

2003-2004



HONDA

SERVICE MANUAL

**VTX1300R
VTX1300S**

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the VTX1300S.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the California Air Resources Board (CARB).

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 vehicle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.


Sections 4 through 19 describe parts of the vehicle, 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 procedures.

If you do not know the source of the trouble, go to Section 21, Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgement. You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle.
- Safety Messages – preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

 **DANGER**

You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

 **WARNING**

You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

 **CAUTION**

You CAN be HURT if you don't follow instructions.

- Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

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SERVICE PUBLICATIONS OFFICE

CONTENTS

	GENERAL INFORMATION	1
	FRAME/BODY PANELS/EXHAUST SYSTEM	2
	MAINTENANCE	3
ENGINE AND DRIVE TRAIN	LUBRICATION SYSTEM	4
	FUEL SYSTEM	5
	COOLING SYSTEM	6
	ENGINE REMOVAL/INSTALLATION	7
	CYLINDER HEAD/VALVE	8
	CYLINDER/PISTON	9
	CLUTCH/GEARSHIFT LINKAGE	10
	CRANKSHAFT/TRANSMISSION	11
	FINAL DRIVE	12
	CHASSIS	FRONT WHEEL/SUSPENSION/STEERING
REAR WHEEL/SUSPENSION		14
HYDRAULIC DISC BRAKE		15
ELECTRICAL	BATTERY/CHARGING SYSTEM	16
	IGNITION SYSTEM	17
	ELECTRIC STARTER/STARTER CLUTCH	18
	LIGHTS/METERS/SWITCHES	19
	WIRING DIAGRAMS	20
	TROUBLESHOOTING	21
	INDEX	22

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

1. GENERAL INFORMATION

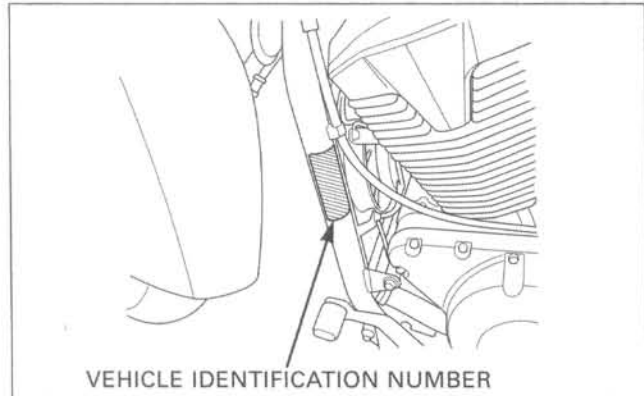
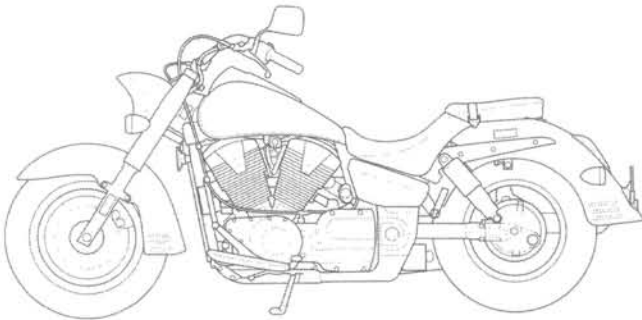
SERVICE RULES	1-1	LUBRICATION & SEAL POINTS	1-16
MODEL IDENTIFICATION	1-2	CABLE & HARNESS ROUTING	1-19
SPECIFICATIONS	1-3	EMISSION CONTROL SYSTEMS	1-32
TORQUE VALUES	1-10	EMISSION CONTROL INFORMATION	
TOOLS	1-14	LABELS	1-35

SERVICE RULES

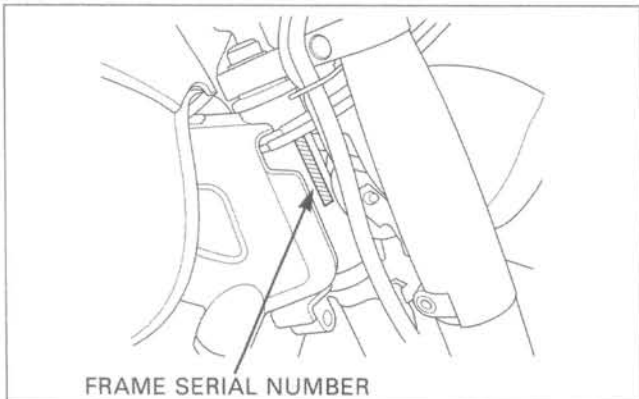
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 1-19 through 1-31, Cable & Harness Routing.

GENERAL INFORMATION

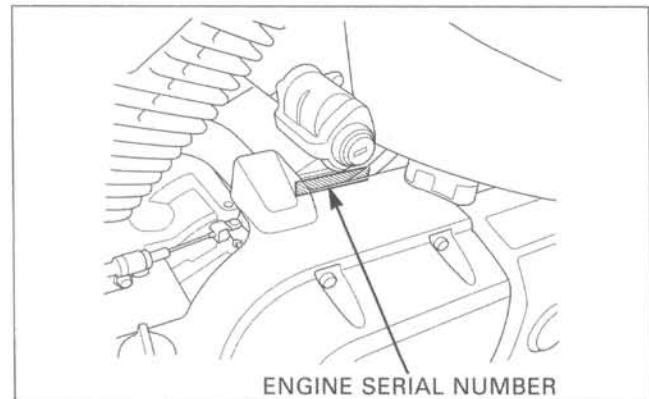
MODEL IDENTIFICATION



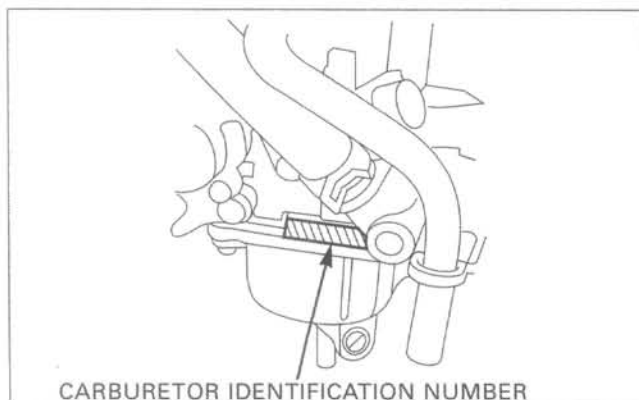
The vehicle identification number (VIN) is attached on the left side of the steering head.



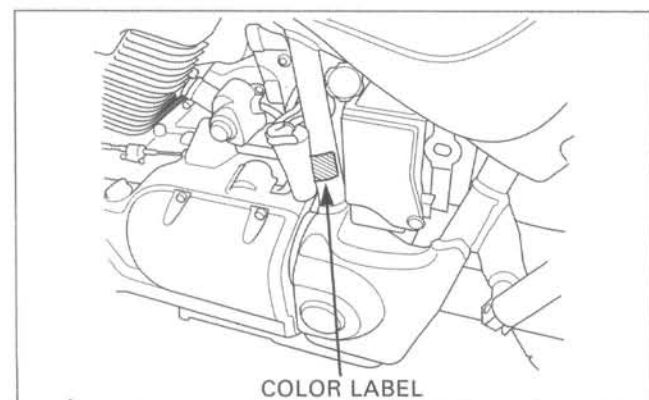
The frame serial number is stamped on the right side of the steering head.



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



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



The color label is attached on the left side of the frame down tube. When ordering color-coded parts, always specify the designated color code.

SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,575 mm (101.4 in)
	Overall width	960 mm (37.8 in)
	Overall height	1,125 mm (44.3 in)
	Wheelbase	1,670 mm (65.7 in)
	Seat height	685 mm (27.0 in)
	Footpeg height	270 mm (10.6 in)
	Ground clearance	130 mm (5.1 in)
	Dry weight	(49 state/Canada type) 305 kg (672 lbs) (California type) 306 kg (675 lbs)
	Curb weight	(49 state/Canada type) 318 kg (701 lbs) (California type) 320 kg (705 lbs)
	Maximum weight capacity	(49 state/California type) 183 kg (404 lbs) (Canada type) 187 kg (413 lbs)
	FRAME	Frame type
Front suspension		Telescopic fork
Front axle travel		110 mm (4.3 in)
Rear suspension		Swingarm
Rear axle travel		95 mm (3.7 in)
Front tire size		140/80-17M/C 69H
Rear tire size		170/80-15M/C 77H
Front tire brand		DUNLOP D404F
Rear tire brand		DUNLOP K555J
Front brake		Hydraulic single disc
Rear brake		Hydraulic single disc
Caster angle		32° 00'
Trail length	144 mm (5.7 in)	
Fuel tank capacity	18.0 liters (4.76 US gal, 3.96 Imp gal)	
ENGINE	Cylinder arrangement	2 cylinders 52° V transverse
	Bore and stroke	89.5 x 104.3 mm (3.52 x 4.11 in)
	Displacement	1,312 cm ³ (80.0 cu in)
	Compression ratio	9.2 : 1
	Valve train	Silent cam chain driven, OHC
	Intake valve	opens 0° BTDC (at 1 mm lift) closes 50° ABDC (at 1 mm lift)
	Exhaust valve	opens Front: 46° BBDC (at 1 mm lift) Rear: 54° BBDC (at 1 mm lift) closes Front: 4° ATDC (at 1 mm lift) Rear: -4° ATDC (at 1 mm lift)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Viscous paper element
	Engine dry weight	109 kg (239.8 lbs)
	Firing order	Front - 308° - Rear - 412° - Front

GENERAL INFORMATION

GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Type Throttle bore	Constant velocity 38 mm (1.5 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Secondary reduction (output drive) Final reduction Gear ratio 1st 2nd 3rd 4th 5th Gearshift pattern	Multi-plate, wet Cable operating Constant mesh, 5-speeds 1.935 (60/31) 0.944 (17/18) 2.818 (31/11) 1.900 (38/20) 1.148 (31/27) 0.912 (31/34) 0.778 (28/36) 0.697 (23/33) Left foot operated return system, 1 - N - 2 - 3 - 4 - 5
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Full transistorized ignition Electric starter motor Triple phase output alternator SCR shorted/triple phase full-wave rectification Battery

GENERAL INFORMATION

Unit: mm (in)

LUBRICATION SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.5 liters (3.7 US qt, 3.1 Imp qt)	—
	After draining/filter change	3.7 liters (3.9 US qt, 3.3 Imp qt)	—
	After disassembly	4.3 liters (4.5 US qt, 3.8 Imp qt)	—
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	—
Oil pressure (at oil pressure switch)		530 kPa (5.4 kgf/cm ² , 77 psi) at 5,000 rpm/80°C (176°F)	—
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15–0.21 (0.006–0.008)	0.35 (0.014)
	Side clearance	0.02–0.07 (0.001–0.003)	0.10 (0.004)

FUEL SYSTEM

ITEM		SPECIFICATIONS
Fuel tank capacity		18.0 liters (4.76 US gal, 3.96 Imp gal)
Carburetor identification number		VE7BA
Main jet		#195
Slow jet		#55
Pilot screw	Initial/final opening	See page 5-18
	High altitude adjustment	See page 5-19
Float level		18.5 mm (0.73 in)
Idle speed		900 ± 100 rpm
Throttle grip free play		2–6 mm (1/12–1/4)

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.7 liters (2.9 US qt, 2.4 Imp qt)
	Reserve tank	0.95 liter (0.25 US gal, 0.21 Imp gal)
Radiator cap relief pressure		108–137 kPa (1.1–1.4 kgf/cm ² , 16–20 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
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 mixture with distilled water

GENERAL INFORMATION

Unit: mm (in)

CYLINDER HEAD/VALVE		ITEM		STANDARD	SERVICE LIMIT
Cylinder compression at 300 rpm				1,177 kPa (12.0 kgf/cm ² , 171 psi)	—
Valve clearance		IN		0.15 ± 0.02 (0.006 ± 0.001)	—
		EX		0.30 ± 0.02 (0.012 ± 0.001)	—
Camshaft	Cam lobe height	IN		38.886—39.080 (1.5309—1.5386)	38.86 (1.530)
		EX		39.050—39.250 (1.5374—1.5453)	39.03 (1.537)
	Runout			—	0.04 (0.0016)
	Oil clearance	A, B		0.040—0.101 (0.0016—0.0040)	0.120 (0.0047)
C			0.055—0.121 (0.0022—0.0048)	0.140 (0.0055)	
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN/EX		13.966—13.984 (0.5498—0.5506)	13.91 (0.548)
	Rocker arm I.D.	IN/EX		14.000—14.018 (0.5512—0.5519)	13.95 (0.549)
	Rocker arm-to-shaft clearance			0.016—0.052 (0.0006—0.0020)	0.15 (0.006)
Valve, valve guide	Valve stem O.D.	IN		6.575—6.590 (0.2589—0.2594)	6.57 (0.259)
		EX		6.560—6.575 (0.2583—0.2589)	6.545 (0.2577)
	Valve guide I.D.	IN/EX		6.600—6.615 (0.2598—0.2604)	6.635 (0.2612)
	Stem-to-guide clearance	IN		0.010—0.040 (0.0004—0.0016)	0.08 (0.003)
		EX		0.025—0.055 (0.0010—0.0022)	0.115 (0.0045)
	Valve guide projection above cylinder head	IN		14.5 (0.57)	—
		EX		15.5 (0.61)	—
Valve seat width	IN/EX		0.9—1.1 (0.035—0.043)	1.5 (0.06)	
Valve spring	Free length	IN		45.70 (1.799)	43.90 (1.728)
		EX		43.50 (1.713)	41.80 (1.646)
Cylinder head warpage				—	0.10 (0.004)

Unit: mm (in)

CYLINDER/PISTON		ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.			89.500—89.515 (3.5236—3.5242)	89.55 (3.326)
	Out-of-round			—	0.10 (0.004)
	Taper			—	0.10 (0.004)
	Warpage			—	0.10 (0.004)
Piston, piston pin, piston ring	Piston O.D. at 15 mm (0.6 in) from bottom			89.470—89.490 (3.5224—3.5232)	89.41 (3.520)
	Piston pin hole I.D.			20.002—20.008 (0.7875—0.7877)	20.018 (0.7881)
	Piston pin O.D.			19.994—20.000 (0.7872—0.7874)	19.984 (0.7868)
	Piston-to-piston pin clearance			0.002—0.014 (0.0001—0.0006)	0.034 (0.0013)
	Piston ring end gap	Top		0.200—0.300 (0.0079—0.0118)	0.315 (0.0124)
		Second		0.300—0.400 (0.0118—0.0157)	0.415 (0.0163)
		Oil (side rail)		0.425—0.475 (0.0167—0.0187)	0.495 (0.0195)
	Piston ring-to-ring groove clearance	Top		0.015—0.050 (0.0006—0.0020)	0.070 (0.0028)
Second			0.015—0.045 (0.0006—0.0018)	0.065 (0.0026)	
Cylinder-to-piston clearance				0.010—0.045 (0.0004—0.0018)	0.32 (0.013)
Connecting rod small end I.D.				20.016—20.034 (0.7880—0.7887)	20.044 (0.7891)
Connecting rod-to-piston pin clearance				0.016—0.040 (0.0006—0.0016)	0.063 (0.0025)

GENERAL INFORMATION

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE		
ITEM	STANDARD	SERVICE LIMIT
Clutch lever free play	10—20 (3/8—3/4)	—
Clutch spring free length	58.2 (2.29)	56.7 (2.23)
Clutch disc thickness	3.72—3.88 (0.146—0.153)	3.1 (0.12)
Clutch plate warpage	—	0.30 (0.012)
Clutch outer guide I.D.	27.995—28.012 (1.1022—1.1028)	28.80 (1.134)
Mainshaft O.D. at clutch outer guide	27.980—27.993 (1.1016—1.1021)	27.97 (1.101)

Unit: mm (in)

CRANKSHAFT/TRANSMISSION				
ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Connecting rod big end side clearance	0.10—0.25 (0.004—0.010)	0.28 (0.011)	
	Crankpin oil clearance	0.038—0.062 (0.0015—0.0024)	0.070 (0.0028)	
	Main journal oil clearance	0.030—0.054 (0.0012—0.0021)	0.068 (0.0027)	
	Crankshaft runout	—	0.05 (0.002)	
Shift fork	I.D.	14.000—14.018 (0.5512—0.5519)	14.04 (0.553)	
	Claw thickness	5.93—6.00 (0.233—0.236)	5.83 (0.230)	
Shift fork shaft	O.D.	13.966—13.984 (0.5498—0.5506)	13.956 (0.5494)	
Transmission	Gear I.D.	M4, M5	31.000—31.025 (1.2205—1.2215)	31.035 (1.2218)
		C1	30.000—30.025 (1.1811—1.1821)	30.035 (1.1825)
		C2, C3	33.000—33.025 (1.2992—1.3002)	33.035 (1.3006)
	Gear bushing O.D.	M4, M5	30.950—30.975 (1.2186—1.2195)	30.94 (1.218)
		C1	25.987—26.000 (1.0231—1.0236)	25.977 (1.0227)
		C2/C3	32.950—32.965 (1.2972—1.2978)	32.94 (1.297)
	Gear-to-bushing clearance	M4, M5	0.025—0.075 (0.0010—0.0030)	0.095 (0.0037)
		C2/C3	0.035—0.075 (0.0014—0.0030)	0.095 (0.0037)
	Gear bushing I.D.	M4	27.985—28.006 (1.1018—1.1026)	28.03 (1.104)
		C1	22.050—22.150 (0.8681—0.8720)	22.170 (0.8728)
		C2/C3	30.000—30.030 (1.1811—1.1823)	30.050 (1.1831)
	Mainshaft O.D.	at M4	27.959—27.980 (1.1007—1.1016)	27.940 (1.1000)
	Countershaft O.D.	at C1	21.980—21.993 (0.8654—0.8659)	21.97 (0.8650)
		at C2/C3	29.959—29.980 (1.1795—1.1803)	29.94 (1.1787)
	Bushing-to-shaft clearance	M4	0.005—0.047 (0.0002—0.0019)	0.067 (0.0026)
		C1	0.057—0.170 (0.0022—0.0067)	0.190 (0.0075)
C2/C3		0.020—0.071 (0.0008—0.0028)	0.091 (0.0036)	

Unit: mm (in)

FINAL DRIVE			
ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	—
Final drive oil capacity	After draining	120 cm ³ (4.1 US oz, 4.2 Imp oz)	—
	After disassembly	150 cm ³ (5.1 US oz, 5.3 Imp oz)	—
Final drive gear backlash		0.05—0.15 (0.002—0.006)	0.30 (0.012)
Backlash difference between measurements		—	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30—0.60 (0.012—0.024)	—
Final drive gear assembly preload		0.2—0.4 N·m (2—4 kgf·cm, 1.7—3.5 lbf·in)	—

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load	225 kPa (2.25 kgf/cm ² , 32 psi)	—
	Up to maximum weight capacity	225 kPa (2.25 kgf/cm ² , 32 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.06)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	493.8 (19.44)	483.9 (19.05)
	Tube runout	—	0.20 (0.008)
	Recommended fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	135 (5.31)	—
	Fluid capacity	459 ± 2.5 cm ³ (15.5 ± 0.08 US oz, 16.2 ± 0.09 Imp oz)	—
Steering head bearing preload		7.8—11.8 N (0.8—1.2 kgf, 1.8—2.6 lbf)	—

REAR WHEEL/SUSPENSION			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	225 kPa (2.25 kgf/cm ² , 32 psi)	—
	Up to maximum weight capacity	250 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		—	70 g (2.5 oz) max.

HYDRAULIC DISC BRAKE			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Specified brake fluid		DOT 4	—
Front	Brake disc thickness	5.8—6.2 (0.0.23—0.24)	5.0 (0.20)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	12.700—12.743 (0.5000—0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657—12.684 (0.4983—0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	27.000—27.050 (1.0630—1.0650)	27.06 (1.065)
	Caliper piston O.D.	26.935—26.968 (1.0604—1.0617)	26.92 (1.060)
Rear	Brake disc thickness	5.8—6.2 (0.0.23—0.24)	5.0 (0.20)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	12.700—12.743 (0.5000—0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657—12.684 (0.4983—0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	38.18—38.23 (1.503—1.505)	38.24 (1.506)
	Caliper piston O.D.	38.115—38.148 (1.5006—1.5019)	38.09 (1.500)

GENERAL INFORMATION

BATTERY/CHARGING SYSTEM

ITEM		STANDARD	
Battery	Capacity	12 V - 12 Ah	
	Current leakage	2 mA max.	
	Voltage (20°C/68°F)	Fully charged	13.0–13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.4 A x 5–10 h
Quick		6.0 A x 1.0 h	
Alternator	Capacity	364 W @ 5,000 rpm	
	Charging coil resistance (20°C/68°F)	0.22–0.34 Ω	

IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	Standard	DCPR6E (NGK), XU20EPR-U (DENSO)
	For extended high speed riding	DCPR7E (NGK), XU22EPR-U (DENSO)
Spark plug gap		0.8–0.9 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)		4.1° BTDC at idle

ELECTRIC STARTER/STARTER CLUTCH

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter motor brush length		12.0–13.0 (0.47–0.51)	4.5 (0.18)
Starter driven gear boss	O.D.	57.759–57.768 (2.2740–2.2743)	57.639 (2.2692)
	I.D.	44.000–44.016 (1.7323–1.7329)	44.10 (1.736)
Torque limiter slip torque		53–84 N·m (5.4–8.6 kgf·m, 39–62 lbf·ft)	—

LIGHTS/METERS/SWITCHES

ITEM		SPECIFICATIONS
Bulbs	Headlight (high/low beam)	12 V - 60/55 W
	Brake/taillight	12 V - 21/5 W
	License light	12 V - 5 W
	Front turn signal/position light	12 V - 21/5 W x 2
	Rear turn signal light	12 V - 21 W x 2
Fuse	Main fuse	30A
	Sub-fuse	10A x 5, 5A x 1
Thermostatic switch	Start to close (ON)	112–118°C (234–244°F)
	Start to open (OFF)	108°C (226°F) minimum
Fan motor switch	Start to close (ON)	98–102°C (208–216°F)
	Start to open (OFF)	93–97°C (199–207°F)
Fuel pump flow capacity (minimum)		700 cm ³ (23.7 US oz, 24.6 Imp oz)/minute

GENERAL INFORMATION

TORQUE VALUES

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

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

- NOTES: 1. Apply oil to the threads and seating surface.
2. Apply grease to the threads.
 3. Apply locking agent to the threads.
 4. Apply sealant to the threads.
 5. Lock nut: replace with a new one and stake it.
 6. ALOC bolt or screw: replace with a new one.
 7. U-nut.
 8. Apply brake fluid to the threads.

ENGINE	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME/BODY PANEL/EXHAUST SYSTEM:					
	Left crankcase rear cover bolt	5	6	10 (1.0, 7)	
	Exhaust pipe joint stud bolt	4	8	—	Page 2-6
MAINTENANCE:					
	Spark plug	4	12	14 (1.4, 10)	
	Timing hole cap	1	45	18 (1.8, 13)	NOTE 2
	Valve adjusting hole cap	2	36	15 (1.5, 11)	NOTE 2
	Valve adjusting screw lock nut	6	7	22 (2.2, 16)	NOTE 1
	Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 1
	Front engine oil drain bolt	1	12	29 (3.0, 22)	
	Rear engine oil drain bolt	1	12	29 (3.0, 22)	
LUBRICATION SYSTEM:					
	Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 4
	Oil pressure switch terminal screw	1	4	2 (0.2, 1.4)	
	Oil strainer bolt	1	6	13 (1.3, 9)	
	Oil pump assembly bolt	1	6	13 (1.3, 9)	
	Oil orifice bolt	1	8	14 (1.4, 10)	NOTE 1
FUEL SYSTEM:					
	Pulse secondary air injection check valve cover bolt	4	5	5 (0.5, 3.6)	
	Carburetor insulator band screw	2	6	—	Page 5-17
	Intake manifold base band screw	2	6	—	Page 5-17
	Intake manifold vacuum joint	1	5	3 (0.3, 2.2)	
	Intake manifold base socket bolt	4	6	10 (1.0, 7)	
COOLING SYSTEM:					
	Water pump cover bolt	2	6	13 (1.3, 9)	
	Water pump stud bolt	1	6	—	Page 6-13

GENERAL INFORMATION

ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
CYLINDER HEAD/VALVE:				
Spark plug sleeve	2	30	18 (1.8, 13)	NOTE 1
Cylinder head cover bolt	4	8	26 (2.7, 20)	
Cylinder head cap nut	8	10	43 (4.4, 32)	NOTE 1
Cylinder head cap nut	4	8	26 (2.7, 20)	NOTE 1
Cam sprocket bolt	4	7	23 (2.3, 17)	NOTE 3
Cam chain tensioner bolt	4	6	12 (1.2, 9)	
CYLINDER/PISTON				
Cylinder stud bolt	4	8	—	Page 9-8
Cylinder stud bolt	8	10	—	Page 9-8
CLUTCH/GEARSHIFT LINKAGE:				
Clutch pressure plate bolt	5	6	12 (1.2, 9)	
Clutch center lock nut	1	25	186 (19.0, 137)	NOTE 1, 5
Oil pump driven sprocket bolt	1	6	18 (1.8, 13)	NOTE 3
Clutch cover socket bolt	5	6	10 (1.0, 7)	
Timing hole cap cover socket bolt	6	6	10 (1.0, 7)	
Primary drive gear bolt	1	12	137 (14.0, 101)	NOTE 1
Primary driven gear nut	1	25	186 (19.0, 137)	NOTE 1, 5
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	
Shift drum center socket bolt	1	8	23 (2.3, 17)	NOTE 3
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	
Clutch cable holder bolt	1	6	12 (1.2, 9)	
CRANKSHAFT/TRANSMISSION:				
Right crankcase bolt	16	8	26 (2.7, 20)	
Cam chain tensioner setting plate bolt	2	6	12 (1.2, 9)	NOTE 3
Connecting rod bearing cap nut	4	10	59 (6.0, 43)	NOTE 1
Output gear case mounting bolt	4	8	31 (3.2, 23)	
Shift drum bearing setting plate bolt	2	6	12 (1.2, 9)	NOTE 3
Rear balancer shaft bearing setting plate bolt	2	6	12 (1.2, 9)	NOTE 3
Mainshaft bearing setting plate bolt	2	6	12 (1.2, 9)	NOTE 3
Spindle plate bolt	1	6	12 (1.2, 9)	NOTE 3
BATTERY/CHARGING SYSTEM:				
Left crankcase cover socket bolt	13	6	12 (1.2, 9)	
Stator mounting bolt	4	6	10 (1.0, 7)	NOTE 3
Ignition pulse generator mounting bolt	2	6	10 (1.0, 7)	NOTE 3
Alternator wire clamp bolt	1	6	10 (1.0, 7)	NOTE 3
ELECTRIC STARTER/STARTER CLUTCH:				
Starter motor case bolt	2	5	7 (0.7, 5.1)	
Starter motor cable terminal nut	1	6	7 (0.7, 5.1)	
Flywheel bolt	1	12	137 (14.0, 101)	NOTE 1
Starter clutch mounting bolt	6	8	29 (3.0, 22)	NOTE 3
LIGHTS/METERS/SWITCHES:				
Neutral switch	1	10	12 (1.2, 9)	

GENERAL INFORMATION

FRAME				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME/BODY PANELS/EXHAUST SYSTEM:				
Fuel tank mounting bolt	1	8	19 (1.9, 14)	NOTE 6
Fuel valve nut	1	22	34 (3.5, 25)	
Fuel valve lever screw	1	5	1 (0.1, 0.7)	
Rider footpeg mounting bolt	4	10	39 (4.0, 29)	
Gearshift arm pinch bolt	1	6	12 (1.2, 9)	
Exhaust pipe joint nut	4	8	23 (2.3, 17)	
Muffler band bolt	5	8	17 (1.7, 12)	
Muffler mounting bolt	2	8	34 (3.5, 25)	
MAINTENANCE:				
Air cleaner cover screw	5	5	4 (0.4, 2.9)	
Final drive oil filler cap	1	30	12 (1.2, 9)	
Final drive oil drain bolt	1	14	20 (2.0, 14)	
FUEL SYSTEM:				
Air cleaner case mounting screw	3	5	4 (0.4, 2.9)	
Air cleaner case mounting bolt	1	6	10 (1.0, 7)	
ENGINE MOUNTING:				
Engine mounting nut	4	10	39 (4.0, 29)	
Engine hanger plate bolt	10	8	26 (2.7, 20)	
FINAL DRIVE:				
Pinion retainer	1	70	147 (15.0, 108)	
Pinion retainer lock tab bolt	1	6	10 (1.0, 7)	
Pinion joint nut	1	16	108 (11.0, 80)	NOTE 3
Dust guard plate bolt	1	6	10 (1.0, 7)	
Gear case cover bolt	2	10	62 (6.3, 46)	NOTE 3
Gear case cover bolt	6	8	25 (2.6, 19)	
Final gear case assembly mounting nut	4	10	64 (6.5, 47)	
Rear shock absorber lower mount	1	12	54 (5.5, 40)	NOTE 3
FRONT WHEEL/SUSPENSION/STEERING:				
Handlebar upper holder bolt	4	8	26 (2.7, 20)	
Handlebar lower holder nut	2	12	64 (6.5, 47)	NOTE 7
Front brake disc bolt	6	8	42 (4.3, 31)	NOTE 6
Spoke nipple	52	BC4	4 (0.4, 2.9)	
Valve stem nut	1	—	3 (0.3, 2.2)	
Front axle bolt	1	14	59 (6.0, 43)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Fork center bolt	2	8	20 (2.0, 14)	NOTE 3
Fork cap	2	37	23 (2.3, 17)	
Fork cover bolt	4	6	12 (1.2, 9)	
Fork top bridge pinch bolt	2	8	23 (2.3, 17)	
Fork bottom bridge pinch bolt	2	10	49 (5.0, 36)	
Steering bearing adjustment nut	1	26	21 (2.1, 15)	NOTE 1
Steering bearing adjustment nut lock nut	1	26	—	Page 13-22
Steering stem nut	1	24	103 (10.5, 76)	
Hose/cable guide bolt	2	8	22 (2.2, 16)	NOTE 6
Brake hose clamp bolt	2	6	12 (1.2, 9)	
REAR WHEEL/SUSPENSION:				
Rear brake disc bolt	6	8	42 (4.3, 31)	NOTE 6
Spoke nipple	52	BC4	4 (0.4, 2.9)	
Valve stem nut	1	—	3 (0.3, 2.2)	
Final driven flange nut	5	12	88 (9.0, 65)	NOTE 7
Rear axle nut	1	18	110 (11.2, 81)	NOTE 7
Rear shock absorber mounting bolt	4	8	26 (2.7, 20)	
Rear brake hose clamp bolt	3	6	12 (1.2, 9)	NOTE 6
Swingarm left pivot bolt	1	30	103 (10.5, 76)	
Swingarm right pivot bolt	1	30	14 (1.4, 10)	
Swingarm right pivot bolt lock nut	1	30	113 (11.5, 83)	

GENERAL INFORMATION

FRAME (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
BRAKE SYSTEM:				
Brake caliper bleed valve	2	8	6 (0.6, 4.3)	
Front master cylinder reservoir cap screw	2	4	2 (0.2, 1.4)	
Brake pad pin	2	10	18 (1.8, 13)	
Brake pad pin plug	2	10	3 (0.3, 2.2)	
Brake hose oil bolt	4	10	34 (3.5, 25)	
Front brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Front brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Rear brake reservoir mounting bolt	1	6	10 (1.0, 7)	
Rear master cylinder push rod joint nut	1	8	18 (1.8, 13)	
Rear master cylinder mounting bolt	2	6	12 (1.2, 9)	
Rear brake pedal pivot nut	1	8	26 (2.7, 20)	NOTE 7
Front brake caliper bracket pin	1	8	13 (1.3, 9)	NOTE 3
Front brake caliper pin	1	10	27 (2.8, 20)	NOTE 3
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	NOTE 6
Rear brake caliper stopper pin bolt	1	18	69 (7.0, 51)	NOTE 6
Rear brake caliper bracket pin bolt	1	8	23 (2.3, 17)	
Rear brake caliper pin	1	10	27 (2.8, 20)	
Brake pipe joint bolt	2	10	17 (1.7, 12)	NOTE 8
Brake hose 2-way joint mounting bolt	2	6	12 (1.2, 9)	
LIGHTS/METERS/SWITCHES:				
Fuel tank top cover socket bolt	7	5	4 (0.4, 2.9)	
Ignition switch mounting bolt	2	6	10 (1.0, 7)	
Ignition switch cover screw	1	4	2 (0.2, 1.4)	
Fan motor switch	1	16	18 (1.8, 13)	
Side stand switch bolt	1	6	10 (1.0, 7)	NOTE 6
Thermostatic switch	1	PT 1/8	8 (0.8, 5.8)	NOTE 4
Horn mounting bolt	1	8	21 (2.1, 15)	
OTHERS:				
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot lock nut	1	10	29 (3.0, 22)	NOTE 7
Gearshift pedal pivot bolt	1	8	26 (2.7, 20)	
Muffler bracket bolt	2	10	74 (7.5, 54)	

GENERAL INFORMATION

TOOLS

- NOTES: 1. Newly designed tool
 2. Equivalent commercially available in U.S.A.
 3. Not available in U.S.A.
 4. Alternative tool

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SECTION
Valve adjusting wrench	070MA-MEA0100	NOTE 1 NOTE 4: 07908-KE90100 (U.S.A. only) with 10-mm offset box wrench	3
Carburetor float level gauge	07401-0010000		5
Oil pressure gauge	07506-3000001	NOTE 2	4
Oil pressure gauge attachment	07510-4220100	NOTE 2	4
Gear holder	07724-0010100	NOTE 4: 07724-001A100 (U.S.A. only)	10
Flywheel holder	07725-0040000	NOTE 2	18
Rotor puller	07733-0020001	NOTE 4: 07933-3290001 (U.S.A. only)	18
Adjustable bearing puller, 25—40 mm	07736-A01000B	NOTE 4: 07736-A01000A	14
Remover weight	07741-0010201	NOTE 4: 07936-371020A or 07936-371020 (U.S.A. only)	11, 12, 18
Valve guide driver, 6.6 mm	07742-0010200	NOTE 4: 07942-6570100 (U.S.A. only)	8
Attachment, 32 x 35 mm	07746-0010100		10, 11, 12, 14
Attachment, 37 x 40 mm	07746-0010200		13, 14
Attachment, 42 x 47 mm	07746-0010300		11, 13, 14
Attachment, 52 x 55 mm	07746-0010400		11, 12, 13, 14
Attachment, 62 x 68 mm	07746-0010500		11
Attachment, 72 x 75 mm	07746-0010600		12
Attachment, 24 x 26 mm	07746-0010700		18
Attachment, 22 x 24 mm	07746-0010800		14
Driver, 40 mm I.D.	07746-0030100		12
Attachment, 30 mm I.D.	07746-0030300		12
Pilot, 10 mm	07746-0040100		18
Pilot, 17 mm	07746-0040400		10
Pilot, 20 mm	07746-0040500		11, 13, 14
Pilot, 25 mm	07746-0040600		11
Pilot, 35 mm	07746-0040800		12
Pilot, 22 mm	07746-0041000		11
Pilot, 28 mm	07746-0041100		11
Bearing remover shaft	07746-0050100		13, 14
Bearing remover head, 20 mm	07746-0050600		13, 14
Driver	07749-0010000		10, 11, 12, 13, 14, 18
Valve spring compressor	07757-0010000		8
Valve seat cutter, 40 mm (45° EX)	07780-0010500	NOTE 2	8
Valve seat cutter, 33 mm (45° IN)	07780-0010800	NOTE 2	8
Flat cutter, 33 mm (32° IN)	07780-0012900	NOTE 2	8
Flat cutter, 42 mm (32° EX)	07780-0013000	NOTE 2	8
Interior cutter, 30 mm (60° IN)	07780-0014000	NOTE 2	8
Interior cutter, 37.5 mm (60° EX)	07780-0014100	NOTE 2	8
Cutter holder, 6.6 mm	07781-0010202	NOTE 2	8
Lock nut wrench	07908-4690003	NOTE 4: 07908-4690002	14
Retainer wrench	07910-MA10100		12
Snap ring pliers	07914-SA50001		15
Steering stem socket	07916-3710101	NOTE 4: 07916-3710100	13
Pinion holder plate	07924-ME40010	NOTE 4: 07924-ME90000 (U.S.A. only)	12
Collar set C	07924-ME40020	NOTE 4: 07HMB-MM80100 (U.S.A. only)	12
Fork tube holder attachment	07930-KA50100		8
Puller shaft	07931-ME40000		12
Remover handle	07936-3710100		11, 12
Bearing remover, 35 mm	07936-3710400		12

GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SECTION
Special nut	07931-HB3020A		12
Bearing remover, 20 mm	07936-3710600		11, 12
Bearing remover shaft	07936-GE00100	NOTE 2	18
Bearing remover head, 10 mm	07936-GE00200	NOTE 2	18
Bearing remover	07946-3710500		13
Steering stem driver	07946-MB00000		13
Fork seal driver body	07947-KA50100		13
Driver attachment, 41 mm I.D.	07947-KF00100		13
Driver	07949-3710001		13
Ball race remover	07953-MJ10000	NOTE4: 07953-MJ1000B or 07953-MJ1000A (U.S.A. only)	13
Oil seal driver	07965-MC70100		12
Valve guide reamer, 6.6 mm	07984-ZE20001	NOTE 4: 07984-ZE2000D (U.S.A. only)	8
Bearing driver attachment	07GAD-SD40101		12
Inspection adaptor	07GMJ-ML80100		19
Oil filter wrench	07HAA-PJ70101	NOTE 4: 07HAA-PJ70100	3
Peak voltage adaptor	07HGJ-0020100	NOTE 3 NOTE 4: IgnitionMate peak voltage tester, MTP-08-0193 (U.S.A. only)	17
Pinion puller base	07HMC-MM80110		12
Assembly shaft, 22 x 1.5 x 240 mm	07931-ME4010B		12
Puller base A	07HMC-MM8011A		12
Adjustable bearing remover	07JAC-PH80100	NOTE 4: 07736-A01000B and slide	11
Bearing remover shaft	07JAC-PH80200	hammer 3/8 x 16	11
Spoke nipple wrench	07JMA-MR60100	NOTE 2	13, 14
Clutch center holder	07JMB-MN50301	NOTE 4: 07HGB-001010B (plate) and 07HGB-001020B (collar) (U.S.A. only)	10
Pilot screw wrench	07KMA-MS60101		5
Torque limiter inspection tool A	07YMJ-MCF0100	NOTE 3	18
Torque limiter inspection tool B	07YMJ-MCF0200	NOTE 3	18
Christie battery charger	MC1012/2	(U.S.A. only)	16

GENERAL INFORMATION

LUBRICATION & SEAL POINTS

ENGINE	LOCATION	MATERIAL	REMARKS
	Oil pressure switch threads Cylinder head cover mating surface (cover side) Camshaft rubber plug seating surface Right crankcase cover mating surface (cover side) Crankcase mating surface (left crankcase side) Left crankcase cover mating surface (cover side)	Sealant	Do not apply to the thread head. Coating area (page 8-21) Coating area (page 10-19) Coating area (page 11-20) Coating area (page 16-11)
	Timing hole cap threads Timing hole cap O-ring Valve adjusting hole cap threads Valve adjusting hole cap O-ring Each oil seal lips	Multi-purpose grease	
	Valve adjusting screw lock nut threads and seating surface Oil filter cartridge threads and mating surface Dipstick O-ring (entire surface) Oil strainer seal ring (entire surface) Relief valve O-ring (entire surface) Scavenge oil pipe O-ring (entire surface) Water pump O-ring (entire surface) Spark plug sleeve threads Spark plug sleeve O-ring (entire surface) 10 mm cylinder head cap nut threads and seating surface 8 mm cylinder head cap nut threads and seating surface Piston outer surface and piston ring (entire surface) Piston pin outer surface Oil jet O-ring (entire surface) 8 mm cylinder stud bolt threads 10 mm cylinder stud bolt threads Clutch joint piece sliding surface Clutch lifer piece sliding surface Clutch disc lining surface Clutch center boss sliding surface Clutch outer guide washer (entire surface) Clutch outer guide outer surface Clutch center lock nut threads and seating surface Primary drive gear bolt threads and seating surface Primary driven gear nut threads and seating surface Connecting rod bearing cap nut threads and seating surface Gearshift fork sliding surface Gearshift fork shaft outer surface Countershaft bearing holder O-ring (entire surface) Oil orifice O-ring (entire surface) Flywheel bolt threads and seating surface Starter motor O-ring (entire surface) Starter clutch outer sliding surface Speed sensor O-ring (entire surface) Each gear teeth and sliding surface Each bearing rotating area Other sliding and rotating surfaces	Engine oil	

GENERAL INFORMATION

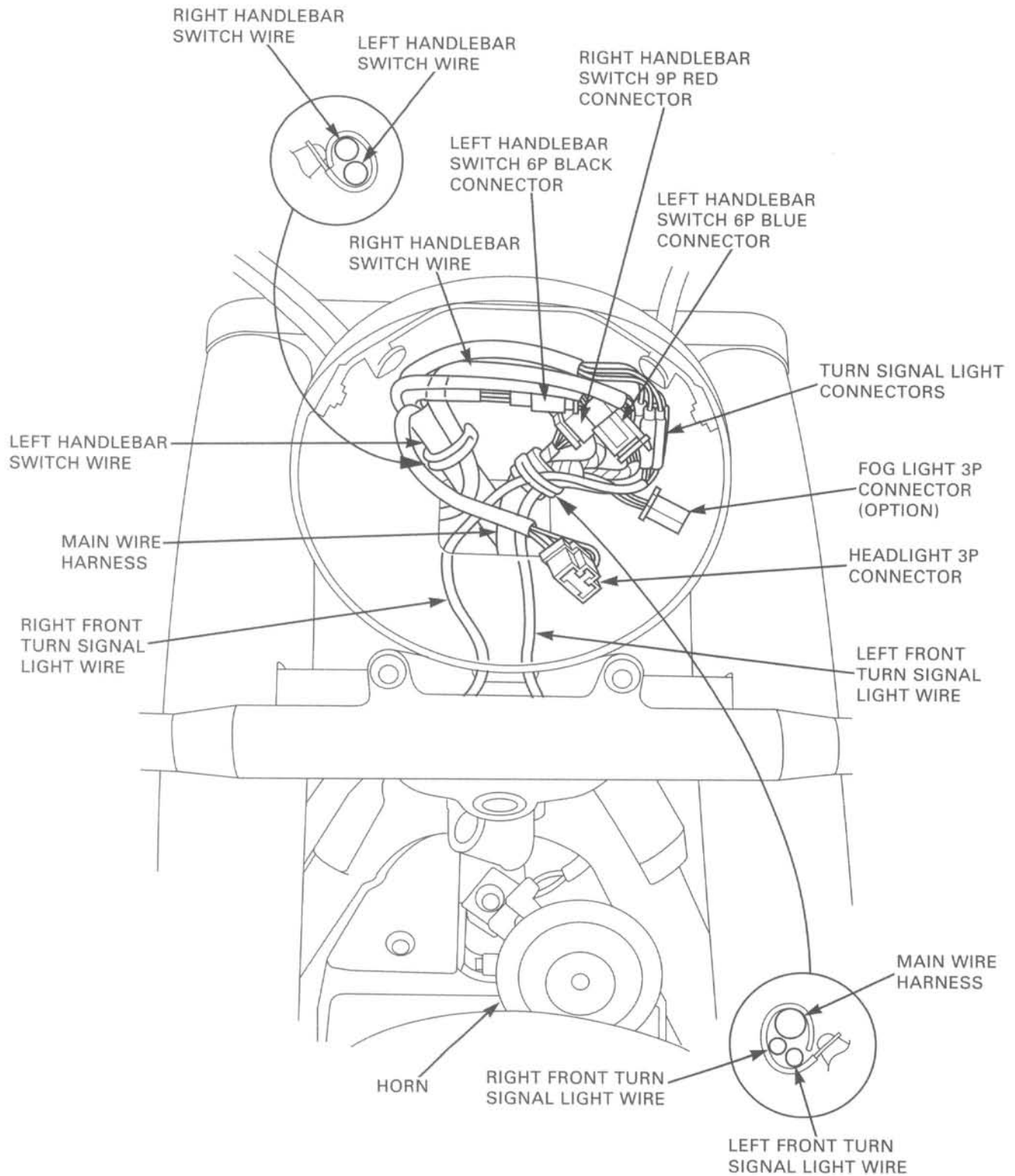
ENGINE (cont'd)		
LOCATION	MATERIAL	REMARKS
Rocker arm shaft sliding surface Rocker arm slipper surface Rocker arm shaft O-ring (entire surface) Camshaft journals and cam lobes Valve stem sliding surface Connecting rod small end inner surface Crankshaft main journal bearing sliding surface Crankpin bearing sliding surface M2/M3, C4 and C5 gear shift fork grooves Starter idle gear shaft outer surface Each transmission gear collar sliding surface	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Oil pump driven sprocket bolt threads Oil filter boss threads Cam sprocket bolt threads Cam chain tensioner setting plate bolt threads Shift drum center socket bolt threads Shift drum bearing setting plate bolt threads Rear balancer shaft bearing setting plate bolt threads Mainshaft bearing setting plate bolt threads Spindle plate bolt threads Stator mounting bolt threads Ignition pulse generator mounting bolt threads Alternator wire clamp bolt threads Starter clutch mounting bolt threads	Locking agent	

FRAME		
LOCATION	MATERIAL	REMARKS
Final gear case cover mating surface Thermostatic switch threads	Sealant	Do not apply to the thread head.
Side stand pivot Rider footrest sliding area Passenger footpeg sliding area Throttle grip pipe flange and sliding surface Clutch lever pivot Rear brake pedal pivot Gearshift pedal pivot Shock absorber mount bushing inner surface Swingarm pivot bearings Swingarm pivot dust seal lips Front wheel dust seal lips Rear wheel dust seal lips Final gear case O-ring (2 places) Final gear case oil seal lips (4 places)	Multi-purpose grease	Apply 1—1.5 g for each bearing
Steering head bearings Steering head bearing dust seal lips	Water resistant grease (urea based multi-purpose grease NLGI #2; page 13-22)	Apply 3—5 g for each bearing
Universal joint bearings Drive shaft oil seal lip	Molybdenum disulfide grease	Apply 0.5 g

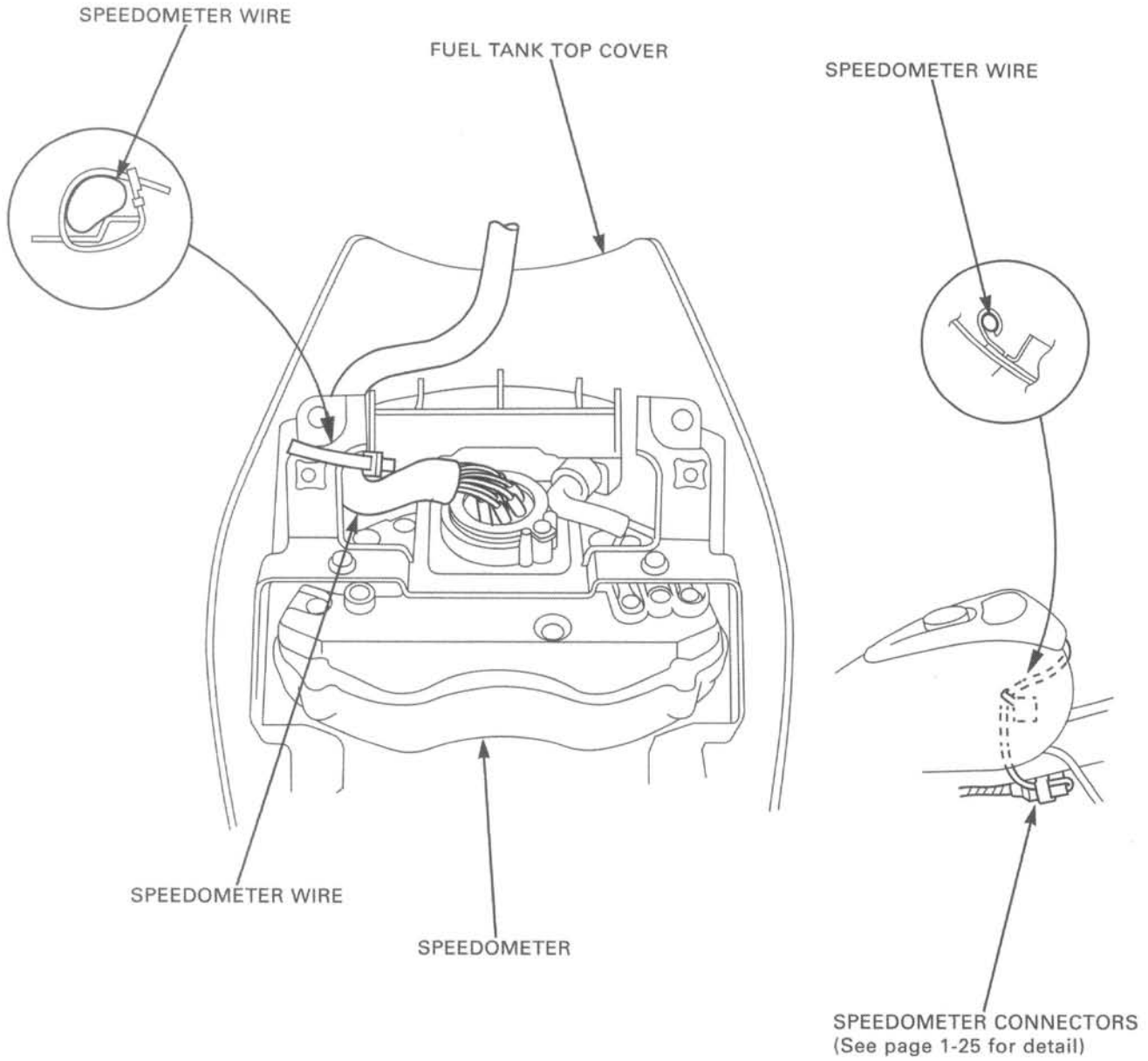
GENERAL INFORMATION

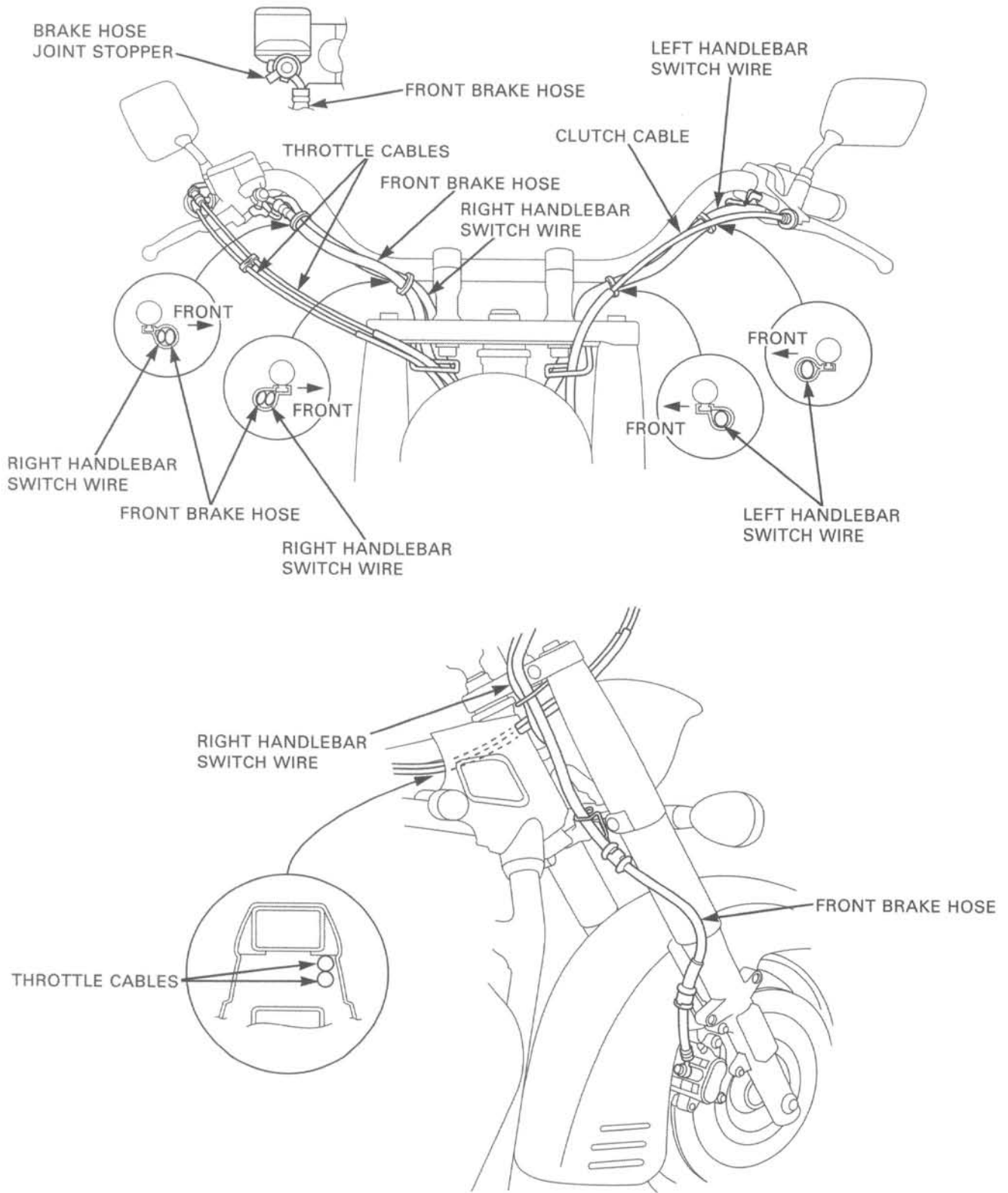
FRAME (cont'd)		
LOCATION	MATERIAL	REMARKS
Final driven flange-to-rear wheel hub mating surface Final driven flange O-ring groove Rear wheel hub O-ring groove Final drive pinion joint splines Final drive ring gear shaft splines Drive shaft splines (universal joint side) Output shaft splines (universal joint side)	Molybdenum disulfide paste	Apply 3 g or more Apply 2 g or more Apply 5 g or more Apply 1 g Apply 1 g
Throttle cable outer inside Clutch cable outer inside Choke cable outer inside	Cable lubricant	
Handlebar grip rubber inside Air cleaner intake duct contacting surface Front fender brace tube inside	Honda Bond A or equivalent	
Steering bearing adjustment nut threads	Engine oil	
Front brake lever pivot Front brake lever-to-master piston contacting area Rear master cylinder push rod boot groove Rear master piston-to-push rod contacting area Brake caliper pin boot inside	Silicone grease	
Brake master piston and cups Brake caliper piston and piston seals Brake pipe joint nut	DOT 4 brake fluid	
Fork dust seal and oil seal lips	Fork fluid	
Cooling fan nut threads Pinion joint nut threads Final gear case cover 10 mm bolt threads Rear shock absorber lower mount stud bolt threads Fork socket bolt threads Front brake caliper bracket pin threads Front brake caliper pin threads Rear brake caliper pin threads Final driven flange stud bolt threads Final gear case stud bolt threads	Locking agent	

CABLE & HARNESS ROUTING

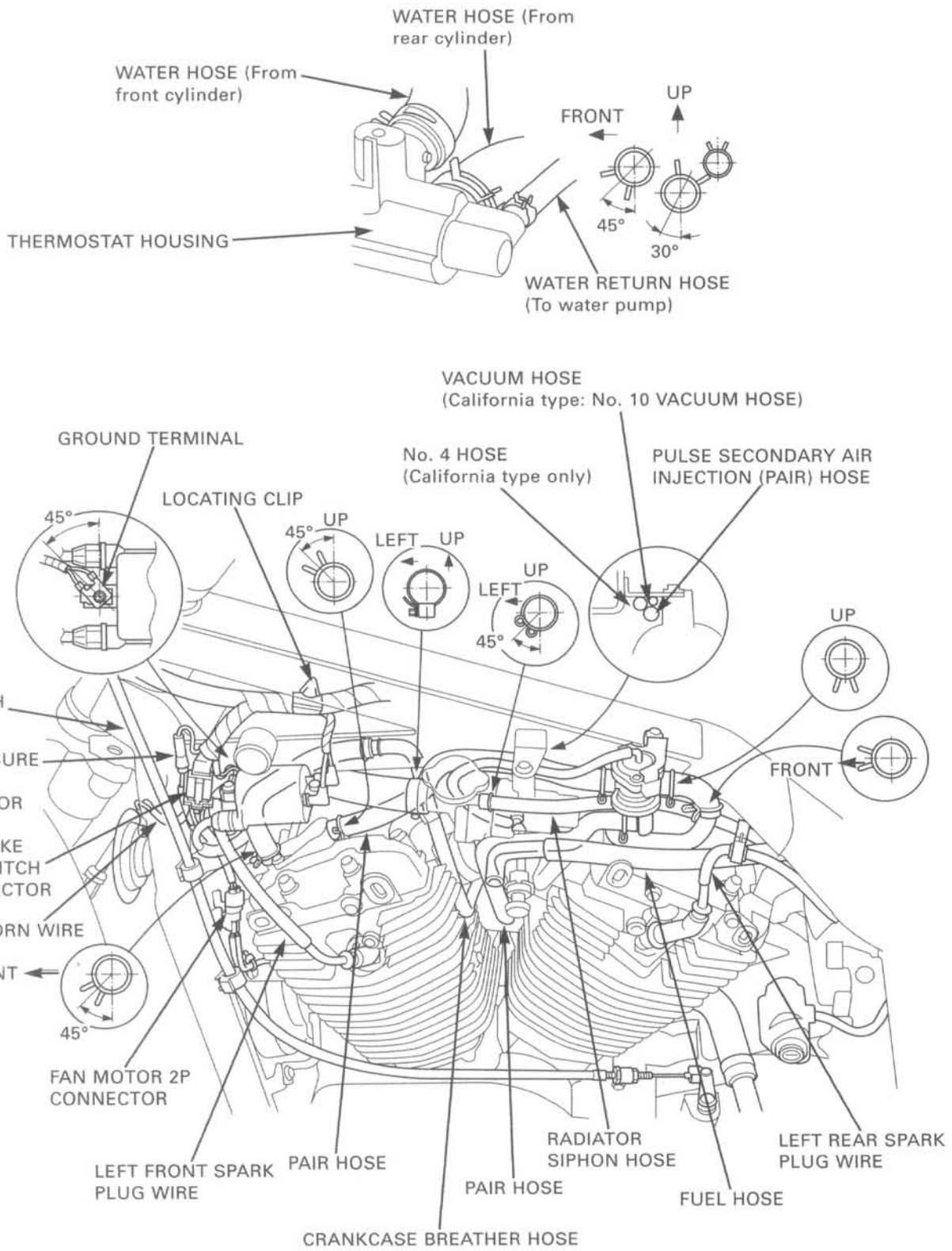


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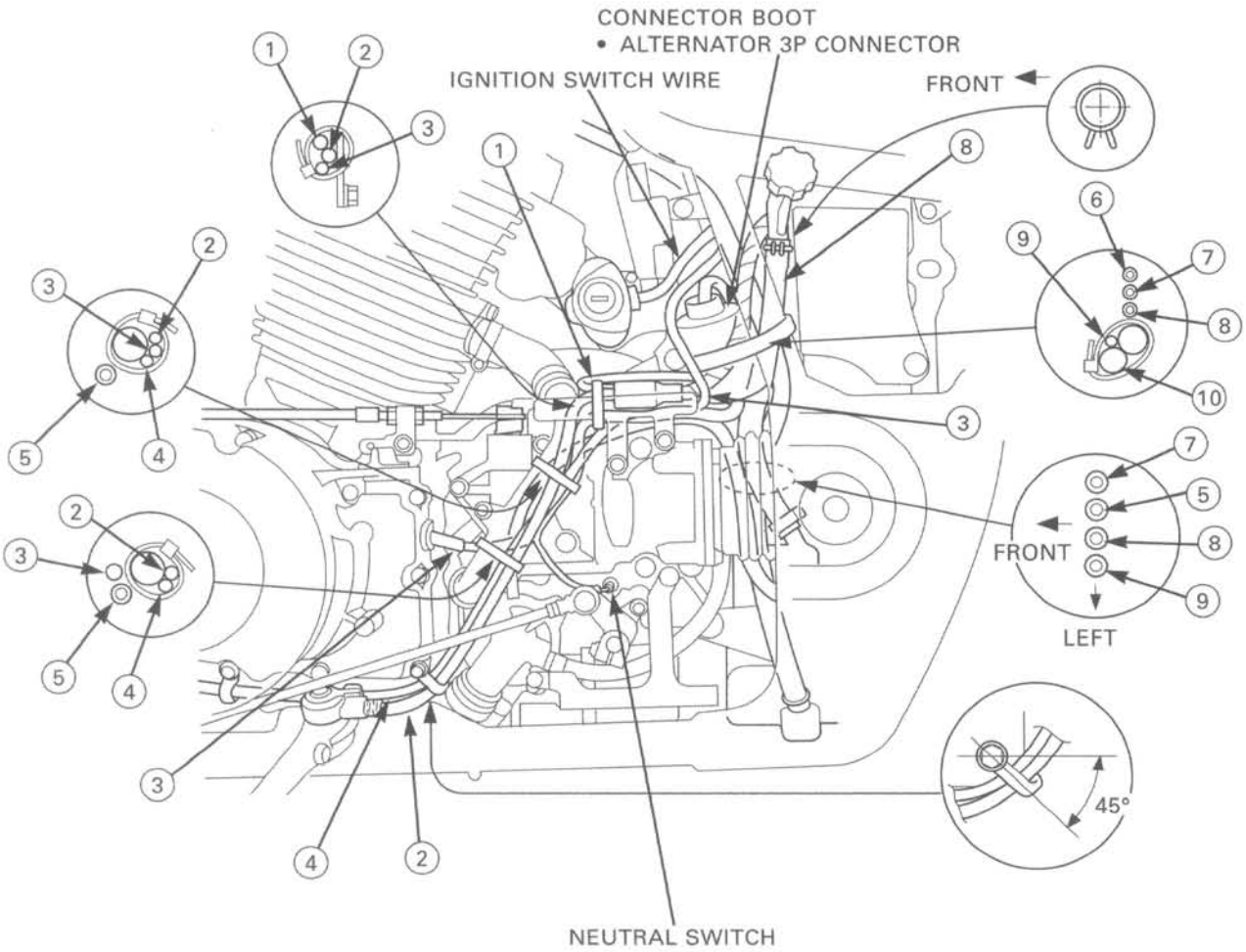




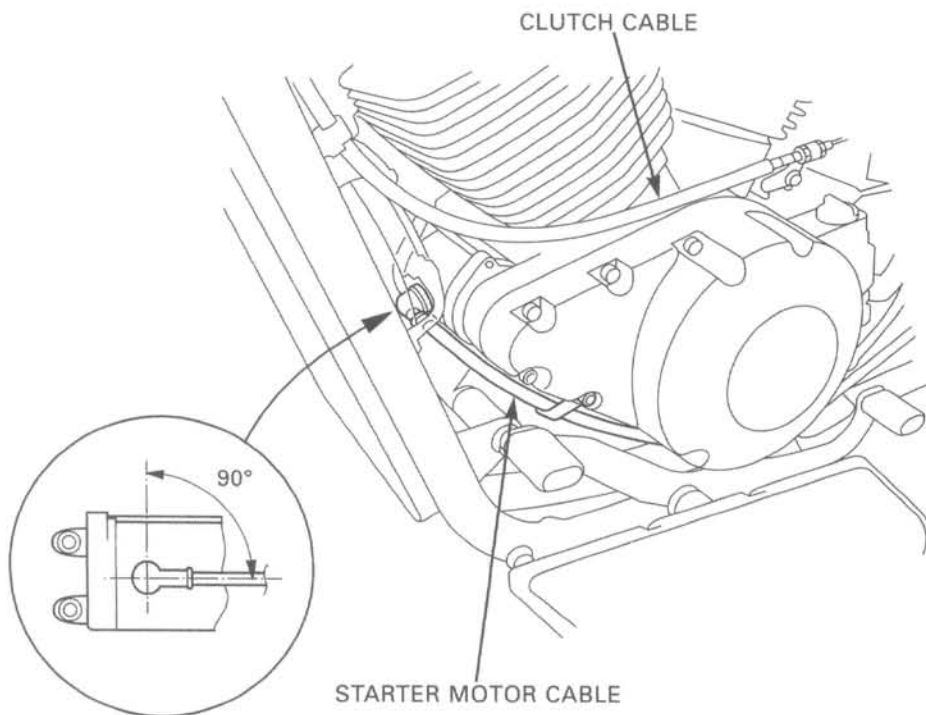
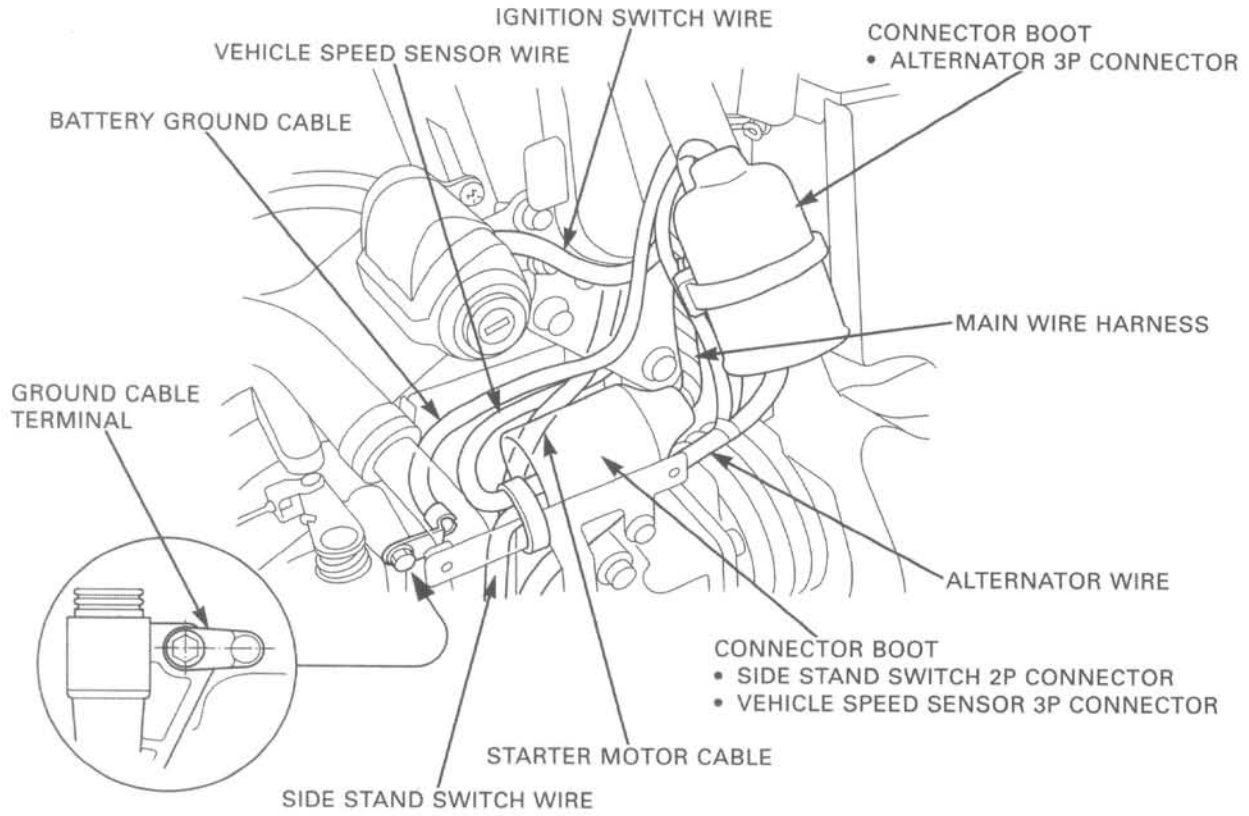
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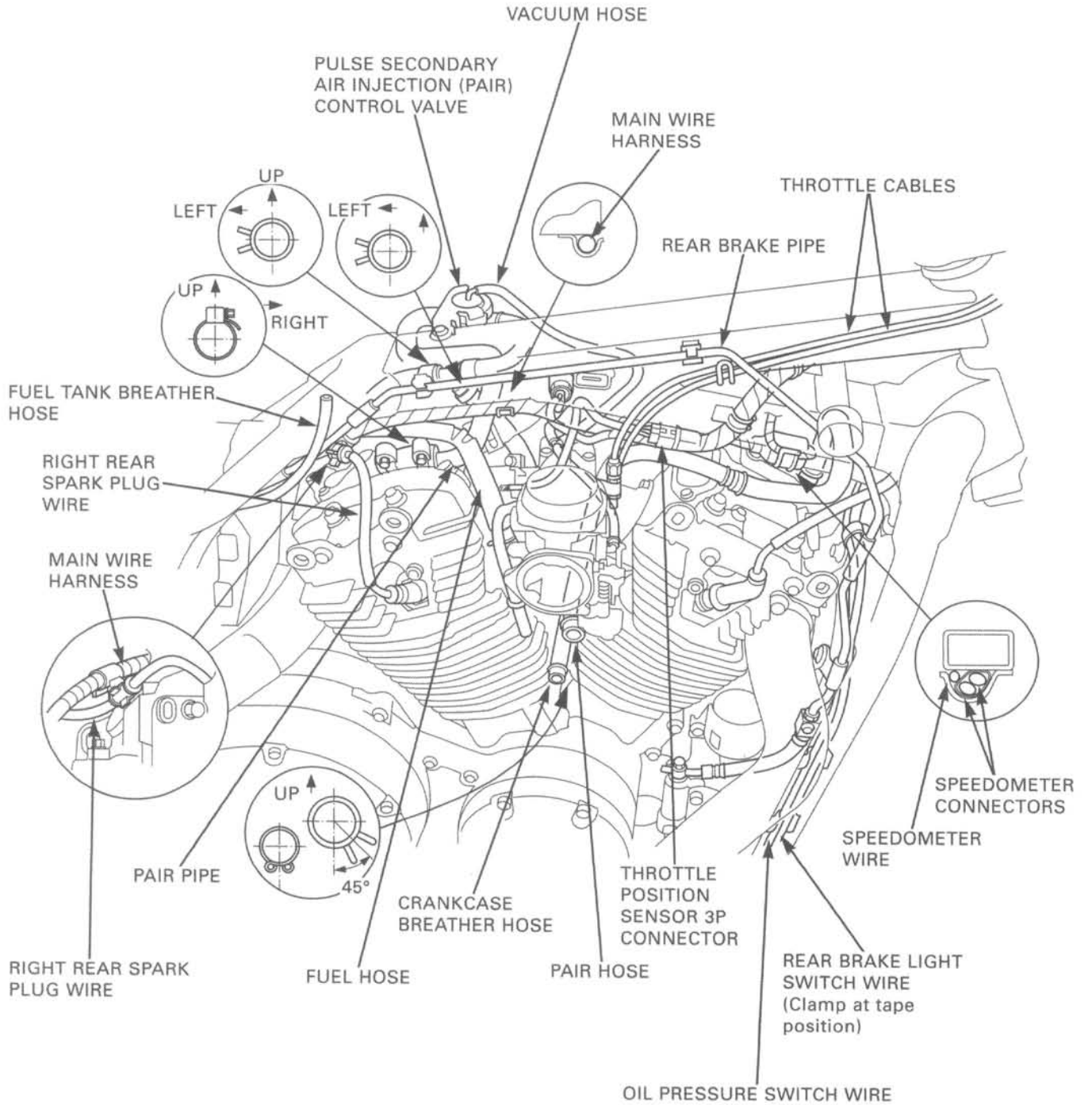


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|-------------------------------------|-------------------------------------|
| ① VEHICLE SPEED SENSOR WIRE | ⑥ No. 4 HOSE (California type only) |
| ② SIDE STAND SWITCH WIRE | ⑦ RADIATOR SIPHON HOSE |
| ③ ALTERNATOR WIRE | ⑧ RESERVE TANK FILLER NECK HOSE |
| ④ STARTER MOTOR CABLE | ⑨ REGULATOR/RECTIFIER WIRE |
| ⑤ No. 2 HOSE (California type only) | ⑩ CONNECTOR BOOT |



GENERAL INFORMATION





GENERAL INFORMATION

CONNECTOR BOOT

- REAR TURN SIGNAL CONNECTORS
- BRAKE/TAILLIGHT CONNECTORS
- LICENSE LIGHT CONNECTORS

FUEL TANK BREATHING HOSE
(Except California type)

MAIN WIRE HARNESS

BATTERY POSITIVE (+)
CABLE TERMINAL

FUSE BOX

BATTERY
POSITIVE
(+) CABLE

WATER RETURN HOSE

FUEL CUT-OFF RELAY

STARTER RELAY
SWITCH WIRE

FUSE BOX WIRE

MAIN WIRE HARNESS

FUSE BOX

STARTER RELAY SWITCH

STARTER MOTOR
CABLE

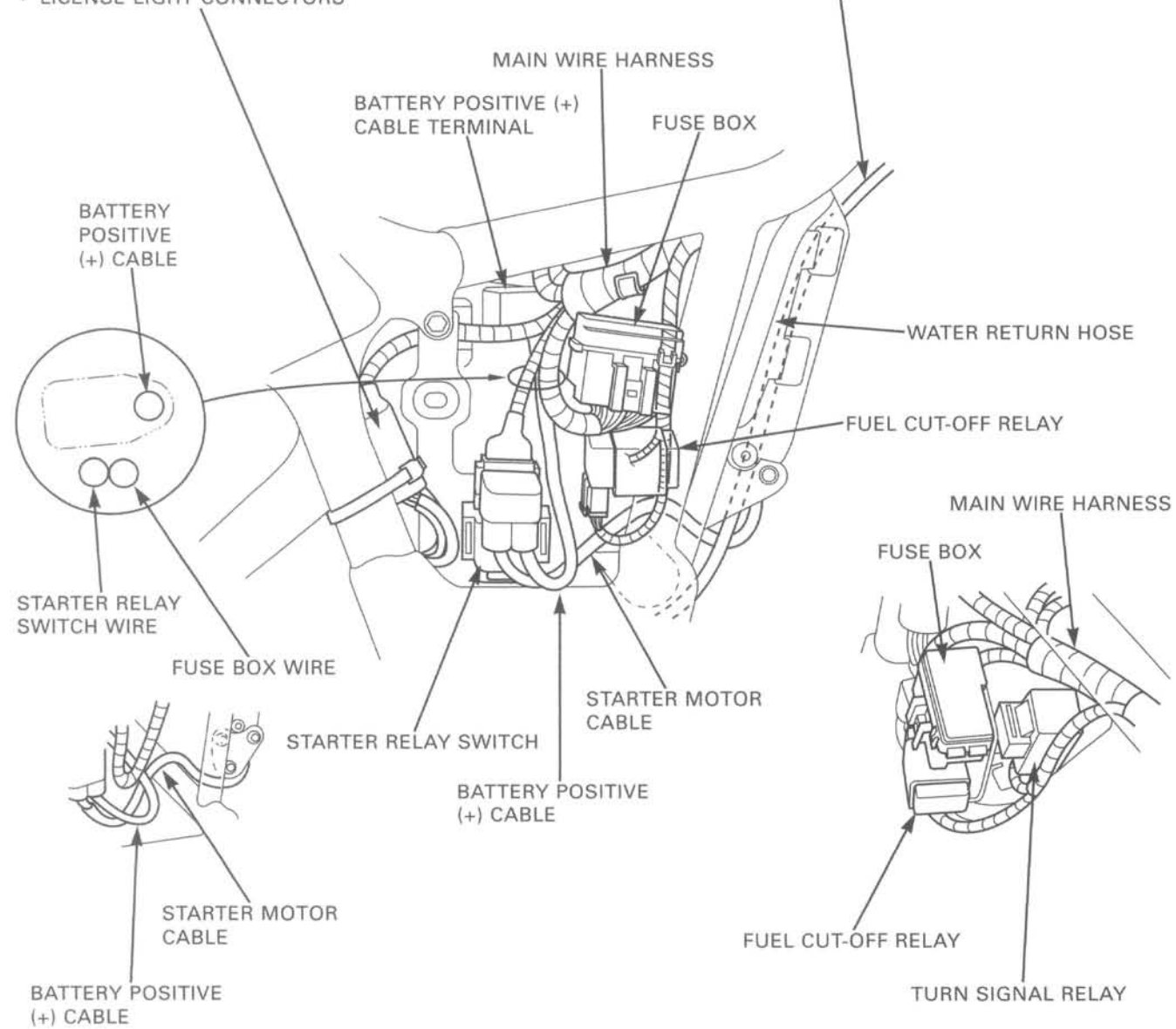
BATTERY POSITIVE
(+) CABLE

FUEL CUT-OFF RELAY

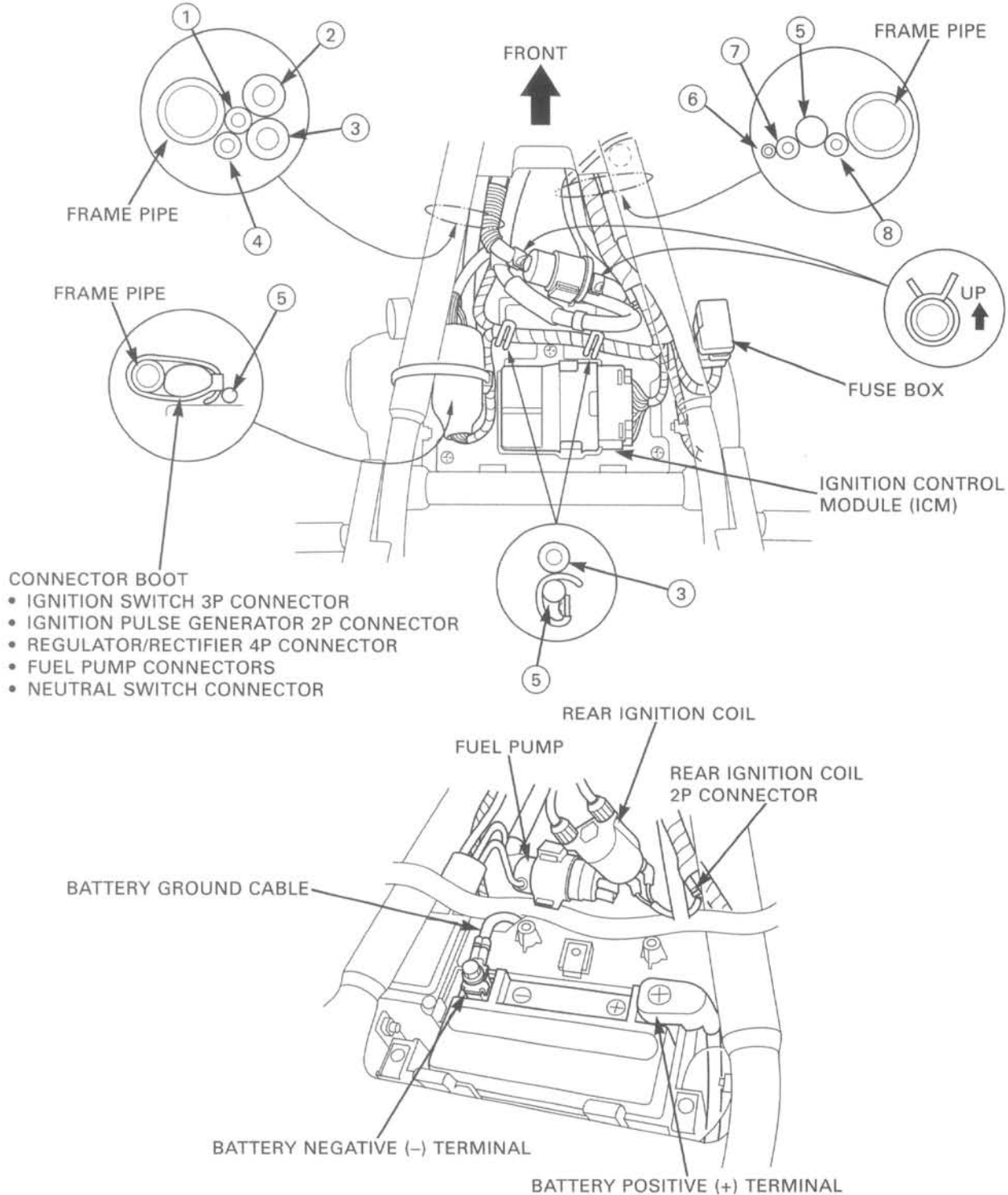
TURN SIGNAL RELAY

STARTER MOTOR
CABLE

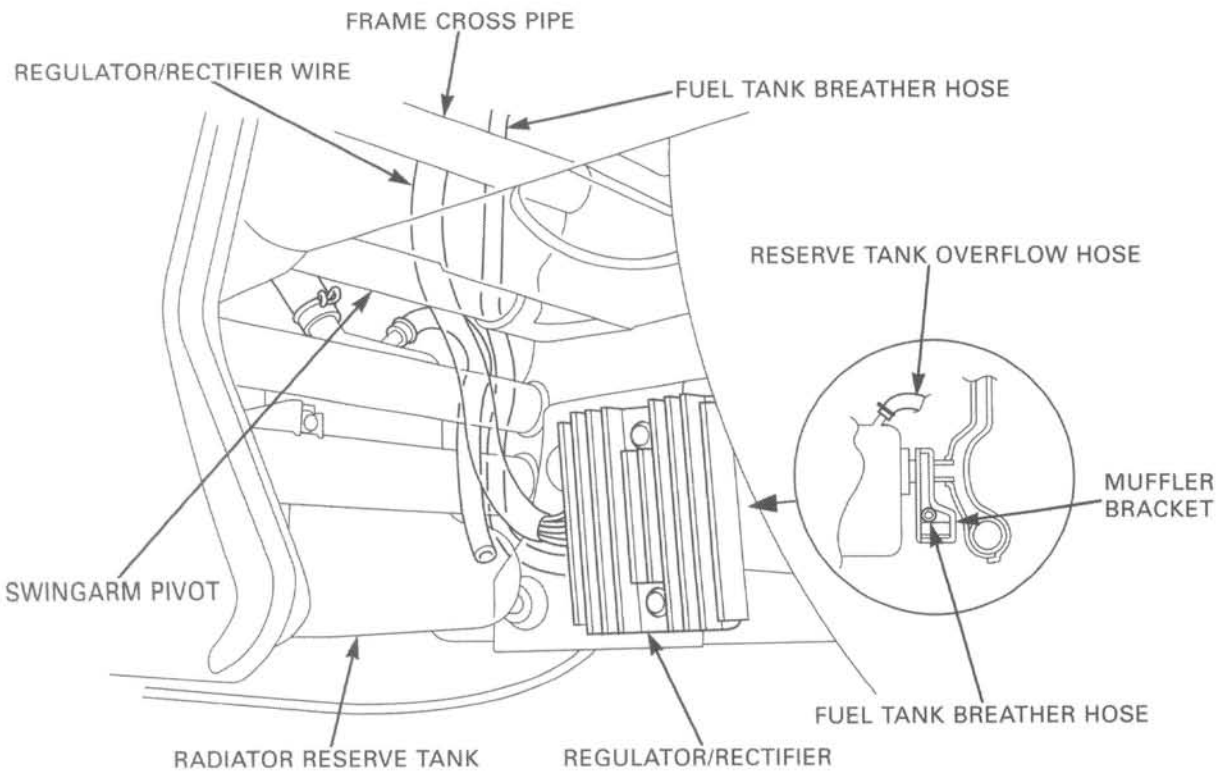
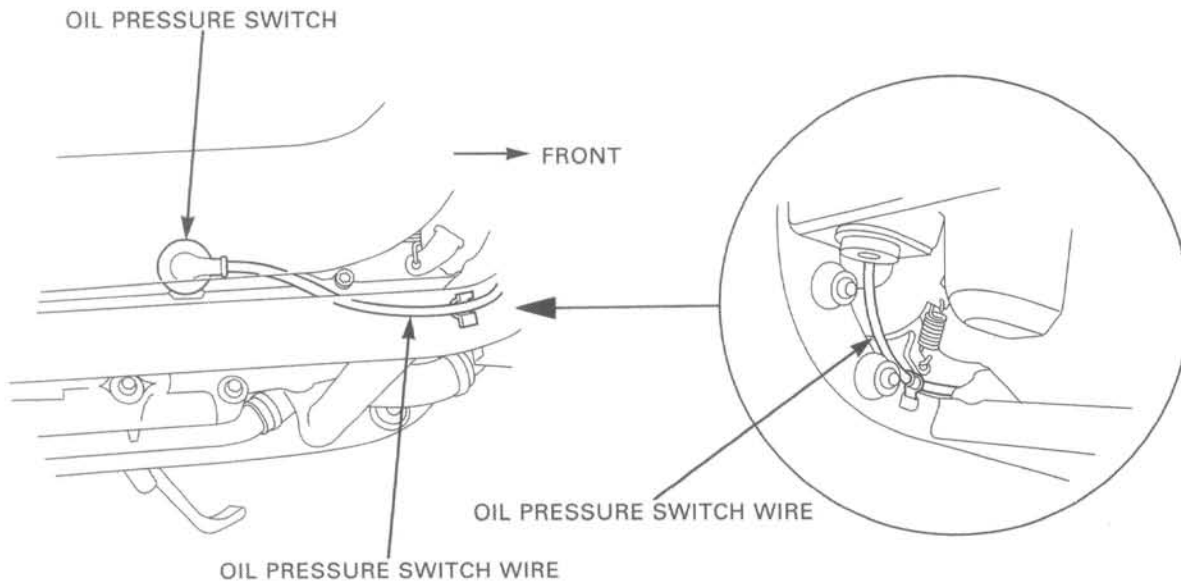
BATTERY POSITIVE
(+) CABLE

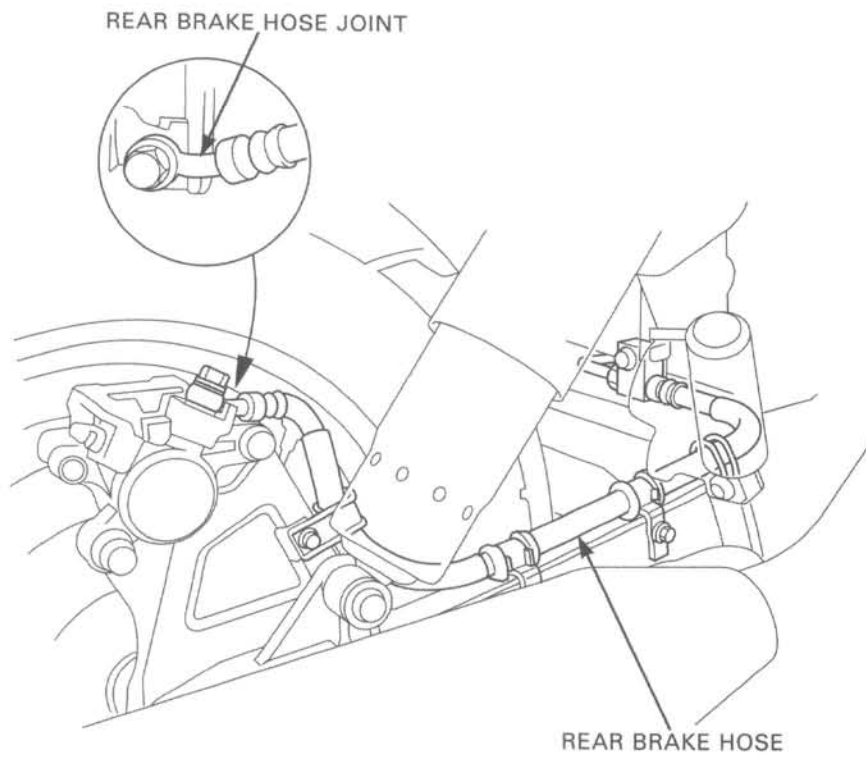
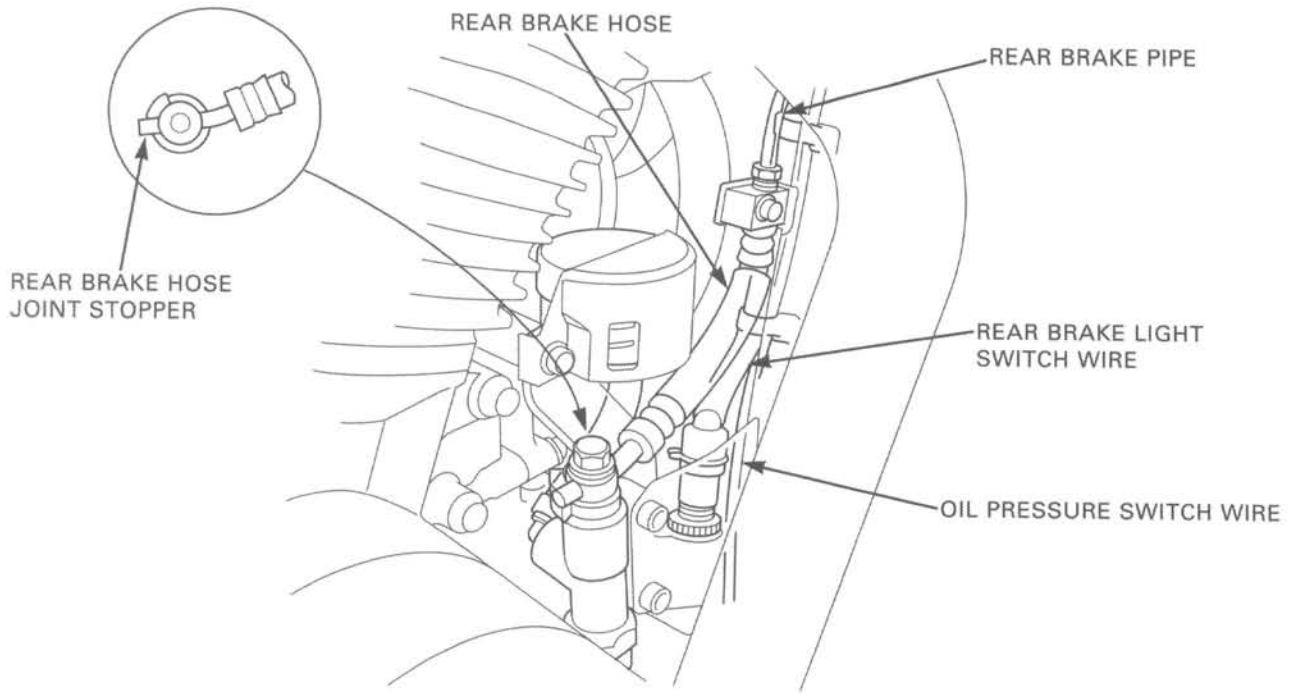


- | | |
|---|------------------------|
| ① No. 4 HOSE (California type only) | ⑤ MAIN WIRE HARNESS |
| ② FUEL HOSE (Fuel filter-to-fuel valve) | ⑥ FUEL TANK DRAIN HOSE |
| ③ FUEL HOSE (Fuel pump-to-carburetor) | ⑦ WATER RETURN HOSE |
| ④ RADIATOR SIPHON HOSE | ⑧ REAR BRAKE PIPE |



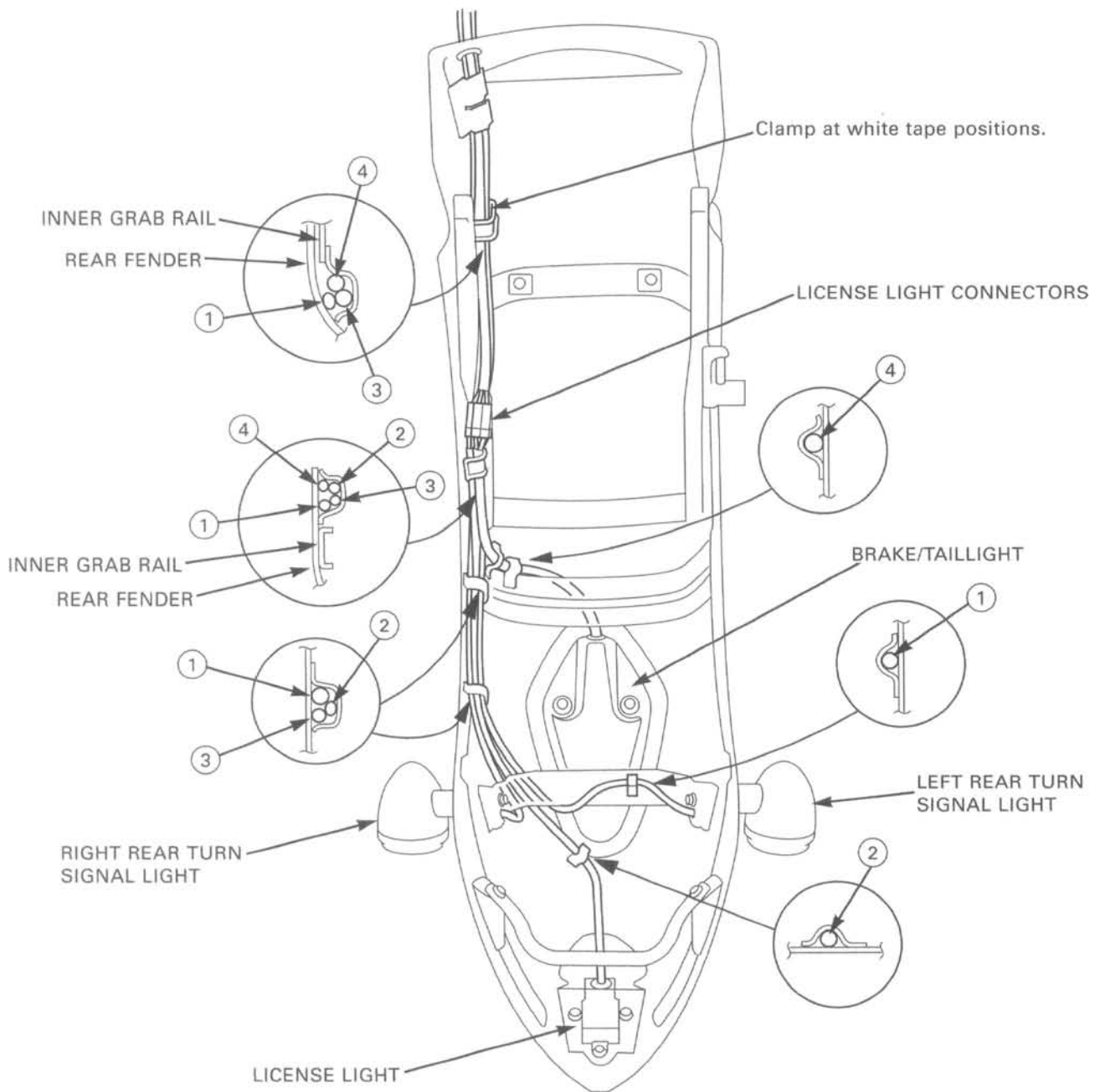
GENERAL INFORMATION



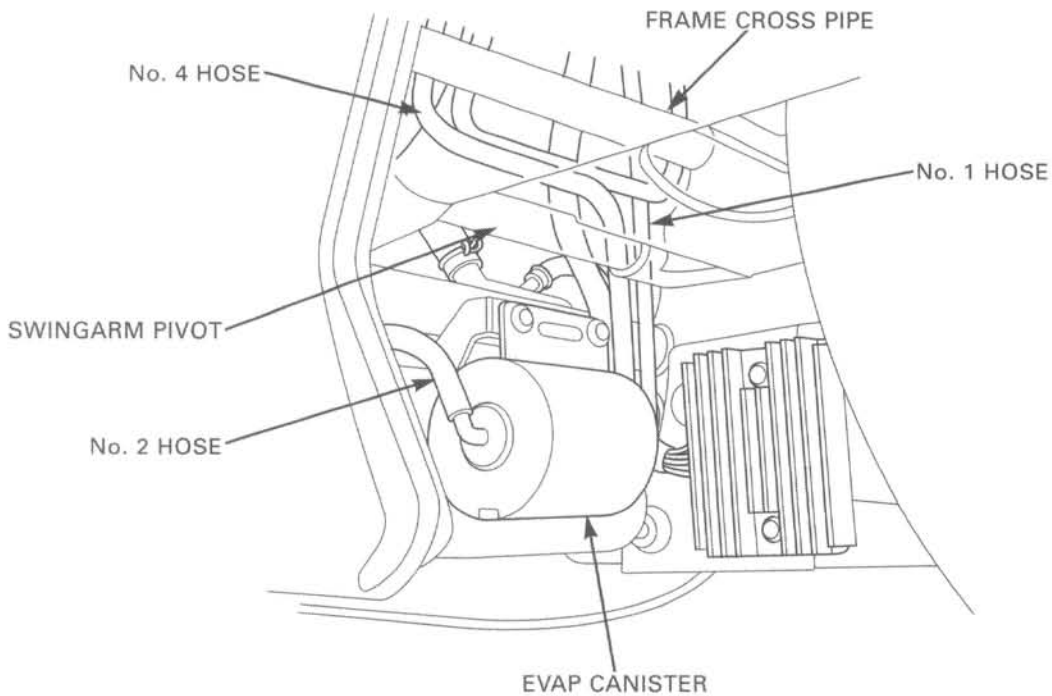
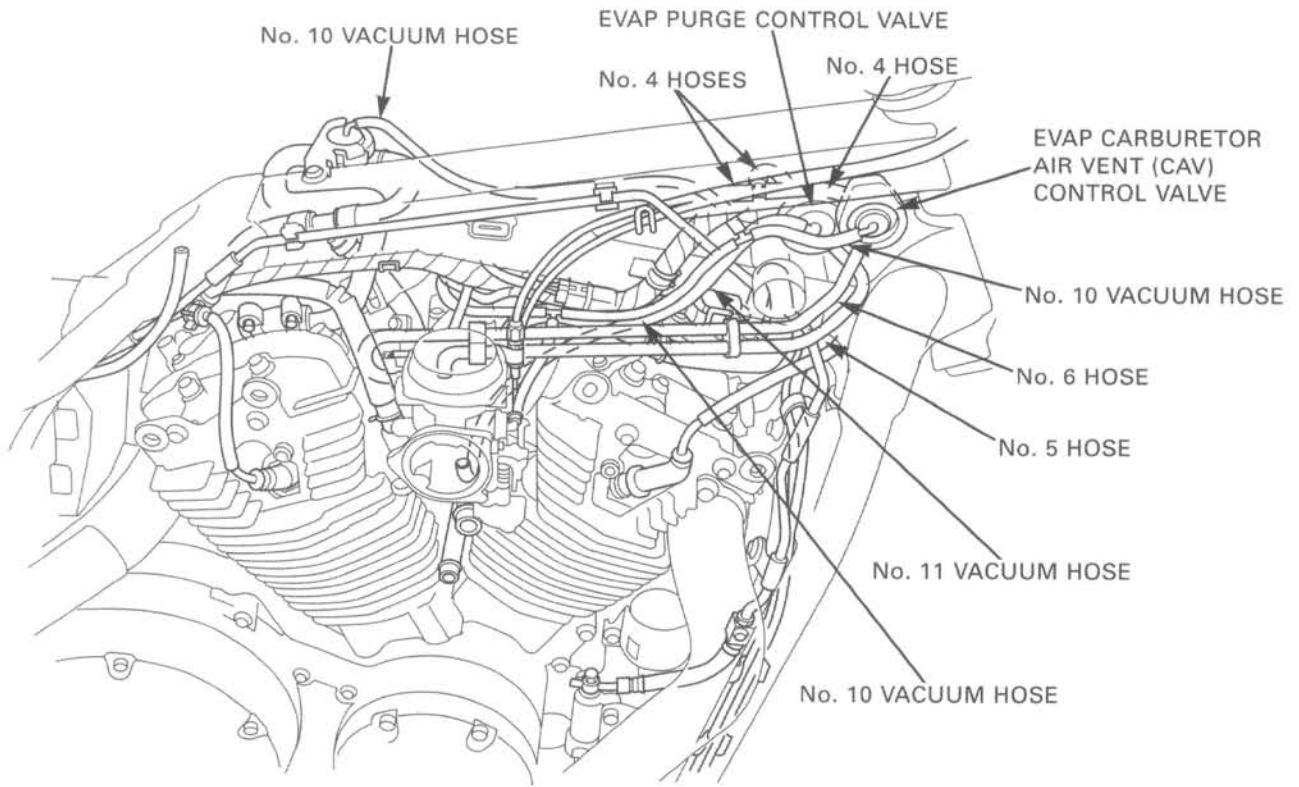


GENERAL INFORMATION

- ① LEFT REAR TURN SIGNAL LIGHT WIRE
- ② LICENSE LIGHT WIRE
- ③ RIGHT REAR TURN SIGNAL LIGHT WIRE
- ④ BRAKE/TAILLIGHT WIRE



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



GENERAL INFORMATION

EMISSION CONTROL SYSTEMS

SOURCE OF EMISSIONS

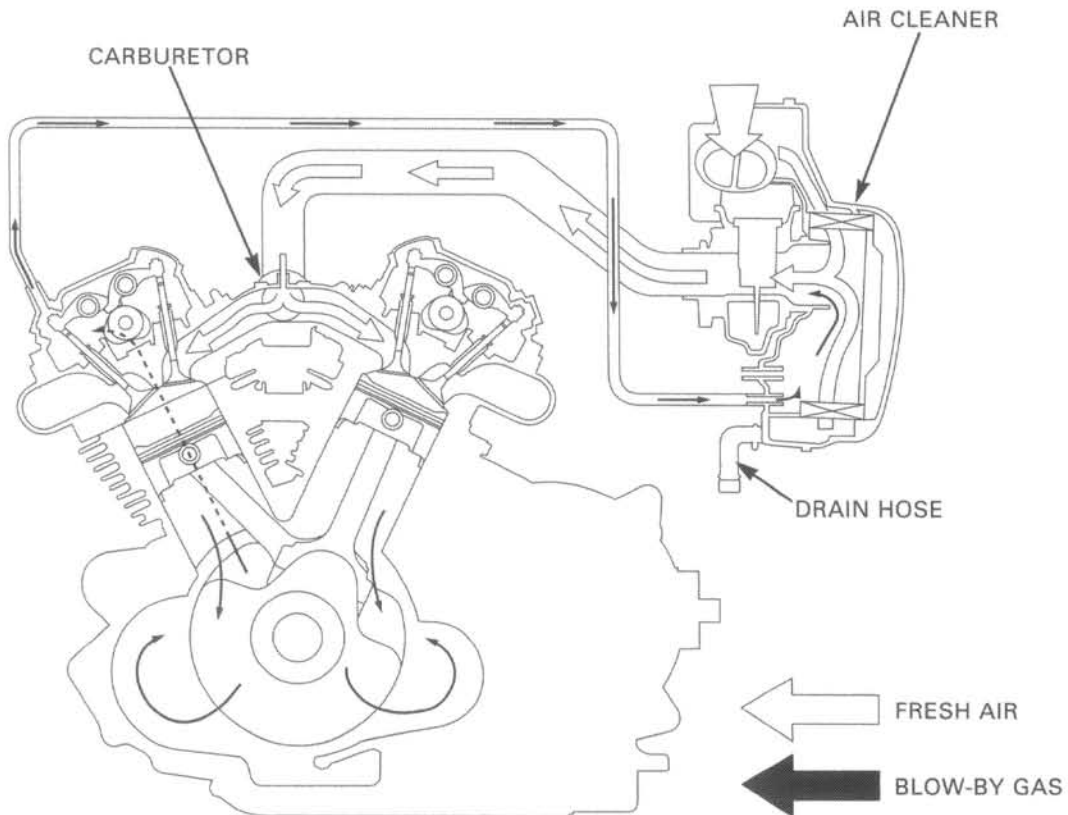
The U.S. Environmental Protection Agency, Transport Canada and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided,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

The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons. Control of hydrocarbons and oxides of nitrogen 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 is toxic.

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

CRANKCASE EMISSION CONTROL SYSTEM

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



EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

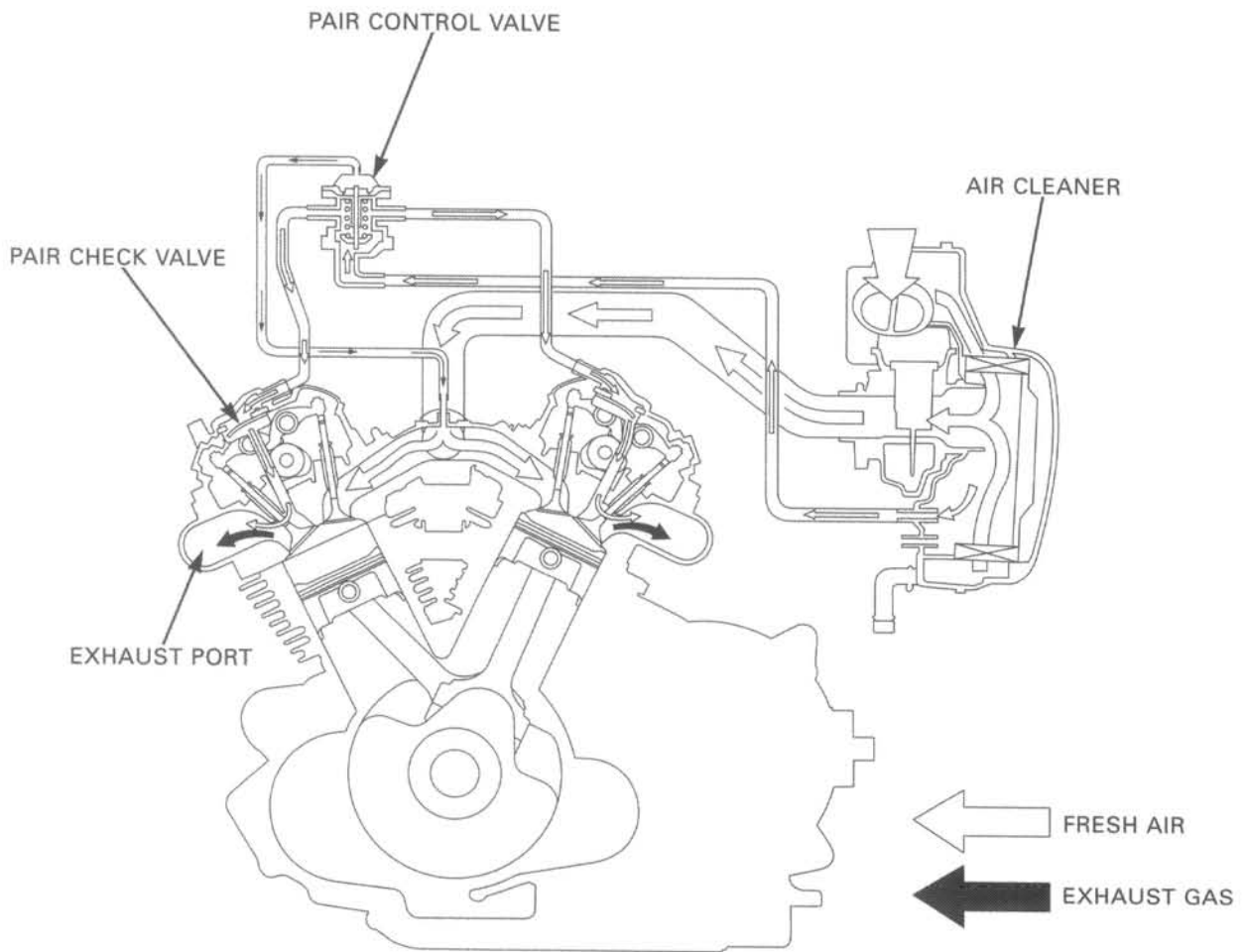
The exhaust emission system is composed of a lean carburetor setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

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 by the function of the Pulse Secondary Air Injection (PAIR) control valve.

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 PAIR control valve reacts to high intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

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

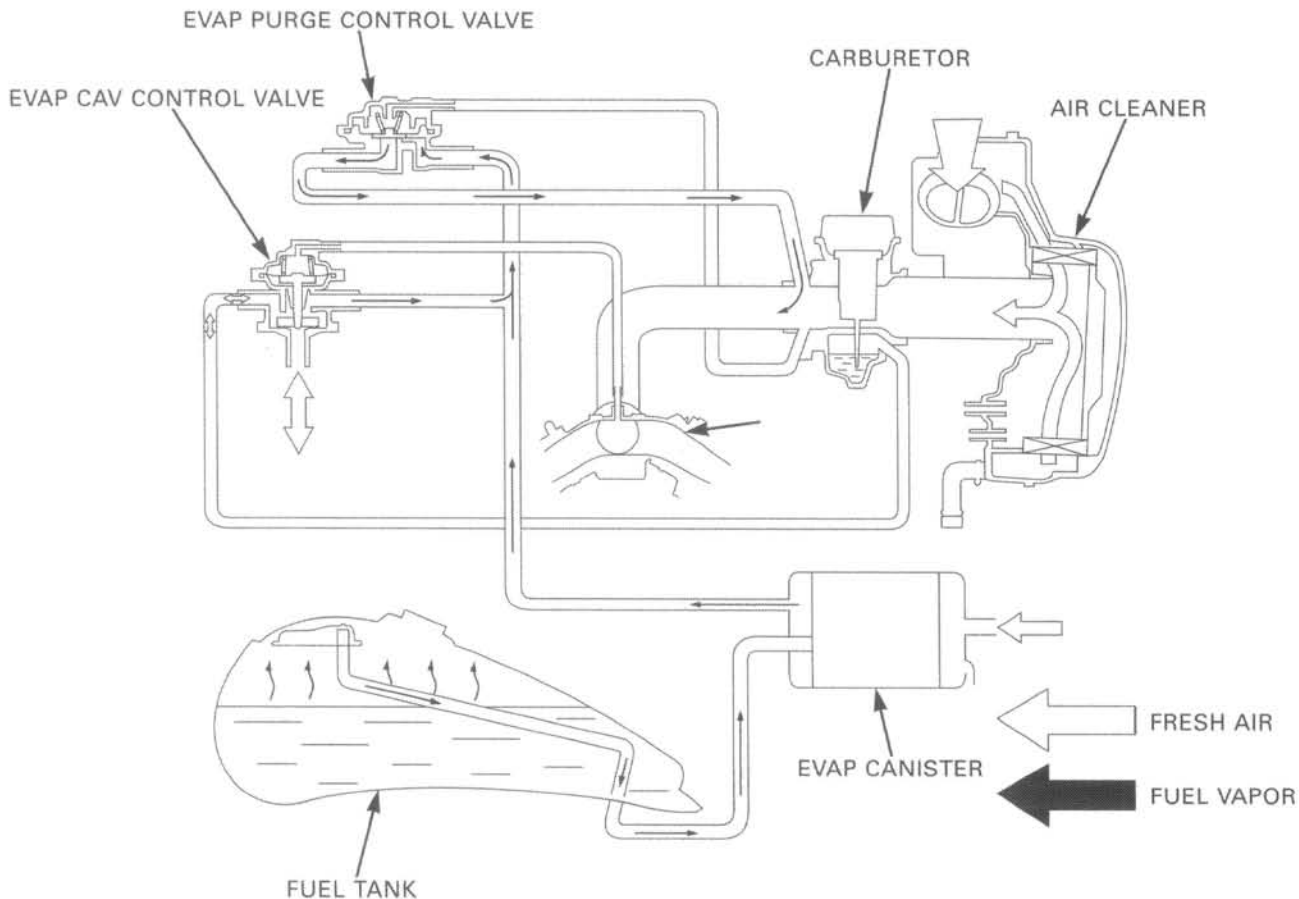


GENERAL INFORMATION

EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

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

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



NOISE EMISSION CONTROL SYSTEM

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

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

1. Removal of or puncturing of the muffler, baffles, header pipes or any other component which 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.

EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the rear fender near the frame cross pipe as shown. It gives basic tune-up specifications.

VEHICLE EMISSION CONTROL INFORMATION UPDATE LABEL

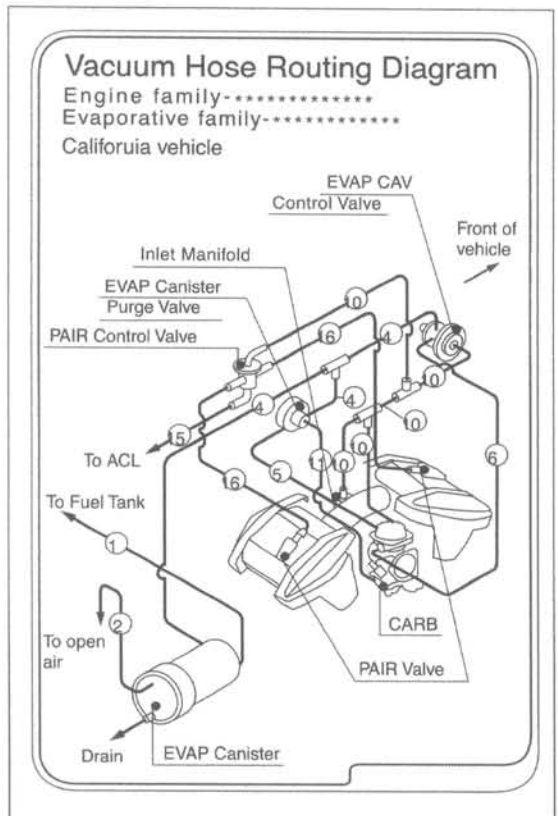
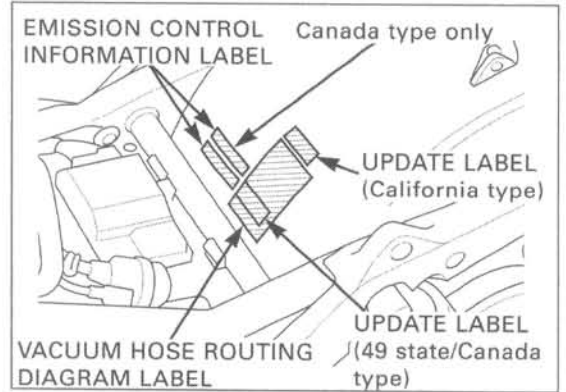
After making a high altitude carburetor adjustment, attach an update label on the rear fender near the frame cross pipe as shown.

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

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

VACUUM HOSE ROUTING DIAGRAM LABEL (California type only)

The Vacuum Hose Routing Diagram Label is located on the rear fender near the frame cross pipe.



2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	STEERING SIDE COVER	2-3
TROUBLESHOOTING	2-1	LEFT CRANKCASE REAR COVER	2-3
SEATS	2-2	FOOTREST	2-4
SIDE COVER	2-2	REAR FENDER	2-5
CYLINDER HEAD SHROUD	2-2	EXHAUST SYSTEM	2-6
FUEL TANK	2-3		

SERVICE INFORMATION

GENERAL

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

TORQUE VALUES

Fuel tank mounting bolt	19 N·m (1.9 kgf·m, 14 lbf·ft)
Fuel valve nut	34 N·m (3.5 kgf·m, 25 lbf·ft)
Fuel valve lever screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft) ALOC screw: replace with a new one.
Left crankcase rear cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Rider footrest mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Exhaust pipe joint nut	23 N·m (2.3 kgf·m, 17 lbf·ft)
Muffler band bolt	17 N·m (1.7 kgf·m, 12 lbf·ft)
Muffler mounting bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Exhaust pipe joint stud bolt	See page 2-6

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

SEATS

REAR SEAT

Remove the following:

- rubber plug (from the 6-mm bolt head)
- 6-mm bolt
- two 8-mm bolts and collars
- seat strap
- rear seat

Installation is in the reverse order of removal.

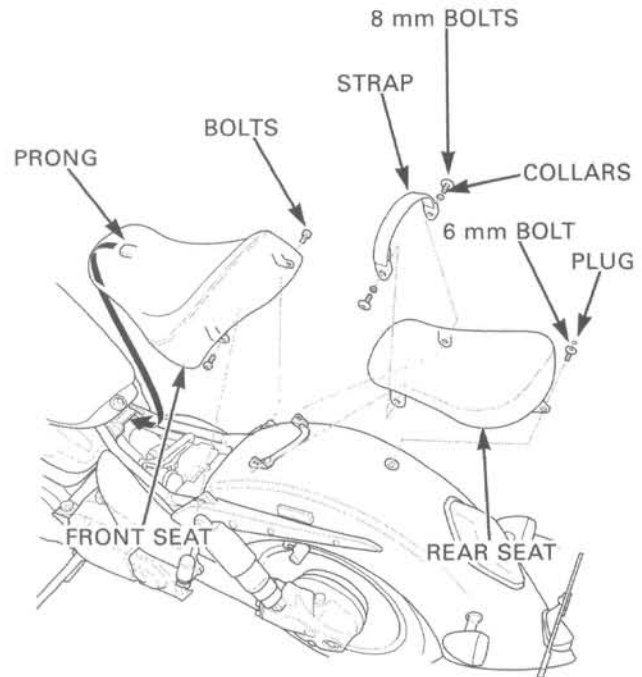
FRONT SEAT

Remove the following:

- two bolts
- front seat (pull it back)

Install by inserting the seat prong under the raised lip of the frame properly.

Installation is in the reverse order of removal.



SIDE COVER

Do not allow the right side cover to contact the exhaust pipe when the exhaust system is hot.

REMOVAL

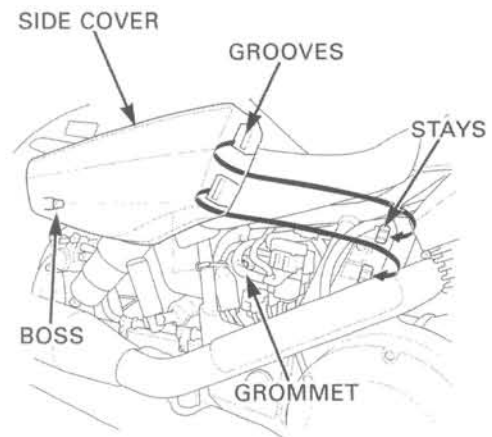
Release the boss on the rear side of the cover and remove the side cover from the stays.

INSTALLATION

Make sure the mounting rubbers are installed on the stays securely.

Be careful not to dislodge the grommet.

Align the grooves in the side cover with the stays and insert the boss into the grommet to install the side cover.



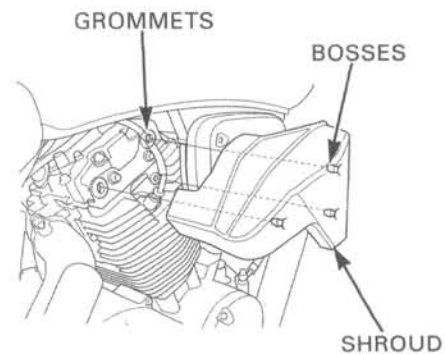
CYLINDER HEAD SHROUD

Take care not to break the bosses.

Carefully raise the shroud and release the three bosses off the grommets to remove it.

Be careful not to dislodge the grommet.

Installation is in the reverse order of removal.



FUEL TANK

Remove the following:

- seats (page 2-2)
- front right cylinder head shroud (page 2-2)

Remove the mounting bolt.

Turn the fuel valve to "OFF".

Disconnect the fuel hose and breather hose (California: No. 1 hose).

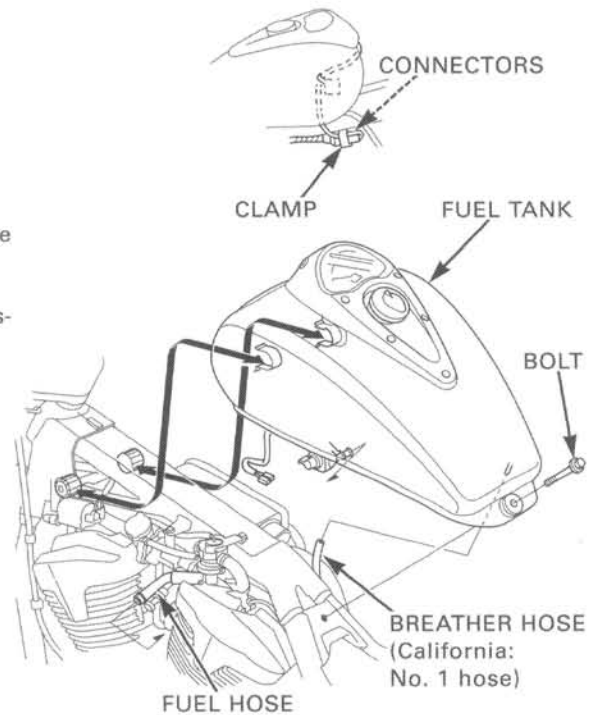
Release the connector boot from the clamp and disconnect the speedometer 7P (green) connectors.

Slide the fuel tank rearward to remove it from the rubber mounts.

Installation is in the reverse order of removal.

TORQUE: 19 N·m (1.9 kgf·m, 14 lbf·ft)

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



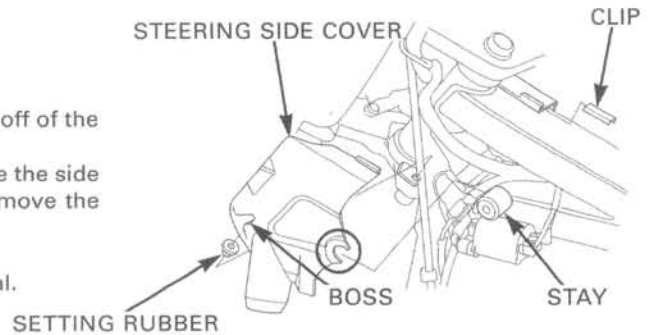
STEERING SIDE COVER

Remove the fuel tank (see above).

Remove the retaining clip by sliding it back, off of the cover.

Release the boss from the frame and remove the side cover from the fuel tank mounting stay. Remove the setting rubber.

Installation is in the reverse order of removal.



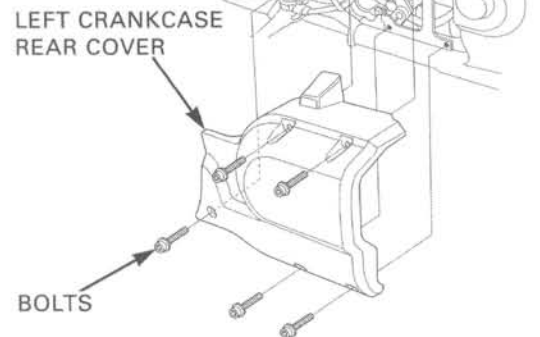
LEFT CRANKCASE REAR COVER

Remove the five bolts and the left crankcase rear cover.

Align the bolt holes properly.

Installation is in the reverse order of removal.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



FOOTREST

ASSEMBLY REMOVAL/INSTALLATION

LEFT FOOTREST

Remove the left crankcase rear cover (page 2-3).

Remove the following:

If the gearshift pedal will be removed, loosen the pedal pivot bolt.

- pinch bolt
- gearshift arm
- two footrest bolts
- left footrest assembly
- footrest (page 2-5)

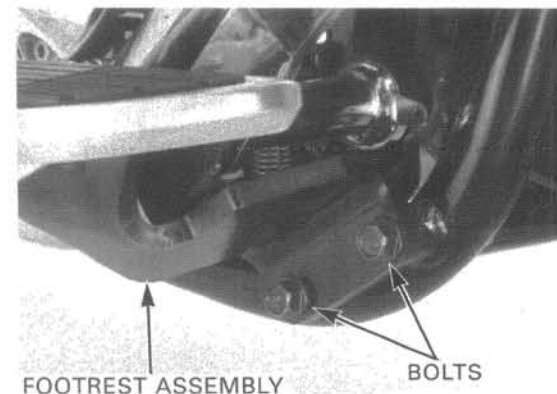
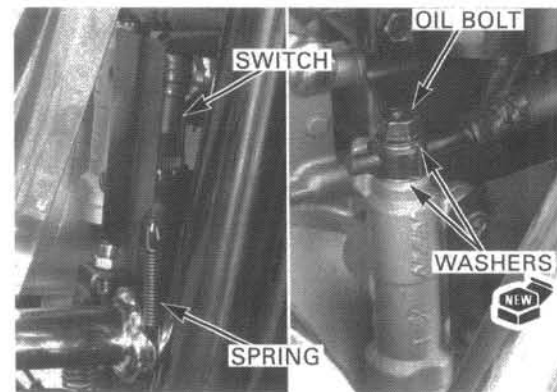
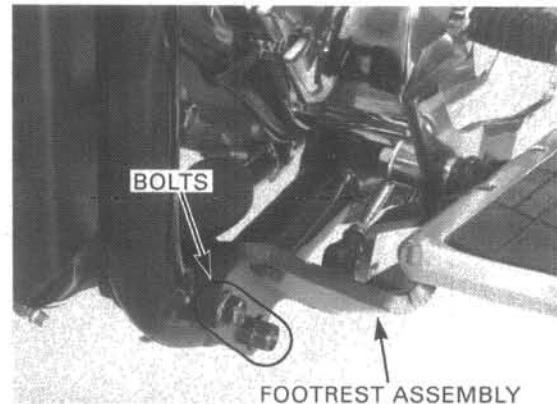
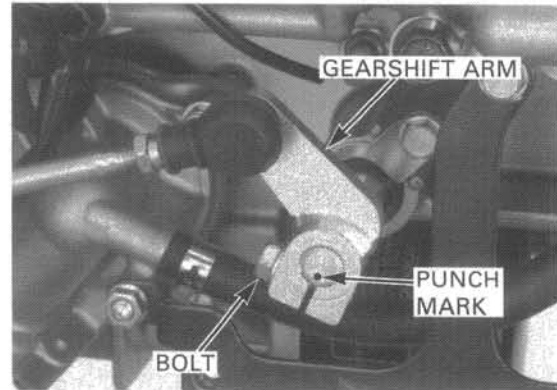
Installation is in the reverse order of removal.

NOTE:

- When installing the gearshift arm, align the slit of the arm with the punch mark on the spindle.

TORQUE:

- Footrest bolt: 39 N·m (4.0 kgf·m, 29 lbf·ft)
- Pinch bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)



RIGHT FOOTREST

The exhaust system must be cool before removing the right footrest assembly.

Drain the brake fluid from the rear brake hydraulic system (page 15-3).

Remove the following:

When removing the oil bolt, cover the end of the hose to prevent contamination.

- brake light switch spring
- rear brake light switch (from the switch holder)
- oil bolt and sealing washers
- brake hose
- two footrest bolts
- right footrest assembly
- footrest (page 2-5)

Always replace the sealing washers with new ones.

Installation is in the reverse order of removal.

TORQUE:

- Footrest bolt: 39 N·m (4.0 kgf·m, 29 lbf·ft)
- Oil bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)

NOTE:

- Fill and bleed the rear brake hydraulic system (page 15-4).
- Adjust the brake light switch (page 3-17).

FOOTREST REMOVAL/INSTALLATION

Remove the following:

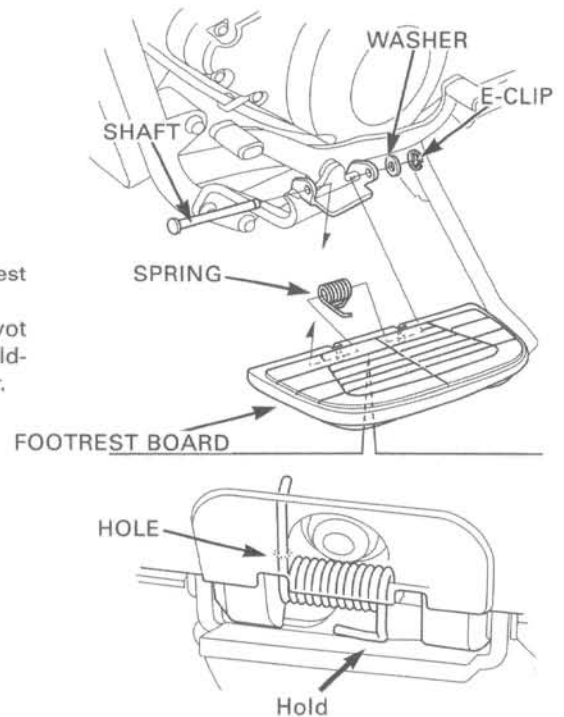
- E-clip and washer
- pivot shaft
- footrest board
- return spring

Apply grease to the footrest sliding area.

Installation is in the reverse order of removal.

NOTE:

- Insert the spring end into the hole in the footrest board.
- When installing the pivot shaft, align the pivot holes in the footrest board and bracket while holding the spring end (bent side) with a screwdriver.



REAR FENDER

Remove the following:

- seats (page 2-2)
- right side cover (page 2-2)

Remove the wire band and disconnect the connectors in the boot.

Remove either the left or right rear shock absorber (page 14-9).

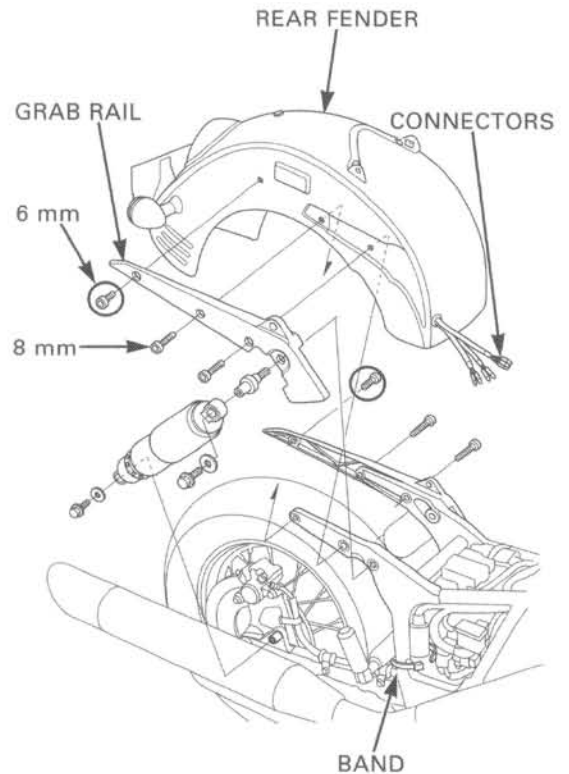
Place wooden blocks and shop towels or an equivalent between the rear wheel and fender to support the rear fender securely.

Be careful not to deform the rear fender.

Remove the following:

- two 6-mm bolts
- four 8-mm bolts
- shock absorber upper pivot bolt
- grab rail
- rear fender (take care not to damage the reflectors)

Installation is in the reverse order of removal.



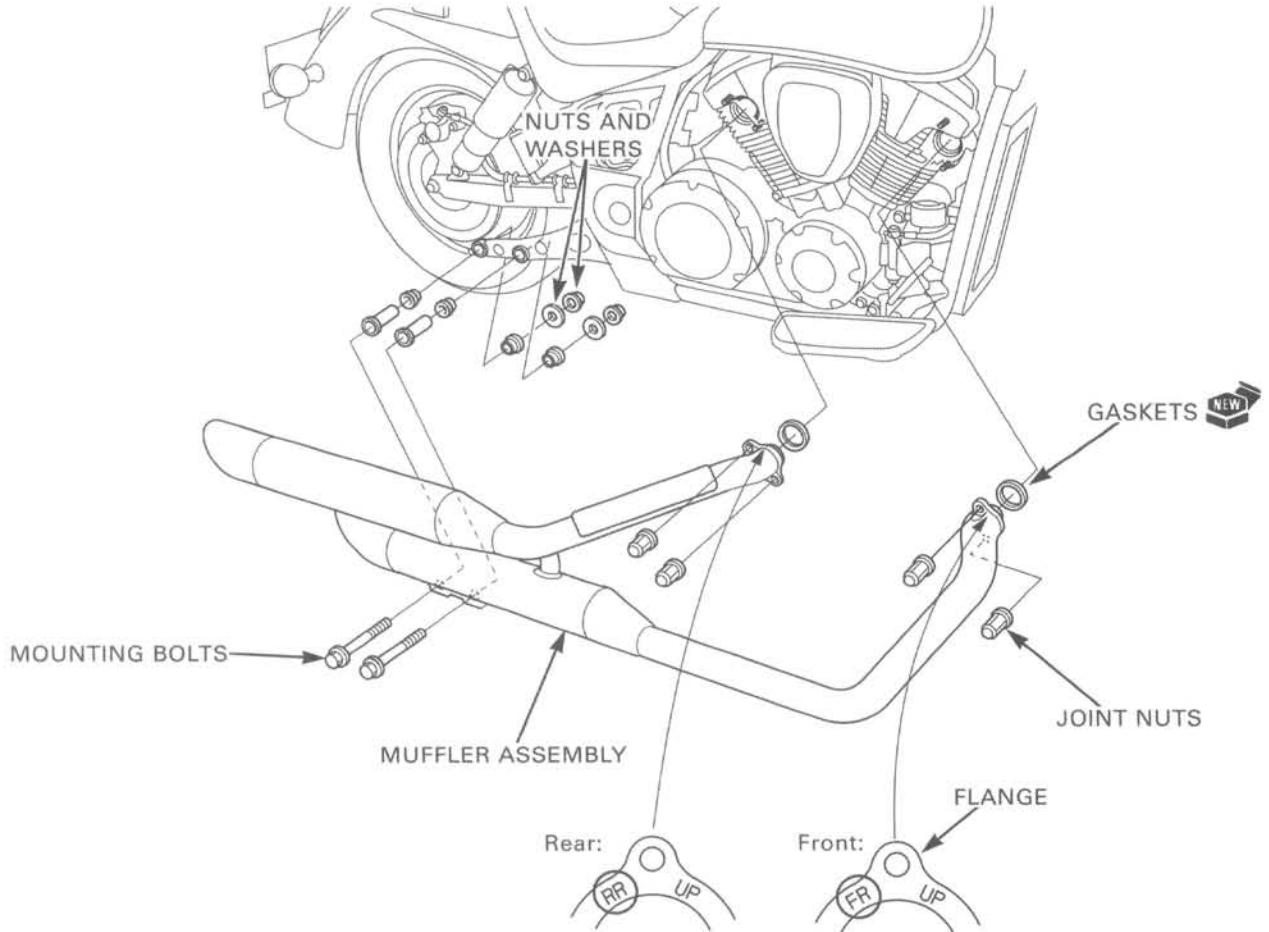
EXHAUST SYSTEM

REMOVAL

Remove the following:

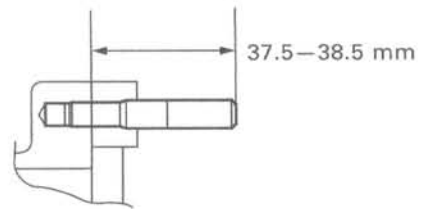
- four exhaust pipe joint nuts
- two mounting nuts and washers
- two mounting bolts
- exhaust pipe/muffler assembly
- gaskets

Be careful not to scratch the exhaust system.



INSTALLATION

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



It is important to follow these steps in order.

NOTE:

- Always replace the gaskets with new ones.
- If the exhaust system was not separated, steps 1 and 2 are not necessary.

1. Before mounting the exhaust system, assemble the front and rear mufflers by tightening the muffler joint bolts (2) and muffler band bolt (1).
2. Temporarily tighten the muffler band bolts (3) and (4).
3. Make sure new gaskets are installed in position. Install the exhaust pipe/muffler assembly by inserting the cylinder head studs into the exhaust flanges with the "UP" mark of the flange facing up, and install the exhaust pipe joint nuts (5) and (6).
4. Carefully align the bolt holes in the muffler and stay, and install the mounting bolts (7) and the nuts with the washers (7).

After mounting the exhaust system, tighten each fastener in the sequence below.

