

## ***A Few Words About Safety***

### **Service information**

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

### **For Your Customer's Safety**

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

#### **⚠ WARNING**

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

### **For Your Safety**

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e. g., Hot parts - wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommended that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

#### **⚠ WARNING**

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

### **Important Safety Precautions**

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.

- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:


- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes sparks and flames away from the battery and all fuel-related parts.

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

You will find important safety information in a variety of forms including:

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



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



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



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

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

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

**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.**

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## HOW TO USE THIS MANUAL

This service manual describes the service procedures for the VT750DC.

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

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

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


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

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


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


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These signal words mean:

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

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

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

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

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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 a 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.

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# 1. GENERAL INFORMATION

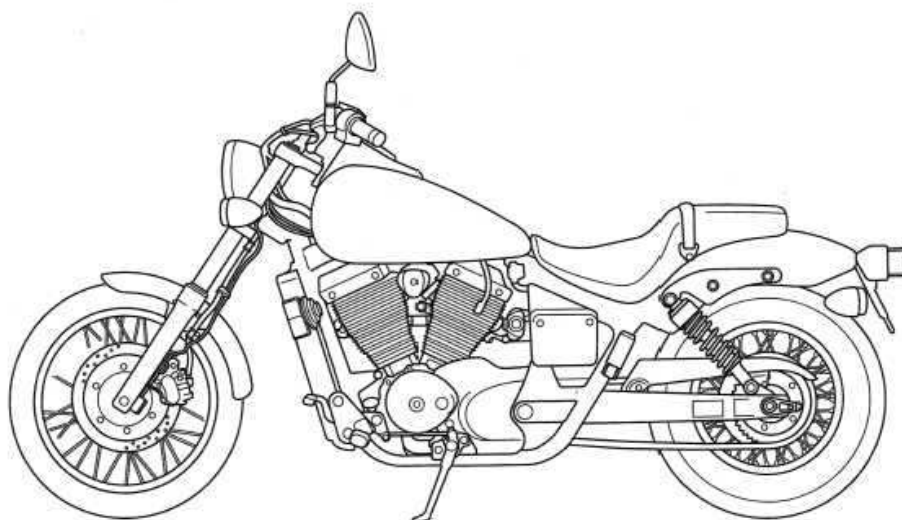
<b>SERVICE RULES</b>	<b>1-1</b>	<b>LUBRICATION &amp; SEAL POINTS</b>	<b>1-16</b>
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**1**

## SERVICE RULES

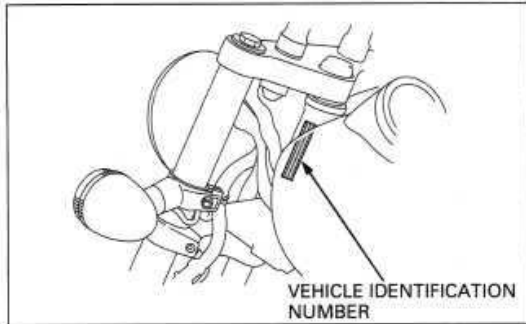
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-18 through 1-27, Cable & Harness Routing.

## MODEL IDENTIFICATION

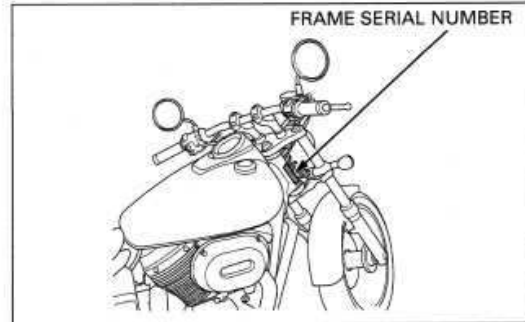


## GENERAL INFORMATION

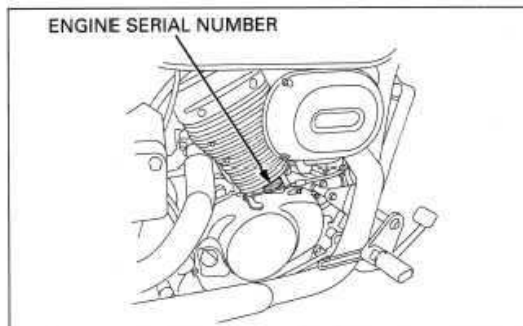
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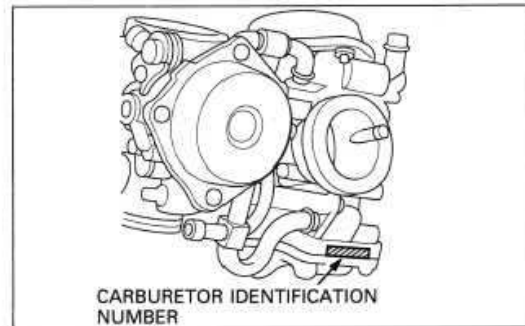
The Vehicle Identification Number (VIN) is attached on the left side of the steering head.



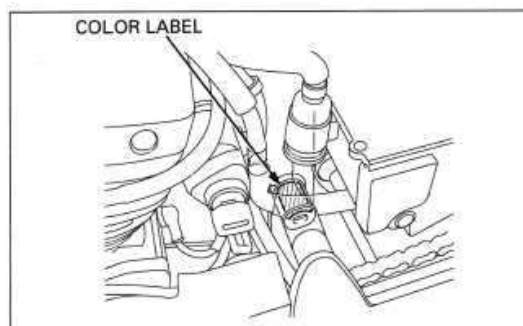
The frame serial number is stamped on the right side of the steering head.



The engine serial number is stamped on the right side of the crankcase below the rear cylinder.



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



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

## SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,335 mm (91.9 in)
	Overall width	800 mm (31.5 in)
	Overall height	1,070 mm (42.1 in)
	Wheelbase	1,645 mm (64.8 in)
	Seat height	675 mm (26.6 in)
	Ground clearance	140 mm (5.5 in)
	Dry weight (49 state/Canada type)	224.5 kg (494.9 lbs)
	(California type)	225.7 kg (497.6 lbs)
	Curb weight (49 state/Canada type)	235.4 kg (519.0 lbs)
	(California type)	236.3 kg (520.9 lbs)
	Maximum weight capacity	166 kg (366.0 lbs)
FRAME	Frame type	Double cradle
	Front suspension	Telescopic fork
	Front axle travel	108 mm (4.3 in)
	Rear suspension	Swingarm
	Rear axle travel	80 mm (3.1 in)
	Front tire size	110/80-19 59S
	Rear tire size	160/80-15 M/C 74S
	Front tire brand	Dunlop Bridgestone
		F24 G515
	Rear tire brand	Dunlop Bridgestone
		K425 G702
	Front brake	Hydraulic single disc brake
	Rear brake	Internal expanding shoe
	Caster angle	34° 00'
	Trail length	152 mm (6.0 in)
ENGINE	Fuel tank capacity	13.0 liters (3.43 US gal, 2.86 Imp gal)
	Fuel tank reserve capacity	4.0 liters (1.06 US gal, 0.88 Imp gal)
	Cylinder arrangement	2 cylinders 52° V transverse
	Bore and stroke	79.0 x 76.0 mm (3.11 x 2.99 in)
	Displacement	745 cm <sup>3</sup> (45.4 cu-in)
	Compression ratio	9.0 : 1
	Valve train	Silent multi-link chain driven and OHC with rocker arm
	Intake valve	0° BTDC — at 1 mm (0.04 in) lift
		20° ABDC —
	Exhaust valve	30° BBDC —
		0° ATDC —
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Viscous paper element
	Crankshaft type	Unit type, two main journals
	Engine dry weight	68.2 kg (150.4 lbs)
	Firing order	Front - 308° - Rear - 412° - Front
	Cylinder number	Front: #2, Rear: #1

**GENERAL INFORMATION**

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<b>GENERAL (Cont'd)</b>		
	<b>ITEM</b>	<b>SPECIFICATIONS</b>
CARBURETOR	Carburetor type Throttle bore	Constant Venturi 34 mm (1.3 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 Cable operating Constant mesh, 5-speed 1.666 (65/39) 2.471 (42T/17T) 3.166 (38/12) 2.000 (34/17) 1.500 (30/20) 1.173 (27/23) 1.042 (25/24)  Left foot operated return system, 1 – N – 2 – 3 – 4 – 5
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Full transistorized ignition Electric starter motor Triple phase output alternator SCR shorted/triple phase full wave rectification Battery

## GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

LUBRICATION SYSTEM			
ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	at draining	2.2 liters (2.32 US qt, 1.94 Imp qt)	——
	at filter change	2.4 liters (2.54 US qt, 2.11 Imp qt)	——
	at disassembly	2.9 liters (3.06 US qt, 2.55 Imp qt)	——
Recommended engine oil		Honda GN4 or HP4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40	——
Oil pressure at oil pressure switch		530 kPa (5.4 kgf/cm <sup>2</sup> , 77 psi) at 5,500 rpm (80°C/176°F)	——
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

FUEL SYSTEM		
ITEM		SPECIFICATIONS
Carburetor identification number	49 state/Canada type	VDF2D
	California type	VDF2C
Main jet	Front	#105
	Rear	#108
Slow jet		#40
Pilot screw initial/final opening		See page 5-22
Float level		7.0 mm (0.28 in)
Base carburetor (for synchronization)		Rear cylinder (#1)
Idle speed		1,000 ± 100 rpm
Carburetor vacuum difference		20 mm Hg (0.7 in Hg)
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)

COOLING SYSTEM		
ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.75 liters (1.85 US qt, 1.54 Imp qt)
	Reserve tank	0.4 liter (0.42 US qt, 0.35 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

## GENERAL INFORMATION

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE			
ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (0.375 – 0.750)	—
Clutch spring free length		45.5 (1.79)	43.9 (1.73)
Clutch disc thickness	A	2.62 – 2.78 (0.103 – 0.107)	2.3 (0.09)
	B	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I.D.	21.991 – 22.016 (0.8658 – 0.8668)	22.03 (0.867)
	O.D.	29.994 – 30.007 (1.1809 – 1.1804)	29.98 (1.180)
Oil pump drive sprocket I.D.		30.025 – 30.145 (1.1821 – 1.1868)	30.15 (1.187)
Mainshaft O.D. at clutch outer guide		21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)

Unit: mm (in)

ALTERNATOR/STARTER CLUTCH			
ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	40.000 – 40.021 (1.5748 – 1.5756)	40.10 (1.579)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.414 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)

Unit: mm (in)

CYLINDER HEAD/VALVE			
ITEM		STANDARD	SERVICE LIMIT
Cylinder compression		1,275 ± 98 kPa (13.0 ± 1.0 kgf/cm <sup>2</sup> , 185 ± 14 psi) at 400 rpm	—
Cylinder head warpage		—	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.0008)
		EX	0.20 ± 0.02 (0.008 ± 0.0008)
	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)
		EX	6.600 – 6.615 (0.2598 – 0.2604)
	Valve guide I.D.	IN	5.500 – 5.512 (0.2165 – 0.2170)
		EX	6.600 – 6.615 (0.2598 – 0.2604)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)
		EX	0.030 – 0.060 (0.0012 – 0.0024)
	Valve guide projection above cylinder head	IN	19.5 (0.77)
		EX	18.0 (0.71)
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)
Valve spring free length		IN	42.14 (1.659)
		EX	42.83 (1.686)
Camshaft	Cam lobe height	IN	37.188 – 37.348 (1.4641 – 1.4704)
		EX	37.605 – 37.765 (1.4805 – 1.4868)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)
	Runout		—
	Oil clearance		0.050 – 0.111 (0.0020 – 0.0044)
	Identification marks		"F": Front, "R": Rear
Rocker arm I.D.		IN/EX	12.000 – 12.018 (0.4724 – 0.4731)
Rocker arm shaft O.D.		IN/EX	11.966 – 11.984 (0.4711 – 0.4718)
Rocker arm-to-rocker arm shaft clearance			0.016 – 0.052 (0.0006 – 0.0020)

## GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

CYLINDER/PISTON				
ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)	
	Out-of-round	————	0.06 (0.002)	
	Taper	————	0.06 (0.002)	
	Warpage	————	0.10 (0.004)	
Piston, piston rings	Piston mark direction		“IN” mark facing toward the intake side	————
	Piston O.D.		78.97 – 78.99 (3.109 – 3.110)	78.90 (3.106)
	Piston O.D. measurement point		7 – 17 (0.3 – 0.7) from bottom of skirt	————
	Piston pin hole I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.07 (0.003)
	Piston ring and gap	Top	0.15 – 0.25 (0.006 – 0.010)	0.30 (0.012)
		Second	0.25 – 0.40 (0.010 – 0.016)	0.50 (0.02)
		Oil (side rail)	0.20 – 0.80 (0.008 – 0.031)	1.0 (0.04)
	Piston ring mark	Top	“R” mark	————
		Second	“RN” mark	————
Cylinder-to-piston clearance		0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)	
Connecting rod small end I.D.		18.016 – 18.034 (0.7093 – 0.7100)	18.07 (0.711)	
Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)	

Unit: mm (in)

Unit: mm (in)

CRANKSHAFT/TRANSMISSION				
ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		—	0.03 (0.001)
	Crankpin oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.030 – 0.046 (0.0012 – 0.0018)	0.07 (0.003)
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C2, C4	31.000 – 31.025 (1.2204 – 1.2215)	31.05 (1.222)
	Bushing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C1, C2, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
		C2	27.995 – 28.016 (1.1021 – 1.1030)	28.04 (1.104)
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C1, C2, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D. at M3 bushing		24.972 – 24.993 (0.9831 – 0.9840)	24.95 (0.982)
	Countershaft O.D. at C2 bushing		27.967 – 27.980 (1.1011 – 1.1016)	27.95 (1.100)
Bushing-to-shaft clearance	M3	0.007 – 0.049 (0.0003 – 0.0019)	0.08 (0.003)	
	C2	0.015 – 0.049 (0.0006 – 0.0019)	0.08 (0.003)	
Shift fork I.D.			13.000 – 13.021 (0.5118 – 0.5126)	13.04 (0.513)
Shift fork claw thickness			5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)
Shift fork shaft O.D.			12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
Shift drum O.D. (at left side journal)			11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)



## GENERAL INFORMATION

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
	Up to maximum weight capacity	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		Page 13-12	—
Wheel balance weight		—	60 g (2.1 oz)
Fork	Spring free length	492.4 (19.39)	482.5 (19.00)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fork fluid level	124 (4.9)	—
	Fork fluid capacity	473 ± 2.5 cm <sup>3</sup> (16.0 ± 0.08 US oz, 16.6 ± 0.09 Imp oz)	—
Steering head bearing preload		0.43 – 1.04 kgf (0.95 – 2.29 lbf)	—

Unit: mm (in)

REAR WHEEL/BRAKE/SUSPENSION			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		Page 14-8	—
Wheel balance weight		—	70 g (2.5 oz)
Drive chain slack		15 – 25 (0.600 – 1)	40 (1.6)
Drive chain size/link		525 SMOZ5/124 L	—
Rear brake	Drum I.D.	180.0 – 180.3 (7.09 – 7.10)	181 (7.13)
	Lining thickness	5 (0.2)	2 (0.1)
	Pedal free play	20 – 30 (3/4 – 1-1/4)	—
Shock absorber spring preload adjuster setting		2nd position	—

Unit: mm (in)

HYDRAULIC DISC BRAKE			
ITEM		STANDARD	SERVICE LIMIT
Specified brake fluid		DOT 4	—
Brake disc thickness		5.8 – 6.2 (0.23 – 0.24)	5 (0.2)
Brake disc runout		—	0.30 (0.012)
Master cylinder I.D.		11.000 – 11.043 (0.4331 – 0.4348)	11.05 (0.435)
Master piston O.D.		10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
Caliper cylinder I.D.		27.000 – 27.050 (1.0630 – 1.0650)	27.06 (1.065)
Caliper piston O.D.		26.918 – 26.968 (1.0598 – 1.0617)	26.91 (1.059)

## GENERAL INFORMATION

BATTERY/CHARGING SYSTEM			
ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 12 Ah
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.1 A x 5 – 10 h
		Quick	5.5 A x 1.0 h
Alternator	Capacity		0.333 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM		
ITEM		SPECIFICATIONS
Spark plug	Standard	DPR8EA-9 (NGK), X24EPR-U9 (DENSO)
	For cold climate (below 5°C/41°F)	DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
	For extend high speed riding	DPR9EA-9 (NGK), X27EPR-U9 (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		6.2° BTDC at idle

Unit: mm (in)

ELECTRIC STARTER		
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	6.5 (0.26)

LIGHTS/METERS/SWITCHES		SPECIFICATIONS
ITEM		
Bulb	Headlight (high/low beam)	12 V – 60/55 W
	Brake/taillight	12 V – 21/5 W
	Front turn signal/running light	12 V – 21/5 W x 2
	Rear turn signal light	12 V – 21 W x 2
	Instrument light	LED x 6
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Coolant temperature indicator	LED
	Oil pressure indicator	LED
Fuse	Main fuse	30 A
	Sub-fuse	10 A x 4, 15 A x 1
Fan motor switch	Start to close (ON)	98 – 102°C (208 – 216°F)
	Stops to open (OFF)	93 – 97°C (199 – 207°F)
Thermosensor resistance	at 80°C (176°F)	45 – 60 Ω
	at 120°C (248°F)	10 – 20 Ω
Carburetor heater resistance at 20°C (68°F)		13 – 15 Ω
Fuel pump flow capacity		Minimum 900 cm <sup>3</sup> (30.4 US oz, 31.7 Imp oz) per minute

## GENERAL INFORMATION

### TORQUE VALUES

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

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

NOTES: 1. Apply sealant to the threads.  
 2. Apply locking agent to the threads.  
 3. Apply grease to the threads and seating surface.  
 4. Apply oil to the threads and seating surface.  
 5. Stake.  
 6. Left hand threads.  
 7. U-nut.  
 8. ALOC bolt: replace with a new one.  
 9. Break-off bolt.

ENGINE	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>MAINTENANCE:</b>					
	Spark plug	4	12	14 (1.4, 10)	
	Crankshaft hole cap	1	30	15 (1.5, 11)	NOTE 3
	Timing hole cap	1	22	15 (1.5, 11)	NOTE 3
	Valve adjusting screw lock nut	6	7	23 (2.3, 17)	NOTE 4
	Oil drain bolt	1	14	29 (3.0, 22)	
	Oil filter cartridge	1	20	10 (1.0, 7)	NOTE 4
	Vacuum plug	2	5	3 (0.3, 2.2)	
<b>LUBRICATION SYSTEM:</b>					
	Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
	Oil pressure switch terminal screw	1	4	2 (0.2, 1.4)	
	Oil pump bolt	5	6	13 (1.3, 9)	
<b>FUEL SYSTEM:</b>					
	Air cleaner housing stay bolt	1	6	12 (1.2, 9)	
<b>COOLING SYSTEM:</b>					
	Water pump bolt	5	6	13 (1.3, 9)	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>					
	Clutch lifter plate bolt	4	6	12 (1.2, 9)	
	Clutch center lock nut	1	18	127 (13.0, 94)	NOTE 4, 5
	Primary drive gear bolt	1	12	88 (9.0, 65)	NOTE 4
	Gearshift return spring pin bolt	1	8	23 (2.3, 17)	
	Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
<b>ALTERNATOR/STARTER CLUTCH:</b>					
	Flywheel bolt	1	12	127 (13.0, 94)	NOTE 4, 6
	Stator mounting bolt	4	6	12 (1.2, 9)	NOTE 2
	Stator wire holder bolt	1	6	12 (1.2, 9)	NOTE 2
	Starter clutch housing bolt	6	8	29 (3.0, 22)	NOTE 2

GENERAL INFORMATION

ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>CYLINDER HEAD/VALVES:</b>				
Cylinder head cover bolt	4	6	10 (1.0, 7)	NOTE 2
Overhead cover bolt	8	6	12 (1.2, 9)	
Cam sprocket bolt	4	7	23 (2.3, 17)	
Cam chain tensioner mounting bolt	4	6	10 (1.0, 7)	
Camshaft holder 8-mm bolt	6	8	23 (2.3, 17)	
8-mm nut	4	8	23 (2.3, 17)	NOTE 4
Cylinder head 8-mm bolt	4	8	23 (2.3, 17)	
10-mm nut	8	10	47 (4.8, 35)	
Cylinder head fin mounting bolt	15	6	10 (1.0, 7)	
<b>CRANKCASE/CRANKSHAFT/TRANSMISSION:</b>				
Crankcase 8-mm bolt	14	8	23 (2.3, 17)	NOTE 4
Connecting rod bearing cap nut	8	8	33 (3.4, 25)	
Drive chain guide plate bolt	2	6	12 (1.2, 9)	
Neutral switch	1	10	12 (1.2, 9)	

## GENERAL INFORMATION

FRAME				
ITEM	QTY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>FRAME/BODY PANELS/EXHAUST SYSTEM:</b>				
Footpeg bracket bolt	4	10	34 (3.5, 25)	
Exhaust pipe joint nut	4	8	25 (2.5, 18)	
Muffler mounting nut	2	8	26 (2.7, 20)	
Exhaust pipe joint pipe bolt	1	8	20 (2.0, 14)	
Seat mounting bolt	2	8	26 (2.7, 20)	
Rear fender bolt	2	10	64 (6.5, 47)	
Shock absorber stud bolt	1	14	108 (11.0, 80)	
Left grab rail mounting nut	1	24	88 (9.0, 65)	
Fuel tank bolt	1	8	19 (1.9, 14)	
Fuel valve	1	22	34 (3.5, 25)	
Fuel valve screw	1	5	0.6 (0.06, 0.43)	
Left crankcase rear cover bolt	1	6	12 (1.2, 9)	
<b>MAINTENANCE:</b>				
Side stand assembly bolt	2	10	49 (5.0, 39)	
Spoke nipple	104	4	4 (0.4)	
<b>COOLING SYSTEM:</b>				
Radiator mounting bolt	1	6	1 (0.1, 0.7)	
Fan motor switch	1	16	18 (1.8, 13)	
<b>ENGINE REMOVAL/INSTALLATION:</b>				
Front engine upper/lower mounting nut	2	10	54 (5.5, 40)	
Rear engine mounting nut	1	10	54 (5.5, 40)	
Front engine bracket bolt	2	8	26 (2.7, 20)	
Rear engine bracket bolt	2	8	26 (2.7, 20)	
Gearshift arm pinch bolt	1	6	12 (1.2, 9)	
Drive sprocket fixing plate bolt	2	6	10 (1.0, 7)	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Gearshift pedal pivot bolt	1	10	34 (3.5, 25)	
<b>FRONT WHEEL/SUSPENSION/STEERING:</b>				
Steering stem nut	1	24	103 (10.5, 76)	
Steering bearing adjustment nut	1	26	—	page 13-28
Steering bearing adjustment lock nut	1	26	—	page 13-29
Top bridge pinch bolt	2	8	26 (2.7, 20)	
Bottom bridge pinch bolt	2	10	49 (5.0, 36)	
Handlebar upper holder bolt	4	8	23 (2.3, 17)	
Handlebar lower holder nut	2	8	23 (2.3, 17)	
Front axle bolt	1	14	59 (6.0, 43)	
Front axle pinch bolt	4	8	22 (2.2, 16)	
Front brake disc bolt	6	8	42 (4.3, 31)	NOTE 8
Fork cap	2	38	22 (2.2, 16)	
Fork socket bolt	2	8	20 (2.0, 14)	NOTE 2
<b>REAR WHEEL/BRAKE/SUSPENSION:</b>				
Rear axle nut	1	18	93 (9.5, 69)	NOTE 7
Driven sprocket nut	5	12	88 (9.0, 65)	NOTE 7
Shock absorber upper/lower mounting bolt	4	8	26 (2.7, 20)	
Swingarm pivot nut	1	14	88 (9.0, 65)	NOTE 7
Swingarm pivot adjusting bolt	1	26	25 (2.5, 18)	
Swingarm pivot lock nut	1	26	64 (6.5, 47)	
Drive chain slider screw	2	5	3 (0.3, 2.2)	
Rear brake stopper arm nut	2	8	20 (2.0, 14)	
Rear brake arm bolt	1	8	28 (2.9, 21)	
Rear brake middle rod joint bolt	1	10	34 (3.5, 25)	

GENERAL INFORMATION

FRAME (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>HYDRAULIC BRAKE:</b>				
Brake caliper mounting bolt	2	8	30 (3.1, 22)	NOTE 8
Brake caliper pin bolt	1	8	13 (1.3, 9)	NOTE 2
Brake caliper bracket pin bolt	1	8	27 (2.8, 20)	NOTE 2
Pad pin	1	10	18 (1.8, 13)	
Pad pin plug	1	10	3 (0.3, 2.2)	
Brake caliper bleed valve	1	8	6 (0.6, 4.3)	
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
pivot nut	1	6	6 (0.6, 4.3)	
Brake master cylinder holder bolt	2	6	12 (1.2, 9)	
Brake master cylinder reservoir cap screw	2	4	2 (0.2, 1.4)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Brake hose oil bolt	2	10	34 (3.5, 25)	
<b>BATTERY/CHARGING SYSTEM:</b>				
Battery case cover screw	1	6	9 (0.9, 6.5)	
<b>ELECTRIC STARTER:</b>				
Starter motor cable terminal nut	1	6	10 (1.0, 7)	
<b>LIGHTS/METER/SWITCHES:</b>				
Side stand switch mounting bolt	1	6	10 (1.0, 7)	
Thermosensor	1	PT 1/8	8 (0.8, 5.8)	NOTE 1
Ignition switch mounting bolt	2	6	12 (1.2, 9)	NOTE 9
Horn mounting bolt	1	8	21 (2.1, 15)	
Speedometer cover bolt	2	6	10 (1.0, 7)	
<b>OTHERS:</b>				
Side stand pivot bolt	1	10	10 (1.0, 7)	
lock nut	1	10	29 (3.0, 22)	
Tool box cover screw	3	4	2 (0.2, 1.4)	

