

 **HONDA**

SHOP MANUAL



HONDA

HONDA



XL 125 V₁

IMPORTANT SAFETY NOTICE

WARNING

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

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

NOTE: Gives helpful information.

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

TYPE CODE

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

CODE	AREA TYPE
ED	EUROPEAN DIRECT SALES
E	U.K.
F	FRANCE
SW	SWITZERLAND
IG	GERMANY (TYPE II)

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the XL125V.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/ installation of components that may be required to perform service described in the following sections. Sections 4 through 20 describe parts of the motorcycle, grouped according to location.

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

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

The subsequent pages give detailed procedure.

If you don't know the source of the trouble, go to section 21 Troubleshooting.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. HONDA MOTOR CO., LTD. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON HONDA MOTORCYCLES, MOTOR SCOOTERS OR ATVS.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE

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SYMBOLS

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

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

1. GENERAL INFORMATION

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1

GENERAL SAFETY

CARBON MONOXIDE

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

▲ WARNING

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

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

GASOLINE

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

▲ WARNING

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

HOT COMPONENTS

▲ WARNING

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

USED ENGINE OIL

▲ WARNING

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

BRAKE FLUID

CAUTION:

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

BATTERY HYDROGEN & ELECTROLYTE

▲ WARNING

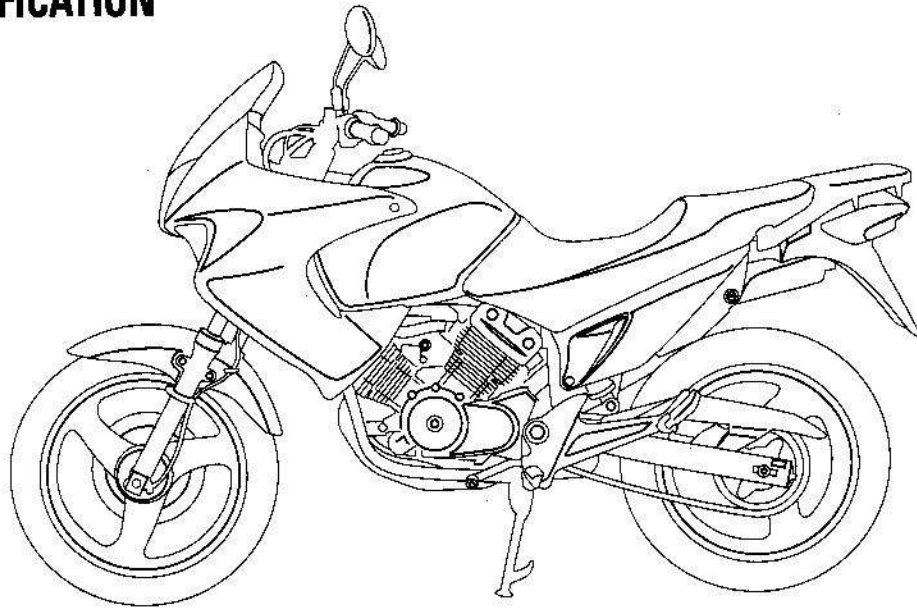
- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a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

GENERAL INFORMATION

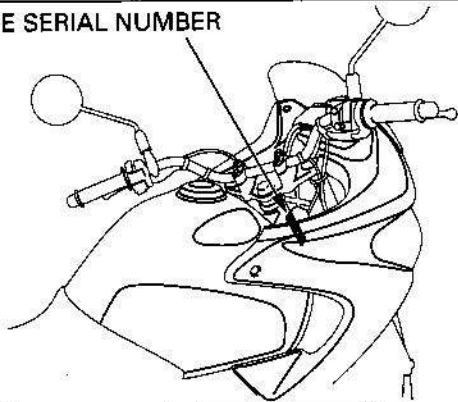
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening a series of bolts or nuts, begin with the larger-diameter of inner bolts first, and 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 assembly, check all parts for proper installation and operation.
8. Route all electrical wires as show on pages 1- through 1- , Cable and Harness Routing.

MODEL IDENTIFICATION

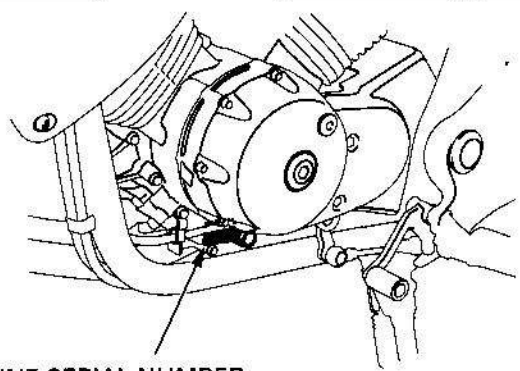


FRAME SERIAL NUMBER



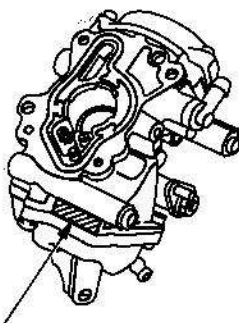
The frame serial number is stamped on the right side of the steering head.

ENGINE SERIAL NUMBER



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

CARBURETOR IDENTIFICATION NUMBER



The carburetor serial number is stamped on the left side of the carburetor body as shown.

GENERAL INFORMATION

SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,150 mm (84.6 in)
	Overall width	850 mm (33.5 in)
	Overall height	1,250 mm (49.2 in)
	Wheelbase	1,450 mm (57.1 in)
	Seat height	802 mm (31.6 in)
	Ground clearance	190 mm (7.5 in)
	Dry weight	154 kg (339.5 lbs)
	Curb weight	167 kg (368.2 lbs)
	Maximum weight capacity	180 kg (396.8 lbs)
FRAME	Frame type	Double cradle
	Front suspension	Telescopic fork
	Front wheel travel	132 mm (5.2 in)
	Rear suspension	Swingarm
	Rear wheel travel	150 mm (5.9 in)
	Front tire size	100/90-18 56P
	Rear tire size	130/80-17 65P
	Front tire brand	BRIDGESTONE, PIRELLI
	Rear tire brand	BRIDGESTONE, PIRELLI
	Front brake	Hydraulic single disc
	Rear brake	Hydraulic single disc
	Caster angle	28°00'
	Trail length	97 mm (3.8 in)
	Fuel tank capacity	17.5 liter (4.62 US gal, 3.85 Imp gal)
	Fuel tank reserve capacity	2.0 liter (0.53 US gal, 0.44 Imp gal)
ENGINE	Bore and stroke	42.0 x 45.0 mm (1.65 x 1.77 in)
	Displacement	125 cm ³ (7.6 cu in)
	Compression ratio	11.8 : 1
	Valve train	Silent multi-link chain driven SOHC with rocker arms
	Intake valve	opens 6° BTDC
		closes 24° ABDC
	Exhaust valve	opens 31° BBDC
		closes 9° ATDC
	Lubrication system	Forced pressure (dry sump)
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Viscous paper element
	Engine dry weight	40.5 kg (89.29 lbs)

GENERAL INFORMATION**GENERAL (Cont'd)**

	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor Type Throttle bore	CV (Constant Velocity) dual carburetor 22 mm (0.9 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th Gearshift pattern	Multi-plate, wet Mechanical type Constant mesh, 5-speed 3.722 (67/18) 3.142 (44/14) 3.083 (37/12) 1.933 (29/15) 1.428 (30/21) 1.173 (27/23) 1.000 (25/25) Left foot operated return system, 1-N-2-3-4-5
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Full transistor digital 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	at draining	1.1 liter (1.2 US qt, 1.0 Imp qt)	—
	at disassembly	1.5 liter (1.6 US qt, 1.3 Imp qt)	—
	at filter change	1.2 liter (1.3 US qt, 1.1 Imp qt)	—
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W - 40	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 - 0.21 (0.006 - 0.008)	0.25 (0.010)
	Side clearance	0.03 - 0.11 (0.001 - 0.004)	0.15 (0.006)

FUEL SYSTEM

ITEM		SPECIFICATIONS
Carburetor identification number		VPU 2A
Main jet	Front	#82
	Rear	#88
Slow jet		#38
Jet needle number	Front	C12A
	Rear	C12B
Pilot screw	Initial/final opening	See page 5-18
Float level		13.7 mm (0.54 in)
Base carburetor (for synchronization)		Front cylinder (#2)
Idle speed		1,500 ± 100 min ⁻¹ (rpm)
PAIR control valve specified vacuum		280 mm Hg (11.02 in Hg)
Throttle grip free play		2 - 6 mm (1/16 - 1/4 in)

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.03 liter (1.08 US qt, 0.95 Imp qt)
	Reserve tank	0.24 liter (0.25 US qt, 0.21 Imp qt)
Radiator cap relief pressure		108 kpa (1.1 kgf/cm ² , 16 psi)
Thermostat	Begin to open	81 - 84°C (178 - 183°F)
	Fully open	95°C (203°F)
	Valve lift	4.5 mm (0.18 in) minimum
Standard coolant concentration		50% mixture with soft water

GENERAL INFORMATION

Unit: mm (in)

CLUTCH SYSTEM/GEARSHIFT LINKAGE

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	—
Clutch spring free length		42.1 (1.66)	41.2 (1.62)
Clutch disc thickness	A	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I.D.	20.010 – 20.035 (0.7878 – 0.7888)	20.05 (0.789)
	O.D.	25.959 – 25.980 (1.0220 – 1.0228)	25.94 (1.021)
Mainshaft O.D. at clutch outer guide		19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)

Unit: mm (in)

CYLINDER HEAD/VALVE

CYLINDER HEAD/VALVE ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,304 kPa (13.3 kgf/cm ² , 189 psi) at 500 min ⁻¹ (rpm)	—
Cylinder head warpage			—	0.05 (0.002)
Valve, valve guide	Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.001)	—
		EX	0.24 ± 0.02 (0.009 ± 0.001)	—
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.955 – 4.970 (0.1951 – 0.1957)	4.945 (0.1947)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
		EX	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.065 (0.0026)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	12.10 (0.476)	—
		EX	12.10 (0.476)	—
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN	38.00 (1.496)	36.5 (1.44)
		EX	38.00 (1.496)	36.5 (1.44)
Camshaft	Cam lobe height	IN	28.8527 – 29.0927 (1.13593 – 1.14538)	28.82 (1.135)
		EX	28.8849 – 29.1249 (1.13720 – 1.14665)	28.85 (1.136)
	Runout		0.030 (0.0012)	0.050 (0.0020)
	Identification marks		Front "F"/Rear "R"	—
Rocker arm I.D.		IN/EX	10.000 – 10.015 (0.3937 – 0.3943)	10.05 (0.396)
Rocker arm shaft O.D.		IN/EX	9.972 – 9.987 (0.3926 – 0.3932)	9.92 (0.391)
Rocker arm-to-rocker arm shaft clearance			0.013 – 0.043 (0.0005 – 0.0017)	0.10 (0.004)

GENERAL INFORMATION

Unit: mm (in)

CYLINDER/PISTON

CYLINDER/PISTON			ITEM	STANDARD	SERVICE LIMIT
Cylinder	I.D.			42.00 – 42.01 (1.654 – 1.654)	42.10 (1.657)
	Out of round			—	0.06 (0.002)
	Taper			—	0.06 (0.002)
	Warpage			—	0.05 (0.002)
Piston, piston rings	Piston mark direction			“IN” mark facing toward the intake side	—
	Piston O.D.			41.97 – 41.99 (1.652 – 1.653)	41.90 (1.650)
	Piston O.D. measurement point			14.0 (0.55) from bottom of skirt	—
	Piston pin bore I.D.			13.002 – 13.008 (0.5119 – 0.5121)	13.04 (0.513)
	Piston pin O.D.			12.994 – 13.000 (0.5116 – 0.5118)	12.98 (0.511)
	Piston-to-piston pin clearance			0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring-to-ring groove clearance	Top		0.015 – 0.05 (0.0006 – 0.002)	0.080 (0.0031)
		Second		0.015 – 0.05 (0.0006 – 0.002)	0.080 (0.0031)
	Piston ring end gap	Top		0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
		Second		0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Oil (side rail)		0.10 – 0.60 (0.004 – 0.024)	0.80 (0.031)
	Piston ring mark	Top		“R” mark	—
		Second		“RN” mark	—
Cylinder-to-piston clearance				0.010 – 0.040 (0.0004 – 0.0016)	0.10 (0.004)
Connecting rod small end I.D.				13.016 – 13.034 (0.5124 – 0.5131)	13.044 (0.5135)
Connecting rod-to-piston pin clearance				0.010 – 0.040 (0.0004 – 0.0016)	0.06 (0.002)

GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

CRANKCASE/TRANSMISSION/CRANKSHAFT				
ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M4, M5, C1, C2	23.000 – 23.021 (0.9055 – 0.9063)	23.04 (0.907)
		C3	25.020 – 25.041 (0.9850 – 0.9859)	25.06 (0.987)
	Bushing O.D.	M4, M5, C1, C2	22.959 – 22.980 (0.9039 – 0.9047)	22.94 (0.903)
		C3	24.979 – 25.000 (0.9834 – 0.9843)	24.96 (0.983)
	Bushing I.D.	M4	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
		C1	18.000 – 18.018 (0.7087 – 0.7094)	18.04 (0.710)
		C2	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
		C3	22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
	Gear-to-bushing clearance	M4, M5, C1, C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Mainshaft O.D.	M4 bushing	19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)
	Countershaft O.D.	C1 bushing	17.966 – 17.984 (0.7073 – 0.7080)	17.95 (0.707)
		C2 bushing	19.974 – 19.987 (0.7864 – 0.7869)	19.95 (0.785)
		C3 bushing	21.959 – 21.980 (0.8645 – 0.8654)	21.94 (0.864)
	Bushing-to-shaft clearance	M4	0.040 – 0.082 (0.0016 – 0.0032)	0.10 (0.004)
		C1	0.016 – 0.052 (0.0006 – 0.0020)	0.08 (0.003)
		C2	0.013 – 0.047 (0.0005 – 0.0019)	0.08 (0.003)
		C3	0.020 – 0.062 (0.0008 – 0.0024)	0.09 (0.004)
Shift fork	I.D.		12.000 – 12.018 (0.4724 – 0.4731)	12.03 (0.474)
	Claw thickness		4.930 – 5.000 (0.1941 – 0.1969)	4.9 (0.19)
Shift fork shaft O.D.			11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)
Shift drum O.D. (at left side journal)			13.966 – 13.984 (0.5498 – 0.5506)	13.94 (0.549)
Crankshaft	Connecting rod big end side clearance		0.05 – 0.70 (0.002 – 0.028)	0.80 (0.031)
	Connecting rod big end radial clearance		—	0.020 (0.0008)
	Runout		—	0.05 (0.002)

GENERAL INFORMATION

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	200 kPa (2.0 kgf/cm ² , 29 psi)	—
	Driver and passenger	200 kPa (2.0 kgf/cm ² , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	1.0 (0.04)
	Axial	—	1.0 (0.04)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	470.6 (18.53)	461 (18.15)
	Tube runout	—	0.20 (0.008)
	Recommended fluid	Fork fluid	—
	Fluid level	117 (4.6)	—
	Fluid capacity	346 ± 2.5 cm ³ (11.7 ± 0.08 US oz, 12.2 ± 0.09 Imp oz)	—
Steering head bearing pre-load		0.10 – 0.15 kgf (0.220 – 0.330 lbf)	—

Unit: mm (in)

REAR WHEEL/SUSPENSION

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Driver only	200 kPa (2.0 kgf/cm ² , 29 psi)	—
	Driver and passenger	225 kPa (2.25 kgf/cm ² , 33 psi)	—
Axle runout		—	0.20 (0.008)
Wheel runout	Radial	—	1.0 (0.04)
	Axial	—	1.0 (0.04)
Wheel balance weight		—	60 g (2.1 oz) max.
Drive chain slack		25 – 35 (1 – 1 3/8)	60 (2 3/8)
Drive chain link		110	—
Drive chain size	DID	520V6	—
	RK	520 SMOZ2	—
	REGINA	135 ORNV2	—

GENERAL INFORMATION

Unit: mm (in)

BRAKE SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT3 or DOT4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.13)
	Brake disc runout	—	0.1 (0.004)
	Master cylinder I.D.	11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
	Caliper piston O.D.	25.335 – 25.368 (0.9968 – 0.9987)	25.31 (0.996)
Rear	Specified brake fluid	DOT3 or DOT4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.13)
	Brake disc runout	—	0.1 (0.004)
	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)	12.654 (0.4978)
	Caliper cylinder I.D.	32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.	31.948 – 31.998 (1.2578 – 1.2598)	31.94 (1.257)

CHARGING SYSTEM/ALTERNATOR

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 6 Ah
	Current leakage		1.0 mA max
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.6 A/5 – 10 h
		Quick	3.0 A/1 h max
Alternator	Capacity		260 W/5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 0.5 Ω

GENERAL INFORMATION

Unit: mm (in)

IGNITION SYSTEM		SPECIFICATIONS	
ITEM		NGK	DENSO
Spark plug	Standard	CR8EH-9 (NGK)	U24FER-9 (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		12° ± 1° BTDC at 1,500 ± 100 min ⁻¹ (rpm)	
Full advance		BTDC 38°	

ELECTRIC STARTER/STARTER CLUTCH		
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.00 – 10.05 (0.394 – 0.396)	3.5 (0.14)
Starter clutch gear O.D.	45.657 – 45.673 (1.7975 – 1.7981)	45.64 (1.797)
Starter clutch outer I.D.	62.317 – 62.347 (2.4534 – 2.4546)	62.33 (2.454)

LIGHTS/METERS/SWITCHES		
ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12 V – 35/35 W x 2
	Position light	12 V – 5 W x 2
	Brake/tail/license light	12 V – 21/5 W
	Front turn signal light	12 V – 10 W x 2
	Rear turn signal light	12 V – 10 W x 2
	Instrument light	12 V – 1.7 W x 3
	Turn signal indicator	12 V – 2 W x 2
	High beam indicator	12 V – 1.2 W
	Neutral indicator	12 V – 2 W
	Temp indicator	12 V – 1.7 W
Fuse	Main fuse	30 A
	Sub fuse	10 A x 5
Thermo switch	OFF → ON	112 – 118°C (234 – 444°F)
	ON → OFF	Below 108°C (226°F)

TORQUE VALUES

STANDARD

FASTENER TYPE	TORQUE N-m (kgf-m, lbf-ft)	FASTENER TYPE	TORQUE N-m (kgf-m, lbf-ft)
5 mm bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt and nut (Include SH flange bolt)	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 and nut (Include NSHF)	12 (1.2, 9)
10 mm bolt and nut	34 (3.5, 25)	8 mm flange bolt and nut	26 (2.7, 20)
12 mm bolt and nut	54 (5.5, 40)	10 mm flange bolt and nut	39 (4.0, 29)

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

- NOTES:
1. Apply sealant to the threads.
 2. Apply locking agent to the threads.
 3. Apply molybdenum disulfide oil to the threads and flange surface.
 4. Left hand threads.
 5. Stake.
 6. Apply oil to the threads and flange surface.
 7. Apply clean engine oil to the O-ring.
 8. UBS bolt.
 9. U-nut.
 10. ALOC bolt.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
MAINTENANCE:				
Spark plug	2	10	12 (1.2, 9)	
Crankshaft hole cap	1	30	15 (1.5, 11)	
Timing hole cap	1	14	10 (1.0, 7)	
Valve adjusting screw lock nut	4	6	17 (1.7, 12)	
Oil drain bolt	1	12	25 (2.5, 18)	NOTE 6
LUBRICATION SYSTEM:				
Oil pump mounting bolt	2	6	14 (1.4, 10)	
FUEL SYSTEM:				
Caburetor insulator band screw	4	5	5 (0.5, 3.6)	
PAIR check valve cover bolt	4	5	5 (0.5, 3.6)	
COOLING SYSTEM:				
Water pump drain bolt	1	10	13 (1.3, 9)	
Water pump impeller	1	7	12 (1.2, 9)	
Cooling fan nut	1	3	1 (0.1, 0.7)	NOTE 2
ENGINE REMOVAL/INSTALLATION:				
Drive sprocket setting plate bolt	2	6	12 (1.2, 9)	
CLUTCH/GEARSHIFT LINKAGE:				
Clutch center lock nut	1	16	108 (11, 80)	NOTE 5, 6
Clutch pressure plate bolt	5	6	12 (1.2, 9)	
Gear shift stopper arm pivot bolt	1	6	12 (1.2, 9)	NOTE 6
Gear shift cam plate bolt	1	8	23 (2.3, 17)	NOTE 2

GENERAL INFORMATION

ENGINE (Cont'd)					
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS	
CYLINDER HEAD/VALVE:					
Cylinder head side cover bolt	4	6	10 (1.0, 7)	NOTE 2 NOTE 6 NOTE 6	
Cylinder head cover bolt	8	6	10 (1.0, 7)		
Cam sprocket bolt	4	7	20 (2.0, 14)		
Cylinder head flange nut: 8 mm (0.3 in)	8	8	32 (3.3, 24)		
6 mm (0.2 in)	4	6	12 (1.2, 9)		
Camshaft holder bolt	12	6	12 (1.2, 9)		
Rocker arm shaft bolt	4	5	5 (0.5, 3.6)		
Cam chain tensioner lifter bolt	4	6	12 (1.2, 9)		
Cam chain tensioner lifter plug	2	6	4 (0.4, 2.9)		
CRANKCASE/TRANSMISSION/CRANKSHAFT:					
Mainshaft bearing setting plate bolt	2	6	10 (1.0, 7)	NOTE 2	
Shift drum bearing setting plate bolt	2	6	10 (1.0, 7)		
CHARGING SYSTEM/ALTERNATOR:					
Flywheel nut	1	12	64 (6.5, 47)	NOTE 6	
Stator mounting bolt	3	6	12 (1.2, 9)		
Ignition pulse generator mounting bolt	2	5	5 (0.5, 3.6)		
Stator/ignition pulse generator wire clamp bolt	1	5	5 (0.5, 3.6)		
IGNITION SYSTEM:					
Engine coolant temperature (ECT) sensor	1	12	23 (2.3, 17)	NOTE 6	
ELECTRIC STARTER/STARTER CLUTCH:					
Starter motor terminal nut	1	6	12 (1.2, 9)		
Starter motor front cover bolt	2	5	5 (0.5, 3.6)		
Primary drive gear lock nut	1	16	88 (9.0, 65)		
OTHERS:					
Neutral switch	1	10	12 (1.2, 9)		
Neutral switch terminal nut	1	4	2 (0.2, 1.4)		

FRAME				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
FRAME/BODY PANELS/EXHAUST SYSTEM:				
Muffler band bolt	1	8	20 (2.0, 14)	
Exhaust pipe joint nut	4	8	18 (1.8, 13)	
Muffler mounting bolt	2	8	32 (3.3, 24)	
ENGINE REMOVAL/INSTALLATION:				
Front engine mounting nut	1	10	39 (4.0, 29)	
Rear upper engine mounting nut	1	10	39 (4.0, 29)	
Rear lower engine mounting nut	2	10	39 (4.0, 29)	
Engine hanger bracket bolt	1	8	18 (1.8, 13)	
FRONT WHEEL/SUSPENSION/STEERING:				
Fork bolt	2	28	22 (2.2, 16)	NOTE 2
Fork socket bolt	2	8	20 (2.0, 14)	
Handlebar holder bolt	4	8	24 (2.4, 17)	
Steering stem nut	1	24	103 (10.5, 76)	
Steering top thread	1	26	See page 12-26	
Top bridge pinch bolt	2	8	26 (2.7, 20)	NOTE 10
Bottom bridge pinch bolt	4	8	34 (3.5, 25)	
Front axle bolt	1	14	66 (6.7, 48)	
Front axle pinth bolt	1	8	22 (2.2, 16)	
Front brake disc bolt	4	8	42 (4.3, 31)	
Throttle housing screw		5	4 (0.4, 2.9)	

GENERAL INFORMATION

FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
REAR WHEEL/SUSPENSION:				
Rear axle nut	1	14	88 (9.0, 65)	NOTE 9
Driven sprocket nut	6	10	64 (6.5, 47)	NOTE 9
Rear brake disc bolt	4	8	42 (4.3, 31)	NOTE 10
Shock absorber upper mounting nut	1	10	44 (4.5, 33)	NOTE 9
Shock absorber lower mounting nut	1	10	44 (4.5, 33)	
Swingarm pivot nut	1	14	88 (9.0, 65)	NOTE 9
Chain slider screw	2	5	3 (0.3, 2.2)	
Chain adjuster lock nut	2	6	10 (1.0, 7)	
BRAKE SYSTEM:				
Front brake oil bolt	2	10	34 (3.5, 25)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front master cylinder cover screw	2	4	2 (0.2, 1.4)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.3)	
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Front brake caliper mounting bolt	1	8	30 (3.1, 22)	NOTE 10
Front caliper pin bolt (main)	1	8	18 (1.8, 13)	
Front caliper pin bolt (sub)	1	8	23 (2.3, 17)	
Front caliper pad pin	1	10	18 (1.8, 13)	
Front caliper pad pin plug	1	10	2 (0.2, 1.4)	
Rear brake reservoir tank bolt	1	6	12 (1.2, 9)	
Rear brake oil bolt	2	10	34 (3.5, 25)	
Rear master cylinder mounting bolt	2	6	12 (1.2, 9)	
Rear master cylinder push rod nut	1	8	17 (1.7, 12)	
Rear master cylinder cover screw	2	4	2 (0.2, 1.4)	
Rear caliper pin bolt	1	8	17 (1.7, 12)	
Rear caliper pad pin	1	10	17 (1.7, 12)	
Rear caliper pad pin plug	1	10	2 (0.2, 1.4)	
LIGHTS/METERS/SWITCHES:				
Thermo switch	1	16	18 (1.8, 13)	
OTHER FASTENERS:				
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand lock nut	1	10	29 (3.0, 22)	NOTE 9
Side stand switch bolt	1	6	10 (1.0, 7)	

GENERAL INFORMATION

TOOLS

NOTES: 1. Alternative tool.
2. Newly provided tool.

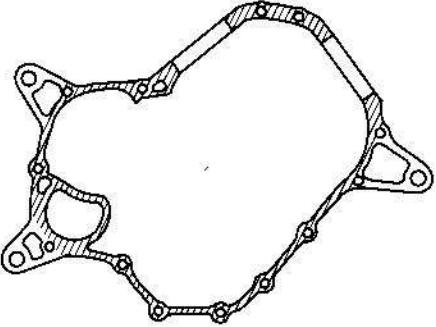
DESCRIPTION	TOOL NUMBER	REMARKS	REF.SEC.
Attachment, 22 x 24 mm	07746-0010800		13
Attachment, 24 x 26 mm	07746-0010700		6
Attachment, 28 x 30 mm	07746-1870100		8
Attachment, 32 x 35 mm	07746-0010100		11, 13, 6
Attachment, 42 x 47 mm	07746-0010300		11, 12, 13
Bearing installer 37.42	07XMF-KGB0100		11
Bearing installer 37.5	07XMF-KGB0200		11
Bearing remover head	07746-0050400		12, 13
Bearing remover head	07936-GE00200		6
Bearing remover head	07936-KC10200		11
Bearing remover shaft	07936-GE00100		6
Bearing remover shaft	07936-KC10100		11
Bearing remover shaft	07746-0050100		12, 13
Bearing remover weight	07741-0010201		11
Carburetor float level gauge	07401-0010000		5
Clutch center holder	07724-0050002		8
Crank shaft assembly collar	07965-VM00100		11
Crank shaft assembly shaft	07965-VM00200		11
Driver	07749-0010000		6, 8, 11, 12, 13
Driver shaft	07946-MJ00100		13
Flywheel holder	07725-0040000		15
Flywheel puller	07KMC-HE00100		15
Fork seal driver body	07747-0010100		12
Fork seal driver attachment	07947-KA20200		12
Gear holder	07724-0010200		17
Mechanical seal driver attachment	07945-4150400		6
Mechanical seal driver	07PMD-KBP0100		11
Peak voltage adapter	07HGJ-0020100		16
Pilot, 10 mm	07746-0040100		6
Pilot, 12 mm	07746-0040200		8
Pilot, 15 mm	07746-0040300		11, 12, 13
Pilot, 17 mm	07746-0040400		11
Pilot, 20 mm	07746-0040500		11
Pilot, 25 mm	07746-0040600		11
Pilot screw wrench	07908-4730002		5
Plate, 200 x 300 x 20	07XMF-KGB0300		11
Snap ring pliers	07914-SA50001		14
Driver handle	07953-MJ10200		12
Steering stem driver	07946-MB00000		12
Driver attachment	07953-MJ10100		12
Steering stem cap nut wrench	07716-0020400		12
Steering stem socket wrench	07916-3710101		12
Universal bearing puller	07631-0010000		11
Vacuum gauge attachment	07510-3000100		3
Valve guide driver, 5 mm	07942-MA60000		9

GENERAL INFORMATION**(Cont'd)**

DESCRIPTION	TOOL NUMBER	REMARKS	REF.SEC.
Valve guide reamer	07984-MA60001		9
Valve spring compressor	07757-0010000		9
Valve spring compressor attachment	07959-KM30101		9
Valve seat cutter			
Seat cutter, 24.5 mm (45° IN)	07780-0010100		9
Seat cutter, 22 mm (45° EX)	07780-0010701		9
Flat cutter, 25 mm (32° IN)	07780-0012000		9
Flat cutter, 22 mm (32° EX)	07780-0012601		9
Interior cutter, 22 mm (60° IN/EX)	07780-0014202		9
Cutter holder, 5 mm	07781-0010400		9

GENERAL INFORMATION

LUBRICATION & SEAL POINTS

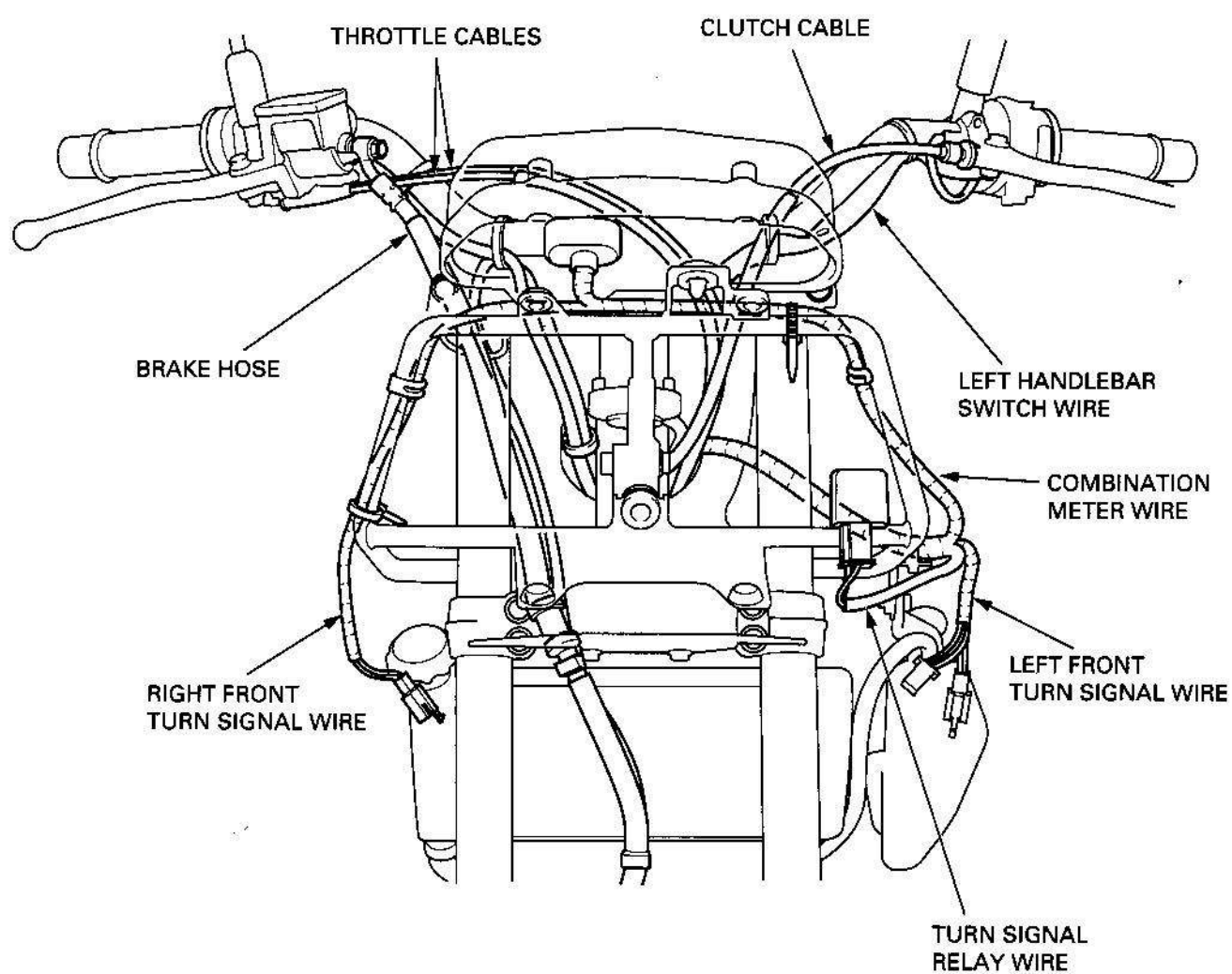
ENGINE		LOCATION	MATERIAL	REMARKS
		Camshaft camsurf/journals Valve stem (valve guide sliding surface)/stem end Rocker arm slipper surface Rocker arm shaft sliding surface Connecting rod small end inner surface Clutch outer sliding surface M-3, C-4, C-5 gear (shift fork grooves) Clutch outer guide surface Gear (engaging and bearing portion) Piston pin outer surface Gear shift fork inner surface and shaft	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
		Piston pin hole and outer cylindrical surface Piston ring whole surface Primary drive gear lock nut threads and seating surface Flywheel lock nut threads and seating surface Clutch disk lining surface Cylinder stud bolt threads Valve adjusting nut threads Cam chain whole surface Connecting rod bearing surface Clutch center lock nut threads and seating surface Oil pump inner rotor Cylinder inner surface Camshaft holder bolt threads and seating surface Clutch lifter piece outer surface Clutch lifter arm shaft outer surface Starter clutch sliding area Each ball/needle bearing sliding area Each O-ring Gearshift spindle shaft outer surface Oil strainer screen rubber frame Scavenging pipe rubber parts	Engine oil	
		Right and left crankcase mating surface  Thermo switch threads Alternator and ignition pulse generator grommets Water pump mechanical seal flange	Sealant	
		Cam chain tensioner tightening bolt threads Gearshift cam plate bolt threads Mainshaft bearing set plate bolt threads Gearshift drum bearing set plate bolt threads Fan motor shaft threads Cam sprocket bolt threads	Locking agent	
		Cylinder head cover gasket	Honda Bond A or equivalent	

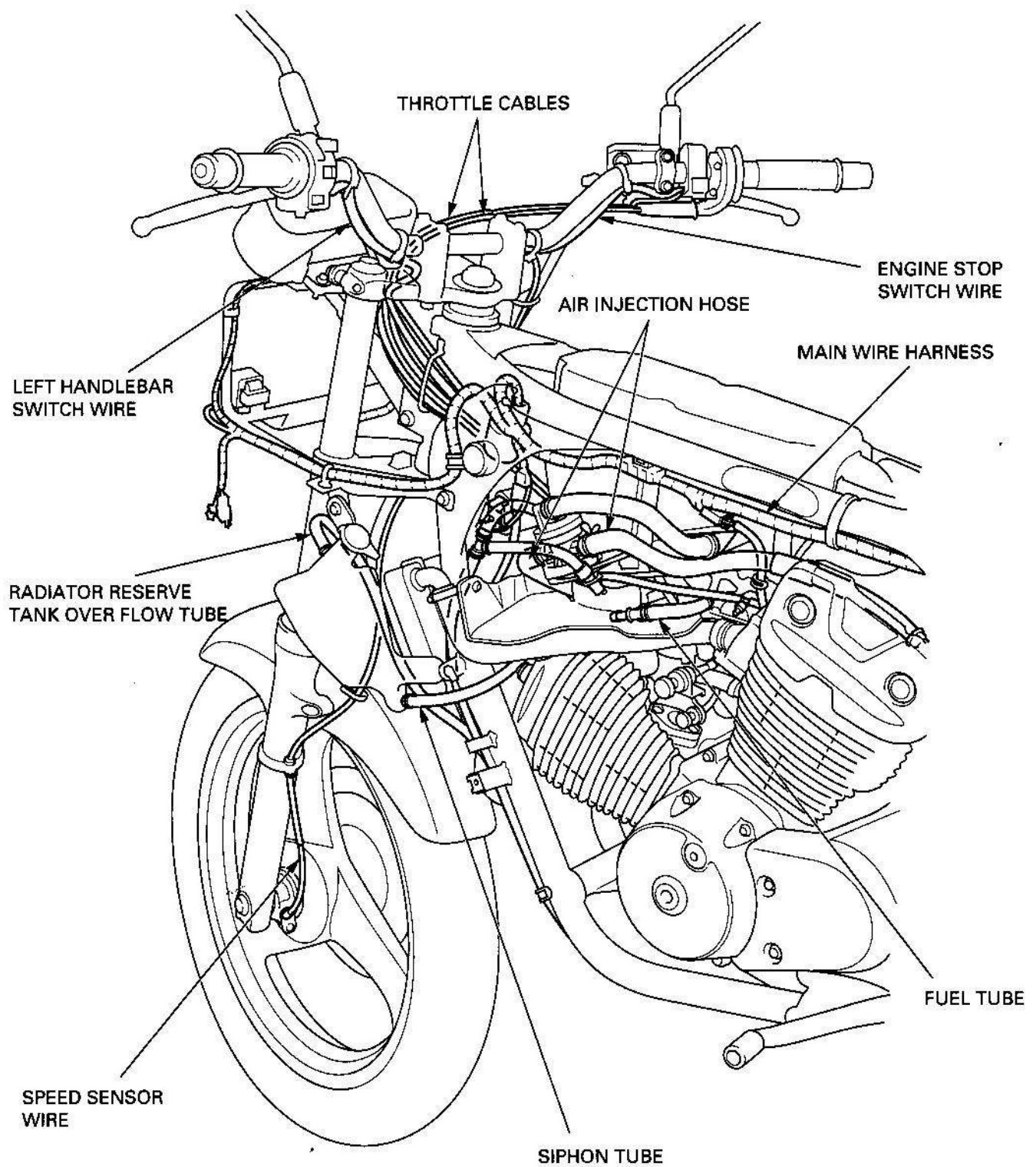
GENERAL INFORMATION

FRAME			
LOCATION	MATERIAL	REMARKS	
Clutch lever pivot sliding surface Throttle grip pipe rolled up portion Rear brake pedal pivot sliding surface Gearshift pedal pivot sliding surface Side stand pivot sliding surface Front wheel dust seal lip area Rear wheel dust seal lip area Rear wheel O-ring whole Final driver flange gap with rear hub Final driver flange dust seal lip area	Multi-purpose grease		
Steering head upper bearing Steering head lower bearing Steering head dust seal lips Rear caliper pin bolt Rear master cylinder push rod contact area Front brake lever pivot and piston contact area Front brake lever pivot sliding area Front fork oil seal lips Swingarm pivot dust seal lips Swingarm pivot bearing and center collar sliding surface Swingarm pivot bush and collar sliding surface Speedometer gear box inside Speedometer gear sliding portion	Grease		
Steering top threads Front engine hanger bolt threads Rear engine hanger bolt threads Upper engine hanger bolt threads	Engine oil		
Brake master cylinder pistons and cups Rear caliper piston sliding surface	DOT 3 or DOT 4 brake fluid		
Throttle cable casting inside Clutch cable casing inside Caliper piston seal sliding surface Caliper pin sliding surface	Silicone grease		
Final driven flange bolt threads Rear caliper nut threads Front caliper pin threads Front caliper nut threads Fork socket bolt threads	Locking agent		
Handle grip rubber inside surfaces	Honda band A or Cemedine #540		
Front fork inside	Fork fluid		

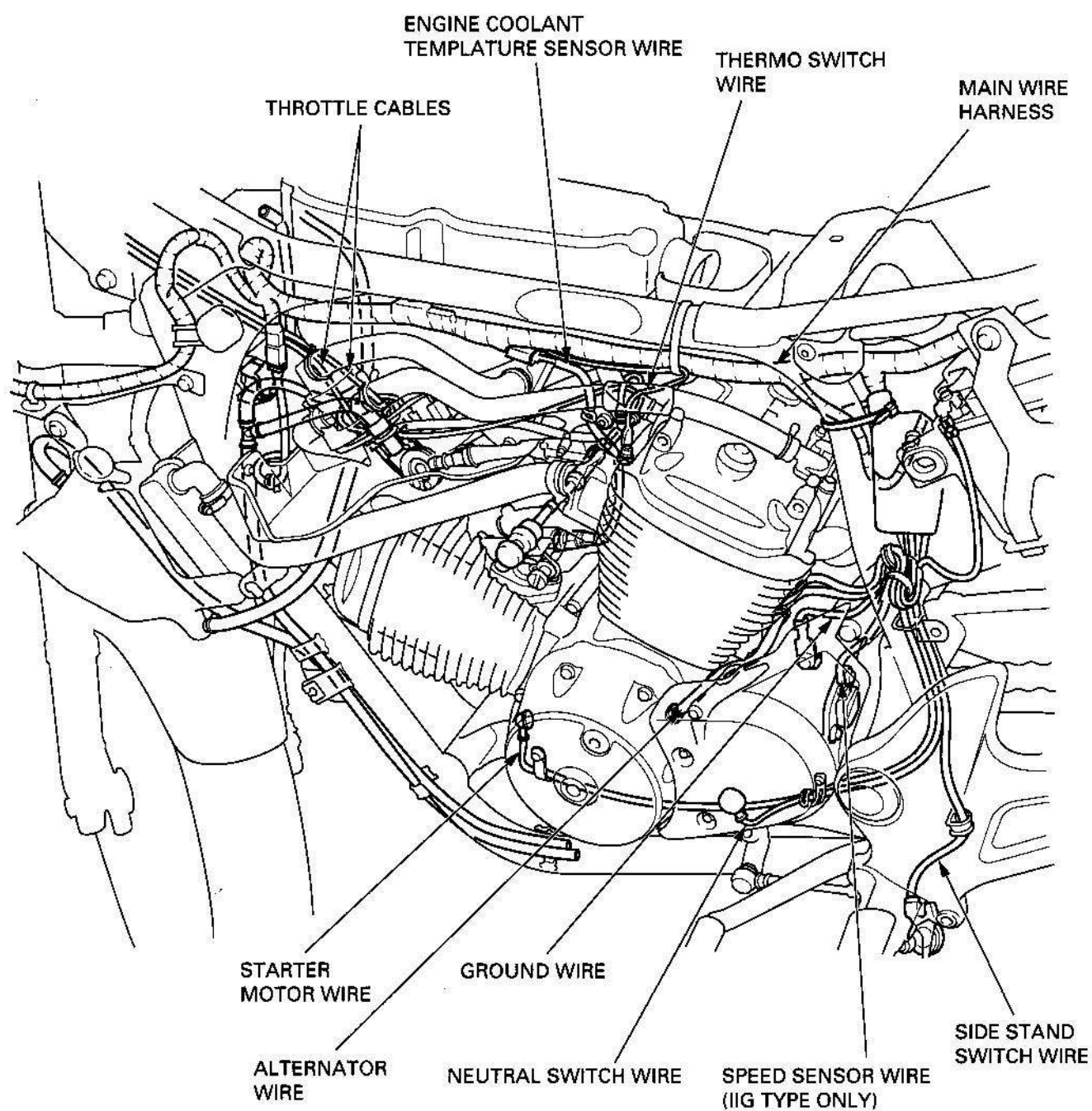
GENERAL INFORMATION

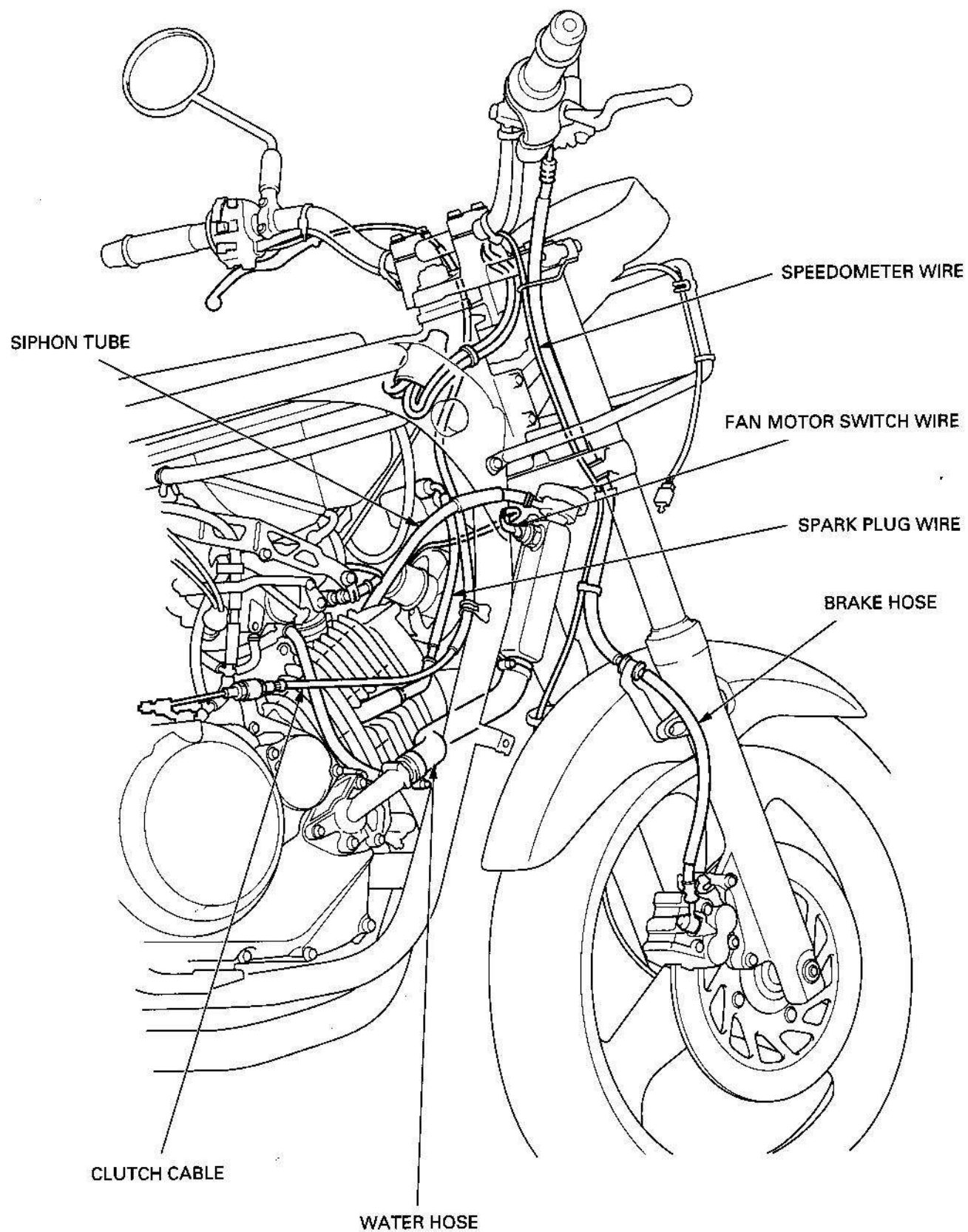
CABLE & HARNESS ROUTING



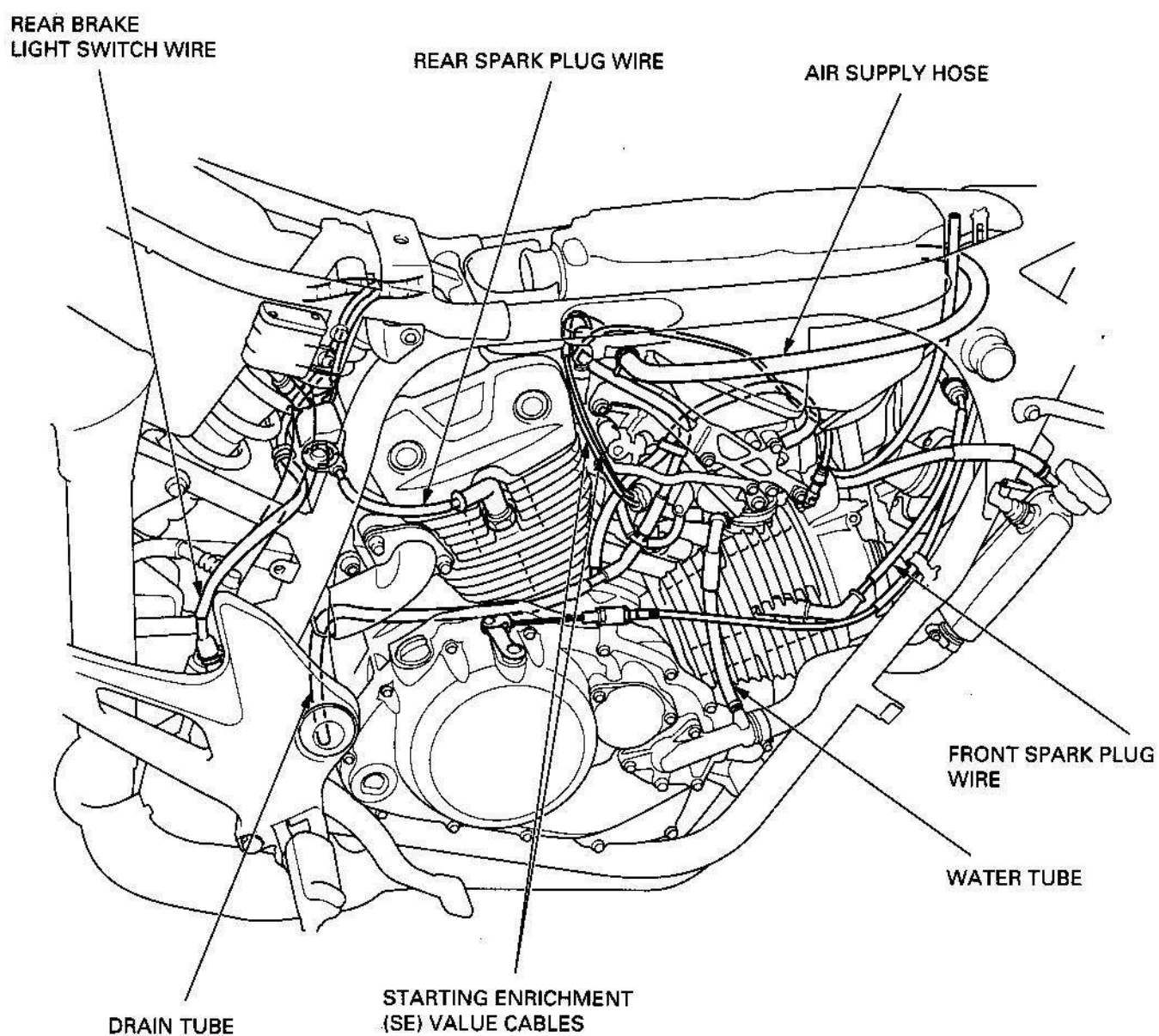


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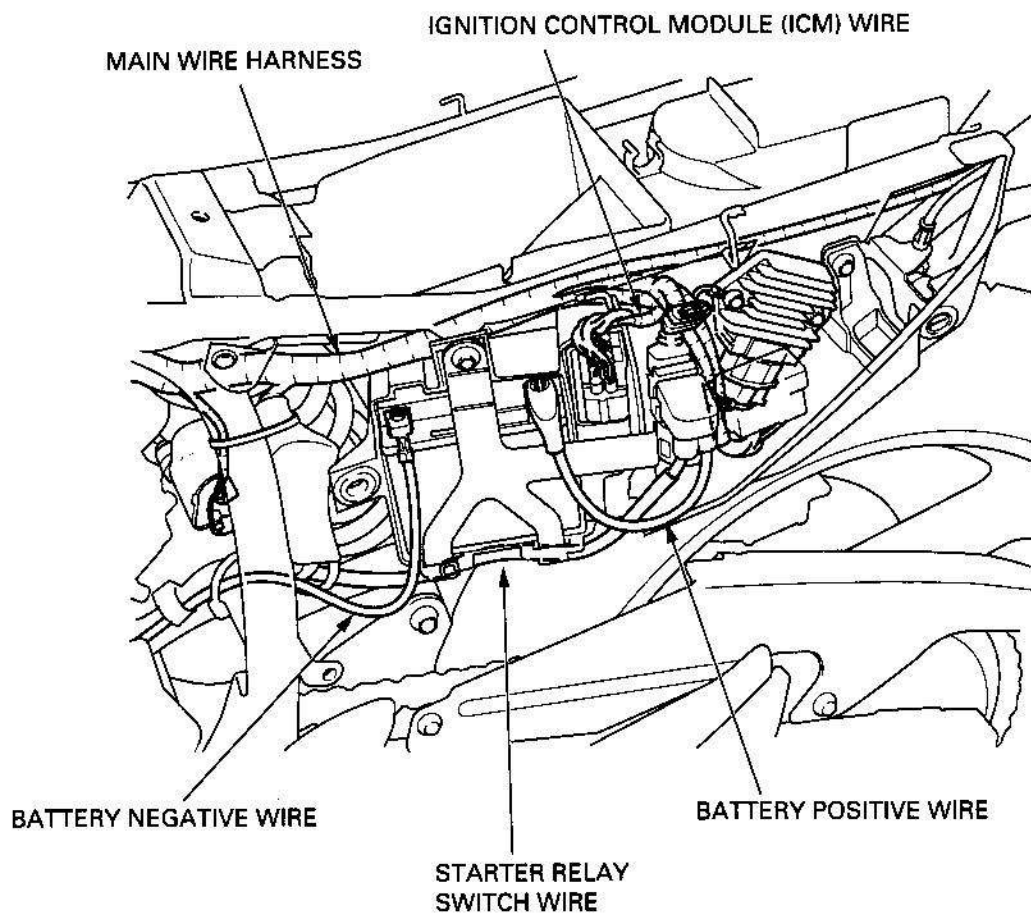
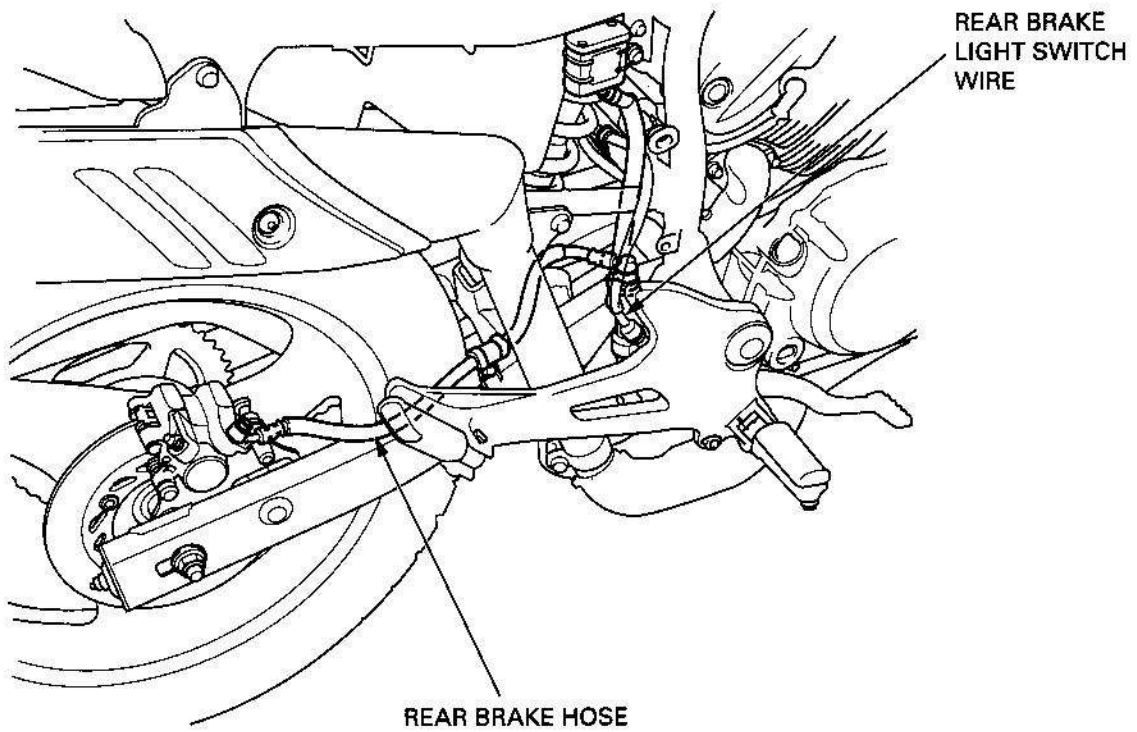




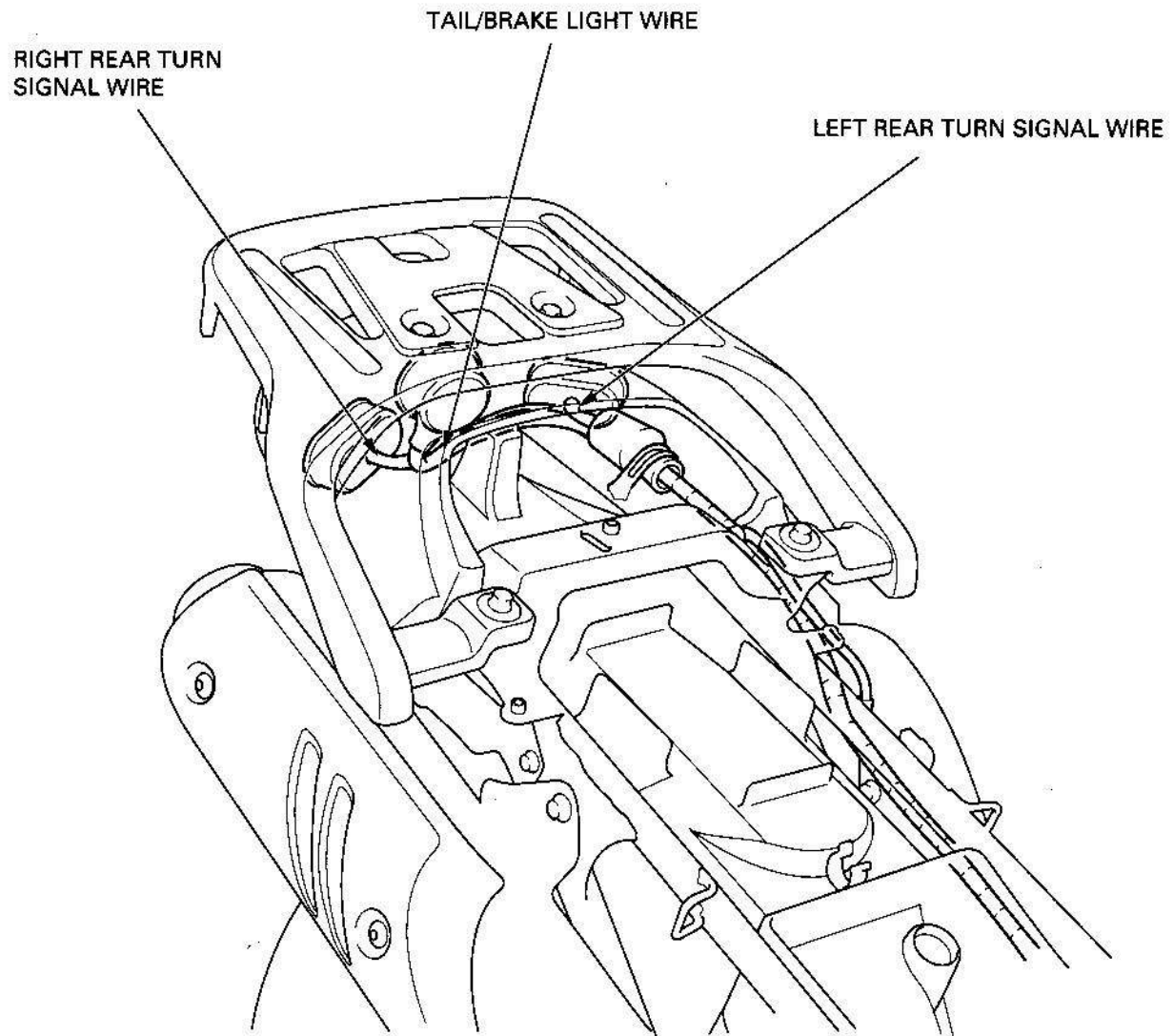
GENERAL INFORMATION



GENERAL INFORMATION



GENERAL INFORMATION



EMISSION CONTROL SYSTEMS

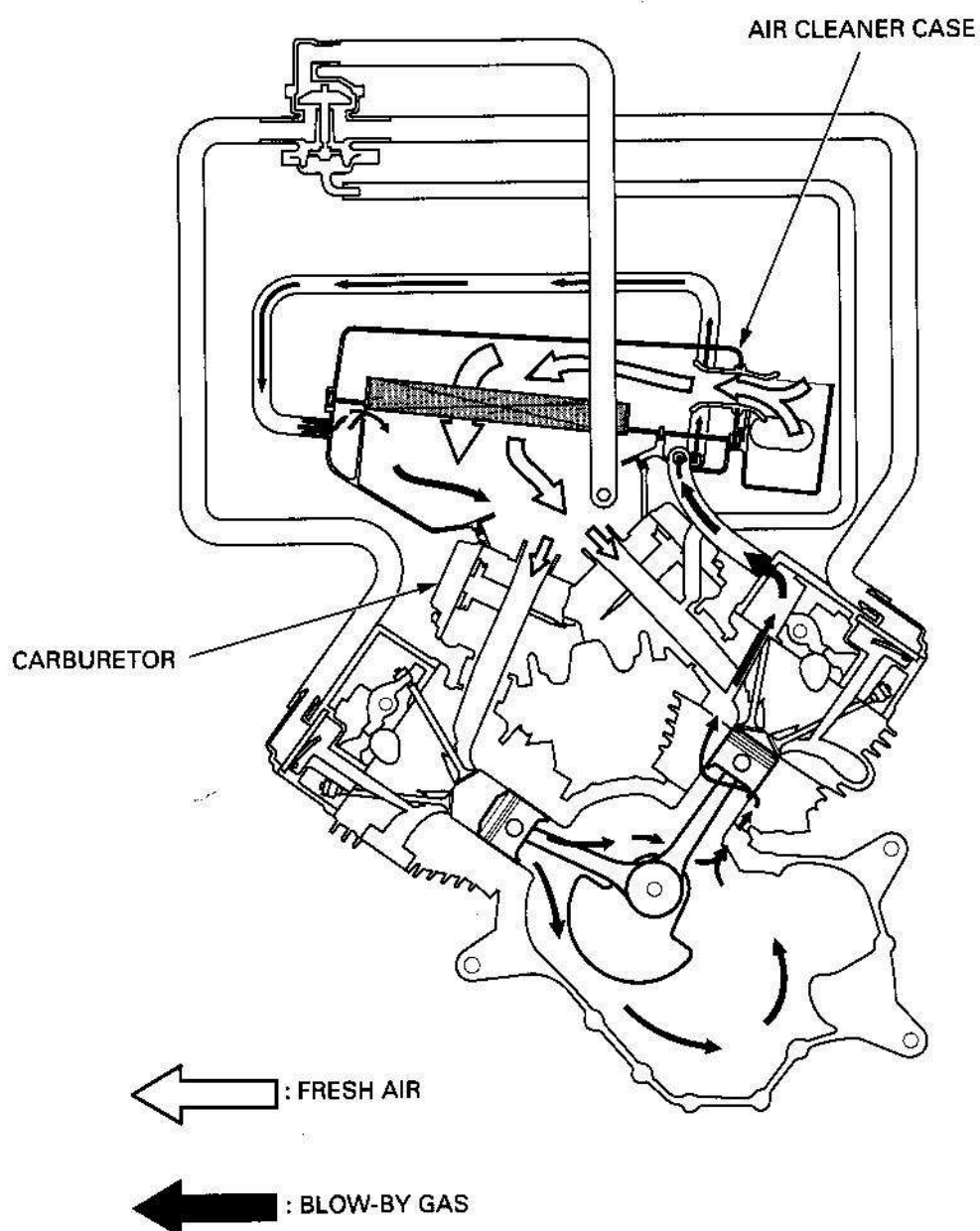
SOURCE OF EMISSIONS

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

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

CRANKCASE EMISSION CONTROL SYSTEM

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

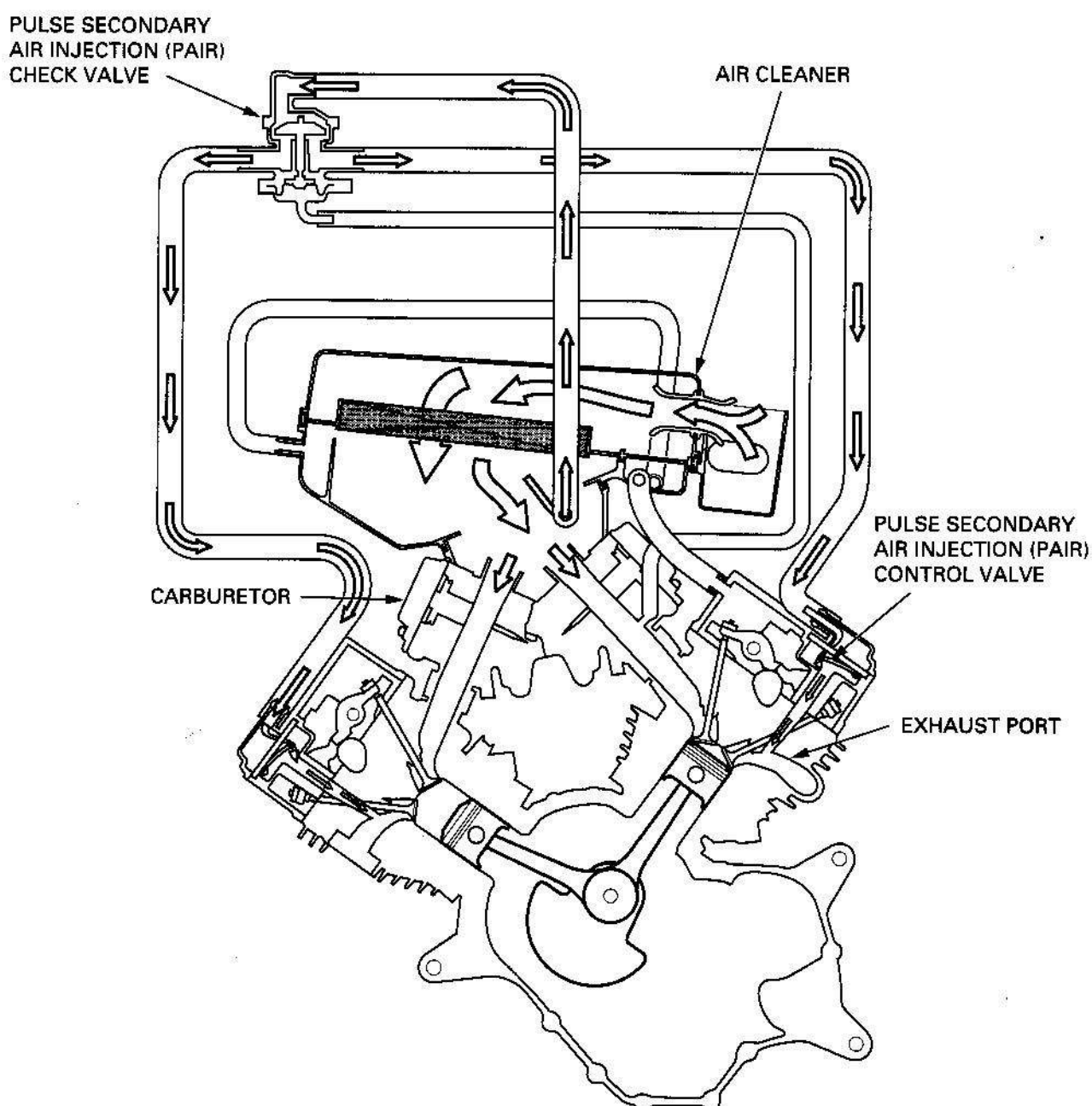


GENERAL INFORMATION

EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust bases in the exhaust port. Fresh air is drawn into the exhaust port whenever there is a negative pressure pulse in the exhaust system. This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor. This model has the pulse secondary air injection (PAIR) control valve and PAIR check valve. Pair check valve prevents reverse air flow through the system. The PAIR control valve reacts to high intake manifold vacuum and will cut off the supply of the fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

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



2. FRAME/BODY PANELS/EXHAUST SYSTEM

2

SERVICE INFORMATION	2-1	TAIL COVER/REAR FENDER	2-4
TROUBLESHOOTING	2-1	REAR INNER FENDER/BATTERY BOX	2-5
SEAT	2-2	FRONT COWL	2-6
SIDE COVER	2-2	FUEL TANK	2-8
FRONT FENDER	2-3	MUFFLER/EXHAUST PIPE	2-9
REAR CARRIER	2-3		

SERVICE INFORMATION

GENERAL

▲ WARNING

- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.*
- *Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.*
- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*

- This section covers removal and installation of the body panels, fuel tank and exhaust system.
- Always replace the exhaust pipe gasket when removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Muffler band bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)
Exhaust pipe joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)
Muffler mounting bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

FRAME/BODY PANELS/EXHAUST SYSTEM

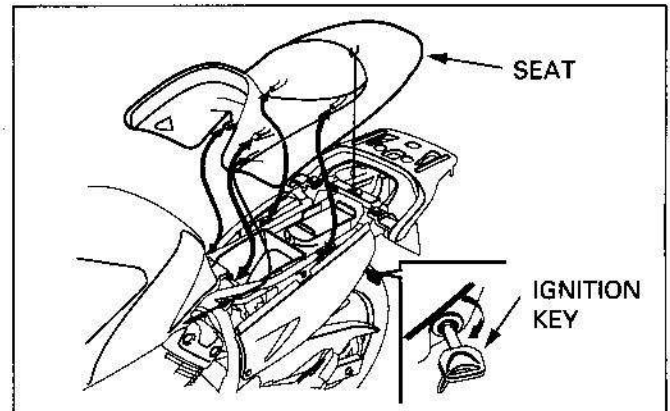
SEAT

REMOVAL

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

INSTALLATION

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



SIDE COVER

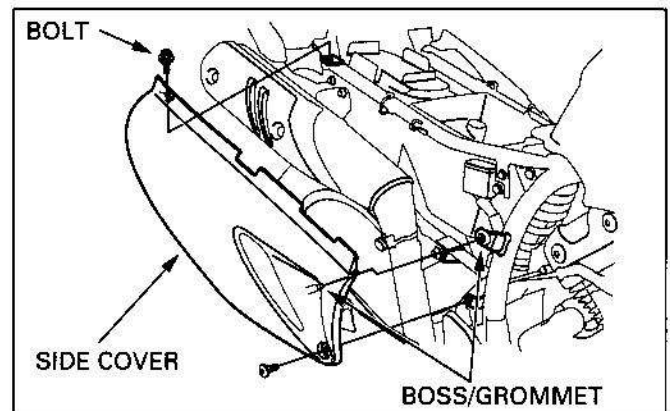
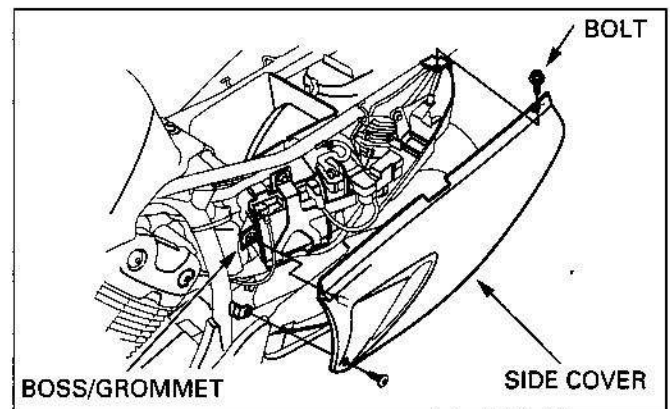
Remove the seat (see above).

NOTE:

Be careful not to damage the bosses of the side cover.

Remove the bolt and screw.
Remove the boss of the side cover from the grommet and remove the side cover.

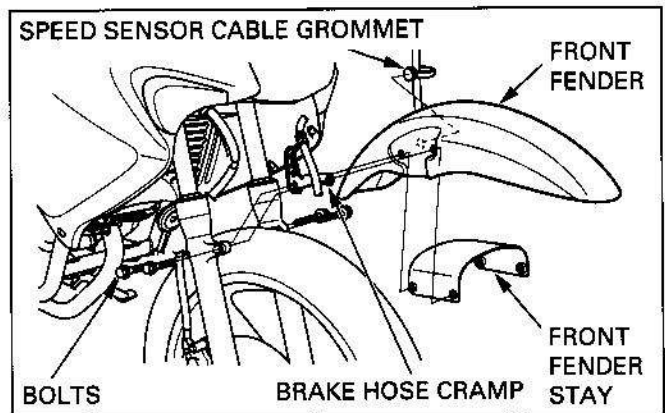
Installation in the reverse order of removal.



FRONT FENDER

Remove the speed sensor cable grommet.
Remove the bolts, brake hose cramp, front fender and front fender stay.

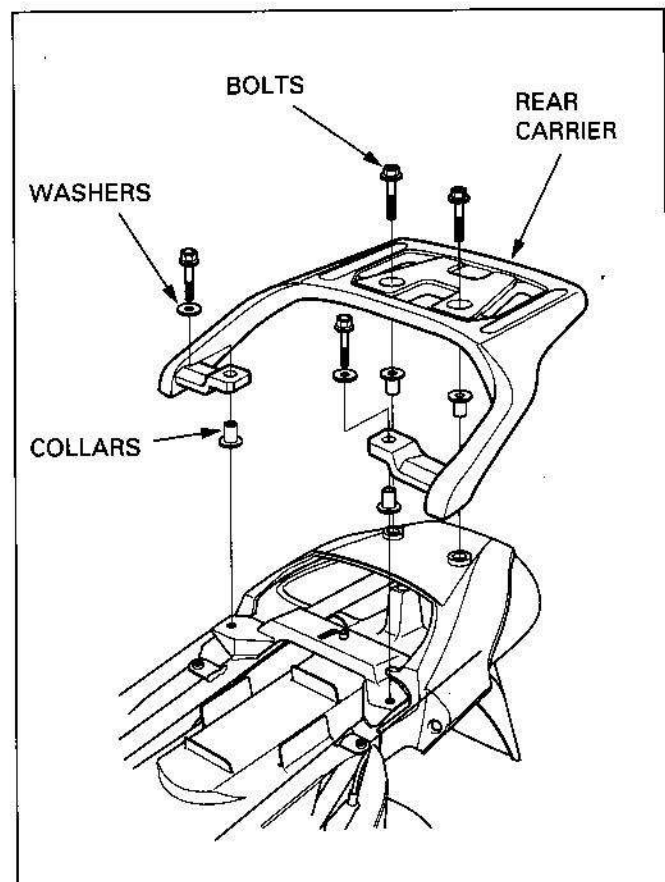
Installation is in the reverse order of removal.



REAR CARRIER

Remove the seat (page 2-2).
Remove the bolts.
Remove the rear carrier, washers and collars.

Installation is in the reverse order of removal.



TAIL COVER/REAR FENDER

REMOVAL

Remove the seat (page 2-2).

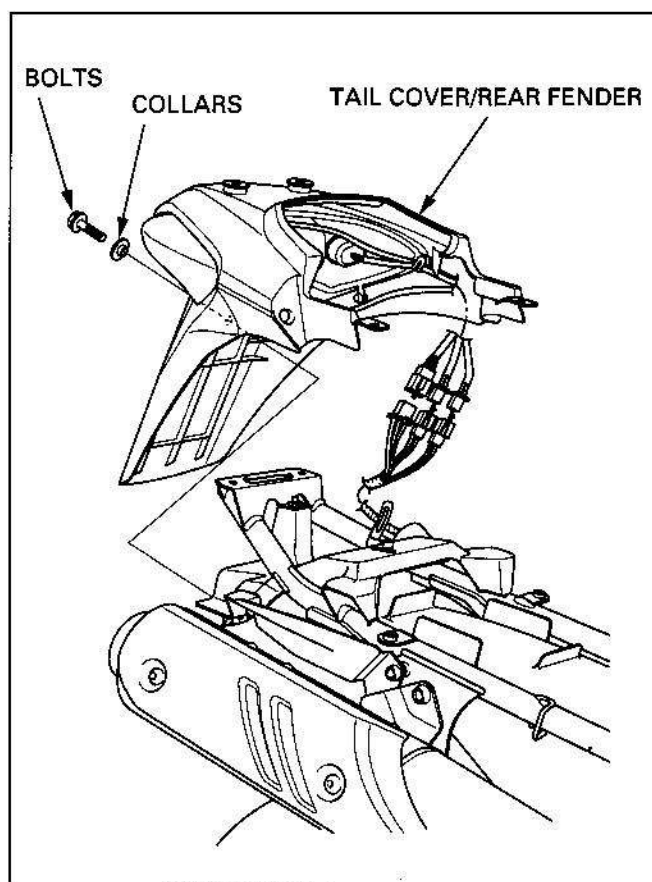
Remove the rear carrier (page 2-3).

Remove the bolts.

Disconnect the tail/brake light and rear turn signal connectors.

Remove the tail cover/rear fender.

Installation is in the reverse order of removal.

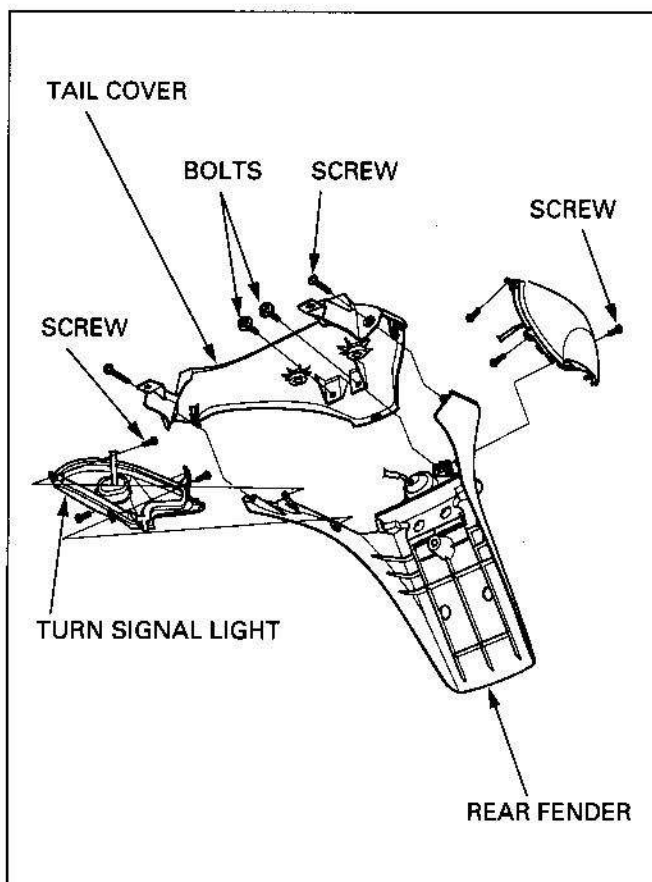


DISASSEMBLY

Remove the screws, bolts and rear tail cover from the rear fender.

Remove the screws and turn signal lights.

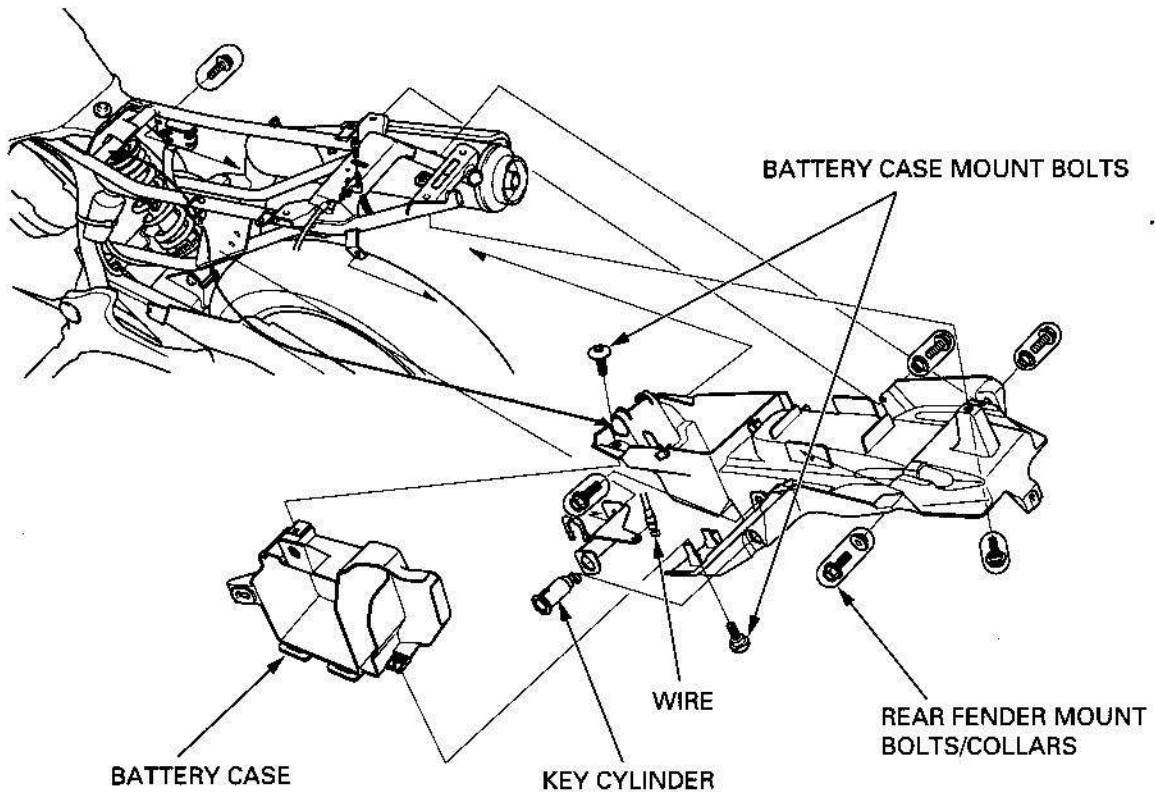
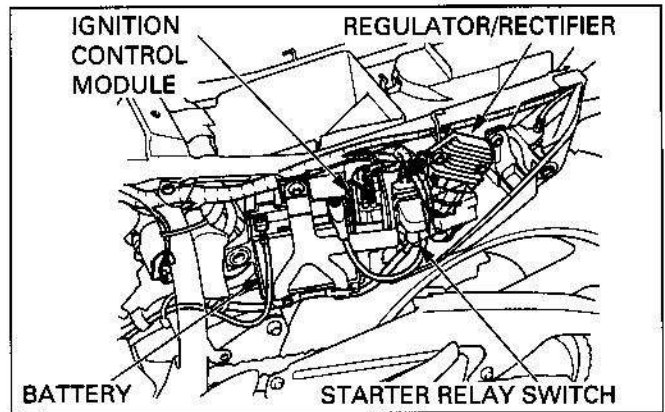
Installation is in the reverse order of removal.



REAR INNER FENDER/BATTERY BOX

Remove the following:

- Seat (page 2-2)
- Left side cover (page 2-2)
- Battery (page 15-4)
- Regulator/rectifier (page 15-7)
- Ignition control module (page 16-9)
- Starter relay switch (page 17-16)



Remove the battery mount bolts and battery case.
Disconnect the wire and remove the key cylinder.
Remove the mount bolts/collars and rear inner fender.

Installation is in the reverse order of removal.

FRAME/BODY PANELS/EXHAUST SYSTEM

FRONT COWL

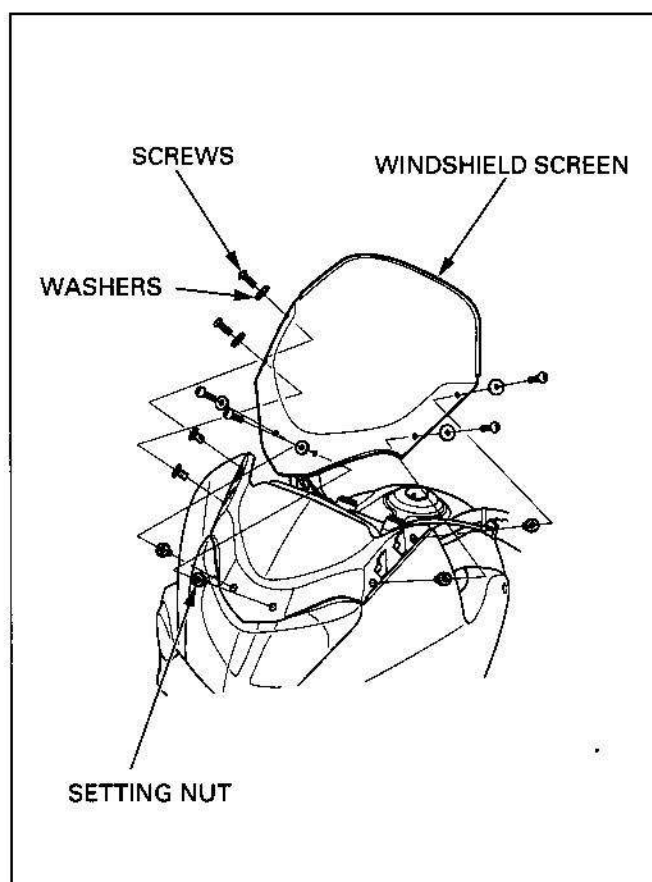
WINDSHIELD SCREEN

CAUTION:

Do not scratch and damage the windshield screen.

Remove the screws, washers and windshield screen.
Remove the setting nut.

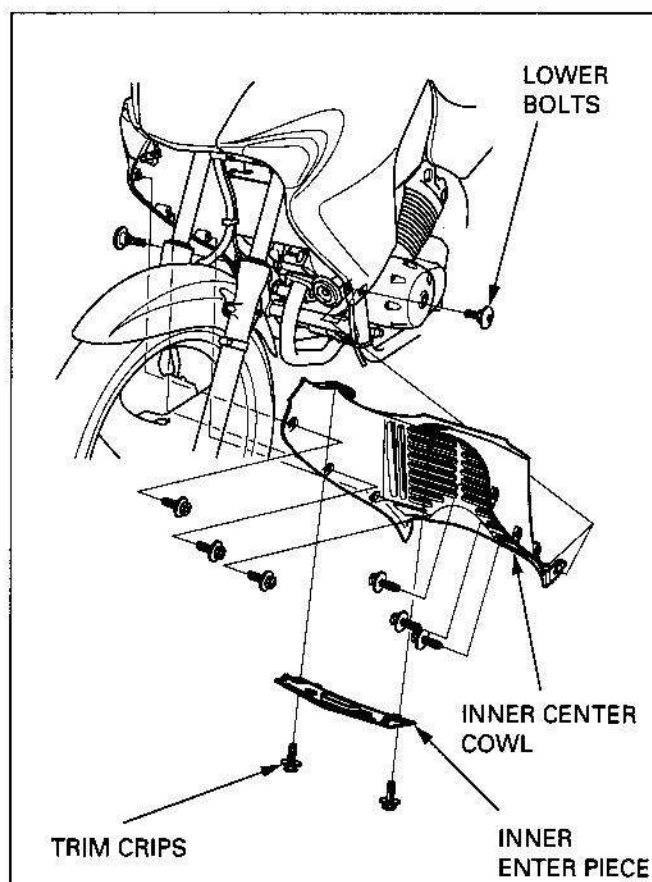
Installation is in the reverse order of removal.



INNER CENTER COWL

Remove the lower bolts of the front cowl assembly.
Remove the trim crips and inner center piece.
Remove the trim crips and inner center cowl.

Installation is in the reverse order of removal.



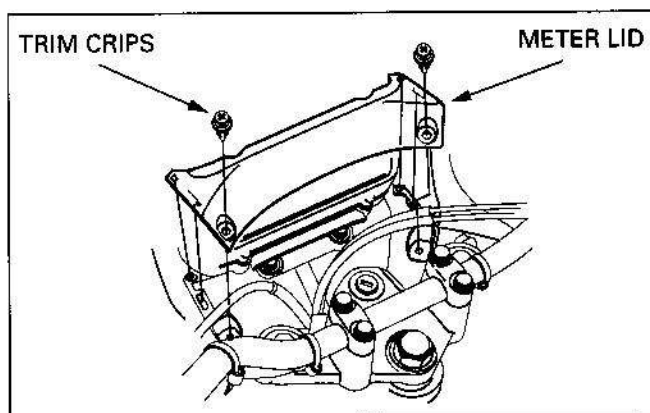
FRONT COWL ASSEMBLY

REMOVAL

Remove the inner center piece and inner center cowl (page 2-6).

Remove the trim crips and meter lid.

Remove the combination meter (page 18-6).

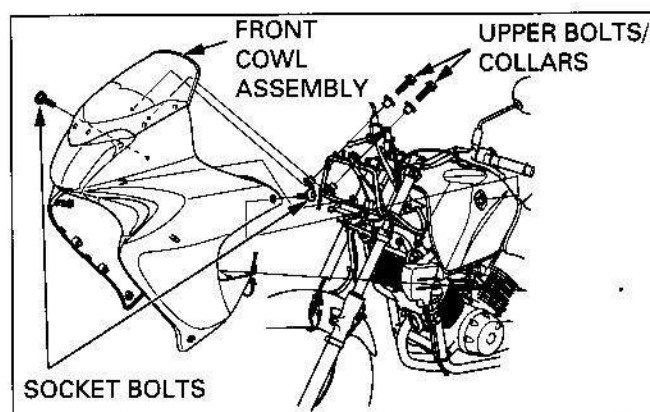


Remove the upper bolts/collars, socket bolts and front cowl assembly.

NOTE:

Be careful not to damage the front cowl assembly.

Disconnect the head light, position light 4P connector and left and right turn signal light 2P connectors.



DISASSEMBLY

Remove the windscreen (page 2-6).

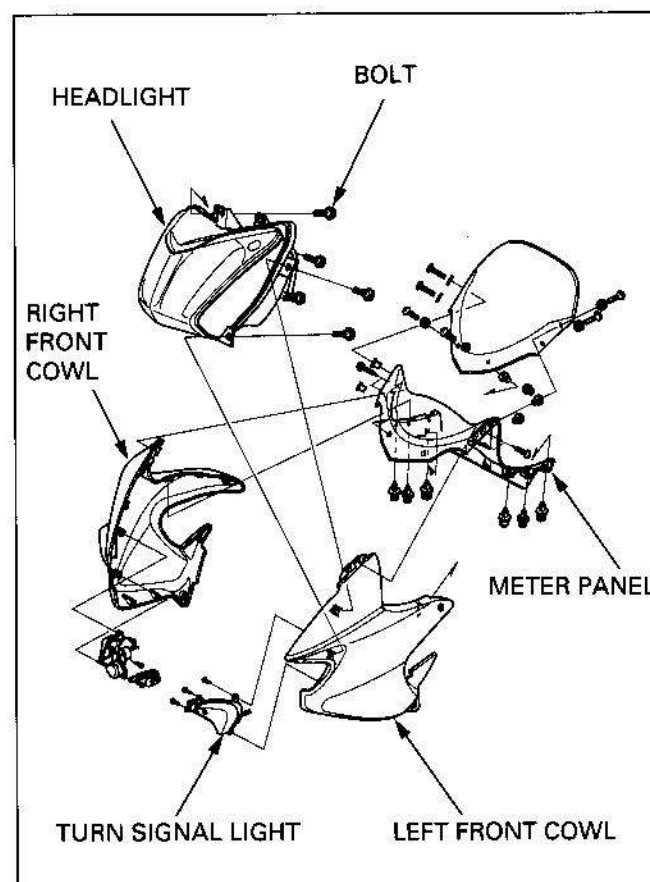
Remove the bolts and headlight.

Remove the trim crips, screws and meter panel.

Remove the left and right front cowls.

Remove the screws and turn signal lights.

Installation is in the reverse order of removal.



FRAME/BODY PANELS/EXHAUST SYSTEM

FUEL TANK

REMOVAL

▲ WARNING

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

CAUTION:

Do not damage the front cowl assembly and fuel tank.

Remove the seat (page 2-2).

Turn the fuel valve "OFF".

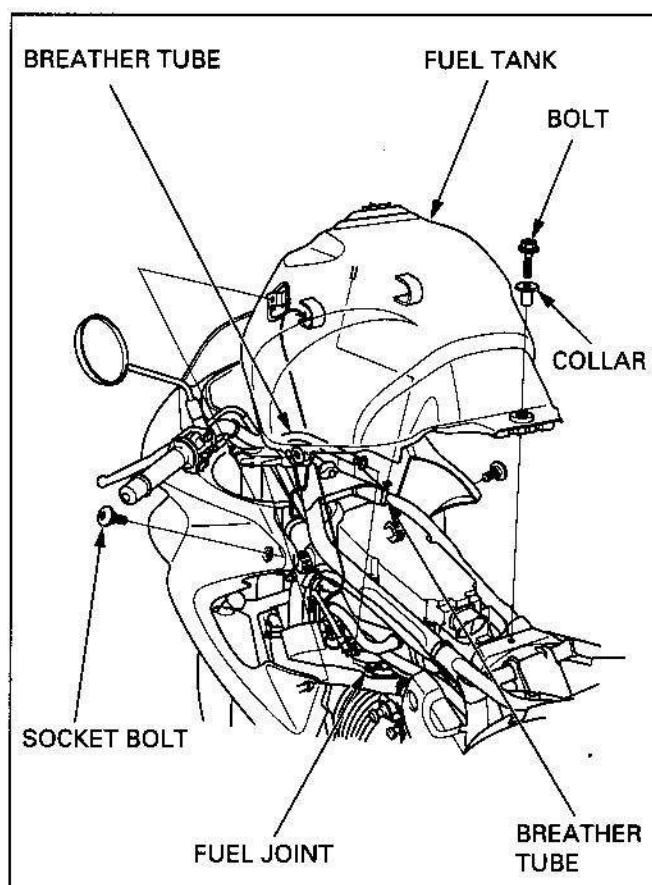
Disconnect the fuel tube from the fuel joint.

NOTE:

At removal, be careful not to damage the fuel sensor 2P connector and wire.

Remove the lower bolts and socket bolts from the front cowl assembly.

Remove the bolt, collar and fuel tank.
Disconnect the breather tube.



DISASSEMBLY

Loosen the fuel valve nut and remove the fuel valve.

Remove the strainer screen and O-ring.

Check the fuel strainer screen for clogs or damage and clean or replace if necessary.

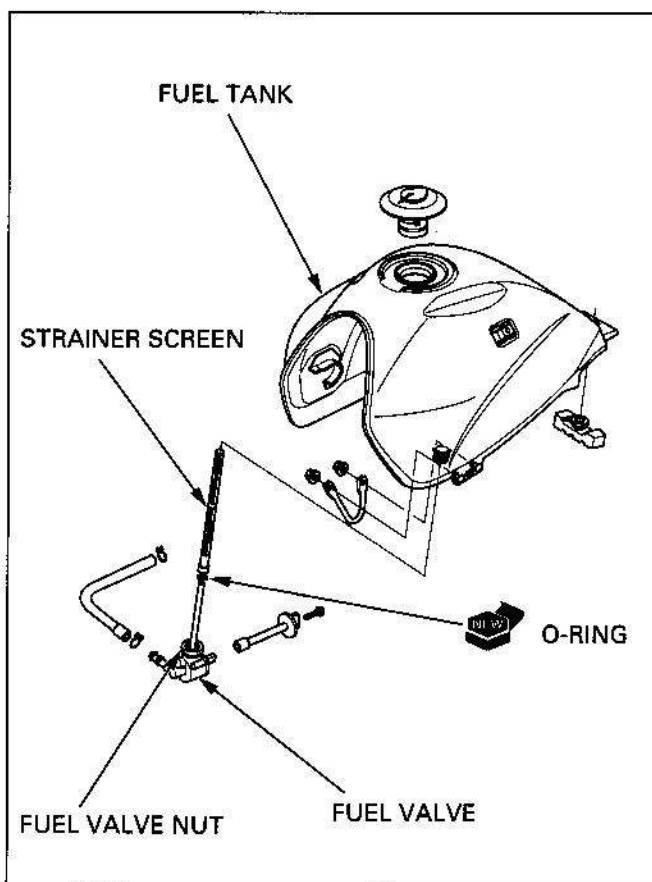
Install the new O-ring to the fuel strainer screen.

Attach the fuel strainer screen to the fuel valve and install to the fuel tank.

NOTE:

Always replace the O-ring with new one.

Tighten the fuel valve nut securely.



MUFFLER/EXHAUST PIPE

REMOVAL

⚠ WARNING

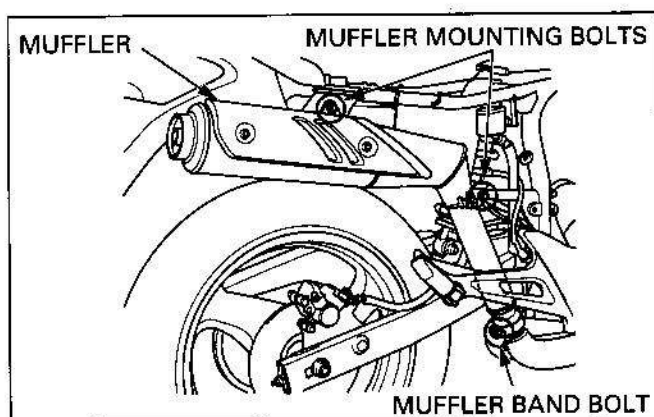
Do not service the exhaust system while it is hot.

Remove the seat (page 2-2).

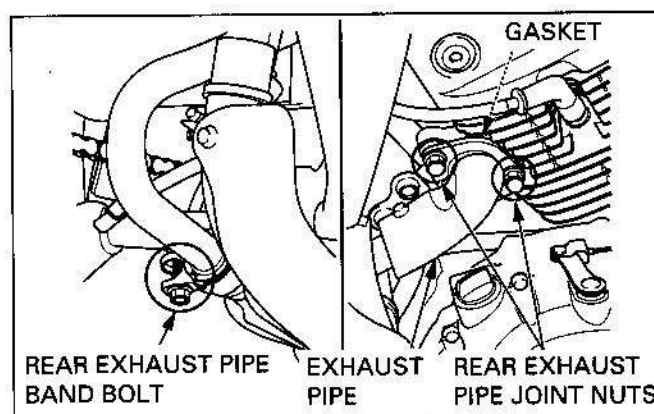
Remove the side covers (page 2-2).

Loosen the muffler band bolt.

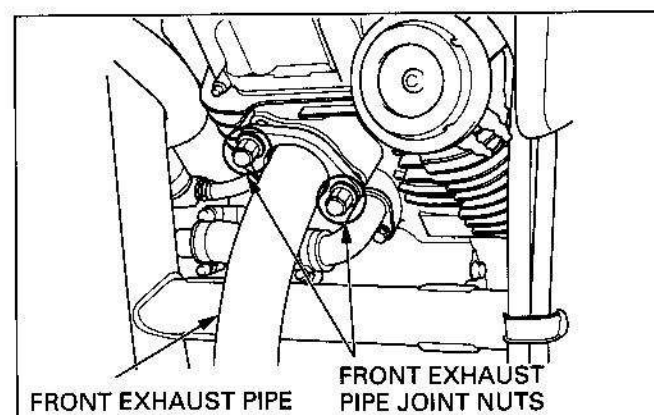
Remove the muffler mounting bolts and muffler.



Loosen the rear exhaust pipe band bolt and remove the rear exhaust pipe joint nuts, gasket and rear exhaust pipe.

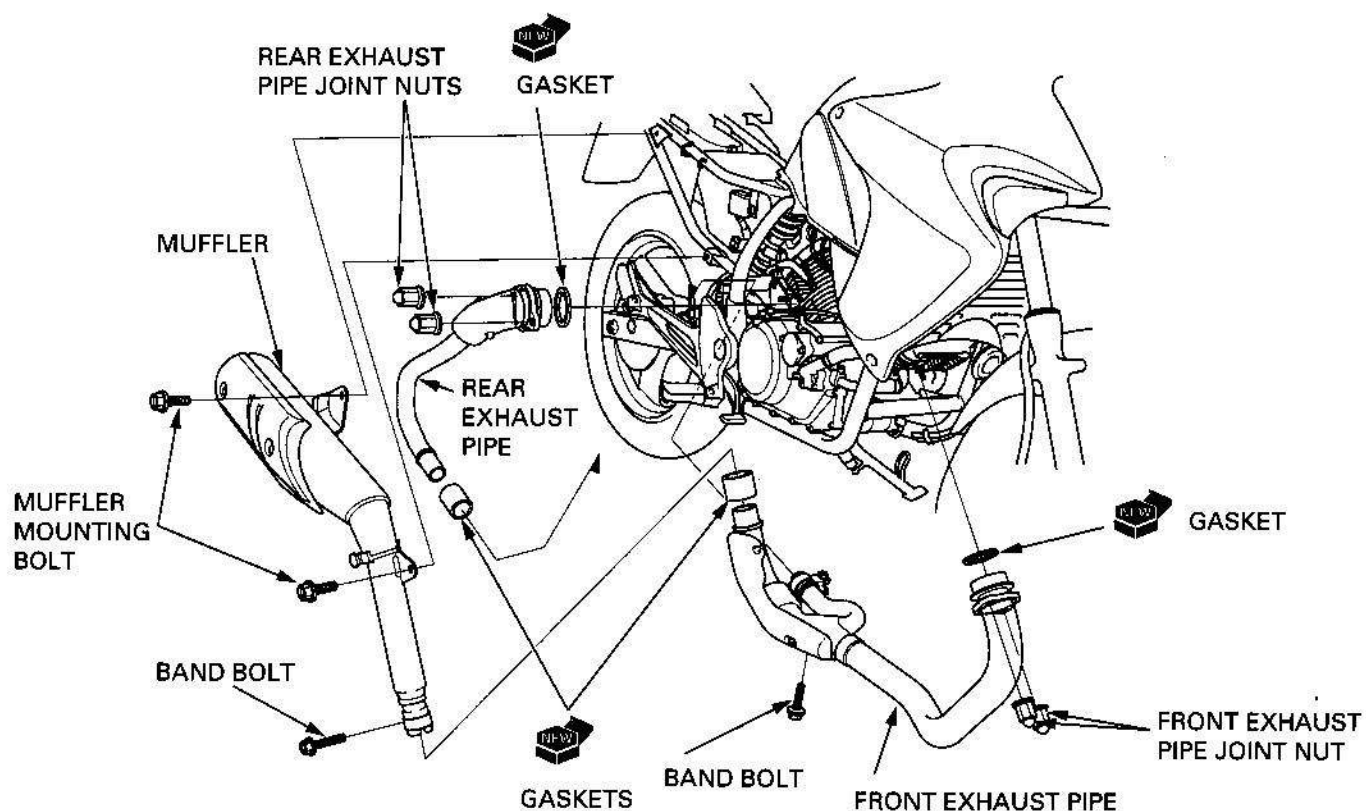


Remove the front exhaust joint nuts, gasket and front exhaust pipe.



FRAME/BODY PANELS/EXHAUST SYSTEM

INSTALLATION



Replace the gaskets with new ones.

Installation is in the reverse order of removal.

Tighten the bolts and nuts to their specified torque.

TORQUE:

Exhaust pipe joint nut: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Muffler band bolt: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Muffler mounting bolt: 32 N·m (3.3 kgf·m, 24 lbf·ft)

3. MAINTENANCE

3

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SERVICE INFORMATION

GENERAL

▲ WARNING

- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.*
- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*

CAUTION:

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

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

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)	
Spark plug	Standard	CR8EH-9 (NGK)	U24FER-9 (DENSO)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)	
Valve clearance	IN	0.15 ± 0.02 mm (0.006 ± 0.001 in)	
	EX	0.24 ± 0.02 mm (0.009 ± 0.001 in)	

MAINTENANCE

ITEM		SPECIFICATIONS	
Engine oil capacity	At draining	1.1 liter (1.2 US qt, 1.0 Imp qt)	
	At disassembly	1.5 liter (1.6 US qt, 1.3 Imp qt)	
	At filter change	1.2 liter (1.3 US qt, 1.1 Imp qt)	
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10 W-40	
Carburetor vacuum difference		4 kPa (30 mm Hg, 1.18 in Hg)	
Engine idle speed		1,500 ± 100 min ⁻¹ (rpm)	
Drive chain slack		25 – 35 mm (1 – 1 3/8 in)	
Drive chain link		110 links	
Recommended brake fluid		DOT 3 OR DOT 4	
Clutch lever free play		10 – 20 mm (3/8 – 13/16 in)	
Tire size		Front	100/90 – 18 56P
		Rear	130/80 – 17 65P
Tire brand		Front	BRIDGESTONE TRAIL WING-53G/PIRELLI MT90ST
		Rear	BRIDGESTONE TRAIL WING-54/PIRELLI MT90ST
Cold tire pressure	Up to 90 kg (200 lb) load	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	200 kPa (2.00 kgf/cm ² , 29 psi)
	Up to maximum weight capacity	Front	200 kPa (2.00 kgf/cm ² , 29 psi)
		Rear	225 kPa (2.25 kgf/cm ² , 33 psi)
Minimum tire tread depth		Front	0.8 mm (0.03 in)
		Rear	0.8 mm (0.03 in)

TORQUE VALUES

Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Valve adjusting screw lock nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	Apply oil to the threads and seating surface
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply molybdenum oil solution to the threads
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply molybdenum oil solution to the threads
Oil drain bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	

MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

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

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

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult their authorized HONDA dealer.

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ⇓	ODOMETER READING (NOTE 1)					REFER TO PAGE
			x 1,000 km	1	4	8	12	
			x 1,000 mi	0.6	2.5	5	7.5	
		NOTE	MONTHS		6	12	18	
* 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	3-6
SPARK PLUG						R		3-6
* VALVE CLEARANCE				I			I	3-8
ENGINE OIL				R			R	3-9
ENGINE OIL FILTER				R			R	3-9
* CARBURETOR SYNCHRONIZATION							I	3-12
* ENGINE IDLE SPEED				I	I	I	I	3-13
RADIATOR COOLANT		NOTE 3				I		3-13
* COOLING SYSTEM						I		3-14
* SECONDARY AIR SUPPLY SYSTEM							I	3-15
DRIVE CHAIN			EVERY 1,000 km (600 mi) I, L					3-16
DRIVE CHAIN SLIDER					I	I	I	3-19
BRAKE FLUID		NOTE 3			I	I	I	3-20
BRAKE PADS WEAR					I	I	I	3-20
BRAKE SYSTEM				I	I	I	I	3-21
* BRAKE LIGHT SWITCH					I	I	I	3-22
* HEADLIGHT AIM					I	I	I	3-22
CLUTCH SYSTEM				I	I	I	I	3-23
SIDE STAND					I	I	I	3-24
* SUSPENSION					I	I	I	3-24
* NUTS, BOLTS, FASTENERS				I		I		3-25
** WHEELS/TIRES				I	I	I	I	3-26
** STEERING HEAD BEARINGS					I		I	3-26

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

** In the interest of safety, we recommend these items be serviced only by an authorized HONDA dealer.

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

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

3. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

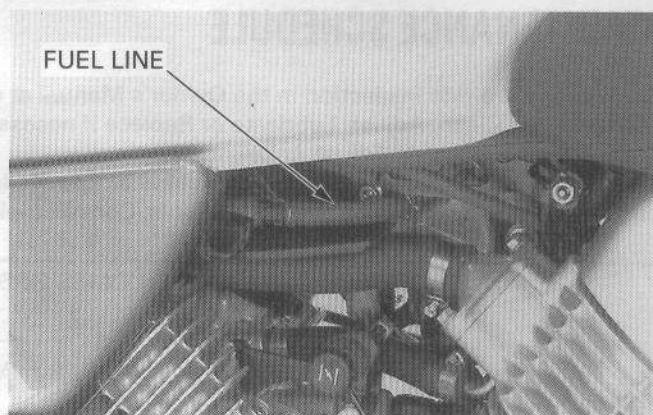
MAINTENANCE

FUEL LINE

▲ WARNING

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

Check the fuel line for deterioration, damage or leakage.
Replace the fuel line 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 grip returns from the full open to the full closed position smoothly and automatically in all steering positions.

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

For cable lubrication: Disconnect the throttle cables at their upper ends (page 12-4). Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

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

▲ WARNING

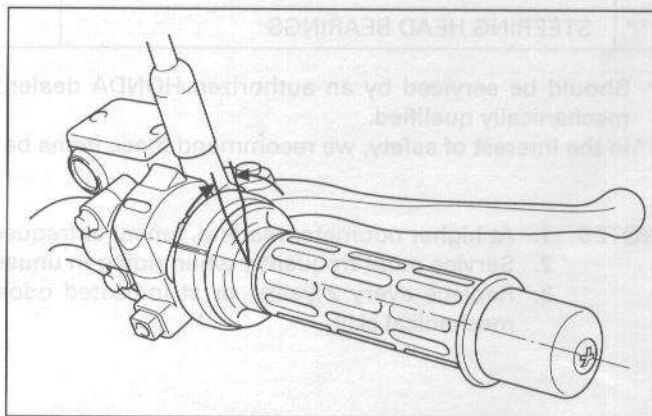
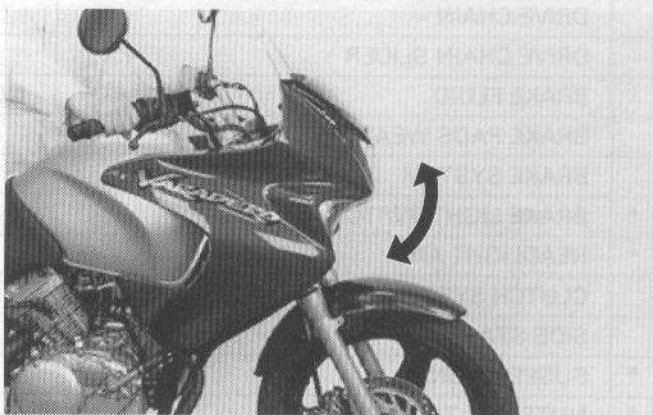
Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle side operation and may lead to a loss of throttle control while riding.

With the engine idling, turn the handlebar all the way to the right and left to ensure that idle speed does not change.

If idle speed increases, check the throttle grip free play and the throttle cable connection.

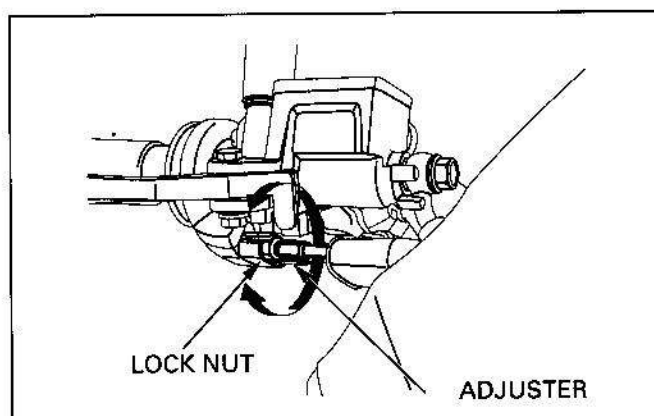
Measure the throttle grip free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/16 – 1/4 in)



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

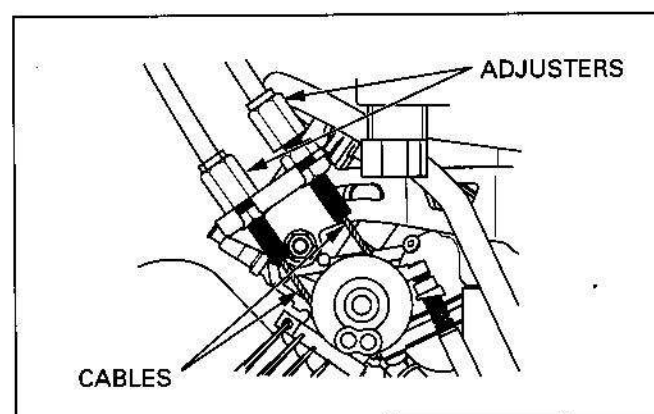
Loosen the lock nut and turn the adjuster to obtain the free play.
After the adjustment, tighten the lock nut securely and reposition the boot properly.



Major adjustments are made with the lower adjuster.

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

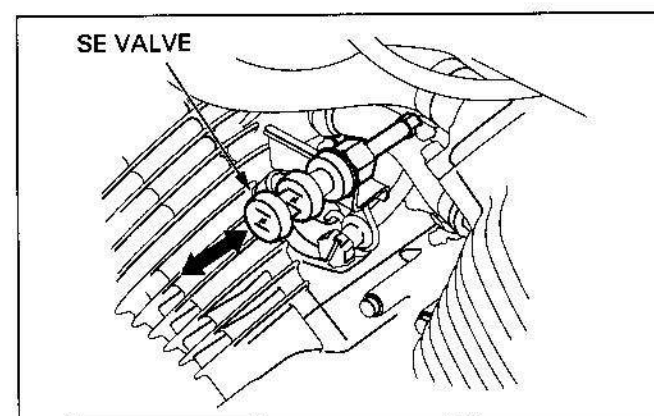
Recheck the free play.



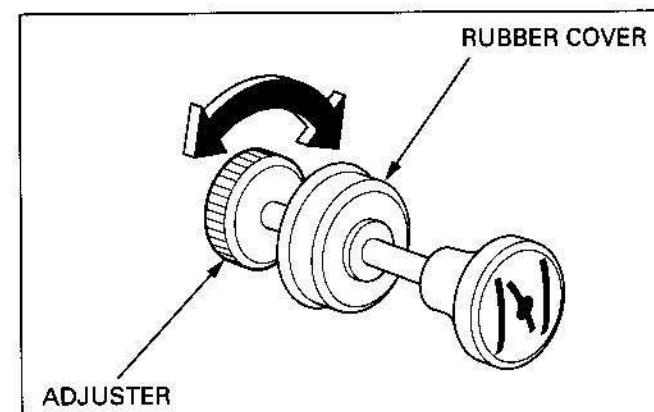
CARBURETOR CHOKE

STARTING ENRICHMENT (SE) VALVE

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



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

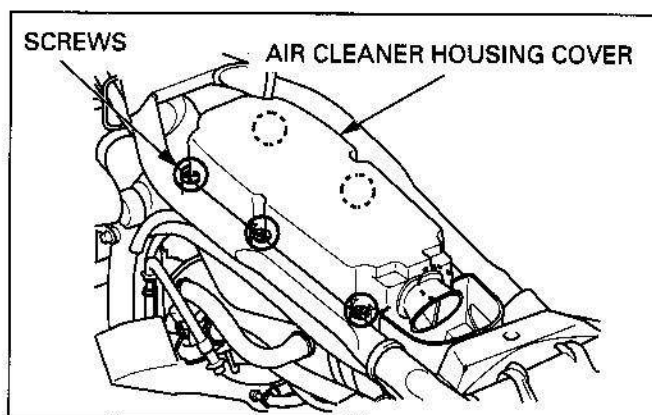


MAINTENANCE

AIR CLEANER

Remove the fuel tank (page 2-8).

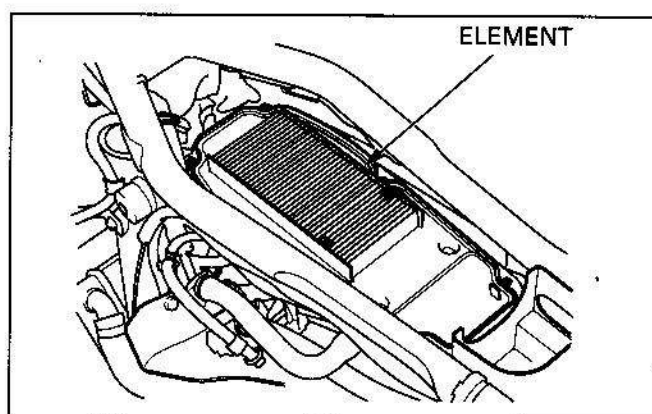
Remove the six screws and air cleaner housing cover.



Remove and discard the air cleaner element in accordance with the maintenance schedule.

Also replace the air cleaner element any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.



SPARK PLUG

FRONT SIDE:

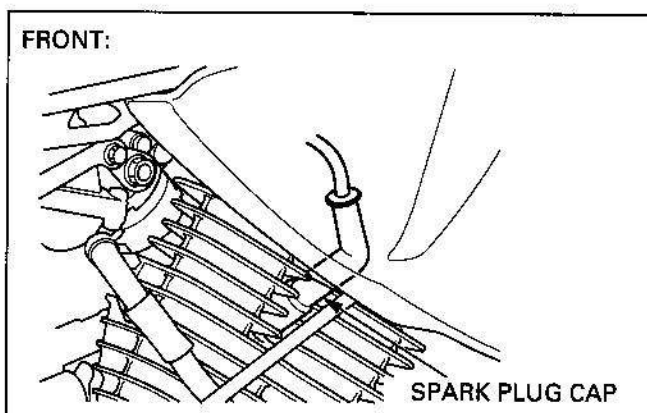
CAUTION:

Do not damage the front cowl.

Remove the front cowl lower bolts.

Remove the trim clip from the inner center cowl (page 2-6) and disconnect the boss of the front cowl from the grommet of the fuel tank.

Disconnect the front spark plug cap.



REAR SIDE:

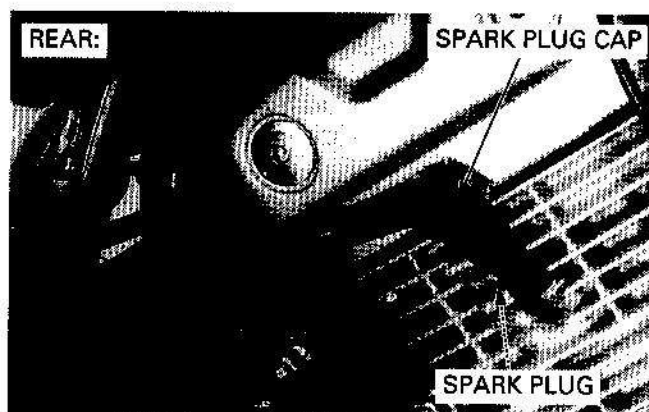
Disconnect the rear spark plug cap.

NOTE:

Clean around the seat of the plug hole with compressed air before removing, and be sure that no debris enters the combustion chamber.

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

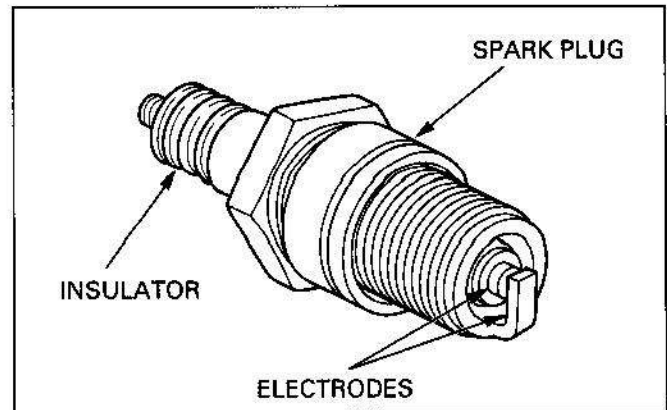
Inspect or replace as described in the maintenance schedule (page 3-3).



INSPECTION

Check the following and replace if necessary (recommended spark plugs: page 3-1).

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration;
 - dark to light brown indicates good condition.
 - excessive lightness indicates malfunctioning ignition system or lean mixture.
 - wet or black sooty deposit indicates over-rich mixture.

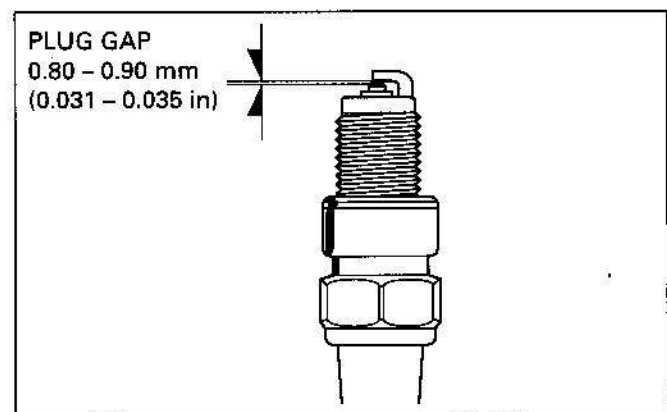


REUSING A SPARK PLUG

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

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

SPARK PLUG GAP: 0.80 – 0.90 mm (0.031 – 0.035 in)

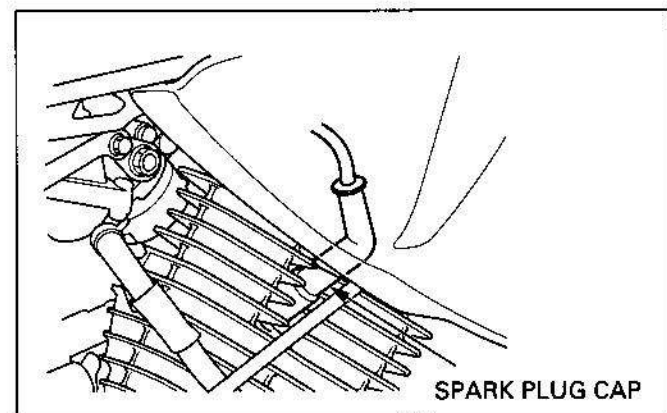


CAUTION:

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

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

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



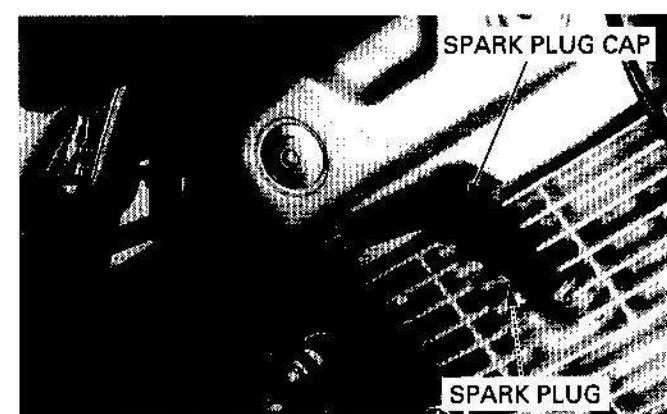
REPLACING A SPARK PLUG

CAUTION:

Do not overtighten the spark plug.

Remove the spark plug (page 3-6).

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



MAINTENANCE

VALVE CLEARANCE

INSPECTION

NOTE:

- Inspection and adjustment of the valve clearance can be done with engine in the frame.
- Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

Remove the following:

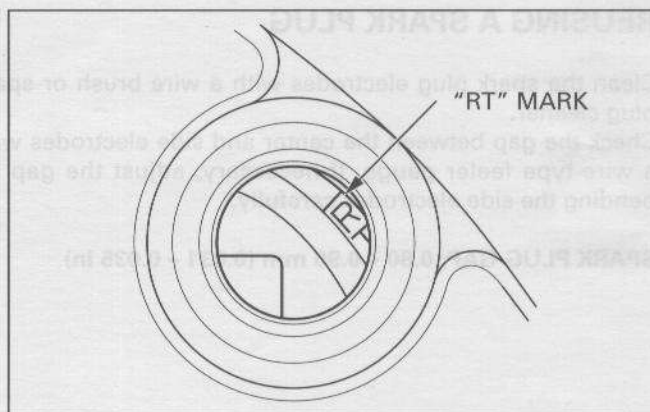
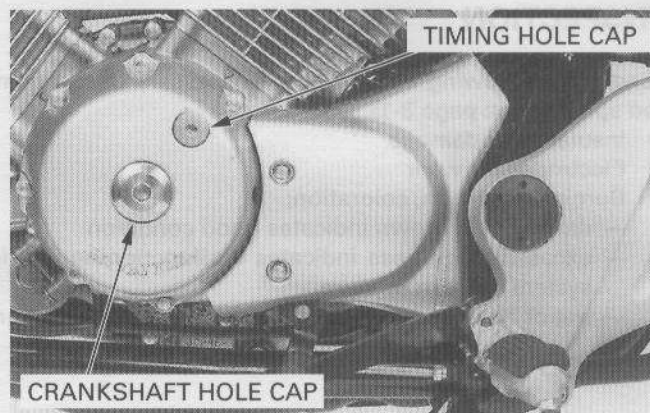
- fuel tank (page 2-8).
- Radiator (page 6-8).

Remove the crankshaft hole cap and timing hole cap.

REAR CYLINDER HEAD

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

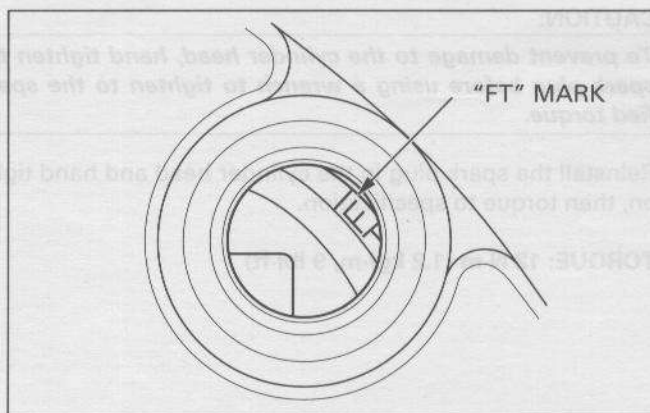
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.



FRONT CYLINDER HEAD

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

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

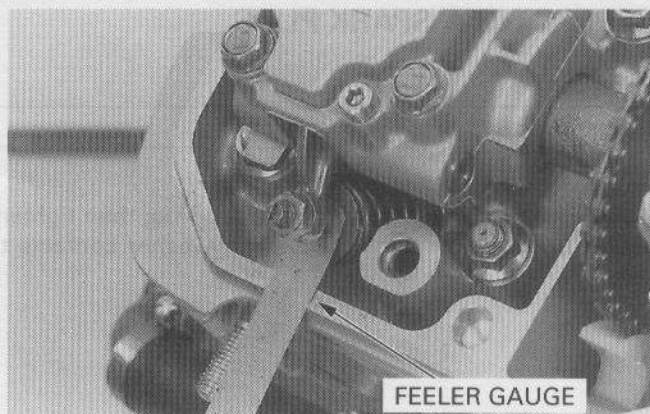


Inspect the clearance of all two valves by inserting a feeler gauge between the adjusting screw and the valve.

VALVE CLEARANCE:

IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)

EX: 0.24 ± 0.02 mm (0.009 ± 0.001 in)



ADJUSTMENT

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

NOTE:

Apply oil to the lock nut threads.

Hold the adjusting screw and tighten the lock nut.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Install the cylinder head covers (page 9-25).

Apply grease to the timing hole cap, crankshaft hole cap threads and O-rings.

Install and tighten the caps to the specified torque.

TORQUE:

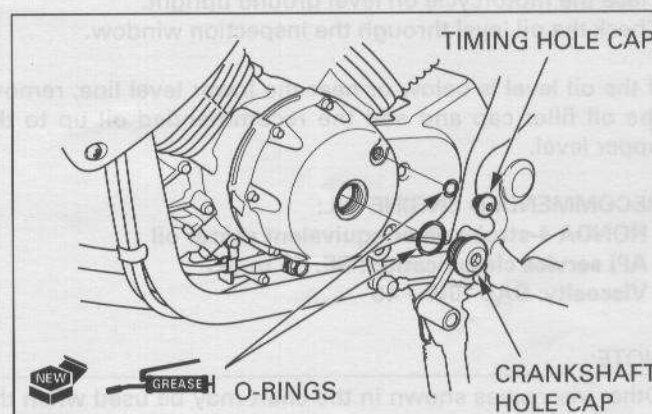
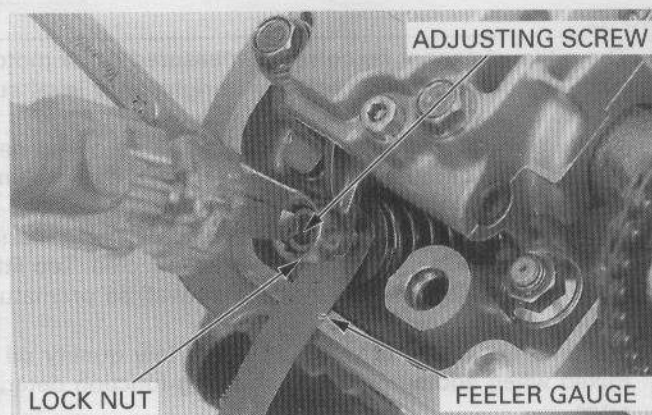
Timing hole cap: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Crankshaft hole cap: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the following:

— Radiator (page 6-12).

— fuel tank (page 2-3).

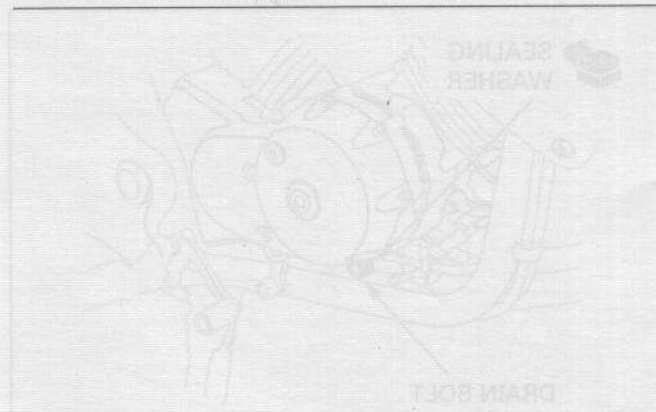


ENGINE OIL/OIL FILTER

INSPECTION

⚠ WARNING

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



MAINTENANCE

NOTE:

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

Place the motorcycle on level ground upright.
Check the oil level through the inspection window.

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

RECOMMENDED ENGINE OIL:

HONDA 4-stroke oil or equivalent motor oil

API service classification: SE, SF or SG

Viscosity: SAE 10W - 40

NOTE:

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

Check the O-ring.
Reinstall the filler cap.

ENGINE OIL CHANGE

Place the motorcycle on the level ground upright.

Warm up the engine.

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

After the engine oil has been drained out, hold the motorcycle upright securely for 10 - 15 seconds to drain the engine oil completely.

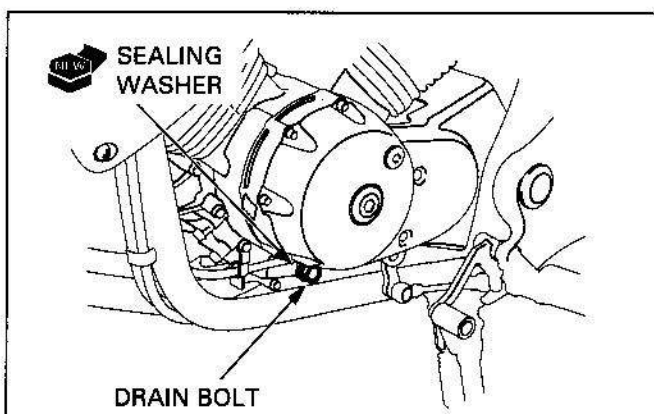
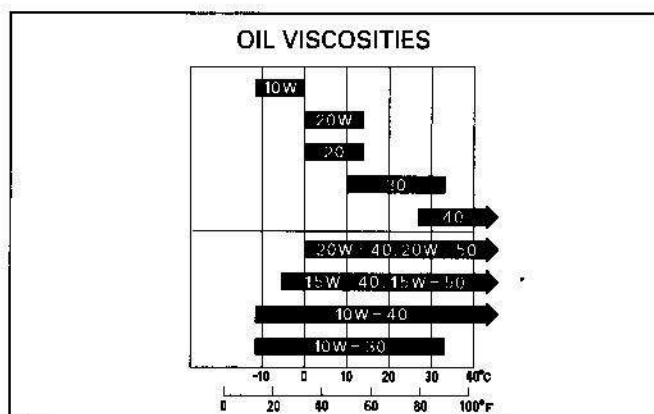
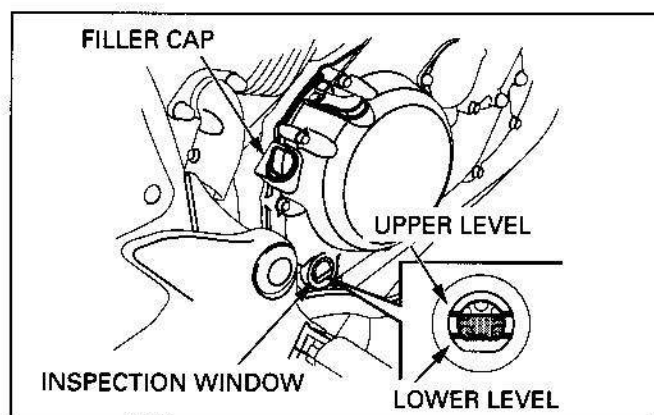
CAUTION:

Support the motorcycle securely with a hoist or equivalent.

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

Tighten the drain bolt to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)



Fill the crankcase with recommended engine oil.

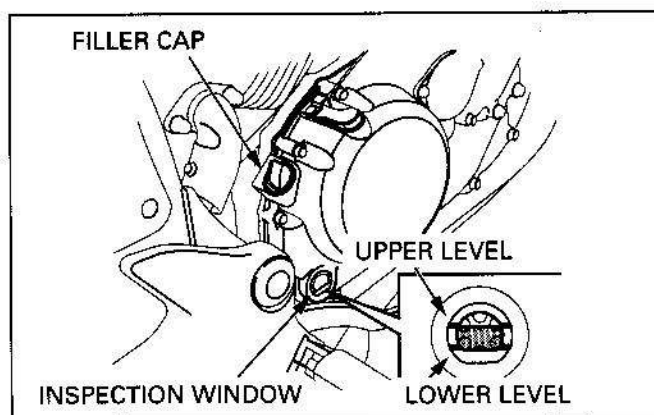
OIL CAPACITY:

- 1.1 liter (1.2 US qt, 1.0 Imp qt) at draining
- 1.5 liter (1.6 US qt, 1.3 Imp qt) at disassembly
- 1.2 liter (1.3 US qt, 1.1 Imp qt) at oil filter change

Install the oil filler cap.

Start the engine and let it idle for 2 – 3 minutes.
Stop the engine and wait a few minutes, then check that the oil level is at the upper level line in the inspection window.

Check that there are no oil leaks.



OIL FILTER CHANGE

Drain the engine oil (page 3-10).

Remove the following:

- cover bolts
- filter cover with O-ring
- oil filter
- spring

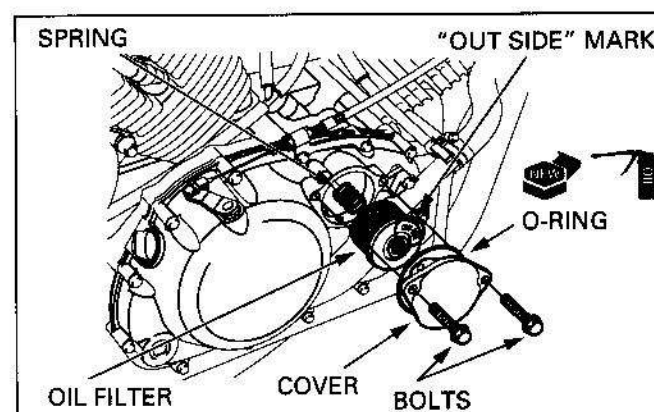
Apply engine oil to a new O-ring and install it in the filter cover groove.

Install the spring between the lugs and a new oil filter with the "OUT-SIDE" mark facing out, and set the filter cover onto filter and tighten the two bolts securely.

CAUTION:

Installing the oil filter backwards will result in severe engine damage.

Fill the engine oil (page 3-11).



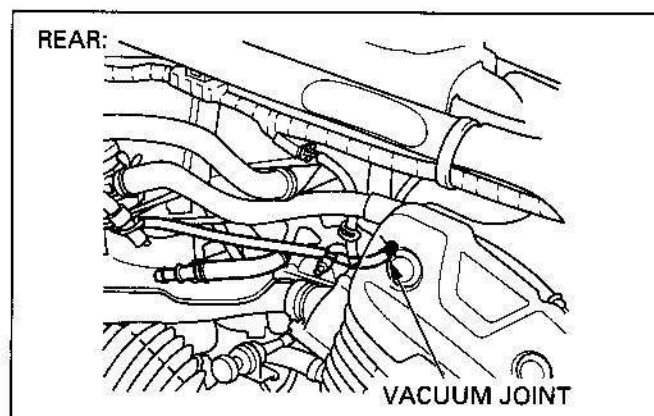
MAINTENANCE

CARBURETOR SYNCHRONIZATION

NOTE:

- Perform this maintenance with the engine at normal operating temperature and transmission in neutral.
- It is not necessary to remove the carburetors when perform this maintenance.

Disconnect the vacuum tube from the vacuum joint pipe of the rear cylinder head.



Remove the screw and washer from the front cylinder head vacuum port.
Install the vacuum gauge attachment into the vacuum port.

TOOL:

vacuum gauge attachment 07510 - 300010

Connect the vacuum gauge tubes to the attachment and vacuum joint pipe.

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

IDLE SPEED: $1,500 \pm 100 \text{ min}^{-1} (\text{rpm})$

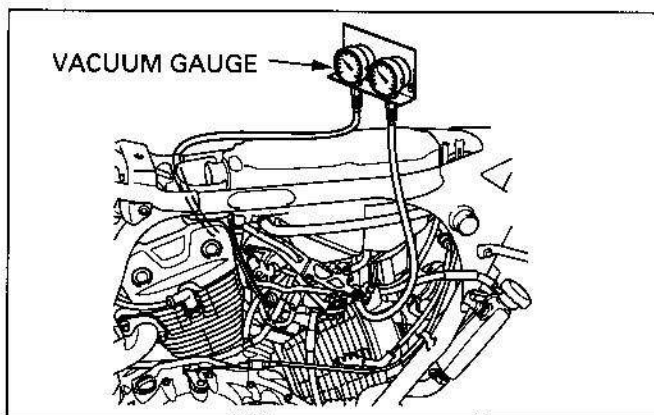
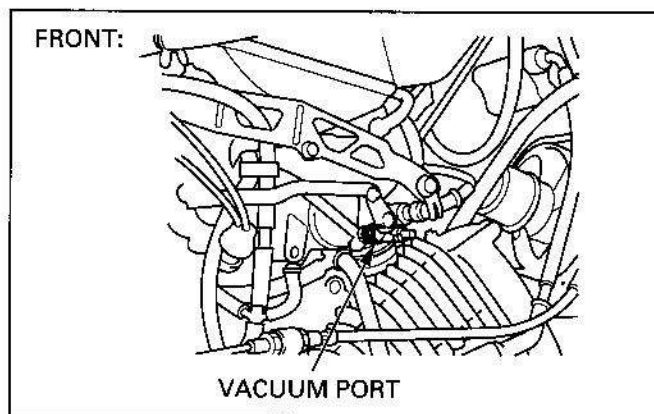
Check the difference between the front and rear carburetors.

CARBURETOR VACUUM DIFFERENCE:

4 kPa (30 mm Hg, 1.18 in Hg)

NOTE:

The base carburetor is the front carburetor.

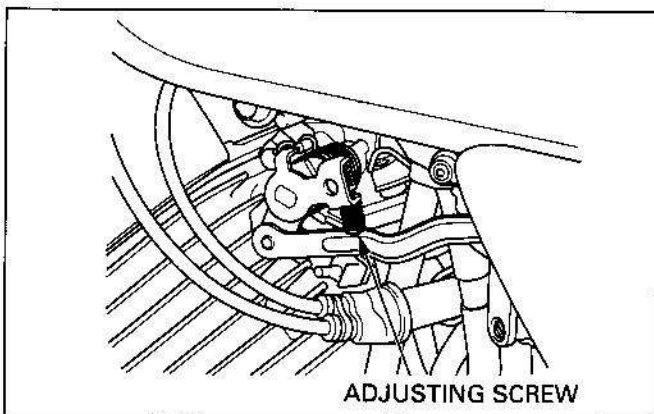


Synchronize to specification by turning the synchronization adjusting screw.

Snap the throttle grip several times.
Recheck the idle speed and synchronization.

Remove the vacuum gauge and attachment.
Install and tighten the vacuum port screw.

Connect the vacuum tube to the vacuum joint pipe of the rear cylinder head.



ENGINE IDLE SPEED

⚠ WARNING

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

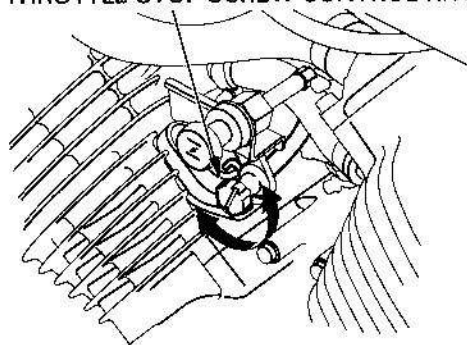
NOTE:

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

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

IDLE SPEED: $1,500 \pm 100 \text{ min}^{-1}$ (rpm)

THROTTLE STOP SCREW CONTROL KNOB



RADIATOR COOLANT

LEVEL CHECK

⚠ WARNING

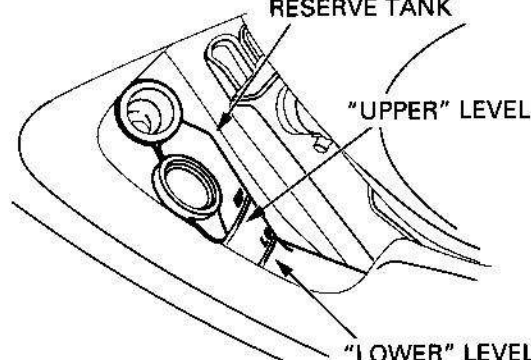
- *Wait until the engine is cool before removing the radiator cap. Removing the cap while the engine is hot and the coolant is under pressure may cause serious scalding.*
- *Radiator coolant is poisonous. Take care to avoid getting coolant in your eyes, on your skin, or on your clothes.*
- *If coolant gets in your eyes, flush repeatedly with water and contact a doctor immediately.*
- *If coolant is accidentally swallowed, induce vomiting and contact a doctor immediately.*
- **KEEP OUT REACH OF CHILDREN.**

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

RESERVE TANK

"UPPER" LEVEL

"LOWER" LEVEL



MAINTENANCE

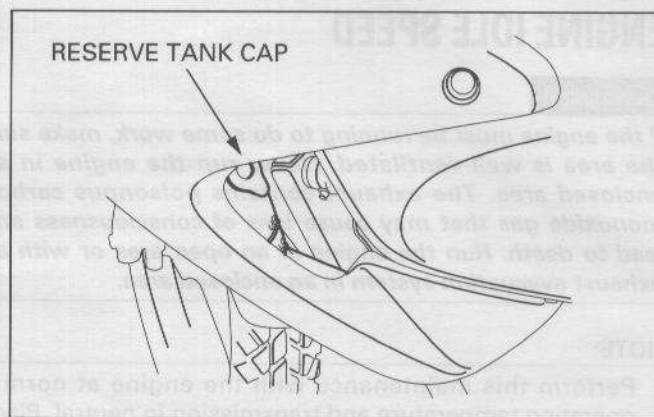
If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50-50 solution of distilled water and recommended antifreeze (coolant mixture preparation: page 6-4).