5. Tighten the muffler band bolt (1) and the muffler joint bolts (2).

TORQUE: Band bolt: 17 N·m (1.7 kgf·m, 12 lbf·ft)
Joint bolt: 26 N·m (2.7 kgf·m, 20 lbf·ft)

6. Tighten the muffler band bolts (3) and (4).

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

7. Tighten each pair of exhaust pipe joint nuts (5) and (6) alternately in several steps.

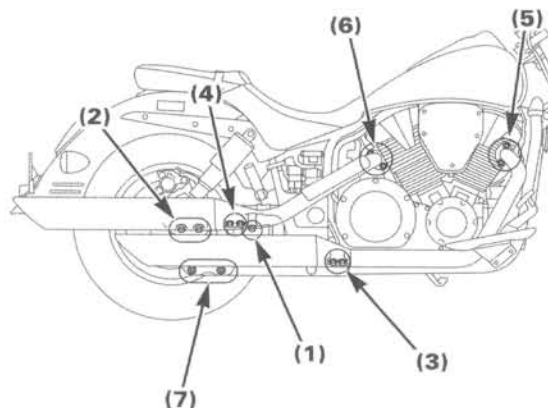
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

8. Tighten the mounting bolts (7).

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Tighten the exhaust pipe cover bolts if the exhaust cover was removed (see following page).

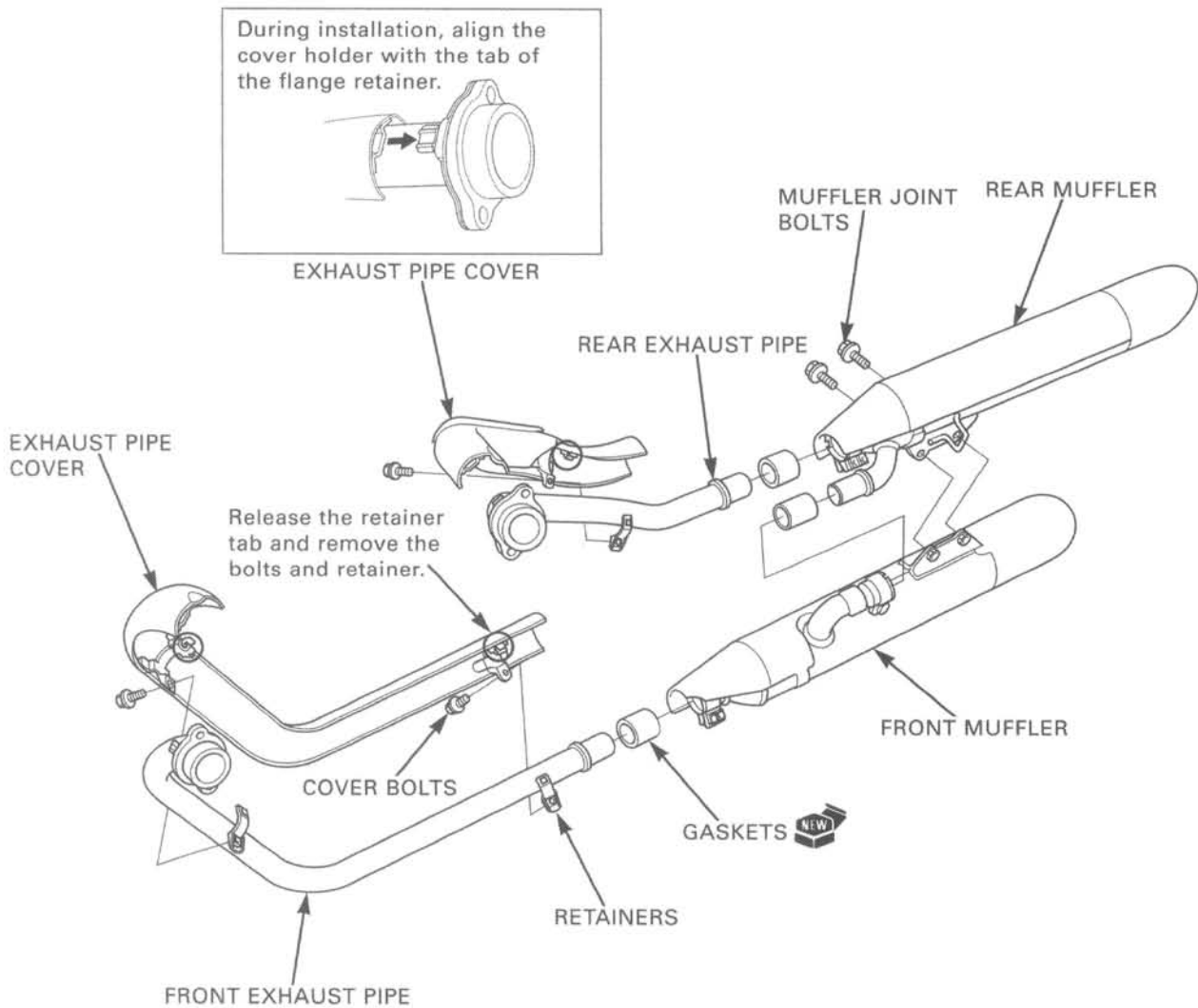
After installation, inspect the exhaust system for leaks.



DISASSEMBLY/ASSEMBLY

NOTE:

- If the exhaust pipe covers were removed, temporarily install the exhaust pipe covers and bolts when installing the exhaust system onto the motorcycle, and tighten the cover bolts after exhaust system installation is completed.



3. MAINTENANCE

SERVICE INFORMATION	3-1	EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	3-14
MAINTENANCE SCHEDULE	3-3	FINAL DRIVE OIL	3-14
FUEL LINE	3-4	BRAKE FLUID	3-15
THROTTLE OPERATION	3-4	BRAKE PAD WEAR	3-16
CARBURETOR CHOKE	3-5	BRAKE SYSTEM	3-17
AIR CLEANER	3-5	BRAKE LIGHT SWITCH	3-17
CRANKCASE BREATHER	3-6	HEADLIGHT AIM	3-17
SPARK PLUG	3-6	CLUTCH SYSTEM	3-17
VALVE CLEARANCE	3-7	SIDE STAND	3-18
ENGINE OIL	3-10	SUSPENSION	3-19
OIL FILTER	3-10	NUTS, BOLTS, FASTENERS	3-19
ENGINE IDLE SPEED	3-11	WHEELS/TIRES	3-20
RADIATOR COOLANT	3-12	STEERING HEAD BEARINGS	3-20
COOLING SYSTEM	3-13		
SECONDARY AIR SUPPLY SYSTEM	3-13		

SERVICE INFORMATION

SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle grip free play		2—6 mm (1/12—1/4 in)
Spark plug	Standard	DCPR6E (NGK), XU20EPR-U (DENSO)
	For extended high speed riding	DCPR7E (NGK), XU22EPR-U (DENSO)
Spark plug gap		0.8—0.9 mm (0.031—0.035 in)
Valve clearance	Intake	0.15 ± 0.02 mm (0.006 ± 0.001 in)
	Exhaust	0.30 ± 0.02 mm (0.012 ± 0.001 in)
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40
Engine oil capacity	After draining	3.5 liters (3.7 US qt, 3.1 Imp qt)
	After draining/filter change	3.7 liters (3.9 US qt, 3.3 Imp qt)
	After disassembly	4.3 liters (4.5 US qt, 3.8 Imp qt)
Engine idle speed		900 ± 100 rpm
Recommended final drive oil		Hypoid gear oil, SAE #80
Final drive oil capacity	After draining	120 cm ³ (4.1 US oz, 4.2 Imp oz)
	After disassembly	150 cm ³ (5.1 US oz, 5.3 Imp oz)
Recommended brake fluid		DOT 4 brake fluid
Clutch lever free play		10—20 mm (3/8—3/4 in)

MAINTENANCE

ITEM		SPECIFICATIONS	
Cold tire pressure	Up to 90 kg (200 lbs) load	Front	225 kPa (2.25 kgf/cm ² , 32 psi)
		Rear	225 kPa (2.25 kgf/cm ² , 32 psi)
	Up to maximum weight capacity	Front	225 kPa (2.25 kgf/cm ² , 32 psi)
		Rear	250 kPa (2.50 kgf/cm ² , 36 psi)
Tire size	Front	140/80-17M/C 69H	
	Rear	170/80-15M/C 77H	
Tire brand	Front	DUNLOP D404F	
	Rear	DUNLOP K555J	
Minimum 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)
Valve adjusting screw lock nut	22 N·m (2.2 kgf·m, 16 lbf·ft) Apply engine oil to the threads and seating surface
Valve adjusting hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft) Apply grease oil to the threads.
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft) Apply grease oil to the threads.
Timing hole cap cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft) Apply engine oil to the threads and seating surface.
Front engine drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)
Rear engine drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)
Final drive oil drain bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)
Front master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Rear brake reservoir mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

TOOLS

Valve adjusting wrench	070MA-MEA0100 or 07908-KE90100 (U.S.A. only) with 10-mm offset box wrench
Oil filter wrench	07HAA-PJ70101 or 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 your Honda dealer.

ITEM	FREQUENCY	WHICHEVER COMES FIRST → ↓ NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
			x 1,000 mi	0.6	4	8	12	16	20	24	
			x 1,000 km	1.0	6.4	12.8	19.2	25.6	32.0	38.4	
EMISSION RELATED ITEMS	* FUEL LINE				I		I		I	3-4	
	* THROTTLE OPERATION				I		I		I	3-4	
	* CARBURETOR CHOKE				I		I		I	3-5	
	AIR CLEANER	NOTE 2				R			R	3-5	
	CRANKCASE BREATHER	NOTE 3		C	C	C	C	C	C	3-6	
	SPARK PLUG			I	R	I	R	I	R	3-6	
	* VALVE CLEARANCE		I		I		I		I	3-7	
	ENGINE OIL		R		R		R		R	3-10	
	ENGINE OIL FILTER		R		R		R		R	3-10	
	* ENGINE IDLE SPEED		I	I	I	I	I	I	I	3-11	
	RADIATOR COOLANT	NOTE 5				I		I		R	3-12
	* COOLING SYSTEM					I		I		I	3-13
	* SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-13
	* EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-14
NON-EMISSION RELATED ITEMS	FINAL DRIVE OIL				I		I		R	3-14	
	BRAKE FLUID	NOTE 5			I	I	R	I	I	R	3-15
	BRAKE PAD WEAR				I	I	I	I	I	3-16	
	BRAKE SYSTEM		I		I		I		I	3-17	
	* BRAKE LIGHT SWITCH				I		I		I	3-17	
	* HEADLIGHT AIM				I		I		I	3-17	
	CLUTCH SYSTEM		I	I	I	I	I	I	I	3-17	
	SIDE STAND				I		I		I	3-18	
	* SUSPENSION				I		I		I	3-19	
	* NUTS, BOLTS, FASTENERS		I		I		I		I	3-19	
	** WHEELS/TIRES		I	I	I	I	I	I	I	3-20	
** STEERING HEAD BEARINGS		I		I		I		I	3-20		

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

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

NOTES: 1. At higher odometer readings, repeat at the frequency interval established here.

2. Service more frequently when riding in unusually wet or dusty areas.

3. Service more frequently when riding in rain or at full throttle.

4. California type only.

5. Replace every 2 years, or at the indicated odometer intervals, whichever comes first. Replacement requires mechanical skill.

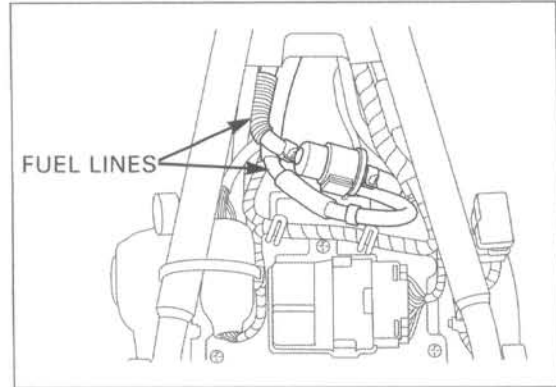
MAINTENANCE

FUEL LINE

Remove the fuel tank (page 2-3).

Check the fuel lines for deterioration, damage or leakage.

Replace the fuel lines if necessary.



THROTTLE OPERATION

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

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

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

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

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

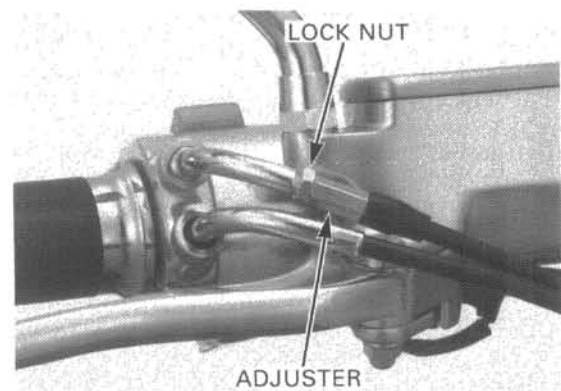
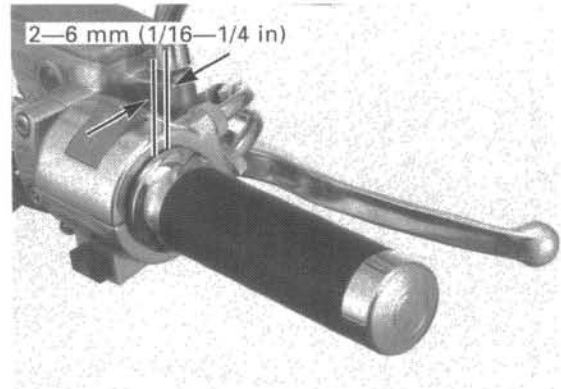
With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip free play and the throttle cable connection.

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

THROTTLE GRIP FREE PLAY: 2—6 mm (1/8—1/4 in)

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

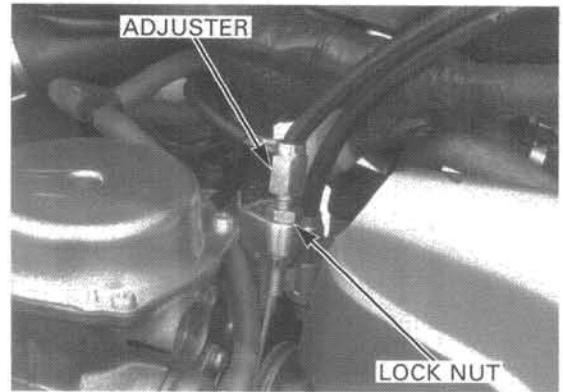
Loosen the lock nut, turn the adjuster as required and tighten the lock nut.



Major adjustments are made with the lower adjuster.

Remove the air cleaner housing (page 5-3).
Loosen the lock nut, turn the adjuster as required and tighten the lock nut.

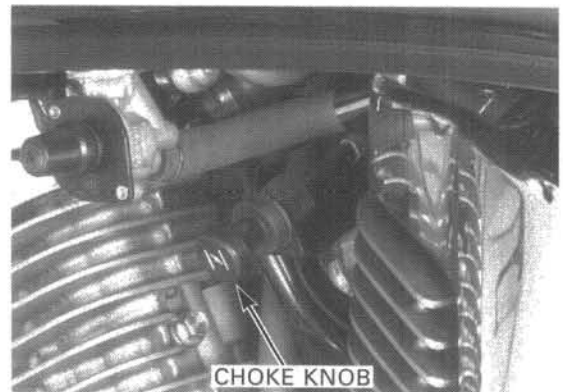
Recheck the throttle operation and install the air cleaner housing (page 5-3).



CARBURETOR CHOKE

This model uses a bypass air volume control choke system controlled by the starter valve. The starter valve opens the bypass air circuit via a cable when the choke knob on the left side of the frame is pulled out.

Check for smooth choke knob operation.
Lubricate the choke cable if the operation is not smooth.



AIR CLEANER

NOTE:

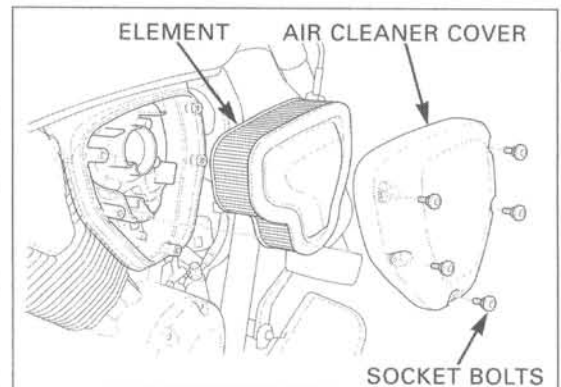
- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in unusually wet or dusty areas, more frequent inspections are required.

Do not lose the plastic washers on each bolt.

Remove the five socket bolts and the air cleaner cover. Remove the air cleaner element from the air cleaner housing.

Replace the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install the air cleaner element and removed parts in the reverse order of removal.



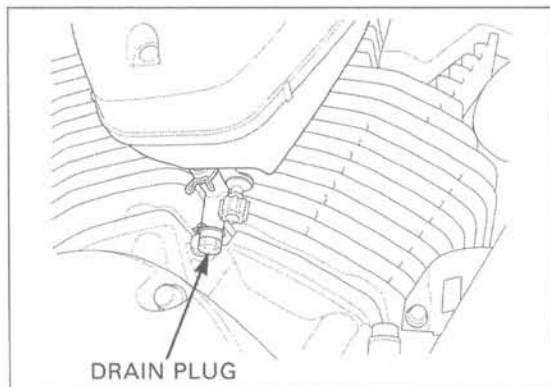
MAINTENANCE

CRANKCASE BREATHER

NOTE:

- Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposit level can be seen in the transparent section of the drain tube.

Remove the drain plug from the air cleaner housing drain hose and drain the deposits into a suitable container, then reinstall the drain plug securely.



SPARK PLUG

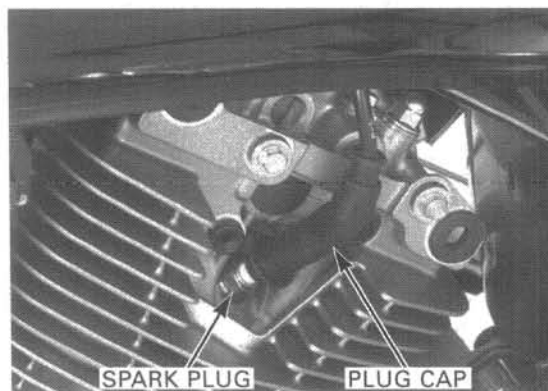
Remove the cylinder head cover shrouds (page 2-2).

Disconnect the spark plug caps and clean around the spark plug bases.

NOTE:

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

Remove the spark plugs.



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

RECOMMENDED SPARK PLUG:

Standard:

DCPR6E (NGK), XU20EPR-U (DENSO)

For extended high speed riding:

DCPR7E (NGK), XU22EPR-U (DENSO)

Clean the spark plug electrodes with a wire brush or special plug cleaner.

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

SPARK PLUG GAP: 0.8—0.9 mm (0.031—0.035 in)

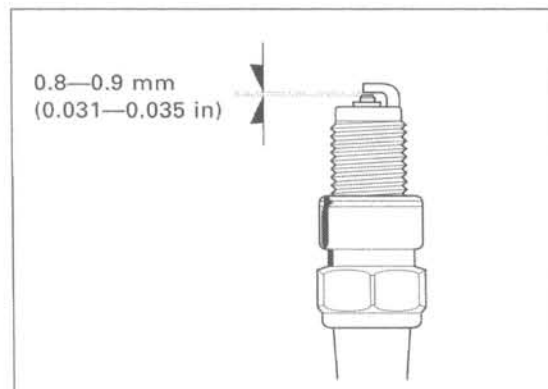
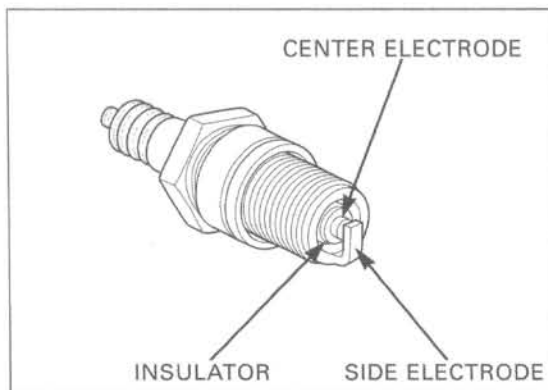
If necessary, adjust the gap by bending the side electrode carefully.

Thread each spark plug in by hand to prevent cross-threading and tighten them with a spark plug wrench.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Connect the spark plug caps.

Install the cylinder head cover shrouds (page 2-2).



VALVE CLEARANCE

INSPECTION

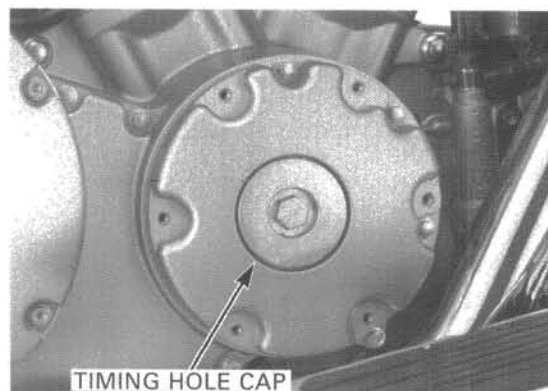
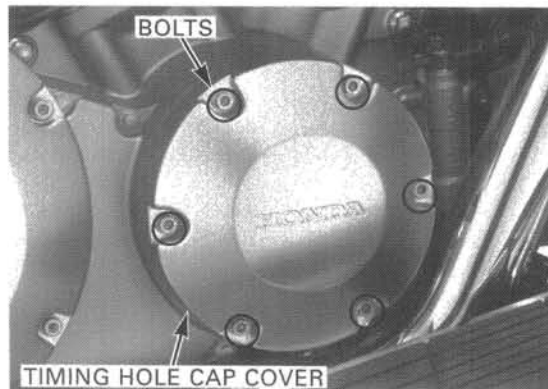
NOTE:

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

Remove the cylinder head cover shrouds (page 2-2).
Remove the fuel tank (page 2-3).

Remove the six socket bolts and the timing hole cap cover.

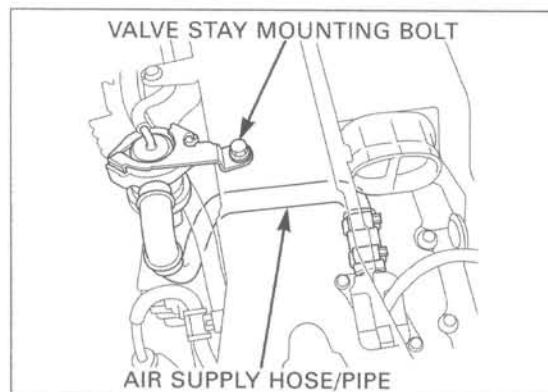
Remove the timing hole cap.



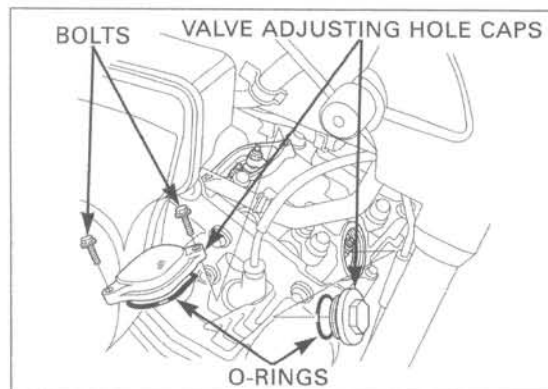
Rear cylinder only:

Remove the air supply hose/pipe from the rear cylinder head cover and pulse secondary air injection (PAIR) control valve.

Remove the PAIR control valve stay mounting bolt and move the control valve away from the rear cylinder head.



Remove the bolts and valve adjusting hole caps.
Remove the O-rings from the caps.

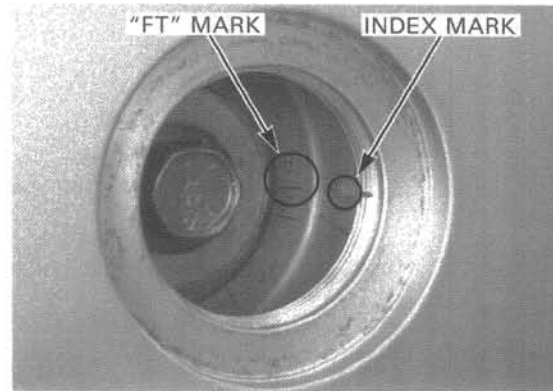


MAINTENANCE

Rotate the crankshaft clockwise and align the "FT" mark on the primary drive gear with the index mark on the right crankcase cover.

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

This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft clockwise one full turn and align the "FT" mark with the index mark again.



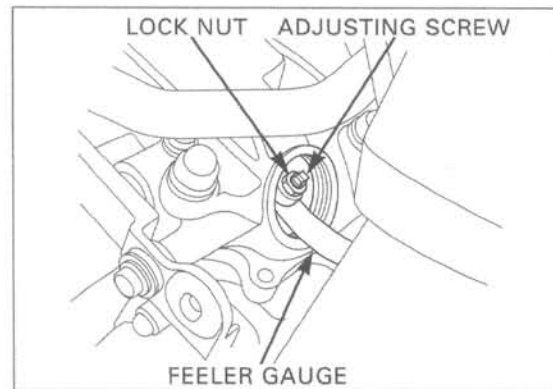
When checking the clearance, slide the feeler gauge from the center toward the outside.

Check the valve clearances of the front cylinder by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES:

INTAKE: 0.15 ± 0.02 mm (0.006 ± 0.001 in)

EXHAUST: 0.30 ± 0.02 mm (0.012 ± 0.001 in)

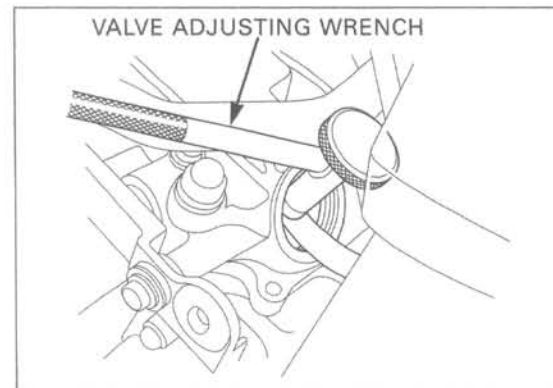


Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

TOOL:

Valve adjusting wrench

070MA-MEA0100 or
07908-KE90100
(U.S.A. only) with
10-mm offset box
wrench



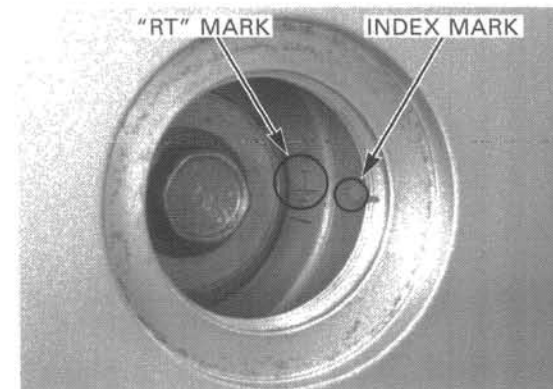
Hold the adjusting screw and tighten the lock nut.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

After tightening the lock nut, recheck the valve clearance.

Rotate the crankshaft clockwise 308° and align the "RT" mark with the index mark.

Check the valve clearances of the rear cylinder and adjust if necessary.

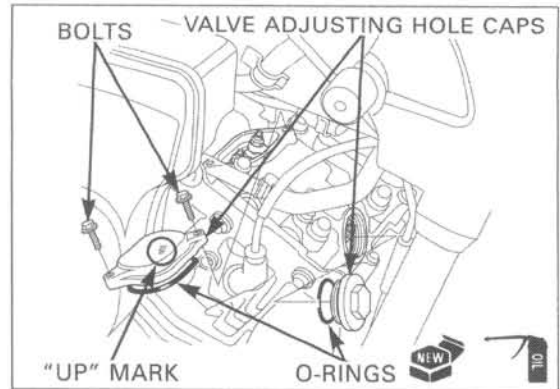


Coat new O-rings with oil and install them into the valve adjusting hole cap grooves.

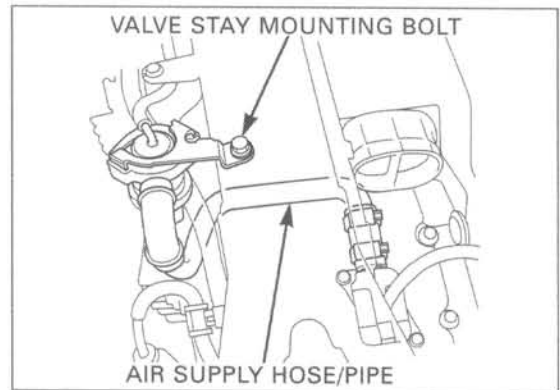
Install the intake valve adjusting hole caps and tighten them.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the exhaust valve adjusting hole caps with the "UP" mark facing up and tighten the bolts securely.

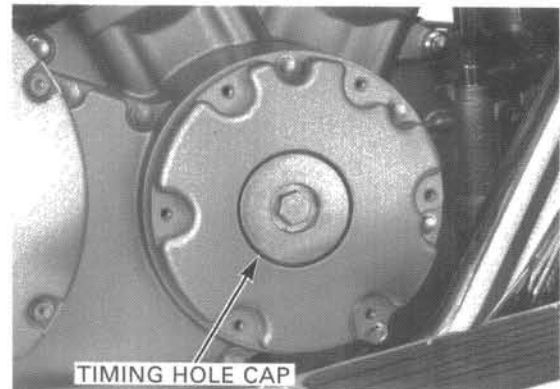


Install the PAIR control valve stay onto the frame and tighten the bolt securely.
Connect the air supply hose to the PAIR control valve and cylinder head cover.



Coat a new O-ring with oil and install it into the timing hole cap groove.
Install the timing hole cap and tighten it.

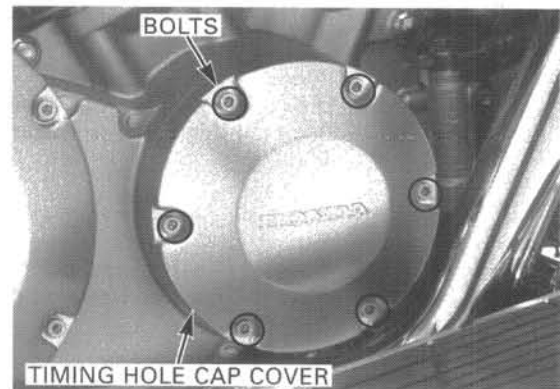
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Install the timing hole cap cover and tighten the six socket bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the fuel tank (page 2-3).
Install the cylinder head cover shrouds (page 2-2).



ENGINE OIL

OIL LEVEL CHECK

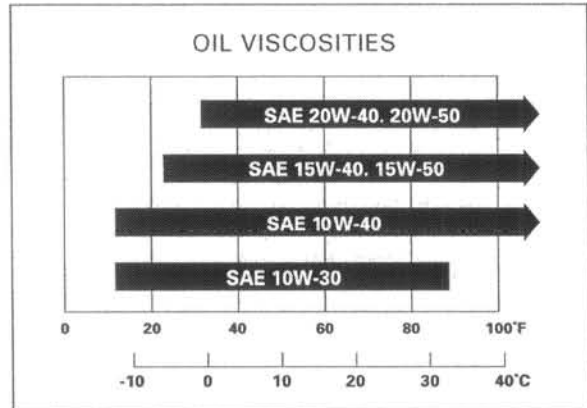
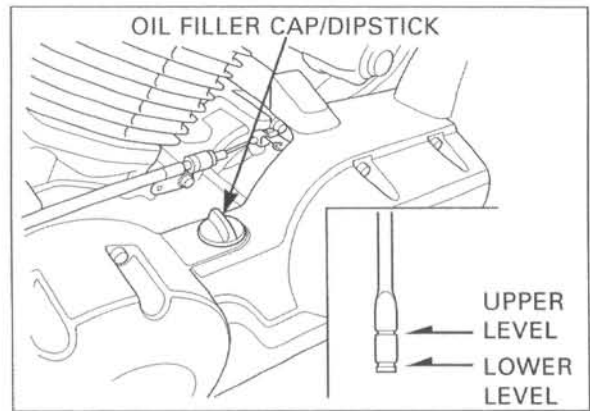
NEW

- Park the motorcycle on its side stand on a firm, level surface.
- Start the engine and let it idle for 3-5 minutes
- Make sure the low oil pressure indicator goes off. If it stays on, stop the engine and troubleshoot the cause.
- Stop the engine and wait 2-3 minutes.
- Remove the oil filler cap/dipstick and wipe the oil from the dipstick with a clean cloth.
- Hold the motorcycle in an upright position.
- Insert the dipstick without screwing it in, remove it and check the oil level.
- If the oil level is below or near the lower level mark on the dipstick, add the recommended oil to the upper level mark.

RECOMMENDED ENGINE OIL:
 Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil
 API service classification: SG or Higher
 JASO T 903 standard: MA
 Viscosity: SAE 10W-40

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

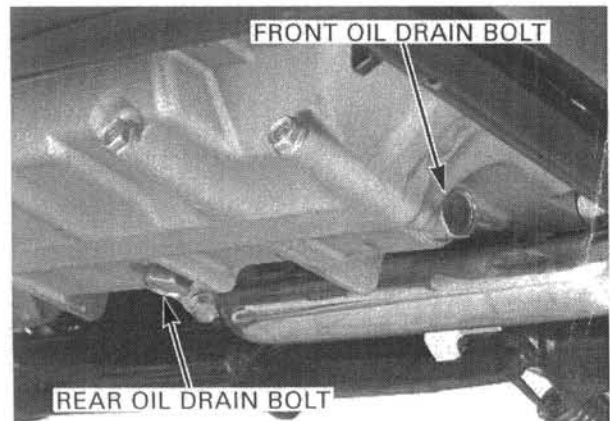
Reinstall the oil filler cap/dipstick.
 For engine oil change, see below



ENGINE OIL FILTER

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

Start the engine, warm it up and stop it.
 Remove oil filler cap/dipstick.
 Remove the front and rear oil drain bolts, and drain the oil.

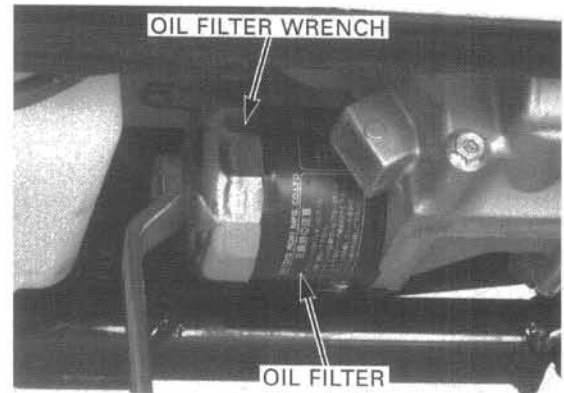


Remove the oil filter cartridge and let the remaining oil drain out.

TOOL:

Oil filter wrench

**07HAA-PJ70101 or
07HAA-PJ70100**

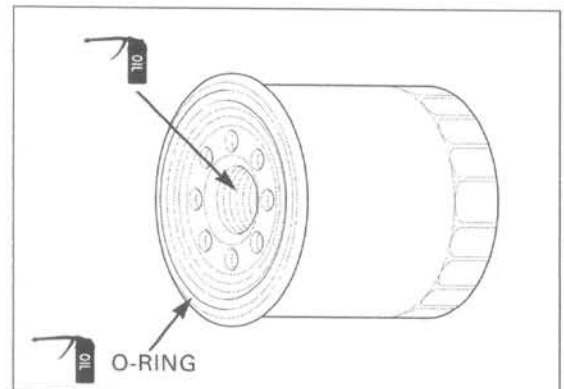


Apply oil to the rubber seal and threads of a new oil filter cartridge and install the filter cartridge.

Oil filter wrench

**07HAA-PJ70101 or
07HAA-PJ70100**

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Install the front and rear oil drain bolts with new sealing washers and tighten them.

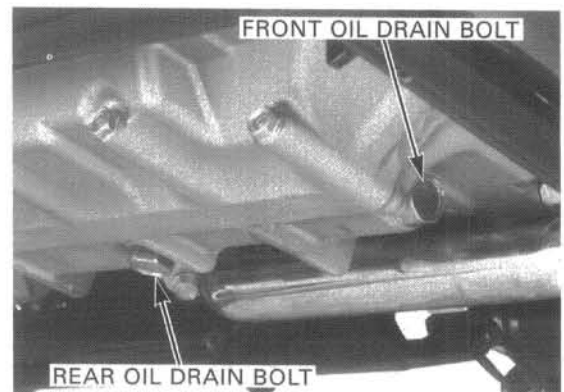
TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

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

OIL CAPACITY:

- 3.5 liters (3.7 US qt, 3.1 Imp qt) at draining**
- 3.7 liters (3.9 US qt, 3.3 Imp qt) at filter change**
- 4.3 liters (4.5 US qt, 3.8 Imp qt) at disassembly**

Check the engine oil level (page 3-10).
Install the oil filler cap/dipstick.
Make sure there are no oil leaks.



ENGINE IDLE SPEED

NOTE:

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

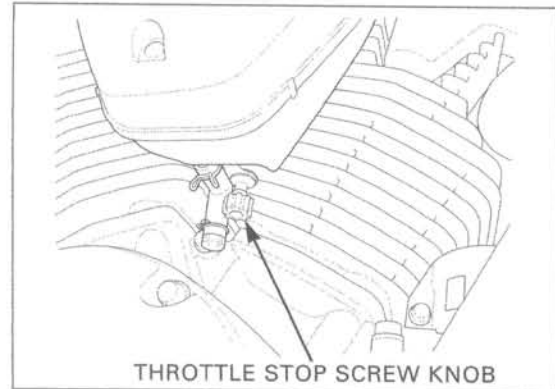
Warm up the engine, shift the transmission into neutral and support the motorcycle upright on a level surface.

MAINTENANCE

Check the idle speed.

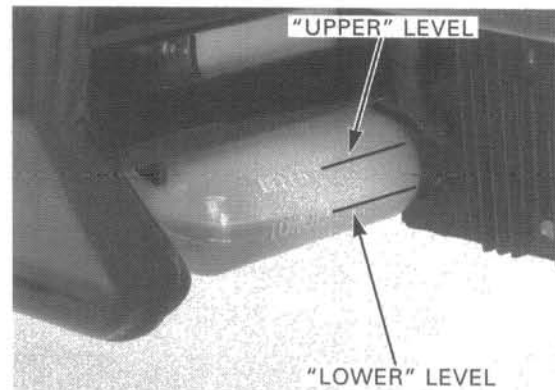
IDLE SPEED: 900 ± 100 rpm

If the adjustment is necessary, turn the throttle stop screw knob as required.



RADIATOR COOLANT

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



If the level is low, remove the left side cover (page 2-2) and the reserve tank cap, and fill the tank to the "UPPER" level line with a 1:1 mixture of distilled water and antifreeze (coolant preparation: page 6-4).

RECOMMENDED ANTIFREEZE:

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

NOTICE

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



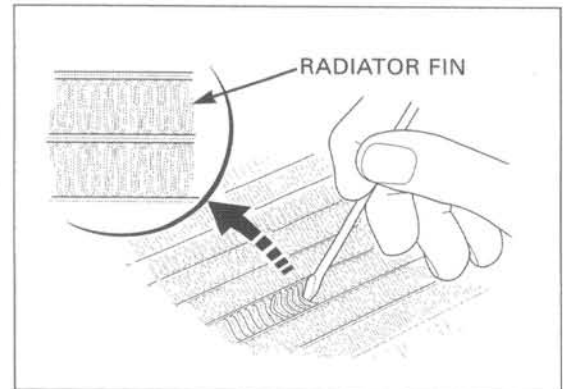
Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

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

COOLING SYSTEM

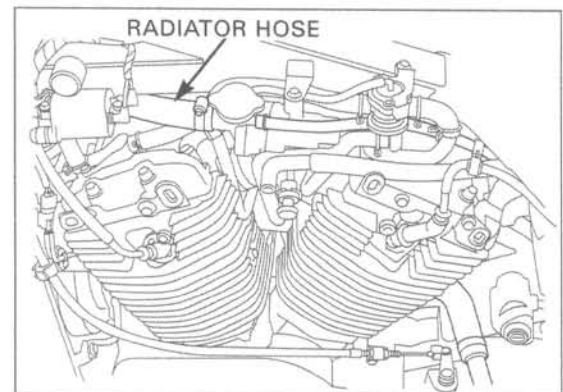
Check the radiator air passage for clogs or damage. Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water. Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

For radiator replacement, refer to page 6-8.



Remove the fuel tank (page 2-3).

Check for any coolant leakage from the water pump, radiator hoses and hose joints. Check the radiator hoses for cracks or deterioration and replace if necessary. Check that all hose clamps are tight.



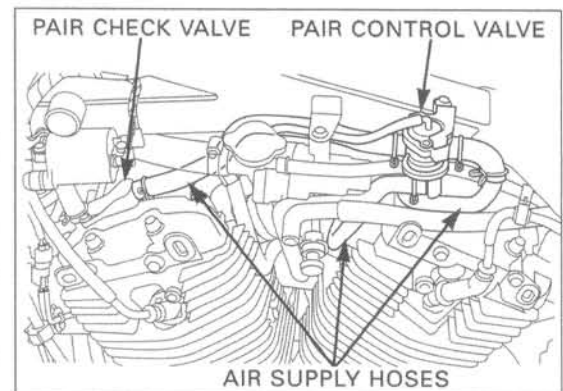
SECONDARY AIR SUPPLY SYSTEM

Remove the fuel tank (page 2-3).

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

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 5-21).

For PAIR control solenoid valve inspection, see page 5-20.



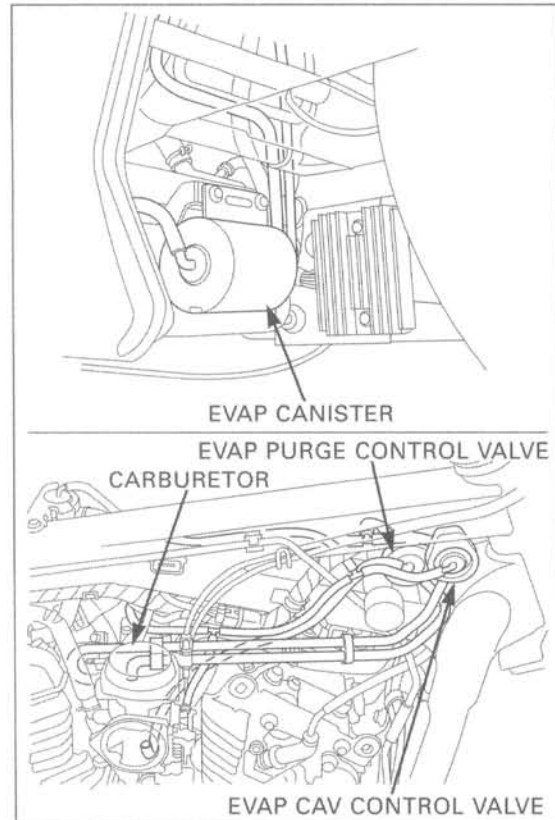
MAINTENANCE

EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

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

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

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-31) for hose connections and routing.



FINAL DRIVE OIL

OIL LEVEL CHECK

Place the motorcycle on its side stand on a level surface.

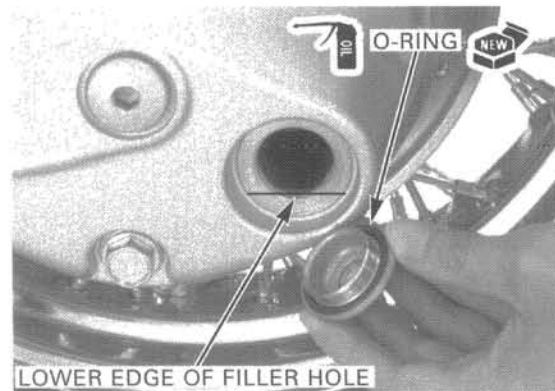
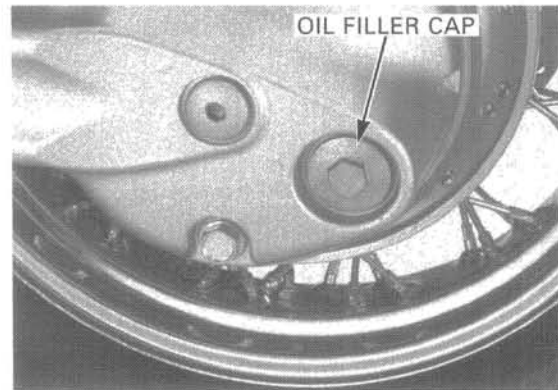
Remove the oil filler cap from the final gear case. Check that the oil level is up to the lower edge of the oil filler hole.

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 oil and install it onto the 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 from the final gear case, slowly turn the rear wheel and drain the oil.

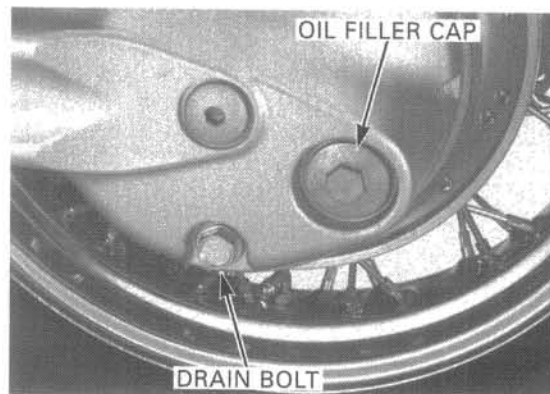
After the oil is completely drained, install the drain bolt with a new sealing washer and tighten it.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Fill the final gear case with the recommended oil to the correct level (page 3-14).

OIL CAPACITY:

120 cm³ (4.1 US oz, 4.2 Imp oz) after draining
150 cm³ (5.1 US oz, 5.3 Imp oz) after disassembly



BRAKE FLUID

NOTICE

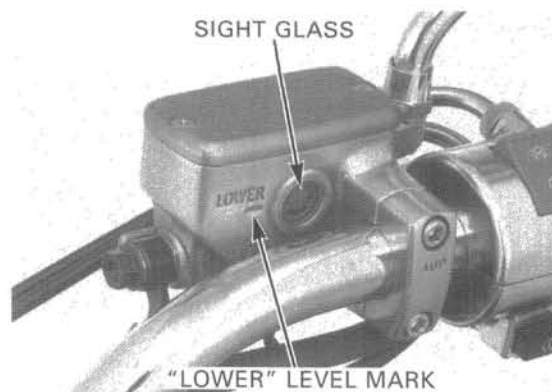
- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

NOTE:

- When the fluid level is low, check the brake pads for wear (page 3-16). A low fluid level may be due to wear of the brake pads. If the brake pads are worn and the caliper pistons are pushed out, this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks (page 3-16).

FRONT BRAKE

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



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

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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

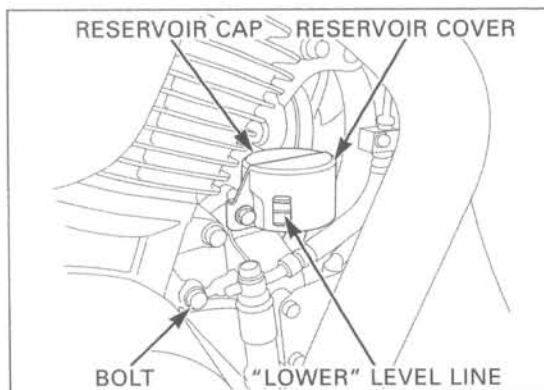


MAINTENANCE

REAR BRAKE

Support the motorcycle upright on a level surface.

Check the fluid level in the rear brake reservoir. If the level is near the "LOWER" level line, remove the bolt and reservoir cover.



Remove the reservoir cap, set plate and diaphragm, and fill the reservoir with DOT 4 brake fluid from a sealed container to the "UPPER" level line.

Install the diaphragm, set plate and reservoir cap. Install the reservoir and cover, and tighten the bolt.

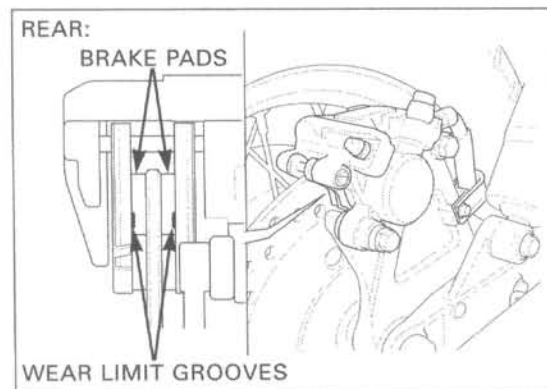
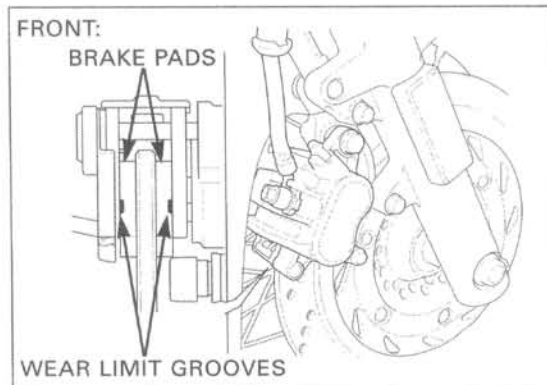
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



BRAKE PAD WEAR

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

Refer to page 15-5 for brake pad replacement.

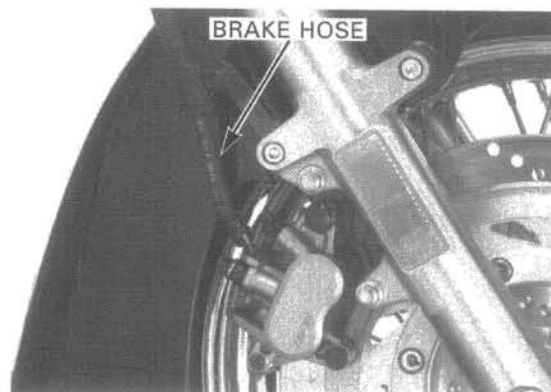


BRAKE SYSTEM

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

Refer to page 15-3 for air bleeding procedures.

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

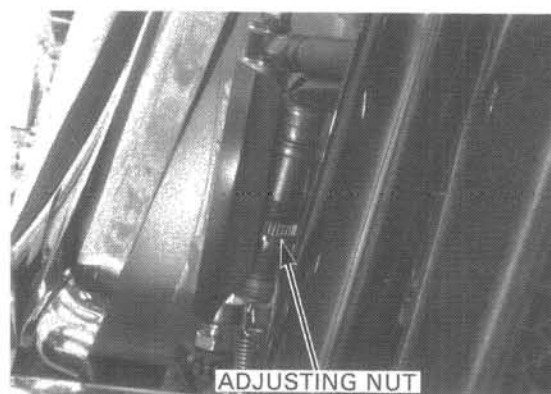


BRAKE LIGHT SWITCH

NOTE:

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

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



HEADLIGHT AIM

Place the motorcycle on a level surface.

Adjust the headlight beam as specified by local laws and regulations.

Adjust vertically by turning the vertical adjusting screw. Adjust horizontally by turning the horizontal adjusting screw.

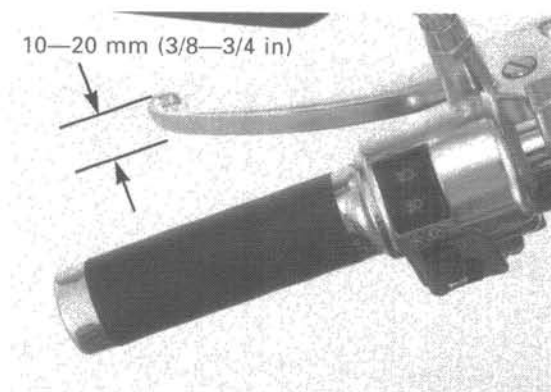


CLUTCH SYSTEM

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

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

FREE PLAY: 10—20 mm (3/8—3/4 in)



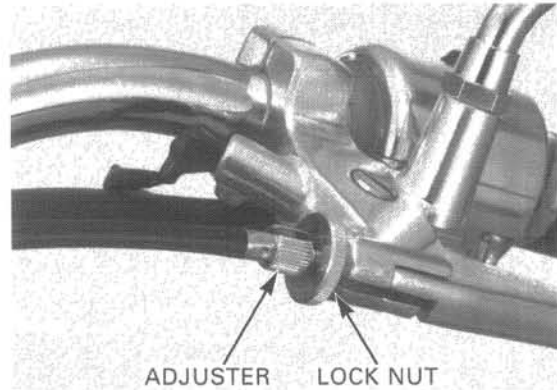
MAINTENANCE

Minor adjustments are made with the upper adjuster at the clutch lever.
Loosen the lock nut and turn the adjuster.
Tighten the lock nut securely.

NOTICE

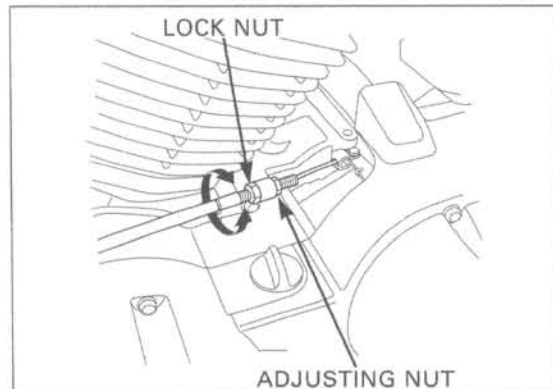
The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.

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 major adjustments as described below.



Major adjustments are made with the lower adjusting nut at the engine.
Loosen the lock nut and turn the adjusting nut.
After adjustment is complete, tighten the lock nut securely while holding the adjusting nut.

Check the clutch operation.
If the free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (section 10).



SIDE STAND

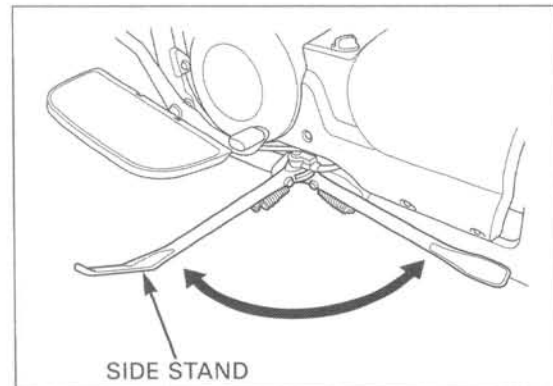
Support the motorcycle on a level surface.

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

Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

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



SUSPENSION

FRONT SUSPENSION INSPECTION

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

Check the action of the forks by applying the front brakes and compressing the front suspension several times.

Check the entire assembly for leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 13 for fork service.



REAR SUSPENSION INSPECTION

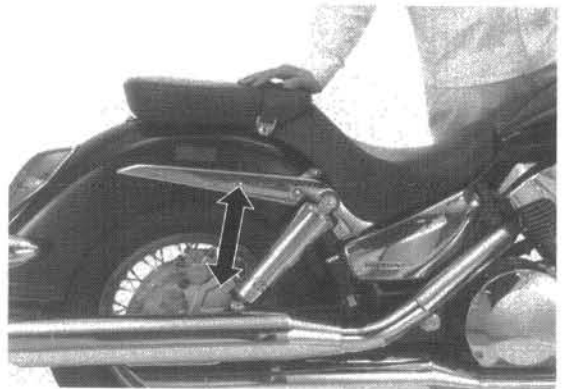
Check the action of the shock absorber by compressing it several times.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

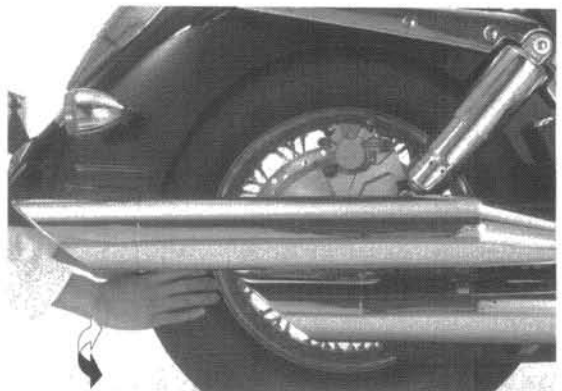
Refer to section 14 for shock absorber service.



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

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

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



NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-14).

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

MAINTENANCE

WHEELS/TIRES

Check the tire pressure with a tire pressure gauge when the tires are cold.

RECOMMENDED TIRE PRESSURE:

Up to 90 kg (200 lbs) load:

Front: 225 kPa (2.25 kgf/cm², 32 psi)

Rear: 225 kPa (2.25 kgf/cm², 32 psi)

Up to maximum weight capacity:

Front: 225 kPa (2.25 kgf/cm², 32 psi)

Rear: 250 kPa (2.50 kgf/cm², 36 psi)

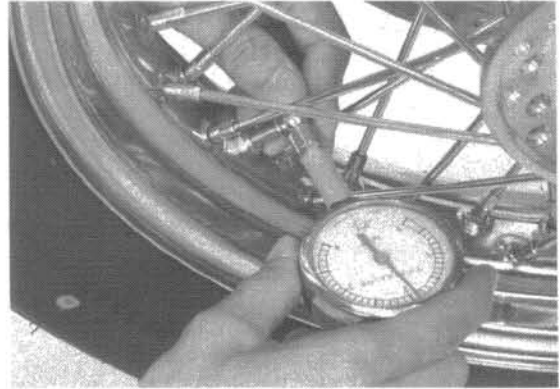
Check the tires for cuts, embedded nails, or other damage.

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

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

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

Rear: 2.0 mm (0.08 in)



STEERING HEAD BEARINGS

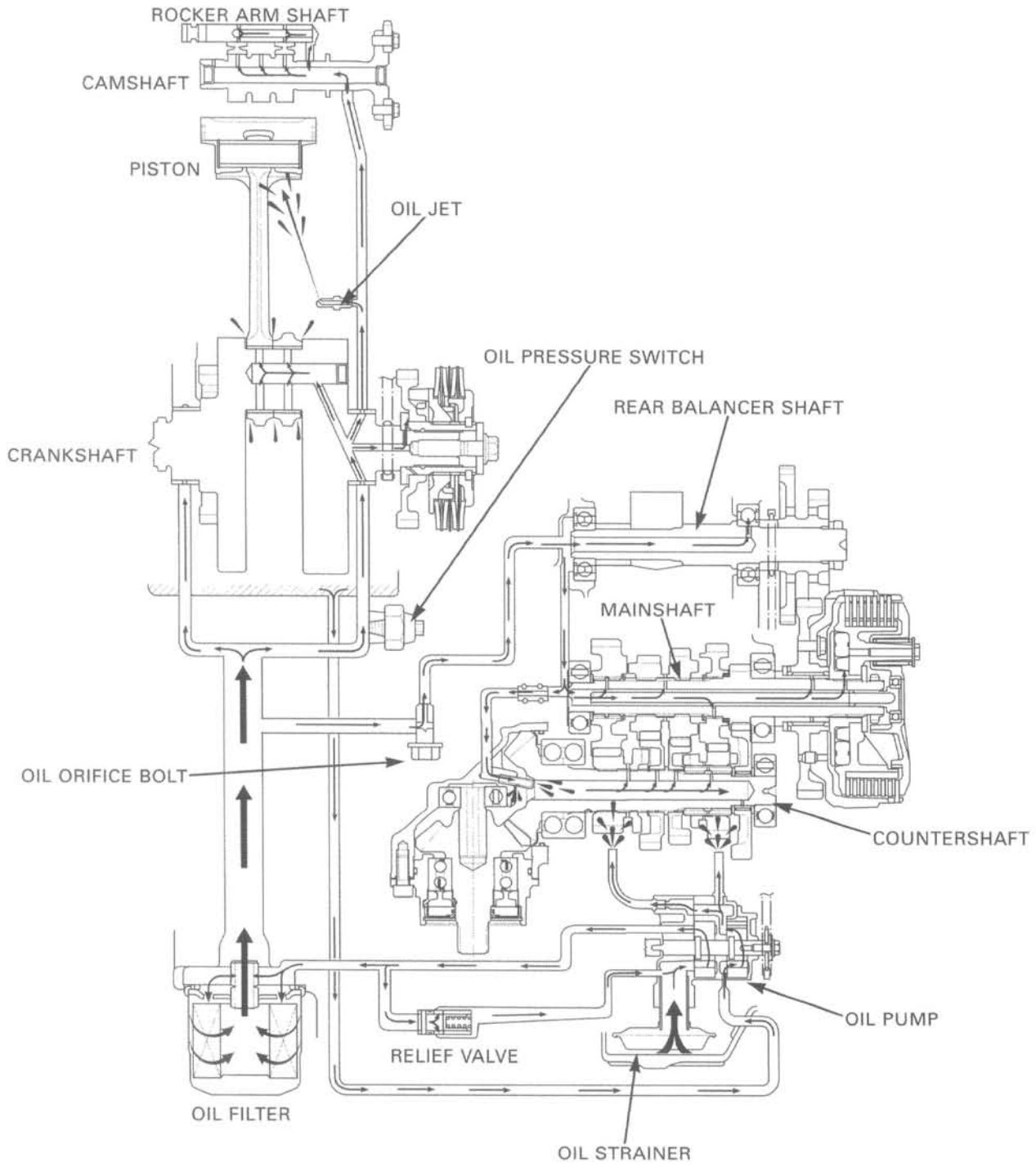
Raise the front wheel off the ground and support the motorcycle securely.

Check that the handlebar moves freely from side to side. Make sure the control cables do not interfere with the handlebar rotation.

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



LUBRICATION SYSTEM



4. LUBRICATION SYSTEM

SERVICE INFORMATION	4-1	OIL PRESSURE CHECK	4-3
TROUBLESHOOTING	4-2	OIL PUMP/PRESSURE RELIEF VALVE	4-4

SERVICE INFORMATION

GENERAL

⚠ CAUTION

4

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.

- The oil pump has twin pump rotors; main and scavenging. The main rotors pick up oil from the transmission division of the crankcase and delivers it under pressure to the bearing and other important parts of the engine. The scavenge rotors draw oil from the crankshaft division of the crankcase and sends it to the transmission gears to lubricate and cool them.
- The crankcase must be separated to service the oil pump (page 11-3).
- For engine oil level check, see page 3-10.
- For engine oil and filter change, see page 3-10.
- For final drive oil check and change, see page 3-14.
- For oil pressure switch inspection, see page 19-11.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.5 liters (3.7 US qt, 3.1 Imp qt)	—
	After draining/filter change	3.7 liters (3.9 US qt, 3.3 Imp qt)	—
	After disassembly	4.3 liters (4.5 US qt, 3.8 Imp qt)	—
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	—
Oil pressure (at oil pressure switch)		530 kPa (5.4 kgf/cm ² , 77 psi) at 5,000 rpm/80°C (176°F)	—
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15—0.21 (0.006—0.008)	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 terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil strainer bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Oil pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Oil orifice bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)	Apply oil to the threads and seating surface.

TOOLS

Oil pressure gauge	07506-300001	or equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07510-4220100	

LUBRICATION SYSTEM

TROUBLESHOOTING

Oil level too low

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

Low oil pressure

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

No oil pressure

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

High oil pressure

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

Oil contamination

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

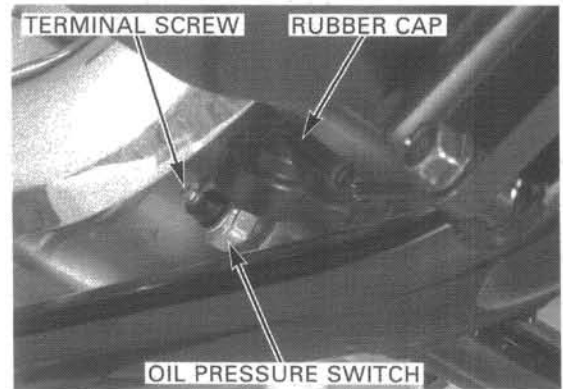
Oil emulsification

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

OIL PRESSURE CHECK

If the engine is cold, the pressure reading will be abnormally high.
Warm up the engine to normal operating temperature before checking the oil pressure.

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



Remove the oil pressure switch and connect an oil pressure gauge attachment and gauge to the pressure switch hole.

TOOLS:

Oil pressure gauge attachment 07510-4220100
Oil pressure gauge 07506-3000001
(or equivalent commercially available in U.S.A., MT37A and adaptor AT77AH)

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

Start the engine and check the oil pressure at 5,000 rpm and 80°C (176°F).

OIL PRESSURE: 530 kPa (5.4 kgf/cm², 77 psi) at 5,000 rpm/80°C (176°F)

Stop the engine.

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

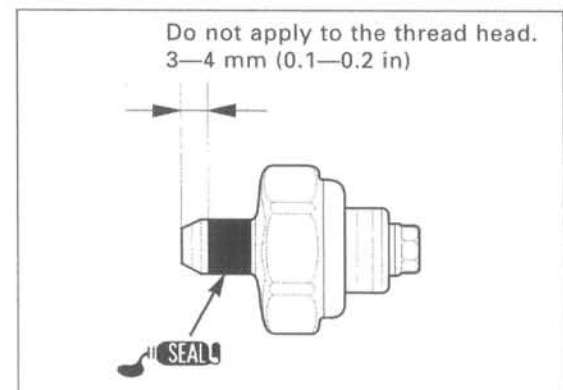
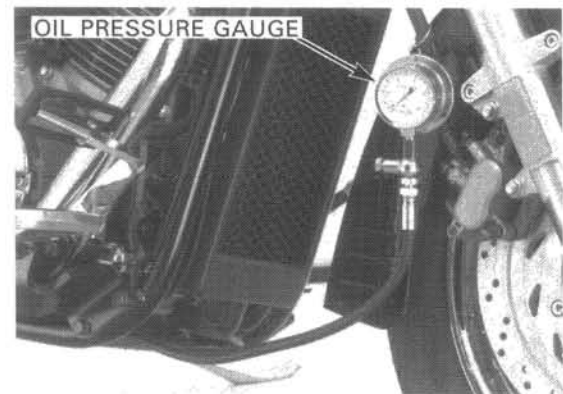
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

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

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the rubber cap.

Start the engine.
Check that the oil pressure indicator turns off after 1 or 2 seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 19-11).



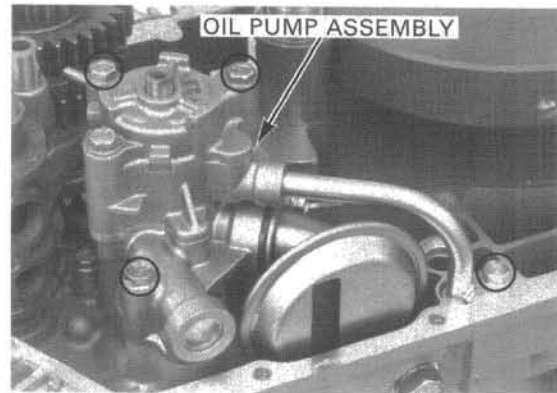
LUBRICATION SYSTEM

OIL PUMP/PRESSURE RELIEF VALVE

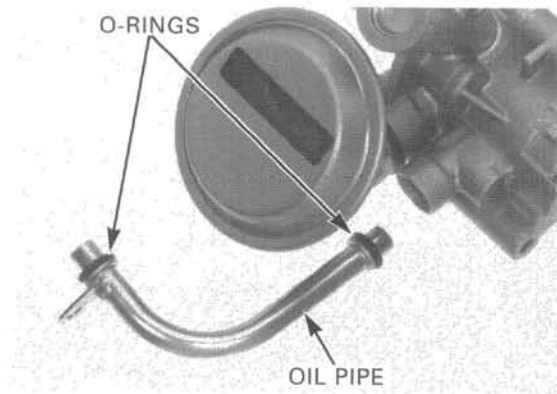
REMOVAL

Separate the crankcase (page 11-3).

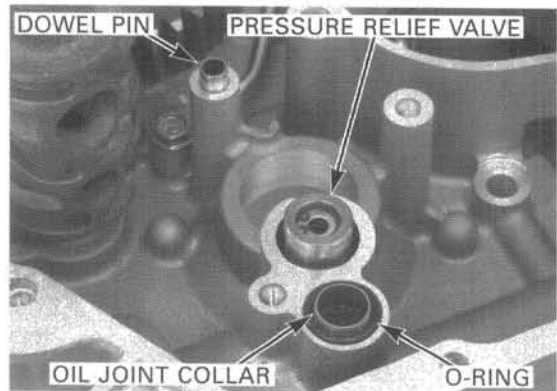
Remove the four mounting bolts and the oil pipe/oil pump assembly from the left crankcase.



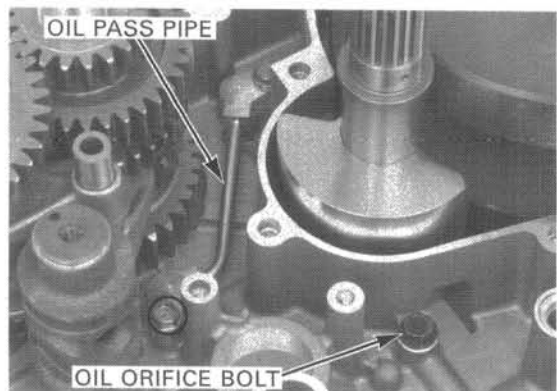
Remove the oil pipe from the oil pump.
Remove the O-rings from the oil pipe.



Remove the dowel pin, oil joint collar, O-ring and pressure relief valve.

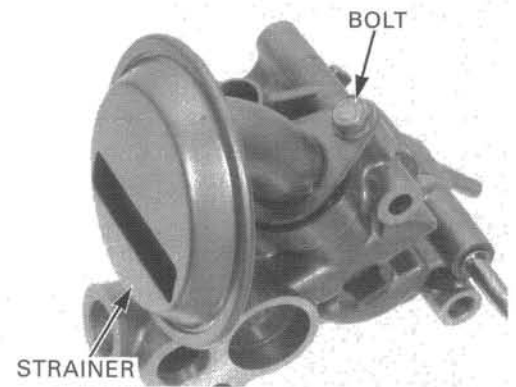


Remove the bolt, oil pass pipe and O-rings.
Remove the oil orifice bolt.

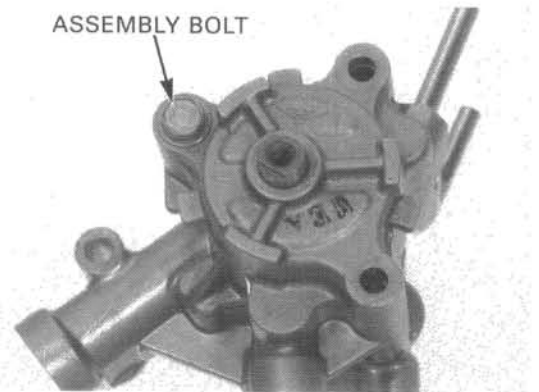


OIL PUMP DISASSEMBLY

Remove the bolt and oil strainer.

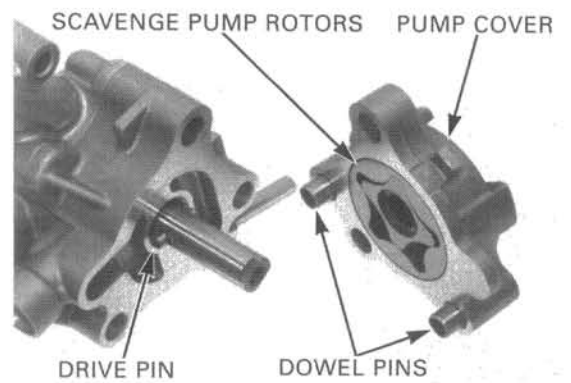


Remove the oil pump assembly bolt.

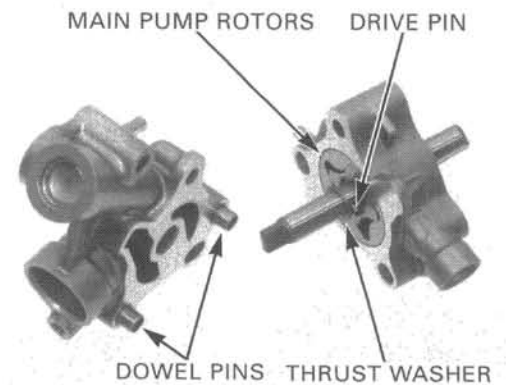


Remove the following:

- oil pump cover
- dowel pins
- drive pin
- scavenge pump inner and outer rotors



- oil pump base
- dowel pins
- thrust washer
- pump shaft
- drive pin
- main pump inner and outer rotors



LUBRICATION SYSTEM

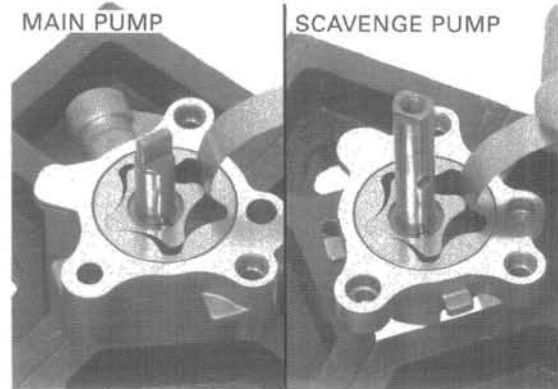
INSPECTION

OIL PUMP

Temporarily assemble the inner rotor, outer rotor, drive pin and pump shaft into the pump body (main pump) or pump cover (scavenge pump).

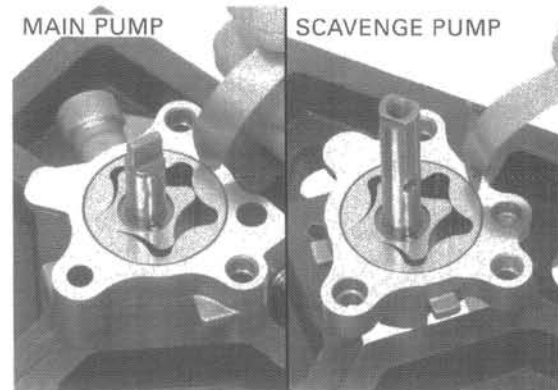
Measure the tip clearance for the feed and scavenge pumps.

SERVICE LIMIT: 0.20 mm (0.008 in)



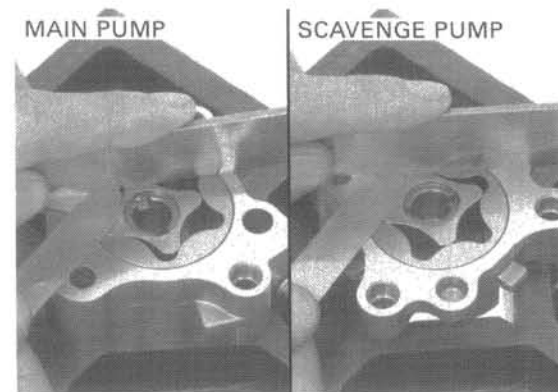
Measure the pump body clearance for the feed and scavenge pumps.

SERVICE LIMIT: 0.35 mm (0.014 in)



Measure the pump side clearance for the feed and scavenge pumps.

SERVICE LIMIT: 0.10 mm (0.004 in)



PRESSURE RELIEF VALVE

Check the operation of the pressure relief valve by pushing on the piston.

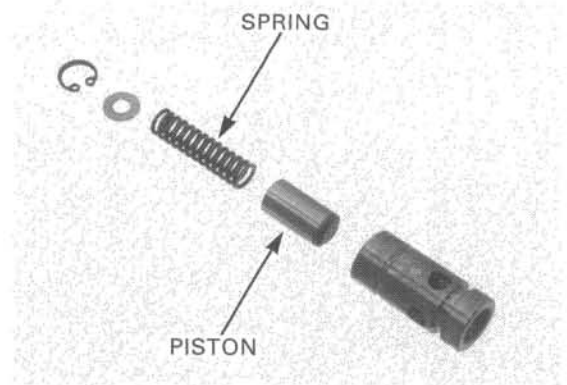
Disassemble the relief valve by removing the snap ring.

SNAP RING



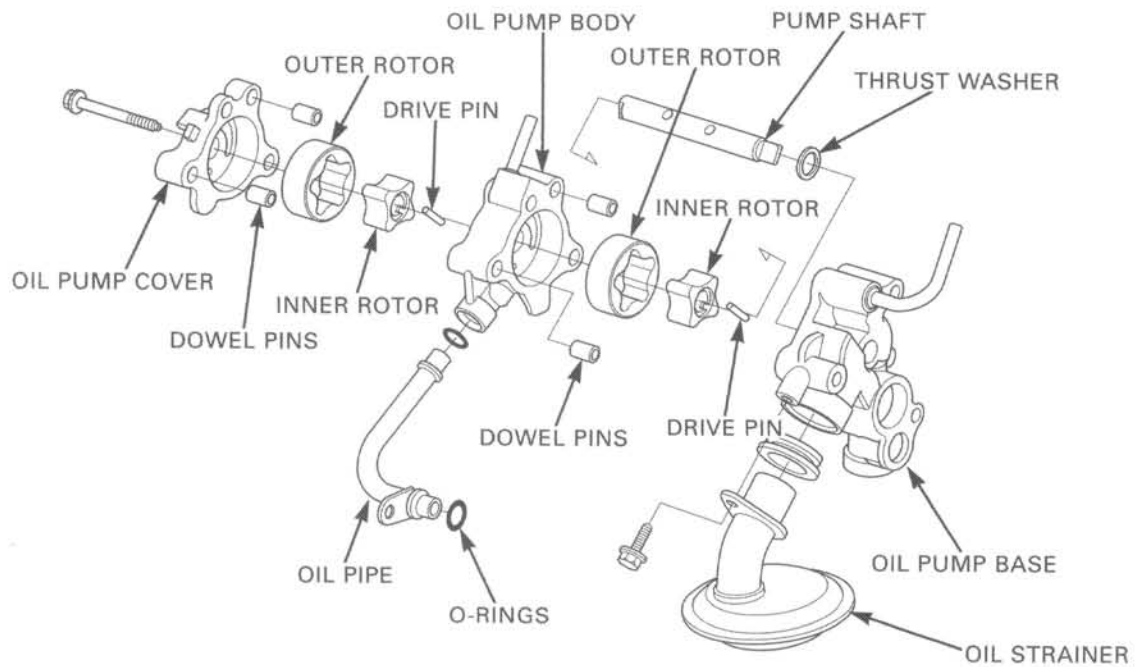
Inspect the piston for wear, unsmooth movement or damage.
Inspect the spring for fatigue or damage.

Assemble the relief valve in the reverse order of disassembly.



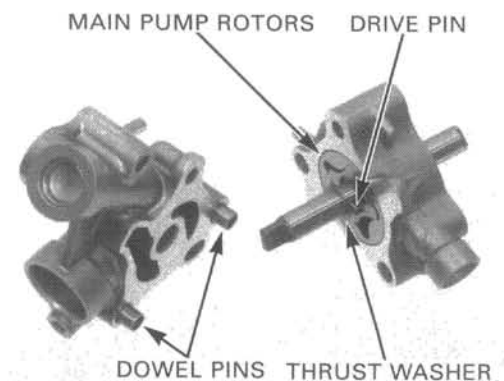
OIL PUMP ASSEMBLY

Dip all parts in clean engine oil.



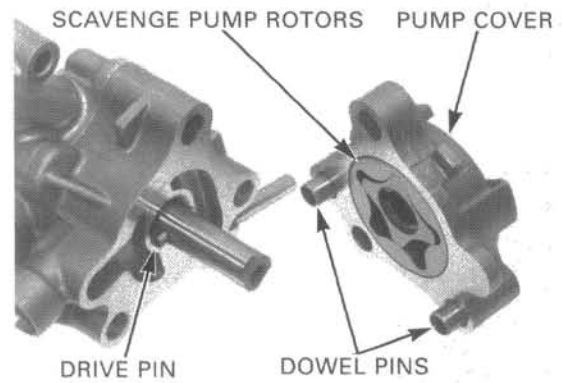
Install the following:

- outer rotor
- inner rotor with the grooves facing the pump base
- drive pin into the pump shaft
- pump shaft, aligning the drive pin with the grooves in the inner rotor
- thrust washer
- dowel pins
- pump base onto the pump body



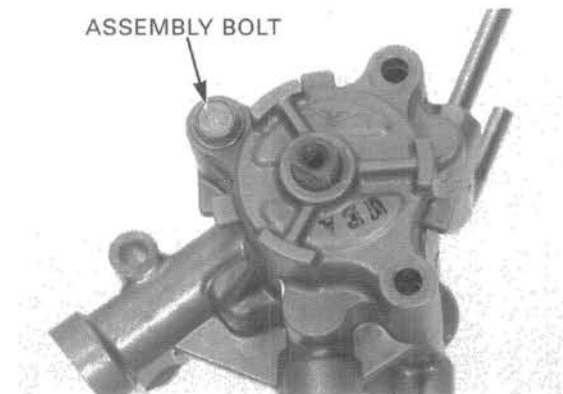
LUBRICATION SYSTEM

- outer rotor
- inner rotor with the grooves facing the pump body
- dowel pins
- drive pin into the pump shaft
- pump cover onto the pump body, aligning the drive pin with the grooves in the inner rotor



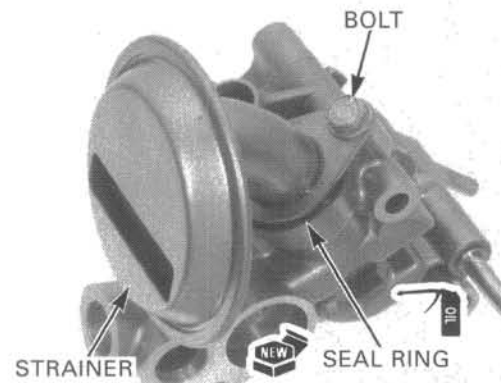
Install and tighten the oil pump assembly bolt.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



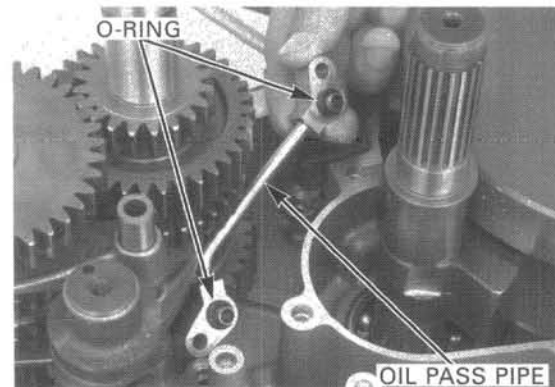
Coat a new seal ring with oil and install it onto the oil strainer.
Install the oil strainer onto the oil pump and tighten the strainer bolt.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



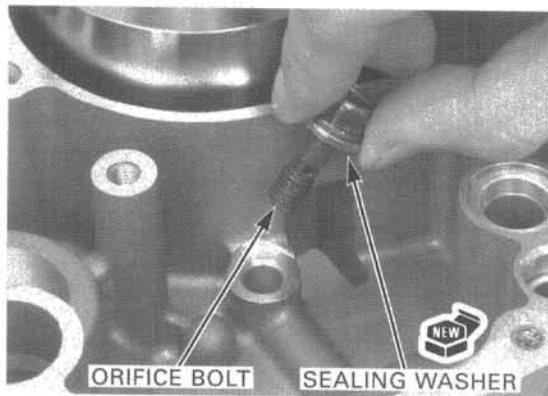
INSTALLATION

Coat new O-rings with oil and install them onto the oil pass pipe.
Install the oil pass pipe onto the left crankcase and tighten the bolt securely.



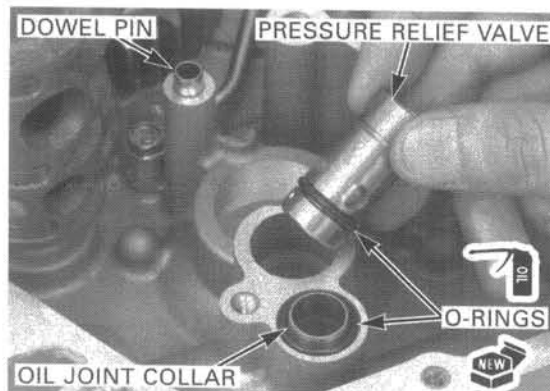
Clean the oil orifice bolt with compressed air.
Install the oil orifice bolt with a new sealing washer and tighten it.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

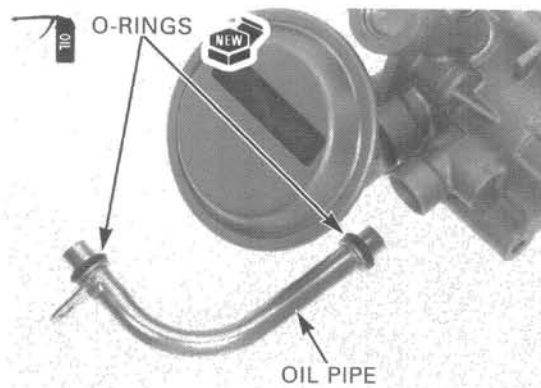


Install the dowel pin and oil joint collar.
Coat a new O-ring with oil and install it onto the oil joint collar.

Coat a new O-ring with oil and install it onto the pressure relief valve.
Install the pressure relief valve into the crankcase as shown.

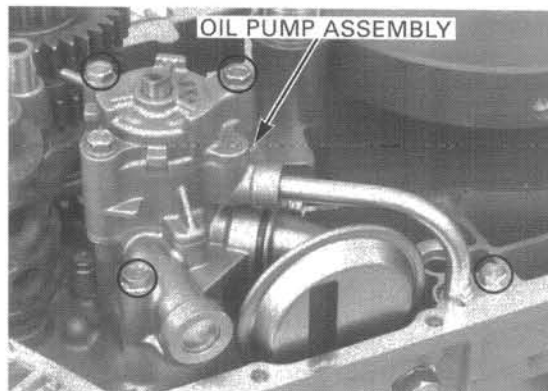


Coat new O-rings with oil and install them onto the oil pipe.
Install the oil pipe into the oil pump.

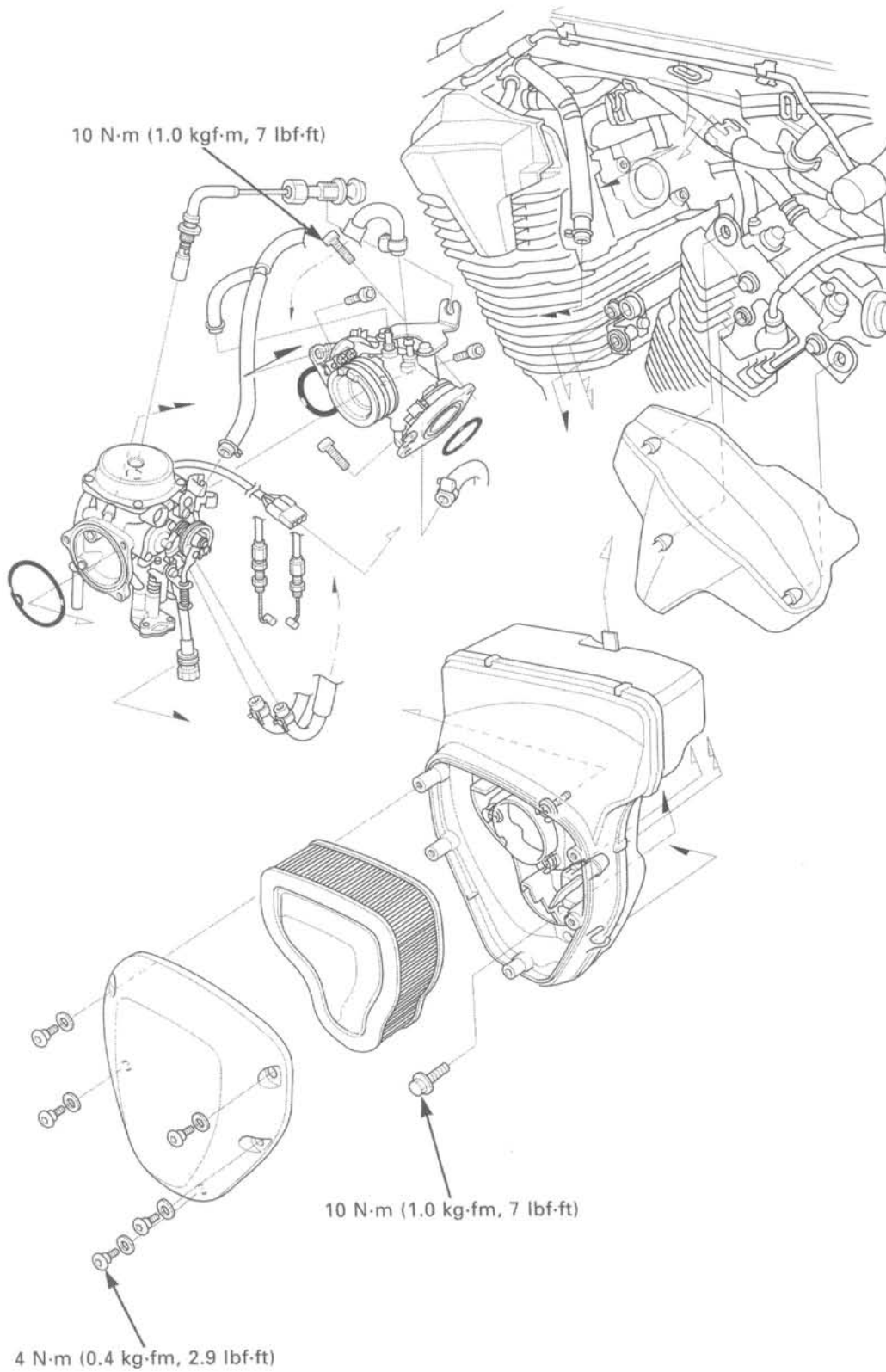


Install the oil pipe/oil pump assembly onto the left crankcase and tighten the four mounting bolts securely.

Assemble the crankcase (page 11-20).



FUEL SYSTEM



5. FUEL SYSTEM

SERVICE INFORMATION	5-1	INTAKE MANIFOLD	5-16
TROUBLESHOOTING	5-2	PILOT SCREW ADJUSTMENT	5-18
AIR CLEANER HOUSING	5-3	HIGH ALTITUDE ADJUSTMENT	5-19
CARBURETOR REMOVAL	5-4	SECONDARY AIR SUPPLY SYSTEM	5-20
CARBURETOR DISASSEMBLY/ INSPECTION	5-5	EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	5-22
CARBURETOR ASSEMBLY	5-10		

SERVICE INFORMATION

GENERAL

- 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.
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.
- Before disassembling the carburetor, place an approved fuel container under the float chamber, loosen the drain screw and drain the carburetor.
- After removing the intake manifold, cover the intake ports of the cylinder heads with shop towels to prevent any foreign material from dropping into the engine.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- All hoses used in the evaporative emission control system (California type only) and secondary air supply system are numbered for identification. When connecting any of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label for its proper routing.
- Do not loosen the throttle position sensor attaching (torx) screws.
- If the vehicle is to be stored for more than 1 month, drain the float chamber. Fuel left in the float chamber may cause clogged jets, resulting in hard starting or poor driveability.
- Refer to section 17 for throttle position sensor inspection and replacement.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		VE7BA
Main jet		#195
Slow jet		#55
Pilot screw	Initial/final opening	See page 5-18
	High altitude adjustment	See page 5-19
Float level		18.5 mm (0.73 in)
Idle speed		900 ± 100 rpm
Throttle grip free play		2—6 mm (1/12—1/4)

TORQUE VALUES

Air cleaner case mounting screw	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Air cleaner case mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Fuel tank mounting bolt	19 N·m (1.9 kgf·m, 14 lbf·ft)
Fuel valve nut	34 N·m (3.5 kgf·m, 25 lbf·ft)
Reed valve cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Intake manifold vacuum joint	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Intake manifold base socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

FUEL SYSTEM

TOOLS

Carburetor float level gauge
Pilot screw wrench

07401-0010000
07KMA-MS60101

TROUBLESHOOTING

Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
 - Clogged fuel strainer
 - Clogged fuel filter
 - Clogged fuel line
 - Clogged fuel tank breather hose
 - Faulty fuel pump
 - Faulty fuel pump circuit (section 19)
- Too much fuel getting to the engine
 - Clogged air cleaner
 - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Clogged starting enrichment valve circuit
- Improper starting enrichment valve operation
- Improper throttle operation
- No spark at plug (faulty ignition system – section 17)

Lean mixture

- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent hose
- Restricted fuel tank breather hose
- Intake air leak
- Faulty vacuum piston
- Faulty evaporative emission (EVAP) control system (California type only)
 - Faulty EVAP carburetor air vent (CAV) control valve
 - Clogged hose of the EVAP CAV system

Rich mixture

- Starting enrichment valve open (ON)
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Worn jet needle or needle jet
- Faulty vacuum piston
- Faulty EVAP control system (California type only)
 - Faulty EVAP purge control valve
 - Clogged hose of the EVAP purge system

Engine stalls, hard to start, rough idling

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Misadjusted float level
- Restricted fuel tank breather hose
- Clogged air cleaner
- Clogged slow circuit
- Clogged starting enrichment valve circuit
- Faulty EVAP control system (California type only)
 - Faulty EVAP CAV control valve
 - Faulty EVAP purge control valve
 - Clogged hose of the EVAP control system
- Faulty ignition system (section 17)

Afterburn when engine braking is used

- Lean mixture in slow circuit
- Faulty air cut-off valve
- Faulty pulse secondary air injection (PAIR) system
 - Faulty PAIR control valve
 - Faulty PAIR check valve
 - Clogged hose of the PAIR system
- Faulty ignition system (section 17)

Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (section 17)

Poor performance (driveability) and poor fuel economy

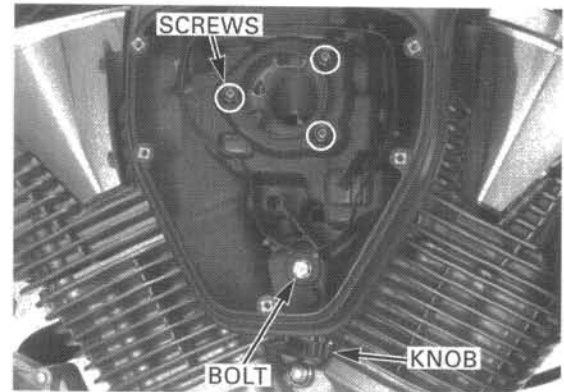
- Clogged fuel system
- Faulty EVAP control system (California type only)
 - Faulty EVAP CAV control valve
 - Clogged hose of the EVAP CAV system
- Faulty ignition system (section 17)

AIR CLEANER HOUSING

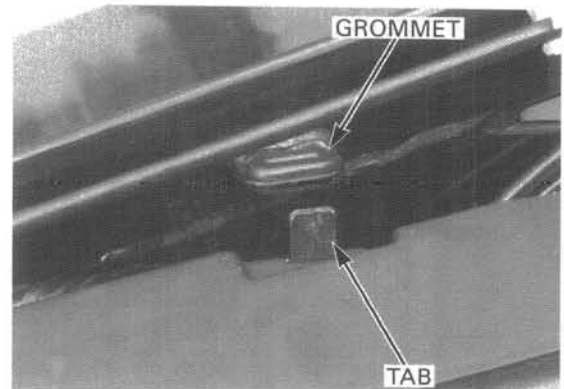
REMOVAL

Remove the fuel tank (page 2-3).
Remove the air cleaner element (page 3-5).

Remove the air cleaner housing mounting bolt and screws.
Remove the throttle stop screw knob from the air cleaner housing.



Release the tab of the air cleaner housing from the grommet in the frame.



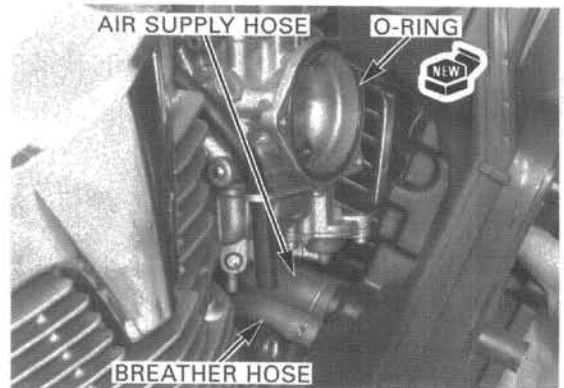
Disconnect the crankcase breather hose and air supply hose, and remove the air cleaner housing.

Remove the O-ring from the carburetor.

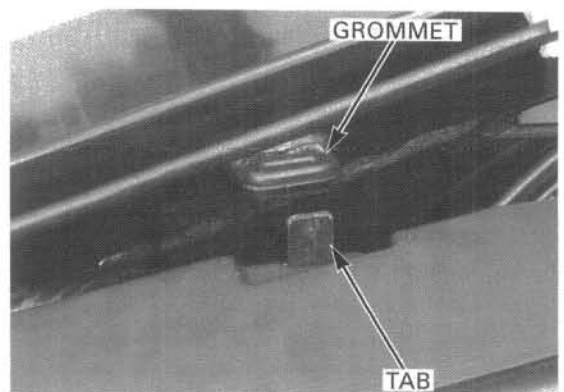
INSTALLATION

Install a new O-ring into the carburetor groove.

Connect the crankcase breather hose and air supply hose to the air cleaner housing.



Hook the tab of the air cleaner housing into the grommet in the frame and install the housing onto the carburetor.



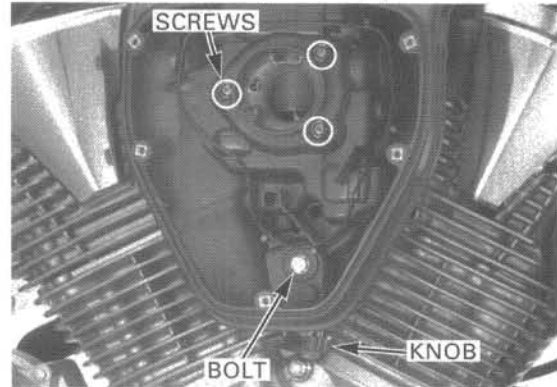
FUEL SYSTEM

Install the throttle stop screw knob onto the air cleaner housing.

Install the air cleaner housing mounting screws and bolt, and tighten them.

TORQUE: Bolt: 10 N·m (1.0 kgf·m, 7 lbf·ft)
Screw: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)

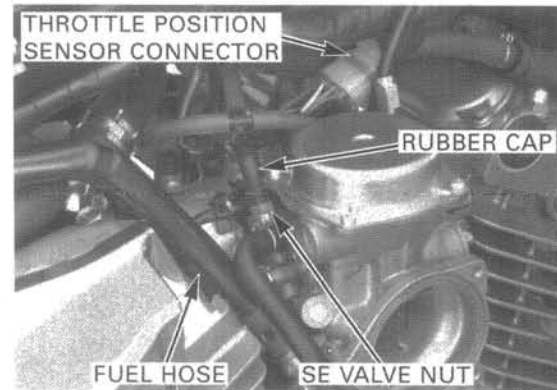
Install the air cleaner element (page 3-5).
Install the fuel tank (page 2-3).



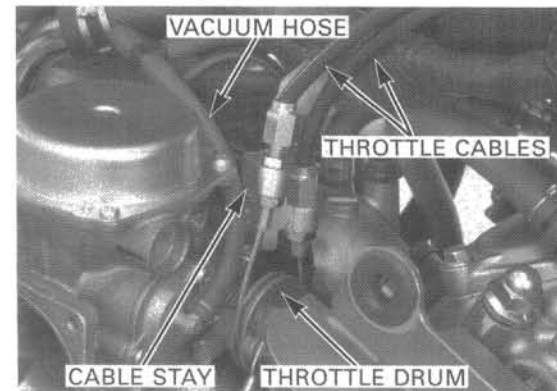
CARBURETOR REMOVAL

Drain the coolant (page 5-5).
Remove the right front cylinder head cover shroud (page 2-2).
Remove the air cleaner housing (page 5-3).

Disconnect the fuel hose from the carburetor.
Slide the rubber cap off the starting enrichment (SE) valve nut.
Loosen the SE valve nut and remove the SE valve from the carburetor.
Disconnect the throttle position sensor connector.



Remove the throttle cables from the cable stay and disconnect them from the throttle drum.
Disconnect the vacuum hose from the carburetor.

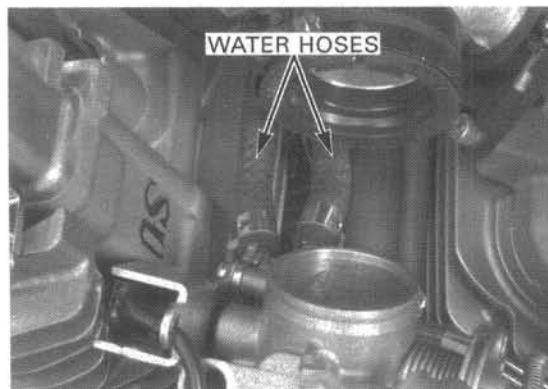


Loosen the carburetor insulator band screw and remove the carburetor from the insulator.



Disconnect the water hoses from the carburetor, and remove the carburetor.

Seal the intake manifold port with tape or a clean cloth to keep dirt and debris from entering the engine.

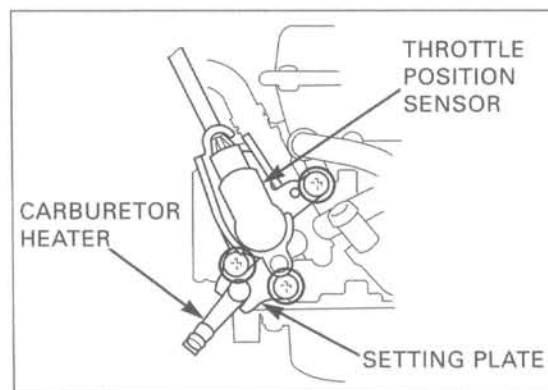


CARBURETOR DISASSEMBLY/ INSPECTION

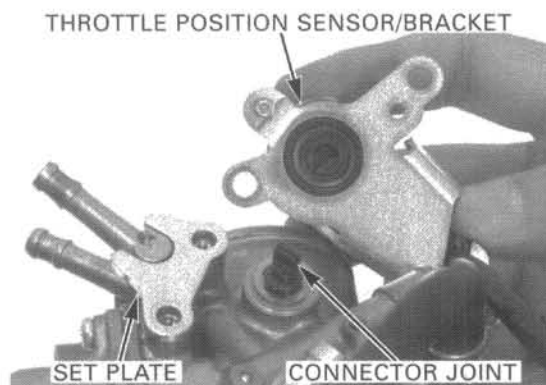
THROTTLE POSITION SENSOR/ CARBURETOR HEATER

Do not loosen the torx screw attaching the throttle position sensor to its bracket.

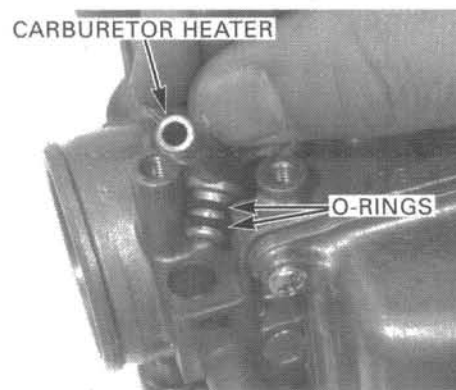
Remove the three screws attaching the throttle position sensor and carburetor heater.



Remove the throttle position sensor with its bracket.
Remove the connector joint from the throttle.
Remove the carburetor heater set plate.



Remove the carburetor heater from the carburetor body.
Remove the O-rings from the carburetor heater.

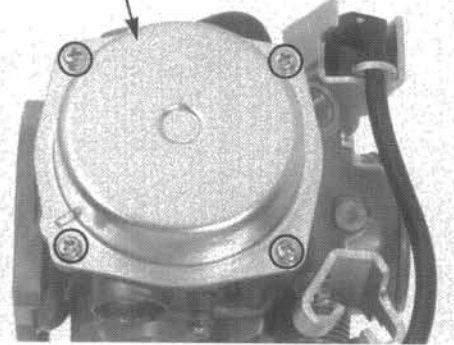


FUEL SYSTEM

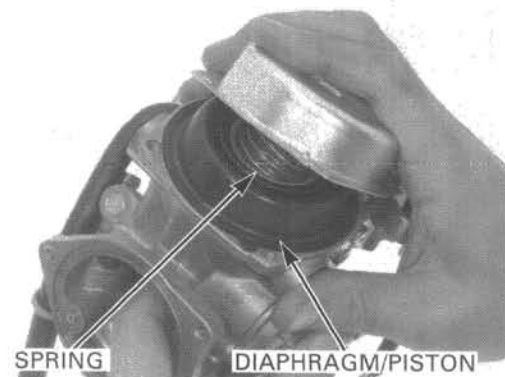
VACUUM CHAMBER

Remove the four screws while holding the vacuum chamber cover.

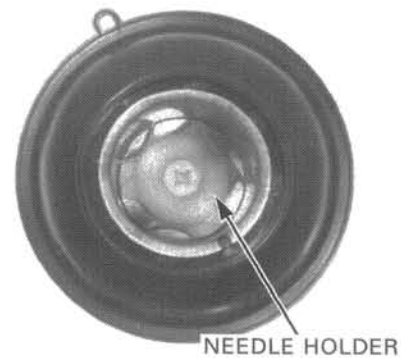
VACUUM CHAMBER COVER



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

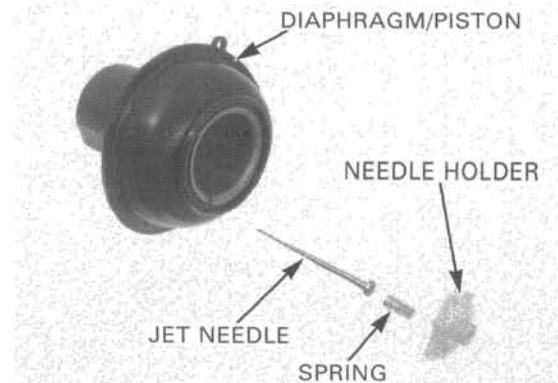


Turn the needle holder counterclockwise by using a screwdriver while pressing it in and release the holder flange from the vacuum piston. Remove the needle holder, spring and jet needle.



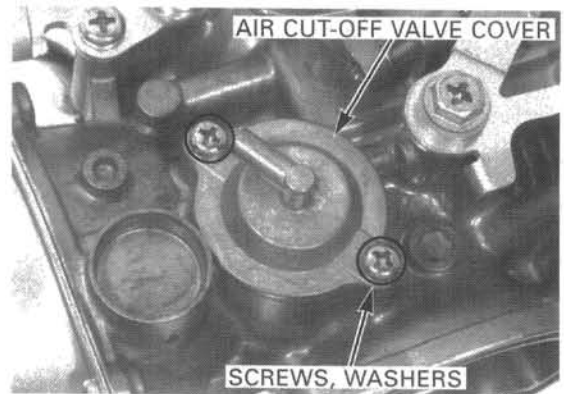
Check the jet needle for stepped wear.
Check the vacuum piston for wear or damage.
Check the diaphragm for pin holes, deterioration or other damage.
Check the vacuum piston for smooth operation up and down in the carburetor body.

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



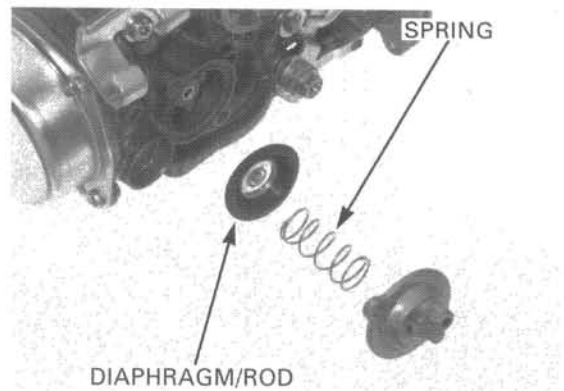
AIR CUT-OFF VALVE

Remove the two screws and washers while holding the air cut-off valve cover.



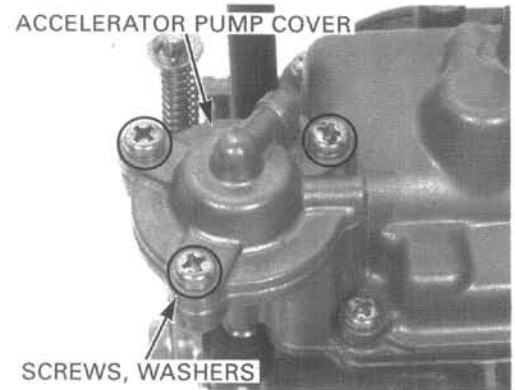
Remove the air cut-off valve cover, spring and diaphragm from the carburetor body.

Check the diaphragm for pin holes, deterioration or other damage.
Check the diaphragm rod for wear or damage at the tip.
Check the orifice in the valve cover and carburetor body for clogs or restrictions.



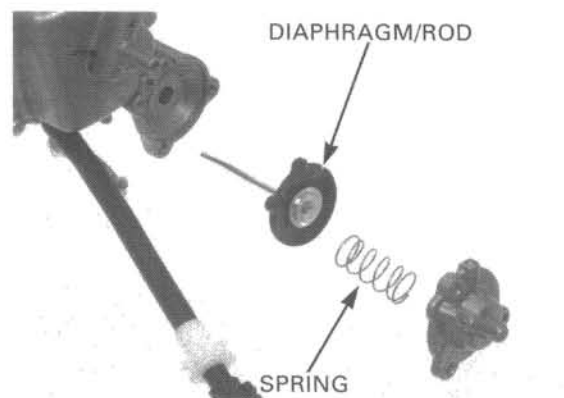
ACCELERATOR PUMP

Remove the three screws and washers while holding the accelerator pump cover.



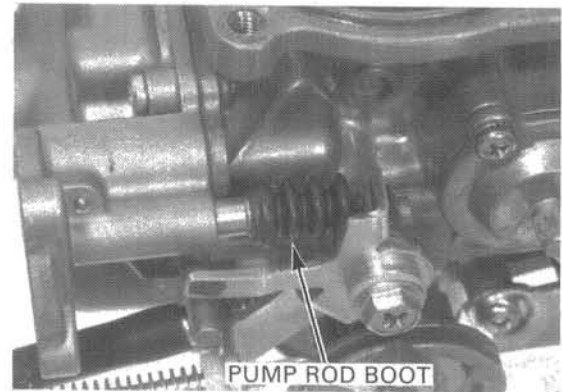
Remove the accelerator pump cover, spring and diaphragm/rod from the float chamber.

Check the diaphragm for pin holes, deterioration or other damage.



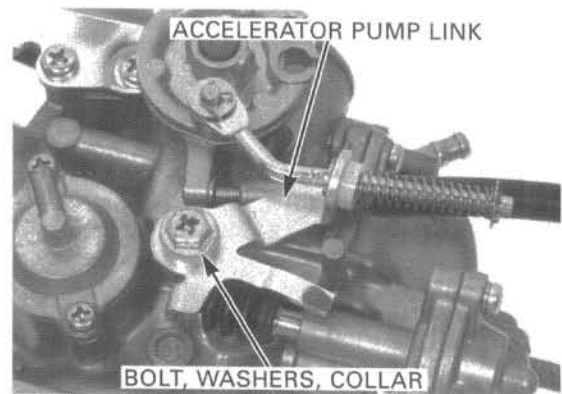
FUEL SYSTEM

Check the pump rod boot for deterioration or damage.

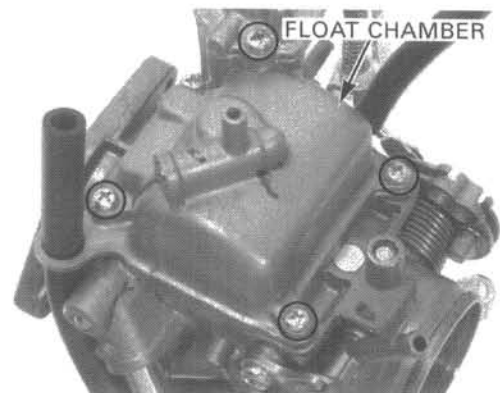


FLOAT CHAMBER

Remove the bolt, plastic washer, accelerator pump link, collar, plain washer and spring washer from the float chamber.

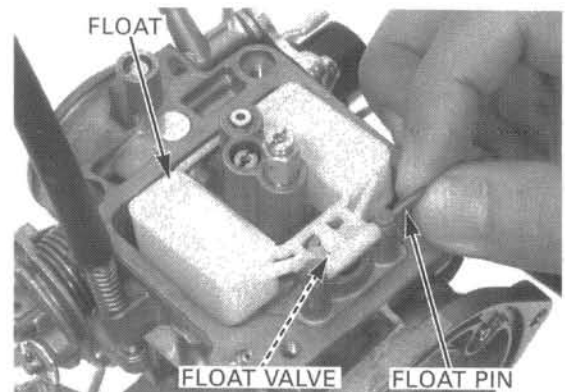


Remove the four screws and the float chamber.

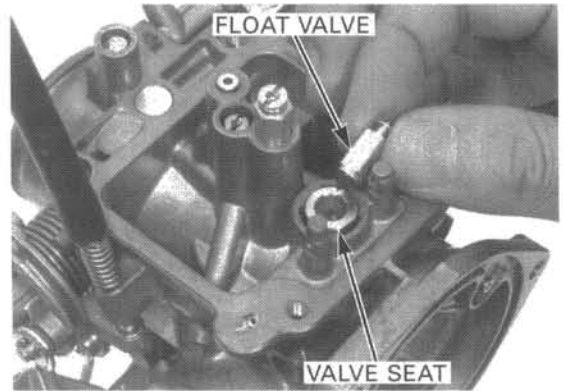


Remove float pin, float and float valve.

Check the float for damage or fuel in the float.



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



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

Remove the following:

- main jet
- needle jet holder
- needle jet
- slow jet

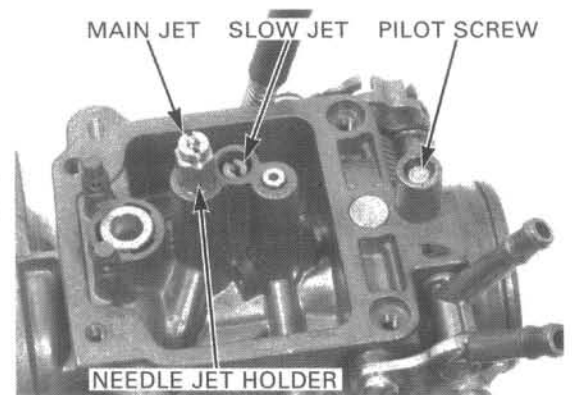
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

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

TOOL:

Pilot screw wrench

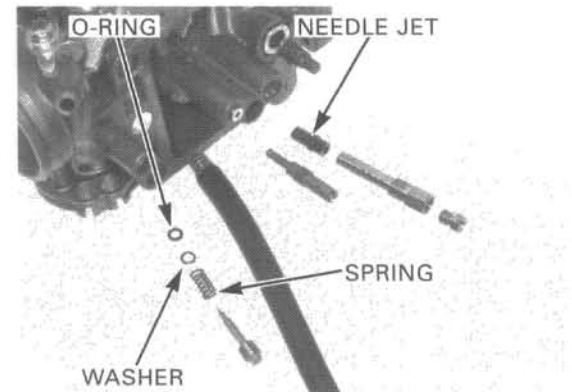
07KMA-MS60101



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

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

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



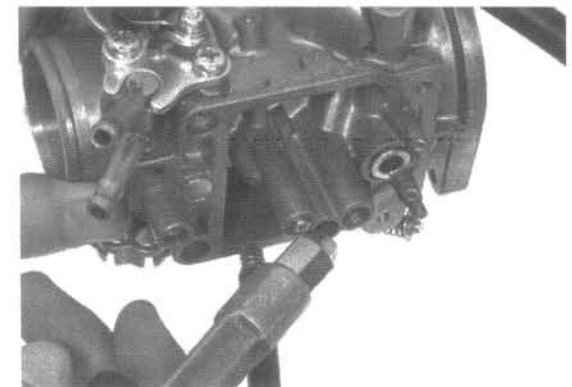
CARBURETOR CLEANING

Remove the following:

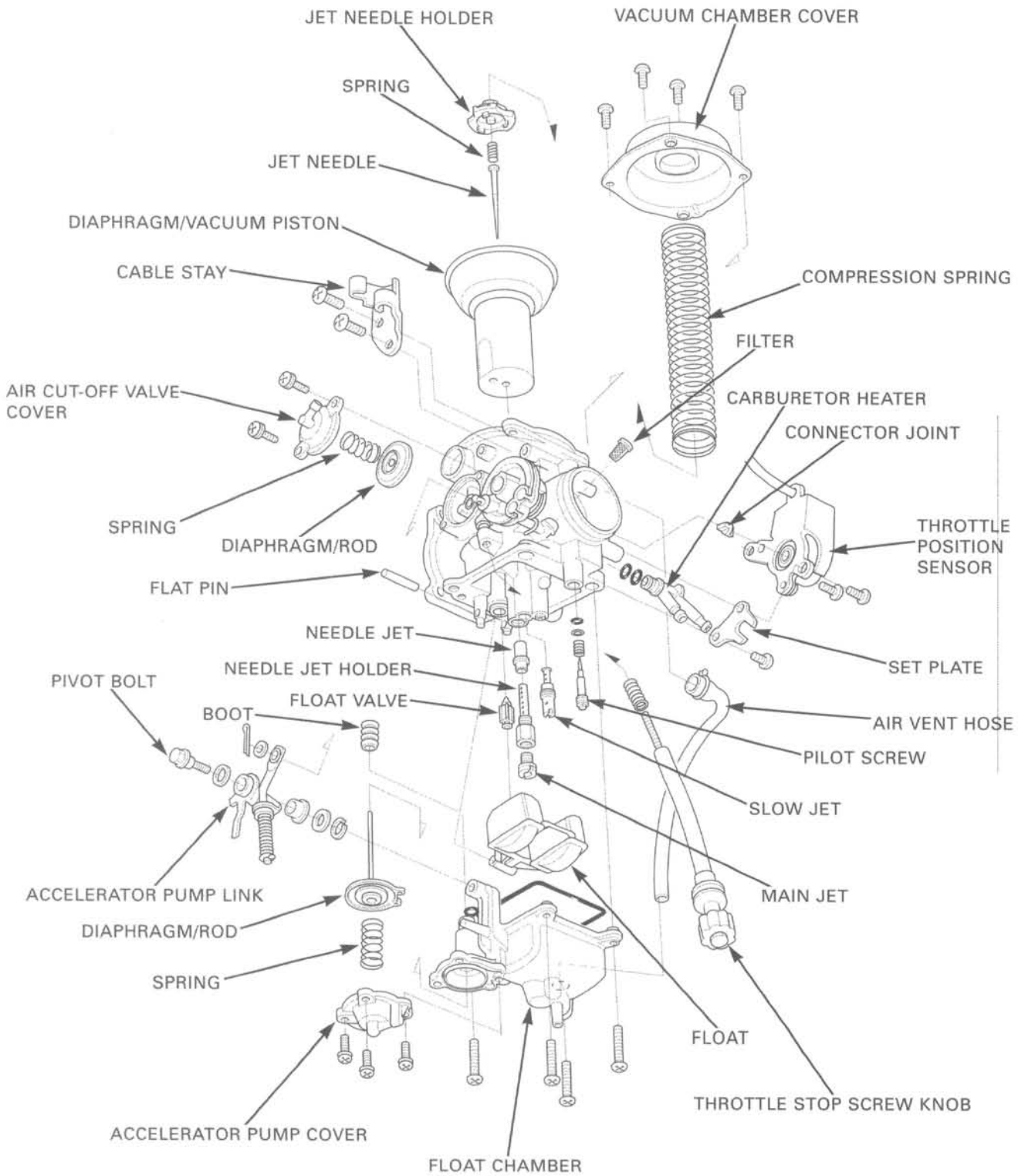
- diaphragm/vacuum piston
- air cut-off valve
- accelerator pump
- all jets and pilot screw

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

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



CARBURETOR ASSEMBLY



FLOAT AND JETS

Install the pilot screw with the spring, washer and a new O-ring, and return it to its original position as noted during removal.

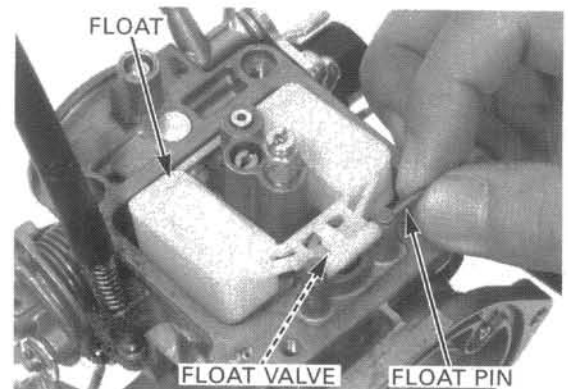
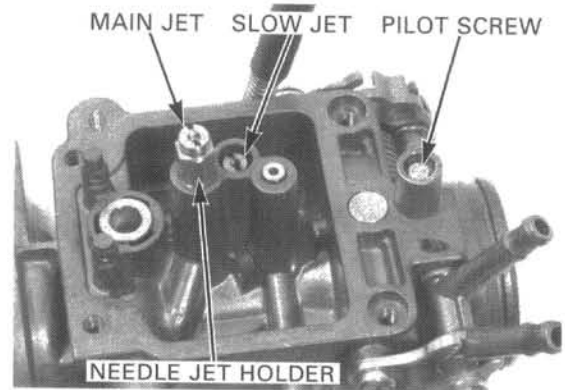
TOOL:
Pilot screw wrench 07KMA-MS60101

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

Install the following:

- needle jet
- needle jet holder
- main jet
- slow jet

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



FLOAT LEVEL INSPECTION

NOTE:
 • Check the float level after checking the float valve, valve seat and float.

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

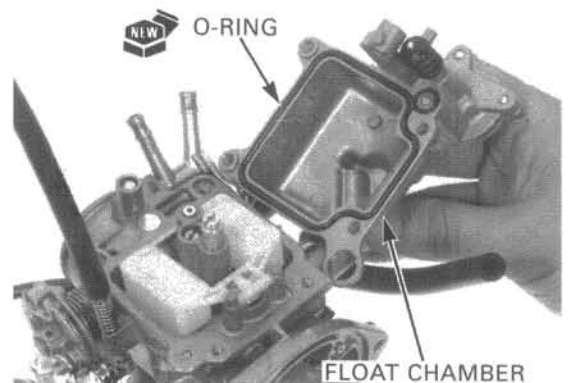
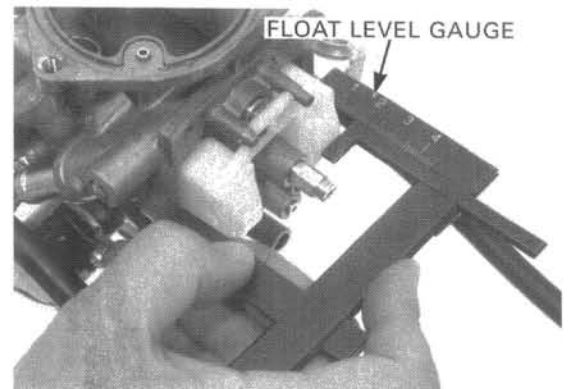
With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

TOOL:
Carburetor float level gauge 07401-0010000

FLOAT LEVEL: 18.5 mm (0.73 in)

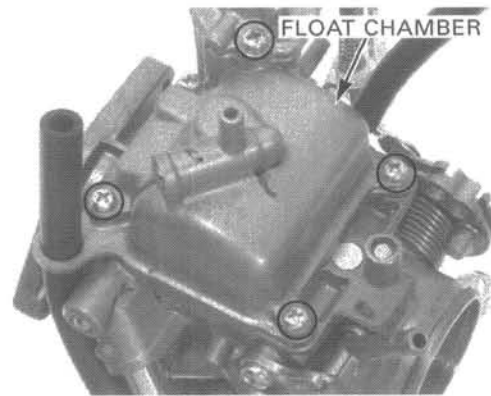
The float cannot be adjusted.
 Replace the float assembly if the float level is out of specification.

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

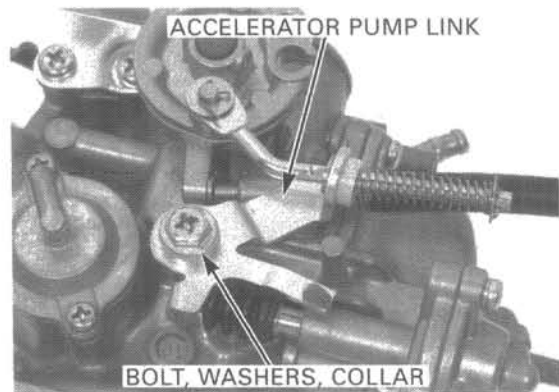


FUEL SYSTEM

Install the float chamber and tighten the four screws securely.

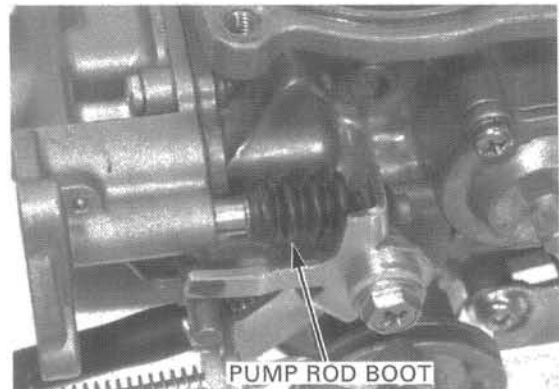


Install the spring washer, plain washer, collar, accelerator pump link, plastic washer and bolt onto the float chamber, and tighten the bolt securely.

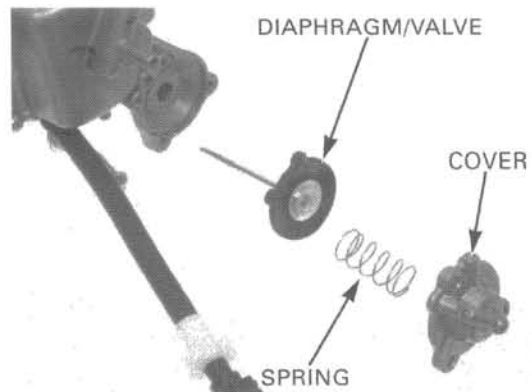


ACCELERATOR PUMP

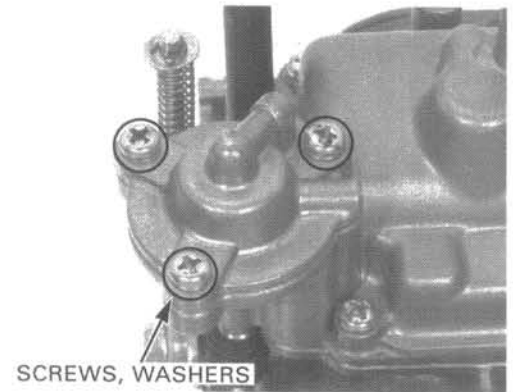
Make sure that the pump rod boot is installed properly as shown.



Install the accelerator pump diaphragm/rod, spring and cover onto the float chamber.

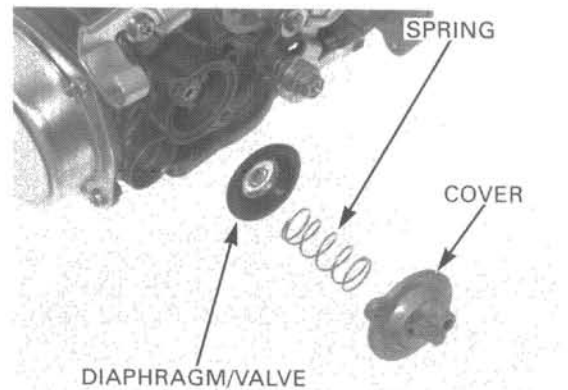


Install the three screws and washers while holding the pump cover, and tighten the screws.



AIR CUT-OFF VALVE

Install the air cut-off valve diaphragm, spring and cover onto the carburetor body.



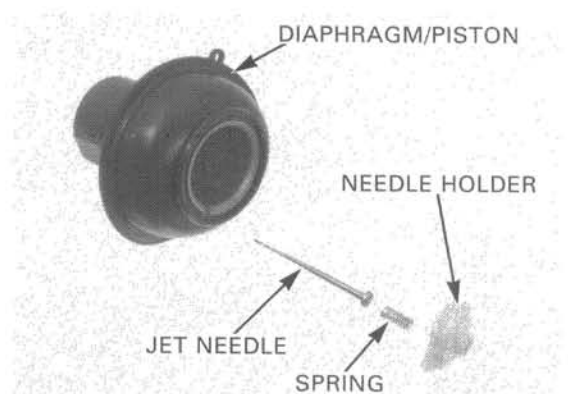
Install the two screws and washers while holding the air cut-off valve cover, and tighten the screws.



VACUUM CHAMBER

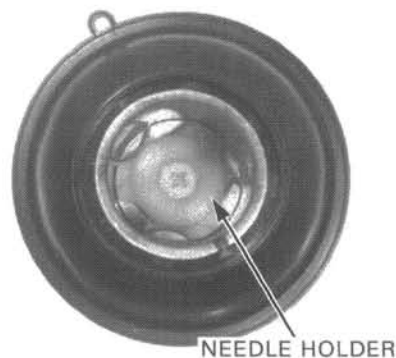
Insert the jet needle into the vacuum piston.

Install the spring into the needle holder and set the holder into the vacuum piston.



FUEL SYSTEM

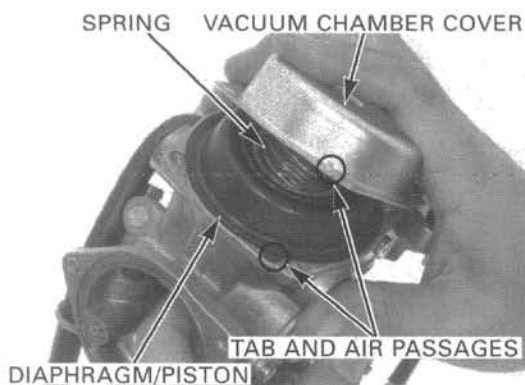
Turn the needle holder 90 degrees clockwise while pressing it until it locks.



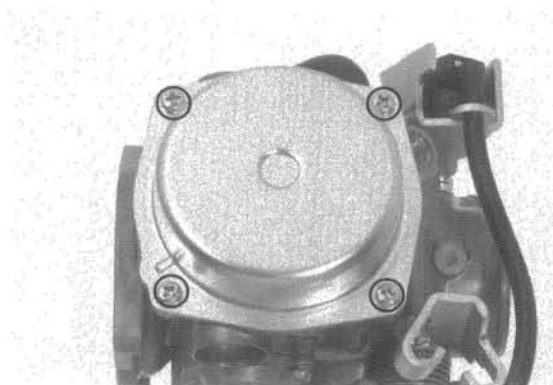
Install the diaphragm/vacuum piston into the carburetor body by aligning the tab of the diaphragm with the air passage, then insert the jet needle into the needle jet.

Lift the bottom of the piston with your finger to set the diaphragm rib into the groove in the carburetor body.

Install the compression spring and vacuum chamber cover while lifting the piston in place. Align the tab of the cover with the air passage and secure the cover with at least two screws before releasing the vacuum piston.



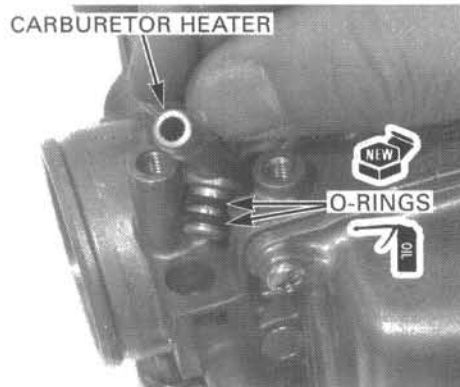
Install and tighten the four screws securely.



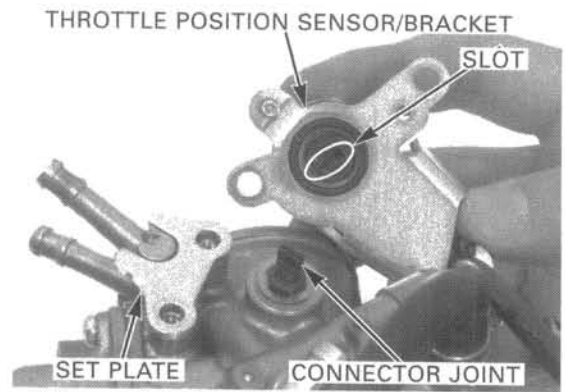
THROTTLE POSITION SENSOR/ CARBURETOR HEATER

Coat new O-rings with oil and install them onto the carburetor heater.

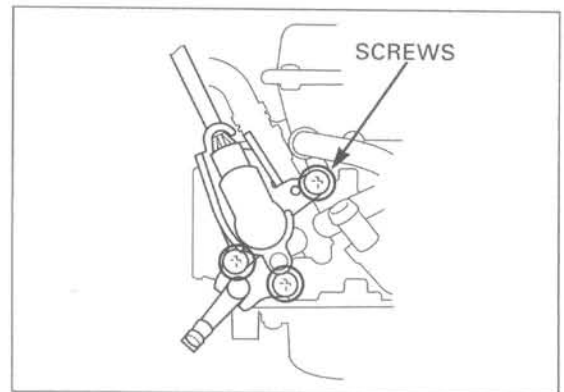
Install the carburetor heater into the carburetor body.



Install the connector joint into the throttle shaft.
Install the set plate onto the carburetor heater.
Install the throttle position sensor by aligning the slot in the sensor with the connector joint.

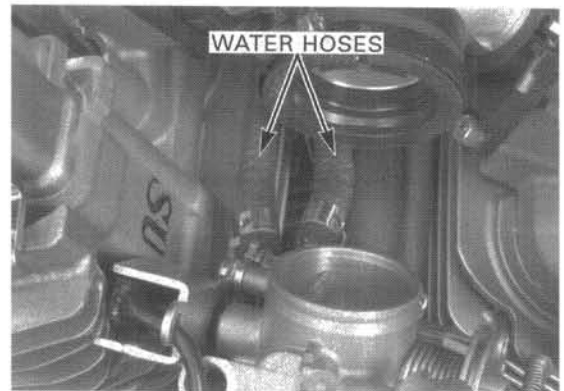


Install and tighten the three screws.



CARBURETOR INSTALLATION

Connect the water hoses to the carburetor heater.

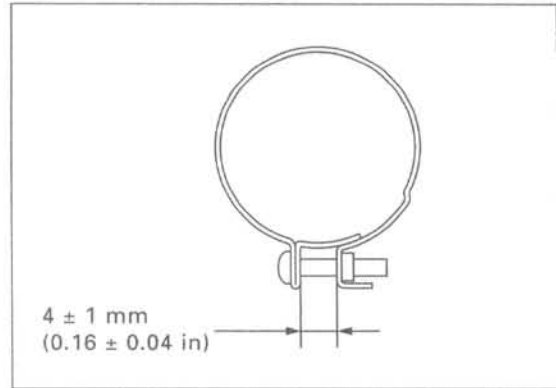


Install the carburetor into the insulator by aligning the lug with the groove.



FUEL SYSTEM

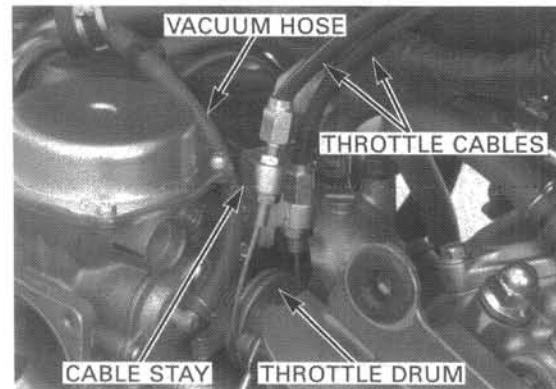
Tighten the insulator band screw so the distance between the band ends is 4 ± 1 mm (0.16 ± 0.04 in).