## GENERAL INFORMATION

### TOOLS

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

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SECTION
Carburetor float level gauge	07401 - 0010000		5
Oil pressure gauge	07506 - 3000000	NOTE 2	4
Vacuum gauge attachment	07510 - 3000200	NOTE 1: 07LMJ - 001000A (U.S.A. only)	3
Oil pressure gauge attachment	07510 - 4220100	NOTE 2	4
Gear holder	07724 - 0010100	NOTE 3	8
Flywheel holder	07725 - 0040000	NOTE 2	9
Rotor puller	07733 - 0020001	NOTE 1: 07933 - 3290001 (U.S.A. only)	9
Valve guide driver, 5.5 mm (IN)	07742 - 0010100		10
Valve guide driver, 6.6 mm (EX)	07742 - 0010200	NOTE 1: 07942 - 6570100 (U.S.A. only)	10
Valve guide driver, (adjustable type)	07743 - 0020000	NOTE 3	10
Attachment, 32 x 35 mm	07746 - 0010100		14
Attachment, 37 x 40 mm	07746 - 0010200		8
Attachment, 42 x 47 mm	07746 - 0010300		12, 13, 14
Attachment, 52 x 55 mm	07746 - 0010400		12, 13
Driver 30 mm I.D.	07746 - 0030300		13
Pilot, 15 mm	07746 - 0040300		14
Pilot, 20 mm	07746 - 0040500		12, 13, 14
Pilot, 25 mm	07746 - 0040600		12
Pilot, 30 mm	07746 - 0040700		8
Pilot, 28 mm	07746 - 0041100		12
Bearing remover shaft	07746 - 0050100		13, 14
Bearing remover head, 20 mm	07746 - 0050600		13, 14
Driver	07749 - 0010000		8, 12, 13, 14
Valve spring compressor	07757 - 0010000		10
Valve seat cutter			10
— seat cutter, 27.5 mm (45° IN)	07780 - 0010200	NOTE 2	
— seat cutter, 35 mm (45° EX)	07780 - 0010400		
— flat cutter, 28 mm (32° IN)	07780 - 0012100		
— flat cutter, 35 mm (32° EX)	07780 - 0012300		
— interior cutter, 30 mm (60° IN)	07780 - 0014000		
— interior cutter, 37.5 mm (60° EX)	07780 - 0014100		
— cutter holder, 5.5 mm (IN)	07781 - 0010101		
— cutter holder, 6.6 mm (EX)	07781 - 0010202		
Valve adjusting wrench	07908 - KE90000	NOTE 1: 07908 - KE90100 (U.S.A. only)	3
Snap ring pliers	07914 - SA50001		14, 15
Steering stem socket	07916 - 3710101	NOTE 1: 07916 - 3710100	13
Bearing remover set	07936 - 3710001	NOTE 3	12
— remover weight	07741 - 0010201	NOTE 1: 07936 - 371020A (U.S.A. only) or 07936 - 3710200	
— remover handle	07936 - 3710100		
— remover head	07936 - 3710600		
Bearing race remover	07946 - 3710500	NOTE 1: M9360 - 277 - 91774 (U.S.A. only)	13
Bearing driver remover	07946 - KA50000		14
Driver shaft	07946 - MJ00100	NOTE 3	14
Attachment	07946 - MJ00201	NOTE 3	14
Fork seal driver	07947 - KA50100		13
Fork seal driver attachment, 41 mm I.D.	07947 - KF00100		13
Ball race remover set	07953 - MJ10000	NOTE 1: 07953 - MJ1000B or 07953 - MJ1000A (U.S.A. only)	13
— driver attachment	07953 - MJ10100		
— driver handle	07953 - MJ10200		

## GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SECTION
Valve guide reamer, 5.5 mm (IN)	07984 – 2000001		10
Valve guide reamer, 6.6 mm (EX)	07984 – ZE20001	NOTE 1: 07984 – ZE2000D (U.S.A. only)	10
Pivot lock nut wrench	07GMA – KT70200	NOTE 3	7, 14
Oil filter wrench	07HAA – PJ70100		3
Peak voltage adaptor	07HGJ – 0020100	NOTE 1: Peak voltage tester (U.S.A. only)	17
Drive chain tool set	07HMH – MR10103	NOTE 1: 07HMH – MR7010B (U.S.A. only)	3
Spoke wrench	07JMA – MR60100	NOTE 2	3, 13, 14
Clutch center holder	07JMB – MN50301	NOTE 1: 07HGB – 001000A (U.S.A. only)	8
Pilot screw wrench	07KMA – MS60101		5
Vacuum gauge set	07LMJ – 001000A	NOTE 1: M937B – 021 – XXXXX (U.S.A. only)	3
Vacuum/pressure pump	A937X – 041 – XXXXX	NOTE 1: ST – AH – 260 – MC7 (U.S.A. only) ST – AH – 255 – MC7 (U.S.A. only)	5



## GENERAL INFORMATION

### LUBRICATION & SEAL POINTS

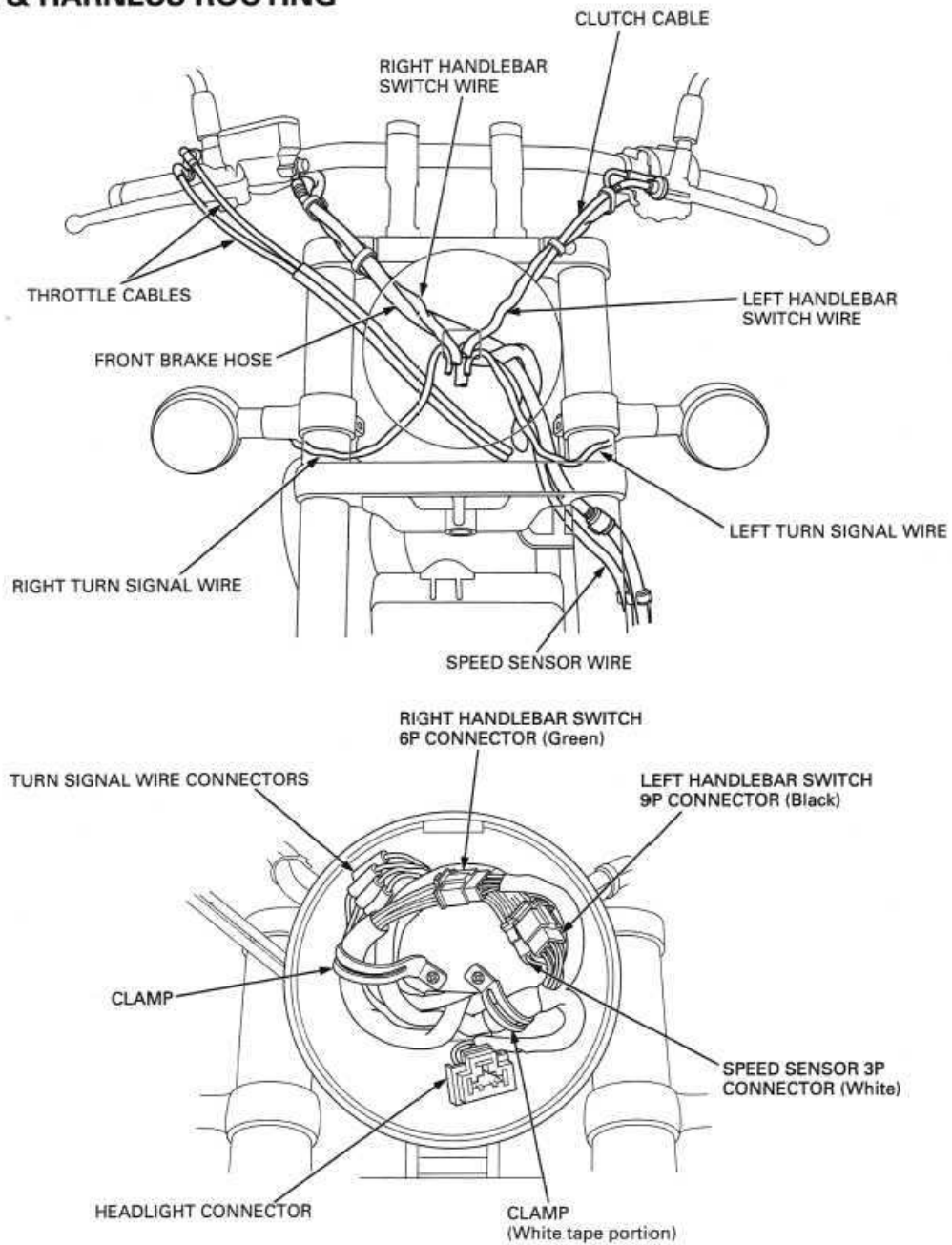
ENGINE	LOCATION	MATERIAL	REMARKS
	Camshaft lobes/journals Valve stem (valve guide sliding surface) Rocker arm slipper surface Rocker arm shaft outer surface Connecting rod bearing surface Crankshaft journals Clutch outer guide outer surface Transmission gear shift fork groove Transmission collar inner and outer surface Transmission spline collar outer surface Connecting rod small end inner surface	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
	Piston outer surface Piston ring outer surface Piston pin outer surface Primary drive gear bolt threads and seating surface Flywheel bolt threads and seating surface Starter clutch sprag sliding lock surface Starter idle gear and reduction gear shaft outer surface Clutch center lock nut threads Clutch lifter arm-to-right crankcase cover sliding surface Clutch lifter rod-to-right crankcase cover sliding surface Clutch disc outer surface Cylinder stud bolt threads Cylinder head 8-mm bolt threads Valve adjusting screw threads and seating surface Cylinder head mounting bolt, nut seating surface Cylinder head cover mounting rubber seal whole surface Connecting rod bolt/nut threads and seating surface Transmission gear teeth Oil filter cartridge threads and O-ring Bearings rolling area O-rings	Engine oil	
	Air cleaner housing-to-chamber band inside surface Crankshaft hole cap threads Timing hole cap threads Oil seal lips	Multi-purpose grease	
	Oil pressure switch threads Thermosensor threads Left and right crankcase mating surface Left and right crankcase cover mating surface	Sealant	See page 4-3. See page 19-8.
	Cam sprocket bolt threads Starter clutch housing bolt threads Oil pump driven sprocket bolt threads Stator wire holder bolt threads Gearshift cam plate bolt threads Transmission bearing set plate bolt threads Countershaft oil seal set plate bolt threads Cam chain tensioner set plate bolt threads Stator mounting bolt threads Oil filter boss threads (crankcase side) Ignition pulse generator bolt threads Left crankcase cover bolt threads	Locking agent	Coating width: $6.5 \pm 1$ mm ( $0.26 \pm 0.04$ in)  See page 9-4.

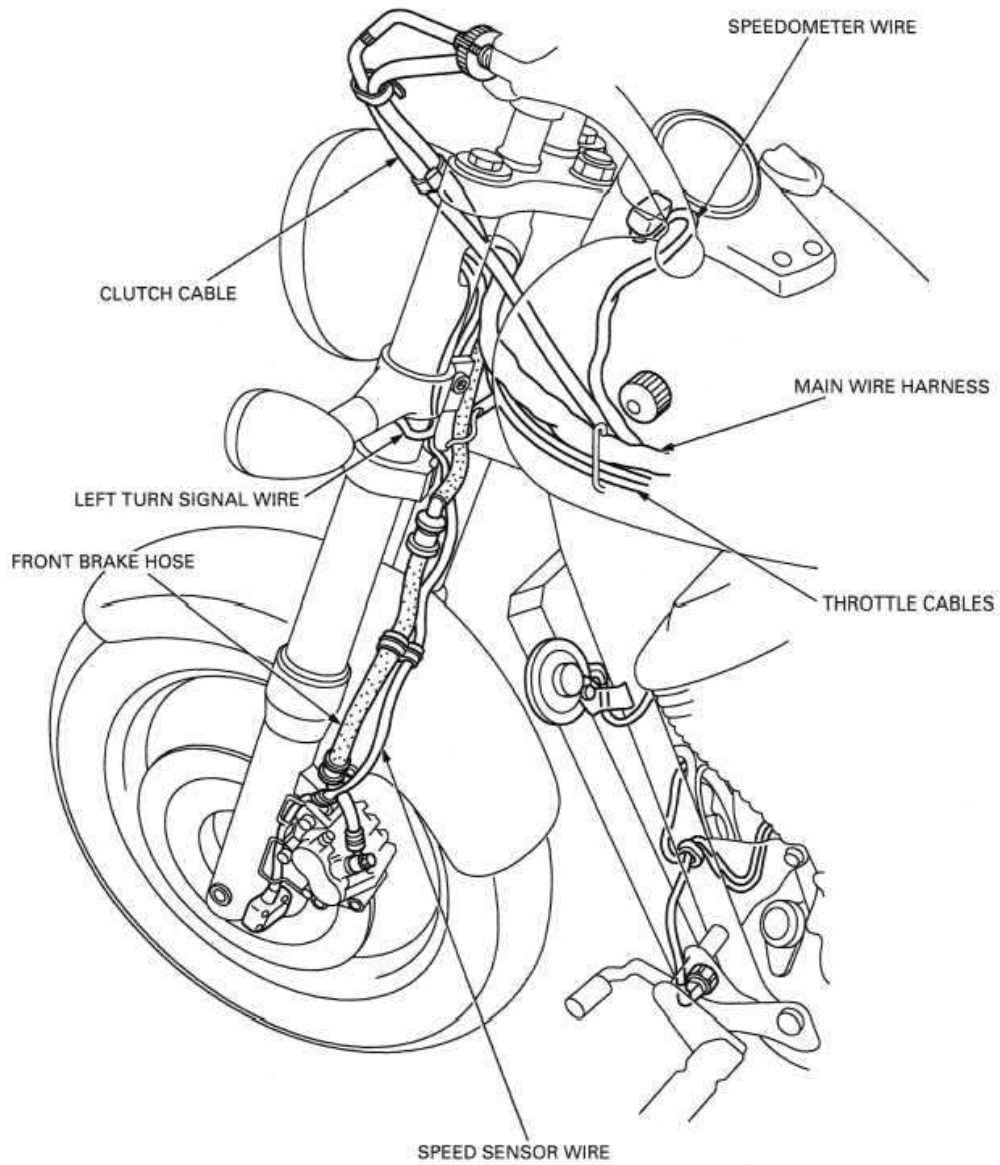
# GENERAL INFORMATION

FRAME	LOCATION	MATERIAL	REMARKS
	Side stand pivot sliding surface Steering head bearing sliding surface Steering head dust seal lips Clutch lever pivot bolt sliding surface Throttle grip inner surface Throttle pipe rolled-up portion, throttle cable end Rear wheel axle sliding surface Rear wheel sleeve sliding surface Rear brake cam sliding surface Rear brake shoe-to-cam sliding surface Rear brake anchor pin sliding surface Rear brake pedal and rod pivot sliding surface Rear brake pedal middle rod joint bolt sliding surface Swingarm pivot dust seal lips Swingarm pivot needle bearing rolling area Footpeg and pillion step pivot sliding area Dust seal lips Oil seal lips	Multi-purpose grease	Spreading 1.0 g  Spreading 1.0 – 2.0 g Spreading 0.2 – 0.3 g
	Steering bearing adjustment nut threads Rear brake cam felt seal	Engine oil	
	Brake master cylinder piston cups Brake master cylinder piston Brake caliper piston Brake caliper piston seals	DOT 4 brake fluid	
	Brake lever pivot Brake lever contacting surface of master piston Brake caliper pin sliding surface Brake caliper bracket pin sliding surface Brake caliper dust seals	Silicone grease	Spreading 0.1 g min  Spreading 0.4 g min Spreading 0.4 g min
	Front fork socket bolt threads Final driven flange stud bolt threads Brake caliper bracket retainer bolt threads Brake caliper bracket pin bolt threads Brake caliper pin bolt threads	Locking agent	
	Swingarm pivot bolt and distance collar whole surface	Gear oil	
	Drive chain	#80 – 90 gear oil	
	Front fork rebound spring Front fork spring Front fork oil seal, dust seal lips	Fork fluid	
	Cable insides	Cable lubricant	
	Handle grip rubber inside	HondaBond A or Honda grip cement (U.S.A. only)	

**GENERAL INFORMATION**

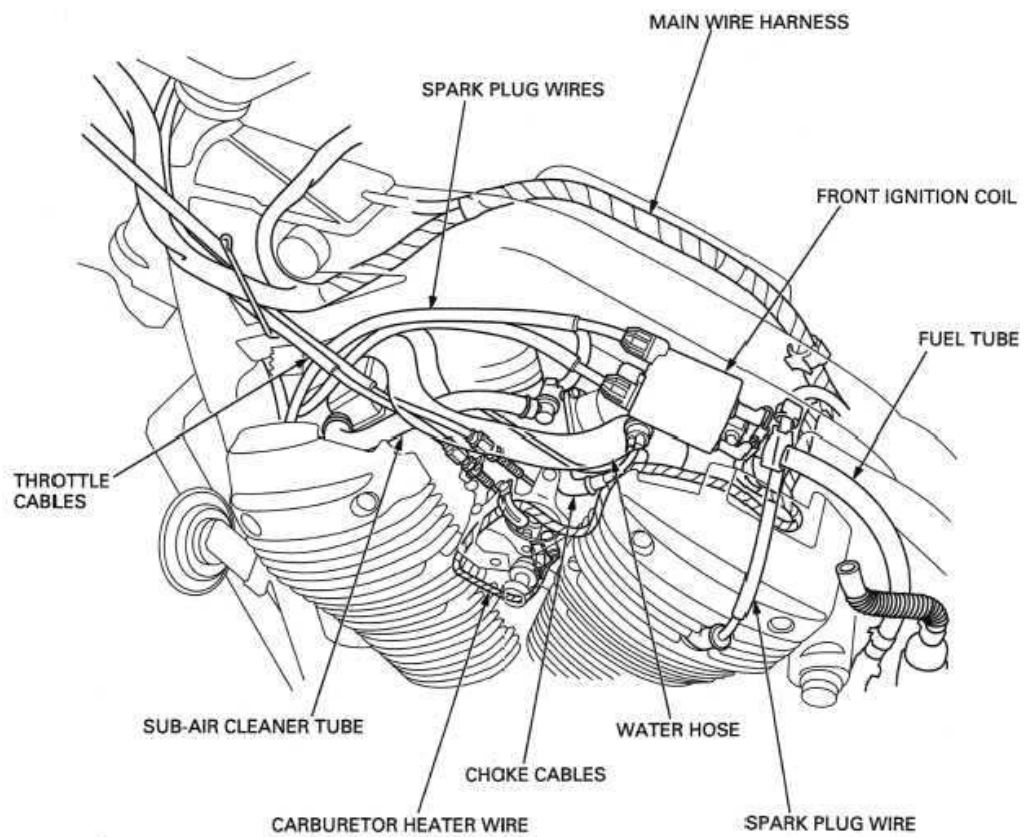
**CABLE & HARNESS ROUTING**

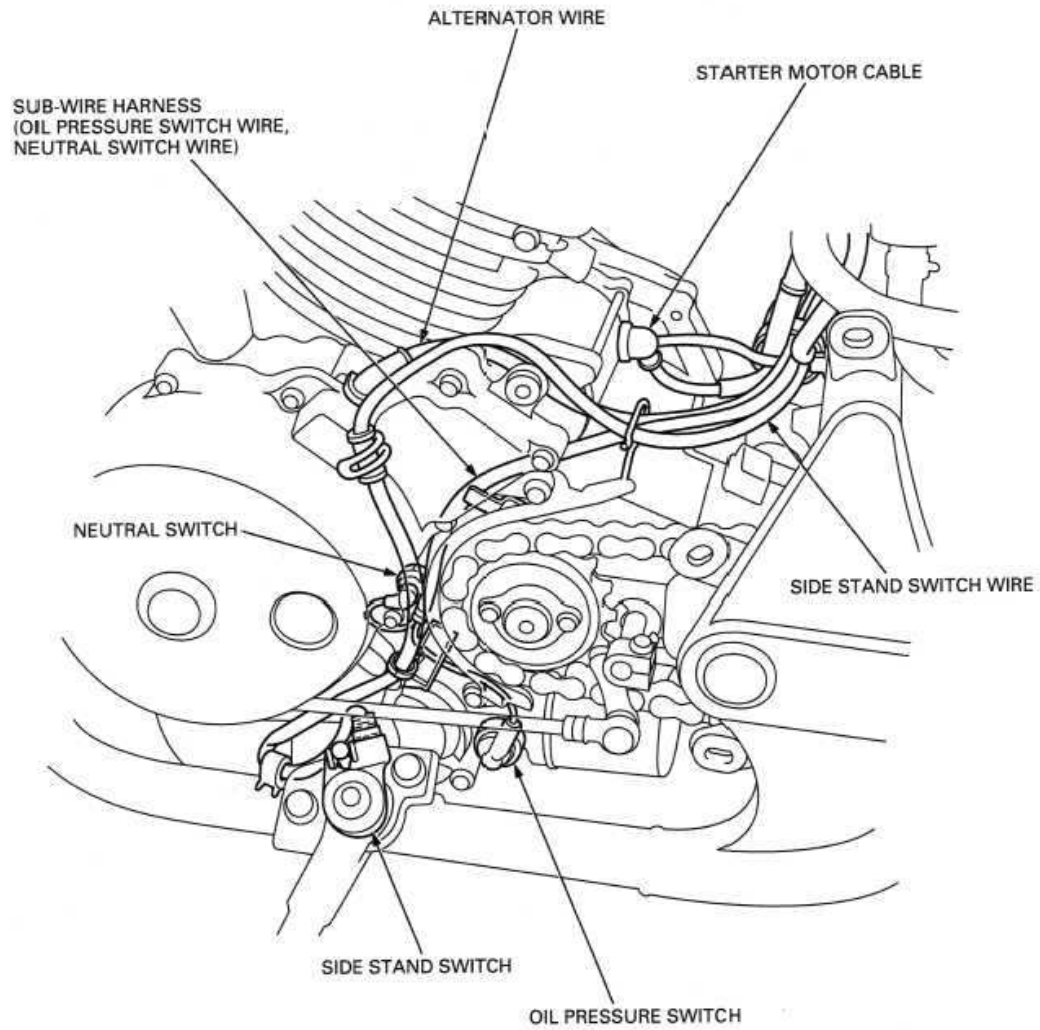




## GENERAL INFORMATION

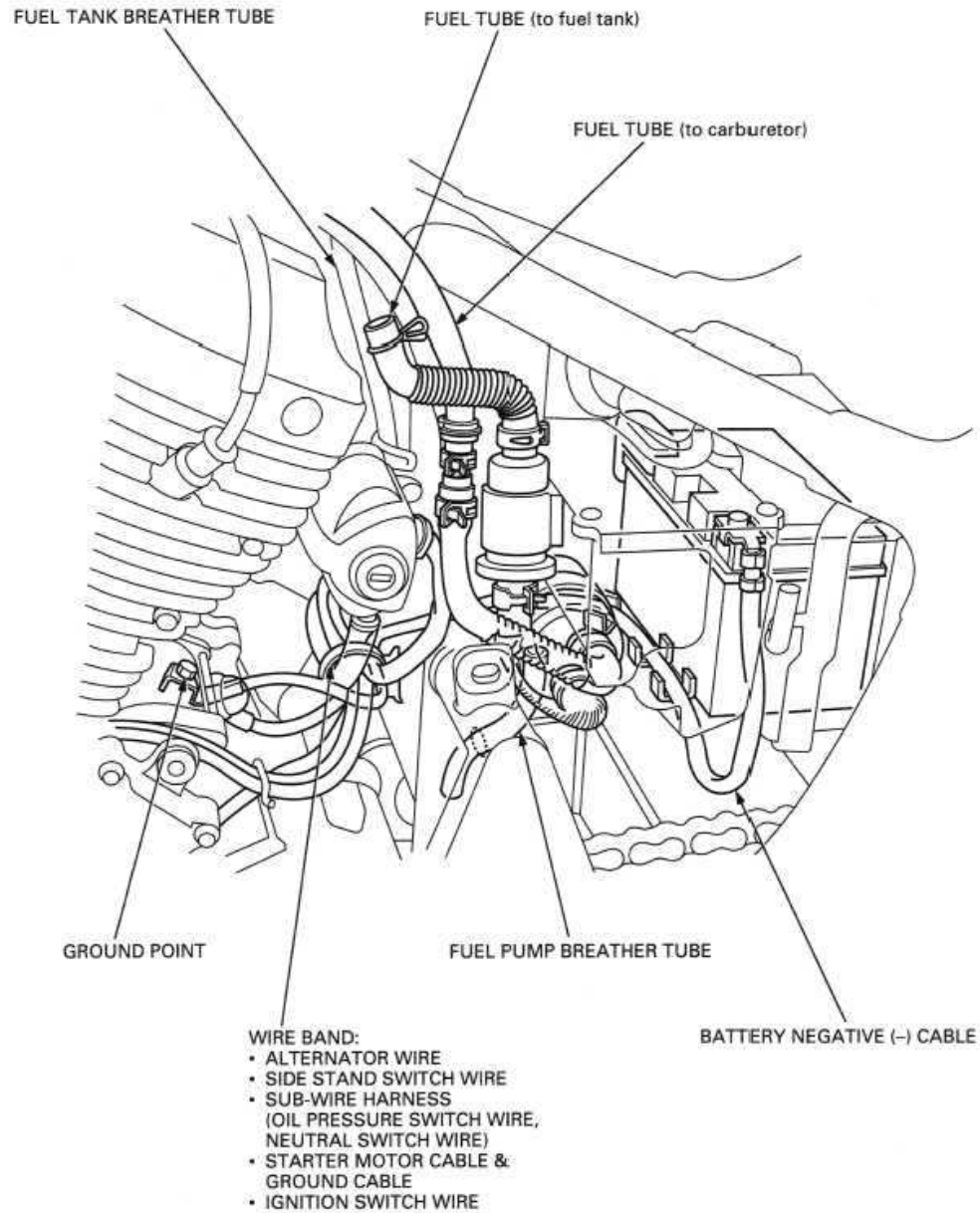
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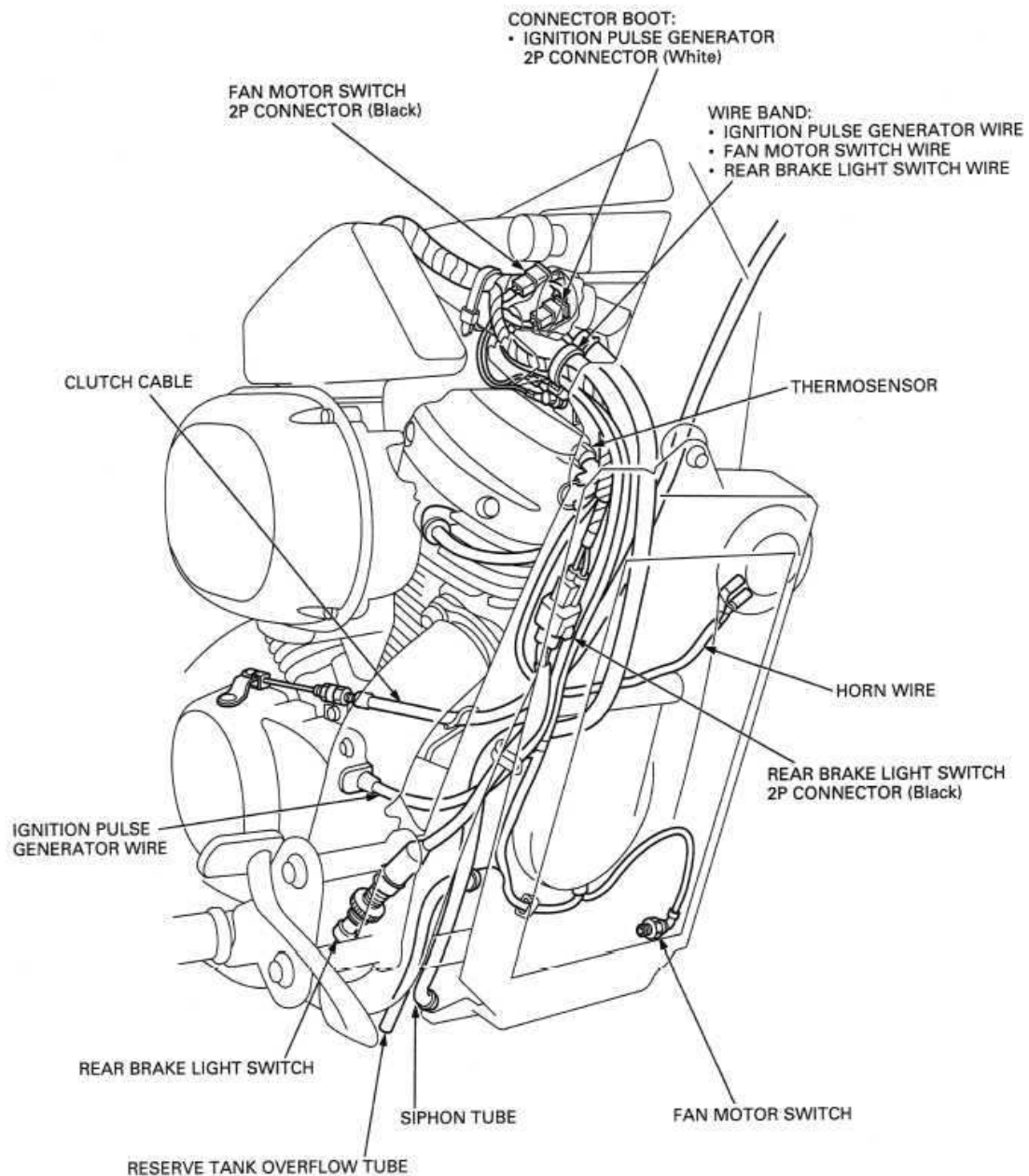