CAUTION:

Using coolant with silicate 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 all air from the cooling system as described on page 6-5.



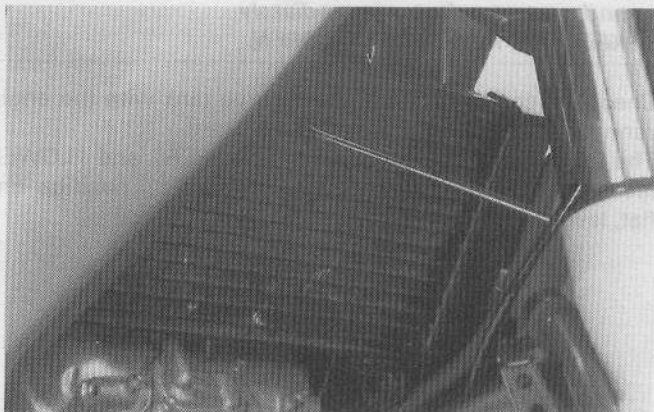
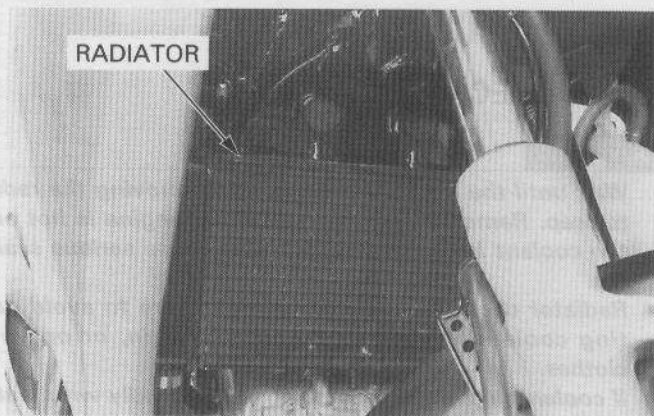
COOLING SYSTEM

⚠ WARNING

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

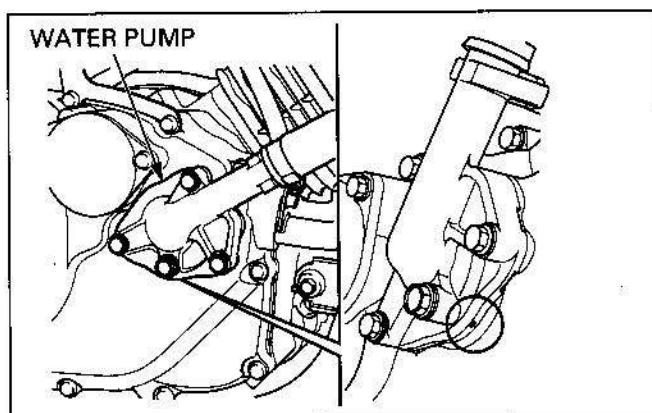
Remove the inner center cowl (page 2-6).
Check the radiator air passage for clogging or damage.

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



Check for any coolant leakage from the water pump (see page 6-13), water hose and hose joints. Make sure the hoses are in good condition; they should not show any signs of deterioration. Replace any hose that shows any sign of deterioration. Check that all hose clamps are tight.

For radiator replacement, refer to page 6-8.



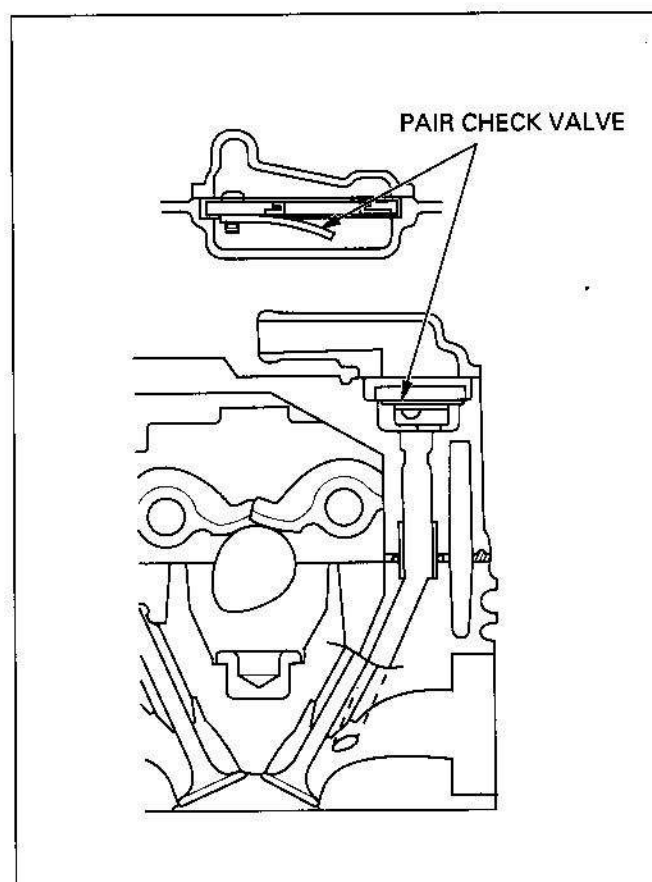
SECONDARY AIR SUPPLY SYSTEM

NOTE:

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

Remove the fuel tank (page 2-5).

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

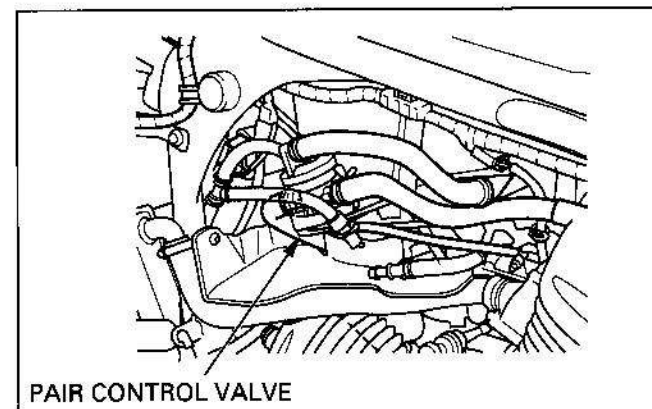


NOTE:

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 5-20).

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

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



MAINTENANCE

DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

⚠ WARNING

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

Turn off the engine, place the motorcycle on its side stand and shift the transmission into neutral. Check the slack in the drive chain lower run midway between the sprockets.

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

CAUTION:

Excessive chain slack, 60 mm (2 3/8 in) or more, may damage the frame.

ADJUSTMENT

Loosen the rear axle nut.

Turn both adjusting nuts until the correct drive chain slack is obtained.

Make sure the index marks on the both adjusters are aligned with the rear edges of the axle slots in the swingarm.

Tighten the rear axle nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

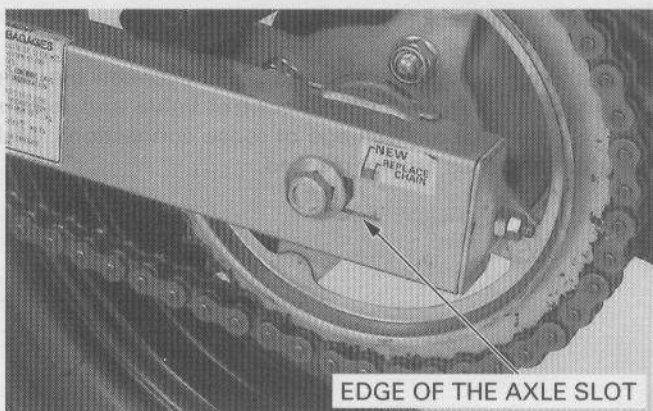
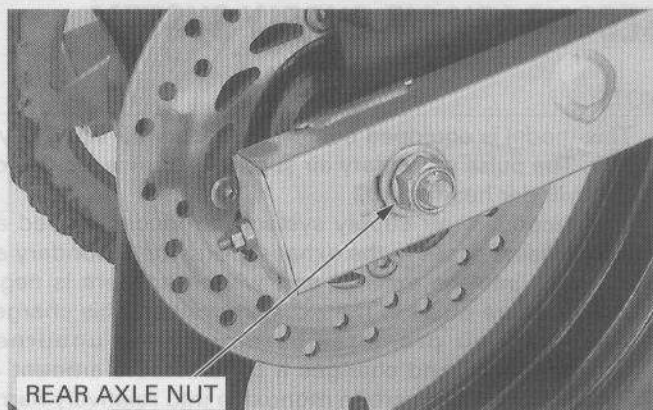
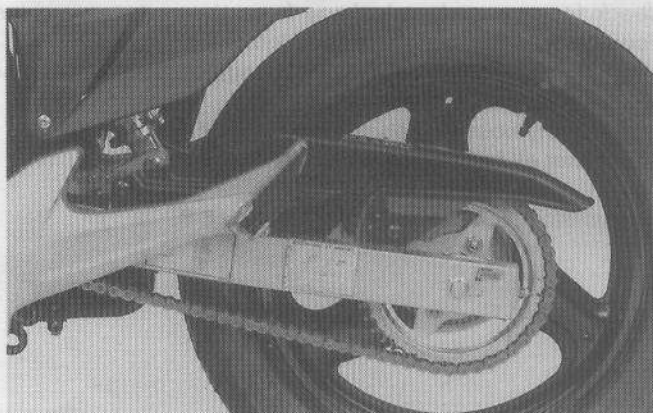
Tighten both adjusting nuts.

Recheck the drive chain slack and free wheel rotation.

Check the rear brake pedal free play (page 3-21), adjust if necessary.

Lubricate the drive chain with #80–90 gear oil or drive chain lubricant designed specifically for use with O-ring chains.

Wipe off the excess oil.



CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.

Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear.

Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

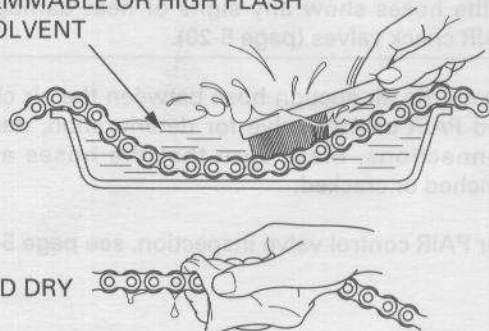
Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace sprocket as necessary.

NON-FLAMMABLE OR HIGH FLASH
POINT SOLVENT

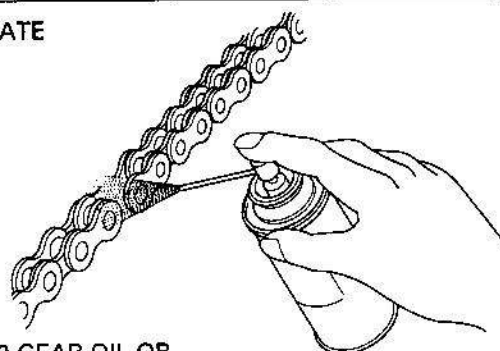
CLEAN

WIPE AND DRY



Lubricate the drive chain with # 80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

LUBRICATE

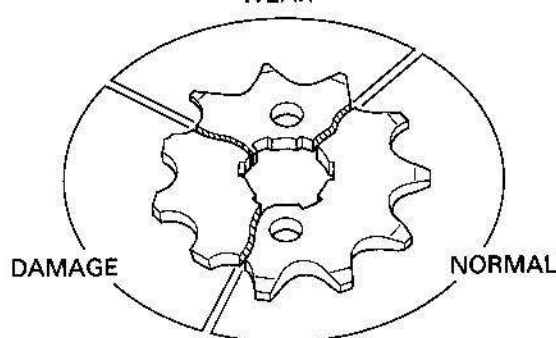


80 – 90 GEAR OIL OR
DRIVE CHAIN LUBRICANT

SPROCKETS INSPECTION

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

WEAR



REPLACEMENT

This motorcycle uses a drive chain with a staked master link.
Loosen the drive chain (page 3-16).
Assemble the special tool as shown.

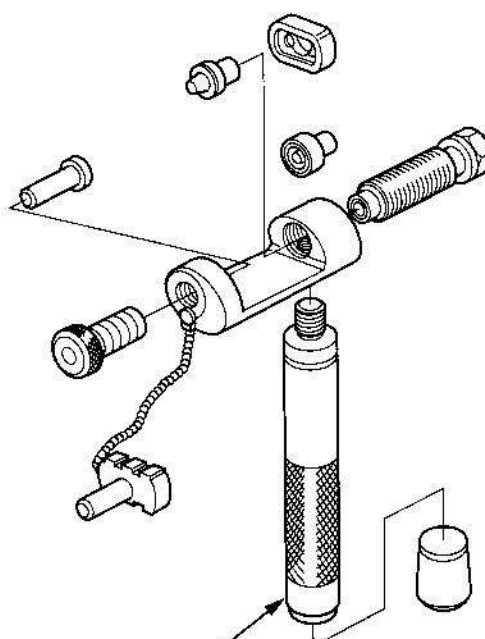
TOOL:

Drive chain tool set

07HMH – MR10103

NOTE:

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



DRIVE CHAIN TOOL SET

MAINTENANCE

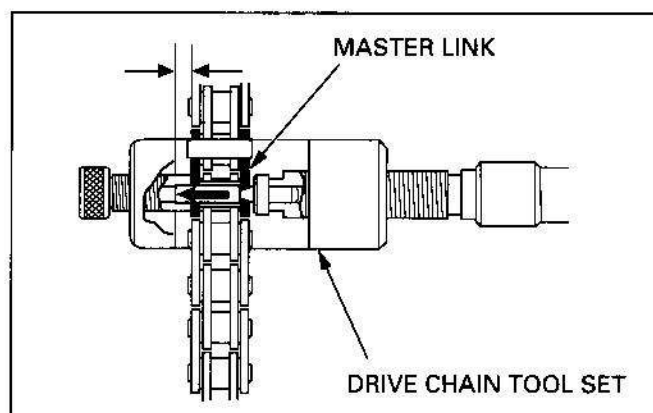
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

TOOL:

Drive chain tool set

07HMH - MR10103

Remove the drive chain.



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

NOTE:

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

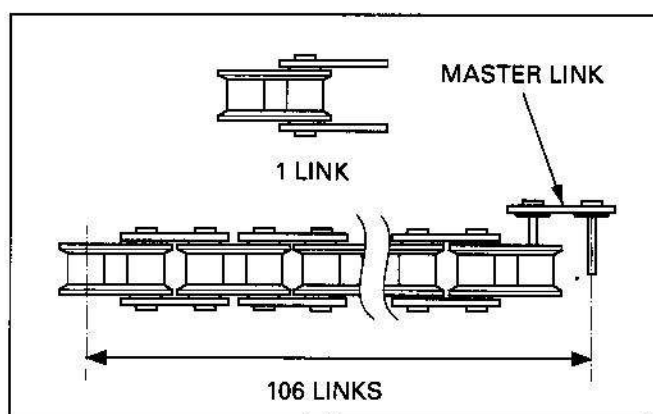
STANDARD LINKS: 110 links

REPLACEMENT CHAIN:

DID: 520 V6

RK: 520SMOZ2

REGINA: 135 ORNV2



CAUTION:

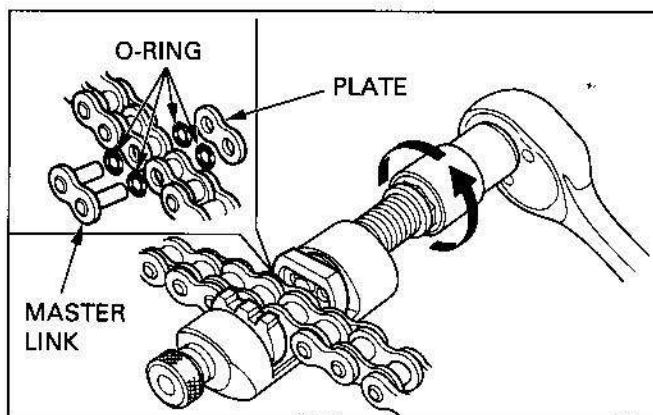
Never reuse the oil drive chain, master link, master link plate and O-rings.

Assemble the new master link, O-rings and plate.

CAUTION:

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

Assemble and set the drive chain tool set.



TOOL:

Drive chain tool set

07HMH - MR10103

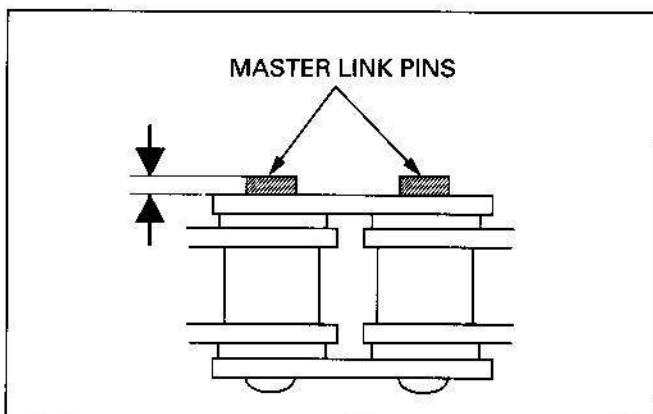
Make sure that the master link pins are installed properly. Measure the master link pin length projected from the plate.

STANDARD LENGTH:

DID: 1.15 - 1.55 mm (0.045 - 0.061 in)

RK: 1.20 - 1.40 mm (0.047 - 0.055 in)

REGINA: Not applicable



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

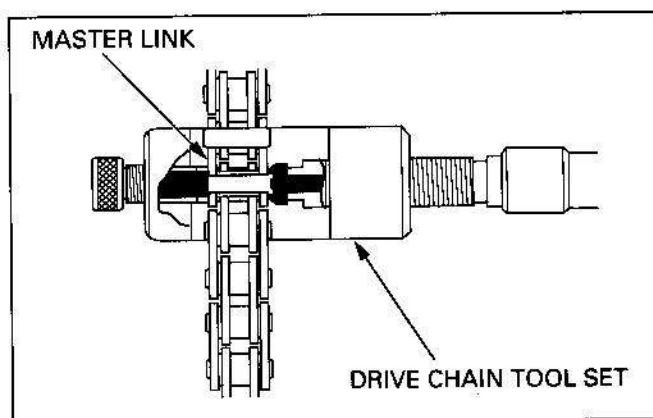
TOOL:

Drive chain tool set

07HMH - MR10103

NOTE:

To prevent over staking, stake gradually checking the diameter of the staked area using slide calipers.



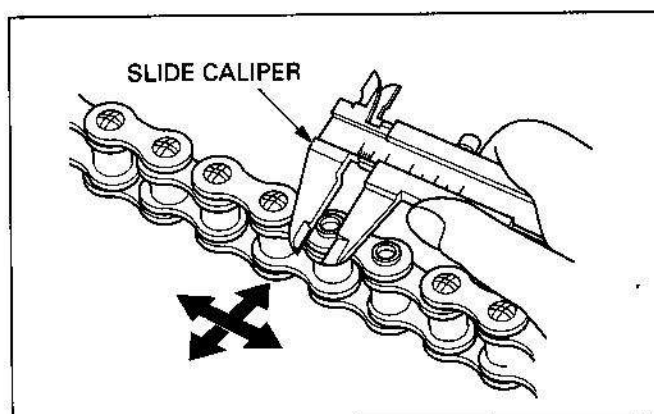
Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

DIAMETER OF THE STAKED AREA:

DID: 5.40 - 5.46 mm (0.213 - 0.215 in)

RK: 5.50 - 5.80 mm (0.217 - 0.228 in)

REGINA: Not applicable

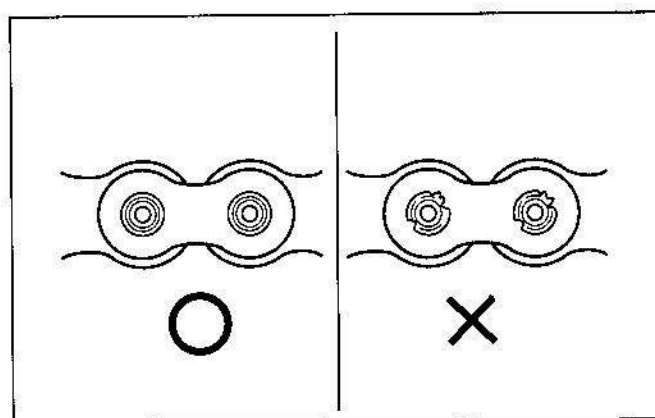


After staking, check the staked area of the master link for cracks.

If there is any cracking, replace the master link, O-rings and plate.

CAUTION:

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



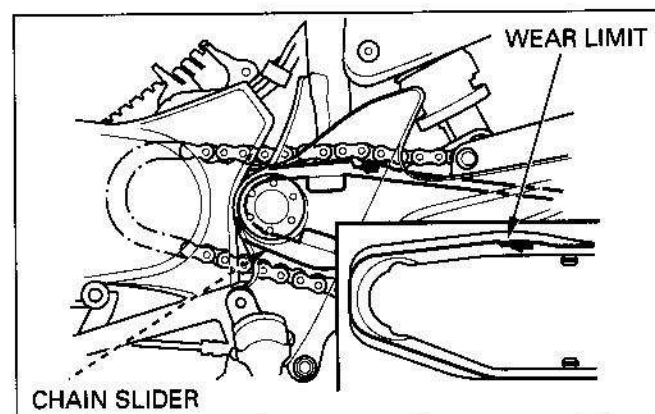
DRIVE CHAIN SLIDER

Remove the left rear cover (page 7-3).

Check the drive chain slider for wear or damage.

Replace the drive chain slider if it is worn to the wear limit or it has been damaged.

Install the left rear cover (page 7-6).



MAINTENANCE

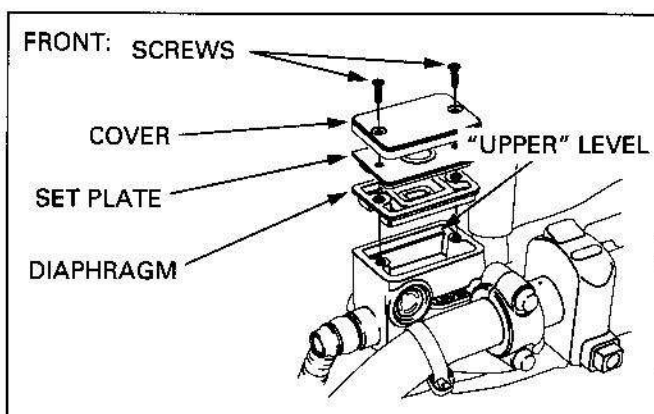
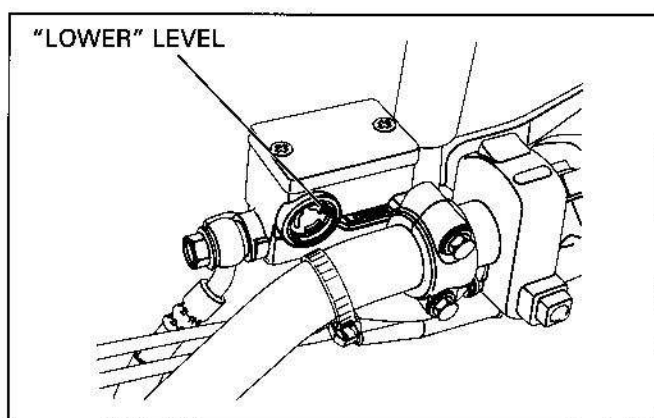
BRAKE FLUID

CAUTION:

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

NOTE:

- When the fluid level is low, check the brake pads for wear (page 3-20). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-20).
- Do not remove the level float from the reservoir when filling with brake fluid.



FRONT BRAKE

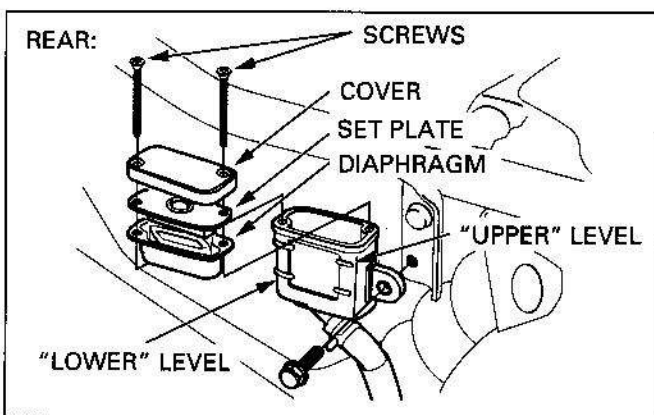
Turn the handlebar so that the reservoir is level and check the front brake reservoir fluid level through the sight glass. If the level is near the lower level mark, remove the cover, set plate and diaphragm and fill the reservoir with DOT 3 or 4 brake fluid from a sealed container to the casting ledge.

Refer to page 14-3 for brake fluid replacement/bleeding procedures.

REAR BRAKE

Place the motorcycle on a level surface, and support it upright. Check the rear brake fluid reservoir level. If the level is near the lower level mark, remove the reservoir cap and fill the reservoir with DOT 3 or 4 brake fluid from a sealed container to the upper level mark.

Refer to page 14-3 for brake fluid replacement/bleeding procedures.

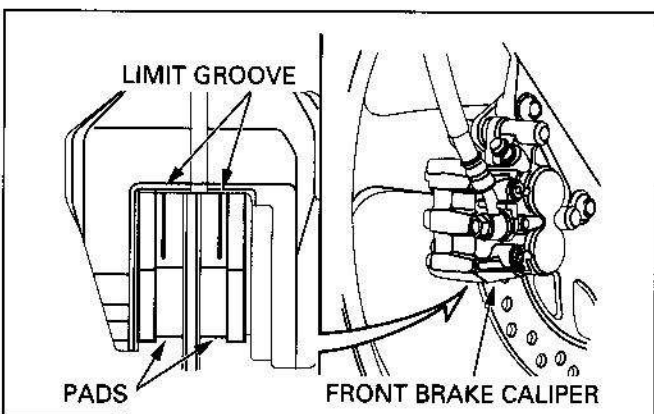


BRAKE PADS WEAR

FRONT BRAKE PAD

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

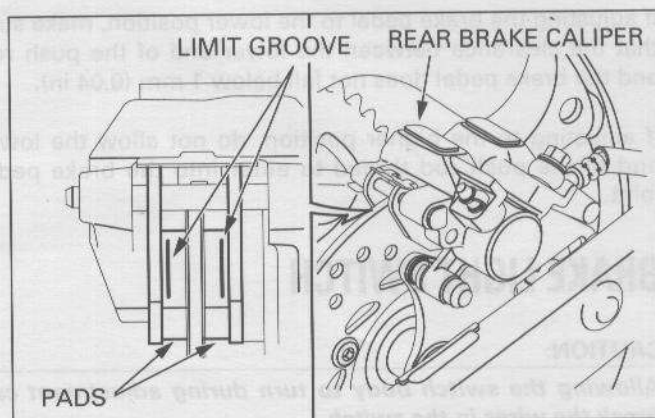
Refer to page 14-5 for brake pad replacement.



REAR BRAKE PAD

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

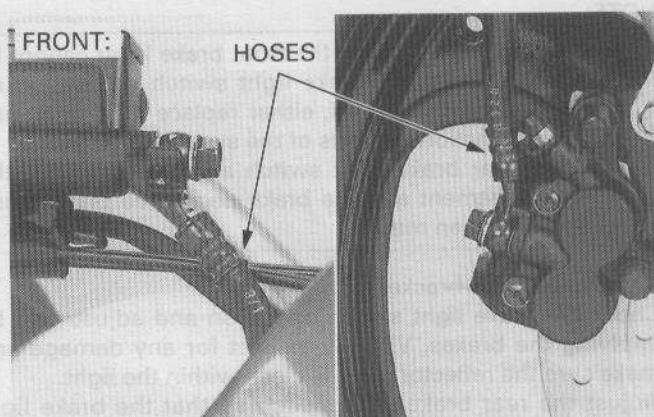
Refer to page 14-7 for brake pad replacement.



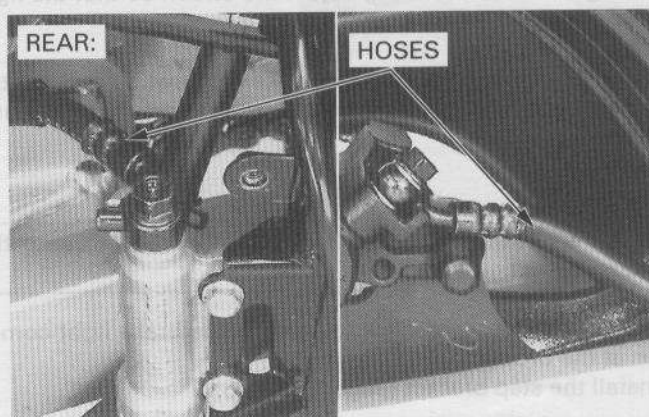
BRAKE SYSTEM

INSPECTION FOR AIR IN 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 air from the system (page 14-4).



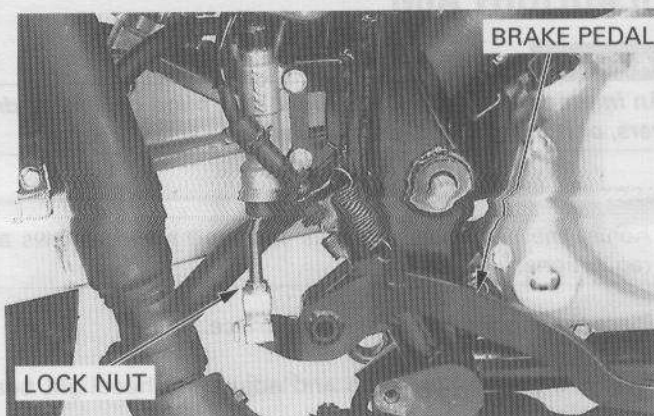
Remove the step bracket (page 14-24). Inspect the brake hose and fittings for deterioration, cracks and signs or leakage. Tighten any loose fittings. Replace hoses and fittings as required. Install the step bracket (page 14-24).



BRAKE PEDAL HEIGHT

Remove the step bracket (page 14-24). Adjust the brake pedal to the desired height. Loosen the lock nut and turn the push rod to obtain the pedal height.

Tighten the lock nut after adjustment has been made. Install the step bracket (page 14-24).



MAINTENANCE

If adjusting the brake pedal to the lower position, make sure that the clearance between the lower end of the push rod and the brake pedal does not fall below 1 mm (0.04 in).

If adjusting to the higher position, do not allow the lower end of the push rod thread to enter into the brake pedal joint.

BRAKE LIGHT SWITCH

CAUTION:

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

NOTE:

- The brake light switch on the front brake lever cannot be adjusted. If the front brake light switch actuation and brake engagement are off, either replace the switch unit or the malfunctioning parts of the system.
- Make all rear brake light switch adjustments after the height adjustment and the brake pedal free play adjustments have been made.

Remove the step bracket (page 14-24).

Check the brake light switch operation and adjustment by applying the brakes. Visually inspect for any damage and make sure the reflector plate is clean within the light.

Adjust the rear brake light switch so that the brake light comes on just prior to the brake actually being engaged. If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Turn the adjusting nut on the brake light switch and not the switch body and wires to make switch actuation adjustments.

NOTE:

Be sure to hold the switch body firmly while turning the adjusting nut.

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

Install the step bracket (page 14-24)AG).

HEADLIGHT AIM

▲ WARNING

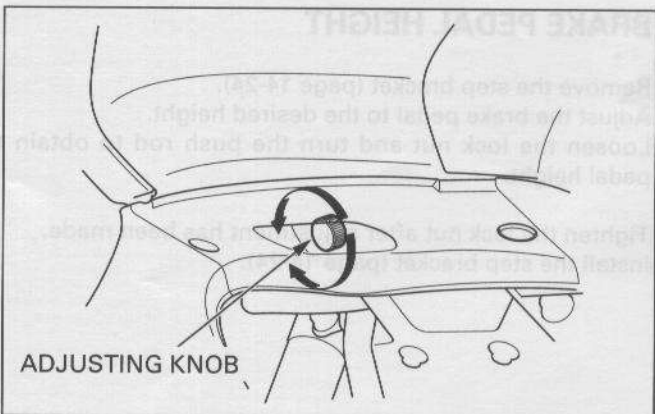
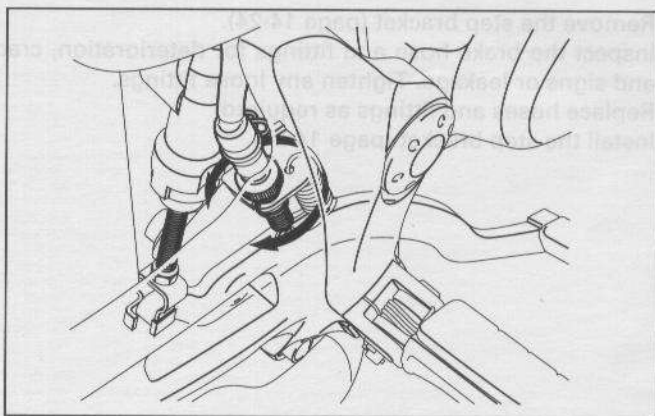
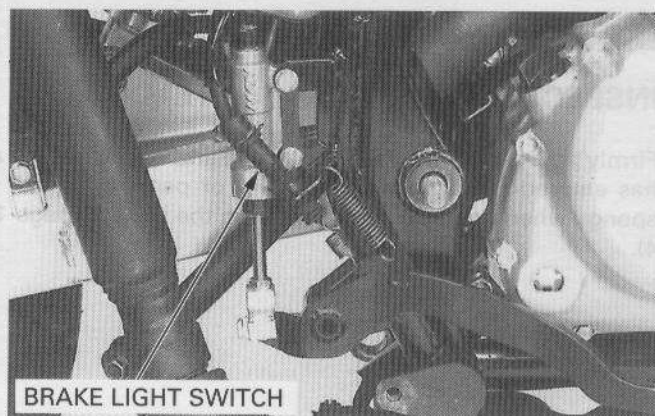
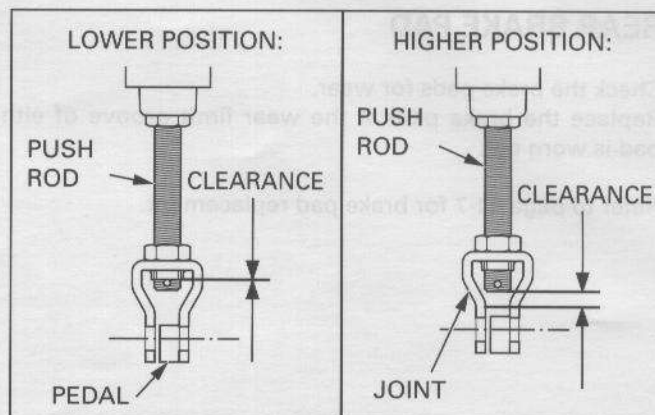
An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.

NOTE:

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

Place the motorcycle on a level surface.

Rotate the adjusting knob and adjust the headlight beam vertically.



CLUTCH SYSTEM

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

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

Adjust as follows:

Minor adjustments are made at the adjuster near the lever.

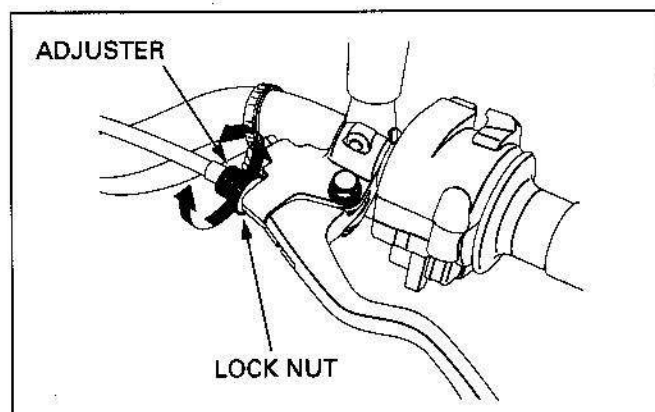
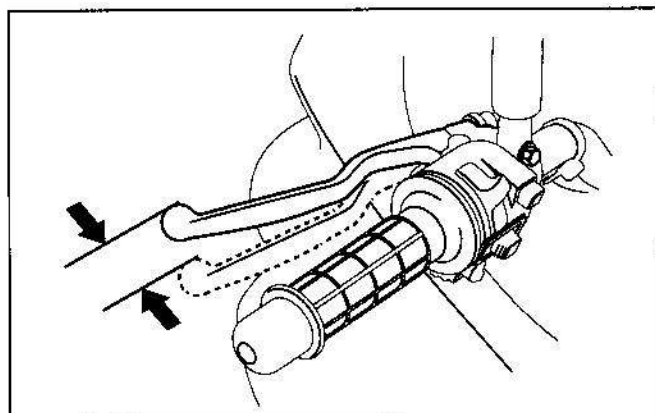
Loosen the lock nut and turn the adjuster. Tighten the lock nut.

CAUTION:

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

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

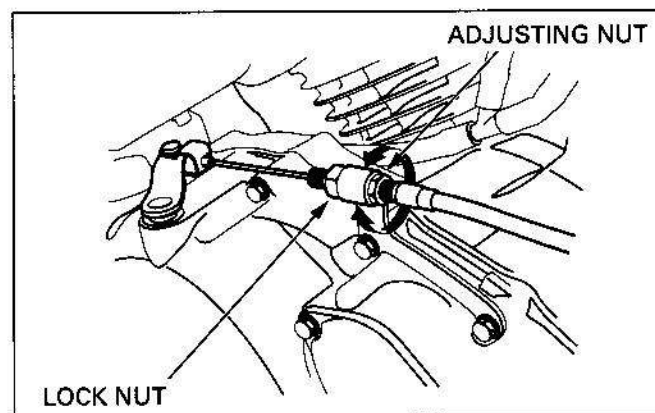
Tighten the lock nut and make a major adjustment as described below.



Major adjustments are performed at the clutch arm.

Loosen the lock nut and turn the adjusting nut to adjust free play. Hold the adjusting nut securely while tightening the lock nut.

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



MAINTENANCE

SIDE STAND

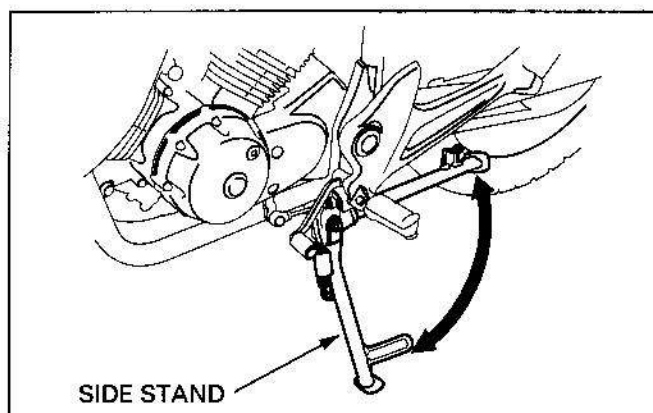
Support the motorcycle on a level surface.

Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.
Make sure that the side stand is not bent.

Check the side stand ignition cut-off system:

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

If there is a problem with the system, check the side stand switch (section 18).



SUSPENSION

⚠ WARNING

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

FRONT

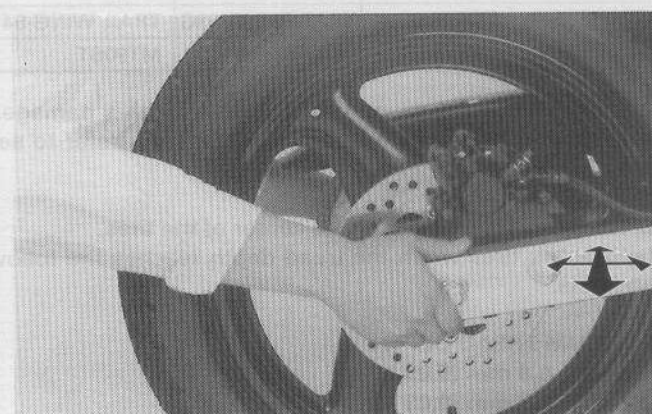
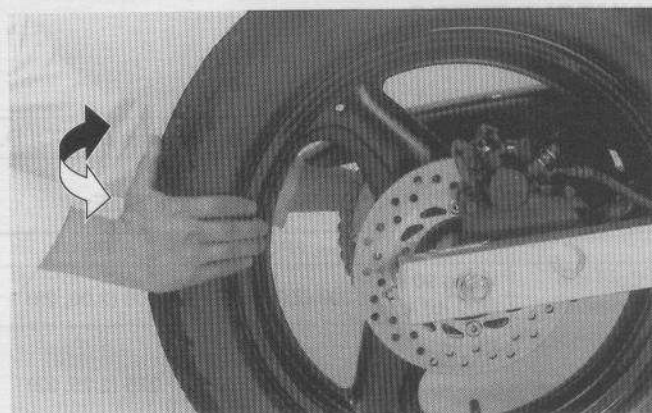
Check the action of the forks by operating the front brakes and compressing the front suspension several times.
Check the entire fork assembly for signs of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

Refer to section 12 for front fork service.



REAR

Support the motorcycle securely using safety stand or hoist and raise the rear wheel off the ground. 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 13).



Check the action of the shock absorbers by compressing them several times. Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners. Replace damaged components which cannot be repaired. Tighten all nuts and bolts.

Refer to section 13 for shock absorber service.



NUTS, BOLTS, FASTENERS

Check that all chassis nuts, bolts and screws are tightened to their correct torque values (page 1-13) at the interval shown in the Maintenance Schedule (page 3-3). Check that all cotter pins, slip clips, hose clamps and cable stays are in place and properly secured.

MAINTENANCE

WHEELS/TIRES

NOTE:

Tire pressure should be checked when the tires are COLD.

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Cold tire pressure kPa (kgf/cm ² , psi)	Up to 90 kg (200 lb) load	200 (2.00, 29)	200 (2.00, 29)
	Up to maximum weight capacity	200 (2.00, 29)	225 (2.25, 33)
Tire size		100/90 - 18 56P	130/80 - 17 65P
Tire brand	Bridgestone	TRAIL WING-53G	TRAIL WING-54
	PIRELL	MT90ST	MT90ST

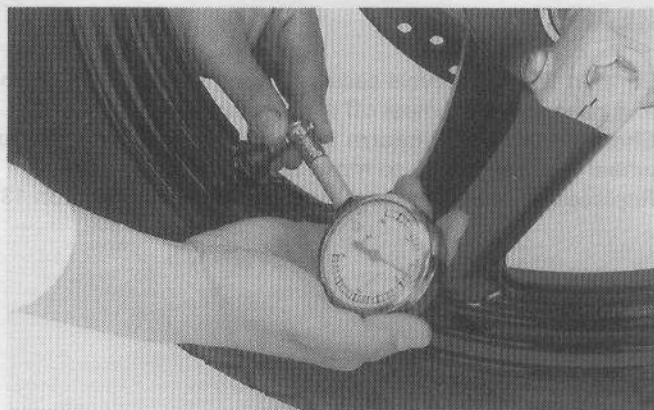
Check the tires for cuts, embedded nails, or other damage.
Check the front and rear wheels for trueness (refer to section 12 and 13).

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: 0.8 mm (0.03 in)

REAR: 0.8 mm (0.03 in)



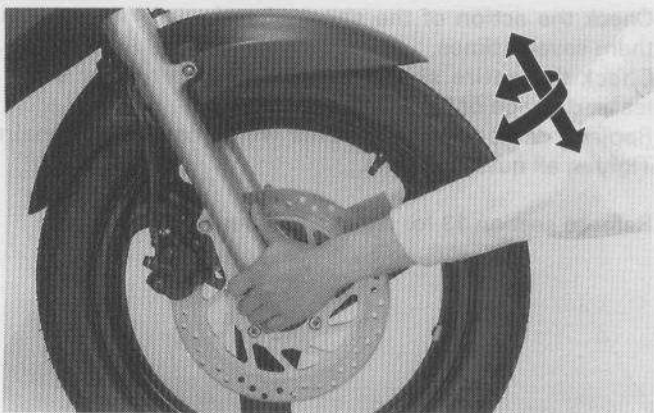
STEERING HEAD BEARINGS

NOTE:

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

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

Check that the handlebar moves freely from side to side.
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 12).



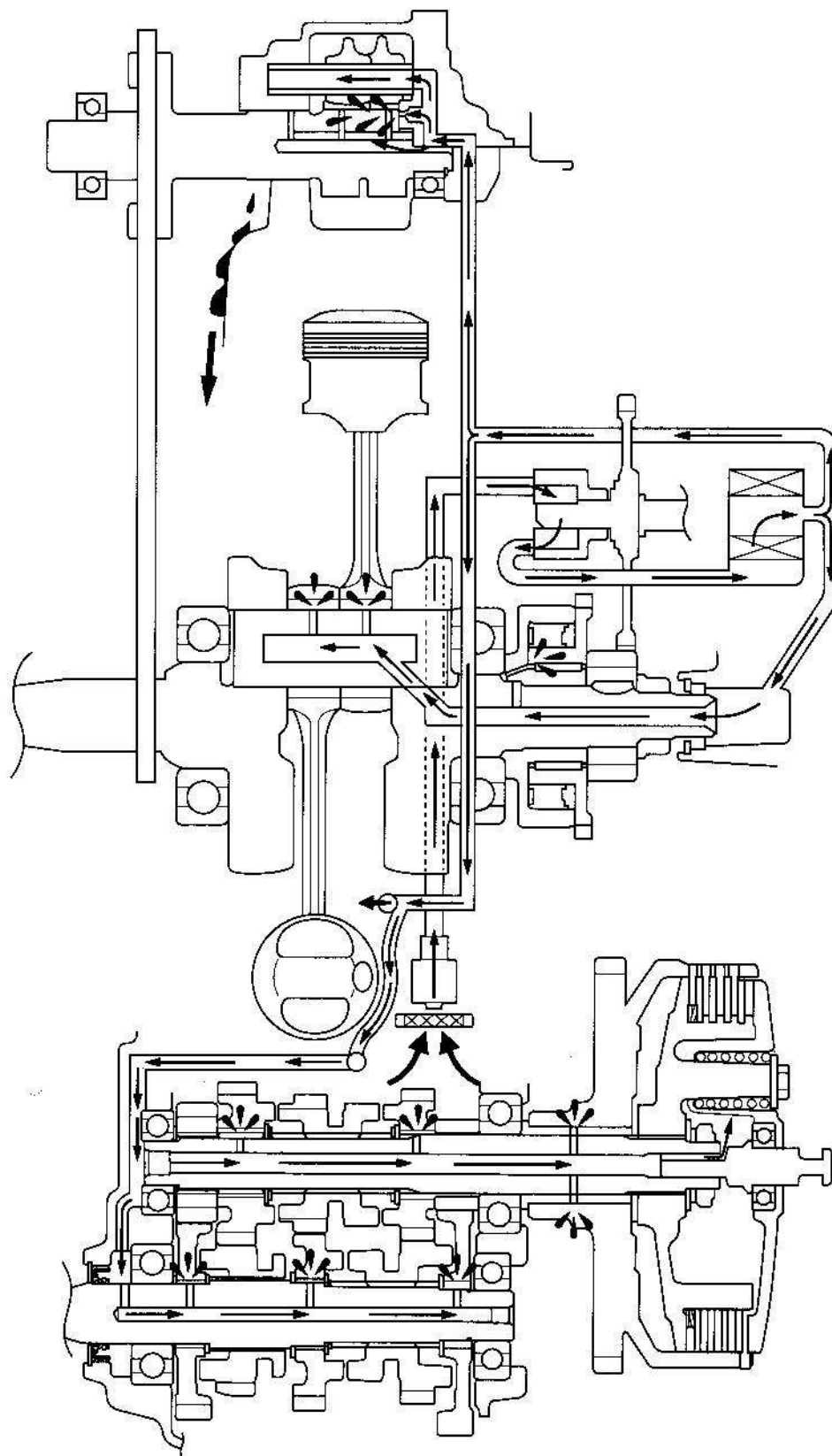
NUTS, BOLTS, FASTENERS

Check that all chassis nuts, bolts and screws are tightened to their correct torque values (page 1-13) at the interval shown in the Maintenance Schedule (page 2-3).
Check that all control pins, clip clips, hose clamps and cables stays are in place and properly secured.

MEMO

LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	TROUBLESHOOTING	4-2
SERVICE INFORMATION	4-1	OIL PUMP	4-3

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil and coolant drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	at draining	1.1 liter (1.2 US qt, 1.0 Imp qt)	—
	at disassembly	1.5 liter (1.6 US qt, 1.3 Imp qt)	—
	at filter change	1.2 liter (1.3 US qt, 1.1 Imp qt)	—
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10 W-40	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.03 – 0.11 (0.001 – 0.004)	0.15 (0.006)

LUBRICATION SYSTEM

TORQUE VALUES

Oil pump mounting bolt 14 N·m (1.4 kgf-m, 10 lbf-ft)

TROUBLESHOOTING

Oil level low

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

Oil contamination (White appearance)

- From coolant mixing with oil
 - Faulty water pump mechanical seal
 - Faulty head gasket
 - Water leak in crankcase

No oil pressure

- Oil level too low
- Oil pump drive gear broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure

- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level too low

High oil pressure

- Plugged oil filter, gallery, or metering orifice
- Incorrect oil being used

Seized engine

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

Oil contamination

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

OIL PUMP

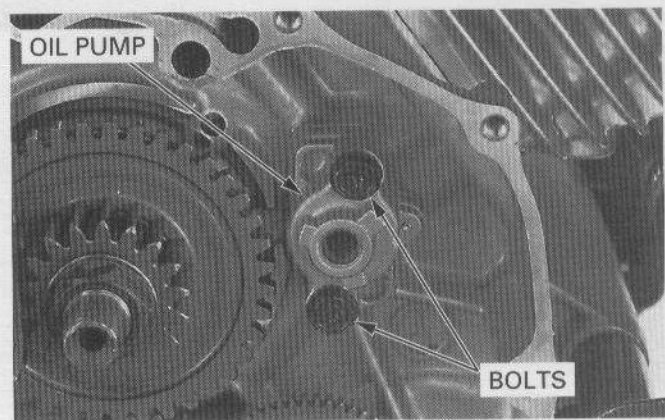
REMOVAL

Drain the engine oil (page 3-10).

Remove the following:

- Right crankcase cover (page 6-13).
- Remove the bolts and oil pump assembly.

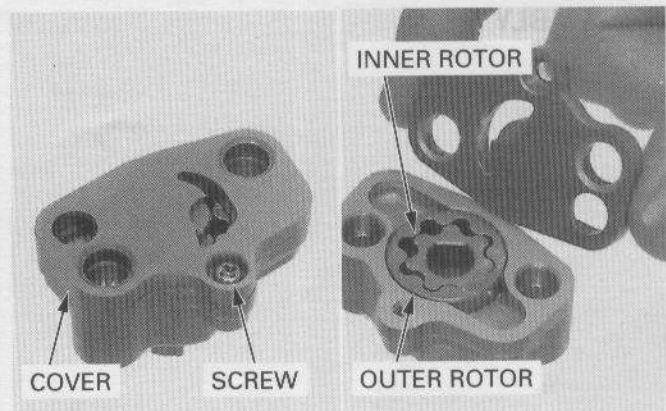
Remove the dowel pins.



DISASSEMBLY

Remove the screw and oil pump cover.

Remove the inner and outer rotor from the oil pump body.

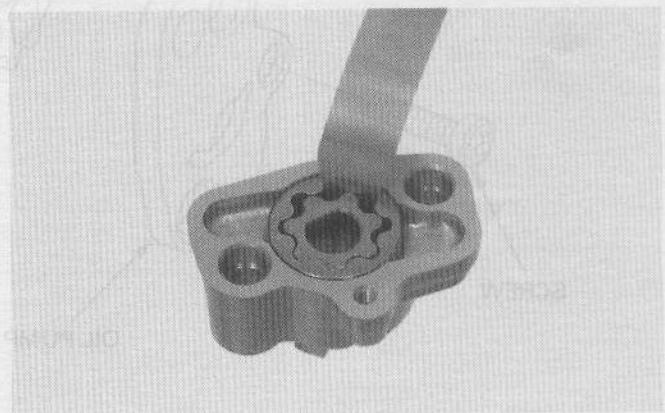


INSPECTION

Temporarily install the outer and inner rotors into the oil pump body.
Install the oil pump shaft.

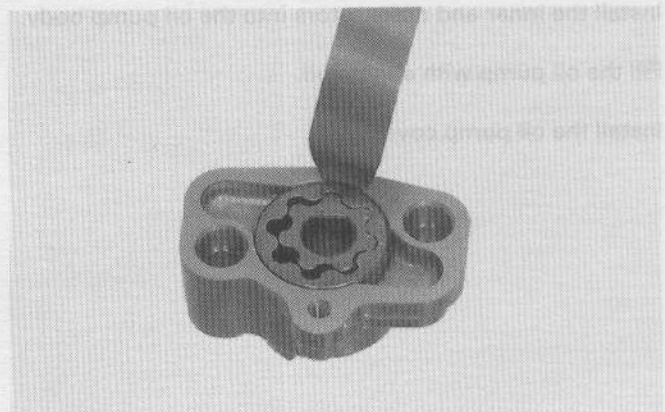
Measure the tip clearance between the inner and outer rotors.

SERVICE LIMIT: 0.20 mm (0.008 in)



Measure the pump body clearance between the outer rotor and pump body.

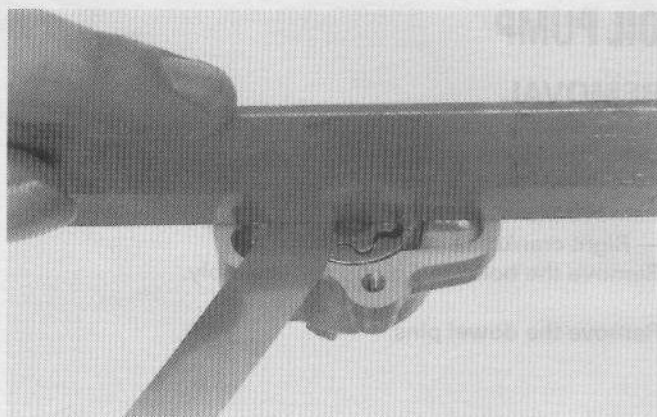
SERVICE LIMIT: 0.25 mm (0.010 in)



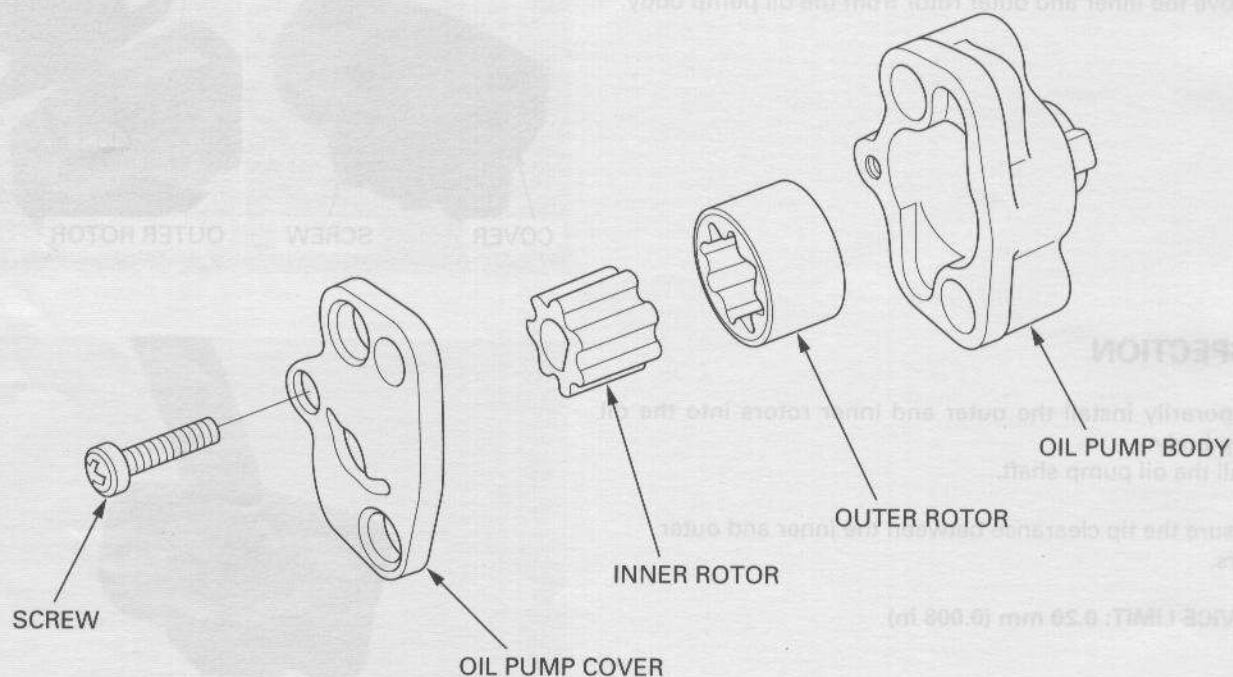
LUBRICATION SYSTEM

Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.15 mm (0.006 in)



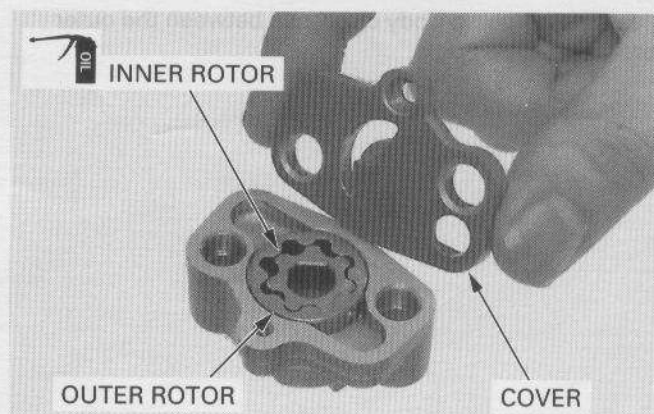
ASSEMBLY



Install the inner and outer rotors into the oil pump body.

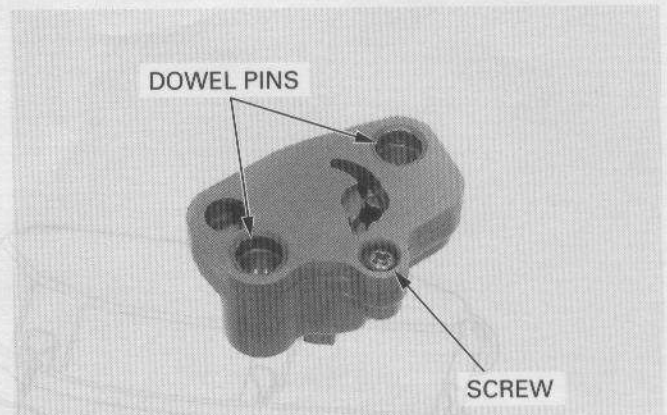
Fill the oil pump with engine oil.

Install the oil pump cover.



Temporarily install the dowel pins.
Tighten the screw securely.

Remove the dowel pins.



INSTALLATION

Install the dowel pins to the crankcase.
Install the oil pump into the crankcase while aligning the dowel pins with the holes in the oil pump.

Install and tighten the bolts to the specified torque.

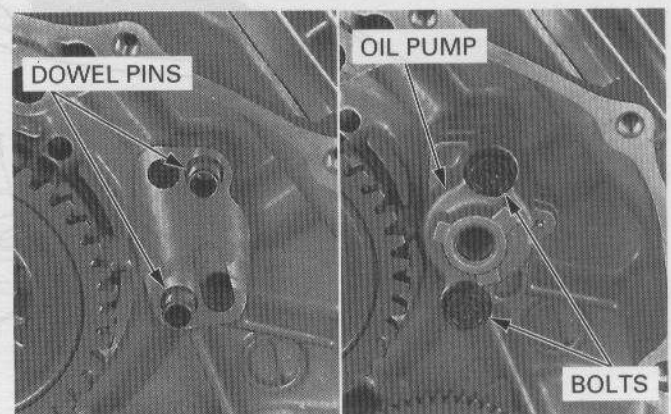
TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Install the following:

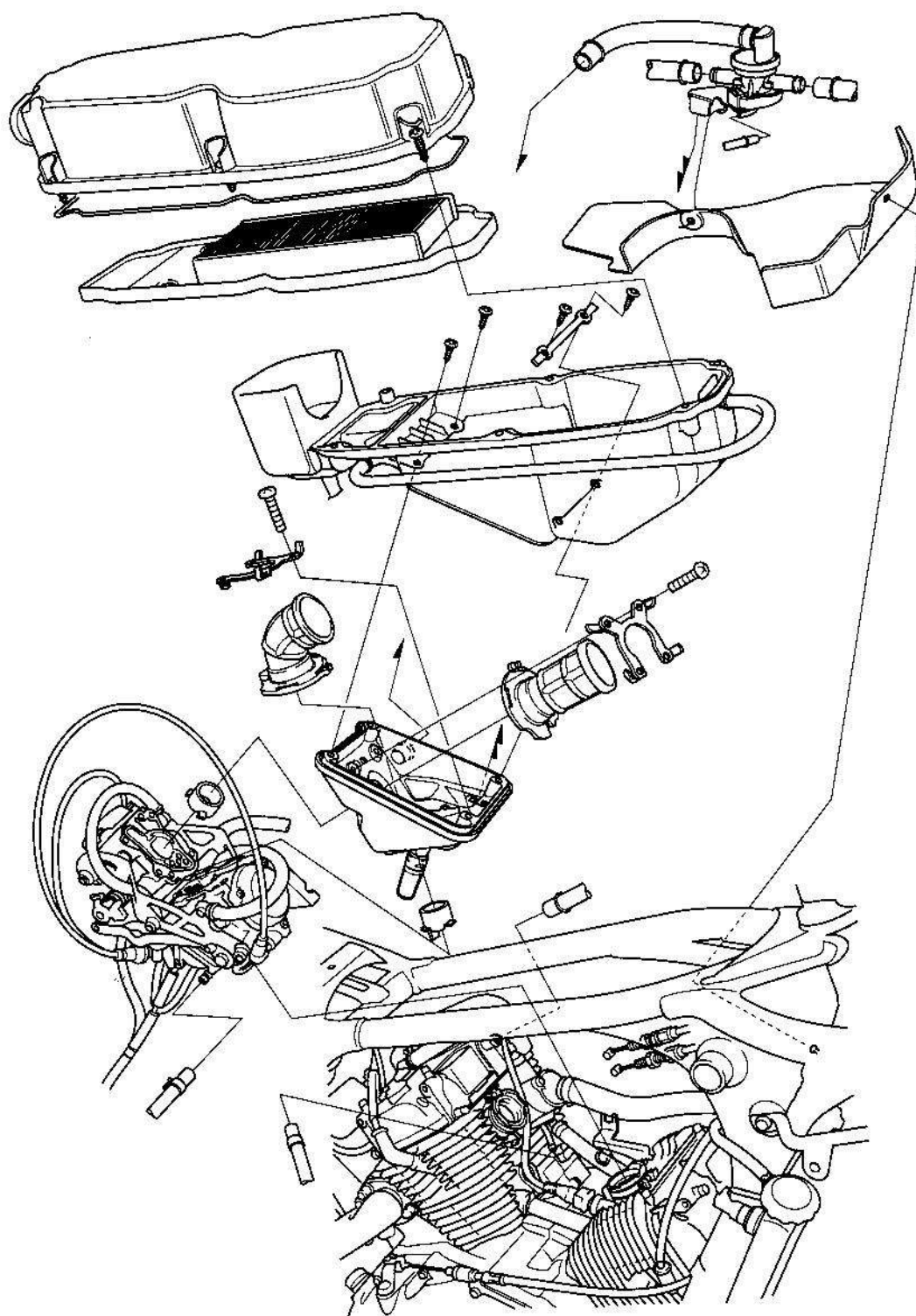
— Right crankcase cover (page 6-18)

After installation, fill the crankcase with recommended oil
(page 3-10) and fill the coolant (page 6-5).

Check that there is no oil and coolant leak.



FUEL SYSTEM



5. FUEL SYSTEM

5

SERVICE INFORMATION	5-1	CARBURETOR ASSEMBLY	5-11
TROUBLESHOOTING	5-3	CARBURETOR COMBINATION	5-14
AIR CLEANER HOUSING	5-4	CARBURETOR INSTALLATION	5-16
CARBURETOR BASE	5-4	CHOKE SYSTEM	5-18
CARBURETOR REMOVAL	5-6	PILOT SCREW ADJUSTMENT	5-18
CARBURETOR SEPARATION	5-7	SECONDARY AIR SUPPLY SYSTEM	5-19
CARBURETOR DISASSEMBLY	5-9		

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

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

CAUTION:

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

- For fuel tank removal and installation, see page 2-6.
- Before disassembling the carburetors, place an approved fuel container under the float chambers, loosen the drain screws and drain the carburetors.
- After removing the carburetors, 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.
- The vacuum chamber and float chamber can be serviced with the carburetors combined.
- For carburetor synchronization, see page 3-12.

FUEL SYSTEM

SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		VPU 2A
Main jet	Front	# 82
	Rear	# 88
Slow jet		# 38
Jet needle number	Front	C12A
	Rear	C12B
Pilot screw	Initial/final opening	See page 5-18
Float level		13.7 mm (0.54 in)
Base carburetor (for synchronization)		Front cylinder (# 2)
Idle speed		1,500 $\pm$ 100 min ⁻¹ (rpm)
PAIR control valve specified vacuum		280 mm Hg (11.02 in Hg)
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)

TORQUE VALUES

Carburetor insulator band screw	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
PAIR check valve cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft) Apply locking agent to the threads.

TOOLS

Float level gauge	07401 – 0010000
Pilot screw wrench	07908 – 4730002

TROUBLESHOOTING

Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
 - Clogged fuel strainer
 - Clogged fuel line
- Too much fuel getting to the engine
 - Clogged air cleaner
 - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Improper choke operation
- Improper throttle operation
- No spark at plug (faulty ignition system-section 16)

Lean mixture

- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent tube
- Intake air leak
- Faulty vacuum piston

Rich mixture

- Starting enrichment valve open
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Faulty vacuum piston

Engine stalls, hard to start, rough idling

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Restricted fuel tank breather tube
- Clogged air cleaner
- Clogged slow circuit
- Starting enrichment valve open
- Faulty ignition system (section 16)

Afterburn when engine braking is used

- Lean mixture in slow circuit
- 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 16)

Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (section 16)

Poor performance (driveability) and poor fuel economy

- Clogged fuel system
- Faulty ignition system (section 16)

FUEL SYSTEM

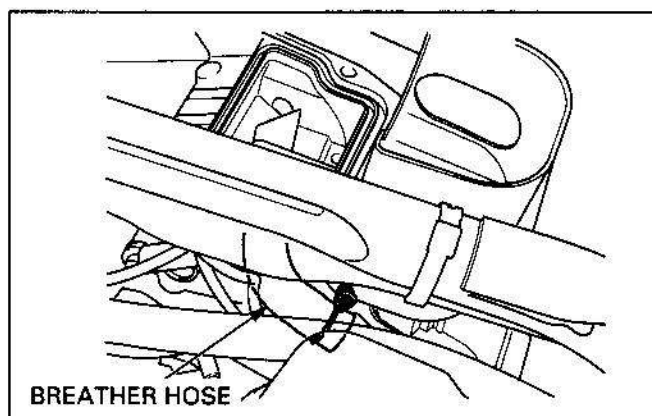
AIR CLEANER HOUSING

REMOVAL/INSTALLATION

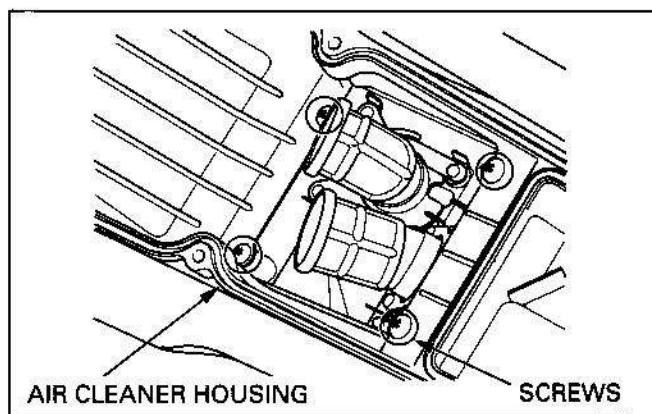
Remove the following

- Fuel tank (page 2-8).
- Air cleaner housing cover and element (page 3-6).

Disconnect the crankcase breather hose.



Remove the screws and air cleaner housing.



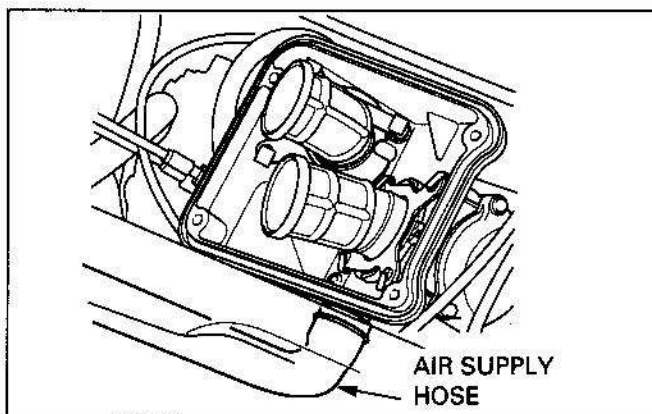
CARBURETOR BASE

REMOVAL/INSTALLATION

NOTE:

Do not remove the carburetor base from the carburetors unless the carburetor overhaul is required.

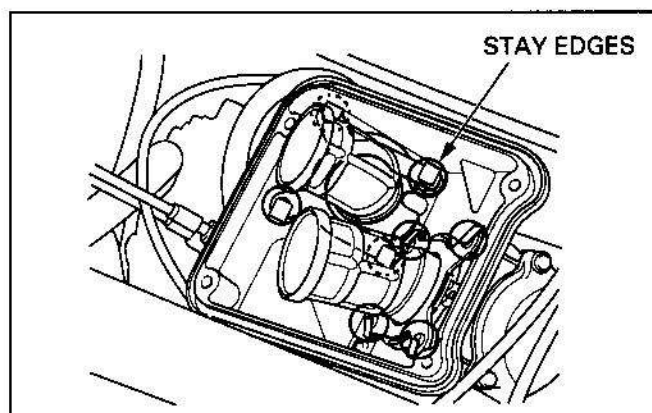
Disconnect the air supply hose.



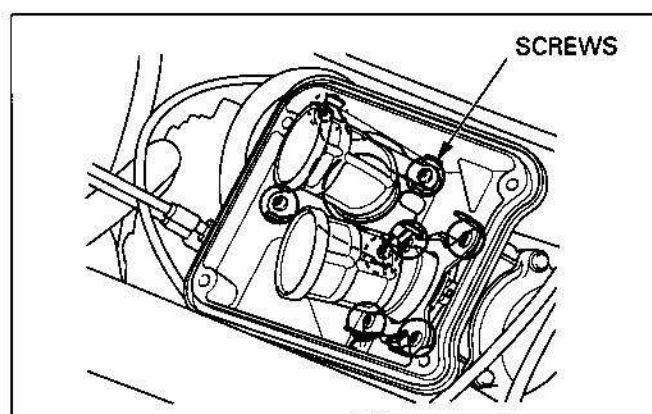
Unstake the stay edges.

CAUTION:

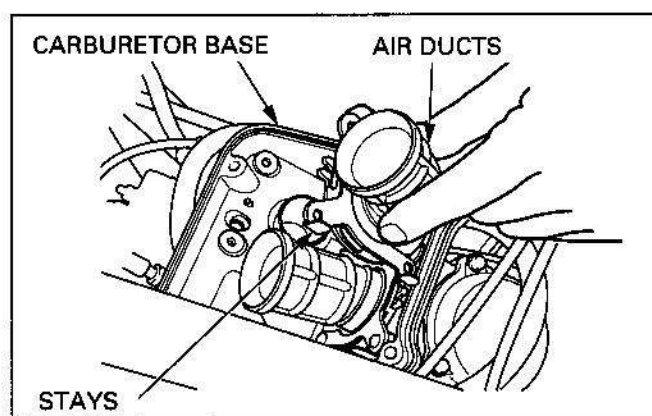
Do not damage the stay.



Remove the eight screws.



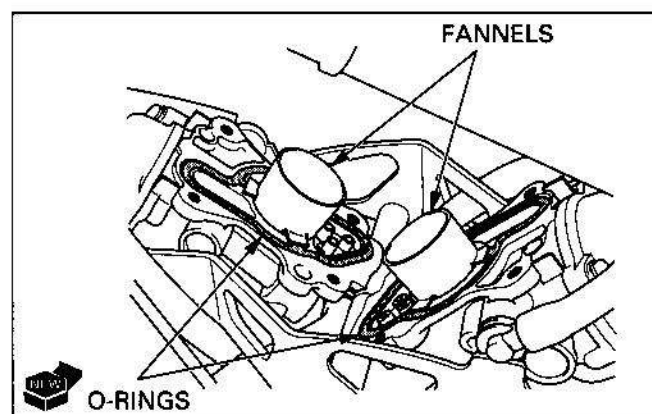
Remove the air ducts, stays and carburetor base.



Remove the fannels and O-rings from the carburetors.

Install the new O-rings to the carburetor grooves.

Install the removed parts in the reverse order of removal.

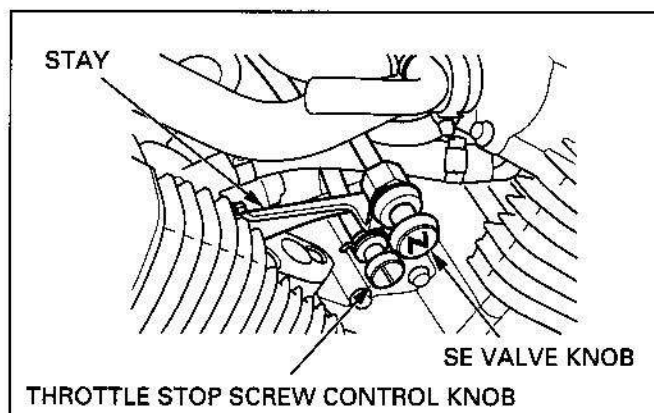


FUEL SYSTEM

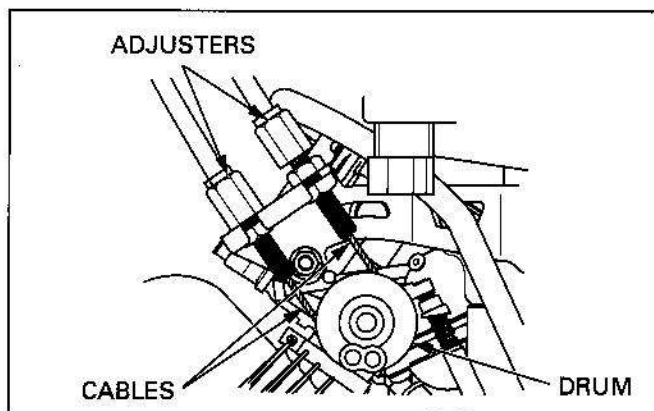
CARBURETOR REMOVAL

Drain the coolant (page 6-5).
Remove the carburetor base (page 5-4).

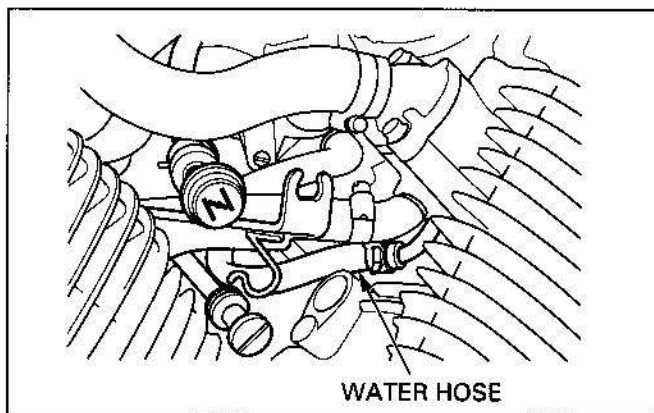
Remove the SE valve knob and throttle stop screw control knob from the stay.



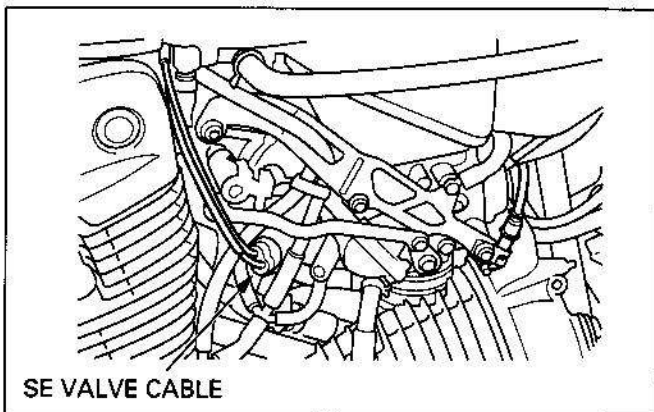
Loosen the adjusters and remove the throttle cables from the throttle drum.



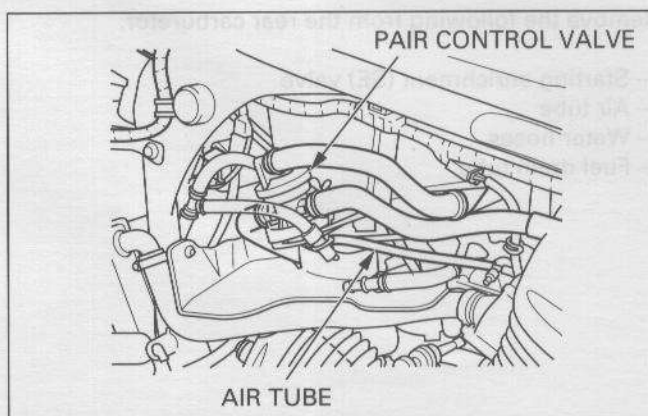
Remove the water hose from the rear cylinder.



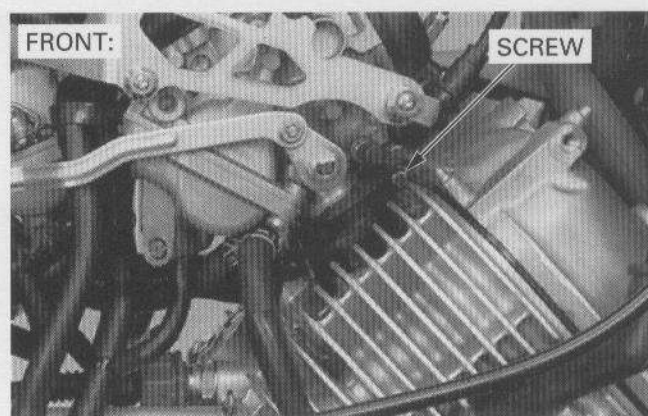
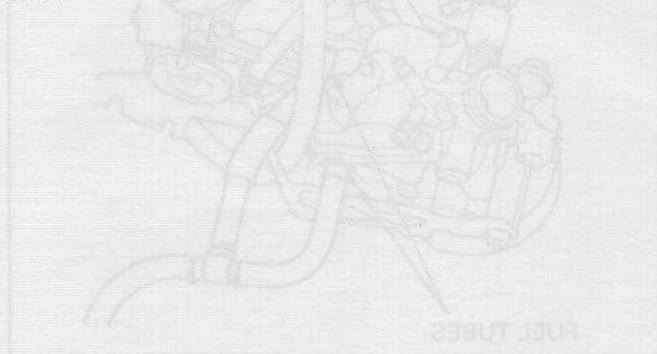
Remove the starting enrichment (SE) valve cable from the clamp.



Remove the air tube from the secondary air injection (PAIR) control valve.

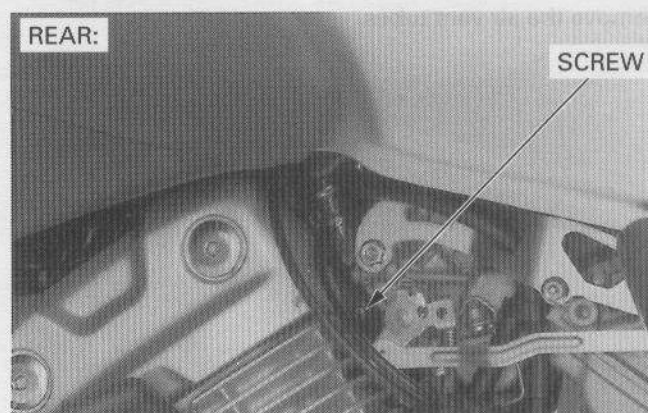


Loosen the carburetor insulator band screw of the front side.



Loosen the carburetor insulator band screw of the rear side.

Remove the carburetors as assembly.

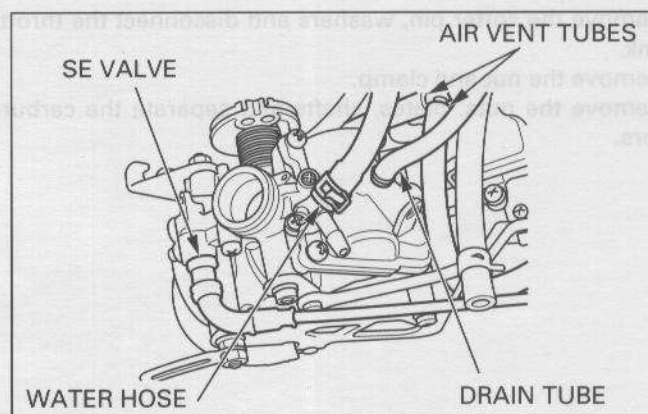


CARBURETOR SEPARATION

Remove the following from the front carburetor.

- Starting enrichment (SE) valve
- Water hose
- Fuel drain tube

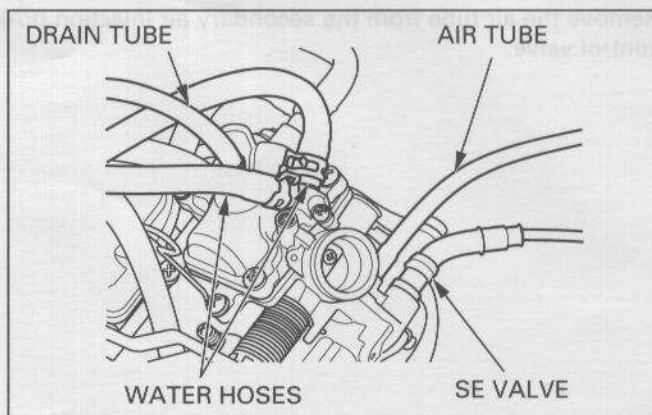
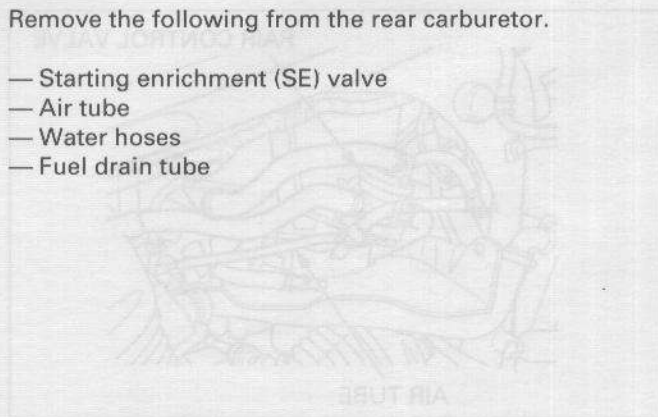
Air vent tubes from the joint.



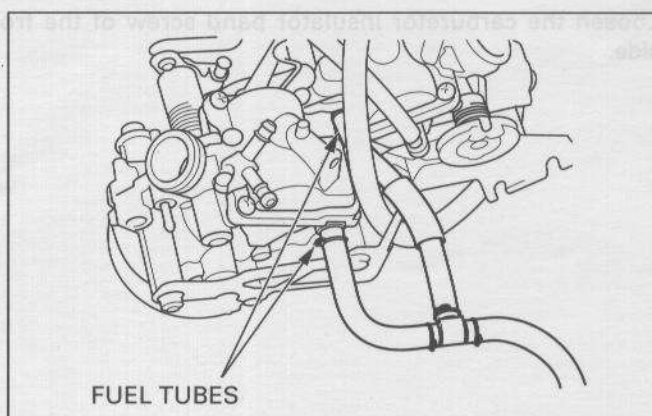
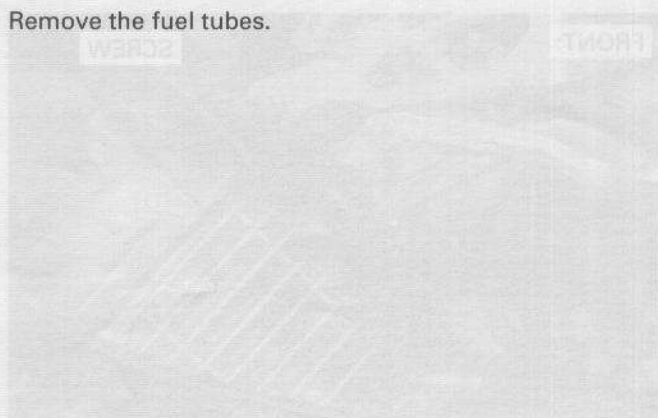
FUEL SYSTEM

Remove the following from the rear carburetor.

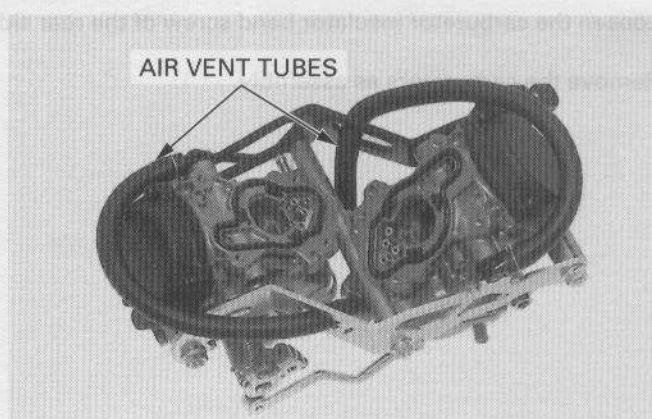
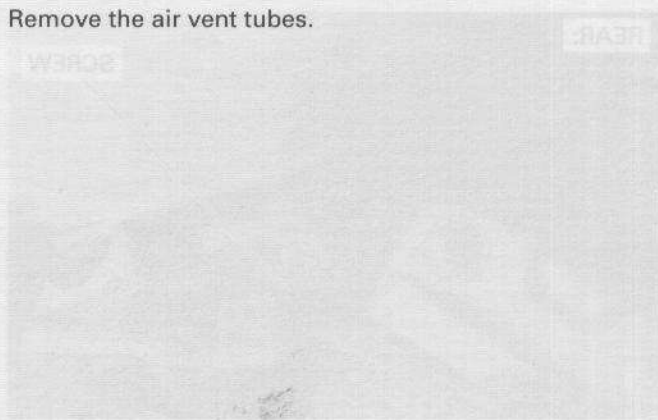
- Starting enrichment (SE) valve
- Air tube
- Water hoses
- Fuel drain tube



Remove the fuel tubes.



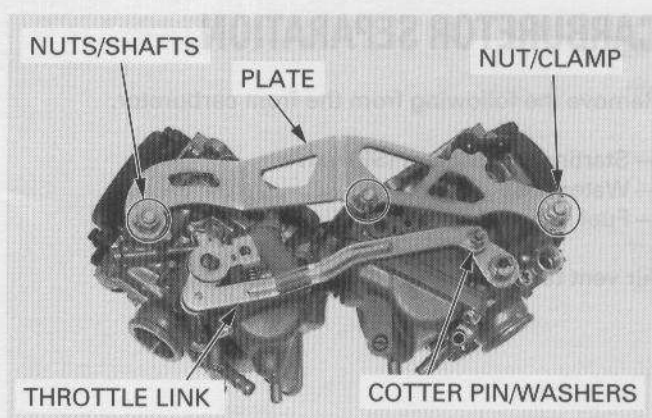
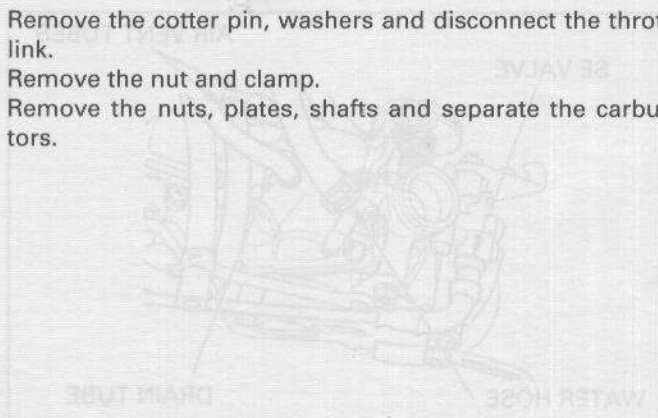
Remove the air vent tubes.



Remove the cotter pin, washers and disconnect the throttle link.

Remove the nut and clamp.

Remove the nuts, plates, shafts and separate the carburetors.



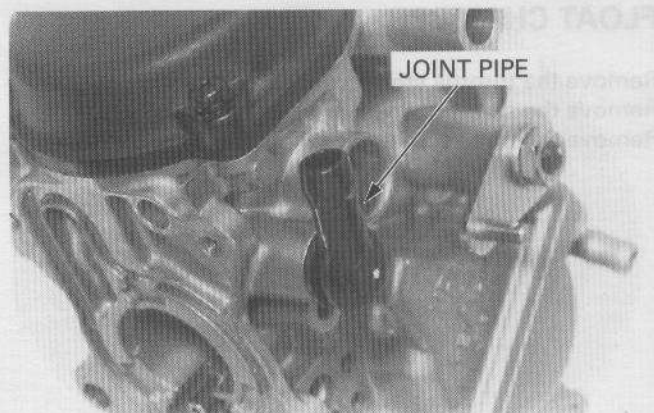
CARBURETOR DISASSEMBLY

NOTE:

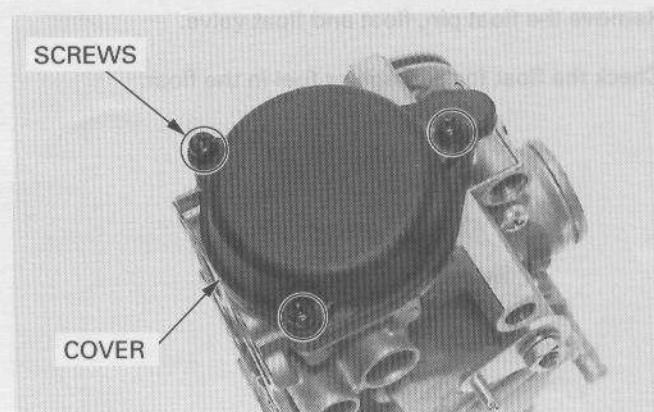
- Each (front/rear) jet needle has an identification mark.
- If you disassemble the both carburetors, keep those parts separately.

VACUUM CHAMBER

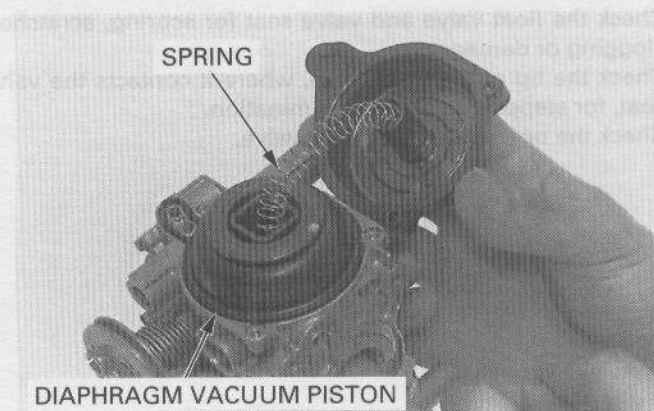
Remove the air vent tube joint pipe.



Remove the three screws and the vacuum chamber cover.

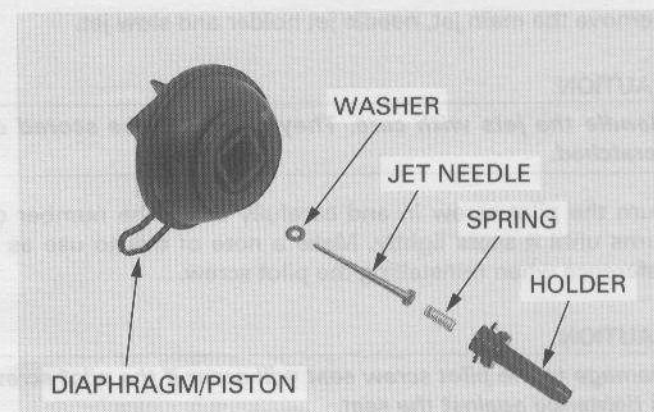


Remove the compression spring and diaphragm/vacuum piston from the carburetor body.



Remove the washer and O-ring from the jet needle holder. Remove the spring, jet needle and washer from the vacuum piston.

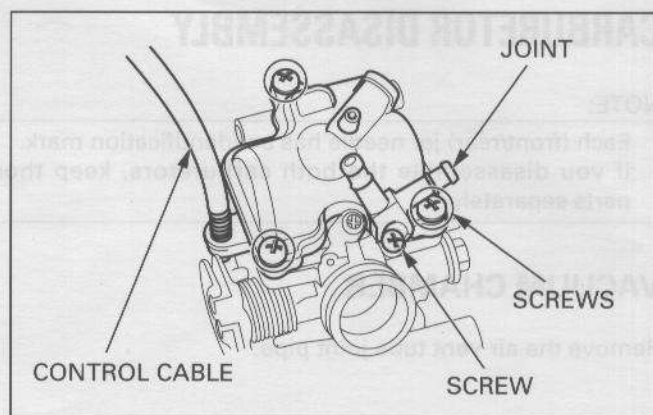
Check the jet needle for stepped wear.
Check the vacuum piston for wear or damage.
Check the diaphragm for pin holes, deterioration or damage.



FUEL SYSTEM

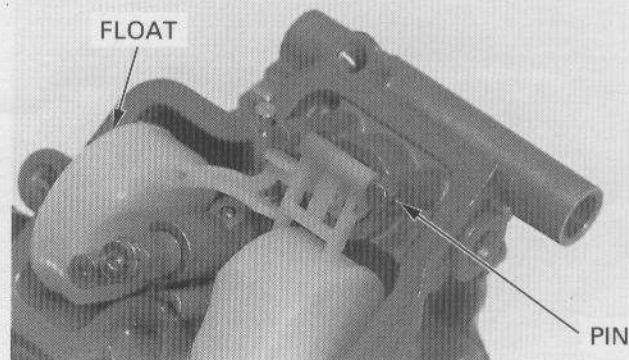
FLOAT CHAMBER

Remove the throttle stop screw control cable.
Remove the screw and water hose joint.
Remove the three screws and the float chamber.

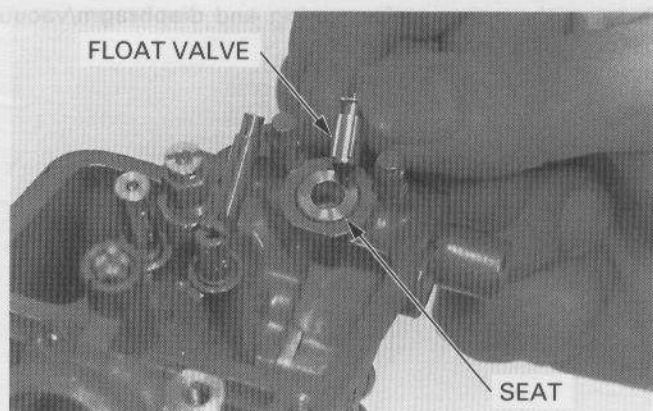


Remove the float pin, float and float valve.

Check the float for damage or fuel in the float.



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



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

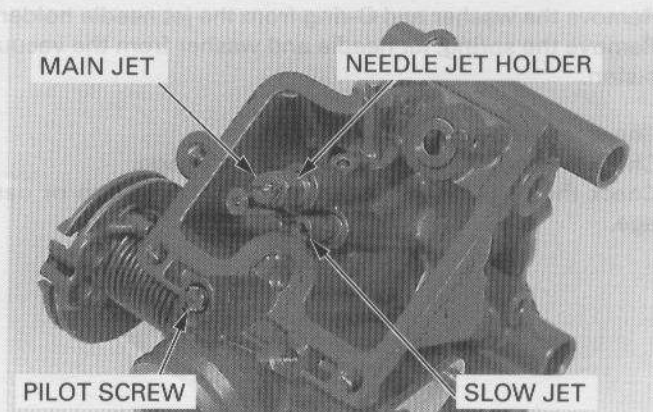
CAUTION:

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

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

CAUTION:

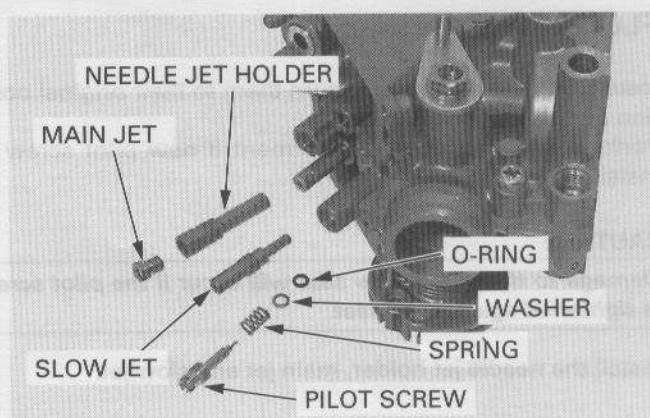
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.



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

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

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



CARBURETOR CLEANING

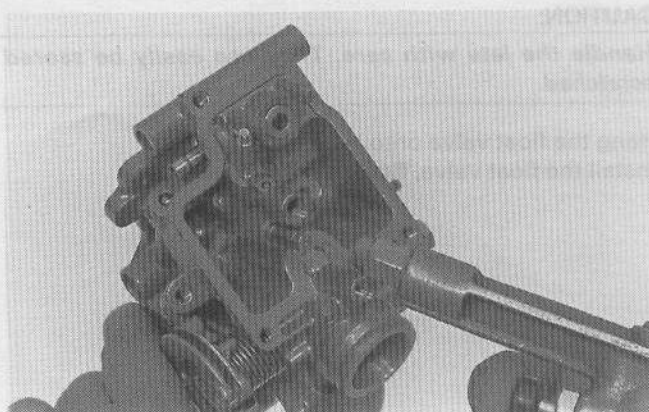
Remove the following:

- diaphragm/vacuum piston
- main jet, needle jet holder and slow jet
- pilot screw

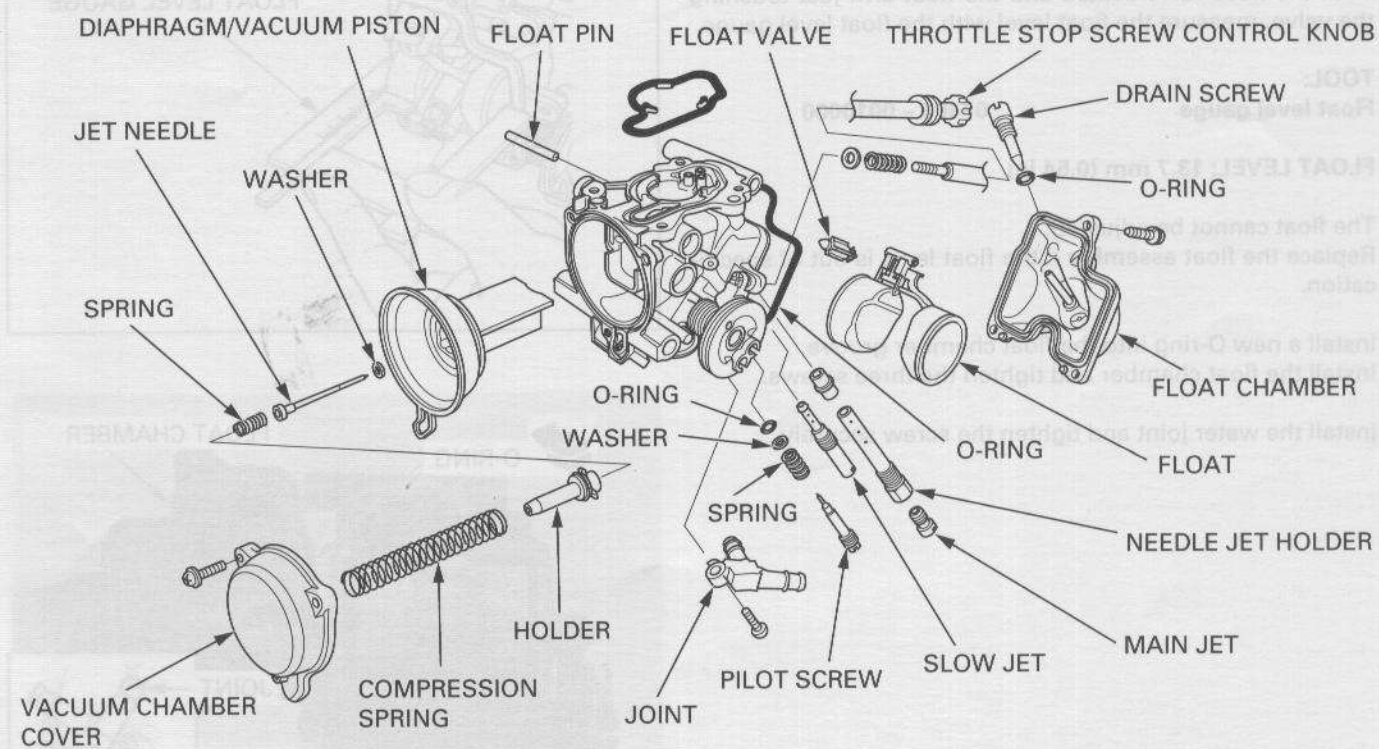
CAUTION:

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

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



CARBURETOR ASSEMBLY



FUEL SYSTEM

FLOAT CHAMBER

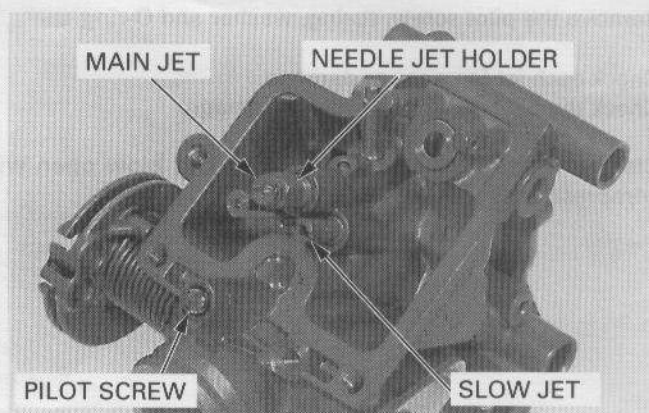
Install the pilot screw and return them to their original position as noted during removal.

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

CAUTION:

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

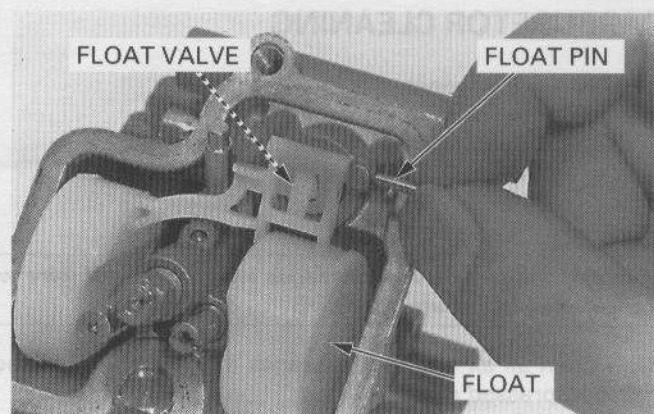
Install the needle jet holder, main jet and slow jet.



CAUTION:

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

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



FLOAT LEVEL INSPECTION

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

TOOL:

Float level gauge

07401 - 0010000

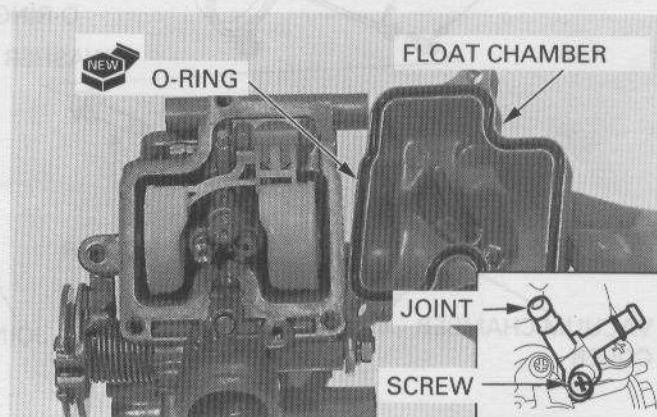
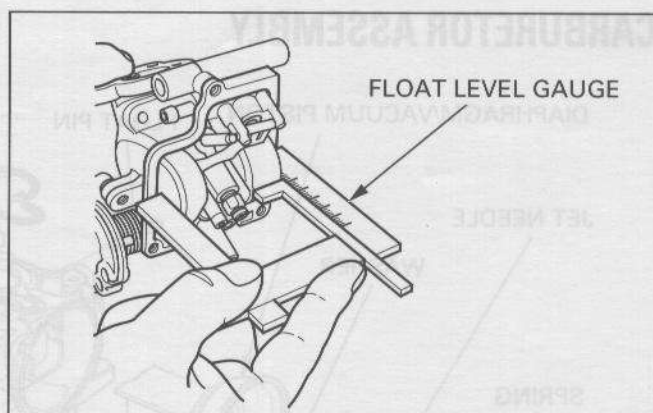
FLOAT LEVEL: 13.7 mm (0.54 in)

The float cannot be adjusted.

Replace the float assembly if the float level is out of specification.

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

Install the water joint and tighten the screw securely.



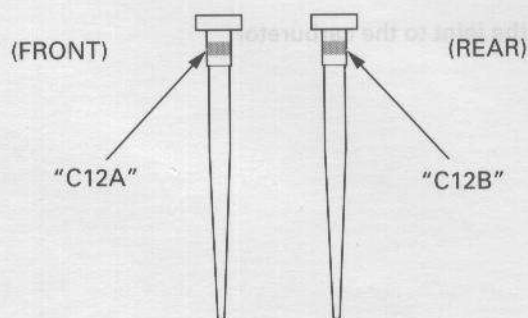
VACUUM CHAMBER

NOTE:

Each (front/rear) jet needle has an identification mark.

If you have disassembled the both carburetors, check the identification mark of the jet needle as shown to prevent use the wrong side.

IDENTIFICATION MARK:

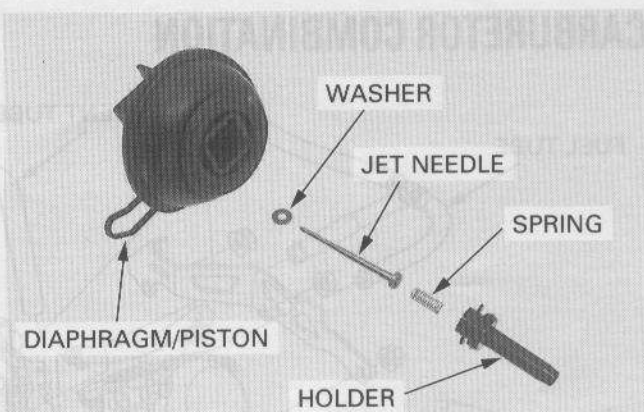


Coat a new O-ring with oil and install it onto the jet needle holder.

Install the washer onto the jet needle holder.

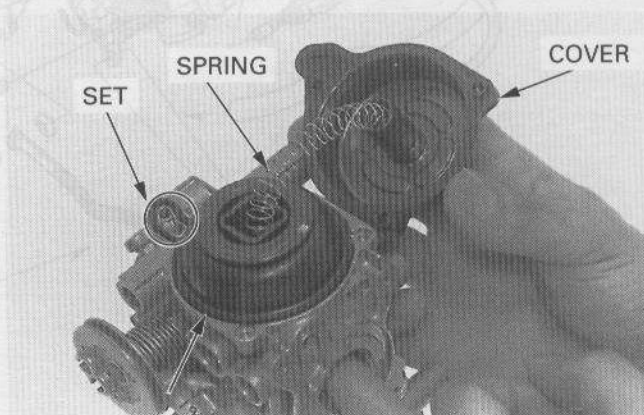
Install the washer, jet needle, spring and jet needle holder into the vacuum piston.

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

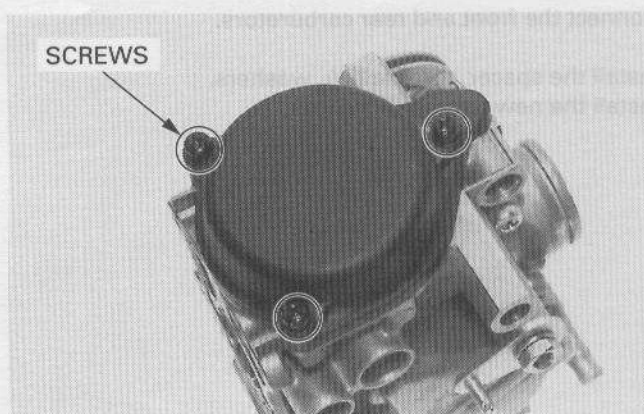


Install the diaphragm/vacuum piston into the carburetor body.

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



Install and tighten the three screws securely.



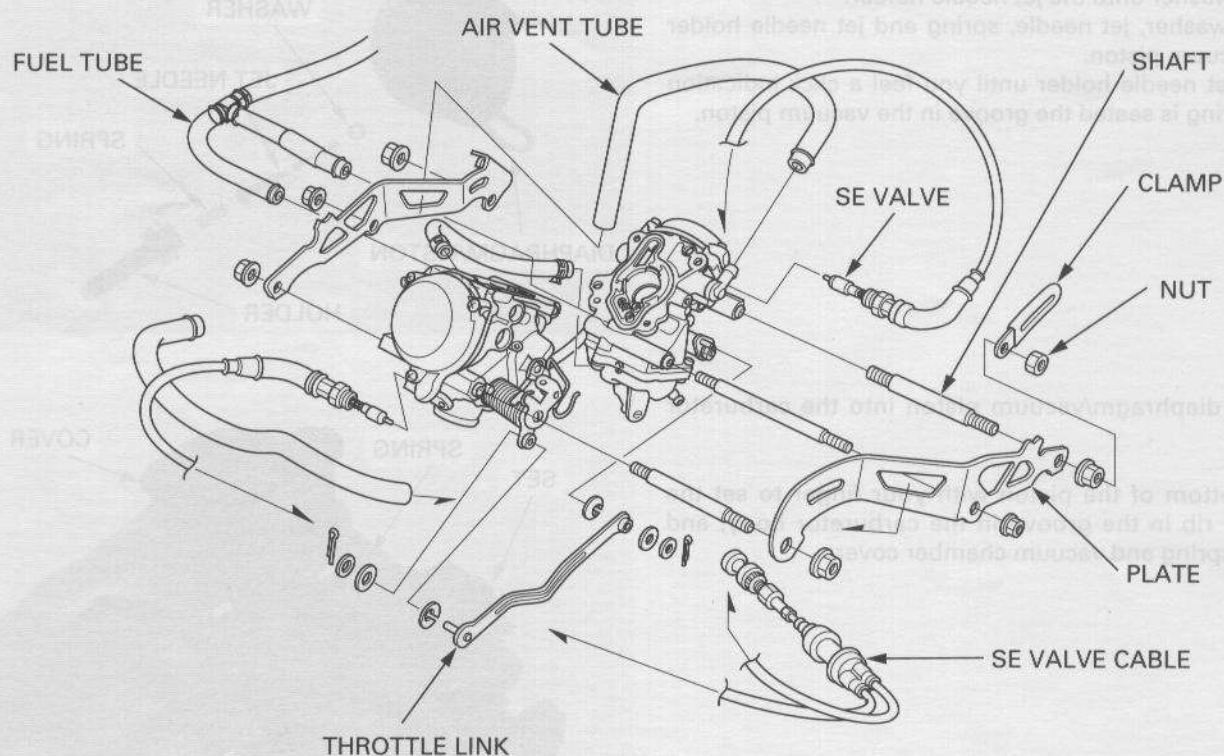
FUEL SYSTEM

Apply engine oil to the O-ring and install it to the air vent tube joint.

Install the joint to the carburetor.

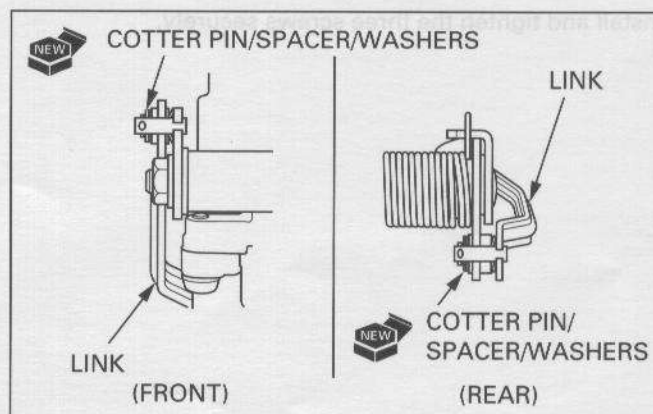


CARBURETOR COMBINATION



Connect the front and rear carburetors.

Install the spacer, throttle link, washers.
Install the new cotter pin securely.

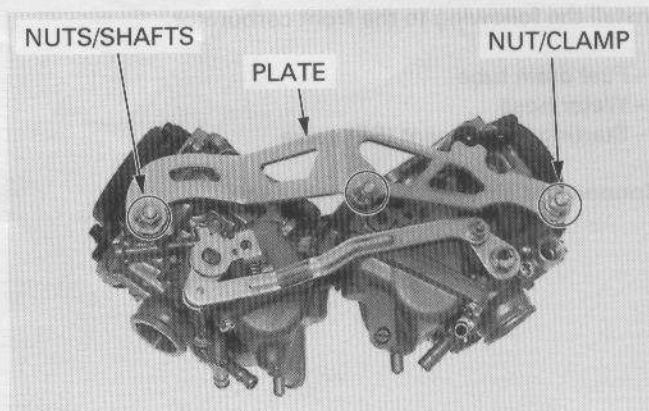


FUEL SYSTEM

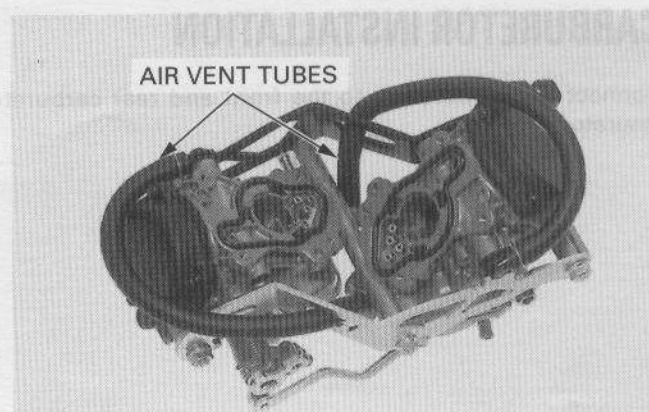
Install the plates and shaft.

Install the nuts securely.

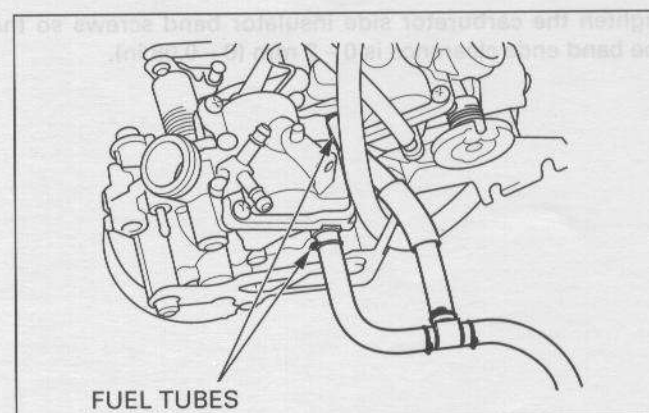
Install the clamp and tighten the nut securely.



Install the air vent tubes.

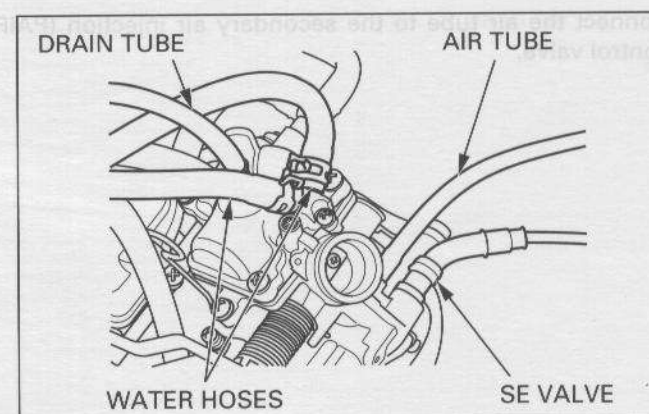


Install the fuel tubes.



Install the following to the rear carburetor.

- Fuel drain tube
- Water hoses
- Air tube
- Starting enrichment (SE) valve

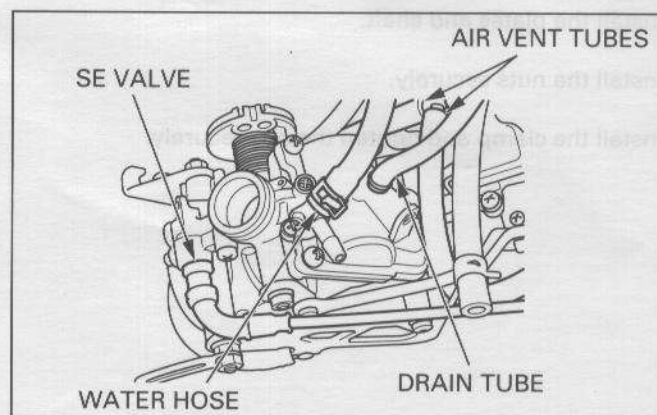


FUEL SYSTEM

Install the following to the front carburetor.

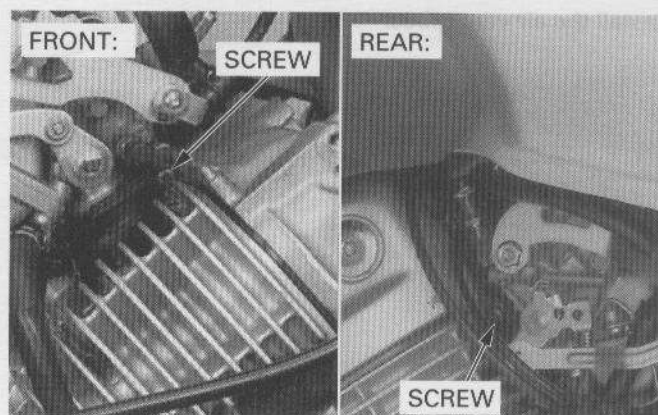
- Fuel drain tube
- Water hose
- Starting enrichment (SE) valve

Connect the air vent tubes to the joint.

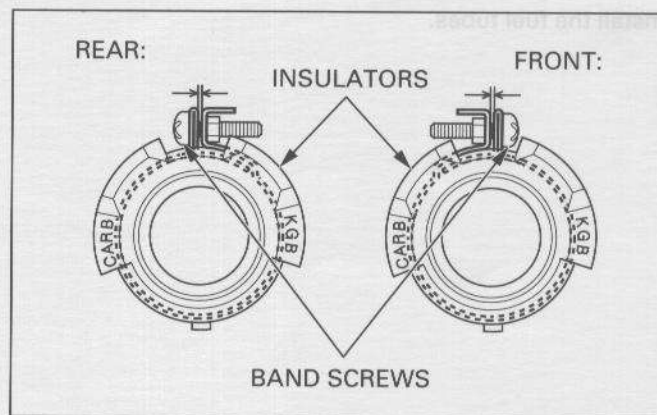


CARBURETOR INSTALLATION

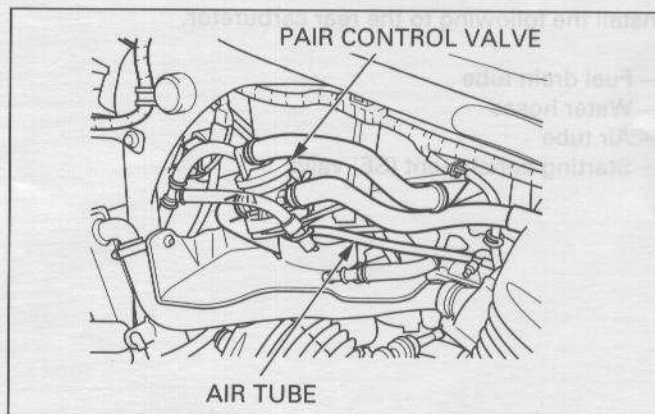
Connect the carburetors to the front and rear carburetor insulator.



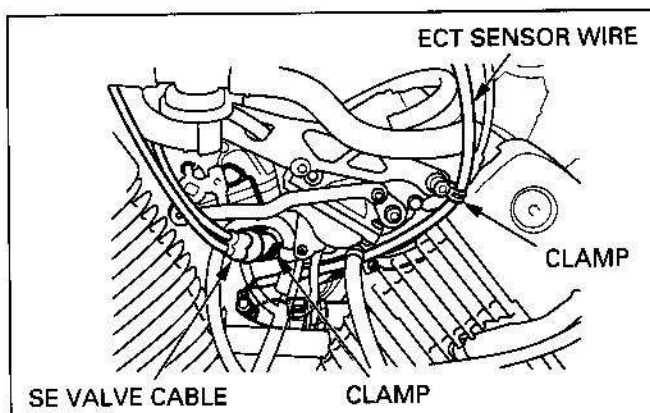
Tighten the carburetor side insulator band screws so that the band ends clearance is 0 – 2 mm (0 – 0.08 in).



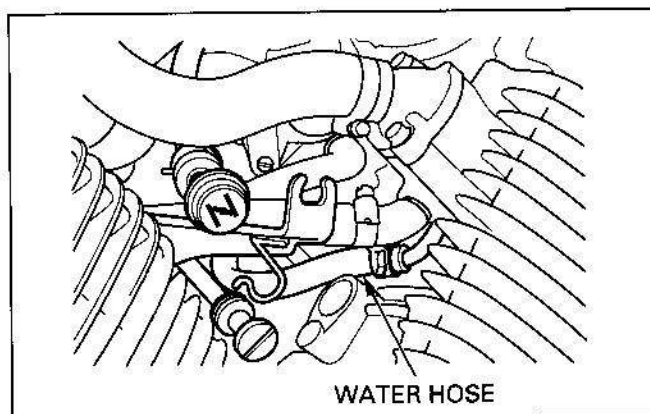
Connect the air tube to the secondary air injection (PAIR) control valve.



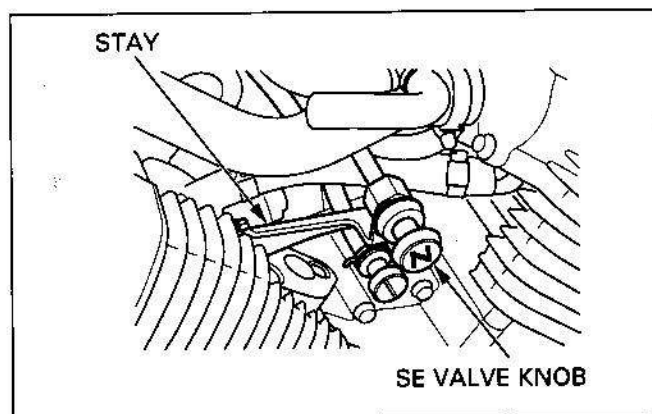
Install the starting enrichment (SE) valve cable to the clamp.



Connect the water hose to the rear cylinder.

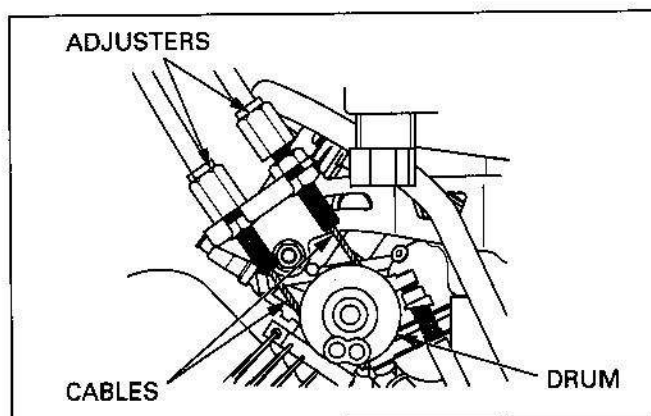


Install the SE valve knob to the stay.



Connect the throttle cables to the throttle drum.
After installation, check the operation of the throttle.

Install the carburetor base (page 5-4).
Fill and bleed the coolant (page 6-5).



FUEL SYSTEM

CHOKE SYSTEM

Remove the carburetors (page 5-7).

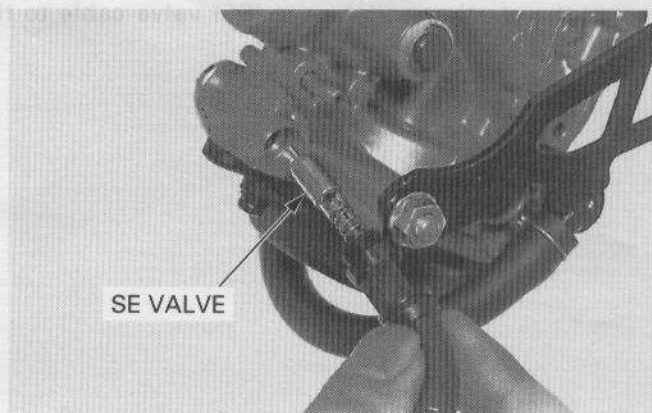
Check the starting enrichment (SE) valve for scoring, scratches or wear.

Check the seat at the tip of the SE valve for stepped wear.

Replace the SE valve set if necessary.

Check the choke cables for frayed, kinked or other damage. Remove the bolt and replace the choke cable assembly if necessary.

Install the carburetors (page 5-16).



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE:

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

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

This is an initial setting prior to the final pilot screw adjustment.

CAUTION:

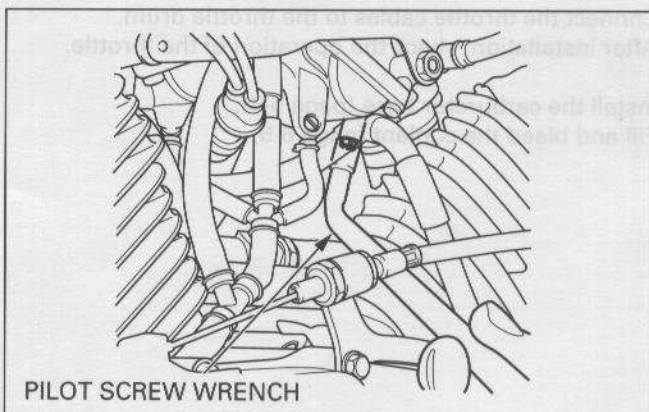
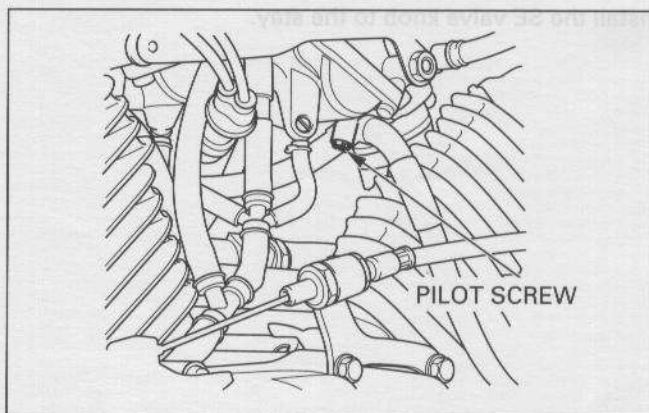
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

TOOL:

Pilot screw wrench

07908 - 4730002

INITIAL OPENING: 1 turns out



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

IDLE SPEED: $1,500 \pm 100 \text{ min}^{-1} \text{ (rpm)}$

5. Turn the front carburetor pilot screw in or out slowly to obtain the highest engine speed.
6. Perform step 5 for rear carburetor pilot screw.
7. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw.
8. Turn the front carburetor pilot screw in until the engine speed drops by $50 \text{ min}^{-1} \text{ (rpm)}$.
9. Turn the rear carburetor pilot screw out to the final opening from the position obtained in step 8.

FINAL OPENING:

Front/Rear: $3/4$ turns out

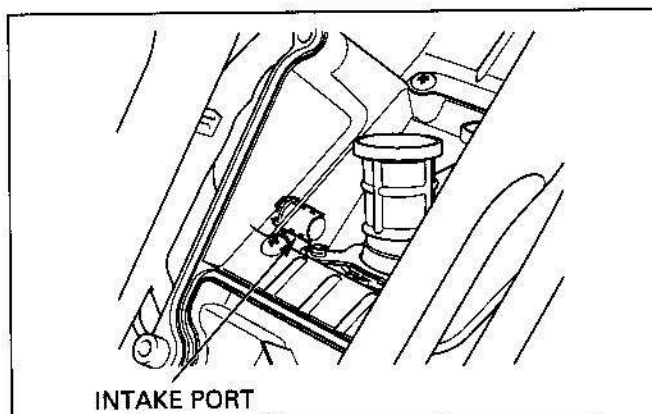
10. Adjust the idle speed with the throttle stop screw control knob.
11. Perform steps 8, 9 and 10 for the rear carburetor pilot screw.



SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

Start the engine and warm it up to normal operating temperature.
 Remove the air cleaner element (page 3-6).
 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.



FUEL SYSTEM

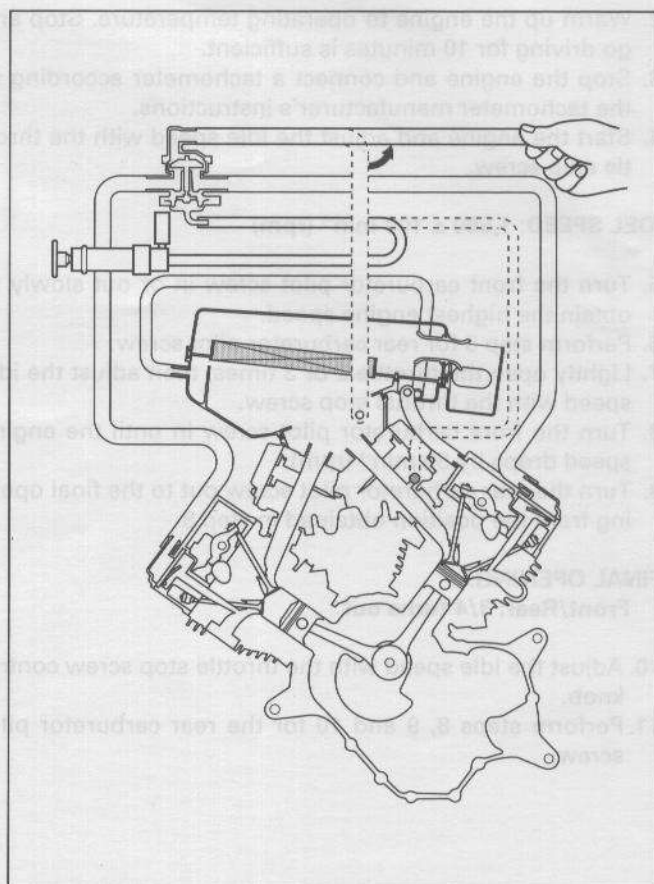
Disconnect the PAIR control valve vacuum tube from the 3-way vacuum joint and plug the vacuum joint. Connect a vacuum pump to the PAIR control valve vacuum tube.

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 clogging.

With the engine running, gradually apply vacuum to the PAIR control valve vacuum tube. Check that the air supply hose stops drawing air, and that the vacuum does not bleed.

SPECIFIED VACUUM: 280 mm Hg (11.02 in Hg)

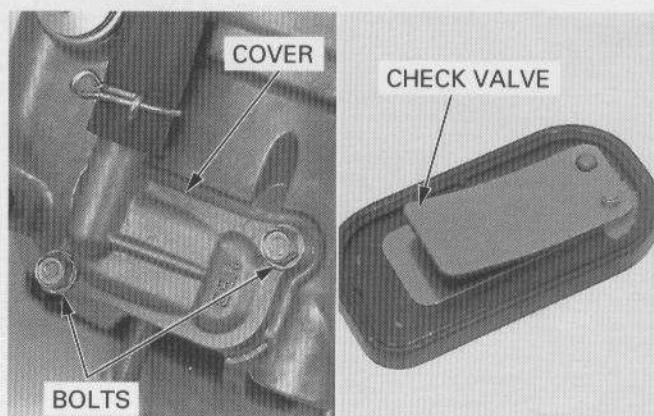
If the air is drawn in, or if the specified vacuum is not maintained, install a new PAIR control valve. If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



PAIR CHECK VALVE INSPECTION

For the rear cylinder PAIR check valve removal, remove the fuel tank (page 2-8).

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

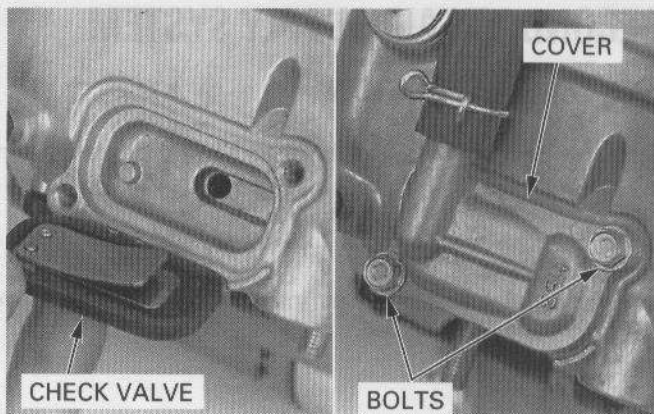


Check the reed for damage or fatigue. Replace if necessary. Replace the PAIR check valve if the seat rubber is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.

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

Install and tighten the bolts to the specified torque.

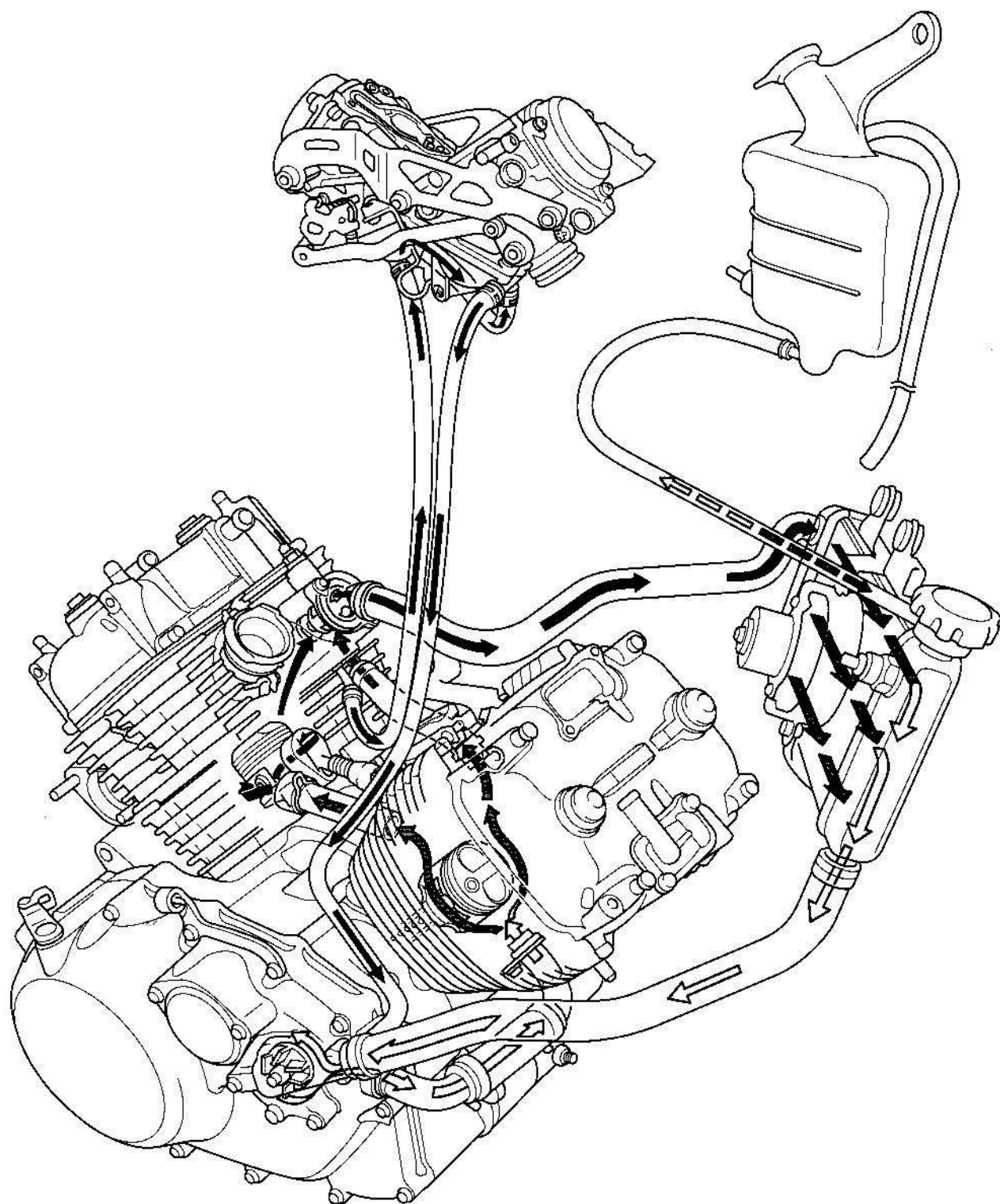
TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



MEMO

COOLING SYSTEM

SYSTEM FLOW PATTERN



6. COOLING SYSTEM

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

SERVICE INFORMATION

GENERAL

WARNING

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

CAUTION:

Using Coolant with silicate 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 services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 18 for fan motor switch and thermosensor inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.03 liter (1.08 US qt, 0.95 Imp qt)
	Reserve tank	0.24 liter (0.25 US qt, 0.21 Imp qt)
Radiator cap relief pressure		108 kPa (1.1 kgf/cm ² , 16 psi)
Thermostat	Begin to open	81 – 84°C (178 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	4.5 mm (0.18 in) minimum
Standard coolant concentration		50% mixture with soft water

COOLING SYSTEM

TORQUE VALUES

Water pump drain bolt	13 N·m (1.3 kgf-m, 9 lbf-ft)
Water pump impeller	12 N·m (1.2 kgf-m, 9 lbf-ft)
Cooling fan nut	1 N·m (0.1 kgf-m, 0.7 lbf-ft)

TOOLS

Bearing remover head	07936 – GE00200
Bearing remover shaft	07936 – GE00100
Bearing remover weight	07741 – 0010201
Driver	07749 – 0010000
Attachment, 24 x 26 mm	07746 – 0010700
Attachment, 32 x 35 mm	07746 – 0010100
Pilot, 10 mm	07746 – 0040100
Mechanical seal driver attachment	07945 – 4150400

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature indicator or thermo switch (Section 18)
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty water pump
- Thermostat stuck closed
- Faulty cooling fan motor
- Faulty fan motor switch

Engine temperature too low

- Faulty temperature indicator or thermo switch (Section 18)
- Thermostat stuck open
- Faulty cooling fan motor switch

Coolant leaks

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

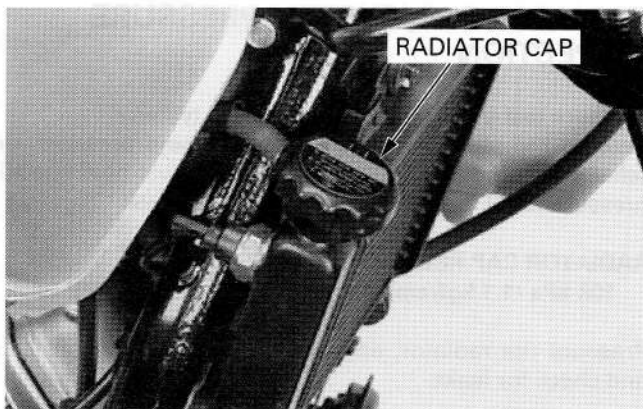
SYSTEM TESTING

COOLANT (HYDROMETER TEST)

⚠ WARNING

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

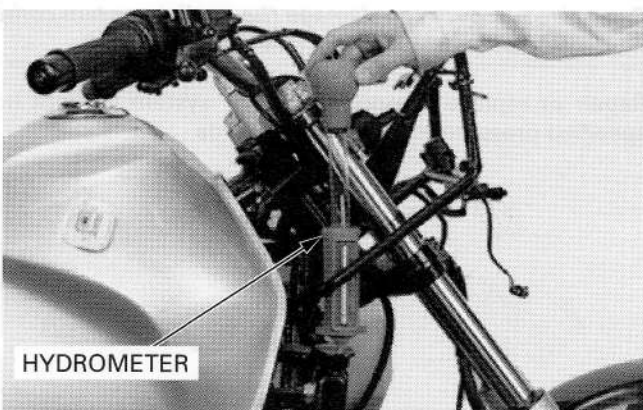
Remove the screw from the radiator cap.
Remove the radiator cap.



Check the coolant gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION: 50%

Look for contamination and replace the coolant if necessary.