Connect the vacuum hose to the carburetor.

Connect the throttle cables to the throttle drum and install them onto the cable stay.

Adjust the throttle cable (page 3-4).

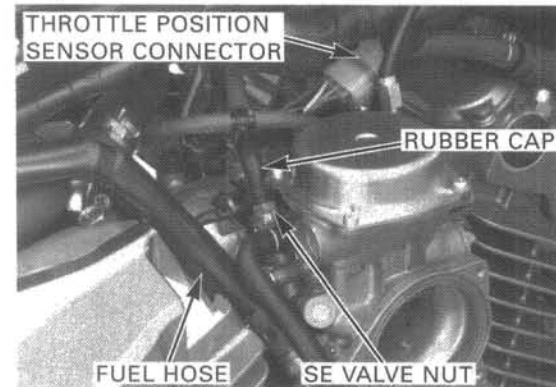


Connect the throttle position sensor connector. Install the starting enrichment (SE) valve and tighten the SE valve nut. Slide the rubber boot over the SE valve nut.

Install the air cleaner housing (page 5-3). Install the right front cylinder head cover shroud (page 2-2). Fill and bleed the cooling system (page 6-5).

Perform the following inspections and adjustments:

- engine idle speed (page 3-11)
- throttle operation (page 3-4)
- pilot screw if it was replaced (page 5-17)

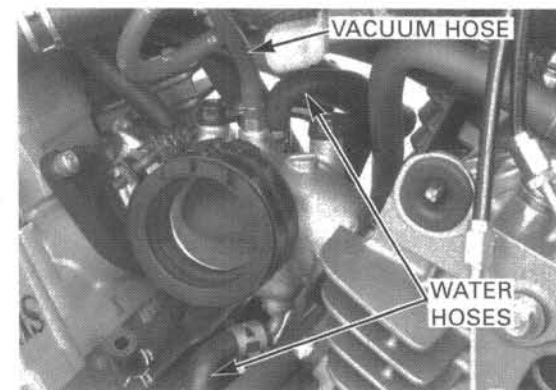


INTAKE MANIFOLD

REMOVAL

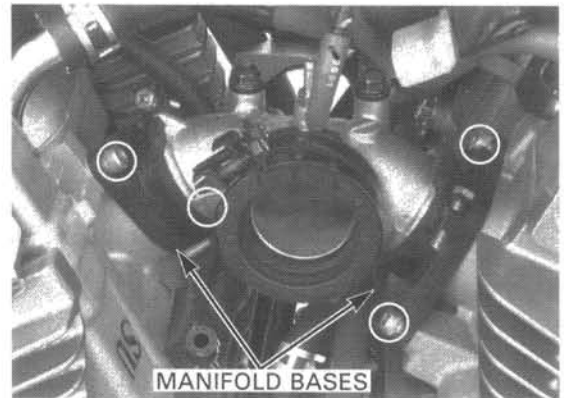
Remove the carburetor (page 5-4).

Disconnect the vacuum hose and water hoses from the intake manifolds.



Remove the four socket bolts and the intake manifold with the manifold bases.

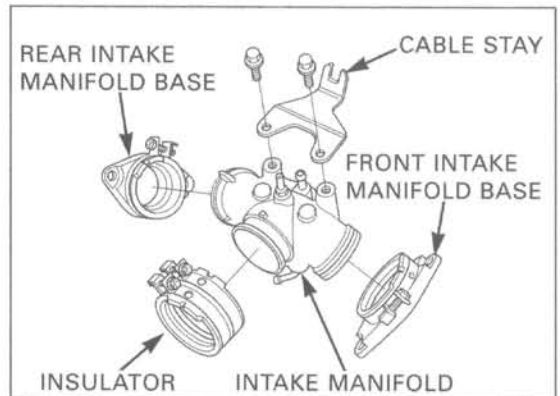
Seal the intake ports of the cylinder heads with tape or clean cloths to keep dirt and debris from entering the engine.



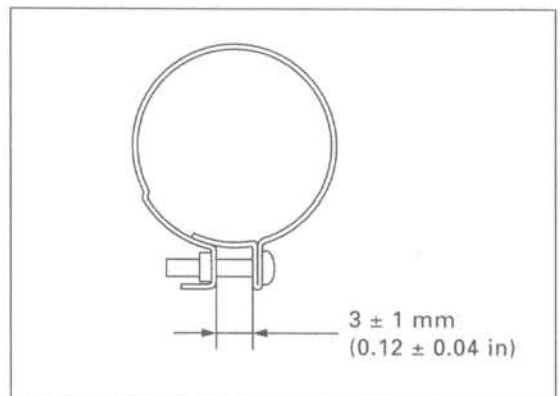
Remove the two bolt and choke cable stay from the intake manifold.
Remove the carburetor insulator and intake manifold bases by loosening the band screws.

INSTALLATION

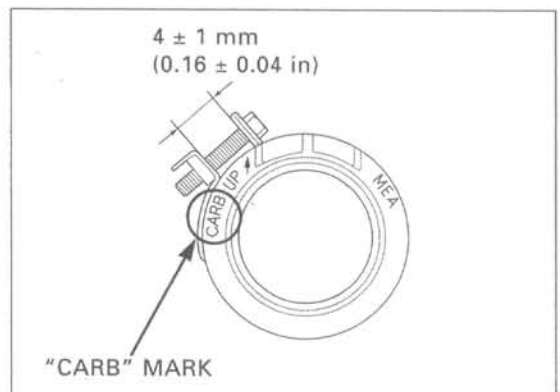
Install the rear intake manifold base onto the manifold while aligning the groove with the lug on the manifold.



Tighten the manifold base band screw so the distance between the band ends is 3 ± 1 mm (0.12 ± 0.04 in). Loosely install the front intake manifold base onto the manifold.



Install the carburetor insulator with the "CARB" mark facing the carburetor side while aligning the the groove with the lug on the manifold.
Tighten the insulator band screw so the distance between the band ends is 4 ± 1 mm (0.16 ± 0.04 in).



Install the choke cable stay onto the manifold and tighten the two bolts.

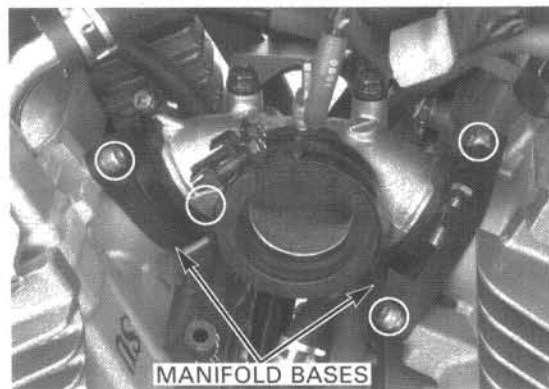
FUEL SYSTEM

Install the intake manifold onto the cylinder heads. Install the four socket bolts and tighten them.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the vacuum hose and water hoses to the intake manifolds.

Install the carburetor (page 5-15).



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE:

- The pilot screw is factory pre-set and no adjustment is necessary unless the pilot screw is replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

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

1. Turn the pilot screw clockwise until it seats lightly, then back it out to the specification given. This is an initial setting prior to the final pilot screw adjustment.

TOOL:

Pilot screw wrench **07KMA-MS60101**

INITIAL OPENING: 1-5/8 turns out

2. Warm up the engine to operating temperature. Ride the motorcycle for approximately 10 minutes.
3. Stop the engine and connect a tachometer according to the tachometer manufacturer's instructions.

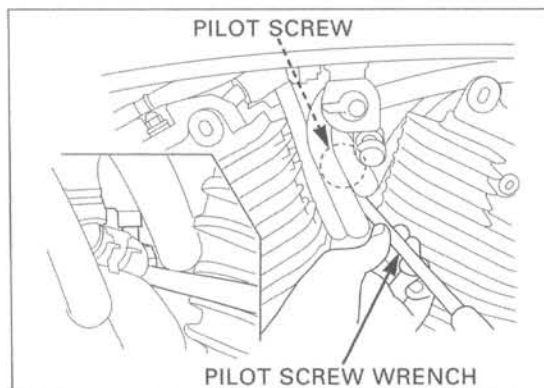
4. Start the engine and adjust the idle speed with the throttle stop screw knob.

IDLE SPEED: 900 ± 100 rpm

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw knob.
7. Turn the pilot screw in gradually until the engine speed drops by 50 rpm.
8. Turn the pilot screw out to the final opening.

FINAL OPENING: 3/4 turn out from the position obtained in step 7

9. Readjust the idle speed with the throttle stop screw.



HIGH ALTITUDE ADJUSTMENT

This adjustment must be made at high altitude to ensure proper high altitude operation.

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

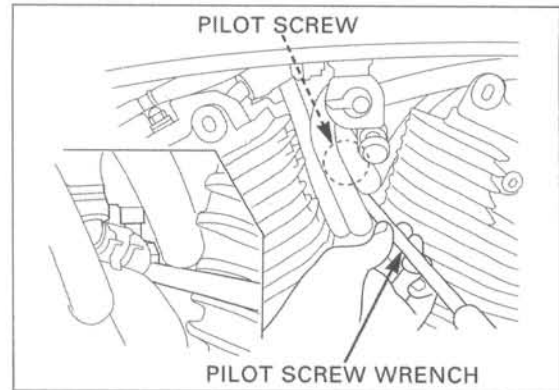
Warm up the engine to operating temperature. Ride the motorcycle for approximately 10 minutes. Turn the pilot screw in to the specification given.

TOOL:
Pilot screw wrench 07KMA-MN90101

HIGH ALTITUDE SETTING: 1/2 turn in

Adjust the idle speed with the throttle stop screw knob.

IDLE SPEED: 900 ± 100 rpm

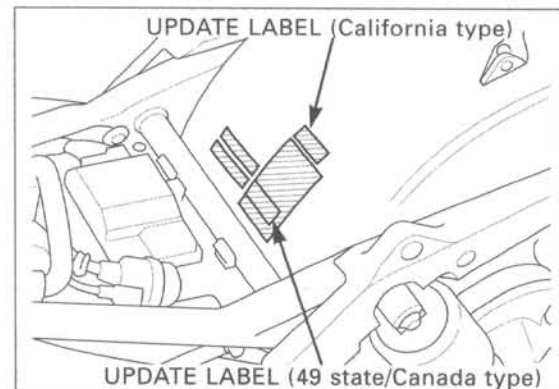


Do not attach the label to any part that can be easily removed from the vehicle.

Attach the Vehicle Emission Control Information Update label on the rear fender near the frame cross pipe as shown.

See Service Letter No. 132 for information on obtaining the label.

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

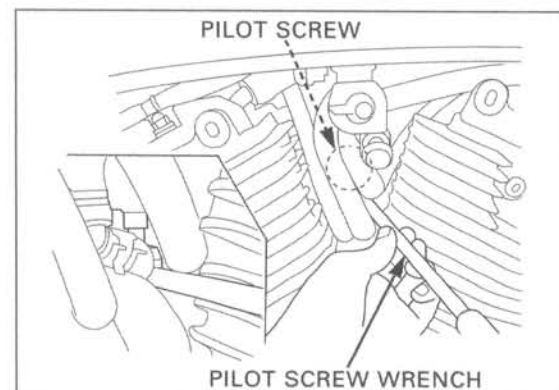


This adjustment must be made at low altitude to ensure proper low altitude operation.

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

Warm up the engine to operating temperature. Ride the motorcycle for approximately 10 minutes. Turn the pilot screw out 1/2 turn to its original position.

TOOL:
Pilot screw wrench 07KMA-MN90101



FUEL SYSTEM

Adjust the idle speed with the throttle stop screw knob.

IDLE SPEED: 900 ± 100 rpm

Remove the Vehicle Emission Control Information Update label that is attached on the rear fender near the frame cross pipe after adjusting for low altitude.



SECONDARY AIR SUPPLY SYSTEM

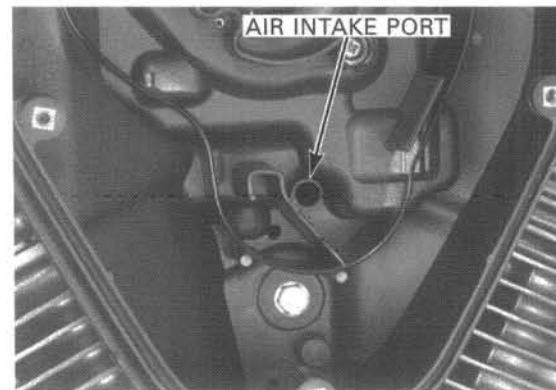
SYSTEM INSPECTION

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

Remove the air cleaner element (page 3-5).

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

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



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

Disconnect the PAIR control valve vacuum hose from the 3-way vacuum joint and plug the vacuum joint. Connect a vacuum pump to the PAIR control valve vacuum hose.

Start the engine and open the throttle slightly to be certain that air is sucked in through the air supply hose.

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

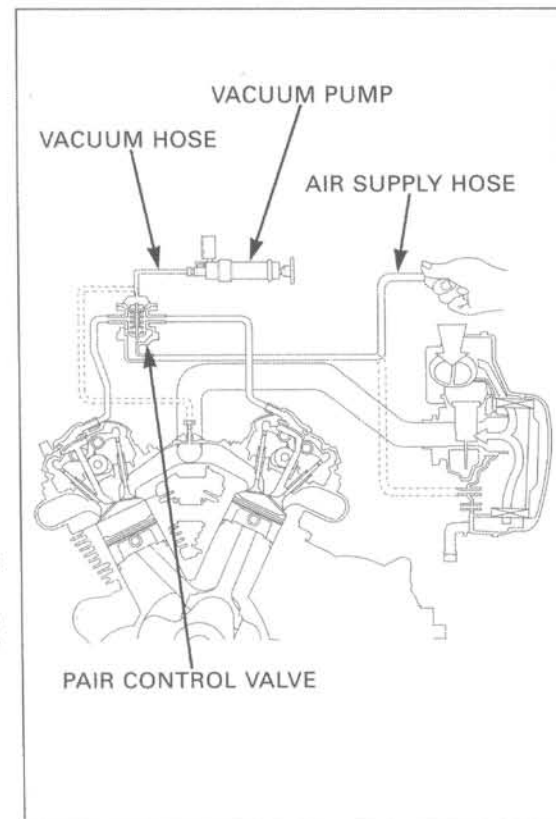
With the engine running, gradually apply vacuum to the PAIR control valve vacuum hose.

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

SPECIFIED VACUUM: 470 mmHg (18.5 inHg)

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

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



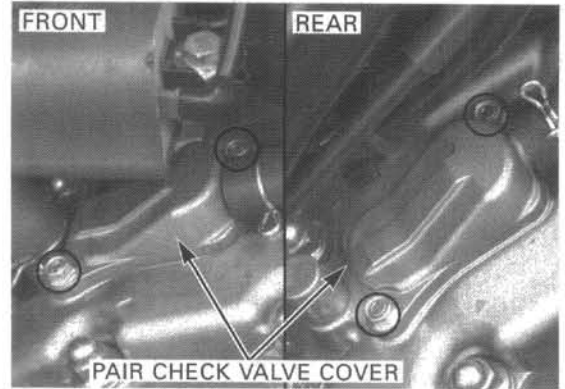
PAIR CHECK VALVE INSPECTION

Remove the fuel tank (page 2-3).

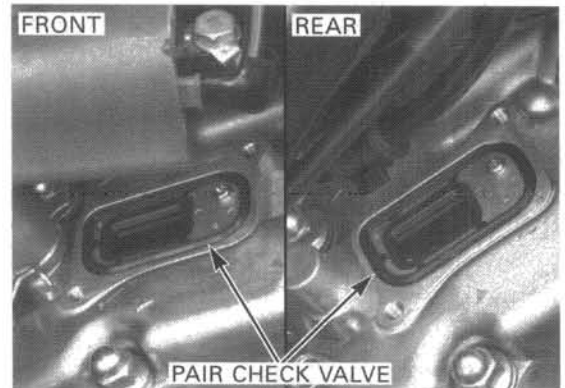
Front: Remove the left front cylinder head cover shroud (page 2-2).

Rear: Remove the right rear cylinder head cover shroud (page 2-2) and right rear spark plug cap.

Remove the bolts and PAIR check valve cover.



Remove the PAIR check valve from the cylinder head cover.



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

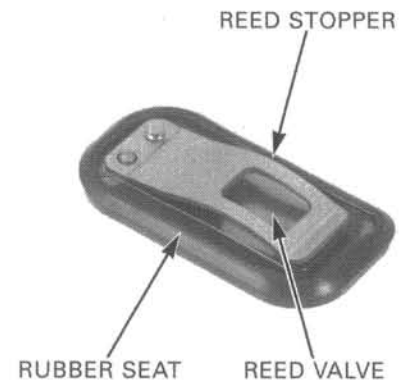
Replace the PAIR check valve if the rubber seat is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.

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

Apply locking agent to the cover bolt threads. Install and tighten the bolts.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the fuel tank (page 2-3).



FUEL SYSTEM

EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

NOTE

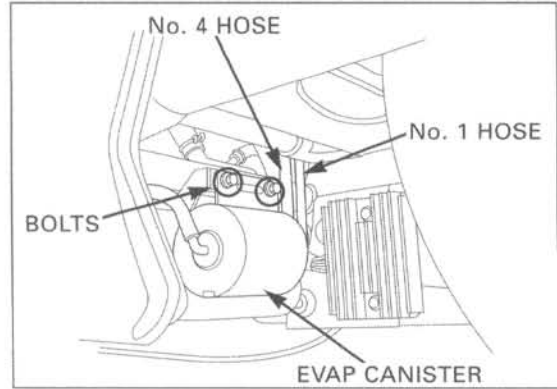
- Refer to the Vacuum Hose Routing Diagram and Cable & Harness Routing (page 1-31) for hose connections and routing.

EVAP CANISTER REMOVAL/INSTALLATION

Disconnect the No. 1 and No. 4 hoses from the EVAP canister, and remove the three bolts and the EVAP canister with the bracket.

Remove the two bolts and EVAP canister from the bracket.

Install the EVAP canister in the reverse order of removal.



EVAP PURGE CONTROL VALVE INSPECTION

NOTE

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

Remove the EVAP purge control valve.

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

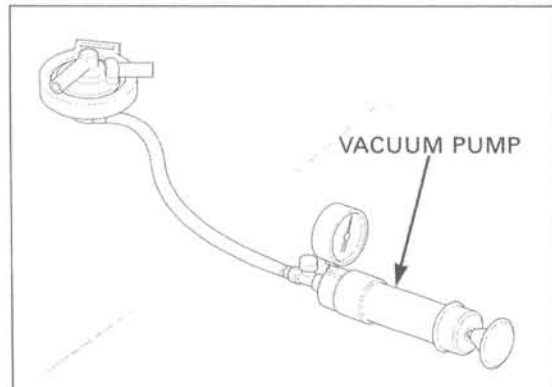
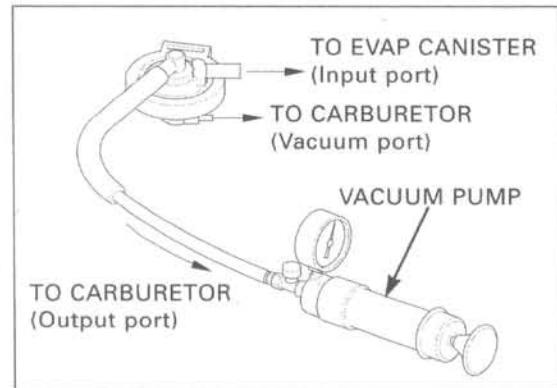
SPECIFIED VACUUM: 40 mm Hg (1.6 in Hg)

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

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

SPECIFIED VACUUM: 250 mm Hg (9.8 in Hg)

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



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

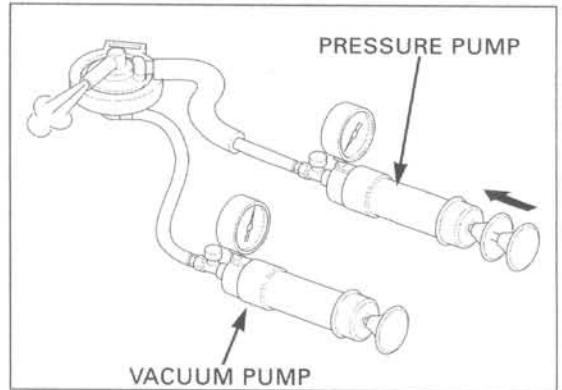
Damage to the EVAP purge control valve may result from use of a high pressure air source. Use a hand-operated air pump only.

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

SPECIFIED VACUUM: 25 mm Hg (1.0 in Hg)

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

Remove the pumps and install the EVAP purge control valve.



EVAP CARBURETOR AIR VENT (CAV) CONTROL VALVE INSPECTION

NOTE

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

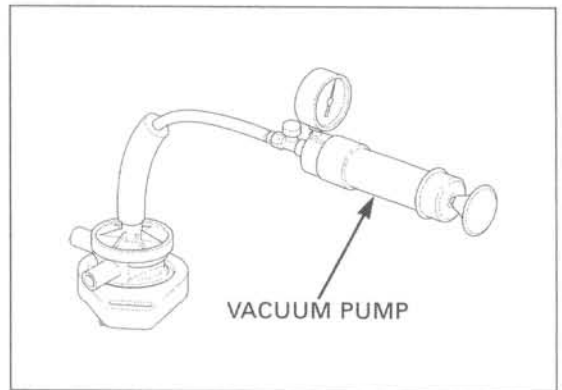
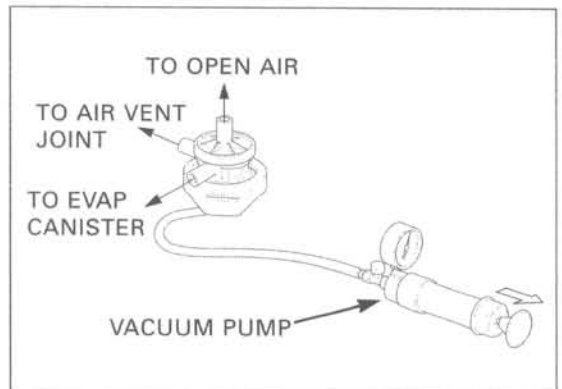
Remove the EVAP CAV control valve.

Connect a vacuum pump to the No. 10 hose fitting (vacuum port) that goes to the intake manifold. Apply the specified vacuum to the EVAP CAV control valve.

SPECIFIED VACUUM: 500 mm Hg (19.7 in Hg)

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

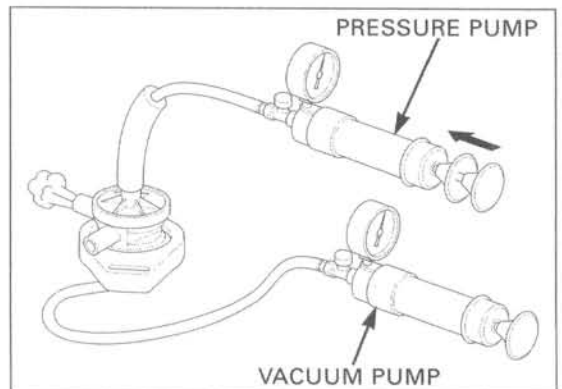
Remove the vacuum pump and connect it to the air vent fitting (open air port). Apply vacuum to the EVAP CAV control valve. The vacuum should hold steady. Replace the EVAP CAV control valve if vacuum leaks.



Remove the vacuum pump and reconnect it to the No. 10 hose fitting (vacuum port). Connect a pressure pump to the open air port.

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

While applying vacuum to the EVAP CAV control valve vacuum port, pump air through the open air port. Air should flow through the EVAP CAV control valve and out the air vent port (No. 6 hose fitting) that goes to the carburetor air vent joint.

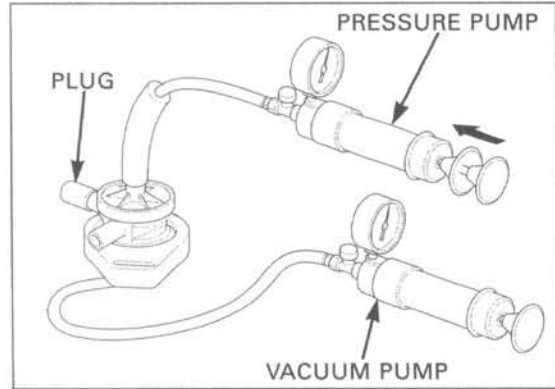


FUEL SYSTEM

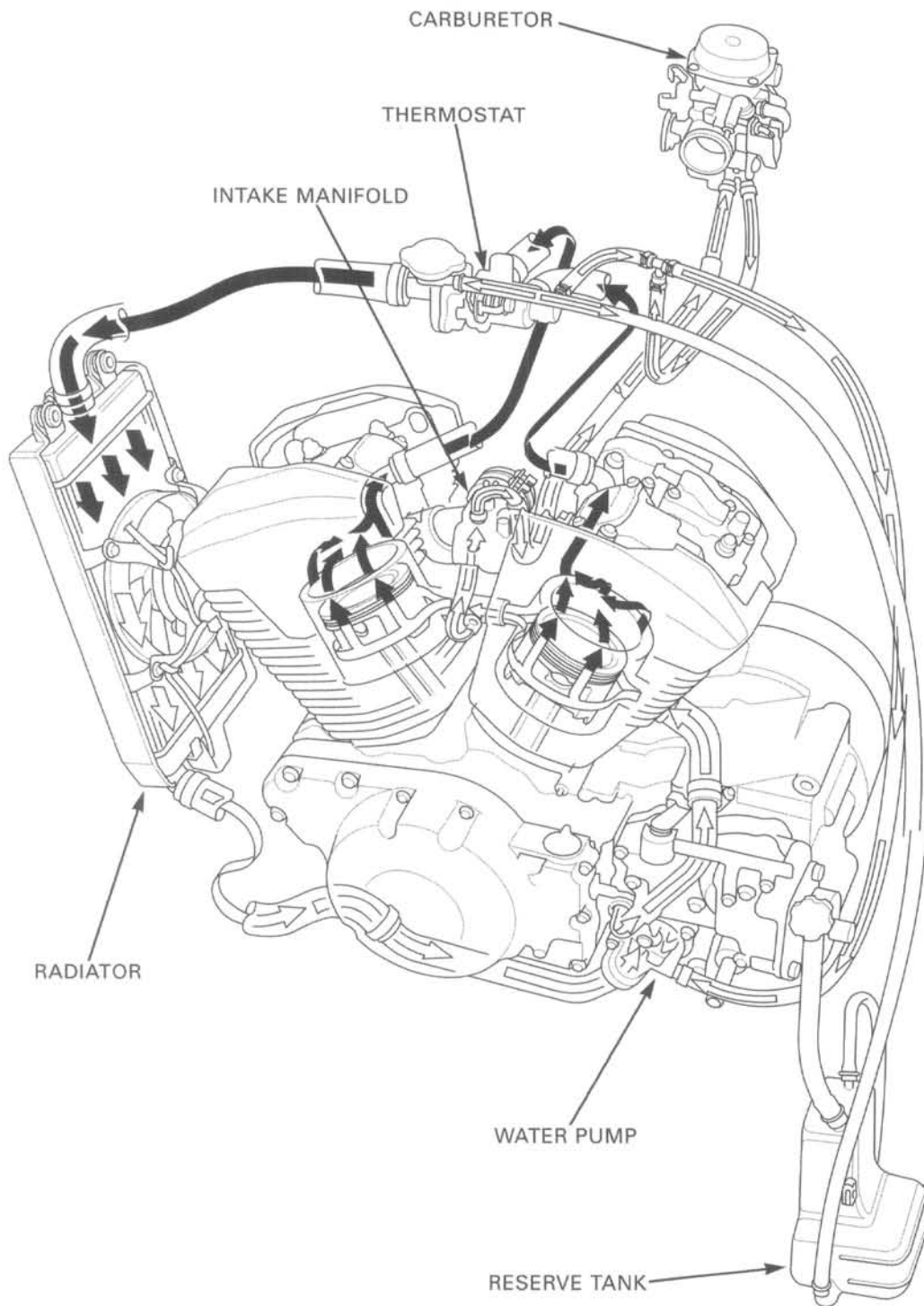
Plug the air vent port (No. 6 hose fitting) that go to the carburetor air vent joint.
While applying vacuum to the EVAP CAV control valve vacuum port, pump air through the open air port. It should hold steady.

Replace the EVAP CAV control valve if pressure is not retained.

Remove the pumps and install the EVAP CAV control valve.



COOLING SYSTEM



6. COOLING SYSTEM

SERVICE INFORMATION	6-1	THERMOSTAT	6-6
TROUBLESHOOTING	6-2	RADIATOR/COOLING FAN	6-8
SYSTEM TESTING	6-3	WATER PUMP	6-10
COOLANT REPLACEMENT	6-4	RADIATOR RESERVE TANK	6-13

SERVICE INFORMATION

GENERAL

⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

6

⚠ CAUTION

Radiator coolant is toxic. Keep it away from eyes, mouth and skin.

- If any coolant gets in your eyes, rinse them with water and consult a physician 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.

NOTICE

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for the thermostatic switch (coolant temperature indicator) and fan motor switch.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.7 liters (2.9 US qt, 2.4 Imp qt)
	Reserve tank	0.95 liter (0.25 US gal, 0.21 Imp gal)
Radiator cap relief pressure		108—137 kPa (1.1—1.4 kgf/cm ² , 16—20 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
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 mixture with distilled water

TORQUE VALUES

Horn mounting bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)
Water pump cover bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Water pump stud bolt	See page 6-13
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

COOLING SYSTEM

TOOLS

Cooling system pressure tester
Cooling system adaptor

SVTS4AH
OTCJ33984A

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature indicator or thermostatic switch
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

Coolant leaks

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

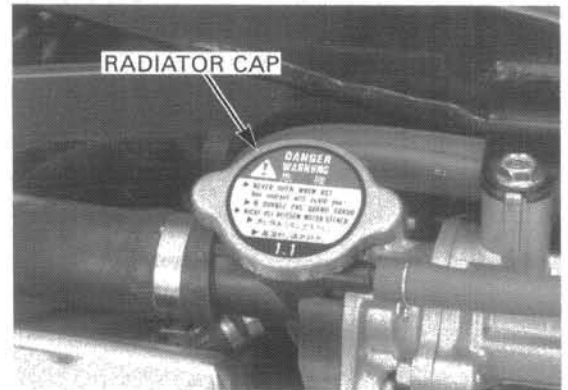
SYSTEM TESTING

COOLANT (HYDROMETER TEST)

Remove the fuel tank (page 2-3).

Remove the radiator cap.

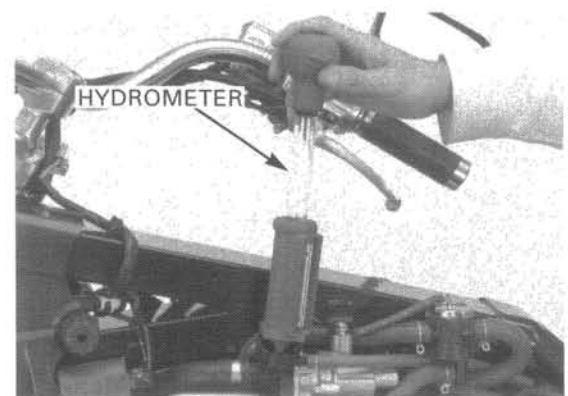
The engine must be cool before removing the radiator cap, or severe scalding may result.



Test the coolant specific gravity using a hydrometer.

**STANDARD COOLANT CONCENTRATION:
1:1 (distilled water and the recommended
antifreeze)**

Look for contamination and replace the coolant if necessary.



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

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (see previous page). Wet the sealing surfaces of the cap, then install the cap onto tester.

TOOLS:

Cooling system pressure tester SVTS4AH
Cooling system adaptor OTCJ33984A

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

RADIATOR CAP RELIEF PRESSURE:

108—137 kPa (1.1—1.4 kgf/cm², 16—20 psi)

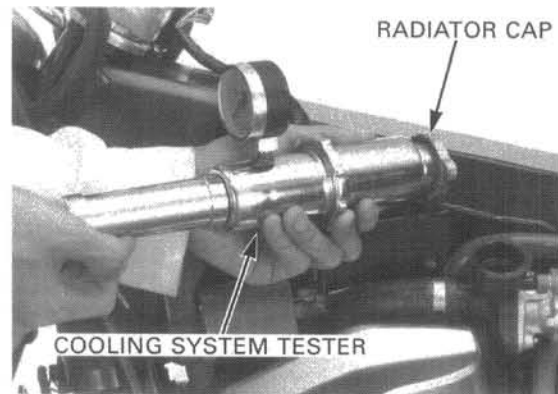
Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

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

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

Remove the tester and install the radiator cap.

Install the fuel tank (page 2-3).



COOLANT REPLACEMENT

PREPARATION

NOTICE

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

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.

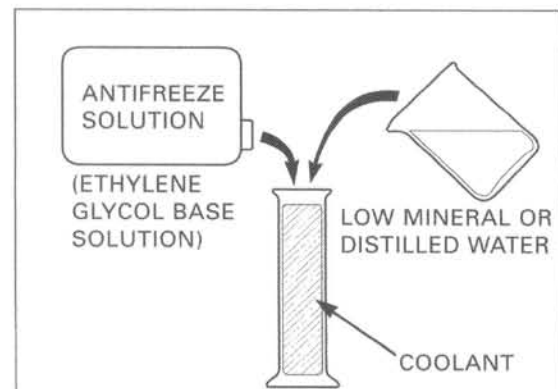
Mix only distilled, low mineral water with the recommended antifreeze.

RECOMMENDED ANTIFREEZE:

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

RECOMMENDED MIXTURE:

1:1 (distilled water and the recommended antifreeze)



REPLACEMENT/AIR BLEEDING

NOTE:

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

Remove the following:

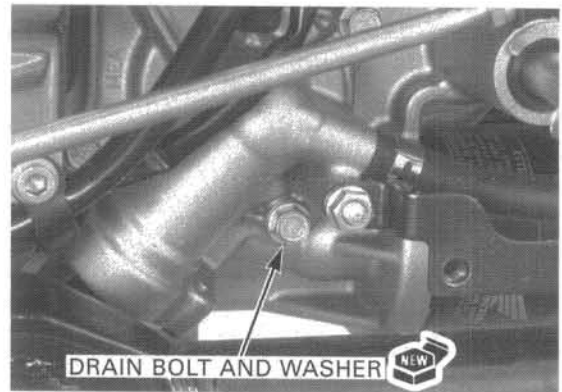
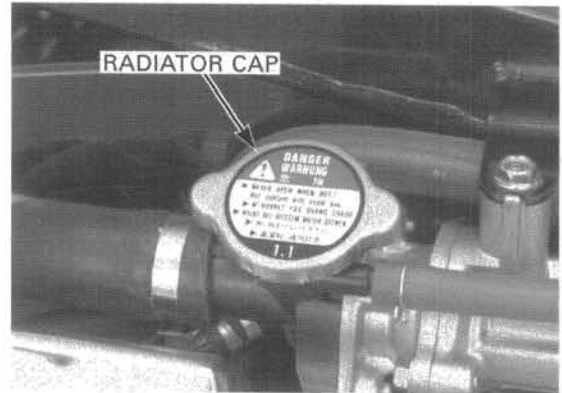
- fuel tank (page 2-3)
- left side cover (page 2-2)

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

Drain the coolant from the system by removing the drain bolt and sealing washer, and the radiator cap.

Reinstall the drain bolt with a new sealing washer.

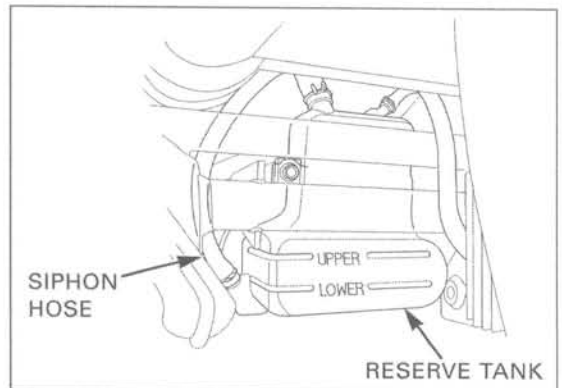
TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



Disconnect the siphon hose from the reserve tank and drain the reserve coolant.

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

Reconnect the siphon hose.

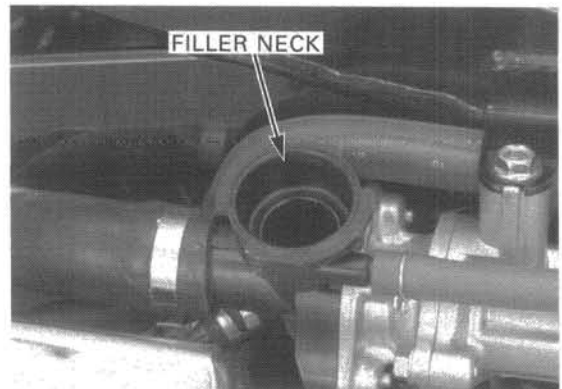


Fill the system with the recommended coolant through the filler opening up to the filler neck.

Connect the fuel tank to the fuel hose and supply fuel to the carburetor.

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 three to four times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
4. Install the radiator cap.

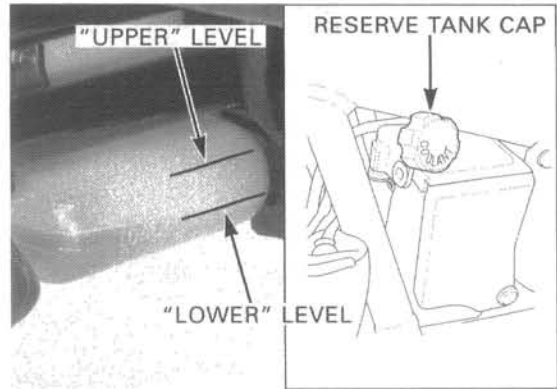


COOLING SYSTEM

Remove the reserve tank cap.
Fill the reserve tank to the upper level line and install the tank cap.

Install the following:

- left side cover (page 2-2)
- fuel tank (page 2-3)



THERMOSTAT

REMOVAL

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

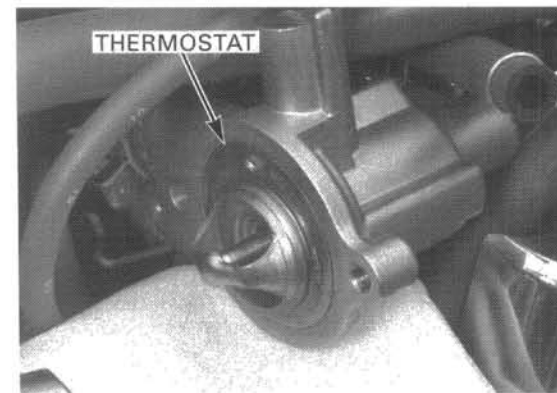
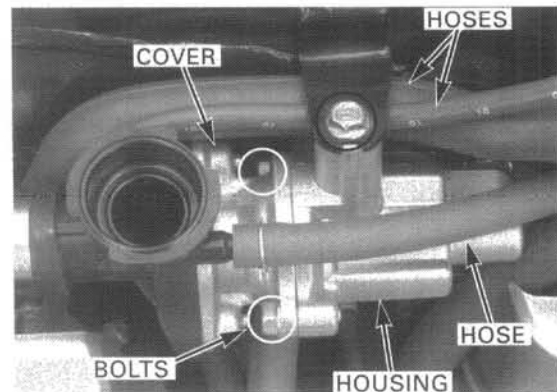
Disconnect the following:

- siphon hose
- vacuum hose and air supply hose (from the PAIR control valve)

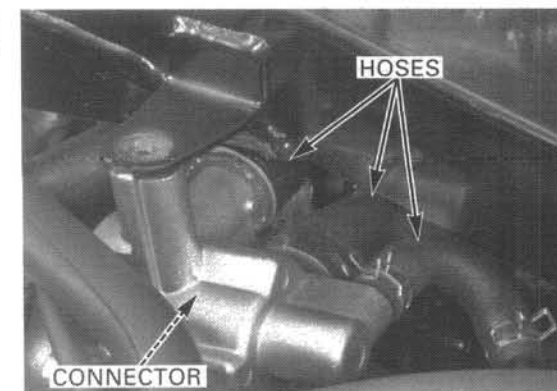
Place a shop towel under the thermostat housing.
Loosen the two housing cover bolts.

Remove the following:

- bolt and thermostat housing (from the stay)
- two bolts and housing cover
- thermostat
- O-ring (from the cover)



If the thermostat housing is to be removed, disconnect the thermostatic switch connector (page 19-10) and the water hoses.



THERMOSTAT INSPECTION

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

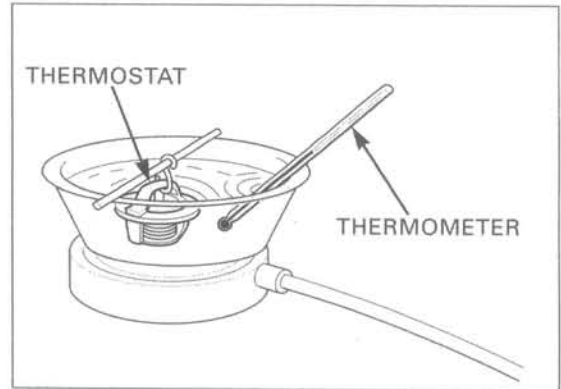
Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element. Do not let the thermostat or thermometer touch the pan, or you will get false readings.

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

THERMOSTAT BEGINS TO OPEN:
80—84°C (176—183°F)

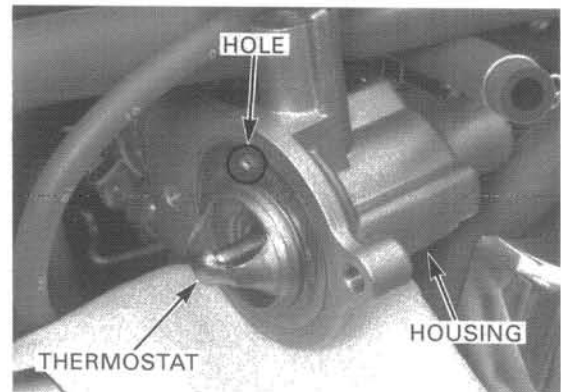
VALVE LIFT:
8 mm (0.3 in) minimum at 95°C (203°F)

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



INSTALLATION

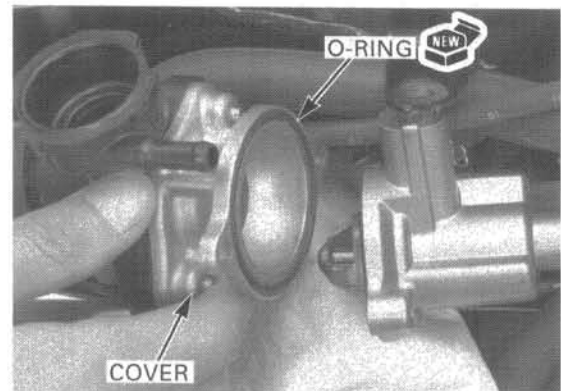
Install the thermostat into the housing with the hole facing up.



Clean the mating surface of the thermostat housing and cover. Install a new O-ring into the groove in the housing cover.

Be careful not to cross-thread the bolts.

Make sure the thermostat flange is flush with the housing surface and install the housing cover onto the thermostat housing, then install the two cover bolts.



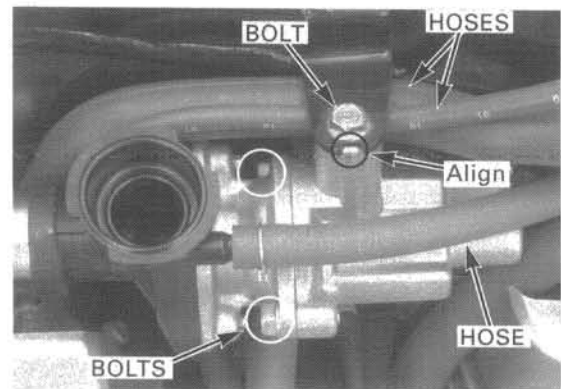
Route the hoses properly (page 1-19).

Install the thermostat housing by aligning the lug with the groove in the stay, and tighten the mounting bolt.

Tighten the two housing cover bolts.

Connect the following:
 - secondary air supply hose
 - PAIR control valve vacuum hose
 - siphon hose

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



RADIATOR/COOLING FAN

NOTICE

Be careful not to damage the radiator fins while servicing the radiator and fan motor.

REMOVAL/INSTALLATION

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

Remove the front left cylinder head shroud (page 2-2).
Disconnect the following:

- cooling fan motor 2P (black) connector (and remove it from the frame)
- horn connectors

Remove the following:

- bolt and horn
- two bolts and setting plate

Disconnect the water hoses by loosening each hose band.

Release the boss on the radiator bottom from the mounting grommet and remove the radiator assembly.

Release the grill tab to remove the radiator grill.

Installation is in the reverse order of removal.

Tighten the hanger plate bolts (8 mm).

TORQUE:

Horn mounting bolt: 21 N·m (2.1 kgf·m, 15 lbf·ft)

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

DISASSEMBLY

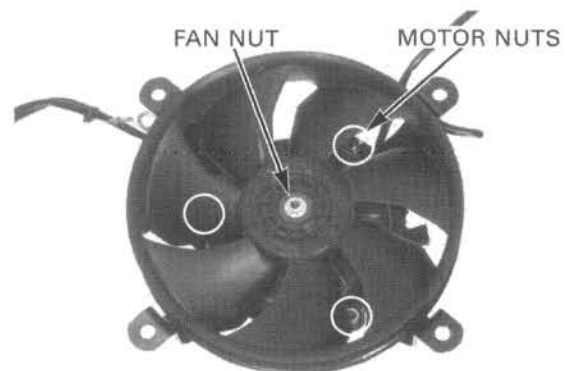
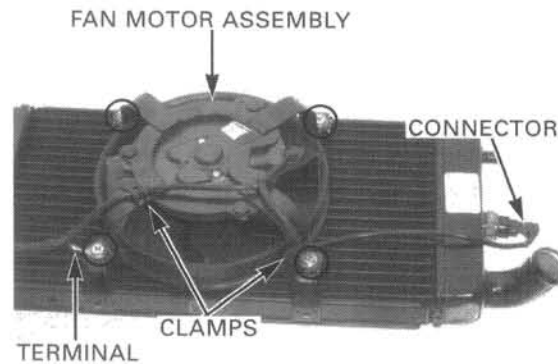
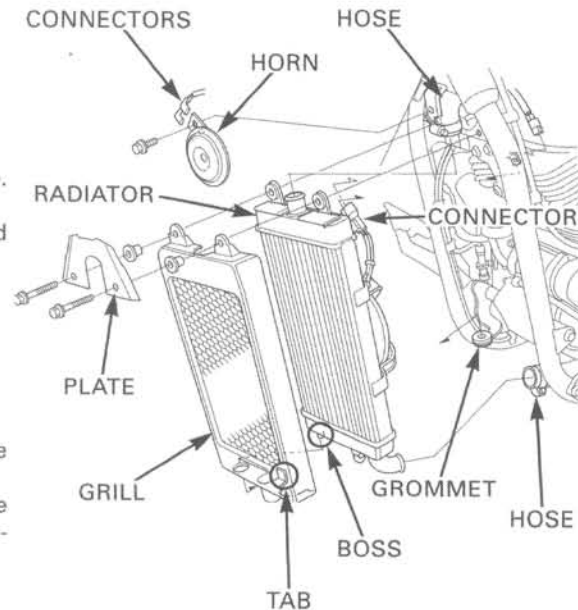
For fan motor switch information, refer to page 19-10.

Disconnect the fan motor switch connector and release the wires from the clamps.

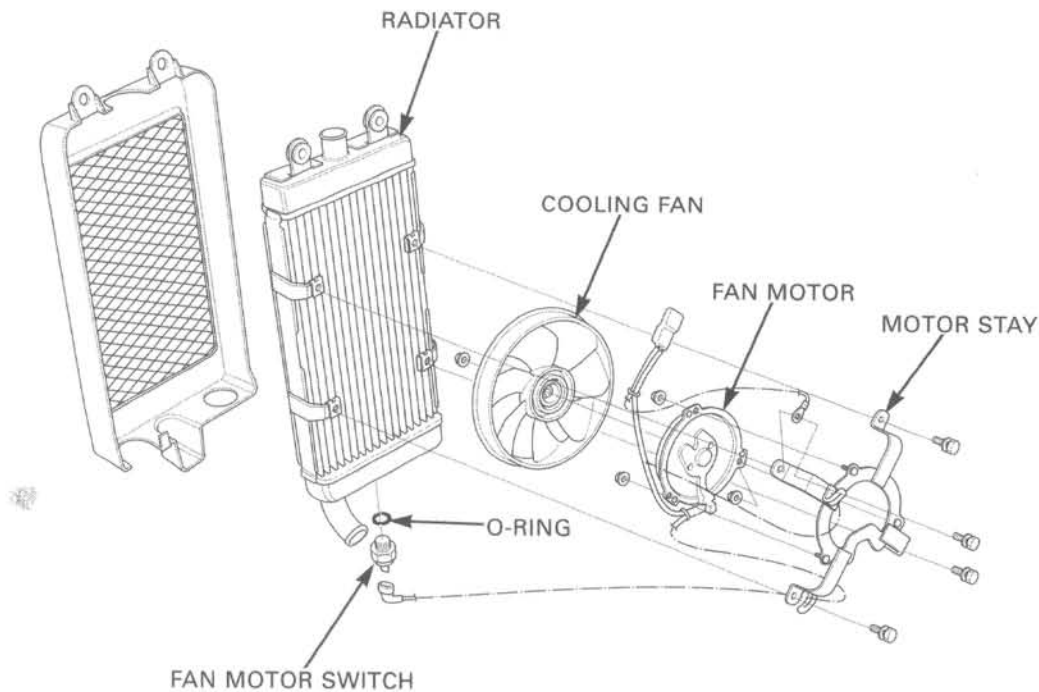
Remove the following:

- four bolts and ground terminal
- fan motor assembly

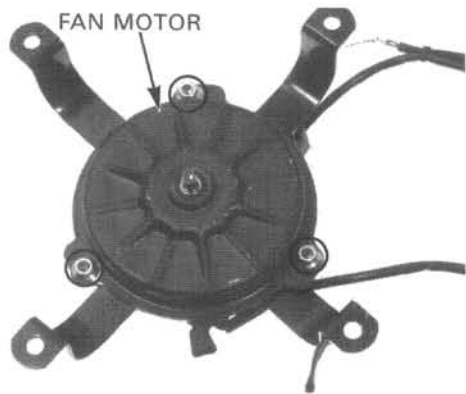
- nut and cooling fan
- three nuts and fan motor



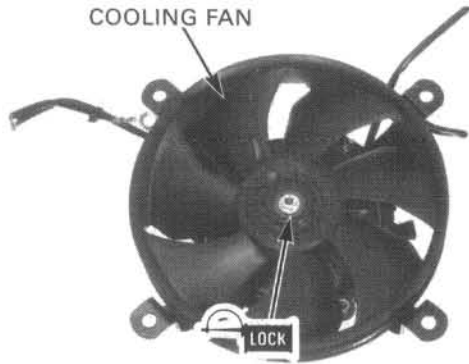
ASSEMBLY



Install the fan motor on the motor stay in the direction as shown and tighten the three nuts.



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

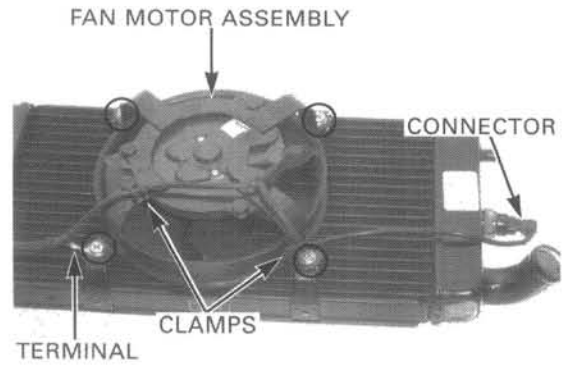


COOLING SYSTEM

Install the fan motor assembly and tighten the four bolts with the ground terminal as shown.

Route the wires properly and secure them with the clamps. Connect the fan motor switch connector.

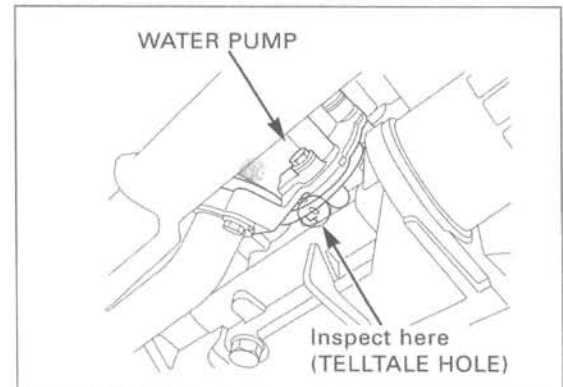
Install the radiator assembly (page 6-8).



WATER PUMP

MECHANICAL SEAL INSPECTION

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



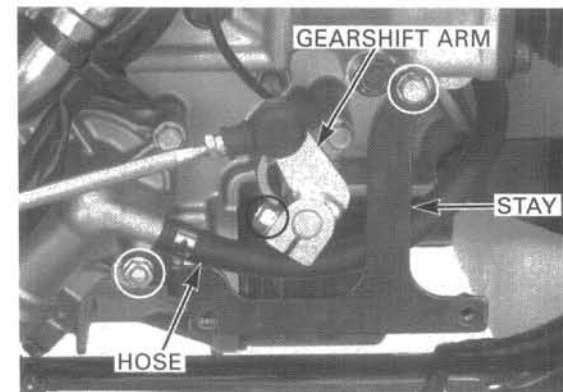
REMOVAL

Drain the coolant from the system (page 6-4).

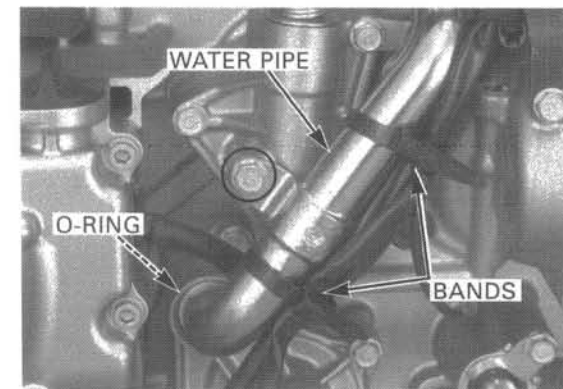
Remove the left crankcase rear cover (page 2-3).

Remove the following:

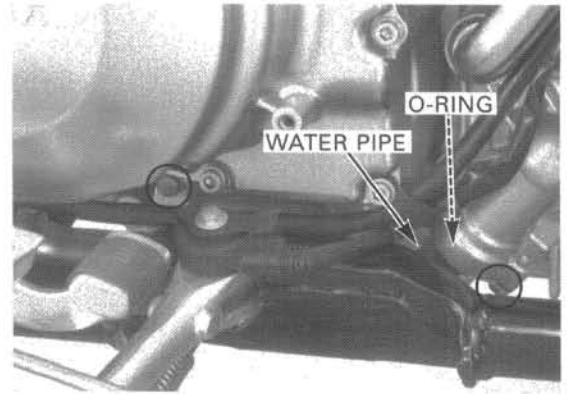
- pinch bolt
- gearshift arm
- bolt and nut
- cover stay
- water hose (from the water pump)



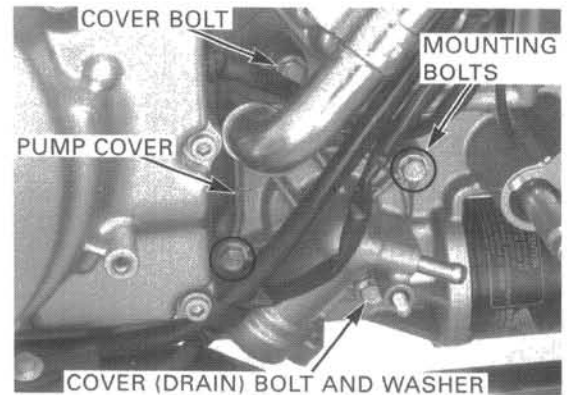
- wire bands
- bolt
- water pipe
- O-ring



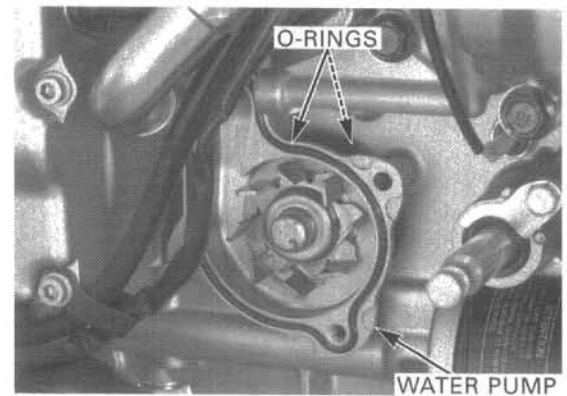
- two bolts
- water pipe
- O-ring



- two cover bolts and washer
- two mounting bolts
- water pump cover



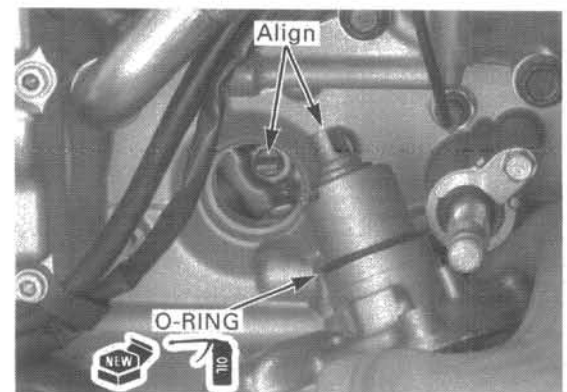
- water pump
- O-rings



INSTALLATION

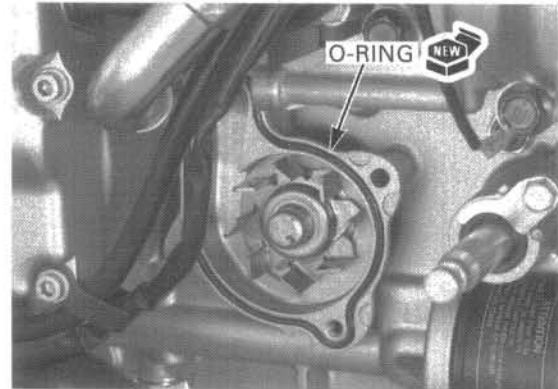
Coat a new O-ring with engine oil and install it onto the stepped section of the water pump.

Install the water pump while aligning the groove with the projection of the oil pump shaft.



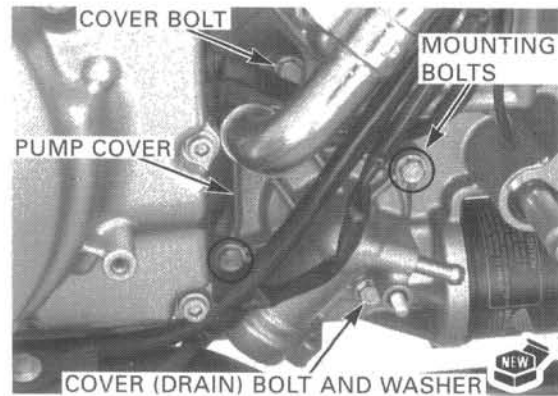
COOLING SYSTEM

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

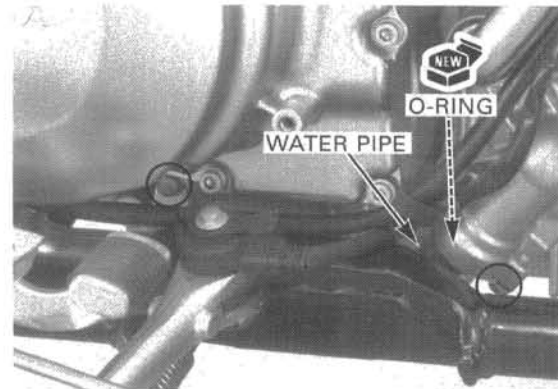


Align the bolt holes in the pump and crankcase, and install the water pump cover with the four bolts and a new sealing washer. Tighten the bolts in a crisscross pattern in several steps.

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



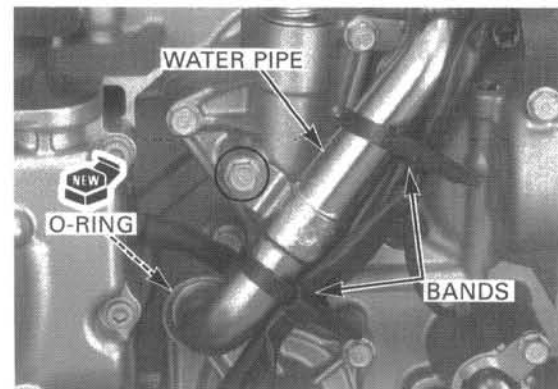
Install a new O-ring onto the lower water pipe. Connect the water pipe to the water pump and secure it with the two bolts.



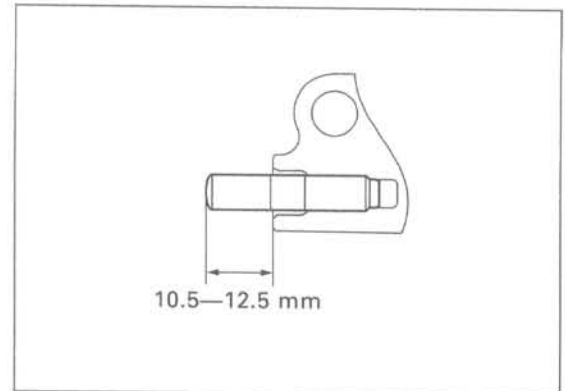
Route the wires properly (page 1-19).

Install a new O-ring onto the upper water pipe. Connect the water pipe and secure it with the bolt.

Secure the wires with the wire bands.



If the water pump was replaced, install the stud bolt into the pump cover.
Be sure to verify the distance from the top of the stud to the pump cover as shown.



Connect the water hose.

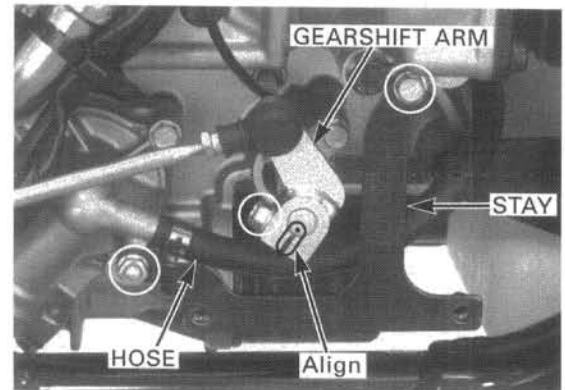
Install the cover stay, and tighten the bolt and nut.

Install the gearshift arm by aligning the slit with the punch mark on the spindle.
Install the pinch bolt and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the left crankcase rear cover (page 2-3).

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



RADIATOR RESERVE TANK

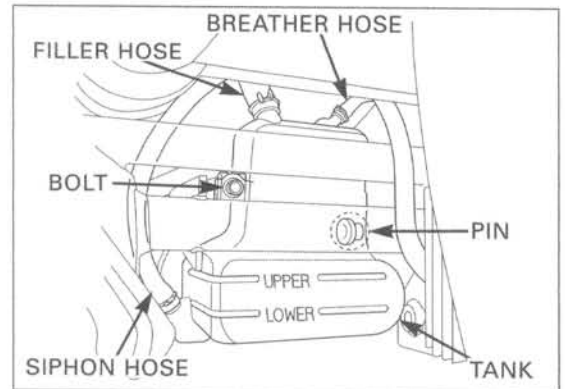
REMOVAL/INSTALLATION

Remove the following:

- left crankcase rear cover (page 2-3)
- California type only:* - EVAP canister (page 5-22)

Disconnect the siphon hose from the reserve tank and drain the reserve coolant.

Disconnect the breather and filler hoses.
Remove the mounting bolt. Release the tank locating pin from the mounting grommet to remove the reserve tank.

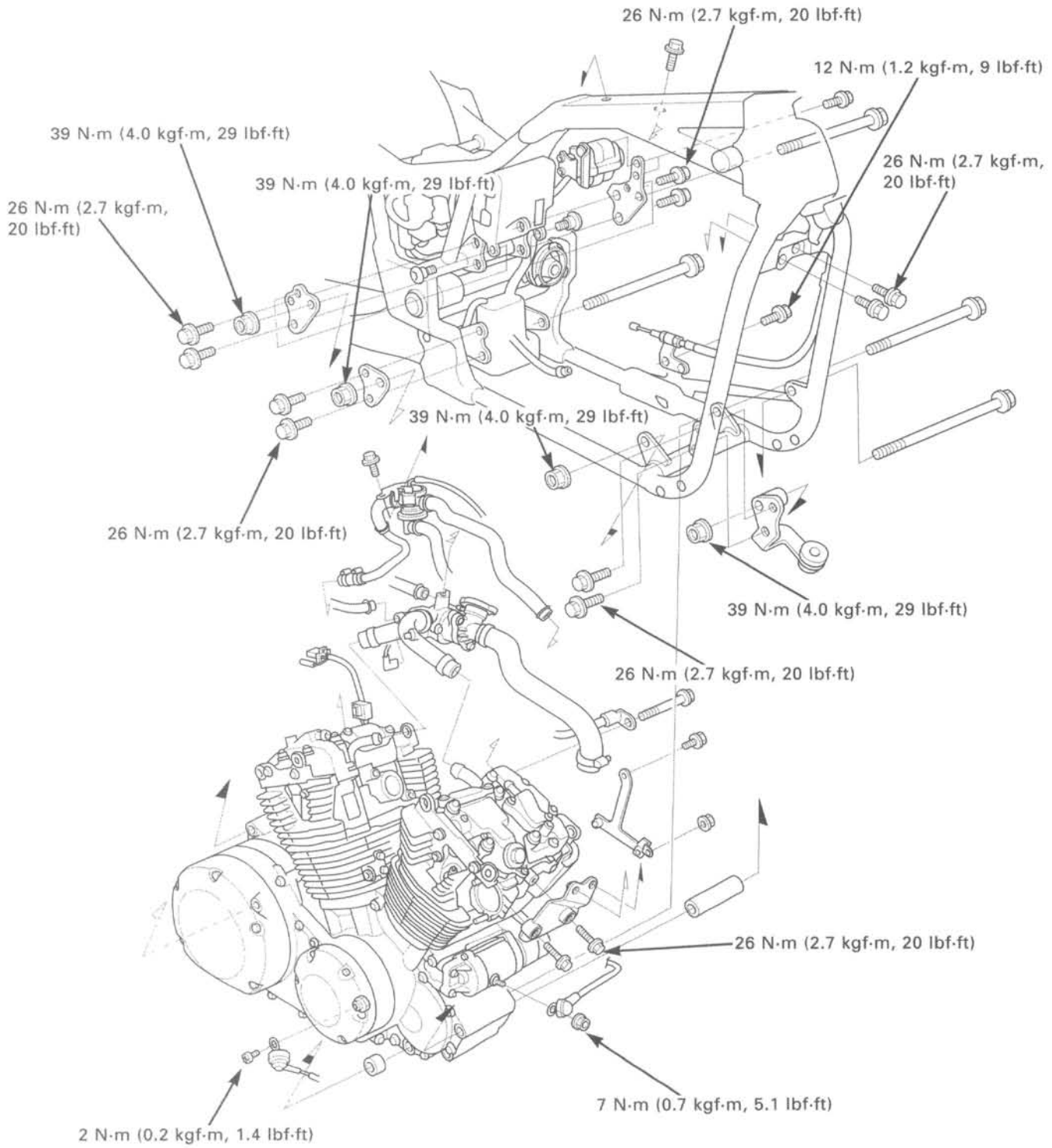


Installation is in the reverse order of removal.

NOTE:

- Take care not to dislodge the mounting grommet.
- Be sure to route the hoses properly (page 1-19).

ENGINE REMOVAL/INSTALLATION



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION
ENGINE REMOVAL

7-1
7-2

ENGINE INSTALLATION

7-6

SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.

NOTICE

Do not support the engine using the engine oil filter.

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for servicing.
 - camshaft (section 8)
 - cylinder head (section 8)
 - cylinder/piston (section 9)
 - crankshaft (section 11)
 - transmission (Including gearshift drum/shift fork: section 11)
 - output gear case (section 11)
- The following components can be serviced with the engine in the frame.
 - carburetor (section 5)
 - water pump (section 6)
 - clutch/gearshift linkage (section 10)
 - alternator (section 16)
 - electric starter/starter clutch (section 18)

7

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	109 kg (239.8 lbs)
Engine oil capacity at disassembly	4.3 liters (4.5 US qt, 3.9 Imp qt)
Coolant capacity (radiator and engine)	2.7 liters (2.9 US qt, 2.4 Imp qt)

TORQUE VALUES

Engine mounting nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Engine hanger plate bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Starter motor cable terminal nut	7 N·m (0.7 kgf·m, 5.1 lbf·ft)
Clutch cable holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

Drain the engine oil (page 3-10).
Drain the coolant (page 3-12).

Remove the following:

- fuel tank (page 2-3)
- all cylinder head shrouds (page 2-2)
- front ignition coil (page 17-5)
- both side covers (page 2-2)
- left crankcase rear cover (page 2-3)
- exhaust system (page 2-6)
- both footrest assemblies (page 2-4)
- carburetor (page 5-4)
- radiator (page 6-8)
- lower water pipe (from the water pump; page 6-11)

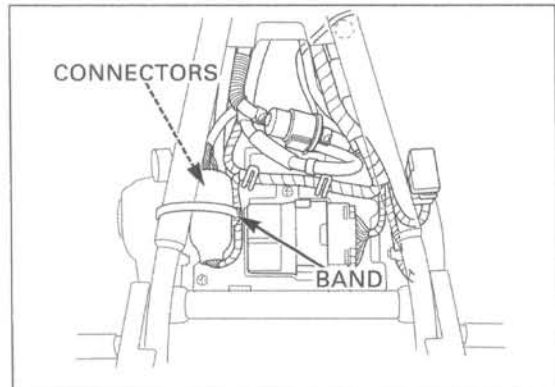
NOTE:

- Wrap the intake manifold port with a shop towel or cover them with a piece of tape to prevent any foreign material from dropping into the engine.

Pull the ignition switch connector and neutral switch connector out of the frame.

Remove the wire band and disconnect the following connectors:

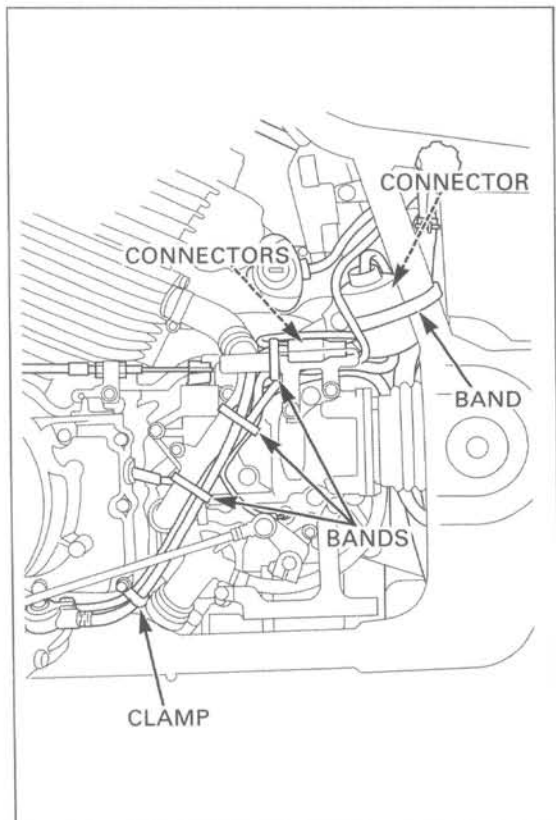
- ignition switch 3P (white)
- ignition pulse generator 2P (white)
- neutral switch (single lead connector; light green)



Remove the four wire bands and disconnect the following connectors:

- alternator 3P (white)
- speed sensor 3P (white)
- side stand switch 2P (black)

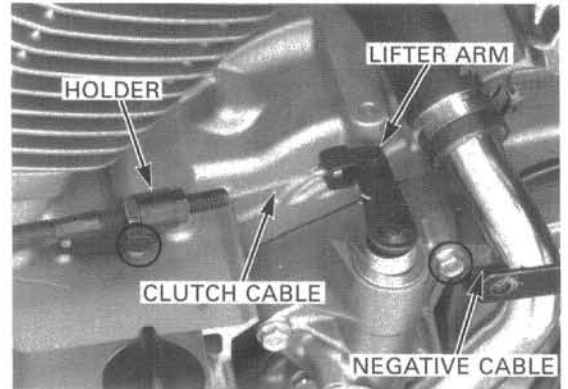
Release the side stand switch wire from the clamp.



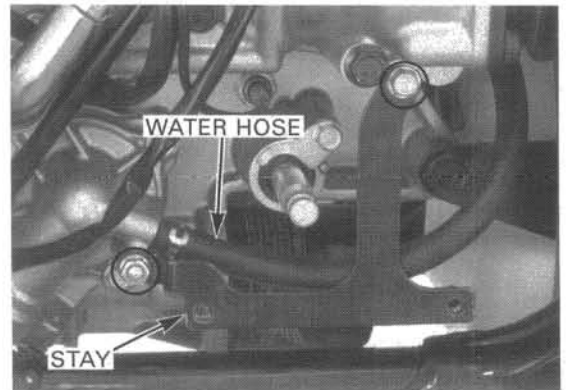
ENGINE REMOVAL/INSTALLATION

Remove the following:

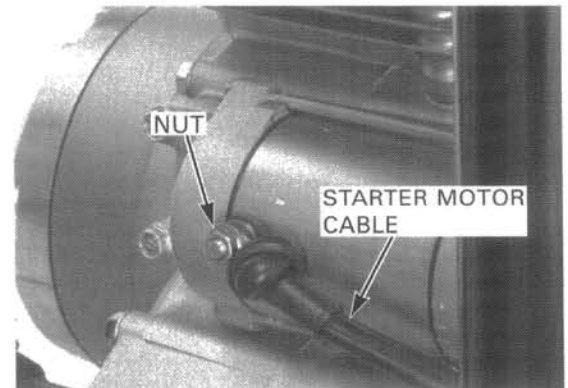
- cable holder bolt
- clutch cable (from the lifter arm)
- terminal bolt
- battery negative (-) cable



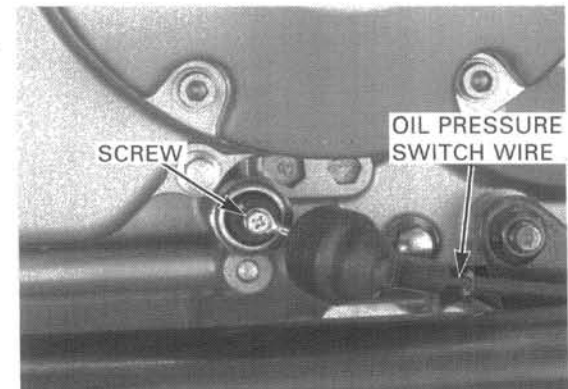
- nut and bolt
- cover stay
- water hose (from the water pump)



- terminal nut
- starter motor cable (release it from the clamps on the left crankcase cover)

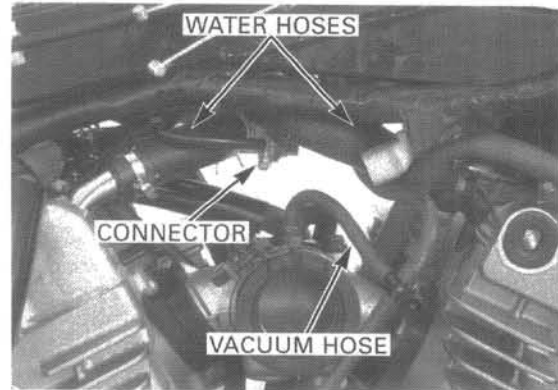


- terminal screw
- oil pressure switch wire (release it from the clamp on the frame)

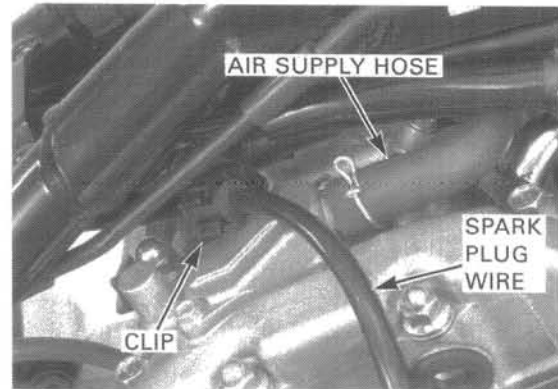


ENGINE REMOVAL/INSTALLATION

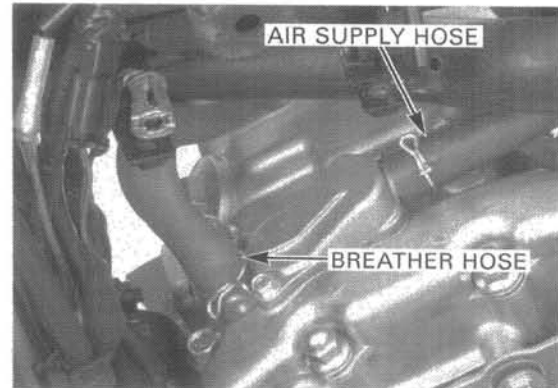
- thermostatic switch connector
- vacuum (No. 10; California) hose (from the intake manifold)
- water hoses (from the cylinder head)



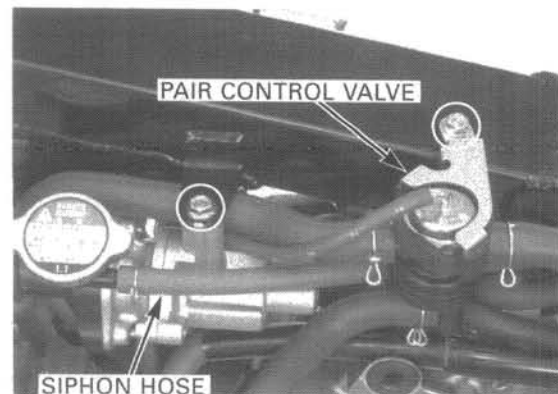
- spark plug caps
- spark plug wires (from the clips)
- secondary air supply hose (rear cylinder head cover)



- secondary air supply hose (front cylinder head cover)
- crankcase breather hose

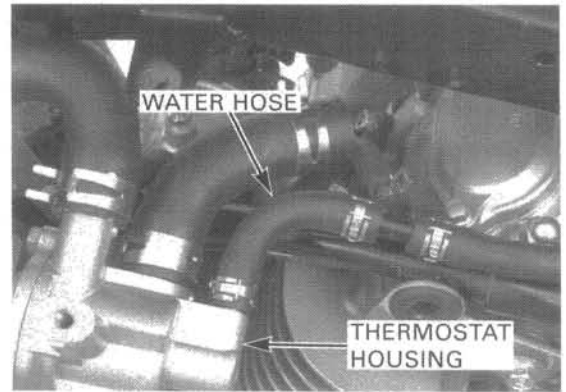


- siphon hose (from the filler neck)
- two bolts
- pulse secondary air injection (PAIR) control valve (by removing its hoses out of the frame)



ENGINE REMOVAL/INSTALLATION

- water hose (from the thermostat housing)
- thermostat housing (by removing the hoses out of the frame)



Support the motorcycle securely with a hoist or equivalent.

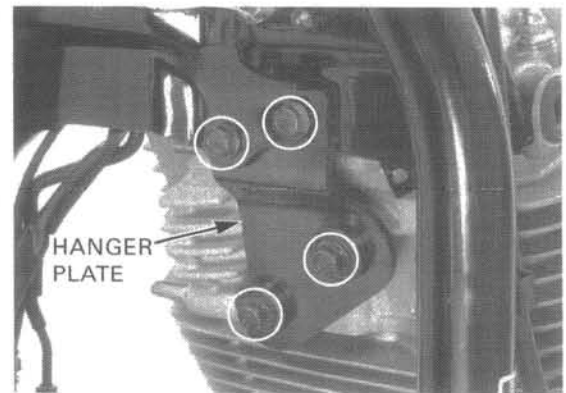
Place the floor jack or other adjustable support under the engine.

NOTE:

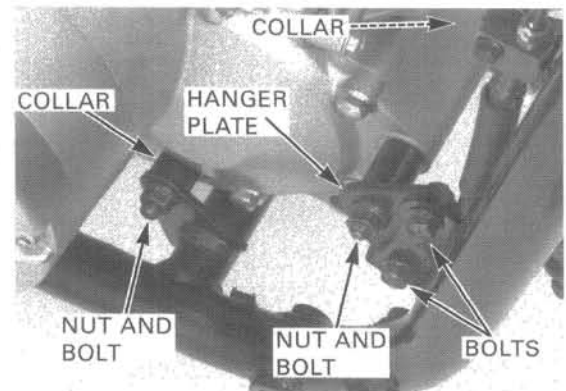
- The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Remove the following engine mounting fasteners:

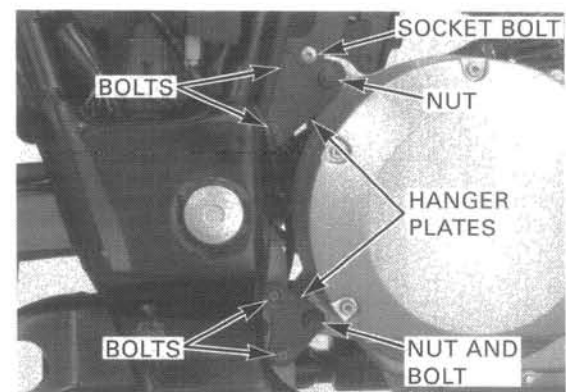
- four plate bolts and hanger plate



- front lower mounting nut
- front lower mounting bolt and collar (left side of the engine)
- two plate bolts and hanger plate
- bottom mounting nut
- bottom mounting bolt and collar (right side of the engine)

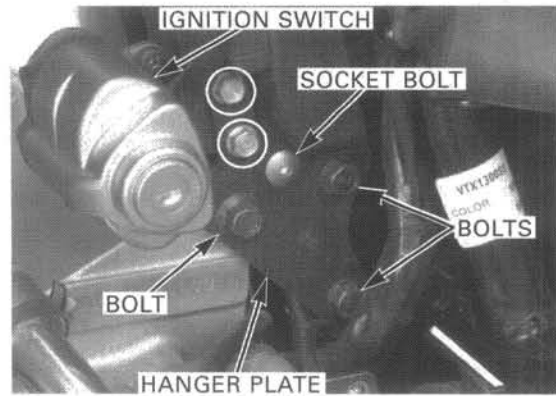


- rear lower mounting nut and bolt
- two plate bolts and hanger plate
- rear upper mounting nut
- center cover socket bolt
- two plate bolts and hanger plate



ENGINE REMOVAL/INSTALLATION

- rear upper mounting bolt
- ignition switch stay bolts
- center cover socket bolt
- two plate bolt and hanger plate

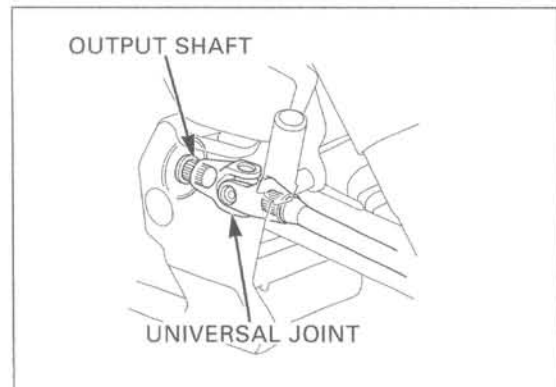


Release the joint boot from the output gear case.

NOTICE

During engine removal, hold the engine securely and be careful not to damage the frame and engine.

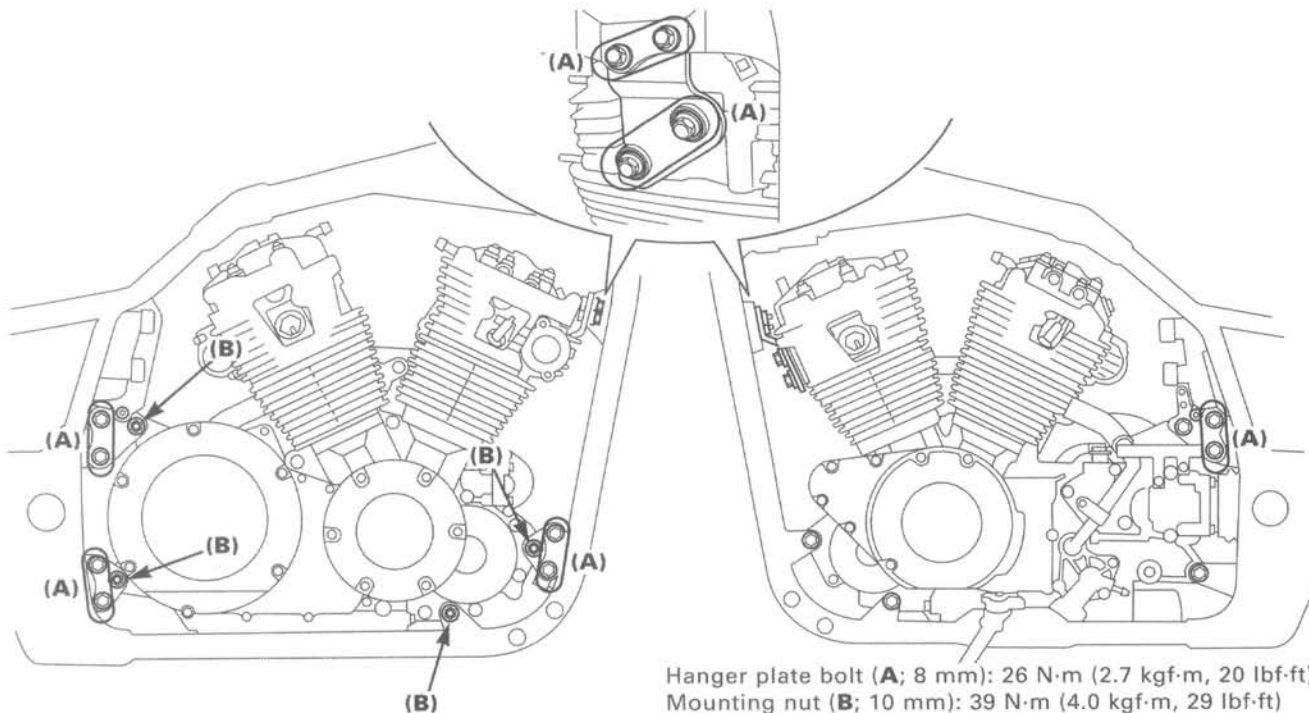
Move the engine forward and release the output shaft from the universal joint in the swingarm. Carefully maneuver the engine and remove it out of the frame to the right.



ENGINE INSTALLATION

NOTE:

- Route the wires, hoses and cables properly (page 1-19).



Hanger plate bolt (A; 8 mm): 26 N·m (2.7 kgf·m, 20 lbf·ft)
Mounting nut (B; 10 mm): 39 N·m (4.0 kgf·m, 29 lbf·ft)

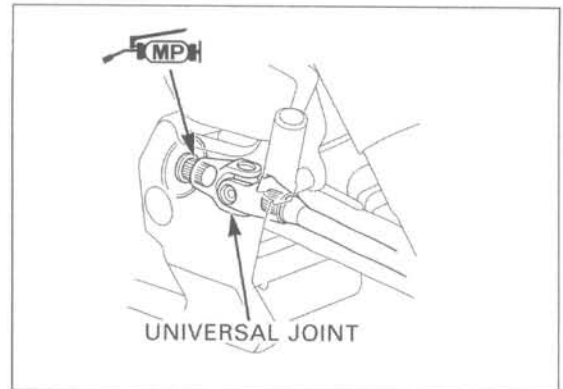
NOTICE

During engine installation, hold the engine securely and be careful not to damage the frame and engine.

Using a floor jack or other adjustable support, carefully place the engine into the frame and maneuver it into place.

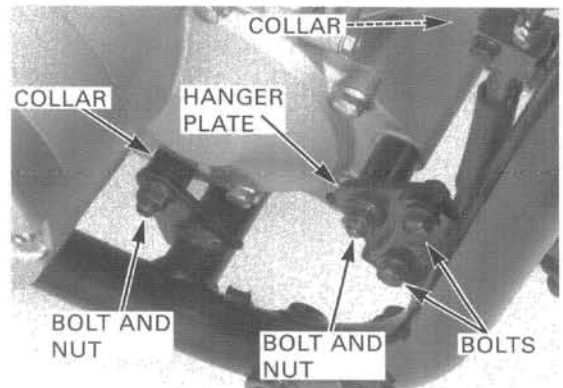
Carefully align the mounting points.

Apply 1 g (0.04 oz) of molybdenum disulfide paste to the output shaft splines. Engage the output shaft with the universal joint.

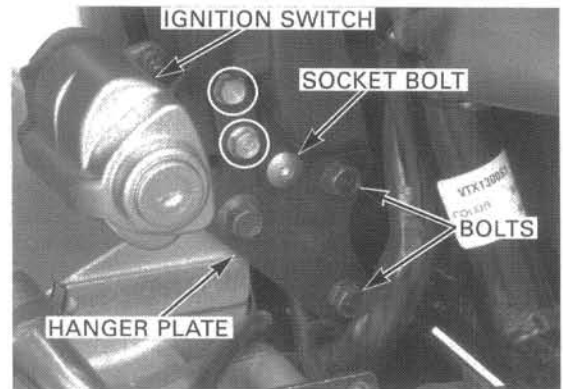


Align the bolt holes in the engine and frame, and install the following fasteners:

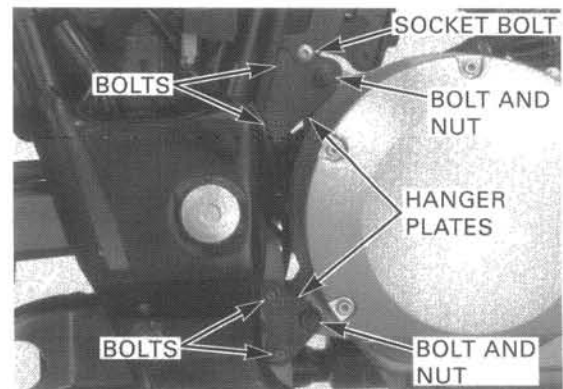
- bottom mounting bolt and collar (right side of the engine)
- bottom mounting nut
- hanger plate with two bolts
- front lower mounting bolt and collar (left side of the engine)
- front lower mounting nut



- hanger plate with the two bolts
- center cover socket bolt
- ignition switch with the two bolts



- hanger plate (upper) with the two bolts
- center cover socket bolt
- rear upper mounting bolt and nut
- hanger plate (lower) with the two bolts
- rear lower mounting bolt and nut



ENGINE REMOVAL/INSTALLATION

- hanger plate with the four bolts

After installing all the mounting fasteners, tighten the fasteners in the following order.

Tighten the hanger plate bolts (8 mm).

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Tighten the mounting nuts (10 mm).

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Install the joint boot over the output gear case properly.

Install the removed parts from the engine removal procedure (page 7-2 to 7-5) in the reverse order of removal.

TORQUE:

Oil pressure switch terminal screw:

2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Starter motor cable terminal nut:

7 N·m (0.7 kgf·m, 5.1 lbf·ft)

Clutch cable holder bolt:

12 N·m (1.2 kgf·m, 9 lbf·ft)

Check the clutch lever free play (page 3-17).

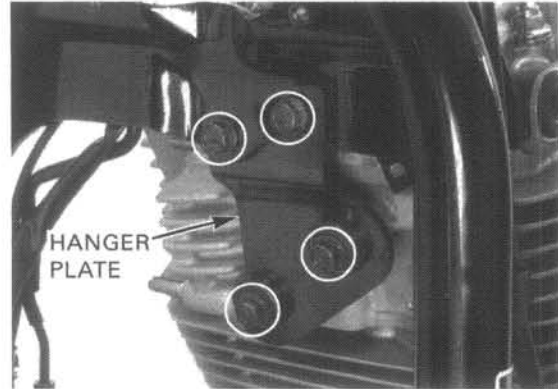
Install the following:

- front ignition coil (page 17-5)
- radiator (page 6-8)
- carburetor (page 5-15)
- both footrest assemblies (page 2-4)
- exhaust system (page 2-6)
- left crankcase rear cover (page 2-3)
- both side covers (page 2-2)
- all cylinder head shrouds (page 2-2)

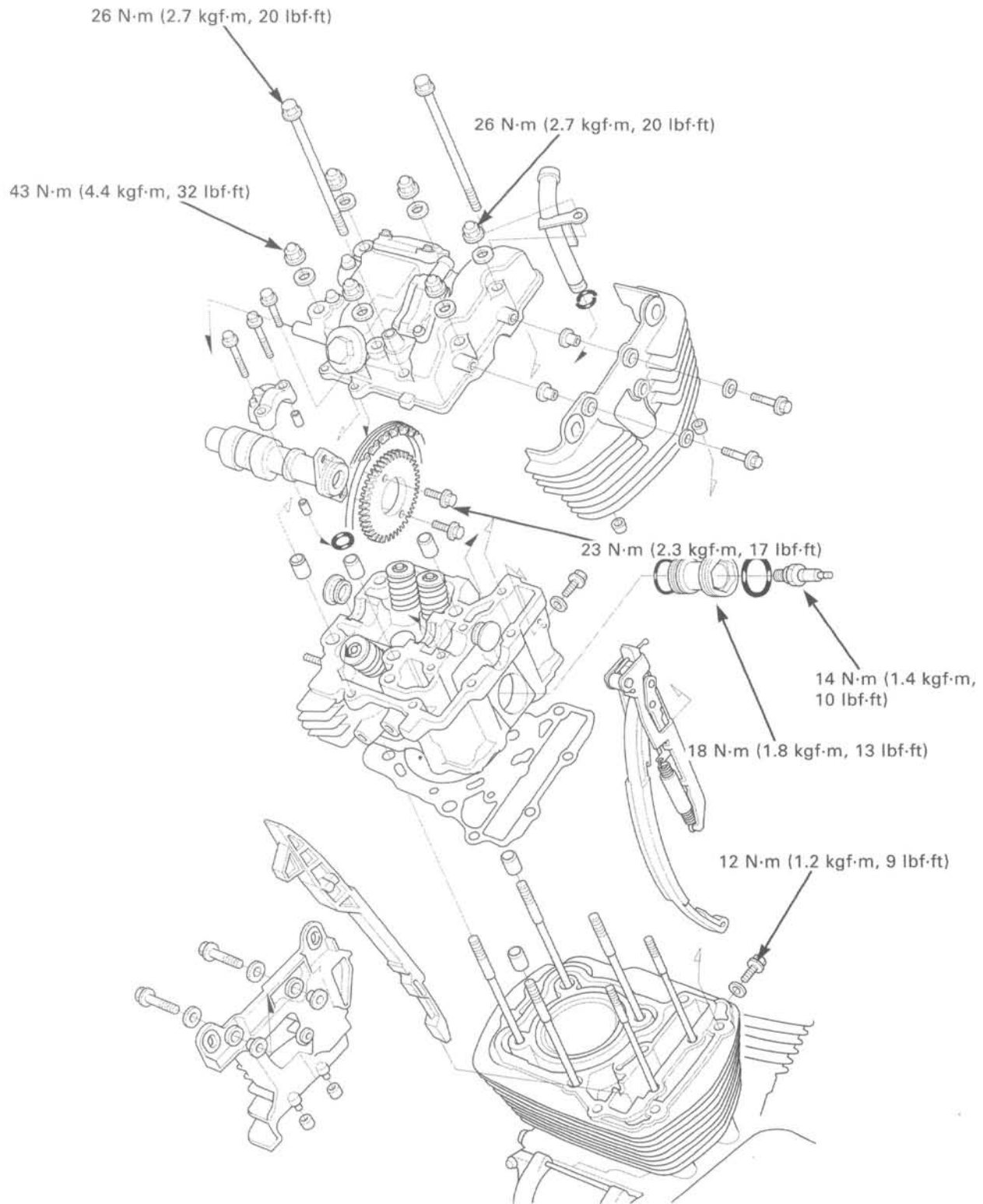
Fill the crankcase with engine oil (page 3-10).

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

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



CYLINDER HEAD/VALVE



8. CYLINDER HEAD/VALVE

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-11
TROUBLESHOOTING	8-2	VALVE SEAT INSPECTION/REFACING	8-12
CYLINDER COMPRESSION	8-3	CYLINDER HEAD ASSEMBLY	8-15
CYLINDER HEAD COVER REMOVAL	8-3	CYLINDER HEAD INSTALLATION	8-16
ROCKER ARM REMOVAL	8-4	CAMSHAFT INSTALLATION	8-17
CAMSHAFT REMOVAL	8-5	ROCKER ARM INSTALLATION	8-20
CYLINDER HEAD REMOVAL	8-8	CYLINDER HEAD COVER INSTALLATION	8-21
CYLINDER HEAD DISASSEMBLY	8-9		

SERVICE INFORMATION

GENERAL

- This section covers service of the rocker arms, camshafts, cylinder head and valves. To service these parts, the engine must be removed from the frame.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head and head cover. Clean the oil passages before assembling the cylinder head and cover.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD		SERVICE LIMIT
Cylinder compression at 300 rpm		1,177 kPa (12.0 kgf/cm ² , 171 psi)		—
Valve clearance		IN	0.15 ± 0.02 (0.006 ± 0.001)	—
		EX	0.30 ± 0.02 (0.012 ± 0.001)	—
Camshaft	Cam lobe height	IN	38.886—39.080 (1.5309—1.5386)	38.86 (1.530)
		EX	39.050—39.250 (1.5374—1.5453)	39.03 (1.537)
	Runout		—	0.04 (0.0016)
	Oil clearance	A, B	0.040—0.101 (0.0016—0.0040)	0.120 (0.0047)
C		0.055—0.121 (0.0022—0.0048)	0.140 (0.0055)	
Rocker arm, rocker arm shaft	Rocker arm shaft O.D.	IN/EX	13.966—13.984 (0.5498—0.5506)	13.91 (0.548)
	Rocker arm I.D.	IN/EX	14.000—14.018 (0.5512—0.5519)	13.95 (0.549)
	Rocker arm-to-shaft clearance		0.016—0.052 (0.0006—0.0020)	0.15 (0.006)
Valve, valve guide	Valve stem O.D.	IN	6.575—6.590 (0.2589—0.2594)	6.57 (0.259)
		EX	6.560—6.575 (0.2583—0.2589)	6.545 (0.2577)
	Valve guide I.D.	IN/EX	6.600—6.615 (0.2598—0.2604)	6.635 (0.2612)
	Stem-to-guide clearance	IN	0.010—0.040 (0.0004—0.0016)	0.08 (0.003)
		EX	0.025—0.055 (0.0010—0.0022)	0.115 (0.0045)
	Valve guide projection above cylinder head	IN	14.5 (0.57)	—
EX		15.5 (0.61)	—	
Valve seat width	IN/EX	0.9—1.1 (0.035—0.043)	1.5 (0.06)	
Valve spring	Free length	IN	45.70 (1.799)	43.90 (1.728)
		EX	43.50 (1.713)	41.80 (1.646)
Cylinder head warpage		—		0.10 (0.004)

CYLINDER HEAD/VALVE

TORQUE VALUES

Spark plug sleeve	18 N·m (1.8 kgf·m, 13 lbf·ft) Apply engine oil to the threads and seating surface.
Cylinder head cover bolt (8 mm)	26 N·m (2.7 kgf·m, 20 lbf·ft)
Cylinder head 10 mm cap nut	43 N·m (4.4 kgf·m, 32 lbf·ft) Apply engine oil to the threads and seating surface.
Cylinder head 8 mm cap nut	26 N·m (2.7 kgf·m, 20 lbf·ft) Apply engine oil to the threads and seating surface.
Cam sprocket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft) Apply locking agent to the threads.
Cam chain tensioner bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

Fork tube holder attachment	07930-KA50100
Valve spring compressor	07757-0010000
Valve guide reamer, 6.6 mm	07984-ZE20001 or 07984-ZE2000D (U.S.A. only)
Valve guide driver, 6.6 mm	07742-0010200 or 07942-6570100 (U.S.A. only)
Valve seat cutter, 33 mm (45° IN)	07780-0010800 — or equivalent commercially available in U.S.A.
Valve seat cutter, 40 mm (45° EX)	07780-0010500 —
Flat cutter, 33 mm (32° IN)	07780-0012900 —
Flat cutter, 42 mm (32° EX)	07780-0013000 —
Interior cutter, 30 mm (60° IN)	07780-0014000 —
Interior cutter, 37.5 mm (60° EX)	07780-0014100 —
Cutter holder, 6.6 mm	07781-0010202 —
Compression tester	EEPV303A (U.S.A. only)

TROUBLESHOOTING

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

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

- Valves
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
 - Uneven valve seating
 - Valve stuck open
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head
 - Loose spark plug
- Cylinder/piston problem (section 9)

Compression too high

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

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (section 9)

Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn or damaged rocker arm and/or shaft
- Worn rocker arm follower or valve stem end
- Worn cam sprocket teeth
- Worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (section 9)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION

Warm up the engine to normal operating temperature. Stop the engine.

Disconnect all the spark plug caps and remove one spark plug from each cylinder head (page 3-6). Install the compression gauge into the spark plug hole.

TOOL:

Compression tester **EEPV303A (U.S.A. only)**

Shift the transmission into neutral.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4—7 seconds.

COMPRESSION PRESSURE:

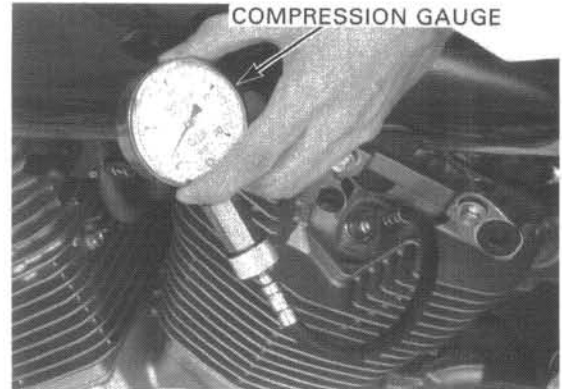
1,177 kPa (12.0 kgf/cm², 171 psi)
at 300 rpm

Low compression can be caused by:

- blown cylinder head gasket
- improper valve adjustment
- valve leakage
- worn piston ring or cylinder

High compression can be caused by:

- carbon deposits in combustion chamber or on piston head

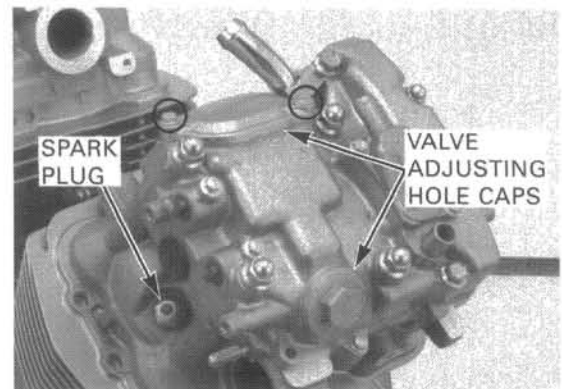
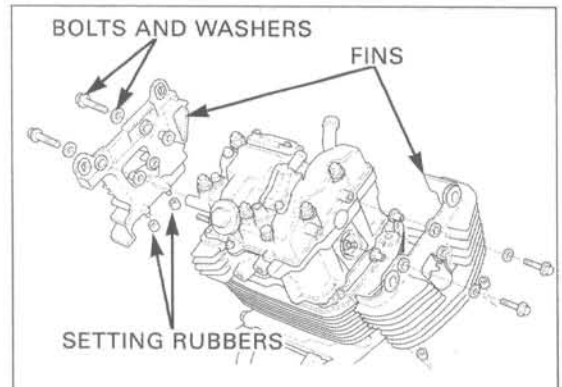


CYLINDER HEAD COVER REMOVAL

Remove the engine from the frame (section 7).

Remove the following:

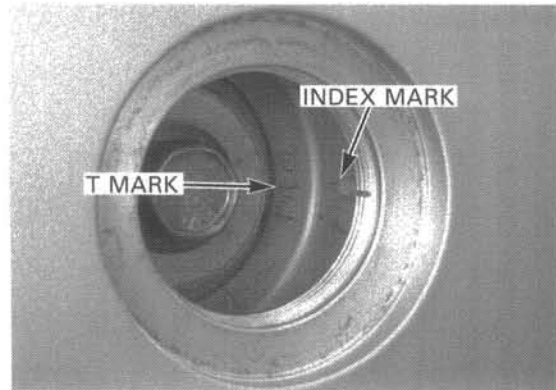
- bolts and washers
 - cylinder head fins
 - setting rubbers
-
- intake manifold (page 5-16; if the cylinder head will be removed)
 - spark plug from each cylinder head (page 3-6)
 - timing hole cap (page 3-7)
 - valve adjusting hole caps



CYLINDER HEAD/VALVE

"FT" for front cylinder.
"RT" for rear cylinder.

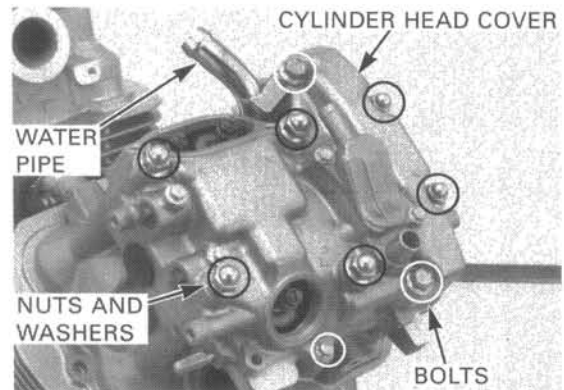
Rotate the crankshaft clockwise and align the "T" mark on the primary drive gear with the index mark on the right crankcase cover. Make sure the piston is at TDC (Top Dead Center) on the compression stroke. This position can be obtained by confirming that there is slack in the rocker arms. If there is no slack, rotate the crankshaft clockwise one full turn and align the "T" mark with the index mark again.



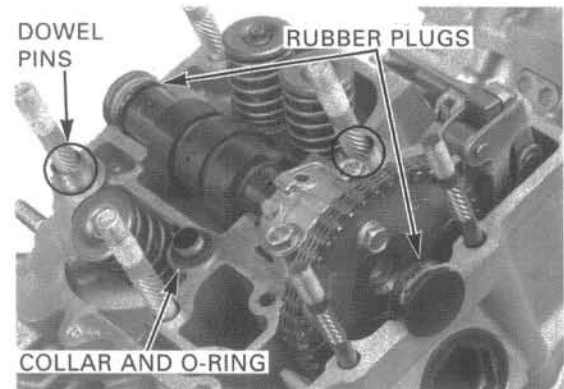
Remove the following:

- 6-mm bolt
- two 8-mm bolts and water pipe
- two 8-mm cap nuts and washers
- four 10-mm cap nuts and washers
- cylinder head cover

Do not strike the head cover too hard and do not damage the mating surfaces with a screw driver.



- rubber plugs
- joint collar and O-ring
- dowel pins

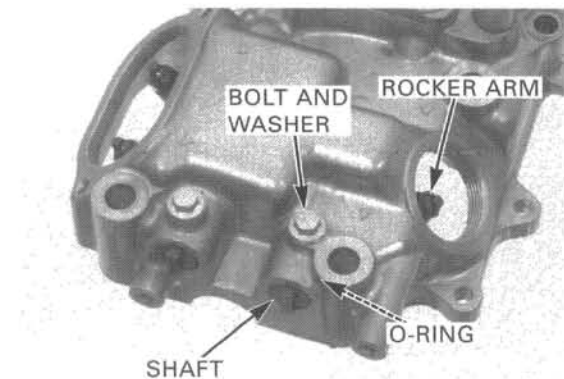


ROCKER ARM REMOVAL

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

Remove the following:

- bolts and sealing washers
- rocker arm shafts and O-rings
- rocker arms



INSPECTION

Inspect the sliding surfaces of the rocker arms and shafts for wear or damage.
Check the oil holes for clogs.

Measure the O.D. of each shaft at the rocker arm sliding areas.

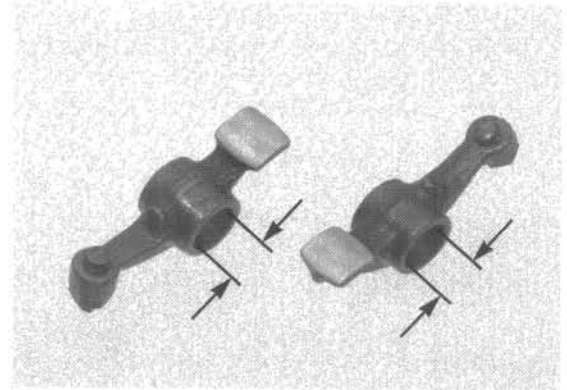
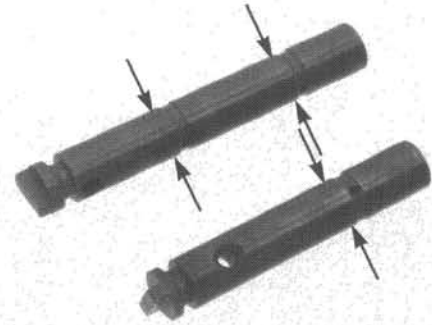
SERVICE LIMIT: 13.91 mm (0.548 in)

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 13.95 mm (0.549 in)

Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.15 mm (0.006 in)

**CAMSHAFT REMOVAL**

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

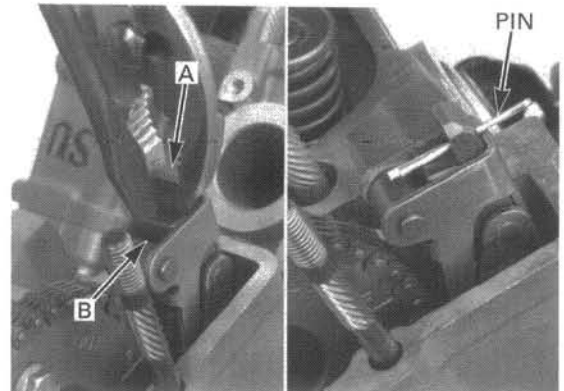
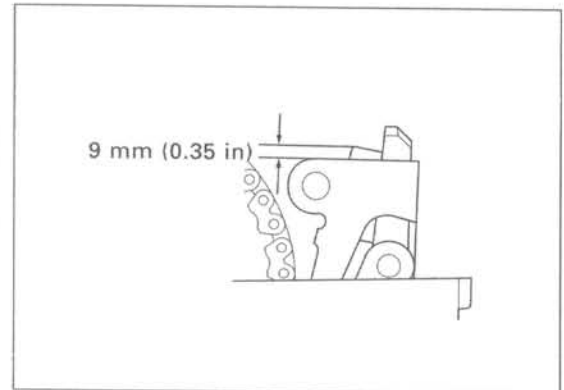
Before releasing the cam chain tensioner, measure the distance of the cam chain tensioner projects above the bracket as shown.

Replace the cam chain with a new one if the projection exceeds 9.0 mm (0.35 in).

To replace the cam chain, remove the following:

- camshaft
- Front cylinder: flywheel/starter clutch (page 18-12)
- Rear cylinder: primary drive gear (page 10-15)

Release the tensioner by pulling wedge A straight up while holding wedge B down, then secure wedge A with a 2 mm pin as shown.



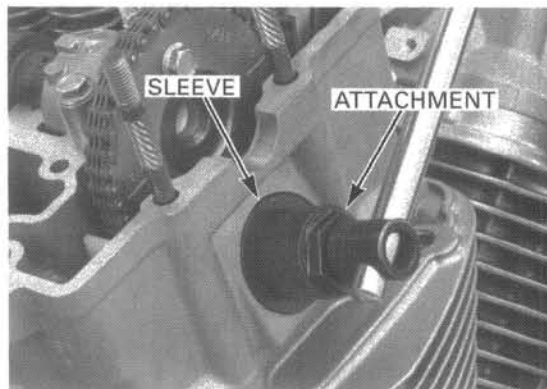
CYLINDER HEAD/VALVE

Remove the following from the cam chain side:

- spark plug
- spark plug sleeve

TOOL:

Fork tube holder attachment 07930-KA50100

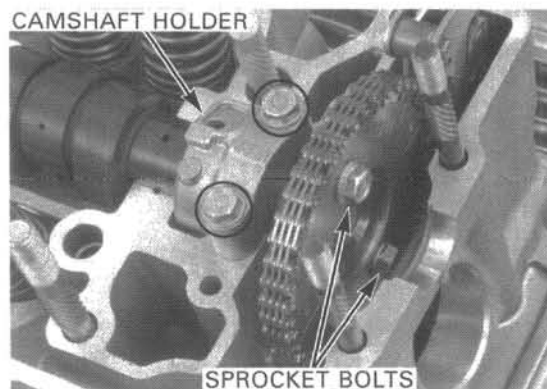


Be careful not to let the bolts fall into the crankcase.

- cam sprocket bolt
- other sprocket bolt (rotate the crankshaft one turn)
- two holder bolts
- camshaft holder

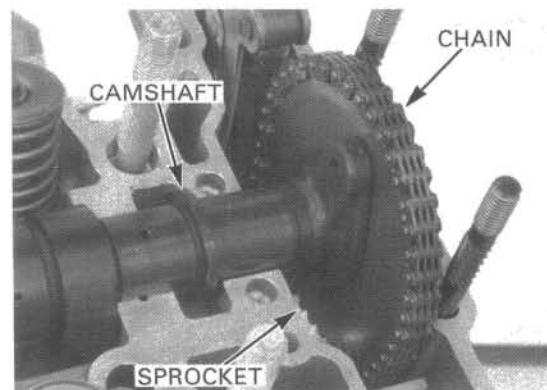
NOTE:

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



Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

- cam sprocket with cam chain (from the camshaft)
- camshaft
- cam sprocket (from the cam chain)



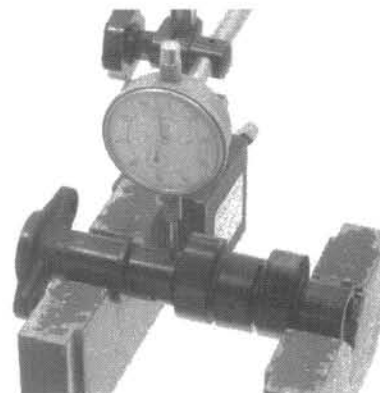
INSPECTION

CAMSHAFT

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

Measure the camshaft runout using a dial indicator.

SERVICE LIMIT: 0.04 mm (0.0016 in)



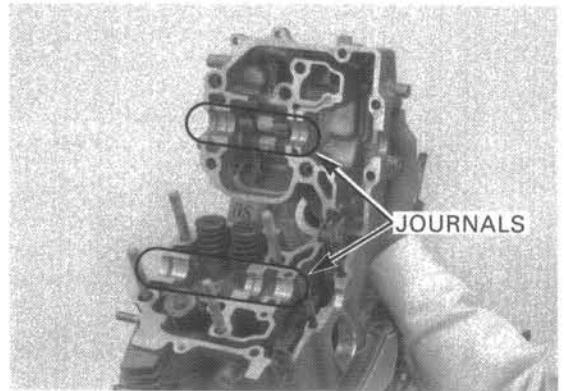
Measure each cam lobe height using a micrometer.

SERVICE LIMITS: IN: 38.86 mm (1.530 in)
EX: 39.03 mm (1.537 in)



CAMSHAFT JOURNAL

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



CAMSHAFT OIL CLEARANCE

NOTE:

- Do not rotate the camshaft during inspection.

Do not hook the cam chain attaching wire against the cylinder head mating surface.

Suspend the cam chain attaching wire through the spark plug sleeve hole.

Clean off any oil from the journals of the camshaft holder, camshaft, cylinder head and head cover.

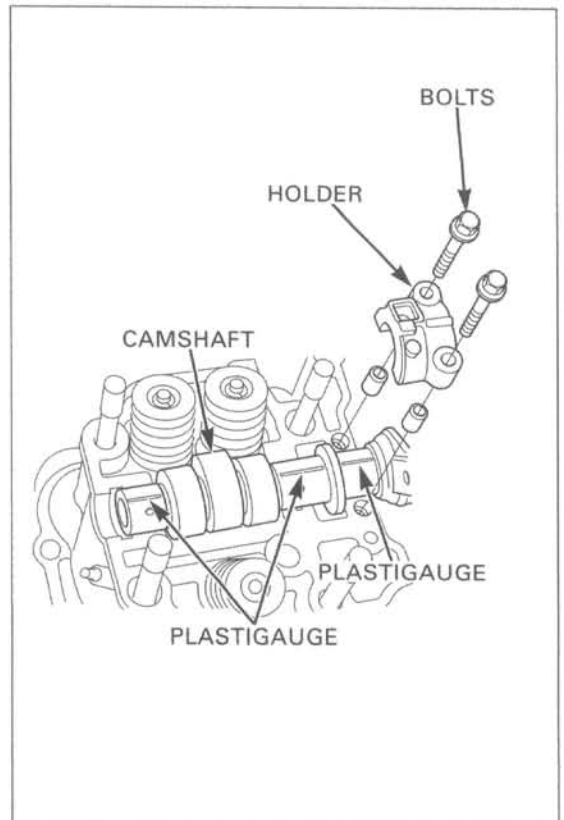
*The camshafts have the identification mark on their flanges:
 - "F": front camshaft
 - "R:" rear camshaft*

Put the camshaft onto the cylinder head and lay a strip of plastigauge lengthwise on the the sprocket side journal of the camshaft.

Carefully install the camshaft holder with the dowel pins. Install the holder bolts and tighten them alternately in several steps.

TORQUE: 12 N·m (1.2 kgfm, 9 lbf·ft)

Lay a strip of plastigauge lengthwise on each camshaft journal and be sure to avoid the oil passages.



CYLINDER HEAD/VALVE

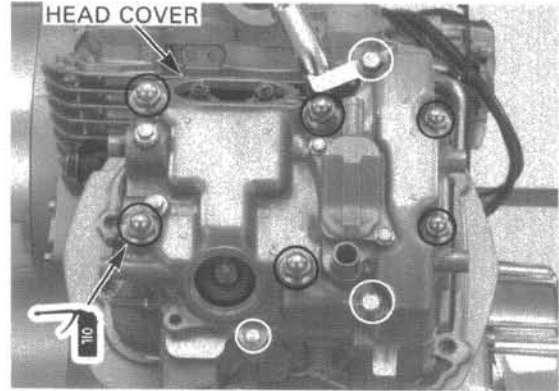
Install the dowel pins and cylinder head cover onto the cylinder head while holding the rocker arms, being careful not to drop the plastigauge.

Apply engine oil to the threads and seating surface of the cap nuts. Install the bolts and cap nuts with the washers, and tighten them in a crisscross pattern in several steps.

TORQUE:

10 mm nut: 43 N·m (4.4 kgf·m, 32 lbf·ft)

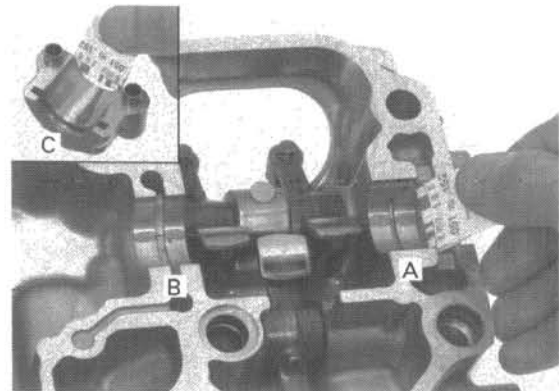
8 mm bolt and nut: 26 N·m (2.7 kgf·m, 20 lbf·ft)



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

SERVICE LIMITS: A, B: 0.120 mm (0.0047 in)
C: 0.140 mm (0.0055 in)

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



CYLINDER HEAD REMOVAL

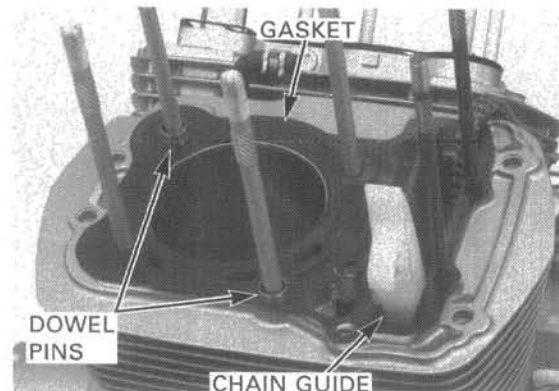
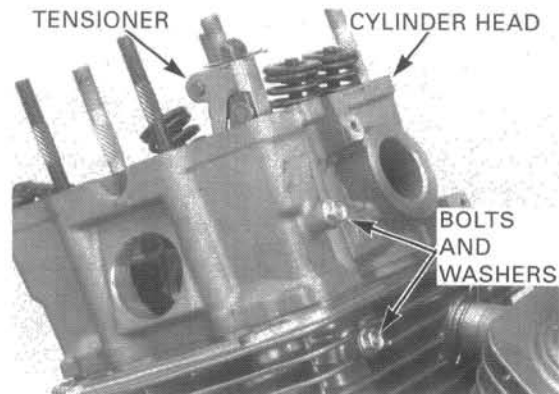
Remove the camshaft (page 8-5).

Remove the following:

- two bolts and sealing washers
- cam chain tensioner
- cylinder head

Do not strike the cylinder head too hard and do not damage the mating surface with a screw driver.

- gasket
- dowel pins
- cam chain guide



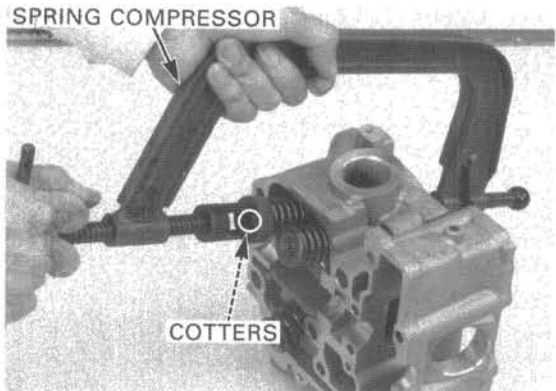
CYLINDER HEAD DISASSEMBLY

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

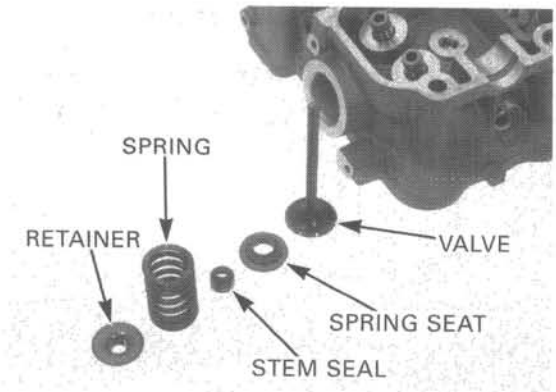
To prevent loss of tension, do not compress the valve spring more than necessary to remove the cotters.

Remove the valve spring cotters using the valve spring compressor.

TOOL:
Valve spring compressor 07757-0010000



- Remove the following:
- spring retainer
 - valve spring
 - valve
 - stem seal
 - spring seat

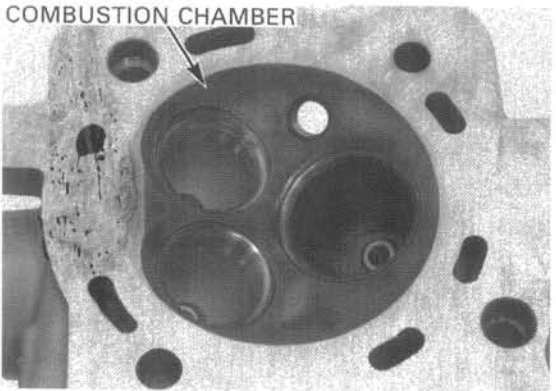


INSPECTION

CYLINDER HEAD

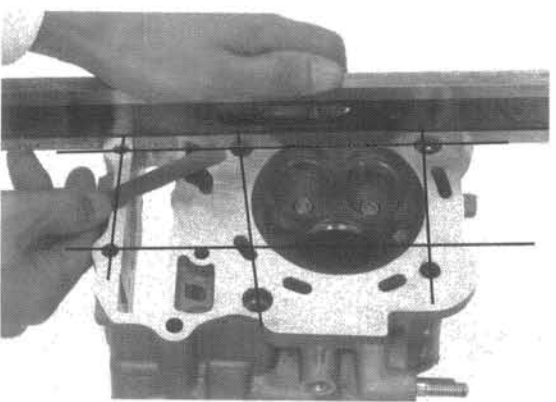
Be careful not to damage the gasket surface.

Remove the carbon deposits from the combustion chamber. Check the spark plug hole and valve areas for cracks.



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

SERVICE LIMIT: 0.10 mm (0.004 in)

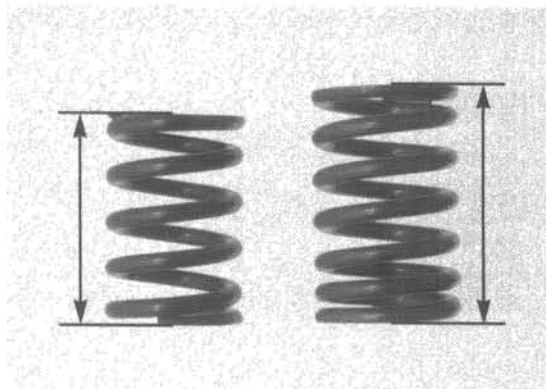


CYLINDER HEAD/VALVE

VALVE SPRING

Measure the valve spring free length.

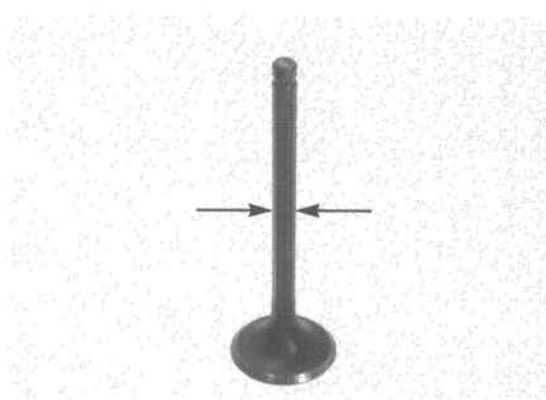
SERVICE LIMITS: IN: 43.90 mm (1.728 in)
EX: 41.80 mm (1.646 in)



VALVE/VALVE GUIDE

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

SERVICE LIMITS: IN: 6.57 mm (0.259 in)
EX: 6.545 mm (0.2577 in)



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

TOOL:
Valve guide reamer, 6.6 mm **07984-ZE20001 or**
07984-ZE2000D
(U.S.A. only)

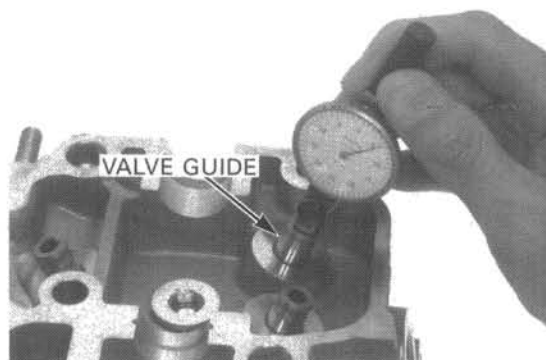


Measure each valve guide I.D. and record it.

SERVICE LIMIT: IN/EX: 6.635 mm (0.2612 in)

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

SERVICE LIMITS: IN: 0.08 mm (0.003 in)
EX: 0.115 mm (0.0045 in)

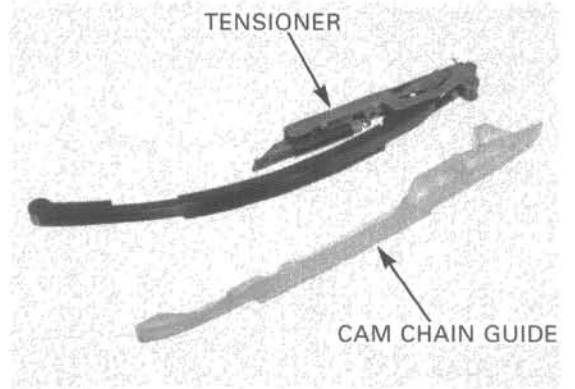


Inspect and reface the valve seats whenever the valve guides are replaced (page 8-12).

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

CAM CHAIN TENSIONER/GUIDE

Check the tensioner and guide for excessive wear or damage.



VALVE GUIDE REPLACEMENT

Mark new valve guides at the specified height indicated below, using a marker.

Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head. Using a torch to heat the cylinder head may cause warpage.

Chill the new valve guides in a freezer for about an hour.

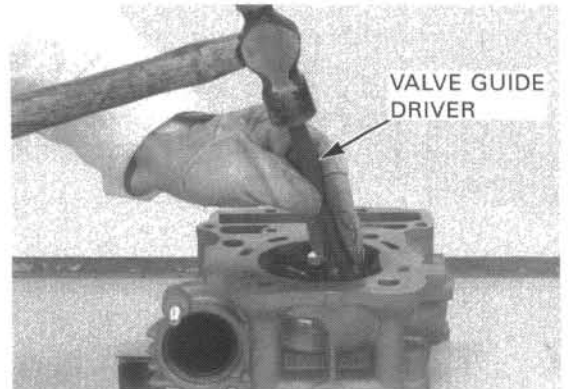
Heat the cylinder head to 130—140°C (275—290°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (300°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

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

TOOL:

Valve guide driver, 6.6 mm

07742-0010200 or
07942-6570100
(U.S.A. only)



While the cylinder head is still heated, remove the new valve guides from the freezer and drive them into the cylinder head from the camshaft side until the exposed height is at the specified value (at the marks).

TOOL:

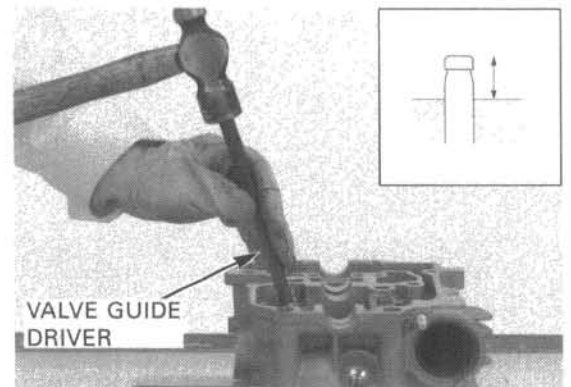
Valve guide driver, 6.6 mm

07742-0010200 or
07942-6570100
(U.S.A. only)

VALVE GUIDE PROJECTION:

IN: 14.5 mm (0.57 in)

EX: 15.5 mm (0.61 in)



Let the cylinder head cool to room temperature.

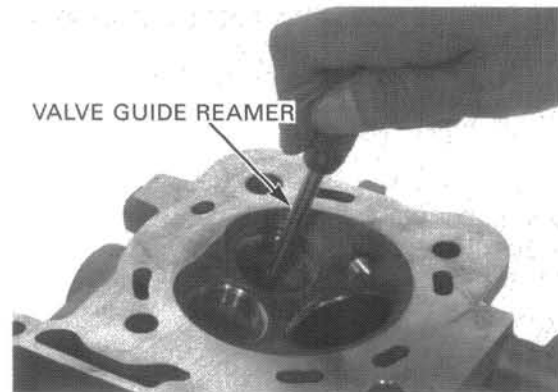
CYLINDER HEAD/VALVE

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

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

TOOL:
Valve guide reamer, 6.6 mm 07984-ZE20001 or 07984-ZE2000D (U.S.A. only)

Clean the cylinder head thoroughly to remove any metal particles after reaming and refacing the valve seat (see next page).

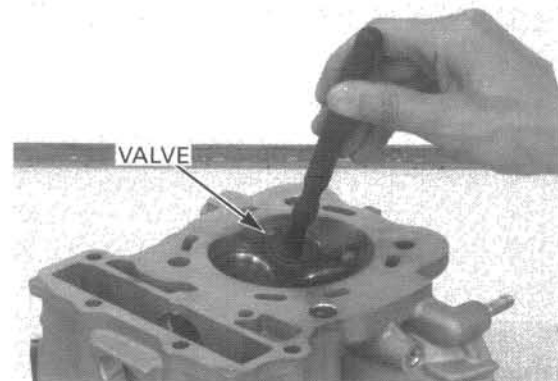


VALVE SEAT INSPECTION/REFACING

INSPECTION

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

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

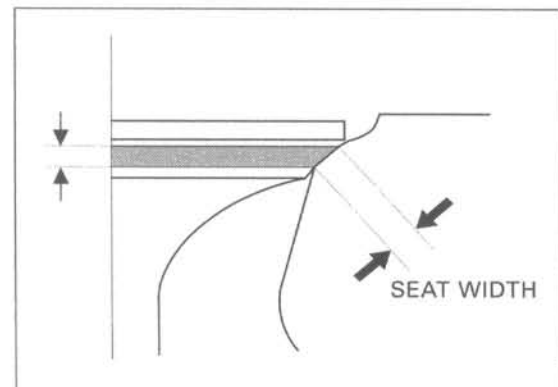


The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

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

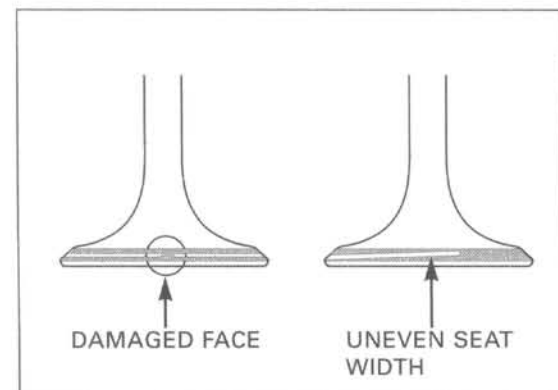
STANDARD: 0.9—1.1 mm (0.035—0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

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

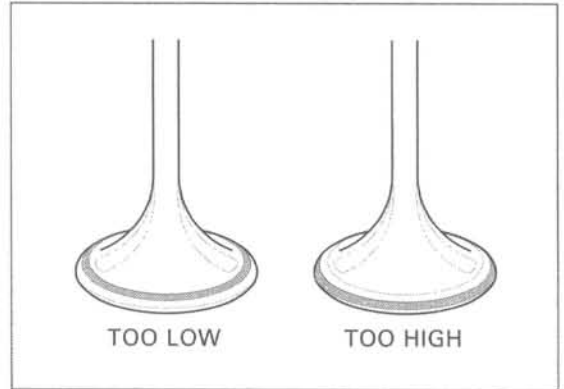


Inspect the valve seat face for:

- Damaged face:
 - Replace the valve and reface the valve seat.
- Uneven seat width:
 - Replace the valve and reface the valve seat.



