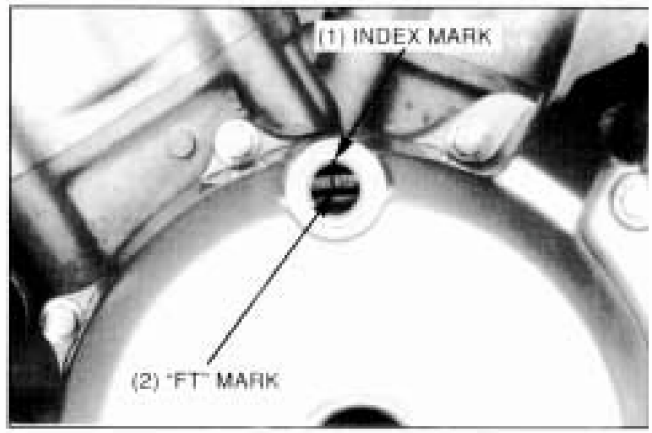
Then turn the crankshaft counterclokwise 232° and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then install the rear camshaft (page 10-30).



REAR CYLINDER CAMSHAFT SERVICE ONLY (FRONT CYLINDER CAMSHAFT WAS NOT SERVICED)

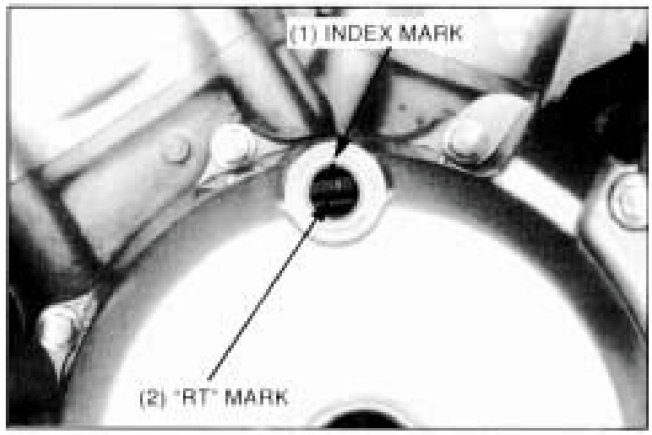
If the front cylinder head was not serviced, remove the front cylinder head cover (page 10-5) and check the camshaft position as follows:

Remove the front cylinder head camshaft end holder (page 10-7).
Remove the timing hole cap.
Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then check that the camshaft "TDC (Top Dead Center)" mark is facing up.



If the "TDC (Top Dead Center)" mark is facing up, turn the crankshaft counterclockwise 232° and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then install the rear camshaft (page 10-31).

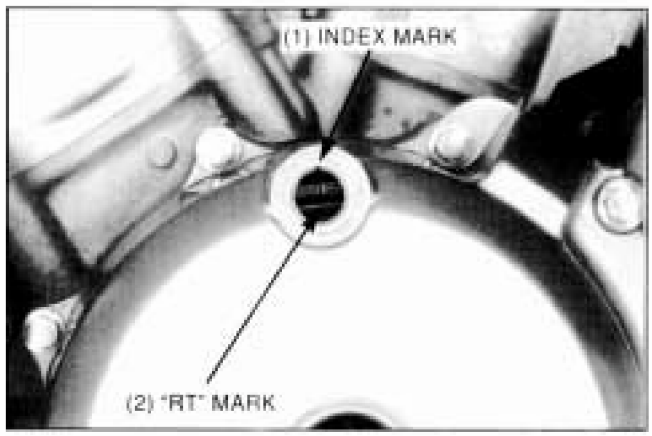
If the "TDC (Top Dead Center)" mark is facing down, turn the crankshaft counterclockwise 592° (360°+232°) and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then install the rear camshaft (page 10-31).



FRONT CYLINDER CAMSHAFT SERVICE ONLY (REAR CYLINDER CAMSHAFT WAS NOT SERVICED)

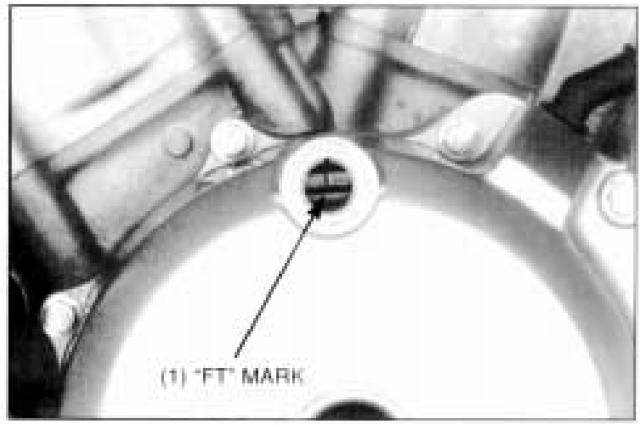
If the front cylinder head was not serviced, remove the rear cylinder head cover (page 10-6) and check the camshaft position as follows:

Remove the front cylinder head camshaft end holder (page 10-9).
Remove the timing hole cap.
Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then check that the camshaft "TDC (Top Dead Center)" mark is facing up.



If the "TDC (Top Dead Center)" mark is facing up, turn the crankshaft counterclockwise 488° (360°+128°) and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then install the front camshaft (page 10-31).

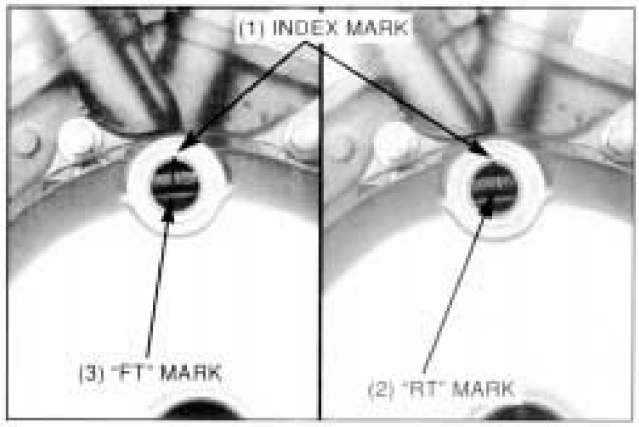
If the "TDC (Top Dead Center)" mark is facing down, turn the crankshaft counterclockwise 128° and align the "FT" mark on the flywheel with the index mark on the left crankase cover, then install the front camshaft (page 10-31).



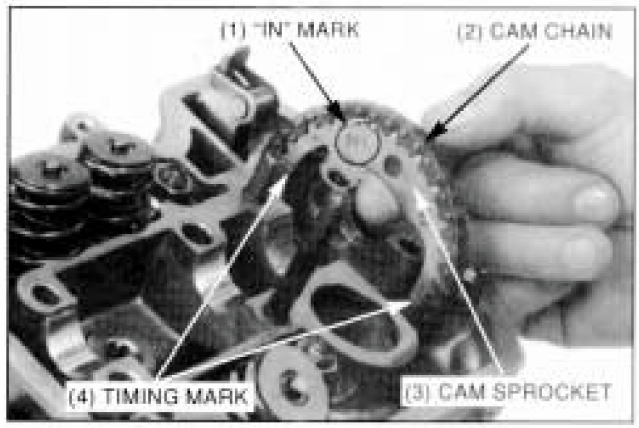
CAMSHAFT INSTALLATION

Remove the timing hole cap.

Turn the crankshaft counterclockwise and align the "FT" mark (rear cylinder: "RT" mark) on the flywheel with the index mark on the left crankcase cover.



Install the cam sprocket to the cam chain with the "IN" mark facing the inside and align the timing marks (index line) on the cam sprocket and the upper surface of the cylinder head.

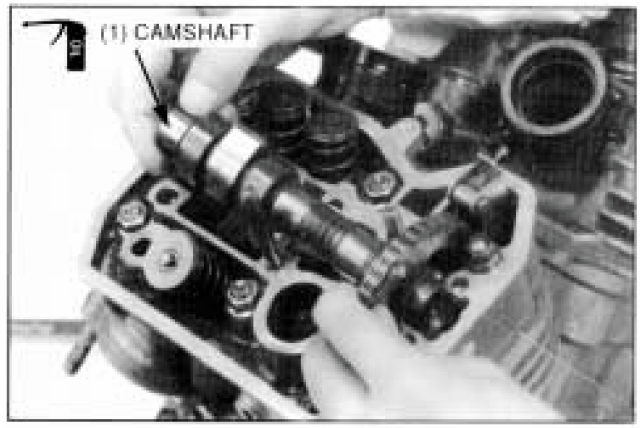


Lubricate camshaft lobe and journal surfaces with molybdenum disulfide oil.

Install the camshaft through the cam chain and cam sprocket with the camshaft "TDC" mark is facing up.

NOTE:

- The camshafts are identified by marks on the their flanges:
  "F": Front cylinder camshaft
  "R": Rear cylinder camshaft
  "Index notch": TDC (Top Dead Center) mark

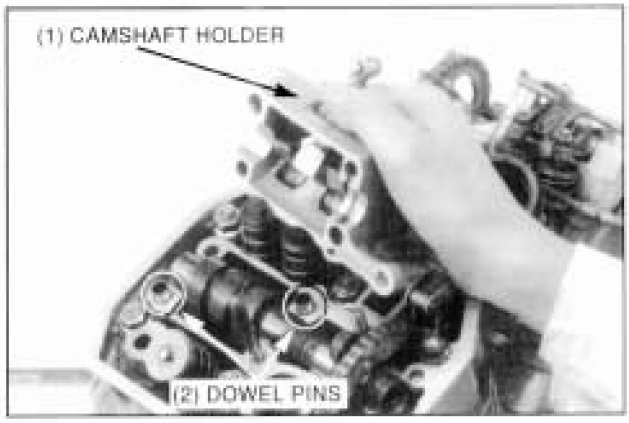


Install the dowel pins.
Lubricate each rocker arm slipper surfaces with molybdenum disulfide oil.

NOTE:

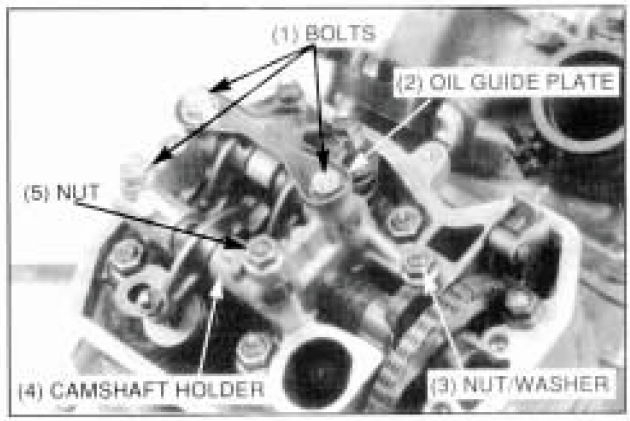
- Before camshaft holder installation, loosen the valve adjusting screw and lock nut fully.

Install the camshaft holder assembly.

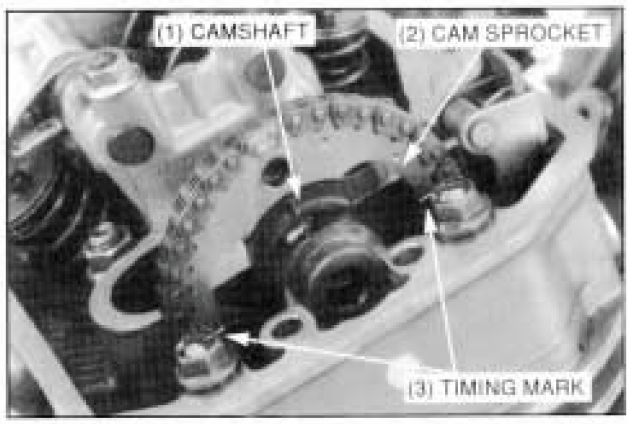


Install the oil guide plate.
Install the camshaft holder bolts (8 mm), nuts and washer (8 mm.)
Tighten the bolts (8 mm) and nuts (8 mm) to the specified torque.

Torques: 8 mm bolt: 23 N·m (2.3 kgf-m, 17 lbf-ft)
8 mm nut: 23 N·m (2.3 kgf-m, 17 lbf-ft)



Install the cam sprocket on the camshaft flange and recheck that the timing marks align with the upper surface of the cylinder heat.



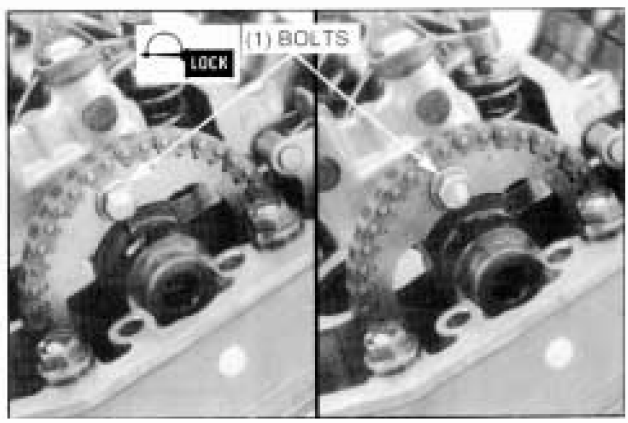
Clean and apply a locking agent to the cam sprocket bolt threads.

NOTE:

- Be careful not to let the cam sprocket bolts fall into the crankcase.

Align the cam sprocket bolt holes in the cam sprocket and camshaft.
Temporarily install the cam sprocket bolt.
Turn the crankshaft counterclockwise 360° and tighten other sprocket bolt to the specified torque.

Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

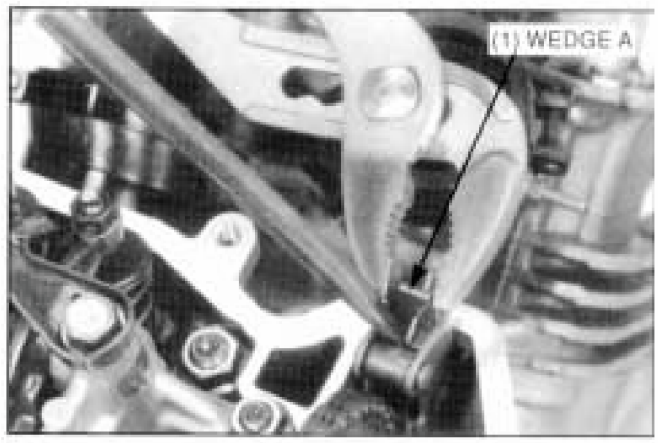


Turn the crankshaft counterclockwise 360° and tighten other sprocket bolt to the specified torque.

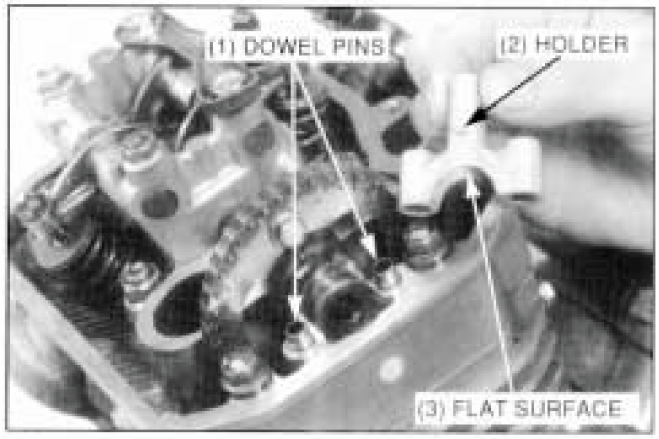
Remove the 2 mm pin holding cam chain tensioner wedge A.

NOTE:

- Be careful not to let the 2 mm pin fall into the crankcase.
- Do not forget to remove the 2 mm pin before installing the cylinder head cover.

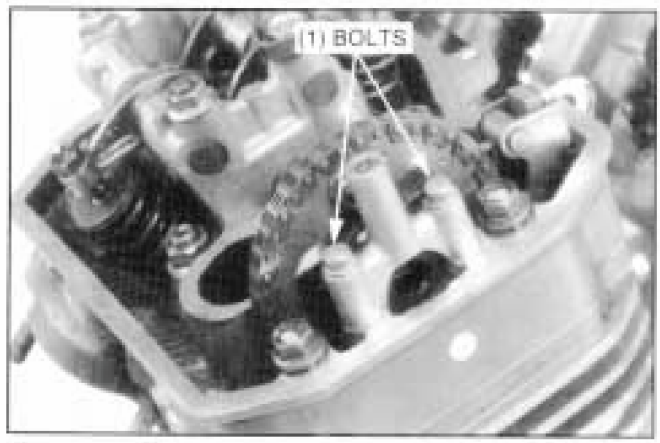


Install the dowel pins.
Install the camshaft end holder with it's flat surface on the holder facing in.



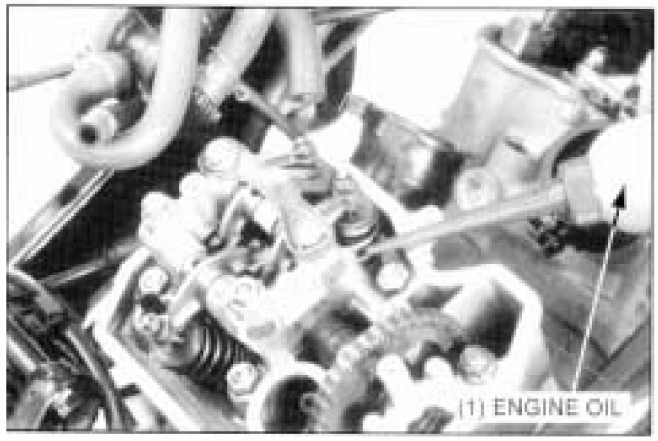
Install and tighten the camshaft end holder bolts.

Adjust the valve clearance (page 3-9).



Cylinder Head Cover Installation

Fill the oil pockets in the head with the engine oil.

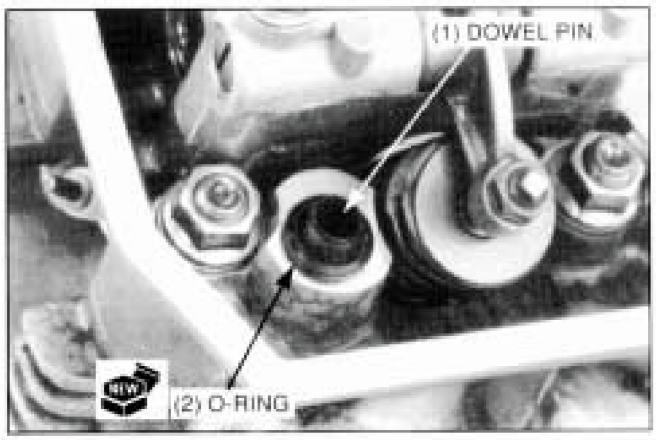


Clean the gasket groove and cylinder head mating surface of the cylinder head cover.
Apply Honda Bond A or equivalent to the gasket groove of the cylinder head cover.

Install the gasket into the groove.

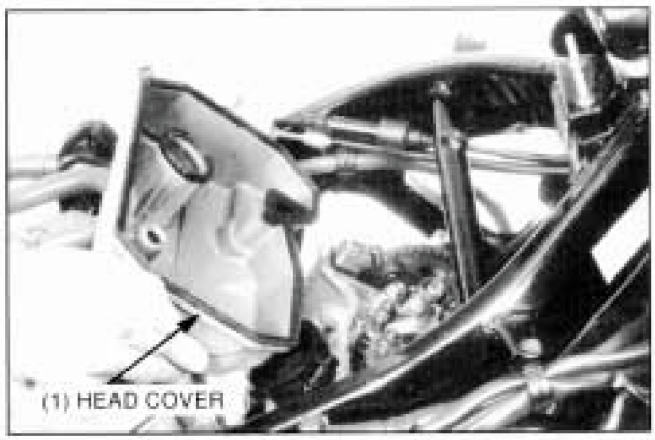
FRONT

Install the dowel pin and new O-ring.



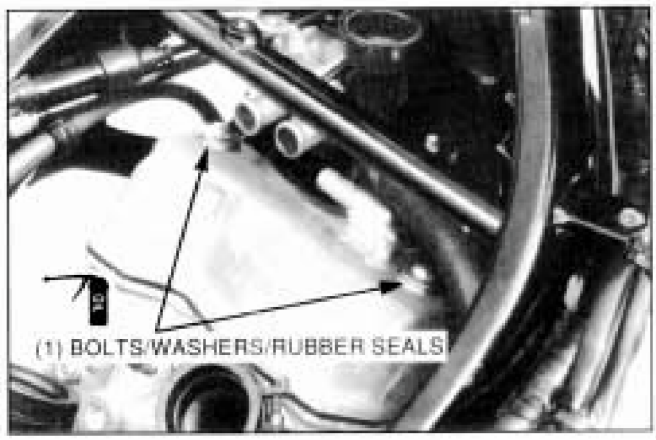
Clean the cylinder head cover mating surface of the cylinder head.

Install the front cylinder head cover to the front cylinder.



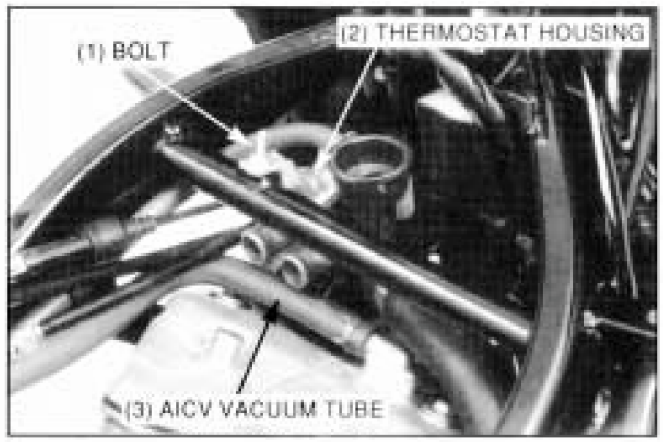
Apply engine oil to the rubber seals whole surface.
Install the rubber seals and washers.
Install and tighten the cylinder head cover bolts to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)

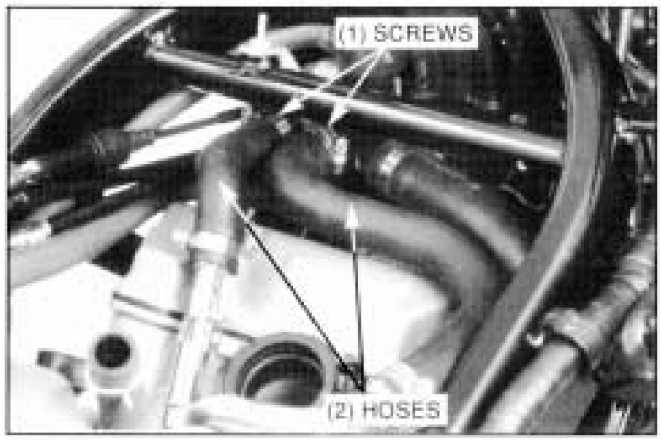


Install the thermostat housing to the frame.
Install and tighten the mounting bolt.

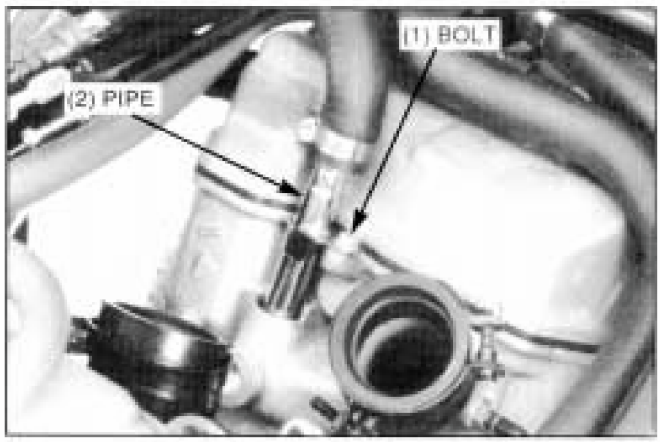
Install the AICV vacuum tube to the intake port air joint.



Connect the water hoses to the thermostat housing.
Tighten the hose band screws securely.



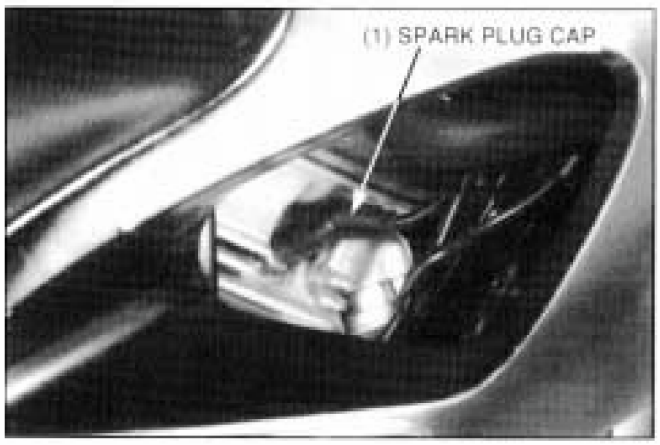
Connect the water pipe to the cylinder head.
Install and tighten the bolt securely.



Connect the spark plug caps.

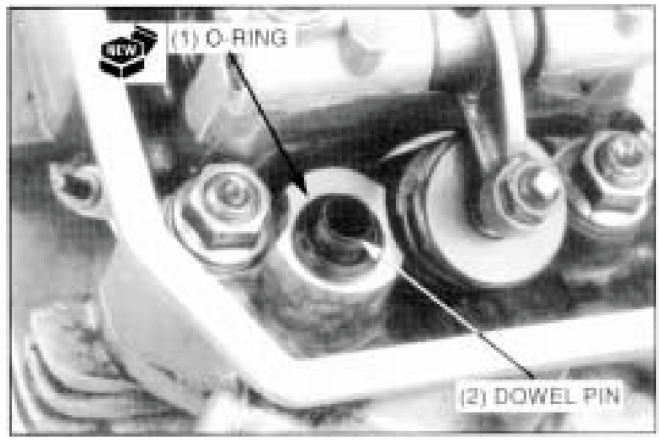
Install the following:
- Carburetors (page 5-18)
- Air cleaner housing (page 5-4)
- Fuel tank (page 2-11)

Fill the coolant (page 6-5).



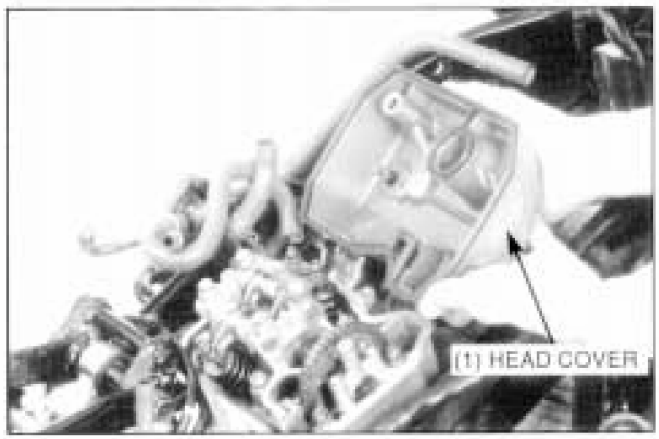
REAR

Install the dowel pin and new O-ring.



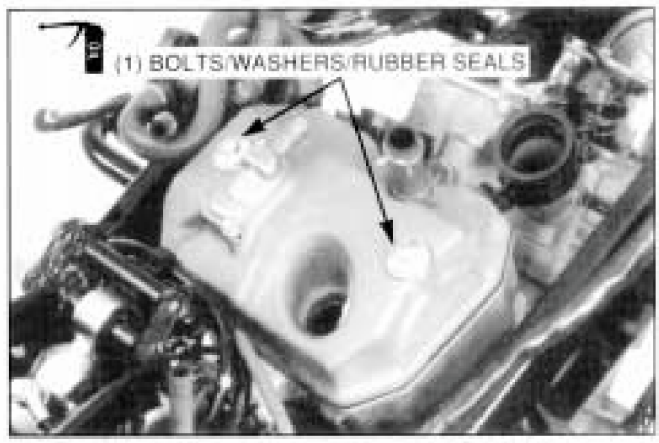
Clean the cylinder head cover mating surface on the cylinder head.

Install the rear cylinder head cover to the rear cylinder.

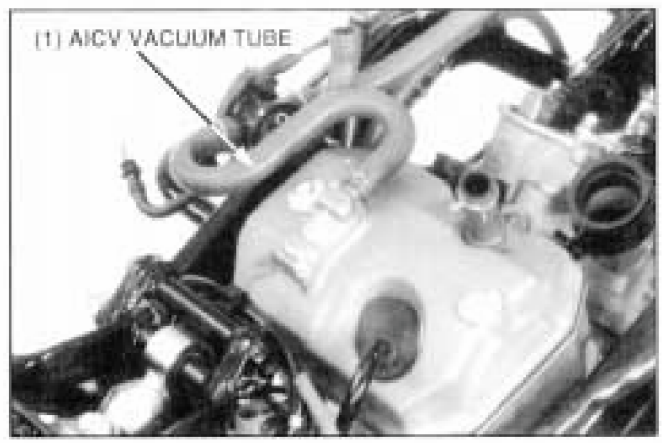


Apply engine oil to the rubber seals whole surface.
Install the rubber seals and washers.
Install and tighten the cylinder head cover bolts to the specified torque.

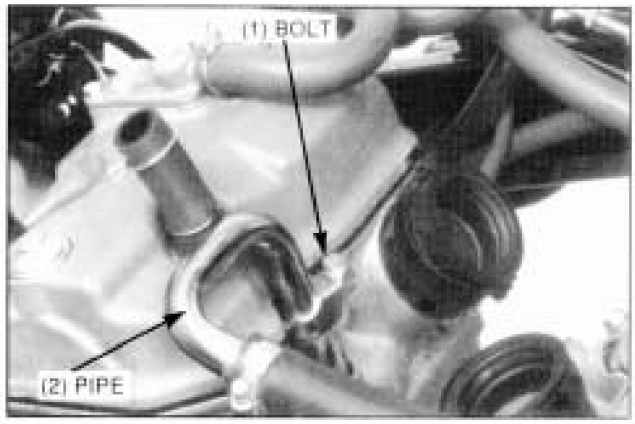
Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



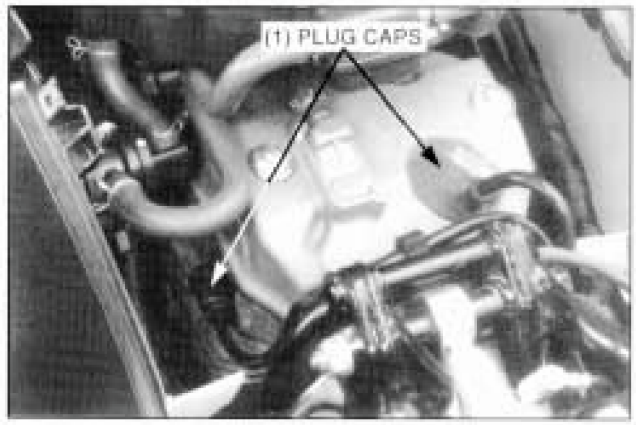
Install the AICV vacuum tube to the intake port air joint.



Connect the water pipe to the cylinder head.
Install and tighten the bolt securely.

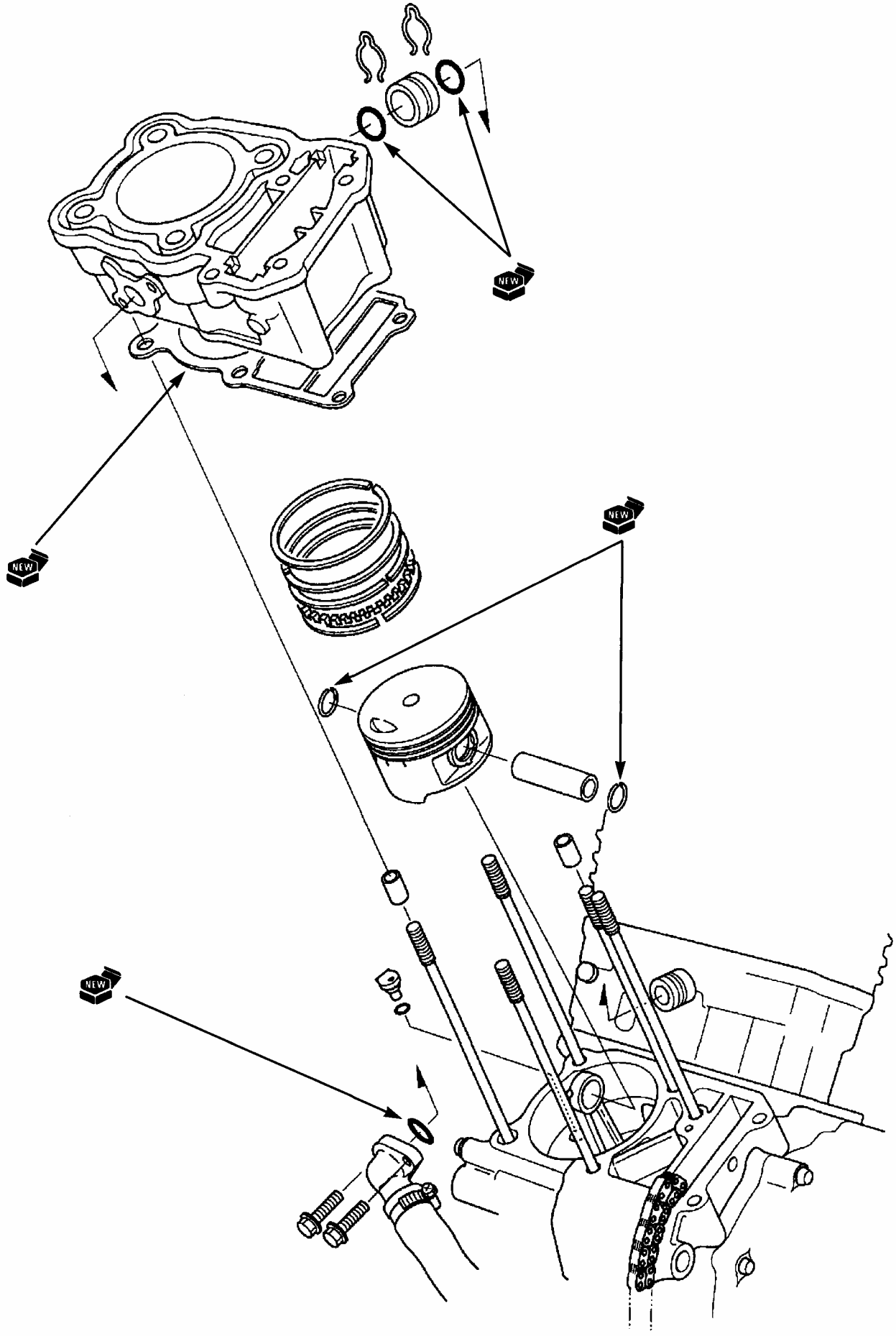


Connect the spark plug caps.



Install the following:
- Carburetors (page 5-18)
- Air cleaner housing (page 5-4)
- Fuel tank (page 2-11)

Fill the coolant (page 6-5).


NEW
NEW
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NEW

11. Cylinder/Piston

SERVICE INFORMATION	11-1	CRANKCASE STUD BOLT	
TROUBLESHOOTING	11-2	INSPECTION	11-8
CYLINDER REMOVAL	11-3	PISTON INSTALLATION	11-8
PISTON REMOVAL	11-5	CYLINDER INSTALLATION	11-10

Service Information

GENERAL

- The engine must be removed from the frame before servicing the cylinder and piston.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces by using a screwdrive when disassembling the cylinder.
- Clean all disassembled parts with clean solvent and dry them using compressed air before inspection.
- When disassemblling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Cylinder	I. D.		79.000 - 79.015 (3.1102 - 3.1108)	79.05 (3.112)
	Out of round		—	0.06 (0.002)
	Taper		—	0.06 (0.002)
	Warpage		—	0.10 (0.04)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		78.97 - 78.99 (3.109 - 31.110)	78.92 (3.107)
	Piston O.D. measurement point		7-17 mm (0.3-0.7 in) from bottom of skirt	—
	Piston pin bore I.D.		20.002 - 20.008 (0.7874 - 0.7877)	20.02 (0.788)
	Piston pin O.D.		19.994 - 20.000 (0.7871 - 0.7874)	19.98 (0.787)
	Piston-to-piston pin clearance		0.002 - 0.014 (0.0001 - 0.0006)	0.03 (0.001)
	Piston ring-to-ring groove clearance	Top	0.025 - 0.055 (0.0010 - 0.0022)	0.11 (0.004)
		Second	0.015 - 0.045 (0.0006 - 0.0018)	0.10 (0.004)
	Piston ring end grap	Top	0.20 - 0.35 (0.008 - 0.014)	0.7 (0.03)
		Second	0.35 - 0.50 (0.014 - 0.020)	0.7 (0.03)
		Oil (side rail)	0.20 - 0.35 (0.008 - 0.031)	1.0 (0.04)
	Piston ring mark	Top	"R" mark	—
		Second	"RN" mark	—
Cylinder-to-piston clearance			0.010 - 0.035 (0.0004 - 0.0014)	0.13 (0.005)
Connecting rod small end I.D.			20.016 - 20.034 (0.7880 - 0.7887)	20.04 (0.789)
Connecting rod-to-piston pin clearance			0.016 - 0.040 (0.0006 - 0.0016)	0.06 (0.002)

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 or piston
- Loose spark plug

Compression too high, over heating or knocking
- Excessive carbon build-up in cylinder head or on top of piston

Abnormal Noise
- Worn cylinder and piston
- Worm piston pin or piston pin hole
- Worn connecting rod small end

Excessive Smoke
- Worm cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

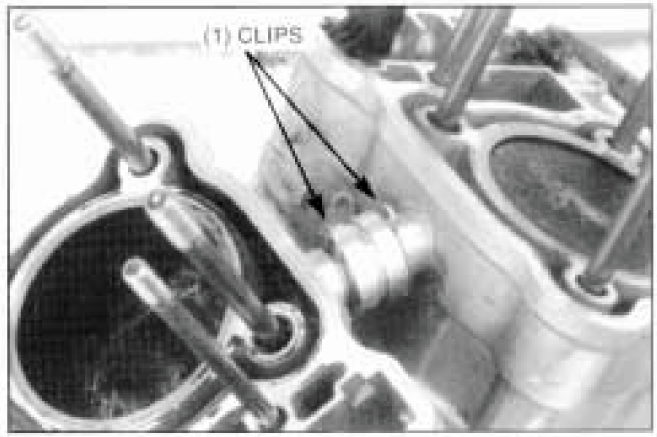
Cylinder Removal

NOTE:

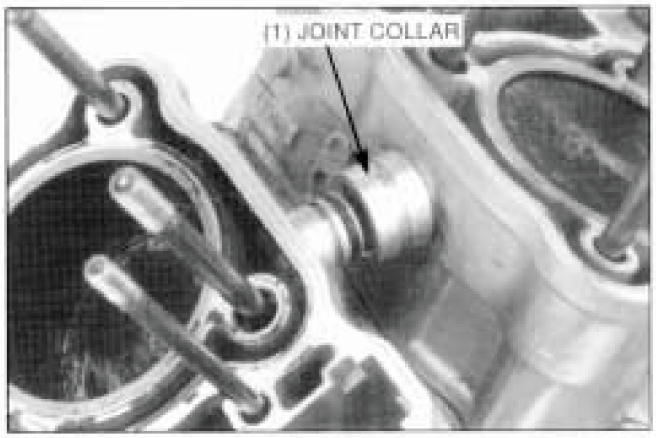
- The front cylinder service using the same procedure as for the rear cylinder.

Remove the cylinder head (page 10-15).

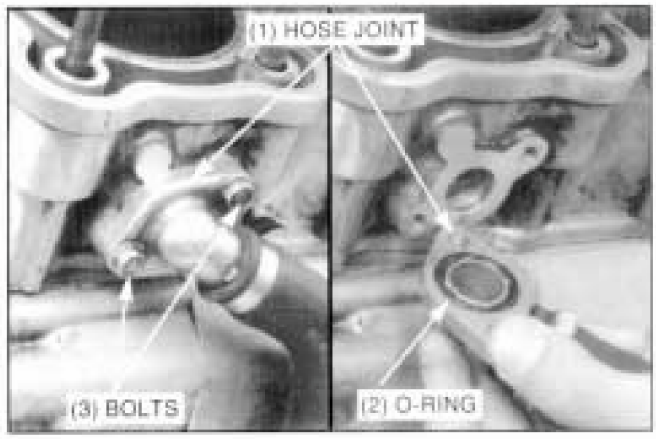
Remove the joint clips.



Slide the cylinder joint collar toward either the front or rear cylinder.



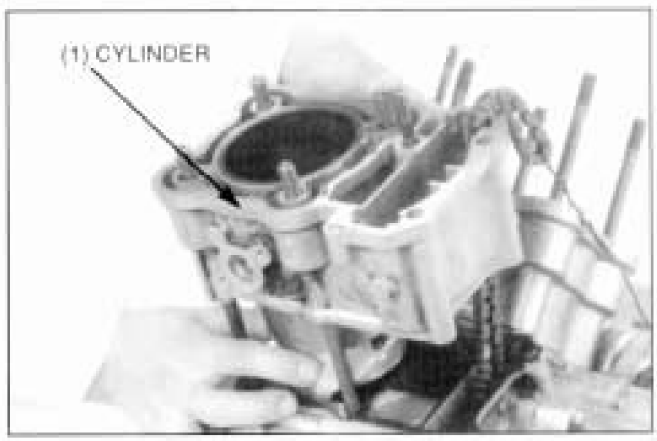
Remove the bolts, water hose joint and O-ring (front cylinder only).



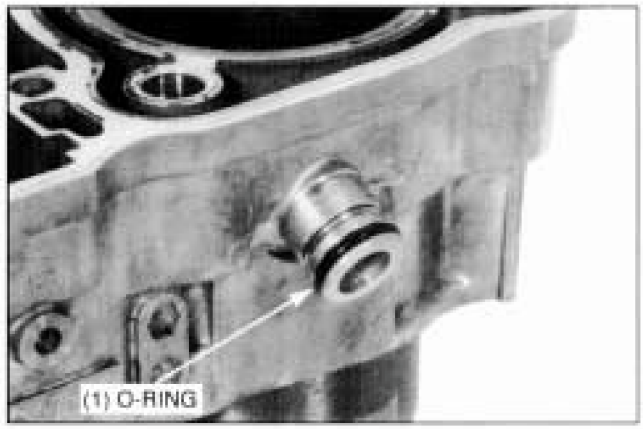
Remove the cylinder.

NOTE:

- Attach a piece of mechanic's wire to the cam chain to prevent it from being dropped into the crankcase.
- Be careful not to damage the mating surfaces by using a screwdriver when disassembling the cylinder.



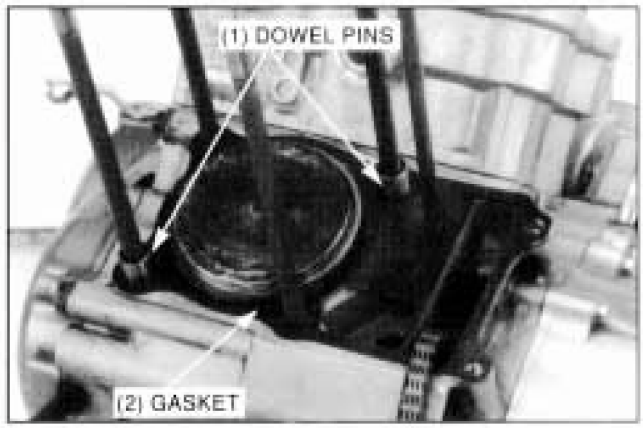
Remove the O-ring



Remove the gasket and dowel pins.
Clean off any gasket material from the cylinder upper surface.

NOTE:

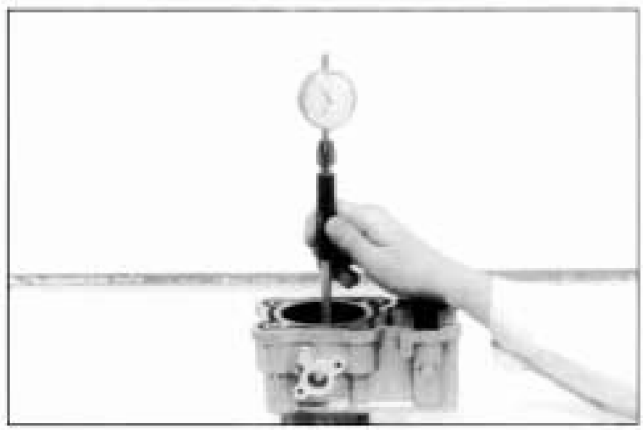
- Be careful not to damage the gasket surface.



INSPECTION

Inspect the cylinder wall for scratches and wear.
Measure and record the cylinder I. D. at three levels in both the X and Y axes. Take the maximum reading to determine the cylinder wear.

Service Limit: 79.05 mm (3.112 in)

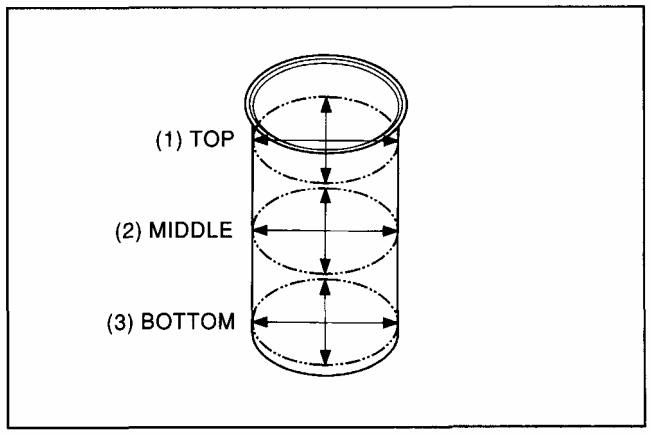


Measure the cylinder for out of round at the three levels in an X and Y axis. Take the maximum reading to determine the out of round.

Service Limit: 0.06 mm (0.002 in)

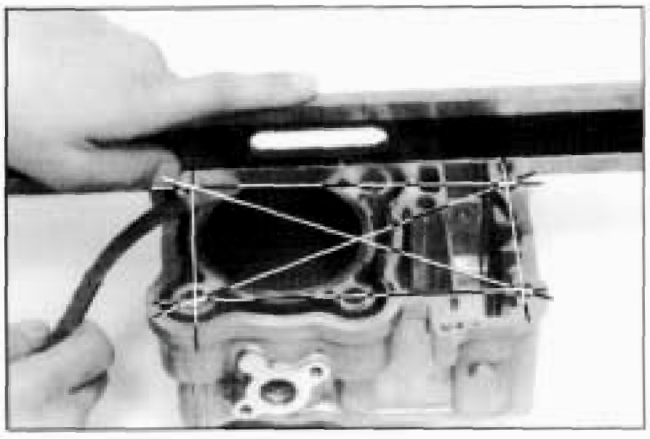
Measure the cylinder for taper a three levels in an X and Y axis. Take the maximum reading to determine the taper.

Service Limit: 0.06 mm (0.002 in)



Check the cylinder for warpage by placing a straight edge and a feeler gauge.

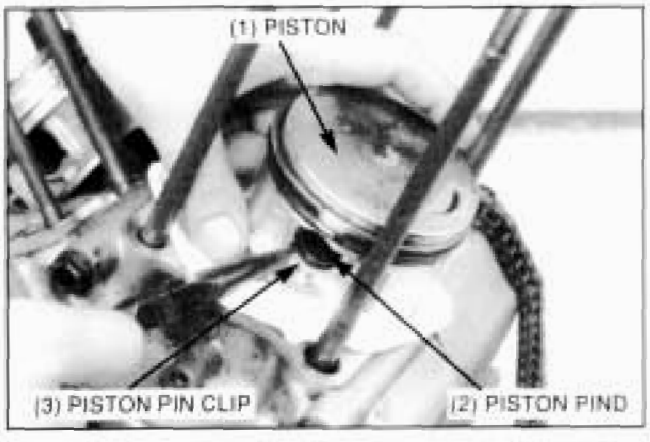
Service Limit: 0.10 mm (0.004 in)



Piston Removal

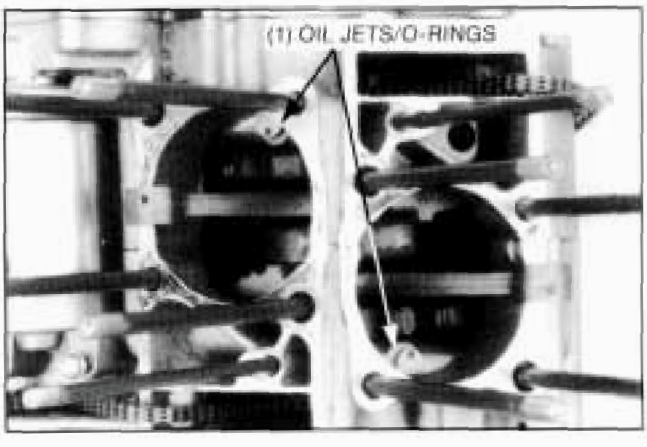
NOTE:

- Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.
- The rear piston service using the same procedure as for the front piston.



Remove the piston pin clip, piston pin and piston.

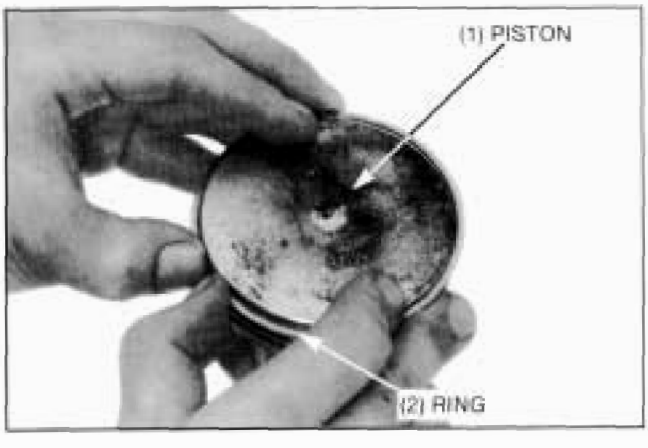
Remove the oil jets and O-rings.



Spread each piston ring and remove it by lifting it up at a *point just opposite the grap.*

CAUTION

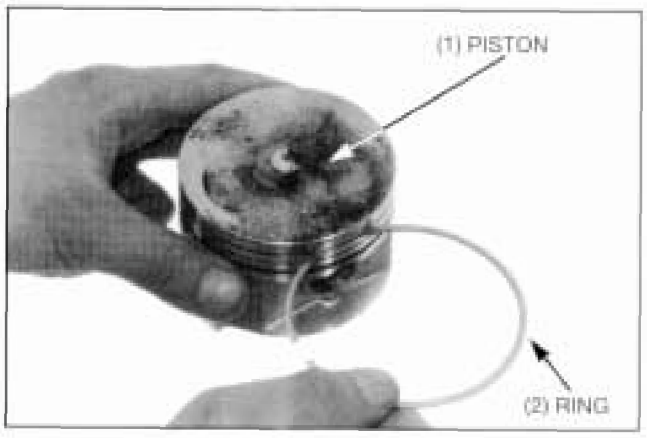
- **Do not the piston ring by spreading the ends too far.**
- **Be careful not to damage the piston when the piston ring removal.**



Clean carbon deposits from the piston.

NOTE:

- Clean carbon deposits from the piston ring grooves with a ring that will be discarded. Never use the wire brush; it will scratch the groove.

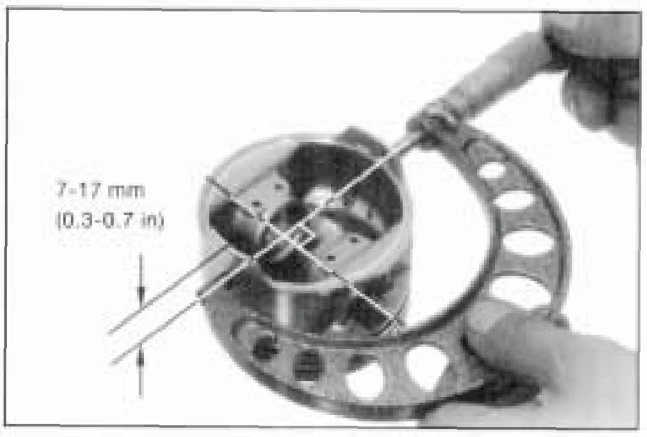


INSPECTION

Inspect the piston for cracks or other damage. Inspect the ring grooves for excessive wear and carbon build-up. Measure each piston O. D.

NOTE:

- Take measurements 7-17 mm (0.3-0.7 in) from the bottom, and 90° to the piston pin hole.



Service Limit: 78.92 mm (3.107 in)

Calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance (Cylinder I. D.: 11-4)

Service Limit: 0.10 mm (0.004 in)

Measure each piston pin hole I. D. in an X and Y axis. Take the maximum reading to determine I. D.

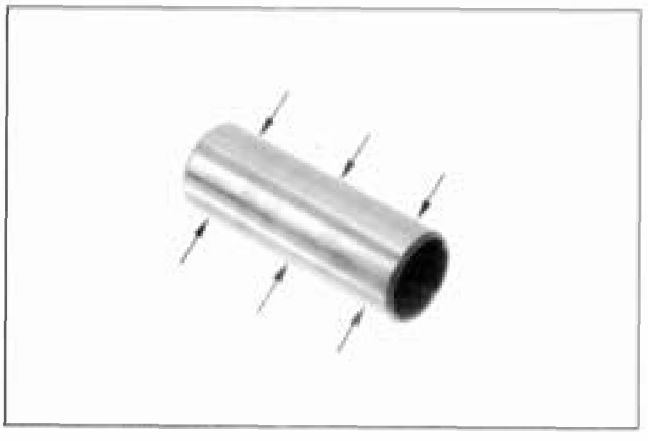
Service Limit: 20.02 mm (0.788 in)

Measure the piston pin O. D. at three points.

Service Limit: 19.98 mm (0.787 in)

Calculate the piston-to-piston pin clearance.

Service Limit: 0.03 mm (0.001 in)



Measure the connecting rod small end I. D.

Service Limit: 20.04 mm (0.789 in)

Calculate the connecting rod small end-to-piston pin clearance.

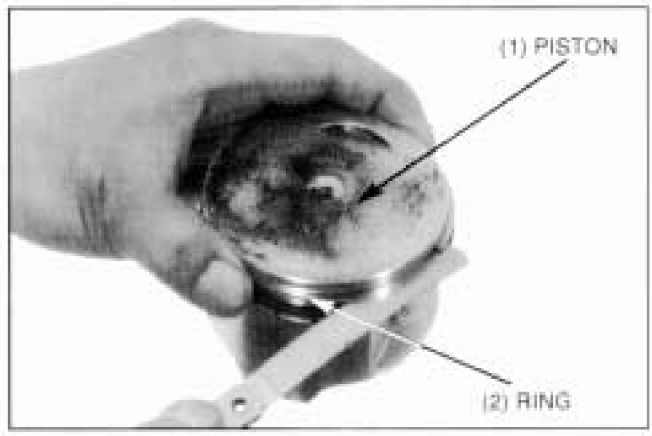
Service Limit: 0.06 mm (0.002 in)

Inspect the piston ring, and replace them if they are worn.

NOTE:

- Always replace the piston rings as a set.

Reinstall the piston rings (page 11-8) into the piston grooves.



Push in the ring until the outer surface of the piston ring is nearly flush with the piston and measure the clearance using a feeler gauge.

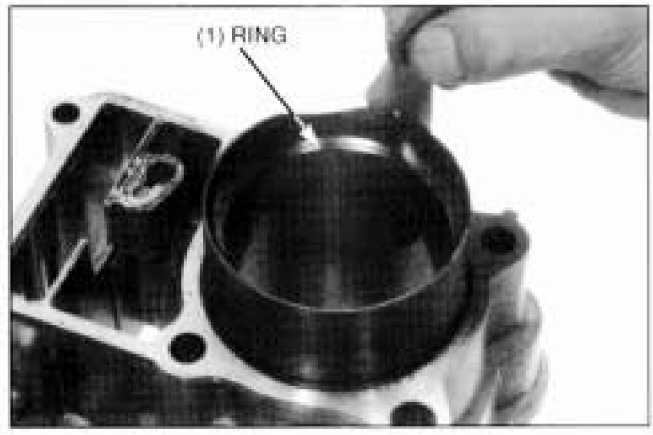
Service Limits:

Top:	**0.11 mm (0.004 in)**
Second:	**0.10 mm (0.004 in)**

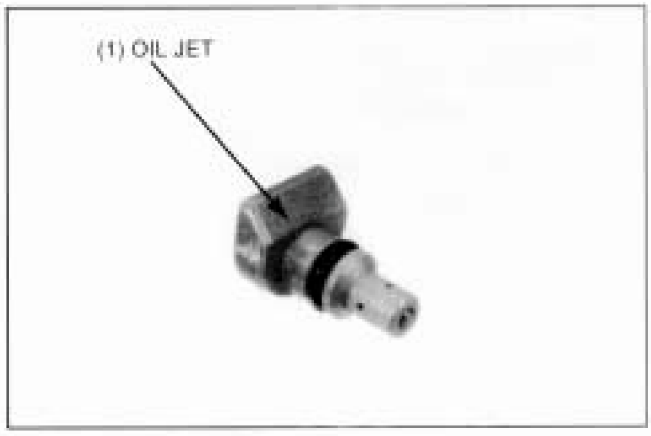
Using a piston, push the ring securely into the cylinder and measure the end gap using a feeler gauge.

Service Limits:

Top:	**0.7 mm (0.03 in)**
Second:	**0.7 mm (0.03 in)**
Oil:	**0.10 mm (0.04 in)**



Check the oil jet for clogging.



Crankcase Stud Bolt Inspection

Check the stud bolts for loose.
If the stud bolts are loose or replace, remove the stud bolts and apply a engine oil to the threads and tighten the stud bolt securely.

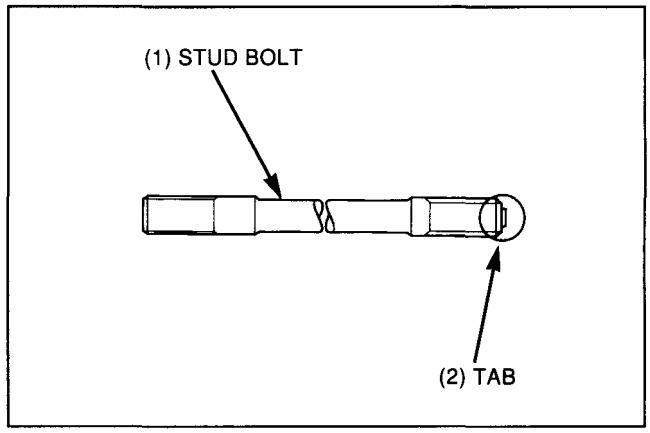
NOTE:

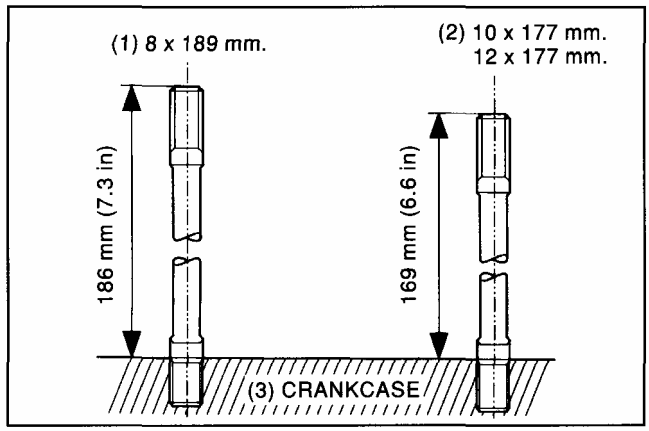
- Install the stud bolts with its tab side facing to the cylinder head side.

After installing, be sure to measure the length from the top of each stud to crankcase surface.

Standard Length:

8 x 189 mm.	**186.0 ● 1 mm (7.32 ± 0.04 in)**
10 x 177 mm.	**169.0 ± 1 mm (6.65 ± 0.04 in)**
12 x 177 mm.	**169.0 ± 1 mm (6.65 ± 0.04 in)**





Piston Installation

NOTE:

- The rear piston service using the same procedure as for the front piston.

Clean the piston heads, ring lands and skirts.

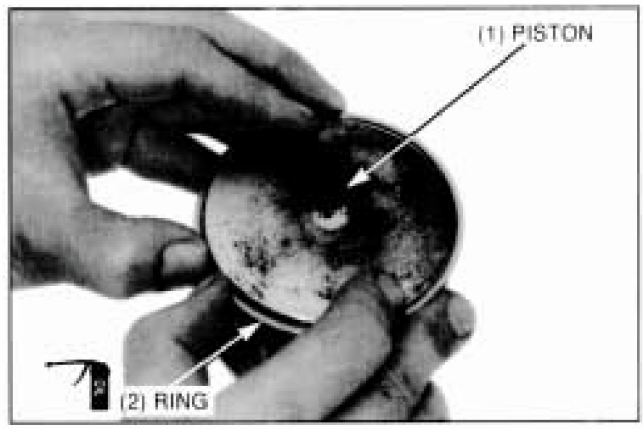
Apply engine oil to the piston rings outer surfaces.
Carefully install the piston rings onto the piston with their markings facing up.

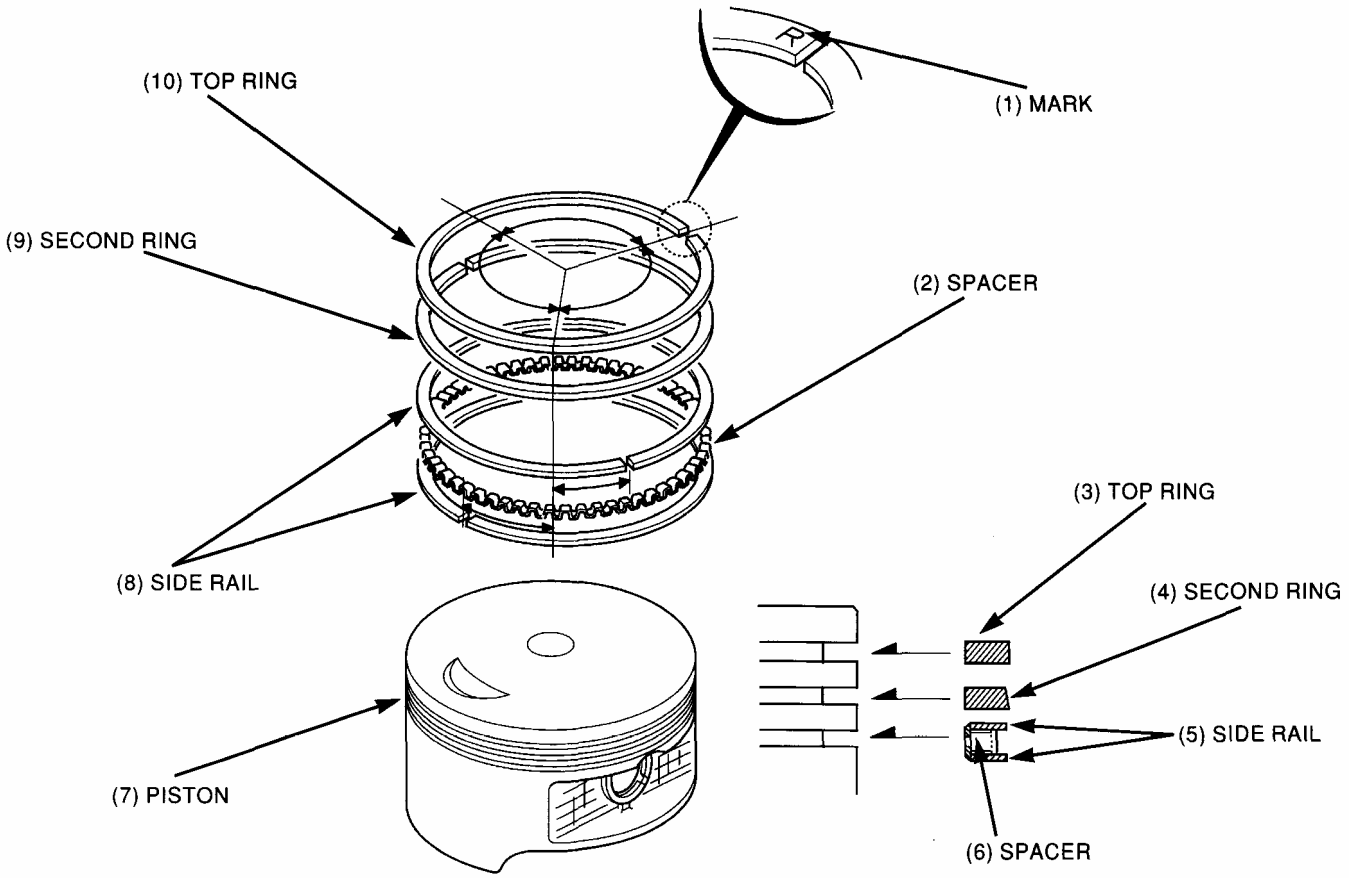
CAUTION

- **Do not the piston ring by spreading the ends too far.**
- **Be careful not to damage the piston when the piston ring installation.**

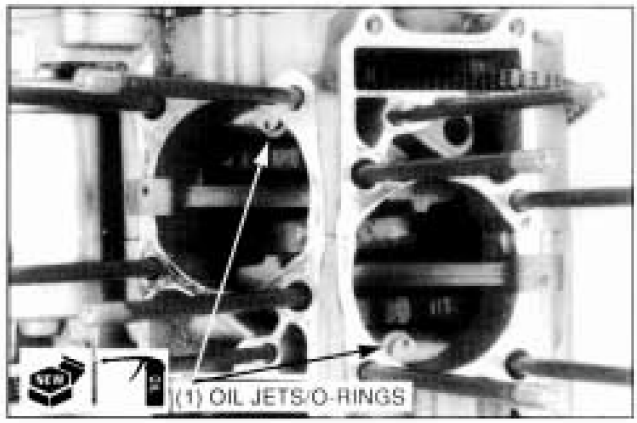
NOTE:

- Do not confuse the top and second rings: The top ring is chrome-coated and second ring is not coated (black).
- After installing the rings they should rotate freely, without sticking.
- Space the ring end gaps 180 degrees apart.





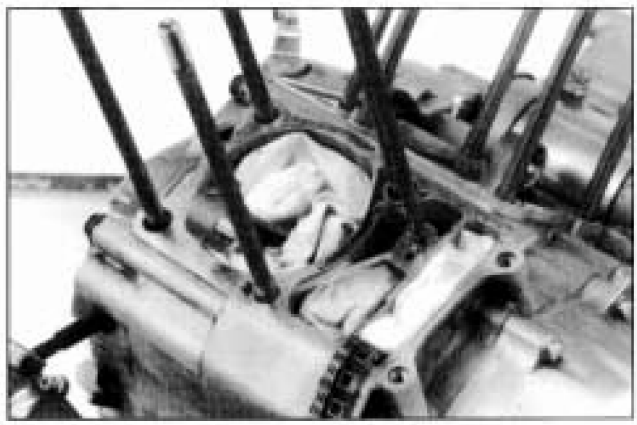
Apply engine oil to the new O-ring and install it to the oil jet. Install the oil jet to the crankcase securely.



NOTE:

- When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt enter the engine.

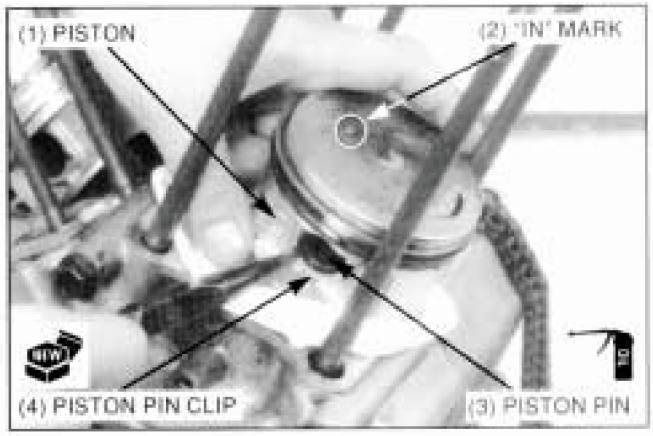
Clean any gasket material from the cylinder mating surfaces of the crankcase.



NOTE:

- Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.

Apply molybdenum disulfide oil to the connecting rod small end inner surface.
Apply engine oil to the piston pin outer surface.
Install the piston with its "IN" mark facing the intake side.
Install the piston pin.
Install the new piston pin clips.



CAUTION

- **Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.**

NOTE:

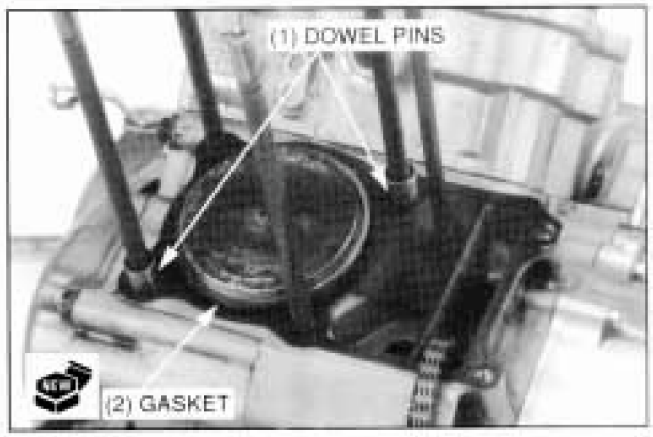
- Set the piston pin clip in the groove properly.
- Do not align the clip's end gap with the piston cut-out.

Cylinder Installation

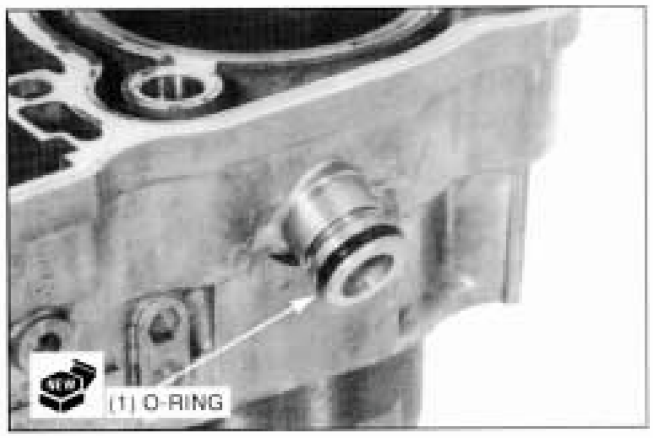
NOTE:

- The rear cylinder service using the same procedure as for the front cylinder.
- When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt enter the engine.

Install the dowel pins and new gasket.



Apply coolant to the new O-ring and install it to the water joint of the cylinder.

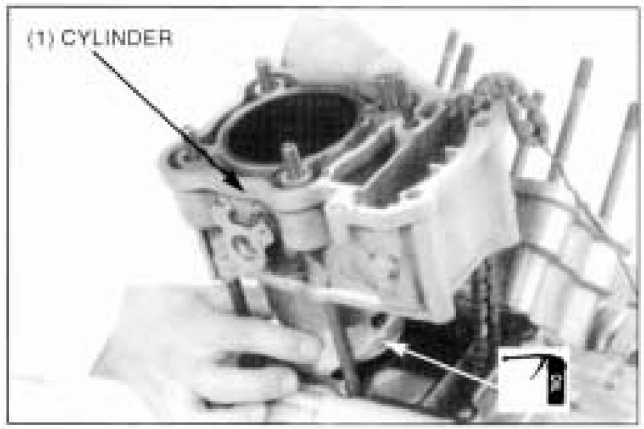


Apply engine oil to the cylinder wall and piston outer surfaces and piston rings.

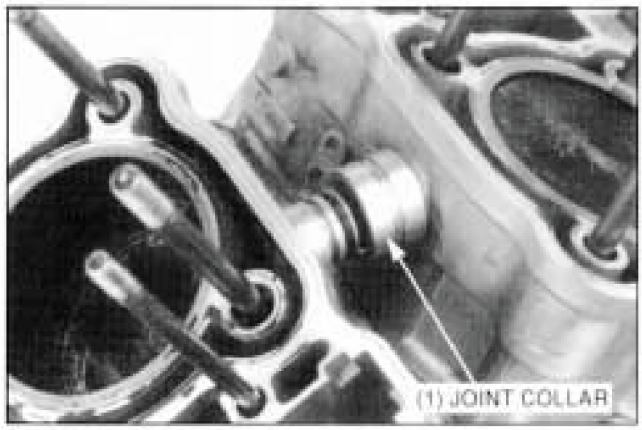
CAUTION

- **Be careful not to damage the piston rings and cylinder walls.**

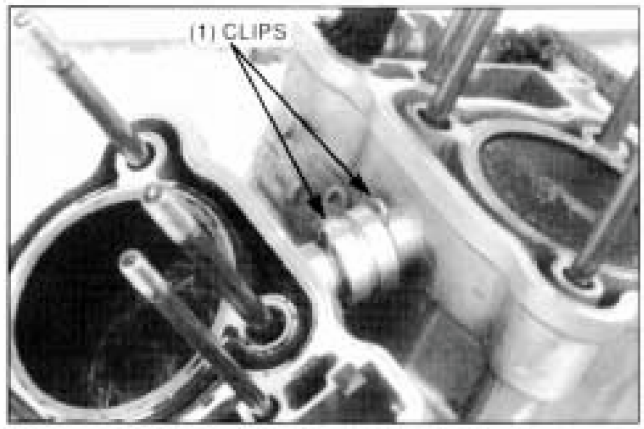
Route the cam chain through the cylinder.
Install the cylinder over the piston rings by hand while compressing the piston rings.



Slide the cylinder joint collar to the its original position.



Install the joint collar clips to the groove on the water joint of the cylinder.



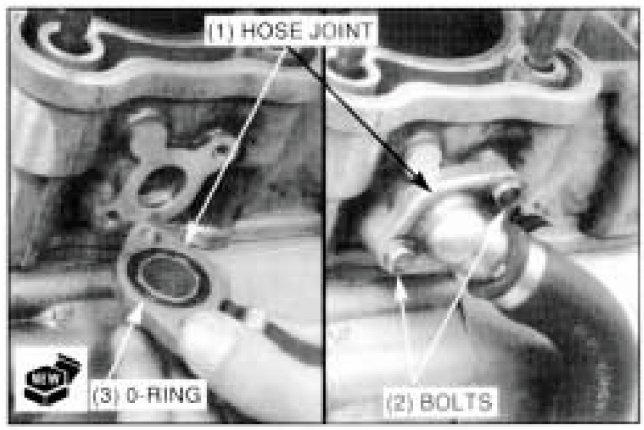
Apply coolant to the new O-ring and install it to the groove on the water hose joint of the front cylinder (front cylinder only).

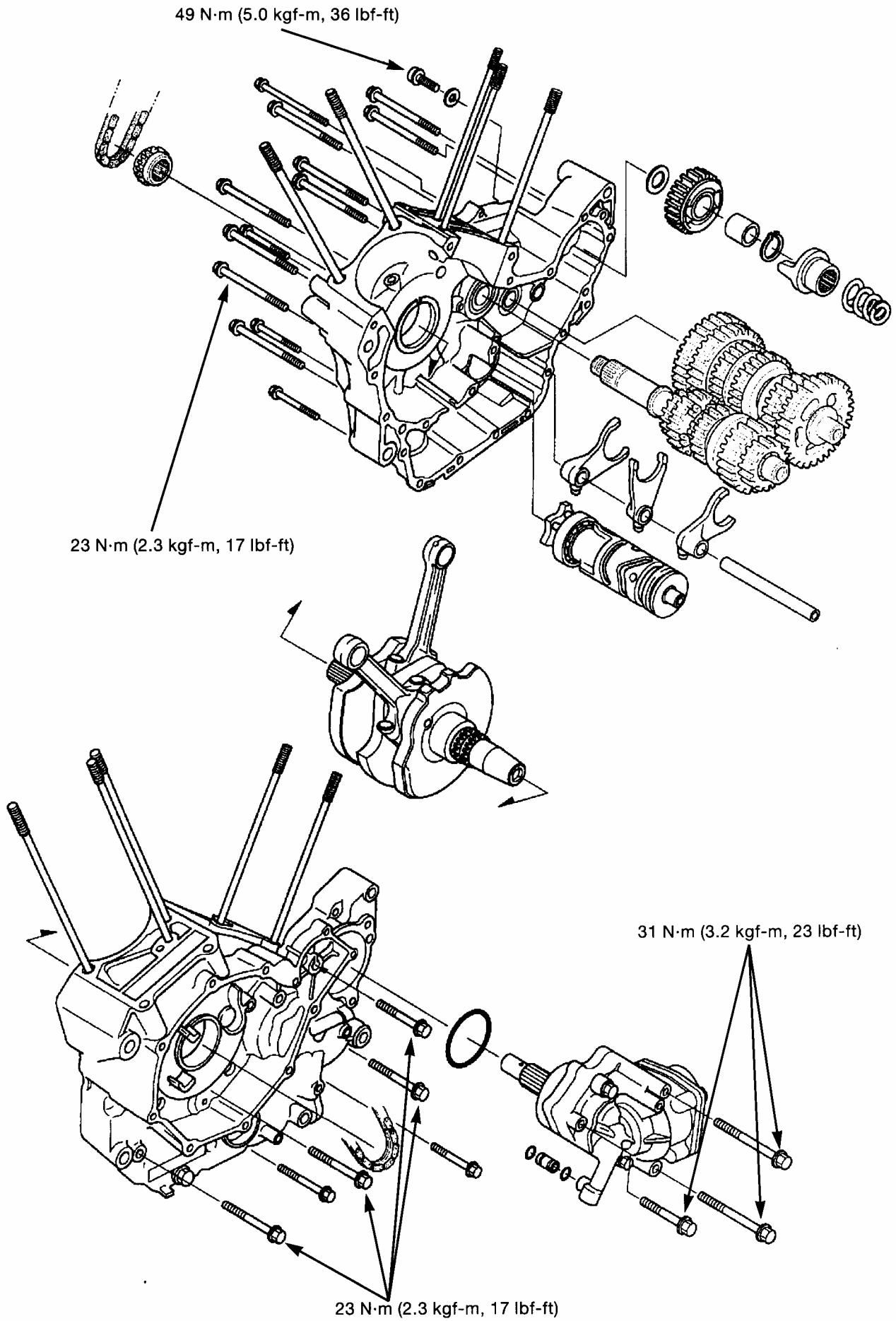
Install and tighten the hose joint bolts securely (front cylinder only).

NOTE:

- Connect the water hose aligning the white paint on the hose with the boss on the water pipe, if water hose removed.

Install the cylinder head (page 10-25).




49 N·m (5.0 kgf-m, 36 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)
31 N·m (3.2 kgf-m, 23 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)

12. Crankshaft/Transmission

SERVICE INFORMATION	12-1	TRANSMISSION	12-13
TROUBLESHOOTING	12-3	OUTPUT GEAR	12-21
CRANKCASE SEPARATION	12-4	CRANKCASE BEARING REPLACEMENT	12-36
CRANKSHAFT/CONNECTING ROD	12-6	CRANKCASE ASSEMBLY	12-38

Service Information

GENERAL

- The crankcase halves must be separated to service the crankshaft, connecting rod and transmission (including the shift fork and shift drum). To service these parts, the engine must be removed from the engine (Section 7).
- The following parts must be removed before separating the crankcase:
  - Oil distributor (Section 4)
  - Water pump (Section 6)
  - Cylinder heat (Section 10)
  - Cylinder, piston (Section 11)
  - Clutch, gearshift linkage and primary drive gear (Section 8)
  - Alternator, flywheel (Section 9)
  - Starter motor (Section 19)
  - Neutral switch, oil pressure switch (Section 20)
- Be careful not to damage the crankcase mating surface.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Be careful not to damage the main journal bearing inserts during crankshaft removal and installation.
- Connecting rod and crankshaft bearing inserts are selected fitted and are identified by color code. Select the replacement bearings using the selection tables. After installing new bearings, recheck them with plastigauge to verify correct clearance.
- Clean and apply sealant to the crankcase mating surfaces. Wipe off excess sealant thoroughly.
- Replace the output drive gear and driven gear as a set.
- Whenever you replace the output driven/drive gears, bearings, bearing holder or gear case, perform the gear contact pattern and backlash inspection and adjust the shim. The extension lines from the gear engagement surfaces should intersect at one point.
- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrenche'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 nuts. The specification later in the text gives both actual and indicated.
- Protect the output gear case with a shop towel or soft jaws while holding it in vase. Do not clamp it too tight as it could damage the gear case.

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Crankshaft	Side clearance		0.05-0.20 (0.002-0.008)	0.30 (0.012)
	Runout		—	0.05 (0.002)
	Crankpin oil clearance		0.028-0.052 (0.0011-0.0020)	0.08 (0.003)
	Mail journal oil clearance		0.025-0.041 (0.0010-0.0016)	0.05 (0.002)
Transmission	Gear I.D.	M4, M5, C1, C2, C3	28.000-28.021 (1.1024-1.1032)	28.03 (1.103)
	Bushing O.D.	M4, M5, C1, C2, C3	27.959-27.980 (1.1007-1.1016)	27.95 (1.100)
	Bushing I.D.	M4, C2, C3	25.000-25.021 (0.9843-0.9851)	25.03 (0.985)
	Gear-to-bushing clearance	M4, M5, C1, C2, C3	0.020-0.062 (0.0008-0.0024)	0.08 (0.003)
	Mainshaft O.D.	M4 bushing	24.959-24.980 (0.9826-0.9835)	24.95 (0.982)
		Case journal A	19.980-19.993 (0.7866-0.7871)	19.96 (0.786)
		Case journal B	21.967-21.980 (0.8648-0.8654)	21.94 (0.864)
	Countershaft O.D.	C2 bushing	24.959-24.980 (0.9826-0.9835)	24.95 (0.982)
		C3 bushing	24.959-24.980 (0.9826-0.9835)	24.95 (0.982)
		Case journal A	19.980-19.993 (0.7866-0.7871)	19.96 (0.786)
		Case journal B	19.980-19.993 (0.7866-0.7871)	19.96 (0.786)
	Bushing-to-shaft clearance	M4, C2, C3	0.020-0.062 (0.0008-0.0024)	0.08 (0.003)
Shift fork, fork shaft	Fork	I.D.	13.000-13.021 (0.5118-0.5126)	13.04 (0.513)
		Claw thickness	5.93-6.00 (0.233-0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966-12.984 (0.5105-0.5112)	12.90 (0.508)
Shift drum O.D. (at left side journal)			11.966-11.984 (0.4711-0.4718)	11.94 (0.470)
Output drive train	Output gear I.D.		24.000-24.021 (0.9449-0.9457)	24.10 (0.949)
	Output gear bushing	O.D.	23.959-23.980 (0.9433-0.9441)	23.70 (0.933)
		I.D.	20.020-20.041 (0.7882-0.7890)	20.10 (0.791)
	Output drive gear shaft O.D.		19.979-20.000 (0.7866-0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020-0.062 (0.0008-0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020-0.062 (0.0008-0.0024)	0.082 (0.0032)
	Output gear damper spring free length		58.40 (2.299)	56.0 (2.20)
	Output drive gear backlash		0.08-0.23 (0.003-0.009)	0.4 (0.02)
	Backlash difference between measurements		—	0.10 (0.004)

TORQUE VALUES

Crankcase 8 mm bolt	23 N·m (2.3 kgf-m, 17 lbf-ft)	
Connecting rod bearing cap nut	33 N·m (3.4 kgf-m, 25 lbf-ft)	Apply oil to the threads and seating surface
Output gear case bolt: 8 x 110 mm	31 N·m (3.2 kgf-m, 23 lbf-ft)	Apply a locking agent to the threads UBS bolt
8 x 65 mm	31 N·m (3.2 kgf-m, 23 lbf-ft)	Apply a locking agent to the threads UBS bolt
8 x 60 mm	31 N·m (3.2 kgf-m, 23 lbf-ft)	Apply oil to the threads and seating surface UBS bolt
8 x 45 mm	31 N·m (3.2 kgf-m, 23 lbf-ft)	Apply oil to the threads and seating surface UBS bolt
Output drive gear bearing lock nut		
(inner)	69 N·m (7.0 kgf-m, 51 lbf-ft)	Apply oil to the threads and seating surface Stake
(outer)	98 N·m (10.0 kgf-m, 72 lbf-ft)	Apply oil to the threads and seating surface Stake
Output driven gear bearing lock nut		
(inner)	69 N·m (7.0 kgf-m, 51 lbf-ft)	Apply oil to the threads and seating surface Stake
(outer)	98 N·m (10.0 kgf-m, 72 lbf-ft)	Apply oil to the threads and seating surface Stake
Output driven gear bearing holder bolt	31 N·m (3.2 kgf-m, 23 lbf-ft)	Apply oil to the threads and seating surface
Output drive gear shaft bolt	49 N·m (5.0 kgf-m, 36 lbf-ft)	

TOOLS

Sliding remover weight	07741-0010201
Attachment, 42 x47 mm	07746-0010300
Attachment, 52 x 55 mm	07746-0010400
Attachment, 62 x 68 mm	07746-0010500
Inner handle	07746-0030100
Inner driver, 30 mm	07746-0030300
Pilot, 17 mm	07746-0040400
Pilot, 20 mm	07746-0040500
Pilot, 30 mm	07746-0040700
Driver	07749-0010000
Snap ring pliers	07914-5670101
Lock nut wrench	07916-MB00001
Remover handle	07936-3710100
Bearing remover set	07936-3710600
Damper spring compressor	07964-ME90000
Dis/assembly tool	07965-3710101
Bearing drive attachment	07HMF-MM90400
Holder A	07PAB-001010012

Troubleshooting

Excessive noise
- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main bearing
- Worn transmission gear

Hard to shift
- Improper clutch adjustment
- Improper clutch operation
- Bent shift fork
- Bent shift fork shaft
- Bent shift spindle
- Damaged shift drum cam grooves
- Incorrect transmission oil weight

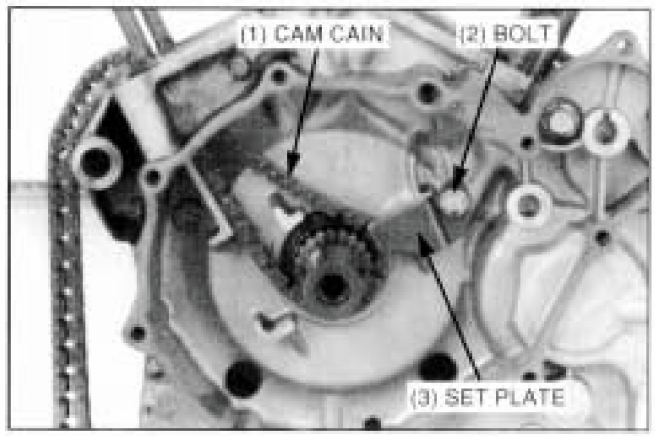
Transmission jumps out of gear
- Worn gear dogs or slots
- Bent fork shaft
- Broken shift drum stopper
- Worn or bent shift forks
- Broken shift linkage return spring

Crankcase Separation

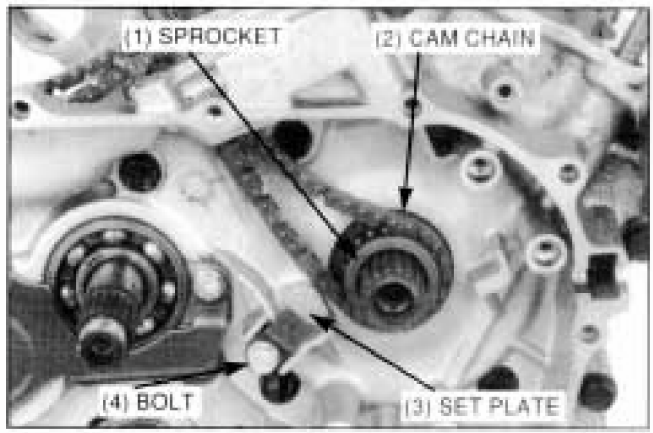
Remove the engine from the frame (Section 7).

Refer to Service Information (page 12-1) for removal of necessary parts before disassembling the crankcase.

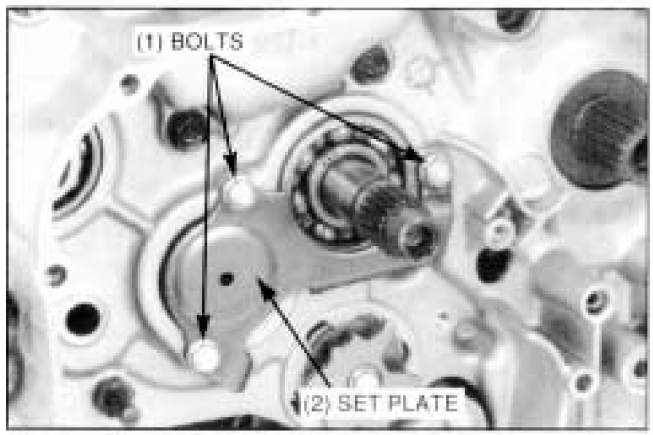
Remove the bolt and front cam chain tensioner set plate. Remove the front cam chain from the crankshaft.



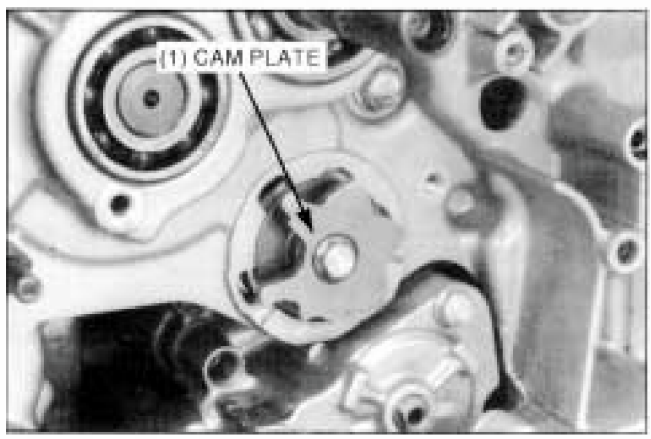
Remove the bolt and rear cam chain tensioner set plate. Remove the rear cam chain and cam chain drive sprocket.



Remove the mainshaft bearing set plate by removing the bolts.



Turn the shift drum until shift cam plate as shown.

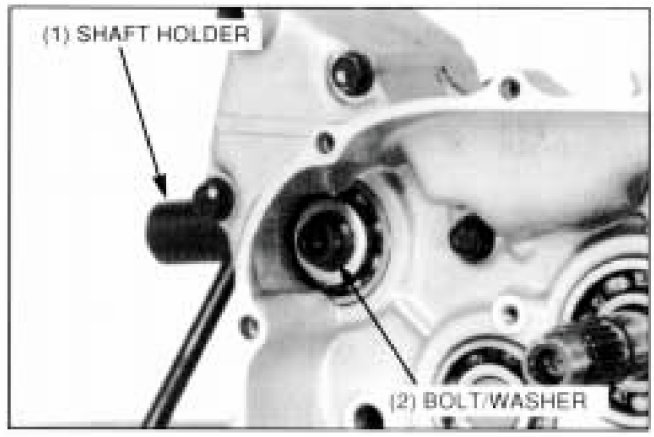


Hold the final driven shaft with a shaft holder and remove the output drive shaft bolt and washer.

Tool:
Holder A **07PAB-0010100**

NOTE:

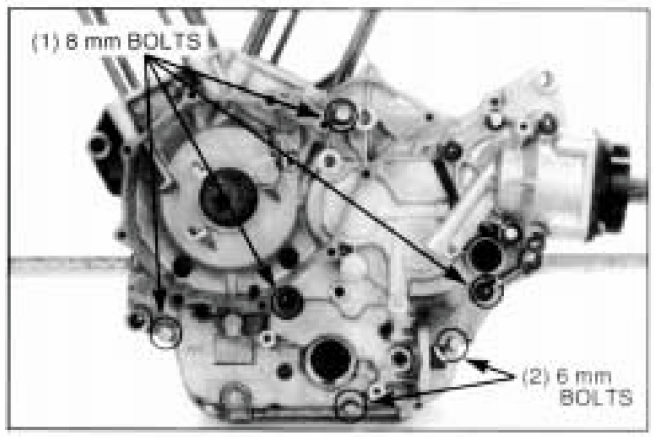
- Be careful to remove the bolt which is applied locking agent.



Remove the left crankcase bolts.

NOTE:

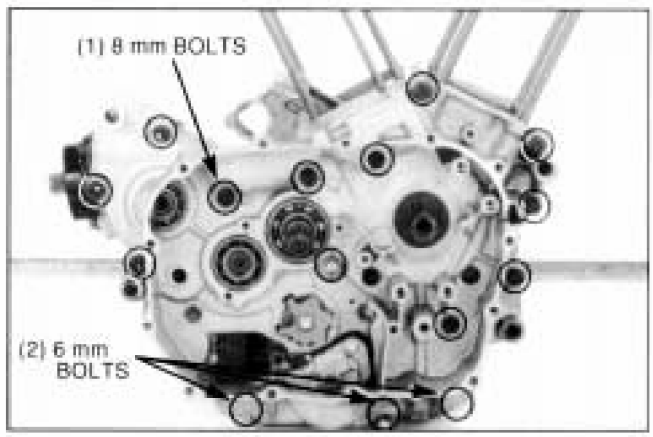
- Loosen the 6 mm bolts first, then 8 mm bolts.
- Loosen the left crankcase bolts in a crisscross pattern in several steps.



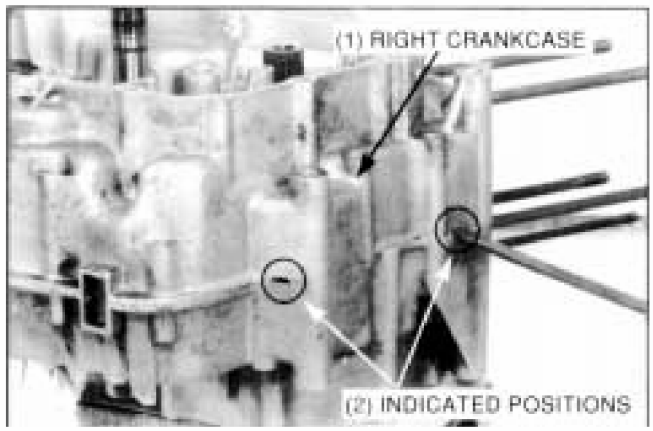
Remove the right crankcase bolts.

NOTE:

- Loosen the 6 mm bolts first, then 8 mm bolts.
- Loosen the right crankcase bolts in a crisscross pattern in several steps.

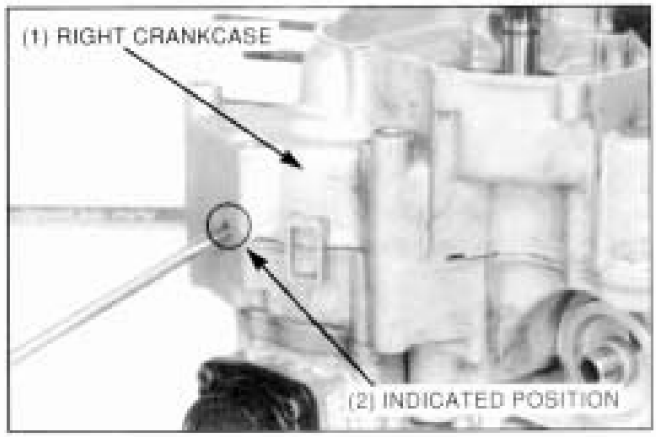


Place the crankcase with the left crankcase down and remove the right crankcase.

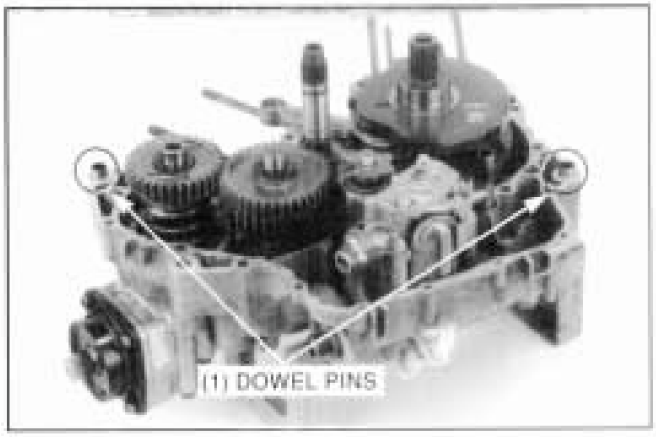


NOTE:

- Separate the right crankcase from the left crankcase while prying where indicated at the points as shown.
- Separate the right crankcase from the left crankcase while tapping them at several locations with a soft hammer.



Remove the dowel pins.
Clean off the sealant from the left and right crankcase mating surfaces.



Crankshaft/Connecting Rod

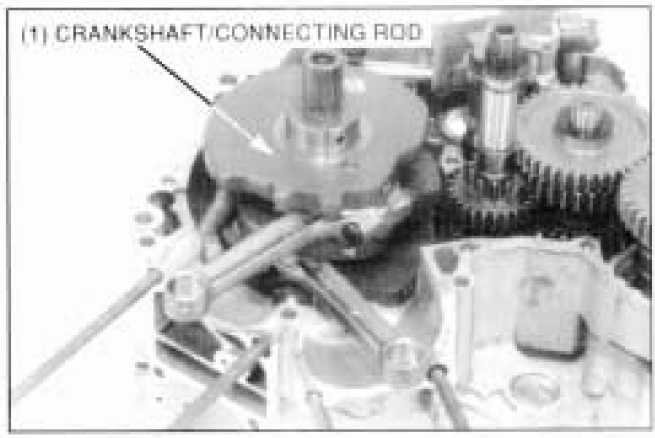
CAUTION

- **Be careful not to damage the crankshat main bearing and connecting rod bearing while servicing the crankshaft/connecting rod.**

REMOVAL

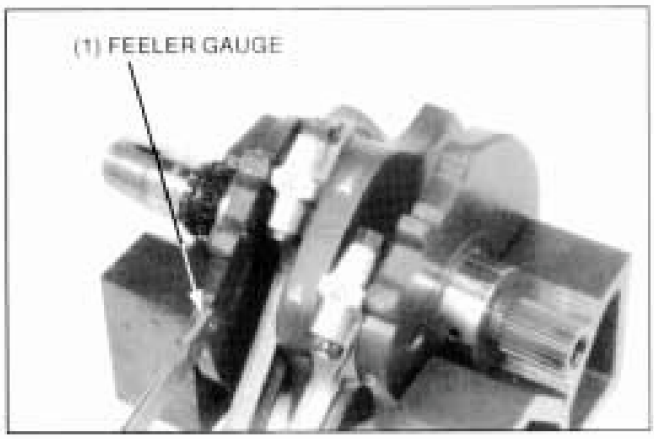
Separate the crankcase (page 12-4).

Remove the crankshaft/connecting rod from left crankcase.



Inspect the connecting rod big end side clearance before connecting rod removal.
Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end as shown.

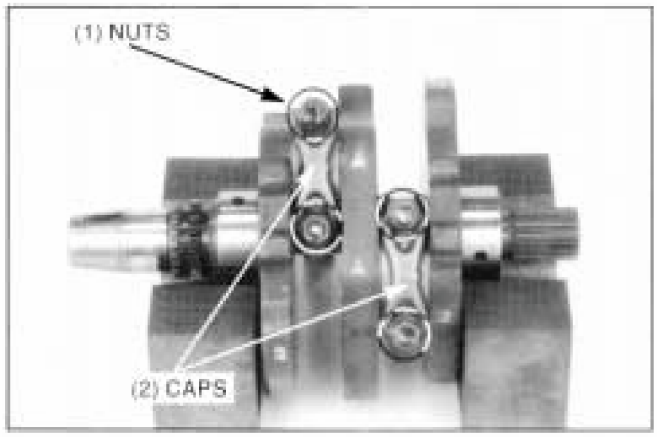
Standard: 0.30 mm (0.012 in)



Remove the connecting rod bearing cap nuts, bearing cap and connecting rod.

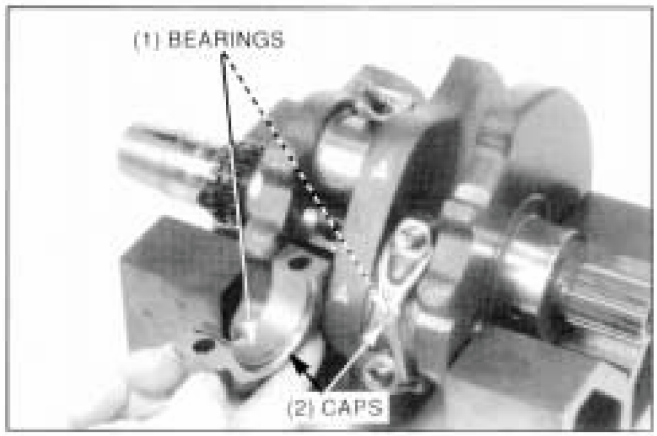
NOTE:

- Tap the side of the cap lightly if the bearing cap is hard to remove.



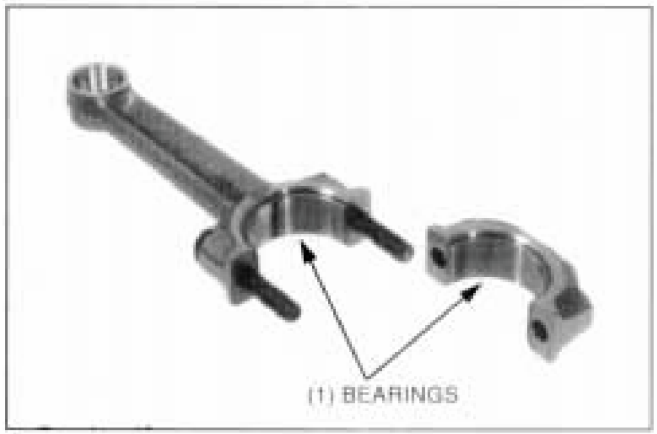
Mark the bearing caps, bearings and connecting rod as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

Connecting rod small end inspection (page 11-7).



CONNECTING ROD BEARING INSPECTION

Inspect the bearing inserts for unusual wear, damage or peeling and replace if necessary.

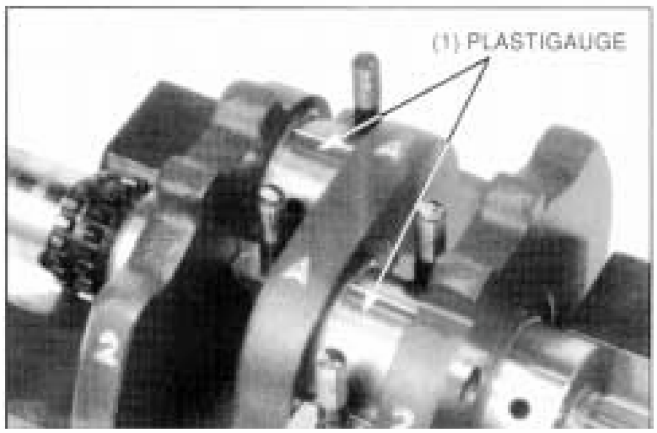


CRANKPIN OIL CLEARANCE

NOTE:

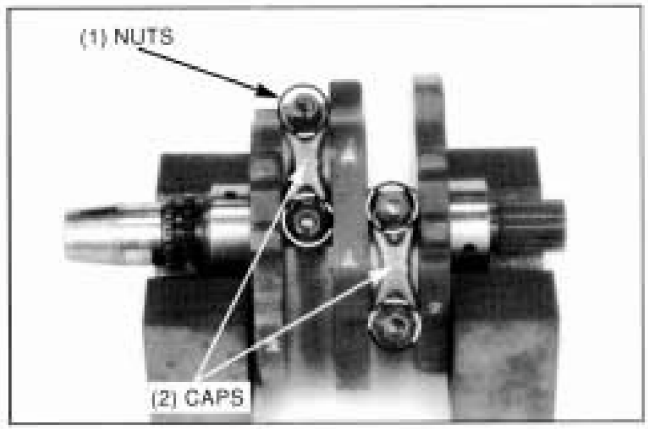
- Do not rotate the crankshaft during inspection.

Clean off any oil from the connecting rod bearing inserts and crankpin.
Put a strip of plastigauge on each crankpin avoiding oil hole.



Install the connecting rod bearing and bearing cap to the original location.
Install and tighten the connecting rod bearing cap nuts in a crisscross pattern in several steps.

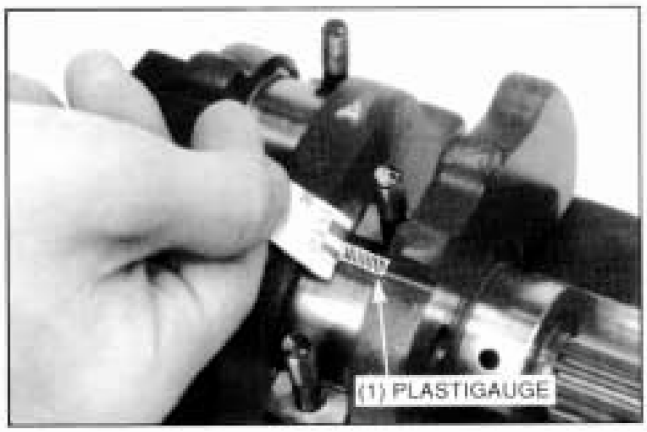
Torque: 33 N·m (3.4 kgf-m, 25 lbf-ft)



Remove the connecting rod bearing cap nuts, bearing cap and bearing.
Measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

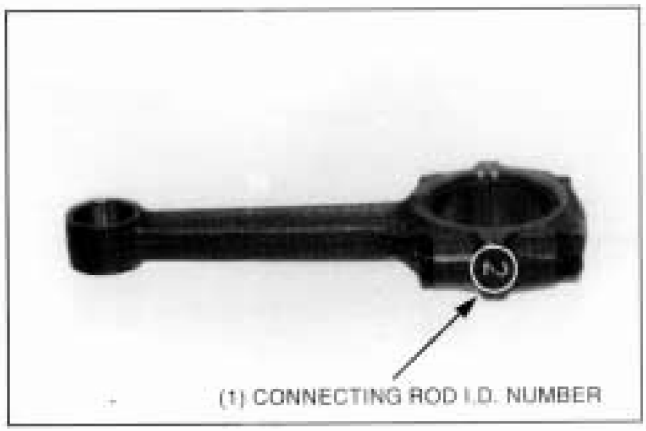
Service Limit: 0.08 mm (0.003 in)

If the clearance exceeds the service limit, select the correct replacement bearings as follows.

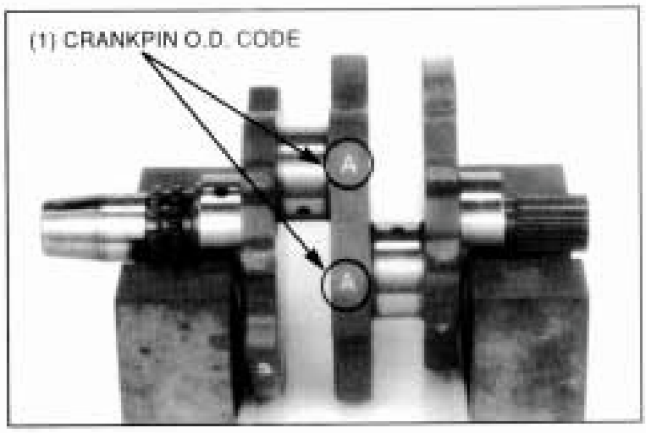


CONNECTING ROD BEARING SELECTION

Determine the connecting rod I.D. number.
The code will be either a number 1 or 2 located on the rod in the area shown.



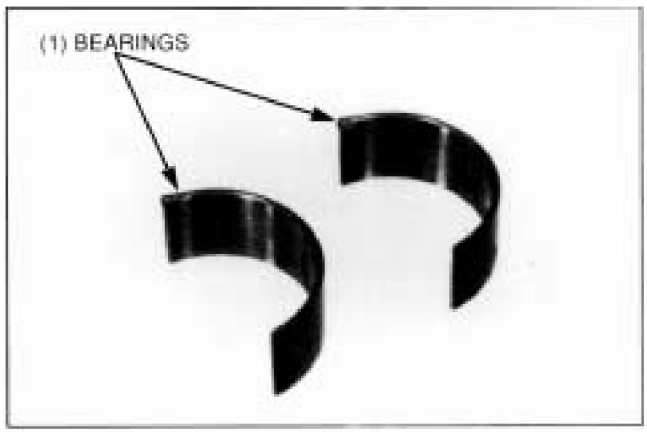
Determine the corresponding crankpin O.D. code (or measure the crankpin O.D.). the code will be either a letter A or B on the crank weight.



Cross reference the crankpin and connecting rod codes to determine the replacement bearing collar.

Unit: mm (in)

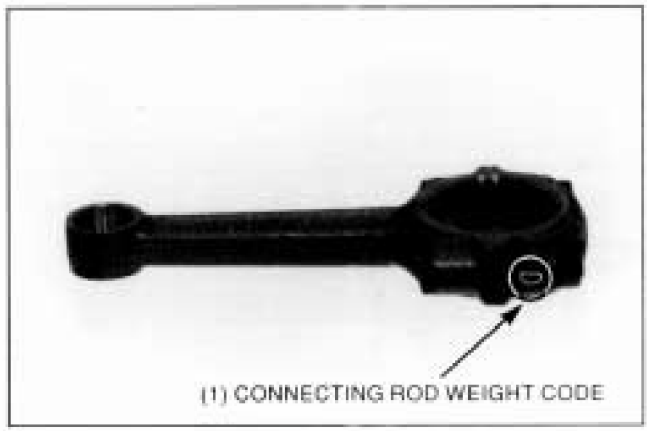
Connecting rod I.D. number \ Crankpin O.D. code		A	B
		39.982-39.990 (1.5741-1.5744)	39.974-39.983 (1.5738-1.5741)
1	43.000-43.008 (1.6929-1.6932)	C (Brown)	B (Black)
2	43.008-43.016 (1.6932-1.6935)	B (Black)	A (Blue)



Bearing Insert Thickness:
A (Blue): 1.495 - 1.499 mm (0.0589 - 0.0590 in)
B (Black): 1.491 - 1.495 mm (0.0587 - 0.0589 in)
C (Brown): 1.487 - 1.491 mm (0.0585 - 0.0587 in)

CONNECTING ROD/SELECTION

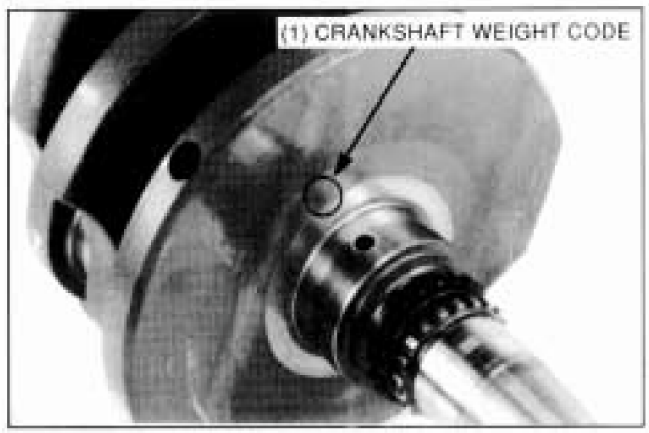
Front and rear connecting rods are select fitted.
Record the connecting rod weight code (A,B,C or D).
If the front and/or rear connecting rods are replaced, select them with the following fitting table.



NOTE:

- The "O" mark in the table indicates that mating is possible in the crossed codes.

Rear rod code \ Front rod code	A	B	C	D
A	O	O		
B	O	O	O	
C		O	O	O
D			O	O



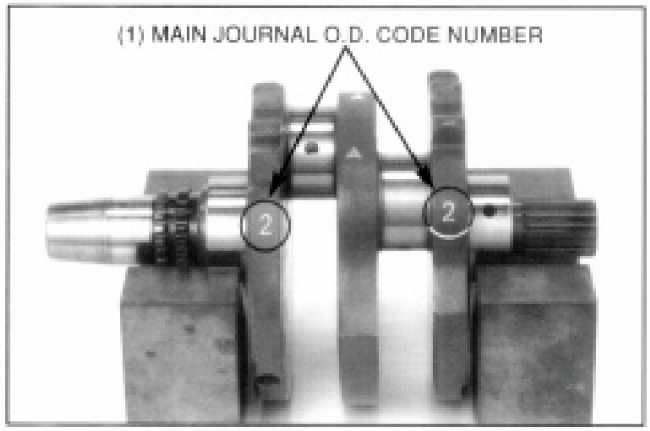
CRANKSHAFT/CRANKCASE SELECTION

Crankcase and crankshaft are select fitted.

Record the main journal O.D. code number (1 or 2).

Record the main journal bearing I.D. code (A or B).

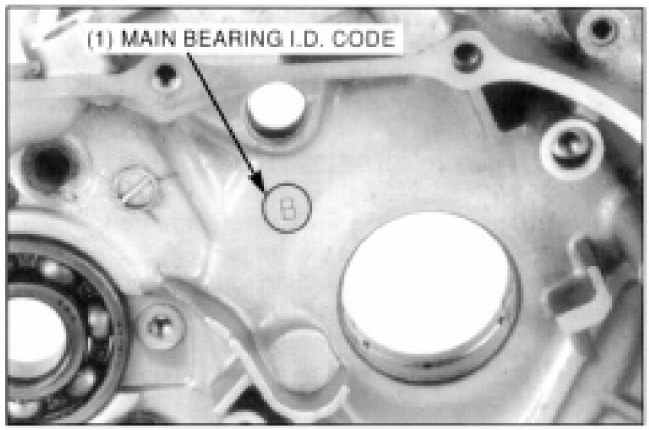
If the crankcase and/or crankshaft are replaced, select them with the following fitting table.



NOTE:

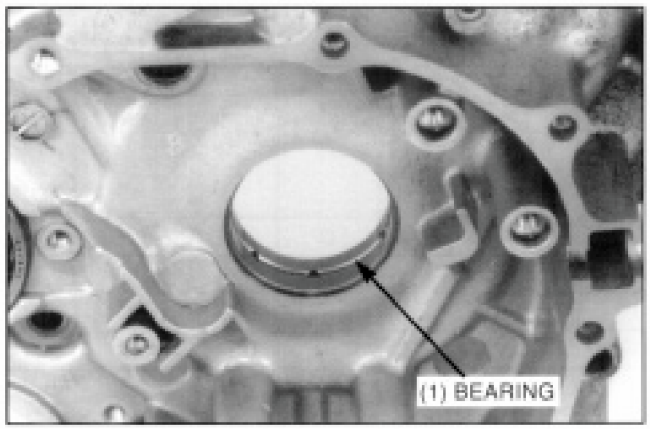
- The "O" mark in the table indicates that mating is possible in the crossed codes.

Main journal O.D. code / Main journal bearing I.D. code	A	B
A	O	
B		O



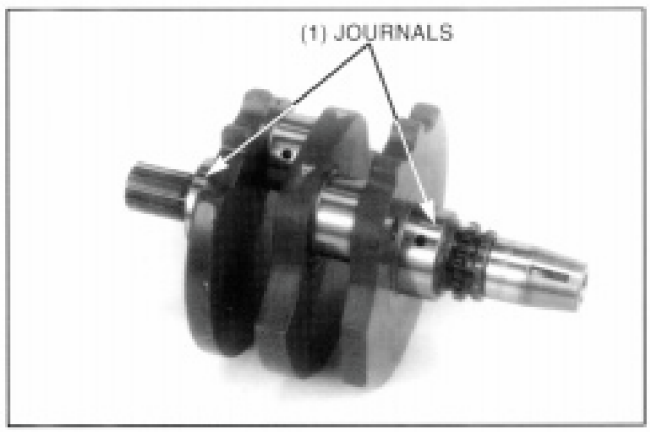
MAIN BEARING INSPECTION

Inspect the bearing inserts for unusual wear, damage or peeling and replace the crankcase if necessary.



MAIN BEARING OIL CLEARANCE

Clean off any oil from the main bearing inserts and crankshaft journals.



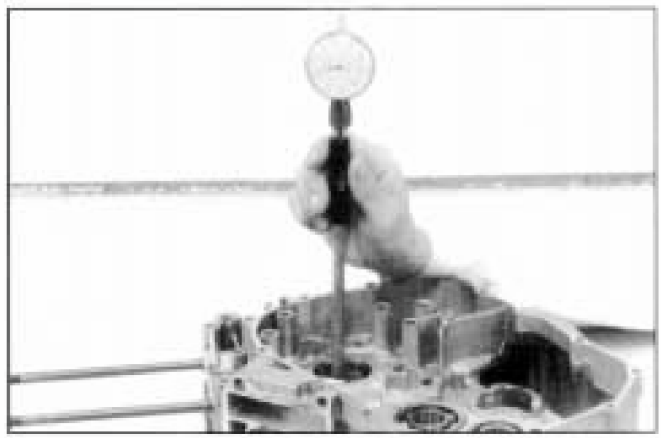
Measure and record the crankshaft main journal O.D.

Measure and record the main bearing I.D.

Calculate the oil clearance by subtracting the journal O.D. from bearing I.D.

Service Limit: 0.05 mm (0.002 in)

Replace the crankcase if the service limit is exceeded. Select the replacement crankcase (page 12-9).



MAIN BEARING SELECTION

Record the main journal O.D. code number (page 12-10).

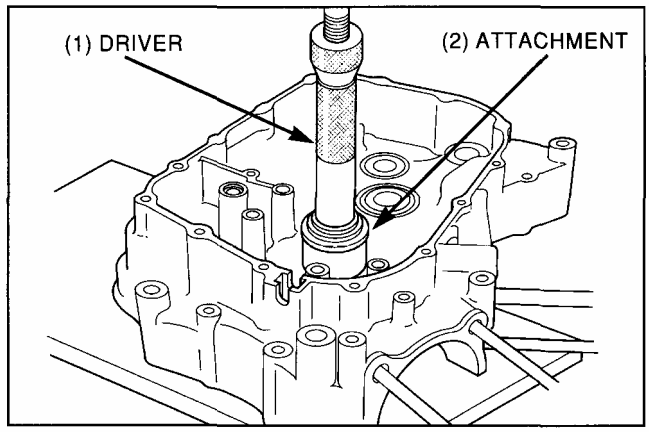
Press out the main bearing using the special tools and hydraulic press.

CAUTION

- **When removing bearings, always use a hydraulic press and special tools to prevent crankcase damage.**

Tools:

Driver	**07749-0010000**
Main bearing remover attachment	**07HMF-MM90400**

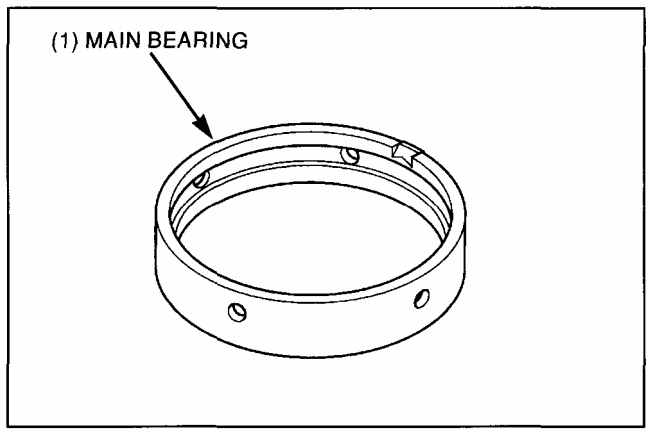


Measure and record the crankcase I.D. (page 12-10).

Cross-reference the crankcase and main journal codes to determine the replacement bearing color.

Unit: mm (in)

Crankcase I.D. code \ Main journal O.D. code		1	2
		44.992 - 45.000 (1.7713 - 1.7717)	44.984 - 44.991 (1.7710 - 1.7713)
1	48.990 - 49.000 (1.9287 - 1.9291)	C (Brown)	B (Black)
2	49.000 - 49.010 (1.9291 - 1.9295)	B (Black)	A (Blue)



Bearing Insert Thickness:
A (Blue): 2.003 - 2.013 mm (0.0789 - 0.0793 in)
B (Black): 1.998 - 2.008 mm (0.0787 - 0.0791 in)
C (Brown): 1.993 - 2.003 mm (0.0785 - 0.0795 in)

Apply molybdenum disulfide oil to the outer surface of the new main bearing.
Place the bearing in the crankcase by aligning the tab with the crankcase groove.
Press the main bearing into the crankase.

CAUTION

- **Be careful not to damage the bearing.**

NOTE:

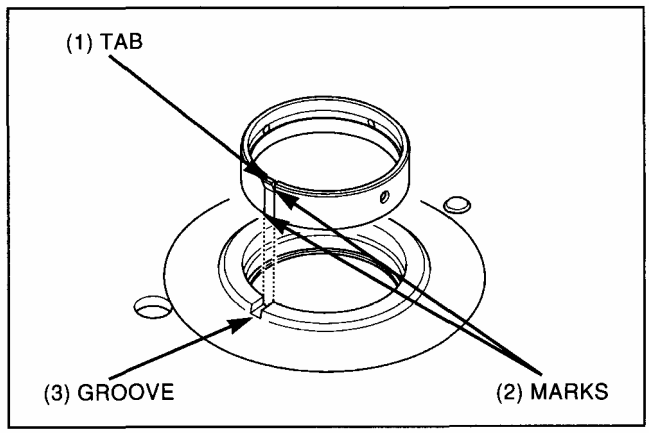
- At installation, align the bearing oil hole with the crankcase oil hole.

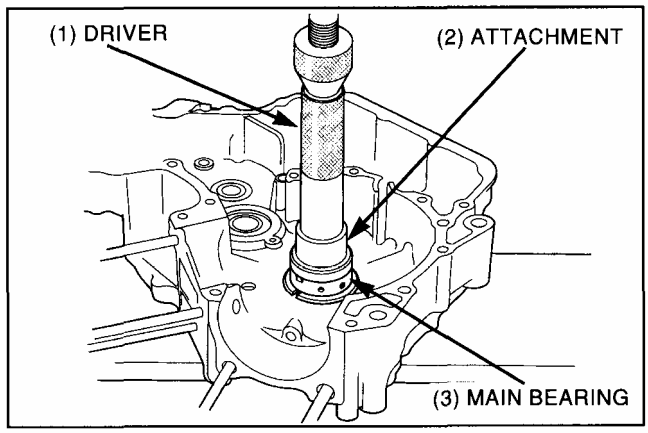
Tools:

Driver	**07749-0010000**
Main bearing driver attachment	**07HMF-MM90400**

NOTE:

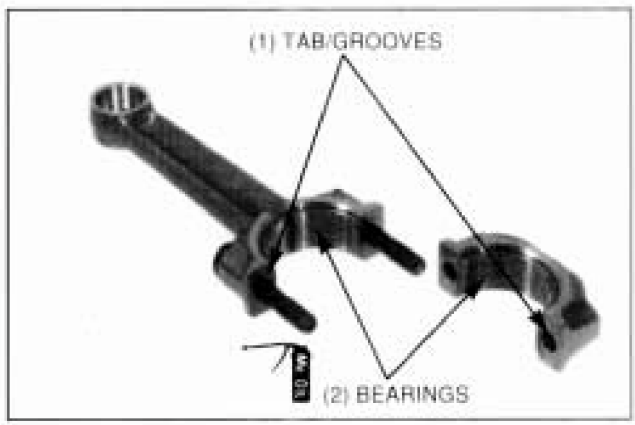
- If the main bearing is replaced, delete the main bearing I.D. code letter on the crankcase.





INSTALLATION

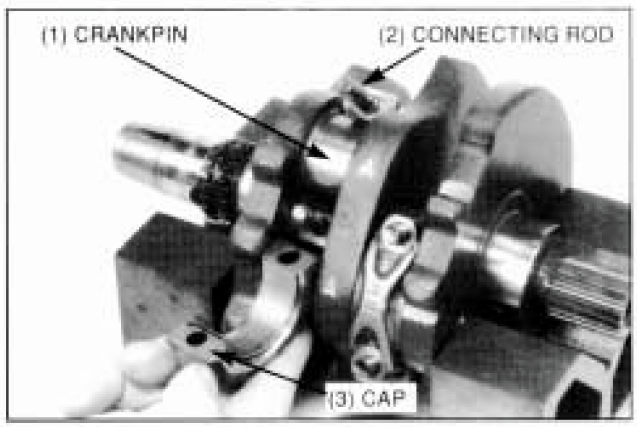
Clean off any oil from the main bearing inserts and connecting rod bearing cap.
Apply molybdenum disulfide oil to the bearings.
Install the main bearing to the connecting rod and bearing cap aligning the tab on the bearing with the groove on the connecting rod and bearing cap.



Install the connecting rods and bearing caps on the crankpin.
Be sure the each part is installed in its original position.

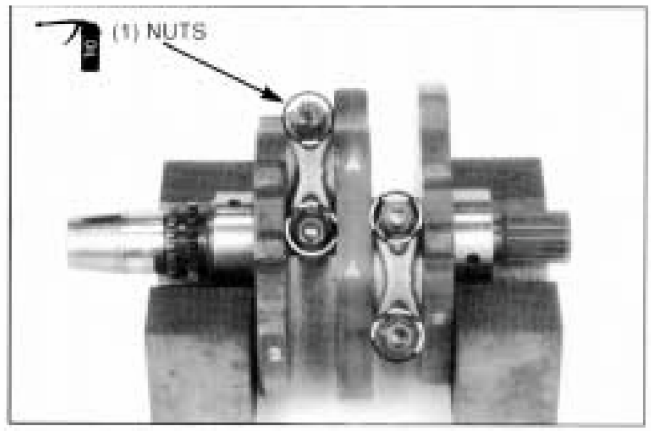
NOTE:

- Align the I.D. code on the bearing cap and connecting rod.



Apply oil to the connecting rod bearing cap bolt/nut threads and flange surface.
Install and tighten the connecting rod bearing cap nuts to the specified torque in several steps.

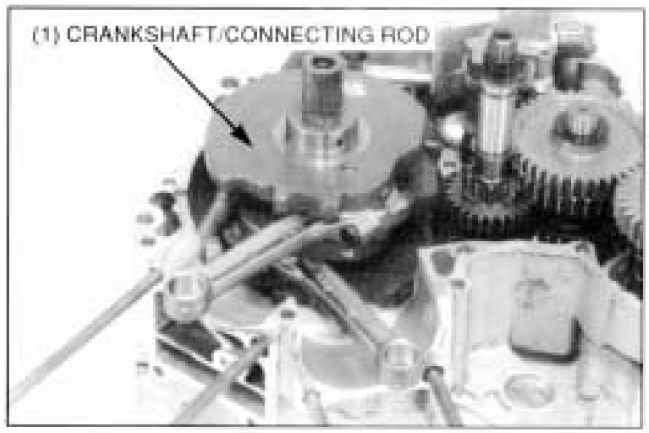
Torque: 33 N·m (3.4 kgf-m, 25 lbf-ft)



After tightening, check the connecting rods move freely without binding.

Apply molybdenum disulfide oil to the main bearing sliding surfaces and install the crankshaft to the left crankcase.

Assemble the crankcase (page 12-38).

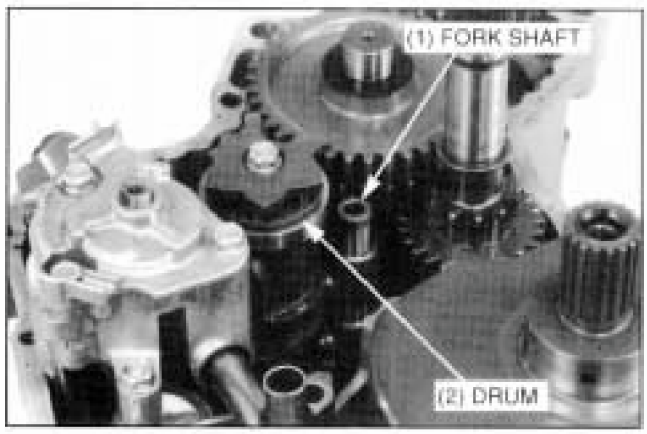


Transmission

REMOVAL

Separate the crankcase (page 12-4).

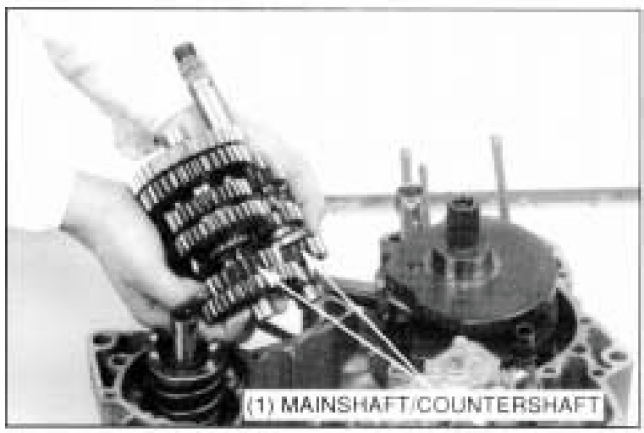
Remove the shift fork shaft from the shift fork.
Remove the shift drum and shift fork.



Remove the mainshaft and countershaft from the left crankcase as assembly.

NOTE:

- Do not forget to install the transmission end washer.

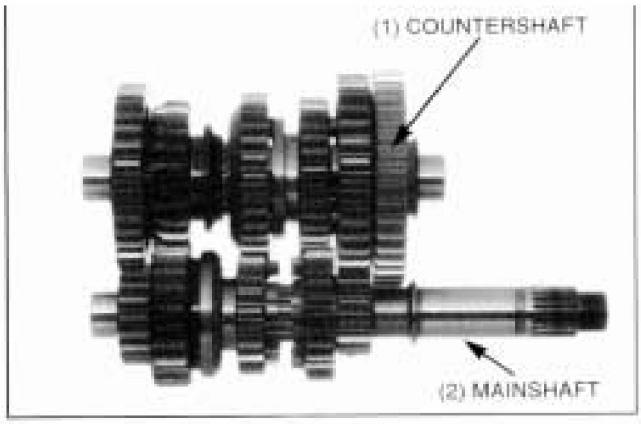


DISASSEMBLY

NOTE:

- Keep track of the disassembled parts (gears, bushings, washers, and snap rings) by stacking them on a tool or slipping them onto a piece of wire.
- Do not expand the snap ring more than necessary for removal. To remove a snap ring, expand the snap ring and pull it off using the gear behind it.

Disassembly the mainshaft and countershaft.

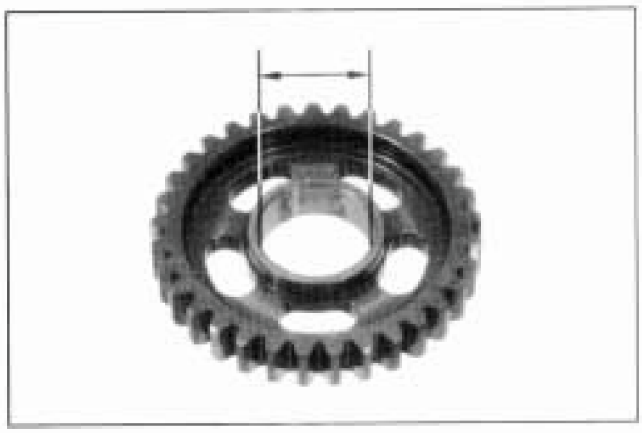


INSPECTION

GEAR

Check the gear dogs, dog holders and teeth for damage or excessive wear.
Measure the I.D. of each gear.

Service Limits:
M4, M5, C1, C2, C3: 28.03 mm (1.103 in)



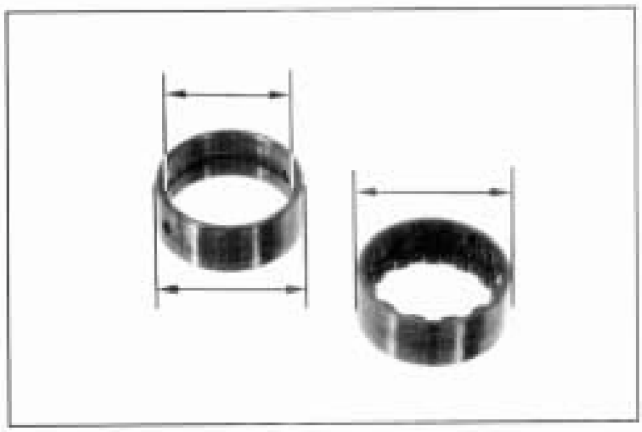
BUSHING

Check the bushings for damage or excessive wear.
Measure the O.D. of each bushings.

Service Limits:
M4, M5, C1, C2, C3: 27.95 mm (1.100 in)

Measure the I.D. of each bushings.

Service Limits:
M4, C2, C3: 25.03 mm (0.985 in)

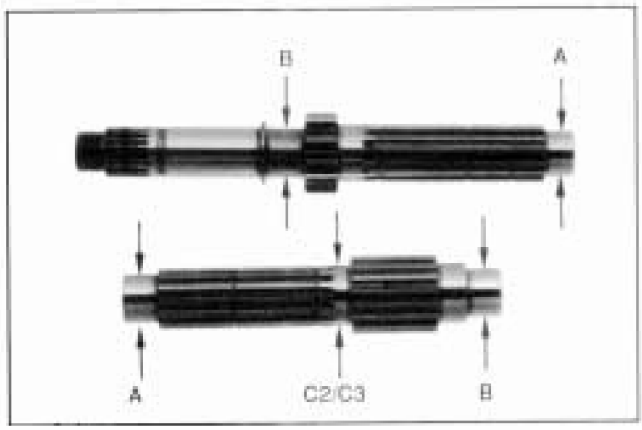


MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for damage or abnormal wear.
Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.