Coolant gravity chart

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

COOLING SYSTEM

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

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

RADIATOR CAP RELIEF PRESSURE:

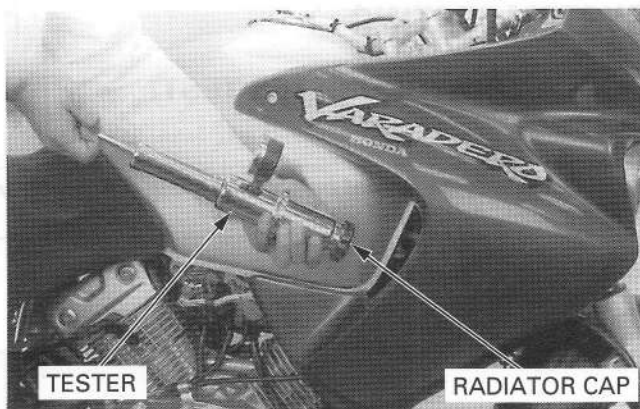
108 kPa (1.1 kgf/cm², 16 psi)

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

CAUTION:

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

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



COOLANT REPLACEMENT

PREPARATION

⚠ WARNING

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

CAUTION:

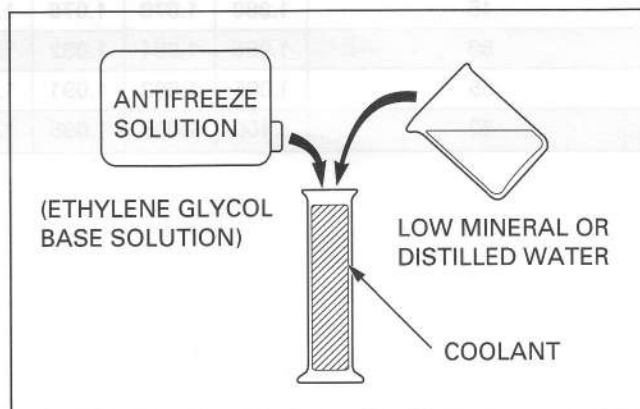
Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passage. Using tap water may cause engine damage.

NOTE:

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

RECOMMENDED MIXTURE:

50 – 50 (Distilled water and antifreeze)



REPLACEMENT/AIR BLEEDING

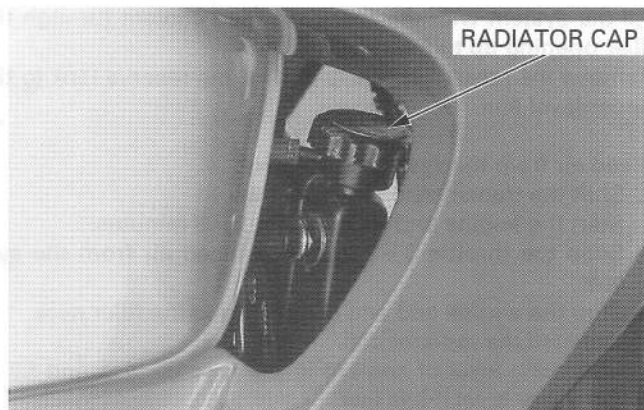
⚠ WARNING

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

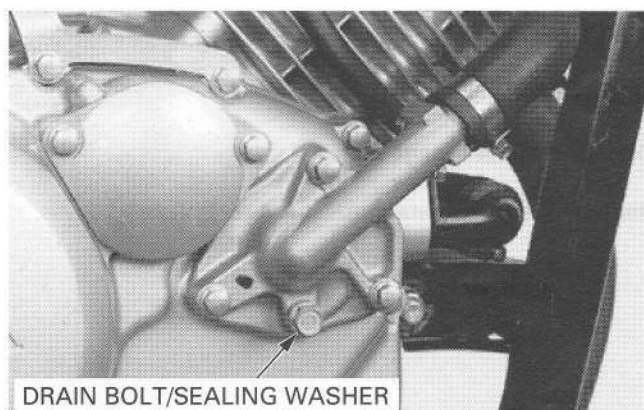
NOTE:

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

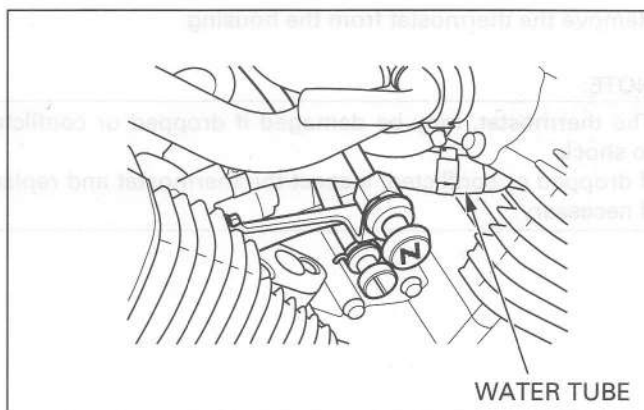
Remove the radiator cap.



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



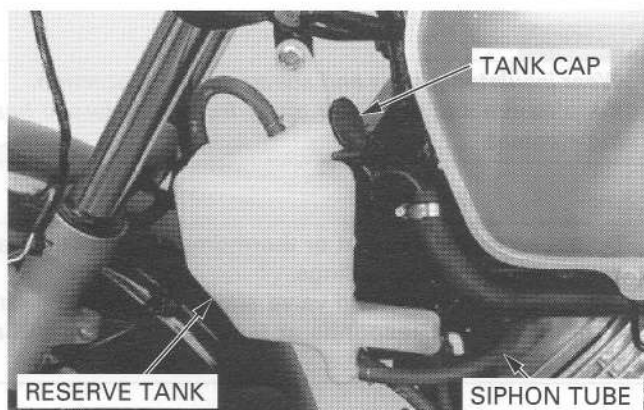
Remove the water tube and drain the coolant from the cylinder.



Remove the reserve tank cap.

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

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



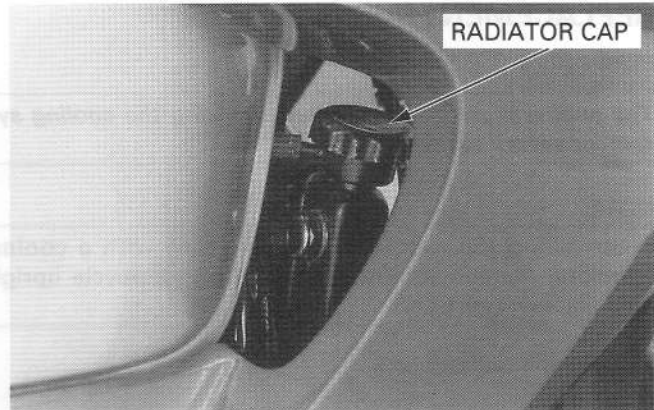
COOLING SYSTEM

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

Remove the reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follows:

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

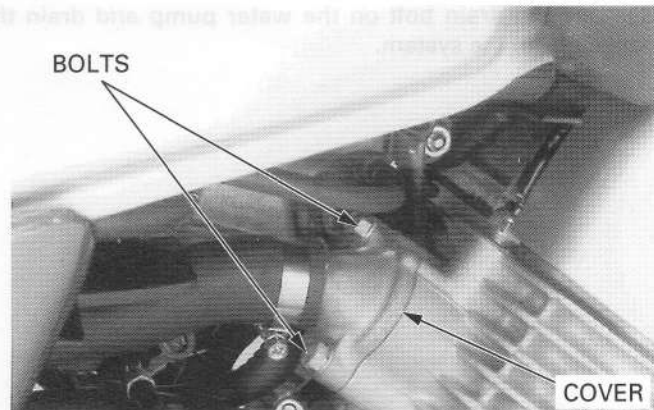


THERMOSTAT

REMOVAL

Drain the coolant (page 6-5).

Remove the thermostat housing cover bolts and cover.

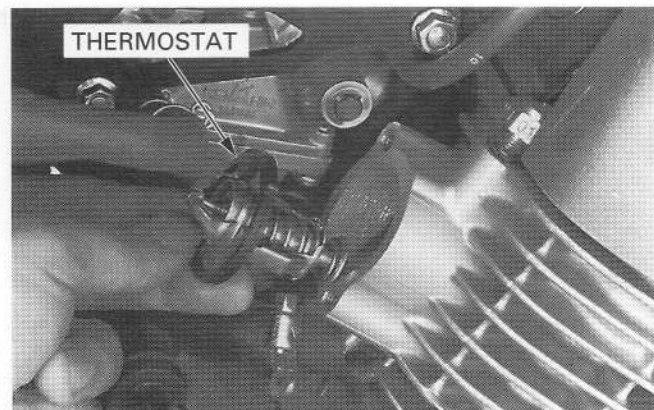


Remove the thermostat from the housing.

NOTE:

The thermostat, may be damaged if dropped or conflicted to shock.

If dropped or conflicted, inspect the thermostat and replace if necessary.



INSPECTION

⚠ WARNING

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

NOTE:

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

Visually inspect the thermostat for damage.

Heat the water with an electric heating element to operating temperature for 5 minutes.

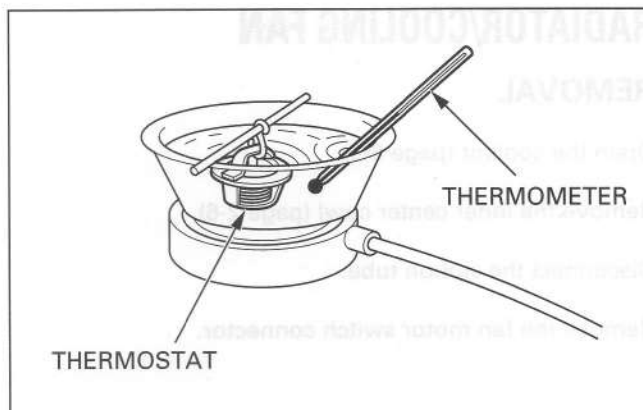
Suspend the thermostat in heated water to check its operation.

THERMOSTAT BEGINS TO OPEN:

81 – 84°C (178 – 183°F)

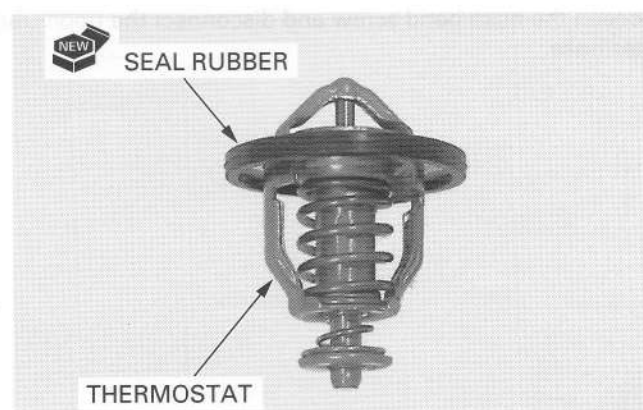
VALVE LIFT:

4.5 mm (0.18 in) minimum

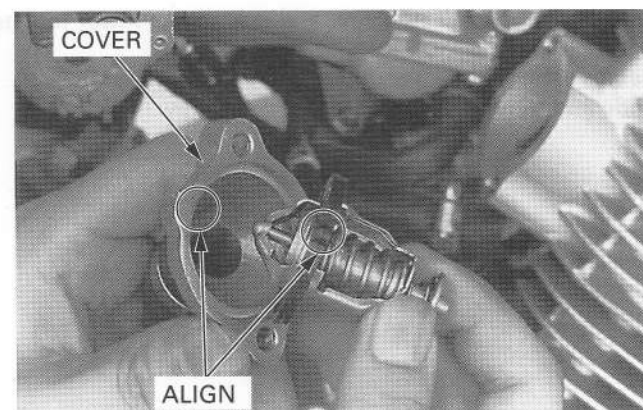


INSTALLATION

Apply coolant to the new seal rubber and install to the thermostat flange.



Install the thermostat into the housing cover with aligning the tab of the seal rubber and cover groove.



Install and tighten the cover bolts securely.

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



COOLING SYSTEM

RADIATOR/COOLING FAN

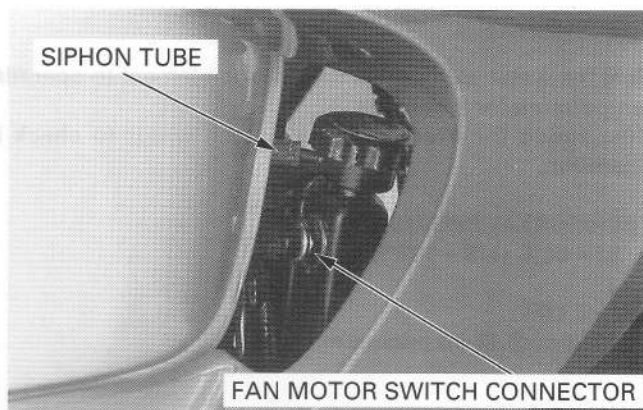
REMOVAL

Drain the coolant (page 6-5).

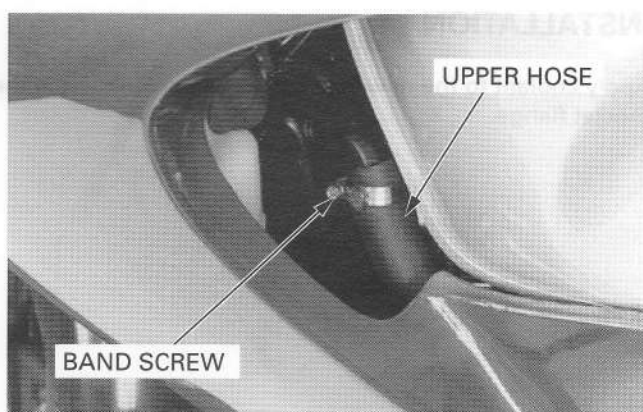
Remove the inner center cowl (page 2-6).

Disconnect the siphon tube.

Remove the fan motor switch connector.

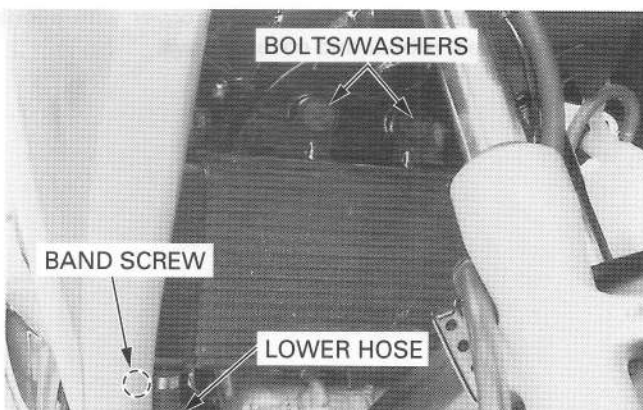


Loosen the hose band screw and disconnect the upper radiator hose.

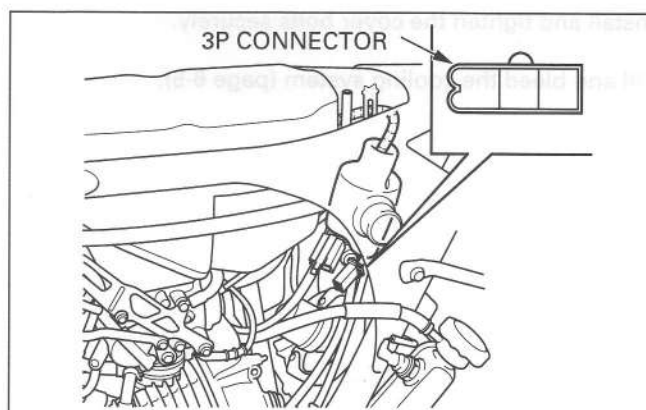


Loosen the hose band screw and disconnect lower radiator hose.

Remove the radiator mounting bolts, washers. Slide and remove the radiator from the stay.

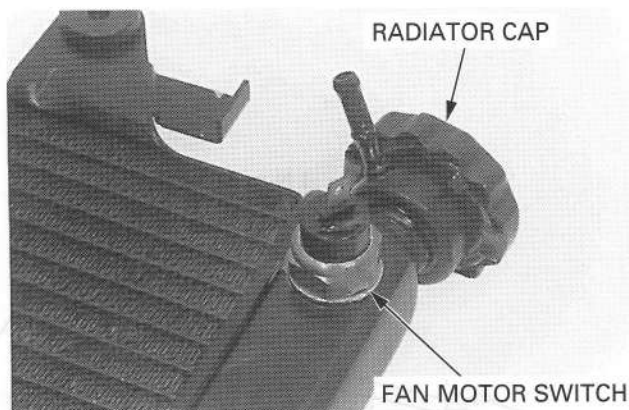


Remove the fan motor 3P connector.

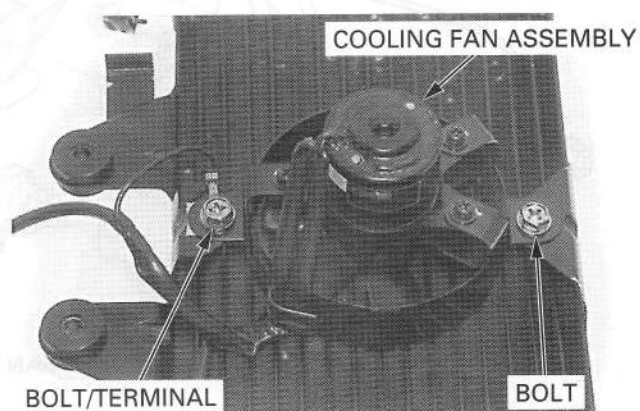


DISASSEMBLY

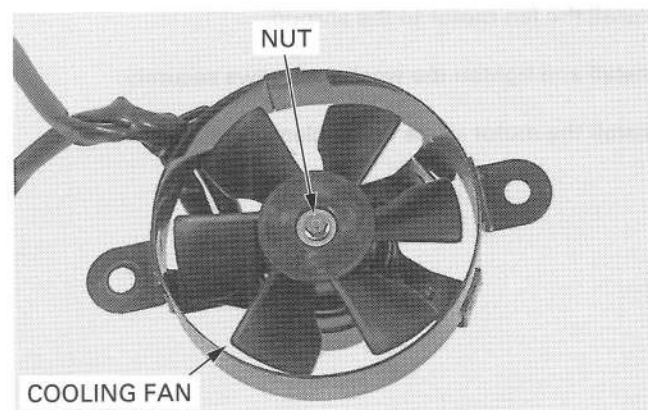
Remove the fan motor switch.
Remove the screw and radiator cap.



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

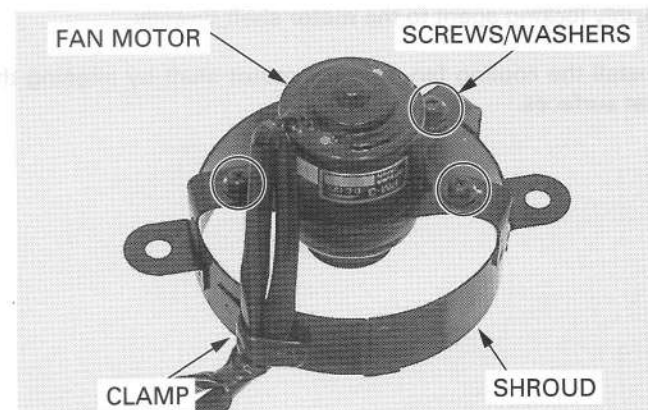


Remove the nut and cooling fan.

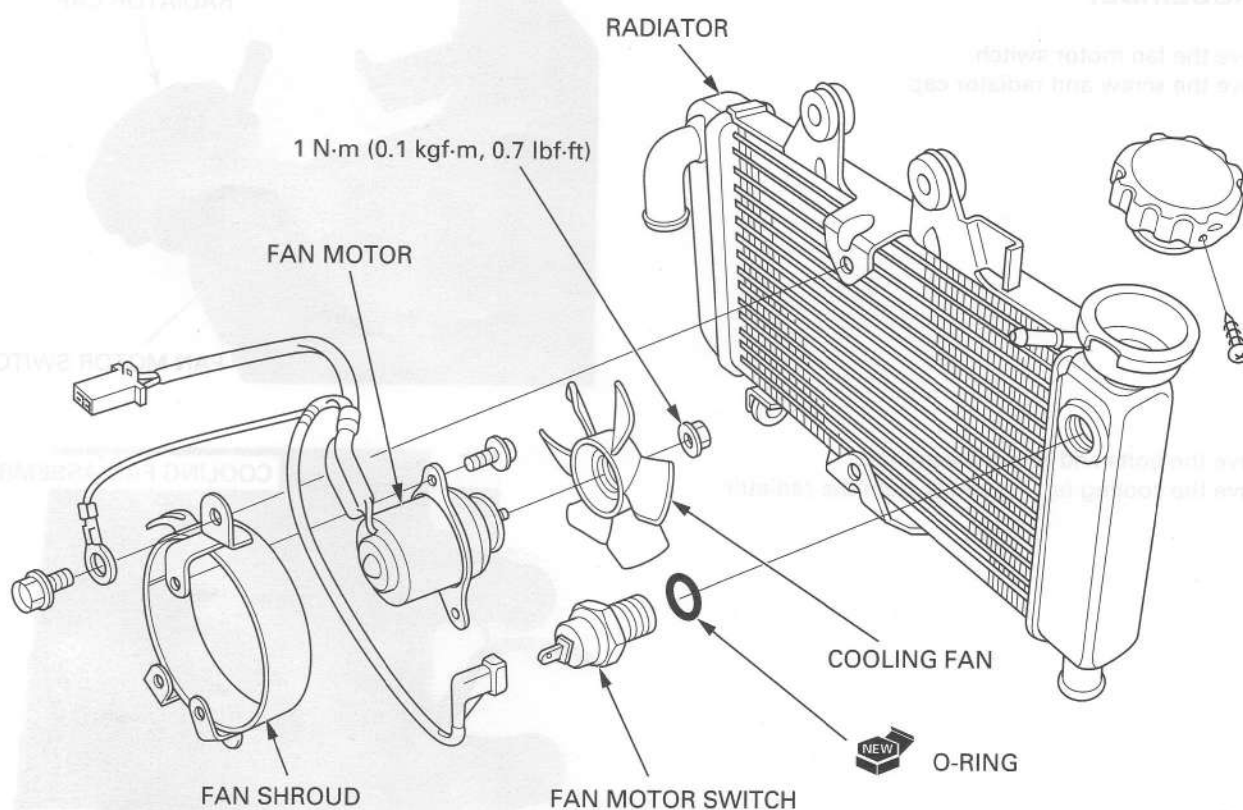


Remove the motor wires from the clamp.
Remove the screws and washers.

Remove the fan motor from the shroud.



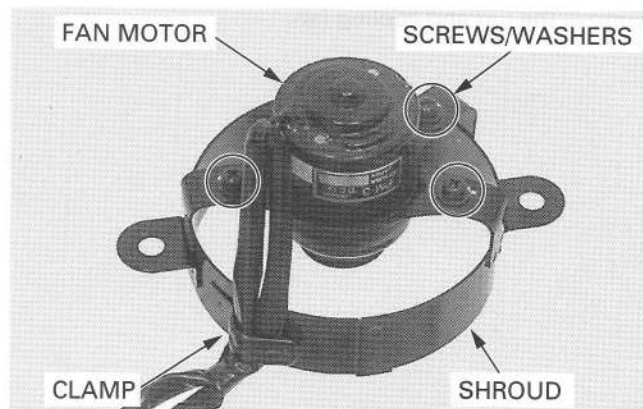
COOLING SYSTEM



Install the fan motor to the shroud.

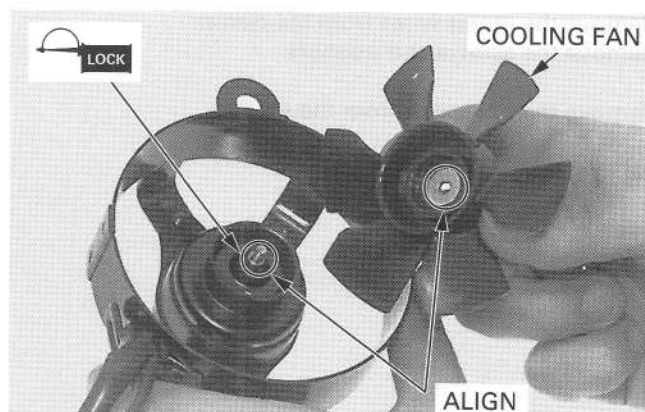
Install and tighten the washers/screws securely.

Install the motor wires to the clamp.



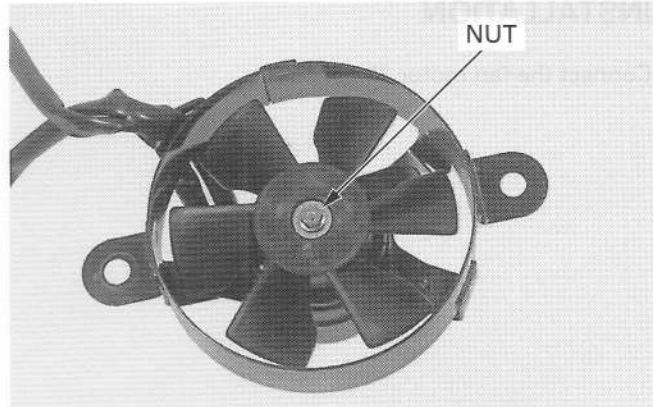
Apply locking agent to the motor shaft threads.

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

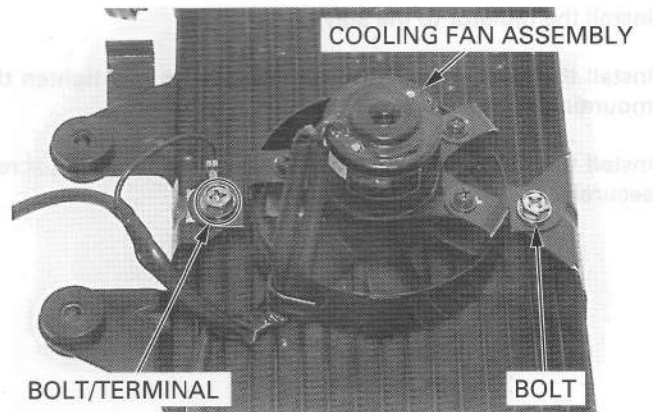


Install and tighten the nut to the specified torque.

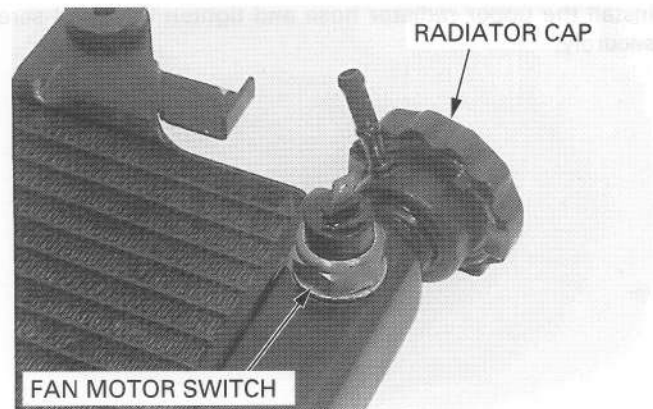
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



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



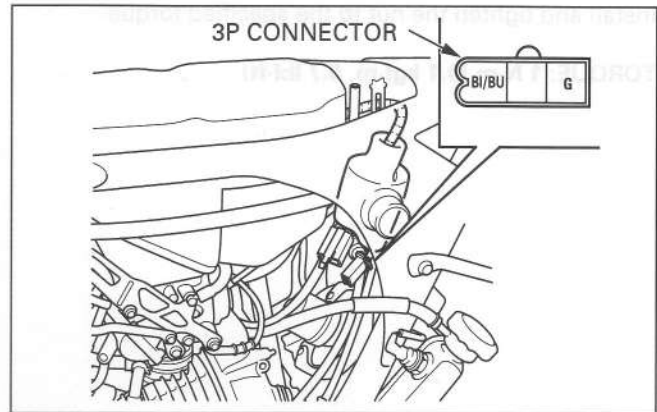
Install the fan motor switch (page 18-12).
Install the radiator cap.



COOLING SYSTEM

INSTALLATION

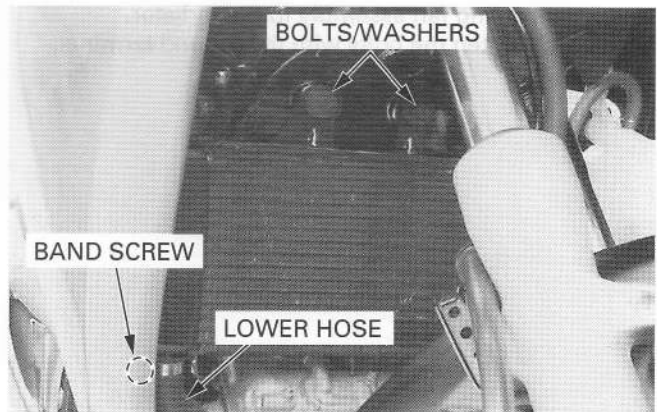
Connect the fan motor 3P connector.



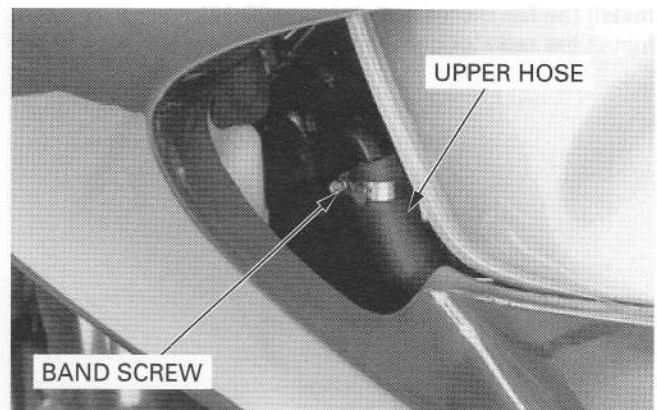
Install the radiator to the stay.

Install the washer, radiator mounting bolts and tighten the mounting bolts securely.

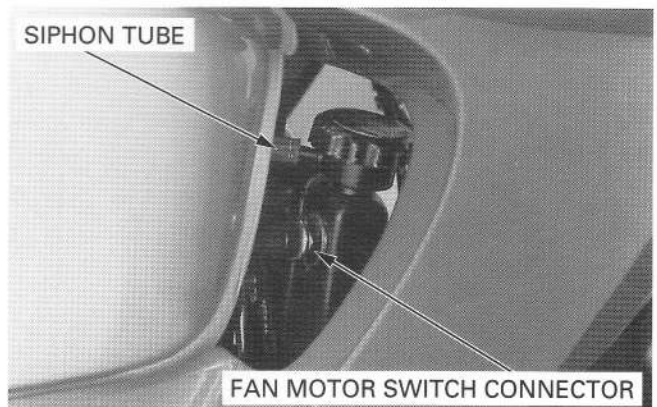
Install the lower radiator hose and tighten the band screw securely.



Install the upper radiator hose and tighten the band screw securely.



Connect the fan motor switch connector.
Connect the siphon tube.
Fill and bleed the coolant (page 6-5).
Install the inner center cowl (page 2-6).



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

Remove the front cowl (page 2-4).
Drain the coolant from the reserve tank (page 6-5).

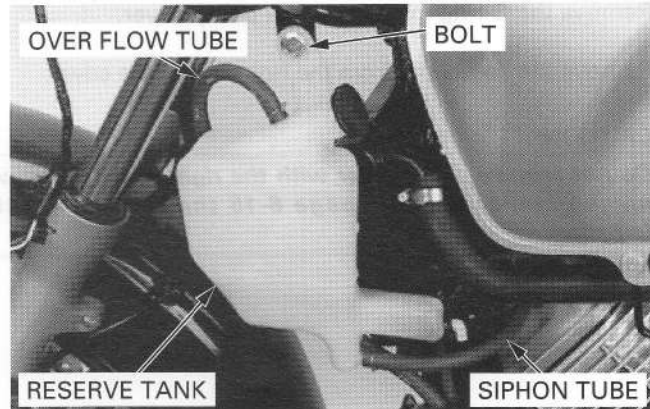
Remove the siphon tube and over flow tube.
Remove the radiator reserve tank.

Installation is in the reverse order of removal.

NOTE:

Route the tubes properly (page 1-23).

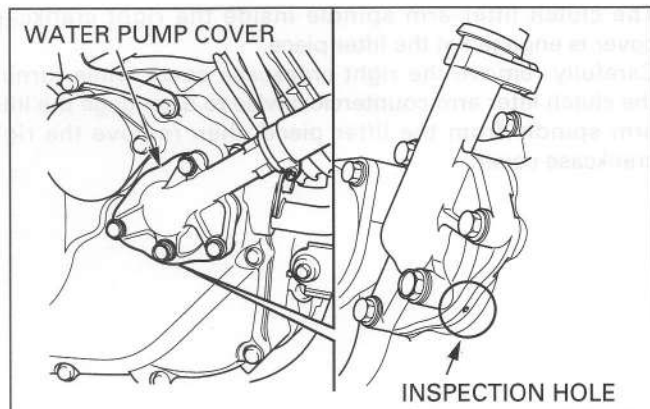
Fill the reserve tank with recommended coolant to the upper level line (page 6-5).



WATER PUMP

MECHANICAL SEAL INSPECTION

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



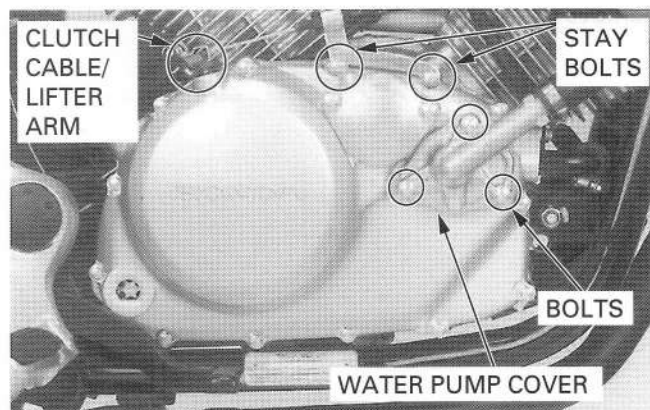
REMOVAL

RIGHT CRANKCASE COVER REMOVAL

Drain the coolant (page 6-5).
Drain the engine oil (page 3-10).
Remove the brake pedal and arm (page 14-24).

Remove the two bolts and clutch cable stay.
Disconnect the clutch cable from the lifter arm.

Remove the three bolts and water pump cover.



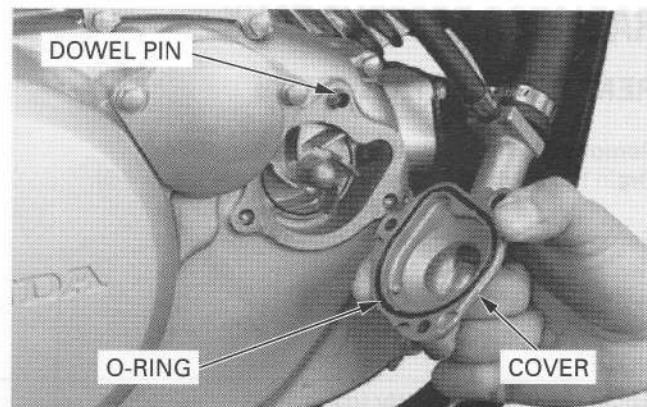
COOLING SYSTEM

Remove the O-ring from the water pump cover.

Remove the dowel pin from the right crankcase cover.

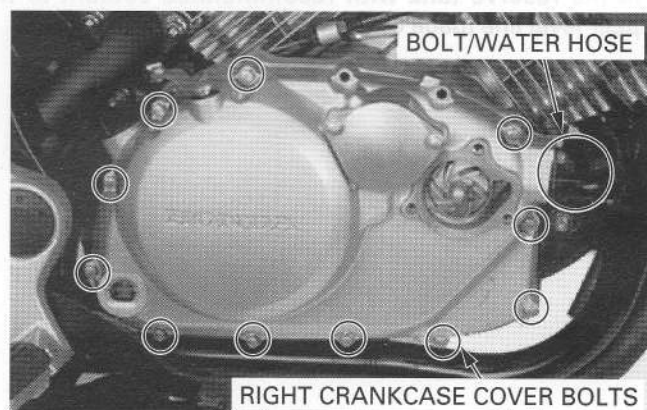
CAUTION:

Do not remove the impeller with the right crankcase cover on the crankcase (see page 6-15 the removal of the impeller).



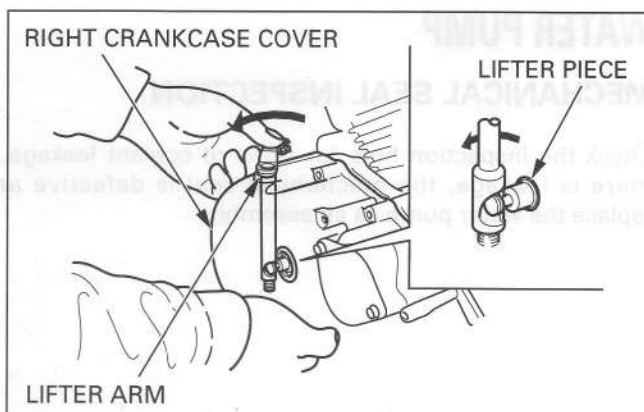
Remove the bolt and water hose.

Remove the right crankcase cover bolts.

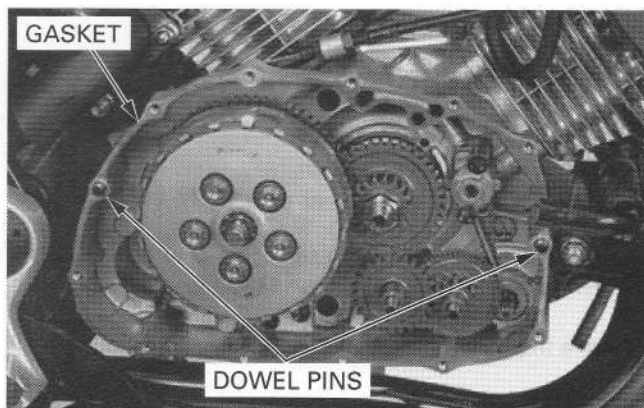


The clutch lifter arm spindle inside the right crankcase cover is engaged at the lifter piece.

Carefully remove the right crankcase cover while turning the clutch lifter arm counterclockwise to disengage the lifter arm spindle from the lifter piece, then remove the right crankcase cover.

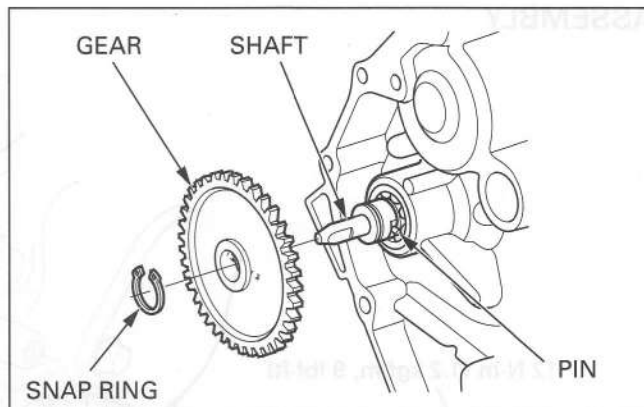


Remove the gasket and dowel pins.

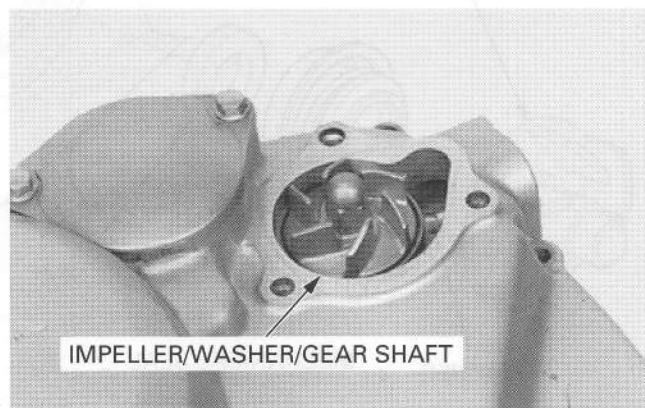


DISASSEMBLY

Remove the snap ring from the water/oil pump shaft.
Remove the pin and water/oil pump gear.



Hold the water/oil pump shaft and remove the impeller, washer and then, remove the water/oil pump shaft from the right crankcase cover.

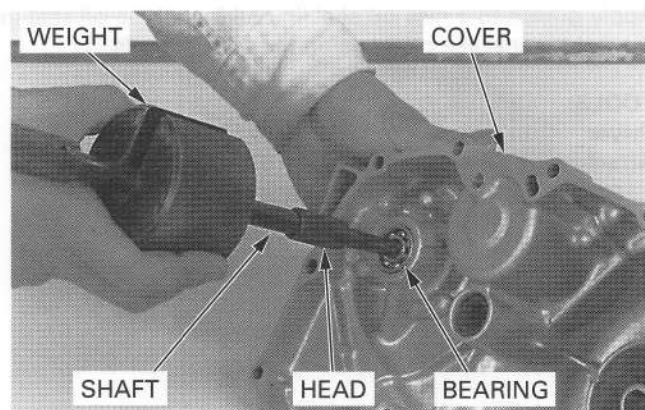


Remove the water/oil pump shaft bearing from the right crankcase cover using the special tools.

TOOLS:

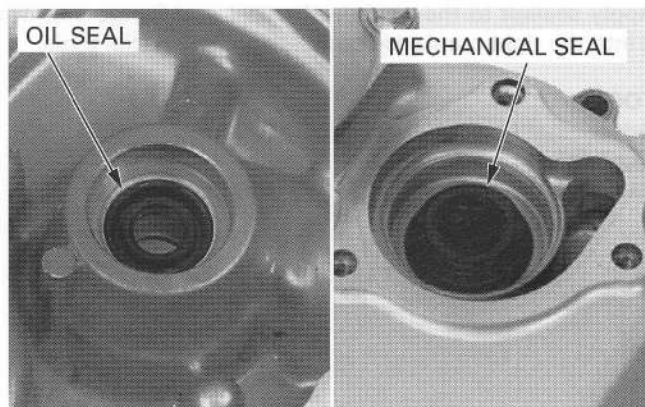
Remover head
Remover shaft
Remover weight

07936 - GE00200
07936 - GE00100
07741 - 0010201



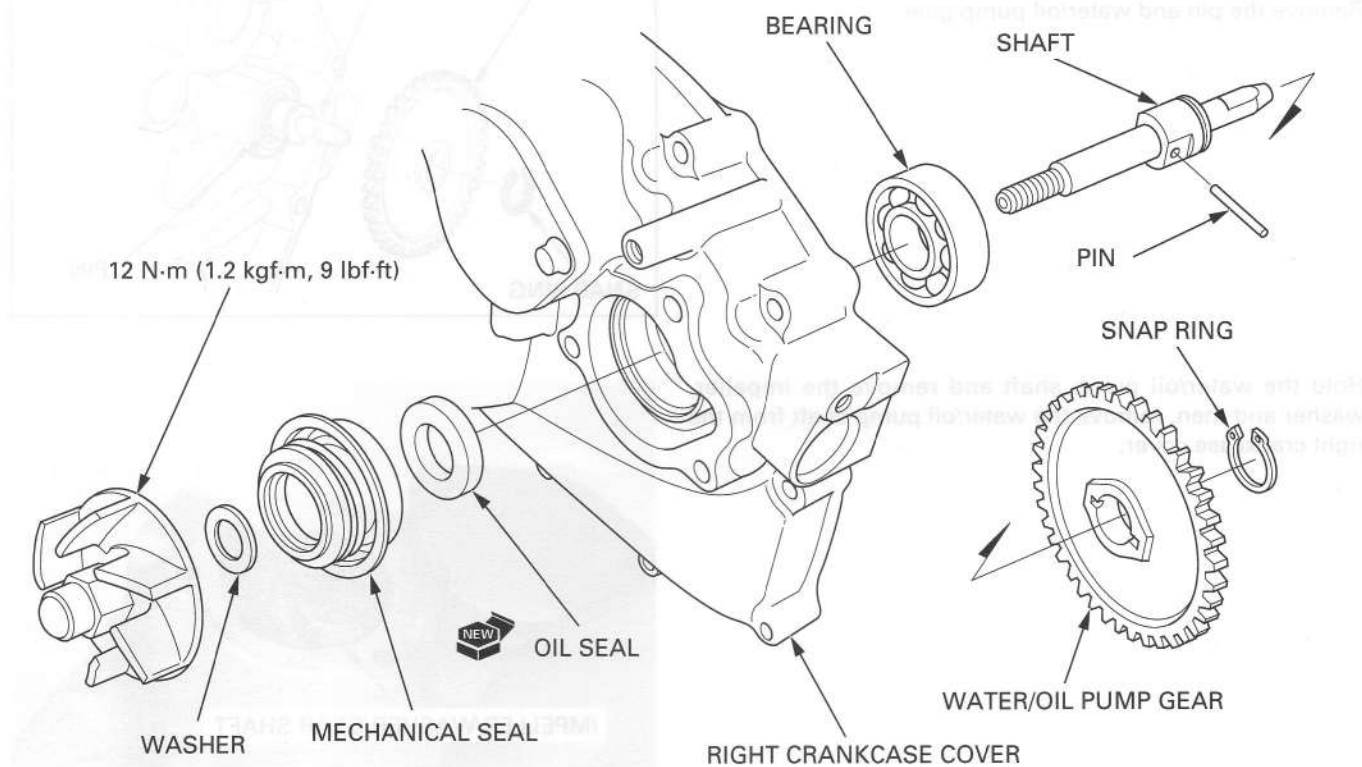
Remove the oil seal from the right crankcase cover.

Remove the mechanical seal from the right crankcase cover.



COOLING SYSTEM

ASSEMBLY



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

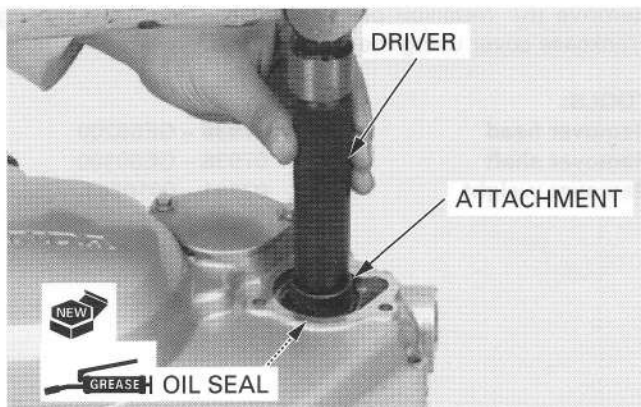
TOOLS:

Driver

07749 - 0010000

Attachment, 32 x 35 mm

07746 - 0010100



Apply sealant to the new mechanical seal flange and drive it into the right crankcase cover using the special tools.

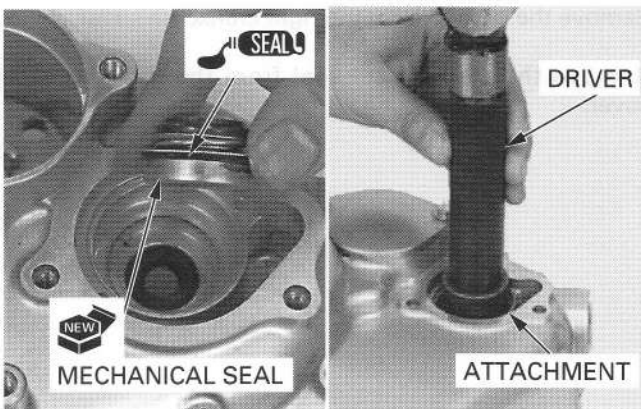
TOOLS:

Driver

07749 - 0010000

Mechanical seal driver
attachment

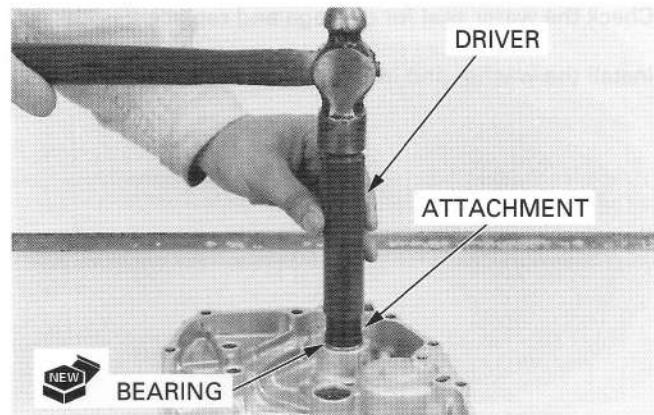
07945 - 4150400



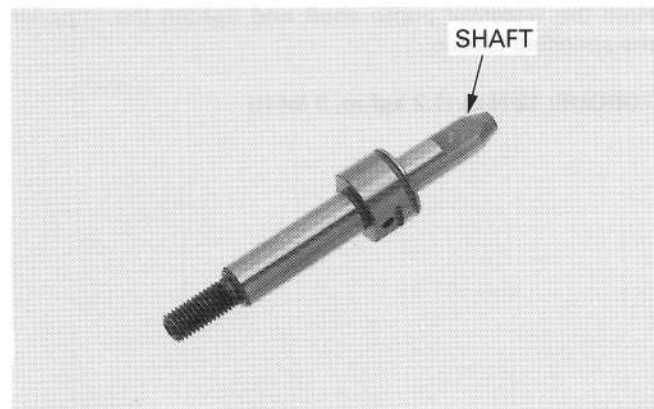
Drive in a new water/oil pump shaft bearing using the special tools.

TOOLS:

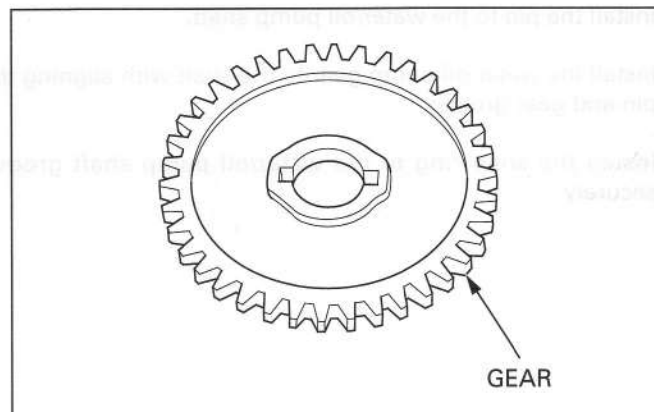
Driver	07949 - 0010000
Attachment, 24 x 26 mm	07746 - 0010700
Pilot, 10 mm	07746 - 0040100



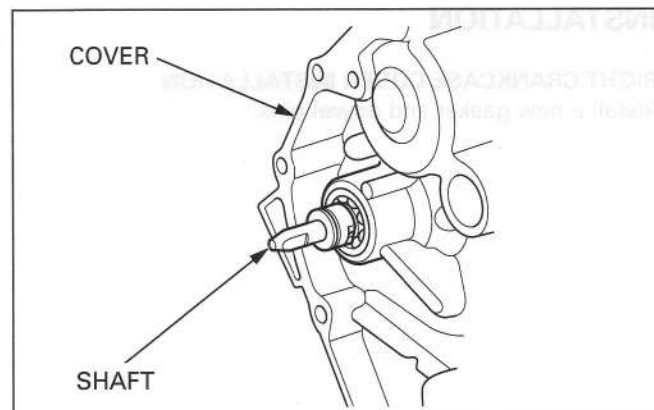
Check the water/oil pump shaft for damage.



Check the water/oil pump gear for damage of the teeth.



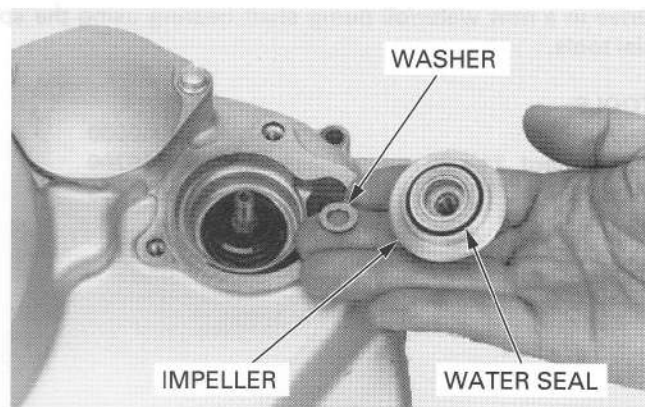
Install the water/oil pump shaft to the right crankcase cover.



COOLING SYSTEM

Check the water seal for damage and replace if necessary.

Install the washer and impeller to the shaft.



Hold the water/oil pump shaft and tighten the impeller to the specified torque.

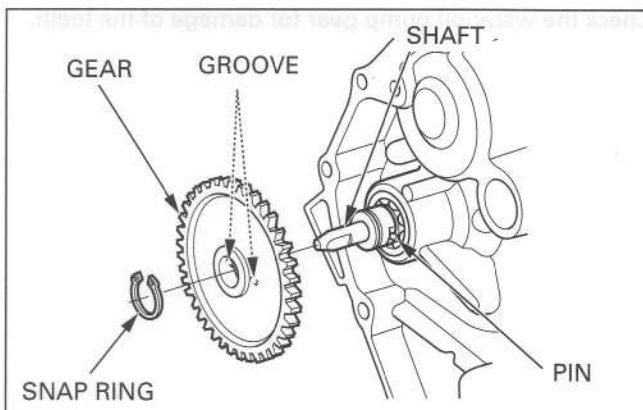
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the pin to the water/oil pump shaft.

Install the water/oil pump gear to the shaft with aligning the pin and gear groove.

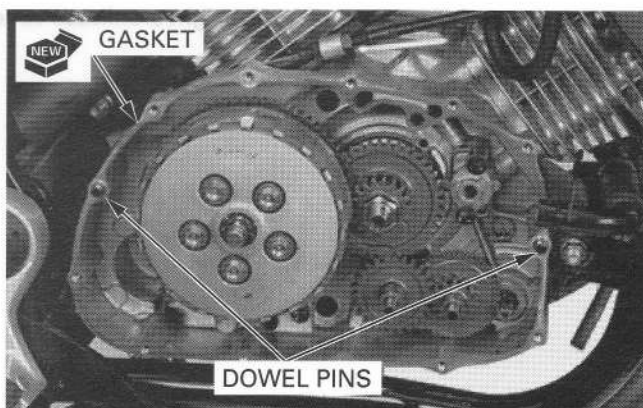
Install the snap ring to the water/oil pump shaft groove securely.



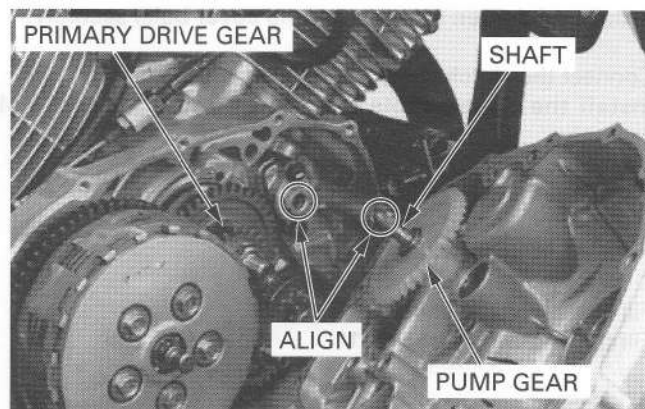
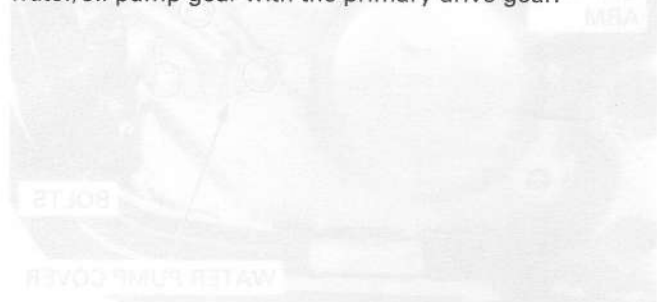
INSTALLATION

RIGHT CRANKCASE COVER INSTALLATION

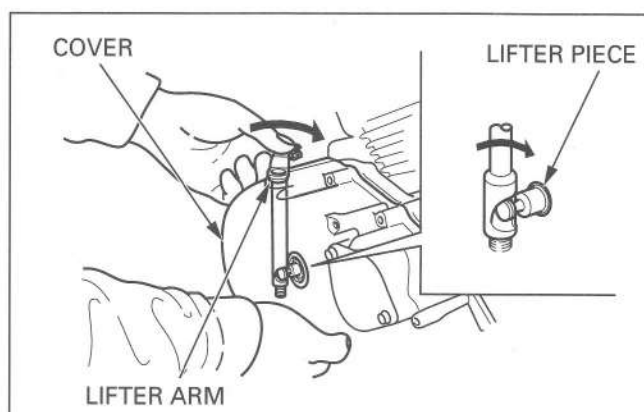
Install a new gasket and dowel pins.



Set the right crankcase cover on to the right crankcase while turning the impeller to engage the flat surface of the water/oil pump gear shaft with the oil pump inner rotor and water/oil pump gear with the primary drive gear.



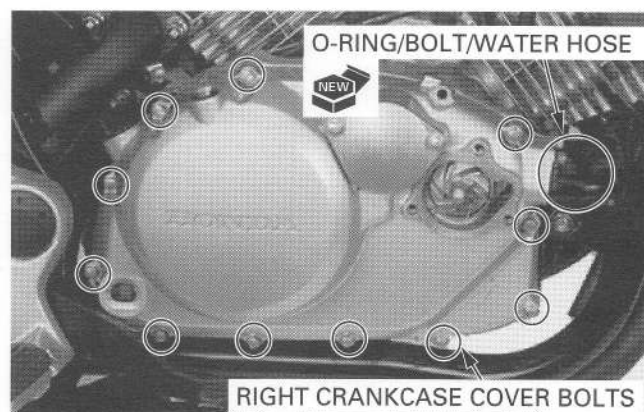
Install the right crankcase cover on to the right crankcase while turning the clutch lifter arm clockwise to engage the cutout in the lifter arm spindle with the lifter piece flange.



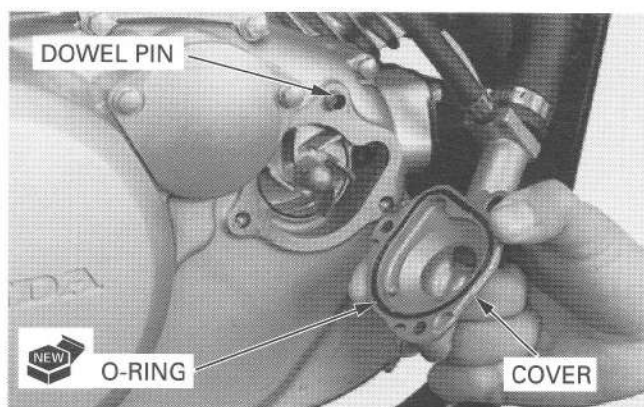
Install and tighten the right crankcase cover bolts securely.

Apply coolant to a new O-ring and install it to the water hose.

Connect the water hose to the right crankcase cover and tighten the bolt securely.



Install the dowel pin to the right crankcase cover. Apply coolant to a new O-ring and install it to the water pump cover groove.



COOLING SYSTEM

Install and tighten the water pump cover bolts securely.

Connect the clutch cable to the lifter arm.

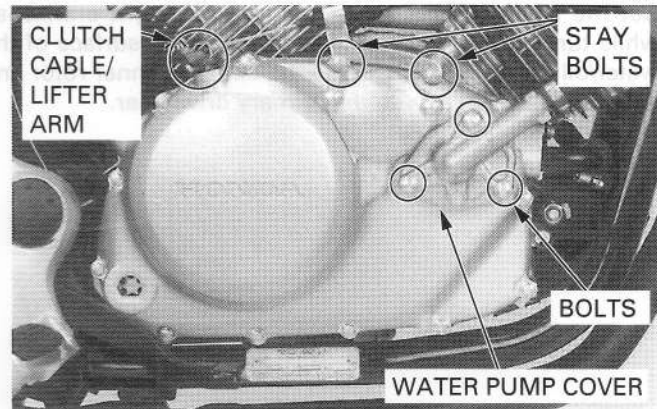
Install the clutch cable stay and tighten the two bolts securely.

Install the following.

- Brake pedal and arm (page 14-25).
- Right front cover (page 3-13).

Fill and bleed the coolant (page 6-5).

Fill the engine oil (page 3-11).



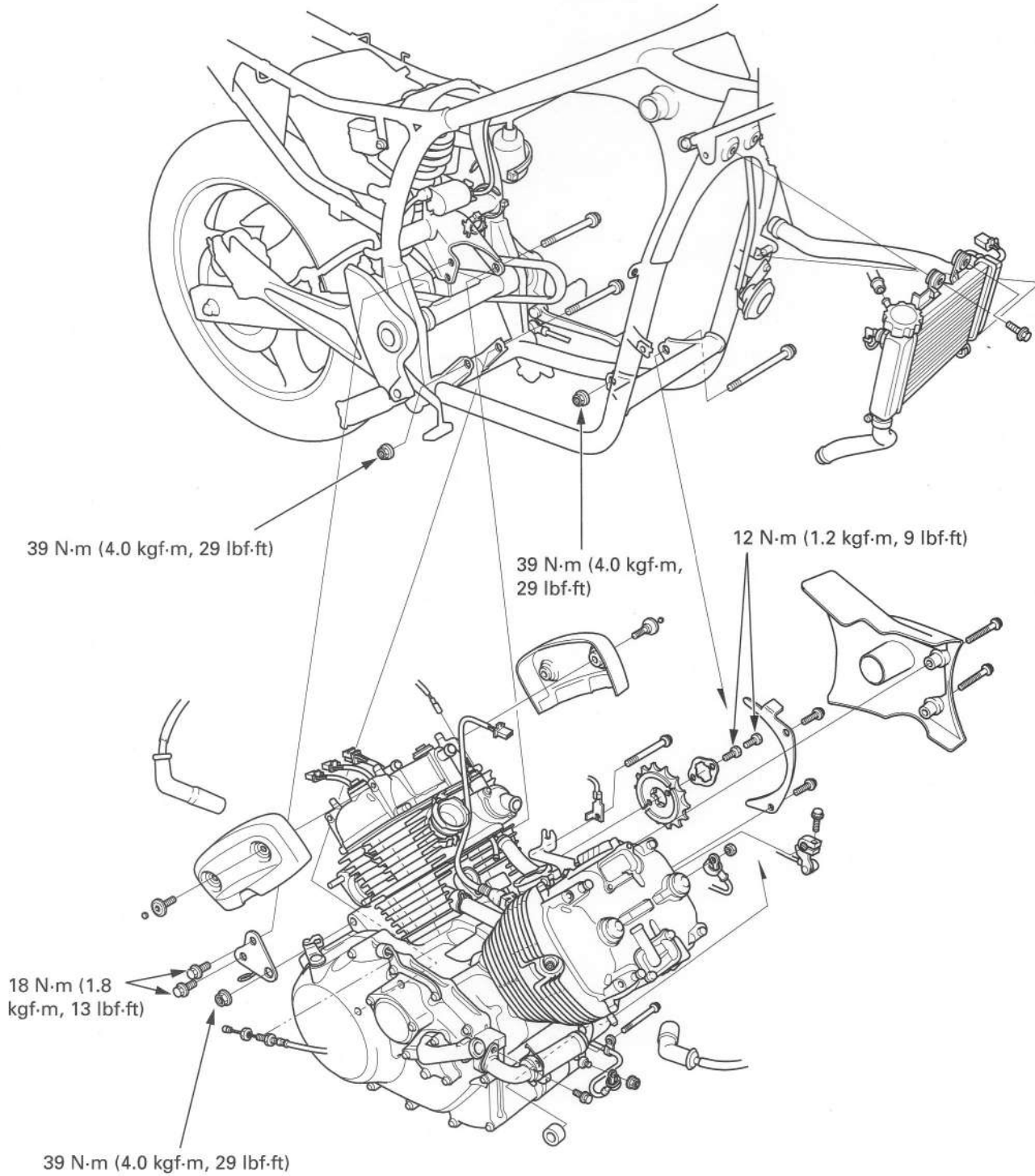
Install the right crankcase cover on to the right crankcase. While turning the clutch lifter arm clockwise to engage the clutch, the lifter arm spindle with the lifter piece engage.

Install and tighten the right crankcase cover bolts securely. Apply coolant to a new O-ring and install it to the water pump.

Connect the water hose to the right crankcase cover and tighten the bolt securely.

Install the dowel pin to the right crankcase cover. Apply coolant to a new O-ring and install it to the water pump cover groove.

MEMO



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE/INSTALLATION	7-5
ENGINE REMOVAL	7-3		

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.
- When removing/installing the engine, tape the frame around the engine beforehand for fame protection.
- The following components can be serviced with the engine installed in the frame.
 - Alternator (section 15)
 - Camshaft (section 9)
 - Carburetor (section 5)
 - Clutch/gearshift linkage (section 8)
 - Cylinder head (section 9)
 - Ignition pulse generator (section 16)
 - Starter motor/starter clutch (section 17)
 - Cylinder/piston (section 10)
 - Oil pump (section 4)
- The following components require engine removal for service.
 - Crankshaft (section 11)
 - Shift fork, shift drum (section 11)
 - Transmission (section 11)
- The following components must be removed before removing the engine.
 - Front cowl (section 2)
 - Muffler/exhaust pipe (section 2)
 - Fuel tank (section 2)
 - Spark plug (section 3)
 - Oil pipe (section 4)
 - Radiator/water hose (section 6)
 - Carburetor (section 5)
 - Clutch cable (section 8)
 - Brake pedal arm (section 14)
 - Crankcase breather tube (section 11)
- After engine installation, adjust the following.
 - Clutch cable (page 3-23)
 - Drive chain (page 3-16)
 - Throttle cable (page 3-4)
 - Engine oil level (page 3-9)

ENGINE REMOVAL/INSTALLATION

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	40.5 kg (89.29 lbs)
Engine oil capacity at disassembly	1.5 liter (1.6 US qt, 1.3 Imp qt)

TORQUE VALUES

Drive sprocket setting plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Front engine mounting nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Rear upper engine mounting nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Rear lower engine mounting nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Engine hanger bracket bolts	18 N·m (1.8 kgf·m, 13 lbf·ft)

ENGINE REMOVAL

DRIVE SPROCKET REMOVAL

NOTE:

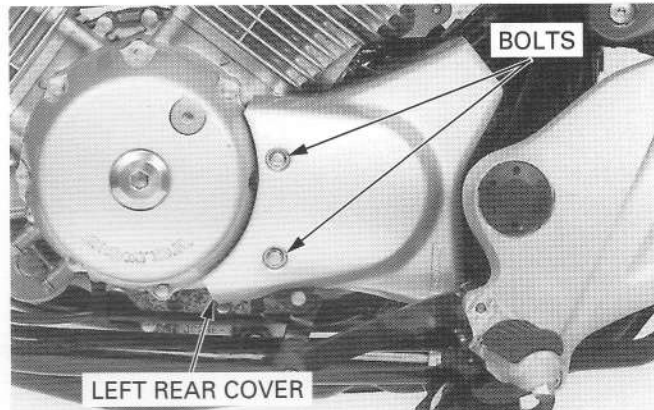
Refer to page 7-1 for the parts which must be removed before removing the engine.

Remove the bolts and left rear cover.

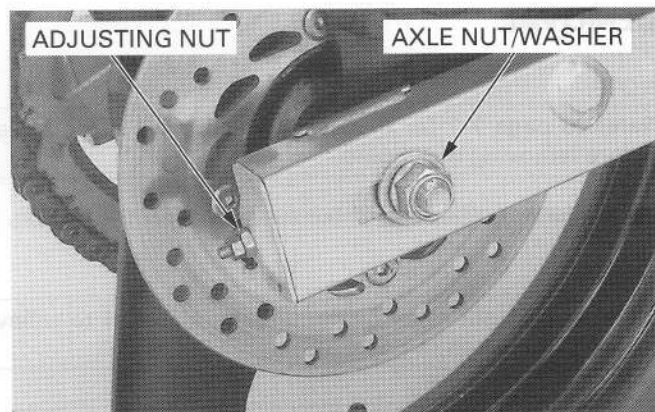
Remove the terminal nut, wire cramp bolt and starter motor wire from the starter motor (page 17-4).

Disconnect the following:

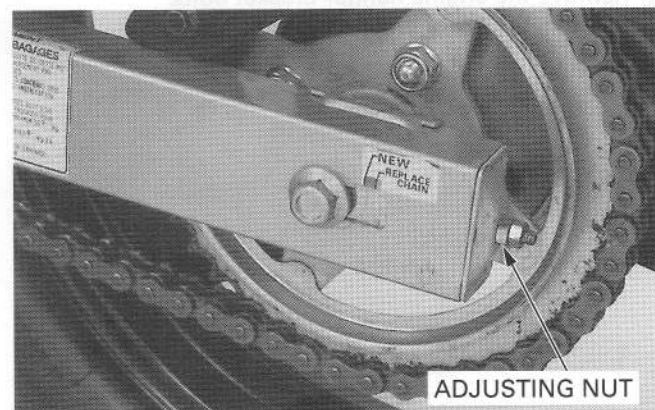
- Neutral switch connector (page 18-11).
- Alternator connector (page 15-9).
- Ignition pulse generator connector (page 15-1).
- Engine coolant temperature (ECT) sensor connector (page 16-9).
- thermo switch connector (page 18-14).



Loosen the rear axle nut/washer and adjusting nut.

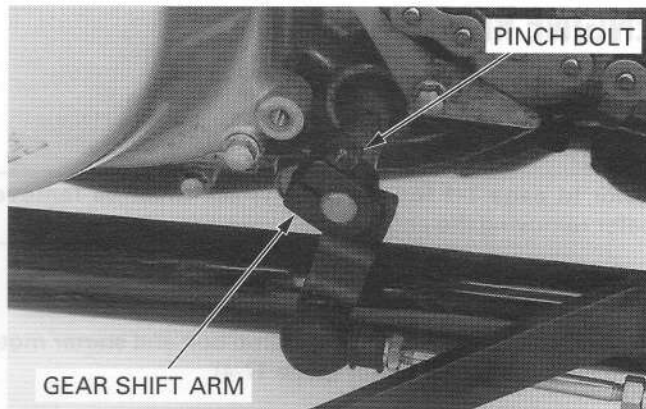


Loosen the adjusting nut of the left side.
Push the rear wheel forward and make a drive chain slack fully.

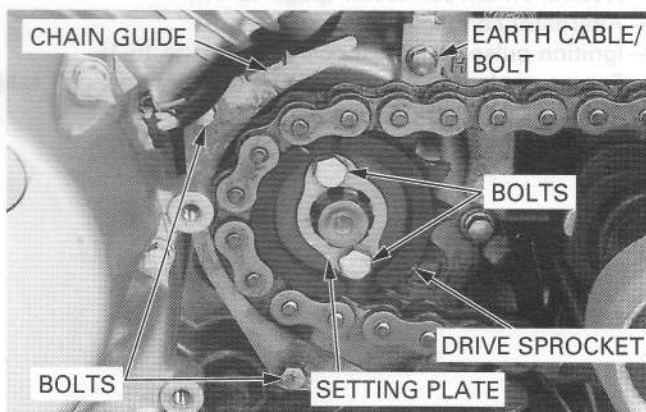


ENGINE REMOVAL/INSTALLATION

Remove the gear shift arm pinch bolt and gear shift arm.



Remove the bolt and earth cable.
Remove the bolt and chain guide.
Remove the drive sprocket setting plate bolts.
Remove the setting plate and drive sprocket.



REMOVAL

NOTE:

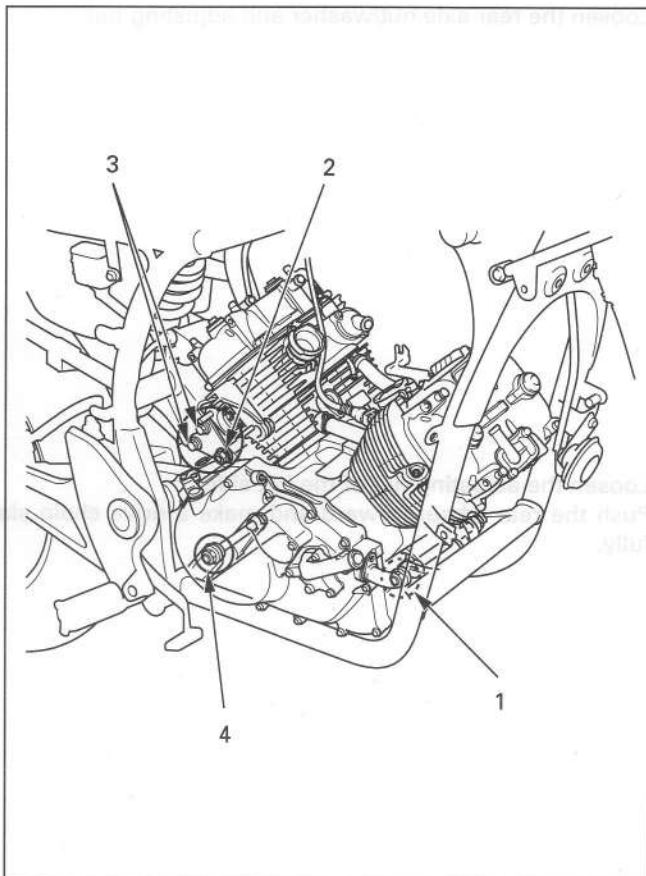
Refer to page 7-1 for the parts which must be removed before removing the engine.

Place a jack or other adjustable support under the engine.

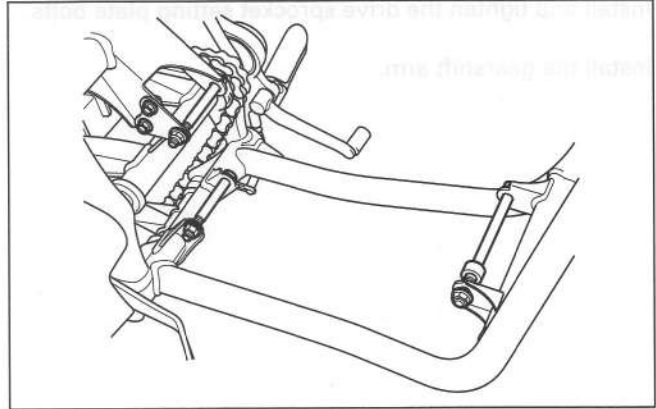
NOTE:

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

1. Remove the front engine mounting bolt/nut.
2. Remove the rear upper engine mounting bolt/nut.
3. Remove the engine hanger bracket bolts.
4. Remove the lower engine mounting bolt/nut.



Note the direction of the hanger bolts nuts and plate.



ENGINE INSTALLATION

NOTE:

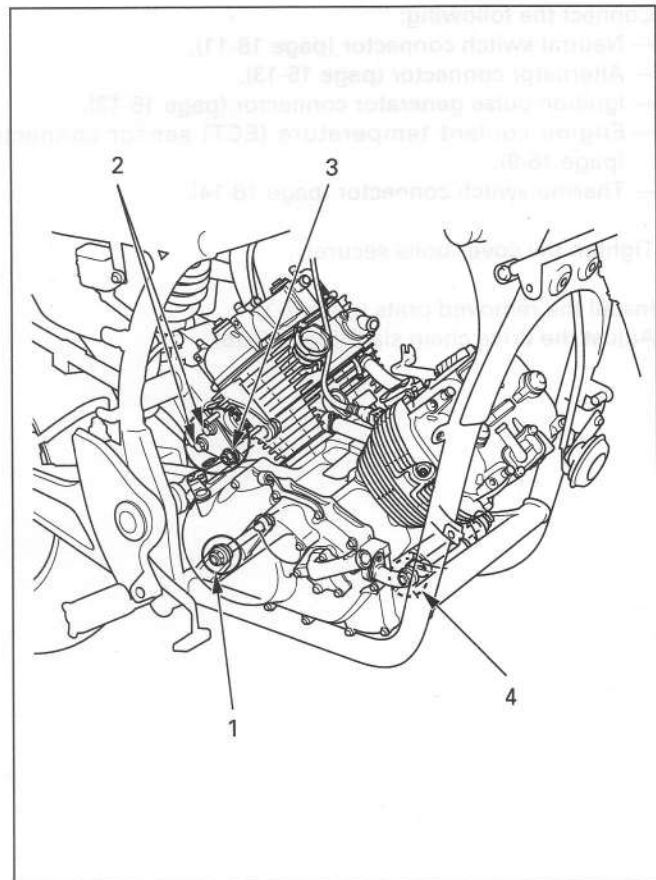
- Place the jack or other adjustable support under the engine.
- The jack height must be continually adjusted to relieve stress for ease bolt installation.

Place the engine in the frame and all the bolts, nuts, plates loosely install.

Tighten the all bolts and nuts to the specified torque.

TORQUE:

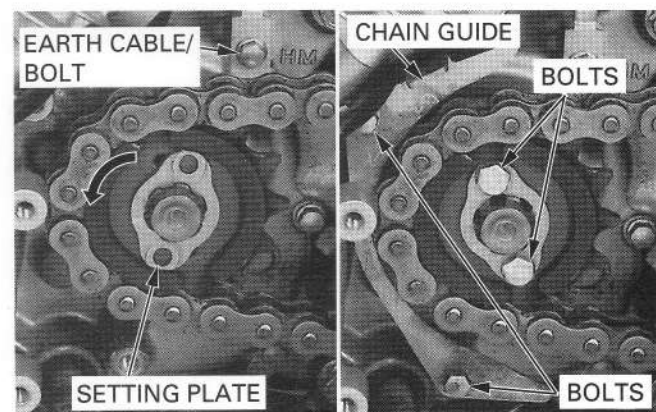
1. Rear lower engine mounting nut: 39 N·m (4.0 kgf·m, 29 lbf·ft)
2. Engine hanger bracket bolts: 18 N·m (1.8 kgf·m, 13 lbf·ft)
3. Rear upper engine mounting nut: 39 N·m (4.0 kgf·m, 29 lbf·ft)
4. Front engine mounting nut: 39 N·m (4.0 kgf·m, 29 lbf·ft)



DRIVE SPROCKET INSTALLATION

Install the bolt and earth cable.
Install the drive sprocket to the countershaft.
Install the drive chain onto the drive sprocket.

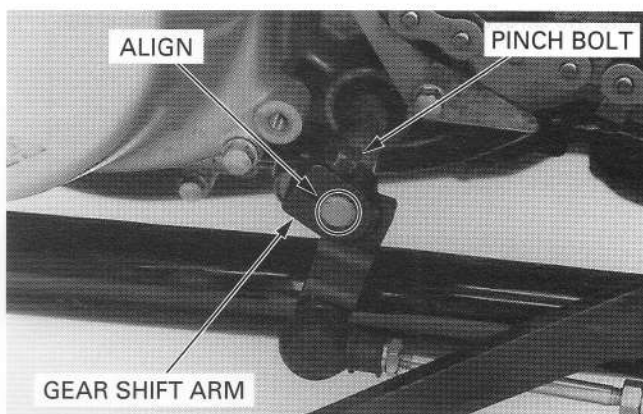
Install the setting plate.
Apply locking agent to the threads of the setting plate bolts.
Install and tighten the drive sprocket setting plate bolts.
Install the chain guide and bolts.



ENGINE REMOVAL/INSTALLATION

Install and tighten the drive sprocket setting plate bolts.

Install the gearshift arm.

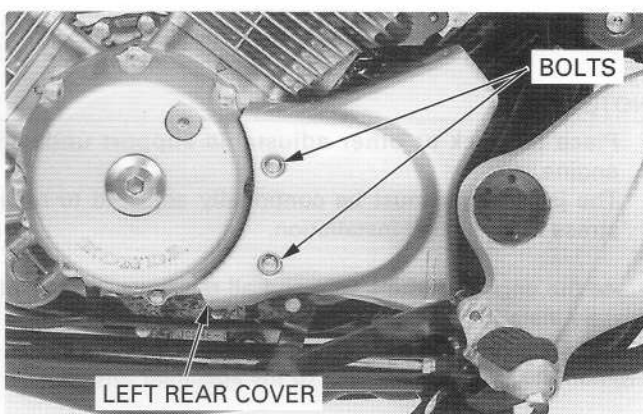


Connect the following:

- Neutral switch connector (page 18-11).
- Alternator connector (page 15-13).
- Ignition pulse generator connector (page 15-13).
- Engine coolant temperature (ECT) sensor connector (page 16-9).
- Thermo switch connector (page 18-14).

Tighten the cover bolts securely.

Install the removed parts (page 7-1).
Adjust the drive chain slack (page 3-16).



1. Front engine mounting nut: 39 N·m (4.0 kgf-m, 29 lbf-ft)
2. Rear upper engine mounting nut: 39 N·m (4.0 kgf-m, 29 lbf-ft)
3. Engine hanger bracket bolts: 18 N·m (1.8 kgf-m, 13 lbf-ft)
4. Rear lower engine mounting nut: 39 N·m (4.0 kgf-m, 29 lbf-ft)

DRIVE SPROCKET INSTALLATION

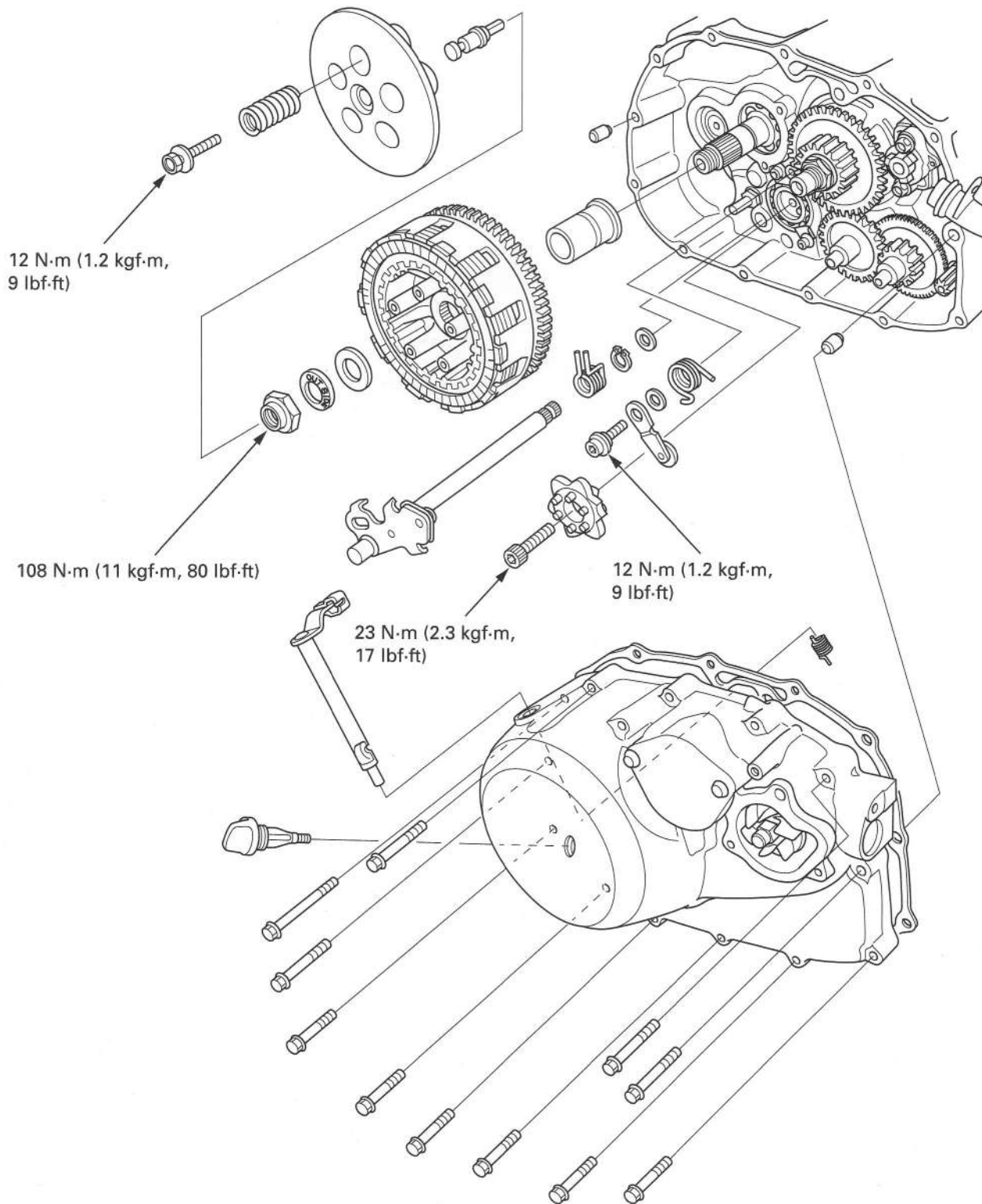
1. Install the drive sprocket to the frame.
2. Install the drive chain to the drive sprocket.
3. Install the drive chain to the frame.
4. Install the setting plate.
5. Adjust the drive chain slack.
6. Install and tighten the drive sprocket setting plate bolts.
7. Install the chain guide and bolt.

MEMO



CLUTCH/GEARSHIFT LINKAGE

MEMO



8. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	8-1	CLUTCH	8-4
TROUBLESHOOTING	8-2	GEARSHIFT LINKAGE	8-10
CLUTCH LIFTER ARM REMOVAL/ INSTALLATION	8-3		

SERVICE INFORMATION

GENERAL

- The clutch, gearshift linkage parts can be serviced with the engine installed in the frame.
- Engine oil viscosity and level and 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 viscosity and level before servicing the clutch system.
- The crankcase must be separated when the transmission, shift drum and shift forks require service (section 11).
- The clutch plates/discs can be serviced without removing the right crankcase cover.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	—
Clutch spring free length		42.1 (1.66)	41.2 (1.62)
Clutch disc thickness	A	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I.D.	20.010 – 20.035 (0.7878 – 0.7888)	20.05 (0.789)
	O.D.	25.959 – 25.980 (1.0220 – 1.0228)	25.94 (1.021)
Mainshaft O.D. at clutch outer guide		19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)

TORQUE VALUES

Clutch center lock nut	108 N·m (11 kgf·m, 80 lbf·ft)	Apply oil to the threads and seating surface and stake
Clutch pressure plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gear shift stopper arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gear shift cam plate bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	

TOOLS

Clutch center holder	07724 – 0050002
Gear holder	07724 – 0010200
Driver	07749 – 0010000
Attachment, 28 x 30 mm	07946 – 1870100
Pilot, 12 mm	07746 – 0040200

TROUBLESHOOTING

Clutch lever too hard

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch pressure plate bearing

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Too much clutch lever free play
- Warped plate
- Loose clutch center lock nut
- Improper engine oil viscosity or oil additive used

Clutch slips

- No clutch lever free play
- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- Oil additive used

Hard to shift

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged shift drum grooves
- Bent shift forks or fork shaft (section 11)

Transmission jumps out of gear

- Broken shift drum stopper arm
- Broken shift linkage return springs
- Damaged shift drum cam grooves
- Bent shift fork shaft (section 11)
- Worn or bent shift forks (section 11)
- Worn gear dogs or slots (section 11)

CLUTCH LIFTER ARM REMOVAL/INSTALLATION

NOTE:

For water pump service operations, refer to section 6.

REMOVAL

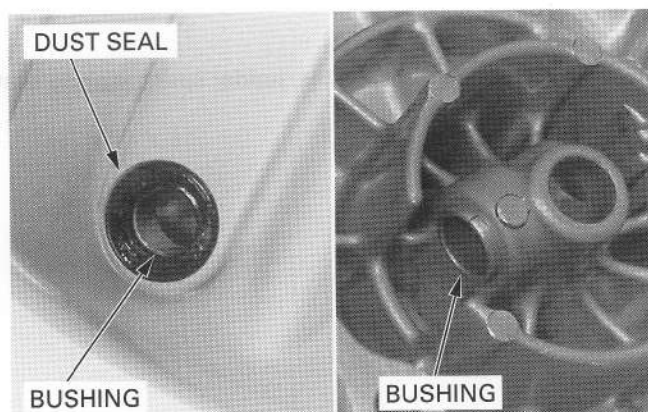
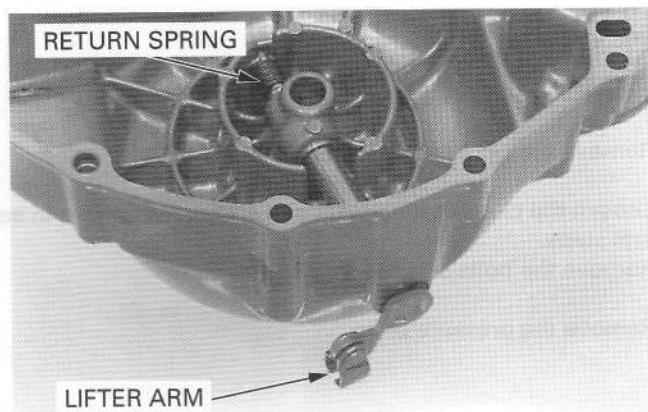
Remove the right crankcase cover (page 6-13).
Remove the clutch lifter arm, return spring from the right crankcase cover.

INSPECTION

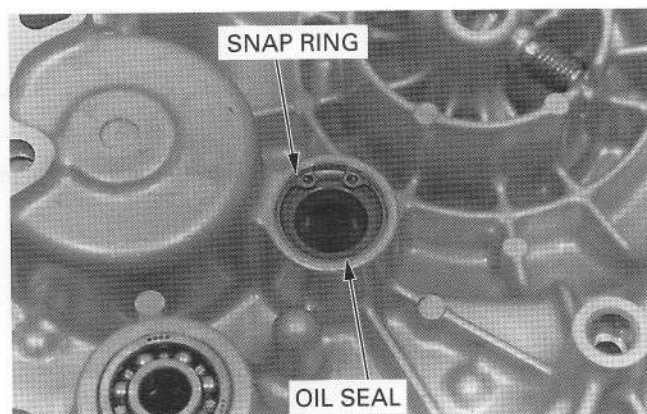
Check the dust seal fatigue or damage.
Check the bushing for wear, damage or loose fit.
Replace these parts if necessary.

NOTE:

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



Remove the snap ring and check the oil seal for wear, damage.
Replace these parts if necessary.



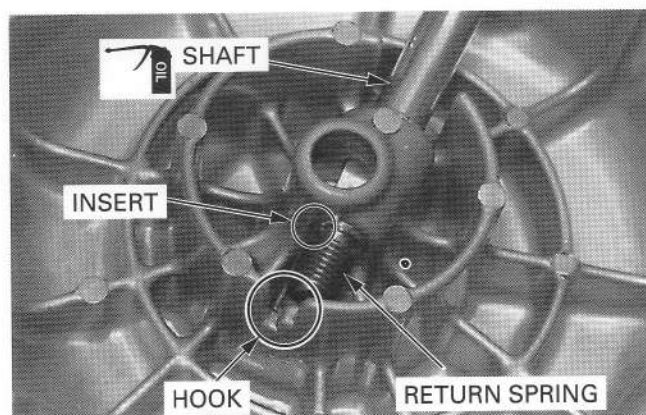
INSTALLATION

Apply engine oil to the clutch lifter arm shaft.

Install the lifter arm into the right crankcase cover.
Install the return spring to the lifter arm.

Hook the spring bottom end in the cover tab and insert the spring upper end into the lifter arm hole.

Install the right crankcase cover (page 6-18).



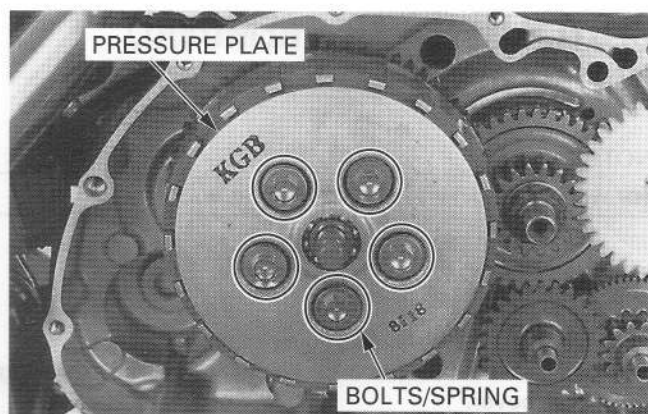
CLUTCH REMOVAL

Remove the right crankcase cover (page 6-13).

Loosen the clutch spring bolts in a crisscross pattern in several steps.

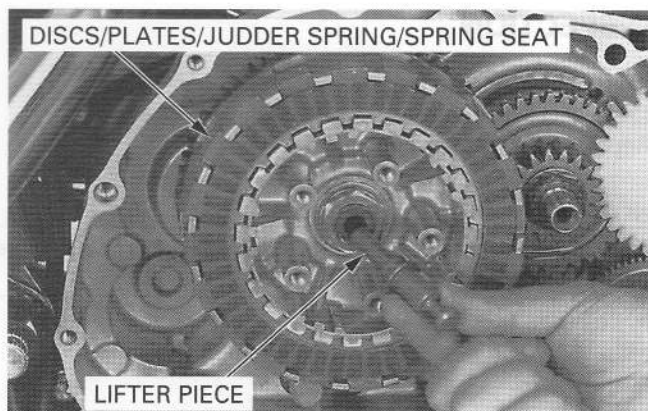
Remove the bolts and springs.

Remove the pressure plate.



Remove the lifter piece.

Remove the clutch discs, plates, judder spring, spring seat.



Unstake the clutch center lock nut.

CAUTION:

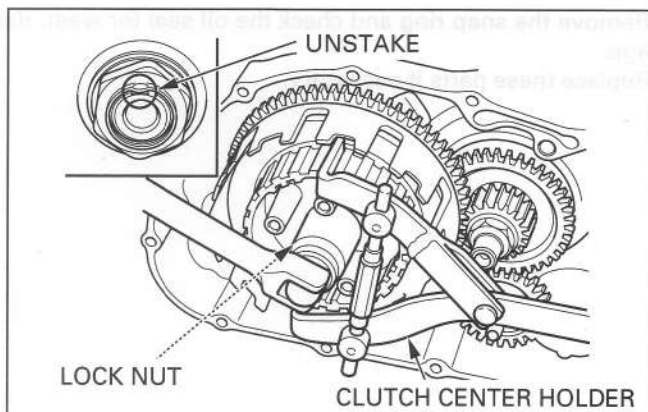
Be careful not to damage the mainshaft threads.

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

TOOL:

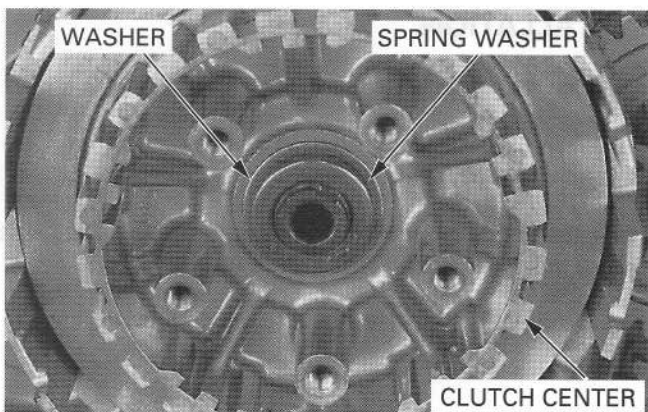
Clutch center holder **07724 - 0050002**

Remove the clutch center lock nut.

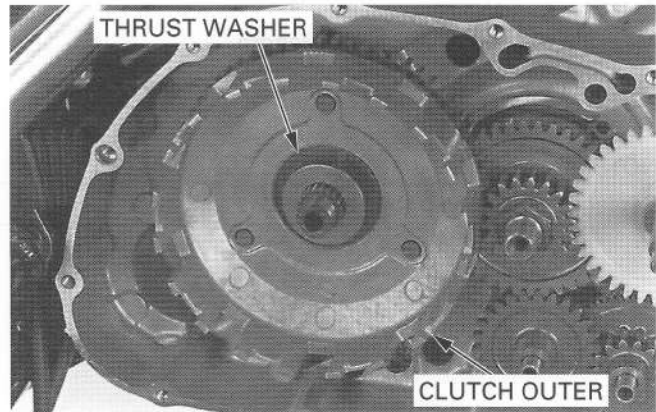


Remove the spring washer and washer.

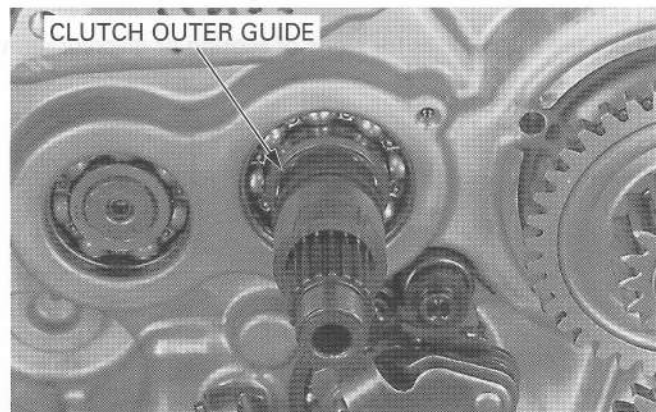
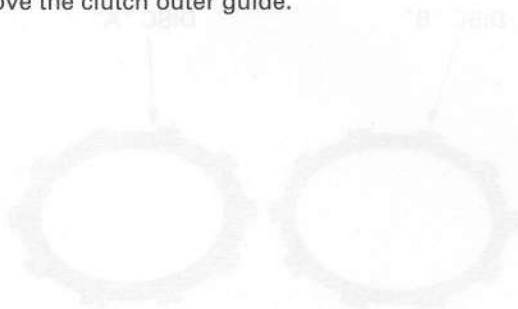
Remove the clutch center.



Remove the thrust washer and clutch outer.



Remove the clutch outer guide.

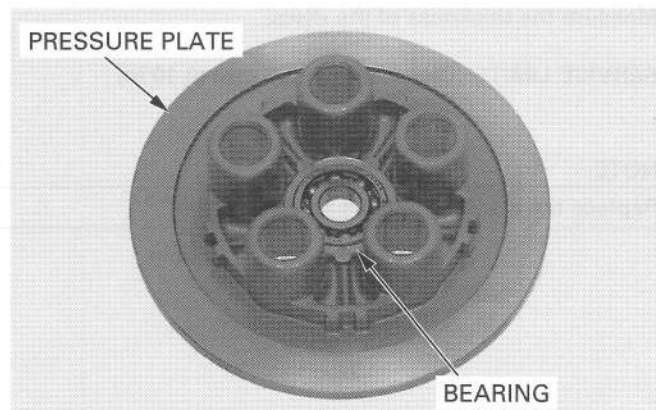


INSPECTION

PRESSURE PLATE BEARING

Check the pressure plate bearing for damage. Turn the bearing inner race with your finger. The bearing should turn smoothly and quietly without play.

Also check that the bearing outer race fits tightly in the pressure plate. Replace if necessary.



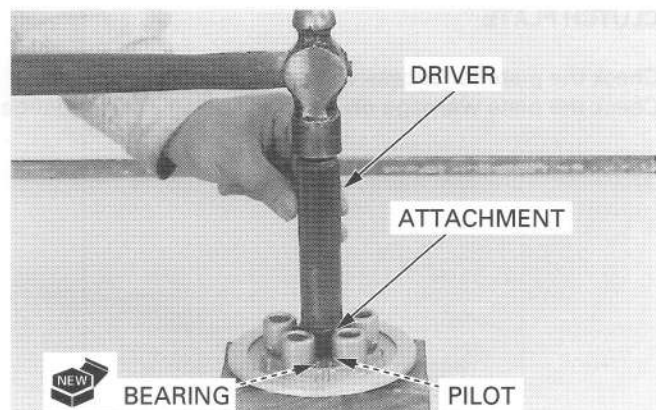
PRESSURE PLATE BEARING REPLACEMENT

Remove the pressure plate bearing.

Drive in a new bearing into the pressure plate.

TOOLS:

Driver	07749 - 0010000
Attachment, 28 x 30 mm	07946 - 1870100
Pilot, 12 mm	07746 - 0040200



CLUTCH/GEARSHIFT LINKAGE

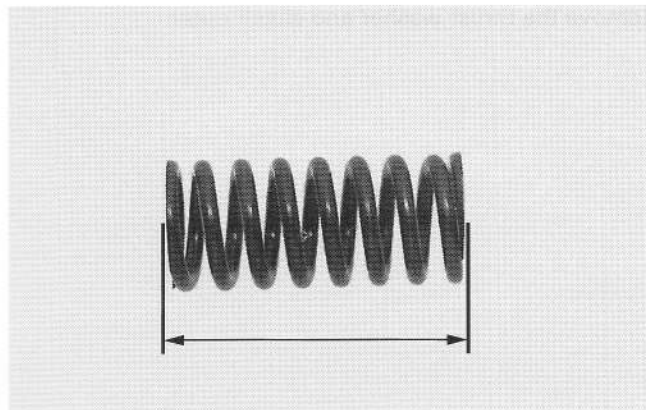
CLUTCH SPRING

Measure the clutch spring free length.

SERVICE LIMIT: 41.2 mm (1.62 in)

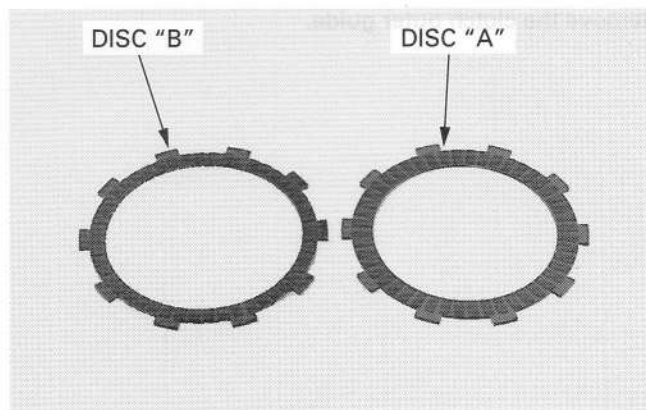
NOTE:

Replace the clutch springs as a set.



CLUTCH DISC

Check the clutch discs for signs of scoring or discoloration.

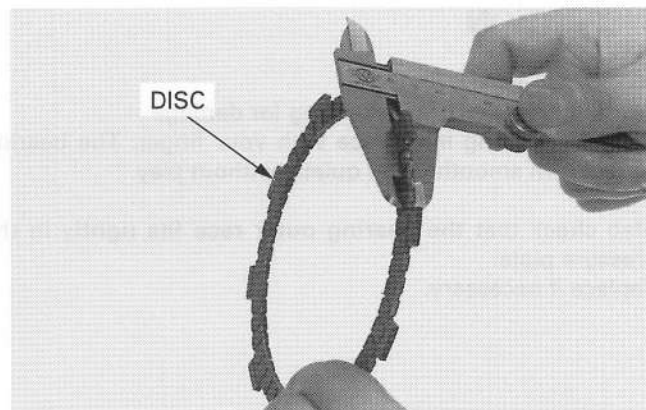


Measure the thickness of the discs.

SERVICE LIMITS: Disc A — 2.6 mm (0.10 in)
Disc B —

NOTE:

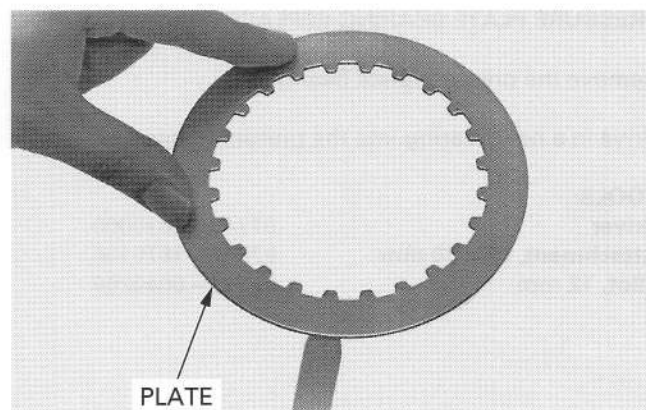
Replace the discs and plates as a set.



CLUTCH PLATE

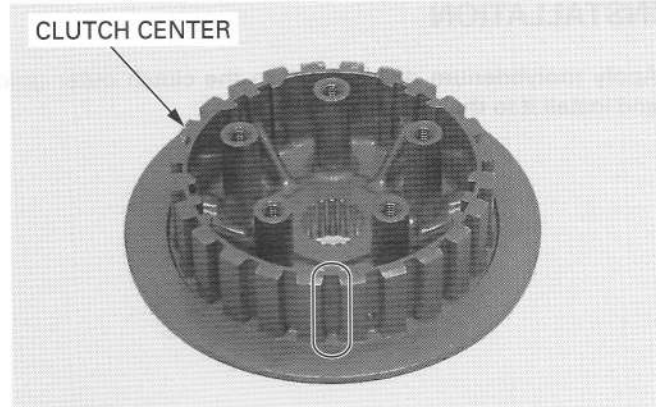
Check the plate for excessive warpage or discoloration.
Check the plate warpage on a surface using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)



CLUTCH CENTER

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

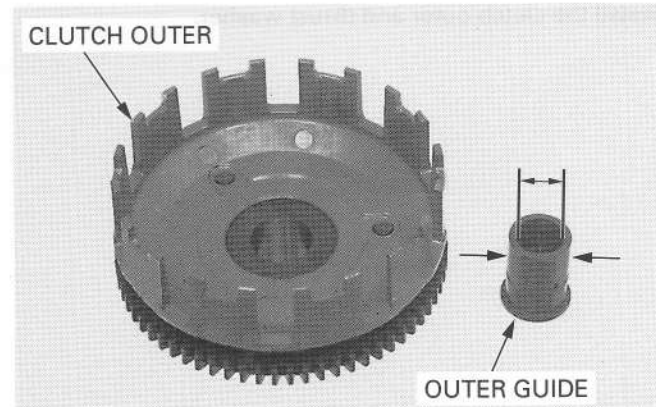
**CLUTCH OUTER**

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

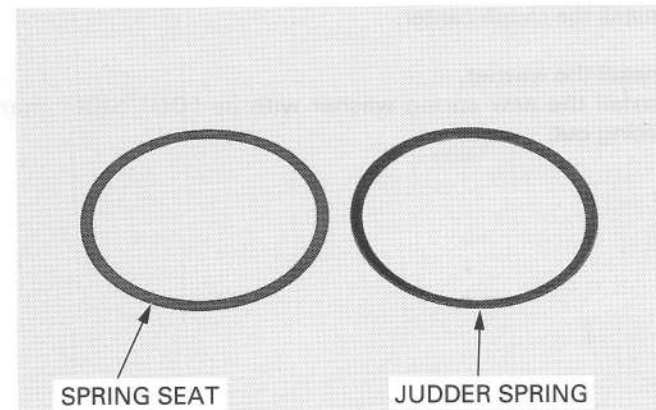
CLUTCH OUTER GUIDE

Measure the clutch outer guide.

SERVICE LIMITS: I.D.: 20.05 mm (0.789 in)
O.D.: 25.94 mm (1.021 in)

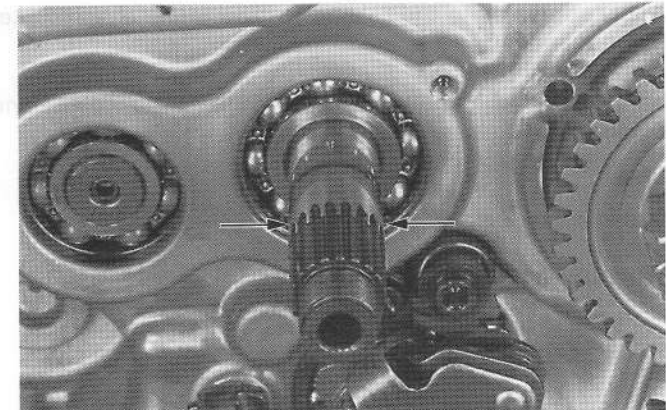
**JUDDER SPRING, SPRING SEAT**

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

**MAINSHAFT**

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

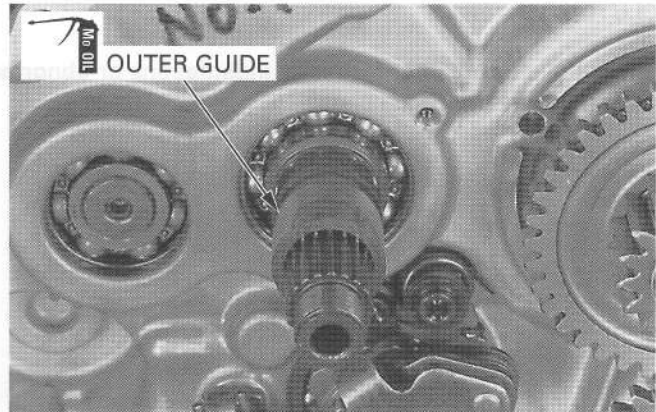
SERVICE LIMIT: 19.94 mm (0.785 in)



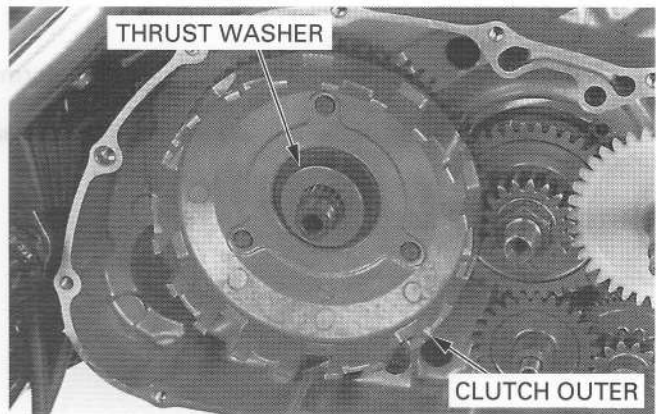
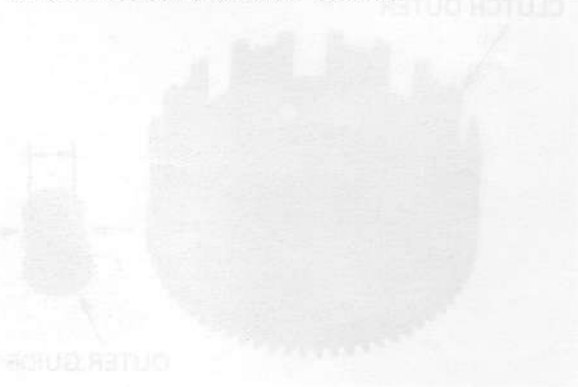
CLUTCH/GEARSHIFT LINKAGE

INSTALLATION

Apply molybdenum disulfide oil to the clutch outer guide and install it to the mainshaft.



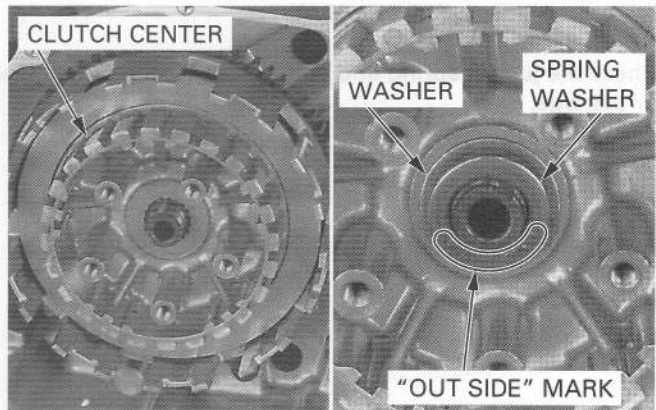
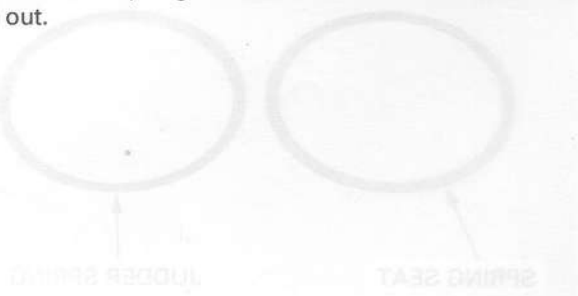
Install the clutch outer and thrust washer.



Install the clutch center.

Install the washer.

Install the new spring washer with its "OUT SIDE" mark facing out.



Apply engine oil to the seating surface of the clutch center lock nut and install it to the mainshaft.

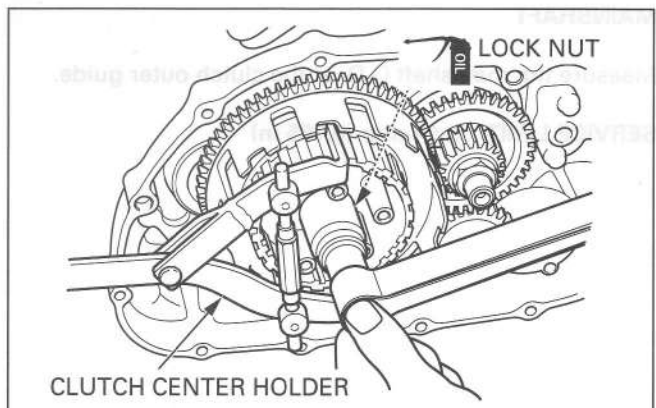
Hold the clutch center with the clutch center holder and tighten the clutch center lock nut to the specified torque.

TOOL:

Clutch center holder

07724 - 0050002

TORQUE: 108 N·m (11 kgf·m, 80 lbf·ft)

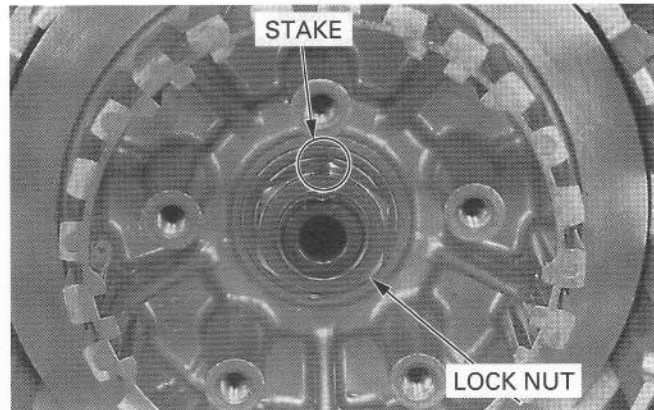


CLUTCH/GEARSHIFT LINKAGE

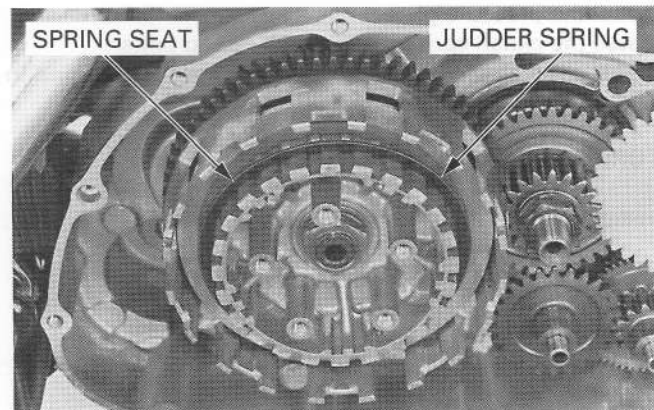
Stake the clutch center lock nut into the mainshaft.

CAUTION:

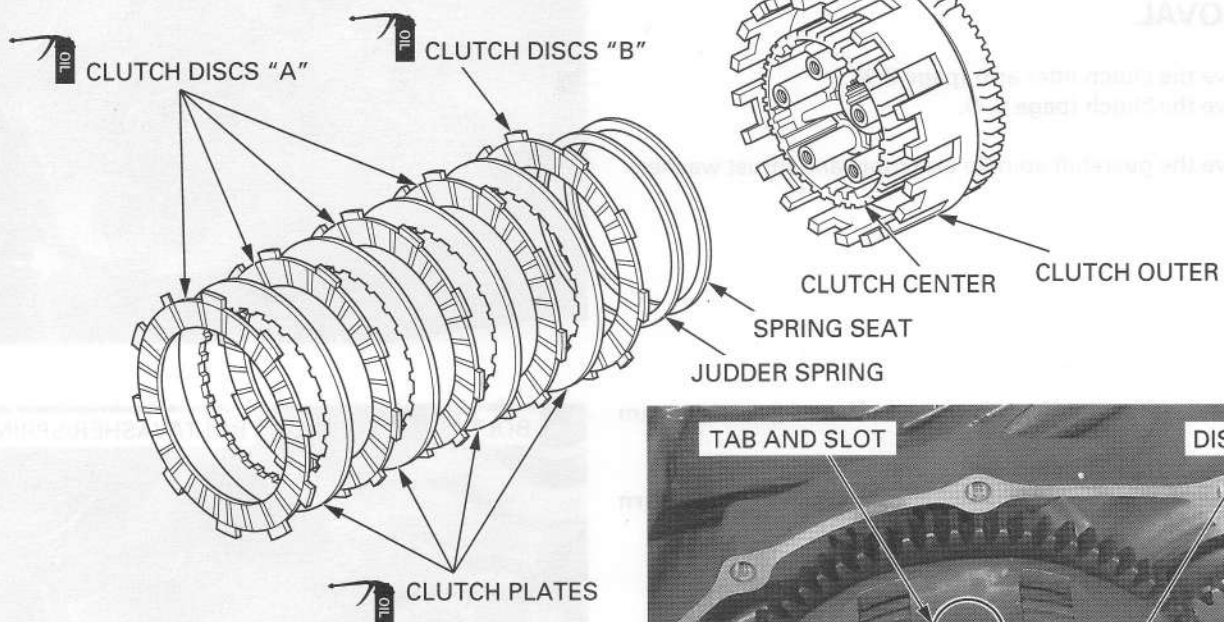
Be careful not to damage the mainshaft threads.



Install the spring seat and judder spring on the clutch center.

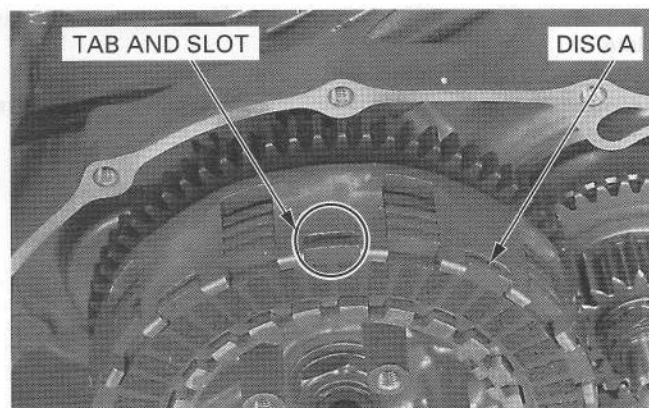


Coat the clutch discs and clutch plate with clean engine oil. Install the clutch discs and clutch plate as shown.



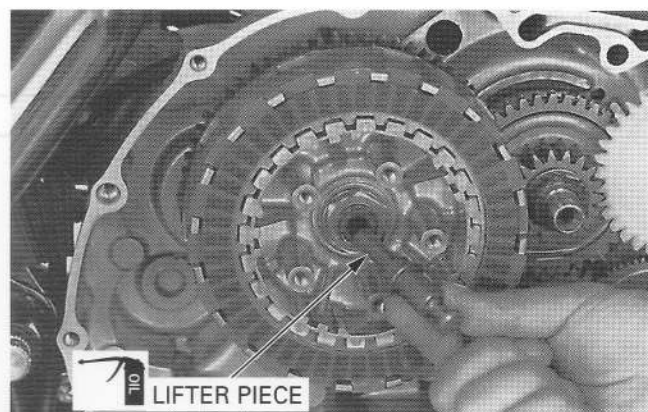
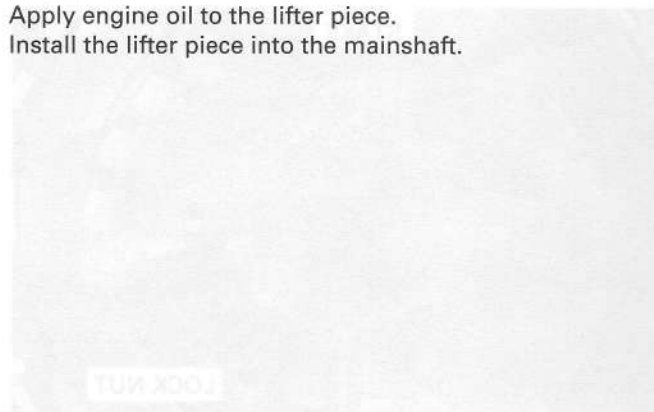
NOTE:

Install the outside clutch disc (A) tabs into the shallow slots of the clutch outer.



CLUTCH/GEARSHIFT LINKAGE

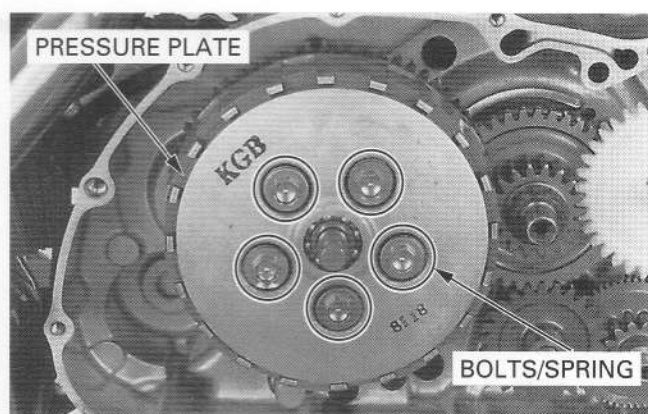
Apply engine oil to the lifter piece.
Install the lifter piece into the mainshaft.



Install the pressure plate.
Install the clutch springs and clutch spring bolts.
Tighten the clutch spring bolts to the specified torque in a crisscross pattern in several steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the right crankcase cover (page 6-18).

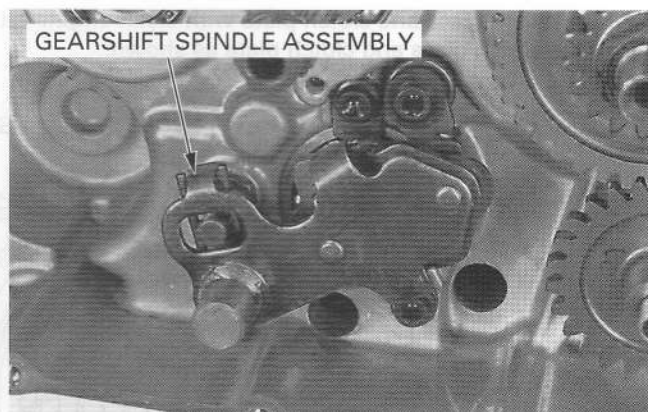


GEARSHIFT LINKAGE

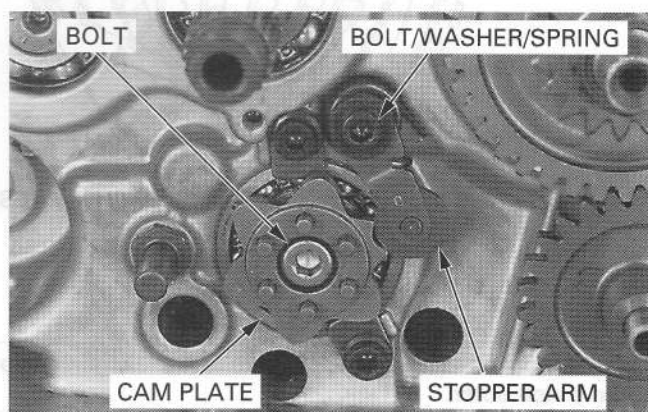
REMOVAL

Remove the clutch lifter arm (page 8-3).
Remove the clutch (page 8-4).

Remove the gearshift spindle assembly and thrust washer.

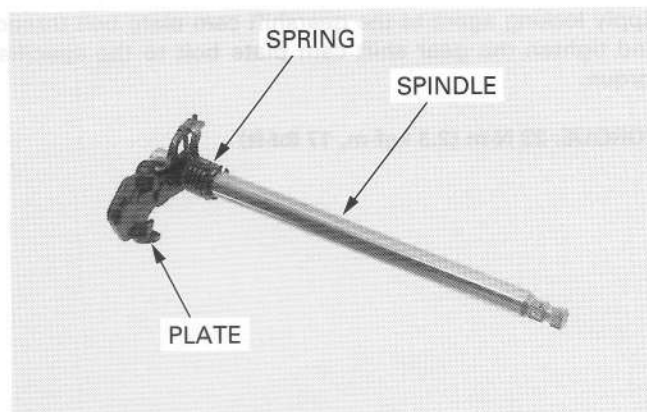


Remove the gearshift cam plate bolt and gearshift cam plate.
Remove the pin from the shift drum.
Remove the stopper arm bolt, arm, washer and return spring.



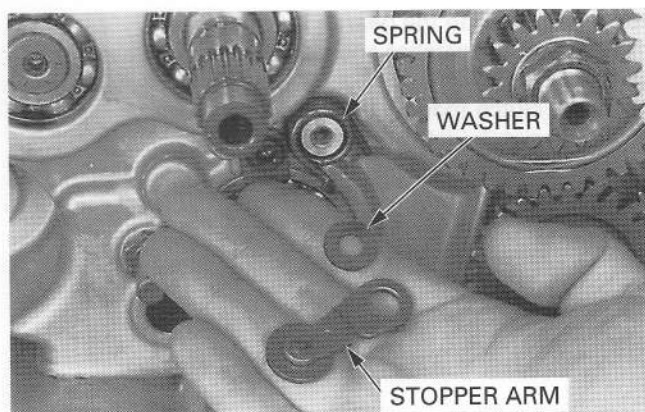
INSPECTION

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



INSTALLATION

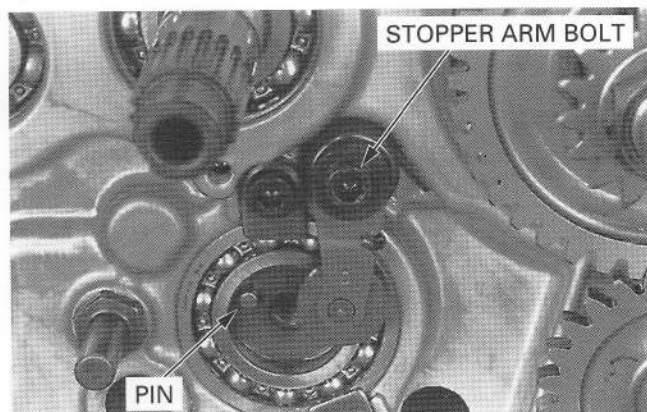
Install the return spring, washer and stopper arm as shown.



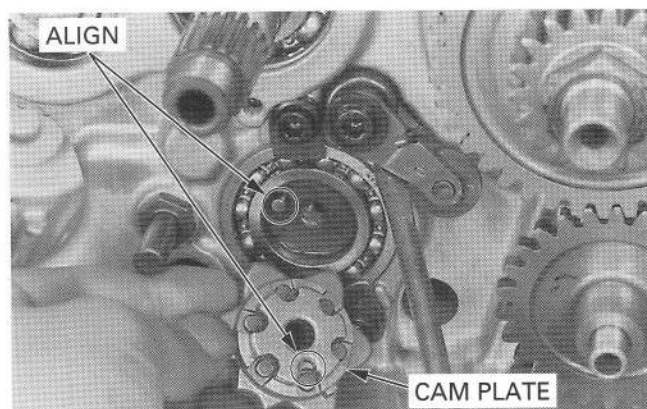
Install the pin to the gearshift drum.

Install the washer and stopper arm bolt and tighten the stopper arm bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



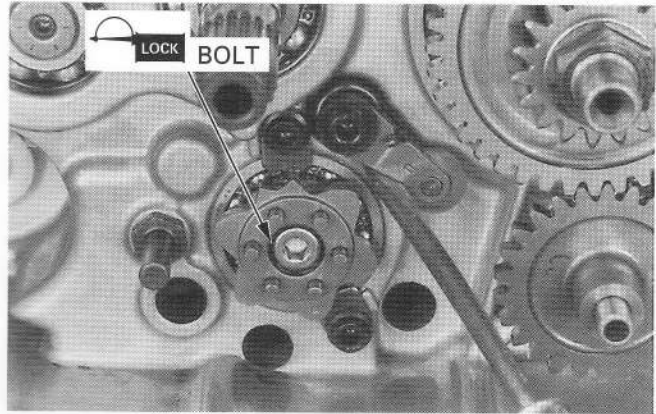
Hold the stopper arm with the screw driver and install the gearshift cam plate with aligning the pin and cutout of the gearshift cam plate.



CLUTCH/GEARSHIFT LINKAGE

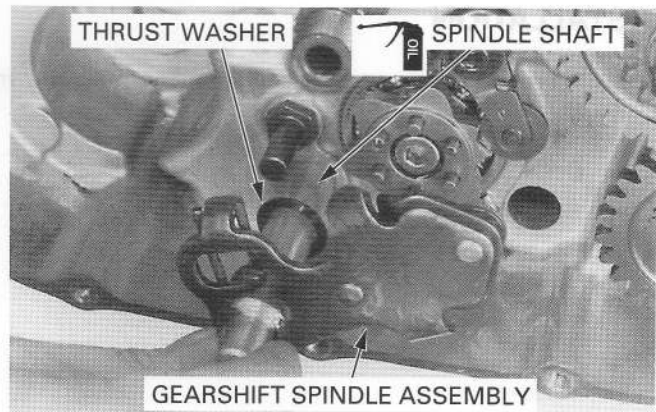
Apply locking agent to the gearshift cam plate bolt threads and tighten the gear shift cam plate bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Apply engine oil to the gearshift spindle shaft. Install the thrust washer and gearshift spindle assembly.

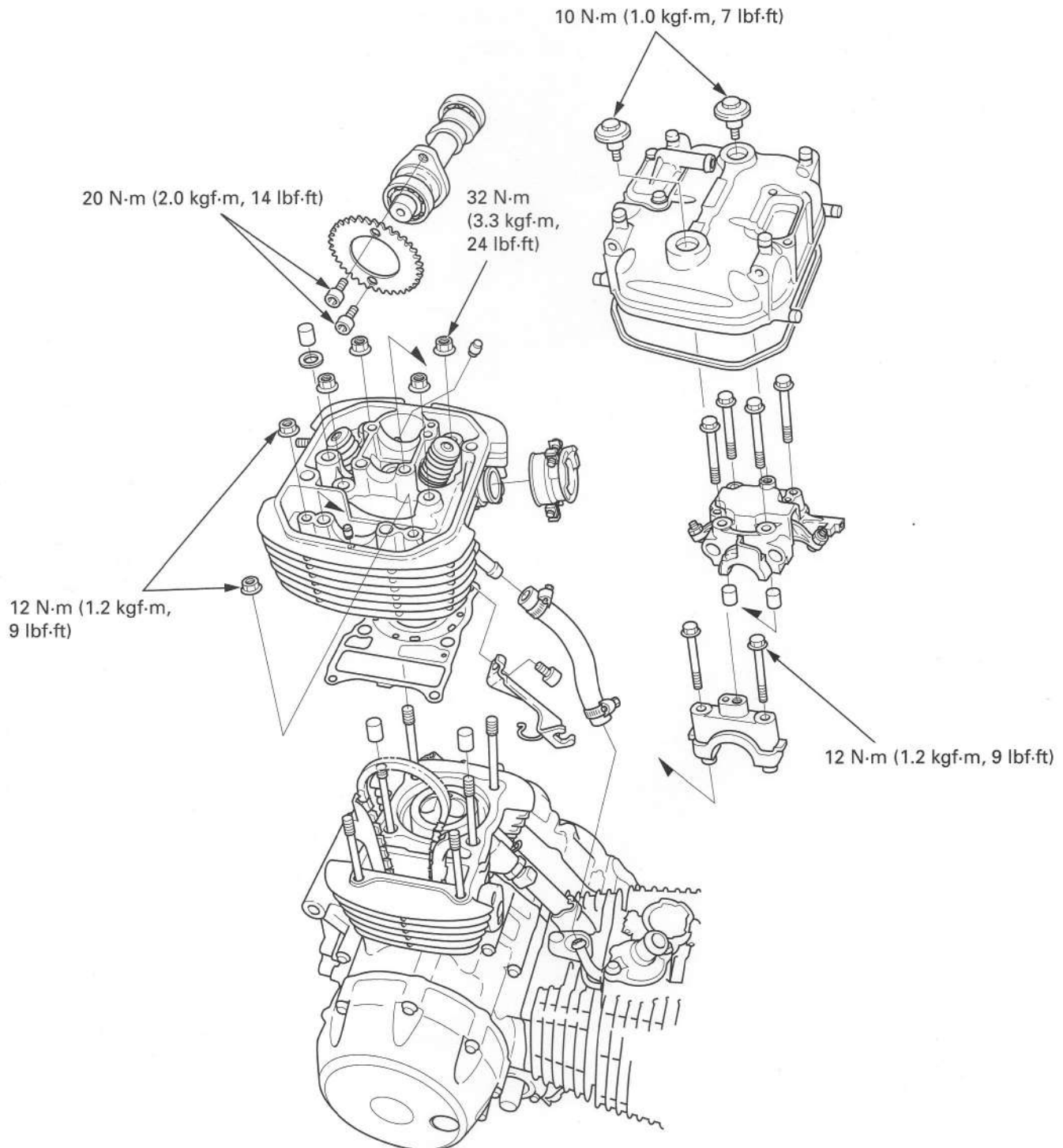
Install the clutch (page 8-8).
Install the clutch lifter arm (page 8-3).



MEMO



OM3M



9. CYLINDER HEAD/VALVES

SERVICE INFORMATION	9-1	CYLINDER HEAD DISASSEMBLY	9-11
TROUBLESHOOTING	9-3	VALVE GUIDE REPLACEMENT	9-13
CYLINDER COMPRESSION	9-4	VALVE SEAT INSPECTION/REFACING	9-14
CYLINDER HEAD SIDE COVER	9-5	CYLINDER HEAD ASSEMBLY	9-17
CYLINDER HEAD COVER REMOVAL	9-5	CYLINDER HEAD INSTALLATION	9-19
CAMSHAFT REMOVAL	9-6	CAMSHAFT INSTALLATION	9-20
CYLINDER HEAD REMOVAL	9-10	CYLINDER HEAD COVER INSTALLATION	9-25

SERVICE INFORMATION

GENERAL

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

9

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,304 kPa (13.3 kgf/cm ² , 189 psi) at 500 min ⁻¹ (rpm)	—
Cylinder head warpage			—	0.05 (0.002)
Valve, valve guide	Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.001)	—
		EX	0.24 ± 0.02 (0.009 ± 0.001)	—
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.955 – 4.970 (0.1951 – 0.1957)	4.945 (0.1947)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
		EX	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.065 (0.0026)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	12.10 (0.476)	—
		EX	12.10 (0.476)	—
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN	38.00 (1.496)	36.5 (1.44)
		EX	38.00 (1.496)	36.5 (1.44)
Camshaft	Cam lobe height	IN	28.8527 – 29.0927 (1.13593 – 1.14538)	28.82 (1.135)
		EX	28.8849 – 29.1249 (1.13720 – 1.14665)	28.85 (1.136)
	Runout		0.030 (0.0012)	0.050 (0.0020)
	Identification marks		Front “F”/Rear “R”	—
Rocker arm I.D.		IN/EX	10.000 – 10.015 (0.3937 – 0.3943)	10.05 (0.396)
Rocker arm shaft O.D.		IN/EX	9.972 – 9.987 (0.3926 – 0.3932)	9.92 (0.391)
Rocker arm-to-rocker arm shaft clearance			0.013 – 0.043 (0.0005 – 0.0017)	0.10 (0.004)

CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head side cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply a locking agent to the threads
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Cam sprocket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply oil to the threads and seating surface
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rocker arm shaft bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Cam chain tensioner lifter bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cam chain tensioner lifter plug	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Cylinder head 8 mm nut	32 N·m (3.3 kgf·m, 24 lbf·ft)	
6 mm nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

Valve guide driver, 5 mm (IN/EX)	07942 - MA60000
Valve spring compressor	07757 - 0010000
Attachment	07959 - KM30101
Valve seat cutter	
— Seat cutter	IN 24.5 mm (45°) 07780 - 0010100
	EX 22 mm (45°) 07780 - 0010701
— Flat cutter	IN 25 mm (32°) 07780 - 0012000
	EX 22 mm (32°) 07780 - 0012601
— Interior cutter	IN/EX 22 mm (60°) 07780 - 0014202
— Cutter holder	(IN/EX) 5 mm 07781 - 00010400
Valve guide reamer (IN/EX)	07984 - MA60001

SPECIFICATIONS		ITEM		STANDARD		SERVICE LIMIT	
Cylinder head warpage				0.15 mm (0.006 in)		0.05 mm (0.002 in)	
Valve guide	Valve clearance	IN	0.15 - 0.25 (0.006 - 0.010)				
		EX	0.24 - 0.42 (0.009 - 0.017)				
Valve stem O.D.	Valve stem O.D.	IN	4.75 - 4.95 (0.187 - 0.195)			4.95 (0.195)	
		EX	4.95 - 5.15 (0.195 - 0.203)			5.15 (0.203)	
Valve guide I.D.	Valve guide I.D.	IN	5.00 - 5.15 (0.197 - 0.203)			5.15 (0.203)	
		EX	5.00 - 5.15 (0.197 - 0.203)			5.15 (0.203)	
Stem-to-guide clearance	Stem-to-guide clearance	IN	0.010 - 0.020 (0.000 - 0.001)			0.020 (0.001)	
		EX	0.020 - 0.040 (0.001 - 0.002)			0.040 (0.002)	
Valve guide protrusion above cylinder head	Valve guide protrusion above cylinder head	IN	12.10 (0.476)				
		EX	12.10 (0.476)				
Valve seat width	Valve seat width	IN/EX	0.90 - 1.10 (0.035 - 0.043)				
		IN/EX	0.90 - 1.10 (0.035 - 0.043)				
Valve spring free length	Valve spring free length	IN	38.00 (1.496)				
		EX	38.00 (1.496)				
Cam lobe height	Cam lobe height	IN	38.827 - 39.027 (1.529 - 1.537)				
		EX	38.849 - 39.149 (1.530 - 1.541)				
Rocker arm I.D.	Rocker arm I.D.	IN	9.00 (0.354)				
		EX	9.00 (0.354)				
Rocker arm shaft O.D.	Rocker arm shaft O.D.	IN	9.272 - 9.987 (0.365 - 0.393)				
		EX	9.272 - 9.987 (0.365 - 0.393)				

TROUBLESHOOTING

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

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

- Valves
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
 - Uneven valve seating
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head
- Loose spark plug
- Faulty cylinder, piston (Section 10)

Compression too high

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

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder, piston (Section 10)

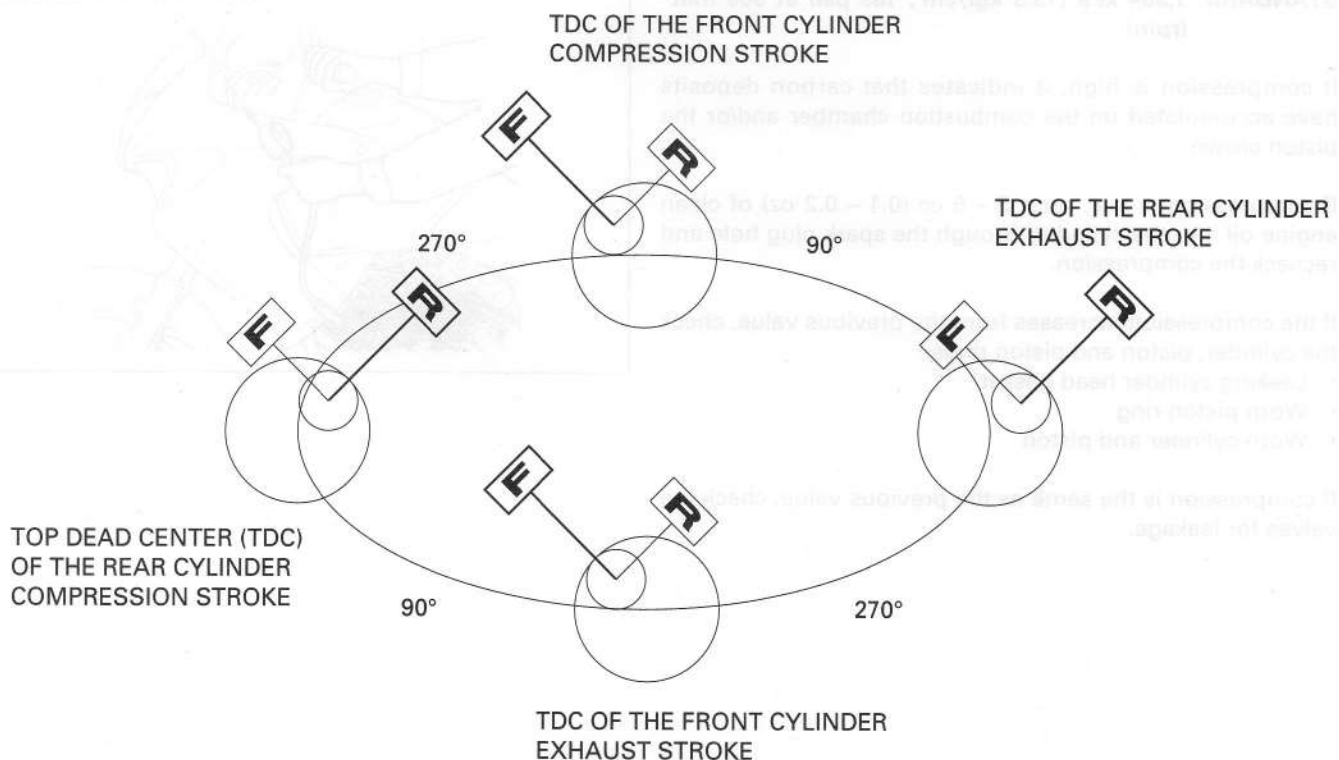
Excessive noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Faulty cylinder, piston (section 10)

Rough idle

- Low cylinder compression

VALVE TIMING



CYLINDER COMPRESSION

⚠ WARNING

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

Warm up the engine to normal operating temperature.

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

NOTE:

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

Shift the transmission into neutral.

Install the compression gauge attachment in a spark plug hole.

Connect the compression gauge to the attachment.

Open the throttle all the way and crank the engine with the starter motor.

NOTE:

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

STANDARD: 1,304 kPa (13.3 kgf/cm², 189 psi) at 500 min⁻¹ (rpm)

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

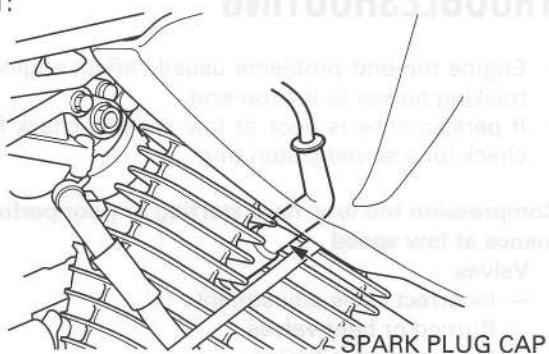
If compression is low, pour 3 – 5 cc (0.1 – 0.2 oz) of clean engine oil into the cylinder through the spark plug hole and recheck the compression.

If the compression increases from the previous value, check the cylinder, piston and piston rings.