## GENERAL INFORMATION

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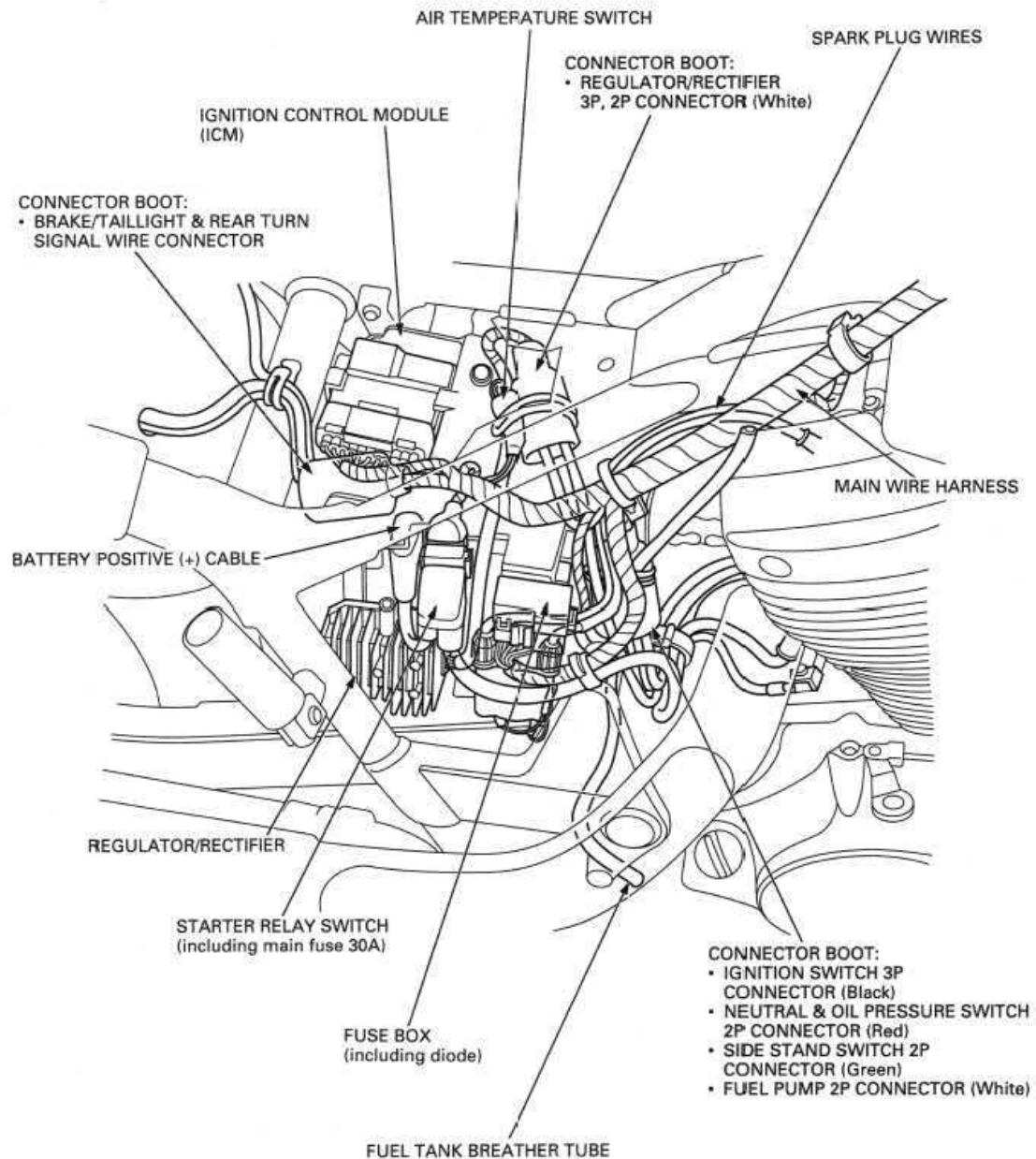


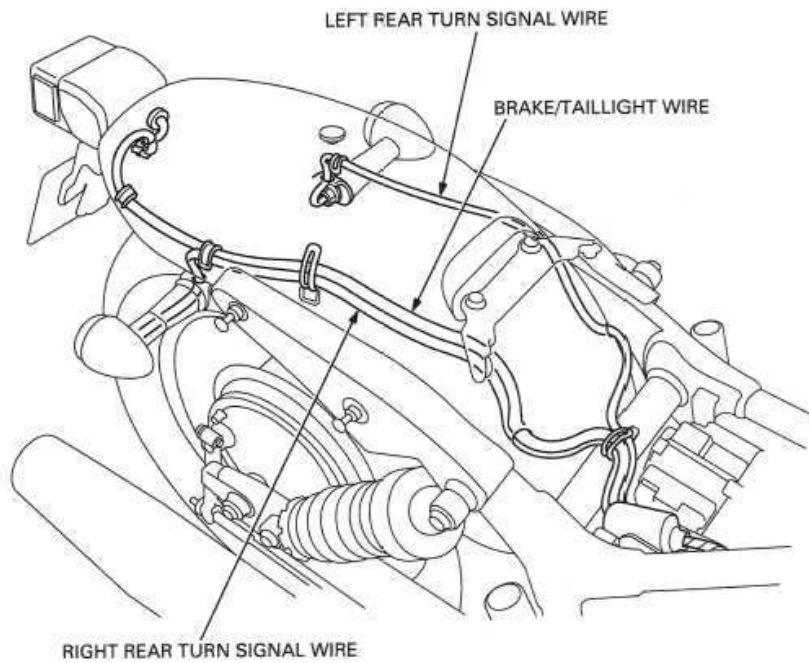
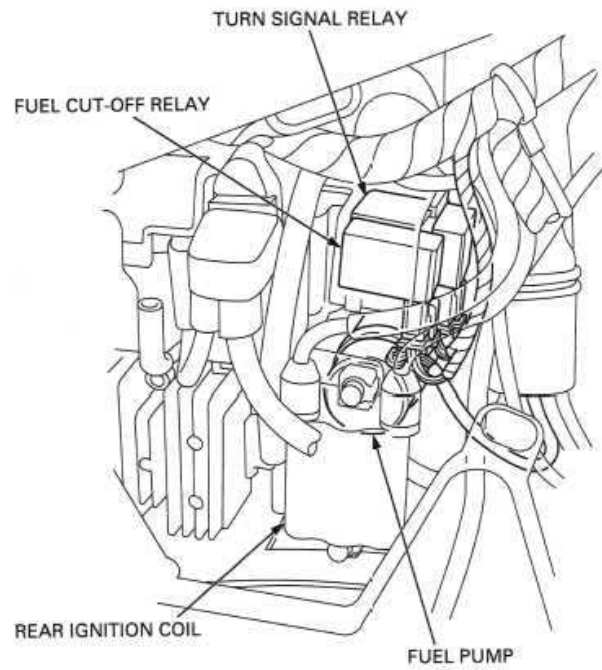




## GENERAL INFORMATION

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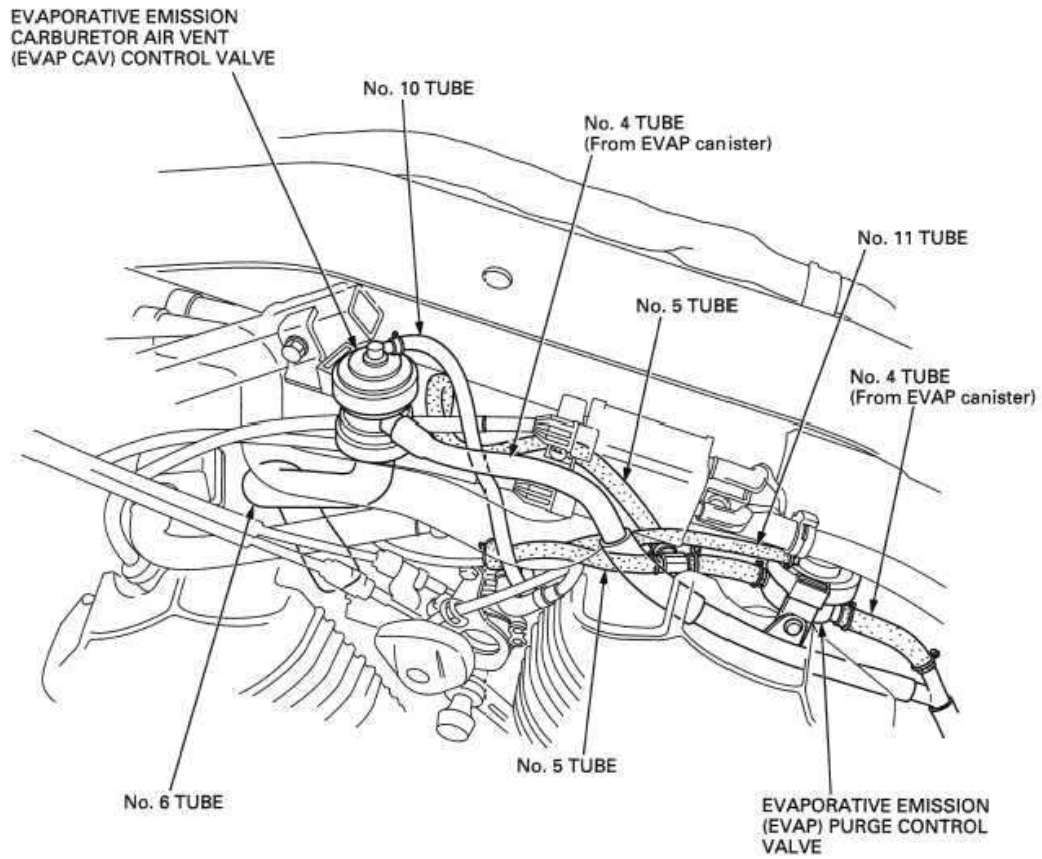




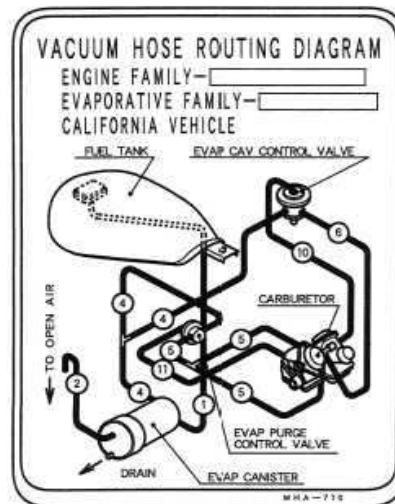
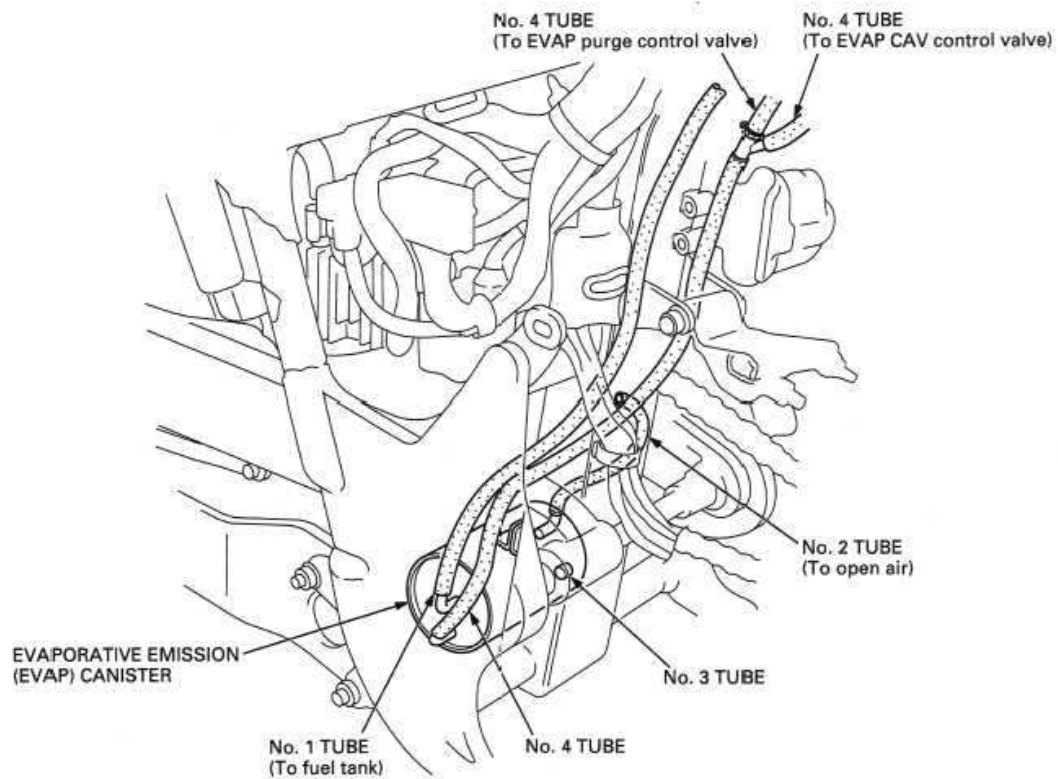
**GENERAL INFORMATION**

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**CALIFORNIA TYPE:**



## GENERAL INFORMATION



This label is located on the reverse side of the left side cover.

## GENERAL INFORMATION

### EMISSION CONTROL SYSTEMS

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

#### SOURCE OF EMISSIONS

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

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

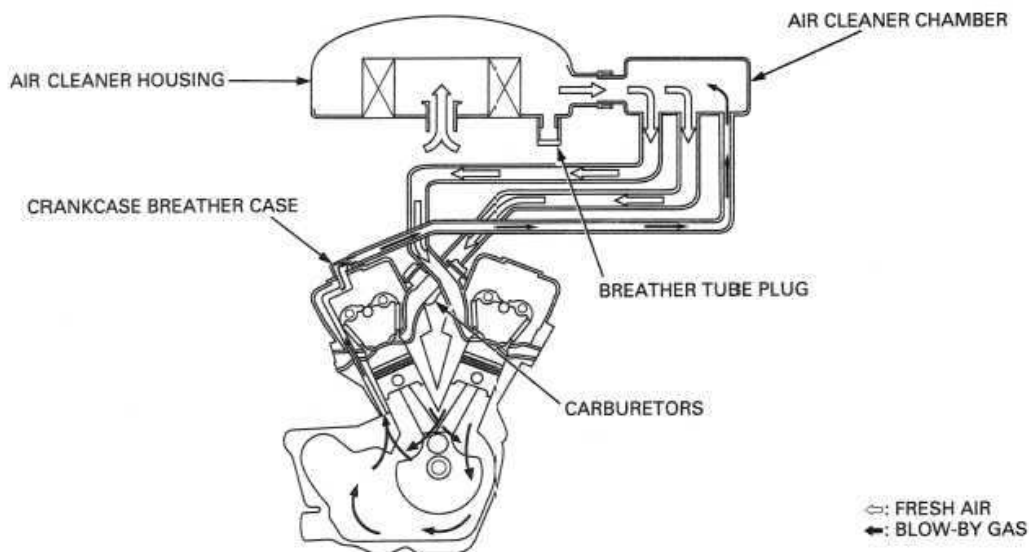
#### EXHAUST EMISSION CONTROL SYSTEM

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

#### CRANKCASE EMISSION CONTROL SYSTEM

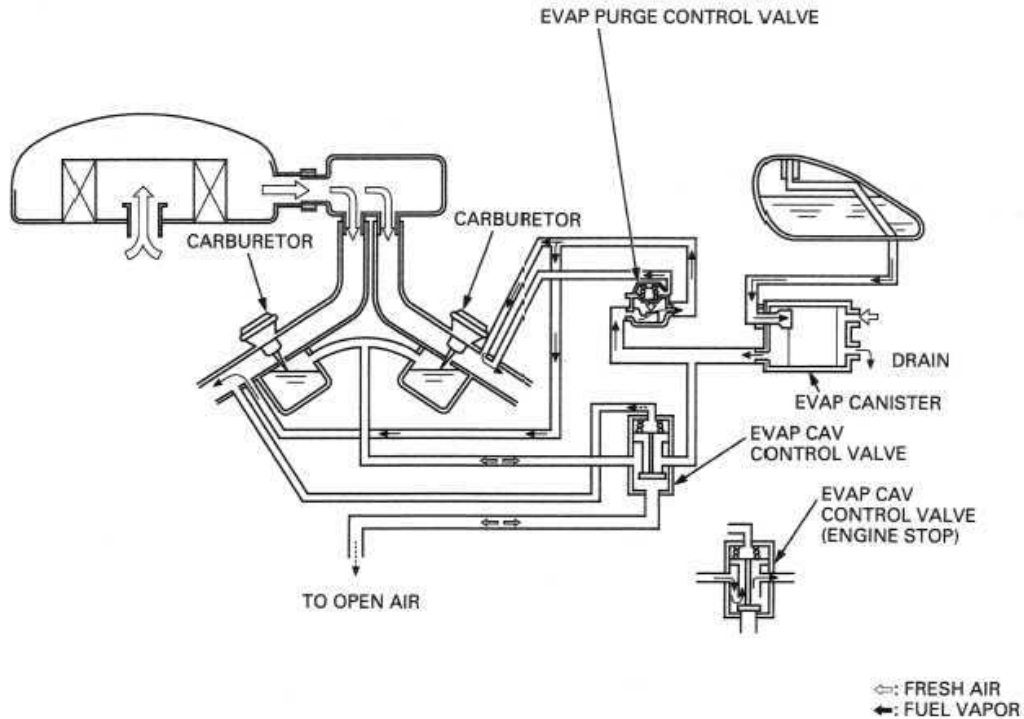
The engine is equipped with a closed crankcase system which routes crankcase emissions through the air cleaner into the combustion chamber.

Condensed crankcase vapors are accumulated in a drain tube it must be emptied periodically (page 3-3). The drain tube needs to be checked for oil accumulation more frequently if the machine has been consistently ridden at high speeds or in rain.



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

This model complies with California Air Resources Board (CARB) evaporative emission requirements. Fuel vapor from the fuel tank and carburetor is directed into the evaporative emission (EVAP) canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control valve is open, fuel vapor in the EVAP canister is drawn into the engine through the carburetor.

**NOISE EMISSION CONTROL SYSTEM**

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

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

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

## GENERAL INFORMATION

### EMISSION CONTROL INFORMATION LABEL

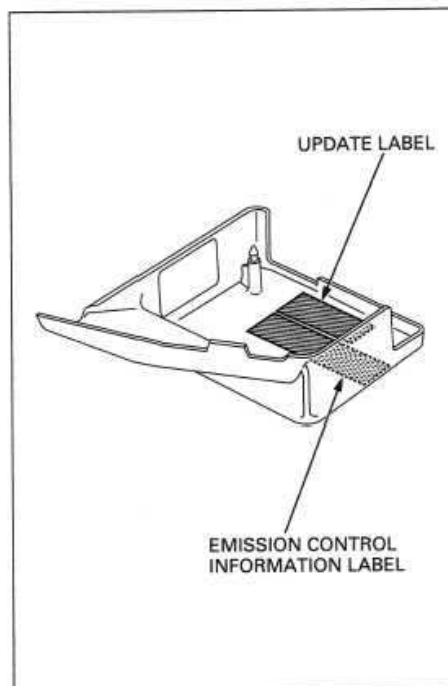
An Emission Control Information Label is located on the reverse side of the left side cover as shown. The left side cover must be removed to read it. It gives basic tune-up specifications.

### VEHICLE EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment, attach an update label on the reverse side of the left side cover as shown (page 5-23).

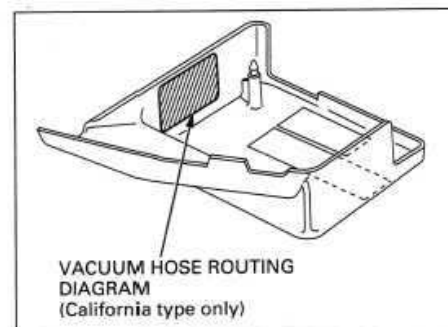
Instructions for obtaining the update label are given in Service Letter No. 132.

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



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

The Vacuum Hose Routing Diagram Label is on the reverse side of the left side cover as shown (page 1-27).



## 2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	LEFT CRANKCASE REAR COVER	2-3
TROUBLESHOOTING	2-1	REAR FENDER	2-4
SEAT	2-2	GRAB RAIL	2-5
FUEL TANK	2-2	EXHAUST SYSTEM	2-5
SIDE COVER	2-3		

### SERVICE INFORMATION

#### GENERAL

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

#### TORQUE VALUES

Footpeg bracket bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Exhaust pipe joint nut	25 N·m (2.5 kgf·m, 18 lbf·ft)
Muffler mounting nut	26 N·m (2.7 kgf·m, 20 lbf·ft)
Exhaust pipe joint pipe bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)
Seat mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Rear fender bolt	64 N·m (6.5 kgf·m, 47 lbf·ft)
Shock absorber stud bolt	108 N·m (11.0 kgf·m, 80 lbf·ft)
Left grab rail mounting nut	88 N·m (9.0 kgf·m, 65 lbf·ft)
Fuel tank mounting bolt	19 N·m (1.9 kgf·m, 14 lbf·ft)
Fuel valve	34 N·m (3.5 kgf·m, 25 lbf·ft)
Fuel valve screw	0.6 N·m (0.06 kgf·m, 0.43 lbf·ft)
Left crankcase rear cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Shock absorber upper/lower mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)

### TROUBLESHOOTING

#### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

#### Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler



## SEAT

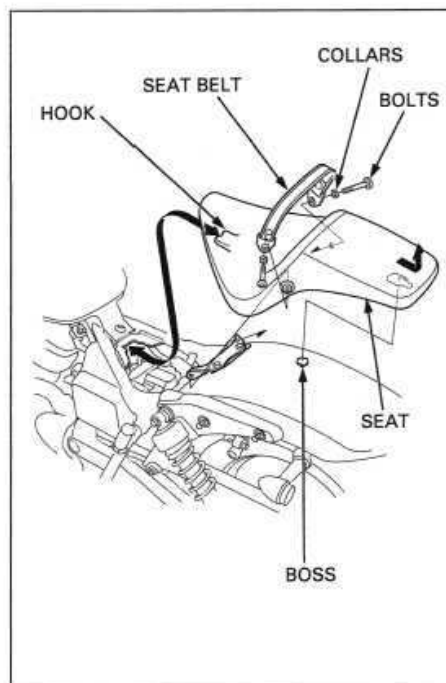
### REMOVAL

Remove the seat mounting bolts, collars, and seat belt.  
Slide and remove the seat rearwards to avoid damaging the rear fender surface.