Service Limits:

Mainshaft:	
M4 gear bushing:	**24.95 mm (0.982 in)**
Case journal A:	**19.96 mm (0.786 in)**
Case journal B:	**21.94 mm (0.864 in)**
Countershaft:	
C2/C3 gear bushing:	**24.95 mm (0.982 in)**
Case journal A:	**19.96 mm (0.786 in)**
Case journal B:	**19.96 mm (0.786 in)**



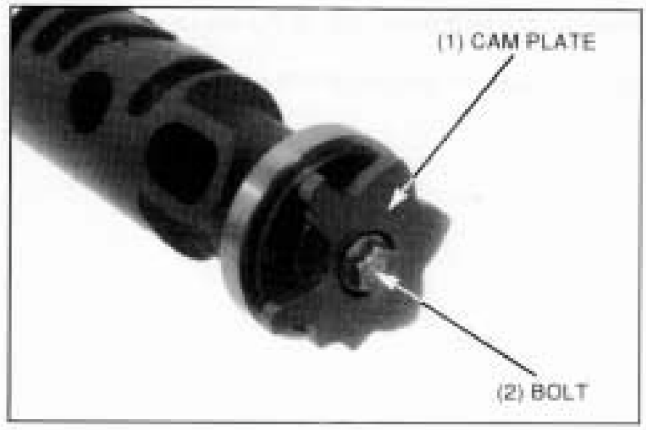
Calculate the clearance by subtracting mainshaft and countershaft O.D. from gear bushing I.D.

Service Limits:
M4, C2, C3: 0.08 mm (0.003 in)

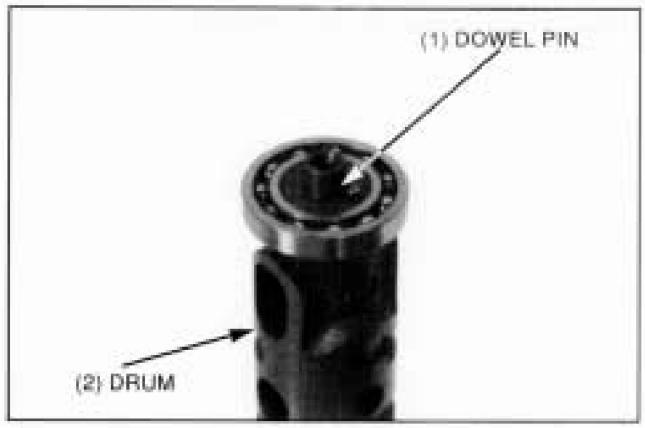
Calculate the clearance by subtracting gear bushing O.D. from gear I.D.

Service Limits:
M4, M5, C1 C2, C3: 0.08 mm (0.003 in)

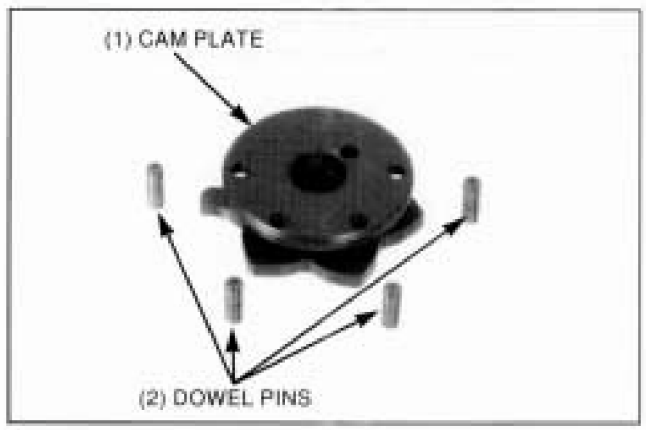
SHIFT DRUM/SHIFT DRUM BEARING
Remove the bolt and gearshift cam plate.



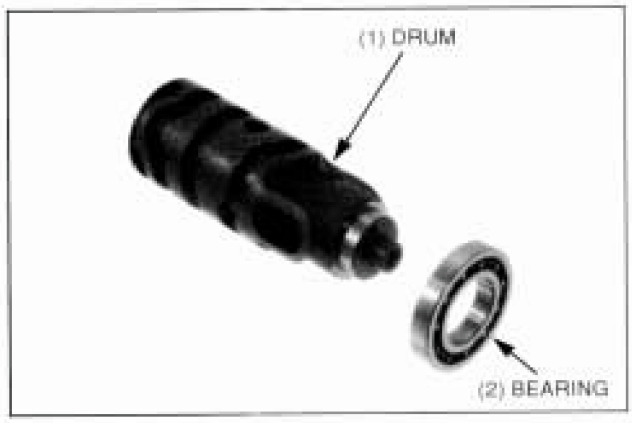
Remove the dowel pin and bearing.



Remove the dowel pins from the gearshift cam plate.

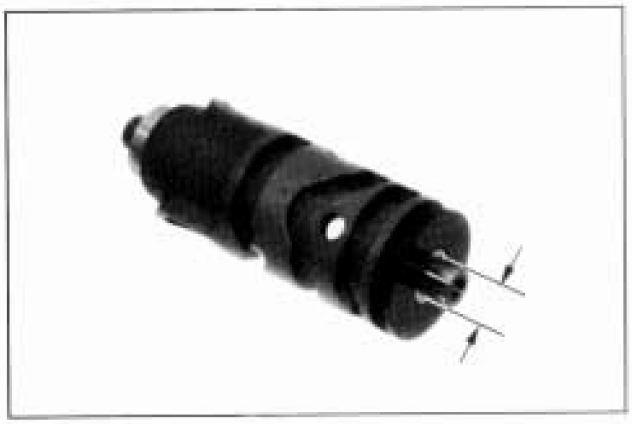


Inspect the shift drum for scoring, scratches or evidence of insufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.
Turn the inner race of bearing with your finger. The bearing should turn smoothly and quietly.

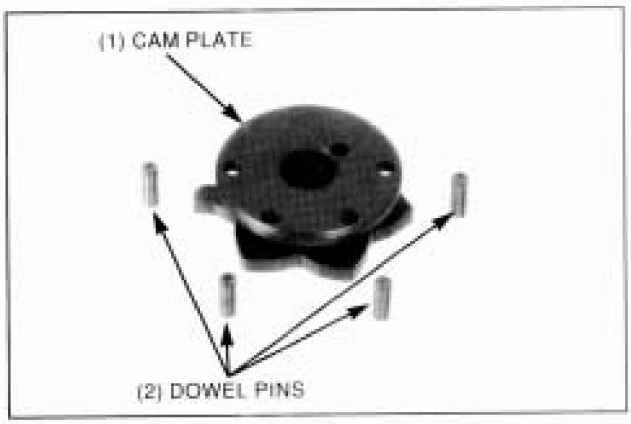


Measure the shift drum O.D. at the left side journal.

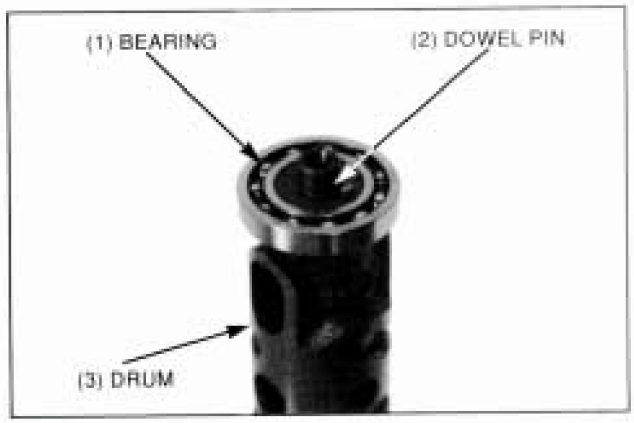
Service Limit: 11.94 mm (0.470 in)



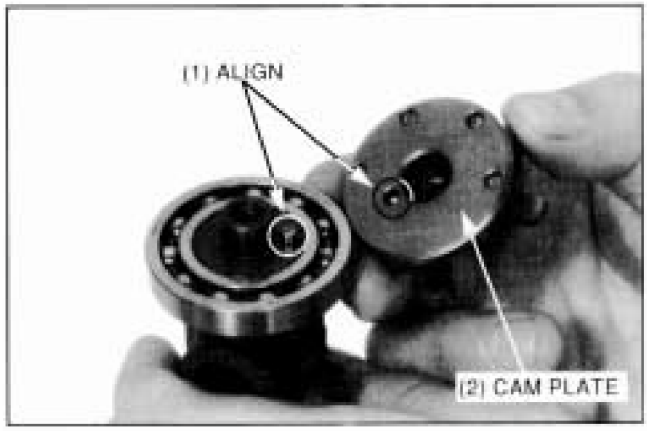
Install the dowel pins into the cam plate holes.



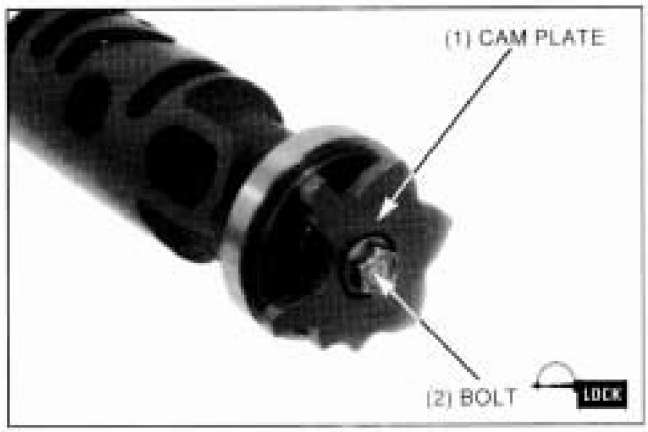
Install the bearing to the shift drum.
Install the dowel pin into the shift drum hole.



Install the gearshift cam plate aligning the hole on the cam plate with the dowel pin.

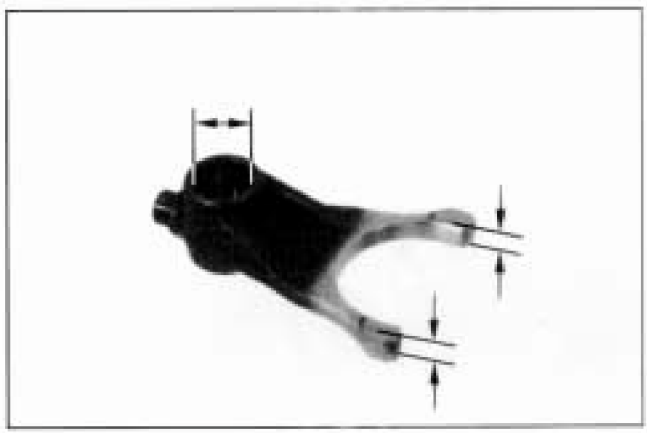


Clean and apply a locking agent to the gearshift cam plate bolt.
Install and tighten the bolt to the securely.



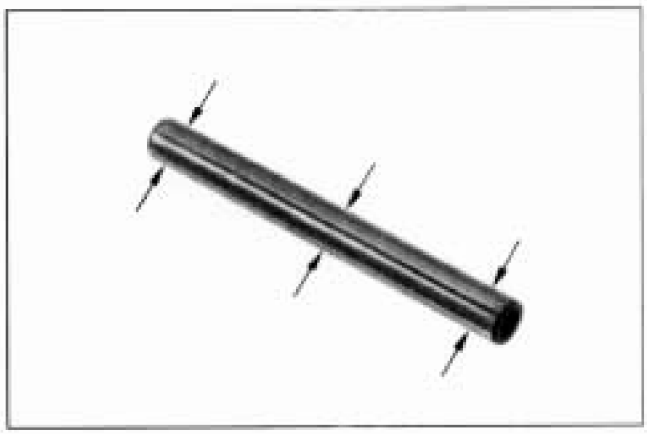
SHIFT FORK, SHIFT FORK SHAFT
Check for abnormal wear or deformation.
Measure the shift fork I.D. and claw thickness.

Service Limits:
I.D.: 13.04 mm (0.513 in)
Claw thickness: 5.6 mm (0.22 in)

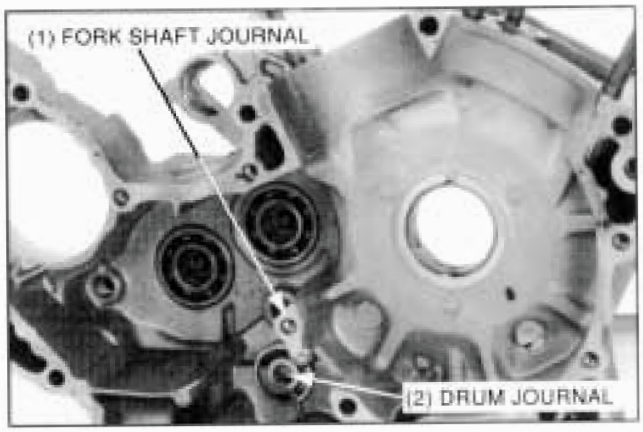


Check for abnormal wear, damage or straightens.
Measure the shift fork shaft O.D.

Service Limit: 12.90 mm (0.508 in)



SHIFT DRUM JOURNAL, SHIFT FORK SHAFT JOURNAL
Check the right and left crankcase shift fork shaft journal for wear or damage.
Check the left crankcase shift drum journal for wear or damage.



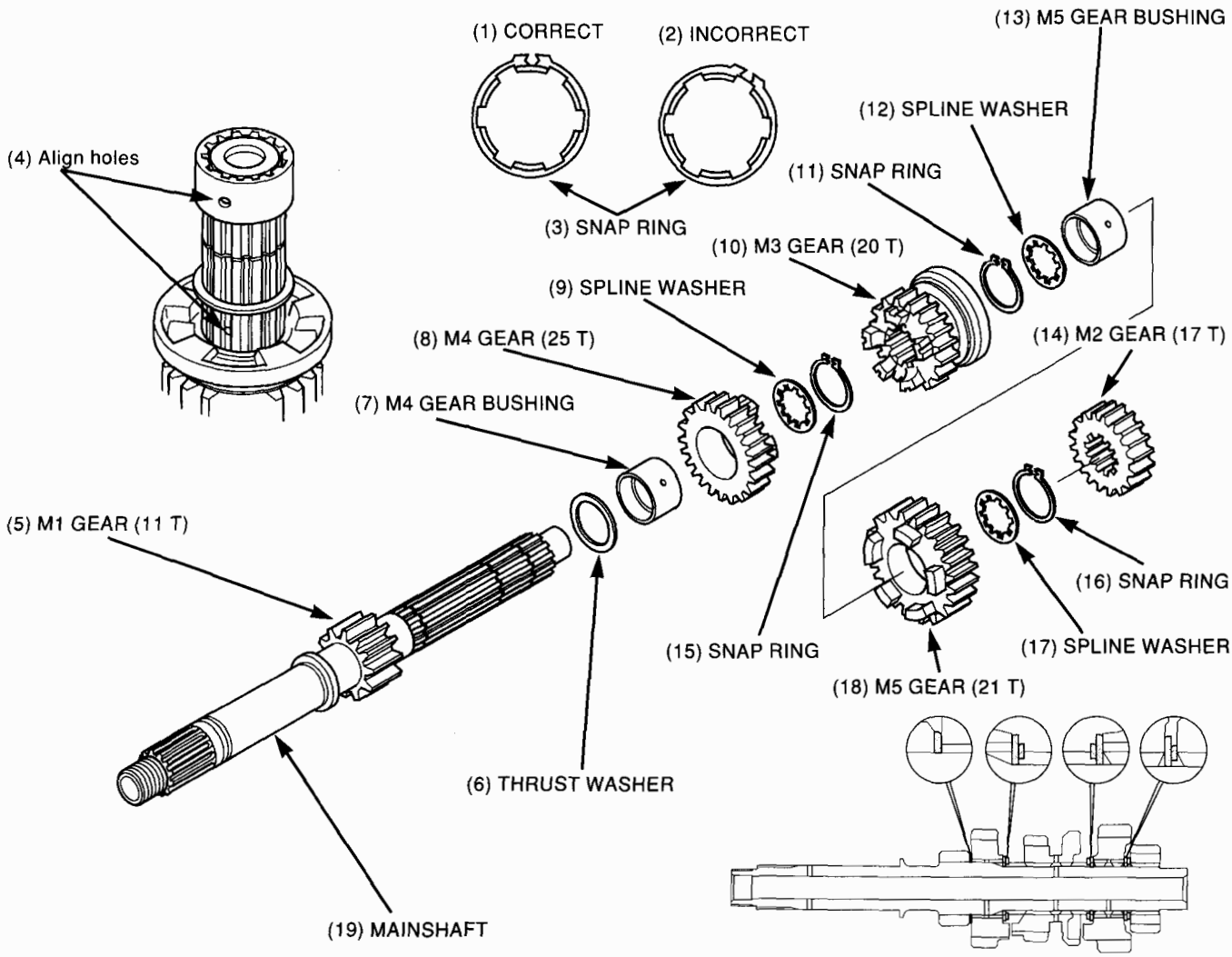
ASSEMBLY

Clean all parts in solvent.
Apply molybdenum oil solution to the transmission gear shift fork groove, transmission collar inner and outer surface and spline collar outer surface to ensure initial lubrication.
Assemble all parts into their original positions.

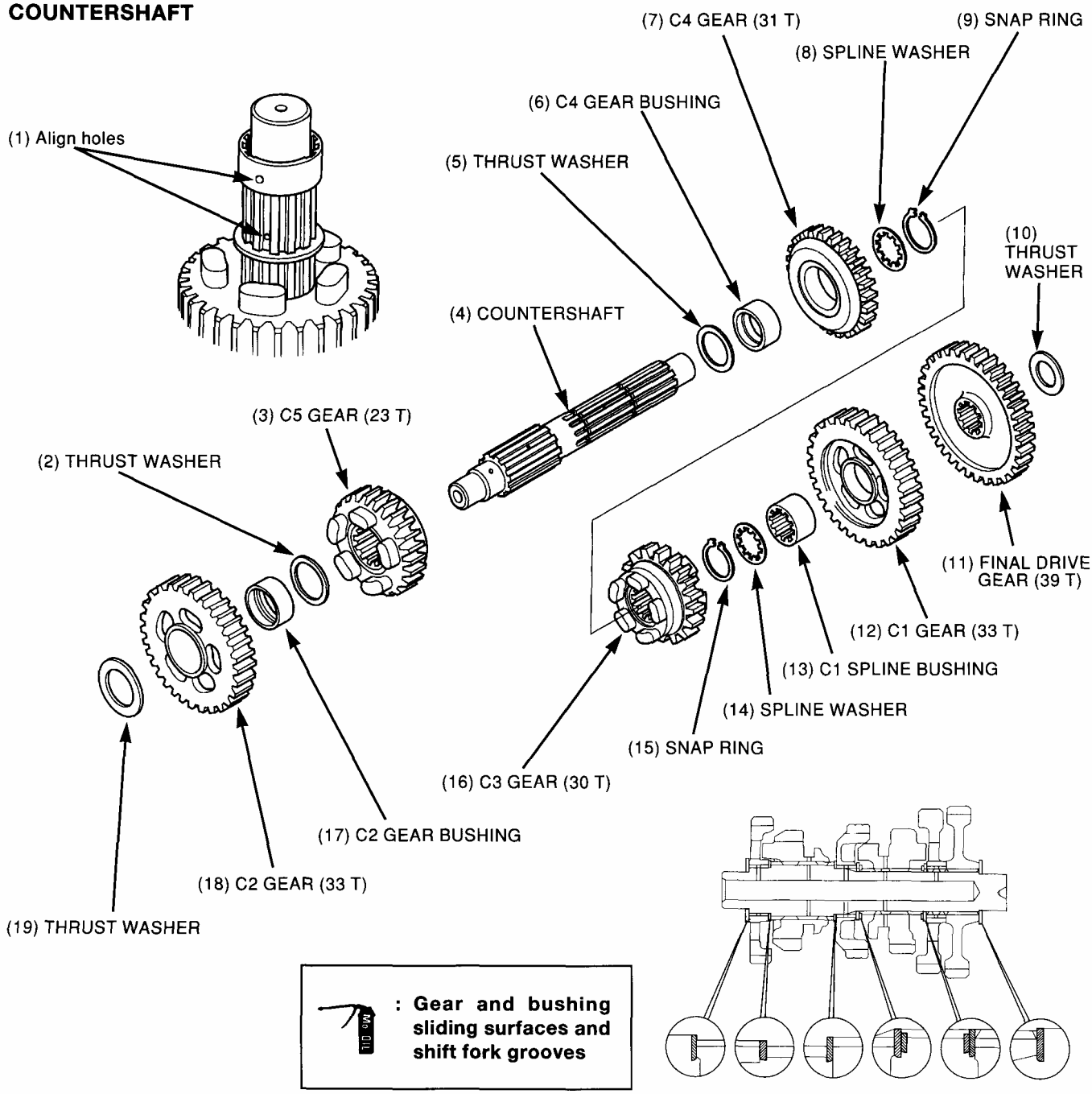
NOTE:

- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust load side.
- Do not reuse worn snap rings which could easily spin in the grooves .
- Check that the snap rings are seated in the grooves. Align their end gaps with the grooves of the spline.

MAINSHAFT



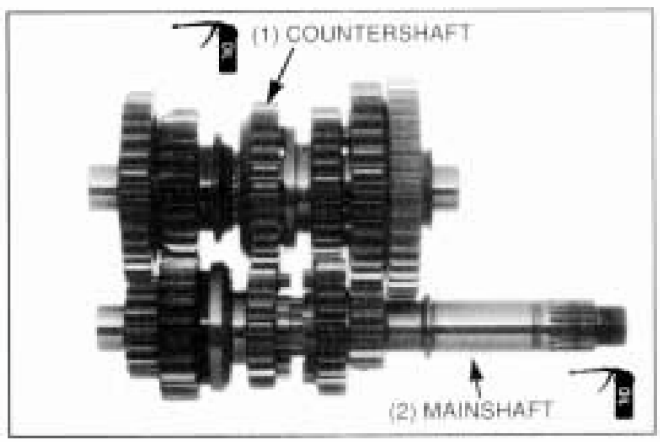
COUNTERSHAFT



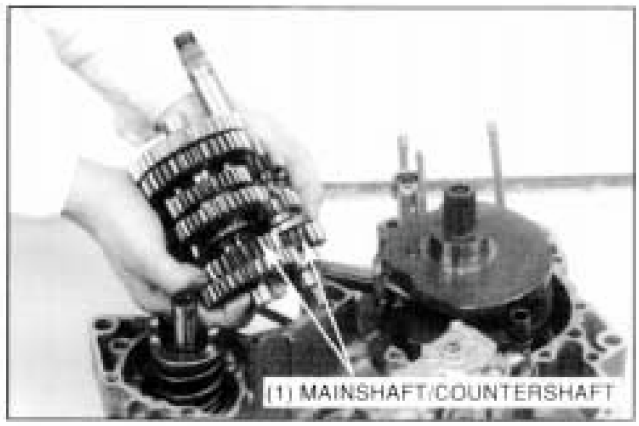
INSTALLATION

Apply engine oil to the following parts:
- Mainshaft
- Countershaft
- Each gear tooth
- Mainshaft bearing
- Countershaft bearing
- Shift drum bearing

Apply molybdenum disulfide oil to the following parts:
- Each gear shift fork grooves
- Each collar inner and outer surfaces
- Each spline collar outer surfaces



Install the mainshaft and countershaft to the left crankcase as assembly.

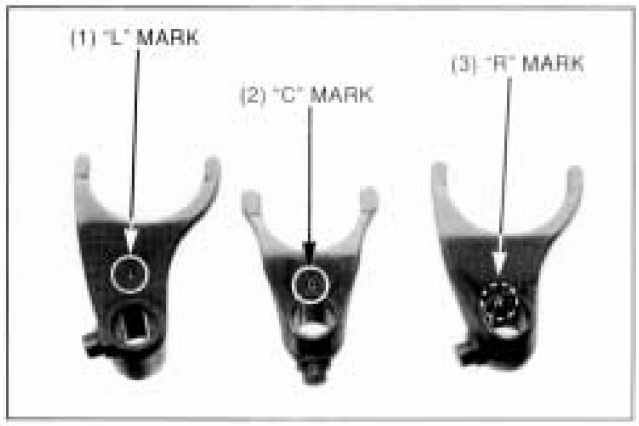


NOTE:

- Do not forget to install the transmission end washer.
- When mainshaft and countershaft installation, be careful not to damage the countershaft oil seal.

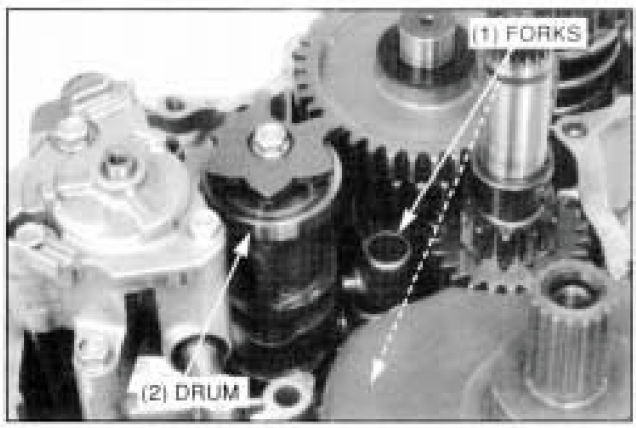
NOTE:

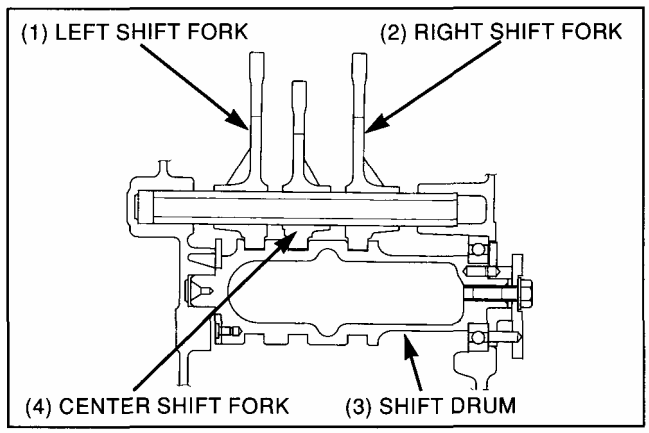
- Each shift fork has an identification mark; "R" is for the right shift fork, "L" is for the left shift fork and "C" is for the center shift fork.



Install the shift forks to the grooves of the shifter gear with their marks facing up (right crankcase side).

Install the shift drum aligning the guide pins on the shift fork with the guide grooves of the shift drum.

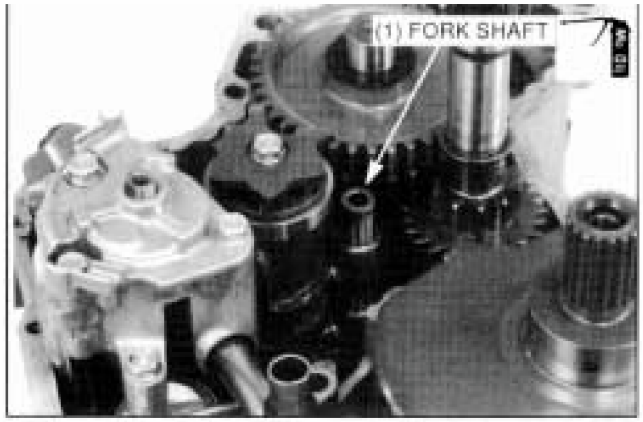




Apply molybdenum oil solution to the shift fork shaft.
Install the shift fork shaft to the right crankcase.

After installing, check for smooth transmission operation.

Assemble the crankcase (page 12-38).

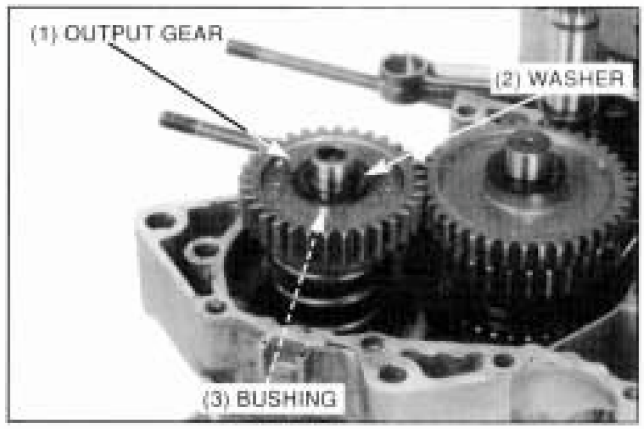


Output Gear

REMOVAL

Separate the crankcase (page 12-4).

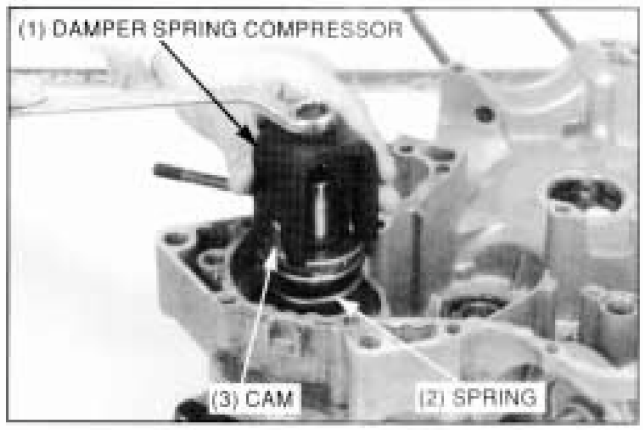
Remove the output gear, bushing and thrust washer from the right crankcase.



Set the damper spring compressor onto the damper cam and output drive gear shaft.

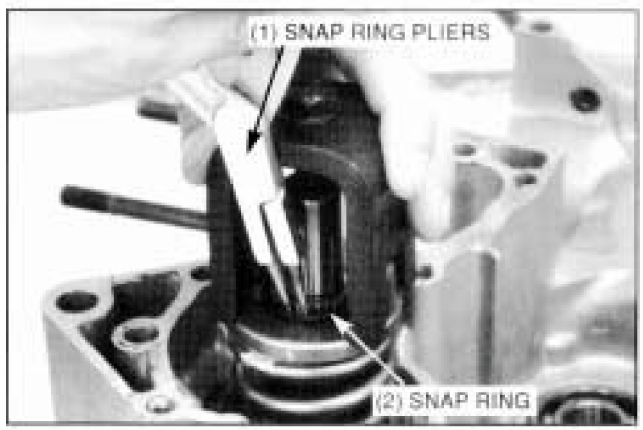
Compress the damper spring by turning the compressor bolt clockwise until the snap ring can be removed.
Remove the snap ring from the drive gear shaft groove.
Loosen and remove the compressor.

Tool:
Damper spring compressor **07964-ME90000**

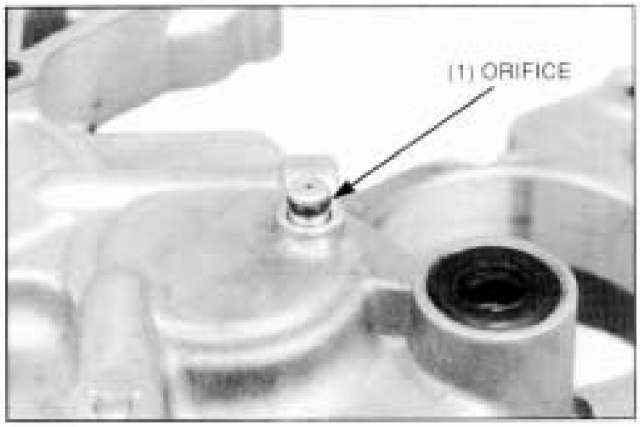


Remove the snap ring, damper cam and spring from the drive gear shaft.

Tool:
Snap ring pliers **07914-5670101**



Remove the three bolts and the output gear assembly.
Remove the oil orifice and O-rings.

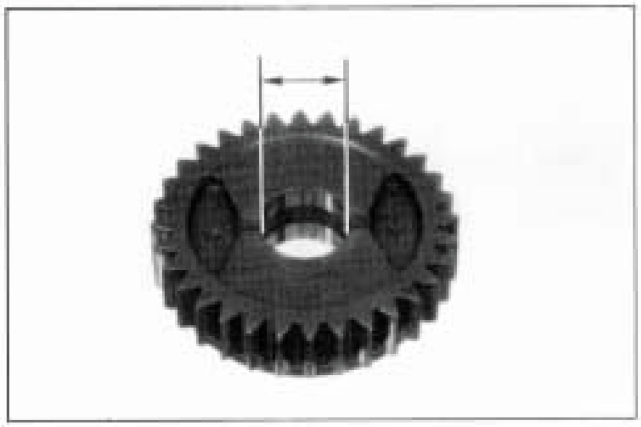


INSPECTION

OUTPUT GEAR

Check the gear teeth for damage or excessive wear, and the gear dog holes for damage.
Measure the output gear I.D.

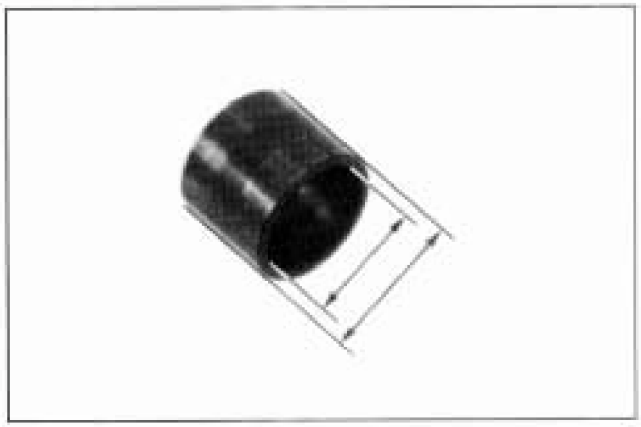
Service Limit: 24.10 mm (0.949 in)



BUSHING

Check the bushing for wear or damage.
Measure the bushing O.D. and I.D.

Service Limits: O.D.: 23.70 mm (0.933 in)
I.D.: 20.10 mm (0.791 in)



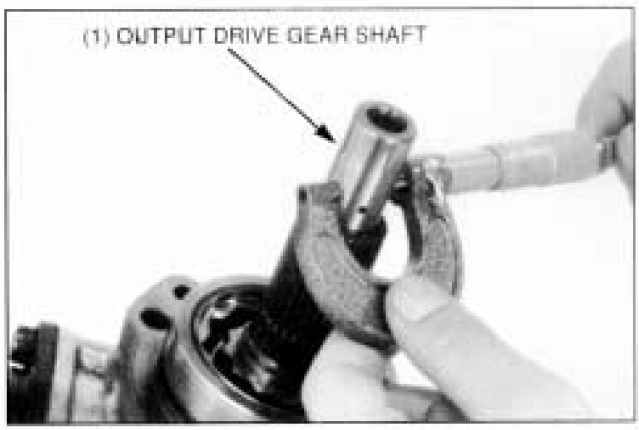
OUTPUT DRIVE GEAR SHAFT

Measure the O.D. of the output drive gear shaft at the sliding area.

Service Limit: 19.97 mm (0.786 in)

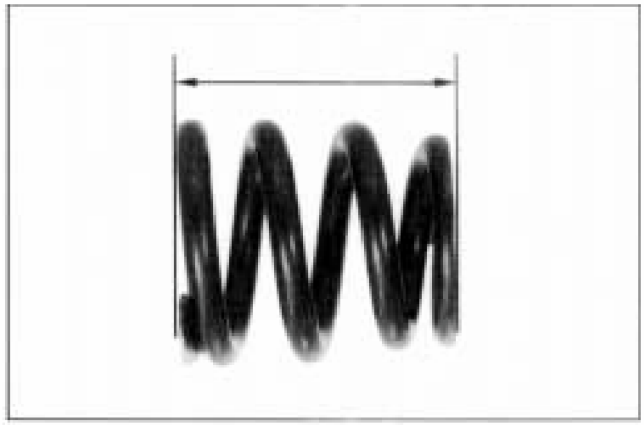
Calculate the gear-to-bushing and bushing-to-shaft clearance.

Service Limits:
Gear-to-bushing: 0.082 mm (0.0032 in)
Bushing-to-shaft: 0.082 mm (0.0032 in)



DAMPER SPRING
Measure the damper spring free length.

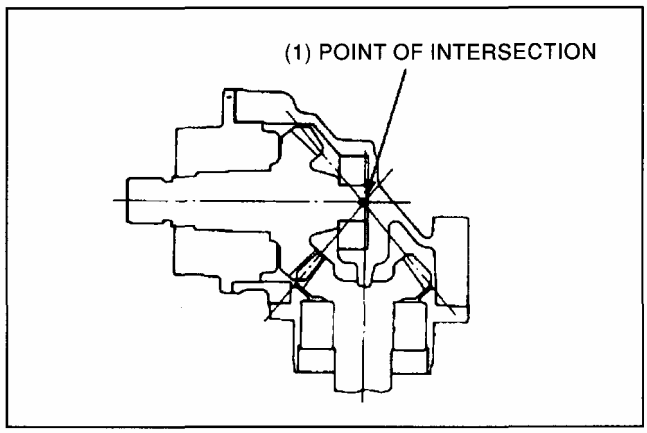
Service Limit: 56.0 mm (2.20 in)



BACKLASH INSPECTION/GEAR TOOTH CONTACT PATTERN CHECK

NOTE:

- Perform the backlash inspection and contact pattern check whenever you replace the output driven/drive gears, bushings, bearing holder and gear case. The extension lines from gear engagement surfaces should intersect at one point.



BACKLASH INSPECTION

Clamp the output gear case in a vise that has soft jaws or use a shop towel.

Set the horizontal type dial indicator on the output drive gear shaft as shown.
Hold the output driven gear shaft with the shaft holder and rotate the drive gear shaft until gear slack is taken up.

Tool:
Holder A **07PAB-0010100**

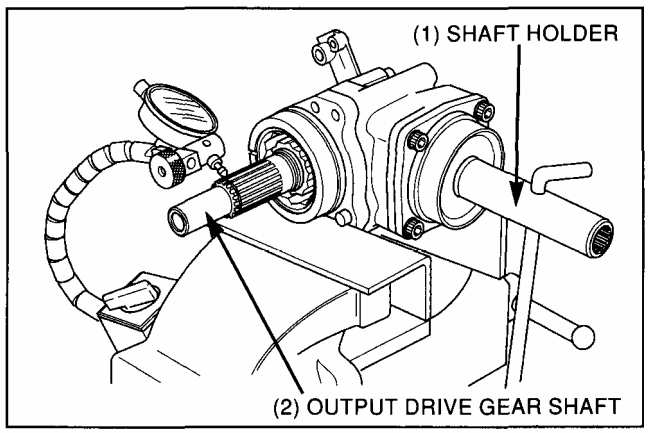
Turn the drive gear shaft back and forth to read backlash.

Service Limit: 0.40 mm (0.016 in)

Remove the dial indicator. Turn the drive gear shaft 120° and measure the backlash. Repeat this procedure once more.
Compare the difference between the measurements.

Backlash Difference Between Measurements:
Service Limit: 0.10 mm (0.004 in)

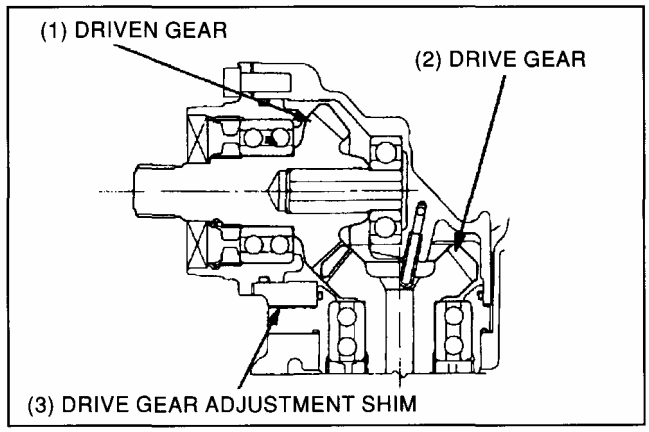
If the difference in measurements exceeds the limit, it indicates that the bearings and reinstall if necessary.



If the backlash is excessive, replace the output drive gear adjustment shim with a thicker one.
If the backlash is too small, replace the output drive gear adjustment shim with a thicker one.

Backlash is changed by about 0.06 - 0.07 mm (0.002 - 0.003 in) when shim thickness is changed by 0.10 mm (0.004 in).

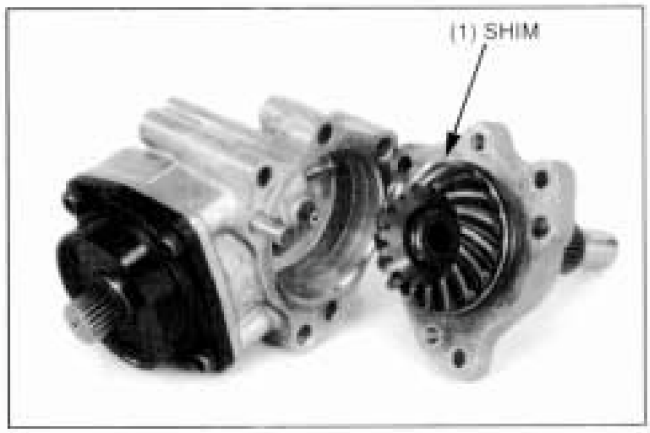
Output Drive Gear Adjustment Shims:
A: 0.40 mm (0.016 in)
B: 0.45 mm (0.018 in)
C: 0.50 mm (0.020 in) - Standard
D: 0.55 mm (0.022 in)
E: 0.60 mm (0.024 in)



To replace the shim, remove the drive gear and bearing holder as an assembly from the gear case.

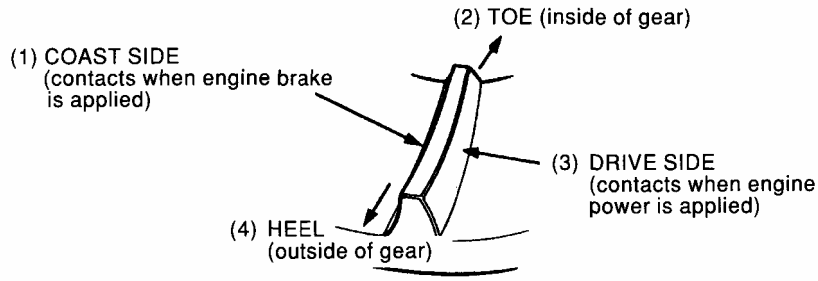
After replacing the shim, install the drive gear assembly (page 12-27).

After the backlash adjustments has been made, check the gear tooth contact pattern described below:



GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:

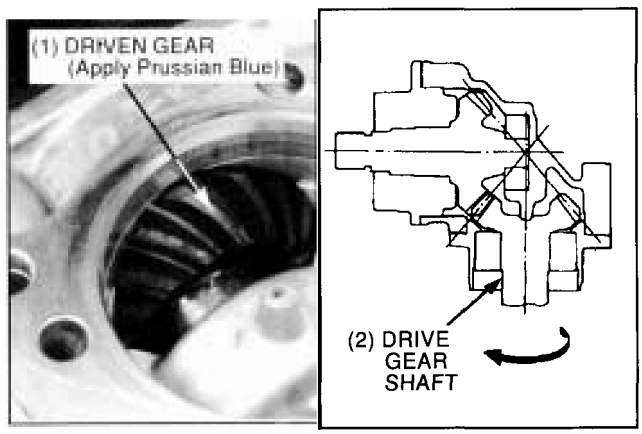


Remove the drive gear assembly from the gear case (see above).
Apply Prussian Blue to the output driven gear tooth.

Reinstall the drive gear with the shim (page 12-28).

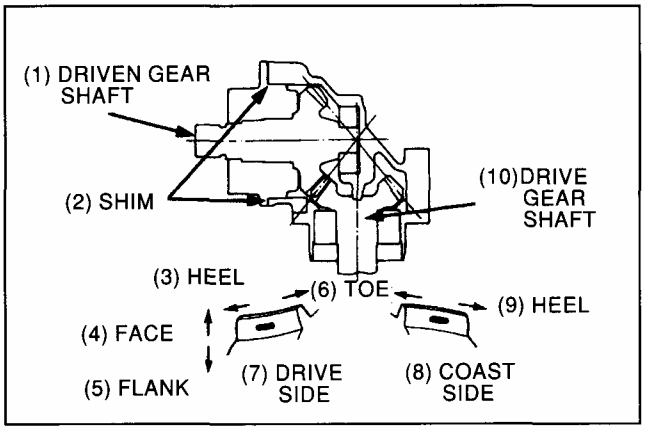
Rotate the drive gear shaft several times in normal direction of rotation.

Remove the drive gear assembly and check the gear tooth contact pattern as described on the following page:

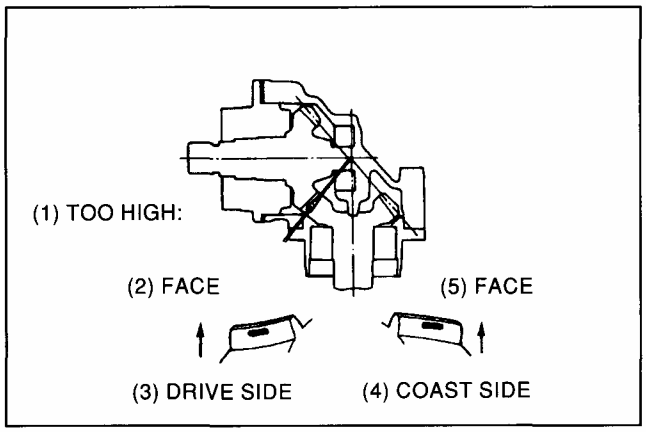


Contact is normal if Prussian Blue is transffered to the approximate center of each tooth and slightly to the toe.

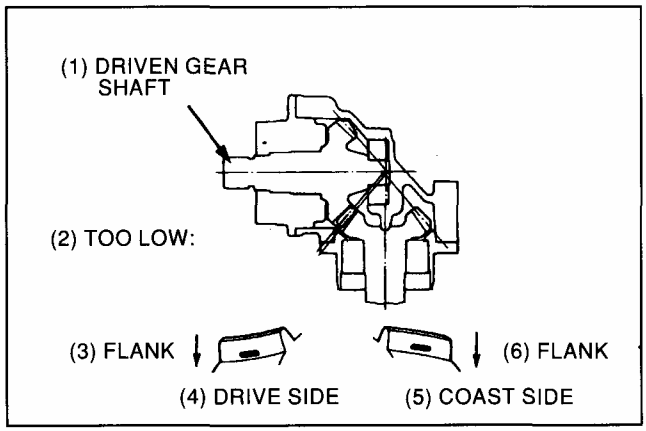
If the pattern is not correct, remove and replace the output driven gear adjustment shim.



Replace the shim with a thinner one if the contact pattern is too high.



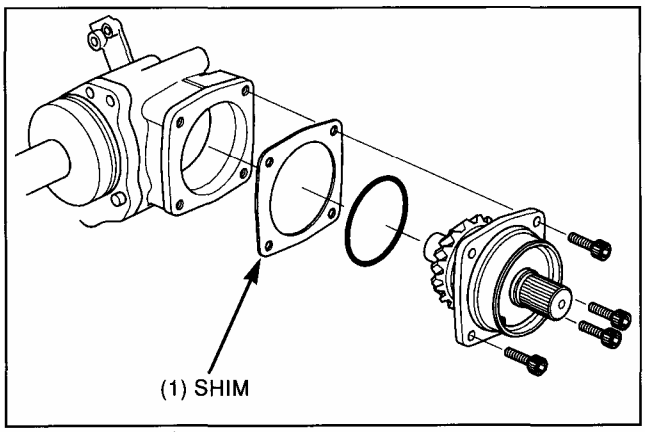
Replace the shim with a thicker one if the contact pattern is too low.



The pattern will shift about 1.5 - 2.0 mm (0.06 - 0.08 in) when the shim thickness is changed by 0.10 mm (0.04 in).

Output Drive Gear Adjustment Shims:
A: 0.20 mm (0.008 in)
B: 0.25 mm (0.010 in)
C: 0.30 mm (0.012 in)
D: 0.35 mm (0.014 in)
E: 0.40 mm (0.016 in) - Standard
F: 0.45 mm (0.018 in)
G: 0.50 mm (0.020 in)
H: 0.55 mm (0.022 in)
I: 0.60 mm (0.024 in)

To replace the shim, remove the driven gear and bearing holder as an assembly from the gear case.
After replacing the shim, install the driven gear assembly and tighten the bolts (page 12-34).



OUTPUT DRIVE GEAR DISASSEMBLY

CAUTION

• Be careful not to distort or damage the gear case.

Place the output gear case in a vise with soft jaws, being careful not to distort it.

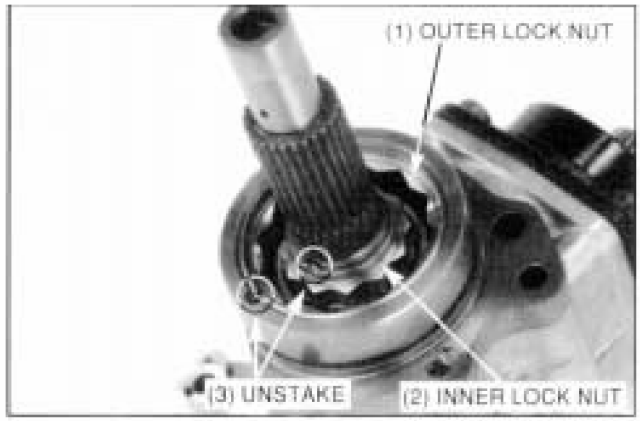
Install the shaft holder on the driven gear shaft, wedging if against the vise to lock the shaft.

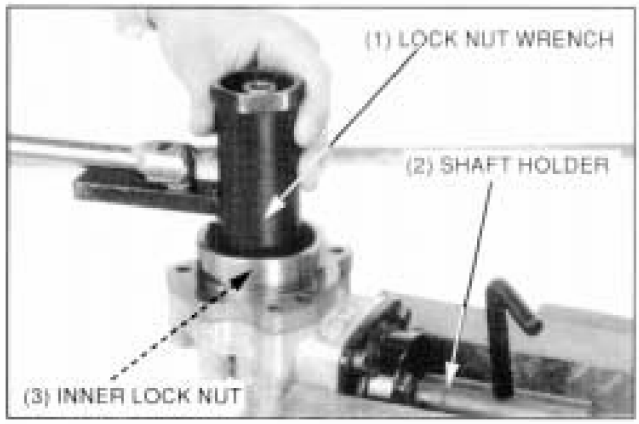
Tool:
Holder A **07PAB-0010100**

Unstake the bearing inner lock nut with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.

Remove the bearing inner lock nut and discard it.

Tools:
Holder A **07PAB-0010100**
Lock nut wrench **07916-MB00001**

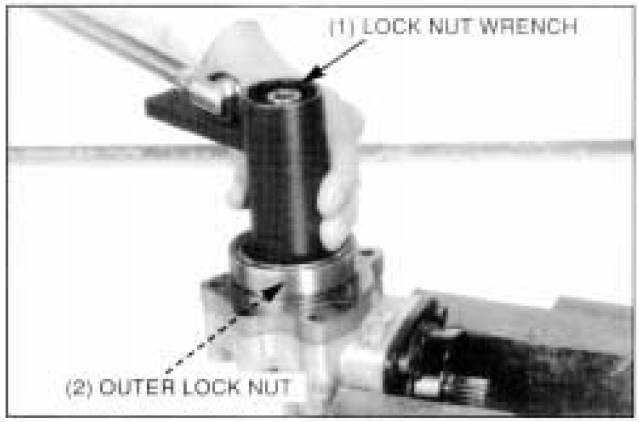




Remove the shaft holder.

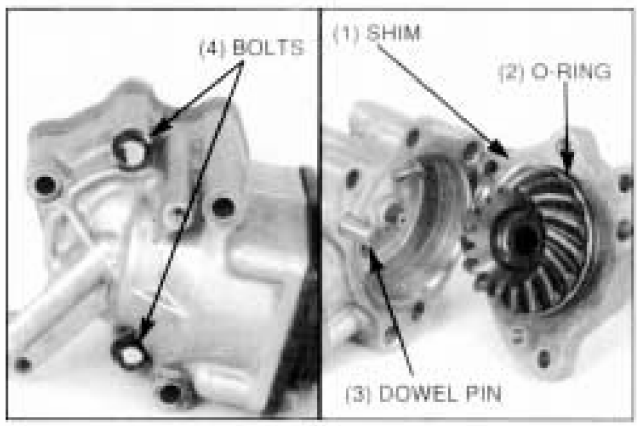
Unstake the bearing outer lock nut and discard it.

Tool:
Lock nut wrench **07916-MB00001**



Remove the two bolts and the drive gear bearing holder from the gear case.

Remove the adjustment shim and O-ring from the gear holder and remove the dowel pin from the gear case.

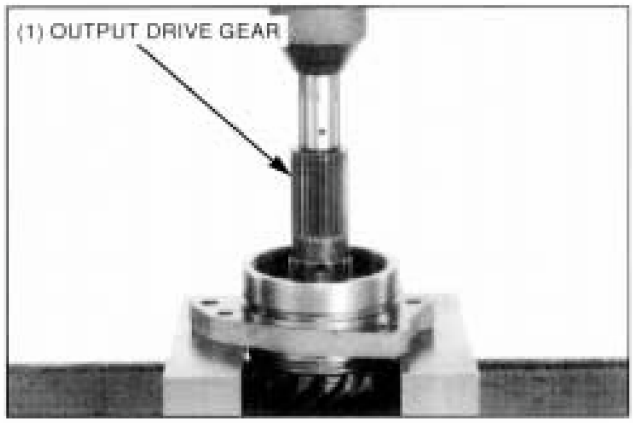


NOTE:

- Remove the center guide from the dis/assembly tool before using it.

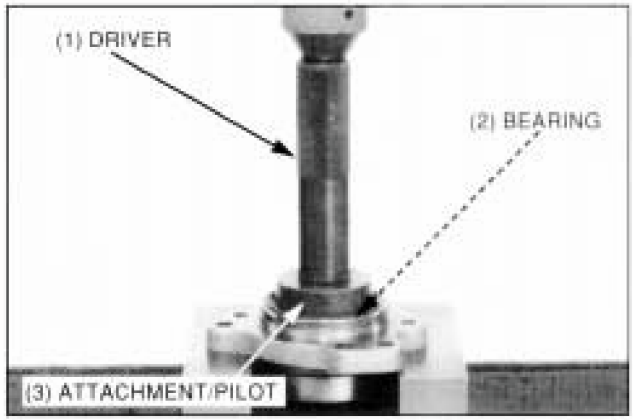
Place the output drive gear and a dis/assembly tool in a hydraulic press.

Tool:
Dis/assembly tool **07965-3710101**

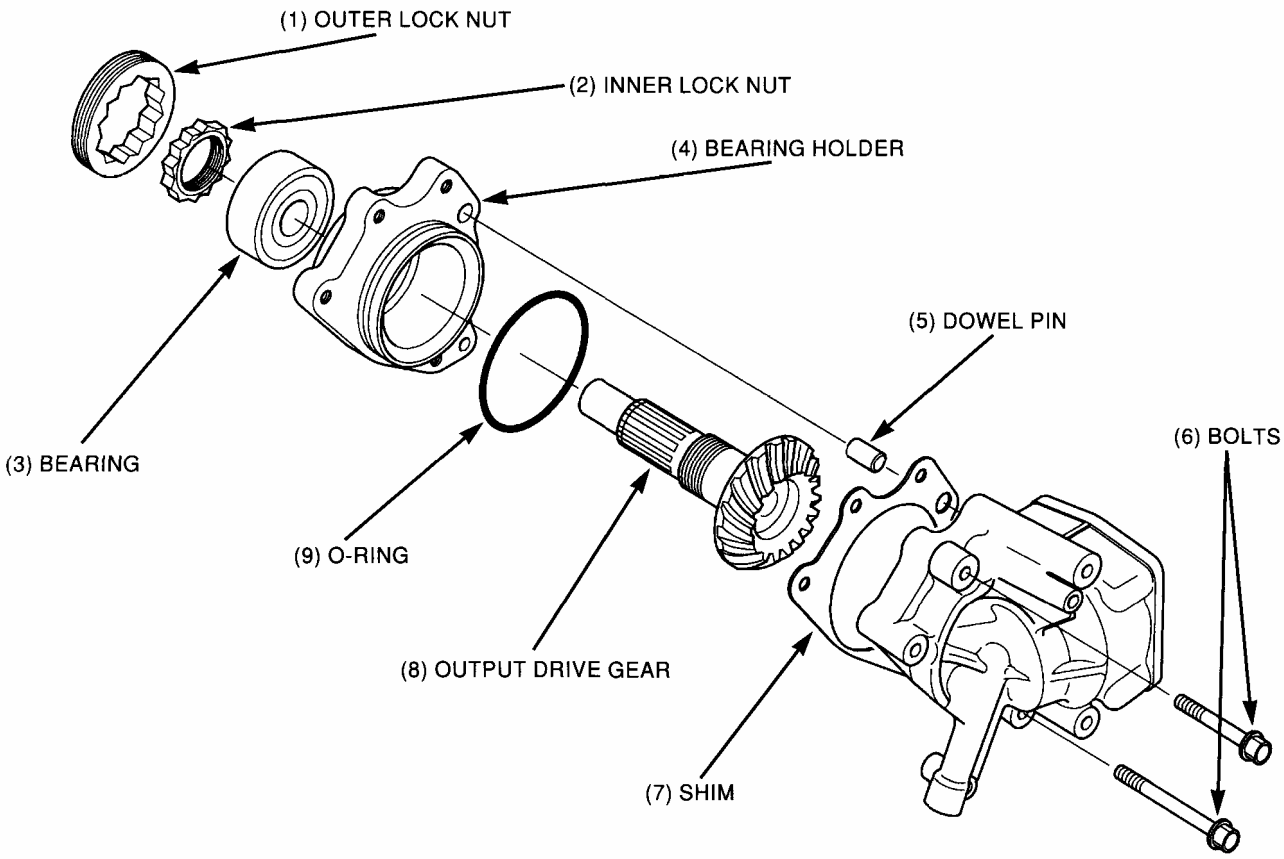


Remove the drive gear bearing using a hydraulic press.

Tools:
Driver **07749-0010000**
Attachment 62 x 68 mm **07746-0010500**
Pilot, 30 mm **07746-0040700**



OUTPUT DRIVE GEAR ASSEMBLY



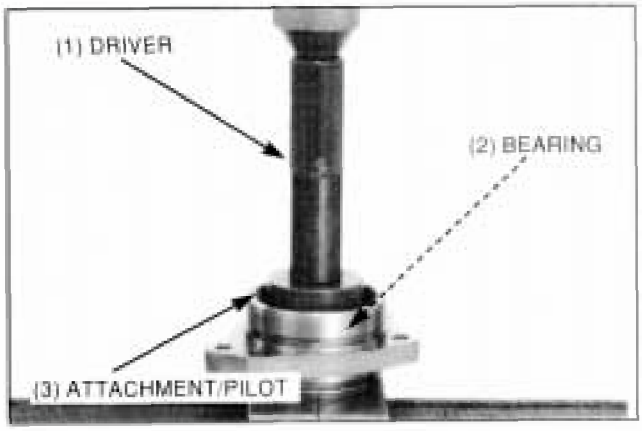
Press a new bearing into the bearing holder.

Tools:

Dis/assembly tool	**07965-3710101**
Driver	**07749-0010000**
Attachment, 62 x68 mm	**07746-0010500**
Pilot, 30 mm	**07746-0040700**

NOTE:

- If the output drive gear requires replacement, the drive and driven gears must be replaced as a set.



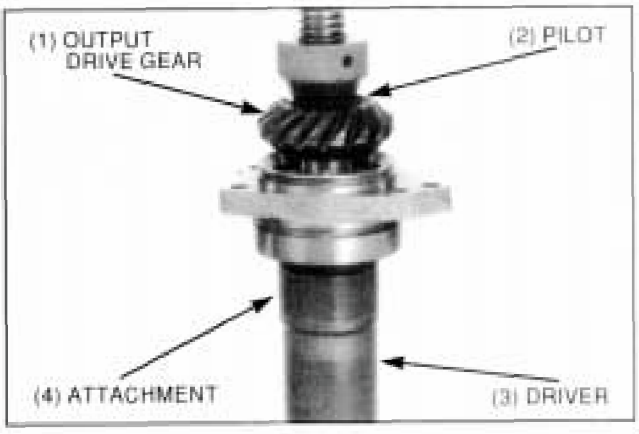
Support the bearing inner race and press the output drive gear into the bearing holder.

NOTE:

- Place the pilot's threaded end into the drive shaft.

Tools:

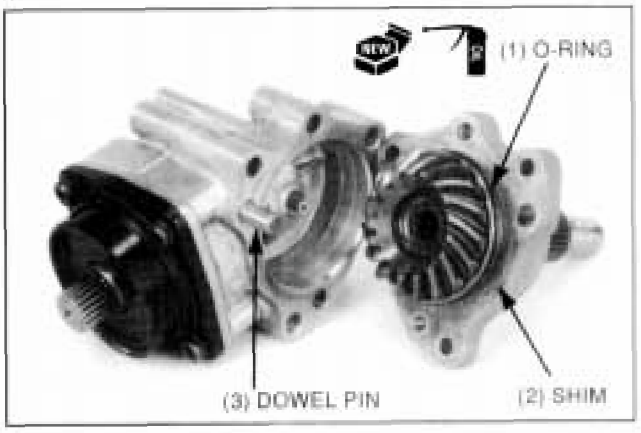
Inner handle	**07746-0030100**
Inner driver, 30 mm	**07746-0030300**
Pilot, 17 mm	**07746-0040400**



NOTE:

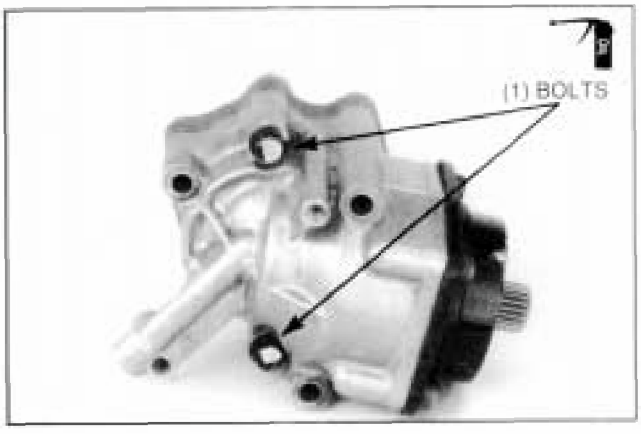
- If the bearing, gear, holder and/or case is replaced, a new adjustment shim must be selected (page 12-23, Backlash Inspection).

Install the dowel pin into the gear case.
Coat a new gear holder O-ring with engine oil and install it into gear holder groove.
Install the adjustment shim over the bearing holder.



Set the bearing holder into the gear case.
Apply engine oil to the gear holder bolt threads and seating surfaces then install them in position as shown.
Tighten the gear holder bolts.

Torque: 31 N·m (3.2 kgf-m, 23 lbf-ft)



Place the gear case in a vise with soft jaws, bearing careful not to distort it.

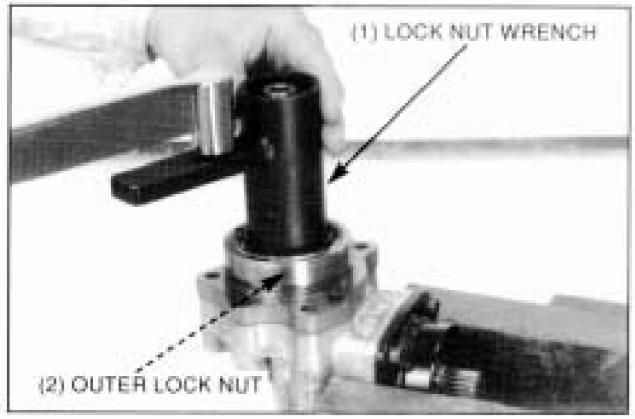
Apply engine oil to the threads of a new bearing outer lock nut and tighten to the specified torque.

Tool:
Lock nut wrench **07916-MB00001**

Torques: Actual: 98 N·m (10.0 kgf-m, 72 lbf-ft)
Indicated: 89 N·m (9.1 kgf-m, 66 lbf-ft)

NOTE:

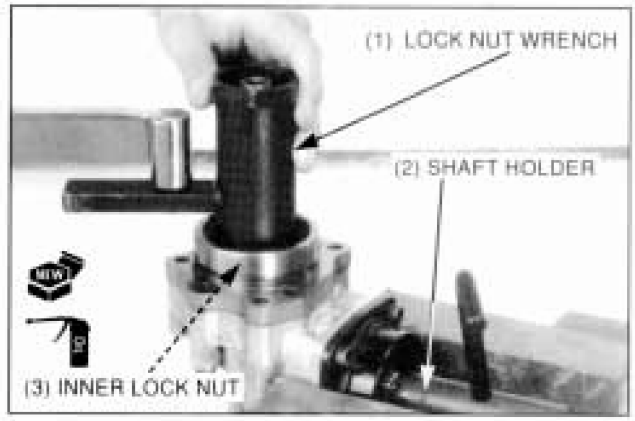
- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrenche's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual 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.



Apply engine oil to the threads of a new bearing inner lock nut and tighten it by holding the drive gear shaft.

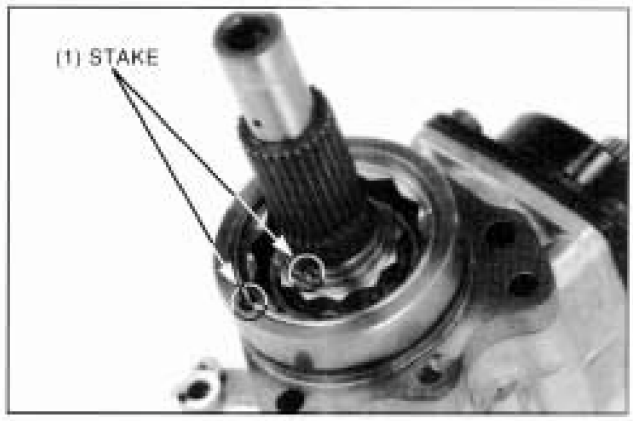
Tools:
Lock nut wrench **07916-MB00001**
Holder A **07PAB-0010100**

Torques: Actual: 69 N·m (7.0 kgf-m, 51 lbf-ft)
Indicated: 62 N·m (6.3 kgf-m, 46 lbf-ft)



Stake the inner and outer lock nuts.

Remove the shaft holder.



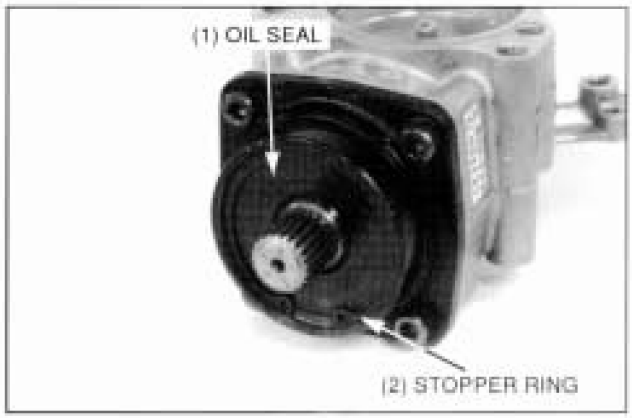
OUTPUT DRIVEN GEAR DISASSEMBLY

CAUTION

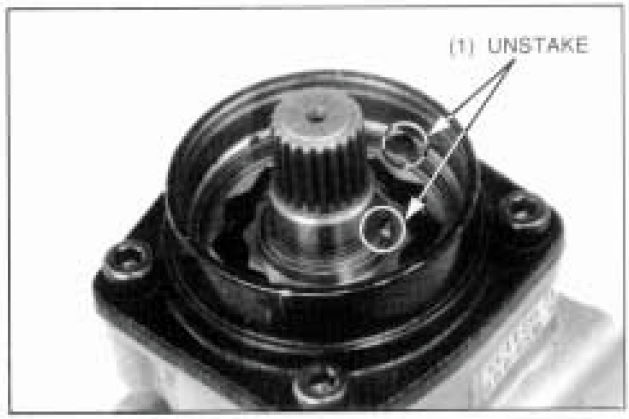
- **Be careful not to damage the bearing holder and gear case mating surface.**

Place the output gear case in a vise wit soft jaws, being careful not to damage it.

Remove the stopper ring out of the gear holder groove.
Remove the driven gear oil seal.



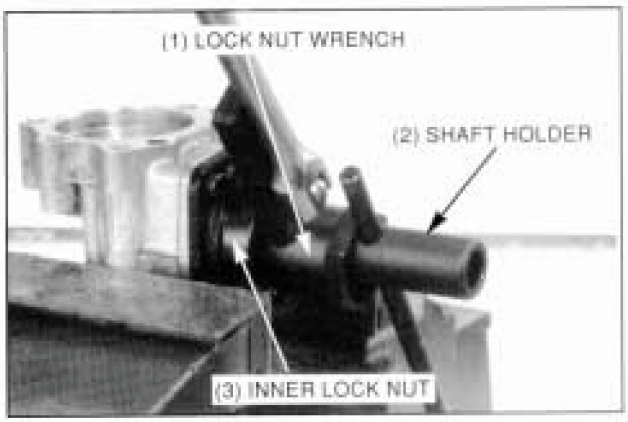
Unstake the bearing inner and outer lock nuts by plying or drilling.



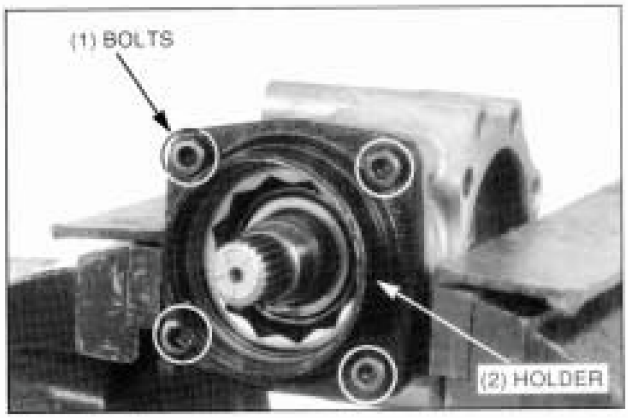
Hold the driven gear shaft and remove the bearing inner lock nut and discard it.

Tools:

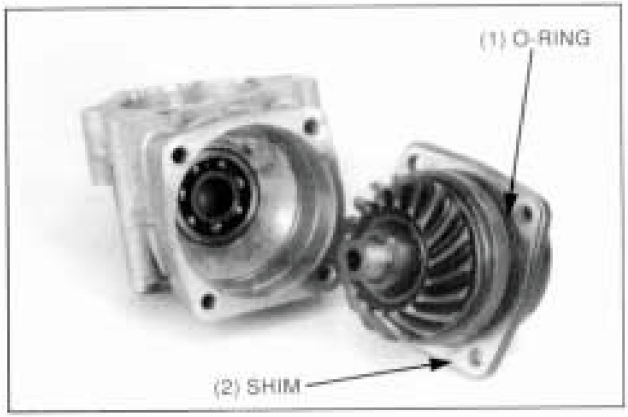
Lock nut wrench	**07916-MB00001**
Holder A	**07PAB-0010100**



Remove the driven gear bearing holder bolts and the holder from the gear case.



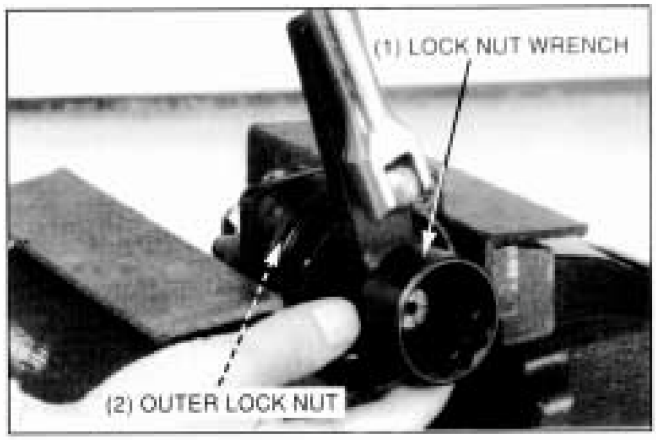
Remove the shim and O-ring from the bearing holder.



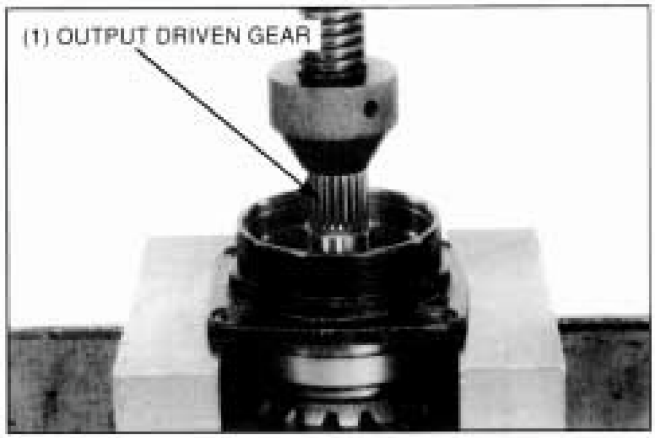
Place the driven gear bearing holder in a vise with soft jaws.

Remove the bearing outer lock nut and discard it.

Tool:
Lock nut wrench **07916-MB00001**



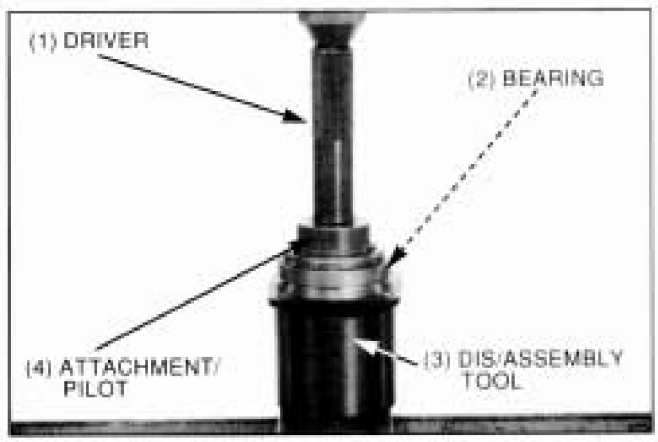
Press the output driven gear out of the bearing holder.



Remove the driven gear bearing using the special tools and a hydraulic press.

Tools:

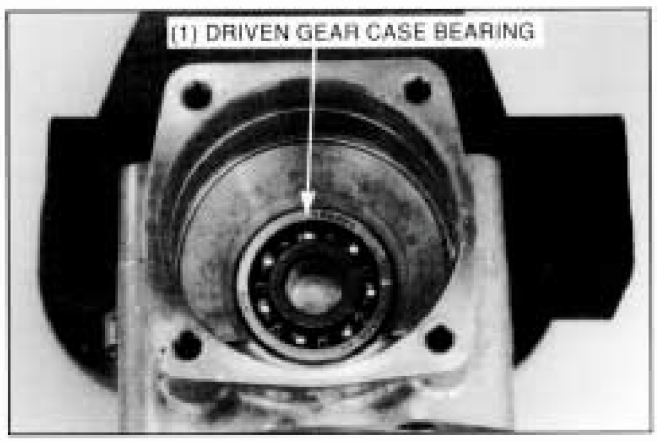
Dis/assembly tool	**07965-3710101**
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010400**
Pilot, 30 mm	**07746-0040700**



CAUTION

- **Always wear insulated gloves when handling a heated gear case.**

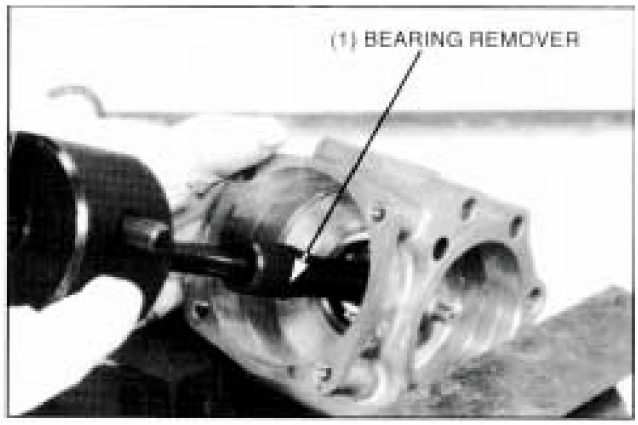
Heat the output gear case around the driven gear case bearing 80° C (176° F).



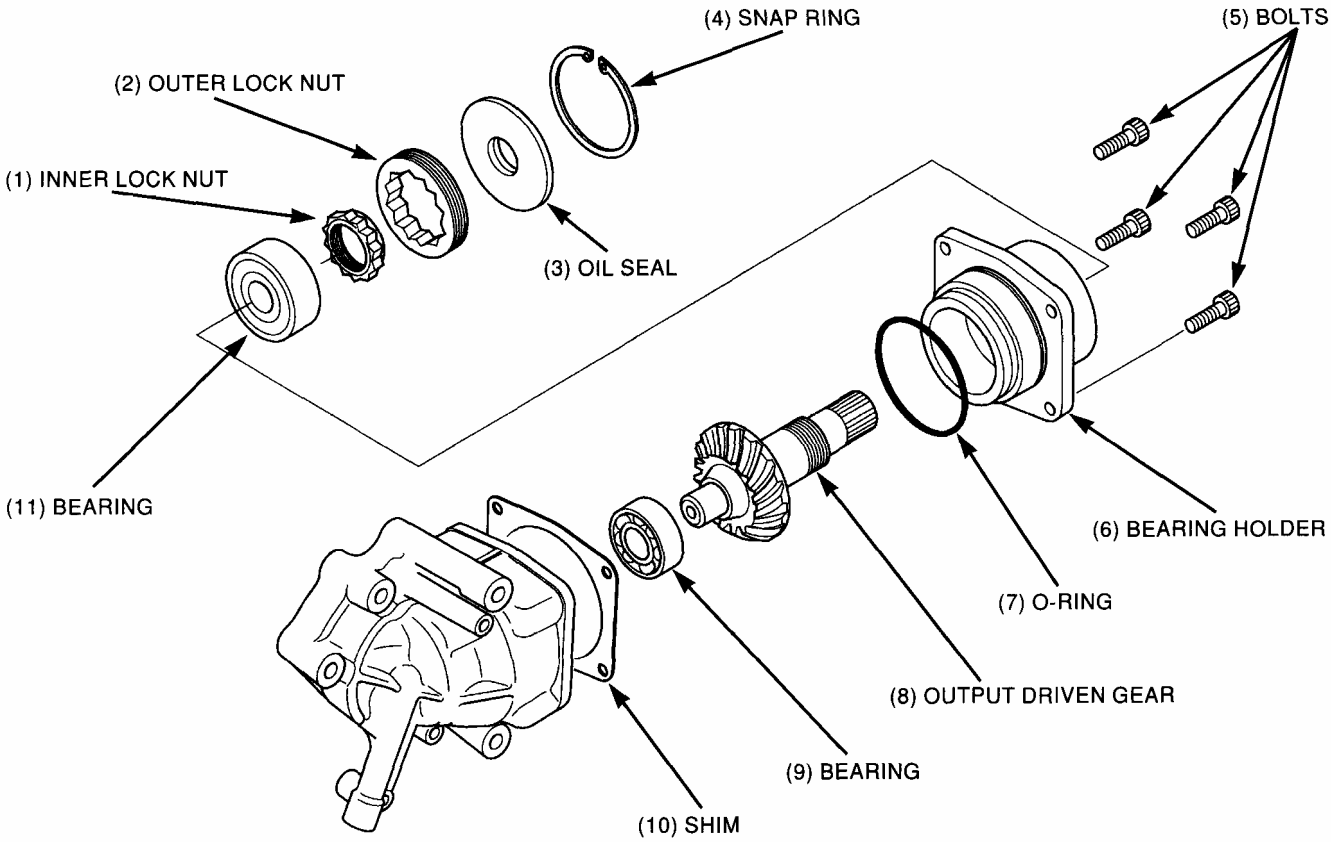
Remove the driven gear case bearing using the special tools.

Tools:

Bearing remover, 17 mm	**07936-3710300**
Remover handle	**07936-3710100**
Remover weight	**07741-0010201**



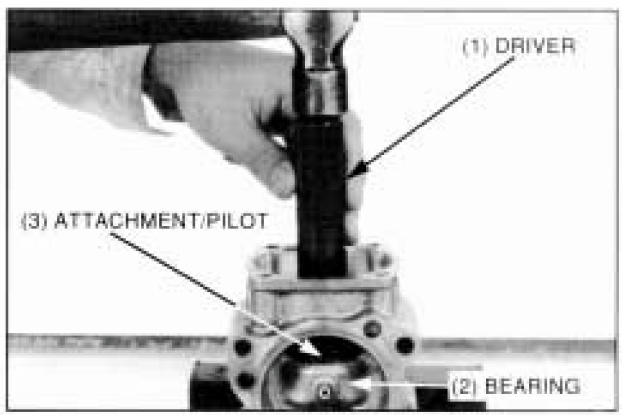
OUTPUT DRIVEN GEAR ASSEMBLY



Drive a new bearing into the gear case.

Tools:

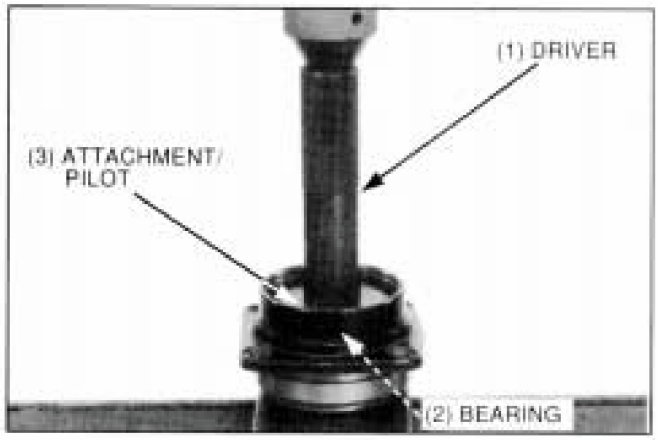
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 17 mm	**07746-0040400**



Press a new bearing into bearing holder and make sure it rotates freely after installation.

Tools:

Dis/assembly tool	**07965-3710101**
Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 30 mm	**07746-0040700**



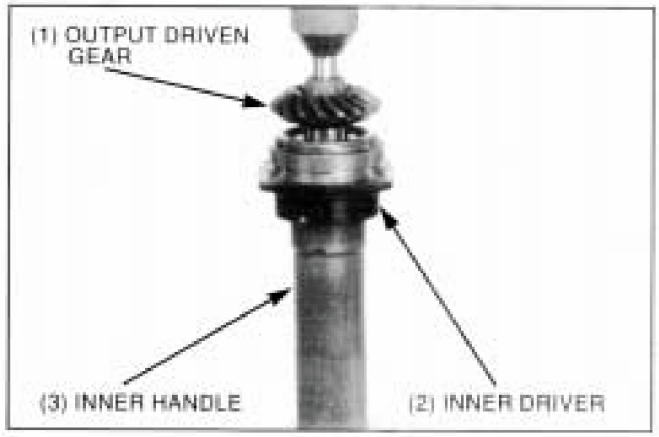
NOTE:

- If the output driven gear requires replacement, the driven and drive gears must be replaced as a set.

Support the bearing inner race and press the output driven gear into the bearing holder.

Tools:

Inner handle	**07746-0030100**
Inner driver, 30 mm	**07746-0030300**



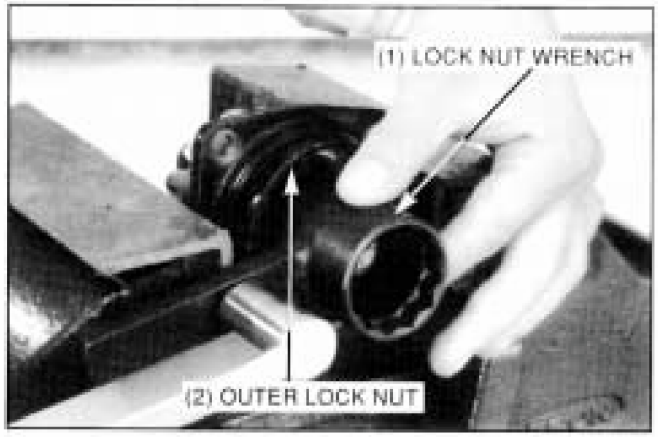
Place the bearing holder in a vise with soft jaws.

Apply engine oil to the threads of a new bearing outer lock nut and tighten to the specified torque.

Tool:

Lock nut wrench, 30 x 64 mm	**07916-MB00001**

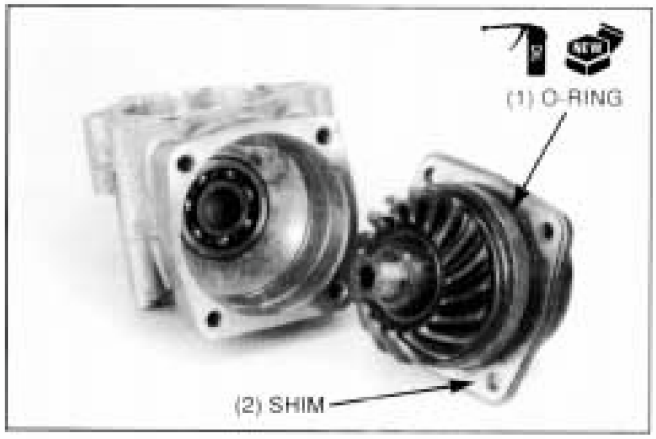
Torques: **Actual:** **98 N·m (10.0 kgf-m, 72 lbf-ft)**
Indicated: **89 N·m (9.1 kgf-m, 66 lbf-ft)**



NOTE:

- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrenche'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.

Coat a new gear holder O-ring with engine oil and install it into gear holder groove.
Install the adjustment shim over the bearing holder.



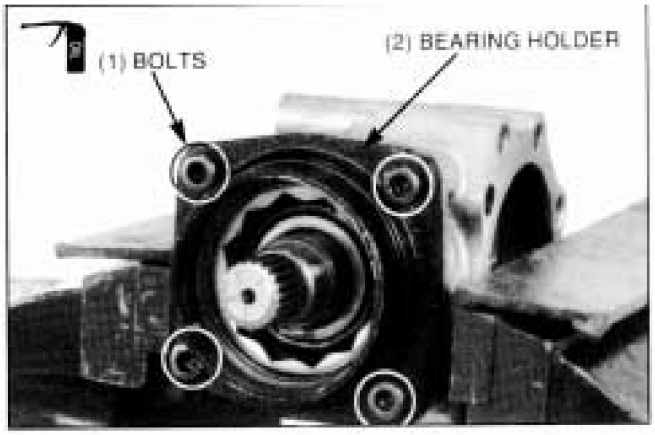
NOTE:

- When the bearing, gear, holder and/or case have been replaced, used the 0.40 mm (0.016 in) shim for initial reference.

Align the bolt holes in the bearing holder and shim then install them into the gear case.

Apply engine oil to the threads and seating surface of the bearing holder bolts and tighten them.

Torque: 31 N·m (3.2 kgf-m, 23 lbf-ft)



Apply engine oil to the threads of a new bearing inner lock nut and tighten it by holding the driven gear shaft.

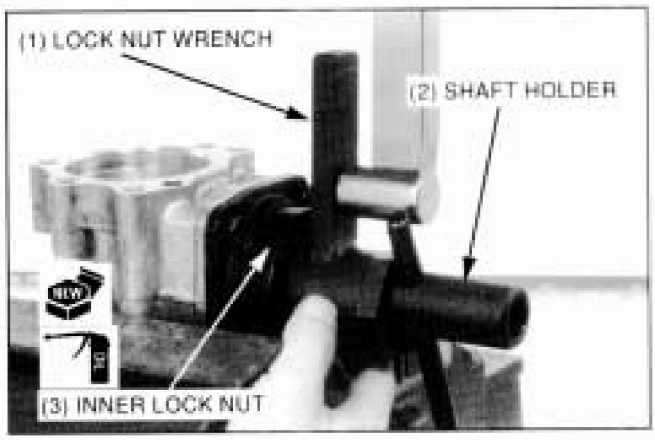
Tools:

Lock nut wrench	**07916-MB00001**
Holder A	**07PAB-0010000**

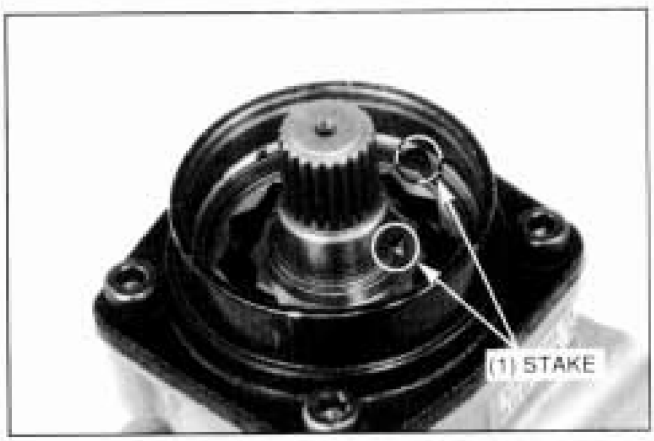
Torques: Actual: 69 N·m (7.0 kgf-m, 51 lbf-ft)
Indicated: 62 N·m (6.3 kgf-m, 46 lbf-ft)

NOTE:

- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrenche'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.

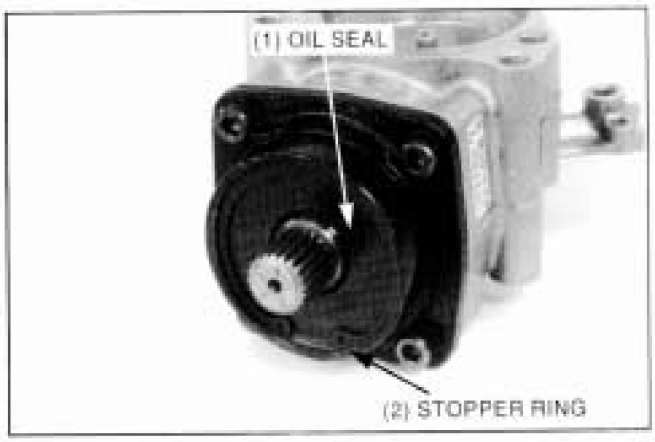


Stake the inner and outer lock nuts.



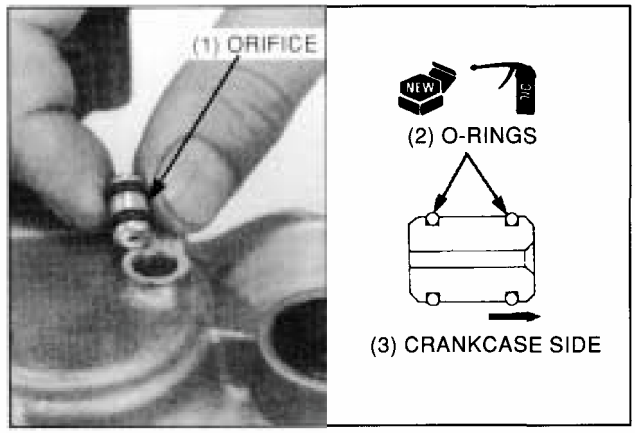
Pack grease into the seal lip cavity of a new driven gear oil seal and install it until the ring groove is visible so the stopper ring can be installed.

Install the stopper ring into the bearing holder groove securely.

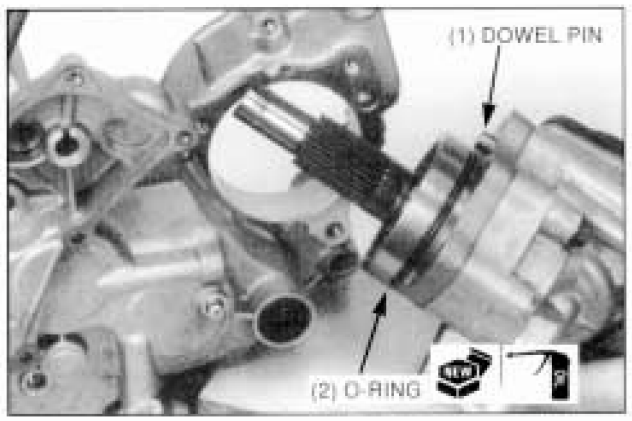


INSTALLATION

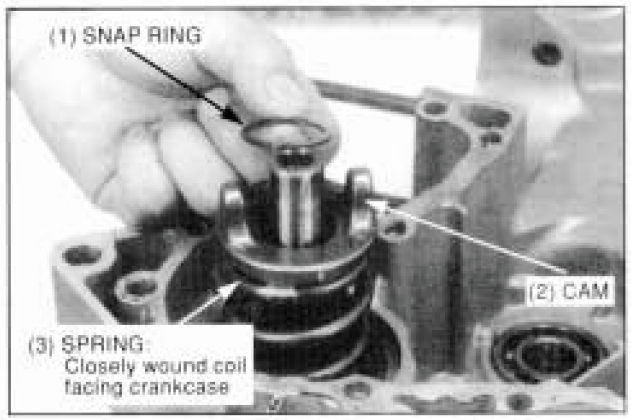
Coat new orifice O-rings with engine oil and install them into the orifice grooves.
Install the orifice into the crankcase with the chamfered hole side facing the crankcase.



Coat a new O-ring with engine oil and install it into the groove in the bearing holder.
Be sure to install the dowel pin in the bearing holder and install the output gear assembly onto the left crankcase.



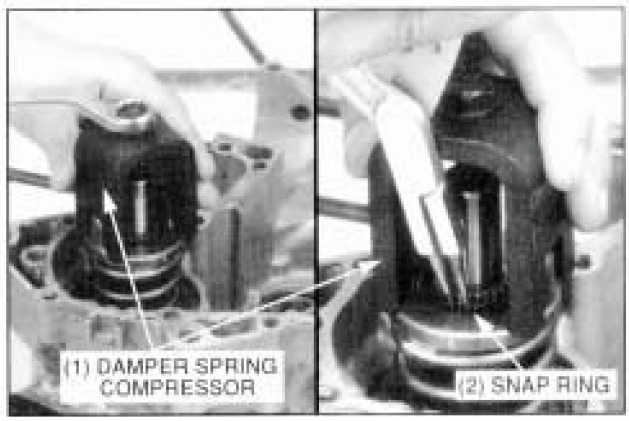
Install the damper spring over the drive gear shaft with the closely wound coil facing the left crankcase.
Install the damper cam onto the drive shaft and place the snap ring onto the damper cam.



Set the damper spring compressor onto the damper cam and drive gear shaft.
Compress the damper spring by turning the compressor bolt clockwise until the snap ring into the groove in the shaft securely.
Loosen and remove the compressor.

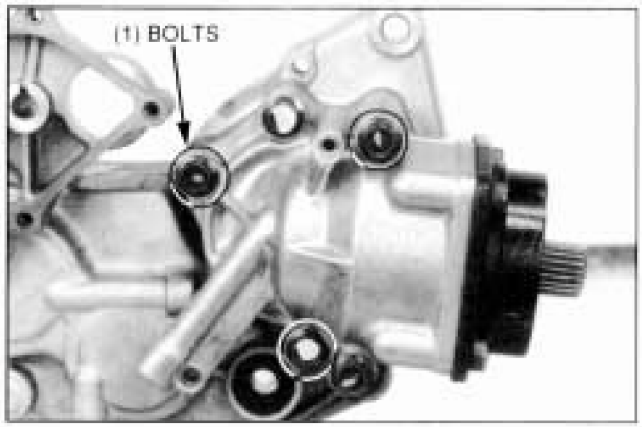
Tools:

Damper spring compressor	**07964-ME90000**
Snap ring pliers	**07914-5670101**

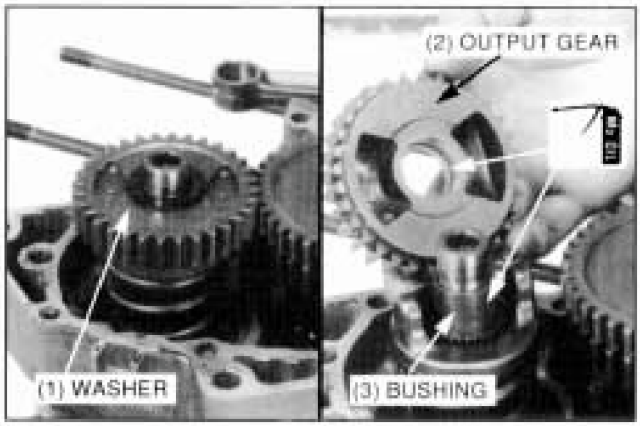


Tighten the gear case mounting bolts to the specified torque.

Torque: 31 N·m (3.2 kgf-m, 23 lbf-ft)



Apply molybdenum disulfied oil to the output gear and bushing sliding surfaces.
Place the washer, bushing and the output gear into the right crankcase with the dog holes facing up.
Assemble the crankcase (page 12-37).

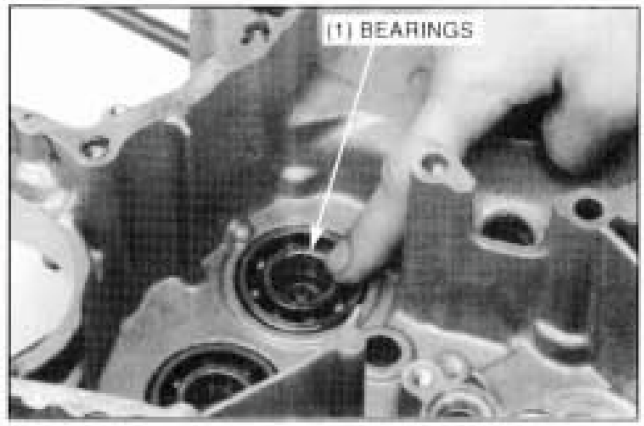


Crankcase Bearing Replacement

Remove the following:
- Crankshaft (page 12-6)
- Transmission (page 12-13)
- Oil pump (page 4-4)

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 crankcase.

Replace the bearings if the races does not turn smoothly and quietly, or if they fit loosely in the crankcase.



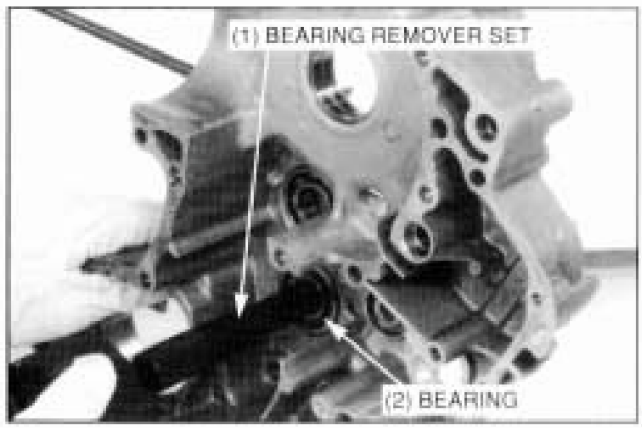
LEFT CRANKCASE BEARING REPLACEMENT

NOTE:

- The oil pump must be removed before replacing the crankcase bearing.

Remove the left mainshaft bearing using the special tools.

Tool:
Bearing remover set **07936-3710600**



Remove the left countershaft bearing and oil seal.

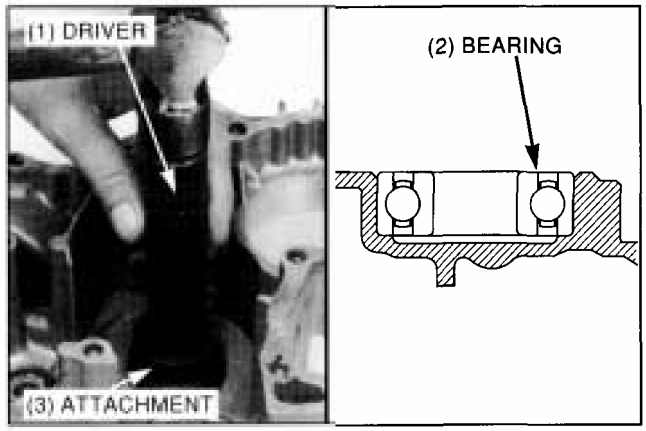
Install the new bearings to the left crankcase using the following special tools.

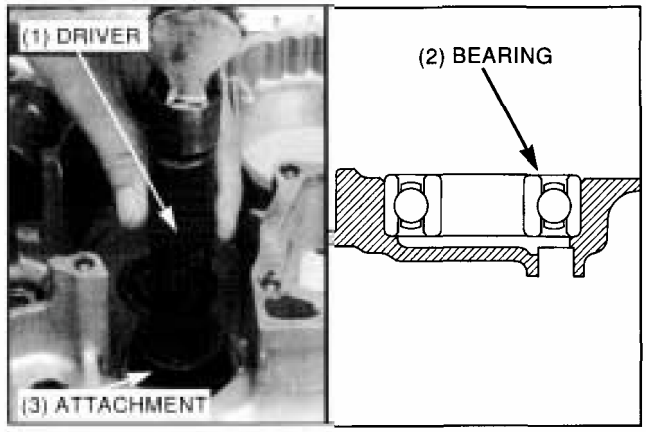
NOTE:

- Drive in the new bearings squarely with the marking side facing up.

Tools:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**

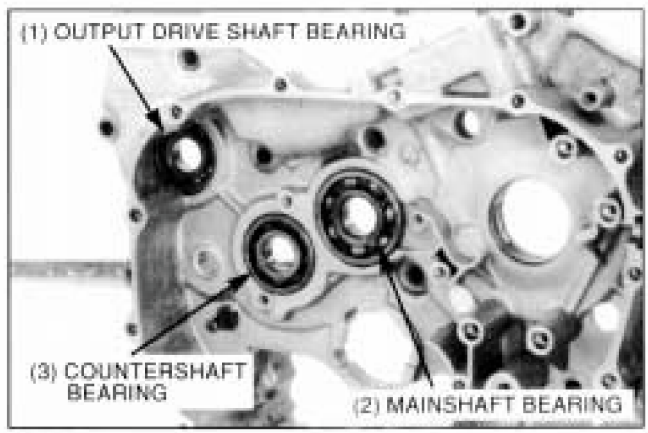




Check the gearshift spindle oil seal for damage.
Replace the gearshift spindle oil seal if necessary.

RIGHT CRANKCASE BEARING REPLACEMENT

Drive out the right mainshaft bearing, right countershaft bearing and output drive shaft bearing.



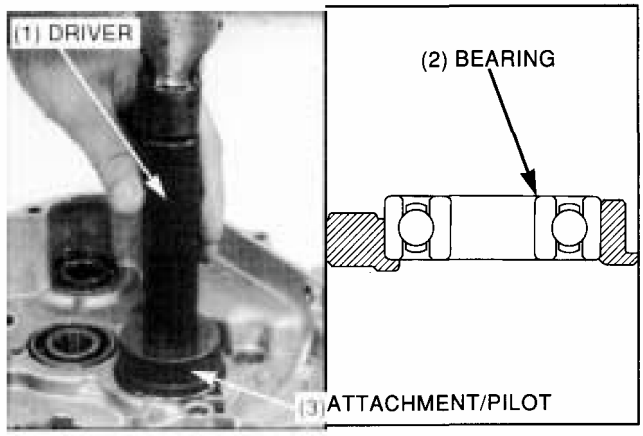
Install the new bearings to the right crankcase using the following special tools.

NOTE:

- Drive in the new bearings squarely with the marking side facing up.

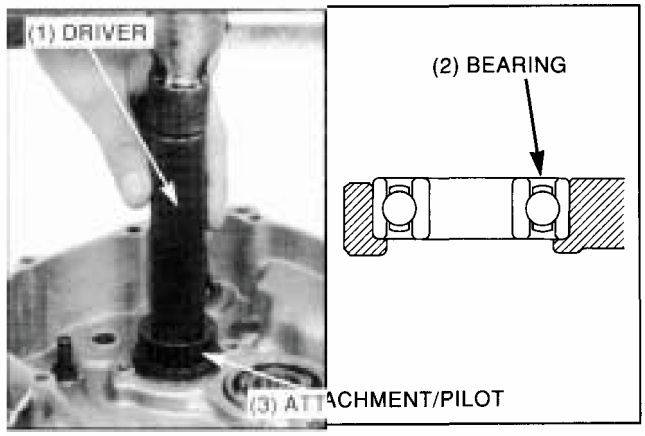
Tools:
Mainshaft bearing:

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



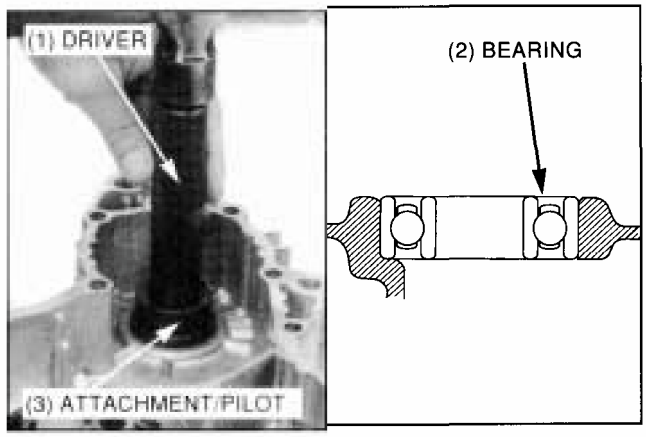
Tools:
Countershaft bearing:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**



Tools:
Output drive shaft bearing:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**

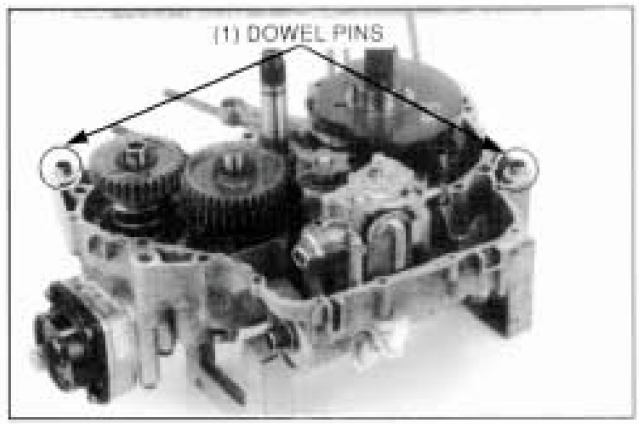


Crankcase Assembly

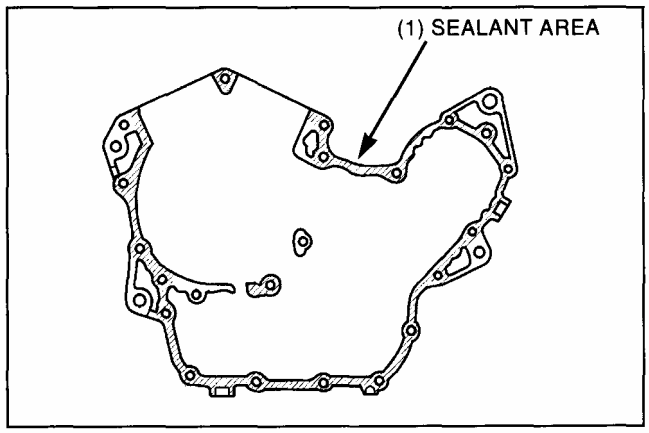
Clean the right and left crankcase mating surface thoroughly, being careful not to damage them.

Install the following:
- Crankshaft (page 12-11)
- Transmission (page 12-18)
- Oil pump (page 4-9)

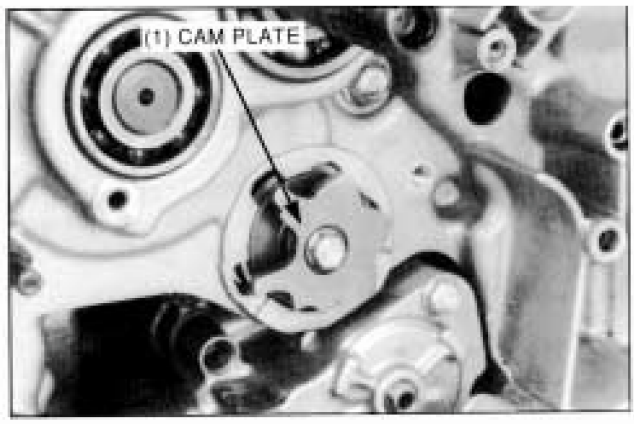
Install the dowel pins.



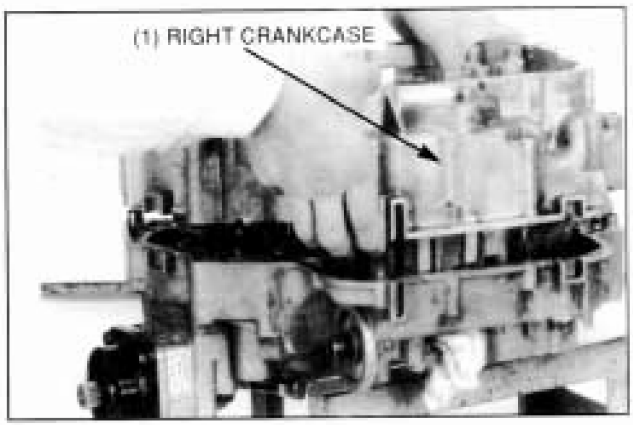
Apply a light but through coating of sealant to all crankcase mating surfaces except the oil passage area.



Turn the shift drum until shift cam plate as shown.

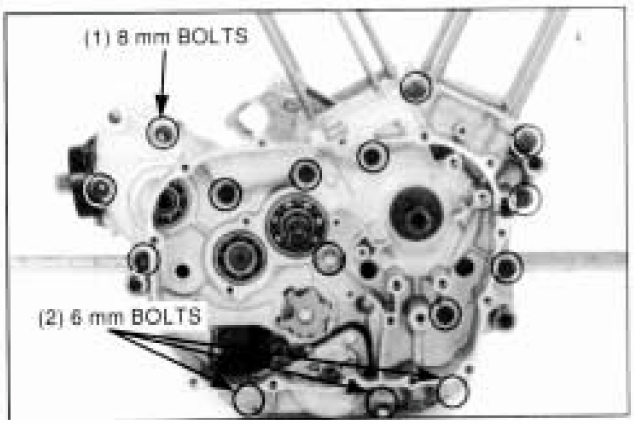


Install the right crankcase to the left crankcase.



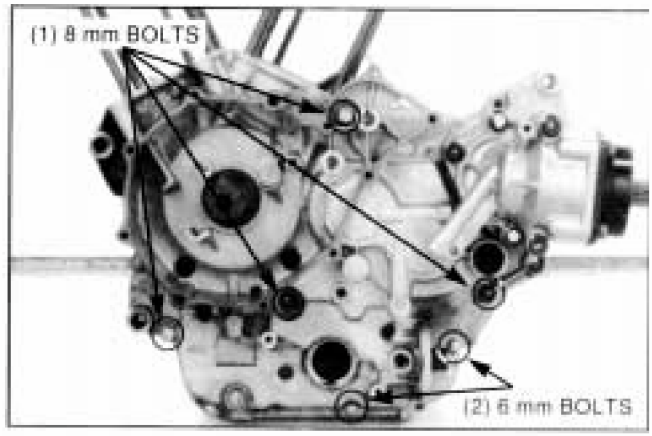
Install and tighten the right crankcase bolts in a crisscross pattern in several steps.

Torque: 8 mm bolt: 23 N·m (2.3 kgf-m, 17 lbf-ft)



Install and tighten the left crankcase bolts in a crisscross pattern in several steps.

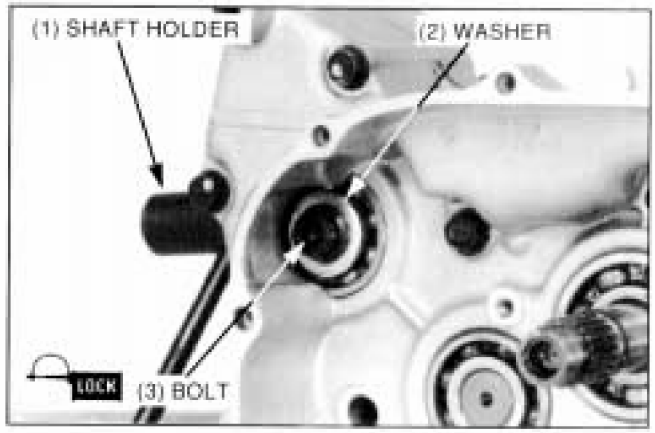
Torque: 8 mm bolt: 23 N·m (2.3 kgf-m, 17 lbf-ft)



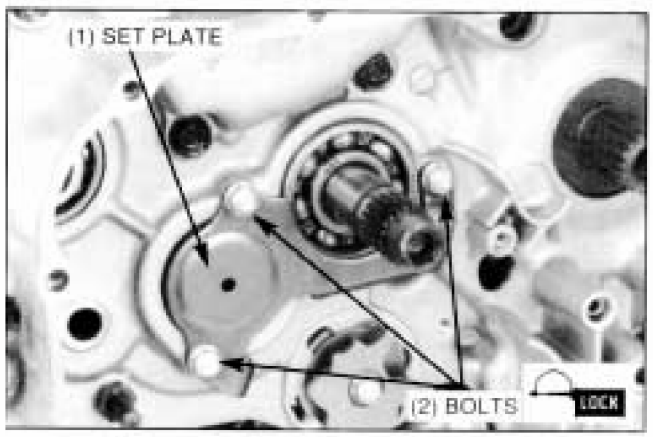
Clean and apply a locking agent to the output drive shaft bolt threads.
Install and tighten the bolt while holding the output driven gear shaft using a special tool.

Tool:
Holder A **07PAB-0010000**

Torque: 49 N·m (5.0 kgf-m, 36 lbf-ft)



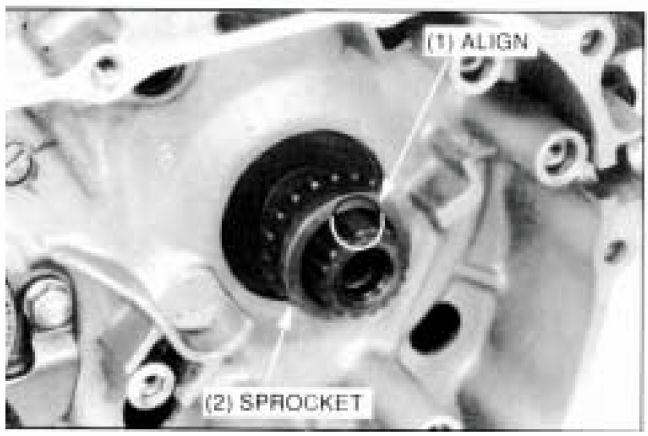
Clean and apply a locking agent to the mainshaft bearing set plate bolt threads.
Install the mainshaft bearing set plate.
Install and tighten the mainshaft bearing set plate bolts securely.



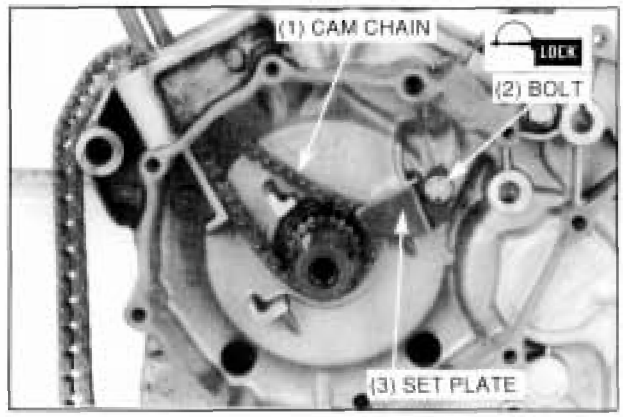
Install the cam chain drive gear to the crankshaft.

NOTE:

- The cam chain drive gear will only go on in one position because of the extra wide aligning spline.

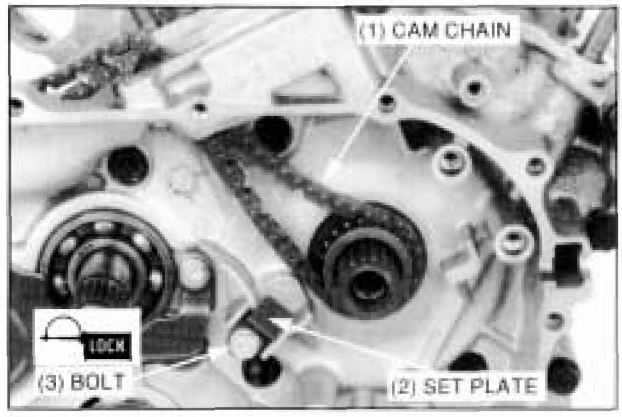


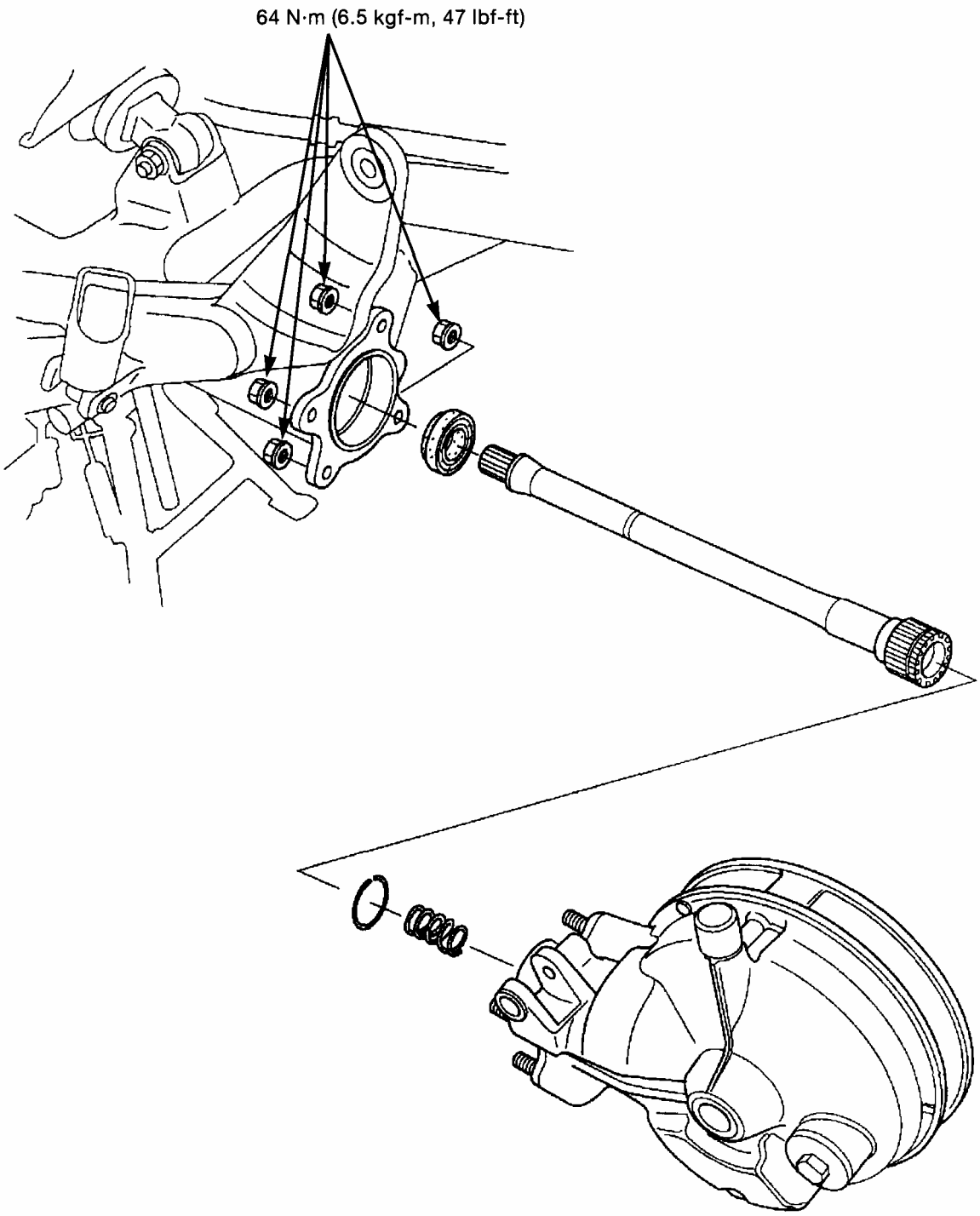
Install the rear cam chain to the cam chain drive sprocket tooth.



Install the front cam chain to the cam chain drive sprocket tooth.
Clean and apply a locking agent to the front cam chain tensioner set plate bolt threads.
Install the front cam chain tensioner set plate.
Install and tighten the front cam chain tensioner set plate bolt securely.

Install the engine to the frame (Section 7).




64 N·m (6.5 kgf-m, 47 lbf-ft)

13. Final Drive

SERVICE INFORMATION	13-1	FINAL DRIVE DISASSEMBLY	13-5
TROUBLESHOOTING	13-2	FINAL DRIVE ASSEMBLY	13-10
FINAL DRIVE REMOVAL	13-3	FINAL DRIVE INSTALLATION	13-19

Service Information

GENERAL

- The final drive gear assembly and final drive shaft must be removed together.
- Replace the ring and pinion gears as a set.
- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gear or gear case. The extension lines from the gear engagement surfaces should intersect at one point.
- Protect the gear case with a shop towel or soft jaws while holding it in vise. Do not clamp it too tight as it could damage the gear case.

SPECIFICATIONS

Unit: mm (in)

Item	Standard	Service Limit
Recommended final drive oil	Hypoid gear oil, SAE #80	—
Final drive oil capacity at draining/disassembly	150 cm^3 (5.1 US oz, 5.3 Imp oz)	—
Final drive gear backlash	0.05-0.15 (0.002-0.006)	0.3 (0.01)
Backlash difference between measurements	—	0.10 (0.004)
Ring gear-to-stop pin clearance	0.3-0.6 (0.01-0.02)	—
Final drive gear assembly pre-load	0.2-0.4 N·m (2-4 kgf·m, 1.7-3.5 lbf·in)	—

TORQUE VALUES

Final gear case assembly mounting nut	64 N·m (6.5 kgf-m, 47 lbf-ft)	UBS bolt
Final drive oil filler cap	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Gear case cover bolt: 10 mm	47 N·m (4.8 kgf-m, 35 lbf-ft)	Apply a locking agent to the threads
8 mm	25 N·m (2.5 kgf-m, 18 lbf-ft)	
Pinion retainer	108 N·m (11.0 kgf-m, 80 lbf-ft)	
Pinion retainer lock tab bolt	10 N·m (1.0 kgf-m, 7 lbf-ft)	
Pinion gear shaft nut	108 N·m (11.0 kgf-m, 80 lbf-ft)	
Dust guard plate bolt	10 N·m (1.0 kgf-m, 7 lbf-ft)	Self tapping screw

TOOLS

Universal bearing puller	07631 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Attachment, 52 x 55 mm	07746 - 0010400
Inner handle	07746 - 0030100
Inner driver, 25 mm	07746 - 0030200
Driver	07749 - 0010000
Retainer wrench	07910 - MA10000
Pinion holder	07924 - ME40002
- Pinion holder plate	07924 - ME40110
- Set collar, 11 x 16 x 50	07924 - ME40120
Puller shaft	07931 - ME40000
Bearing puller & driver attachment	07934 - MB00000 or 07965 - 6920201
Ball driver attachment	07945 - 3330300
Seal driver attachment	07965 - KE80200 or 07931 - 4630300
Bearing driver attachment	07GAD - SD40101
Pinion puller base	07HMC - MM80110

Troubleshooting

Excessive noise
- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gear
- Oil level too low

Oil leak
- Clogged breather
- Oil level too high
- Seals damaged

Final Drive Removal

GEAR CASE REMOVAL

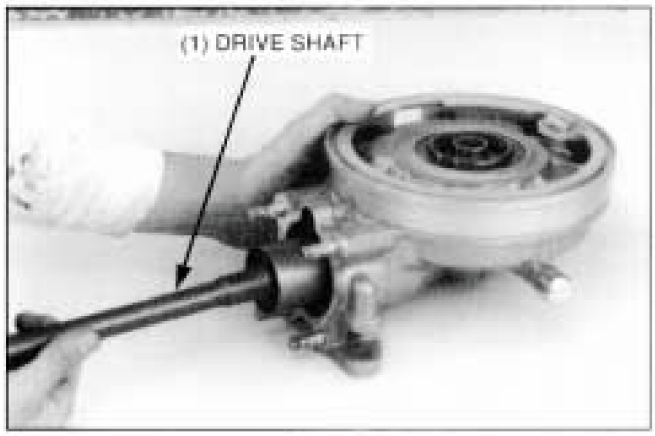
Place the motorcycle on its center stand.

Remove the rear wheel (page 15-3).
Drain the final drive oil (page 3-18).

Remove the gear case mounting nuts, then remove the final gear case from the swingarm.

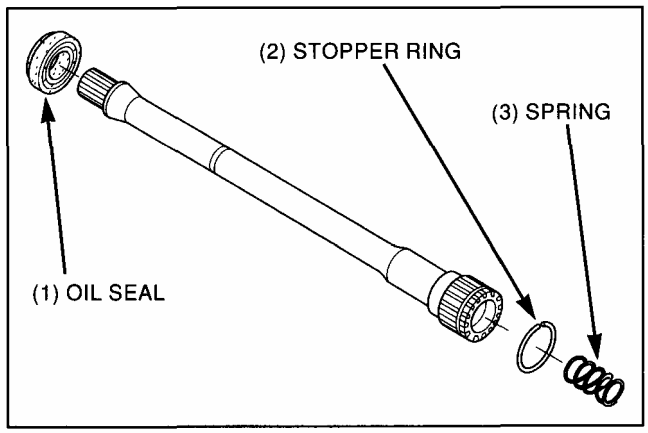
DRIVE SHAFT REMOVAL/DISASSEMBLY

Separate the drive shaft from the gear case by gently turning the drive shaft and pulling.



Remove the spring, oil seal and stopper ring from the drive shaft.

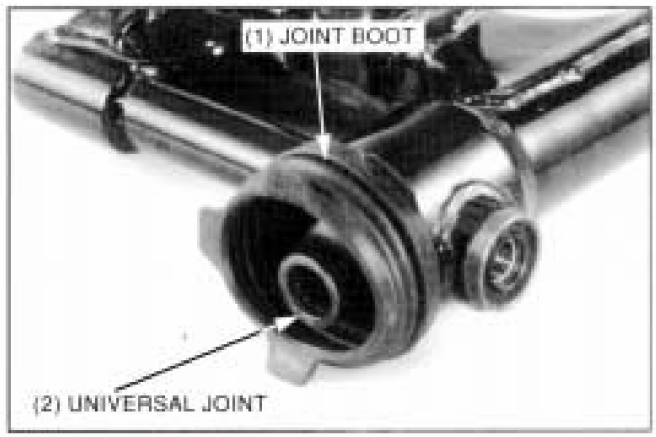
Check the splines of the drive shaft for wear or damage.
If the splines are damaged, check the universal joint splines also.



UNIVERSAL JOINT REMOVAL

Remove the swingarm (page 15-13).

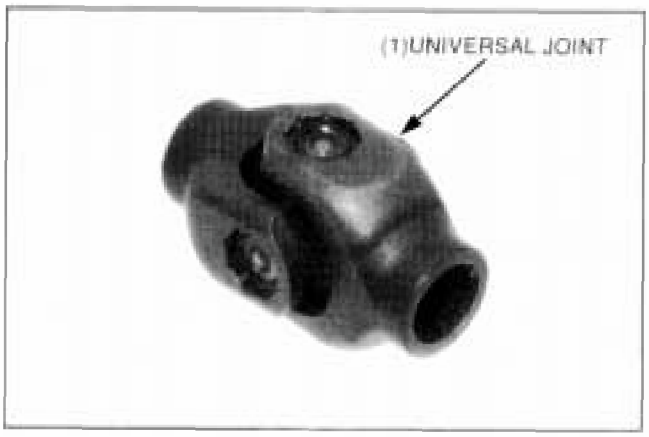
Remove the universal joint from the swingarm.



INSPECTION

UNIVERSAL JOINT

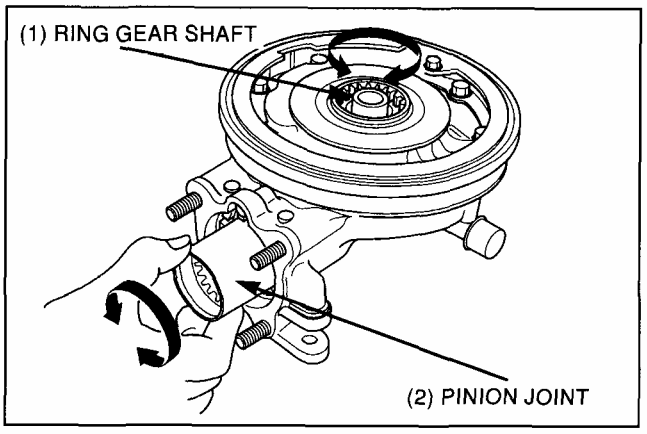
Check that the universal joint moves smoothly without binding or noise.
Check the splines for wear or damage.



FINAL GEAR ASSEMBLY

Turn the pinion joint and check that the ring gear turns smoothly and quietly without binding.

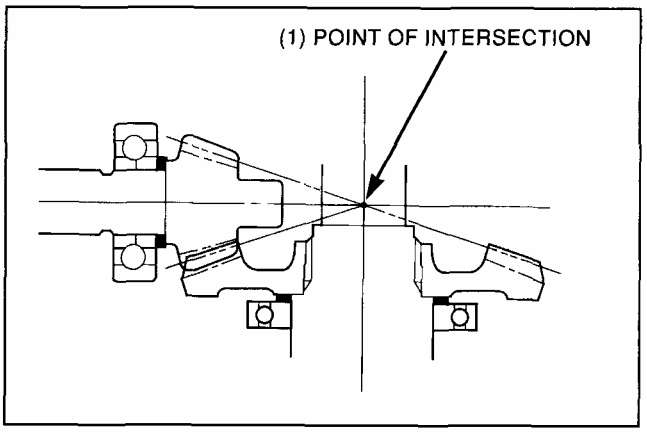
If the gears do not turn smoothly or quietly, the bearings and/or gears may be damaged or faulty.
They must be checked after disassembly, replace them if necessary.



BACKLASH INSPECTION

NOTE:

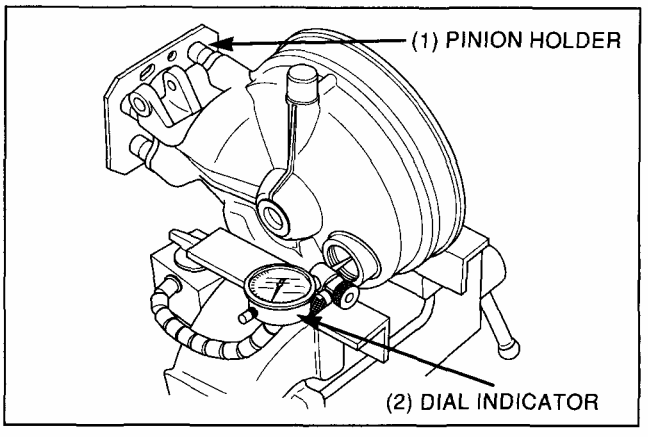
- Perform the backlash inspection and tooth contact pattern check (page 13-7) whenever you replace the gear set, bearings or gear case. The extension lines from the gear engagement surfaces should intersect at one point.



Remove the oil filler cap.
Set the final gear assembly into a jig or vise with soft jaws.

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Hold the pinion gear spline with special tool.

Tool:
Pinion holder **07924 - ME40002**



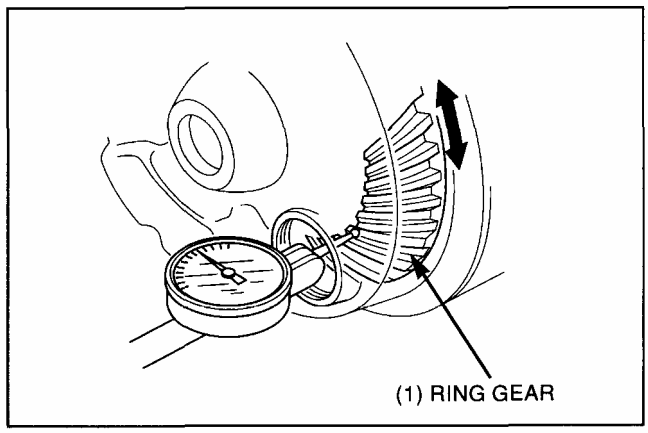
Turn the ring gear back and forth to read backlash.

Standard: 0.05-0.15 mm (0.002-0.006 in)
Service Limit: 0.3 mm (0.01 in)

Remove the dial indicator.
Turn the ring gear 120° and measure backlash.
Repeat this procedure once more.

Compare the difference between the three measurement.

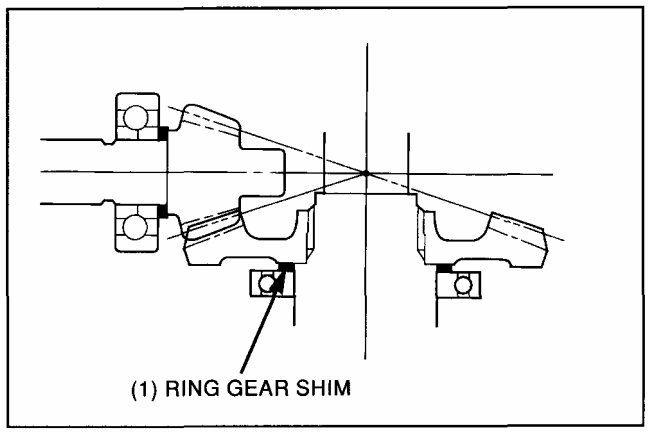
Backlash Difference Between Measurement:
Service Limit: 0.10 mm (0.004 in)



If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely.
Inspect the bearings and reinstall the bearing if necessary.

If backlash is excessive, replace the ring gear shim with a thicker one.
If the backlash is too small, replace the ring gear shim with a thinner one.