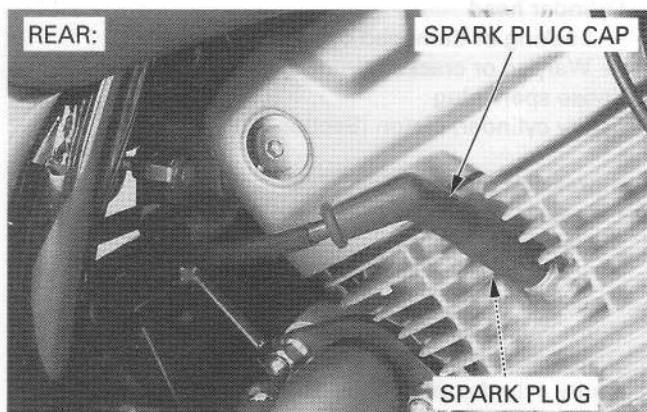
- Leaking cylinder head gasket
- Worn piston ring
- Worn cylinder and piston

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

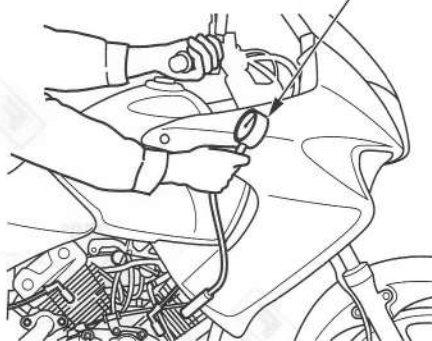
FRONT:



REAR:



COMPRESSION GAUGE



CYLINDER HEAD SIDE COVER

REMOVAL/INSTALLATION

Remove the spark plug cap (page 3-6).

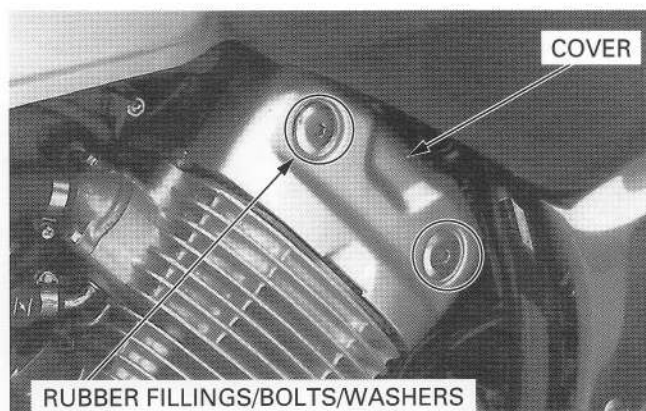
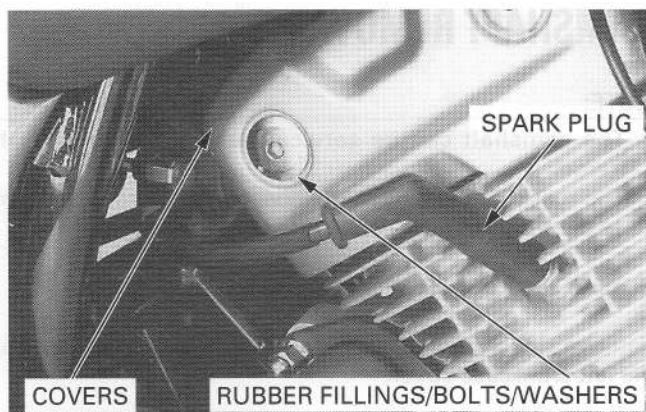
Remove the rubber fillings from the bolts.

Remove the four bolts, washer and cylinder head side covers.

Installation is in the reverse order of removal.

TORQUE:

Cylinder head side cover bolt: 10 N·m (1.0 kgf·m, 7 lbf·ft)



CYLINDER HEAD COVER REMOVAL

FRONT/REAR

NOTE:

The front and rear cylinder head covers can be serviced with the engine in the frame.

Remove the following:

- Air cleaner housing (page 5-4)
- Cylinder head side cover (page 9-5)

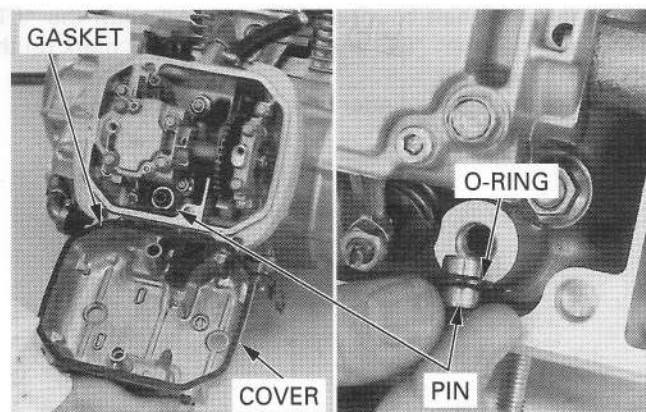
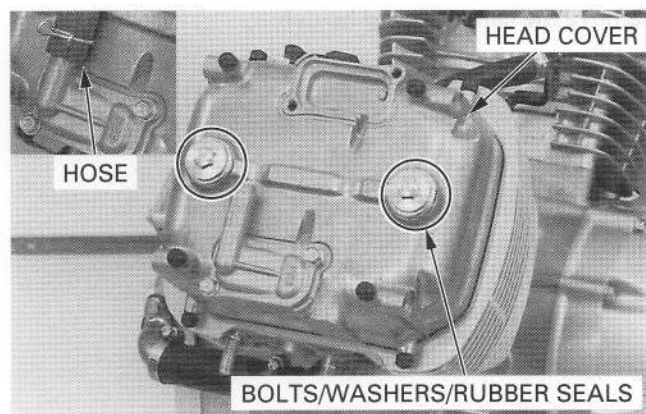
Remove the air injection hose.

Remove the engine breather hose (Rear side only/page 1-22).

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

Remove the gasket.

Remove the dowel pin and O-ring.



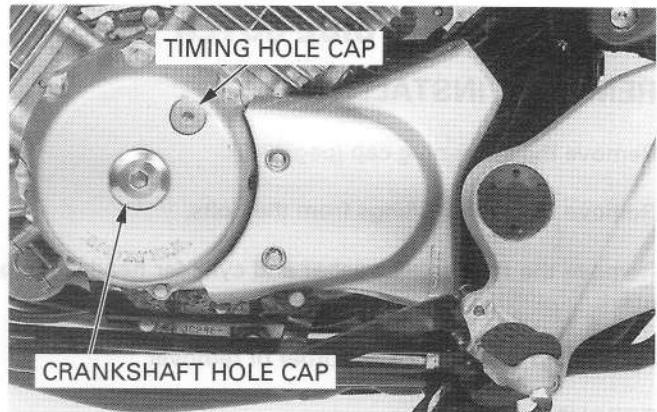
CAMSHAFT REMOVAL

NOTE:

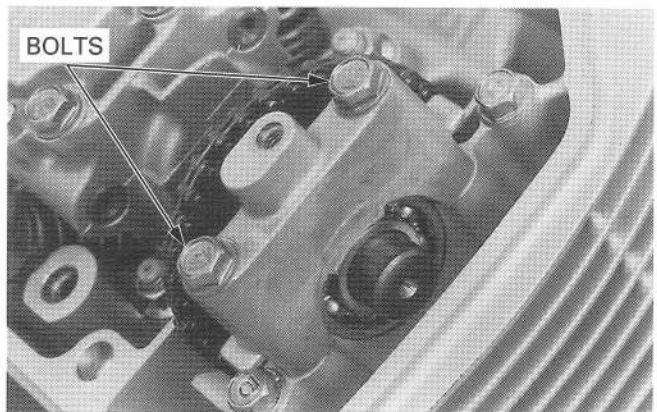
- The camshaft can be serviced with the engine in the frame.
- The rear cylinder camshaft service procedure is the same as the front cylinder camshaft service procedure.

Remove the front cylinder head cover (page 9-5).

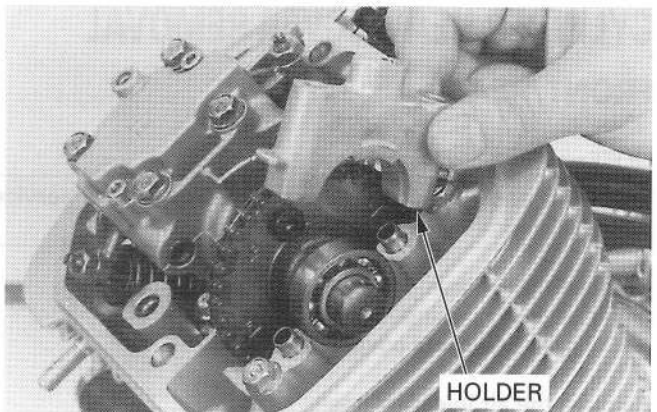
Remove the crankshaft hole cap and timing hole cap from the left crankcase cover.



Remove the camshaft end holder bolts.

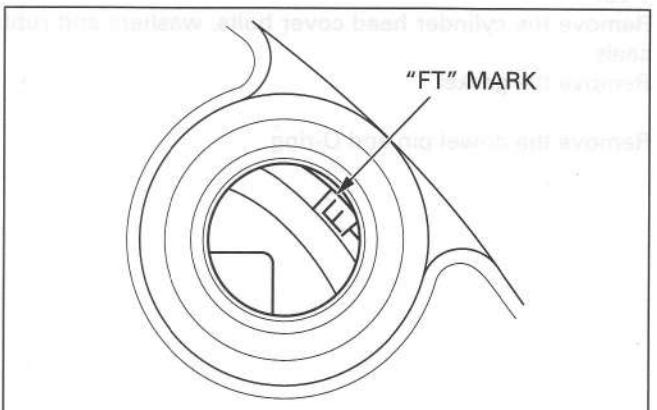


Remove the camshaft end holder.

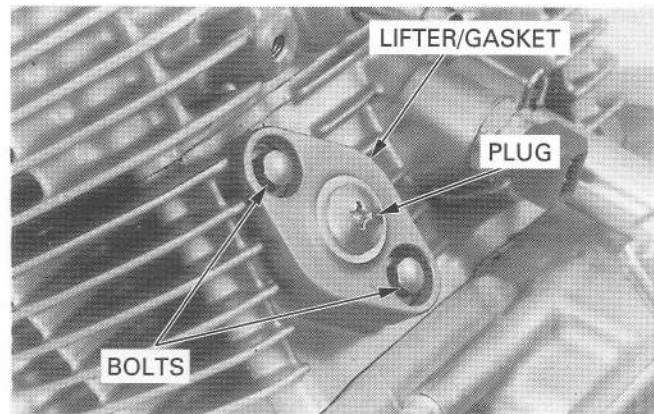


Turn the crankshaft counterclockwise and align the "FT" mark (rear cylinder: "RT" mark) with the index mark on the left crankcase cover.

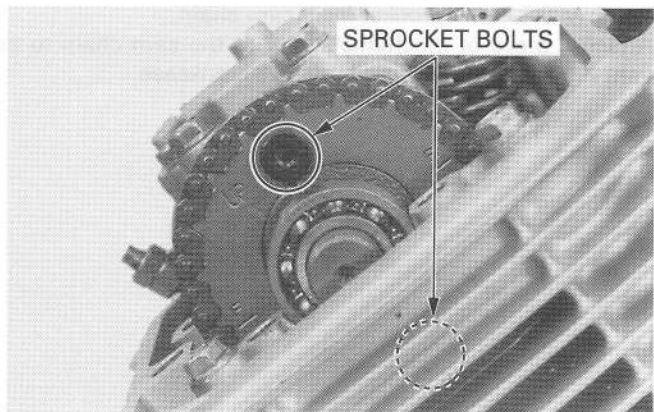
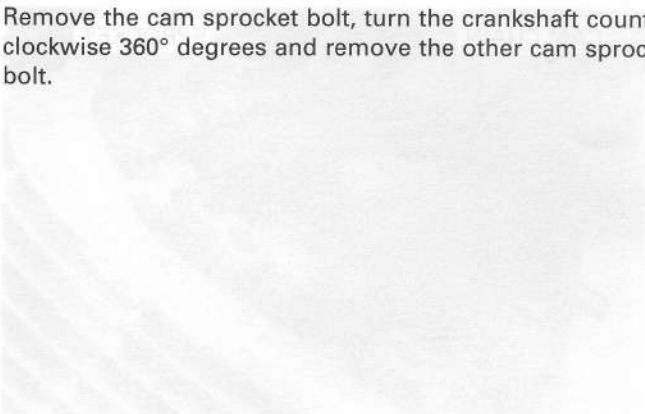
Make sure the front cylinder is at TDC (top dead center).



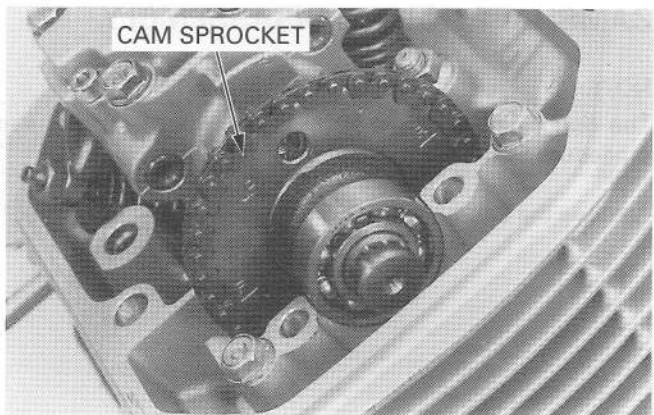
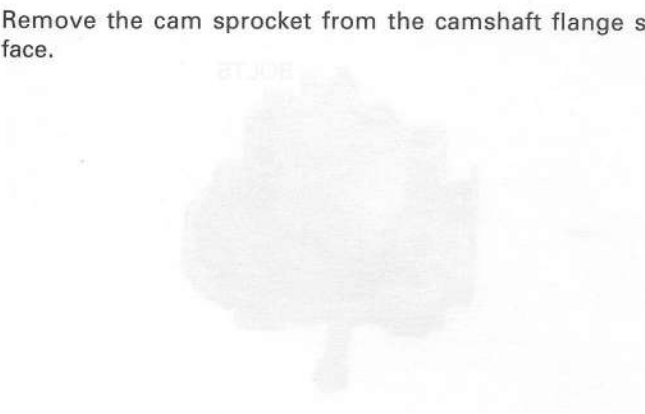
Loosen the lifter plug but do not remove yet.
Remove the cam chain tensioner lifter and gasket by
remove the two bolts alternately.



Remove the cam sprocket bolt, turn the crankshaft counter-
clockwise 360° degrees and remove the other cam sprocket
bolt.

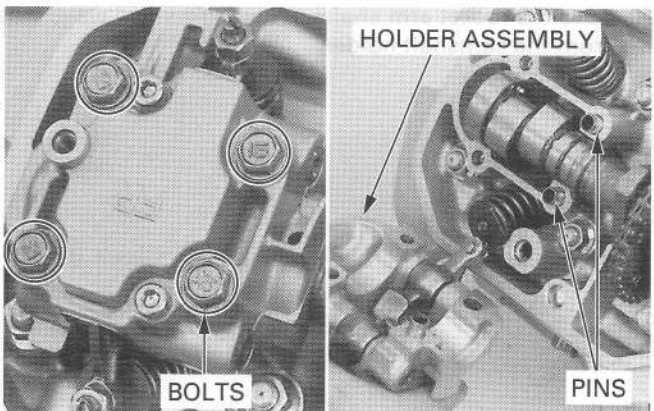
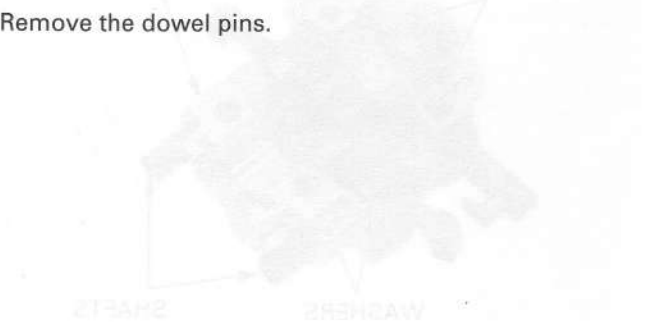


Remove the cam sprocket from the camshaft flange sur-
face.



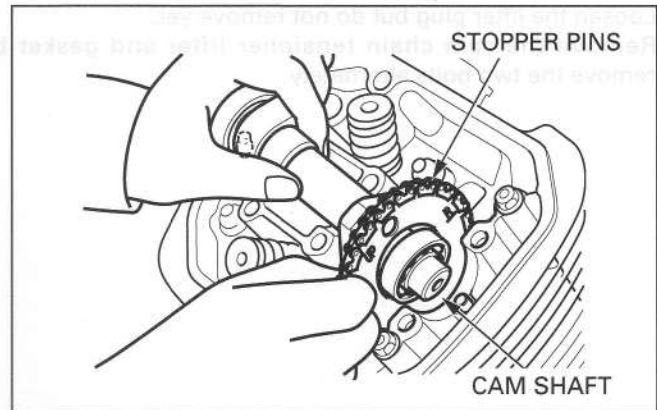
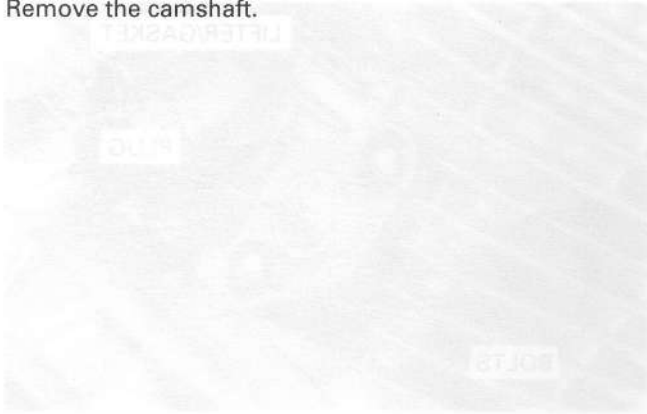
Remove the camshaft holder bolts.
Remove the camshaft holder assembly.

Remove the dowel pins.

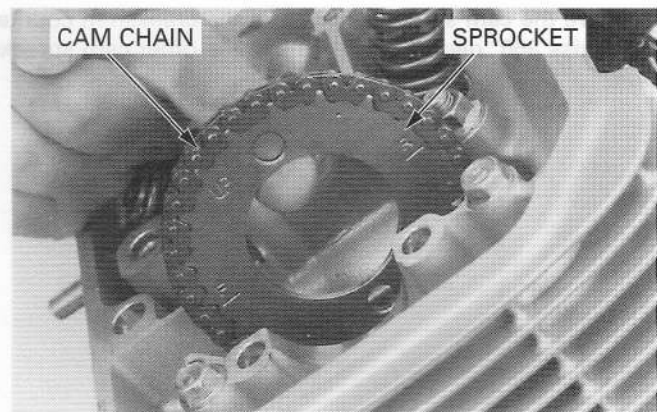
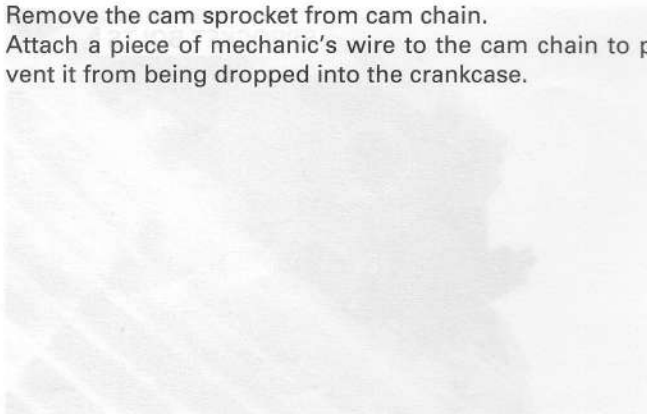


CYLINDER HEAD/VALVES

Remove the camshaft.



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

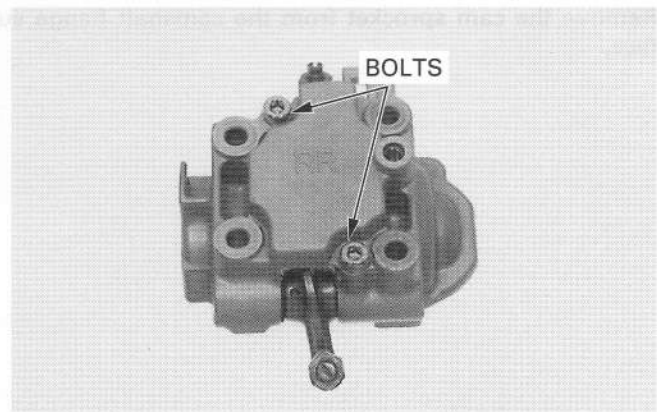


CAMSHAFT HOLDER DISASSEMBLY

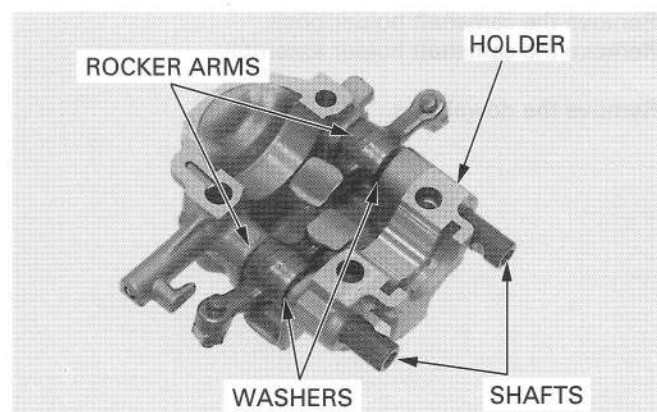
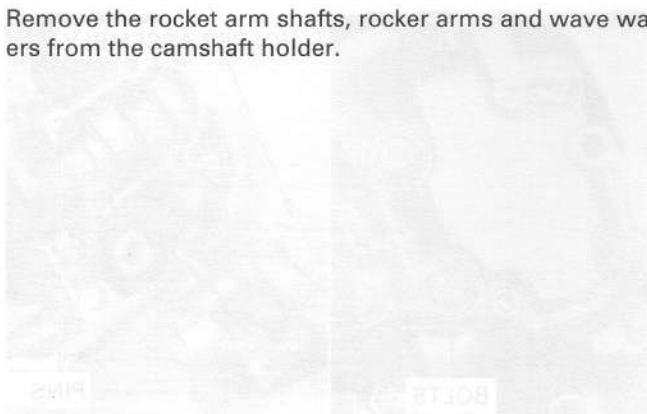
NOTE:

The rear cylinder camshaft holder service uses the same procedure as the front cylinder camshaft holder.

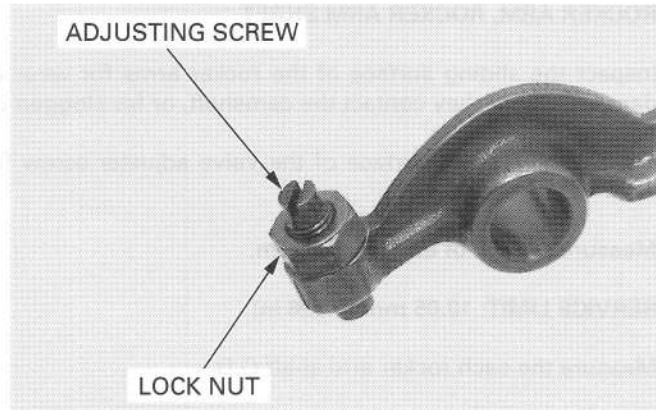
Remove the two bolts.



Remove the rocker arm shafts, rocker arms and wave washers from the camshaft holder.



Remove the valve adjuster lock nut and valve adjusting screw.

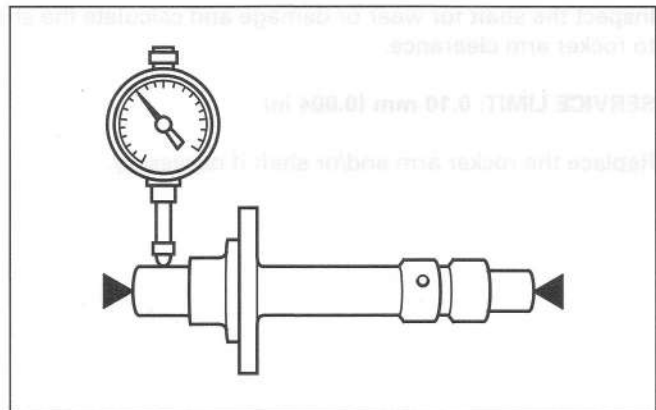


INSPECTION

CAMSHAFT RUNOUT

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

SERVICE LIMIT: 0.050 mm (0.0020 in)



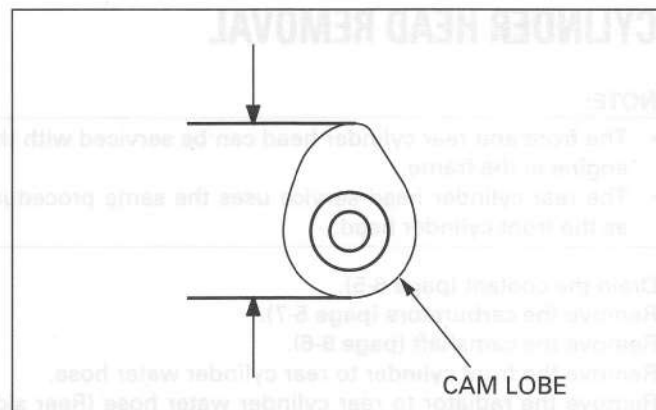
CAM LOBE HEIGHT

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

SERVICE LIMITS: IN: 28.82 mm (1.135 in)
EX: 28.85 mm (1.136 in)

NOTE:

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



CYLINDER HEAD/VALVES

ROCKER ARM, ROCKER ARM SHAFT

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

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

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 10.05 mm (0.396 in)

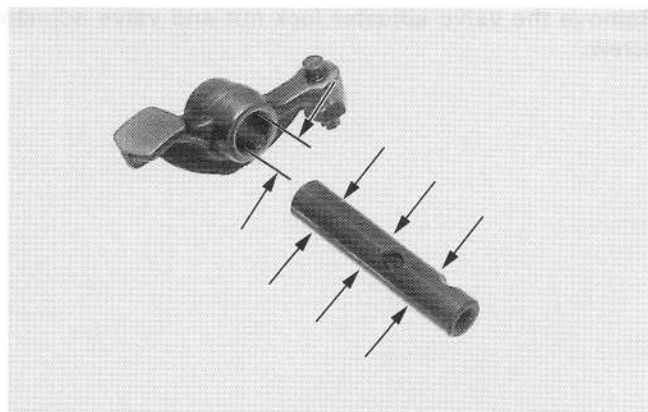
Measure the each rocker arm shaft O.D.

SERVICE LIMIT: 9.92 mm (0.391 in)

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

SERVICE LIMIT: 0.10 mm (0.004 in)

Replace the rocker arm and/or shaft if necessary.



CYLINDER HEAD REMOVAL

NOTE:

- The front and rear cylinder head can be serviced with the engine in the frame.
- The rear cylinder head service uses the same procedure as the front cylinder head.

Drain the coolant (page 6-5).

Remove the carburetors (page 5-7).

Remove the camshaft (page 9-6).

Remove the front cylinder to rear cylinder water hose.

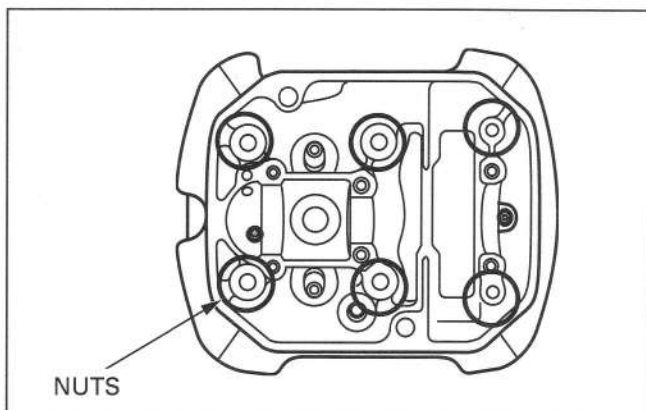
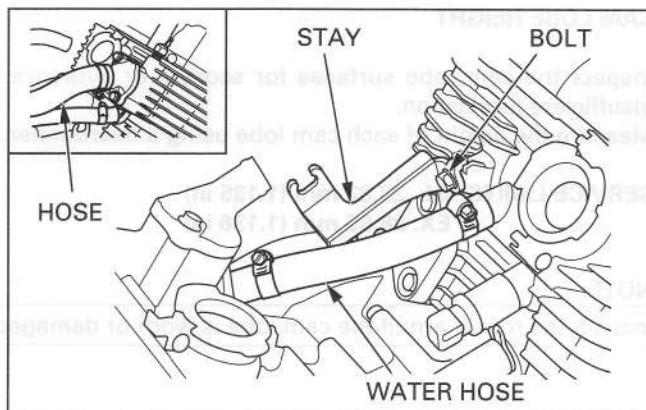
Remove the radiator to rear cylinder water hose (Rear side only).

Remove the bolt and stay. (Front side only).

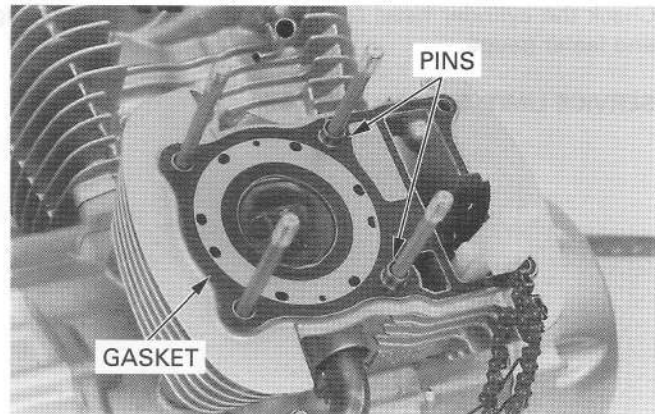
Remove the thermo switch (Rear side only/page 18-14).

Remove the bolts and nuts.

Remove the cylinder head.



Remove the gasket and dowel pins.



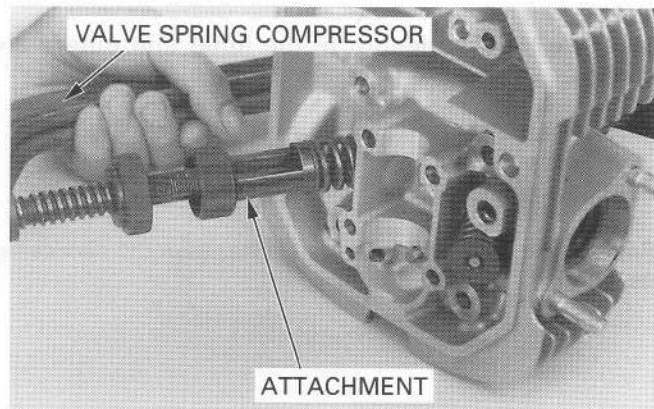
CYLINDER HEAD DISASSEMBLY

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

TOOLS:

Valve spring compressor
Attachment

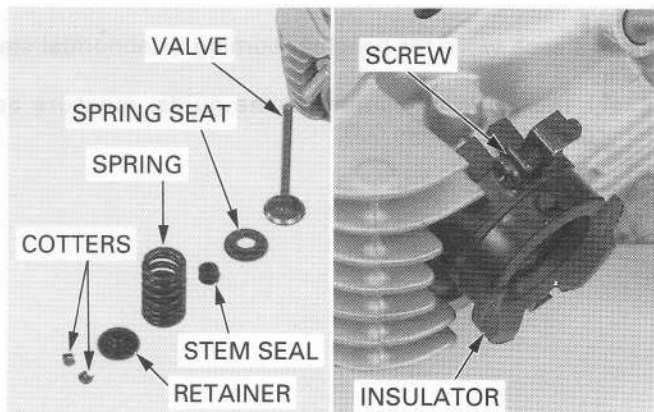
07757 - 0010000
07959 - KM30101



Remove the following:

- Spring retainer
- Valve springs
- Valve
- Stem seal
- Valve spring seat
- Cotters

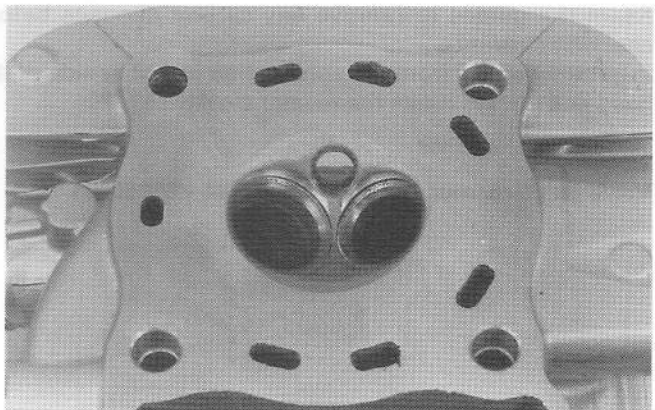
Remove the screw and insulator.



INSPECTION

CYLINDER HEAD

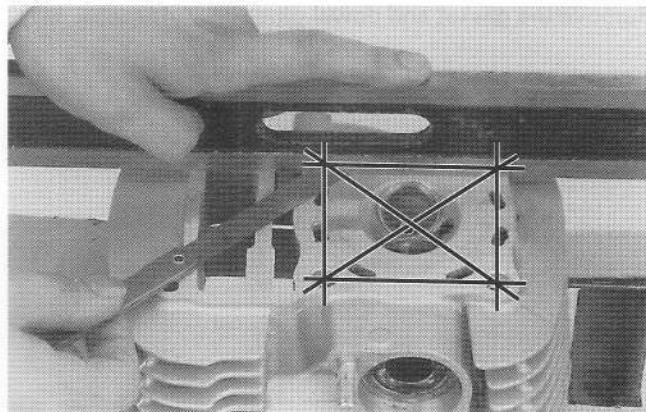
Remove carbon deposits from the combustion chamber.
Check the spark plug hole and valve areas for cracks.



CYLINDER HEAD/VALVES

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

SERVICE LIMIT: 0.05 mm (0.002 in)



VALVE SPRING

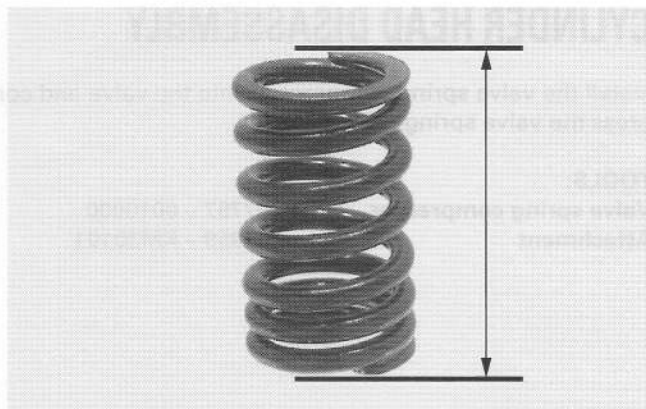
Measure the free length of the inner and outer valve springs.

SERVICE LIMIT:

IN: 36.5 mm (1.44 in)

EX: 36.5 mm (1.44 in)

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



VALVE

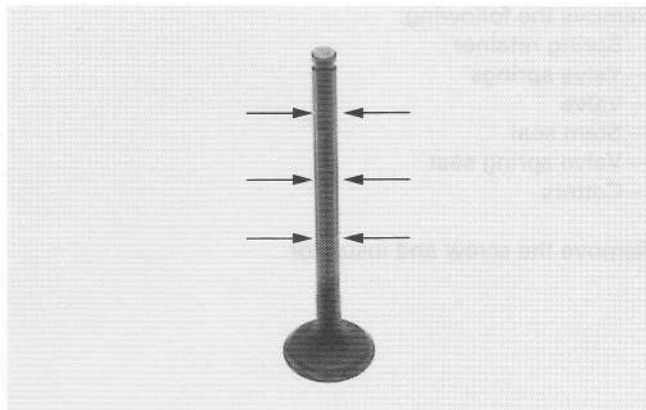
Inspect each valve for bending, burning or abnormal stem wear.

Check the valve movement in the guide, measure and record each valve stem O.D.

SERVICE LIMIT:

IN: 4.965 mm (0.1955 in)

EX: 4.945 mm (0.1947 in)



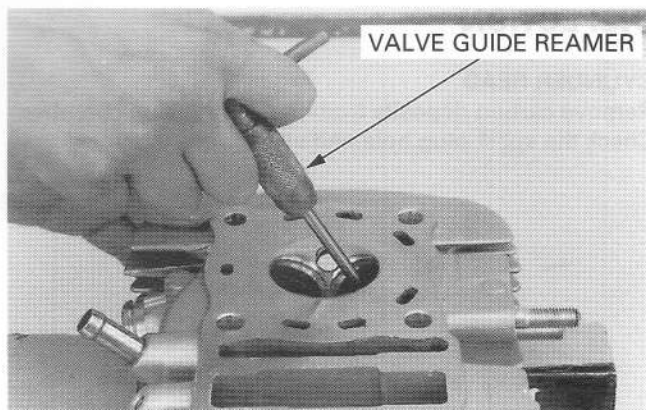
Ream the guides to remove any carbon deposits before checking clearance.

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

TOOL:

Valve guide reamer

07984 - MA60001



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 5.03 mm (0.198 in)

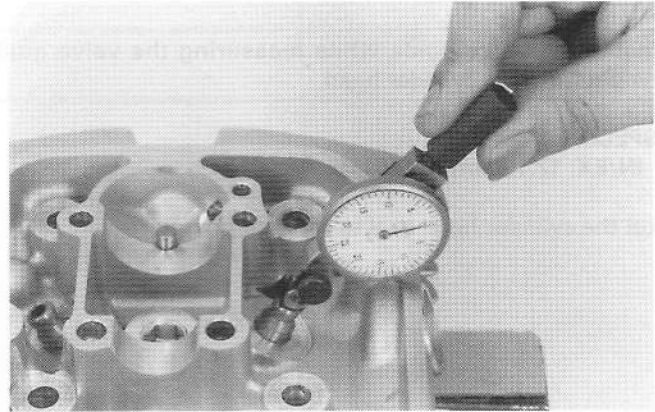
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS:

IN: 0.065 mm (0.0026 in)

EX: 0.085 mm (0.0033 in)

If the stem-to-guide clearance is out of specification, 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 is out of specification with the new guides, replace the valves and guides.



From the new valve guide after installation, insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

07942 - MA60000

Valve guide reamer

TOOL:

NOTE:

Use cutting oil on the reamer during this operation.

Clear the cylinder head thoroughly to remove any metal particles.
Before the valve seat (see below).

VALVE GUIDE REPLACEMENT

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

Heat the cylinder head to 100 – 150°C (212 – 302°F) with a hot plate or oven.

⚠ WARNING

To avoid burns, wear heavy gloves when handling the heated cylinder head.

CAUTION:

Do not use a torch to heat the cylinder head; it may cause warping.

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

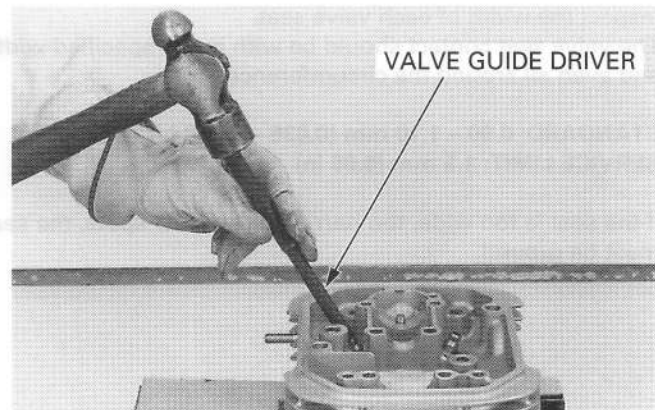
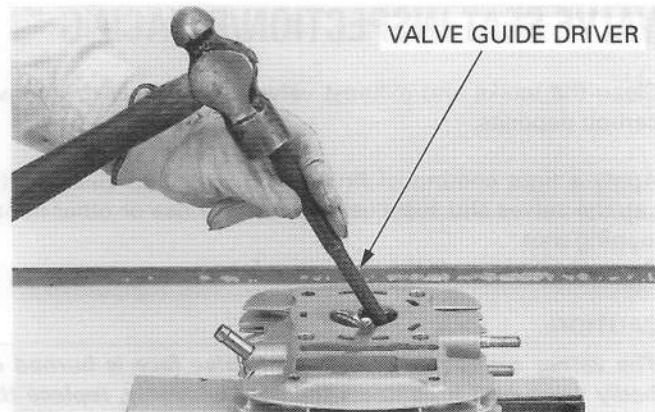
TOOL:

Valve guide driver, 5 mm 07942 – MA60000

Drive in the guide from the top of the head using the special tool as shown.

TOOL:

Valve guide driver, 5 mm 07942 – MA60000



CYLINDER HEAD/VALVES

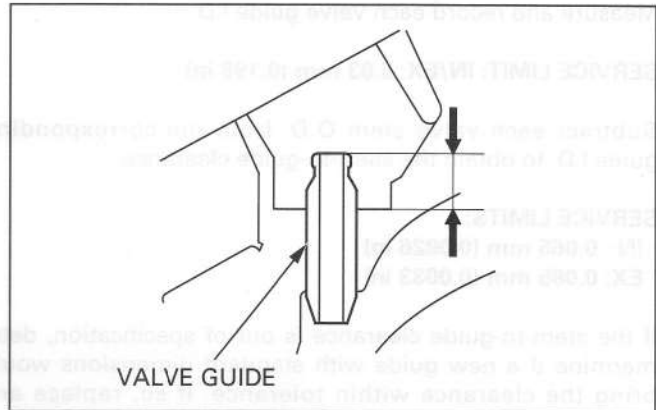
NOTE:

Install the valve guide while measuring the valve guide height from the cylinder head.

SPECIFIED HEIGHT:

IN/EX: 12.10 mm (0.476 in)

Let the cylinder head cool to room temperature.



Ream the new valve guide after installation.

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

TOOL:

Valve guide reamer

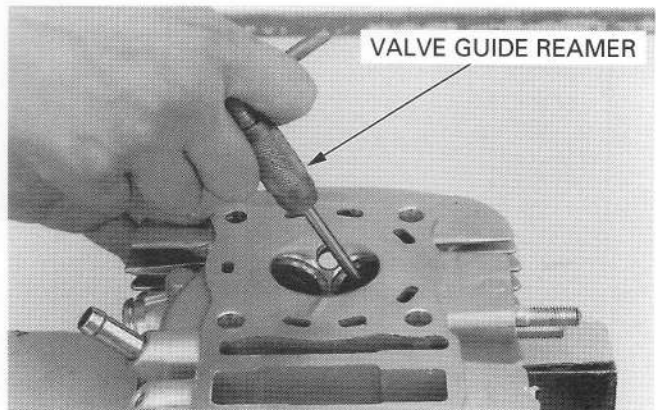
07984 - MA60001

NOTE:

Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles.

Reface the valve seat (See below).

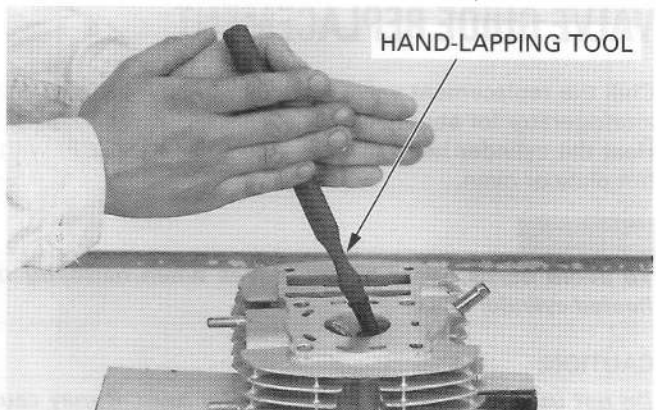


VALVE SEAT INSPECTION/REFACING

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

Apply a light coating of Prussian Blue to the valve seats. Lap the valves and seats using a rubber hose or other hand-lapping tool.

Remove and inspect the valve seat face.



CAUTION:

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

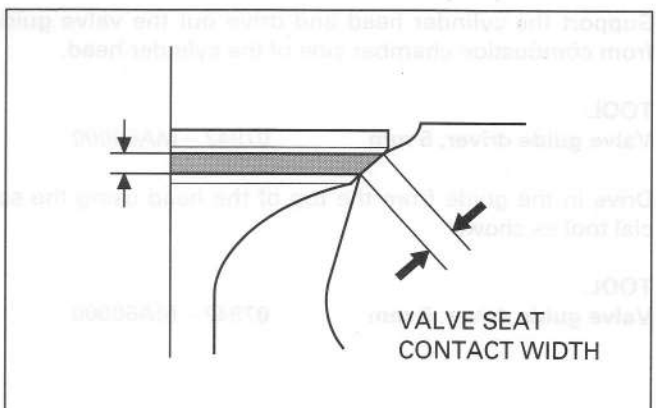
Inspect the width of each valve seat.

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

STANDARD: 0.90 - 1.10 mm (0.035 - 0.043 in)

SERVICE LIMIT: 1.5 mm (0.06 in)

If the seat is too wide, too narrow or has low spots, the seat must be ground.

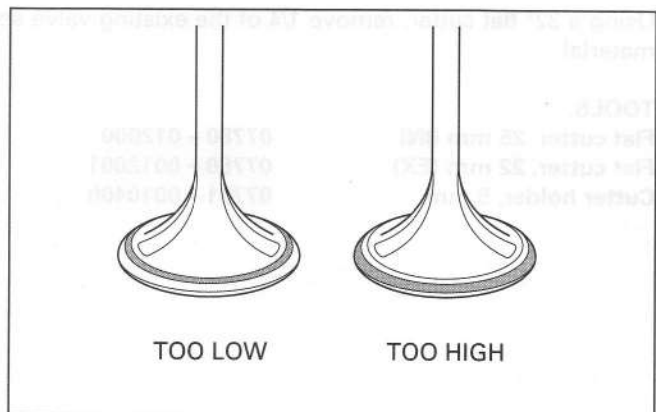
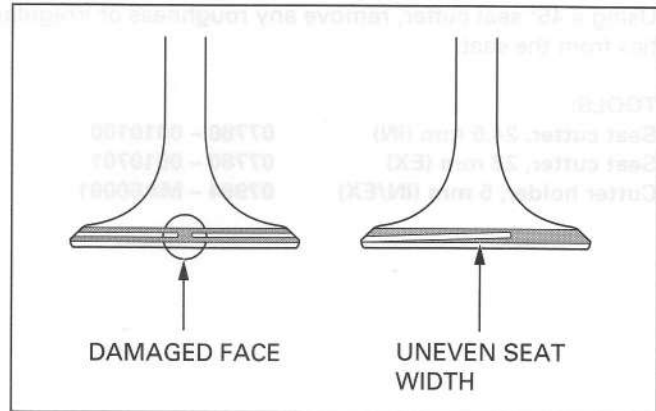


Inspect the valve seat face for:

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

NOTE:

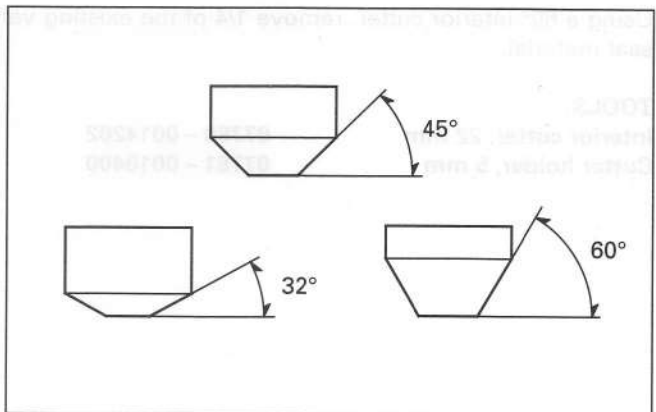
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



REFACING

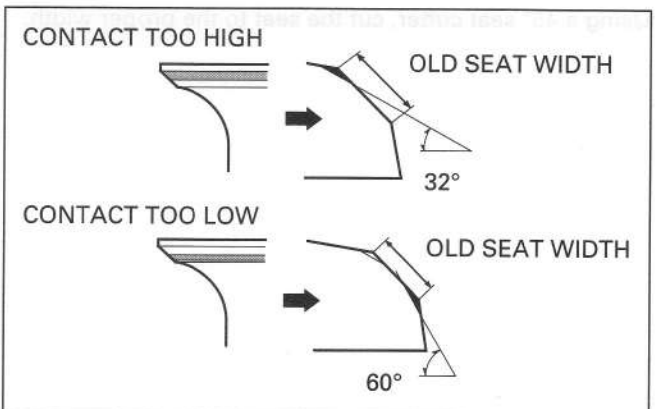
NOTE:

- Follow the refacing manufacture'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.



CYLINDER HEAD/VALVES

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

TOOLS:

Seat cutter, 24.5 mm (IN)

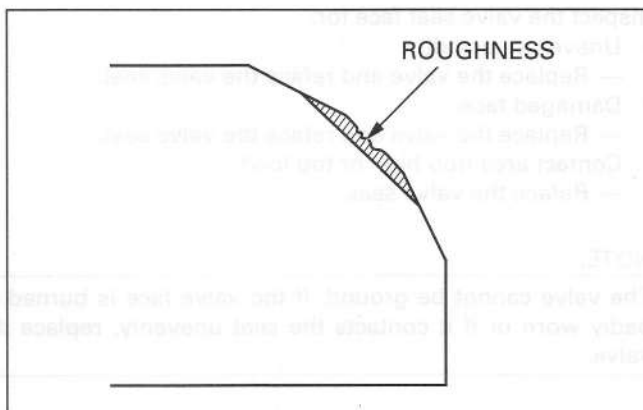
07780 - 0010100

Seat cutter, 22 mm (EX)

07780 - 0010701

Cutter holder, 5 mm (IN/EX)

07984 - MA60001



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

TOOLS:

Flat cutter, 25 mm (IN)

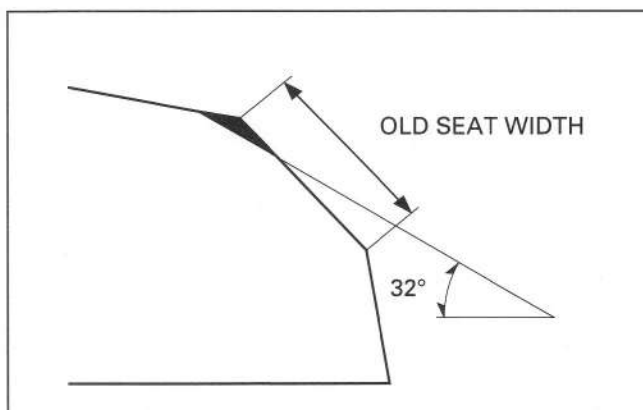
07780 - 012000

Flat cutter, 22 mm (EX)

07780 - 0012601

Cutter holder, 5 mm

07781 - 0010400



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

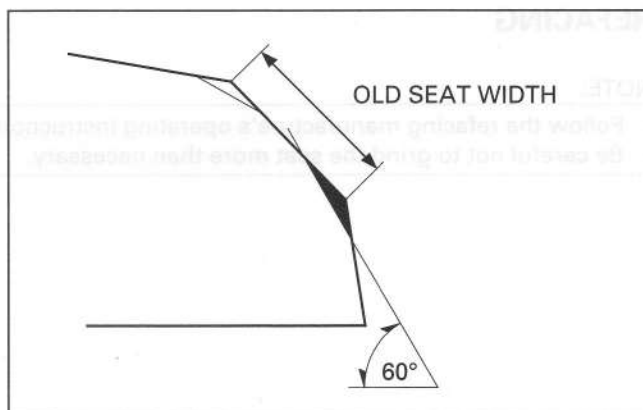
TOOLS:

Interior cutter, 22 mm

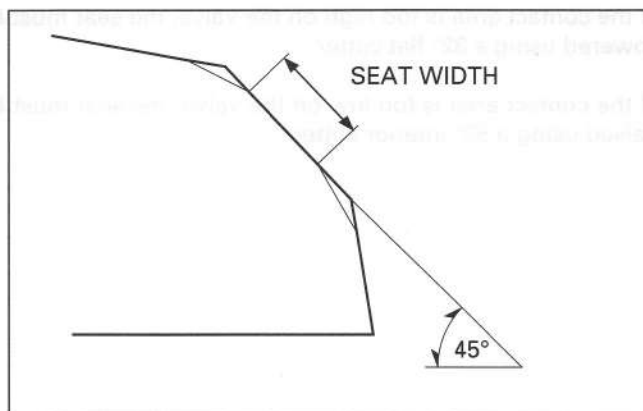
07780 - 0014202

Cutter holder, 5 mm

07781 - 0010400



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

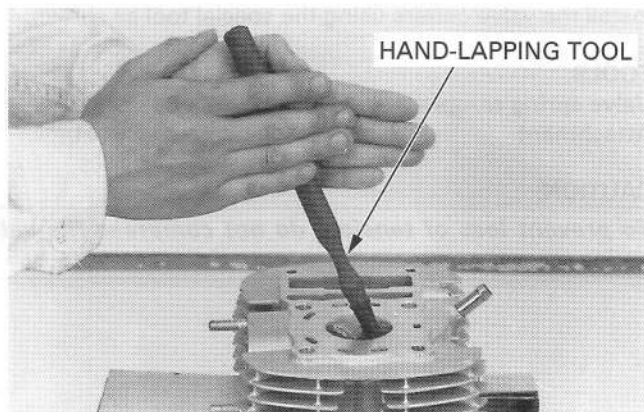


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

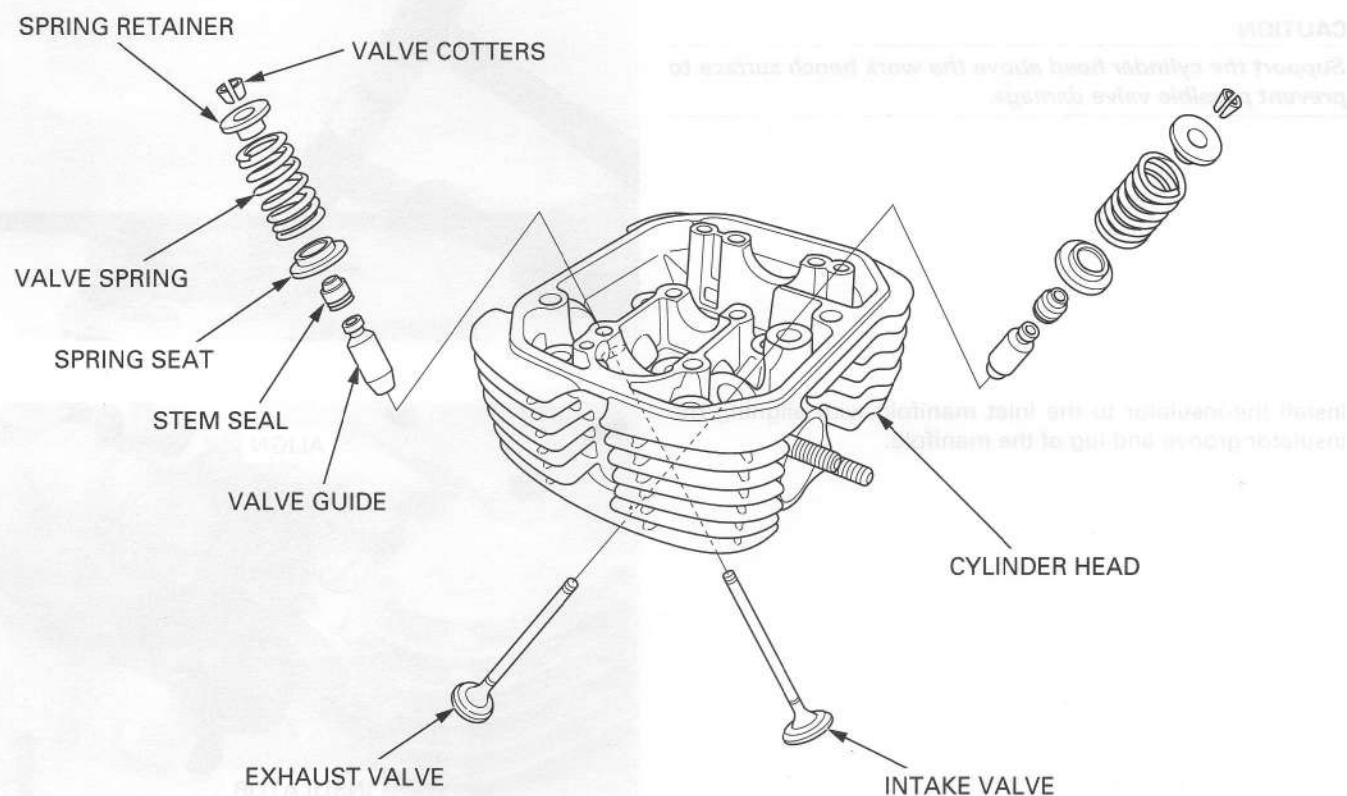
After lapping, wash all residual compound off the cylinder head and valve.

CAUTION:

Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY



Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the valve spring seats.

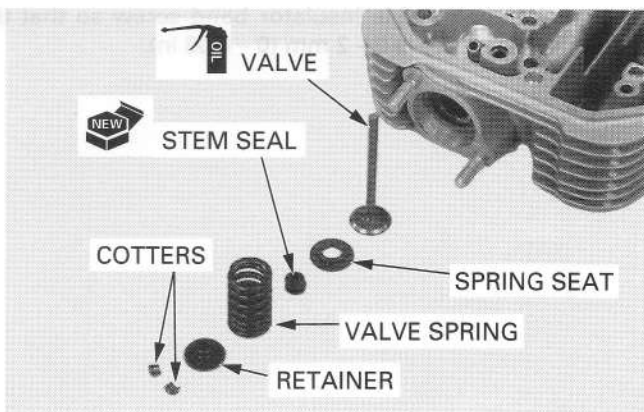
Install the new stem seals.

Lubricate the valve stems with engine oil and insert the valve into the valve guide.

To avoid damage to the stem seal, turn the valve slowly when inserting.

Install the valve springs.

Install the valve spring retainer.



CYLINDER HEAD/VALVES

Install the valve cotters using the special tool as shown.

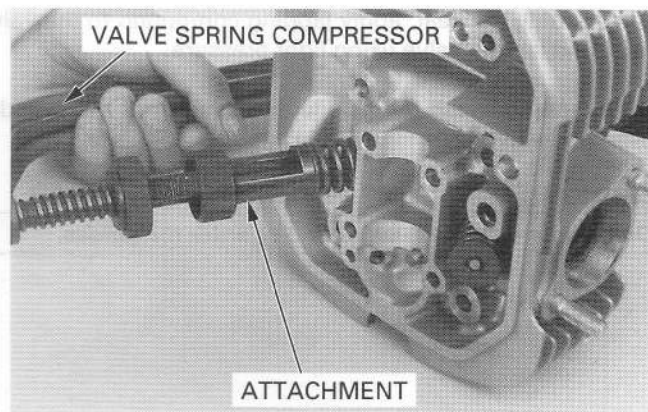
TOOLS:

Valve spring compressor
Attachment

07757 - 0010000
07959 - KM30101

CAUTION:

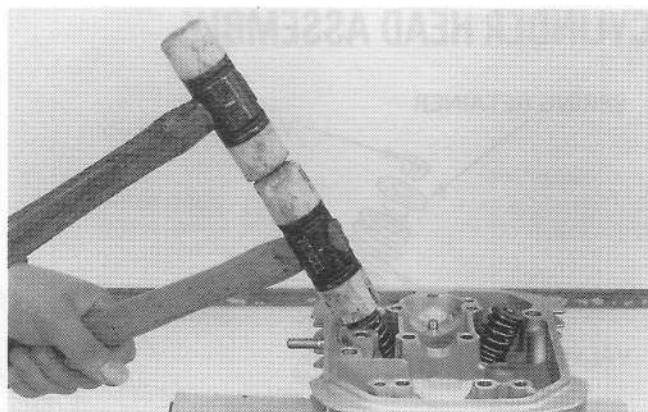
To prevent loss of tension, do not compress the valve spring more than necessary.



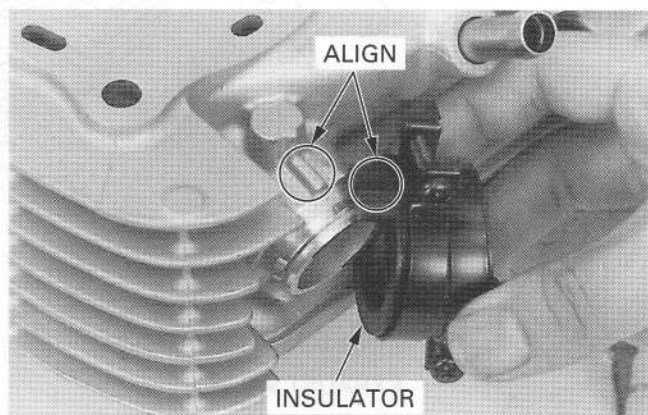
Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

CAUTION:

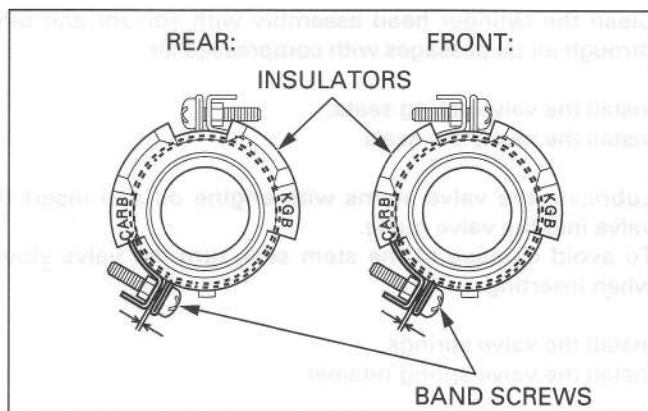
Support the cylinder head above the work bench surface to prevent possible valve damage.



Install the insulator to the inlet manifold with aligning the insulator groove and lug of the manifold.



Tighten the engine side insulator band screw so that the band ends clearance is 0 - 2 mm (0 - 0.08 in).



CYLINDER HEAD INSTALLATION

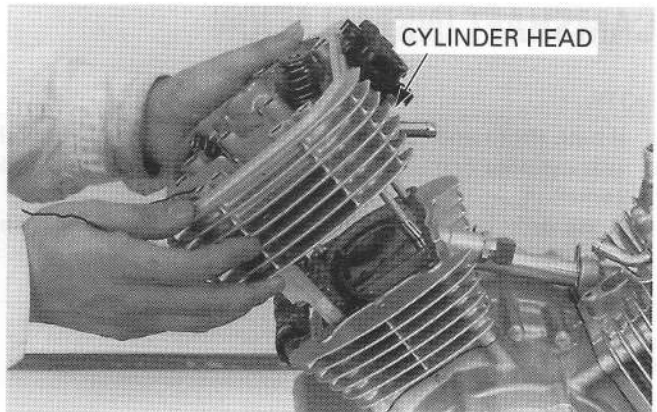
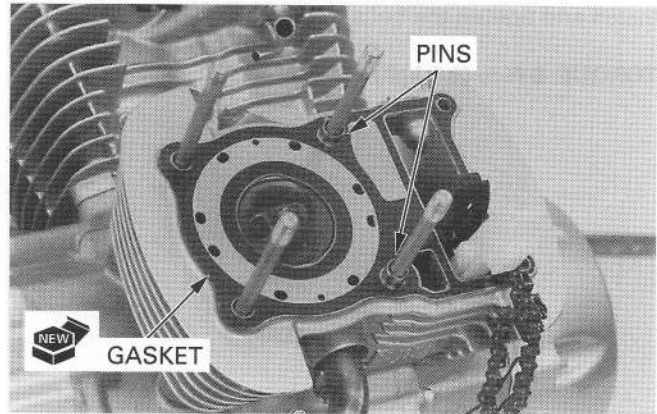
NOTE:

- Base cylinder is the rear (#1) cylinder.
- If you disassembled the both cylinder heads, install the rear cylinder head first, then install the front cylinder head.
- The rear cylinder head uses the same service procedure as the front cylinder head.
- Be careful not to damage the mating surfaces when cleaning the cylinder mating surface.
- When cleaning the cylinder mating surface, place the shop towel over the cylinder opening to prevent dust or dirt from entering the engine.

Clean any gasket material from the cylinder mating surfaces.

Install the new gasket with the "UP" mark is facing up and dowel pins.

Install the cylinder head.



Apply oil to the cylinder head nut threads and flange surfaces.

Tighten the cylinder head nuts to the specified torque.

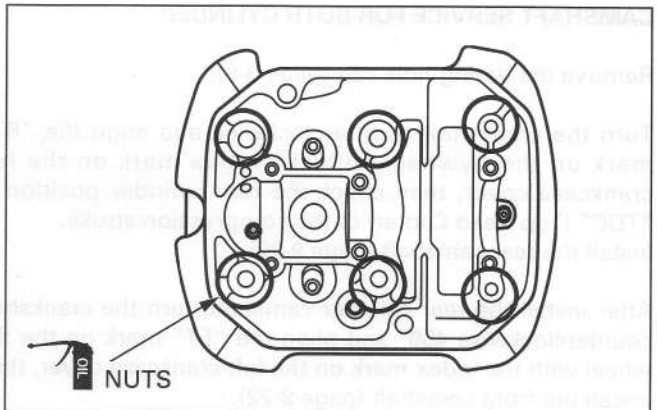
TORQUE:

8 mm nut: 32 N·m (3.3 kgf·m, 24 lbf·ft)

6 mm nut: 12 N·m (1.2 kgf·m, 9 lbf·ft)

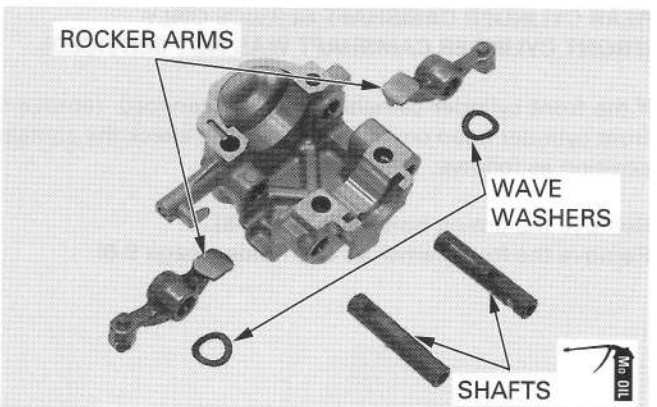
NOTE:

- Tighten all hand-tight, then torque the big fasteners before little fasteners.
- Tighten the bolts and nuts in a crisscross pattern in several times.



Lubricate each rocker arm shafts with molybdenum oil solution.

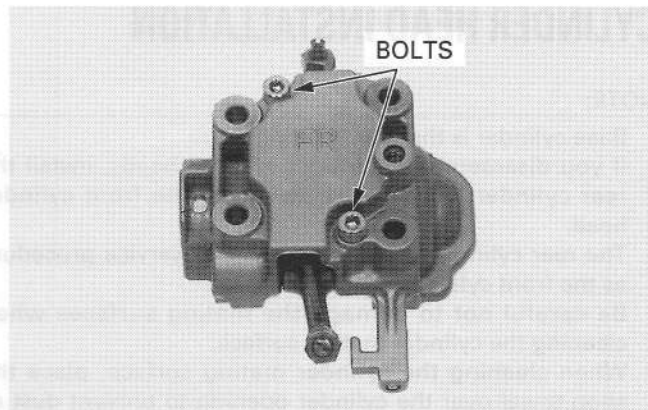
Install the wave washer, rocker arms and rocker arm shafts to the camshaft holder.



CYLINDER HEAD/VALVES

Install and tighten the bolts to the specified torque.

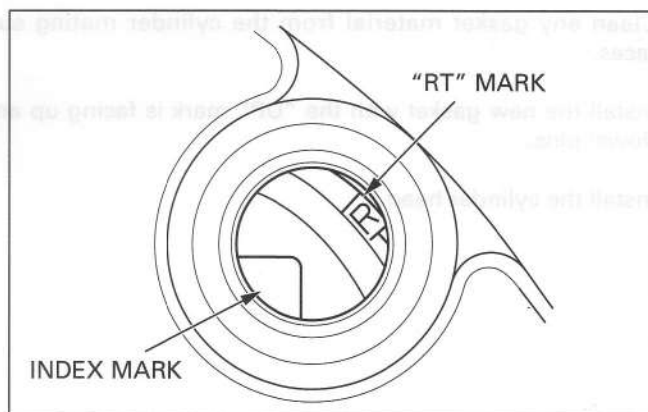
TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



CAMSHAFT INSTALLATION

NOTE:

- If both (front and rear) camshafts are removed, install the rear cylinder camshaft first, then install the front cylinder camshaft.
- If the only one side of the cylinder head was serviced, the other cylinder head cover is required to removal to check the camshaft position.

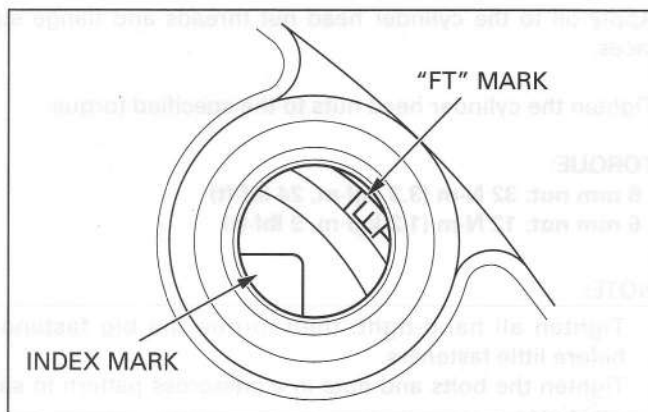


CAMSHAFT SERVICE FOR BOTH CYLINDER

Remove the timing hole cap (page 3-8).

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then check the rear cylinder position is "TDC" (Top Dead Center) of the compression stroke. Install the rear camshaft (page 9-22).

After install the rear cylinder camshaft, turn the crankshaft counterclockwise 450° and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then install the front camshaft (page 9-22).



REAR CYLINDER CAMSHAFT SERVICE ONLY (FRONT CYLINDER CAMSHAFT WAS NOT SERVICED)

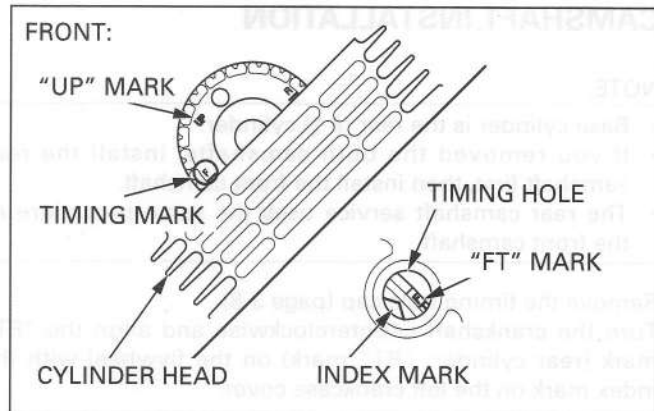
If the front cylinder camshaft was not serviced, remove the front cylinder head cover (page 9-5) and check the camshaft position as follows:

Remove the timing hole cap (page 3-8).

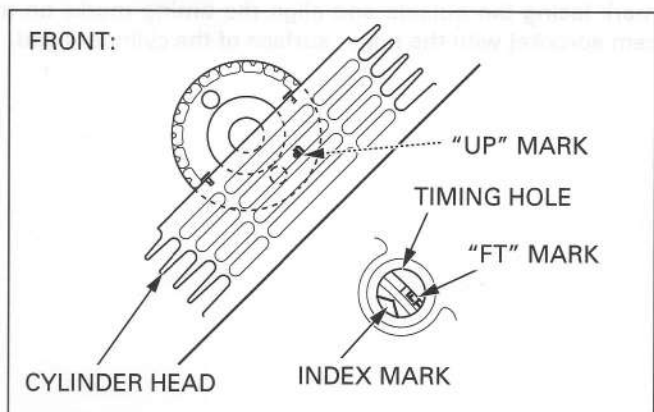
Remove the front camshaft end holder (page 9-6)

Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then check that the "UP" mark which on the cam sprocket surface appear and align the timing marks with the upper surface of the front cylinder head (Front cylinder position is the TDC/Top Dead Center of the compression stroke).

If the "UP" mark is facing up (TDC/compression stroke), turn the crankshaft counterclockwise 270° (3/4 revolutions) and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then install the rear camshaft (see after page).



If the "UP" mark is facing down (TDC/exhaust stroke), turn the crankshaft counterclockwise 630° (1 3/4 revolutions) and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then install the rear camshaft (see after page).



FRONT CYLINDER CAMSHAFT SERVICE ONLY (REAR CYLINDER CAMSHAFT WAS NOT SERVICE)

If the rear cylinder camshaft was not serviced, remove the rear cylinder head cover (page 9-5) and check the camshaft position as follows:

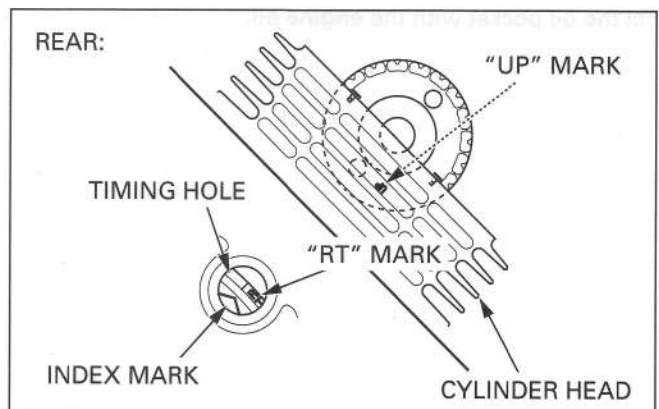
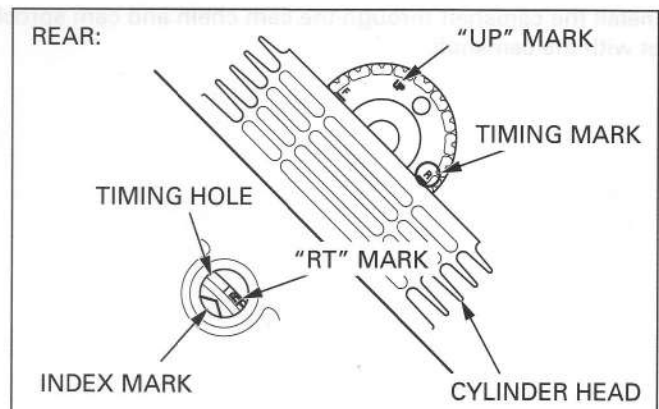
Remove the timing hole cap (page 3-8).

Remove the rear camshaft end holder (page 9-6).

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then check that the "UP" mark which on the cam sprocket surface appear and align the timing marks with the upper surface of the rear cylinder head (Rear cylinder position is the TDC of the compression stroke.)

If the "UP" mark is facing up (TDC/compression stroke), turn the crankshaft counterclockwise 450° (1 1/4 revolutions) and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then install the front camshaft (see after page).

If the "UP" mark is facing down (TDC/exhaust stroke), turn the crankshaft counterclockwise 90° and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then install the front camshaft (see after page).



CYLINDER HEAD/VALVES

CAMSHAFT INSTALLATION

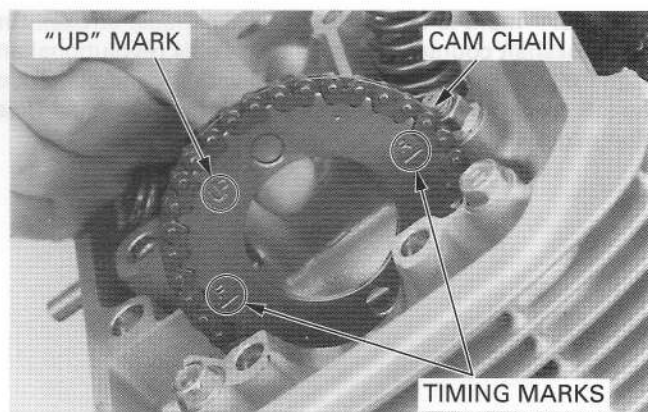
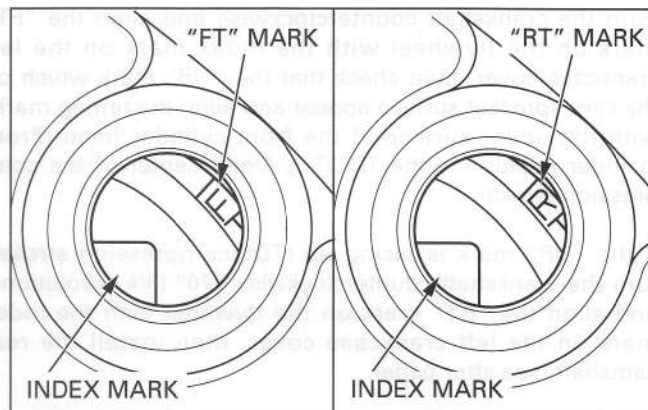
NOTE:

- Base cylinder is the rear (# 1) cylinder.
- If you removed the both camshafts, install the rear camshaft first, then install the front camshaft.
- The rear camshaft service uses the same procedure as the front camshaft.

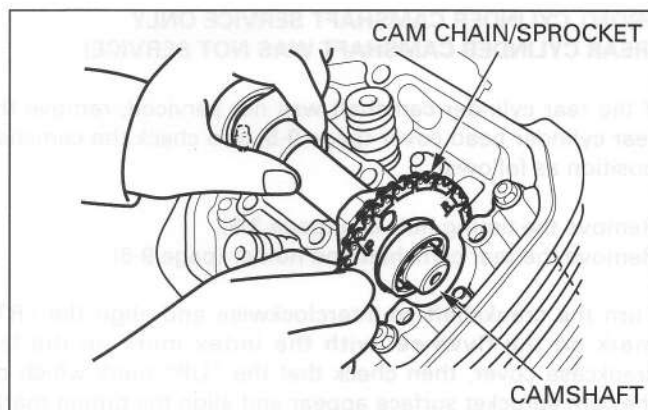
Remove the timing hole cap (page 3-8).

Turn the crankshaft counterclockwise and align the "FT" mark (rear cylinder: "RT" mark) on the flywheel with the index mark on the left crankcase cover.

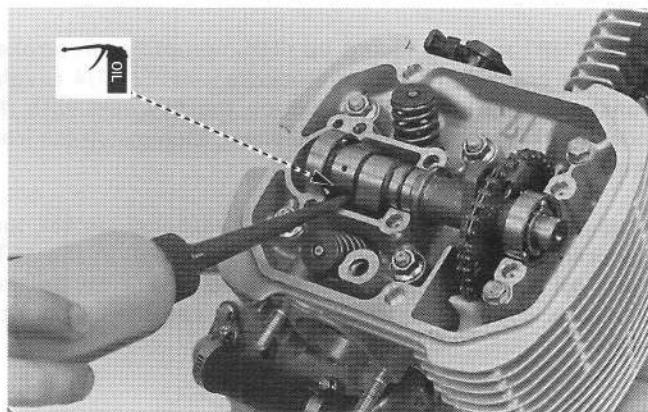
Install the cam sprocket to the cam chain with the "UP" mark facing the outside and align the timing marks on the cam sprocket with the upper surface of the cylinder head.



Install the camshaft through the cam chain and cam sprocket with the camshaft.



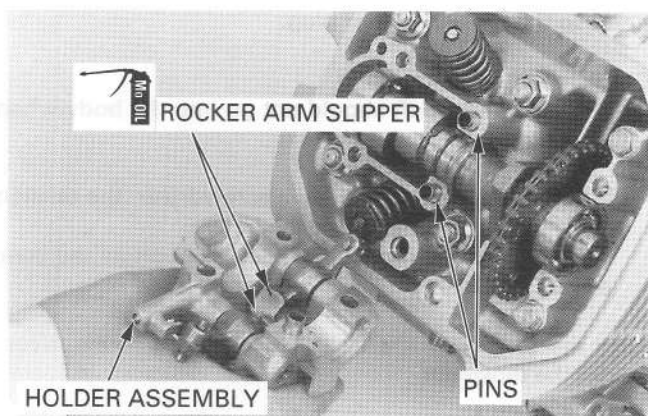
Fill the oil pocket with the engine oil.



Install the dowel pins.

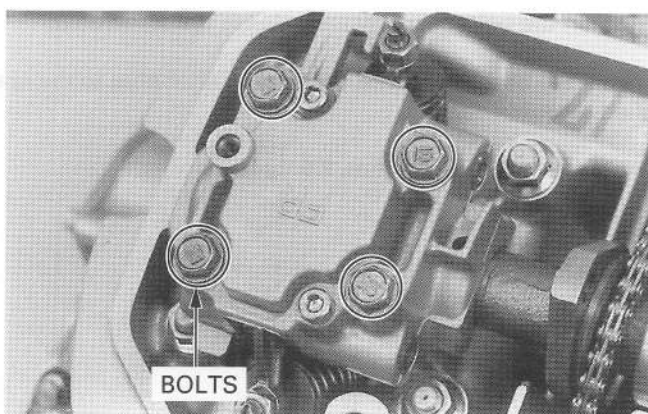
Loosen the valve adjusting screw and lock nut fully. Lubricate each rocker arm slipper surface and valve stem end with molybdenum oil solution.

Install the camshaft holder assembly.

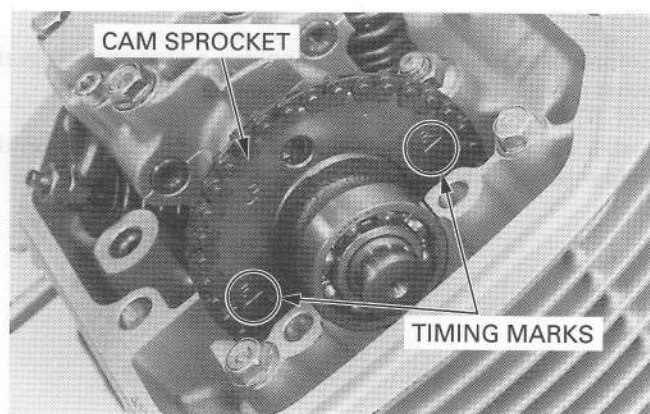


Install and tighten the camshaft holder bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the cam sprocket on the camshaft flange and recheck that the timing marks align with the upper surface of the cylinder head.



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

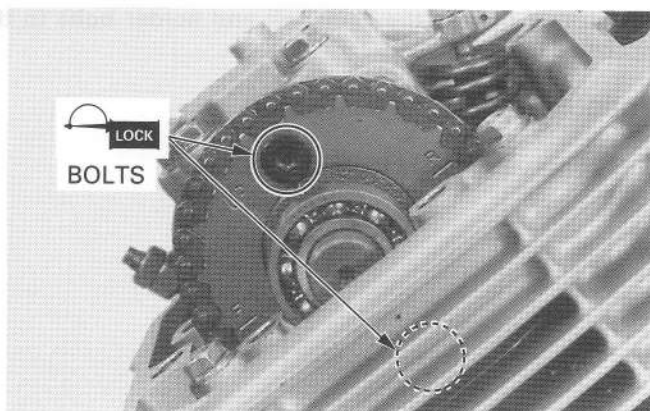
Align the cam sprocket bolt holes with the cam sprocket and camshaft.

Temporarily install the cam sprocket bolt.

Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Turn the crankshaft counterclockwise 360° and tighten the other sprocket bolt to the specified torque (see above).



CYLINDER HEAD/VALVES

Remove the tensioner lifter plug.

Check the lifter operation:

- The tensioner shaft should not go into the body when it is pushed.
- When it is turned clockwise a screwdriver, the tensioner shaft should be pulled into the body. The shaft spring out of the body as soon as the screwdriver is released.

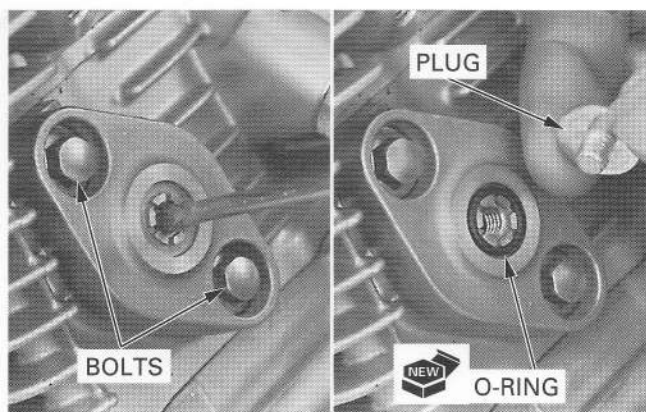
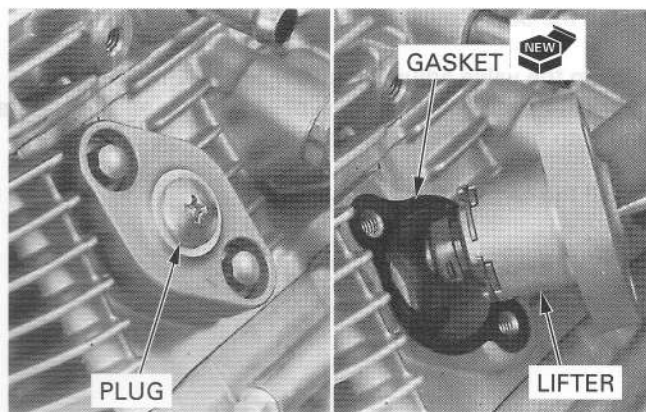
Turn the tensioner shaft clockwise with a screwdriver to retract the tensioner.

Install a new gasket and tensioner to the cylinder.

Tighten the bolts securely and release the screwdriver.

Install the new O-ring and tighten the lifter plug to the specified torque.

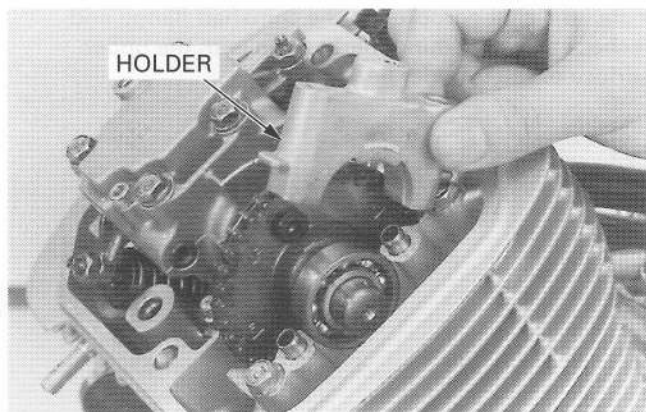
TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



NOTE:

Before install the camshaft end holder, adjust and check the other camshaft position (page 9-20, 21).

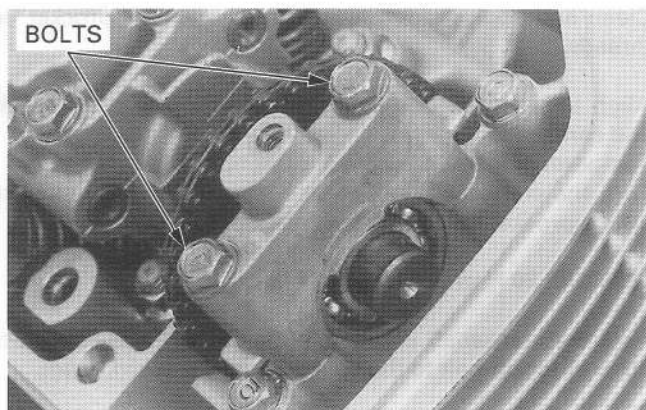
Install the camshaft end holder with it's flat surface on the holder facing in.



Install and tighten the camshaft end holder bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

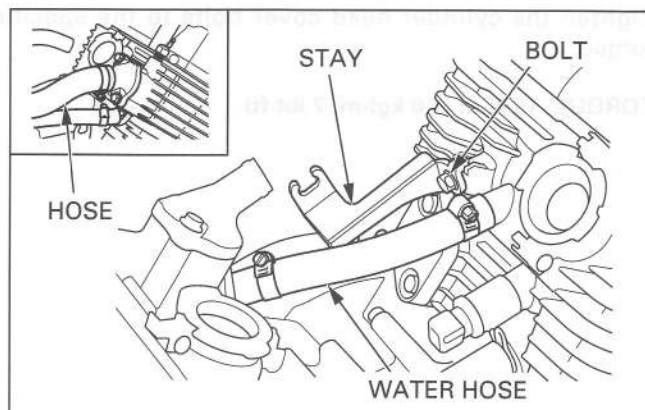
Adjust the valve clearance (page 3-8).



Install the thermo switch (Rear side only).

Connect the radiator to rear cylinder water hose (Rear side only).

Connect the front cylinder to rear cylinder water hose.
Install the stay and tighten the bolt securely.



CYLINDER HEAD COVER INSTALLATION

FRONT/REAR

NOTE:

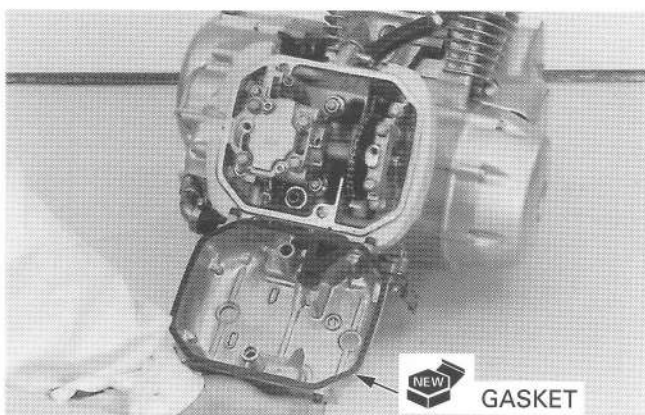
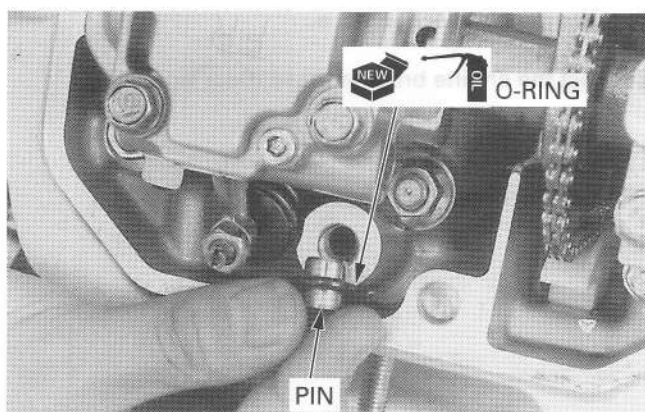
The front and rear cylinder head cover can be serviced with the engine in the frame.

Apply engine oil to the new O-ring and install the O-ring to the dowel pin.

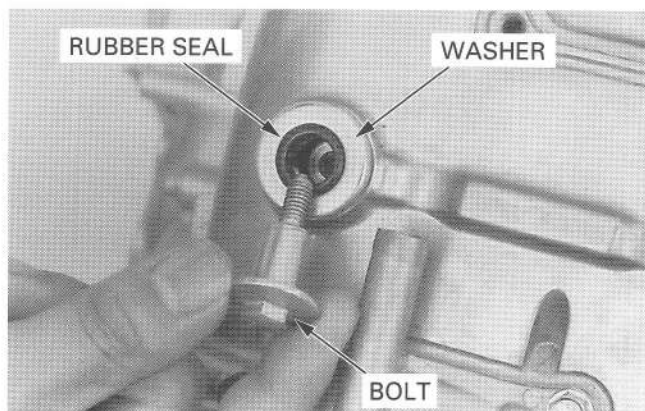
Install the dowel pin to the cylinder head.

Clean the gasket groove of the cylinder head cover. Apply Honda Bond A or equivalent to the gasket groove of the cylinder head cover, then install the new gasket into the groove.

Install the cylinder head cover to the cylinder head.



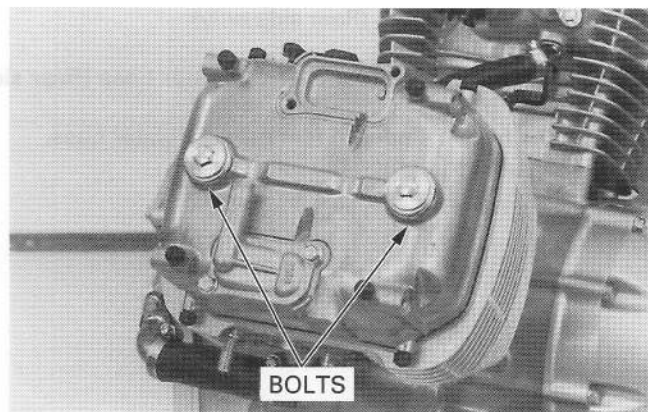
Install the rubber seals, washers and bolt to the cylinder head cover.



CYLINDER HEAD/VALVES

Tighten the cylinder head cover bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

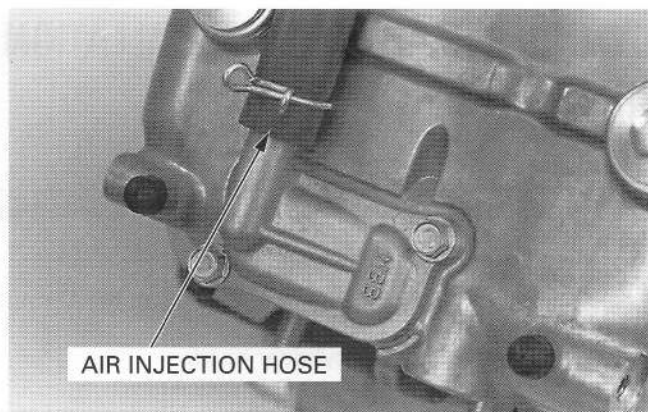


Connect the air injection hose.

Connect the engine breather hose (Rear side only).

Install the following:

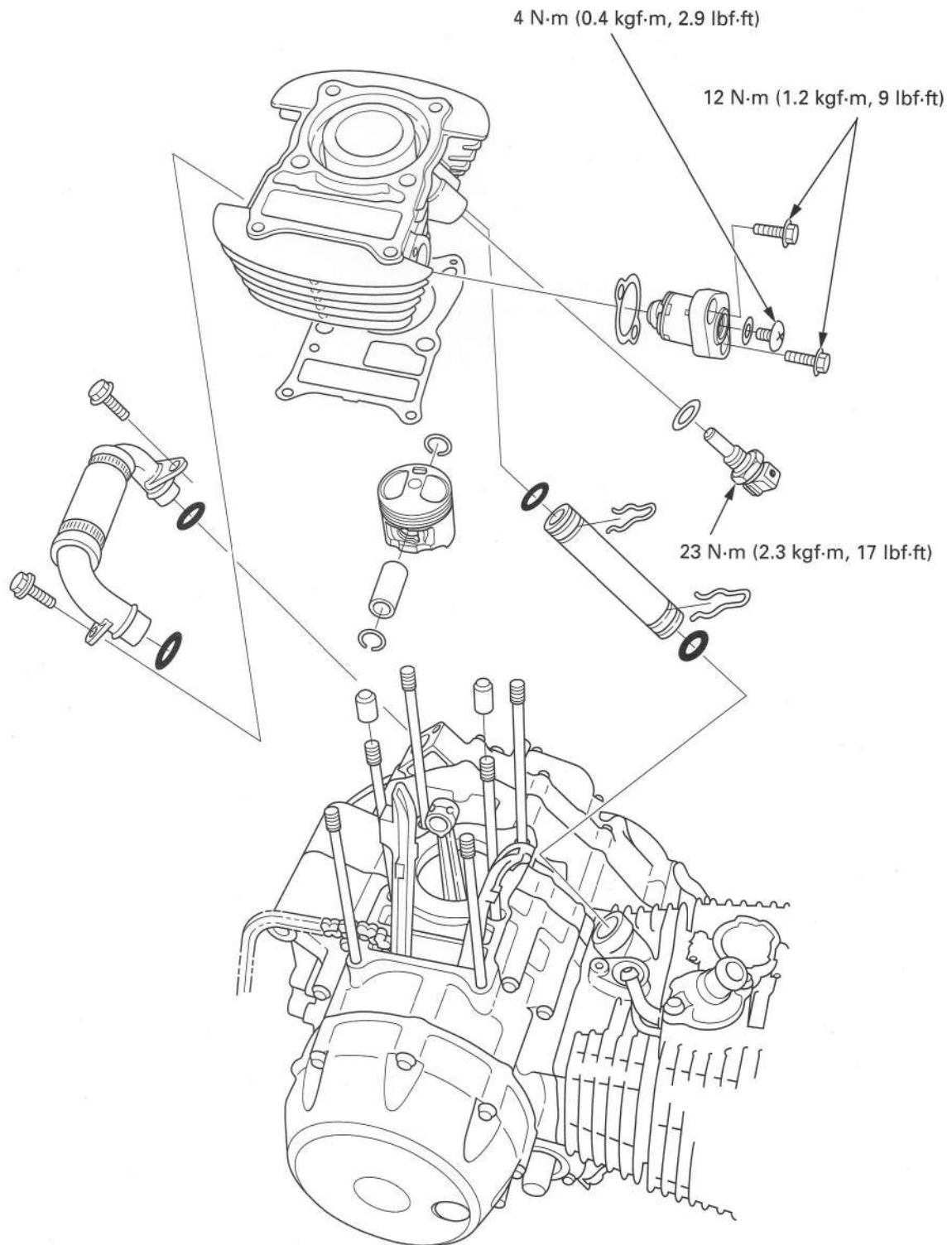
- Cylinder head side cover (page 9-5).
- Air cleaner housing (page 5-4).



MEMO



OM3M



10. CYLINDER/PISTON

SERVICE INFORMATION	10-1	CRANKCASE STUD BOLT INSPECTION	10-7
TROUBLESHOOTING	10-2	PISTON INSTALLATION	10-8
CYLINDER REMOVAL	10-3	CYLINDER INSTALLATION	10-9
PISTON REMOVAL	10-5		

SERVICE INFORMATION

GENERAL

- The engine must be removed from the frame before servicing the cylinder and piston.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces by using a screwdriver when disassembling the cylinder.
- Clean all disassembled parts with clean solvent and dry them using compressed air before inspection.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		42.00 – 42.01 (1.654 – 1.654)	42.10 (1.657)
	Out of round		—	0.06 (0.002)
	Taper		—	0.06 (0.002)
	Warpage		—	0.05 (0.002)
Piston, piston rings	Piston mark direction		“IN” mark facing toward the intake side	—
	Piston O.D.		41.97 – 41.99 (1.652 – 1.653)	41.90 (1.650)
	Piston O.D. measurement point		14.0 (0.55) from bottom of skirt	—
	Piston pin bore I.D.		13.002 – 13.008 (0.5119 – 0.5121)	13.04 (0.513)
	Piston pin O.D.		12.994 – 13.000 (0.5116 – 0.5118)	12.98 (0.511)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring-to-ring groove clearance	Top	0.015 – 0.05 (0.0006 – 0.002)	0.080 (0.0031)
		Second	0.015 – 0.05 (0.0006 – 0.002)	0.080 (0.0031)
	Piston ring end gap	Top	0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
		Second	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Oil (side rail)	0.10 – 0.60 (0.004 – 0.024)	0.80 (0.031)
	Piston ring mark	Top	“R” mark	—
		Second	“RN” mark	—
Cylinder-to-piston clearance			0.010 – 0.040 (0.0004 – 0.0016)	0.10 (0.004)
Connecting rod small end I.D.			13.016 – 13.034 (0.5124 – 0.5131)	13.044 (0.5135)
Connecting rod-to-piston pin clearance			0.010 – 0.040 (0.0004 – 0.0016)	0.06 (0.002)

10

TROUBLESHOOTING

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

- Leaking cylinder head gasket
- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston
- Loose spark plug

Compression too high, over heating or knocking

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

Abnormal noise

- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod small end

Excessive smoke

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

ITEM	STANDARD	SERVICE LIMIT
Cylinder		
I.D.	42.00 - 42.01 (1.654 - 1.654)	42.10 (1.657)
Out of round	—	0.08 (0.003)
Taper	—	0.08 (0.003)
Warpage	—	0.02 (0.001)
Piston mark direction	"IN" mark facing toward the intake side	—
Piston O.D.	41.97 - 41.98 (1.652 - 1.653)	41.90 (1.650)
Piston O.D. measurement point	14.0 (0.55) from bottom of skirt	—
Piston pin hole I.D.	12.002 - 12.008 (0.518 - 0.517)	12.04 (0.513)
Piston pin O.D.	12.004 - 12.000 (0.518 - 0.518)	12.98 (0.511)
Piston-to-piston pin clearance	0.002 - 0.014 (0.0001 - 0.0005)	0.04 (0.002)
Piston ring-to-ring groove clearance	Top	0.102 - 0.02 (0.0008 - 0.002)
	Second	0.076 - 0.00 (0.0008 - 0.002)
Piston ring and gap	Top	0.66 - 0.18 (0.002 - 0.006)
	Second	0.58 - 0.35 (0.008 - 0.014)
Oil ring seal	0.10 - 0.80 (0.004 - 0.031)	0.30 (0.012)
Piston ring mark	Top	"IN" mark
Second	—	"OUT" mark
Cylinder-to-piston clearance	0.010 - 0.040 (0.0004 - 0.0016)	0.10 (0.004)
Connecting rod small end I.D.	12.016 - 12.024 (0.514 - 0.517)	12.044 (0.513)
Connecting rod-to-piston pin clearance	0.010 - 0.040 (0.0004 - 0.0016)	0.06 (0.002)

CYLINDER REMOVAL

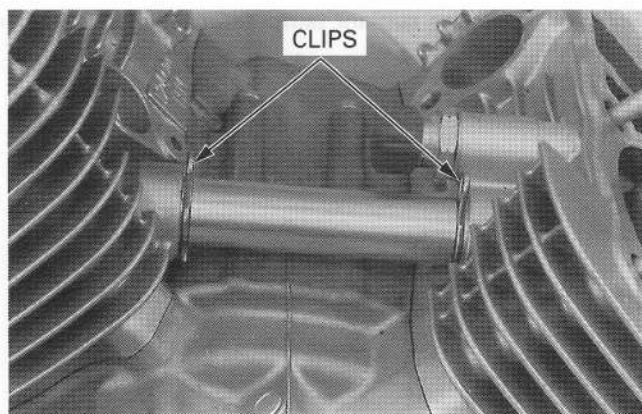
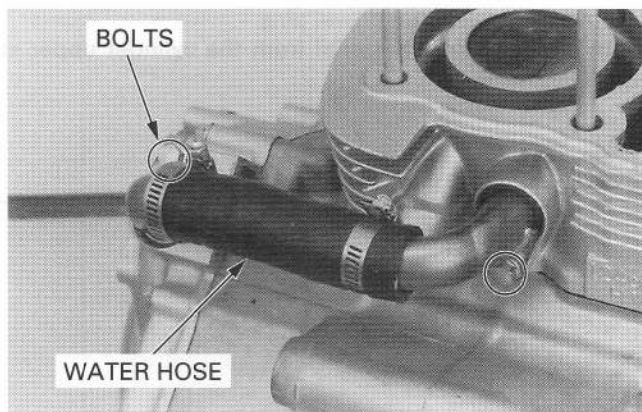
NOTE:

- Front and rear cylinders can be serviced with engine in the frame.
- The front cylinder service uses the same procedure as the rear cylinder.

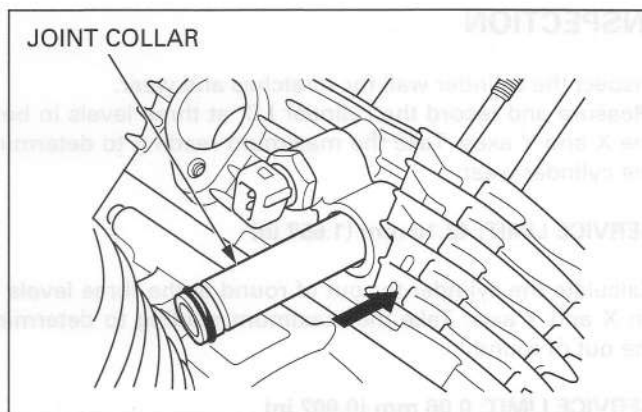
Remove the cylinder head (page 9-10).

Remove the two bolts and water hose from the front cylinder and water pump (Front side only).

Remove the joint collar clips.



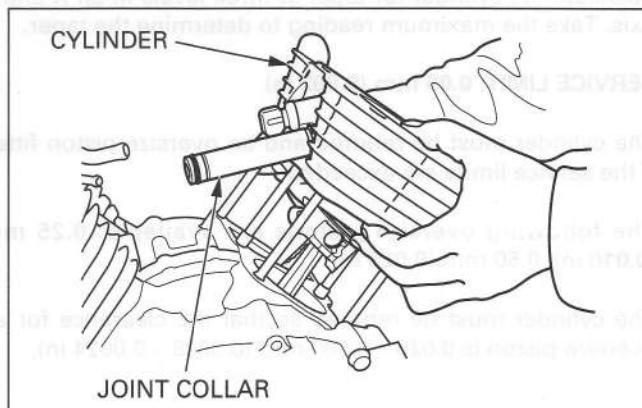
Slide the cylinder joint collar toward the front cylinder.



Remove the cylinder.
Remove the joint collar.

NOTE:

- Attach a piece of mechanic's wire to the cam chain to prevent it from being dropped into the crankcase.
- Be careful not to damage the mating surfaces by using a screwdriver when disassembling the cylinder.

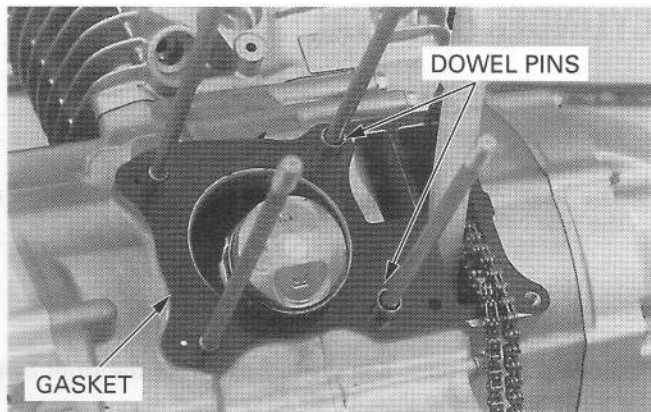


CYLINDER/PISTON

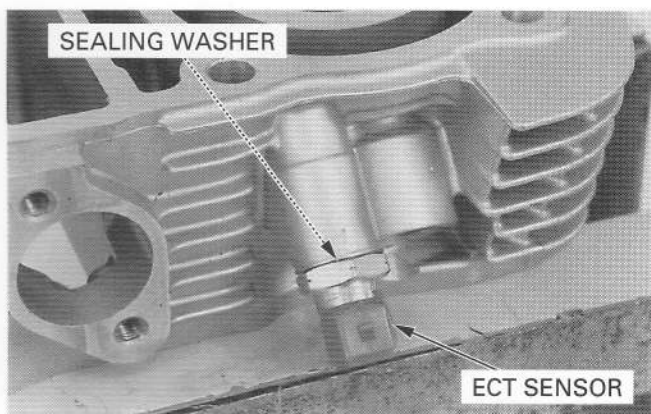
Remove the gasket and dowel pins.
Clean off any gasket material from the cylinder upper surface.

NOTE:

Be careful not to damage the gasket surface.



Remove the engine coolant temperature (ECT) sensor and sealing washer.



INSPECTION

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

SERVICE LIMIT: 42.10 mm (1.657 in)

Calculate the cylinder for out of round at the three levels in an X and Y axis. Take the maximum reading to determine the out of round.

SERVICE LIMIT: 0.06 mm (0.002 in)

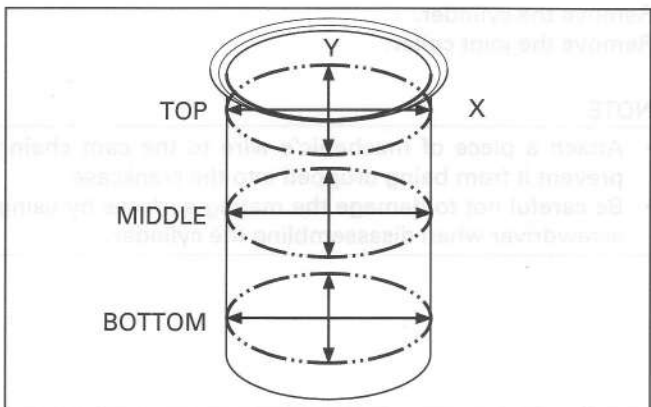
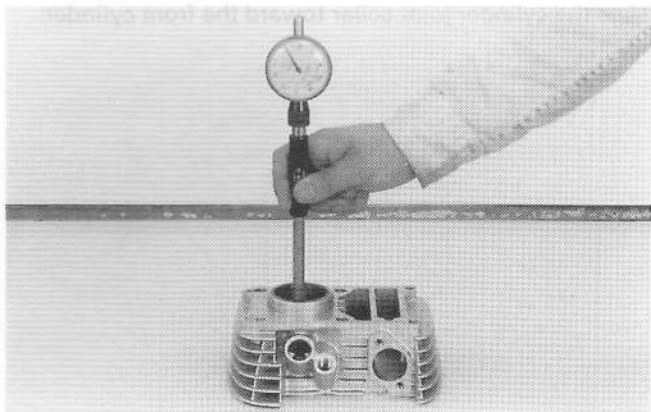
Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.

SERVICE LIMIT: 0.06 mm (0.002 in)

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

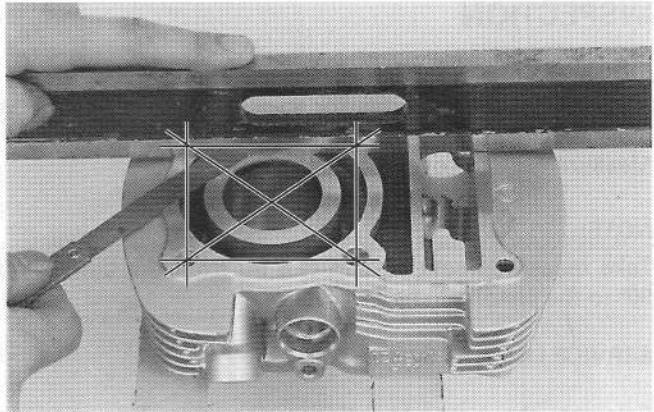
The following oversize pistons are available: 0.25 mm (0.010 in), 0.50 mm (0.020 in).

The cylinder must be rebored so that the clearance for an oversize piston is 0.020 – 0.060 mm (0.0008 – 0.0024 in).



Check the cylinder for warpage by placing a straight edge and a feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)

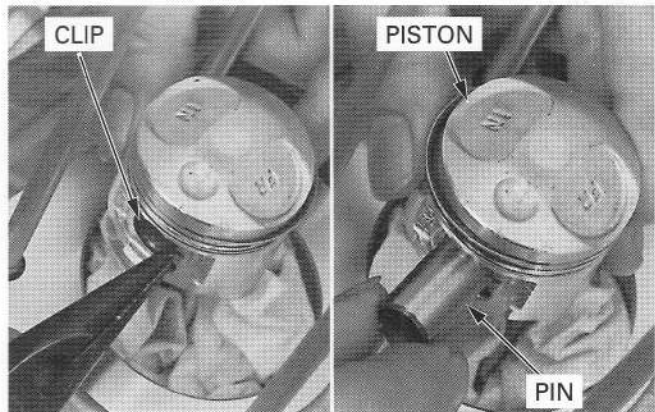


PISTON REMOVAL

NOTE:

- Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.
- The rear piston service using the same procedure as for the front piston.

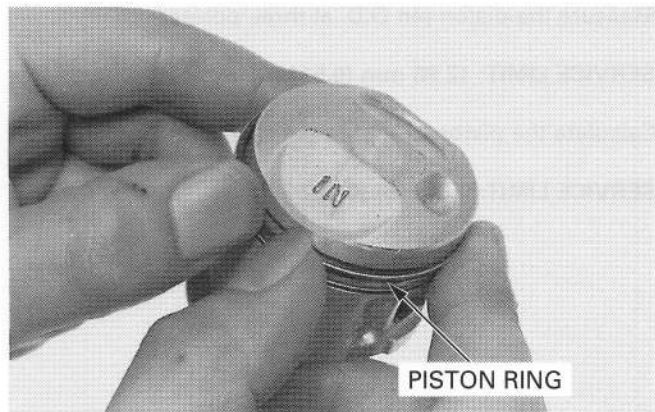
Remove the piston pin clip, piston pin and piston.



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

CAUTION:

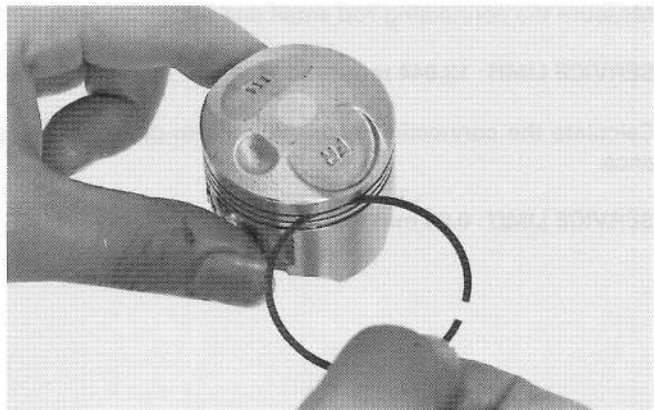
- *Do not damage the piston ring by spreading the ends too far.*
- *Be careful not to damage the piston when the piston ring removal.*



Clean carbon deposits from the piston.

NOTE:

Clean carbon deposits from the piston ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the grooves.



CYLINDER/PISTON

INSPECTION

Inspect the piston for cracks or other damage.
Inspect the ring grooves for excessive wear and carbon build-up.
Measure each piston O.D..

NOTE:

Take measurements 14 mm (0.6 in) from the bottom, and 90° to the piston pin hole.

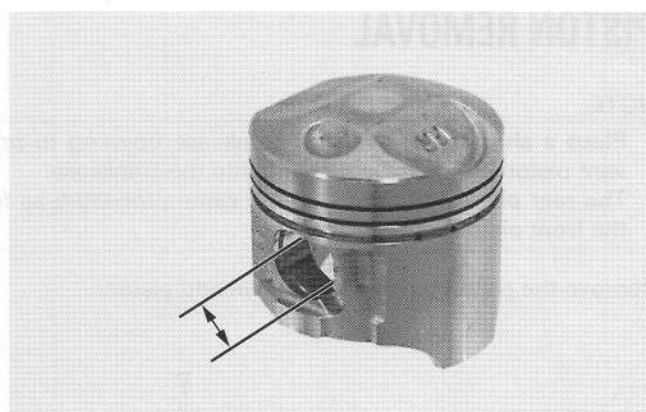
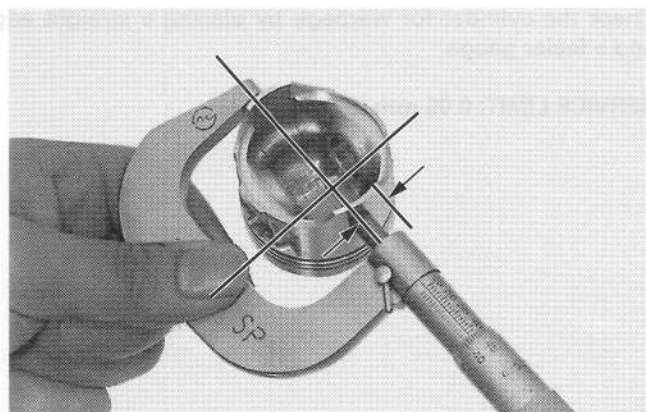
SERVICE LIMIT: 41.90 mm (1.650 in)

Calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance (Cylinder I.D.: page 10-4).

SERVICE LIMIT: 0.10 mm (0.004 in)

Measure each piston pin hole I.D. in an X and Y axis.
Take the maximum reading to determine I.D..

SERVICE LIMIT: 13.04 mm (0.513 in)

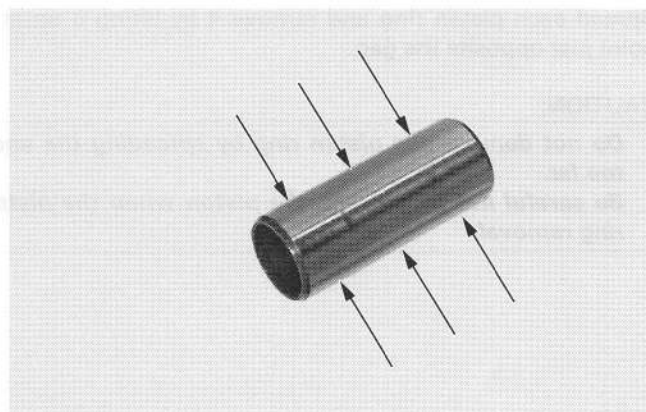


Measure the piston pin O.D. at three points.

SERVICE LIMIT: 12.98 mm (0.511 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)

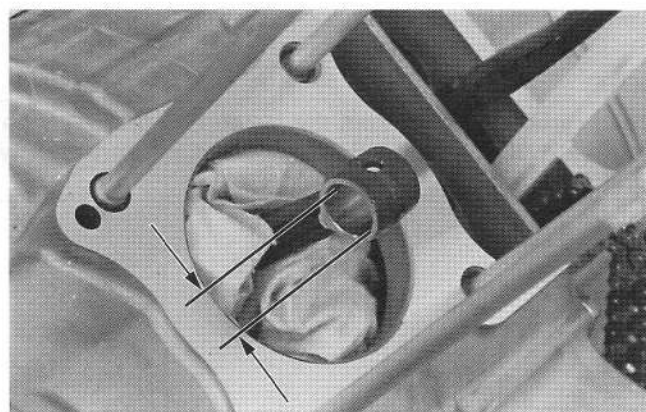


Measure the connecting rod small end I.D..

SERVICE LIMIT: 13.044 mm (0.5135 in)

Calculate the connecting rod small end-to-piston pin clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)



Inspect the piston ring, and replace them if they are worn.

Reinstall the piston rings (page 10-8) into the piston grooves.

Push in the ring until the outer surface of the piston ring is nearly flush with the piston and measure the clearance using a feeler gauge.

SERVICE LIMIT:

Top: 0.080 mm (0.0031 in)

Second: 0.080 mm (0.0031 in)

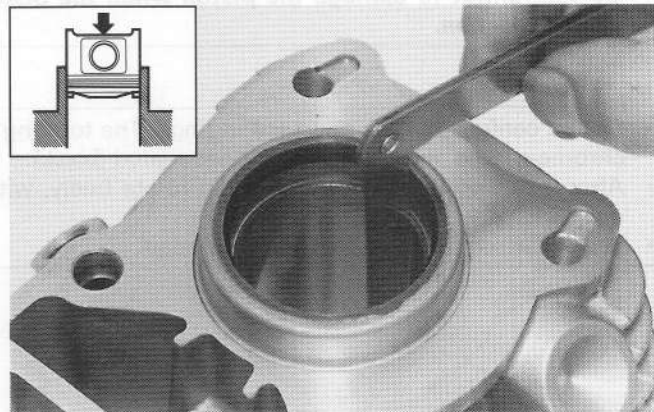
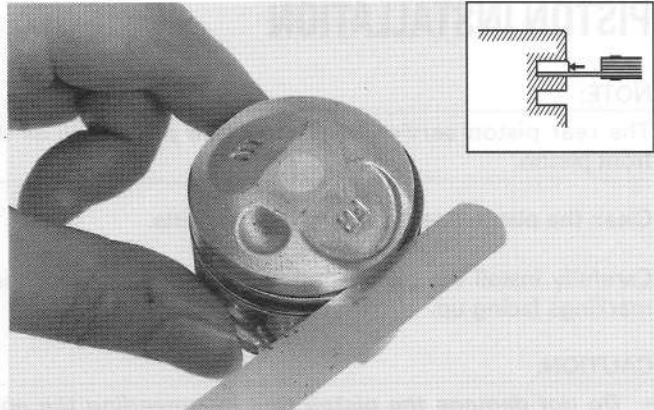
Using a piston, push the ring securely into the cylinder and measure the end gap using a feeler gauge.

SERVICE LIMIT:

Top: 0.30 mm (0.012 in)

Second: 0.50 mm (0.020 in)

Oil 0.80 mm (0.031 in)



CRANKCASE STUD BOLT INSPECTION

Check the stud bolts for looseness.

If the stud bolts are loose, remove the stud bolts and apply engine oil to the threads and tighten the stud bolt securely or replace the stud bolt and clean and apply a locking agent to the new stud bolt threads and tighten the stud bolt securely.

NOTE:

Install the stud bolts with its short thread area side facing to the cylinder head side.

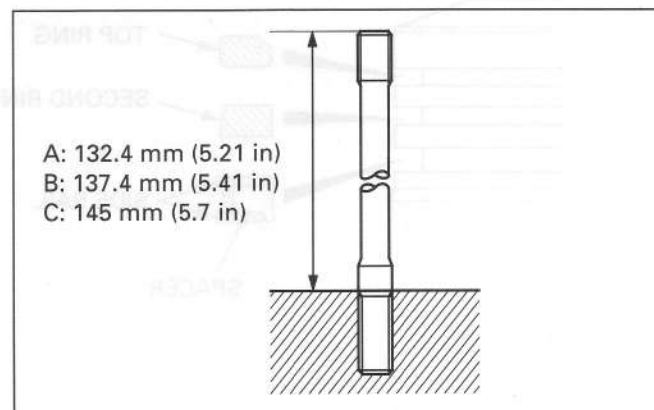
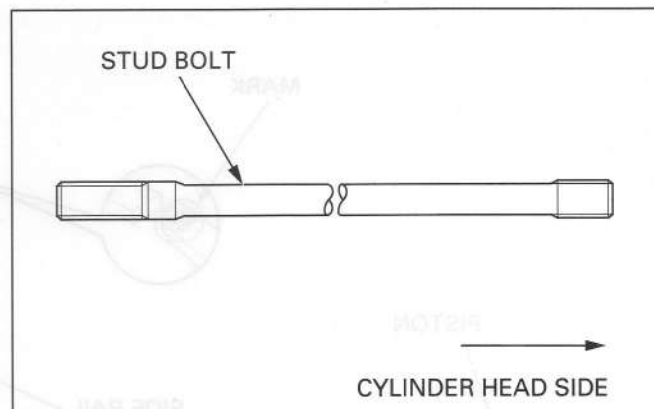
After installing, be sure to measure the length from the top of each stud bolt to crankcase surface.

STANDARD LENGTH:

A. 146 mm/M8, R. Crankcase cover side:
132.4 mm (5.21 in)

B. 146 mm/M8, Cam chain side:
137.4 mm (5.41 in)

C. 160 mm/M6, L. Crankcase cover side:
145 mm (5.7 in)



PISTON INSTALLATION

NOTE:

The rear piston service uses the same procedure as the front piston.

Clean the piston heads, ring lands and skirts.

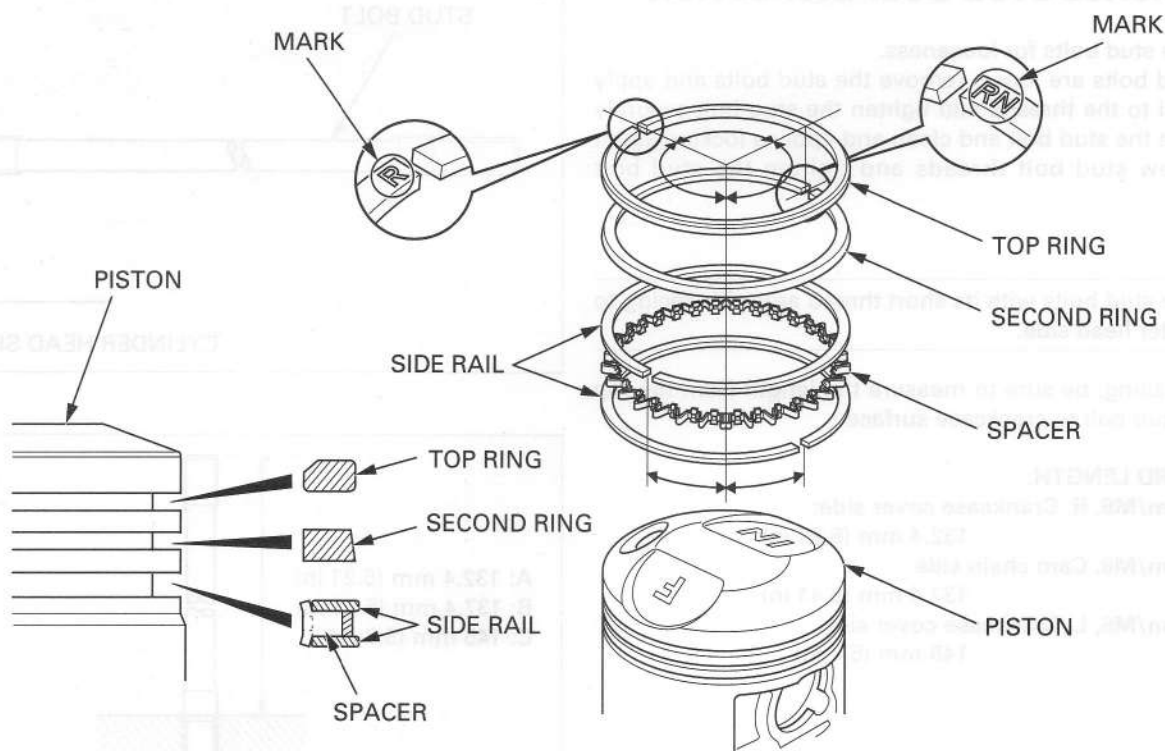
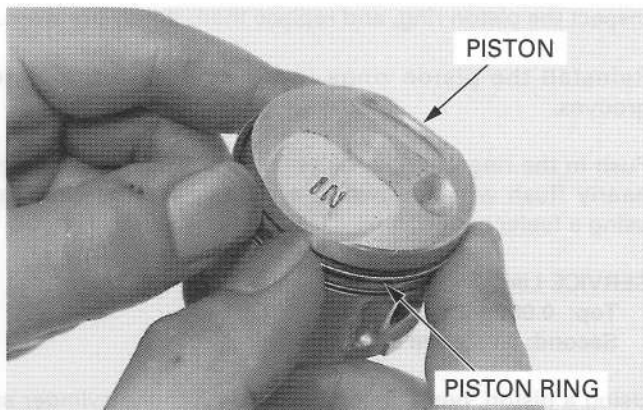
Carefully install the piston rings onto the piston with their markings facing up.

CAUTION:

- **Do not damage the piston ring by spreading the ends too far.**
- **Be careful not to damage the piston when the piston ring installation.**

NOTE:

- Do not confuse the top and second rings: The top ring is chrome-coated and second ring is not coated (black).
- After installing the rings they should rotate freely, without sticking.
- Space the ring end gaps 120 degrees apart.



NOTE:

When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt enter the engine.

Clean any gasket material from the cylinder mating surfaces of the crankcase.

NOTE:

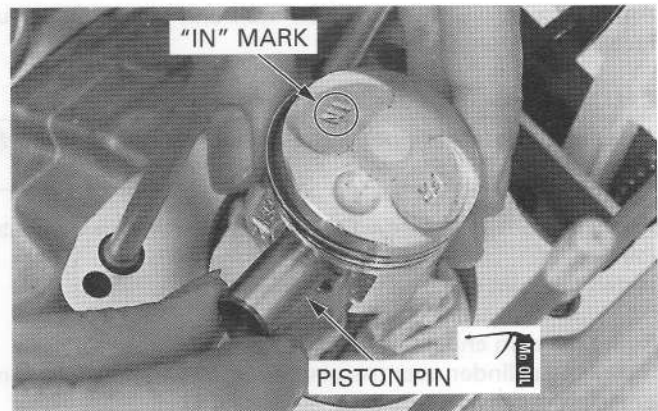
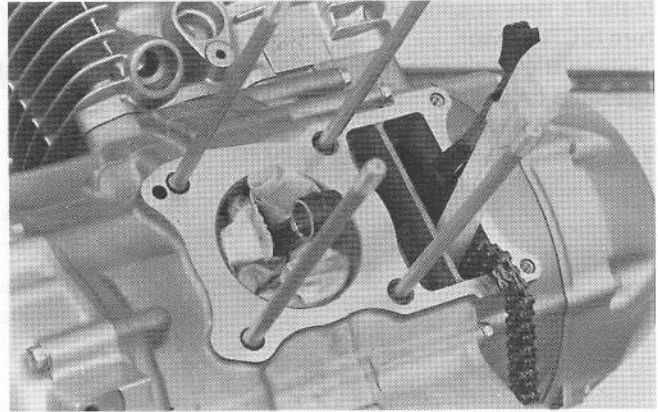
Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.

Apply molybdenum solution to the piston pin outer surfaces.

Apply engine oil to the connecting rod small end and piston pin hole.

Install the piston with its "IN" mark facing the intake side.

Install the piston pin.



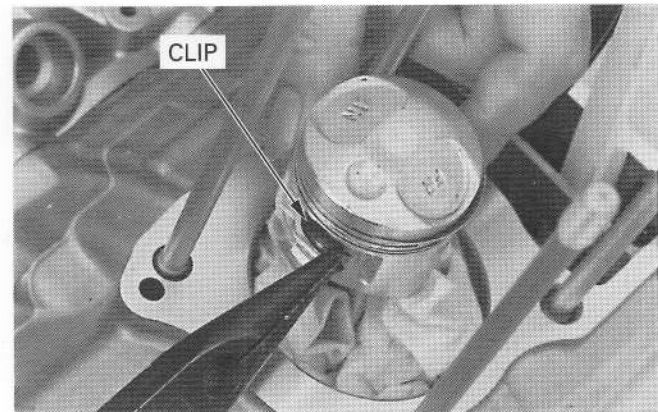
Install the new piston pin clips.

CAUTION:

Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.

NOTE:

- Set the piston pin clip in the groove properly.
- Do not align the clip's end gap with the piston cut-out.

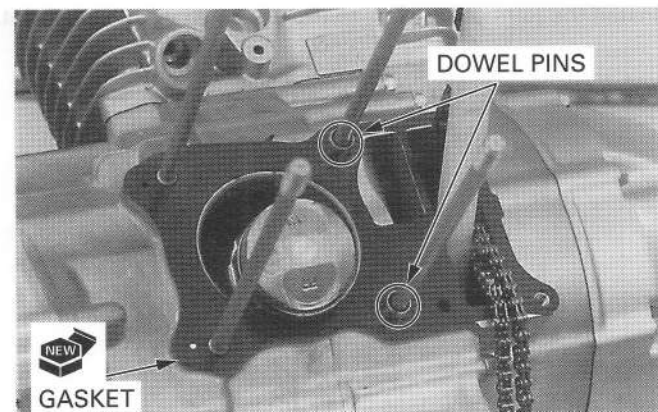


CYLINDER INSTALLATION

NOTE:

- The rear cylinder service using the same procedure as for the front cylinder.
- When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt enter the engine.

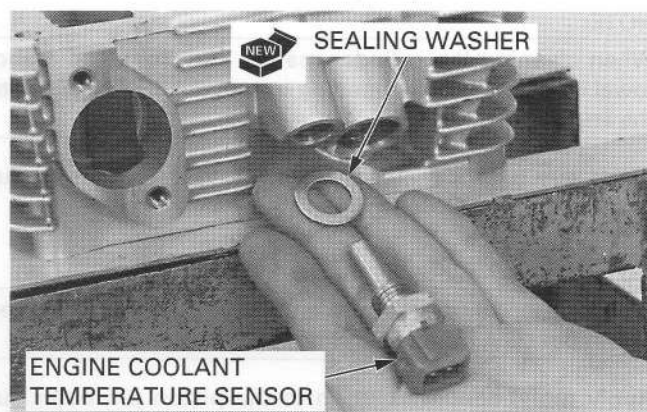
Install the dowel pins and new gasket with the "UP" mark facing up.



CYLINDER/PISTON

Install a new sealing washer and engine coolant temperature (ECT) sensor.
Tighten the engine coolant temperature (ECT) sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



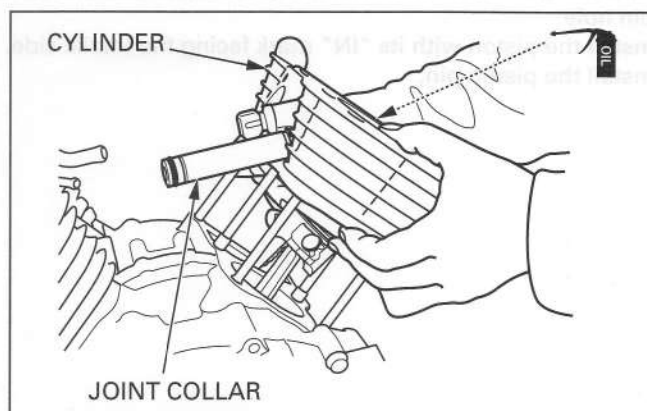
Apply engine oil to the cylinder wall and piston outer surfaces and piston rings.

CAUTION:

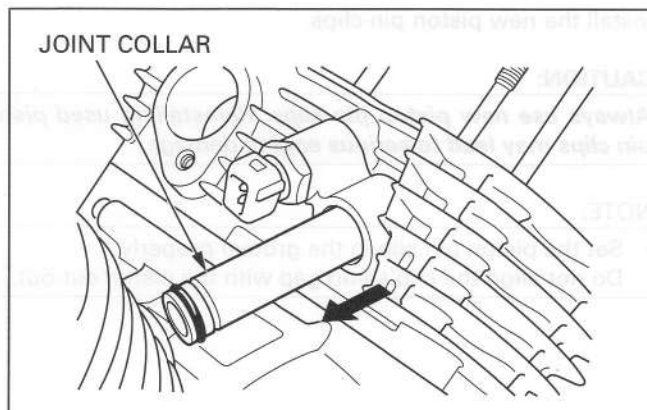
Be careful not to damage the piston rings and cylinder walls.

Apply coolant to the new O-rings and install it to the water joint collar.
Install the joint collar to the front cylinder.

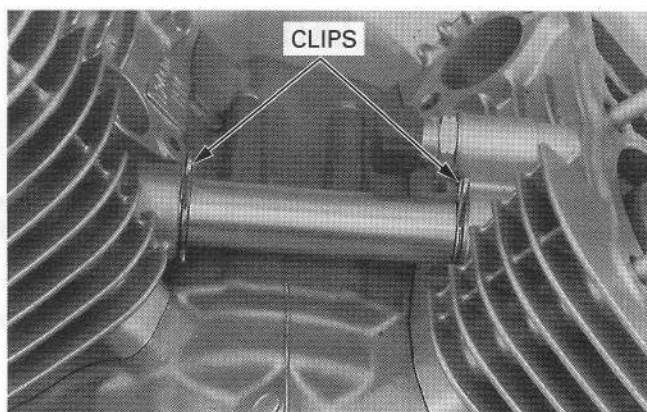
Route the cam chain through the cylinder.
Install the cylinder over the piston rings by hand while compressing the piston rings.



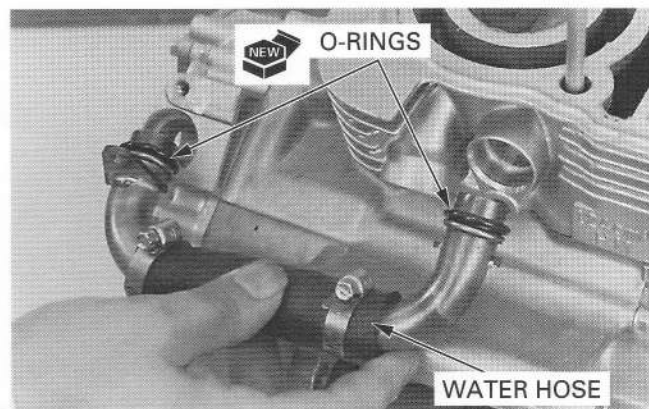
Slide the cylinder joint collar to its original position.



Install the joint collar clips to the groove on the water joint.



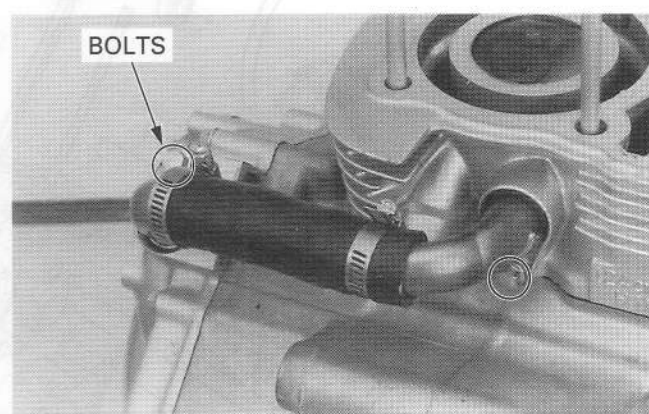
Apply coolant to the new O-rings and install to the water joint.
Install the water joint to the front cylinder and water pump (Front side only).



Install the water joint bolts.

Tighten the bolts securely (Front side only).

Install the cylinder head (page 9-19).



11. CRANKCASE/TRANSMISSION/CRANKSHAFT

SERVICE INFORMATION	11-1	CRANKSHAFT	11-11
TROUBLESHOOTING	11-2	CRANKCASE BEARING REPLACEMENT	11-13
CRANKCASE SEPARATION	11-3	CRANKCASE ASSEMBLY	11-16
TRANSMISSION	11-4		

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the transmission and crankshaft. To service these parts, the engine must be removed from the frame.
- The following components must be removed before separating the crankcase.
 - Oil pump (section 4)
 - Clutch, gearshift linkage (section 8)
 - Cylinder head (section 9)
 - Cylinder and piston (section 10)
 - Starter motor, Starter clutch, primary drive gear (section 17)
 - Flywheel (section 15)

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M4, M5, C1, C2	23.000 – 23.021 (0.9055 – 0.9063)	23.04 (0.907)
		C3	25.020 – 25.041 (0.9850 – 0.9859)	25.06 (0.987)
	Bushing O.D.	M4, M5, C1, C2	22.959 – 22.980 (0.9039 – 0.9047)	22.94 (0.903)
		C3	24.979 – 25.000 (0.9834 – 0.9843)	24.96 (0.983)
	Bushing I.D.	M4	20.020 – 20.041 (0.7882 – 0.7890)	20.06 (0.790)
		C1	18.000 – 18.018 (0.7087 – 0.7094)	18.04 (0.710)
		C2	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
		C3	22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
	Gear-to-bushing clearance	M4, M5, C1, C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Mainshaft O.D.	M4 bushing	19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)
	Countershaft O.D.	C1 bushing	17.966 – 17.984 (0.7073 – 0.7080)	17.95 (0.707)
		C2 bushing	19.974 – 19.987 (0.7864 – 0.7869)	19.95 (0.785)
		C3 bushing	21.959 – 21.980 (0.8645 – 0.8654)	21.94 (0.864)
	Bushing-to-shaft clearance	M4	0.040 – 0.082 (0.0016 – 0.0032)	0.10 (0.004)
		C1	0.016 – 0.052 (0.0006 – 0.0020)	0.08 (0.003)
		C2	0.013 – 0.047 (0.0005 – 0.0019)	0.08 (0.003)
		C3	0.020 – 0.062 (0.0008 – 0.0024)	0.09 (0.004)
Shift fork	I.D.		12.000 – 12.018 (0.4724 – 0.4731)	12.03 (0.474)
	Claw thickness		4.930 – 5.000 (0.1941 – 0.1969)	4.9 (0.19)
Shift fork shaft O.D.			11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)
Shift drum O.D. (at left side journal)			13.966 – 13.984 (0.5498 – 0.5506)	13.94 (0.549)
Crankshaft	Connecting rod big end side clearance		0.05 – 0.70 (0.002 – 0.028)	0.80 (0.031)
	Connecting rod big end radial clearance		————	0.020 (0.0008)
	Runout		————	0.05 (0.002)

TORQUE VALUES

Mainshaft bearing setting plate bolt 10 N·m (1.0 kgf·m, 7 lbf·ft) Apply to locking agent.
Shift drum bearing setting plate bolt

TOOLS

BUniversal bearing puller	07631 - 0010000
Attachment, 32 x 35 mm	07746 - 0010100
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 17 mm	07746 - 0040400
Pilot, 25 mm	07746 - 0040600
Pilot, 15 mm	07746 - 0040300
Pilot, 20 mm	07746 - 0040500
Driver	07749 - 0010000
Bearing remover set, 15 mm	07936 - KC10000
— bearing remover head	07936 - KC10100
— remover shaft	07936 - KC10200
— remover weight	07411 - 0010201
Mechanical seal driver	07PMD - KBP0100
Crankshaft assembly collar	07965 - VM00100
Crankshaft assembly shaft	07965 - VM00200
Bearing installer 37.42	07XMF - KGB0100
Bearing installer 37.5	07XMF - KGB0200
Plate, 200 x 300 x 20	07XMF - KGB0300

TROUBLESHOOTING

Engine noise

- Worn crankshaft bearing
- Worn connecting rod big end bearing
- Worn transmission bearing

Transmission jumps out of gear

- Worn gear dogs and slots
- Bent or damaged shift fork
- Bent shift fork shaft
- Damaged shift drum stopper arm

Hard to shift

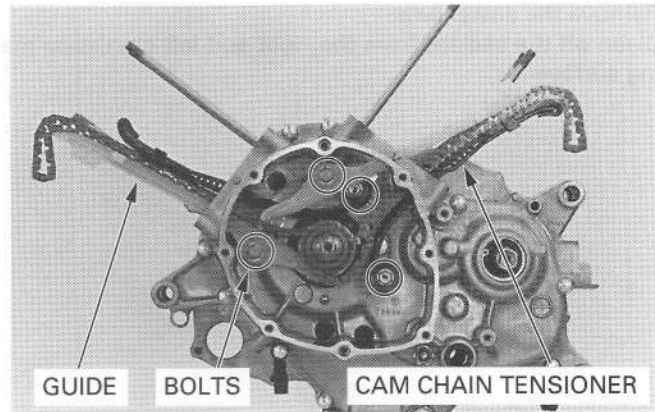
- Clutch not adjusted properly
- Bent shift fork
- Bent shift fork shaft
- Worn or damaged shift drum cam grooves

CRANKCASE SEPARATION

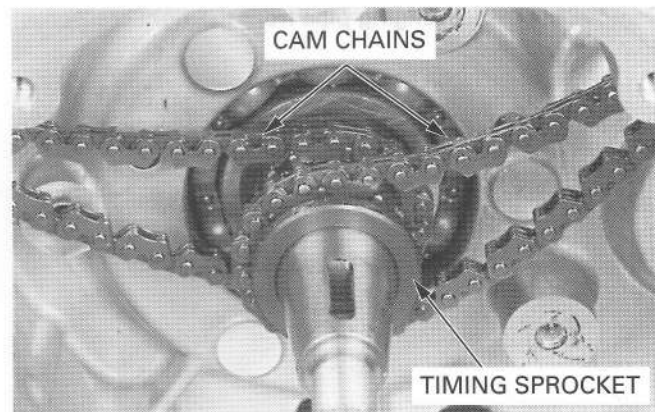
NOTE:

Refer to page 11-1 for the parts which must be removed before separating the crankcase.

Remove the bolts, washers, collars, cam chain guides and cam chain tensioners.