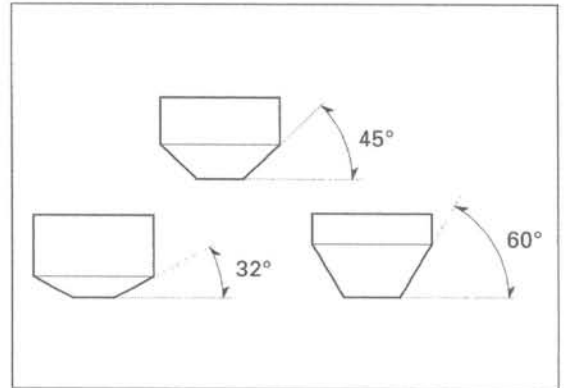
- Contact area (too low or too high)
 - Reface the valve seat.



REFACING

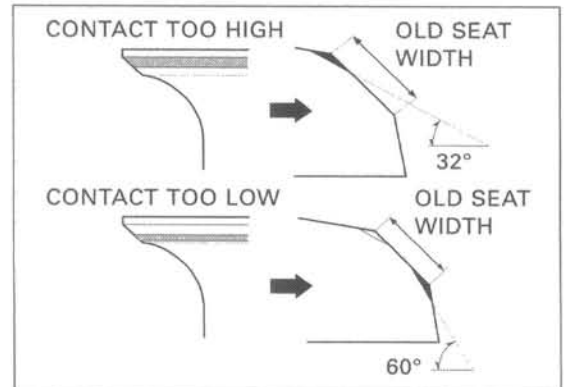
NOTE

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



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

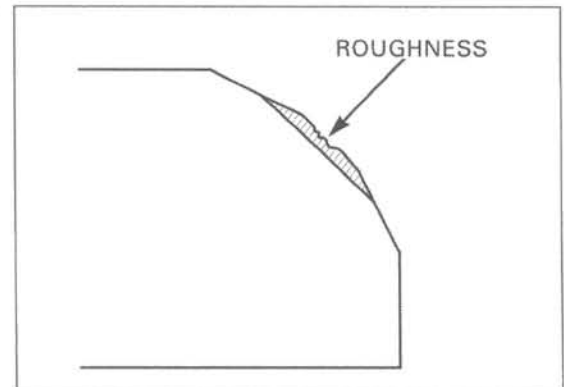
If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



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

TOOLS:

- Valve seat cutter, 33 mm (45° IN) 07780-0010800
- Valve seat cutter, 40 mm (45° EX) 07780-0010500
- Cutter holder, 6.6 mm 07781-0010202
- or equivalent commercially available in U.S.A.

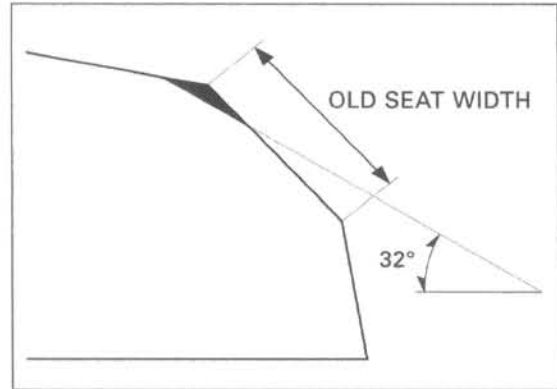


CYLINDER HEAD/VALVE

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

TOOLS:

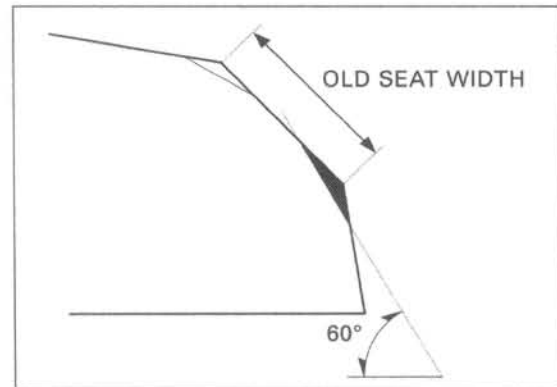
Flat cutter, 33 mm (32° IN) 07780-0012900
Flat cutter, 42 mm (32° EX) 07780-0013000
Cutter holder, 6.6 mm 07781-0010202
or equivalent commercially available in U.S.A.



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

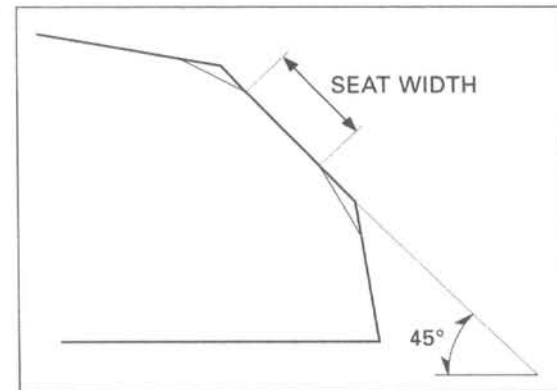
TOOLS:

Interior cutter, 30 mm (60° IN) 07780-0014000
Interior cutter, 37.5 mm (60° EX) 07780-0014100
Cutter holder, 6.6 mm 07781-0010202
or equivalent commercially available in U.S.A.



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

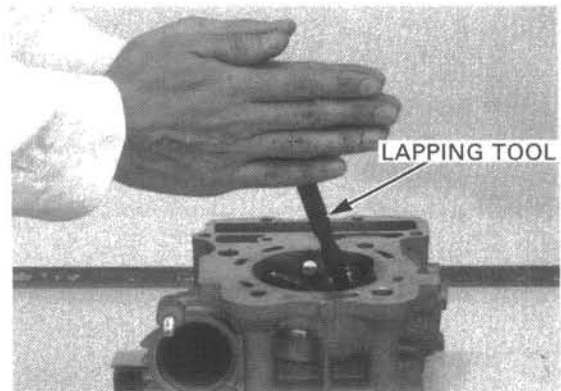
Make sure all pitting and irregularities are removed.



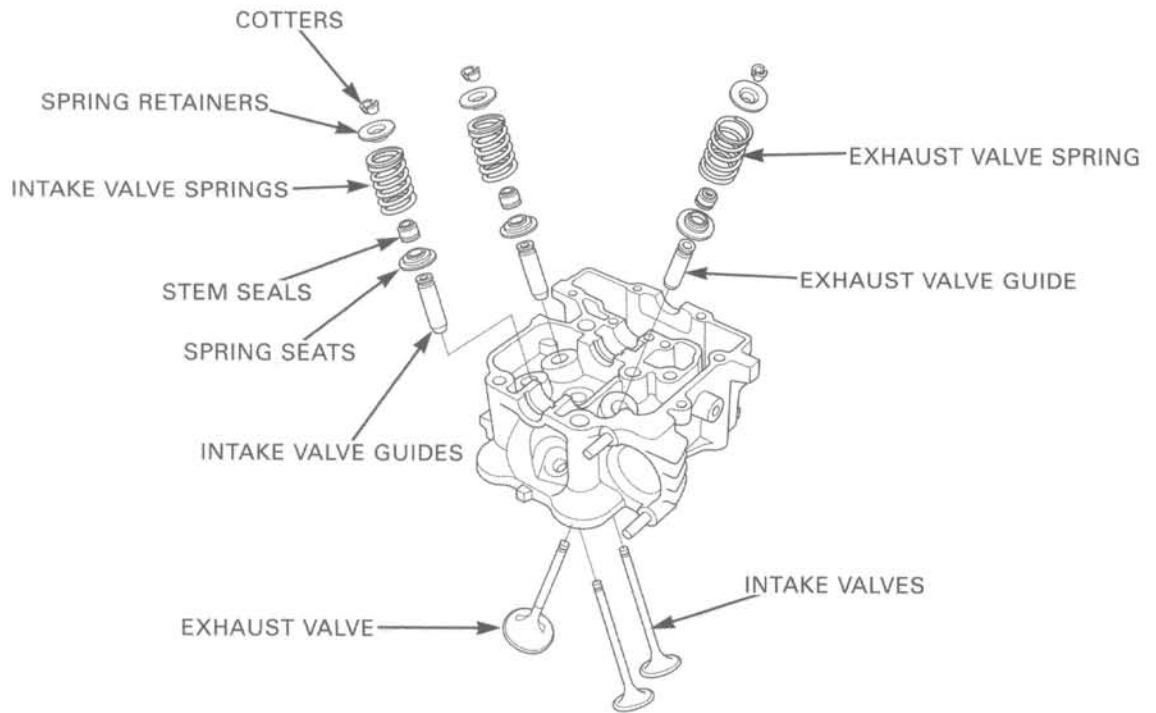
Excessive lapping pressure may deform or damage the seat. Do not allow lapping compound to enter the guides.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure. Change the angle of the lapping tool frequently to prevent uneven seat wear.

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

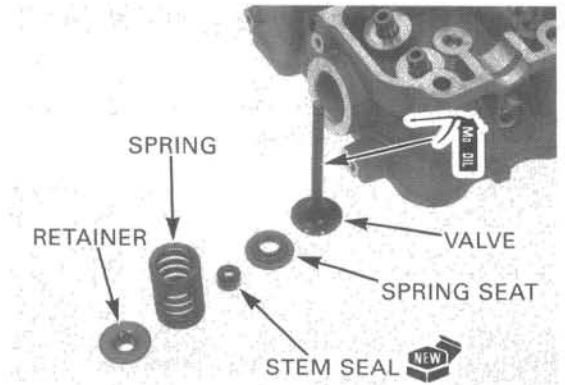


CYLINDER HEAD ASSEMBLY



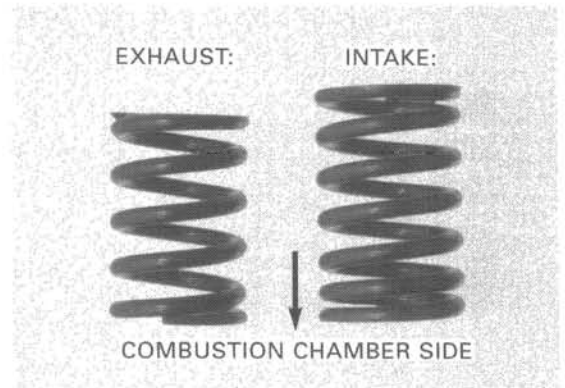
Blow out all of the oil passages in the cylinder head with compressed air.
Install the spring seats and new stem seals.

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



Install the valve springs with the tightly wound coils of the exhaust valve spring facing the combustion chamber.

Install the spring retainer.



CYLINDER HEAD/VALVE

Grease the cotters to ease installation.

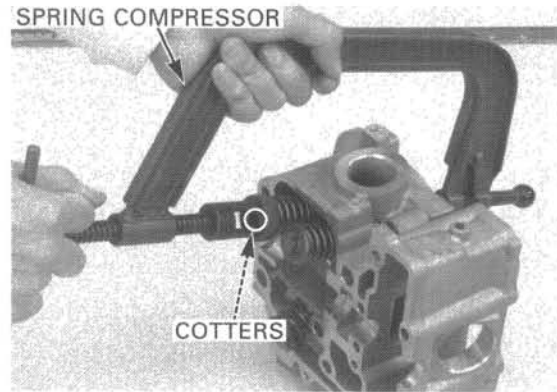
To prevent loss of tension, do not compress the valve springs more than necessary to install the cotters.

Install the valve spring cotters using the valve spring compressor.

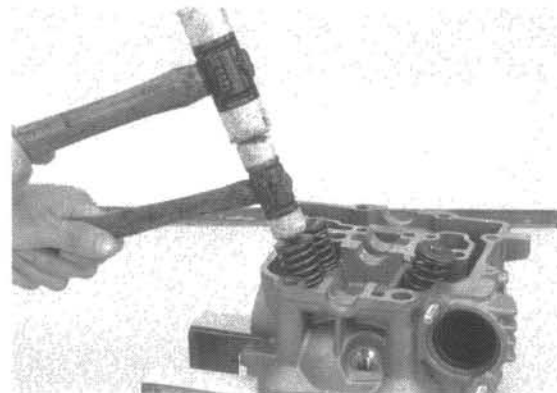
TOOL:

Valve spring compressor

07757-0010000



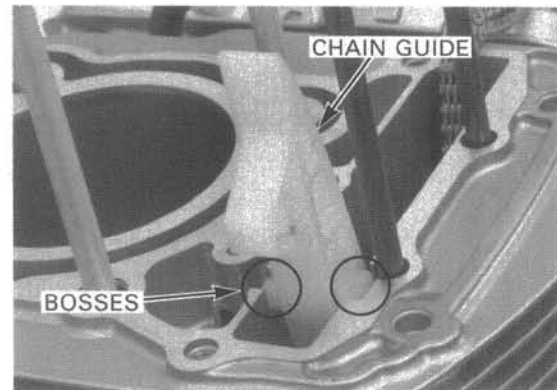
Support the cylinder head so the valve heads will not contact anything and possibly get damaged. Tap the valve stems gently with two plastic hammers to seat the cotters firmly as shown.



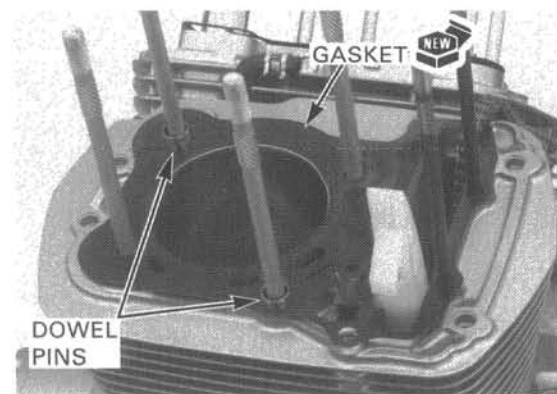
CYLINDER HEAD INSTALLATION

Clean the gasket mating surfaces of the cylinder and cylinder head thoroughly, being careful not to damage them.

Install the cam chain guide by aligning the guide end with the groove in the crankcase and the bosses with the groove in the cylinder.



Install the two dowel pins and a new gasket.



CYLINDER HEAD/VALVE

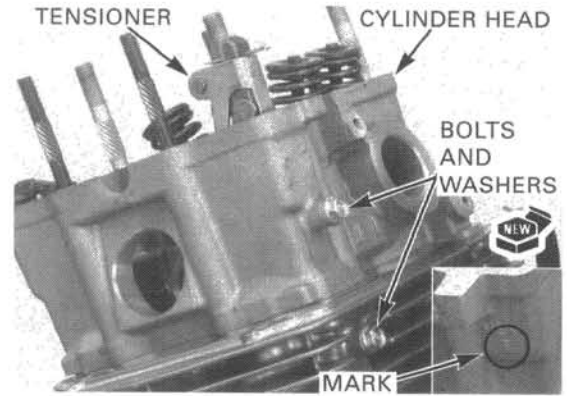
The cylinder heads have the following identification marks:
- "F": front
- "R": rear

Install the cylinder head onto the cylinder.

Install the cam chain tensioner by aligning the tensioner end with the groove in the crankcase.

Install the tensioner bolts with new sealing washers and tighten them alternately.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



CAMSHAFT INSTALLATION

NOTE:

- If both the front and rear camshafts were removed, start the installation with the front cylinder (see the following page).
- Even if you are servicing either the front or rear cylinder head, the other cylinder head cover must be removed and the other camshaft position must be checked.

NOTICE

Carefully rotate the crankshaft while holding the cam chain to avoid jamming the cam chain into the timing sprocket of the crankshaft.

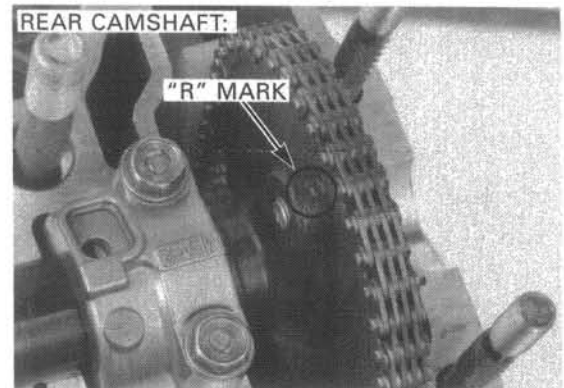
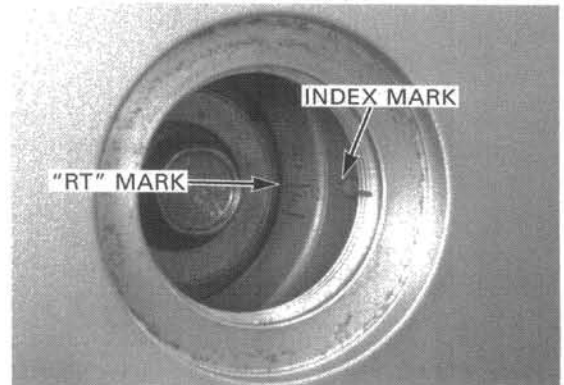
FRONT CAMSHAFT

If the rear cylinder has not been serviced, begin here:

Remove the rear cylinder head cover and check the rear camshaft position as follows:

Turn the crankshaft clockwise and align the "RT" mark on the primary drive gear with the index mark on the crankcase cover, then check the identification mark "R" on the rear camshaft flange.

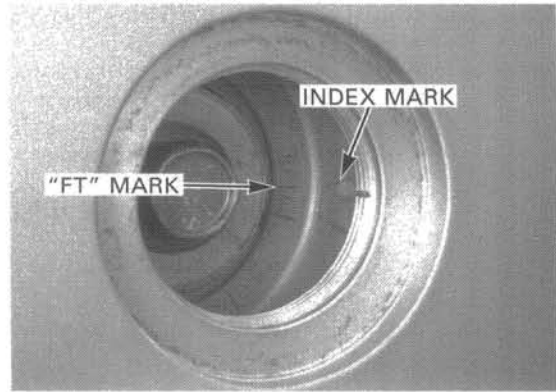
- If the "R" mark faces up, turn the crankshaft clockwise 1-1/7 (412°) turn (align the "FT" mark with the index mark) and begin installation of the front camshaft.
- If the "R" mark faces down (cannot be seen), turn the crankshaft clockwise 1/7 (52°) turn (align the "FT" mark with the index mark) and begin installation of the front camshaft.



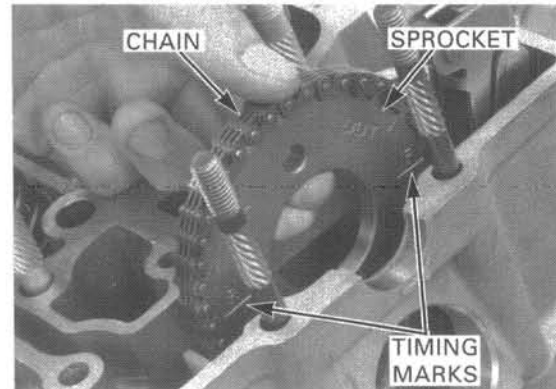
CYLINDER HEAD/VALVE

If both camshafts have been serviced, begin installation of the front camshaft here:

Align the "FT" mark on the primary drive gear with the index mark on the crankcase cover.



Set the cam sprocket onto the cam chain carefully so the timing marks on the sprocket are flush with the cylinder head surface.

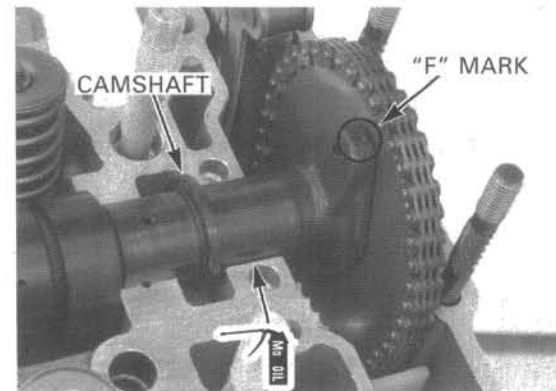


The camshafts are identified by the following marks:

- "F": front camshaft
- "R": rear camshaft

Apply molybdenum oil solution to the camshaft journals.

Install the camshaft onto the cylinder head through the sprocket with the "F" mark on the flange facing up, then install the sprocket onto the camshaft flange.



Make sure the timing marks on the sprocket aligns with the cylinder head surface when the "FT" mark is aligned with the index mark.

Align the bolt holes in the sprocket and camshaft flange and install the camshaft holder with the dowel pins.

Install the holder bolts and tighten them alternately in several steps.

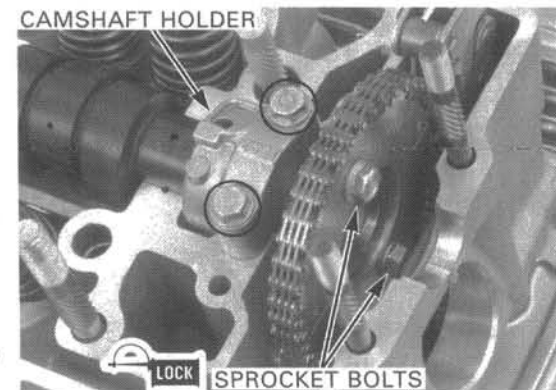
Apply locking agent to the threads of the sprocket bolts.

Install the sprocket bolt. Turn the crankshaft clockwise one revolution and install the remaining bolt.

Tighten the sprocket bolt while holding the crankshaft.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Turn the crankshaft one revolution and tighten the other bolt to the same torque.

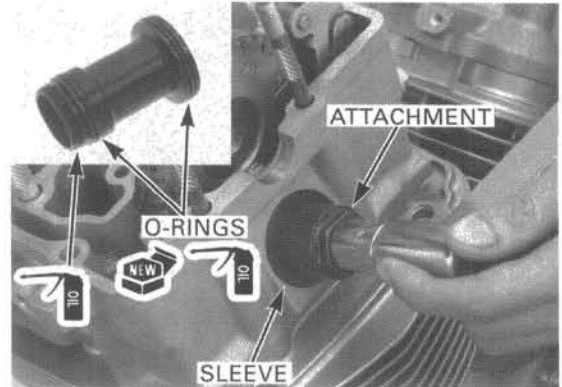


Coat new O-rings with engine oil and install them into the grooves in the spark plug sleeve.

Apply engine oil to the sleeve threads. Install the spark plug sleeve and tighten it.

TOOL:
Fork tube holder attachment 07930-KA50100

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



REAR CAMSHAFT

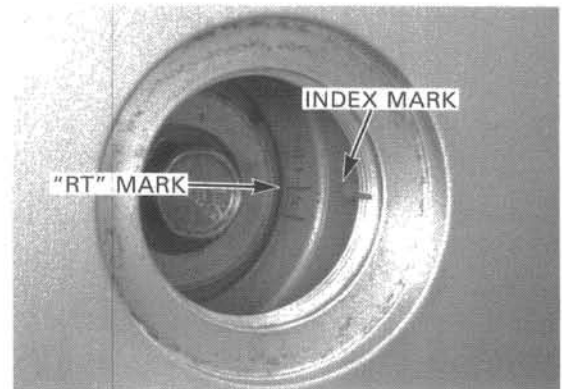
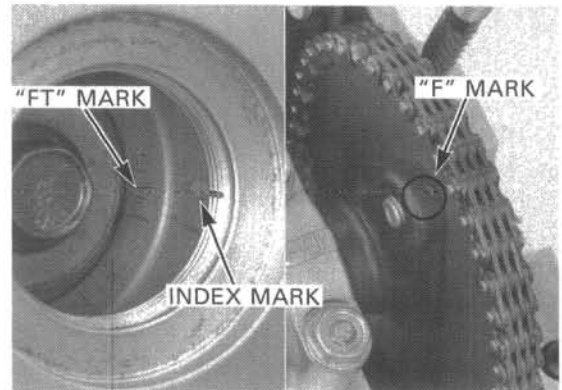
If the front cylinder has not been serviced, remove the front cylinder head cover and begin installation of the rear camshaft.

Turn the crankshaft clockwise and align the "FT" mark on the primary drive gear with the index mark on the crankcase cover, then check the identification mark "F" on the front camshaft flange.

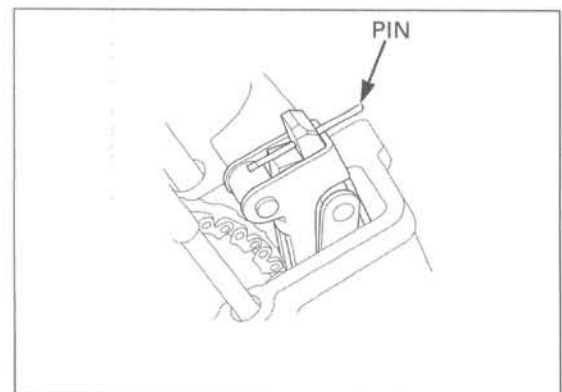
- If the "F" mark faces up, turn the crankshaft clockwise 6/7 (308°) turn and align the "RT" mark with the index mark.
- If the "F" mark faces down (cannot be seen), turn the crankshaft clockwise 1-6/7 (668°) turn and align the "RT" mark with the index mark.

NOTE:

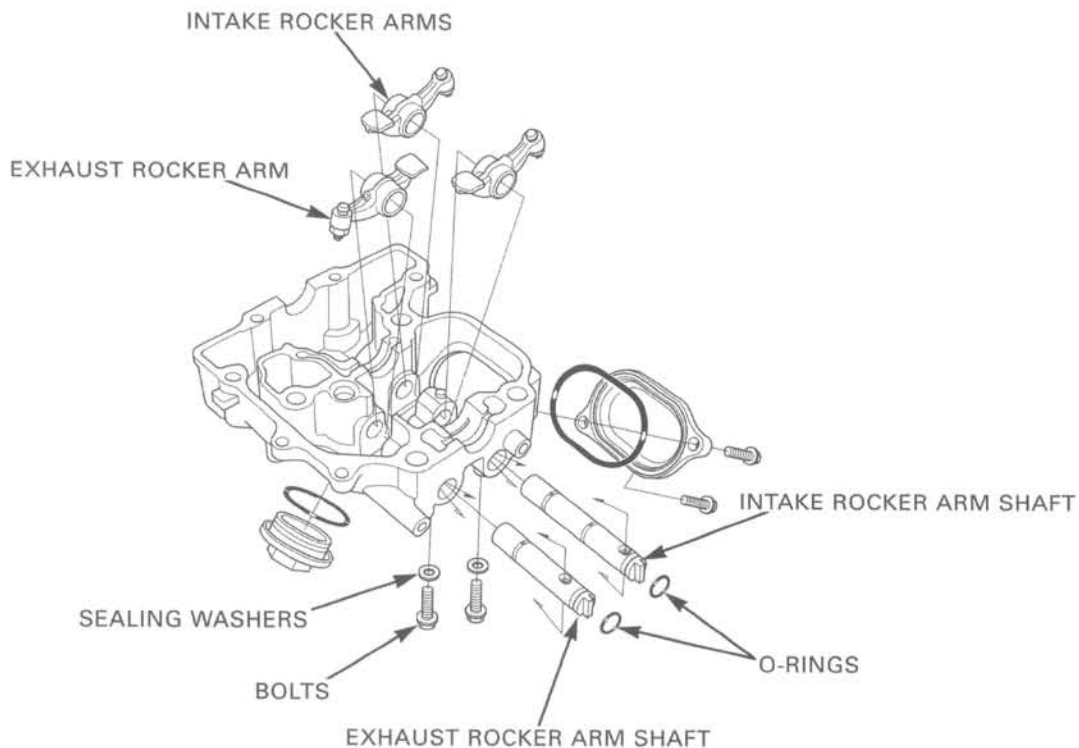
- The remainder of the rear camshaft installation is the same as the procedures described on page 8-18 from the second step. The "R" mark on the rear camshaft flange should face up.



After camshaft installation is completed, remove the 2 mm pin from each cam chain tensioner.

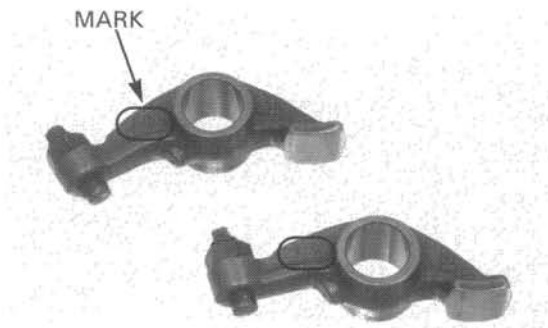


ROCKER ARM INSTALLATION



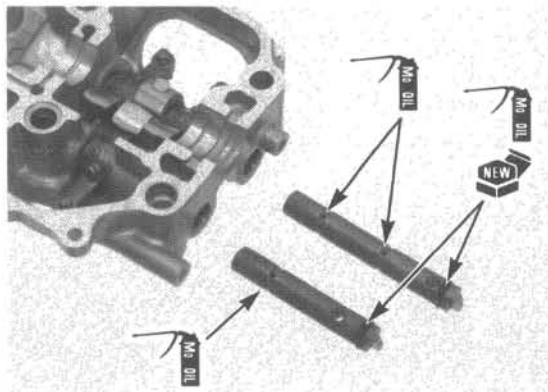
The rocker arms have the following identification marks:
"IN": intake
"EX": exhaust

Place the rocker arms into the head cover in the proper position.

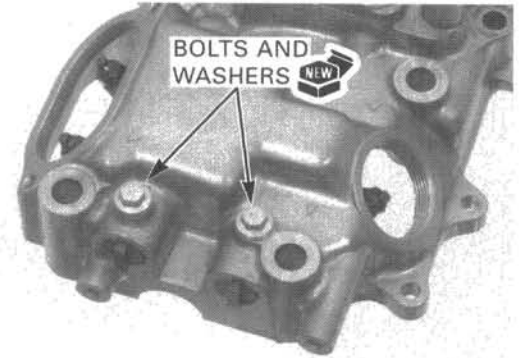


Coat new O-rings with molybdenum oil solution and install them into each rocker arm shaft groove.

Apply molybdenum oil solution to the sliding surface of the shaft. Install the rocker arm shafts through the head cover and rocker arms.



Align the bolt holes in the head cover and rocker arm shafts. Install the retaining bolts with new sealing washers and tighten them.



CYLINDER HEAD COVER INSTALLATION

Rotate the crankshaft clockwise so the cam lobes face down.

Clean the gasket mating surfaces of the cylinder head and cover thoroughly, being careful not to damage them.

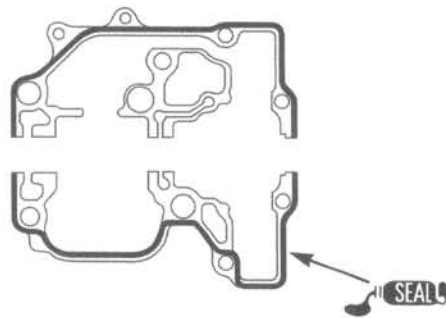
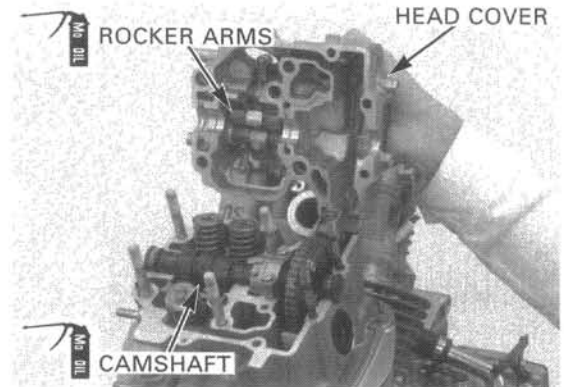
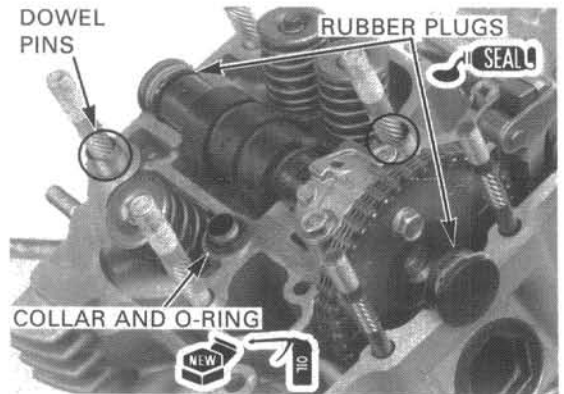
Install the following:

- two dowel pins
- joint collar and a new O-ring (apply engine oil)
- rubber plugs (apply sealant to the seating surface)

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

Apply molybdenum oil solution to the slipper surfaces of the rocker arms.

Apply liquid sealant to the head cover mating surface as shown.

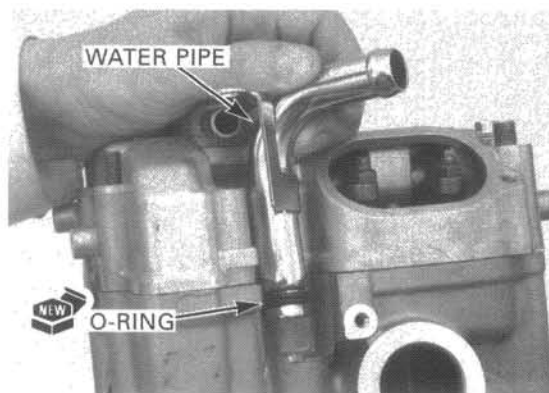


Make sure the sealant is applied evenly to the mating surfaces.

Carefully install the cylinder head cover while holding the rocker arms to avoid interfering the rocker arms with the camshaft.

CYLINDER HEAD/VALVE

Install the water pipe with a new O-ring.



Apply engine oil to the threads and seating surface of each cap nut, and install the following:

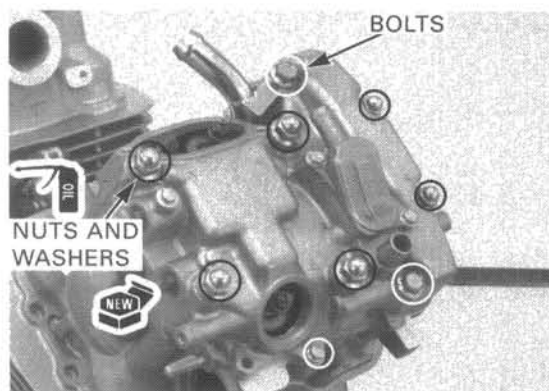
- four 10-mm cap nuts and with new sealing washers
- two 8-mm cap nuts and with new sealing washers
- two 8-mm bolts
- 6-mm bolt

Tighten the fasteners in a crisscross pattern in several steps.

TORQUE:

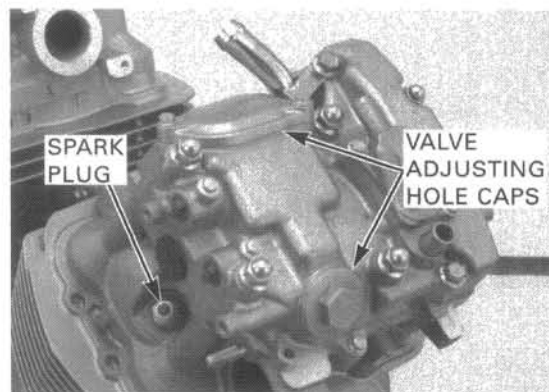
10 mm nut: 43 N·m (4.4 kgf·m, 32 lbf·ft)

8 mm bolt and nut: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Install the following:

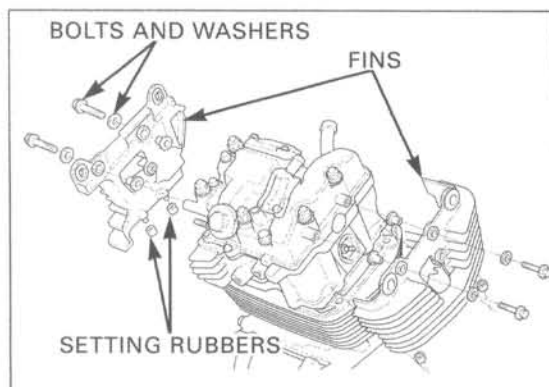
- spark plugs (page 3-6)
- valve adjusting hole caps (page 3-9)
- timing hole cap (page 3-9)

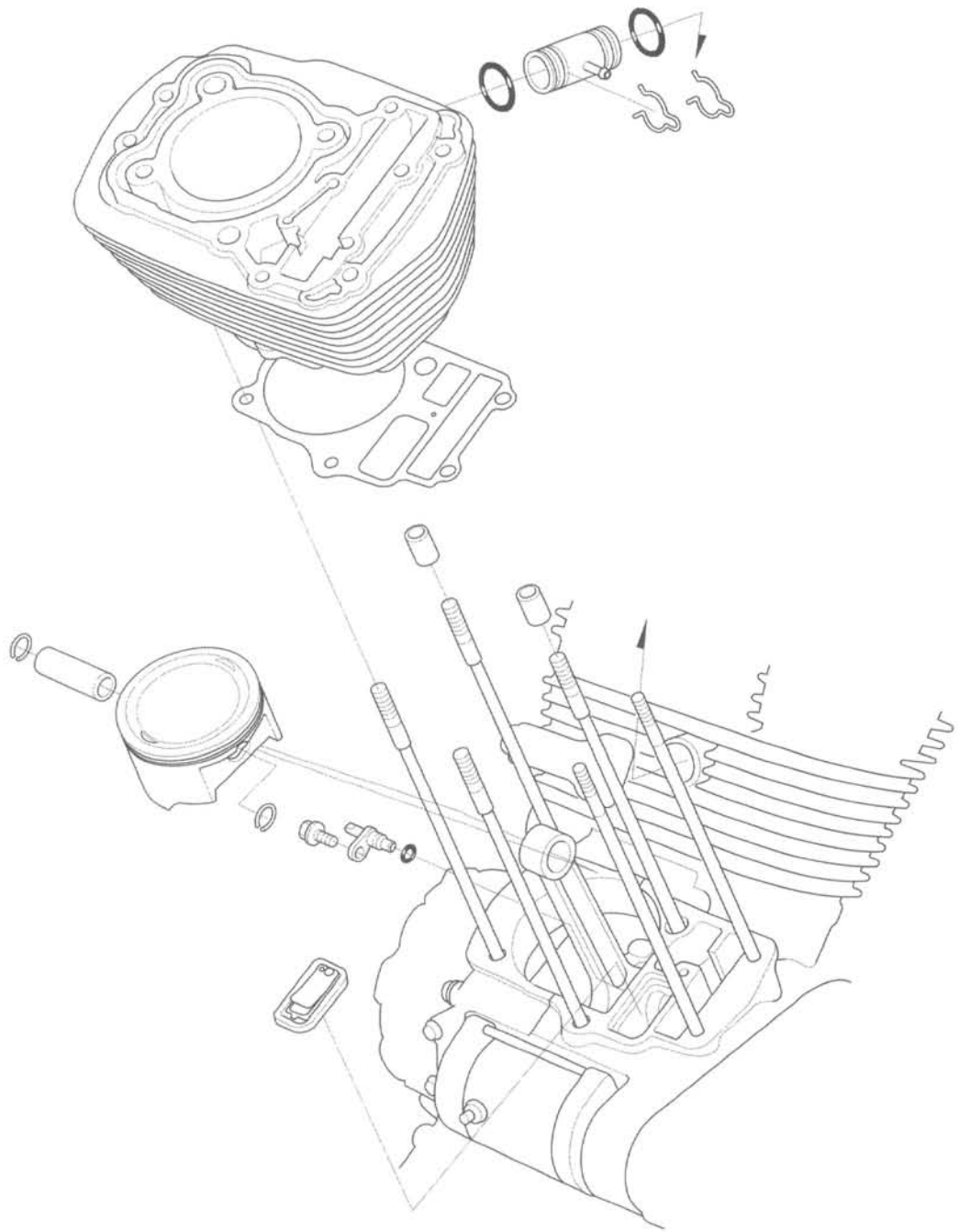


- intake manifold (page 5-17; if the cylinder head was removed)

Install the cylinder head fins with the setting rubbers. Install the fin bolts and washers, and tighten them.

Install the engine in the frame (section 7).





9. CYLINDER/PISTON

SERVICE INFORMATION	9-1	CYLINDER/PISTON REMOVAL	9-3
TROUBLESHOOTING	9-2	CYLINDER/PISTON INSTALLATION	9-8

SERVICE INFORMATION

GENERAL

- This section covers service of the pistons and cylinders. To service these parts, the engine must be removed from the frame.
- Take care not to damage the cylinder walls and pistons.
- Be careful not to damage the mating surfaces when removing the cylinders. Do not strike the cylinders too hard during removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder. Clean the oil passages before installing the cylinder.

SPECIFICATIONS

Unit: mm (in)

9

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	89.500—89.515 (3.5236—3.5242)	89.55 (3.326)	
	Out-of-round	—	0.10 (0.004)	
	Taper	—	0.10 (0.004)	
	Warpage	—	0.10 (0.004)	
Piston, piston pin, piston ring	Piston O.D. at 15 mm (0.6 in) from bottom	89.470—89.490 (3.5224—3.5232)	89.41 (3.520)	
	Piston pin hole I.D.	20.002—20.008 (0.7875—0.7877)	20.018 (0.7881)	
	Piston pin O.D.	19.994—20.000 (0.7872—0.7874)	19.984 (0.7868)	
	Piston-to-piston pin clearance	0.002—0.014 (0.0001—0.0006)	0.034 (0.0013)	
	Piston ring end gap	Top	0.200—0.300 (0.0079—0.0118)	0.315 (0.0124)
		Second	0.300—0.400 (0.0118—0.0157)	0.415 (0.0163)
		Oil (side rail)	0.425—0.475 (0.0167—0.0187)	0.495 (0.0195)
	Piston ring-to-ring groove clearance	Top	0.015—0.050 (0.0006—0.0020)	0.070 (0.0028)
Second		0.015—0.045 (0.0006—0.0018)	0.065 (0.0026)	
Cylinder-to-piston clearance		0.010—0.045 (0.0004—0.0018)	0.32 (0.013)	
Connecting rod small end I.D.		20.016—20.034 (0.7880—0.7887)	20.044 (0.7891)	
Connecting rod-to-piston pin clearance		0.016—0.040 (0.0006—0.0016)	0.063 (0.0025)	

TORQUE VALUE

Cylinder stud bolt

See page 9-8

CYLINDER/PISTON

TROUBLESHOOTING

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

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking

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

Excessive smoke

- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise

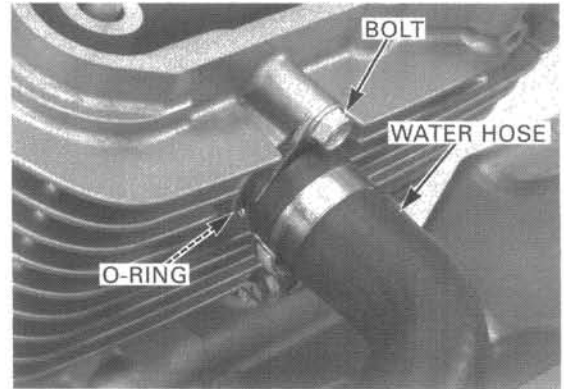
- Worn piston pin or piston pin hole
- Worn cylinder, piston or piston rings
- Worn connecting rod small end

CYLINDER/PISTON REMOVAL

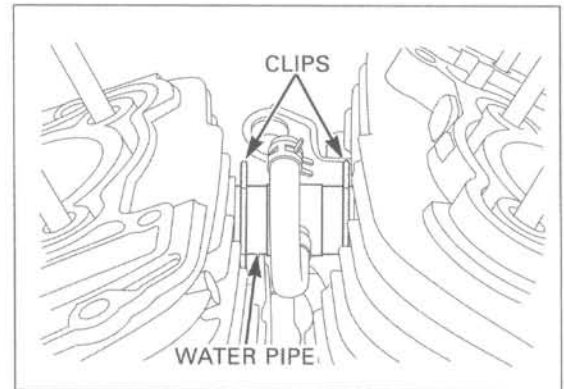
CYLINDER REMOVAL

Remove the cylinder head (page 8-8).

Rear cylinder only: Remove the bolt and disconnect the water hose.
Remove the O-ring.



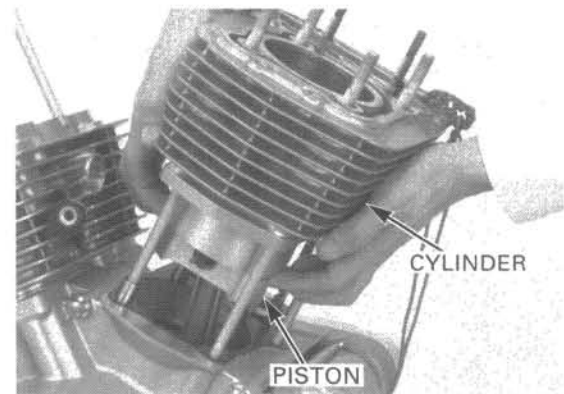
Remove the retaining clips and slide the water pipe to disconnect it from the cylinder.



Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.

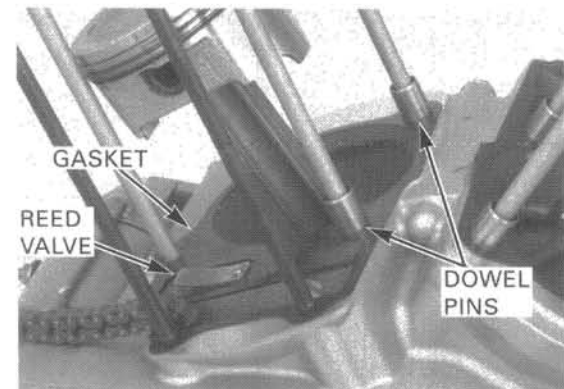
Lift the cylinder and remove it, being careful not to damage the piston with the stud bolts.

Remove the water pipe and O-rings.



Remove the following:

- gasket
- dowel pins
- crankcase breather reed valve

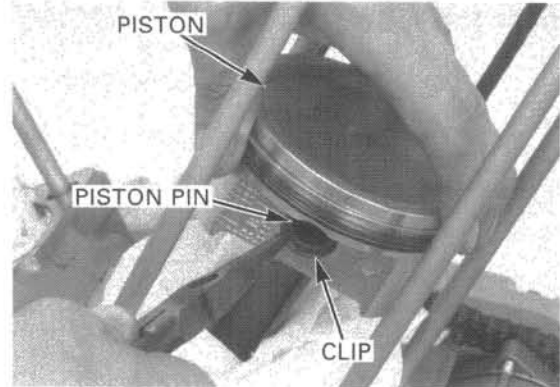


CYLINDER/PISTON

PISTON REMOVAL

Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Remove the piston pin clip with pliers. Push the piston pin out of the piston and connecting rod, and remove the piston.



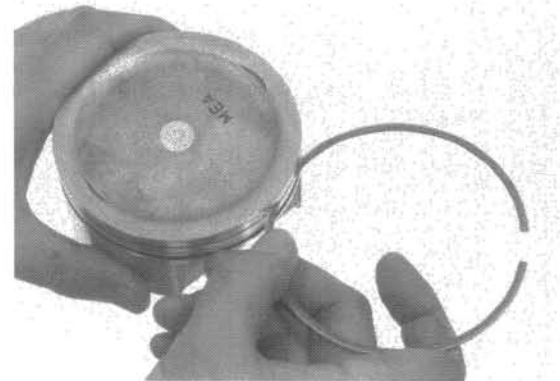
Do not damage the piston ring by spreading the ends too far.

Spread each piston ring and remove it by lifting up a point opposite the gap.



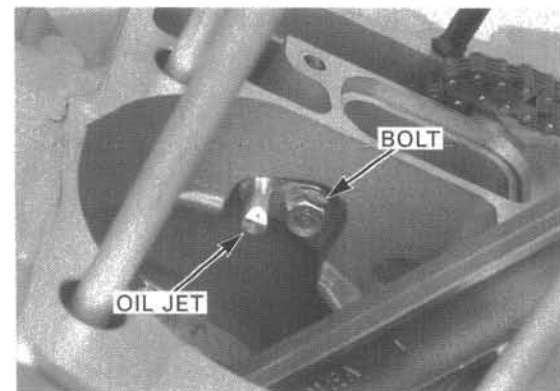
Never use a wire brush; it will scratch the groove.

Clean carbon deposits from the ring grooves with a used piston ring that will be discarded.



Be careful not to let the bolt fall into the crankcase.

Remove the bolt and the oil jet.



INSPECTION**PISTON/PISTON RING**

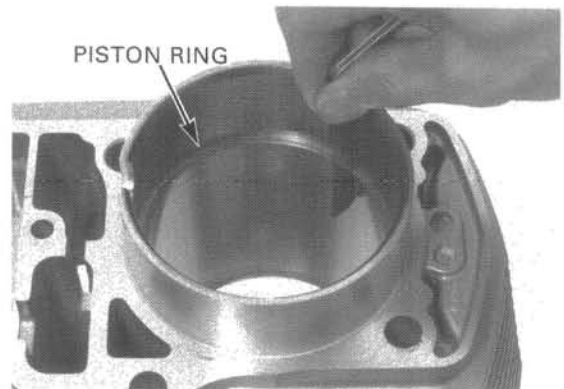
Inspect the piston rings for smooth movement by rotating them. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMITS: Top: 0.070 mm (0.0028 in)
Second: 0.065 mm (0.0026 in)

Insert each piston ring into the bottom of the cylinder squarely using the piston crown. Measure the ring end gap.

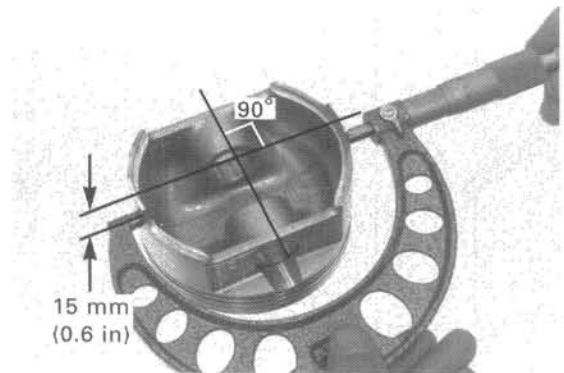
SERVICE LIMITS: Top: 0.315 mm (0.0124 in)
Second: 0.415 mm (0.0163 in)
Oil (side rail): 0.495 mm (0.0195 in)



Measure the piston O.D. at a point 15 mm (0.6 in) from the bottom and 90° to the piston pin hole.

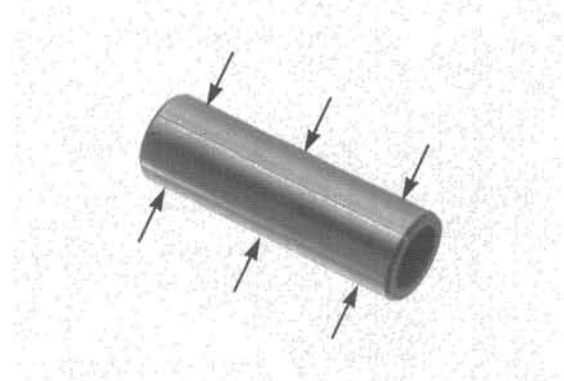
SERVICE LIMIT: 89.41 mm (3.520 in)

Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance (page 9-6).



Measure the piston pin O.D. at three points.

SERVICE LIMIT: 19.984 mm (0.7868 in)



CYLINDER/PISTON

Measure the piston pin hole I.D.

SERVICE LIMIT: 20.018 mm (0.7881 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.034 mm (0.0013 in)



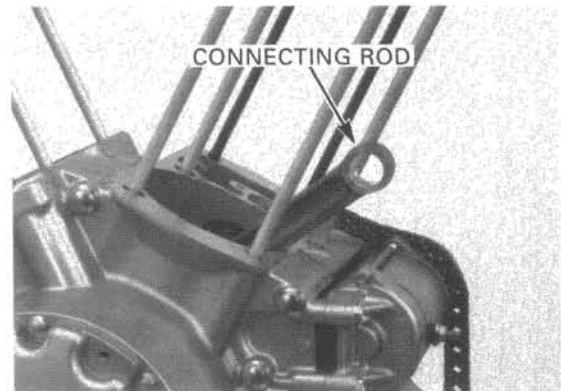
CONNECTING ROD

Measure the connecting rod small end I.D.

SERVICE LIMIT: 20.044 mm (0.7891 in)

Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.063 mm (0.0025 in)



CYLINDER

Inspect the cylinder wall for scratches or wear. Measure the cylinder I.D. at three levels on the X and Y axes. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 89.55 mm (3.326 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.32 mm (0.013 in)

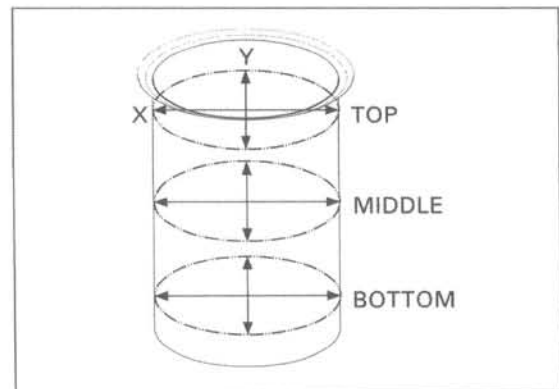
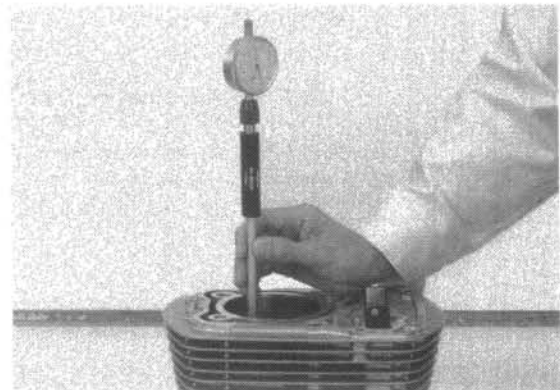
Calculate the cylinder taper and out-of-round at three levels on the X and Y axes. Take the maximum reading to determine the taper and out-of-round.

**SERVICE LIMITS: Taper: 0.10 mm (0.004 in)
Out-of-round: 0.10 mm (0.004 in)**

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

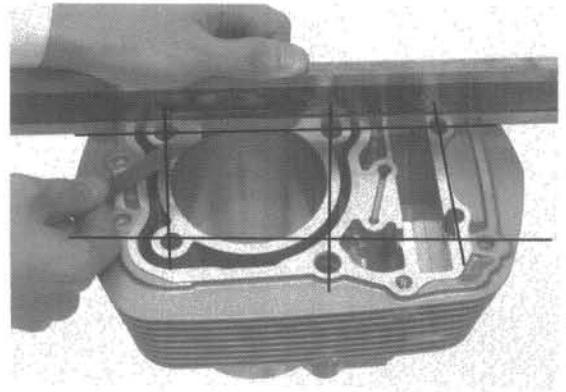
The 0.25 mm (0.010 in) oversize piston is available.

The cylinder must be rebored so the clearance for an oversize piston is 0.010—0.045 mm (0.0004—0.0018 in).



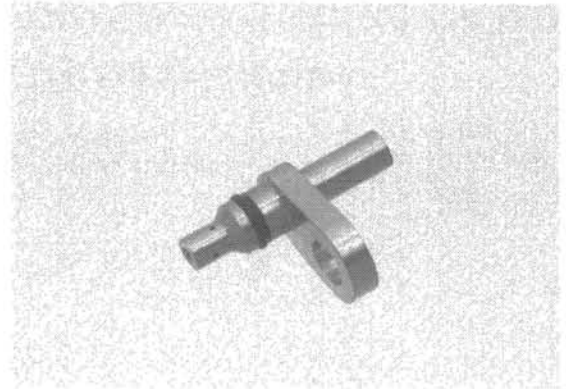
Check the top of the cylinder for warpage with a straight edge and feeler gauge across the stud holes.

SERVICE LIMIT: 0.10 mm (0.004 in)



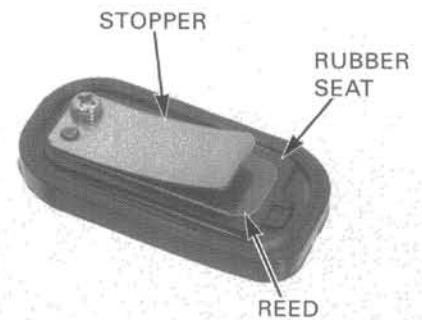
OIL JET

Check the oil jet for clogs. Blow out the oil jet with compressed air.



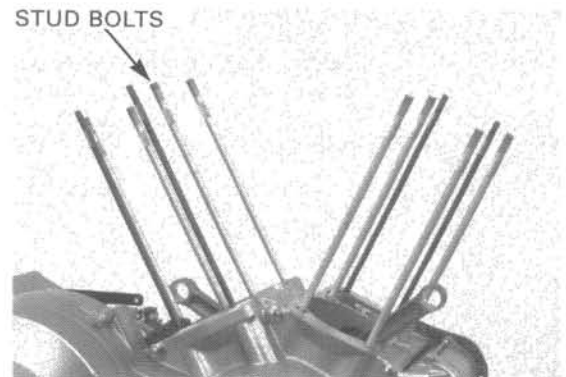
REED VALVE

Check the reed for damage or fatigue.
Check the rubber seat for cracks, deterioration or damage.
Check for clearance between the reed and rubber seat. There should be no clearance.



CYLINDER STUD BOLT REPLACEMENT

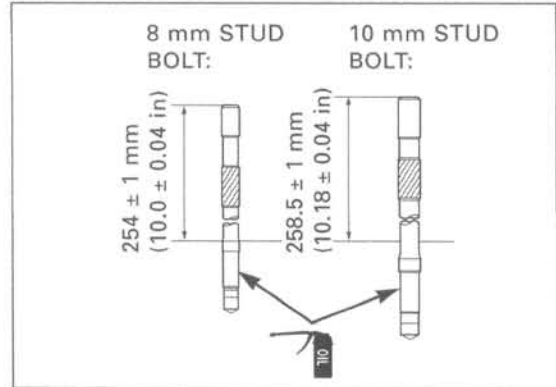
Thread two nuts onto the stud and tighten them together, and use a wrench on them to turn the stud bolt out.



CYLINDER/PISTON

Apply engine oil to the lower threads of a new stud bolt and install it in the direction as shown. Be sure to verify the stud height from the crankcase surface.

Adjust the height if necessary.



CYLINDER/PISTON INSTALLATION

PISTON RING INSTALLATION

Be careful not to damage the piston and rings.

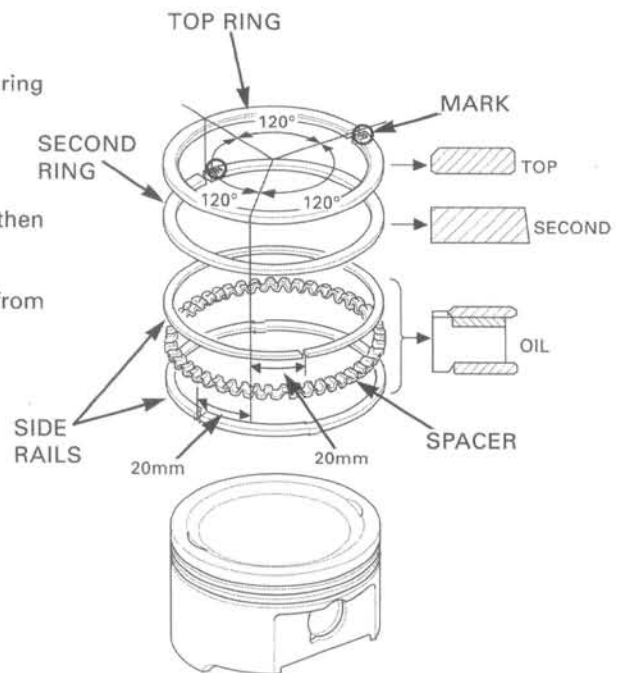
Carefully install the piston rings into the piston ring grooves with the markings facing up.

NOTE:

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.

Stagger the side rail end gaps as shown.

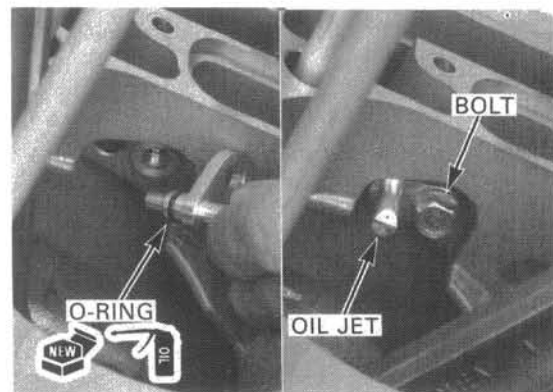


PISTON INSTALLATION

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

Be careful not to let the bolt fall into the crankcase.

Install the oil jet and tighten the bolt securely.



Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Apply molybdenum oil solution to the connecting rod inner surface.

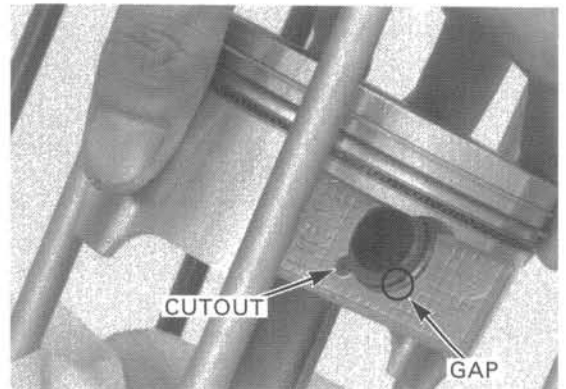
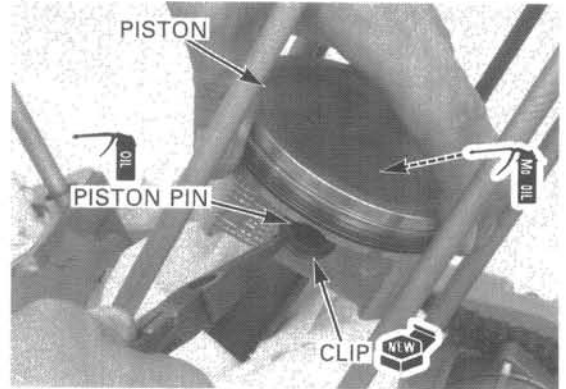
Apply engine oil to the piston pin outer surface.

Install the piston and insert the piston pin through the piston and connecting rod.

Install new piston pin clips into the grooves in the piston pin hole.

NOTE:

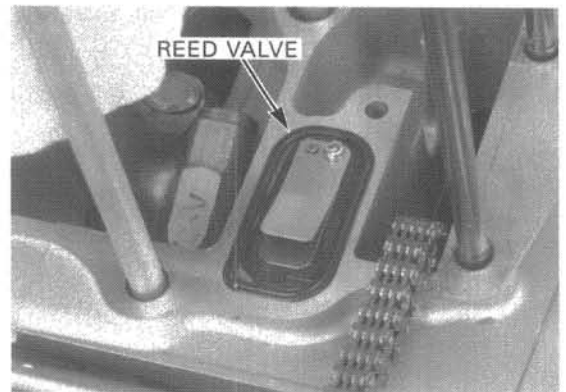
- Make sure the piston pin clips are seated securely.
- Do not align the clip end gap with the piston cutout.



CYLINDER INSTALLATION

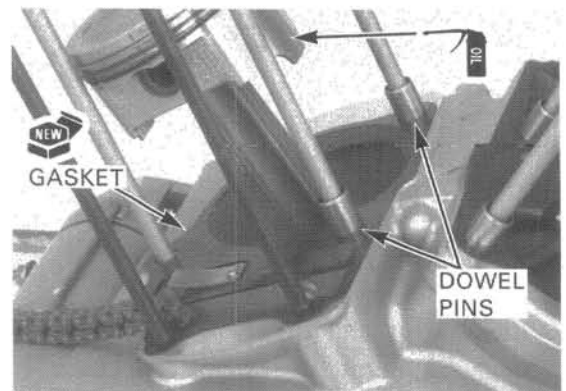
Clean the gasket surfaces of the cylinder and crankcase thoroughly, being careful not to damage them.

Install the reed valve onto the crankcase in the direction as shown.



Install the dowel pins and a new gasket.

Apply engine oil to the cylinder wall, piston outer surface and piston rings.

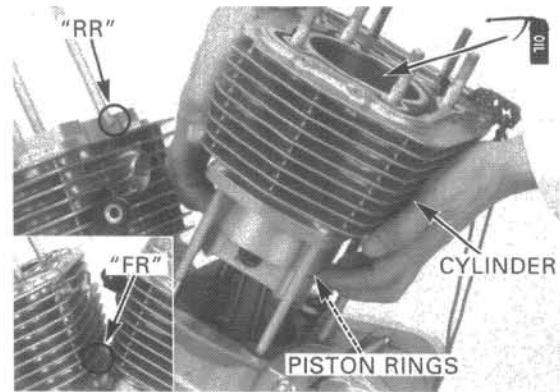


CYLINDER/PISTON

The cylinder heads have the following identification marks:
- "FR": front
- "RR": rear

Be careful not to damage the piston rings and cylinder wall.

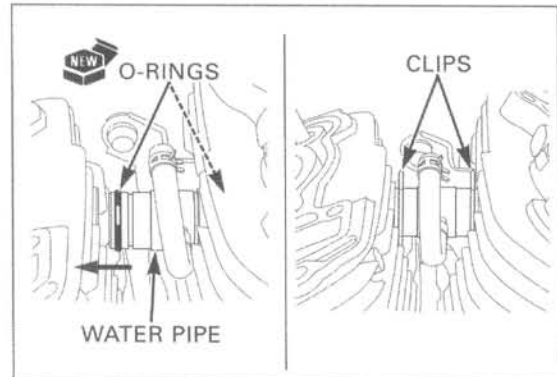
Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.



Coat new O-rings with coolant and install them into the grooves in the water pipe.

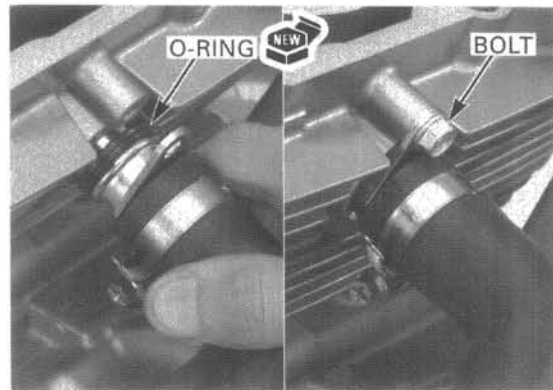
Install the water pipe into the cylinder with the hose joint facing to the left while lifting either cylinder slightly. Slide the water pipe into the hole in the cylinder and connect it.

Install the retaining clips into the pipe grooves.

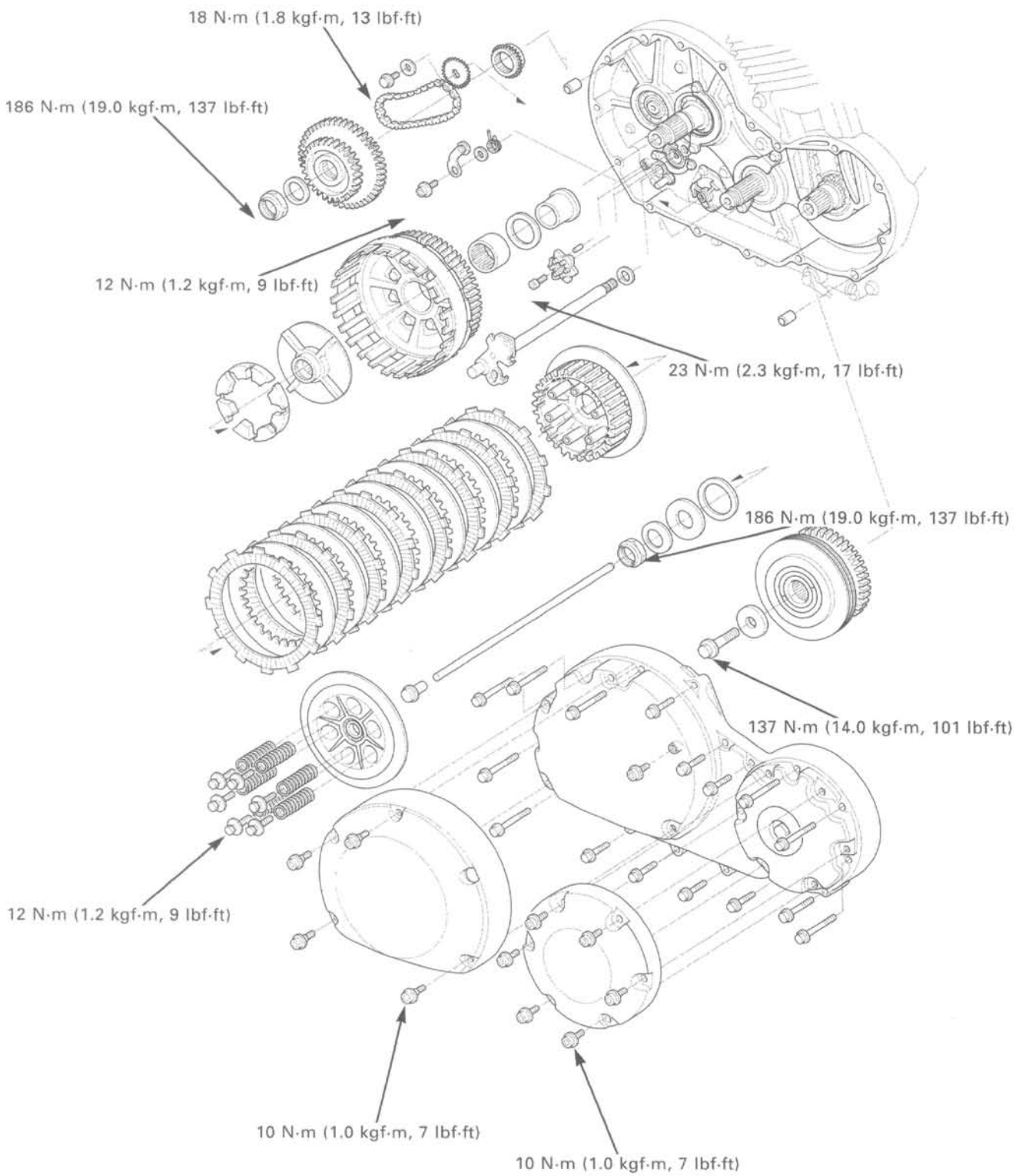


Rear cylinder only: Install a new O-ring and connect the hose joint into the rear cylinder. Install the joint bolt and tighten it.

Install the cylinder head (page 8-16).

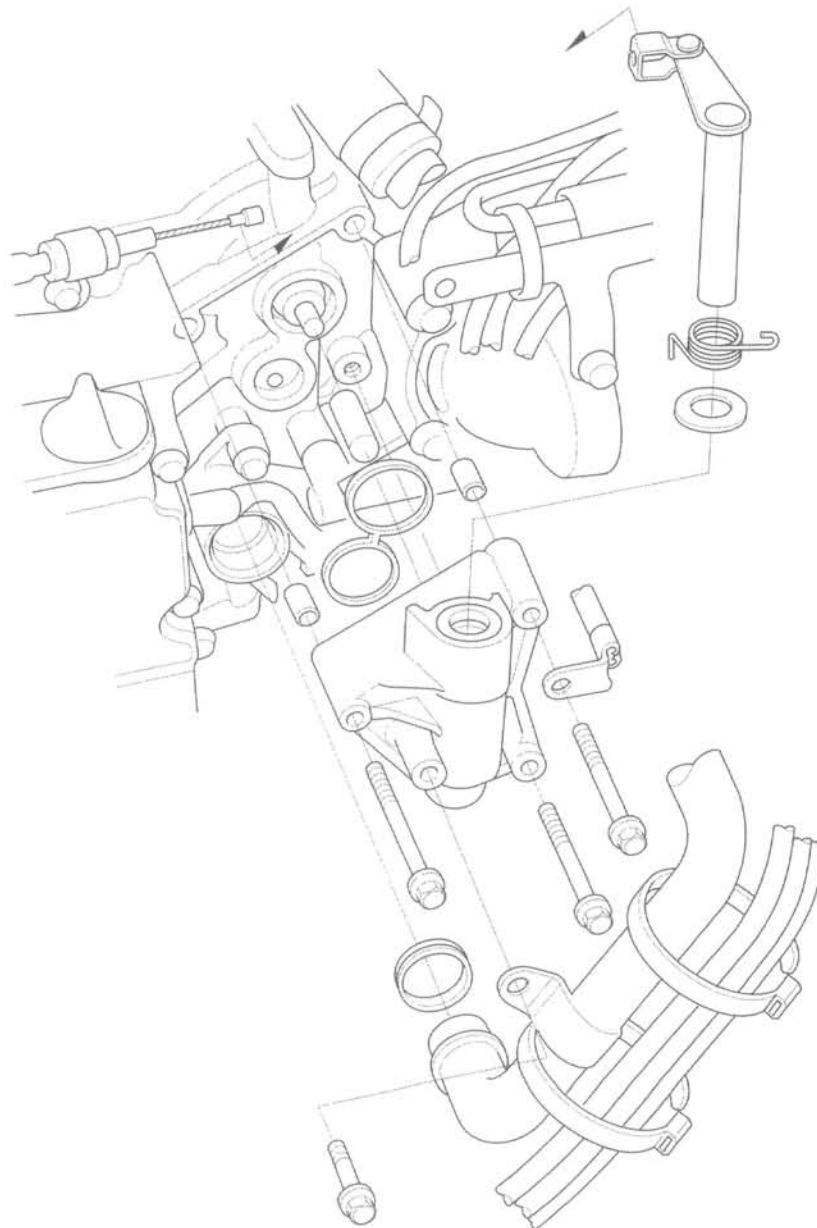


CLUTCH/GEARSHIFT LINKAGE



10. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	10-2	PRIMARY GEARS	10-15
TROUBLESHOOTING	10-3	RIGHT CRANKCASE COVER INSTALLATION	10-18
RIGHT CRANKCASE COVER REMOVAL	10-4	CLUTCH LIFTER ARM	10-19
CLUTCH	10-4		
GEARSHIFT LINKAGE	10-12		



CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION

GENERAL

- The clutch and gearshift linkage can be serviced with the engine in the frame.
- Engine oil viscosity, oil level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil and oil level before servicing the clutch system.
- The crankcase must be separated when the transmission, shift drum and shift forks require service (section 11).

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Clutch lever free play	10–20 (3/8–3/4)	—
Clutch spring free length	58.2 (2.29)	56.7 (2.23)
Clutch disc thickness	3.72–3.88 (0.146–0.153)	3.1 (0.12)
Clutch plate warpage	—	0.30 (0.012)
Clutch outer guide I.D.	27.995–28.012 (1.1022–1.1028)	28.80 (1.134)
Mainshaft O.D. at clutch outer guide	27.980–27.993 (1.1016–1.1021)	27.97 (1.101)

TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Apply oil to the threads and seating surface. Replace with a new one and stake.
Clutch cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Timing hole cap cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Primary drive gear bolt	137 N·m (14.0 kgf·m, 101 lbf·ft)	Apply oil to the threads and seating surface.
Primary driven gear nut	186 N·m (19.0 kgf·m, 137 lbf·ft)	Apply oil to the threads and seating surface. Replace with a new one and stake.
Shift drum stopper arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Shift drum center socket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply locking agent to the threads.
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil pump driven sprocket bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply locking agent to the threads.

TOOLS

Clutch center holder	07JMB-MN50301 or 07HGB-001010B (plate) and 07HGB-001020B (collar) (U.S.A. only)
Attachment, 32 x 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400
Driver	07749-0010000
Gear holder	07724-0010100 or 07724-001A100 (U.S.A. only)

TROUBLESHOOTING

Clutch lever engagement hard

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Too much clutch lever free play
- Warped clutch plates
- Loose clutch lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

Clutch slips

- No clutch lever free play
- Worn clutch discs
- Weak clutch springs
- Clutch lifter sticking
- Engine oil level too low or oil additive used

Hard to shift

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged gearshift cam
- Bent fork shaft or damaged shift forks and shift drum (section 11)

Transmission jumps out of gear

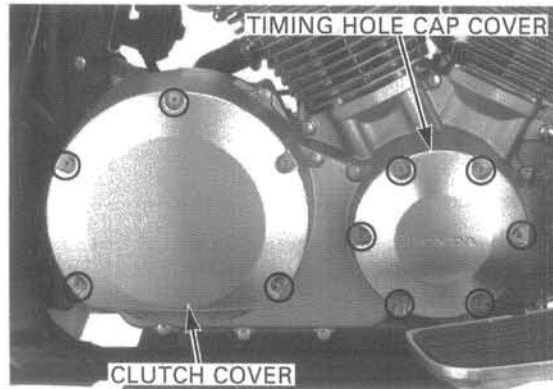
- Broken shift drum stopper arm
- Weak or broken gearshift spindle return springs
- Worn or damaged gearshift cam
- Bent fork shaft or worn shift forks and shift drum (section 11)
- Worn gear dogs or dog holes (section 11)

CLUTCH/GEARSHIFT LINKAGE

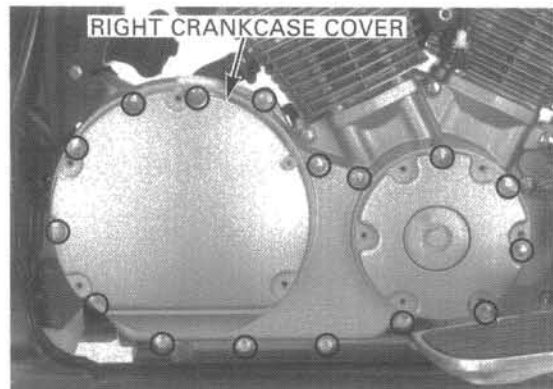
RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-10).
Remove the exhaust system (page 2-6).

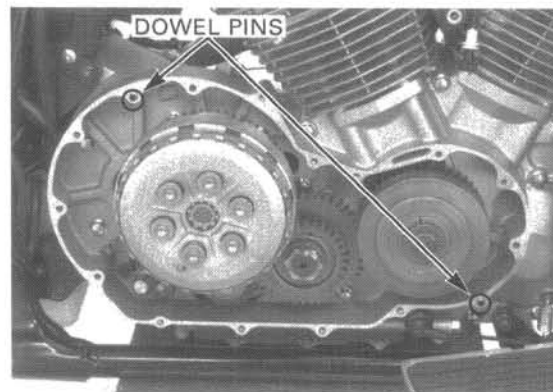
Remove the four socket bolts and clutch cover.
Remove the six socket bolts and timing hole cap cover.



Remove the 16 bolts and the right crankcase cover.



Remove the two dowel pins.

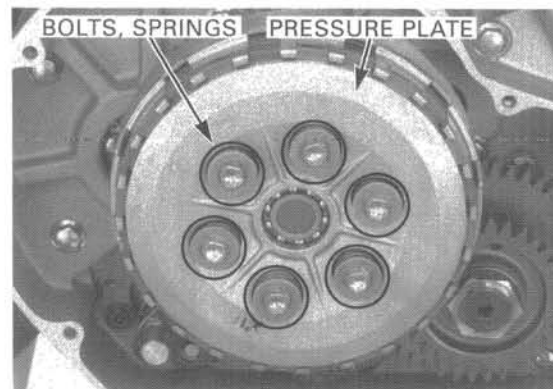


CLUTCH

DISASSEMBLY

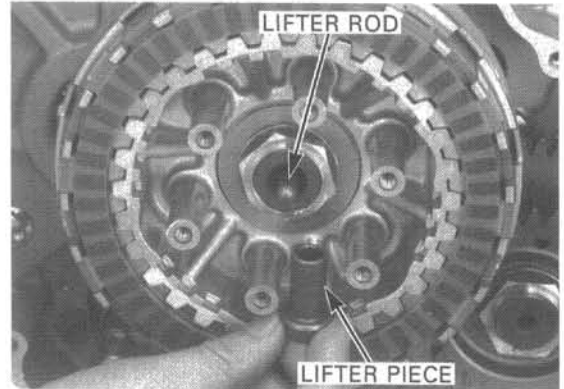
Remove the right crankcase cover.

Loosen the clutch pressure plate bolts in a crisscross pattern in several steps, and remove the bolts, springs and the clutch pressure plate.



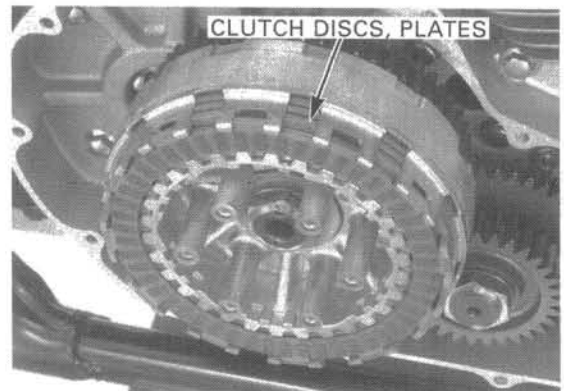
CLUTCH/GEARSHIFT LINKAGE

Remove the clutch lifter piece and lifter rod from the mainshaft.



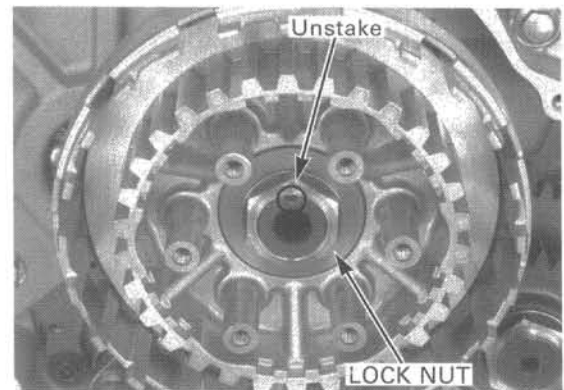
Remove the following:

- clutch disc B
- seven clutch plates
- six clutch discs A
- clutch disc B



Be careful not to damage the mainshaft threads.

Unstake the clutch center lock nut.



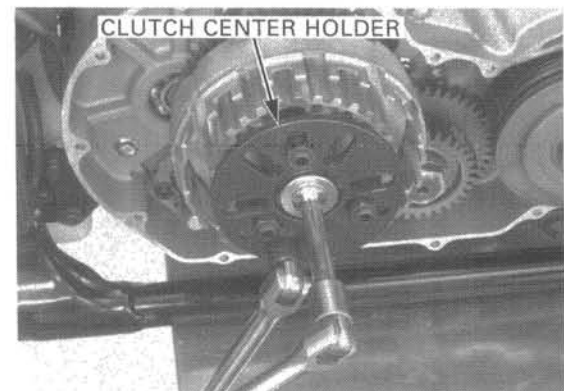
Hold the clutch center with the special tool and loosen the clutch center lock nut.

TOOL:

Clutch center holder

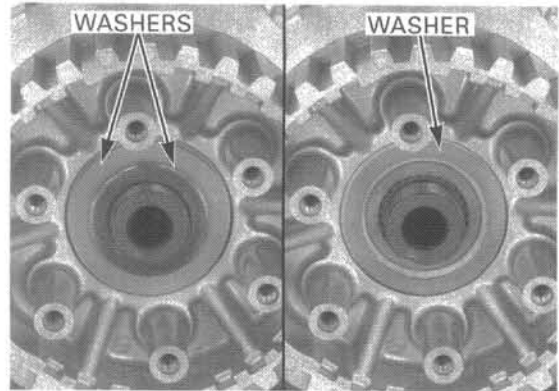
07JMB-MN50301 or
07HGB-001010B (plate)
and 07HGB-001020B
(collar) (U.S.A. only)

Remove the tool and clutch center lock nut.

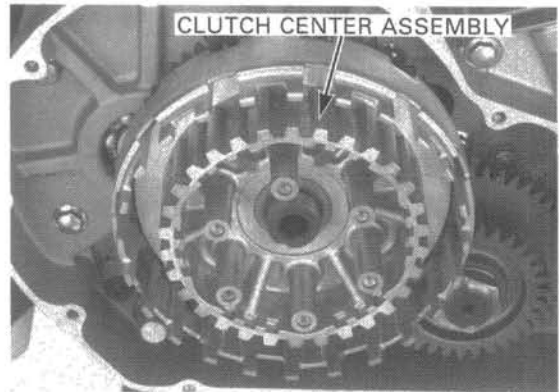


CLUTCH/GEARSHIFT LINKAGE

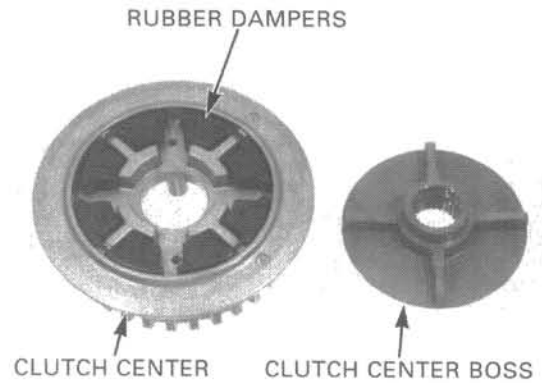
Remove the three washers.



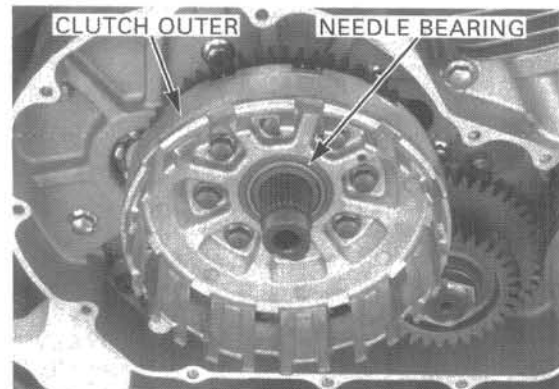
Remove the clutch center assembly.



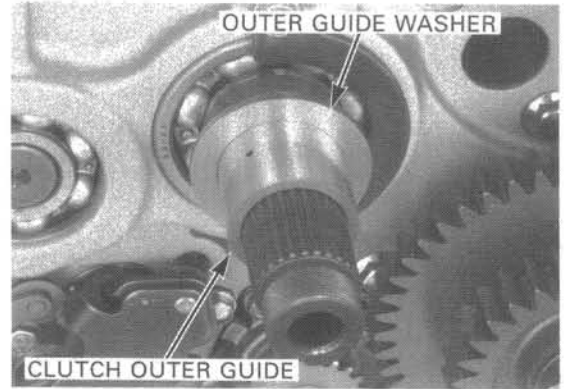
Remove the clutch center boss and rubber dampers from the clutch center.



Remove the clutch outer and needle bearing.



Remove the clutch outer guide washer and outer guide.



INSPECTION

LIFTER BEARING

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and quietly. Also check that the outer race of the bearing fits tightly in the pressure plate.

Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the pressure plate.

Drive the bearing out of the pressure plate.

Drive a new bearing into the plate with its mark side facing out.

TOOLS:

Driver

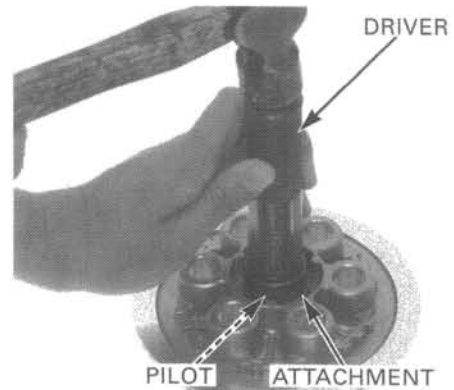
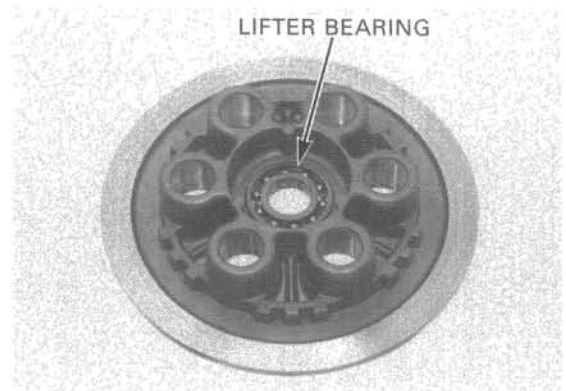
07749-0010000

Attachment, 32 x 35 mm

07746-0010100

Pilot, 17 mm

07746-0040400

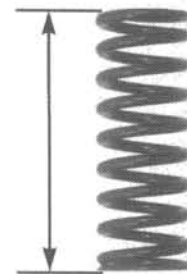


CLUTCH SPRING

Replace the clutch springs as a set.

Measure the clutch spring free length.

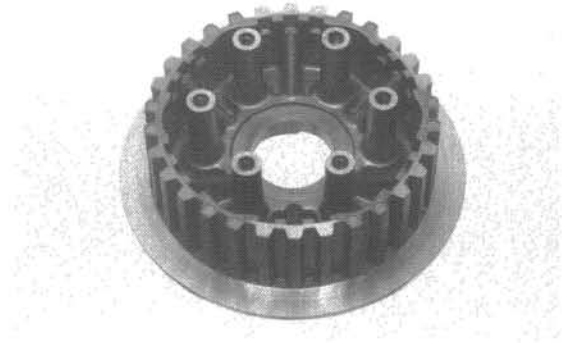
SERVICE LIMIT: 56.7 mm (2.23 in)



CLUTCH/GEARSHIFT LINKAGE

CLUTCH CENTER

Check the clutch center and pressure plate for nicks, indentations or abnormal wear made by the plates.



RUBBER DAMPER

Check the rubber dampers for deterioration, wear or damage.



CLUTCH LIFTER ROD

Check the clutch lifter rod for bends or damage.

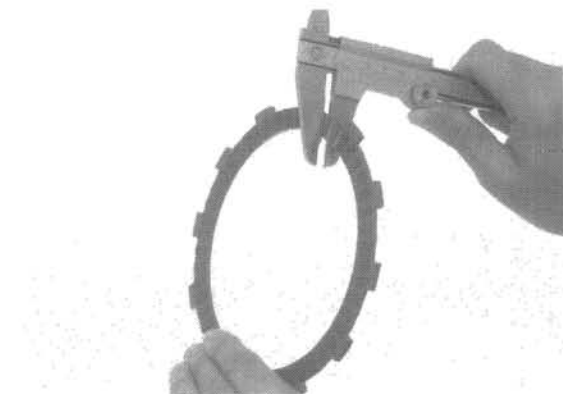


CLUTCH DISC

Replace the clutch discs and plates as a set.

Check the clutch discs for signs of scoring or discoloration.
Measure the clutch disc thickness.

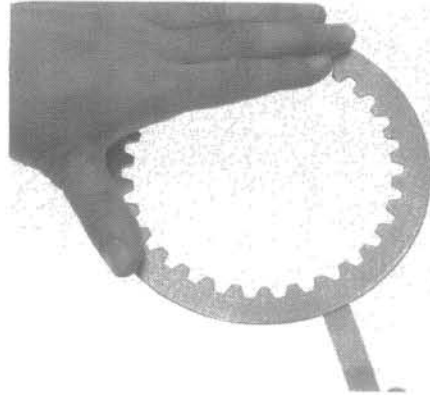
SERVICE LIMIT: 3.1 mm (0.12 in)



CLUTCH PLATE

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

SERVICE LIMIT: 0.30 mm (0.012 in)

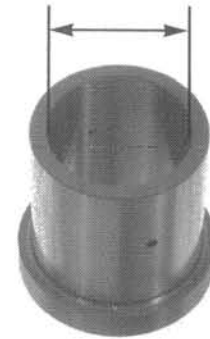


CLUTCH OUTER GUIDE

Check the clutch outer guide for damage or abnormal wear

Measure the clutch outer guide I.D.

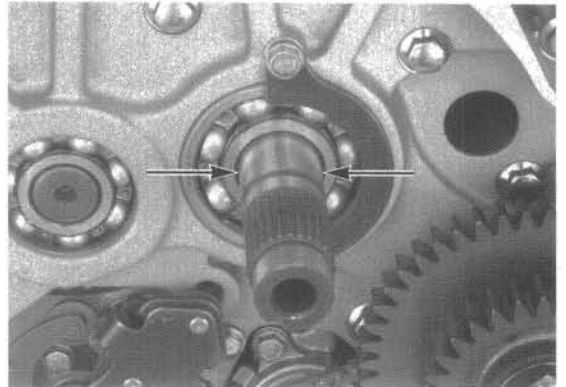
SERVICE LIMITS: I.D.: 28.80 mm (1.134 in)



MAINSHAFT

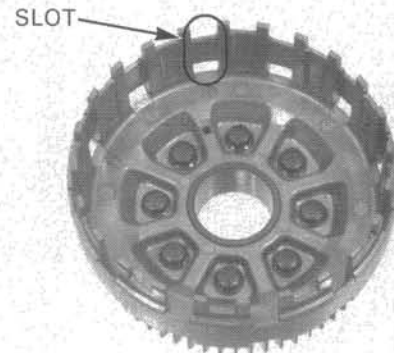
Measure the mainshaft O.D. at the clutch outer guide.

SERVICE LIMIT: 27.970 mm (1.1012 in)



CLUTCH OUTER

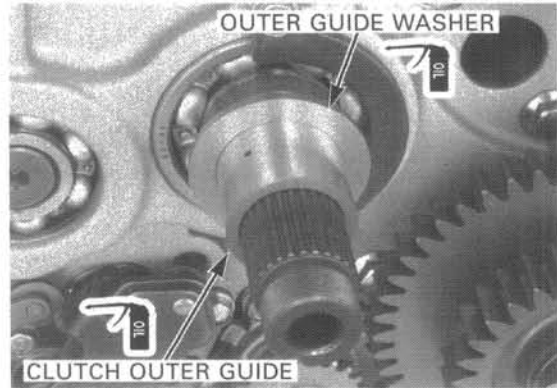
Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.



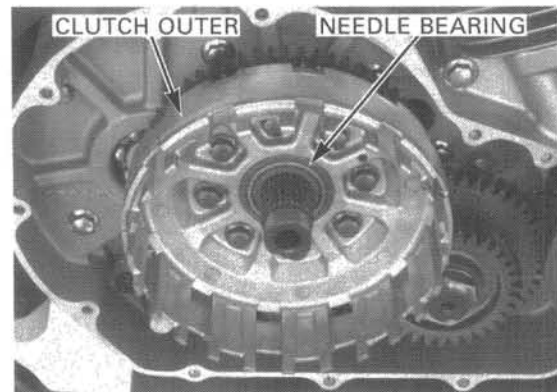
CLUTCH/GEARSHIFT LINKAGE

ASSEMBLY

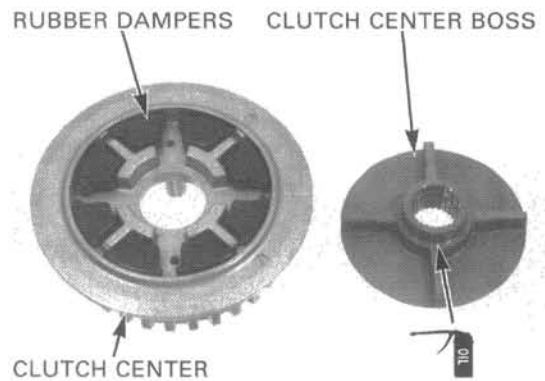
Coat the clutch outer guide and washer with oil.
Install the clutch outer guide onto the mainshaft with the flange side facing the crankcase.
Install the outer guide washer onto the outer guide.



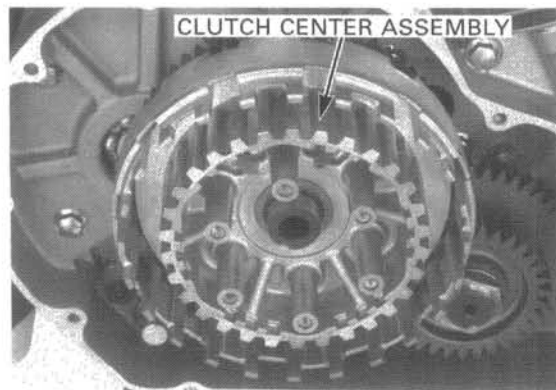
Apply oil to the clutch outer needle bearing.
Install the needle bearing and clutch outer onto the outer guide.



Install the rubber dampers into the clutch center.
Apply oil to the clutch center sliding surface of the center boss and install it onto the clutch center.

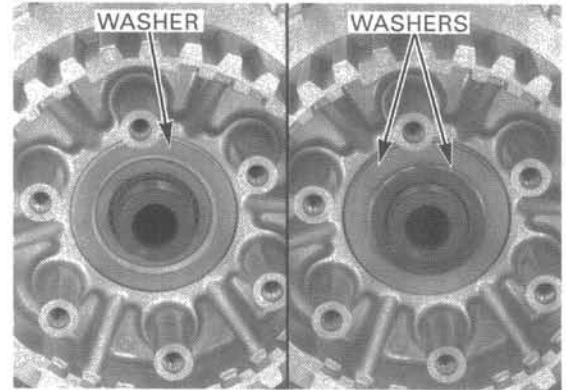


Install the clutch center assembly onto the mainshaft.



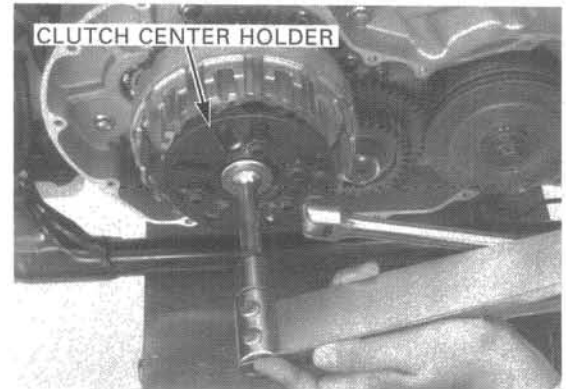
CLUTCH/GEARSHIFT LINKAGE

Install the three washers as shown.



Apply oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft. Hold the clutch center with the special tool and tighten the lock nut.

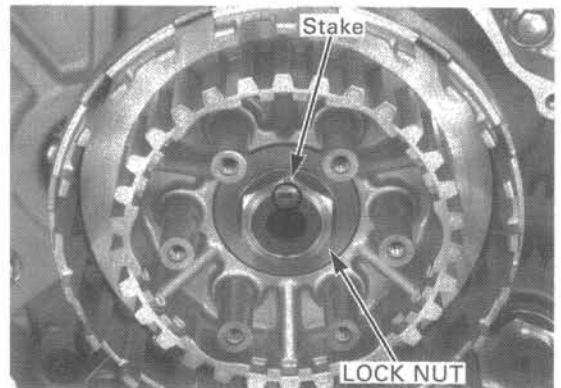
TOOL:
Clutch center holder 07JMB-MN50301 or
 07HGB-001010B (plate)
 and 07HGB-001020B
 (collar) (U.S.A. only)



TORQUE: 186 N·m (19.0 kgf·m, 137 lbf·ft)

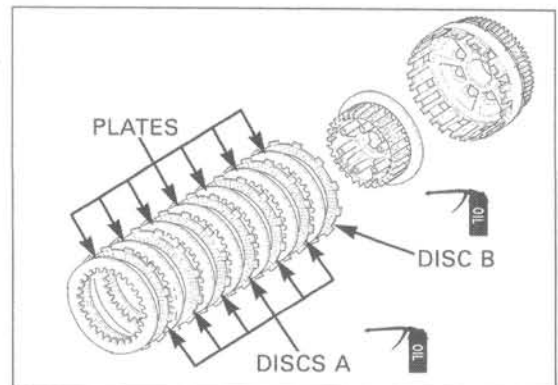
Be careful not to damage the mainshaft threads.

Stake the clutch center lock nut into the mainshaft groove.



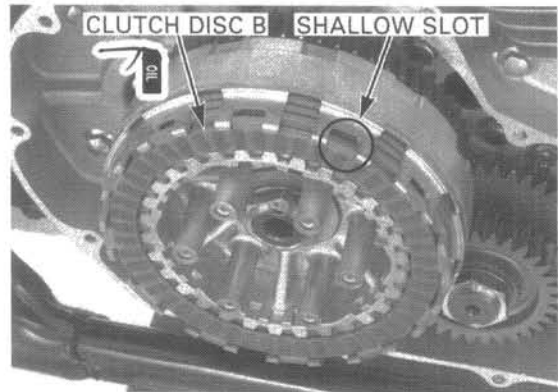
Clutch disc B has paints on the tabs.

Coat clutch discs A and B with clean engine oil. Install clutch disc B. Install the seven clutch plates and six disc A alternately, starting with the plate.

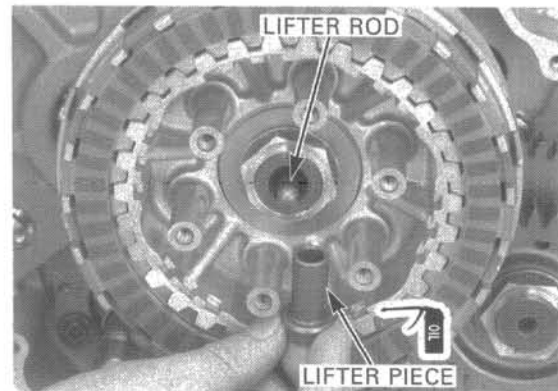


CLUTCH/GEARSHIFT LINKAGE

Install clutch disc B into the shallow slots of the clutch outer.



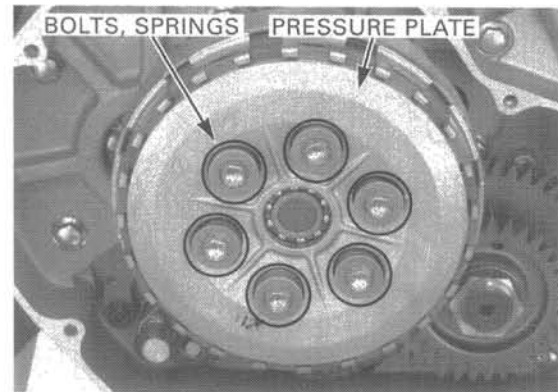
Install the clutch lifter rod into the mainshaft. Coat the clutch lifter piece with oil and install it into the mainshaft.



Install the clutch pressure plate, clutch springs and clutch bolts. Tighten the clutch bolt in a crisscross pattern in two or three steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the right crankcase cover (page 10-18).

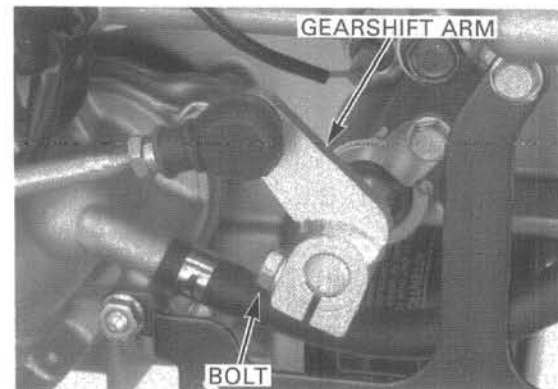


GEARSHIFT LINKAGE

REMOVAL

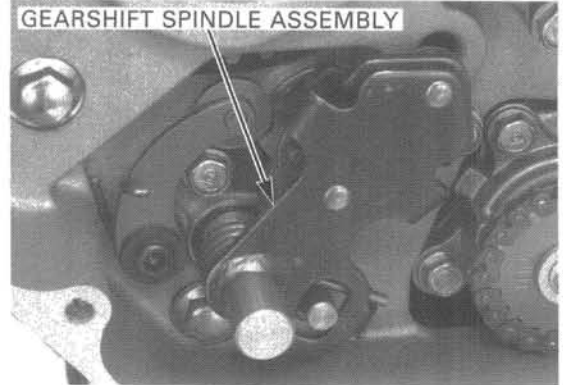
Disassemble the clutch (page 10-4).

Remove the bolt and gearshift arm from the gearshift spindle.

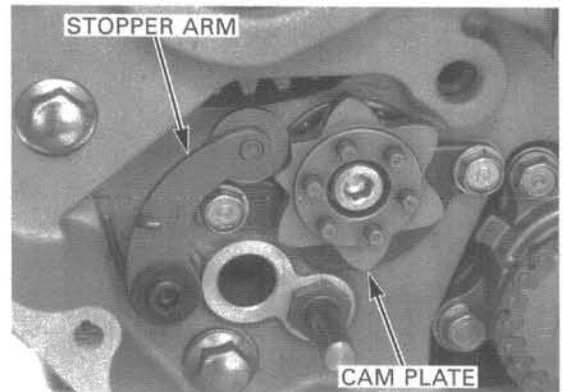


CLUTCH/GEARSHIFT LINKAGE

Remove the gearshift spindle assembly and thrust washer.

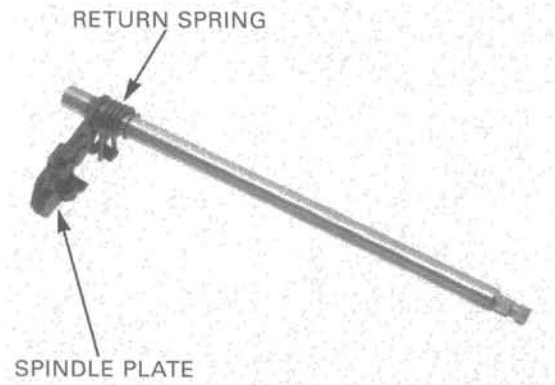


Remove the shift drum center socket bolt and cam plate.
Remove the stopper arm pivot bolt, arm, washer and return spring.
Remove the dowel pin from the shift drum.



INSPECTION

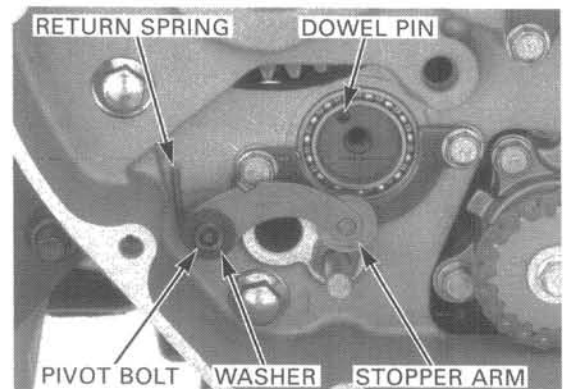
- Check the gearshift spindle for bends.
- Check the spindle plate for wear or damage.
- Check the spindle return spring for fatigue or damage.



INSTALLATION

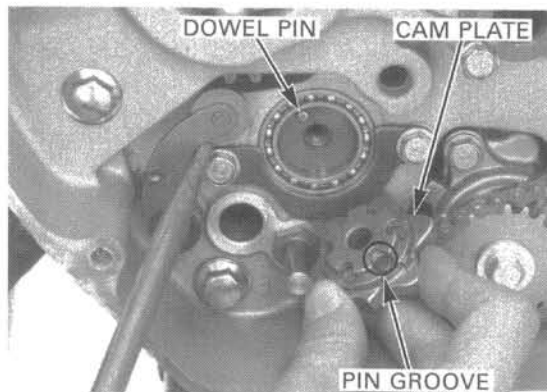
Install the dowel pin into the shift drum.
Install the return spring, washer, stopper arm and pivot bolt, and tighten the bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



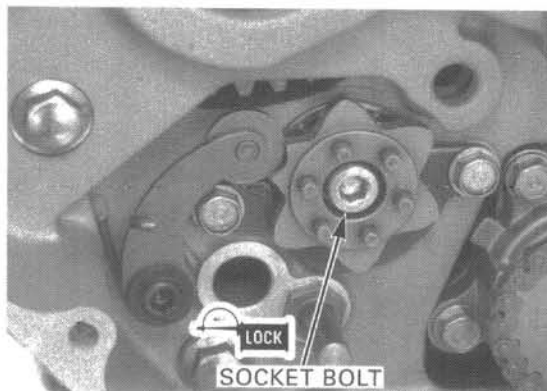
CLUTCH/GEARSHIFT LINKAGE

Lift the stopper arm with a screwdriver and install the cam plate by aligning the pin groove in the plate with the dowel pin.

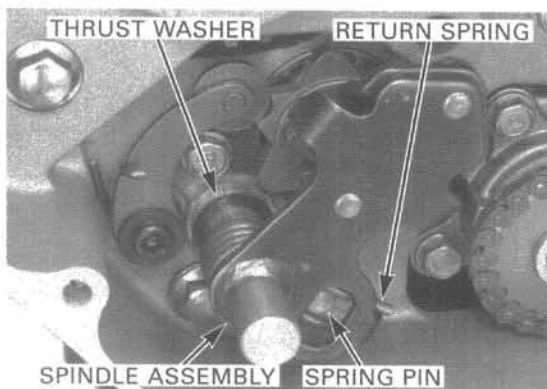


Apply locking agent to the shift drum center socket bolt threads.
Install and tighten the socket bolt.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



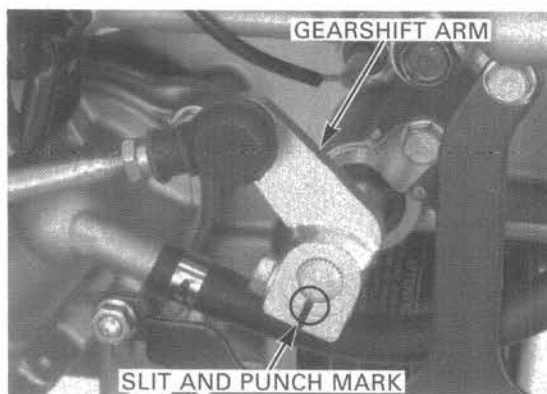
Install the thrust washer onto the gearshift spindle, and insert the spindle into the crankcase, aligning the return spring ends with the spring pin.



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

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Assemble the clutch (page 10-10).



PRIMARY GEARS

PRIMARY DRIVE GEAR

REMOVAL

Remove the right crankcase cover (page 10-4).

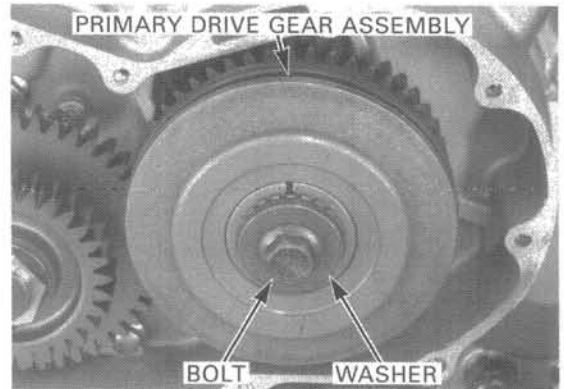
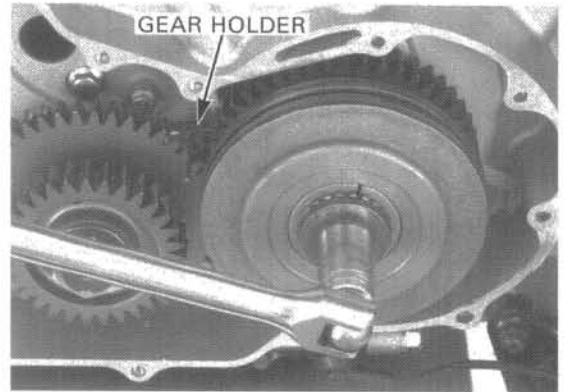
Install the gear holder between the primary drive and driven gears as shown and loosen the primary drive gear bolt.

TOOL:

Gear holder

07724-0010100 or
07724-001A100
(U.S.A. only)

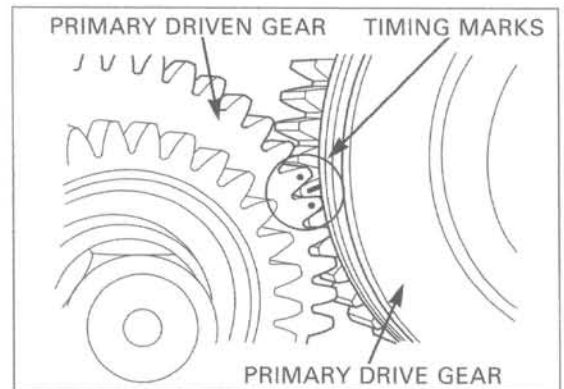
Remove the bolt, washer and the primary drive gear assembly from the crankshaft.



INSTALLATION

Install the primary drive gear assembly onto the crankshaft, aligning the wide groove with the wide tooth.

Align the timing marks on the primary drive and driven gears as shown and mesh the drive and driven gears.



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

Install the washer and primary drive gear bolt.

Install the gear holder between the primary drive and driven gears as shown and tighten the primary drive gear bolt.

TOOL:

Gear holder

07724-0010100 or
07724-001A100
(U.S.A. only)

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)

Install the right crankcase cover (page 10-18).



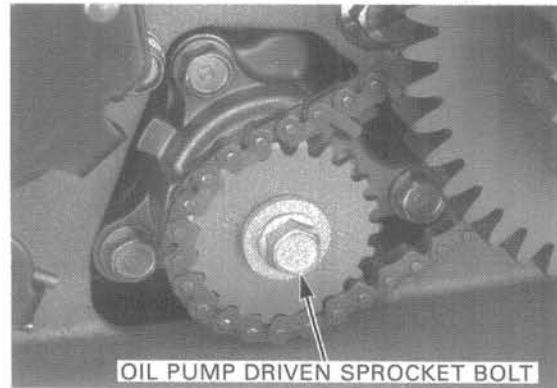
CLUTCH/GEARSHIFT LINKAGE

PRIMARY DRIVEN GEAR

REMOVAL

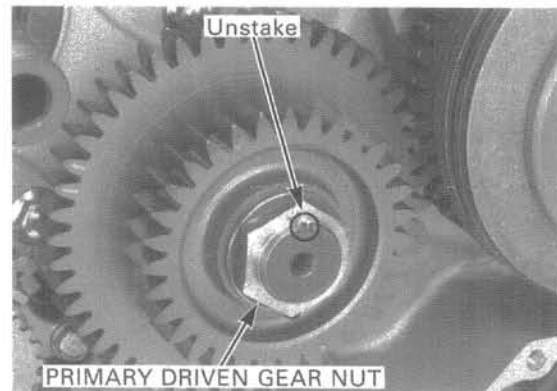
Disassemble the clutch (page 10-4).

When the oil pump driven sprocket will be removed, loosen the driven sprocket bolt.



Be careful not to damage the rear balancer shaft threads.

Unstake the primary driven gear nut.

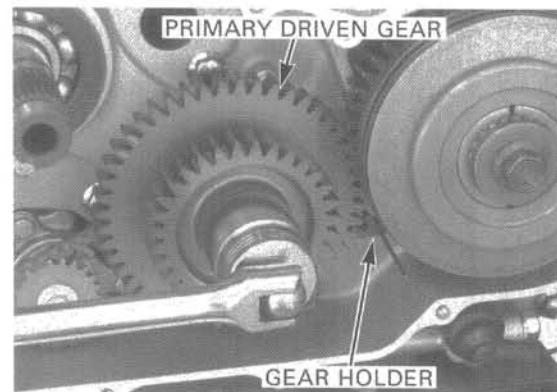


Install the gear holder between the primary drive and driven gears as shown and loosen the primary driven gear nut.

TOOL:
Gear holder

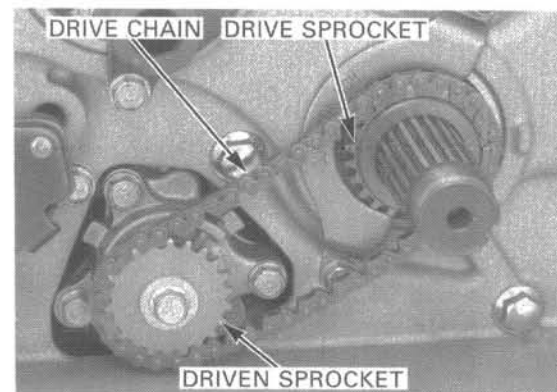
07724-0010100 or
07724-001A100
(U.S.A. only)

Remove the nut, washer and primary driven gear.



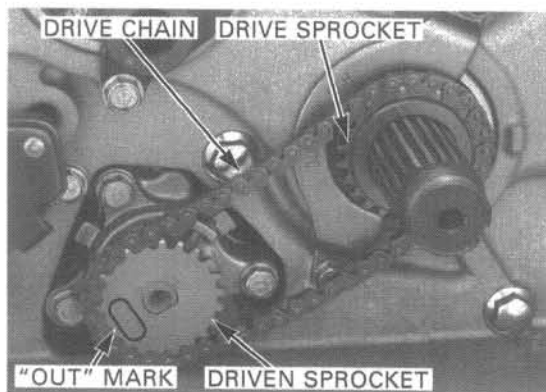
Remove the oil pump driven sprocket bolt and washer.

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



INSTALLATION

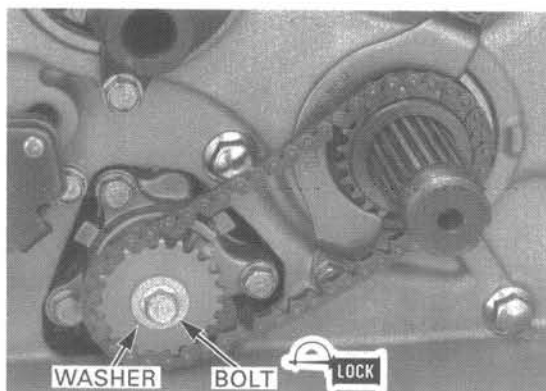
Install the oil pump drive sprocket, drive chain and driven sprocket as a set with the "OUT" mark on the driven sprocket facing out.



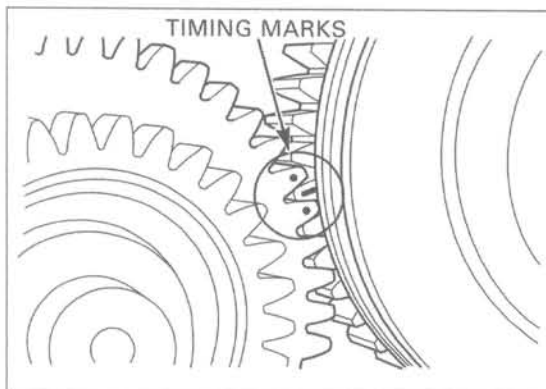
Apply locking agent to the oil pump driven sprocket bolt threads and install the washer and bolt.

NOTE

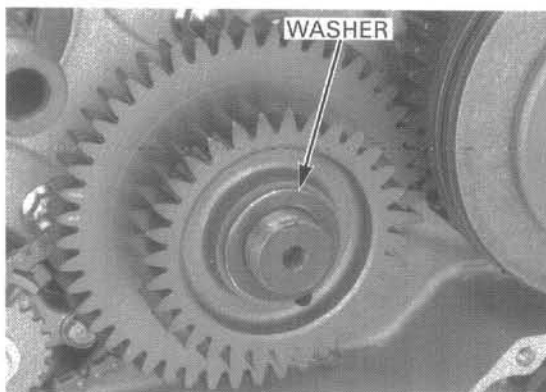
- Tighten the driven sprocket bolt to the specified torque after installing the primary driven gear.



Install the primary driven gear onto the rear balancer shaft, aligning the wide groove with the wide tooth. Align the timing marks on the primary drive and driven gears as shown and mesh the drive and driven gears.



Install the washer onto the rear balancer shaft.



CLUTCH/GEARSHIFT LINKAGE

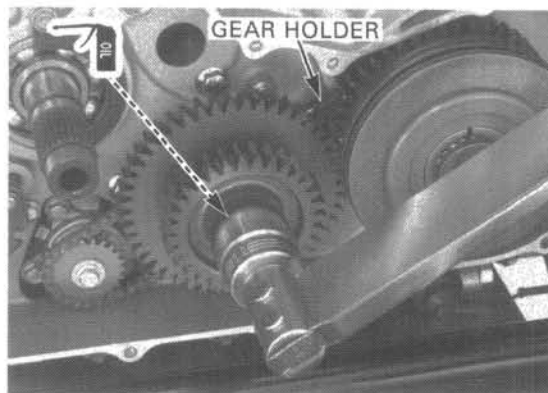
Apply oil to a new primary driven gear nut threads and seating surface, and install it. Install the gear holder between the primary drive and driven gears as shown and tighten the primary driven gear nut.

TOOL:

Gear holder

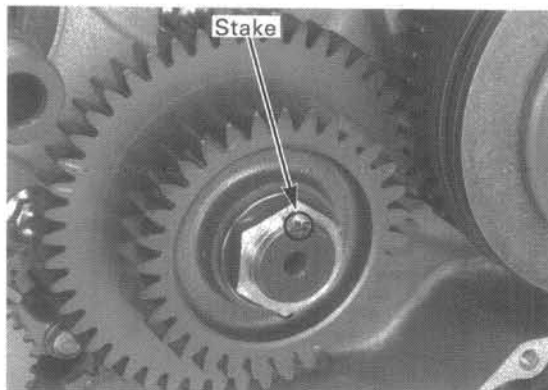
07724-0010100 or
07724-001A100
(U.S.A. only)

TORQUE: 186 N·m (19.0 kgf·m, 137 lbf·ft)



Be careful not to damage the rear balancer shaft threads.

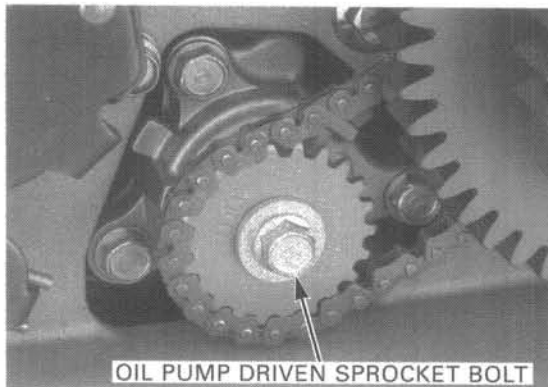
Stake the primary driven gear nut.



Tighten the oil pump driven sprocket bolt if it was removed.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Assemble the clutch (page 10-10).

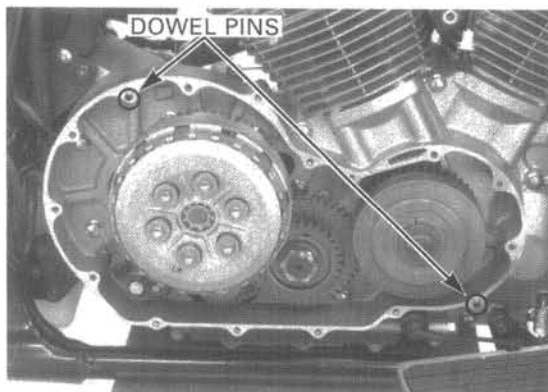


RIGHT CRANKCASE COVER INSTALLATION

Be careful not to damage the mating surfaces.

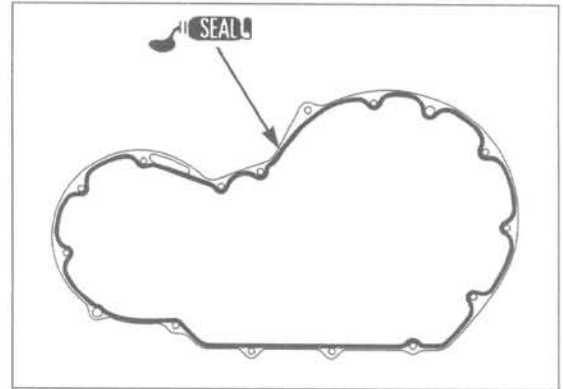
Clean the mating surfaces of the right crankcase and cover.

Install the two dowel pins.

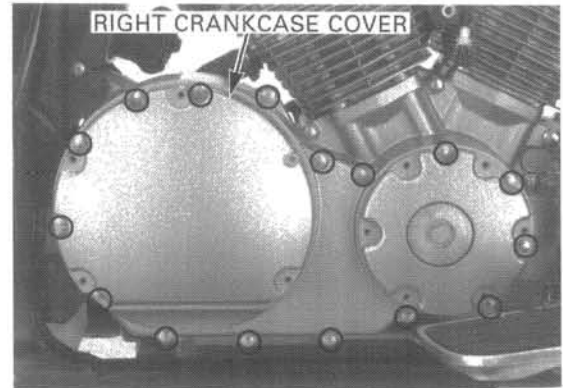


CLUTCH/GEARSHIFT LINKAGE

Apply sealant to the right crankcase cover mating surface as shown.



Install the right crankcase cover and 16 bolts, and tighten the bolts in a crisscross pattern in two or three steps.



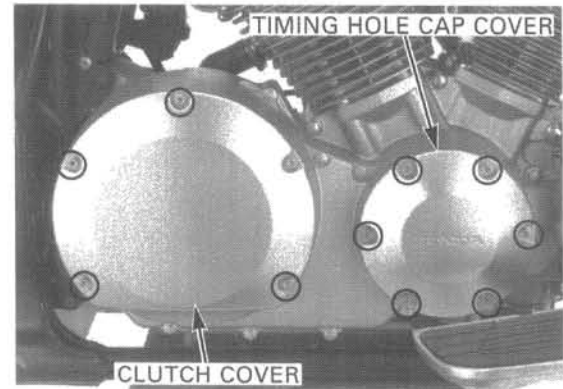
Install the timing hole cap cover and tighten the six socket bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the clutch cover and tighten the four socket bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the exhaust system (page 2-6).
Fill the crankcase with the recommended engine oil (page 3-11).

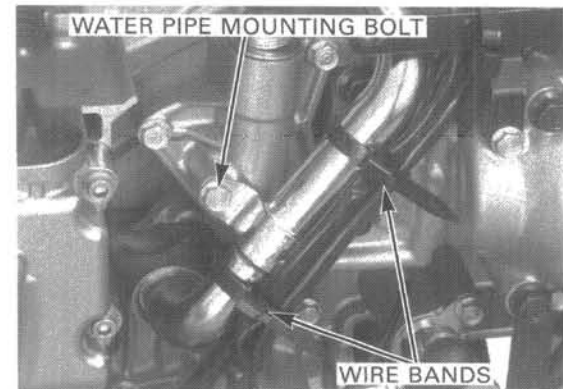


CLUTCH LIFTER ARM

REMOVAL

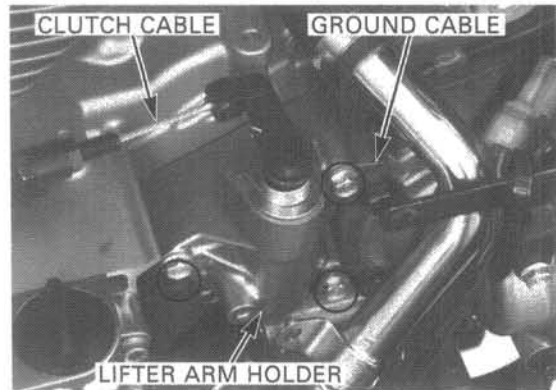
Remove the left crankcase rear cover (page 2-3).
Drain the coolant (page 6-5).

Remove the two wire bands and water pipe mounting bolt.
Remove the water pipe from the water pump.

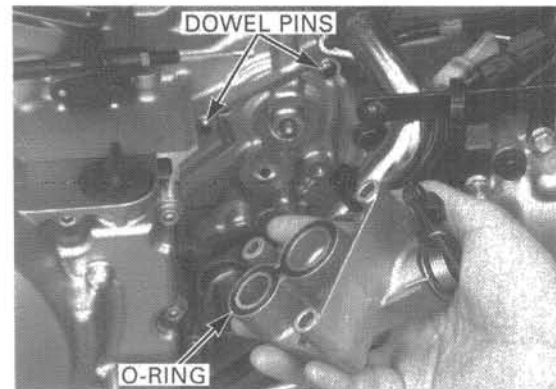


CLUTCH/GEARSHIFT LINKAGE

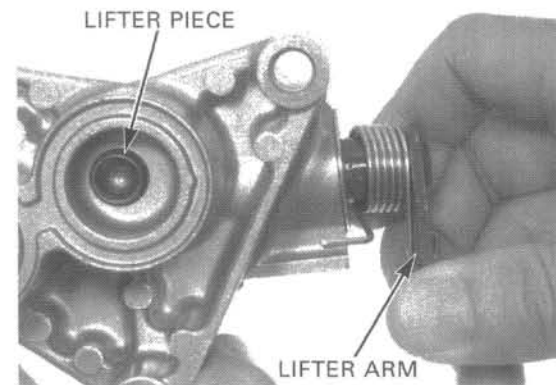
Remove the three bolts, ground cable and clutch lifter arm holder.
Disconnect the clutch cable from the clutch lifter arm.



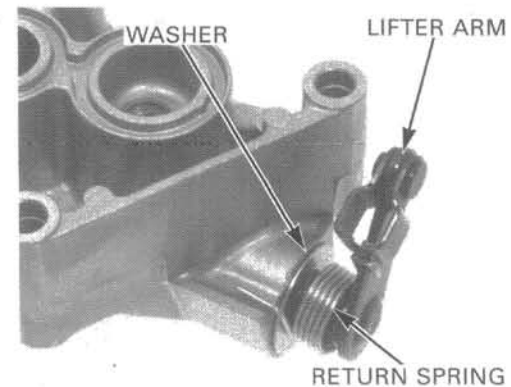
Remove the two dowel pins and O-ring.



Turn the clutch lifter arm counterclockwise and remove the clutch joint piece.

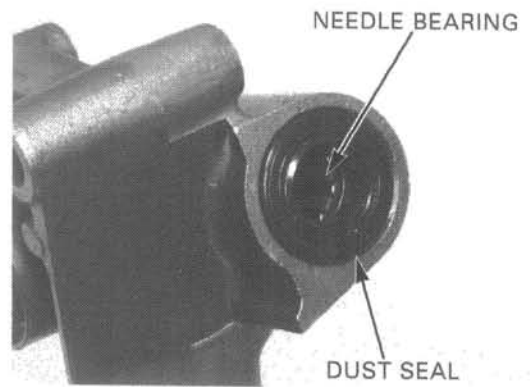


Remove the clutch lifter arm, return spring and washer from the lifter arm holder.



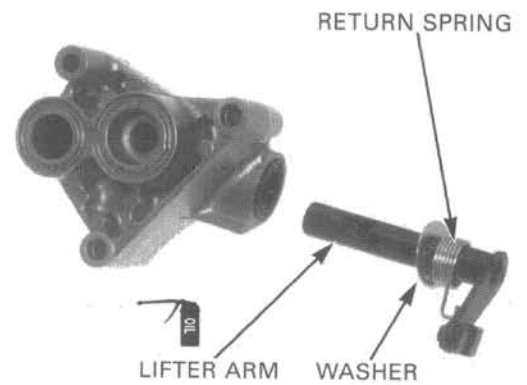
CLUTCH/GEARSHIFT LINKAGE

Check the dust seal and needle bearings in the clutch lifter arm holder for wear or damage. Replace the lifter arm holder if necessary.



INSTALLATION

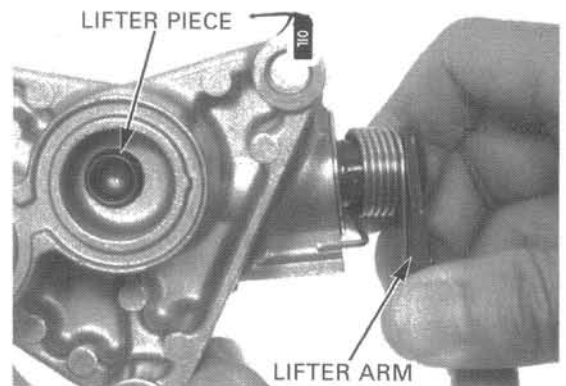
Apply oil to the sliding surface of the clutch lifter arm. Install the return spring and washer onto the lifter arm. Install the lifter arm into the lifter arm holder.



Hook the return spring ends to the lifter arm and holder as shown.

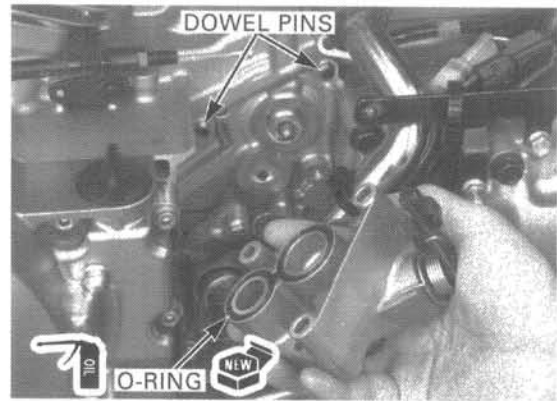


Coat the clutch joint piece with oil. Turn the lifter arm counterclockwise and install the joint piece into the lifter arm holder.

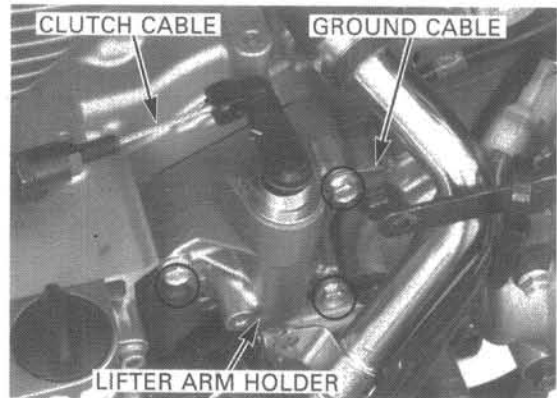


CLUTCH/GEARSHIFT LINKAGE

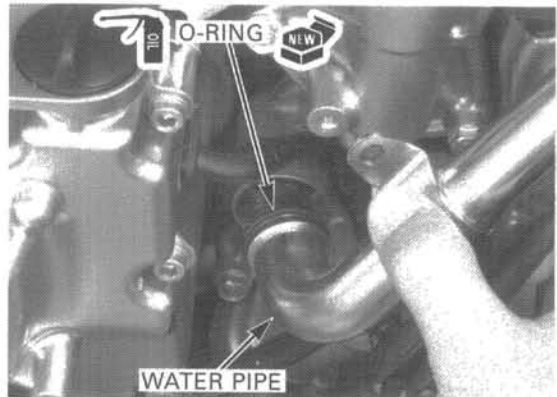
Install the dowel pins.
Coat a new O-ring with oil and install it into the clutch lifter arm holder grooves.



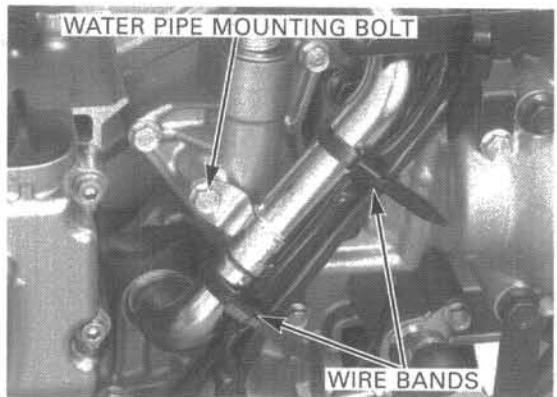
Connect the clutch cable to the clutch lifter arm.
Install the lifter arm holder, ground cable and three bolts, and tighten the bolts securely.



Coat a new O-ring with oil and install it onto the water pipe.
Install the water pipe into the water pump.