Ring Gear Shims:
A: 1.82 mm (0.072 in)
B: 1.88 mm (0.074 in)
C: 1.94 mm (0.076 in)
D: 2.00 mm (0.079 in) - Standard
E: 2.06 mm (0.081 in)
F: 2.12 mm (0.083 in)
G: 2.18 mm (0.086 in)
H: 2.24 mm (0.088 in)
I: 2.30 mm (0.091 in)

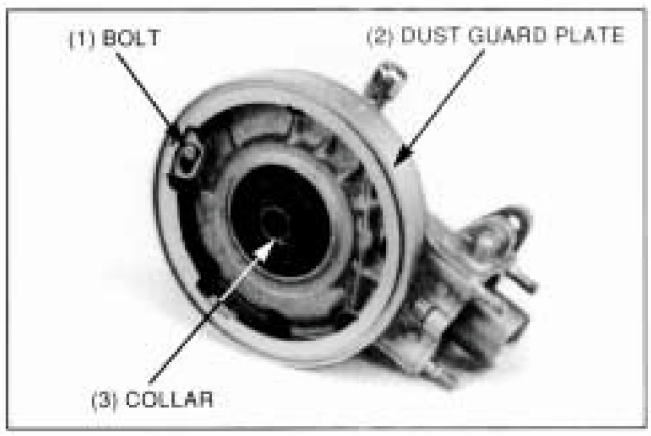


Final Drive Disassembly

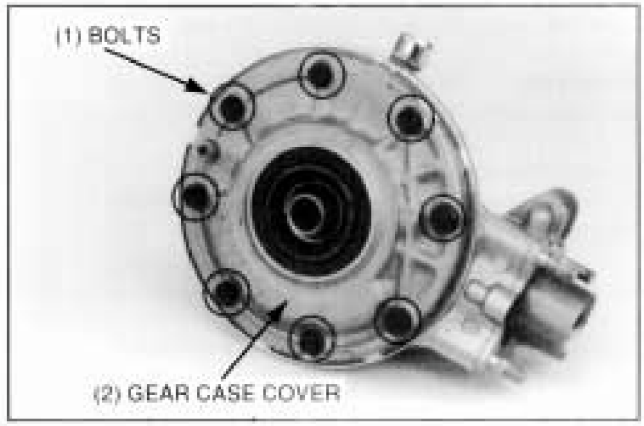
RING GEAR REMOVAL

Remove the distance collar.

Remove the dust guard plate bolt with the washer and remove the dust guard plate by turning it clockwise.



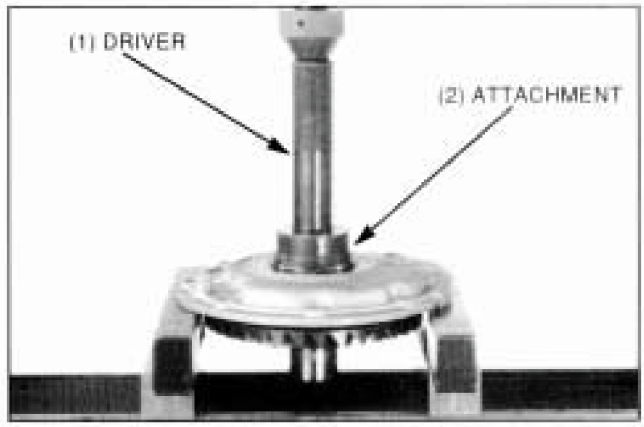
Remove the eight case cover bolts and the gear case cover.



If the ring gear stays in the cover, press out the ring gear using a hydraulic press and special tools.

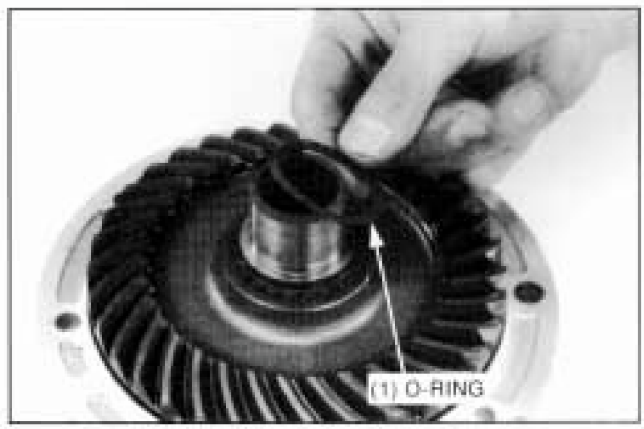
Tools:

Driver	**07749 - 0010000**
Attachment, 52 x 55 mm	**07746 - 0010400**



Remove the ring gear from the gear case.
Remove the wave washer.

Remove the O-ring guide by tapping it from the opposite side.



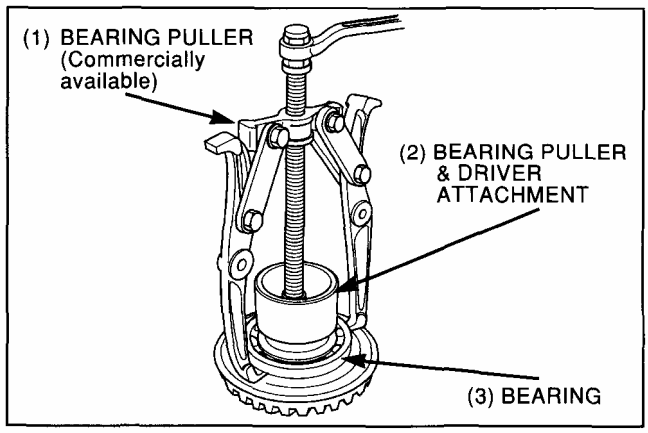
Remove the ring gear bearing using a commercially available bearing puller and the special tool.

Tool:

Bearing puller & driver attachment	**07934 - MB00000 or 07965 - 6920201**

NOTE:

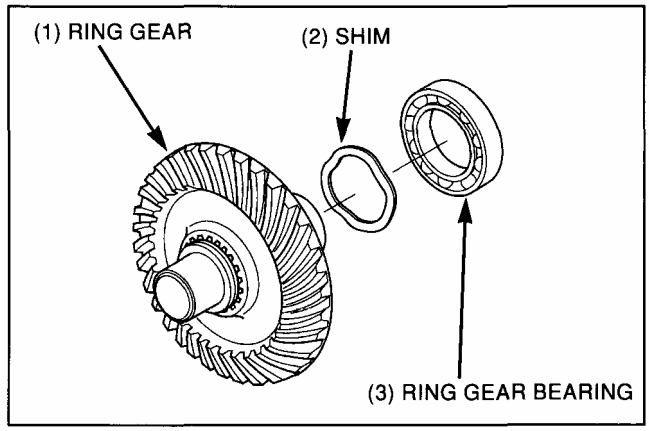
- This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.



Remove the ring gear and shim.

NOTE:

- If the gear set, pinion bearing, ring gear bearing and/or gear case are replaced, install a 2.00 mm (0.079 in) thick shim (standard).

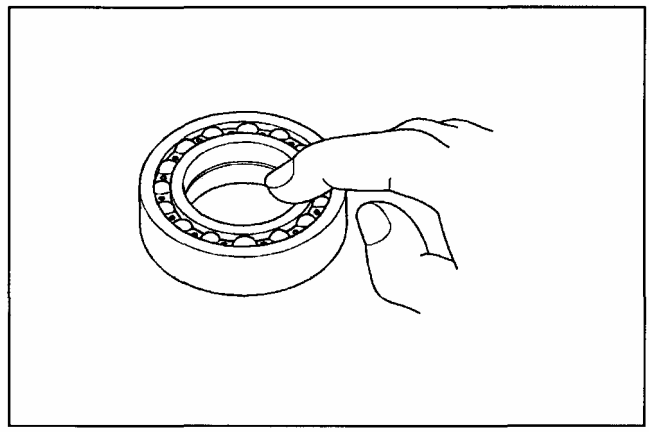


RING GEAR BEARING INSPECTION

Turn the inner race of the ring gear bearings with your finger. The bearings should turn smoothly and quietly. Also check that the outer races fit tightly in the case or cover.

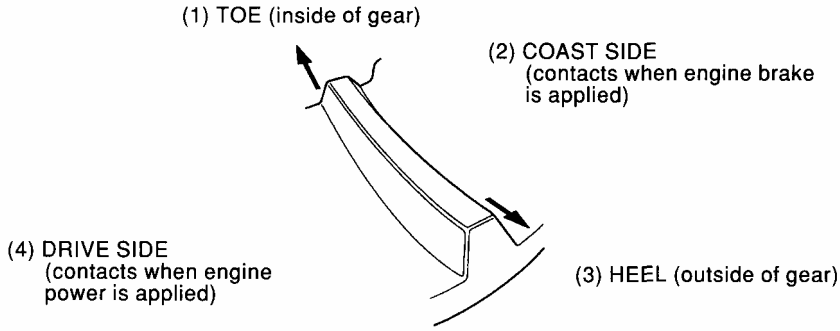
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they loosely fit in the case or cover.

For ring gear bearing replacement, refer to page 13-15.
For drive pinion removal and disassembly, refer to page 13-9

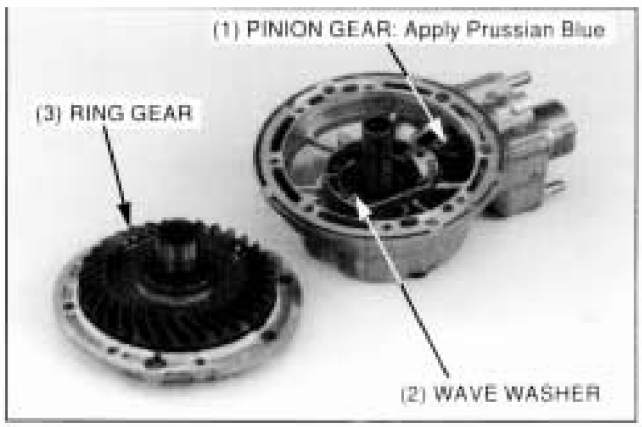


GEAR TOOTH CONTACT PATTERN CHECK

Description of the tooth:

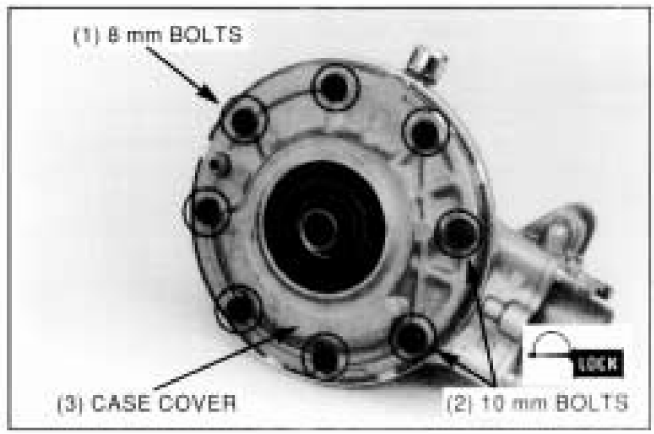


Apply a thin coat of Prussian Blue to the pinion gear teeth for a tooth contact pattern check.
Place the wave washer and ring gear into the gear case.



Tighten the cover bolts in 2-3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps. Next apply a locking agent to the 10 mm bolt threads and tighten them to the specified torque.

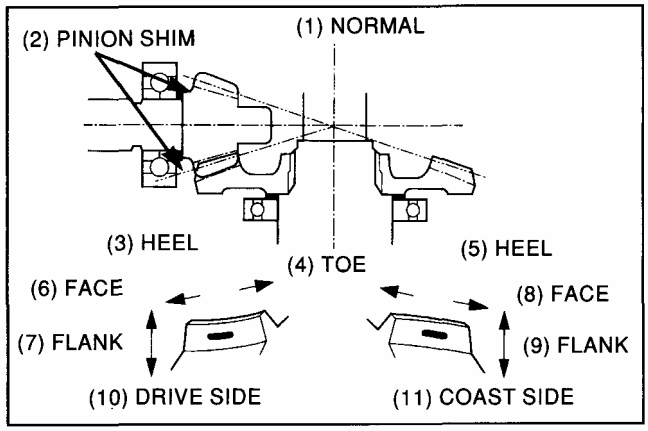
Torques: 8 mm: 25 N·m (2.6 kgf-m, 19 lbf-ft)
10 mm: 47 N·m (4.8 kgf-m, 35 lbf-ft)



Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in the normal direction of rotation.

Check the gear tooth contact pattern through the oil filler hole.
The pattern is indicated by the Prussian Blue applied to the pinion.
Contact is normal if the Prussian Blue applied is transferred to the approximate center of each tooth and slightly towards the face.



If the pattern is not correct, remove and change the pinion shim.

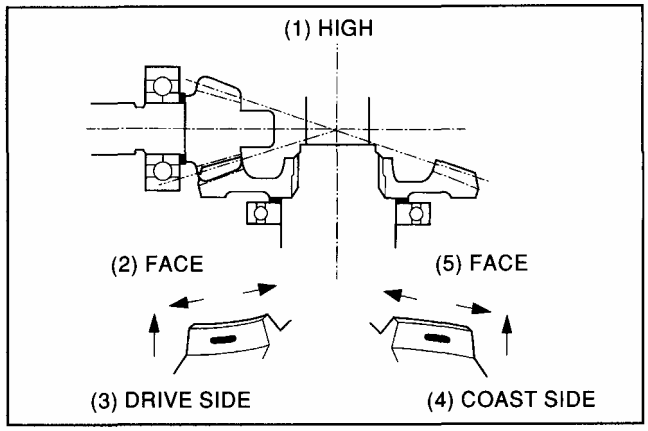
Replace the pinion shim with a thicker one if the contact pattern are too high.

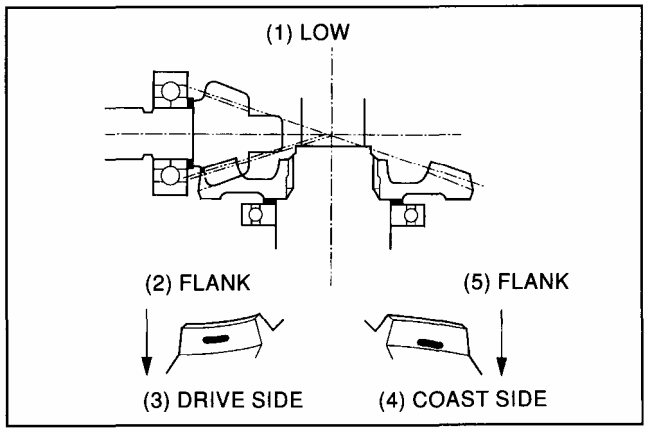
Replace the pinion shim with a thinner one if the contact pattern is too low.

The pattern will shift about 1.5-2.0 mm (0.06-0.08 in) when the thickness of shim is changed by 0.1 mm (0.004 in).

Pinion Spacer:
A: 1.82 mm (0.072 in)
B: 1.88 mm (0.074 in)
C: 1.94 mm (0.076 in)
D: 2.00 mm (0.079 in) - Standard
E: 2.06 mm (0.081 in)
F: 2.12 mm (0.083 in)
G: 2.18 mm (0.086 in)

For the gear case assembly, see page 13-17.





PINION GEAR REMOVAL/SHIM REPLACEMENT

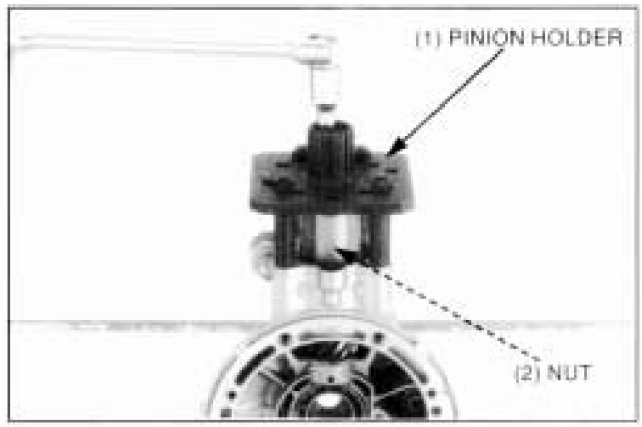
CAUTION

- **Be careful not to damage the gear case.**

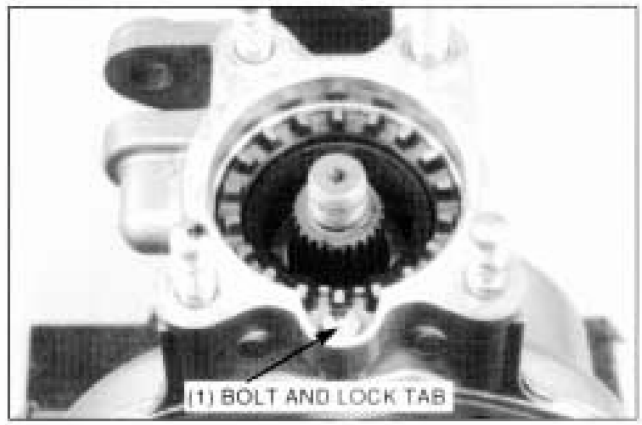
Place the final gear case in a vise with a soft jaws.

Position the special tool onto the gear case as shown.
Remove the pinion gear shaft nut and pinion joint.

Tool:
Pinion holder **07924 - ME40002**

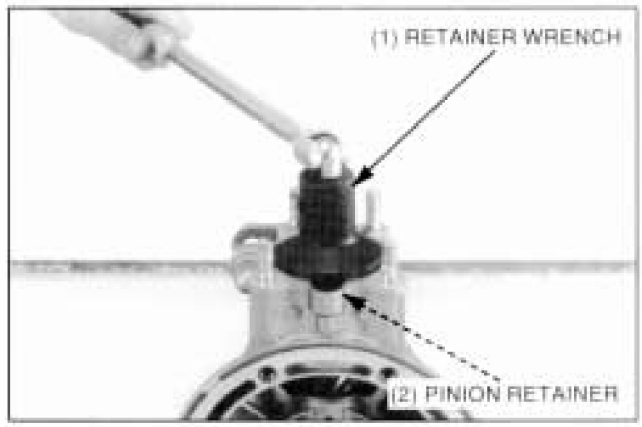


Remove the bolt and retainer lock tab.



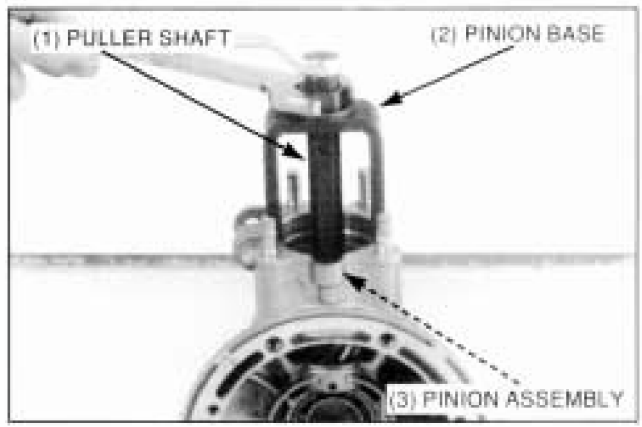
Remove the pinion bearing retainer using the special tool.

Tool:
Retainer wrench **07910 - MA10000**

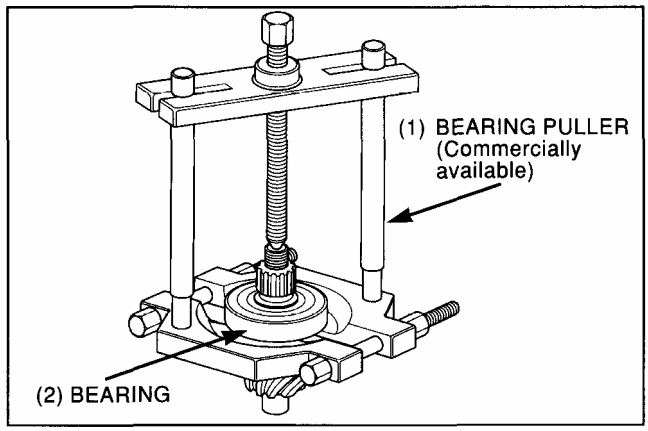


Assemble the special tools as shown.
Pull the pinion assembly off from the gear case.

Tools:
Puller shaft **07931 - ME40000**
Pinion base **07HMC - MM80110**



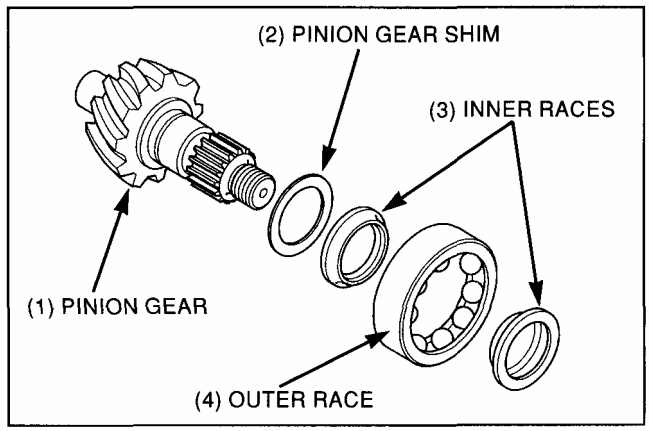
Pull the bearing outer and inner races from the shaft with the bearing puller.



NOTE:

- This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.

Remove the pinion shim.



NOTE:

- If the gear set, pinion bearing, ring gear bearing and/or gear case are replaced, install a 2.00 mm (0.079 in) thick shim (standard) for initial reference.

Final Drive Assembly

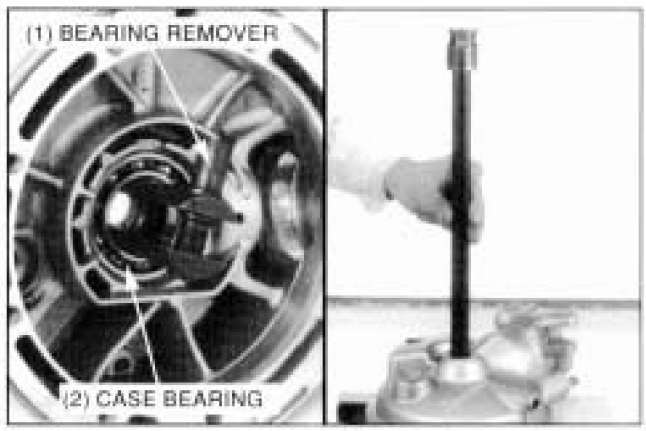
CASE BEARING REMOVAL

Remove the ring gear and pinion gear.
Heat the gear case to 80° C (176° C) evenly using a heat gun.

⚠ WARNING

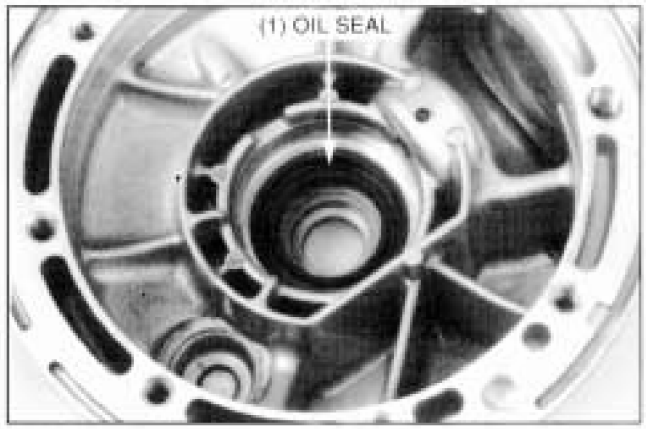
- **Always wear insulated gloves when handling the gear case after it has been heated.**

Remove the ring gear case bearing if necessary using the special tools.



Tool:
Bearing remover **07948-4630100**

Remove the oil seal and discard it.

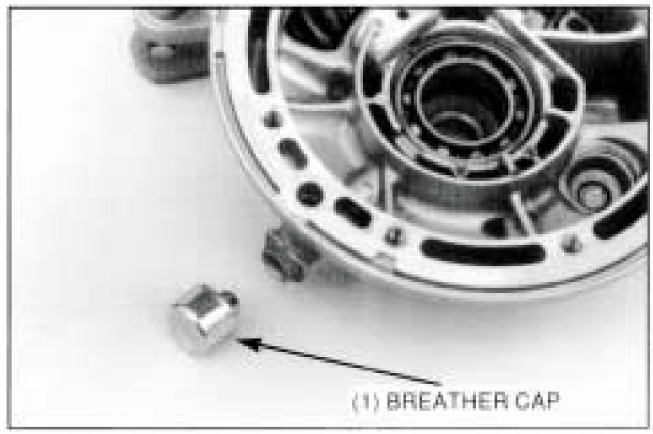


BREATHER HOLE CLEANING

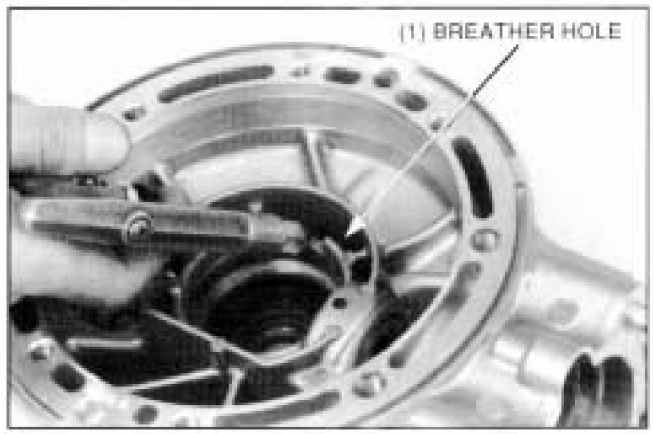
CAUTION

- **Be careful not to deform or damage the breather cap.**

Remove the breather cap.



Blow compressed air through the breather hole.

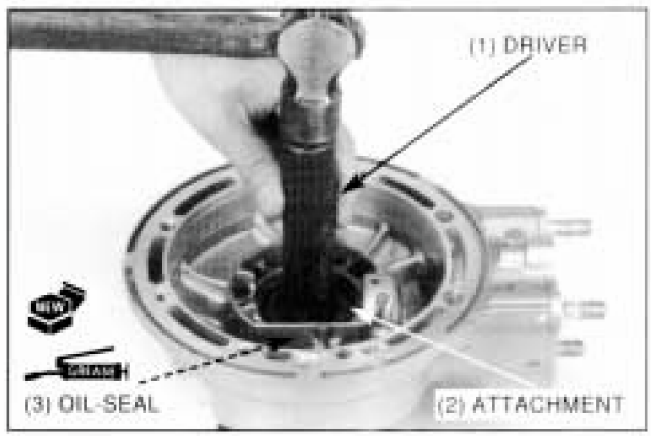


CASE BEARING INSTALLATION

Drive a new oil seal into the gear case.

Tools:

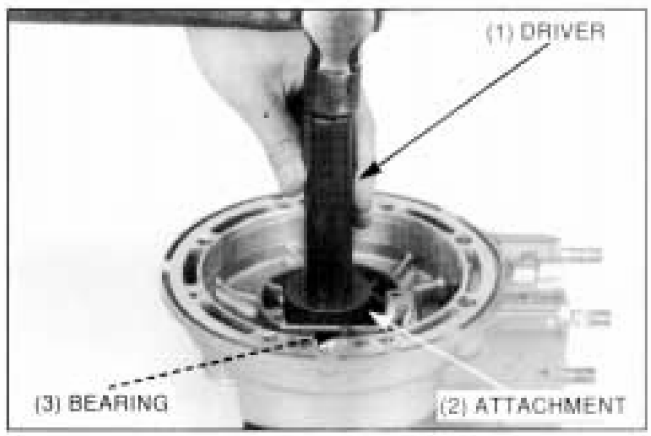
Driver	**07749 - 0010000**
Ball driver attachment	**07945 - 3330300**



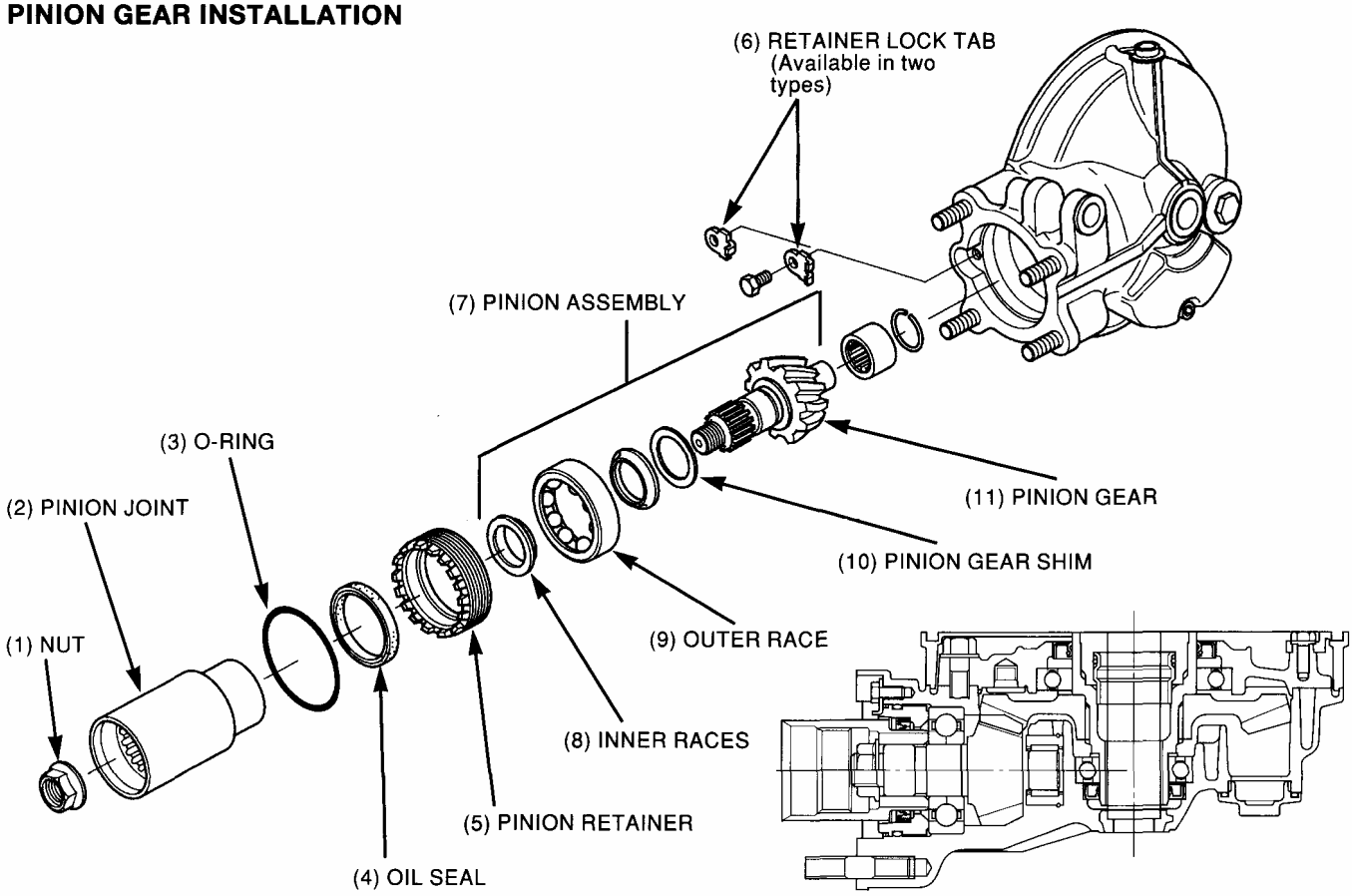
Drive a new ring gear case bearing into the gear case.

Tools:

Driver	**07749 - 0010000**
Attachment, 52 x 55 mm	**07746 - 0010400**



PINION GEAR INSTALLATION

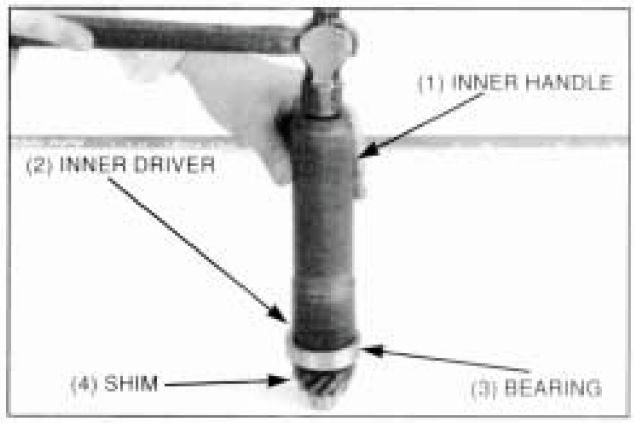


Install the pinion shim on the pinion gear.

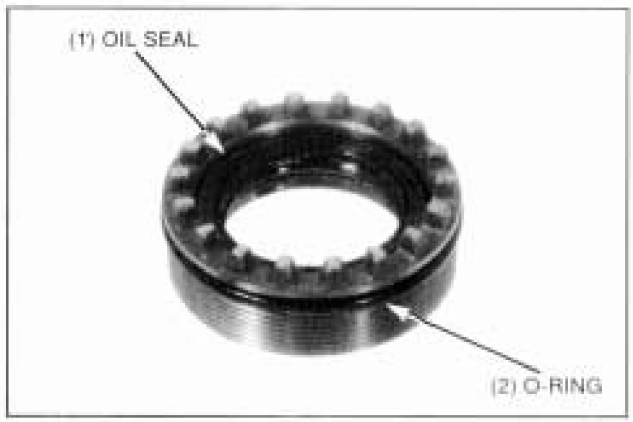
Drive the pinion gear bearing onto the pinion gear using the special tool.

Tools:

Inner handle	**07746 - 0030100**
Inner driver, 26 mm	**07746 - 0030200**



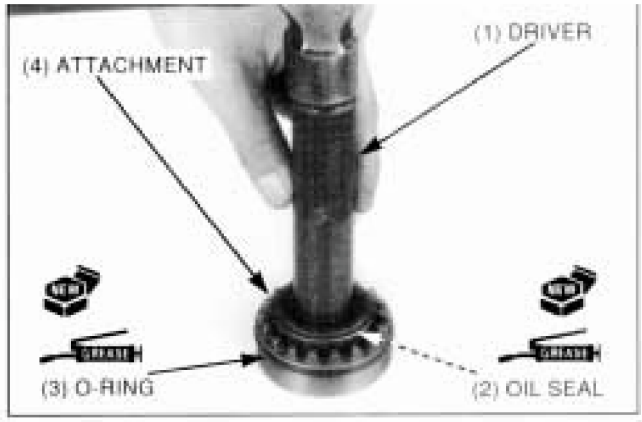
Remove the O-ring and oil seal from the pinion retainer.



Driver a new oil seal into the retainer using the special tools.

Tools:
Driver **07749 - 0010000**
Ball driver attachment **07945 - 3330300**

Pack grease into the seal lip cavity.
Coat a new O-ring with grease an install it on the retainer.



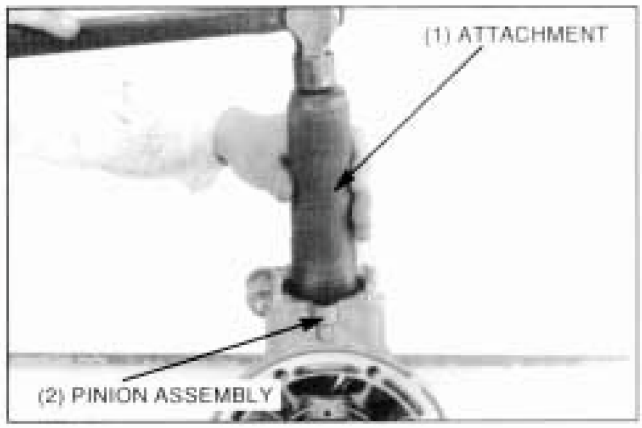
Place the gear case in a vise with a soft jaws.

CAUTION

- **Be careful not to damage the gear case.**

Drive the pinion assembly into the gear case until enough threads are visible to accept the pinion retainer.

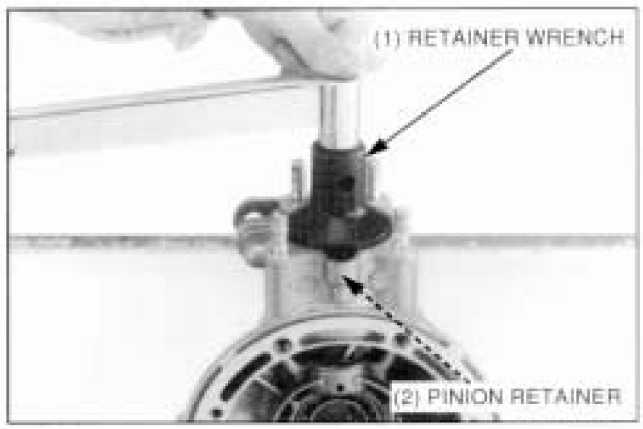
Tool:
Seal driver attachment **07965 - KE80200 or 07931 - 4630300**



Press the pinion bearing in place, then tighten the retainer to the specified torque.

Tool:
Retainer wrench **07910 - MA10000**

Torque: 108 N·m (11.0 kgf-m, 80 lbf-ft)



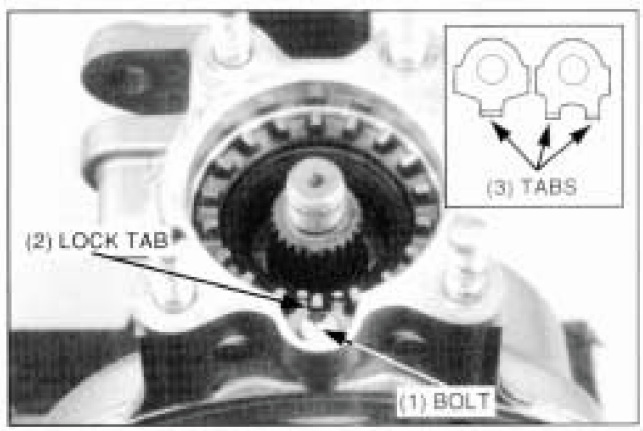
Install a locking tab, depending on the position of the pinion retainer grooves in relation to the locking tabs.

NOTE:

- The lock tab plate is available in the two types shown.

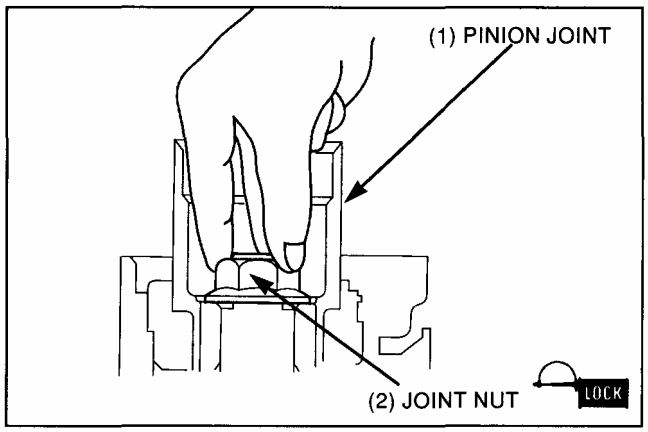
Install and tighten the lock tab bolt.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



Install the pinion joint to the pinion gear shaft.

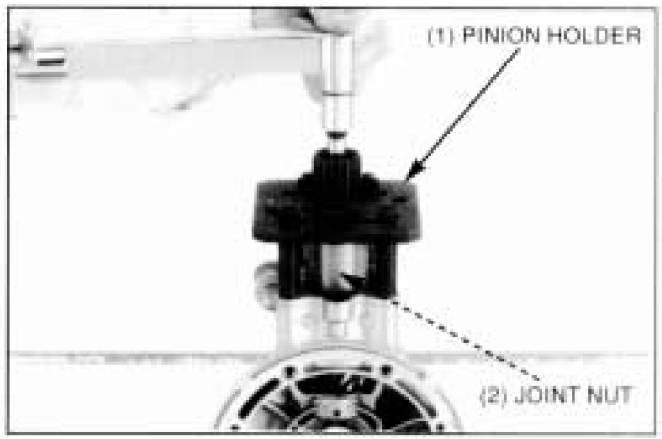
Apply a locking agent to the threads of the pinion joint nut and screw it in by hand as far as it goes.



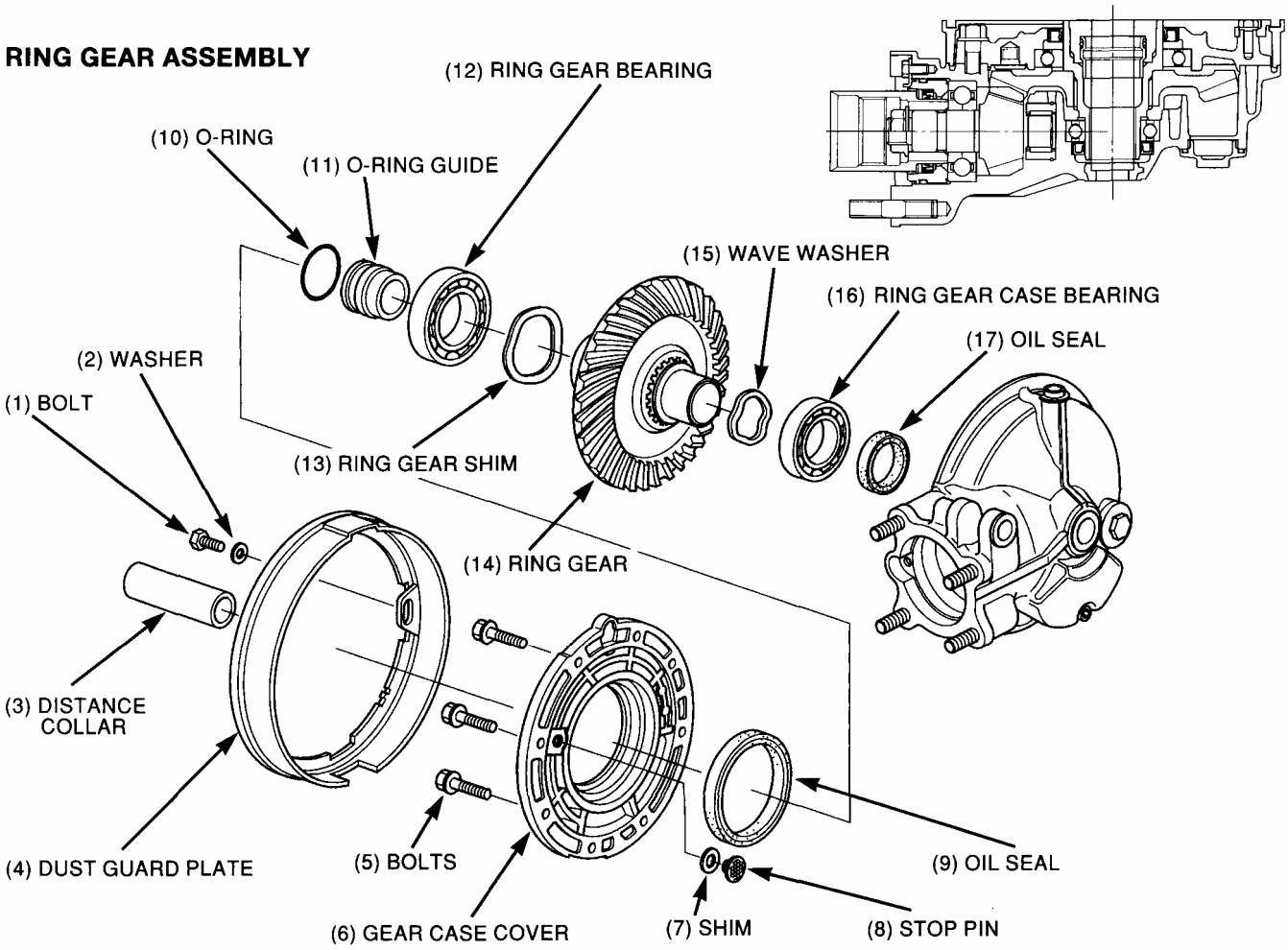
Hold the pinion joint using the pinion joint holder.
Tighten the pinion joint nut to the specified torque.

Tool:
Pinion holder **07924 - ME40002**

Torque: 108 N·m (11.0 kgf-m, 80 lbf-ft)



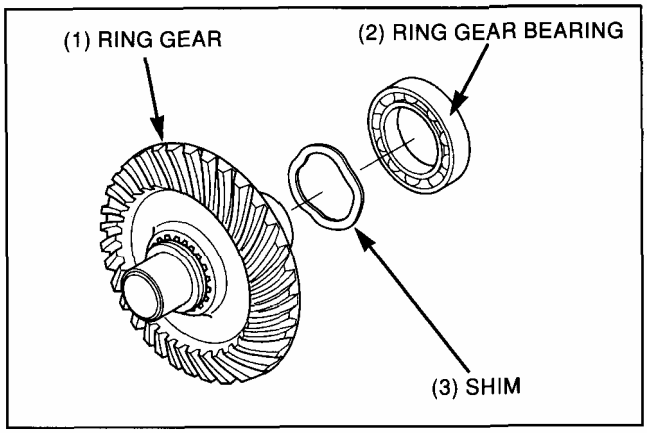
RING GEAR ASSEMBLY



NOTE:

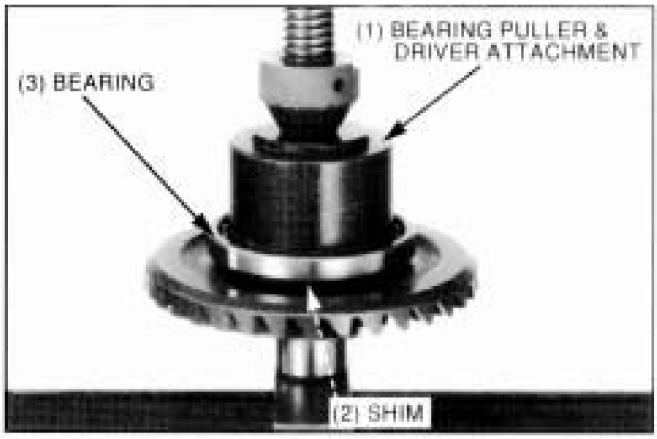
- If the ring gear assembly was loose against the cover (if it didn't stay in the cover), do the following:

Place the ring gear shim onto the ring gear.



Press the bearing onto the shaft.

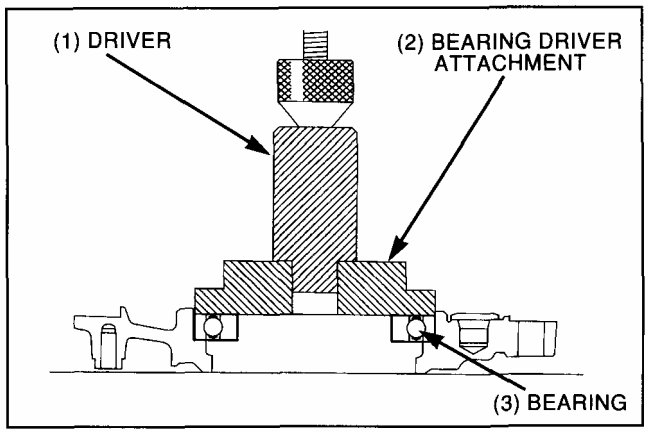
Tool:
Bearing puller & driver attachment **07934 - MB00000**
or 07965 - 6920201



If the ring gear remained in the cover, do the following:

Remove the case cover oil seal.
Press the ring gear bearing into the cover using the special tools.

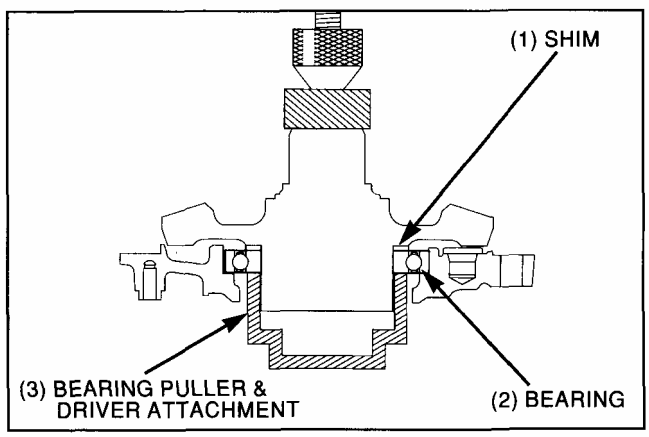
Tools:
Driver **07749 - 0010000**
Bearing driver attachment **07GAD - SD40101**



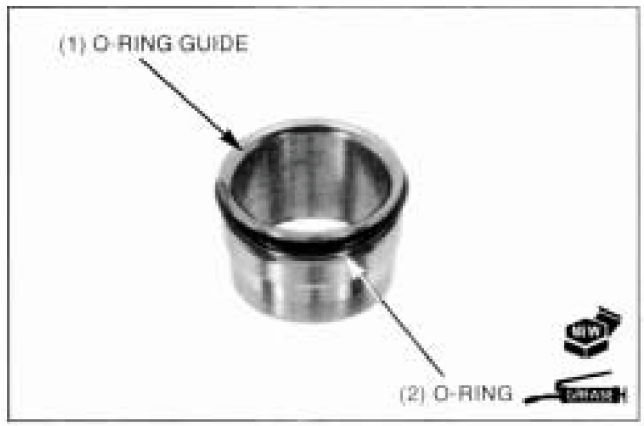
Install the shim onto the ring gear see above.

Support the bearing inner race with the special tool, and press the ring gear into the bearing.

Tool:
Bearing puller & driver attachment **07934 - MB00000**
or 07965 - 6920201



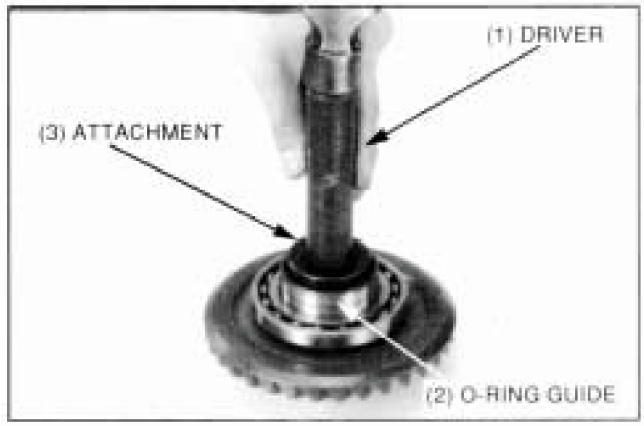
Coat a new O-ring with grease and install it on the O-ring guide.



Drive the O-ring guide into the ring gear shaft.

Tools:

Driver	**07749 - 0010000**
Attachment, 42 x 47 mm	**07746 - 0010300**



Install the ring gear into the gear case cover.

NOTE:

- If the ring gear stayed in the cover, see page 13-15 for removal procedures.

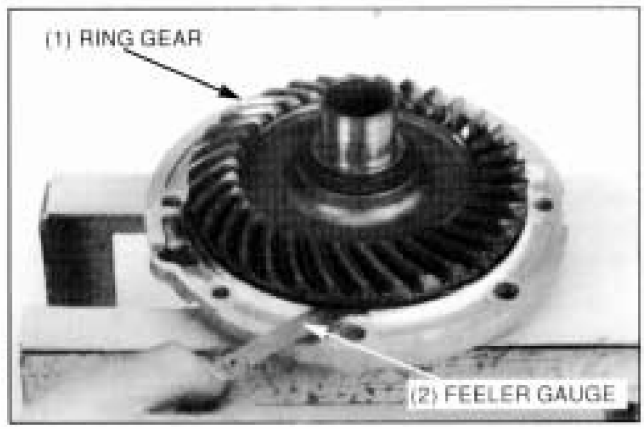
Measure the clearance between the ring gear and the ring gear stop pin without a feeler gauge.

Clearance: 0.3-0.6 mm (0.01-0.02 in)

Remove the ring gear if the clearance exceeds the service limit.

NOTE:

- If the ring gear stayed in the cover, see page 13-6 for removal procedures.



Heat the gear case cover to approximately 80° C (176° F) and remove the stop pin by tapping the cover.

⚠ WARNING

- **Always wear insulated gloves when handling the gear case cover after it has been heated.**

Heat the case cover evenly and slowly to prevent warpage. Do not heat small areas individually.

CAUTION

- **Case cover warpage can occur if the cover is not heated properly.**

Install a stop pin shim to obtain the correct clearance.

Shim Thickness: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

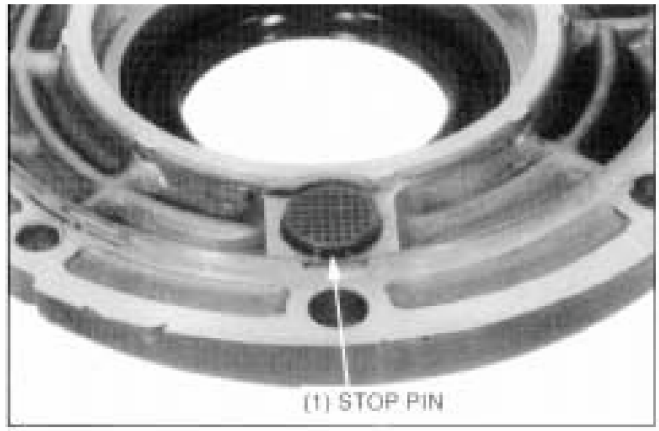
NOTE:

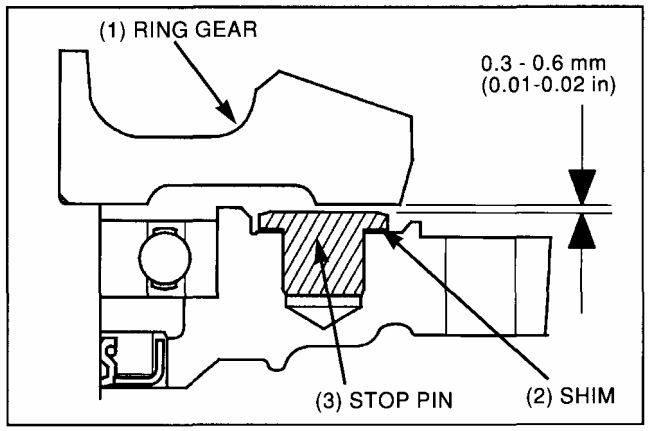
- If the ring gear stayed in the cover, see page 13-15 for installation procedures.

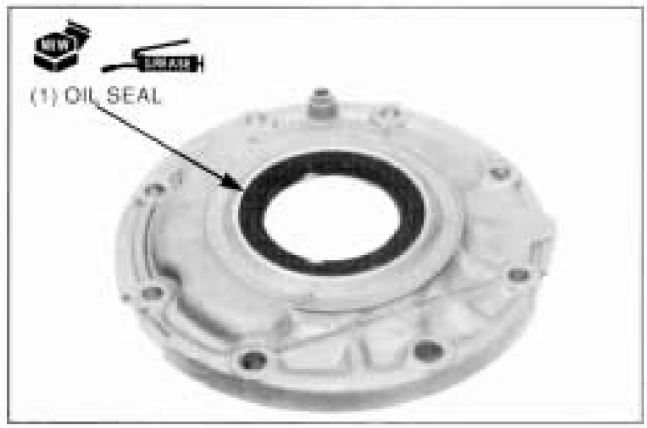
Install the shim and drive the stop pin into the case cover.

Check the gear tooth contact pattern after the ring gear shim has been replaced (see page 12-7).

Apply grease to the new oil seal lips, then install it into the cover groove.
The seal align with cover surface.







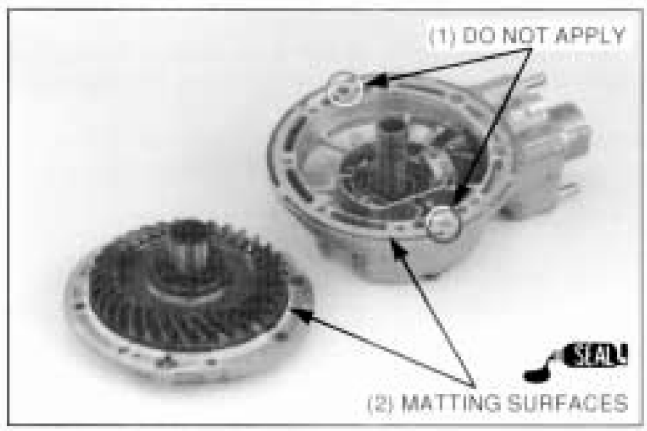
GEAR CASE ASSEMBLY

Clean all sealing material off the mating surfaces of the gear case cover.

NOTE:

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

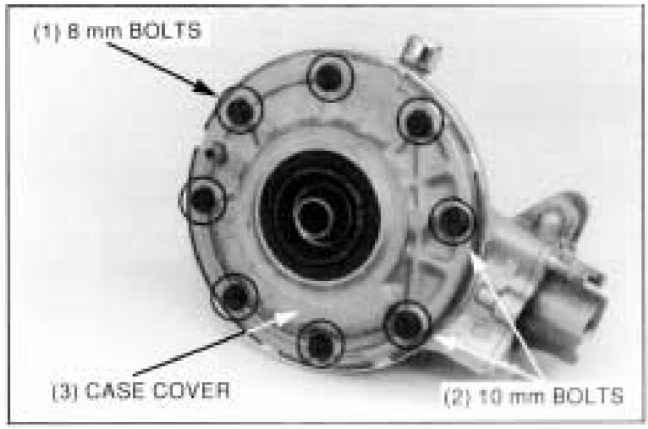
Apply liquid sealant to the mating surface of the gear case and cover. Do not apply sealant to the around the dowel holes.



Install the gear case cover.

Tighten the cover bolts in 2-3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps. Next, apply a locking agent to the 10 mm bolt threads and tighten them to the specified torque.

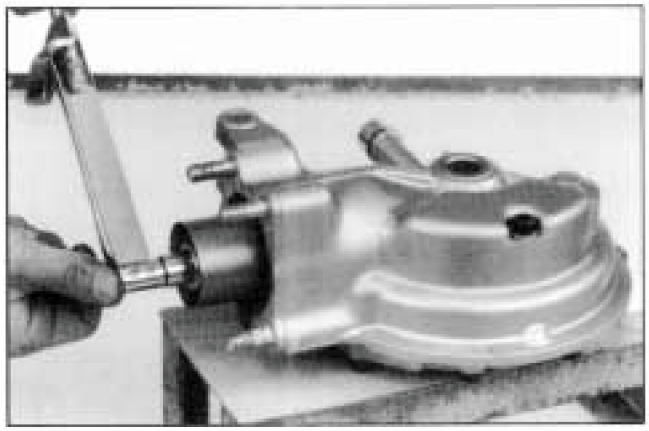
Torques: 8 mm: 25 N·m (2.6 kgf-m, 19 lbf-ft)
10 mm: 47 N·m (4.8 kgf-m, 35 lbf-ft)



Make sure that the gear assembly rotates smoothly without binding.
Measure the final gear assembly pre-load.

Pre-load: 0.2-0.4 N·m (2-4 kg-cm, 1.7 -3.5 lbf-in)

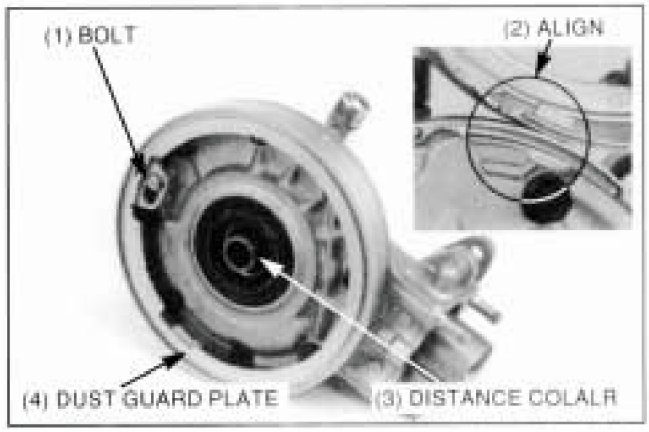
If the pre-load reading does not fall within the limit, disassemble the final gear and check the bearings for proper installation.



Install the dust guard plate by aligning the plate tabs with the case cover grooves and turn it counterclockwise to lock.
Tighten the guard plate bolt to the specified torque.

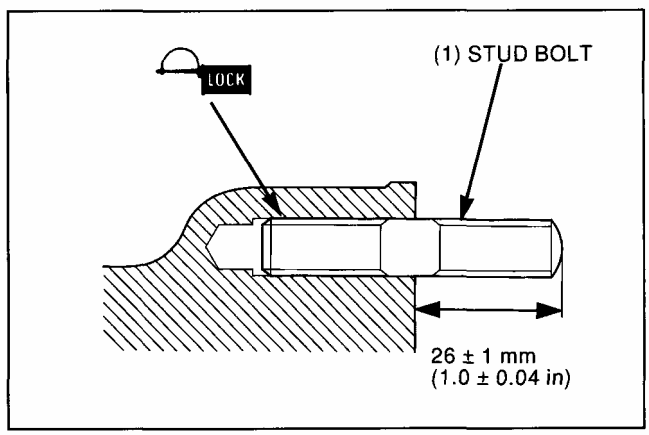
Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)

Install the distance collar with the polished side facing the gear case.



Check that the final gear case stud bolts are tight.
If any are loose, remove them, clean their threads with contact cleaner, then install them using locking agent.

After installing, be sure to measure the distance from top of each stud to the final gear case surface as shown.



Final Drive Installation

UNIVERSAL JOINT INSTALLATION

Apply molybdenum disulfide grease to the universal joint splines.

Install the universal joint into the swingarm with the long spline side forward.

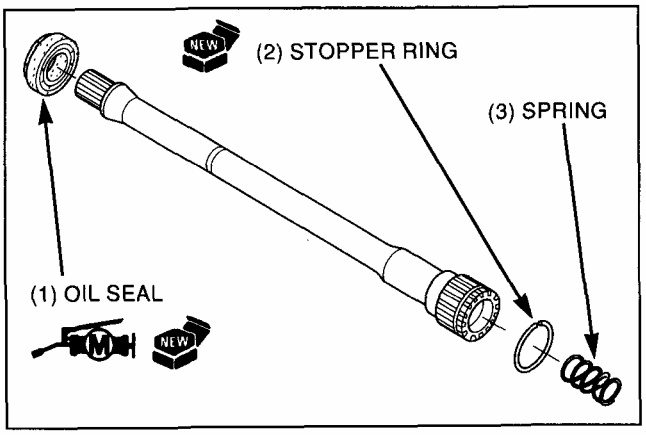
Install the swingarm (page 15-15).

DRIVE SHAFT ASSEMBLY/INSTALLATION

Install new stopper ring.

Install the new oil seal and pack 0.5 g. (0.02 oz) of molybdenum disulfide grease into the seal lip cavity.

Install the spring, washer and snap ring.



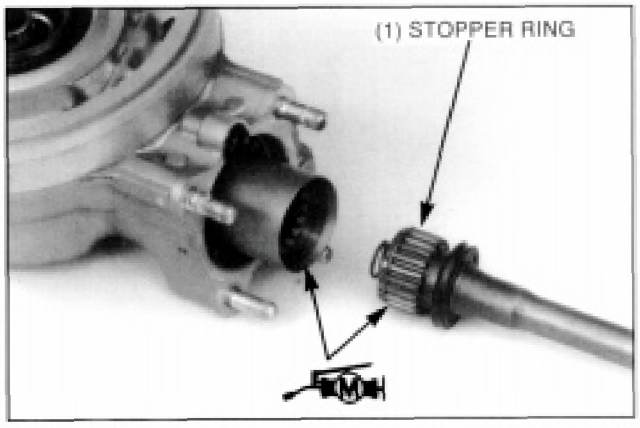
Pack 2 g. (0.08 oz) of molybdenum disulfide grease into the pinion joint spline.

Install the drive shaft into the pinion joint until the stopper ring seats in the pinion joint spline groove.

NOTE:

- Make sure that the stopper ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.

Pack 1 g. (0.04 oz) of molybdenum disulfide grease into the drive shaft spline.



Insert the final drive assembly into the swingarm and align the splines with the universal joint by holding the swingarm.

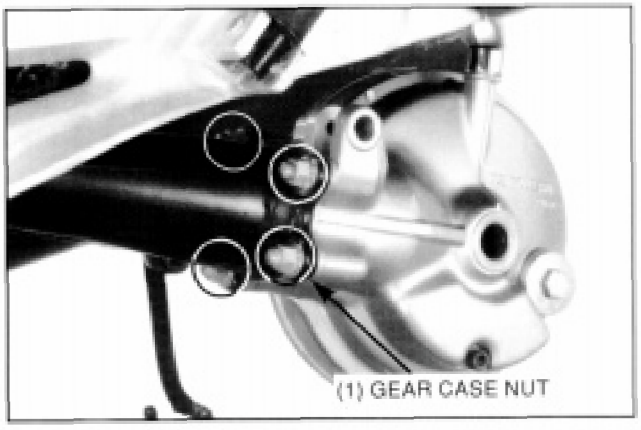
Temporarily install the gear case mounting nuts and shock absorber lower mounting bolt.
Tighten the gear case mounting nut to the specified torque.

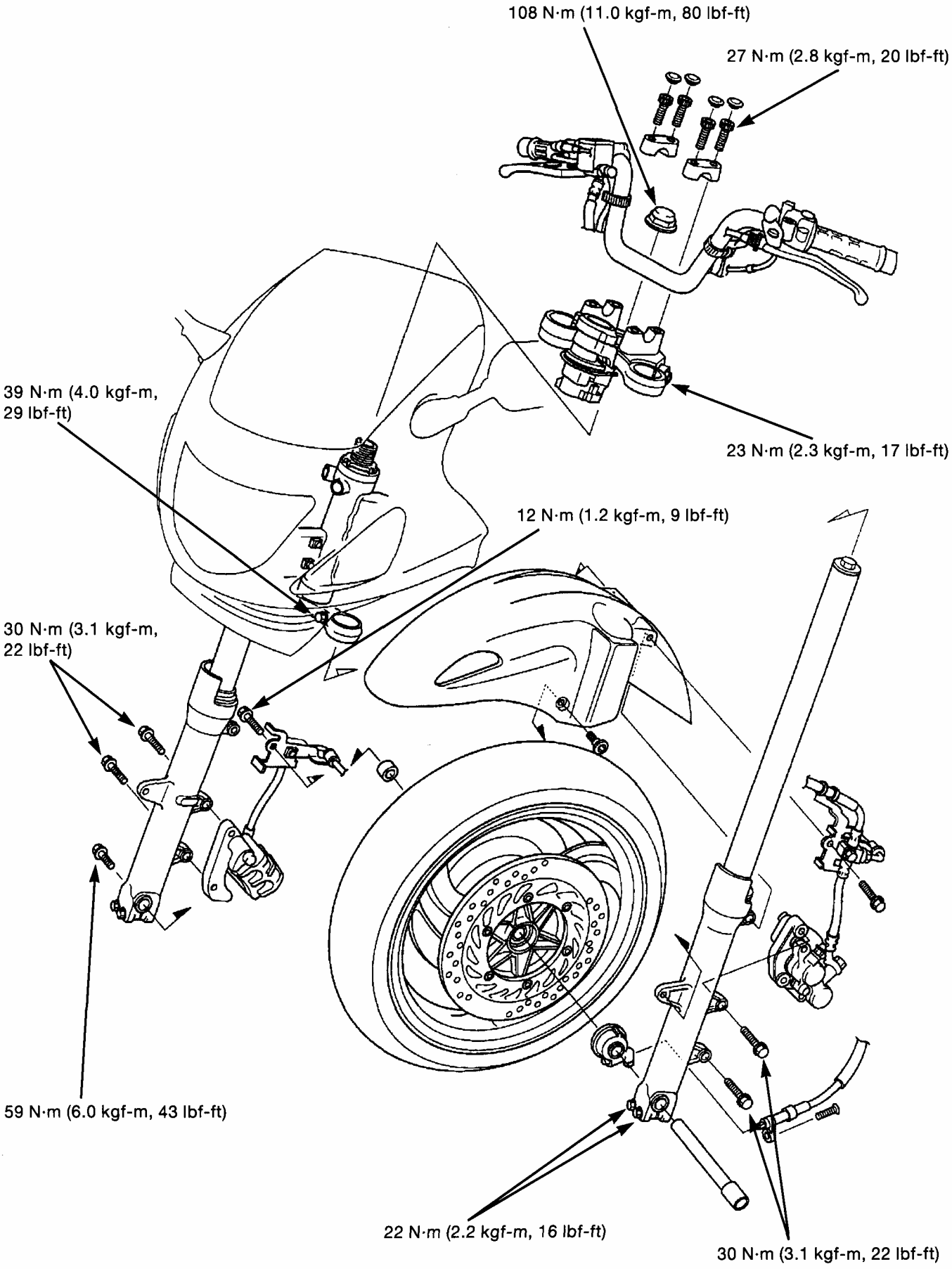
Torque: 64 N·m (6.5 kgf-m, 47 lbf-ft)

Install the rear wheel (page 15-8).

Fill the gear case with recommended final drive oil (page 3-18).

Oil Capacity:
150 cm³ (5.1 US oz, 5.3 Imp oz) at disassembly




108 N·m (11.0 kgf-m, 80 lbf-ft)
27 N·m (2.8 kgf-m, 20 lbf-ft)
39 N·m (4.0 kgf-m, 29 lbf-ft)
23 N·m (2.3 kgf-m, 17 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
30 N·m (3.1 kgf-m, 22 lbf-ft)
59 N·m (6.0 kgf-m, 43 lbf-ft)
22 N·m (2.2 kgf-m, 16 lbf-ft)
30 N·m (3.1 kgf-m, 22 lbf-ft)

14. Front Wheel/Suspension/Steering

SERVICE INFORMATION	14-1	FRONT WHEEL	14-12
TROUBLESHOOTING	14-3	FORK	14-20
HANDLEBAR	14-4	STEERING STEM	14-32

Service Information

GENERAL

⚠ WARNING

- **A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.**
- **Riding on damaged rims or spokes impairs safe operation of the vehicle.**
- **Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.**

CAUTION

- **Do not jack up the motorcycle using oil filter.**
- **To avoid damaging the rim when using the tire lever, always use rim protectors.**

- When servicing the front wheel, support the motorcycle securely with a jack or other support under the engine.
- Do not operate the brake lever after removing the caliper and front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.
- Refer to Section 16 for brake system information.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	245 kPa (2.50 kgf/cm.², 36 psi)	—
	Up to maximum weight capacity	245 kPa (2.50 kgf/cm.², 36 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Fork	Spring free length	416.9 (16.41)	408.6 (16.09)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Fork fluid	—
	Oil level	113 (4.4)	—
	Oil capacity	480 ± 2.5 cm.³ (16.2 ± 0.08 US oz, 16.9 ± 0.09 Imp oz)	—
Steering head bearing preload		1.04 - 1.46 kgf (2.30 - 3.22 lbf)	—

TORQUE VALUES

Steering stem nut	103 N·m (10.5 kgf-m, 76 lbf-ft)	See page 14-36
Top thread A	25 N·m (2.5 kgf-m, 18 lbf-ft)	Apply oil to the threads and seating surface
Top thread B	—	
Top bridge pinch bolt	23 N·m (2.3 kgf-m, 17 lbf-ft)	
Bottom bridge pinch bolt	39 N·m (4.0 kgf-m, 29 lbf-ft)	
Front axle	59 N·m (6.0 kgf-m, 43 lbf-ft)	
Front axle pinch bolt	22 N·m (2.2 kgf-m, 16 lbf-ft)	
Front brake disc bolt	42 N·m (4.3 kgf-m, 31 lbf-ft)	Apply a locking agent to the threads
Fork cap	23 N·m (2.3 kgf-m, 17 lbf-ft)	
Fork socket bolt	22 N·m (2.2 kgf-m, 16 lbf-ft)	Apply a locking agent to the threads
Handlebar upper holder bolt	27 N·m (2.8 kgf-m, 20 lbf-ft)	

TOOLS

Attachment, 42 x 47 mm	07746-0010300
Attachment, 52 x 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500
Bearing remover shaft	07746-0050100
Remover head, 20 mm	07746-0050600
Driver	07749-0010000
Steering stem socket	07916-3710101
Ball race remover	07946-3710500
Steering stem driver	07946-MB00000
Slider weight	07947-KA50100
Seal driver attachment	07947-KF00100
Ball race remover	07953-MJ10000
Driver attachment	07953-MJ10100
Driver handle	07953-MJ10200

Troubleshooting

Hard steering
- Steering top thread too tight
- Faulty steering head bearings
- Damaged steering head bearings
- Faulty tire
- Insufficient tire pressure

Steers to one side or does not track straight
- Bent fork
- Faulty steering head bearings
- Damaged steering head bearings
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot component

Front wheel wobbling
- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel

Soft suspension
- Weak fork spring
- Low fluid level in fork
- Insufficient fluid in fork
- Low tire pressure

Hard suspension
- High tire pressure
- Bent fork
- High fluid level in fork
- Incorrect fluid weight
- Clogged fluid passage

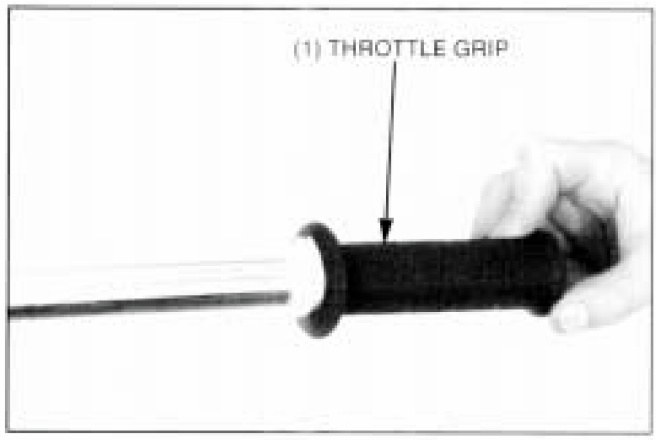
Front suspension noisy
- Loose fork fasteners
- Insufficient fluid in fork

Wheels turns hard
- Faulty wheel bearings
- Bent front axle
- Brake drug
- Faulty speedometer gear

Handlebar

GRIP REPLACEMENT

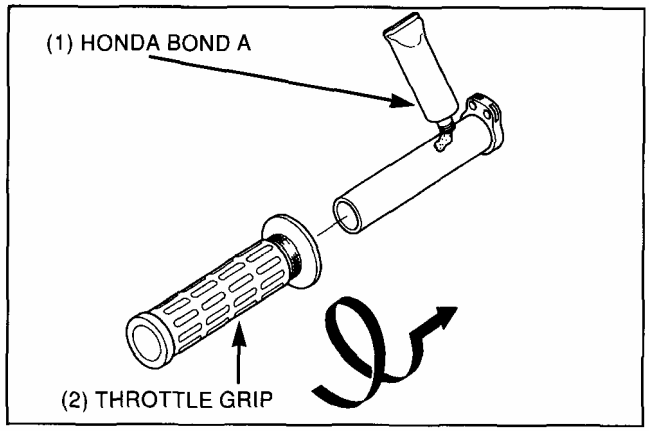
Remove the throttle grip from the handlebar (page 14-6).



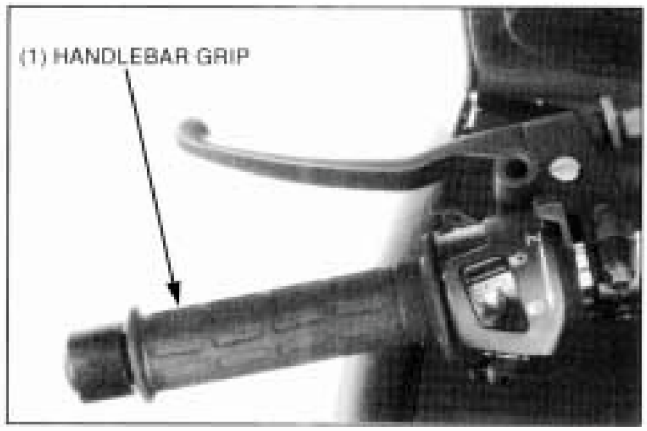
Remove the grip from the throttle grip.

Apply Honda Bond A to the inside surface of the throttle grip of the clean surface of the throttle pipe. Wait 3-5 minutes and install the grip. Rotate the grip for even application of the adhesive.

Install the throttle grip to the handlebar (page 14-8).



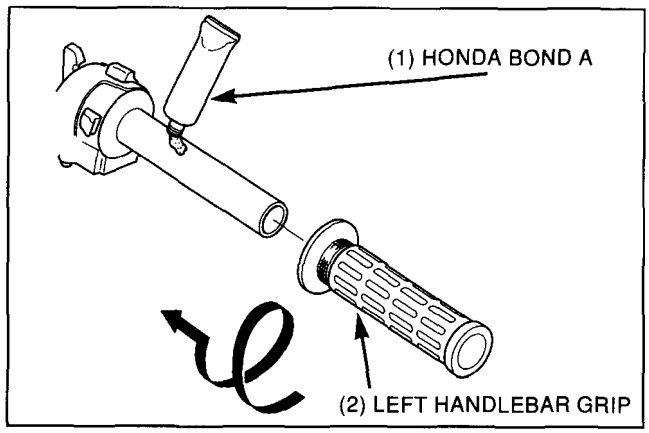
Remove the left handlebar grip from the handlebar (page 14-6).



Apply Honda Bond A to the inside surface of the left handlebar grip to the clean surface of the handlebar. Wait 3-5 minutes and install the grip. Rotate the grip for even application of the adhesive.

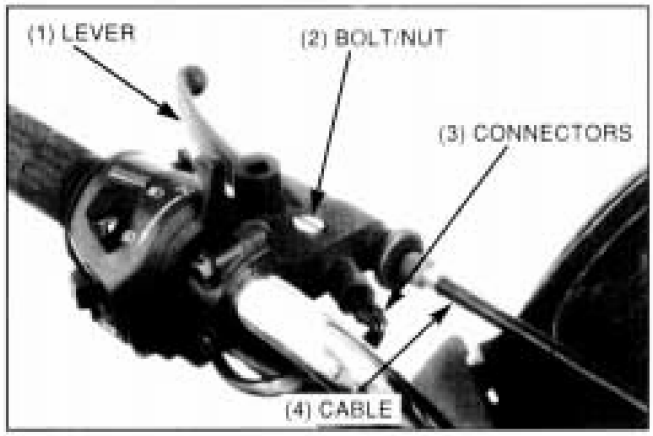
NOTE:

- Allow the adhesive to dry for an hour before using. Check for smooth throttle operation after the right grip is installed.

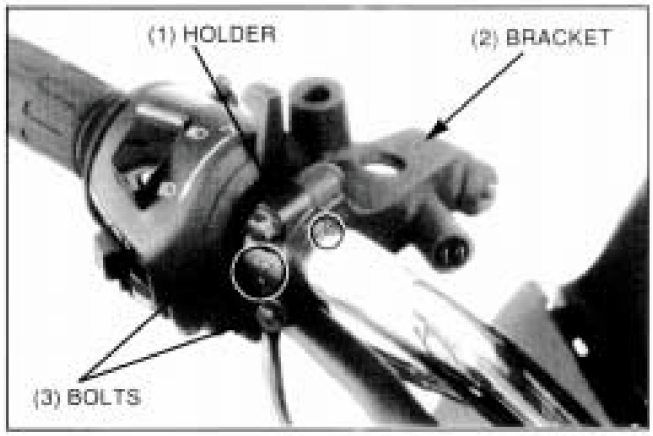


REMOVAL

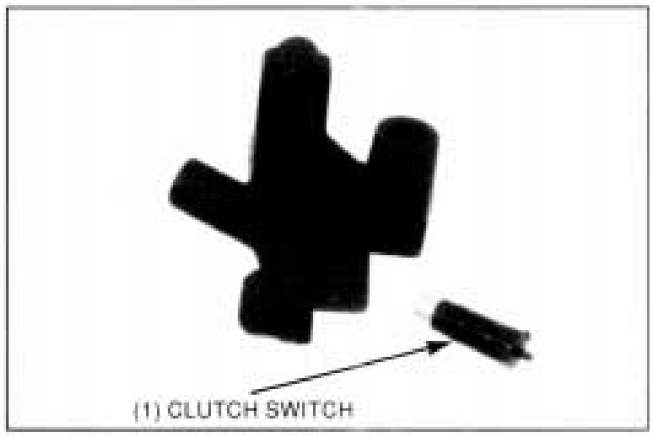
Loosen the clutch cable lower adjusting nuts and disconnect the clutch cable from the clutch lever.
Remove the bolt/nut and clutch lever from the clutch lever bracket.
Disconnect the clutch switch connectors from the clutch switch.



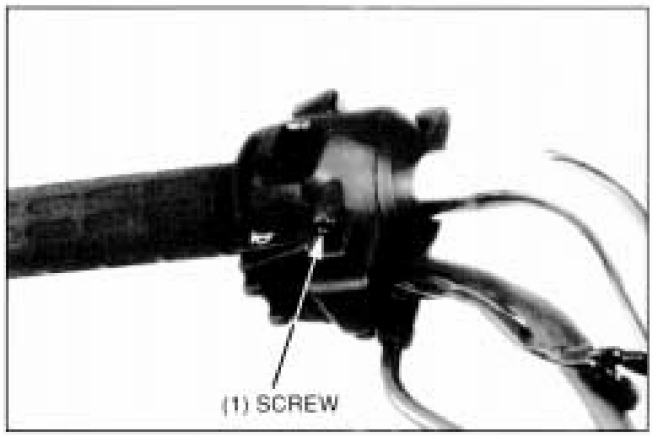
Remove the bolts, clutch lever holder and bracket.



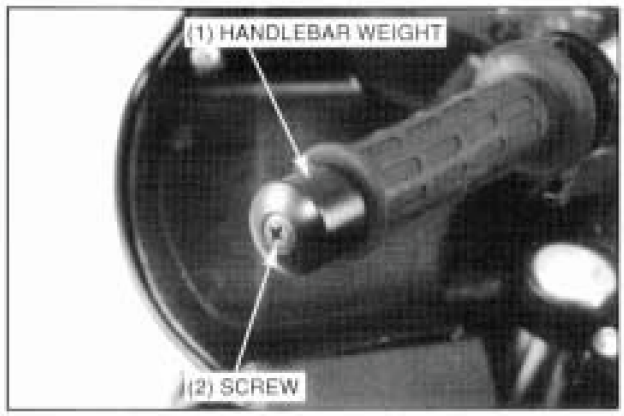
Remove the clutch switch from the clutch lever holder.



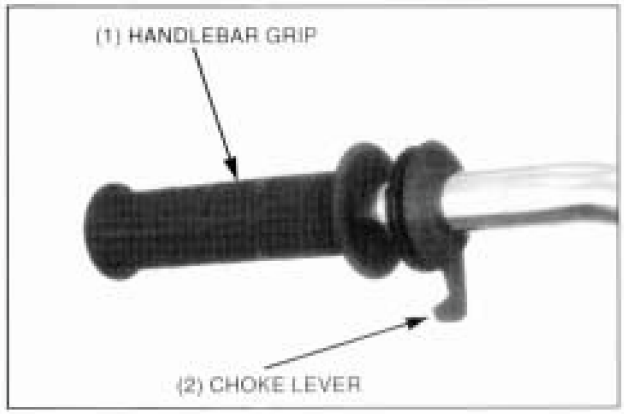
Remove the screws and left handlebar switch.



Remove the screw and handlebar weight.

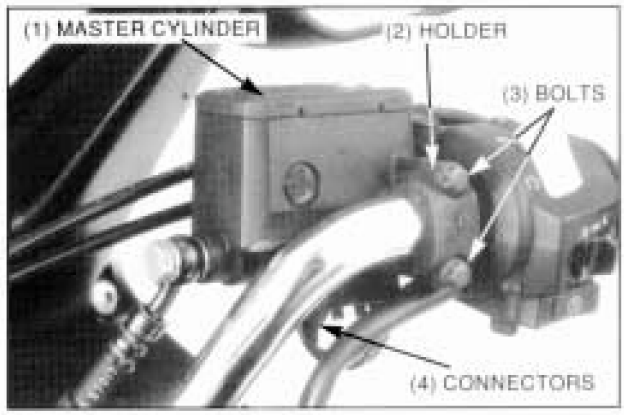


Remove the left handlebar grip and choke lever.

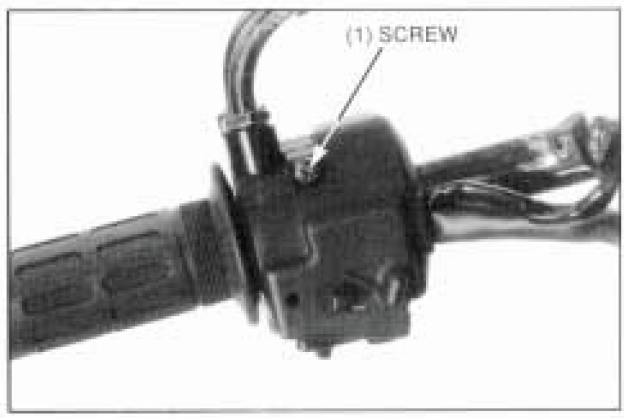


Disconnect the front brake light switch connectors from the switch.

Remove the bolts, master cylinder holder and master cylinder.

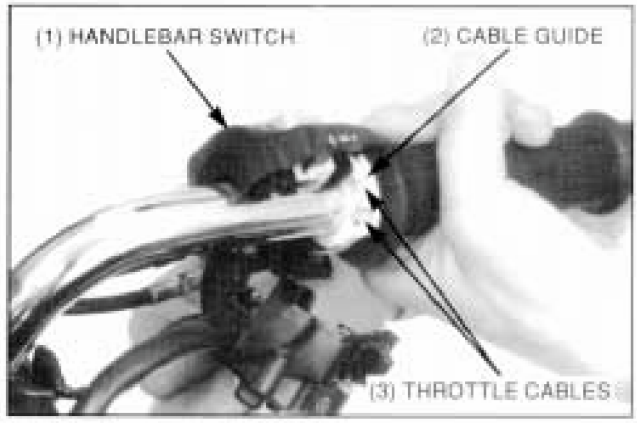


Remove the right handlebar switch screw.

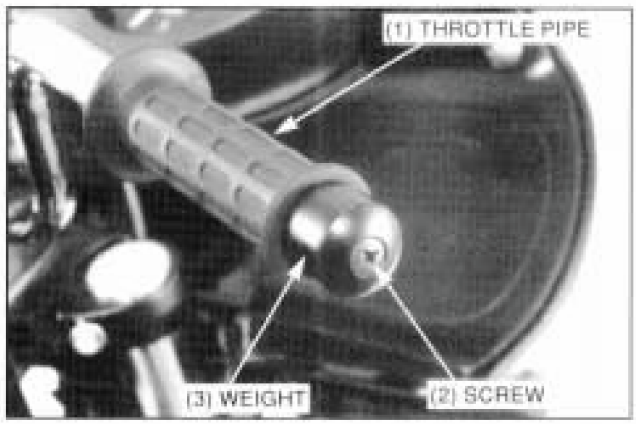


Loosen the throttle cable lower adjusting nuts at the carburetors and disconnect the throttle cables from the throttle cable guide.

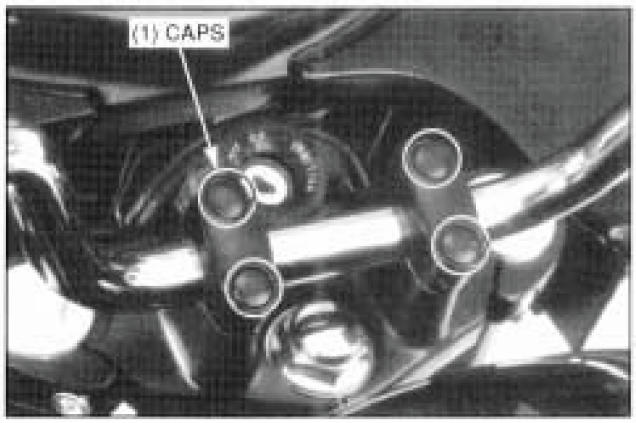
Remove the right handlebar switch from the handlebar.



Remove the screw, handlebar weight and throttle pipe from the right handlebar.



Remove the handlebar upper holder bolt caps.

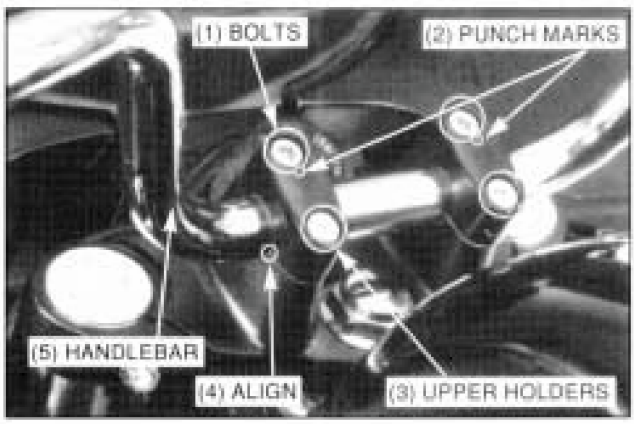


Remove the socket bolts, upper holders and handlebar.

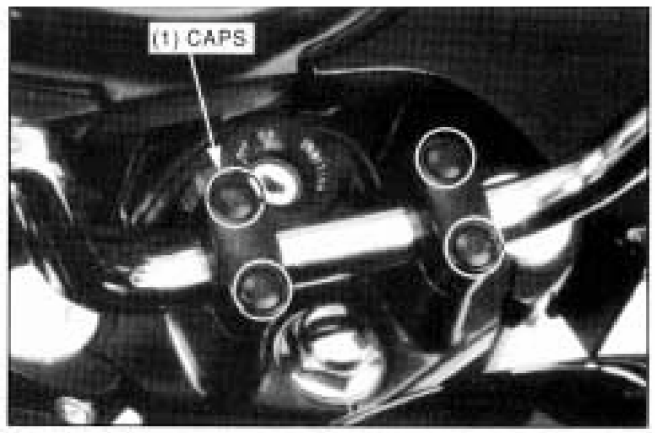
INSTALLATION

Install the handlebar and upper holders with their punch marks facing forward.
Align the punch marks on the handlebar with the splits of the handlebar holders.
Tighten the forward bolts first, then tighten the rear bolts.

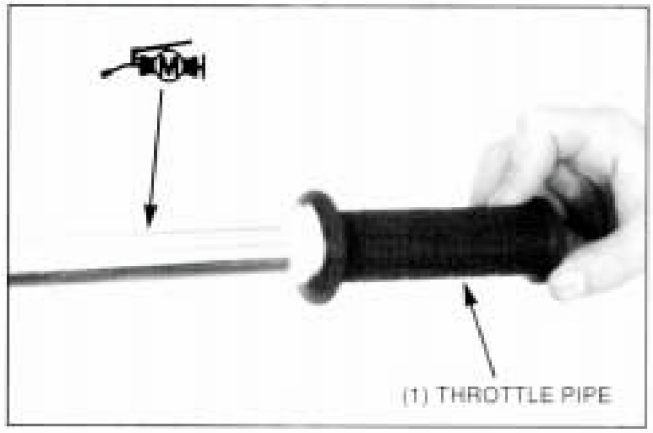
Torque: 27 N·m (2.8 kgf-m, 20 lbf-ft)



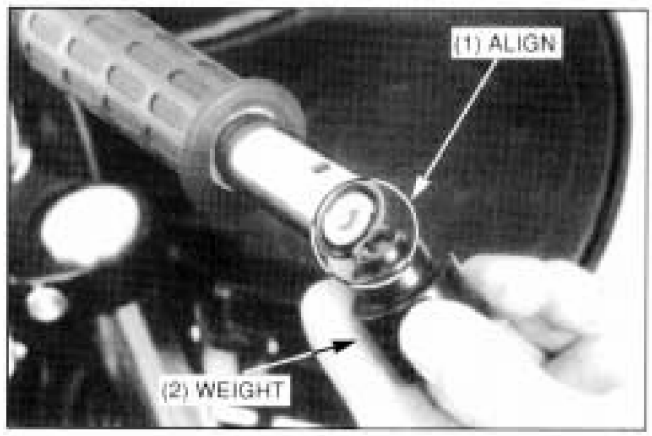
Install the upper holder bolt caps.



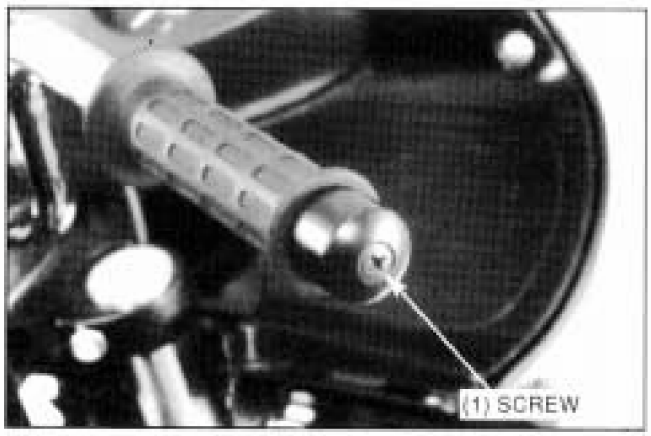
Apply molybdenum disulfide grease to the throttle pipe inner surface and throttle cable contact point.
Install the throttle pipe to the handlebar.



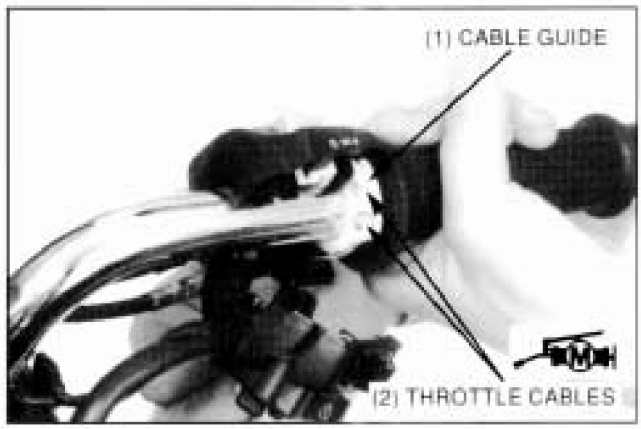
Install the handlebar weight to the handlebar, aligning the tab on the handlebar weight with the slit of the handlebar.



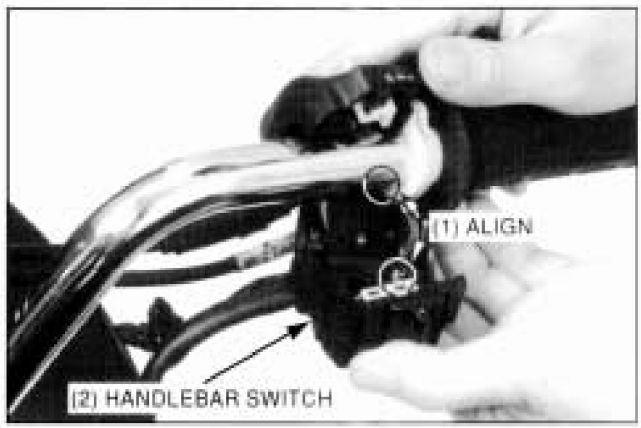
Install and tighten the screw to securely.



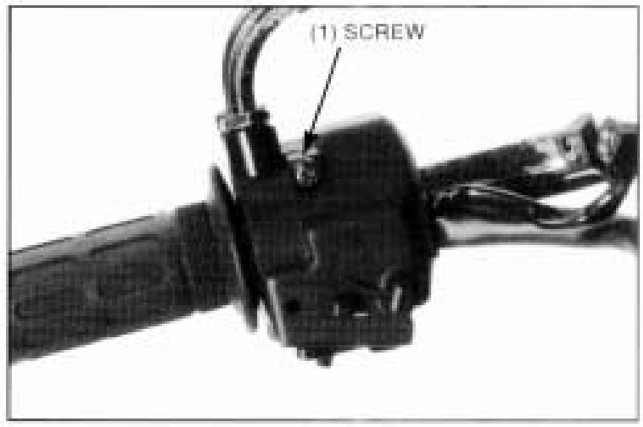
Apply molybdenum disulfide grease to the throttle pipe to cable sliding surface.



Install the right handlebar switch housing onto the handlebar, aligning the locating pin with the hole in the handlebar.



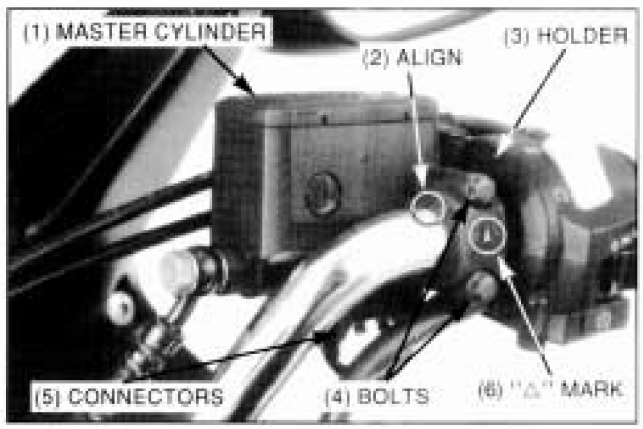
Install and tighten the screw.



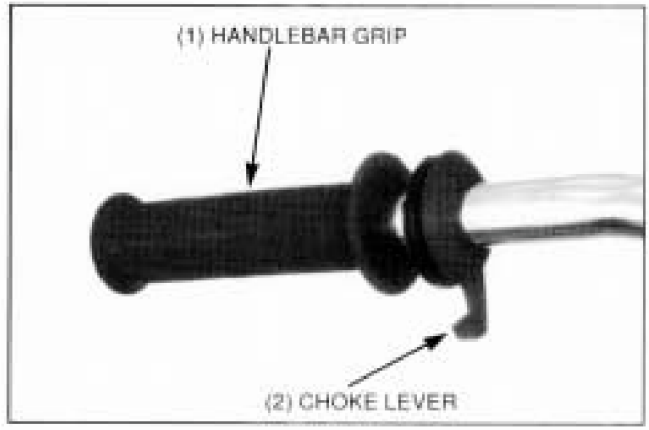
Install the master cylinder and holder with the "△" mark facing up.
Align the end of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

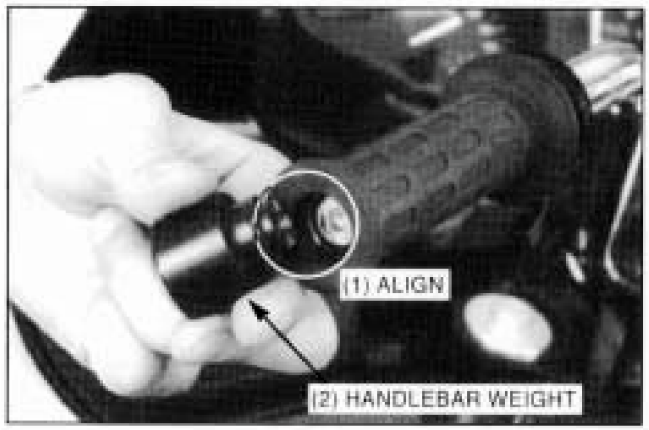
Connect the front brake light switch connector to the switch.



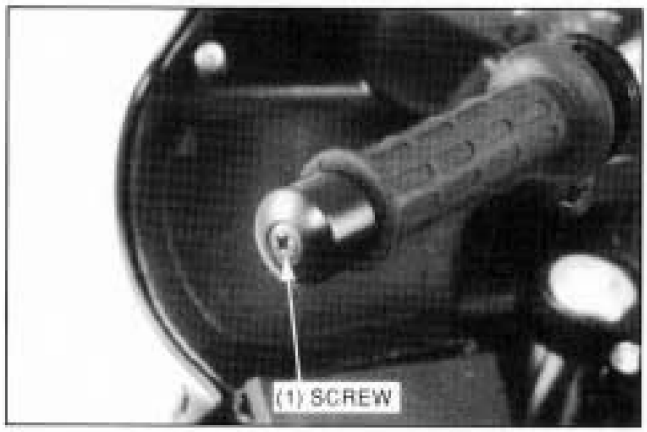
Install the clutch lever and left handlebar grip onto the handlebar (refer to page 14-4).



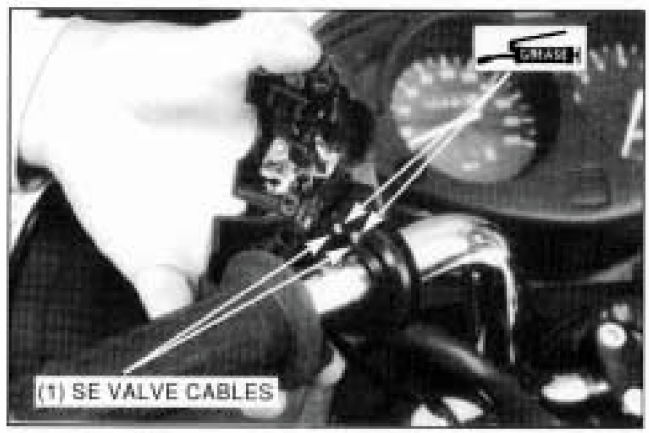
Install the handlebar weight to the handlebar, aligning the tab on the handlebar weight with the slit of the handlebar.



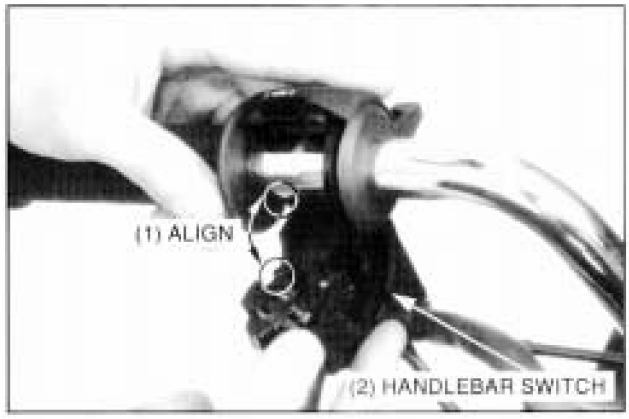
Install and tighten the screw to securely.



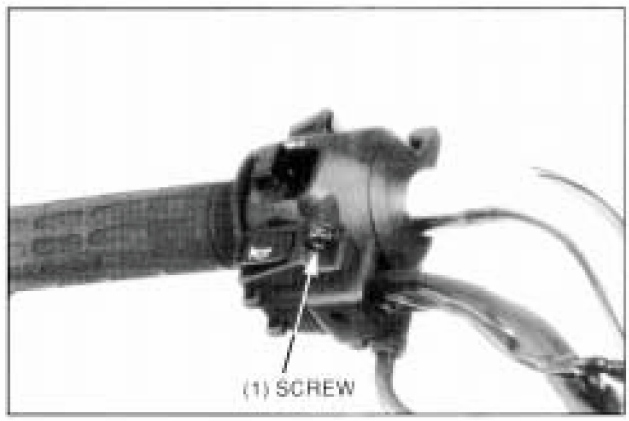
Apply grease to the SE valve cable end.
Connect the SE valve cables to the choke lever.



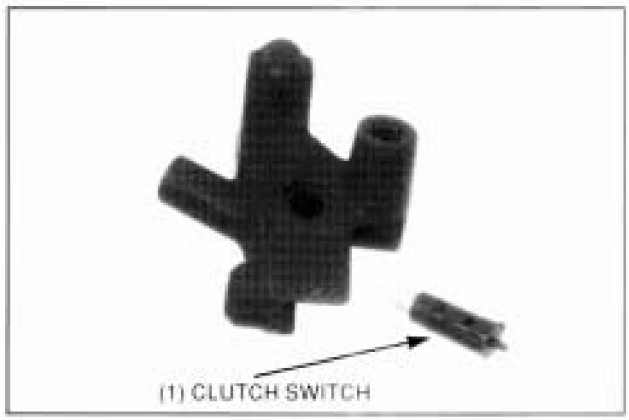
Install the left handlebar switch housing onto the handlebar, aligning the location pin with the hole in the handlebar.



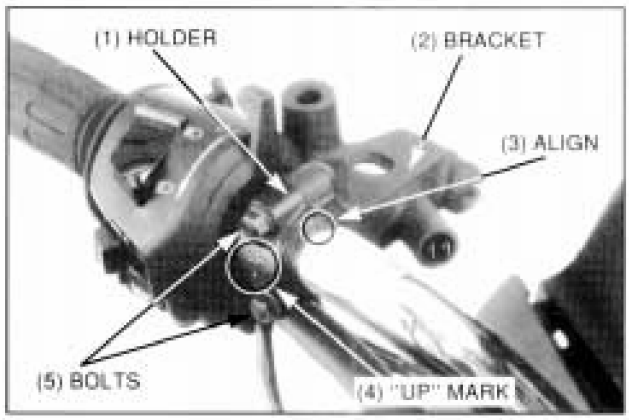
Install and tighten the screw.



Install the clutch switch into the clutch lever bracket.



Install the clutch lever bracket and 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 then tighten the lower bolt.



Connect the clutch switch connectors to the clutch switch.

Apply molybdenum disulfide grease to the clutch lever pivot bolt sliding surface.

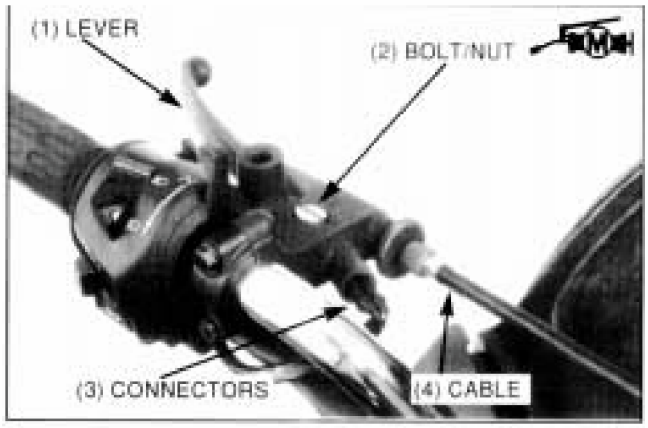
Install the clutch lever to the clutch lever bracket.
Install and tighten the bolt and nut securely.

Connect the clutch cable to the lever.

NOTE:

- Route the cables, wires and harness properly (page 1-24).

Adjust the following:
- Throttle operation free play (page 3-4).
- Clutch lever free play (page 3-21).



Front Wheel

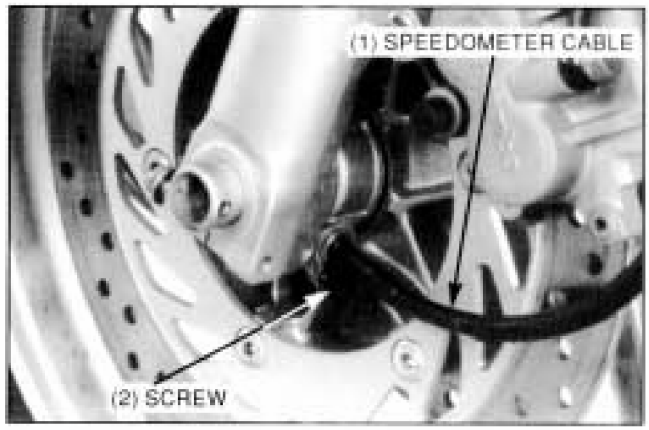
⚠ WARNING

- **A contaminated brake disc or pad reduces stopping power.**
- **Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.**

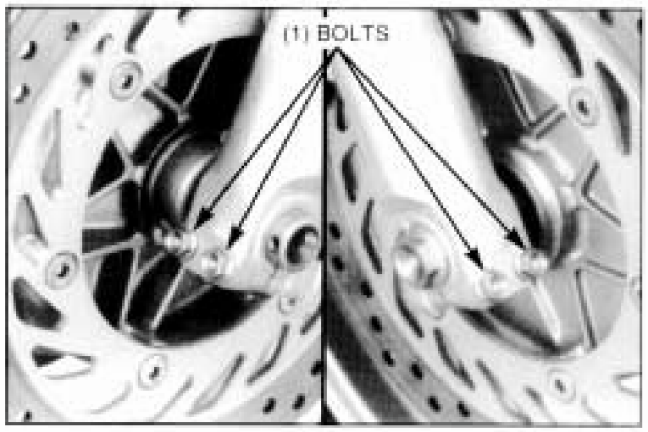
REMOVAL

Support the motorcycle on its main stand.

Remove the screw and speedometer cable from the speedometer gear.



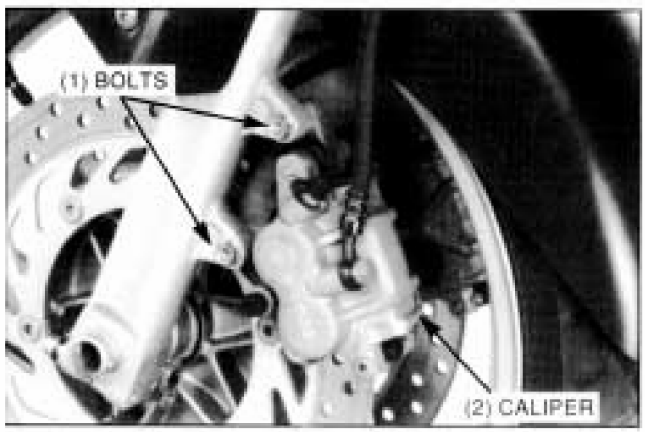
Loosen the axle pinch bolts.



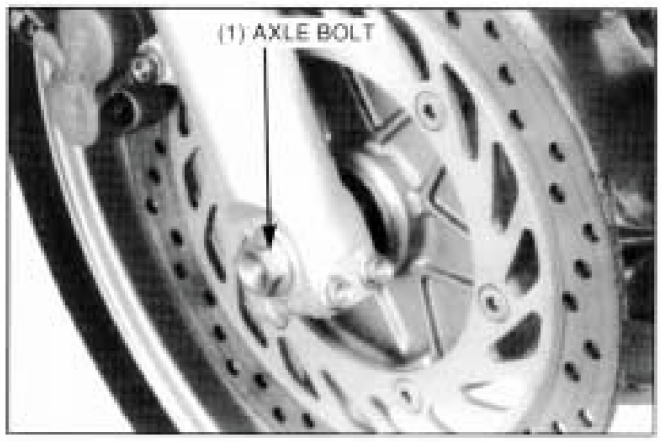
Remove the bolts and left front caliper.

CAUTION

- **Do not suspend the brake caliper from the brake hose.**
- **Do not twist the brake hose.**



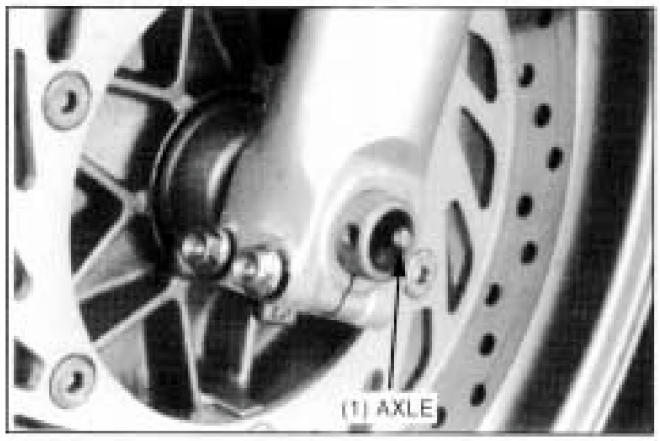
Remove the axle bolt.



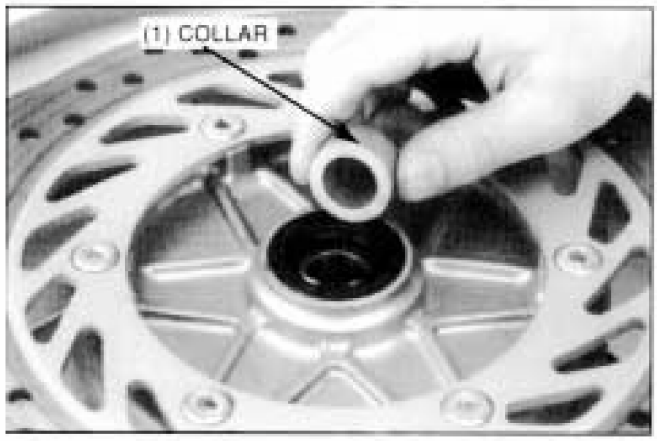
Remove the axle and front wheel.

NOTE:

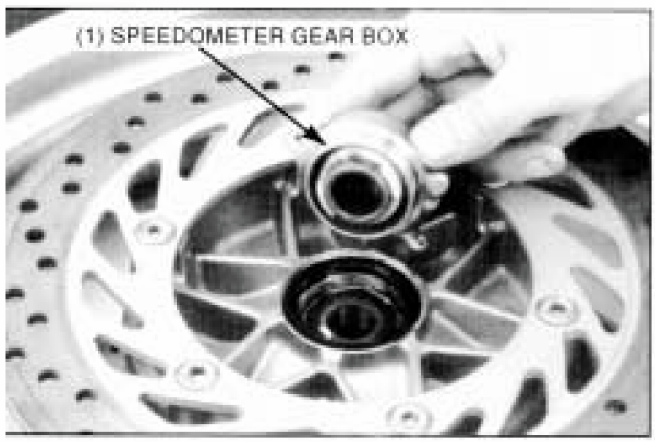
- Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.



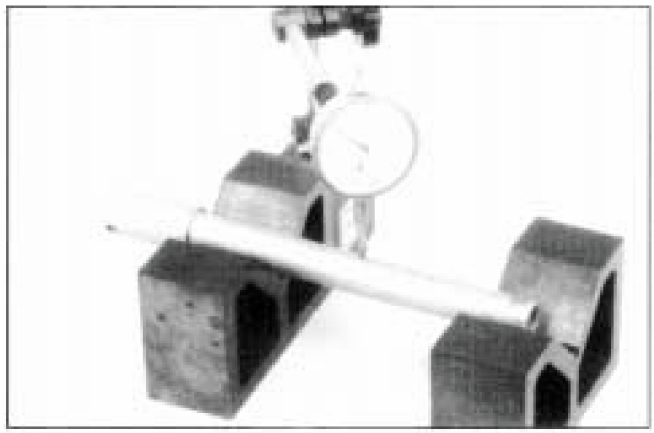
Remove the side collar.



Remove the speedometer gear box.



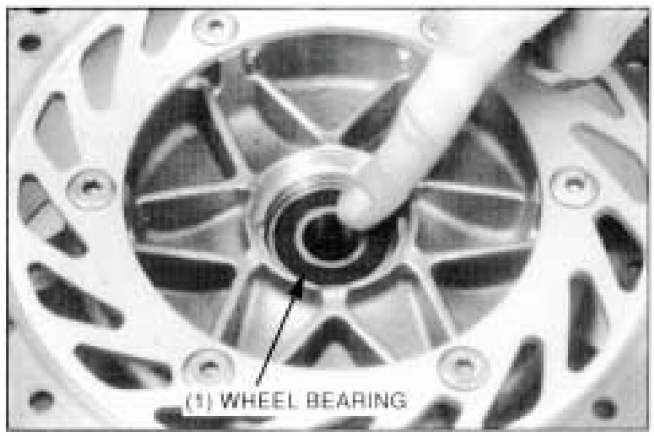
INSPECTION



AXLE

Set the front axle in V-blocks and measure the runout.
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 (0.008 in)

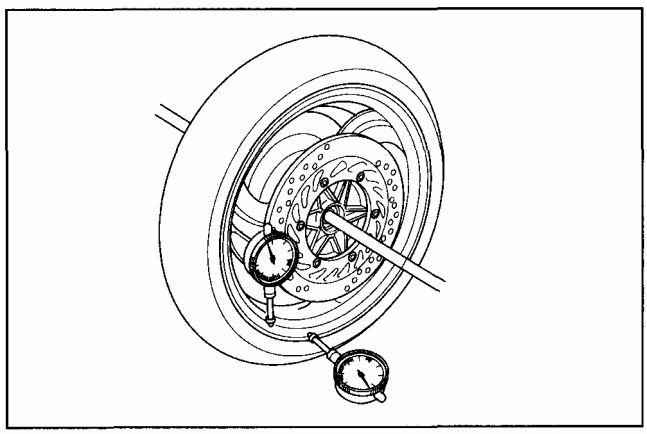


WHEEL BEARING

Turn the inner race of each bearings with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.
Remove and discard the bearings if the races do not turn smoothly and quietly, if they fit loosely in the hub.

NOTE:

- Replace the wheel bearings in pairs.



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.

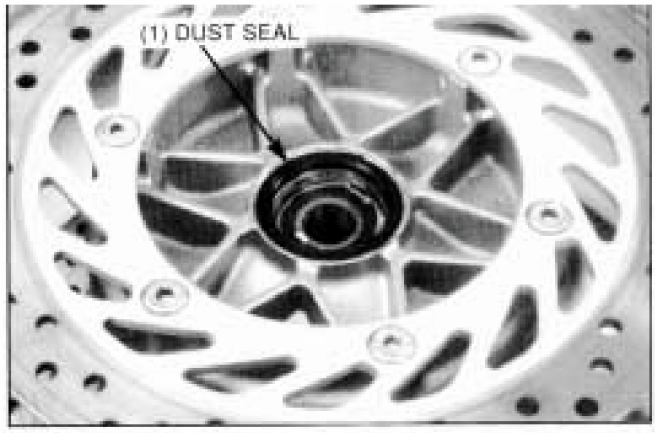
Service Limits:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

Chek the spokes for loose or damage.

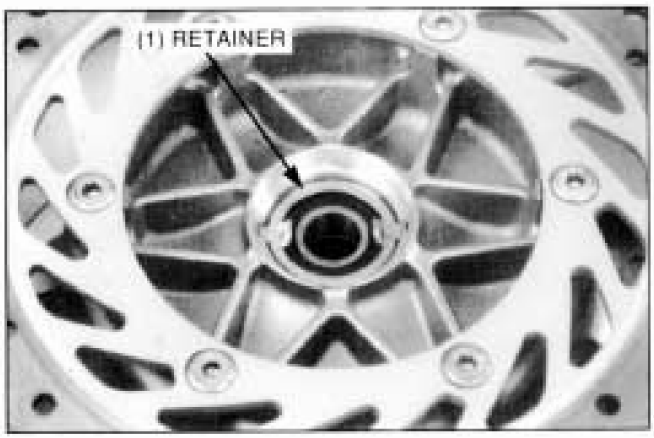
DISASSEMBLY

Remove the right dust seal from the right side of the front wheel.

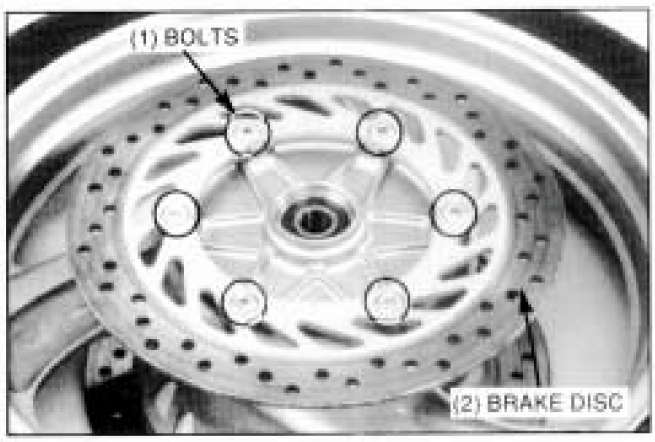
Remove the left dust seal from the left side of the front wheel.



Remove the speedometer gear retainer.



Remove the brake disc mounting bolts and brake discs.



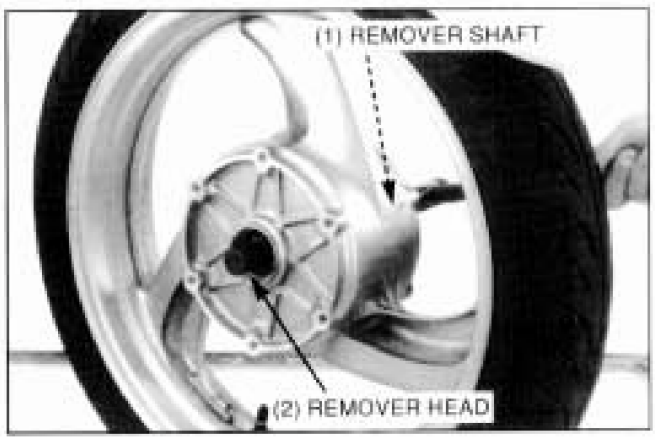
Install the bearing remover head into the bearing.
From opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

Tools:

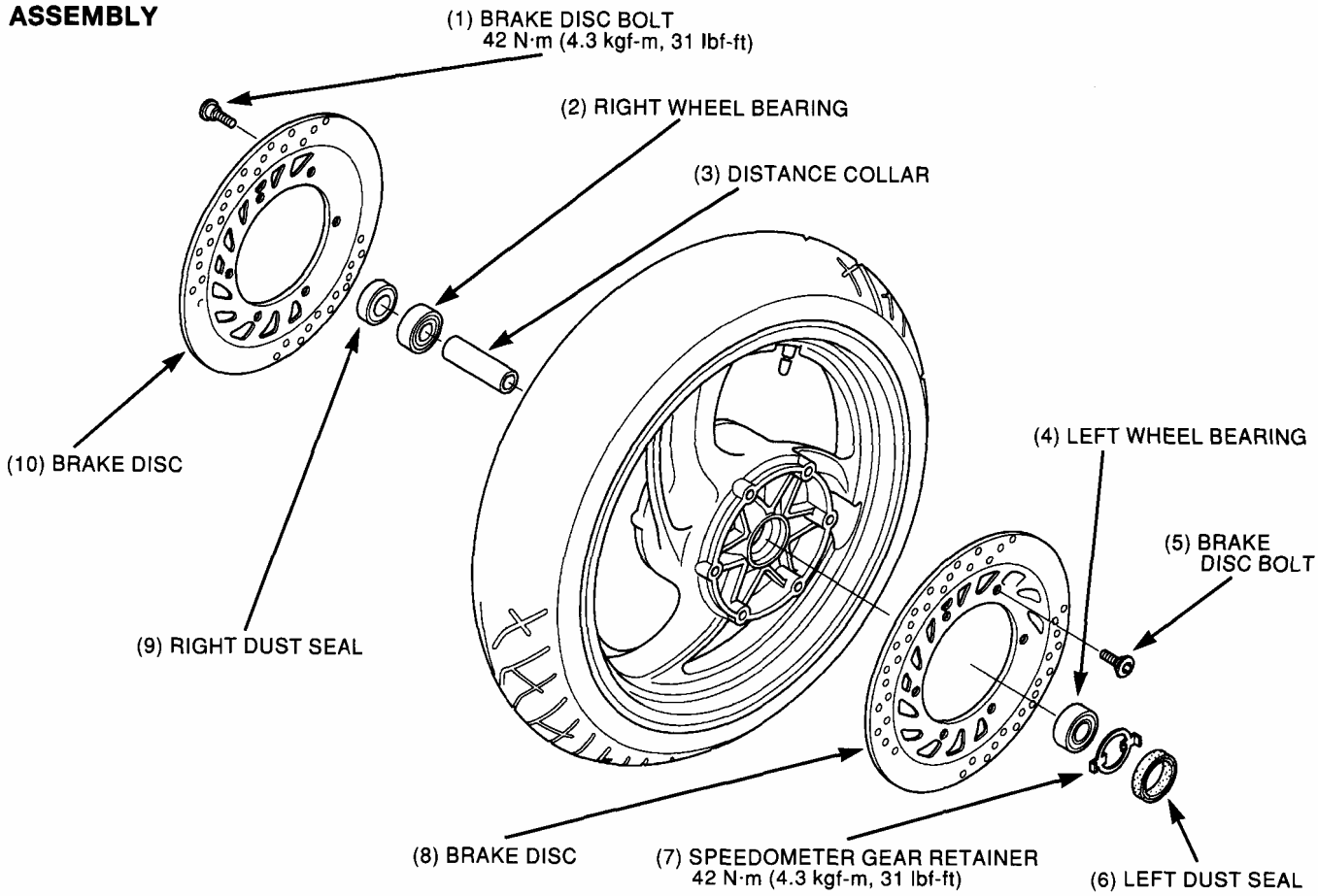
Bearing remover shaft	**07746-0050100**
Bearing remover head, 20 mm	**07746-0050600**

NOTE:

- Replace the wheel bearings in pairs. Do not re-use old bearings.



ASSEMBLY



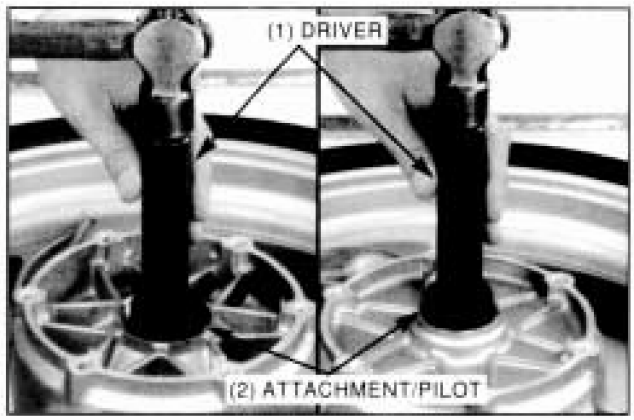
Drive in a new right bearing squarely with the marking side facing up until it is fully seated.
Install the distance collar.
Drive in a new left bearing squarely with the marking side facing up until it is fully seated.

NOTE:

- Drive in the left bearing while holding the right bearing inner race.

Tools:

Driver	**07749-0010000**
Attachment, 42 x 47 mm	**07746-0010300**
Pilot, 20 mm	**07746-0040500**

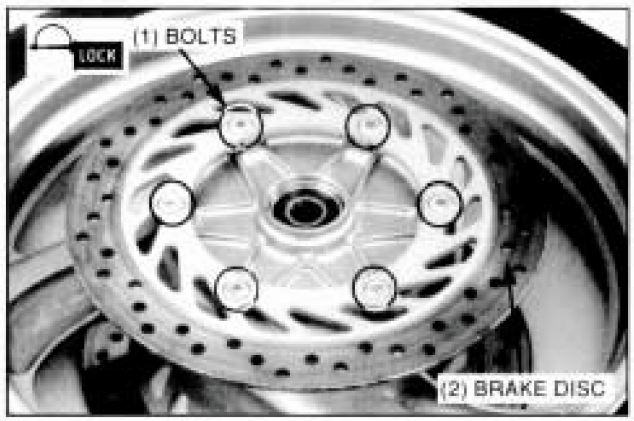


Install the brake disk as shown.
Clean and apply a locking agent to the brake disc bolt threads.
Install and tighten the brake disc bolts to the specified torque.

NOTE:

- Tighten the bolts in a crisscross pattern in 2 or 3 steps.

Torque: 42 N·m (4.3 kgf-m, 31 lbf-ft)



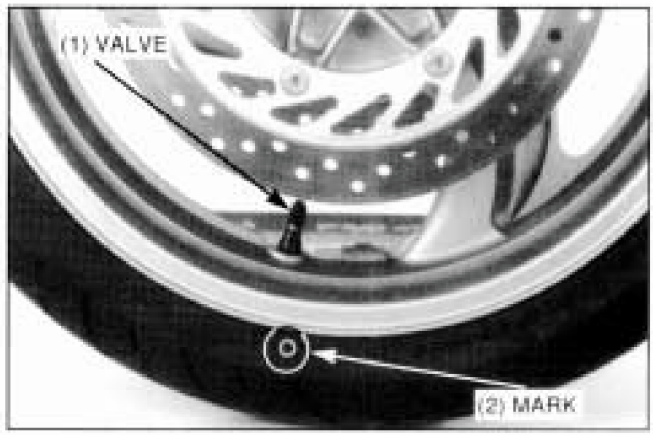
WHEEL BALANCE

⚠ WARNING

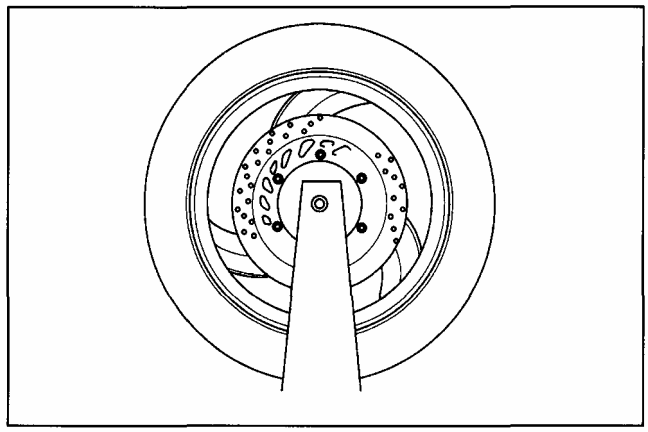
- **Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.**

NOTE:

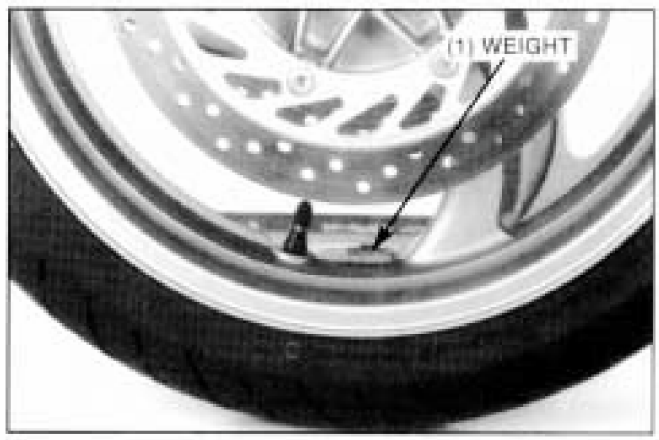
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem.
  Remount the tire if necessary.



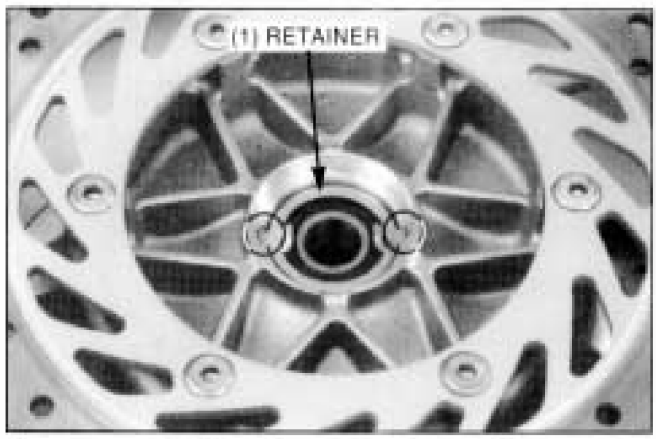
Mount the wheel, tire and brake discs assembly on an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



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 front wheel.



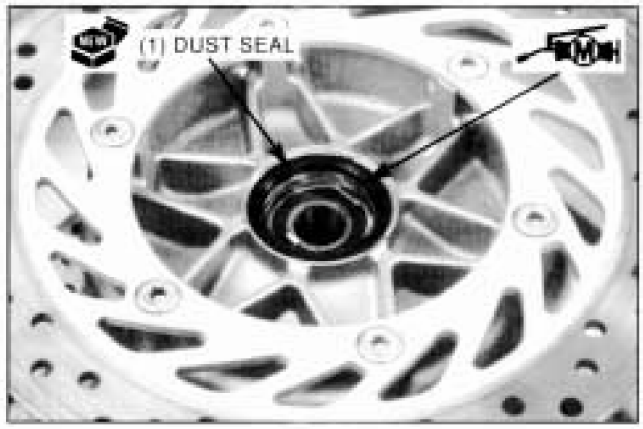
Install the speedometer gear retainer to the wheel hub aligning the tangs on the retainer with the slots on the hub.



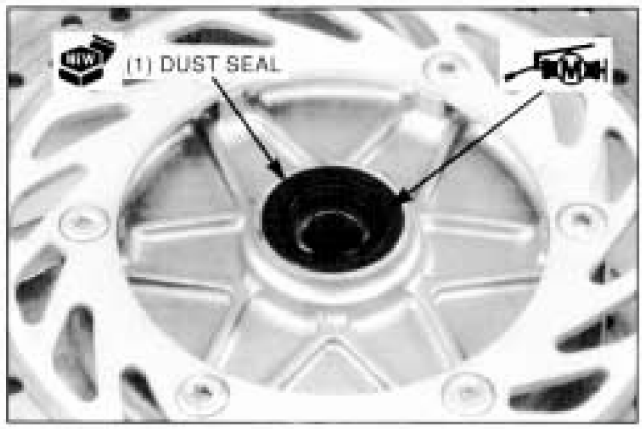
⚠ WARNING

- **Do not get grease on the brake disc or stopping power will be reduced.**

Apply molybdenum disulfide grease to the new left dust seal lip.
Install the dust seals to the left wheel hub.

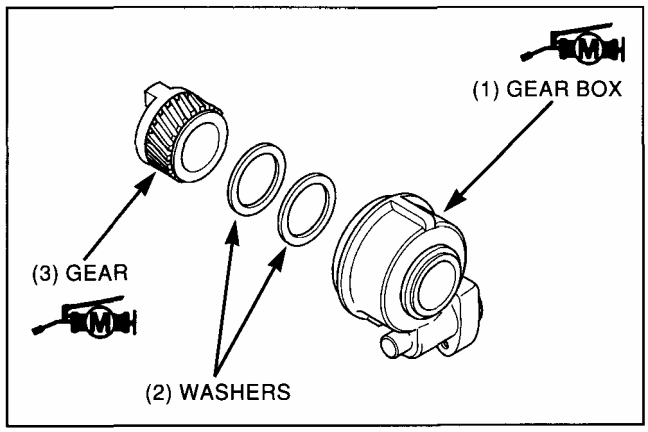


Apply molybdenum disulfide grease to the new right dust seal lip.
Install the dust seals to the right wheel hub.