### INSTALLATION

Install the seat by inserting the hook of the seat under the raised lip of the frame and push the seat to the forward.  
Align the bolt holes and install the seat belt, collars and mounting bolts, then tighten the bolts to the specified torque.

**TORQUE:** 26 N-m (2.7 kgf-m, 20 lbf-ft)



## FUEL TANK

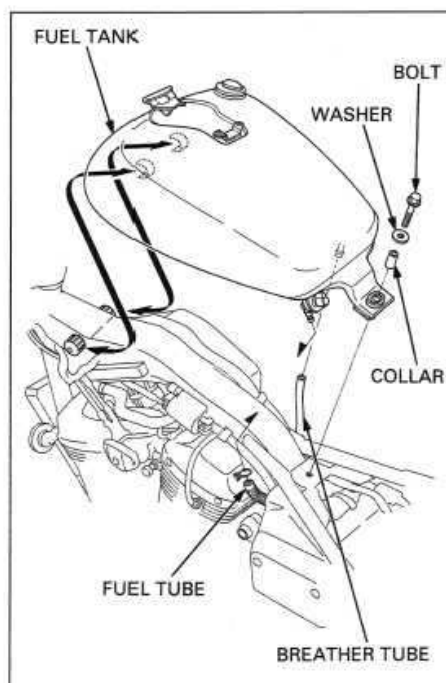
Remove the seat (see above).  
Remove the speedometer (page 19-4).

Turn the fuel valve to the off position.  
Disconnect the fuel tube and breather tube.  
Remove the fuel tank mounting bolt, washer and collar.

Slide and remove the fuel tank rearwards.

Installation is in the reverse order of removal.

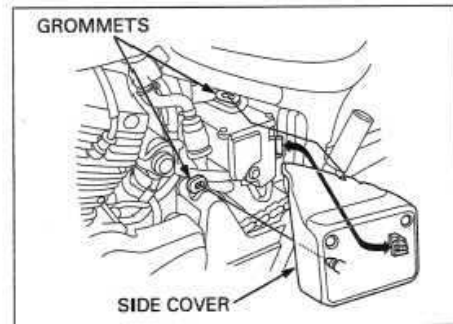
**TORQUE:** Fuel tank mounting bolt:  
19 N-m (1.9 kgf-m, 14 lbf-ft)



## SIDE COVER

Release the side cover bosses and tab from the grommets and side cover.

Installation is in the reverse order of removal.



## LEFT CRANKCASE REAR COVER

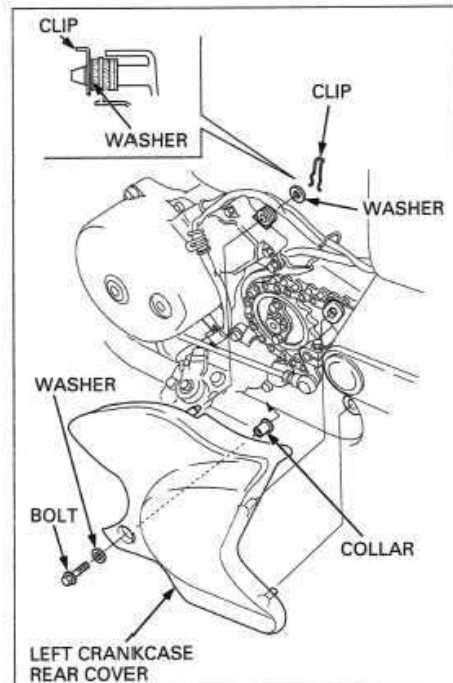
Remove the clip and washer from the boss of the cover.  
Remove the cover bolt, washer and collar.

Release the bosses from the grommets and remove the left crankcase rear cover.

Installation is in the reverse order of removal.

### TORQUE:

Left crankcase rear cover bolt:  
12 N-m (1.2 kgf-m, 9 lbf-ft)



## REAR FENDER

### ASSEMBLY REMOVAL/INSTALLATION

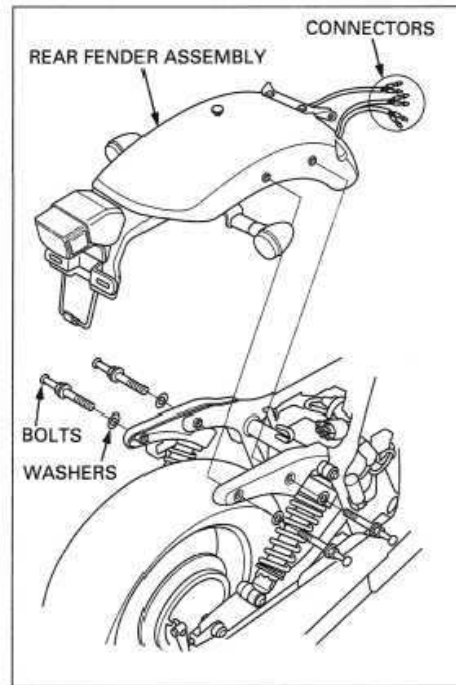
Remove the seat (page 2-2).

Disconnect the brake/taillight, rear turn signal wire connectors located in the connector boot.

Remove the four bolts, washers and rear fender assembly from the frame to avoid scratching the rear fender.

#### TORQUE:

Rear fender bolt: 64 N·m (6.5 kgf-m, 47 lbf-ft)



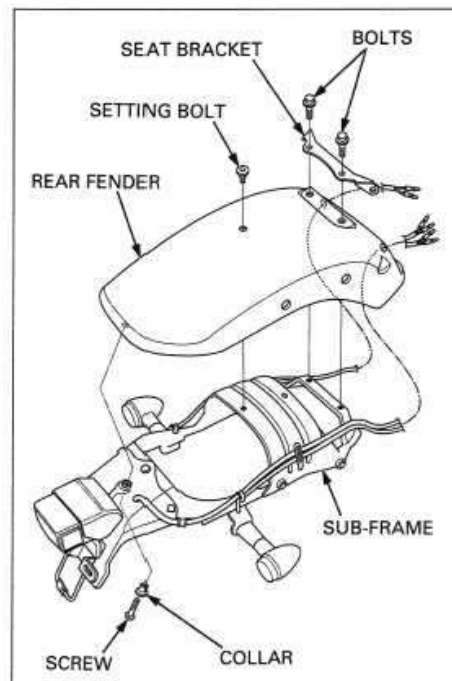
### DISASSEMBLY/ASSEMBLY

Remove the two bolts and seat bracket.

Remove the setting bolt.

Remove the screw and collar, then remove the rear fender from the sub-frame.

Assembly is in the reverse order of disassembly.



## GRAB RAIL

Remove the rear fender assembly (see previous page).

### LEFT GRAB RAIL

Loosen the left grab rail mounting nut, then remove the grab rail.

### RIGHT GRAB RAIL

Remove the right shock absorber (page 14-14).

Remove the shock absorber stud bolt, then remove the grab rail.

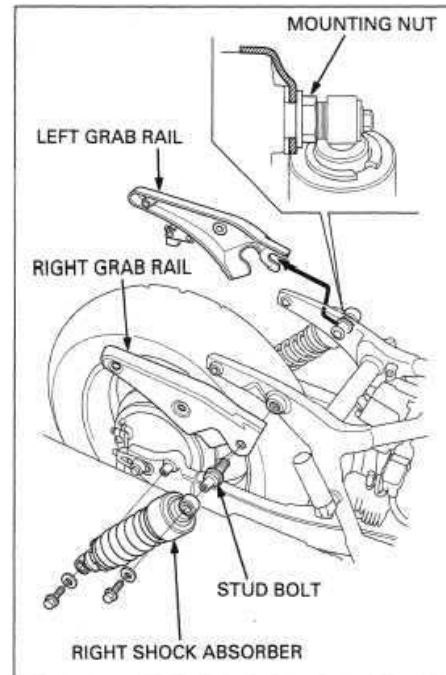
Installation is in the reverse order of removal.

### TORQUE:

Shock absorber upper/lower mounting bolt:  
26 N-m (2.7 kgf-m, 20 lbf-ft)

Left grab rail mounting nut:  
88 N-m (9.0 kgf-m, 65 lbf-ft)

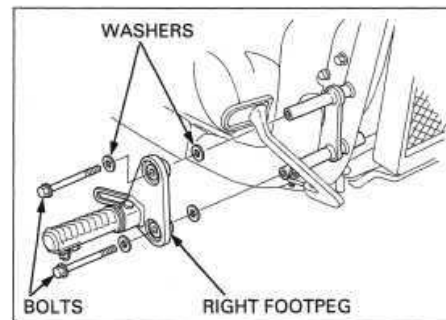
Shock absorber stud bolt:  
108 N-m (11.0 kgf-m, 80 lbf-ft)



## EXHAUST SYSTEM

### REMOVAL

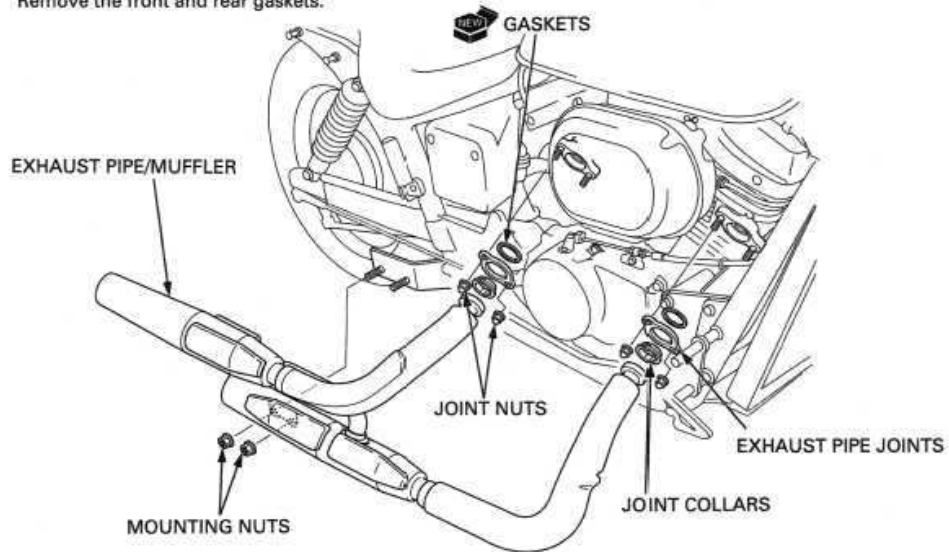
Remove the bolts, washers and right footpeg assembly from the frame.



## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the exhaust pipe joint nuts.  
Remove the muffler mounting nuts and exhaust pipe/muffler assembly.

Remove the exhaust pipe joint collars.  
Remove the front and rear gaskets.



### INSTALLATION

Install the exhaust pipe joint collars.  
Make sure new gaskets are installed in the proper position.

Align the rear exhaust pipe flange with the cylinder head stud bolts.  
Loosely install the exhaust pipe joint nuts and mounting nuts.

Tighten the mounting nuts to the specified torque.

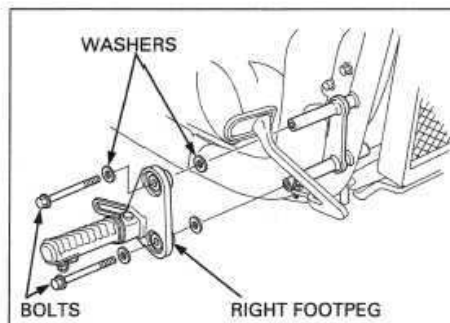
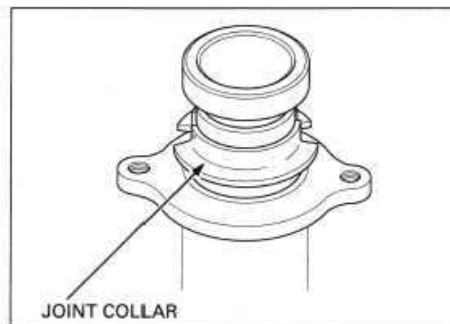
**TORQUE: 26 N-m (2.7 kg-m, 20 lbf-ft)**

Tighten the joint nuts to the specified torque.

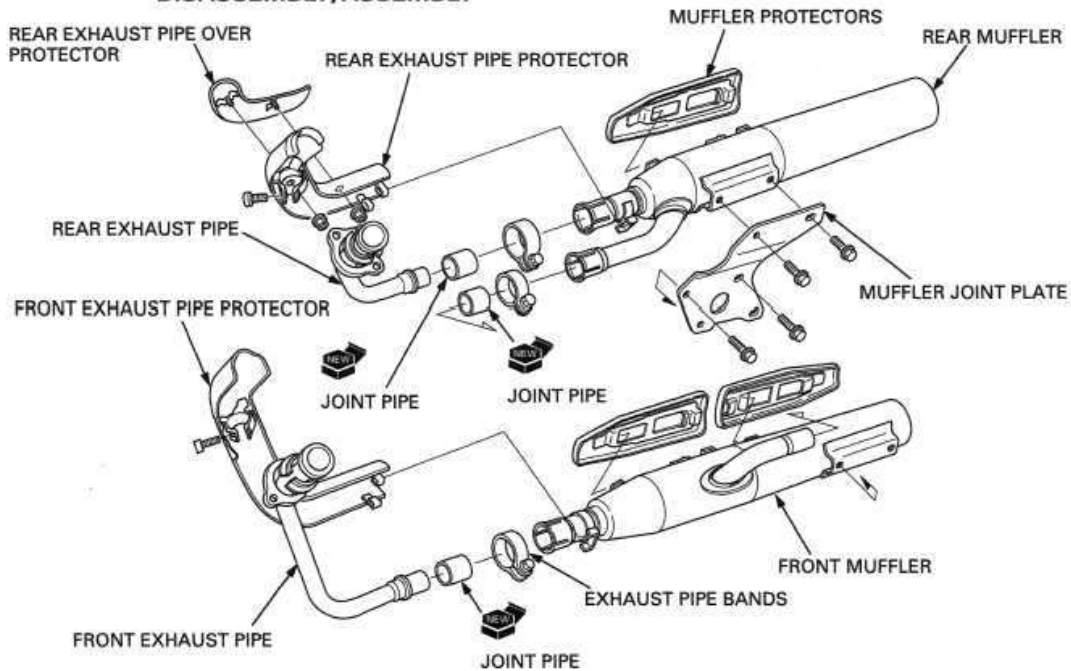
**TORQUE: 25 N-m (2.5 kgf-m, 18 lbf-ft)**

Install the washers and right footpeg assembly.  
Install the washers and bracket bolts, then tighten the bolts to the specified torque.

**TORQUE: 34 N-m (3.5 kgf-m, 25 lbf-ft)**



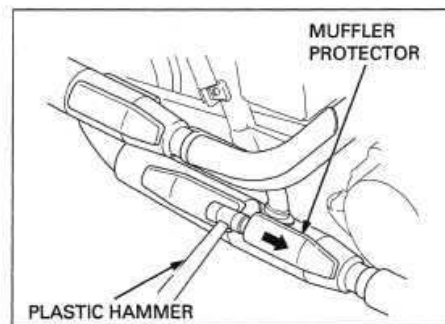
**DISASSEMBLY/ASSEMBLY**



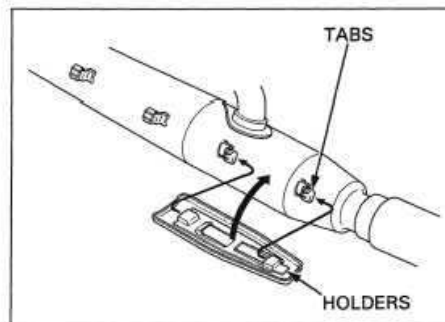
**MUFFLER PROTECTOR**

Drive the rear end of the protector using the plastic hammer and break the lock tab (reverse side of the protector) and remove it.

Do not reuse the removed protector.



Install the new protector by aligning the holders with the tabs on the muffler.



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**MEMO**

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## 3. MAINTENANCE

3

SERVICE INFORMATION	3-1	EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	3-14
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN	3-15
FUEL LINE	3-4	BRAKE FLUID	3-18
THROTTLE OPERATION	3-4	BRAKE SHOES/PADS WEAR	3-18
CARBURETOR CHOKE	3-5	BRAKE SYSTEM	3-19
AIR CLEANER	3-6	BRAKE LIGHT SWITCH	3-20
CRANKCASE BREATHER	3-6	HEADLIGHT AIM	3-20
SPARK PLUG	3-7	CLUTCH SYSTEM	3-20
VALVE CLEARANCE	3-8	SIDE STAND	3-21
ENGINE OIL	3-10	SUSPENSION	3-22
ENGINE OIL FILTER	3-10	NUTS, BOLTS, FASTENERS	3-22
CARBURETOR SYNCHRONIZATION	3-11	WHEELS/TIRES	3-23
ENGINE IDLE SPEED	3-12	STEERING HEAD BEARINGS	3-24
RADIATOR COOLANT	3-13		
COOLING SYSTEM	3-13		

### SERVICE INFORMATION

#### SPECIFICATIONS

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

ITEM		SPECIFICATIONS
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)
Spark plug	Standard	DPR8EA-9 (NGK) X24EPR-U9 (DENSO)
	For cold climate/below (5°C/41°F)	DPR7EA-9 (NGK) X22EPR-U9 (DENSO)
	For extended high speed riding	DPR9EA-9 (NGK) X27EPR-U9 (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Valve clearance	IN	0.15 ± 0.02 mm (0.006 ± 0.0008 in)
	EX	0.20 ± 0.02 mm (0.008 ± 0.0008 in)
Engine oil capacity	at draining	2.2 liters (2.32 US qt, 1.94 Imp qt)
	at oil filter change	2.4 liters (2.54 US qt, 2.11 Imp qt)
	at disassembly	2.9 liters (3.06 US qt, 2.55 Imp qt)
Recommended engine oil		Honda GN4 or HP4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40
Carburetor vacuum difference		Within 20 mm Hg (0.8 in Hg) base carburetor: No. 1 (rear)
Engine idle speed		1,000 ± 100 rpm



## MAINTENANCE

ITEM			SPECIFICATIONS
Drive chain slack			15 – 25 mm (0.600 – 1 in)
Drive chain size/link (RK)			525 SMOZ5/124 L
Recommended brake fluid			DOT 4
Brake pedal free play			20 – 30 mm (0.750 – 1.250 in)
Clutch lever free play			10 – 20 mm (0.375 – 0.750 in)
Cold tire pressure	Up to 90 kg (200 lbs) load	Front	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)
		Rear	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)
	Up to maximum weight capacity	Front	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)
		Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)
Tire size		Front	110/80-19 59S
		Rear	160/80-15 M/C 74S
Tire brand	Dunlop	Front	F24
		Rear	K425
	Bridgestone	Front	G515
		Rear	G702

## TORQUE VALUES

Spark plug	14 N·m (1.4 kgf·m, 10 lbf·ft)	
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads and seating surface.
Timing hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads and seating surface.
Valve adjusting screw lock nut	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply oil to the threads and seating surface.
Oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Oil filter cartridge	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply oil to the threads and seating surface.
Vacuum plug	3 N·m (0.3 kgf·m, 2.2 lbf·ft)	
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut.
Side stand assembly bolt	49 N·m (5.0 kgf·m, 39 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)	
Overhead cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

## TOOLS

Valve adjusting wrench	07908 – KE90000	or 07908 – KE90100 (U.S.A. only)
Oil filter wrench	07HAA – PJ70100	
Spoke wrench	07JMA – MR60100	or equivalent commercially available in U.S.A.
Vacuum gauge attachment	07510 – 3000200	or 07LMJ – 001000A (U.S.A. only)
Vacuum gauge set	07LMJ – 001000A	or M937B – 021-XXXXX (U.S.A. only)
Drive chain tool set	07HMH – MR10103	or 07HMH – MR7010B (U.S.A. only)

# MAINTENANCE SCHEDULE

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

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

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

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

ITEM	FREQUENCY	WHICHEVER COMES FIRST → ↓ NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
			x 1,000 mi	0.6	4	8	12	16	20	24	
			x 100 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	* FUEL LINE					I		I		I	3-4
	* THROTTLE OPERATION					I		I		I	3-4
	* CARBURETOR CHOKE					I		I		I	3-5
	AIR CLEANER	NOTE 2					R			R	3-6
	CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-6
	SPARK PLUG				I	R	I	R	I	R	3-7
	* VALVE CLEARANCE			I		I		I		I	3-8
	ENGINE OIL			R		R		R		R	3-10
	ENGINE OIL FILTER			R		R		R		R	3-10
	* CARBURETOR SYNCHRONIZATION					I		I		I	3-11
	* ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-12
	RADIATOR COOLANT	NOTE 5				I		I		R	3-13
	* COOLING SYSTEM					I		I		I	3-13
	* EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-14
NON-EMISSION RELATED ITEMS	DRIVE CHAIN		Every 500 mi (800 km) I, L								3-15
	BRAKE FLUID	NOTE 5			I	I	R	I	I	R	3-18
	BRAKE SHOES/PADS WEAR				I	I	I	I	I	I	3-18
	BRAKE SYSTEM			I		I		I		I	3-19
	* BRAKE LIGHT SWITCH					I		I		I	3-20
	* HEADLIGHT AIM					I		I		I	3-20
	CLUTCH SYSTEM			I	I	I	I	I	I	I	3-20
	SIDE STAND					I		I		I	3-21
	* SUSPENSION					I		I		I	3-22
	* NUTS, BOLTS, FASTENERS			I		I		I		I	3-22
	** WHEELS/TIRES			I	I	I	I	I	I	I	3-23
	** STEERING HEAD BEARINGS			I		I		I		I	3-24

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

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

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

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

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

4. California type only.

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

## MAINTENANCE

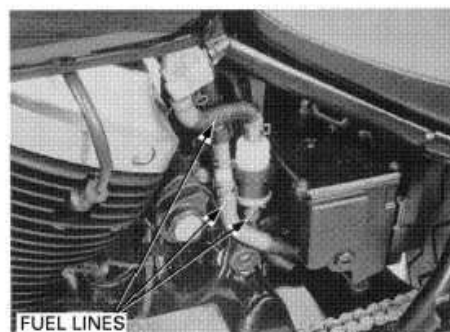
### FUEL LINE

Remove the left side cover (page 2-3).

Check the fuel lines for deterioration, damage or leakage.

Replace the fuel lines if necessary.

For the tube routing, see section 1.



### THROTTLE OPERATION

Check for any deterioration or damage to the throttle cables.

Check the throttle grip for smooth operation.

Check that the throttle opens and automatically closes in all steering positions.

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

For lubrication: Disconnect the throttle cables at their upper ends (page 13-3). Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a lightweight oil.

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

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

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

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

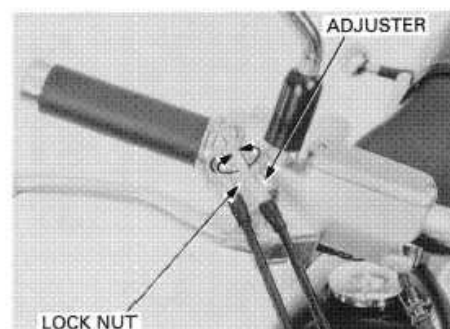
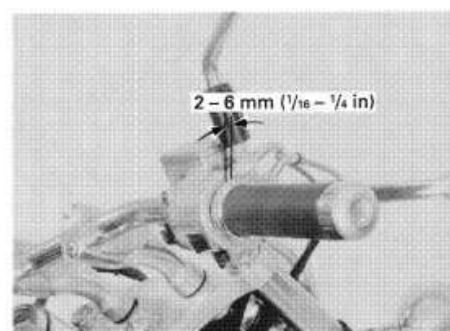
Measure the throttle grip free play at the throttle grip flange.

**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.

Tighten the lock nut and reposition the adjuster boot properly after the adjustment has been made.

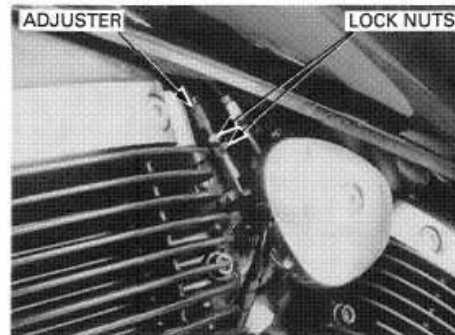


Major adjustments are made with the lower adjuster.

Loosen the lock nuts and turn the adjuster to obtain the free play.

Tighten the lock nuts after the adjustment has been made.

Recheck the throttle grip free play.

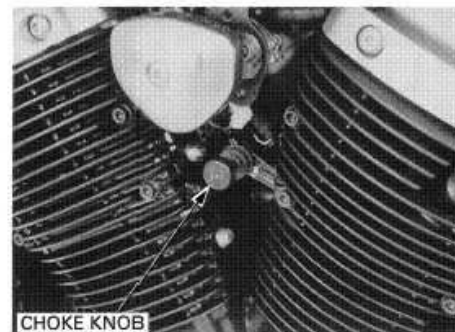


## CARBURETOR CHOKE

This motorcycle's choke system uses a fuel enriching circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enriching circuit via a cable when the choke knob on the left side of the carburetor is pulled up.

Check for smooth choke knob operation and lubricate the choke if required.

Check the choke cable for frayed, kinked or other damage.



## STARTING ENRICHMENT (SE) VALVE

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

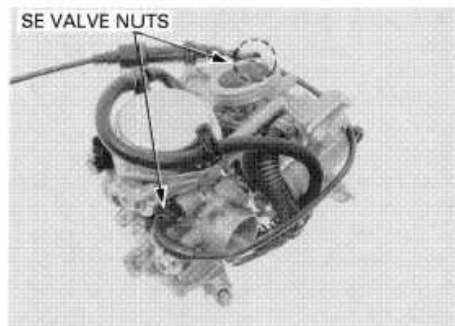
- Difficulty in starting before the engine is warmed up (easy once it is warmed up): SE valve is not completely opened.
- Idle speed is erratic even after warm-up (imperfect combustion): SE valve is not completely closed.

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

Remove the carburetor (page 5-5).

Remove the choke cable boots from the SE valve nuts.