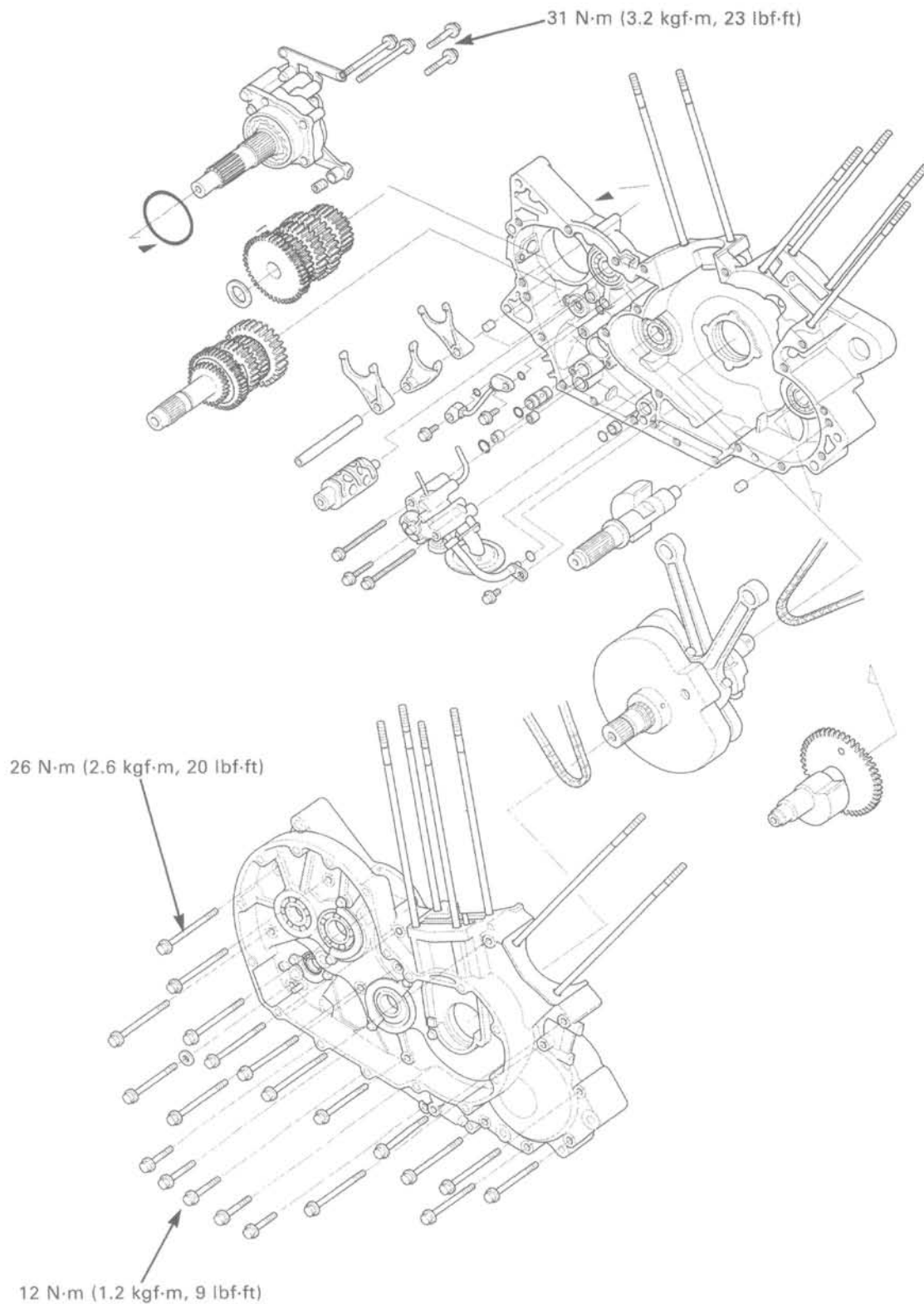


Install the water pipe mounting bolt and tighten it securely.
Install the wire bands.



Fill and bleed the cooling system (page 6-5).
Install the left crankcase rear cover (page 2-3).

CRANKSHAFT/TRANSMISSION



11. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	11-1	BALANCER SHAFT	11-9
TROUBLESHOOTING	11-2	TRANSMISSION/OUTPUT GEAR CASE	11-10
CRANKCASE SEPARATION	11-3	CRANKCASE BEARING REPLACEMENT	11-18
CRANKSHAFT/CONNECTING ROD	11-3	CRANKCASE ASSEMBLY	11-20

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
 - oil pump (section 4)
 - crankshaft/connecting rod
 - balancer shaft
 - transmission
- Be careful not to damage the crankcase mating surfaces when servicing.
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

11

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Connecting rod big end side clearance	0.10—0.25 (0.004—0.010)	0.28 (0.011)	
	Crankpin oil clearance	0.038—0.062 (0.0015—0.0024)	0.070 (0.0028)	
	Main journal oil clearance	0.030—0.054 (0.0012—0.0021)	0.068 (0.0027)	
	Crankshaft runout	—	0.05 (0.002)	
Shift fork	I.D.	14.000—14.018 (0.5512—0.5519)	14.04 (0.553)	
	Claw thickness	5.93—6.00 (0.233—0.236)	5.83 (0.230)	
Shift fork shaft	O.D.	13.966—13.984 (0.5498—0.5506)	13.956 (0.5494)	
Transmission	Gear I.D.	M4, M5	31.000—31.025 (1.2205—1.2215)	31.035 (1.2218)
		C1	30.000—30.025 (1.1811—1.1821)	30.035 (1.1825)
		C2, C3	33.000—33.025 (1.2992—1.3002)	33.035 (1.3006)
	Gear bushing O.D.	M4, M5	30.950—30.975 (1.2186—1.2195)	30.94 (1.218)
		C1	25.987—26.000 (1.0231—1.0236)	25.977 (1.0227)
		C2/C3	32.950—32.965 (1.2972—1.2978)	32.94 (1.297)
	Gear-to-bushing clearance	M4, M5	0.025—0.075 (0.0010—0.0030)	0.095 (0.0037)
		C2/C3	0.035—0.075 (0.0014—0.0030)	0.095 (0.0037)
	Gear bushing I.D.	M4	27.985—28.006 (1.1018—1.1026)	28.03 (1.104)
		C1	22.050—22.150 (0.8681—0.8720)	22.170 (0.8728)
		C2/C3	30.000—30.030 (1.1811—1.1823)	30.050 (1.1831)
	Mainshaft O.D.	at M4	27.959—27.980 (1.1007—1.1016)	27.940 (1.1000)
	Countershaft O.D.	at C1	21.980—21.993 (0.8654—0.8659)	21.97 (0.8650)
		at C2/C3	29.959—29.980 (1.1795—1.1803)	29.94 (1.1787)
	Bushing-to-shaft clearance	M4	0.005—0.047 (0.0002—0.0019)	0.067 (0.0026)
C1		0.057—0.170 (0.0022—0.0067)	0.190 (0.0075)	
C2/C3		0.020—0.071 (0.0008—0.0028)	0.091 (0.0036)	

CRANKSHAFT/TRANSMISSION

TORQUE VALUES

Right crankcase bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Cam chain tensioner setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
Connecting rod bearing cap nut	59 N·m (6.0 kgf·m, 43 lbf·ft) Apply oil to the threads and seating surface.
Output gear case mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)
Shift drum bearing setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
Shift drum center socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
Oil pump driven sprocket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.

TOOLS

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Attachment, 42 x 47 mm	07746-0010300
Attachment, 52 x 55 mm	07746-0010400
Attachment, 62 x 68 mm	07746-0010500
Pilot, 20 mm	07746-0040500
Pilot, 22 mm	07746-0041000
Pilot, 25 mm	07746-0040600
Pilot, 28 mm	07746-0041100
Remover handle	07936-3710100
Bearing remover, 20 mm	07936-3710600
Adjustable bearing remover	07JAC-PH80100 or 07736-A01000B and slide hammer 3/8 x 16
Bearing remover shaft	07JAC-PH80200
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)

TROUBLESHOOTING

Excessive engine noise

- Worn main journal bearings
- Worn crankpin bearings
- Worn or damaged transmission gears
- Worn or damaged transmission bearings

Hard to shift

- Improper clutch operation (section 10)
- Incorrect engine oil viscosity
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Bent gearshift spindle

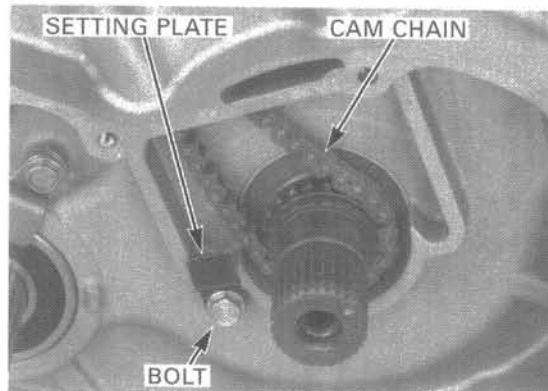
Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

CRANKCASE SEPARATION

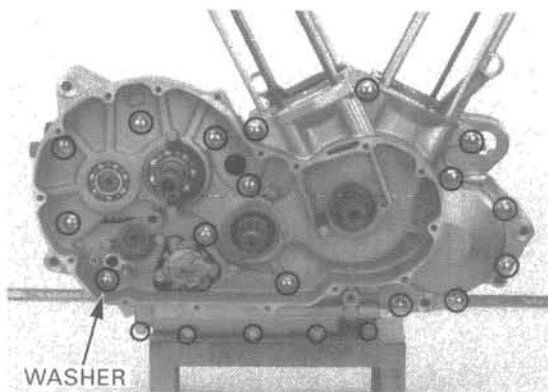
Remove the following:

- engine (section 7)
- cylinder head (section 8)
- cylinder, piston (section 9)
- clutch, gearshift linkage, primary gears, clutch lifter arm holder (section 10)
- flywheel, starter gears (section 18)
- front and rear cylinder cam chains
- bolt and cam chain tensioner setting plate if necessary

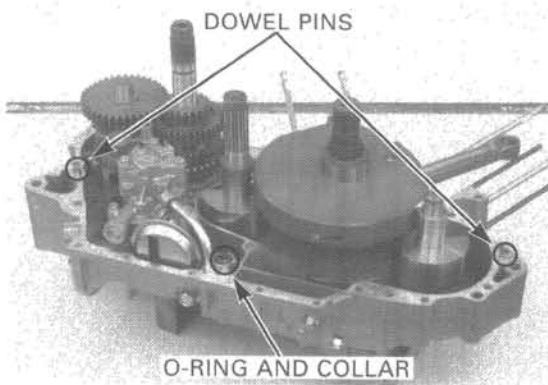


Loosen the five 6 mm bolts and sixteen 8 mm bolts in a crisscross pattern in two or three steps, and remove the bolts and washer.

Carefully separate the right crankcase from the left crankcase.



Remove the two dowel pins, O-ring and oil joint collar.



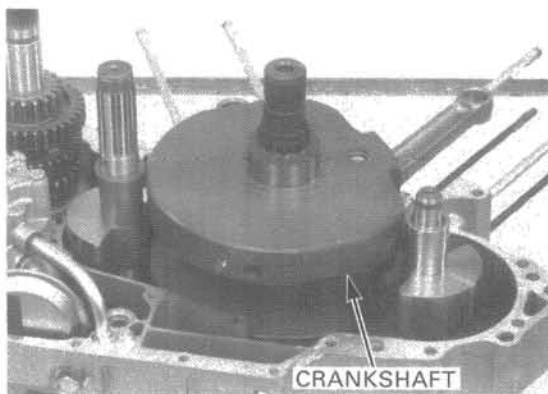
CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase.

Be careful not to damage the main bearing sliding surface.

Remove the crankshaft from the left crankcase.



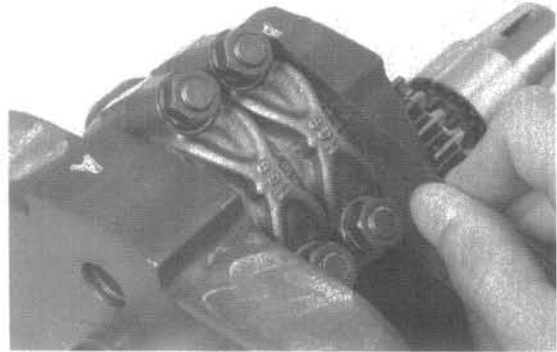
CRANKSHAFT/TRANSMISSION

SIDE CLEARANCE INSPECTION

Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end.

SERVICE LIMIT: 0.28 mm (0.011 in)

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if still out of limit, replace the crankshaft.

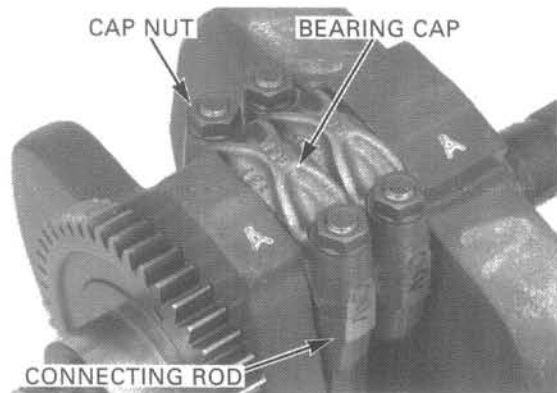


CONNECTING ROD REMOVAL

Tap the side of the cap lightly if the bearing cap is hard to remove.

Remove the connecting rod bearing cap nuts, bearing caps and connecting rods.

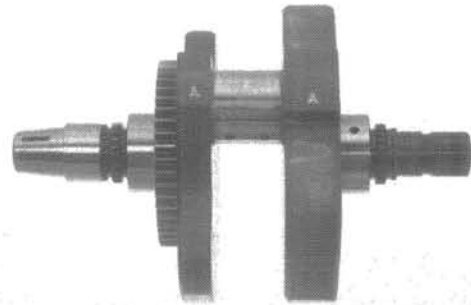
Mark the connecting rods, bearings and caps to indicate the correct cylinder on the crankpin for reassembly.



CRANKSHAFT INSPECTION

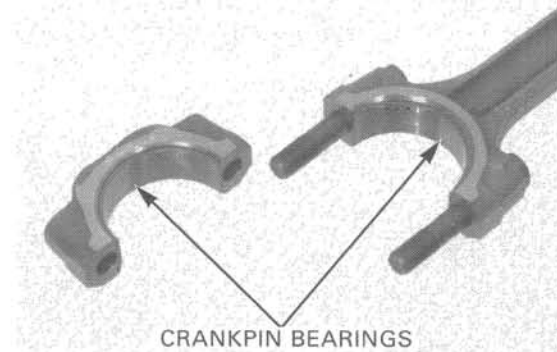
Place the crankshaft on a stand or V-blocks.
Rotate the crankshaft two revolutions and read the runout using a dial indicator.

SERVICE LIMIT: 0.05 mm (0.002 in)



CRANKPIN BEARING INSPECTION

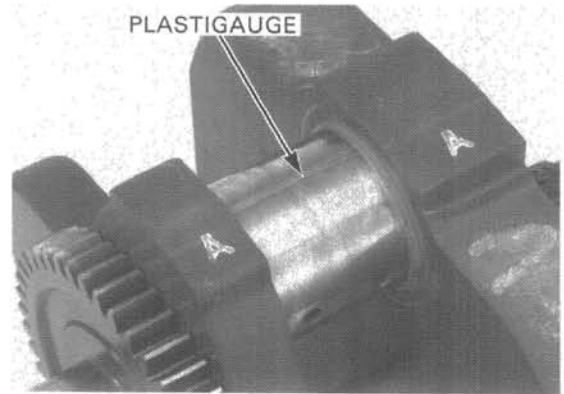
Check the bearing inserts for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE

Clean off any oil from the bearing inserts and crankpin.

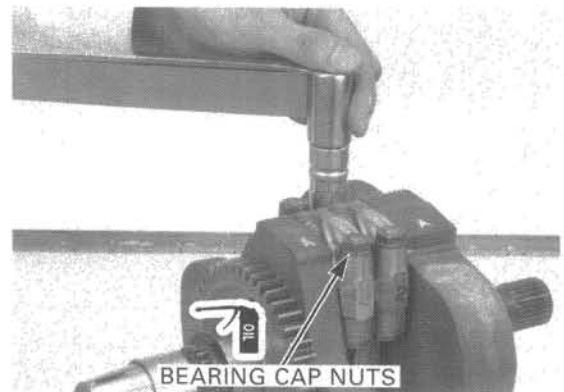
Put strip of plastigauge lengthwise on the crankpin avoiding the oil hole.



Do not rotate the connecting rod during inspection.

Carefully install the connecting rods and bearing caps on the correct positions of the crankpin. Apply oil to the threads and seating surface of the connecting rod bearing cap nuts. Install the cap nuts and tighten them in two or three steps alternately.

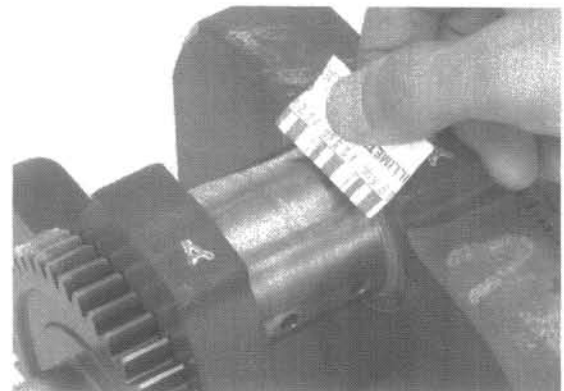
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



Remove the bearing caps and measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.070 mm (0.0028 in)

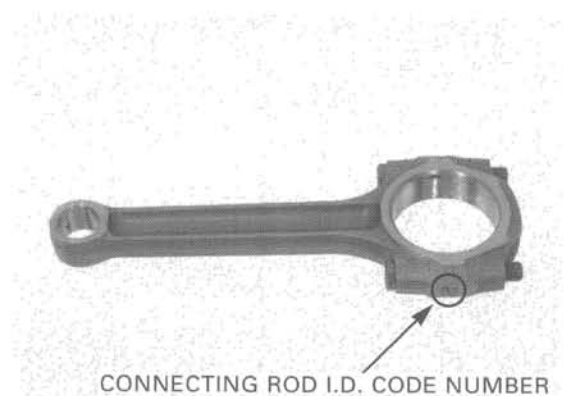
If the oil clearance exceeds the service limit, select the correct replacement bearings.



CRANKPIN BEARING SELECTION

Number 1 or 2 on the connecting rod is the code for the connecting rod I.D.

Record the connecting rod I.D. code number.

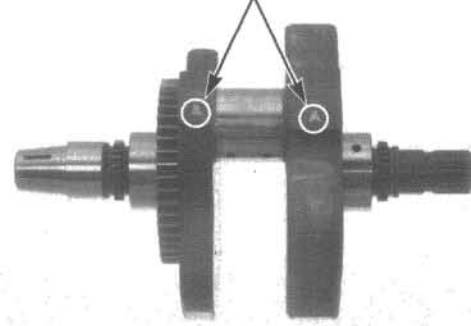


CRANKSHAFT/TRANSMISSION

Letter A or B on the crank weight is the code for the crankpin O.D.

Record the crankpin O.D. code letter.

CRANKPIN O.D. CODE LETTER



Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

Connecting rod I.D. code \ Crankpin O.D. code	1	2
A	Pink	Yellow
B	Yellow	Green

Crankpin bearing thickness:

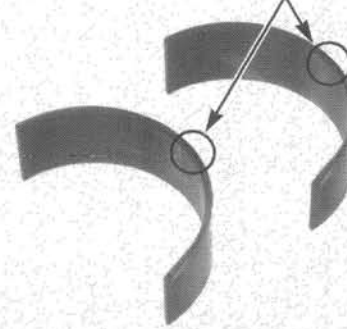
Green: 1.495—1.499 mm (0.0589—0.0590 in)

Yellow: 1.491—1.495 mm (0.0587—0.0589 in)

Pink: 1.487—1.491 mm (0.0585—0.0587 in)

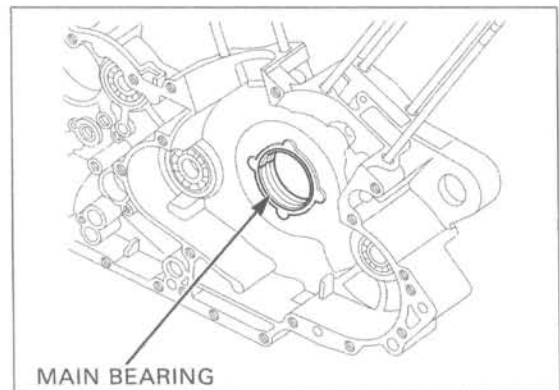
After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearances can cause major engine damage.

COLOR CODE



MAIN BEARING INSPECTION

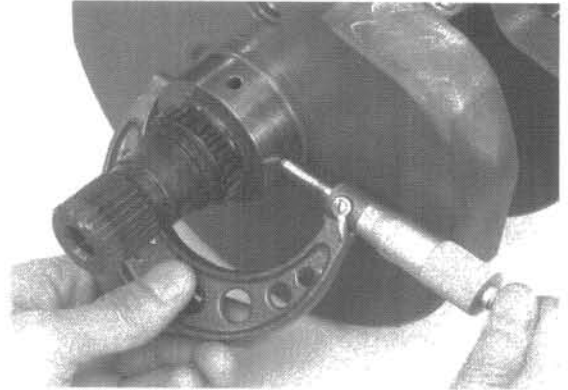
Check the bearings for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE

Clean any oil from the bearings and crankshaft journal.

Measure and record the crankshaft main journal O.D.

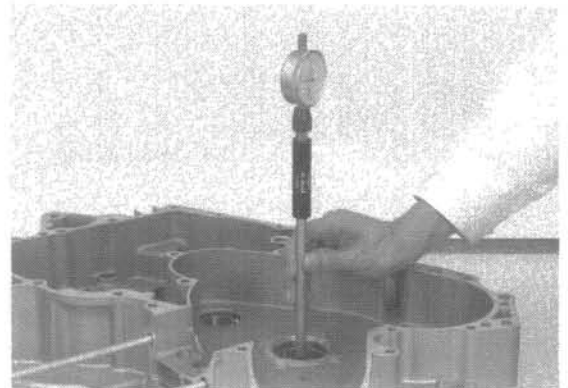


Measure and record the main bearing I.D. in the crankcase.

Calculate the oil clearance between the main journal and main bearing.

SERVICE LIMIT: 0.068 mm (0.0027 in)

If the oil clearance exceeds the service limit, replace the crankcase.



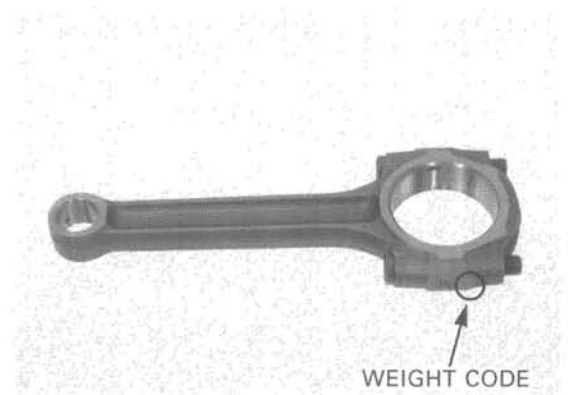
CONNECTING ROD SELECTION

An alphabetical weight code is stamped on the connecting rod.

Connecting rods A, B, F and G are not available for the service parts.

If a connecting rod requires replacement, you should select a rod with the same weight code as the original. But if that is unavailable, you may use one of the others specified in the following chart. The "○" mark in the table indicates that matching is possible in the crossed codes.

Rod code on products	A	B	C	D	E	F	G
Rode code for service parts							
C			○	○	○	○	○
D		○	○	○	○	○	
E	○	○	○	○	○		

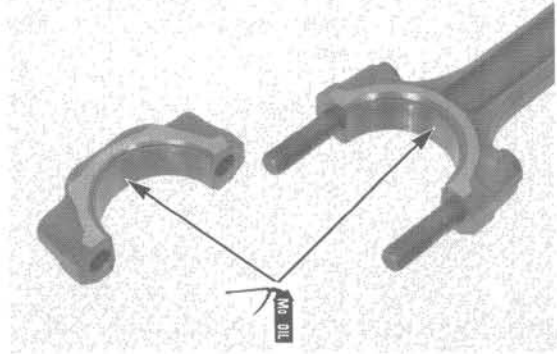


CONNECTING ROD INSTALLATION

Wipe any oil from the connecting rods, bearing caps and bearing inserts.

Install the bearing inserts on the connecting rods and bearing caps by aligning the tab with the groove.

Apply molybdenum oil solution to the bearing sliding surfaces.

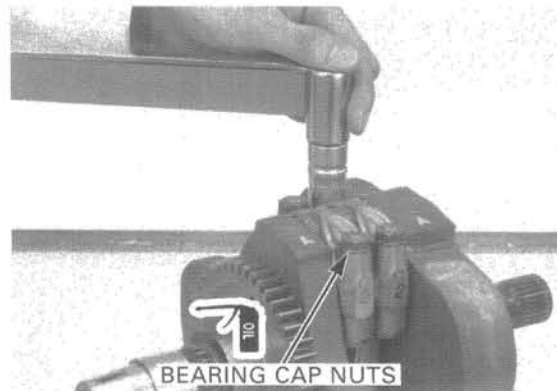


Install the connecting rods and bearing caps in their original positions as noted during removal while aligning the I.D. code on the rods and caps.

Apply oil to the threads and seating surfaces of the connecting rod bearing cap nuts, and install them. Tighten the nuts in two or three steps alternately.

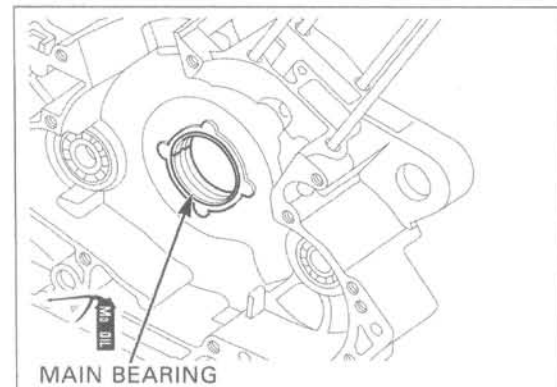
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

After tightening the nuts, check that the connecting rods move freely without binding.

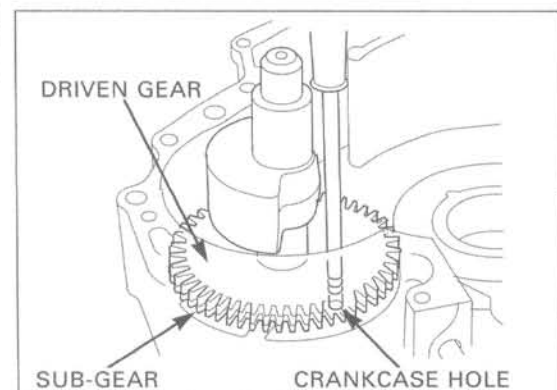


CRANKSHAFT INSTALLATION

Apply molybdenum oil solution to the main bearing sliding surface.



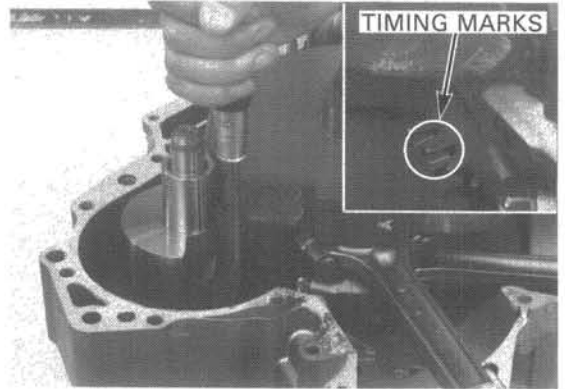
Align the scissors gears (balancer driven gear and sub-gear) by inserting a screwdriver into the gear holes, and further insert the screwdriver into the crankcase hole to hold the balancer gears.



Be careful not to damage the main bearing sliding surface.

Install the crankshaft into the left crankcase so that the connecting rods are positioned in the correct cylinder groove in crankcase and the timing marks on the front balancer shaft drive and driven gears are aligned.

Assemble the crankcase (page 11-20).



BALANCER SHAFT

REMOVAL

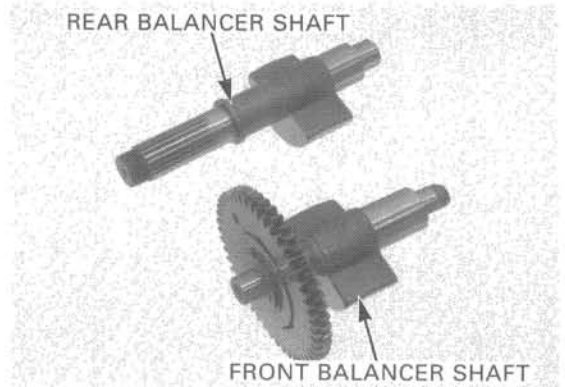
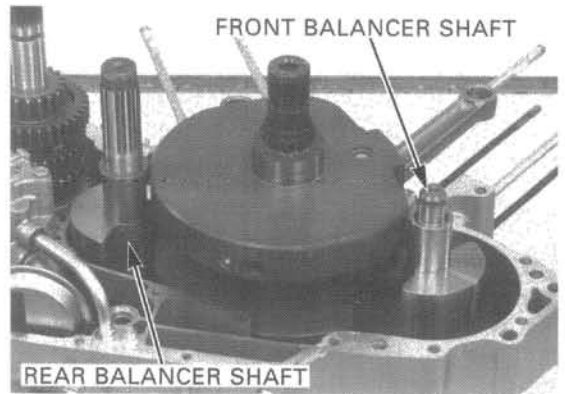
Separate the crankcase (page 11-3).

Remove the rear balancer shaft from the left crankcase.

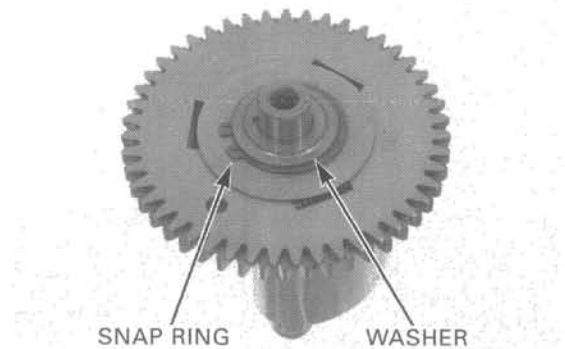
Remove the crankshaft (page 11-3).

Remove the front balancer shaft from the left crankcase.

Check the balancer shafts for wear or damage.



Remove the snap ring and washer from the front balancer shaft.



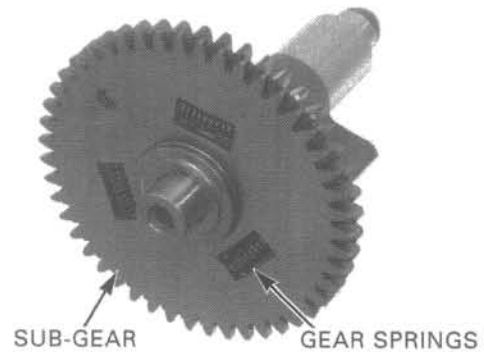
CRANKSHAFT/TRANSMISSION

Remove the balancer gear springs and balancer sub-gear.

Check the springs and sub-gear for wear or damage.

INSTALLATION

Install the sub-gear, springs, washer and snap ring onto the front balancer shaft.

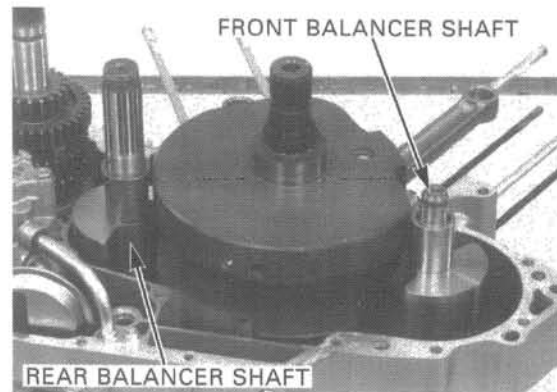


Install the front balancer shaft into the left crankcase.

Install the crankshaft (page 11-8).

Install the rear balancer shaft into the left crankcase.

Assemble the crankcase (page 11-20).

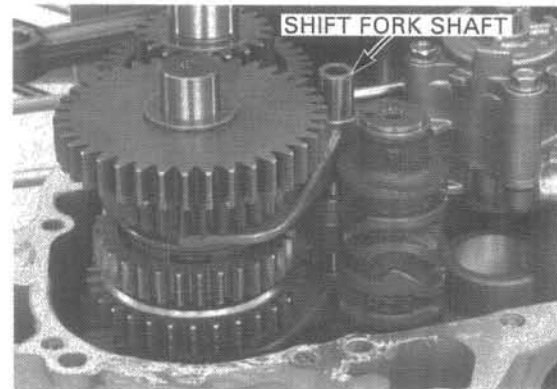


TRANSMISSION/OUTPUT GEAR CASE

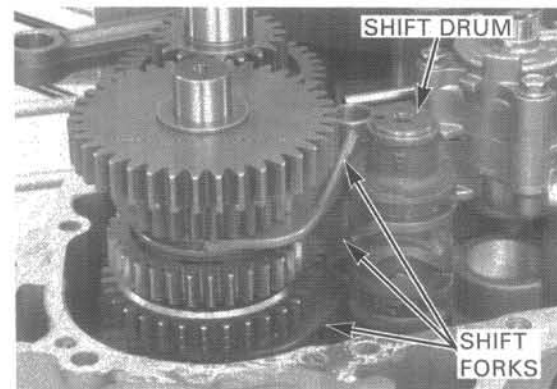
DISASSEMBLY

Separate the crankcase (page 11-3).

Pull the shift fork shaft out of the left crankcase and shift forks.

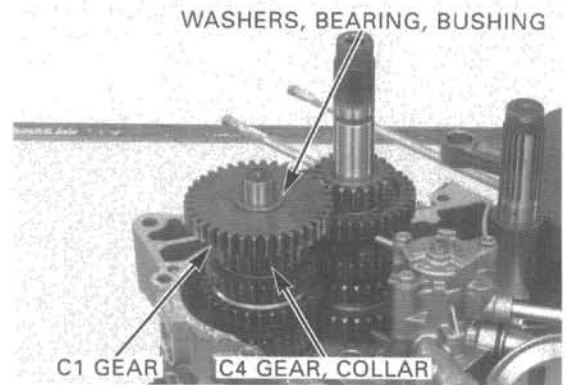


Remove the shift drum and shift forks.

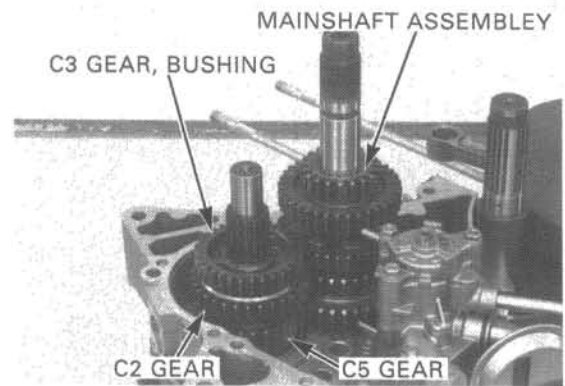


CRANKSHAFT/TRANSMISSION

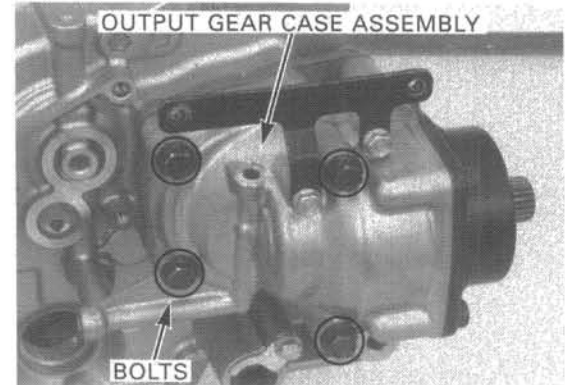
Remove the thrust washer, C1 gear, needle bearing, bushing, thrust washer, C4 gear and spline collar from the countershaft.



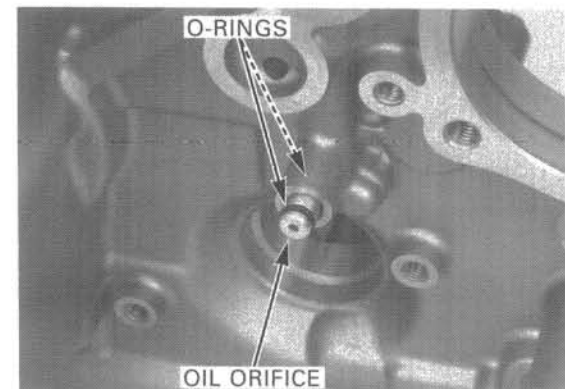
Remove the C3 gear, bushing, C2 gear, thrust washer, C5 gear and mainshaft assembly as a set.



Remove the four mounting bolts and output gear case assembly.



Remove the oil orifice and O-rings.



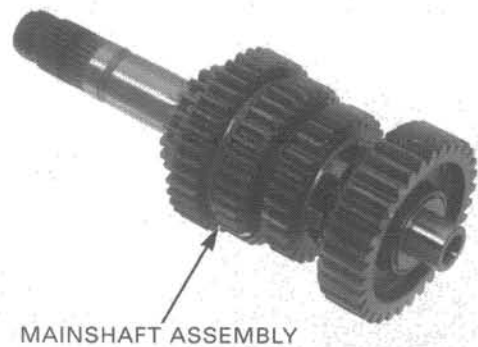
CRANKSHAFT/TRANSMISSION

Remove the O-ring from the output gear case.



Disassemble the mainshaft.

Clean all disassembled parts in solvent thoroughly.



INSPECTION

SHIFT FORK/SHAFT

Check the shift fork guide pins for abnormal wear or damage.

Measure the shift fork I.D.

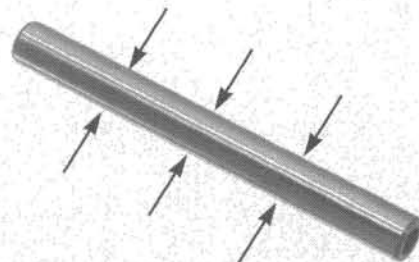
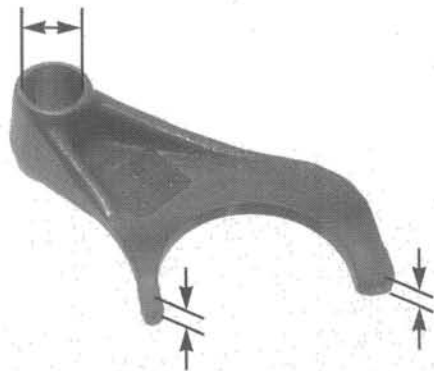
SERVICE LIMIT: 14.04 mm (0.553 in)

Measure the shift fork claw thickness.

SERVICE LIMIT: 5.83 mm (0.230 in)

Measure the shift fork shaft O.D.

SERVICE LIMIT: 13.956 mm (0.5494 in)



Check the shift drum guide groove for abnormal wear or damage.



GEAR/BUSHING/SHAFT

Check the gear shifter groove for abnormal wear or damage.

Check the gear dogs and teeth for abnormal wear or damage.

Measure the gear I.D.

SERVICE LIMITS: M4, M5: 31.035 mm (1.2218 in)
C1: 30.035 mm (1.1825 in)
C2, C3: 33.035 mm (1.3006 in)

Measure the gear bushing O.D.

SERVICE LIMITS: M4, M5: 30.94 mm (1.218 in)
C1: 25.977 mm (1.20227 in)
C2/C3: 32.94 mm (1.297 in)

Calculate the gear-to-bushing clearance.

SERVICE LIMIT: 0.095 mm (0.0037 in)

Measure the gear bushing I.D.

SERVICE LIMITS: M4: 28.03 mm (1.104 in)
C1: 22.170 mm (0.8728 in)
C2/C3: 30.050 mm (1.1831 in)

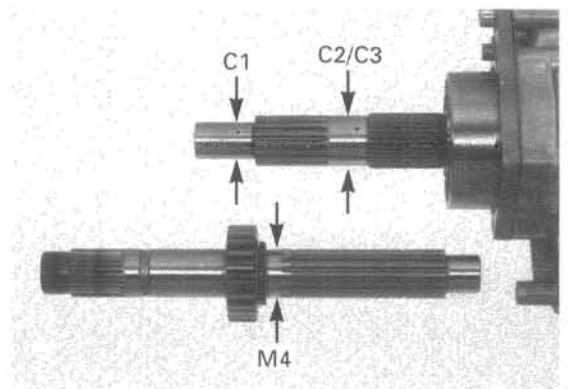
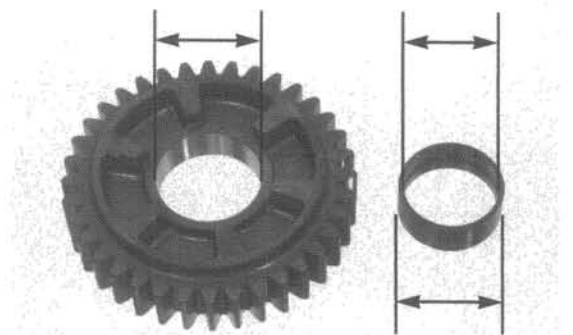
Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O.D. at the M4 gear.

SERVICE LIMIT: 27.940 mm (1.1000 in)

Measure the countershaft O.D. at the C1 gear and C2/C3 gear.

SERVICE LIMITS:
at C1 gear: 21.97 mm (0.8650 in)
at C2/C3 gear: 29.94 mm (1.1787 in)



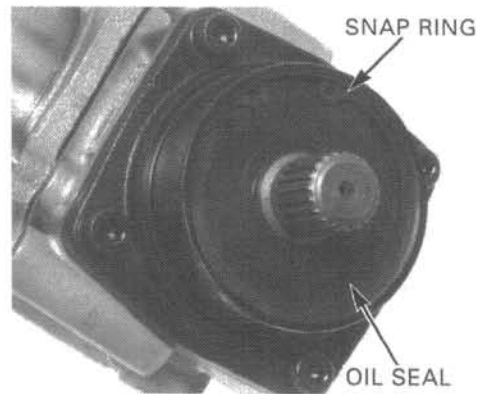
CRANKSHAFT/TRANSMISSION

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMITS: M4: 0.067 mm (0.0026 in)
C1: 0.190 mm (0.0075 in)
C2/C3: 0.091 mm (0.0036 in)

OUTPUT GEAR OIL SEAL

Check the output gear oil seal for deterioration or damage.
Remove the snap ring and replace the oil seal if necessary.



ASSEMBLY

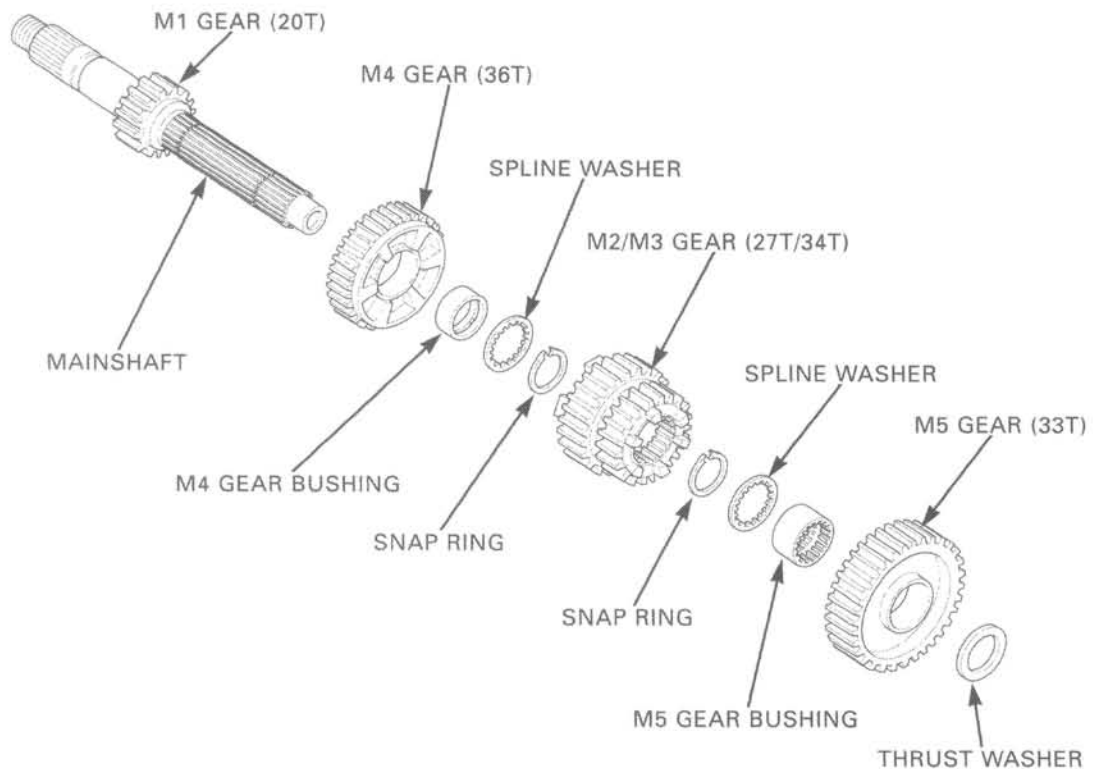
Apply molybdenum oil solution to the gear shifter grooves and bushings.

Apply engine oil to all gear teeth and sliding surfaces.

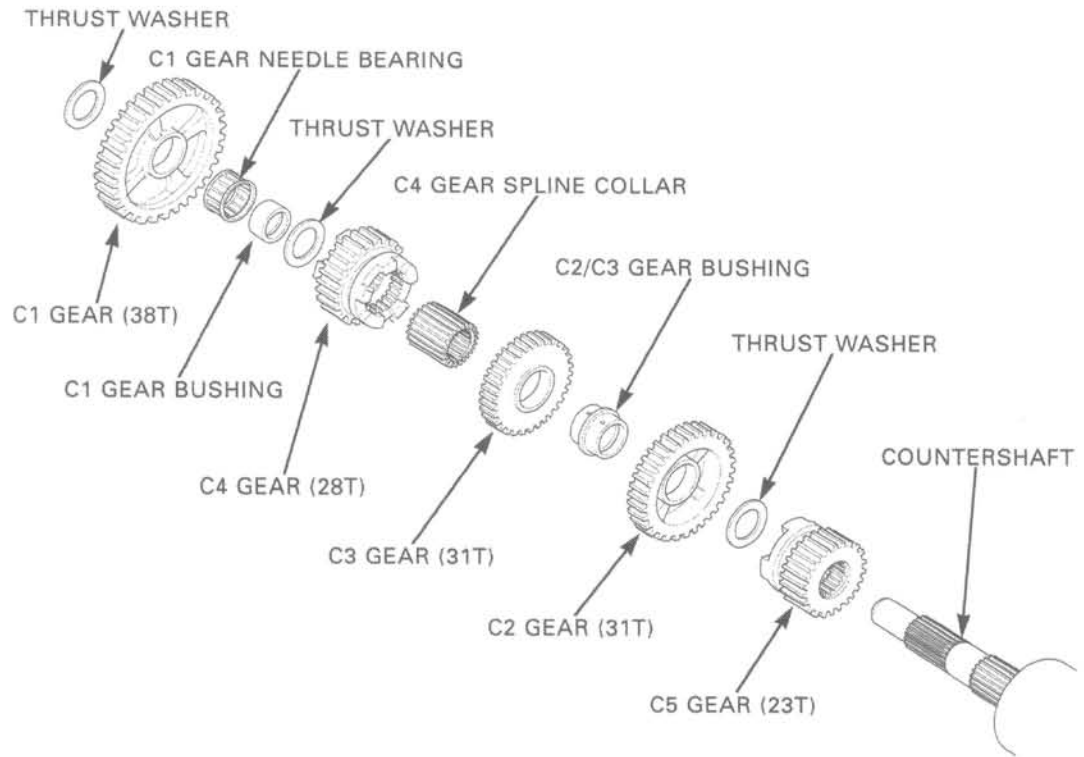
NOTE:

- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.

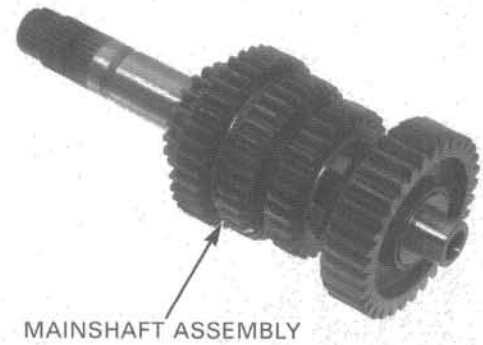
MAINSHAFT



COUNTERSHAFT



Assemble the mainshaft.



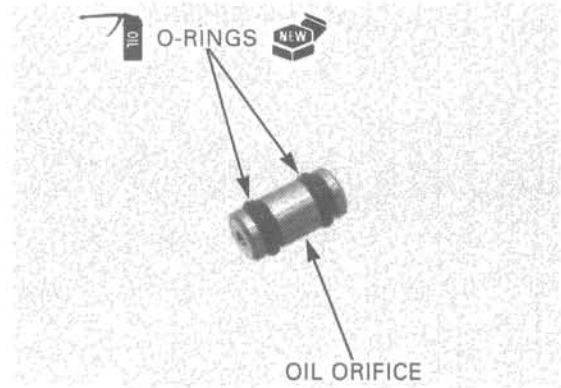
Coat a new O-ring with oil and install it onto the output gear case. Make sure the dowel pin is installed in the output gear case properly.



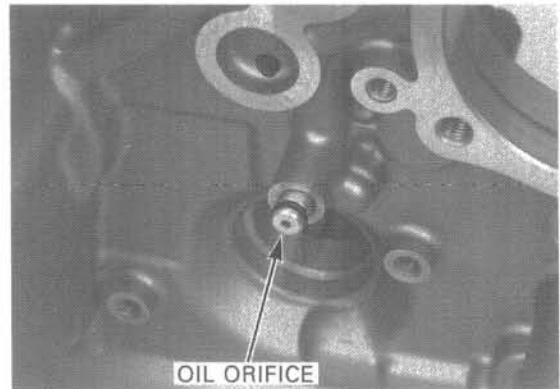
CRANKSHAFT/TRANSMISSION

Clean the oil orifice with compressed air.

Coat new O-rings with oil and install them into the grooves in the oil orifice.

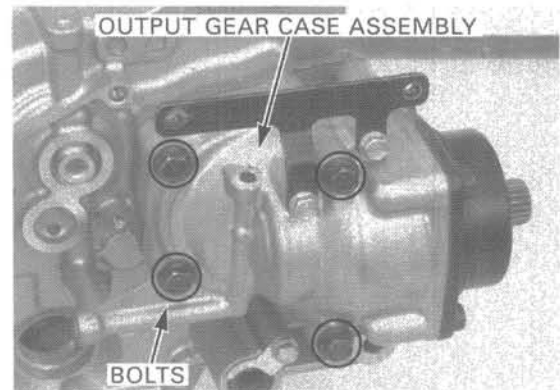


Install the oil orifice into the left crankcase with the chamfered hole side facing the crankcase.

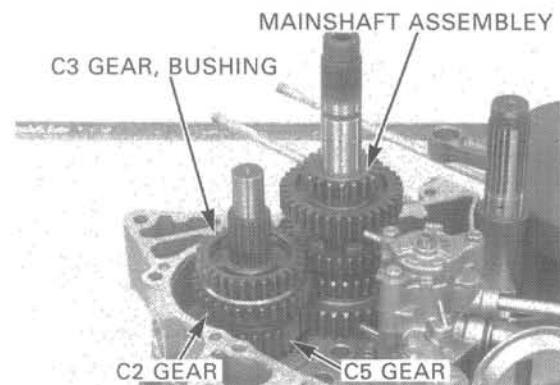


Install the output gear case assembly onto the left crankcase and tighten the mounting bolts.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

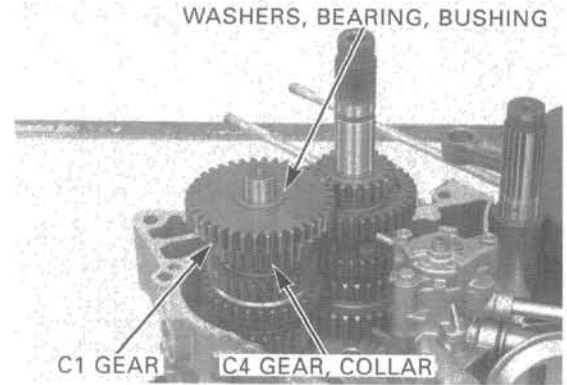


Install the mainshaft assembly, C5 gear, thrust washer, C2 gear, bushing and C3 gear as a set.



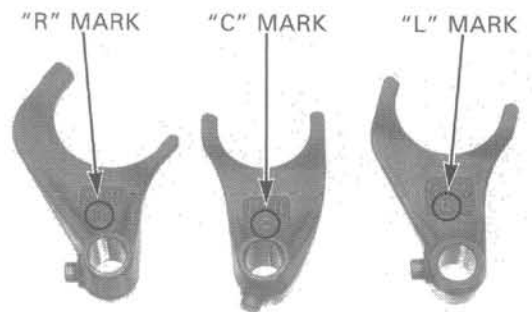
CRANKSHAFT/TRANSMISSION

Install the spline collar, C4 gear, thrust washer, C1 gear bushing, needle bearing, C1 gear and thrust washer onto the countershaft.



The shift forks have the following identification marks.

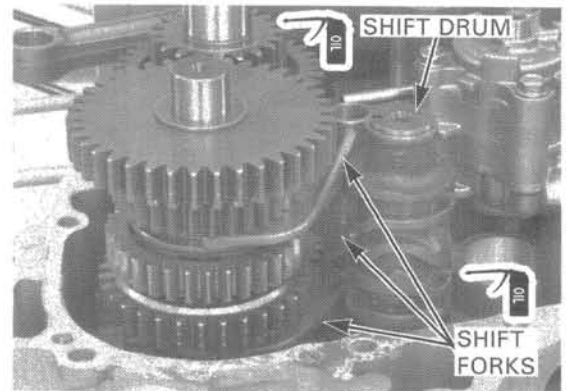
"L": Left shift fork
"C": Center shift fork
"R": Right shift fork



Apply oil to the sliding surfaces of the shift forks and shift drum.

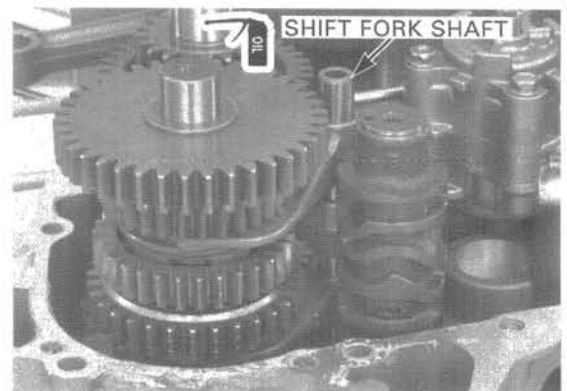
Install the shift forks into the gear shifter grooves with the identification marks facing up (right crankcase side).

Install the shift drum into the left crankcase while inserting the shift fork guide pin into the guide groove in the drum.



Coat the shift fork shaft with oil and install it through the shift forks into the left crankcase.

Assemble the crankcase (page 11-20).



CRANKCASE BEARING REPLACEMENT

Separate the crankcase (page 11-3).

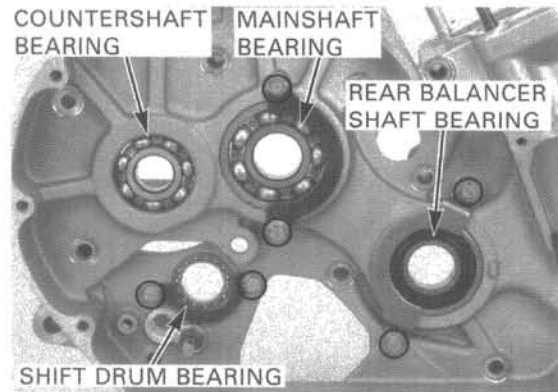
RIGHT CRANKCASE

Remove the bolts and bearing setting plates.

Always wear insulated gloves when handling a heated case.

Before removing the bearings, heat the crankcase around the bearings to about 80°C (176°F).

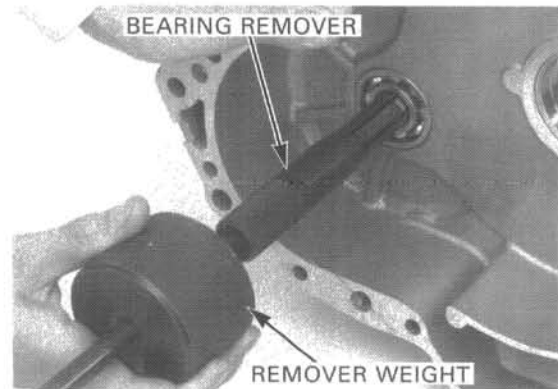
Drive the rear balancer shaft, mainshaft, countershaft and shift drum bearings out of the right crankcase.



Remove the front balancer shaft bearing using the special tools.

TOOLS:

Remover handle	07936-3710100
Bearing remover, 20 mm	07936-3710600
Remover weight	07741-0010201 or 07936-371010A or 07936-3710100 (U.S.A. only)



Drive new bearings into the right crankcase using the following special tools.

TOOLS:

Mainshaft and rear balancer shaft bearings:

Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500
Pilot, 28 mm	07746-0041100

Countershaft bearing:

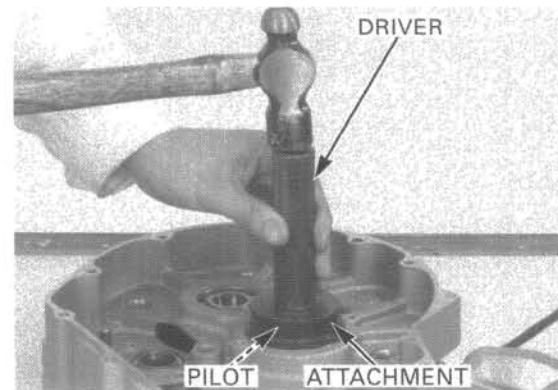
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000

Shift drum bearing:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 25 mm	07746-0040600

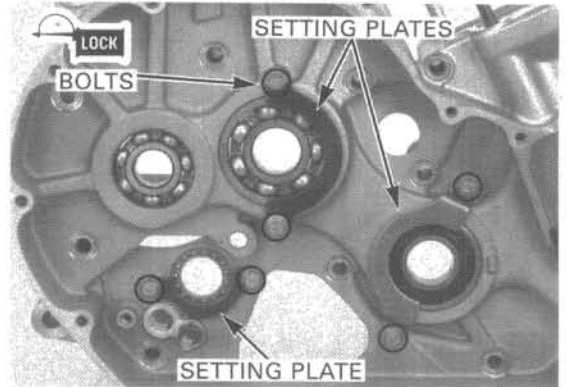
Front balancer shaft bearing:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



Apply locking agent to the bearing setting plate bolt threads.
Install the bearing setting plates and tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



LEFT CRANKCASE

Always wear insulated gloves when handling a heated case.

- Remove the following:
- crankshaft (page 11-3)
 - balancer shafts (page 11-9)
 - transmission, output gear case (page 11-10)

Before removing the bearings, heat the crankcase around the bearings to about 80°C (176°F).

Remove the left crankcase bearings using the special tools.

TOOLS:

Mainshaft and rear balancer shaft bearings:

Non-U.S.A.

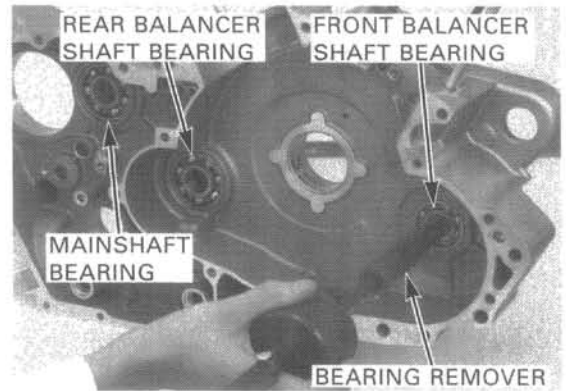
Adjustable bearing remover	07JAC-PH80100
Bearing remover shaft	07JAC-PH80200
Bearing remover weight	07741-0010201

U.S.A. only

Adjustable bearing puller, 25—40 mm	07736-A01000B
Slide hammer, 3/8 x 16	Equivalent commercially available in U.S.A.

Front balancer shaft bearing:

Remover handle	07936-3710100
Bearing remover, 20 mm	07936-3710600
Remover weight	07741-0010201 or 07936-371010A or 07936-3710100 (U.S.A. only)



Drive new bearings into the right crankcase using the following special tools.

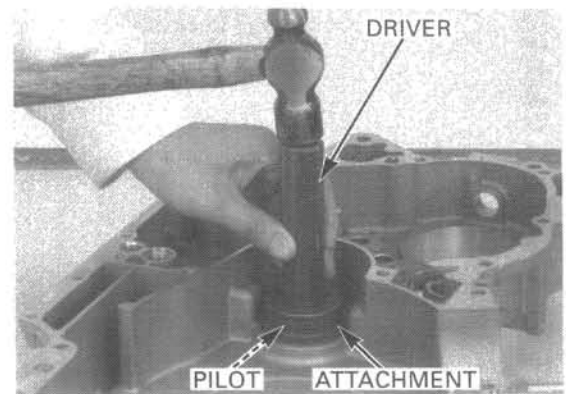
TOOLS:

Mainshaft and rear balancer shaft bearings:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000

Front balancer shaft bearing:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



CRANKSHAFT/TRANSMISSION

install the following:

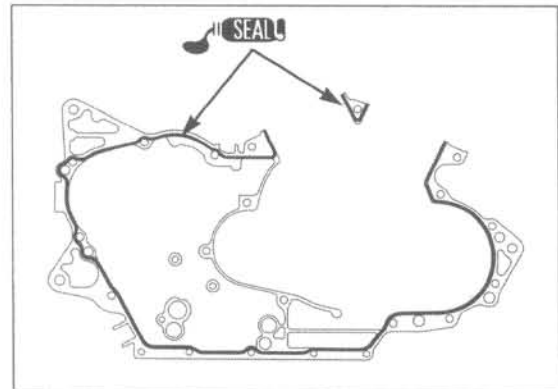
- transmission, output gear case (page 11-14)
- balancer shafts (page 11-10)
- crankshaft (page 11-8)

Assemble the crankcase.

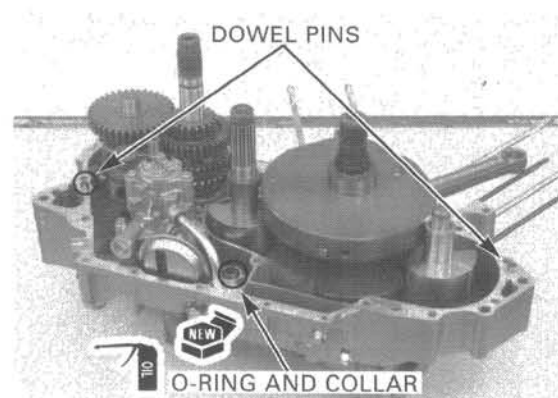
CRANKCASE ASSEMBLY

Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them.

Apply sealant to the mating surface of the left crankcase as shown.



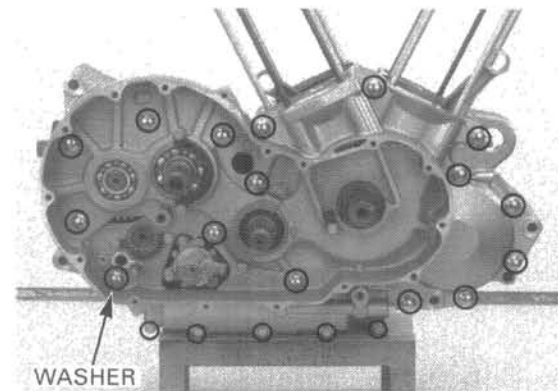
Install the two dowel pins and oil joint collar. Coat a new O-ring with oil and install it onto the oil joint collar.



Install the right crankcase over the left crankcase.

Install the sixteen 8 mm bolts, washer and five 6 mm bolts, and tighten the bolts in a crisscross pattern in two or three steps.

TORQUE: 8 mm bolt: 26 N-m (2.7 kgf-m, 20 lbf-ft)



Install the front and rear cam chains.

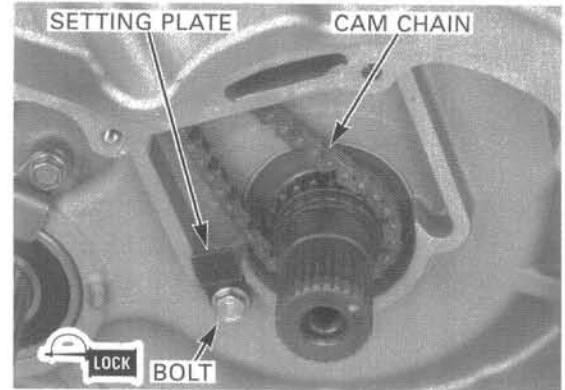
Install the cam chain tensioner setting plates if they were removed as follows:

Apply locking agent to the setting plate bolt threads, and install the setting plates and bolts. Tighten the bolts.

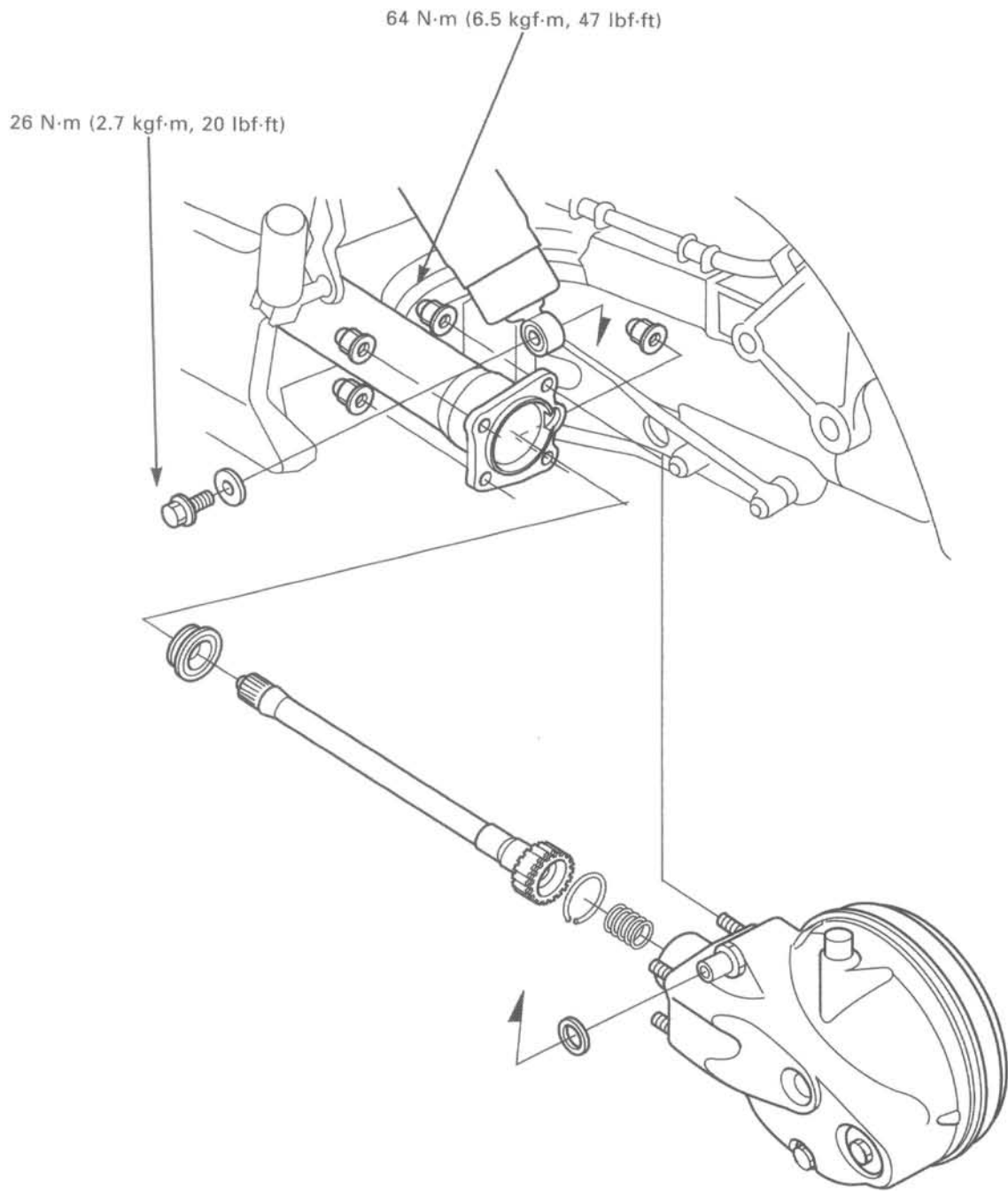
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the following:

- flywheel, starter gears (section 18)
- clutch, gearshift linkage, primary gears, clutch lifter arm holder (section 10)
- cylinder, piston (section 9)
- cylinder head (section 8)
- engine (section 7)



FINAL DRIVE



12. FINAL DRIVE

SERVICE INFORMATION	12-1	CASE BEARING REPLACEMENT	12-9
TROUBLESHOOTING	12-2	FINAL DRIVE ASSEMBLY	12-12
FINAL DRIVE REMOVAL	12-3	FINAL DRIVE INSTALLATION	12-18
FINAL DRIVE DISASSEMBLY/ INSPECTION	12-4		

SERVICE INFORMATION

GENERAL

- The final drive gear assembly and final drive shaft must be removed together.
- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gears 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 a vise. Do not clamp the gear case too tight or it could get damaged.
- Replace the ring and pinion gears as a set.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended final drive oil		Hypoid gear oil, SAE #80	—
Final drive oil capacity	After draining	120 cm ³ (4.1 US oz, 4.2 Imp oz)	—
	After disassembly	150 cm ³ (5.1 US oz, 5.3 Imp oz)	—
Final drive gear backlash		0.05—0.15 (0.002—0.006)	0.30 (0.012)
Backlash difference between measurements		—	0.10 (0.004)
Ring gear-to-stop pin clearance		0.30—0.60 (0.012—0.024)	—
Final drive gear assembly preload		0.2—0.4 N·m (2—4 kgf·cm, 1.7—3.5 lbf·in)	—

12

TORQUE VALUES

Pinion retainer	147 N·m (15.0 kgf·m, 108 lbf·ft)
Pinion retainer lock tab bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Pinion joint nut	108 N·m (11.0 kgf·m, 80 lbf·ft) Apply locking agent to the threads.
Dust guard plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Gear case cover 10 mm bolt	62 N·m (6.3 kgf·m, 46 lbf·ft) Apply locking agent to the threads.
Gear case cover 8 mm bolt	25 N·m (2.6 kgf·m, 19 lbf·ft)
Final gear case assembly mounting nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Rear shock absorber lower mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)

FINAL DRIVE

TOOLS

Attachment, 32 x 35 mm	07746-0010100
Attachment, 52 x 55 mm	07746-0010400
Attachment, 72 x 75 mm	07746-0010600
Pilot, 35 mm	07746-0040800
Driver	07749-0010000
Driver, 40 mm I.D.	07746-0030100
Attachment, 30 mm I.D.	07746-0030300
Pinion holder plate	07924-ME40010 or 07924-ME90000 (U.S.A. only)
Collar set "C"	07924-ME40020 or 07HMB-MM80100 (U.S.A. only)
Oil seal driver	07965-MC70100
Retainer wrench	07910-MA10100
Pinion puller base	07HMC-MM80110
Puller shaft	07931-ME40000
Special nut	07931-HB3020A
Bearing remover, 35 mm	07936-3710400
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-371020A or 07936-371020 (U.S.A. only)
Bearing remover, 20 mm	07936-3710600
Bearing driver attachment	07GAD-SD40101

TROUBLESHOOTING

Excessive noise

- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gears
- Oil level too low

Oil leakage

- Clogged breather
- Oil level too high
- Damaged seals
- Loose case cover bolts

FINAL DRIVE REMOVAL

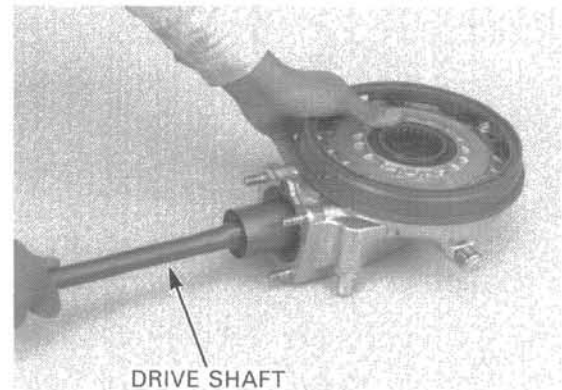
Drain the final drive gear oil (page 3-14).
Remove the rear wheel (page 14-3).

Support the swingarm and remove the left shock absorber lower mounting bolt, washer and the shock absorber from the final gear case.
Remove the washer from the gear case stud.

Remove the four mounting nuts and final drive gear case assembly.



Separate the drive shaft from the gear case by gently turning the drive shaft and pulling it.



Remove the spring, oil seal and stopper ring from the drive shaft.

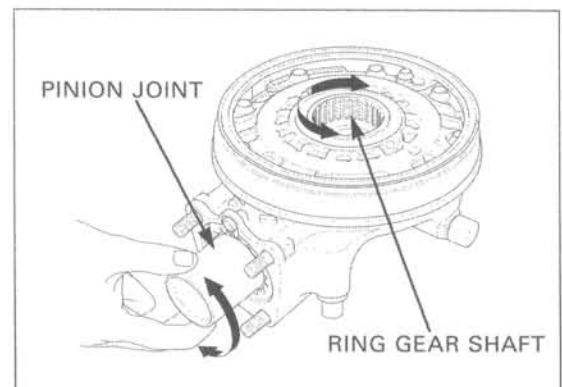
INSPECTION

Check the splines of the drive shaft for damage or wear.
If the splines of the drive shaft are damaged, check the universal joint splines also (page 14-10).



Turn the pinion joint and check that the pinion and ring gears turn smoothly and quietly without binding.

If the gears do not turn smoothly or quietly, the gears and/or bearing may be damaged or faulty. They must be checked after disassembly; replace faulty parts/assemblies as required.



FINAL DRIVE DISASSEMBLY/ INSPECTION

BACKLASH INSPECTION

Remove the oil filler cap.
Set the final drive gear case assembly in a vise with soft jaws.

Install the special tools onto the gear case and into the pinion joint to hold the pinion gear.

TOOLS:

Pinion holder plate	07924-ME40010 or 07924-ME90000 (U.S.A. only)
Collar set "C"	07924-ME40020 or 07HMB-MM80100 (U.S.A. only)

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Turn the ring gear back and forth to read the backlash.

STANDARD: 0.05—0.15 mm (0.002—0.006 in)
SERVICE LIMIT: 0.30 mm (0.012 in)

Remove the dial indicator. Turn the ring gear 120° and measure the backlash. Repeat this procedure once more. Compare the difference of the three measurements.

SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference between the three measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed. Inspect the bearings and case.

If the backlash is excessive, replace the right ring gear shim with a thicker one.
If the backlash is too small, replace the right ring gear shim with a thinner one.

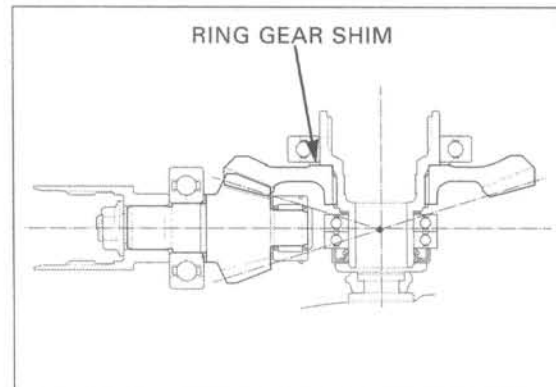
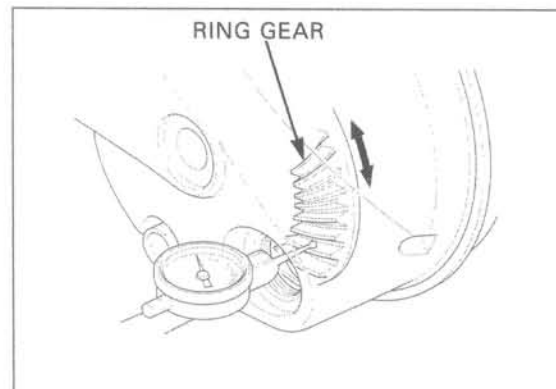
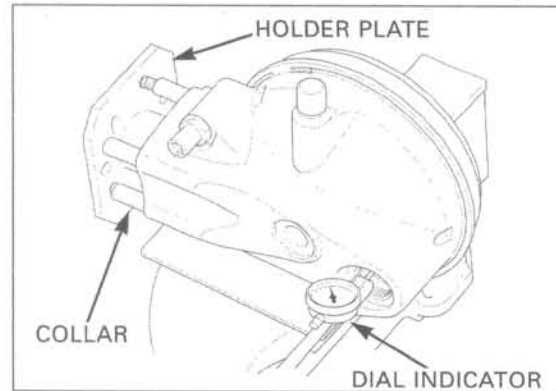
NOTE:

- Nine different shim thicknesses are available in increments of 0.06 mm (0.002 in). Select the shims from A to I.

RIGHT RING GEAR SHIMS:

A (thinnest): 1.82 mm (0.072 in)
D (standard): 2.00 mm (0.079 in)
I (thickest): 2.30 mm (0.091 in)

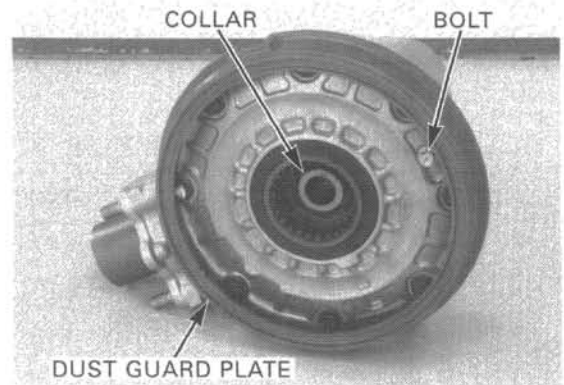
For ring gear shim replacement, see page 12-7.



FINAL GEAR CASE SEPARATION

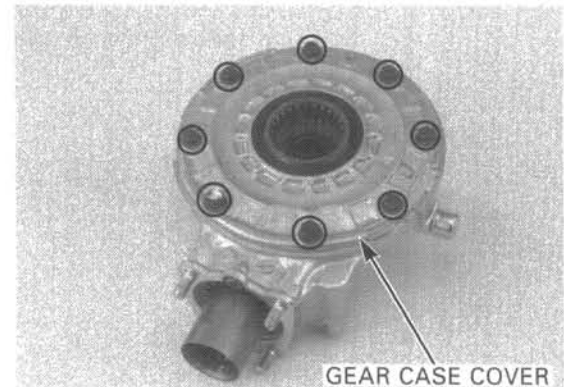
Remove the distance collar.

Remove the bolt and the dust guard plate by turning it counterclockwise.



Loosen the eight cover bolts in a crisscross pattern in two or three steps and remove them. Pry the gear case cover and remove it from the case.

Remove the wave washer.



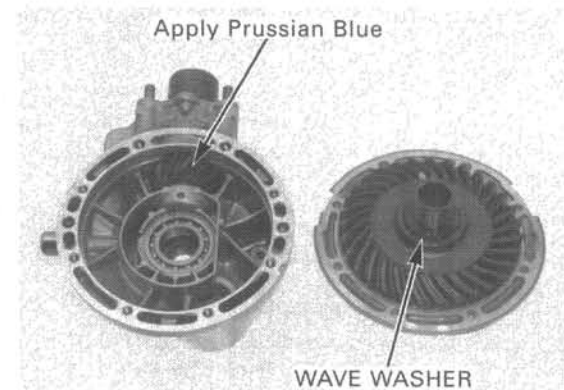
GEAR TOOTH CONTACT PATTERN CHECK

Keep dust and dirt out of the case and cover.

Clean the sealing material off the mating surfaces of the gear case and cover, being careful not to damage them.

Apply a thin coat of Prussian Blue to the pinion gear teeth for the tooth contact pattern check.

Install the wave washer.

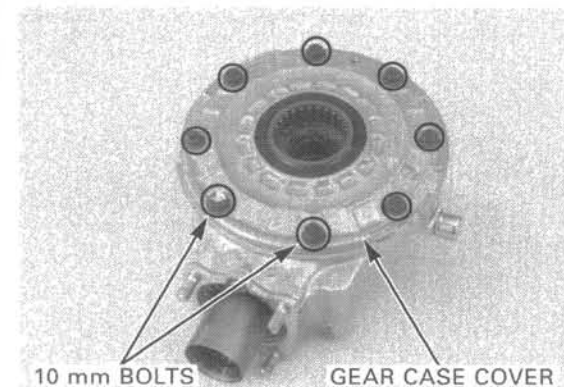


Install the case cover and tighten the bolts in several steps until the cover evenly touches the gear case. Then, tighten the six 8 mm bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

Tighten the two 10 mm bolts to the specified torque.

TORQUE: 62 N·m (6.3 kgf·m, 46 lbf·ft)



FINAL DRIVE

Remove the oil filler cap.

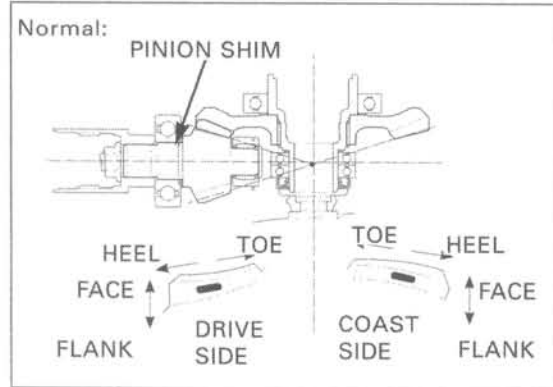
Rotate the ring gear several times in both directions of rotation.

Check the gear tooth contact pattern through the oil filler hole.

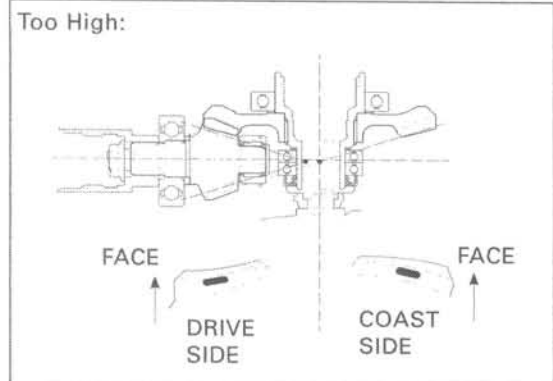
The pattern is indicated by the Prussian Blue applied to the pinion gear.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.

If the patterns are not correct, remove and change the pinion shim with a suitable one.



Replace the pinion gear shim with a thicker one if the contact pattern is too high, toward the face.



Replace the pinion gear shim with a thinner one if the contact pattern is too low, toward the flank.

The patterns will shift about 1.5—2.0 mm (0.06—0.08 in) when the thickness of the shim is changed by 0.1 mm (0.004 in).

NOTE:

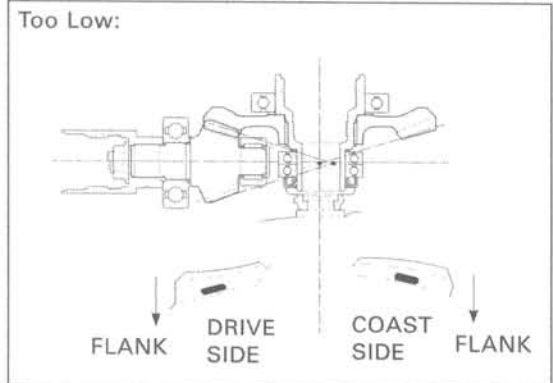
- Seven different shim thicknesses (from A to G) are available in increments of 0.06 mm (0.002 in).

PINION SHIMS:

A (thinnest): 1.82 mm (0.072 in)

D (standard): 2.00 mm (0.079 in)

G (thickest): 2.18 mm (0.086 in)



For pinion gear shim replacement, see page 12-8.

RING GEAR REMOVAL/SHIM REPLACEMENT

Remove the final gear case cover (page 11-5).

If the ring gear stays in the cover, remove it as follows:

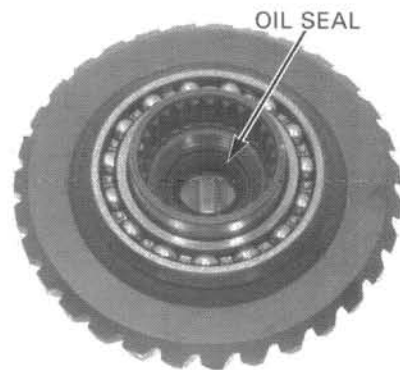
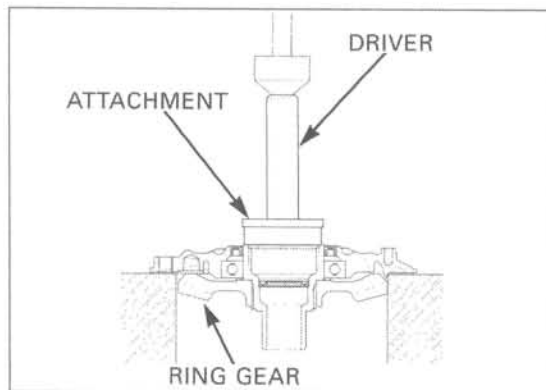
Support the cover horizontally with the ring gear facing down and press the gear out using the special tools and hydraulic press.

TOOLS:

- | | |
|-------------------------------|----------------------|
| Oil seal driver | 07965-MC70100 |
| Attachment, 72 x 75 mm | 07746-0010600 |

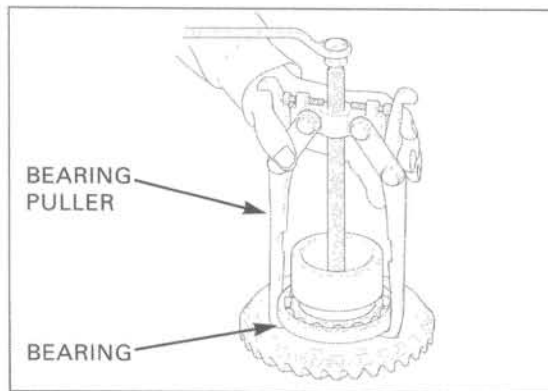
Remove the oil seal from the ring gear.

Remove the oil seal from the gear case cover.



This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.

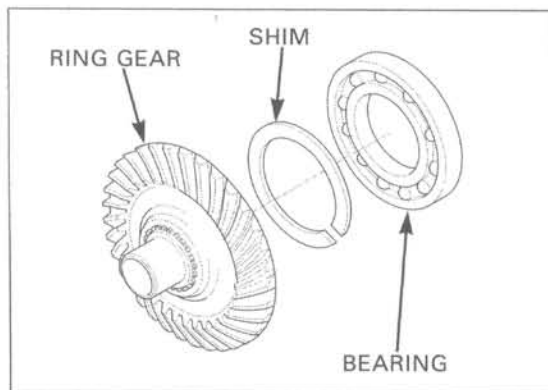
Remove the ring gear bearing using a commercially available bearing puller.



Replace the ring gear shim.

NOTE:

- When the gear set, pinion bearing, ring gear bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thick shim for initial reference.



FINAL DRIVE

PINION GEAR REMOVAL

Set the gear case in a vise with soft jaws.

Install the special tools and remove the pinion joint nut.

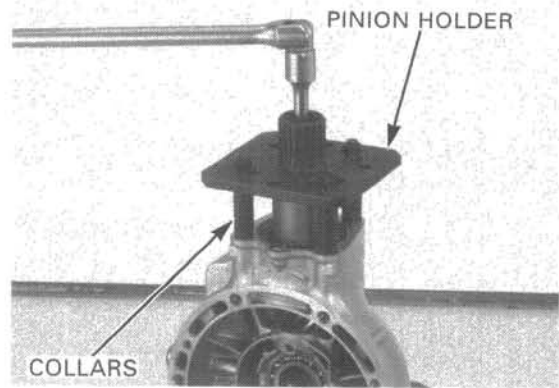
TOOLS:

Pinion holder plate

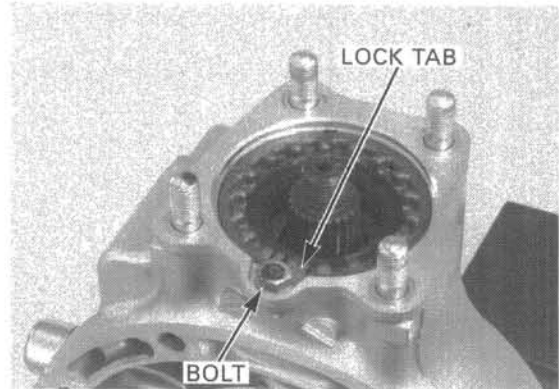
07924-ME40010 or
07924-ME90000
(U.S.A. only)

Collar set "C"

07924-ME40020 or
07HMB-MM80100
(U.S.A. only)



Remove the pinion joint.
Remove the bolt and retainer lock tab.



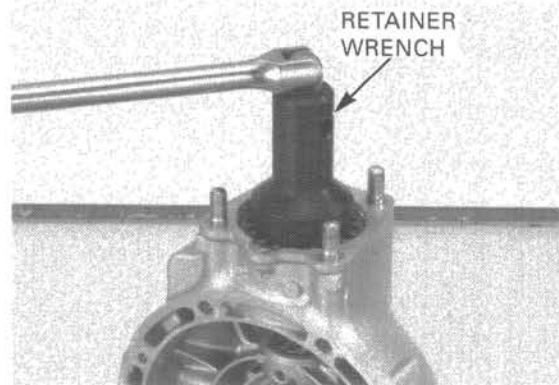
Remove the pinion retainer using the special tool.

TOOL:

Retainer wrench

07910-MA10100

Remove the O-ring and oil seal from the pinion retainer.



Install the special tools onto the pinion gear shaft and gear case.

TOOLS:

Non-U.S.A.

Pinion puller base

Puller shaft

07HMC-MM80110
07931-ME40000

U.S.A. only

Puller base "A"

Assembly shaft, 22 x 1.5 x 240 mm

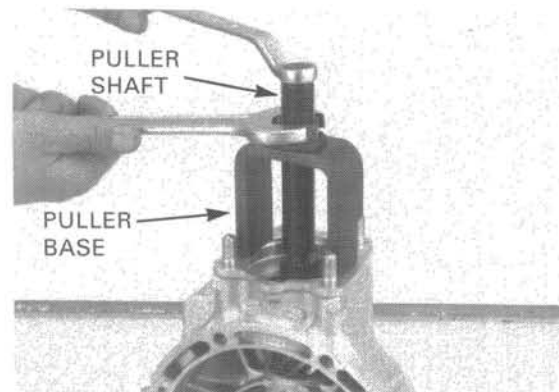
07HMC-MM8011A

07931-ME4010B and

07931-HB3020A

Special nut

Pull the pinion gear assembly out of the gear case.
Check the pinion needle bearing in the gear case for wear or damage.



PINION BEARING/SHIM REPLACEMENT

Pull the pinion bearing from the shaft with a commercially available bearing puller.

Remove the pinion shim.

Install the shim and a new bearing onto the pinion gear.

NOTE:

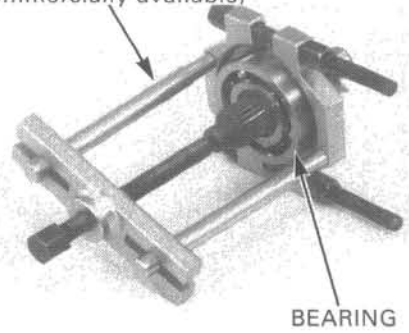
- When the gear set, pinion bearing, ring gear bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thick shim for initial reference.

Drive the bearing using the special tools.

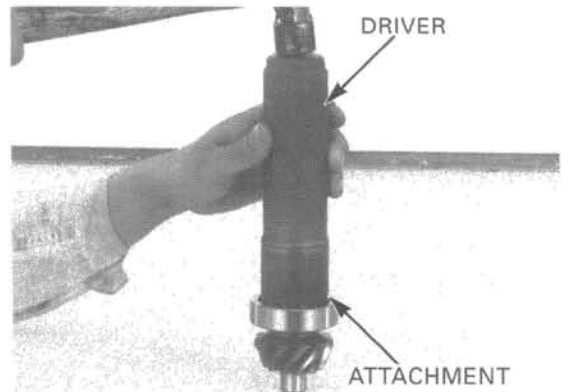
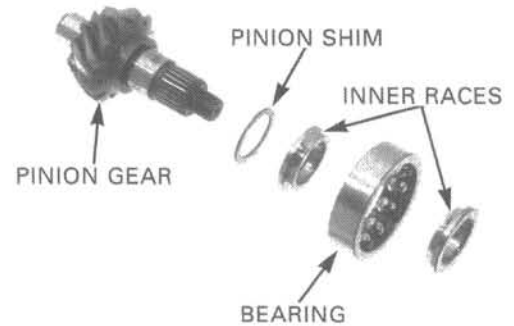
TOOLS:

- Driver, 40 mm I.D. 07746-0030100
- Attachment, 30 mm I.D. 07746-0030300

BEARING PULLER
(Commercially available)



BEARING



CASE BEARING REPLACEMENT

RING GEAR BEARING

Be sure to wear heavy gloves to avoid burns when handling the heated gear case.

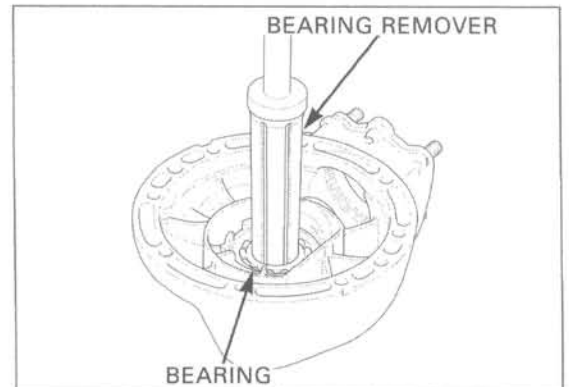
Heat the gear case to 80°C (176°F) evenly using a heat gun.

Remove the ring gear bearing from the gear case using the special tools.

TOOLS:

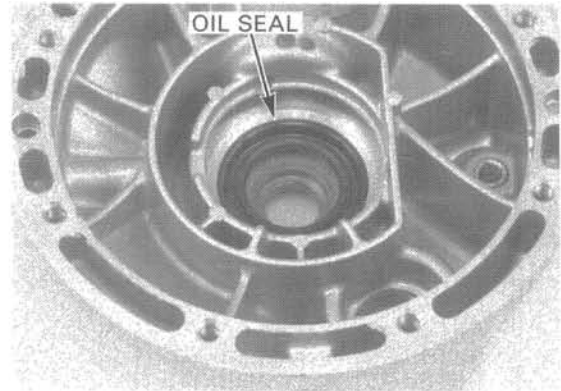
- Bearing remover, 35 mm 07936-3710400
- Remover handle 07936-3710100
- Remover weight 07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)

or equivalent commercially available in U.S.A.



FINAL DRIVE

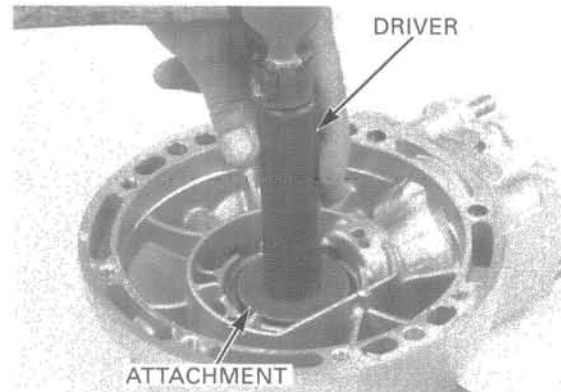
Remove the oil seal.



Apply grease to a new oil seal lip.
Drive the oil seal into the gear case using the special tools.

TOOLS:

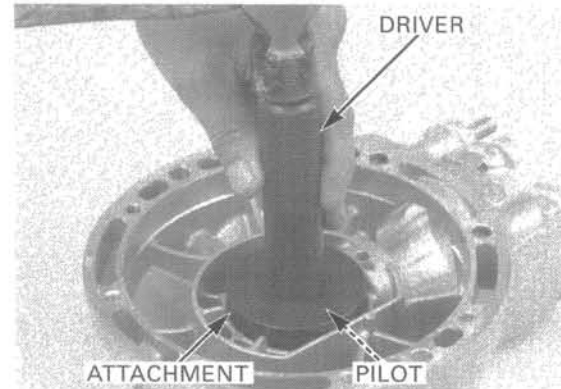
Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400



Drive a new ring gear bearing into the gear case using the special tools.

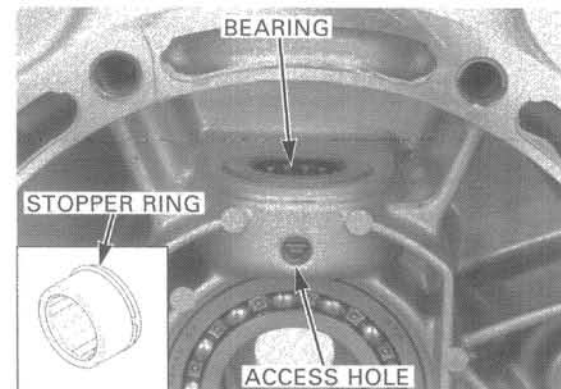
TOOLS:

Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400
Pilot, 35 mm 07746-0040800



PINION NEEDLE BEARING

Remove the stopper ring by rotating it until the end of the stopper ring appears in the access hole.
Strike gently near the end of the ring with a punch to bend the end upward.
Grasp the end of the ring with needle-nose pliers and pull the stopper ring out through the access hole.



Be sure to wear heavy gloves to avoid burns when handling the heated gear case. Using a torch to heat the gear case may cause warpage.

Heat the gear case to 80°C (176°F) and remove the needle bearing by using the special tools.

TOOLS:

- Bearing remover, 20 mm** 07936-3710600
- Remover handle** 07936-3710100
- Remover weight** 07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)

or equivalent commercially available in U.S.A.

Remove the bearing cage and bearings from the inside of the pinion bearing to allow the special tool to grip the bearing.

Install a new stopper ring into the groove securely.

Place the needle bearing in a freezer.

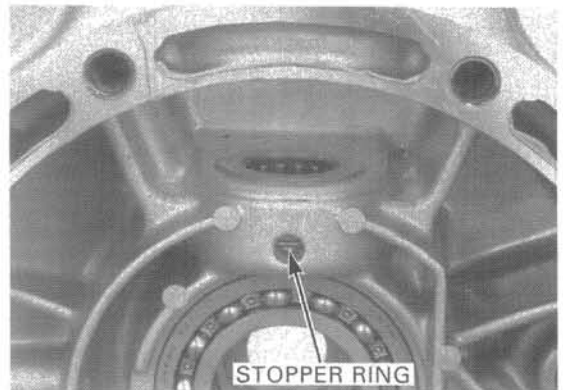
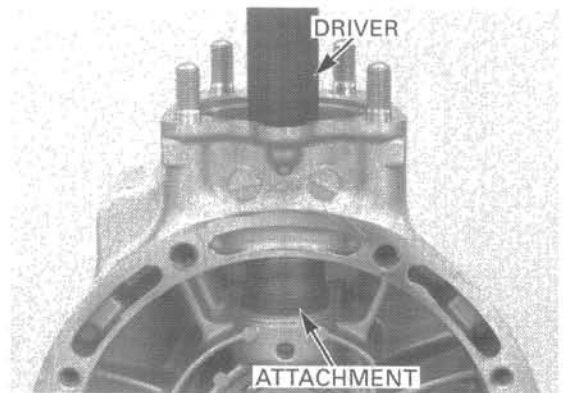
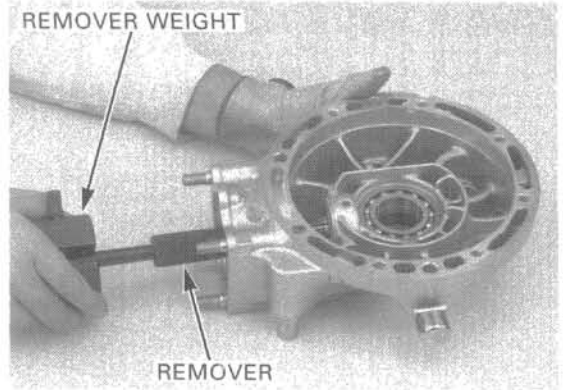
Heat the gear case to 80°C (176°F).

Remove the needle bearing from the freezer and drive it into the gear case using the special tools.

TOOLS:

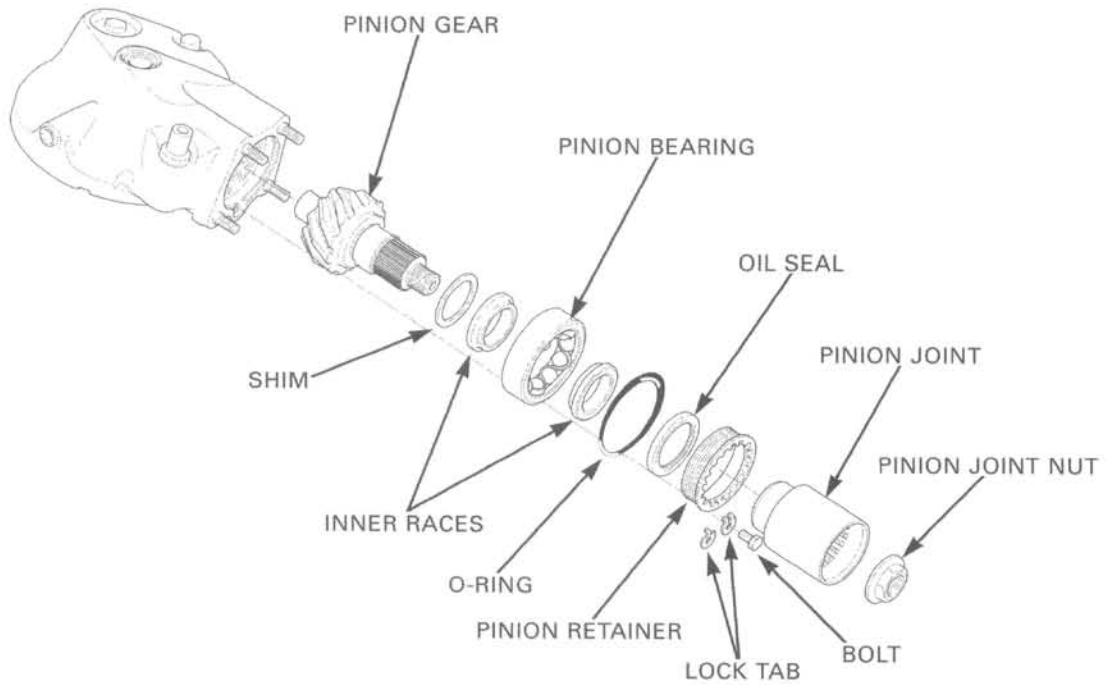
- Driver** 07749-0010000
- Attachment, 32 x 35 mm** 07746-0010100

Make sure the stopper ring is securely set in the groove of the gear case.



FINAL DRIVE ASSEMBLY

PINION GEAR



Drive the pinion gear assembly into the gear case using the special tool.

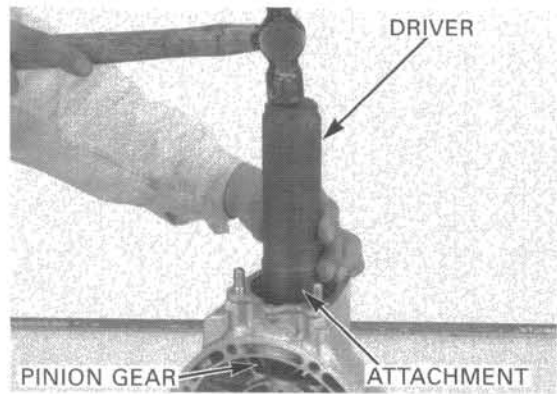
TOOL:

Driver, 40 mm I.D.

07746-0030100

Attachment, 30 mm I.D.

07746-0030300



Drive a new oil seal into the pinion retainer with the flat side facing down using the special tool.

TOOLS:

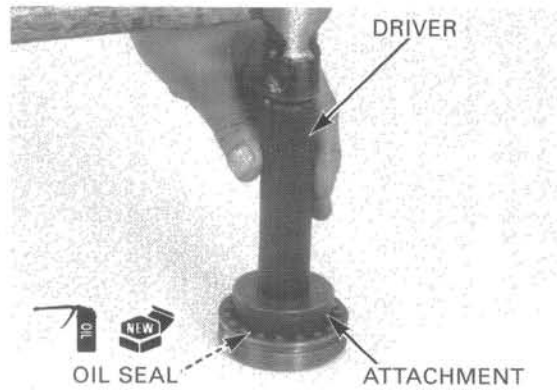
Driver

07749-0010000:

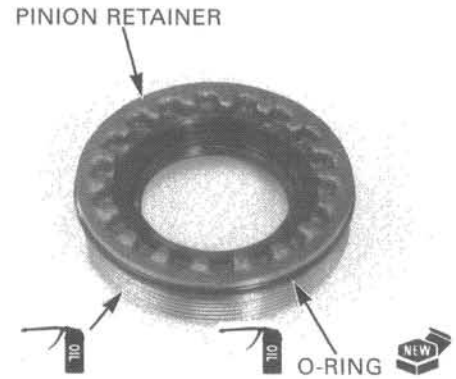
Attachment, 52 x 55 mm

07746-0010400

Pack grease into the seal lip cavity.



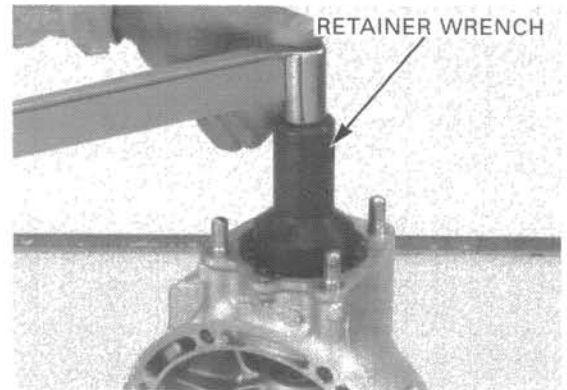
Coat a new O-ring with grease and install it into the retainer groove.



Apply engine oil onto the threads of the pinion retainer. Install the retainer into the gear case and tighten it.

TOOL:
Retainer wrench **07910-MA10100**

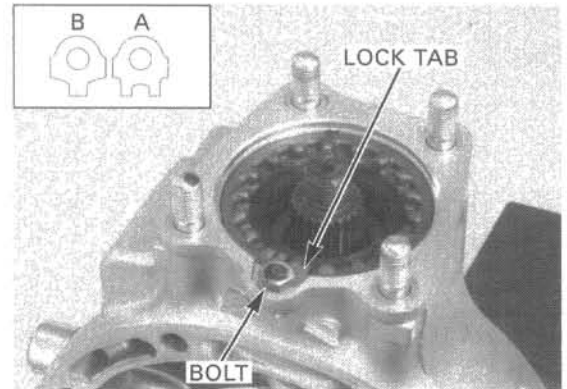
TORQUE: 147 N·m (15.0 kgf·m, 108 lbf·ft)



The lock tab is available in the two types (A and B) shown.

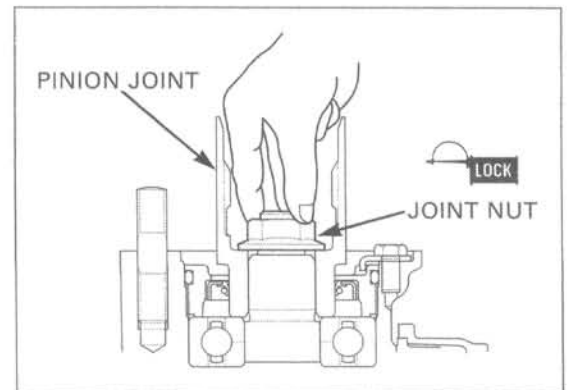
Install the lock tab, depending on the position of the pinion retainer grooves in relation to the lock tab and tighten the bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Clean the threads of the pinion gear shaft and pinion joint nut thoroughly.

Apply locking agent to the joint nut threads and install the pinion joint and joint nut onto the pinion gear shaft.



FINAL DRIVE

Hold the pinion joint with the special tools and tighten the pinion joint nut.

TOOLS:

Pinion holder plate

07924-ME40010 or
07924-ME90000
(U.S.A. only)

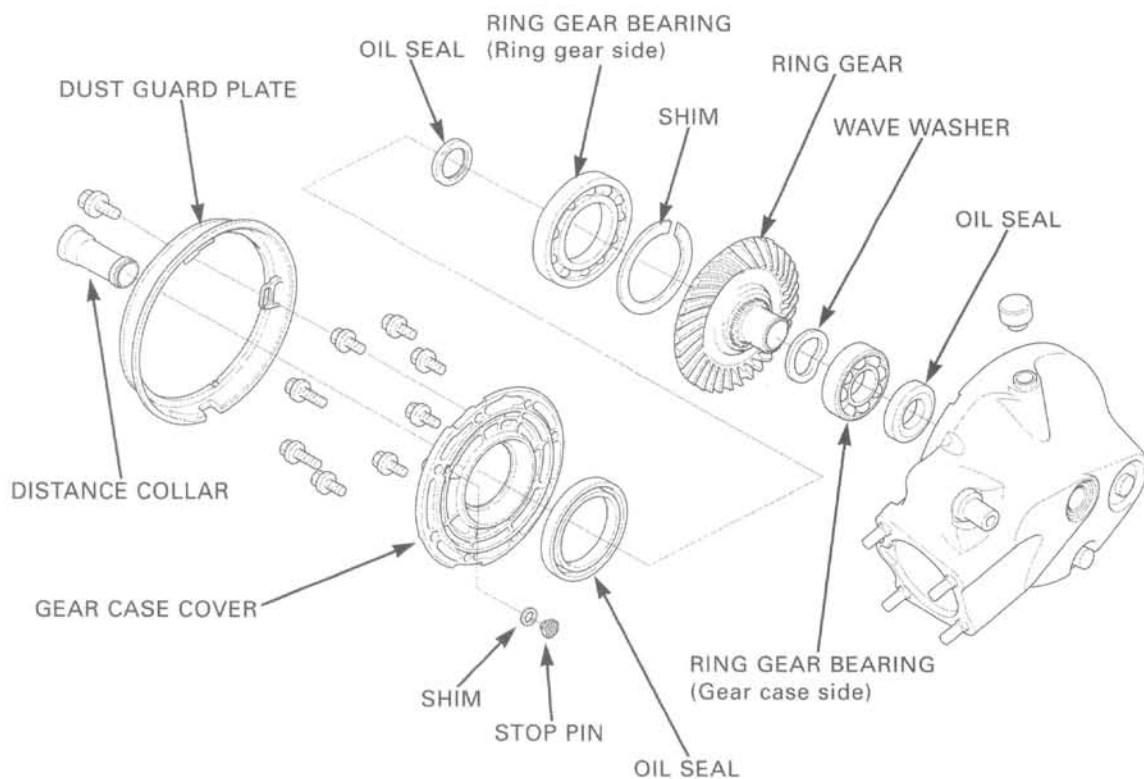
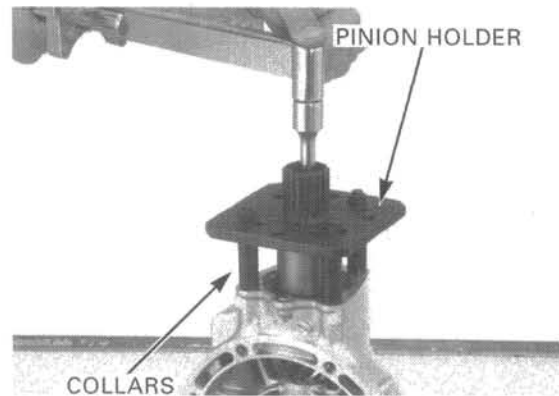
Collar set "C"

07924-ME40020 or
07HMB-MM80100
(U.S.A. only)

TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

RING GEAR INSTALLATION

For the case bearing replacement and breather hole cleaning, see pages 12-9 and 12-16.



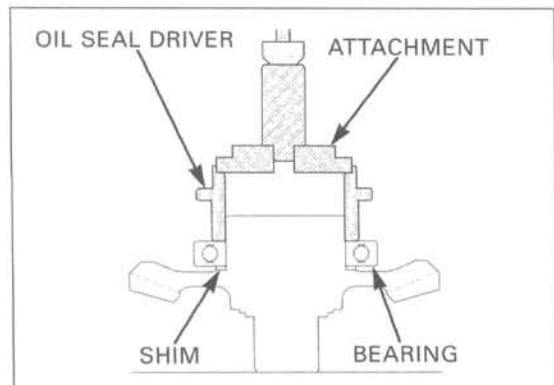
If the ring gear bearing was loose against the cover (if it did not stay in the cover), do the following:

Place the ring gear shim onto the ring gear. Press the bearing onto the ring gear shaft using the special tools.

TOOLS:

Oil seal driver
Attachment, 72 x 75 mm

07965-MC70100
07746-0010600

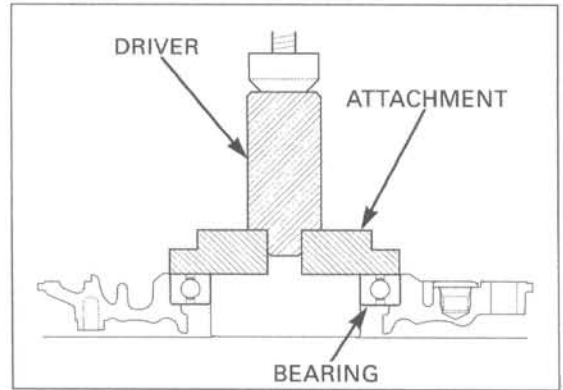


If the ring gear bearing remained in the cover, do the following:

Press the ring gear bearing into the cover using the special tools.

TOOLS:

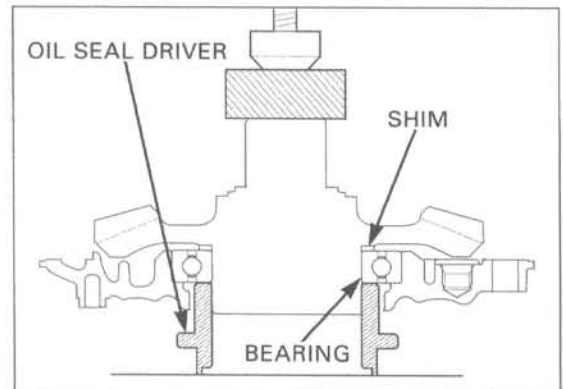
Driver 07749-0010000
Bearing driver attachment 07GAD-SD40101



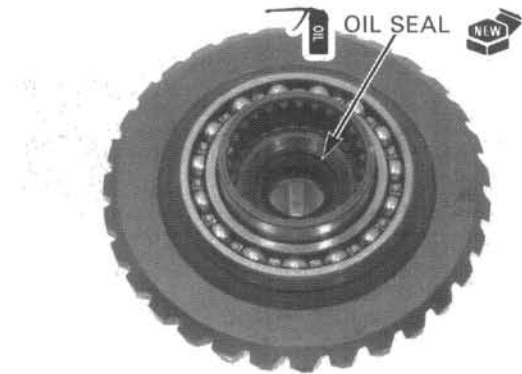
Install the shim onto the ring gear. Support the bearing inner race with the special tool and press the ring gear into the bearing.

TOOL:

Oil seal driver 07965-MC70100



Apply grease to a new oil seal lip and install it into the ring gear.



Install a new oil seal into the gear case cover using the special tools.

TOOLS:

Driver 07749-0010000
Bearing driver attachment 07GAD-SD40101

Apply grease to the oil seal lip.



FINAL DRIVE

Install the ring gear into the gear case cover.

Measure the clearance between the ring gear and stop pin with a feeler gauge.

CLEARANCE: 0.30—0.60 mm (0.012—0.024 in)



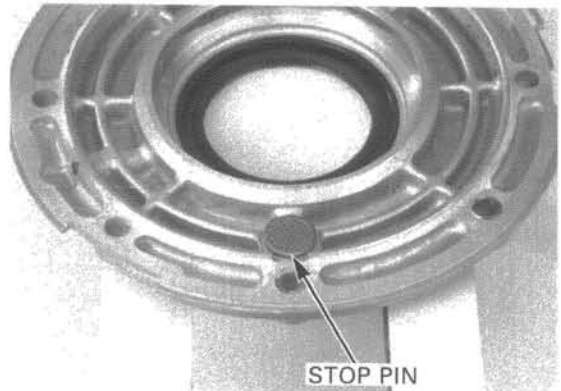
Remove the ring gear if the clearance does not fall within the specifications.

Be sure to wear heavy gloves to avoid burns when handling the heated gear case cover.

Heat the gear case cover to approximately 80°C (176°F). Heat the case cover evenly and slowly to prevent warpage.

Do not heat small areas individually.

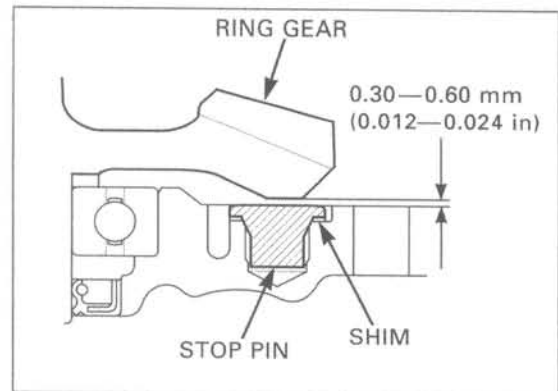
When the gear case cover is heated to the proper temperature, remove the stop pin by tapping the cover.



Select 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)**

Install the shim and drive the stop pin into the gear case cover.



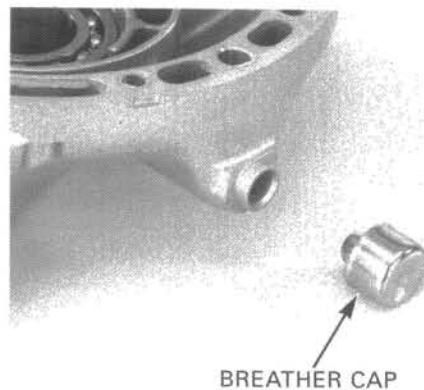
FINAL GEAR CASE ASSEMBLY

NOTE:

- When the gear set, bearing, and/or gear case has been replaced, check the tooth contact pattern (page 12-6) and gear backlash (page 12-4).

Remove the breather cap, being careful not to deform it.

Blow compressed air through the breather hole in the gear case.

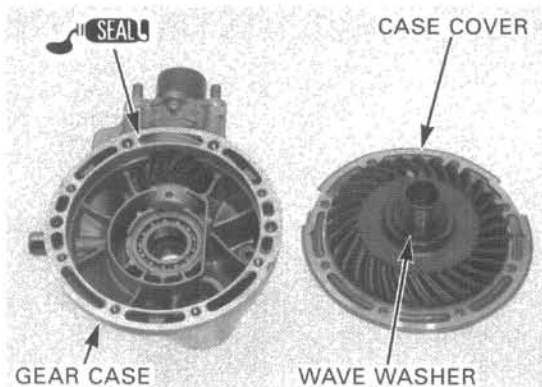


Keep dust and dirt out of the case and cover.

Clean the mating surface of the gear case and cover, being careful not to damage them.

Apply liquid sealant to the mating surface of the gear case.

Install the wave washer.
Install the case cover onto the gear case.



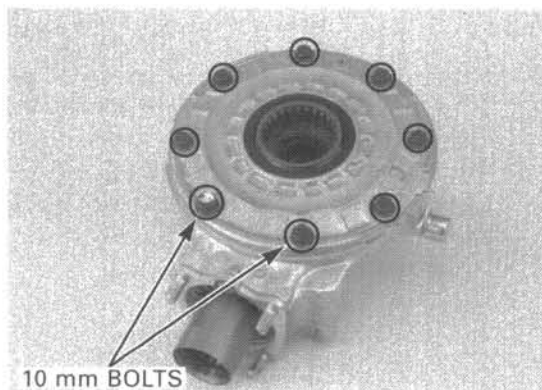
Apply locking agent to the threads of the 10 mm case cover bolts.

Install the bolts, and tighten them in several steps until the cover evenly touches the gear case. Tighten the six 8 mm bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 25 N·m (2.6 kgf·m, 19 lbf·ft)

Tighten the two 10 mm bolts to the specified torque.

TORQUE: 62 N·m (6.3 kgf·m, 46 lbf·ft)

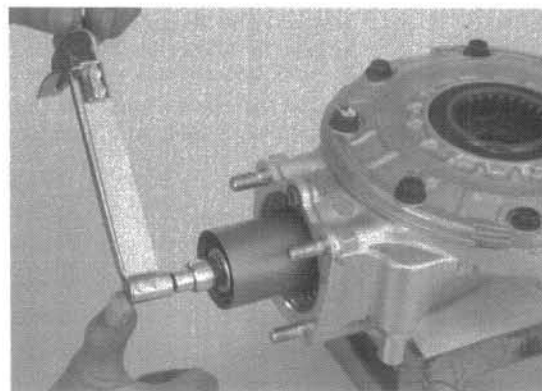


Check that the gear assembly turns smoothly without binding.

Measure the gear assembly preload.

STANDARD:
0.2—0.4 N·m (2—4 kgf·cm, 1.7—3.5 lbf·in)

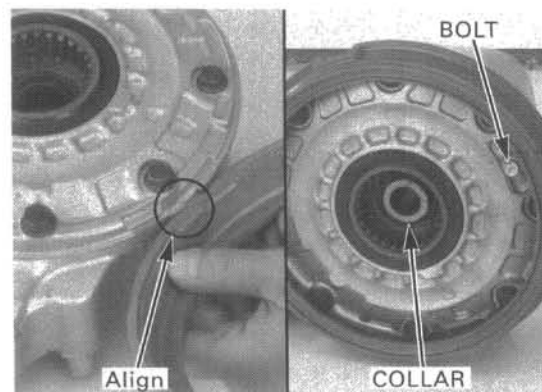
If the preload reading does not fall within the limit, check the bearings for proper installation.



Install the dust guard plate by aligning the plate tabs with the case cover grooves and turn it clockwise to lock. Install and tighten the guard plate bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the distance collar with the polished side facing the gear case.

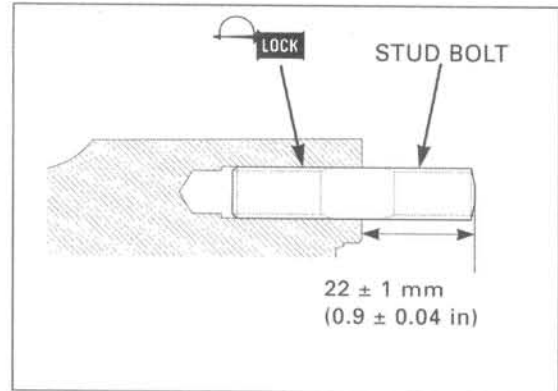


FINAL DRIVE

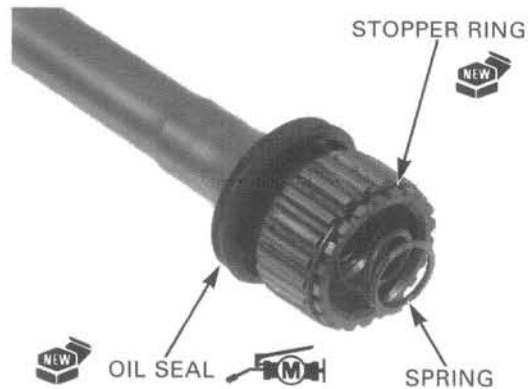
FINAL DRIVE INSTALLATION

Check that the gear case stud bolts are tight. If any are loose, remove them, clean their threads with contact cleaner, then install them using a locking agent.

After installing, be sure to measure the distance from the top of each stud to the gear case surface as shown.



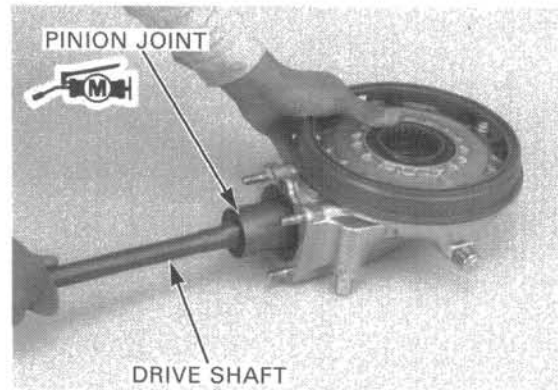
Install a new stopper ring into the drive shaft groove. Install the spring into the drive shaft. Apply 0.5 g (0.02 oz) of molybdenum disulfide grease to a new oil seal lip and install it onto the drive shaft.



Apply 2 g (0.08 oz) or more of molybdenum disulfide grease to the pinion joint splines.

Make sure the stopper ring is seated properly by pulling on the drive shaft lightly. Be careful not to damage the drive shaft oil seal.

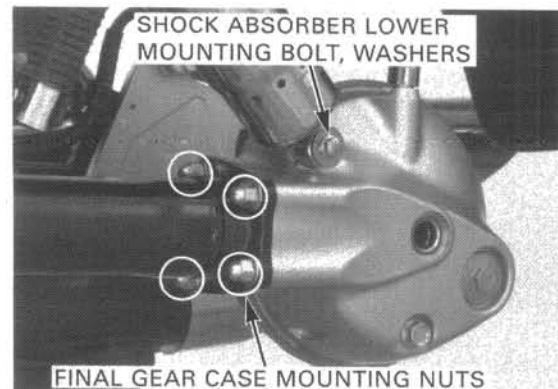
Install the drive shaft into the pinion joint until the stopper ring seats in the pinion joint spline groove.



Apply 1 g (0.04 oz) of molybdenum disulfide grease to the universal joint side splines of the drive shaft.

Insert the final drive assembly into the swingarm and align the drive shaft splines with the universal joint splines by holding the swingarm.

Install the gear case mounting nuts. Install the washer onto the final gear case stud. Install the shock absorber, washer and mounting bolt onto the stud.



Tighten the gear case mounting nuts in a crisscross pattern in two or three steps.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

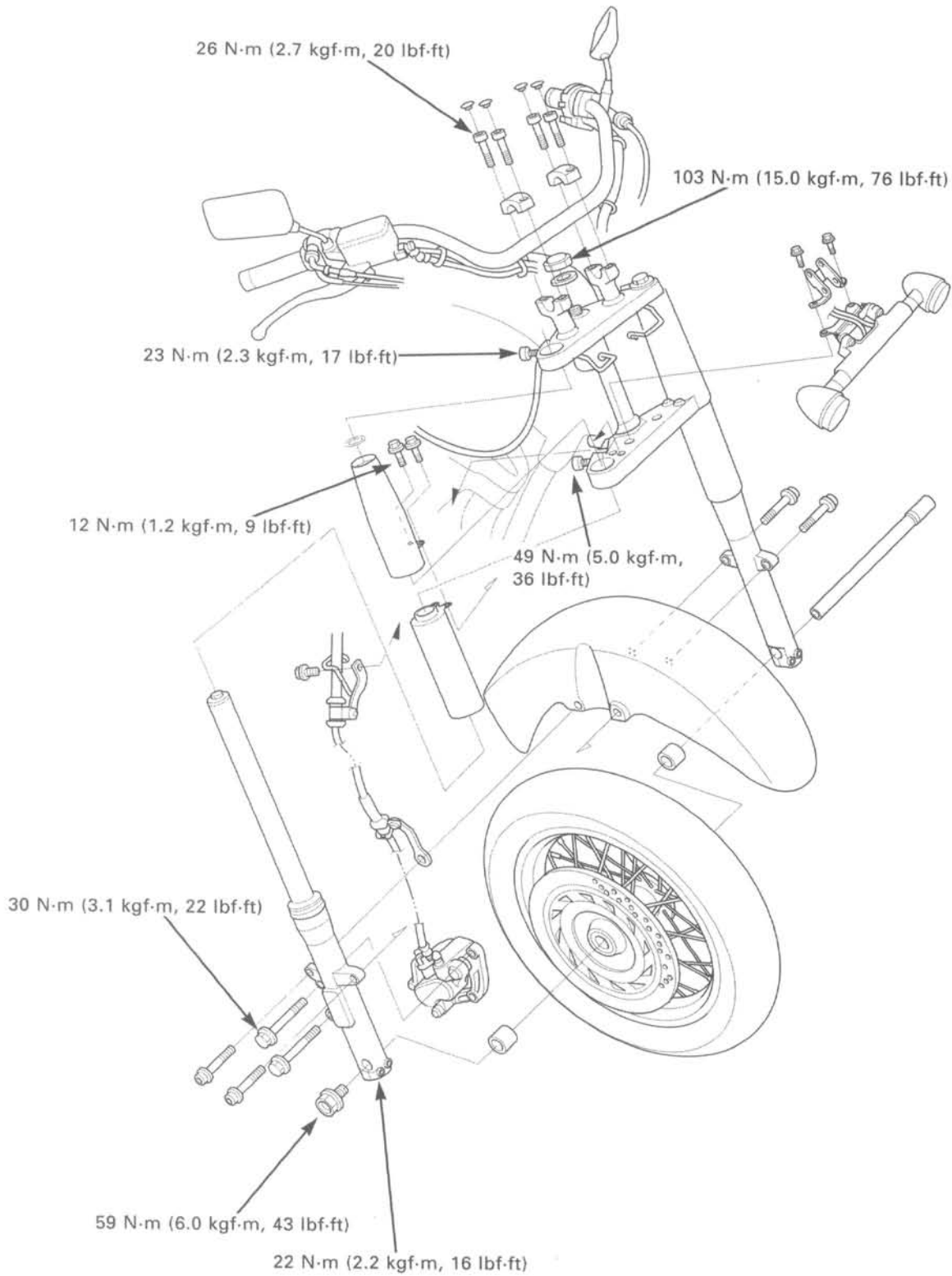
Tighten the shock absorber lower mounting bolt.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the rear wheel (page 14-8).

Fill the gear case with the recommended final drive gear oil (page 3-14).

FRONT WHEEL/SUSPENSION/STEERING



13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-7
TROUBLESHOOTING	13-3	FORK	13-12
HANDLEBAR	13-4	STEERING STEM	13-18

SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- Refer to section 15 for hydraulic brake system service.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load	225 kPa (2.25 kgf/cm ² , 32 psi)	—
	Up to maximum weight capacity	225 kPa (2.25 kgf/cm ² , 32 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.06)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	493.8 (19.44)	483.9 (19.05)
	Tube runout	—	0.20 (0.008)
	Recommended fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	135 (5.31)	—
	Fluid capacity	459 ± 2.5 cm ³ (15.5 ± 0.08 US oz, 16.2 ± 0.09 Imp oz)	—
Steering head bearing pre-load		7.8—11.8 N (0.8—1.2 kgf, 1.8—2.6 lbf)	—

FRONT WHEEL/SUSPENSION/STEERING

TORQUE VALUES

Handlebar upper holder bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Handlebar lower holder nut	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut.
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft) ALOC bolt: replace with a new one.
Spoke nipple	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Valve stem nut	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft) Apply locking agent to the threads.
Fork cap	23 N·m (2.3 kgf·m, 17 lbf·ft)
Fork cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Fork top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)
Fork bottom bridge pinch bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) ALOC bolt: replace with a new one
Steering bearing adjustment nut	21 N·m (2.1 kgf·m, 15 lbf·ft) Apply engine oil to the threads.
Steering bearing adjustment nut lock nut	See page 13-22
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)
Hose/cable guide bolt	22 N·m (2.2 kgf·m, 16 lbf·ft) ALOC bolt: replace with a new one.
Brake hose clamp bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Attachment, 42 x 47 mm	07746-0010300
Attachment, 52 x 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Spoke nipple wrench	07JMA-MR60100 or equivalent commercially available in U.S.A.
Fork seal driver body	07947-KA50100
Driver attachment, 41 mm I.D.	07947-KF00100
Steering stem socket	07916-3710101 or 07916-3710100
Bearing remover	07946-3710500
Ball race remover	07953-MJ10000 or 07953-MJ1000B or 07953-MJ1000A (U.S.A. only)
Driver	07949-3710001
Steering stem driver	07946-MB00000

TROUBLESHOOTING

Hard steering

- Steering bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Worn or damaged steering head bearing races
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

Steers to one side or does not track straight

- Bent fork leg
- Damaged steering head bearings
- Loose steering head bearings
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot components (section 14)

Front wheel wobbles

- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel

Wheel turns hard

- Faulty wheel bearings
- Bent axle
- Brake drag (section 15)

Soft suspension

- Weak fork spring
- Low fluid level in fork
- Insufficient fluid weight (low viscosity)
- Low tire pressure

Hard suspension

- High tire pressure
- Bent fork tube
- Fork slider binds
- High fluid level in fork leg
- Incorrect fluid weight (high viscosity)
- Clogged fork fluid passage

Front suspension noise

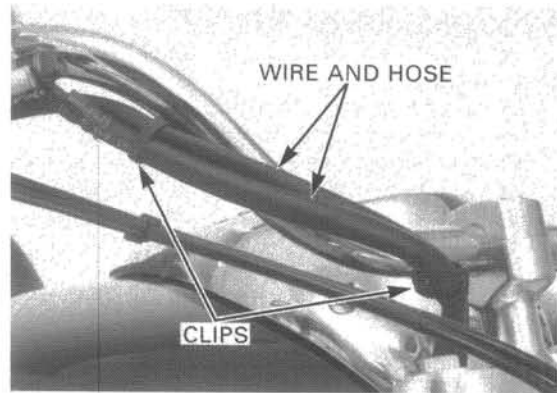
- Loose fork fasteners
- Insufficient fluid weight (low viscosity)
- Worn slider or fork tube bushing

HANDLEBAR

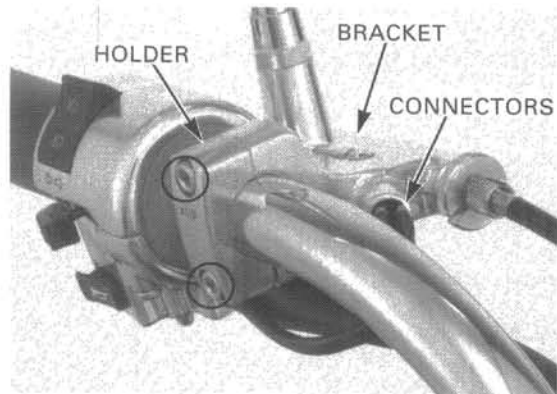
REMOVAL

Pull the clips while holding the lock tab with a small screwdriver to remove them.