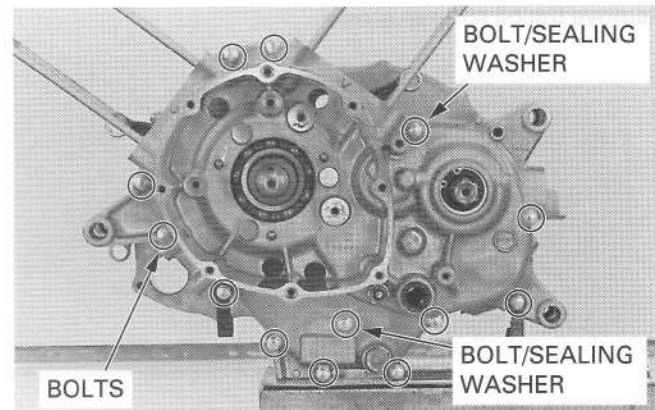


Remove the cam chains from the timing sprocket.

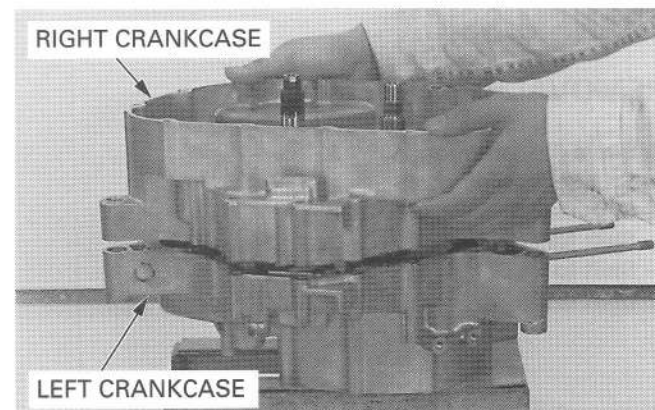


Loosen the left crankcase bolts in a crisscross pattern in 2 or 3 steps to prevent crankcase distortion.

Remove the left crankcase bolts and sealing washers.



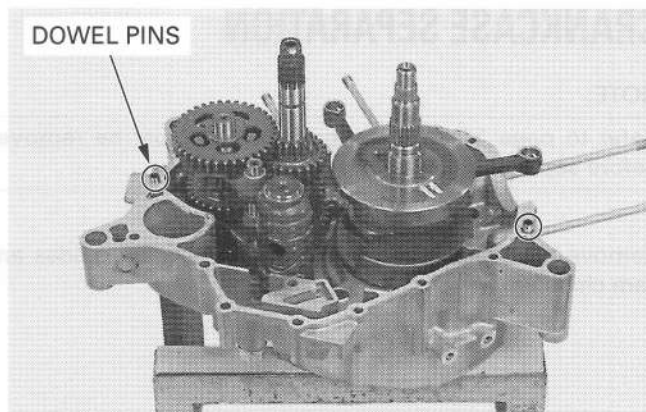
Place the crankcase with the left side down and remove the right crankcase.



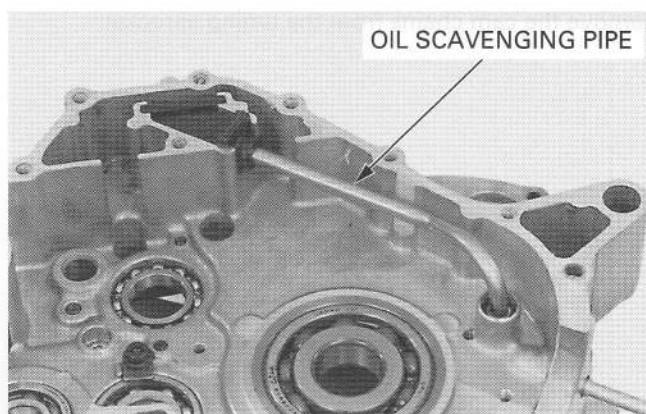
CRANKCASE/TRANSMISSION/CRANKSHAFT

Remove the dowel pins.

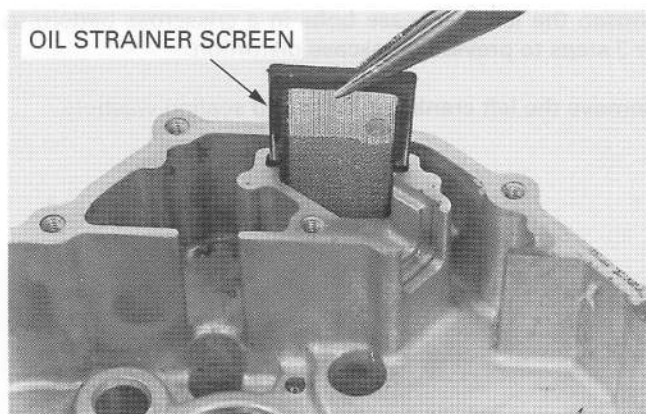
Clean off the sealant from the right and left crankcase mating surface.



Remove the oil scavenging pipe from the right crankcase.



Remove the oil strainer screen.

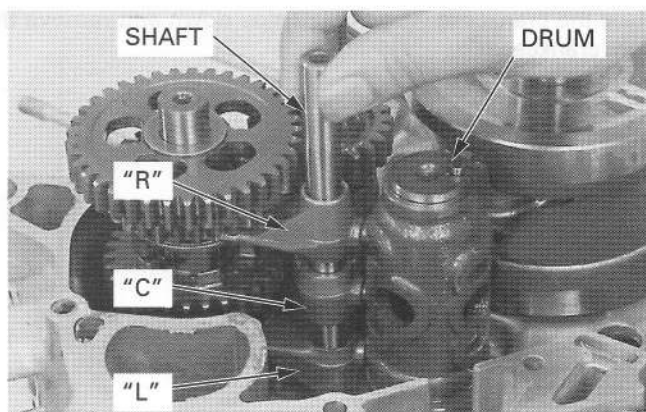


TRANSMISSION

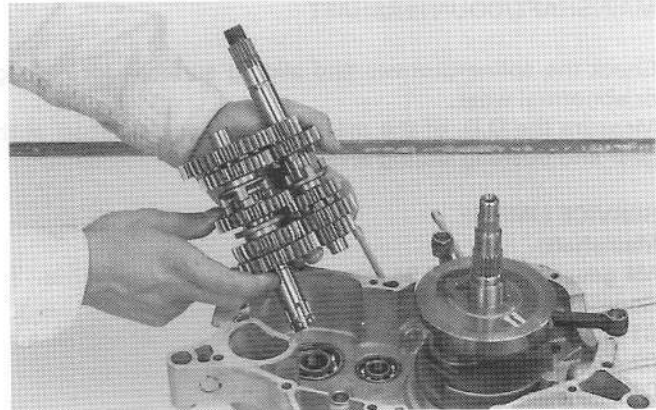
REMOVAL/DISASSEMBLY

Remove the following:

- Shift fork guide shaft
- Shift fork R
- Shift fork C
- Shift fork L
- Shift drum



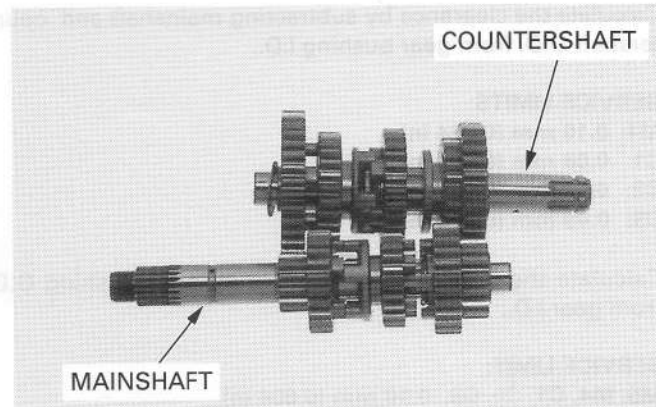
Remove the mainshaft and countershaft as an assembly.



Disassemble the mainshaft and countershaft.

NOTE:

- Keep track of the disassembled parts (gears, bushings, washers, and snap rings) by stacking them on a tool or slipping them onto a piece of wire.
- Do not expand the snap ring more than necessary for removal. To remove a snap ring, expand the snap ring and pull it off using the gear behind it.



INSPECTION

GEAR

Check the gear dogs, dog holders and teeth for damage or excessive wear.

Measure the I.D. of each gears.

SERVICE LIMITS:

M4, M5, C1, C2: 23.04 mm (0.907 in)

C3: 25.06 mm (0.987 in)

BUSHING

Check the bushings for damage or excessive wear.

Measure the O.D. of each bushings.

SERVICE LIMITS:

M4, M5, C1, C2: 22.94 mm (0.903 in)

C3: 24.96 mm (0.983 in)

Measure the I.D. of each bushings.

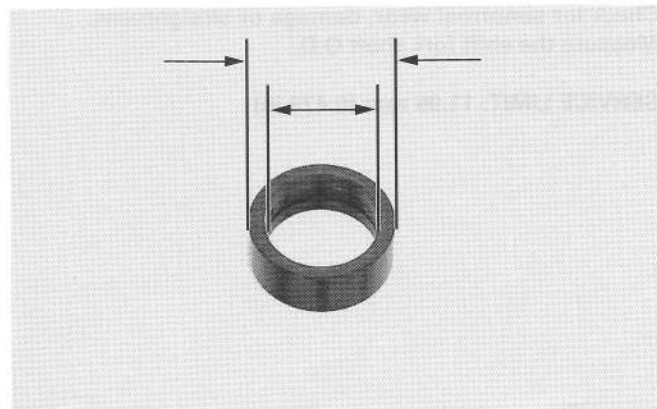
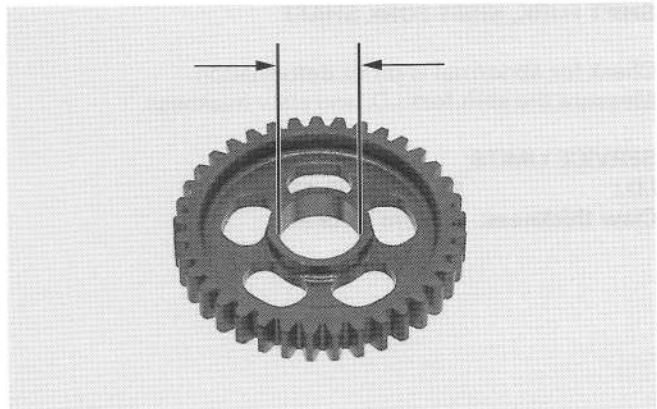
SERVICE LIMITS:

M4: 20.06 mm (0.790 in)

C1: 18.04 mm (0.710 in)

C2: 20.04 mm (0.789 in)

C3: 22.04 mm (0.868 in)



CRANKCASE/TRANSMISSION/CRANKSHAFT

MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for damage or abnormal wear.

Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.

SERVICE LIMITS:

Mainshaft:

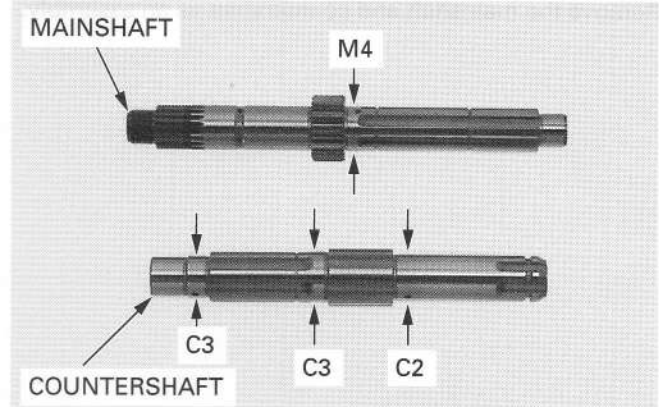
M4 gear bushing: 19.94 mm (0.785 in)

Countershaft:

C1 gear bushing: 17.95 mm (0.707 in)

C2 gear bushing: 19.95 mm (0.785 in)

C3 gear bushing: 21.94 mm (0.864 in)



Calculate the clearance by subtracting mainshaft and countershaft O.D. from gear bushing I.D..

SERVICE LIMITS:

M4: 0.10 mm (0.004 in)

C1: 0.08 mm (0.003 in)

C2: 0.08 mm (0.003 in)

C3: 0.09 mm (0.004 in)

Calculate the clearance by subtracting gear bushing O.D. from gear I.D..

SERVICE LIMIT:

M5, M4, C1, C2, C3: 0.10 mm (0.004 in)

SHIFT FORK, SHIFT FORK SHAFT

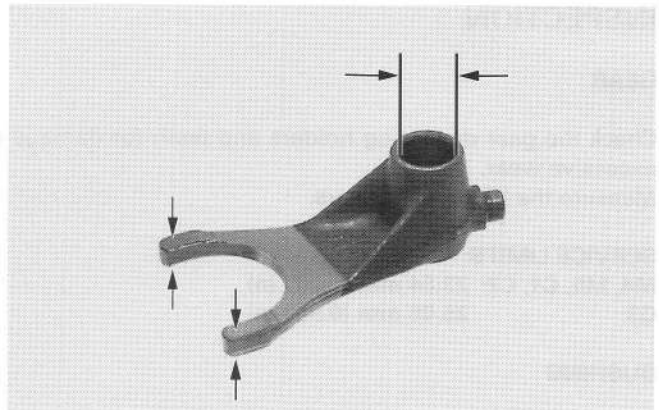
Check for abnormal wear or deformation.

Measure the shift fork I.D. and claw thickness.

SERVICE LIMITS:

I.D.: 12.03 mm (0.474 in)

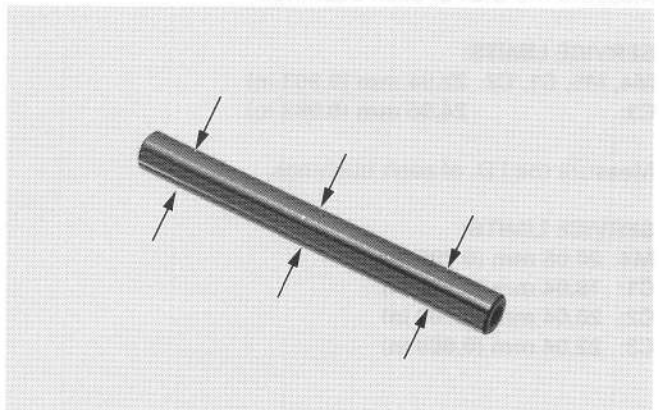
Claw thickness: 4.9 mm (0.19 in)



Check for abnormal wear, damage or straightness.

Measure the shift fork shaft O.D..

SERVICE LIMIT: 11.95 mm (0.470 in)

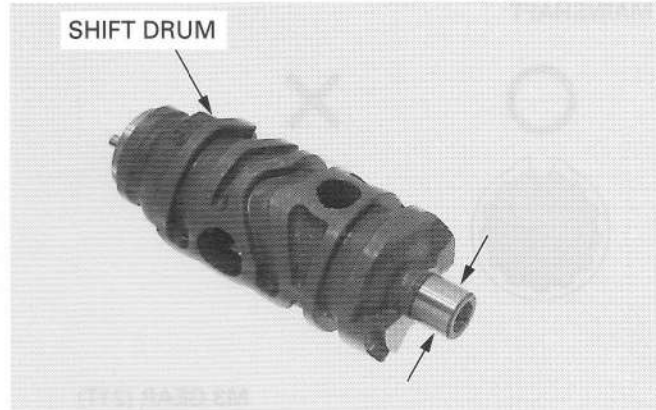


SHIFT DRUM

Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication. Check the shift drum grooves for damage.

Measure the shift drum shaft O.D. at the left side journal.

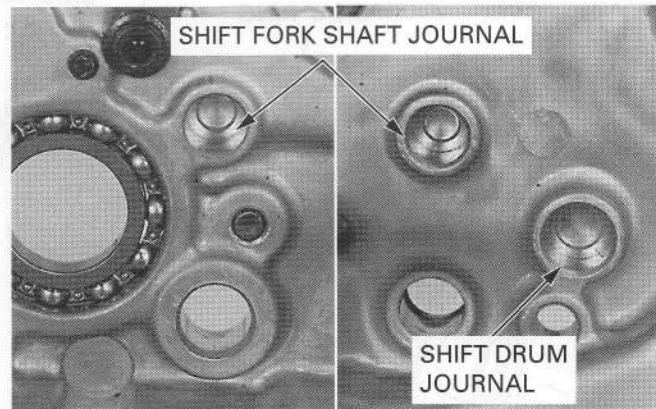
SERVICE LIMIT: 13.94 mm (0.549 in)



SHIFT DRUM JOURNAL, SHIFT FORK SHAFT JOURNAL

Check the right and left crankcase shift fork shaft journal for wear or damage.

Check the left crankcase shift drum journal for wear or damage.



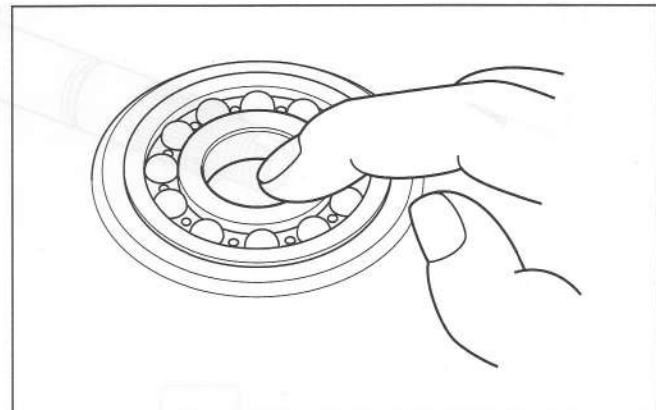
TRANSMISSION BEARING

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 crankcase.

Replace the bearings if the race does not turn smoothly and quietly, or if they fit loosely in the crankcase (page 11-13).



ASSEMBLY

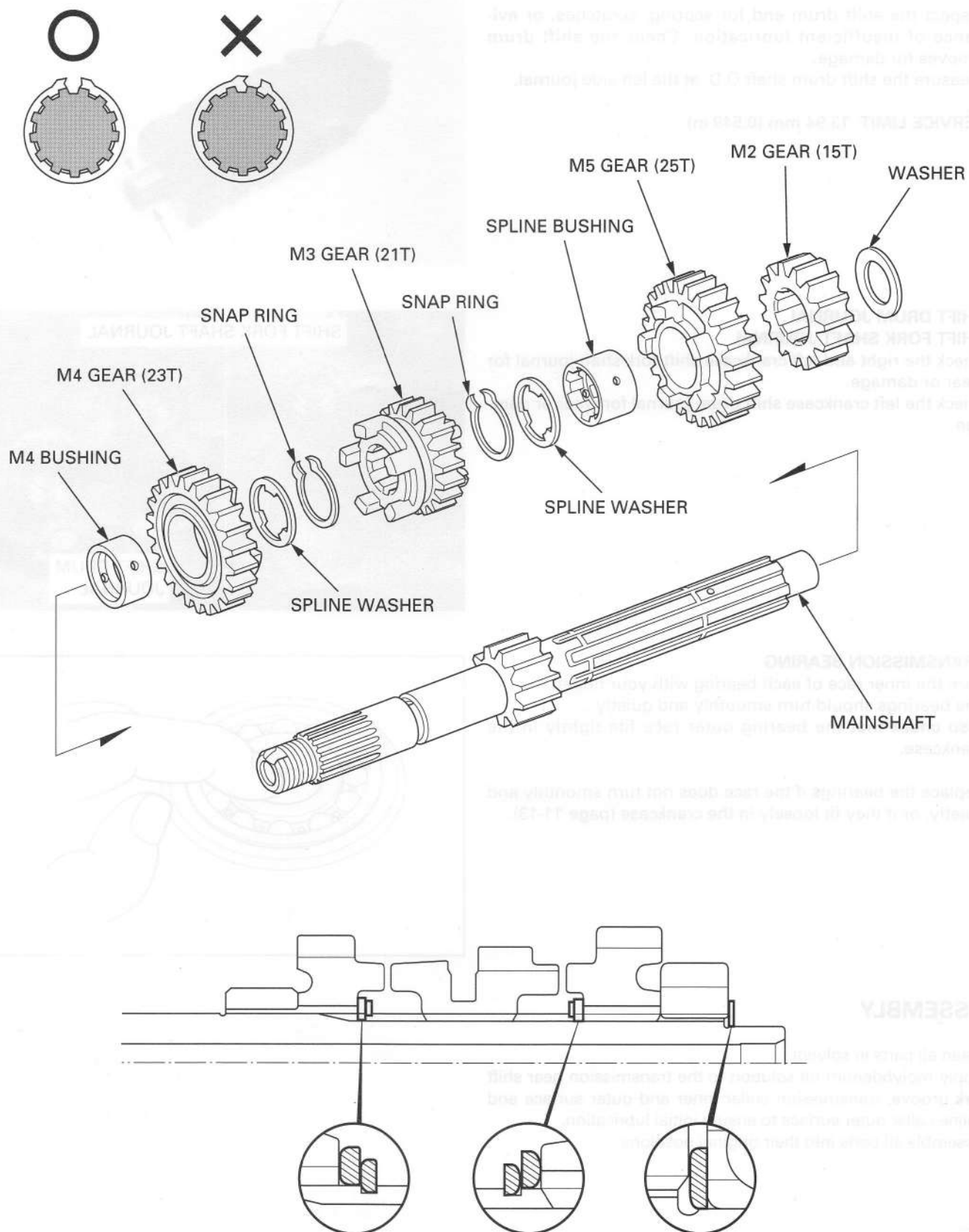
Clean all parts in solvent.

Apply molybdenum oil solution to the transmission gear shift fork groove, transmission collar inner and outer surface and spline collar outer surface to ensure initial lubrication.

Assemble all parts into their original positions.

CRANKCASE/TRANSMISSION/CRANKSHAFT

MAINSHAFT

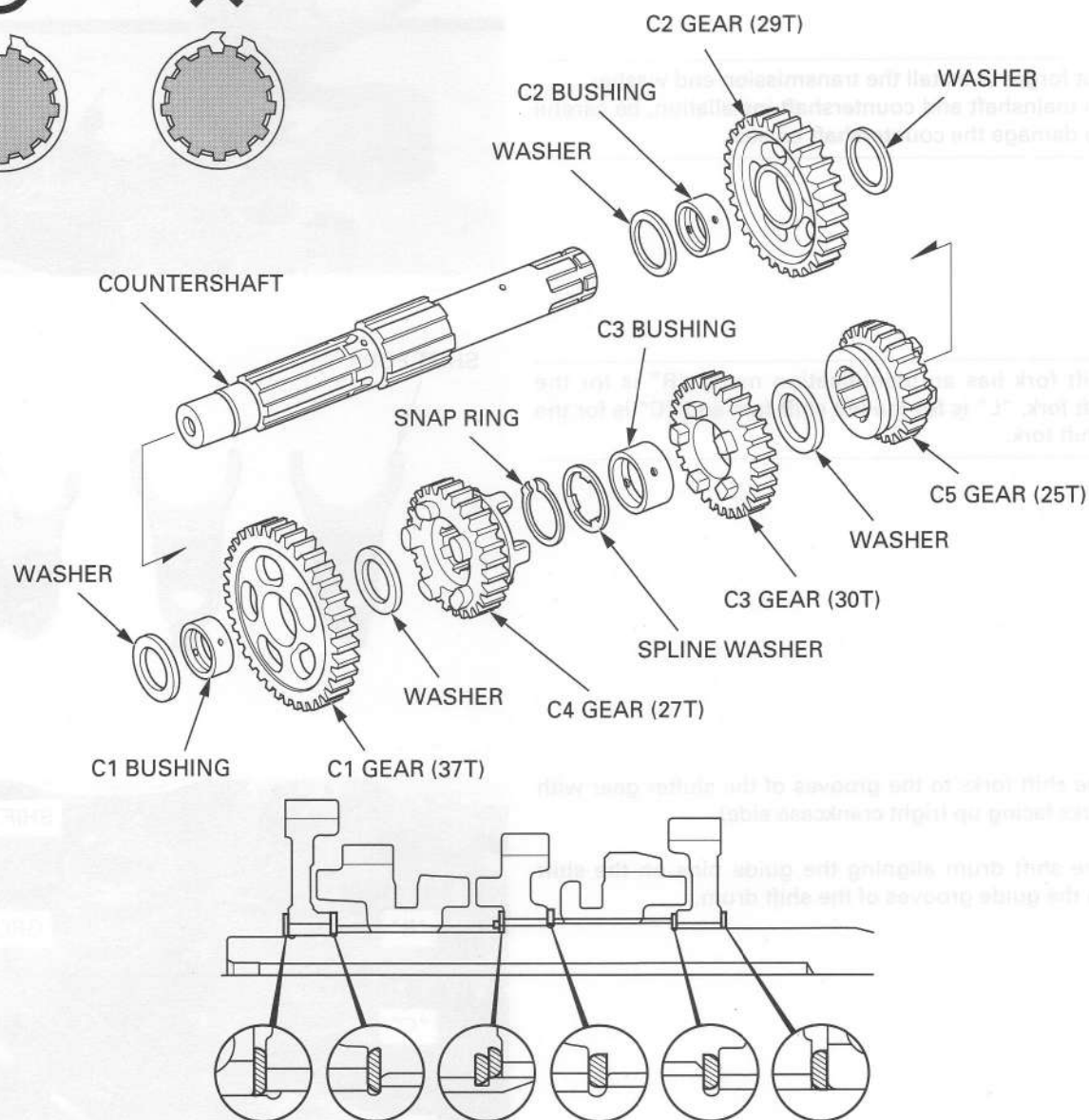


COUNTERSHAFT

INSTALL THE COUNTERSHAFT AND COUNTERGEAR TO THE LEFT CRANKCASE.

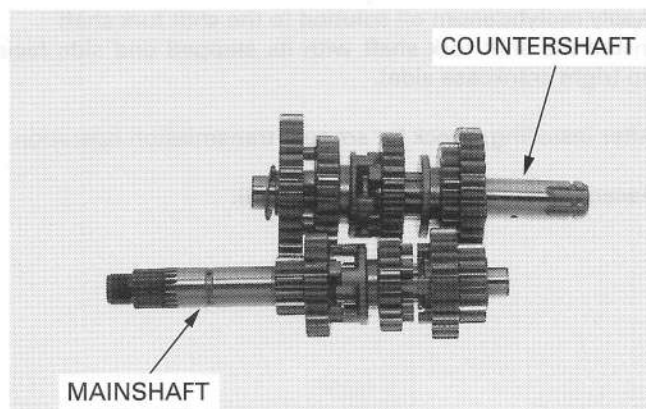
INSTALLATION

NOTE:



NOTE:

- Check the gear freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edge facing the thrust load side.
- Do not reuse worn snap rings which could easily spin in the grooves.
- Check that the snap rings are seated in the grooves. Align their end gaps with the grooves of the spline.



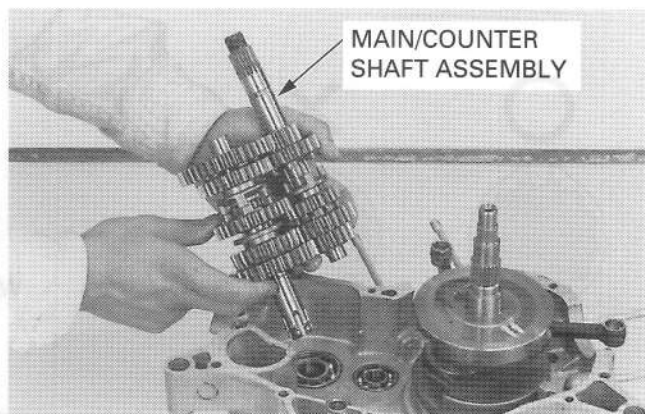
CRANKCASE/TRANSMISSION/CRANKSHAFT

INSTALLATION

Install the mainshaft and countershaft to the left crankcase as assembly.

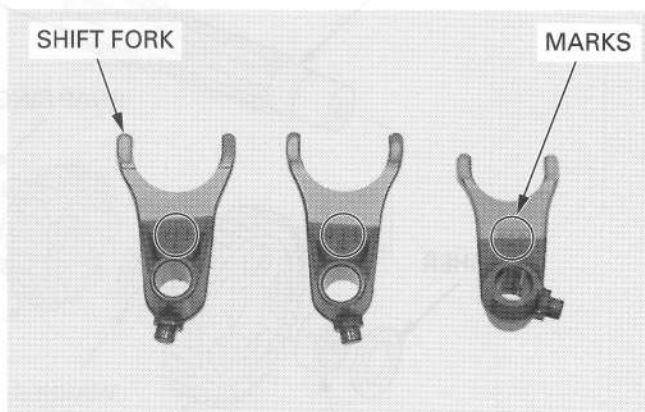
NOTE:

- Do not forget to install the transmission end washer.
- When mainshaft and countershaft installation, be careful not to damage the countershaft oil seal.



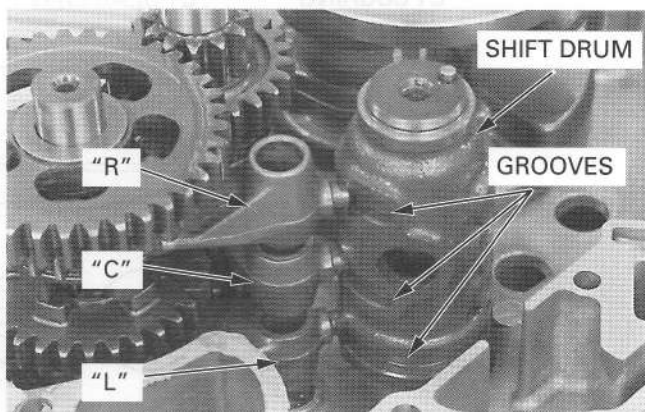
NOTE:

Each shift fork has an identification mark; "R" is for the right shift fork, "L" is for the left shift fork and "C" is for the center shift fork.



Install the shift forks to the grooves of the shifter gear with their marks facing up (right crankcase side).

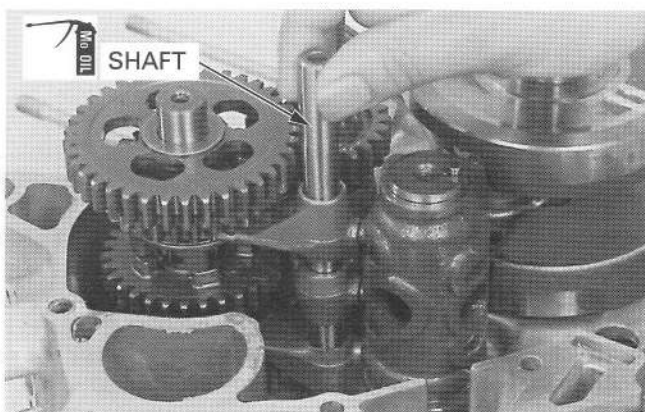
Install the shift drum aligning the guide pins on the shift fork with the guide grooves of the shift drum.



Apply molybdenum oil solution to the shift fork shaft. Install the shift fork shaft with its stepped end side facing up (right crankcase side).

After installing, check for smooth transmission operation.

Assemble the crankcase (page 11-16).



CRANKSHAFT

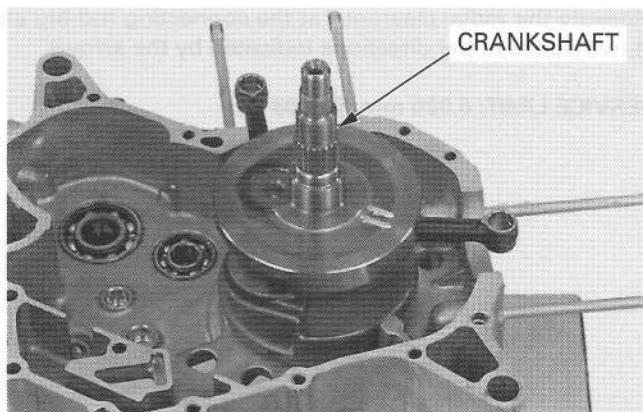
REMOVAL

Separate the crankcase (page 11-3).
Remove the transmission (page 11-4).

Remove the crankshaft from the crankcase using a hydraulic press.

CAUTION:

Be careful not to damage the crankcase mating surface and crankshaft assembly.



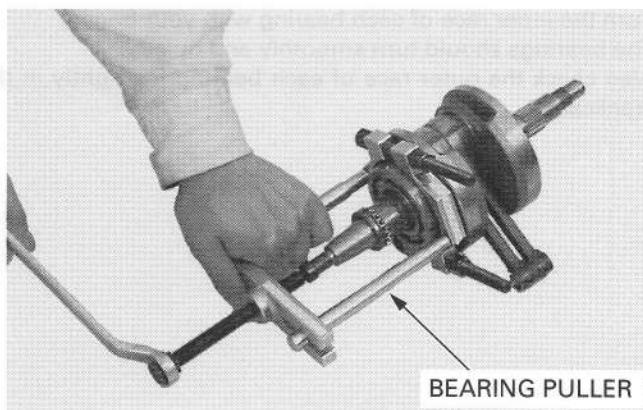
If the crankshaft bearing is left on the crankshaft, remove them using the bearing puller with a protector.

TOOL:

Universal bearing puller 07631 - 0010000

NOTE:

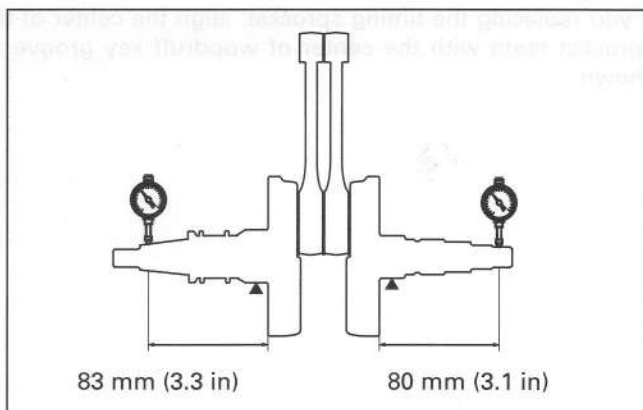
Always replace the left bearing with a new one if it comes out with the crankshaft.



INSPECTION

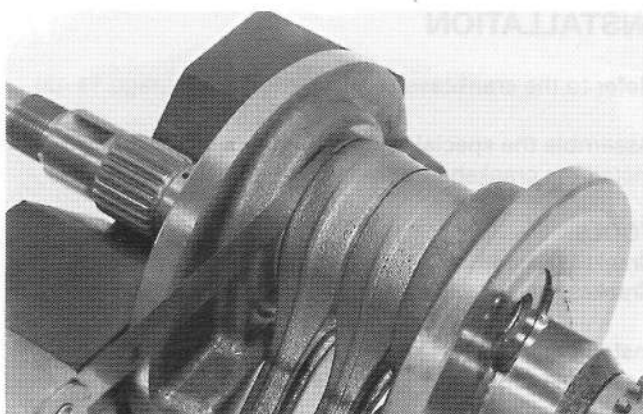
Place the crankshaft on a stand or V-blocks.
Set the indicator on the crankshaft journal.
Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.05 mm (0.002 in)



Measure the connecting rod big end side clearance between the connecting rod big end and the crankshaft weight with a feeler gauge.

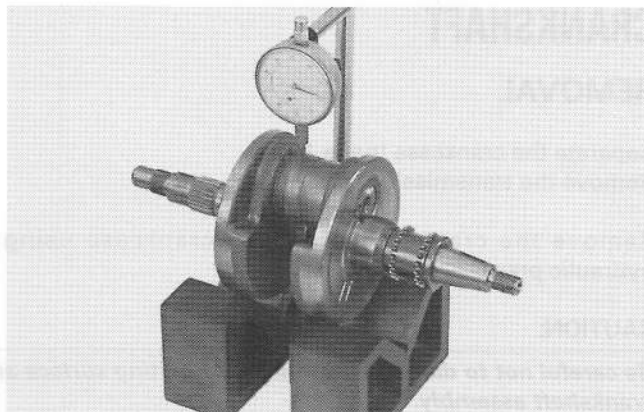
SERVICE LIMIT: 0.80 mm (0.031 in)



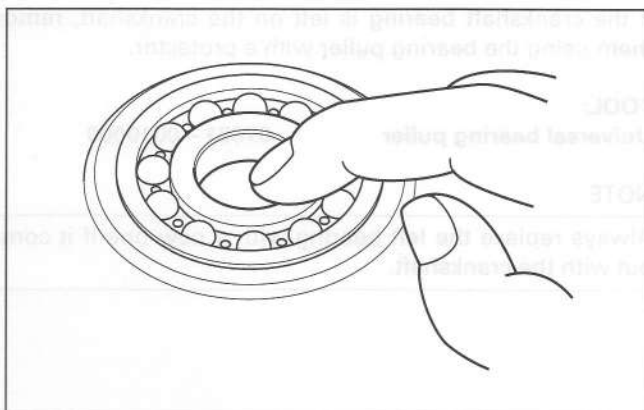
CRANKCASE/TRANSMISSION/CRANKSHAFT

Measure the radial clearance at the connecting rod big end, at two points in the directions indicated by the arrows.

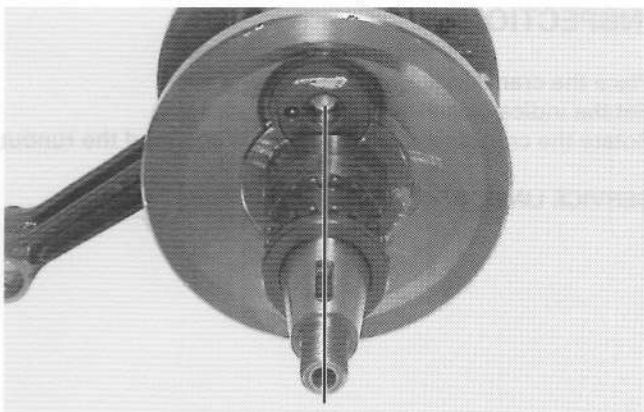
SERVICE LIMIT: 0.020 mm (0.0008 in)



Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check the outer race of each bearing fits tightly in the crankcase.



If you replacing the timing sprocket, align the center of the sprocket teeth with the center of woodruff key groove as shown.



INSTALLATION

Refer to the crankcase bearing installation (page 11-13).

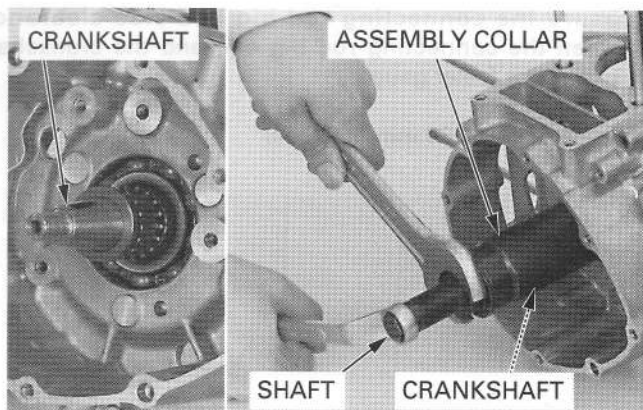
Assemble the special tools onto the crankshaft.
Install the crankshaft drawing it.

TOOLS:

Crankcase assembly collar
Crankcase assembly shaft

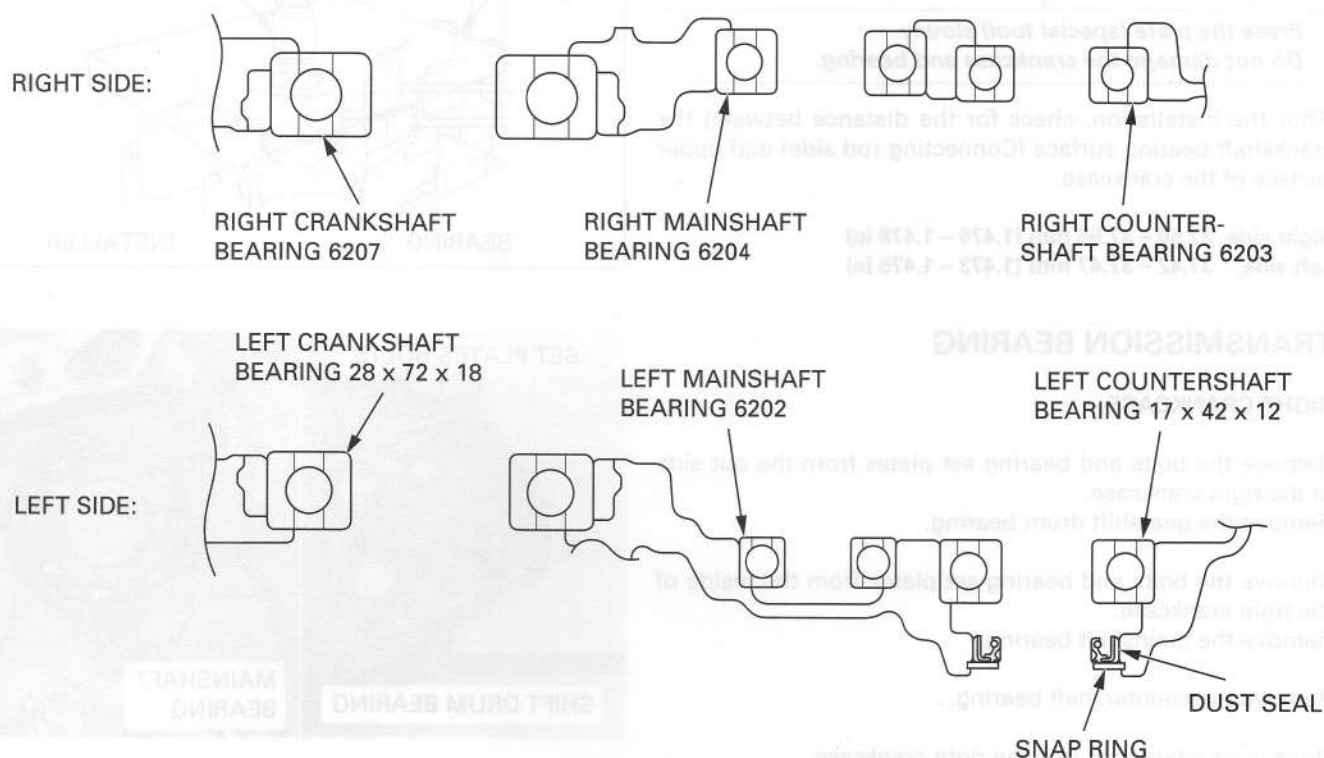
07965 - VM00100
07965 - VM00200

Install the transmission (page 11-10).
Assemble the crankcase (page 11-16).



CRANKCASE BEARING REPLACEMENT

CRANKCASE BEARING/ DUST SEAL LOCATION



CRANKSHAFT BEARING

Remove the bearings from crankcase halves.

Clean the crankcase mating surface thoroughly, be careful not to damage the mating surface.

Apply engine oil to the new crankshaft bearing and place it on the crankcase.

Set the installer (special tool) into the inner race of the bearing.

Place the plate (special tool) over the installer (special tool).

NOTE:

Installer (special tool) has an identification mark.

TOOLS:

Right side:

Installer, 37.5 BRG.

07XMF - KGB0200

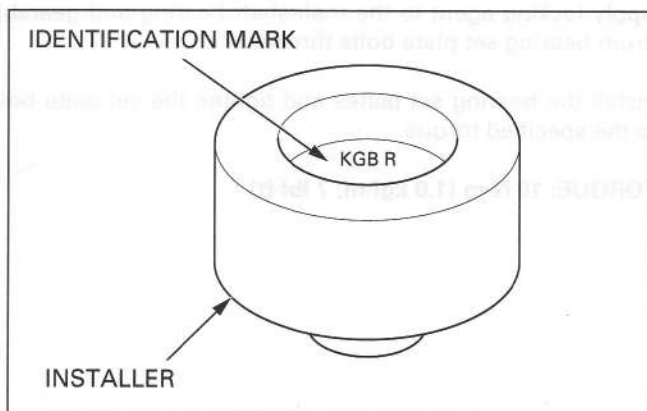
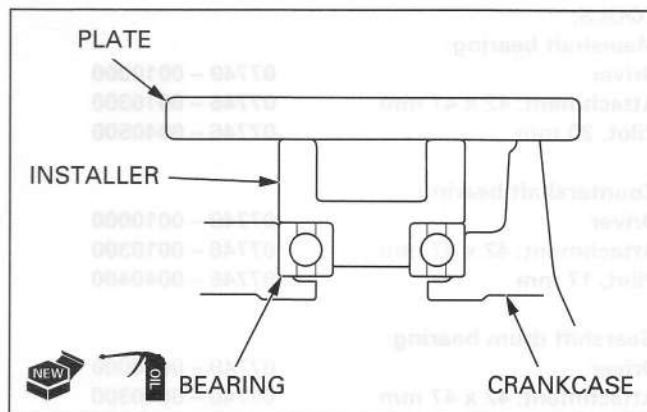
Left side:

Installer, 37.42 BRG.

07XMF - KGB0100

Plate, 200 x 300 x 20

07XMF - KGB0300



CRANKCASE/TRANSMISSION/CRANKSHAFT

Press the center of the plate (special tool) using a hydraulic press until the plate (special tool) touch with the crankcase surface.

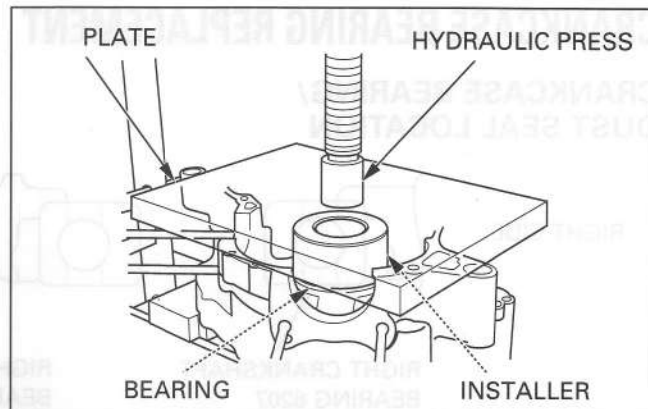
CAUTION:

- **Press the plate (special tool) slowly.**
- **Do not damage the crankcase and bearing.**

After the installation, check for the distance between the crankshaft bearing surface (Connecting rod side) and upper surface of the crankcase.

Right side: 37.50 – 37.55 mm (1.476 – 1.478 in)

Left side: 37.42 – 37.47 mm (1.473 – 1.475 in)



TRANSMISSION BEARING

RIGHT CRANKCASE

Remove the bolts and bearing set plates from the out side of the right crankcase.

Remove the gearshift drum bearing.

Remove the bolts and bearing set plates from the inside of the right crankcase.

Remove the mainshaft bearing.

Remove the countershaft bearing.

Drive in new bearings into the right crankcase.

TOOLS:

Mainshaft bearing:

Driver	07749 – 0010000
Attachment: 42 x 47 mm	07746 – 0010300
Pilot, 20 mm	07746 – 0040500

Countershaft bearing:

Driver	07749 – 0010000
Attachment: 42 x 47 mm	07746 – 0010300
Pilot, 17 mm	07746 – 0040400

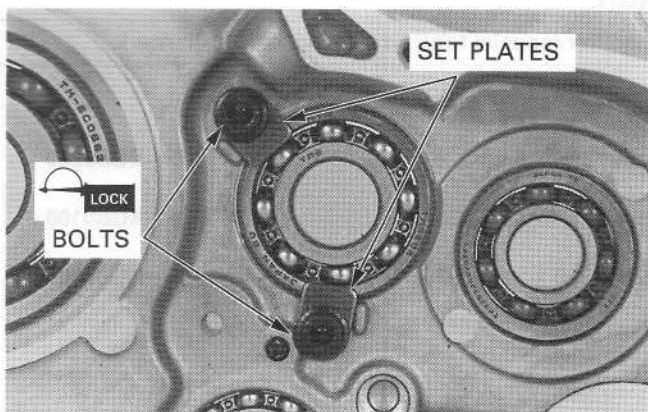
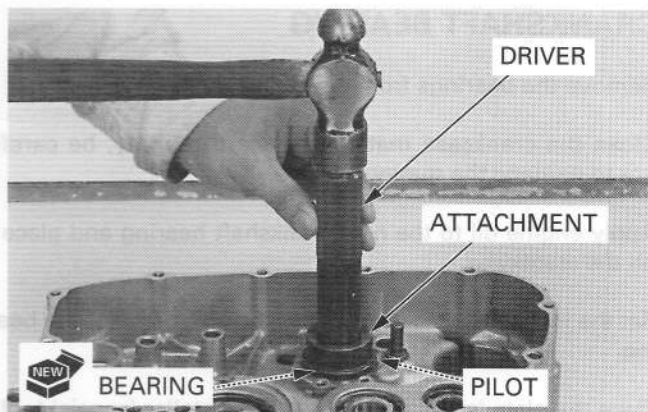
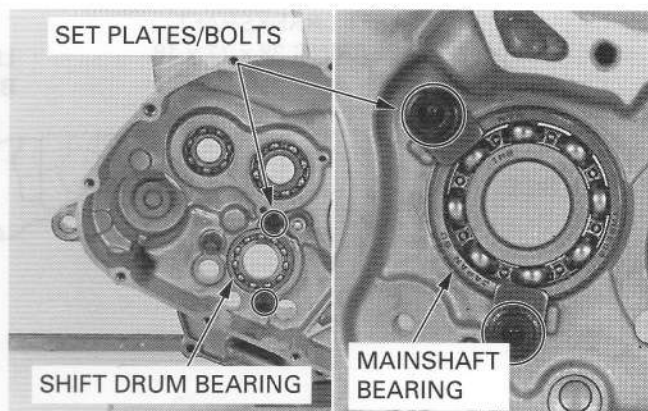
Gearshift drum bearing:

Driver	07749 – 0010000
Attachment: 42 x 47 mm	07746 – 0010300
Pilot, 25 mm	07746 – 0040600

Apply locking agent to the mainshaft bearing and gearshift drum bearing set plate bolts threads.

Install the bearing set plates and tighten the set plate bolts to the specified torque.

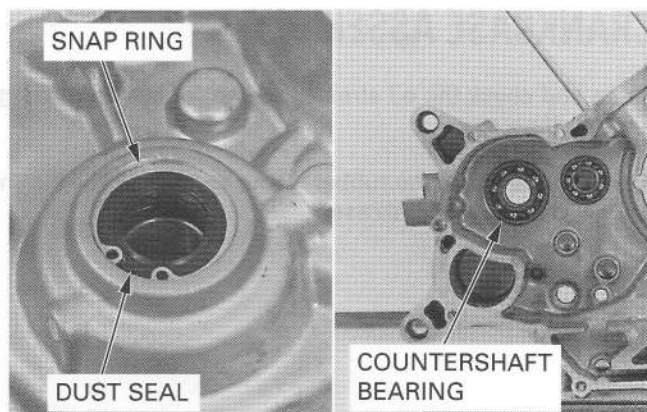
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



LEFT CRANKCASE

Remove the snap ring and dust seal from the outside of the left crankcase.

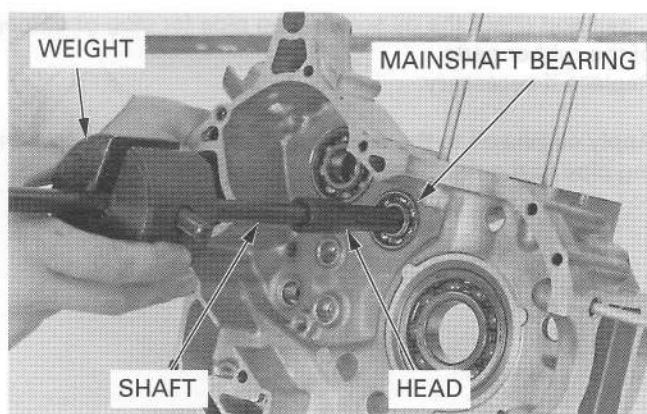
Remove the countershaft bearing.



Remove the mainshaft bearing using the special tool.

TOOLS:

Bearing remover set, 15 mm	07936 - KC10000
— bearing remover head	07936 - KC10100
— remover shaft	07936 - KC10200
— remover weight	07411 - 0010201



Drive in new bearings to the left crankcase.

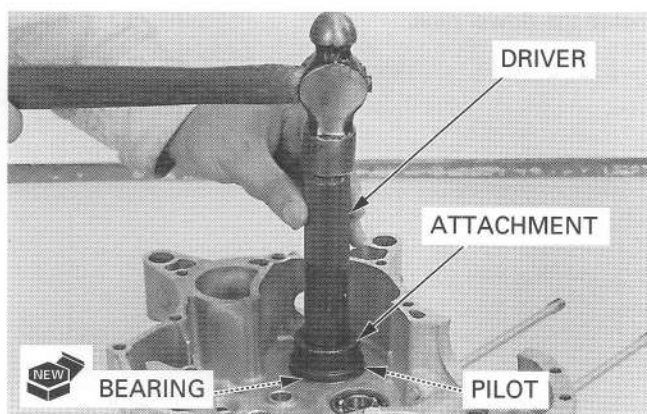
TOOLS:

Mainshaft bearing:

Driver	07749 - 0010000
Attachment: 32 x 35 mm	07746 - 0040500
Pilot, 15 mm	07746 - 0040300

Countershaft bearing:

Driver	07749 - 0010000
Attachment: 42 x 47 mm	07746 - 0010300
Pilot, 17 mm	07746 - 0040400

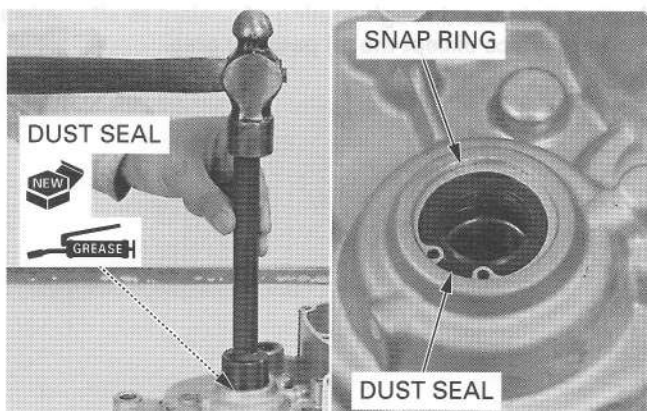


Apply grease to a new dust seal and drive in it to the right crankcase (Refer to illustration/page 11-13 bearing, oil seal location).

TOOL:

Mechanical seal driver	07PMD - KBP0100
------------------------	-----------------

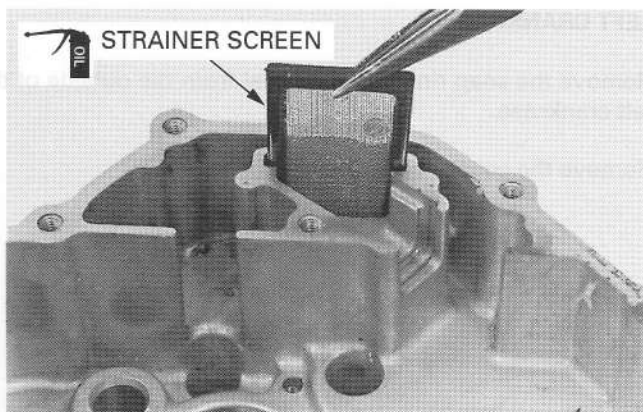
Install the snap ring.



CRANKCASE ASSEMBLY

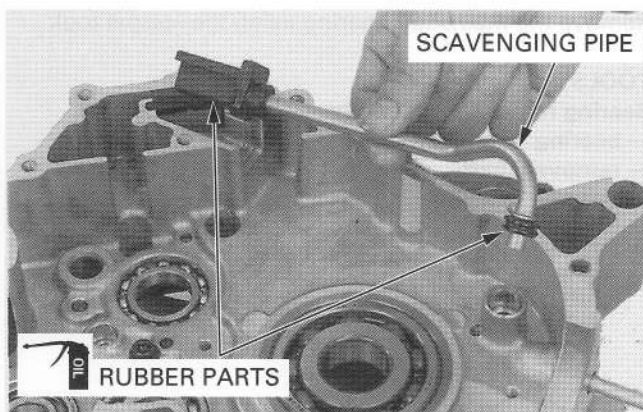
Clean and check the oil strainer screen for clog or damage. Replace if necessary.

Apply engine oil to the rubber frame and install the strainer screen to the right crankcase.

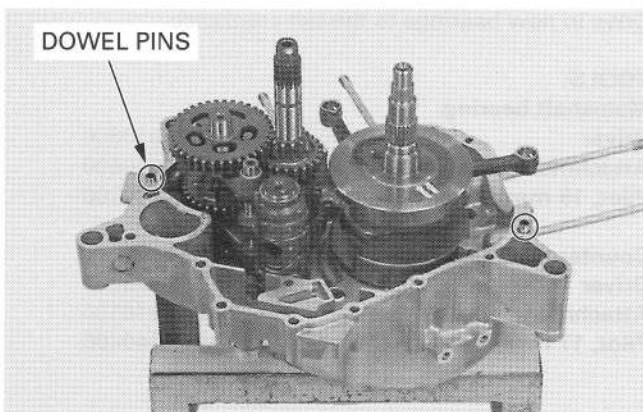


Clean and check the oil scavenging pipe for clog or damage of the rubber parts. Replace if necessary.

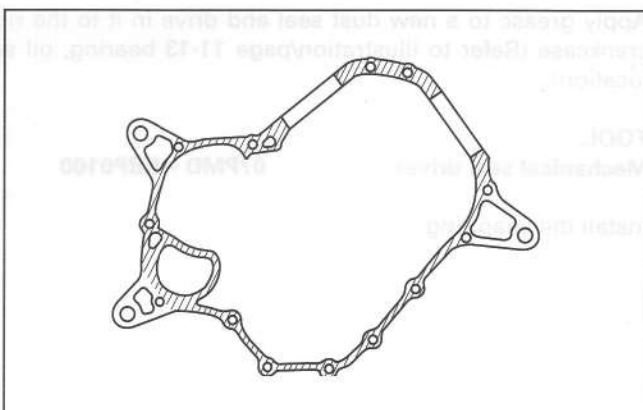
Apply engine oil to the rubber parts and install the scavenging pipe to the right crankcase.



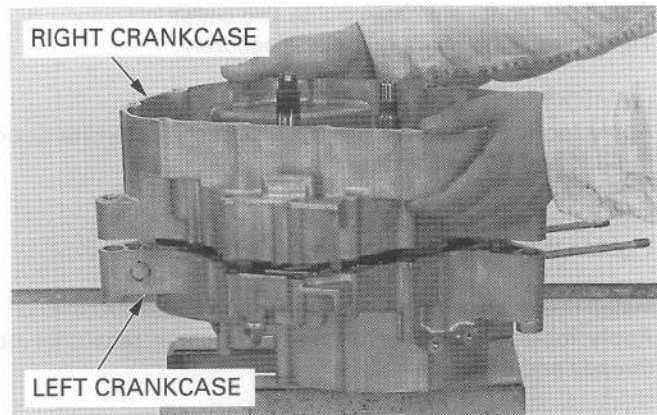
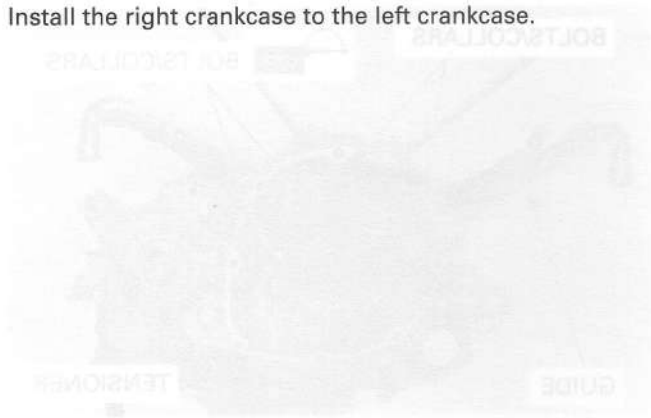
Install the dowel pins.



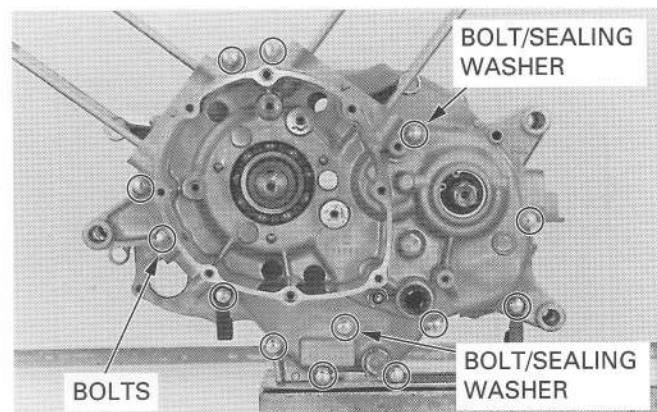
Apply a light but thorough coating of sealant to all crankcase mating surface except the oil passage area.



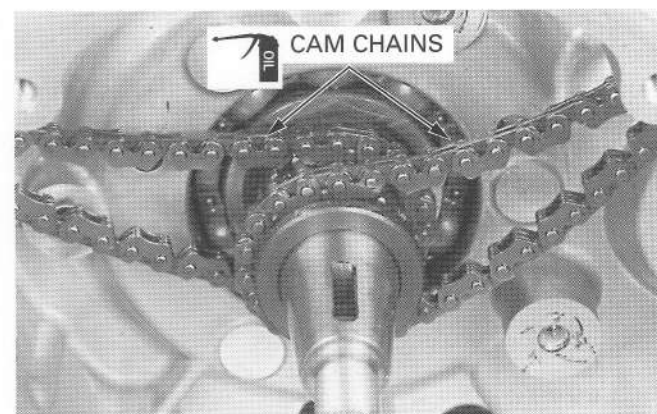
Install the right crankcase to the left crankcase.



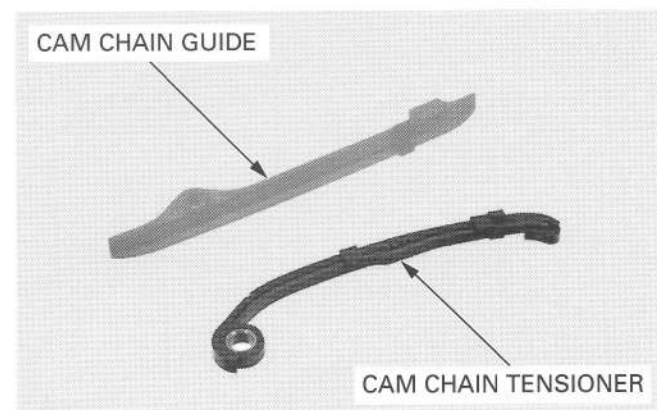
Install the left crankcase bolts, sealing washers and tighten the bolts in a crisscross pattern in several steps.



Apply engine oil to the front and rear cam chains and install to the timing sprockets.



Check the cam chain guide and lifter for damage and replace if necessary.



CRANKCASE/TRANSMISSION/CRANKSHAFT

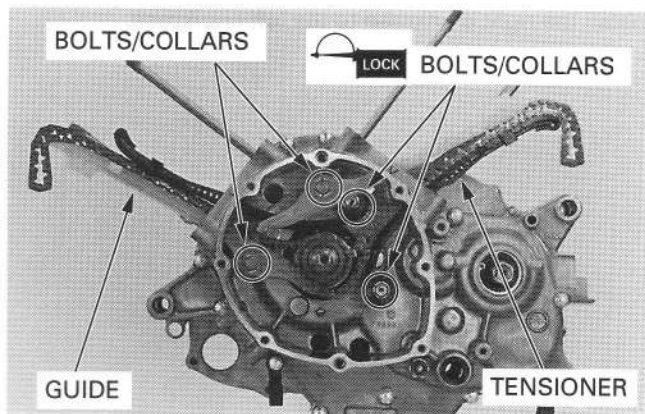
Install the front cam chain guide and collar.
Tighten the cam chain guide bolt securely.

Install the front cam chain tensioner and collar.
Apply locking agent to the front cam chain tensioner bolt threads and tighten it securely.

Install the rear cam chain guide and collar.
Tighten the cam chain guide bolt securely.

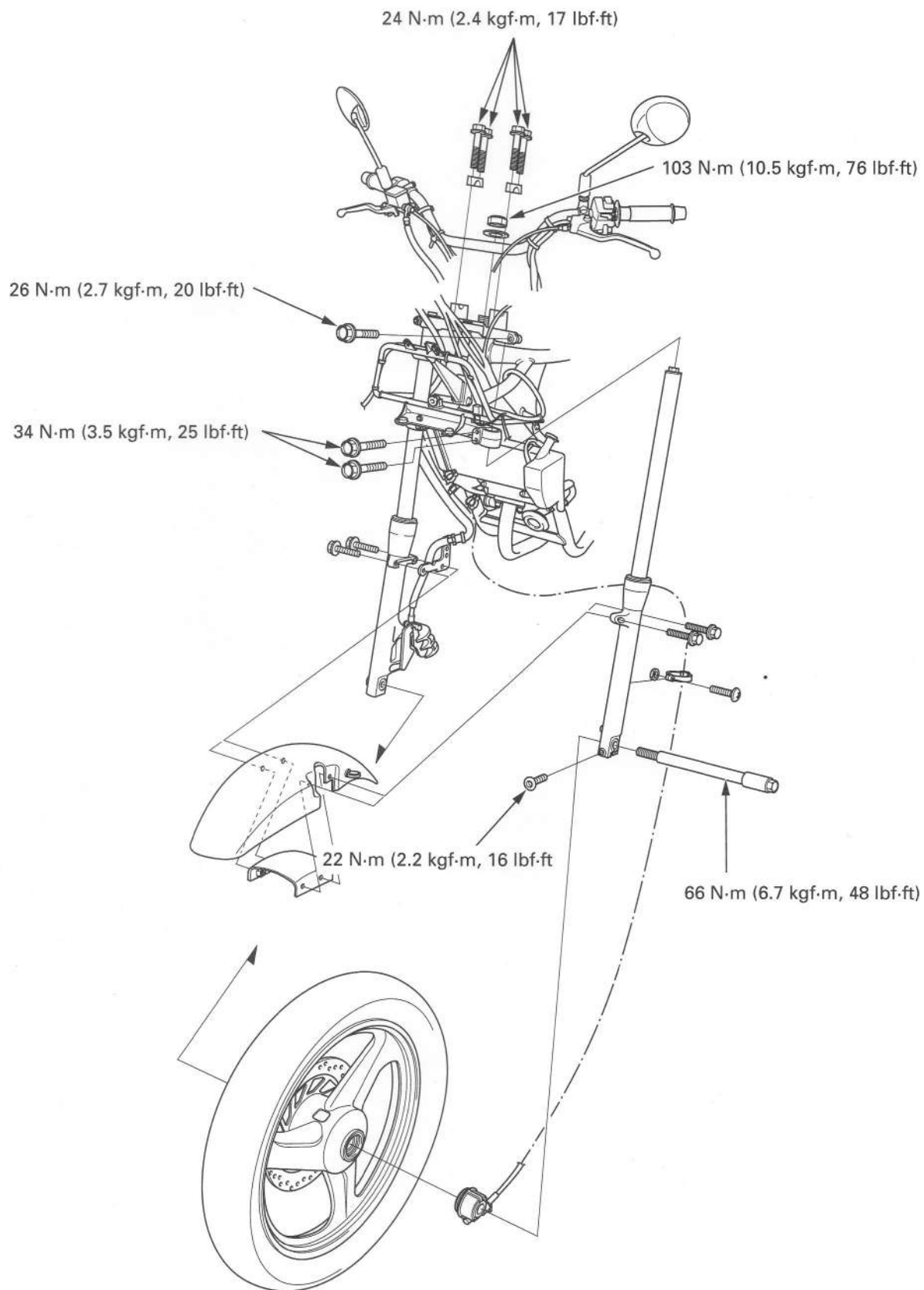
Install the rear cam chain tensioner and collar.
Apply locking agent to the rear cam chain tensioner bolt threads and tighten it securely.

Install the removed parts.



MEMO

FRONT WHEEL/SUSPENSION/STEERING



12. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	12-1	FRONT WHEEL	12-9
TROUBLESHOOTING	12-2	FORK	12-14
HANDLEBAR	12-3	STEERING STEM	12-23

SERVICE INFORMATION

GENERAL

⚠ WARNING

- **A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.**
- **Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.**
- When servicing the front wheel, support the motorcycle securely with a box or other adjustable support.
- Do not operate the brake lever after removing the caliper and front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.
- Refer to Section 14 for brake system information.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	200 kPa (2.0 kgf/cm ² , 29 psi)	—
	Driver and passenger	200 kPa (2.0 kgf/cm ² , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	1.0 (0.04)
	Axial	—	1.0 (0.04)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	470.6 (18.53)	461 (18.15)
	Tube runout	—	0.20 (0.008)
	Recommended fluid	Fork fluid	—
	Fluid level	117 (4.6)	—
	Fluid capacity	346 ± 2.5 cm ³ (11.7 ± 0.08 US oz, 12.2 ± 0.09 Imp oz)	—
Steering head bearing pre-load		0.10 – 0.15 kgf (0.220 – 0.330 lbf)	—

FRONT WHEEL/SUSPENSION/STEERING

TORQUE VALUES

Fork bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)
Handlebar holder bolt	24 N·m (2.4 kgf·m, 17 lbf·ft)
Steering stem nut	103 N·m (105 kgf·m, 76 lbf·ft)
Steering top thread	See page 13-27
Top bridge pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Bottom bridge pinch bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Front axle bolt	66 N·m (6.7 kgf·m, 48 lbf·ft)
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)
Throttle housing screw	4 N·m (0.4 kgf·m, 2.9 lbf·ft)

TOOLS

Bearing remover head, 15 mm	07746 - 0050400
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 15 mm	07746 - 0040300
Driver	07749 - 0010000
Bearing remover shaft	07746 - 0050100
Fork seal driver bobby	07747 - 0010100
Fork seal driver attachment	07947 - KA20200
Steering stem cap nut wrench	07716 - 0020400
Steering stem socket wrench	07916 - 3710101
Steering stem driver	07946 - MB00000
— Attachment	07953 - MJ10100
— Driver	07953 - MJ10200

TROUBLESHOOTING

Hard steering

- Steering top thread too tight
- Faulty steering head bearings
- Damaged steering head bearings
- Faulty tire
- Insufficient tire pressure

Steers to one side or does not track straight

- Bent fork
- Faulty steering head bearings
- Damaged steering head bearings
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot component

Front wheel wobbling

- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel

Soft suspension

- Weak fork spring
- Low fluid level in fork
- Insufficient fluid in fork
- Low tire pressure

Hard suspension

- High tire pressure
- Bent fork
- High fluid level in fork
- Incorrect fluid weight
- Clogged fluid passage

Front suspension noisy

- Loose fork fasteners
- Insufficient fluid in fork

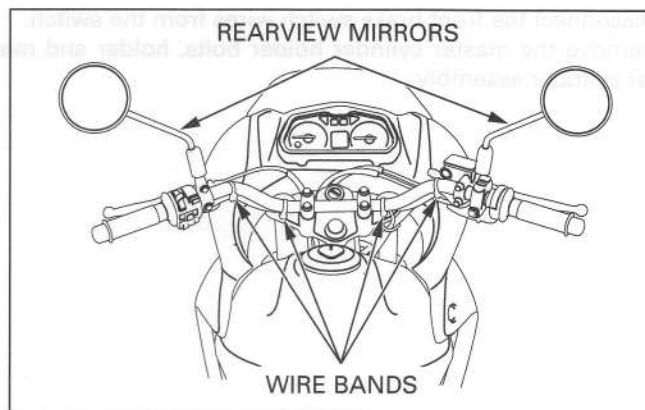
Wheel turns hard

- Faulty wheel bearings
- Bent front axle
- Brake drag
- Faulty speed sensor gear

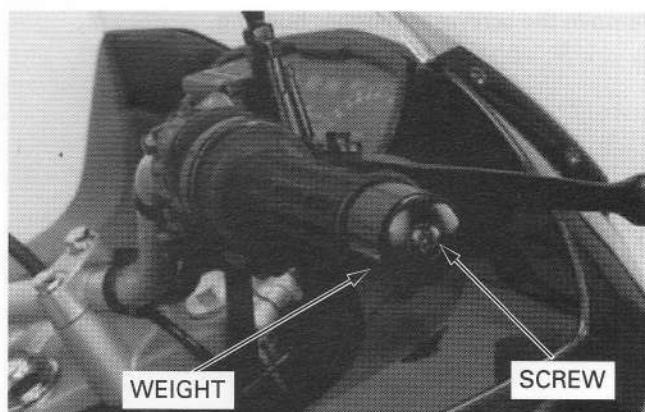
HANDLEBAR

REMOVAL

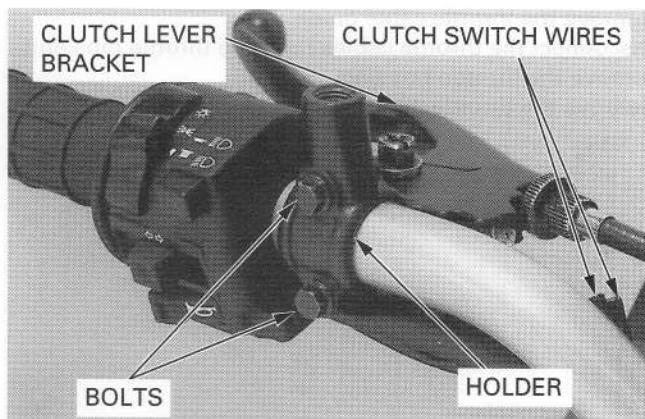
Remove the wire bands.
Remove the rearview mirrors.



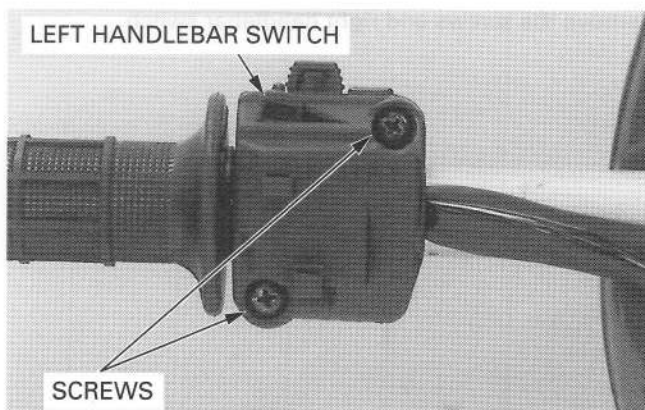
Remove the right and left screws and both handlebar weight.



Disconnect the clutch switch wires from the switch.
Remove the clutch lever holder bolts, holder and clutch lever bracket assembly.

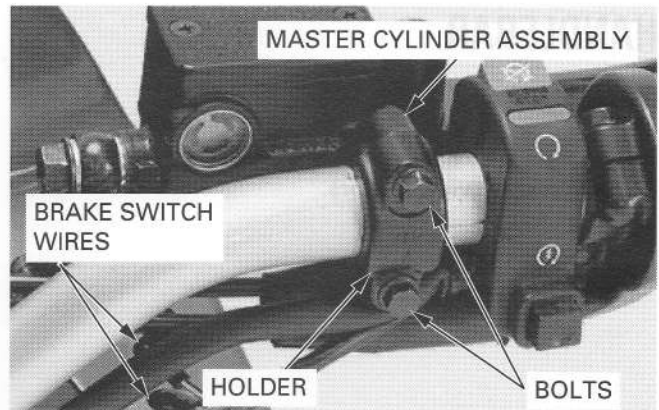


Remove the left handlebar switch screws and switch.

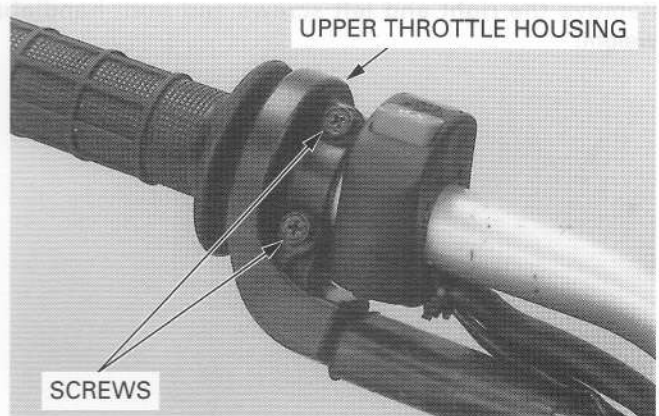
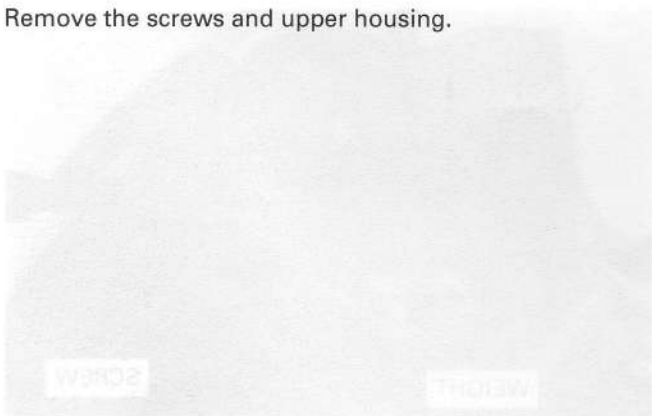


FRONT WHEEL/SUSPENSION/STEERING

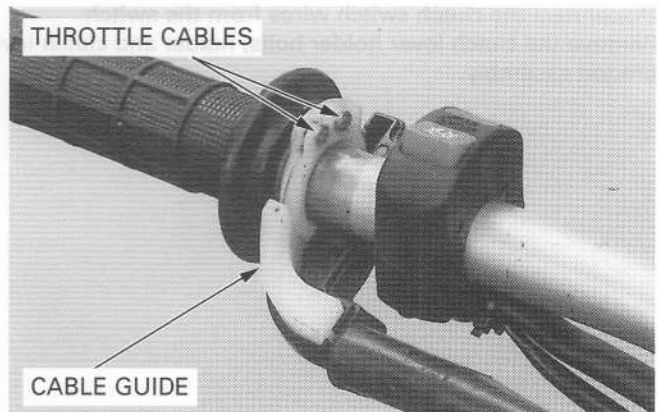
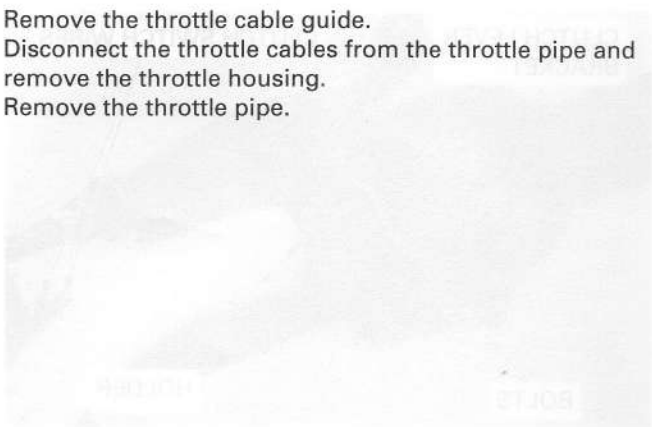
Disconnect the front brake switch wires from the switch. Remove the master cylinder holder bolts, holder and master cylinder assembly.



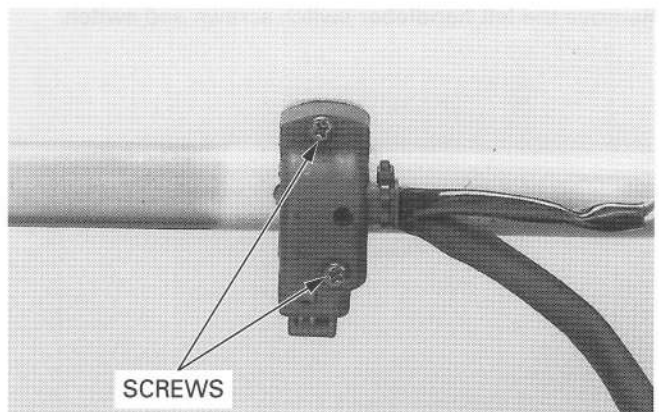
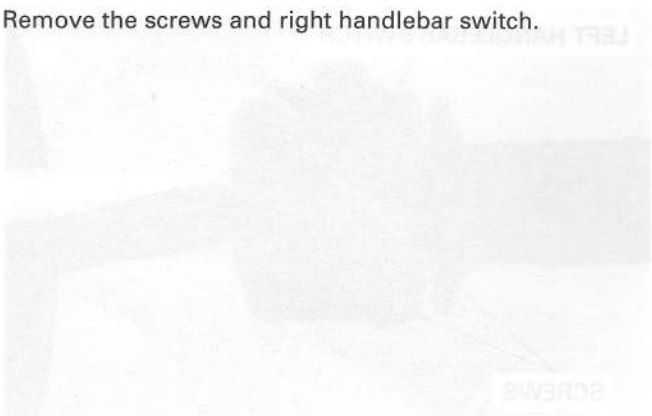
Remove the screws and upper housing.



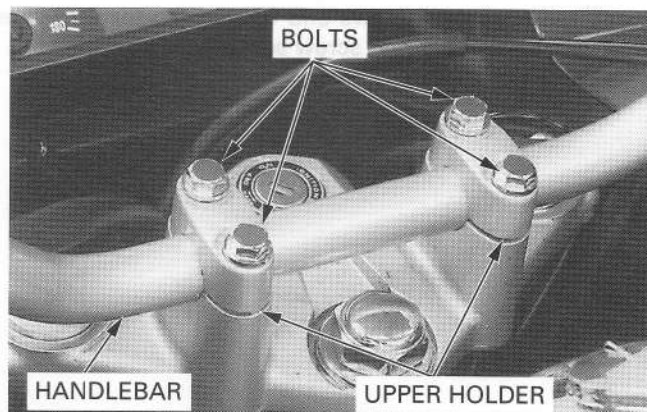
Remove the throttle cable guide. Disconnect the throttle cables from the throttle pipe and remove the throttle housing. Remove the throttle pipe.



Remove the screws and right handlebar switch.



Remove the upper holder bolts, holders and handlebar.

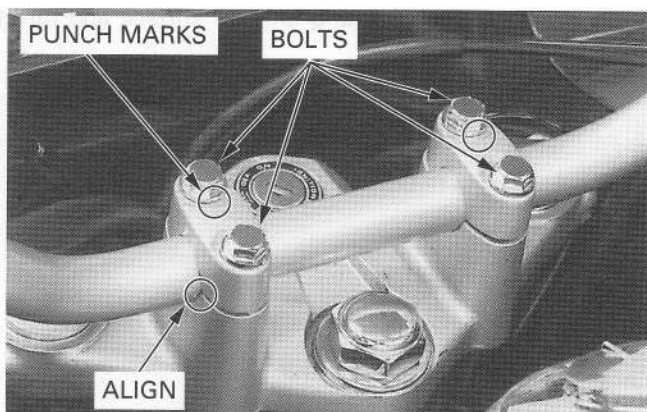


INSTALLATION

Install the upper holders on the handlebar with their punch marks forward.
Install the upper holders and temporarily tighten the upper holder bolts.

Align the punch mark on the handlebar with the top of the lower holders.
Tighten the front bolts first, then tighten the rear bolts to the specified torque.

TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)

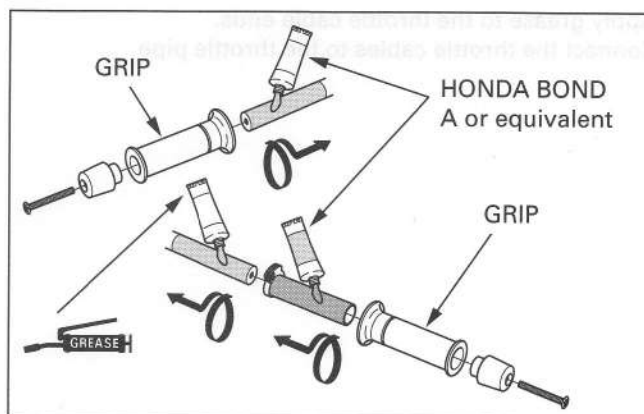


Apply Honda Bond A or equivalent to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

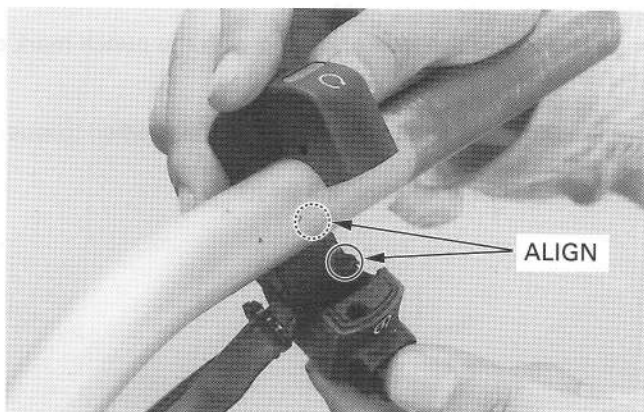
Wait 3 – 5 minutes and install the grip.
Rotate the grip for even application of the adhesive.

NOTE:

Allow the adhesive to dry for an hour before using.

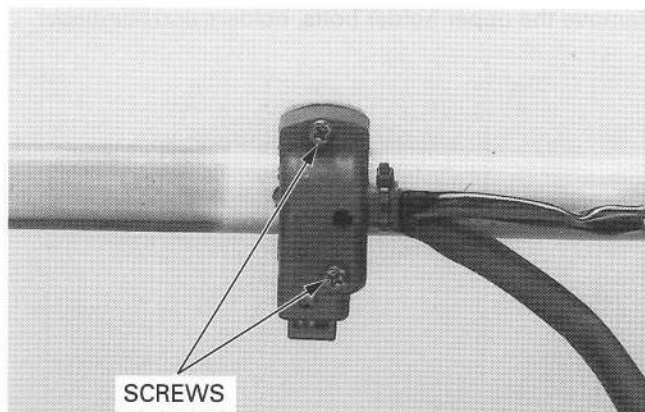


Install the right handlebar switch housing onto the handlebar, aligning the locating pin with the hole in the handlebar.

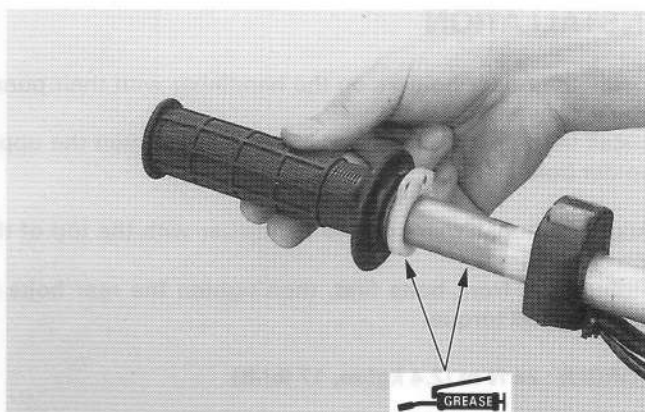


FRONT WHEEL/SUSPENSION/STEERING

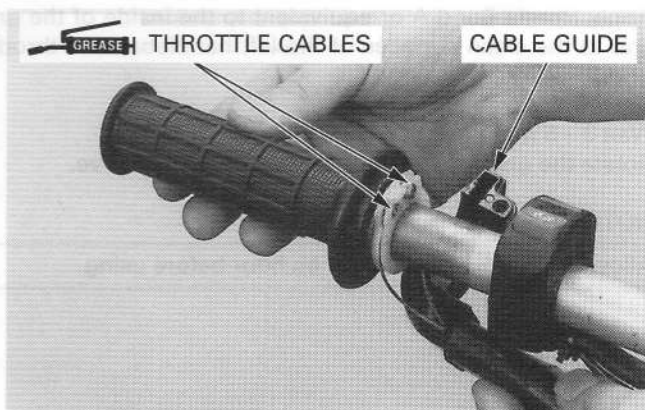
Install the attaching screws and tighten the forward screw first, then tighten the rear screw securely.



Apply grease to the throttle grip inner surface and throttle cable contact point.
Install the throttle grip to the handlebar.

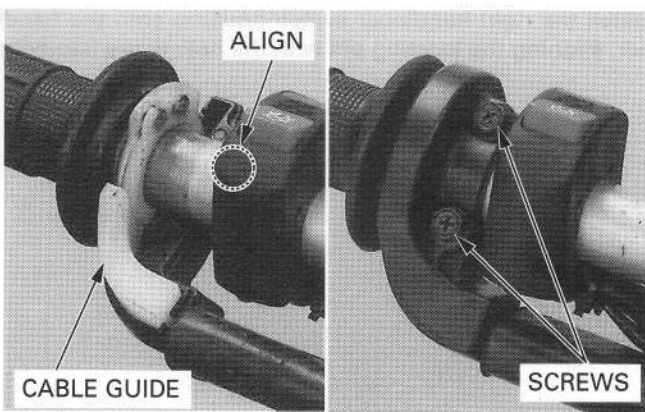
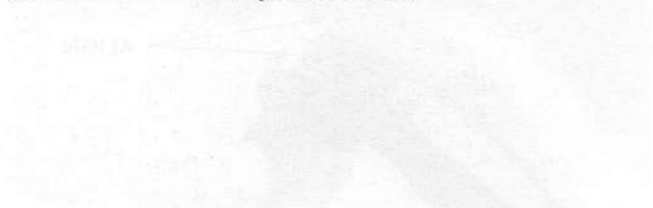


Apply grease to the throttle cable ends.
Connect the throttle cables to the throttle pipe.



Install the throttle cable guide.
Align the end of the lower housing with the punch mark on the handlebar.
Install the throttle upper housing.
Tighten the throttle housing screws to the specified torque.

TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)



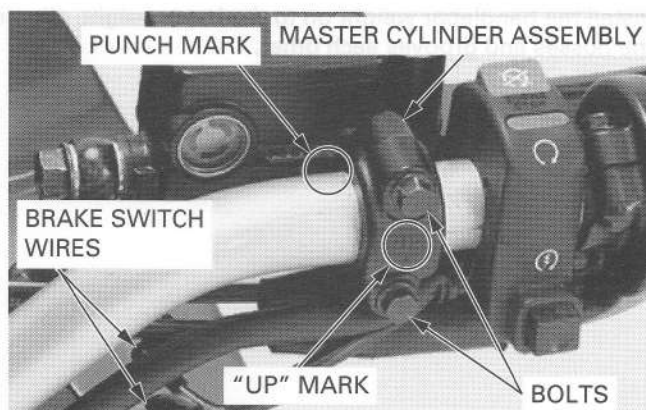
FRONT WHEEL/SUSPENSION/STEERING

Install the master cylinder and holder with the "UP" mark facing up.

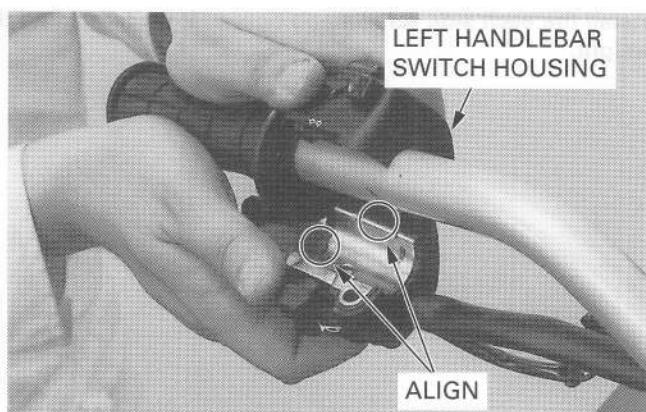
Align the end of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

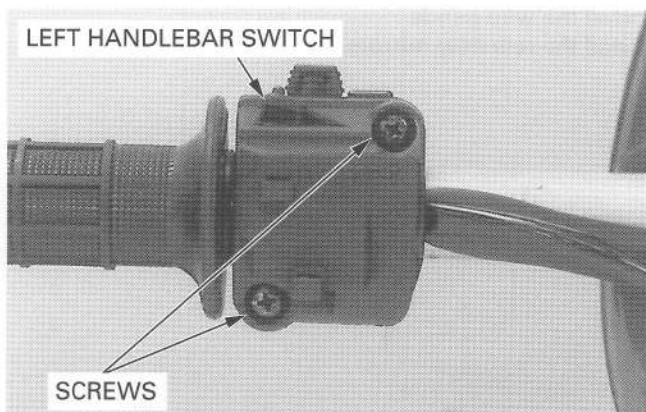
Connect the front brake switch wires to the switch.



Install the left handlebar switch housing onto the handlebar, aligning the locating pin with the hole in the handlebar.



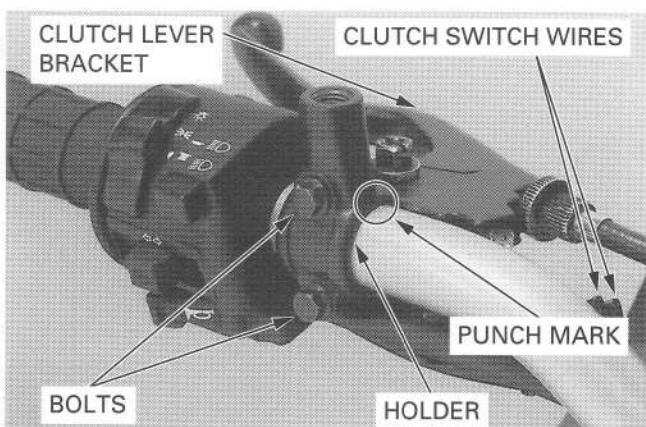
Install the screws and tighten the forward screw then tighten the rear screw.



Install the clutch lever bracket assembly aligning the end of the bracket with the punch mark on the handlebar. Install the clutch lever bracket holder with the "UP" mark facing up.

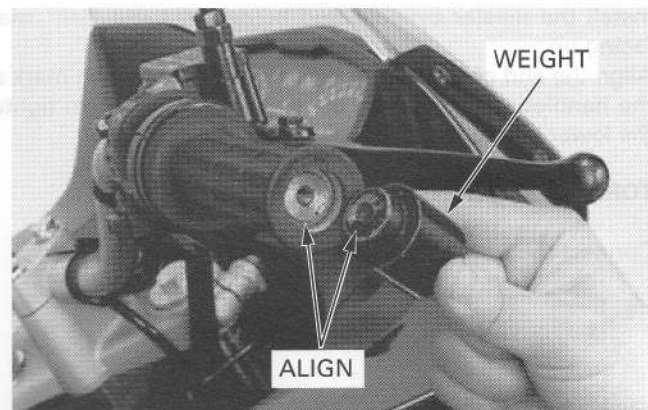
Tighten the upper bolt first, then the lower bolt.

Connect the clutch switch wires.



FRONT WHEEL/SUSPENSION/STEERING

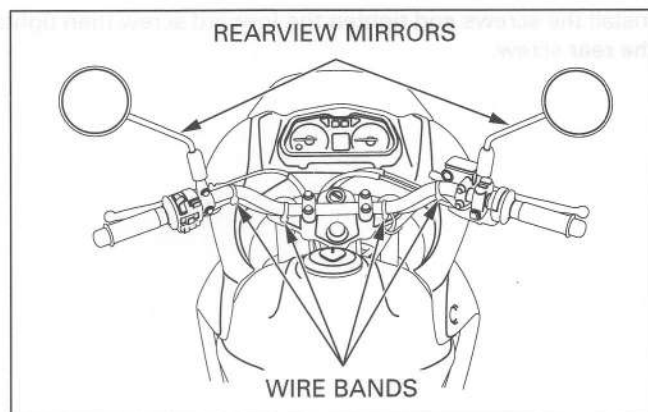
Install the handlebar weight on to the inner weight, aligning the bosses and grooves each other.



Install the each side screws and tighten it while holding the weight.



Install the wire bands.
Install the rearview mirrors.



Install the wire bands. Install the rearview mirrors.

FRONT WHEEL

REMOVAL

Support the motorcycle securely using a hoist or equivalent.

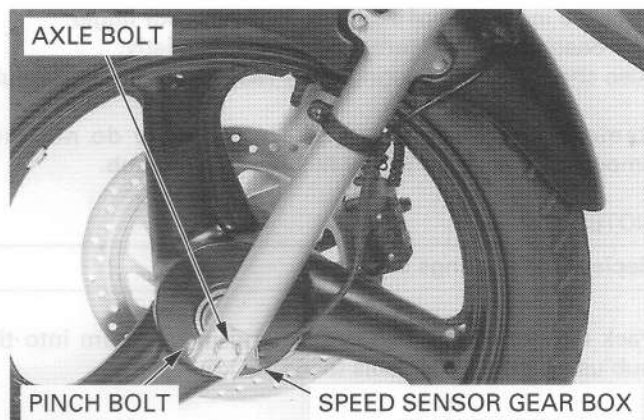
Loosen the front axle pinch bolt.

Remove the axle and the front wheel.

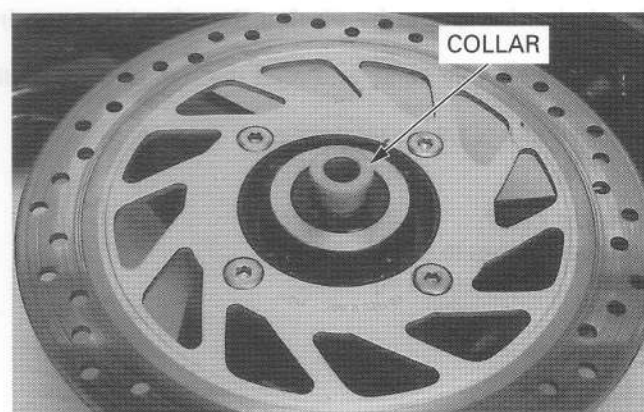
Remove the speed sensor gear box from the left wheel hub.

NOTE:

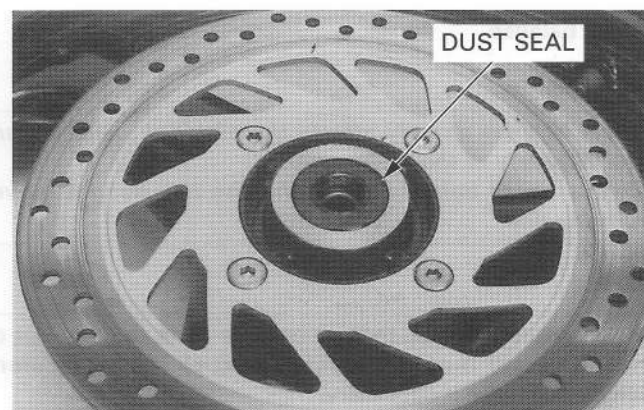
Do not damage the speed sensor wire.



Remove the side collar from the right wheel hub.



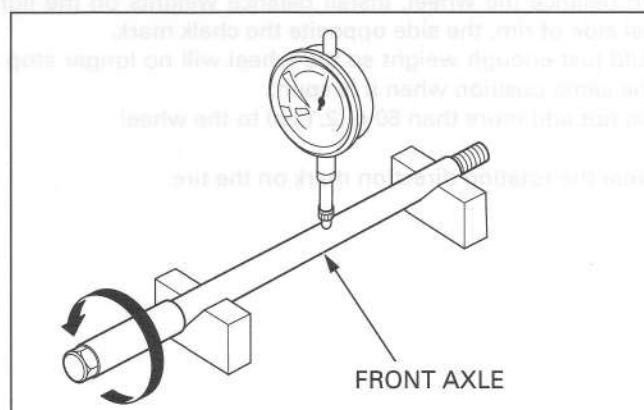
Remove the dust seal from the right wheel hub.



INSPECTION

Set the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



FRONT WHEEL/SUSPENSION/STEERING

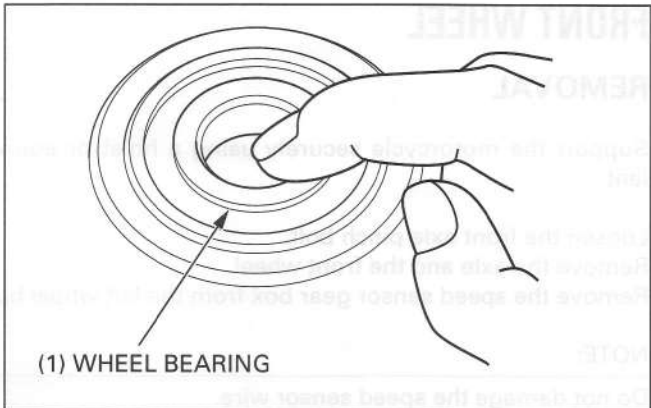
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

Replace the bearings in pairs.

Pack new bearings with grease and install them into the hub using the special tools (page 12-12).

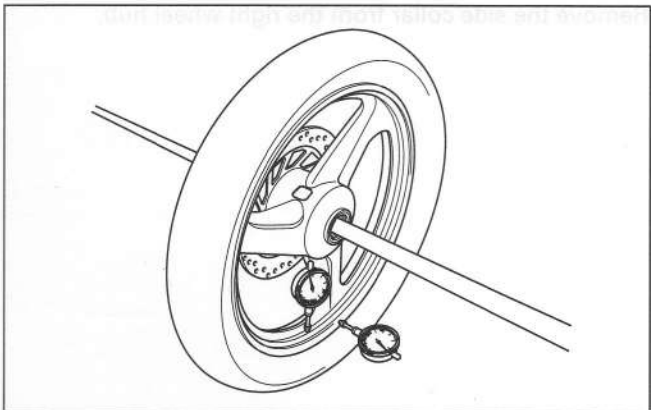


Check the rim runout by placing the wheel in a turning stand. Spin the wheel by hand, and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT:

Radial: 1.0 mm (0.04 in)

Axial: 1.0 mm (0.04 in)



Wheel balance

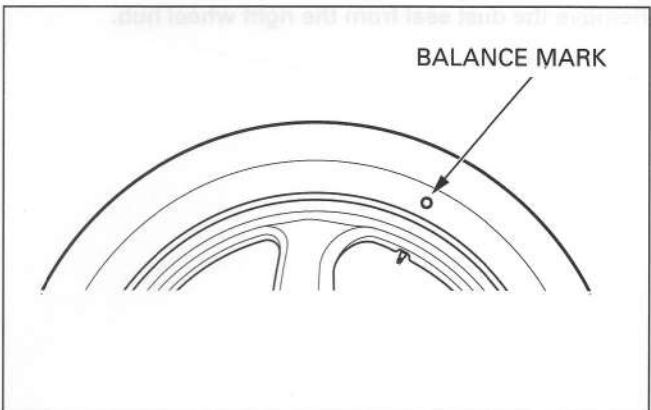
CAUTION:

Wheel balance directly affects the stability, handling and over all safety of the motorcycle.

Always check balance when the tire has been removed from the rim.

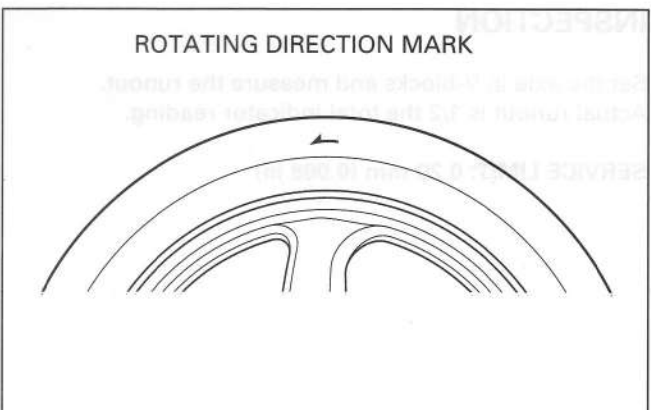
NOTE:

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.



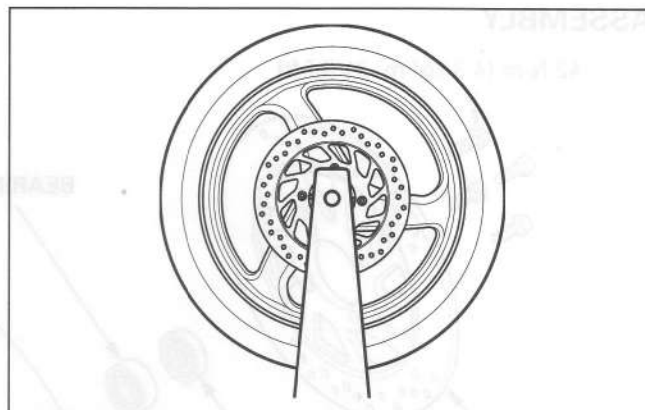
To balance the wheel, install balance weights on the lightest side of rim, the side opposite the chalk mark. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 g (2.1 oz) to the wheel.

Note the rotating direction mark on the tire.



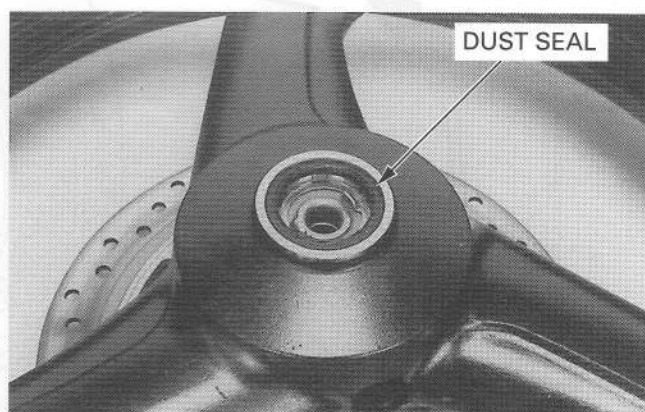
Remove the dust seals from the wheel.
Mount the wheel, tire and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.
Do not add more than 60 grams to the wheel.



DISASSEMBLY

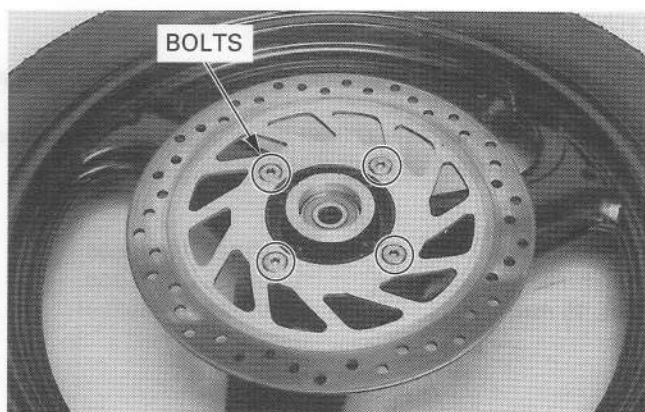
Remove the dust seal.



Remove the mounting bolts and brake disc.

NOTE:

Check for disc warpage; see page 14-8.

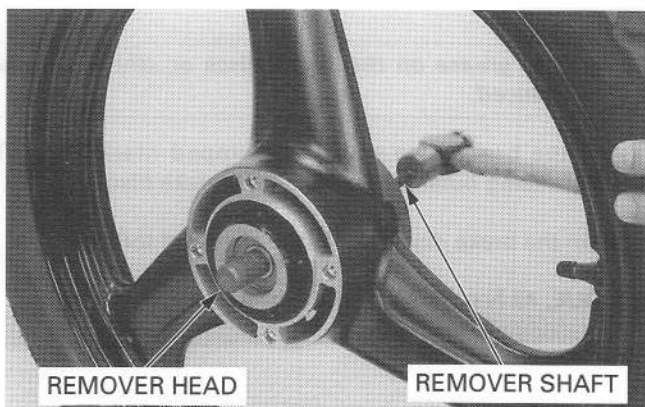


WHEEL BEARING REPLACEMENT

Install the bearing remover head into the bearing.
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

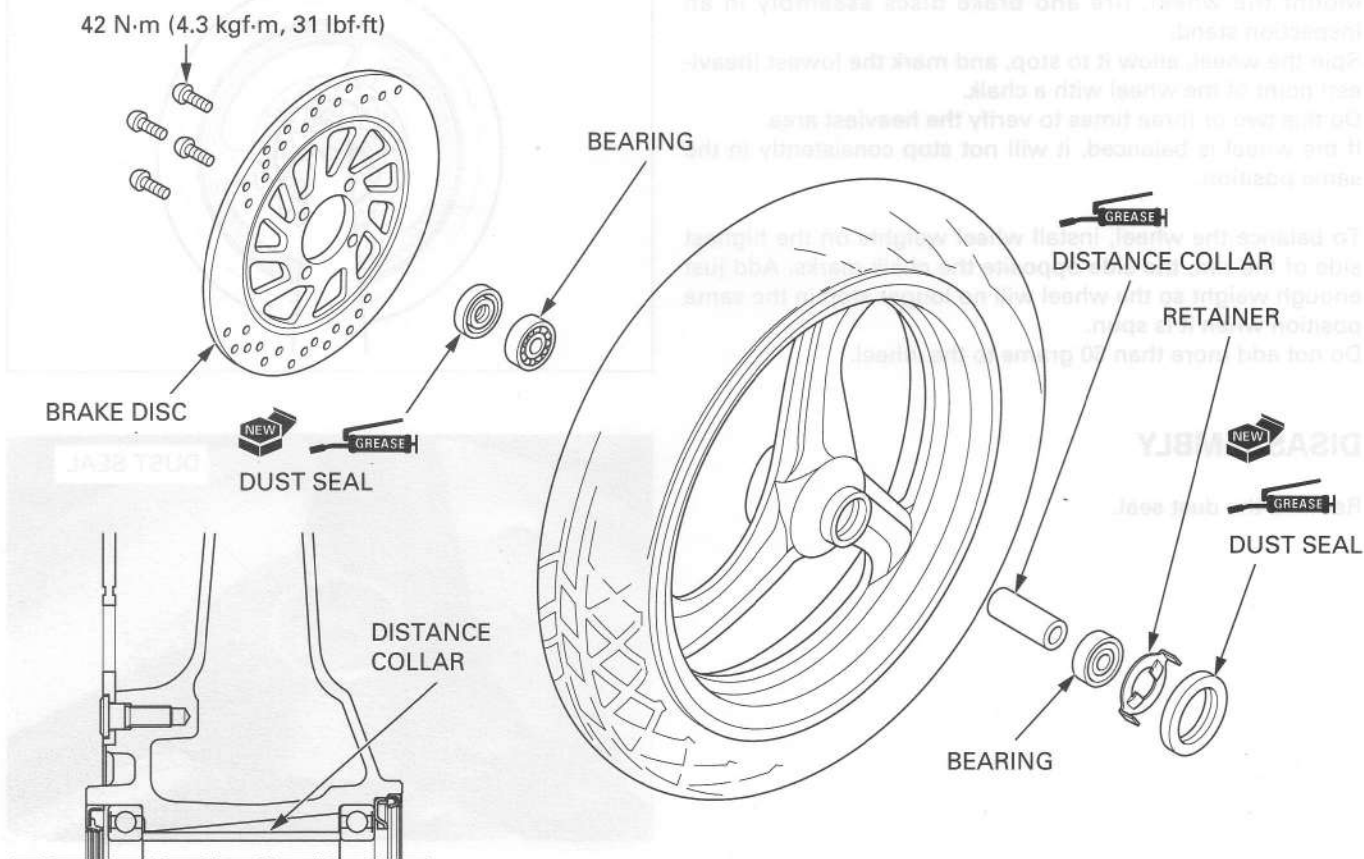
TOOLS:

Bearing remover head, 15 mm 07746 - 0050400
Bearing remover shaft 07746 - 0050100



FRONT WHEEL/SUSPENSION/STEERING

ASSEMBLY



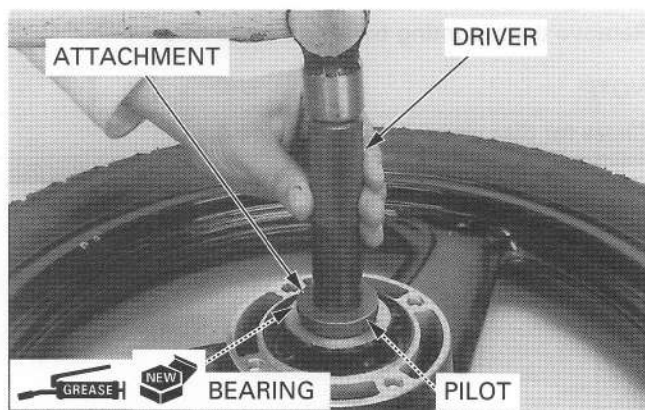
Pack all bearing cavities with grease.

Drive in a new left bearing squarely with its sealed side facing out.

Install the distance collar, then drive in the right side bearing with its sealed side facing out.

TOOLS:

Driver	07749 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 15 mm	07746 - 0040300



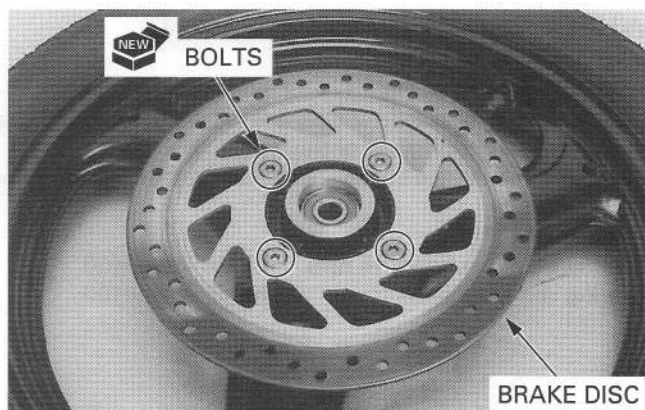
⚠ WARNING

Do not get grease on the brake discs or stopping power will be reduced.

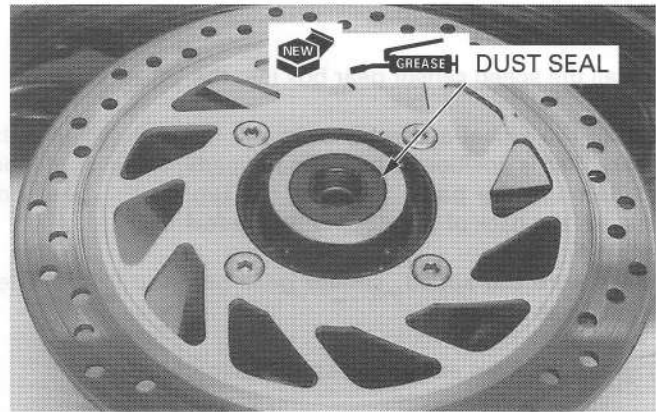
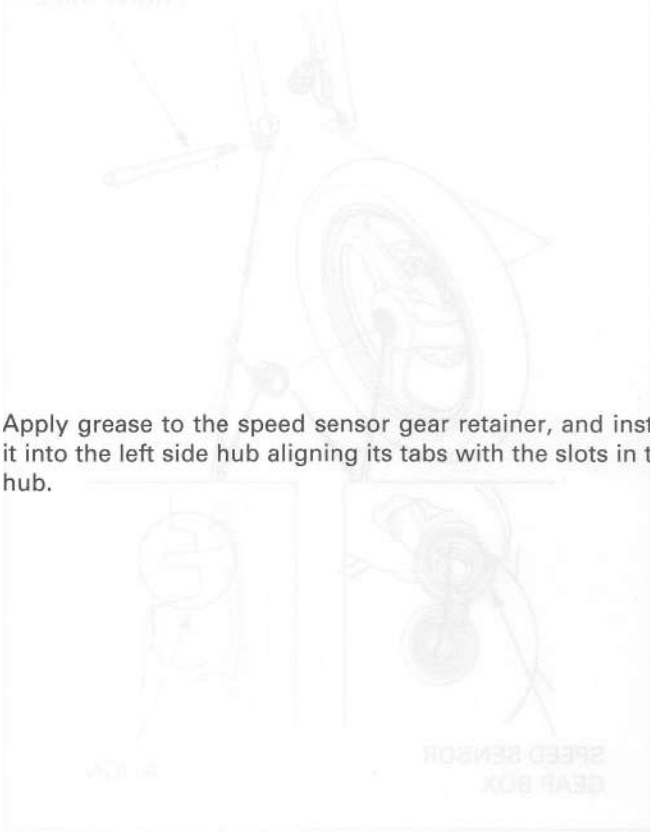
Install the brake disc with the stamped mark "MIN. TH 3.5MM" facing outside and install the brake disc bolts.

Tighten the brake disc bolts to the specified torque.

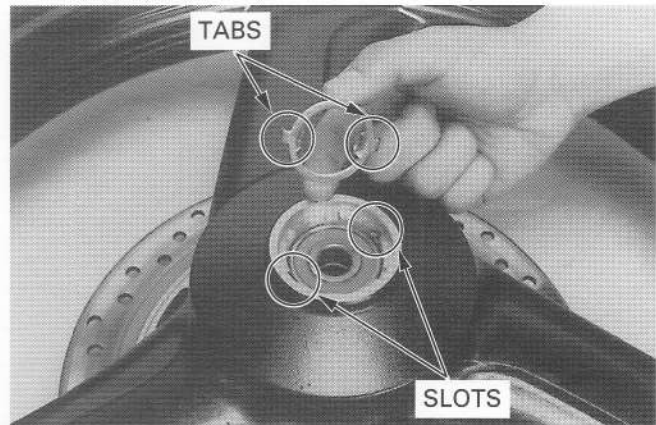
TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



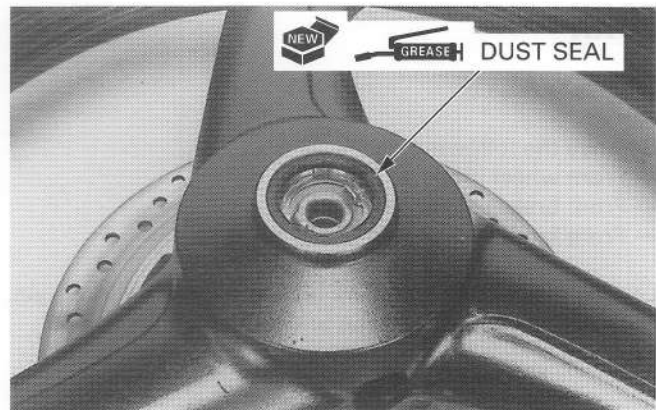
Apply grease to the new dust seal lips then install it into the wheel hub.



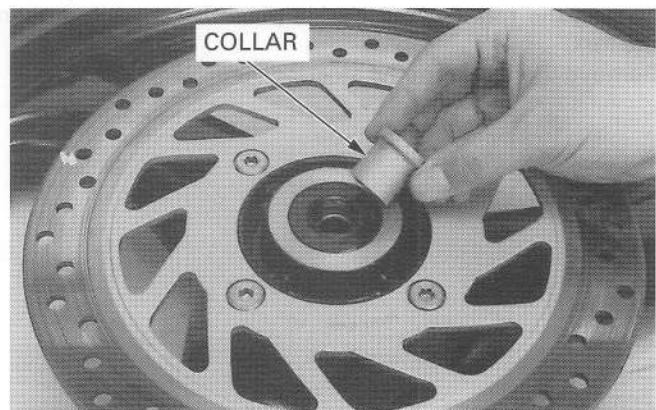
Apply grease to the speed sensor gear retainer, and install it into the left side hub aligning its tabs with the slots in the hub.



Apply grease to the new dust seal lips, then install them into the wheel hub.



Install the right side collar.



FRONT WHEEL/SUSPENSION/STEERING

INSTALLATION

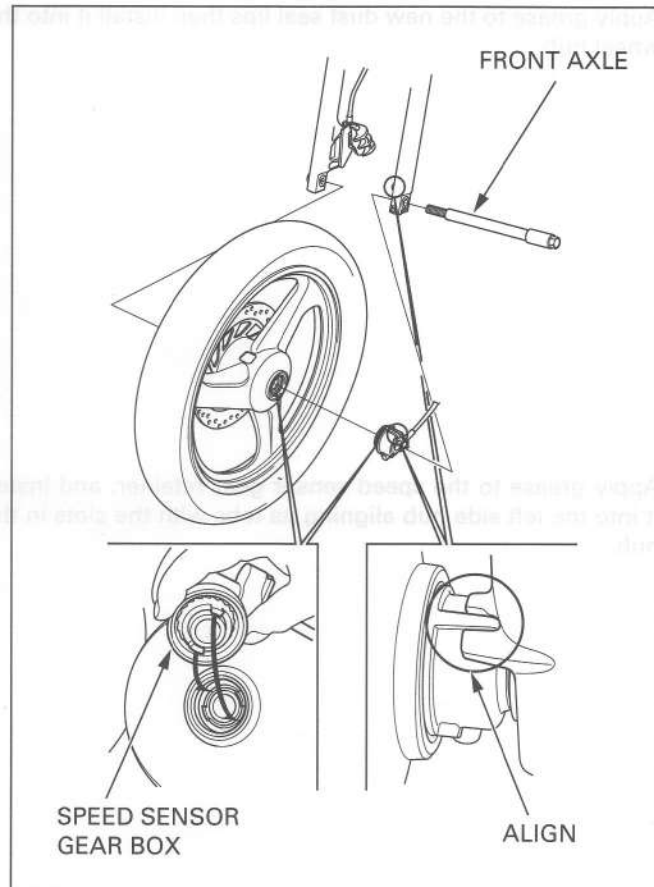
Install the speed sensor gear box into the left wheel hub.

Install the wheel assembly onto the fork legs so that the brake disc is positioned between the pads, being careful not to damage the pads. Position the lug on the gear box against the back of the stopper on the fork leg.

Make sure the speed sensor gear box and left fork leg aligning as shown.

Tighten the front axle to the specified torque.

TORQUE: 66 N·m (6.7 kgf·m, 48 lbf·ft)



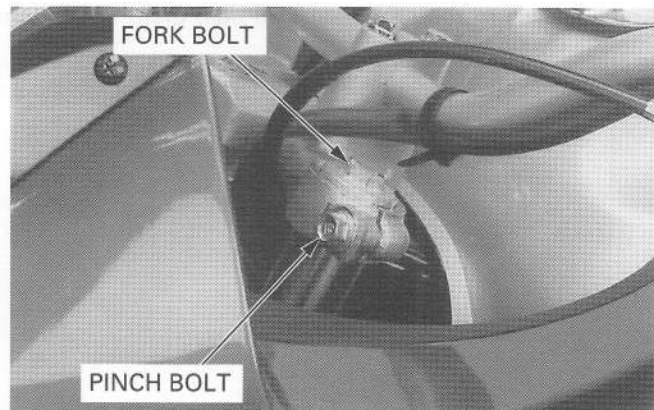
FORK

REMOVAL

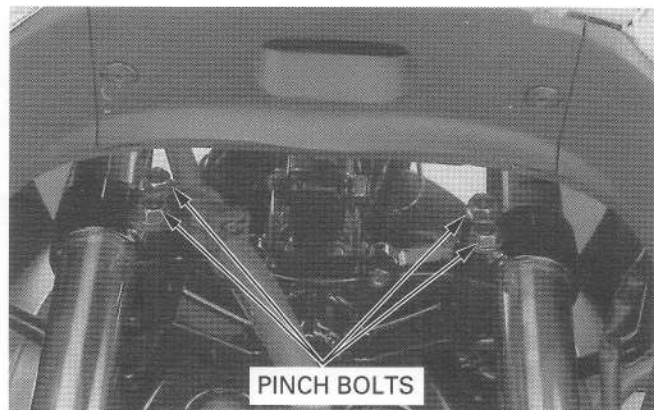
Remove the following:

- Front wheel (page 12-9)
- Front brake caliper (page 14-17)
- Front fender (page 2-3)

Loosen the left and right fork bolts but do not remove yet.
Loosen the left and right top bridge pinch bolts.



Loosen the fork bottom bridge pinch bolts while holding the fork.
Remove the fork from the steering stem.

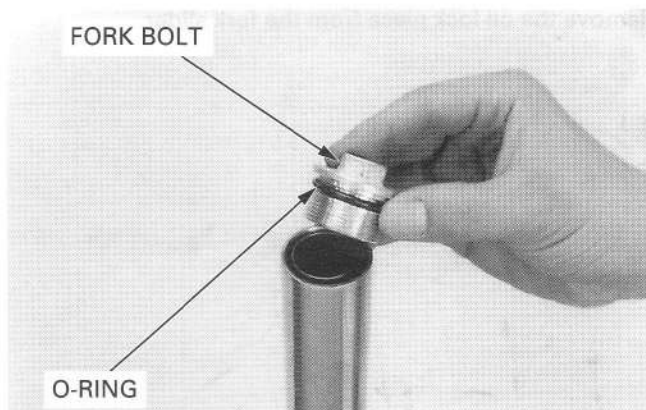


DISASSEMBLY

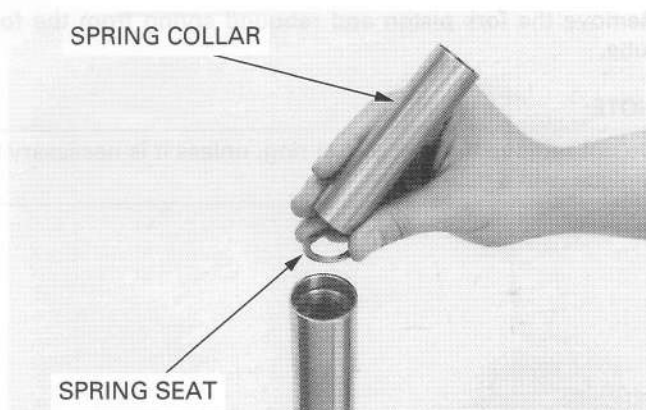
Remove the fork bolt and O-ring from the fork tube.

⚠ WARNING

The fork bolt is under spring pressure. Use care when removing it and wear eye and face protection.

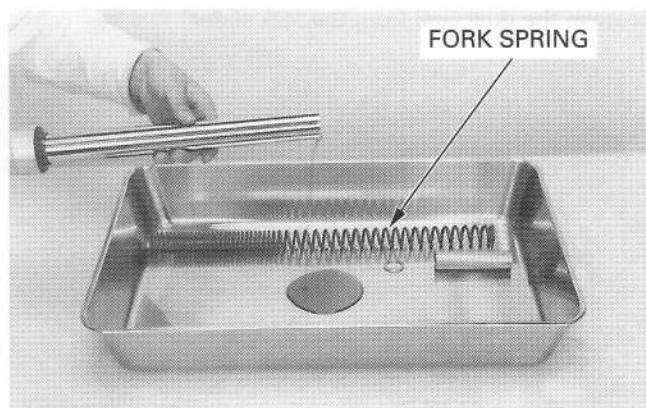


Remove the spring collar, spring seat.



Remove the fork spring.

Pour out the fork fluid by pumping the fork tube several times.



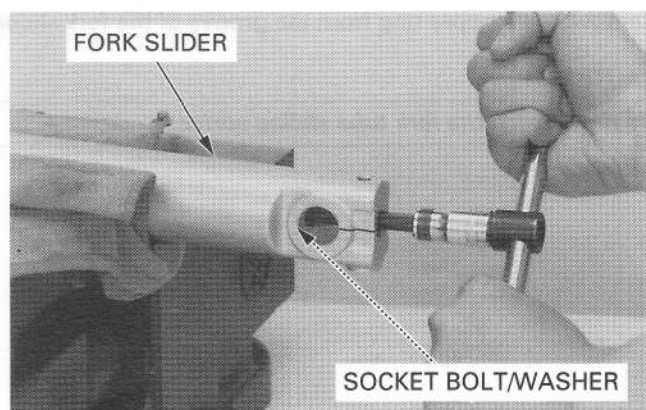
CAUTION:

Do not over tighten the fork slider.

Hold the fork slider in a vise with a piece of wood or soft jaws to avoid damage.

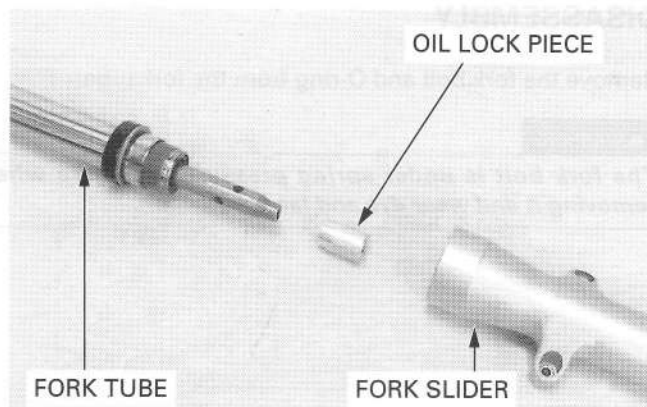
Loosen and remove the fork socket bolt and sealing washer from the fork slider.

If the fork piston turns with the socket bolt, temporarily install the fork spring, washer, spring seat and fork bolt.



FRONT WHEEL/SUSPENSION/STEERING

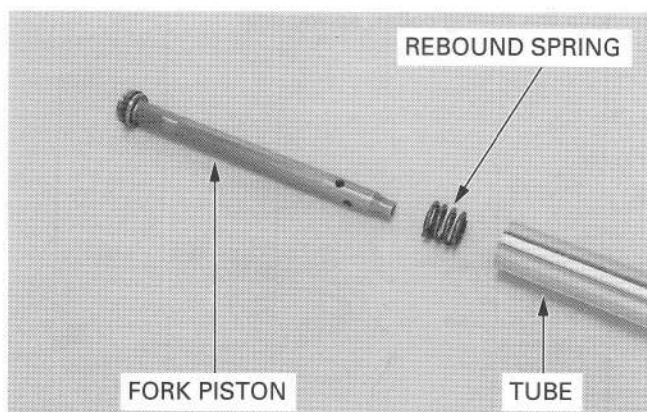
Remove the oil lock piece from the fork slider.



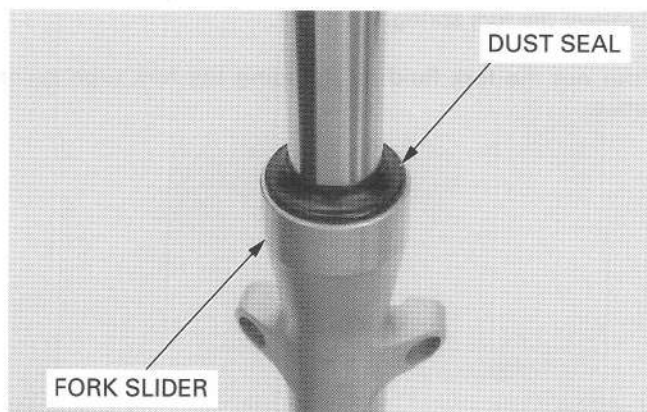
Remove the fork piston and rebound spring from the fork tube.

NOTE:

Do not remove the fork piston ring, unless it is necessary to replace with a new one.



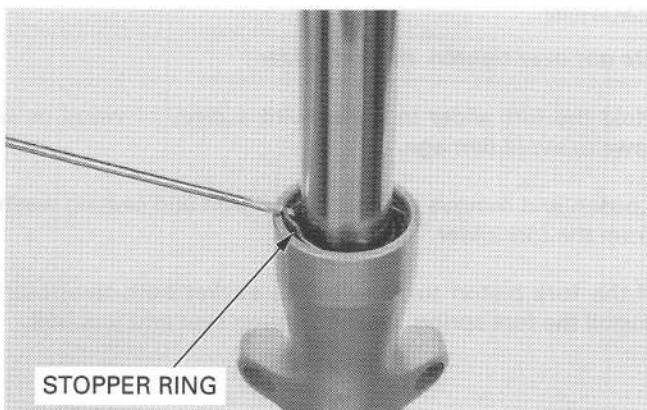
Remove the dust seal from the fork slider.



Remove the stopper ring from the groove of the fork slider.

CAUTION:

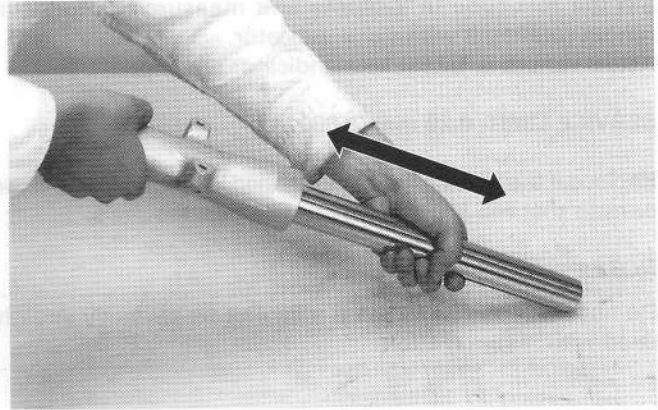
Do not scratch the fork tube sliding surface.



NOTE:

Check that the fork tube moves smoothly in the fork slider. If it does not, check the fork tube for bending or damage, and bushings for wear or damage.

Using quick successive motions, pull the fork tube out of the fork slider.

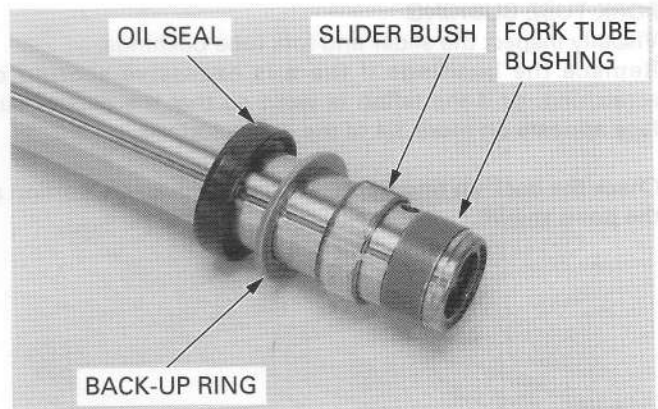


Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE:

Do not remove the fork tube bushing unless it is necessary to replace it with a new one.

Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.

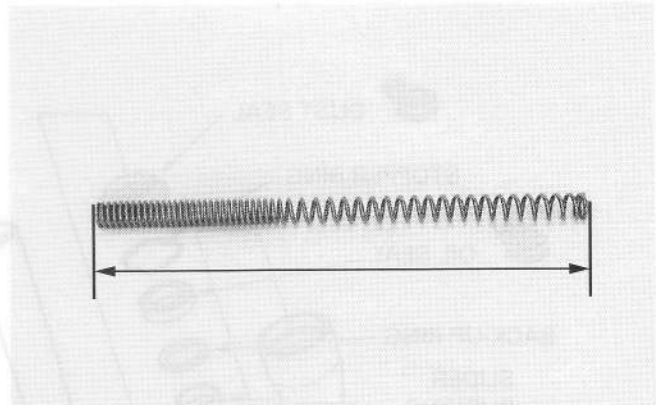


INSPECTION

FORK SPRING

Measure the fork spring free length by placing the spring on a flat surface.

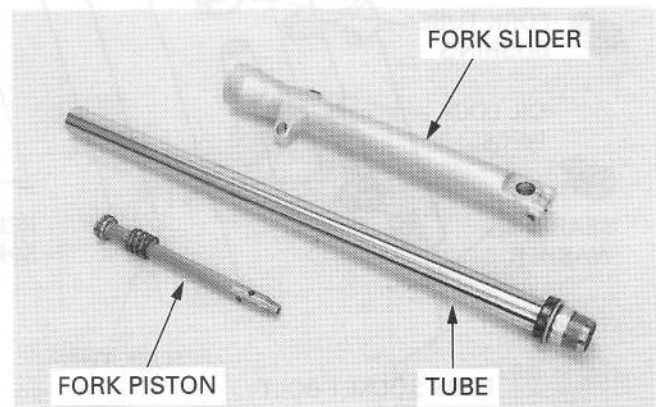
SERVICE LIMIT: 461 mm (18.15 in)



FORK TUBE/SLIDER/FORK PISTON

Check the fork tube, slider 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 the component if necessary.



FRONT WHEEL/SUSPENSION/STEERING

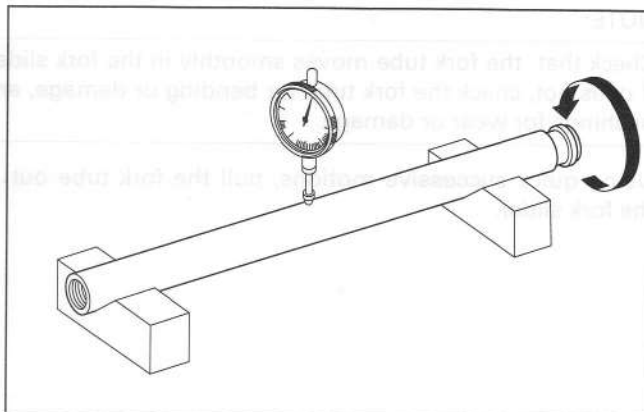
Set the fork tube in V-blocks and measure the fork tube runout rotating it with a dial indicator. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

Replace if the service limit is exceeded, or there are scratches or nicks that will allow fork oil to leak past the seals.

NOTE:

Do not reuse the fork tube if it cannot be perfectly straightened with minimal effort.

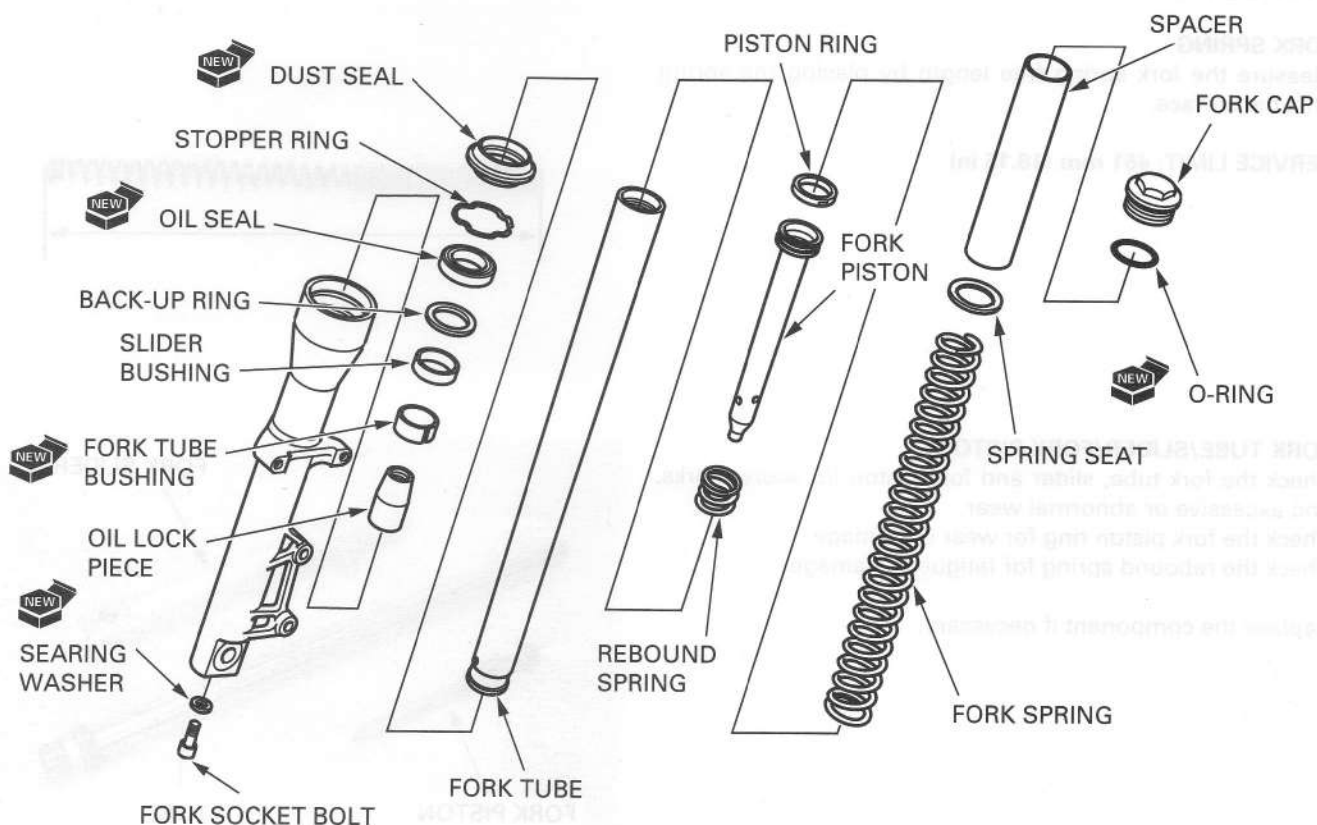
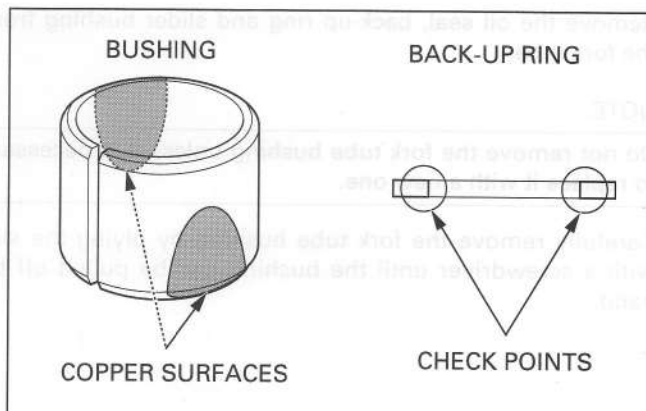


FORK TUBE BUSHING

Visually inspect the slider and fork tube bushings.

Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the point shown.



Install a new fork tube bushing if the tube bushing has been removed.

CAUTION:

- *Be careful not to damage the fork tube bushing coating.*
- *Do not open the fork tube bushing more than necessary.*

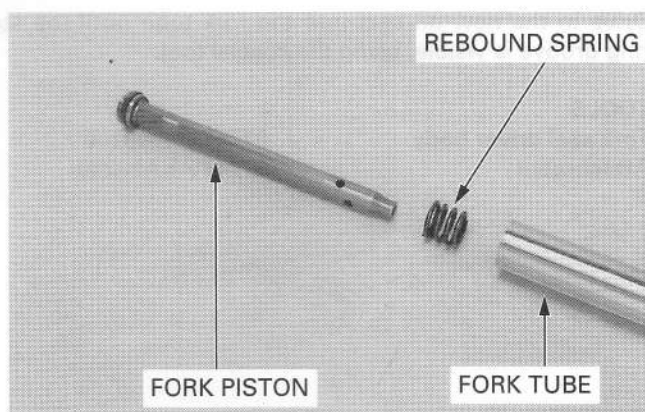
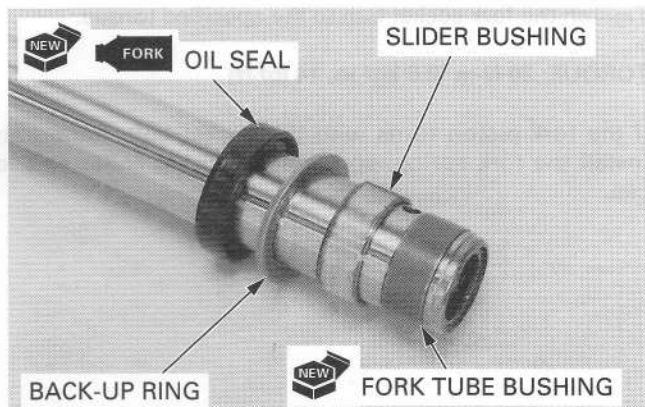
NOTE:

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

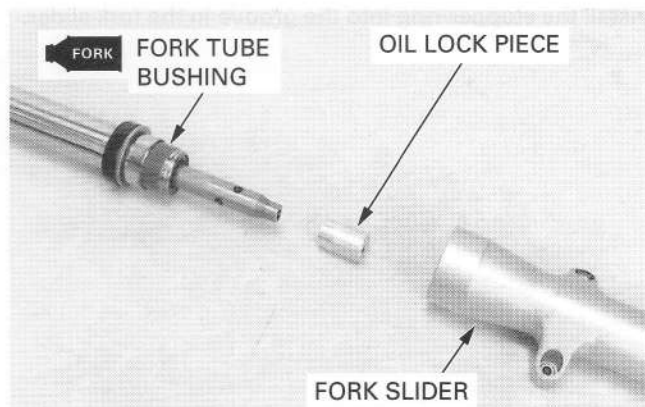
Install the slider bushing and back-up ring to the fork tube. Apply fork oil to the new oil seal lip. Install the new oil seal to the fork tube with its marking side facing up.