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

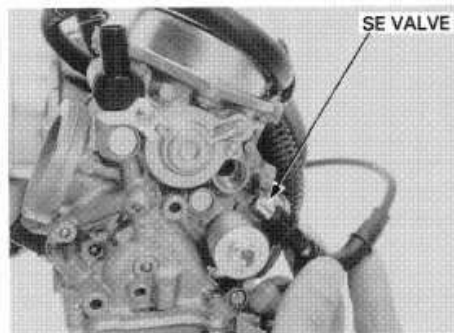


## MAINTENANCE

Pull the SE valve knob all the way out to fully open position and recheck for smooth operation of the SE valve knob.

There should be no free play.

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



## AIR CLEANER

### NOTE:

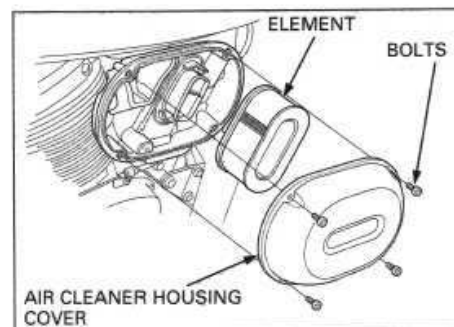
- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.

*If the motorcycle is used in wet or dusty areas, more frequent inspections are required.*

Remove the four bolts from the air cleaner housing cover and remove the cover.  
Remove the air cleaner element.

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

Install the air cleaner element in the reverse order of removal.

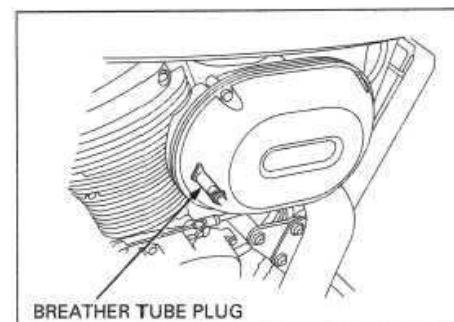


## CRANKCASE BREATHER

### NOTE:

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

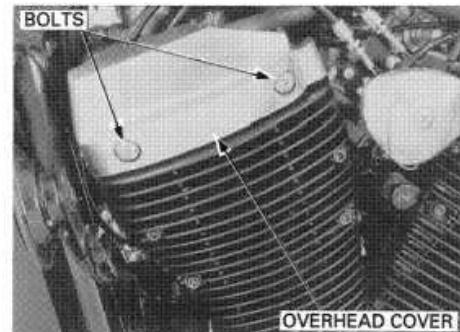
Remove the air cleaner housing breather tube plug from the tube end and drain deposits into a suitable container, then install the tube plug securely.



## SPARK PLUG

Front cylinder  
left side and rear  
cylinder right  
side plugs:

Remove the two bolts and cylinder head overhead cover.

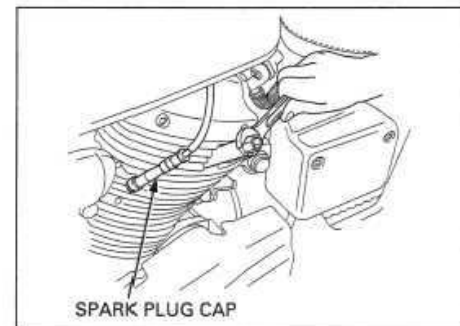


Disconnect the spark plug caps and clean around the spark plug bases.

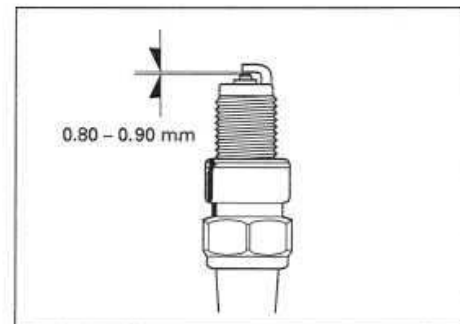
**NOTE:**

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

Remove the spark plugs and inspect or replace as described in the maintenance schedule.



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



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

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

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

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

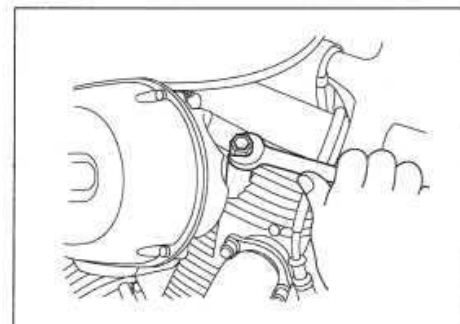
Reinstall the spark plug in the cylinder head and hand tighten, then torque to specification.

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

Install the spark plug caps

**TORQUE:**

**Overhead cover bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



## MAINTENANCE

### VALVE CLEARANCE

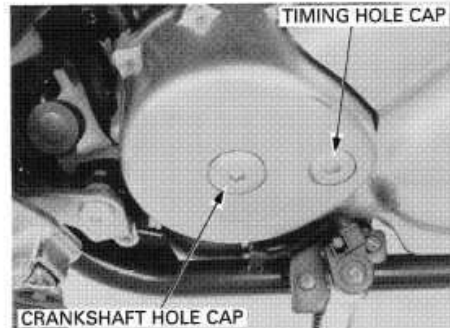
#### INSPECTION

##### NOTE:

- Inspect and adjust the valve clearance while the engine is cold (below 35°C, 95°F).
- Adjust the front cylinder head valves first.

Remove the front and rear cylinder head covers (page 10-4).

Remove the timing hole cap and crankshaft hole cap.

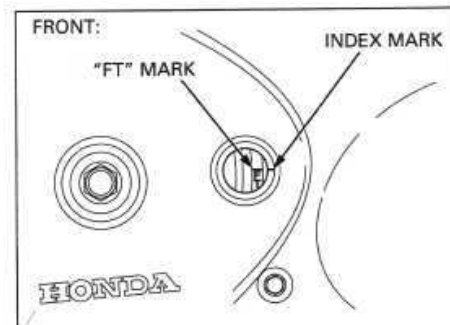


#### FRONT CYLINDER HEAD

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

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

This position can be obtained by confirming that there is slack in the rocker arm. If there is no slack, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and match up the "FT" mark again.



Measure the front cylinder head valve clearance by inserting a feeler gauge between the valve adjusting screw and valve.

##### VALVE CLEARANCES:

IN:  $0.15 \pm 0.02$  mm ( $0.006 \pm 0.0008$  in)

EX:  $0.20 \pm 0.02$  mm ( $0.008 \pm 0.0008$  in)

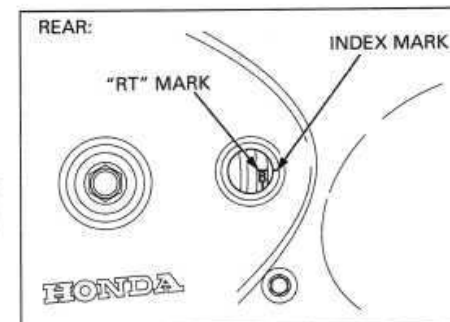


#### REAR CYLINDER HEAD

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

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

This position can be obtained by confirming that there is slack in the rocker arm. If there is no slack, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and match up the "RT" mark again.



Measure the rear cylinder head valve clearance by inserting a feeler gauge between the valve adjusting screw and valve.

**VALVE CLEARANCES:**

IN:  $0.15 \pm 0.02$  mm ( $0.006 \pm 0.0008$  in)

EX:  $0.20 \pm 0.02$  mm ( $0.008 \pm 0.0008$  in)



**ADJUSTMENT**

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

Apply oil to the valve adjusting lock nut threads. Hold the adjusting screw and tighten the lock nut.

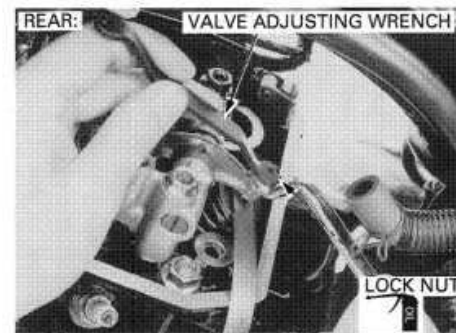
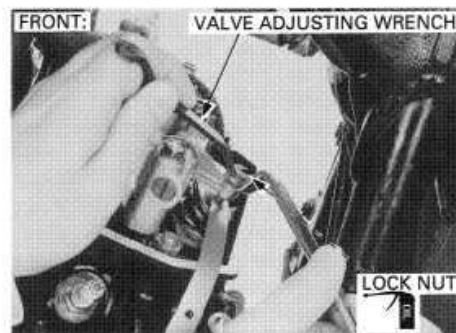
**TORQUE: 23 N-m (2.3 kgf-m, 17 lbf-ft)**

**TOOL:**

Valve adjusting wrench  
07908 – KE90000  
or  
07908 – KE90100  
(U.S.A. only)

After tightening the lock nut, recheck the valve clearance.

Install the front and rear cylinder head cover (page 10-16).

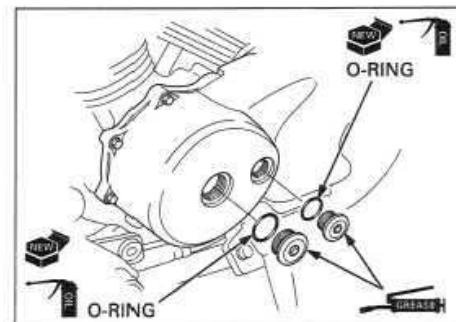


Apply grease to the timing hole cap and crankshaft hole cap threads.

Coat the new O-rings with oil and install them onto the timing hole cap and crankshaft hole cap.

Tighten the timing hole cap and crankshaft hole cap.

**TORQUE: 15 N-m (1.5 kgf-m, 11 lbf-ft)**





## MAINTENANCE

### ENGINE OIL

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

Stop the engine, remove the oil filler cap/dipstick and wipe the oil from the dipstick with a clean cloth.

Wait 2 or 3 minutes after stopping the engine. With the motorcycle in an upright position, insert the dipstick into the dipstick hole without screwing it in.

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

#### RECOMMENDED ENGINE OIL:

Honda GN4 or HP4 4-stroke oil or equivalent motor oil certified to meet

API service classification: SF or SG

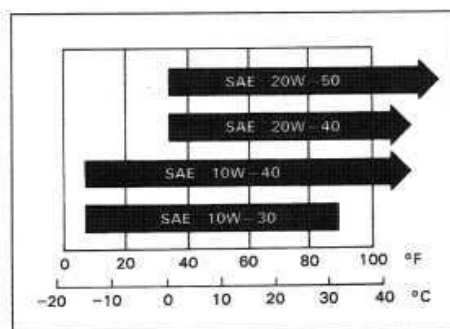
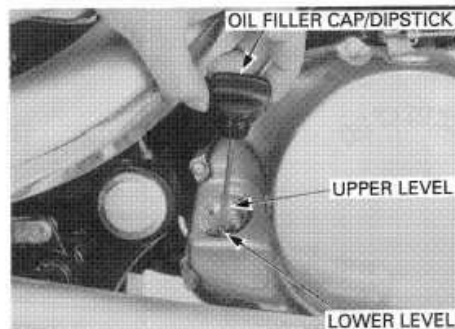
Viscosity: SAE 10W-40

#### NOTE:

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

Reinstall the oil filler cap/dipstick.

For engine oil change, see below.



### ENGINE OIL FILTER

#### NOTE:

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

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.

Remove the engine oil drain bolt and filler cap/dipstick, and drain the oil.

Remove and discard the oil filter cartridge.

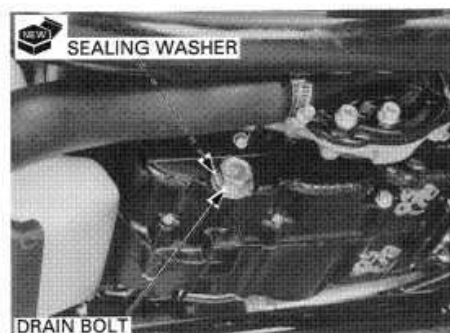
#### TOOL:

Oil filter wrench

07HAA - PJ70100

After draining the oil completely, install and tighten the engine oil drain bolt with a new sealing washer.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

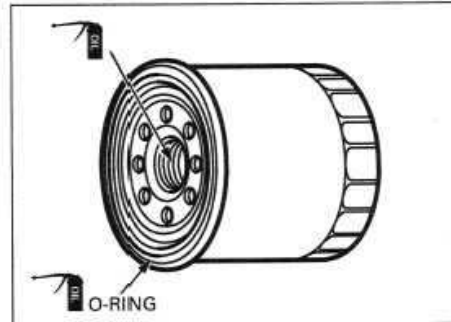


Apply oil to a new oil filter O-ring and the oil filter threads and install the oil filter cartridge.

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

Fill the crankcase with the recommended oil (see previous page).

Install the oil filter cap/dipstick.  
Start the engine and let it idle for 2 or 3 minutes.  
Stop the engine and check that the oil level is at the upper level mark on the dipstick (see previous page).  
Make sure there are no oil leaks.

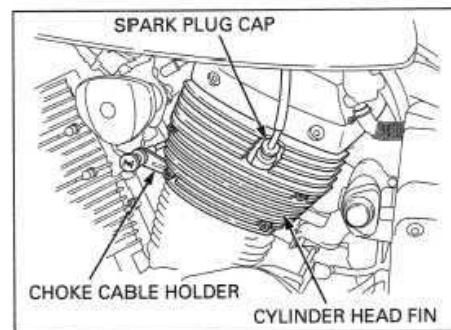


## CARBURETOR SYNCHRONIZATION

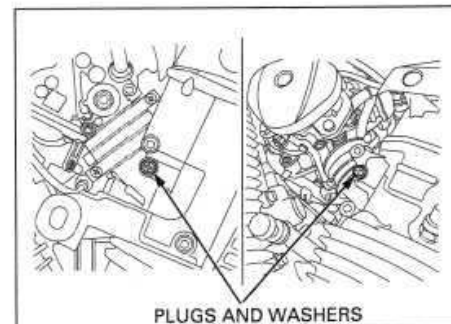
Perform this maintenance with the engine at normal operating temperature and the transmission in neutral. Place the motorcycle on a level surface.

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

Remove the spark plug cap from the left side of the rear cylinder head, then remove the four bolts, choke cable holder and rear left cylinder head fin. Reinstall the spark plug cap.

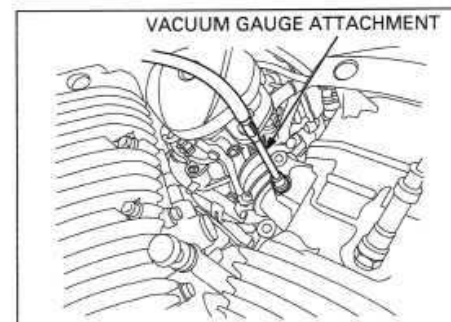


Remove the plugs and washers from the cylinder head intake ports.



Install the vacuum gauge attachment.  
Connect the vacuum gauge to the gauge attachment.

**TOOLS:**  
Vacuum gauge attachment 07510 - 3000200  
or  
07LMJ - 001000A  
(U.S.A. only)  
or  
M937B - 021 - XXXXX  
(U.S.A. only)



## MAINTENANCE

Remove the fuel tank (page 2-2) and connect a suitable tube between the fuel tank and fuel line.

1. Start the engine and adjust the idle speed with the throttle stop screw to the specification below.

**IDLE SPEED: 1,000  $\pm$  100 rpm**

2. Check the difference in vacuum between each carburetor.

**CARBURETOR VACUUM DIFFERENCE:  
20 mm Hg (0.8 in Hg)**

*The base carburetor is the No. 1 (rear) carburetor.*

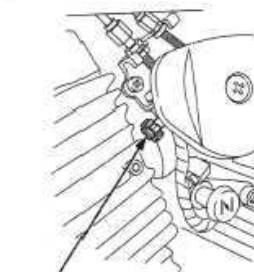
3. Turn the synchronization adjusting screw so that the difference between each carburetor is below the specification.
4. Be sure the synchronization is stable by snapping the throttle grip several times.
5. Snap the throttle grip several times and recheck the idle speed and difference in vacuum between each carburetor.

Disconnect the vacuum gauge and install the removed parts.

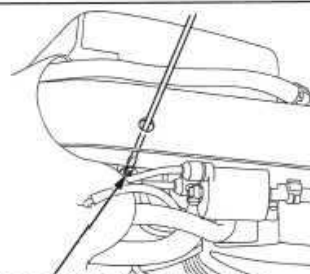
### TORQUE:

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

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



THROTTLE STOP SCREW



SYNCHRONIZATION ADJUSTING SCREW

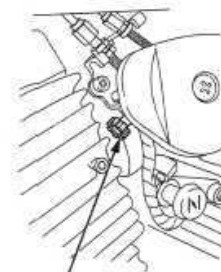
## ENGINE IDLE SPEED

### NOTE:

- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine. Support the motorcycle on a level surface and shift the transmission into neutral. Check the idle speed and adjust by turning the throttle stop screw if necessary.

**IDLE SPEED: 1,000  $\pm$  100 rpm**



THROTTLE STOP SCREW

## RADIATOR COOLANT

### LEVEL CHECK

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

If necessary, remove the 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).

### RECOMMENDED ANTIFREEZE:

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

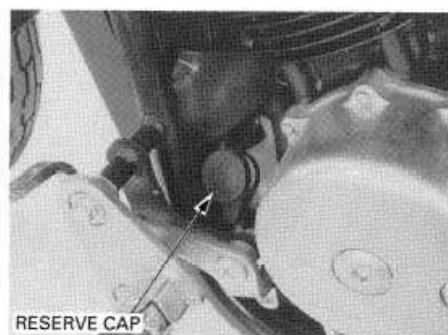
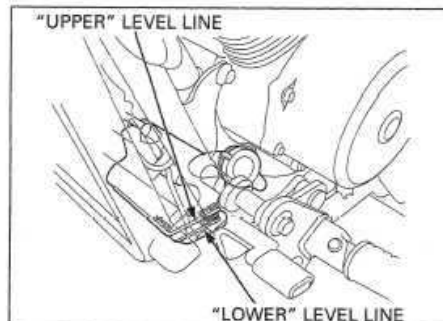
### NOTICE

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

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

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.

Be sure to remove all air from the cooling system as described on page 6-4.



## COOLING SYSTEM

Check the radiator air passage for clogging or damage.

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

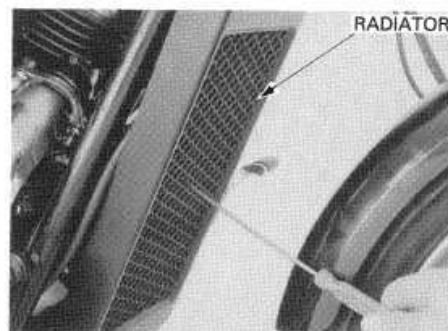
Replace the radiator if the air flow is restricted over 20% of the radiating surface.

For radiator replacement, refer to page 6-8.

Remove the fuel tank (page 2-2) and check for any coolant leakage from the water pump, water hose and hose joints.

Make sure the hoses are in good condition; they should not show any signs of deterioration.

Replace any hose that shows any sign of deterioration. Check that all hose clamps are tight.



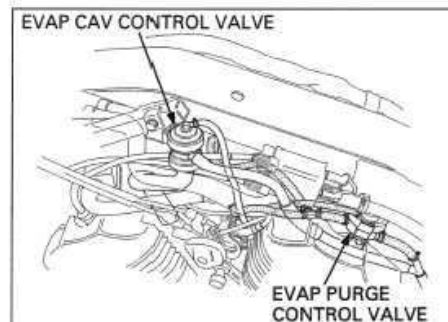
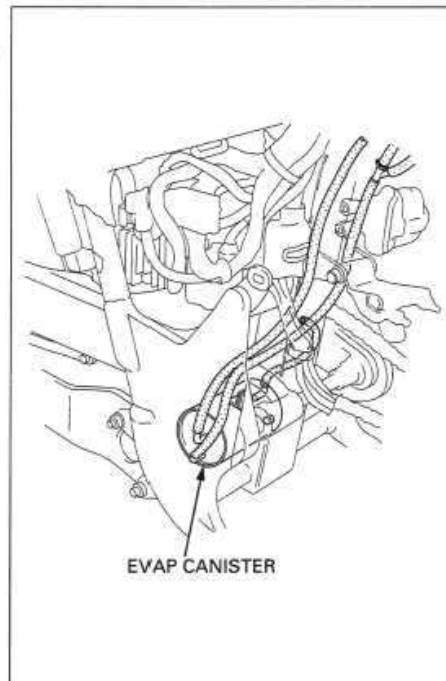
## MAINTENANCE

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

Check the tubes between the fuel tank, EVAP canister, EVAP purge control valve, EVAP CAV control valve and carburetors for deterioration, damage or loose connections.

Check the EVAP canister for cracks or other damage.

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



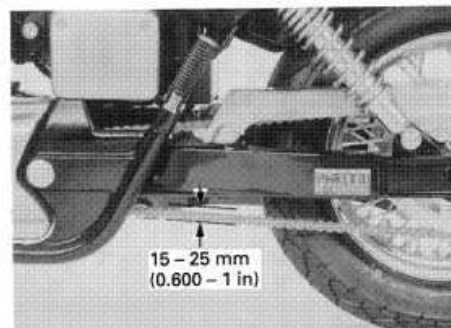
## DRIVE CHAIN

### CHAIN SLACK INSPECTION

Turn the ignition switch to the off position, 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:** 15 – 25 mm (0.600 – 1 in)



### ADJUSTMENT

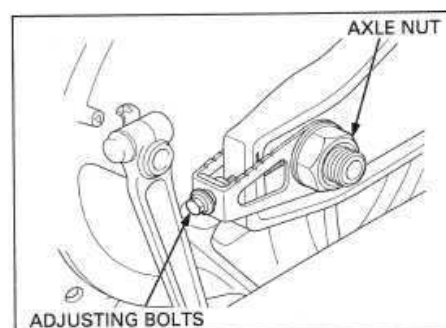
Loosen the rear axle nut.

Turn both adjusting bolts an equal number of turns until the correct drive chain slack is obtained.

Make sure the index marks on both adjusters are aligned with the rear end of the swingarm.

Tighten the rear axle nut to the specified torque.

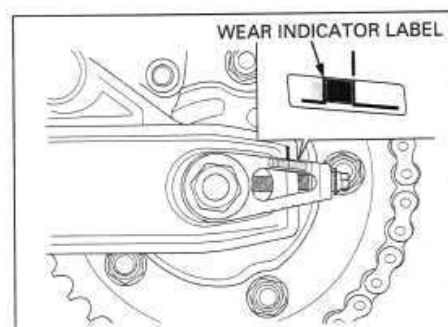
**TORQUE:** 93 N·m (9.5 kgf·m, 69 lbf·ft)



Recheck the drive chain slack and free wheel rotation.

Check the drive chain wear indicator label attached on the left drive chain adjuster.

If the red zone of the indicator label reaches the end of the swingarm, replace the drive chain with a new one (see next page).



### CLEANING AND INSPECTION

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

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

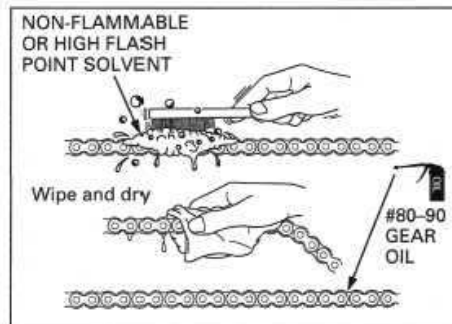
Installing a new chain on badly worn sprockets will cause the new chain to wear quickly. Inspect and replace the sprockets as necessary.

## MAINTENANCE

### LUBRICATION

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

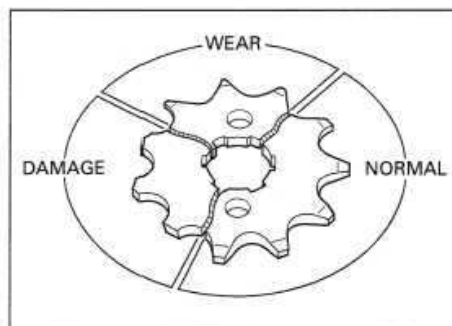
Wipe off the excess chain lube.



### SPROCKET INSPECTION

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

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



### REPLACEMENT

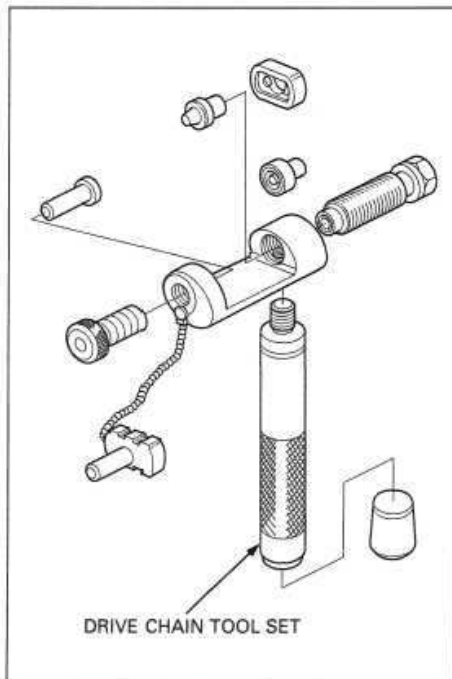
This motorcycle uses a drive chain with a staked master link.

Loosen the drive chain.  
Assemble the special tool.

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

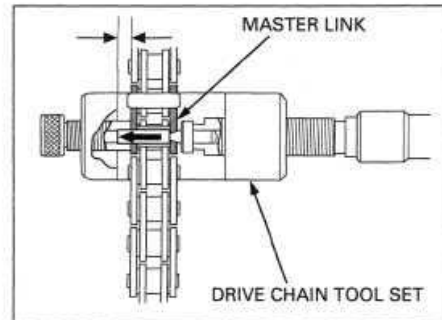
**TOOL:**  
**Drive chain tool set**

**07HMH - MR10103**  
**or**  
**07HMH - MR7010B**  
**(U.S.A. only)**



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

Remove the drive chain.