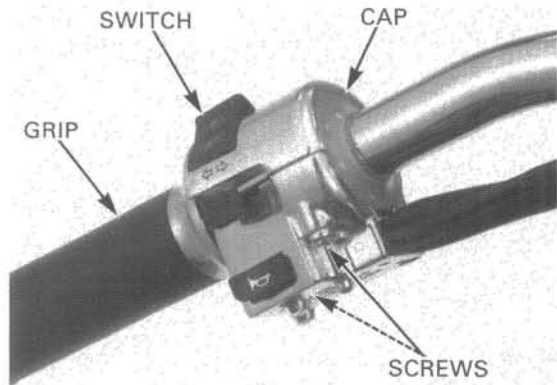
- Remove the following:
- handlebar switch wires and brake hose (from the wire clips)
 - four wire clips



- clutch switch connectors
- two socket bolts
- bracket holder
- clutch lever bracket

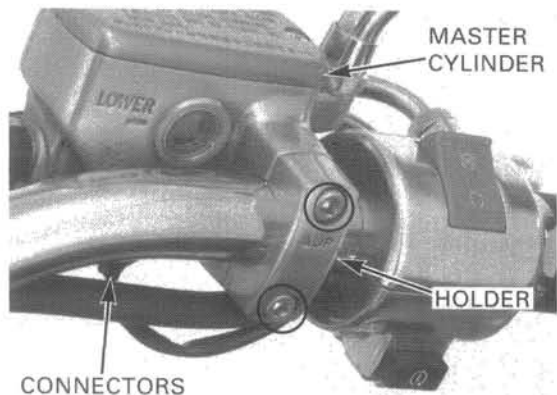


- two screws
- left handlebar switch housing
- left handlebar grip
- housing cap

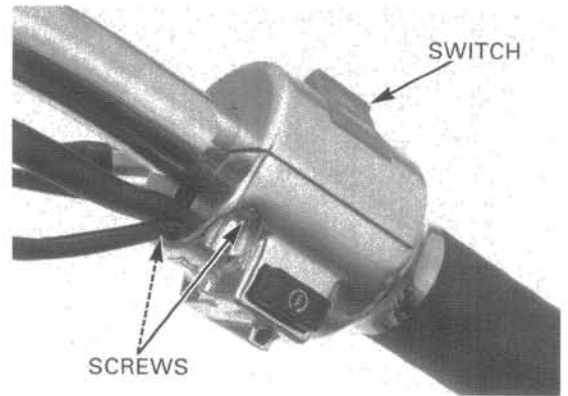


- brake light switch connectors
- two socket bolts
- master cylinder holder
- brake master cylinder

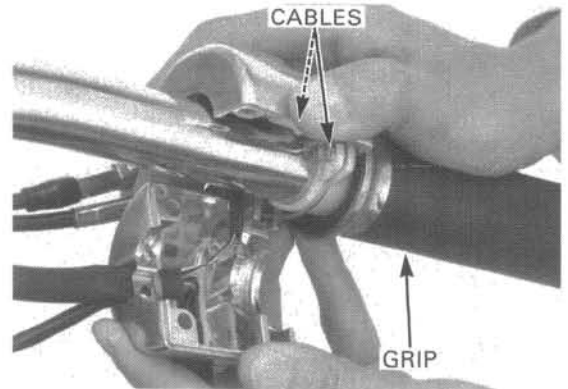
Keep the reservoir upright to prevent air from entering the hydraulic system.



- two screws
- right handlebar switch housing



- throttle grip (from the handlebar)
- throttle cables



- four bolt caps
- four socket bolts
- handlebar upper holders
- handlebar

INSTALLATION

NOTE:

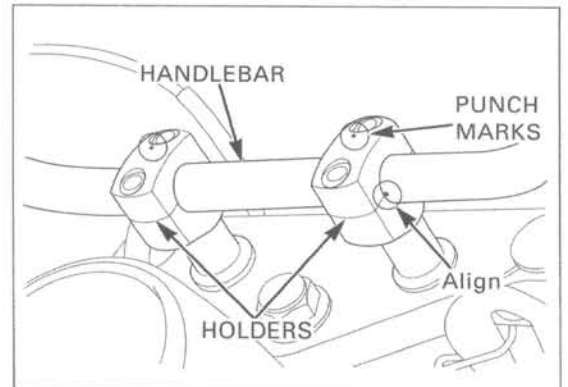
- Route the cable, hose and wires properly (page 1-19).

Install with the punch mark on each holder facing forward.

Place the handlebar onto the lower holders and align the punch mark on the handlebar with the lower holder edge, then install the upper holders and bolts. Tighten the front bolt first, then tighten the rear bolts.

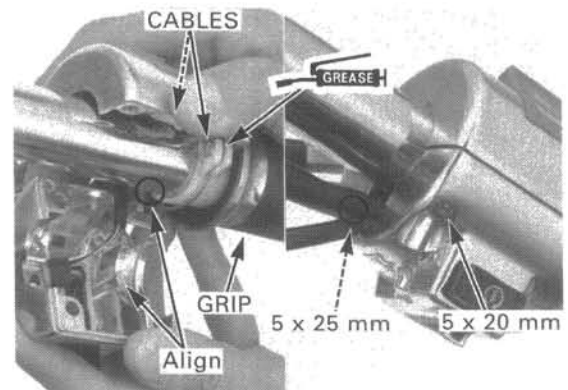
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the bolt caps.



Apply grease to the throttle grip flange groove and sliding surface. Connect the throttle cables to the throttle grip flange and install the throttle grip onto the handlebar.

Install the right handlebar switch housing with the two screws, aligning the locating pin with the hole in the handlebar. Tighten the front screw first, then tighten the rear screw.



FRONT WHEEL/SUSPENSION/STEERING

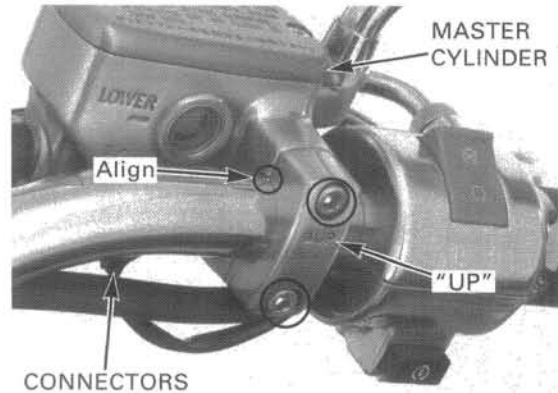
Install with the "UP" mark on the holder facing up.

Install the master cylinder with the holder and two bolts.

Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake light switch connectors.



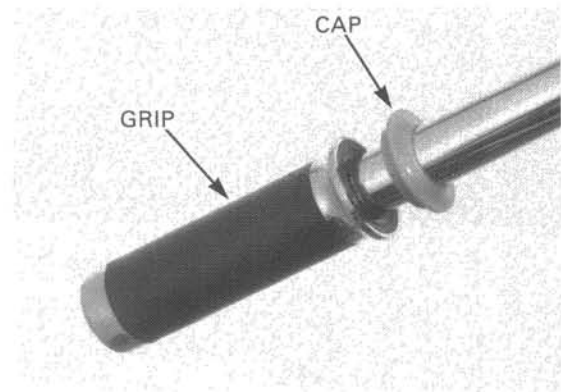
Install the housing cap.

Clean the inside surface of the left handlebar grip and the outside surface of the handlebar.

Apply Honda Bond A or equivalent to the inside surface of the handlebar grip and to the outside surface of the handlebar. Wait 3—5 minutes and install the grip.

Rotate the grip for even application of the adhesive.

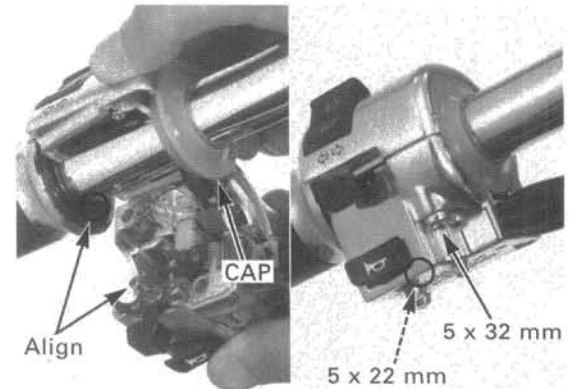
Allow the adhesive to dry for 1 hour before using.



Set the housing cap flange into the housing groove.

Install the left handlebar switch housing with the two screws, aligning the locating pin with the hole in the handlebar.

Tighten the front screw first, then tighten the rear screw.

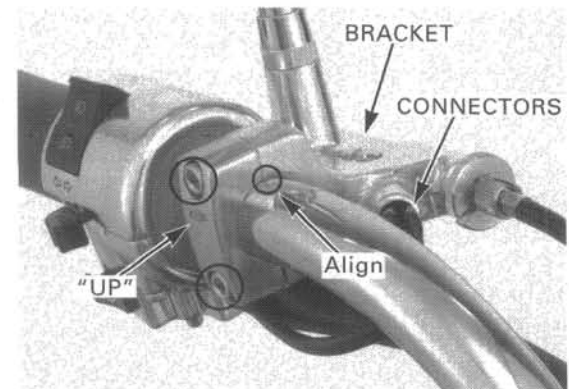


Install with the "UP" mark on the holder facing up.

Install the clutch lever bracket with the holder and two bolts.

Align the edge of the bracket with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

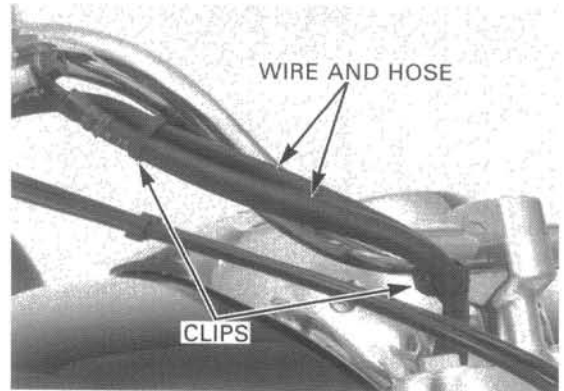
Connect the clutch switch connectors.



Note the installation direction (page 1-19).

Install the four wire clips onto the studs on the handlebar.

Secure the brake hose and switch wires with the clips.



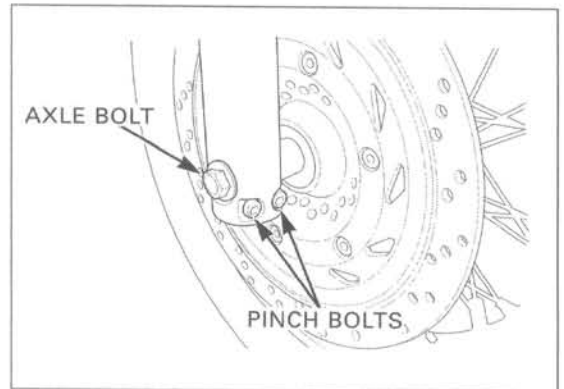
FRONT WHEEL

REMOVAL

Lift the front wheel 30 cm (12 in) or more above the ground.

Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.

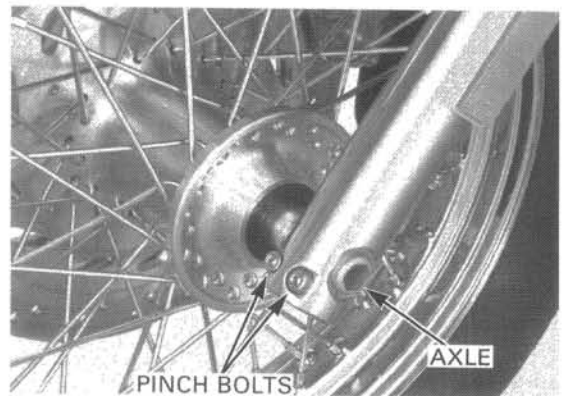
Loosen the right axle pinch bolts and remove the axle bolt.



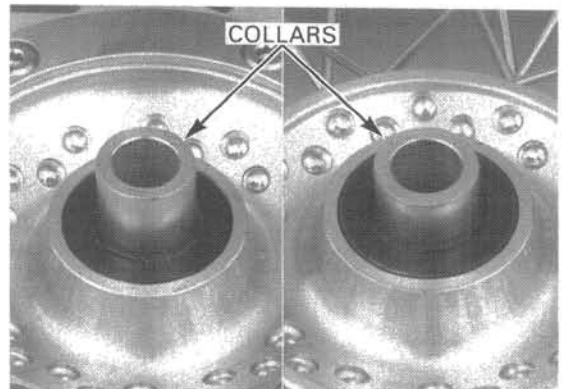
Do not operate the brake lever after removing the wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Loosen the left axle pinch bolts.

Pull the front axle out and remove the front wheel.



Remove the side collars.



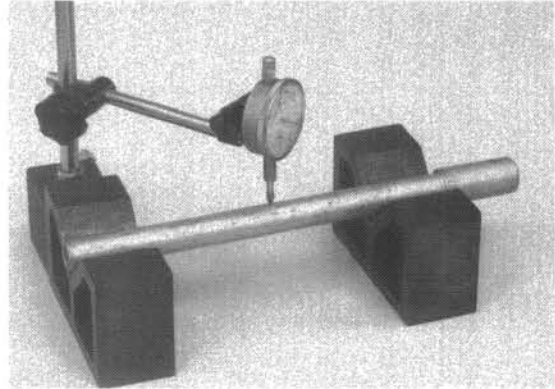
FRONT WHEEL/SUSPENSION/STEERING

INSPECTION

AXLE

Set the front axle in V-blocks.
Turn the axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

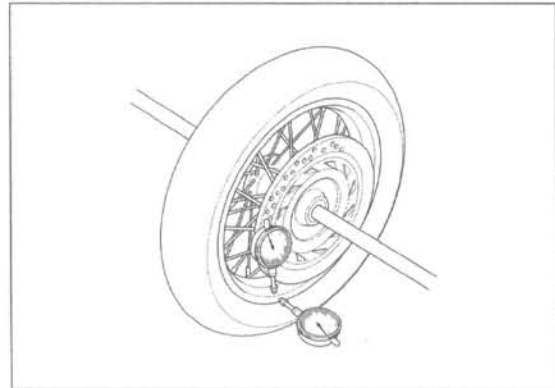
SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL RIM

Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

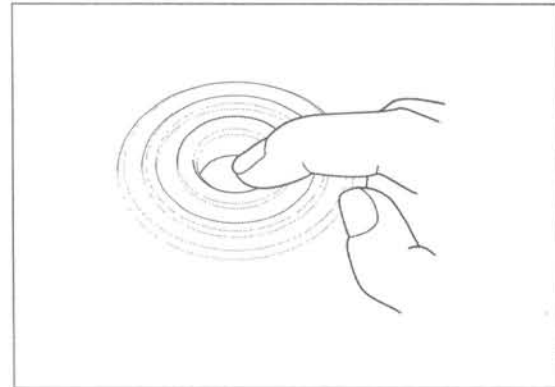


WHEEL BEARING

Replace the wheel bearings in pairs.

Turn the inner race of each bearing with your finger; the bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

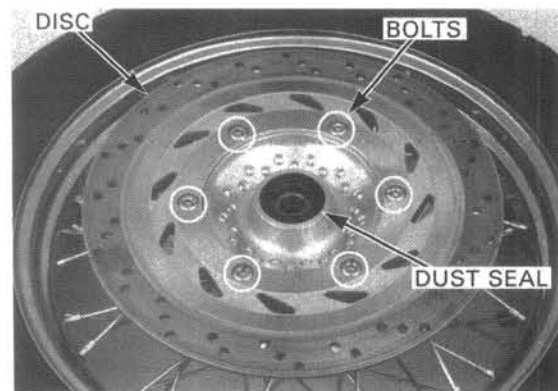
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



DISASSEMBLY

Remove the dust seals from both sides of the hub.

Remove the six disc bolts and brake disc.



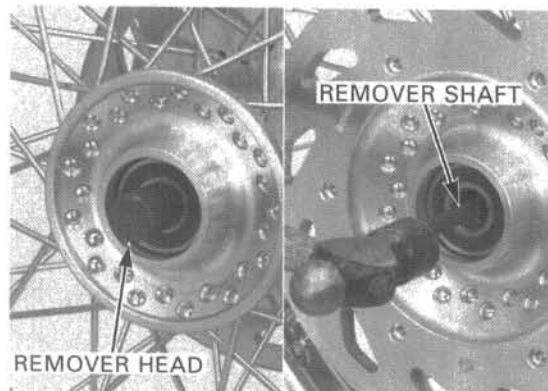
FRONT WHEEL/SUSPENSION/STEERING

Replace the wheel bearings in pairs.
Do not reuse old bearings.

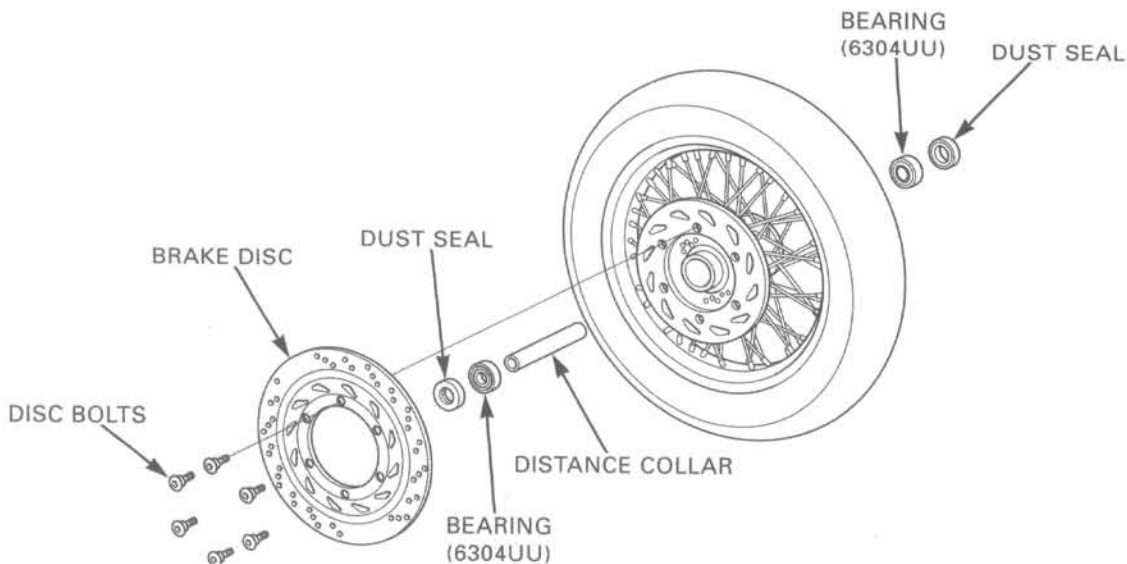
Install the remover head into the bearing.
From the opposite side of the wheel, install the remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover shaft 07746-0050100
Bearing remover head, 20 mm 07746-0050600



ASSEMBLY



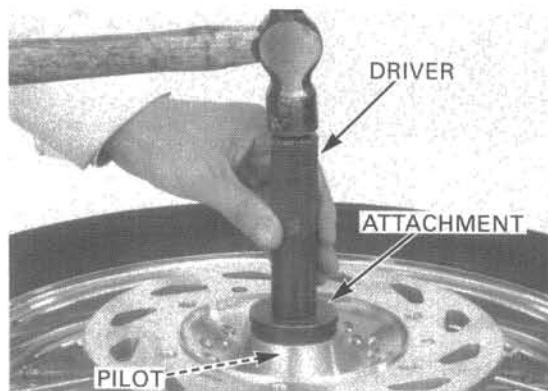
Drive in a new right bearing (disc side) squarely with the marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400
Pilot, 20 mm 07746-0040500



FRONT WHEEL/SUSPENSION/STEERING

WHEEL CENTER ADJUSTMENT

Measure distance B (rim width) and calculate distance A as follows:

$$A = 78.8 \text{ mm} - B/2$$

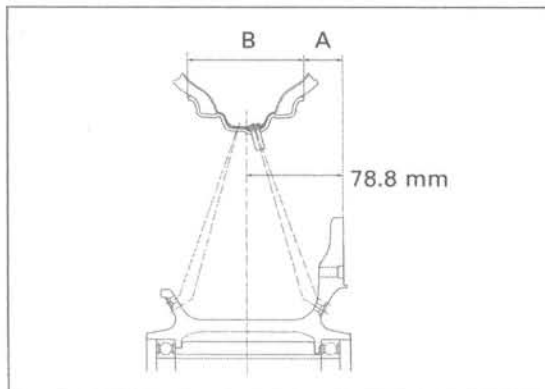
Adjust the rim position and distance A by tightening the spokes to the specified torque in several progressive steps.

TOOL:

Spoke nipple wrench

07JMA-MR60100 or equivalent commercially available in U.S.A.

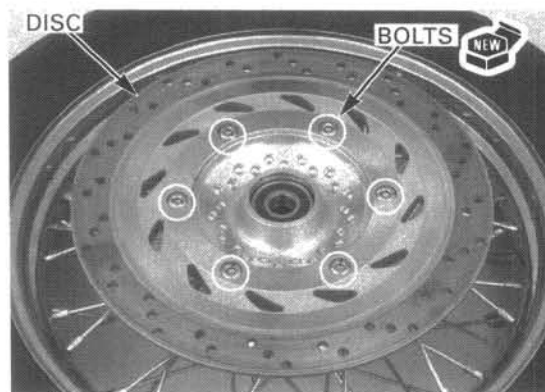
TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



Do not get grease on the brake disc or stopping power will be reduced.

Install the brake disc with the stamp facing out. Install new disc bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

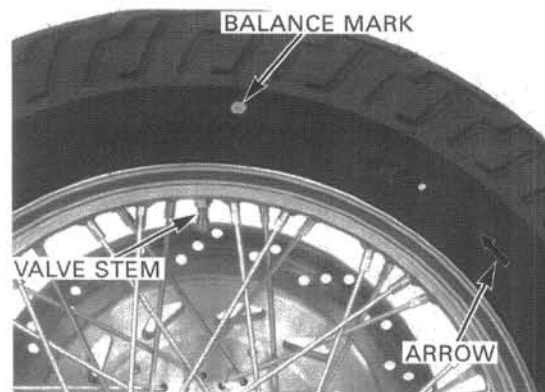


Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before re-installing the wheel.

WHEEL BALANCE

NOTE:

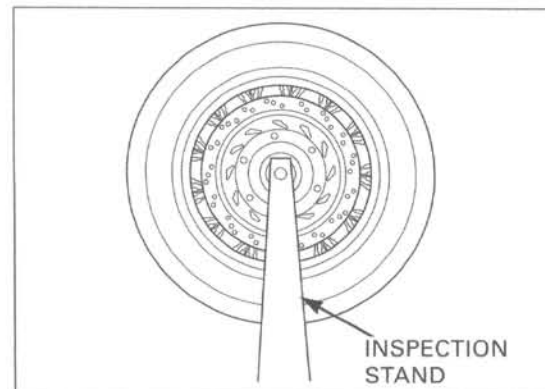
- Mount the tire with the arrow mark facing in the direction of rotation.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



Mount the wheel, tire and brake disc assembly on an inspection stand.

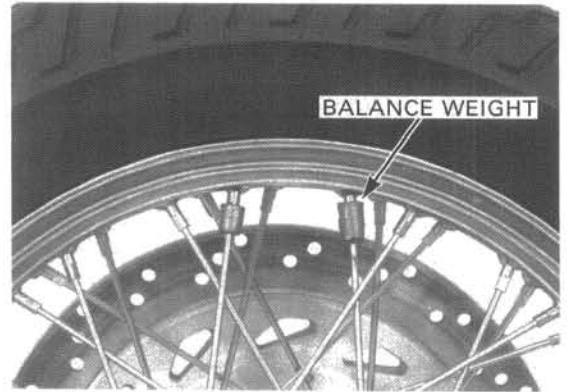
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

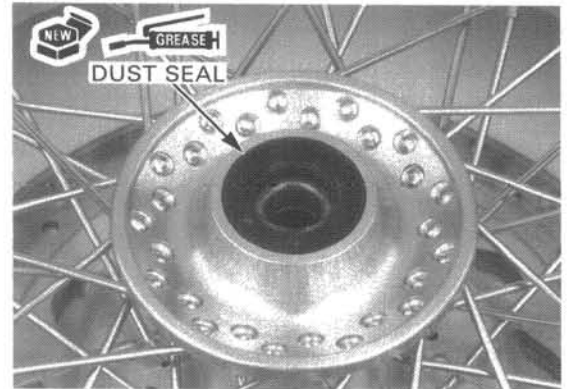


FRONT WHEEL/SUSPENSION/STEERING

To balance the wheel, install a balance weight on the lightest side of the spoke, on 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.



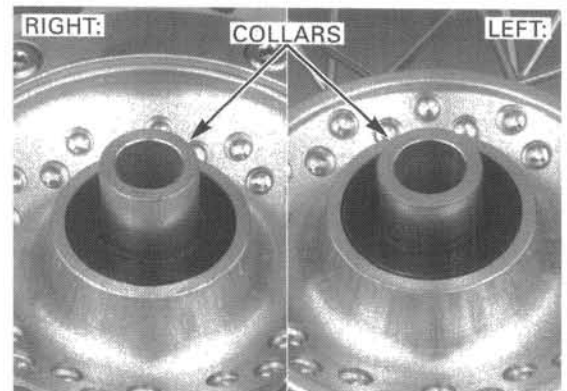
Apply grease to new dust seal lips and install the dust seals until they are flush with the wheel hub.



INSTALLATION

The right side collar (disc side) is longer than the left side collar.

Install the side collars.

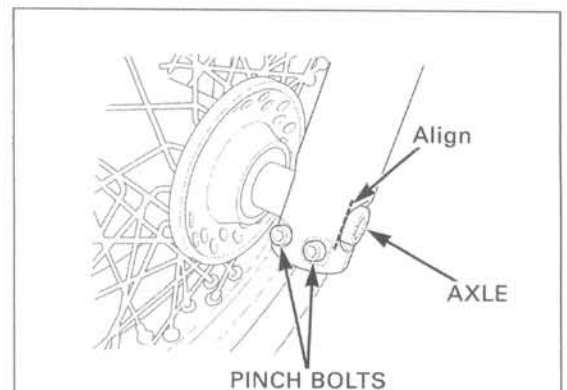


Be careful not to damage the pads.

Place the front wheel between the fork legs so the brake disc is positioned between the brake pads. Insert the axle from the left side until it is fully seated.

Make sure the index groove in the axle is aligned with the fork leg, and tighten the left axle pinch bolts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



FRONT WHEEL/SUSPENSION/STEERING

Install the axle bolt and tighten it.

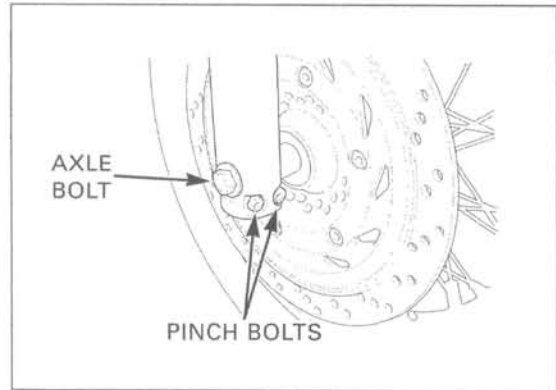
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten the right axle pinch bolts.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Loosen the left axle pinch bolts.
With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.

Tighten the left axle pinch bolts to the same torque.



FORK

REMOVAL

Remove the front wheel (page 13-7).

Remove the following:

- two fender bolts
- hose clamp stay (right fork only)
- two bolts and brake caliper (right fork only)

Support the brake caliper so it does not hang from the brake hose. Do not twist the brake hose.

NOTE:

- Front fender removal is performed after removing either fork leg.

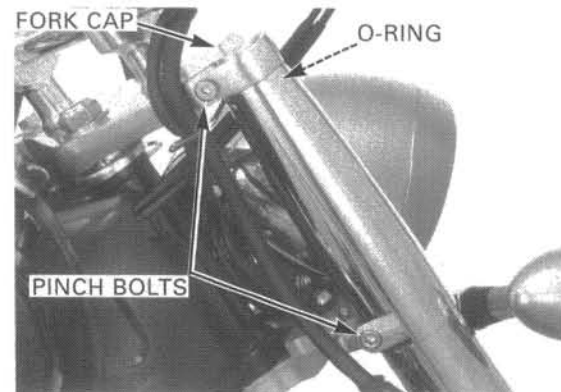
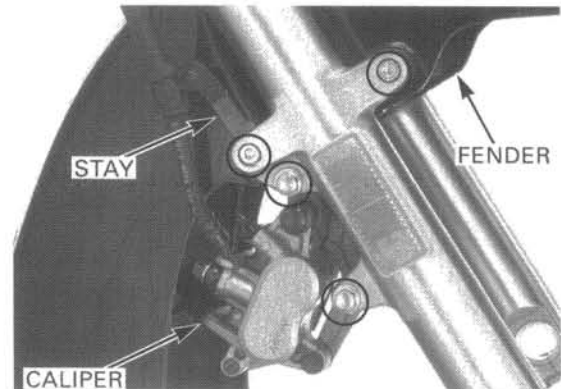
When the fork is ready to be disassembled, loosen the fork cap, but do not remove it.

Loosen the top and bottom bridge pinch bolts. Pull the fork leg down and remove the fork tube from the fork bridges.

Be careful not to scratch the fender surface.

Remove the O-ring from inside of the fork cover.

Remove the two bolts and front fender, and remove the other fork leg.

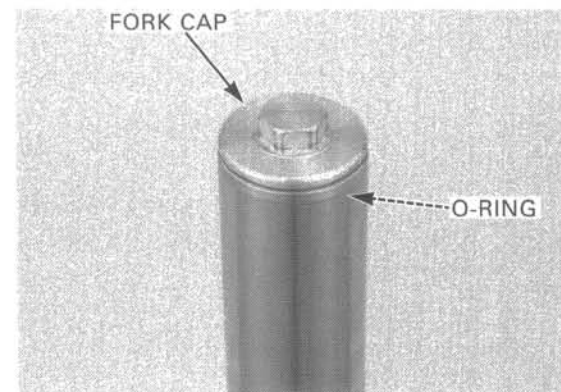


DISASSEMBLY

Remove the following:

- fork cap
- O-ring (from the fork cap)

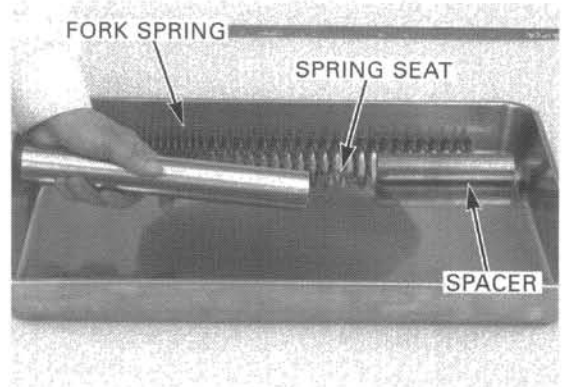
The fork cap is under spring pressure; use care when loosening it.



FRONT WHEEL/SUSPENSION/STEERING

- spacer
- spring seat
- fork spring

Pour out the fork fluid by pumping the fork tube up and down several times.

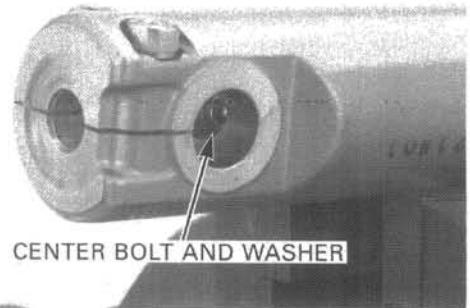


Hold the fork slider in a vise with soft jaws or shop towels.

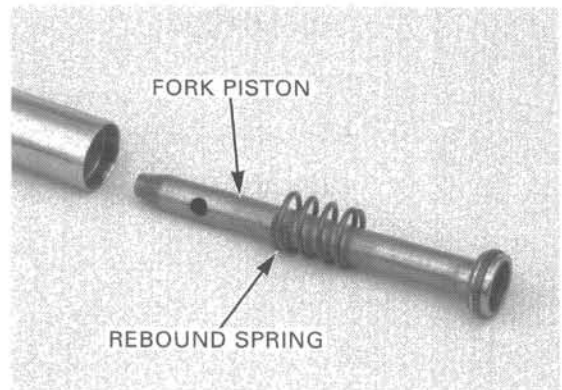
Remove the following:

- fork center bolt
- sealing washer

If the fork piston turns with the center bolt, temporarily install the fork spring, spring seat, spacer and fork cap.

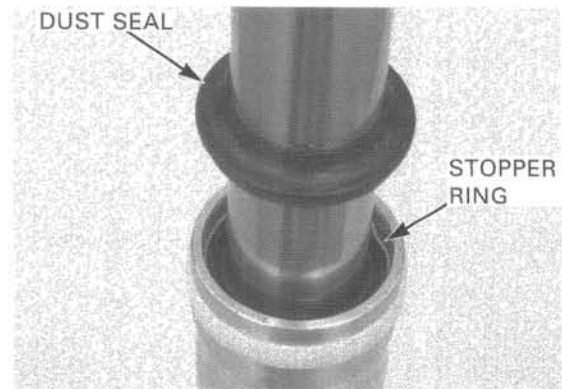


- fork piston
- rebound spring



Be careful not to scratch the fork tube sliding surface.

- dust seal
- stopper ring

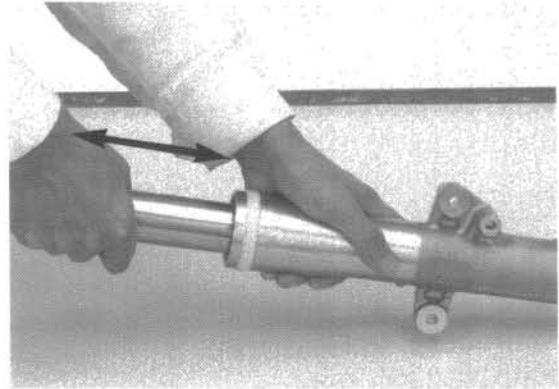


FRONT WHEEL/SUSPENSION/STEERING

Using quick successive motions, pull the fork tube out of the fork slider.

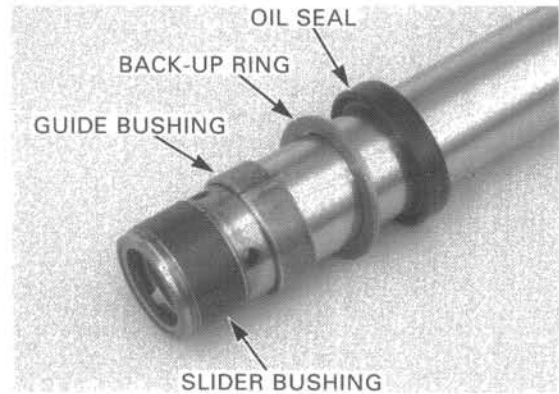
Remove the following:

- oil lock piece (from the fork slider)



- oil seal
- back-up ring
- guide bushing
- slider bushing

Carefully remove by prying the slit with a screwdriver until the bushing can be pulled off by hand.

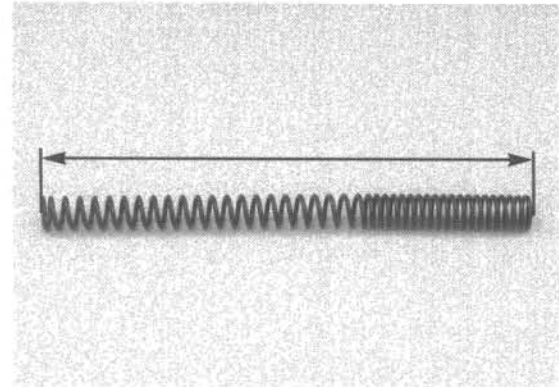


INSPECTION

FORK SPRING

Measure the fork spring free length.

SERVICE LIMIT: 483.9 mm (19.05 in)

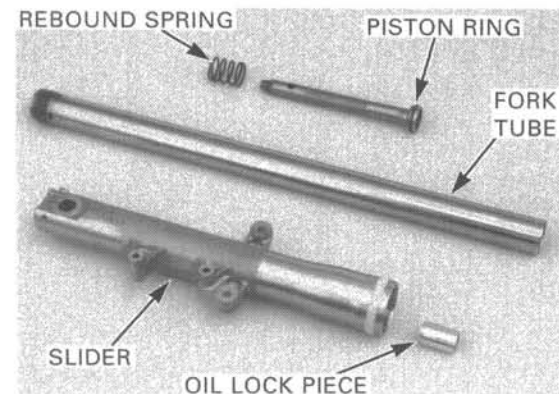


FORK TUBE/SLIDER/PISTON

Check the fork tube, slider, oil lock piece and fork piston for score marks, and excessive or abnormal wear.

Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

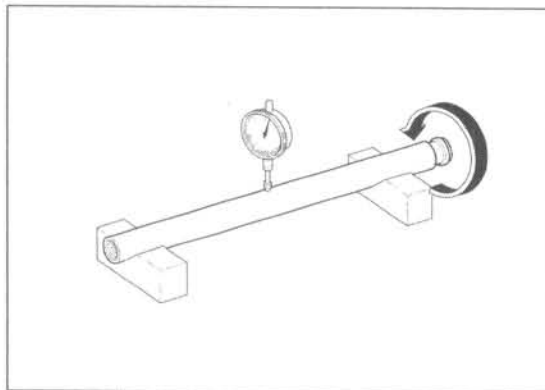
Replace any damaged component if necessary.



FRONT WHEEL/SUSPENSION/STEERING

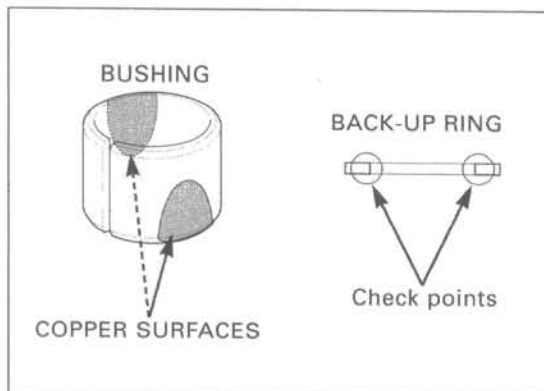
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



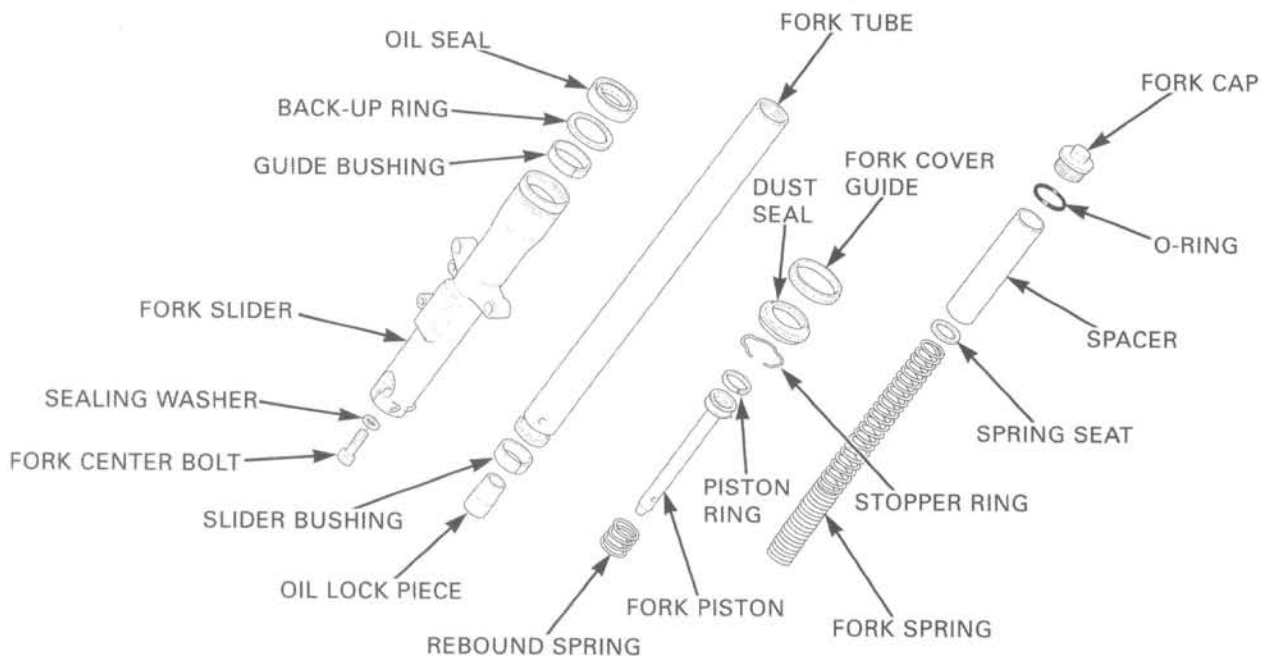
Visually inspect the slider and guide bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



FRONT WHEEL/SUSPENSION/STEERING

Install a new slider bushing if it has been removed.

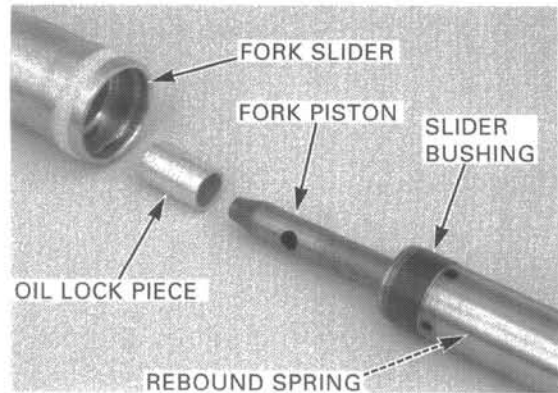
NOTE:

- Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the following:

- rebound spring (onto the fork piston)
- fork piston (into the fork tube)
- oil lock piece (onto the fork piston)

Install the fork tube into the fork slider.

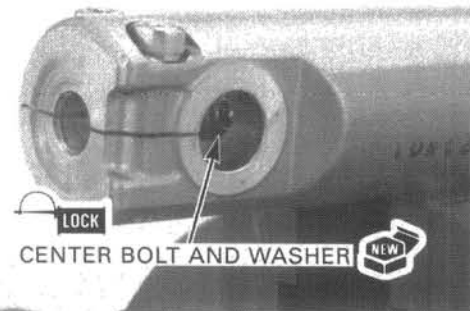


Hold the fork slider in a vise with soft jaws or shop towels.

Apply locking agent to the fork center bolt threads. Install the center bolt with a new sealing washer and tighten it.

If the fork piston turns with the center bolt, temporarily install the fork spring, spring seat, spacer and fork cap.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



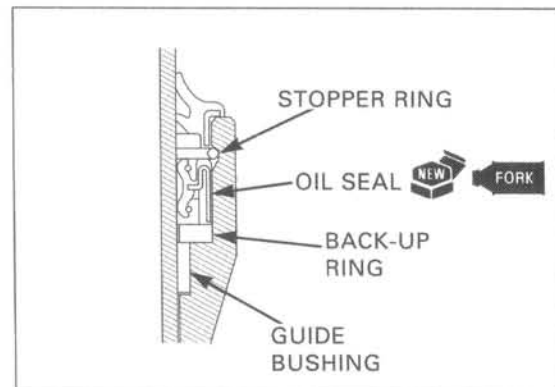
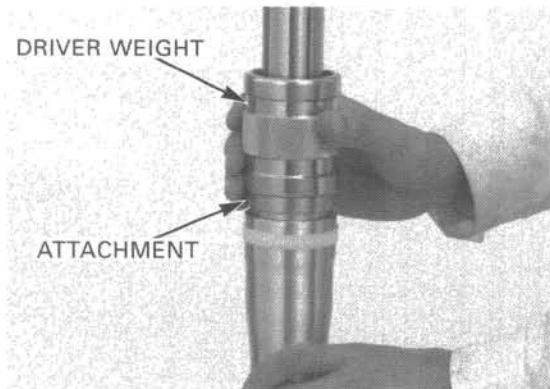
Place the guide bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on the guide bushing. Drive the bushing into place, using the special tools.

Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip. Apply fork fluid to a new oil seal lip. Install the oil seal with the marking facing up.

Drive the oil seal until the stopper ring groove is visible.

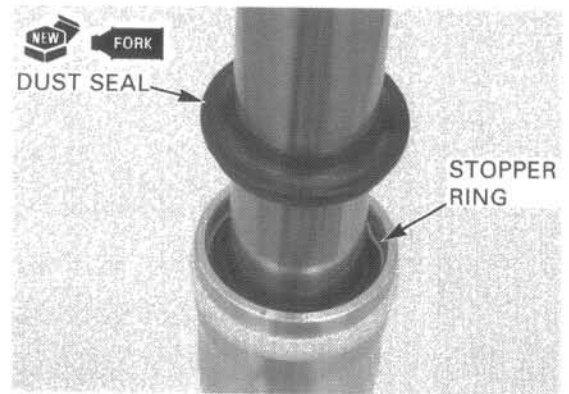
TOOLS:

- Fork seal driver body 07947-KA50100
- Driver attachment, 41 mm I.D. 07947-KF00100



Install the stopper ring into the groove into the fork slider, being careful not to scratch the fork tube sliding surface.

Coat a new dust seal with fork fluid and install it.



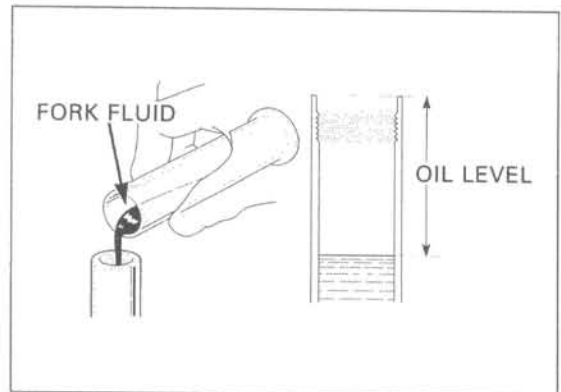
Pour the specified amount of the recommended fork fluid into the fork tube.

RECOMMENDED FORK FLUID:
Pro Honda Suspension Fluid SS-8

FORK FLUID CAPACITY:
459 ± 2.5 cm³ (15.5 ± 0.08 US oz,
16.2 ± 0.09 Imp oz)

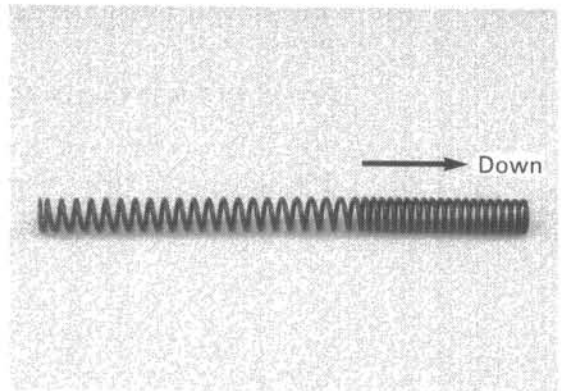
Slowly pump the fork tube several times to remove any trapped air from the lower portion of the fork tube.

Compress the fork tube fully. Measure the oil level from the top of the fork tube.



FORK FLUID LEVEL: 135 mm (5.31 in)

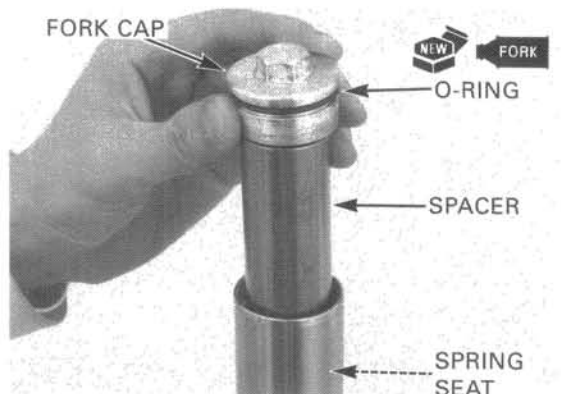
Pull the fork tube up and install the fork spring with the tightly wound coil side facing down.



Install the spring seat and spacer.

Coat a new O-ring with fork fluid and install it into the fork cap groove.
Hold the fork cap securely and install it into the fork tube.

*Be careful not to cross-thread the fork cap.
Tighten the fork cap after installing the fork tube into the fork bridges.*



FRONT WHEEL/SUSPENSION/STEERING

INSTALLATION

Loosen the fork cover bolts on the bottom bridge. Install a new O-ring onto the top of the fork cover.

Apply soapy water to the fork tube to aid in installation. Take care not to pinch the O-ring on the fork cover.

Install the fork tube into the bottom and top bridges. Align the top of the fork tube with the upper surface of the top bridge as shown.

Tighten the bottom bridge pinch bolt.

TORQUE: 49 N·m (5.0 kgf·m, 39 lbf·ft)

Tighten the top bridge pinch bolt.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the fork cap to the specified torque if it was removed.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the fork cover bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Be careful not to scratch the fender surface.

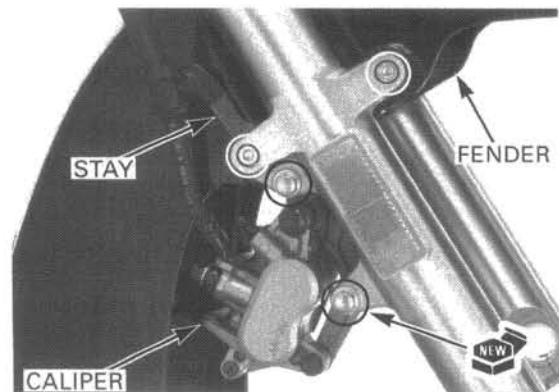
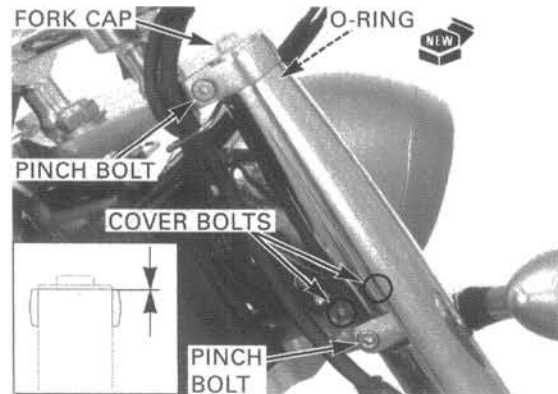
Temporarily install the front fender with the two bolts. Install the other fork leg using the same procedure.

Install the brake caliper with new mounting bolts and tighten the bolts.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install the fender bolts with the hose clamp stay and tighten all the fender bolts securely.

Install the front wheel (page 13-11).



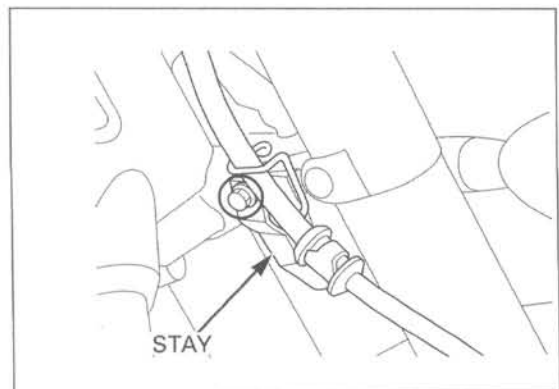
STEERING STEM

REMOVAL

Remove the following:

- handlebar (page 13-4)
- front wheel (page 13-7)
- headlight case (page 19-4)

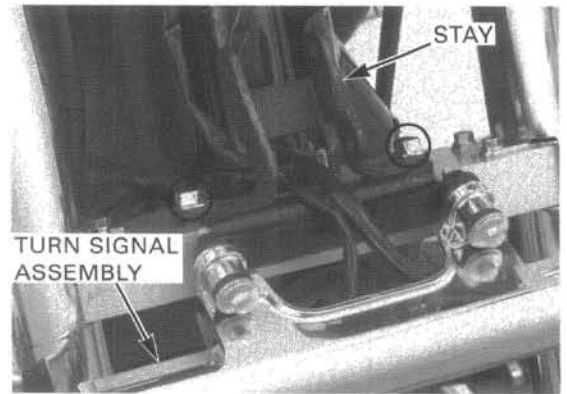
Remove the bolt and hose clamp stay.



FRONT WHEEL/SUSPENSION/STEERING

Disconnect the turn signal connectors.

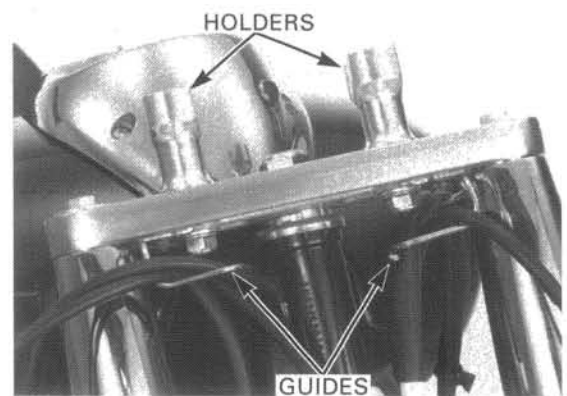
Remove the bolts and nuts, and the headlight stay and turn signal assembly.



Release the cables, hose and wires from the cable guides.

Remove the following if necessary:

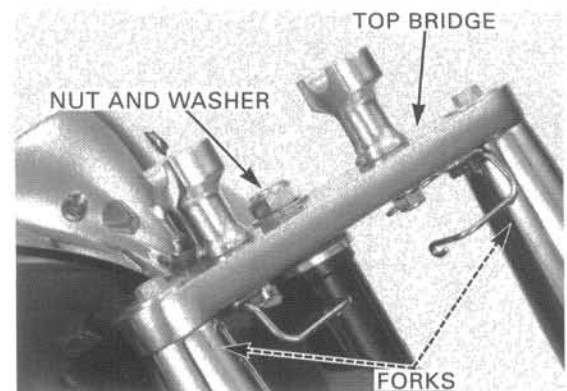
- bolts and cable guides
- nuts, washers and handlebar lower holders



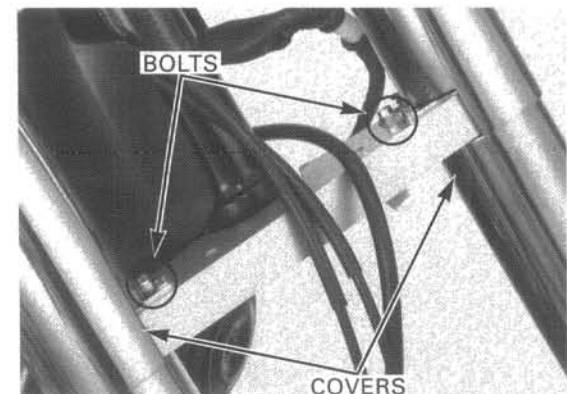
Loosen the steering stem nut.

Remove the fork legs (page 13-12).

Remove the stem nut and washer, and the top bridge.

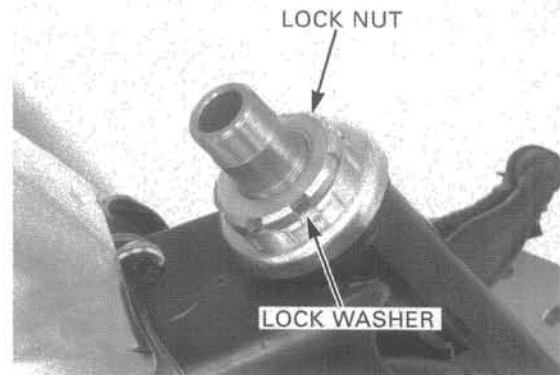


Remove the bolts, upper and lower fork covers.



FRONT WHEEL/SUSPENSION/STEERING

Straighten the lock washer tabs.
Remove the lock nut and lock washer.



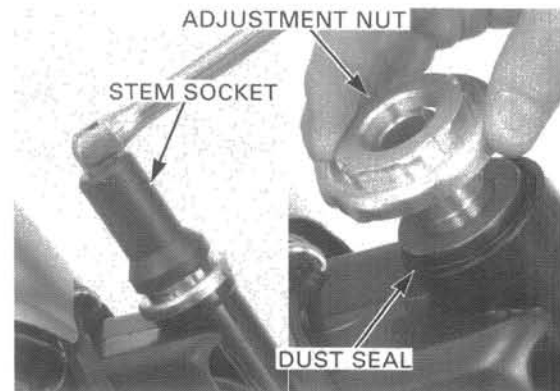
Loosen the steering bearing adjustment nut.

TOOL:

Steering stem socket

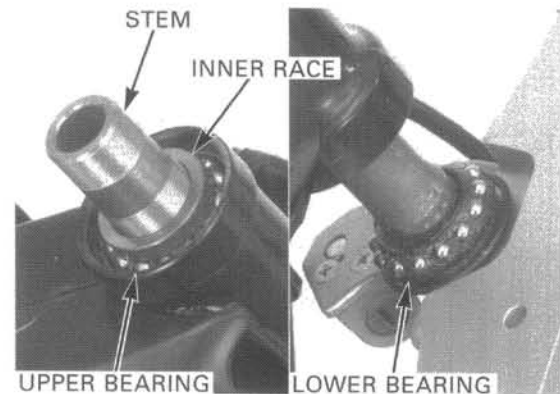
**07916-3710101 or
07916-3710100**

While holding the steering stem, remove the adjustment nut and dust seal.



Remove the following:

- stem
- upper inner race
- upper steering bearing
- lower steering bearing



Remove the upper bearing outer race using the special tool.

TOOLS:

Ball race remover

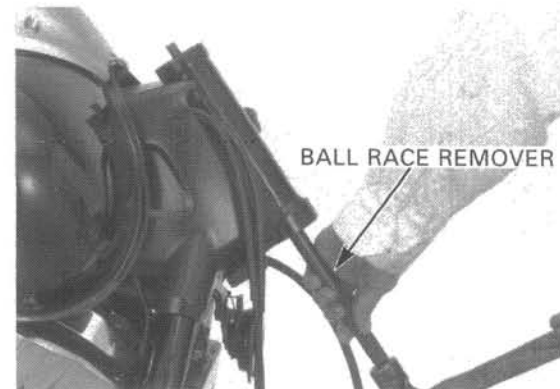
**07953-MJ10000 or
07953-MJ1000B or
07953-MJ1000A
(U.S.A. only)**

or

Driver

Attachment, 37 x 40 mm

**07949-3710001
07746-0010200**



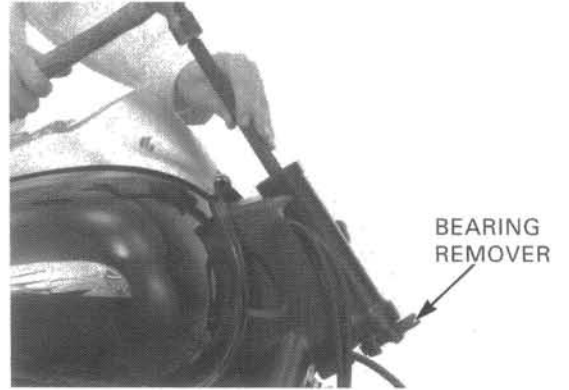
FRONT WHEEL/SUSPENSION/STEERING

Remove the lower bearing outer race using the special tool and a drift.

TOOL:

Bearing remover

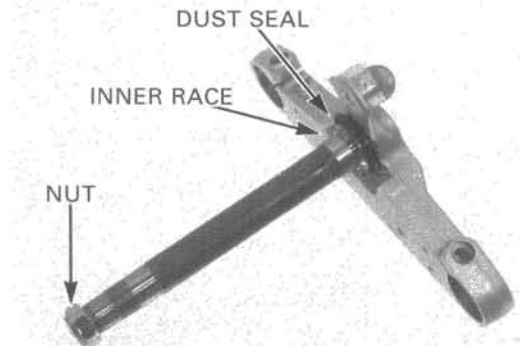
07946-3710500



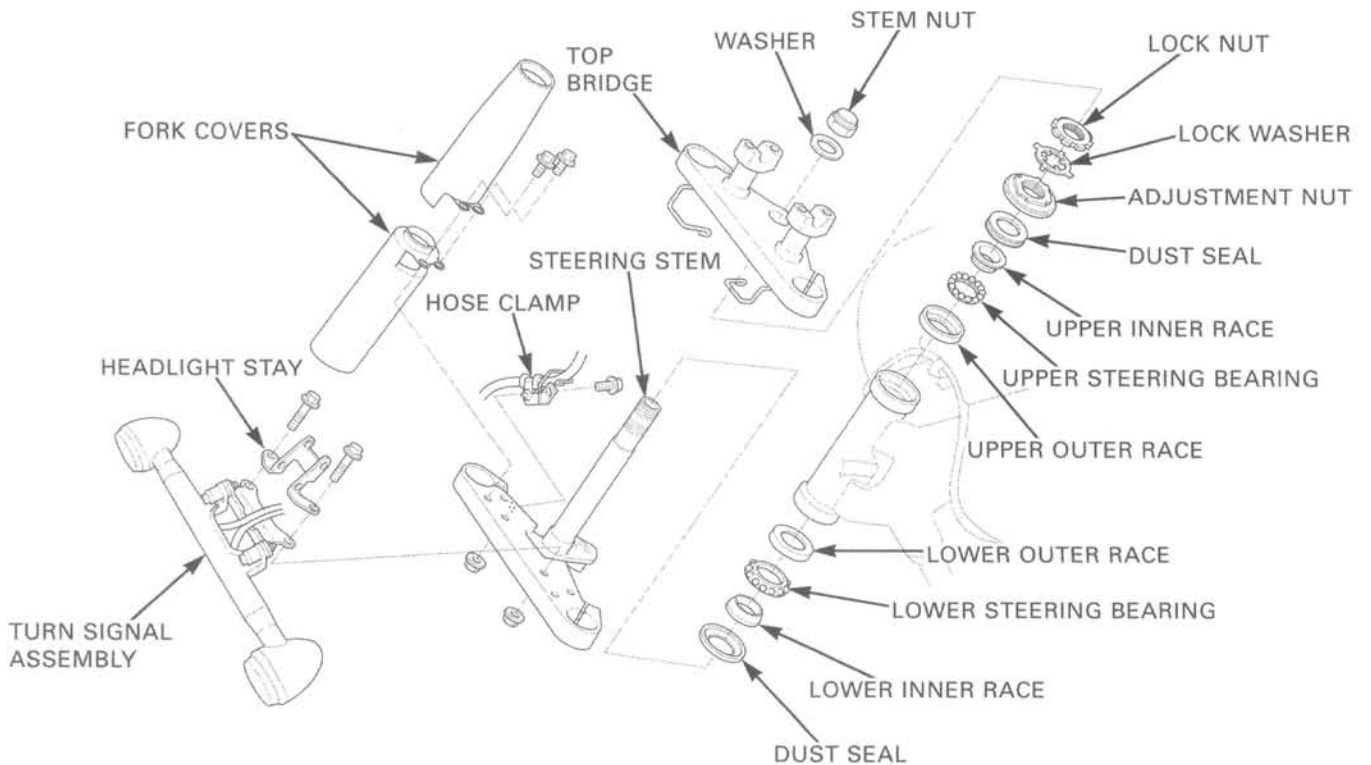
Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.



INSTALLATION



FRONT WHEEL/SUSPENSION/STEERING

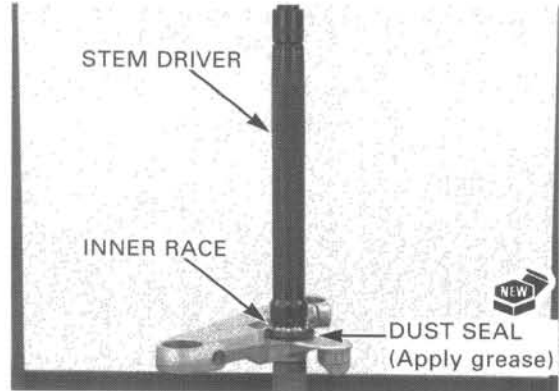
NOTE:

- Use water resistant grease #2 (urea based multi-purpose grease) for the steering bearings and dust seals:
 - Excelite EP2 (Kyodo yushi) or
 - Stamina EP2 (Shell) or equivalent

Apply grease to a new dust seal lip and install it onto the steering stem.
Press a new lower bearing inner race using the special tool.

TOOL:

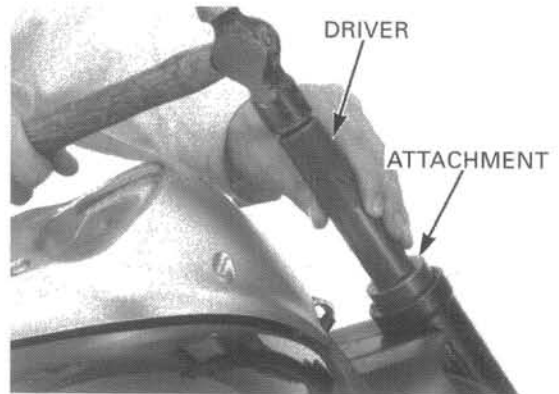
Steering stem driver 07946-MB00000



Drive in a new upper bearing outer race into the steering head pipe.

TOOLS:

Driver 07749-0010000
Attachment, 42 x 47 mm 07746-0010300



Drive in a new lower bearing outer race.

TOOLS:

Driver 07749-0010000
Attachment, 52 x 55 mm 07746-0010400

Apply 3–5 g (0.1–0.2 oz) of grease to each new steering bearing and fill it up. Install the lower steering bearing onto the stem.
Apply grease to a new upper dust seal lip.
Apply oil to the bearing adjustment nut threads.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

- upper steering bearing
- upper inner race
- dust seal
- adjustment nut

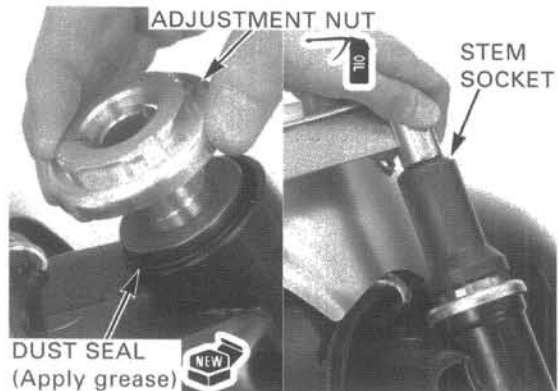
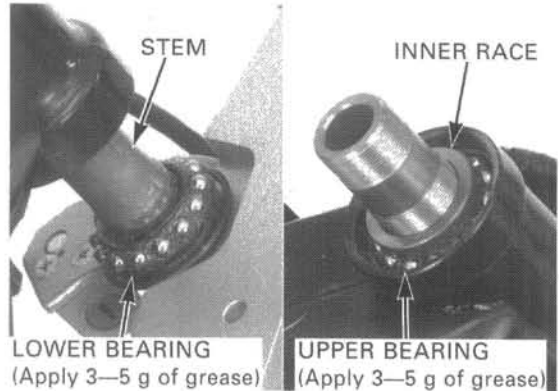
1. Tighten the adjustment nut to the specified torque.

TOOL:

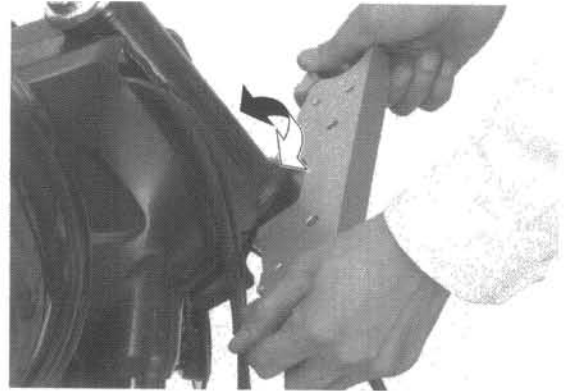
Steering stem socket 07916-3710101 or 07916-3710100

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

2. Loosen the adjustment nut and retighten it to the same torque.



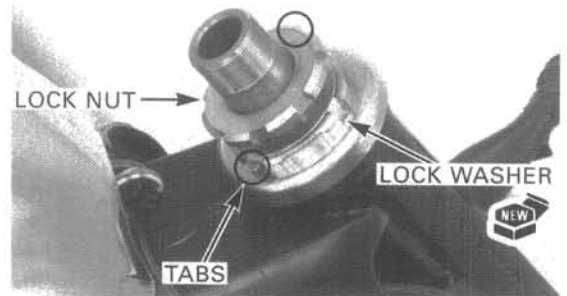
3. Turn the steering stem left and right, lock-to-lock at least four times to seat the bearings.
Retighten the adjustment nut to the same torque.
4. Repeat step 3.



Install a new lock washer to align its bended tabs with the grooves in the adjustment nut.

Install the lock nut and finger tighten it all the way.

Further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer. Bend up the lock washer tabs into the grooves of the lock nut.



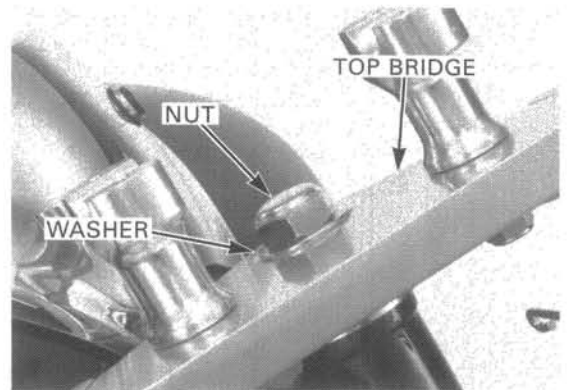
Install the top bridge, washer and stem nut.

Temporarily install the fork legs into the bottom and top bridges.

Tighten the stem nut.

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

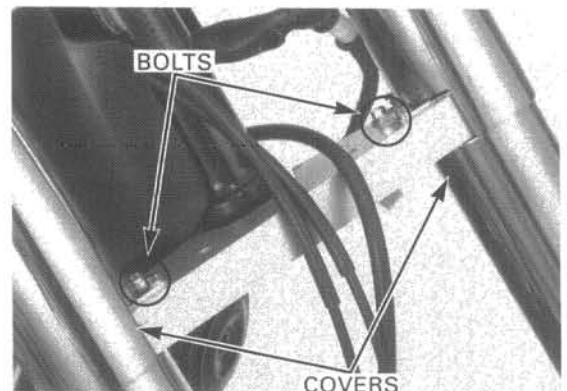
Remove the fork legs.
Make sure the steering stem moves smoothly, without play or binding.



Route the hose, wires and cables properly (page 1-19).

Install the lower and upper fork covers with the four bolts.

Install the fork legs (page 13-18).



FRONT WHEEL/SUSPENSION/STEERING

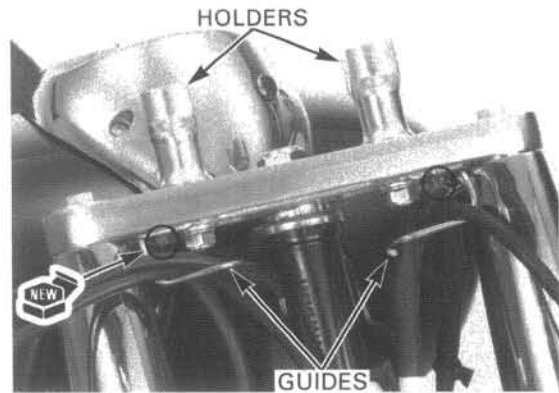
Install the following if they were removed:

- handlebar lower holders (with washers and nuts)
- cable guides (with new bolts)

Temporarily install the handlebar when tightening the lower holder bolt.

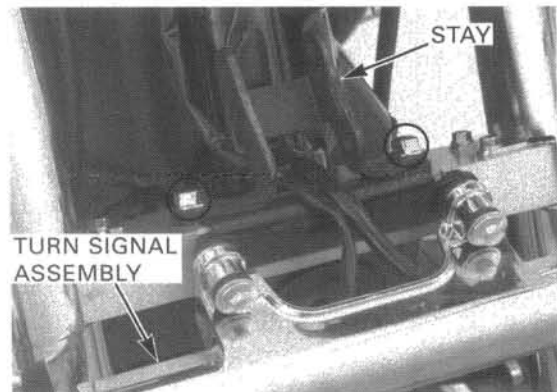
TORQUE: Holder bolt: 64 N·m (6.5 kgf·m, 47 lbf·ft)
Guide bolt: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Route the hose, wires and cables into the cable guides properly (page 1-19).



Install the turn signal assembly and headlight stay with the two bolts and nuts, and tighten them.

Connect the turn signal connectors.



Install the hose clamp stay and tighten the bolt.

Install the following:

- front wheel (page 13-11)
- handlebar (page 13-5)
- headlight case (page 19-4)

STEERING BEARING PRE-LOAD

Support the motorcycle securely using safety stands or a hoist and raise the front wheel off the ground.

Position the steering stem straight ahead.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

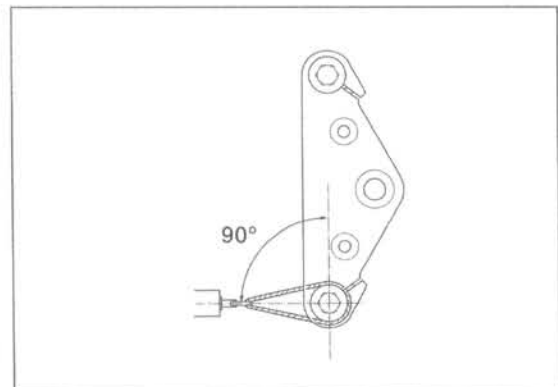
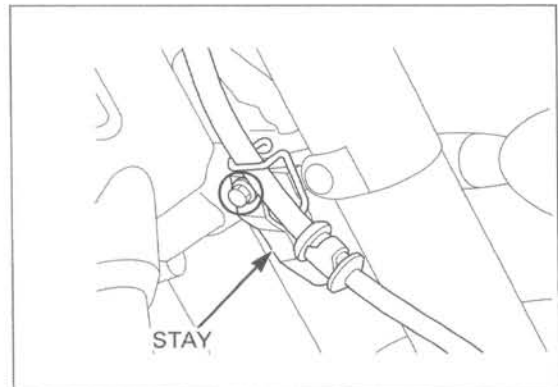
Make sure there is no cable, wire harness or hose interference.

Pull the spring scale keeping it at a right angle to the steering stem.

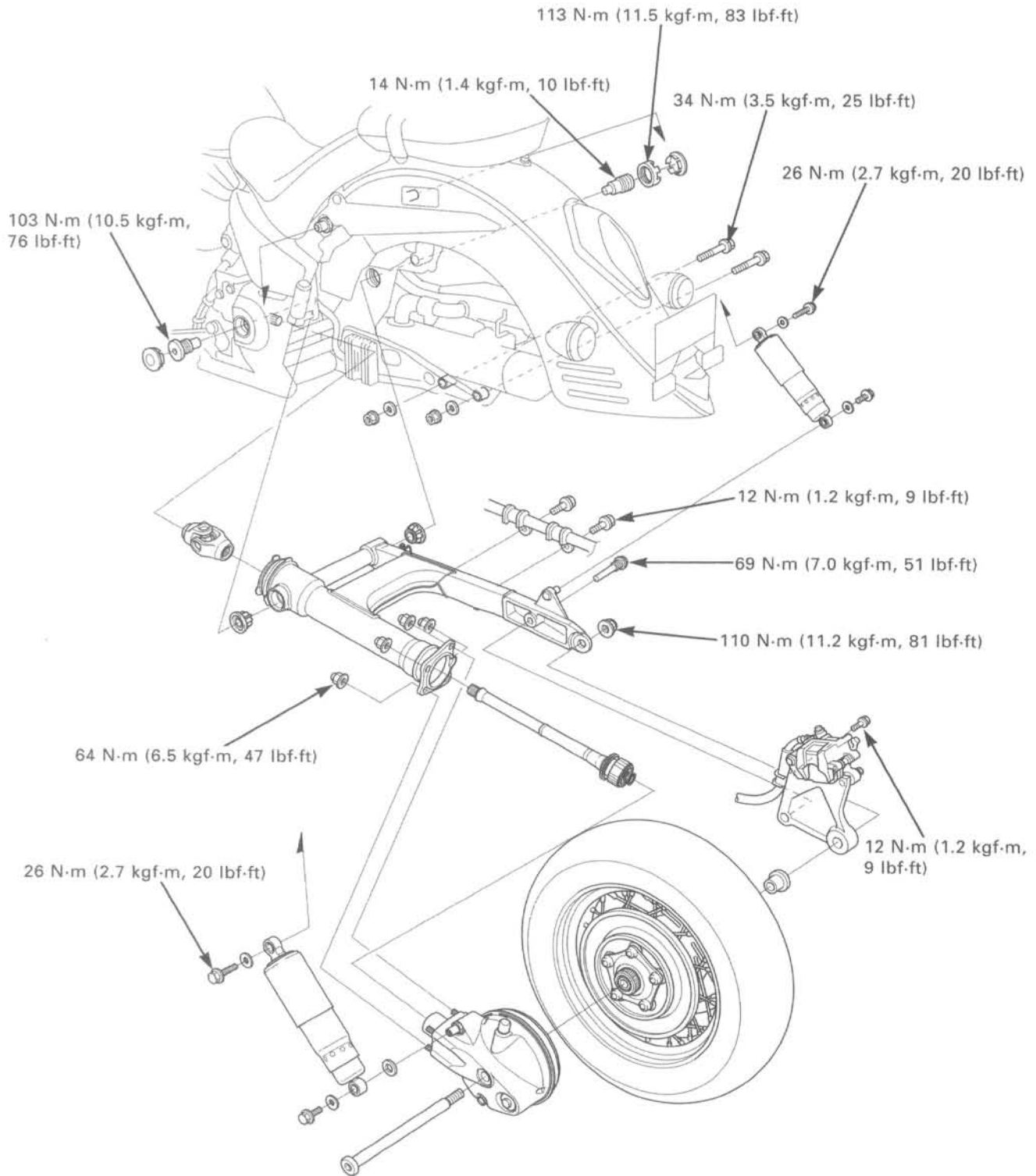
Read the scale at the point where the steering stem just starts to move.

STEERING BEARING PRE-LOAD:
7.8—11.8 N (0.8—1.2 kgf, 1.8—2.6 lbf)

If the readings do not fall within the limits, readjust the steering bearing adjustment.



REAR WHEEL/SUSPENSION



14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-9
TROUBLESHOOTING	14-2	SWINGARM	14-10
REAR WHEEL	14-3		

SERVICE INFORMATION

GENERAL

- Riding on damaged rims impairs safe operation of the vehicle.
- When servicing the rear wheel, shock absorber, or swingarm, raise the rear wheel off the ground by supporting the frame securely.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.
- When using the lock nut wrench, use a 20-inch long deflecting beam type torque wrench. 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 on the next page 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.
- Refer to section 15 for hydraulic brake system service.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	225 kPa (2.25 kgf/cm ² , 32 psi)	—
	Up to maximum weight capacity	250 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		—	70 g (2.5 oz) max.

14

TORQUE VALUES

Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft) ALOC bolt: replace with a new one.
Spoke nipple	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Valve stem nut	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Final driven flange nut	88 N·m (9.0 kgf·m, 65 lbf·ft) U-nut.
Rear axle nut	110 N·m (11.2 kgf·m, 81 lbf·ft) U-nut.
Rear brake caliper stopper pin bolt	69 N·m (7.0 kgf·m, 51 lbf·ft) ALOC bolt: replace with a new one.
Muffle mounting bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Final gear case assembly mounting nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Rear shock absorber mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Rear brake hose clamp bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) ALOC bolt: replace with a new one.
Swingarm left pivot bolt	103 N·m (10.5 kgf·m, 76 lbf·ft)
Swingarm right pivot bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)
Swingarm right pivot bolt lock nut	113 N·m (11.5 kgf·m, 83 lbf·ft)

REAR WHEEL/SUSPENSION

TOOLS

Driver	07749-0010000
Attachment, 22 x 24 mm	07746-0010800
Attachment, 32 x 35 mm	07746-0010100
Attachment, 37 x 40 mm	07746-0010200
Attachment, 42 x 47 mm	07746-0010300
Attachment, 52 x 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Spoke nipple wrench	07JMA-MR60100 or equivalent commercially available in U.S.A.
Adjustable bearing puller, 25—40 mm	07736-A01000B or 07736-A01000A
Lock nut wrench	07908-4690003 or 07908-4690002

TROUBLESHOOTING

Soft suspension

- Incorrect suspension adjustment
- Weak shock absorber spring
- Oil leakage from damper unit
- Insufficient tire pressure

Hard suspension

- Incorrect suspension adjustment
- Bent damper rod
- Damaged shock absorber mount bushings
- Damaged swingarm pivot bearings
- Improperly tightened swingarm pivot
- Tire pressure too high

Rear suspension noise

- Loose suspension fasteners
- Binding shock absorber case
- Worn shock absorber rubber mounts
- Faulty rear shock absorber

Rear wheel wobbles

- Bent rim
- Unbalanced rear tire and wheel
- Insufficient tire pressure
- Faulty swingarm pivot bearings
- Axle fastener not tightened properly
- Faulty rear tire

Wheel turns hard

- Faulty wheel bearings
- Bent axle
- Brake drag (section 15)

REAR WHEEL

REMOVAL

Loosen the axle nut and caliper stopper pin bolt.

Lift the rear wheel 30 cm (12 in) or more above the ground.

Support the motorcycle securely using a hoist or equivalent and raise the rear wheel off the ground.

Remove the following:

- hose clamp bolt
- stopper pin bolt

- two muffler mounting nuts, washers and bolts
- axle nut
- rear axle
- brake caliper
- side collar

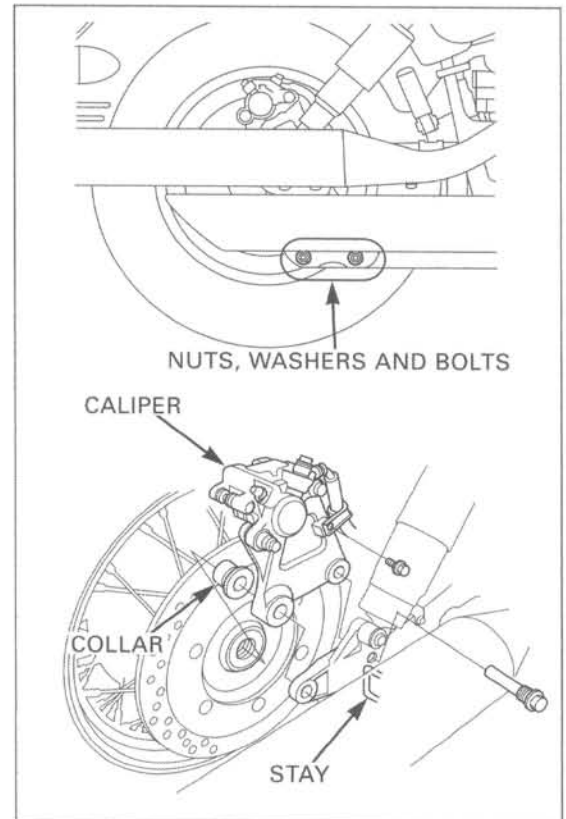
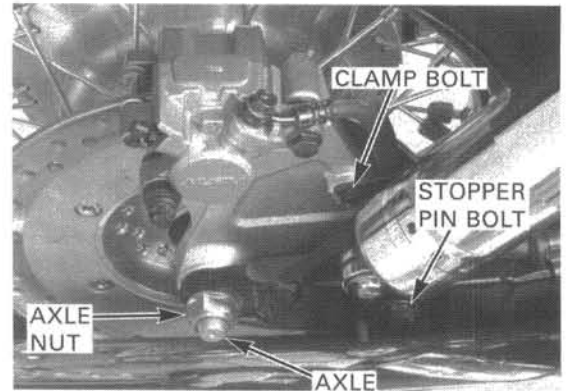
Support the brake caliper so it does not hang from the brake hose. Do not twist the brake hose.

Set a suitable wooden block between the swingarm and stay on the muffler to support the muffler and get the clearance for wheel removal.

NOTICE

During rear wheel removal, hold the wheel securely and be careful not to damage the brake disc and gear case.

Move the rear wheel to the right to separate it from the final drive gear case and carefully remove the rear wheel out of the frame.



INSPECTION

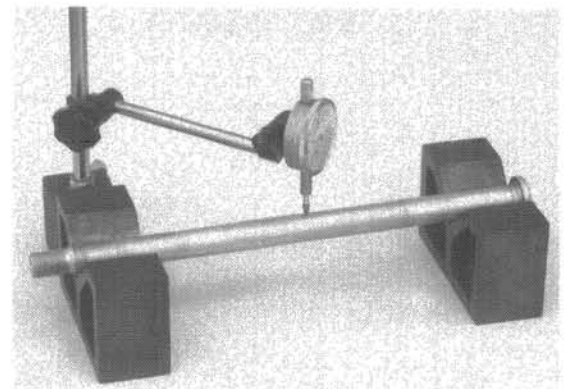
AXLE

Set the rear axle in V-blocks.

Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



REAR WHEEL/SUSPENSION

WHEEL RIM

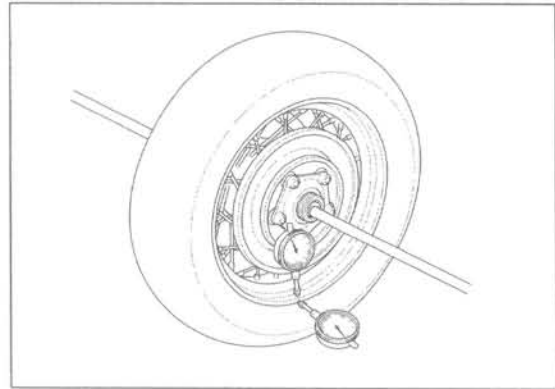
Check the rim runout by placing the wheel in a truing stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 2.0 mm (0.08 in)

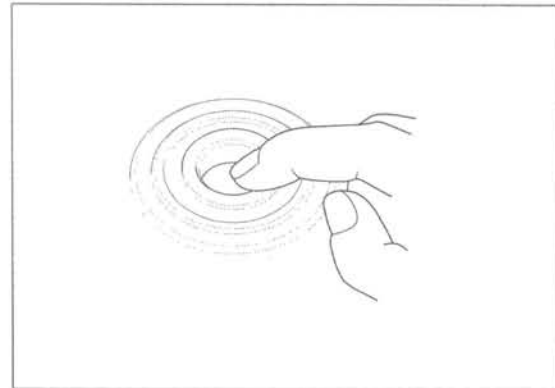
Axial: 2.0 mm (0.08 in)



WHEEL BEARING

Turn the inner race of each bearing with your finger; the bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

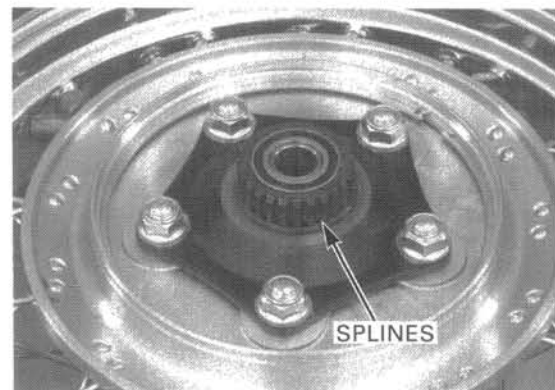
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



FINAL DRIVEN FLANGE

Replace the driven flange and bearing as an assembly.

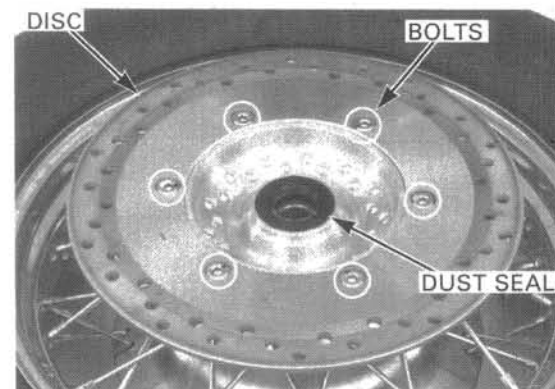
Check the driven flange splines for wear or damage. If damaged, check the splines of the final drive gear case also.



DISASSEMBLY

Remove the following:

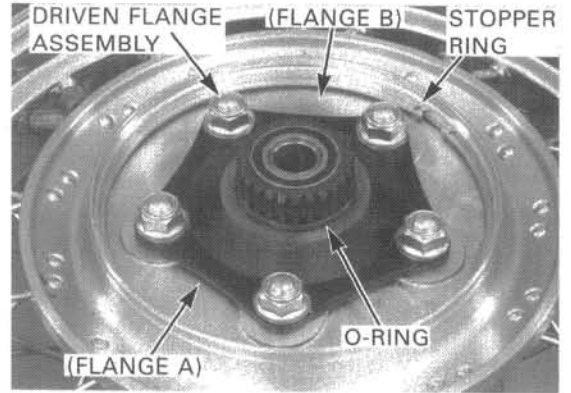
- dust seal
- six disc bolts
- brake disc



REAR WHEEL/SUSPENSION

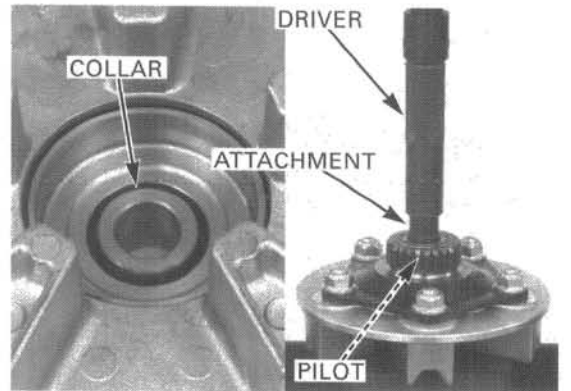
If you will replace the driven flange, loosen the flange nuts.

- O-ring
- stopper ring
- final driven flange assembly



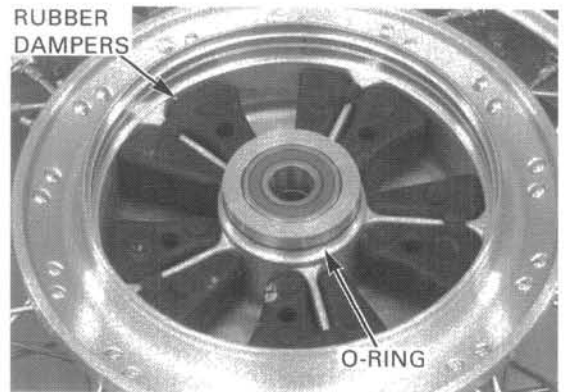
When replacing the final driven flange A, remove the collar using the following tools.

- distance collar A (press out of the driven flange)
- TOOLS:**
Driver 07749-0010000
Attachment, 22 x 24 mm 07746-0010800
Pilot, 20 mm 07746-0040500



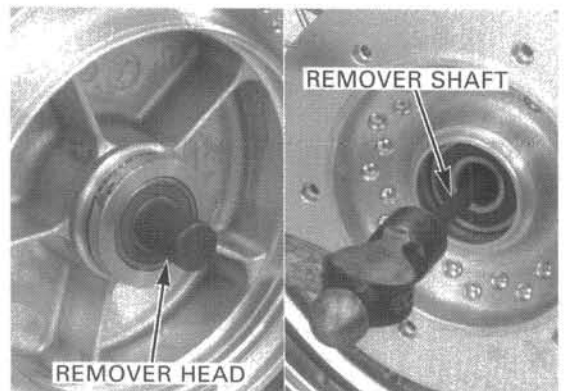
- rubber dampers
- O-ring

Replace the rubber dampers as a set. Check the rubber dampers for deterioration or damage.



Install the remover head into the bearing. From the opposite side of the wheel, install the 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

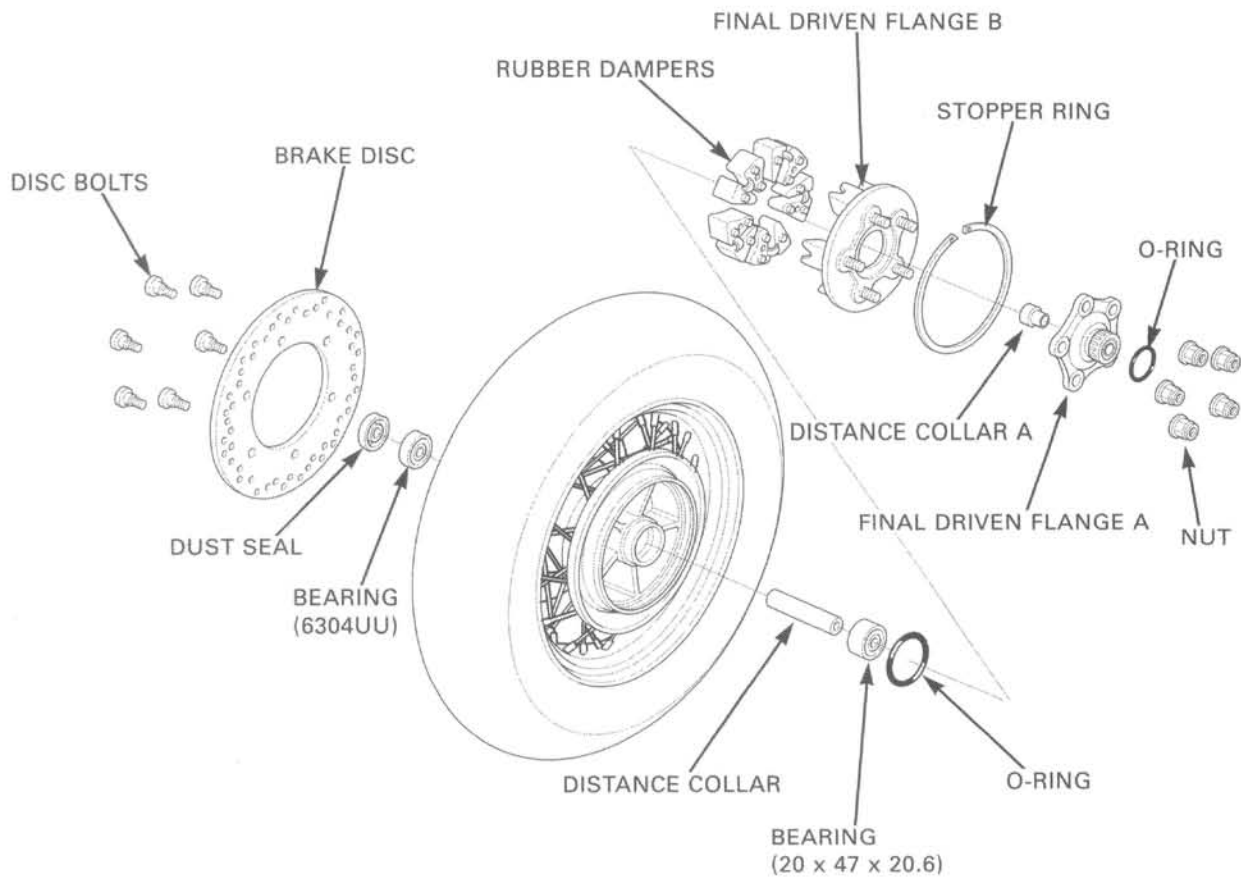


REAR WHEEL/SUSPENSION

ASSEMBLY

NOTE:

- Refer to page 13-10 for wheel balance. Do not add balance weight more than 70 g (2.5 oz) to the rear wheel



Drive in a new right bearing (disc side) squarely with the marked side facing up until it is fully seated.

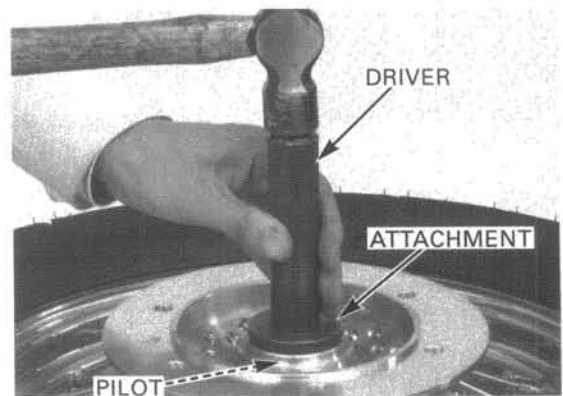
TOOLS:

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500

Install the distance collar.
Drive in a new left bearing squarely with the marked side facing up until it is fully seated.

TOOLS:

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



WHEEL CENTER ADJUSTMENT

Measure distance B (rim width) and calculate distance A as follows:

$$A = 97.5 \text{ mm} - B/2$$

Adjust the rim position and distance A by tightening the spokes to the specified torque in several progressive steps.

TOOL:

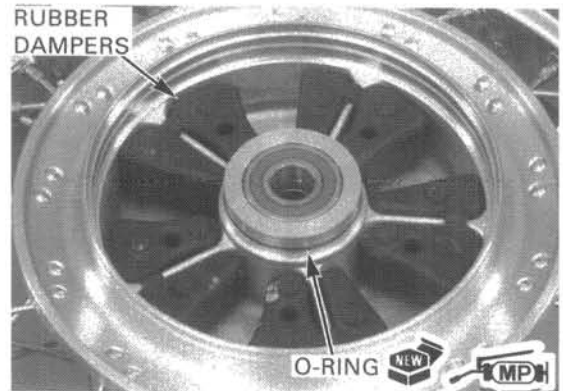
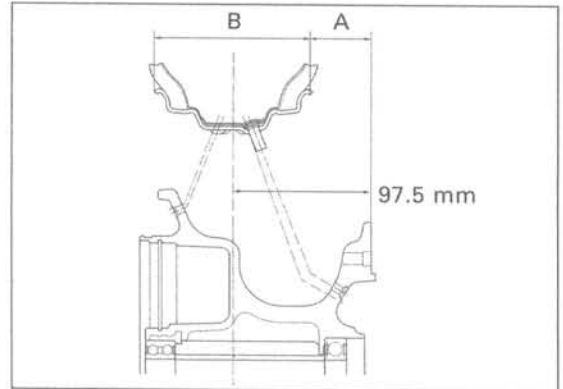
Spoke nipple wrench **07JMA-MR60100 or equivalent commercially available in U.S.A.**

TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)

Install the rubber dampers as shown.

Pack molybdenum disulfide paste into the O-ring groove in the hub.

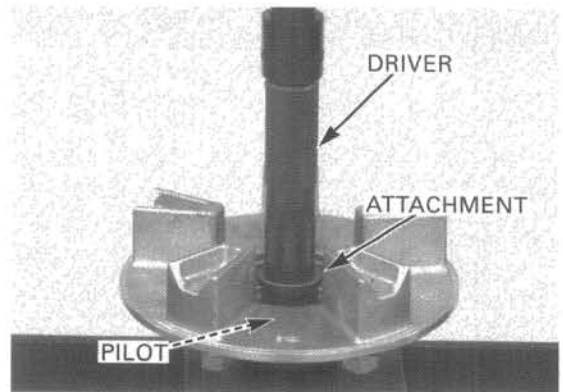
Coat a new O-ring with molybdenum disulfide paste and install it into the groove.



Press distance collar A into the driven flange until it is fully seated.

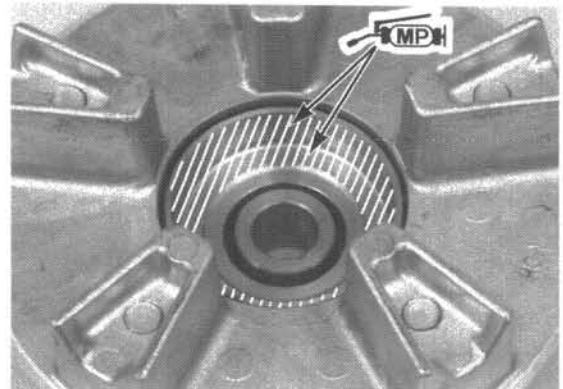
TOOLS:

Driver **07749-0010000**
Attachment, 32 x 35 mm **07746-0010100**
Pilot, 20 mm **07746-0040500**



Apply 3 g (0.11 oz) of molybdenum disulfide past to the mating surface of the final driven flange.

Install the driven flange assembly until it is fully seated.



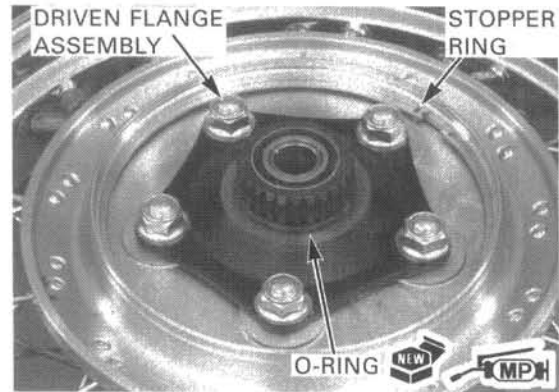
REAR WHEEL/SUSPENSION

Install the stopper ring into the ring groove properly.

Tighten the driven flange nuts if they were removed.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

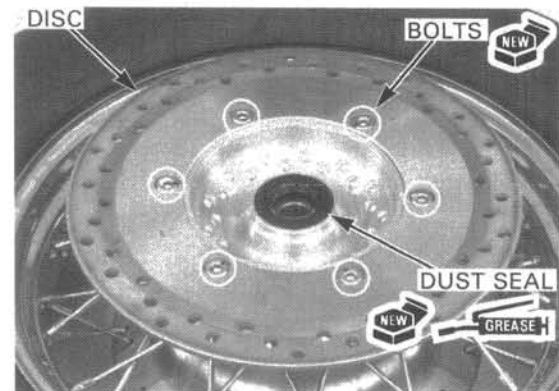
Pack molybdenum disulfide paste into the O-ring groove in the driven flange.
Coat a new O-ring with molybdenum disulfide paste and install it into the groove.



Install the brake disc with the stamp facing out.
Install new disc bolts and tighten them in a crisscross pattern in several steps.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Apply grease to a new dust seal lips and install the dust seal until it is flush with the wheel hub.

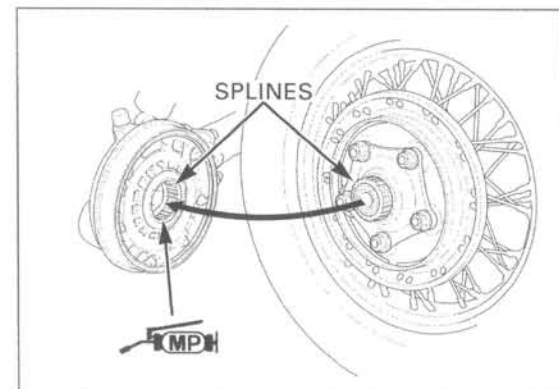


INSTALLATION

Apply 5 g (0.2 oz) of molybdenum disulfide paste to the ring gear shaft splines of the gear case.

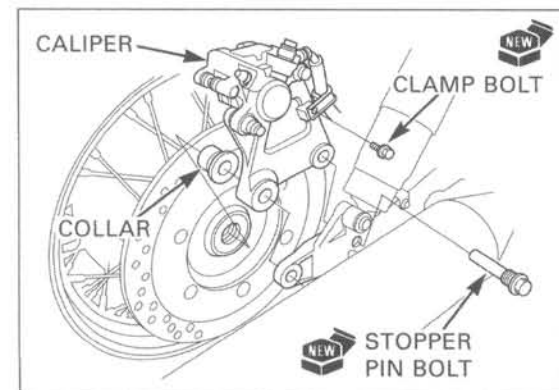
Hold the wheel securely and be careful not to damage the brake disc and gear case.

Place the rear wheel into the frame and engage it with the gear case, making sure the splines are correctly aligned.



Install the side collar.

Set the brake caliper over the brake disc, and install a new stopper pin bolt and a new clamp bolt.



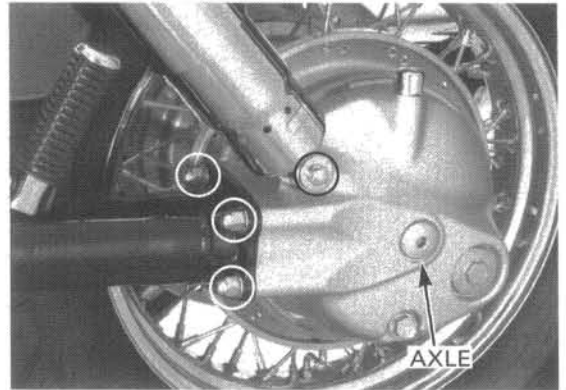
Insert the axle through the gear case, wheel, caliper and swingarm, and install the axle nut.

If the final drive gear case was removed, tighten the following to the specified torque.

TORQUE:

Gear case nut: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Shock absorber bolt: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Tighten the axle nut.

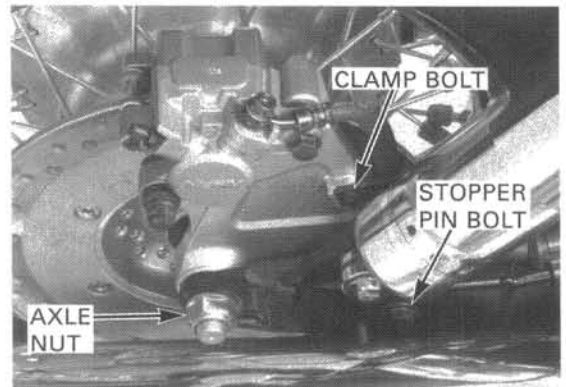
TORQUE: 110 N·m (11.2 kgf·m, 81 lbf·ft)

Tighten the stopper pin bolt.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)

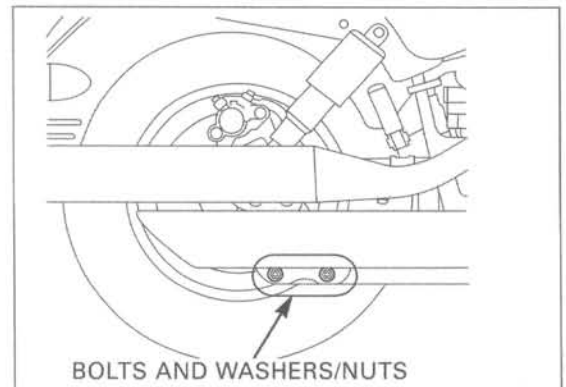
Tighten the clamp bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the muffler mounting bolts, washers and nuts, and tighten them.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



SHOCK ABSORBER

Support the frame and swingarm securely using a hoist or equivalent.

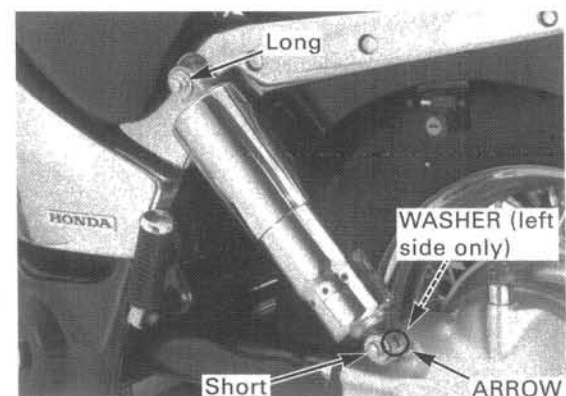
Remove the mounting bolts and washers, and the shock absorber.

Left side only: Remove the washer from the lower pivot on the gear case.

Replace the shock absorber as an assembly. Check for deformation or oil leakage. Check the rubber mounts for worn or damage.

Install with the arrow facing to the rear. Install the shock absorber in the reverse order of removal.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



REAR WHEEL/SUSPENSION

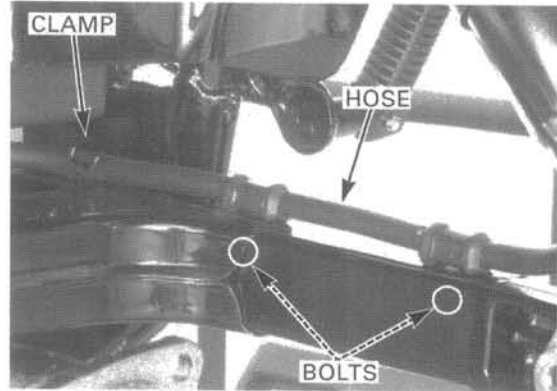
SWINGARM

REMOVAL

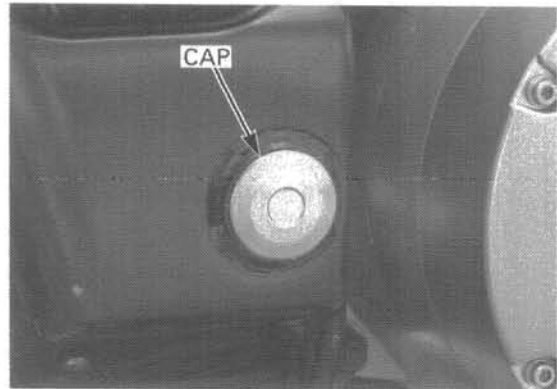
Remove the following:

- left crankcase rear cover (page 2-3).
- exhaust system (page 2-6).
- final drive gear case (page 12-3)
- rear shock absorbers (page 13-9)

Remove the hose clamp bolts.
Release the brake hose from the clamp.



Remove the both pivot caps.



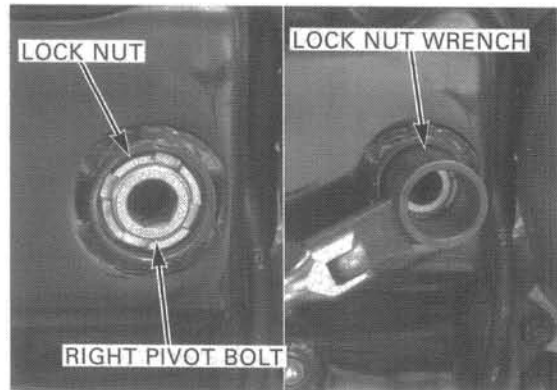
Loosen the right pivot lock nut and remove it.

TOOL:

Lock nut wrench

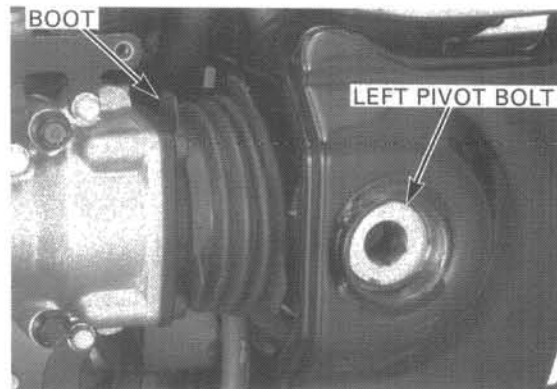
**07908-4690003 or
07908-4690002**

Loosen the right pivot bolt.



Loosen the right pivot bolt.

Release the joint boot from the output gear case.
Remove the left and right pivot bolts, and the
swingarm from the frame.



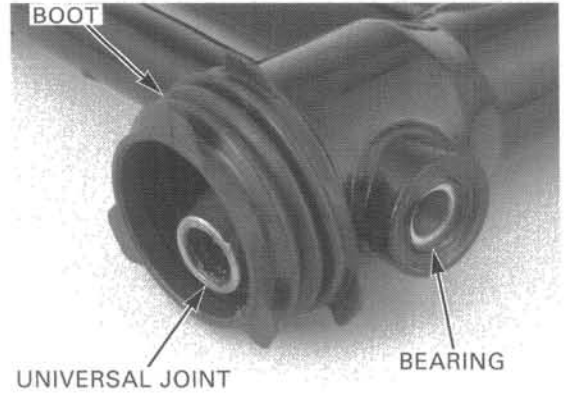
Remove the following:

- universal joint
- pivot bearings
- joint boot

INSPECTION

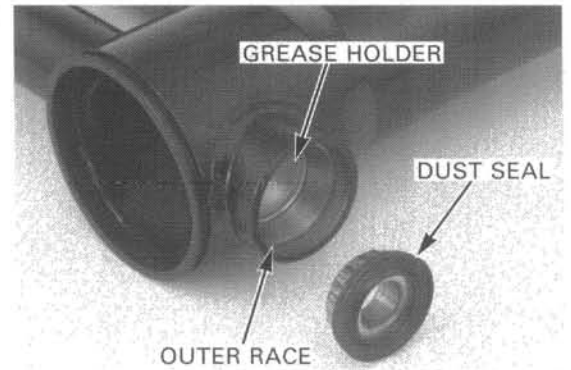
Check that the universal joint moves smoothly without binding or noise.
 Check the splines for wear or damage.
 If damaged, check the splines of the output shaft and drive shaft also.

Check the boot for cuts or other damage.



Both bearings, outer races and grease holders must be replaced as a set if any part is damaged or worn.

Check the bearings and dust seals for wear or damage.
 Check the outer races for wear or damage.
 Check the grease holders for damage or deformation.



PIVOT BEARING OUTER RACE REPLACEMENT

Punch or drill an appropriate hole into the grease holder.
 Pull the outer race and grease holder out of the swingarm using a commercially available 3/8" x 16 slide hammer and the special tool.

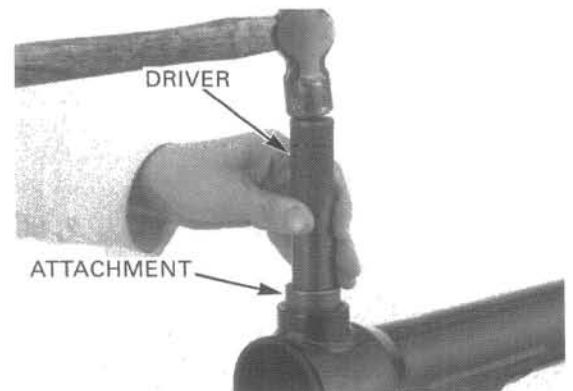
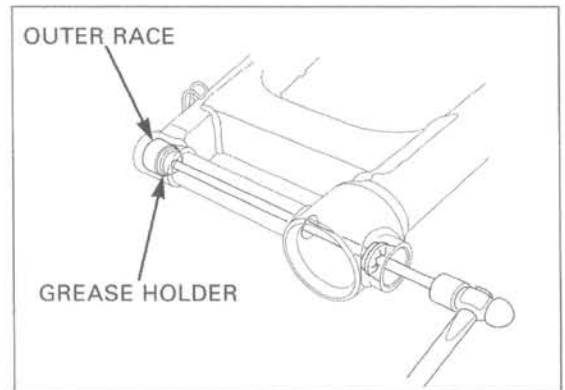
Insert a suitable driver through the swingarm and drive the other outer race and grease holder out of the swingarm.

TOOL:
 Adjustable bearing puller, 25—40 mm 07736-A01000B or 07736-A01000A and

Slide hammer, 3/8" x 16 (equivalent commercially available in U.S.A.)

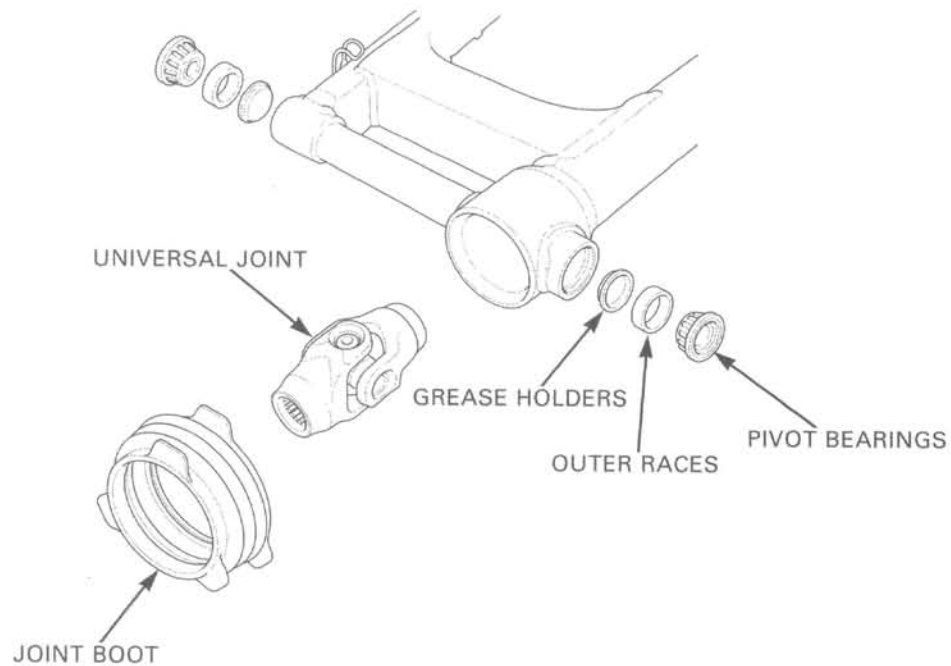
Install a new grease holder into the pivot.
 Drive in a new outer race squarely until it is fully seated.

TOOLS:
 Driver 07749-0010000
 Attachment, 37 x 40 mm 07746-0010200

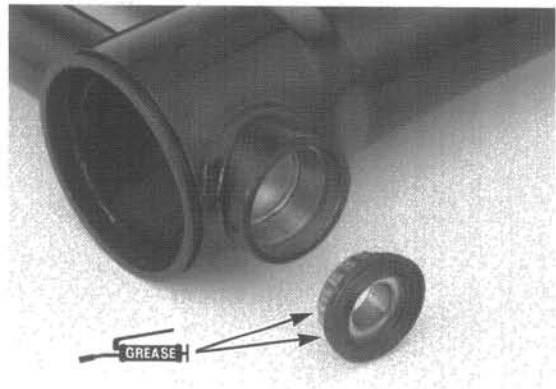


REAR WHEEL/SUSPENSION

INSTALLATION

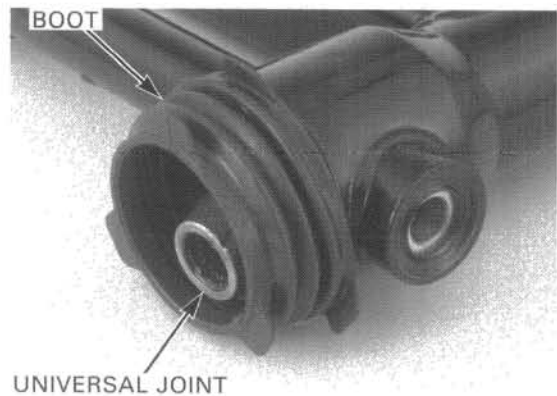


Apply 1–1.5 g (0.04–0.05 oz) of grease to the needle rollers and dust seal lips of each new bearing. Install the bearings into the swingarm pivots.



Install the joint boot by aligning the boot rib with the swingarm groove in the direction as shown.

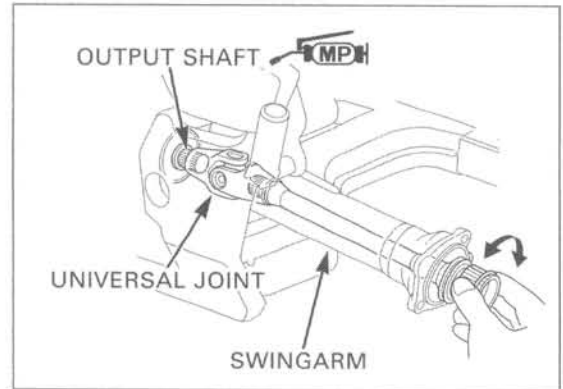
Place the universal joint into the swingarm.



REAR WHEEL/SUSPENSION

Apply 1 g (0.04 oz) of molybdenum disulfide paste to the output shaft splines.

Set the swingarm into the frame and hold it. Install the universal joint onto the output shaft using the drive shaft as shown.



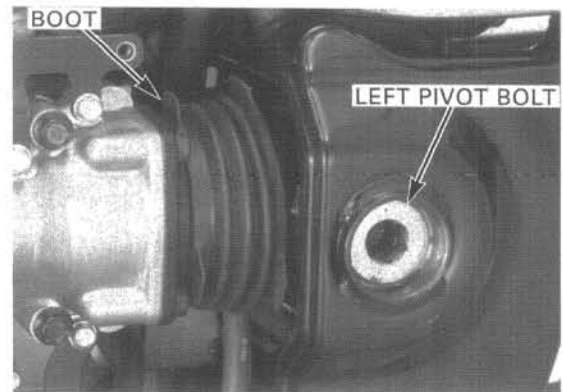
Install the joint boot over the output gear case.

Carefully align the swingarm pivots with the pivot bolts.

Install the left and right pivot bolts and tighten them.

Tighten the left pivot bolt to the specified torque.

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

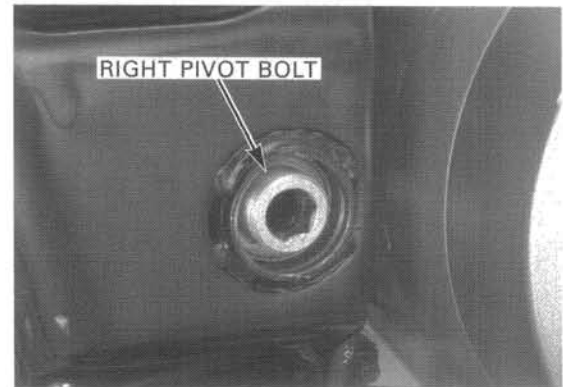


Tighten the right pivot bolt to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Move the swingarm up and down several times to seat the pivot bearings.

Retighten the pivot bolts to the same torque.



Install the right pivot lock nut.

Tighten the lock nut while holding the pivot bolt.

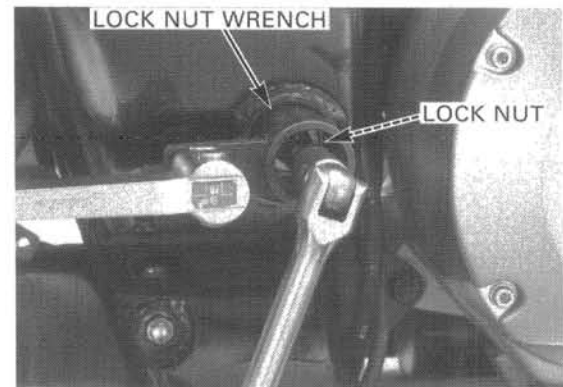
TOOL:

Lock nut wrench

07908-4690003 or
07908-4690002

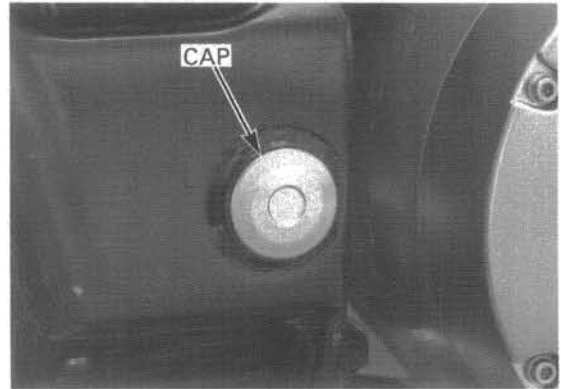
**TORQUE: Actual: 113 N·m (11.5 kgf·m, 83 lbf·ft)
Indicated: 103 N·m (10.5 kgf·m, 76 lbf·ft)**

Refer to torque wrench reading information on page 14-1 "Service Information".

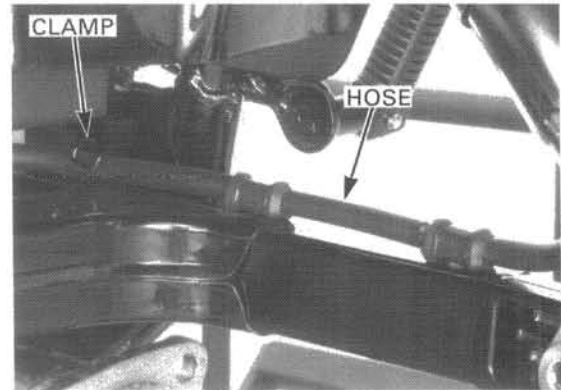


REAR WHEEL/SUSPENSION

Install the pivot caps.



Install the brake hose into the clamp on the swingarm.

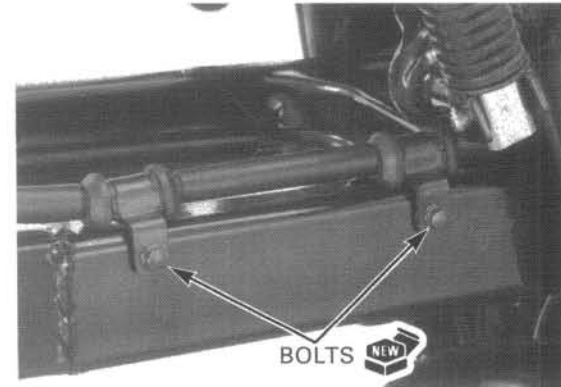


Install the hose clamps with new clamp bolts. Tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

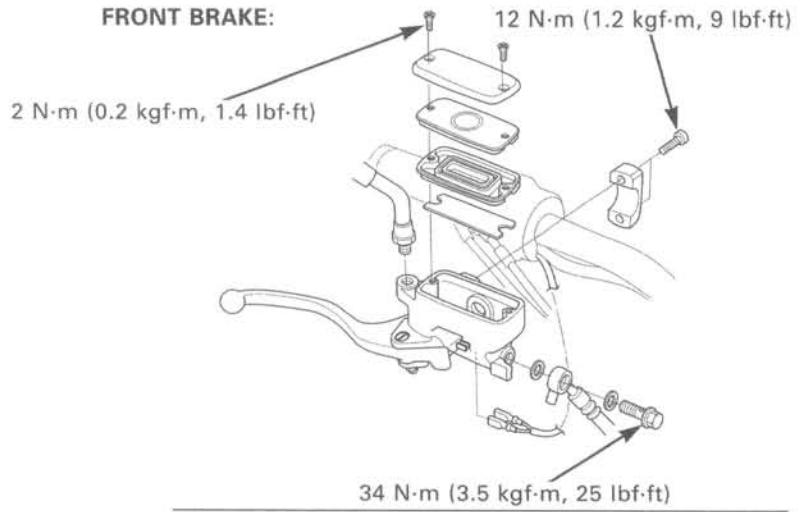
Install the following:

- rear shock absorbers (page 13-9)
- final drive gear case (page 12-18)
- exhaust system (page 2-6).
- left crankcase rear cover (page 2-3)

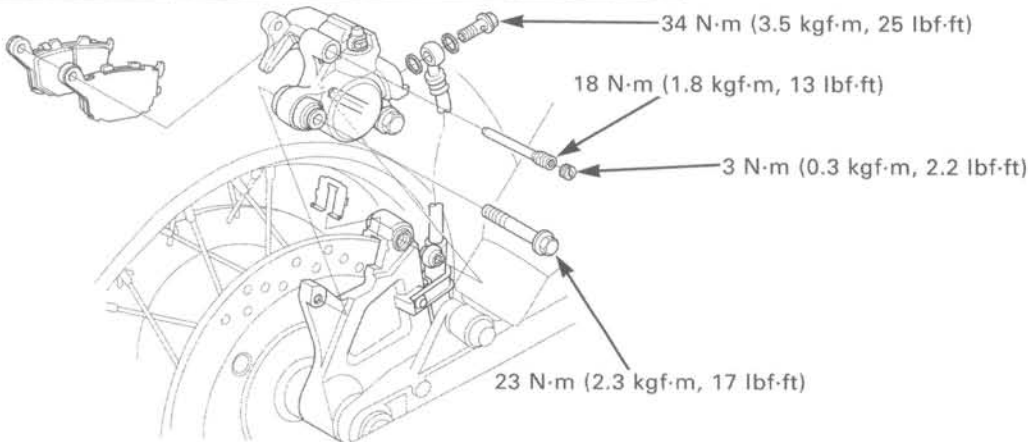
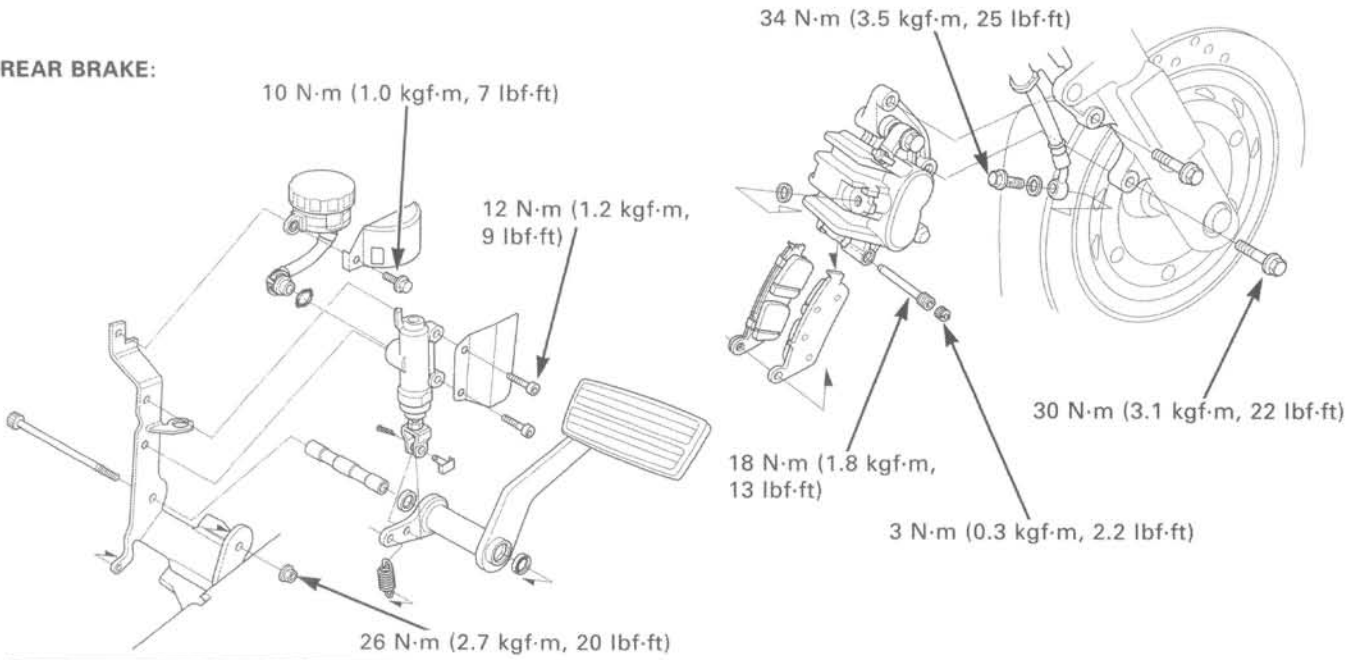


HYDRAULIC DISC BRAKE

FRONT BRAKE:



REAR BRAKE:



15. HYDRAULIC DISC BRAKE

SERVICE INFORMATION	15-1	FRONT MASTER CYLINDER	15-7
TROUBLESHOOTING	15-2	FRONT BRAKE CALIPER	15-10
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-3	REAR MASTER CYLINDER/ BRAKE PEDAL	15-13
BRAKE PAD/DISC	15-5	REAR BRAKE CALIPER	15-17

SERVICE INFORMATION

GENERAL

⚠ CAUTION

Frequent inhalation of brake lining dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (e.g., dirt, water) to enter an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Specified brake fluid		DOT 4	—
Front	Brake disc thickness	5.8—6.2 (0.023—0.24)	5.0 (0.20)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	12.700—12.743 (0.5000—0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657—12.684 (0.4983—0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	27.000—27.050 (1.0630—1.0650)	27.06 (1.065)
	Caliper piston O.D.	26.935—26.968 (1.0604—1.0617)	26.92 (1.060)
Rear	Brake disc thickness	5.8—6.2 (0.023—0.24)	5.0 (0.20)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	12.700—12.743 (0.5000—0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657—12.684 (0.4983—0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	38.18—38.23 (1.503—1.505)	38.24 (1.506)
	Caliper piston O.D.	38.115—38.148 (1.5006—1.5019)	38.09 (1.500)

15

HYDRAULIC DISC BRAKE

TORQUE VALUES

Brake caliper bleed valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Front master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Brake pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)
Brake pad pin plug	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Front brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Front brake light switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear brake reservoir mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Rear master cylinder push rod joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear brake pedal pivot nut	26 N·m (2.7 kgf·m, 20 lbf·ft) U-nut.
Front brake caliper bracket pin	13 N·m (1.3 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
Front brake caliper pin	27 N·m (2.8 kgf·m, 20 lbf·ft) Apply locking agent to the threads.
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) ALOC bolt: replace with a new one.
Rear brake caliper stopper pin bolt	69 N·m (7.0 kgf·m, 51 lbf·ft) ALOC bolt: replace with a new one.
Rear brake caliper bracket pin bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)
Rear brake caliper pin	27 N·m (2.8 kgf·m, 20 lbf·ft)
Brake pipe joint bolt	17 N·m (1.7 kgf·m, 12 lbf·ft) Apply brake fluid to the threads.
Brake hose 2-way joint mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOL

Snap ring pliers	07914-SA50001
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TROUBLESHOOTING

Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Bent brake lever/pedal

Brake lever/pedal hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever/pedal

Brake drag

- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

BRAKE FLUID REPLACEMENT/AIR BLEEDING

NOTICE

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.

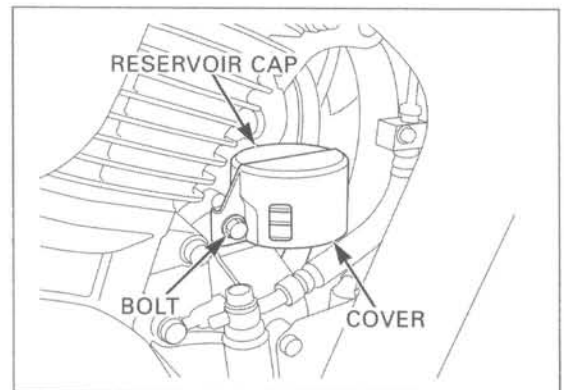
NOTE:

- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

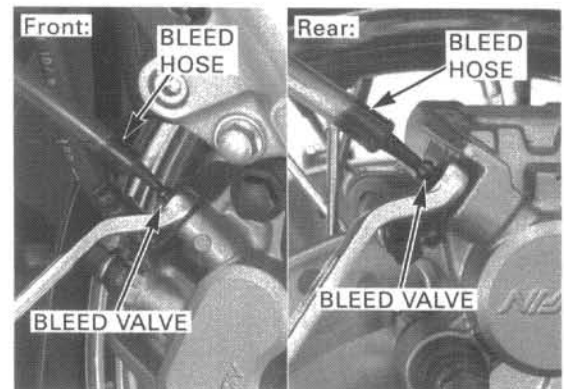
BRAKE FLUID DRAINING

For front brake: Turn the handlebar to the left until the front master cylinder reservoir is level before removing the reservoir cap. Remove the screws, reservoir cap, set plate and diaphragm.

For rear brake: Remove the reservoir cover by removing the reservoir mounting bolt. Secure the reservoir with the bolt. Remove the reservoir cap.



Connect a bleed hose to the bleed valve. Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve. Tighten the bleed valve.



HYDRAULIC DISC BRAKE

BRAKE FLUID FILLING/BLEEDING

Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve. If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir is low.

NOTE:

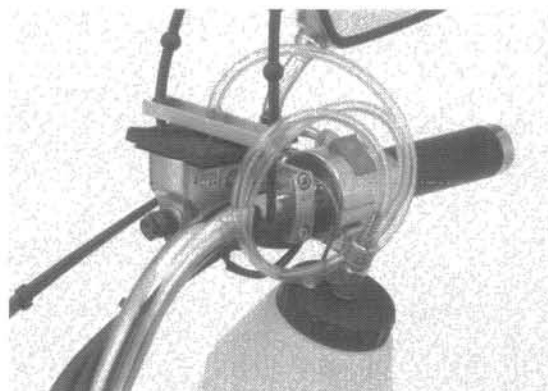
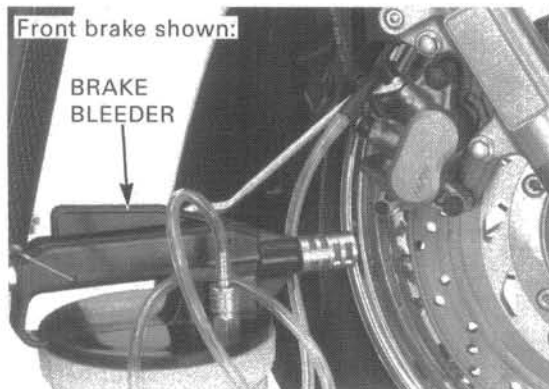
- Check the fluid level often while bleeding to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Perform the bleeding procedure until the system is completely flushed/bled.

NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

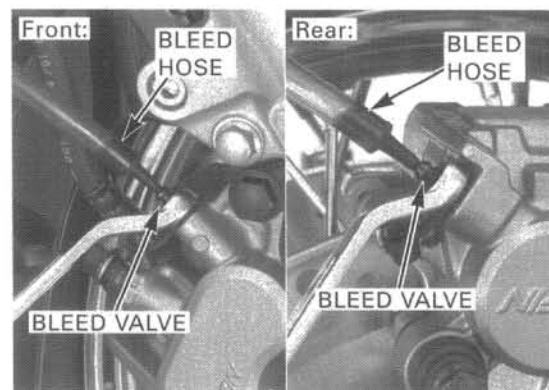
Close the bleed valve and operate the brake lever or pedal. If it is still spongy, bleed the system again.