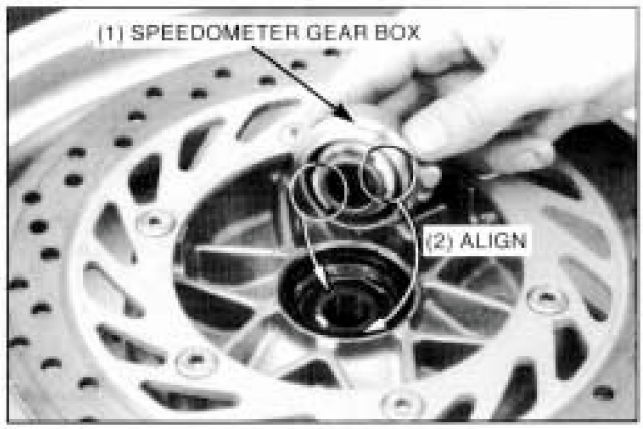


INSTALLATION

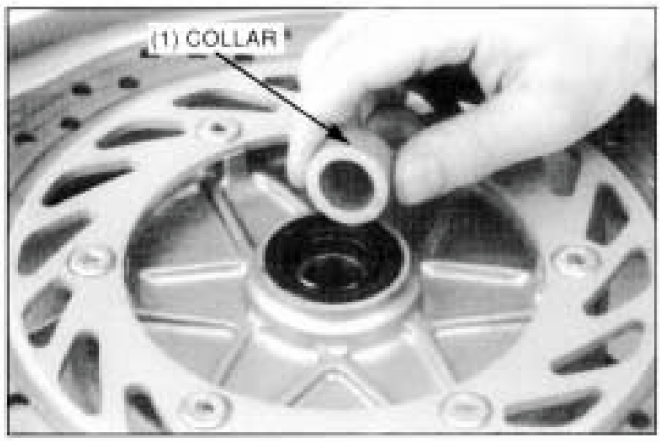
Apply molybdenum disulfide grease to the speedometer gear box and gear.
Install the speedometer gear and washers into the gear box.



Install the speedometer gear box into the left wheel hub, aligning the tangs with the slots.

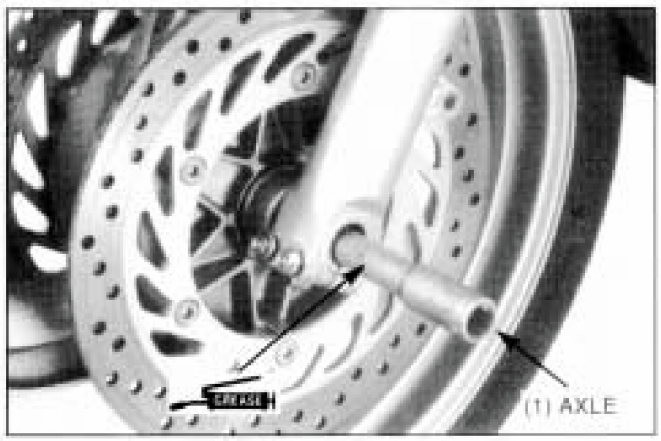


Install the side collar into the right wheel hub.



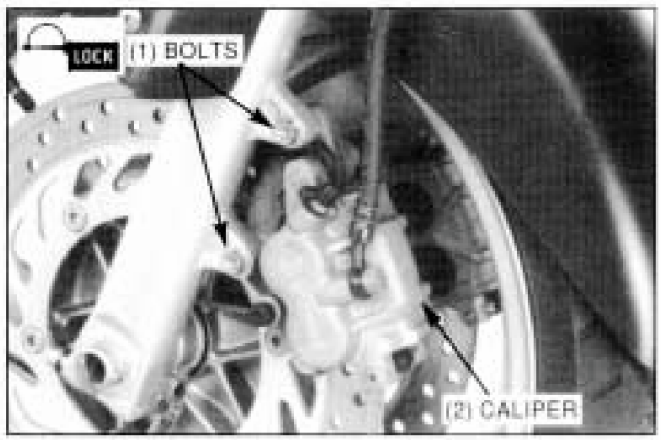
Install the front wheel between the fork legs so that the brake disc is positioned between the pads, being careful not to damage the pads.

Apply thin coat of grease to the front axle.
Install the front axle.



Install the left front caliper.
Clean and apply a locking agent to the caliper mount bolt threads.
Install and tighten the bolts to the specified torque.

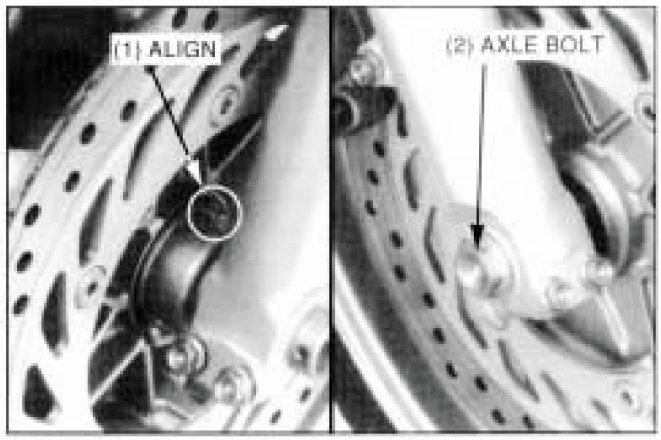
Torque: 30 N·m (3.1 kgf-m, 22 lbf-ft)



Position the lug on the speedometer gear box againsed the *back of stopper on the fork leg.*

Install and tighten the front axle bolt to the specified torque.

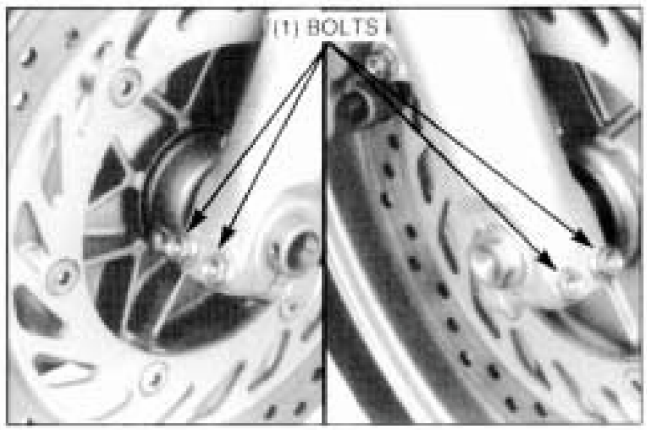
Torque: 59 N·m (6.0 kgf-m, 43 lbf-ft)



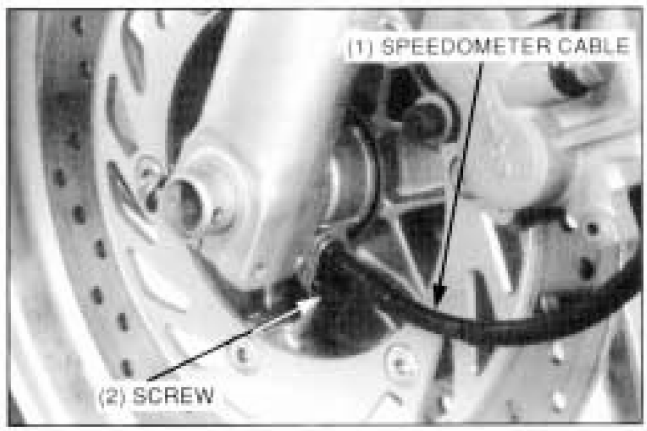
With the front brake applied, pump the front suspension up and down several times to seat the axle and check front brake operation.

Tighten the axle pinch bolts to the specified torque.

Torque: 22 N·m (2.2 kgf-m, 16 lbf-ft)



Install the speedometer cable and tighten the screw securely.



Fork

REMOVAL

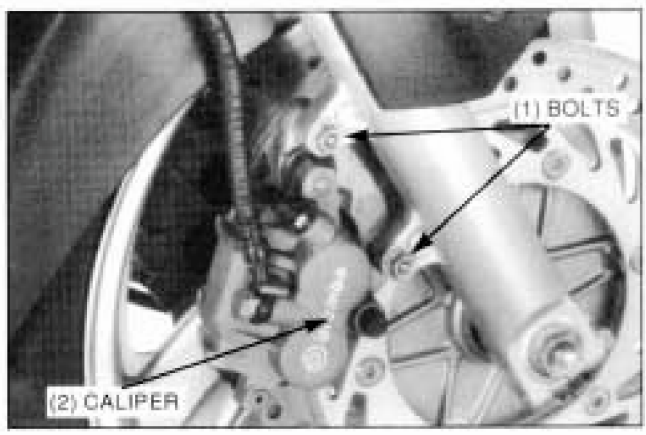
NOTE:

- Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Remove the brake caliper mounting bolts and brake caliper.

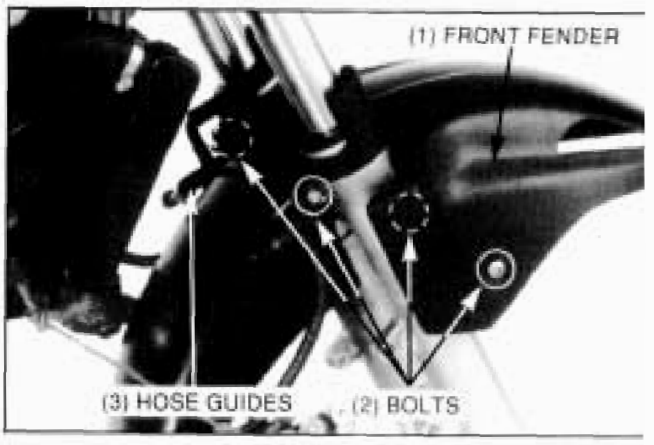
CAUTION

- **Do not suspend the brake caliper from the brake hose.**
- **Do not twist the brake hose.**



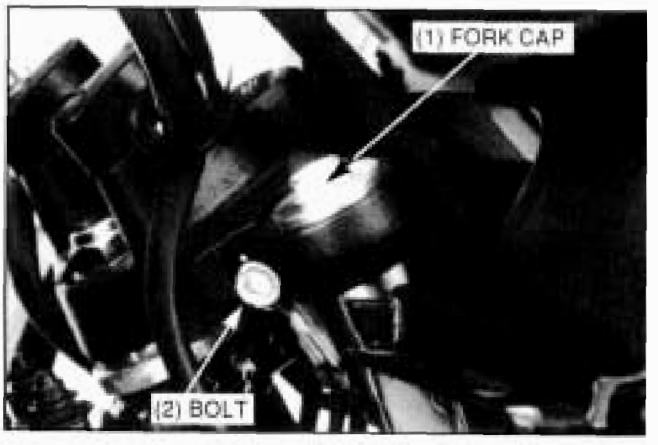
Remove the front wheel (page 14-12).

Remove the four bolts.
Remove the brake hose guides and front fender.

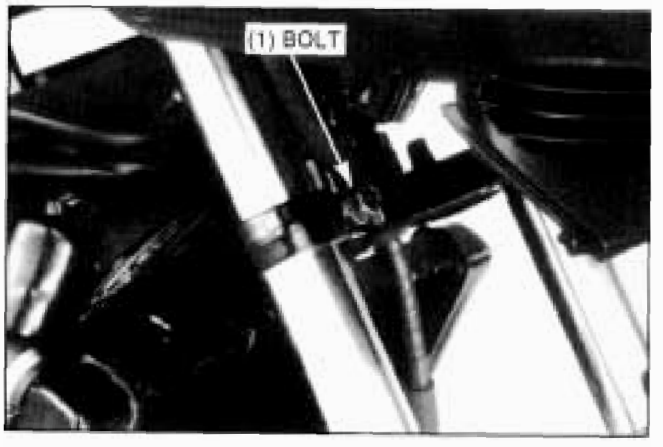


Loosen the fork top bridge pinch bolt.
When the fork is ready to be disassembled, loosen the fork cap, but do not remove it.

Remove the top bridge (page 14-32).



Loosen the fork bottom bridge pinch bolt while holding the fork.
Remove the fork from the steering stem.

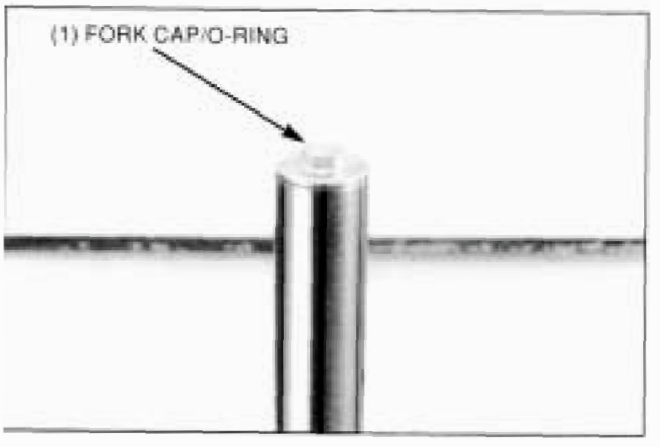


DISASSEMBLY

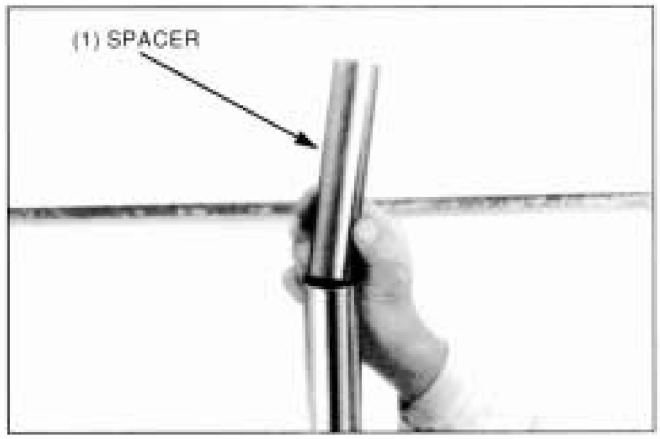
Remove the fork cap and O-ring from the fork tube.

⚠ WARNING

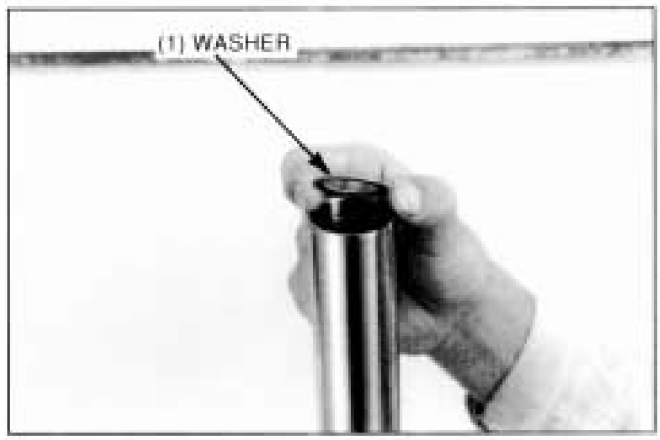
- **The fork cap is under spring pressure. Use care when *removing it and wear eye and face protection.***



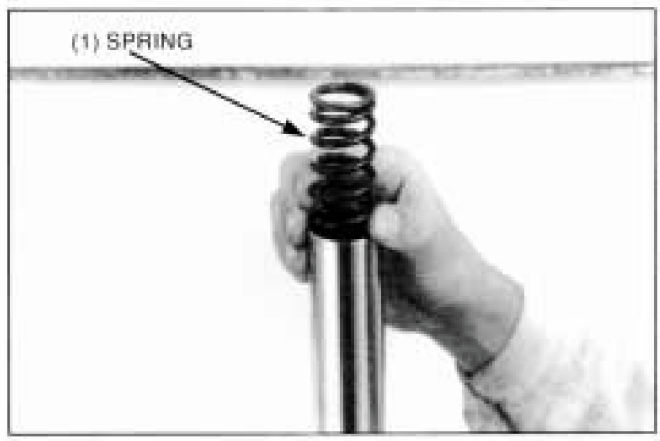
Remove the spring spacer from the fork tube.



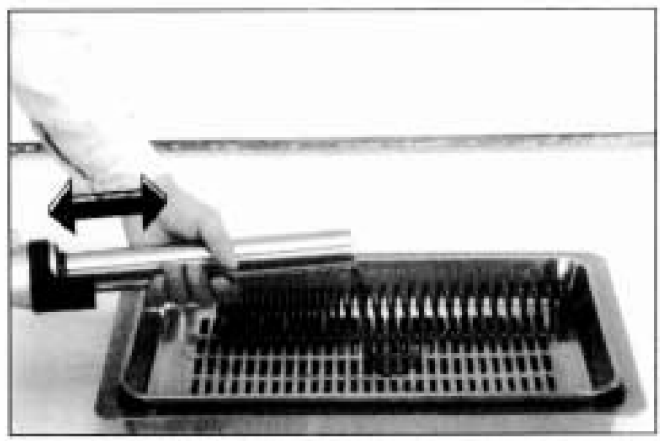
Remove the washer.



Remove the fork spring.



Pour the fork oil from the fork leg by pumping the fork 8-10 times.



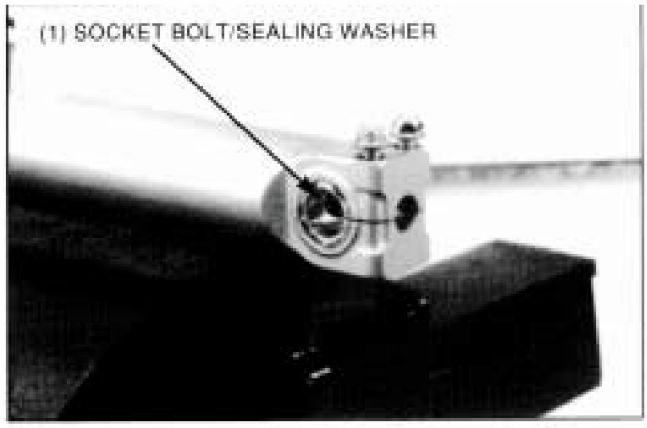
CAUTION

- **Do not over tighten the fork slider.**

Hold the axle holder in a vise with a piece of wood or soft jaws to avoid damage.

Loosen and remove the fork socket bolt and sealing washer from the fork slider.

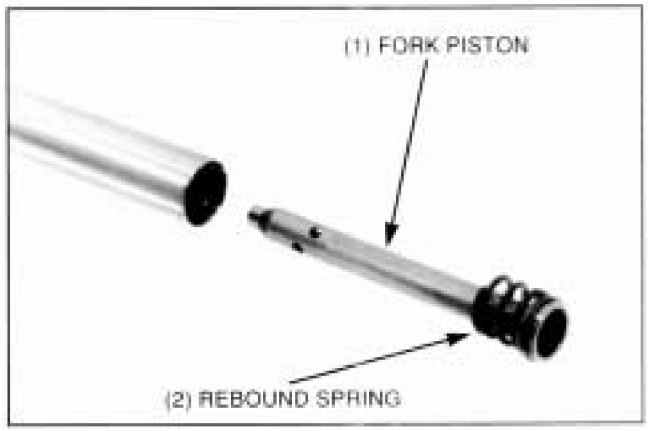
If the fork piston turns with the socket bolt, temporarily install the fork spring, washer, spring spacer and fork cap.



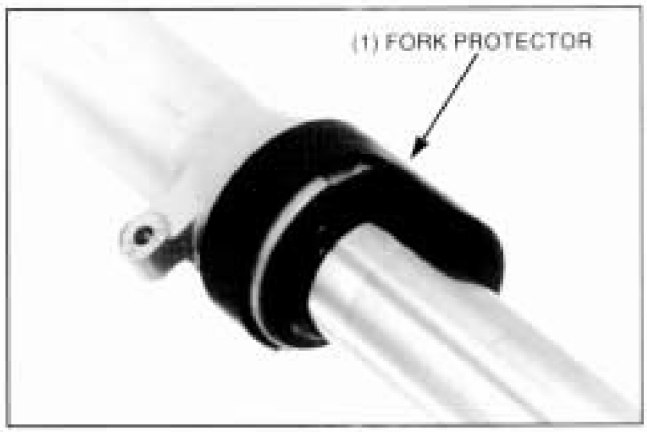
Remove the fork piston and rebound spring.

NOTE:

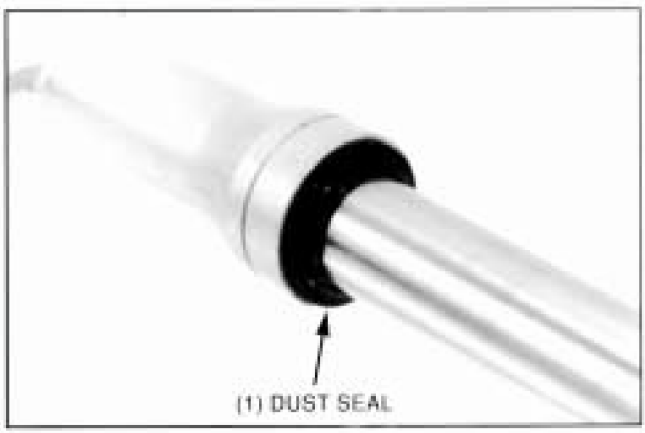
- Do not remove the fork piston ring, unless it is necessary to replace with a new one.



Remove the fork protector.



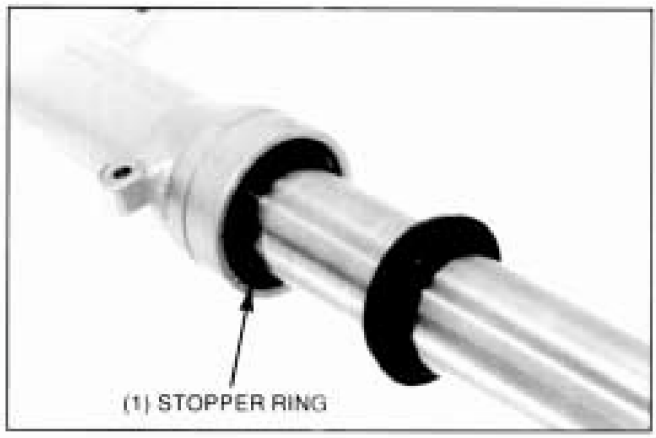
Remove the dust seal from the fork slider.



Remove the stopper ring from the groove of the fork slider.

CAUTION

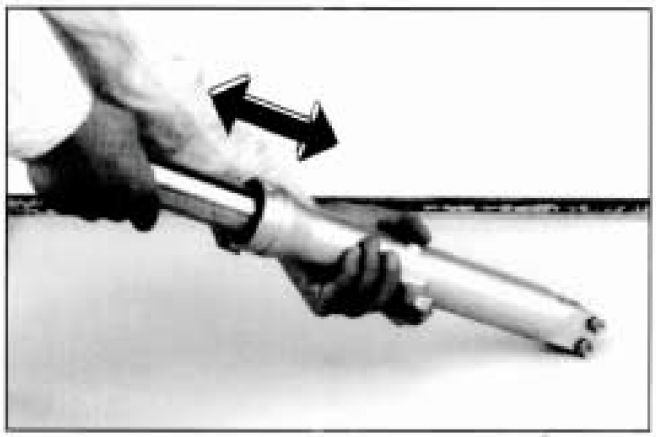
- **Do not scratch the fork tube sliding surface.**



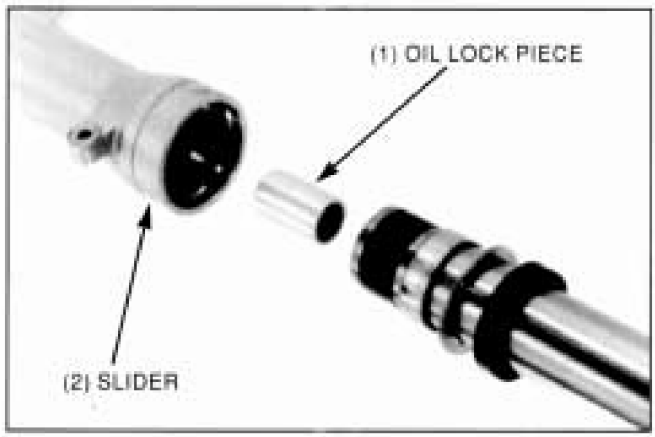
NOTE:

- Check that the fork tube moves smoothly in the fork slider. If does not, check the fork tube for bending or damage, and bushings for wear or damage.

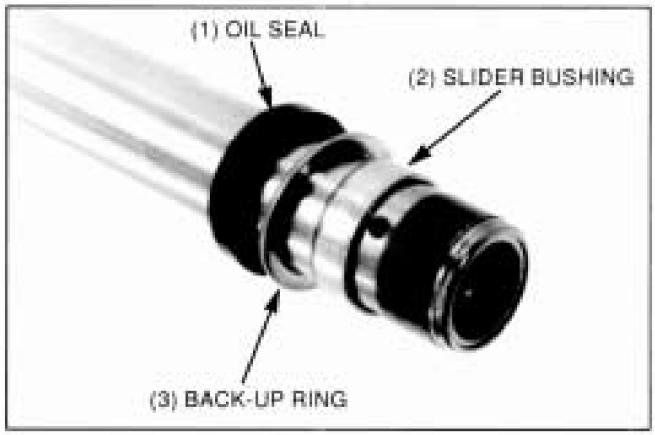
Using quick successive motions, pull the fork tube out of the fork slider.



Remove the oil lock piece from the fork slider.



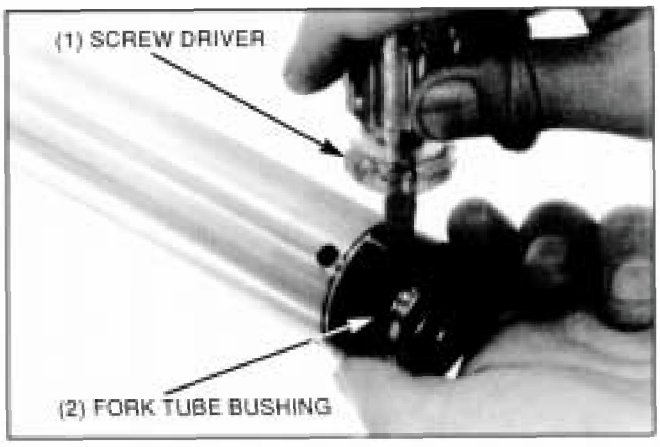
Remove the oil seal, back-up ring and slider bushing from the fork tube.



NOTE:

••Do not remove the fork tube bushing unless it is necessary to replace it with a new one.

Carefully remove the fork tube bushing by plying the slot with a screwdriver until the bushing can be pulled off by hand.

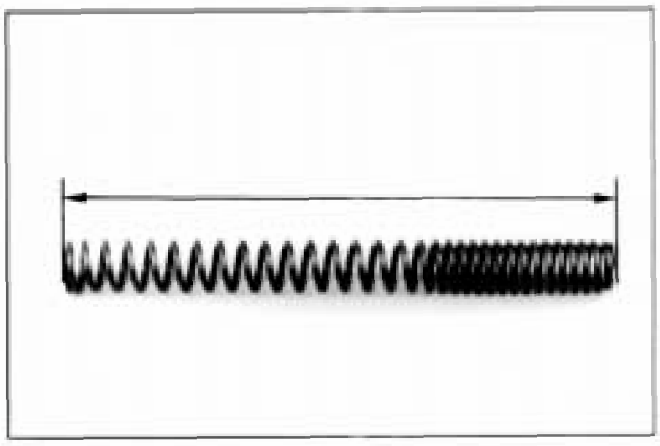


INSPECTION

FORK SPRING

Measure the fork spring free length by placing the spring on a flat surface.

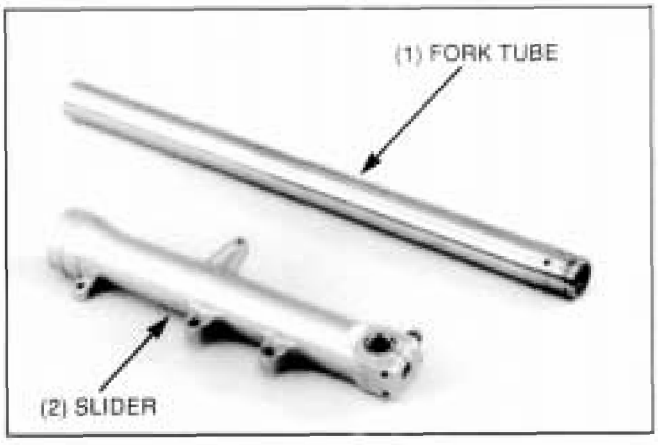
Service Limit: 408.6 mm (16.09 in)



FORK TUBE/SLIDER/FORK PISTON

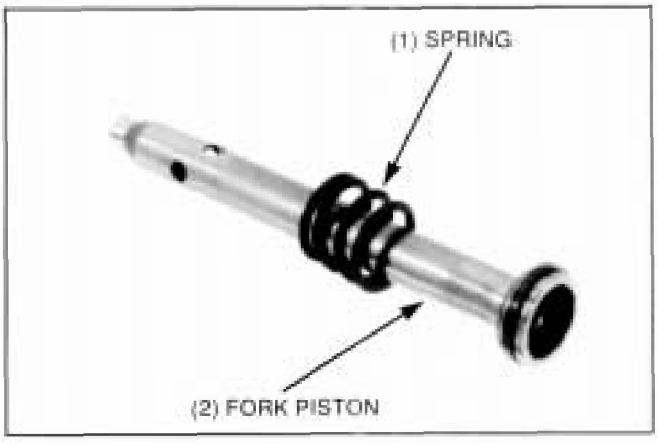
Check the fork tube, slider and fork piston for score marks, and excessive or abnormal wear.

Replace the component if necessary.



Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

Replace the component if necessary.



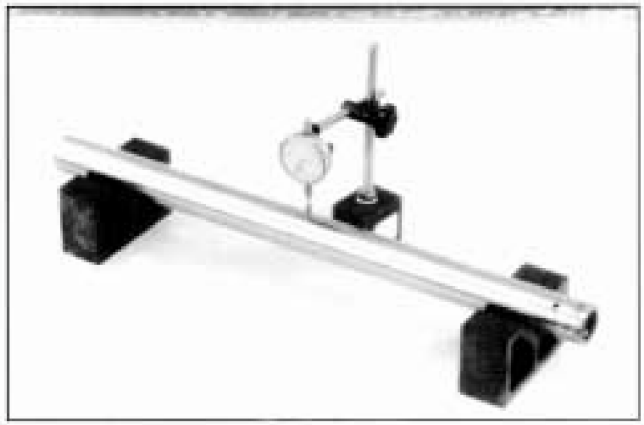
Set the fork tube in V-blocks and measure the fork tube runout rotating it with a dial indicator.
Actual runout is 1/2 the total indicator reading.

Service Limit: 0.2 mm (0.008 in)

Replace if the service limit is exceeded, or there are scratches or nicks that will allow fork oil to leak past the seals.

NOTE:

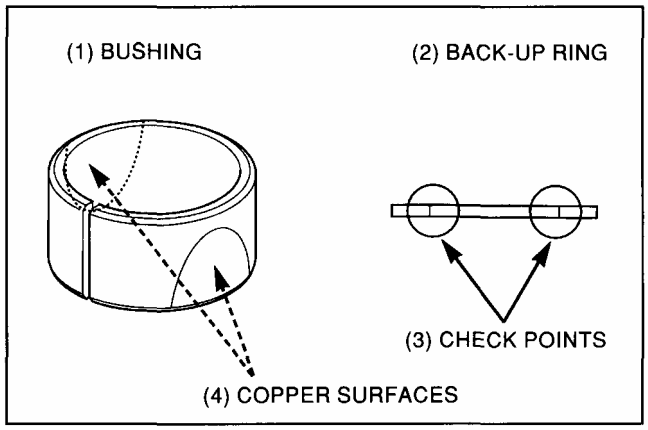
- Do not reuse the fork tube if it cannot be perfectly straightened with minimal effort.



FORK TUBE BUSHING

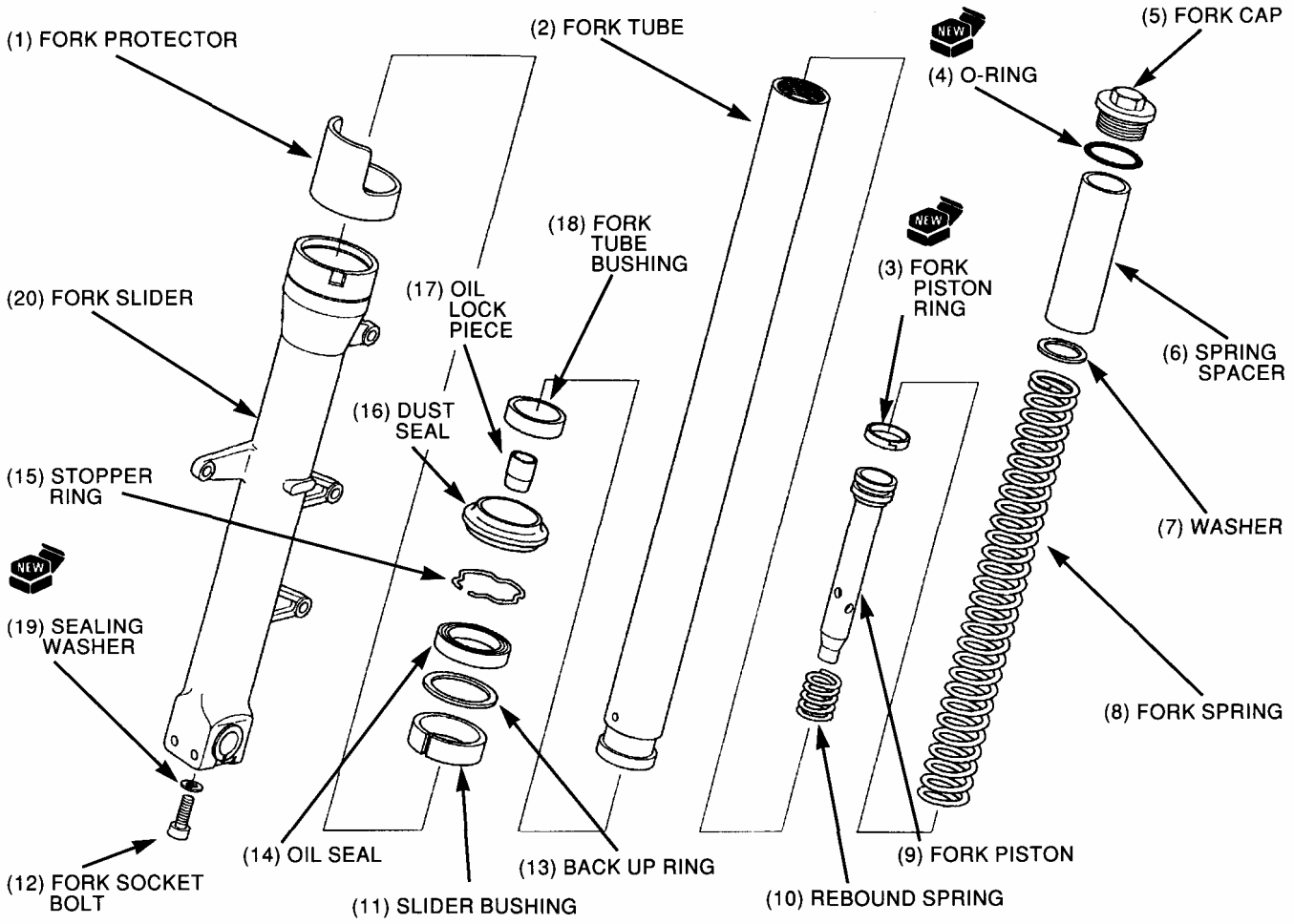
Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the point shown.



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



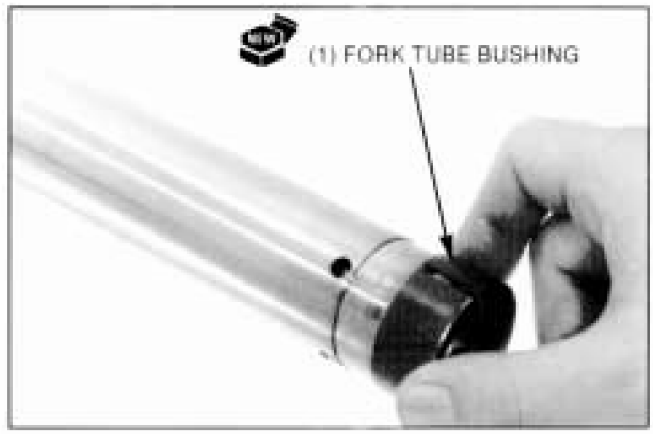
Install a new fork tube bushing if the tube bushing has been removed.

CAUTION

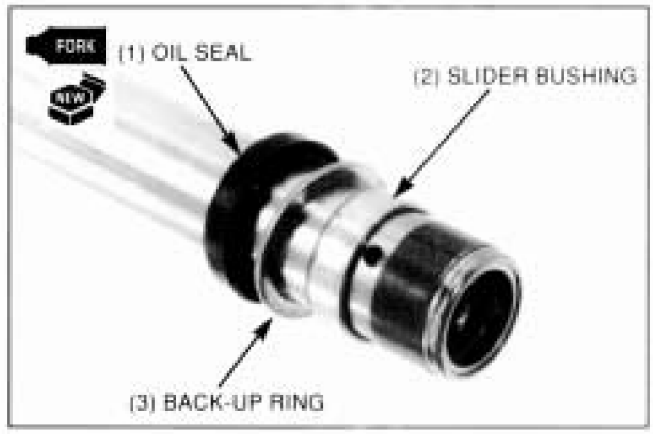
- **Be careful not to damage the fork tube bushing coating.**
- **Do not open the fork tube bushing more than necessary.**

NOTE:

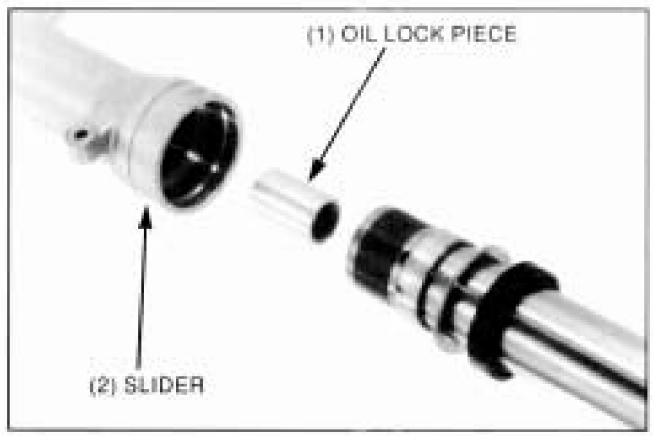
- Remove the burrs from the bushing mating surface, being careful not to peel off the coating.



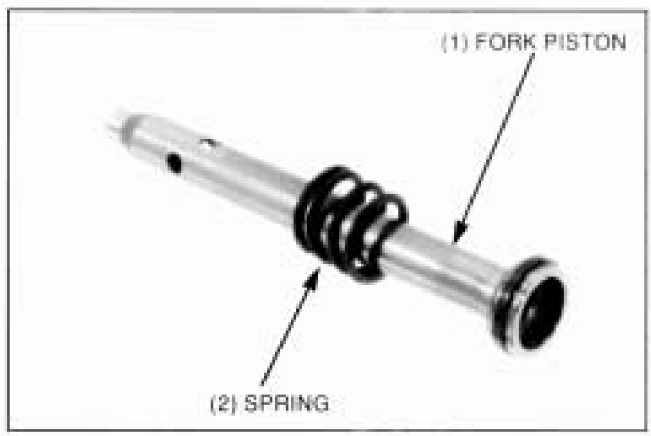
Install the slider bushing and back-up ring to the fork tube.
Apply fork oil to the new oil seal lip.
Install the new oil seal to the fork tube with it marking side facing up.



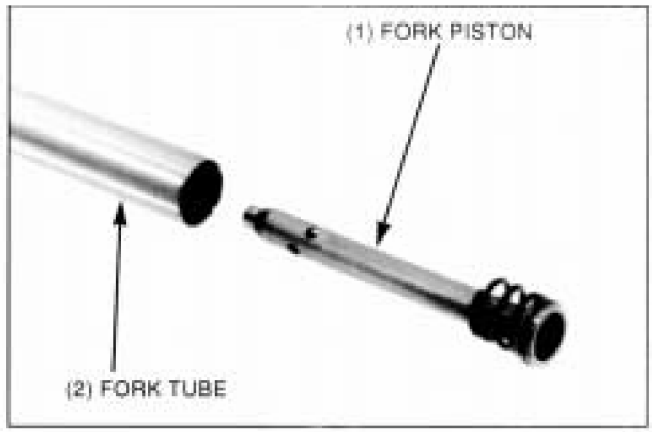
Install the oil lock piece onto the fork piston end.
Coat the fork tube bushing with the fork oil and install the fork into the fork slider.



Install the rebound spring to the fork piston.



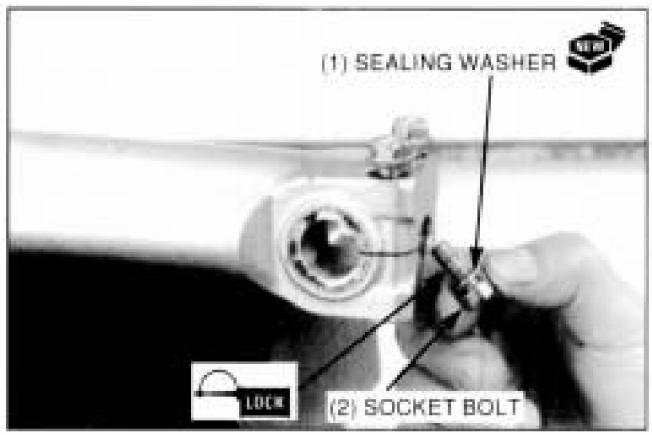
Install the fork piston into the fork tube.



CAUTION

- **Do not overtighten fork slider.**

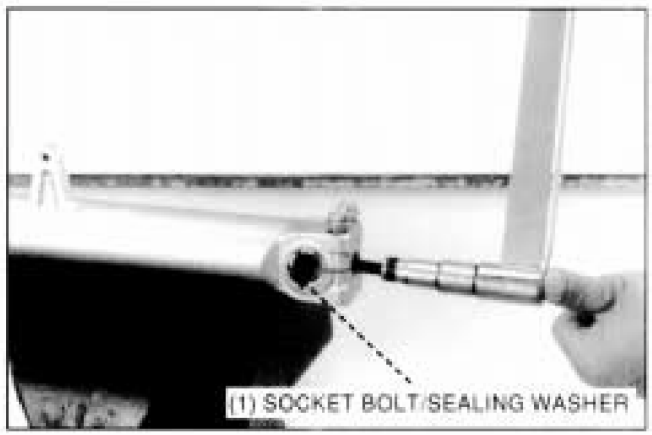
Hold the axle holder of the fork slider in a vise with a piece of wood or soft jaws to avoid damage.
Replace the sealing washer with a new one.
Clean and apply a locking agent to the fork socket bolt threads and install the fork socket bolt with the new sealing washer into the fork piston.



Tighten the fork socket bolt to the specified torque.

Torque: 22 N·m (2.2 kgf-m, 16 lbf-ft)

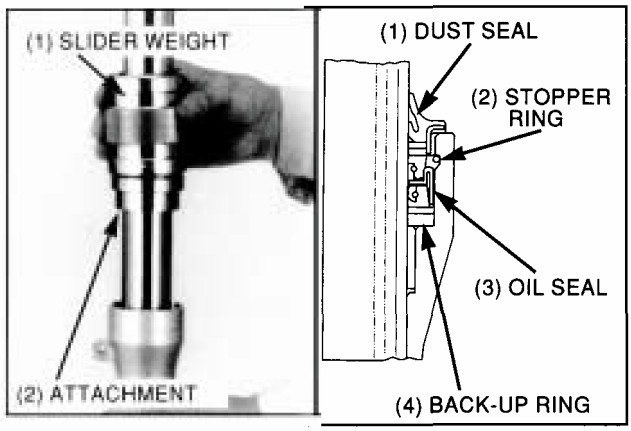
If the fork piston turns with the socket bolt, temporarily install the fork spring, washer, spring spacer and fork cap.



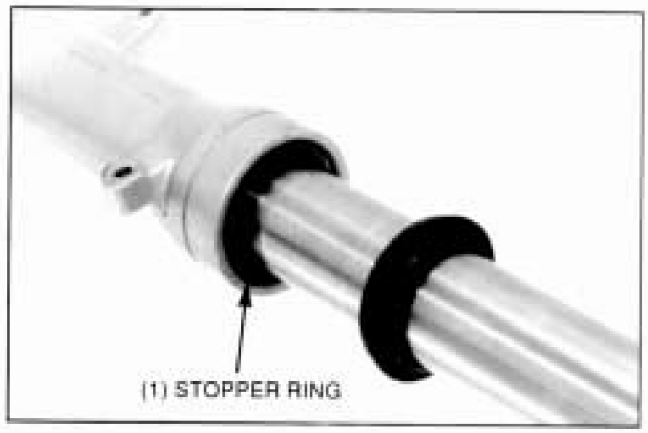
Drive in the new oil seal into the fork tube until the stop ring groove is visible, using the special tool.

Tools:

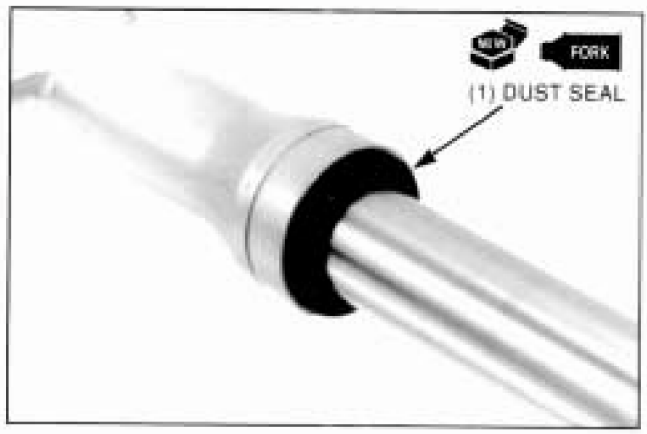
Slider weight	**07947-KA50100**
Seal driver attachment	**07947-KF00100**



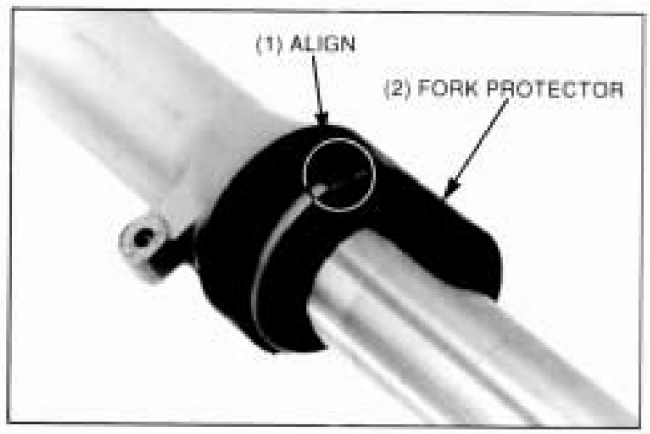
Install the stopper ring into the groove in the fork slider.



Apply fork oil to the lip a new dust seal and install the dust seal.



Install the fork protector onto the fork slider aligning the protector boss with the groove in the fork slider.

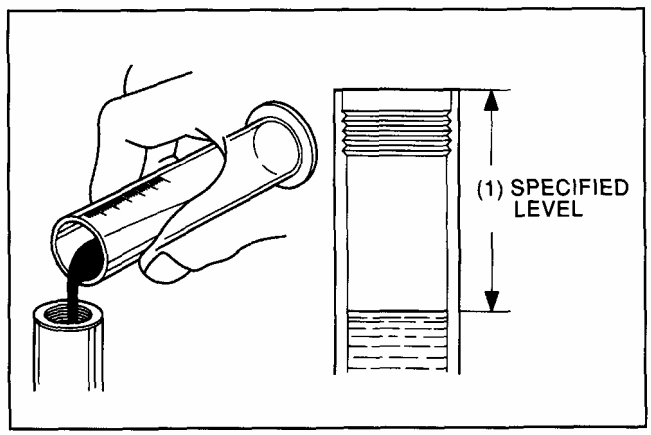


Pour half the required amount of the recommended fork oil in the fork tube.

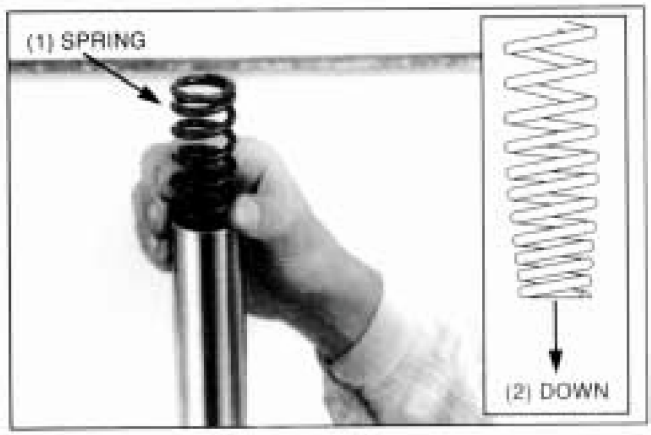
Recommended Fork Oil: Fork fluid
Oil Capacity: 480 ± 2.5 cm³ (16.2 ± 0.02 US oz, 16.9 ± 0.09 Imp oz)

Slowly pump the fork tube several times to remove trapped air.
Pour additional oil up to the specified capacity and repeat the above step.
Compress the fork leg fully.
Measure the oil level from the top of the fork tube.

Oil Level: 113 mm (4.4 in)

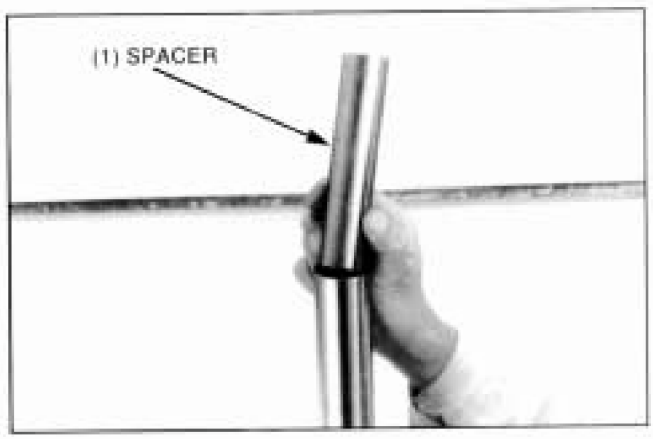


Install the fork spring into the fork tube with its narrow pitch side facing down.



Install the washer.

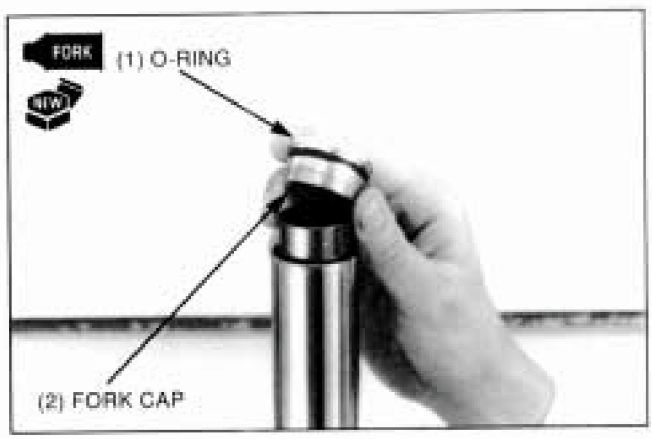
Install the spring spacer.



Apply fork oil to the new O-ring and install the new O-ring to the fork cap.
Install the fork cap into the fork tube.

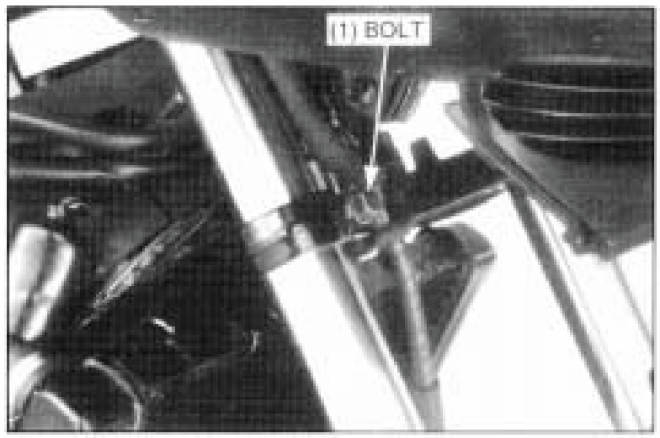
NOTE:

- Tighten the fork cap after installing the fork tube into the fork bridge.



INSTALLATION

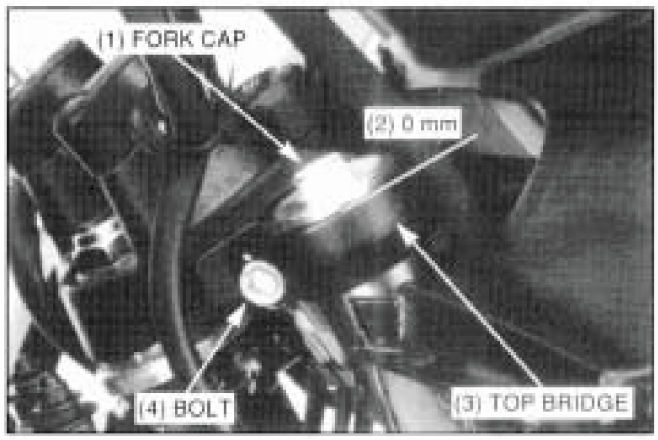
Install the front fork to the steering stem, then tighten the bottom bridge pinch bolt to temporaly.



Install the top bridge (page 14-38).

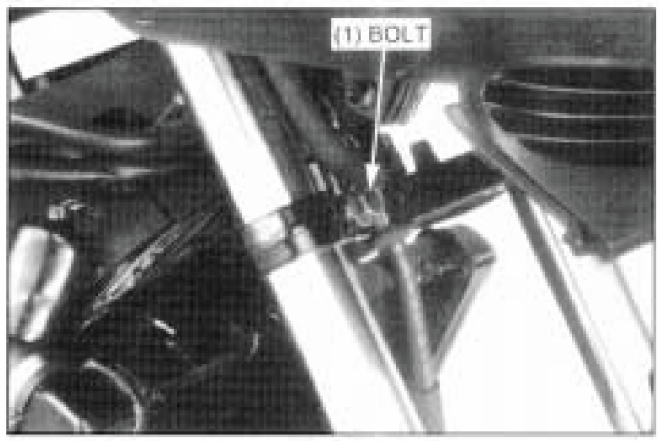
Loosen the bottom bridge pinch bolt.

Align the top of fork tube with the upper surface of the top bridge.



Tighten the bottom bridge pinch bolts to the specified torque.

Torque: 39 N·m (4.0 kgf-m, 29 lbf-ft)

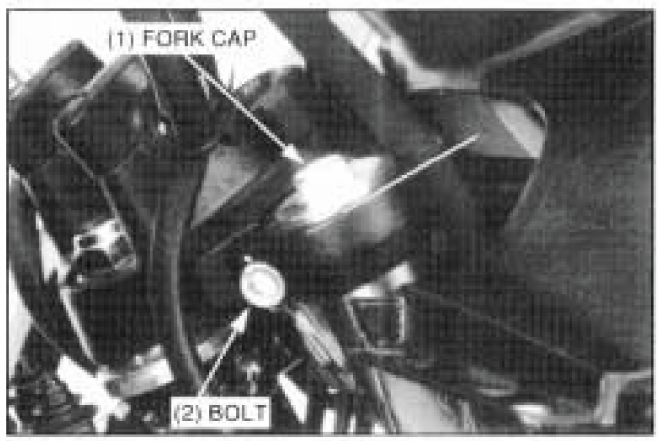


Tighten the fork cap to the specified torque, if removed.

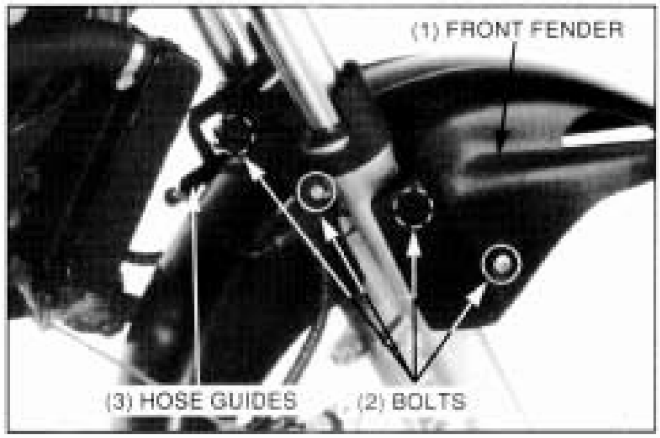
Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

Tighten the top bridge pinch bolts to the specified torque.

Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

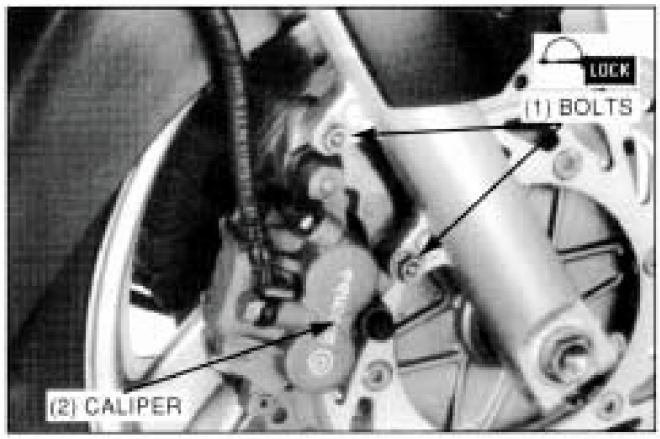


Install the front fender with the brake hose guides.
Install and tighten the mounting bolts securely.



Install the brake caliper.
Clean and apply a locking agent to the brake caliper mounting bolt threads.
Install and tighten the bolts to the specified torque.

Torque: 30 N·m (3.1 kgf-m, 22 lbf-ft)

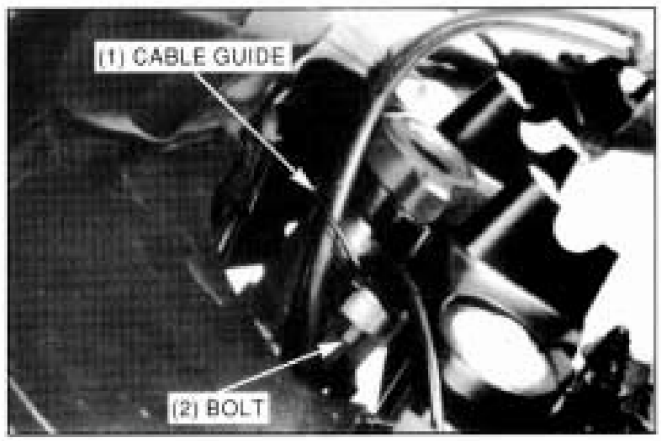


Steering Stem

REMOVAL

Remove the following:
- Front wheel (page 14-12).
- Handlebar (page 14-5).

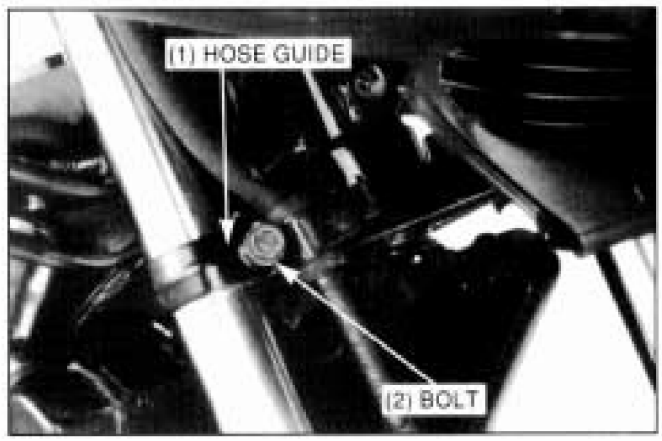
Remove the bolt and cable guide.



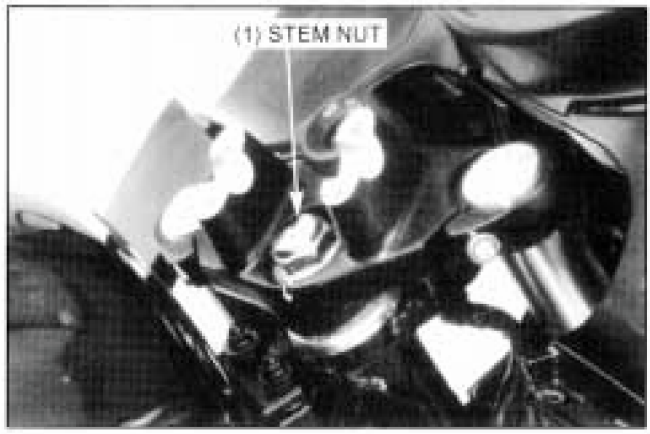
Remove the bolt and front brake hose guide.

CAUTION

- **Do not suspend the brake caliper from the brake hose.**
- **Do not twist the brake hose.**

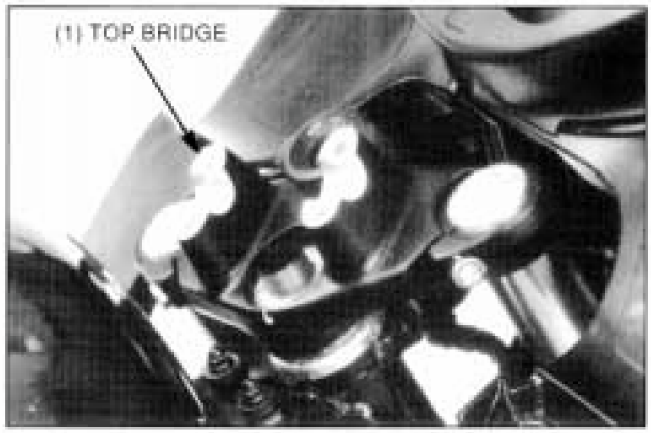


Remove the steering stem nut.

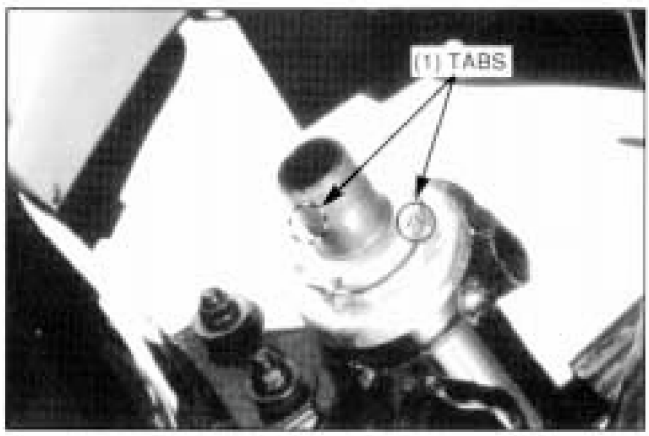


Remove the top bridge.

Remove the front fork (page 13-21).

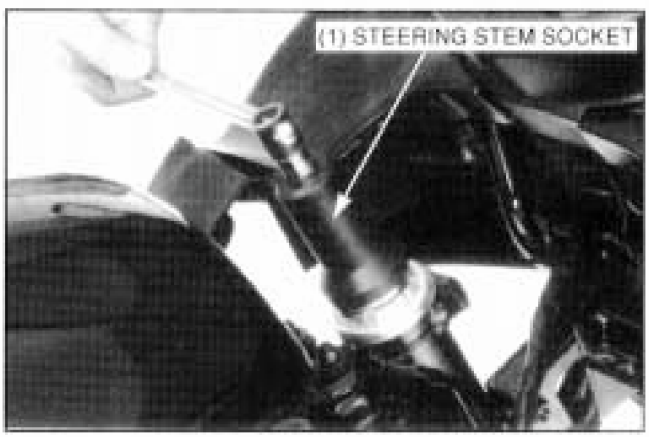


Straighten the lock washer tabs.

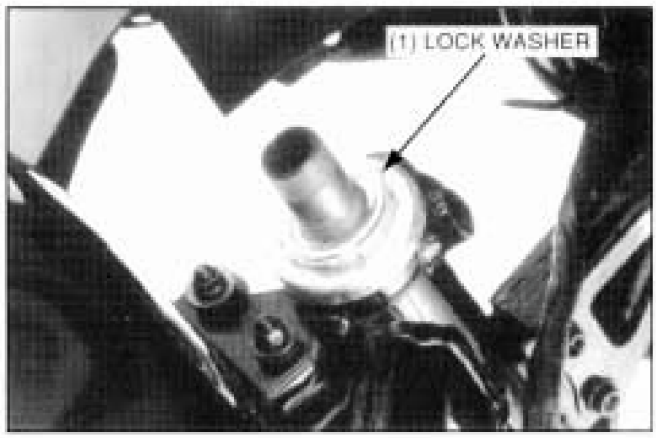


Remove the lock nut using following tool.

Tool:
Steering stem socket **07916-3710101**

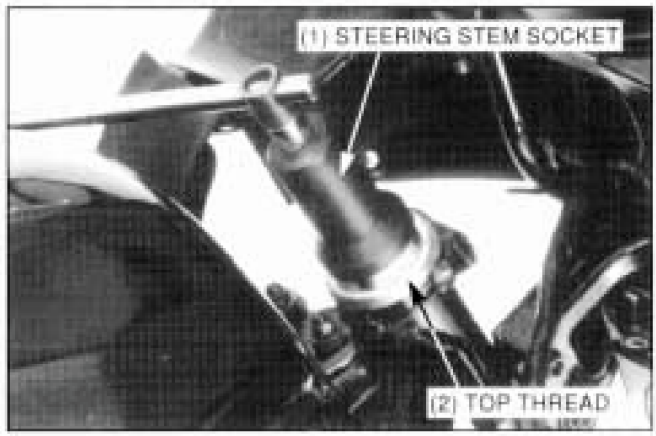


Remove the lock washer.

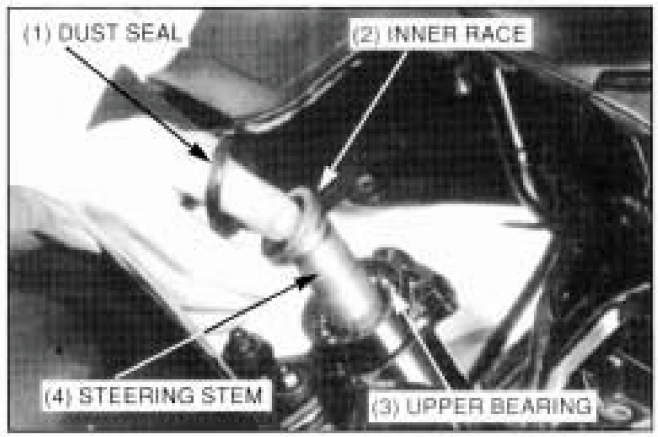


Remove the steering top thread using following tool.

Tool:
Steering stem socket **07916-3710101**

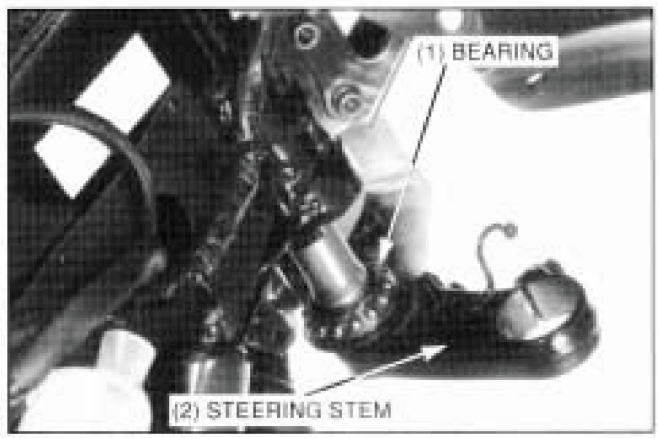


Hold the steering stem by hand and remove the dust seal, upper bearing inner race and upper bearing.



Remove the steering stem from the steering head.

Check the steering bearings, inner and outer races for wear or damage.



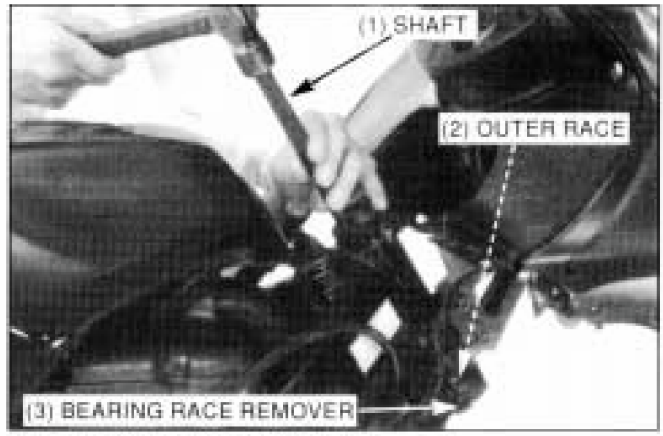
STEERING BEARING REPLACEMENT

Remove the lower bearing outer race using the following tool and suitable shaft.

Tool:
Bearing race remover **07946-3710500**

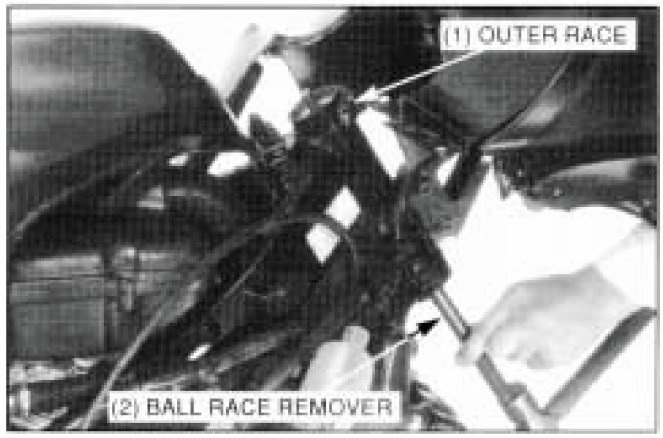
NOTE:

- Always replace the bearings and races as a set.

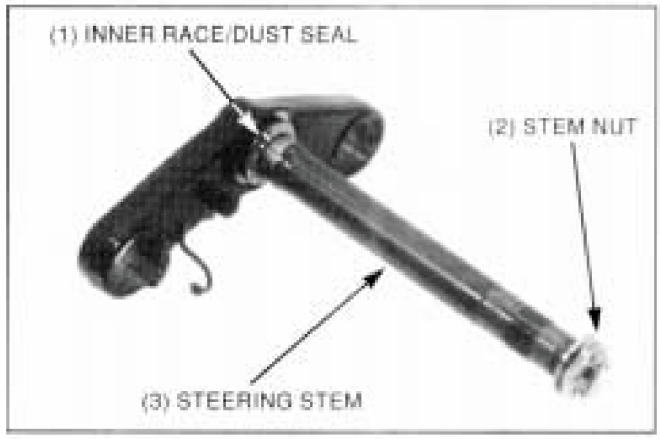


Remove the upper bearing outer race using the following tool.

Tool:
Ball race remover **07953-MJ10000**

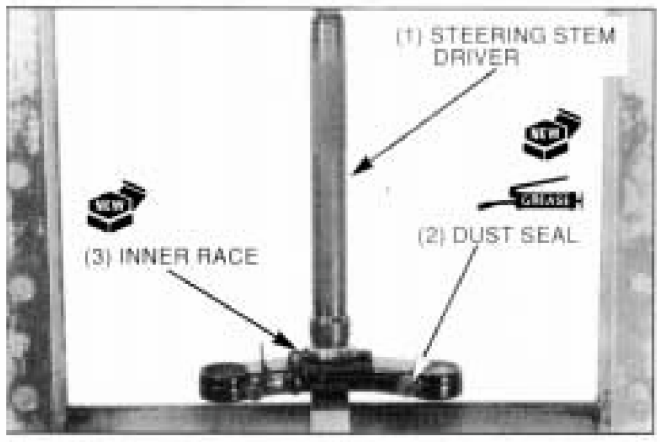


Install the stem nut onto the stem to prevent the threads from being damage when removing the lower bearing inner race from the stem.
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



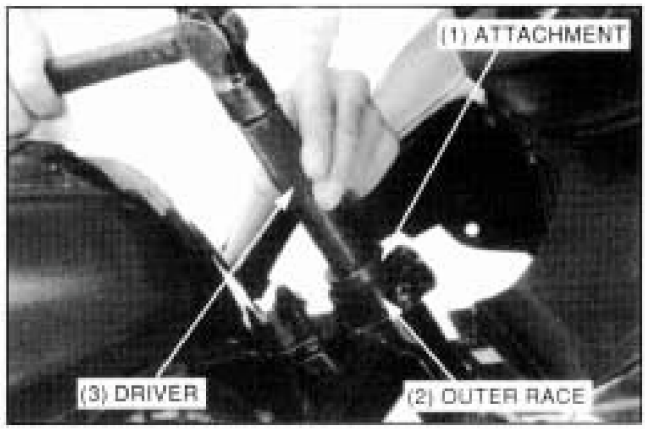
Apply grease to the new dust seal lip and install it to the steering stem.
Install the new lower bearing inner race using the following tool and hydraulic press.

Tool:
Steering stem driver **07946-MB00000**



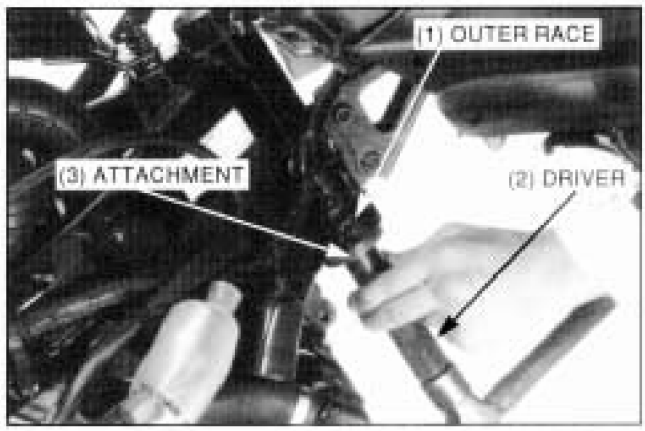
Drive the new upper bearing outer race into the head pipe using the following tools.

Tools:
Driver **07749-0010000**
Attachment, 42 x 47 mm **07746-0010300**

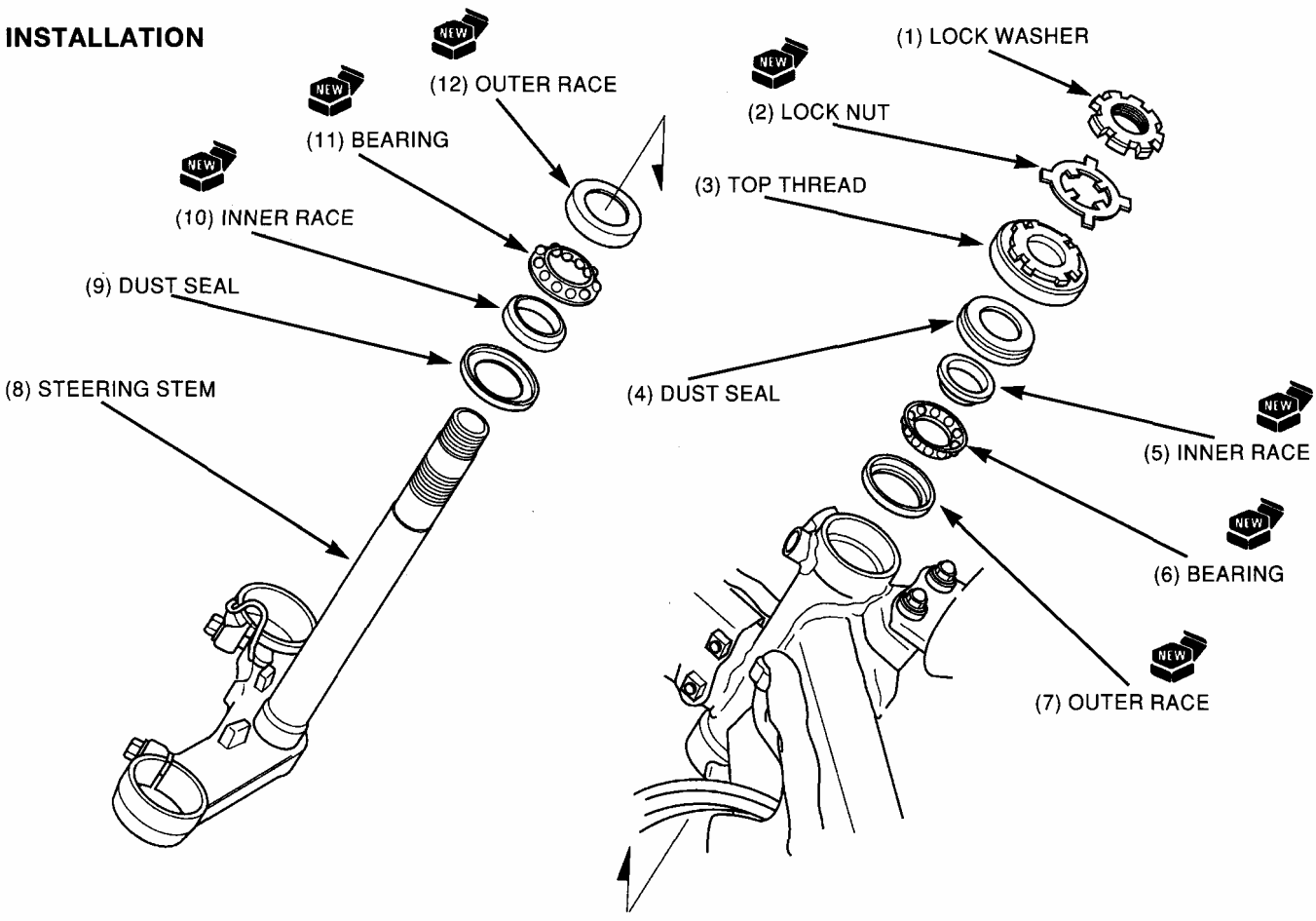


Drive the new lower bearing outer race into the head pipe using the following tools.

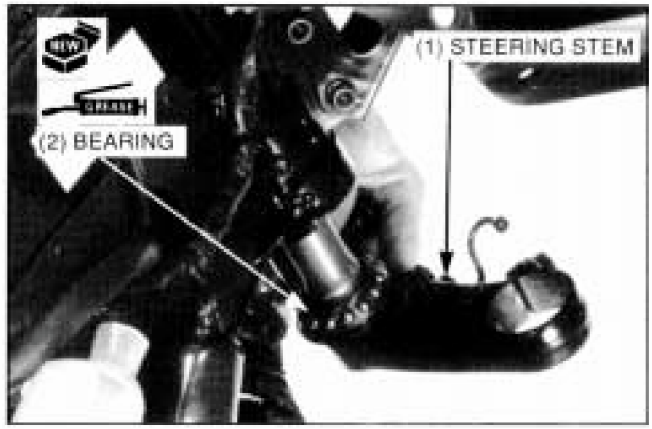
Tools:
Driver **07749-0010000**
Attachment, 52 x 55 mm **07746-0010400**



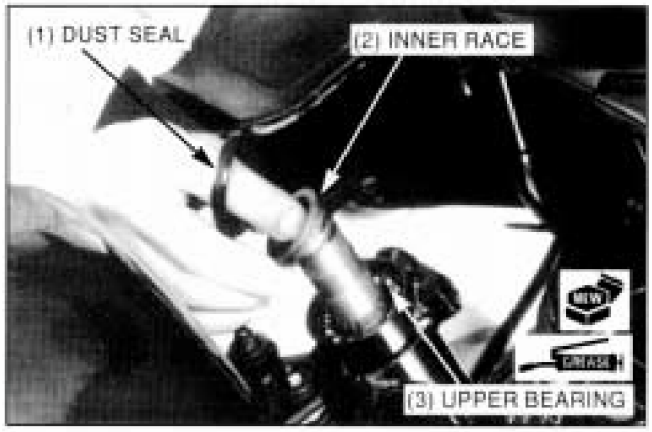
INSTALLATION



Apply grease to the new lower bearing.
Install the new lower bearing onto the steering stem.
Install the steering stem into the head pipe.



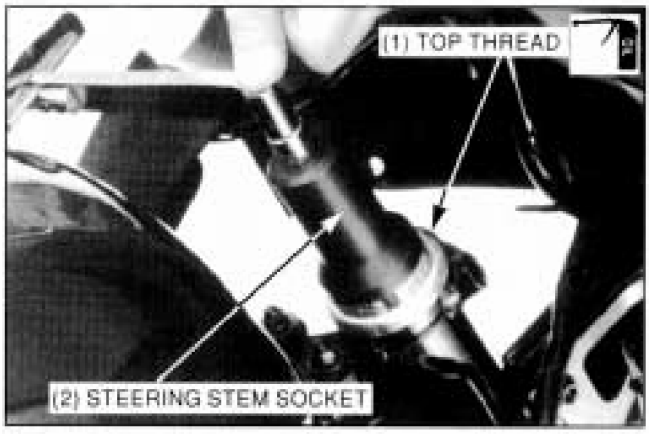
Apply grease to the new upper bearing.
Install the upper bearing, upper bearing inner race and dust seal.



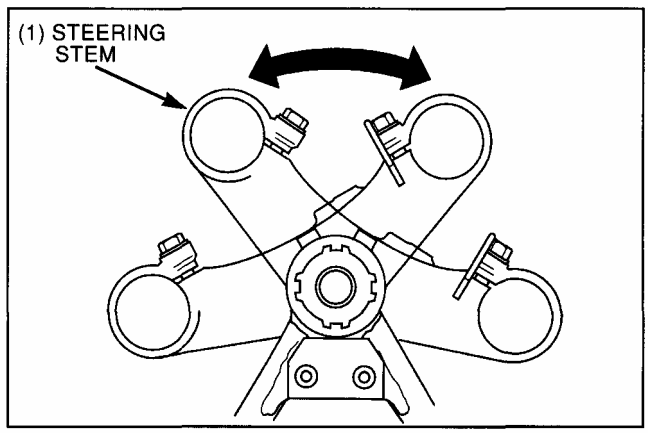
Apply oil to the steering top threads.
Install and tighten the top thread to the specified torque.

Tool:
Steering stem socket **07916-3710101**

Torque: 25 N·m (2.5 kgf-m, 18 lbf-ft)



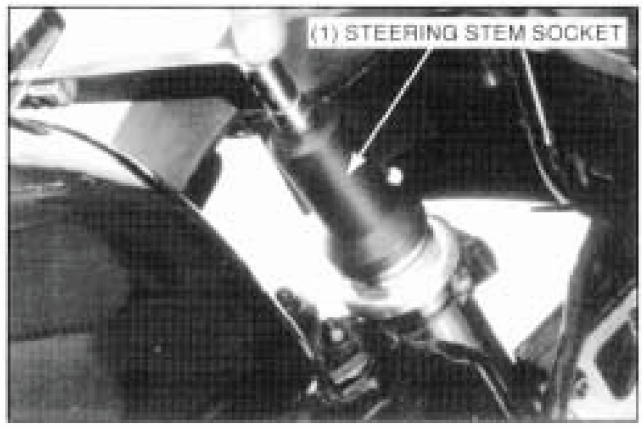
Turn the steering stem right and left, lock-to-lock at least five times to seat bearings.
Make sure that the steering stem moves smoothly, without play or binding.



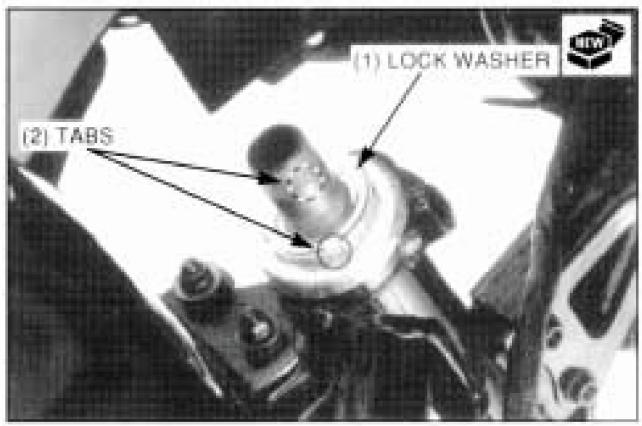
Retighten the top thread to the specified torque.

Tool:
Steering stem socket **07916-3710101**

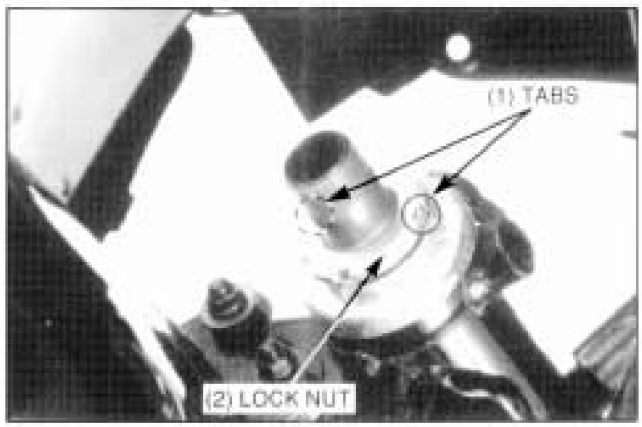
Torque: 25 N·m (2.5 kgf-m, 18 lbf-ft)



Install the new lock washer and bend the two opposite tabs down into the grooves in the top thread.



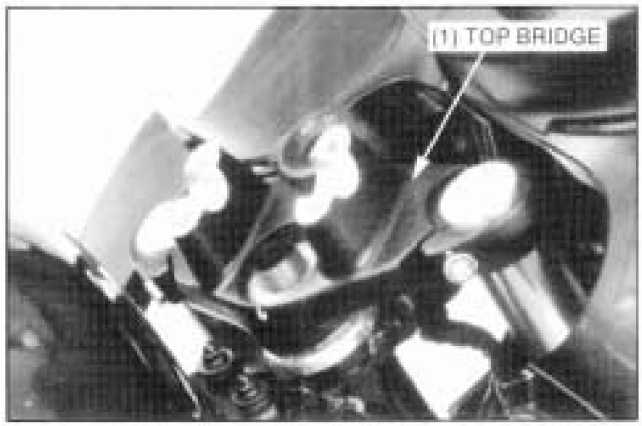
Install and finger tighten the lock nut all the way.
Hold the steering top thread and further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer.
Band up the lock washer tabs into the grooves of the lock nut.



Install the front fork to temporaly.

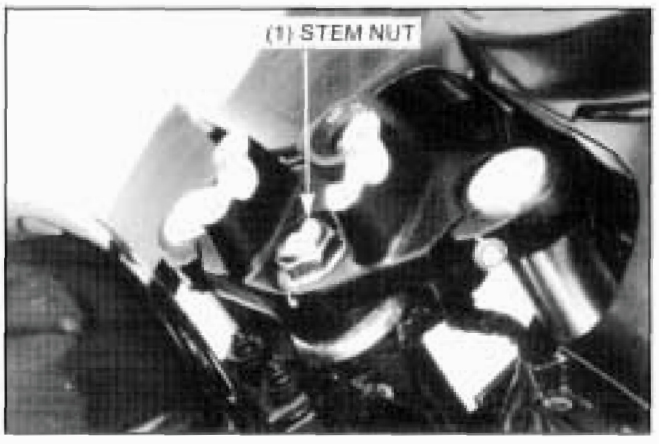
Install the top bridge.

Tighten the top and bottom bridge pinch bolts to the securely (page 14-31).



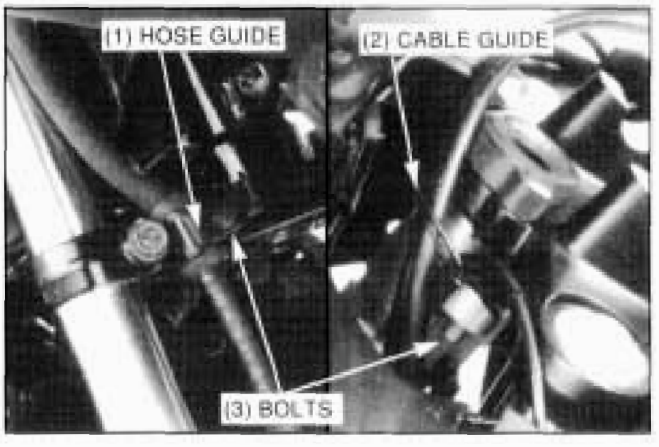
Install and tighten the steering stem nut to the specified torque.

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



Install the front brake hose guide and cable guide. Tighten the bolts securely.

Install the following:
- Handlebar (page 14-7)
- Front wheel (page 14-18)

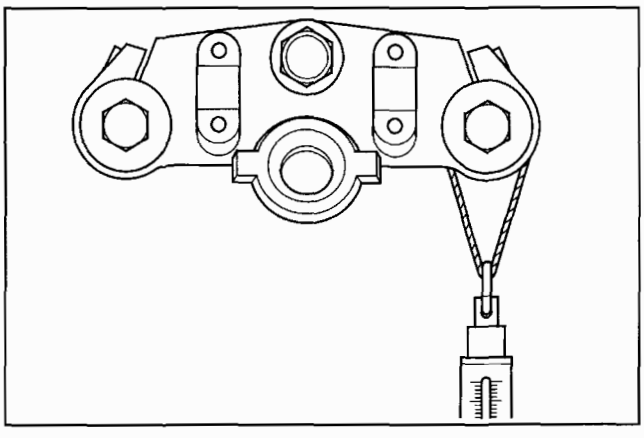


STEERING BEARING PRELOAD

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 tube between the fork top and bottom bridges.
Make sure that there is no cable or wire harness interference.
Pull the spring scale keeping the scale at a right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.

Steering Bearing Preload:
1.04 - 1.46 kgf (2.30 - 3.22 lbf)

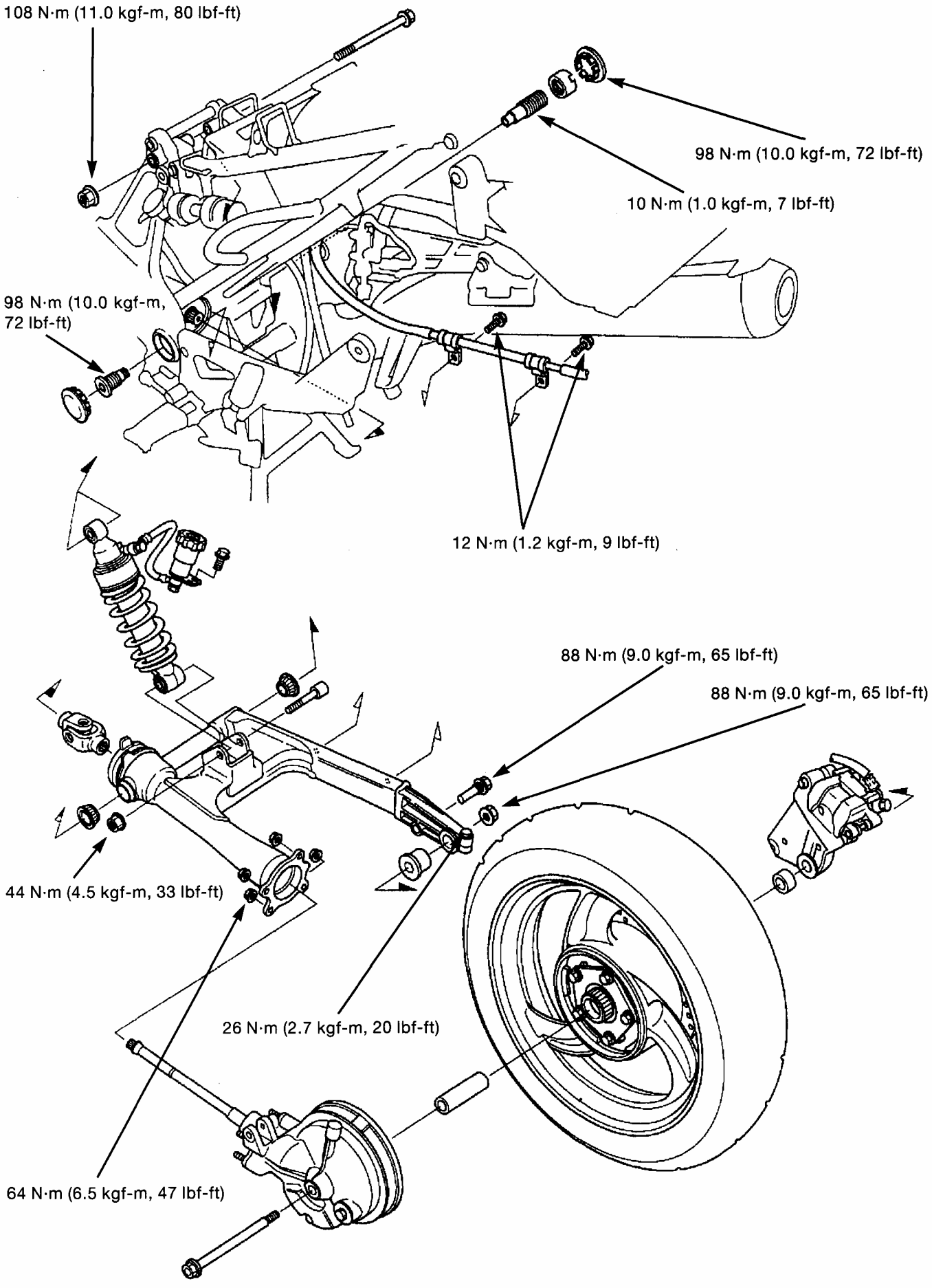


If the readings do not fall within the limits, readjust the steering top thread.

Install the removed parts in the reverse order of removal.

NOTE:

- Route the cables and wire harness properly (page 1-24).


108 N·m (11.0 kgf-m, 80 lbf-ft)
98 N·m (10.0 kgf-m, 72 lbf-ft)
10 N·m (1.0 kgf-m, 7 lbf-ft)
98 N·m (10.0 kgf-m, 72 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
88 N·m (9.0 kgf-m, 65 lbf-ft)
88 N·m (9.0 kgf-m, 65 lbf-ft)
44 N·m (4.5 kgf-m, 33 lbf-ft)
26 N·m (2.7 kgf-m, 20 lbf-ft)
64 N·m (6.5 kgf-m, 47 lbf-ft)

15. Rear Wheel/Suspension

SERVICE INFORMATION	15-1	SHOCK ABSORBER	15-10
TROUBLESHOOTING	15-2	SWINGARM	15-13
REAR WHEEL	15-3		

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.**

- When servicing the rear wheel, shock absorber or swingarm, support the motorcycle using a safety standar or hoist.
- Refer to section 15 for brake system information.
- Use only tires market "TUBELESS" and tubeless valves on rim market "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.
- When using the lock nut wrench, 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 the below is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives both actual and indicated.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (100 lb) load	284 kPa (2.90 kgf/cm², 41 psi)	—
	Up to maximum weight capacity	284 kPa (2.90 kgf/cm², 41 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		4 turns (8 clicks) from lowest position	—

TORQUE VALUES

Rear axle nut	88 N·m (9.0 kgf-m, 65 lbf-ft)	U-nut
Rear axle pinch bolt	26 N·m (2.7 kgf-m, 20 lbf-ft)	
Rear brake disc bolt	42 N·m (4.3 kgf-m, 31 lbf-ft)	Apply a locking agent to the threads
Damper holder plate bolt	20 N·m (2.0 kgf-m, 14 lbf-ft)	ALOC bolt, replace with a new one
Final driven flange bolt	59 N·m (6.0 kgf-m, 43 lbf-ft)	
Rear shock absorber upper mounting bolt	108 N·m (11.0 kgf-m, 80 lbf-ft)	Apply oil to the threads and seating surfaces U-nut
Rear shock absorber lower mounting bolt	44 N·m (4.5 kgf-m, 33 lbf-ft)	U-nut
Swingarm right pivot bolt	10 N·m (1.0 kgf-m, 7 lbf-ft)	
Swingarm right pivot lock nut	98 N·m (10.0 kgf-m, 72 lbf-ft)	
Swingarm left pivot bolt	98 N·m (10.0 kgf-m, 72 lbf-ft)	
Rear brake caliper stopper bolt	88 N·m (9.0 kgf-m, 65 lbf-ft)	

TOOLS

Attachment, 32 x 35 mm	07746 - 0010100
Attachment, 42 x 47 mm	07746 - 0010300
Attachment, 24 x 26 mm	07746 - 0010700
Pilot, 17 mm	07746 - 0040400
Pilot, 20 mm	07746 - 0040500
Bearing remover shaft	07746 - 0050100
Remover head, 20 mm	07746 - 0050600
Driver	07749 - 0010000
Lock nut wrench	07908 - ME90000
Driver shaft	07946 - MJ00100
Drive handle	07949 - 3710001

Troubleshooting

Soft suspension
- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Tire pressure too low

Hard suspension
- Damaged shock absorber mount bushing
- Bent damper rod
- Damaged swingarm pivot bearings
- Bent swingarm pivot
- Incorrect suspension adjustment
- Tire pressure too high

Steers to one side or does not track straight
- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

Rear wheel wobbling
- Bent rim
- Worn rear wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Tire pressure too low
- Faulty swingarm pivot bearings

Rear Wheel

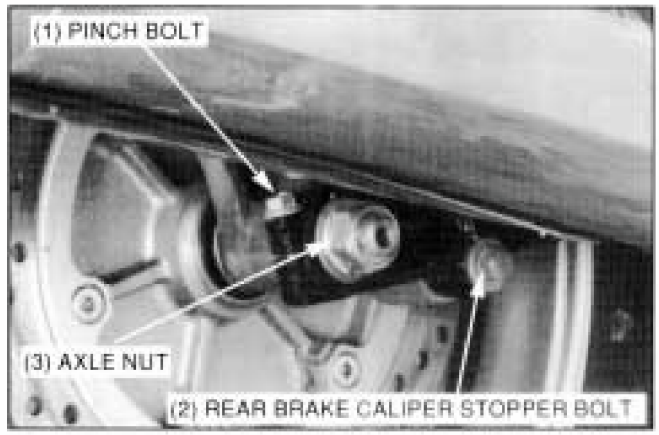
REMOVAL

Support the motorcycle with its main stand.

Loosen the rear axle pinch bolt.
Remove the axle nut.

Remove the rear brake caliper stopper bolt.

Pull out the rear axle.
Remove the rear brake caliper from the brake disc.



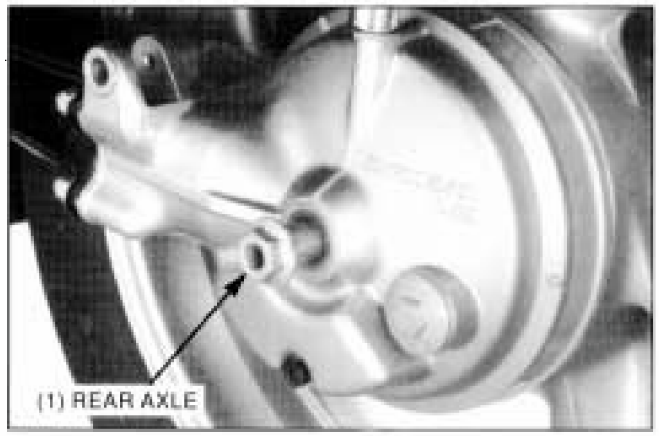
CAUTION

- **Do not hang the brake caliper from the brake hose.**
- **Do not twist the brake hose.**

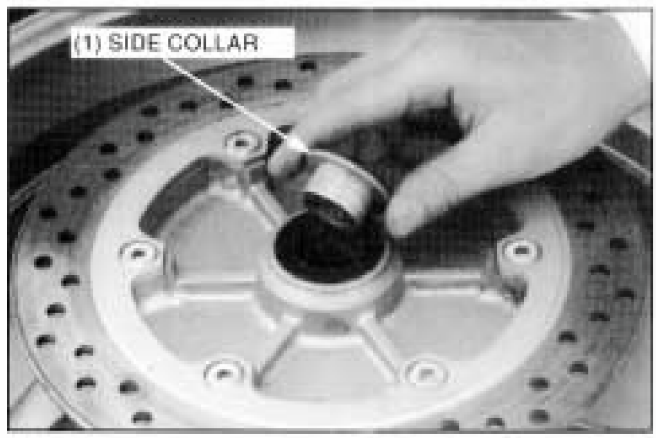
NOTE:

- Do not depress the brake pedal after removing the caliper

Move the rear wheel to the right to separate it from the final gear case and remove the rear wheel.



Remove the right side collar.

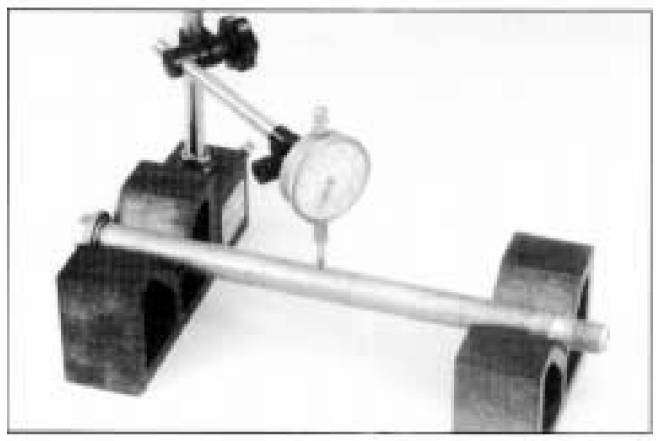


INSPECTION

AXLE

Place the axle in V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

Service Limit: 0.20 mm (0.008 in)

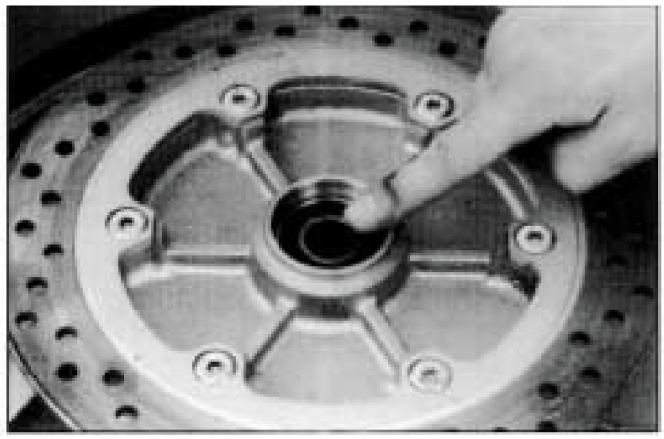


WHEEL BEARING
Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

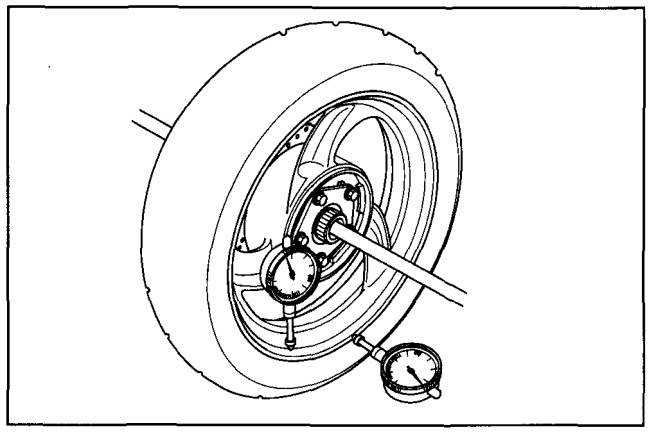
NOTE:

- Replace the wheel bearings in pairs.



WHEEL RIM RUNOUT
Check the rim runout b placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

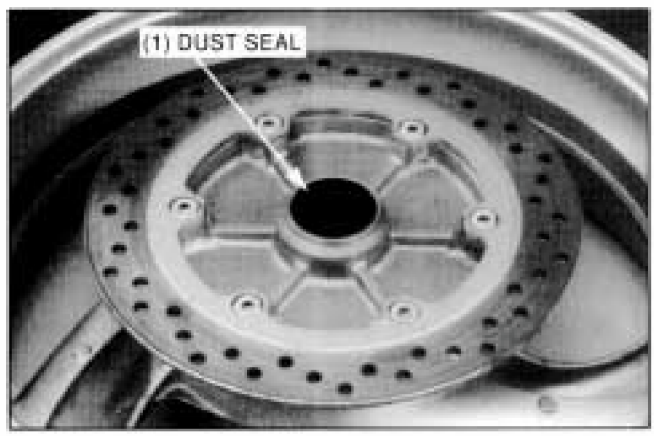
Service Limits: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



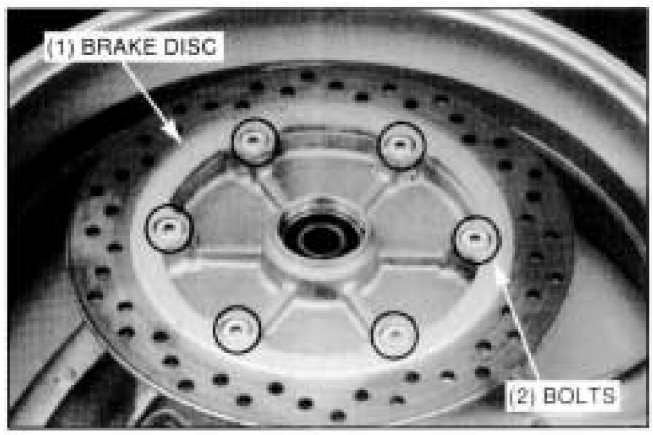
WHEEL BALANCE
See page 14-17 for wheel balance.

DISASSEMBLY

Remove the right dust seal.



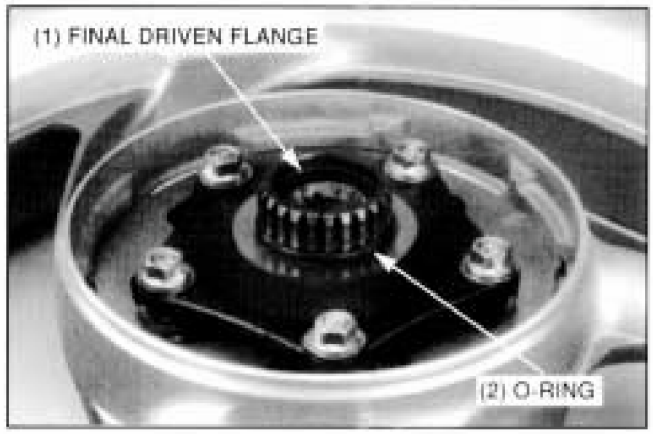
Remove the bolts and brake disc.



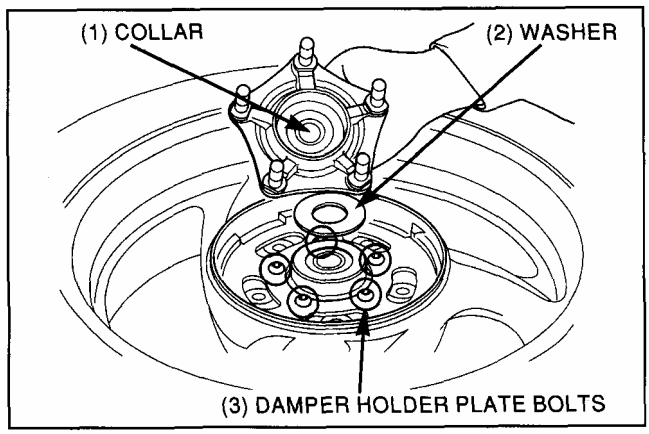
Remove the O-ring from the driven flange.
Remove the driven flange assembly from the left wheel hub.

NOTE:

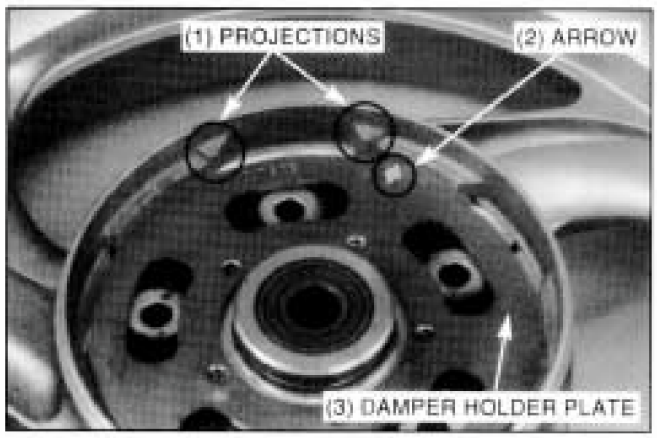
- Do not try to disassemble the final driven flange assembly.



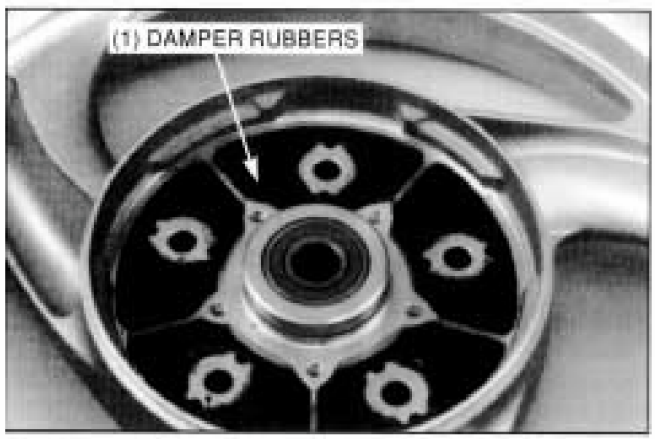
Remove the collar from the final driven flange.
Remove the damper holder plate bolts.



Align the arrow on the damper holder plate between the projections on the wheel by turning the holder plate and remove the plate.



Remove the damper rubbers.



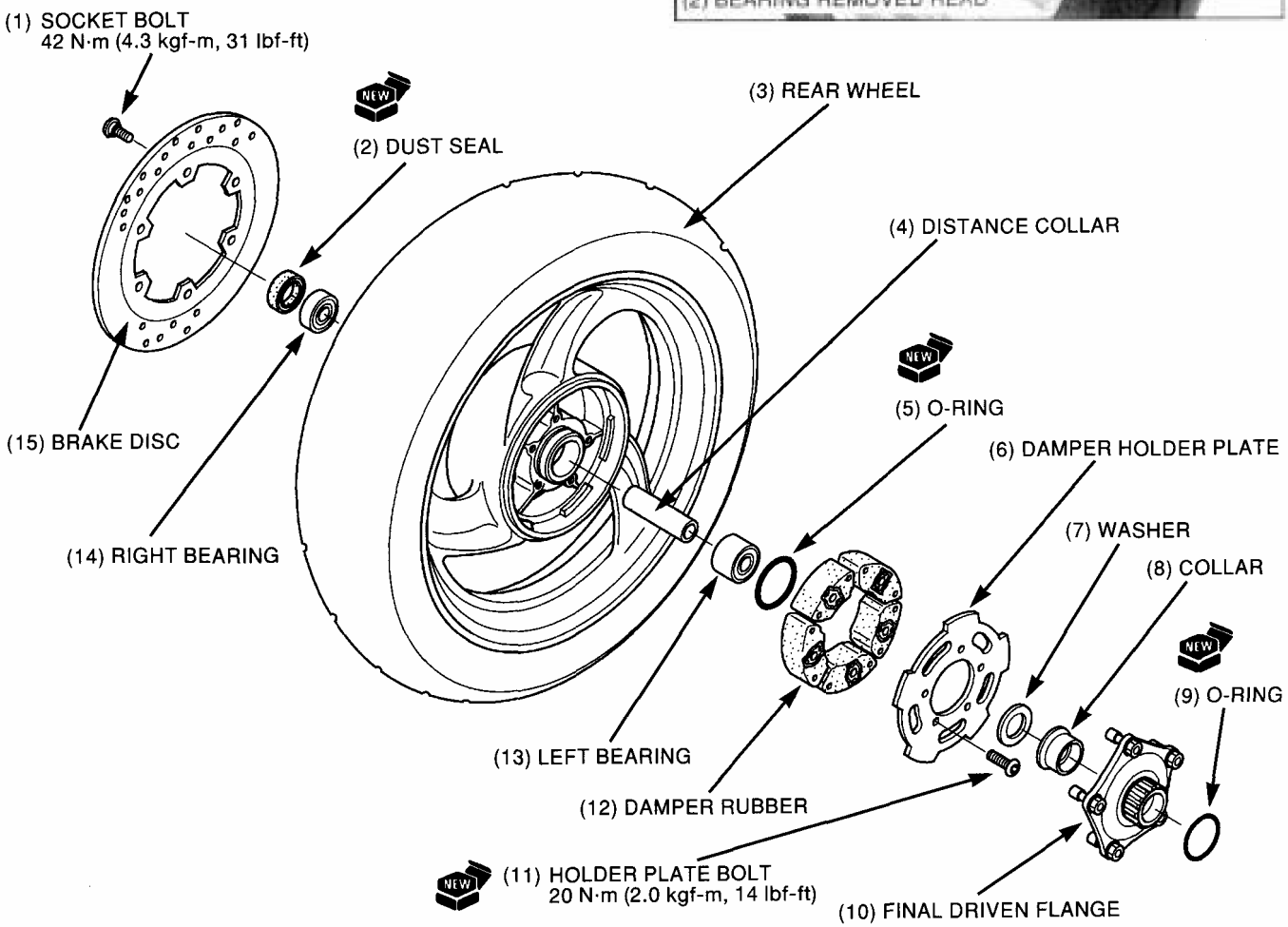
WHEEL BEARING REMOVAL

Install the bearing remover head into the bearing.
From the 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 head, 20 mm	**07746 - 0050600**
Bearing remover shaft	**07746 - 0050100**

ASSEMBLY



WHEEL BEARING INSTALLATION

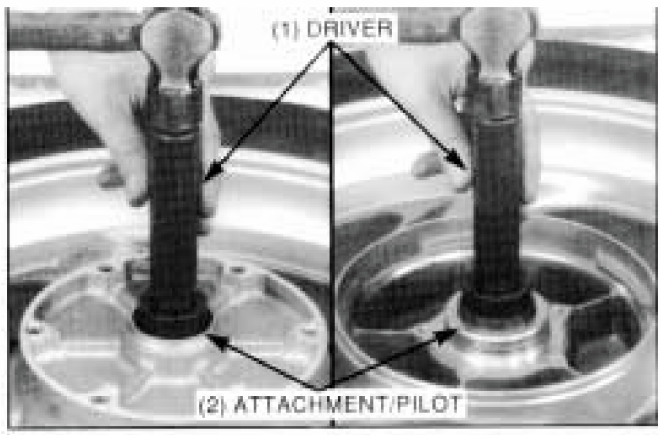
CAUTION

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

Drive in a new right bearing squarely until it is fully seated.
Install the distance collar, then drive in the left side bearing.

Tools:

Driver	**07749 - 0010000**
Attachment, 42 x 47 mm	**07746 - 0010300**
Pilot, 20 mm	**07746 - 0040500**

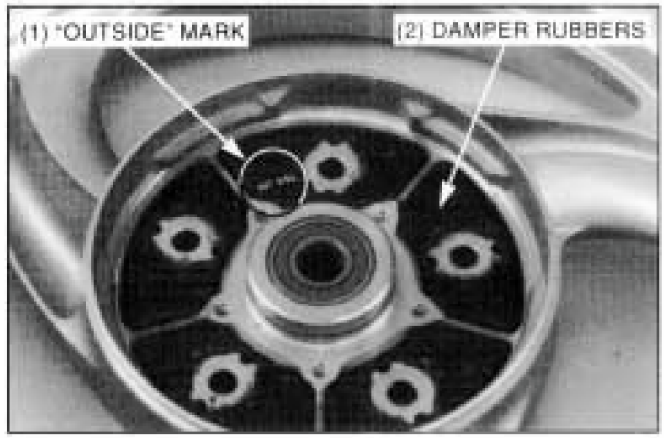


Check the wheel damper rubbers for deterioration or damage and replace them with new ones if necessary.

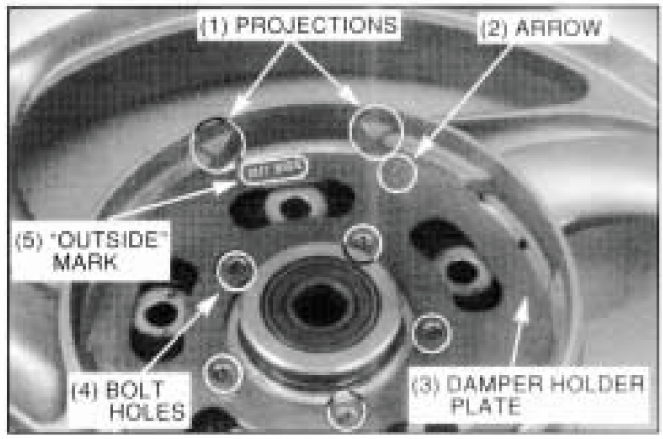
NOTE:

- Replace the wheel damper rubbers as a set.

Install the wheel damper rubbers into the wheel hub with the "OUTSIDE" mark facing out.



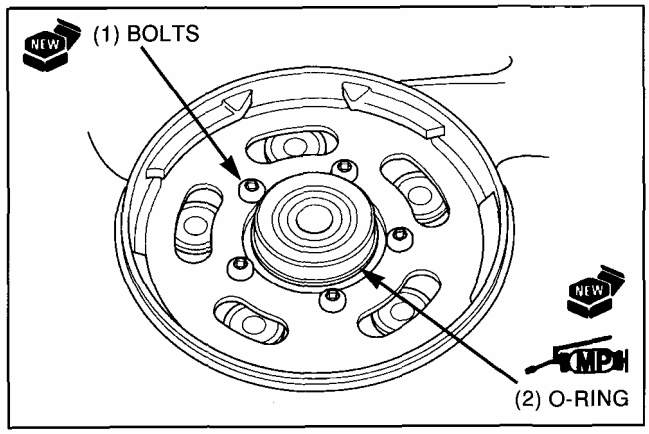
Install the damper holder plate with the "OUTSIDE" mark facing out, aligning the arrow between the projections on the wheel, and turn it clockwise until the bolt holes aligns in the holder plate and wheel.



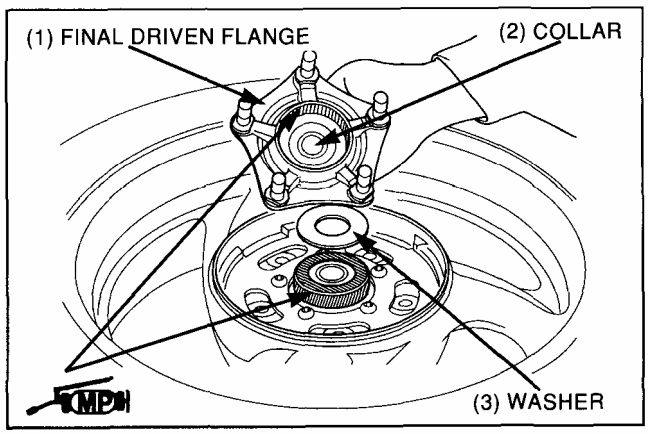
Install and tighten new damper holder plate bolts to the specified torque.

Torque: 20 N·m (2.0 kgf-m, 14 lbf-ft)

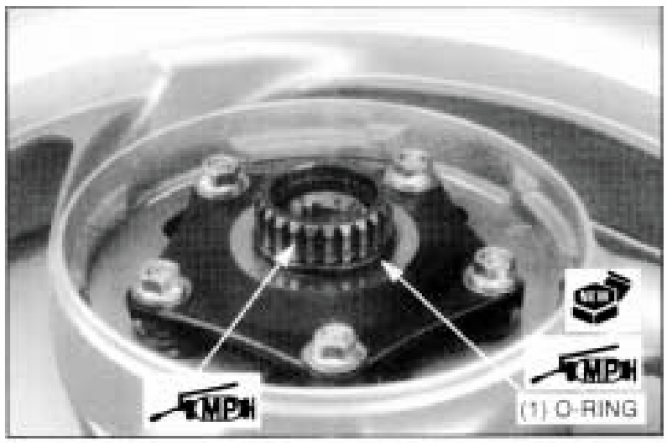
Pack molybdenum disulfide paste into the O-ring groove in the wheel hub.
Coat a new O-ring with molybdenum disulfide paste and install it into the groove.



Install the collar into the final driven flange.
Apply 3 g. (0.11 oz) of molybdenum disulfide paste to the mating surface of the wheel hub and final driven flange as shown.
Install the final driven flange onto the wheel hub.

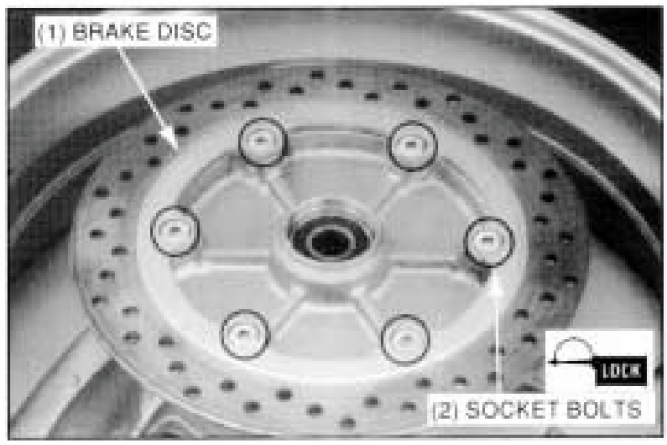


Pack molybdenum disulfide paste into the O-ring groove in the wheel hub.
Coat a new O-ring with molybdenum disulfide paste and install it into the groove.



Install the brake disc as shown.
Clean and apply a locking agent to the brake disc bolt threads, then tighten bolts to the specified torque.

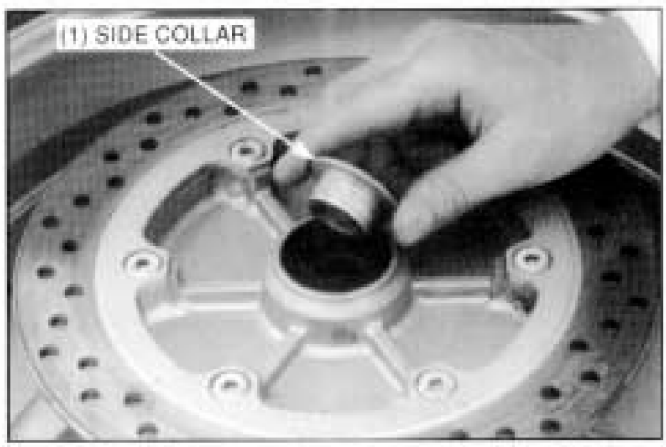
Torque: 42 N·m (4.3 kgf-m, 31 lbf-ft)



Apply molybdenum disulfide grease to the new dust seal lips.
Install the dust seal into the right wheel hub.

INSTALLATION

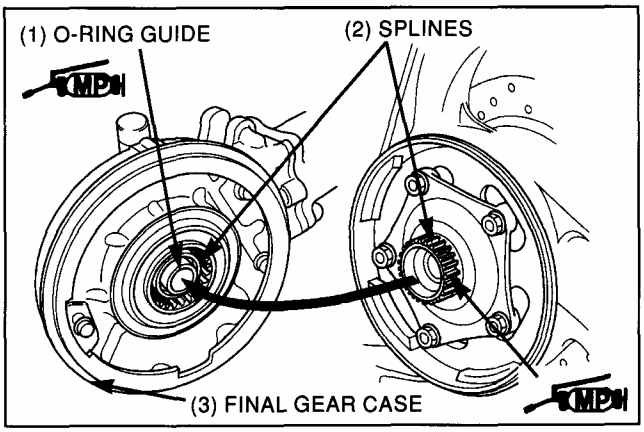
Install the side collar.



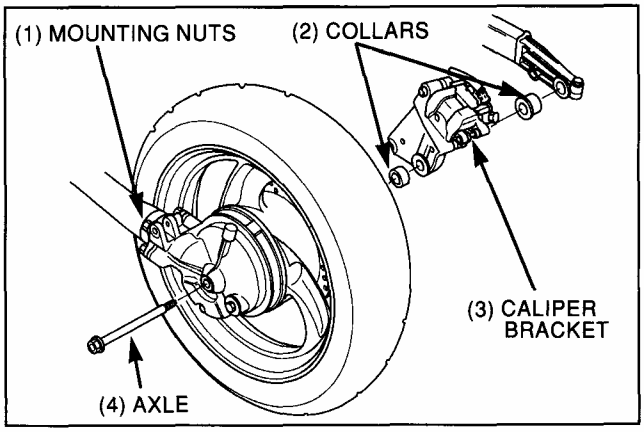
Apply 5 g. (0.8 oz) of molybdenum disulfide paste to the final driven flange splines.
Apply a molybdenum disulfide paste to the joint surface of the final gear case O-ring holder and driven flange.

Loosen the final gear case mounting nuts to ease axle installation and to assure proper driven flange alignment.

Engage the rear wheel with the final gear case, making sure that the splines are correctly aligned.

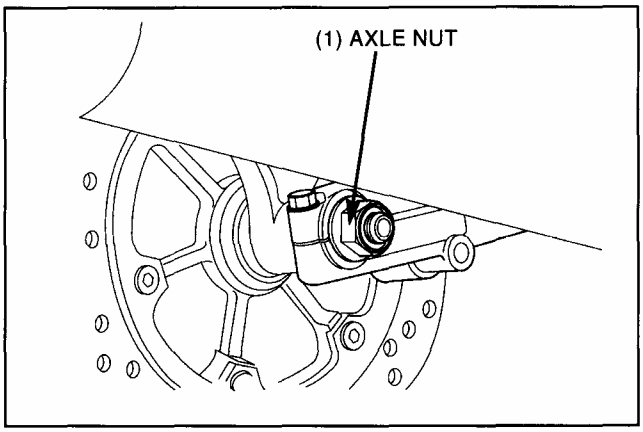


Install the final gear case to the swingarm.
Install and finger tighten the mounting nuts all the way.
Install the rear brake caliper in position, and insert the rear axle through the final gear case, wheel hub, side collars, brake caliper and swingarm.



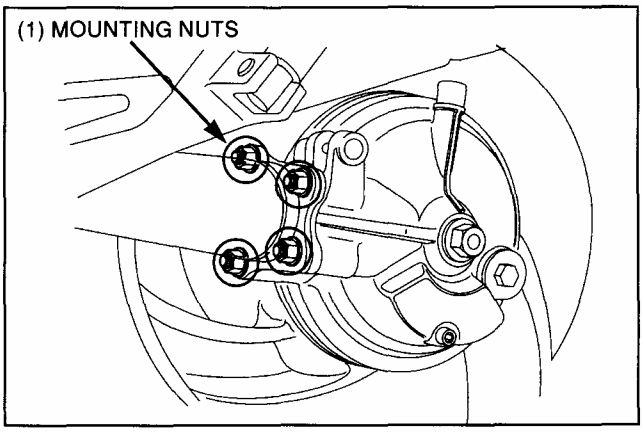
Install and tighten the axle nut to the specified torque.

Torque: 88 N·m (9.0 kgf-m, 65 lbf-ft)



Tighten the final gear case mounting nuts to the specified torque.

Torque: 65 N·m (6.5 kgf-m, 47 lbf-ft)

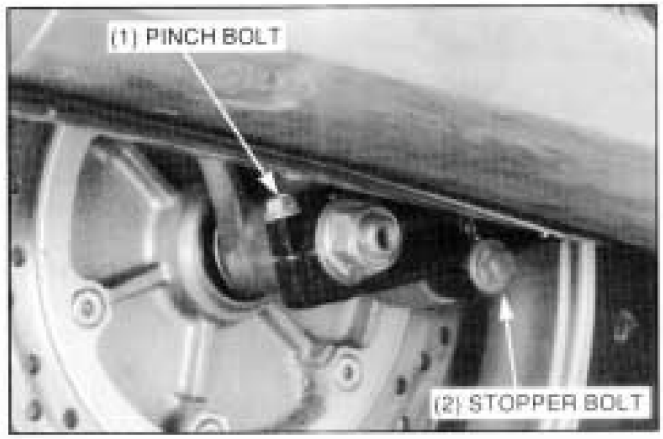


Install and tighten the rear brake caliper stopper bolt.

Torque: 88 N·m (9.0 kgf-m, 65 lbf-ft)

Tighten the rear axle pinch bolt to the specified torque.

Torque: 26 N·m (2.7 kgf-m, 20 lbf-ft)

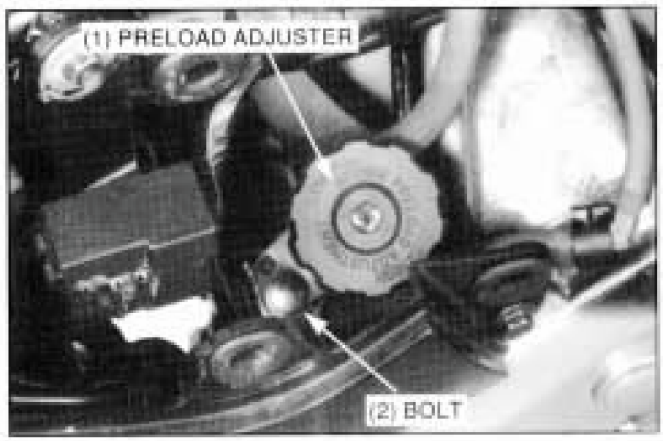


Shock Absorber

REMOVAL

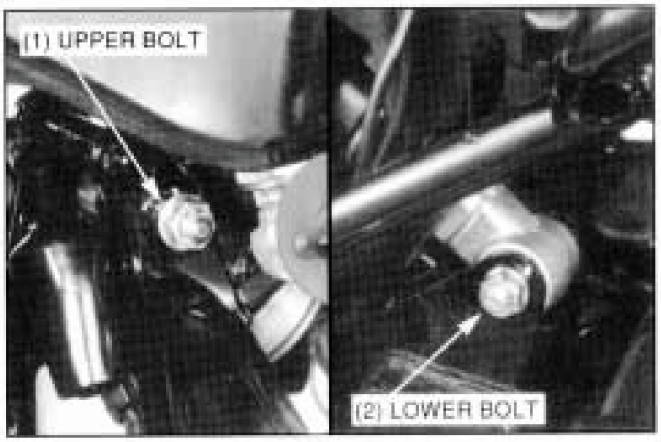
Remove the right side cover (page 2-3).

Remove the bolt and rear shock absorber spring preload adjuster.



Remove the right and left saddle bag (page 2-8).
Support the motorcycle on its center stand.

Remove the upper and lower mounting bolts and shock absorber.

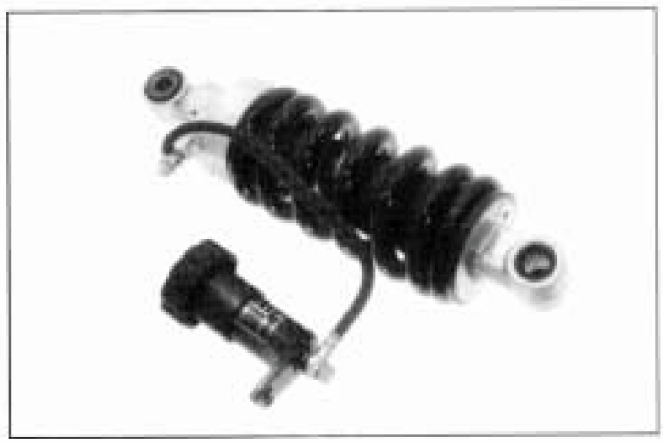


INSPECTION

Visually inspect the shock absorber for damage.

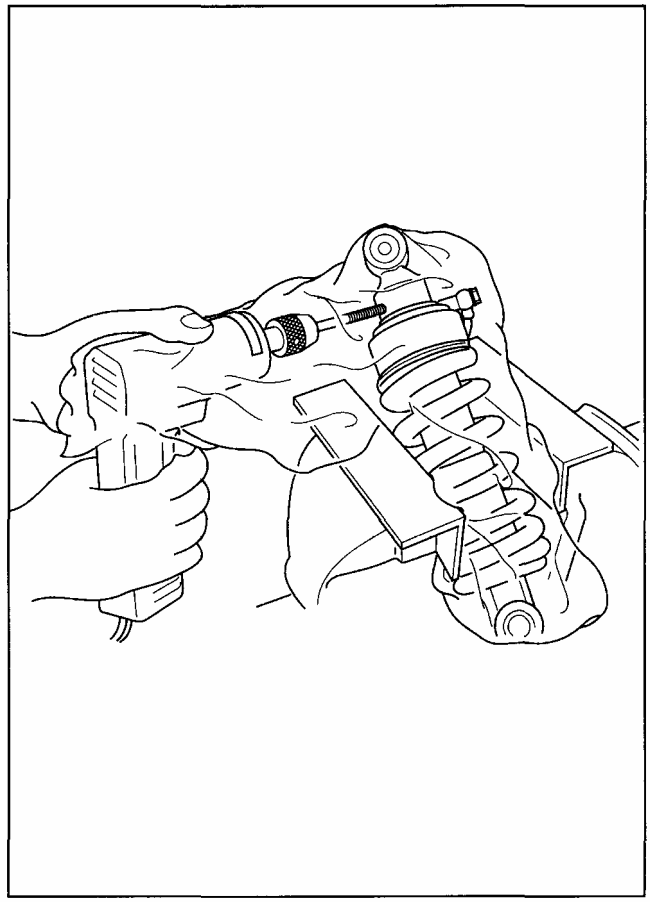
Check for the:
- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Bump rubber for wear or damage

Inspect all the other parts for wear or damage.



SHOCK ABSORBER DISPOSAL PROCEDURE
Center punch the damper to mark the drilling point.

Wrap the damper unit inside a plastic bag.
Support the damper 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.

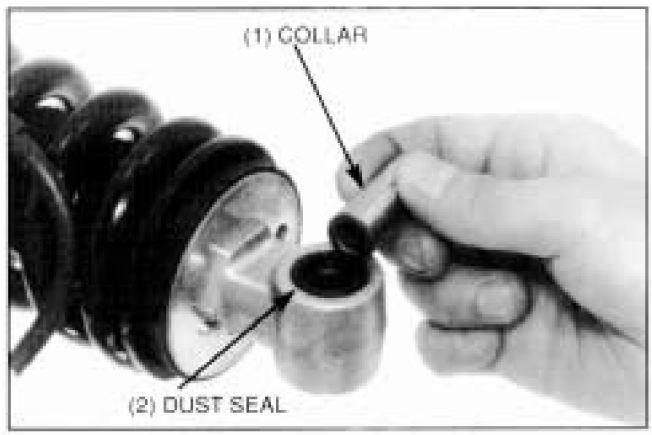


⚠ WARNING

- **Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.**
- **The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any farther down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.**
- **Always wear eye protection to avoid getting metal shaving 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 gab; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.