Install the rebound spring to the fork piston.

Install the fork piston into the fork tube.



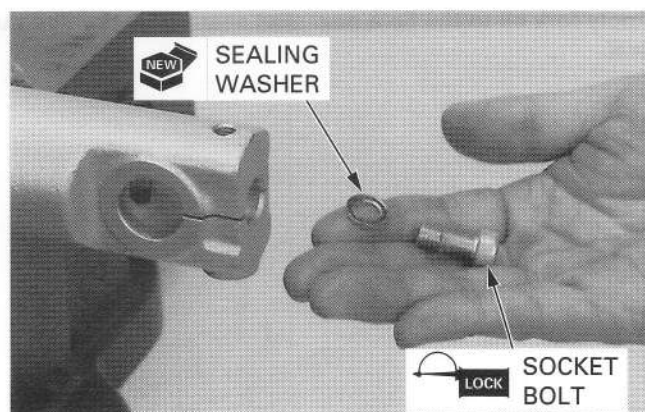
Install the oil lock piece onto the fork piston end. Coat the fork tube bushing with the fork oil and install the fork into the fork slider.



CAUTION:

Do not overtighten fork slider.

Hold the axle holder of the fork slider in a vise with a piece of wood or soft jaws to avoid damage. Replace the sealing washer with a new one. Clean and apply a locking agent to the fork socket bolt threads and install the fork socket bolt with the new sealing washer into the fork piston.

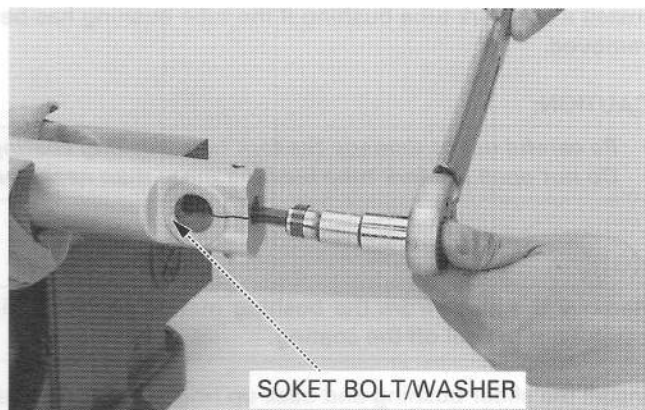


FRONT WHEEL/SUSPENSION/STEERING

Tighten the fork socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spring collar and fork cap.



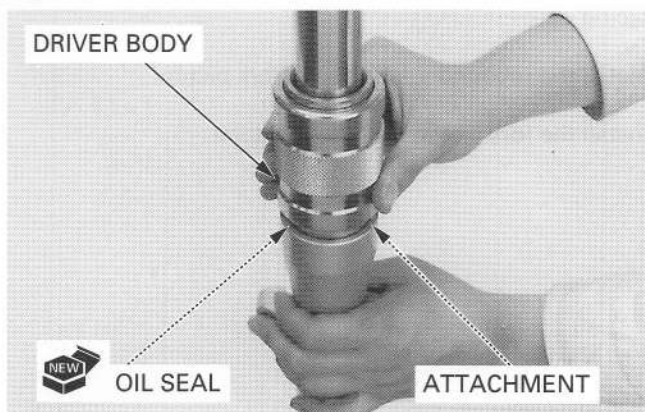
Drive in the new oil seal into the fork tube until the stop ring groove is visible, using the special tool.

TOOLS:

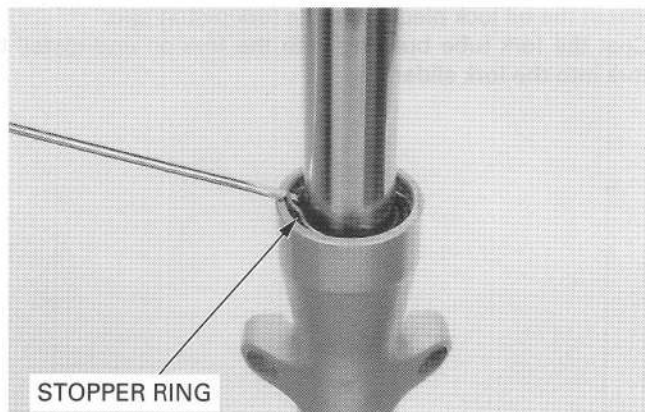
Fork seal driver body
Attachment

07747 - 0010100

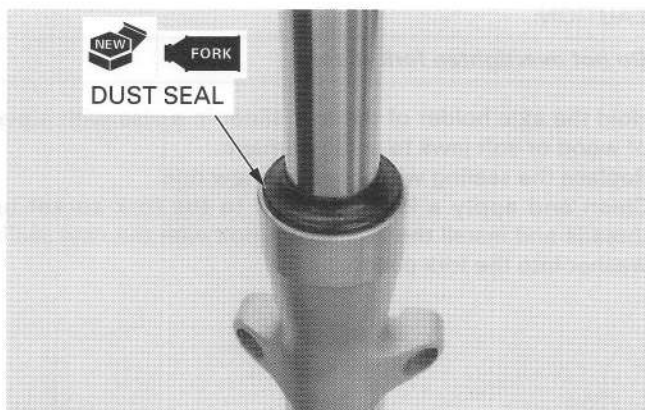
07947 - KA20200



Install the stopper ring into the groove in the fork slider.



Apply fork oil to the lip of a new dust seal and install the dust seal.



Pour the specified amount of recommended fork fluid into the fork tube.

FORK FLUID CAPACITY:

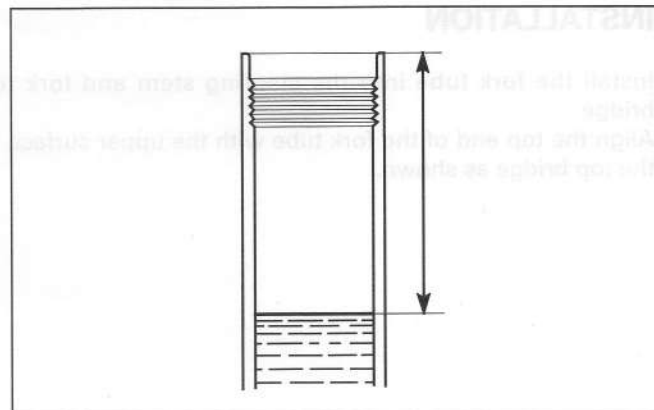
$346 \pm 2.5 \text{ cm}^3$ (11.7 $\pm$ 0.08 US oz, 12.2 $\pm$ 0.09 Imp oz)

Pump the fork tube several times to remove trapped air from the lower portion of the fork tube.



Compress the fork leg fully and measure the oil level from the top of the fork tube.

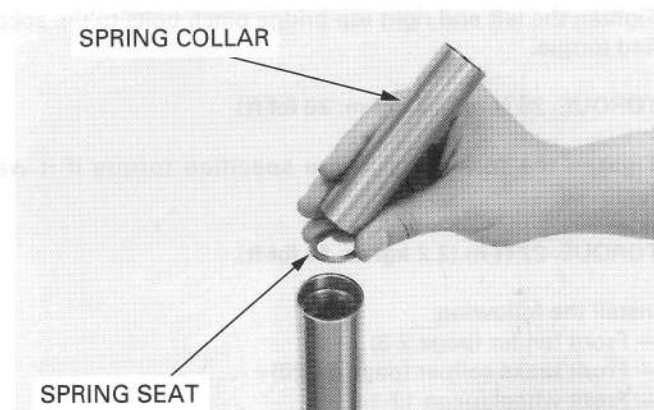
FORK OIL LEVEL: 117 mm (4.6 in)



Wipe oil off the spring thoroughly using a clean cloth. Install the fork spring with the tapered end facing down.



Install the spring seat and spring collar.



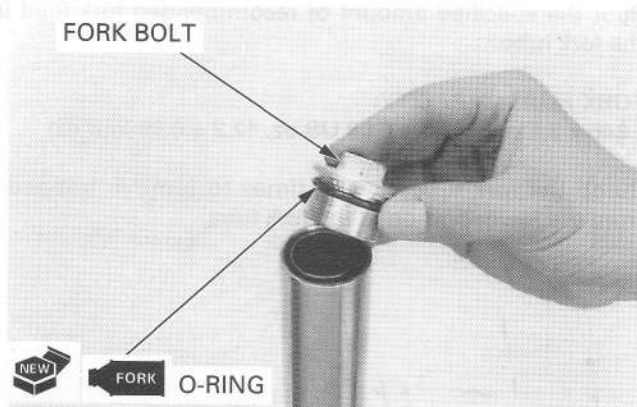
FRONT WHEEL/SUSPENSION/STEERING

Coat a new O-ring with fork fluid and install it onto the fork bolt.

Install the fork bolt loosely.

NOTE:

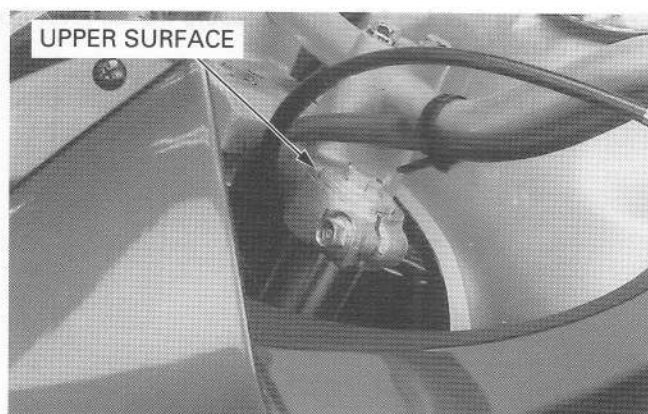
Install the fork bolt but do not tighten yet.



INSTALLATION

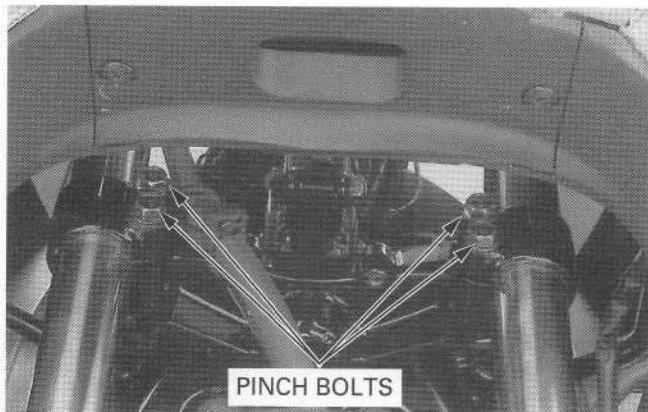
Install the fork tube into the steering stem and fork top bridge.

Align the top end of the fork tube with the upper surface of the top bridge as shown.



Tighten the bottom bridge pinch bolts.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Tighten the left and right top bridge pinch bolts to the specified torque.

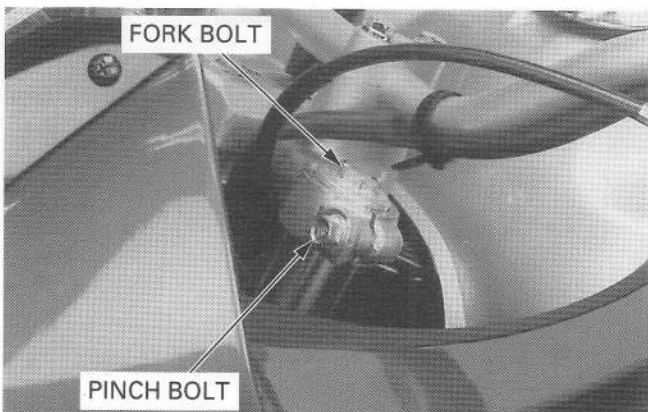
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Tighten the fork bolts to the specified torque if it was removed.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Install the following:

- Front fender (page 2-3)
- Front brake caliper (page 14-20)
- Front wheel (page 12-14)



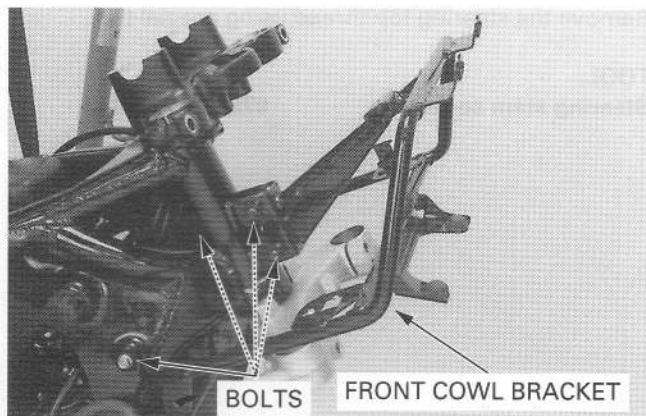
STEERING STEM

REMOVAL

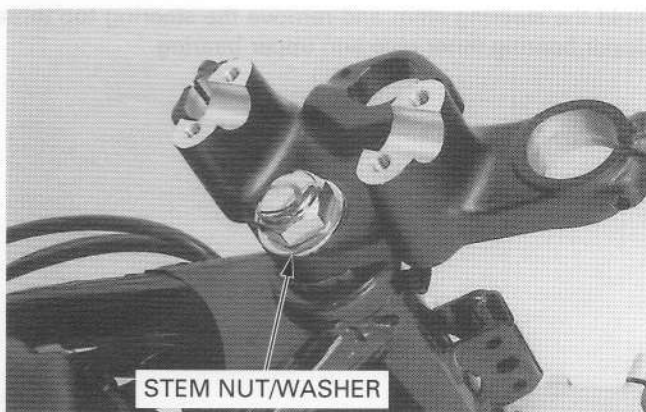
- Front forks (page 12-14)
- Handlebar (page 12-3)
- Inner center cowl (page 2-6)
- Front cowl assembly (page 2-7)

Remove the brake hose clamp bolt and brake hose from the steering stem.

Remove the mount bolts and front cowl bracket.

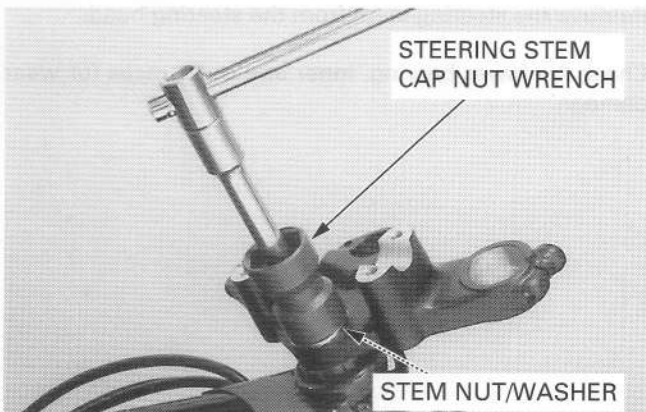


Remove the stem nut and washer using the special tool.

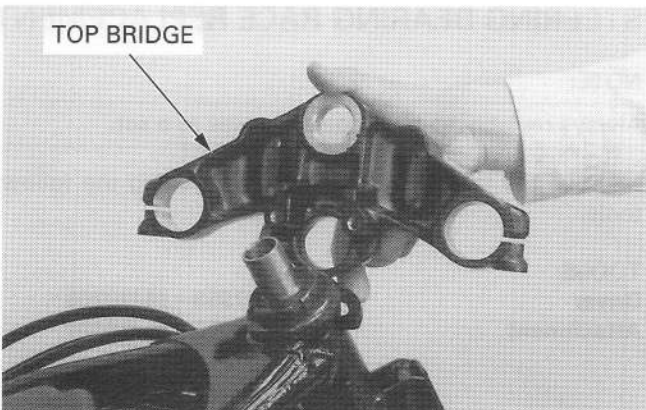


TOOLS:

Steering stem cap nut wrench 07716 - 0020400



Remove the top bridge.



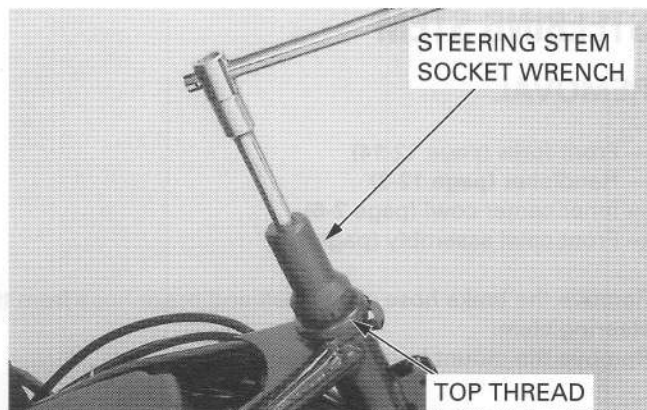
FRONT WHEEL/SUSPENSION/STEERING

Remove the steering top thread using special tool.

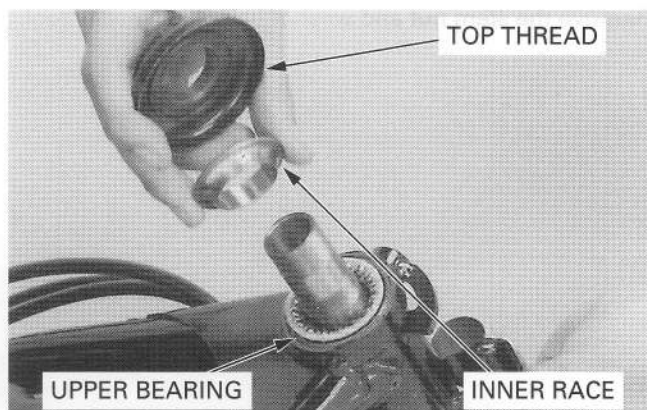
TOOL:

Steering stem socket

07916 - 3710101

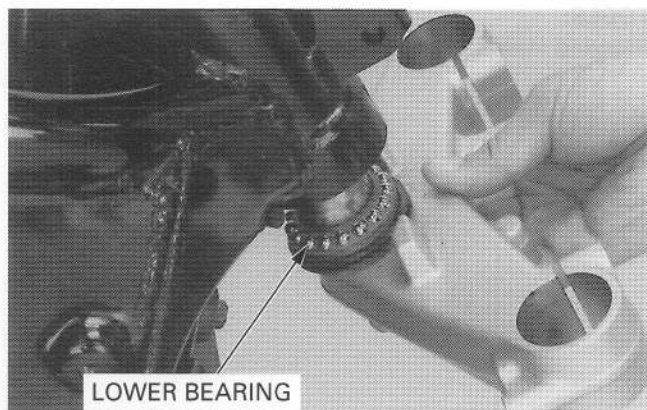


Hold the steering stem and remove the steering top thread, upper bearing inner race and upper bearing.



Remove the steering stem from the steering head.

Check the lower bearing, inner and outer races for wear or damage.



STEERING BEARING RACE REPLACEMENT

NOTE:

Always replace the bearings and races as a set.

Remove the lower bearing outer race using the following tools.

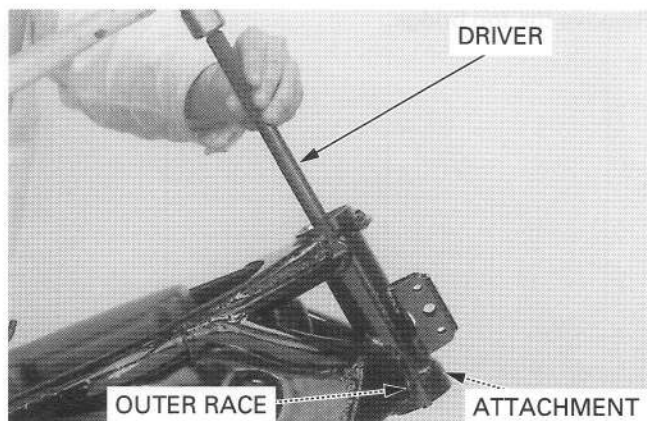
TOOLS:

Driver

07953 - MJ10200

Attachment

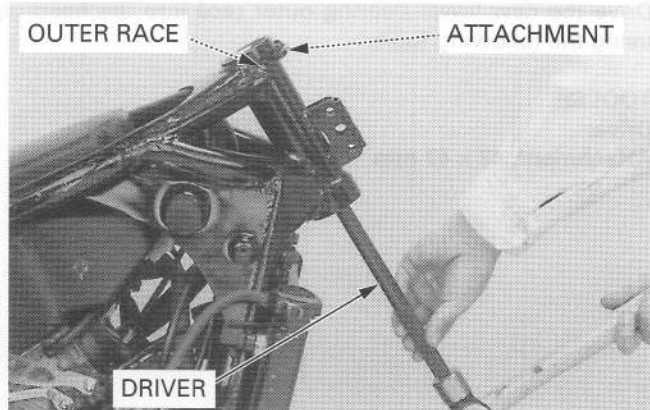
07953 - MJ10100



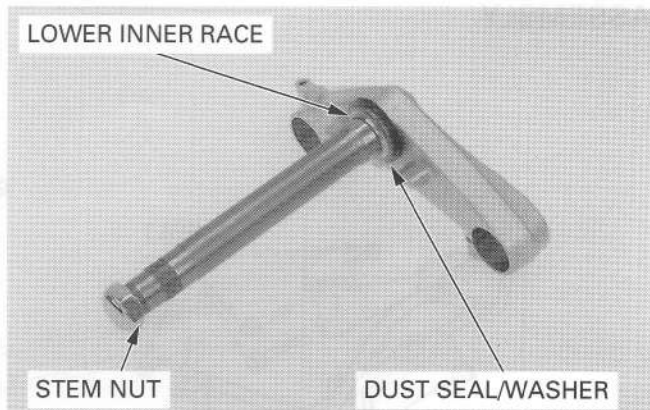
Remove the upper bearing outer race using the following tools.

TOOLS:

Driver 07953 - MJ10200
Attachment 07953 - MJ10100



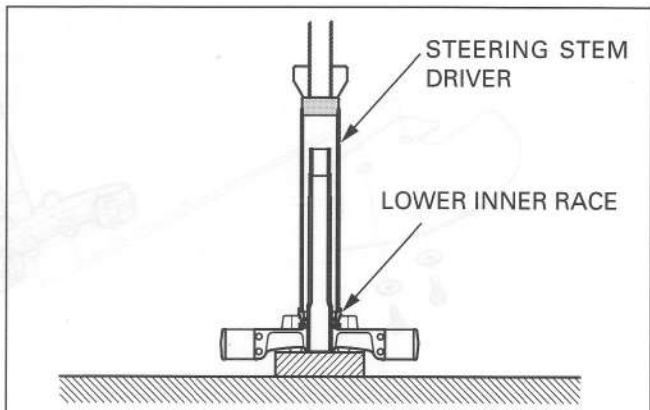
Install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.
 Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
 Remove the dust seal and washer.



Install the washer onto the steering stem.
 Apply grease to new dust seal lips and install it over the steering stem.
 Install a new lower bearing inner race using a special tool and a hydraulic press.

TOOL:

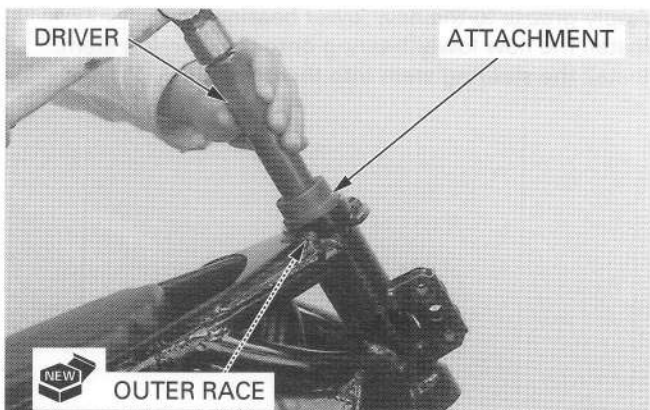
Steering stem driver 07946 - MB00000



Drive the new upper bearing outer race into the head pipe using the following tools.

TOOLS:

Driver 07749 - 0010000
Attachment, 42 x 47 mm 07746 - 0010300



FRONT WHEEL/SUSPENSION/STEERING

Drive the new lower bearing outer race into the head pipe using the following tools.

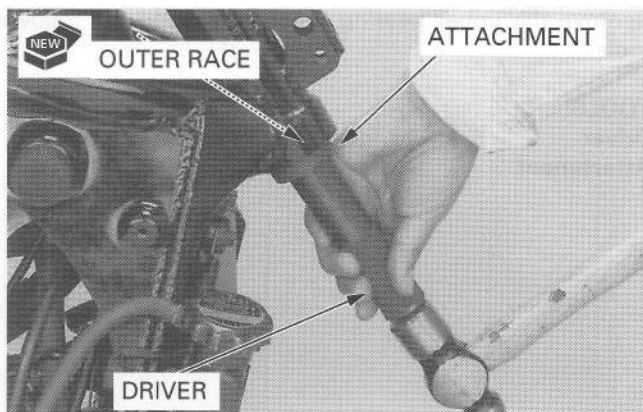
TOOLS:

Driver

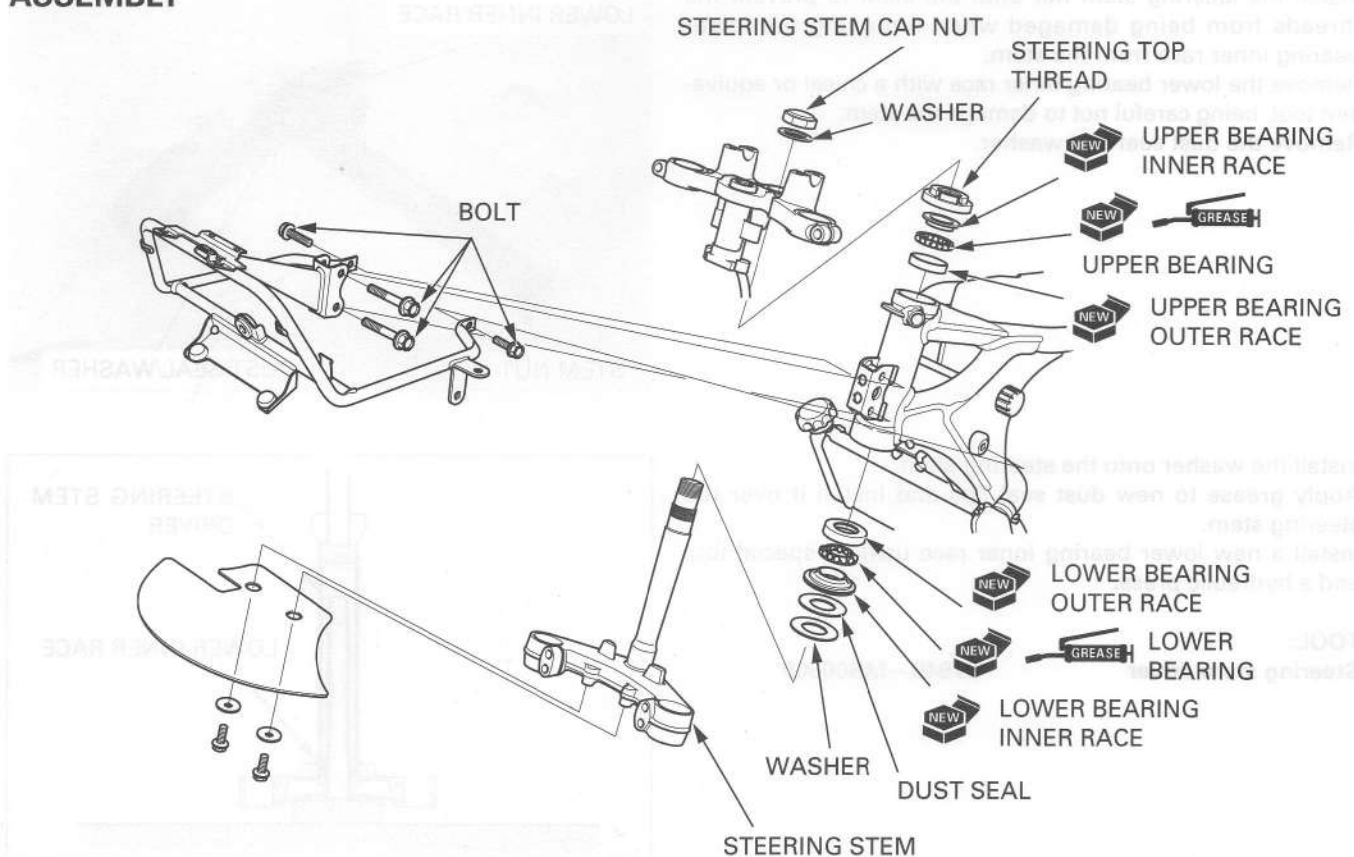
07749 - 0010000

Attachment, 42 x 47 mm

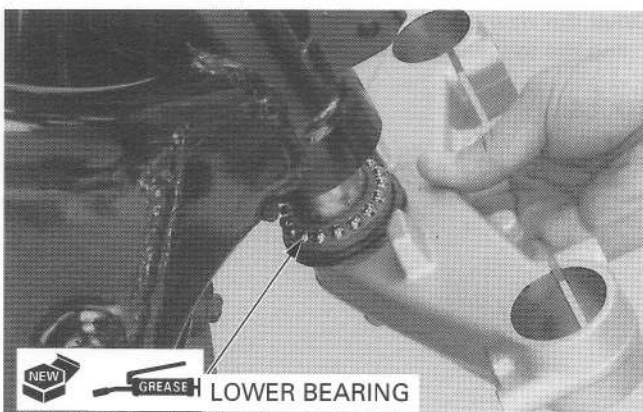
07746 - 0010300



ASSEMBLY

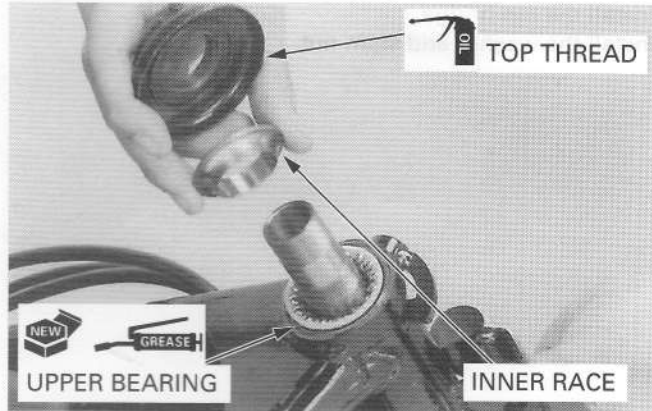


Apply grease to the new lower bearing.
Install the new lower bearing onto the steering stem.
Install the steering stem into the head pipe.



FRONT WHEEL/SUSPENSION/STEERING

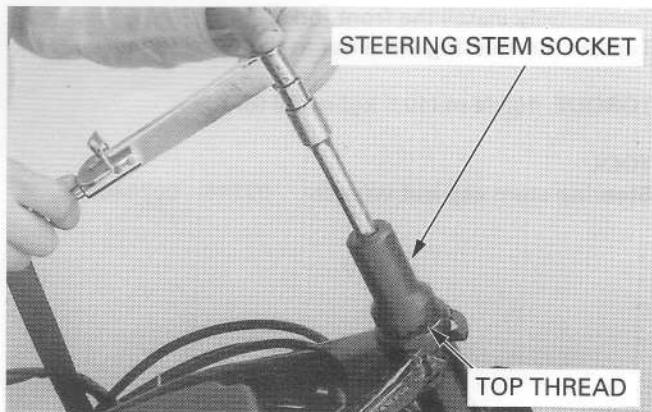
Apply grease to the new upper bearing.
Apply oil to the steering top thread bolt.
Install the upper bearing, upper bearing inner race, and steering top thread.



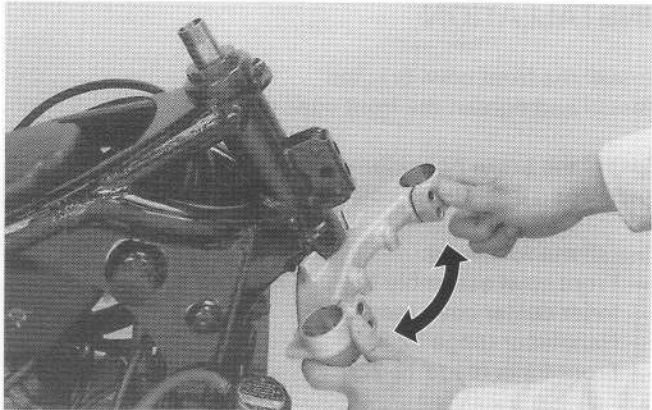
Tighten the top thread to the specified torque.

TOOL:
Steering stem socket 07916 - 3710101

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Turn the steering stem right and left, lock-to-lock at least five times to seat bearings.
Make sure that the steering stem moves smoothly, without play or binding.
Loosen the top thread completely.

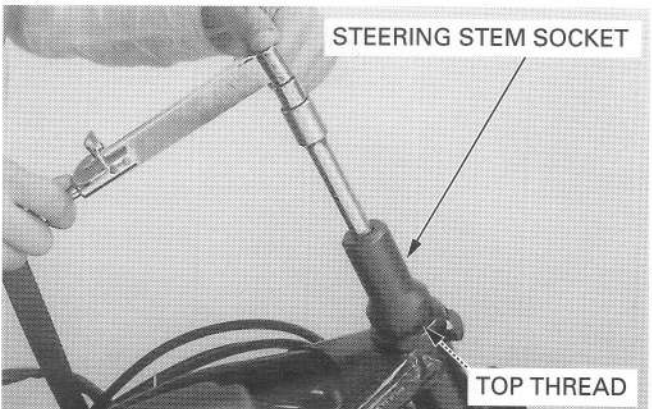


Retighten the top thread to the specified torque.

TOOL:
Steering stem socket 07916 - 3710101

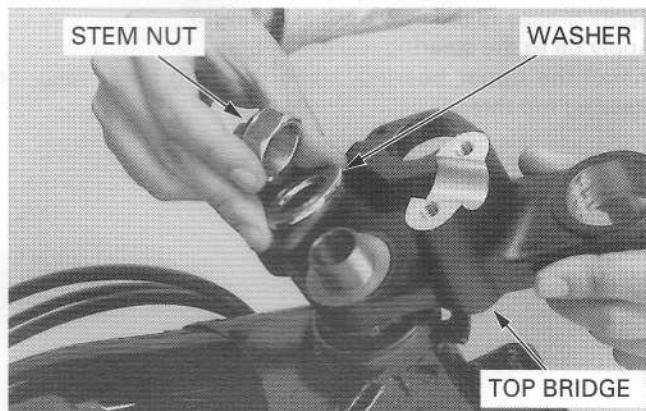
TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Rotate the top thread counterclockwise 45 degrees.



FRONT WHEEL/SUSPENSION/STEERING

Install the top bridge.
Install the washer and stem nut.

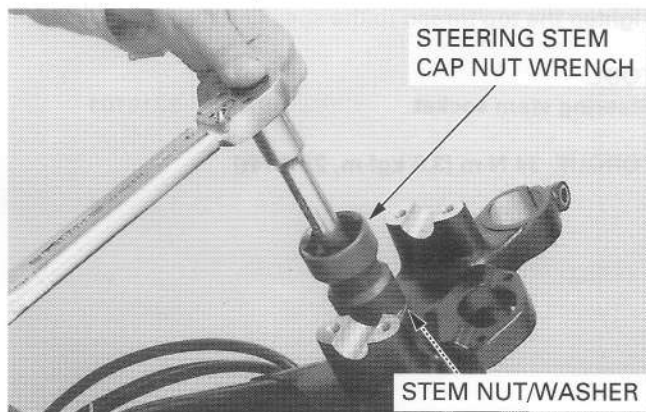


Temporarily install the front forks.
Tighten the steering stem nut to the specified torque.

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

TOOL:

Steering stem cap nut wrench 07716 - 0020400



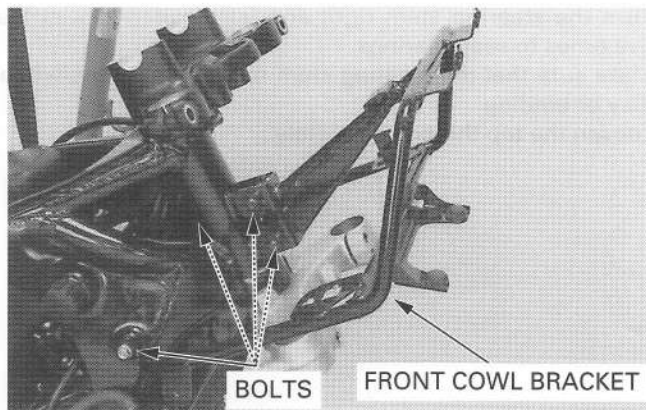
INSTALLATION

Install the front cowl bracket.
Install and tighten the front cowl mount bolts.

Install the brake hose clamp and brake hose.
Install and tighten the bolt.

Install the following:

- Front cowl assembly (page 2-7)
- Inner center cowl (page 2-6)
- Handlebar (page 12-5)
- Front forks (page 12-22)



STEERING BEARING PRELOAD

Raise the front wheel off the ground.

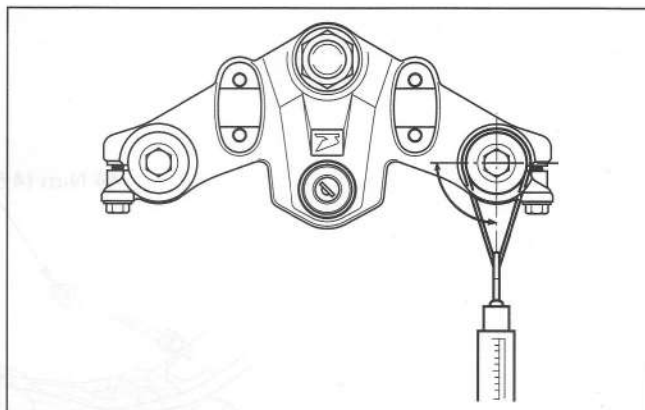
Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

Make sure that there is no cable or wire harness interference.

Pull the spring scale keeping the scale at a right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.



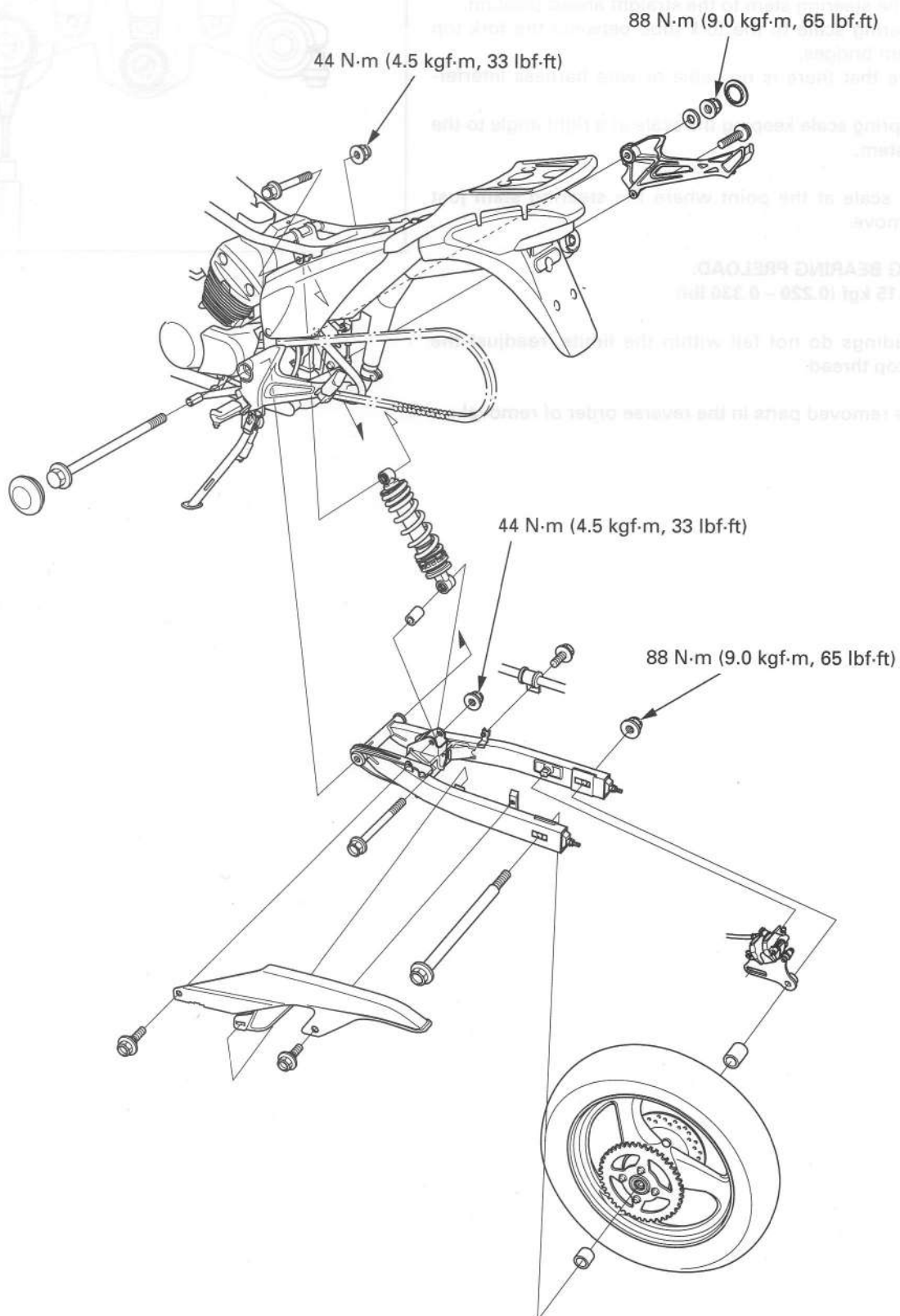
STEERING BEARING PRELOAD:

0.10 – 0.15 kgf (0.220 – 0.330 lbf)

If the readings do not fall within the limits, readjust the steering top thread.

Install the removed parts in the reverse order of removal.

REAR WHEEL/SUSPENSION



13. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	13-1	SHOCK ABSORBER	13-10
TROUBLESHOOTING	13-2	SWINGARM	13-12
REAR WHEEL	13-3		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.
- Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.

CAUTION:

To avoid damaging the rim when using the tire lever, always use rim protectors.

- When servicing the rear wheel, swingarm or shock absorber, support the motorcycle securely with a using a hoist or equivalent.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Driver only	200 kPa (2.0 kgf/cm ² , 29 psi)	—
	Driver and passenger	225 kPa (2.25 kgf/cm ² , 33 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	1.0 (0.04)
	Axial	—	1.0 (0.04)
Wheel balance weight		—	60 g (2.1 oz) max.
Drive chain slack		25 – 35 (1 – 1 3/8)	60 (2 3/8)
Drive chain link		110	—
Drive chain size	DID	520V6	—
	RK	520 SMOZ2	—
	REGINA	135 ORNV2	—

TORQUE VALUES

Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)
Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)
Shock absorber upper mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)
Chain slider screw	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Chain adjuster lock nut	10 N·m (1.0 kgf·m, 7 lbf·ft)

REAR WHEEL/SUSPENSION

TOOLS

Bearing remover head, 15 mm	07746 - 0050400
Bearing remover shaft	07746 - 0050100
Driver	07749 - 0010000
Attachment, 22 x 24 mm	07746 - 0010800
Attachment, 42 x 47 mm	07746 - 0010300
Attachment, 24 x 26 mm	07746 - 0010700
Pilot, 15 mm	07746 - 0040300
Pilot, 20 mm	07746 - 0040500
Pilot, 17 mm	07746 - 0040400
Bearing remover shaft, 20 mm	07936 - 3710600
Bearing remover handle	07936 - 3710100
Bearing remover weight	07741 - 0010201

TROUBLESHOOTING

Wobble or vibration in motorcycle

- Bent wheel
- Damaged tire
- Axle not tightened properly
- Chain adjusters not adjusted equally

Soft suspension

- Weak spring
- Oil leakage from damper unit
- Improper shock absorber spring preload
- Tire pressure too low

Hard suspension

- Improper shock absorber spring preload
- Bent damper rod
- Bent frame or swingarm
- Tire pressure too high

Suspension noise

- Faulty damper
- Loose fasteners

Steers to one side or does not track straight

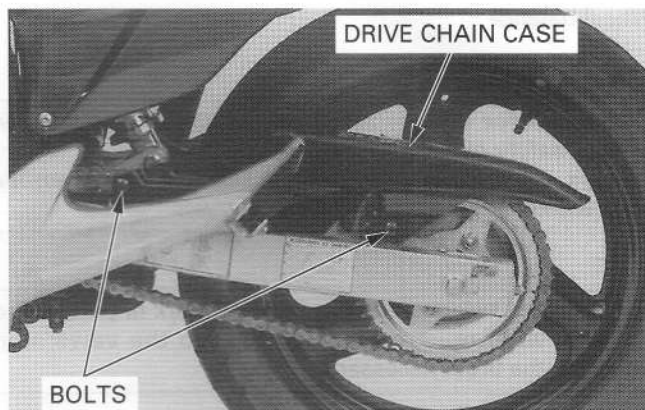
- Bent rear axle
- Axle alignment/chain adjustment not equal both sides

REAR WHEEL

REMOVAL

Support the motorcycle securely using a hoist or equivalent.

Remove the bolts and drive chain case from the swingarm.



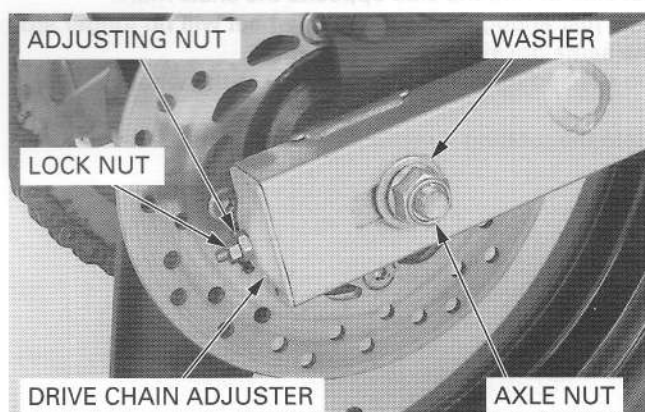
Remove the rear axle nut and washers.

Loosen the drive chain adjusting nut and lock nut.

Push the rear wheel forward.

Derail the drive chain.

Remove the axle from the left side and remove the rear wheel.



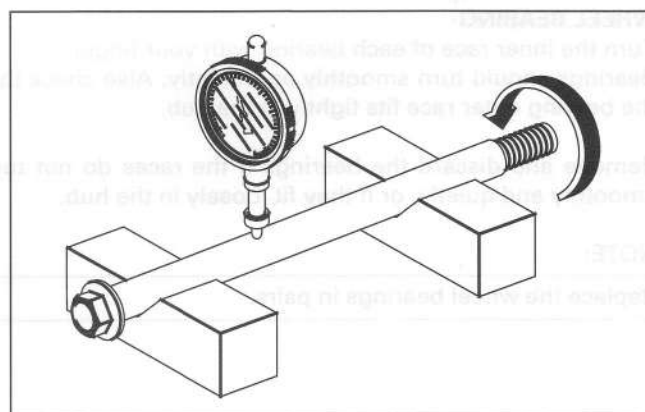
Remove the drive chain adjusters.

INSPECTION

AXLE

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL

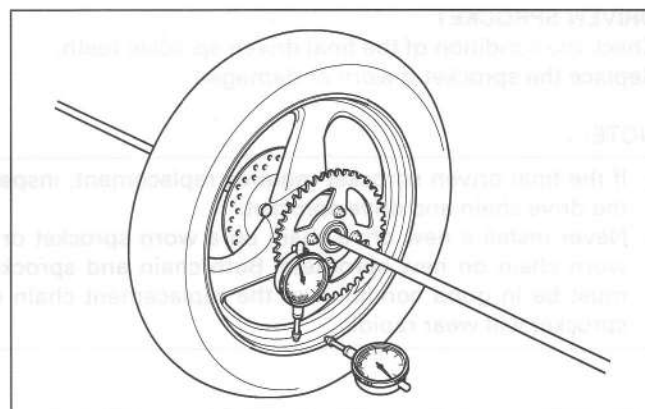
Check the rim runout by placing the wheel in a turning stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 1.0 mm (0.04 in)

Axial: 1.0 mm (0.04 in)



REAR WHEEL/SUSPENSION

Wheel balance

CAUTION:

Wheel balance directly affects the stability, handling and over all safety of the motorcycle.

Always check balance when the tire has been removed from the rim.

NOTE:

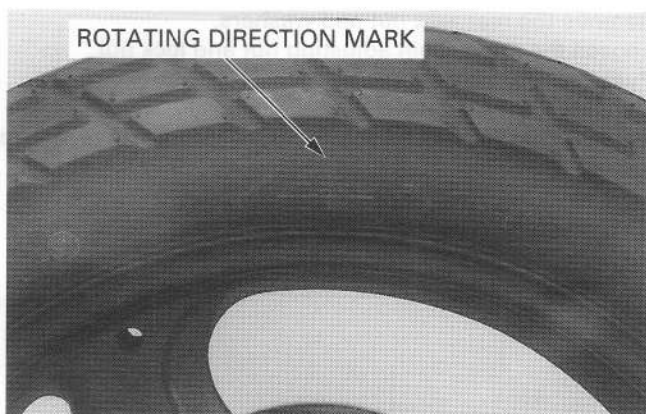
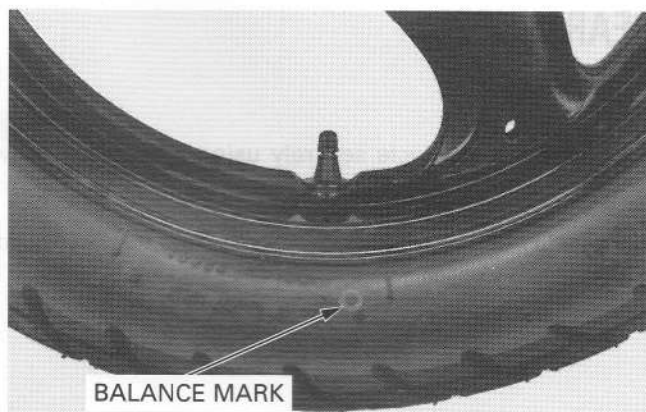
For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

To balance the wheel, install balance weights on the lightest side of rim, the side opposite the chalk mark.

Add just enough weight so the wheel will no longer stop in the same position when it is spun.

Do not add more than 60 g (2.1 oz) to the wheel.

Note the rotating direction mark on the tire.



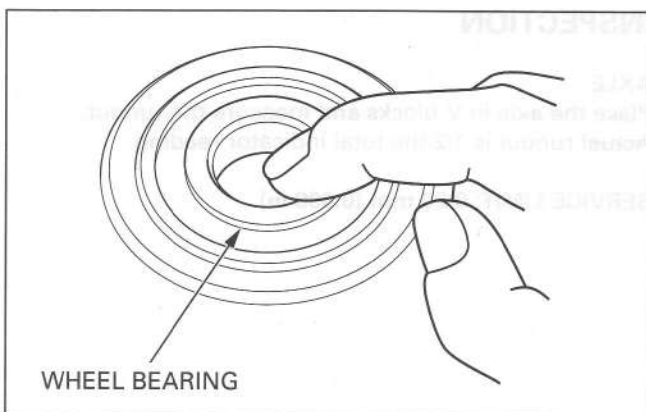
WHEEL BEARING

Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

NOTE:

Replace the wheel bearings in pairs.

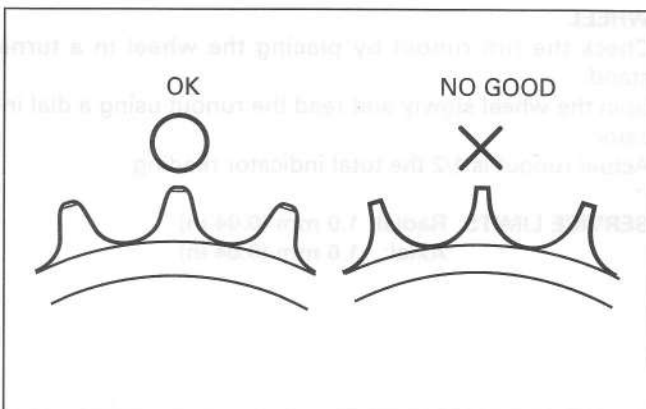


DRIVEN SPROCKET

Check the condition of the final driven sprocket teeth. Replace the sprocket if worn or damaged.

NOTE:

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

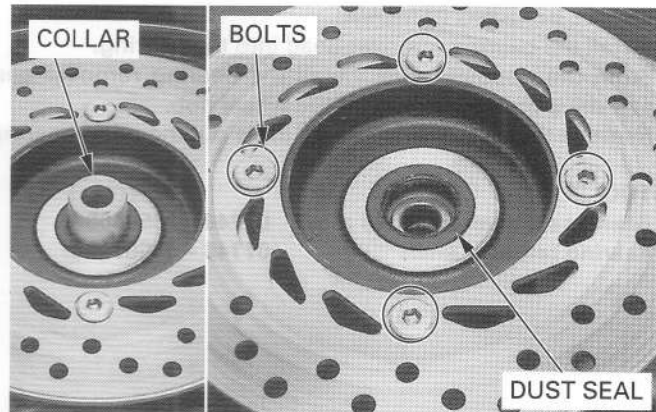


DISASSEMBLY

Remove the collar.

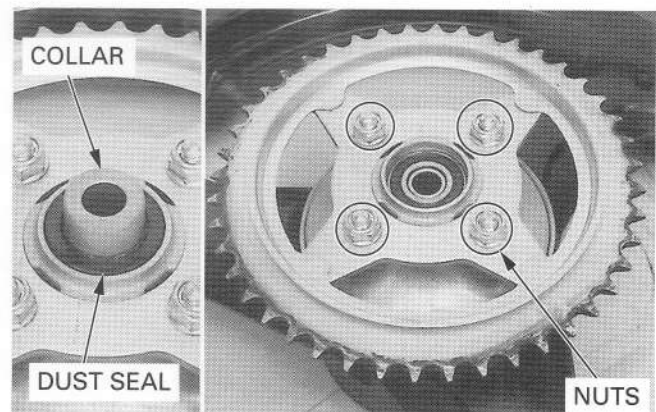
Remove the dust seal.

Remove the bolts and brake disc.

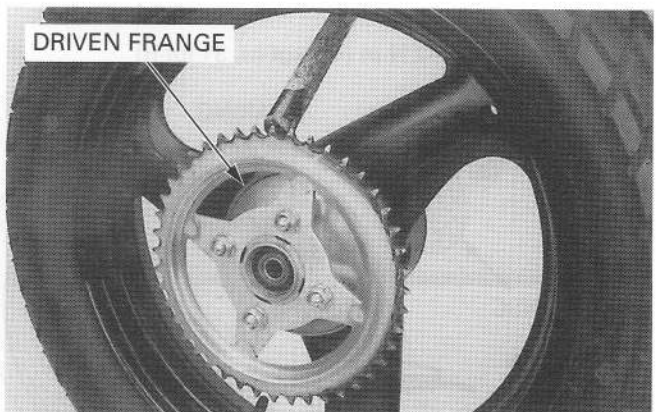


Remove the collar and dust seal.

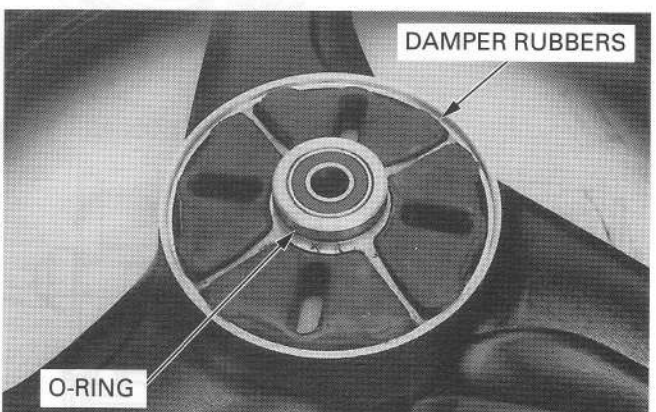
Loosen the driven sprocket nuts.



Remove the driven frange from the left wheel hub, then remove the driven sprocket nuts and sprocket.



Remove the damper rubbers and O-ring.



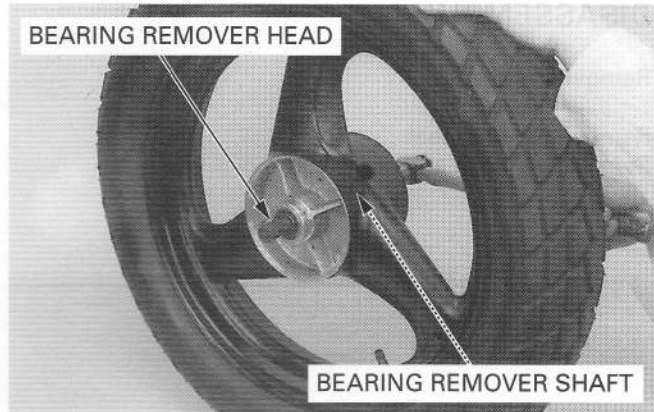
REAR WHEEL/SUSPENSION

WHEEL BEARING REMOVAL

Install the bearing remover head into the bearing.
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

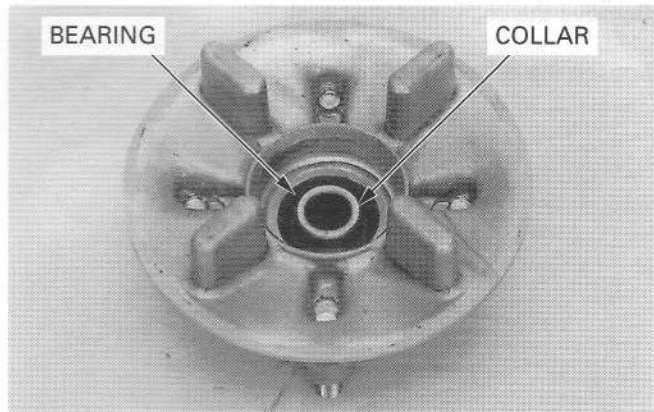
TOOLS:

Bearing remover head, 15 mm 07746 - 0050400
Bearing remover shaft 07746 - 0050100

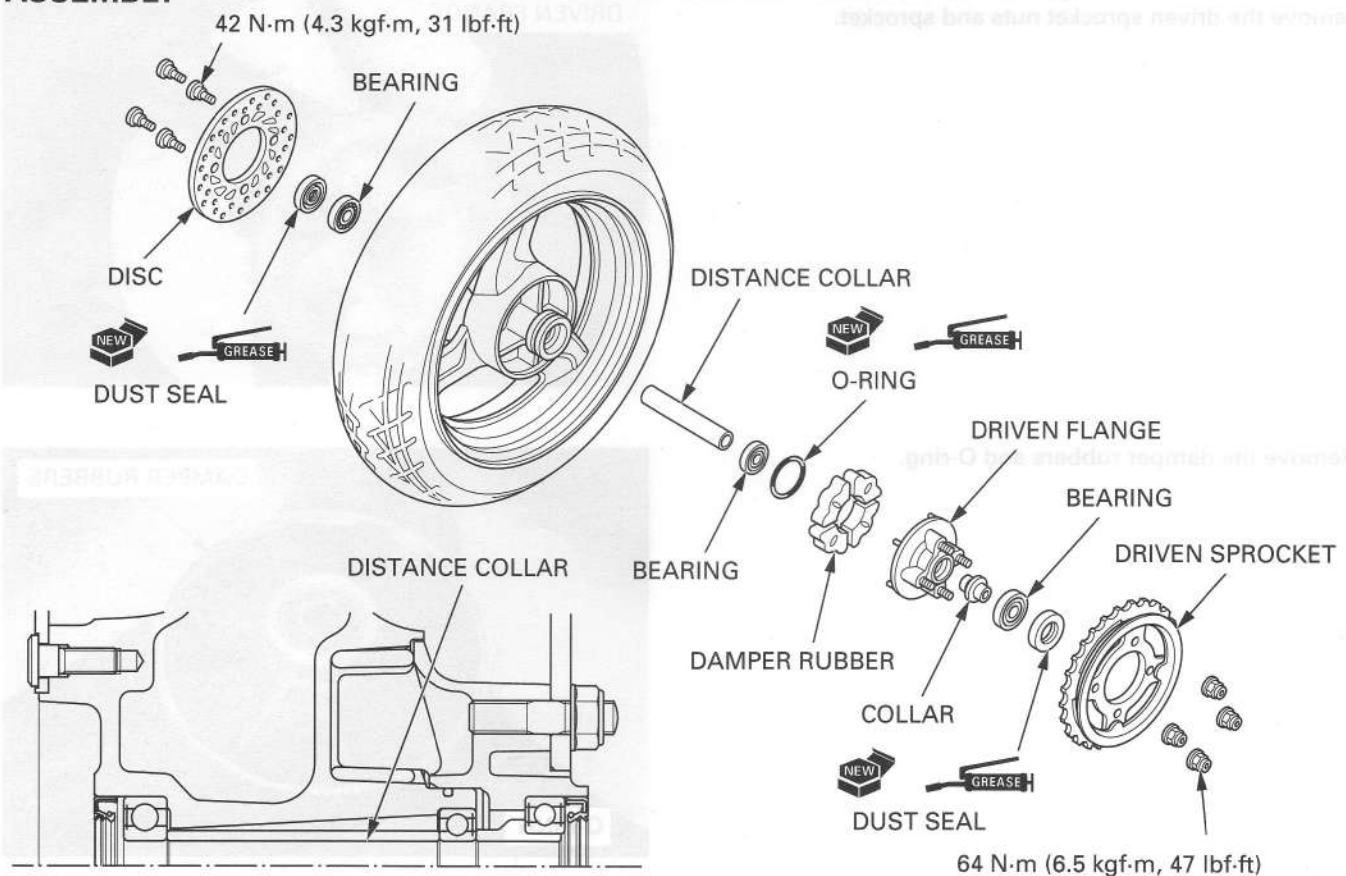


DRIVEN FLANGE BEARING REMOVAL

Remove the driven flange bearing and collar.



ASSEMBLY



WHEEL BEARING INSTALLATION

Pack all bearing cavities with grease.

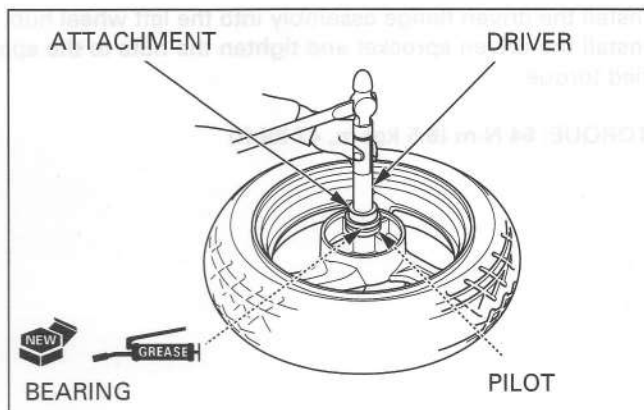
CAUTION:

Never install an old bearing has been removed, the bearing must be replaced with a new one.

Drive a new left bearing squarely with its sealed side facing out.

TOOLS:

Driver	07749 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 15 mm	07746 - 0040300



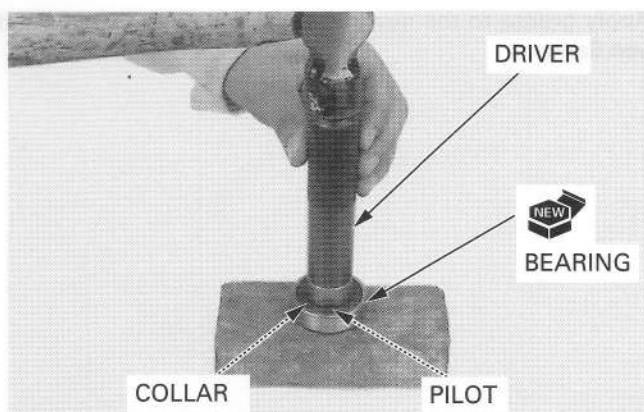
Install the distance collar, then drive in the right side bearing with its sealed side facing out.

DRIVEN FLANGE BEARING INSTALLATION

Install the driven flange collar to the new drive flange bearing using the special tools.

TOOLS:

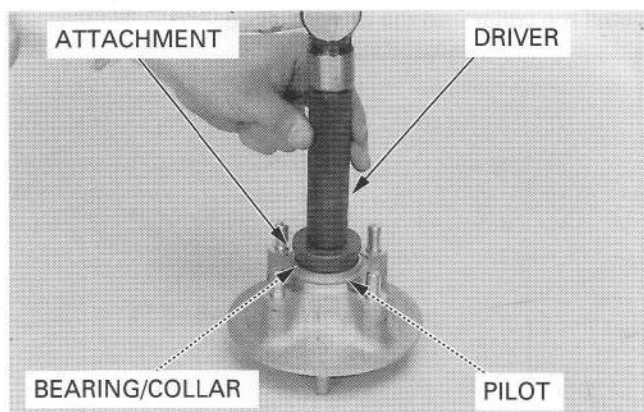
Driver	07749 - 0010000
Pilot, 15 mm	07746 - 0040300



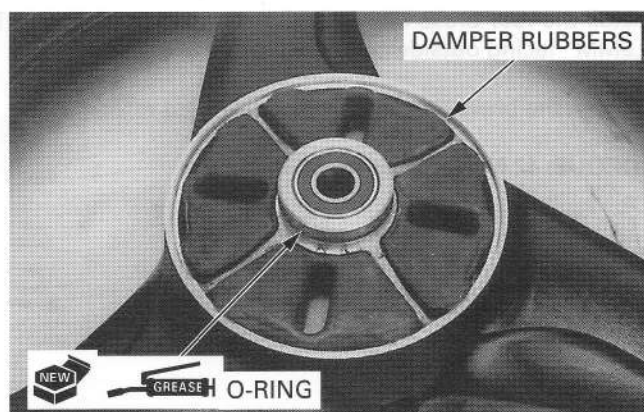
Drive the driven flange bearing and collar into the driven flange using the special tools.

TOOLS:

Driver	07749 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 15 mm	07746 - 0040300



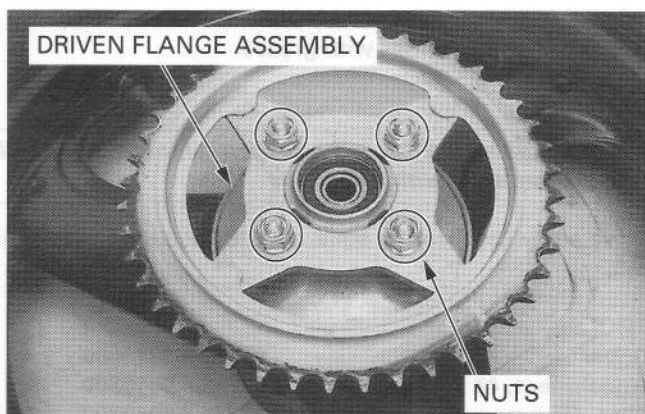
Install the damper rubbers into the wheel hub. Apply grease to a new O-ring and install it to the wheel hub.



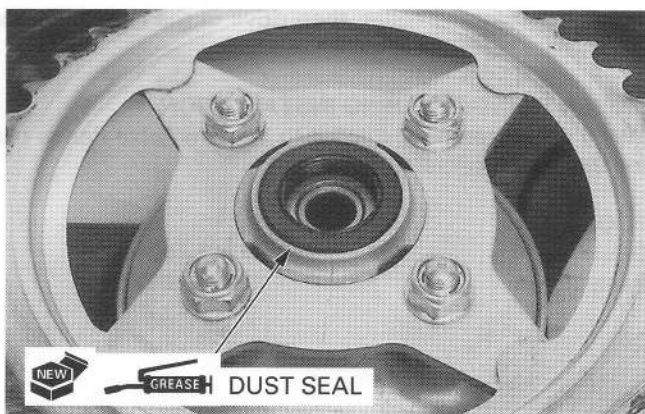
REAR WHEEL/SUSPENSION

Install the driven flange assembly into the left wheel hub. Install the driven sprocket and tighten the nuts to the specified torque.

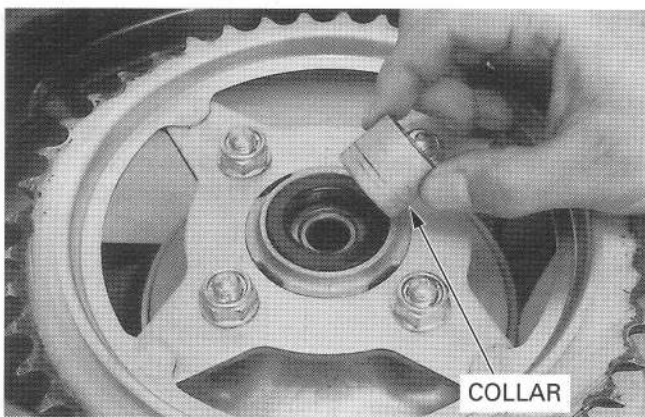
TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Apply grease to the new dust seal lips, then install the driven flange.



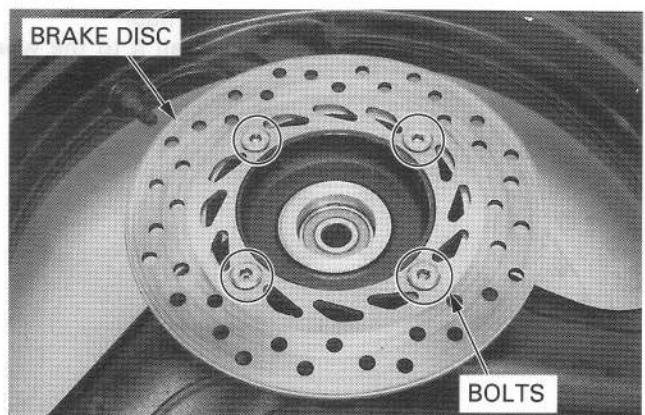
Install the collar into the driven flange.



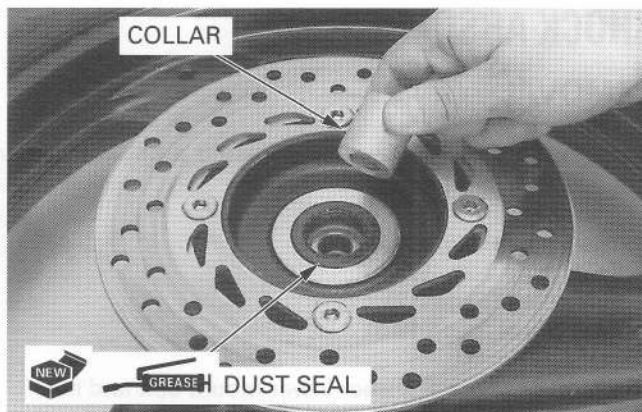
Install the rear brake disc with the stamped mark "MIN. TH 3.5MM" facing outside and install the brake disc bolts.

Tighten the brake disc bolts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Apply grease to the new dust seal lips, then install it in to the wheel hub.

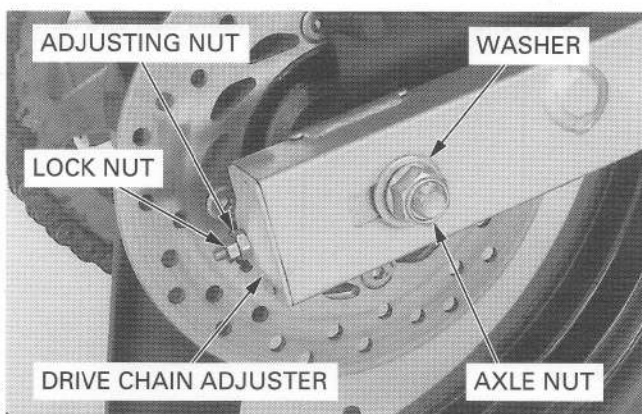


INSTALLATION

Check the rear brake cariper bracket position (page 14-24). Install both drive chain adjusters into the swingarm.

Place the rear wheel into the swingarm carefully aligning the brake disc between the brake pads. Insert the axle through the left drive chain adjuster, left side collar, wheel, right side collar, rear caliper bracket and right chain adjuster. Install the drive chain onto the driven sprocket.

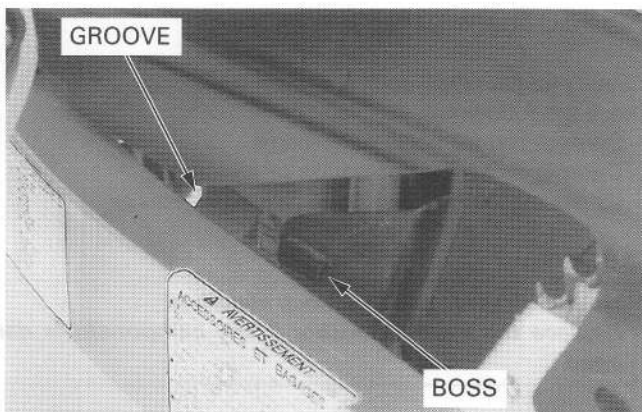
Install the washer and loosely install the axle nut. Adjust the drive chain slack (page 3-16).



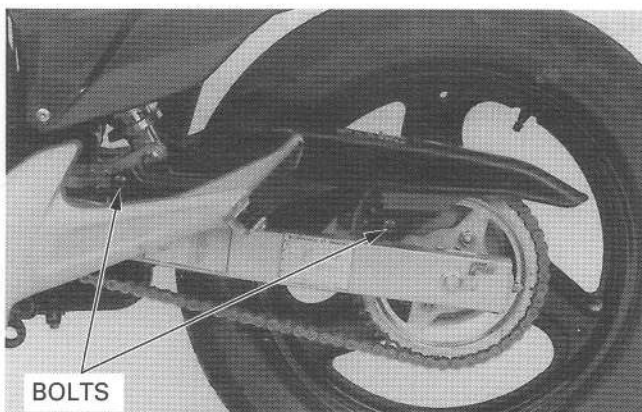
Tighten the axle nut to the specified torque.

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

Install and slide the drive chain case by aligning the groove with the boss of the swingarm and chain case.



Tighten the bolts securely.



SHOCK ABSORBER

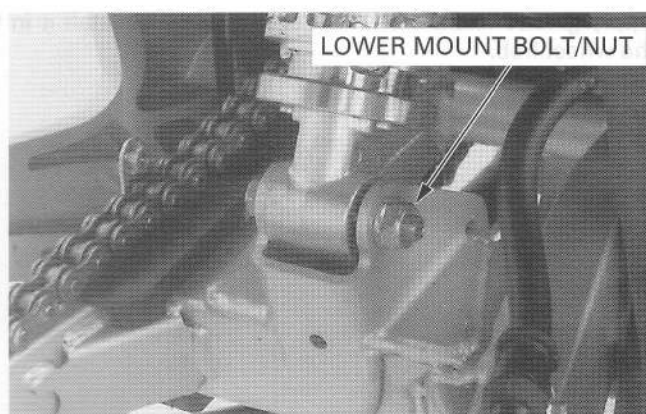
REMOVAL

Support the motorcycle securely using a hoist or equivalent.

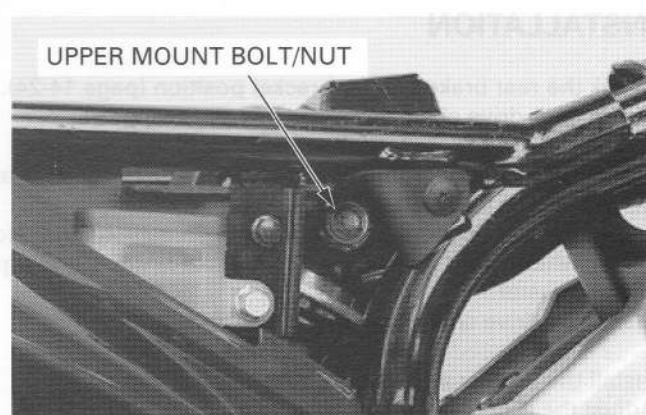
Remove the following:

- Seat (page 2-2).
- Side cover (page 2-2).
- Rear wheel (page 13-3).

Remove the shock absorber lower mount bolt and nut.



Remove the shock absorber upper mount bolt and nut.



INSPECTION

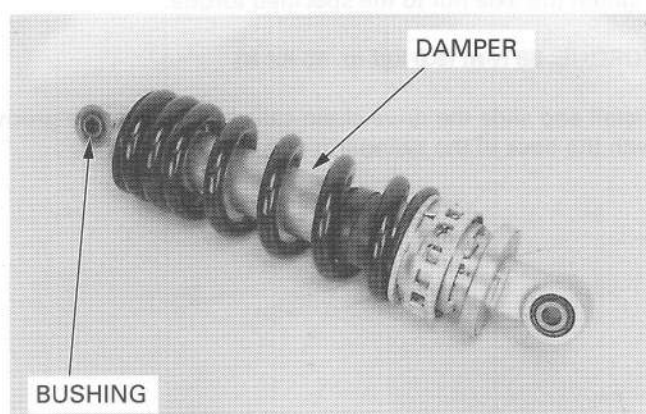
Visually inspect the shock absorber for damage.

Check the following:

- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Upper mounting bushing for wear or damage

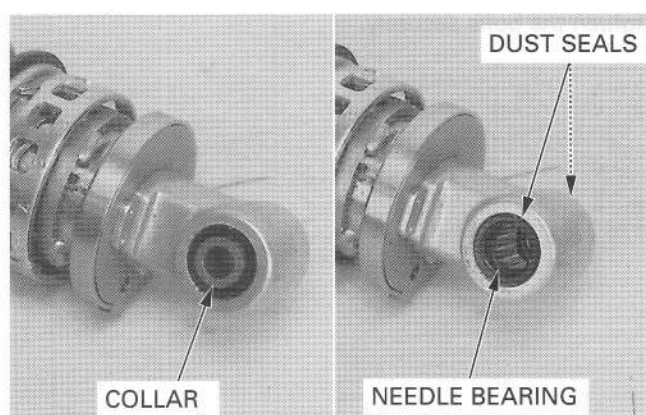
CAUTION:

- *Do not disassemble the shock absorber.*
- *Replace the shock absorber if any component is damaged.*



NEEDLE BEARING REPLACEMENT

Remove the collar from the shock absorber.
Remove the dust seals and needle bearing.



Pack the new needle bearings with multi purpose grease. Press the needle bearings into the shock arm until the bearing outer ends are on a level with the shock arm inner edges.

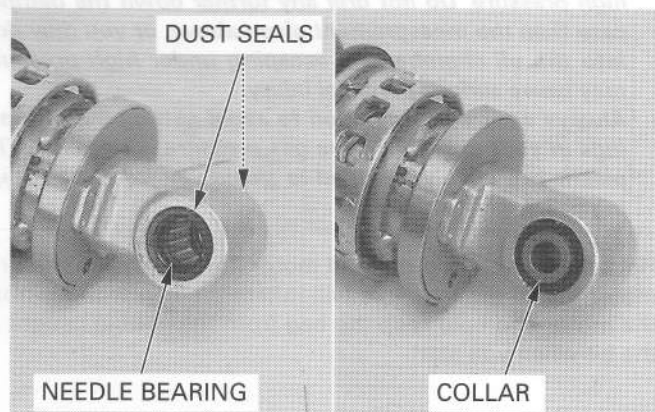
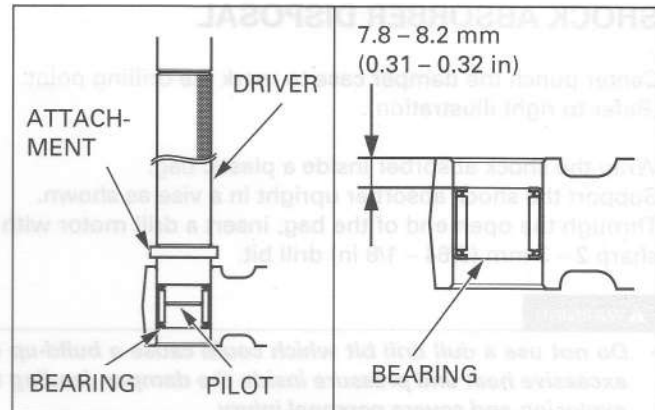
NOTE:

Press the needle bearing on the stamped end.

TOOLS:

Driver	07749 - 0010000
Attachment, 24 x 26 mm	07746 - 0010700
Pilot, 17 mm	07746 - 0040400

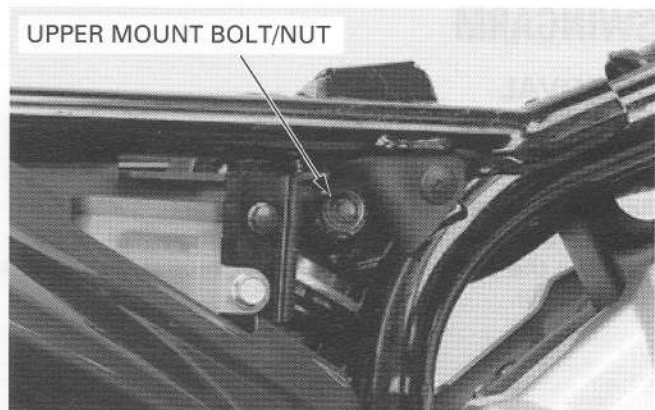
Install the dust seals into the shock absorber.
Install the collar.



INSTALLATION

Install the shock absorber to the frame.
Install and tighten the shock absorber upper mount bolt to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



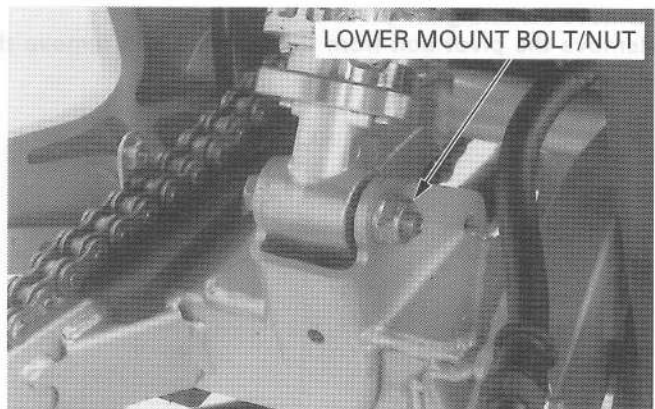
Install and tighten the shock absorber lower mount nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Install the following:

- Rear wheel (page 13-9).
- Side cover (page 2-2).
- Seat (page 2-2).

Check the operation of the shock absorber (page 3-24).



REAR WHEEL/SUSPENSION

SHOCK ABSORBER DISPOSAL

Center punch the damper case to mark the drilling point.
(Refer to right illustration).

Wrap the shock absorber inside a plastic bag.

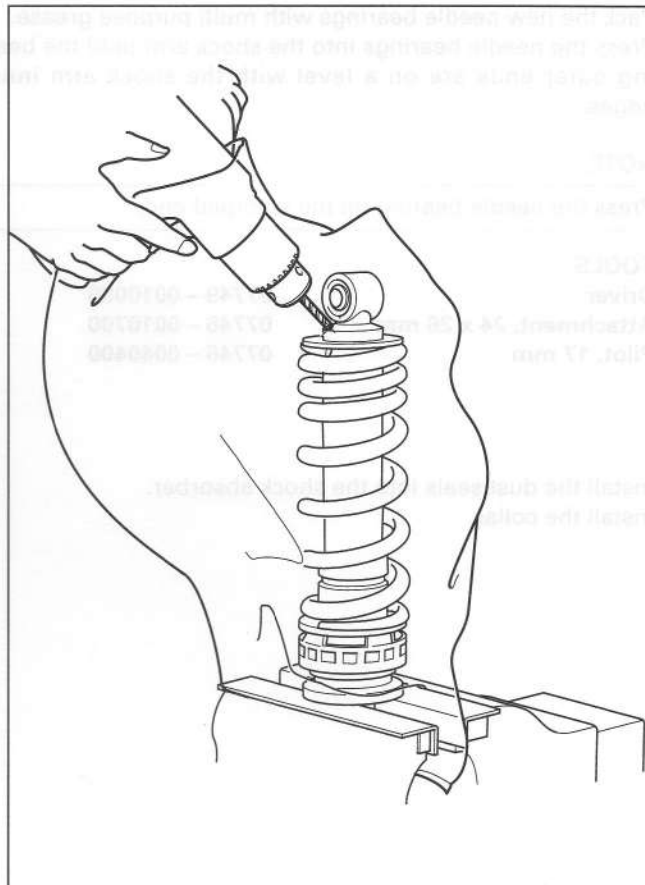
Support the shock absorber upright in a vise as shown.

Through the open end of the bag, insert a drill motor with a sharp 2 – 3 mm (5/64 – 1/8 in) drill bit.

⚠ WARNING

- **Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.**
- **The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any further down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.**
- **Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.**

Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from the getting caught in the bit when you start.



SWINGARM

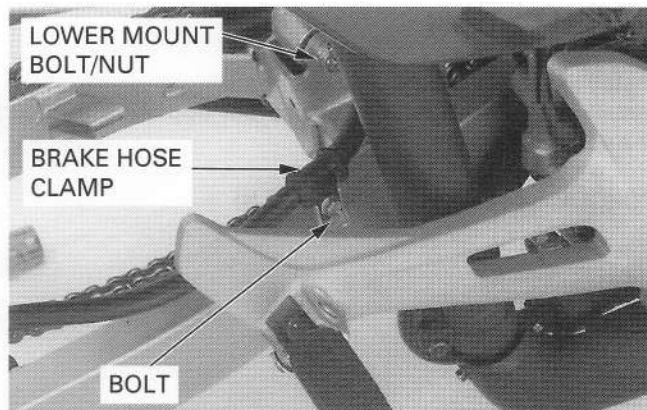
REMOVAL

Remove the rear wheel (page 13-3).

Remove the bolt from the brake hose clamp.

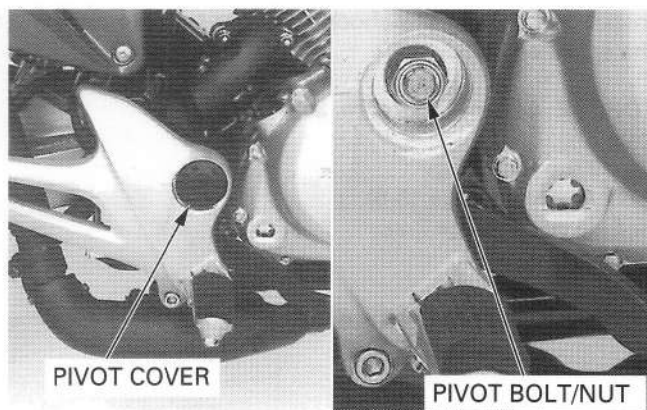
Remove the brake caliper assembly from the swingarm.

Remove the shock absorber lower mount bolt and nut (page 13-10).



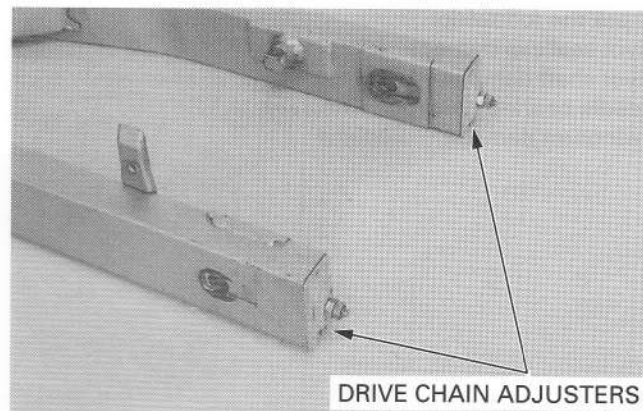
Remove the swingarm pivot nut.

Remove the pivot bolt from the left side and remove the swingarm.

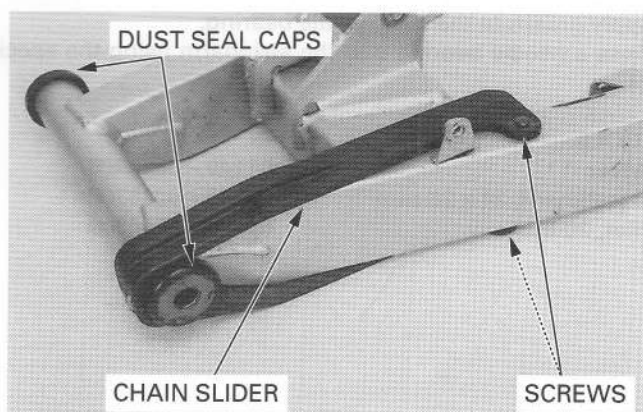


DISASSEMBLY

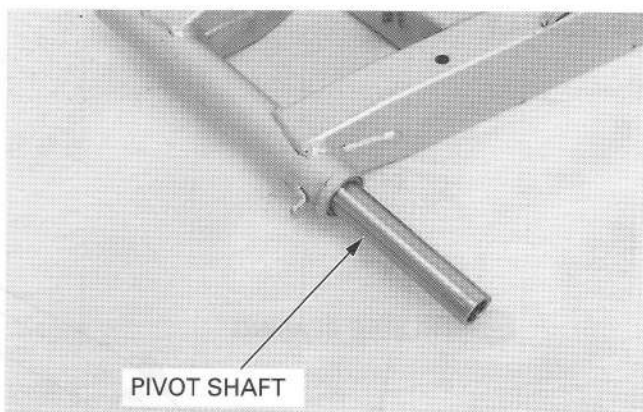
Check the drive chain slider for wear or damage.
Remove the drive chain adjusters.



Remove the screws and drive chain slider.
Remove the swingarm dust seal caps.



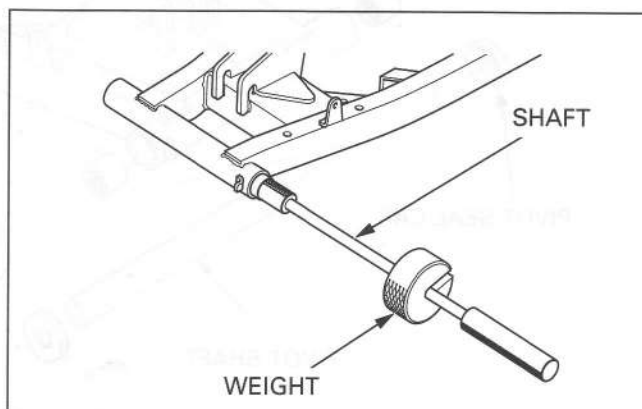
Remove the pivot shaft.



Remove the needle bearing from the swingarm using the special tool.

TOOLS:

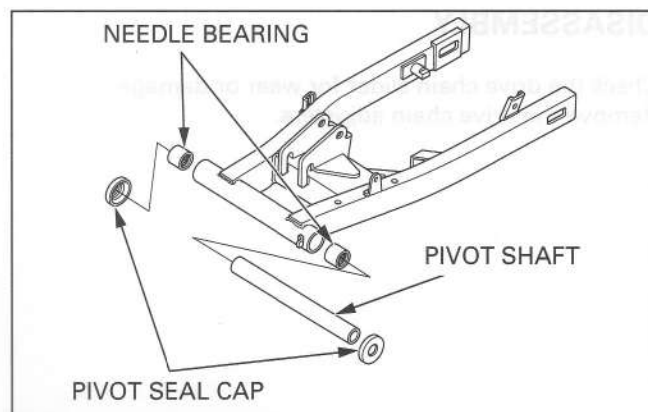
Bearing remover shaft, 20 mm	07936 - 3710600
Bearing remover handle	07936 - 3710100
Bearing remover weight	07741 - 0010201



REAR WHEEL/SUSPENSION

Check the following:

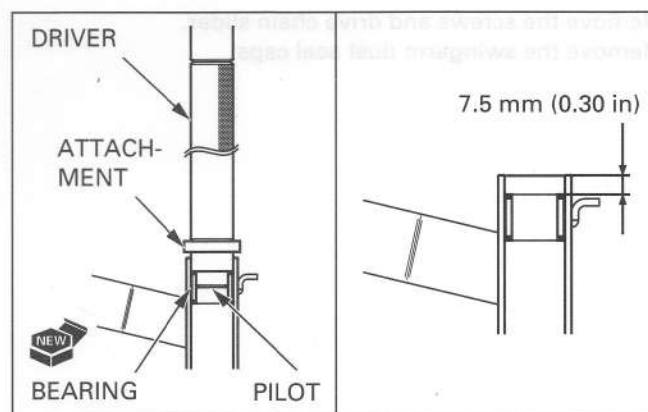
- Pivot seal cap damage → Replace
- Pivot shaft damage → Replace
- Needle bearing damage → Replace
- Swingarm damage → Replace



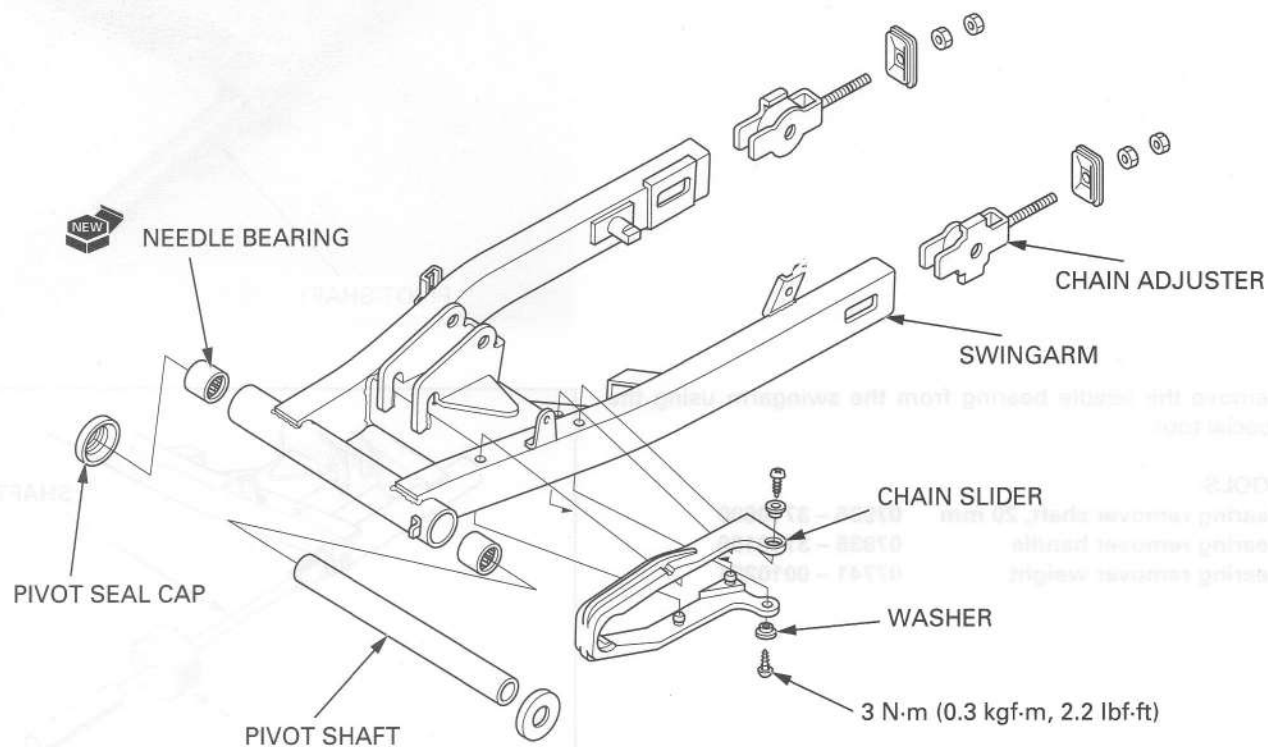
Apply grease to the new needle bearing.
Press a needle bearing into the swingarm using the special tools.

TOOLS:

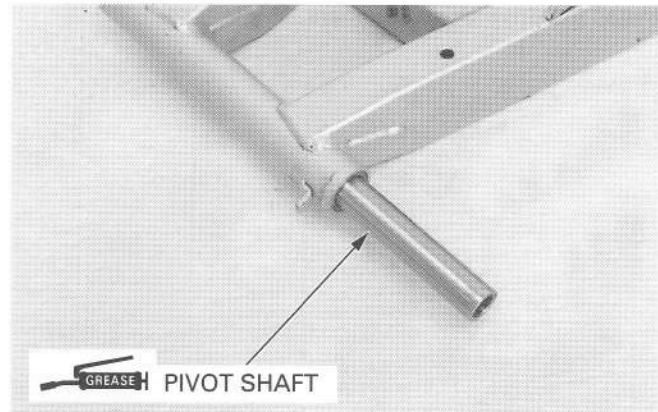
Driver	07749 - 0010000
Attachment, 24 x 26 mm	07746 - 0010700
Pilot, 20 mm	07746 - 0040300



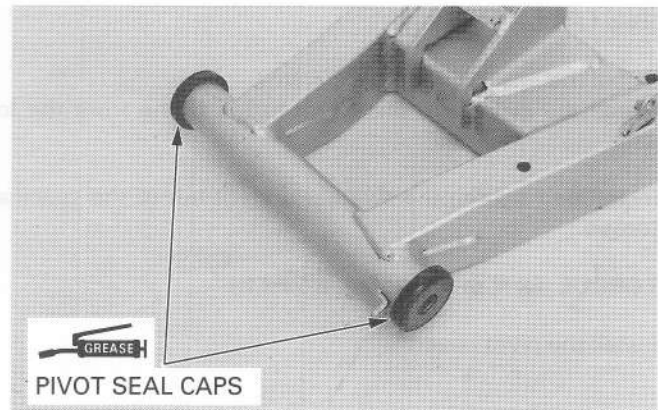
ASSEMBLY



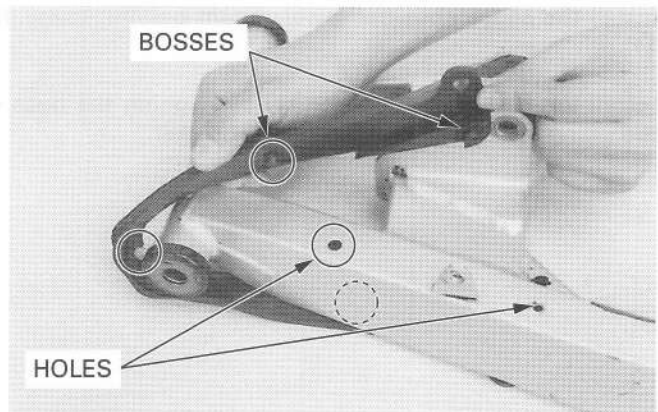
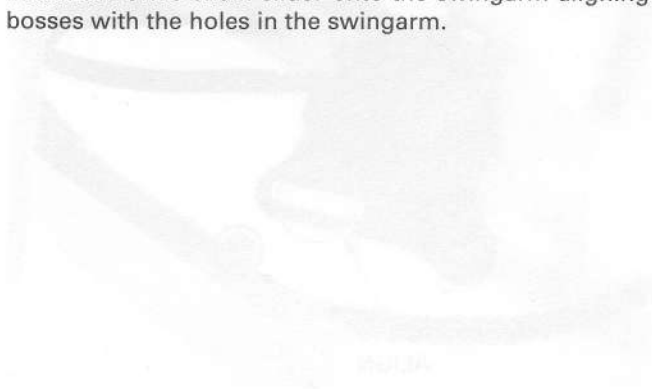
Apply grease to the pivot shaft and install it into the swingarm.



Apply grease to the dust seal cap inside and install them to the swingarm.

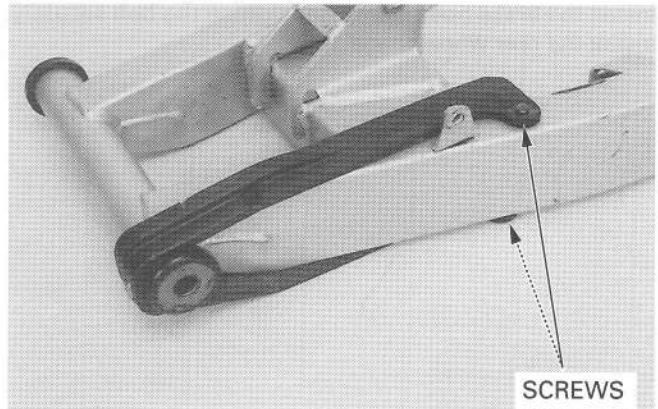
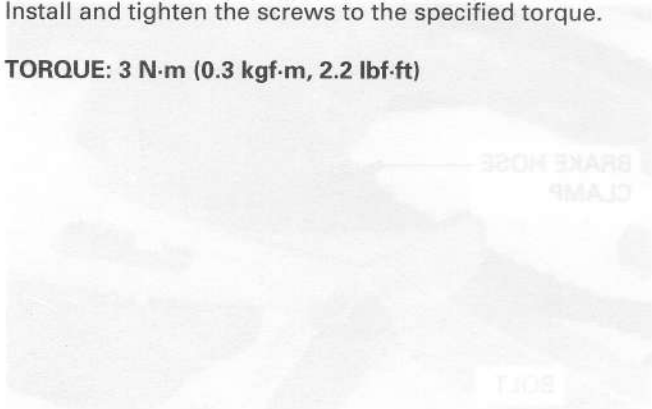


Install the drive chain slider onto the swingarm aligning its bosses with the holes in the swingarm.



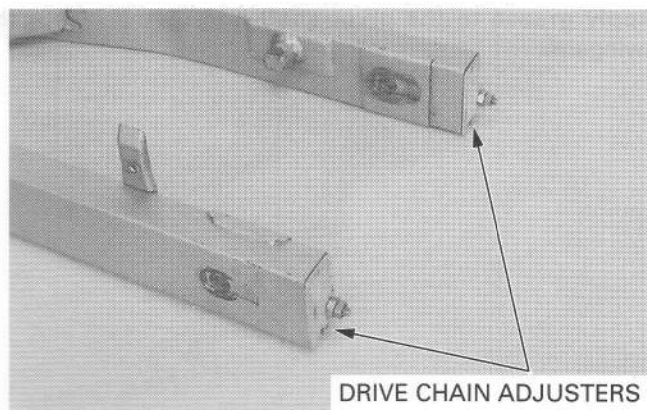
Install and tighten the screws to the specified torque.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



REAR WHEEL/SUSPENSION

Install the drive chain adjusters.



INSTALLATION

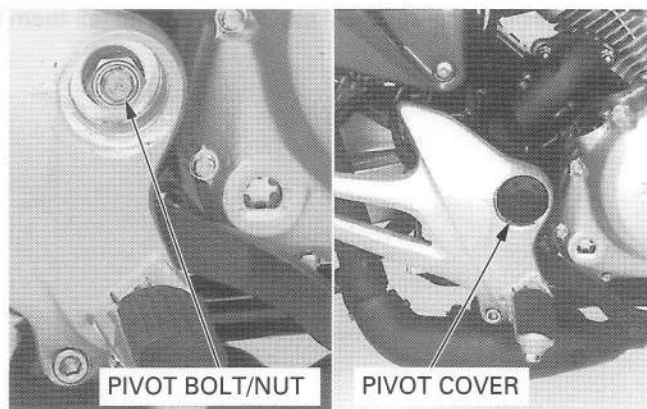
Install the swingarm onto the frame.

Install the swingarm pivot bolt to the frame from the left side.

Install and tighten the swingarm pivot nut to the specified torque.

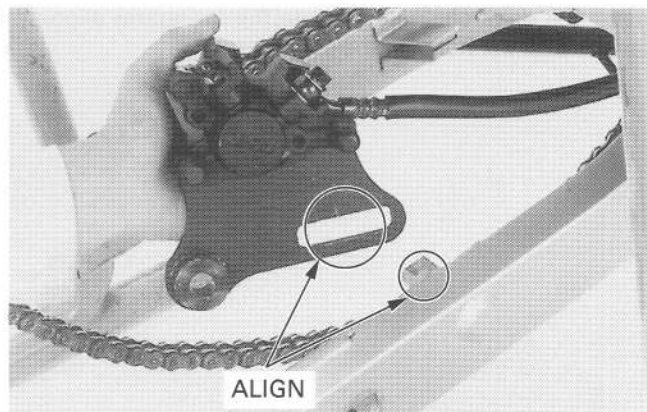
TORQUE: 88 N·m (9.0 kgf·m, 6.5 lbf·ft)

Install the pivot cover.

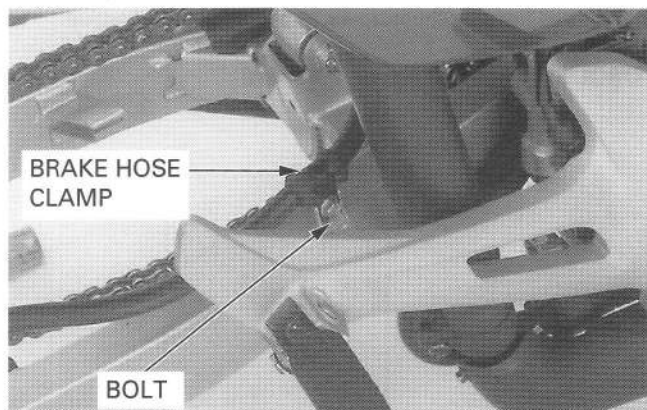


Install the shock absorber lower mount bolt/nut (page 13-11).

Install the brake caliper assembly by aligning the boss of the swingarm and hole of the caliper bracket.



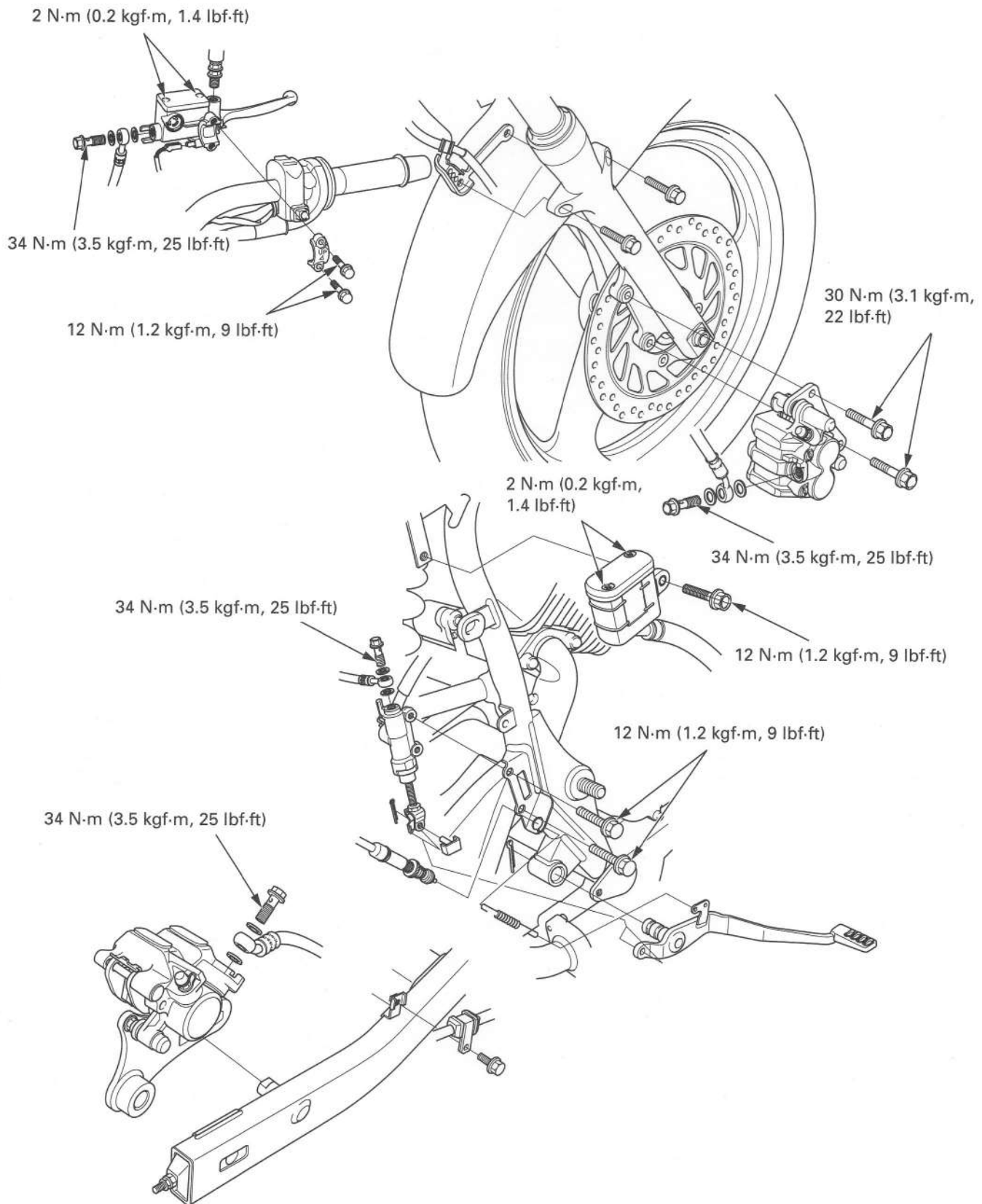
Install the brake hose clamp and tighten the bolt securely. Install the rear wheel (page 14-9).



MEMO



MEMO



14. BRAKE SYSTEM

SERVICE INFORMATION	14-1	FRONT MASTER CYLINDER	14-8
TROUBLESHOOTING	14-2	REAR MASTER CYLINDER	14-13
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	14-3	FRONT BRAKE CALIPER	14-17
BRAKE PAD/DISC	14-5	REAR BRAKE CALIPER	14-21
		BRAKE PEDAL	14-24

SERVICE INFORMATION

GENERAL

⚠ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

- Keep grease off of brake pads and disc.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 3 or DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.

CAUTION:

Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts.

Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.

- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

14

	ITEM	STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 3 or DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.13)
	Brake disc runout	—	0.1 (0.004)
	Master cylinder I.D.	11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
	Caliper piston O.D.	25.335 – 25.368 (0.9968 – 0.9987)	25.31 (0.996)
Rear	Specified brake fluid	DOT 3 or DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.13)
	Brake disc runout	—	0.1 (0.004)
	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)	12.654 (0.4978)
	Caliper cylinder I.D.	32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.	31.948 – 31.998 (1.2578 – 1.2598)	31.94 (1.257)

BRAKE SYSTEM

TORQUE VALUES

Front brake oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front master cylinder cover screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Front brake light switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt
Front caliper pin bolt (main)	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Front caliper pin bolt (sub)	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Front caliper pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Front caliper pad pin plug	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Rear brake reservoir tank bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear brake oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear master cylinder push rod nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Rear master cylinder cover screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Rear caliper pin bolt	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Rear caliper pad pin	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Rear caliper pad pin plug	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	

TOOL

Snap ring pliers	07914 – SA50001
------------------	-----------------

TROUBLESHOOTING

Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pads/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pads/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake drags

- Contaminated brake pads/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

BRAKE FLUID REPLACEMENT/AIR BLEEDING

⚠ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

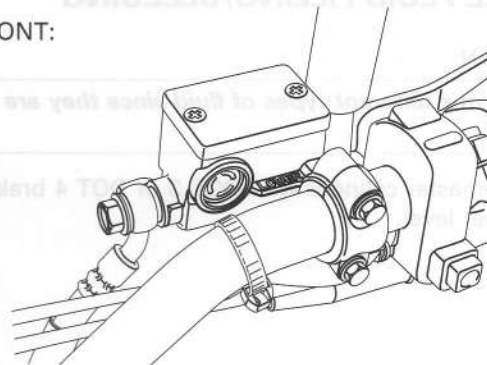
CAUTION:

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

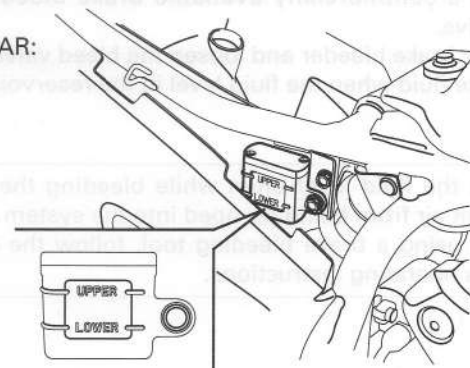
NOTE:

- The pedal brake line air bleeding procedure is performed in the same manner as in the lever brake line air bleeding procedure.
- 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.

FRONT:



REAR:



BRAKE FLUID DRAINING

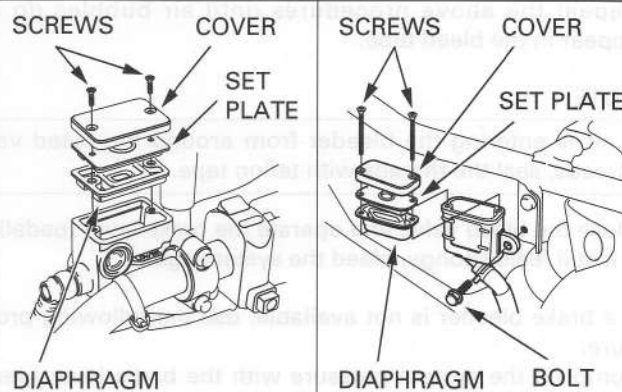
Make sure that the master cylinder is parallel to the ground, before removing the reservoir cover and cap.

FRONT:

Remove the screws, reservoir cover, set plate and diaphragm.

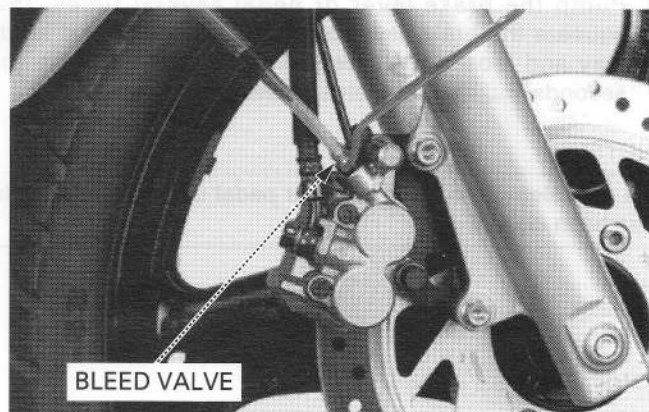
REAR:

Remove the reservoir tank mount bolt, screws, reservoir cover, set plate and diaphragm.



Connect a bleed hose to the bleed valve.

Loosen the bleed valve and pump the brake lever (pedal). Stop operating the brake when no more fluid flows out of the bleed valve.



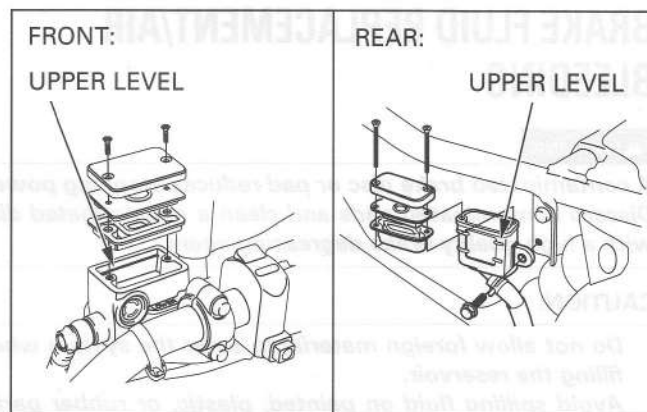
BRAKE SYSTEM

BRAKE FLUID FILLING/BLEEDING

CAUTION:

Do not mix different types of fluid since they are not compatible.

Fill the master cylinder with DOT 3 or DOT 4 brake fluid to the upper level.



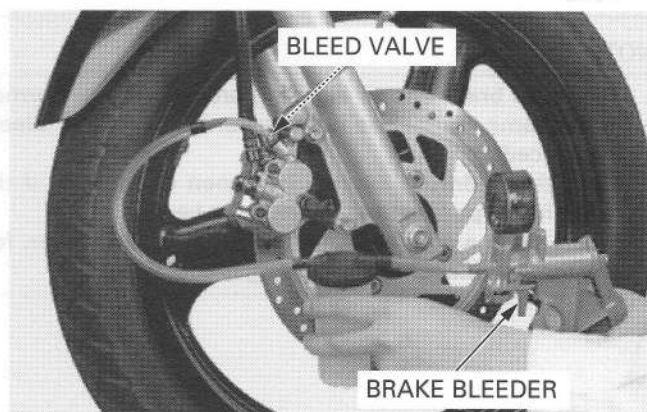
Connect a commercially available brake bleeder to the bleed valve.

Pump the brake bleeder and loosen the bleed valve.

Add brake fluid when the fluid level in the reservoir is low.

NOTE:

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



Repeat the above procedures until air bubbles do not appear in the bleed tube.

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 (pedal). If it still feels spongy, bleed the system again.

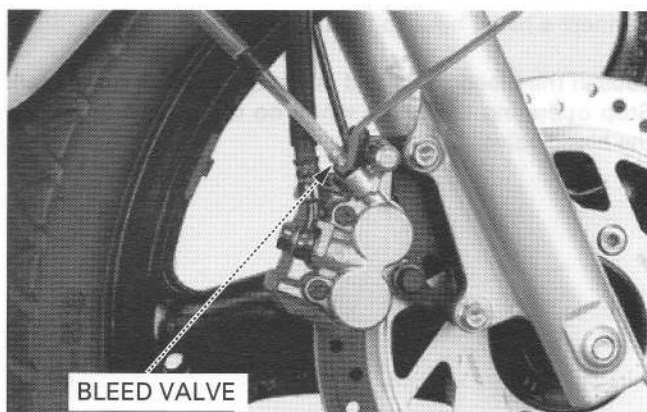
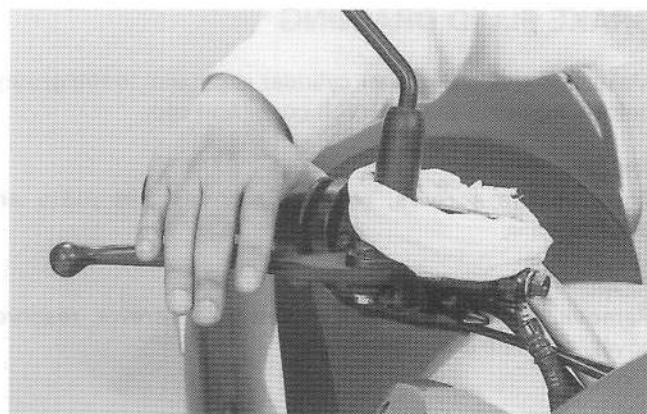
If a brake bleeder is not available, use the following procedure:

Pump up the system pressure with the brake lever (pedal) until lever (pedal) resistance is felt.

1. Pump the brake lever or pedal several times, then squeeze the brake lever or push the brake pedal all the way and loosen the bleed valve 1/2 turn. Wait several seconds and close the bleed valve.

NOTE:

Do not release the brake lever or pedal until the bleed valve has been closed.



2. Release the brake lever or pedal slowly until the bleed valve has been closed.
3. Repeat steps 1 – 2 until there are no air bubbles in the bleed hose.

After bleeding air completely, tighten the bleed valves to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Fill the reservoir to the casting ledge with DOT 3 or DOT 4 brake fluid to the upper level (page 14-4).

FRONT:

Install the diaphragm and reservoir cover.

Tighten the reservoir cover screws to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

REAR:

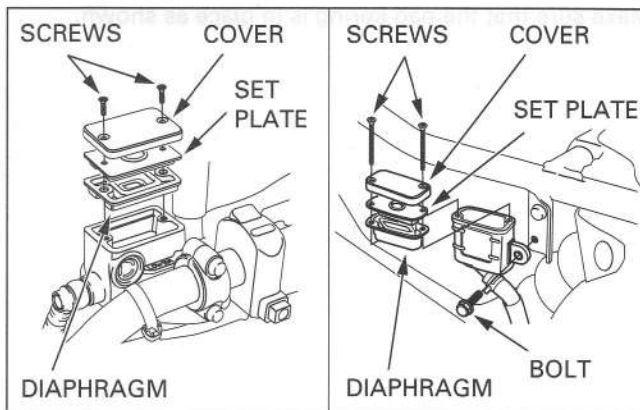
Install the diaphragm, set plate and reservoir cover.

Tighten the reservoir cover screws to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the reservoir and tighten the mount bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

Push the caliper pistons all the way in to allow installation of new brake pad.

NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

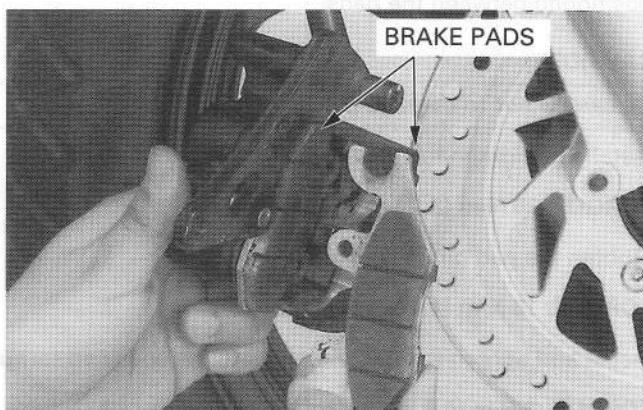
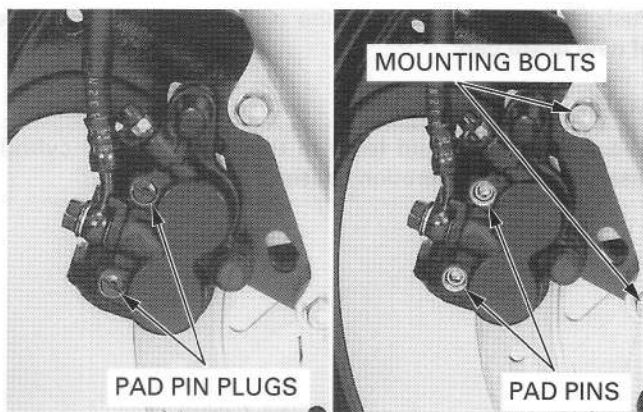
Remove the pad pin plugs and loosen the pad pins.

Remove the caliper mounting bolts and caliper.

Remove the pad pins.

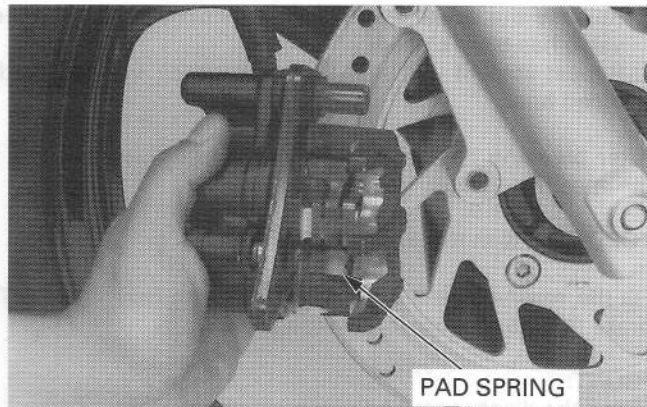
Remove the brake pads.

Clean the brake caliper inside especially around the pistons.

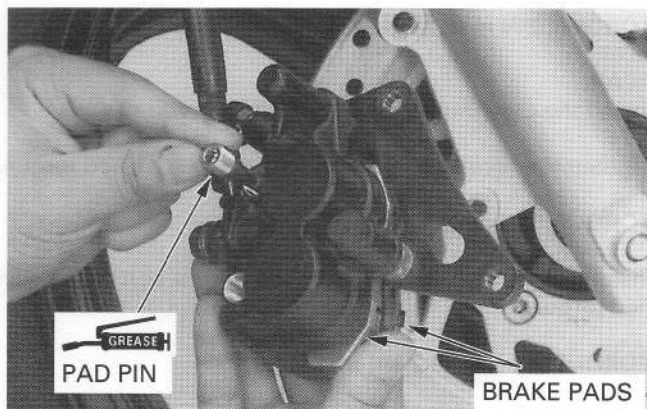


BRAKE SYSTEM

Make sure that the pad spring is in place as shown.



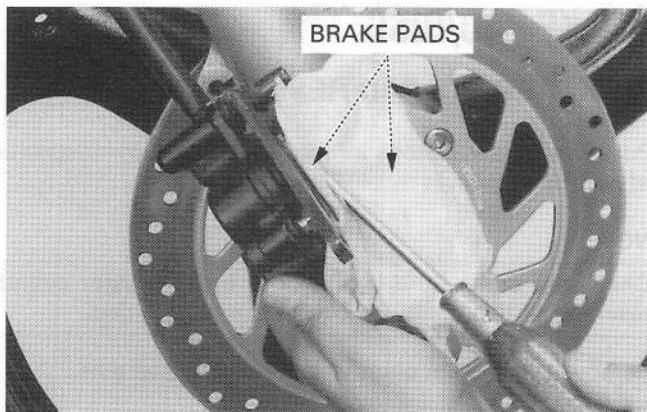
Apply grease to the sliding surface of the pad pins.
Install the brake pads.
Push the brake pads against the pad spring, then install the pad pins.



Push the caliper pistons all the way in to allow installation of new brake pad.

NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Install the brake caliper to the left fork leg so the disc is positioned between the pads.

CAUTION:

Be careful not to damage the pads.

Install and tighten the new brake caliper mounting bolts.

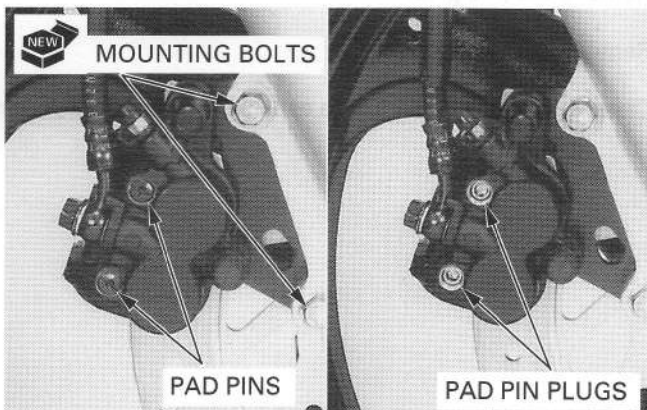
TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Tighten the pad pins to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install and tighten the pad pin plugs to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



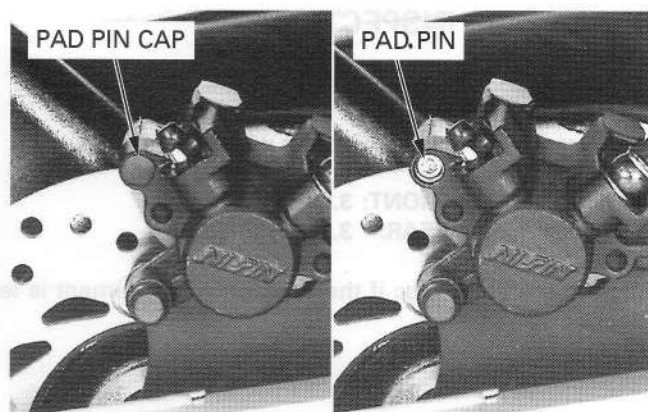
REAR BRAKE PAD REPLACEMENT

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

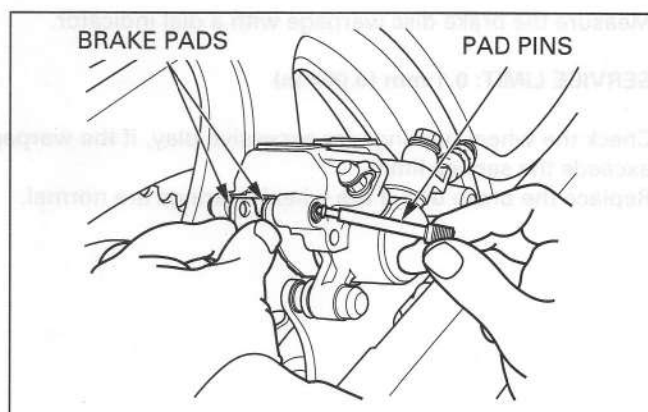
NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Remove the pad pin cap and loosen the pad pin.



Remove the pad pin and brake pads.
Clean the brake caliper inside especially around the pistons.

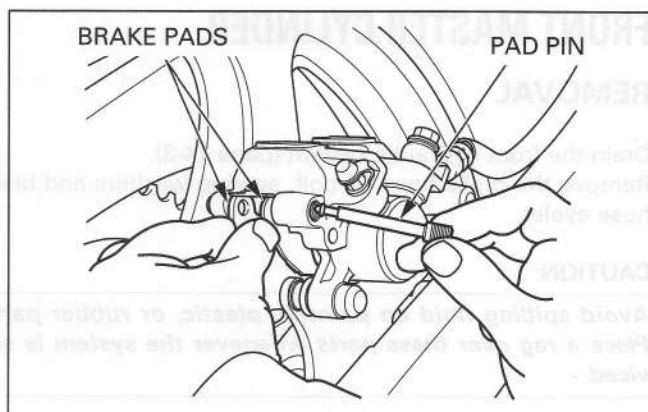


NOTE:

Always replace the brake pads in pairs to assure even disc pressure.

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

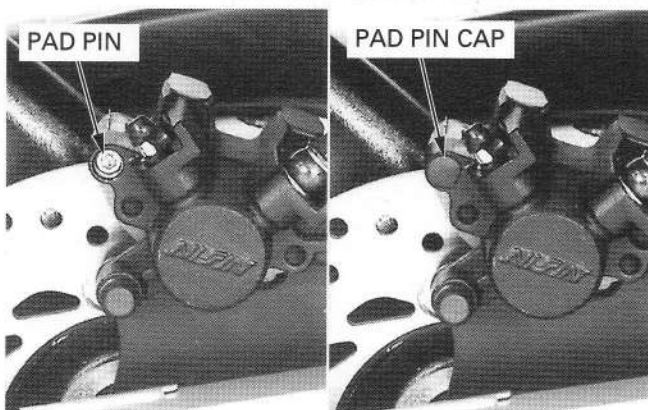
Apply grease to the sliding surface of the pad pins.
Install the pad pin while pushing the pads against the pad spring so that the pad ends are positioned onto the retainer on the caliper bracket.



Install and tighten the pad pin to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Install the pad pin cap.



BRAKE SYSTEM

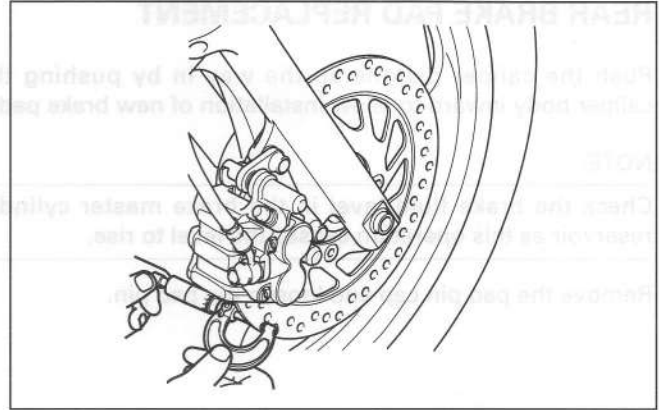
BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc thickness with a micrometer.

SERVICE LIMITS: FRONT: 3.5 mm (0.13 in)
REAR: 3.5 mm (0.13 in)

Replace the brake disc if the smallest measurement is less than the service limit.

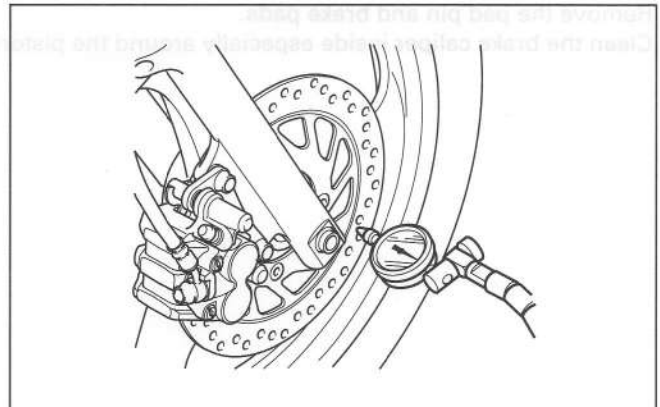


Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.1 mm (0.004 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



FRONT MASTER CYLINDER

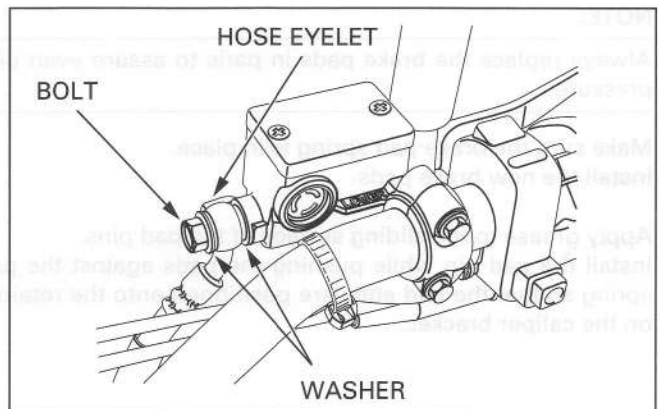
REMOVAL

Drain the front hydraulic system (page 14-3).

Remove the brake hose oil bolt, searing washers and brake hose eyelet.

CAUTION:

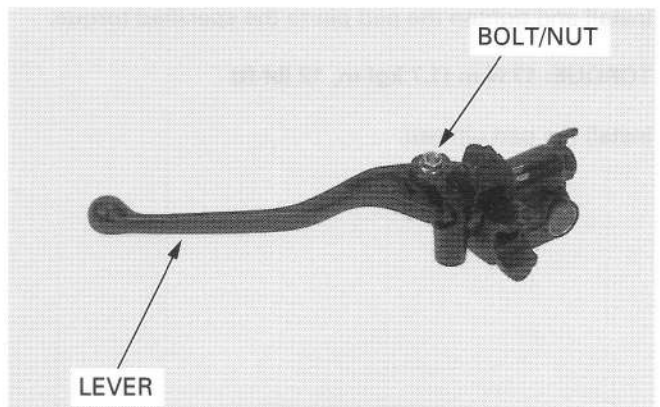
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



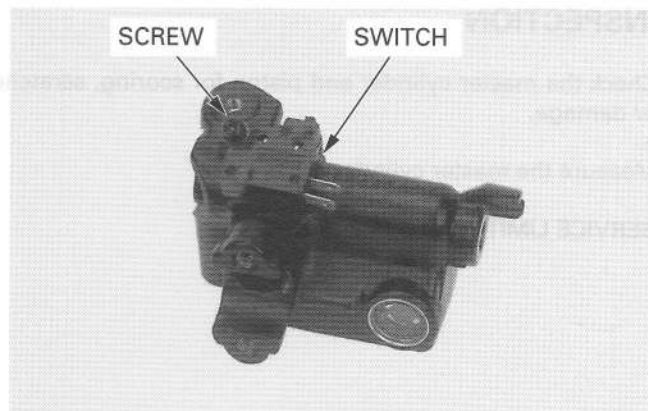
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

DISASSEMBLY

Remove the pivot nut, bolt and brake lever.



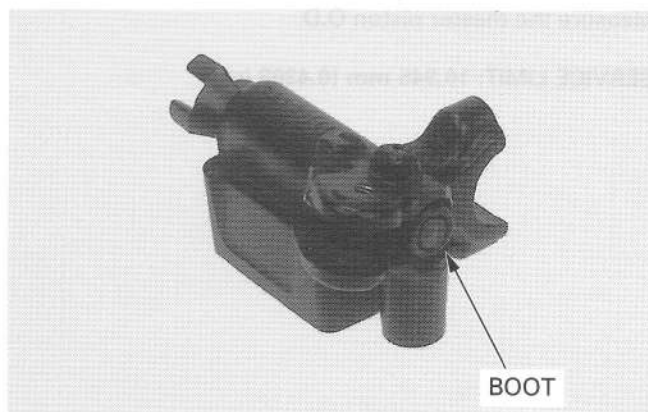
Remove the screw and front brake light switch.



Remove the boot.

NOTE:

Be careful not to damage the boot.

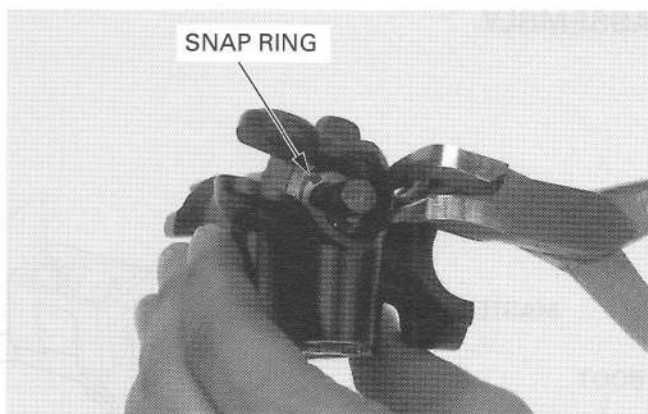


Remove the snap ring using the special tool.

TOOL:

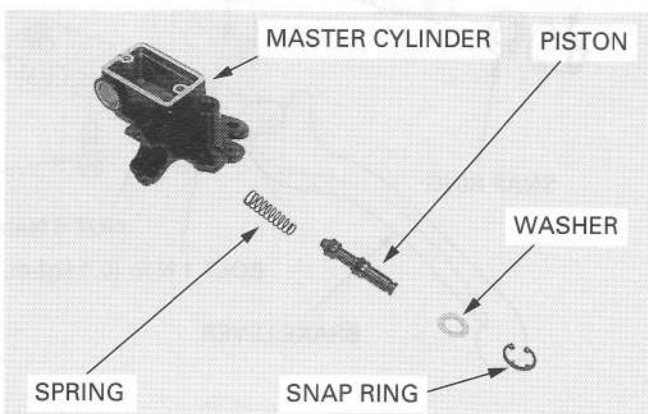
Snap ring pliers

07914 - SA50001



Remove the snap ring, washer, master piston and spring from the master cylinder.

Clean the master cylinder, reservoir and master piston in the clean brake fluid.



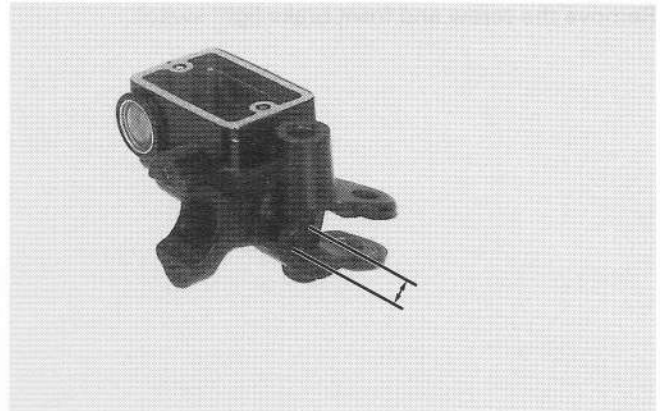
BRAKE SYSTEM

INSPECTION

Check the master cylinder and piston for scoring, scratches or damage.

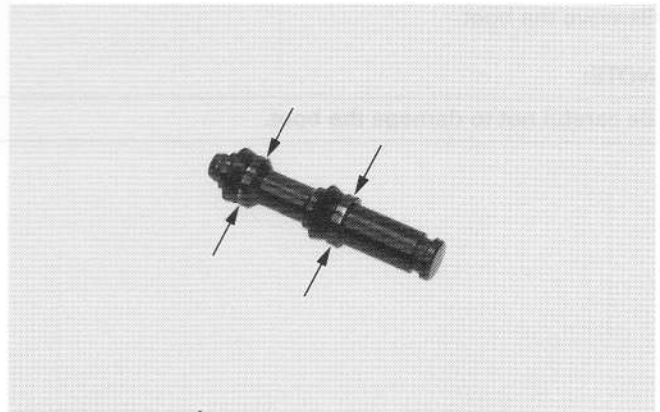
Measure the master cylinder I.D.

SERVICE LIMIT: 11.055 mm (0.4352 in)

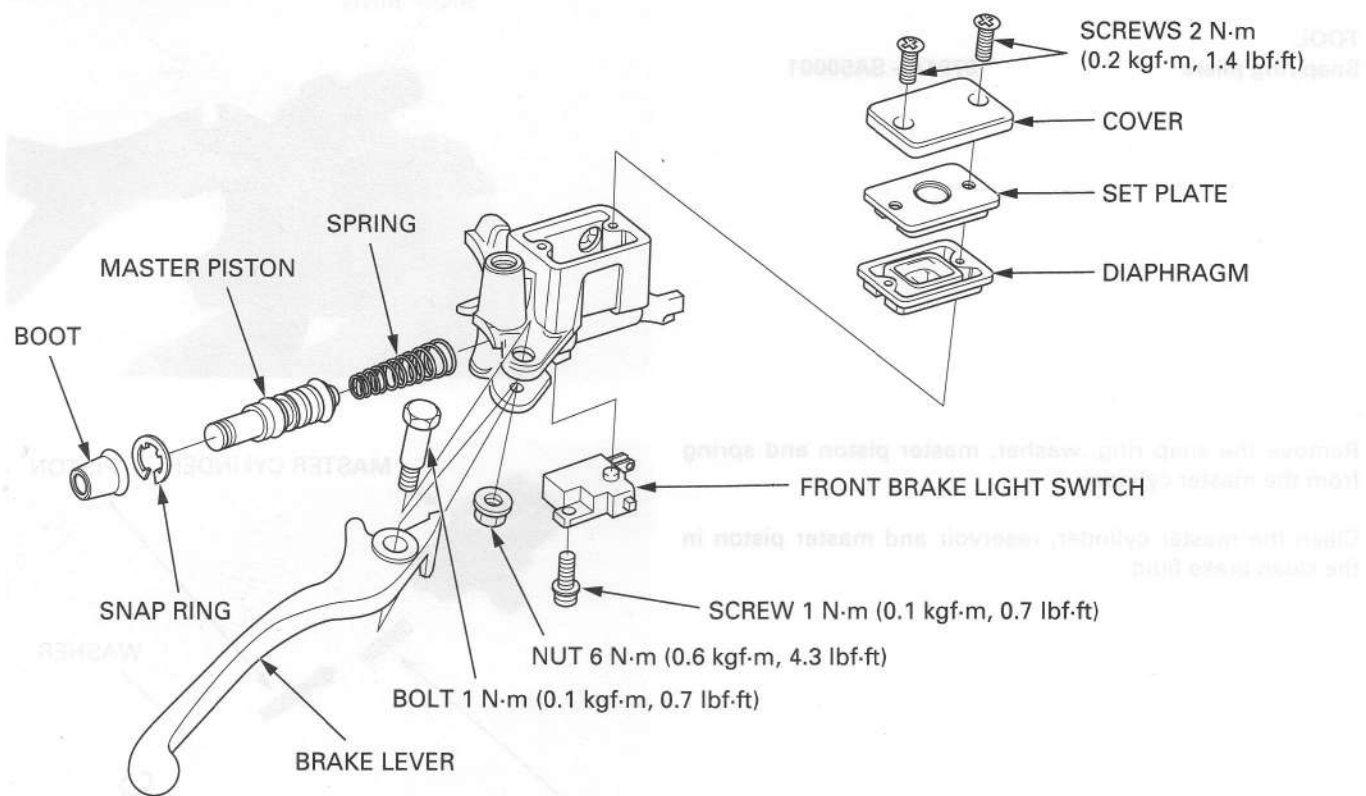


Measure the master piston O.D.