If a brake bleeder is not available, use the following procedure:

Connect a bleed hose to the bleed valve.

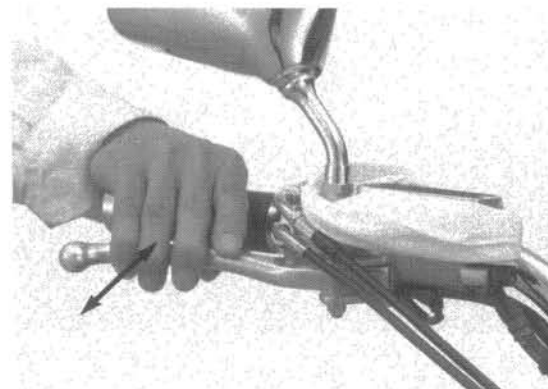
Pressurize the system with the brake lever or pedal until lever or pedal resistance is felt.



Do not release the lever or pedal until the bleed valve has been closed.

1. Squeeze the brake lever or depress the brake pedal, open the bleed valve 1/4 turn and then close it.
2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until air bubbles do not appear in the bleed hose.

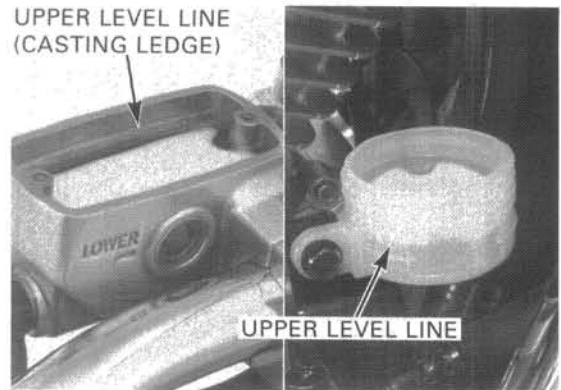


HYDRAULIC DISC BRAKE

After bleeding the air completely, tighten the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid.

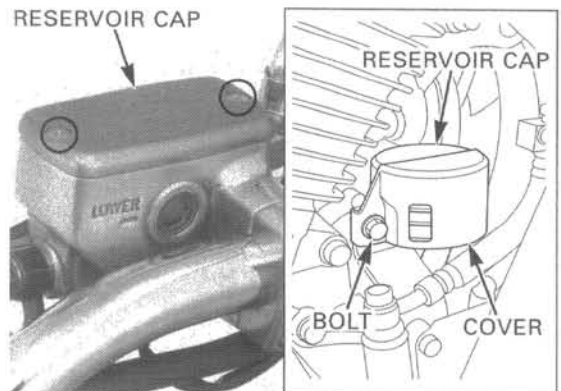


For front brake: Install the diaphragm, set plate and reservoir cap and tighten the screws.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

For rear brake: Install the reservoir cap. Remove the reservoir mounting bolt, and install the reservoir and cover with the bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

Check the brake fluid level in the reservoir as this operation causes the level to rise. Push the caliper piston all the way in to allow installation of new brake pads by pushing the caliper body inward.

Remove the pad pin plug and loosen the pad pin.

Pull the pad pin out of the caliper body while pushing in the pads against the pad spring. Remove the brake pads.

Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure. Install new brake pads into the caliper so their ends rest into the pad retainer on the bracket properly. Install the pad pin by pushing in the pads against the pad spring to align the pad pin holes in the pads and caliper body.

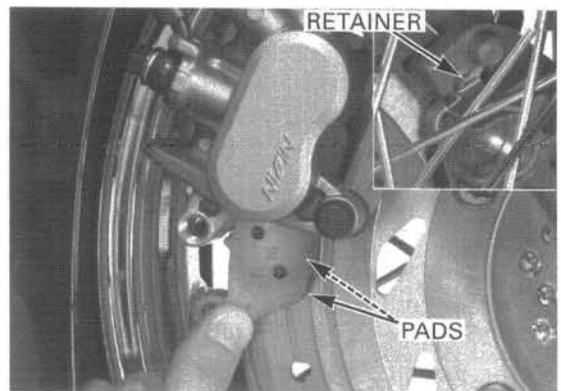
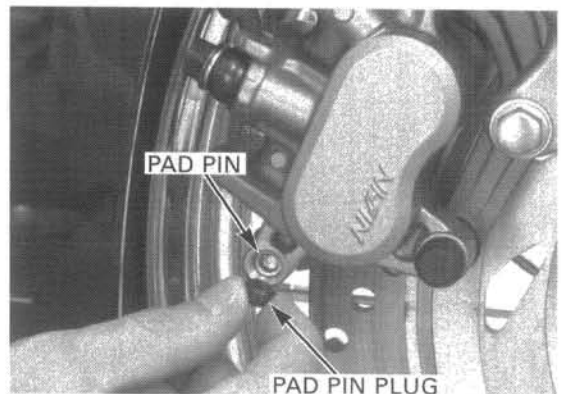
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug and tighten it.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

Operate the brake lever to seat the caliper piston against the pads.



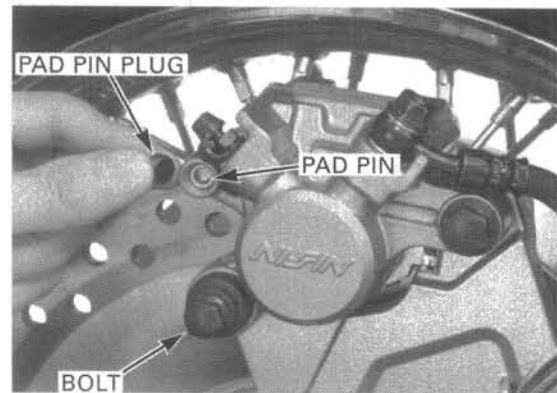
HYDRAULIC DISC BRAKE

REAR BRAKE PAD REPLACEMENT

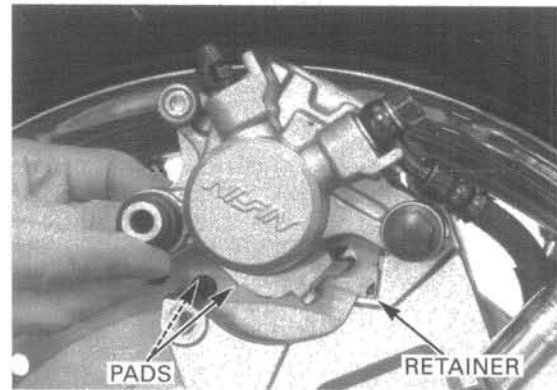
Check the brake fluid level in the reservoir as this operation causes the level to rise.

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

Remove the pad pin plug and loosen the pad pin. Remove the bracket pin bolt.



Pivot the caliper body up, and remove the pad pin and the brake pads.



Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure.

Install new brake pads with the pad pin and set them onto the pad spring properly.

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

Install the bracket pin bolt and tighten it.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug and tighten it.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

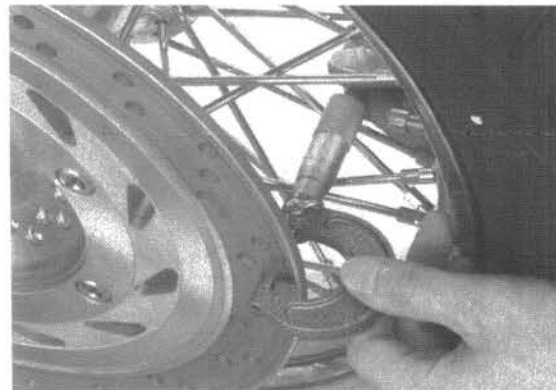
Operate the brake pedal to seat the caliper piston against the pads.

BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

SERVICE LIMIT: Front/Rear: 5.0 mm (0.20 in)



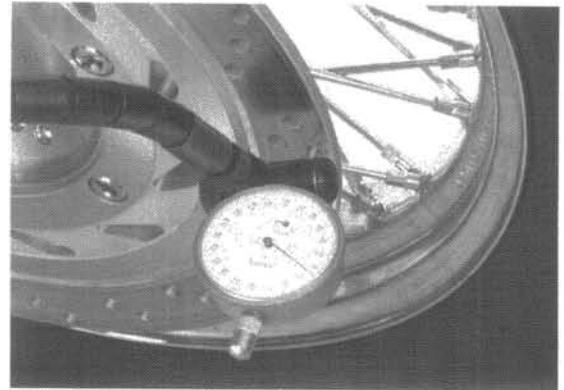
Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: Front/Rear: 0.30 mm (0.012 in)

Check the bearing for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the bearings are normal.

For brake disc replacement, see section 13 or 14.



FRONT MASTER CYLINDER

DISASSEMBLY

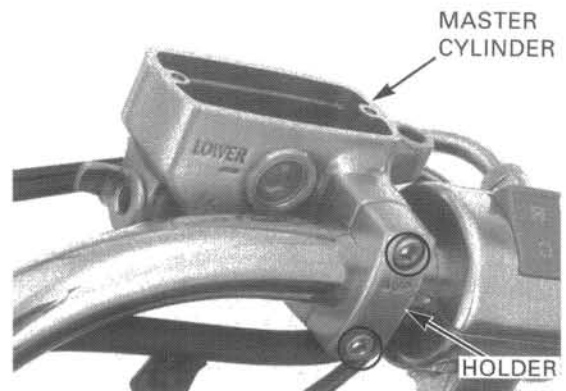
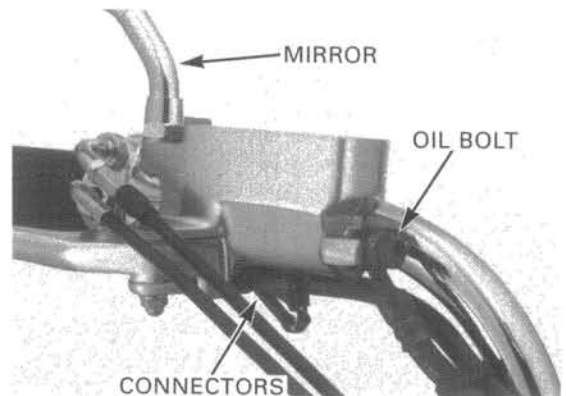
Drain the brake fluid from the hydraulic system (page 15-3).

Remove the following:

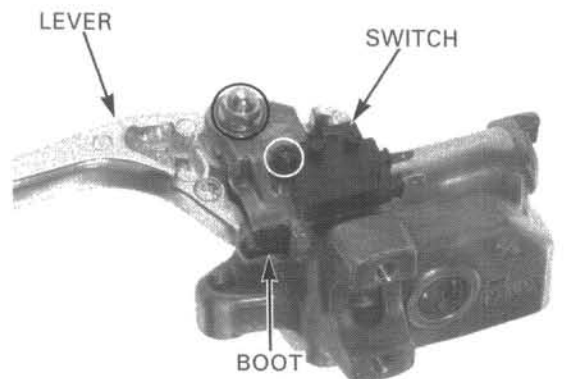
- brake light switch connectors
- rearview mirror
- oil bolt and sealing washers
- brake hose

When removing the oil bolt, cover the end of the hose to prevent contamination.

- two socket bolts
- master cylinder holder
- brake master cylinder



- screw and brake light switch
- pivot nut and bolt
- brake lever
- piston boot



HYDRAULIC DISC BRAKE

- snap ring

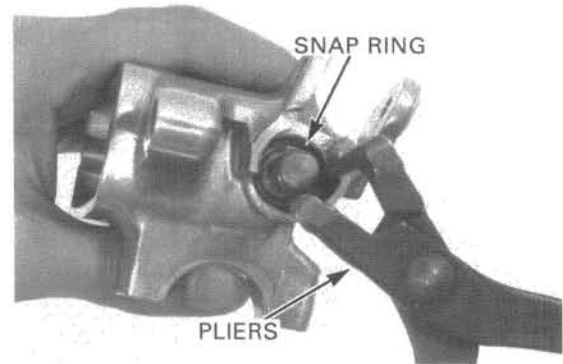
TOOL:

Snap ring pliers

07914-SA50001

- master piston
- spring

Clean the master cylinder, reservoir and master piston in clean brake fluid.



INSPECTION

Check the piston cups and boot for wear, deterioration or damage.

Check the spring for damage.

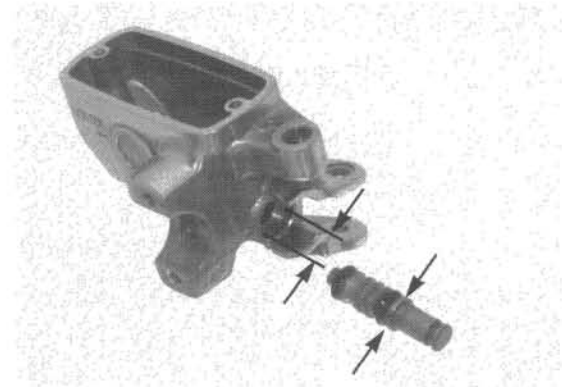
Check the master cylinder and piston for scoring, scratches or damage.

Measure the master cylinder I.D.

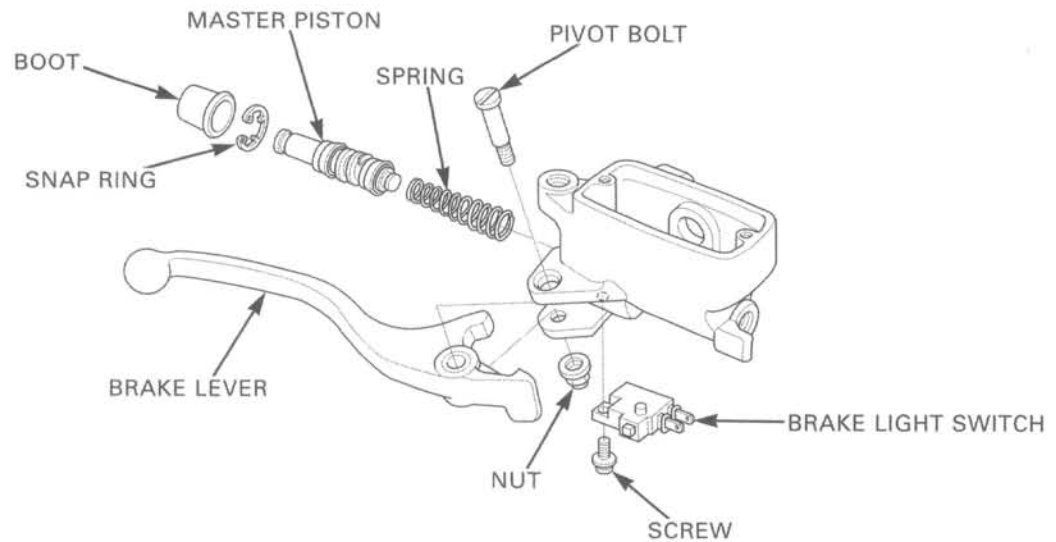
SERVICE LIMIT: 12.755 mm (0.5022 in)

Measure the master piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)

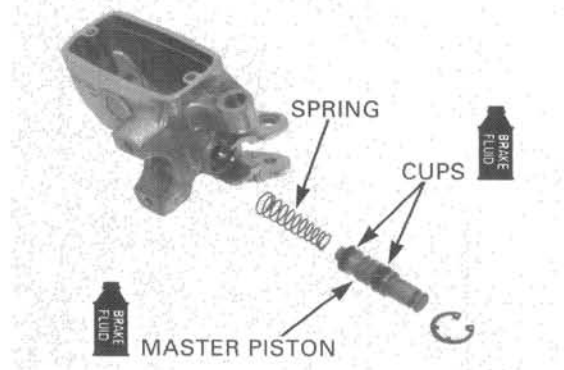


ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
 Install the spring onto the piston end.
 Install the master piston/spring into the master cylinder.

Do not allow the piston cup lips to turn inside out.



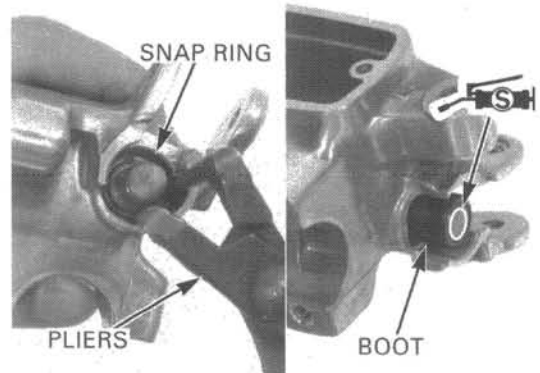
Make sure the snap ring is firmly seated in the groove.

Install the snap ring into the groove in the master cylinder.

TOOL:
Snap ring pliers 07914-SA50001

Install the boot into the master cylinder and the piston groove.

Apply silicone grease to the brake lever contacting surface of the piston.



Apply silicone grease to the brake lever pivot.
 Install the brake lever and pivot bolt, and tighten it.

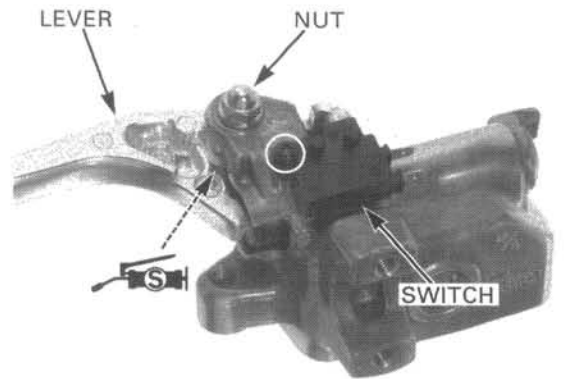
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Install the pivot nut and tighten it.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the brake light switch with the screw.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

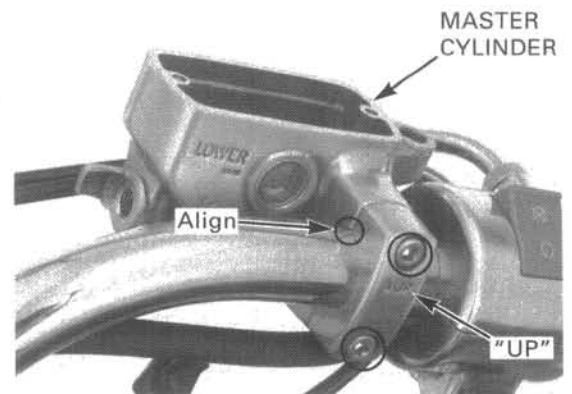


Install with the "UP" mark on the holder facing up.

Install the master cylinder with the holder and two bolts.

Align the edge of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



HYDRAULIC DISC BRAKE

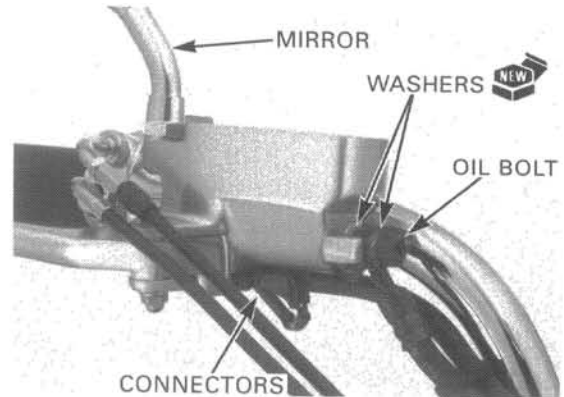
Connect the brake hose to the master cylinder with the oil bolt and new sealing washers. Be sure to rest the hose joint pin against the stopper. Tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the rearview mirror.

Connect the brake light switch connectors.

Fill and bleed the hydraulic system (page 15-4).



FRONT BRAKE CALIPER

DISASSEMBLY

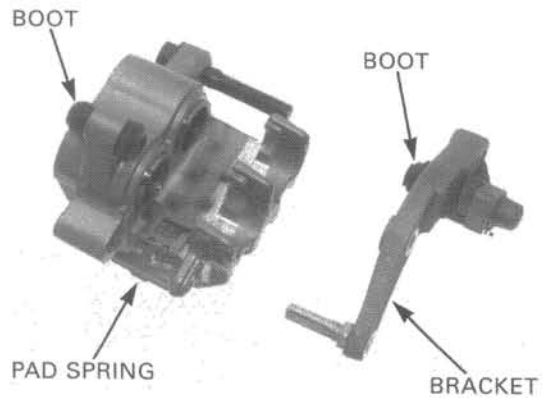
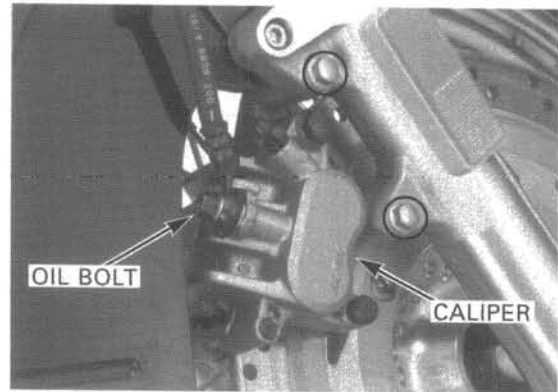
Drain the brake fluid from the hydraulic system (page 15-3).

Remove the brake pads (page 15-5).

Remove the following:

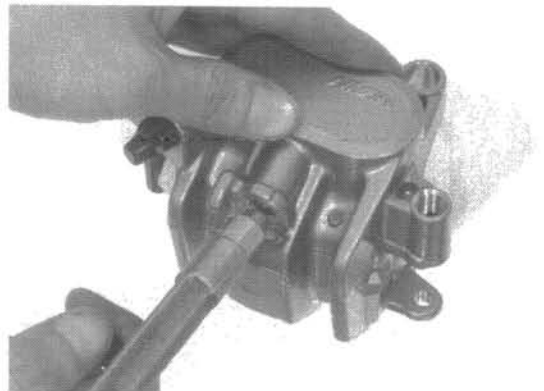
- oil bolt and sealing washers
- brake hose
- two mounting bolts
- brake caliper
- caliper bracket
- pad spring
- boots

When removing the oil bolt, cover the end of the hose to prevent contamination.



Do not use high pressure air or bring the nozzle too close to the inlet.

Place a shop towel over the pistons. Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



HYDRAULIC DISC BRAKE

Be careful not to damage the piston sliding surface.

Push the dust and piston seals in and lift them out.

Clean the seal grooves, caliper cylinders and pistons with clean brake fluid.



INSPECTION

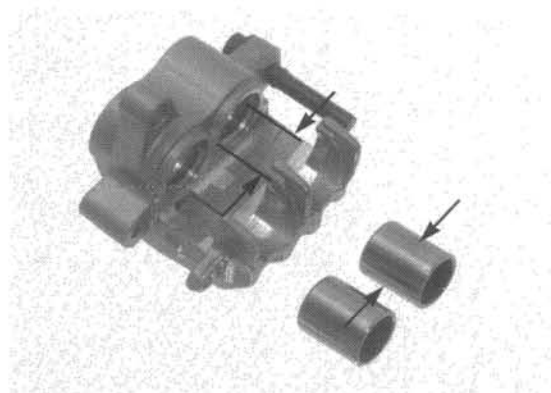
Check the caliper cylinders and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

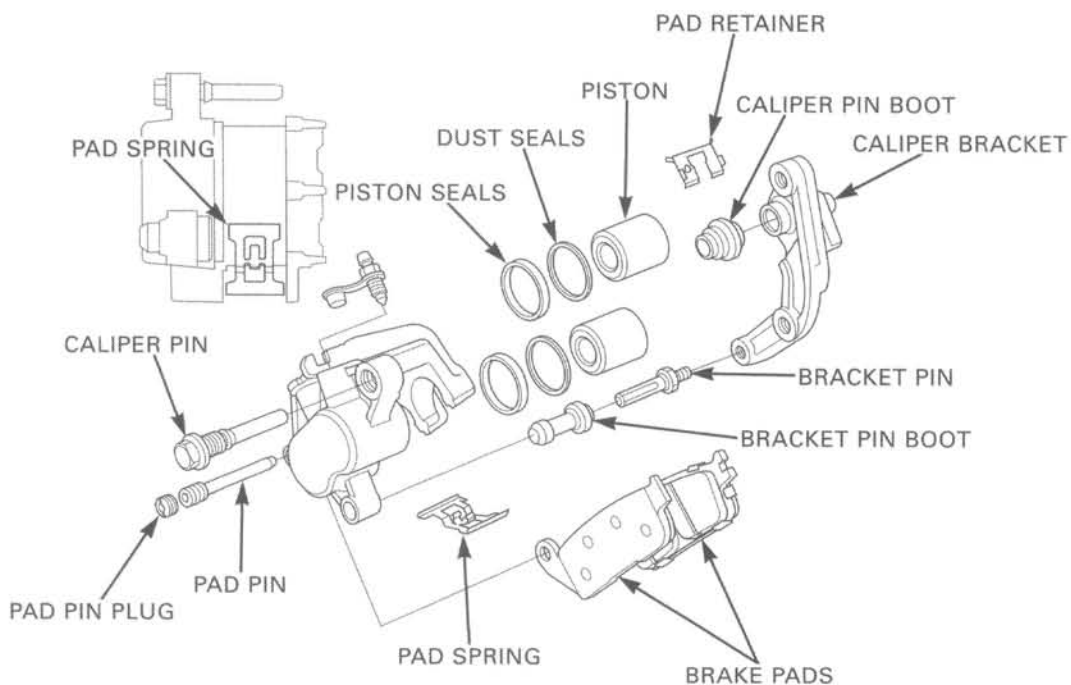
SERVICE LIMIT: 27.06 mm (1.065 in)

Measure the caliper piston O.D.

SERVICE LIMIT: 26.92 mm (1.060 in)



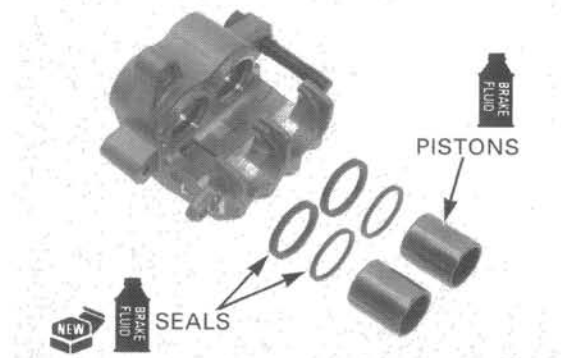
ASSEMBLY



HYDRAULIC DISC BRAKE

Coat new piston and dust seals with clean brake fluid and install them into the seal grooves in the caliper.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

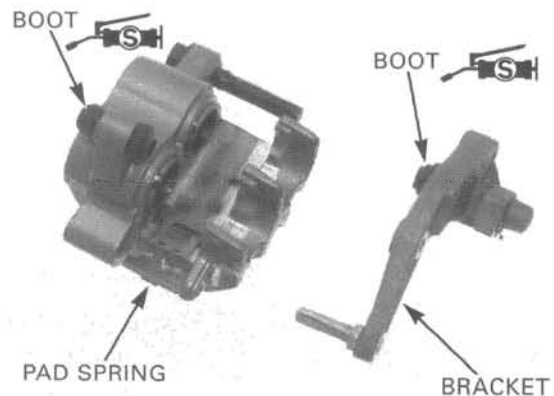


Check the caliper and bracket pin boots and replace them if they are hard, deteriorated or damaged. Install the boots into the caliper and bracket.

Install the pad spring onto the caliper body properly.

Apply silicone grease to the inside of the boots and install the caliper bracket over the caliper body.

Install the brake pads (page 15-5).



Install the brake caliper so the disc is positioned between the pads, being careful not to damage the pads. Install new mounting bolts and tighten them.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Connect the brake hose to the caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

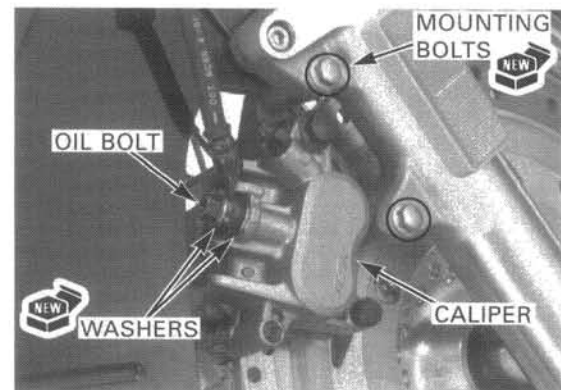
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug and tighten it.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

Fill and bleed the hydraulic system (page 15-4).



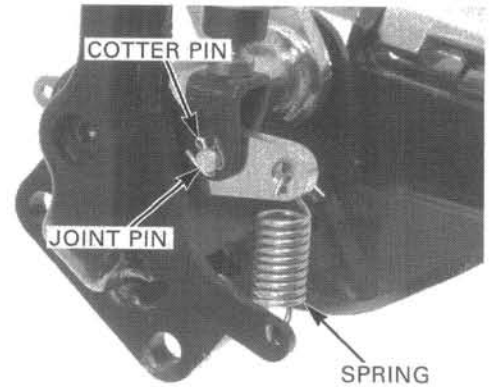
REAR MASTER CYLINDER/ BRAKE PEDAL

REMOVAL

Remove the right footrest assembly (page 2-4).

Remove the following:

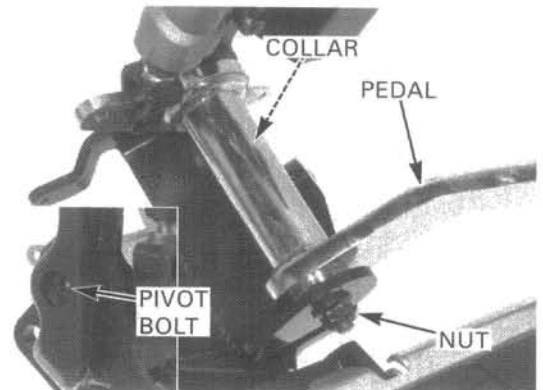
- return spring
- cotter pin
- joint pin



BRAKE PEDAL

Remove the following:

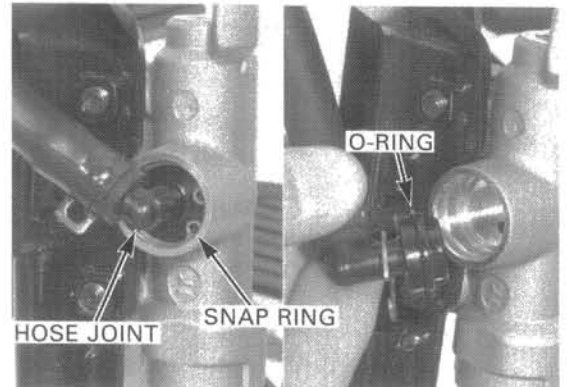
- pivot nut and bolt
- brake pedal
- pivot collar
- dust seals



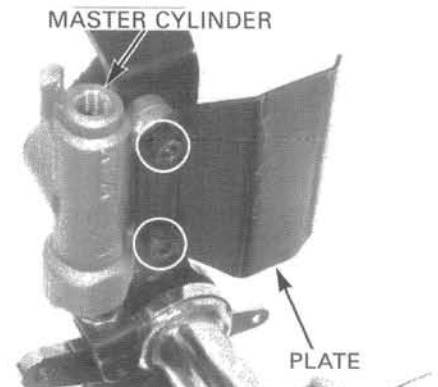
MASTER CYLINDER

Remove the following:

- snap ring
- reservoir hose joint
- O-ring



- two mounting bolts
- guard plate
- master cylinder



HYDRAULIC DISC BRAKE

MASTER CYLINDER DISASSEMBLY

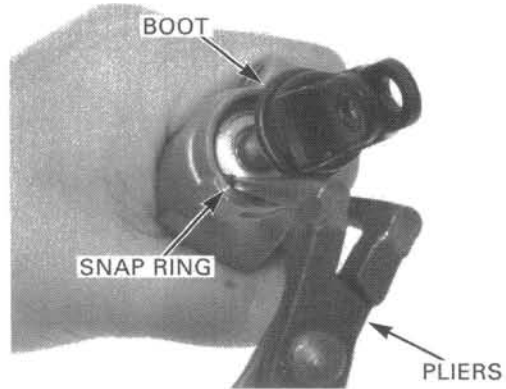
- Remove the following:
- boot (from the master cylinder)
 - snap ring

TOOL:

Snap ring pliers 07914-SA50001

- push rod assembly
- master piston
- spring

Clean the master cylinder and master piston in clean brake fluid.



INSPECTION

Check the piston cups and boot for wear, deterioration or damage.

Check the spring for damage.

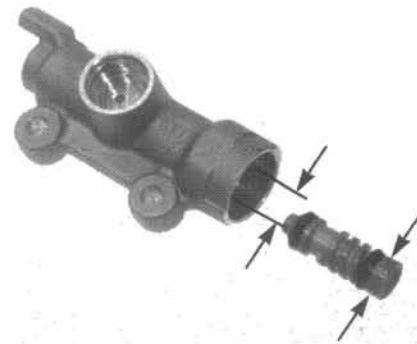
Check the master cylinder and piston for scoring, scratches or damage.

Measure the master cylinder I.D.

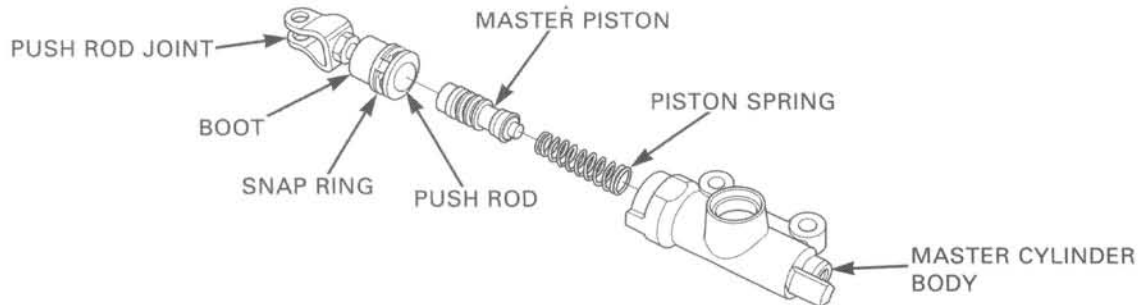
SERVICE LIMIT: 12.755 mm (0.5022 in)

Measure the master piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



MASTER CYLINDER ASSEMBLY

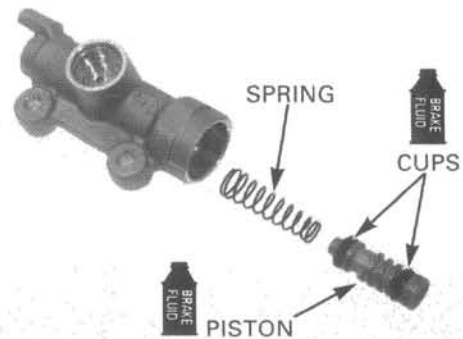


Coat the master piston and piston cups with clean brake fluid.

Install the spring onto the piston end.

Install the master piston/spring into the master cylinder.

Do not allow the piston cup lips to turn inside out.

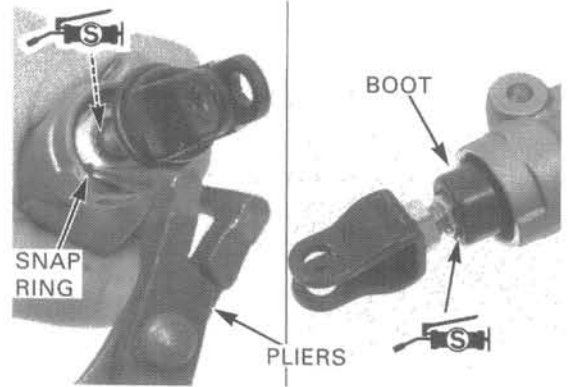


Make sure the snap ring is firmly seated in the groove.

Apply silicone grease to the piston contacting surface of the push rod.
Install the push rod assembly and the snap ring into the groove in the master cylinder.

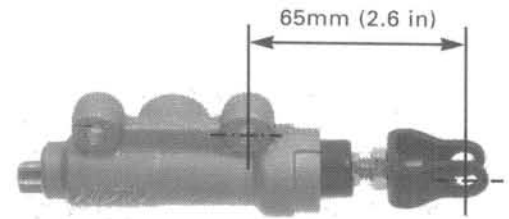
TOOL:
Snap ring pliers 07914-SA50001

Apply silicone grease to the boot groove in the push rod and install the boot into the master cylinder and boot groove.



If the push rod joint is reinstalled, adjust the push rod length so the distance from the center of the lower mounting bolt hole to the center of the joint pin hole is 65 mm (2.6 in). After adjustment, tighten the joint nut.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

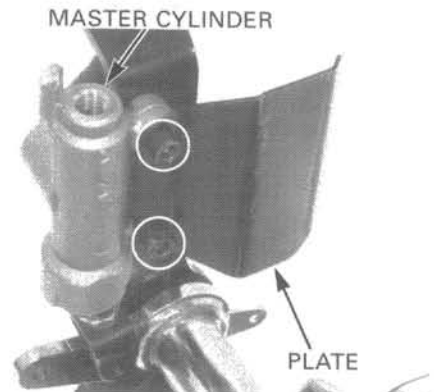


INSTALLATION

MASTER CYLINDER

Install the master cylinder onto the stay with the guard plate and two bolts.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

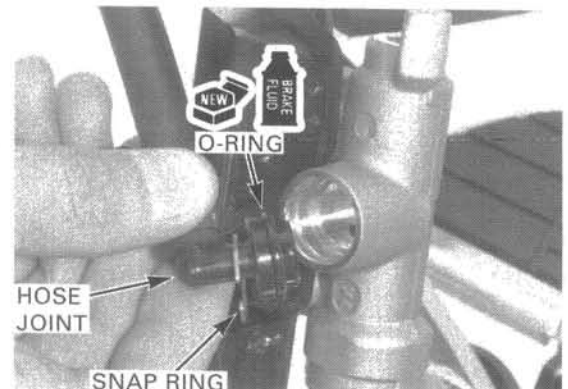


Make sure the snap ring is firmly seated in the groove.

Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.

Install the hose joint into the master cylinder and secure it with the snap ring.

Connect the brake pedal to the master cylinder (see next page).



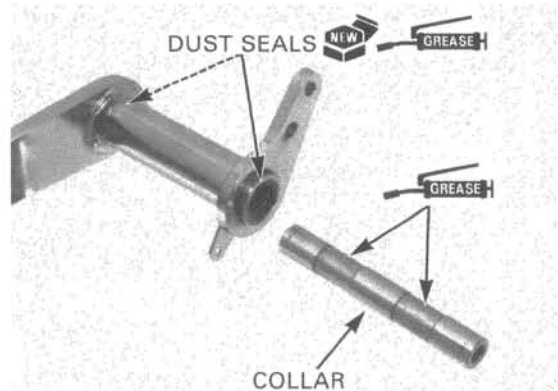
HYDRAULIC DISC BRAKE

BRAKE PEDAL

Apply grease to the lips of new dust seals and to the grooves of the pivot collar.

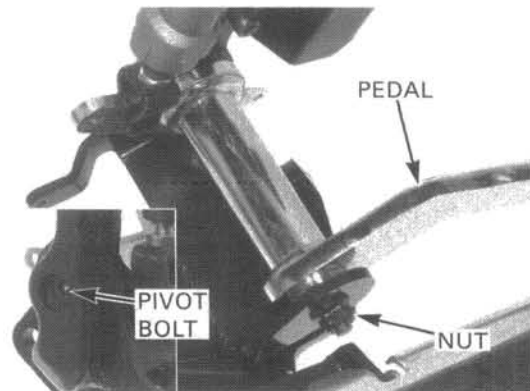
Install the dust seals into the pedal pivot with the flat side toward inside.

Install the pivot collar, being careful not to damage the seal lips.



Install the brake pedal and insert the pivot bolt through the stays and pedal. Install the pivot nut and tighten it while holding the footrest bracket securely.

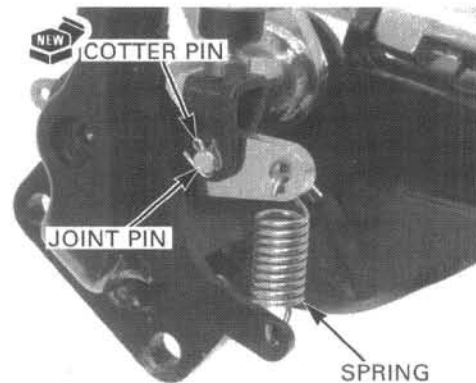
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Connect the brake pedal to the master cylinder with the joint pin and secure it with a new cotter pin.

Install the return spring in the direction as shown.

Install the right footrest assembly (page 2-4).



REAR BRAKE CALIPER

DISASSEMBLY

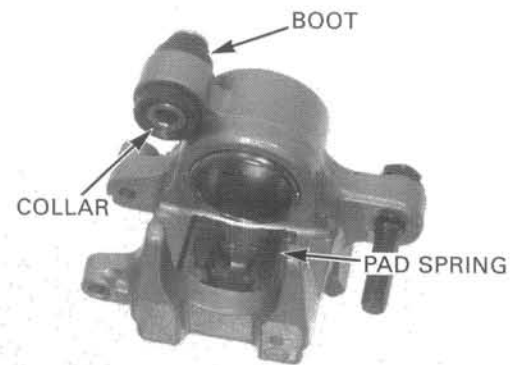
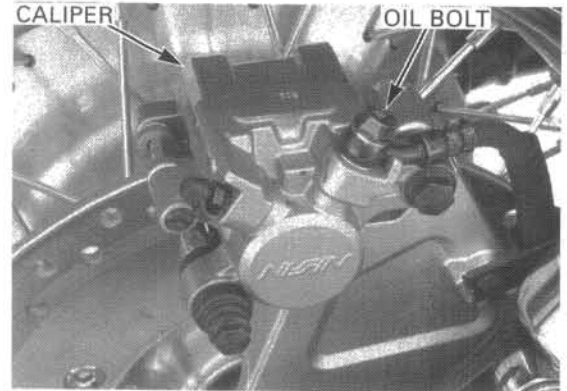
Drain the brake fluid from the hydraulic system (page 15-3).

When removing the oil bolt, cover the end of the hose to prevent contamination.

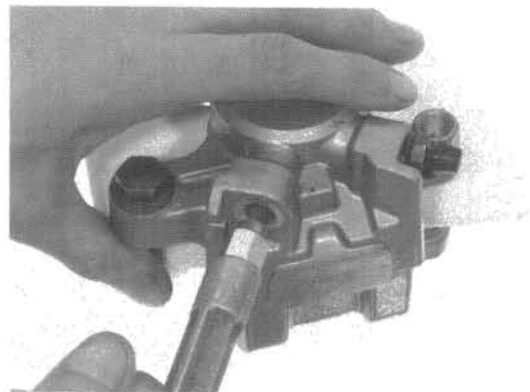
Remove the following:

- oil bolt and sealing washers
- brake hose
- brake pads (page 15-6)
- caliper body (from the bracket)

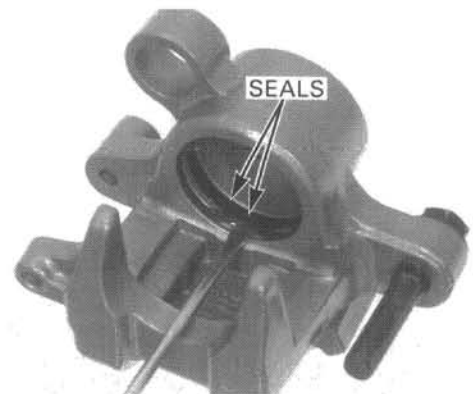
- pad spring
- collar
- boot



Do not use high pressure air or bring the nozzle too close to the inlet. Place a shop towel over the piston. Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the piston.



Be careful not to damage the piston sliding surface. Push the dust and piston seals in and lift them out. Clean the seal grooves, caliper cylinder and piston with clean brake fluid.



HYDRAULIC DISC BRAKE

INSPECTION

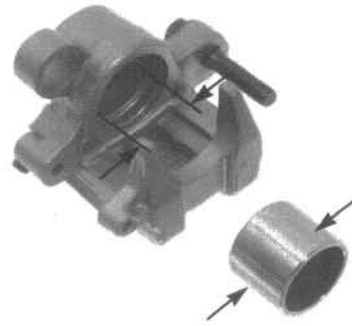
Check the caliper cylinder and piston for scoring, scratches or damage.

Measure the caliper cylinder I.D.

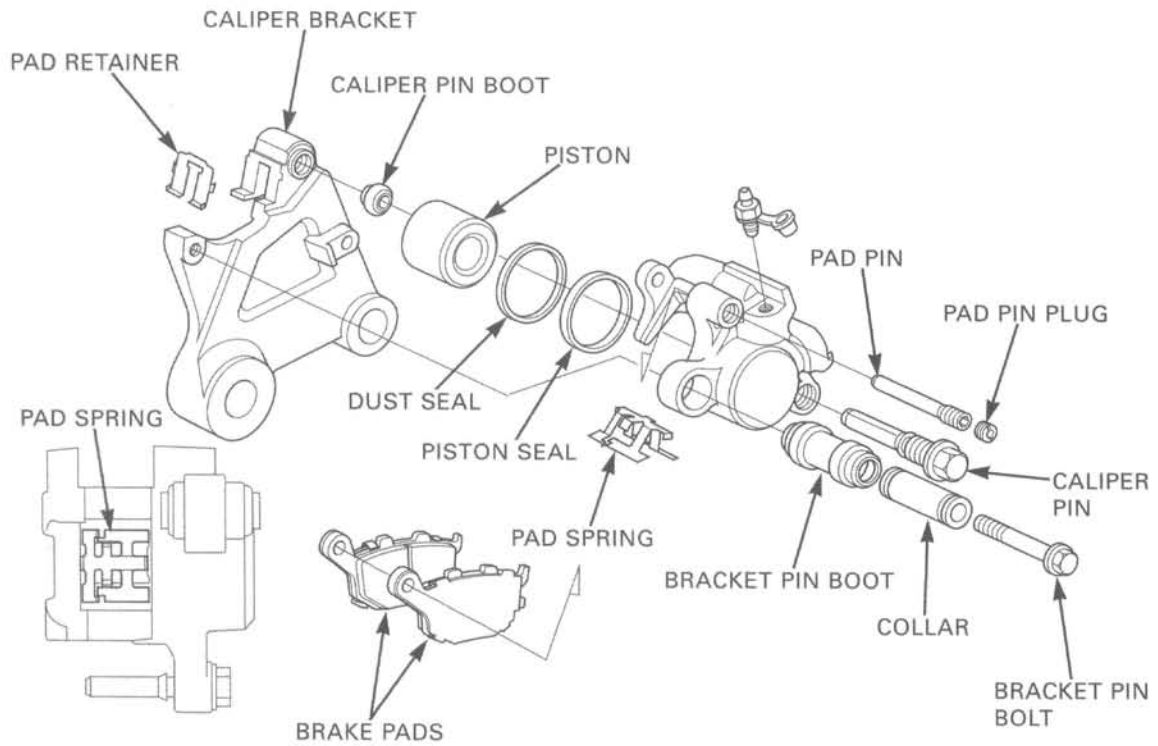
SERVICE LIMIT: 38.24 mm (1.506 in)

Measure the caliper piston O.D.

SERVICE LIMIT: 38.09 mm (1.500 in)



ASSEMBLY



Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the pads.

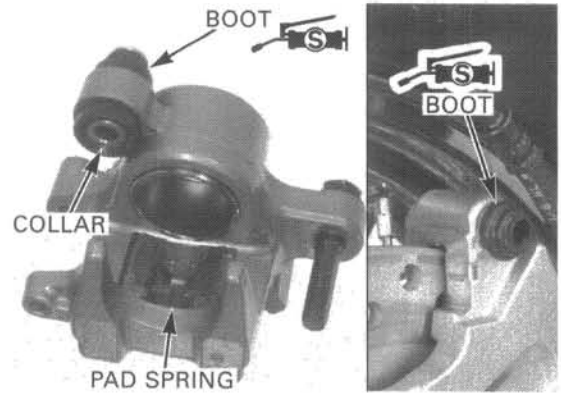


HYDRAULIC DISC BRAKE

Check the caliper and bracket pin boots and replace them if they are hard, deteriorated or damaged. Install the boots into the caliper and bracket.

Apply silicone grease to the inside of the boots and install the collar into the boot on the caliper.

Install the pad spring onto the caliper body properly as shown.



Install the caliper body onto the bracket.
Install the brake pads (page 15-6).

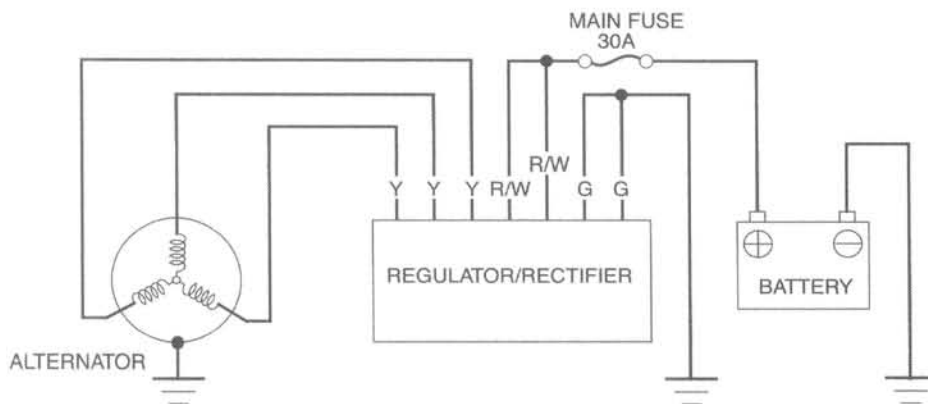
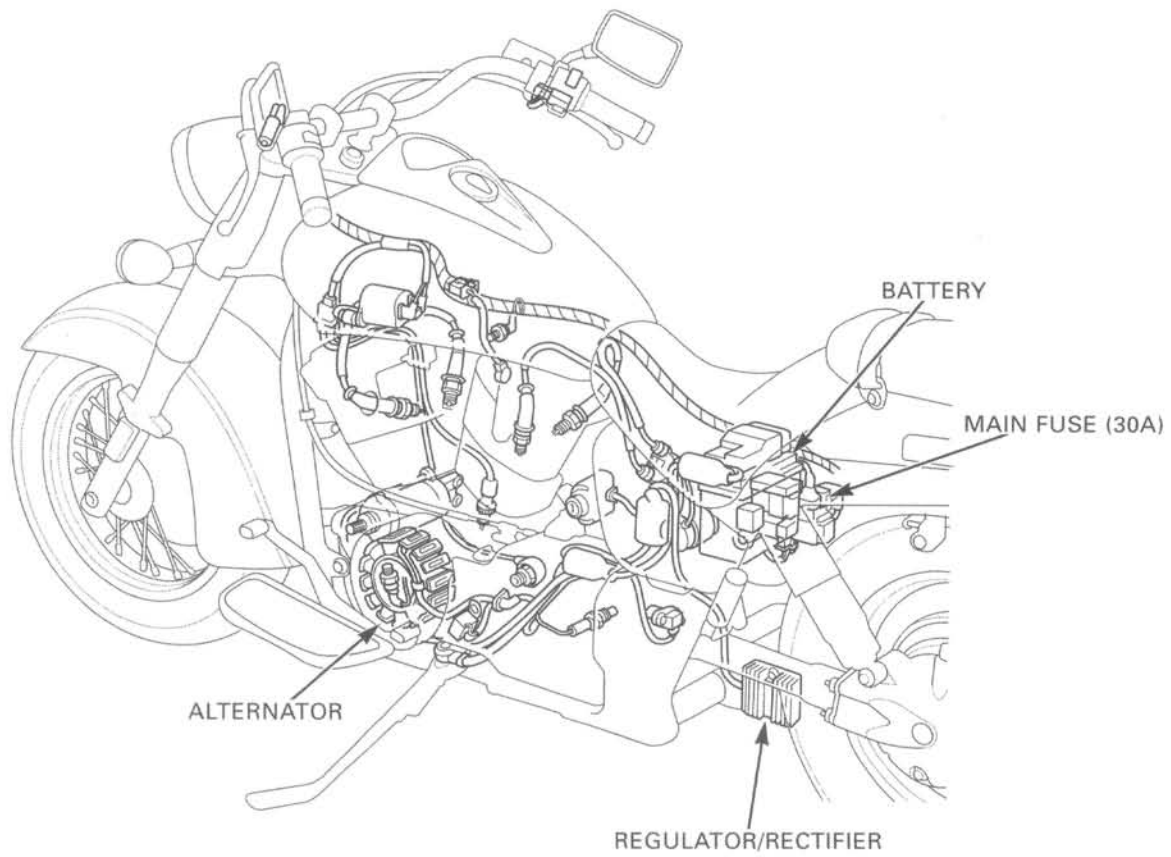
Connect the brake hose to the caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the hydraulic system (page 15-4).



BATTERY/CHARGING SYSTEM



Y: Yellow
G: Green
R: Red
W: White

16. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	16-1	CHARGING SYSTEM INSPECTION	16-7
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-8
BATTERY	16-4	ALTERNATOR	16-8

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery.
- The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free (MF) battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2—3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- The alternator service may be done with the engine in the frame.

16

BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
 - Use only the electrolyte that comes with the battery.
 - Use all of the electrolyte.
 - Seal the battery properly.
 - Never open the seals after installation.
- 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.

BATTERY/CHARGING SYSTEM

BATTERY TESTING

Refer to the battery tester's Operation Manual for the recommended battery testing procedure. The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

Recommended battery tester **BM-210-AH or BM-210**

SPECIFICATIONS

ITEM		STANDARD	
Battery	Capacity	12 V - 12 Ah	
	Current leakage	2 mA max.	
	Voltage (20°C/68°F)	Fully charged	13.0—13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.4 A x 5—10 h
Quick		6.0 A x 1.0 h	
Alternator	Capacity	364 W @ 5,000 rpm	
	Charging coil resistance (20°C/68°F)	0.22—0.34 Ω	

TORQUE VALUES

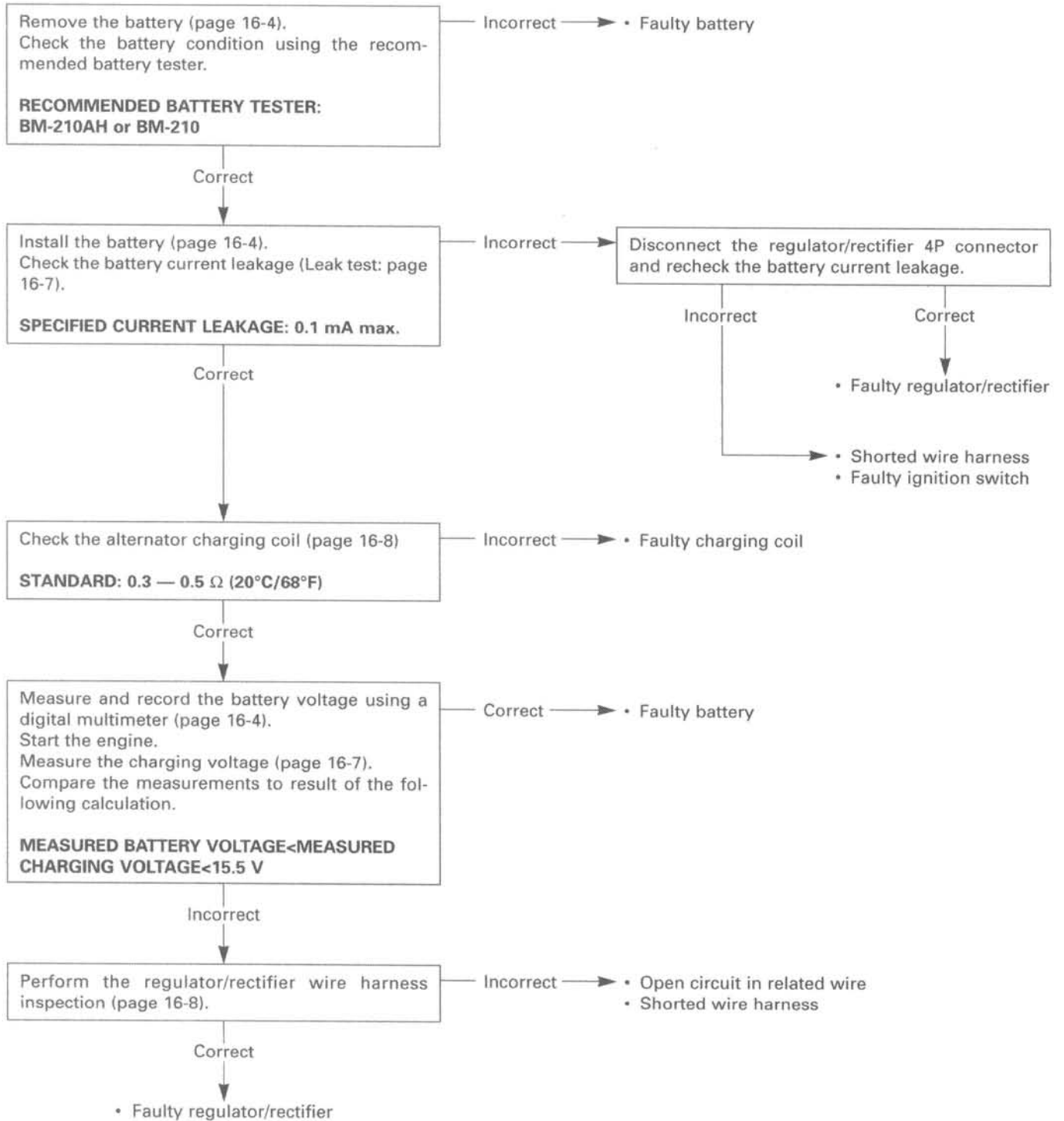
Left crankcase cover socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Stator mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Ignition pulse generator mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Alternator wire clamp bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.

TOOLS

Christie battery charger **MC1012/2 (U.S.A. only)**

TROUBLESHOOTING

Battery is damaged or weak



BATTERY/CHARGING SYSTEM

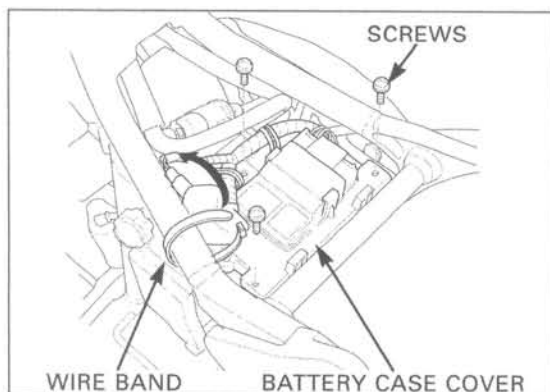
BATTERY

REMOVAL/INSTALLATION

Remove the seats (page 2-2).

Remove the wire band.

Remove the three screws and the battery case cover.



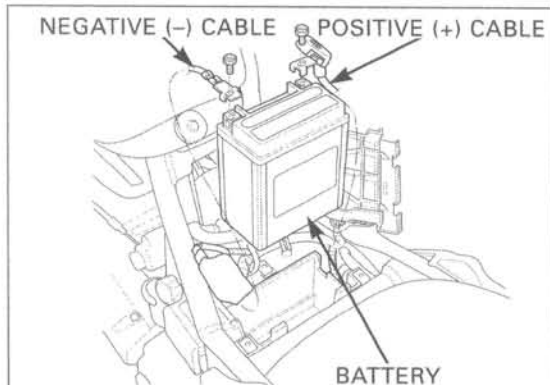
With the ignition switch turned to "OFF", disconnect the battery negative (-) cable first, then disconnect the battery positive (+) cable.

Remove the battery from the battery case.

Install the battery in the reverse order of removal.

NOTE

- Connect the positive (+) cable first, then connect the negative (-) cable.
- After connecting the battery cables, coat the terminals with grease.

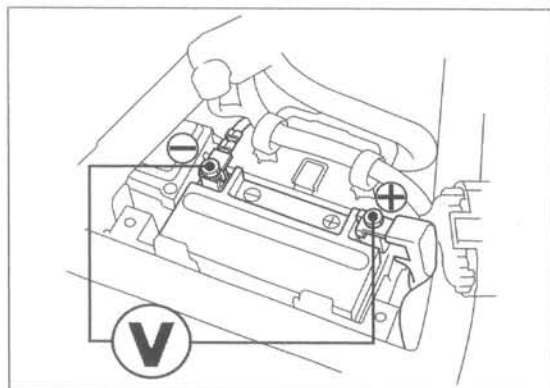


VOLTAGE INSPECTION

Remove the battery case cover.

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F): Fully charged: 13.0—13.2 V
Under charged: Below 12.3 V



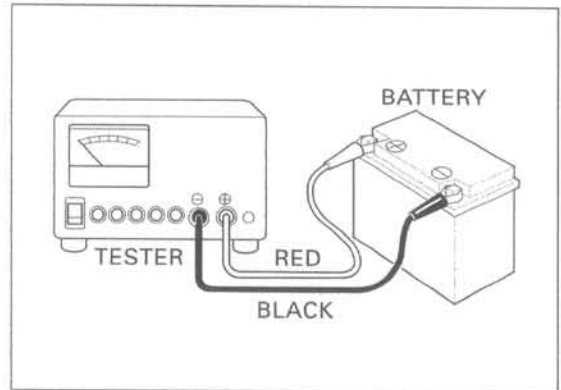
BATTERY TESTING

Remove the battery (page 16-4).

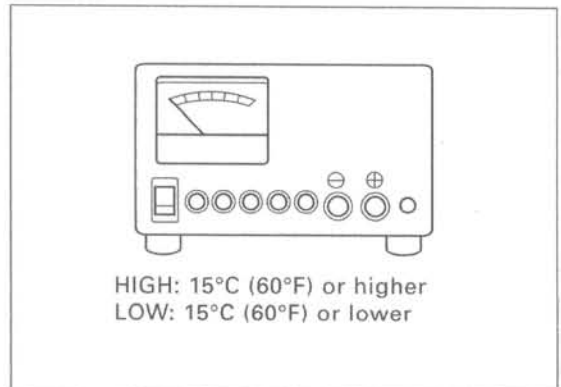
For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.

Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

TOOL:
Battery tester BM-210-AH or BM-210 (U.S.A. only)



Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.

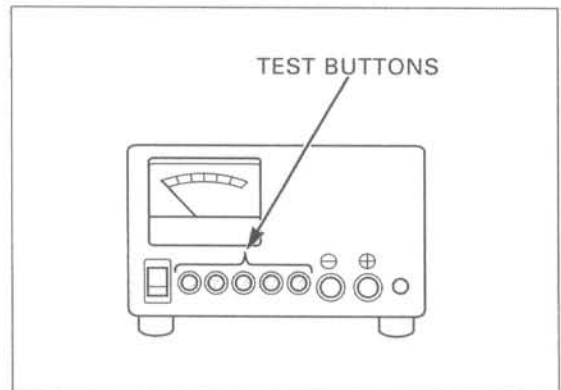


For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

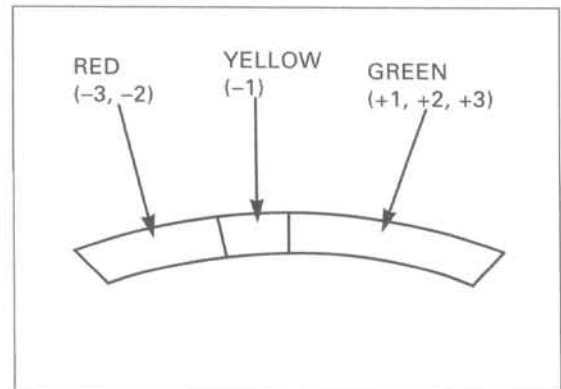
Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

NOTICE

- To avoid damaging the tester, only test batteries with an amperage rating of less than 30 Ah.
- Tester damage can result from overheating when:
 - The test button is pushed in for more than 3 seconds.
 - The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.
 - More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.



The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any battery reading in the green zone is OK. Batteries should only be charged if they register in the YELLOW or RED zone.



BATTERY/CHARGING SYSTEM

BATTERY CHARGING

Remove the battery (page 16-4).

NOTE:

- Make sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger – gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

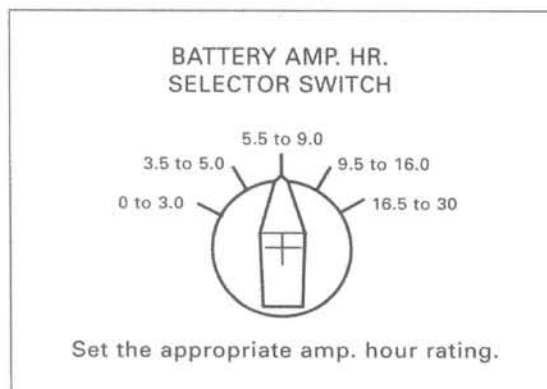
Turn the power ON/OFF at the charger, not at the battery terminals.

1. Turn the "POWER" switch to "OFF".
2. Set the "BATTERY AMP. HR. SELECTOR SWITCH" for the size of the battery being charged.

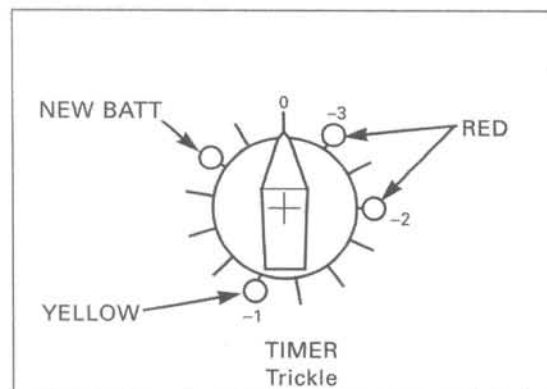
TOOL:

Christie battery charger

**MC1012/2
(U.S.A. only)**



3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED-3, RED-2 or YELLOW 1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: red to positive, black to negative.



Connecting the cables with the POWER switch turned to "ON" can produce a spark which could ignite or explode the battery.

Connect the battery cables only when the "POWER" switch is turned to "OFF".

5. Turn the "POWER" switch to "ON".
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" switch to "OFF" and disconnect the clamps.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Retest the battery using the Honda battery tester and recharge if necessary using the above steps.

The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.

CHARGING SYSTEM INSPECTION

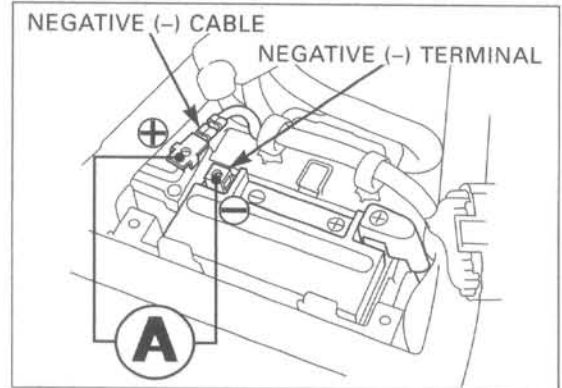
CURRENT LEAKAGE TEST

Remove the battery case cover (page 2-4).

With the ignition switch turned to "OFF", disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch turned to "OFF", check for current leakage.



NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition switch to "ON". A sudden surge of current may blow the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 2 mA maximum

If current leakage exceeds the specified value, a shorted circuit is the probable cause.

Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

NOTE:

- Make sure the battery is in good condition before performing this test.

Start the engine and warm it up to the operating temperature; then stop the engine.

Remove the battery case cover (page 2-4).

Connect the multimeter between the positive and negative terminals of the battery.

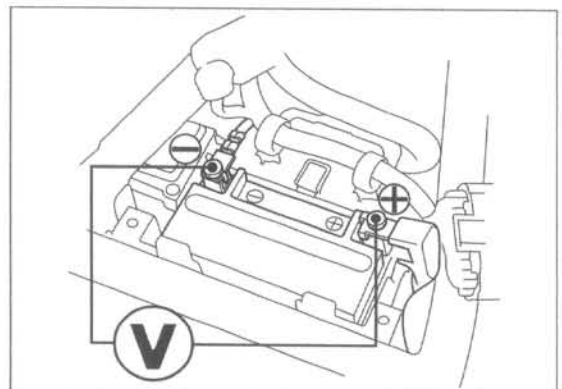
NOTE:

- To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on high beam, restart the engine. Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

STANDARD:

Measured battery voltage (page 16-4) < Measured charging voltage (see above) < 15.5 V



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.

BATTERY/CHARGING SYSTEM

WIRE HARNESS INSPECTION

BATTERY CHARGING LINE/GROUND LINE

Remove the seats (page 2-2).

With the ignition switch turned to "OFF", disconnect the regulator/rectifier 4P connector.

Measure the voltage between the Red/white wire terminal (+) of the wire harness side connector and ground (-).

There should be battery voltage at all times.

Check for continuity between the Green wire terminal of the wire harness side connector and ground (-). There should be continuity at all times.

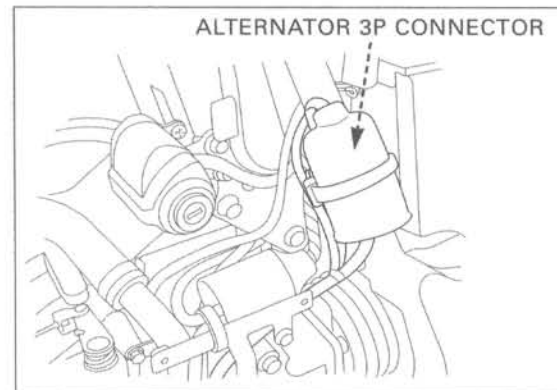
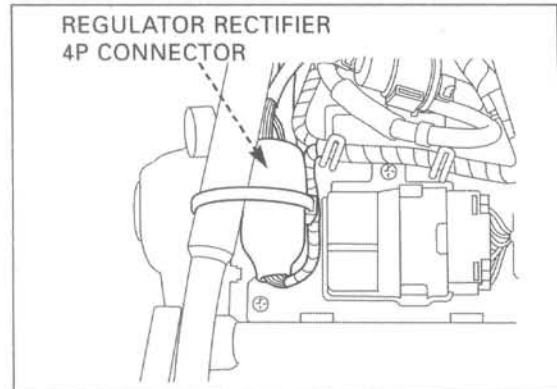
CHARGING COIL LINE

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

With the ignition switch turned to "OFF", disconnect the alternator 3P connector.

Measure the resistance between the Yellow wire terminals of the alternator side connector.

STANDARD: 0.3—0.5 Ω at 20°C (68°F)



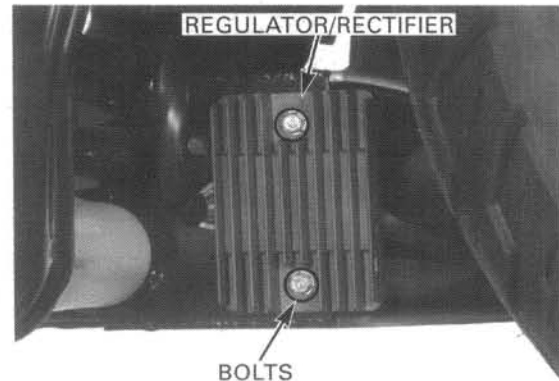
REGULATOR/RECTIFIER

REMOVAL/INSTALLATION

With the ignition switch turned to "OFF", disconnect the regulator/rectifier 4P connector and alternator 3P connector (see above).

Remove the two bolts and the regulator/rectifier.

Install the regulator/rectifier in the reverse order of removal.



ALTERNATOR

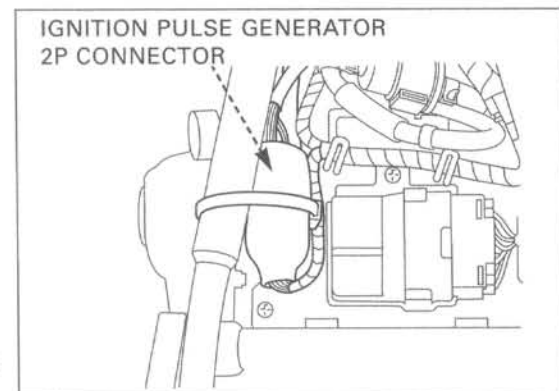
LEFT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-10).

Remove the following:

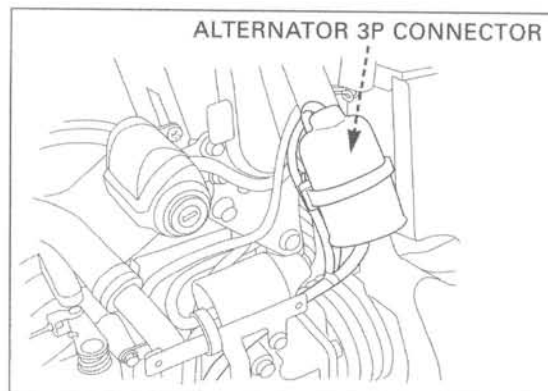
- seats (page 2-2)
- left side cover (page 2-2)
- left crankcase rear cover (page 2-3)
- left footrest (page 2-4)

With the ignition switch turned to "OFF", disconnect the ignition pulse generator 2P connector.

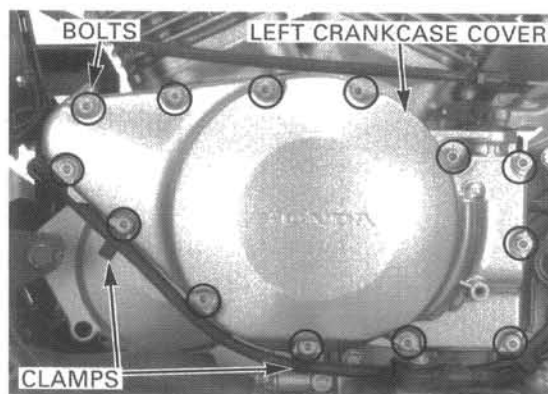


BATTERY/CHARGING SYSTEM

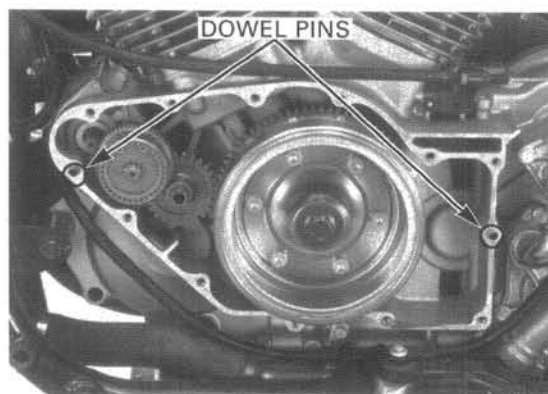
With the ignition switch turned to "OFF", disconnect the alternator 3P connector.



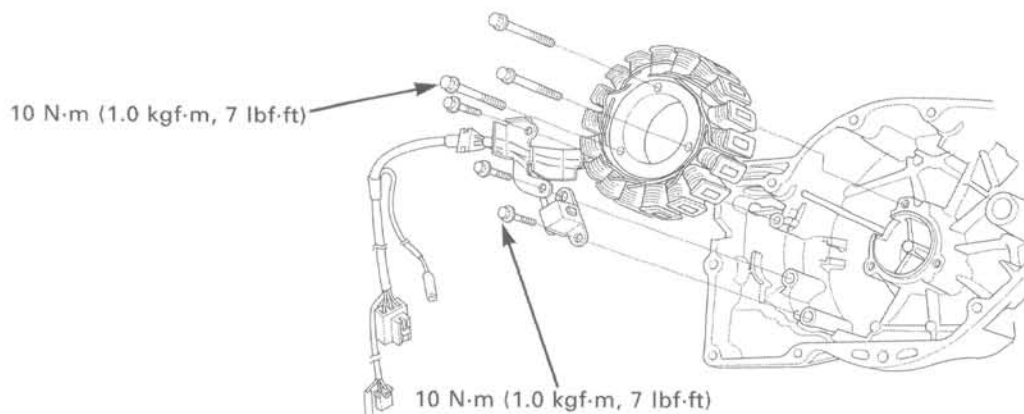
Remove the 13 socket bolts, two cable clamps and the left crankcase cover.



Remove the two dowel pins.



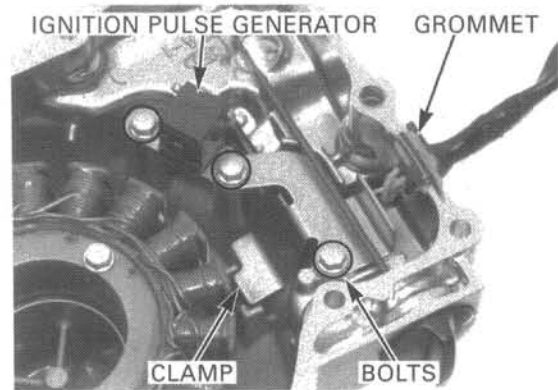
STATOR REMOVAL



BATTERY/CHARGING SYSTEM

Remove the bolts, wire clamp and ignition pulse generator from the left crankcase cover.

Remove the wire grommet from the left crankcase cover groove.

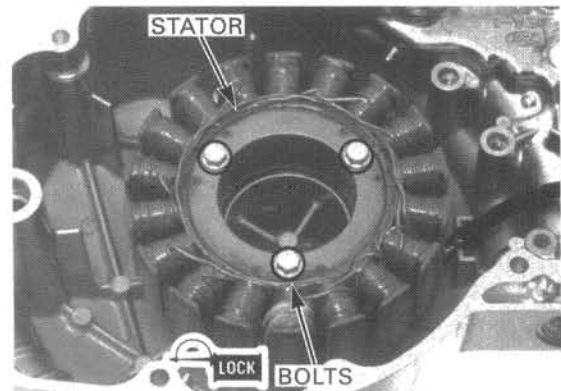


Remove the bolts and stator from the left crankcase cover.

STATOR INSTALLATION

Install the stator onto the left crankcase cover. Apply locking agent to the stator mounting bolt threads. Install the mounting bolts and tighten them.

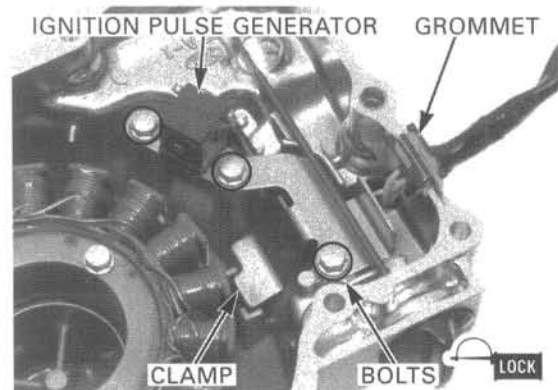
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Apply sealant to the wire grommet seating surface and install it into the left crankcase cover groove.

Apply locking agent to the ignition pulse generator and wire clamp mounting bolt threads. Install the ignition pulse generator, wire clamp and mounting bolts, and tighten the bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

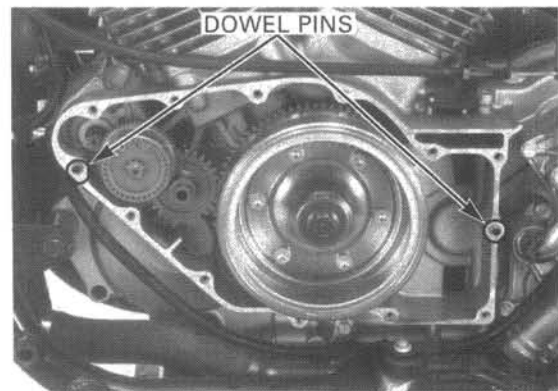


LEFT CRANKCASE COVER INSTALLATION

Be careful not to damage the mating surfaces.

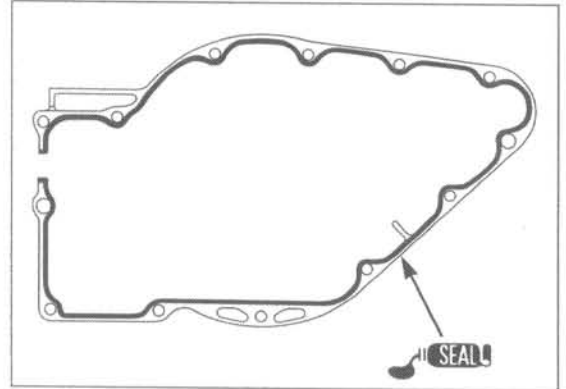
Clean the mating surfaces of the left crankcase cover and left crankcase thoroughly.

Install the two dowel pins.



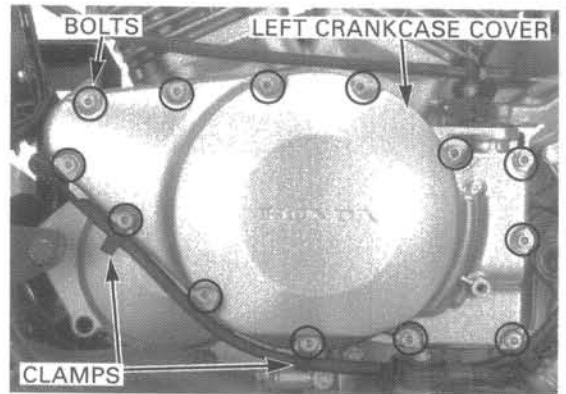
BATTERY/CHARGING SYSTEM

Apply sealant to the left crankcase mating surface as shown.



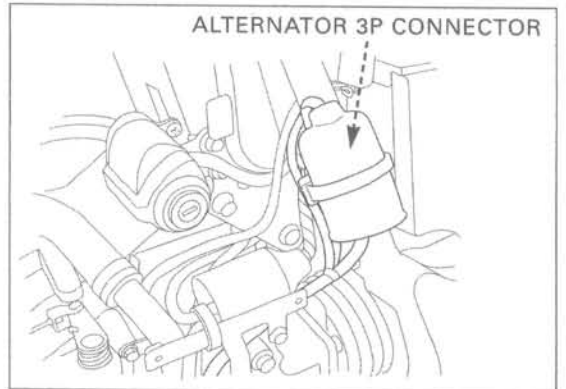
Install the left crankcase cover, two wire clamps and thirteen bolts, and tighten the bolts in a crisscross pattern in two or three steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Route the alternator wire properly (page 1-19).

Connect the alternator 3P connector.

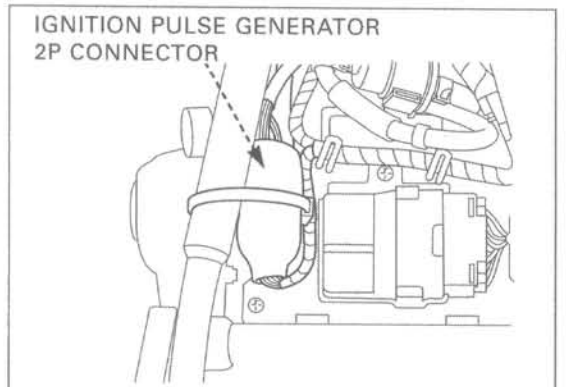


Connect the ignition pulse generator 2P connector.

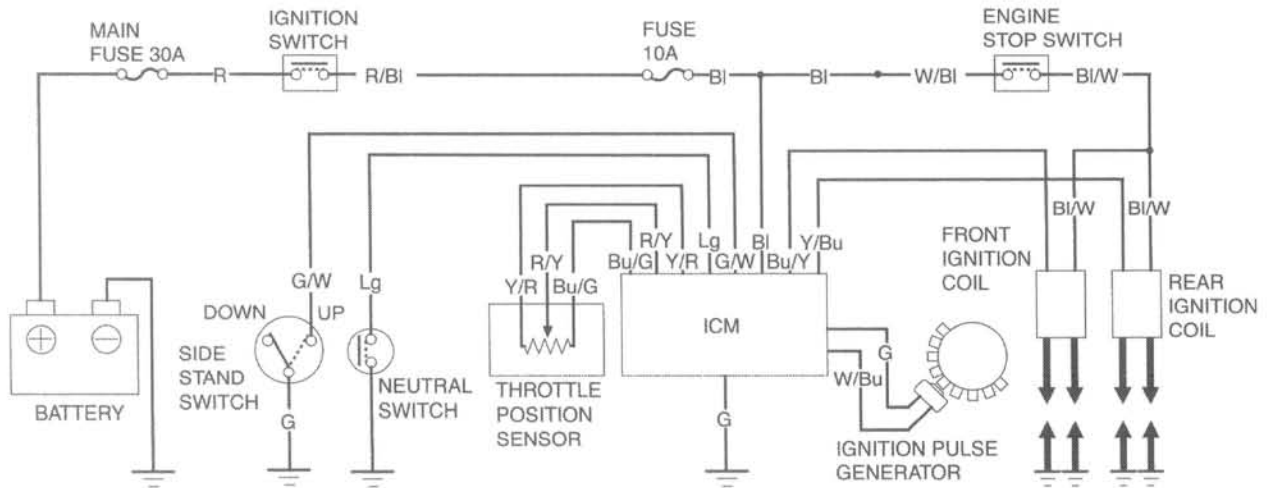
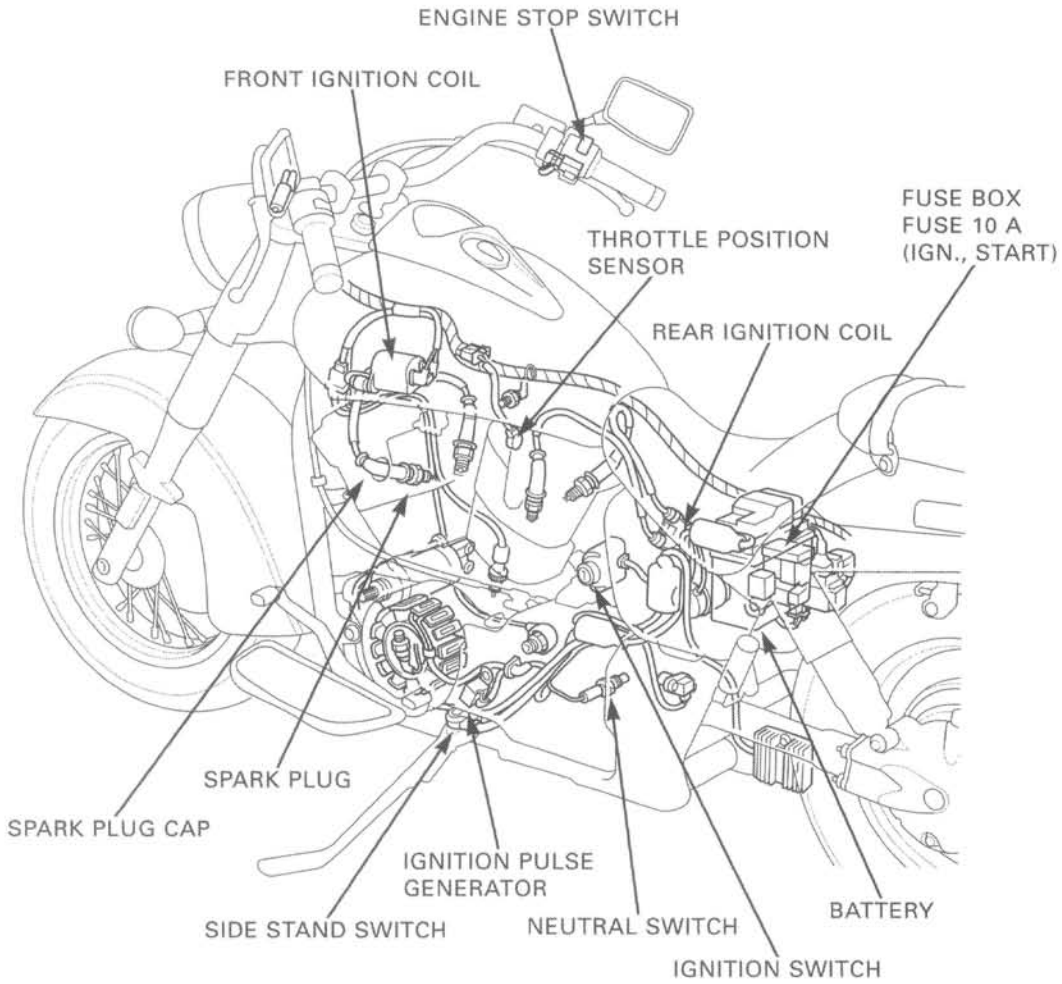
Install the following:

- left footrest (page 2-4)
- left crankcase rear cover (page 2-3)
- left side cover (page 2-2)
- seats (page 2-2)

Fill the crankcase with the recommended engine oil (page 3-11).



IGNITION SYSTEM



- R: Red
- Bi: Black
- Bu: Blue
- Y: Yellow
- Lg: Light green
- G: Green
- W: White

17. IGNITION SYSTEM

SERVICE INFORMATION	17-1	IGNITION COIL	17-5
TROUBLESHOOTING	17-2	IGNITION TIMING	17-7
IGNITION SYSTEM INSPECTION	17-3	THROTTLE POSITION SENSOR	17-8

SERVICE INFORMATION

GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table on page 17-2.
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ignition control module (ICM) varies ignition timing according to the engine speed. The throttle sensor signals the ICM to compensate the ignition timing according to the throttle opening.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ICM. Always turn the ignition switch to "OFF" before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- Use spark plugs with the correct heat range. Using spark plugs with an incorrect heat range can damage the engine.
- For spark plug inspection, see page 3-6.
- For ignition pulse generator removal/installation, see page 16-8.
- See section 19 for the following components:
 - Ignition switch
 - Engine stop switch
 - Gear position switch switch
 - Side stand switch

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	DCPR6E (NGK), XU20EPR-U (DENSO)
	For extended high speed riding	DCPR7E (NGK), XU22EPR-U (DENSO)
Spark plug gap		0.8–0.9 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)		4.1° BTDC at idle

17

TORQUE VALUES

Timing hole cap cover socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Timing hole cap	14 N·m (1.4 kgf·m, 10 lbf·ft) Apply grease to the threads.

TOOL

Peak voltage tester (U.S.A. only) or Peak voltage adaptor	07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 M Ω /DCV minimum) or MTP-08-0193 (U.S.A. only)
IgnitionMate peak voltage tester	

IGNITION SYSTEM

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug.
 - Loose spark plug cap or spark plug wire connections.
 - Water in the spark plug cap (Leaking the ignition coil secondary voltage).
- If there is no spark at any cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned to "ON" and the engine stop switch turned to "○". (The engine is not cranked by the starter motor.)

No spark at spark plugs

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned to "ON" and the engine stop switch at "○". (Other electrical components are normal.)	<ol style="list-style-type: none"> 1. Faulty engine stop switch. 2. Open circuit in Black/white wire between the engine stop switch and ignition coil. 3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil. 4. Faulty ignition control module (ICM) (in case when the initial voltage is normal with the ICM connector disconnected).
	Initial voltage is normal, but it drops by 2–4 volts while cranking the engine.	<ol style="list-style-type: none"> 1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Battery is undercharged. (Voltage drops largely when the engine is started.) 3. No voltage at the Black wire of the ICM connector, or loose or poorly connected ICM connector. 4. Loose or poor connection or an open circuit in Green wire of the ICM. 5. Loose or poor connection or an open circuit in Blue/yellow or Yellow/blue wire between the ignition coils and ICM. 6. A short circuit in the ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. Loose or poor connection or an open circuit in No. 7 related wires. <ul style="list-style-type: none"> • Side stand switch line: Green/white wire • Neutral switch line: Light green wire 9. Faulty ignition pulse generator. (Measure peak voltage.) 10. Faulty ICM (in case when above No. 1 through 9 are normal).
	Initial voltage is normal but there is no peak voltage while cranking the engine.	<ol style="list-style-type: none"> 1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Faulty peak voltage adaptor. 3. Faulty ICM (in case when above No. 1 and 2 are normal).
	Initial voltage is normal but peak voltage is lower than the standard value.	<ol style="list-style-type: none"> 1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ICM (in case when above No. 1 through 3 are normal).
	Initial and peak voltages are normal but no spark jumps.	<ol style="list-style-type: none"> 1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
Ignition pulse generator	Peak voltage is lower than the standard value.	<ol style="list-style-type: none"> 1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (in case when above No. 1 through 3 are normal).
	No peak voltage.	<ol style="list-style-type: none"> 1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

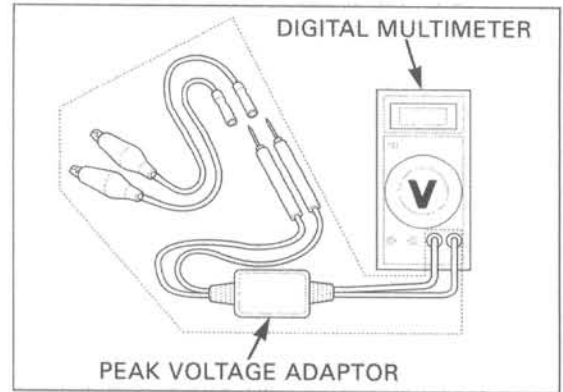
NOTE:

- If there is no spark present at the plugs, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter (impedance 10 MΩ/DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter or use the peak voltage tester.

TOOLS:

- Peak voltage tester (U.S.A. only) or
- Peak voltage adaptor 07HGJ-0020100
(not available in U.S.A.)
- with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum) or
- IgnitionMate peak voltage tester
MTP-08-0193
(U.S.A. only)



IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Remove the following:

- seats (page 2-2)
- cylinder head cover shrouds (page 2-2)

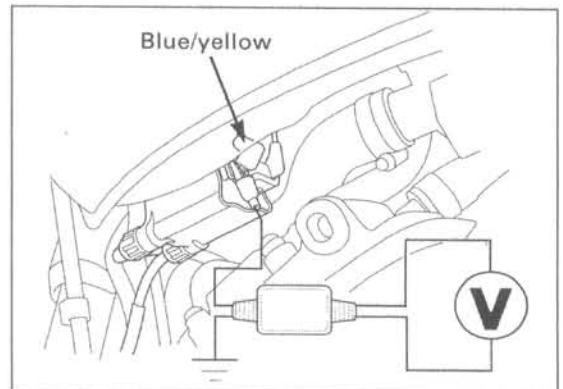
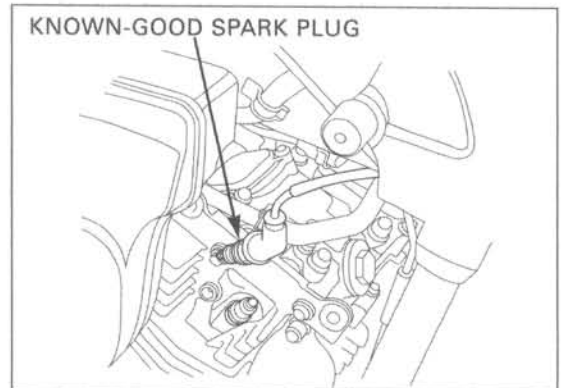
Disconnect all spark plug caps from the spark plugs. Connect known-good spark plugs to all spark plug caps and ground them to the cylinder heads as done in a spark test.

Front: With the ignition coil primary wires connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and ground.

TOOLS:

- Peak voltage tester (U.S.A. only) or
- Peak voltage adaptor 07HGJ-0020100
(not available in U.S.A.)
- with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum) or
- IgnitionMate peak voltage tester
MTP-08-0193
(U.S.A. only)

CONNECTION: Blue/yellow (+) — ground (-)



IGNITION SYSTEM

Rear: With the rear ignition coil 2P connector connected, connect the peak voltage tester or adaptor probes to the 2P connector terminal and ground.

CONNECTION: Yellow/blue (+) — ground (-)

Turn the ignition switch to "ON" with the engine stop switch at "O".
Check the initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, follow the checks in the troubleshooting table (page 17-2).

Shift the transmission into neutral.
Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

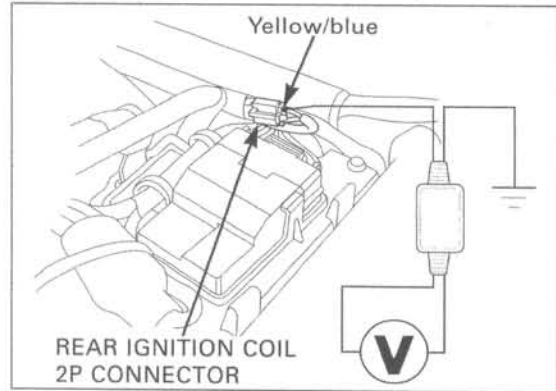
PEAK VOLTAGE: 100 V minimum

NOTE:

Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the standard value, follow the checks in the troubleshooting table (page 17-2).

Install the removed parts in the reverse order of removal.



Avoid touching the spark plugs and tester probes to prevent electric shock.

IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

- Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Remove the seats (page 2-2).

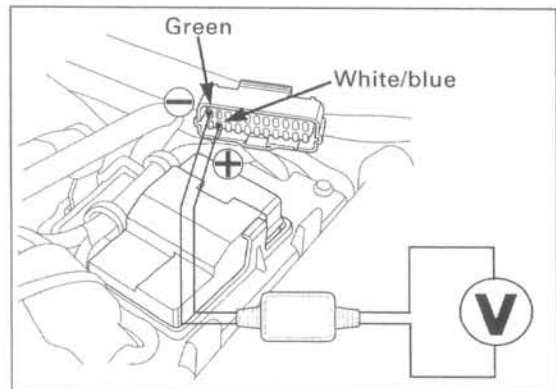
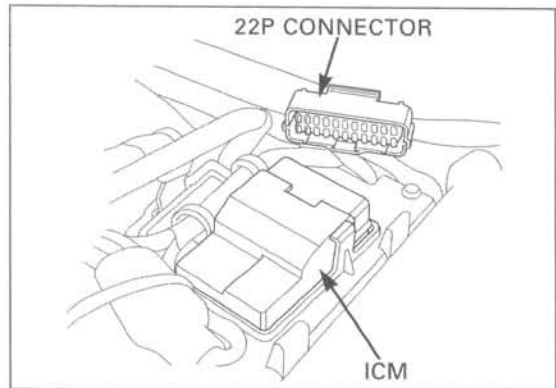
Remove the ignition control module (ICM) from the battery case cover and disconnect the ICM 22P connector.

Connect the peak voltage tester or adaptor probes to the wire harness side ICM connector terminals.

CONNECTION: White/blue (+) — Green (-)

Turn the ignition switch to "ON" with the engine stop switch at "O".
Shift the transmission into neutral.
Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 0.7 V minimum



If the voltage measured at the ICM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

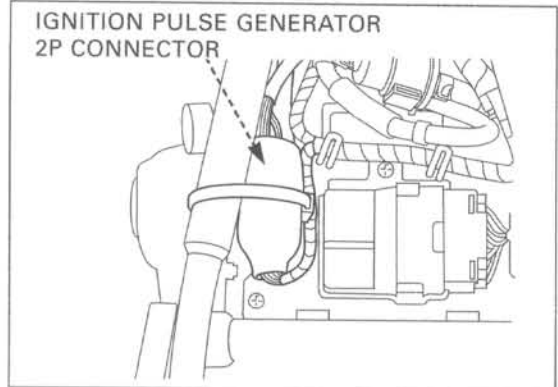
Turn the ignition switch to "OFF".

Disconnect the ignition pulse generator 2P connector and connect the peak voltage tester or adaptor probes to the connector terminals of the ignition pulse generator side.

In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open or short circuit, or loose connection.
- If the peak voltage is lower than standard value, follow the checks in the troubleshooting table (page 17-2).

Install the removed parts in the reverse order of removal.



IGNITION COIL

FRONT IGNITION COIL

REMOVAL

Remove the following:

- front cylinder head cover shrouds (page 2-2)
- fuel tank (page 2-3)
- right steering side cover (page 2-3)

Remove the front cylinder spark plug caps from the spark plugs.

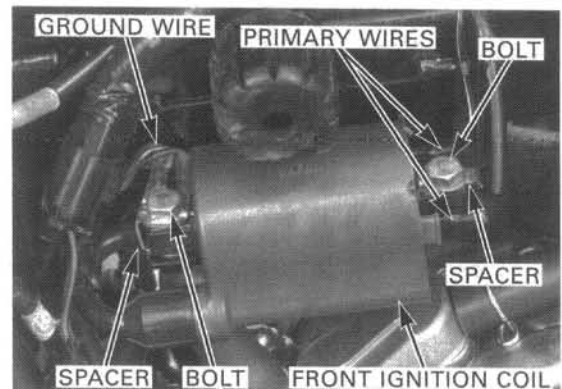
Remove the bolts, ground wire terminal, metal spacers and front ignition coil from the bracket.

Disconnect the ignition coil primary wires from the front ignition coil.

INSTALLATION

Install the front ignition coil in the reverse order of removal.

Route the spark plug wires properly (page 1-19).



IGNITION SYSTEM

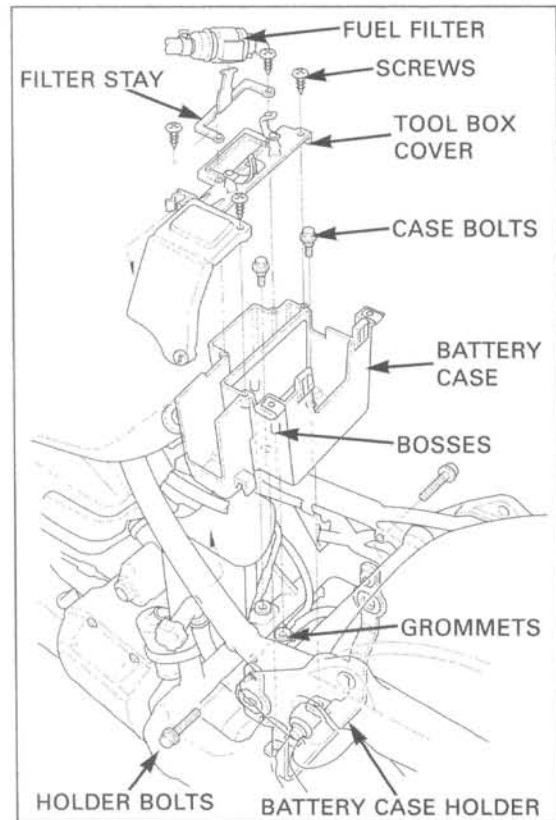
REAR IGNITION COIL

REMOVAL

Remove the following:

- both side covers (page 2-2)
- rear cylinder head cover shrouds (page 2-2)
- fuel tank (page 2-3)
- ignition control module (page 17-4)
- case cover (page 16-4)

- fuel filter from the stay
- three screws
- fuel filter stay
- tool box cover
- two battery case mounting bolts
- two battery case holder mounting bolts
- battery case from the frame



- rear cylinder spark plug caps
- spark plug wires from the clamps
- fuel pump from the center cover
- two bolts
- rear ignition coil from the center cover

Disconnect the ignition coil primary wires from the rear coil.

INSTALLATION

Make sure the heat protector rubber is installed in position.

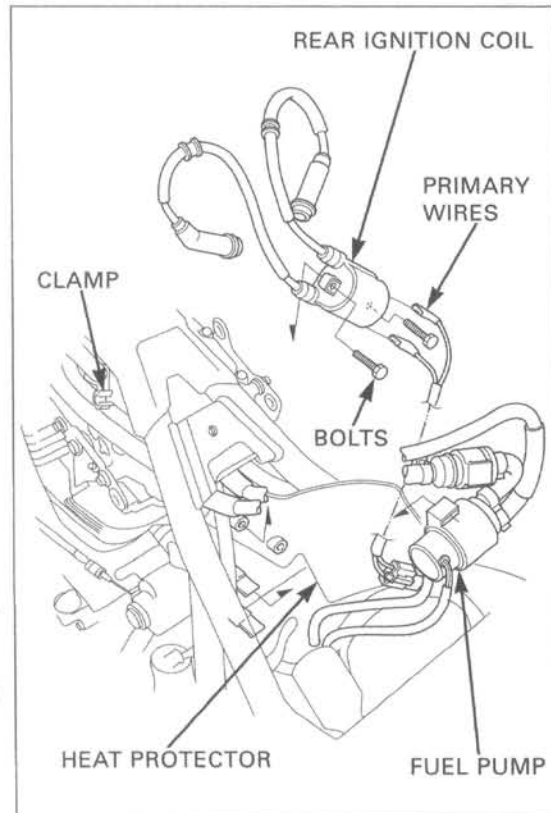
Install the following:

- rear ignition coil onto the center cover
- two bolts
- fuel pump onto the center cover
- spark plug wires onto the clamps
- rear cylinder spark plug caps
- battery case in the frame

Route the spark plug wires properly (page 1-19).

Insert the bosses of the battery case into the grommets in the frame.

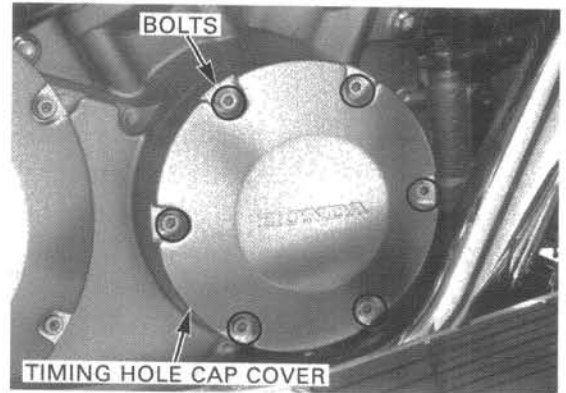
Install the removed parts in the reverse order of removal.



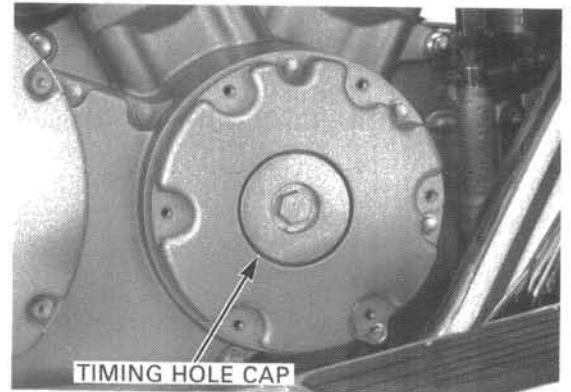
IGNITION TIMING

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

Remove the six socket bolts and the timing hole cap cover.



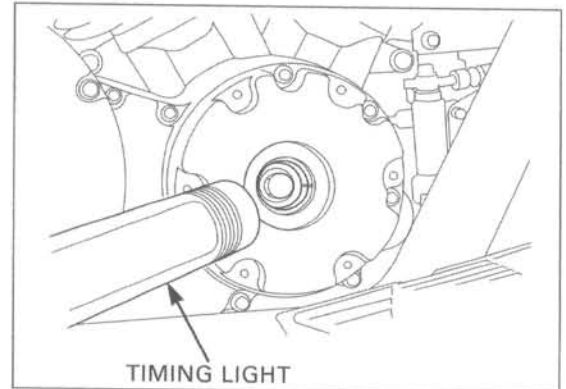
Remove the timing hole cap.



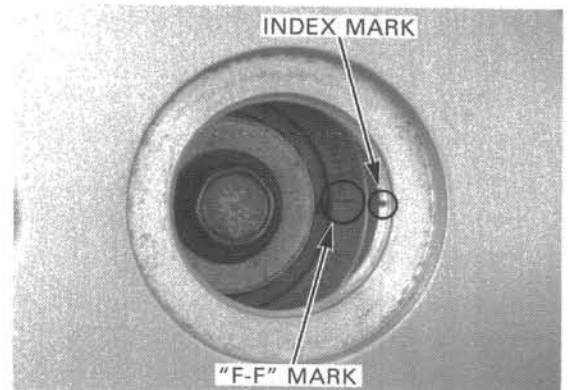
Read the manufacturer's instructions for timing light operation.

Connect the timing light to the front spark plug wire.

Start the engine, let it idle and check the ignition timing.



The timing is correct if the "F-F" mark on the primary drive gear aligns with the index mark on the right crankcase cover.



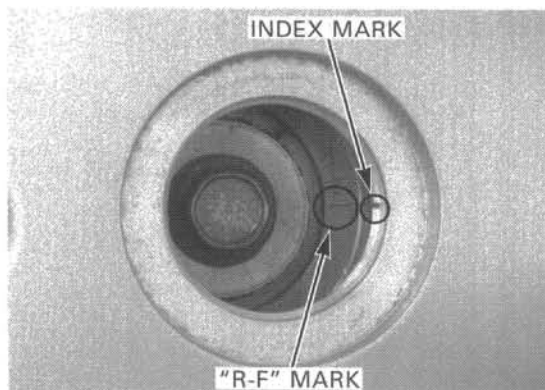
IGNITION SYSTEM

Stop the engine and connect the timing light to the rear spark plug wire.

Start the engine, let it idle and check the ignition timing.

The timing is correct if the "R-F" mark on the primary drive gear aligns with the index mark on the right crankcase cover.

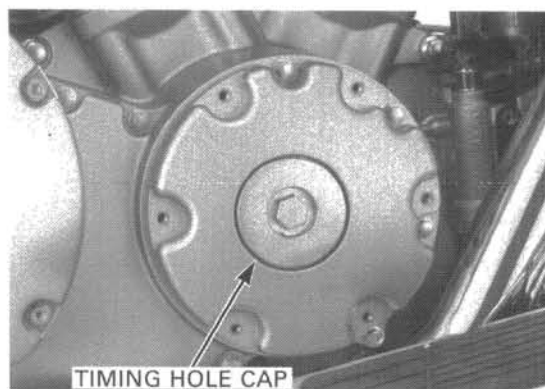
Remove the timing light.



Coat a new O-ring with oil and install it into the timing hole cap groove.

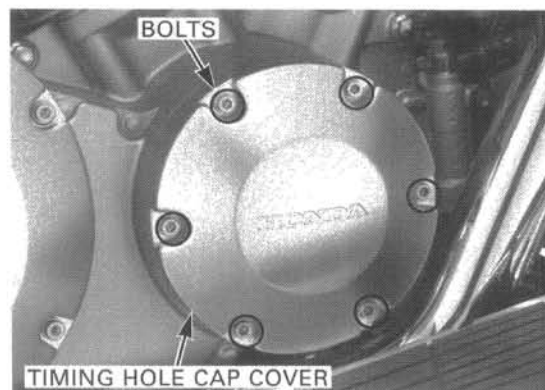
Install the timing hole cap and tighten it.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Install the timing hole cap cover and tighten the six socket bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

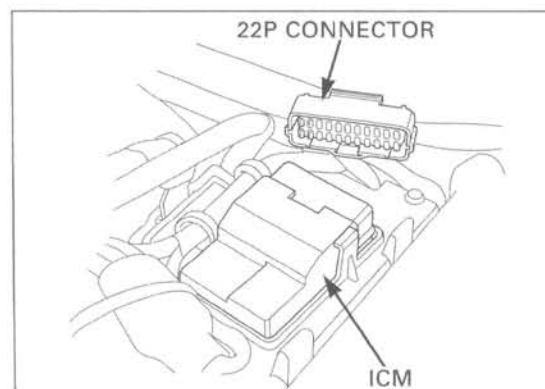


THROTTLE POSITION SENSOR

INSPECTION

Remove the seats (page 2-2).

Remove the ignition control module (ICM) from the battery case cover and disconnect the ICM 22P connector.



Measure the resistance between the Yellow/red and Blue/green wire terminals of the wire harness side connector.

STANDARD: 4—6 k Ω (20°C/68°F)

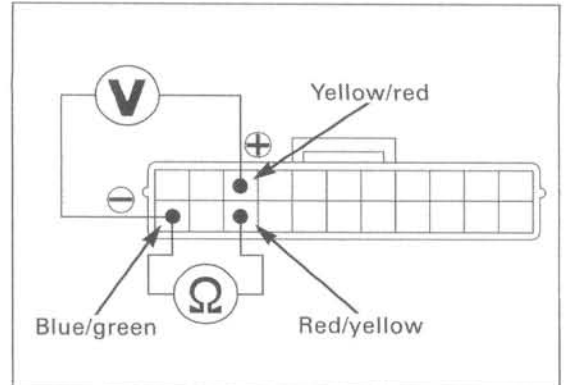
Check that the resistance between the Red/yellow and Blue/green wire terminals varies with the throttle position while operating the throttle grip.

Fully open — Fully closed position:

Resistance decreases

Fully closed — Fully open position:

Resistance increases



If the correct measurements cannot be obtained, remove the air cleaner housing (page 5-3). Disconnect the throttle position sensor 3P connector and perform the same inspections at the sensor side connector terminals.

- If the measurement at the ICM is abnormal and the one at the throttle position sensor is normal, check for an open or short circuit, or loose or poor connections in the wire harness.
- If both measurements are abnormal, remove the carburetor and replace the throttle position sensor (section 5).

Connect the ICM connector.

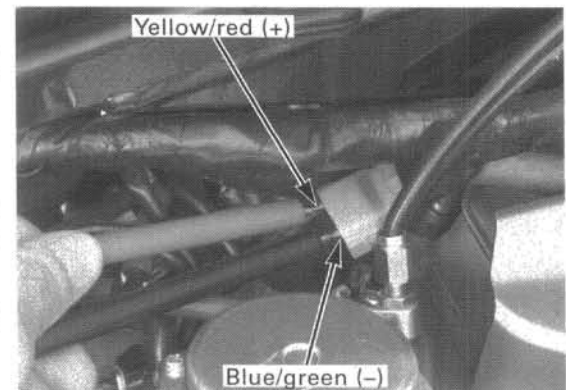
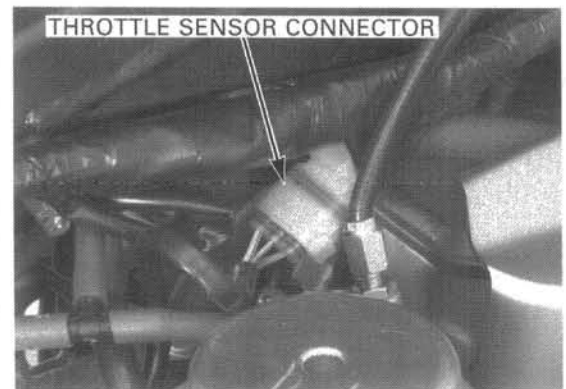
Turn the ignition switch to "ON" with the engine stop switch at "O".

Measure the input voltage between the Yellow/red (+) and Blue/green (-) wire terminals of the wire harness side throttle sensor connector.

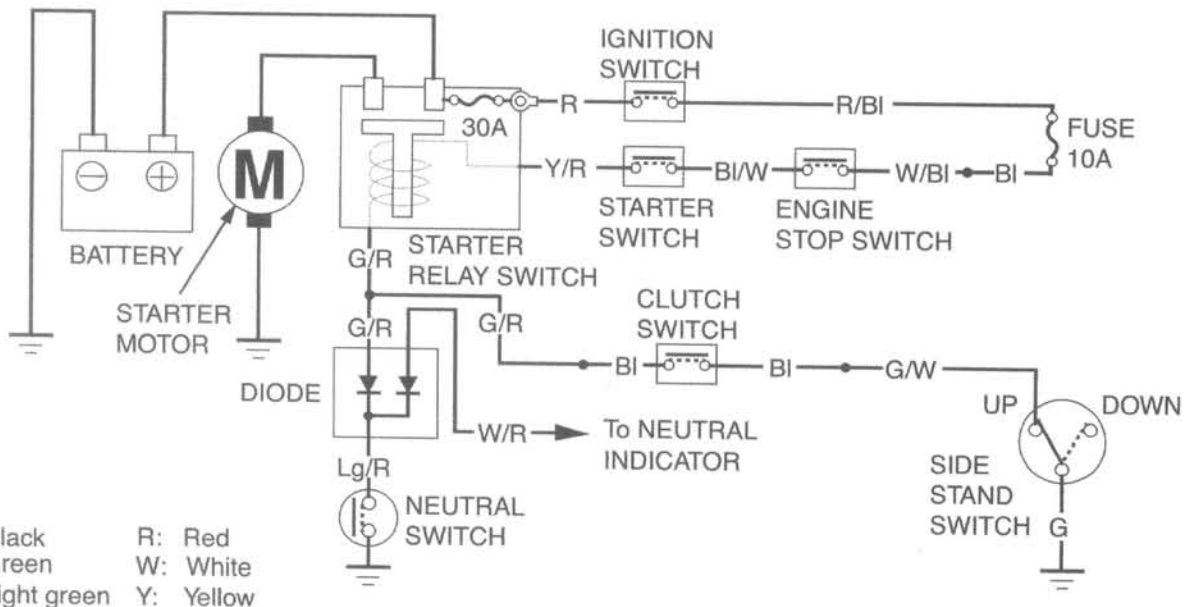
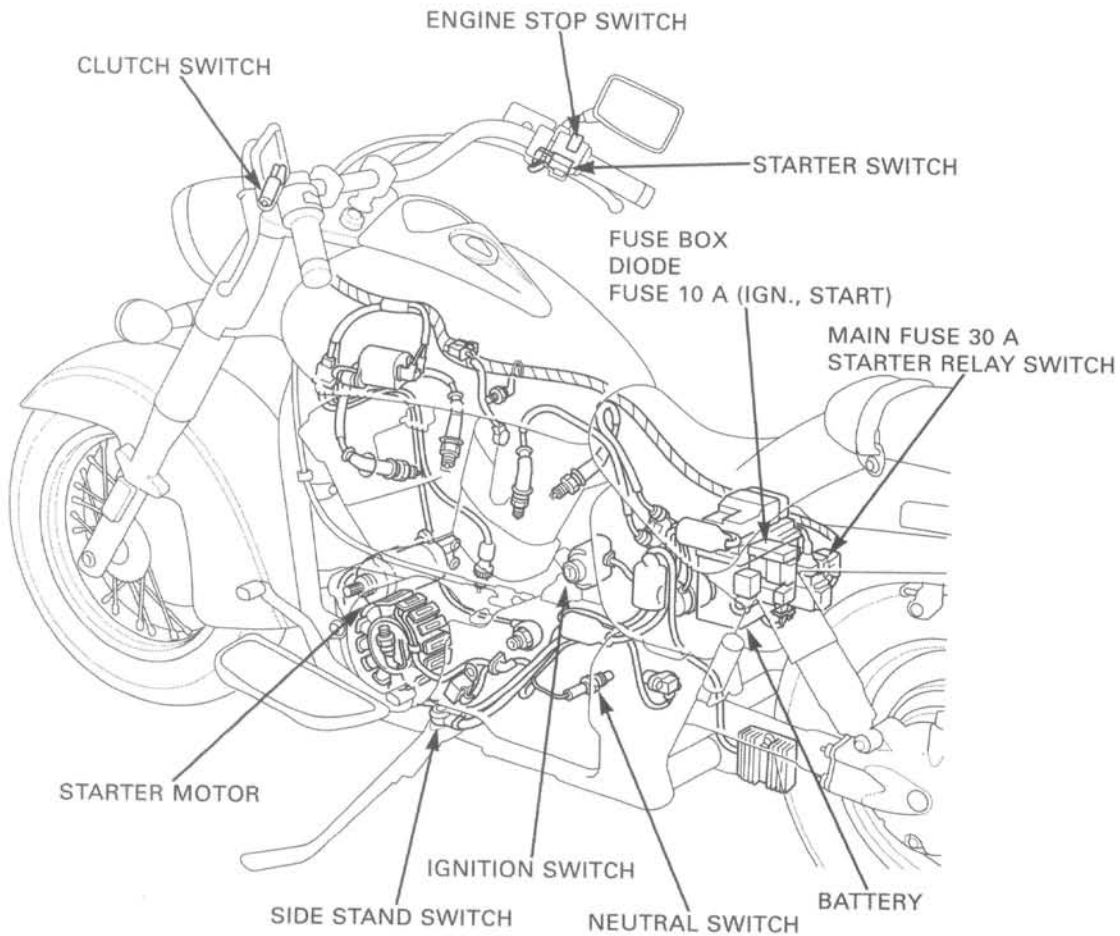
STANDARD: 4.7—5.3 V

If the input voltage is abnormal, or if there is no input voltage, check for an open or short circuit in the wire harness, or loose or poor ICM connector contact.

Install the removed parts in the reverse order of removal.



ELECTRIC STARTER/STARTER CLUTCH



18. ELECTRIC STARTER/STARTER CLUTCH

SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	DIODE	18-11
STARTER MOTOR	18-4	FLYWHEEL/STARTER CLUTCH	18-12

SERVICE INFORMATION

GENERAL

- Always turn the ignition switch to "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 19 for following components:
 - ignition switch
 - engine stop switch
 - starter switch
 - neutral switch
 - side stand switch
 - clutch switch

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter motor brush length		12.0—13.0 (0.47—0.51)	4.5 (0.18)
Starter driven gear boss	O.D.	57.759—57.768 (2.2740—2.2743)	57.639 (2.2692)
	I.D.	44.000—44.016 (1.7323—1.7329)	44.10 (1.736)
Torque limiter slip torque		53—84 N·m (5.4—8.6 kgf·m, 39—62 lbf·ft)	—

TORQUE VALUES

Starter motor case bolt	7 N·m (0.7 kgf·m, 5.1 lbf·ft)
Starter motor cable terminal nut	7 N·m (0.7 kgf·m, 5.1 lbf·ft)
Flywheel bolt	137 N·m (14.0 kgf·m, 101 lbf·ft)
Starter clutch mounting bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)

18

TOOLS

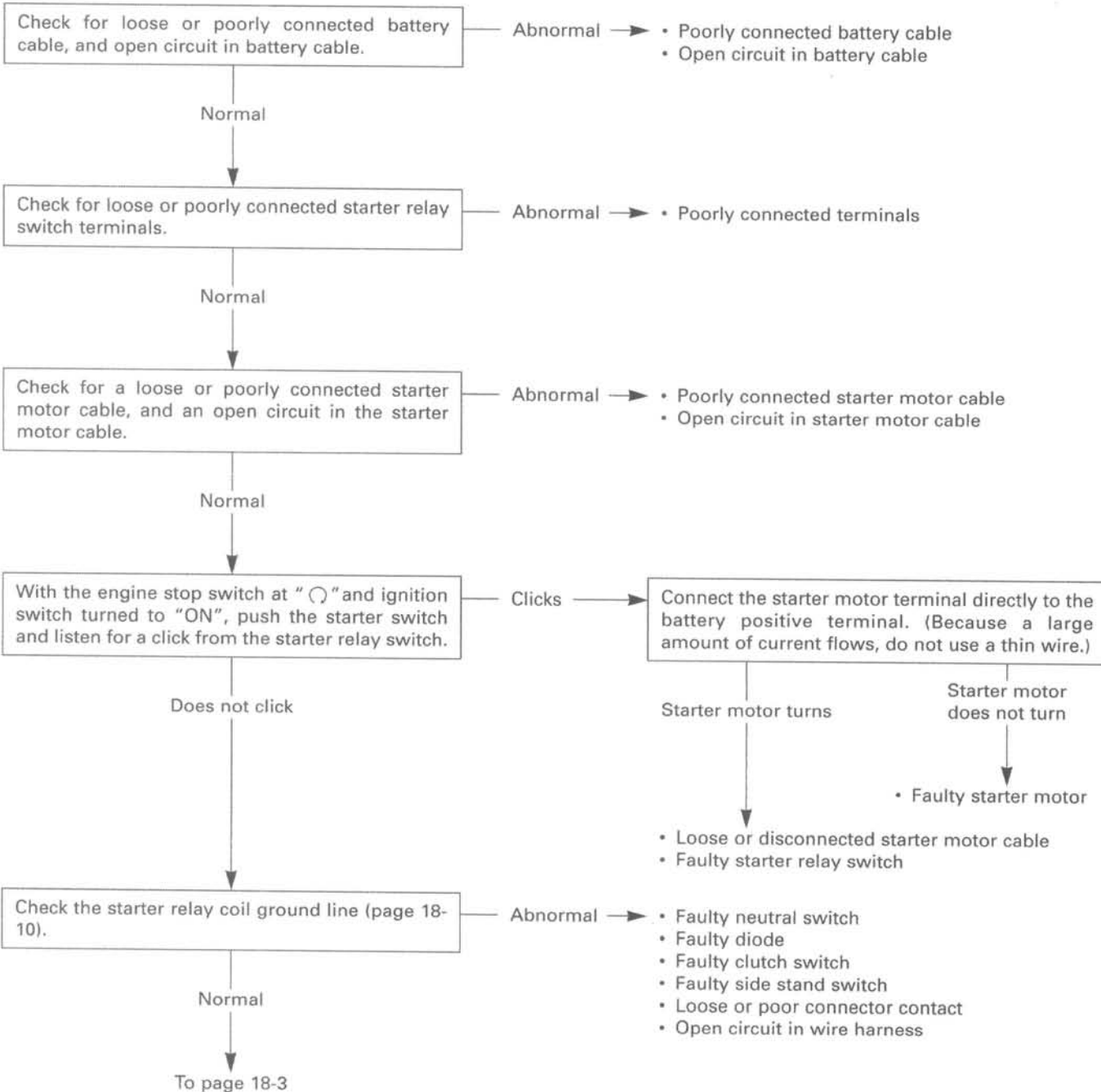
Flywheel holder	07725-0040000 or equivalent commercially available in U.S.A.
Rotor puller	07733-0020001 or 07933-3290001 (U.S.A. only)
Torque limiter inspection tool A	07YMJ-MCF0100 — not available in U.S.A.
Torque limiter inspection tool B	07YMJ-MCF0200 —
Bearing remover shaft	07936-GE00100 or equivalent commercially available in U.S.A.
Bearing remover head, 10 mm	07936-GE00200 or equivalent commercially available in U.S.A.
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200 (U.S.A. only)
Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 10 mm	07746-0040100

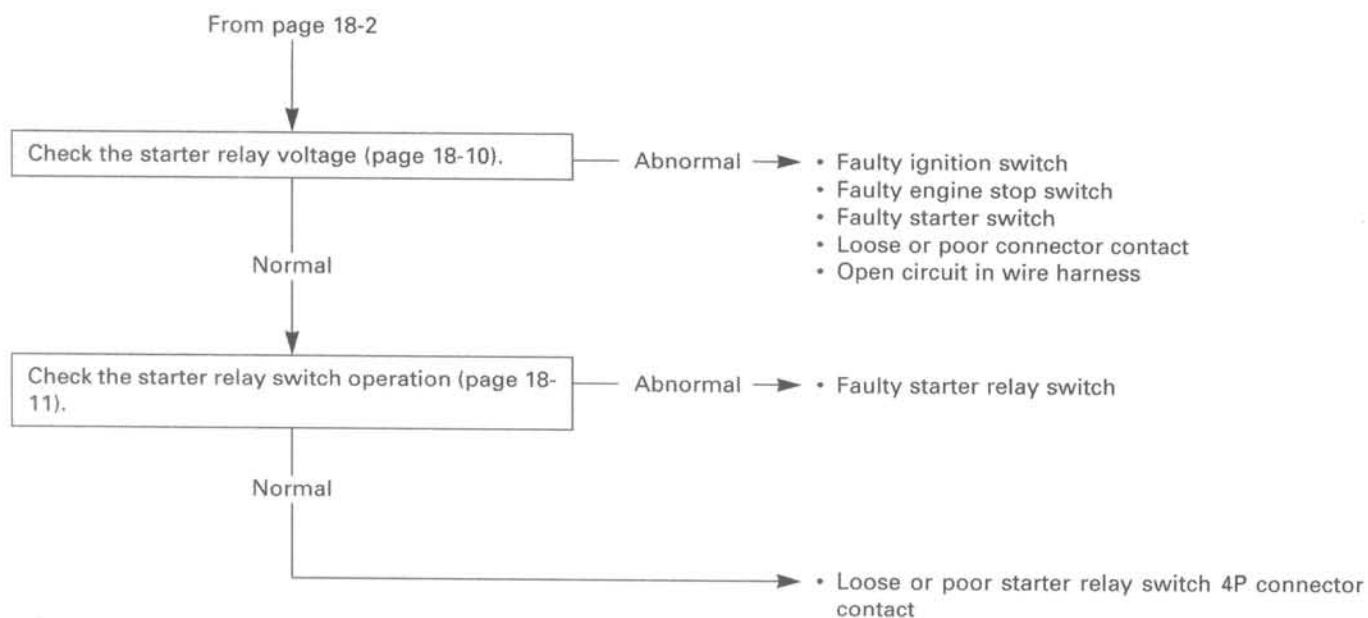
ELECTRIC STARTER/STARTER CLUTCH

TROUBLESHOOTING

Starter motor will not turn

- Check for a blown main fuse (30 A) or sub-fuse (10 A).
- Check that the battery is fully charged and in good condition.





Starter motor turns slowly

- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn

- Faulty starter clutch

Starter relay switch clicks, but engine does not turn over

- Crankshaft does not turn due to engine problem
- Faulty starter torque limiter or idle gear

ELECTRIC STARTER/STARTER CLUTCH

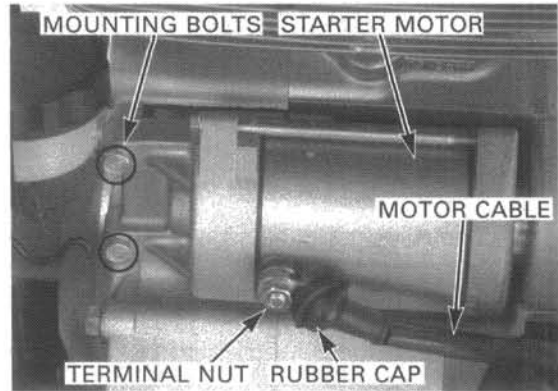
STARTER MOTOR

REMOVAL

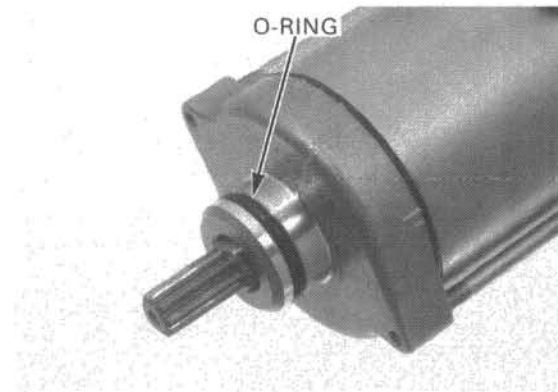
Remove the radiator (page 6-8).

Remove the rubber cap, terminal nut and starter motor cable.

Remove the two mounting bolts and the starter motor from the crankcase.

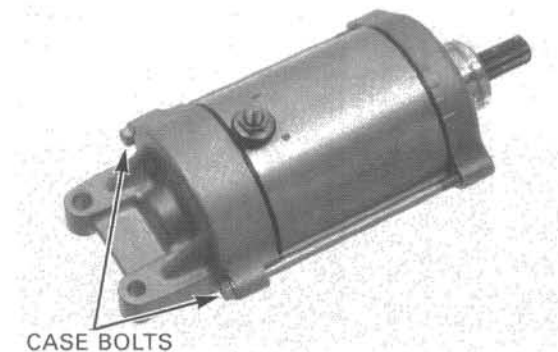


Remove the O-ring from the starter motor.



DISASSEMBLY/INSPECTION

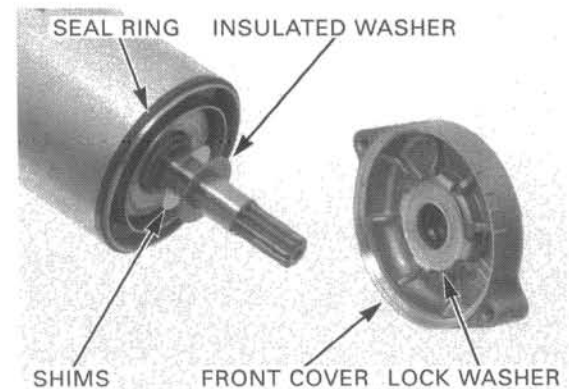
Remove the starter motor case bolts.



Remove the following:

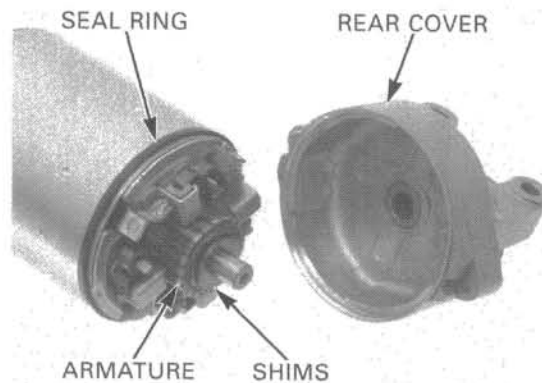
- front cover
- lock washer
- insulated washer
- shims
- seal ring

*Record the location
and number of
shims.*

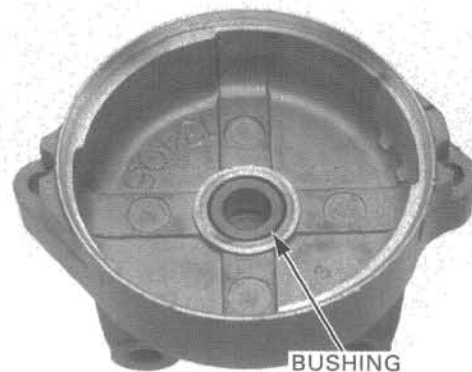


ELECTRIC STARTER/STARTER CLUTCH

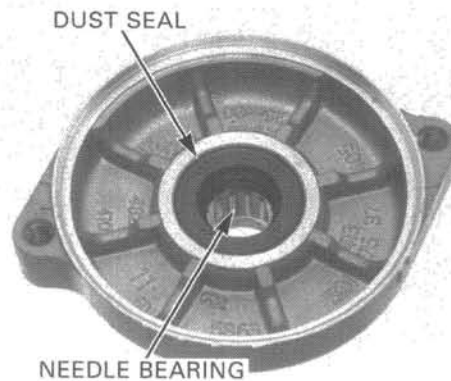
- rear cover
- shims
- seal ring
- armature



Check the bushing in the rear cover for wear or damage.



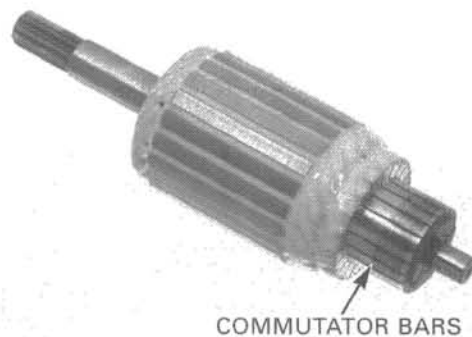
Check the dust seal and needle bearing in the front cover for deterioration, wear or damage.



Check the commutator bars of the armature for discoloration.

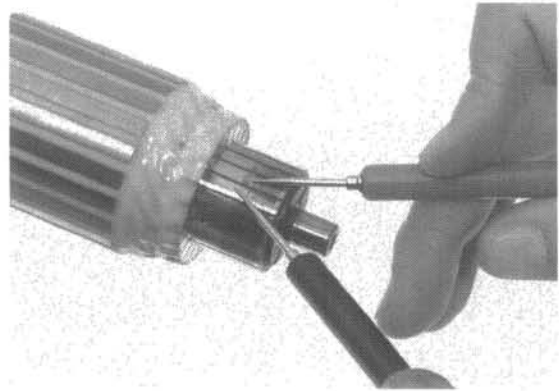
NOTE:

- Do not use emery or sand paper on the commutator.