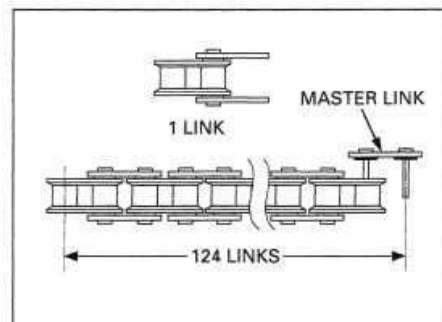
Remove the excess drive chain links from the new drive chain with the drive chain tool set.

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

**SPECIFIED LINKS: 124 links**  
**REPLACEMENT CHAIN: RK: 525 SMOZ5**

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

Install the new drive chain over the drive and driven sprockets.



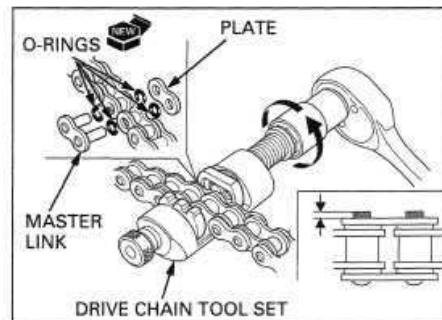
*Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing outside.*

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

Measure the master link pin length projected from the plate.

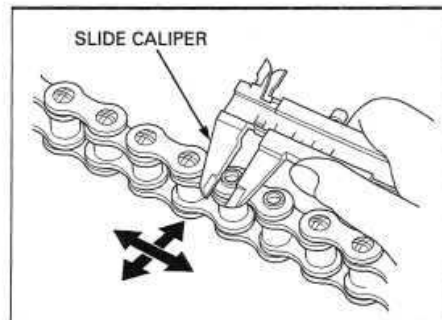
**SPECIFIED LENGTH: 1.20 – 1.40 mm (0.047 – 0.055 in)**

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



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

**DIAMETER OF THE STAKED AREA:**  
**5.50 – 5.80 mm (0.217 – 0.228 in)**



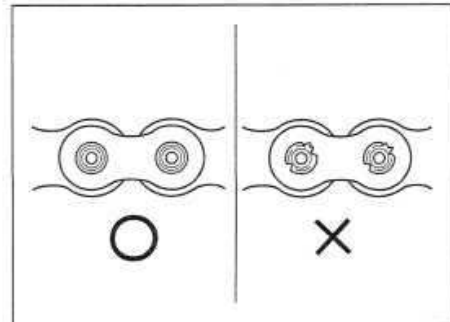


## MAINTENANCE

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

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.

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



## BRAKE FLUID

### NOTE:

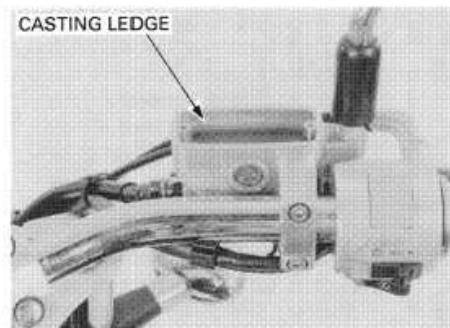
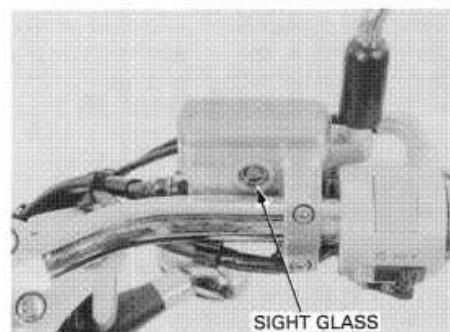
- When the fluid level is low, check the brake pads for wear (see below). A low fluid level may be due to worn brake pads. If the brake pads are worn, the caliper piston is pushed out, and this causes a low reservoir level.

Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

*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.*

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

Refer to page 15-3 for brake fluid replacement/bleeding procedures.

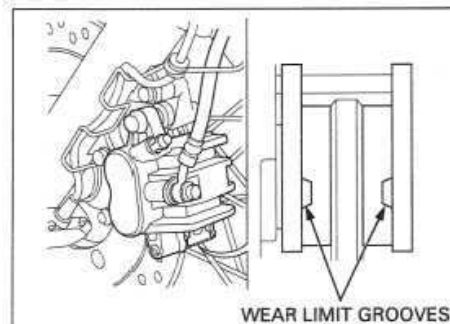


## BRAKE SHOES/PADS WEAR

### FRONT BRAKE PAD

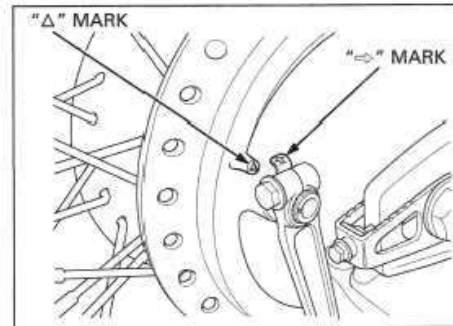
Check the brake pad for wear. Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Refer to page 15-4 for brake pad replacement.



## REAR BRAKE SHOE

Replace the brake shoes if the arrow mark on the brake arm aligns with the reference mark "Δ" when the rear brake is applied.



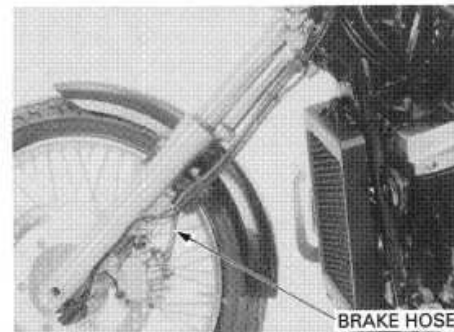
## BRAKE SYSTEM

### FRONT BRAKE

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

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

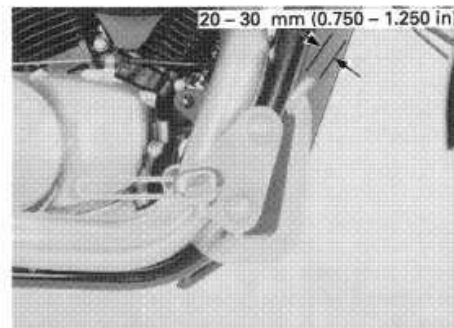
Refer to page 15-3 for brake bleeding procedures.



### REAR BRAKE PEDAL FREE PLAY

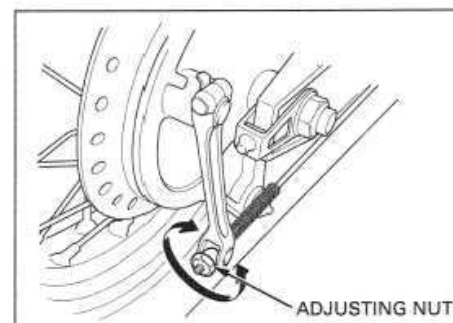
Measure the rear brake pedal free play.

**FREE PLAY: 20 – 30 mm (0.750 – 1.250 in)**



*Make sure that the cut-out in the adjusting nut is seated on the brake arm joint.*

Adjust the brake pedal free play by turning the adjusting nut at the brake arm.



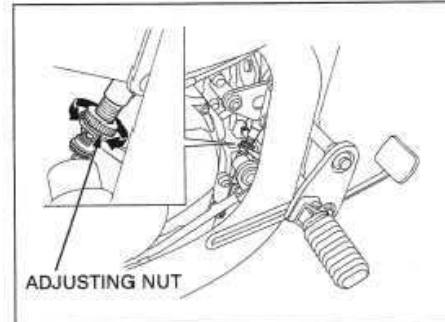
## MAINTENANCE

### BRAKE LIGHT SWITCH

*The front brake light switch does not require adjustment.*

Adjust the rear brake light switch so the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the switch so the light comes on at the proper time. Hold the switch body and turn the adjusting nut. Do not turn the switch body.



### HEADLIGHT AIM

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

Adjust vertically by turning the vertical adjusting screw.

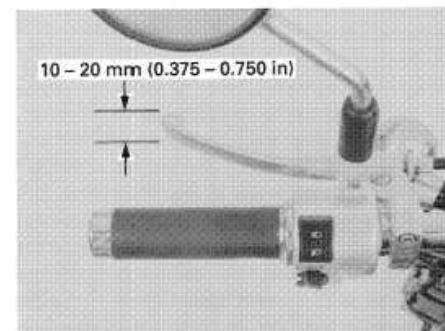
Adjust horizontally by turning the horizontal adjusting screw.



### CLUTCH SYSTEM

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

**FREE PLAY: 10 – 20 mm (0.375 – 0.750 in)**

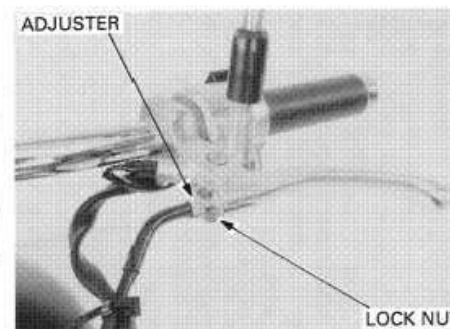


Adjust as follows:

Minor adjustments are made at the adjuster near the lever.

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

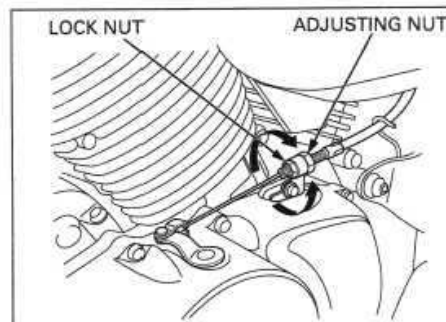
If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn. Tighten the lock nut and make a major adjustment as described on the next page.



Major adjustments are performed at the clutch lifter arm.

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

If proper free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (see section 7).



## SIDE STAND

Support the motorcycle on a level surface.

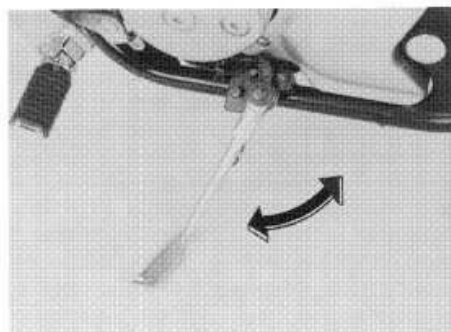
Check the side stand spring for damage or loss of tension.

Check side stand assembly for freedom of movement and lubricate the side stand pivot if necessary. Make sure 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 down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 19-14).



## **SUSPENSION**

### **FRONT SUSPENSION INSPECTION**

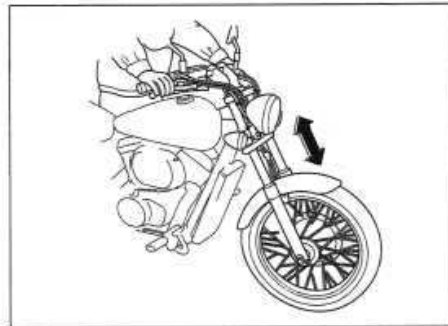
Check the action of the forks by operating the front brakes and compressing the front suspension several times.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 13 for fork service.



### **REAR SUSPENSION INSPECTION**

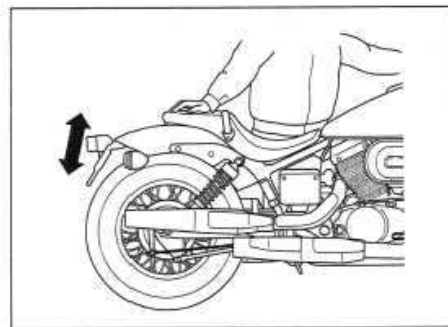
Check the action of the shock absorber by compressing it several times.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

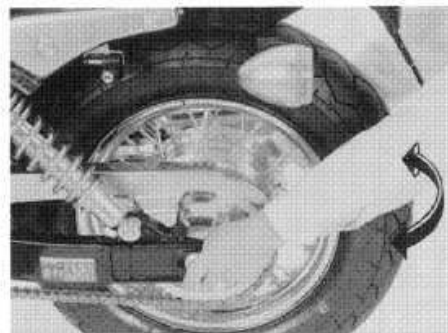
Refer to section 14 for shock absorber service.



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

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

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



## **NUTS, BOLTS, FASTENERS**

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).

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

## WHEELS/TIRES

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

*As the swingarm pivot is included in this check, be sure to confirm the location of the play (e.g. from the wheel bearings or the swingarm pivot).*

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

If abnormal conditions are suspected, check the rear wheel bearings (see section 14).

*Tap on the spokes and be sure that the same clear metallic sound can be heard on all spokes.*

Inspect the spokes for looseness by tapping them with a screwdriver.

If a spoke does not sound clearly, or if it sounds different from the other spokes, tighten it to the specified torque.

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

### TOOL:

Spoke wrench 07JMA – MR60100  
or equivalent commercially available in U.S.A.

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

### RECOMMENDED TIRE PRESSURE:

Up to 90 kg (200 lbs):

Front: 200 kPa (2.00 kgf/cm<sup>2</sup>, 29 psi)

Rear: 200 kPa (2.00 kgf/cm<sup>2</sup>, 29 psi)

Up to maximum weight capacity:

Front: 200 kPa (2.00 kgf/cm<sup>2</sup>, 29 psi)

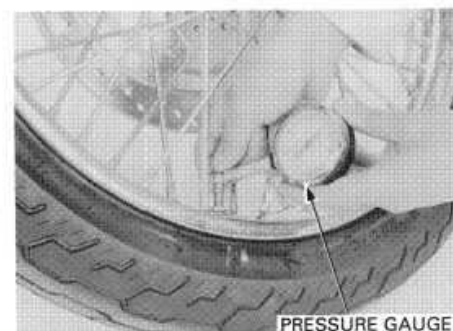
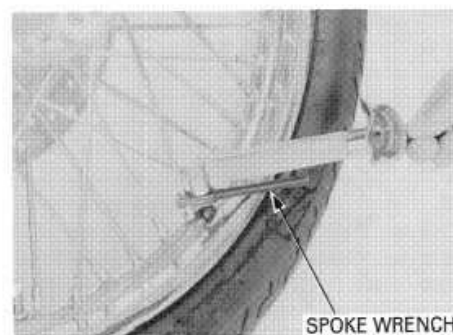
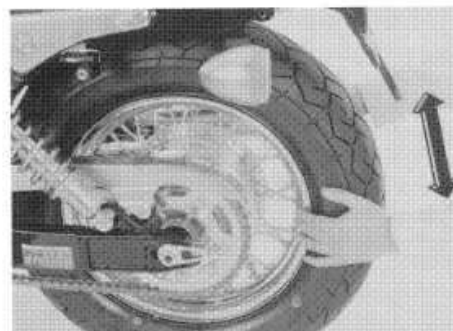
Rear: 250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

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

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

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

**MINIMUM TREAD DEPTH:** Front: 1.5 mm (0.06 in)  
Rear: 2.0 mm (0.08 in)

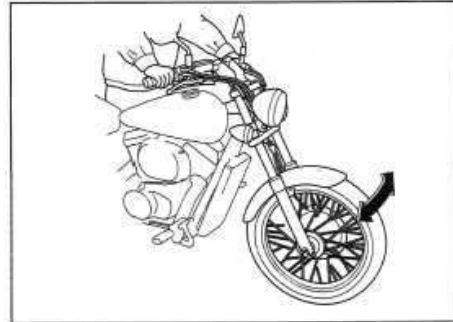


## **STEERING HEAD BEARINGS**

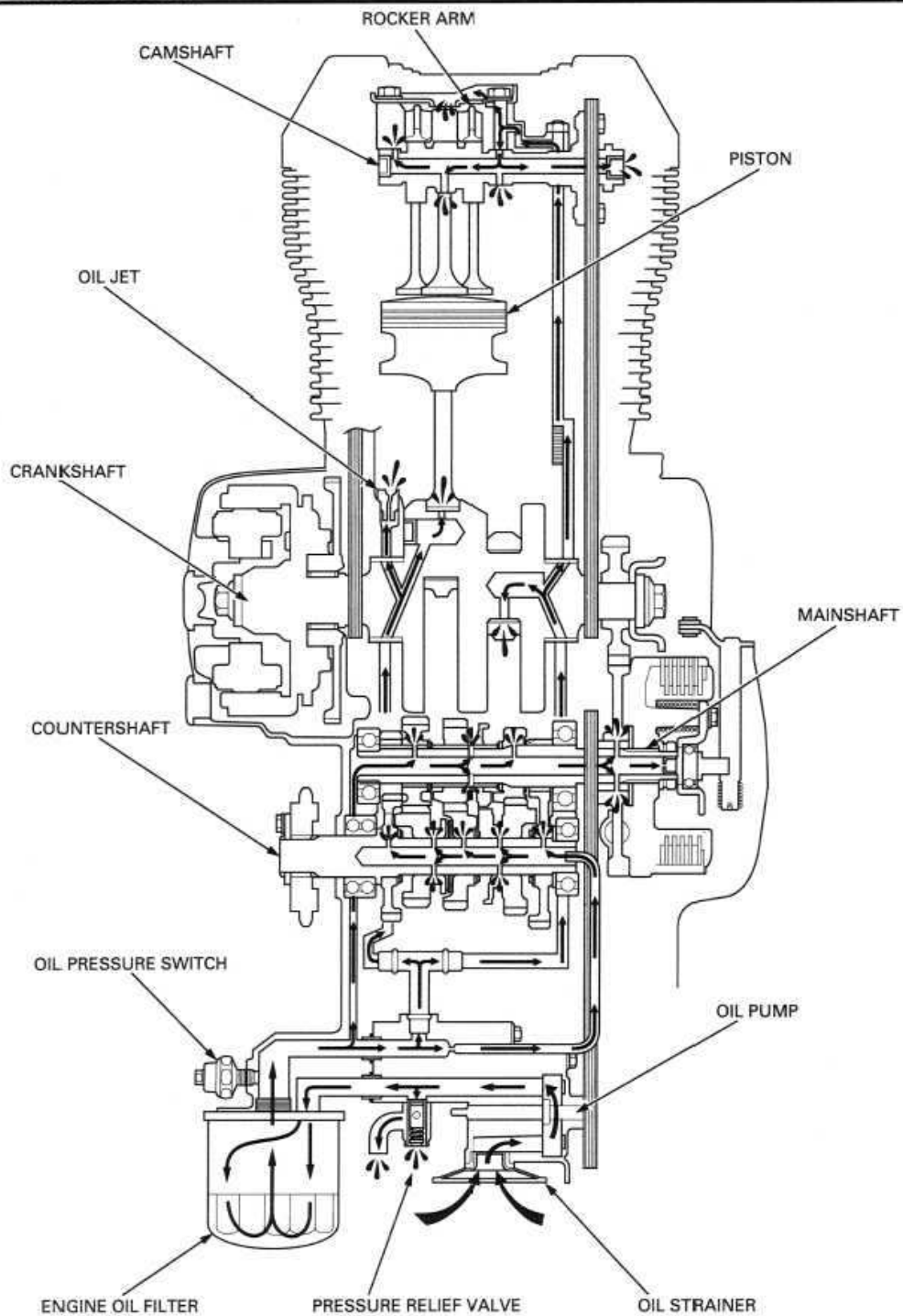
Raise the front wheel off the ground and support the motorcycle securely.

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

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



## LUBRICATION SYSTEM





## 4. LUBRICATION SYSTEM

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

### SERVICE INFORMATION

#### GENERAL

#### ⚠ CAUTION

**4**

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

- The service procedures in this section can be performed with the engine in the frame.
- 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 and that oil pressure is correct.
- For oil pressure indicator inspection, refer to section 19 of this manual.

#### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	at draining	2.2 liters (2.32 US qt, 1.94 Imp qt)	—
	at filter change	2.4 liters (2.54 US qt, 2.11 Imp qt)	—
	at disassembly	2.9 liters (3.06 US qt, 2.55 Imp qt)	—
Recommended engine oil		Honda GN4 or HP4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		530 kPa (5.4 kgf/cm <sup>2</sup> , 77 psi) at 5,500 rpm (80°C/176°F)	
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

#### TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads.
Oil pressure switch terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil pump bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	

#### TOOLS

Oil pressure gauge	07506 – 3000000	— or equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07510 – 4220100	

## LUBRICATION SYSTEM

---

### TROUBLESHOOTING

#### **Oil level too low – high oil consumption**

- External oil leak
- Worn piston rings or incorrect piston ring installation
- Worn cylinder
- Worn valve guide or stem seals

#### **Oil contamination (white appearance)**

- Coolant mixing with oil
  - Faulty head gasket
  - Water leak in crankcase

#### **Low oil pressure**

- Oil level low
- Oil pressure relief valve stuck open
- Clogged oil strainer or filter
- Oil pump worn or damaged
- Incorrect oil being used

#### **No oil pressure**

- Oil level too low
- Oil pump drive chain or drive/driven sprocket broken
- Oil pump damaged

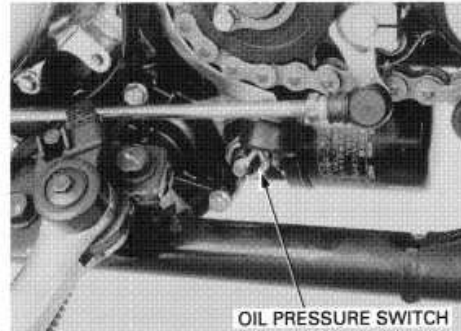
#### **High oil pressure**

- Oil pressure relief valve stuck closed
- Plugged gallery, or metering orifice
- Incorrect oil being use

## OIL PRESSURE CHECK

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

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



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

### TOOLS:

**Oil pressure gauge attachment** 07510 - 4220100  
or equivalent commercially available in U.S.A.  
**Oil pressure gauge** 07506 - 3000000  
or equivalent commercially available in U.S.A.

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

Start the engine and check the oil pressure at 5,500 rpm (80°C/176°F).

**OIL PRESSURE: 530 kPa (5.4 kgf/cm<sup>2</sup>, 77 psi)**

Stop the engine.

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

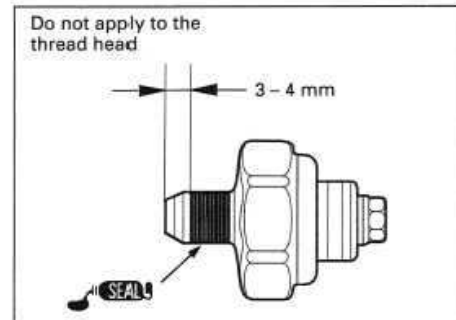
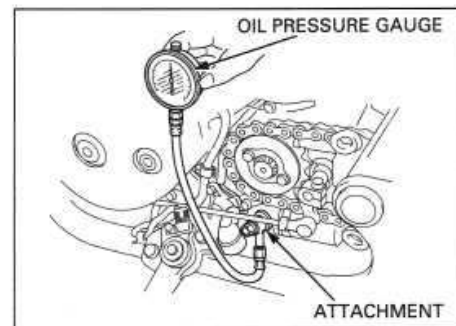
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

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

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

Install the switch cover.

Start the engine.  
Check that the oil pressure indicator goes out after 1 or 2 seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 19-9).

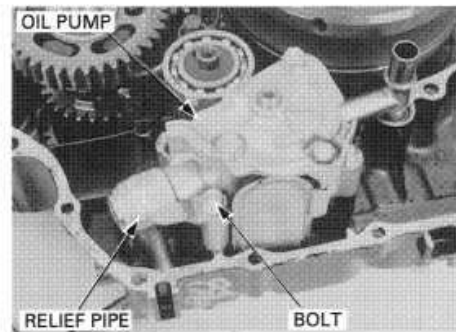


## OIL PUMP

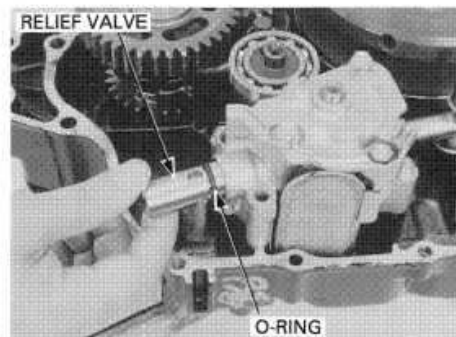
### REMOVAL

Separate the crankcase (page12-4).

Remove the bolt and oil relief pipe.

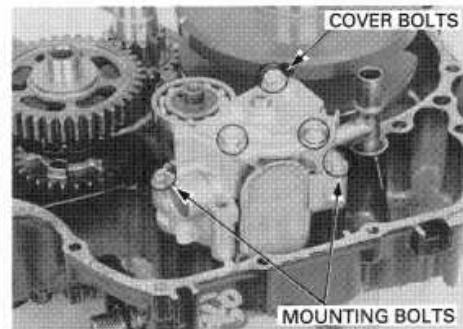


Remove the pressure relief valve and O-ring.

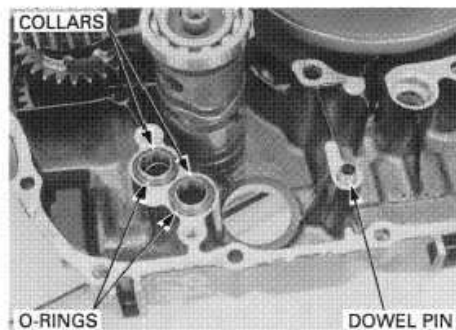


When the oil pump is ready to be disassembled, loosen the three oil pump cover bolts.

Remove the two oil pump mounting bolts and oil pump.

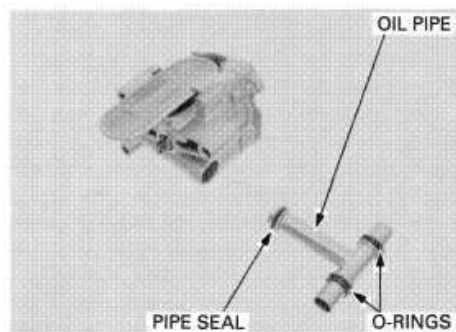


Remove the collars and O-rings.  
Remove the dowel pin.