SERVICE LIMIT: 10.945 mm (0.4309 in)



ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.

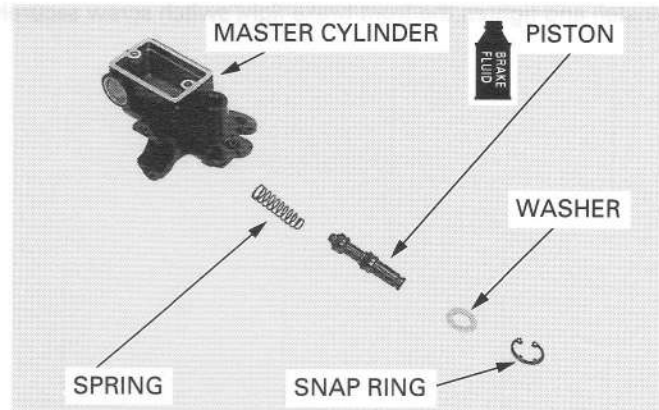
Install the spring onto the master piston.

Install the spring and master piston into the master cylinder.

Install the washer and snap ring.

CAUTION:

Do not allow the piston cup lips to turn inside out.



Install the snap ring into the groove in the master cylinder, using the special tool.

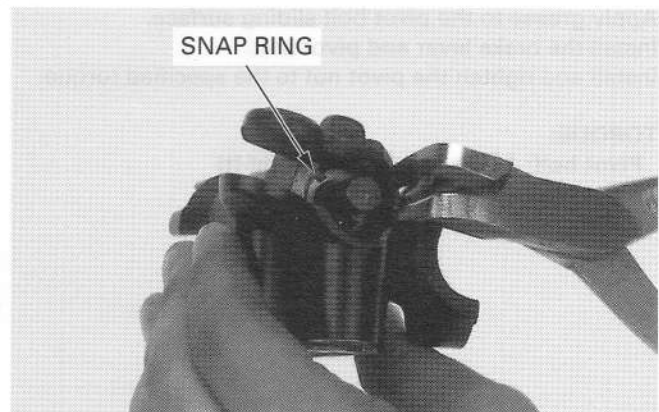
TOOL:

Snap ring pliers

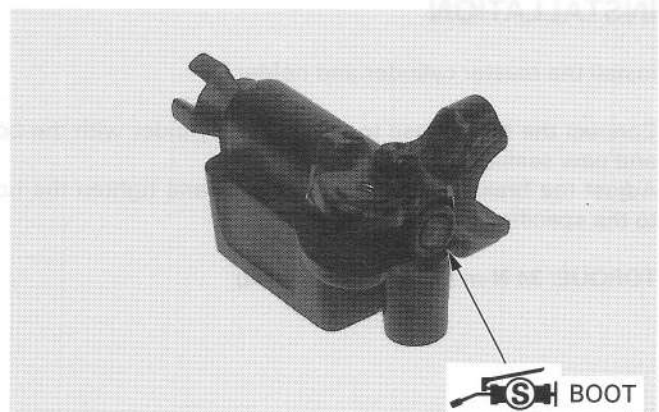
07914 - SA50001

CAUTION:

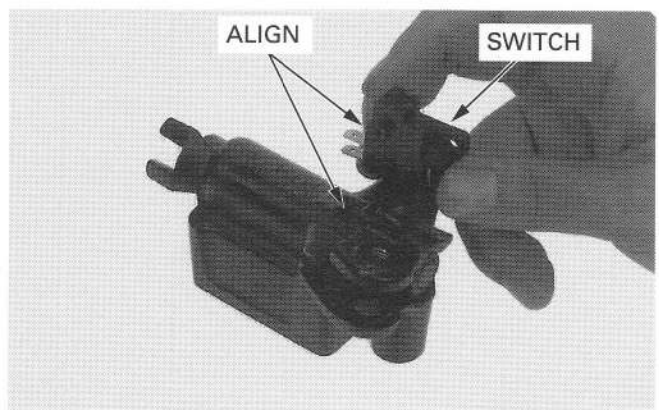
Be certain the snap ring is firmly seated in the groove.



Install the boot onto the piston and into the master cylinder. Apply silicone grease to the brake lever contacting area of the master piston.

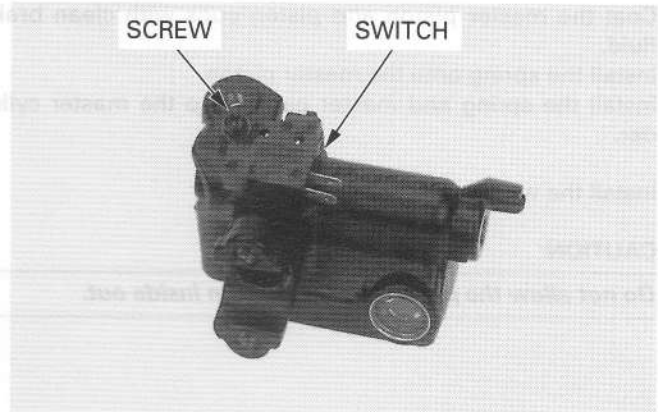


Install the front brake light switch onto the master cylinder with aligning the boss of the switch and hole of the master cylinder.



BRAKE SYSTEM

Install and tighten the front brake light switch screw securely.

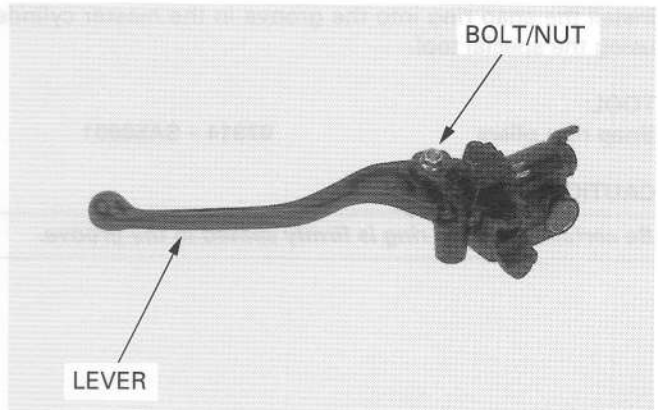


Apply grease to the pivot bolt sliding surface.
Install the brake lever and pivot bolt.
Install and tighten the pivot nut to the specified torque.

TORQUE:

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

Pivot nut: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



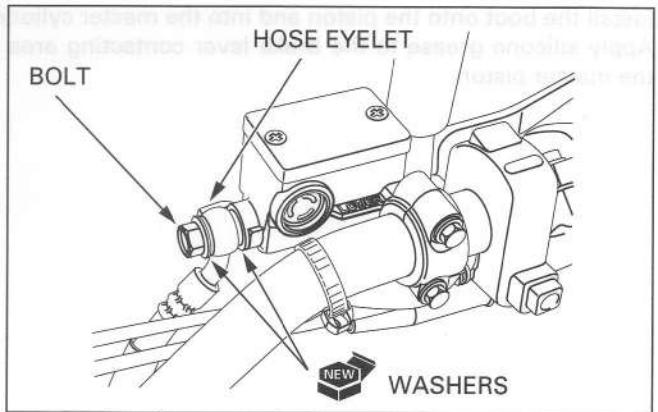
INSTALLATION

Install the master cylinder and holder.

Connect the brake hose to the master cylinder with the bolt and new sealing washers.

Adjust the brake hose angle as shown and tighten the bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



REAR MASTER CYLINDER

REMOVAL

CAUTION:

- Avoid spilling fluid on painted, plastic or rubber parts.
- Place a shop towel over these parts whenever the system is serviced.

NOTE:

- When removing the brake hose bolt, cover the end of the hose to prevent contamination.
- Secure the hose to prevent fluid from leaking out.

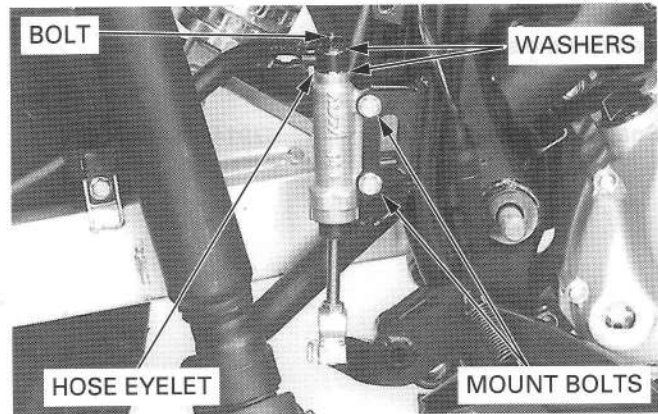
Drain the hydraulic system (page 14-3).

Remove the right step bracket (page 14-24).

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

Remove the master cylinder mount bolt and master cylinder assembly.

Remove the reservoir tank mount bolt and reservoir tank (page 14-3).



DISASSEMBLY

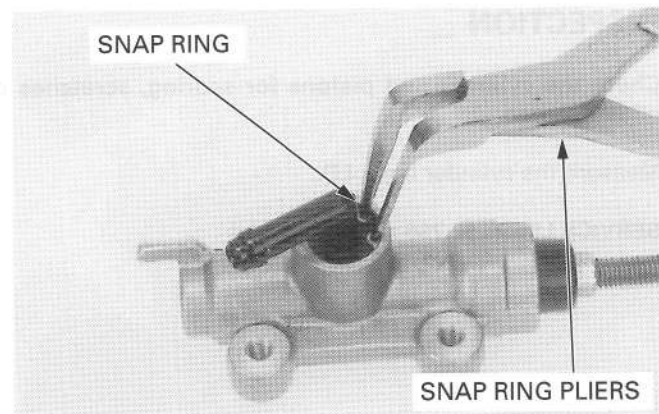
Remove the brake hose.

Remove the snap ring using the special tool.

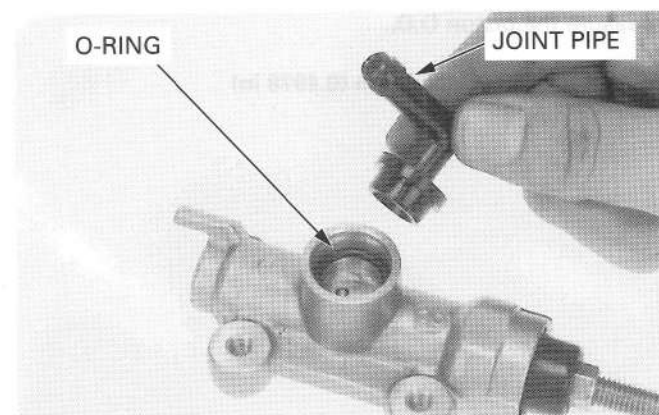
TOOL:

Snap ring pliers

07914 - SA50001



Remove the joint pipe and O-ring



BRAKE SYSTEM

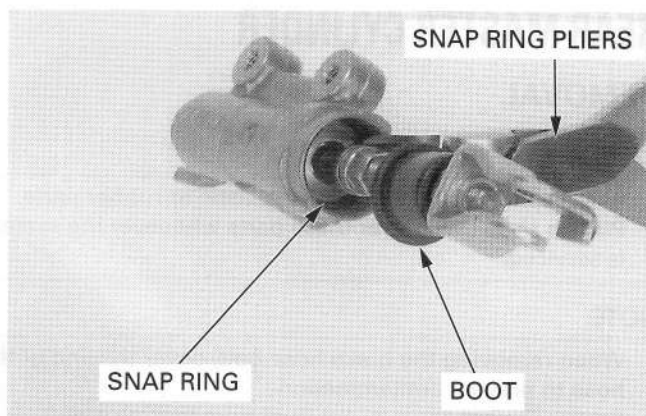
Remove the boot.

Remove the snap ring using the special tool.

TOOL:

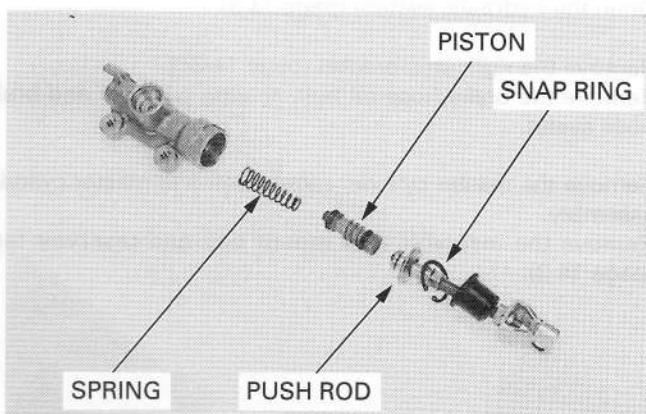
Snap ring pliers

07914 - SA50001



Remove the snap ring, master piston and spring from the master cylinder.

Clean the master cylinder, reservoir and master piston in the clean brake fluid.

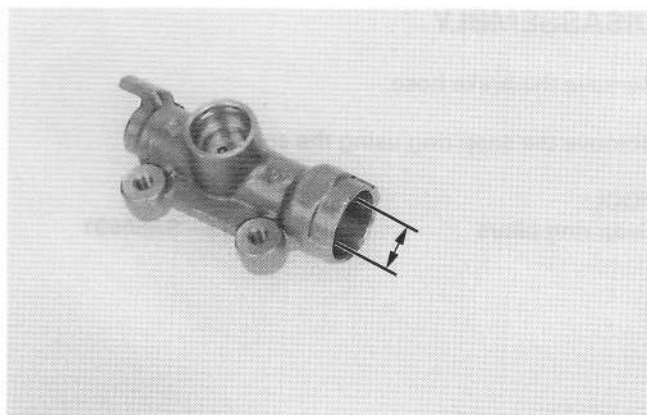


INSPECTION

Check the cylinder and pistons for scoring, scratches or other damage.

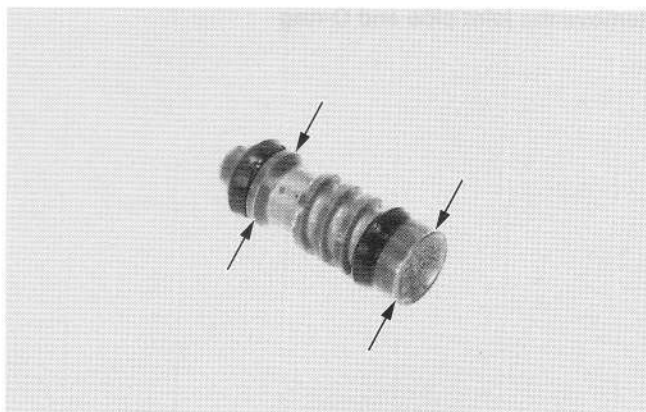
Measure the cylinder bore. I.D..

SERVICE LIMIT: 12.755 mm (0.5022 in)

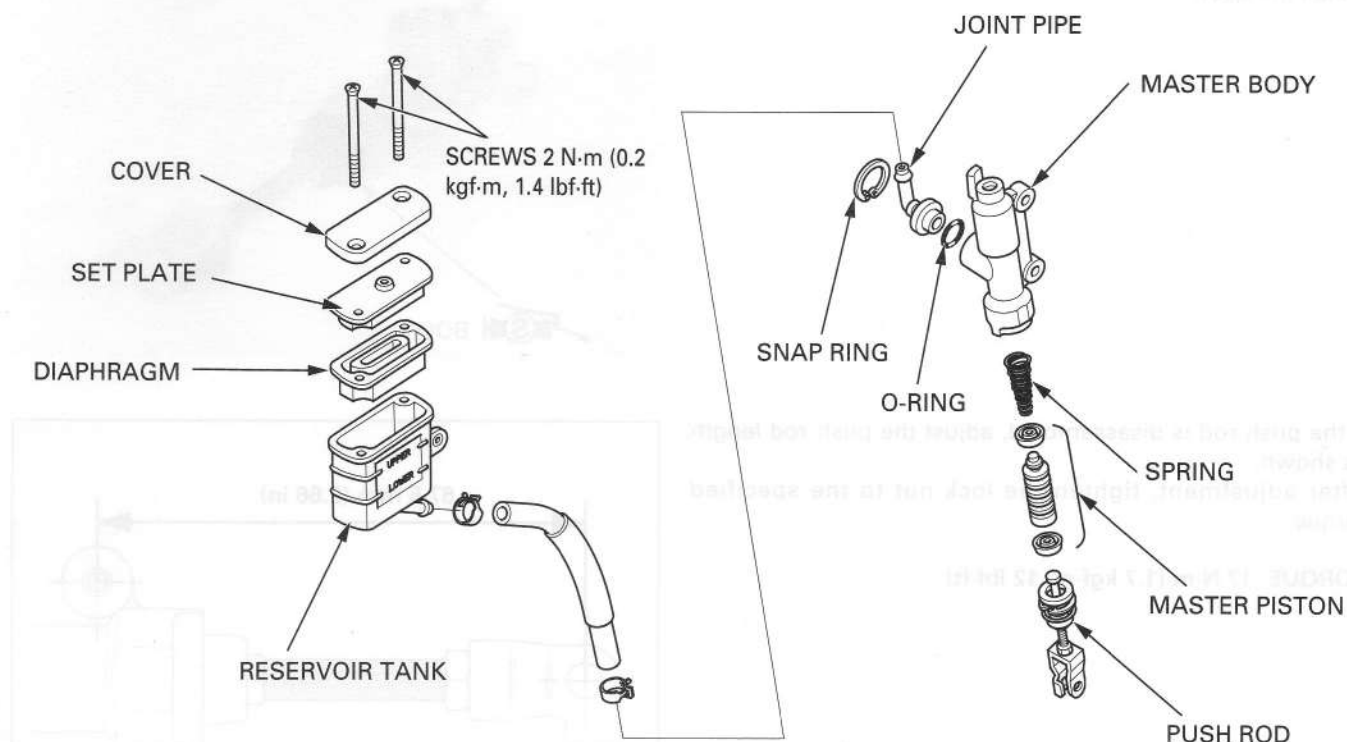


Measure the piston O.D..

SERVICE LIMIT: 12.654 mm (0.4978 in)



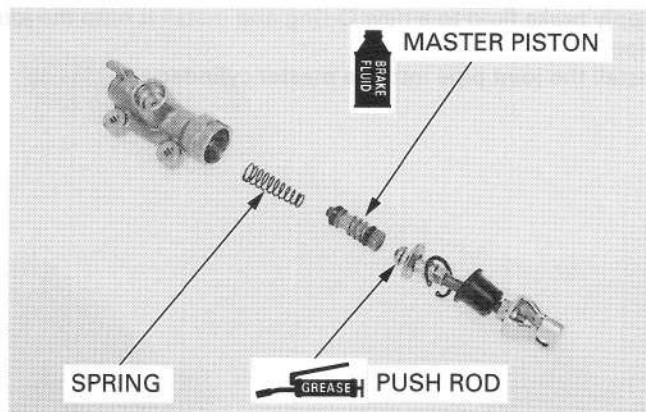
ASSEMBLY



NOTE:

- Repair the piston assembly and spring as a set if damaged.
- Replace the boot, if damaged.
- Apply silicone grease to the inside of the boot.
- Make sure that each part is free from dust or dirt before reassembly.

Coat the piston cup with the recommended brake fluid.
Install the spring onto the master piston.
Install the spring and master piston into the master cylinder.
Apply grease to the piston contact area of the push rod.



Install the push rod into the master cylinder.
Install the snap ring using the special tool.

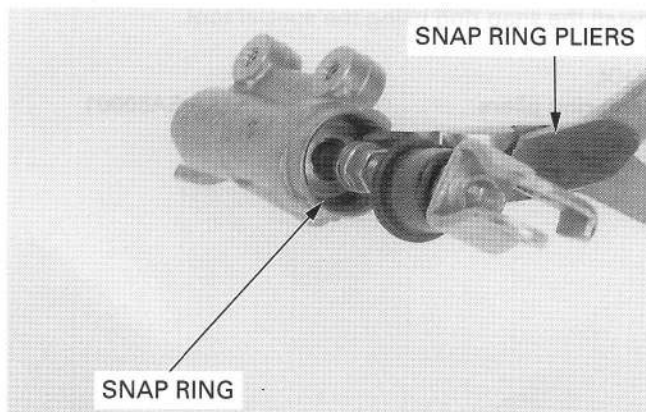
CAUTION:

Be certain the snap ring is firmly seated in the groove.

TOOL:

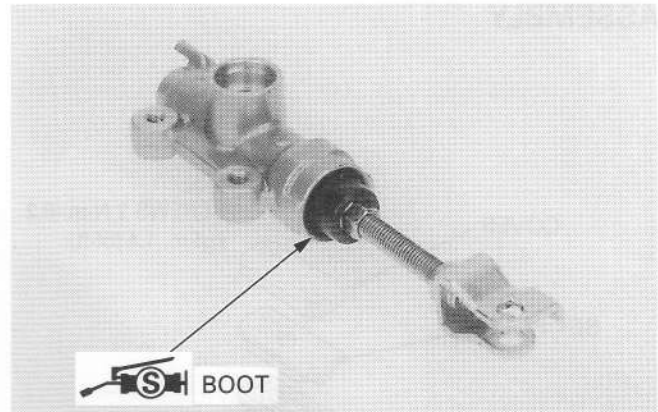
Snap ring pliers

07914 – SA50001



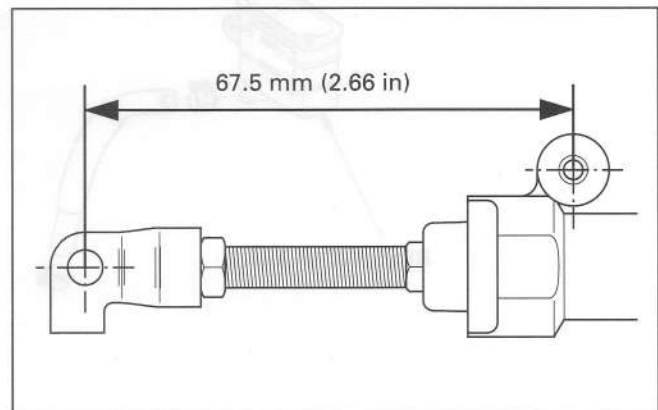
BRAKE SYSTEM

Apply silicone grease to the inside of the boot.
Install the boot.

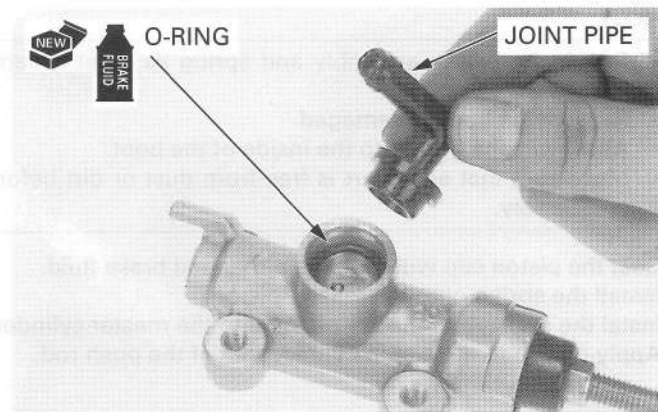


If the push rod is disassembled, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)



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

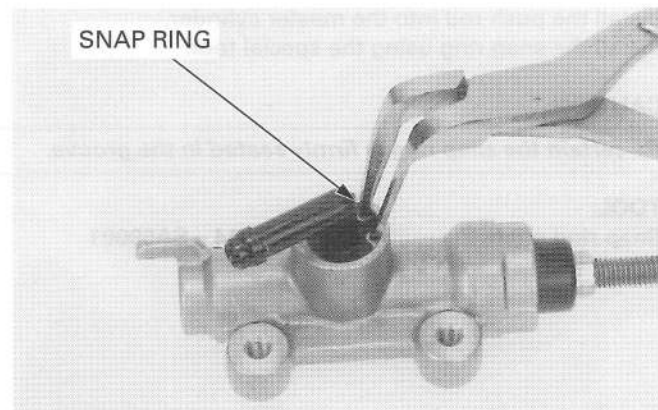


Install the snap ring using the special tool.

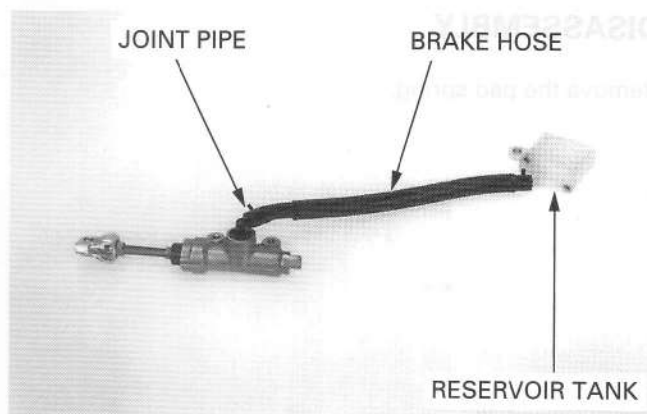
TOOL:

Snap ring pliers

07914 - SA50001



Install the brake hose to the master cylinder joint pipe and reservoir tank.



Install the master cylinder and tighten the master cylinder mount bolts.

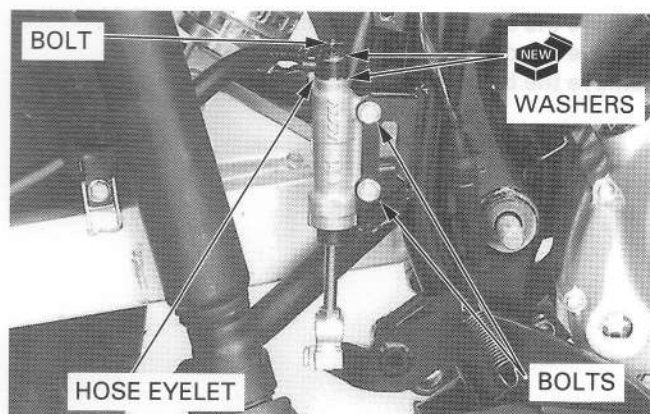
Install the brake hose eyelet joint with the oil bolt and new sealing washers as shown. Push the eyelet joint against the stopper, then tighten the oil bolt the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the step bracket (page 14-24).

Fill the reservoir to the upper level and bleed the brake system (page 14-3).

Install and tighten the brake reservoir mounting bolt (page 14-5).



Place a screwdriver over the piston. Push the piston down and apply small amount of air pressure to the fluid inlet to remove the piston.

Do not use high pressure air or bring the nozzle too close to the inlet.

FRONT BRAKE CALIPER

REMOVAL

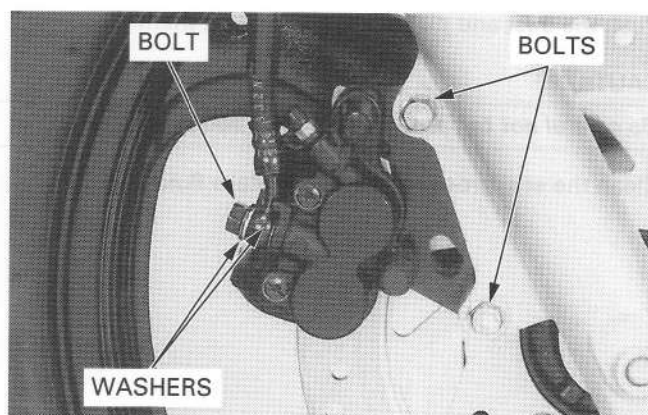
CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Drain the brake hydraulic system (page 14-3).
Remove the brake pad (page 14-5).

Remove the bolt, sealing washers and brake hose eyelet joints.

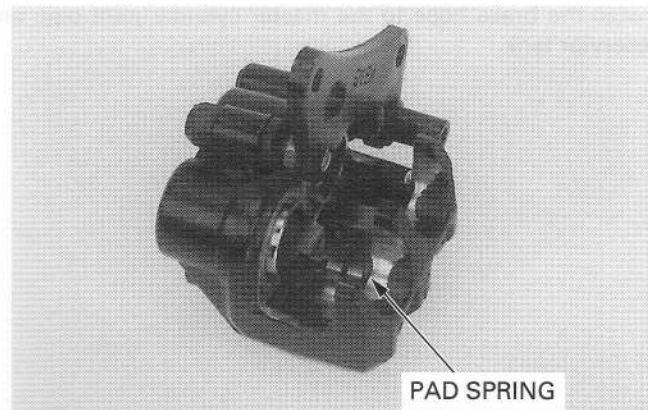
Remove the caliper mounting bolts and then remove the caliper and bracket as an assembly.



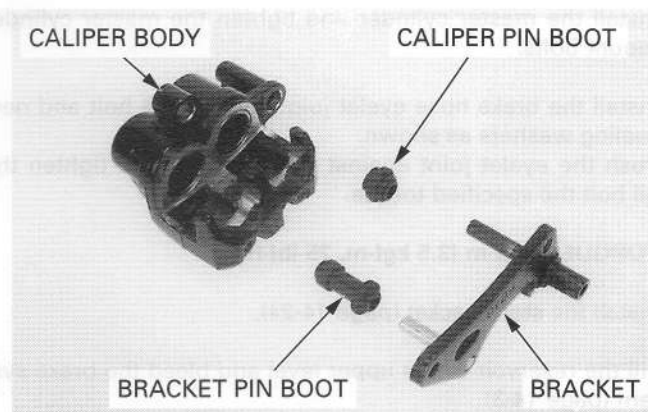
BRAKE SYSTEM

DISASSEMBLY

Remove the pad spring.



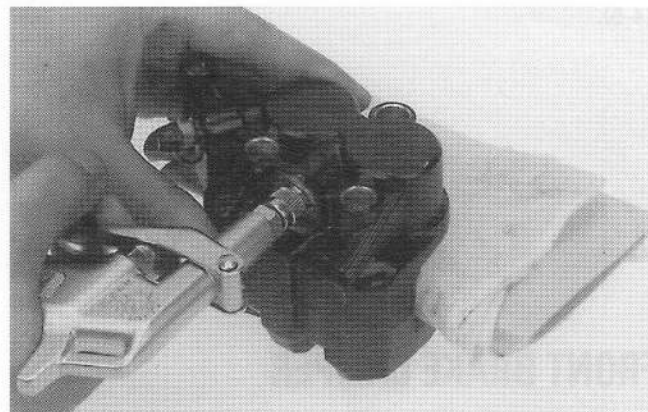
Remove the caliper bracket from the caliper body.
Remove the caliper pin boot from the bracket.
Remove the bracket pin boot from the caliper body.



Place a shop towel over the piston.
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠ WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

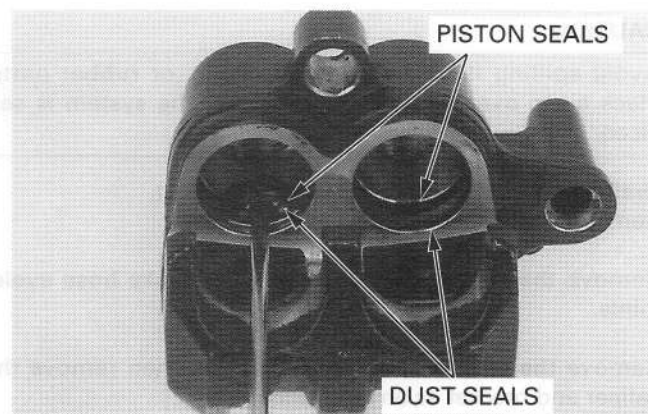


Push the dust and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.

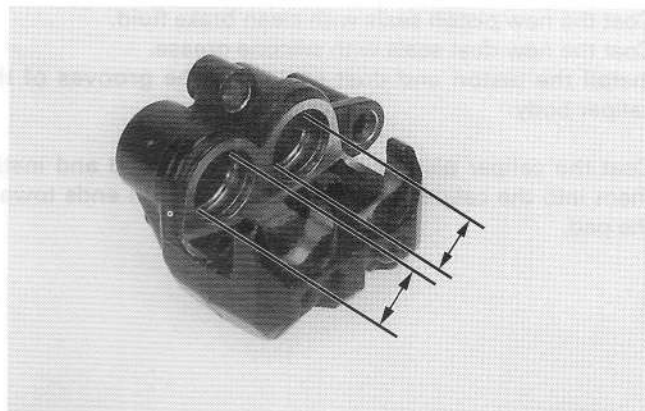


INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

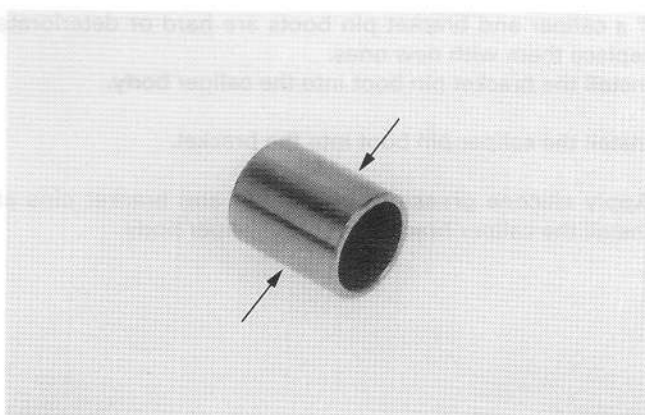
SERVICE LIMIT: 25.460 mm (1.0024 in)



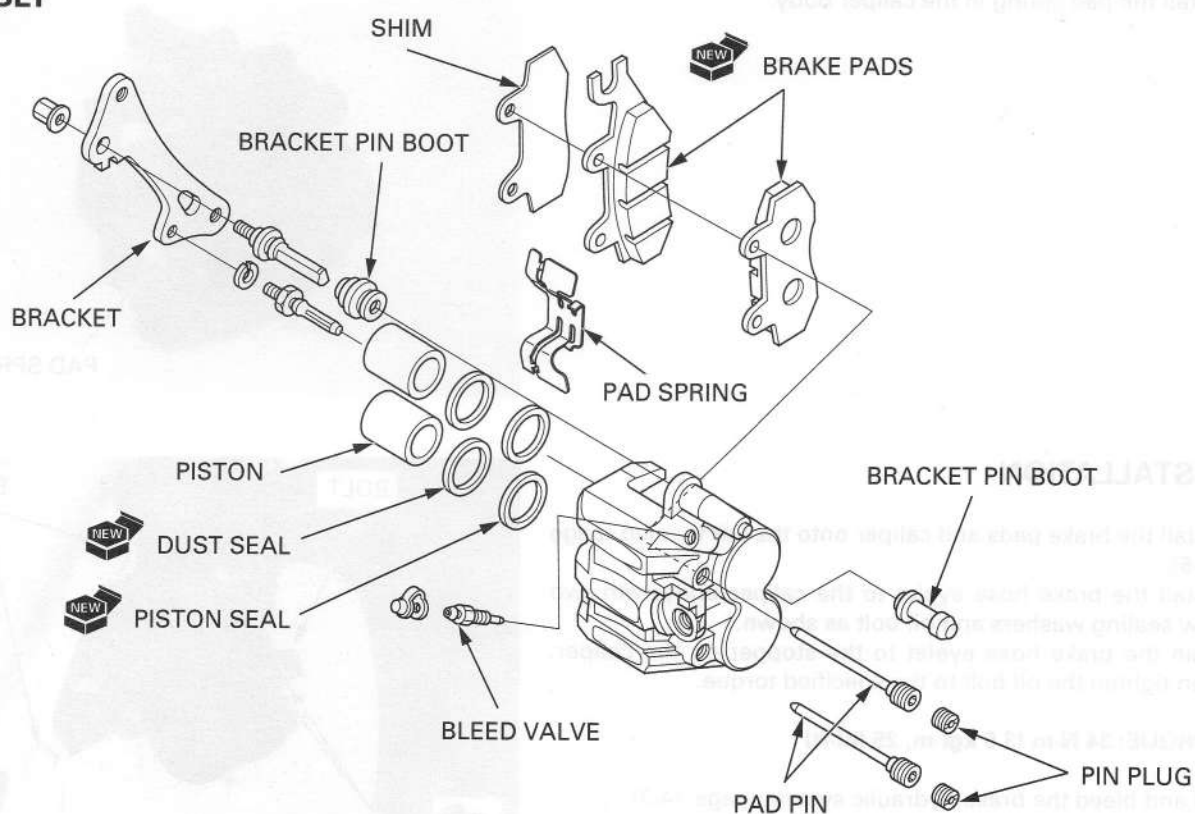
Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 25.31 mm (0.996 in)



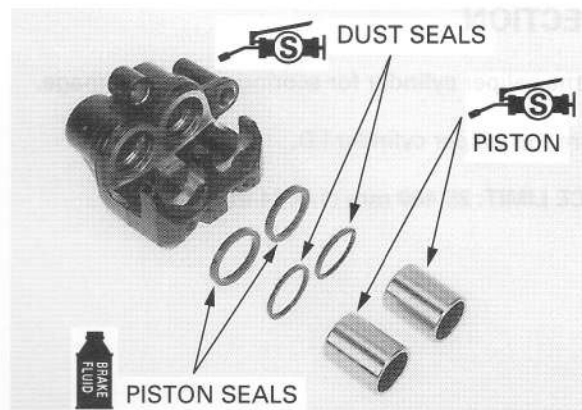
ASSEMBLY



BRAKE SYSTEM

Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.
Install the piston and dust seals into the grooves of the caliper body.

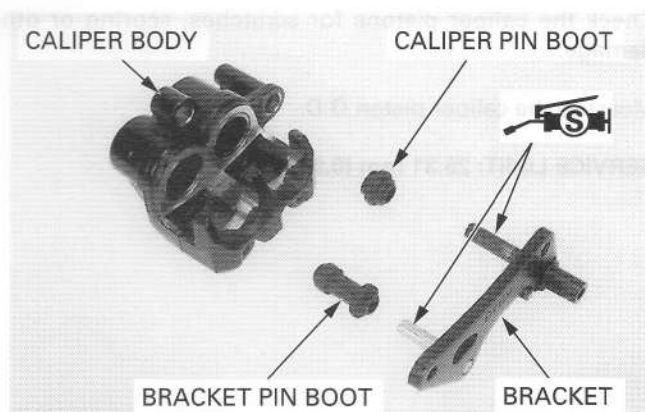
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.



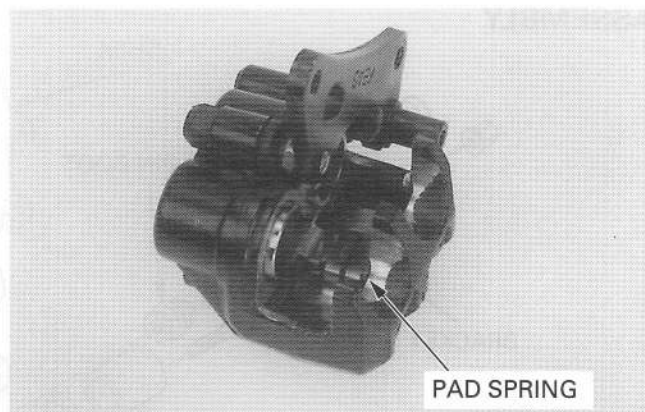
If a caliper and bracket pin boots are hard or deteriorated, replace them with new ones.
Install the bracket pin boot into the caliper body.

Install the caliper pin boot into the bracket.

Apply silicone grease to the caliper and bracket pins and install the caliper bracket over the caliper body.



Install the pad spring in the caliper body.



INSTALLATION

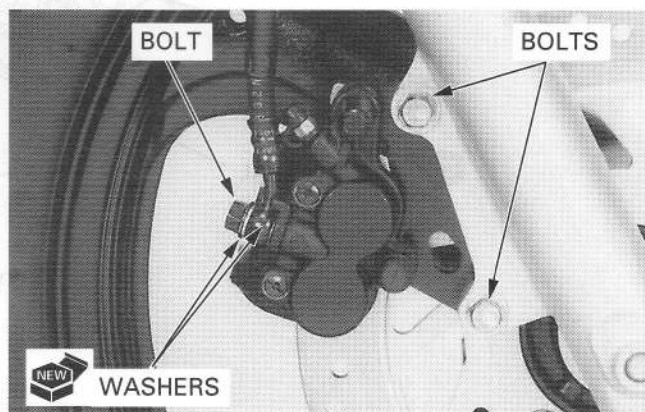
Install the brake pads and caliper onto the left fork leg (page 14-5).

Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt as shown.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the brake hydraulic system (page 14-3).



REAR BRAKE CALIPER

REMOVAL

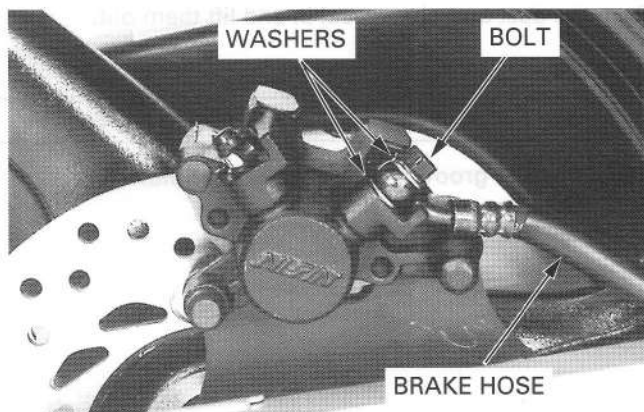
Drain the brake hydraulic system (page 14-3).

Remove the brake pad (page 14-5).

Remove the rear wheel (page 13-3).

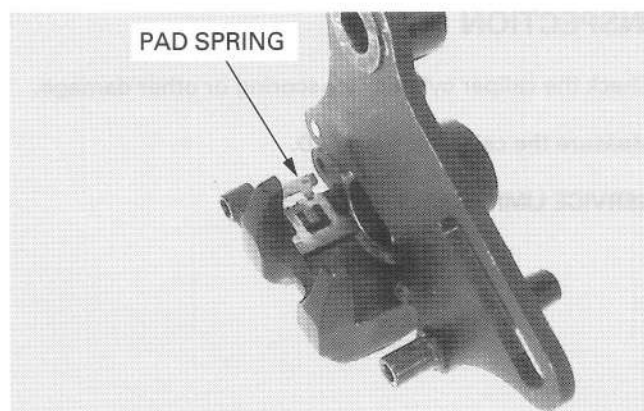
Remove the caliper and bracket as an assembly.

Remove the bolt, sealing washers and brake hose eyelet joint.

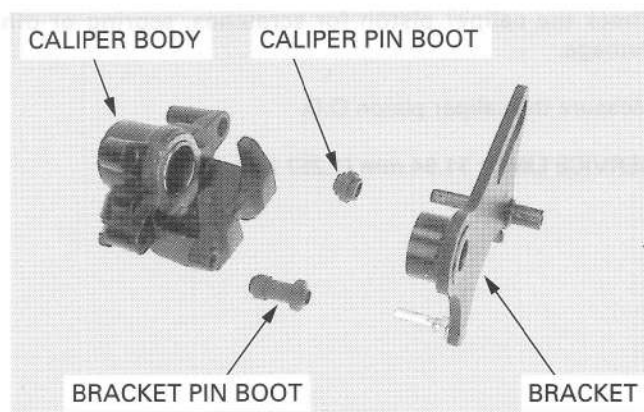


DISASSEMBLY

Remove the pad spring.



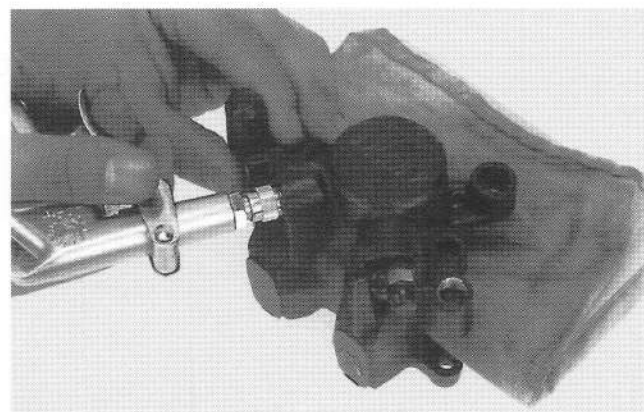
Remove the caliper bracket from the caliper body.
Remove the caliper pin boot from the bracket.
Remove the bracket pin boot from the caliper body.



Place a shop towel over the piston.
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the piston.

⚠ WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.



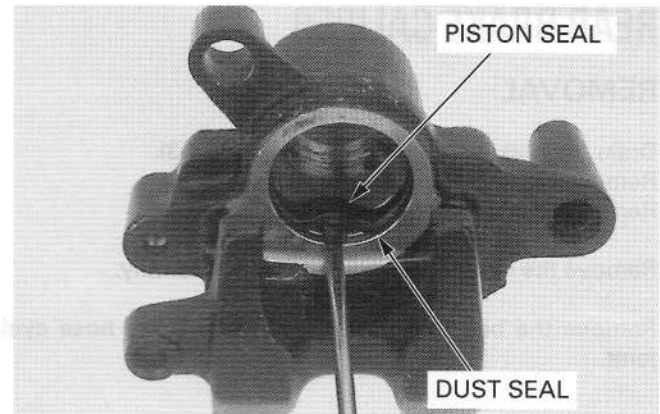
BRAKE SYSTEM

Push the dust and piston seal in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.

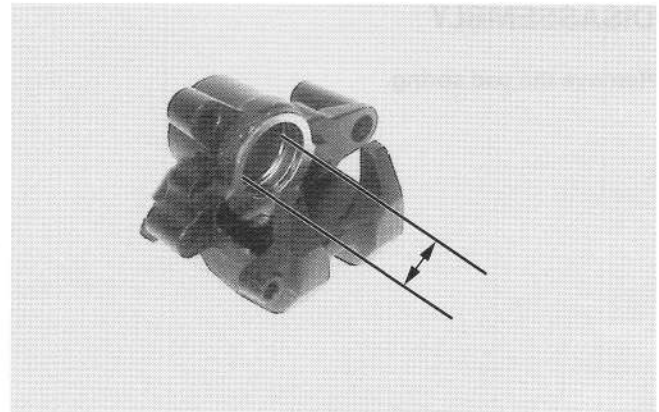


INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

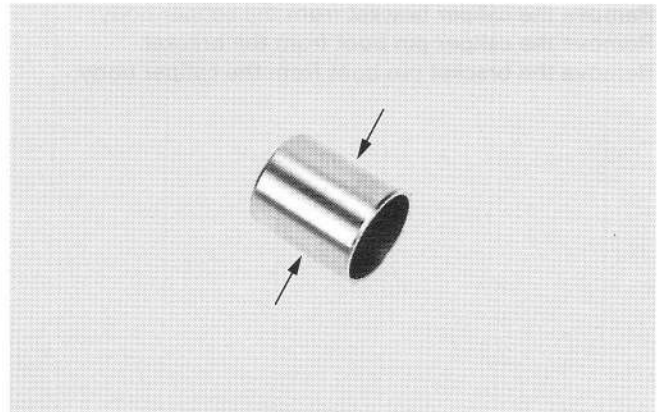
SERVICE LIMIT: 32.090 mm (1.2634 in)



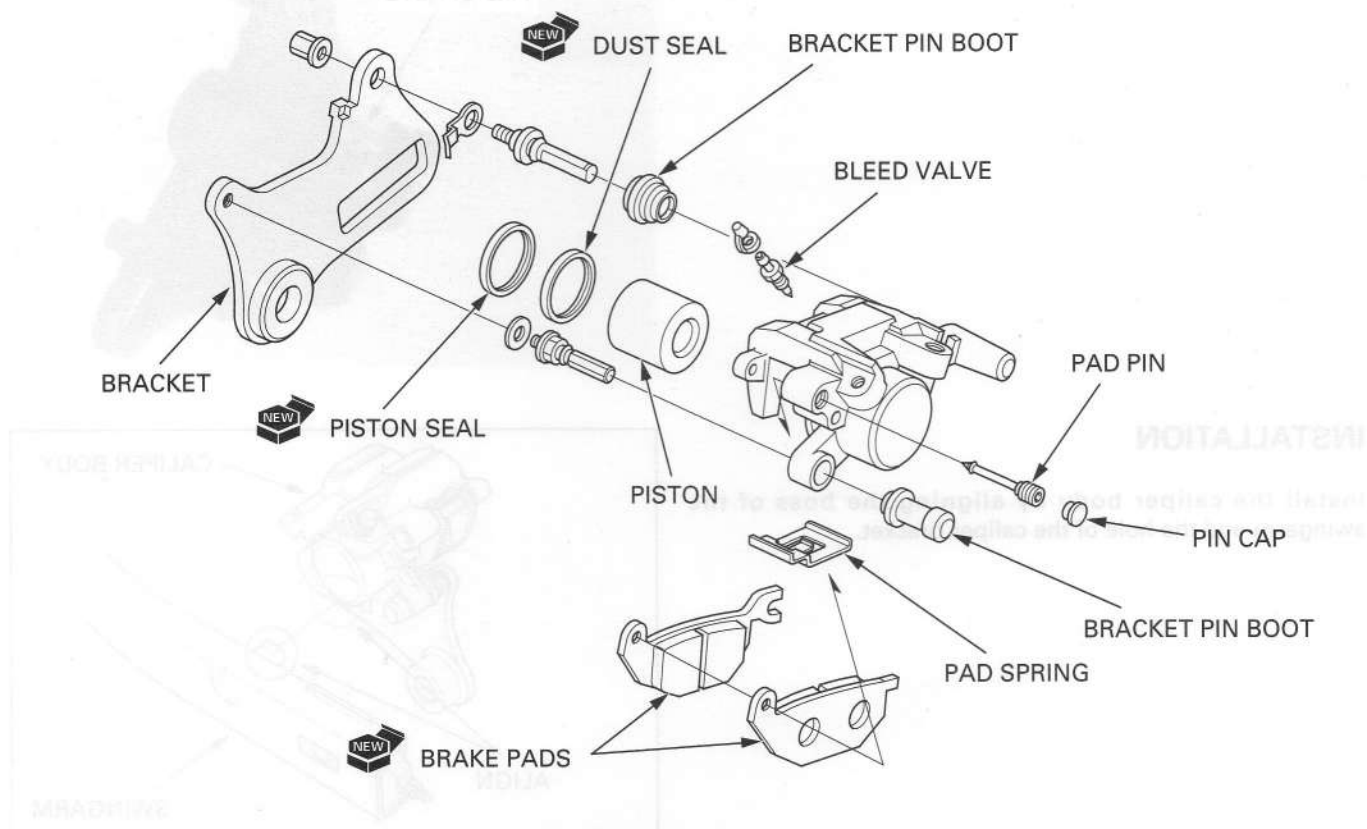
Check the caliper piston for scratches, scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 31.94 mm (1.257 in)

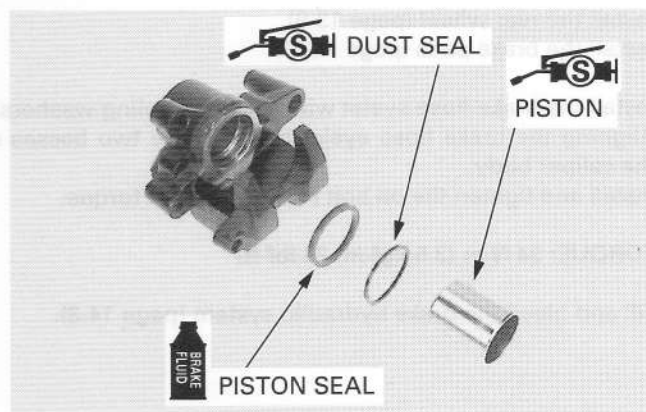


ASSEMBLY



Coat the new piston seals with clean brake fluid.
 Coat the new dust seals with silicone grease.
 Install the piston and dust seals into the grooves of the caliper body.

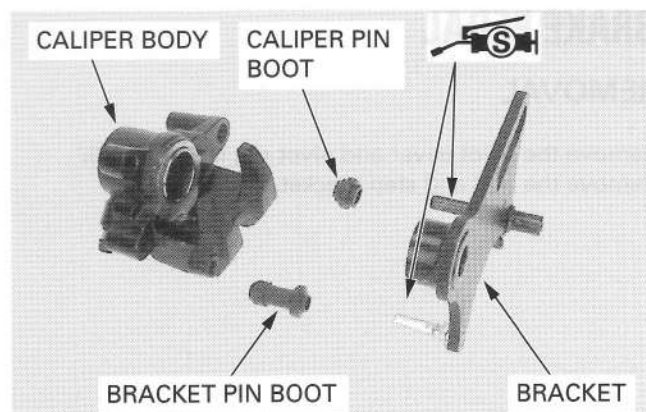
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.



If a caliper and bracket pin boots are hard or deteriorated, replace them with new ones.
 Install the bracket pin boot into the caliper body.

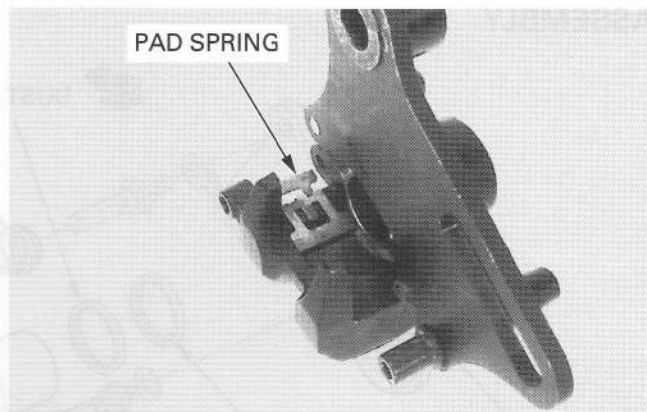
Install the caliper pin boot into the bracket.

Apply silicone grease to the caliper and bracket pins and install the caliper bracket over the caliper body.



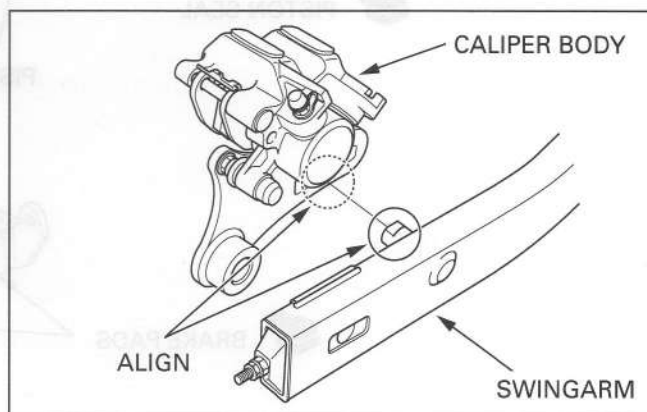
BRAKE SYSTEM

Install the pad spring in the caliper body.



INSTALLATION

Install the caliper body by aligning the boss of the swingarm and the hole of the caliper bracket.



Install the rear wheel (page 13-9).

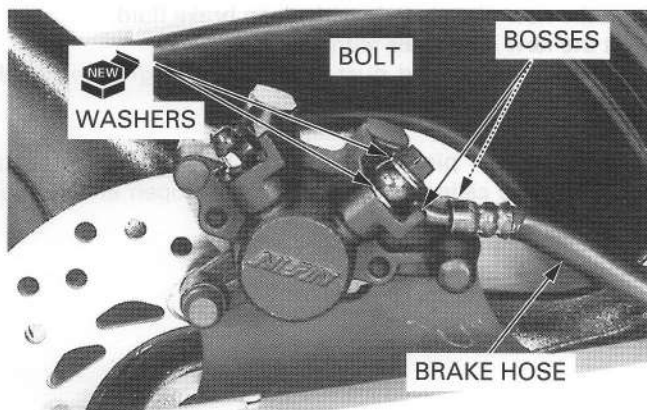
Install the brake pads (page 14-5).

Install the brake hose eyelet with the new sealing washers. Aligning the brake hose eyelet between the two bosses of the caliper body.

Install and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the brake hydraulic system (page 14-3).

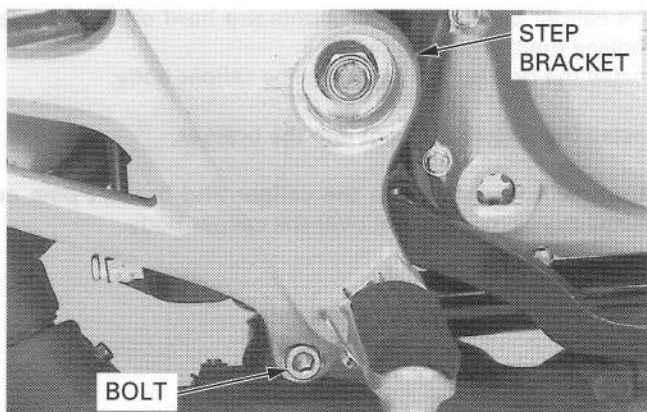


BRAKE PEDAL

REMOVAL

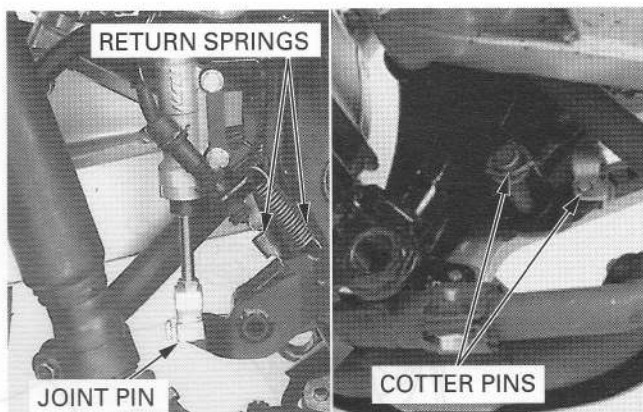
Remove the pivot cover and pivot nut (page 13-12).

Remove the bolt and step bracket.



Disconnect the rear brake master cylinder push rod from the brake pedal by removing the cotter pin and joint pin. Disconnect the return springs from the pedal.

Remove the cotter pin and brake pedal.



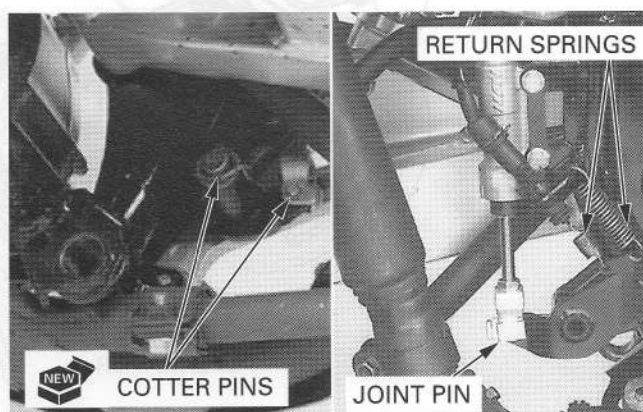
INSTALLATION

Apply grease to the brake pedal shaft and install them into the pedal pivot in the frame.

Secure the brake pedal with the new cotter pin.

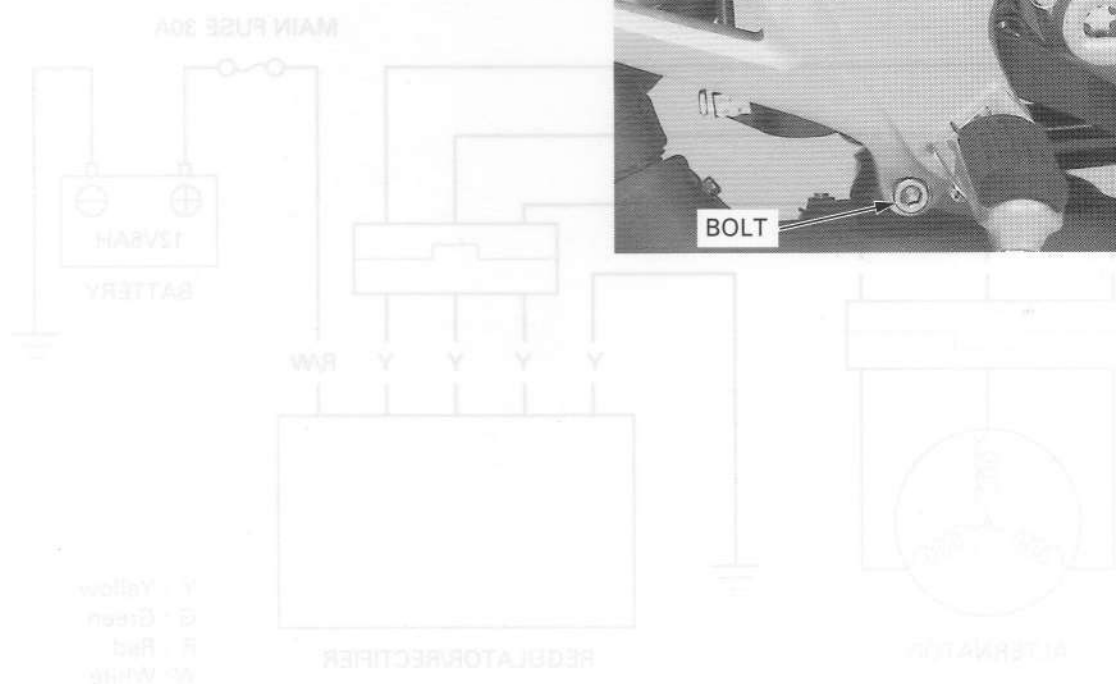
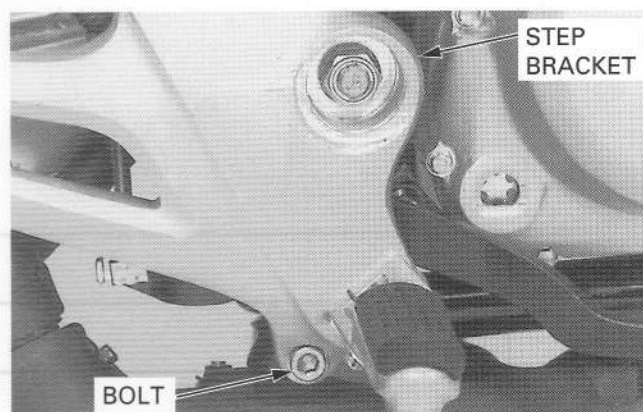
Hook the return springs to the pedal.

Connect the rear brake master cylinder push rod to the pedal with the joint pin and secure the joint pin with a new cotter pin.

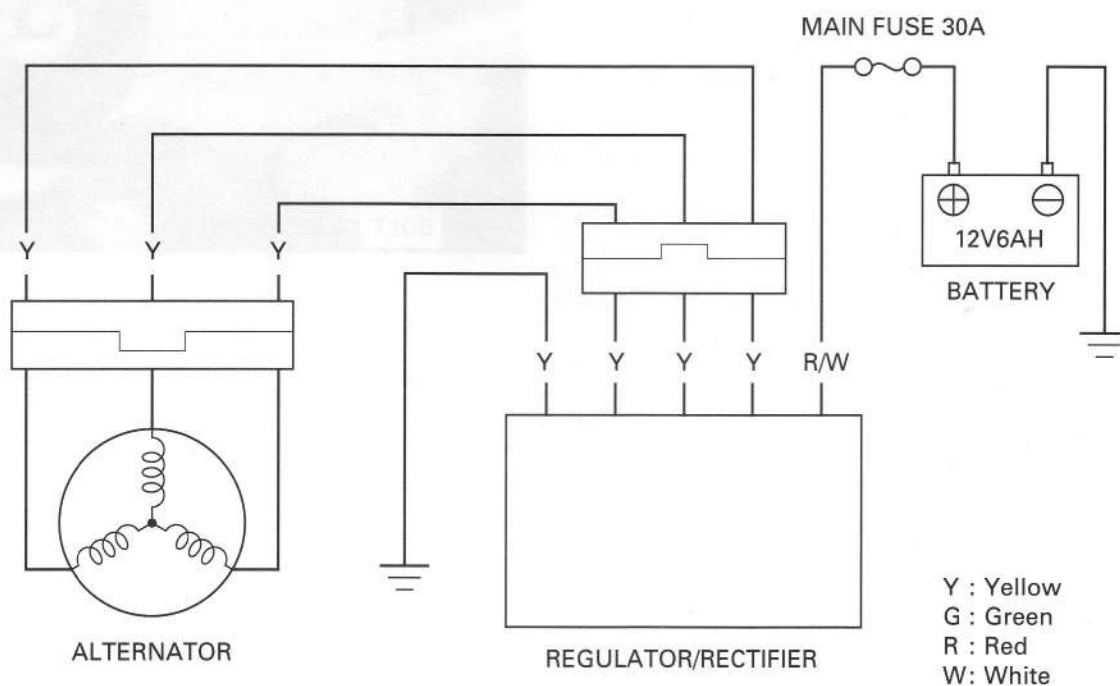
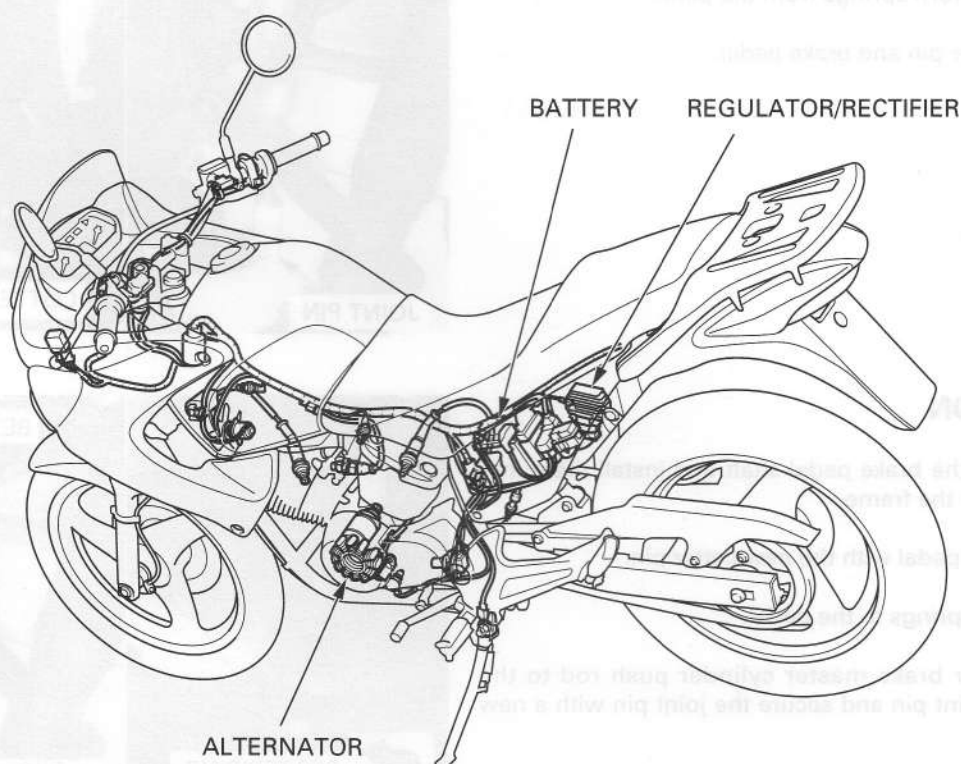


Install the bolt and step bracket. Tighten the bolt securely.

Install and tighten the pivot nut (page 13-16). Install the pivot cover.



SYSTEM DIAGRAM



15. CHARGING SYSTEM/ALTERNATOR

SYSTEM DIAGRAM	15-0	CHARGING SYSTEM INSPECTION	15-6
SERVICE INFORMATION	15-1	REGULATOR/RECTIFIER	15-7
TROUBLESHOOTING	15-3	ALTERNATOR	15-9
BATTERY	15-4		

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnect while the ignition switch is ON and a current is present.

- For extended storage, remove the battery, give it a full charge and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long 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 a heavy load, battery voltage will drop quickly and eventually the battery will be completely discharged. For this reason, the charging system is often suspected to be the problem. Battery overcharge often results in problems in the battery itself, which may appear to be an over-charge symptom.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under a heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not use. For this reason, charge the battery every two weeks to prevent sulfation from forming.
- When checking the charge system, always follow the steps in the troubleshooting flow chart (page 15-3).
- Alternator servicing can be done with the engine in the frame.

CHARGING SYSTEM/ALTERNATOR

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
 - Use only the electrolyte that comes with the battery.
 - Use all of the electrolyte.
 - Seal the battery properly.
 - Never open the seals again.

BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester for details about the battery testing.

The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester BM210 or BATTERY MATE or equivalent

CAUTION:

For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

	ITEM	SPECIFICATIONS
Battery	Capacity	12 V – 6 Ah
	Current leakage	1.0 mA max
	Voltage (20°C/68°F)	Fully charged
		13.0 – 13.2 V
	Charging current	Needs charging
		Below 12.3 V
Alternator	Capacity	0.6 A/5 – 10 h
		3.0 A/1 h max
	Charging coil resistance (20°C/68°F)	260 W/5,000 min ⁻¹ (rpm)
		0.1 – 0.5 W

TORQUE VALUES

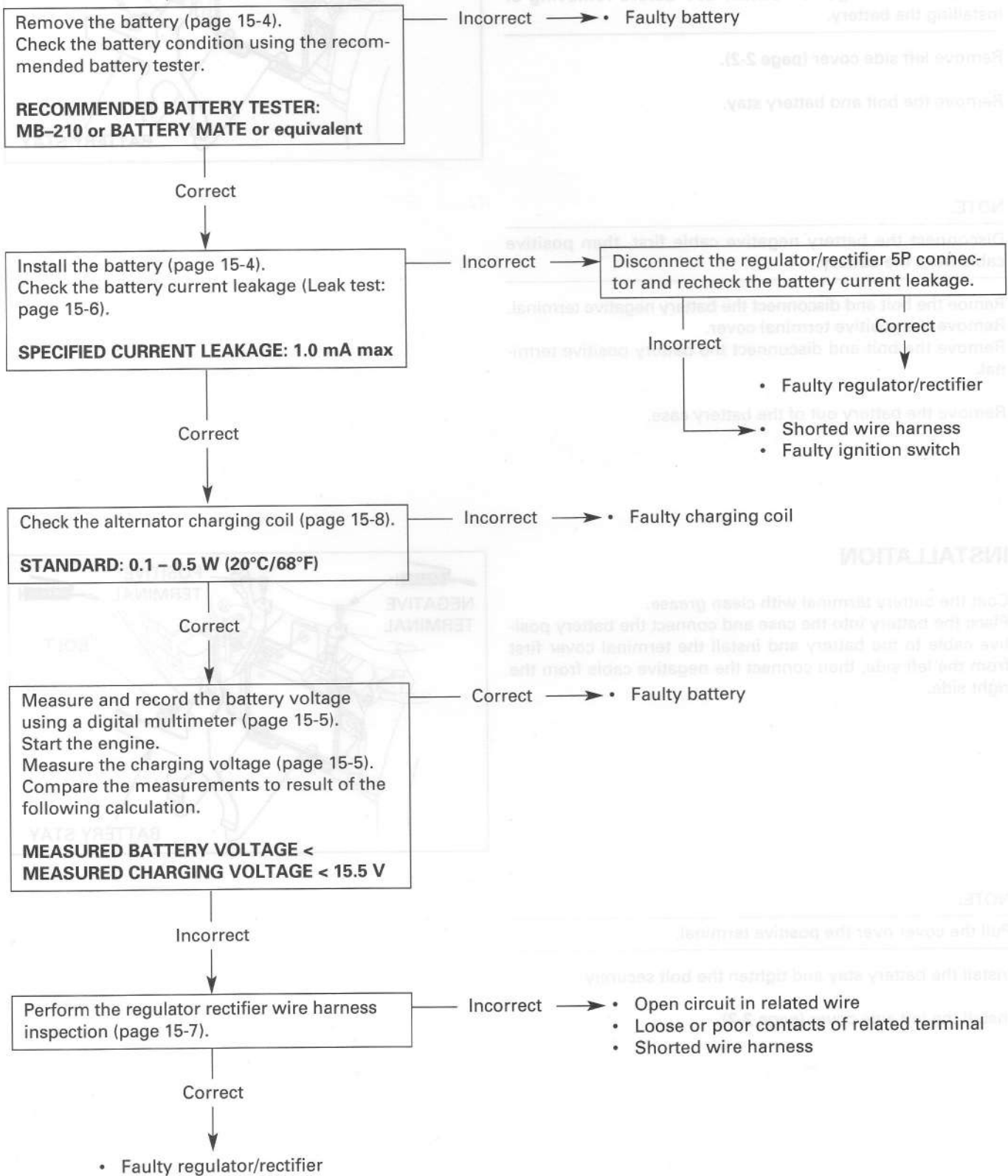
Flywheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Stator mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Ignition pulse generator mounting bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Stator/ignition pulse generator wire clamp bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)

TOOLS

Flywheel holder	07725 – 0040000
Flywheel puller	07KMC – HE00100

TROUBLESHOOTING

Battery is damaged or weak



BATTERY

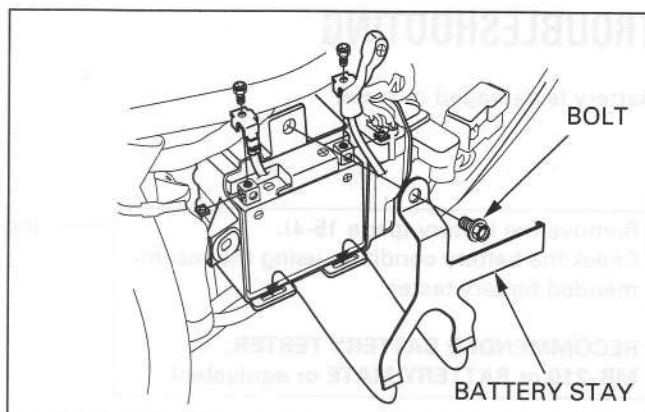
REMOVAL

NOTE:

Always turn the ignition switch OFF before removing or installing the battery.

Remove left side cover (page 2-2).

Remove the bolt and battery stay.



NOTE:

Disconnect the battery negative cable first, then positive cable from the battery.

Remove the bolt and disconnect the battery negative terminal. Remove the positive terminal cover.

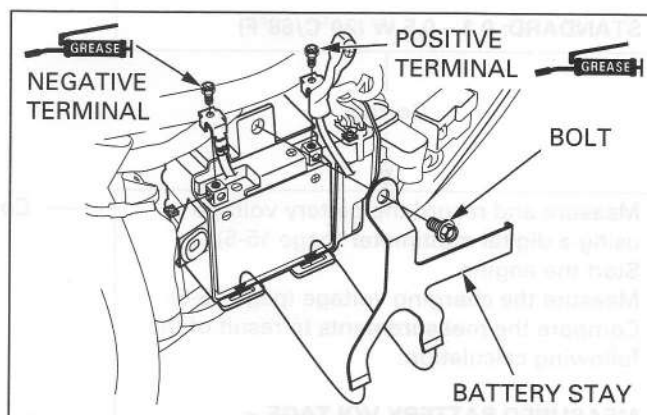
Remove the bolt and disconnect the battery positive terminal.

Remove the battery out of the battery case.

INSTALLATION

Coat the battery terminal with clean grease.

Place the battery into the case and connect the battery positive cable to the battery and install the terminal cover first from the left side, then connect the negative cable from the right side.



NOTE:

Pull the cover over the positive terminal.

Install the battery stay and tighten the bolt securely.

Install the left side cover (page 2-2).

INSPECTION

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE: Fully charged: 13.0 – 13.2 V (20°C/68°F)
Under charged: Below 12.3 V

BATTERY CHARGING

⚠ WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
 - *If electrolyte gets on your skin, flush with water.*
 - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.*
- *Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*

Remove the battery (page 15-4).

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (-) cable to the battery negative (-) terminal.

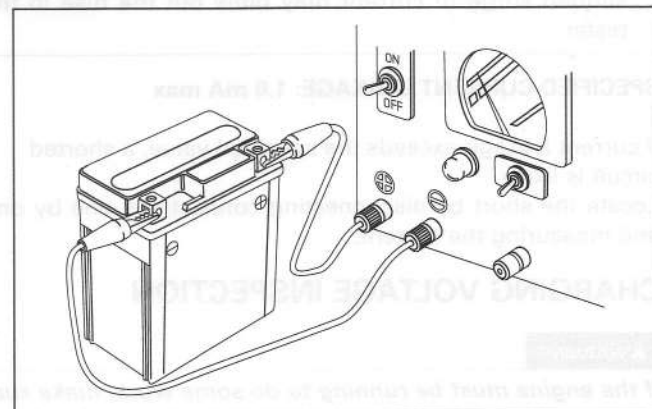
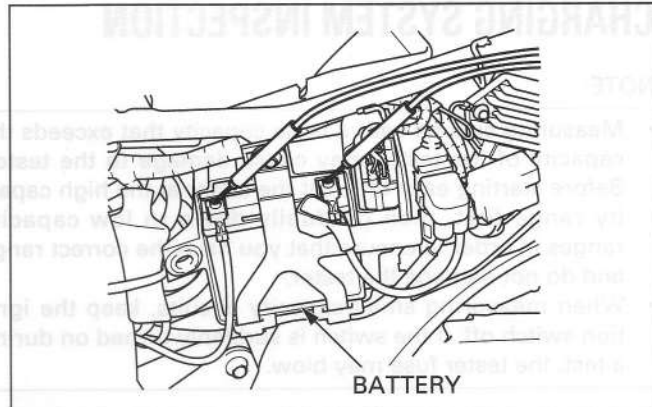
CHARGING CURRENT/TIME

Standard: 0.6 A/5 – 10 h

Quick: 3.0 A/1 h max

CAUTION:

- *Quick-charging should only be done in an emergency; slow charging is preferred.*
- *For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.*



CHARGING SYSTEM INSPECTION

NOTE:

- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the high capacity range first, then gradually down to low capacity ranges in order to ensure that you have the correct range and do not damage the tester.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.

CURRENT LEAKAGE TEST

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

Turn the ignition switch off, and disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the battery negative cable and the ammeter (-) probe to the battery (-) terminal. With the ignition switch off, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 1.0 mA max

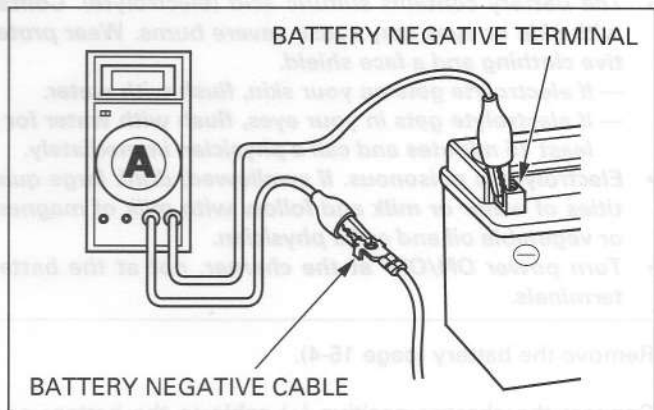
If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

CHARGING VOLTAGE INSPECTION

⚠ WARNING

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



NOTE:

Be sure that the battery is in good condition before performing this test.

Start the engine and warm it up to the operating temperature; stop the engine.

Connect the multimeter between the positive and negative terminals of the battery.

CAUTION:

- *To prevent short, make absolutely certain which are the positive and negative terminals or cable.*
- *Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

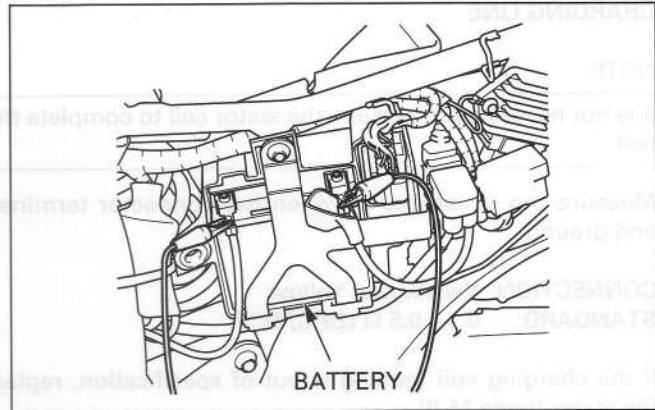
With the headlight on (Hi beam), restart the engine. Measure the voltage on the multimeter when the engine runs at 5,000 min⁻¹ (rpm).

STANDARD:

Measured battery voltage (page 15-5) < Measured charging voltage (see above) < 15.5 V

NOTE:

Be sure that the battery is in good condition before performing this test.

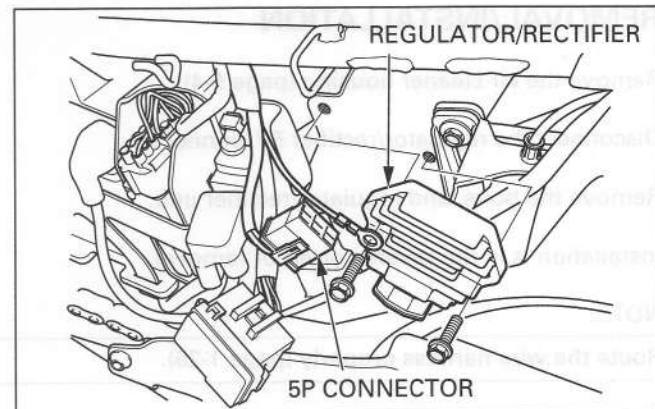


REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

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

Disconnect the regulator/rectifier 5P connector. Check the connector for loose or corroded terminals.

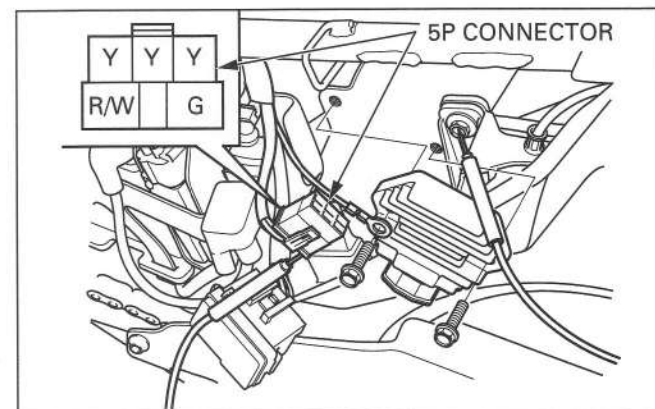


BATTERY LINE

Make sure the battery voltage between Red/White (+) and Green (-).

If there is no voltage, measure the following:

ITEM	TERMINALS	SPECIFICATION
Battery charging line	Red/White (+) and ground (-)	Battery voltage should register
Ground line	Green and ground	Continuity exists



CHARGING SYSTEM/ALTERNATOR

CHARGING LINE

NOTE:

It is not necessary to remove the stator coil to complete this test.

Measure the resistance between the connector terminals and ground.

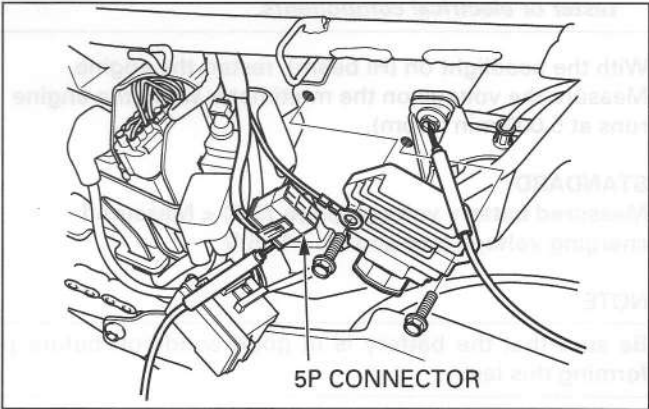
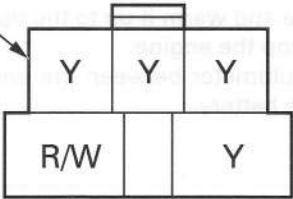
CONNECTION: Yellow and Yellow
STANDARD: 0.1 – 0.5 Ω (20°C/68°F)

If the charging coil reading is out of specification, replace the stator (page 15-9).

Check for continuity between the connector terminals and ground.
There should be no continuity.

If there is continuity between the connector and ground, replace the stator (page 15-9).

REGULATOR/RECTIFIER
5P CONNECTOR



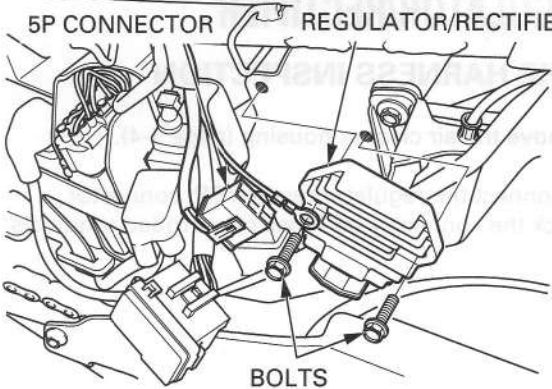
REMOVAL/INSTALLATION

- Remove the air cleaner housing (page 5-4).
- Disconnect the regulator/rectifier 5P connector.
- Remove the bolts, and regulator/rectifier unit.
- Installation is in the reverse order of removal.

NOTE:

Route the wire harness properly (page 1-25).

5P CONNECTOR REGULATOR/RECTIFIER



ITEM	TERMINALS	SPECIFICATION
Battery charging and ground	Battery (+) and ground (-)	Voltage should be 12V
Regulator and ground	Regulator (+) and ground (-)	Continuity exists

ALTERNATOR

REMOVAL

• LEFT CRANKCASE COVER REMOVAL

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

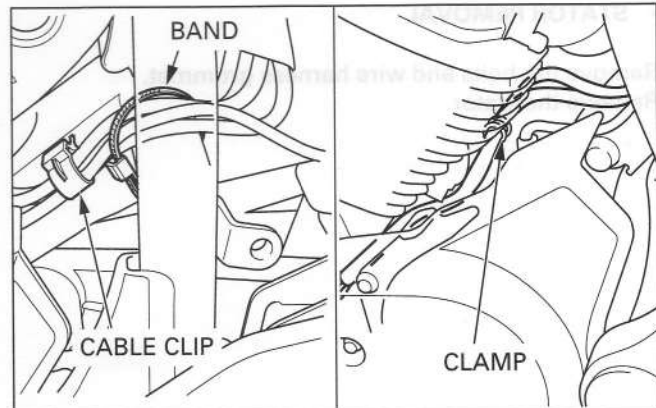
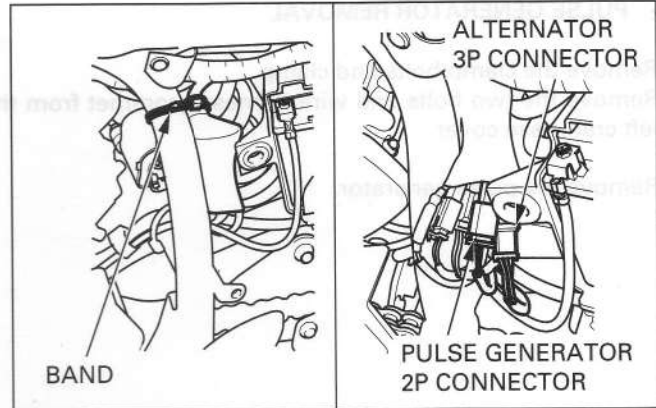
Remove the left rear cover (page 7-3).

Remove the wire harness band.

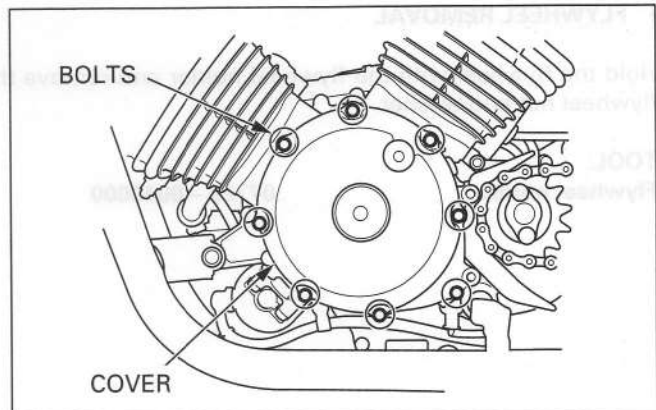
Disconnect the alternator 3P connector and ignition pulse generator 2P connector.

Remove the alternator and ignition pulse generator wire from the wire band which on the main pipe.

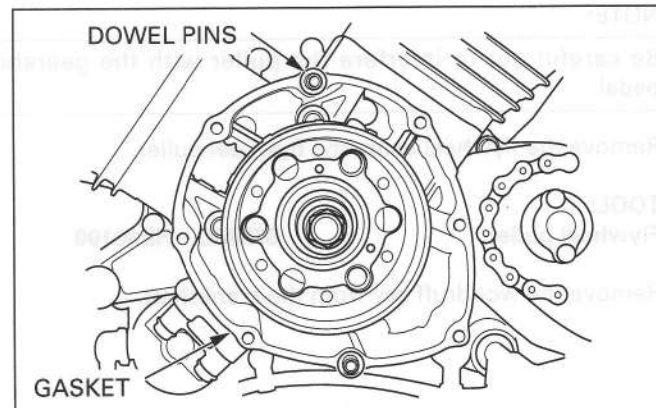
Remove the alternator and ignition pulse generator wire from the clip and clamp.



Remove the left crankcase cover bolts and left crankcase cover.



Remove the gasket and dowel pins.

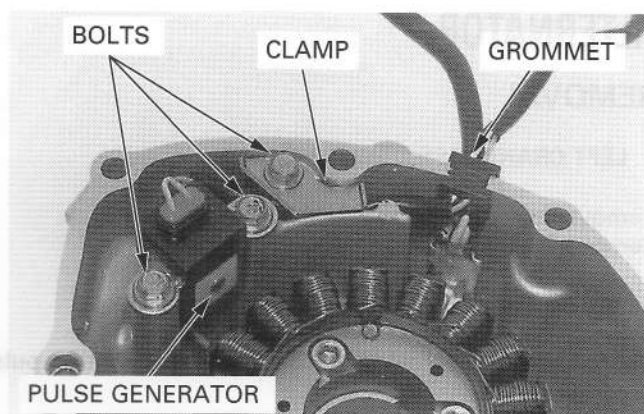


CHARGING SYSTEM/ALTERNATOR

• PULSE GENERATOR REMOVAL

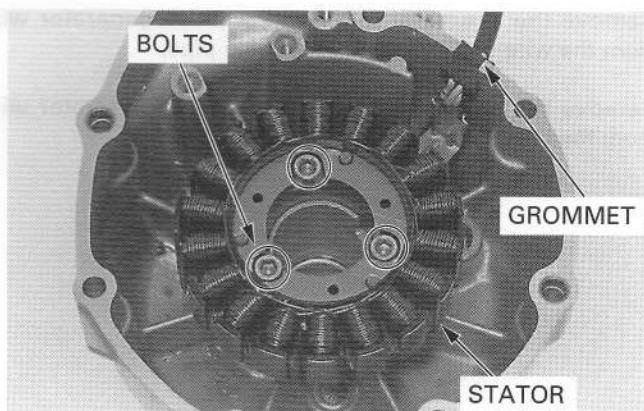
Remove the clamp bolts and clamp.
Remove the two bolts and wire harness grommet from the left crankcase cover.

Remove the pulse generator.



• STATOR REMOVAL

Remove the bolts and wire harness grommet.
Remove the stator.



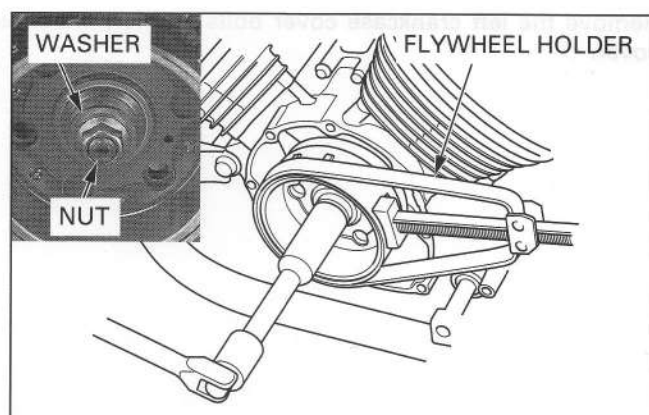
• FLYWHEEL REMOVAL

Hold the flywheel with the flywheel holder and remove the flywheel nut and washer.

TOOL:

Flywheel holder

07725 - 0040000



NOTE:

Be careful not to interfere the puller with the gearshift pedal.

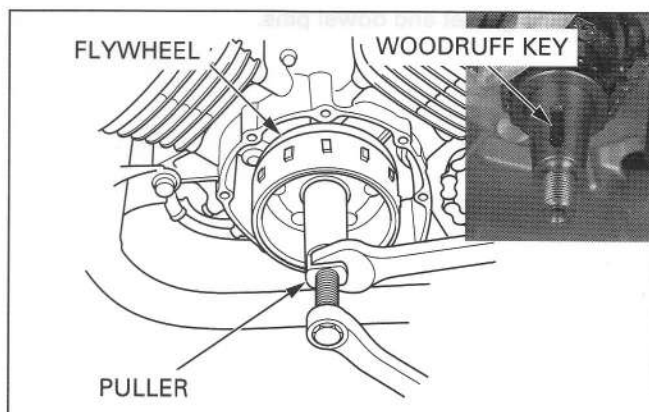
Remove the flywheel using the flywheel puller.

TOOL:

Flywheel puller

07KMC - HE00100

Remove the woodruff key from the crankshaft.



INSTALLATION

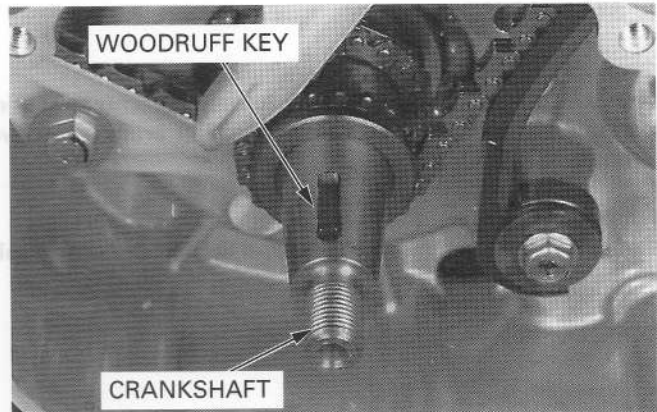
• FLYWHEEL INSTALLATION

NOTE:

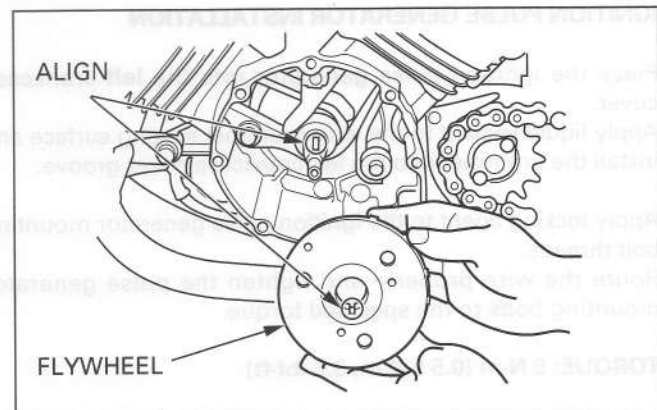
When woodruff key installation, be careful not to damage the key way groove or crankshaft.

Install the woodruff key into the crankshaft.

Clean the tapered area of the crankshaft and flywheel with a degreasing agent and wipe them off completely.

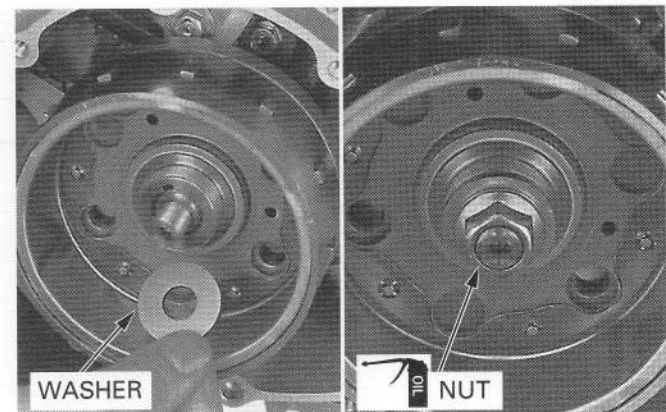


Install the flywheel over the crankshaft by aligning its groove with the woodruff key.



Install the washer.

Apply engine oil to the flywheel nut threads and seating surface.



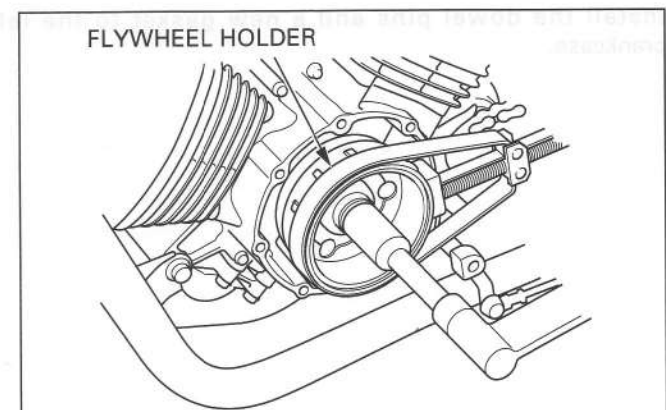
Hold the flywheel using the flywheel holder. Tighten the flywheel nut to the specified torque.

TOOL:

Flywheel holder

07725 - 0040000

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



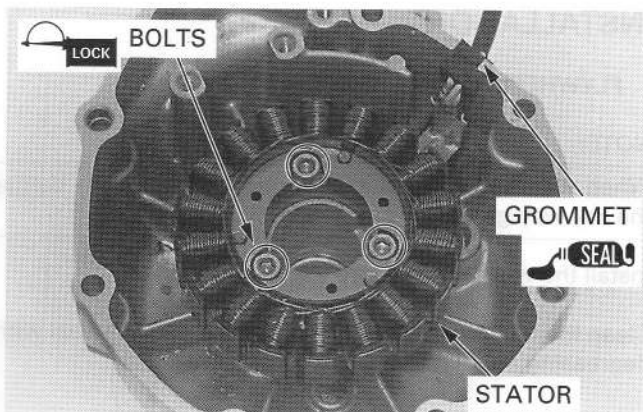
CHARGING SYSTEM/ALTERNATOR

• STATOR INSTALLATION

Place the stator into the left crankcase cover.
Apply liquid sealant to the wire harness grommet seating surface and install the grommet into left crankcase cover groove.

Apply locking agent to the stator mounting bolt threads.
Route the wire harness properly and tighten the stator bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



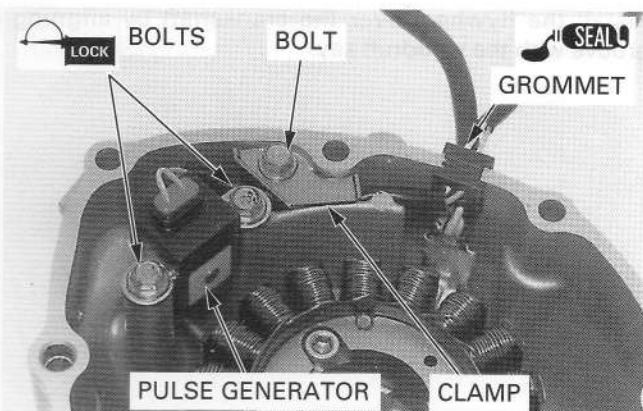
IGNITION PULSE GENERATOR INSTALLATION

Place the ignition pulse generator into the left crankcase cover.
Apply liquid sealant to the wire grommet seating surface and install the grommet into the left crankcase cover groove.

Apply locking agent to the ignition pulse generator mounting bolt threads.
Route the wire properly and tighten the pulse generator mounting bolts to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Tighten the wire clamp bolt securely.

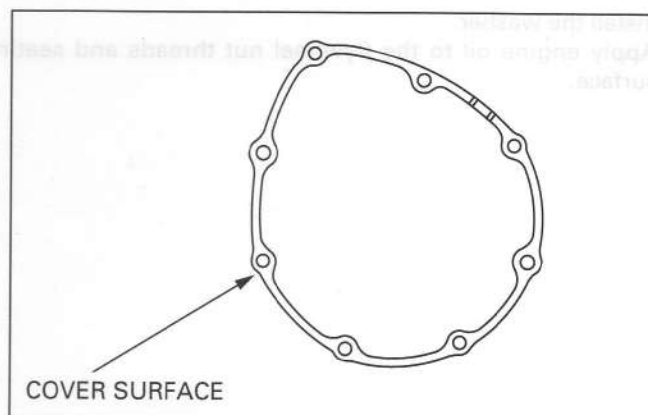


LEFT CRANKCASE COVER INSTALLATION

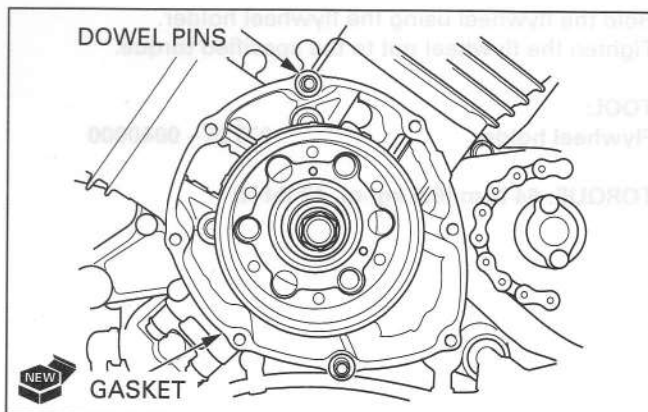
NOTE:

Be careful not to damage the mating surface.

Clean the crankcase cover mating surface.



Install the dowel pins and a new gasket to the left crankcase.



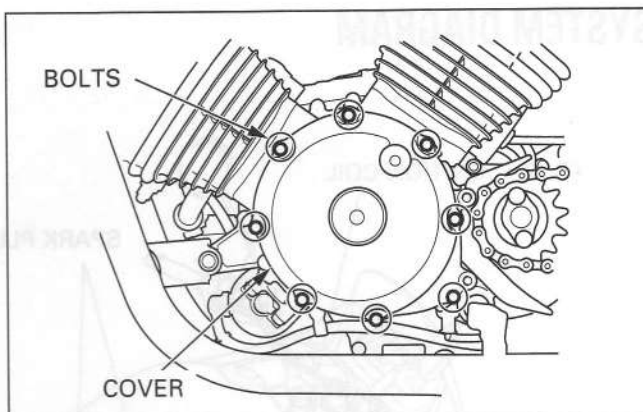
CHARGING SYSTEM/ALTERNATOR

Install the left crankcase cover.

NOTE:

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

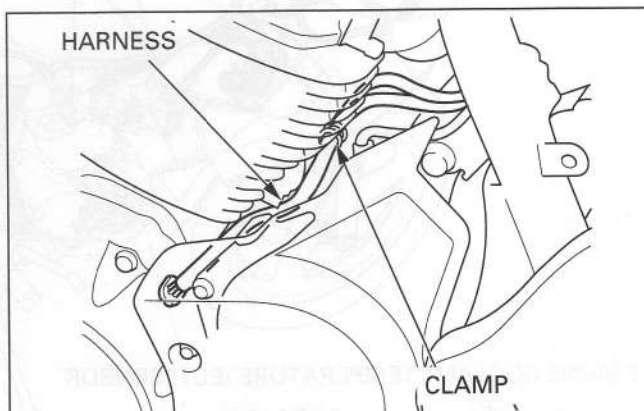
Install and tighten the left crankcase cover bolts securely.



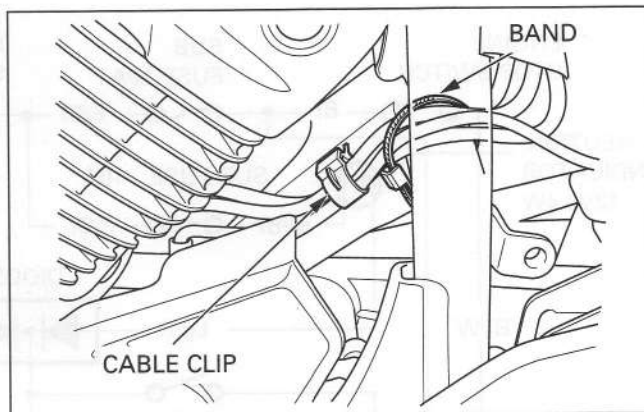
Install the alternator and ignition pulse generator wire harness to the clamp and crip.

NOTE:

Route the wire harness properly (page 1-22).



Install the harness to the cable clip wire harness band which on the frame.

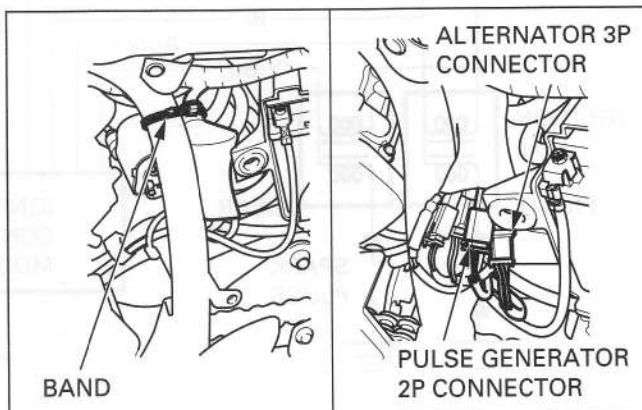


Connect the alternator 3P connector and ignition pulse generator 2P connector.

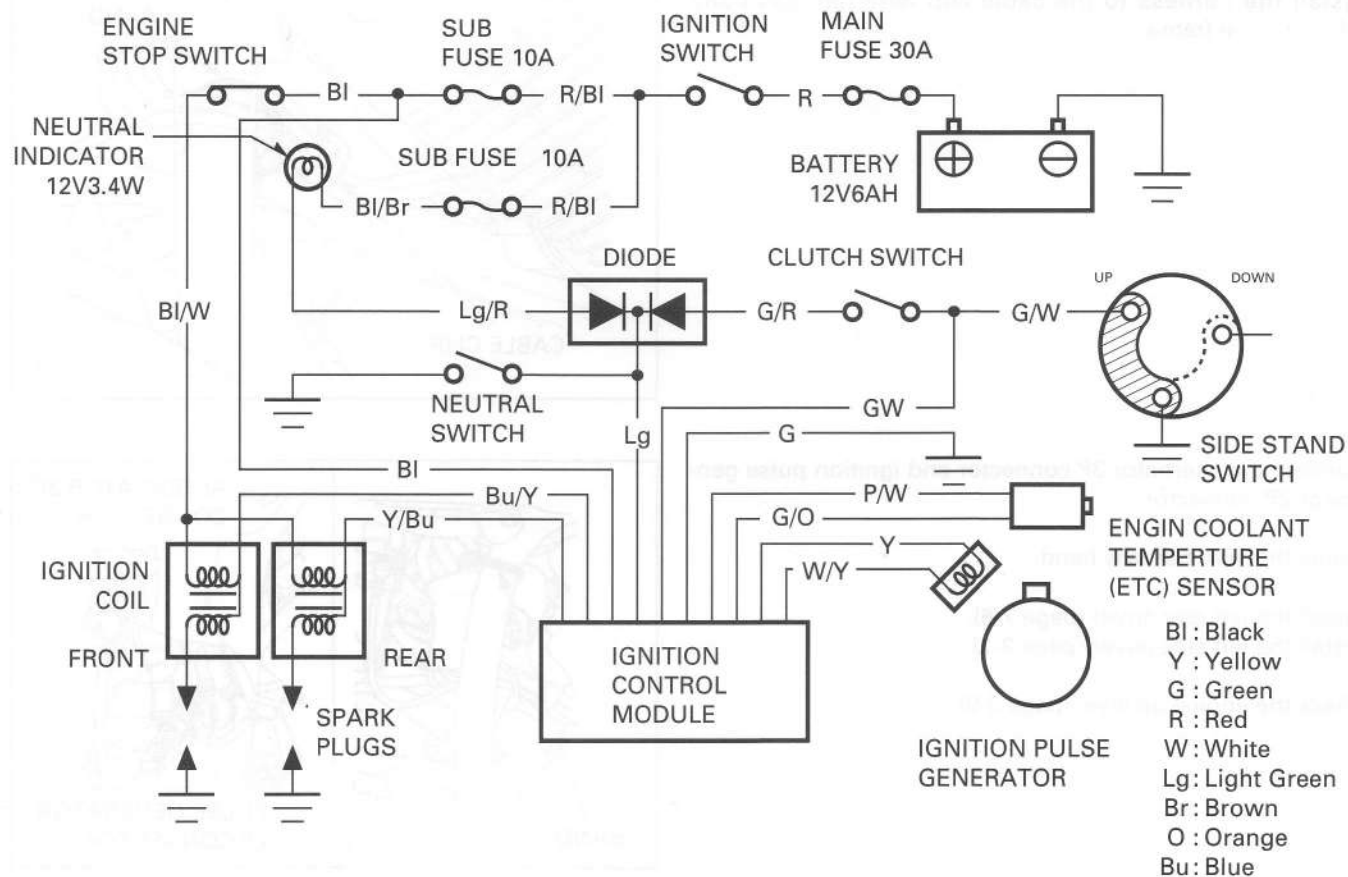
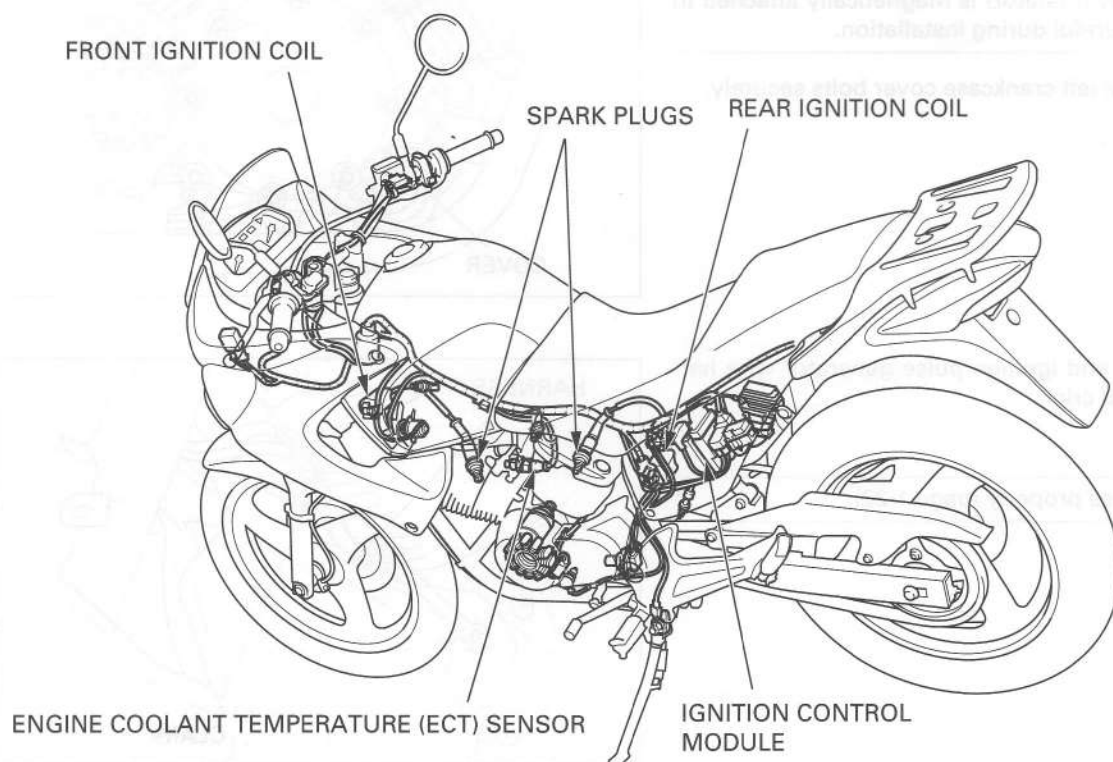
Install the wire harness band.

Install the left rear cover (page 7-6).
Install the left side cover (page 2-2).

Check the engine oil level (page 3-9).



SYSTEM DIAGRAM



16. IGNITION SYSTEM

SYSTEM DIAGRAM	16-0	IGNITION COIL	16-7
SERVICE INFORMATION	16-1	IGNITION TIMING	16-8
TROUBLESHOOTING	16-2	ENGINE COOLANT TEMPERATURE (ECT) SENSOR	16-9
IGNITION SYSTEM INSPECTION	16-4		

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 16-2.
- 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 engine coolant temperature (ECT) sensor signal the ICM to compensate the ignition timing according to the coolant temperature.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ICM. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- For ignition pulse generator removal/installation, refer to section 15.
- For spark plug inspection, see section 3.
- See section 18 for following components:
 - Ignition switch
 - Engine stop switch
 - Neutral switch
 - Side stand switch
 - Clutch switch

IGNITION SYSTEM

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Spark plug		NGK	DENSO
	Standard	CR8EH-9 (NGK)	U24FER-9 (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		12° ± 1° BTDC at 1,500 ± 100 min ⁻¹ (rpm)	
Full advance		BTDC 38°	

TORQUE VALUES

Engine coolant temperature (ECT) sensor 23 N·m (2.3 kgf·m, 17 lbf·ft)

TOOL

Peak voltage adaptor 07HGJ-0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

TROUBLESHOOTING

Engine revolution is 7,500 rpm (min⁻¹) or less when operating the motorcycle above 5 km/h (IIG type).

- Check for the speedometer operation.
 - Speedometer is abnormal (see page 18-3).
 - Speedometer is normal
- Check for the continuity of the Black/Yellow wire between the speed sensor and ignition control module (ICM).
 - If there is no continuity, open circuit on the Black/Yellow wire.
 - If there is continuity, replace the ICM.
- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connections
 - Water got into the spark plug cap (Leaking to the ignition coil secondary voltage)
- If there is no spark at either cylinders, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is a spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (The engine is not cranked by the starter motor).

NO SPARK AT SPARK PLUGS

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	Low peak voltage	1. Incorrect peak voltage adaptor connections. 2. The multimeter impedance is too low; below 10 MΩ/DCV. 3. Cranking speed is too low. (Battery is undercharged). 4. 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.) 5. Poorly connected connectors or an open circuit in ignition system. 6. Faulty side stand switch or neutral switch. 7. An open circuit or loose connection in No. 6 related circuit wires. • Side stand switch line: green/white wire • Neutral switch line: light green wire 8. Faulty ignition control module (ICM) (in case when above No. 1 thru. 7 are normal).
	No peak voltage	1. Incorrect peak voltage adaptor connections. 2. The multimeter impedance is too low; below 10 MΩ/DCV. 3. Faulty ignition switch or engine stop switch. 4. Loose or poorly connected ICM connector. 5. No voltage at the yellow/blue wire of the ICM. 6. Open circuit or poor connection in green (ground) wire of the ICM. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No. 7 related circuit wires. • Side stand switch line: green/white wire • Neutral switch line: light green wire 9. Faulty peak voltage adaptor. 10. Faulty ignition pulse generator. (Measure peak voltage.) 11. Faulty ICM (in case when above No. 1 thru. 10 are normal).
	Peak voltage is normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coils.
Ignition pulse generator	Low peak voltage	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 thru. 3 are normal).
	No peak voltage	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

NOTE:

- If there is no spark at either plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use the recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using an Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic tester.

TOOLS:

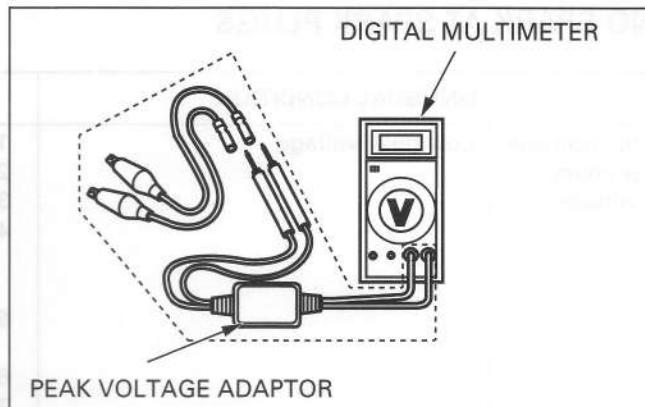
Peak voltage tester or

Peak voltage adaptor

07HGJ - 0020100

With commercially available digital multimeter

(impedance 10 M Ω /DCV minimum)



IGNITION PRIMARY VOLTAGE INSPECTION

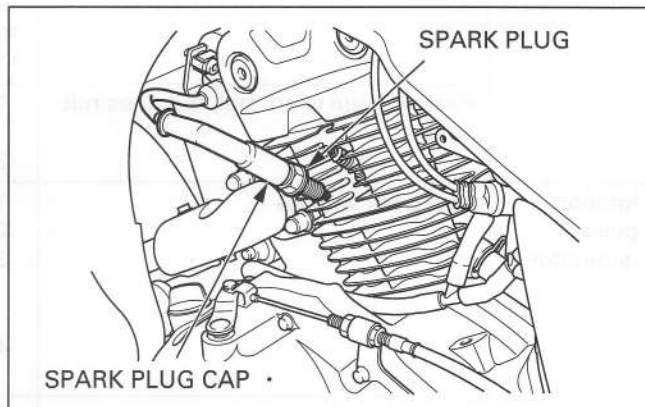
NOTE:

- Check all system connections before the inspection. If the system is disconnected, an incorrect peak voltage will register.
- Check cylinder compression at each cylinder and check that the spark plugs are installed correctly in each cylinder.

Support the motorcycle using the side stand.

Disconnect the spark plug caps from the spark plugs on the cylinder head.

Connect a good known spark plug to each spark plug cap and ground the spark plugs to the cylinder as done in a spark test.



When servicing the front ignition coil as following:
— Remove the air cleaner housing (page 5-4).

When servicing the rear ignition coil as following:
— Remove the right side cover (page 2-2).

Connect the peak voltage adaptor or peak voltage tester to the ignition coil primary terminal.

NOTE:

Do not disconnect the ignition coil primary wires.

TOOLS:

Peak voltage taster or
Peak voltage adaptor 07HGJ – 0020100
With commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTION:

Front ignition coil:

Blue/Yellow (+) — Body ground (–)

Rear ignition coil:

Yellow/Blue (+) — Body ground (–)

Turn the ignition switch "ON" and engine stop switch to "RUN".

Check for initial battery voltage.

If battery voltage is not present, follow the checks described in the troubleshooting on page 16-3.

Shift the transmission into "neutral".

Crank the engine with the starter motor and read each ignition coil primary voltage.

PEAK VOLTAGE: 100 V minimum

⚠ WARNING

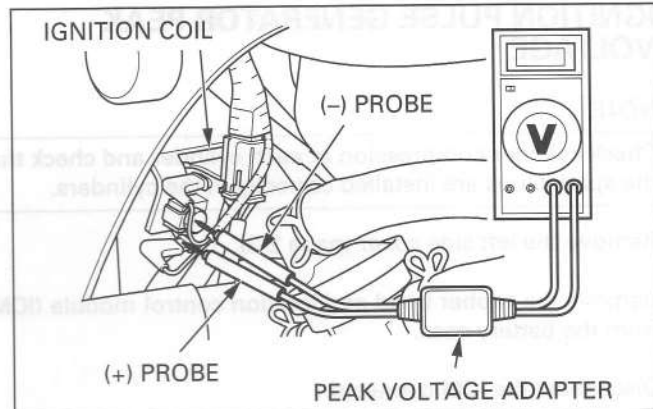
Avoid touching the spark plugs and tester probes to prevent electric shock.

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting on page 16-3.

NOTE:

Although measured values are different for each ignition coil, they are normal as long as the voltage is higher than the standard value.

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting on page 16-3.



IGNITION COIL

REMOVAL/INSTALLATION

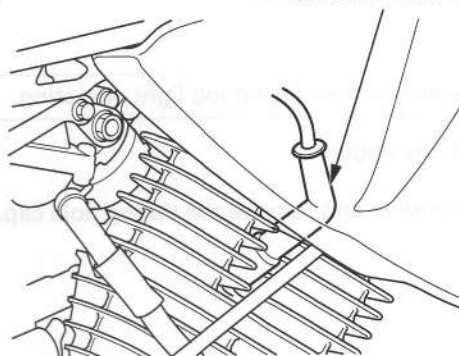
FRONT:

Disconnect the spark plug cap from the spark plug.

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

FRONT:

SPARK PLUG CAP



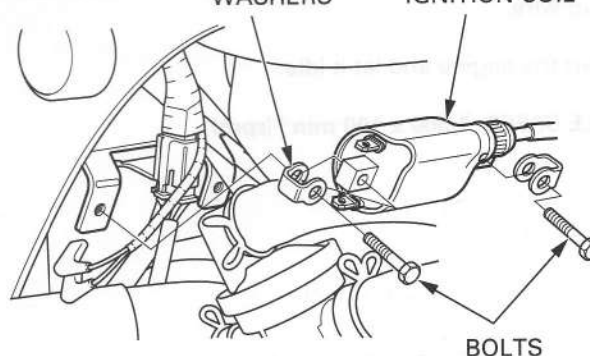
Disconnect the ignition coil primary wire connectors from the terminals.

Remove the two bolts.
Remove the ignition coil.

Installation is in the reverse order of removal.

WASHERS

IGNITION COIL



BOLTS

REAR:

Remove the right side cover (page 2-2).

Disconnect the spark plug cap from the spark plug.

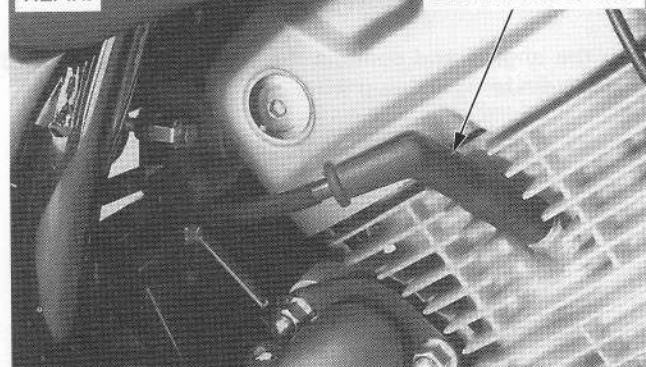
Disconnect the ignition coil primary wire connectors from the terminals.

Remove the two bolts, collars and nuts.
Remove the ignition coil.

Installation is in the reverse order of removal.

REAR:

SPARK PLUG CAP



NOTE:

- Route the spark plug wires properly (page 1-24).
- Connect the primary wires to the original position.

Front:

Black terminal: Black/White wire

Green terminal: Blue/Yellow wire

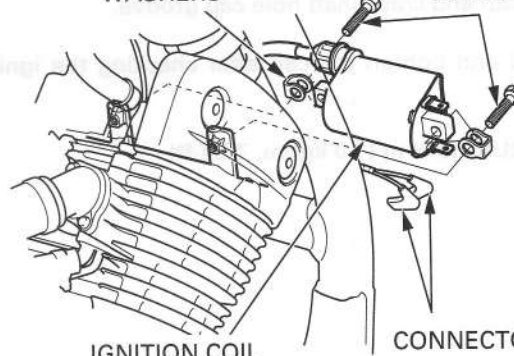
Rear:

Black terminal: Black/White wire

Green terminal: Yellow/Blue wire

WASHERS

BOLTS



IGNITION COIL

CONNECTORS

IGNITION SYSTEM

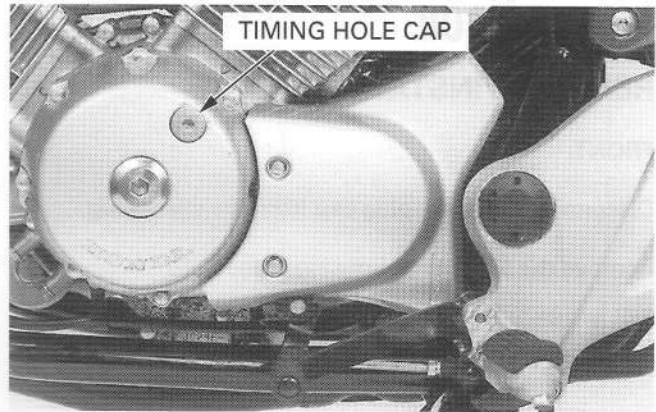
IGNITION TIMING

NOTE:

Read the instructions for timing light operating.

Warm up the engine.

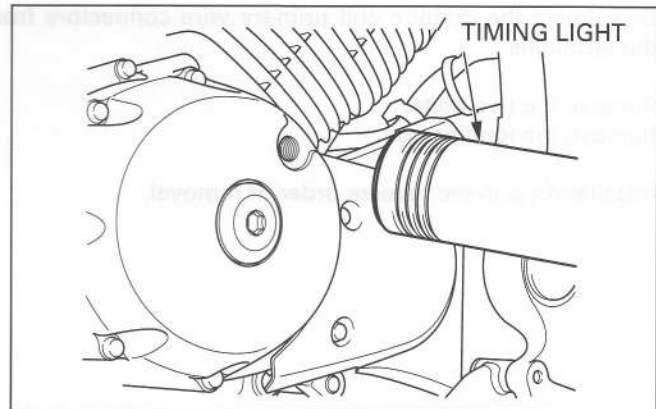
Stop the engine and remove the timing hole cap.



Connect the timing light to the rear (No.1) cylinder spark plug wire.

Start the engine and let it idle.

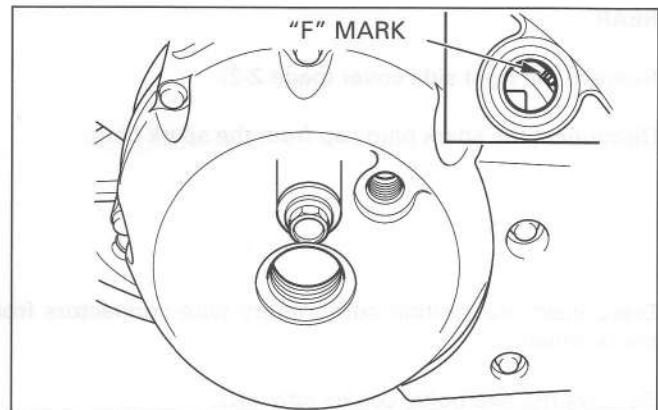
IDLE SPEED: $1,500 \pm 100 \text{ min}^{-1}$ (rpm)



The timing is correct if the "F" mark aligns with the index mark on the crankcase cover.

Stop the engine and connect the timing light to the front (No. 2) cylinder spark plug wire.

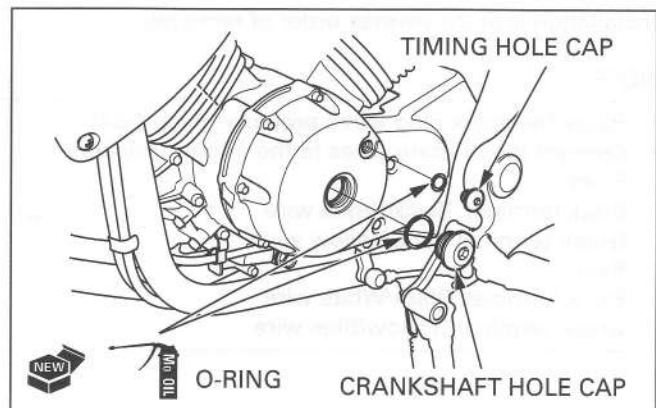
Recheck ignition timing at the front cylinder.



Coat a new O-ring with engine oil and install it in the timing hole cap and crankshaft hole cap groove.

Install and tighten the cap after checking the ignition timing.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



ENGINE COOLANT TEMPERATURE (ECT) SENSOR

INSPECTION

Disconnect the ignition control module (ICM) connector (page 16-6).

Disconnect the ECT sensor connector.
Check for continuity between the ECT sensor connector and ICM connector.
There should be continuity between the same color wires, and no continuity between different color wires.

Drain the coolant (page 6-5).

Remove the ECT sensor from the rear cylinder.
Suspend the sensor in cold water. Heat the water slowly, using an electric heating element.

⚠ WARNING

Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.

Measure the resistance between the sensor terminals.

STANDARD: 2 – 3 k Ω at 20°C (68°F)
200 – 400 Ω at 80°C (178°F)

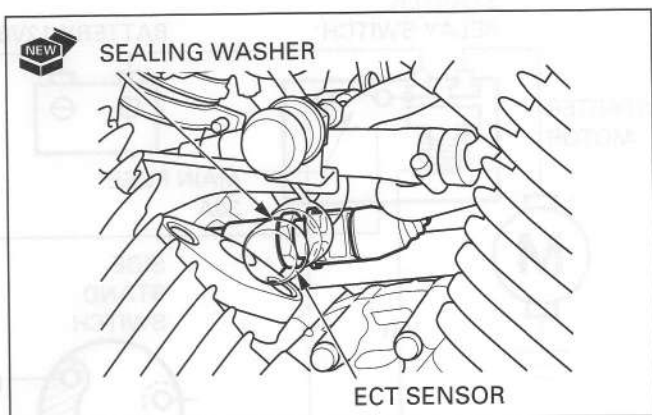
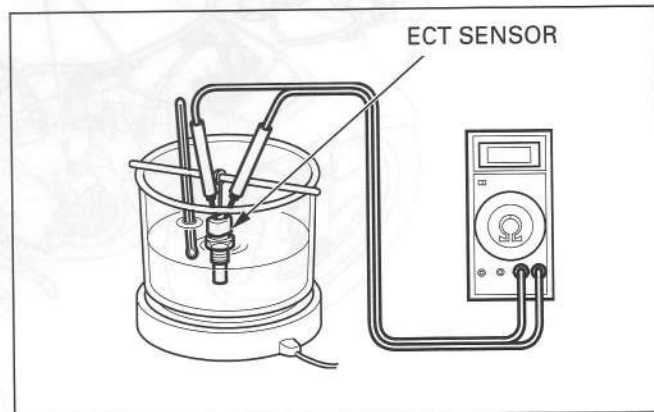
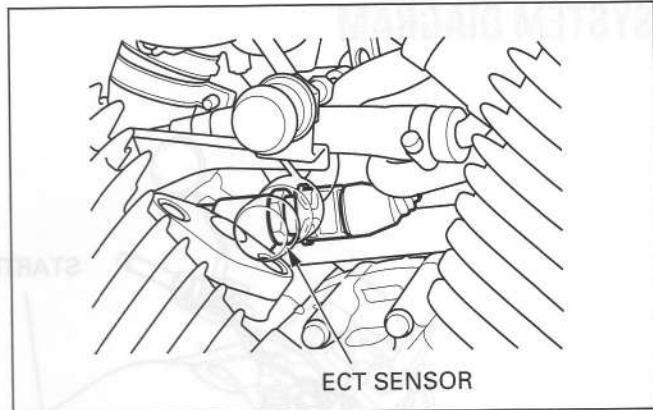
If the resistance is out of above ranges, replace the ECT sensor.

Install the ECT sensor with a new sealing washer and tighten it.

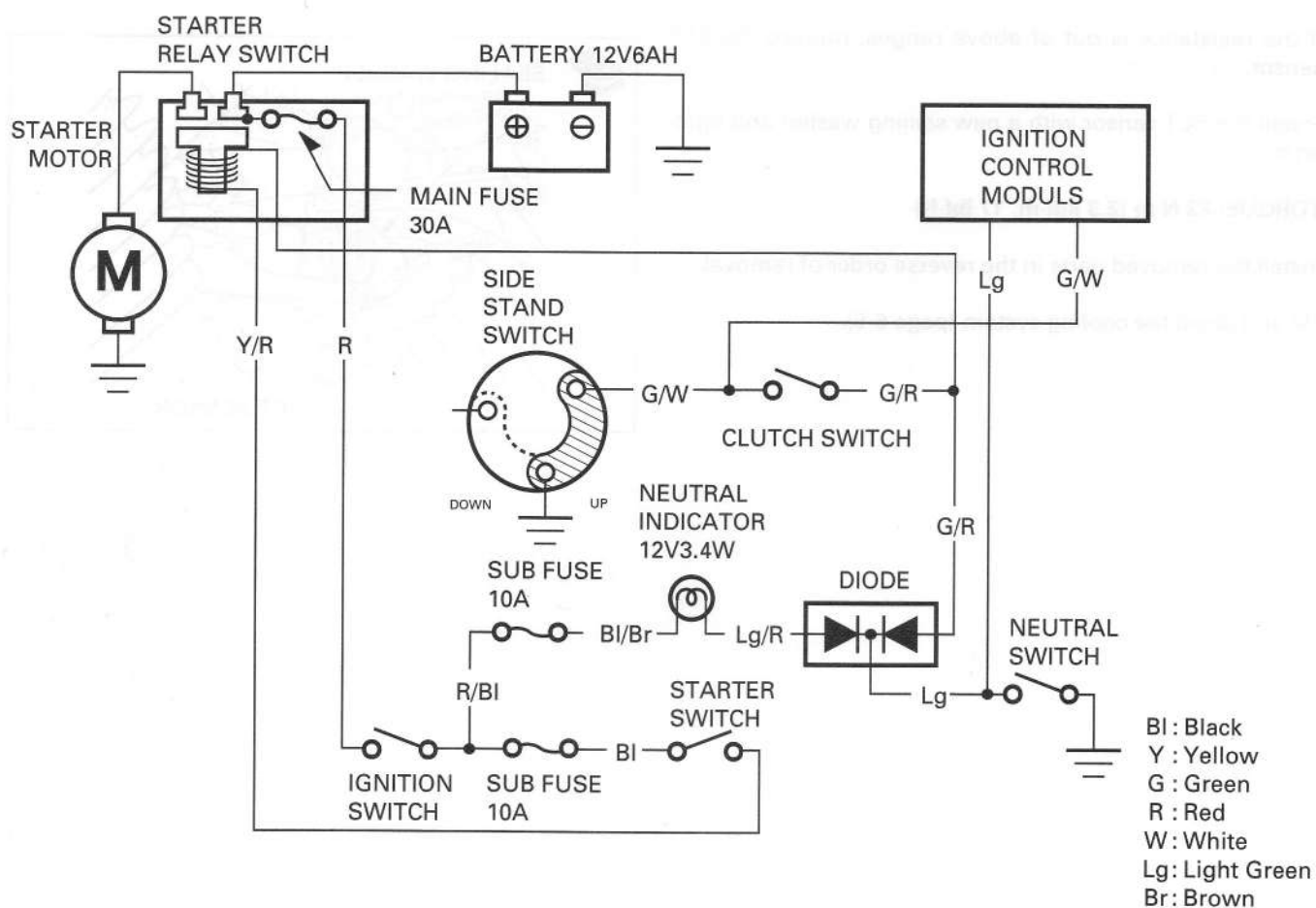
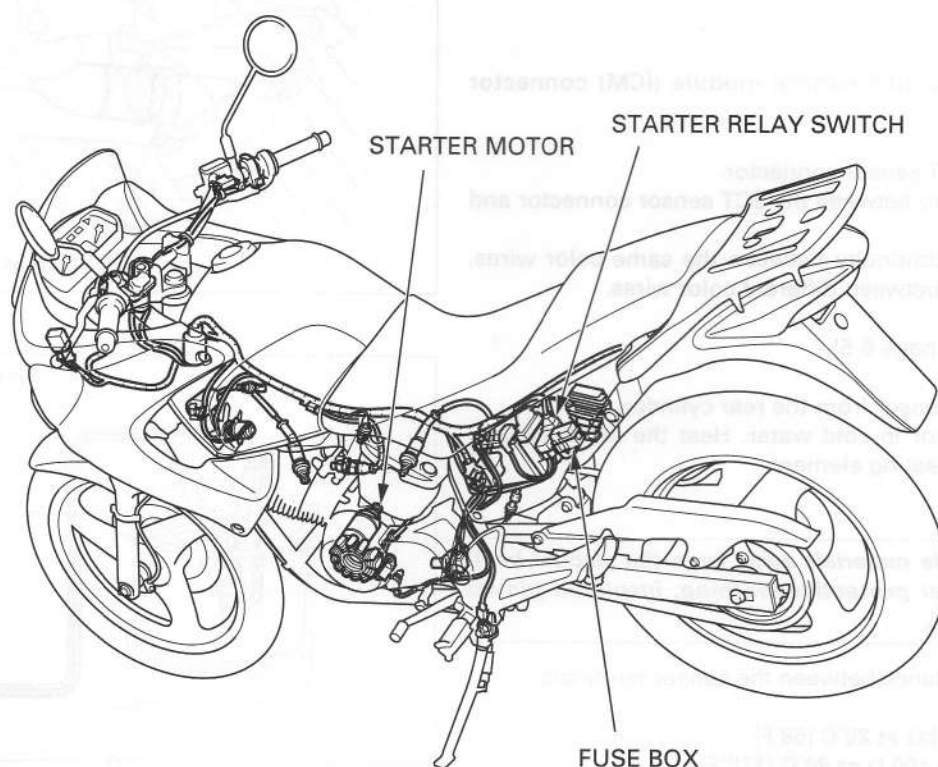
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the removed parts in the reverse order of removal.

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



SYSTEM DIAGRAM



17. ELECTRIC STARTER/STARTER CLUTCH

SYSTEM DIAGRAM	17-0	PRIMARY DRIVE GEAR/STARTER CLUTCH	17-11
SERVICE INFORMATION	17-1		
TROUBLESHOOTING	17-2	STARTER RELAY SWITCH	17-16
STARTER MOTOR	17-4	CLUTCH DIODE	17-17

SERVICE INFORMATION

GENERAL

⚠ WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 17-2).
- 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 the engine is not cranking over, the starter motor may be damaged.
- See page 17-11 for starter clutch servicing.
- See section 18 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	10.00 – 10.05 (0.394 – 0.396)	3.5 (0.14)
Starter clutch gear O.D.	45.657 – 45.673 (1.7975 – 1.7981)	45.64 (1.797)
Starter clutch outer I.D.	62.317 – 62.347 (2.4534 – 2.4546)	62.33 (2.454)

17

TORQUE VALUES

Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Starter motor front cover bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Primary drive gear lock nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	Left hand threads.

TOOL

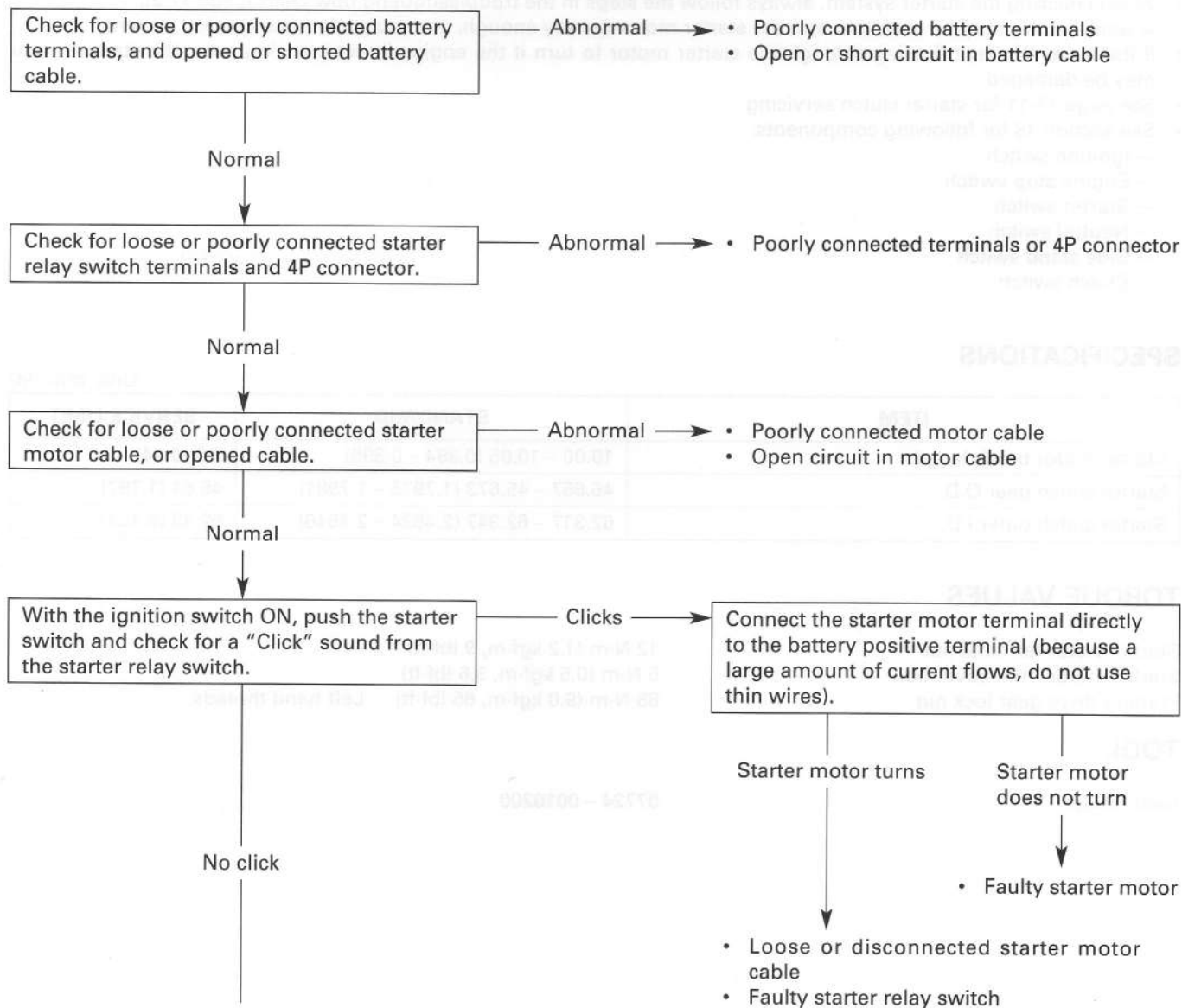
Gear holder	07724 – 0010200
-------------	-----------------

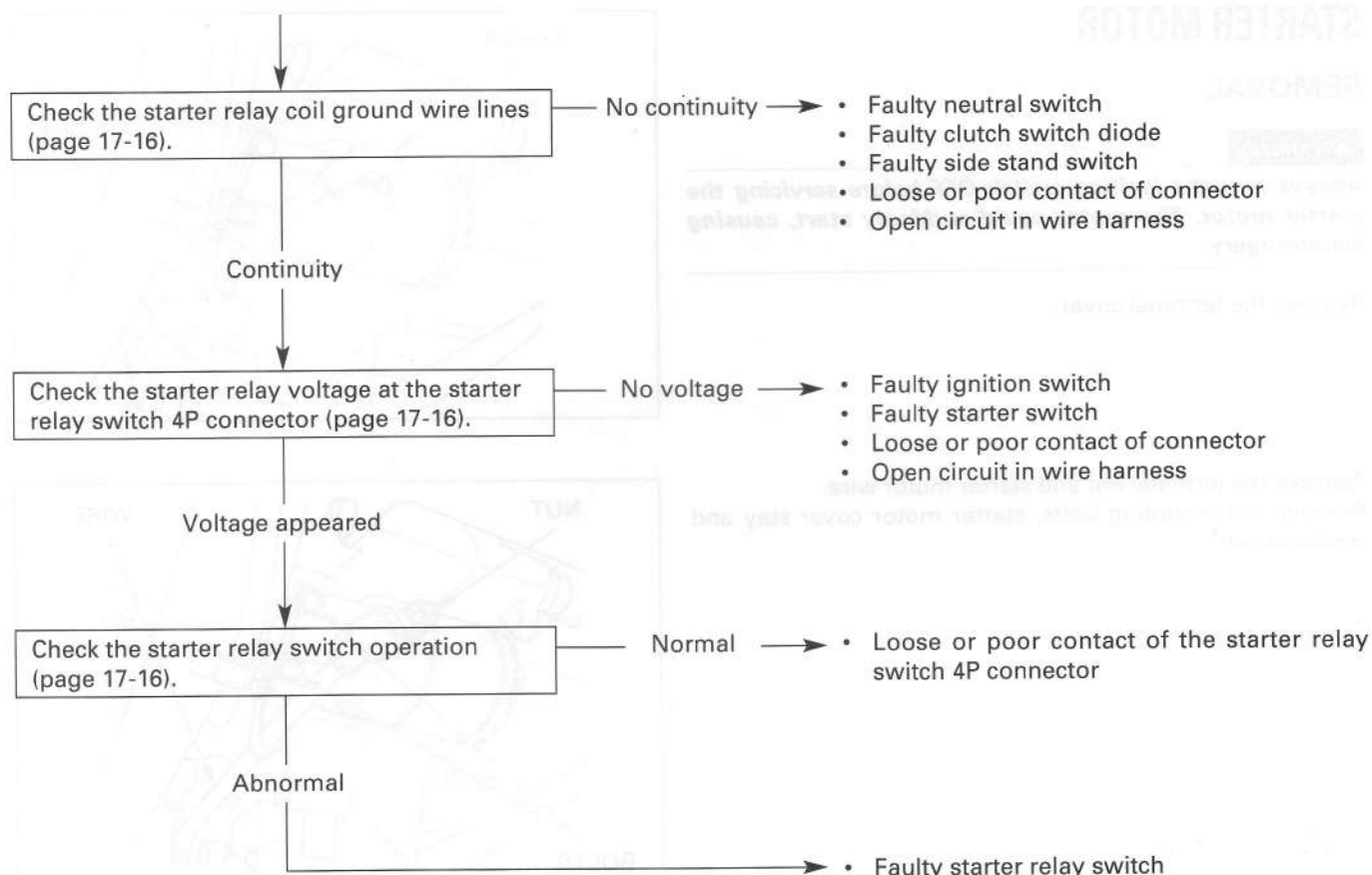
TROUBLESHOOTING

- Check for the following before troubleshooting the system.
 - Blown main fuse (30 A) or sub-fuse (10 A).
 - Loose battery and starter motor cable.
 - Discharged battery.
- The starter motor should turn when the transmission is in neutral.
- The starter motor should turn when transmission is in any gear as indicated the chart below.