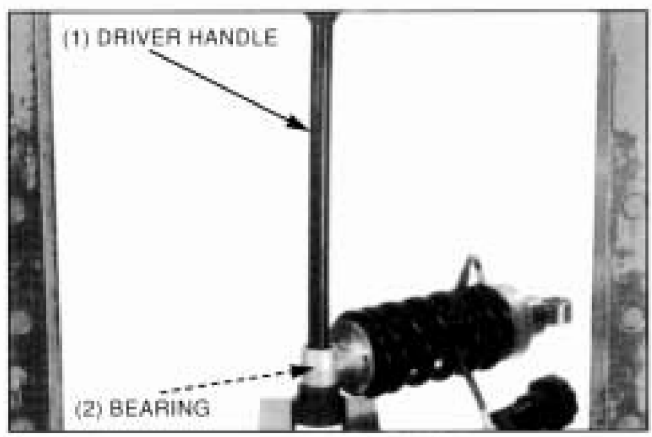
LOWER JOINT NEEDLE BEARING REPLACEMENT
Remove the pivot collar and dust seals.



Set the damper in a hydraulic press.

Press the needle bearing out from the lower joint.

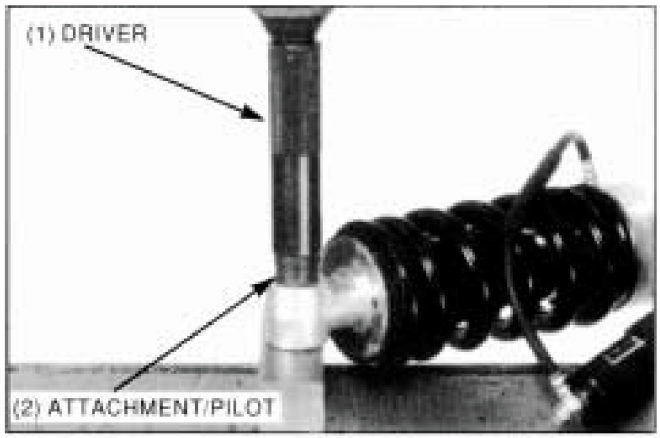
Tool:
Driver handle **07946 - MJ00200**



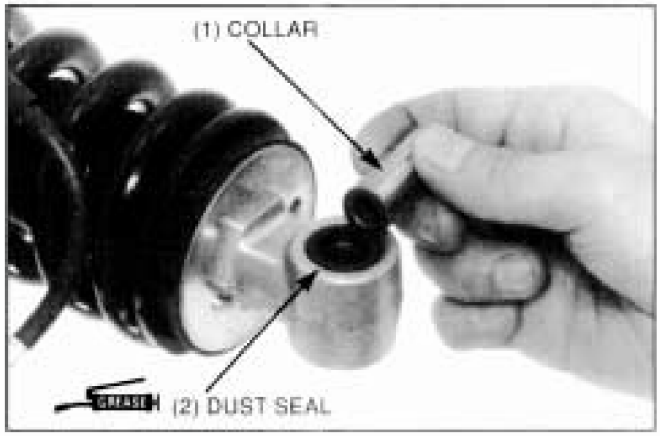
Pack a new needle bearing with multipurpose grease.
Press the needle bearing into the lower joint so that the needle bearing casing is lower 5.0-5.5 mm (0.20 - 0.22 in) below the end of the lower joint as shown.

Tools:

Driver	**07749 - 0010000**
Attachment, 24 x 26 mm	**07746 - 0010700**
Pilot, 17 mm	**07746 - 0040400**



Apply grease to the dust seal lips.
Install the dust seals and pivot collar.



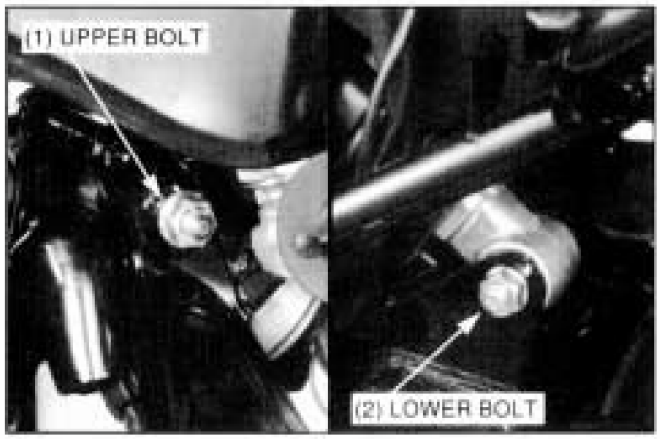
INSTALLATION

Install the shock absorber into the frame.

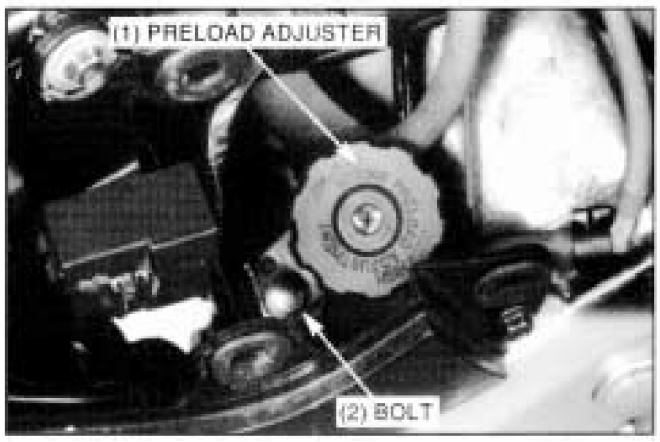
Apply oil to the upper mounting bolt threads and sliding surface.
Install and tighten the upper and lower mounting bolts to the specified torque.

Torques:

Upper mounting stet	**108 N·m (11.0 kgf-m, 80 lbf-ft)**
Lower mounting stet	**44 N·m (4.5 kgf-m, 33 lbf-ft)**



Install the rear shock absorber spring preload adjuster to the frame.
Install and tighten the bolt.

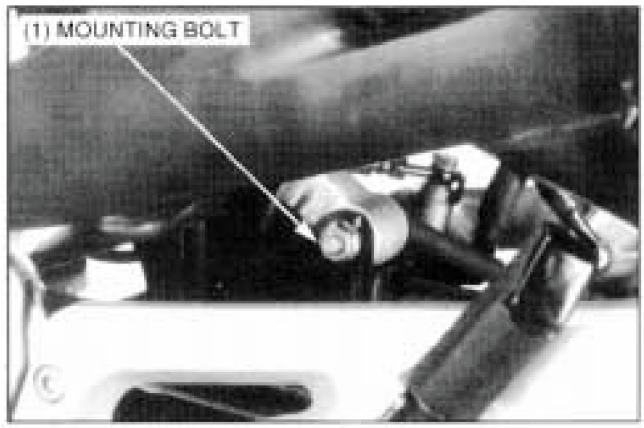


Swingarm

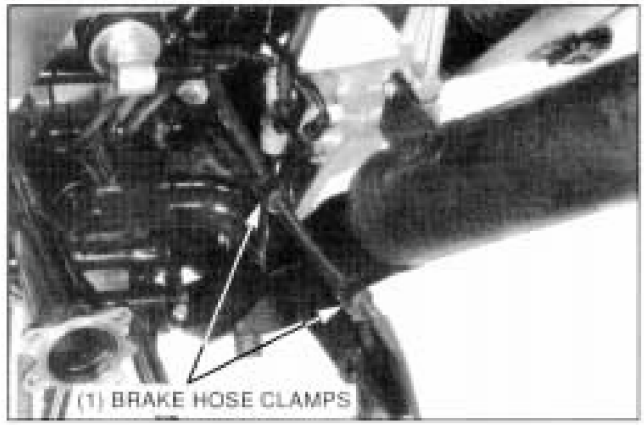
REMOVAL

Remove the following:
- Rear wheel (page 15-3)
- Final gear case (page 13-3)

Remove the shock absorber lower mount bolt.



Remove the bolts and rear brake hose clamps from the swingarm.

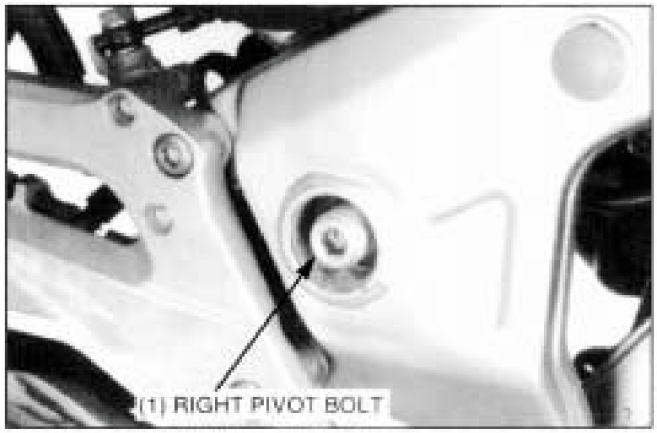


Remove the left and right swingarm pivot caps.

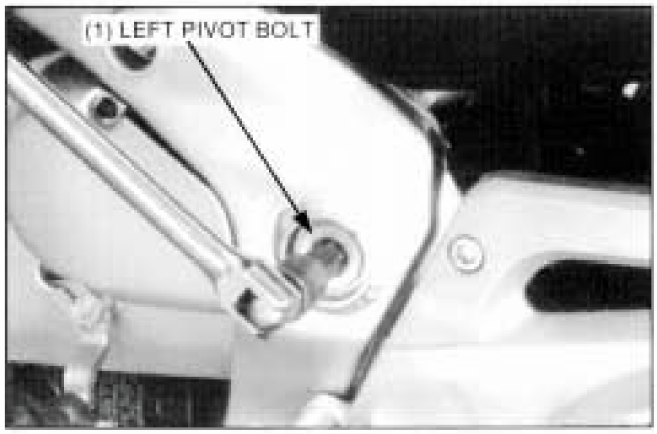
Loosen and remove the left pivot lock nut using the special tool.

Tool:
Swingarm lock nut wrench **07908 - ME90000**

Loosen the swingarm adjusting bolt by turning the pivot bolt.

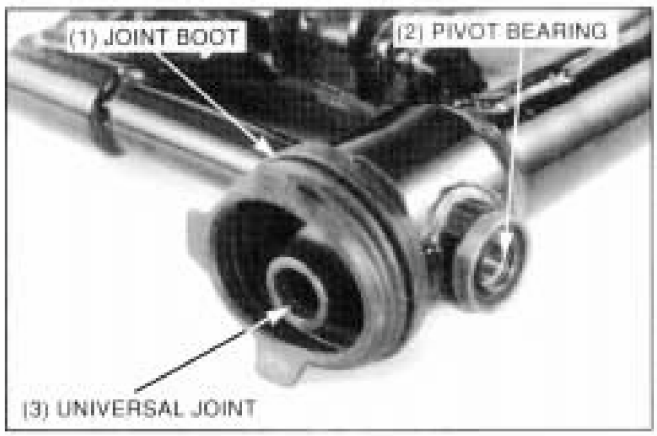


Loosen and remove the swingarm left pivot bolt, and remove the swingarm from the frame.



Remove the joint boot and universal joint.

Remove the pivot bearing from the swingarm.

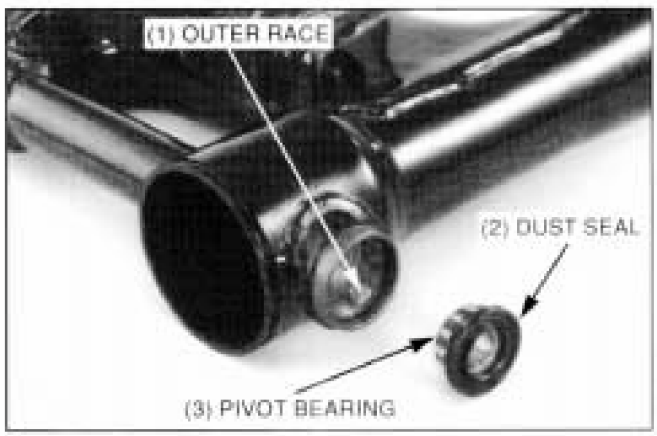


INSPECTION

Check the bearing, dust seal and outer race for wear or damage.

NOTE:

- Both bearings, outer races and grease retainer plates must be replaced as a set if any part is damaged or worn.

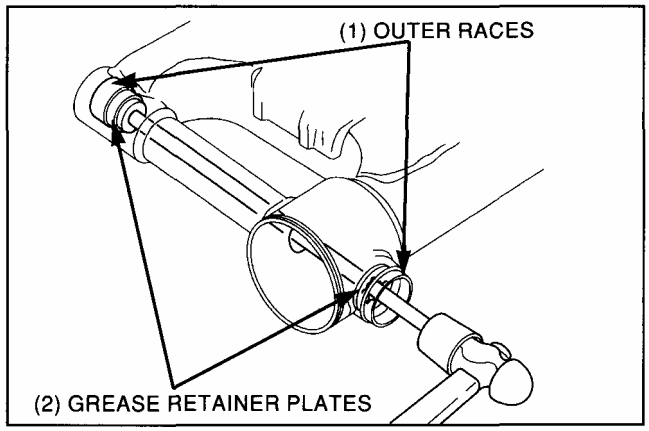


PIVOT BEARING OUTER RACE REPLACEMENT

Punch or drill an appropriate hole into one grease retainer plate.
Remove the outer race on the other side with grease retainer plate.
Remove the other outer race with grease retainer plate.

Tools:

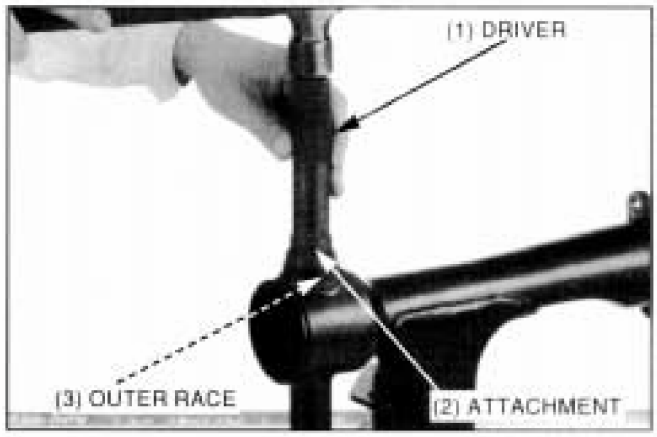
Attachment, 32 x 35 mm	**07746 - 0010100**
Slide hammer, 3/8 x 16	**Commercially available**



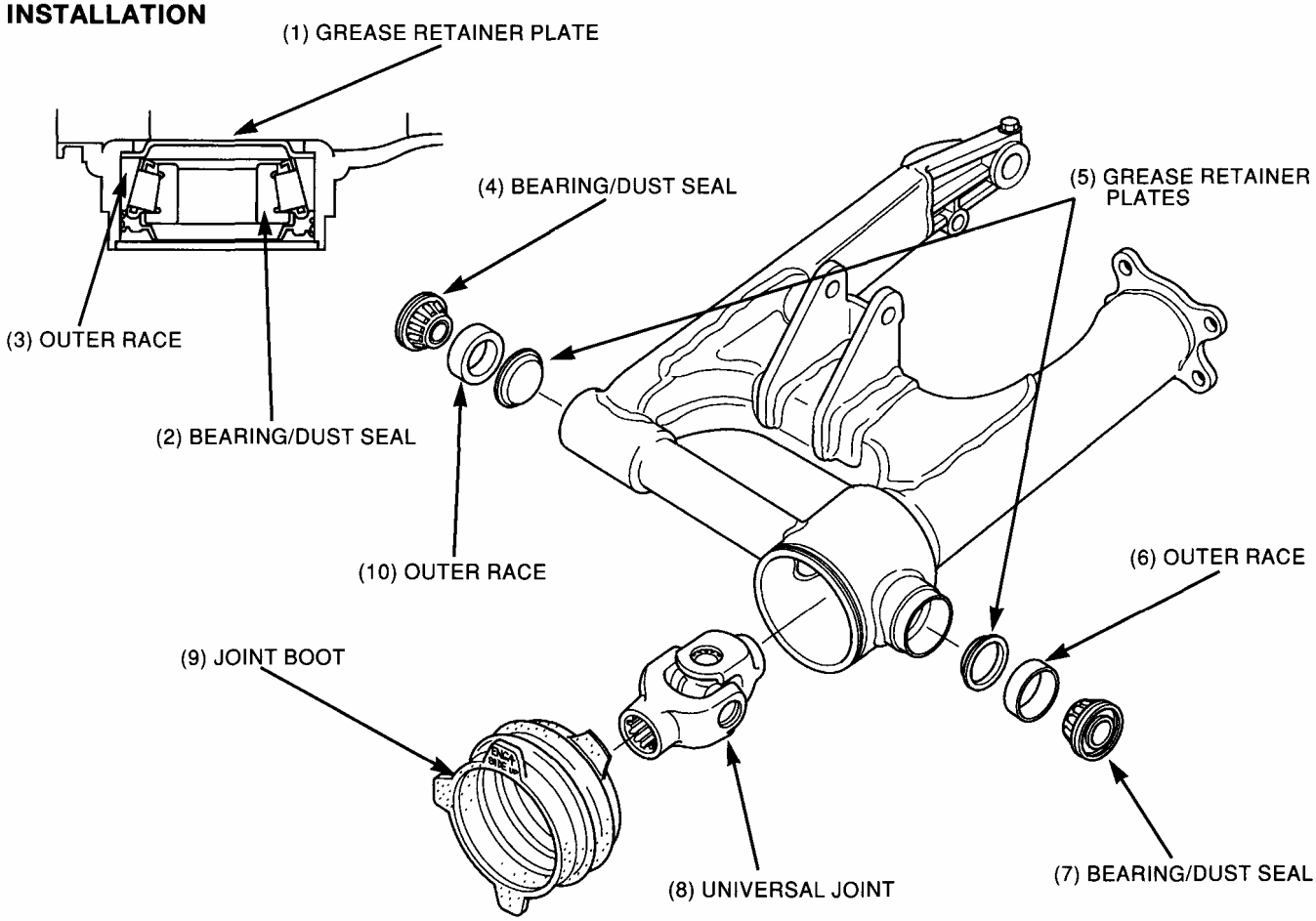
Install new grease retainer plates and drive new bearing outer races into the swingarm pivot.

Tools:

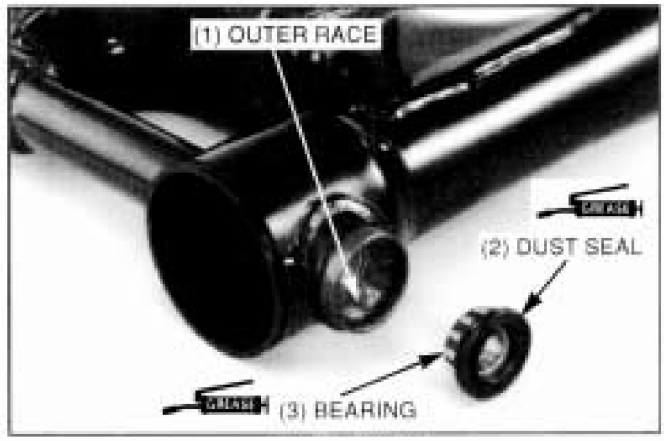
Driver	**07749 - 0010000**
Attachment, 32 x 35 mm	**07746 - 0010100**



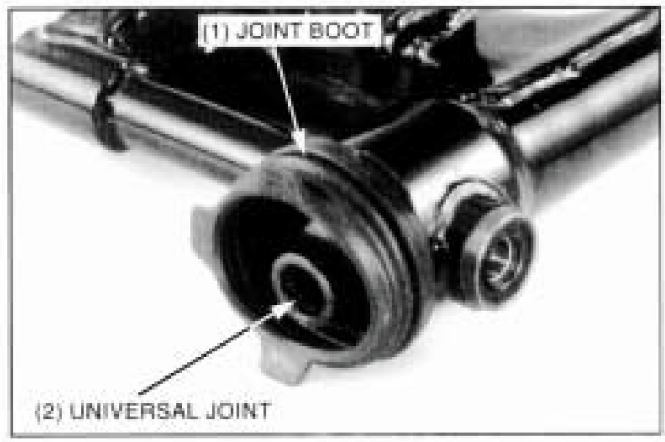
INSTALLATION



Apply grease to the pivot bearings and dust seal lips.
Install the bearings/dust seals into the swingarm pivot.



Install the universal joint into the swingarm.
Install the joint boot onto the swingarm.



Install the swingarm and pivot bolts to temporarily.

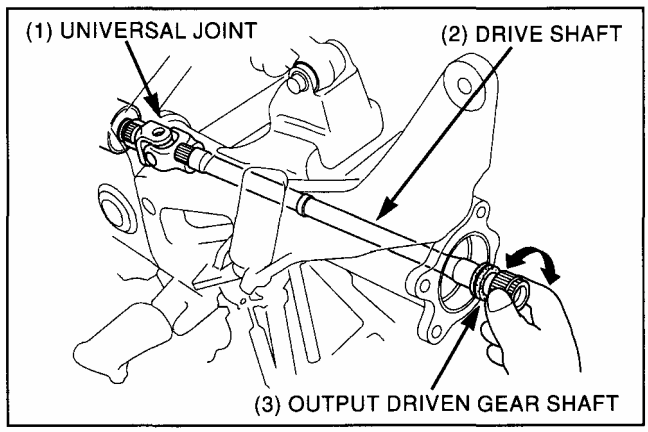
Remove the drive shaft from the final gear case (page 13-3).

Engage the universal joint splines with the output driven gear shaft splines using the drive shaft as shown.

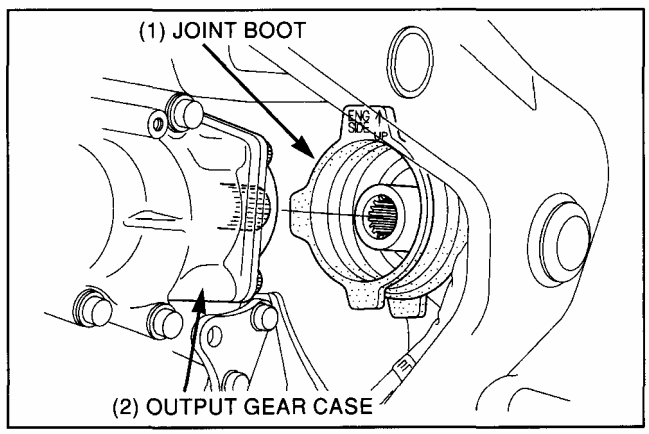
NOTE:

- Install the universal joint, with long side to the output driven gear shaft.

Reinstall the drive shaft into the final gear case (page 13-19).

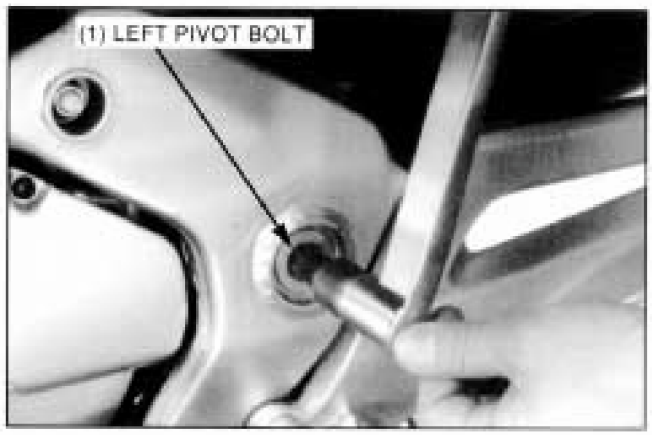


Install the joint boot over the output gear case.



Tighten the left pivot bolt to the specified torque.

Torque: 98 N·m (10.0 kgf-m, 72 lbf-ft)

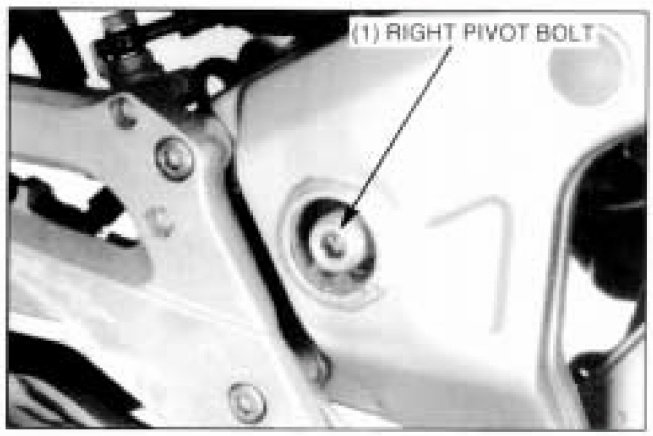


Tighten the right pivot bolt to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)

Move the swingarm up and down several times to seat the pivot bearings.
Retighten the left pivot bolt to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



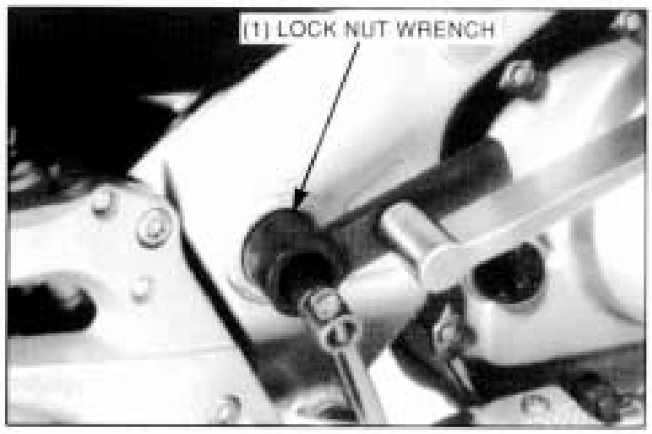
Tighten the right pivot lock nut to the specified torque while holding the pivot bolt.

Tool:
Swingarm lock nut wrench **07908 - ME90000**

Torques:
Actual: **98 N·m (10.0 kgf-m, 72 lbf-ft)**
Scale reading: **89 N·m (9.1 kgf-m, 66 lbf-ft)**

NOTE:

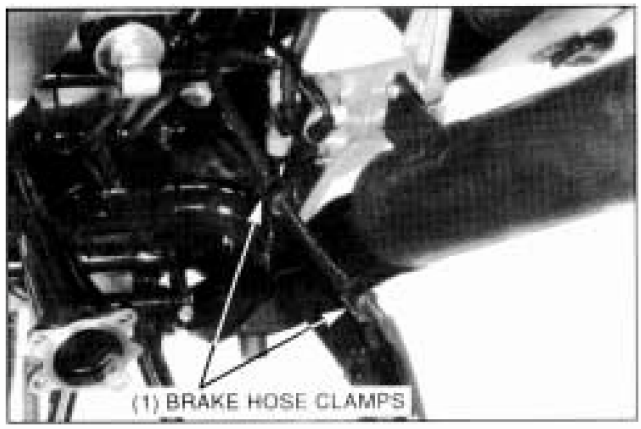
- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrenche's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual 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.



Install the left and right swingarm pivot caps.

Install the brake hose clamps and tighten the bolts to the specified torque.

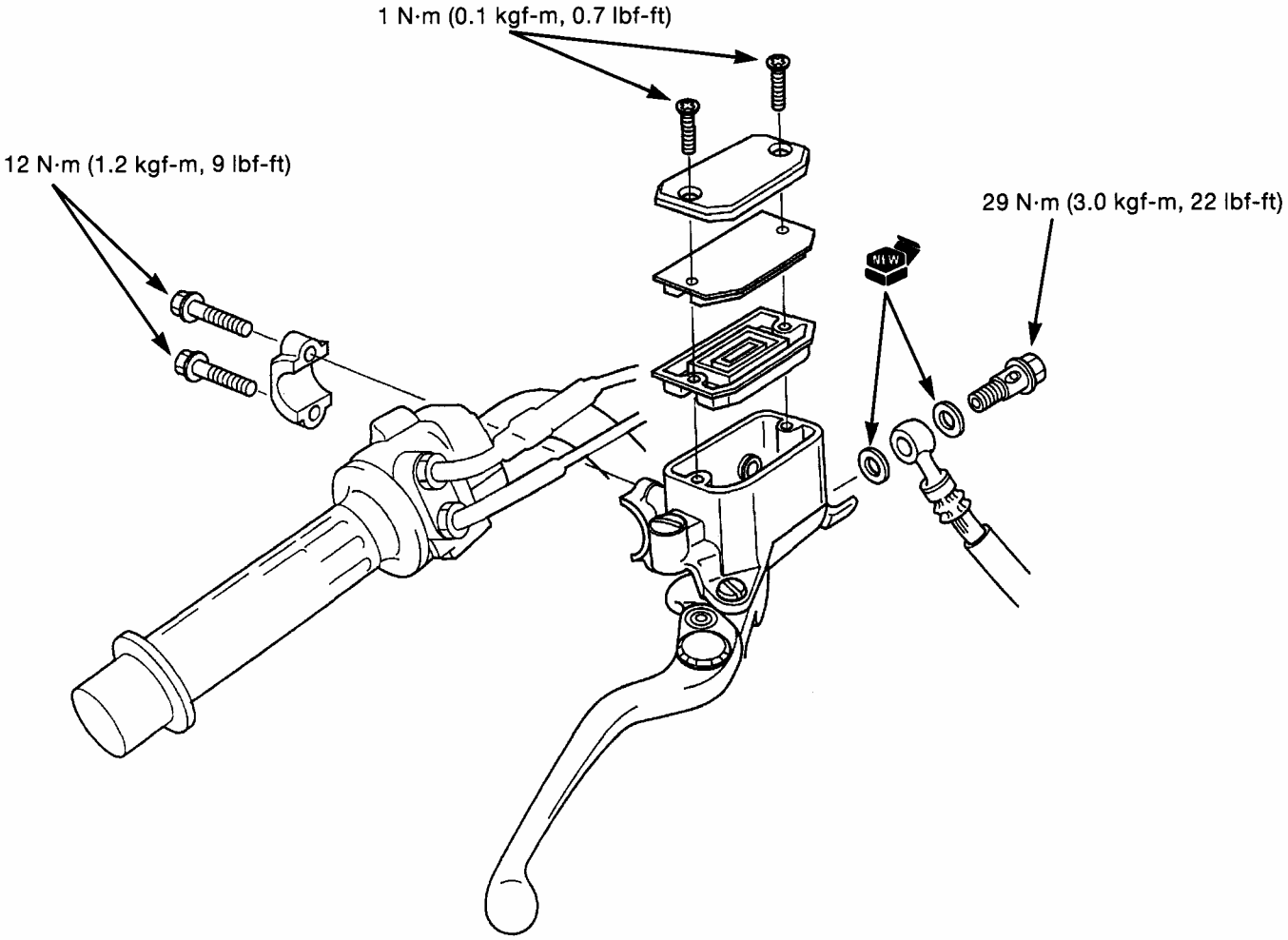
Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

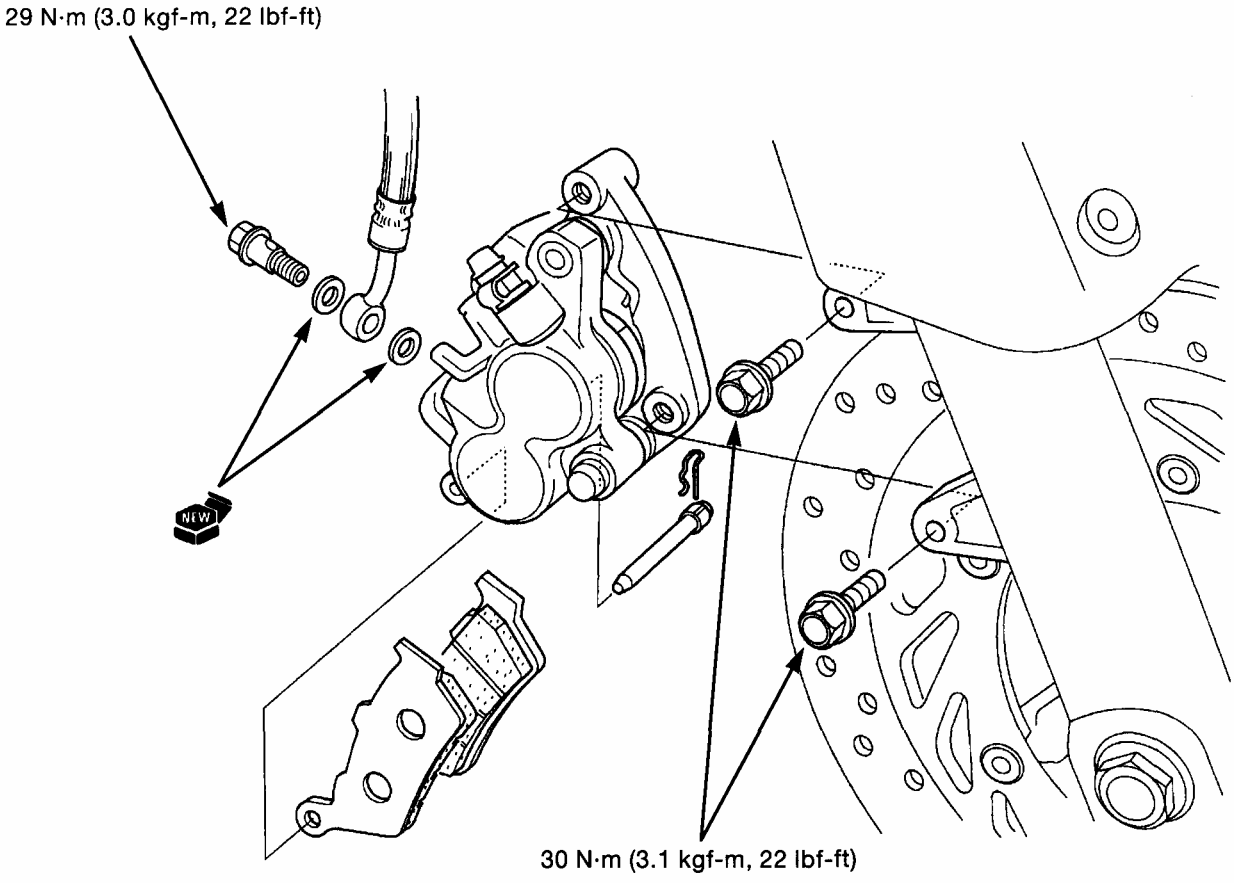


Install and tighten the shock absorber lower mount bolt to the specified torque.

Torque: 44 N·m (4.5 kgf-m, 33 lbf-ft)

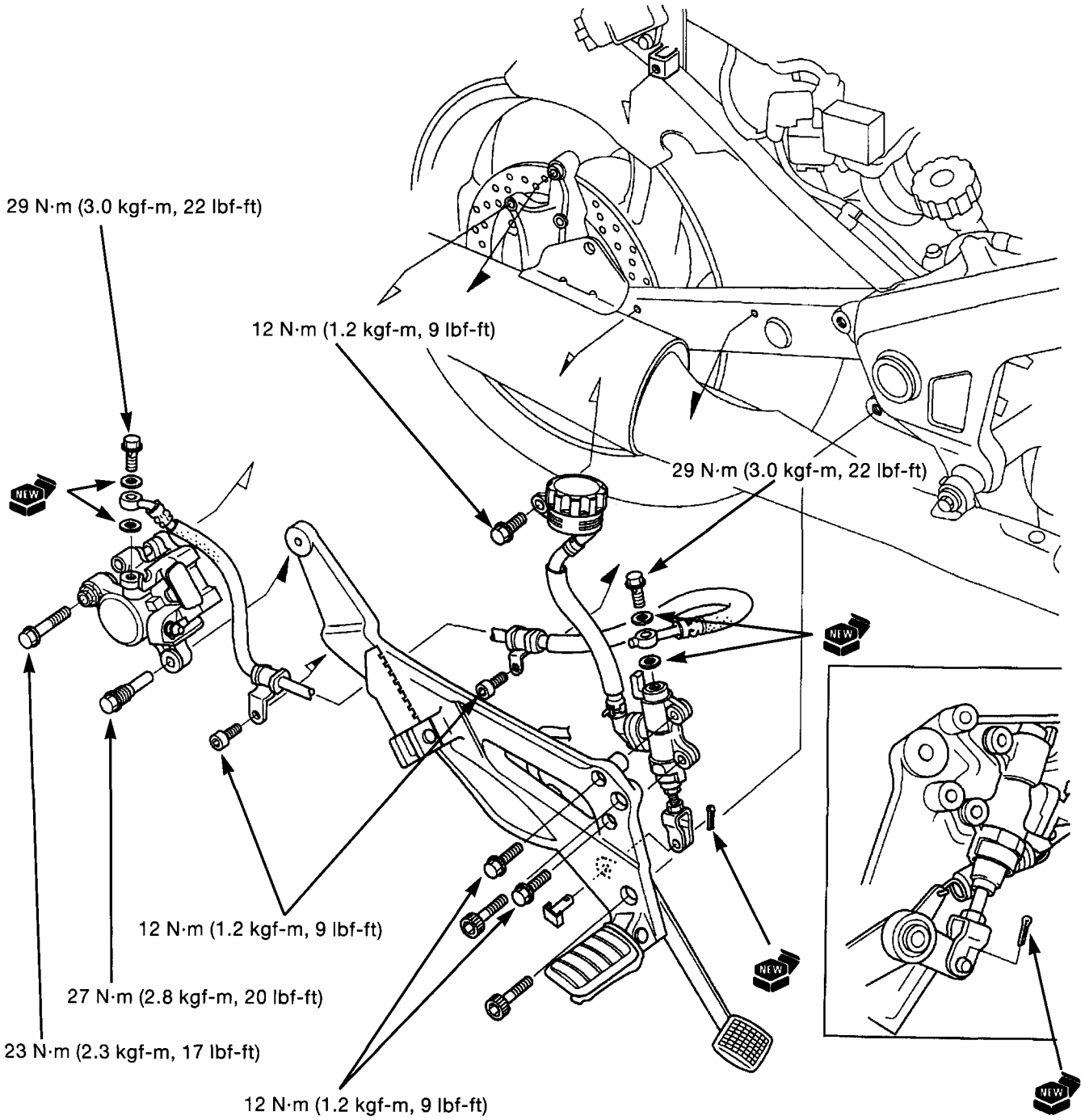
Install the following:
- Final gear case (page 13-19)
- Rear wheel (page 15-8)


1 N·m (0.1 kgf-m, 0.7 lbf-ft)
12 N·m (1.2 kgf-m, 9 lbf-ft)
29 N·m (3.0 kgf-m, 22 lbf-ft)
NEW


29 N·m (3.0 kgf-m, 22 lbf-ft)
NEW
30 N·m (3.1 kgf-m, 22 lbf-ft)

16. Hydraulic Brake

SERVICE INFORMATION	16-2	FRONT BRAKE CALIPER	16-11
TROUBLESHOOTING	16-3	REAR MASTER CYLINDER	16-12
BRAKE FLUID REPLACEMENT/AIR BLEEDING	16-4	REAR BRAKE CALIPER	16-19
BRAKE PAD/DISC	16-6	BRAKE PEDAL	16-23
FRONT MASTER CYLINDER	16-10		



Service Information

GENERAL

⚠ WARNING

- **A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.**

CAUTION

- **Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.**
- **Reusing drained fluids can impair braking efficiency.**
- **Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.**

- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- 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.
- Spilled brake fluid will severally damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap: make sure the from reservoir is horizontal first.
- Do not reuse the sealing washers. Replace with new ones.
- Once the hydraulic system has been operated, or if the brake feel spongy, the system must be bled.
- Always check brake operation before riding the motorcycle.
- Always replace the brake pads is pairs to ensure even disc pressure.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Front	Specified brake fluid	DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	4.5 (0.18)	3.5 (0.14)
	Brake disc runout	—	0.25 (0.010)
Rear	Specified brake fluid	DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	5.0 (0.20)	4.0 (0.16)
	Brake disc runout	—	0.25 (0.010)
	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.	38.180 - 38.230 (1.5031 - 1.5051)	38.24 (1.506)
	Caliper piston O.D.	38.003 - 38.148 (1.4962 - 1.5019)	38.09 (1.500)

TORQUE VALUES

Front brake caliper mounting bolt	30 N·m (3.1 kgf-m, 22 lbf-ft)	Apply a locking agent to the threads
Rear brake caliper mounting bolt	23 N·m (2.3 kgf-m, 17 lbf-ft)	
Rear brake caliper pin bolt	27 N·m (2.8 kgf-m, 20 lbf-ft)	
Rear brake caliper bleeder	6 N·m (0.6 kgf-m, 4.3 lbf-ft)	
Rear brake pad pin	18 N·m (1.8 kgf-m, 13 lbf-ft)	
Rear brake pad pin plug	3 N·m (0.3 kgf-m, 2.2 lbf-ft)	
Front brake caliper bleeder	14 N·m (1.4 kgf-m, 10 lbf-ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf-m, 0.7 lbf-ft)	
Brake lever pivot nut	6 N·m (0.6 kgf-m, 4.3 lbf-ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Rear master cylinder holder bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Rear master cylinder joint lock nut	18 N·m (1.8 kgf-m, 13 lbf-ft)	
Rear brake reservoir holder bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Front master cylinder cover screw	1 N·m (0.1 kgf-m, 0.7 lbf-ft)	
Front brake light switch screw	1 N·m (0.1 kgf-m, 0.7 lbf-ft)	
Brake hose oil bolt	29 N·m (3.0 kgf-m, 22 lbf-ft)	
Front brake hose guide bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Rear brake hose guide bolt	12 N·m (1.2 kgf-m, 9 lbf-ft)	
Rear brake hose joint screw	2 N·m (0.2 kgf-m, 1.4 lbf-ft)	Apply a locking agent to the threads
Front brake pipe	17 N·m (1.7 kgf-m, 12 lbf-ft)	Apply PZ100

TOOLS

Snap ring pliers	07914-SA50001

Troubleshooting

Brake lever/pedal soft or spongy
- Air in the hydraulic system
- Leaking hydraulic system
- Contaminated brake disc/pad
- Worn caliper piston seal
- Worn master cylinder piston cup
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Worn brake pad/disc
- Low fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn caster cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake grab or pull to one side
- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly

Brakes drag
- Contaminated brake disc/pad
- Warped/deformed brake disc
- Caliper not sliding properly
- Misaligned wheel

Brake Fluid Replacement/Air Bleeding

⚠ WARNING

- **A contaminated brake disc or pad reduces stopping power.**
- **Discard contaminated pads and clean 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 or fluid. They are not compatible.**

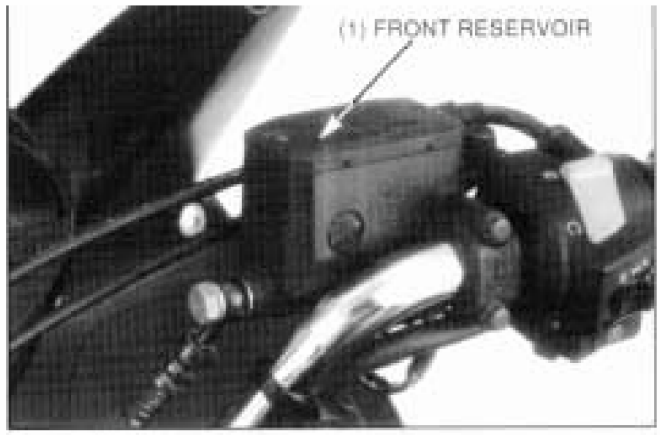
BRAKE FLUID DRAINING

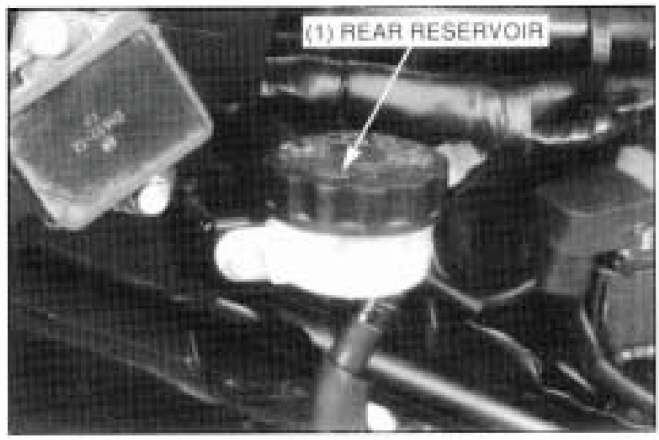
For the front brake, turn the handlebar to the left until the reservoir is level. Remove the screws, reservoir cover, set plate and diaphragm.

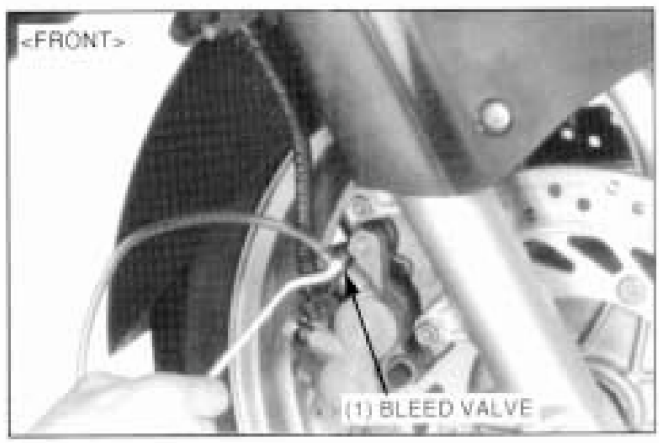
For rear brake, remove the right side cover (pag. 2-3). Remove the reservoir cap, set plate and diaphragm.

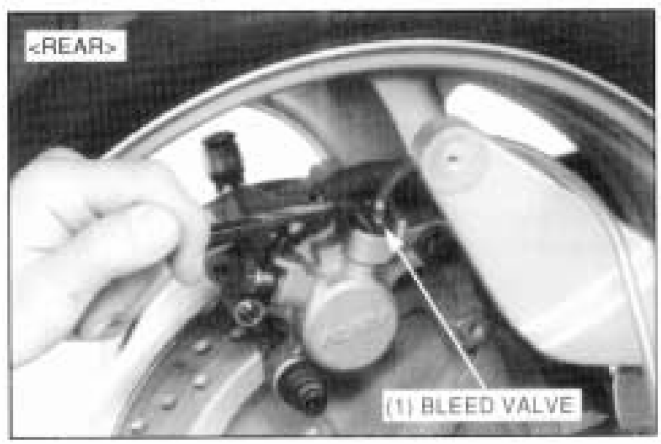
Connect the bleed tube to the bleed valve.

Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve.



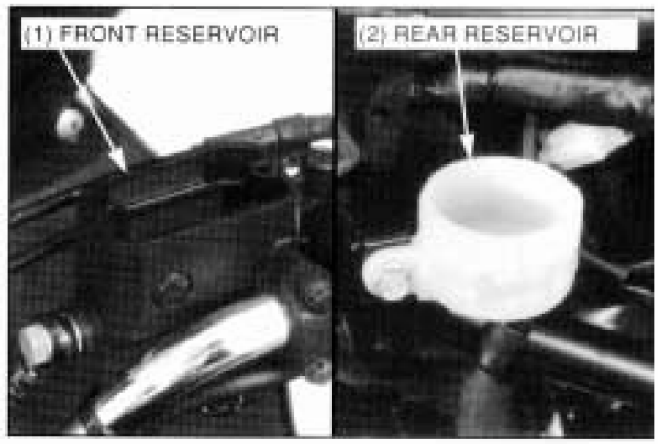






BRAKE FLUID FILLING/BLEEDING

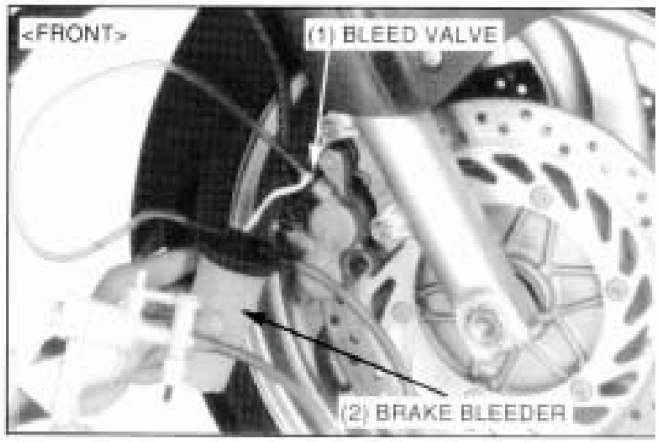
Close the bleed valve.
Fill the reservoir with DOT 4 brake fluid from a sealed container.



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.

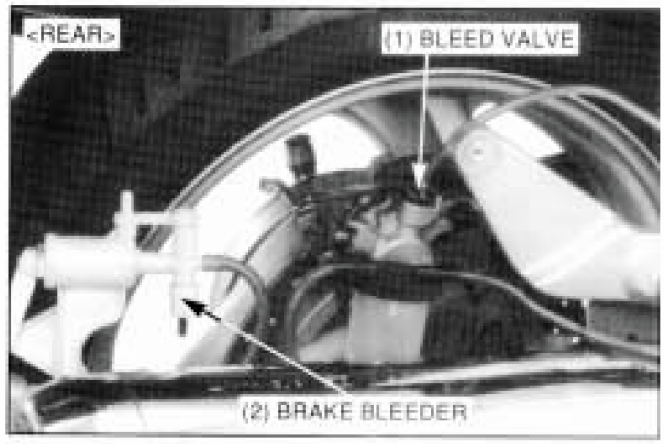


Repeat the above procedures until air bubbles do not appear in the plastic hose.

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 level 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 close it.

NOTE:

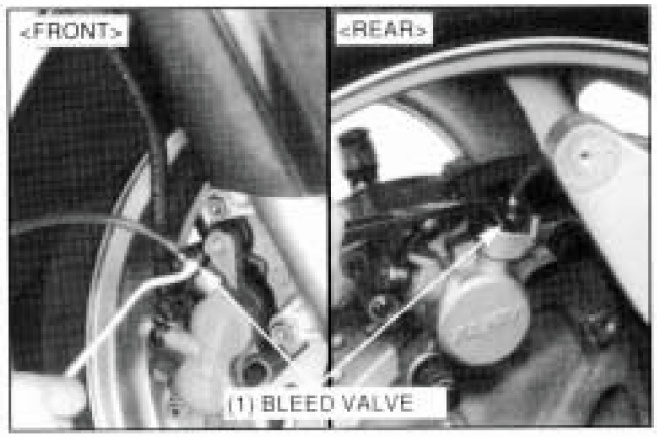
- Do not release the brake lever or pedal until the bleed valve has been closed.

2. Release the brake lever or pedal slowly and wait several seconds after it stops moving.

Repeat steps 1 and 2 until air bubbles do not appear in the bleed valve.

Tighten the bleed valve.

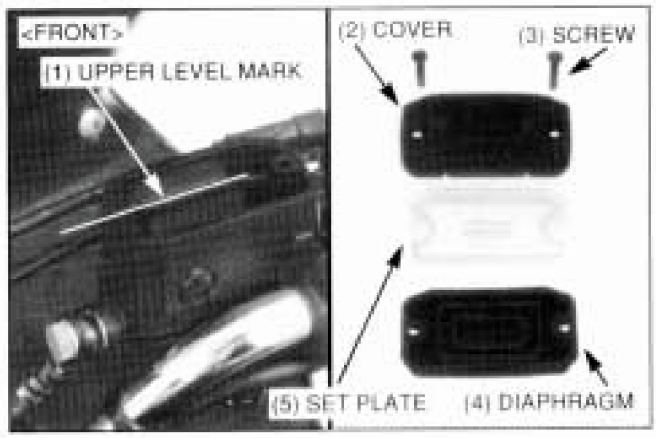
Torques: Front: 14 N·m (1.4 kgf-m, 10 lbf-ft)
Rear: 6 N·m (0.6 kgf-m, 4.3 lbf-ft)



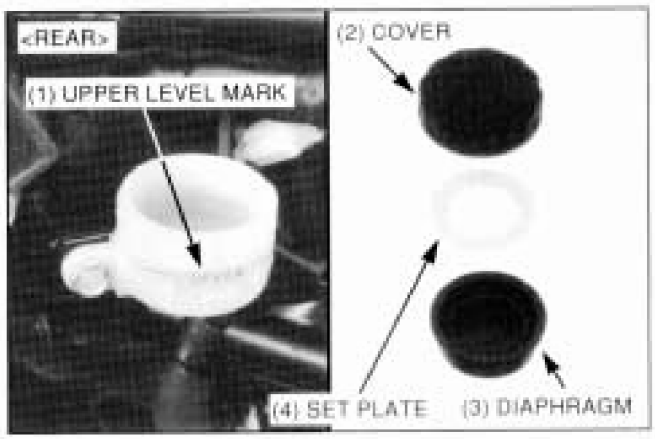
Fill the reservoir to the upper level mark with DOT 4 brake fluid from a sealed container.

For front brake, install the diaphragm, set plate and reservoir cover. Tighten the screws to the specified torque.

Torque: 1 N·m (0.1 kgf-m, 0.7 lbf-ft)



For rear brake, install the diaphragm, set plate and reservoir cover.



Brake Pad/Disc

⚠ WARNING

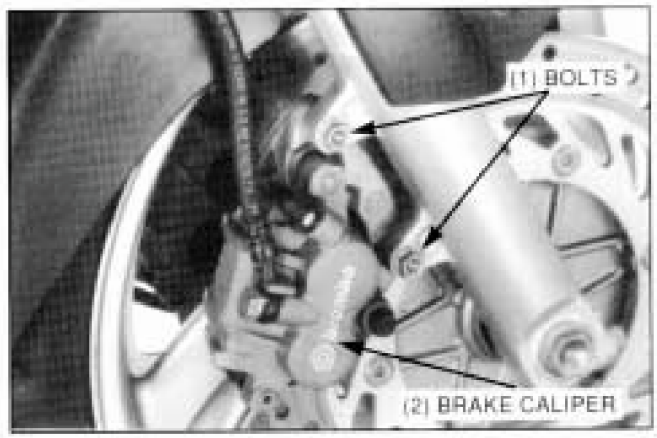
- **A contaminated brake disc or pad reduces stopping power.**
- **Discard contaminated pads and clean contaminated disc with a high quality brake degreased agent.**

FRONT BRAKE PAD REPLACEMENT

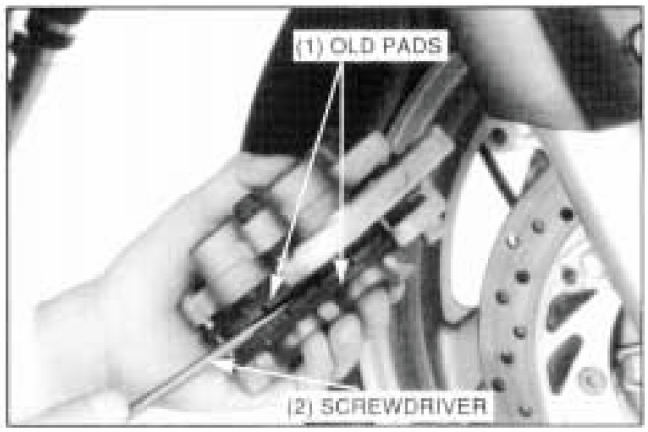
NOTE:

- Always replace the brake pads in pairs to ensure even disc pressure.

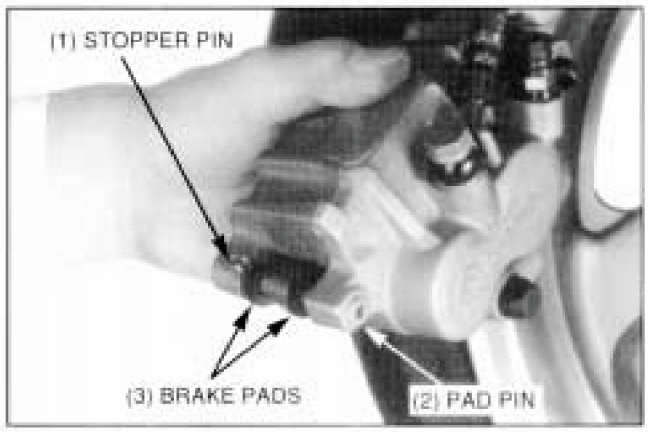
Remove the brake caliper mounting bolts.



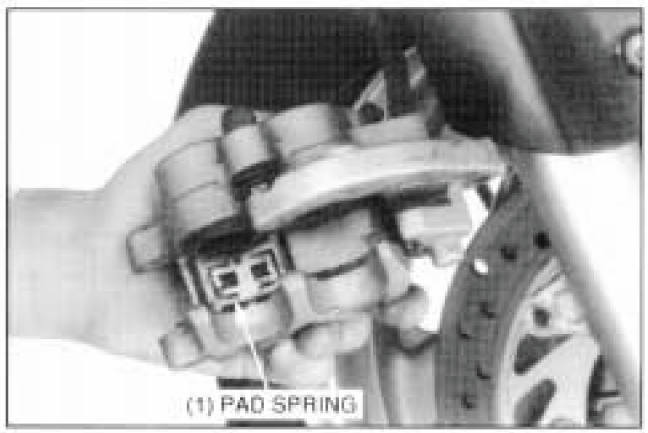
Pry one old pad against the caliper with a screw driver to push the pistons into the caliper.



Remove the stopper pin, pad and brake pads.

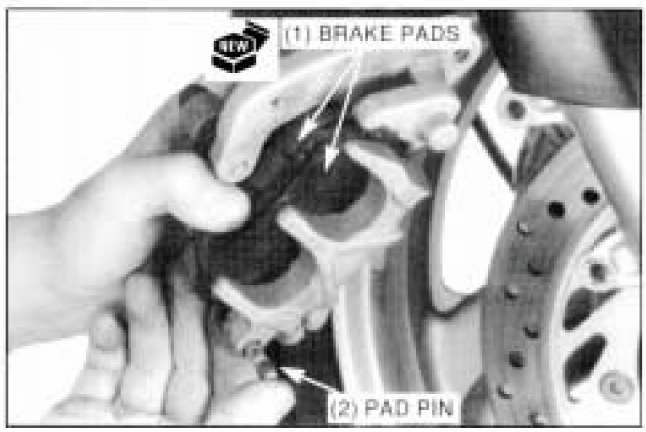


Clean the inside of the caliper especially around the caliper piston.
Make sure that the pad spring is installed in piston.

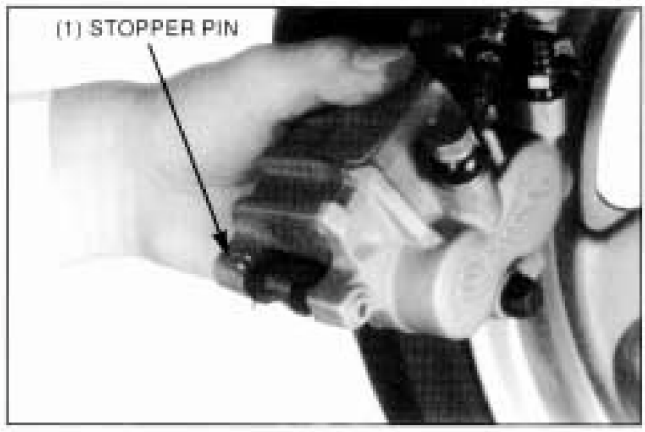


Install the new pads so that their ends rest on the pad retainer on the bracket properly.

Install the pad pin by pushing the pads against the pad spring to align the pad pin holes in the pads and caliper.

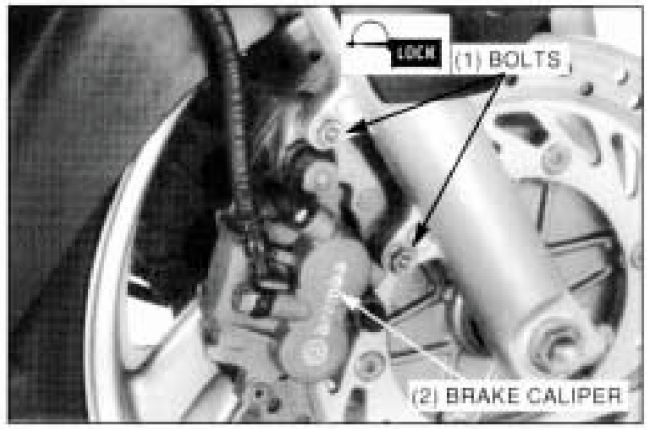


Install the stopper pin into the pad pin hole.



Clean and apply a locking agent to the caliper mounting bolt threads.
Install the brake caliper to the front fork.
Install and tighten the mounting bolt to the specified torque.

Torque: 30 N·m (3.1 kgf-m, 22 lbf-ft)



⚠ WARNING

- **After replacement, operate the brake lever to seat the caliper pistons against the pads.**

REAR BRAKE PAD REPLACEMENT

NOTE:

- Always replace the brake pads is pairs to ensure even disc pressure.

Push the caliper piston all the way in by pushing the caliper body inward to provide clearance for the new pads.

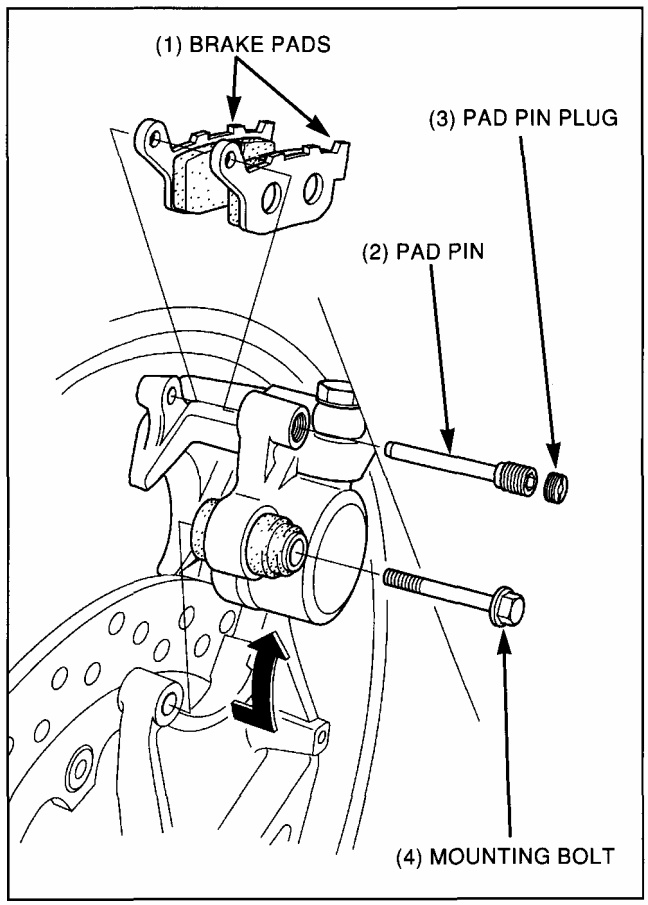
Remove the pad pin plug and loosen the pad pin.

Remove the rear caliper mounting bolt.

Swing the rear caliper upward and remove the rear caliper.

Ply one old pad against the caliper with a screwdriver to push the pistons into the caliper.

Remove the pad pin and the brake pads.



Clean the inside of the caliper especially around the caliper piston.
Make sure that the pad spring is installed in position.

Install the new pads so that their ends rest on the pad retainer on the bracket properly.
Install the pad pin.

Install and lower the caliper while pushing the pads against the spring.

Clean and apply a locking agent to the caliper mounting bolt threads.

Install and tighten the caliper mounting bolt to the specified torque.

Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

Tighten the pad pin to the specified torque.

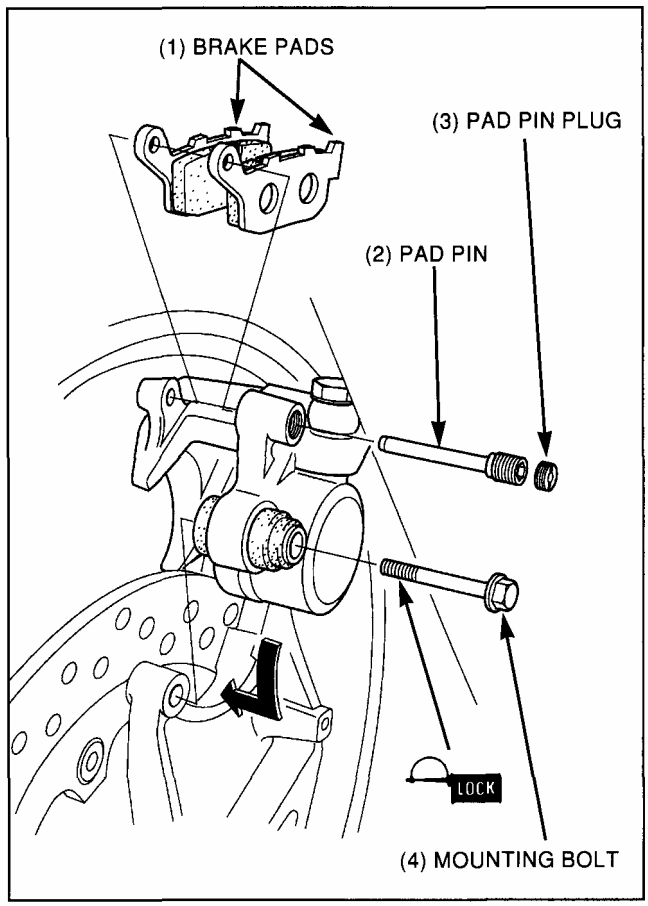
Torque: 18 N·m (1.8 kgf-m, 13 lbf-ft)

Install and tighten the pad pin plug to the specified torque.

Torque: 3 N·m (0.3 kgf-m, 2.2 lbf-ft)

⚠ WARNING

- **After replacement, operate the brake pedal to seat the caliper pistons 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)

Replace the brake disc if the smallest measurement is less than the service limit.

Check the brake disc for warpage.

Service Limit: 0.25 mm (0.010 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the wheel bearings are normal.

Front Master Cylinder

CAUTION

- **Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.**
- **When removing the oil hose, cover the end of the hose to prevent contamination.**

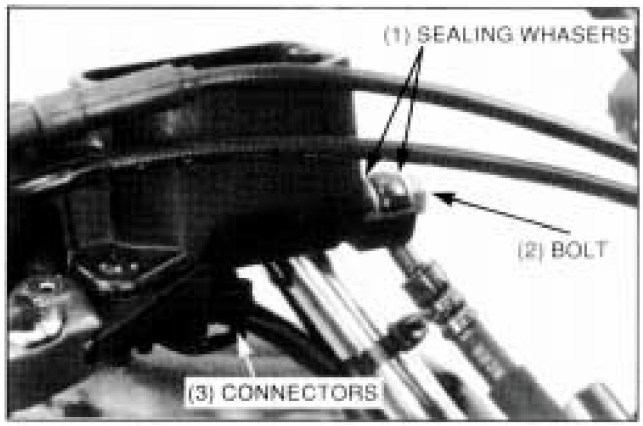
REMOVAL

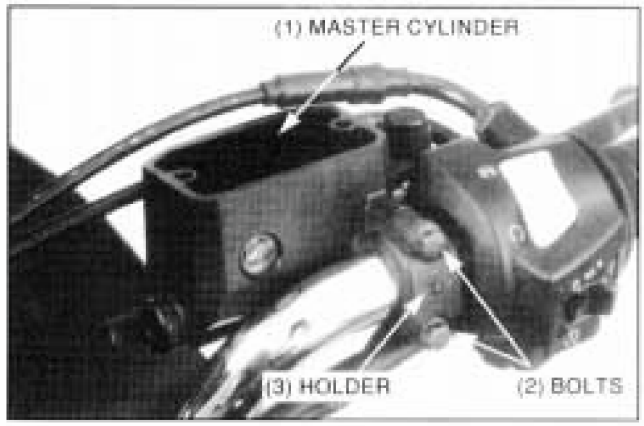
Drain the brake fluid (page 16-4).

Disconnect the brake light switch connectors.

Disconnetc the brake hose by removing the oil bolt and sealing washers.

Remove the master cylinder holder bolts, holder and master cylinder.





BRAKE LIGHT SWITCH, BRAKE LEVER REMOVAL/ INSTALLATION

REMOVAL

Remove the screw and brake light switch.

Remove the brake lever pivot nut, bolt and brake lever.

INSTALLATION

Apply silicone grease to the brake lever pivot bolt sliding surface and master piston tip.
Install the brake lever to the master cylinder.
Install and tighten the brake lever pivot bolt to the specified torque.

Torque: 1 N·m (0.1 kgf-m, 0.7 lbf-ft)

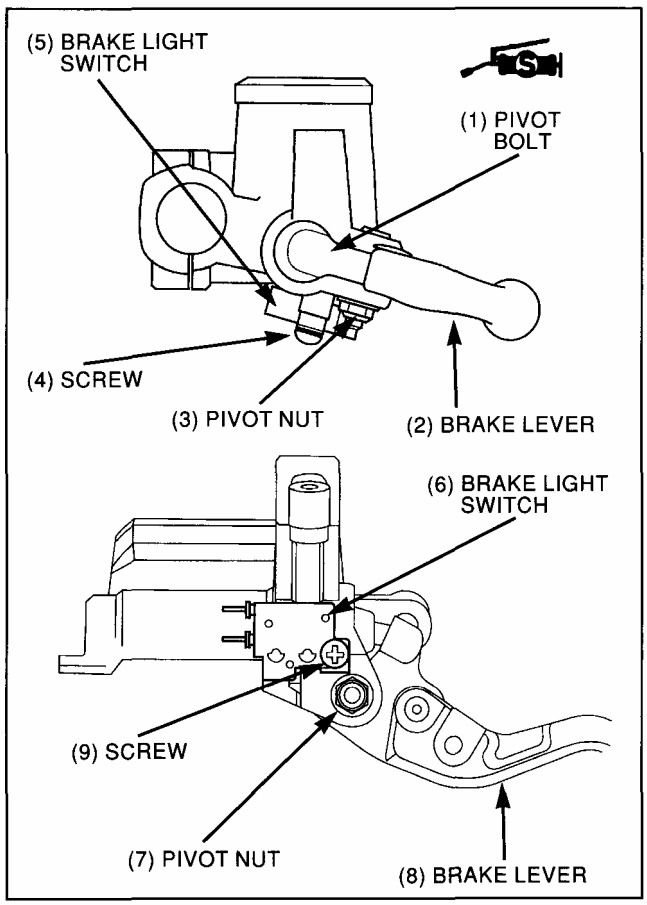
Install and tighten the brake lever pivot nut to the specified torque.

Torque: 6 N·m (0.6 kgf-m, 4.3 lbf-ft)

Install the brake light switch to the master cylinder aligning the brake light switch boss and master cylinder hole.

Install and tighten the screw to the specified torque.

Torque: 1 N·m (0.1 kgf-m, 0.7 lbf-ft)



INSTALLATION

Install the master cylinder and the master cylinder holder with the "△" mark facing up.

Align the end of the master cylinder with the punch mark on the handlebar.
Install the front master cylinder bolts and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

Connect the brake hose eyelet with the oil bolt and new sealing washers.

NOTE:

- Be careful not to twist the brake hose.

Tighten the brake hose oil bolt to the specified torque.

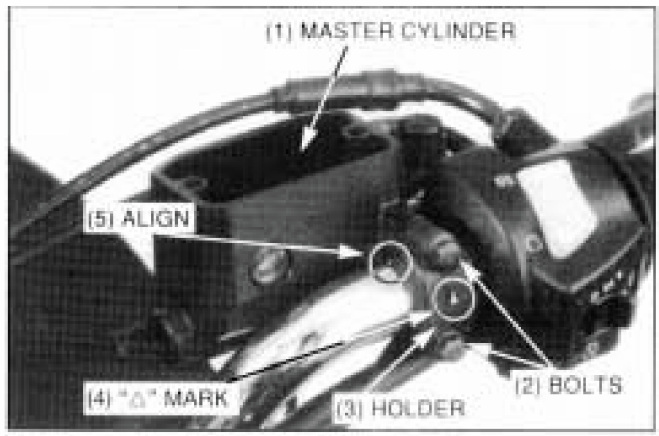
Torque: 29 N·m (3.0 kgf-m, 22 lbf-ft)

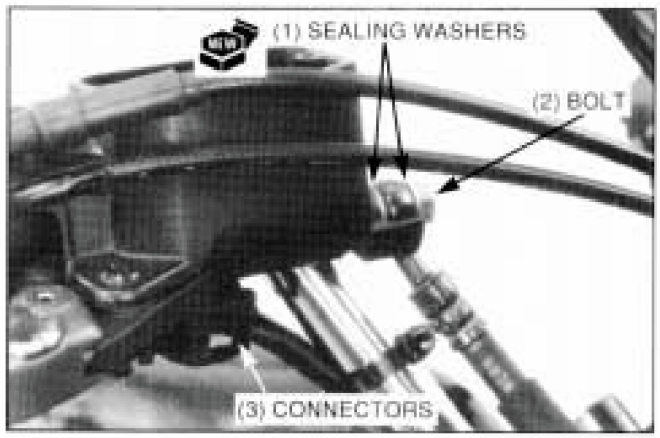
NOTE:

- While tightening the brake hose oil bolt, align the brake hose end with the stopper

Connect the brake light switch connectors.

Refill the brake fluid (page 16-5).

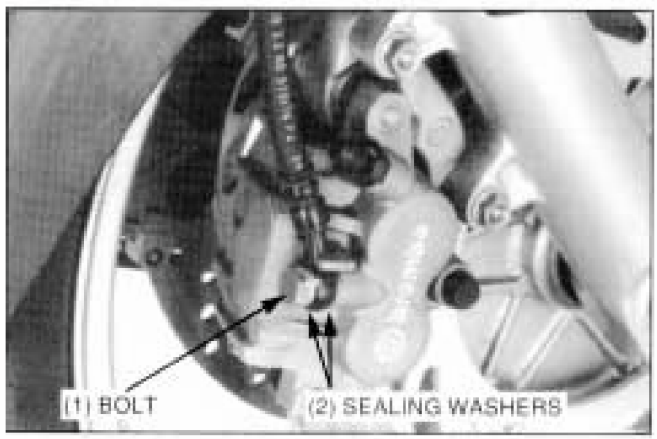




Front Brake Caliper

CAUTION

- **Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.**
- **When removing the oil hose bolt, cover the end of the hose to prevent contamination.**

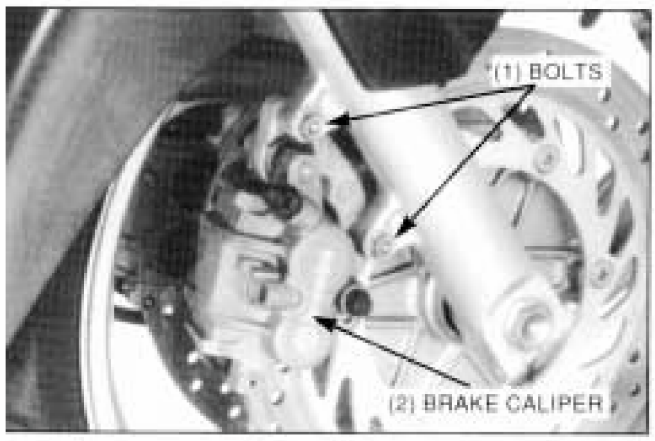


REMOVAL

Drain the brake fluid (page 16-3).

Remove the brake hose oil bolt and sealing washers and disconnect the brake hose from the front brake caliper.

Remove the front brake caliper mounting bolts and front brake caliper.



INSTALLATION

Clean and apply a locking agent to the brake caliper mounting bolt threads.
Install the front brake caliper to the front fork.
Install and tighten the front caliper mounting bolts to the specified torque.

Torque: 30 N·m (3.1 kgf-m, 22 lbf-ft)

Connect the brake hose to the brake caliper with new sealing washers.

NOTE:

- Be careful not to twist the brake hose.

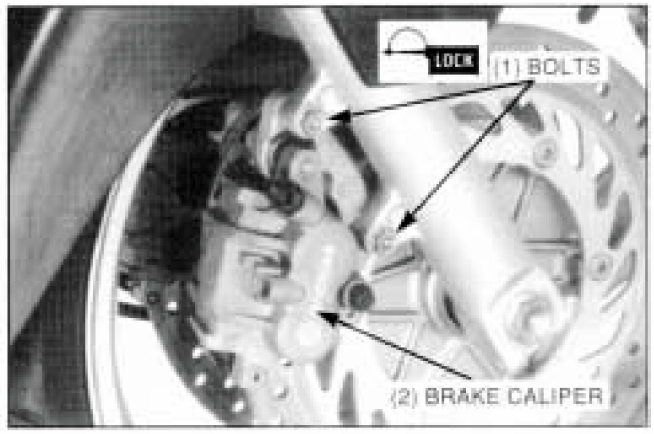
Install and tighten the brake hose oil bolt to specified torque.

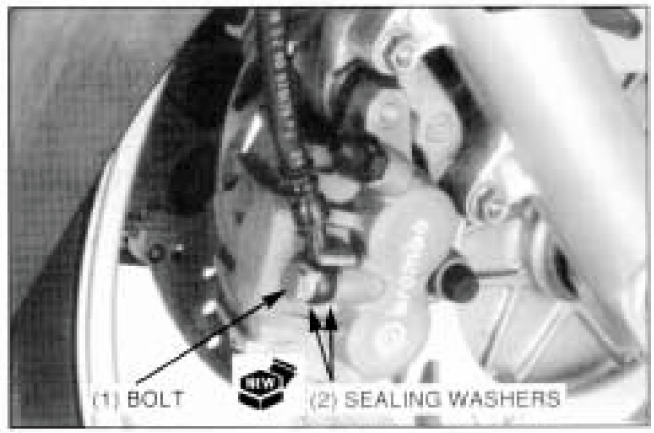
Torque: 29 N·m (3.0 kgf-m, 22 lbf-ft)

NOTE:

- While tightening the brake hose oil bolt, align the brake hose end with the stopper.

Refill the brake fluid (page 16-5).





Rear Master Cylinder

CAUTION

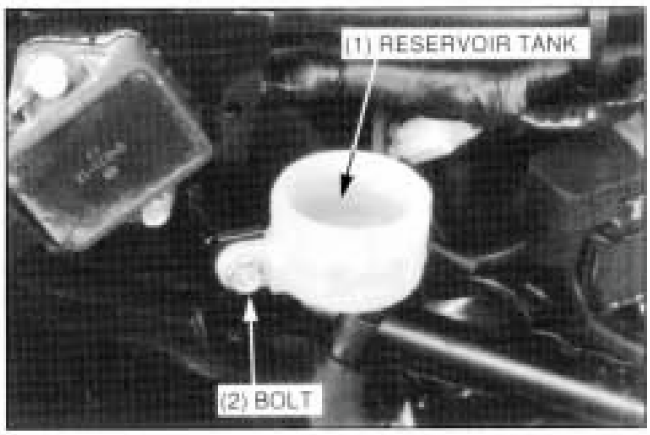
- **Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.**
- **When removing the oil hose, cover the end of the hose to prevent contamination.**

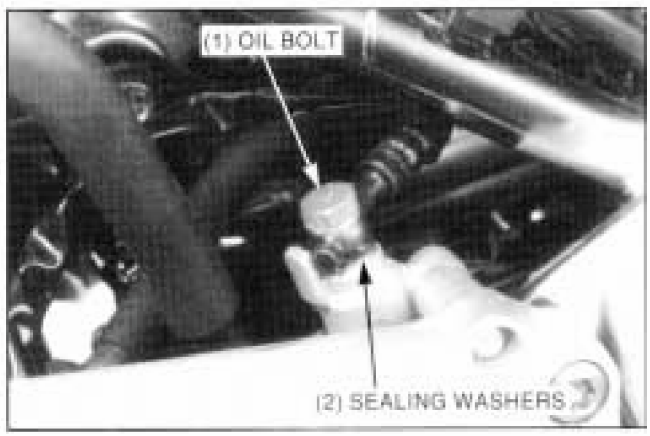
REMOVAL

Remove the right saddle bag (page 2-8).
Drain the brake fluid (page 16-3).

Remove the bolts and rear brake reservoir tank.

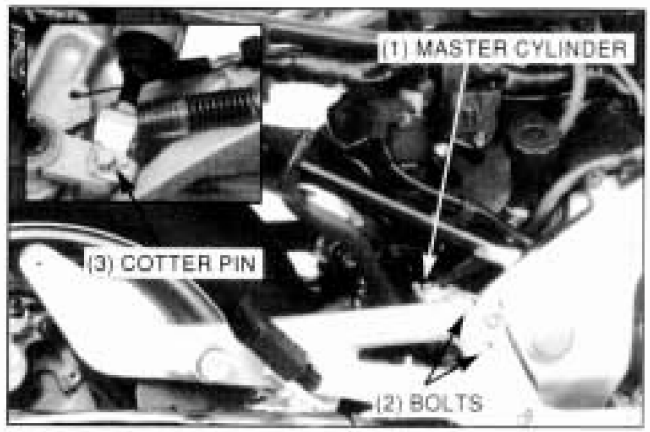
Remove the brake hose oil bolt and sealing washers.
Disconnect the brake hose from the master cylinder.





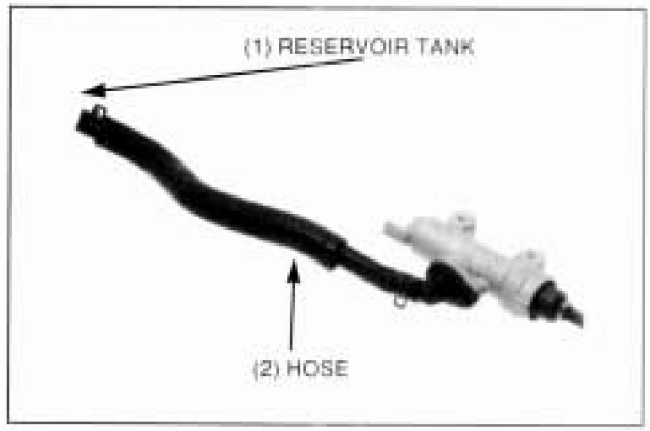
Remove the master cylinder mount bolts.

Remove and discard the brake pedal joint cotter pin.
Remove the joint pin and rear master cylinder.

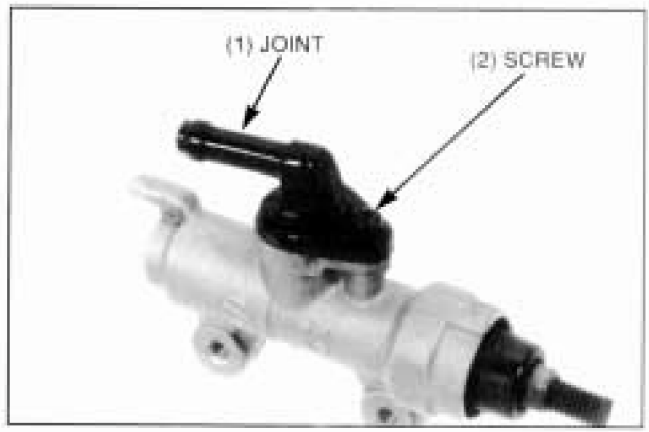


DISASSEMBLY

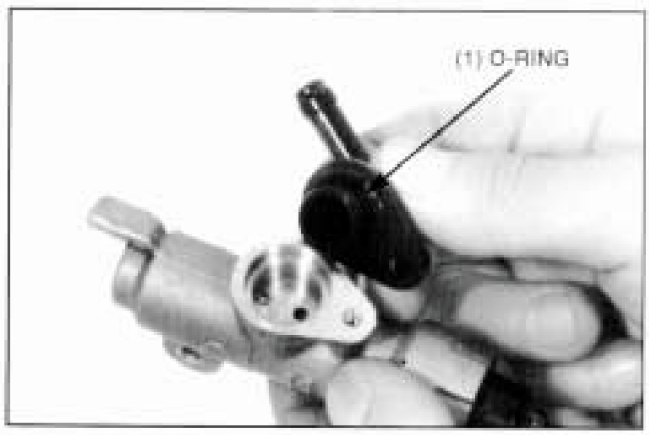
Disconnect the reservoir hose and reservoir tank.



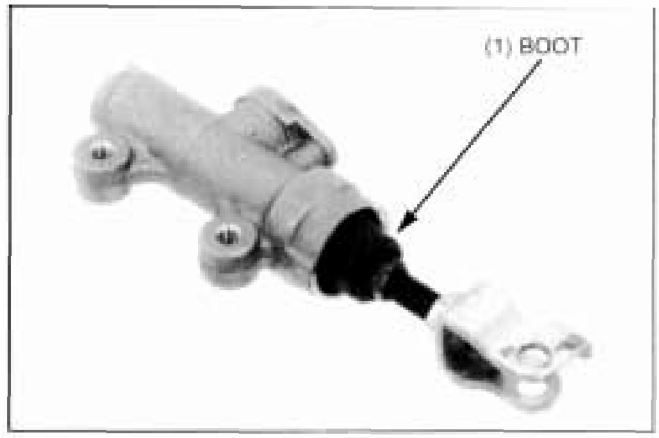
Remove the screw and reservoir joint.



Remove the O-ring from the reservoir joint.

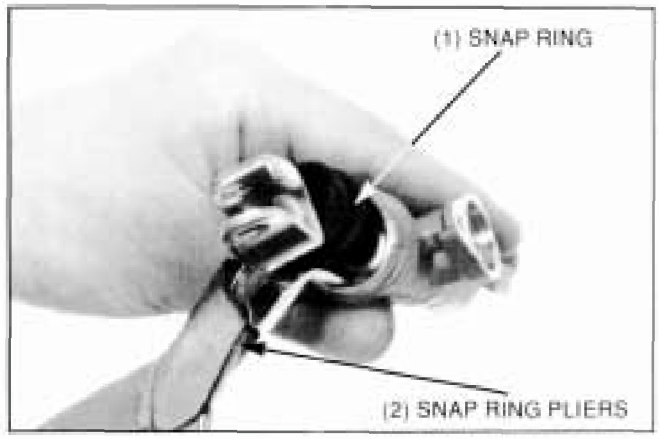


Remove the boot from the push rod groove and master cylinder.



Remove the snap ring.

Tool:
Snap ring pliers **07914-SA50001**

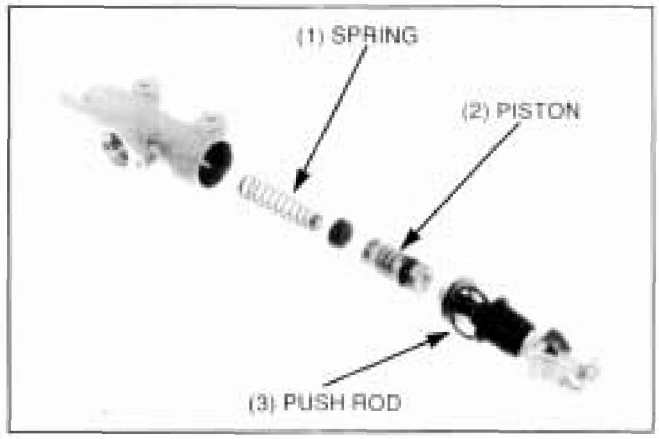


Remove the push rod, master piston and spring.

Clean the master cylinder and master piston with clean brake fluid.

NOTE:

- Replace the master piston, spring, cups and snap ring as a set whenever they are disassembled.
- Be sure that each part is free from the dust or dirt before reassembly.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.

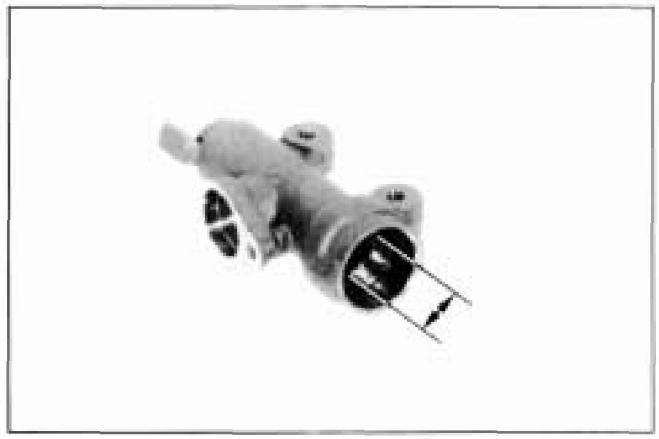


INSPECTION

Check the piston cups for wear, deterioration or damage.
Check the master cylinder and piston for scoring, scratches or damage.

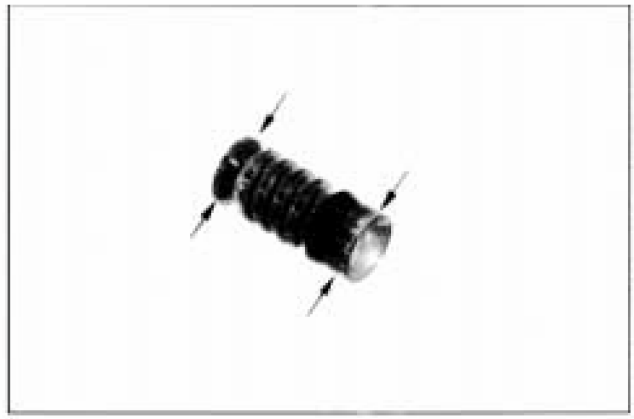
Measure the master cylinder I.D.

Service Limit: 14.055 mm (0.5533 in)

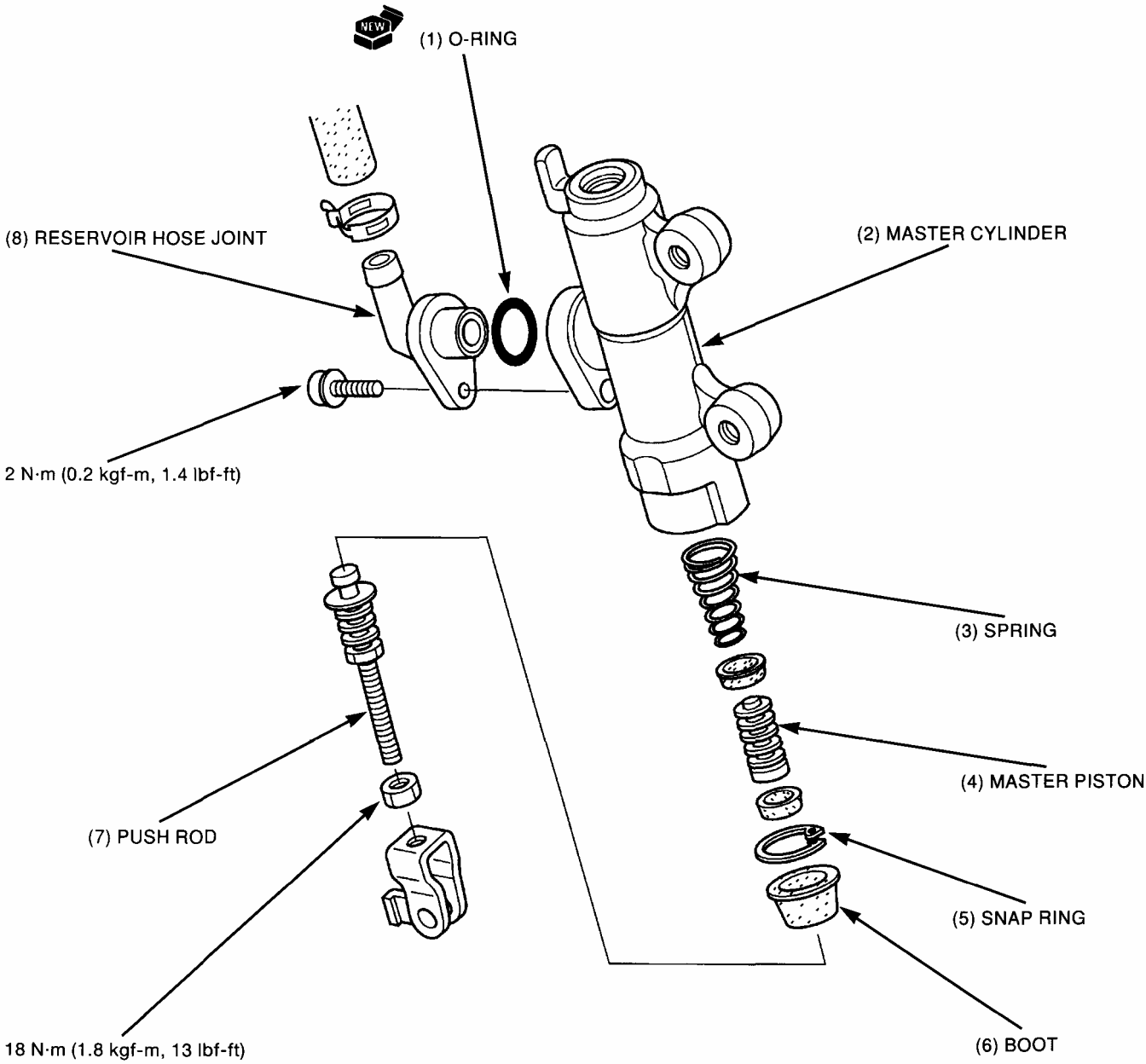


Measure the master piston O.D.

Service Limit: 13.945 (0.5490 in)

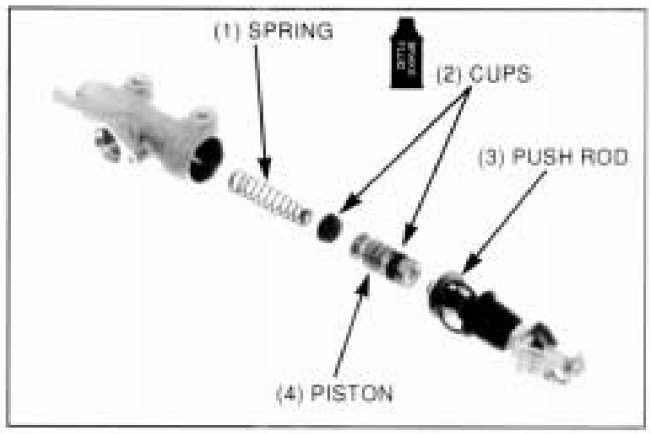


ASSEMBLY



NOTE:

- Replace the master piston, spring, cups and snap ring as a set.
- Replace the boot if it is wear, deterioration or damage.
- Apply silicone grease to the boot inner surface.
- Be sure that each part is free from the dust or dirt before reassembly.



Coat the master piston and piston cups with clean DOT 4 brake fluid.
Install the spring onto the master piston end.

Install the master piston/spring into the master cylinder.

CAUTION

- **Do not allow the piston cup lips to turn inside out.**

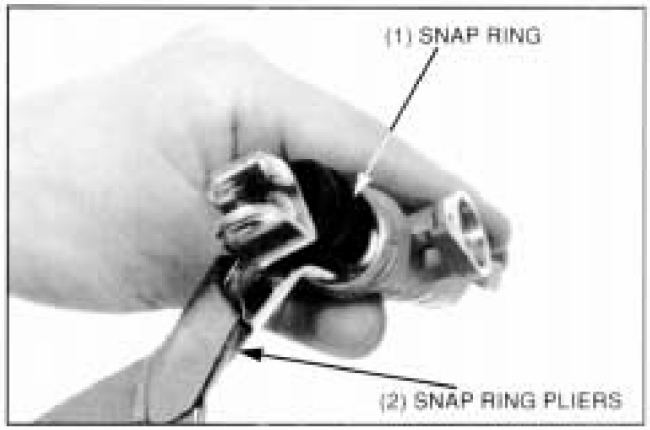
Apply silicone grease to the master piston contacting surface of the push rod.

Install the snap ring into the groove in the master cylinder.

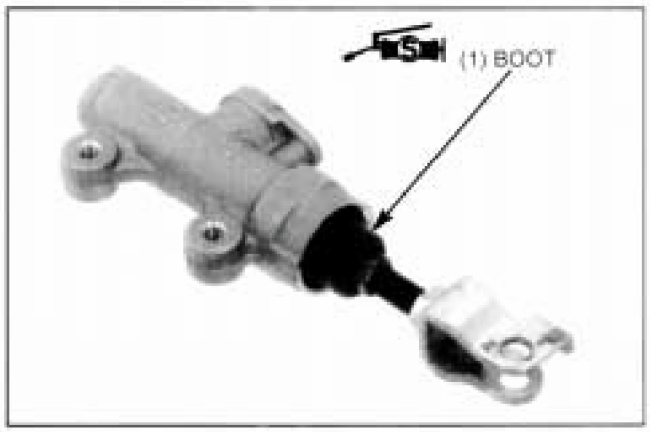
Tool:
Snap ring pliers **07914-SA50001**

CAUTION

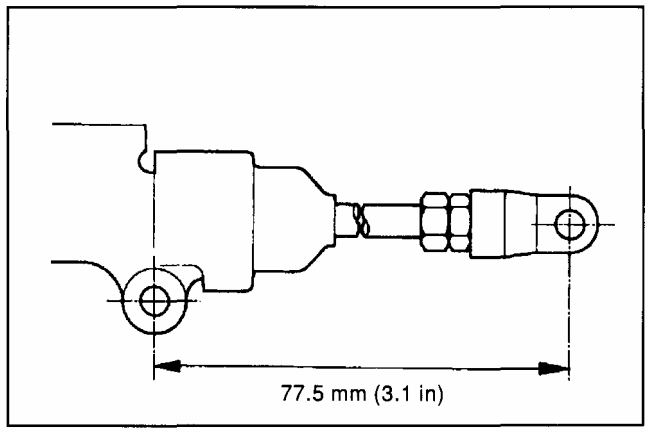
- **Be certain the snap ring is firmly seated in the groove.**



Apply silicone grease to the boot groove in the push rod.
Install the boot into the master cylinder and the groove in the push rod.

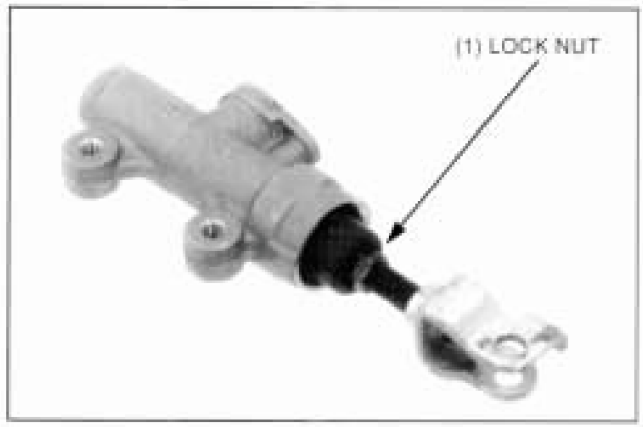


If the push rod joint is reinstalled, adjust the push rod length so that the distance from the center of the master cylinder lower mounting hole to the center of the joint pin hole is 77.5 mm (3.1 in).

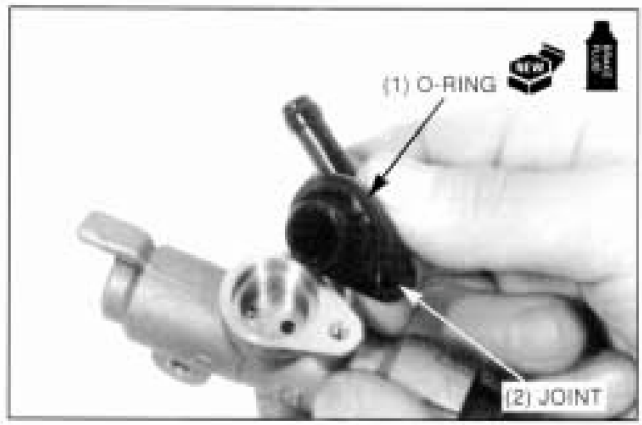


After adjustment, tighten the lock nut.

Torque: 18 N·m (1.8 kgf-m, 13 lbf-ft)

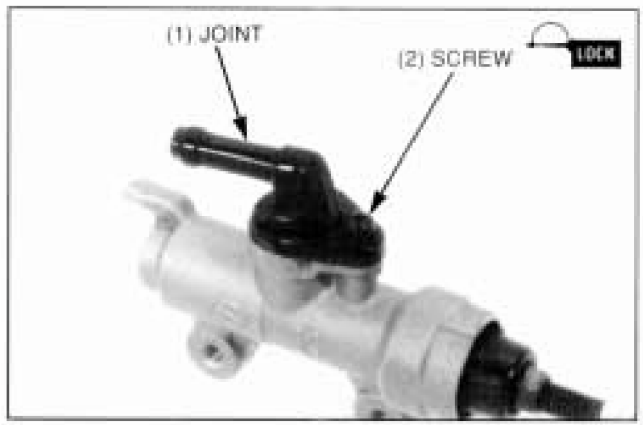


Coat the new O-ring with clean brake fluid and install it onto the reservoir hose joint.

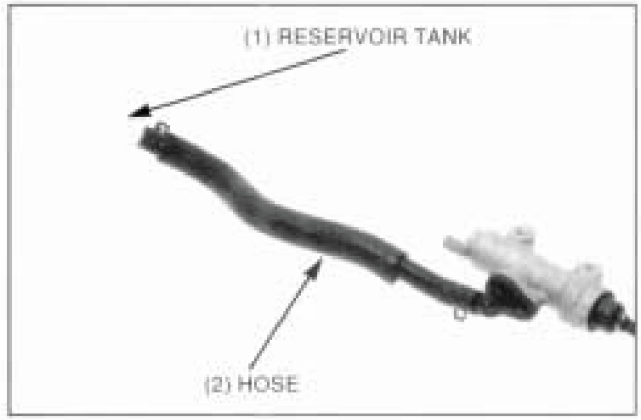


Install the reservoir hose joint to the master cylinder.
Clean and apply a locking agent to the reservoir hose joint screw threads.
Install and tighten the screw to the specified torque.

Torque: 2 N·m (0.2 kgf-m, 1.4 lbf-ft)



Connect the reservoir hose and reservoir tank.

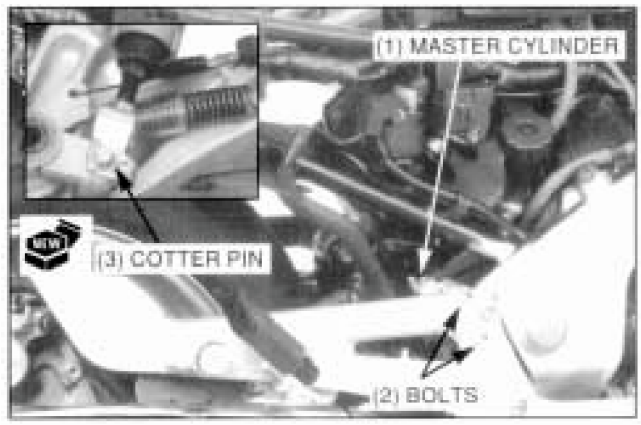


INSTALLATION

Connect the rear master cylinder lower joint to the brake pedal with joint pin and new cotter pin.

Install the master cylinder to the right footpeg holder. Install and tighten the bolts to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)



Connect the brake hose to the master cylinder with new sealing washers.

NOTE:

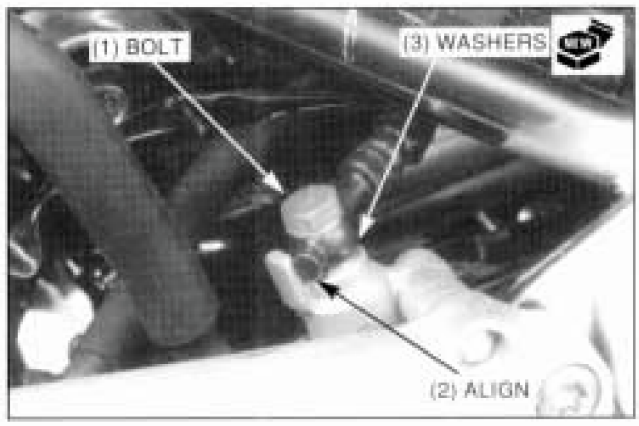
- Be careful not to twist the brake hose.

Install and tighten the brake hose oil bolt to the specified torque.

Torque: 29 N·m (3.0 kgf-m, 22 lbf-ft)

NOTE:

- While tightening the brake hose oil bolt, press the brake hose end against the stopper.

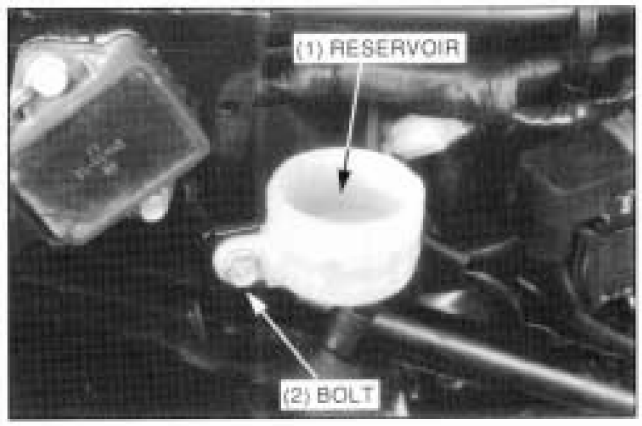


Install the rear brake reservoir and tighten the bolt to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

Refill the brake fluid and bleed the rear hydraulic system (page 16-5).

Install the right saddle bag (page 2-8).



Rear Brake Caliper

CAUTION

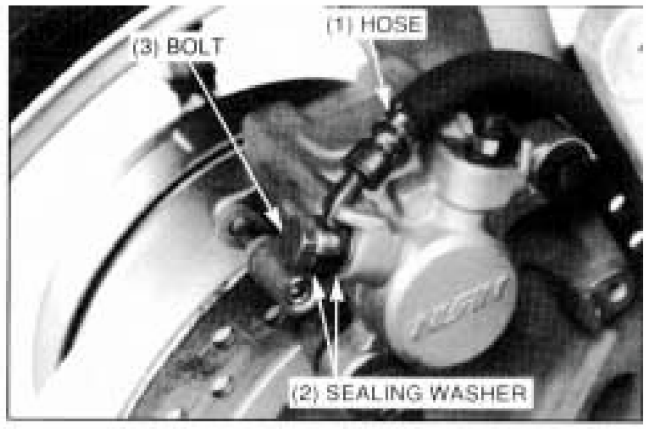
- **Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.**
- **When removing the oil hose bolt, cover the end of the hose to prevent contamination.**

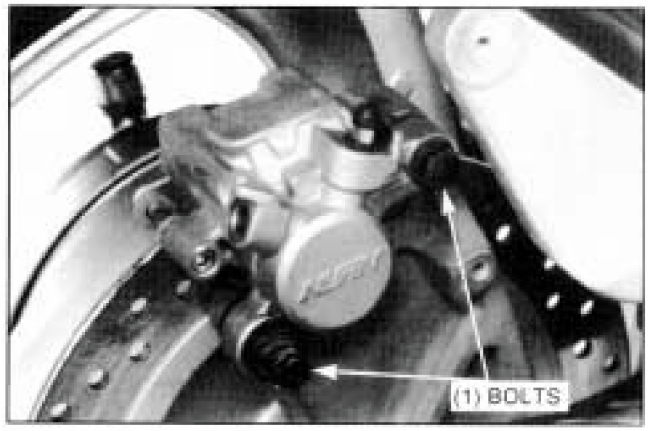
REMOVAL

Drain the brake fluid (page 16-4).

Remove the brake hose oil bolt and sealing washers. Disconnect the brake hose from the rear brake caliper. Remove the rear caliper mounting bolt and caliper pin bolt.

Remove the brake pad (page 16-8).



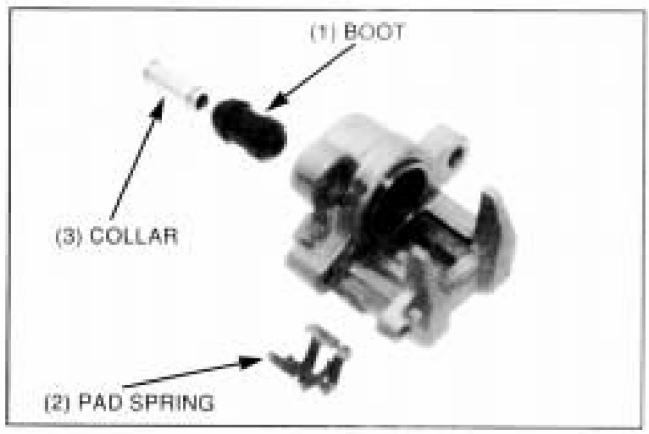


DISASSEMBLY

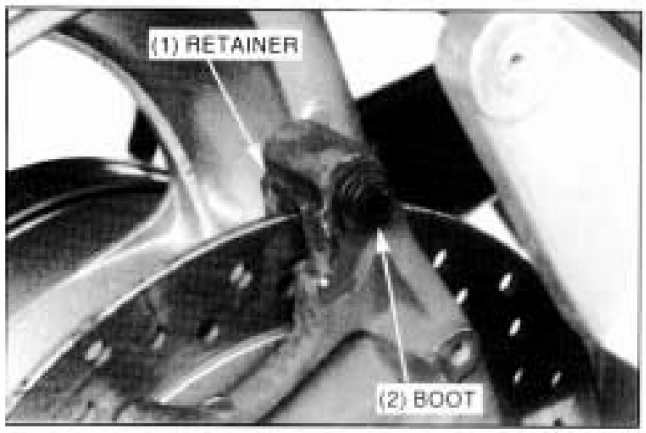
NOTE:

- Do not remove the caliper and bracket pins unless replacement.

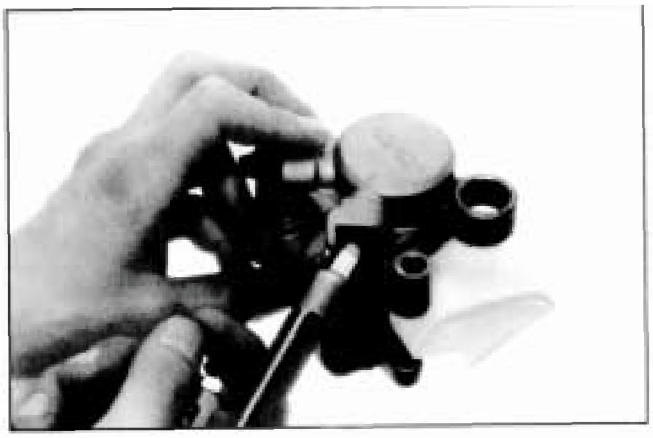
Remove the pad spring, collar and bracket pin boot from the caliper body.



Remove the pad retainer and caliper pin boot from the caliper bracket.



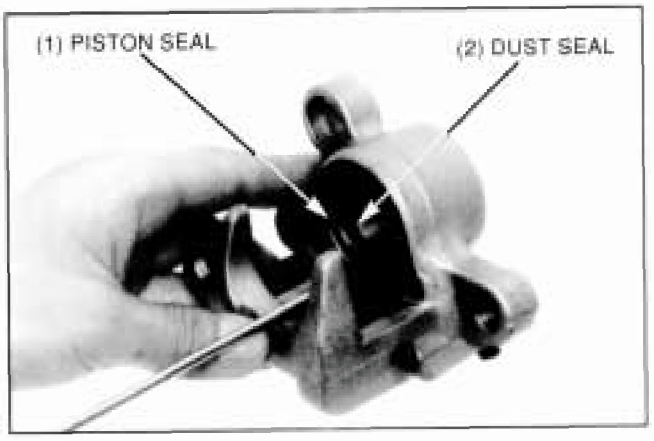
Place a shop towel over the piston.
Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.



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 lit them out.



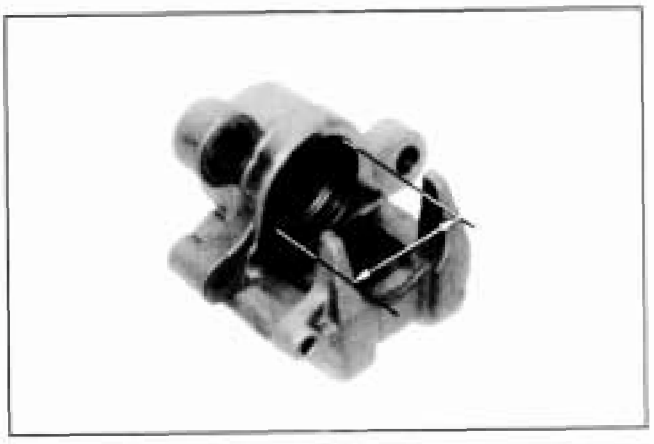
CAUTION

- **Be careful not to damage the piston sliding surface.**

Clean the seal grooves, caliper piston and caliper piston sliding surfaces with clean brake fluid.

INSPECTION

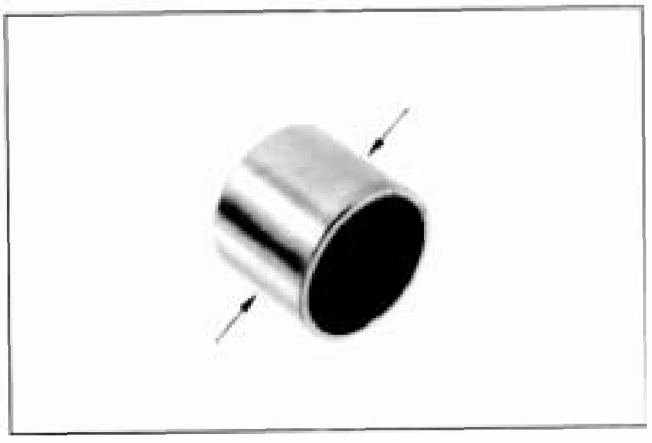
Check the caliper cylinder and piston for scoring, scratches or damage.



Measure the caliper cylinder I.D.

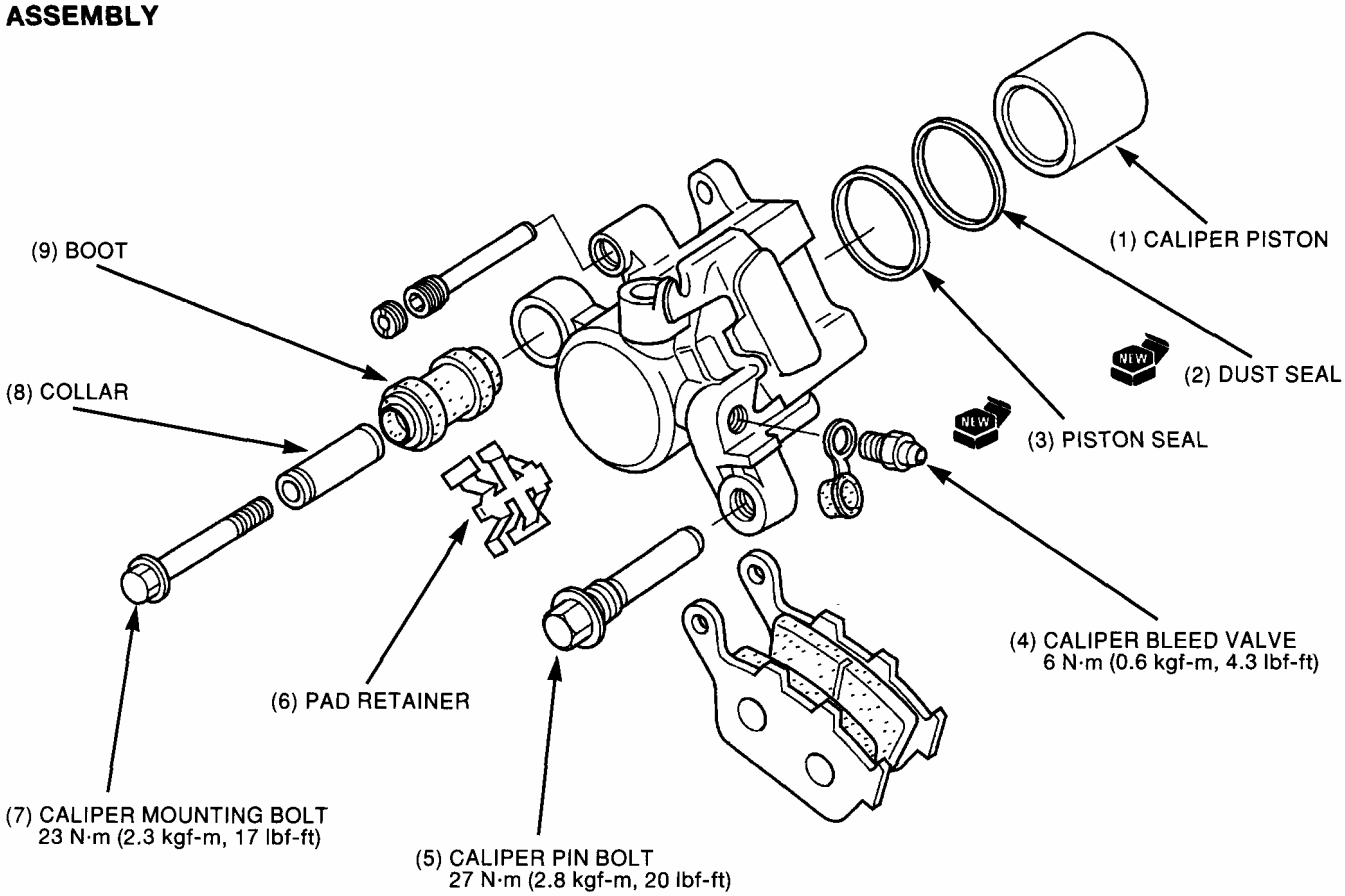
Service Limit: 38.24 mm (1.506 in)

Measure the caliper piston O.D.



Service Limit: 38.09 mm (1.500 in)

ASSEMBLY



NOTE:

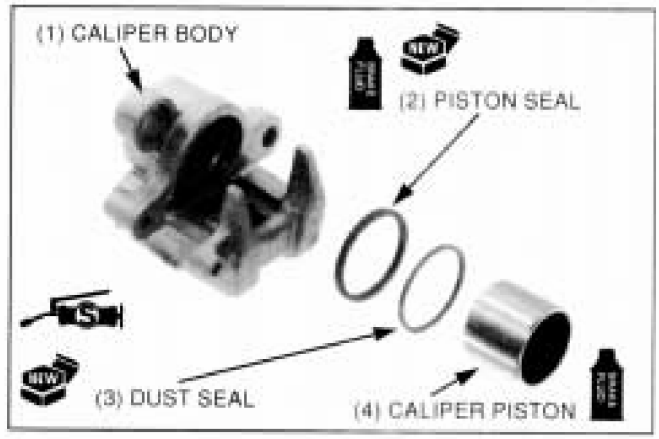
- Replace the dust seals and piston seals with a new ones.
- Replace the caliper and bracket pin boots if it is wear, deterioration or damage.
- Apply silicone grease to the boot inner surface.
- Be sure that each part is free from the dust or dirt before reassembly.

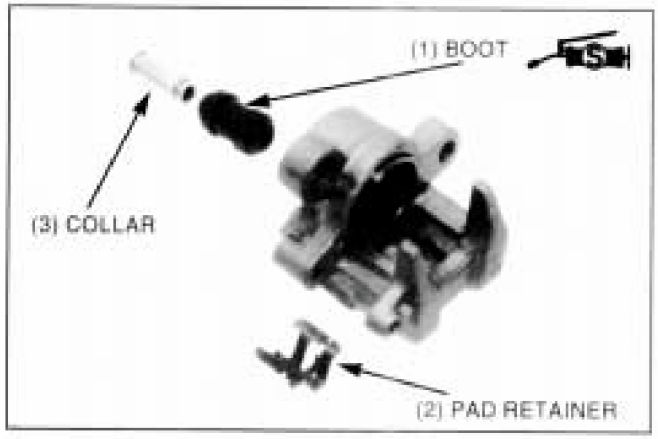
Coat a new piston seal with clean brake fluid and install it in the seal groove in the caliper.
Coat a new dust seal with silicone grease and install it in the seal groove in the caliper.
Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the pads.

Replace the caliper mounting bolt boot with a new ones if it is wear, deterioration or damage.

Apply silicone grease to the inside of the caliper mounting bolt boot.
Install the caliper mounting bolt boot and collar to the caliper body.

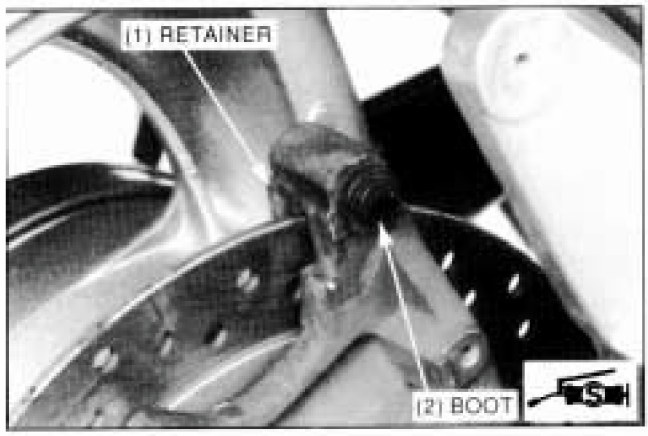
Install the pad spring to the caliper body.





Replace the caliper pin boot with a new ones if it is wear, deterioration or damage.

Apply silicone grease to the inside of the caliper pin boot. Install the caliper pin boot and pad retainer to the caliper bracket.



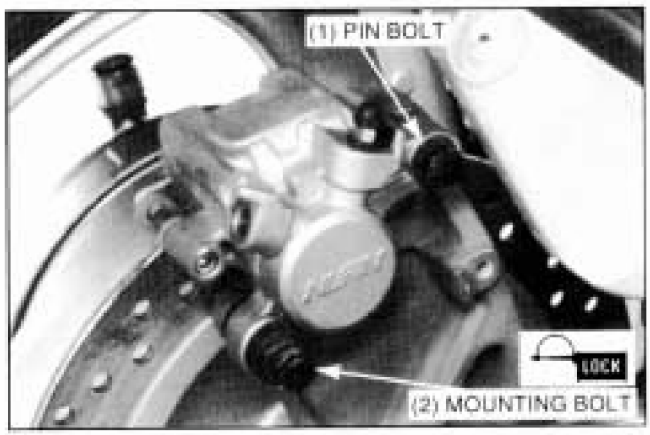
INSTALLATION

Install the brake pad (page 16-9).

Apply silicone grease to the caliper pin bolt sliding surface.

Install the rear brake caliper to the caliper bracket.
Install and tighten the caliper pin bolt to the specified torque.

Torque: 27 N·m (2.8 kgf-m, 20 lbf-ft)



Clean and apply a locking agent to the rear caliper mounting bolt threads.

Install and tighten the rear caliper mounting bolt to the specified torque.

Torque: 23 N·m (2.3 kgf-m, 17 lbf-ft)

Connect the brake hose to the rear master cylinder with the new searing washers.

NOTE:

- Be careful not to twist the brake hose.

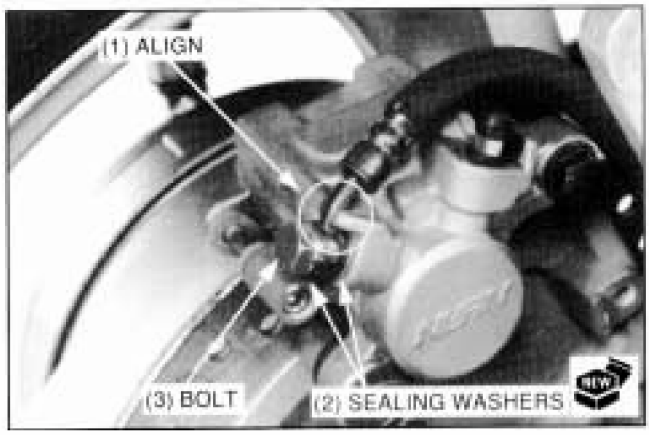
Install and tighten the brake hose oil bolt to the specified torque.

Torque: 29 N·m (3.0 kgf-m, 22 lbf-ft)

NOTE:

- While tightening the brake hose oil bolt, aligning the brake hose end with the stopper.

Refill the brake fluid and bleed the rear hydraulic system (page 16-5).

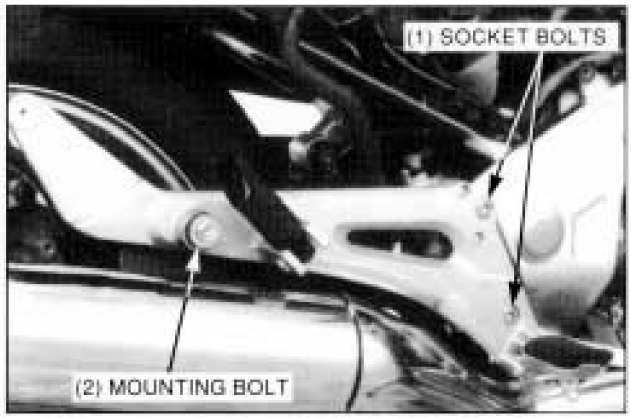


Brake Pedal

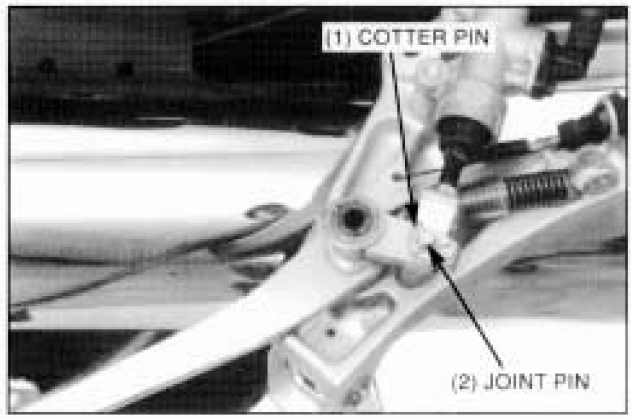
REMOVAL

Remove the right saddle bag (page 2-8).

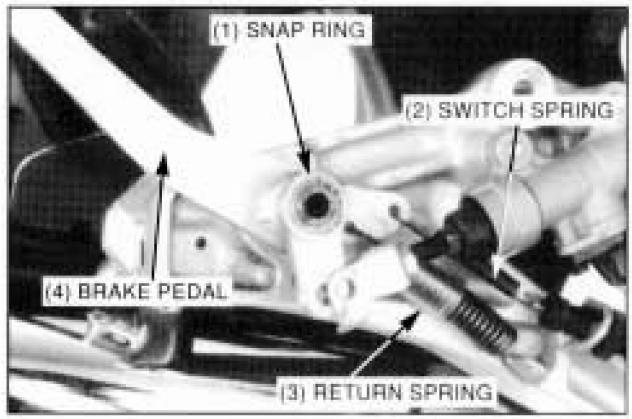
Remove the muffler mounting bolt.
Remove the socket bolts and right footpeg bracket.



Remove and discard the brake pedal joint cotter pin.
Remove the joint pin and disconnect the master cylinder joint.

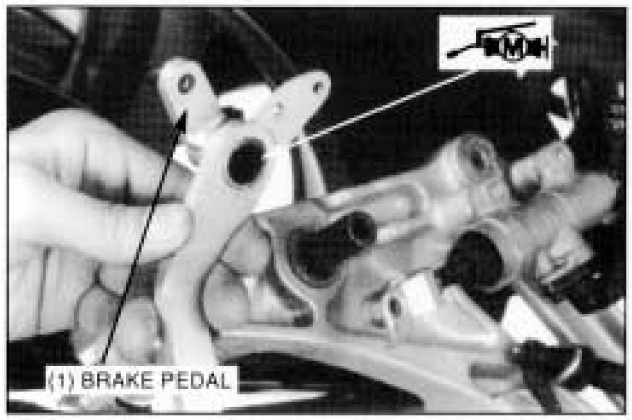


Unhook the brake pedal return spring and brake light switch return spring.
Remove the snap ring and brake pedal from the right footpeg bracket.

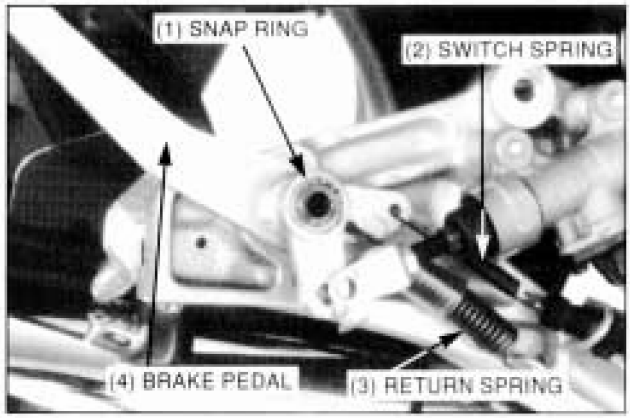


INSTALLATION

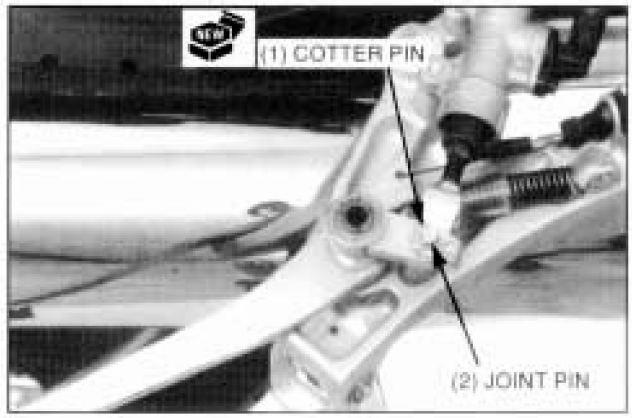
Apply molybdenum disulfide grease to the brake pedal pivot.



Install the brake pedal and snap ring to the right footpeg bracket.
Hook the brake light switch return spring and brake pedal return spring.



Connect the master cylinder joint with the joint pin and new cotter pin.

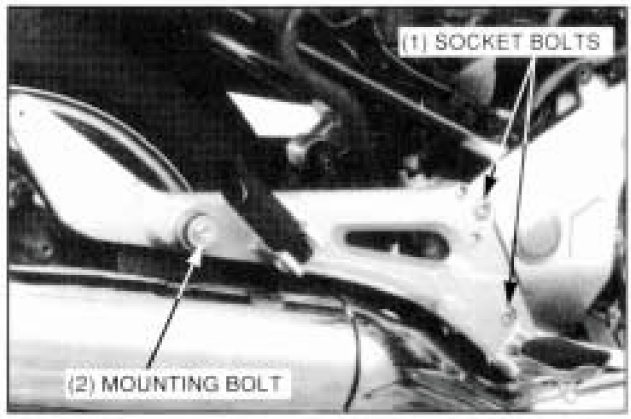


Install the right footpeg bracket to the frame.
Install and tighten the socket bolts to the specified torque.

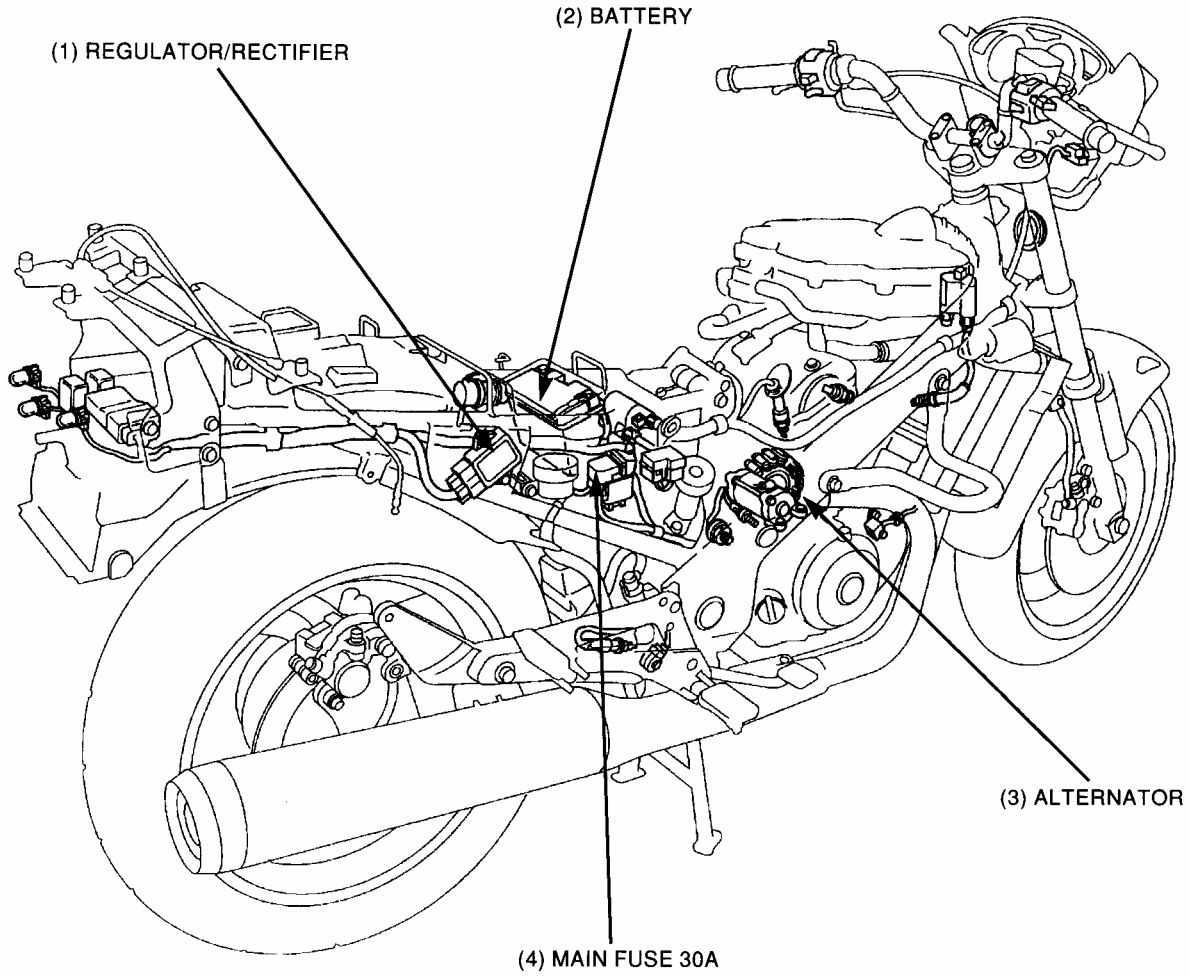
Torque: 26 N·m (2.7 kgf-m, 20 lbf-ft)

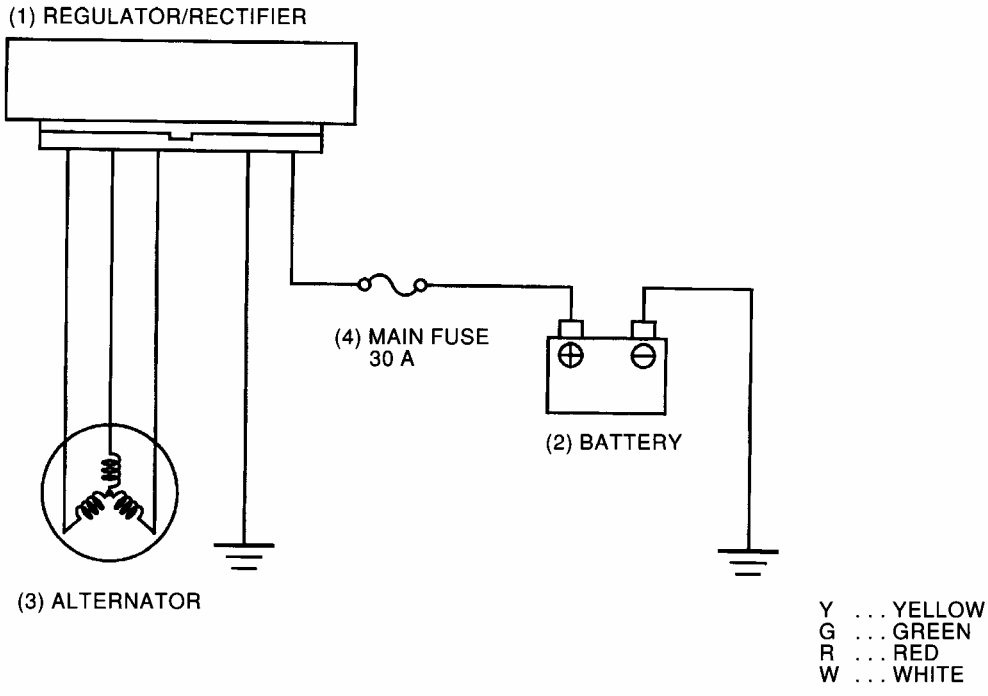
Install and tighten the muffler mount bolt.