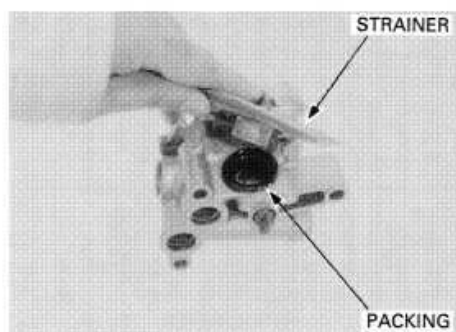


**DISASSEMBLY**

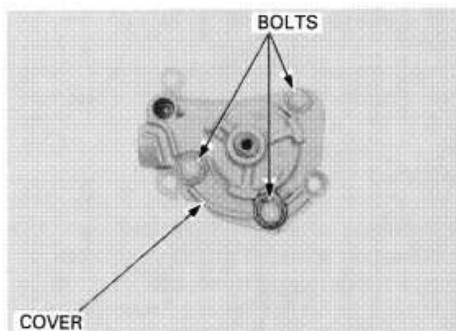
Remove the oil pipe, oil pipe seal and O-rings.



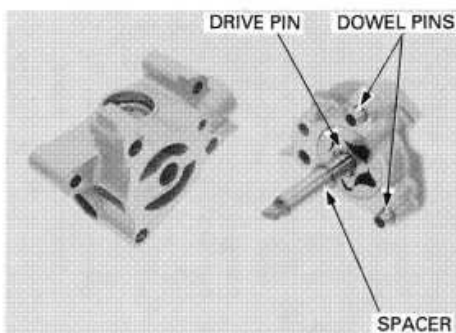
Remove the oil strainer and packing from the oil pump.



Remove the bolts and pump cover.



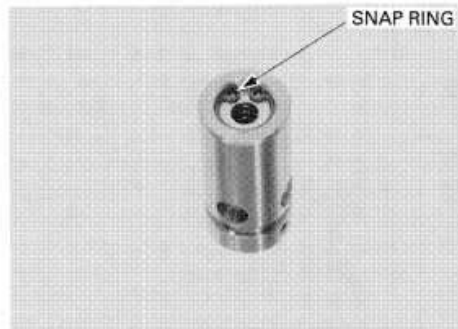
Remove the dowel pins.  
Remove the spacer, rotor shaft, drive pin, inner and outer rotor.



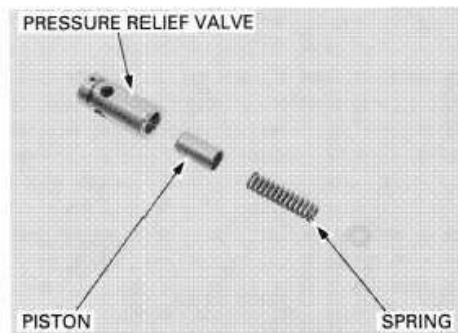
## LUBRICATION SYSTEM

### PRESSURE RELIEF VALVE

Remove the snap ring and disassemble the pressure relief valve.



Check the spring and piston for wear or damage.  
Check the valve for clogging or damage.  
Assemble the parts in the reverse order of disassembly.



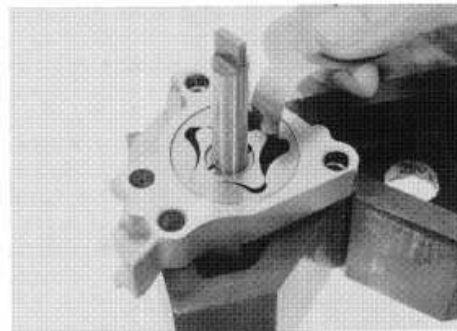
### INSPECTION

Temporary install the following:

- outer rotor
- inner rotor
- rotor shaft, drive pin

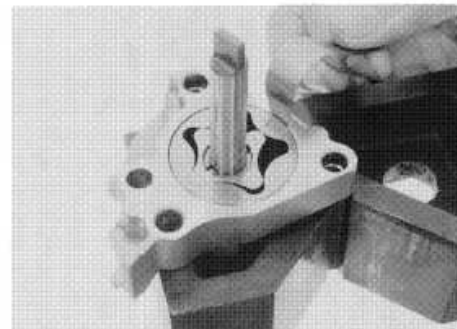
Measure the rotor tip clearance.

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



Measure the pump body clearance.

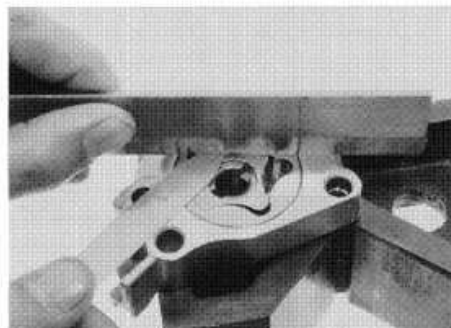
**SERVICE LIMIT: 0.35 mm (0.014 in)**



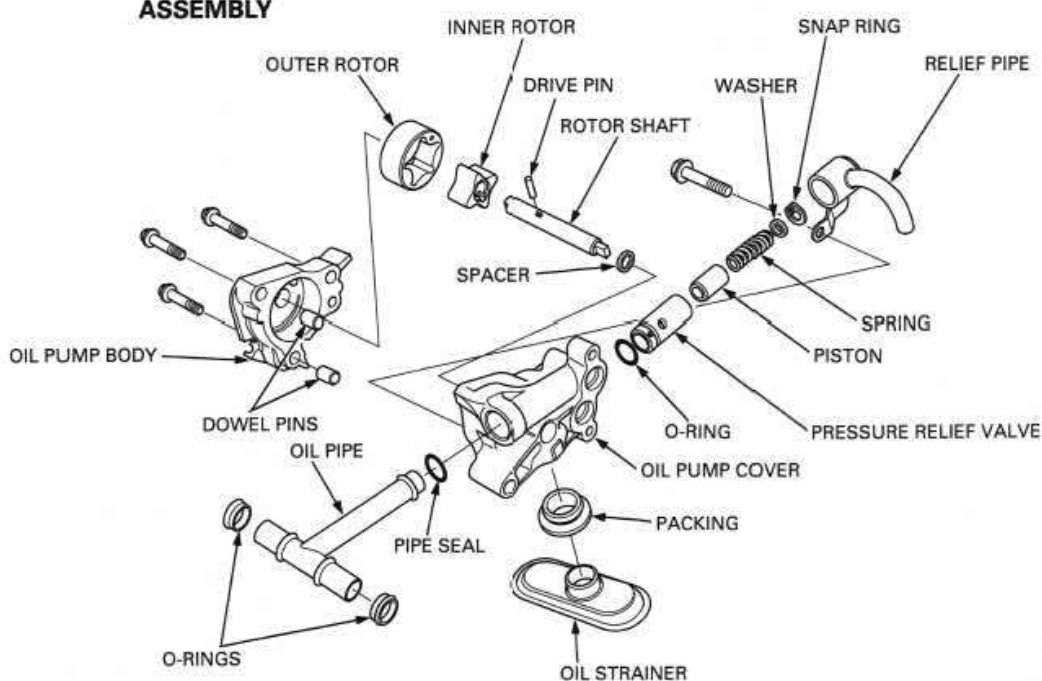
Remove the drive pin and rotor shaft.

Measure the oil pump side clearance.

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

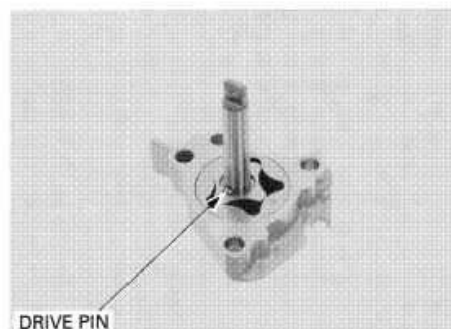


### ASSEMBLY



Install the outer rotor and inner rotor.

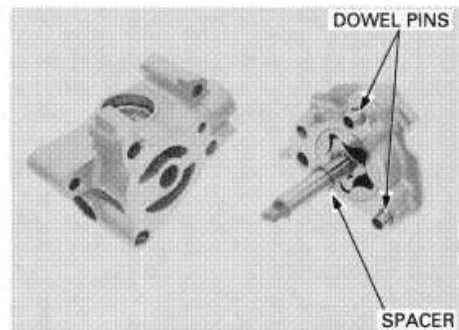
Insert the rotor shaft and install the drive pin by aligning the slots in the inner rotor.



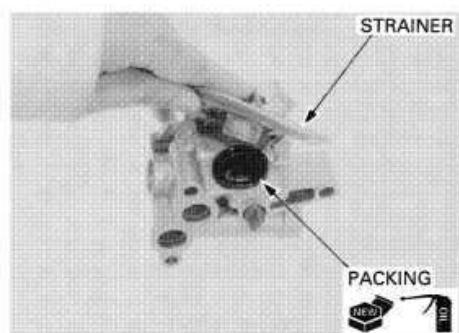
## LUBRICATION SYSTEM

Place the spacer into the inner rotor groove.  
Install the dowel pins into the oil pump body.

Install the oil pump cover onto the pump body with the cover bolts.

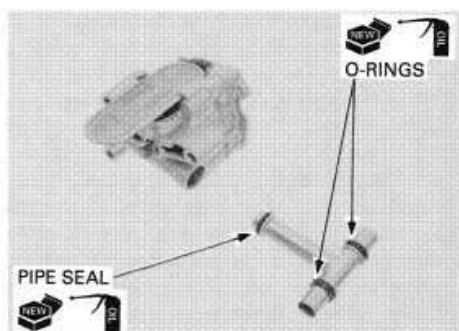


Coat a new packing with engine oil and install it into the groove of the oil pump, and install the oil strainer into the oil pump.



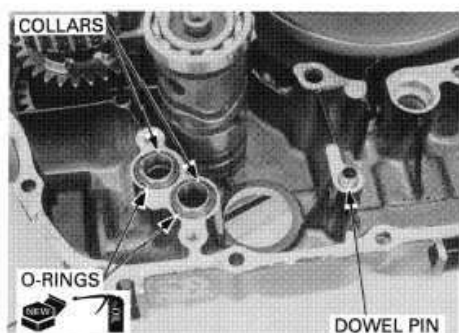
Coat a new oil pipe seal with engine oil, then install it to the oil pipe.  
Coat the new O-rings with engine oil, and install them to the oil pipe with their tapered side facing out.

Install the oil pipe to the oil pump securely.



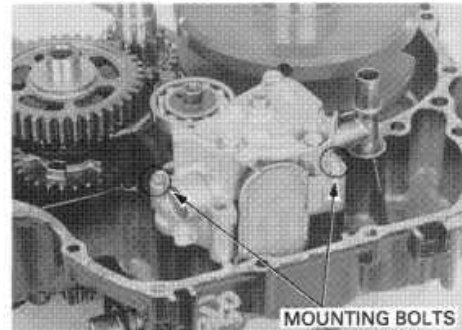
## INSTALLATION

Install the collars and dowel pin.  
Coat the new O-rings with engine oil and install them onto the collars.

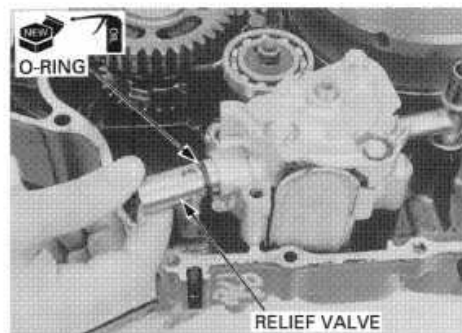




Install the oil pump with the mounting bolts.



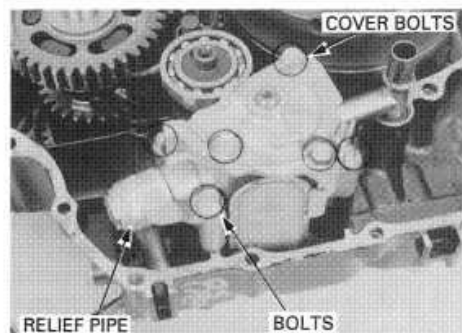
Coat a new O-ring with engine oil and install it into the groove of the pressure relief valve.  
Install the pressure relief valve to the oil pump securely.

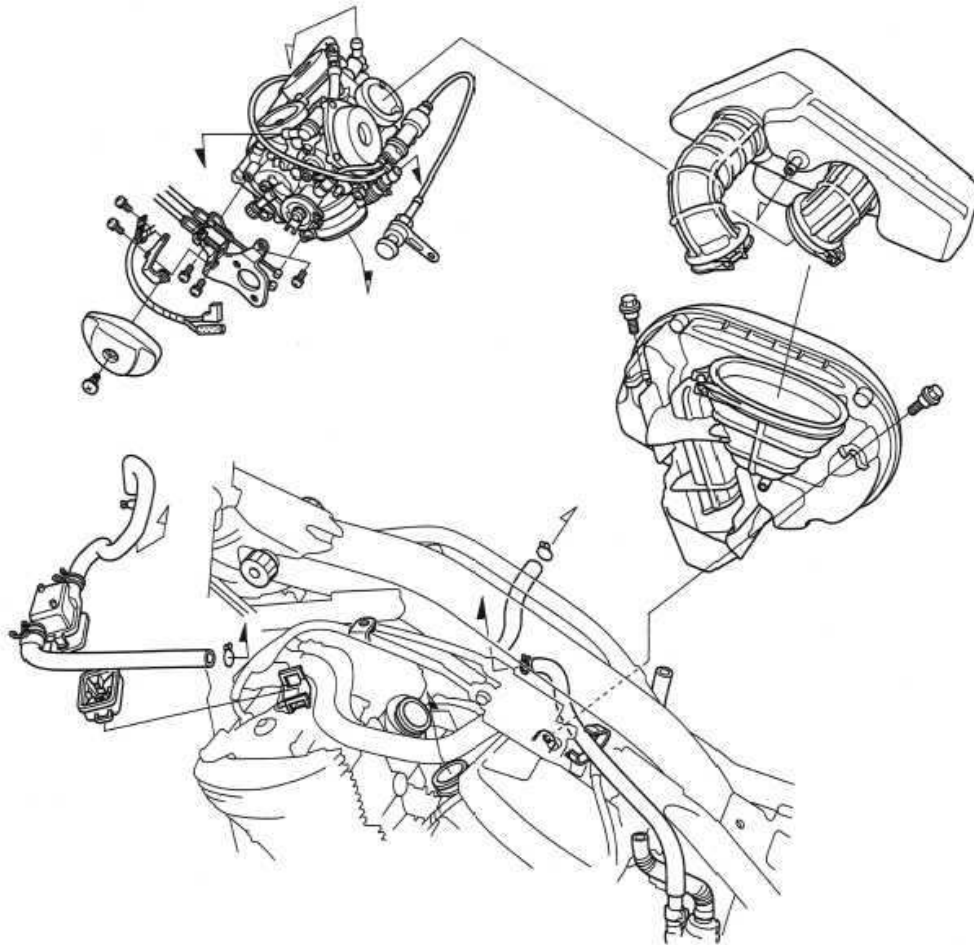


Install the oil relief pipe with bolt.  
Tighten the oil pump mounting bolts.  
Tighten the oil relief pipe bolt and oil pump cover bolts.

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

Assemble the crankcase (page 12-19).





## 5. FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR ASSEMBLY	5-15
TROUBLESHOOTING	5-2	CARBURETOR CLEANING	5-15
AIR CLEANER HOUSING	5-3	CARBURETOR COMBINATION	5-16
SUB-AIR CLEANER	5-4	CARBURETOR INSTALLATION	5-17
CARBURETOR REMOVAL	5-5	PILOT SCREW ADJUSTMENT	5-22
VACUUM CHAMBER	5-9	HIGH ALTITUDE ADJUSTMENT	5-23
FLOAT CHAMBER/PILOT SCREW	5-11	FUEL PUMP REMOVAL/INSTALLATION	5-24
AIR CUT-OFF VALVE	5-14	EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	5-24
CARBURETOR SEPARATION	5-15		

**5**

### SERVICE INFORMATION

#### GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.
- Before removing the carburetor, place an approved fuel container under the drain tube, loosen the drain screw and drain the carburetor.
- After removing the carburetor, cover the intake port of the cylinder head with shop towel 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.
- If the vehicle is to be stored for more than one month, drain the float chamber. Fuel left in the float chamber may cause clogged jets, resulting in hard starting or poor driveability.
- For fuel tank removal and installation see section 2.
- Refer to section 19 for carburetor heater inspection.
- All hoses used in the evaporative emission control system (California type only) are numbered for identification.
- When connecting one of these hoses, compare the hose number with Vacuum Hose Routing Diagram Label on page 1-27, for its proper routing.

#### NOTICE

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

#### SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	49 state/Canada type	VDF2D
	California type	VDF2C
Main jet	Front	#105
	Rear	#108
Slow jet		#40
Pilot screw initial/final opening		See page 5-22
Float level		7.0 mm (0.28 in)
Base carburetor (for synchronization)		Rear cylinder (#1)
Idle speed		1,000 ± 100 rpm
Carburetor vacuum difference		20 mm Hg (0.7 in Hg)
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)

## FUEL SYSTEM

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### TORQUE VALVES

Vacuum plug	3 N-m (0.3 kgf-m, 2.2 lbf-ft)
Air cleaner housing stay bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)
Choke cable holder bolt	10 N-m (1.0 kgf-m, 7 lbf-ft)

### TOOLS

Carburetor float level gauge	07401 – 0010000
Pilot screw wrench	07KMA – MS60101
Vacuum/pressure pump	A937X – 041 – XXXXX or
— Vacuum pump	ST – AH – 260 – MC7 (U.S.A. only)
— Pressure pump	ST – AH – 255 – MC7 (U.S.A. only)

## TROUBLESHOOTING

### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
  - Fuel filter clogged
  - Fuel line clogged
  - Fuel level misadjusted
  - Fuel tank breather tube restricted (49 state/Canada type)
  - Evaporative Emission (EVAP) tube No.1 restricted (California type)
- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated/deteriorated
  - Jets clogged
- Improper Starting Enrichment (SE) valve operation
- SE valve circuit clogged
- Improper throttle operation
- Faulty fuel pump (system inspection, see page 19-14)
- No spark at plug (ignition system faulty)

### Lean mixture

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent tube clogged
- Intake air leak
- Vacuum piston faulty
- Needle valve faulty
- Emission control system faulty (California type)
  - Evaporative Emission Carburetor Air Vent (EVAP CAV) control valve faulty
  - Hose of the emission control system faulty

### Rich mixture

- SE valve open
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner clogged
- Vacuum piston faulty
- Emission control system faulty (California type only)
  - EVAP purge control valve faulty
  - Hose of the emission control system faulty

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

- Fuel line restricted
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
  - Jets clogged
- Intake air leak
- Idle speed misadjusted
- Float level misadjusted
- Fuel tank breather tube restricted (49 state/Canada type)
- EVAP tube No.1 restricted (California type)
- Pilot screw misadjusted
- Starting enrichment valve circuit clogged
- Ignition system malfunction
- Emission control system faulty (California type)
  - EVAP CAV control valve faulty
  - EVAP purge control valve faulty
  - Hose of the emission control system faulty

### Afterburn when engine braking is used

- Lean mixture in slow circuit
- Air cut-off valve malfunction
- Ignition Control Module (ICM) stops ignition intermittently to prevent over revolution (working over rev limiter function)

### Poor performance (driveability) and fuel economy

- Fuel system clogged
- Ignition system malfunction
- Emission control system faulty (California type only)
  - EVAP CAV control valve faulty
  - Hose of the emission control system faulty

## AIR CLEANER HOUSING

### REMOVAL

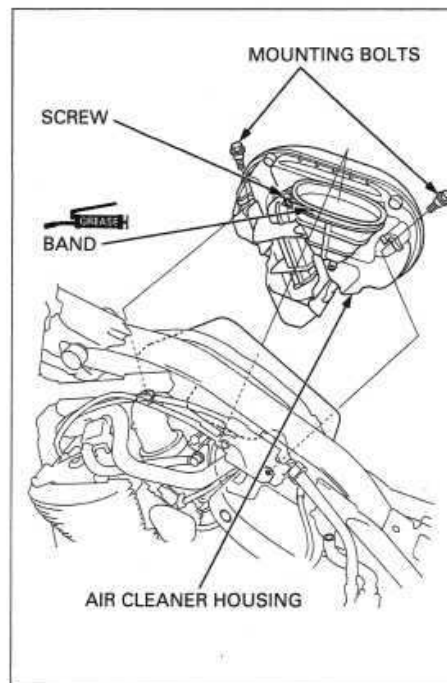
Remove the fuel tank (page 2-2).

Remove the two mounting bolts.  
Loosen the band screw and remove the air cleaner housing.

### INSTALLATION

Apply grease to the air cleaner housing band inside surface.  
Install the air cleaner housing and tighten the band screw.  
Install and tighten the mounting bolts.

Install the fuel tank (page 2-2).

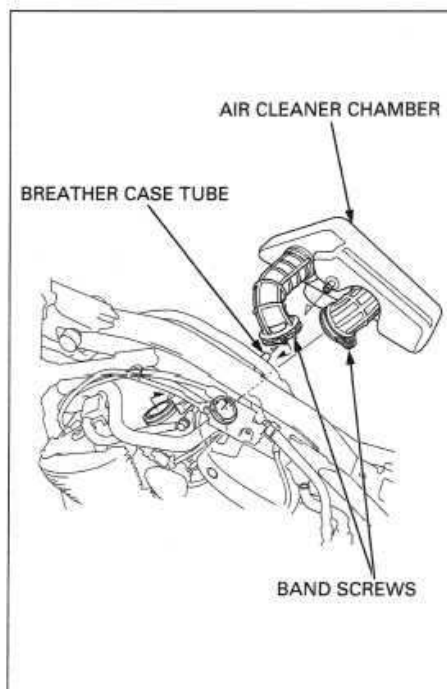


### AIR CLEANER CHAMBER REMOVAL/INSTALLATION

Remove the air cleaner housing (see above).

Loosen the band screws.  
Disconnect the crankcase breather case tube from the air cleaner chamber and remove the air cleaner chamber.

Installation is in the reverse order of removal.

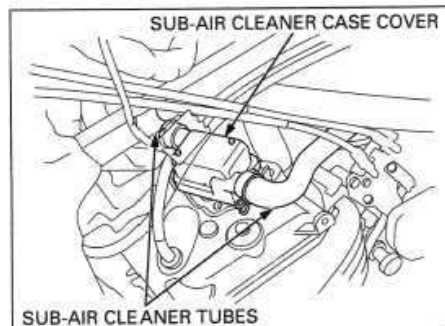


## FUEL SYSTEM

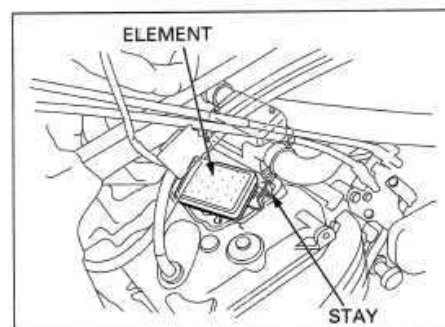
### SUB-AIR CLEANER

Remove the fuel tank (page 2-2).  
Remove the front cylinder left overhead cover (page 3-7).

Disconnect the sub-air cleaner tubes.  
Remove the sub-air cleaner case cover from the case stay.



Remove the sub-air cleaner case and remove the element from the case.



#### SUB-AIR CLEANER ELEMENT

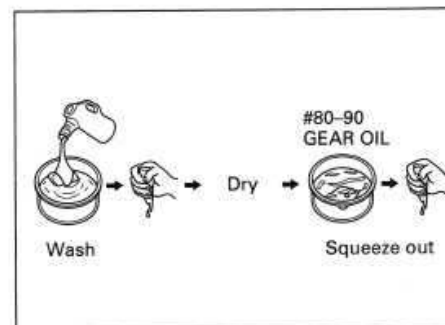
Wash the element in non-flammable or high flash point solvent, squeeze out the solvent thoroughly, and allow the element to dry.

#### NOTICE

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

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

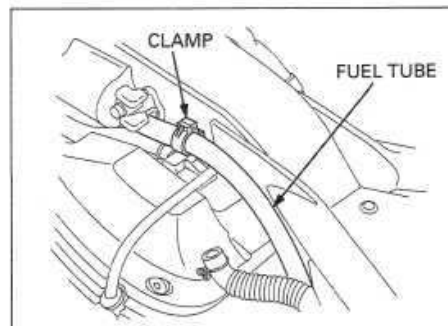
Installation is in the reverse order of removal.



## CARBURETOR REMOVAL

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

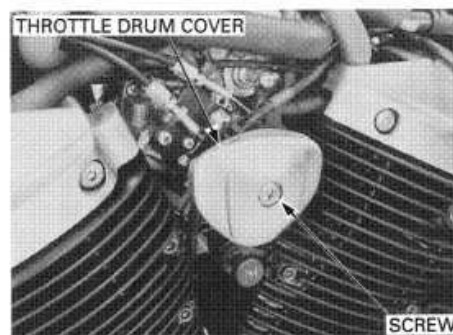
Release the fuel tube from the tube clamp.



Loosen the carburetor drain screws and drain the carburetor.

Remove the following:

- screw
- throttle drum cover

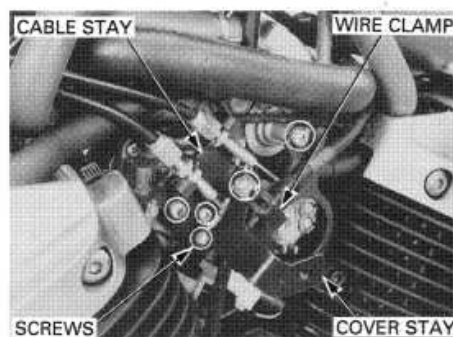


Loosen the throttle cable lock nut.