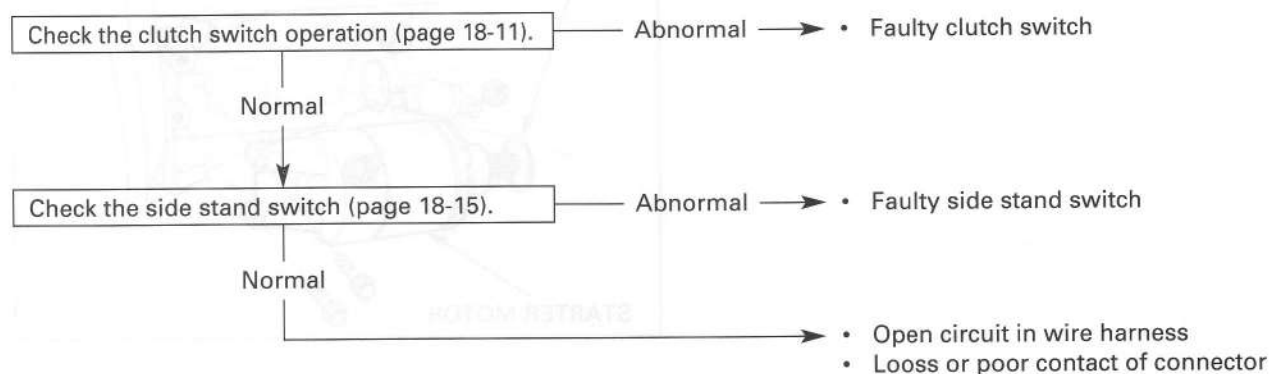
Gear Position	Side Stand	Clutch Lever	Starter Motor
Any Gear	Up	Pulled In	Turn
		Released	Does not turn
	Down	Pulled In	Does not turn
		Released	Does not turn

Starter motor will not turn





The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral. The side stand is up and the clutch lever is pulled in.



Starter motor turns slowly

- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Worn or damaged starter motor brush

Starter motor turns, but engine does not turn

- Starter motor is running backwards
 - Case assembled improperly
 - Terminals connected improperly
- Faulty starter clutch
- Damaged reduction gear
- Damaged starter idle gear

Starter relay switch "clicks", but engine does not turn over

- Crankshaft does not turn due to engine problem
- Faulty starter reduction gear
- Faulty starter idle gear

ELECTRIC STARTER/STARTER CLUTCH

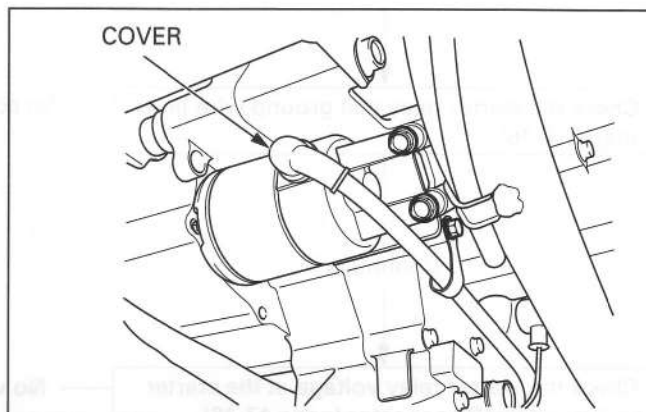
STARTER MOTOR

REMOVAL

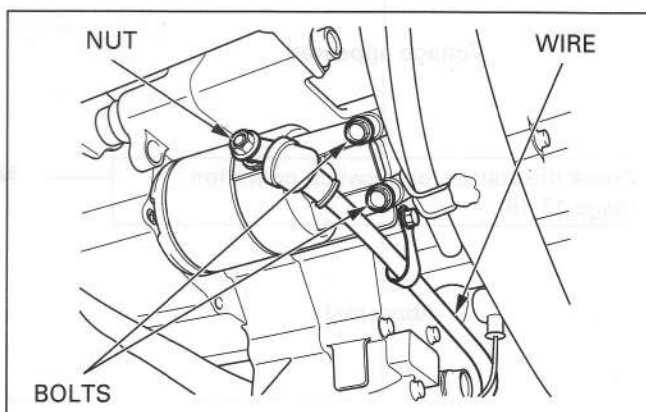
⚠ WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

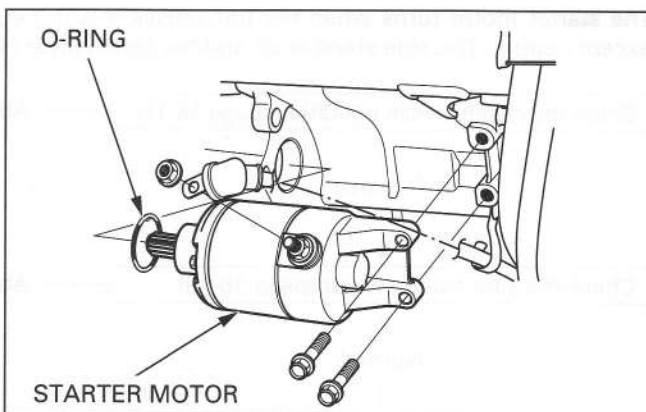
Remove the terminal cover.



Remove the terminal nut and starter motor wire.
Remove the mounting bolts, starter motor cover stay and starter motor.



Remove the O-ring from the starter motor.

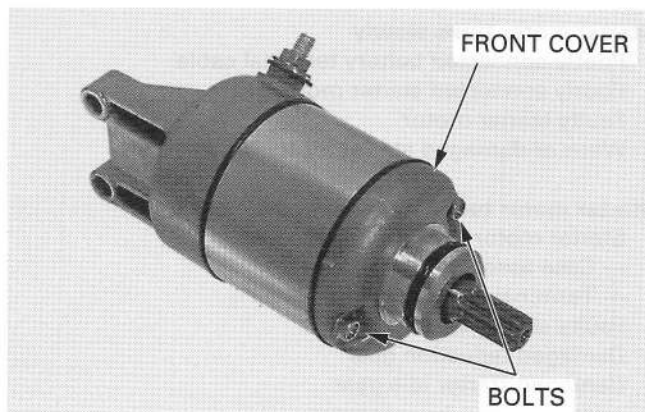


DISASSEMBLY

NOTE:

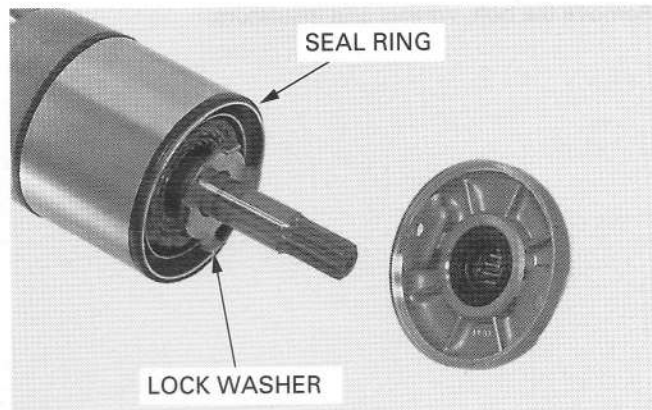
Record the number and location of shims and washers for correct assembly.

Remove the starter motor front cover bolts, front cover.

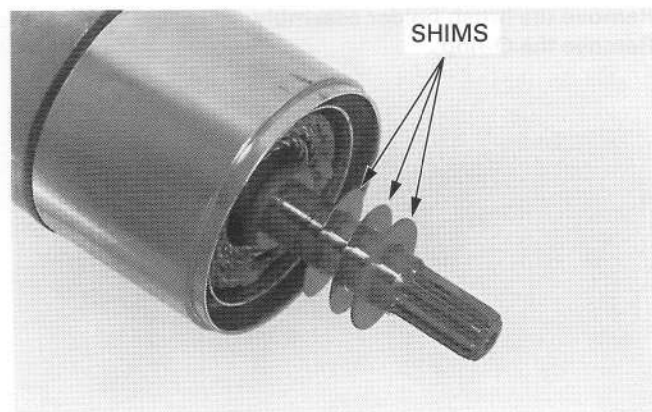


ELECTRIC STARTER/STARTER CLUTCH

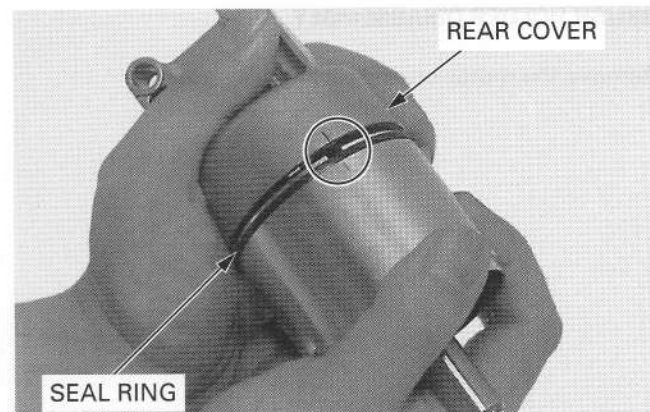
Remove the seal ring from the motor case.
Remove the lock washer.



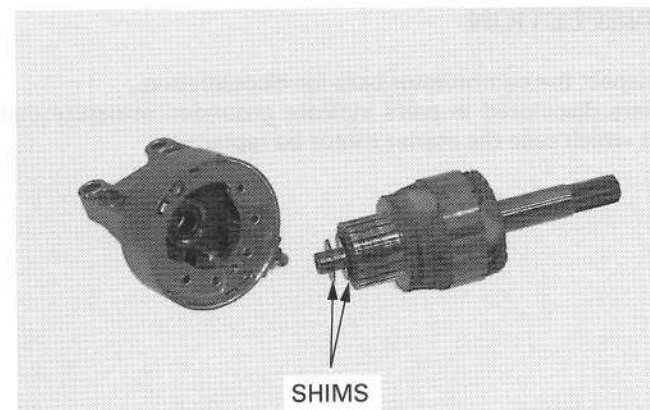
Remove the shims.



Remove the rear cover.
Remove the seal ring from the motor case.

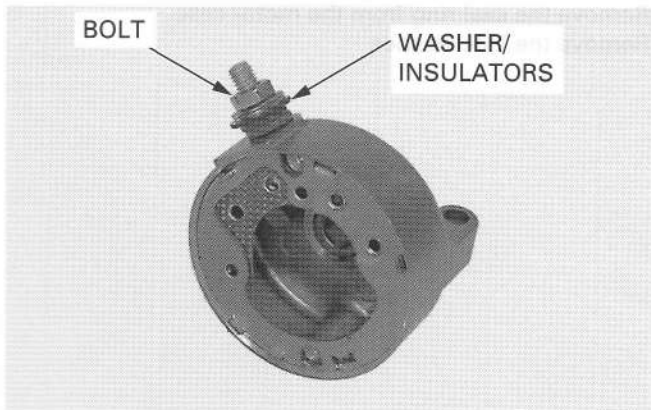
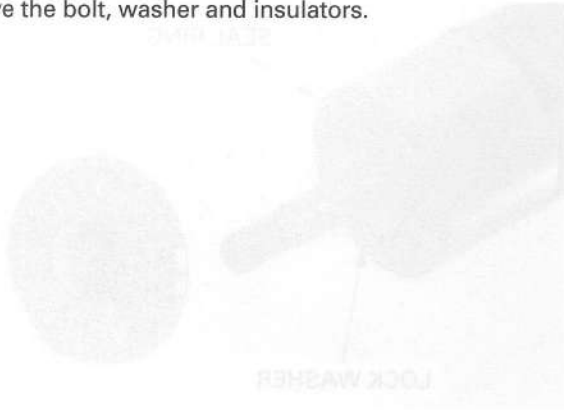


Remove the shims from the armature.

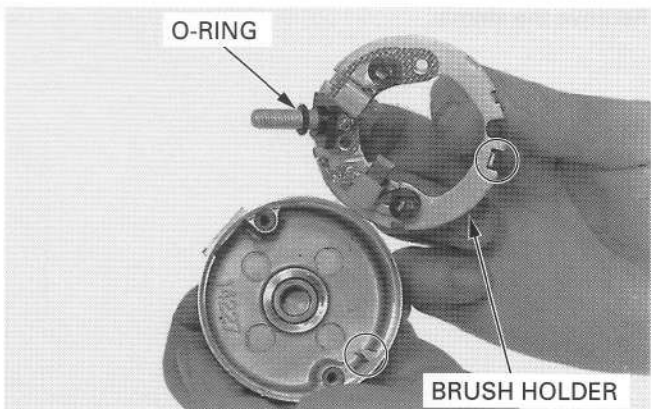
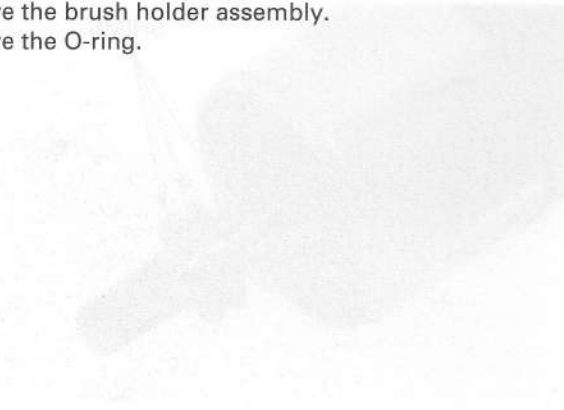


ELECTRIC STARTER/STARTER CLUTCH

Remove the bolt, washer and insulators.

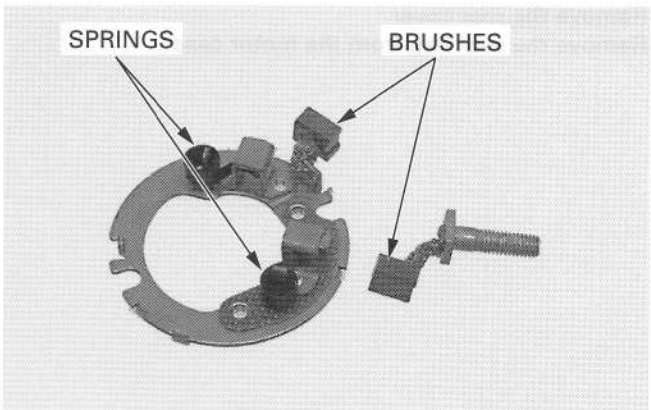


Remove the brush holder assembly.
Remove the O-ring.



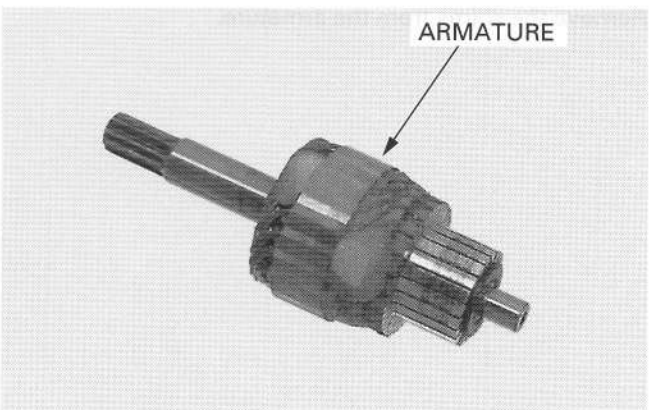
BRUSH HOLDER DISASSEMBLY

Remove the motor brushes and brush springs.



INSPECTION

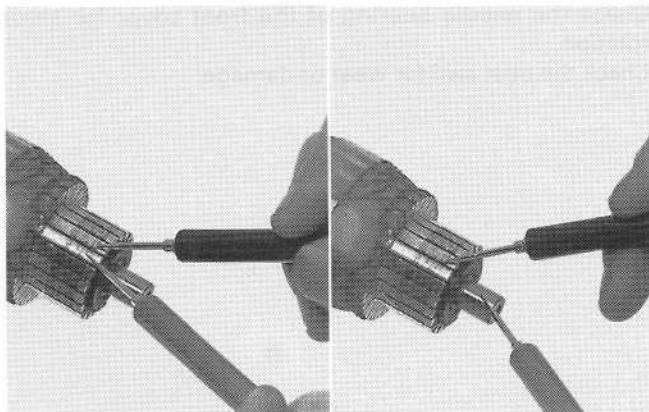
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils,
in which case the starter motor be replaced.



ELECTRIC STARTER/STARTER CLUTCH

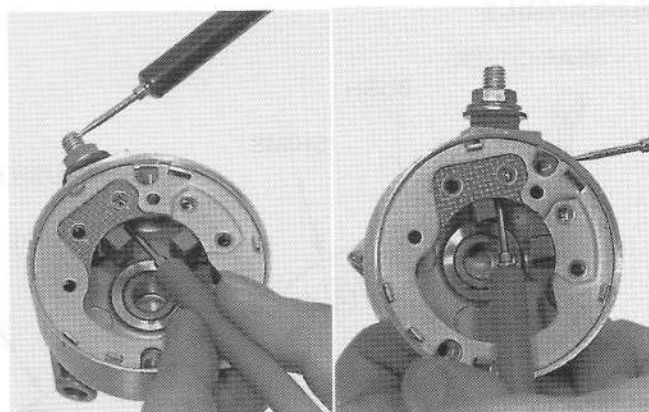
Check for continuity between individual commutator bars; there should be continuity.

Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.



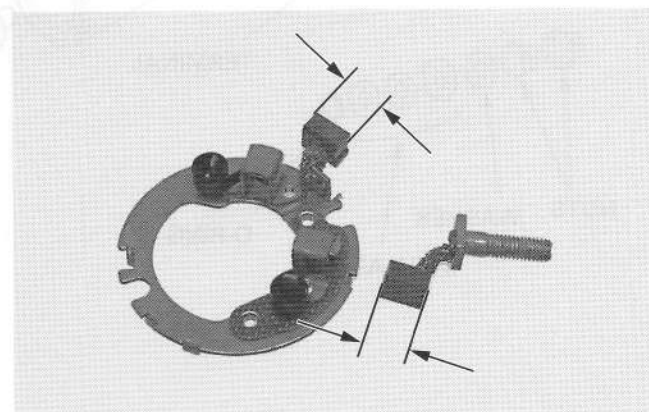
Check for continuity between the cable terminal and the brush wire.
There should be continuity.

Check for continuity between the rear cover and the brush wire.
There should be no continuity.

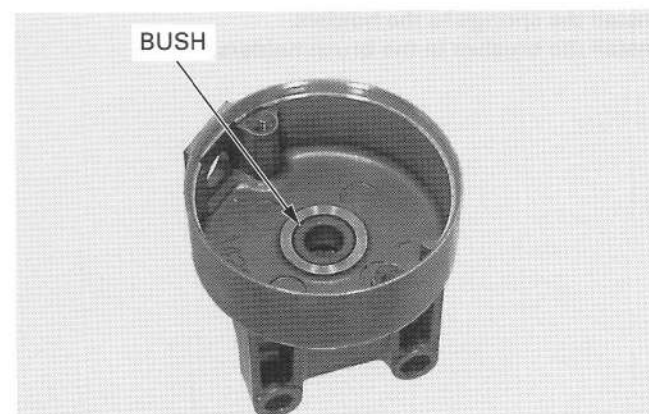


Disassemble the rear cover.
Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 3.5 mm (0.14 in)

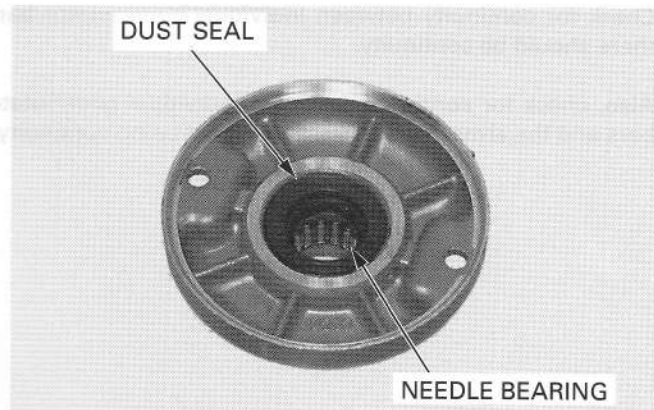


Check the bush of the rear cover for wear or damage.

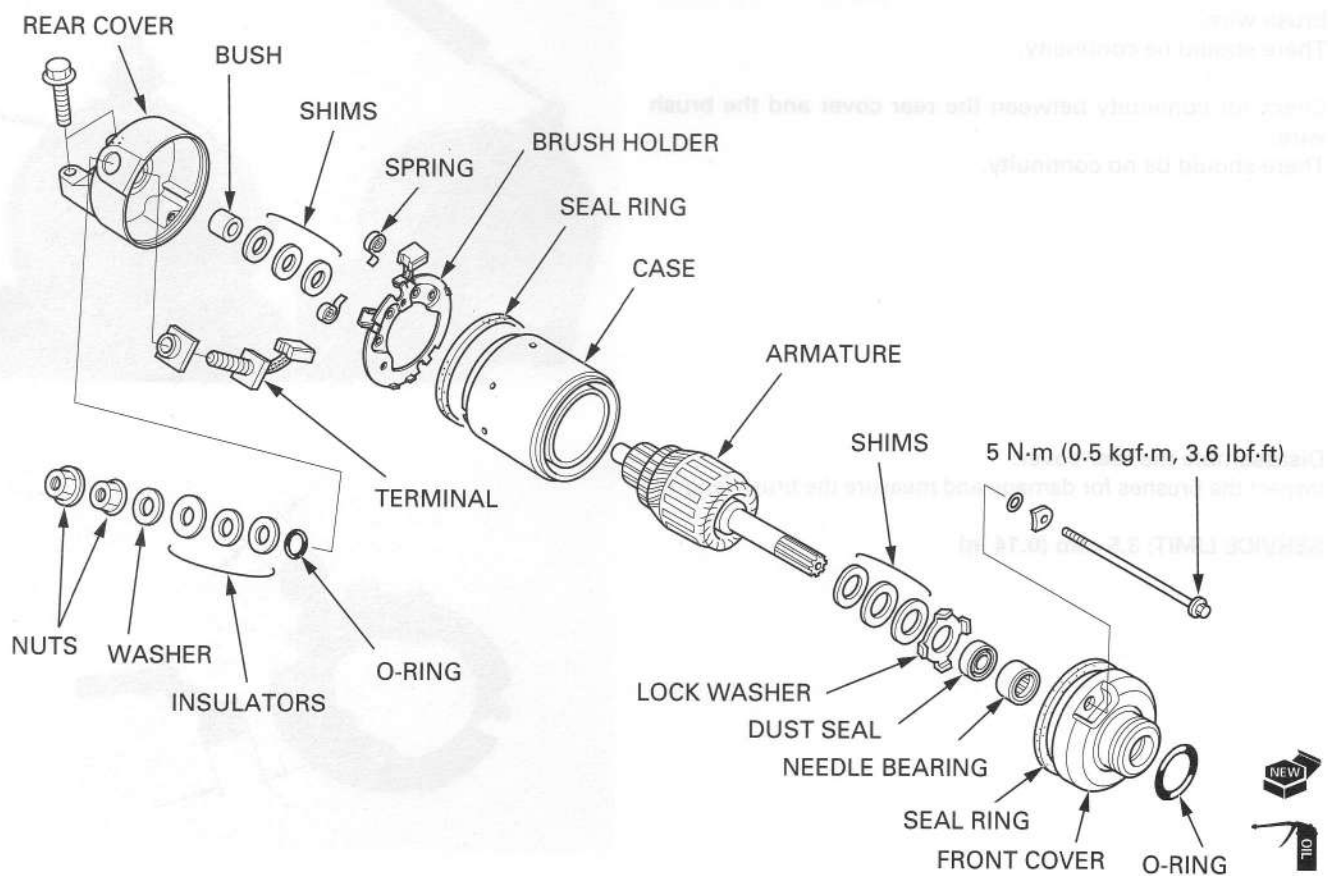


ELECTRIC STARTER/STARTER CLUTCH

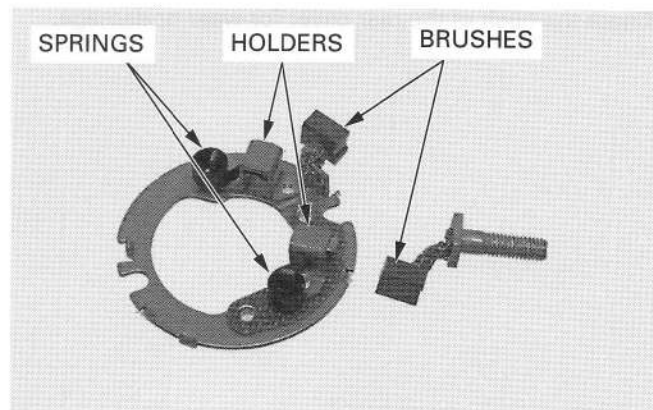
Check the needle bearing of the front cover for smooth rotation.
Check the dust seal for wear or damage.



ASSEMBLY

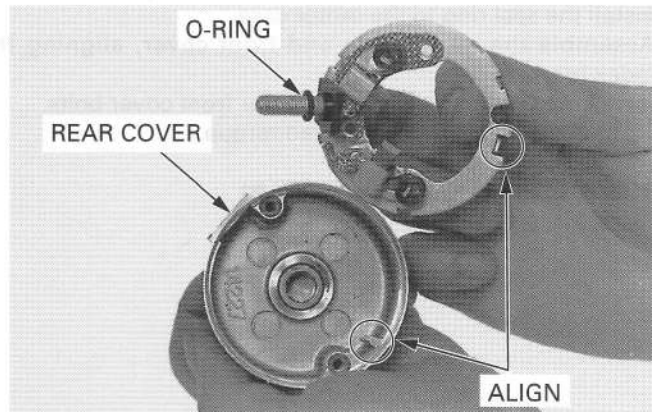


Install the springs to the holders.
Install the brushes in the brush holders.

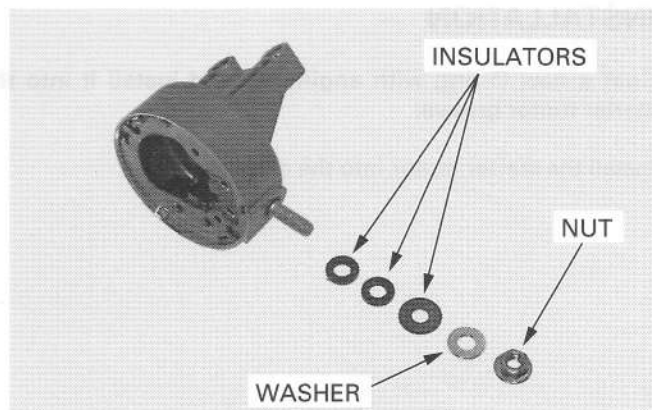


ELECTRIC STARTER/STARTER CLUTCH

Install the O-ring to the terminal bolt.
Install the brush holder assembly to the rear cover, aligning the tab of the holder with the groove of the rear cover.



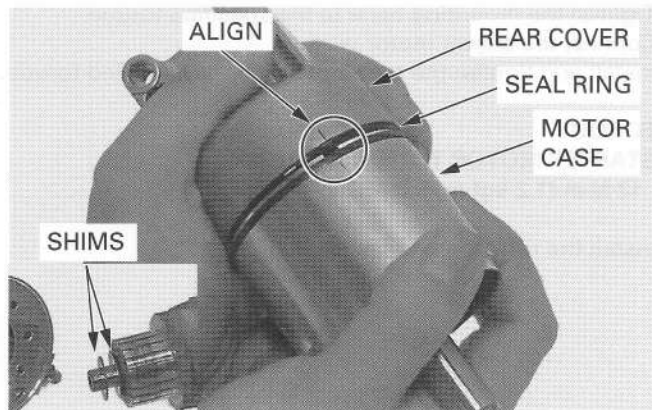
Install the insulators, washer, nut to the terminal bolt in the correct positions as recorded.



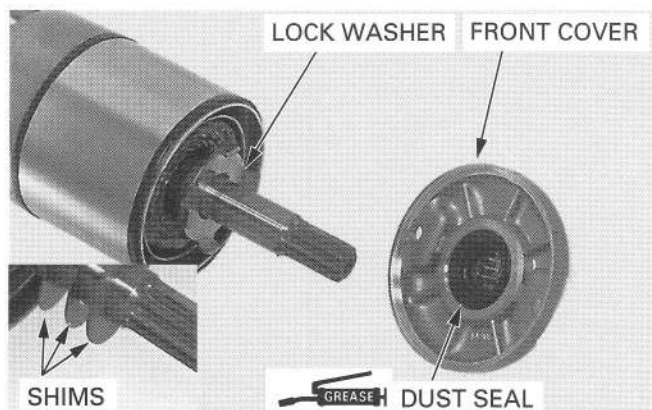
Install the shims to the armature.
Install the armature into the motor case.
Install the seal ring on the motor case.
Assemble the motor case and rear cover, aligning the index marks.

NOTE:

Hold the armature coil shaft, or armature might be drawn out by the magnetic field.



Apply grease to the dust seal of the front cover.
Install the lock washer to the cover, shims to the shaft in the correct positions as recorded, and seal ring to the case.



ELECTRIC STARTER/STARTER CLUTCH

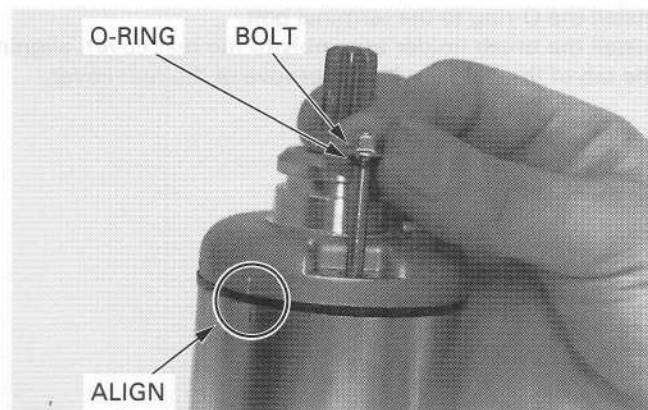
Install the seal ring to the motor case.

Assemble the motor case and front cover, aligning the index marks.

Install the O-ring to the starter motor front cover bolts.

Tighten the bolts to the specified torque.

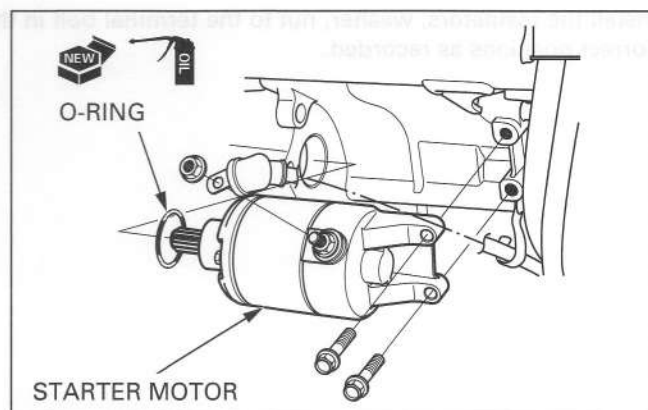
TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)



INSTALLATION

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

Install the starter motor into the crankcase.



Tighten the mounting bolts to the specified torque.

Connect the starter motor wire.

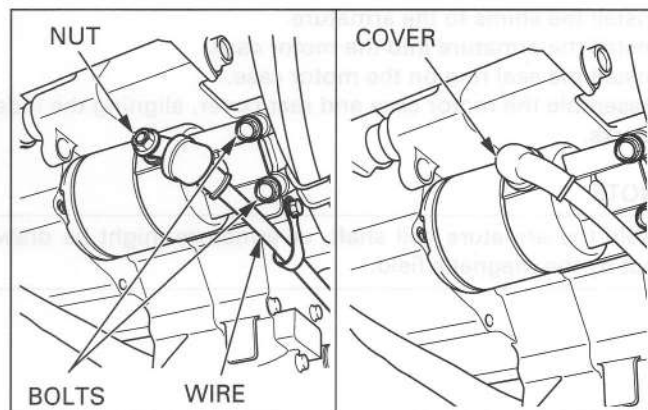
Install and tighten the terminal nut to the specified torque.

TORQUE:

STARTER MOTOR TERMINAL NUT:

12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the rubber cover securely.



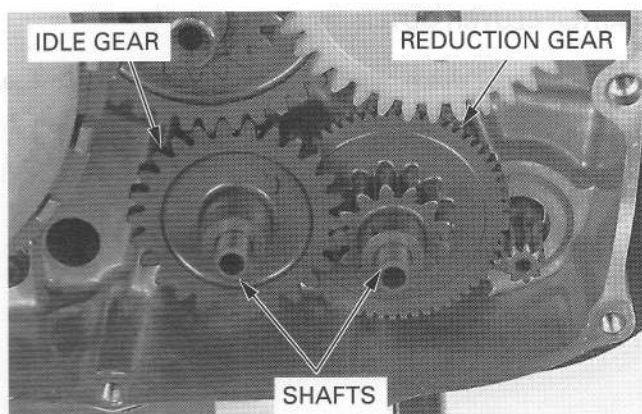
PRIMARY DRIVE GEAR/STARTER CLUTCH

REMOVAL

Remove the right crankcase cover (page 6-13).

Remove the starter idle gear and shaft.

Remove the starter reduction gear and shaft.



Remove the clutch (page 8-4).

CAUTION:

The primary gear nut has left hand threads.

Temporarily install the clutch outer.
Hold the primary drive gear using the gear holder and remove the primary drive gear nut.

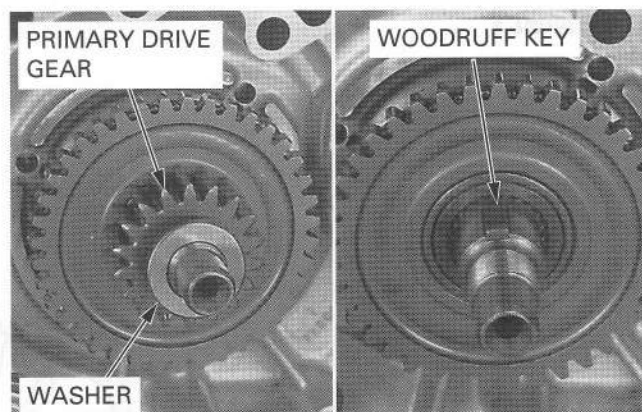
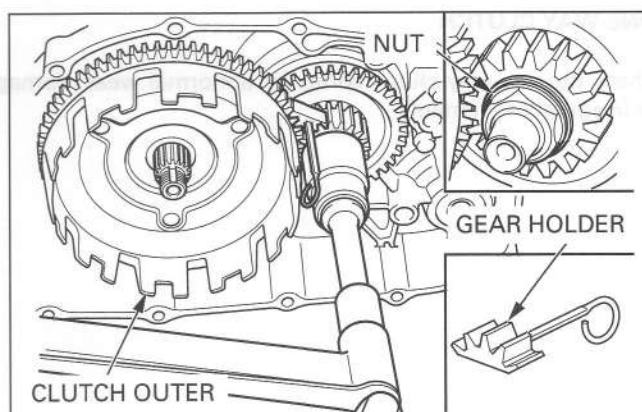
TOOL:

Gear holder 07724 - 0010200

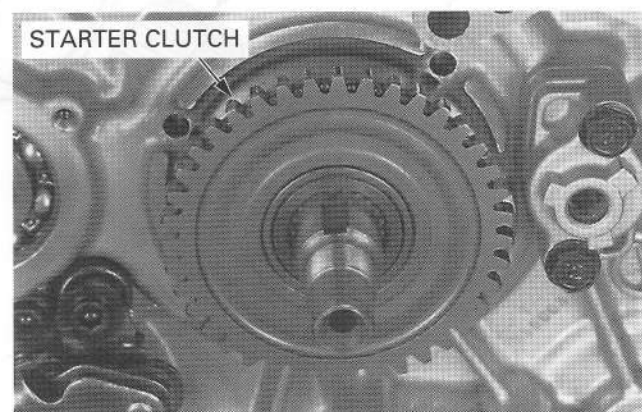
Remove the clutch outer.

Remove the washer and primary drive gear.

Remove the woodruff key from the crankshaft.



Remove the starter clutch.



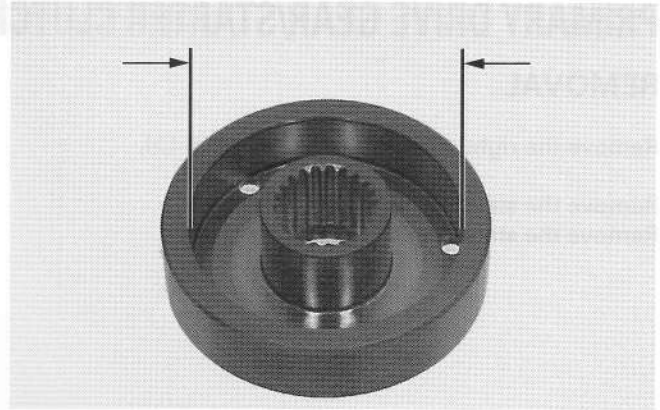
ELECTRIC STARTER/STARTER CLUTCH

STARTER CLUTCH OUTER

Check the starter clutch outer for abnormal wear, or damage.

Measure the starter clutch outer I.D.

SERVICE LIMIT: 62.33 mm (2.454 in)

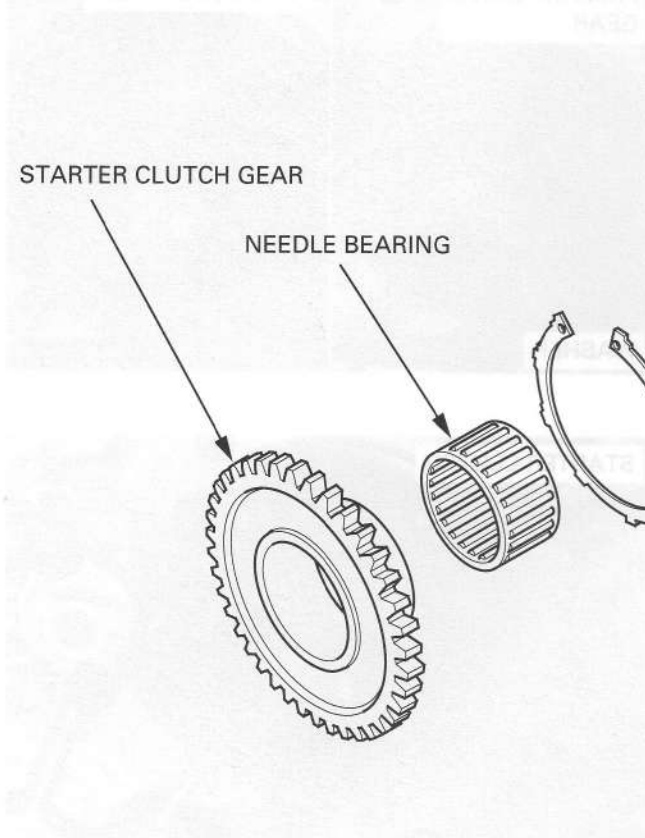


ONE-WAY CLUTCH

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

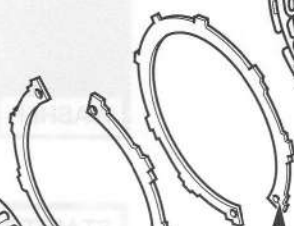


ASSEMBLY

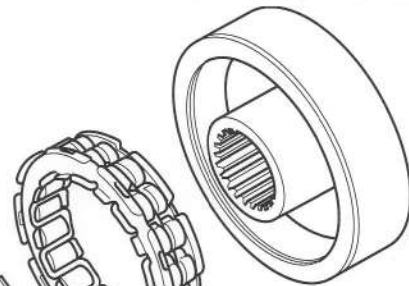


STARTER CLUTCH GEAR

NEEDLE BEARING



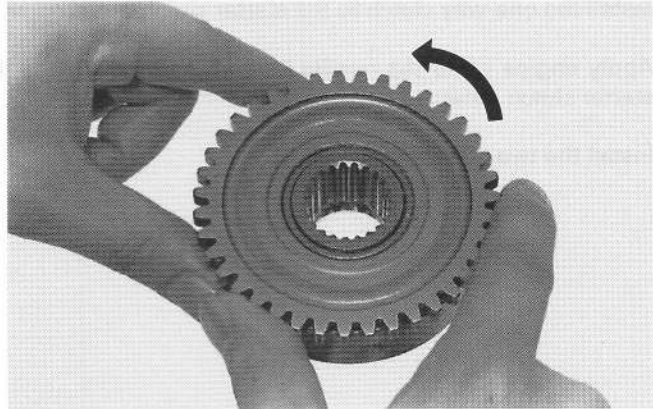
SNAP RING



ONE-WAY CLUTCH

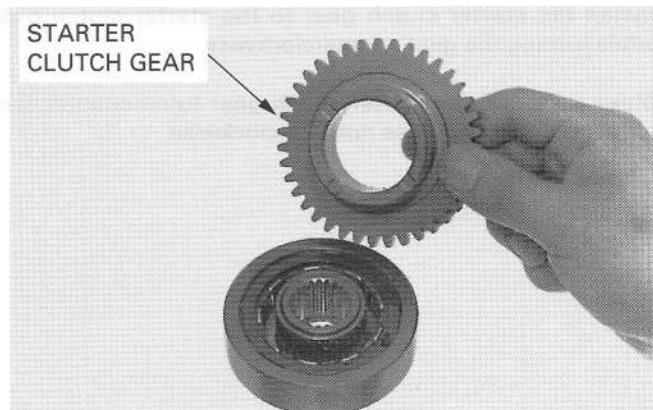
STARTER CLUTCH OUTER

Check that the starter clutch gear turns counterclockwise smoothly and does not turn clockwise.



STARTER CLUTCH DISASSEMBLY

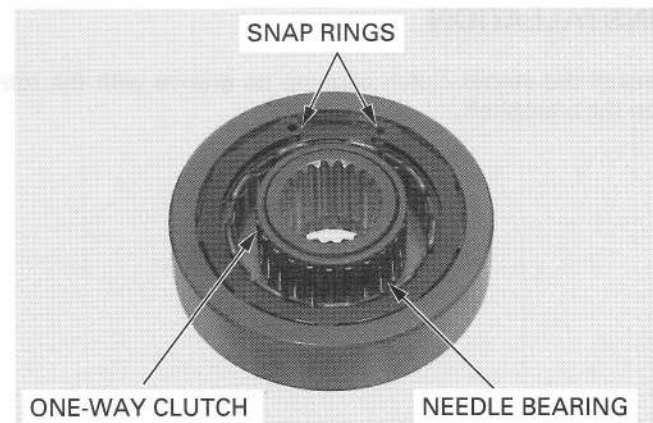
Remove the starter clutch gear while turning it counterclockwise



Remove the needle bearing.
Remove the two snap rings.
Remove the one-way clutch from the starter clutch outer.

NOTE:

Do not remove the one-way clutch from the clutch outer unless it is necessary to replace with new one.



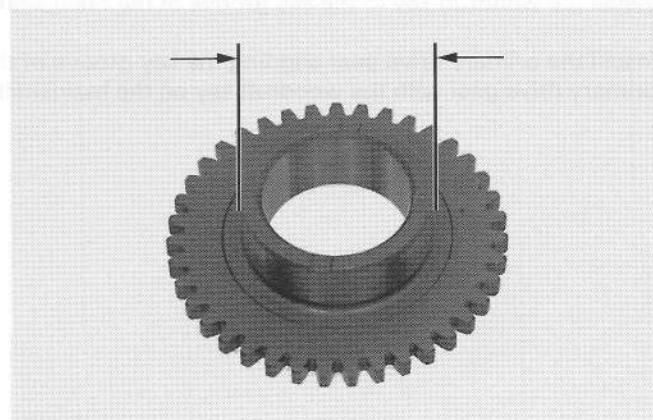
INSPECTION

STARTER CLUTCH GEAR

Check the starter clutch gear.

Measure the starter clutch gear O.D.

SERVICE LIMIT: 45.64 mm (1.797 in)

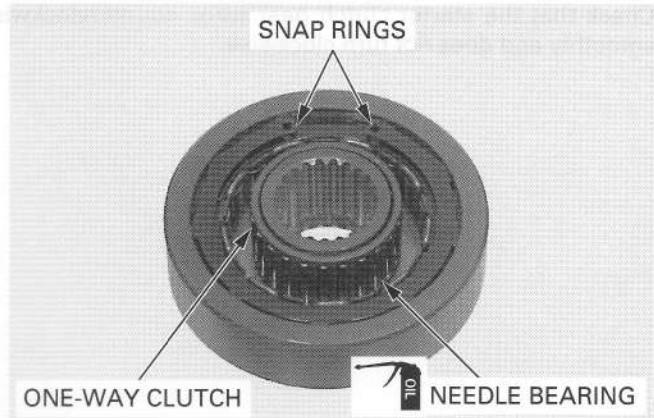


ELECTRIC STARTER/STARTER CLUTCH

Install the one-way clutch to the starter clutch outer.

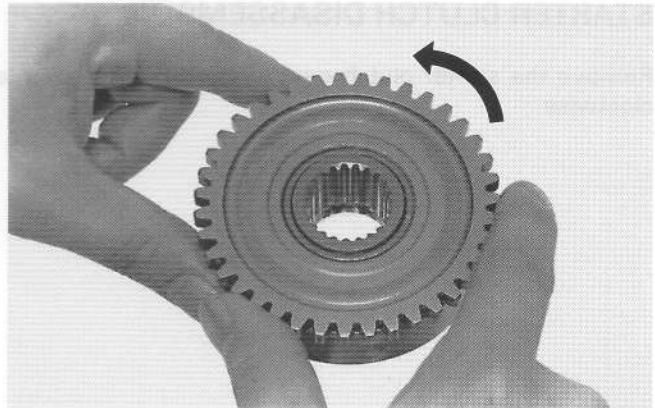
Apply engine oil to the needle bearing and install it to the starter clutch outer.

Install the two snap rings.



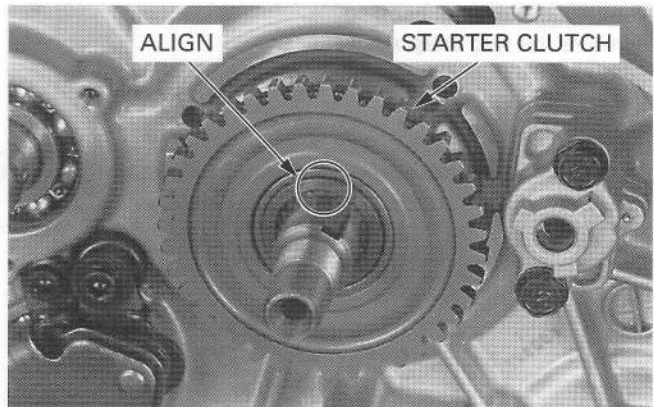
Install the starter clutch gear to the starter clutch outer while turning the gear counterclockwise.

Make sure that the starter clutch gear turns counterclockwise smoothly and does not turn clockwise.



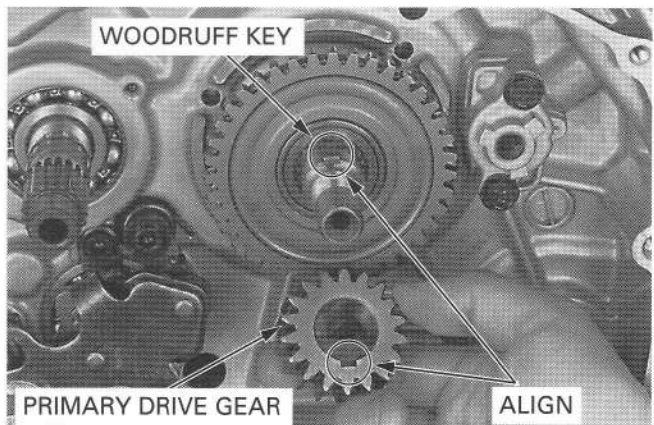
INSTALLATION

Install the starter clutch aligning its groove with the tooth on the crankshaft.



Install the woodruff key to the key groove of the main shaft.

Install the primary drive gear aligning the key groove of the primary drive gear with the woodruff key on the mainshaft.



ELECTRIC STARTER/STARTER CLUTCH

Install the washer.

Apply the engine oil to the threads and seating surface of a primary drive gear nut.

Temporarily install the clutch outer.

Hold the primary drive gear using a gear holder and tighten the nut to the specified torque.

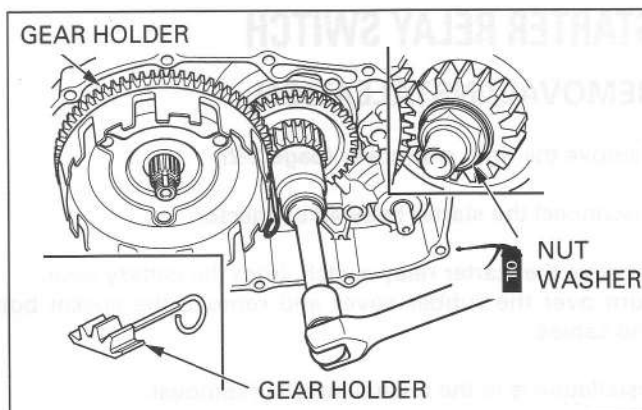
TOOL:

Gear holder

07724 - 0010200

TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

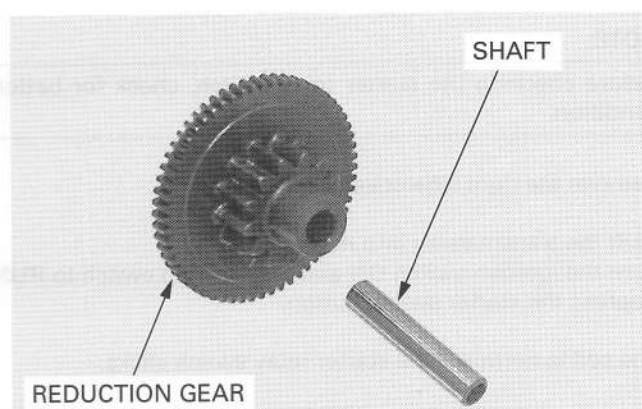
Install the clutch (page 8-8).



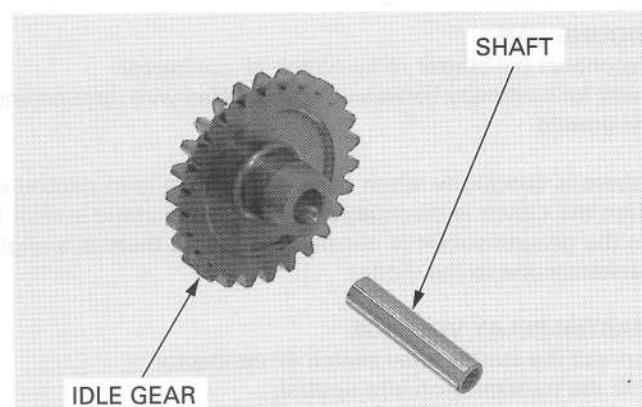
Check the starter reduction gear, shaft and journal for wear or damage.

NOTE:

The primary drive gear nut has left hand threads.



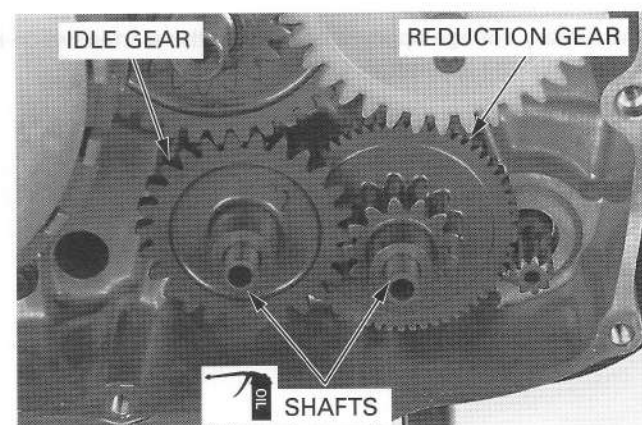
Check the starter idle gear, shaft and journal for wear or damage.



Apply engine oil to the starter reduction gear, starter idle gear and shafts.

Install the starter reduction gear, starter idle gear and shafts to the right crankcase.

Install the right crankcase cover (page 6-18).



ELECTRIC STARTER/STARTER CLUTCH

STARTER RELAY SWITCH

REMOVAL/INSTALLATION

Remove the right side cover (page 2-2).

Disconnect the starter relay 4P connector.

Remove the starter relay switch, from the battery case.
Turn over the rubber cover and remove the socket bolts and cables.

Installation is in the reverse order of removal.

INSPECTION

NOTE:

Before checking the starter relay switch, check for battery condition.

Remove the right side cover (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch ON and engine stop switch to RUN.
Depress the starter switch button.

The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.

GROUND LINE

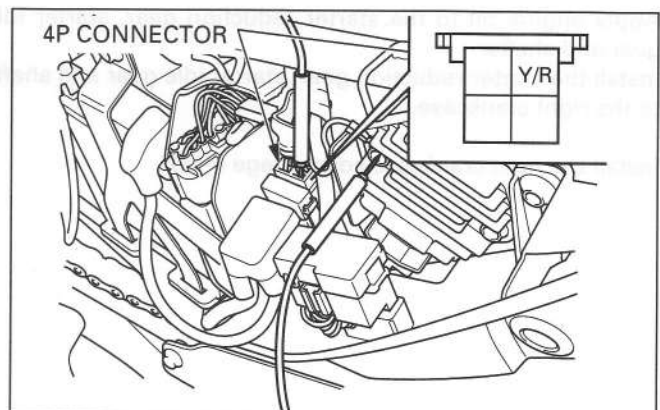
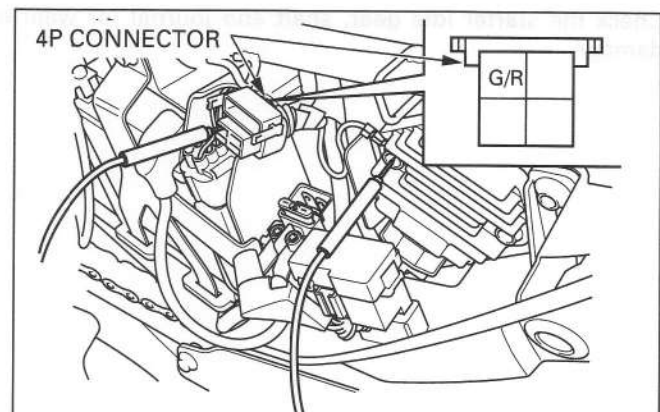
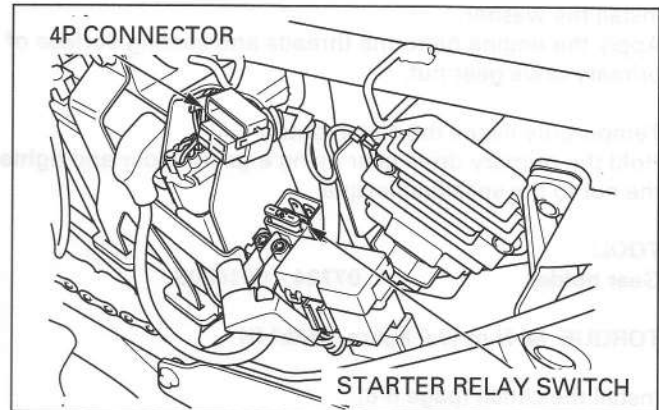
Disconnect the starter relay switch 4P connector.
Check for continuity between the Green/Red wire (ground line) and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is up, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).

STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Measure the voltage between the Yellow/Red (+) wire and ground at the starter relay switch 4P connector.

If the battery voltage appears only when the starter switch is pressed with the ignition switch ON, it is normal.

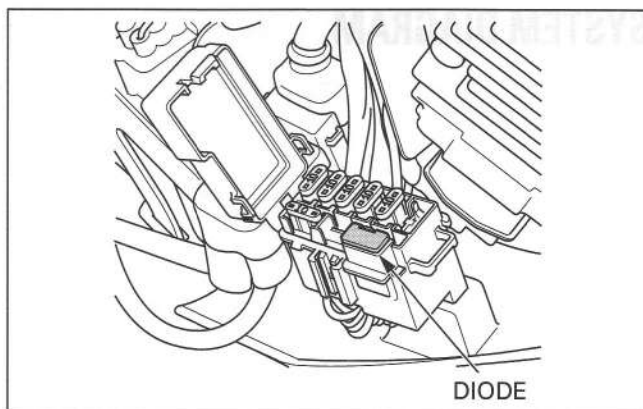


CLUTCH DIODE

INSPECTION

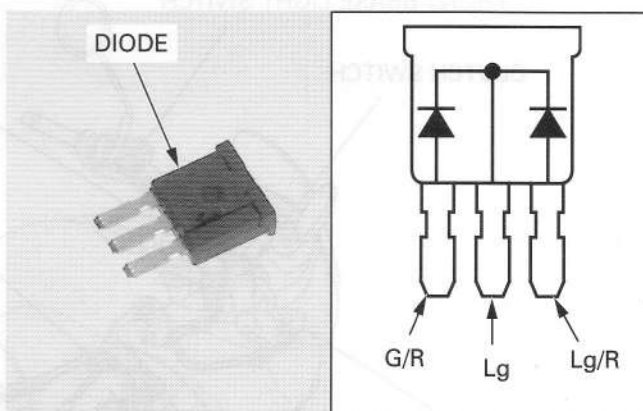
Remove the right side cover (page 2-2).

Open the fuse box and remove the diode.

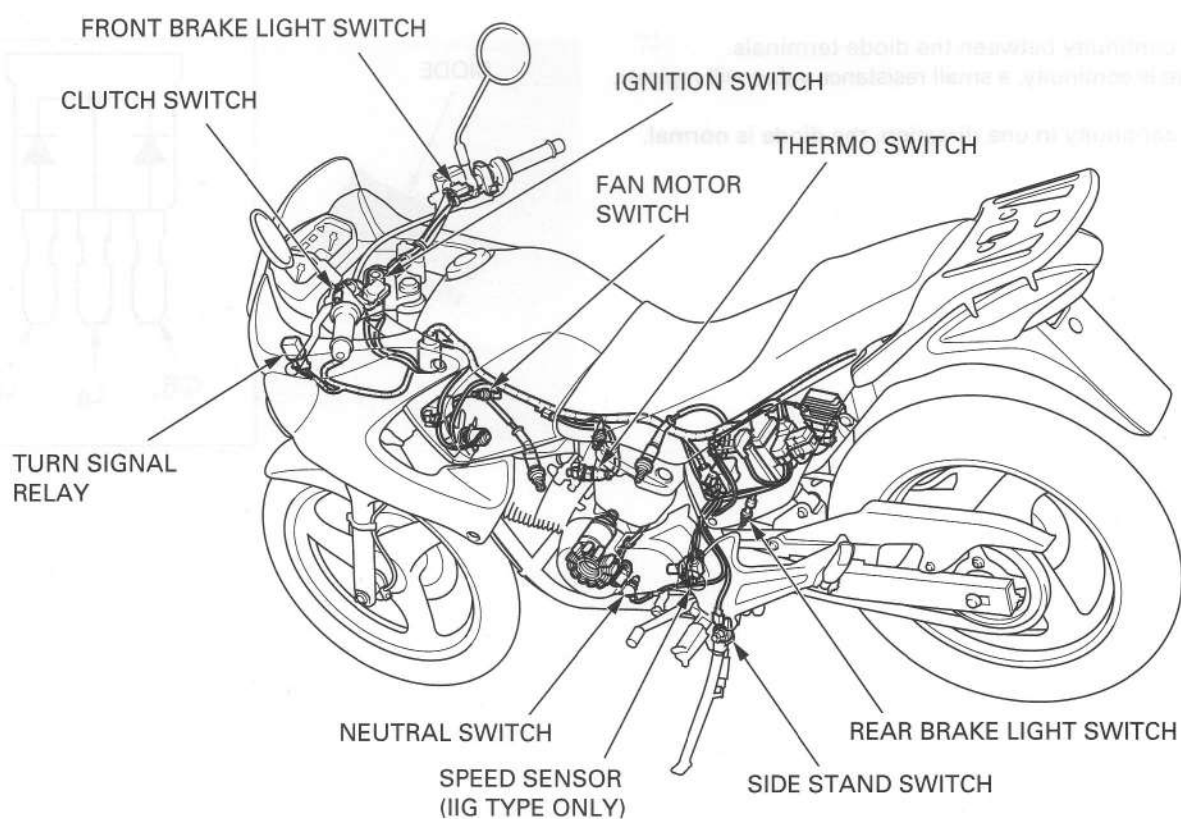


Check for continuity between the diode terminals.
When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



SYSTEM DIAGRAM



18. LIGHTS/METERS/SWITCHES

SYSTEM DIAGRAM	18-0	CLUTCH SWITCH	18-11
SERVICE INFORMATION	18-1	NEUTRAL SWITCH	18-11
TROUBLESHOOTING	18-3	HORN	18-11
BULB REPLACEMENT	18-4	FAN MOTOR SWITCH	18-12
COMBINATION METER	18-5	COOLANT TEMPERATURE	
SPEED SENSOR	18-7	INDICATOR THERMO SWITCH	18-13
TACHOMETER	18-7	TURN SIGNAL RELAY	18-15
IGNITION SWITCH	18-8	SIDE STAND SWITCH	18-15
HANDLEBAR SWITCHES	18-9	SPEED SENSOR	
BRAKE LIGHT SWITCH	18-10	(IIG TYPE ONLY)	18-16

SERVICE INFORMATION

GENERAL

⚠ WARNING

- A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.
- Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.

- Note the following when replacing the halogen headlight bulb.
 - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
 - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12 V – 35/35 W x 2
	Position light	12 V – 5 W x 2
	Brake/tail/license light	12 V – 21/5 W
	Front turn signal light	12 V – 10 W x 2
	Rear turn signal light	12 V – 10 W x 2
	Instrument light	12 V – 1.7 W x 3
	Turn signal indicator	12 V – 2 W x 2
	High beam indicator	12 V – 1.2 W
	Neutral indicator	12 V – 2 W
	Temp indicator	12 V – 1.7 W
Fuse	Main fuse	30 A
	Sub fuse	10 A x 5
Thermo switch	OFF → ON	112 – 118°C (234 – 444°F)
	ON → OFF	Below 108°C (226°F)

TORQUE VALUES

Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Neutral switch terminal nut	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Thermo switch	18 N·m (1.8 kgf·m, 13 lbf·ft)
Side stand pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Side stand lock nut	29 N·m (3.0 kgf·m, 22 lbf·ft)
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

TROUBLE SHOOTING

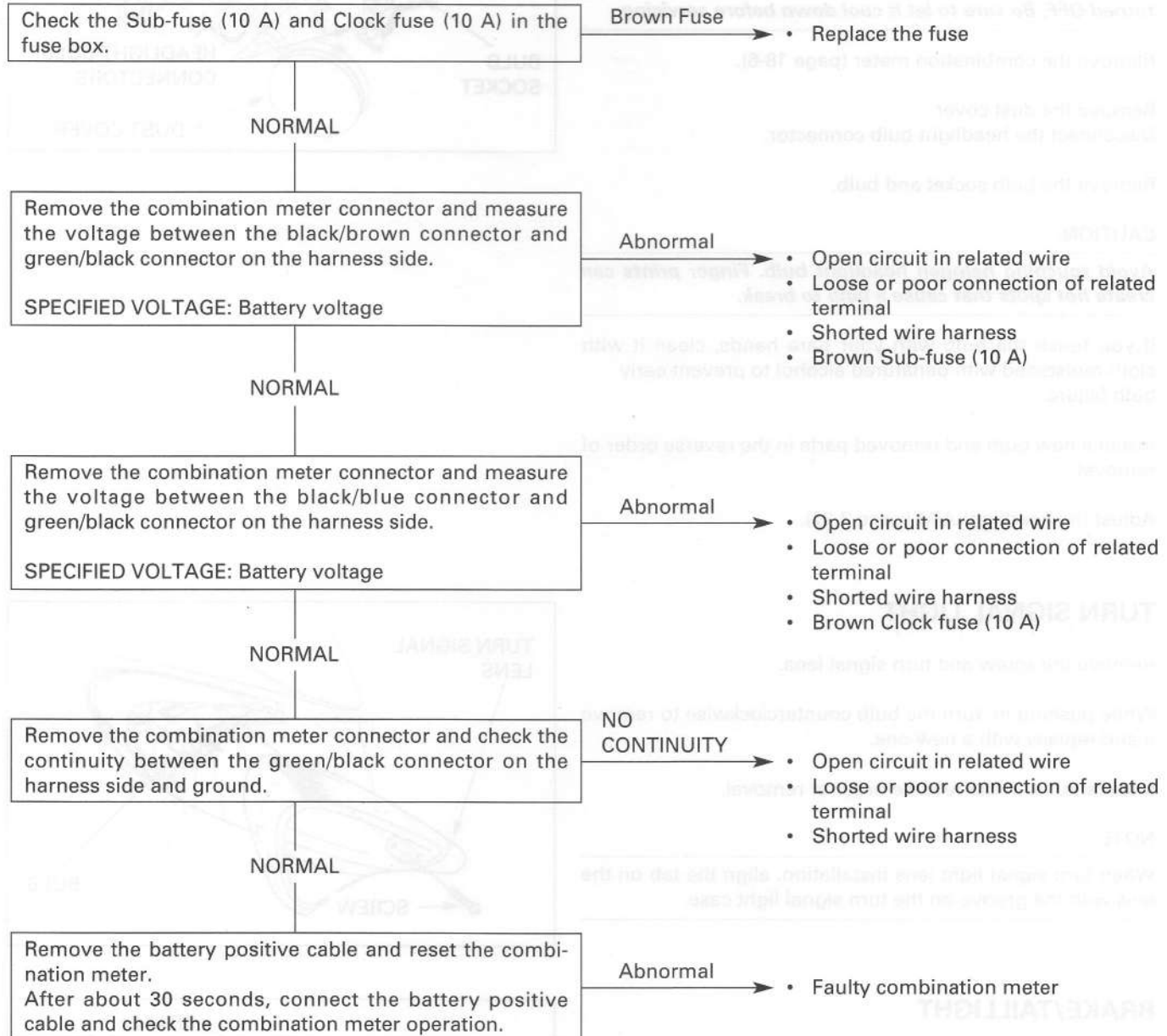
COMBINATION METER

- Before check the combination meter, make sure the battery, Sub-fuse (10 A), clock (10 A), speed meter 16P connector are in good condition and connected securely.
- Turn the ignition switch ON and check the following:
 - Speed meter indicator and tachometer indicator goes back.
 - Meter display comes on.

TROUBLESHOOTING

Before combination meter inspection, make sure the following.

- Indicator bulbs not blown (Indicator bulb replacement/see page 18-4).
- Speed sensor is normal (Speed sensor inspection/see page 18-7).
- Tachometer is normal (Tachometer inspection/see page 18-7).



BULB REPLACEMENT

HEADLIGHT

⚠ WARNING

A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

Remove the combination meter (page 18-6).

Remove the dust cover.

Disconnect the headlight bulb connector.

Remove the bulb socket and bulb.

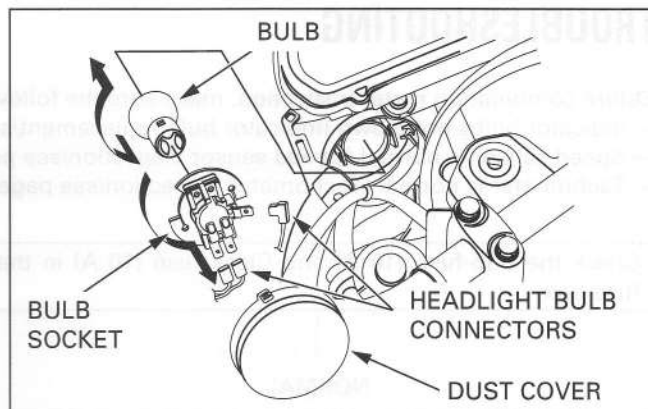
CAUTION:

Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

Install a new bulb and removed parts in the reverse order of removal.

Adjust the headlight AIM (page 3-22).



TURN SIGNAL LIGHT

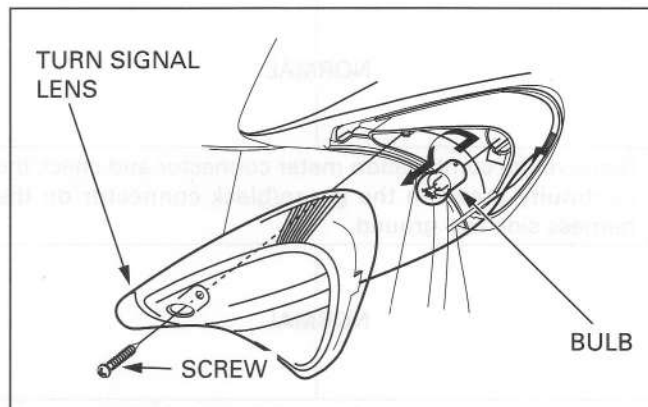
Remove the screw and turn signal lens.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Installation is in the reverse order of removal.

NOTE:

When turn signal light lens installation, align the tab on the lens with the groove on the turn signal light case.



BRAKE/TAILLIGHT

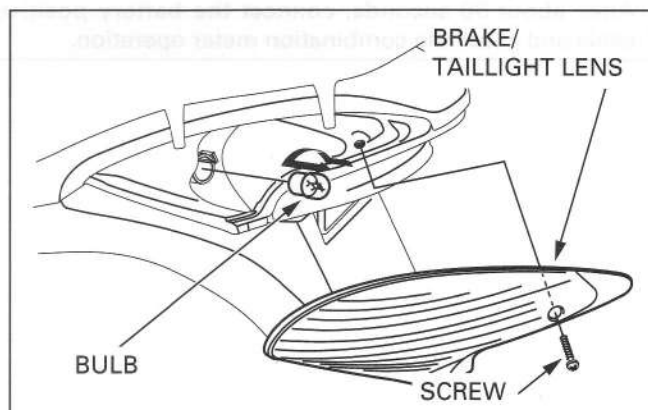
Remove the screws and brake/taillight lens.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Installation is in the reverse order of removal.

NOTE:

Seat the rubber packing properly.



INDICATOR AND METER LIGHT

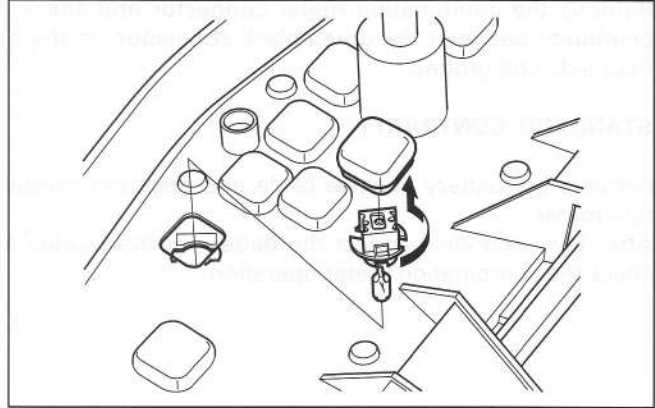
Remove the combination meter (page 18-6).

Remove the indicator and meter light bulb socket from the combination meter.

Replace and install the bulb in the reverse order of removal.

NOTE:

When turn signal light lens installation, align the tab on the lens with the groove on the turn signal light case.



COMBINATION METER

INSPECTION

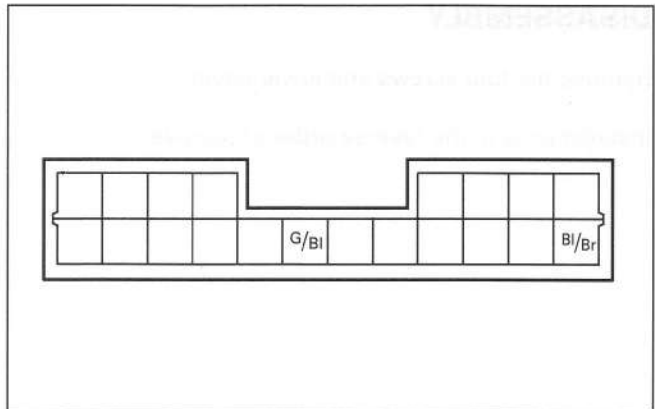
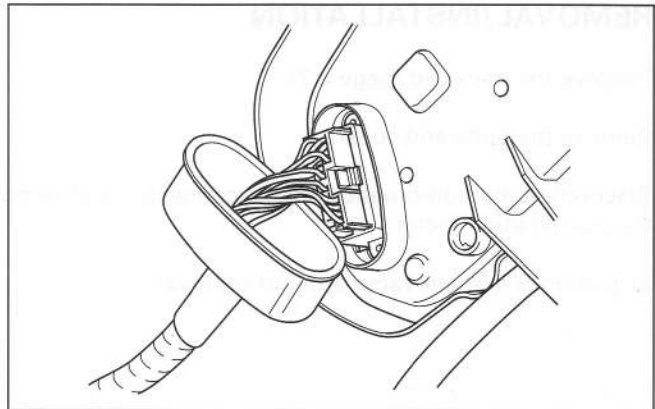
Before combination meter inspection, make sure the following.

- Indicator bulbs not blown
(Indicator bulb replacement/see page 18-4).
- Speed sensor is normal
(Speed sensor inspection/see page 18-7).
- Tachometer is normal
(Tachometer inspection/see page 18-7).

Check the main fuse (30 A), sub-fuse (10 A) and clock fuse (10 A).

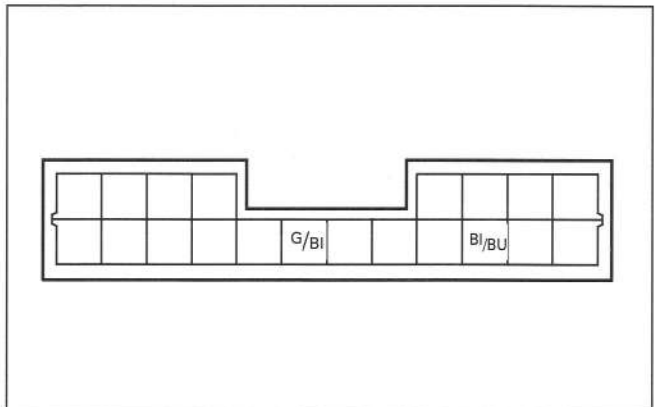
Remove the combination meter connector and measure the voltage between the black/blown connector and green/black connector on the harness side.

STANDARD: Battery voltage



Remove the combination meter connector and measure the voltage between the black/blue connector and green/black connector on the harness side.

STANDARD: Battery voltage



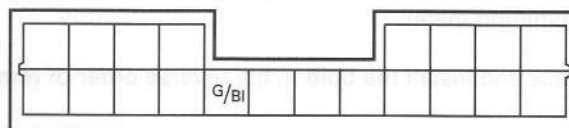
LIGHTS/METERS/SWITCHES

Remove the combination meter connector and check the continuity between the green/black connector on the harness side and ground.

STANDARD: CONTINUITY

Remove the battery positive cable and reset the combination meter.

After few seconds, connect the battery positive cable and check the combination meter operation.



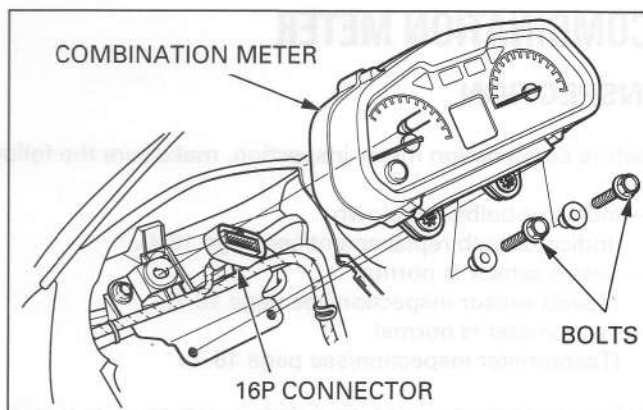
REMOVAL/INSTALLATION

Remove the meter lid (page 2-7).

Remove the bolts and collars.

Disconnect the combination meter connector and remove the combination meter.

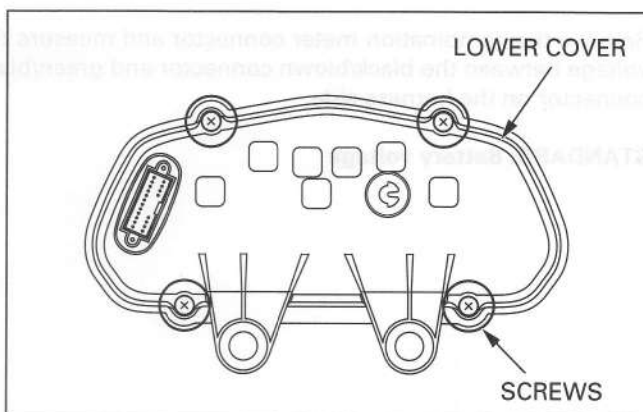
Installation is in the reverse order of removal.



DISASSEMBLY

Remove the four screws and lower cover.

Installation is in the reverse order of removal.



SPEED SENSOR

INSPECTION

Remove the combination meter connector (page 18-6).

Raise and support the motorcycle using safety stand or a box.

Measure the voltage between the Black/Yellow (+) and Green/Brack (-) wire terminals of the wire harness side.

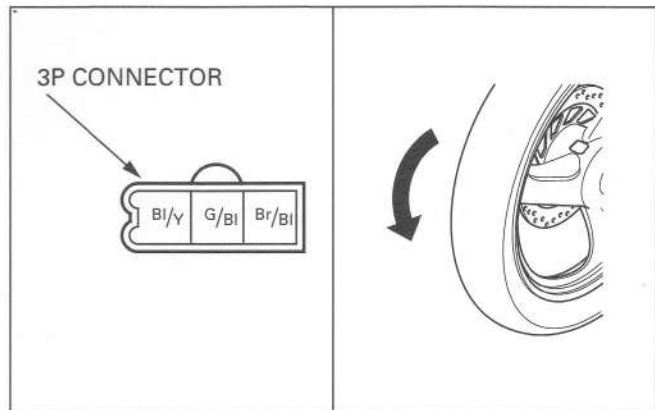
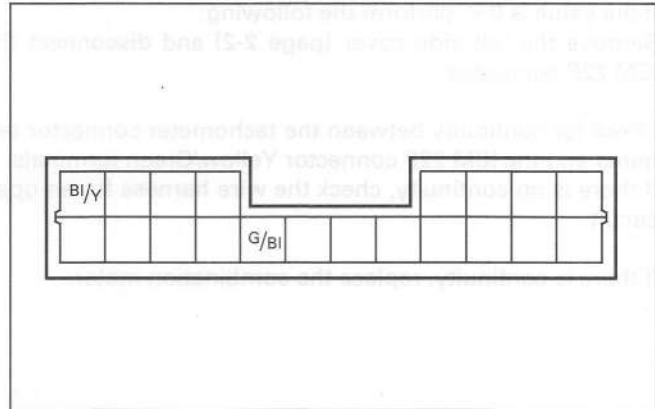
Slowly turn the front wheel by hand.

There should be pulse voltage.

If pulse voltage does not appear, check for open or short circuit in the wire harness and loose connection of the speed sensor 3P connector and combination meter connector.

If the connection of the connectors and wire harness are OK.

Replace the combination meter.



TACHOMETER

INSPECTION

Check for loose or poor contact terminals of the combination meter connectors.

Disconnect the combination meter connector, connect the peak voltage adaptor to the tachometer Yellow/Green terminal and ground.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ - 0020100
With commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

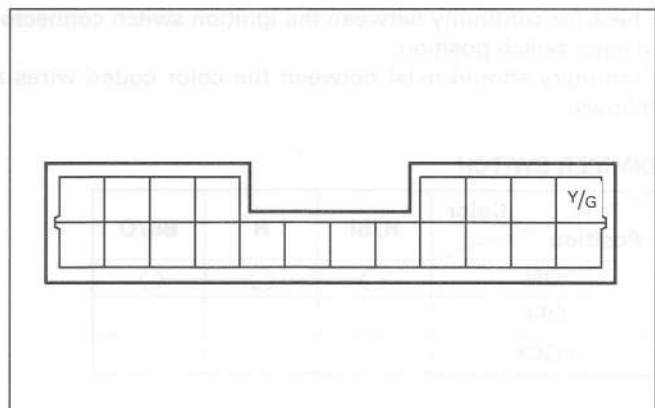
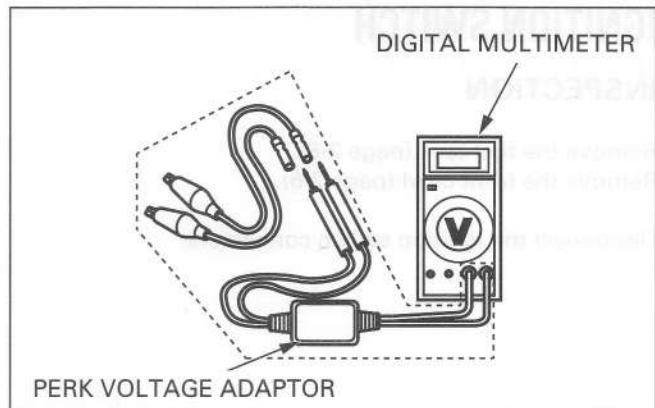
CONNECTION: Yellow/Green (+) and Ground (-)

Start the engine and measure the tachometer input voltage.

PEAK VOLTAGE: 10.5 V minimum

If the value is normal, replace the tachometer.

If the measured value is below 10.5 V, replace the ICM.



LIGHTS/METERS/SWITCHES

If the value is 0 V, perform the following:

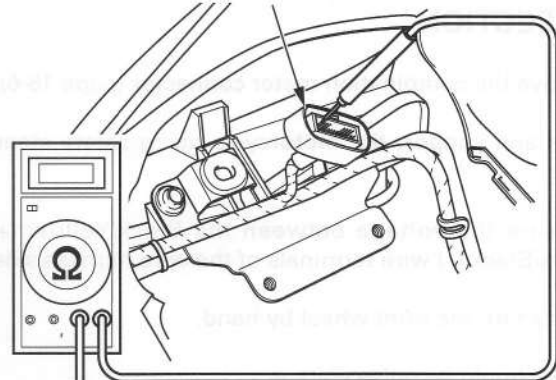
Remove the left side cover (page 2-2) and disconnect the ICM 22P connector.

Check for continuity between the tachometer connector terminal and the ICM 22P connector Yellow/Green terminals.

If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the combination meter.

6P (NATURAL) CONNECTOR



ICM MULTI-CONNECTOR

IGNITION SWITCH

INSPECTION

Remove the fuel tank (page 2-8).

Remove the front cowl (page 2-6).

Disconnect the ignition switch connectors.

CONNECTOR

Check for continuity between the ignition switch connectors in each switch position.

Continuity should exist between the color coded wires as follows:

DIMMER SWITCH

Position \ Color	R/BI	R	Bu/O
ON	○	○	○
OFF			
LOCK			

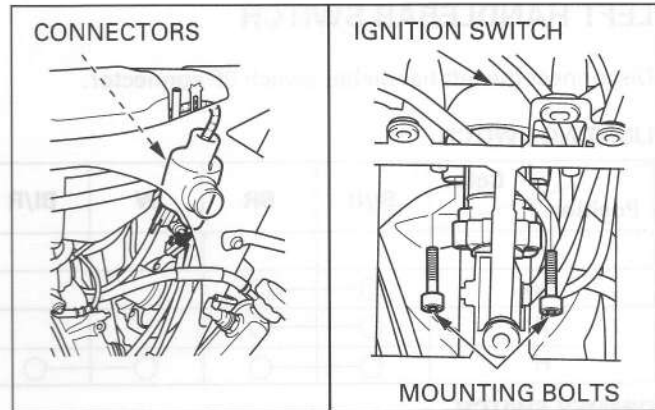
REMOVAL/INSTALLATION

Disconnect the ignition switch connectors.

Remove the two mounting bolts and the ignition switch.

Install the ignition switch and tighten the mounting bolts.

Install the removed parts.



HANDLEBAR SWITCHES

NOTE:

The handlebar switches removal/installation is refer to page 12-3.

Remove the front cowl (page 2-6).

Remove the fuel tank (page 2-8).

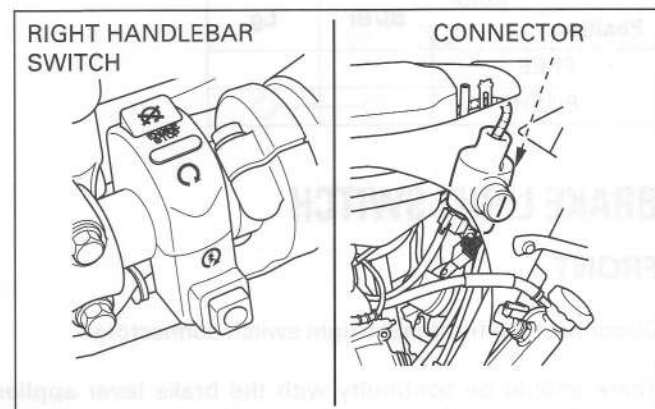
Check for continuity between the terminals.
Continuity should exist between the color code wire as shown in each chart.

RIGHT HANDLEBAR SWITCH

Disconnect the right handlebar switch 6P connector.

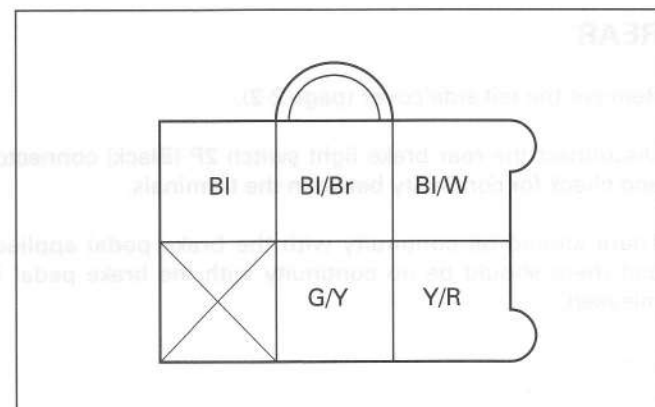
ENGINE STOP SWITCH

Position \ Color	BI/R	BI/W
OFF		
RUN	○	○



STARTER SWITCH

Position \ Color	BI/W	Y/R
FREE		
PUSH	○	○



LIGHTS/METERS/SWITCHES

LEFT HANDLEBAR SWITCH

Disconnect the left handlebar switch 9P connector.

LIGHTING SWITCH

Position \ Color	BI/R	BR	W	BI/R
•				
(N)	○	○		
P	○	○		
H	○	○	○	○

DIMMER SWITCH

Position \ Color	BI/R	W	Bu
H	○	○	
(N)	○	○	○
L	○		○

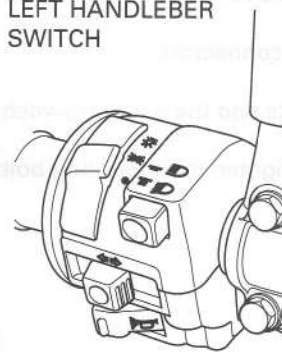
TURN SIGNAL SWITCH

Position \ Color	O	Gr	Lb
L	○	○	
(N)			
R		○	○

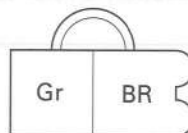
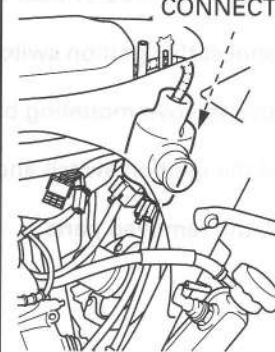
HORN SWITCH

Position \ Color	BI/Br	Lg
FREE		
PUSH	○	○

LEFT HANDLEBAR SWITCH



CONNECTOR



G/W	Lg/BI	BI/Br
G/R	Bu	W
Br	O	Lb

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors.

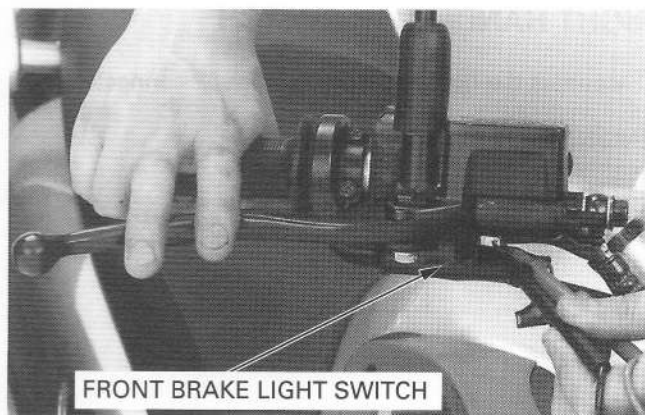
There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.

REAR

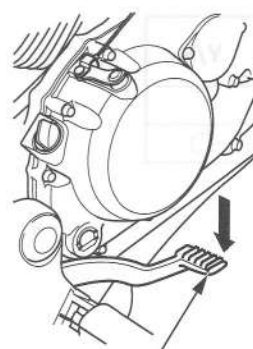
Remove the left side cover (page 2-2).

Disconnect the rear brake light switch 2P (Black) connector and check for continuity between the terminals.

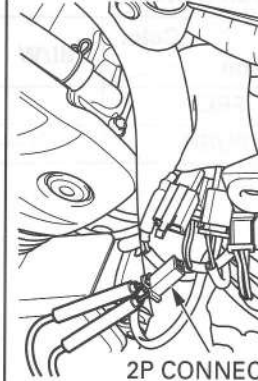
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



FRONT BRAKE LIGHT SWITCH



BRAKE PEDAL

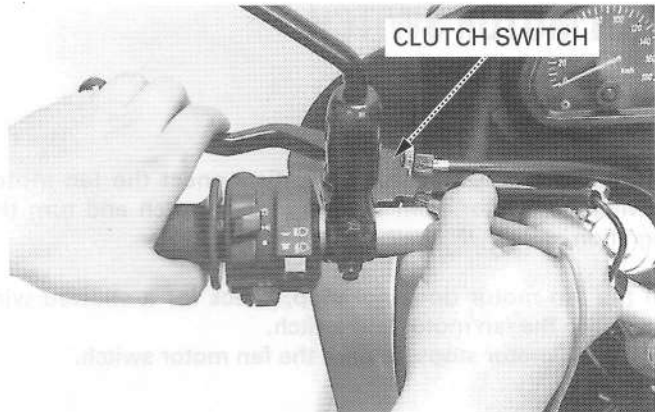


2P CONNECTOR

CLUTCH SWITCH

Disconnect the clutch switch connectors.

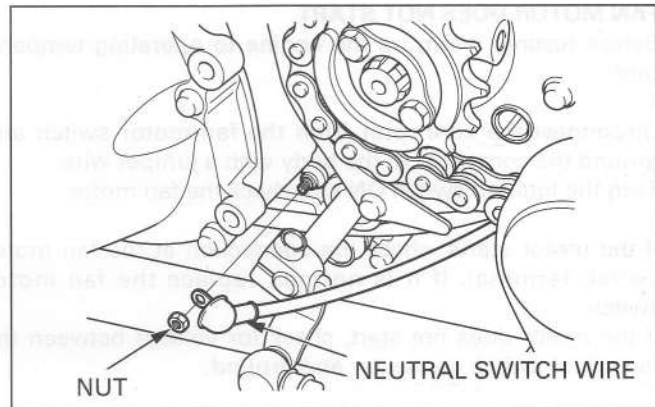
There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.



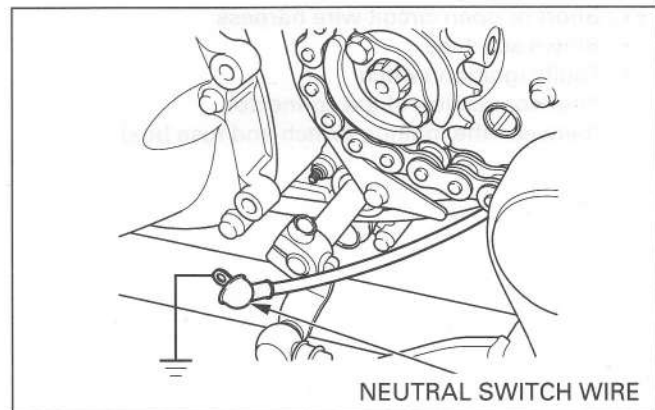
NEUTRAL SWITCH

Remove the left rear cover (page 7-3).

Disconnect the neutral switch wire.



Shift the transmission into neutral and check for continuity between the Light Green wire terminal and ground. There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.

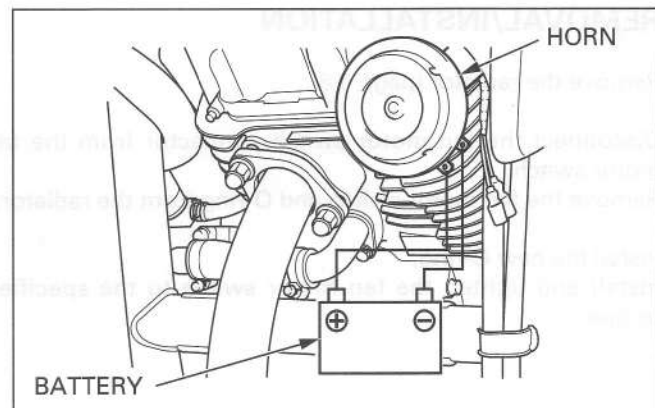


HORN

Remove the front cowl assembly (page 2-4).

Disconnect the wire connectors from the horn.

Connect the 12 V battery to the horn terminal directly. The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



FAN MOTOR SWITCH

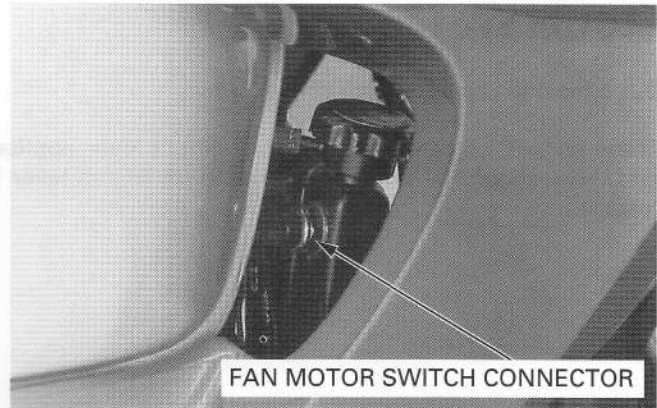
INSPECTION

FAN MOTOR DOES NOT STOP

Turn the ignition switch OFF, disconnect the fan motor switch connector from the fan motor switch and turn the ignition switch ON again.

If the fan motor does not stop, check for a shorted wire between the fan motor and switch.

If the fan motor stops, replace the fan motor switch.



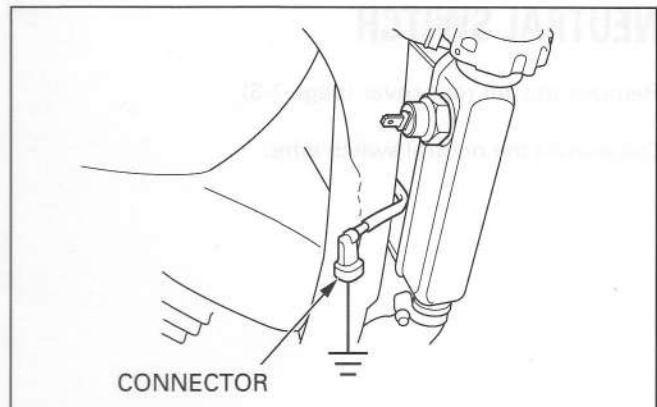
FAN MOTOR DOES NOT START

Before testing, warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector to the body with a jumper wire. Turn the ignition switch ON and check the fan motor.

If the motor starts, check the connection at the fan motor switch terminal. If it is normal, replace the fan motor switch.

If the motor does not start, check for voltage between the fan motor switch connector and ground.



— Battery voltage: Faulty fan motor

— No battery voltage:

- Short or open circuit wire harness
- Blown sub-fuse
- Faulty ignition switch
- Poor connection of the connector (between the ignition switch and fuse box)

REMOVAL/INSTALLATION

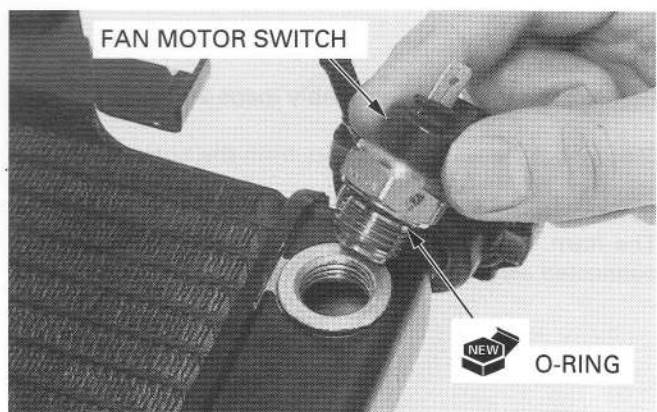
Remove the radiator (page 6-8).

Disconnect the fan motor switch connector from the fan motor switch.

Remove the fan motor switch and O-ring from the radiator.

Install the new O-ring.

Install and tighten the fan motor switch to the specified torque.



COOLANT TEMPERATURE INDICATOR THERMO SWITCH

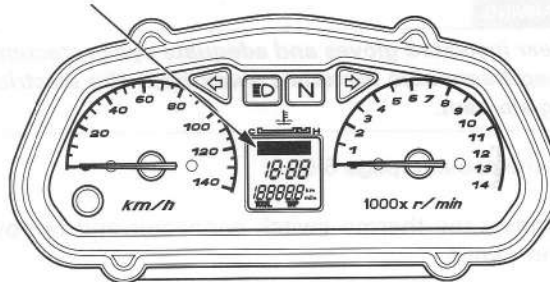
SYSTEM INSPECTION

Remove the front cowl assembly (page 2-4).

Turn the ignition switch ON.

The all segments of the coolant temperature indicator should comes on for a few seconds and it should show the present temperature.

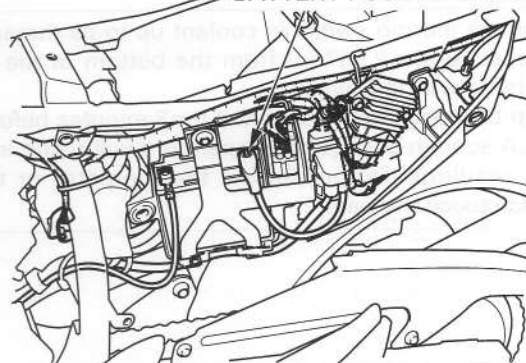
COOLANT TEMPERATURE INDINATOR



If the operation of the coolant temperature indicator is abnormal, remove the left side cover (page 2-2) and disconnect the battery positive cable.

After few seconds, connect the battery positive cable and inspect the operation of the coolant temperature indicator.

BATTERY POSITIVE CABLE



THE INDICATOR DOES NOT COME ON

Inspect the following:

- Meter fuse (15 A)
- Clock fuse (10 A)
- Combination meter 16P connector
- Related wire harness

If the above inspections are OK, faulty combination meter.

THE INDICATOR COME ON

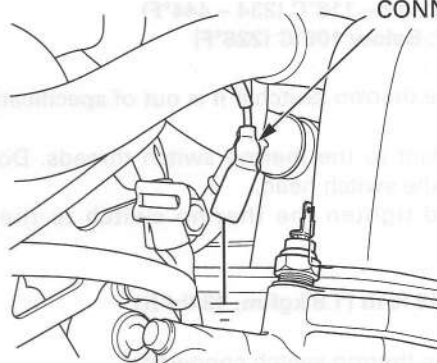
Disconnect the thermo switch connector.

Short it ground using a jumper wire, then turn the ignition switch ON.

The all segments of the coolant temperature indicator should comes on.

If the segments comes on, inspect the thermo switch (page 18-14).

CONNECTOR



THERMO SWITCH INSPECTION

⚠ WARNING

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

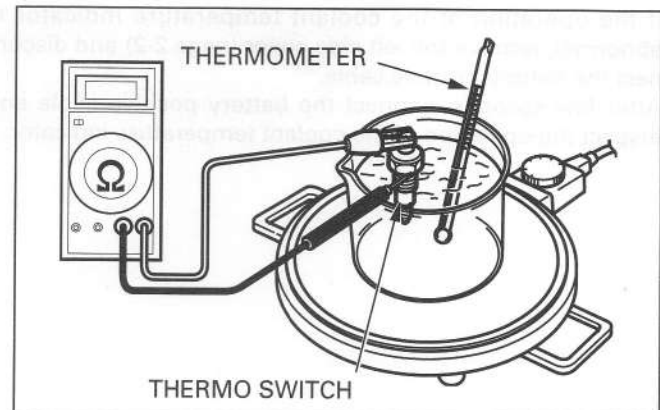
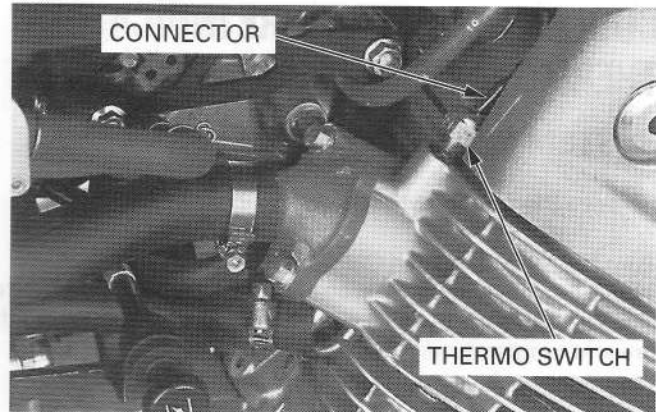
Drain the coolant (page 6-5).

Disconnect the thermo switch connector and remove the thermo switch.

Suspend the thermo switch in a pan of coolant (50 – 50 mixture) on an electric heating element and measure the resistance through the switch as the coolant heats up.

NOTE:

- Soak the thermo switch in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the switch.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or thermo switch touch the pan.



STANDARD:

OFF → ON: 112 – 118°C (234 – 444°F)

ON → OFF: Below 108°C (226°F)

Replace the thermo switch if it is out of specifications.

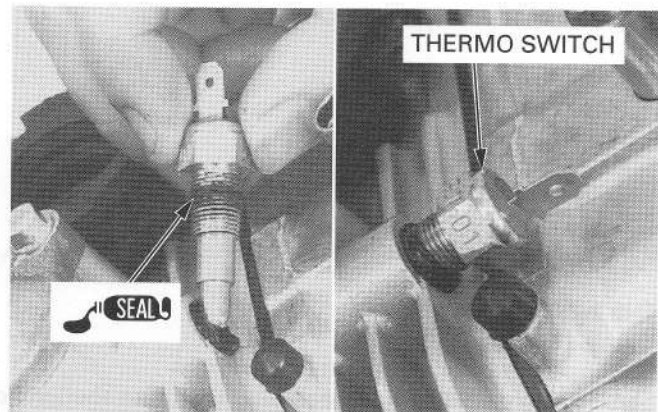
Apply sealant to the thermo switch threads. Do not apply sealant to the switch head.

Install and tighten the thermo switch to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the thermo switch connector.

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



TURN SIGNAL RELAY

INSPECTION

Check the following:

- Battery condition
- Broken indicator bulb or non-specified wattage
- Broken fuse
- Ignition switch and turn signal switch function
- Loose connectors

Remove the inner center cowl (page 2-6).

Remove the front cowl assembly (page 2-7).

If above items all normal, check the following:

Disconnect the turn signal relay connector from the relay.

Short the Gray and Black/Brown terminals of the turn signal relay connector with a jumper wire.

Turn the ignition switch ON and check the turn signal light by turning the switch ON.

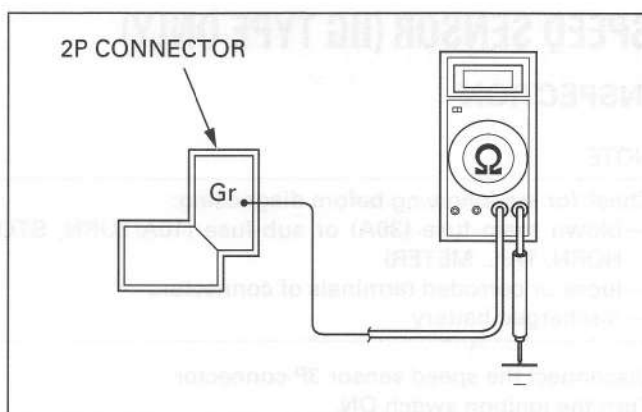
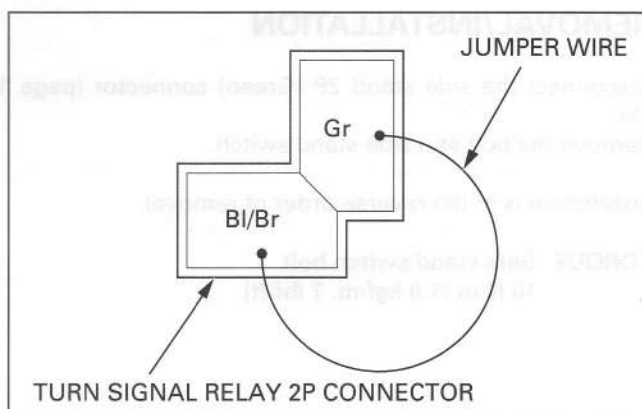
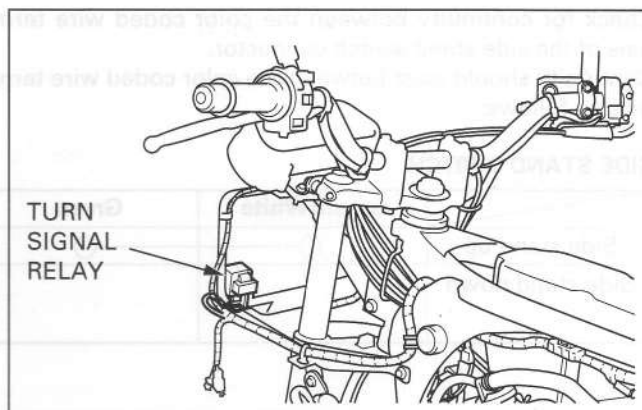
Light does not come on:

- Broken wire harness

Light comes on:

Check for continuity between the Gray terminal of the relay connector and ground.

- Continuity
 - Faulty turn signal relay
 - Poor connection of the connector
- No continuity
 - Broken Gray wire harness



SIDE STAND SWITCH

INSPECTION

Disconnect the side stand switch 2P (Green) connector.



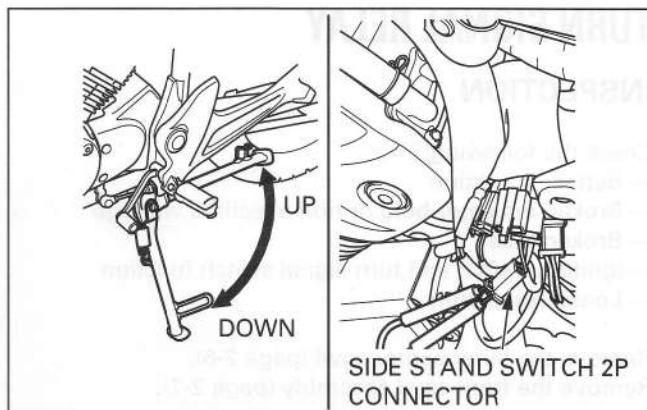
LIGHTS/METERS/SWITCHES

Check for continuity between the color coded wire terminals of the side stand switch connector.

Continuity should exist between the color coded wire terminals as follows:

SIDE STAND SWITCH

	Green/White	Green
Side stand up	○	○
Side stand down		



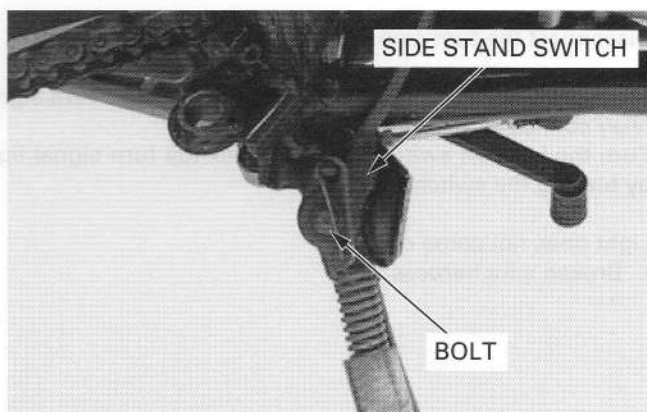
REMOVAL/INSTALLATION

Disconnect the side stand 2P (Green) connector (page 18-15).

Remove the bolt and side stand switch.

Installation is in the reverse order of removal.

TORQUE: Side stand switch bolt
: 10 N·m (1.0 kgf·m, 7 lbf·ft)



SPEED SENSOR (IIG TYPE ONLY)

INSPECTION

NOTE:

Check for the following before diagnosing:

- blown main fuse (30A) or sub-fuse (10A/TURN, STOP, HORN, TAIL, METER)
- loose or corroded terminals of connectors
- discharged battery

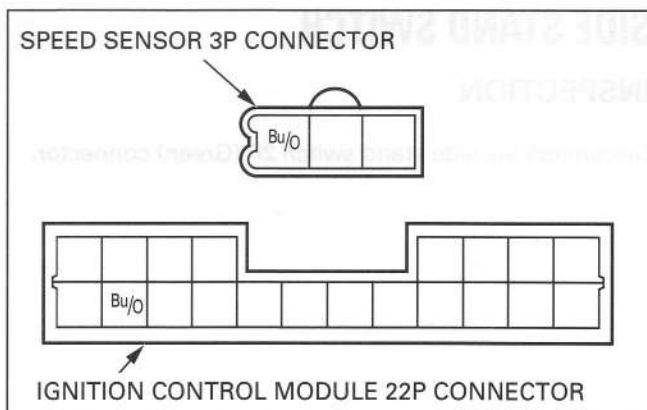
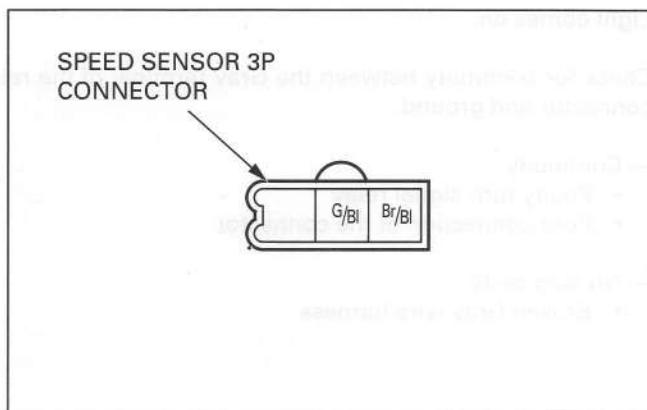
Disconnect the speed sensor 3P connector.

Turn the ignition switch ON.

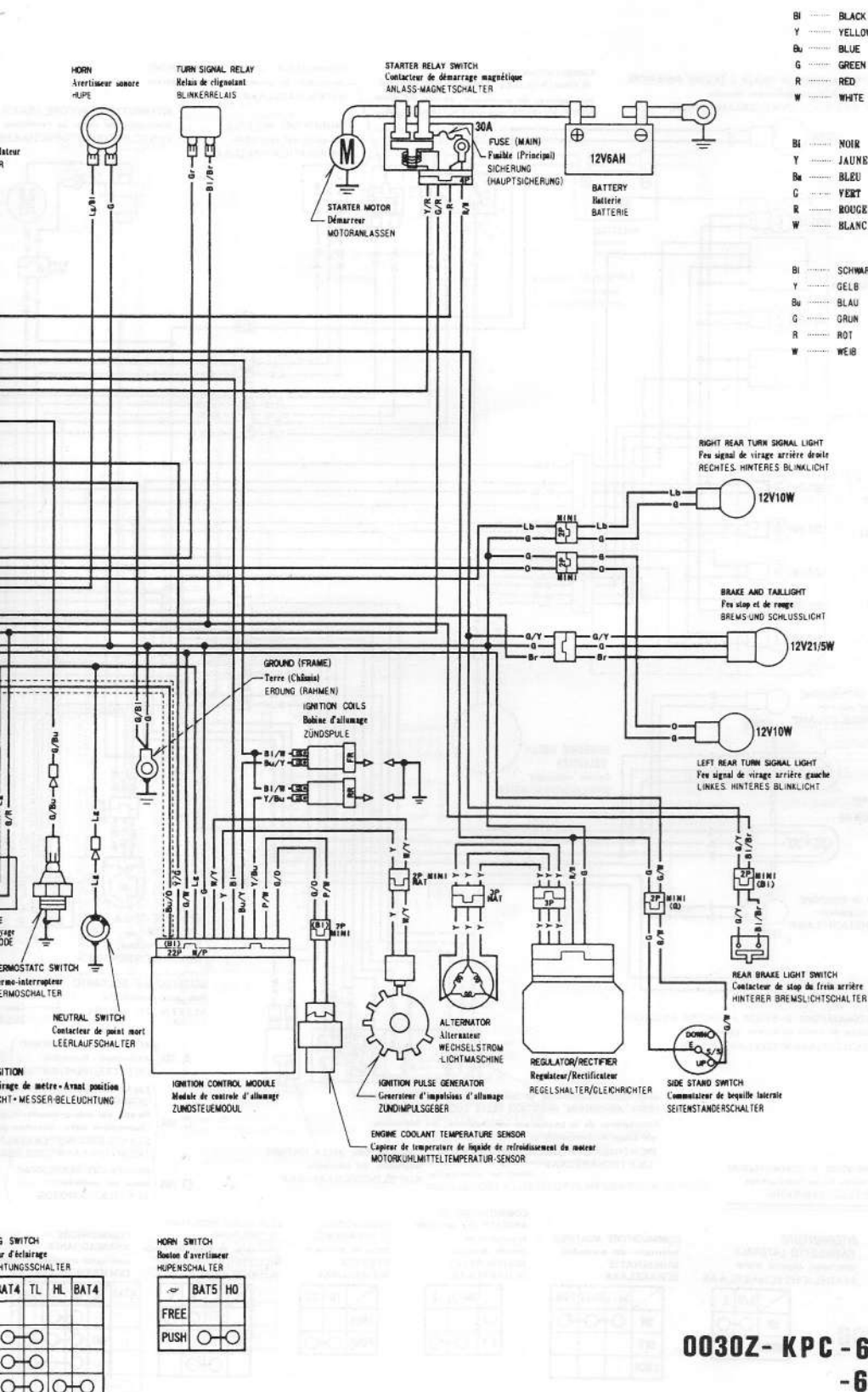
Check the voltage to between Brown/Black and Green/Black of 3P connector main wire harness side.

If there is no battery voltage, check for the blown main fuse and sub-fuse or loosen or corroded terminals of connectors or discharged battery.

Check the continuity between Blue/Orange of the speed sensor 3P connector and ignition control module 22P connector.



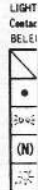
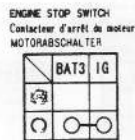
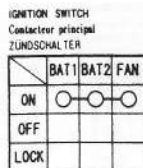
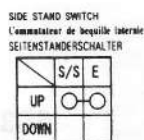
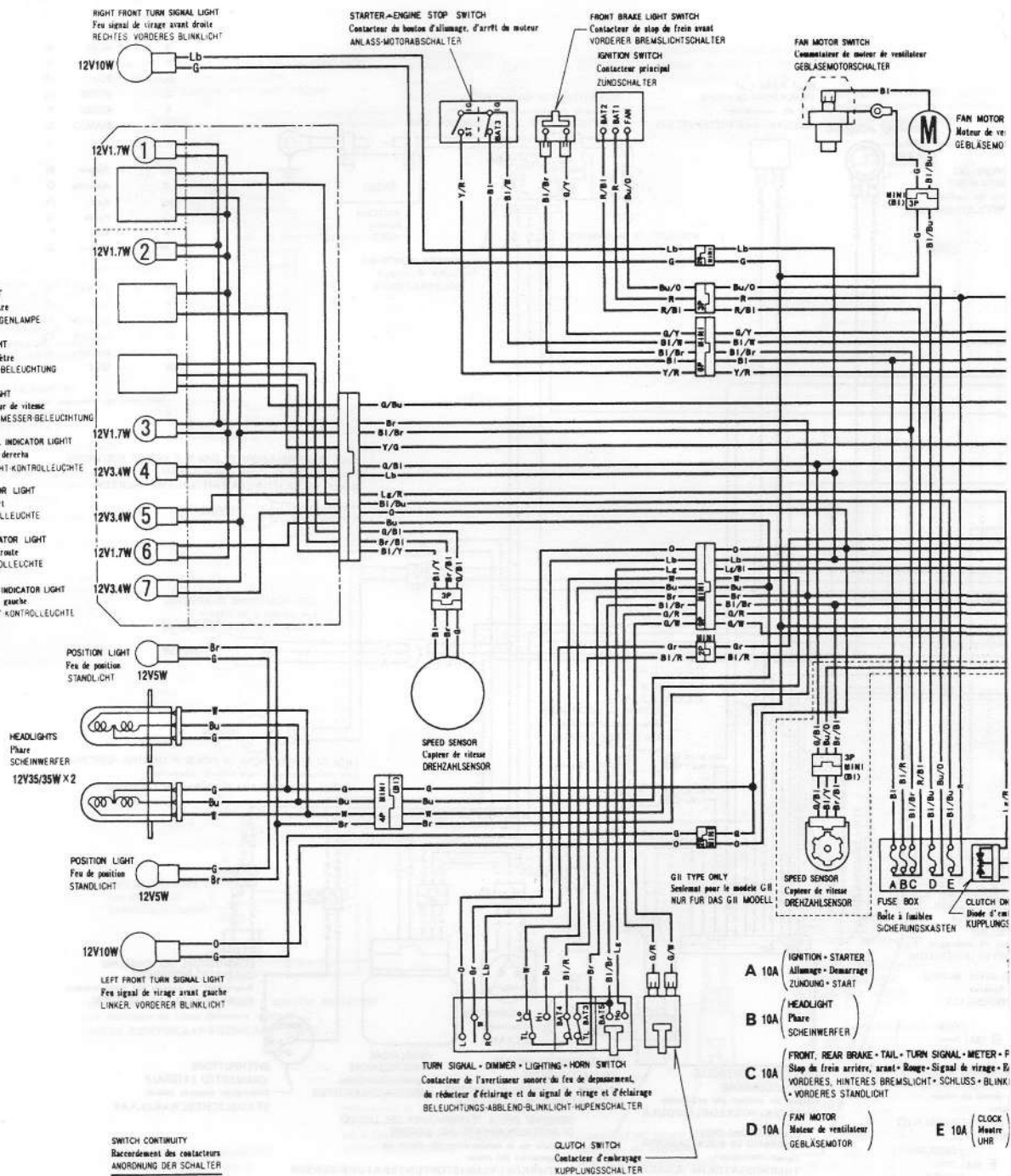
19. WIRING DIAGRAM



19

0030Z - KPC - 6100
- 6400

- 1 TEMP METER LIGHT
Lampe de thermomètre
TEMPERATURANZEIGENLAMPE
- 2 TACHOMETER LIGHT
Éclairage du tachomètre
DREHZAHLMESSER-BELEUCHTUNG
- 3 SPEEDOMETER LIGHT
Éclairage du compteur de vitesse
GESCHWINDIGKEITSMESSER-BELEUCHTUNG
- 4 RIGHT TURN SIGNAL INDICATOR LIGHT
Feu signal de virage droite
RECHTES BLINKLICHT-KONTROLLEUCHTE
- 5 NEUTRAL INDICATOR LIGHT
Témoin du point mort
LEERLAUF-KONTROLLEUCHTE
- 6 HIGH BEAM INDICATOR LIGHT
Témoin des feux de route
FERNLICHT-KONTROLLEUCHTE
- 7 LEFT TURN SIGNAL INDICATOR LIGHT
Feu signal de virage gauche
LINKER BLINKLICHT-KONTROLLEUCHTE



20. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

20-1

ENGINE LACKS POWER

20-2

POOR PERFORMANCE AT LOW AND IDLE SPEED

20-3

POOR PERFORMANCE AT HIGH SPEED

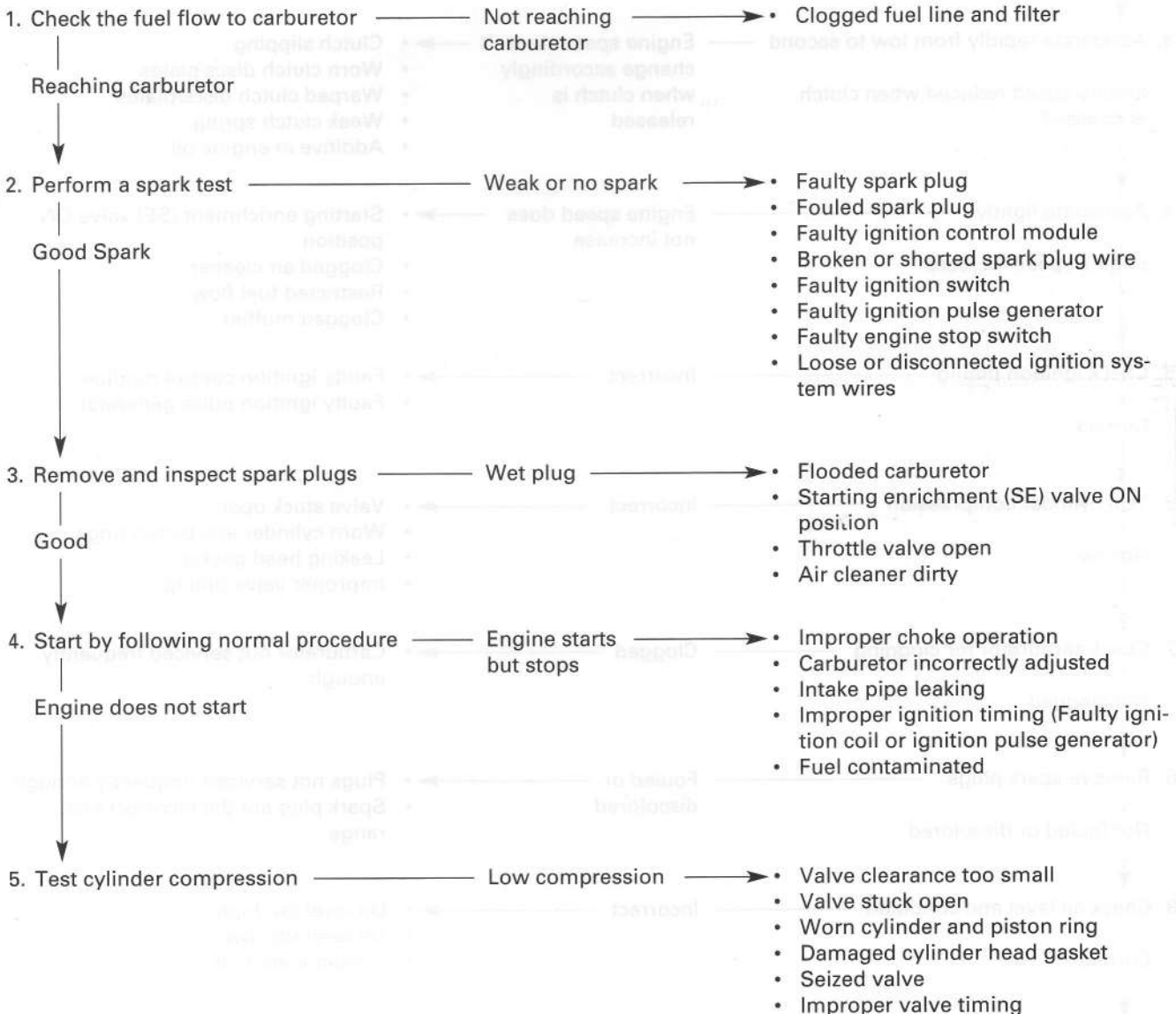
20-4

POOR HANDLING

20-4

ENGINE DOES NOT START OR IS HARD TO START

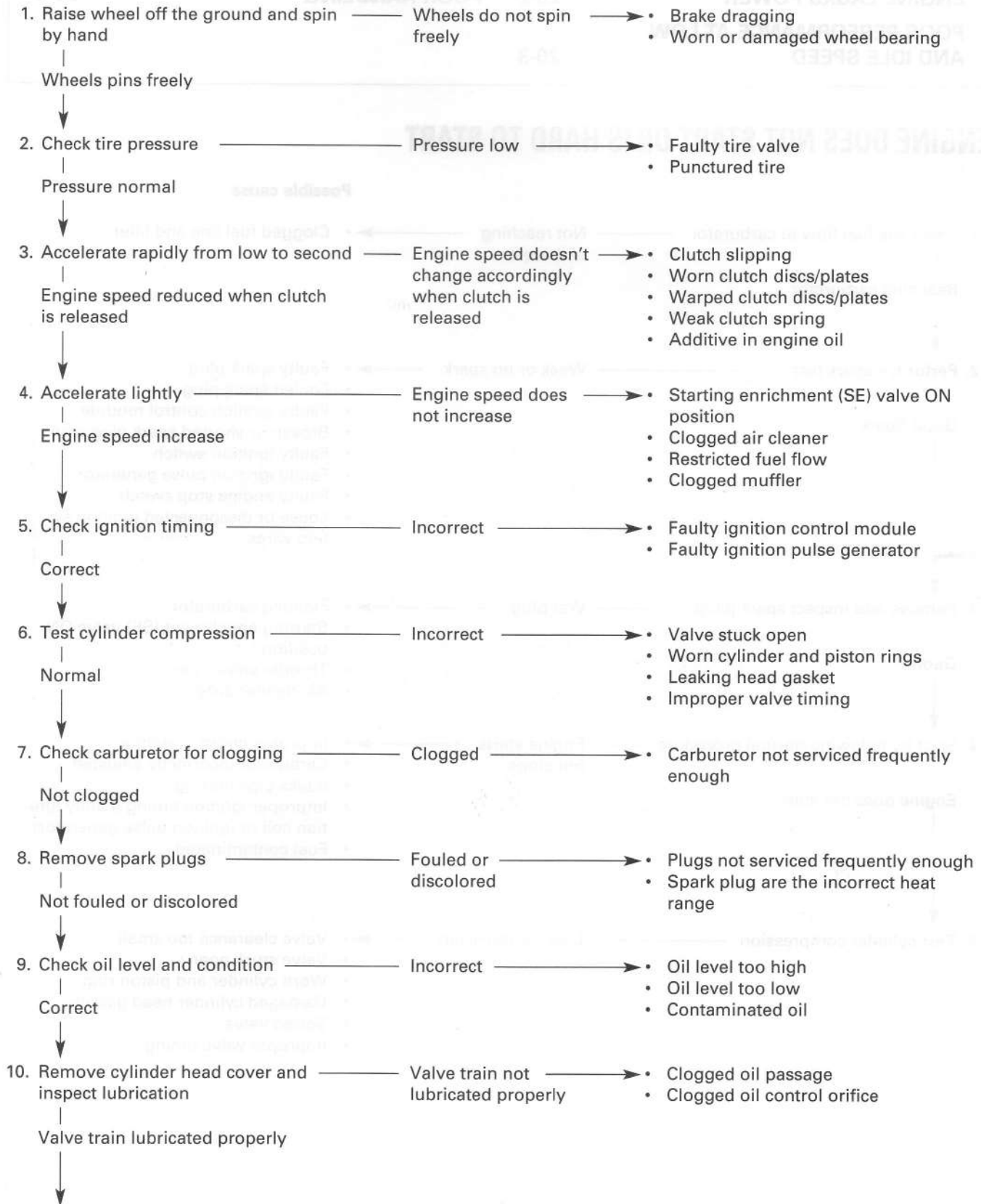
Possible cause

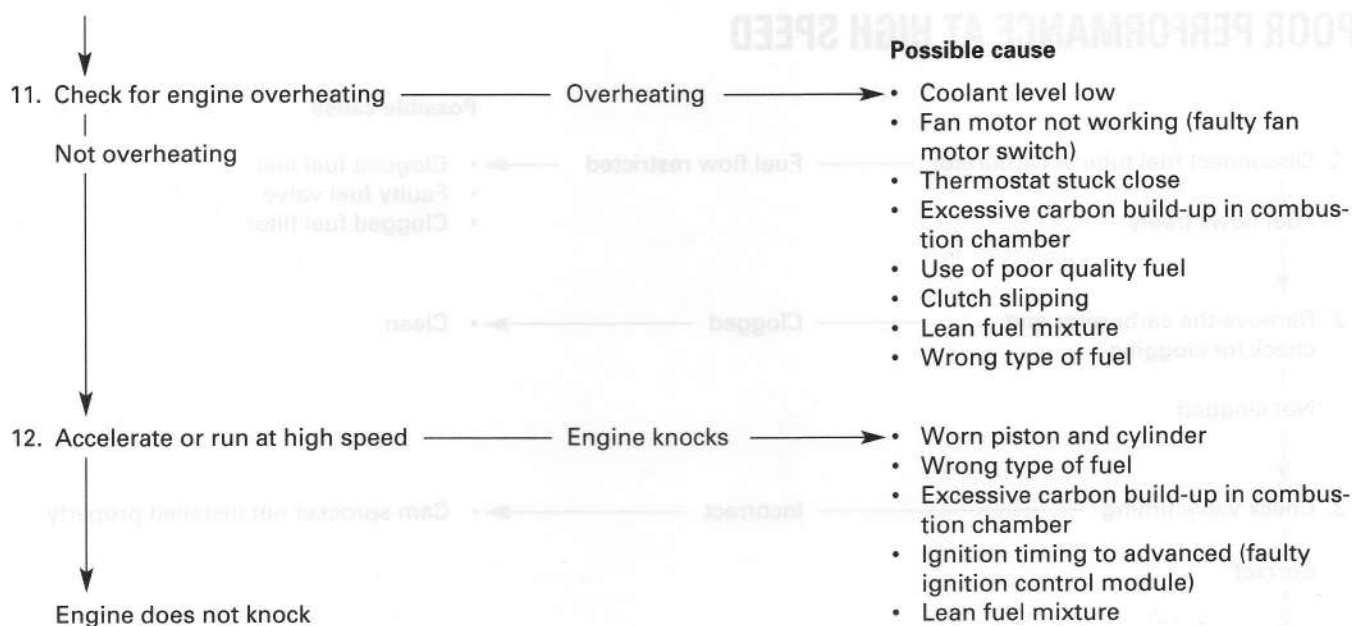


20

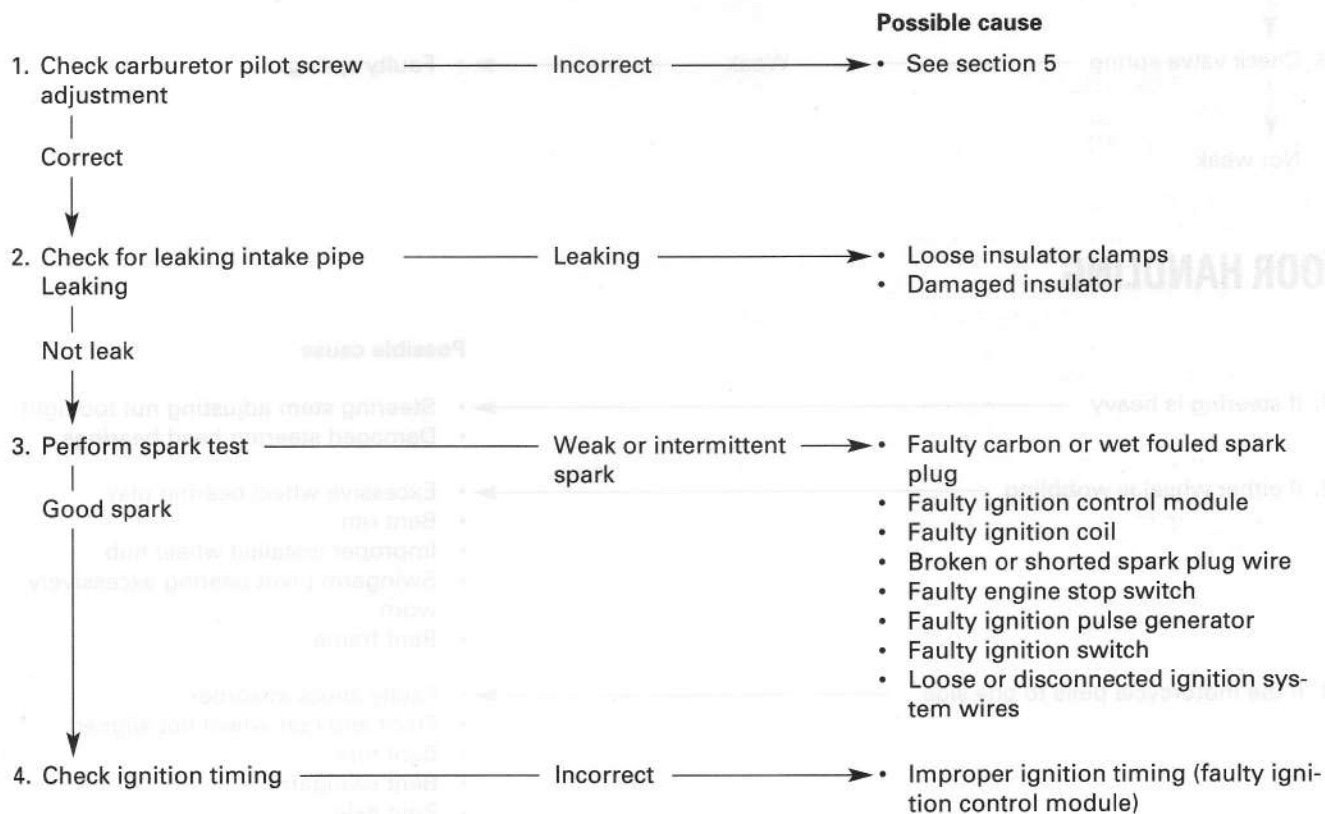
ENGINE LACKS POWER

Possible cause

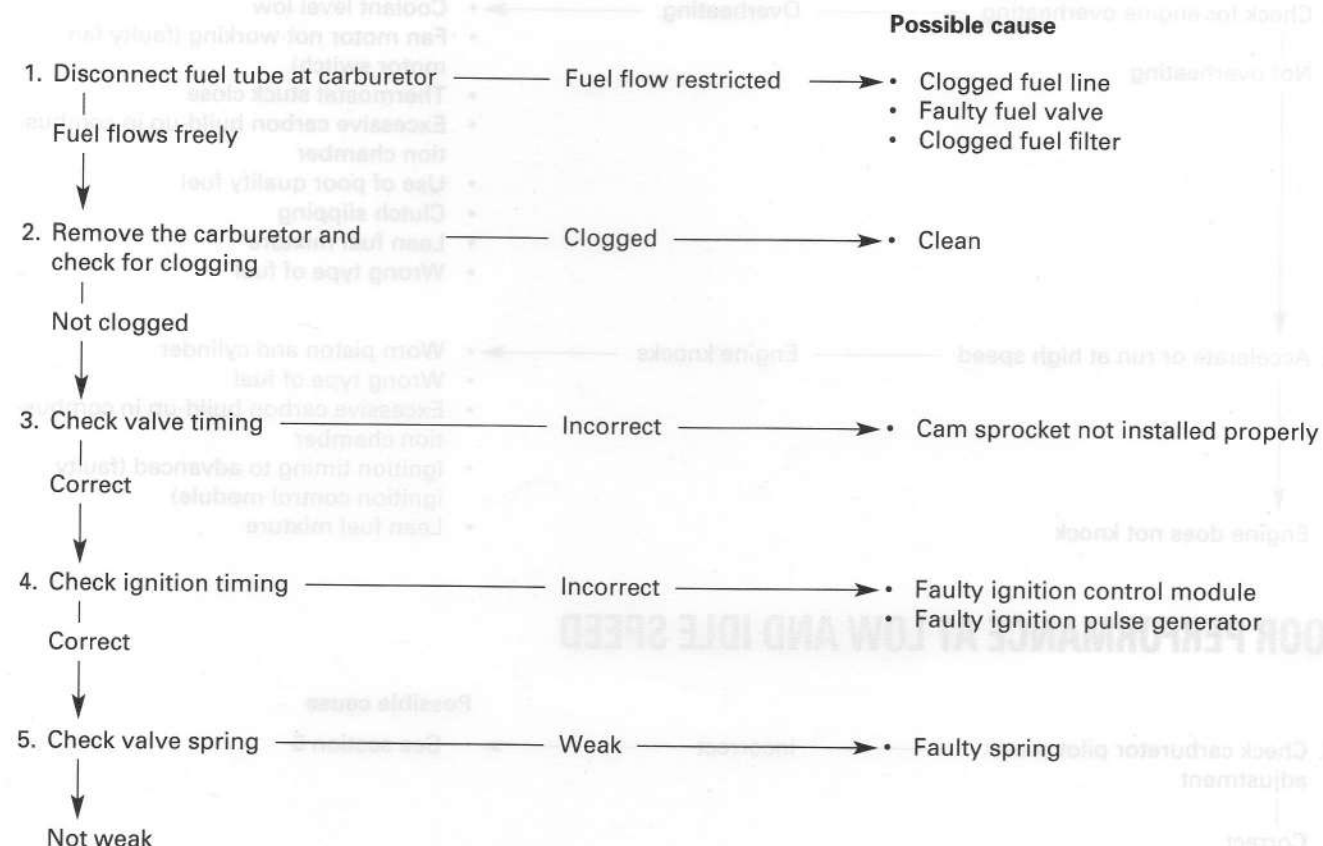




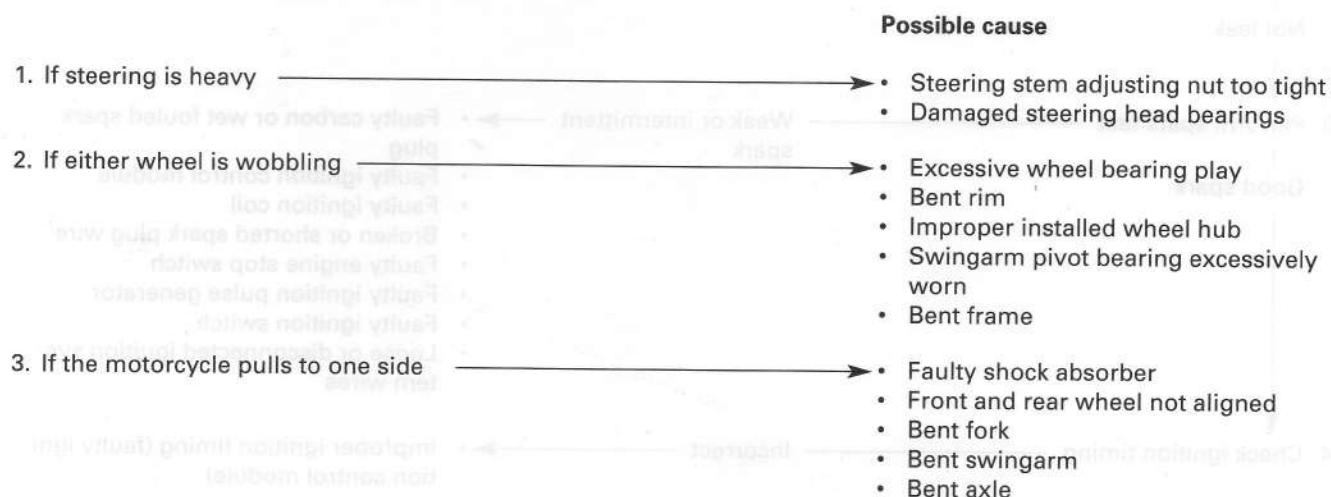
POOR PERFORMANCE AT LOW AND IDLE SPEED



POOR PERFORMANCE AT HIGH SPEED



POOR HANDLING



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