Install the right side cover (page 2-9).



System Diagram





17. Battery/Charging System

SYSTEM DIAGRAM	17-0	BATTERY	17-5
SERVICE INFORMATION	17-1	CHARGING SYSTEM INSPECTION	17-7
TROUBLESHOOTING	17-3	REGULATOR/RECTIFIER	17-9

Service Information

GENERAL

⚠ WARNING

- **The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.**
- **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 on 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.**

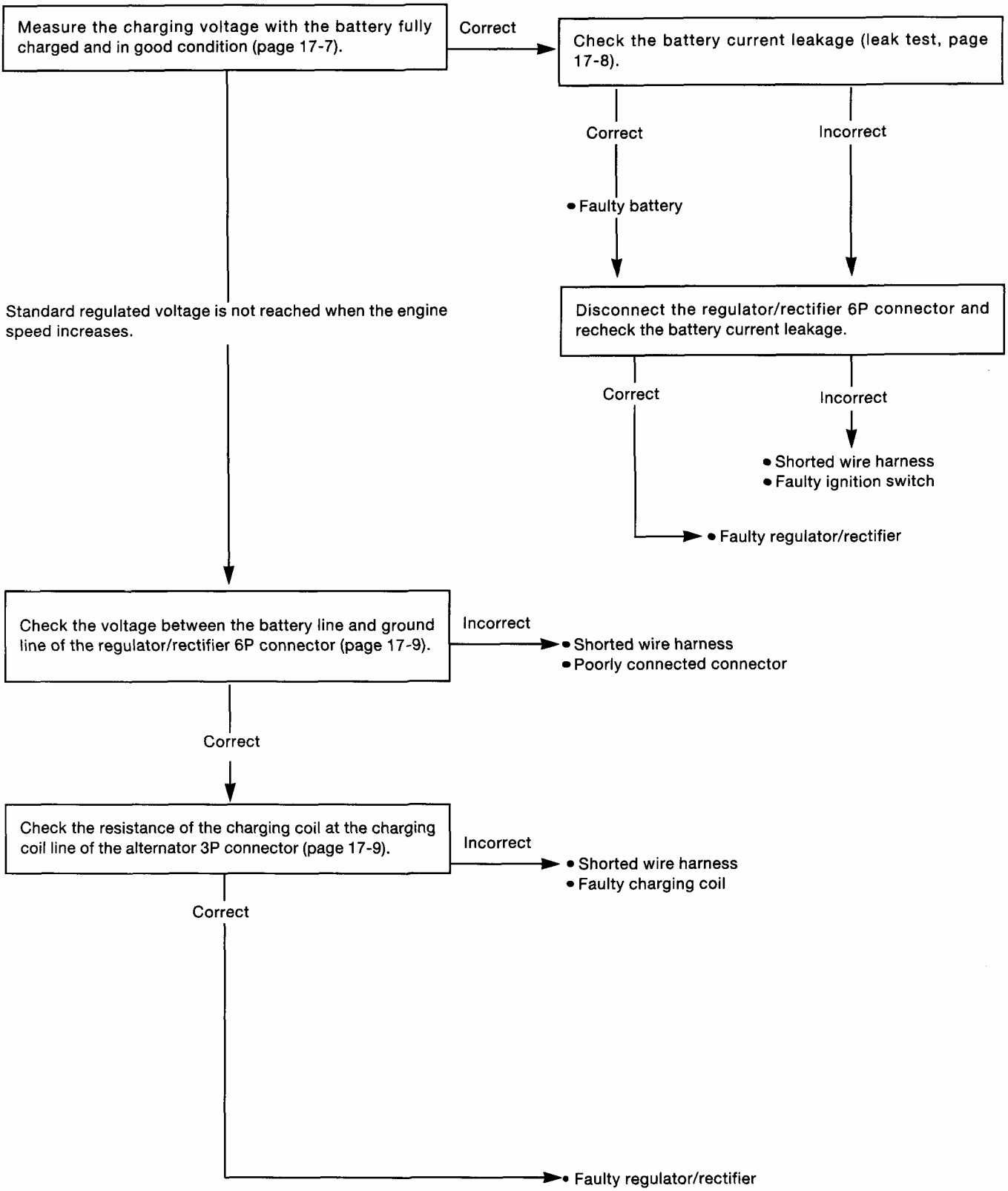
- For extended storage, remove the battery, give it a full charge and store it in a cool, dry place. For maximum service life, charge the stored battery every two weeks.
- For battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The battery can 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 a heavy load, battery voltage will drop quickly and eventually the battery will be completely discharged. For this reason, the charging system is often suspected to be the problem. Battery overcharge often results in problems in the battery itself, which may appear to be an overcharge symptom. If one of the battery cells is shorted and the battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level drops quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under a 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 use. For this reason, charge the battery every two weeks to prevent sulfation from forming.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve maximum performance, always charge the battery. Also, the battery life is lengthened when it is initial-charged.
- When checking the charge system, always follow the steps in the troubleshooting flow chart (page 17-3).
- Alternator servicing may be done with the engine in the frame.

SPECIFICATIONS

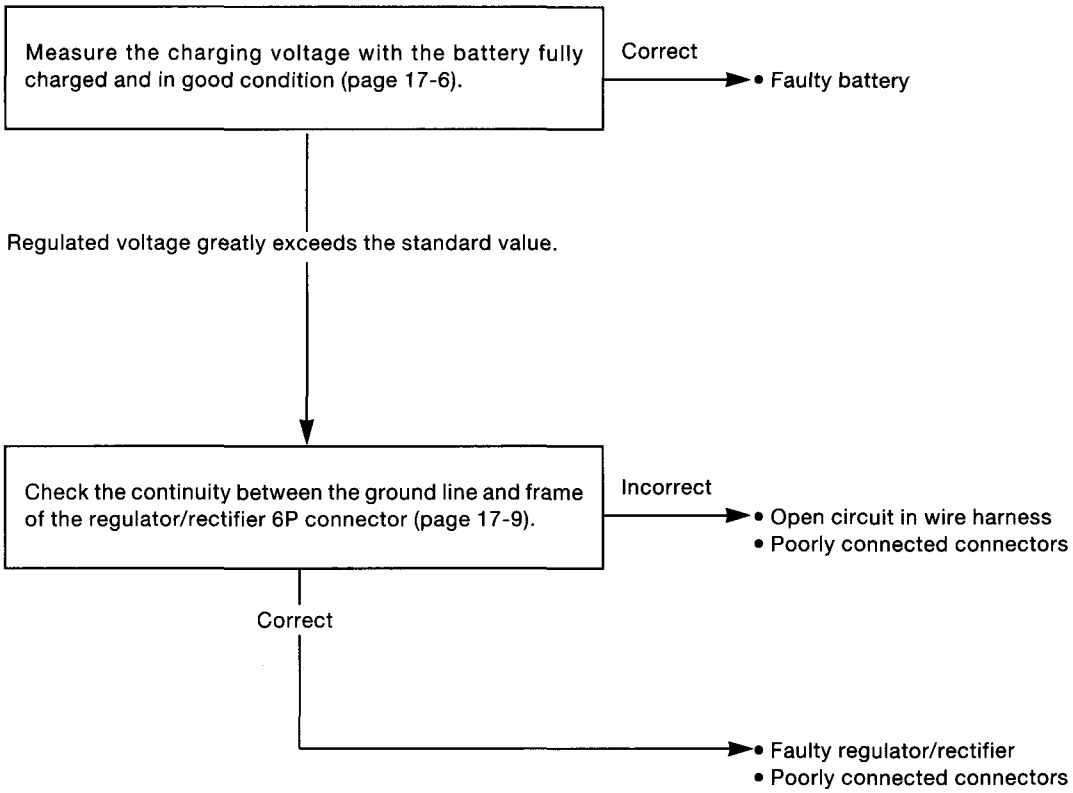
Item			Specifications
Battery	Capacity		12 V - 8 Ah
	Current leakage		1.0 mA max.
	Voltaje (20° C / 68° F)	Fully charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A / 5-10 h
		Quick	4.0 A / 1 h max
Alternator	Capacity		308 W/ 5,000 min^{-1} (rpm)
	Charging coil resistance (20° C / 68° F)		0.1 - 1.0 Ω
Regulator/rectifier regulated voltage			14 - 15 V/ 5,000 min^{-1} (rpm)

Troubleshooting

Battery undercharging (voltage not raised to regulated voltage).



Battery overcharging (regulated voltage too high).



Battery

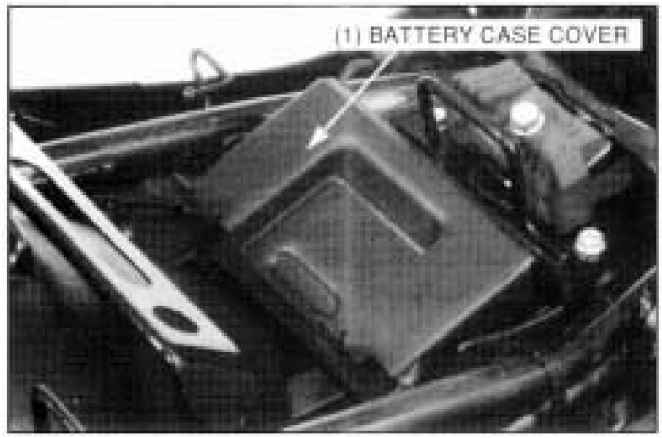
REMOVAL

NOTE:

- Always turn the ignition switch OFF before removing or installing the battery.

Remove the seat (page 2-2).

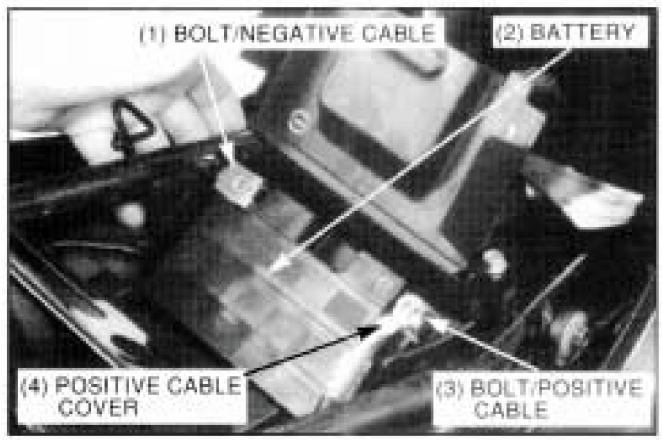
Open the battery case cover.



NOTE:

- Disconnect the battery negative cable first, then positive cable from the battery.

Remove the bolt and battery negative cable.
Remove the positive cable cover.
Remove the bolt and battery positive cable.
Pull the battery out of the battery case.

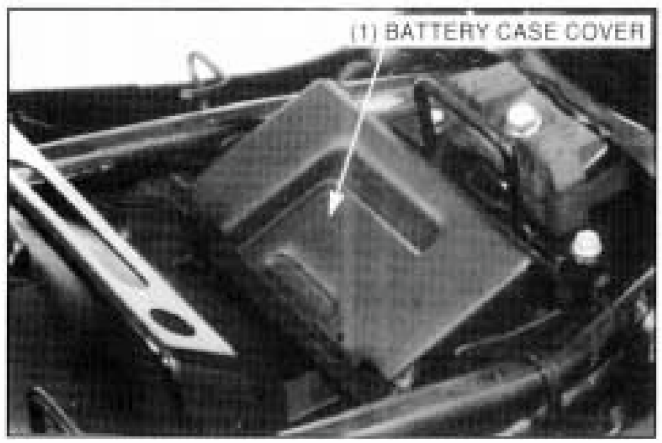


INSTALLATION

Place the battery into the case and connect the battery positive cable to the battery first from the right side, then connect the negative cable from the left side.
Coat the battery terminal with clean grease.

Close the battery case cover.

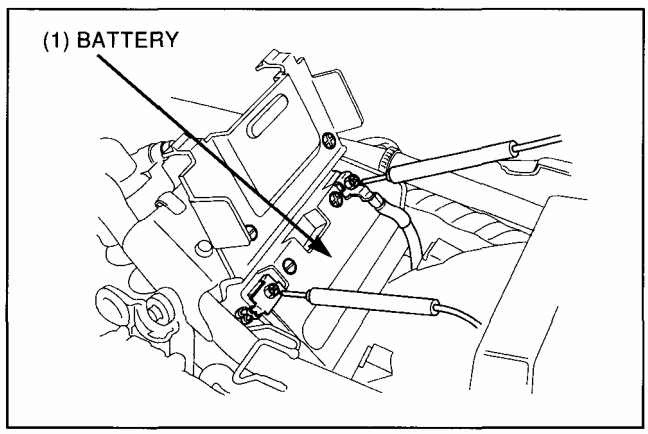
Install the seat (page 2-2).



INSPECTION

Measure the battery voltage using a commercially available digital multimeter

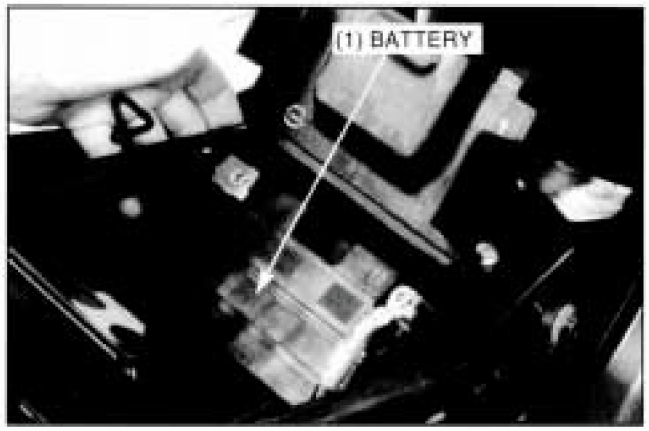
Voltage: **Fully charged:** **13.0 - 13.2 V**
Under charged: **Below 12.3 V**



BATTERY CHARGING

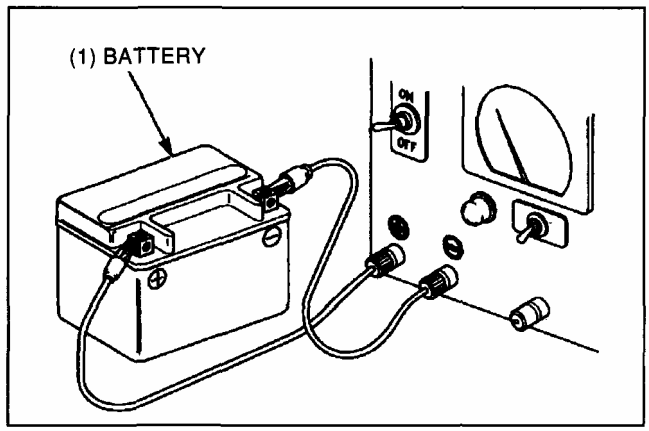
⚠ WARNING

- **The battery gives off explosive gases; keep sparks, flames, and cigarettes away. Provide adequate ventilation when charging.**
- **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 on your eyes, flush with water for at least 15 minutes and call a physician.**
- **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.**
- **Turn power ON/OFF at the charger, not at the battery terminals.**



Remove the battery (page 17-5).

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 A/5-10 h
Quick: 4.0 A/1 h max.

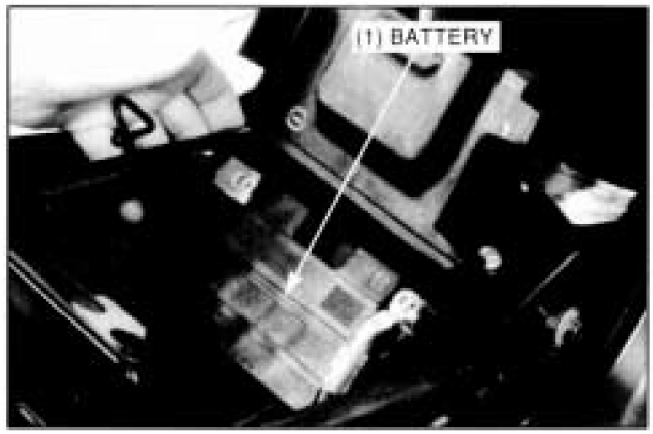
CAUTION

- **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

NOTE:

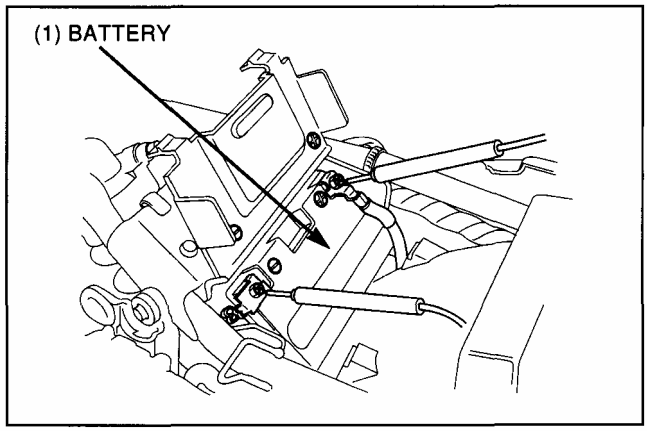
- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the high capacity range first, then gradually down to low capacity ranges in order to ensure that you have the correct range and do not damage the tester.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.



REGULATED VOLTAGE INSPECTION

⚠ WARNING

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



Remove the battery (page 17-5) and install the fully charged battery.
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 a 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 to Lo beam, restart the engine.
Measure the voltage on the multimeter when the engine runs at min^{-1} (rpm).

Regulated Voltage: 14 - 15 V/ 5,000 min^{-1} (rpm)

The battery is normal if the voltage reads the regulated voltage on the tester.

NOTE:

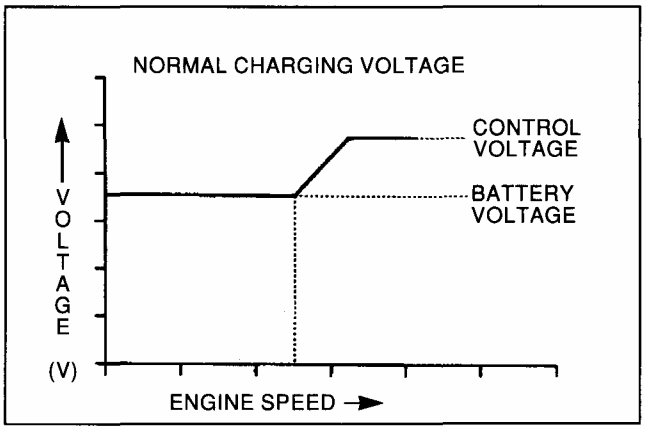
- The speed at which voltage starts to rise cannot be checked as it varies with the temperature and loads of the generator.

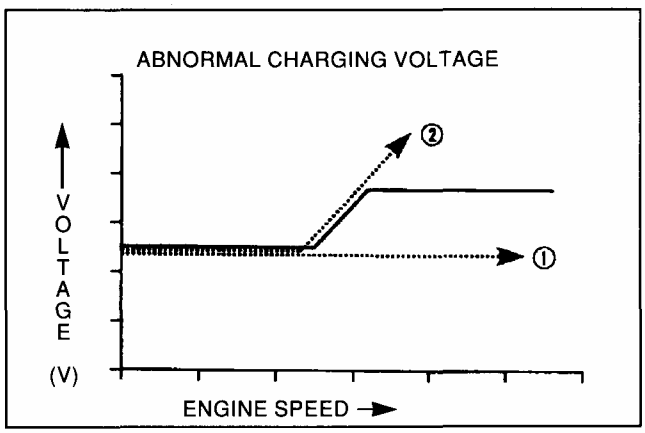
A frequently discharged battery is an indication that it is deteriorated even if it proves normal in the regulated voltage inspection.

The charging circuit may be abnormal if any of the following symptoms is encountered:

① **Voltage not raised to regulated voltage (page 17-3).**
- Open or shorted circuit in the charging system wire harness or poorly connected connector.
- Open or shorted of the alternator.
- Faulty regulator/rectifier.

② **Regulated voltage too high (page 17-4).**
- Poorly grounded voltage regulator/rectifier.
- Faulty battery.
- Faulty regulator/rectifier.

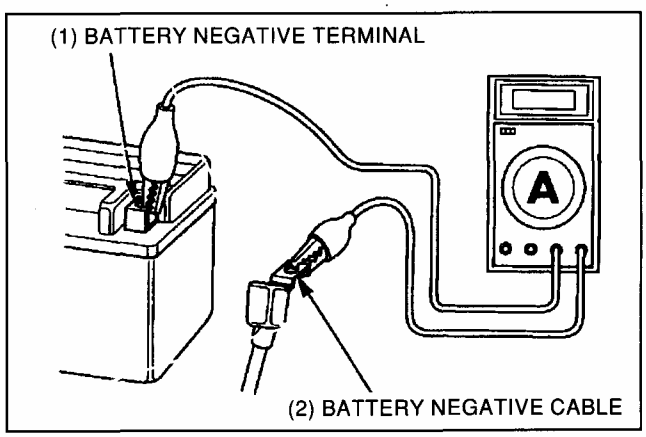




CURRENT LEAKAGE TEST

Remove the battery cover (page 17-5).

Turn the ignition switch OFF, and disconnect the ground (-) cable from the battery.
Connect the ammeter (+) probe to the battery ground 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 appropiate 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.

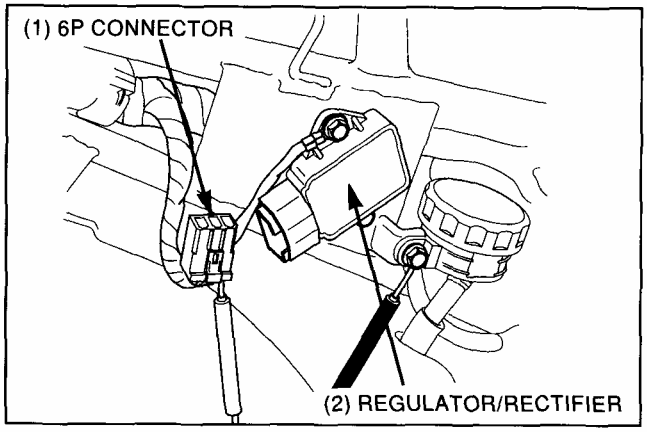
If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

Regulator/Rectifier

WIRE HARNESS INSPECTION

Remove the right saddle bag (page 2-8).

Disconnect the regulator/rectifier 6P connector.
Check the connectors for loose or corroded terminals.



BATTERY LINE
Make sure the battery voltage between Red/White (+) and Green (-).
If there are no voltage, measure the following:

Item	Terminals	Specification
Battery charging line	Red/White (+) and ground (-)	Battery voltage should register
Ground line	Green and ground	Continuity exists

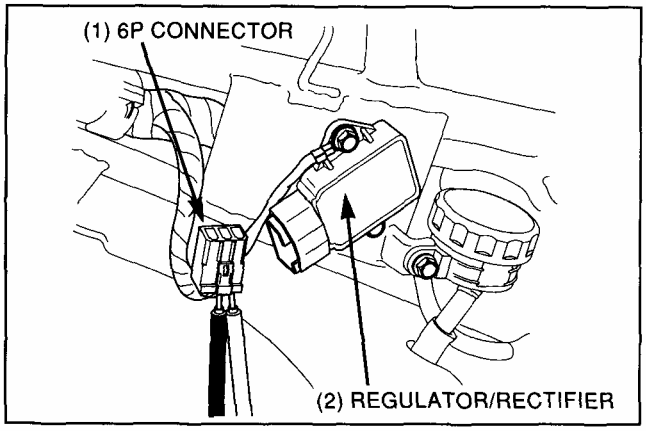
CHARGING LINE

NOTE:

- It is not necessary to remove the stator coil to complete this test.

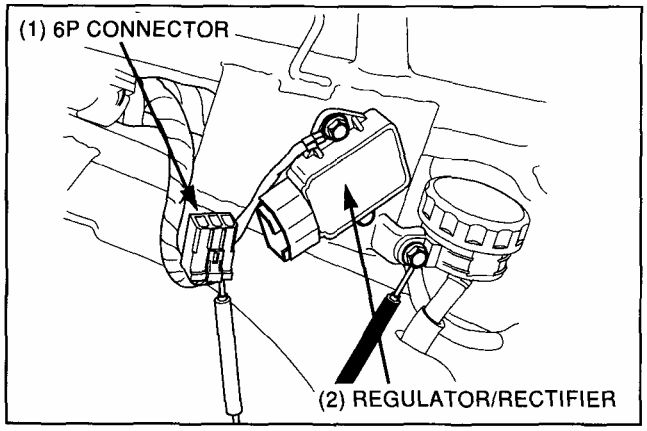
Measure the resistance between the connector terminals and ground.

Connection: **Yelow and Yelow**
Standard: **0.1 - 1.0 Ω**



If the charging coil reading is out of specification, replace the stator (page 9-2).

Check for continuity between the connector terminals and ground.
There should be no continuity.



If there is continuity between the connector and ground, replace the stator (page 9-2).

REMOVAL/INSTALLATION

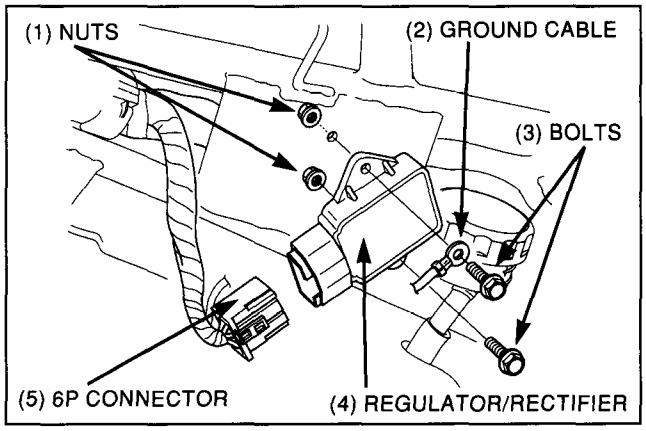
Remove the right saddle bag (page 2-8).

Disconnect the regulator/rectifier 6P connector.
Remove the nuts, bolts and ground cable.
Remove the regulator/rectifier unit.

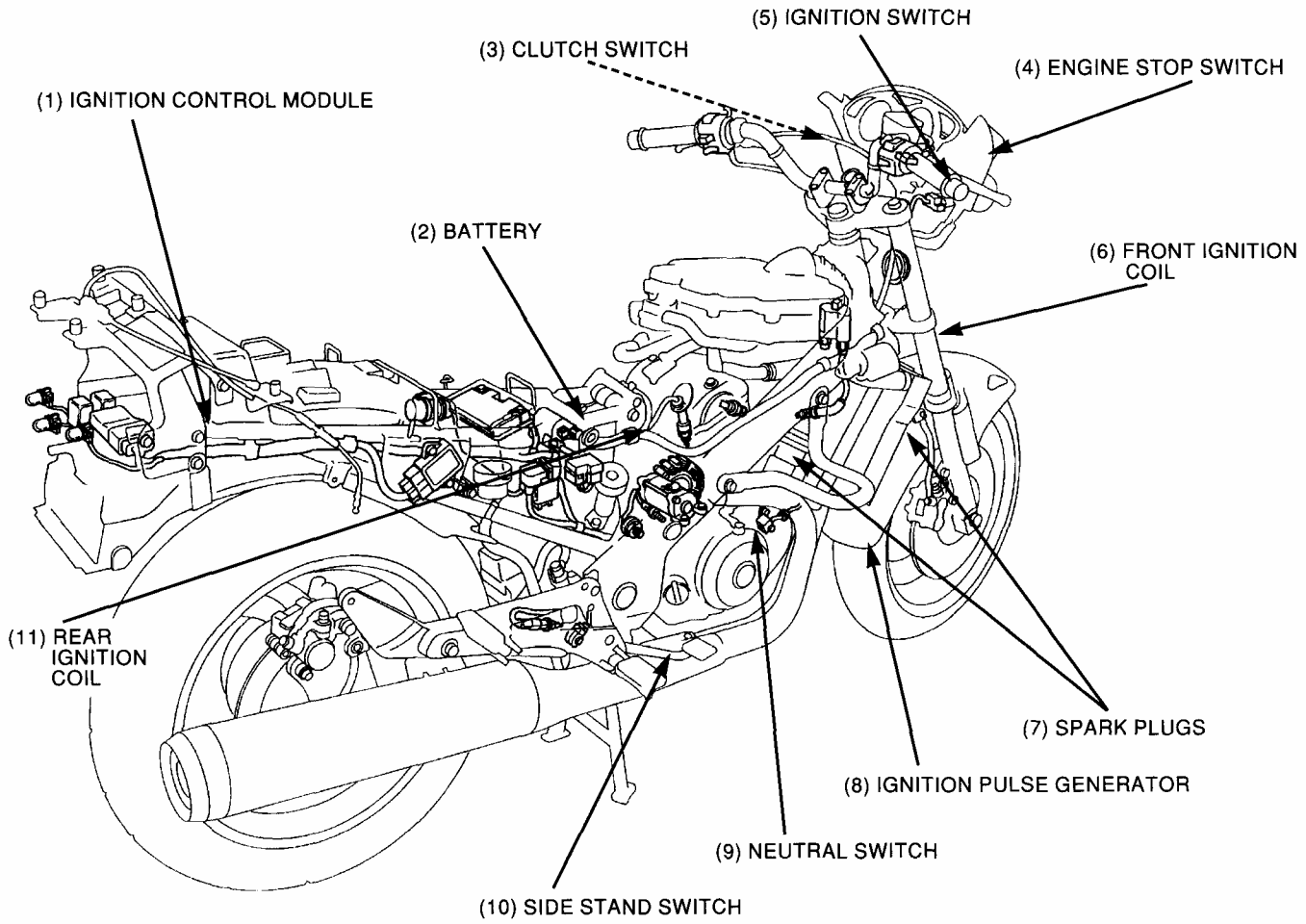
Installation is in the reverse order of removal.

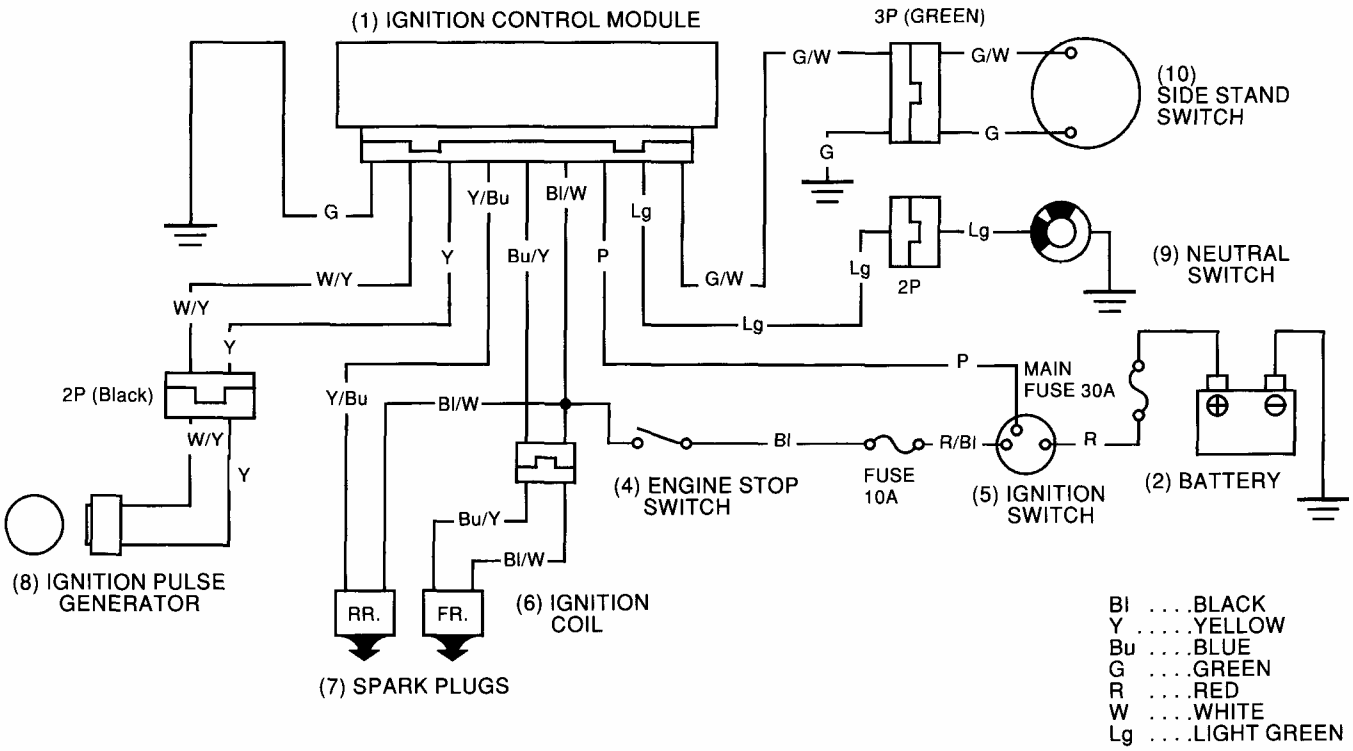
NOTE:

- Route the wire harness properly (page 1-27).



System Diagram





18. Ignition System

SYSTEM DIAGRAM	18-0	IGNITION CONTROL MODULE (ICM)	18-7
SERVICE INFORMATION	18-1	IGNITION COIL	18-7
TROUBLESHOOTING	18-3	IGNITION TIMING	18-8
IGNITION SYSTEM INSPECTION	18-4		

Service Information

GENERAL

⚠ WARNING

- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of the consciousness and may 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 checking the ignition system, always follow the steps in the troubleshooting (page 18-3).
- Ignition timing cannot be adjusted since the Ignition Control Module (ICM) is non-adjustable. If ignition timing is incorect, check the system components and replace any faulty parts.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the resulting excessive voltage may damage the unit. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poorly connected or corroded connectors. 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.
- Use spark plugs of the correct heat range. Using a spark plug of an incorrect heat range can damage the engine.
- For neutral switch and side stand switch inspection and removal/installation see section 20.
- For engine stop switch and ignition switch inspection and removal/installation see section 14, 20.

SPECIFICATIONS

Item		Specifications	
Spark plug		NGK	DENSO
	Standard	DPR8EA-9	X24EPR-U9
	For cold climate (below 5° C/41° F)	DPR7EA-9	X22EPR-U9
	For extend high speed riding	DPR9EA-9	X27EPR-U9
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 timig "F" mark		9.5° BTDC	
Advance	Start	10° / 1,500 min^{-1} (rpm)	
	Stop	29° / 9,000 min^{-1} (rpm)	
Full advance		29°	

TORQUE VALUES

Timing hole cap	10 N·m (1.0 kgf-m, 7 lbf-ft) Apply grease to the threads.

TOOLS

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

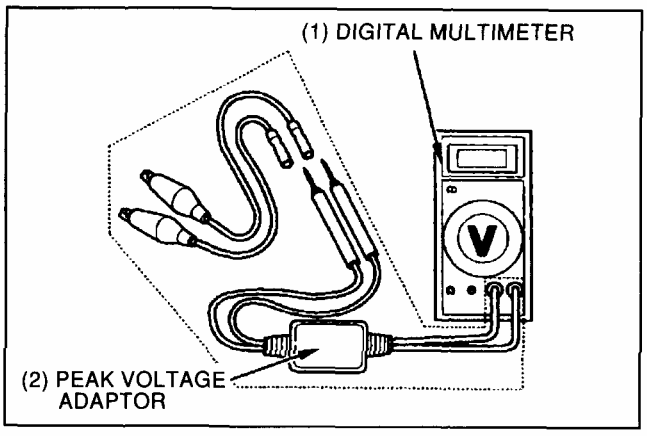
Troubleshooting

- Inspect the following before diagnosing the system.
  - Faulty spark plug.
  - Loose spark plug cap or spark plug wire connections.
  - Water got into the spark plug cap (Leaking to the ignition coil secondary voltage).
- If there is no spark at either cylinders, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is a spark, the exchanged 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 (The engine is not cranked by the starter motor).

No spark at all plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches ON. (Other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/White wire between the ignition coil and engine stop switch. 3. Loose primary terminal or an open circuit in primary coil. 4. Faulty ICM (in case when the initial voltage is normal while disconnecting ICM connectors.
	Initial voltage is normal, but it drops down to 2-4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/White (+) and Body ground (-) at the ICM connector or loose ICM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Yellow/Blue and Blue/Yellow wires between the ignition coils and ICM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No. 7 related circuit wires. • Side stand switch line: Green/White wire. • Neutral switch line: Light green/Red wire. 9. Faulty ignition pulse generator (measure the peak voltage). 10. Faulty ICM (in case when above No.1 - 9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Faulty peak voltage adapter connections. 2. Faulty peak voltage adapter. 3. Faulty ICM (in case when above No. 1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery 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 (in case, when above No. 1 - 3 are normal).
	Initial and voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
Ignition pulse generator	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ /DCV. 2. Cranking speed in too low (battery 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 (in case when above No. 1 - 3 are normal).
	No peak voltage.	1. Faulty peak voltage adapter. 2. Faulty ignition pulse generator.

Ignition System Inspection



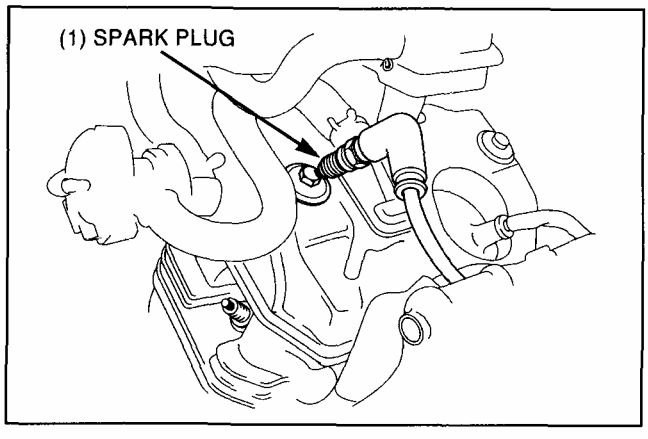
NOTE:

- If there is no spark at either plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use the recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using an Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adapter to the digital multimeter, or use the Imrie diagnostic tester.

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

IGNITION PRIMARY VOLTAGE INSPECTION



NOTE:

- Check all system connection before the inspection. If the system is disconnected, an incorrect peak voltage will register.
- Check cylinder compression at each cylinder and check that the spark plugs are installed correctly in each cylinder.

Support the motorcycle using the side stand.

Disconnect the spark plug caps from the spark plugs on the cylinder head.

Connect a good known spark plug to each spark plug cap and ground the spark plugs to the cylinder as done in a spark test.

When servicing the front ignition coil as following:
- Remove the fuel tank (page 2-11).

When servicing the rear ignition coil as following:
- Remove the left side cover (page 2-4).

Connect the peak voltage adaptor or Imrie tester to the ignition coil primary terminal.

NOTE:

- Do not disconnect the ignition coil primary wires.

Tools:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ - 0020100 with
Commercially available digital multimeter (impedance 10 M Ω /DCV minimum)

Connections:
Front ignition coil:
Blue/Yellow (+) — Body Ground (-)
Rear ignition coil:
Yellow/Blue (+) — Body Ground (-)

⚠ WARNING

- **Avoid touching the spark plugs and tester probes to prevent electric shock.**

Turn the ignition switch "ON" and engine stop switch to "RUN".

Check for initial battery voltage.

If battery voltage is not present, follow the checks described in the troubleshooting on page 18-3.

Shift the transmission into neutral.

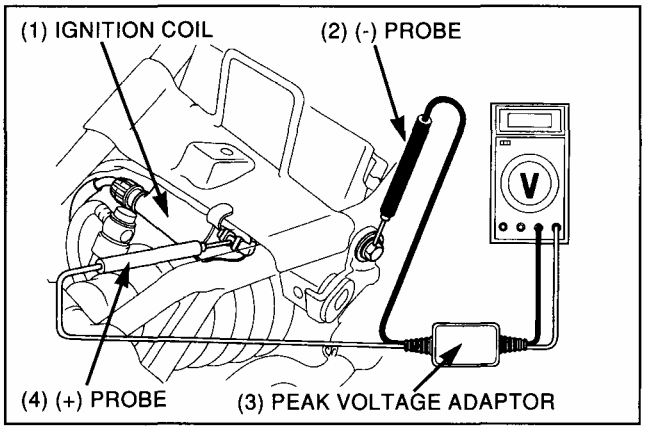
Crank the engine with the starter motor and read each ignition coil primary peak voltage.

Peak Voltage: 100 V minimum

NOTE:

- Although measured values are different for each ignition coil, they are normal as long as the voltage is higher than the standard value.

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting on page 18-3.



IGNITION PULSE GENERATOR PEAK VOLTAGE INSPECTION

NOTE:

- Check all system connection before the inspection. If the system is disconnected, an incorrect peak voltage will register.
- Check cylinder compression at each cylinder and check that spark plugs are installed correctly in each cylinder.

Remove the ignition control module (ICM) (page 18-7).

Disconnect the ignition control module (ICM) 16P connector.
Connect the peak voltage adaptor to the 16P connector wire harness side.

Tools:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ - 0020100 with
Commercially available digital multimeter (impedance 10 M Ω /DCV minimum)

Connection: White/Yellow (+) — Yelow (-)

Turn the ignition switch "ON" and engine stop switch to "RUN".
Shift the transmission into neutral.
Crank the engine with the starter motor and read the ignition pulse generator peak voltage.

Peak Voltage: 0.7 V minimum

If the peak voltage is lower than standard value, perform the following procedure.

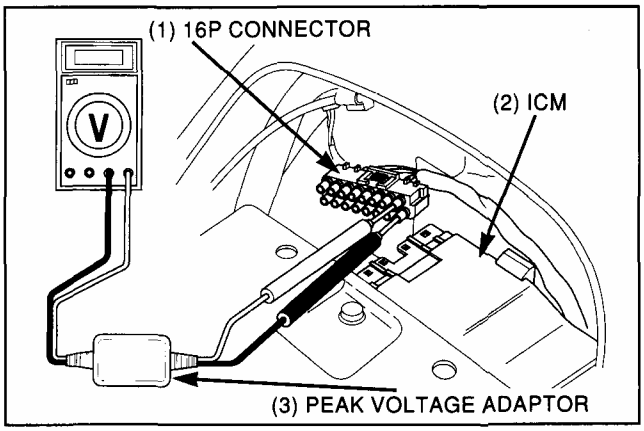
Remove the right middle fairing (page 2-3).

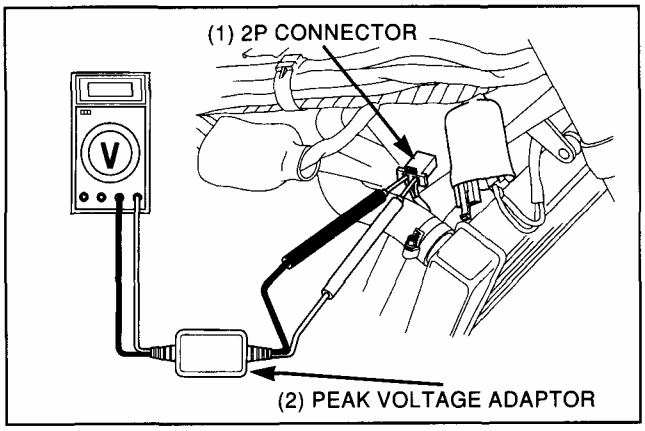
Disconnect the ignition pulse generator 2P (White) connector.
Turn the ignition switch "ON" and engine stop switch to "RUN".
Shift the transmission into neutral.
Crank the engine with the starter motor and measure the peak voltage at the 2P (White) connector ignition pulse generator side and record it.

Connection: White/Yellow (+) — Yelow (-)

Peak Voltage: 0.7 V minimum

Compare their values at the ignition control module (ICM) 16P connector and the ignition pulse generator 2P connector.





If the value at the ignition pulse generator is normal, but abnormal at the ignition control module (ICM):
- Open circuit in the ignition pulse generator wires.
- Loosen connection in the ignition pulse generator connector.

If both values are abnormal:
- The ignition pulse generator is likely to be faulty. Check and perform troubleshooting on page 18-3.
- For ignition pulse generator replacement, refer to section 8.

Ignition Control Module (ICM)

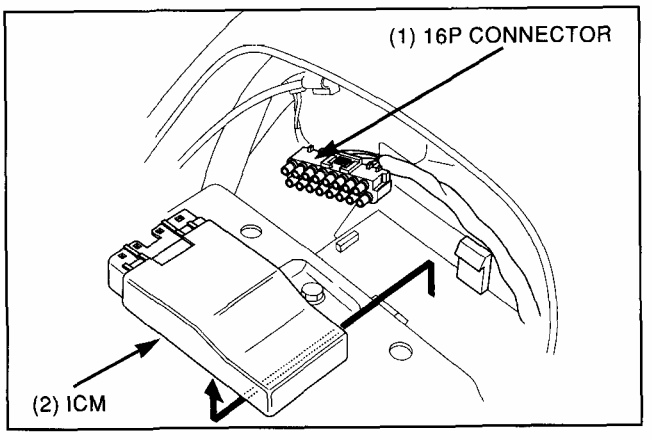
REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Remove the ignition control module (ICM) from the bracket on the rear fender.

Disconnect the 16P connector.

Installation is in the reverse order of removal.



Ignition Coil

REMOVAL/INSTALLATION

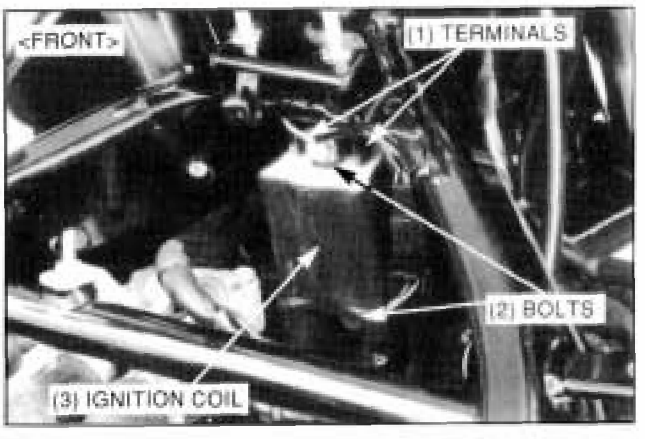
Remove the fuel tank (page 2-11).

Disconnect the spark plug caps from the spark plugs.

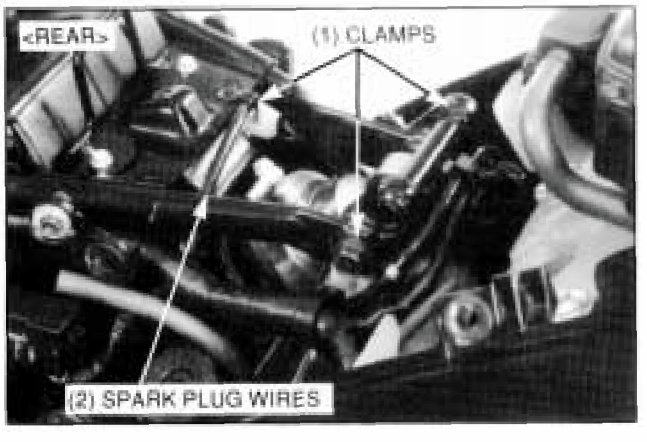
FRONT
Remove the air cleaner housing (page 5-4).

Disconnect the front ignition coil primary wires from the terminals.
Remove the bolts and ignition coils.

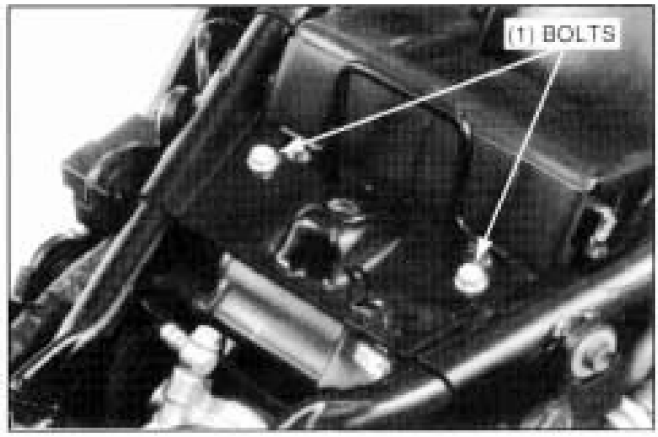
Installation is in the reverse order of removal.



REAR
Remove the spark plug wires from the wire clamps.



Remove the bolts.

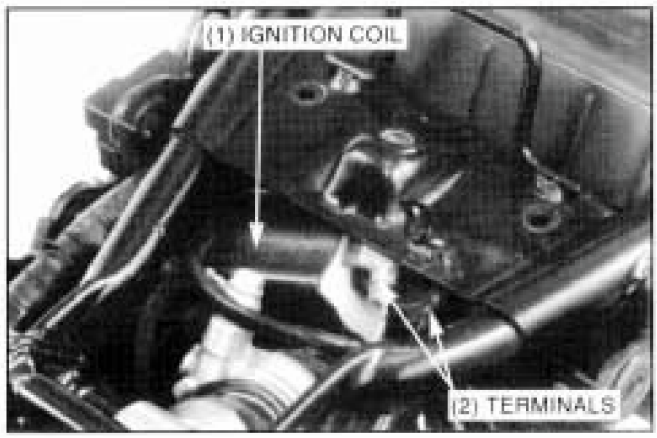


Disconnect the rear ignition coil primary wires from the terminals.

NOTE:

- Route the spark plug wires properly (section 1).
- Connect the primary wires to the original position.

Front:
Black terminal: Black/White wire
Green terminal: Blue/Yelow wire
Rear:
Black terminal: Black/White wire
Green terminal: Yelow/Blue wire



Ignition Timing

⚠ WARNING

- **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. The exhaust contains poisonous carbon monoxide gas that may cause loss of the consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.**

NOTE:

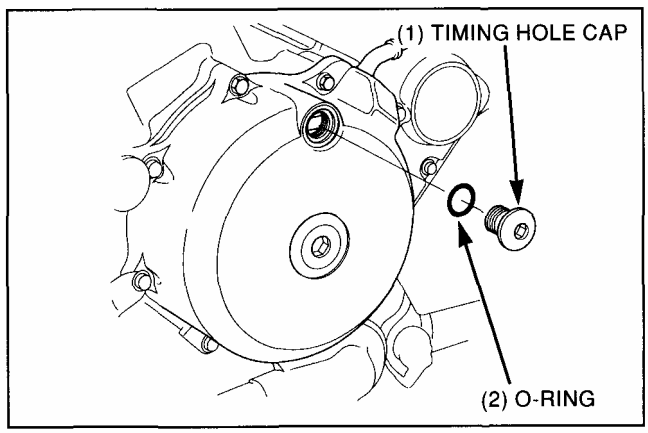
- Read the manufacturer's instructions for the timing light before operating.

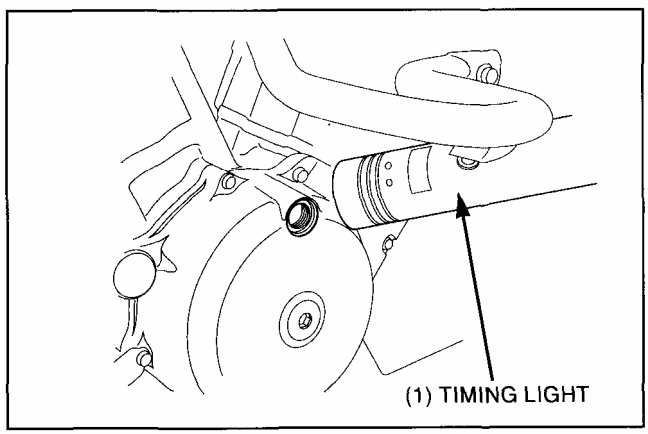
Warm up the engine.
Stop the engine.

Remove the timing hole cap.

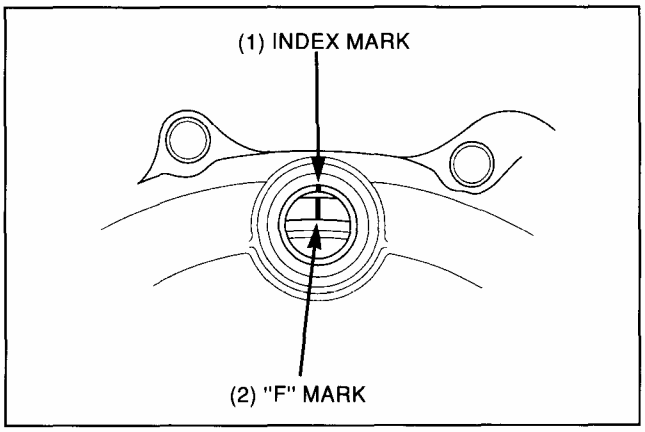
Connect a timing light to the rear (No.1) cylinder spark plug wire.
Start the engine and let it idle.

Idle Speed: Except SW type: 1,200 ± 100 min^{-1} (rpm)
SW type: 1,200 ± 50 min^{-1} (rpm)



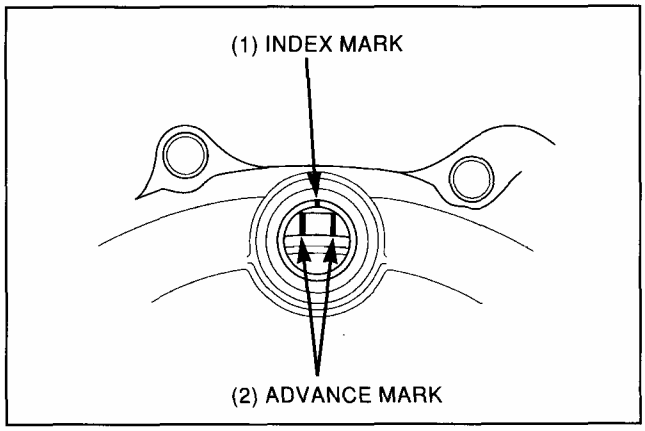


The timing is correct if the "F" mark on the flywheel aligns with the index mark on the left crankcase cover.



Increase the engine speed by rotating the throttle stop control knob.
The timing is correct if the advance marks on the flywheel aligns with the index mark on the left crankcase cover.

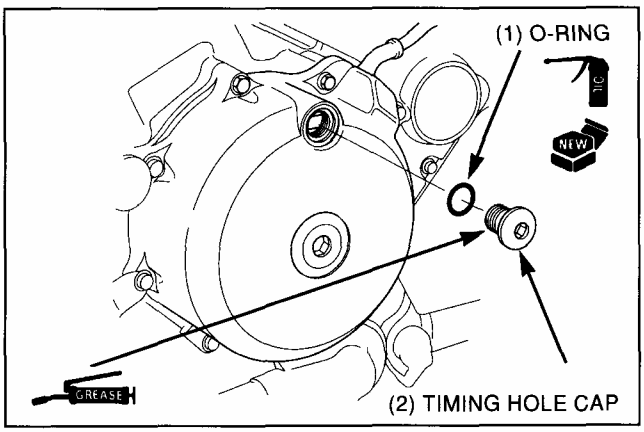
Stop the engine and connect the timing light to the front (No.2) cylinder spark plug wire.



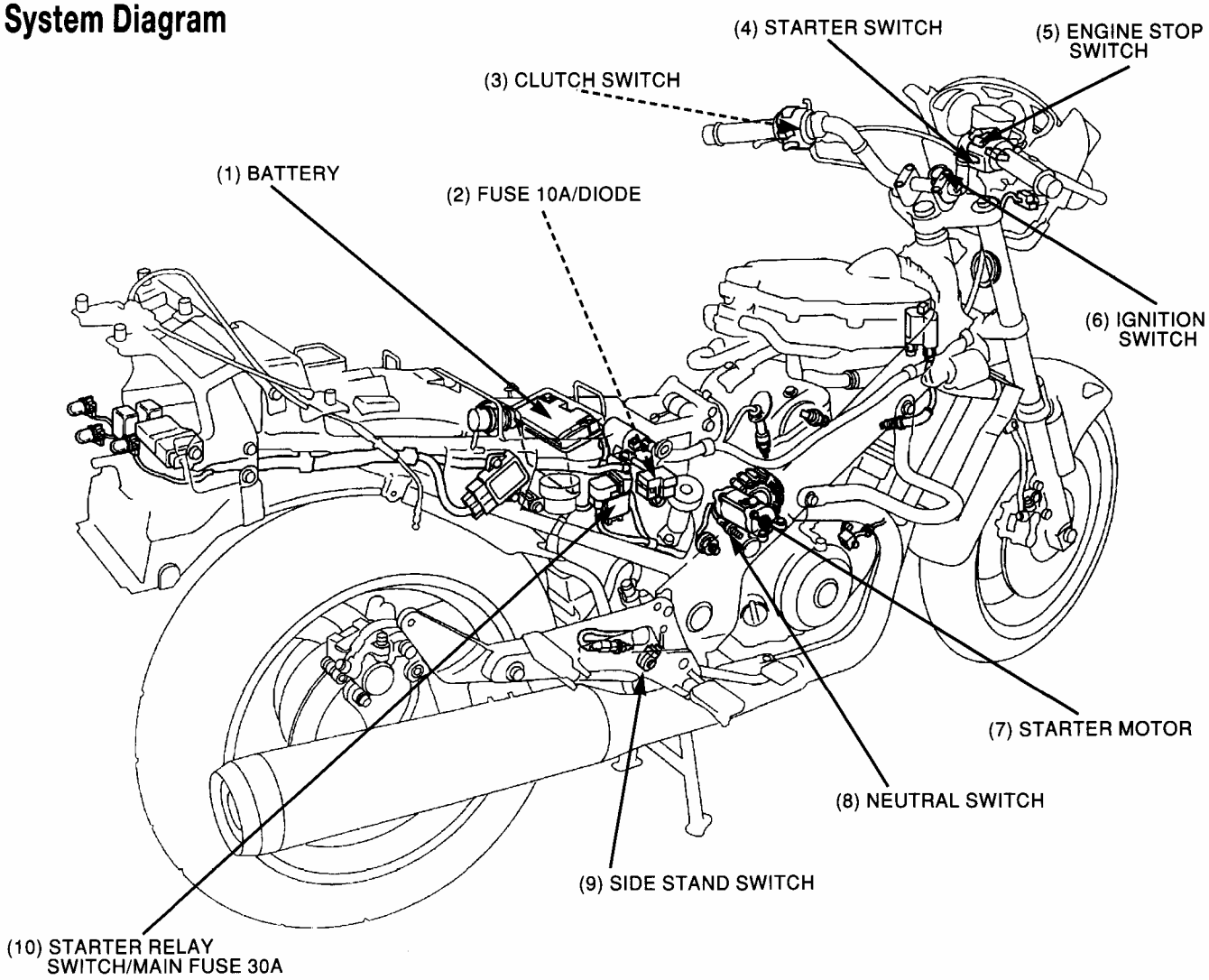
Recheck the ignition timing at the front cylinder.
Coat the new O-ring with engine oil and install it in the timing hole cap groove.
Apply grease to the timing hole cap threads and flange surface.

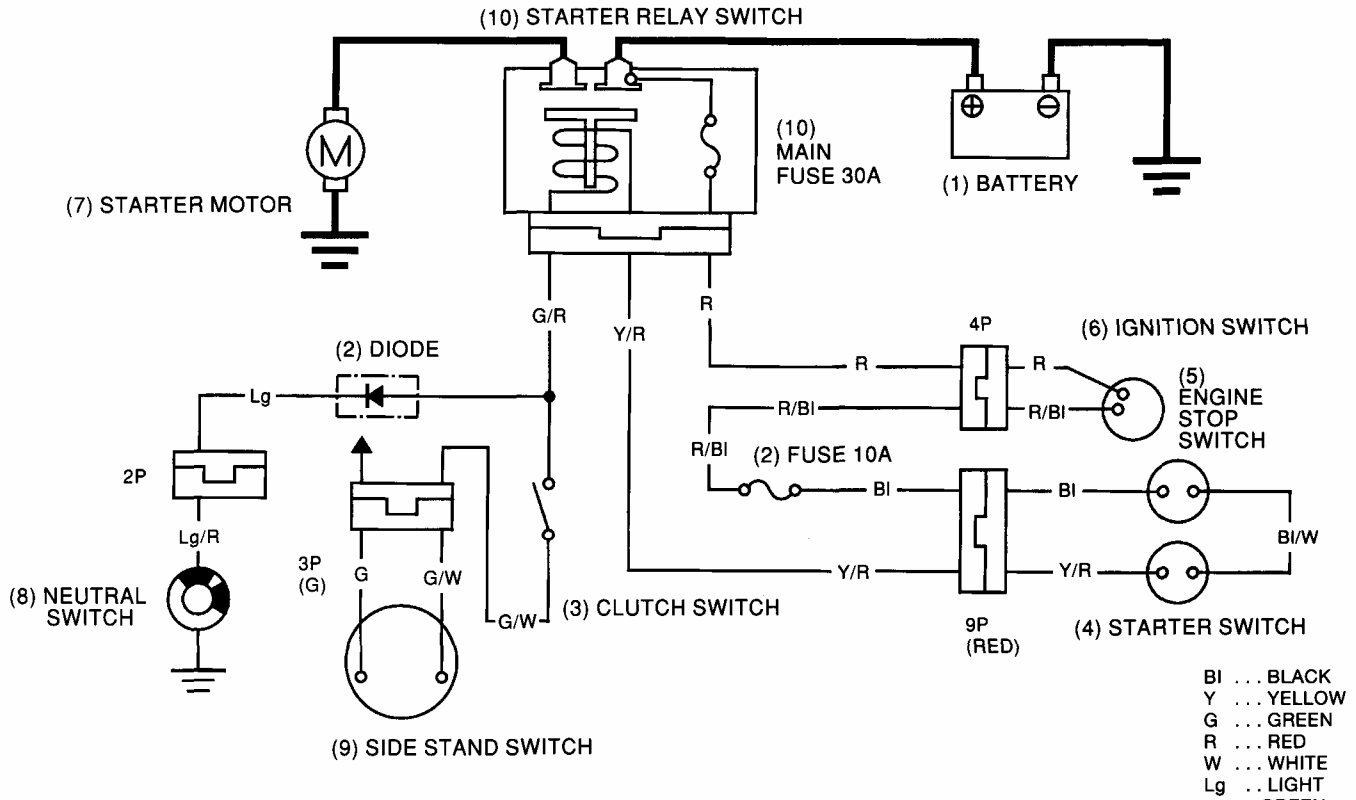
Install and tighten the timing hole cap to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)



System Diagram





19. Electric Starter

SYSTEM DIAGRAM	19-0	STARTER MOTOR	19-4
SERVICE INFORMATION	19-1	STARTER RELAY SWITCH	19-13
TROUBLESHOOTING	19-2	CLUTCH DIODE	19-14

Service Information

GENERAL

⚠ WARNING

- **Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.**

- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current continues to flow kept flowing through the starter motor while the engine is not cranking over, the starter motor may be damaged.
- Always turn of the ignition switch before disconnecting any electrical components.
- For following components inspections, refer to the following pages; for the parts locations, see page 19-0 of this manual.
  - Side stand switch (Section 20)
  - Neutral switch (Section 20)
  - Ignition switch (Section 20)
  - Starter switch (Section 20)
  - Clutch switch (Section 20)

SPECIFICATION

Unit: mm (in)

Item	Standard	Service Limit
Starter motor brush lenght	12.5 (0.49)	6.5 (0.26)

TORQUE VALUES

Starter motor cable nut	10 N·m (1.0 kgf-m, 7 lbf-ft)
Starter motor cable socket bolt	5 N·m (0.5 kgf-m, 3.6 lbf-ft)

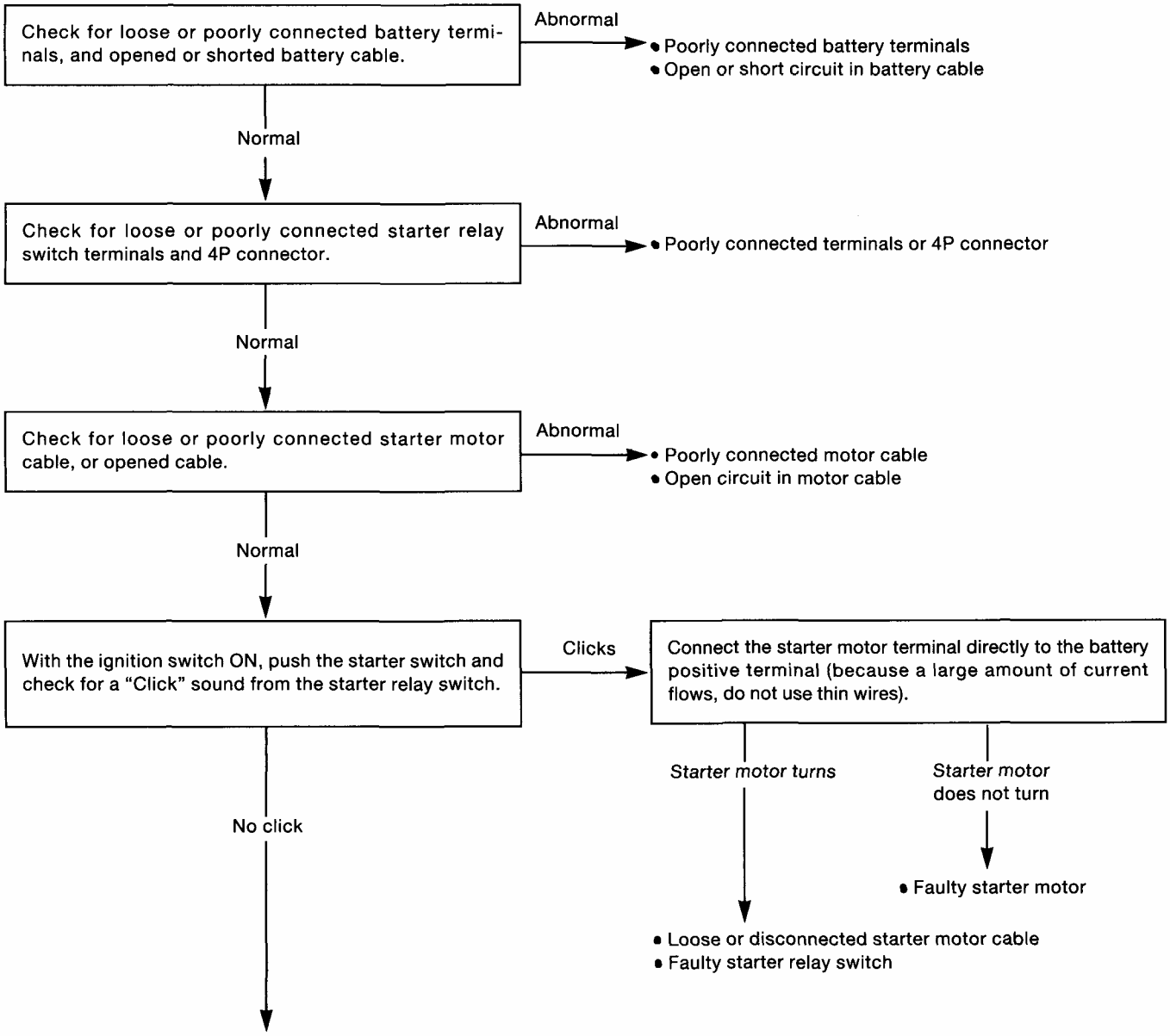
19

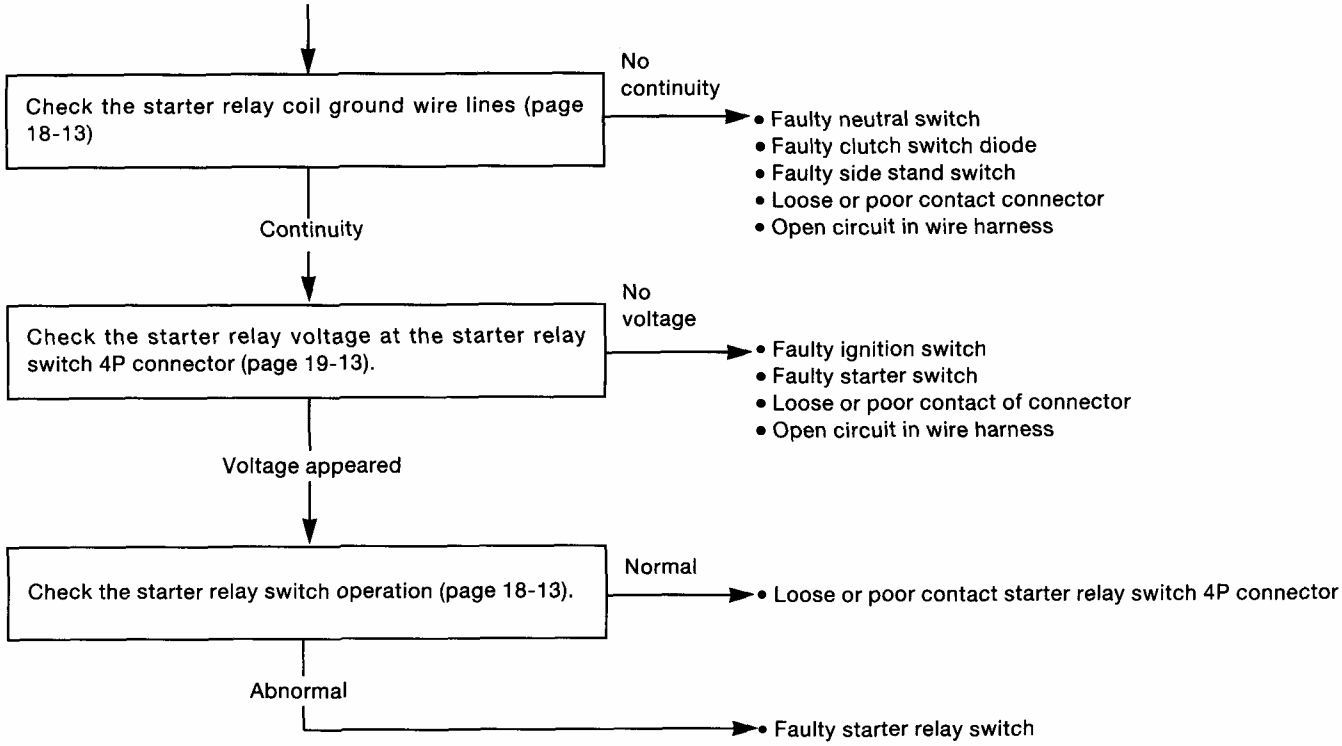
Troubleshooting

- Check for the following before troubleshooting the system.
  - Blown main fuse (30 A) or sub-fuse (10 A, 15 A).
  - Loose battery and starter motor cable.
  - Discharged battery.
- The starter motor should turn when the transmission is in neutral.
- The starter motor should turn when the transmission is in any gear as indicated the chart below.

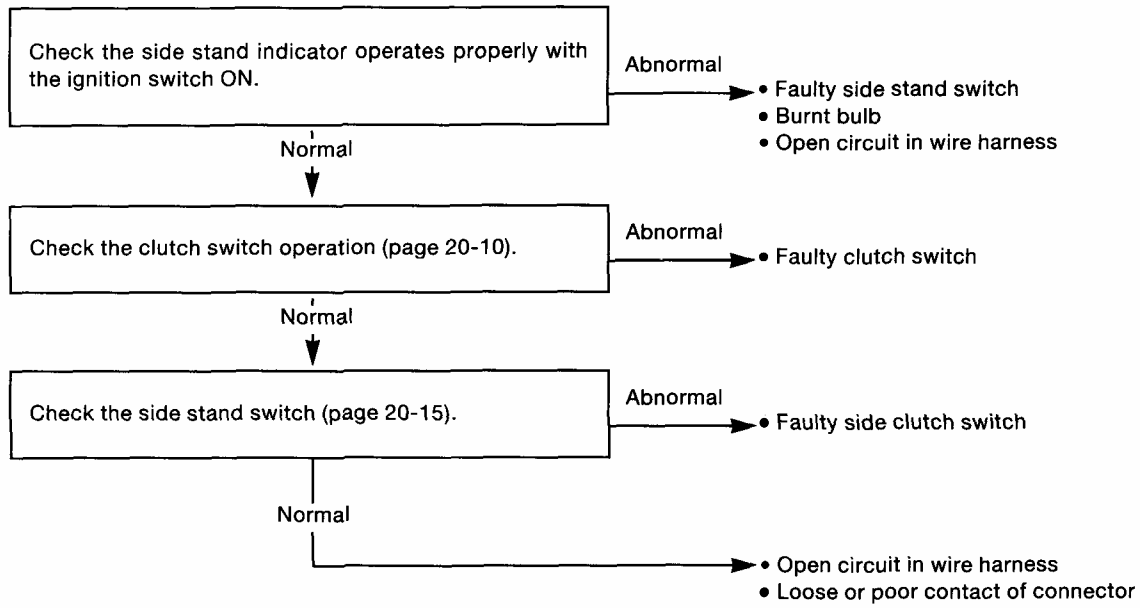
Gear Position	Side Stand	Clutch Lever	Starter Motor
Any Gear	Up	Pulled in	Turn
		Released	Does not turn
	Down	Pulled in	Does not turn
		Released	Does not turn

Starter motor will not turn





The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral. The side stand is up and the clutch lever pulled in.



Starter motor turns slowly
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Worn or damaged starter motor bush

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch

Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problem
- Faulty starter reduction gear
- Faulty starter idle gear

Starter Motor

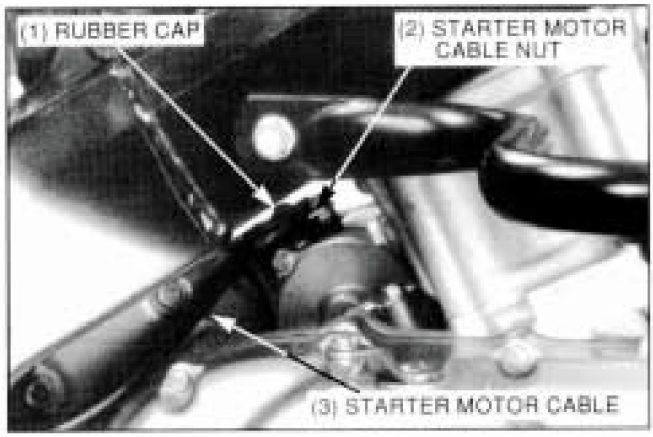
REMOVAL

⚠ WARNING

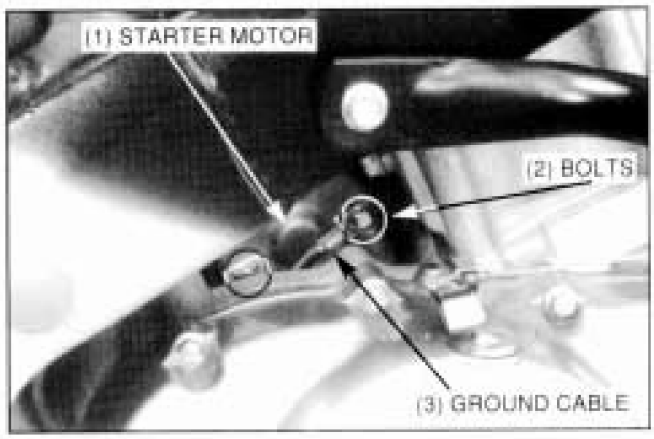
- **Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.**

Remove the rear exhaust pipe (page 2-14).

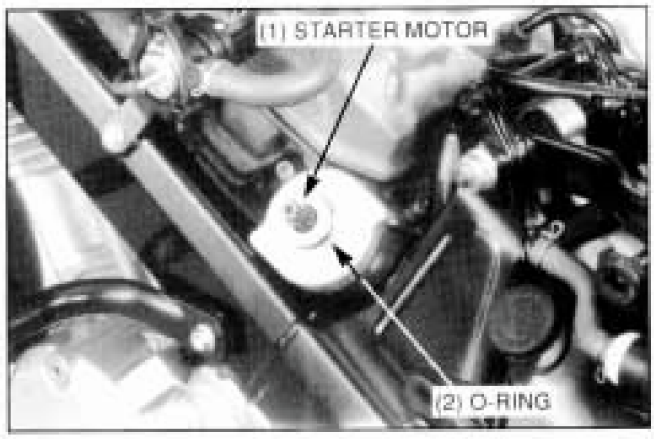
Remove the rubber cap and starter motor cable nut.
Disconnect the starter motor cable.



Remove the bolts and ground cable.
Remove the starter motor from the left side.



Remove the O-ring.

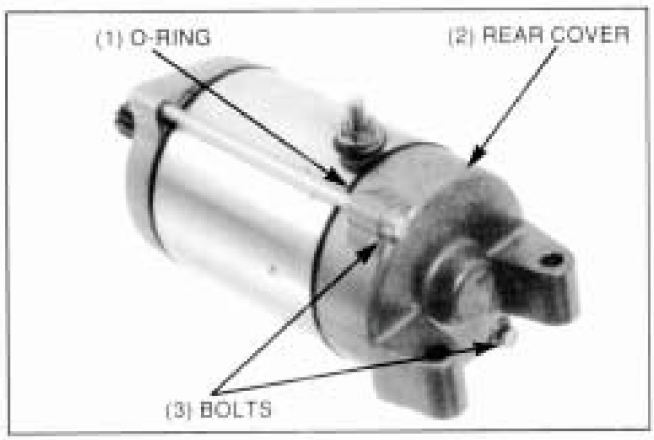


DISASSEMBLY

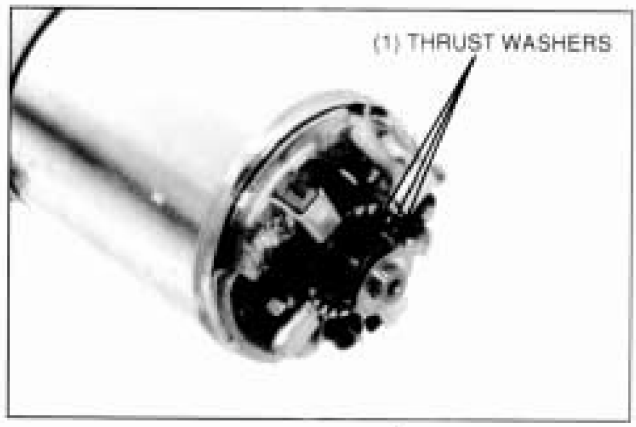
NOTE:

- Record the location and number of shims and washers.

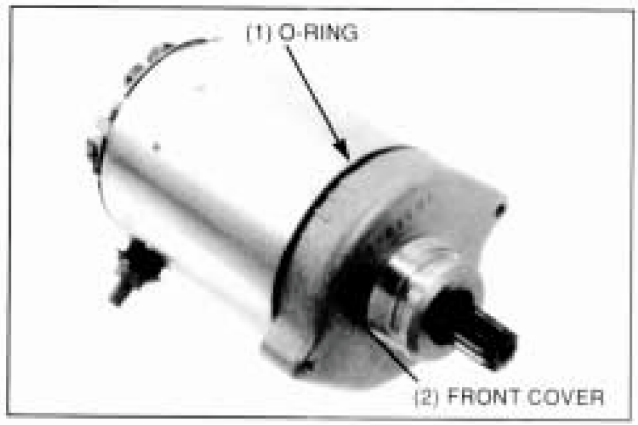
Remove the bolts, rear cover and O-ring.



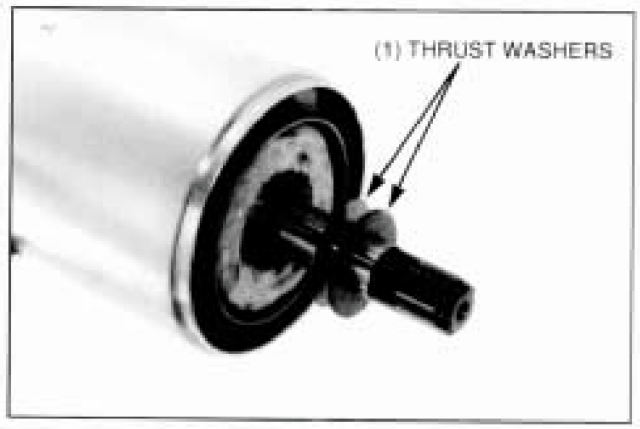
Remove the thrust washers.



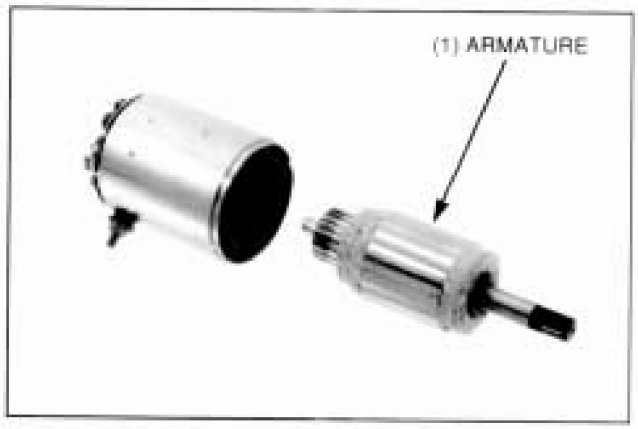
Remove the front cover and O-ring.



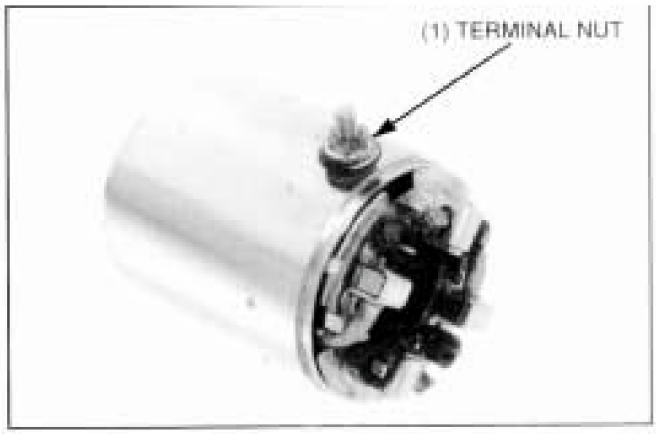
Remove the thrust washers.



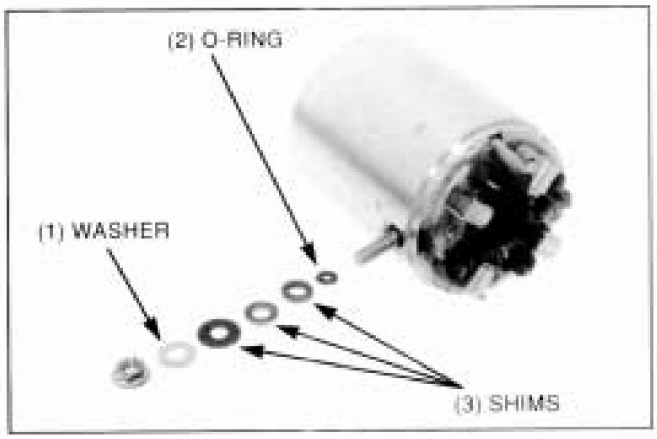
Remove the armature.



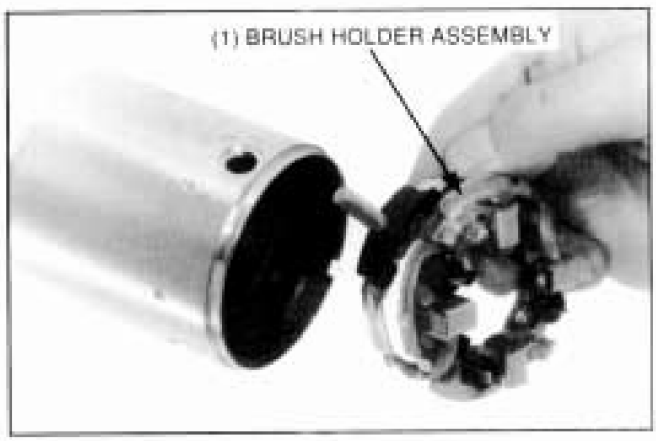
Remove the terminal nut.



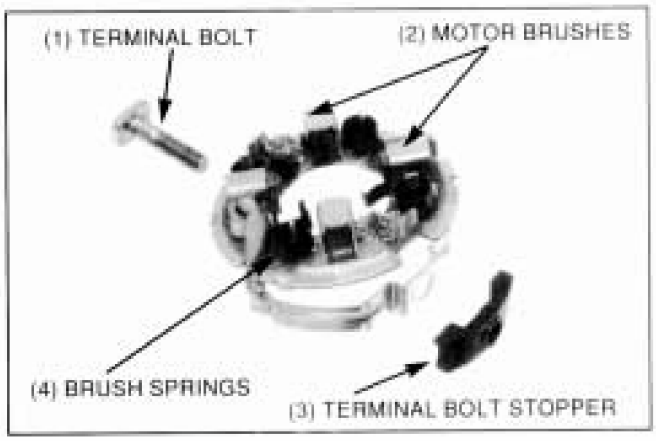
Remove the washer, shims and O-ring.



Remove the brush holder assembly.



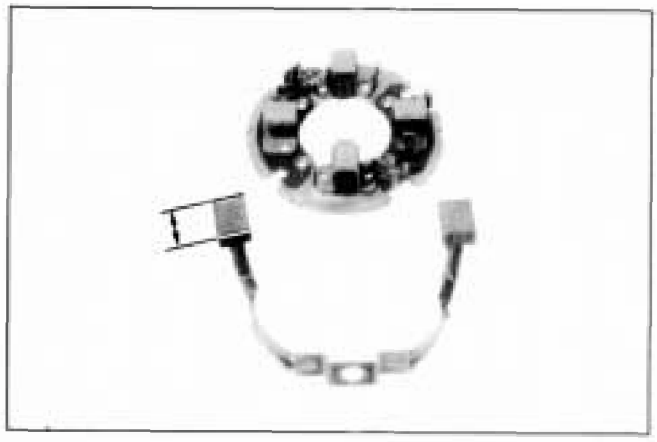
BLUSH HOLDER DISASSEMBLY
Remove the terminal bolt stopper, terminal bolt, motor brushes and brush springs.



INSPECTION

Measure the each brush length.

Service Limit: 6.5 mm (0.26 in)

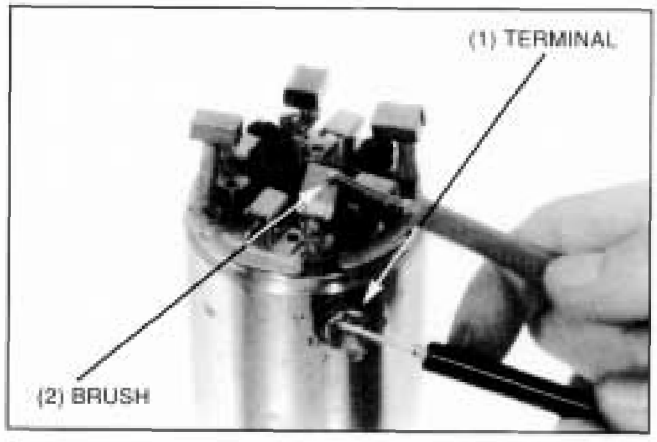


Check for continuity between starter motor terminal and positive brush.

There should be continuity.

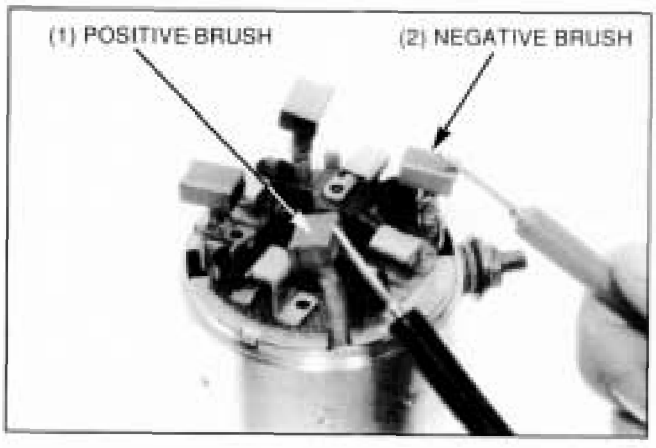
Check for continuity between starter motor terminal and starter motor case.

There should be no continuity.



Check for continuity between positive and negative terminals.

There should be no continuity.



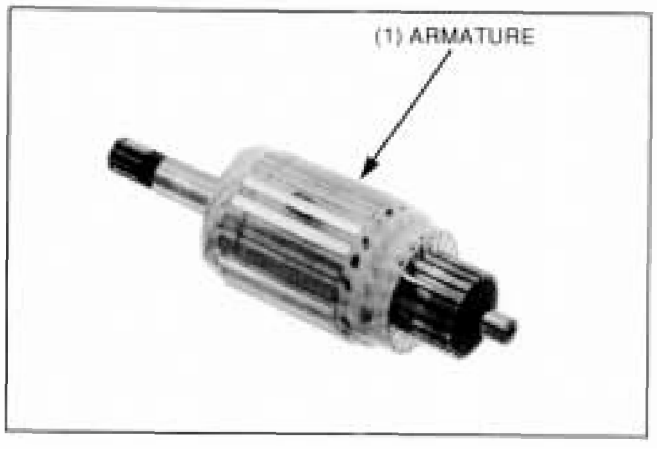
Check the commutator for damage or abnormal wear.
Replace the armature with a new one if necessary.

Check the commutator for metallic debris between commutator bars.
Clean the metallic debris off between commutator bars.

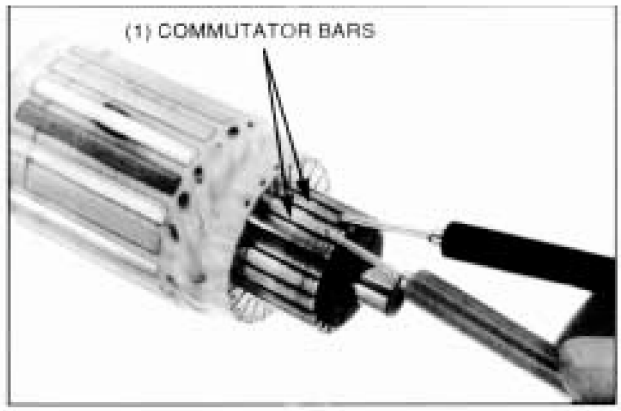
NOTE:

- Do not use emery or sand paper on the commutator.

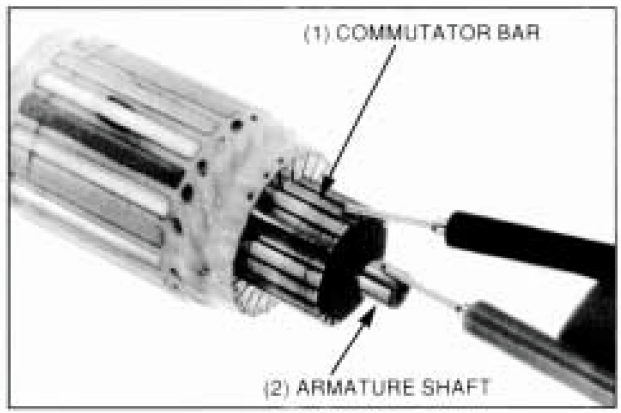
Check the commutator for discolorration of the commutator bar.
Replace the armature with a new one if necessary.



Check for continuity between pairs of commutator bars.
There should be continuity.
Replace the armature with a new one if necessary.



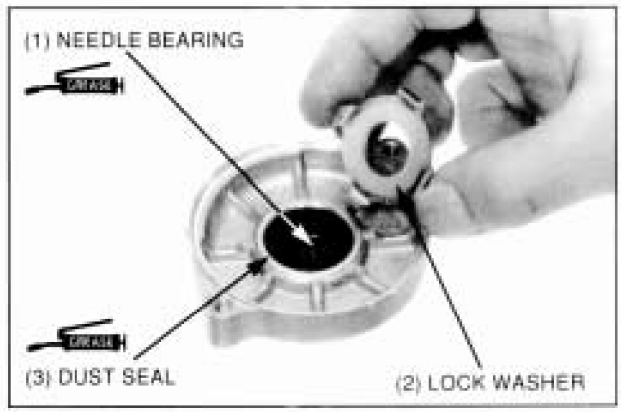
Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.
Replace the armature with a new one if necessary.



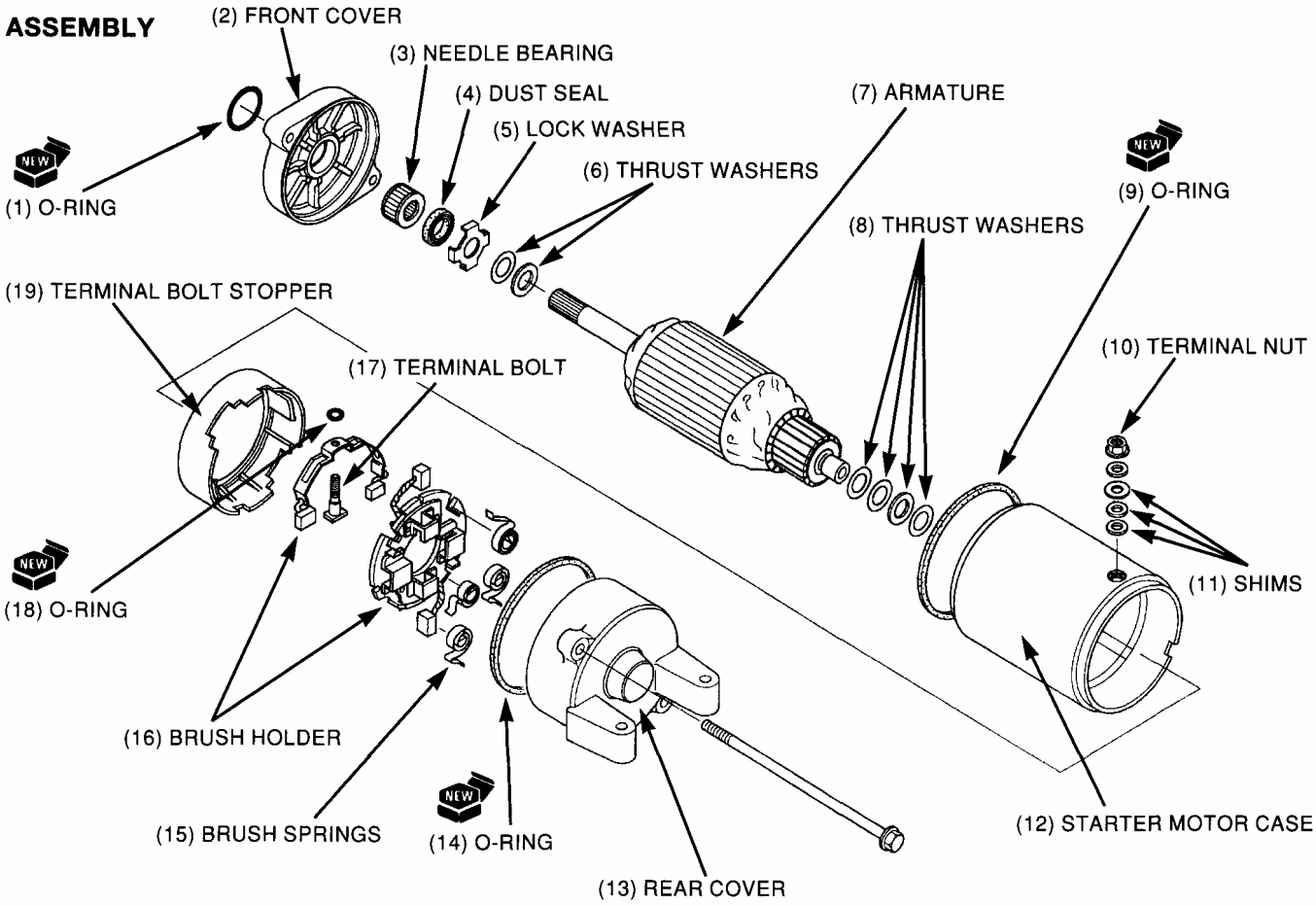
Remove the lock washer from the front cover.

Check the dust seal and needle bearing for wear or damage.
Check the needle bearing rotates smoothly.

Apply grease to the seal lips and needle bearing.
Install the lock washer to the front cover.

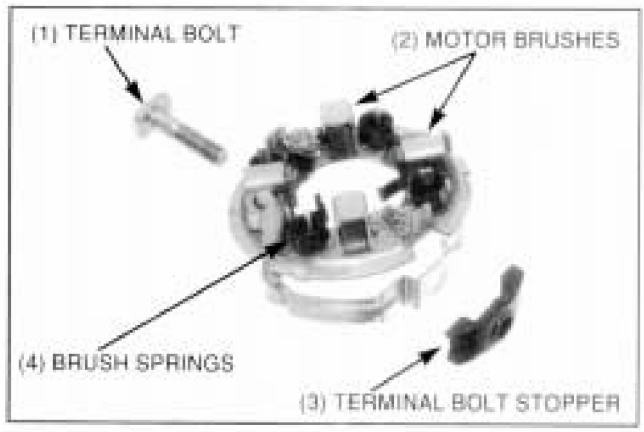


ASSEMBLY



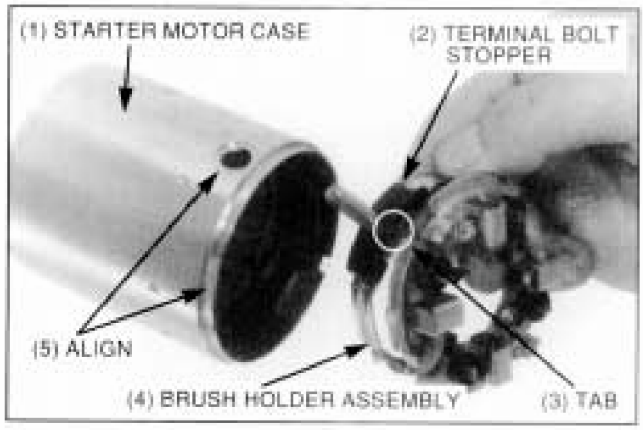
BRUSH HOLDER ASSEMBLY

Install the brush spring, motor brush and terminal bolt.

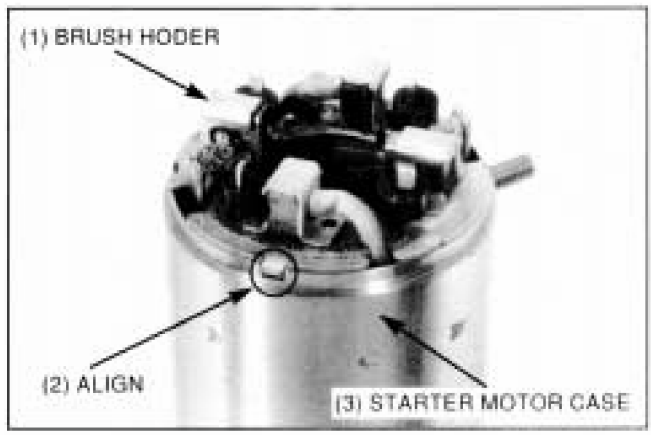


Install the teminal bolt stopper with its tab side facing to the rear cover side.

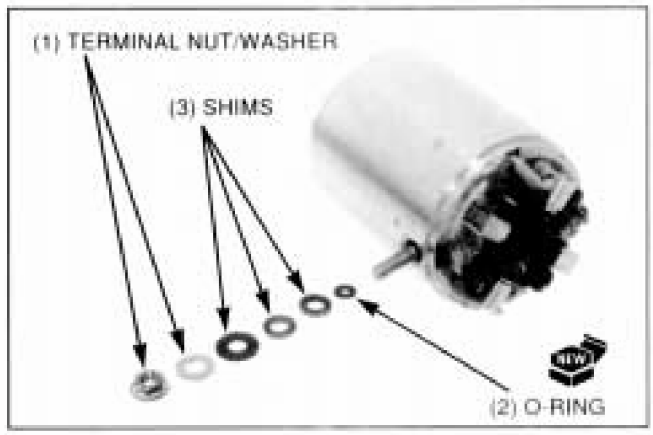
Install the terminal bolt and brush holder to the starter motor case aligning the terminal bolt and hole on the starter motor case.



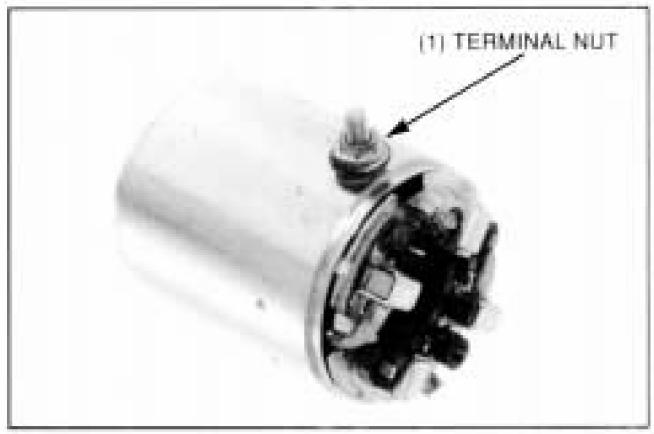
Align the starter motor case notch with the brush holder tab.



Install the new O-ring.
Install the same number of shims in the same locations as when disassembled.
Install the washer and terminal nut.



Tighten the terminal nut securely.

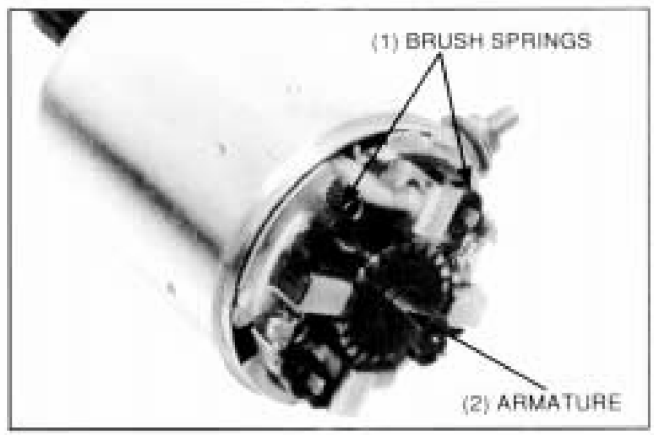


Push and hold the brush inside the brush holder, and install the armature through the brush holder.
When installing the armature into the starter motor case, hold the armature tightly to keep the magnet from pulling the armature against the starter motor case.

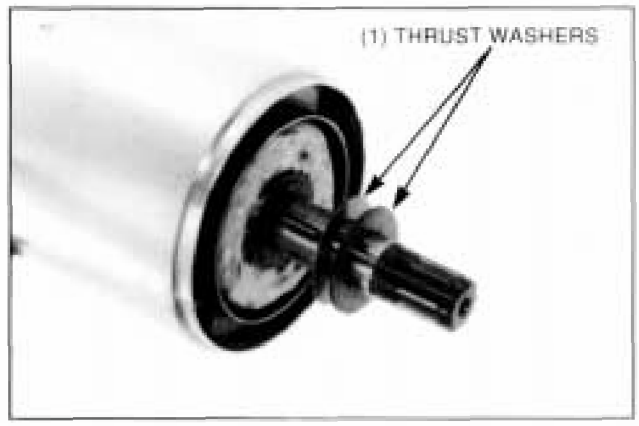
CAUTION

- **The coil may be damaged if the magnet pulls the armature against the case.**
- **The sliding surfaces of the brushes can be damaged if they are not installed properly.**

Set the brush springs.



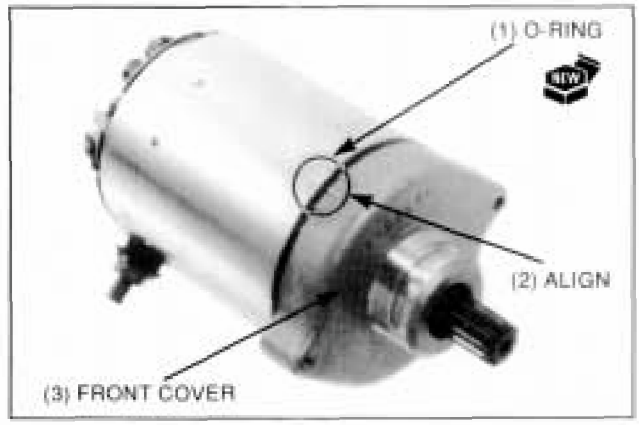
Install the same number of thrust washers in the same locations as when disassembled.



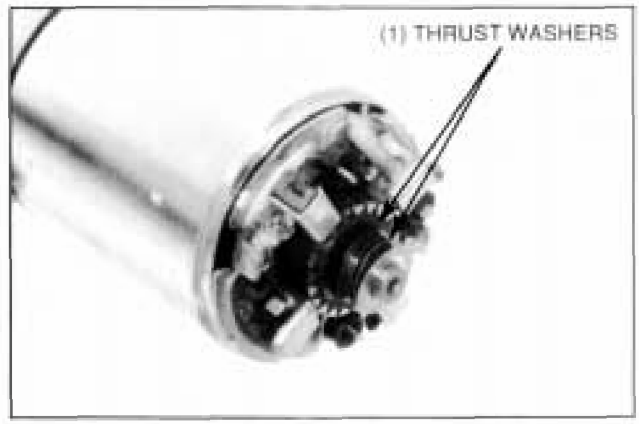
Install the new O-ring and front cover with aligning the index mark.

CAUTION

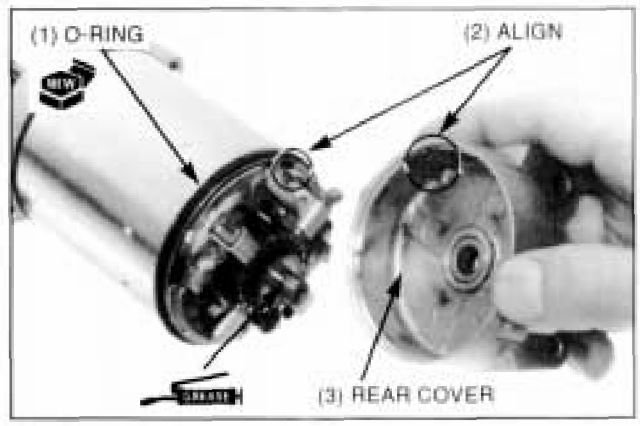
- **When installing the front cover, take care to prevent damaging the oil seal lip with armature shaft.**



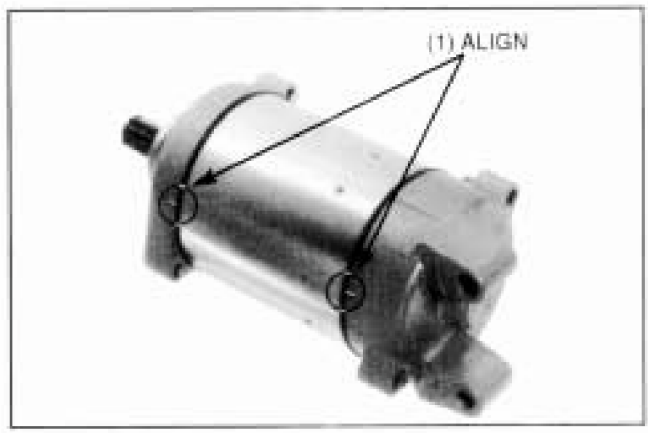
Install the same number of thrust washers in the same locations as when disassembled.



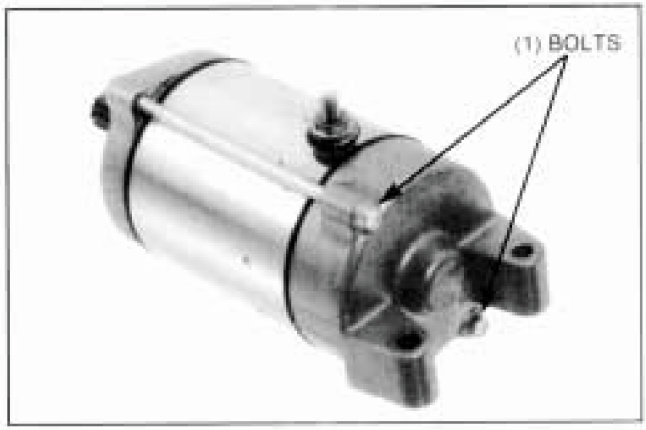
Install the new O-ring.
Apply thin coat of grease to the armature shaft end.
Install the rear cover aligning its groove with the brush holder tab.



Align the index marks on the rear cover and front cover.



Install and tighten the bolts securely.

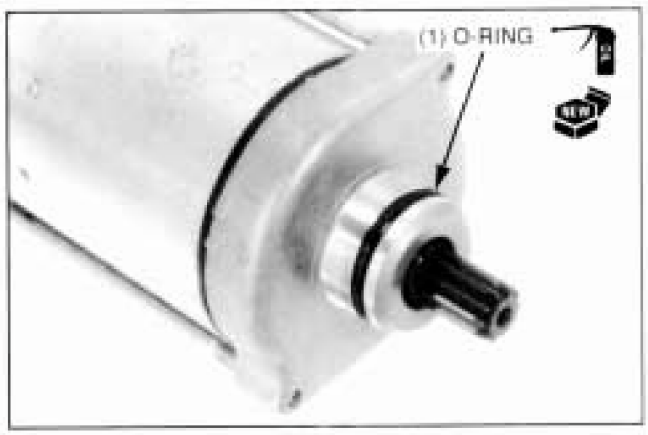


INSTALLATION

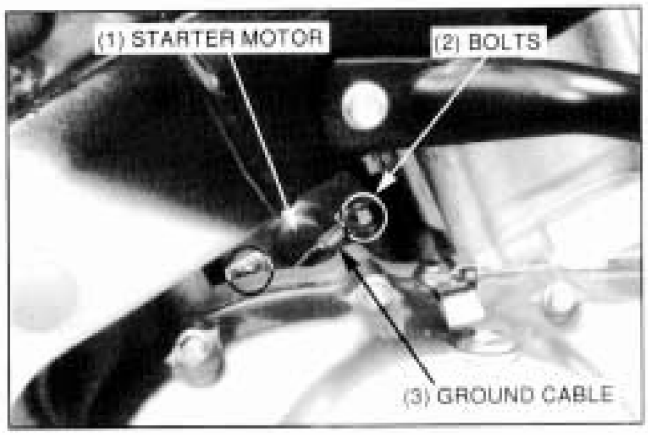
NOTE:

- Route the starter motor cable and ground cable properly (page 1-27).

Apply oil to the new O-ring and install it to the starter motor groove.



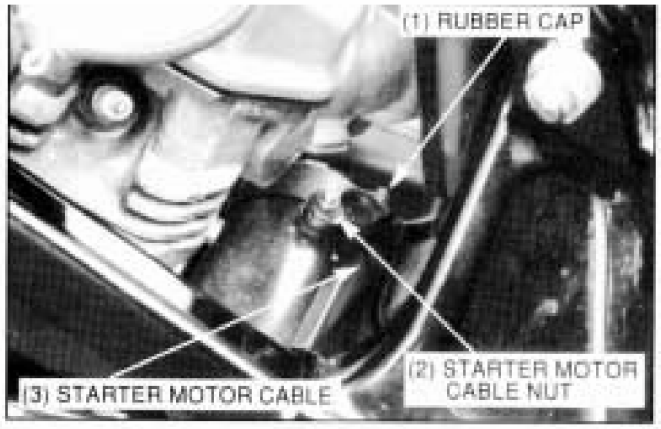
Install the starter motor onto the crankcase from the left side.
Install the ground cable.
Install and tighten the bolts securely.



Connect the starter motor cable.
Install and tighten the starter motor cable nut to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)

Install the rubber cap securely.



Starter Relay Switch

INSPECTION

NOTE:

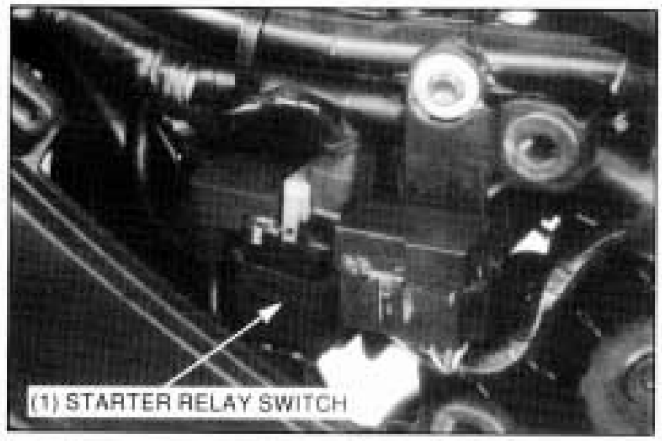
- Before checking the starter relay switch, check for battery condition.

Remove the right side cover (page 2-3).

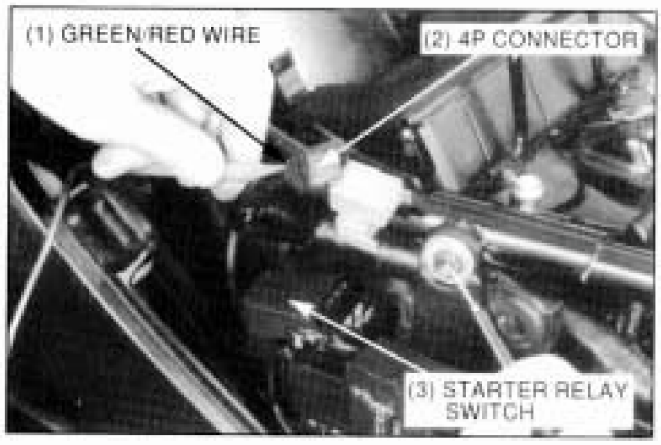
Shift the transmission into neutral.
Turn the ignition switch ON and engine stop switch to RUN.
Depress the starter switch button.

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.

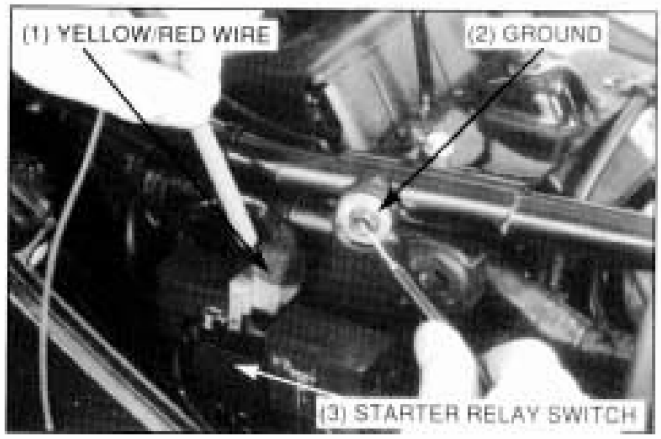


GROUND LINE
Disconnect the starter relay switch 4P connector.
Check for continuity between the Green/Red wire (ground line) and ground.



If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is up, the ground circuit is normal (In neutral, there is a slight resitance dues to the diode).

STARTER RELAY VOLTAGE
Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Measure the voltage between the Yelow/Red (+) wire and ground at the starter relay switch 4P connector.



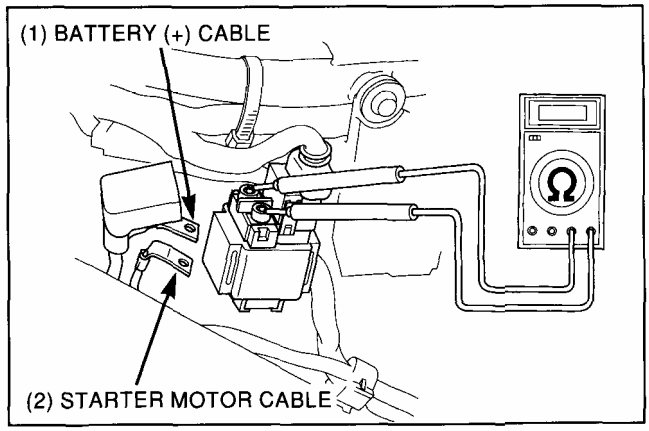
If the battery voltage appears only when the starter switch is pressed with the ignition switch ON, it is normal.

OPERATION CHECK

Disconnect the battery cables.
Disconnect the estarter motor and battery (+) cables from the starter relay.

Replace the battery with a fully charged battery.

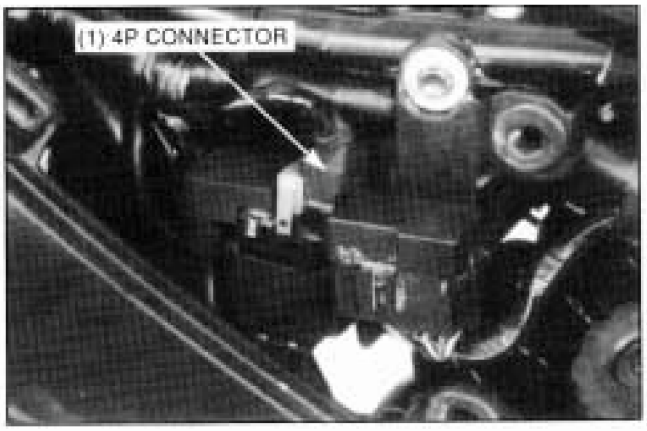
Press the starter switch button. The relay is normal if there is continuity between the terminals only when the switch button is pressed.



REMOVAL/INSTALLATION

Remove the right side cover (page 2-3).

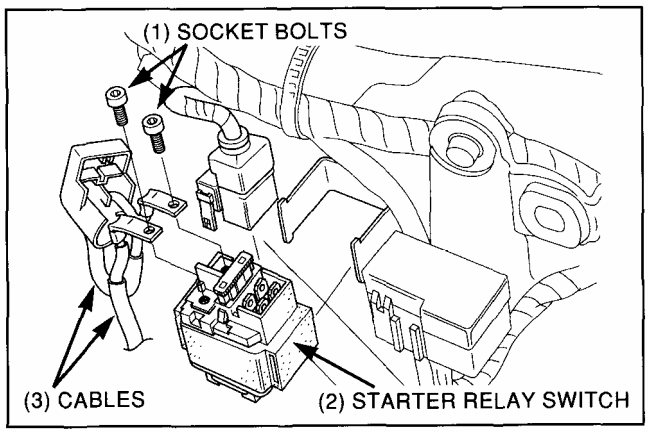
Disconnect the starter relay 4P connector.



Remove the socket bolts and cables.
Remove the starter relay switch.

Installation is in the reverse order of removal.

Torque:
Starter motor cable socket bolt: 10 N·m (1.0 kgf-m, 7 lbf-ft)

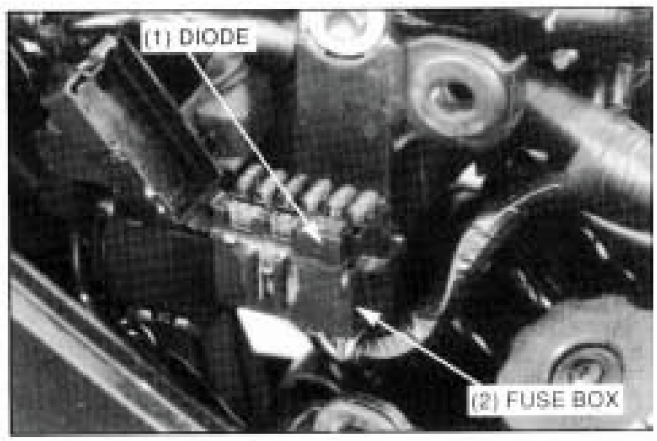


Clutch Diode

INSPECTION

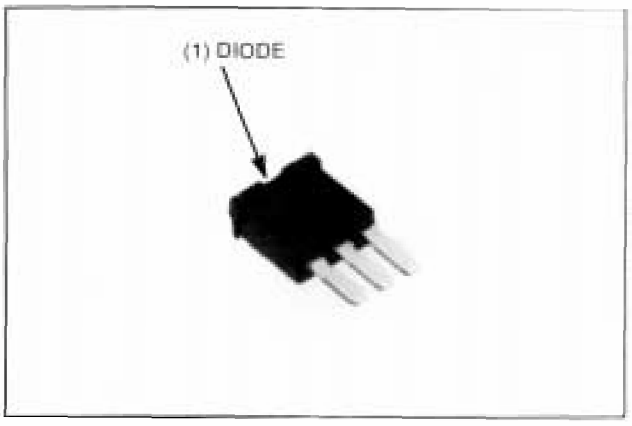
Remove the right side cover (page 2-3).

Open the fuse box and remove the diode.

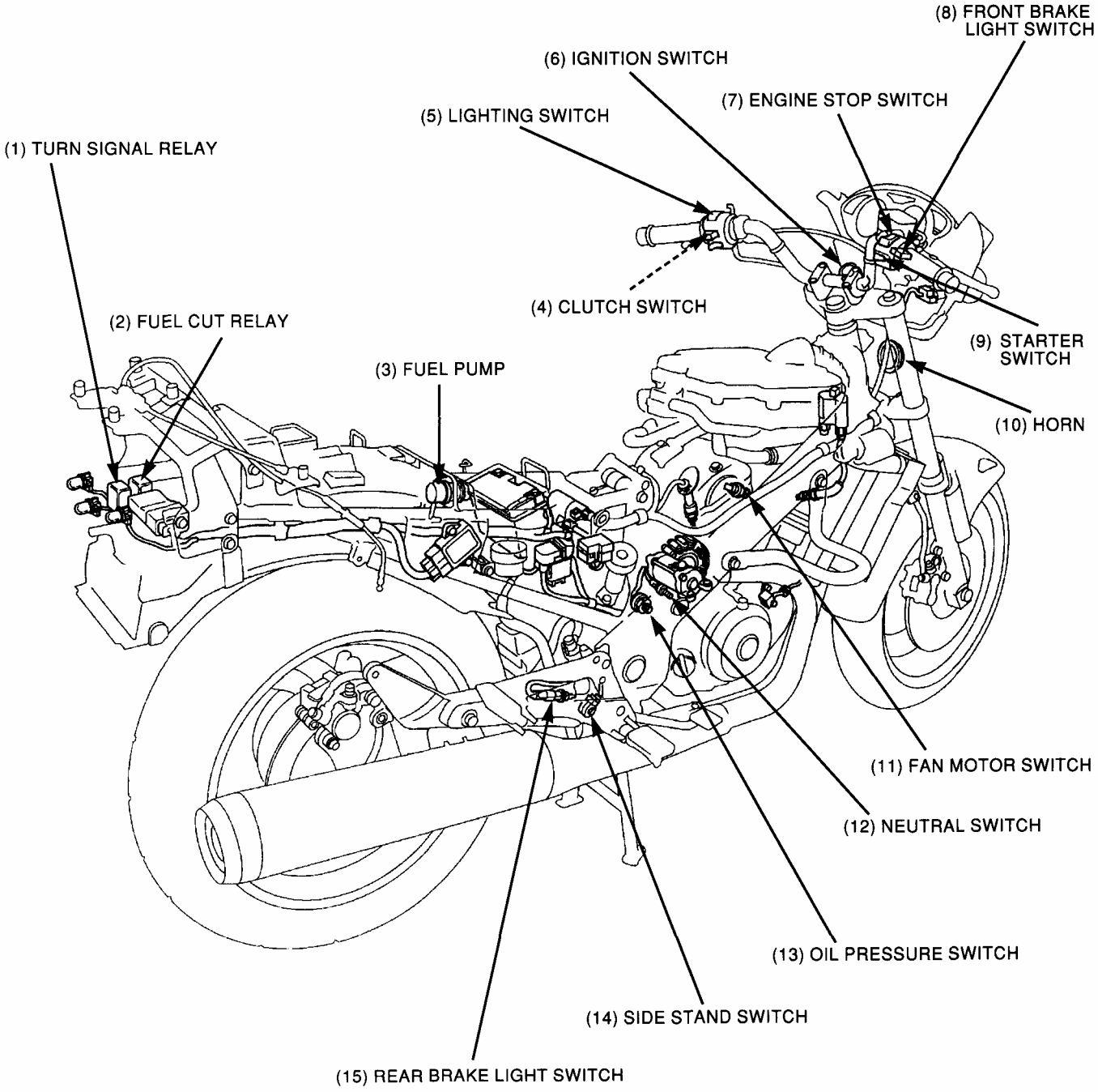


Check for continuity between the diode terminals.
When there is continuity, a small resistance value is register.

If there is continuity in one direction, the diode is normal.



System Diagram



20. Lights/Meters/Switches

SYSTEM DIAGRAM	20-0	HANDLEBAR SWITCH	20-10
SERVICE INFORMATION	20-1	IGNITION SWITCH	20-12
BULB REPLACEMENT	20-3	FAN MOTOR SWITCH	20-12
SPEEDOMETER	20-4	COOLANT TEMPERATURE,	
OIL PRESSURE SWITCH	20-9	THERMOSENSOR	20-13
NEUTRAL SWITCH	20-9	HORN	20-14
FRONT BRAKE LIGHT SWITCH	20-10	TURN SIGNAL RELAY	20-15
REAR BRAKE LIGHT SWITCH	20-10	SIDE STAND SWITCH	20-15

Service Information

GENERAL

⚠ WARNING

- **A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.**
- **Use an electric heating element to heat the water/coolant mixture for the thermosensor inspection. Keep all flamable 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 break.
  - 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.
- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- Always turn off the ignition switch before disconnecting any electrical component.
- A continuity test can be made with the switches installed on the motorcycle.
- Check the battery condition before performing any inspection that requires proper battery voltage.

Item		Specifications
Bulbs	Headlight (High/low beam)	12 V - 60/55 W
	Position light	12 V - 4 W
	Brake/tail light	12 V - 21/5 W
	Turn signal light	12 V - 21 W x 4
	Instrument light	12 V - 1.7 W x 2
	Clock light	12 V - 1.7 W
	Turn signal indicator	12 V - 1.7 W x 2
	High beam indicator	12 V - 1.7 W
	Neutral indicator	12 V - 1.7 W
	Oil indicator	12 V - 1.7 W
Fuse	Main fuse	30 A
	Sub-fuse	5 A x 2, 10 A x 2, 15 A x 2
Fan motor switch	Start to close (ON)	98 - 102° C (208 - 216° F)
	Start to open (OFF)	93 - 97° C (199 - 207° F)
Coolant temperature sensor	Start to close (ON)	112 - 118° C (259 - 270° F)
	Start to open (OFF)	Below 108° C (252° F)

TORQUE VALUES

Neutral switch	12 N·m (1.2 kgf-m, 9 lbf-ft)
Side stand switch mounting bolt	10 N·m (1.0 kgf-m, 7 lbf-ft)
Thermosensor	18 N·m (1.8 kgf-m, 13 lbf-ft)

Bulb Replacement

HEADLIGHT/POSITION LIGHT

HEADLIGHT

⚠ WARNING

- **A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.**

CAUTION

- **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 break.**
- **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.**

Remove the upper fairing (page 2-7).

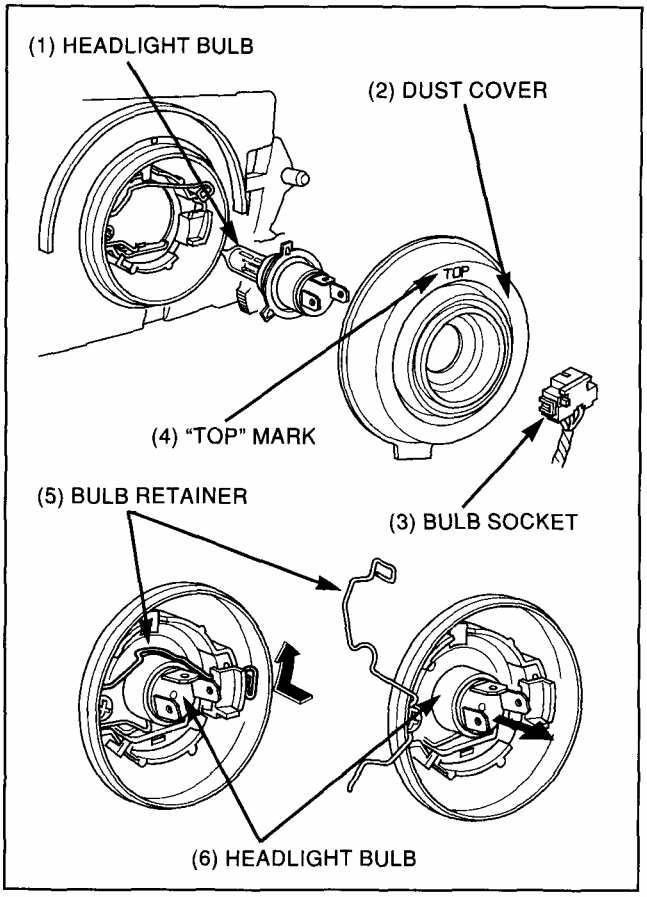
Disconnect the headlight bulb socket and remove the dust cover.

Unhook the bulb retainer and remove the headlight bulb and replace with a new one.

Installation is in the reverse order of removal.

NOTE:

- Install the dust cover with its "TOP" mark facing up.

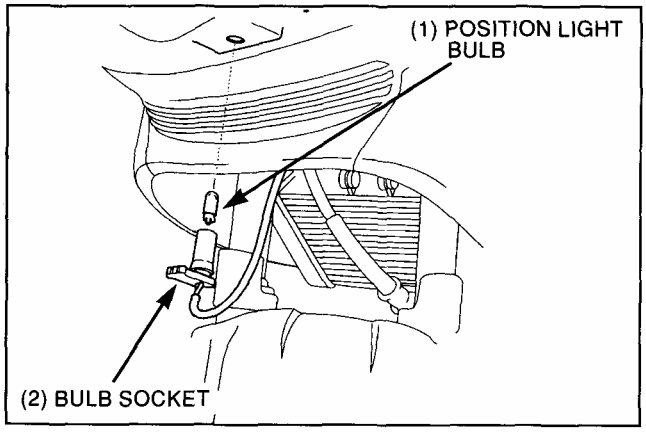


POSITION LIGHT

Remove the middle fairing inner cover (page 2-4).

Remove the position light bulb socket from the headlight unit.
Remove position light bulb and replace with a new one.

Installation is in the reverse order of removal.

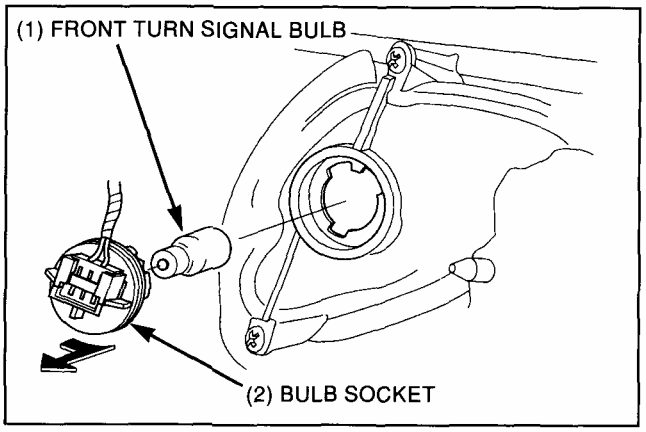


FRONT TURN SIGNAL LIGHT

Remove the upper fairing (page 2-7).

Turn the bulb socket counterclockwise and remove it.
Remove the turn signal bulb and replace with a new one.

Installation is in the reverse order of removal.