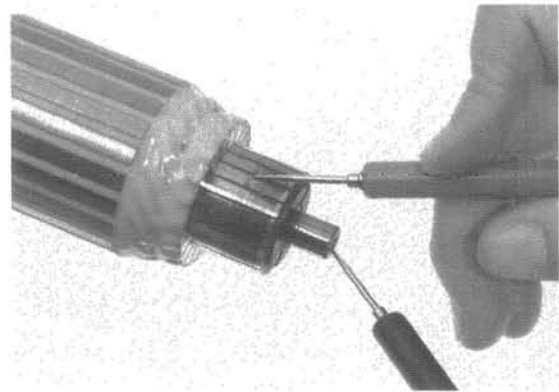


ELECTRIC STARTER/STARTER CLUTCH

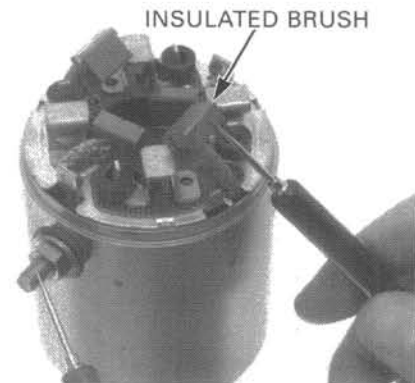
Check for continuity between pairs of commutator bars.
There should be continuity.



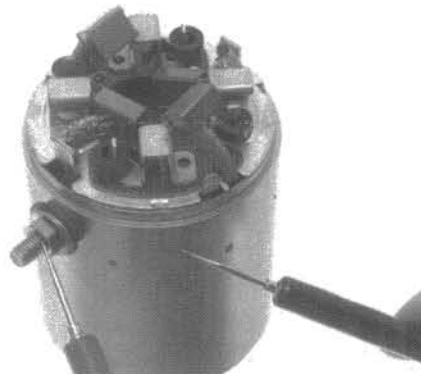
Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.



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



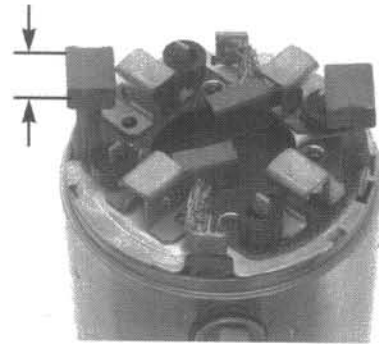
Check for continuity between the cable terminal and motor case.
There should be no continuity.



ELECTRIC STARTER/STARTER CLUTCH

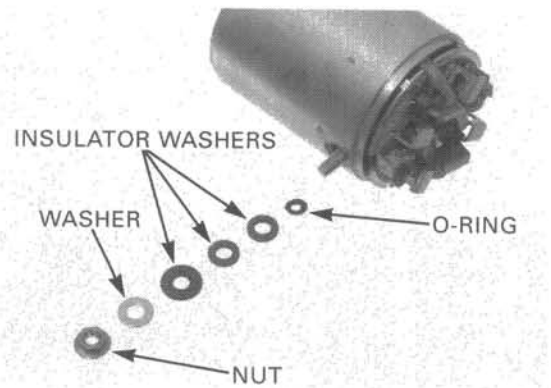
Measure the brush length.

SERVICE LIMIT: 4.5 mm (0.18 in)

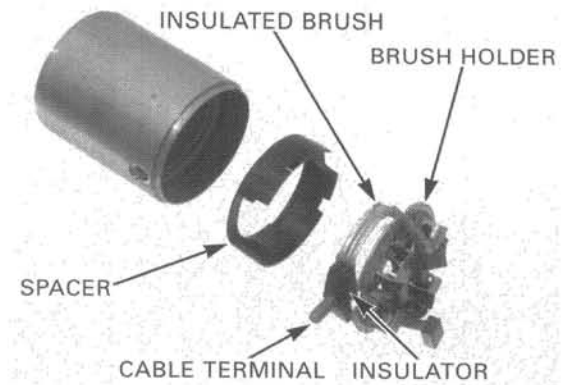


Remove the following if necessary:

- nut
- washer
- insulator washers
- O-ring

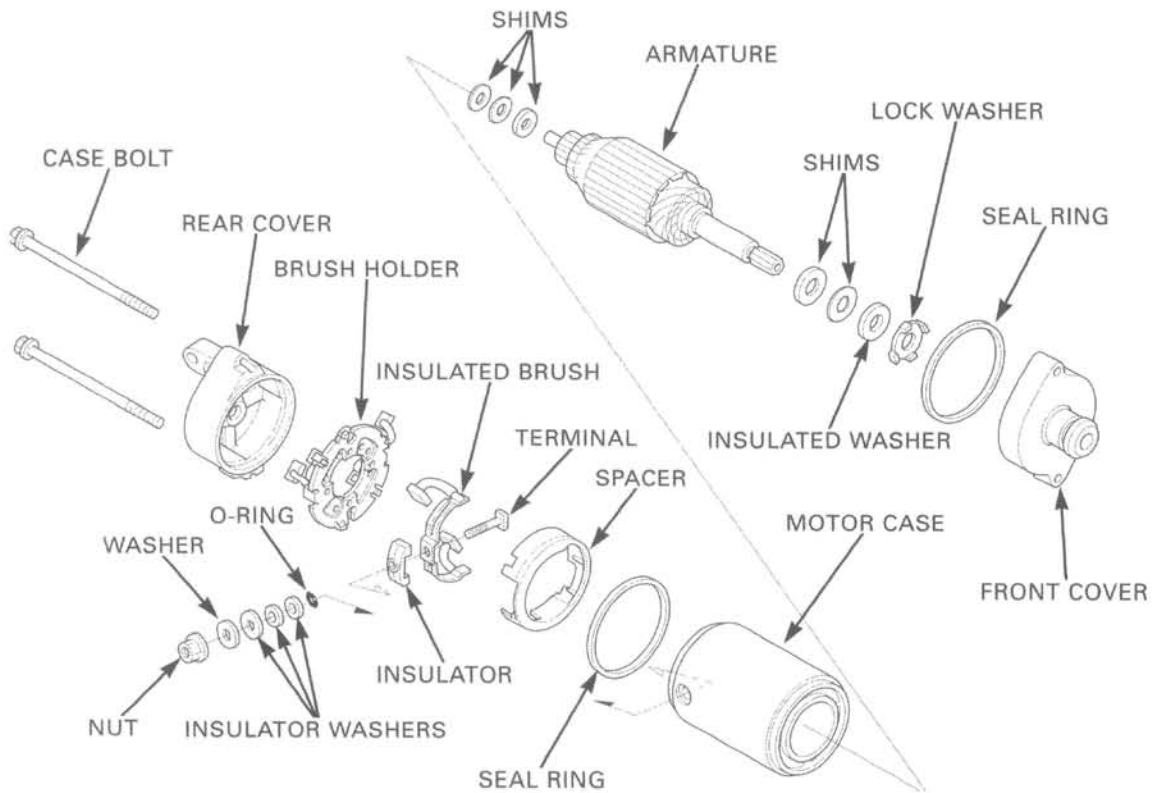


- brush holder
- cable terminal
- insulated brush
- insulator
- spacer



ELECTRIC STARTER/STARTER CLUTCH

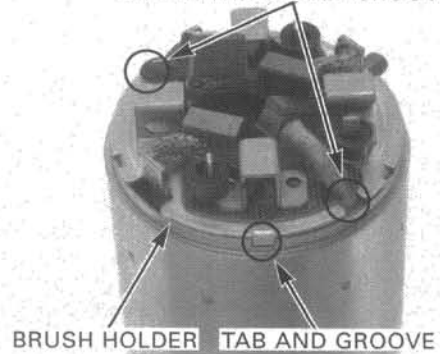
ASSEMBLY



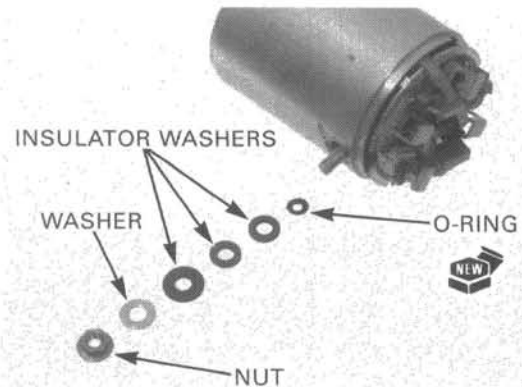
Install the spacer, insulator, insulated brush and cable terminal.

Install the brush holder, aligning the holder tab with the case groove, and the holder grooves with the insulated brush wires.

BRUSH WIRES AND GROOVES



Install a new O-ring, insulator washers, washer and nut.

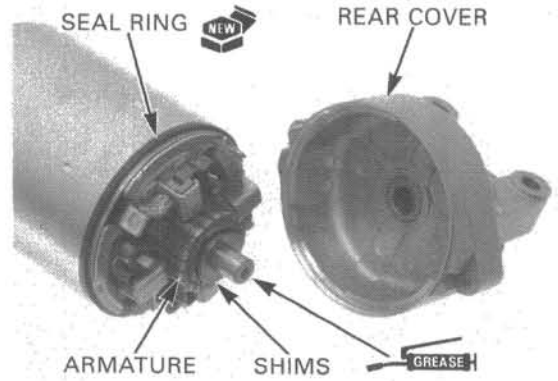


ELECTRIC STARTER/STARTER CLUTCH

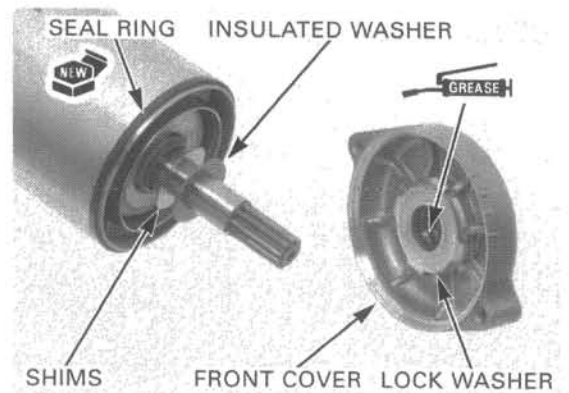
The coil may be damaged if the magnet pulls the armature against the case.

Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder. When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

Install the same number of shims in the same locations as noted during disassembly. Install a new seal ring onto the motor case. Apply thin coat of grease to the armature shaft end and install the rear cover.

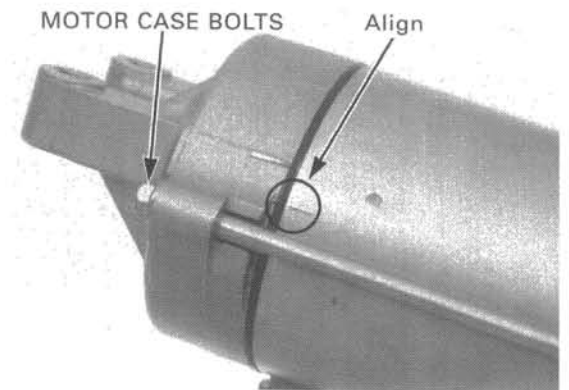


Install the same number of shims in the same locations as noted during disassembly. Install the insulated washer. Install a new seal ring onto the motor case. Apply grease to the oil seal lip and needle bearing in the front cover. Install the lock washer onto the front cover. Install the front cover.



Align the index marks on the motor case and rear cover. Install the motor case bolts and tighten them.

TORQUE: 7 N·m (0.7 kgf·m, 5.1 lbf·ft)



INSTALLATION

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



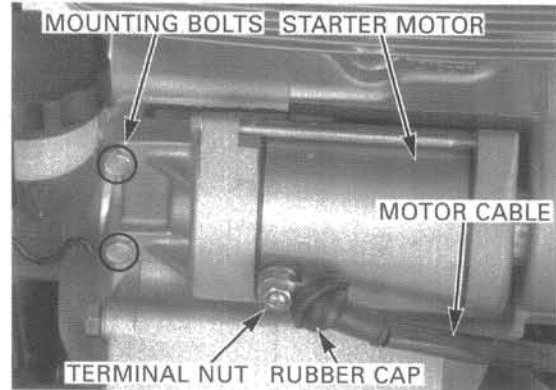
ELECTRIC STARTER/STARTER CLUTCH

Install the starter motor into the crankcase and tighten the mounting bolts securely.
Connect the starter motor cable.
Install and tighten the terminal nut.

TORQUE: 7 N·m (0.7 kgf·m, 5.1 lbf·ft)

Install the rubber cap securely.

Install the radiator (page 6-8).



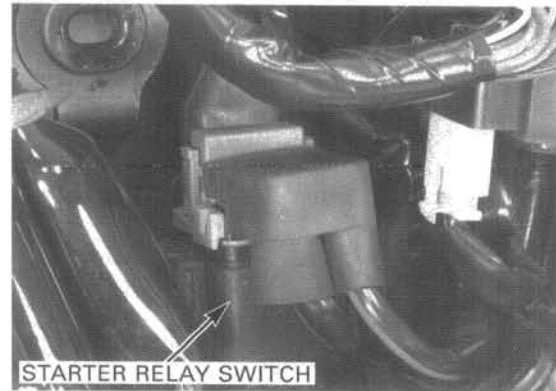
STARTER RELAY SWITCH

INSPECTION

Remove the right side cover (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch to "ON" with the engine stop switch at "O".
Push the starter switch.
The coil is normal if the starter relay switch clicks.

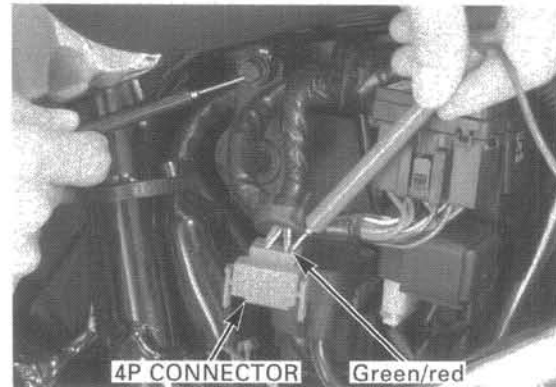
If you do not hear the switch click, inspect the relay switch using the procedure below.



GROUND LINE

Disconnect the starter relay switch 4P connector.
Check for continuity between the Green/red wire (ground line) terminal and ground.

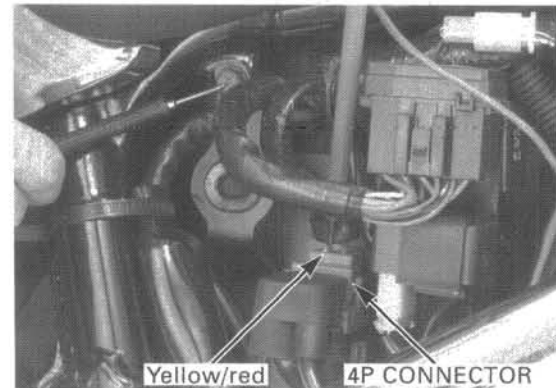
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is retracted, the ground circuit of the relay coil is normal. (In neutral, there is a slight resistance due to the diode.)



STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Turn the ignition switch to "ON" with the engine stop switch at "O".
Measure the voltage between the yellow/red wire terminal (+) and ground (-).

If the battery voltage appears when the starter switch is pushed, the power supply circuit of the relay coil is normal.

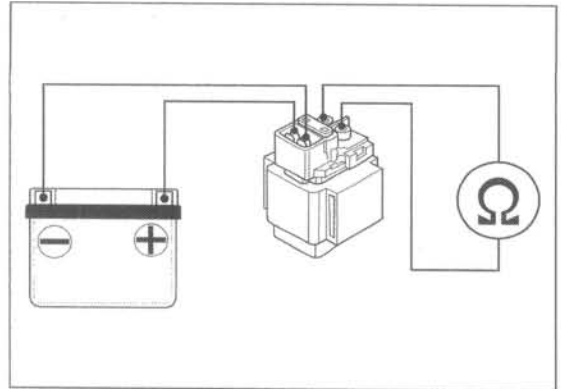


OPERATION CHECK

Disconnect the 4P connector, battery (+) cable and starter motor cable from the starter relay switch.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/red wire terminal and negative wire to the Green/red wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.

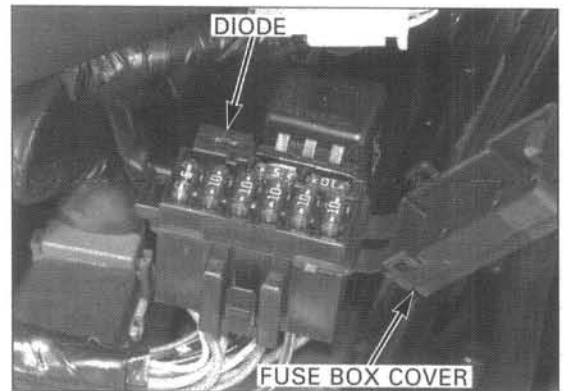


DIODE

INSPECTION

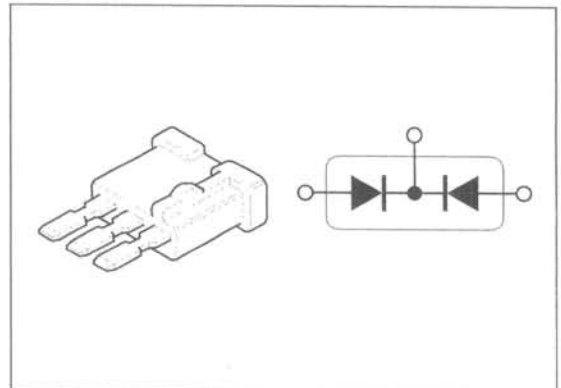
Remove the right side cover (page 2-2).

Open the fuse box cover and remove diode.



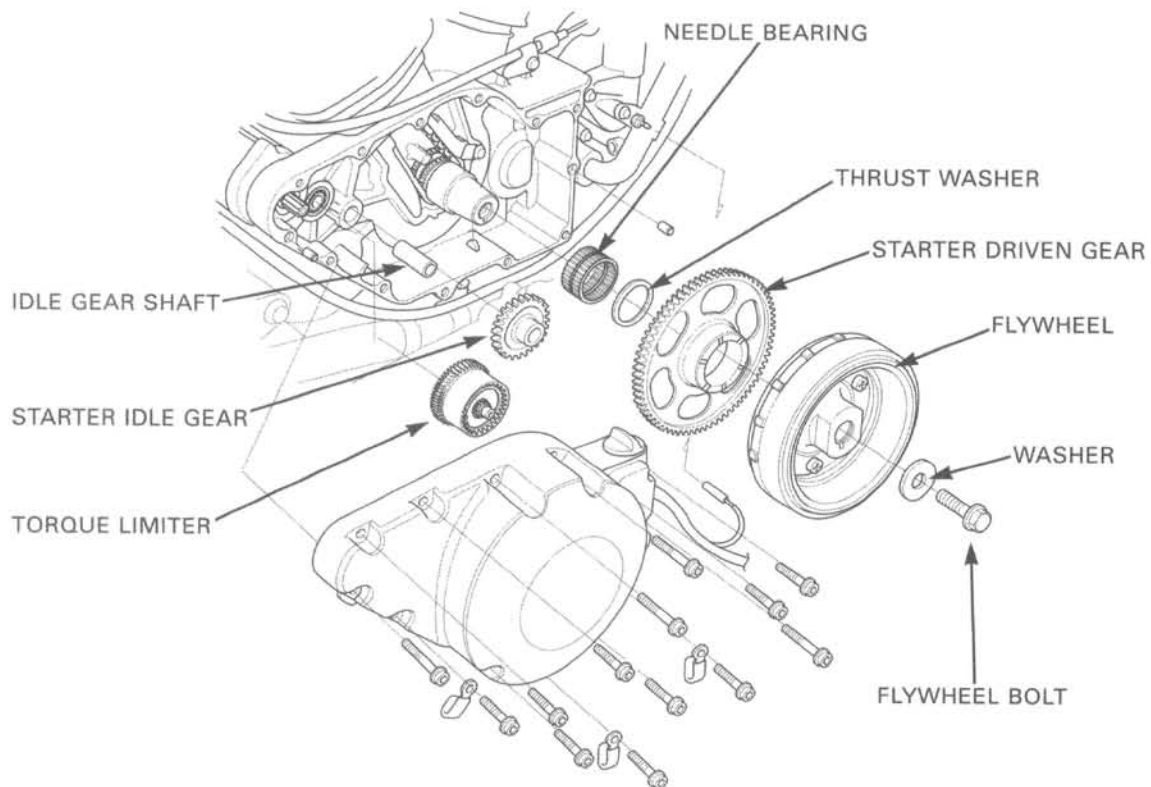
Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



ELECTRIC STARTER/STARTER CLUTCH

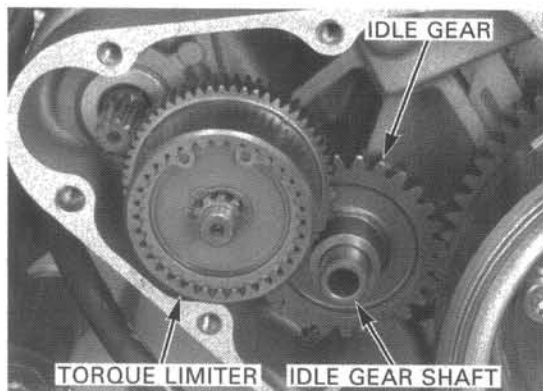
FLYWHEEL/STARTER CLUTCH



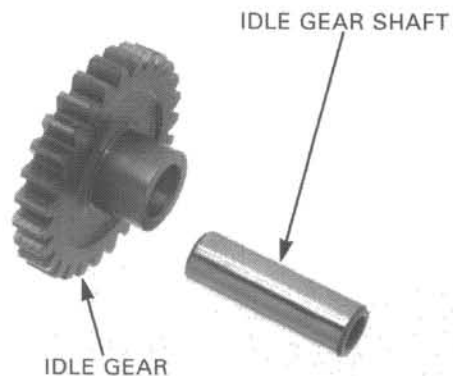
STARTER TORQUE LIMITER/IDLE GEAR REMOVAL/INSPECTION

Remove left crankcase cover (page 16-8).

Remove the starter torque limiter, idle gear shaft and idle gear.



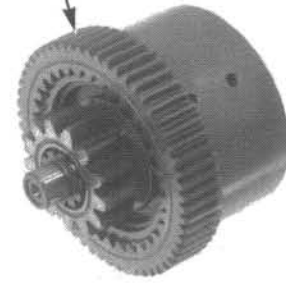
Check the starter idle gear and shaft for abnormal wear or damage.



ELECTRIC STARTER/STARTER CLUTCH

Check the starter torque limiter gear for abnormal wear or damage.

TORQUE LIMITER GEAR



Check the torque limiter slip torque with the special tools and a torque wrench.

TOOLS:

Torque limiter inspection tool A: 07YMJ-MCF0100
not available in U.S.A.

Torque limiter inspection tool B: 07YMJ-MCF0200
not available in U.S.A.

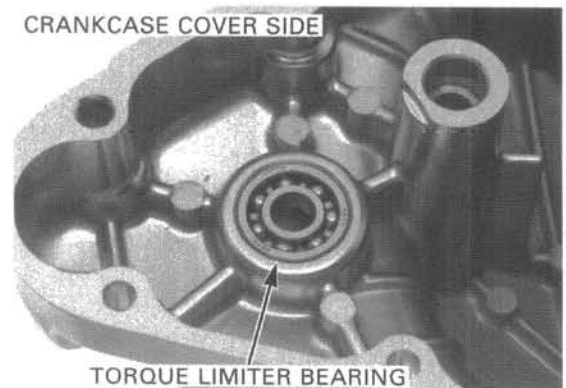
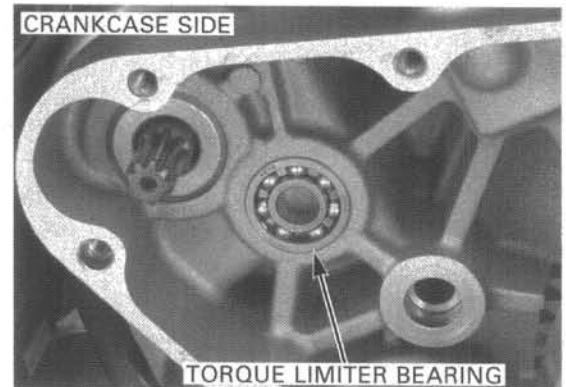
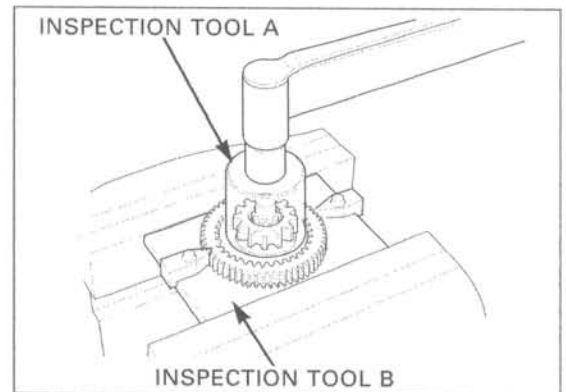
SLIP TORQUE:

53 – 84 N·m (5.4 – 8.6 kgf·m, 39 – 62 lbf·ft)

Replace the torque limiter assembly if the slip torque is out of specification.

Turn the inner races of the torque limiter bearings with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the left crankcase and cover.

Remove and discard the bearings if the races do not turn smoothly and quietly, if they fit loosely in the crankcase and cover.



ELECTRIC STARTER/STARTER CLUTCH

TORQUE LIMITER BEARING REPLACEMENT

LEFT CRANKCASE SIDE

Be sure to wear heavy gloves to avoid burns when handling the heated crankcase.

Heat the left crankcase to 80°C (176°F) evenly using a heat gun. Remove the torque limiter bearing from the crankcase using the special tools.

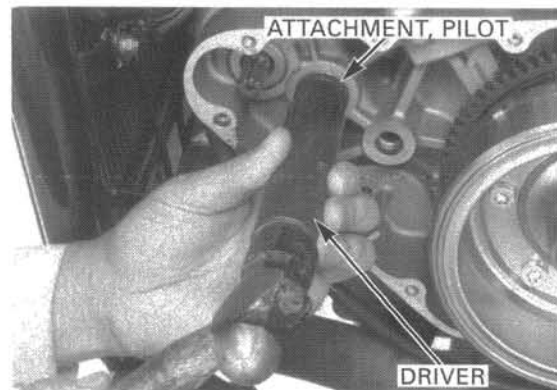
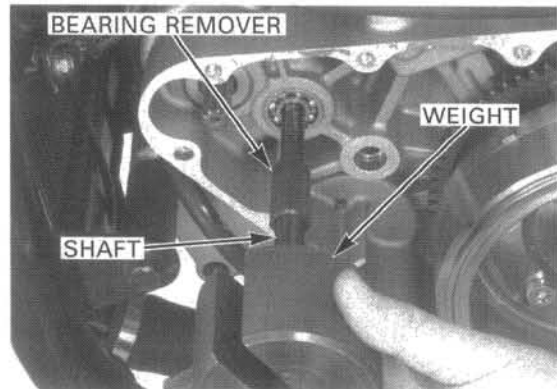
TOOLS:

Bearing remover head, 10 mm	07936-GE00200
Remover shaft	07936-GE00100
Remover weight	07741-0010201 or equivalent commercially available in U.S.A

Drive in a new bearing into the left crankcase using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 10 mm	07746-0040100



LEFT CRANKCASE COVER SIDE

Be sure to wear heavy gloves to avoid burns when handling the heated crankcase cover.

Heat the left crankcase cover to 80°C (176°F) evenly using a heat gun. Remove the torque limiter bearing from the crankcase cover using the special tools.

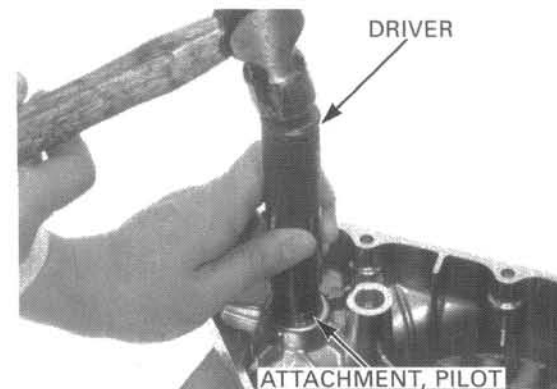
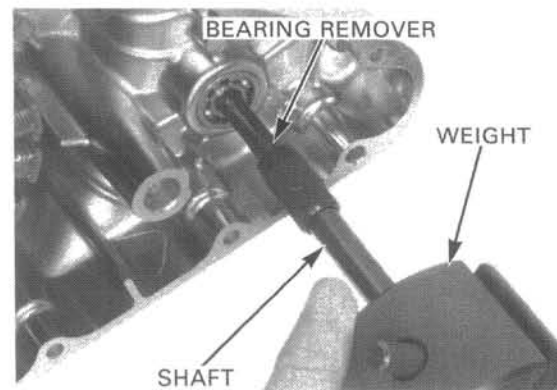
TOOLS:

Bearing remover head, 10 mm	07936-GE00200
Remover shaft	07936-GE00100
Remover weight	07741-0010201 or equivalent commercially available in U.S.A.

Drive in a new bearing into the left crankcase cover using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 10 mm	07746-0040100



FLYWHEEL REMOVAL

Remove the starter torque limiter and idle gear (page 18-12).

Hold the flywheel with the special tool and loosen the flywheel bolt.

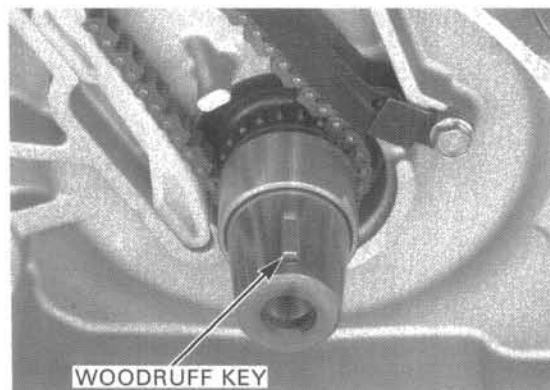
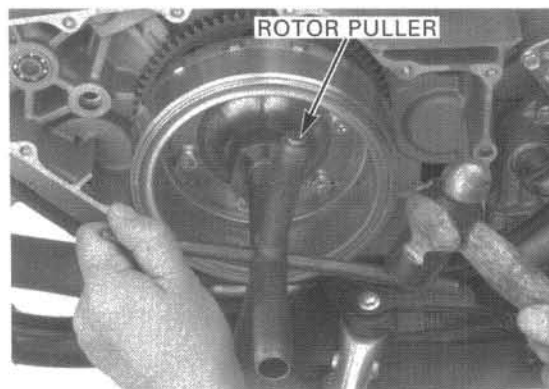
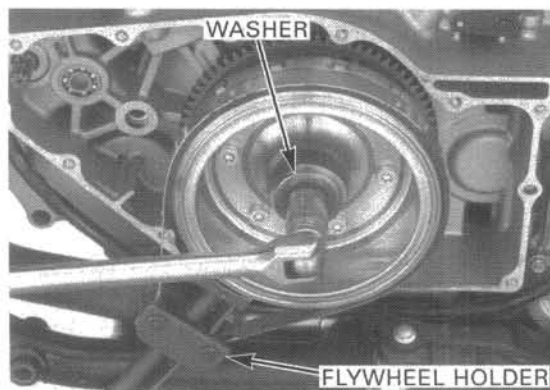
TOOL:
Flywheel holder **07725-0040000** or
 equivalent commercially
 available in U.S.A.

Remove the flywheel bolt and washer.

Remove the flywheel using the special tool.

TOOL:
Rotor puller **07733-0020001** or
 07933-3290001
 (U.S.A. only)

Remove the woodruff key from the crankshaft.



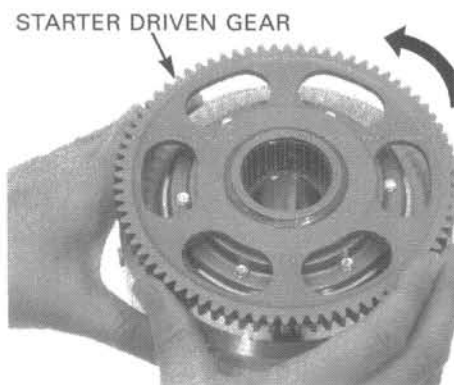
STARTER CLUTCH INSPECTION/ REMOVAL

Remove the flywheel.

Check that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

Remove the starter driven gear while turning it counterclockwise.

Remove the needle bearing and thrust washer.



ELECTRIC STARTER/STARTER CLUTCH

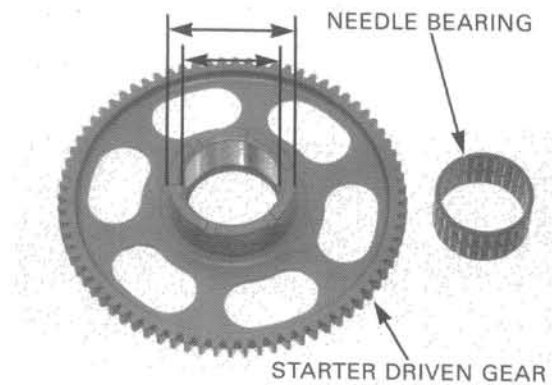
Check the starter driven gear and needle bearing for abnormal wear or damage.

Measure the starter driven gear O.D.

SERVICE LIMIT: 57.639 mm (2.2692 in)

Measure the starter driven gear I.D.

SERVICE LIMIT: 44.10 mm (1.736 in)



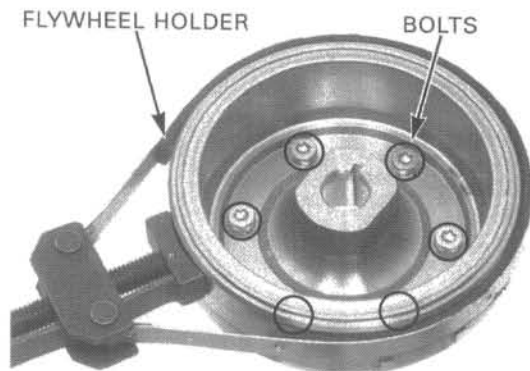
Hold the flywheel with the special tool and remove the starter clutch bolts.

TOOL:
Flywheel holder

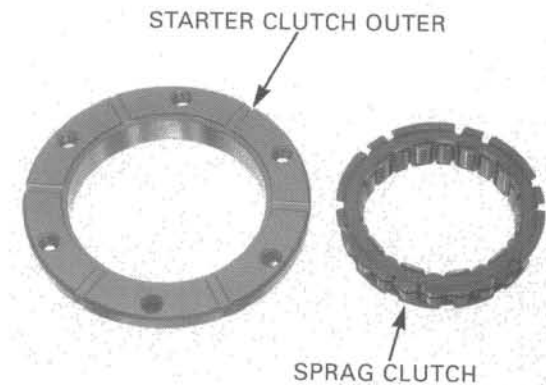
**07725-0040000 or
equivalent commercially
available in U.S.A.**

Remove the starter clutch assembly from the flywheel.

Remove the sprag clutch from the starter clutch outer.



Check the starter clutch outer and sprag clutch for abnormal wear or damage.

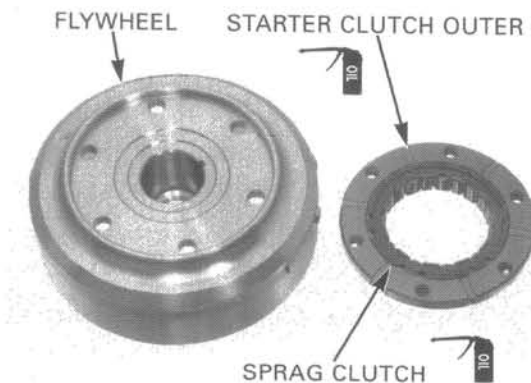


STARTER CLUTCH INSTALLATION

Apply oil to the starter clutch outer sliding surface and sprag clutch.

Install the sprag clutch into the starter clutch outer with the flanged side toward the flywheel.

Install the starter clutch onto the flywheel.



ELECTRIC STARTER/STARTER CLUTCH

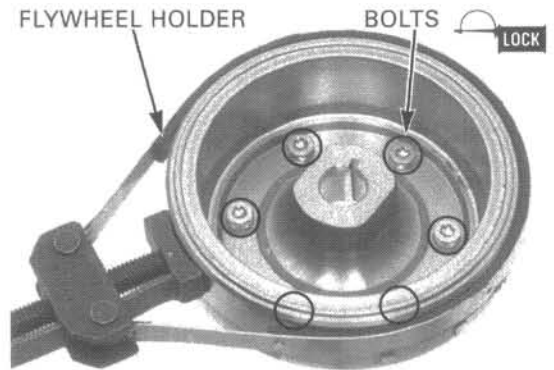
Apply locking agent to the starter clutch bolt threads and install the bolts.
Hold the flywheel with the special tool and tighten the bolts.

TOOL:

Flywheel holder

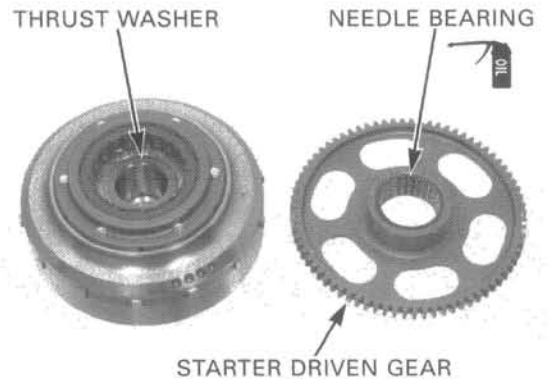
07725-0040000 or
equivalent commercially
available in U.S.A.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



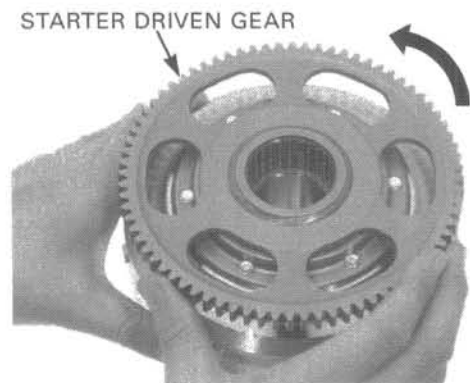
Install the thrust washer onto the flywheel.

Apply oil to the needle bearing and install the bearing into the starter driven gear.



Install the starter driven gear while turning it counter-clockwise.

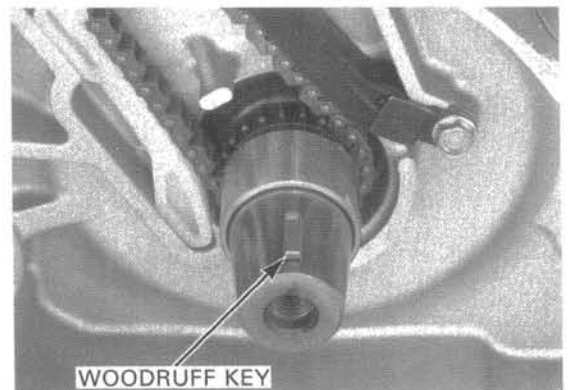
Install the flywheel.



FLYWHEEL INSTALLATION

Clean any oil from the tapered portion of the crankshaft and flywheel.

Install the woodruff key in the crankshaft key groove.



ELECTRIC STARTER/STARTER CLUTCH

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

Apply oil to the flywheel bolt threads and seating surface, and install the washer and bolt. Hold the flywheel with the special tool and tighten the bolt.

TOOL:

Flywheel holder 07725-0040000 or
equivalent commercially
available in U.S.A.

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)

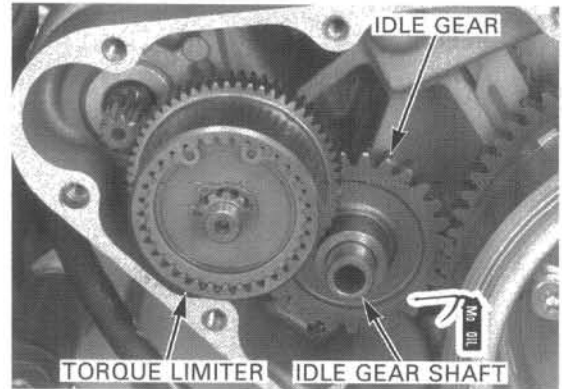
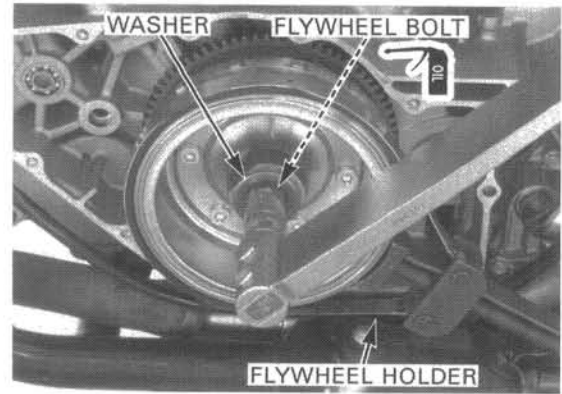
Install the starter idle gear and torque limiter.

STARTER IDLE GEAR/TORQUE LIMITER INSTALLATION

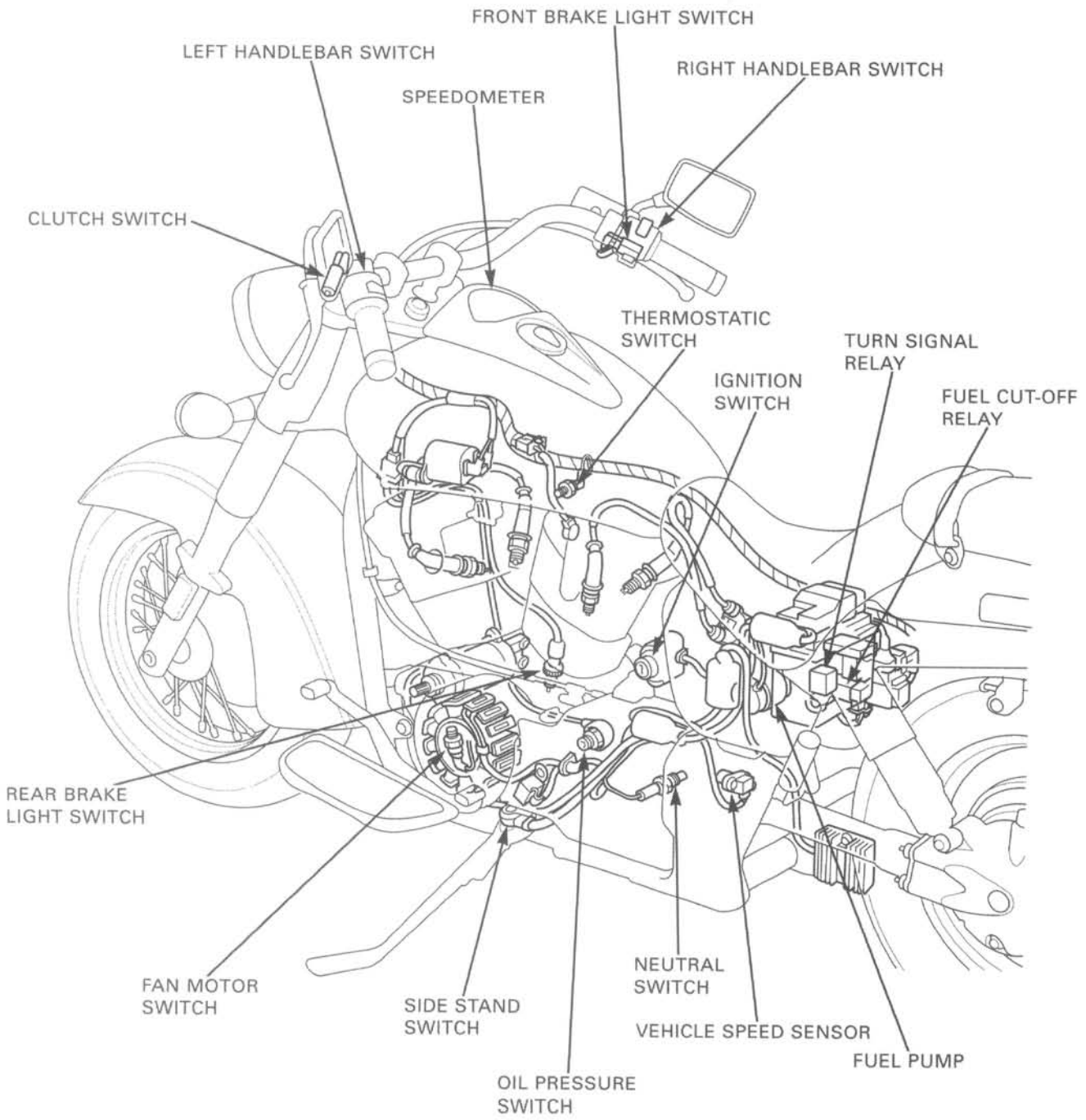
Apply molybdenum oil solution to the starter idle gear shaft outer surface, and install the starter idle gear and shaft.

Install the starter torque limiter.

Install the left crankcase cover (page 16-10).



LIGHTS/METERS/SWITCHES



19. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION	19-1	IGNITION SWITCH	19-12
HEADLIGHT	19-3	HANDLEBAR SWITCH	19-13
TURN SIGNAL LIGHT	19-4	BRAKE LIGHT SWITCH	19-14
BRAKE/TAILLIGHT	19-5	CLUTCH SWITCH	19-14
LICENSE LIGHT	19-5	NEUTRAL SWITCH	19-14
SPEEDOMETER/ VEHICLE SPEED SENSOR	19-6	SIDE STAND SWITCH	19-15
COOLANT TEMPERATURE INDICATOR/ THERMOSTATIC SWITCH	19-9	FUEL PUMP	19-16
COOLING FAN MOTOR SWITCH	19-10	HORN	19-18
OIL PRESSURE INDICATOR	19-11	TURN SIGNAL RELAY	19-18

SERVICE INFORMATION

GENERAL

- A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.
- Use an electric heating element to heat the water/coolant mixture for the thermosensor inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Note the following when replacing the halogen headlight bulb.
 - Wear clean gloves while replacing the bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
 - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes used are indicated throughout this section.

Bu: Blue	G: Green	Lg: Light Green	R: Red
Bl: Black	Gr: Gray	O: Orange	W: White
Br: Brown	Lb: Light Blue	P: Pink	Y: Yellow

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (high beam)	12 V - 60 W
	Headlight (low beam)	12 V - 55 W
	Brake/taillight	12 V - 21/5 W
	License light	12 V - 5 W
	Front turn signal/position light	12 V - 21/5 W x 2
	Rear turn signal light	12 V - 21 W x 2
Fuse	Main fuse	30A
	Sub-fuse	10A x 5, 5A x 1
Thermostatic switch	Start to close (ON)	112—118°C (234—244°F)
	Start to open (OFF)	108°C (226°F) minimum
Fan motor switch	Start to close (ON)	98—102°C (208—216°F)
	Start to open (OFF)	93—97°C (199—207°F)
Fuel pump flow capacity (minimum)		700 cm ³ (23.7 US oz, 24.6 Imp oz)/minute

LIGHTS/METERS/SWITCHES

TORQUE VALUES

Fuel tank top cover screw	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Thermostatic switch	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	Apply sealant to the threads.
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Ignition switch mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Ignition switch cover screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt: replace with a new one.
Horn mounting bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)	

TOOL

Inspection adaptor	07GMJ-ML80100
--------------------	---------------

HEADLIGHT

BULB REPLACEMENT

NOTE:

- A halogen headlight bulb becomes very hot while the headlight is on, and will remain hot for a while after it is turned off. Be sure to let it cool down before servicing or you may burn your hand or could damage the bulb.

Remove the two screws and the headlight from the headlight case.

Disconnect the headlight connector and remove the dust cover.

Unhook the bulb retainer.

Remove the bulb socket and replace the headlight bulb with a new one.

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

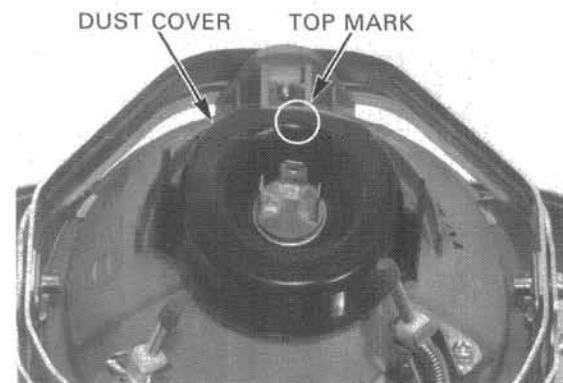
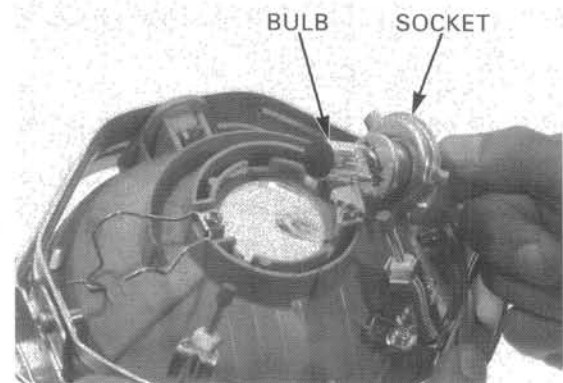
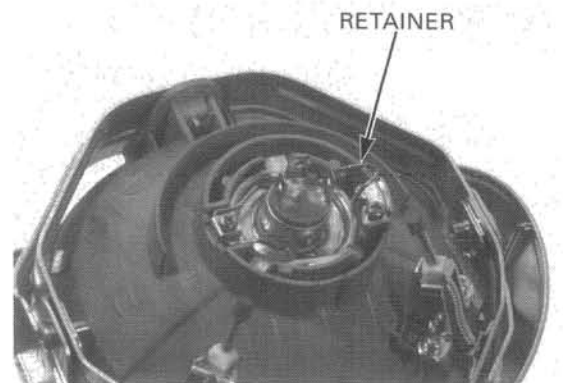
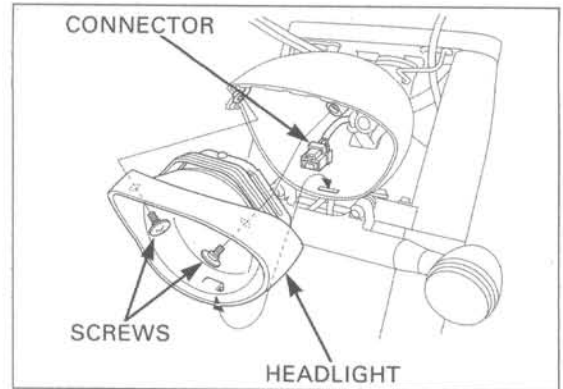
If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.

Install the bulb/socket into the headlight and hook the bulb retainer properly.

Install the dust cover properly onto the headlight with the "TOP" mark facing up.

Connect the headlight connector.

Install the headlight into the case by aligning the tab of the headlight with the slot in the case. Install the two screws and tighten them.



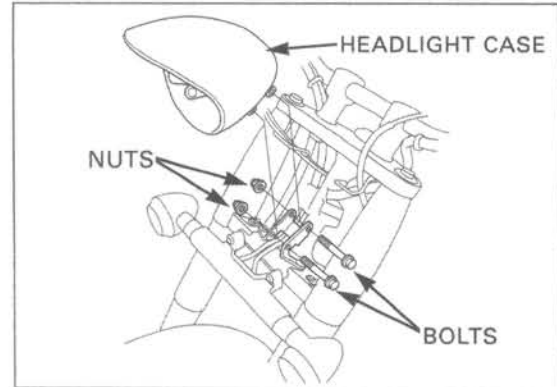
LIGHTS/METERS/SWITCHES

HEADLIGHT CASE REMOVAL/ INSTALLATION

Remove the headlight (page 19-3).

Remove the wire harnesses from the clamps and disconnect the connectors in the headlight case.
Remove the wire harnesses from the headlight case.

Remove the two mounting bolts, nuts and the headlight case from the stay.



Route the wire harnesses properly (page 1-19).

Install the headlight case in the reverse order of removal.

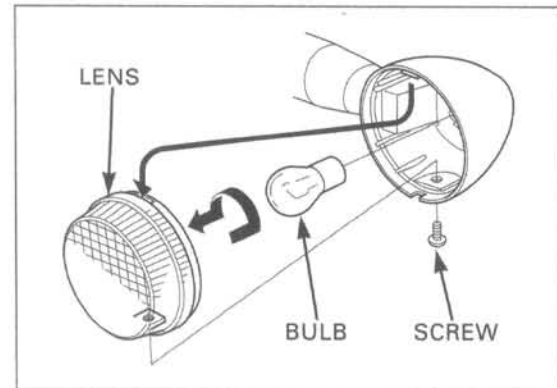
TURN SIGNAL LIGHT

BULB REPLACEMENT

Remove the screw and turn signal light lens.
While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure the lens gasket is installed in position and is in good condition, and replace it with a new one if necessary.

Install the lens, aligning the slot with the tab of the turn signal light, and tighten the screw.



REMOVAL/INSTALLATION

FRONT

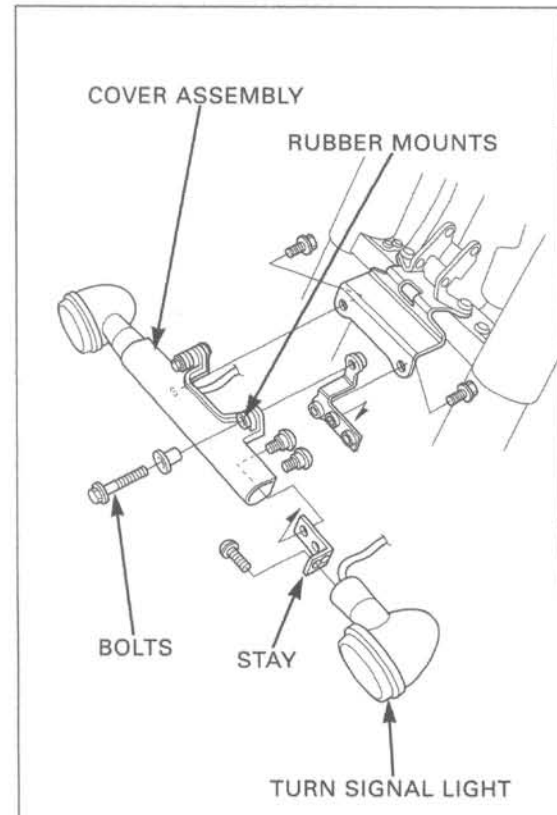
Remove the headlight (page 19-3).

Disconnect the turn signal connectors.
Release the wires from the clamps and remove them out of the headlight case.

Remove the bolts, collars, rubber mounts and turn signal cover assembly.

Remove the two bolts and turn signal light/stay from the cover.

Remove the bolt and stay from the turn signal light.



Route the turn signal wire properly (page 1-19).

Installation is in the reverse order of removal.

REAR

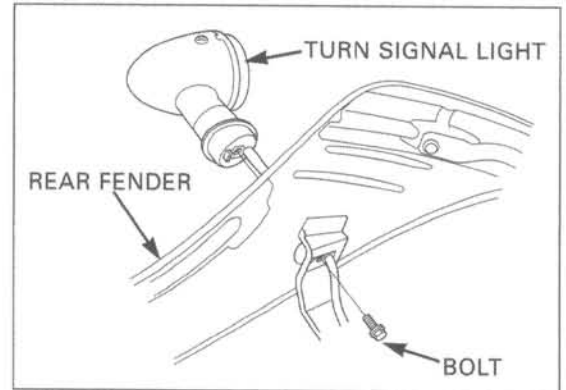
Remove the rear fender (page 2-5).

Remove the turn signal wire from the clamps.

Remove the mounting bolt and turn signal light from the rear fender.

Installation is in the reverse order of removal.

Route the turn signal wire properly (page 1-19).



BRAKE/TAILLIGHT

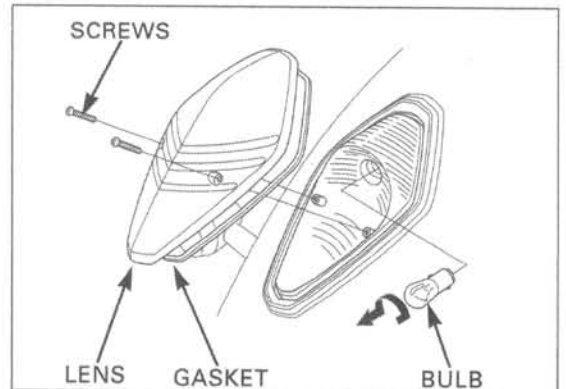
BULB REPLACEMENT

Remove the two screws and the brake/taillight lens.

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

Make sure that the lens gasket is installed in position and is in good condition, and replace it with a new one if necessary.

Install the removed parts in the reverse order of removal.



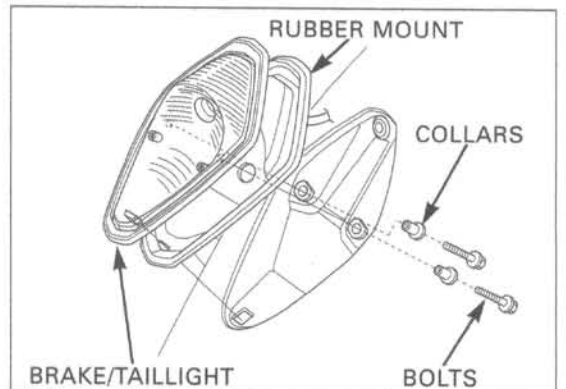
REMOVAL/INSTALLATION

Remove the rear fender (page 2-2).

Disconnect the license light connectors. Remove the brake/taillight wire from the clamps.

Remove the two mounting bolts, collars and the brake/taillight and rubber mount.

Installation is in the reverse order of removal.



LICENSE LIGHT

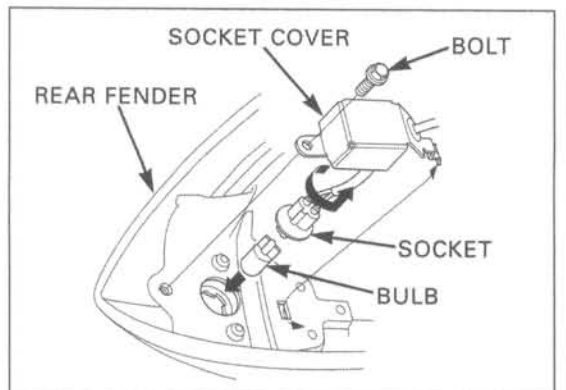
BULB REPLACEMENT

Remove the bolt and bulb socket cover from the rear fender.

Turn the socket counterclockwise and remove it. Pull the license light bulb out of the socket and replace it with a new one.

Install the removed parts in the reverse order of removal.

When installing the socket cover, align its tab with the slot in the fender.



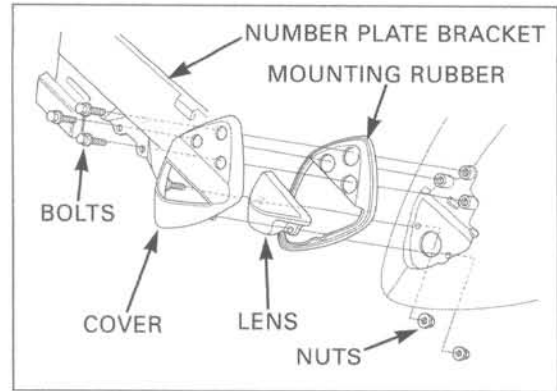
REMOVAL/INSTALLATION

Remove the license light bulb.

Remove the three bolts and number plate bracket.

Remove the two nuts, and the license light cover, license light lens and mounting rubber.

Installation is in the reverse order of removal.



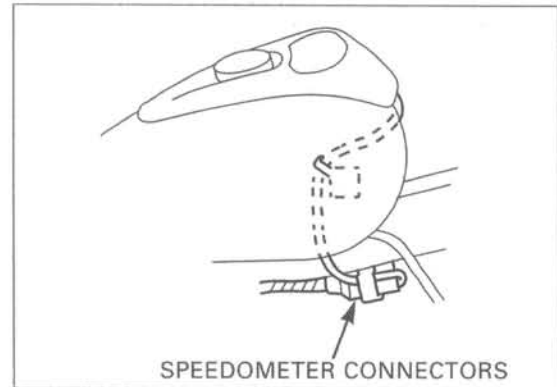
SPEEDOMETER/VEHICLE SPEED SENSOR

POWER/GROUND LINE INSPECTION

Remove the right cylinder head cover shroud (page 2-2).

Remove the speedometer connectors from the clamp and disconnect them.

Check the following at the wire harness side connector terminals.



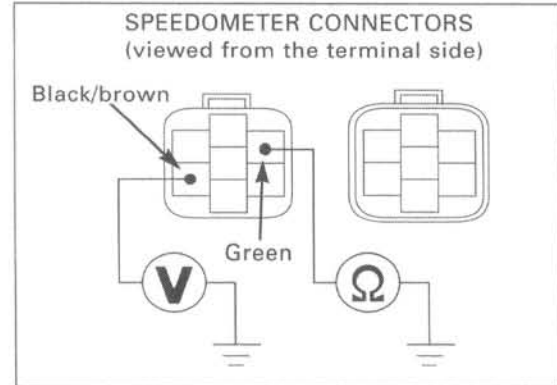
POWER INPUT LINE

Measure the voltage between the Black/brown wire terminal (+) and ground (-).

There should be battery voltage with the ignition switch turned to "ON".

If there is no voltage, check the following:

- open circuit in the Black/brown wire
- blown TAIL, METER fuse (10 A)



GROUND LINE

Check for continuity between the Green wire terminal and ground.

There should be continuity at all times.

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

BACK-UP VOLTAGE LINE

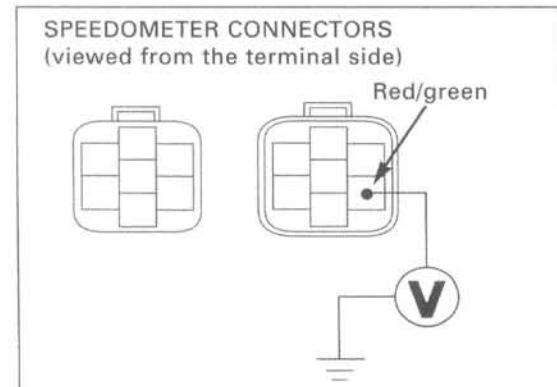
Check this line if the odometer/trip meter does not function.

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

There should be battery voltage at all times.

If there is no voltage, check the following:

- open circuit in the Red/green wire
- blown ODOMETER fuse (5 A)
- open circuit in the Red wire



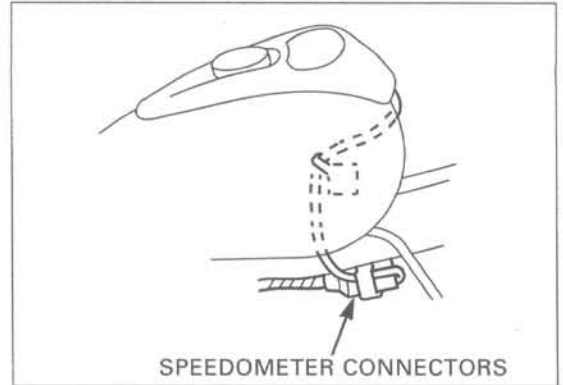
SPEEDOMETER INSPECTION

Speedometer does not operate

Check that the indicators function properly.
If they do not function, check the power/ground line.

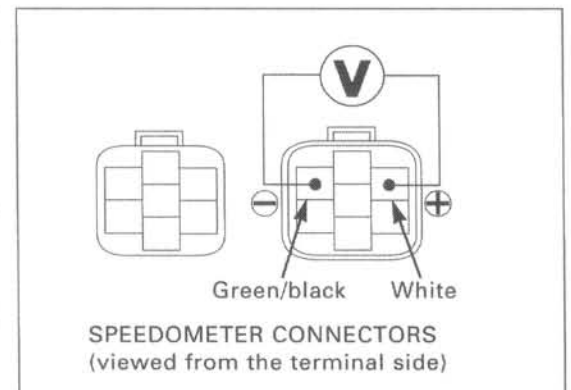
Remove the right cylinder head cover shroud (page 2-3).

Remove the speedometer connectors from the clamp.
Shift the transmission into neutral and turn the ignition switch to "ON".



Measure the voltage between the White (+) and Green/black (-) wire terminals of the speedometer connector with the connector connected.
Slowly turn the rear wheel by hand.
There should be 0 V to 5 V pulse voltage.

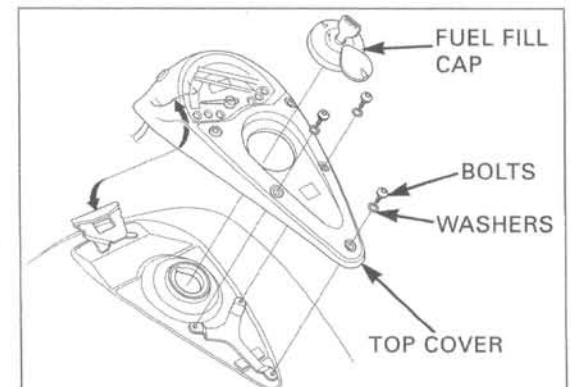
- If pulse voltage appears, replace the speedometer.
- If pulse voltage does not appear, check the following:
 - White wire for an open or short circuit
 - Green/black wire for an open circuit
 If the wires are OK, check the vehicle speed sensor (page 19-8).



SPEEDOMETER REMOVAL/INSTALLATION

Remove the fuel tank (page 2-3).

Remove the speedometer wire from the clamp.
Remove the fuel fill cap.
Remove the three socket bolts and washers.
Unhook the front of the fuel tank top cover from the setting stay on the tank and remove the top cover.



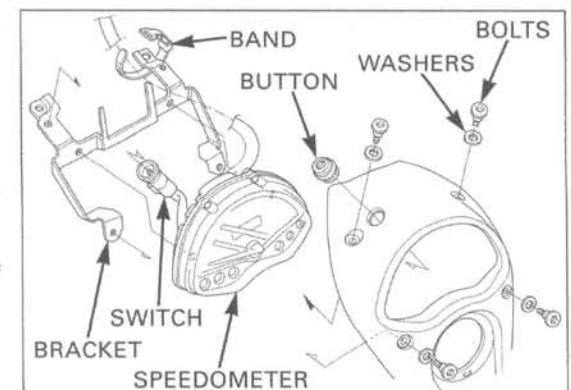
Remove the trip meter reset switch button from the top cover.
Remove the four socket bolts, washers and the speedometer with the bracket from the top cover.
Remove the trip meter reset switch body from the top cover.

Remove the wire from the bracket.
Remove the two bolts and speedometer from the bracket.

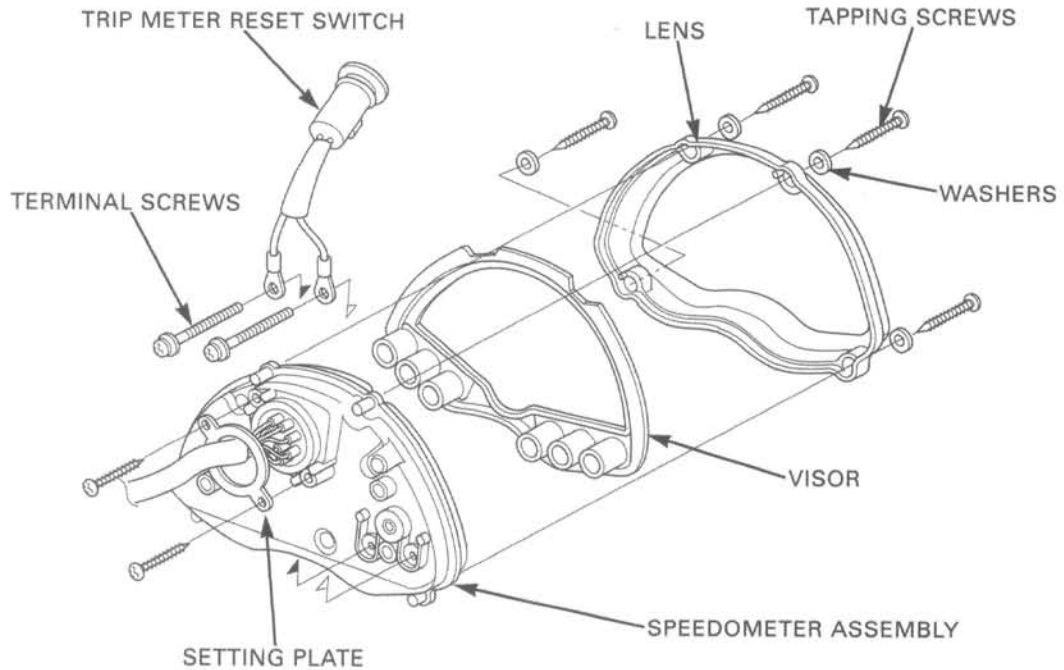
Install the speedometer in the reverse order of removal.

TORQUE:

Top cover socket bolt: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



**SPEEDOMETER DISASSEMBLY/
ASSEMBLY**



VEHICLE SPEED SENSOR INSPECTION

Remove the left crankcase rear cover (page 2-3).

Disconnect the vehicle speed sensor 3P connector and connect the inspection adaptor

TOOL:

Inspection adaptor **07GMJ-ML80100**

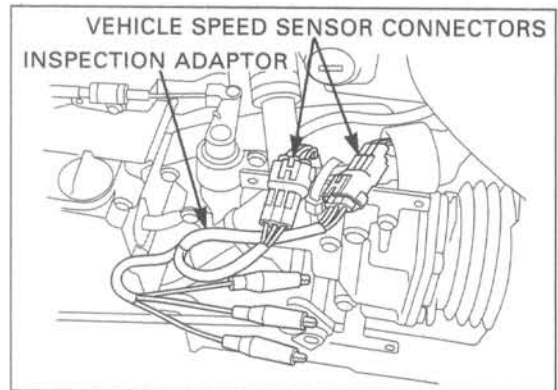
Turn the ignition switch to "ON" and measure the voltage between the White clip (+) and Red clip (-) of the inspection adaptor. There should be battery voltage.

If there is no voltage, check for an open circuit in the Black/brown and Green/black wires.

Shift the transmission into neutral and turn the ignition switch to "ON".

Measure the voltage between the Green clip (+) and Red clip (-) of the inspection adaptor. Slowly turn the rear wheel by hand. There should be 0 to 5 V pulse voltage.

If pulse voltage does not appear, replace the vehicle speed sensor.



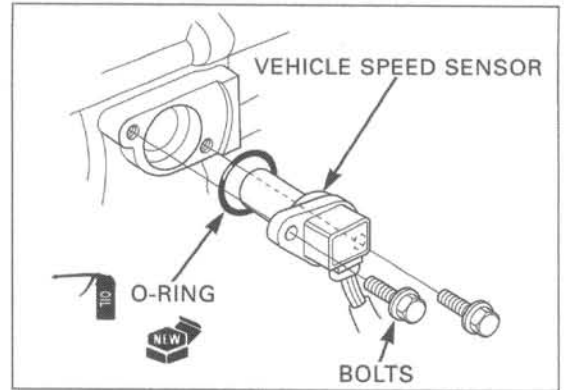
VEHICLE SPEED SENSOR REPLACEMENT

Remove the radiator reserve tank (page 6-13).

Remove the two bolts and vehicle speed sensor from the crankcase.

Coat a new O-ring with oil and install it onto a new vehicle speed sensor

Install the vehicle speed sensor and removed parts in the reverse order of removal.



COOLANT TEMPERATURE INDICATOR/THERMOSTATIC SWITCH

INSPECTION

The coolant temperature is too high, but the indicator does not come on

Check that the neutral and oil pressure indicators function properly.

If they do not function, check the power input line of the speedometer (page 19-6).

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

Disconnect the thermostatic switch connector and ground it with a jumper wire.

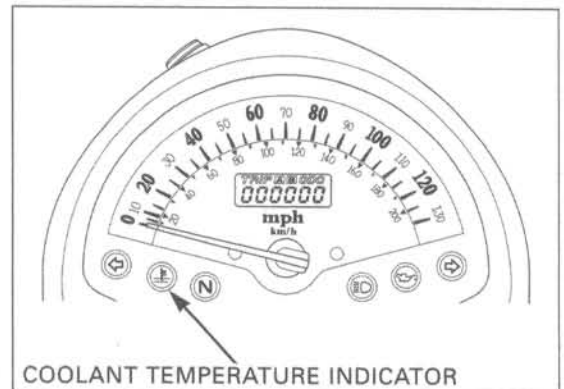
Turn the ignition switch to "ON" and check the indicator.

- If the indicator comes on, replace the thermostatic switch.
- If the indicator does not come on, check for an open circuit in the Gray wire. If the wire is OK replace the speedometer (page 19-7).

The coolant temperature is low, but the indicator comes on

Disconnect the thermostatic switch connector. Turn the ignition switch to "ON" and check the indicator.

- If the indicator does not come on, replace the thermostatic switch.
- If the indicator comes on, check for a short circuit in the Gray wire. If the wire is OK replace the speedometer (page 19-7).



THERMOSTATIC SWITCH REPLACEMENT

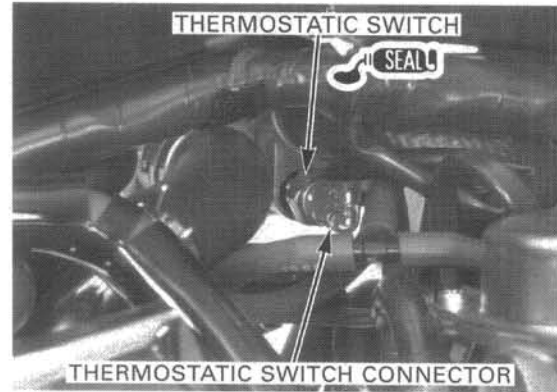
Drain the coolant (page 6-5).
Remove the air cleaner housing (page 5-3).

Disconnect the thermostatic switch connector.
Remove the thermostatic switch from the thermostat housing.

Apply sealant to the threads of a new thermostatic switch.
Install and tighten the thermostatic switch.

TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)

Install the air cleaner housing (page 5-3).
Fill and bleed the cooling system (page 6-5).



FAN MOTOR SWITCH

Disconnect the horn wires, and remove the bolt and horn.
Remove the two radiator mounting bolts, setting plate and radiator grille.

INSPECTION

Fan motor does not stop

Turn the ignition switch to "OFF", disconnect the connector from the fan motor switch and turn the ignition switch to "ON".

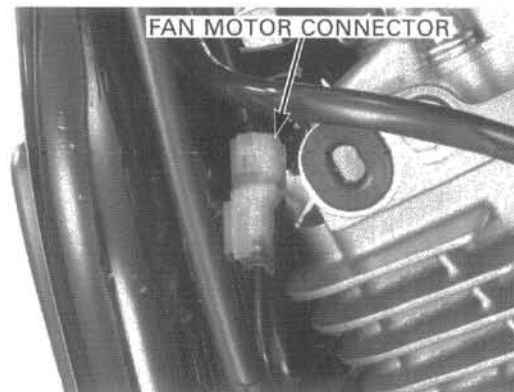
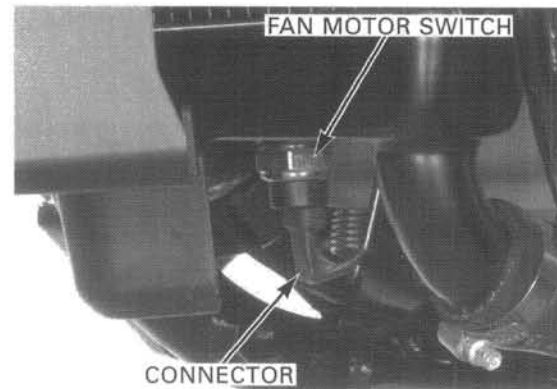
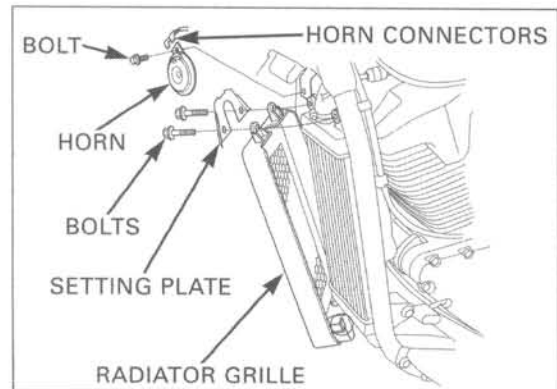
- If the fan motor does not stop, check for a short circuit between the fan motor and switch.
- If the fan motor stops, replace the fan motor switch.

Fan motor does not start

Before testing, check for a blown FAN fuse (10 A).

Disconnect the connector from the fan motor switch and ground it with a jumper wire.
Turn the ignition switch to "ON" and check the fan motor.

- If the motor starts, check the connection at the fan motor switch terminal. If it is OK, replace the fan motor switch.
- If the fan motor does not start, remove the left cylinder head cover shroud (page 2-2).
Disconnect the fan motor 2P connector.
Measure the voltage between the Black/blue (+) and Green (-) wire terminals of the wire harness side connector.
There should be battery voltage.
- If there is battery voltage, replace the fan motor (page 6-8).
- If there is no voltage, check for an open circuit in the Black/blue and Green wires.



REPLACEMENT

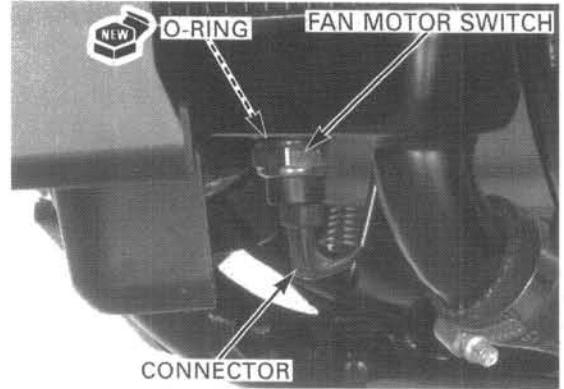
Drain the coolant (page 6-5).

Disconnect the connector from the fan motor switch. Remove the fan motor switch from the radiator.

Install a new O-ring onto a new fan motor switch. Install and tighten the fan motor switch.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the connector to the fan motor switch.

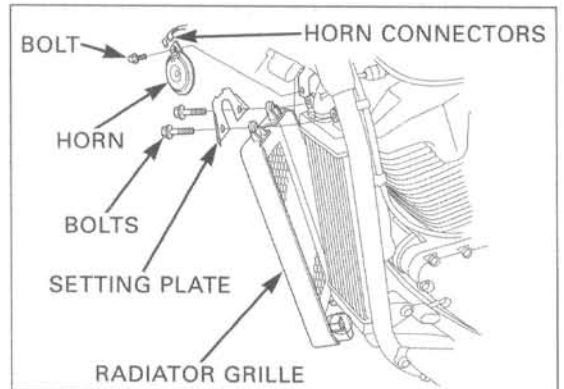


Install the radiator grille and setting plate, and tighten the two bolts securely. Install the horn and tighten the mounting bolt.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Connect the horn connectors.

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



OIL PRESSURE INDICATOR

INSPECTION

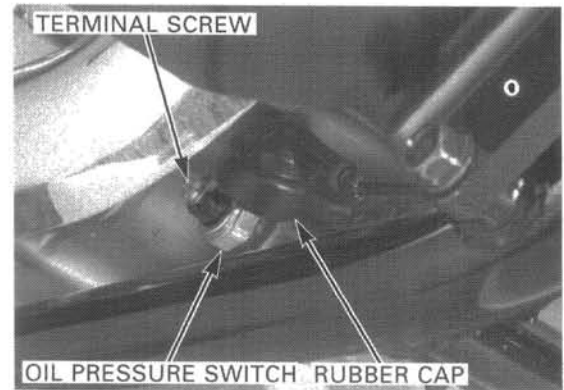
Indicator does not come on with the ignition switch turned to "ON"

Check that the neutral and coolant temperature indicators function properly. If they do not function properly, check the power input line of the speedometer (page 19-6).

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw. Ground the wire terminal to the engine with a jumper wire.

Turn the ignition switch to "ON" and check the oil pressure indicator.

- If the indicator comes on, replace the oil pressure switch.
- If the indicator does not come on, check for loose or poor connections, or an open circuit in the Blue/red wire.

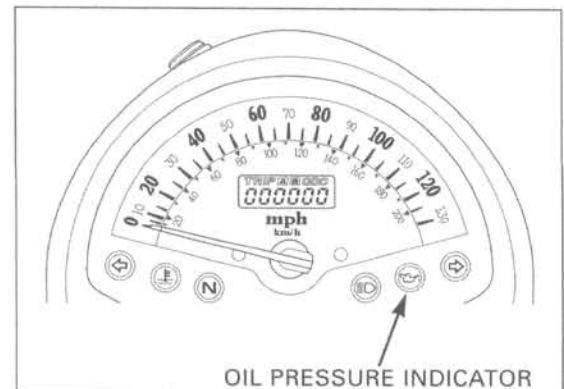


Indicator stays on while the engine is running

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

Check for continuity between the wire terminal and ground.

- If there is continuity, check for a short circuit in the Blue/red wire.
- If there is no continuity, check the oil pressure (page 4-4). If the oil pressure is normal, replace the oil pressure switch.

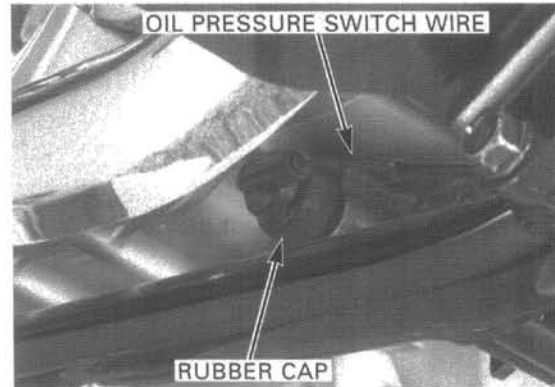


LIGHTS/METERS/SWITCHES

After inspection, connect the oil pressure switch wire and tighten the terminal screw.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the rubber cap properly.



IGNITION SWITCH

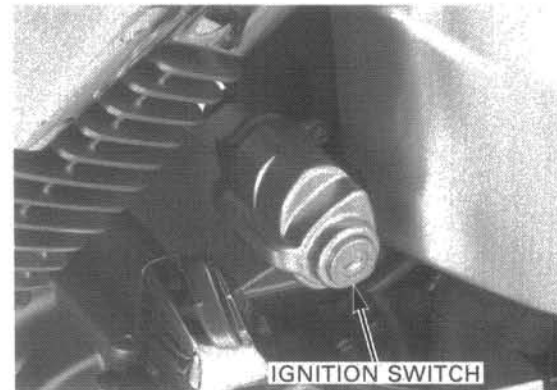
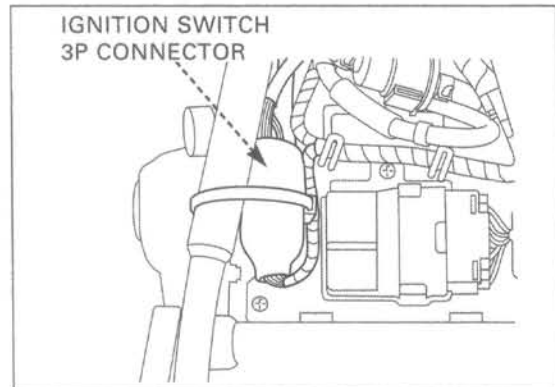
INSPECTION

Remove the seats (page 2-2).

Disconnect the ignition switch 3P connector.

Check for continuity between the switch side connector terminals in each switch position. Continuity should exist between the color coded wires as shown in the chart.

Color Position	R	R/Bl	Bu/O
OFF			
ON	○	○	○



REMOVAL/INSTALLATION

Remove the seats (page 2-2).

Disconnect the ignition switch 3P connector.

Remove the screw and ignition switch cover. Remove the two mounting bolts and ignition switch.

Install the ignition switch and tighten the two mounting bolts.

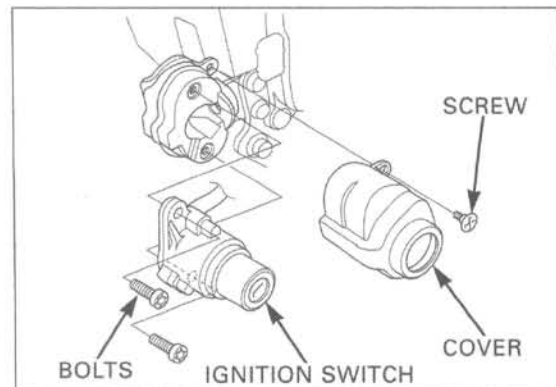
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the ignition switch cover and tighten the screw.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Route the ignition switch wire properly (page 1-19). Connect the ignition switch 3P connector.

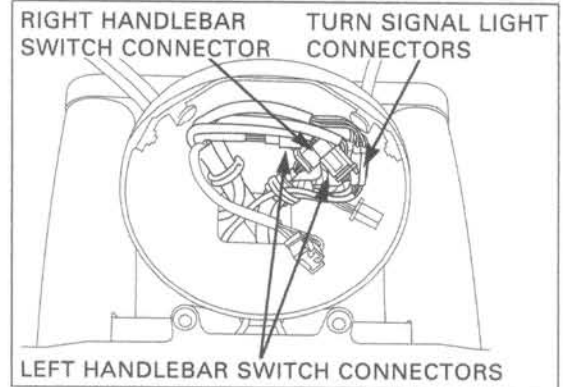
Install the seats (page 2-2).



HANDLEBAR SWITCH

Remove the headlight (page 19-3).

Disconnect the right handlebar switch 9P red connector, left handlebar switch 6P black and 6P blue connectors, and turn signal light connectors. Check for continuity between the connector terminals in each switch position. Continuity should exist between the color coded wires as shown in the charts on the next page.



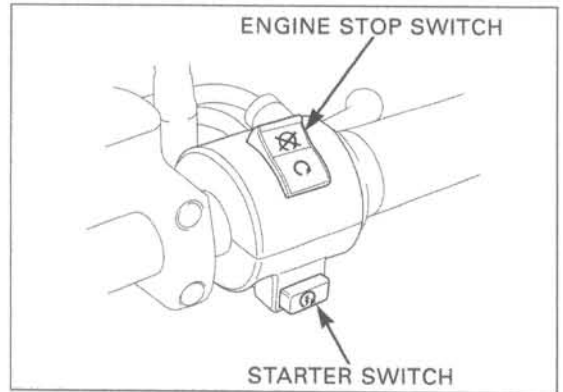
RIGHT HANDLEBAR SWITCH

STARTER SWITCH

Position \ Color	Bl/W	Y/R	Bl/R	Bu/W
FREE			○—○	
PUSH	○—○			

ENGINE STOP SWITCH

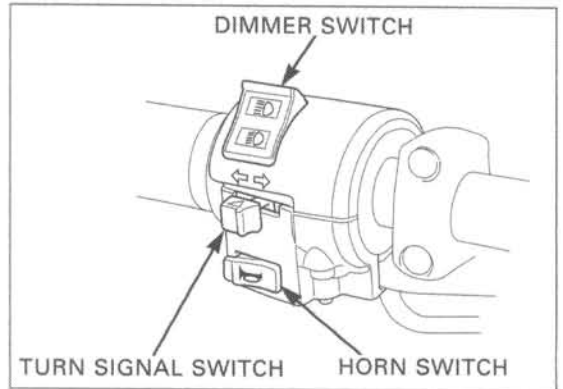
Position \ Color	W/Bl	Bl/W
OFF		
RUN	○—○	



LEFT HANDLEBAR SWITCH

DIMMER SWITCH

Position \ Color	Bu/W	W	Bu
LO	○—○		
(N)	○—○	○—○	
HI	○—○		○—○



HORN SWITCH

Position \ Color	W/G	Lg
FREE		
PUSH	○—○	

TURN SIGNAL SWITCH

Position \ Color	Gr	O	Lb	Bl/Br	O/W	Lb/W
L	○—○			○—○		○—○
(N)				○—○	○—○	○—○
R	○—○		○—○	○—○		

BRAKE LIGHT SWITCH

FRONT

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

There should be continuity with the front brake lever squeezed and no continuity with the lever released.

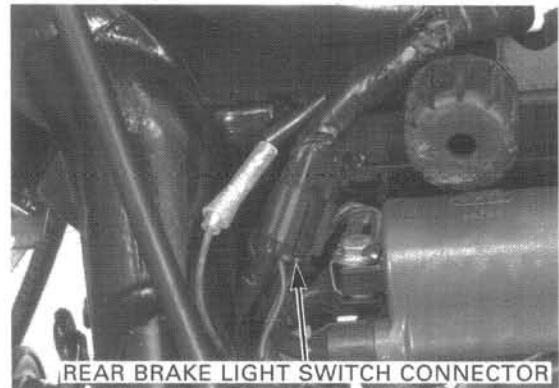


REAR

Remove the left steering side cover (page 2-3).

Disconnect the rear brake light switch 2P connector and check for continuity between the switch side connector terminals.

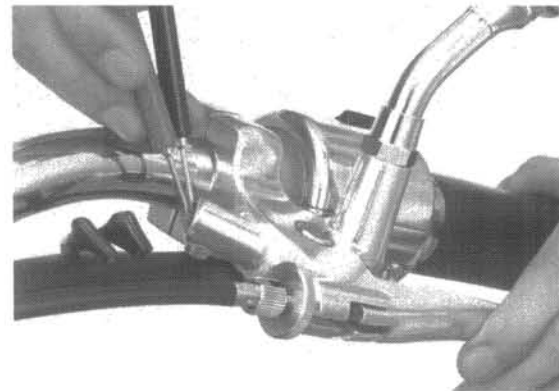
There should be continuity with the rear brake pedal depressed and no continuity with the pedal released.



CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.



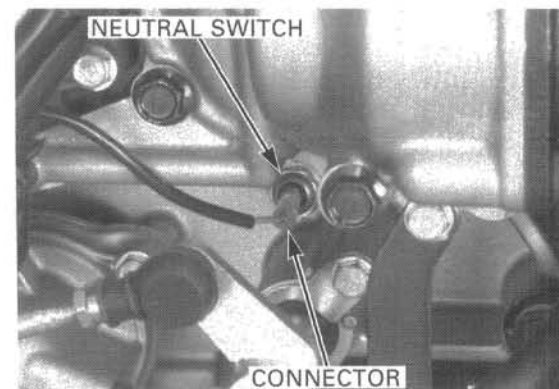
NEUTRAL SWITCH

Remove the left crankcase rear cover (page 2-3).

INSPECTION

Disconnect the neutral switch connector. Check for continuity between the switch terminal and engine ground.

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



REPLACEMENT

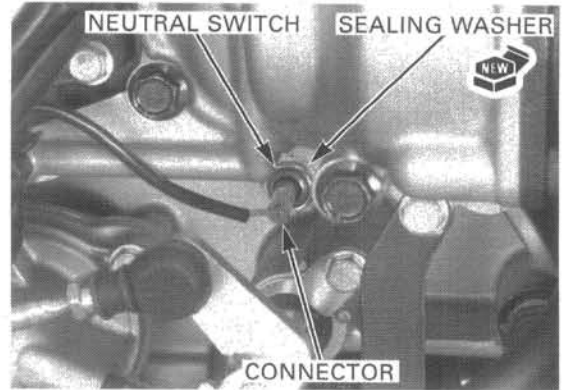
Disconnect the neutral switch connector.
Remove the neutral switch from the crankcase.

Install the neutral switch with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the neutral switch wire connector.

Install the left crankcase rear cover (page 2-3).



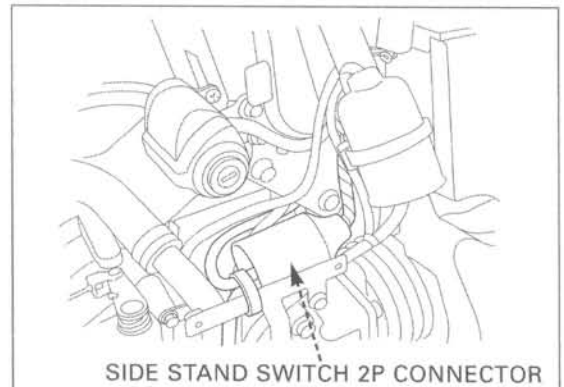
SIDE STAND SWITCH

Remove the left crankcase rear cover (page 2-3).

INSPECTION

Disconnect the side stand switch 2P connector.
Check for continuity between the switch side connector terminals.

There should be continuity with the side stand retracted and no continuity with the side stand lowered.



REMOVAL/INSTALLATION

Support the motorcycle securely.

Disconnect the side stand switch 2P connector.
Remove the side stand switch wire from the wire bands and clamp.

Remove the side stand switch bolt, setting plate, washer and switch from the side stand pivot.

Install the side stand switch by aligning the switch pin with the side stand hole.

Install the washer.

Install the setting plate by aligning the tab of the plate with the switch groove, and the groove in the plate with the return spring pin.

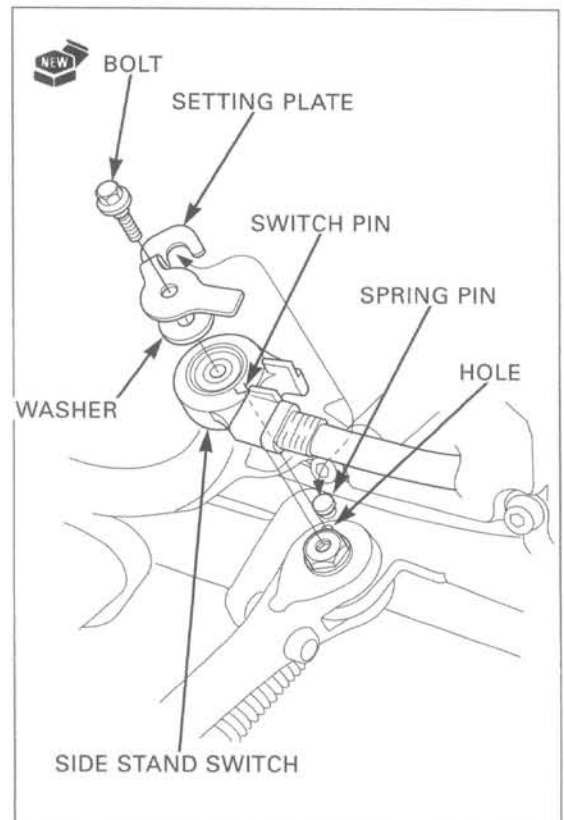
Install a new side stand switch bolt and tighten it.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Route the side stand switch wire properly (page 1-19).

Connect the side stand switch 2P connector.

Install the left crankcase rear cover (page 2-3).

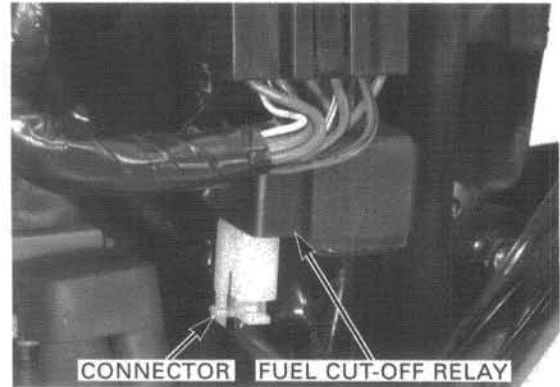


FUEL PUMP

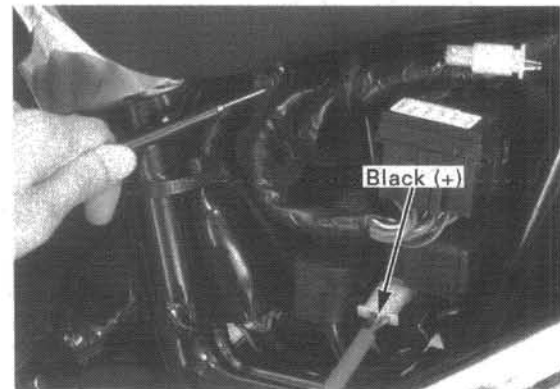
SYSTEM INSPECTION

Remove the right side cover (page 2-2).

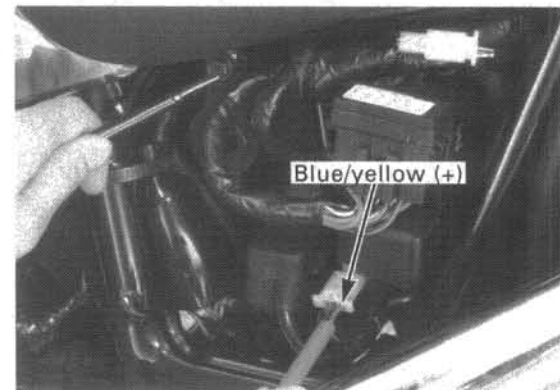
Turn the ignition switch to "OFF" and disconnect the fuel cut-off relay connector.



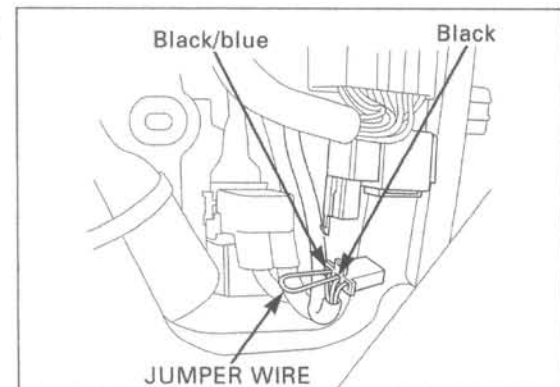
Turn the ignition switch to "ON" and measure the voltage between the Black wire terminal (+) and ground (-). There should be battery voltage. If there is no voltage, check for an open circuit in the Black wire.



Make sure that the engine stop switch is at "O". Measure the voltage between the Blue/yellow wire terminal (+) and ground (-). There should be battery voltage with the ignition switch turned to "ON". If there is no voltage, check for an open circuit in the Blue/yellow wire.

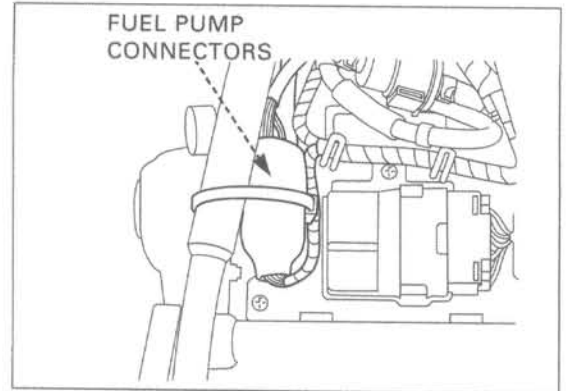


Turn the ignition switch to "OFF" and connect the Black and Black/blue wire terminals with a jumper wire.



Remove the seats (page 2-2).

Disconnect the fuel pump connectors.
Turn the ignition switch to "ON" and measure the voltage between the Black/blue (+) and Green (-) wire terminals of the wire harness side connectors.
There should be battery voltage.
If there is no voltage, check for an open circuit in the Black/blue and Green wires.

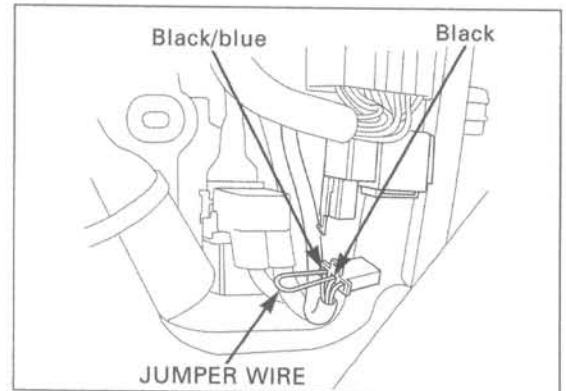


DISCHARGE VOLUME INSPECTION

Remove the right side cover (page 2-2).
Remove the air cleaner housing (page 5-3).

Temporarily connect the fuel hose to the fuel valve and turn the fuel valve to "ON".

Turn the ignition switch to "OFF" and disconnect the fuel cut-off relay connector.
Connect the Black and Black/blue wire terminals with a jumper wire.



Disconnect the fuel hose from the carburetor.
Hold a graduated beaker under the fuel hose.

Turn the ignition switch to "ON" and let the fuel flow into the beaker for 5 seconds, then turn the ignition switch to "OFF".

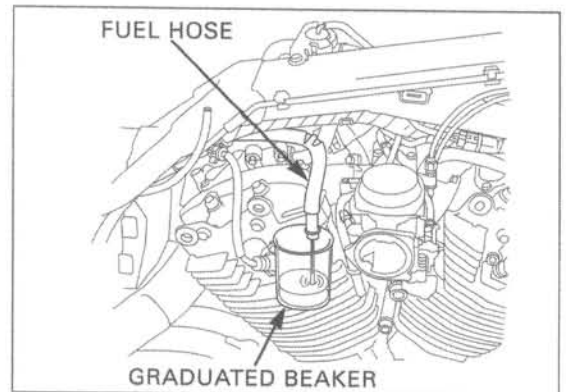
Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

FUEL PUMP FLOW CAPACITY:
700 cm³ (23.7 US oz, 24.6 Imp oz)/minute

Install the removed parts in the reverse order of removal.

NOTE:

- If the fuel pump does not operate on this inspection, replace the pump.
If the system inspection and discharge volume inspection are OK, but fuel pump does not operate at the engine running, replace the fuel cut-off relay.



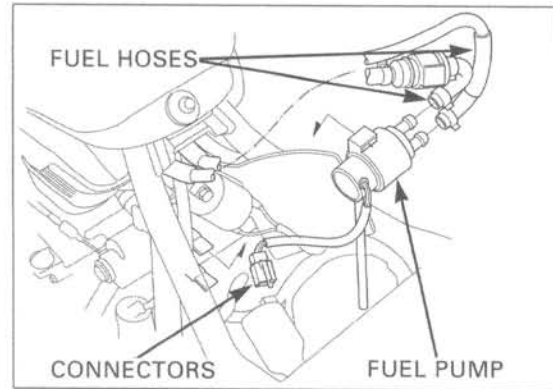
LIGHTS/METERS/SWITCHES

REMOVAL/INSTALLATION

Remove the battery case (page 17-6).

Disconnect the fuel pump connectors.
Remove the fuel pump from the center cover.
Disconnect the fuel hoses from the fuel pump and remove the fuel pump.

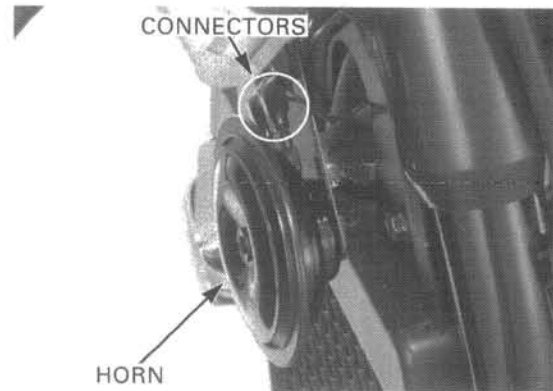
Install the fuel pump in the reverse order of removal.



HORN

Disconnect the wire connectors from the horn.
Connect a 12 V battery to the horn terminals.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.

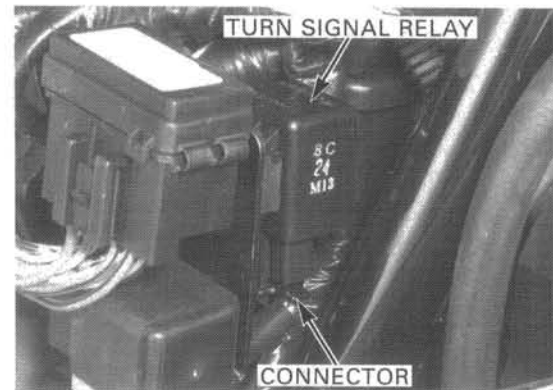


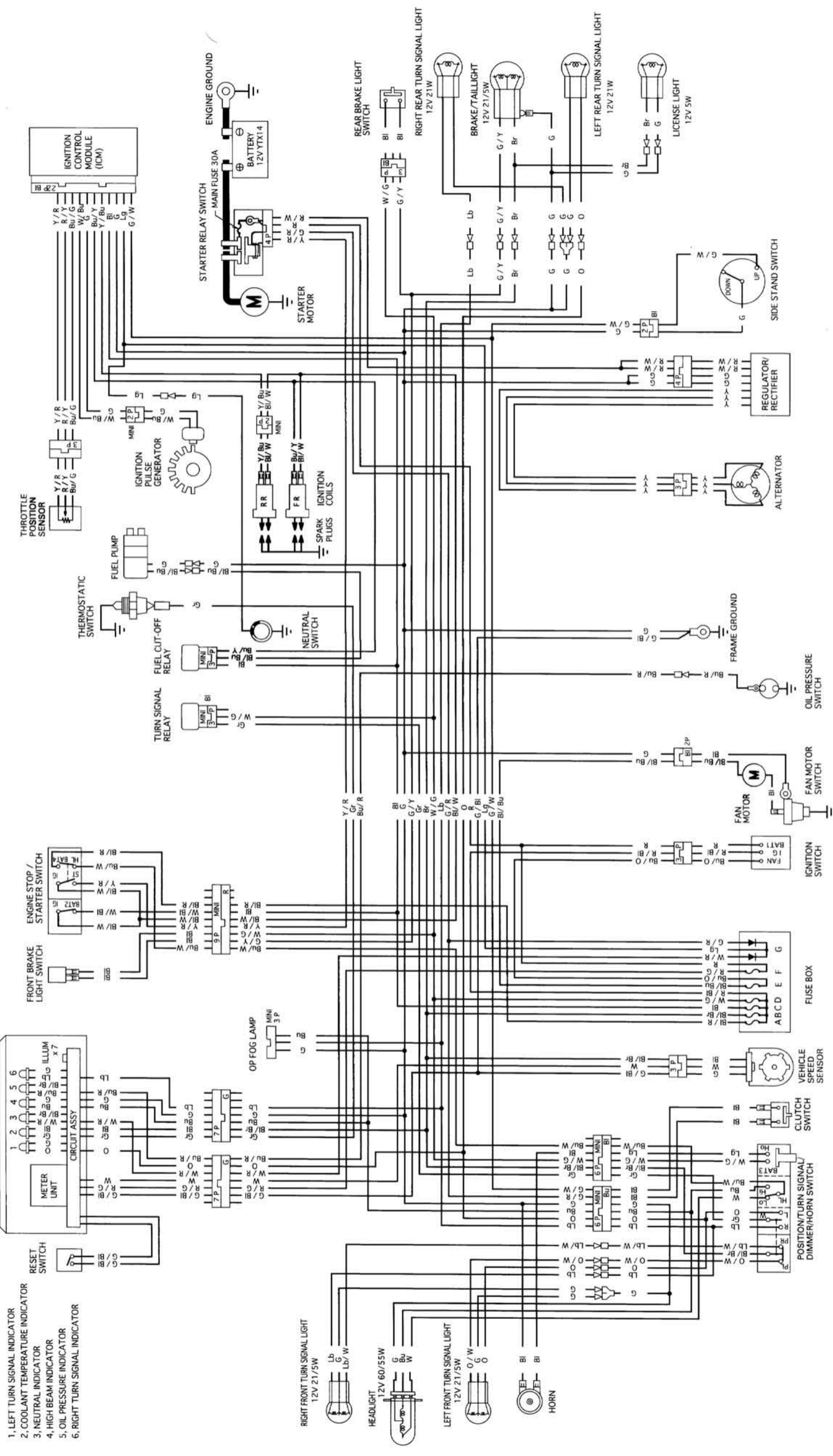
TURN SIGNAL RELAY

Turn signal light does not blink
Remove the right side cover (page 2-2).

Remove the turn signal relay from the stay and disconnect the connector.
Connect the White/green and Gray wire terminals of the wire harness side connector with a jumper wire.
Turn the ignition switch to "ON" and check the turn signal lights by operating the turn signal switch.

- If the light does not come on, check for an open circuit in the White/green and Gray wires.
- If the light comes on, check the connector terminals for loose or poor contact.
If the connector terminals are OK, replace the turn signal relay.





- 1. LEFT TURN SIGNAL INDICATOR
- 2. COOLANT TEMPERATURE INDICATOR
- 3. NEUTRAL INDICATOR
- 4. HIGH BEAM INDICATOR
- 5. OIL PRESSURE INDICATOR
- 6. RIGHT TURN SIGNAL INDICATOR

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

IGNITION SWITCH	
ON	KEY ON
OFF	KEY OFF

- A: 10A(H/LIGHT)
- B: 10A(METER, TAIL)
- C: 10A(IGN., START)
- D: 10A(TURN, HORN, STOP)
- E: 10A(FAN)
- F: 5A(ODOMETER)

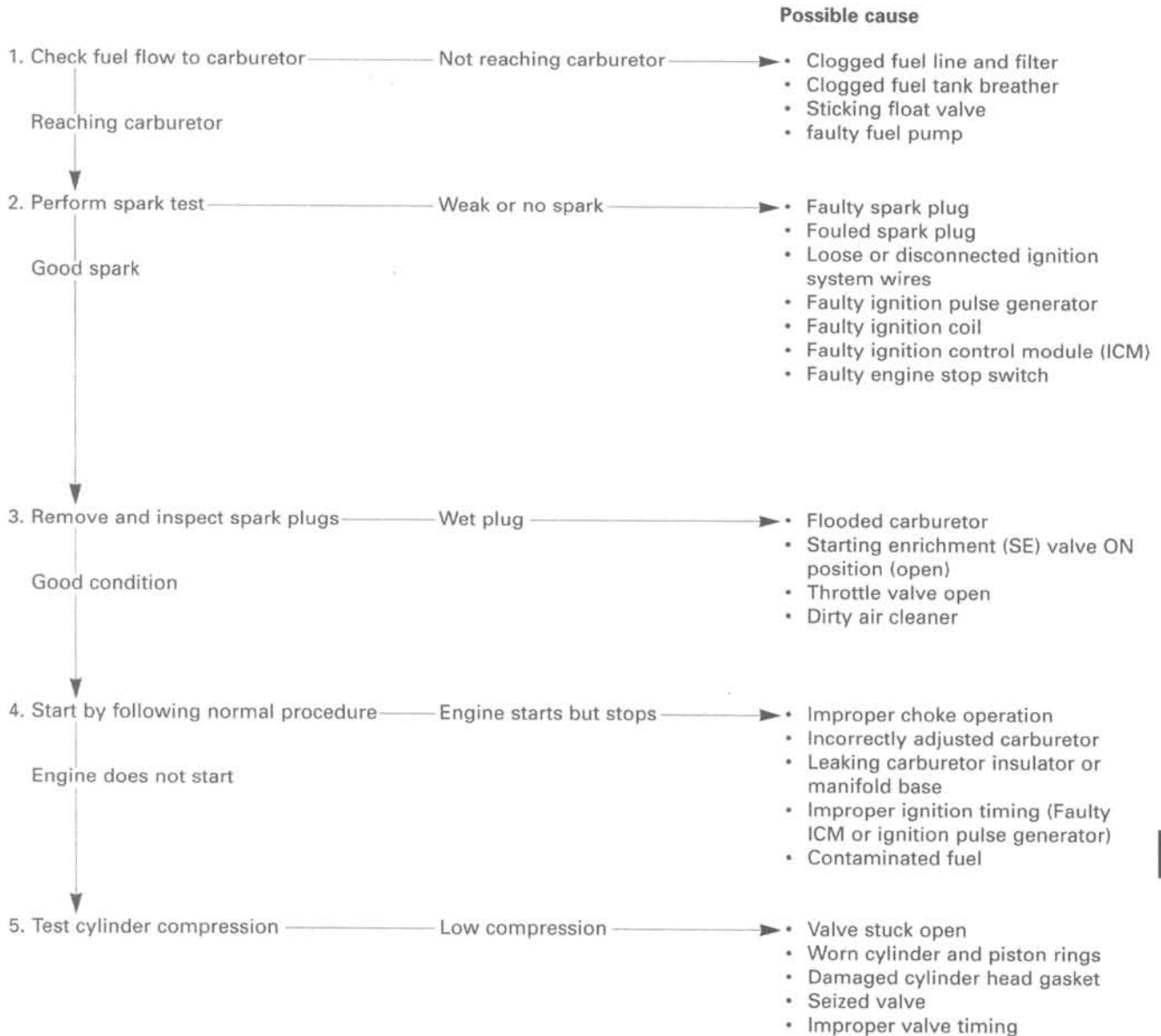
ENGINE STOP SWITCH	
ST	IG BATT HL
FREE	OFF
PUSH	RUN

TURN SIGNAL SWITCH					
W	L	R	PO	PL	PR
L	(N)	(N)	(N)	(N)	(N)
R	(N)	(N)	(N)	(N)	(N)

21. TROUBLESHOOTING

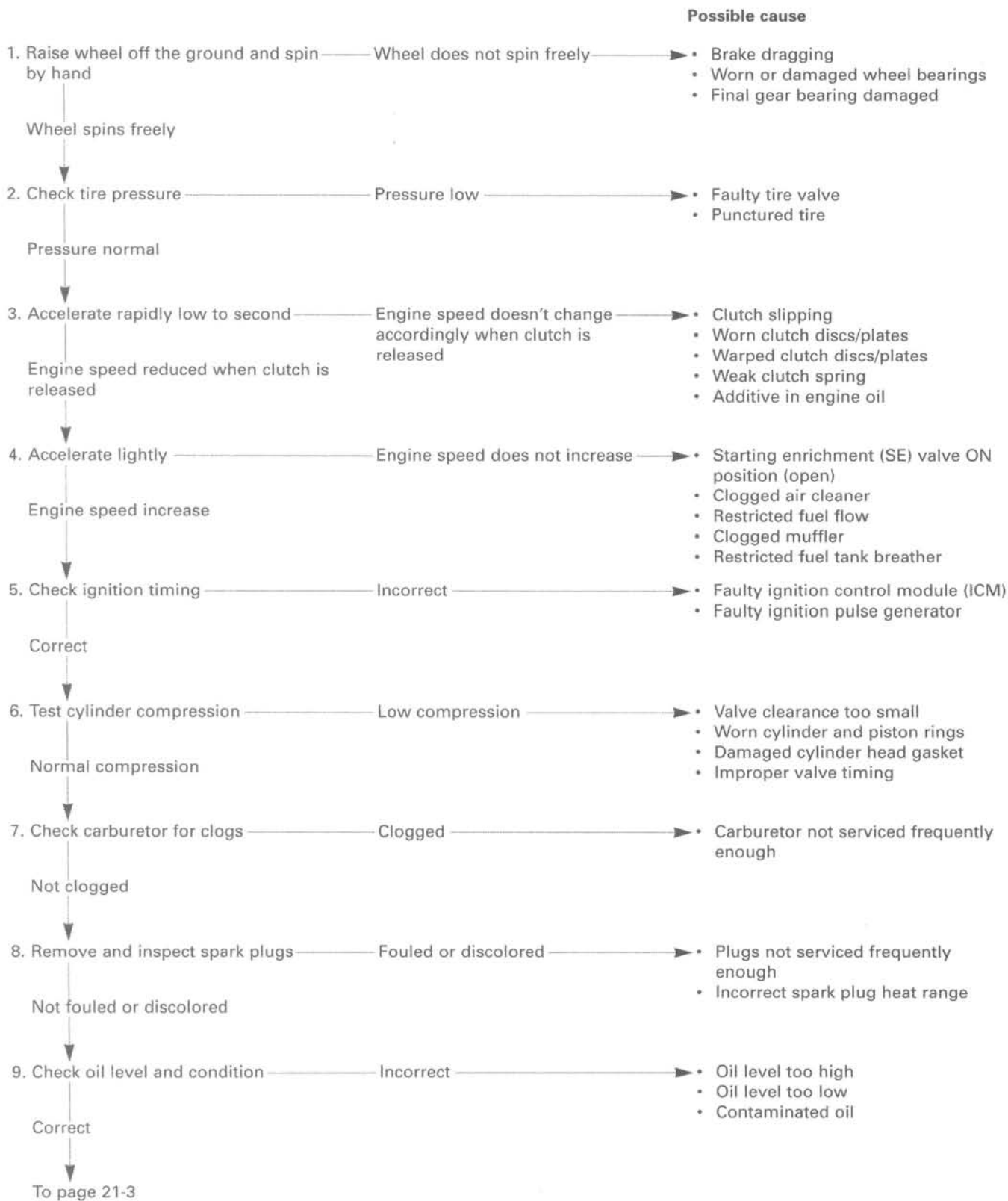
ENGINE DOES NOT START OR IS HARD TO START	21-1	POOR PERFORMANCE AT HIGH SPEED	21-4
ENGINE LACKS POWER	21-2	POOR HANDLING	21-4
POOR PERFORMANCE AT LOW AND IDLE SPEEDS	21-3		

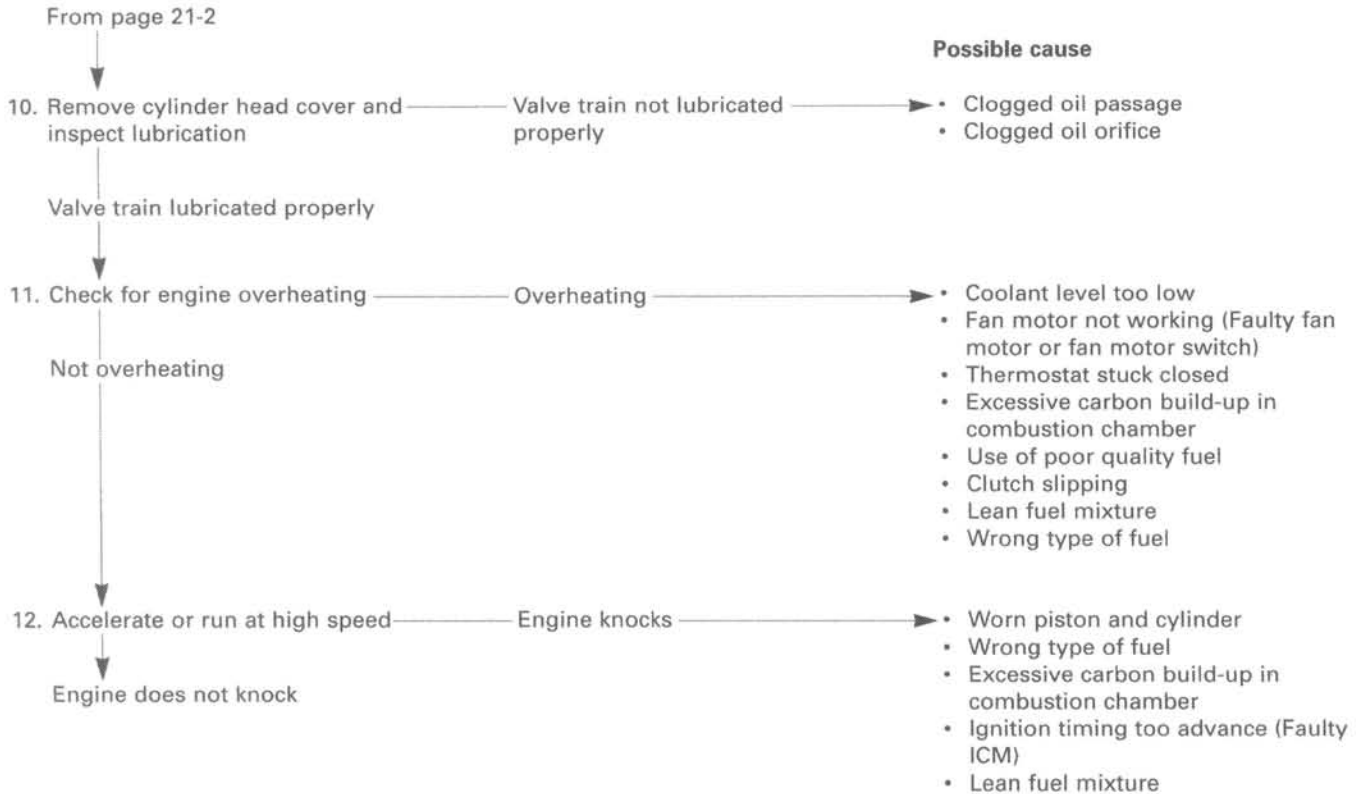
ENGINE DOES NOT START OR IS HARD TO START



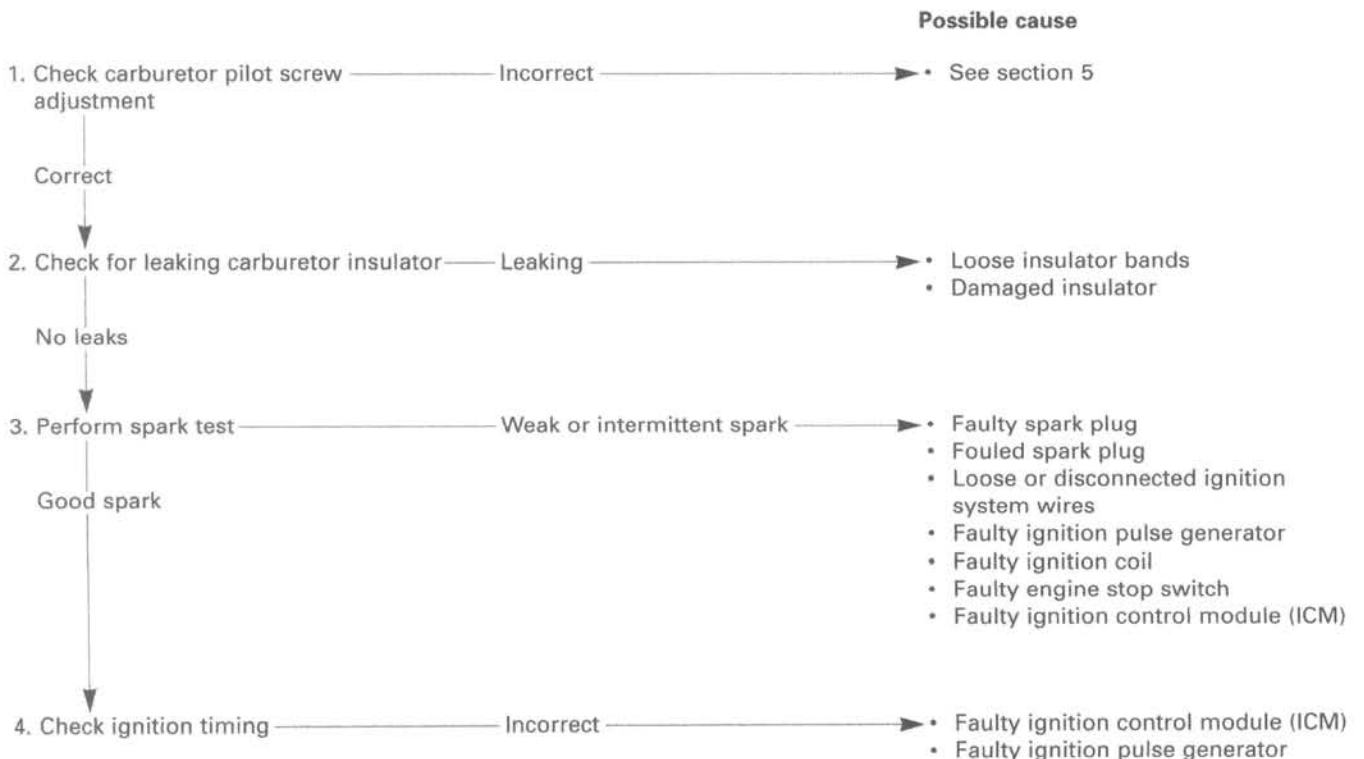
TROUBLESHOOTING

ENGINE LACKS POWER



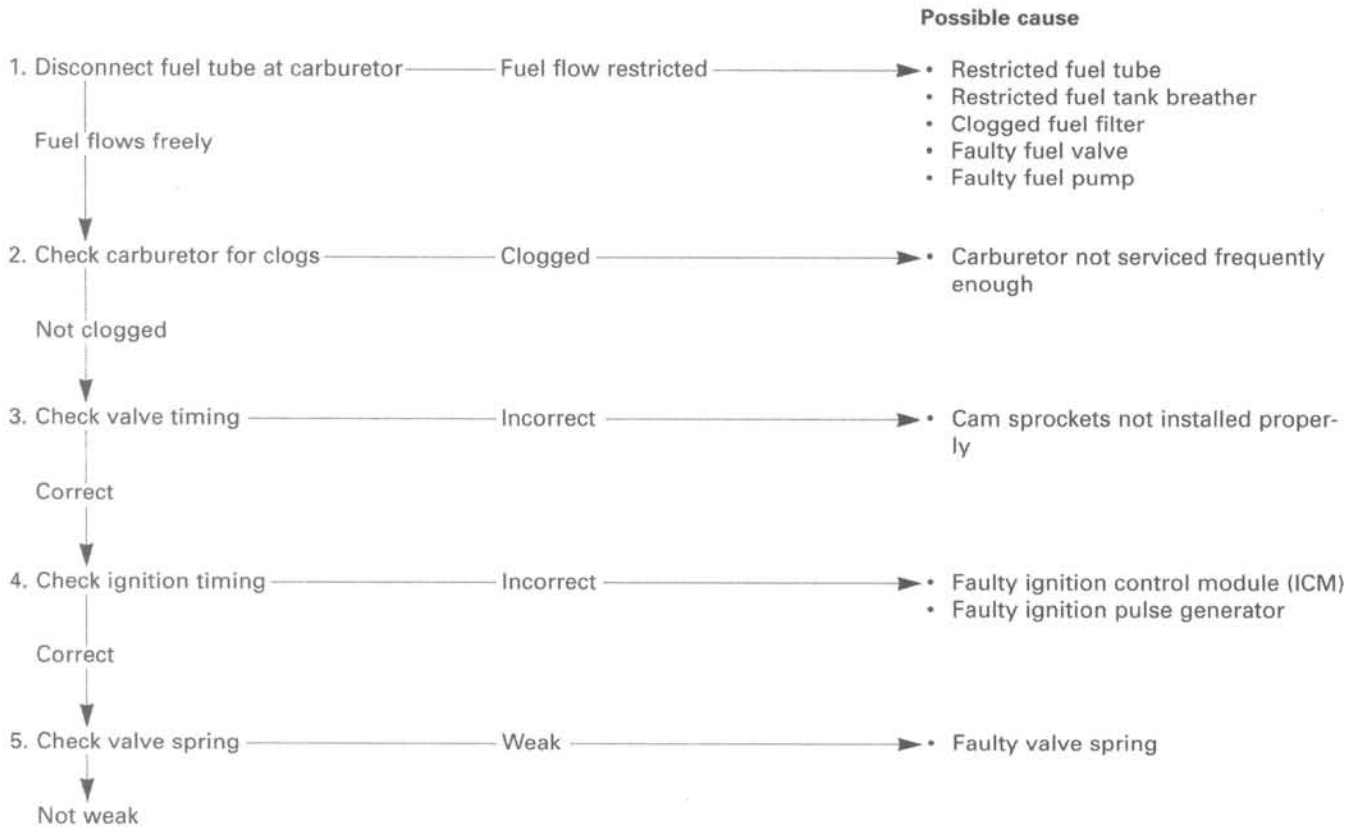


POOR PERFORMANCE AT LOW AND IDLE SPEEDS



TROUBLESHOOTING

POOR PERFORMANCE AT HIGH SPEED



POOR HANDLING

- Possible cause**
1. If steering is heavy —
- Steering stem adjustment nut too tight
 - Damaged steering head bearings
2. If either wheel is wobbles —
- Excessive wheel bearing play
 - Bent rim
 - Improperly installed wheel hub
 - Excessively worn swingarm pivot bearings
 - Bent frame
3. If motorcycle pulls to one side —
- Front and rear wheels not aligned
 - Bent fork
 - Bent swingarm
 - Bent axle
 - Bent frame

AIR CLEANER	3-5	FINAL DRIVE OIL	3-14
AIR CLEANER HOUSING	5-3	FINAL DRIVE REMOVAL	12-3
ALTERNATOR	16-8	FLYWHEEL/STARTER CLUTCH	18-12
BALANCER SHAFT	11-9	FOOTREST	2-4
BATTERY	16-4	FORK	13-12
BRAKE FLUID	3-15	FRONT BRAKE CALIPER	15-10
BRAKE FLUID REPLACEMENT/AIR BLEEDING	15-3	FRONT MASTER CYLINDER	15-7
BRAKE LIGHT SWITCH	3-17, 19-14	FRONT WHEEL	13-7
BRAKE PAD WEAR	3-16	FUEL LINE	3-4
BRAKE PAD/DISC	15-5	FUEL PUMP	19-16
BRAKE SYSTEM	3-17	FUEL TANK	2-3
BRAKE/TAILLIGHT	19-5	GEARSHIFT LINKAGE	10-12
CABLE & HARNESS ROUTING	1-19	HANDLEBAR	13-4
CAMSHAFT INSTALLATION	8-17	HANDLEBAR SWITCH	19-13
CAMSHAFT REMOVAL	8-5	HEADLIGHT	19-3
CARBURETOR ASSEMBLY	5-10	HEADLIGHT AIM	3-17
CARBURETOR CHOKE	3-5	HIGH ALTITUDE ADJUSTMENT	5-19
CARBURETOR DISASSEMBLY/INSPECTION	5-5	HORN	19-18
CARBURETOR REMOVAL	5-4	IGNITION COIL	17-5
CHARGING SYSTEM INSPECTION	16-7	IGNITION SWITCH	19-12
CLUTCH	10-4	IGNITION SYSTEM INSPECTION	17-3
CLUTCH LIFTER ARM	10-19	IGNITION TIMING	17-7
CLUTCH SWITCH	19-14	INTAKE MANIFOLD	5-16
CLUTCH SYSTEM	3-17	LEFT CRANKCASE REAR COVER	2-3
COOLANT REPLACEMENT	6-4	LICENSE LIGHT	19-5
COOLANT TEMPERATURE INDICATOR/ THERMOSTATIC SWITCH	19-9	LUBRICATION & SEAL POINTS	1-16
COOLING FAN MOTOR SWITCH	19-10	MAINTENANCE SCHEDULE	3-3
COOLING SYSTEM	3-13	MODEL IDENTIFICATION	1-2
COOLING SYSTEM TESTING	6-3	NEUTRAL SWITCH	19-14
CRANKCASE ASSEMBLY	11-20	NUTS, BOLTS, FASTENERS	3-19
CRANKCASE BEARING REPLACEMENT	11-18	OIL FILTER	3-10
CRANKCASE BREATHER	3-6	OIL PRESSURE CHECK	4-3
CRANKCASE SEPARATION	11-3	OIL PRESSURE INDICATOR	19-11
CRANKSHAFT/CONNECTING ROD	11-3	OIL PUMP/PRESSURE RELIEF VALVE	4-4
CYLINDER COMPRESSION	8-3	PILOT SCREW ADJUSTMENT	5-18
CYLINDER HEAD ASSEMBLY	8-15	PRIMARY GEARS	10-15
CYLINDER HEAD COVER INSTALLATION	8-21	RADIATOR COOLANT	3-12
CYLINDER HEAD COVER REMOVAL	8-3	RADIATOR RESERVE TANK	6-13
CYLINDER HEAD DISASSEMBLY	8-9	RADIATOR/COOLING FAN	6-8
CYLINDER HEAD INSTALLATION	8-16	REAR BRAKE CALIPER	15-17
CYLINDER HEAD REMOVAL	8-8	REAR FENDER	2-5
CYLINDER HEAD SHROUD	2-2	REAR MASTER CYLINDER/BRAKE PEDAL	15-13
CYLINDER/PISTON INSTALLATION	9-8	REAR WHEEL	14-3
CYLINDER/PISTON REMOVAL	9-3	REGULATOR/RECTIFIER	16-8
DIODE	18-11	RIGHT CRANKCASE COVER INSTALLATION	10-18
EMISSION CONTROL INFORMATION LABELS	1-35	RIGHT CRANKCASE COVER REMOVAL	10-4
EMISSION CONTROL SYSTEMS	1-32	ROCKER ARM INSTALLATION	8-20
ENGINE IDLE SPEED	3-11	ROCKER ARM REMOVAL	8-4
ENGINE INSTALLATION	7-6	SEATS	2-2
ENGINE OIL	3-10	SECONDARY AIR SUPPLY SYSTEM	3-13, 5-20
ENGINE REMOVAL	7-2	SERVICE INFORMATION	
EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	3-14, 5-22	BATTERY/CHARGING SYSTEM	16-1
EXHAUST SYSTEM	2-6	CLUTCH/GEARSHIFT LINKAGE	10-2
FINAL DRIVE ASSEMBLY	12-12	COOLING SYSTEM	6-1
FINAL DRIVE DISASSEMBLY/INSPECTION	12-4	CRANKSHAFT/TRANSMISSION	11-1
FINAL DRIVE GEAR CASE BEARING REPLACEMENT	12-9	CYLINDER HEAD/VALVE	8-1
FINAL DRIVE INSTALLATION	12-18	CYLINDER/PISTON	9-1
		ELECTRIC STARTER/STARTER CLUTCH	18-1
		ENGINE REMOVAL/INSTALLATION	7-1
		FINAL DRIVE	12-1

INDEX

SERVICE INFORMATION	
FRAME/BODY PANELS/EXHAUST SYSTEM.....	2-1
FRONT WHEEL/SUSPENSION/STEERING	13-1
FUEL SYSTEM.....	5-1
HYDRAULIC DISC BRAKE.....	15-1
IGNITION SYSTEM.....	17-1
LIGHTS/METERS/SWITCHES	19-1
LUBRICATION SYSTEM.....	4-1
MAINTENANCE	3-1
REAR WHEEL/SUSPENSION	14-1
SERVICE RULES	1-1
SHOCK ABSORBER.....	14-9
SIDE COVER	2-2
SIDE STAND	3-18
SIDE STAND SWITCH.....	19-15
SPARK PLUG	3-6
SPECIFICATIONS.....	1-3
SPEEDOMETER/VEHICLE SPEED SENSOR.....	19-6
STARTER MOTOR	18-4
STARTER RELAY SWITCH	18-10
STEERING HEAD BEARINGS	3-20
STEERING SIDE COVER	2-3
STEERING STEM.....	13-18
SUSPENSION	3-19
SWINGARM.....	14-10
THERMOSTAT	6-6
THROTTLE OPERATION	3-4
THROTTLE POSITION SENSOR.....	17-8
TOOLS.....	1-14
TORQUE VALUES.....	1-10
TRANSMISSION/OUTPUT GEAR CASE.....	11-10
TROUBLESHOOTING	
BATTERY/CHARGING SYSTEM.....	16-3
CLUTCH/GEARSHIFT LINKAGE.....	10-3
COOLING SYSTEM	6-2
CRANKSHAFT/TRANSMISSION	11-2
CYLINDER HEAD/VALVE	8-2
CYLINDER/PISTON.....	9-2
ELECTRIC STARTER/STARTER CLUTCH.....	18-2
ENGINE DOES NOT START OR IS HARD TO START ..	21-1
ENGINE LACKS POWER	21-2
FINAL DRIVE	12-2
FRAME/BODY PANELS/EXHAUST SYSTEM.....	2-1
FRONT WHEEL/SUSPENSION/STEERING	13-3
FUEL SYSTEM.....	5-2
HYDRAULIC DISC BRAKE.....	15-2
IGNITION SYSTEM.....	17-2
LUBRICATION SYSTEM.....	4-2
POOR HANDLING.....	21-4
POOR PERFORMANCE AT HIGH SPEED	21-4
POOR PERFORMANCE AT LOW AND IDLE SPEEDS ..	21-3
REAR WHEEL/SUSPENSION	14-2
TURN SIGNAL LIGHT	19-4
TURN SIGNAL RELAY	19-18
VALVE CLEARANCE	3-7
VALVE GUIDE REPLACEMENT.....	8-11
VALVE SEAT INSPECTION/REFACING.....	8-12
WATER PUMP.....	6-10
WHEELS/TIRES.....	3-20
WIRING DIAGRAMS	20-1