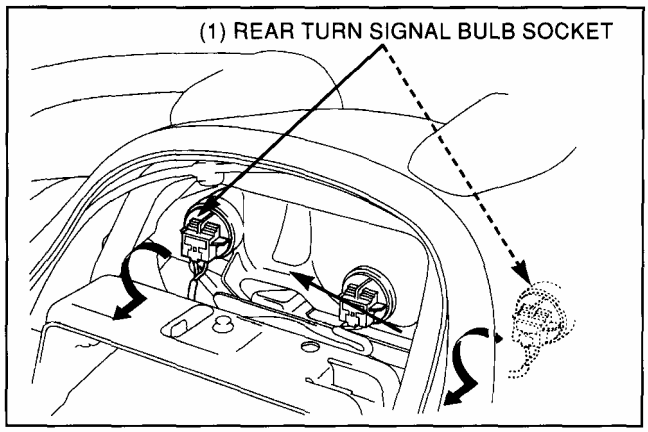


REAR TURN SIGNAL LIGHT

Remove the seat (page 2-2).

Turn the bulb socket counterclockwise and remove it.
Remove the turn signal bulb and replace with a new one.

Installation is in the reverse order of removal.

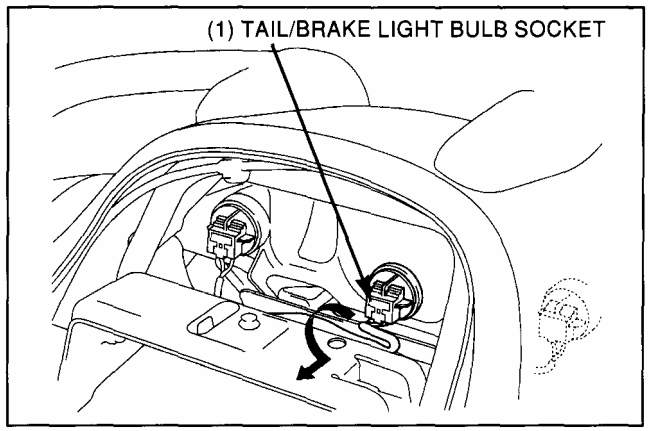


TAIL/BRAKE LIGHT

Remove the seat (page 2-2).

Turn the bulb socket counterclokwise and remove it.
Remove the tail/brake light bulb and replace with a new one.

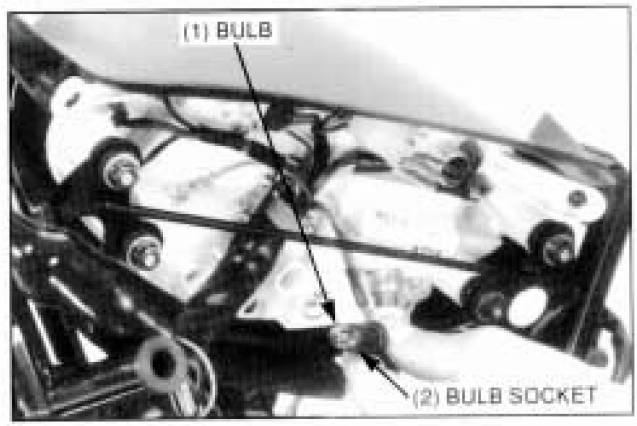
Installation is in the reverse order of removal.



SPEEDOMETER LIGHT/INDICATOR LIGHT

Remove the upper fairing (page 2-7).

Remove the speedometer light bulb socket from the speedometer.
Replace a new bulb and install it in the reverse order of removal.



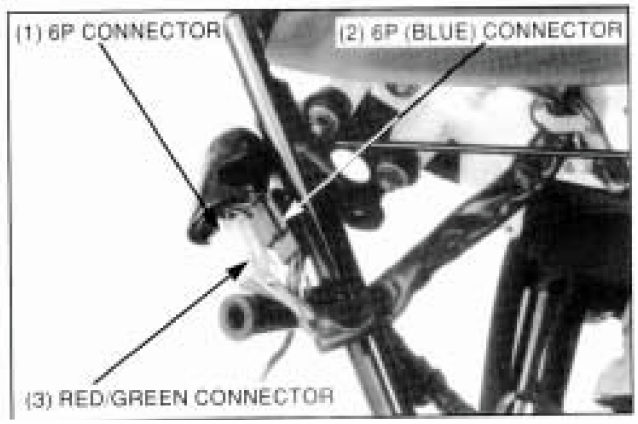
Speedometer

INSPECTION

Check the main fuse (30 A) or sub-fuse (15 A, 5 A) for brown.

Remove the upper fairing (page 2-7).

Check for loose or poor contacts of the speedometer 6P, 6P (Blue) and Red/Green connectors.

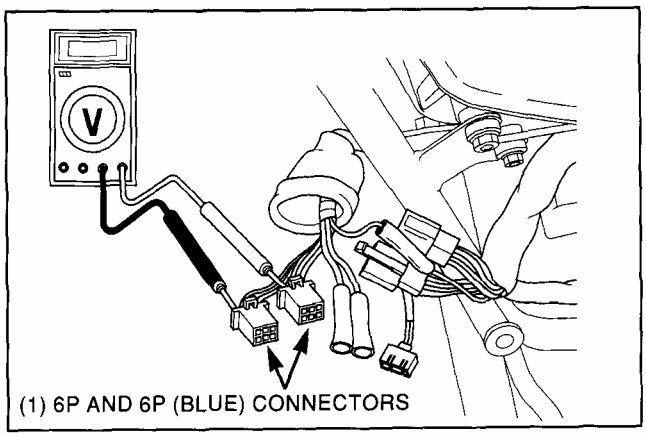


Disconnect the speedometer 6P and 6P (Blue) connectors.

Turn the ignition switch ON and measure the voltage at the 6P and 6P (Blue) connectors wire harness side.

Connection: Black/Brown (+) — Green/Black (-)
Standard: Battery voltage

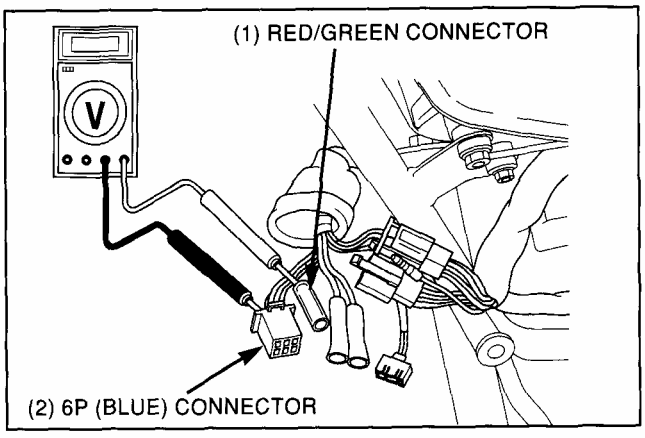
If there is no voltage, check the relater circuit for open or short circuit.



Measure the voltage at the 6P (Blue) connector and Red/Geen connector wire harness side.

Connection: Red/Green (+) — Green/Black (-)
Standard: Battery voltage

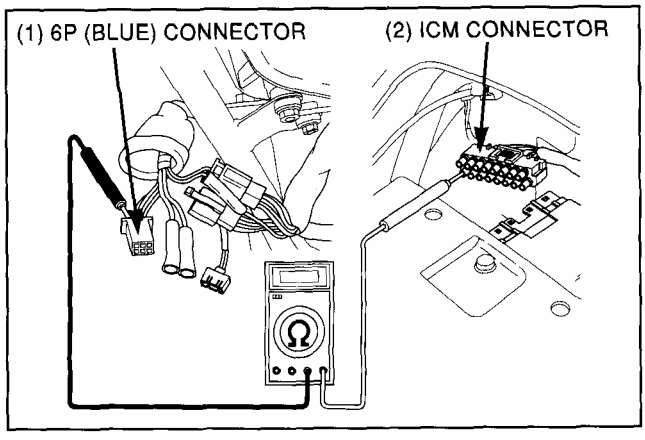
If there is no voltage, check the relater circuit for open or short circuit



Disconnect the ignition control module (ICM) connector. Check for continuity between ICM connector and speedometer 6P (Blue) connector Yelow/Blue terminal.

If there is no continuity, check the wire harness for an open circuit.

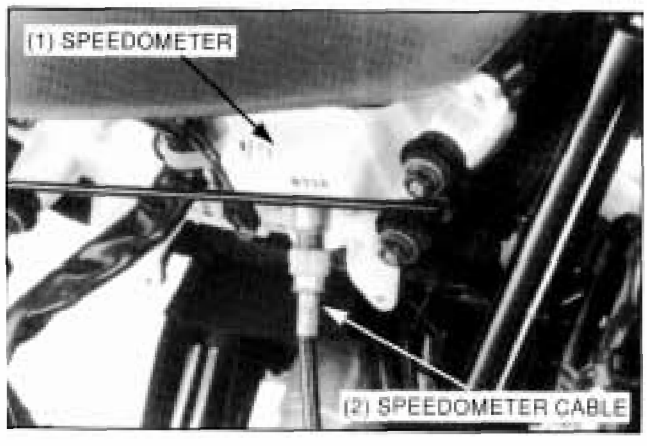
If there is continuity, replace the speedometer assembly.



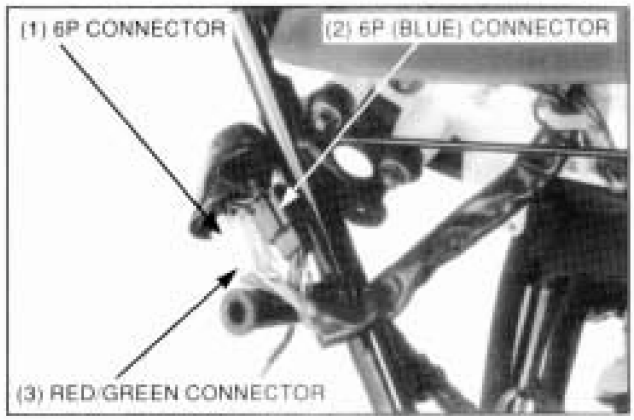
REMOVAL

Remove the upper fairing (page 2-7).

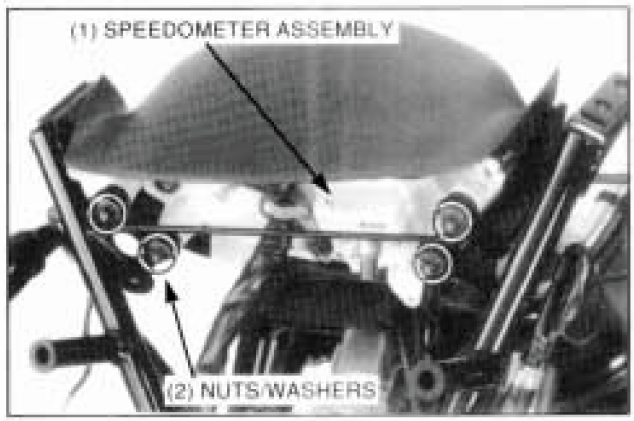
Disconnect the speedometer cable from the speedometer.



Disconnect the speedometer 6P, 6P (Blue) and Red/Green connectors.



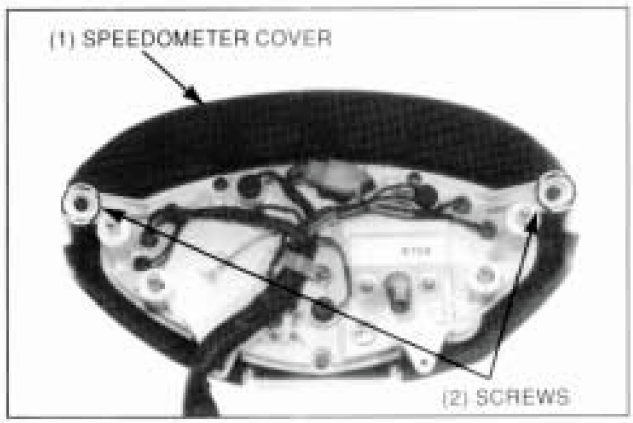
Remove the nuts, washers and speedometer assembly.



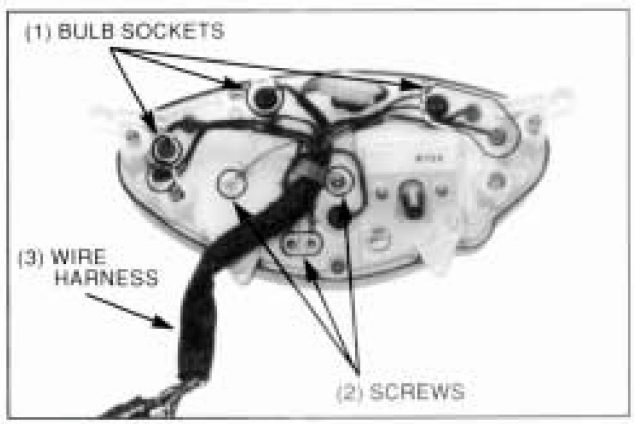
DISASSEMBLY

Remove the speedometer (see above).

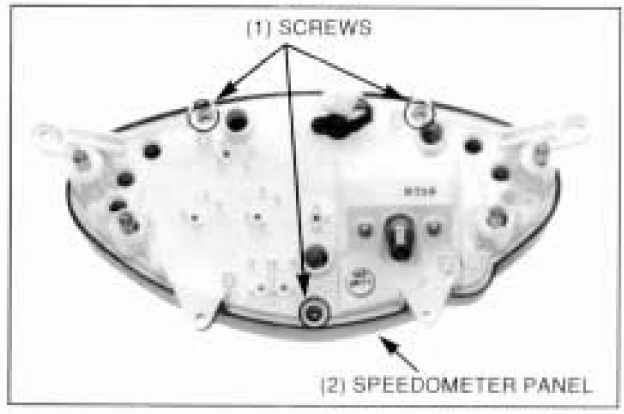
Remove the screws and speedometer cover.



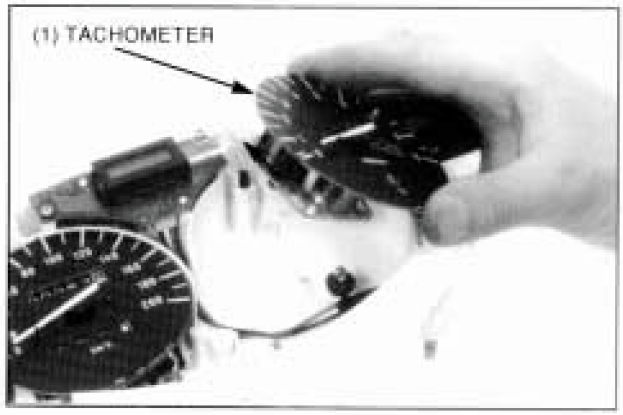
Remove the speedometer bulb and indicator sockets.
Remove the screws and wire harness.



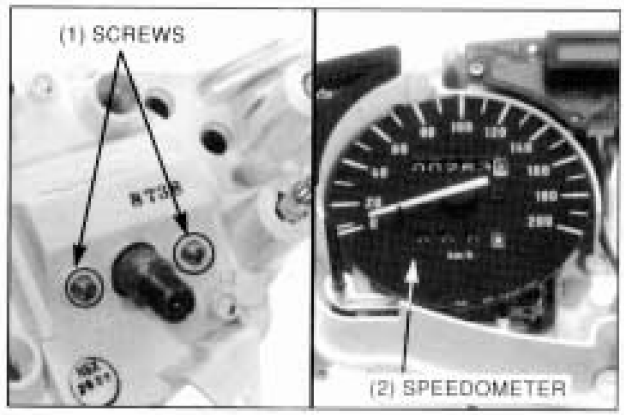
Remove the screws and speedometer panel.



Remove the tachometer.



Remove the screw and speedometer.

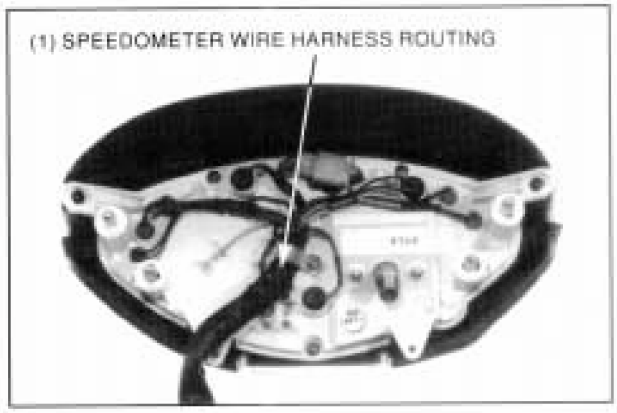


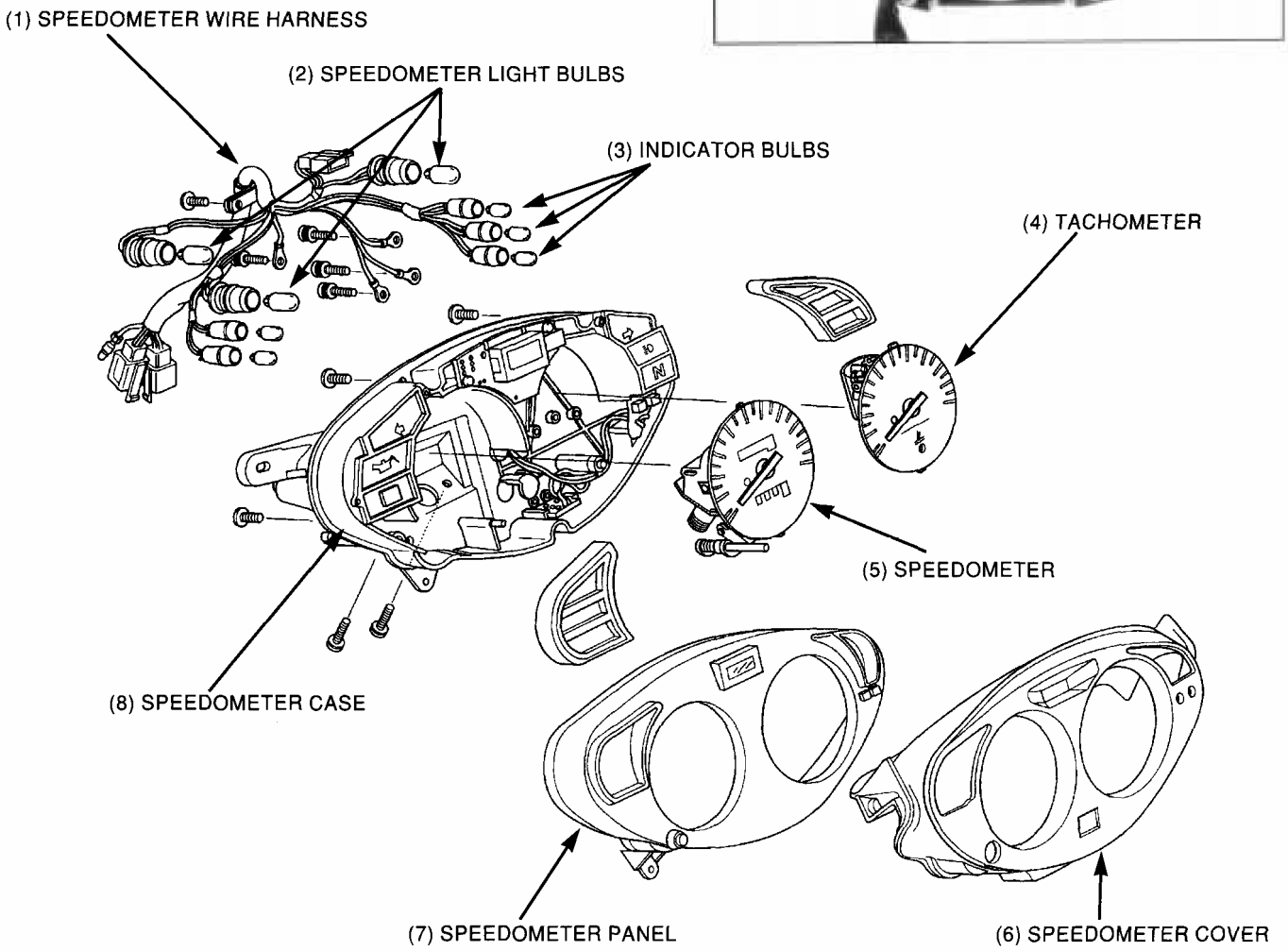
ASSEMBLY

Assembly is in the reverse order of disassembly.

NOTE:

- Connect the wire harness properly.



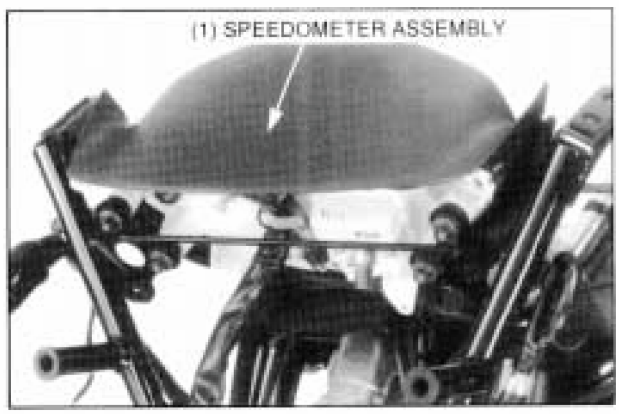


INSTALLATION

Installation is in the reverse order of removal.

NOTE:

- Route the wire harness properly.



Oil Pressure Switch

NOTE:

- The oil pressure switch removal/installation is refer to page 4-3.

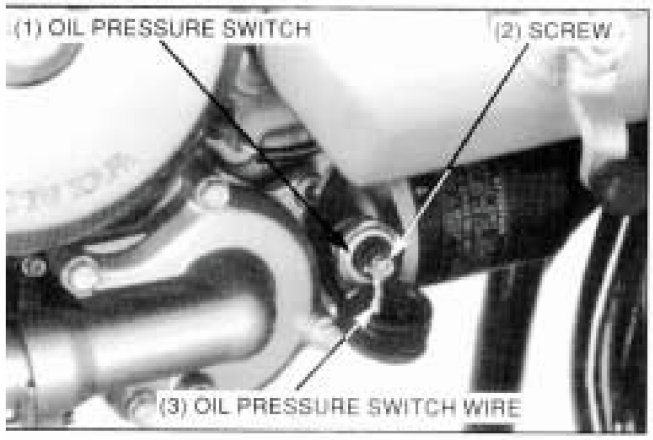
Make sure that the oil pressure warning indicator comes on with the ignition switch "ON".

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

Disconnect the oil pressure switch wire from the switch by removing the terminal screw.
Short it to ground using a jumper wire. Turn the ignition switch "ON".

The oil pressure warning indicator should come on.
If the indicator does not come on, check the sub-fuse (15A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the indicator goes out.
If the indicator does not go out, check the oil pressure (page 4-3).
If the oil pressure is normal, replace the oil pressure switch (page 4-3).



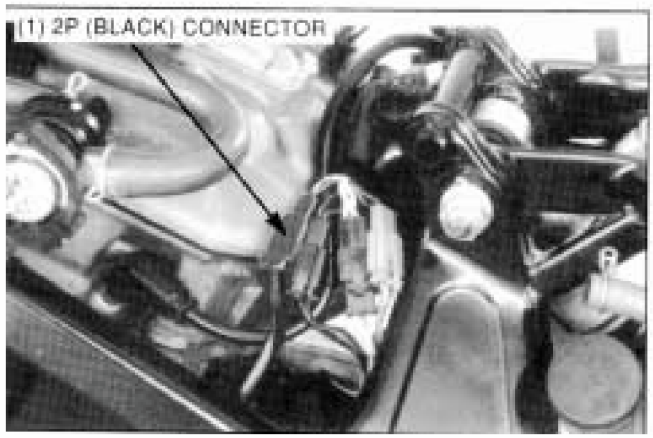
Neutral Switch

INSPECTION

Remove the left side cover (page 2-2).
Remove the fuel tank (page 2-11).

Disconnect the engine sub-harness 2P (Black) connector.
Shift the transmission into neutral and check for continuity between the Light green/Red wire and ground.

There should be continuity when the transmission is in neutral.
There should be no continuity when the transmission is in any other gear.



REMOVAL/INSTALLATION

Remove the left rear cover (page 9-2).

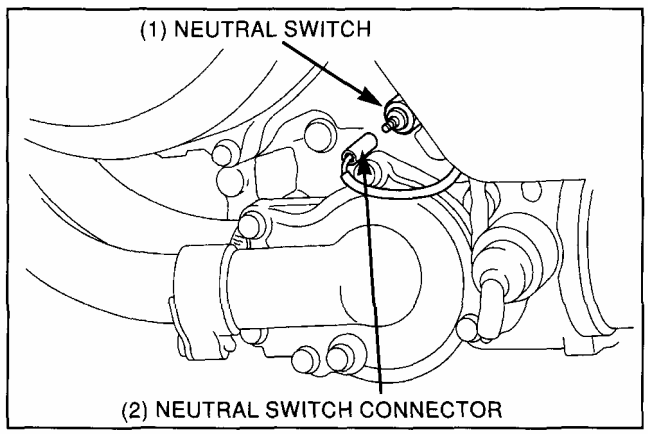
Disconnect the neutral switch connector.

Remove the neutral switch.

Install and tighten the neutral switch to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

Connect the neutral switch connector.



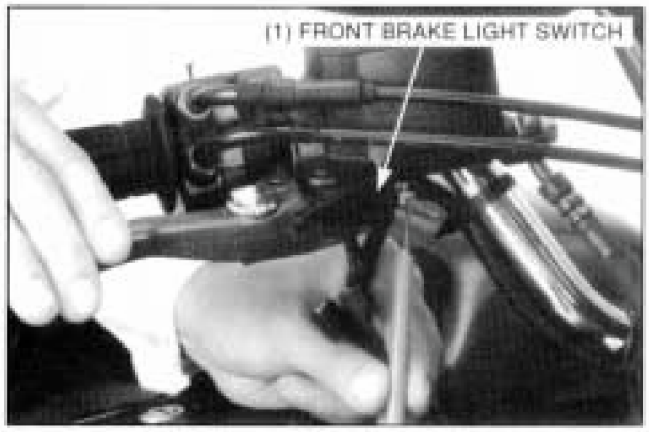
Front Brake Light Switch

NOTE:

- The front brake light switch removal/installation is refer to page 16-10).

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

There should be continuity with the from brake applied and no continuity with it released.

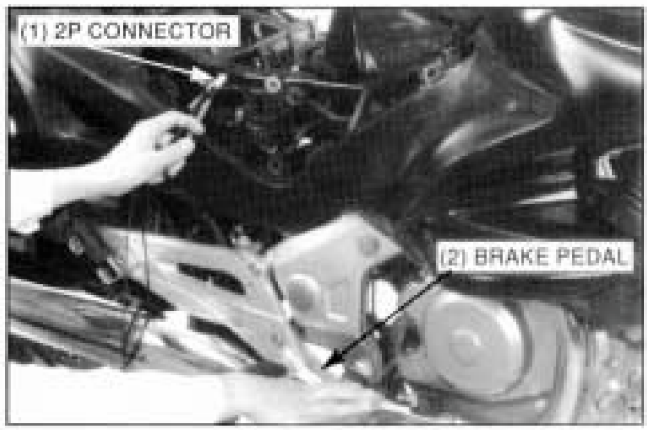


Rear Brake Light Switch

Remove the right side cover (page 2-3).

Disconnect the rear brake light switch 2P connector and check for continuity at the switch side connector.

There should be continuity with the rear brake applied and no continuity with it released.



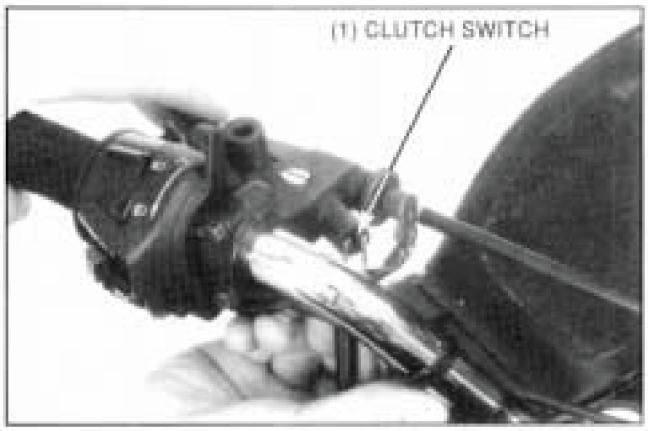
Clutch Switch

NOTE:

- The clutch switch removal/installation is refer to page 14-5, 11).

Disconnect the clutch switch connectors and check for continuity.

There should be continuity with the clutch lever applied and no continuity with it released.



Handlebar Switch

NOTE:

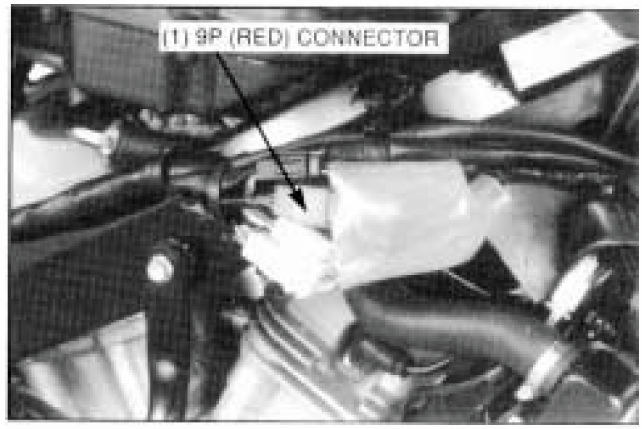
- The handlebar switches removal/installation is refer to page 13-6.

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

Check for continuity between the terminals.
Continuity should exist between the color code wire as shown in each chart.

RIGHT HANDLEBAR SWITCH

Disconnect the right handlebar 9P (Red) connector.



STARTER SWITCH

	ST	IG
FREE		
PUSH	○	○
COLOR	Y/R	Bl/W

ENGINE STOP SWITCH

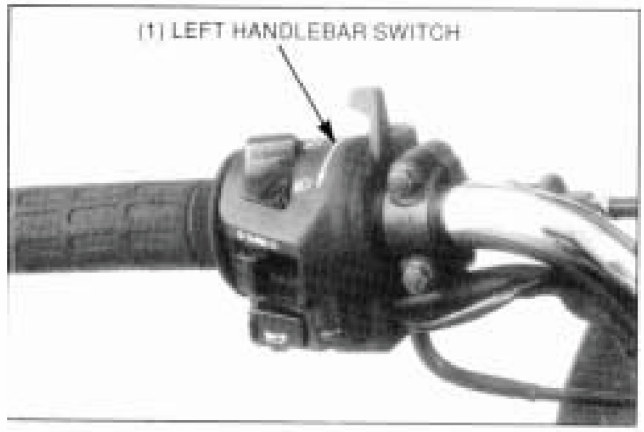
	IG	BAT2
OFF		
RUN	○	○
COLOR	Bl/W	Bl

LIGHTING SWITCH

	TL	BAT3	HL	BAT1
●				
P	○	○		
H	○	○	○	○
COLOR	Br	Bl/Br	Bu/W	Bl/R

LEFT HANDLEBAR SWITCH

Disconnect the left handlebar 6P, 6P (Blue) connector.

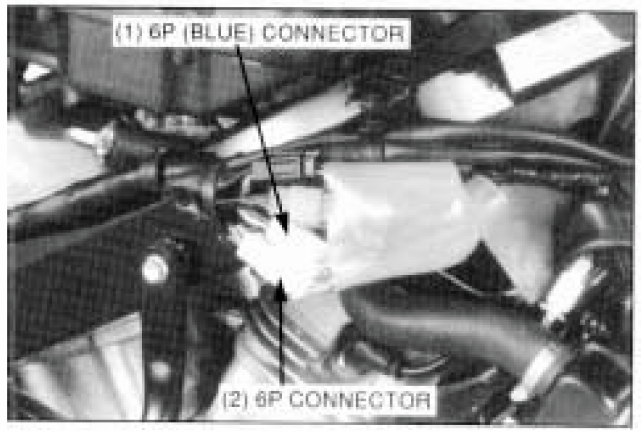


TURN SIGNAL SWITCH

	W	R	L
R	○	○	
(N)			
L	○		○
COLOR	Gr	Lb	O

HORN SWITCH

	Ho	BAT3
FREE		
PUSH	○	○
COLOR	Lg	Bl/Br



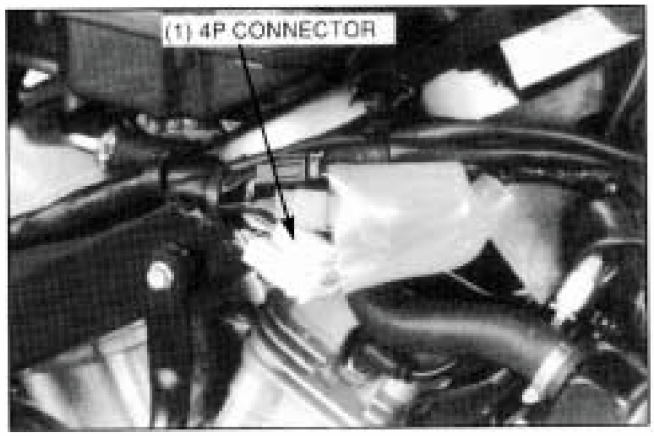
DIMMER SWITCH

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

PASSING SWITCH

	BAT1	HL
FREE		
PUSH	○	○
COLOR	Bl/R	Bu

Ignition Switch

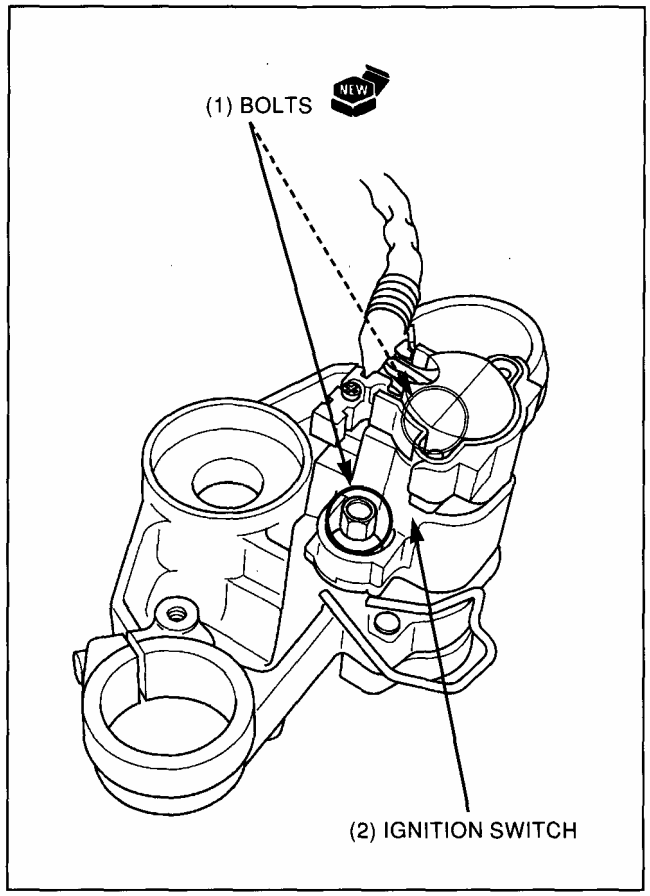


INSPECTION

Remove the seat and left side cover (page 2-2).

Disconnect the ignition switch 4P connector.
Check for continuity between the ignition switch connector terminals in each switch position.
Continuity should exist between the collar coded wires in each chart below.

	FAN	BAT1	IG	S
ON	○	○	○	
OFF			○	○
LOCK			○	○
COLOR	Bu/O	R	R/Bl	P

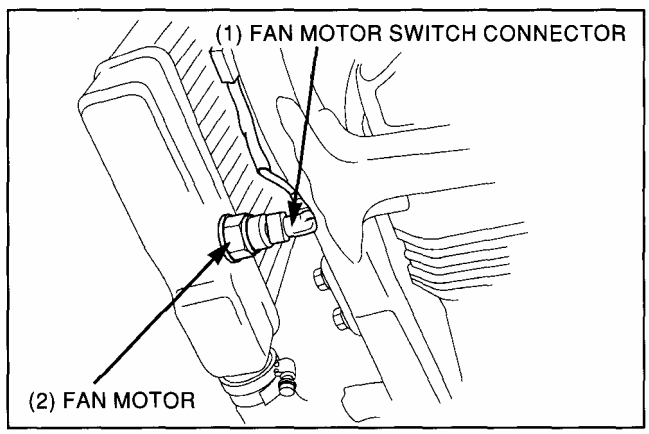


REMOVAL/INSTALLATION

Disconnect the ignition switch 4P connector (see above).
Remove the two bolts and ignition switch.

Installation is in the reverse order of removal.

Fan Motor Switch



INSPECTION

FAN MOTOR DOES NOT STOP
Turn the ignition switch OFF, disconnect the fan motor switch connector from the fan motor switch and turn the ignition switch ON again.

If the fan motor does not stop, check for a shorted wire between the fan motor and switch.
If the fan motor stops, replace the fan motor switch.

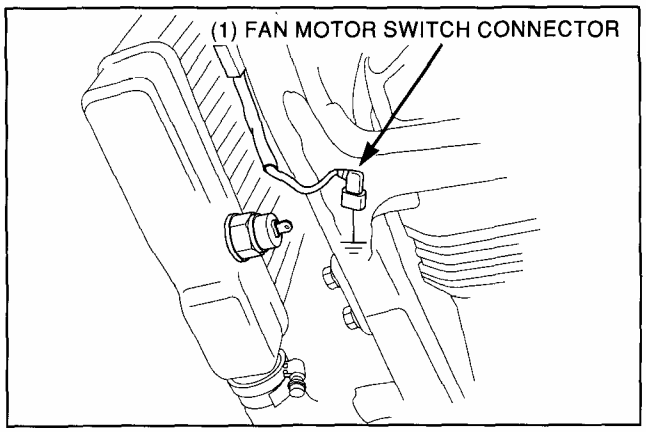
FAN MOTOR DOES NOT START

Before testing, warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector to the body 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 motor does not start, check for voltage between the fan motor switch connector and ground.

- Battery voltage: • Faulty fan motor
- No battery volgage: • Broken wire harnes
  • Broken sub-fuse
  • Faulty ignition switch
  • Poor connection of the connector (between the ignition switch and fuse box)

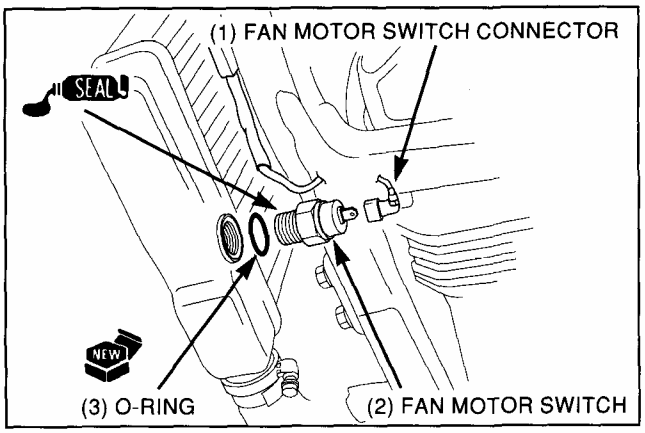


REMOVAL/INSTALLATION

Disconnect the fan motor switch connector from the fan motor switch.
Remove the fan motor switch and O-ring from the radiator.

Install the new O-ring.
Clean and apply sealant to the fan motor switch threads.
Install and tighten the fan motor switch to the specified torque.

Torque: 18 N·m (1.8 kgf-m, 13 lbf-ft)



Coolant Temperature, Thermosensor

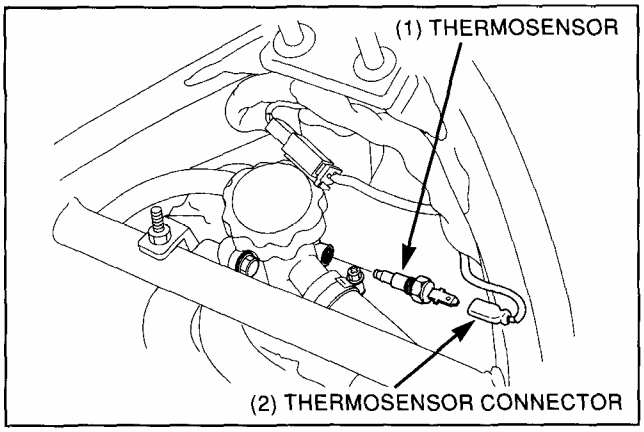
COOLANT TEMPERATURE INDICATOR

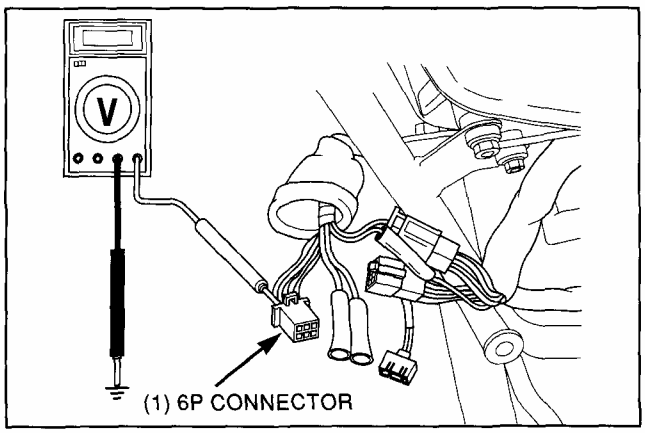
Remove the fuel tank (page 2-11).

Disconnect the thermosensor connector from the thermosensor and short it to body ground.
Turn the ignition switch ON.
The coolant temperature indicator should come on.

If the coolant temperature indicator does not come on, disconnect the speedometer 6P connector and measure the battery voltage at the speedometer 6P connector wire harness side.

Connection: **Black/Brown (+) — Body ground (-)**
Standard: **Battery voltage**





THERMOSENSOR INSPECTION

⚠ WARNING

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

NOTE:

- The thermosensor is a precision device and can be damaged easily.
  Before reinstalling an old switch, check that it is not damaged and in good condition.
- Soak the thermosensor in coolant up to its threads with at least a 40 mm (1.6 in) gap from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constat for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermosensor or thermometer touch the pan.

Drain the coolant (page 6-5).
Remove the fuel tank (page 2-11).

Disconnect the thermosensor connector.
Remove the thermosensor.

Suspend the thermosensor in a pan of coolant (50 - 50 mixture) over the electric heating element and check for continuity through the sensor as the coolant heats up.

Standard:
Start to close (ON): 112 - 118° C (259 - 270° F)
Start to open (OFF): Below 108° C (252° F)

Replace the sensor if it is out of specifications.

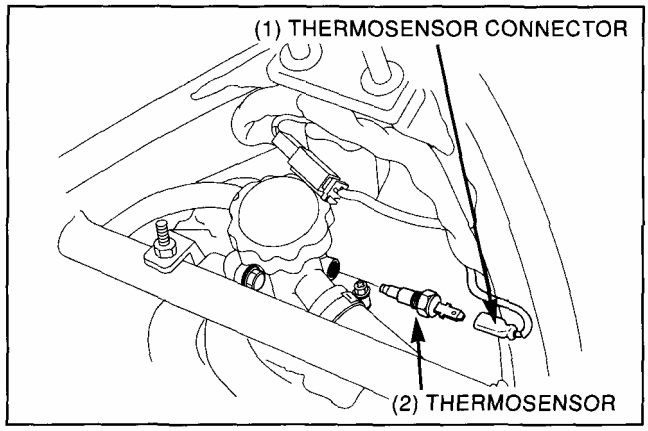
Clean and apply sealant to the thermosensor threads. Do not apply sealant to the sensor head.

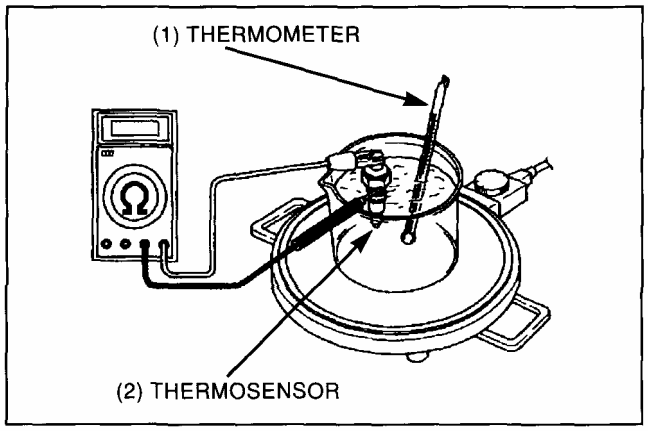
Install and tighten the thermosensor to the specified torque.

Torque: 12 N·m (1.2 kgf-m, 9 lbf-ft)

Connect the thermosensor connector.

Refill the coolant (page 6-5).
Install the fuel tank (page 2-11).



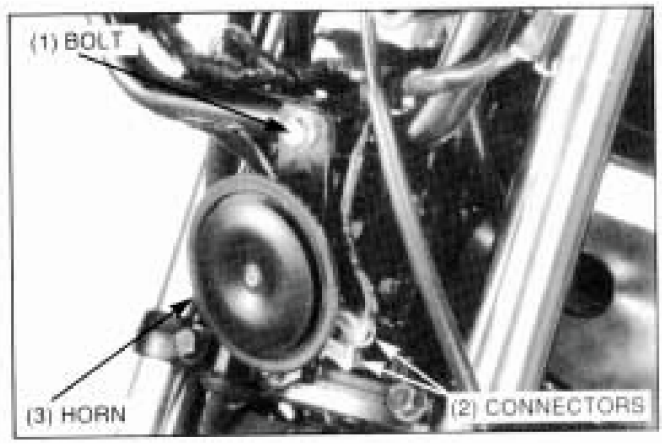


Horn

Remove the bolt.
Disconnect the horn connectors and remove 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

REMOVAL/INSTALLATION

Remove the left saddle bag (page 2-9).

Disconnect the turn signal relay 3P (Black) connector.
Remove the turn signal relay.

Installation is in the reverse order of removal.

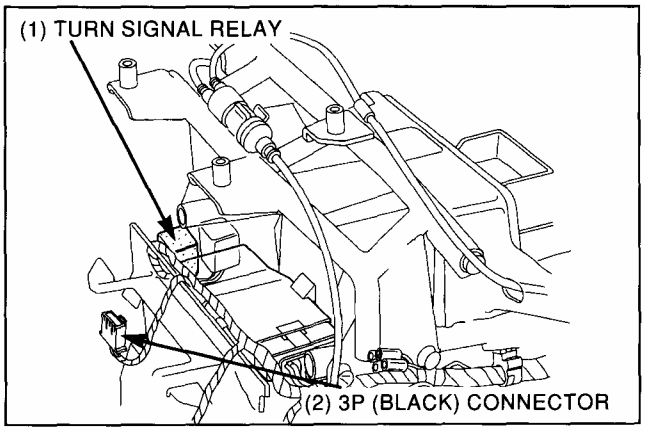
PERFORMANCE TEST

Check for turn signal circuit connection before testing.

Short the black and gray terminals of the turn signal relay connector with a jumper wire. Turn the ignition switch ON and check turn signal light by turning the switch ON.

If the light does not come on, check the turn signal switch or open circuit in Black/Brown or Gray wire.

If the light comes on, check for continuity between Green terminal and body ground at the turn signal relay 3P (Black) connector.
- No continuity: • Open circuit in Green wire
- Continuity: • Loose or poor contact of the turn signal relay 3P connector
  • Faulty turn signal relay



Side Stand Switch

INSPECTION

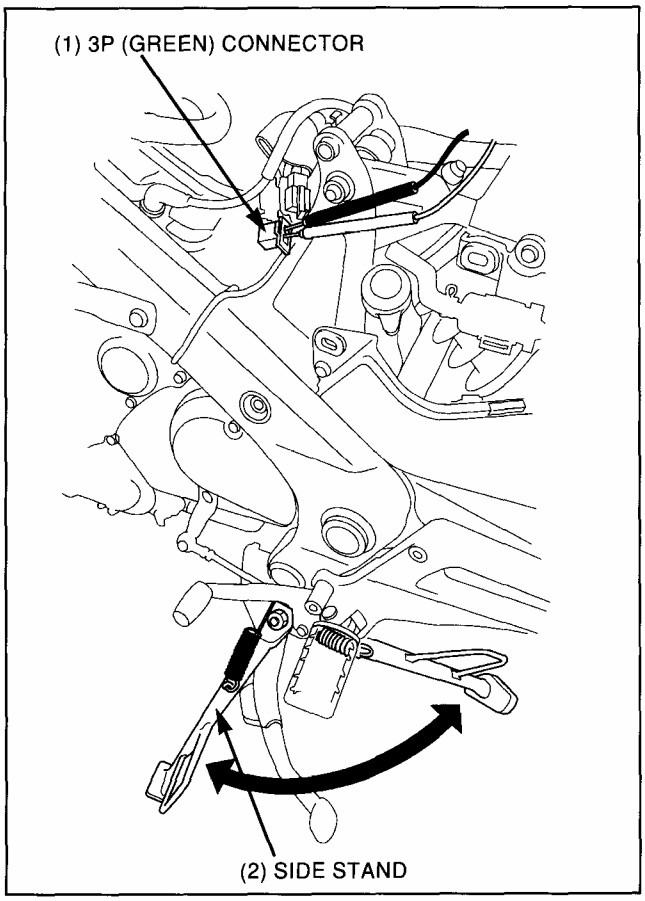
Remove the left side cover (page 2-2).

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

Check for continuity between each of the terminals as below.
There should be continuity between the O - O positions on the chart below.

SIDE STAND SWITCH

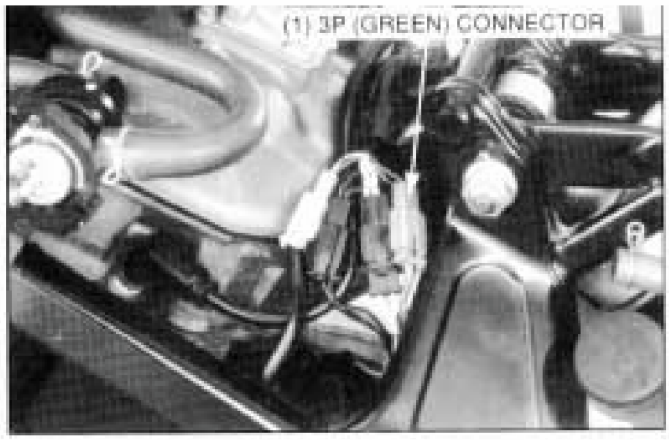
	Green/White	Yellow/Black	Green
Side stand down		O——	——O
Side stand up	O——		——O



REMOVAL

Remove the left side cover (page 2-2).

Disconnect the side stand 3P (Green) connector.



Remove the side stand switch bolt and side stand switch.

INSTALLATION

Install the side stand switch.

NOTE:

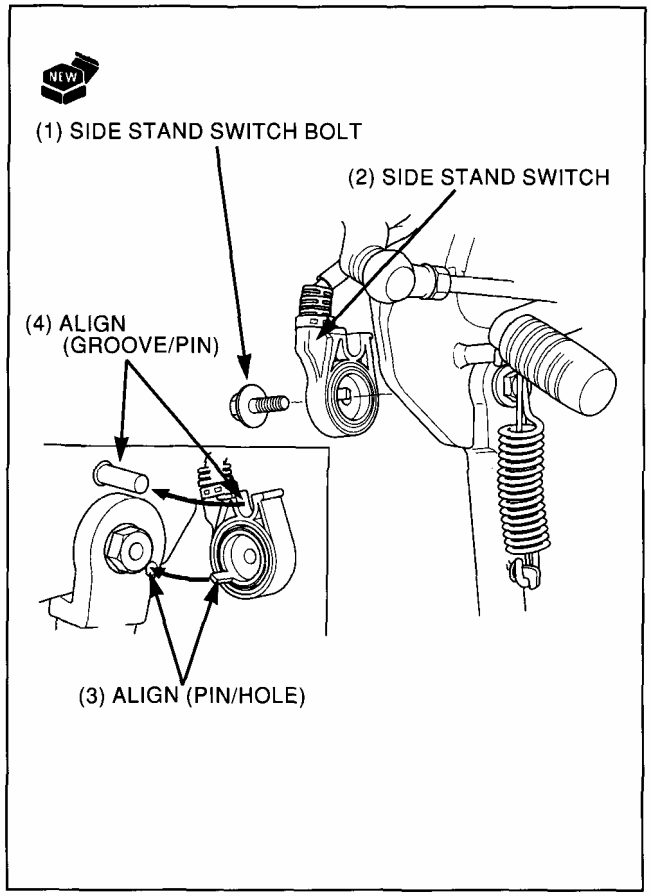
- At side stand switch installation, align the pin on the switch with the hole in the side stand.
- At side stand switch installation, align the groove on the switch with the pin on the side stand bracket.

Install and tighten the new side stand switch bolt to the specified torque.

Torque: 10 N·m (1.0 kgf-m, 7 lbf-ft)

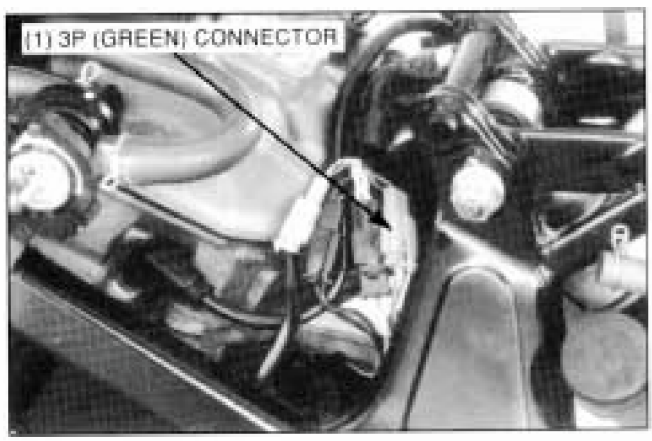
NOTE:

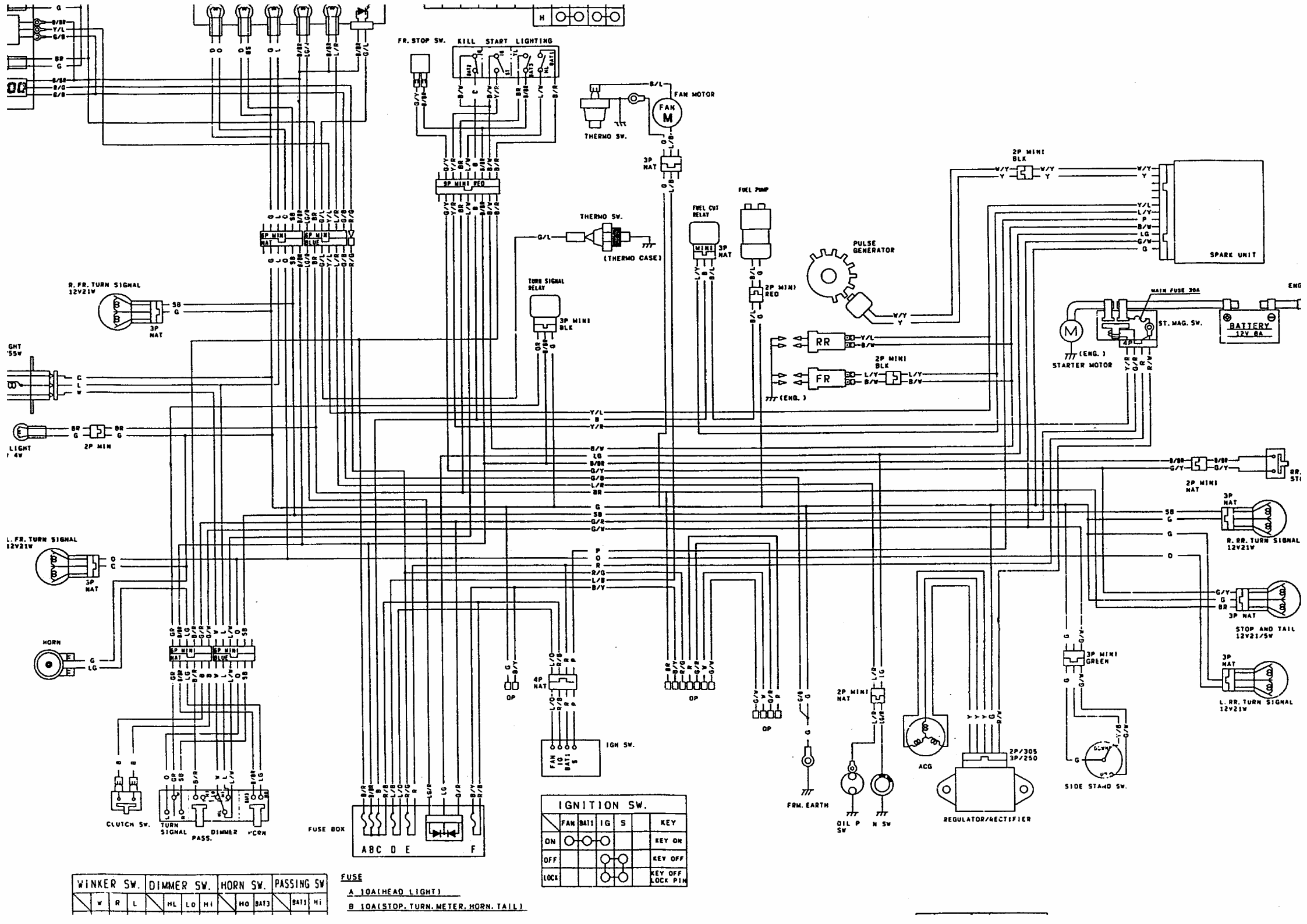
- Route the side stand switch wire properly (page 1-27).



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

Install the left side cover (page 2-2).




FR. STOP SW.
KILL START LIGHTING
FAN MOTOR
THERMO SW.
FUEL CUT RELAY
FUEL PUMP
PULSE GENERATOR
SPARK UNIT
MAIN FUSE 30A
ST. MAG. SW.
BATTERY 12V 8A
(ENG.) STARTER MOTOR
TURN SIGNAL RELAY
R. FR. TURN SIGNAL 12V21W
L. FR. TURN SIGNAL 12V21W
R. RR. TURN SIGNAL 12V21W
L. RR. TURN SIGNAL 12V21W
STOP AND TAIL 12V21/5W
HORN
IGN SW.
FRM. EARTH
ACG
REGULATOR/RECTIFIER
SIDE STAND SW.
OIL P SW
N SW
CLUTCH SW.
TURN SIGNAL
PASS.
DIMMER
HORN
FUSE BOX
ABC D E F
IGNITION SW.
KEY ON
KEY OFF
KEY OFF LOCK PIN
WINKER SW.
DIMMER SW.
HORN SW.
PASSING SW
FUSE
A 10A(HEAD LIGHT)
B 10A(STOP, TURN, METER, HORN, TAIL)

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Engine Does Not Start or is Hard to Start

		Possible Cause
1. Check the fuel flow to carburetor	Not reaching carburetor	• Clogged fuel line and filter • Pinched fuel valve vacuum tube • Clogged fuel tank breather
Reaching carburetor		
2. Perform a spark test	Weak or no spark	• Faulty spark plug • Fouled spark plug • Faulty ignition control module • Broken or shorted spark plug wire • Faulty ignition switch • Faulty ignition pulse generator • Faulty engine stop switch • Loose or disconnected ignition system wires
Good spark		
3. Remove and inspect spark plugs	Wet plug	• Flooded carburetor • SE valve ON position • Throttle valve open • Air cleaner dirty
Good		
4. Start by following normal procedure	Engine starts but stops	• Improper choke operation • Carburetor incorrectly adjusted • Intake pipe leaking • Improper ignition timing (Faulty ignition coil or ignition pulse generator) • Fuel contaminated
Engine does not start		
5. Test cylinder compression	Low compression	• Valve clearance too small • Valve stuck open • Worn cylinder and piston ring • Damaged cylinder head gasket • Seized valve • Improper valve timing

Engine Lacks Power

		Possible Cause
1. Raise wheel off the ground and spin by Wheel pins freely	Wheels do not spin freely	• Brake dragging • Worn or damaged wheel bearing
2. Check tire pressure Pressure normal	Pressure low	• Faulty tire valve • Punctured tire
3 Accelerate rapidly from low to second Engine speed reduced when clutch is released	Engine speed doesn't change accordingly when clutch is released	• Clutch slipping • Worn clutch discs/plates • Warped clutch discs/plates • Weak clutch spring • Additive in engine oil
4. Accelerate lightly Engine speed increase	Engine speed does not increase	• SE valve ON position • Clogged air cleaner • Restricted fuel flow • Clogged muffler • Pinched fuel tank breather
5. Check ignition timing Correct	Incorrect	• Faulty ignition control module • Faulty ignition pulse generator
6. Test cylinder compression Normal	Incorrect	• Valve stuck open • Worn cylinder and piston rings • Leaking head gasket • Improper valve timing
7. Check carburetor for clogging Not clogged	Clogged	• Carburetor not serviced frequently enough
8. Remove spark plugs Not fouled or discolored	Fouled or discolored	• Plugs not serviced frequently enough • Spark plugs are the incorrect heat range
9. Check oil level and condition Correct	Incorrect	• Oil level too high • Oil level too low • Contaminated oil
10. Remove cylinder head cover and inspect lubrication Valve train lubricated properly	Valve train not lubricated properly	• Clogged oil passage • Clogged oil control orifice

		Possible Cause
11. Check for engine overheating	Overheating	• Coolant level low • Fan motor not working (faulty fan motor switch) • Thermostat stuck close • Excessive carbon build-up in combustion chamber • Use of poor quality fuel • Clutch slipping • Lean fuel mixture • Wrong type of fuel
Not overheating		
12. Accelerate or run at hight speed	Engine knocks	• Worn piston and cylinder • Wrong type of fuel • Excessive carbon build-up in combustion chamber • Ignition timing to advanced (faulty ignition control module) • Lean fuel mixture
Engine does not knock		

Poor Performance at Low and Idle Speed

		Possible Cause
1. Check carburetor pilot screw adjustment	Incorrect	• See section 5
Correct		
2. Check for leaking intake pipe	Leaking	• Loose insulator clamps • Damaged insulator
Not leak		
3. Perform spark test	Weak or intermitent spark	• Faulty carbon or wet fouled spark plug • Faulty ignition control module • Faulty ignition coil • Broken or shorted spark plug wire • Faulty engine stop switch • Faulty ignition pulse generator • Faulty ignition switch • Loose or disconnected ignition system wires
Good spark		
4. Check ignition timing	Incorrect	• Improper ignition timing (faulty ignition control module)

Poor Performance at High Speed

		Possible Cause
1. Disconnect fuel tube at carburetor and pump the vacuum line	Fuel flow restricted →	• Clogged fuel line • Clogged fuel tank breather • Faulty fuel valve • Clogged fuel filter
Fuel flows freely ↓		
2. Remove the carburetor and check for clogging	Clogged →	• Clean
Not clogged ↓		
3. Check valve timing	Incorrect →	• Cam sprocket not installed properly
Correct ↓		
4. Check ignition timing	Incorrect →	• Faulty ignition control module • Faulty ignition pulse generator
Correct ↓		
5. Check valve spring	Weak →	• Faulty spring
Not weak		

Poor Handling

	Possible Cause
1. If steering is heavy →	• Steering stem adjusting nut too tight • Damaged steering head bearings
2. If either wheel is wobbling →	• Excessive wheel bearing play • Bent rim • Improper installed wheel hub • Swingarm pivot bearing excessively worn • Bent frame
3. If the motorcycle pulls to one side →	• Faulty shock absorber • Front and rear wheel not aligned • Bent fork • Bent swingarm • Bent axle

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24. NT650V(2) ADDENDUM

INTRODUCTION

This addendum contains information for the NT650V(2). Refer to NT650V Shop manual (No.63MBLS1MH, No.63MBLFS1MH) for service procedures and data not included in this addendum.

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SERVICE PUBLICATION OFFICE

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IMPORTANT SAFETY NOTICE

⚠ WARNING ***Indicates a strong possibility of severe personal injury or death if instructions are not followed.***

CAUTION: ***Indicates a possibility of equipment damage if instructions are not followed.***

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda, might be done or of the possibly hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized by the service methods or tools selected.

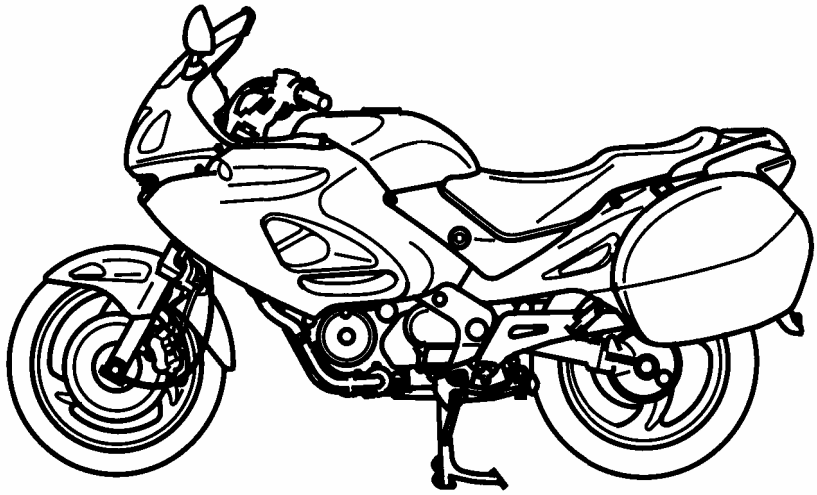
TYPE CODE

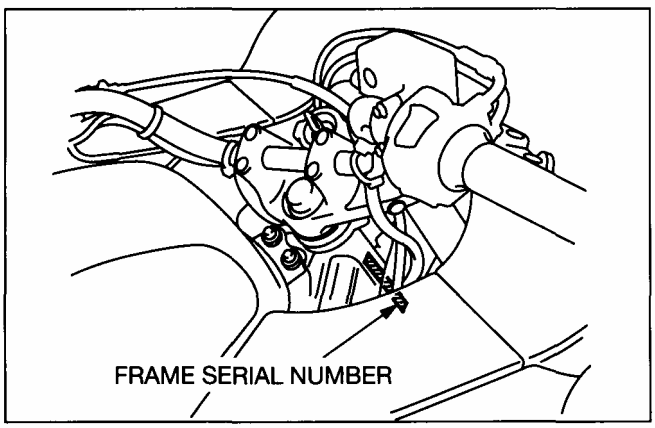
- Throughout this manual, the following abbreviations are used to identify individual model.

CODE	AREA TYPE
E	U.K.
ED	European direct seles; Spain, Italy, Holland, Belgium, Portugal, Swizerland, Germany,
F	France

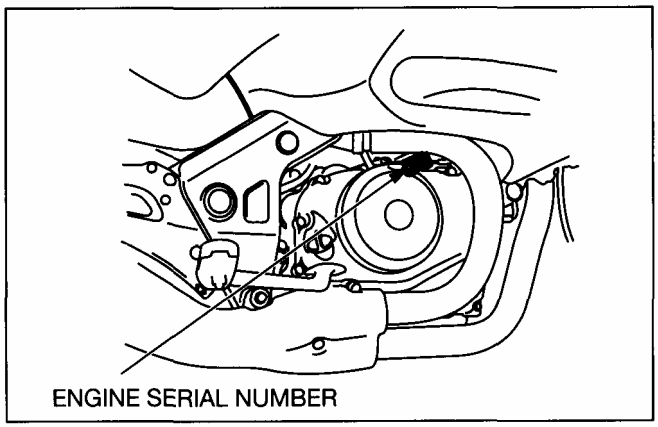
CODE	AREA TYPE
IIG	Germany (Limited power: 37 kw)
IIF	France (Limited power: 25 kw)
IIED	European direct seles; Spain, Holland, Portugal, Germany (IIIG) (Limited power: 25 kw)

MODEL IDENTIFICATION

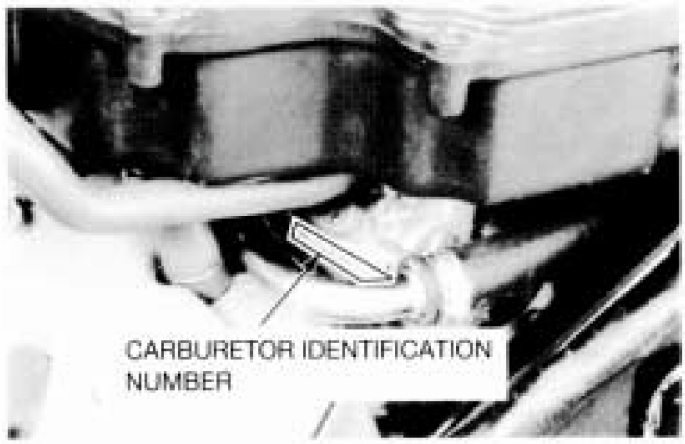




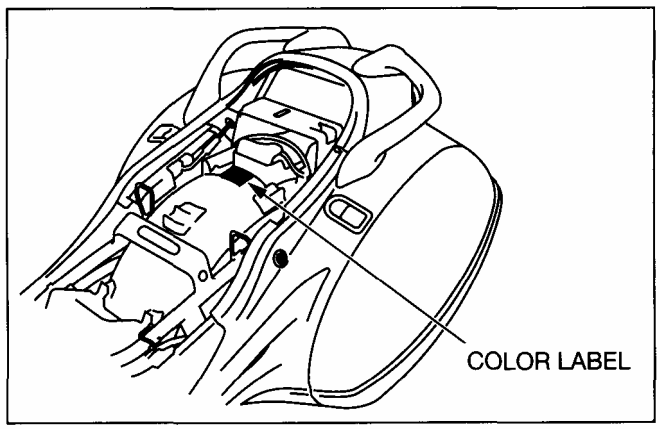
The frame serial number is stamped on the right side of the steering head.



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



The carburetor identification numbers are stamped on the intake side of the carburetor body as shown.



The color label is attached as shown. When ordering color-coded parts, always specify the designated color code.

SPECIFICATIONS

GENERAL

ITEM		SPECIFICATIONS
DIMENSIONS	Overall length	2,215 mm (87.2 in)
	Overall width	780 mm (30.7 in)
	Overall height	1,260 mm (49.6 in)
	Wheelbase	1,475 mm (58.1 in)
	Seat height	814 mm (32.0 in)
	Footpeg height	319 mm (12.6 in)
	Ground clearance	140 mm (5.5 in)
	Dry weight	233 kg (513 lbs)
	Curb weight	248 kg (546 lbs)
	Maximum weight capacity	192 kg (423 lbs)
FRAME	Frame type	Twin tube
	Front suspension	Telescopic fork
	Front wheel travel	130 mm (5.1 in)
	Rear suspension	Swingarm
	Rear wheel travel	120 mm (4.7 in)
	Rear damper	Nitrogen gas filled damper
	Front tire size	120/70 ZR17MC (58W)
	Rear tire size	150/70 ZR17MC (69W)
	Tire brand Dunlop	Front: D205FN /Rear: D205N
	Michelin	Front/Rear: MACADAM90XB
	Front brake	Hydraulic double disc brake with 3 pots caliper
	Rear brake	Hydraulic single disc brake with 2 pots caliper
	Caster angle	28°
	Trail length	116 mm (4.6 in)
	Fuel tank capacity	19.0 liter (5.02 US gal, 4.18 Imp gal)
	Fuel tank reserve capacity	3.2 liter (0.85 US gal, 0.70 Imp gal)
ENGINE	Bore and stroke	79.0 x 66.0 mm (3.11 x 2.60 in)
	Displacement	647 cm^3 (39.5 cu-in)
	Compression ratio	9.2 : 1
	Valve train	Silent, Multi-link chain drive and OHC with rock arm
	Intake valve opens	5° BTDC — At 1 mm (0.04 in)lift
	closes	40° ABDC
	Exhaust valve opens	40° BBDC
	closes	10° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Paper filter
	Crankshaft type	Unit type, two main jornals
	Engine dry weight	66.5 kg (146.6 lbs)
	Cylinder arrangement	Front - 232° - Rear - 488° - Front
	Cylinder number	Front: #2, Rear: #1

GENERAL (Cont'd)

ITEM			SPECIFICATIONS
CARBURETOR	Carburetor type		CV (Constant Velocity) dual carburetor with fuel pump
	Throttle bore		36.5 mm (1.4 in)
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Mechanical type
	Transmission		Constant mesh, 5-speed
	Primary reduction		1.763 (67/38)
	Secondary reducation		0.820 (32/39)
	Third reduction		1.058 (18/17)
	Final reduction		3.091 (34/11)
	Gear ratio	1st	3.000 (33/11)
		2nd	1.941 (33/17)
		3rd	1.500 (30/20)
		4th	1.240 (31/25)
		5th	1.095 (23/21)
	Gearshift pattern		Left foot operated return system, 1–N–2–3–4–5
ELECTRICAL	Ignition system		Full transistor digital ignition
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		SCR shorted/triple phase, full wave rectification
	Lighting system		Battery

LUBRICATION

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	at draining	2.4 liter (2.5 US qt, 2.1 Imp qt)	—
	at disassembly	3.0 liter (3.2 US qt, 2.6 Imp qt)	—
	at oil filter change	2.6 liter (2.7 US qt, 2.3 Imp qt)	—
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		441 kPa (4.5 kgf/cm², 64 psi) at 6,000 min⁻¹ (rpm) (80°C/176°F)	—
Oil pump rotor	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

ITEM		SPECIFICATIONS
Clutch lever free play		VDK1E
Main jet	Front	#125
	Rear	#125
Slow jet		#42
Pilot screw	Initial/final opening	See page 24-36
Float level		9.2 mm (0.36 in)
Base carburetor (for synchronization)		Rear cylinder (#1)
Idle speed		1,200 ± 100 min⁻¹ (rpm)
Carburetor vacuum difference		27 kPa (20 mm Hg, 0.7 in Hg)
PAIR control valve specified vacuum		320 mm Hg (12.6 in Hg)
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)
Fuel pump flow capacity		Minimum 600 cm³ (20.3 US oz, 21.1 Imp oz) per minute at 13 V

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.1 liter (0.55 US gal, 0.46 Imp gal)
	Reserve tank	0.25 liter (0.26 US qt, 0.22 Imp qt)
Radiator cap relief pressure		88 – 127 kPa (0.9 – 1.3 kgf/cm², 13 – 18 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		50% mixture with soft water

CLUTCH SYSTEM

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 3/4)	—
Clutch spring free length		42.3 (1.67)	43.9 (1.73)
Clutch disc thickness	A	2.62 – 2.78 (0.103 – 0.107)	2.3 (0.09)
	B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	C	2.62 – 2.78 (0.103 – 0.107)	2.3 (0.09)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.09 (0.870)
	O.D.	31.959 – 31.975 (1.2582 – 1.2589)	31.92 (1.257)
Oil pump drive sprocket I.D.		32.025 – 32.145 (1.2608 – 1.2655)	30.15 (1.187)
Mainshaft O.D. at clutch outer guide		21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)

ALTERNATOR/STARTER CLUTCH

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	37.000 – 37.025 (1.4567 – 1.4577)	37.10 (1.461)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)

CYLINDER HEAD/VALVE

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,324 ± 196 kPa (13.5 ± 2.0 kgf/cm², 192 ± 28 psi) at 400 min⁻¹ (rpm)	—
Cylinder head warpage			—	0.10 (0.004)
	Valve clearance	IN	0.15 (0.006)	—
		EX	0.20 (0.008)	—
	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.47 (0.215)
		EX	6.555 – 6.570 (0.2580 – 0.2587)	6.55 (0.258)
	Valve guide I.D.	IN	5.500 – 5.512 (0.2165 – 0.2170)	5.53 (0.218)
		EX	6.600 – 6.615 (0.2598 – 0.2604)	6.66 (0.262)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX	0.030 – 0.060 (0.0012 – 0.0024)	0.11 (0.004)
		IN	19.4 – 19.6 (0.76 – 0.77)	—
		EX	17.9 – 18.1 (0.70 – 0.71)	—
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	Outer	IN	42.14 (1.659)	40.58 (1 .598)
		EX	42.83 (1.686)	41.25 (1.624)
	Inner	IN	38.11 (1.500)	36.47 (1.436)
		EX	38.81 (1.765)	37.51 (1.477)
Camshaft	Cam lobe height	IN	38.189 (1.5035)	38.17 (1.503)
		EX	38.213 (1.5044)	38.19 (1.504)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.95 (0.864)
	Runout		0.030 (0.012)	0.05 (0.002)
	Oil clearance		0.040 –0.093 (0.0015 – 0.0037)	0.11 (0.004)
	Identification marks		"F": Front, "R": Rear	—
Rocker arm I.D.		IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.03 (0.474)
Rocker arm shaft O.D.		IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.96 (0.471)
Rocker arm-to-rocker arm shaft clearance			0.016 – 0.052 (0.0006 – 0.0020)	0.07 (0.003)

CYLINDER/PISTON

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.05 (3.112)
	Out of round		—	0.06 (0.002)
	Taper		—	0.06 (0.002)
	Warpage		—	0.10 (0.004)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		78.97 – 78.99 (3.109 – 31.110)	78.92 (3.107)
	Piston O.D. measurement point		3 – 13 mm (0.1 – 0.5 in) from bottom of skirt	—
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7089)	18.02 (0.709)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7086)	17.98 (0.707)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.03 (0.001)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.11 (0.004)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.10 (0.004)
	Piston ring end gap	Top	0.15 – 0.25 (0.006 – 0.010)	0.6 (0.02)
		Second	0.25 – 0.40 (0.010 – 0.016)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.80 (0.008 – 0.031)	1.0 (0.04)
	Piston ring mark	Top	"R" mark	—
		Second	"RN" mark	—
Cylinder-to-piston clearance			0.010 – 0.035 (0.0004 – 0.0014)	0.13 (0.005)
Connecting rod small end I.D.			20.016 – 20.034 (0.7880 – 0.7887)	20.04 (0.789)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

CRANKSHAFT/TRANSMISSION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		—	0.05 (0.002)
	Crankpin oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.08 (0.003)
	Main journal oil clearance		0.025 – 0.041 (0.0010 – 0.0016)	0.05 (0.002)
Transmission	Gear I.D.	M4, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.03 (1.103)
		C1, C2, C3	31.000 – 31.025 (1.2205 – 1.2215)	31.05 (1.222)
	Bushing O.D.	M4, M5	27.959 – 27.980 (1.2185 – 1.2194)	27.35 (1.100)
		C1, C2, C3	30.950 – 30.975 (1.2185 – 1.2194)	30.93 (1.218)
	Bushing I.D.	M4	25.000 – 25.021 (0.9843 – 0.9851)	25.03 (0.985)
	Gear-to-bushing clearance	M4, M5, C1, C2, C3	0.025 – 0.075 (0.0010 – 0.0030)	0.011 (0.0004)
	Mainshaft O.D.	M4 bushing	24.959 – 24.980 (0.9826 – 0.9835)	24.95 (0.982)
		Case journal A	19.980 – 19.993 (0.7866 – 0.7871)	19.96 (0.786)
		Case journal B	21.967 – 21.980 (0.8648 – 0.8654)	21.94 (0.864)
	Countershaft O.D.	Case journal A	19.980 – 19.993 (0.7866 – 0.7871)	19.96 (0.786)
		Case journal B	19.980 – 19.993 (0.7866 – 0.7871)	19.96 (0.786)
	Bushing-to-shaft clearance	M4	0.020 – 0.062 (0.0008 – 0.0024)	0.08 (0.003)
Shift fork, fork shaft	Fork	I.D.	13.000 – 13.021 (0.5118 – 0.5126)	13.04 (0.513)
		Claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D. (at left side journal)			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)
Output drive gear	Output gear I.D.		24.000 – 24.021 (0.9449 – 0.9457)	24.10 (0.949)
	Output gear bushing	O.D.	23.959 – 23.980 (0.9433 – 0.9441)	23.70 (0.933)
		I.D.	20.020 – 20.041 (0.7882 – 0.7890)	20.10 (0.791)
	Output drive gear shaft O.D.		19.979 – 20.000 (0.7866 – 0.7874)	19.97 (0.786)
	Gear-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Output gear damper spring free length		58.40 (2.299)	56.0 (2.20)
	Output drive gear backlash		0.08 – 0.23 (0.003 – 0.009)	0.4 (0.02)
	Backlash difference between measurements		—	0.10 (0.004)

FINAL DRIVE

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Recommended final drive oil	Hypoid gear oil SAE #80	—
Final drive oil capacity at draining/disassembly	150 cm^3 (5.1 US oz, 5.3 Imp oz)	—
Final drive gear backlash	0.05 – 0.15 (0.002 – 0.006)	0.3 (0.01)
Backlash difference between measurements	—	0.10 (0.004)
Ring gear-to-stop pin clearance	0.3 – 0.6 (0.01 – 0.02)	—
Final drive gear assembly preload	0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·in)	—

FRONT WHEEL/SUSPENSION/STEERING

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm², 36 psi)	—
	Driver and passenger	250 kPa (2.50 kgf/cm², 36 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Fork	Spring free length	416.9 (16.41)	408.6 (16.09)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Fork fluid	—
	Oil level	113 (4.4)	—
	Oil capacity	480 ± 2.5 cm³ (16.2 ± 0.08 US oz, 16.9 ± 0.09 Imp oz)	—
Steering head bearing preload		0.23 – 0.37 kgf (0.507 – 0.816 lbf)	—

REAR WHEEL/SUSPENSION

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm², 42 psi)	—
	Driver and passenger	290 kPa (2.90 kgf/cm², 42 psi)	—
Axle runout		—	0.20 (0.008)
Rear wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz)
Shock absorber spring preload adjuster setting		5.5 turns (11 clicks) from lowest position	—

HYDRAULIC BRAKE

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	—
	Brake pad wear indicator		—	To groove
	Brake disc thickness		4.5 (0.18)	3.5 (0.14)
	Brake disc runout		—	0.25 (0.010)
	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.	Outer	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
		Center	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	Caliper piston O.D.	Outer	26.918 – 26.968 (1.0598 – 1.0617)	26.910 (1.0594)
		Center	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
Rear	Specified brake fluid		DOT 4	—
	Brake pad wear indicator		—	To groove
	Brake disc thickness		0.6 (0.24)	5.0 (0.20)
	Brake disc runout		—	0.25 (0.010)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6848)	17.405 (0.6852)
	Caliper cylinder I.D.		32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.		31.948 – 31.998 (1.2578 – 1.2598)	31.94 (1.257)

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 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 rate	Normal	0.9 A/5 – 10 h
		Quick	4.0 A/1 h max.
Alternator	Capacity		0.24kw/5,000 min^{-1} (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0
Regulator/rectifier regulated voltage			14 – 15 V/5,000 min^{-1} (rpm)

IGNITION SYSTEM

ITEM		SPECIFICATIONS	
Spark plug		NGK	DENSO
	Standard	DPR8EA-9	X24EPR-U9
	For cold climate (below 5°C/41°F)	DPR7EA-9	X22EPR-U9
	For extend high speed riding	DPR9EA-9	X27EPR-U9
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	9.5° BTDC	
Advance	Start	10°/1,500 min^{-1} (rpm)	
	Stop	29°/9,000 min^{-1} (rpm)	
Full advance		29°	

ELECTRIC STARTER

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	6.5 (0.26)

LIGHTS/METERS/SWITCHES

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12V – 60/55 W
	Position light	12V – 4 W
	Brake/tail light	12V – 21/5 W
	Turn signal light	12V – 21 W x 4
	Instrument light	12V – 1.7 W x 2
	Clock light	12V – 1.7 W
	Immobilizer indicator	12V – 1.7 W
	Turn signal indicator	12V – 1.7 W x 2
	High beam indicator	12V – 1.7 W
	Neutral indicator	12V – 1.7 W
	Oil pressure indicator	12V – 1.7 W
Fuse	Main fuse	30 A
	Sub fuse	3 A x 2, 10 A x 4
Fan motor switch	Start to close (ON)	98 – 102°C (208 – 216°F)
	Start to open (OFF)	93 – 97°C (199 – 207°F)
Coolant temperature sensor	Start to close (ON)	112 – 118°C (259 – 270°F)
	Start to open (OFF)	Below 108°C (252°F)

TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8mm head)	9 (0.9, 6.5)
10 mm hex bolt and nut	34 (3.5, 25)	6 mm flange bolt (10mm head) and nut	12 (1.2, 9)
12 mm hex bolt and nut	54 (5.5, 40)	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 grease to the threads.
2. Apply oil to the threads and seating surface.
3. Apply sealant to the threads.
4. Apply a locking agent to the threads.
5. Stake
6. CT bolt
7. UBS bolt
8. Left hand threads.
9. Self tapping screw
10. ALOC bolt/screw : replace with a new one.
11. U-nut
12. Torx bolt

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
MAINTENANCE:				
Spark plug	4	12	14 (1.4, 10)	
Engine oil drain bolt	1	30	29 (3.0, 22)	
Engine oil filter cartridge	1	20	10 (1.0, 7)	
Timing hole cap	1	14	10 (1.0, 7)	NOTE 1
Crankshaft hole cap	1	30	15 (1.0, 7)	NOTE 1
Valve adjusting screw lock nut	1	7	23 (2.3, 17)	NOTE 2
LUBRICATION SYSTEM:				
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 3
Oil pressure switch wire terminal screw	1	4	2 (0.2, 14)	
Oil pump cover bolt	3	6	13 (1.3, 9)	NOTE 6
Oil filter boss (stud)	1	20	18 (1.8, 13)	NOTE 4
COOLING SYSTEM:				
Water pump cover bolt	2	6	12 (1.2, 9)	
CLUTCH/GEARSHIFT LINKAGE:				
Clutch lifter plate bolt	4	6	12 (1.2, 9)	
Clutch center lock nut	1	18	128 (13.0, 94)	NOTE 2, 5
Primary drive gear bolt	1	12	88 (9.0, 65)	
Gearshift return spring pin	1	8	23 (2.3, 17)	
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 4
ALTERNATOR/STARTER CLUTCH:				
Flywheel bolt	1	12	128 (13.0, 94)	NOTE 7, 8
Stator wire holder socket bolt	4	6	12 (1.2, 9)	NOTE 4
Starter one-way clutch socket bolt	6	8	29 (3.0, 22)	NOTE 4, 12
Stator wire holder socket bolt	1	6	12 (1.2, 9)	NOTE 4

ENGINE (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
CLYNDER HEAD/VALVE:				
EVAP air injection reed valve cover bolt	4	5	5 (0.5, 3.6)	NOTE 6
Cylinder head cover bolt	4	6	10 (1.0, 7)	
Cam sprocket bolt	4	7	23 (2.3, 17)	NOTE 4
Camshaft holder 8 mm bolt	6	8	23 (2.3, 17)	
8 mm nut	4	8	23 (2.3, 17)	
Cam chain tensioner mounting bolt	4	6	10 (1.0, 7)	
Cylinder head 8 mm bolt	4	8	23 (2.3, 17)	NOTE 2
8 mm nut	2	8	23 (2.3, 17)	
10 mm nut	8	10	47 (4.8, 35)	
CRANKCASE/CRANKSHAFT/TRANSMISSION:				
Crankcase 8 mm bolt	15	8	23 (2.3, 17)	NOTE 2
Connecting rod bearing cap nut	8	8	33 (3.4, 25)	NOTE 4, 7
Output gear case bolt: 8 x 110 mm	2	8	31 (3.2, 23)	NOTE 4, 7
8 x 65 mm	1	8	31 (3.2, 23)	NOTE 2, 7
8 x 60 mm	1	8	31 (3.2, 23)	NOTE 2, 7
8 x 45 mm	1	8	31 (3.2, 23)	NOTE 2, 5
Output drive gear bearing lock nut (inner)	1	30	69 (7.0, 51)	NOTE 2, 5
(outer)	1	64	98 (10.0, 72)	NOTE 2, 5
Output driven gear bearing lock nut (inner)	1	30	69 (7.0, 51)	NOTE 2, 5
(outer)	1	64	98 (10.0, 72)	NOTE 2, 5
Output driven gear bearing holder bolt	4	8	31 (3.2, 23)	NOTE 2
Output drive gear shaft bolt	1	10	49 (5.0, 36)	
ELECTRIC STARTER:				
Starter motor cable nut	1	6	10 (1.0, 7)	
Starter motor cable socket bolt	1	4	5 (0.5, 3.6)	
LIGHTS/METERS/SWITCHES:				
Neutral switch	1	10	12 (1.2, 9)	

FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME BODY PANELS/EXHAUST SYSTEM:				
Footpeg bracket bolt	4	8	26 (2.7, 20)	
MAINTENANCE:				
Air cleaner housing cover screw	10	5	0.1 (1, 0.7)	
COOLING SYSTEM:				
Fan motor nut	3	5	3 (0.3, 2.2)	
Cooling fan nut	1	5	5 (0.5, 3.6)	NOTE 4
Cooling fan stroud bolt	3	6	9 (0.9, 6.5)	
Radiater filler bolt	2	6	9 (0.9, 6.5)	
Themostat housing cover bolt	2	6	10 (1.0, 7)	
Fan motor switch	1	PT 1/8	10 (1.0, 7)	NOTE 4
Water pump cover bolt	4	6	13 (1.3, 9)	
ENGINE MOUNTING:				
Front engine lower mounting bolt	1	10	39 (4.0, 29)	
Rear engine upper mounting bolt	1	10	39 (4.0, 29)	
Rear engine lower mounting bolt	1	10	44 (4.5, 33)	NOTE 2
Front engine hanger bolt	2	8	27 (2.8, 2.0)	
Hanger plate mounting bolt	4	8	34 (3.5, 25)	
FINAL DRIVE:				
Final gear case assembly mounting bolt	4	10	64 (6.5, 47)	NOTE 7
Final driven oil filler cap	1	30	12 (1.2, 9)	
Gear case cover bolt: 10 mm	2	10	47 (4.8, 35)	NOTE 4
8 mm	6	8	25 (2.5, 18)	
Pinion retainer	1	64	108 (11.0, 80)	
Pinion retainer lock tab bolt	1	6	10 (1.0, 7)	
Pinion gear shaft nut	1	16	108 (11.0, 80)	
Dust guard plate bolt	1	6	10 (1.0, 7)	NOTE 9
FRONT WHEEL/SUSPENSION/STEERING				
Steering stem nut	1	24	103 (10.5, 76)	Page 14-37
Top threed	1	26	23 (2.3, 17)	NOTE 2
Top bridge pinch bolt	2	8	23 (2.3, 17)	
Bottom bridge pinch bolt	2	10	39 (4.0, 29)	
Front axle	1	14	59 (6.0, 43)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Front brake disc bolt	12	8	42 (4.3, 31)	NOTE 4
Fork cap	2	37	23 (2.3, 17)	
Fork socket bolt	2	8	22 (2.2, 16)	NOTE 4
Handleber upper holder bolt	4	8	27 (2.8, 20)	
REAR WHEEL/SUSPENSION:				
Rear axle nut	1	18	89 (9.1, 66)	NOTE 11
Rear axle pinch bolt	1	8	26 (2.7, 20)	
Rear brake disc bolt	6	8	42 (4.3, 31)	NOTE 4
Damper holder plate bolt	5	6	20 (2.0, 14)	NOTE 10
Final driven frange bolt	5	10	59 (6.0, 43)	NOTE 10
Rear shock absorber upper mounting bolt	1	12	108 (11.0, 80)	NOTE 2,11
Rear shock absorber upper mounting nut	1	10	44 (4.5, 33)	NOTE 11
Swingarm right pivot bolt	1	23	10 (1.0, 7)	
Swingarm right pivot lock nut	1	23	98 (10.0, 72)	
Swingarm left pivot bolt	1	23	98 (10.0, 72)	
Rear brake caliper stopper bolt	1	14	89 (9.1, 66)	

FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
HYDRAULIC BRAKE:				
Front brake caliper mounting bolt	4	8	31 (3.2, 23)	NOTE 4
Front caliper pin	1	8	22 (2.2, 1.6)	
Front caliper bracket pin	1	8	12 (1.2, 9)	
Rear brake caliper pin	1	8	27 (2.8, 20)	
Rear brake caliper bracket pin	1	8	22 (2.3, 17)	
Front brake caliper bleeder	3	8	6 (0.6, 4.3)	
Rear brake caliper bleeder	1	8	6 (0.6, 4.3)	
Brake pad pin	3	10	17 (1.7, 1.2)	
Front caliper body B bolt	6	8	32 (3.3, 24)	NOTE 10
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Rear master cylinder holder bolt	2	6	12 (1.2, 9)	
Rear master cylinder joint lock nut	1	8	18 (1.8, 13)	
Rear brake resevoir holder bolt	1	6	12 (1.2, 9)	
Front master cylinder cover screw	2	4	1 (0.1, 0.7)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Brake hose oil bolt	6	10	35 (3.6, 26)	
Front brake hose guide bolt	3	6	12 (1.2, 9)	
Rear brake hose guide bolt	4	6	12 (1.2, 9)	
Rear brake hose joint screw	1	4	1 (0.1, 0.7)	
Front brake pipe	8	10	17 (1.7, 12)	NOTE 2
PCV (Proportional Control Valve) mounting bolt	2	6	12 (1.2, 9)	
LIGHTS/METERS/SWITCHES:				
Side stand switch mounting bolt	1	6	10 (1.0, 7)	
Thermosensor	1	16	18 (1.8, 13)	
OTHERS:				
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand lock nut	1	10	26 (2.7, 20)	

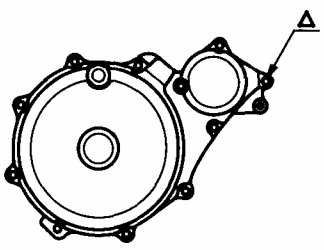
TOOLS

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Float level gauge	07401-0010000		5
Pressure gauge	07506-3000000		4
Oil pressure gauge attachment	07510-4220100		4
Universal bearing puller	07631-0010000		13
Gear holder	07724-0010100		8
Flywheel holder	07725-0040000		9
Rotor puller	07733-0020001		9
Sliding remover weight	07741-0010201		12
Valve guide remover, 5.5 mm (IN)	07742-0010100		10
Valve guide remover, 6.6 mm (EX)	07742-0010200		10
Valve guide driver	07743-0020000		10
Attachment, 32 x 35 mm	07746-0010100		15
Attachment, 42 x 47 mm	07746-0010300		12, 13, 14, 15
Attachment, 52 x 55 mm	07746-0010400		12, 13, 14
Attachment, 62 x 68 mm	07746-0010500		12
Attachment, 24 x 26 mm	07746-0010700		15
Inner handle	07746-0030100		12, 13
Inner driver, 25 mm	07746-0030200		13
Inner driver, 30 mm	07746-0030300		12
Pilot, 17 mm	07746-0040400		12, 15
Pilot, 20 mm	07746-0040500		12, 14, 15
Pilot, 30 mm	07746-0040700		12
Bearing remover shaft	07746-0050100		14, 15
Remover head. 20 mm	07746-0050600		14, 15
Driver	07749-0010000		12, 13, 14, 15
Valve spring compressor	07757-0010000		10
Seat cutter, 27.5 mm (45° EX)	07780-0010200		10
Seat cutter, 35 mm (45° IN)	07780-0010400		10
Flat cutter, 28 mm (32° EX)	07780-0012100		10
Flat cutter, 35 mm (32° IN)	07780-0012300		10
Interior cutter, 30 mm (60° EX)	07780-0014000		10
Interior cutter, 37.5 mm (60° IN)	07780-0014100		10
Cutter holder, 5.5 mm (IN)	07781-0010101		10
Cutter holder, 6.6 mm (EX)	07781-0010202		10
Valve adjusting wrench	07708-KE90000		3
Lock nut wrench	07708-ME90000		15
Retainer wrench	07710-MA10000		13
Snap ring pliers	07914-5670101		12
Snap ring pliers	07914-SA50001		16, 24
Steering stem socket	07916-3710101		14
Lock nut wrench	07916-MB00001		12
Pinion holder	07924-ME40002		13
– Pinion holder plate	07924-ME40110		
– Set collar, 11 x 16 x 50	07924-ME40120		
Puller shaft	07931-ME40000		13
Bearing puller & driver attachment	07934-MB00000	or 07965-6920201	13
Remover handle	07936-3710100		12
Bearing remover set	07936-3710600		12
Valve guide driver attachment, 11.3 mm (IN)	07943-MF50100		10
Valve guide driver attachment, 12.3 mm (EX)	07943-MF50200		10
Ball driver attachment	07945-3330300		13
Ball race remover	07946-3710500		14
Steering stem driver	07946-MB00000		14
Driver shaft	07946-MJ00100		15
Slider weight	07947-KA50100		14
Seal driver attachment	07947-KF00100		14
Driver handle	07949-3710001		15

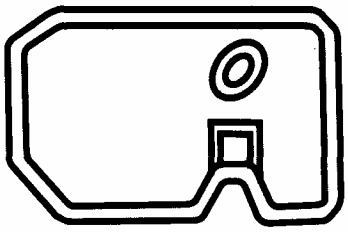
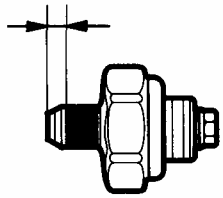
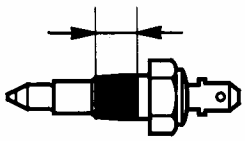
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Ball race remover	07953-MJ10000		14
Slider weight	07947-KA50100		14
Seal driver attachment	07947-KF00100		14
Driver handle	07949-3710001		15
Ball race remover	07953-MJ10000		14
Driver attachment	07953-MJ10100		14
Driver handle	07953-MJ10200		14
Damper spring compressor	07964-ME90000		12
Dis/assembly tool	07965-3710101	or 07931-4630300	12
Seal driver attachment	07965-KE80200		13
Valve guide reamer, 5.510 mm (IN)	07984-2000001		10
Valve guide reamer (EX)	07984-ZE20001		10
Bearing driver attachment	07GAD-SD40101		13
Oil filter wrench	07HAA-PJ70100		3, 4
Peak voltage adapter	07HGJ-0020100		18
Pinion puller base	07HMC-MM80110		13
Bearing driver attachment	07HMF-MM90400		12
Clutch center holder	07JMB-MN50301		8
Pilot screw wrench, D	07KMA-MS60101		5
Holder A	07PAB-0010100		12

LUBRICATION & SEAL POINTS

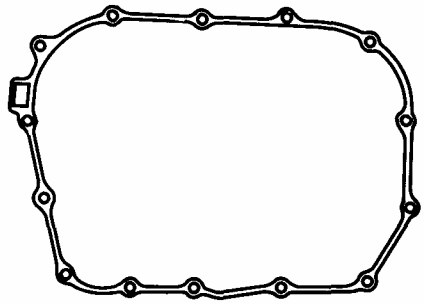
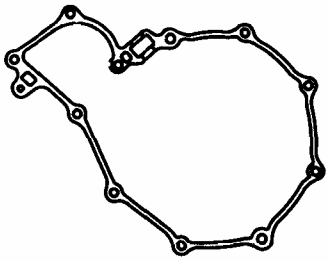
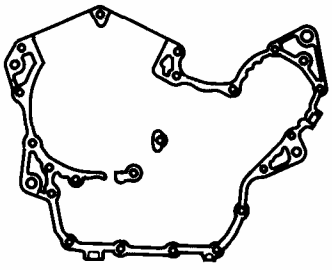
ENGINE

LOCATION	MATERIAL	REMARKS
Camshaft lobes/journals Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Crankshaft crank pin and journals Clutch outer guide outer surface Transmission gear shift fork groove Transmission collar inner and outer surface Transmission spline collar outer surface Connecting rod small end inner surface	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Piston outer surface Piston ring outer surface Piston pin outer surface Primary drive gear bolt threads and seating surface Flywheel bolt threads and seating surface Starter one-way clutch sliding lock surface Starter reduction gear shaft outer surface Clutch center lock nut threads Clutch lifter arm-to-right crankcase cover sliding surface Clutch disc outer surface Cylinder wall surface Cylinder stud bolt threads Cylinder 8 X 187 mm bolt threads Valve adjusting screw threads and seating surface Connecting rod bolt/nut threads and seating surface Cylinder head mounting bolt and nut seating surface Oil filter cartridge threads and O-ring Each bearings rolling area Each O-rings	Engine oil	
Crankshaft hole cap threads Timing hole cap threads Each oil seal lips	Multi-purpose grease	
Cam sprocket bolt threads Starter one-way clutch housing bolt threads Oil pump driven sprocket bolt threads Stator wire holder socket bolt threads Gearshift cam plate bolt threads Transmission bearing set plate bolt threads Countershaft oil seal set plate bolt threads Cam chain tensioner set plate bolt threads Stator mounting bolt threads Oil filter boss crankcase side threads Ignition pluse generator bolt threads Left crankcase cover bolt threads (marked "Δ") 	Locking agent	Coating width: 6.5 ± 1 mm (0.26 ± 0.04 in)

ENGINE (Cont'd)

LOCATION	MATERIAL	REMARKS
Clynder head cover-to-gasket groove 	Honda Bond A or equivalent	
Output gear case bolt threads Oil pressure switch threads 3 – 4 mm (0.12 – 0.16 in)  Engine coolant temperature (ECT) switch threads 11 mm (0.4 in) 	Sealant	

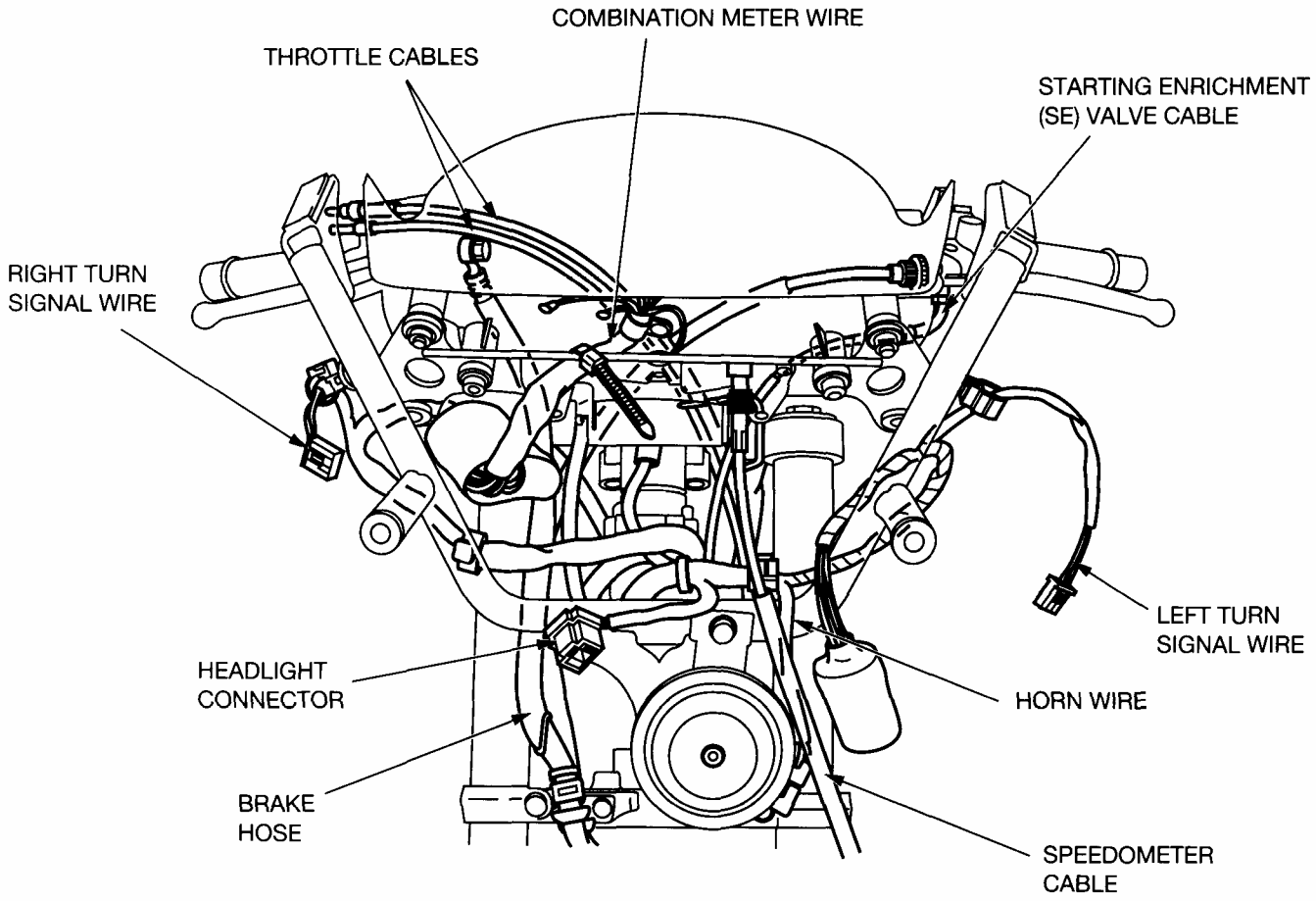
ENGINE (Cont'd)

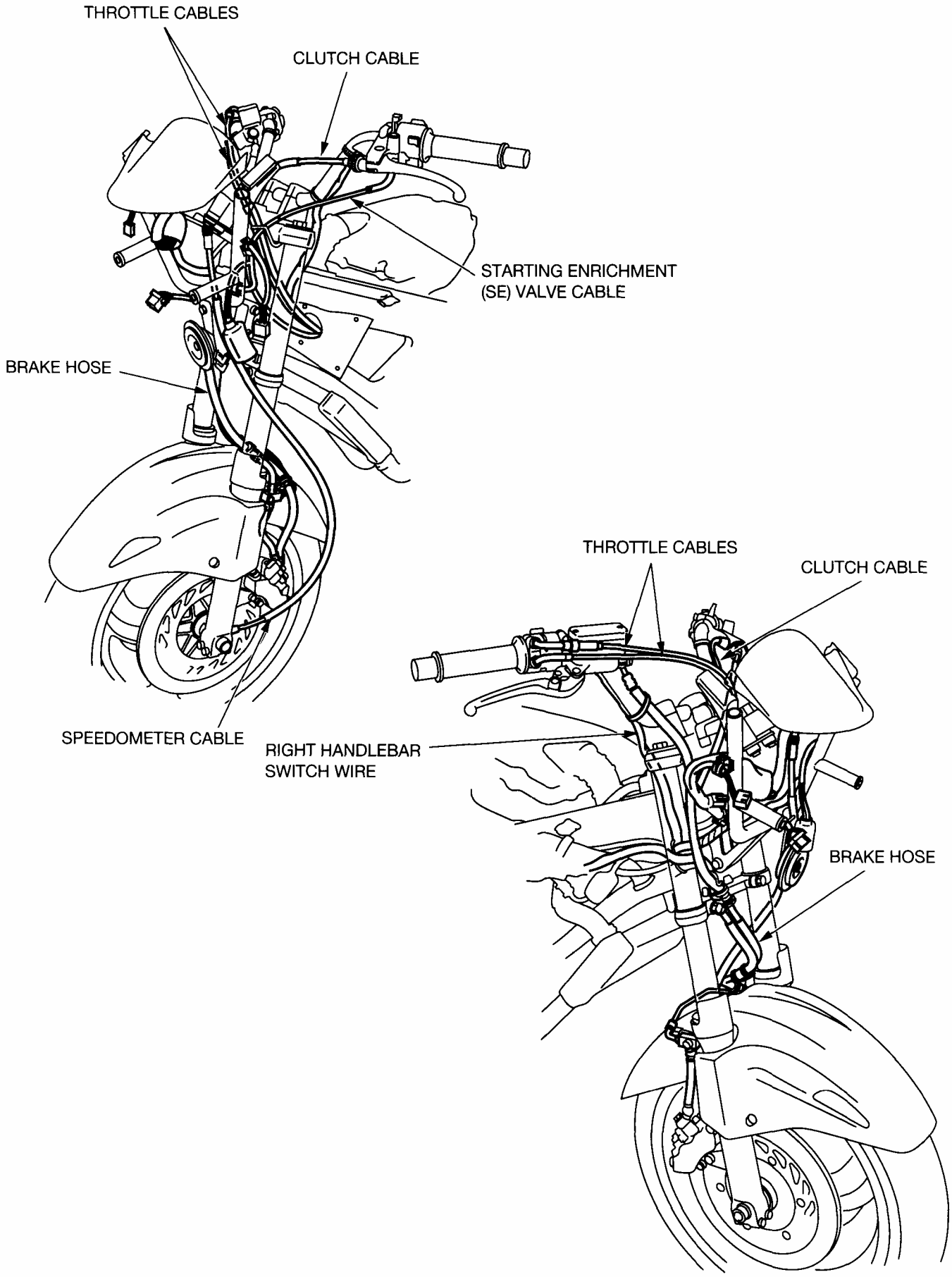
LOCATION	MATERIAL	REMARKS
Right crankcase-to-cover mating surface 	Sealant	
Left crankcase-to-cover mating surface 		
Right and left crankcase mating surface 		

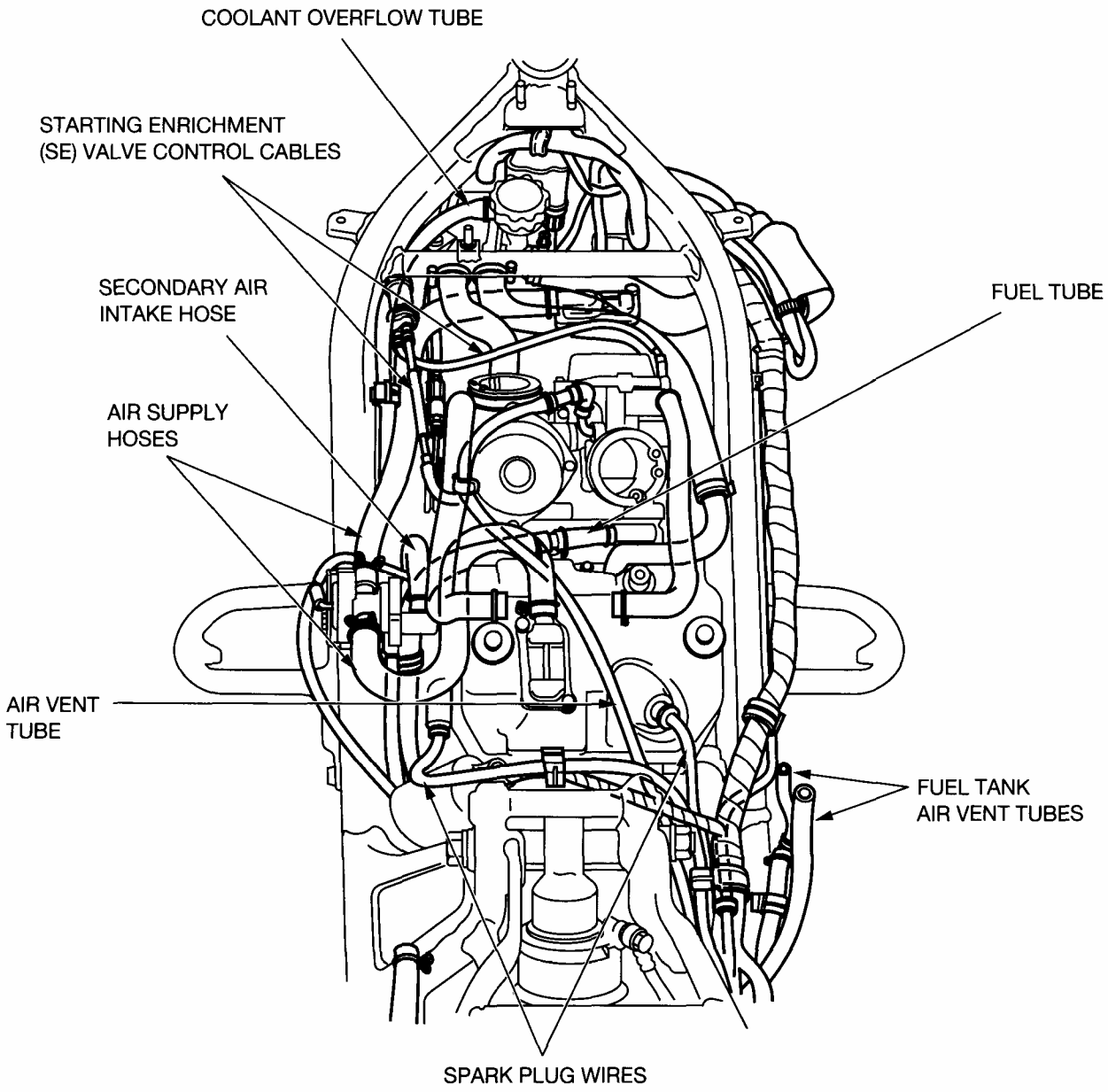
FRAME

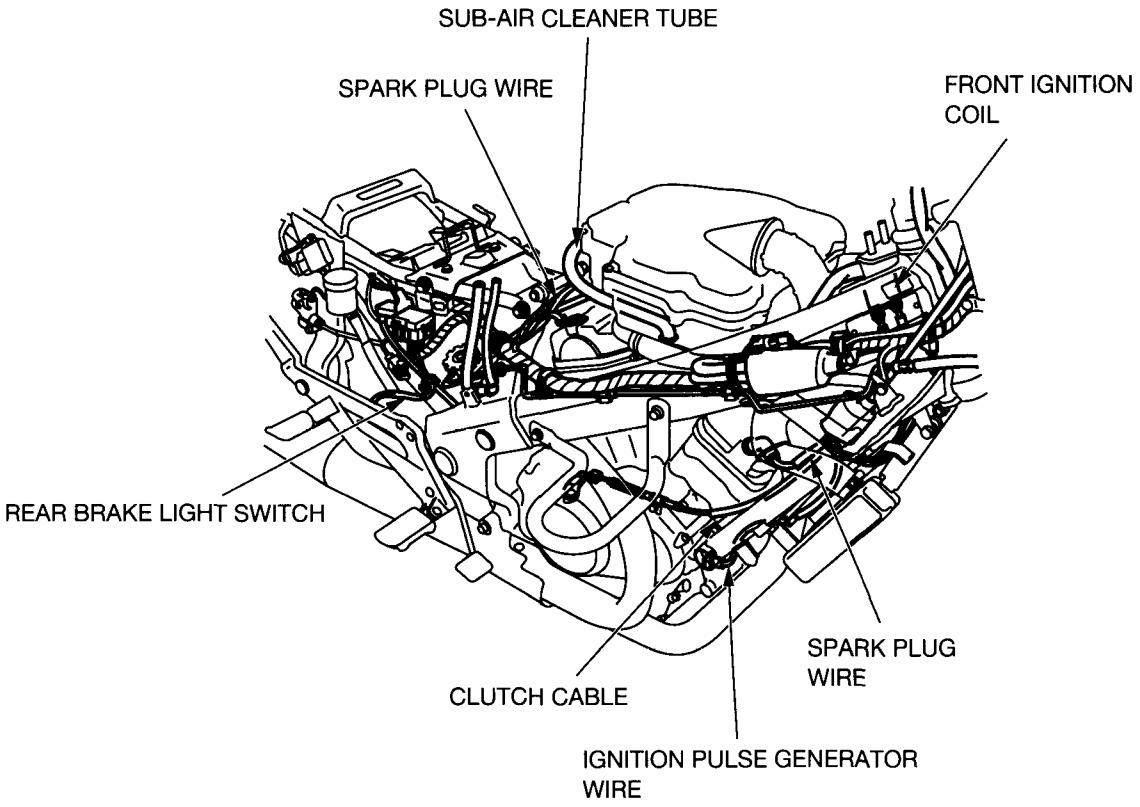
LOCATION	MATERIAL	REMARKS
Final gear case O-rings and oil seal lips Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot dust seal lips Swingarm pivot bearing rolling area Front and rear wheels dust seal lips Each dust seal lips Each oil seal lips	Multi-purpose grease	
Speedometer gearbox inside Speedometer gear and pinion sliding surface Throttle pipe inner surface and rolled-up portion Clutch lever pivot bolt sliding surface Main and side stand pivot sliding surface Rear brake pedal pivot sliding surface Gearshift pedal pivot sliding surface Seat lock sliding area Final drive pinion joint spline Final drive shaft spline (universal joint side) Final drive shaft oil seal lips Output driven gear shaft spline (universal joint side) Universal joint bearings and dust seals	Molybdenum disulfide grease	 Spreading 2.0 g Spreading 1.0 g Spreading 0.5 g Spreading 2.0 g
Rear wheel hub-to-driven flange mating surface Rear wheel hub O-ring groove Final driven flange spline and O-ring groove Final driven flange-to-final gear case O-ring holder mating surface	Molybdenum disulfide paste	Spreading 3.0 g min Spreading 5.0 g
Thermosensor threads Final gear case-to-case cover mating surface	Sealant	
Steering top threads Rear shock absorber upper bolt threads and sliding surface	Engine oil	
Brake master cylinder inside Brake master piston Brake caliper piston seals	DOT 4 brake fluid	
Rear master piston tip and push lod Brake lever pivot and piston tips Brake caliper dust seals Brake caliper pin boot/bracket pin boot inner surface Brake caliper pad pin sliding surface Brake lever pivot bolt sliding surface Master cylinder push rod rounded surface Master cylinder boot setting area	Silicone grease	
Brake caliper slide pin threads Brake caliper bracket pin threads Rear brake hose joint screw threads Front fork socket bolt threads Main stand bolt threads Pinion joint nut threads Final gear case cover 10 mm bolt threads Final gear case stad bolt thread Front brake caliper mounting bolt threads Front and rear brake disc bolt threads	Locking agent	
Handle grip rubber inside	Honda Bond A or equivalent	
Front fork oil seal and dust seal lips	Fork fluid	

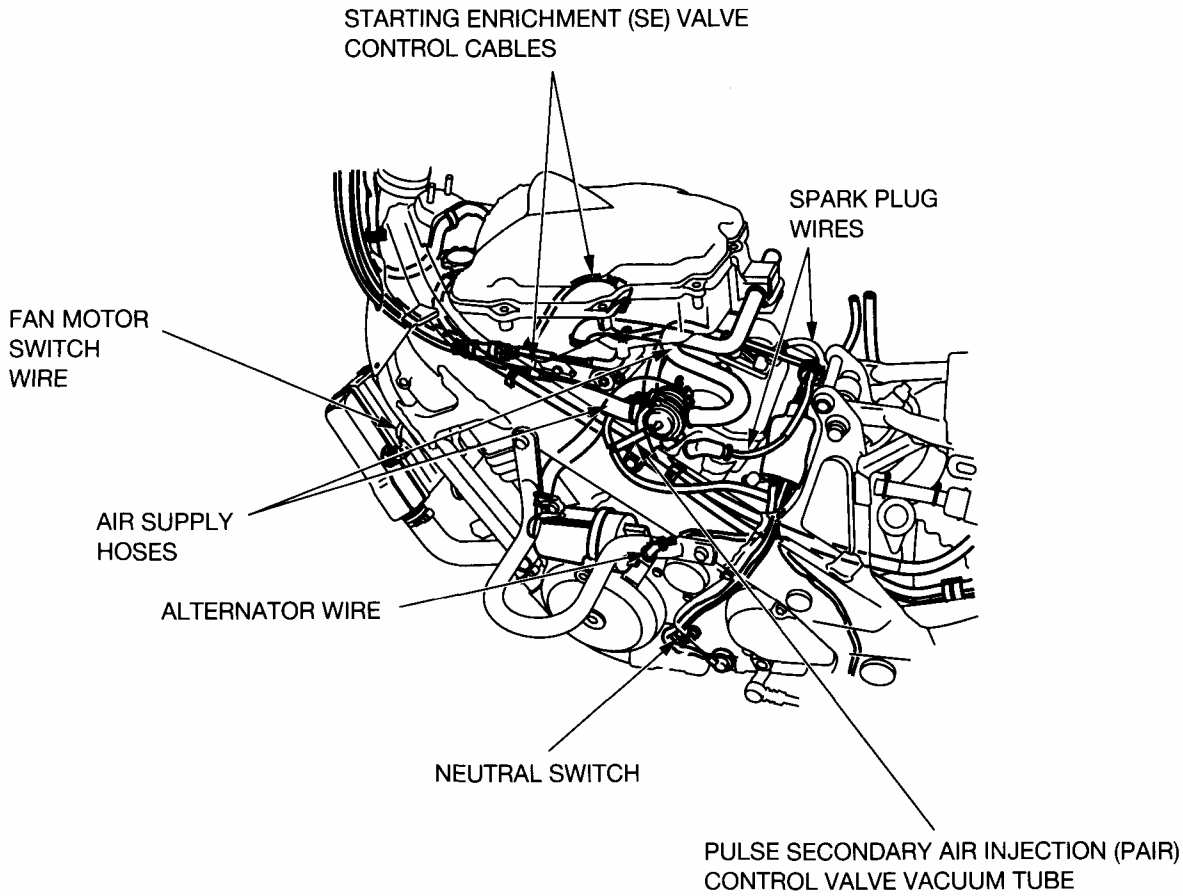
CABLE & HARNESS ROUTING

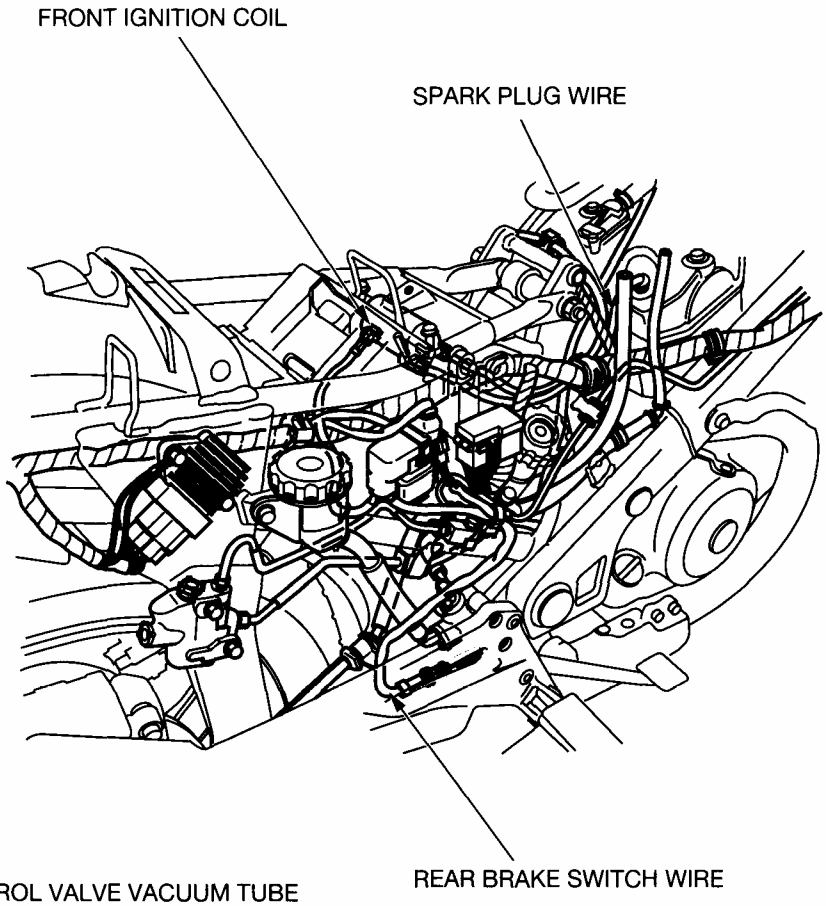


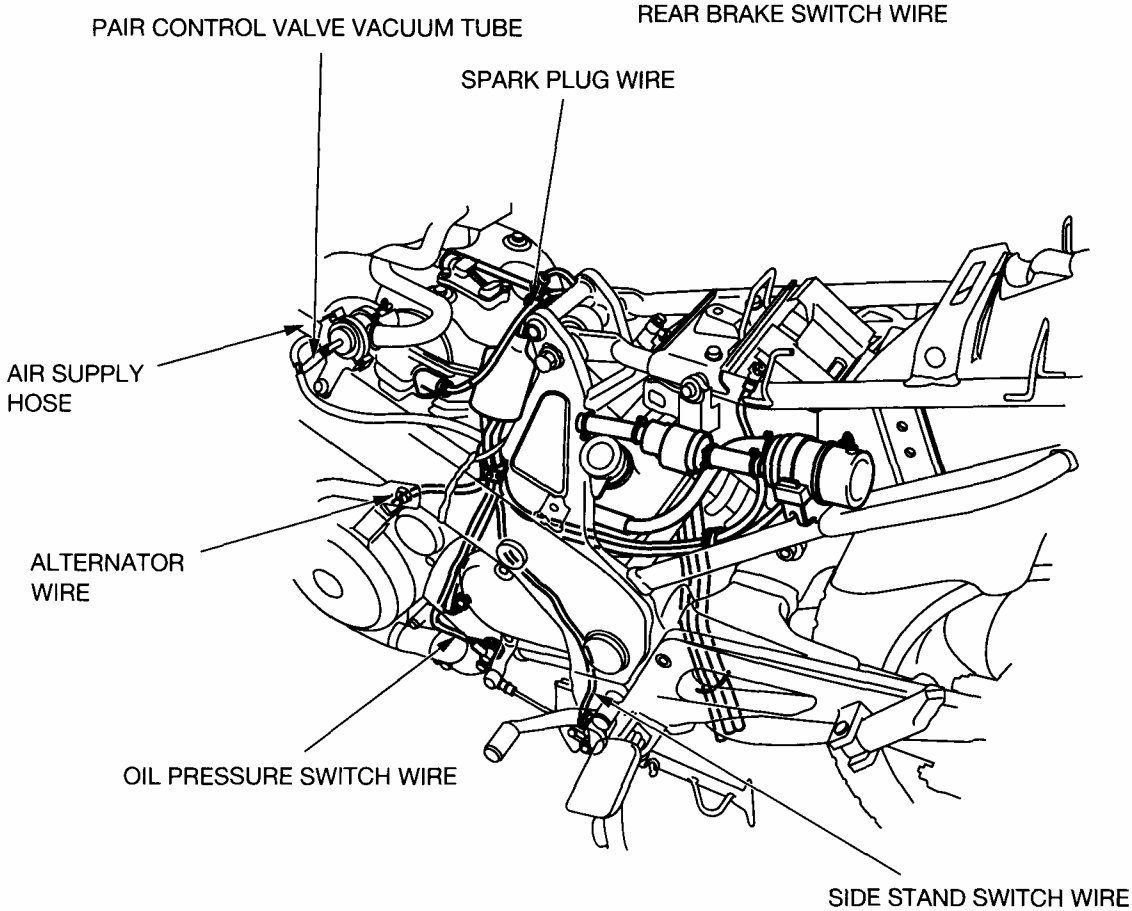

THROTTLE CABLES
CLUTCH CABLE
STARTING ENRICHMENT (SE) VALVE CABLE
BRAKE HOSE
SPEEDOMETER CABLE
THROTTLE CABLES
CLUTCH CABLE
RIGHT HANDLEBAR SWITCH WIRE
BRAKE HOSE

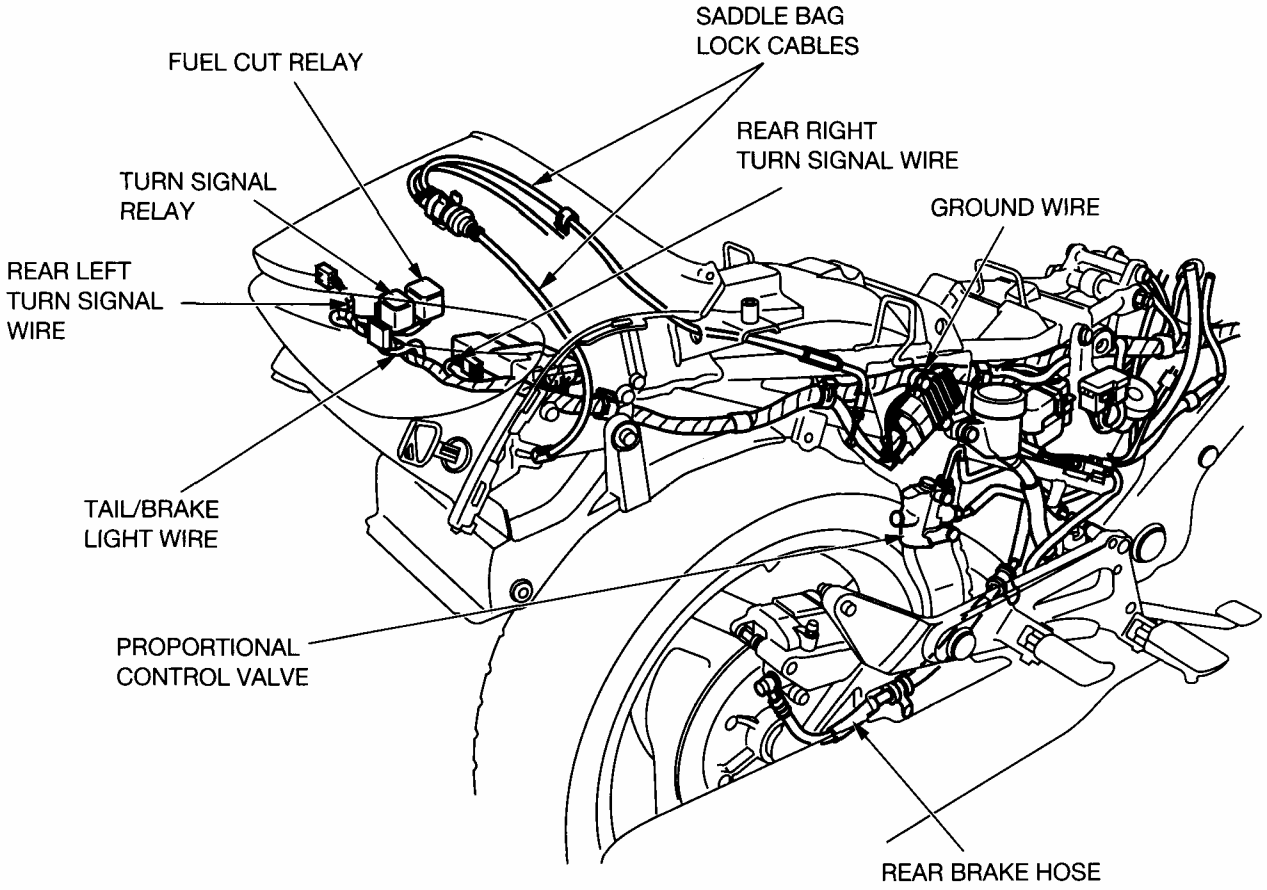

COOLANT OVERFLOW TUBE
STARTING ENRICHMENT (SE) VALVE CONTROL CABLES
SECONDARY AIR INTAKE HOSE
FUEL TUBE
AIR SUPPLY HOSES
AIR VENT TUBE
FUEL TANK AIR VENT TUBES
SPARK PLUG WIRES


SUB-AIR CLEANER TUBE
SPARK PLUG WIRE
FRONT IGNITION COIL
REAR BRAKE LIGHT SWITCH
SPARK PLUG WIRE
CLUTCH CABLE
IGNITION PULSE GENERATOR WIRE


STARTING ENRICHMENT (SE) VALVE CONTROL CABLES
SPARK PLUG WIRES
FAN MOTOR SWITCH WIRE
AIR SUPPLY HOSES
ALTERNATOR WIRE
NEUTRAL SWITCH
PULSE SECONDARY AIR INJECTION (PAIR) CONTROL VALVE VACUUM TUBE


FRONT IGNITION COIL
SPARK PLUG WIRE
REAR BRAKE SWITCH WIRE

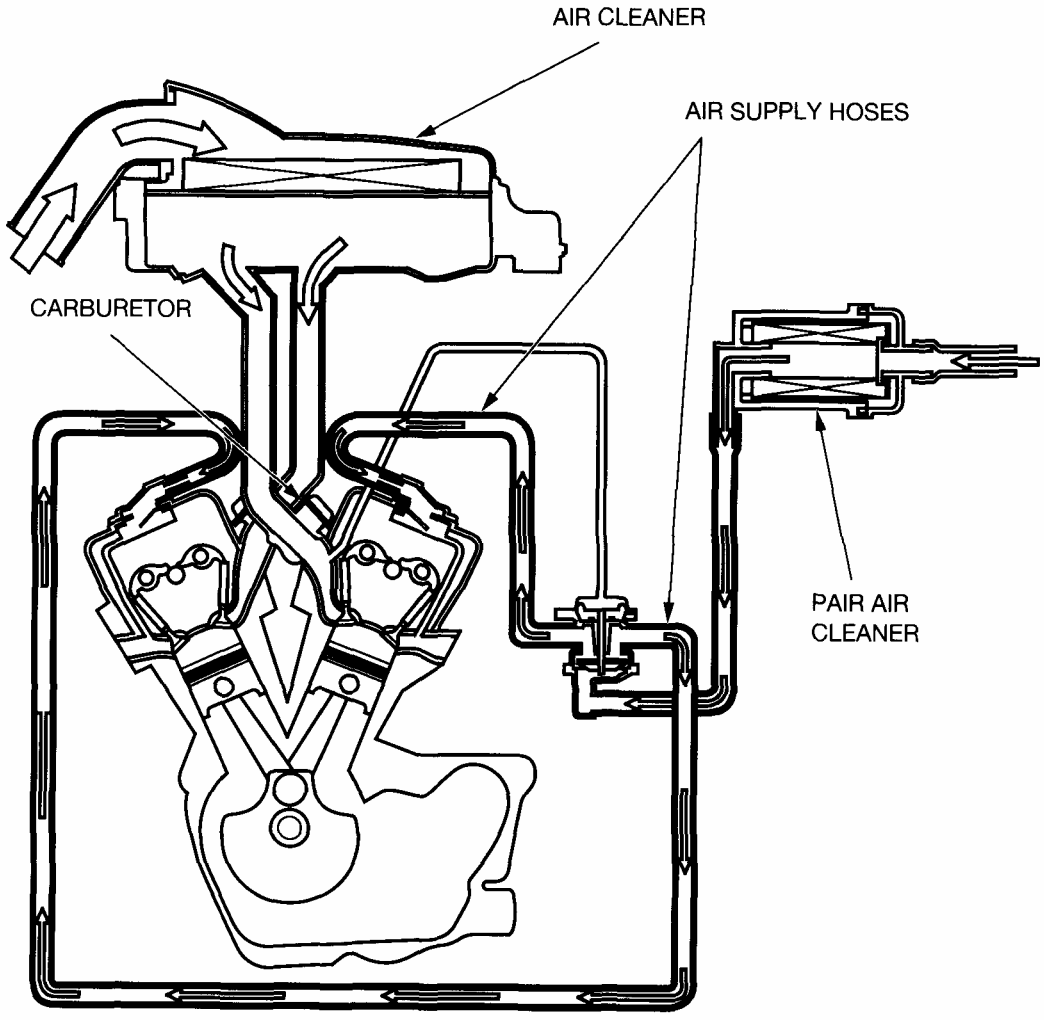

PAIR CONTROL VALVE VACUUM TUBE
SPARK PLUG WIRE
AIR SUPPLY HOSE
ALTERNATOR WIRE
OIL PRESSURE SWITCH WIRE
SIDE STAND SWITCH WIRE


SADDLE BAG
LOCK CABLES
FUEL CUT RELAY
REAR RIGHT
TURN SIGNAL WIRE
TURN SIGNAL
RELAY
GROUND WIRE
REAR LEFT
TURN SIGNAL
WIRE
TAIL/BRAKE
LIGHT WIRE
PROPORTIONAL
CONTROL VALVE
REAR BRAKE HOSE

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 bases 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 changes 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 valve. 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 the 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.

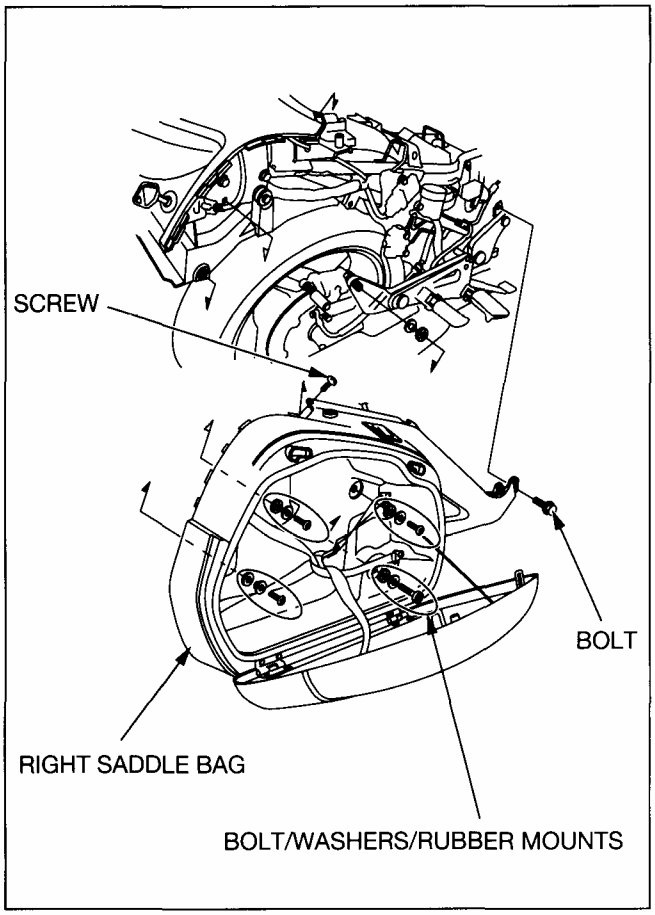


RIGHT SADDLE BAG

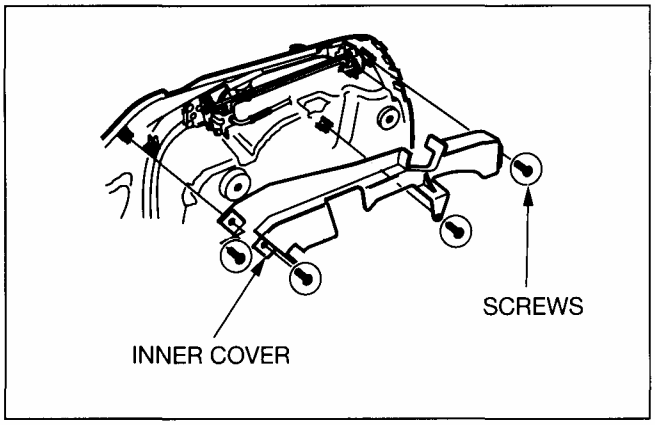
REMOVAL/INSTALLATION

Remove the following:
— Seat (page 2-2)
— Right side cover (page 2-3)
— Grab rail (page 2-8)

Open the right saddle bag lid using the ignition key and saddle bag lock lever.
Remove the mud guard screws (page 2-7).
Remove the screw and bolt.
Remove the socket bolts, washers, rubber mounts and saddle bag.

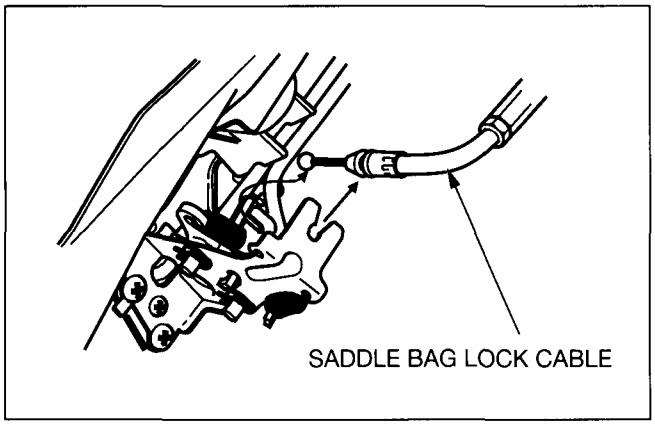


Remove the screws and inner cover.



Disconnect the saddle bag lock cable from the saddle bag.

Installation is in the reverse order of removal.

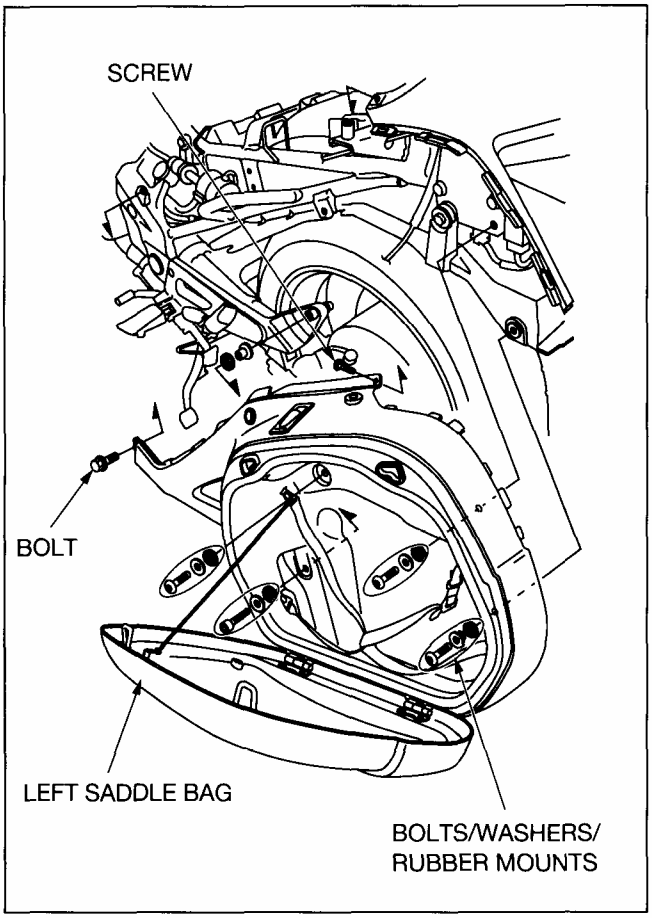


LEFT SADDLE BAG

REMOVAL/INSTALLATION

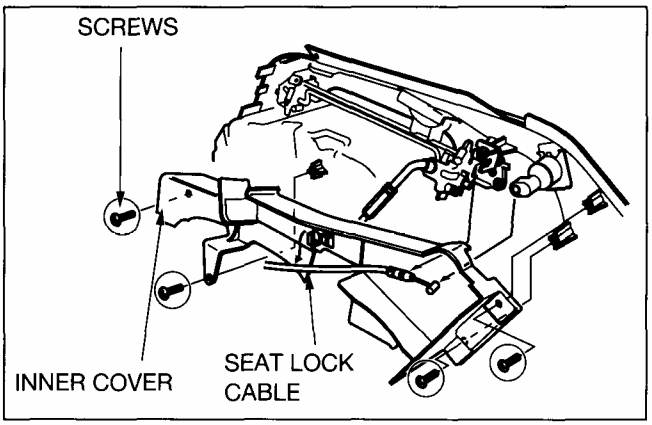
Remove the following:
— Seat (page 2-2)
— Left side cover (page 2-3)
— Grab rail (page 2-8)

Open the right saddle bag lid using the ignition key and saddle bag lock lever.
Remove the mud gard screws (page 2-7).
Remove the screw and bolt.
Remove the socket bolts, washer, rubber mount and saddle bag.



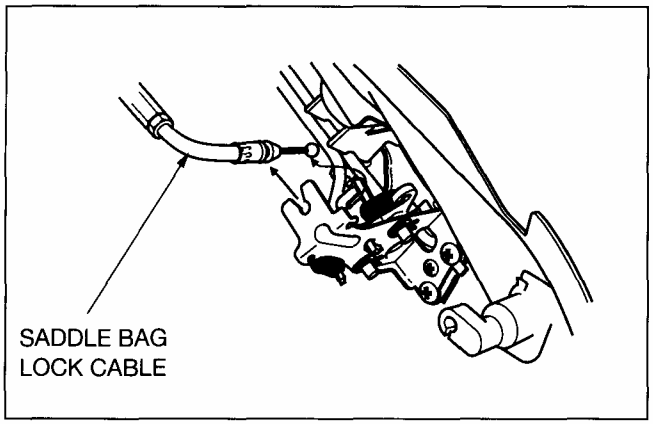
Disconnect the seat lock cable.

Remove the screws and inner cover.



Disconnect the saddle bag cable from the saddle bag.

Installation is in the reverse order of removal.



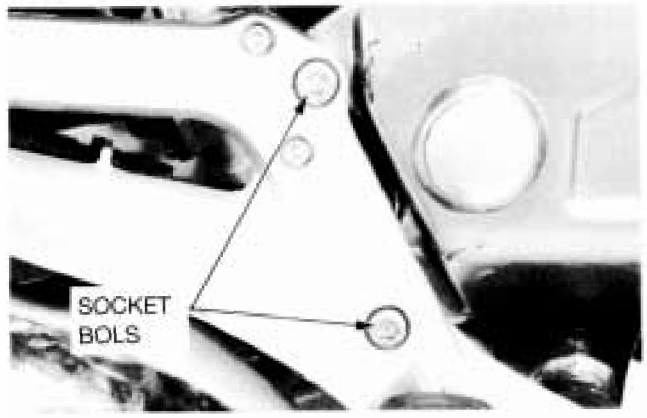
EXHAUST PIPE/MUFFLER

MUFFLER REMOVAL/INSTALLATION

⚠ WARNING

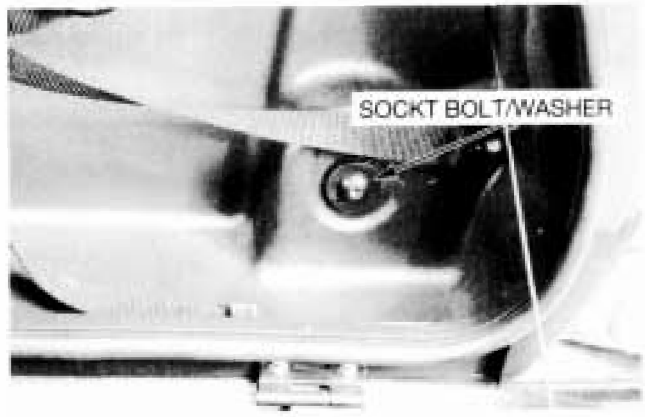
Do not service the exhaust system while it is hot.

Remove the socket bolts from the footpeg bracket.



Open the right saddle bag lid using the ignition key and saddle bag lock lever.

Remove the socket bolt, washer and slide the footpeg bracket.

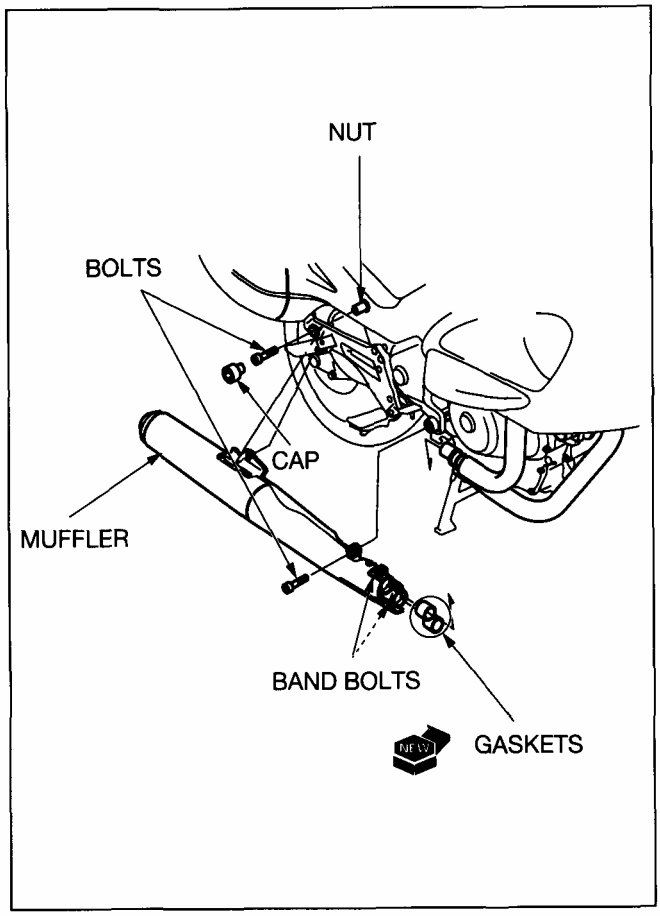


Loosen the front exhaust pipe band bolt.
Loosen the rear exhaust pipe band bolt.

Remove the front muffler mount bolt.
Remove the rear muffler mount bolt and nut.

Remove the gaskets and muffler.

Install the new gaskets.
Install the muffler in the reverse order of removal.



EXHAUST PIPES REMOVAL/INSTALLATION

⚠ WARNING

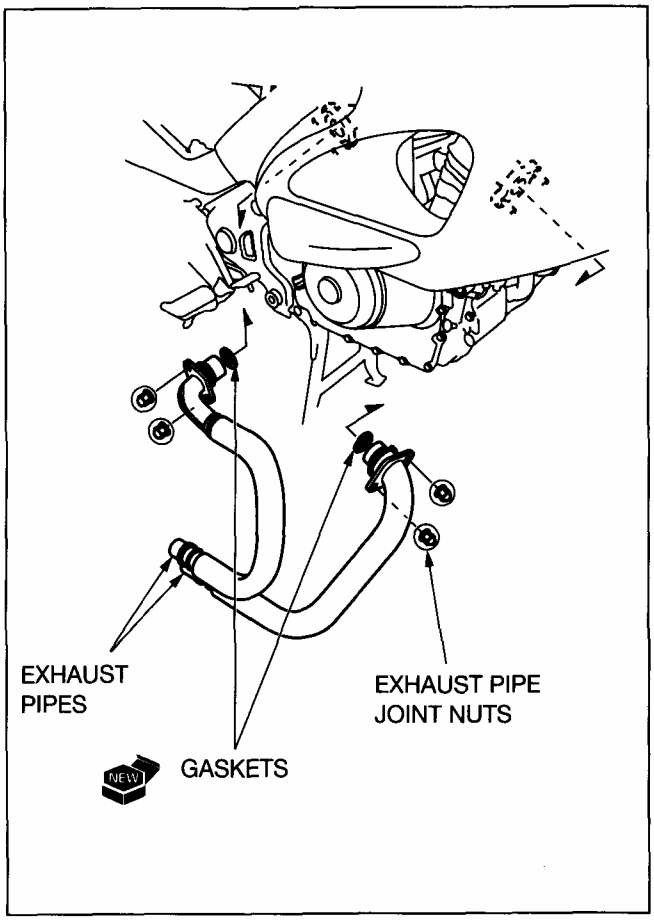
Do not service the exhaust system while it is hot.

Remove the following:
— Seat (page 2-2)
— Right side cover (page 2-3)
— Fuel tank (page 2-11)

Remove the muffler (page 24-31).

Remove the front and rear exhaust pipe joint nuts.
Remove the front and rear exhaust pipes and gaskets.

Install the new gaskets.
Install the front and rear exhaust pipes in the reverse order of removal.



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 their authorized Honda dealer.

	ITEM / FREQUENCY	WHICHEVER ⇩ COMES FIRST ⇩								REFER TO PAGE
		X1,000 km	1	6	12	18	24	30	36	
		X1,000 mi	0.6	4	8	12	16	20	24	
		Months		6	12	18	24	30	36	
*	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	3-6
	SPARK PLUG			I	R	I	R	I	R	3-7
*	VALVE CLEARANCE		I		I		I		I	3-8
	ENGINE OIL		R		R		R		R	3-10
	ENGINE OIL FILTER		R		R		R		R	3-10
*	CARBURETOR CYNCHRONIZATION		I		I		I		I	3-13
•	ENGINE IDLE SPEED		I	I	I	I	I	I	I	3-15
	RADIATOR COOLANT	NOTE 3			I		I		R	3-15
*	COOLING SYSTEM				I		I		I	3-16
*	SECONDARY AIR SUPPLY SYSTEM				I		I		I	3-17
*	SECONDARY AIR SUPPLY SYSTEM CLEANER	NOTE 2							R	24-34
	FINAL DRIVE OIL				I		I		R	3-17
	BRAKE FLUID	NOTE 3		I	I	R	I	I	R	3-18
	BRAKE PADS WEAR			I	I	I	I	I	I	24-34
	BRAKE SYSTEM		I		I		I		I	24-35
•	BRAKE LIGHT SWITCH				I		I		I	3-20
•	HEADLIGHT AIM				I		I		I	3-21
	CLUTCH SYSTEM		I	I	I	I	I	I	I	3-21
	SIDE STAND				I		I		I	3-22
*	SUSPENSION				I		I		I	3-22
•	NUTS, BOLTS, FASTENERS		I		I		I		I	3-23
**	WHEELS/TIRES				I		I		I	3-23
**	STEERING HEAD BEARINGS		I		I		I		I	3-24

• Should be serviced by an authorized Honda 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 an authorized Honda dealer.

NOTES 1 At higher odometer reading, repeat at frequency interval established here.
2 Service more frequently when riding in unusually wet or dusty areas.
3 Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement require mechanical skill.

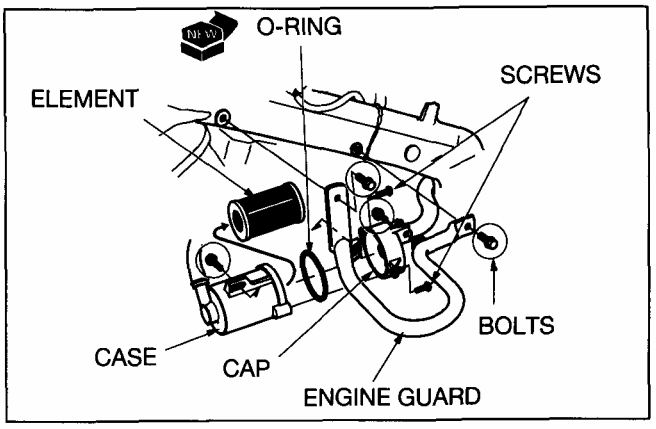
SECONDARY AIR SUPPLY SYSTEM CLEANER

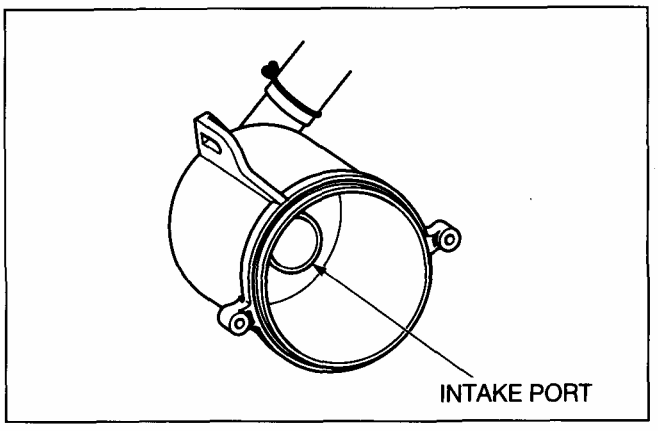
PULSE SECONDARY AIR INJECTION (PAIR) AIR CLEANER

Remove the left middle fairing (page 2-4).

Remove the bolts and engine guard.
Remove the mounting bolts and pulse secondary air injection (PAIR) air cleaner case from the engine guard.
Remove the screws, PAIR air cleaner cap and element.
Replace the element accordance with the maintenance schedule (page 24-33).
Also, clean the element using compressed air from the PAIR control valve side, or replace it if necessary.

Check the PAIR air intake port of PAIR air cleaner case is clean and free of carbon deposit.



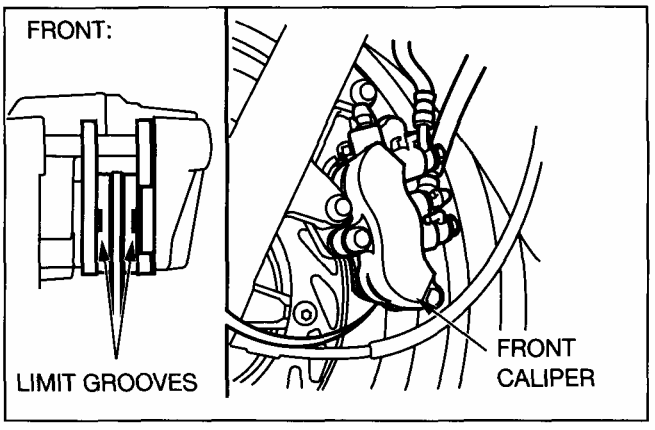


BRAKE PADS WEAR

FRONT BRAKE PAD

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

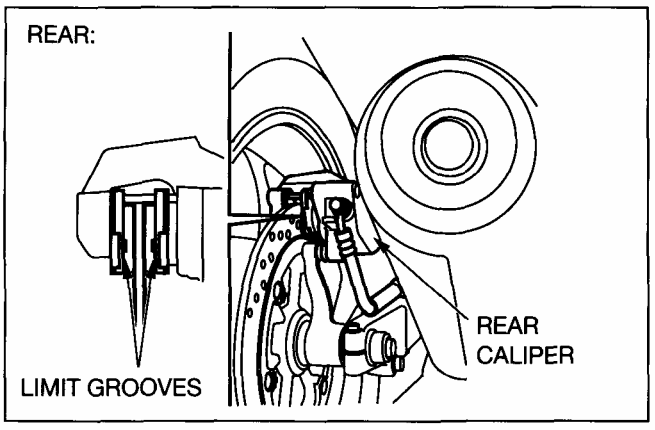
Refer to page 24-44 for brake pad replacement.



REAR BRAKE PAD

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

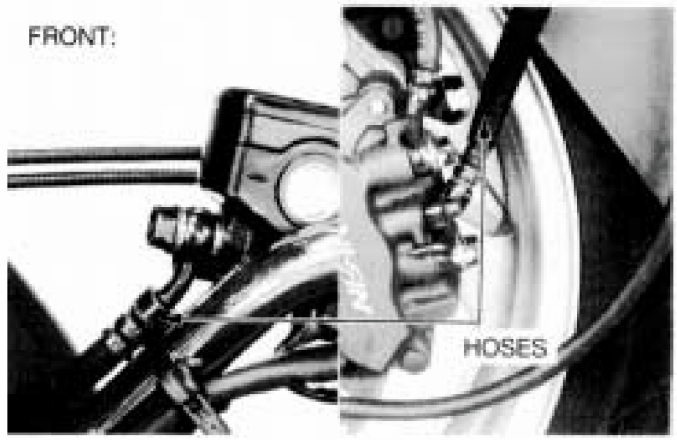
Refer to page 24-46 for brake pad replacement.



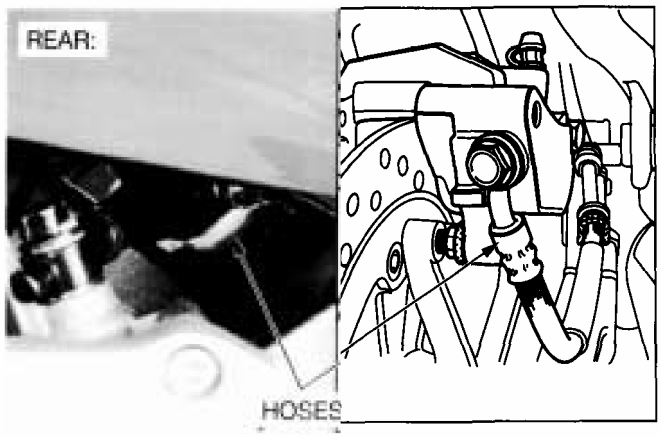
BRAKE SYSTEM

INSPECTION

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 air from the system (page 24-40).



Remove the step bracket (page 24-64).
Inspect the brake hose and fittings for deterioration, cracks and signs or leakage. Tighten any loose fittings.
Replace hoses and fittings as required.
Install the step bracket (page 24-64).



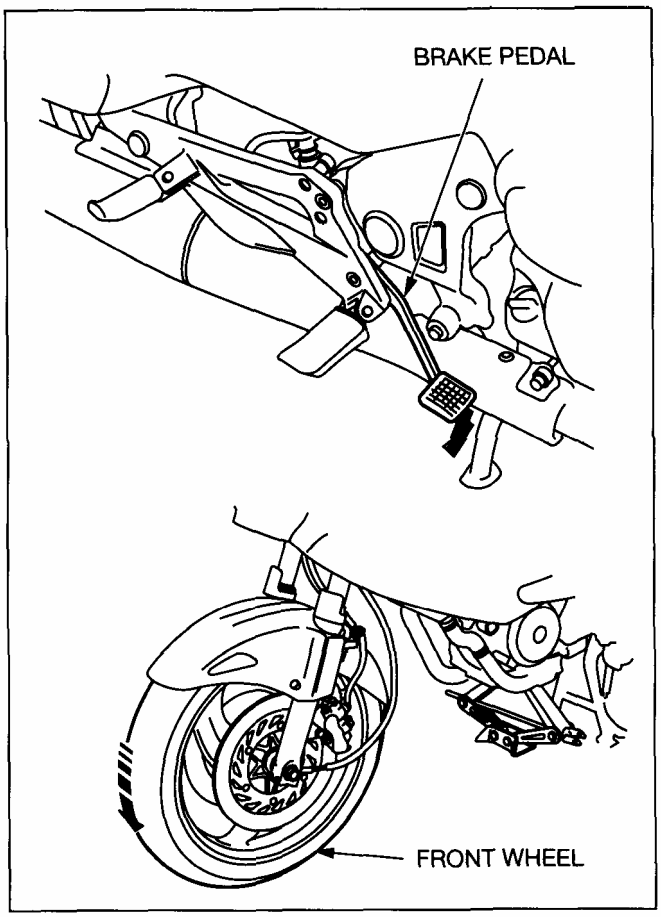
This model is equipped with a combined brake system.
Check the rear brake operation as follows:
Place the motorcycle on its center stand and shift the transmission into neutral.

Raise the front wheel off the ground.

CAUTION:

Do not use the oil filter as a jack point.

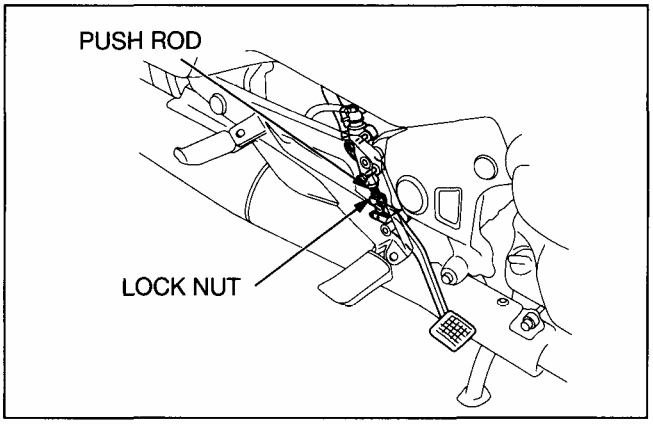
Apply the rear brake pedal.
Make sure the front wheel does not turn while the rear brake pedal is applied.



BRAKE PEDAL HEIGHT

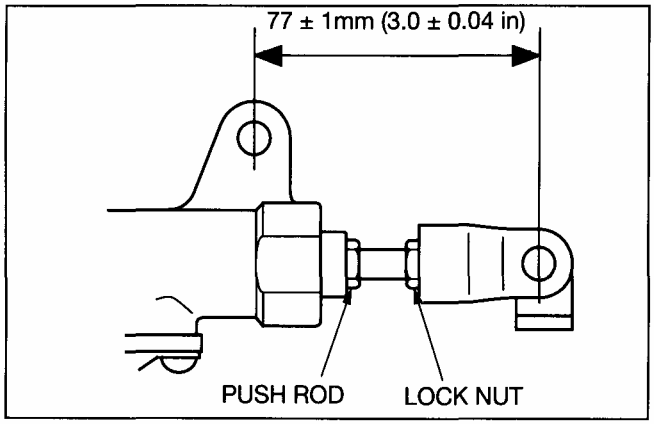
Remove the step bracket (page 24-64).
Adjust the brake pedal to the desired height.
Loosen the lock nut and turn the push rod to obtain the pedal height.

Tighten the lock nut after adjustment has been made.
Install the step bracket (page 24-64).



If the brake pedal to the upper and lower position, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

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



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

⚠ WARNING

- ***If the engine must be running 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 may lead to death.***

NOTE:

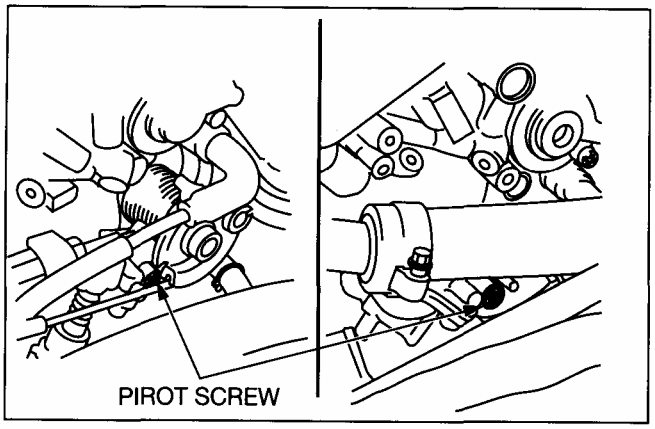
- Make sure the carburetor synchronization is within specification before pilot screw adjustment (page 3-14).
- The pilot screw factory pre-set and no adjustment can be done unless it is replaced.
- Use a tachometer with graduations of 50 min^{-1} (rpm) or smaller that will accurately indicate a 50 min^{-1} (rpm) change.

1. Turn each pilot screw clockwise until it seats lightly, then back it out to specification given.

INITIAL OPENING: UNDECIDED

CAUTION:

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



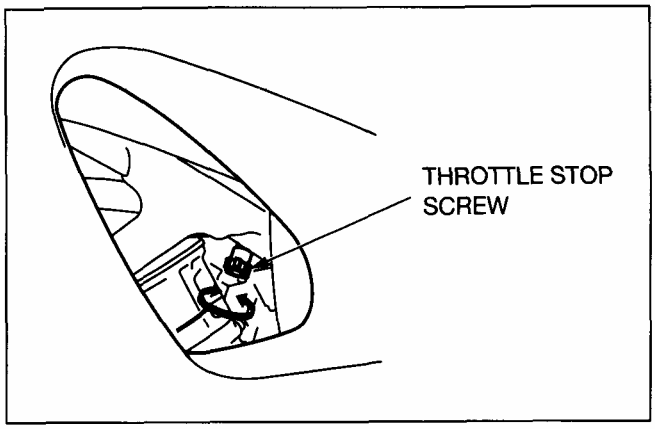
2. Warm up engine to the operating temperature. Stop and go riding for 10 minutes is sufficient.
3. Attach a tachometer according to the manufactures instructions.
4. Start the engine and adjust the engine idle speed to the specified min^{-1} (rpm) with the throttle stop control knob.

IDLE SPEED: 1.200 ± 100 min (rpm)

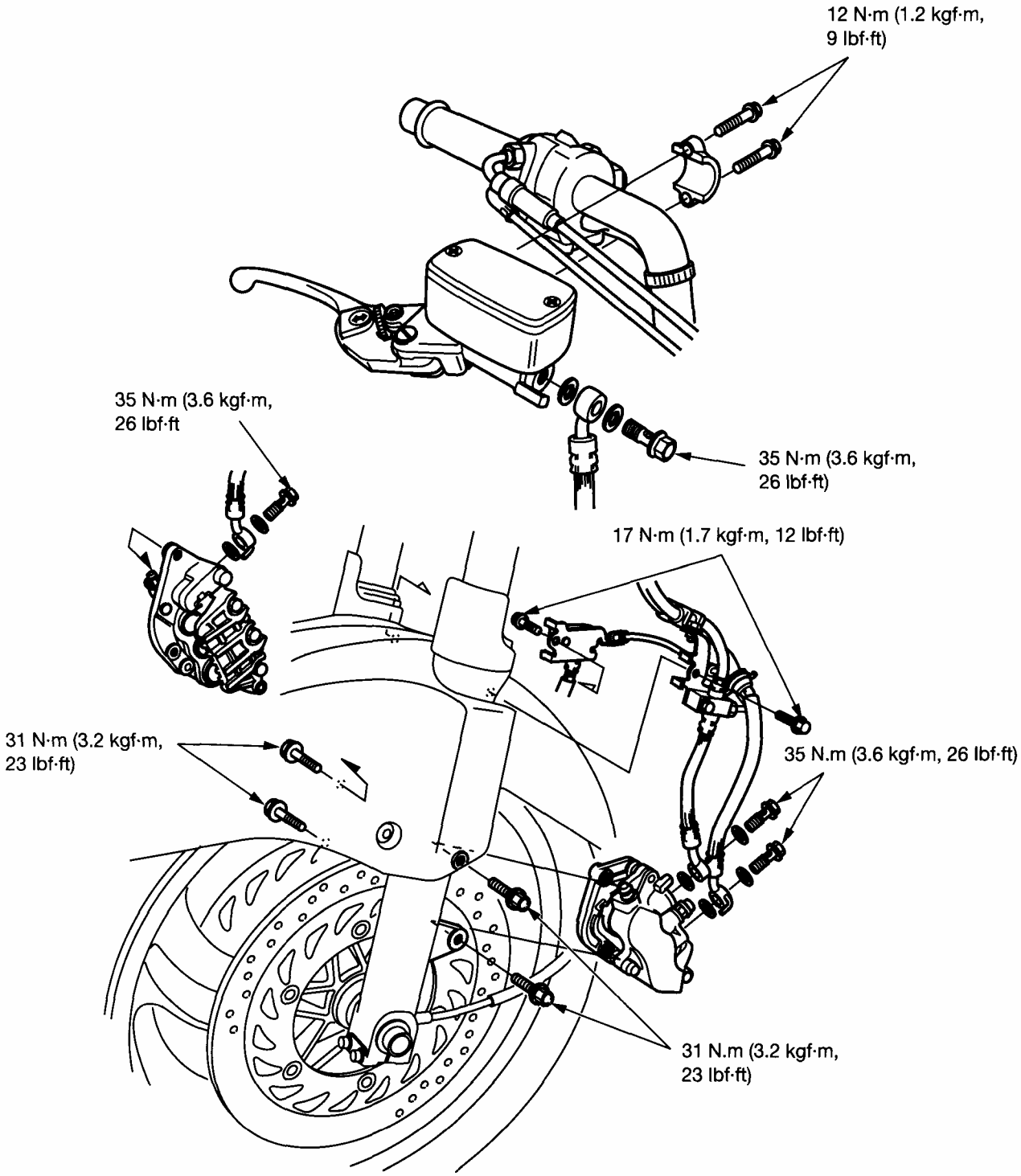
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increase by 50 min^{-1} (rpm) or more, turn each pilot screw out by successive 1/2 turn increments until engine speed dose not increase.
7. Adjust the idle speed with the throttle stop control knob.
8. Turn the rear cylinder carburetor pilot screw in until the engine speed drops 50 min^{-1} (rpm).
9. Turn the rear cylinder carburetor pilot screw counter-clockwise to the final opening from the position in step 8.

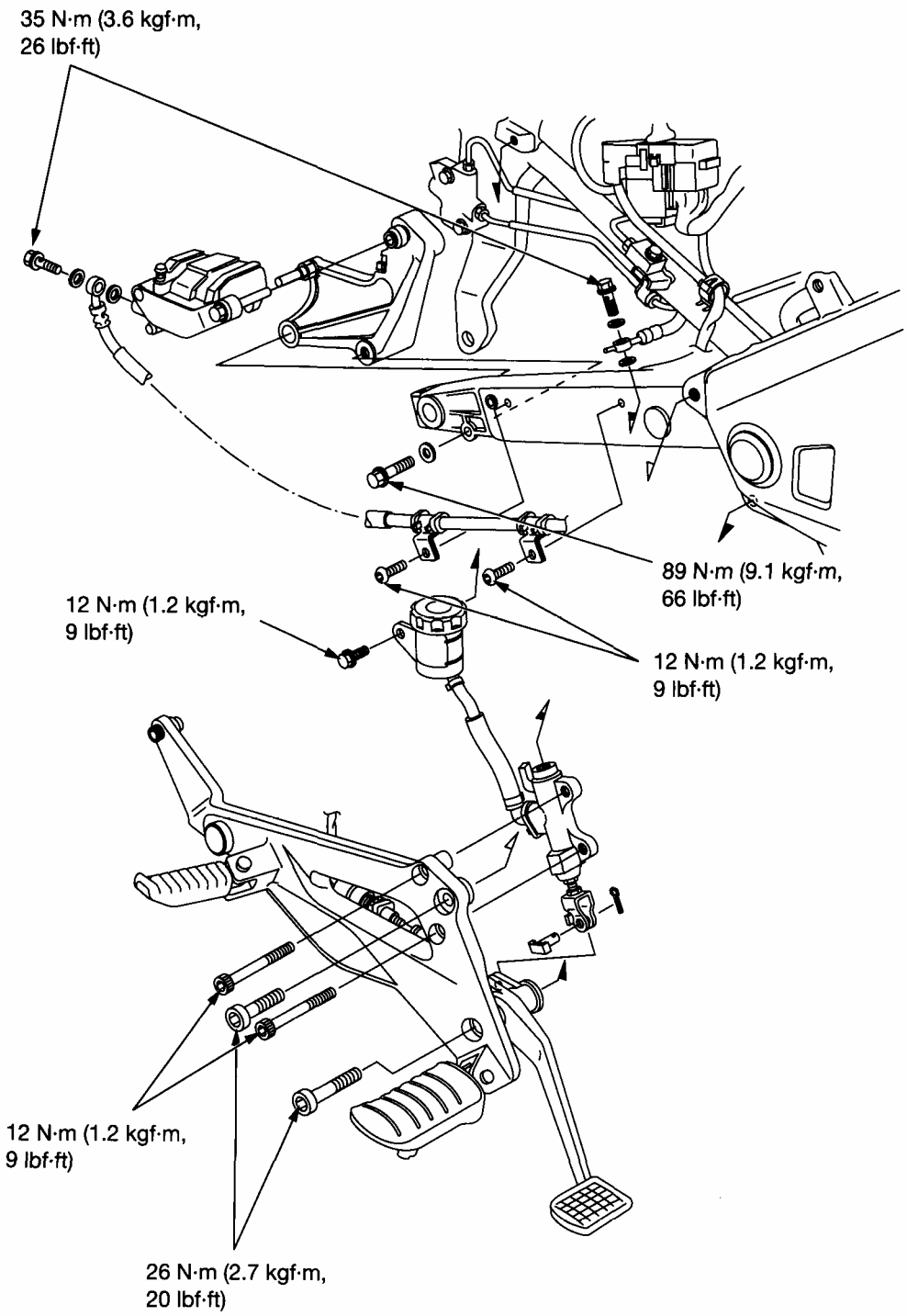
FINAL OPENING: UNDECIDED

10. Adjust the idle speed with the throttle stop control knob.
11. Perfrom steps 8, 9 and 10 for the front cylinder caburetor pilot screw.



HYDRAULIC BRAKE DIAGRAM





TROUBLE SHOOTING

Brake lever/pedal hard

- Clogged/restricted brake system

Rear wheel locks when only the brake pedal is applied (In the case that all items are normal in "Poor lever/pedal brake performance")

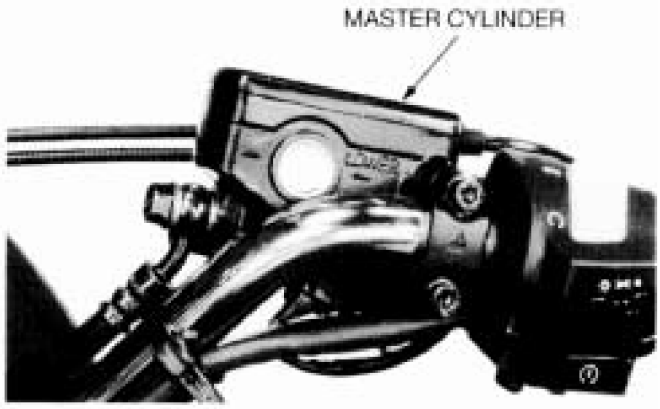
- Faulty proportional control valve (PCV)

BRAKE FLUID REPLACEMENT/AIR BLEEDING

BRAKE FLUID DRAINING

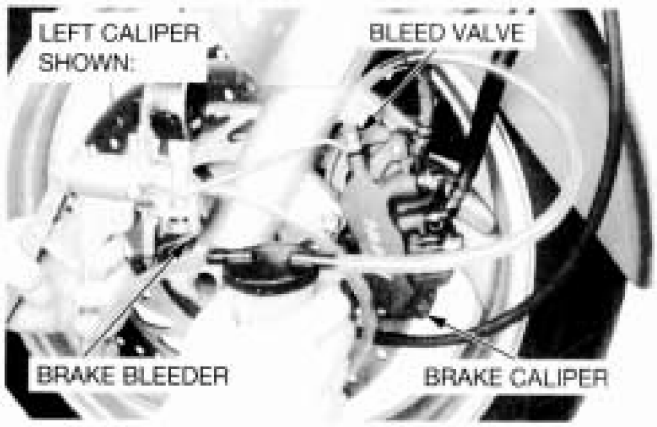
Lever brake line
Support the motorcycle on its center stand.
Turn the handlebar to the left until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws, reservoir cap, set plate and diaphragm.



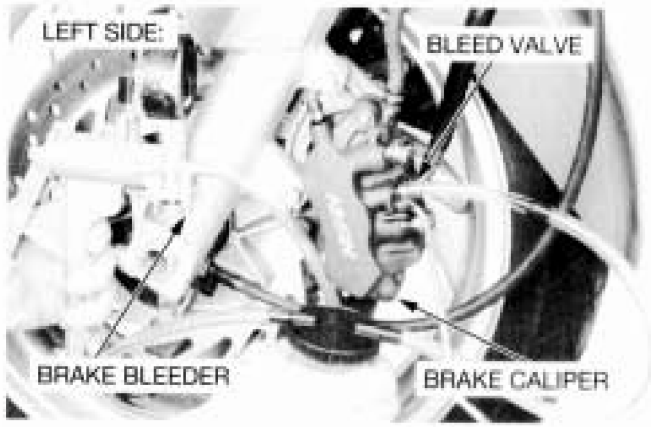
Connect a commercially available brake bleeder to the front brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



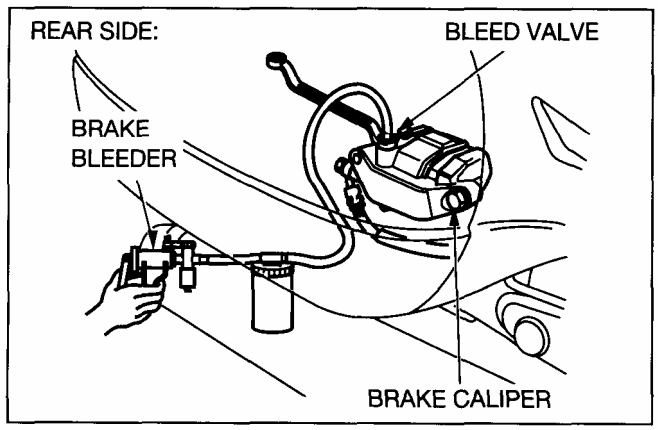
Pedal brake line
Connect a commercially available brake bleeder to the left front brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.

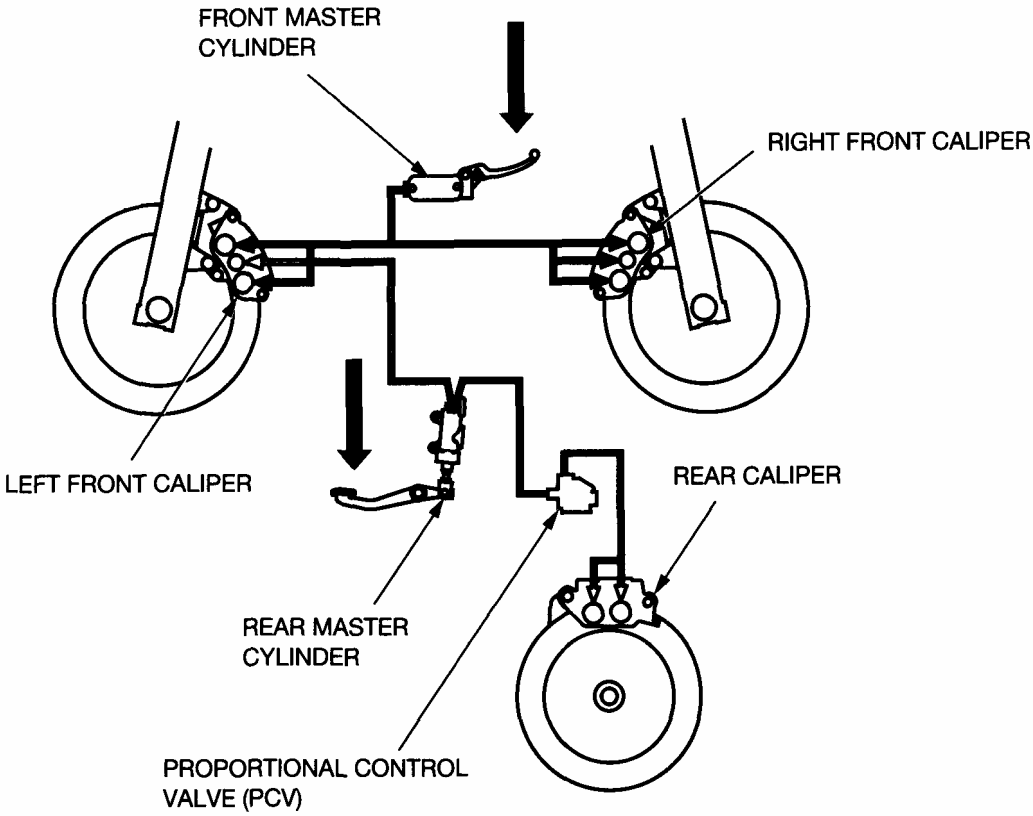


Connect a commercially available brake bleeder to the rear brake caliper bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.

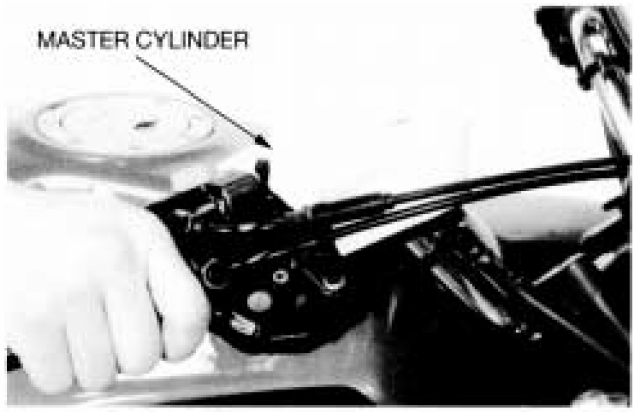


BRAKE FLUID FILLING/AIR BLEEDING



Fill the reservoir with DOT 4 brake fluid from a sealed container.

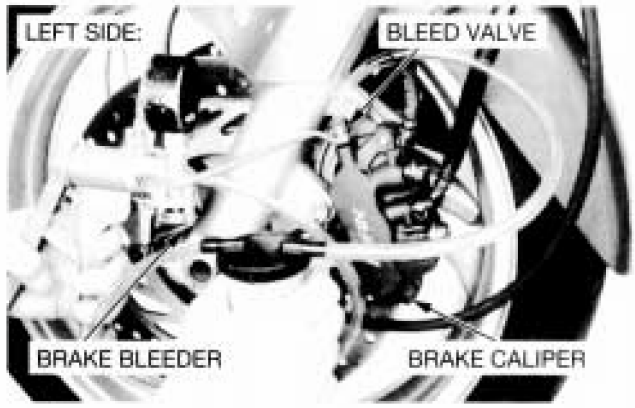
Operate the brake lever several times to bleed air from the master cylinder.



Connect a commercially available brake bleeder to the left front brake caliper outer bleed valve.
Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

NOTE:

- Check the fluid level often the while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacture's operating instructions.

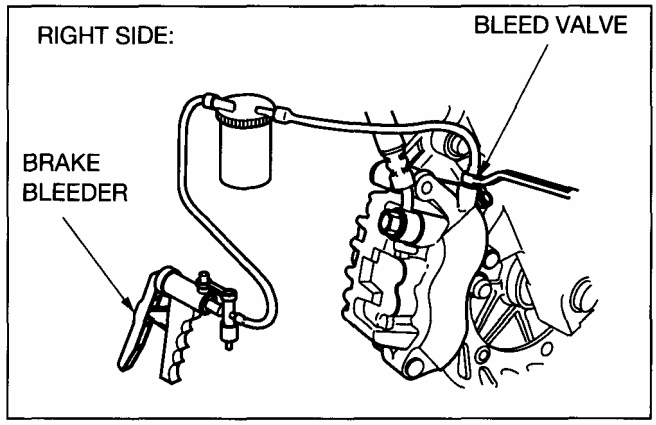


Repeat the above step procedures until air bubbles do not appear in the plastic hose.

Close the bleed valve.
Operate the brake lever and check the brake operation.
If it still feels spongy, bleed the lever system again.

NOTE:

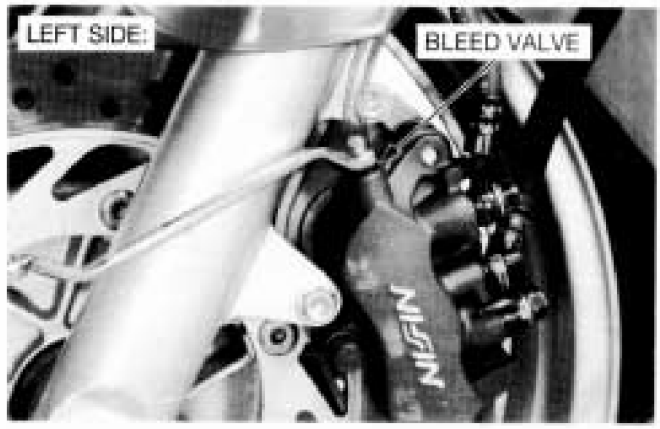
If air is entering the bleeder from around valve threads, seal the threads with tefron tape.



If a brake bleeder is not available, use the following procedure:
Connect a transparent bleed hose to the bleed valve and place the outer end of the hose in a container.

Loosen the bleed valve 1/4 turn and pump the brake lever until the brake fluid flows out from the bleed valve.

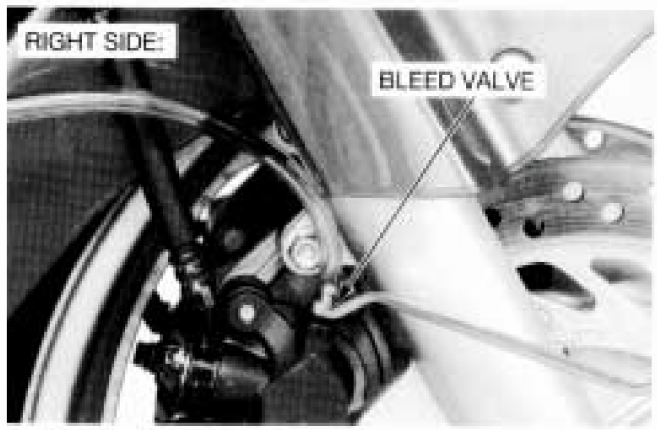
1. Pump the brake lever several times, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.



NOTE:

Do not the release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly until the bleed valve has been closed.
3. Repeat the steps 1-2 until there are no air bubbles in the bleed hose.



After bleeding air completely and tighten the bleed valves to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.
Install the diaphragm, set plate and reservoir cap (page16-4).

Check the front brake operation (page 24-35).

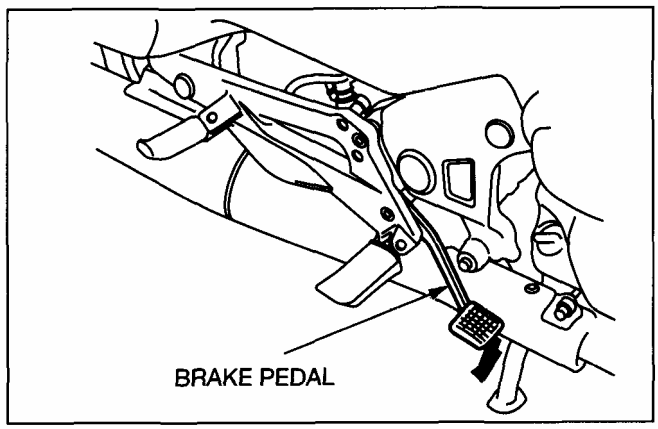
Pedal brake line

NOTE:

- Fluid filling and bleed air from the brake pedal line in the sequence as follow:
  1. Left front caliper center bleed valve
  2. Rear caliper bleed valve

Remove the reservoir cap, set plate and diaphragm (page16-4).
Fill the reservoir with DOT 4 brake fluid.

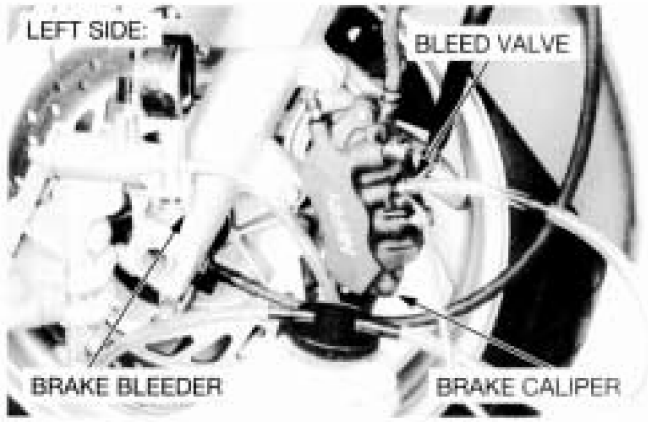
Pump the brake pedal while filling the brake fluid and feed fluid into the master cylinder.



1. Connect a commercially available brake bleeder to the left front brake caliper center bleed valve.
   Pump the brake bleeder and loosen the bleed valve.
   Operate the brake bleeder and feed the brake fluid until fluid flow out from the bleed valve.
   Close the bleeder valve.

NOTE:

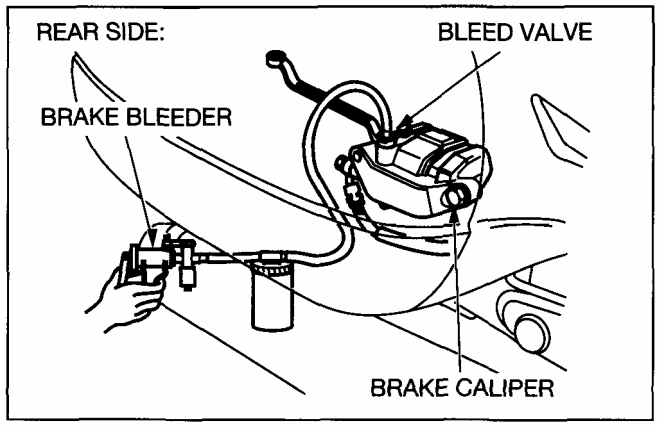
- Check the fluid level often the while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacture's operating instructions.



2. Feed the brake fluid at the rear brake caliper bleed valve as same procedure in step 1.

3. Repeat step 1-2 until the pedal resistance is felt.

Next bleed the air from the system without using brake bleeder tool.



Connect the transparent bleeder tube to the bleed valve and place the outer end of the hose in a container.

1. Pump the brake pedal 5-10 times, then release the pedal. Loosen the bleed valve, then pushing down the brake pedal all the way.

NOTE:

Do not release the brake pedal while opening the bleed valve.

Close the bleed valve.

2. Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.

3. Repeat above step 1 and 2 until bubbles cease to appear in the fluid at the end of the bleed tube and pedal resistance is felt.

NOTE:

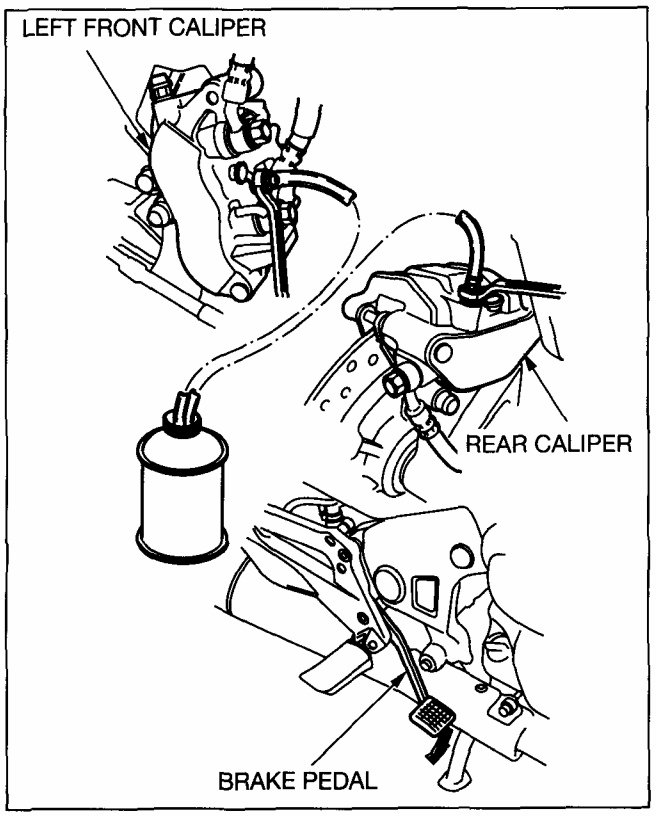
After the bubbles cease to appear in the fluid, repeat air bleeding procedure about 2-3 times.

Tighten the each bleed valve to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir up to the "UPPER" level with DOT 4 brake fluid.

Install the rear reservoir cap (page16-6).



BRAKE PAD

FRONT BRAKE PAD REPLACEMENT

⚠ WARNING

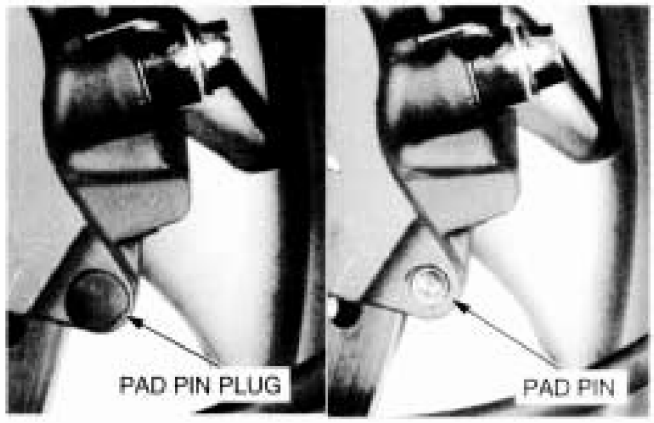
After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

Push the caliper pistons all the way in to allow installation of new brake pads.

NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

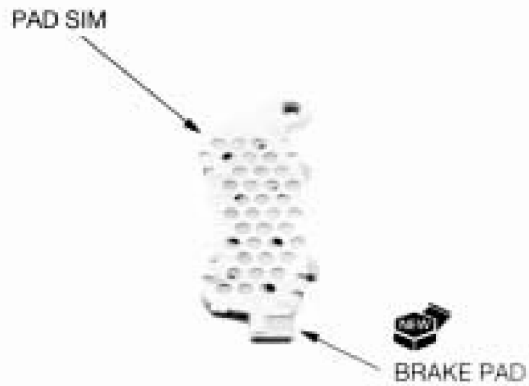
Remove the pad pin plug and pad pin.



Remove the brake pads.

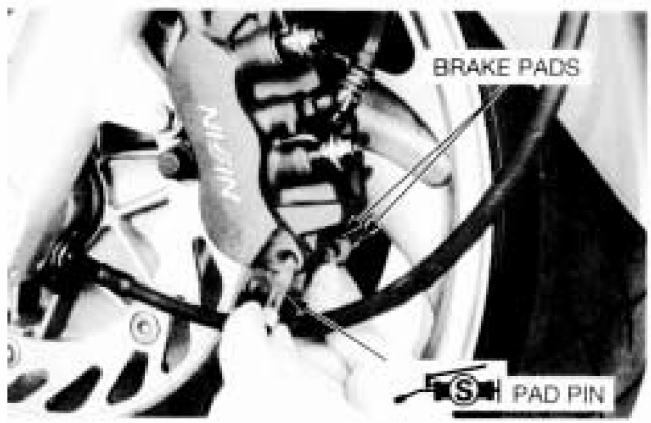
Remove the brake pad sim.
Check the brake pad sim for damage.

Install the brake pad sim to the new brake pad.



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

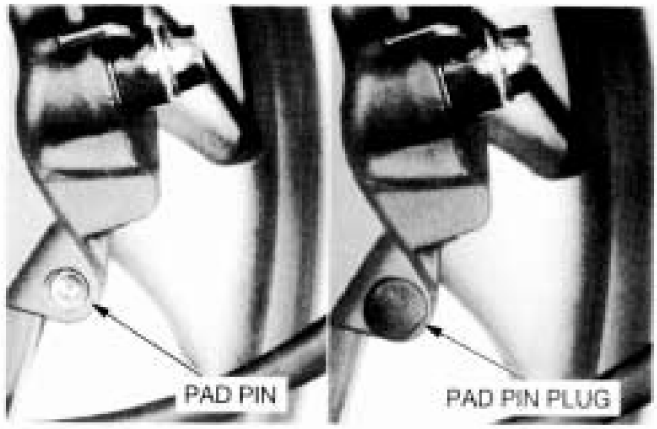
Make sure the brake pad spring is in place.
Install the new brake pads.
Push the brake pads against the pad spring, then appy sillicon grease and install the pad pin.



Tighten the pad pin to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Install the pad pin plug.



REAR BRAKE PAD REPLACEMENT

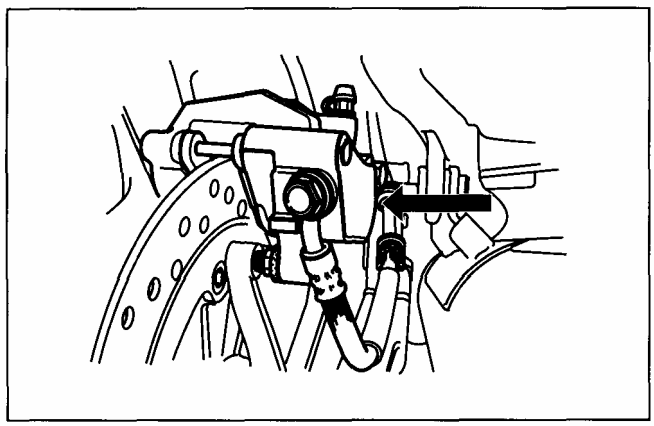
⚠ WARNING

After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

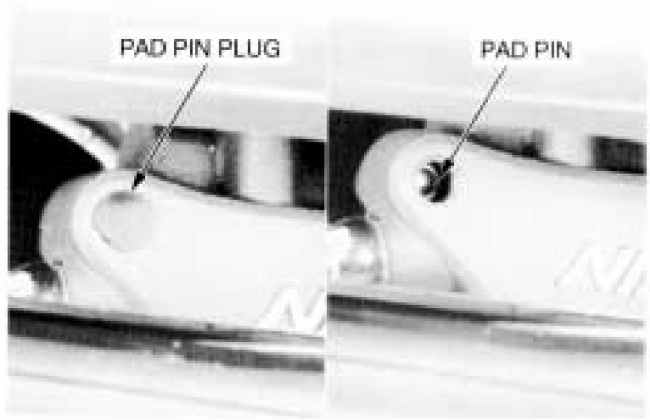
Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

NOTE:

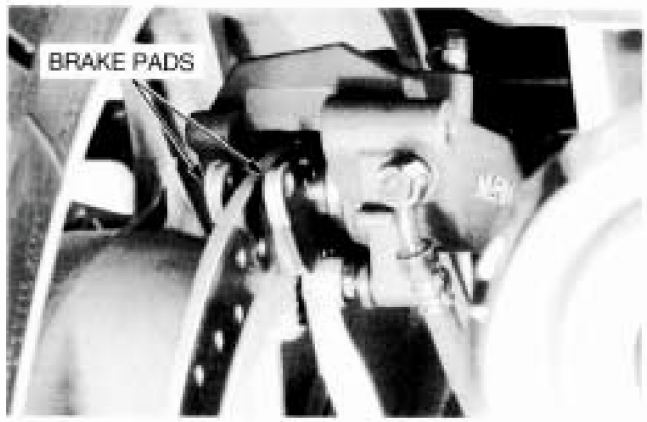
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Remove the pad pin plug and pad pin.

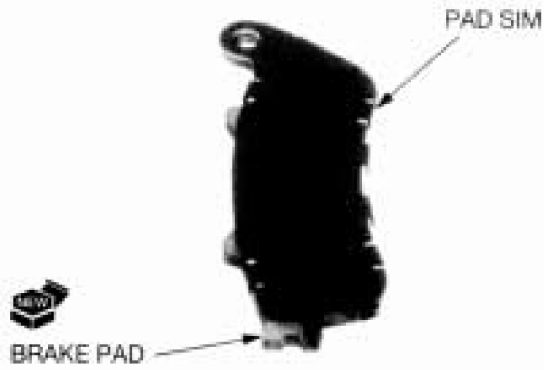


Remove the brake pads.



Remove the brake pad sim.
Check the brake pad sim for damage.

Install the brake pad sim to the new brake pad.



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

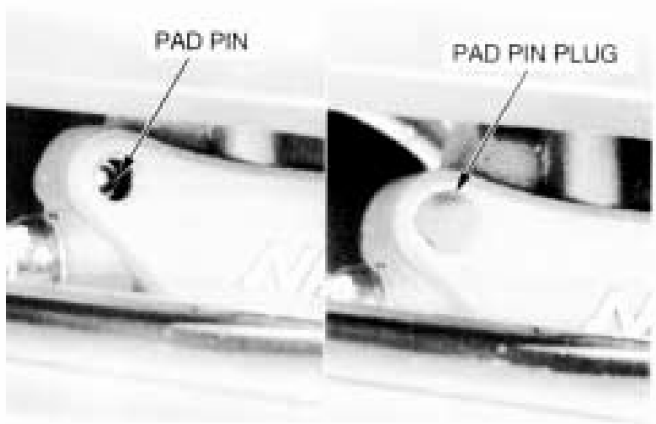
Make sure the brake pad spring is in place.
Install the new brake pads.

Apply cillicon grease and install the pad pin.

Tighten the pad pin to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Install the pad pin plug.



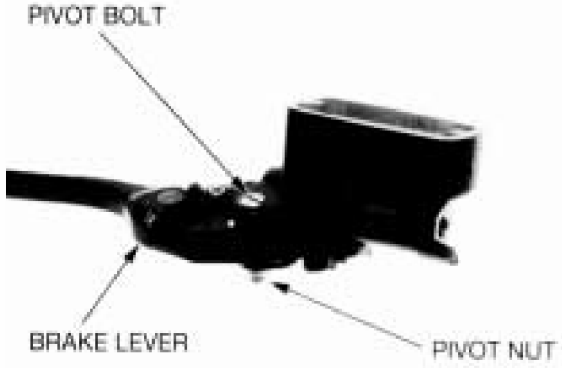
FRONT MASTER CYLINDER

REMOVAL

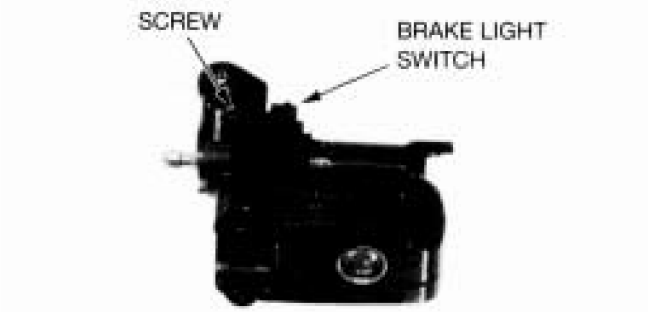
Remove the front master cylinder (page 16-10).

DISASSEMBLY

Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.

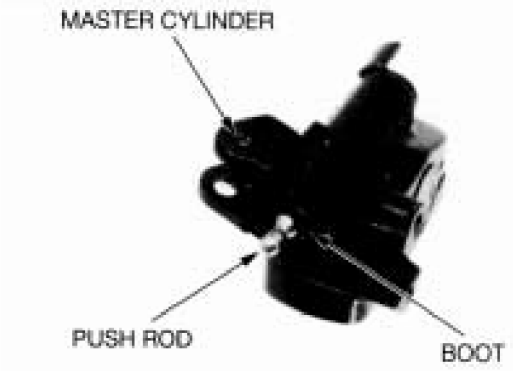


Remove the boot and push rod.

NOTE:

Be careful not to damage the boot.

Check the piston boot for fatigue or damage.

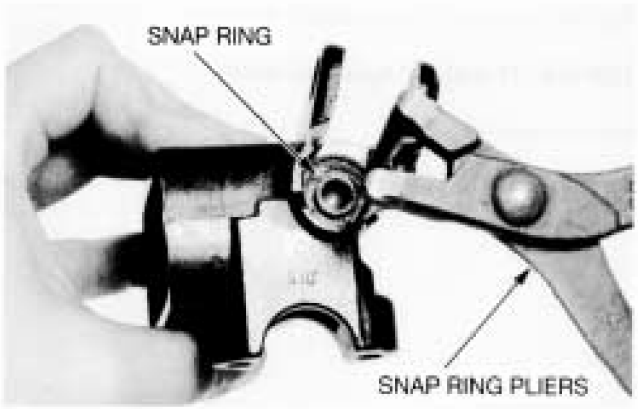


Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers **07914-SA50001**

Remove the master piston, primary cup and spring.
Check the primary cup for fatigue or damage.

Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

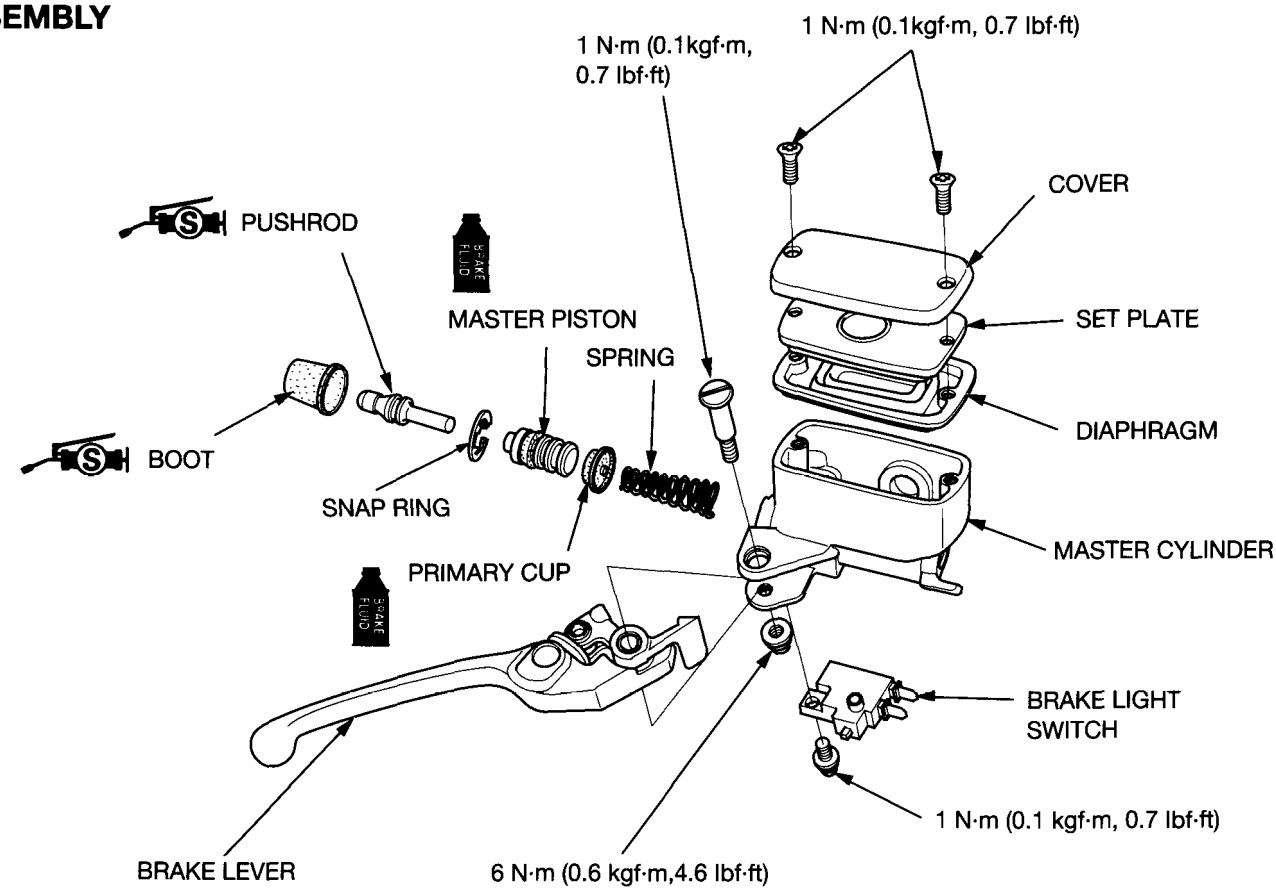
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 15.925 mm (0.6270 in)

Measure the master cylinder piston O.D.

SERVICE LIMIT: 15.815 mm (0.6225 in)

ASSEMBLY



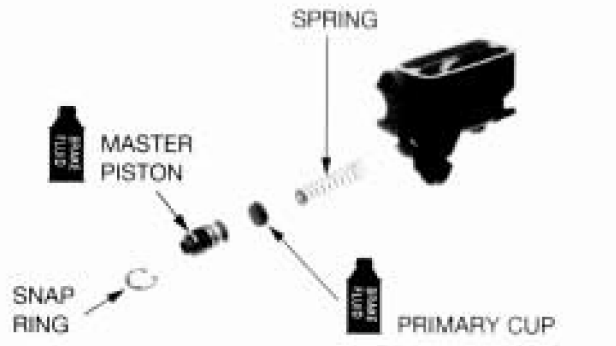
CAUTION:

Keep the piston, cups, spring, snap ring and boot as set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston and primary cup into the master cylinder.

CAUTION:

When installing the cups, do not allow the lips to turn in side out.



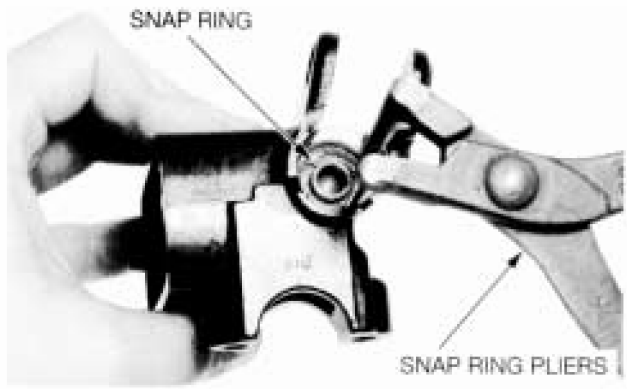
Install the snap ring using the special tool.

CAUTION:

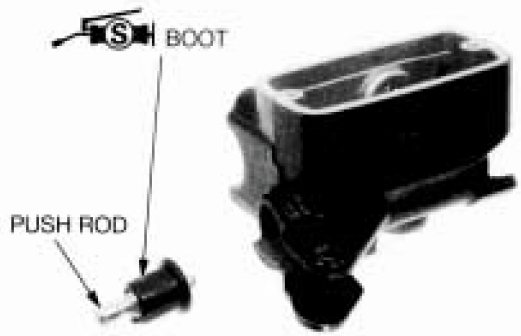
Be certain the snap ring is firmly seated in the groove.

TOOL:

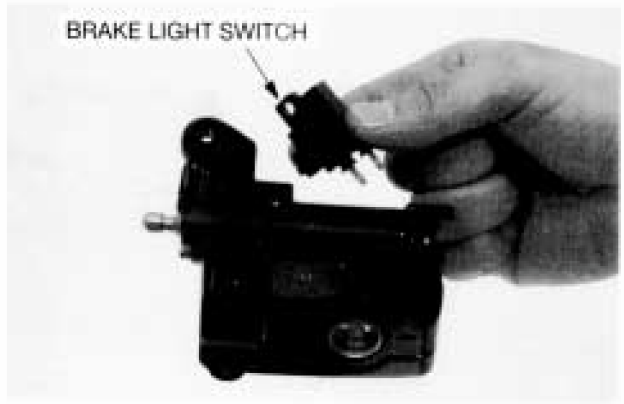
Snap ring pliers	**07914-SA50001**



Apply silicone grease to the inside of the boot and master piston tip.
Install the boot.

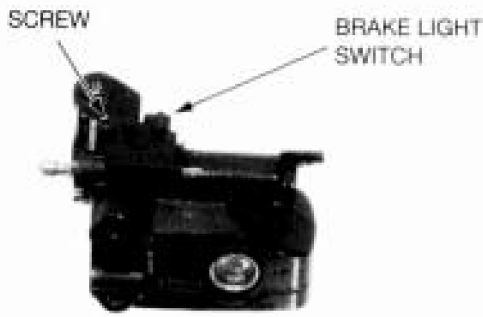


Install the brake light switch onto the master cylinder with aligning the boss of the switch and hole of the master cylinder.

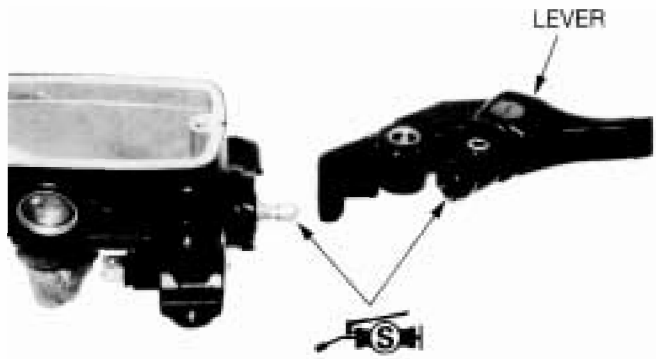


Install and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.12 kgf·m, 0.9 lbf·ft)



Apply silicone grease to the contact surface of the master piston, then install the brake lever assembly.



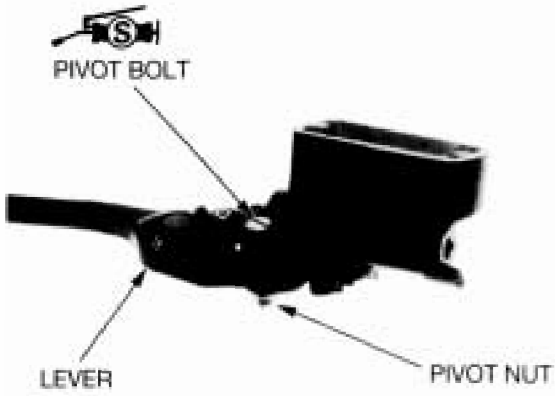
Apply cillicone grease to the pivot bolt thread.
Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the front master cylinder (page 16-11).



REAR MASTER CYLINDER

REMOVAL

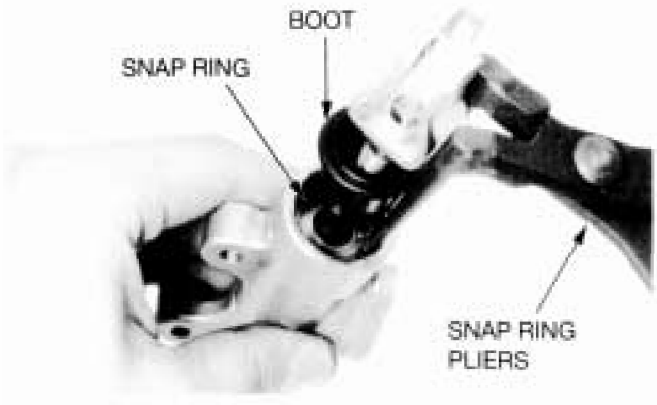
Remove the rear master cylinder (page 16-12).

DISASSEMBLY

Roll up the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers **07914-SA50001**



Remove the push rod/piston, primary cup and spring.
Clean the inside of the cylinder with brake fluid.

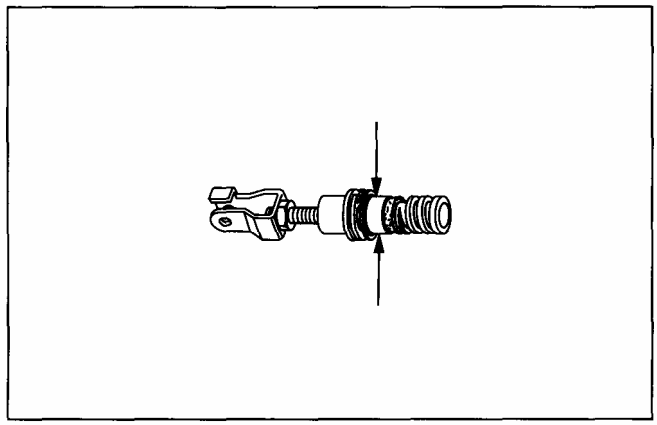
INSPECTION

Check the piston boot and primary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

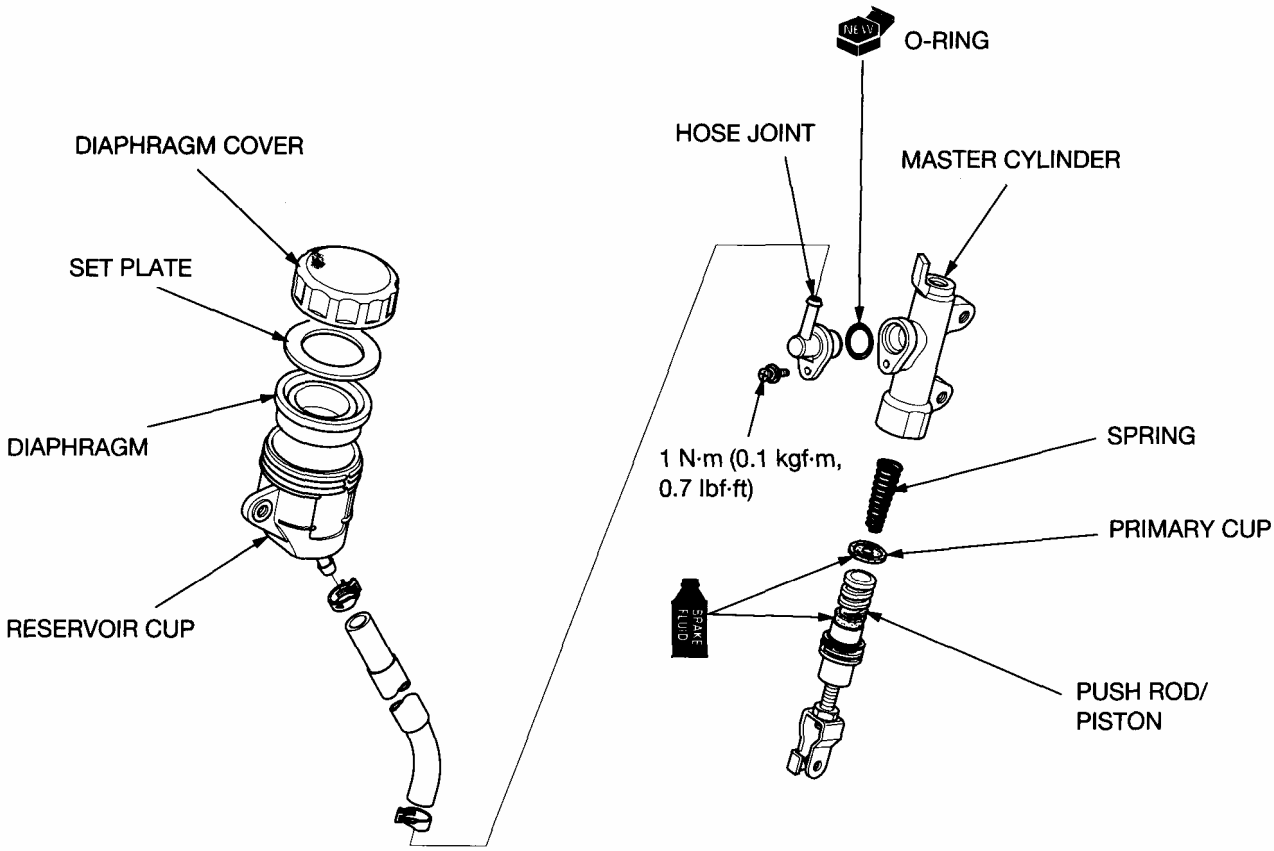
SERVICE LIMIT: 17.515 mm (0.6896 in)

Measure the master cylinder piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



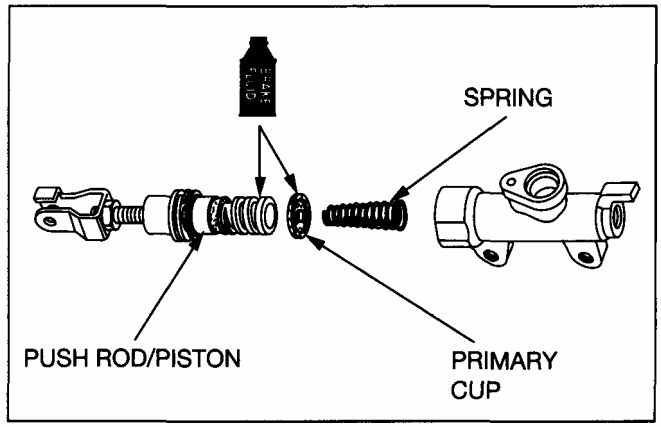
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the master cylinder.
Install the primary cup and push rod/piston into the master cylinder.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

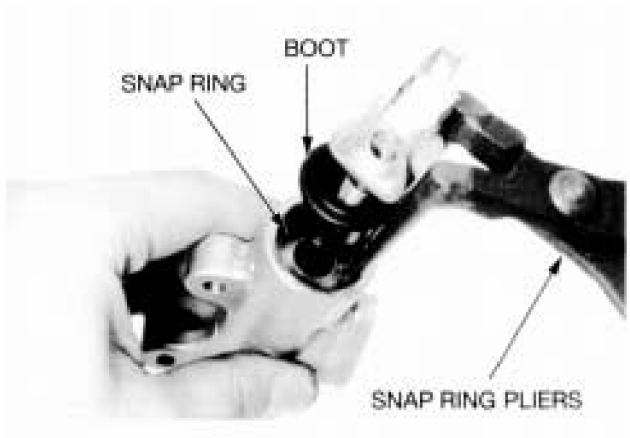
Install the snap ring using the special tool.

CAUTION:

Be certain the snap ring is firmly seated in the groove.

TOOL:
Snap ring pliers **07914-SA50001**

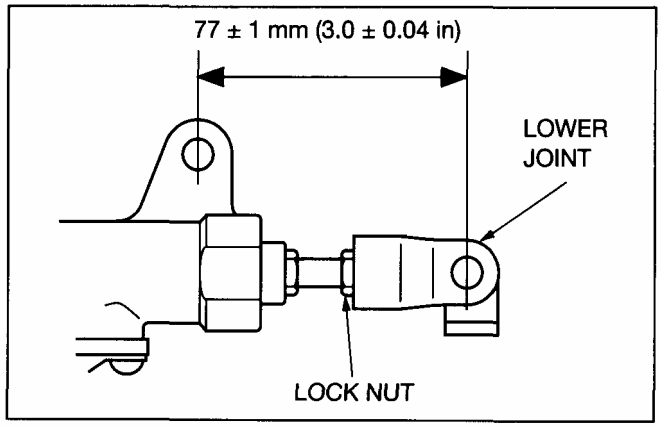
Return boot to the cause.



If the push rod is disassembled, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the master cylinder (page 16-17).



PROPORTIONAL CONTROL VALVE

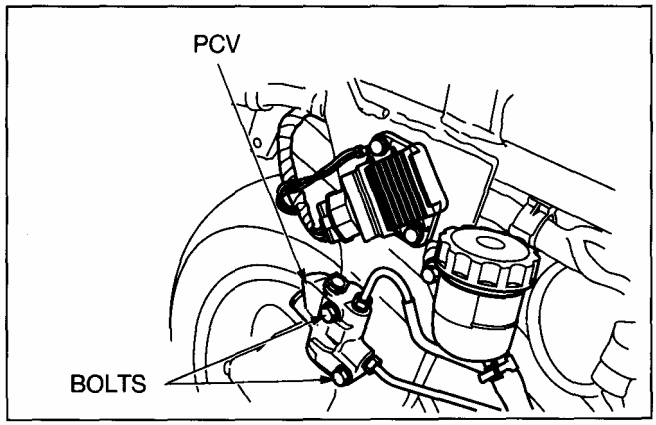
REMOVAL/INSTALLATION

Remove the following:
— Right side cover (page 2-3)
— Right saddle bag (page 24-29)

Remove the oil bolt, seating washers and brake hose eyelet from the Proportional Control Valve (PCV).
Loosen the oil pipe nut and remove the oil pipe.
Remove the two mounting bolts and PCV.

Installation is in the reverse order of removal.
Tighten the PCV mounting bolt to specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



FRONT BRAKE CALIPER

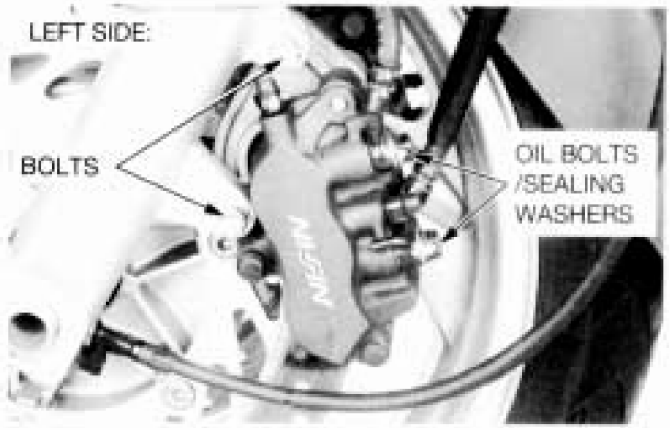
LEFT CALIPER REMOVAL

CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

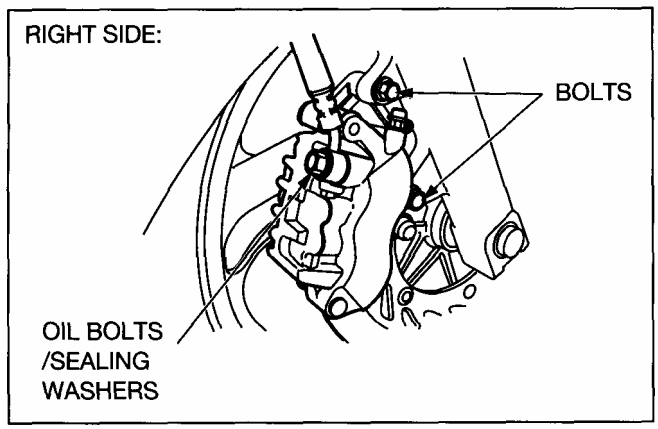
Drain the lever and pedal brake line hydraulic system (page 24-40).

Remove the oil bolts, sealing washers and brake hose eyelet joints.
Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.



RIGHT CALIPER REMOVAL

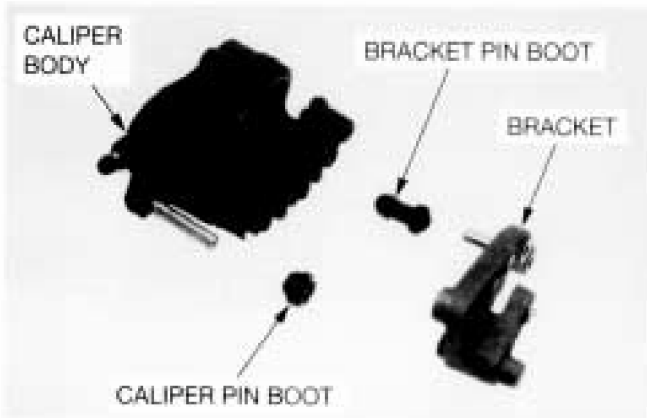
Remove the oil bolt, sealing washers and brake hose eyelet joint.
Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.



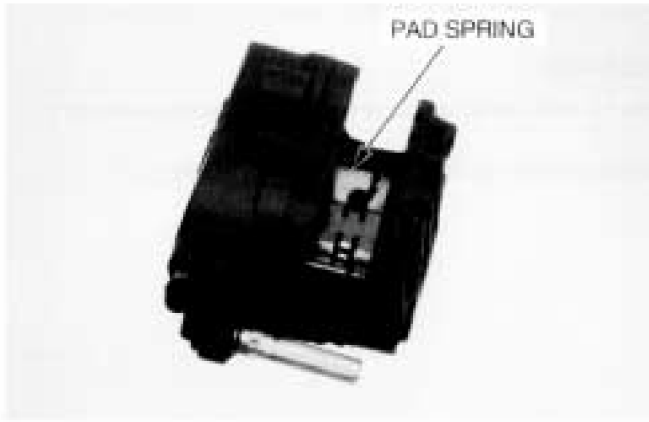
DISASSEMBLY

Remove the brake pads (page 24-44).

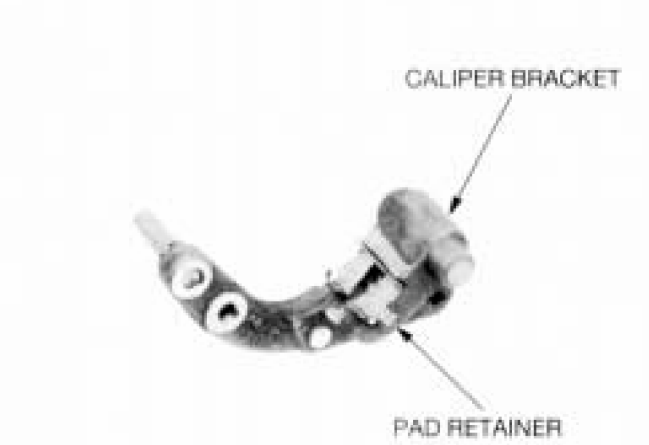
Remove the caliper bracket from the caliper body.
Remove the caliper pin boot and bracket pin boot.



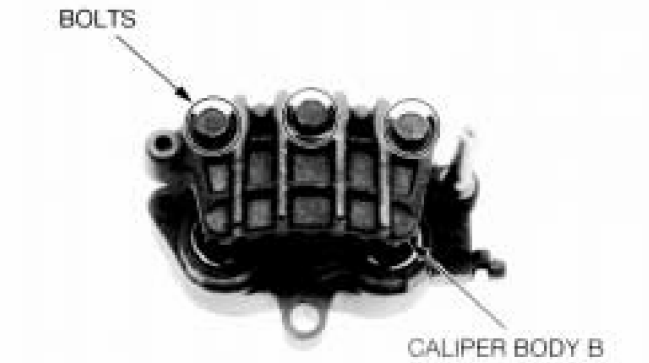
Remove the brake pad spring from the caliper body.



Remove the brake pad retainer from the caliper bracket B.



Remove the bolts and caliper body B.

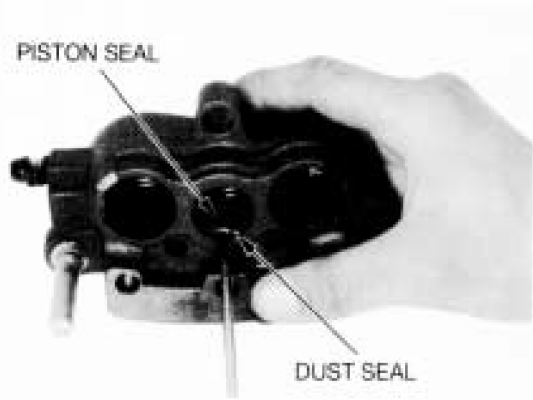


Place the piece of wood sheet under the caliper pistons.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠ WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

Push the dust seals and piston seals in and lift them out.



CAUTION:

Be careful not to damage the piston sliding surface.

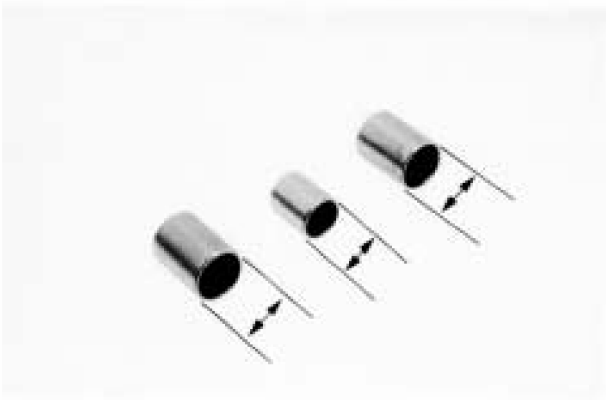
Clean the seal grooves with clean brake fluid.

INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

SERVICE LIMITS:
Outer: 27.060 mm (1.0654 in)
Center: 22.710 mm (0.8941 in)

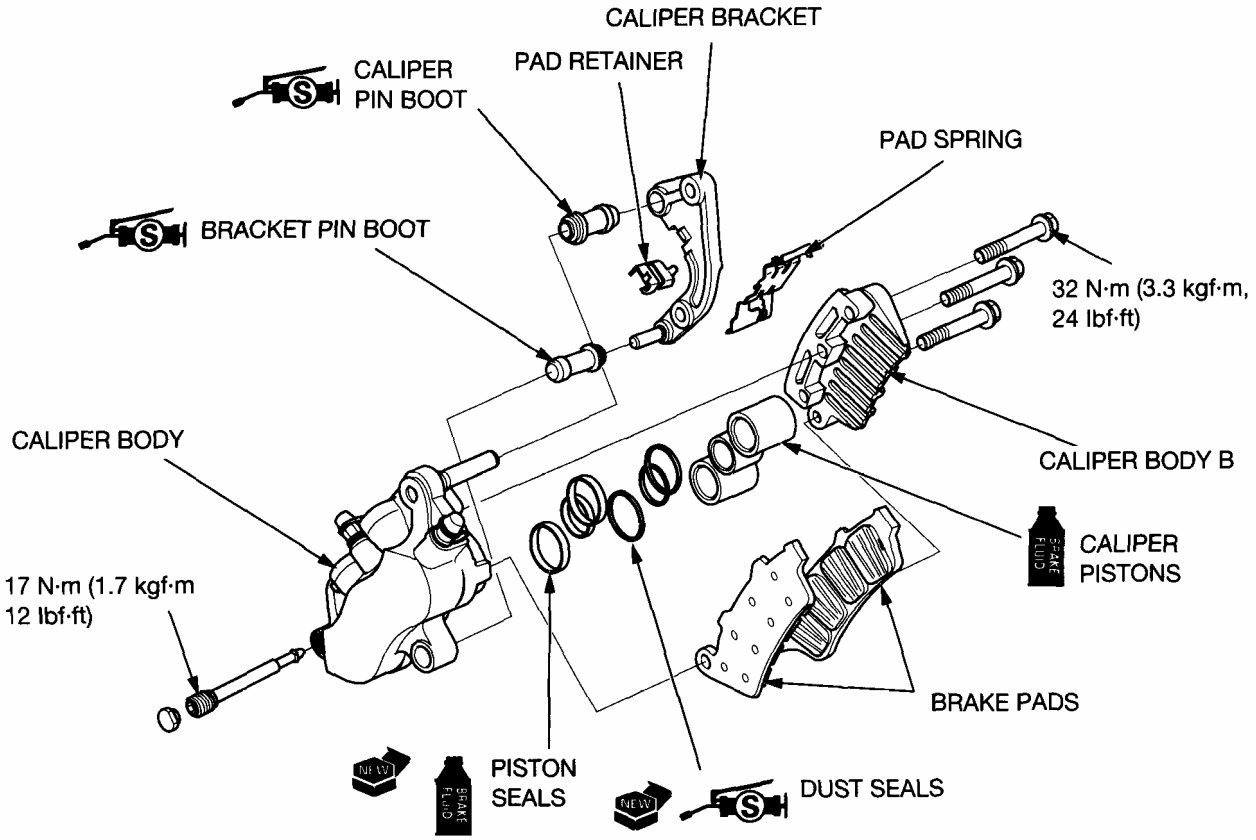


Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMITS:
Outer: 26.910 mm (1.0594 in)
Center: 22.560 mm (0.8882 in)

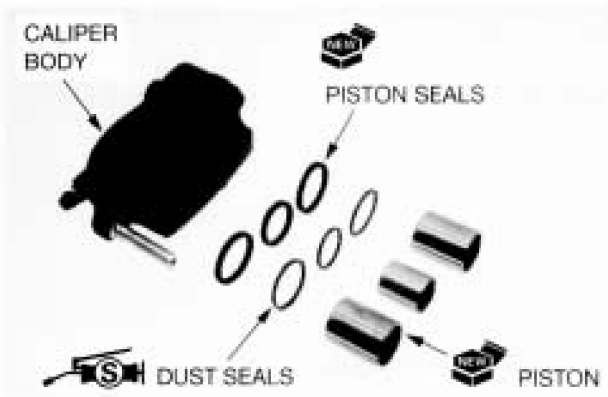
ASSEMBLY



Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

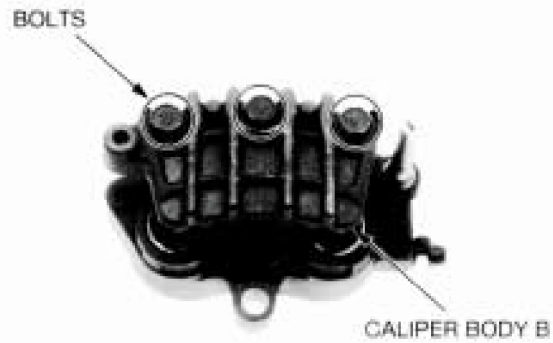
Install the piston seals and dust seals into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and Install them into the caliper cylinder with their opening ends toward the pad.

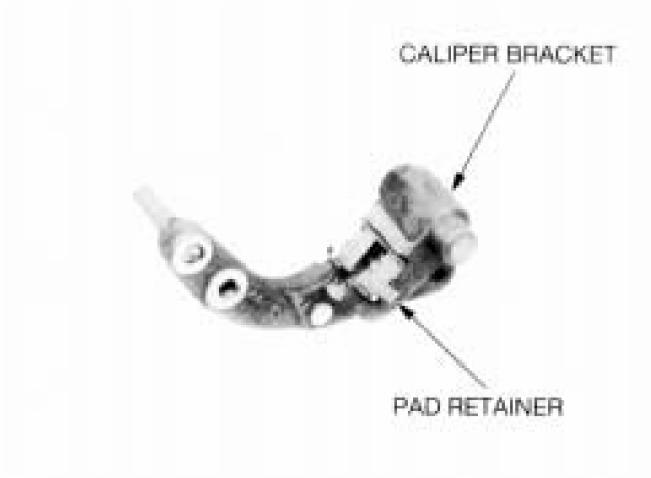


Install the caliper body B and tighten the new bolts to the specified torque.

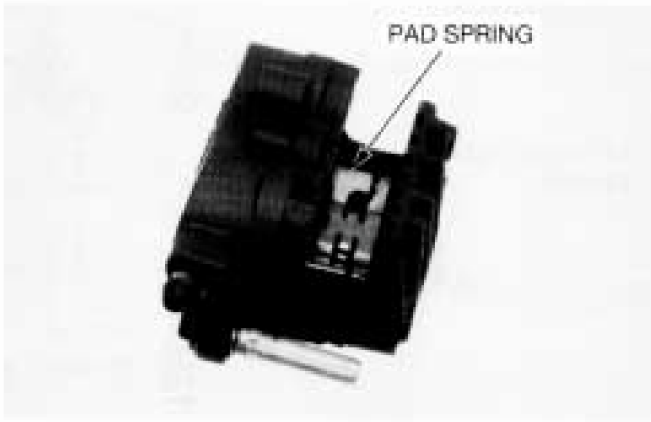
TOROUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)



Install the brake pad retainer onto the caliper bracket.

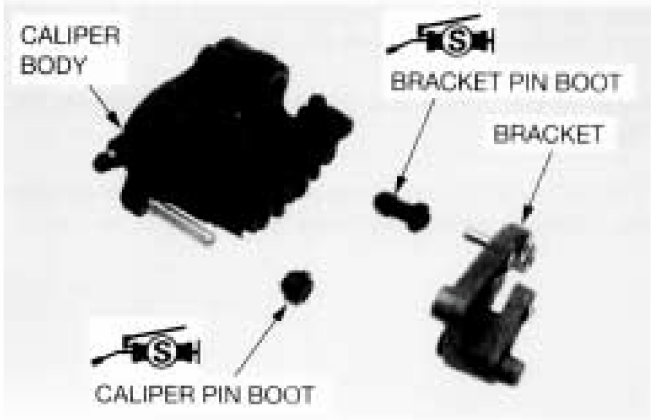


Install the pad spring into the caliper body.



If a bracket pin boots are hard or deteriorated, replace them with new one.

Apply silicone grease to the boot inside then install them.
Assemble the caliper and bracket.



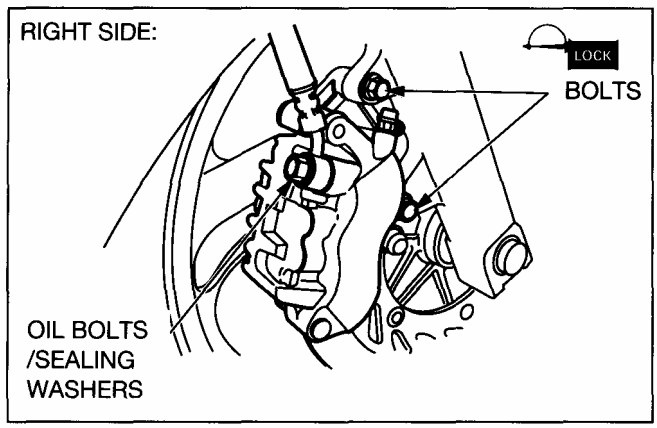
RIGHT CALIPER INSTALLATION

Install the brake pads (page 24-44).
Install the right brake caliper/bracket assembly over the brake disc.
Clean and apply a locking agent to the caliper mounting bolt threads.
Install and tighten the new caliper mounting bolts.

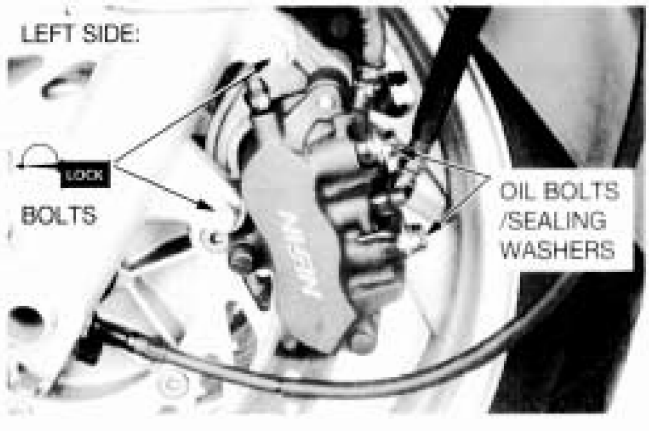
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

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

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)



LEFT CALIPER INSTALLATION



Install the brake pads (page 24-44).
Install the left brake caliper/bracket assembly over the brake disc.
Clean and apply a locking agent to the caliper mounting bolt threads.
Install and tighten the caliper mounting bolts.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

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

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)

NOTE:

It surely starts brake lever and brake pedal separately, and check even which front wheel stop with after left caliper assembled.

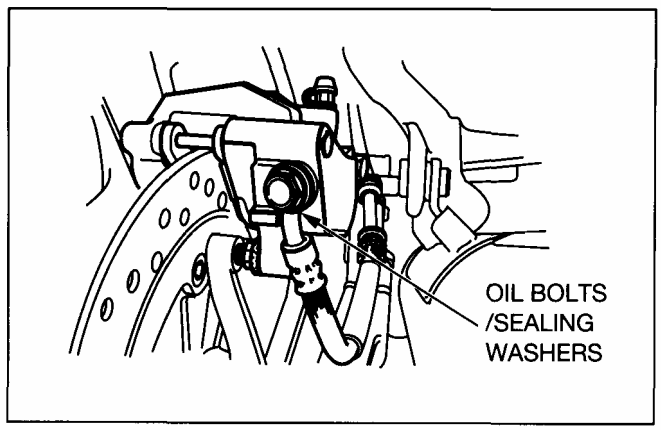
Fill and breed the brake hydraulic system (page 24-41).

REAR BRAKE CALIPER

REMOVAL

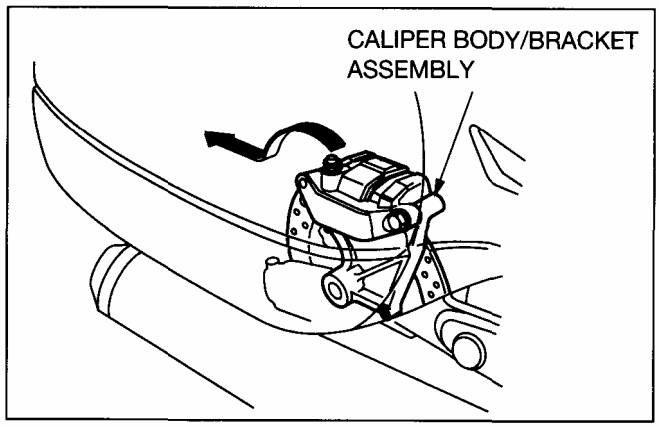
Drain the brake hydraulic system (page 24-40).

Remove the bolt, sealing washers and brake hose eyelet joint.



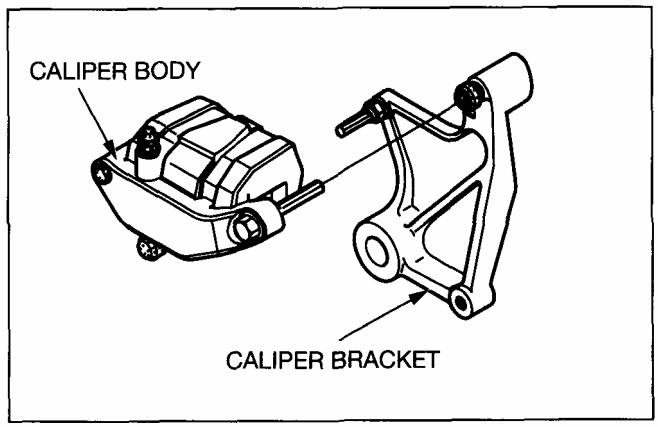
Remove the following:
- Rear axle nut (page 15-3)
- Rear brake caliper stopper bolt (page 15-3)

Remove the caliper body/bracket assembly.



Remove the caliper body from the caliper bracket.

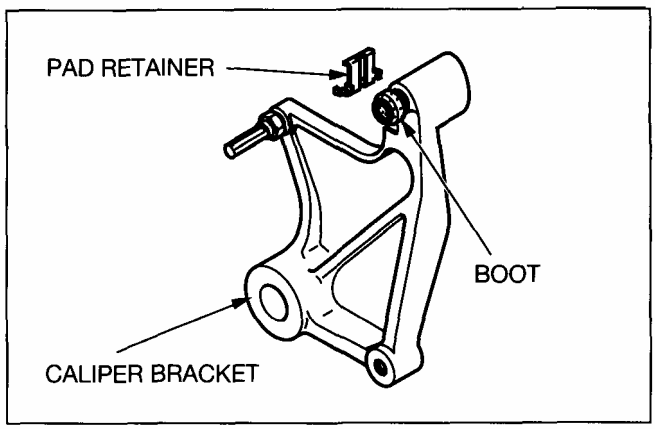
Remove the brake pad (page 24-46).



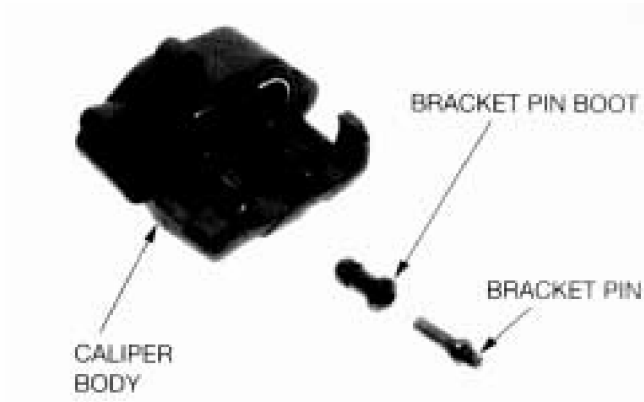
DISASSEMBLY

Remove the pad spring.

Remove the brake pad retainer from the caliper bracket.
Remove the caliper pin boot from the bracket.



Remove the bracket pin and boot from the caliper body.

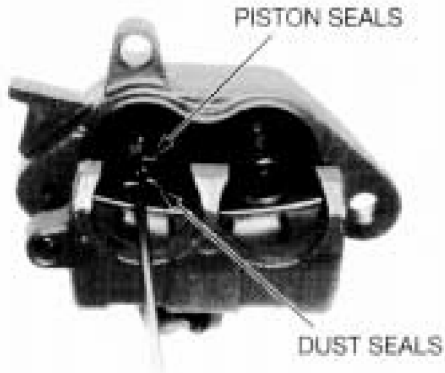


Place a shop towel over the piston.
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the piston.

⚠ WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

Push the dust seals and piston seals in and lift them out.



CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.

INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

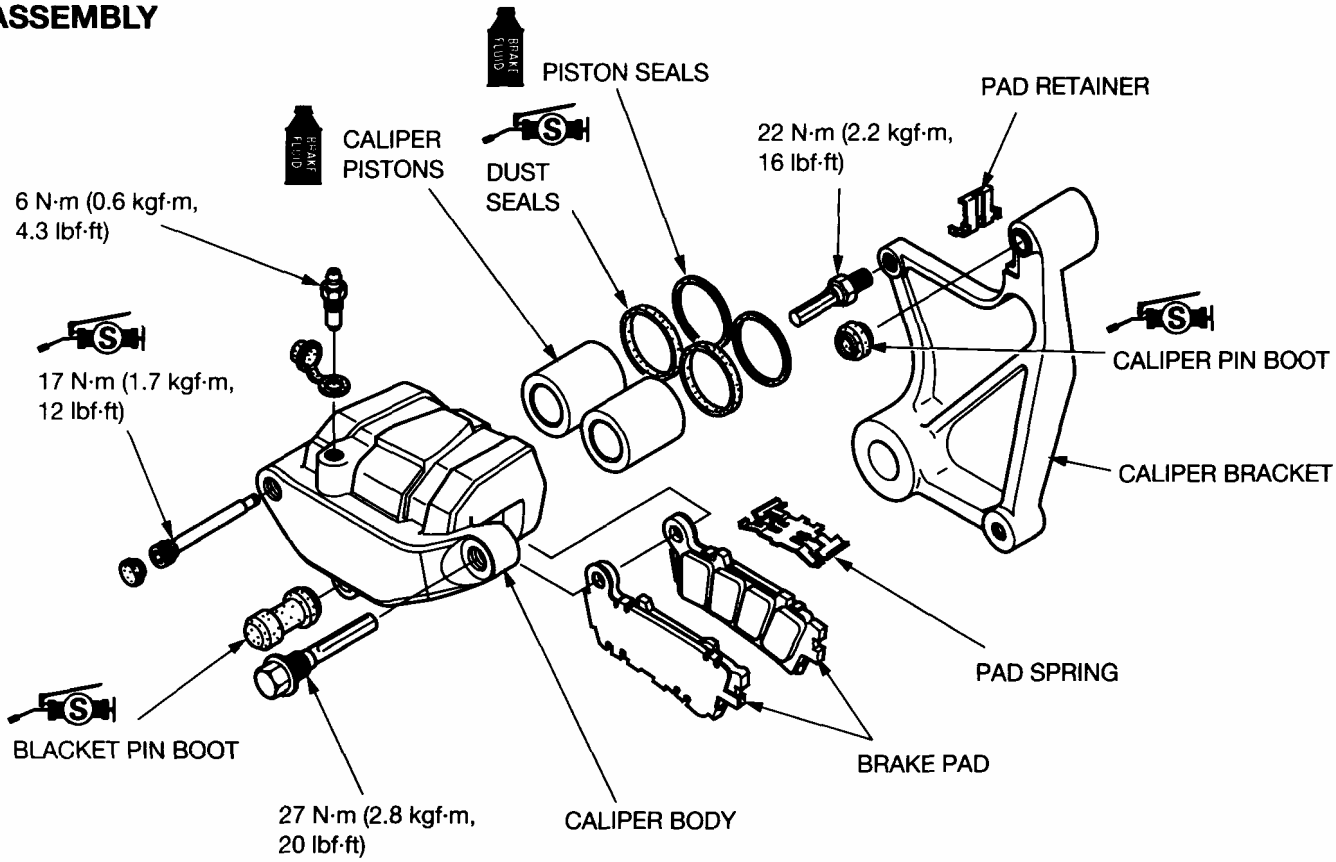
SERVICE LIMIT: 32.090 mm (1.2634 in)

Check the caliper piston for scratches, scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 31.94 mm (1.257 in)

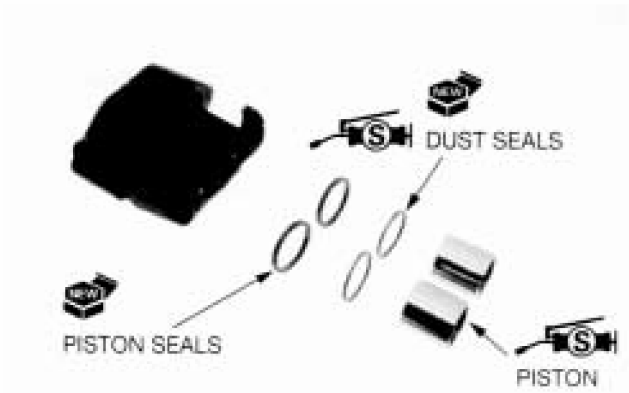
ASSEMBLY



Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the piston seals and dust seals into the grooves of the caliper body.

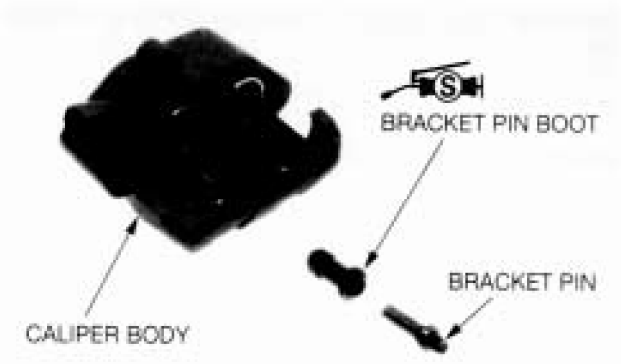
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.



If a bracket pin boots are hard or deteriorated, replace them with new one.

Install the bracket pin boot into the caliper body.

Apply silicone grease to the boot inside then install them.



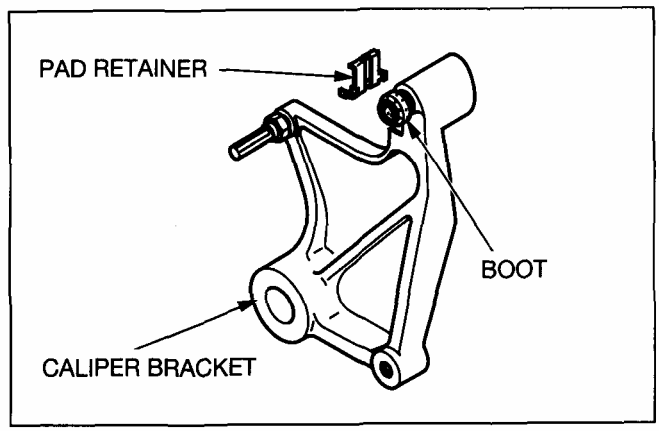
Install the pad spring into the caliper body.

Install the brake pad retainer onto the caliper bracket.

If a caliper pin boot are hard or deteriorated, replace them with new one.

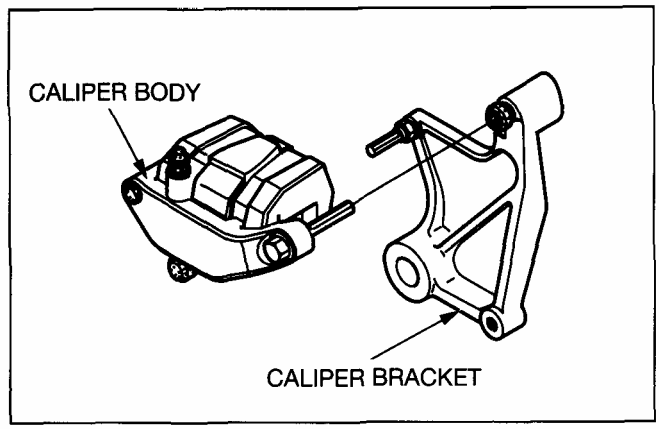
Install the caliper pin boot into the caliper bracket.

Apply silicone grease to the boot inside then install them.



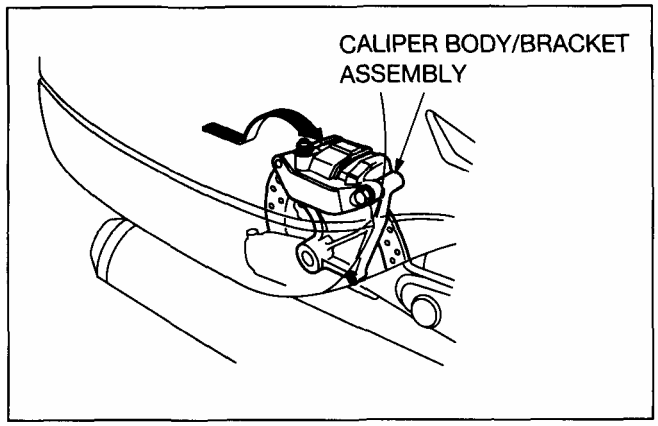
Install the caliper body to caliper bracket.

Install the brake pads (page 24-46).



INSTALLATION

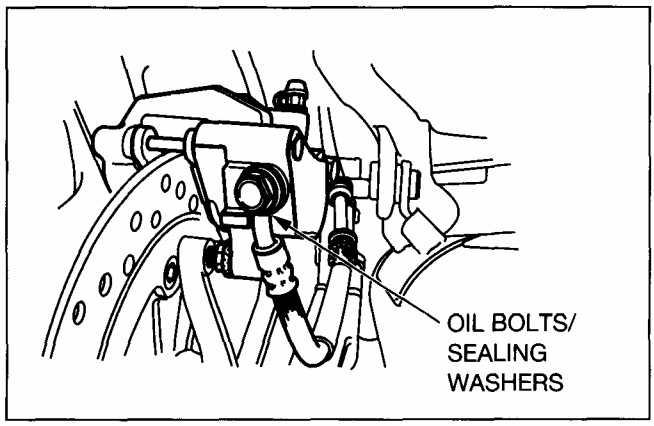
Install the caliper body/bracket.
Install the rear axle bolt (page 15-3).
Install the rear brake caliper stopper bolt (page 15-3).



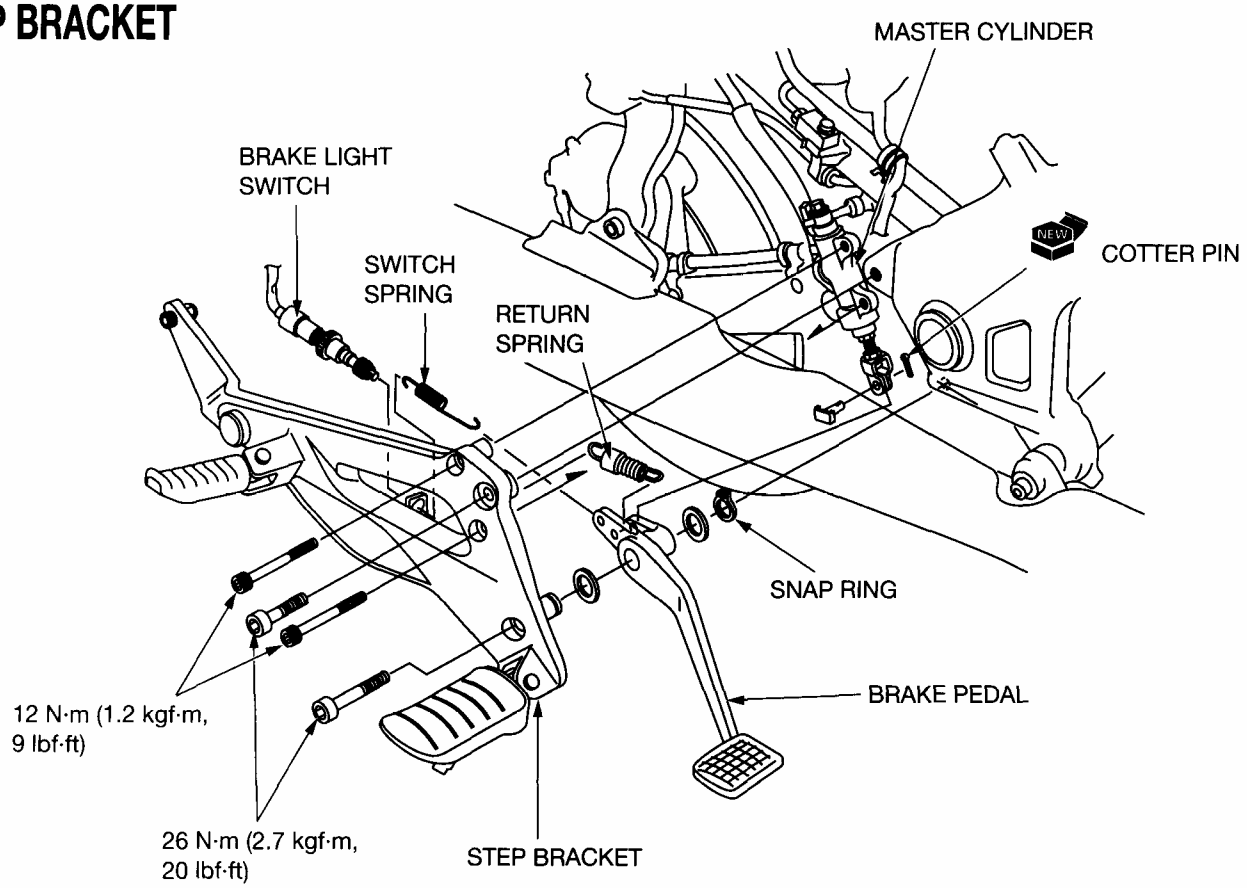
Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt as shown.
Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m, 26 lbf·ft)

Fill and bleed the brake hydraulic system (page 24-40).



STEP BRACKET



REGULATOR/RECTIFIER

REMOVAL/INSTALLATION

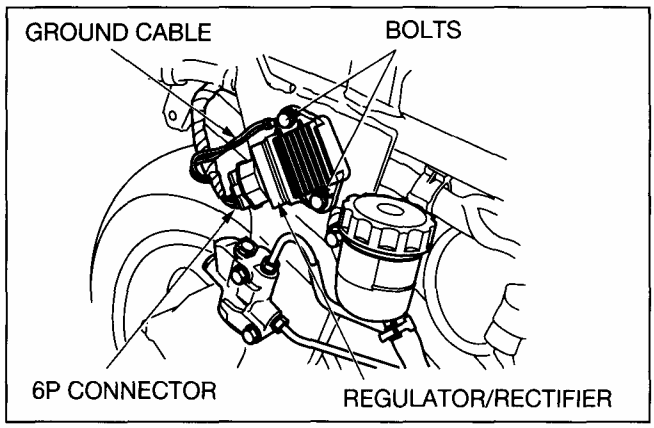
Remove the right saddle bag (page 24-29).

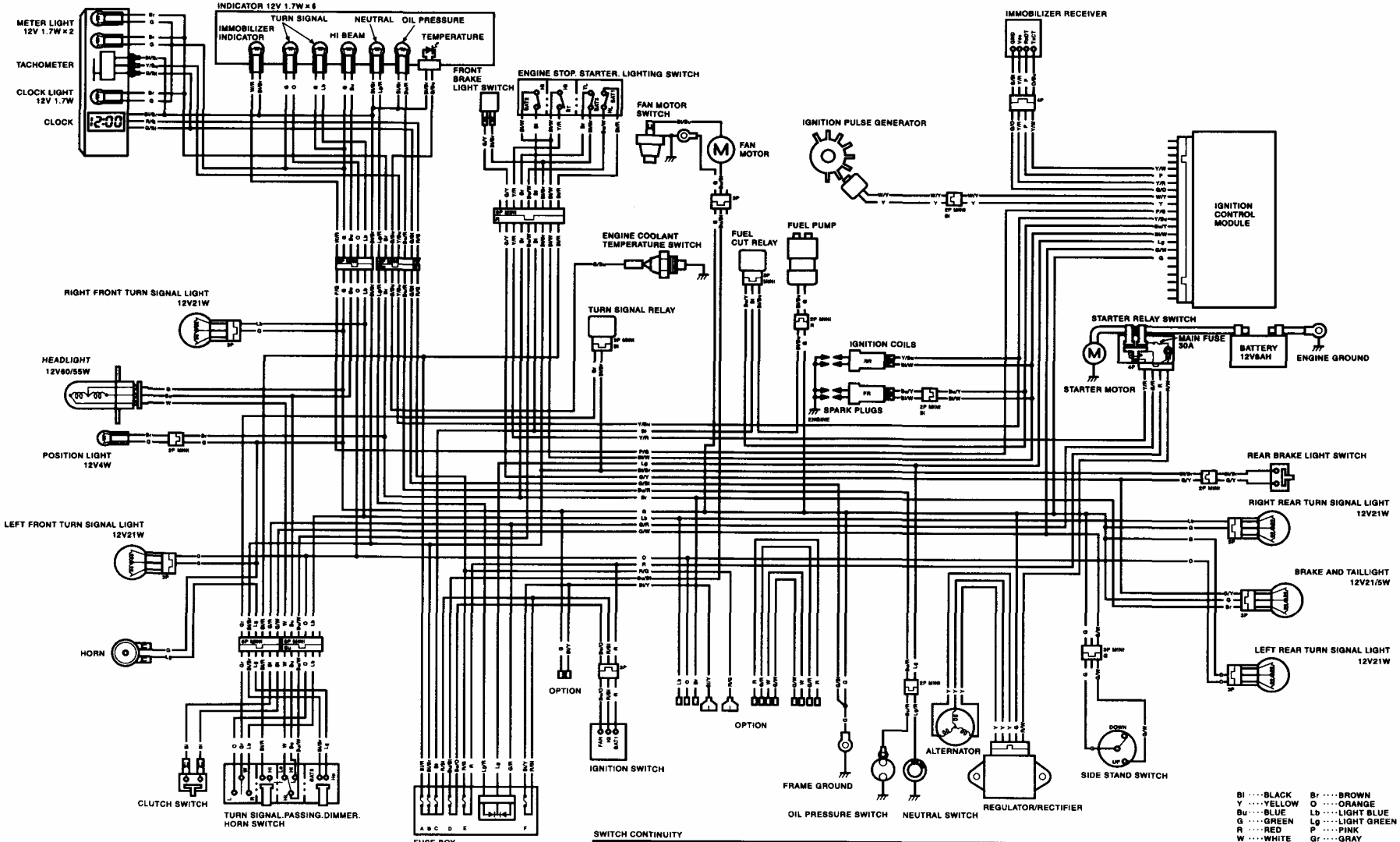
Disconnect the regulator/rectifier 6P connenctor.
Remove the nuts, bolts and ground cable.
Remove the regulator/rectifier unit.

Installation is in the reverse order of removal.

NOTE:

Route the wire harness properly (page 24-22).





SWITCH CONTINUITY

TURN SIGNAL SWITCH				DIMMER SWITCH			
	W	R	L		HL	Lo	HI
R	○	○		Lo	○	○	
N				(N)	○	○	○
L	○		○	HI	○		○

HORN SWITCH		
	Ho	BAT
FREE		
PUSH	○	○

PASSING SWITCH		
	BAT	HI
FREE		
PUSH	○	○

STARTER SWITCH		
	ST	IG
FREE		
PUSH	○	○

ENGINE STOP SWITCH		
	IG	BAT
OFF		
RUN	○	○

LIGHTING SWITCH				
	TL	BAT	HL	BAT
●				
P	○	○		
H	○	○	○	○

IGNITION SWITCH				
	FAN	BAT	IG	KEY
ON	○	○	○	KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN

0030Z-MBL-D000