Remove the following:

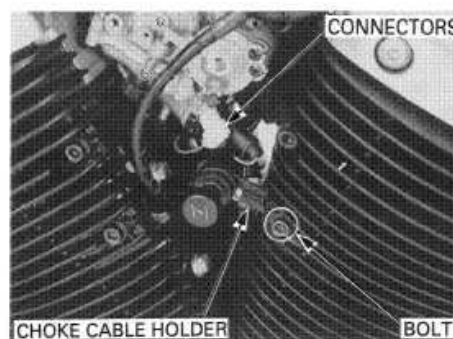
- screw and wire clamp
- screw and throttle drum cover stay
- three screws and throttle cable stay

Disconnect the throttle cables from the throttle drum.



Remove the bolt and choke cable holder.

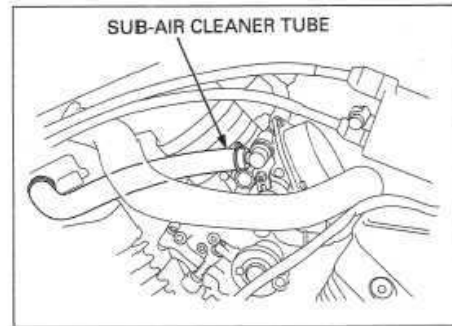
Disconnect the carburetor heater connectors from the rear carburetor.



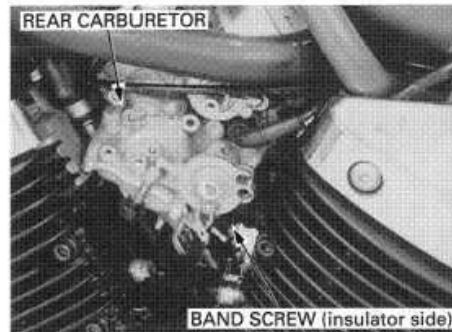
## FUEL SYSTEM

---

Disconnect the sub-air cleaner tube from the rear carburetor.



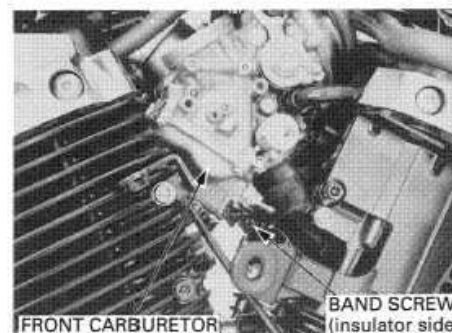
Loosen the band screw at the insulator side.



Disconnect the carburetor heater connectors from the front carburetor.  
Disconnect the sub-air cleaner tube from the front carburetor.



Loosen the band screw at the insulator side.





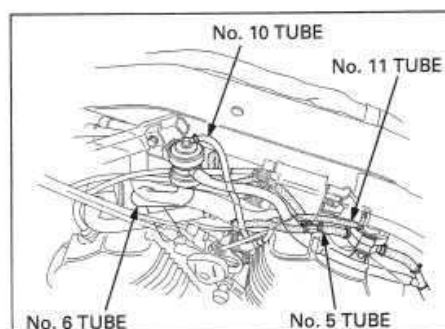
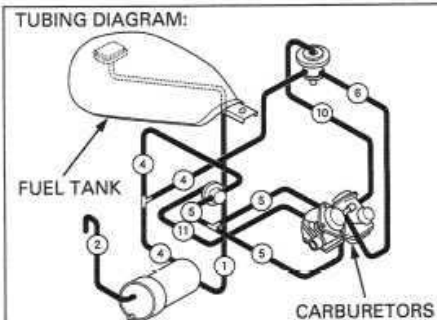
## FUEL SYSTEM

*California type only:* The tube number of the evaporative emission control system are printed on all tubes.

Refer to the tubing diagram for the tube connections.

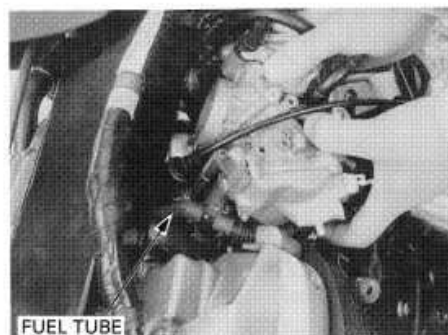
Disconnect the No. 5 tube and No. 10 tube from the rear carburetor.  
Disconnect the No. 5 tube and No. 11 tube from the front carburetor.

Disconnect the No. 6 tube (49 state/Canada type: air vent tube) from the Evaporative Emission Carburetor Air Vent (EVAP CAV) control valve.

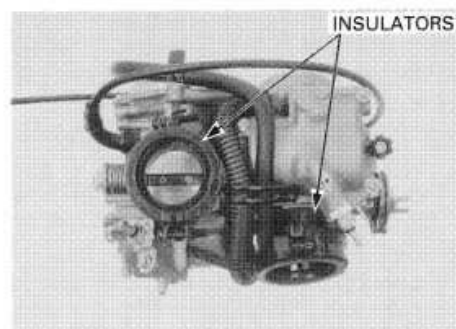


Release the carburetor with the insulators from the cylinder head intake ports while carefully raising the carburetor assembly.

Remove the carburetor assembly by rotating it and then disconnecting the fuel tube from the carburetor.



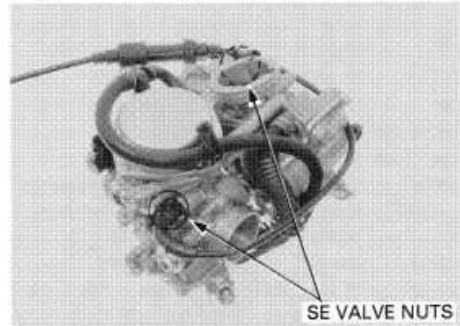
Loosen the band screw and remove the insulators from each carburetor.



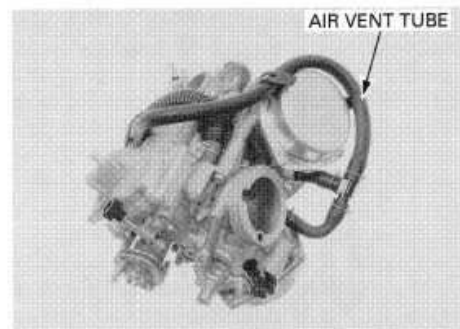
## FUEL SYSTEM

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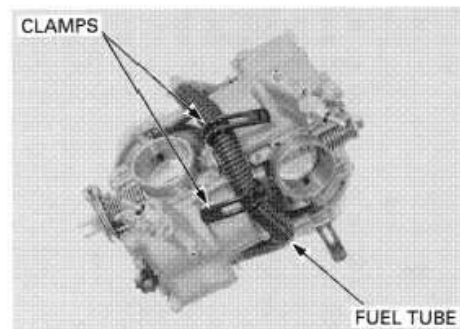
Remove the choke cable boots from the Starting Enrichment (SE) valve nuts. Loosen the SE valve nuts and remove them from the carburetors.



Disconnect the carburetor air vent tubes (California: No. 6 tube) from the carburetors and release the tubes from the clamps.



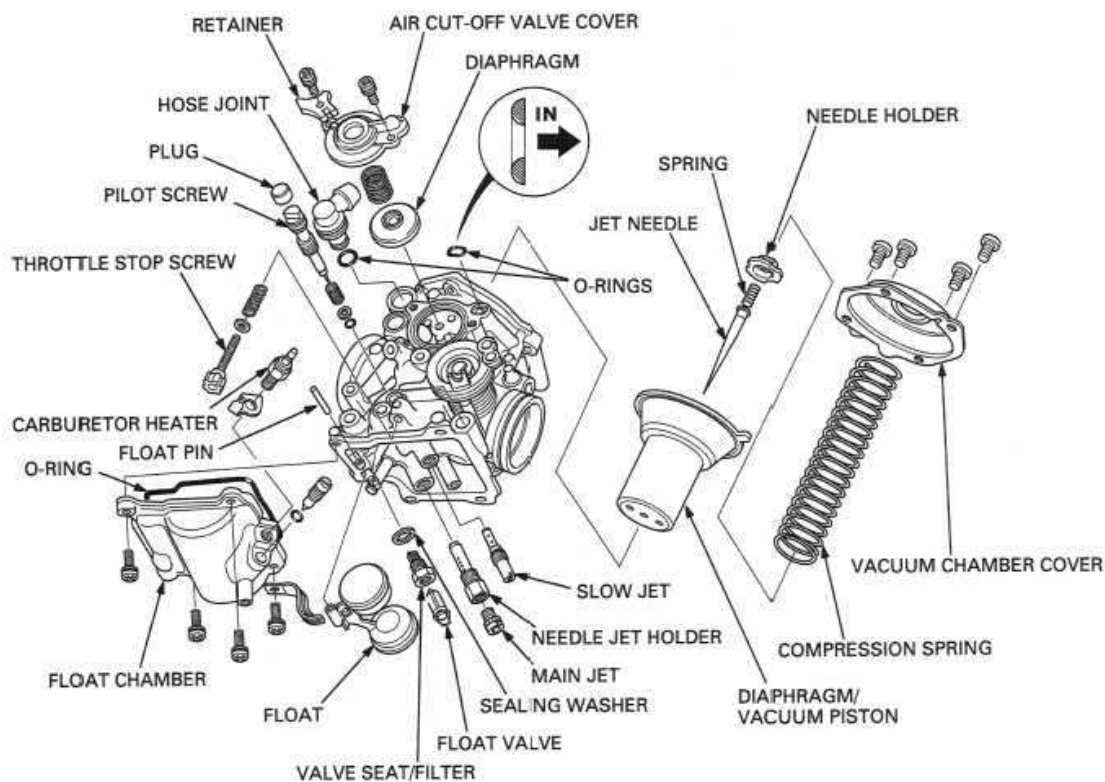
Disconnect the fuel tube from the carburetors and release the tube from the clamps.



## ASSEMBLY/DISASSEMBLY

## NOTE:

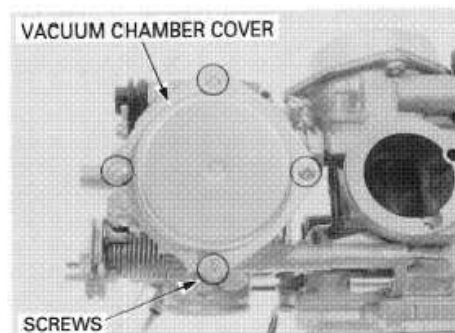
- Refer to the following pages for service of each part.
- Vacuum chambers, float chambers, pilot screws and air cut-off valves can be serviced without separating the carburetors.
- Keep each carburetor's parts separate from the other's so you can install the parts in their original location.



## VACUUM CHAMBER

## REMOVAL

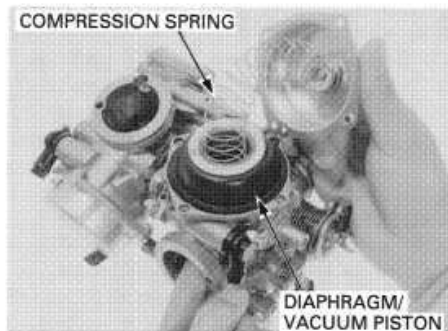
Remove the four screws and vacuum chamber cover.



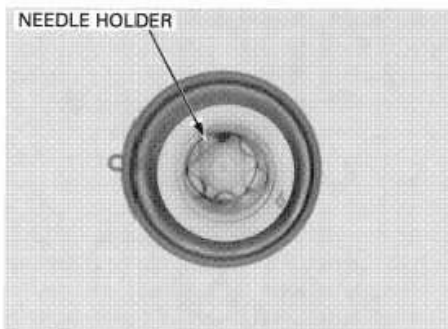
## FUEL SYSTEM

Remove the compression spring and diaphragm/vacuum piston.

Check the piston for smooth operation up and down in the carburetor body.



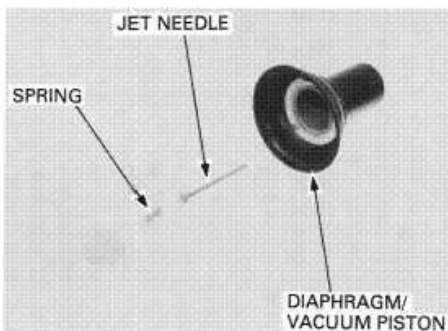
Turn the needle holder counterclockwise while pressing it in and remove the holder flanges from the piston grooves. Remove the needle holder, spring and jet needle from the vacuum piston.



## INSPECTION

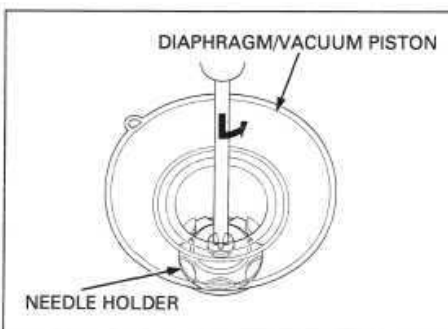
Check the jet needle for stepped wear.  
Check the vacuum piston for wear or damage.  
Check the diaphragm for damage, pin holes, wrinkles or bend.  
Replace these parts if necessary.

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

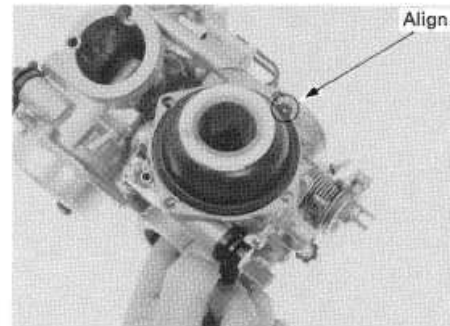


## INSTALLATION

Install the jet needle into the vacuum piston.  
Install the spring onto the needle holder and set the jet needle holder into the piston.  
Turn the needle holder clockwise while pressing it until it locks. Holder flanges and piston grooves should be fitted after turning.



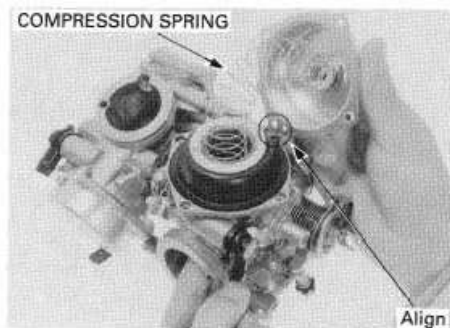
Install the vacuum piston/diaphragm into the carburetor body by aligning the tab of the diaphragm with the cavity.  
Lift the bottom of the piston with your finger to set the diaphragm rib in the groove in the carburetor body.



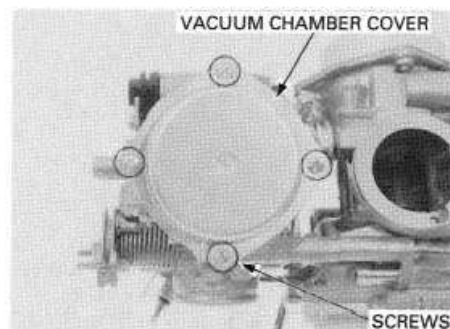
**NOTE:**

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

Install the spring and chamber cover while the piston remains held in place. Align the concave of the cover with the cavity in the carburetor and secure the cover with at least two screws before releasing the vacuum piston.



Tighten the four chamber cover screws.



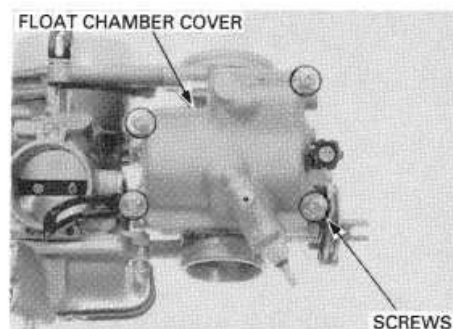
## FLOAT CHAMBER/PILOT SCREW

### REMOVAL

Remove the four screws, clamp and float chamber.  
Remove the O-ring from the float chamber groove.

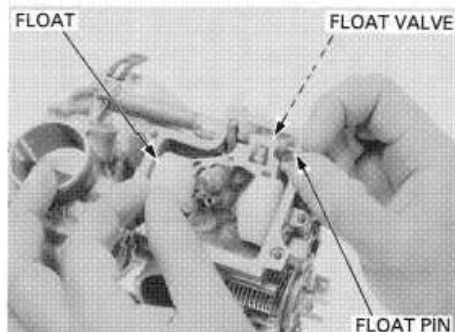
*No.1 (base: rear)  
carburetor only:*

Remove the throttle stop screw.



## FUEL SYSTEM

Remove the float pin, float and float valve.



Remove the following:

- main jet
- needle jet holder
- slow jet
- float valve seat/filter and sealing washer

*For proper pilot screw adjustment, both pilot screws must be replaced even if only one requires it.*

Cover all openings with tape to keep particles out when the plugs are drilled.

Use extreme care when drilling into the pilot screw plug to avoid damaging the pilot screw.

Center punch the pilot screw plug to center the drill point.

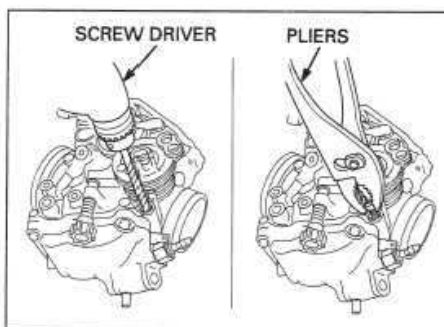
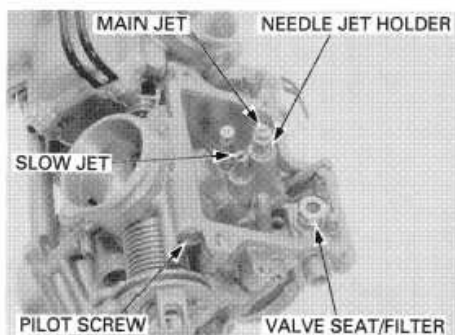
Drill through the plug with a 4 mm (5/32 in) drill bit. Attach a drill stop to the bit 3 mm (1/8 in) from the end to prevent drilling into the pilot screw.

Force the self-tapping 4 mm screw (H/C 069399, P/N 93903-35410) into the drilled plug and continue turning the screw driver until the plug rotates with the screw.

Pull out the screw head with pliers to remove the plug.

Use compressed air to clean the pilot screw area and remove metal shavings.

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



### TOOL:

Pilot screw wrench

07KMA - MS60101

*The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled. Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Remove the following:

- pilot screw
- spring
- washer
- O-ring

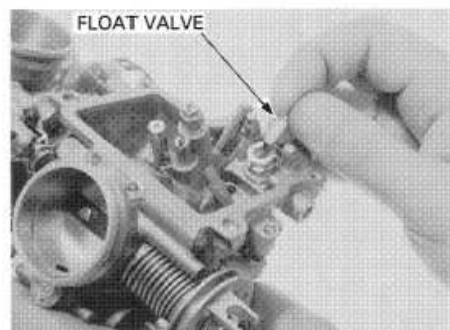
### FLOAT VALVE INSPECTION

Check the float for damage, deterioration 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.

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



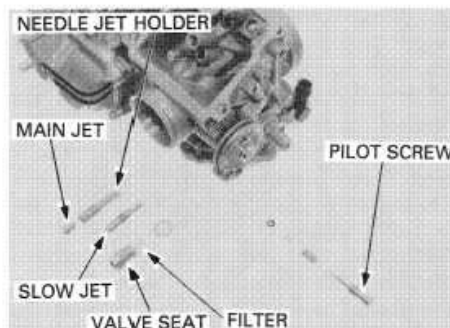
### JETS/FILTER/PILOT SCREW

Check each jet for wear or damage.

Clean the jets with non-flammable or high flash point solvent and blow open with compressed air.

Check the filter for damage or clogging, and be sure the filter is securely installed onto the valve seat. Clean the filter with low pressure compressed air.

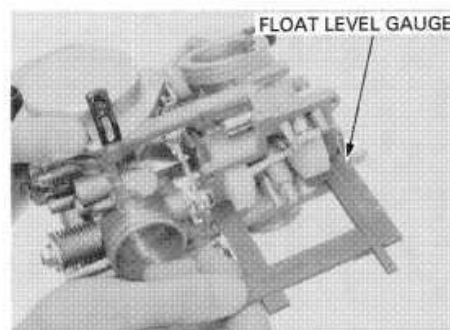
Check the pilot screw for wear or damage. Replace it if it is worn or damaged.



### FLOAT LEVEL

Check the float level after checking the float valve, valve seat and float.

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



### TOOL:

Float level gauge 07401 - 0010000

FLOAT LEVEL: 7.0 mm (0.28 in)

If the level is out of specification and the float arm lip can be bent, adjust the float level by carefully bending the lip.

### INSTALLATION

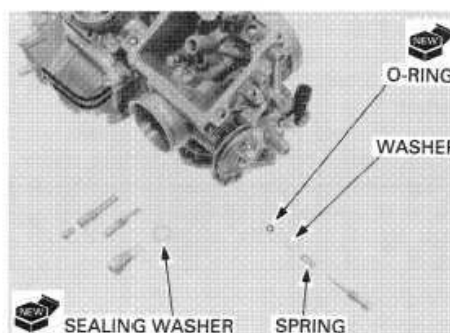
Install the following:

- new O-ring
- washer
- spring

Install the pilot screw and return it to its original position as noted during removal. Perform the pilot screw adjustment if a new pilot screw is installed (page 5-22).

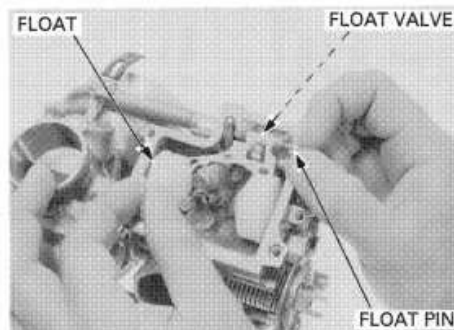
Install the following:

- new sealing washer and float valve seat/filter
- slow jet
- needle jet holder
- main jet



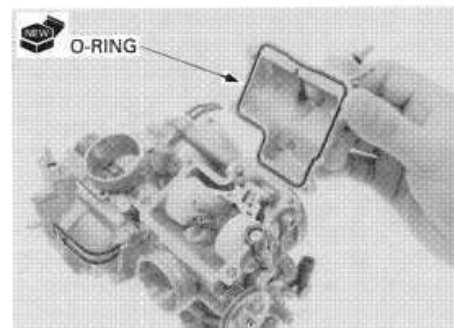
## FUEL SYSTEM

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



Install a new O-ring into the chamber cover groove. Install the chamber cover with the clamp and tighten the four screws.

No. 1 (rear) carburetor only: Install the throttle stop screw.

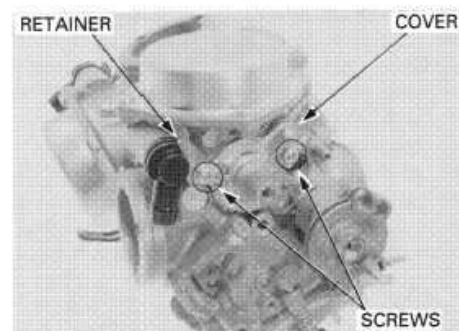


## AIR CUT-OFF VALVE

### REMOVAL

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

Remove the two screws and retainer while holding the air cut-off valve cover, then remove the cover and spring. Remove the diaphragm and O-ring. Remove the sub-air cleaner hose joint if necessary.

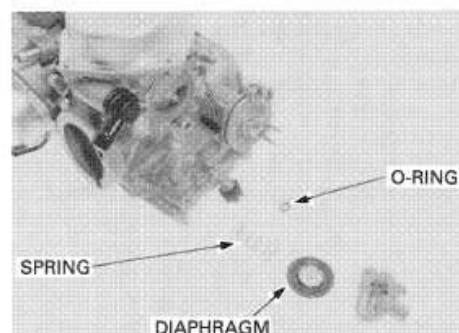


### INSPECTION

Visually check the following:

- the diaphragm for deterioration or pin holes
- the spring for deterioration
- the needle of the diaphragm for excessive wear at the tip
- the orifice of the air vent for clogging or restriction
- the O-ring for damage

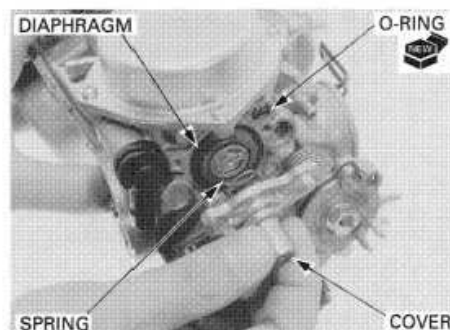
Blow open air passage in the cover with compressed air.





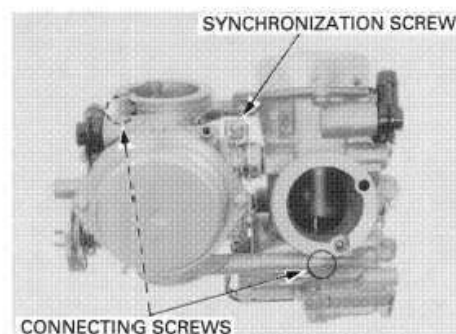
## INSTALLATION

Install a new O-ring with the flat side facing the carburetor body.  
Install the diaphragm and spring and air cut-off valve cover. Be sure the diaphragm and O-ring do not interfere with the cover.  
Install the retainer and screws by holding the air cut-off valve cover and tighten the screws.

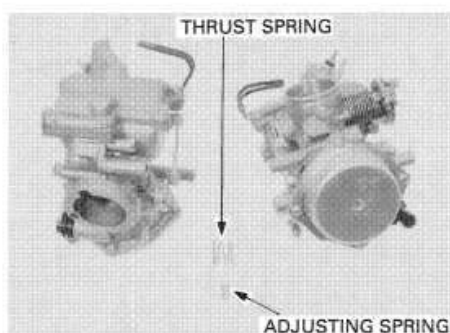


## CARBURETOR SEPARATION

Loosen the synchronization screw until there is no tension and remove the adjusting spring.  
Remove the two connecting screws.



Carefully separate the carburetors, then remove the thrust spring.

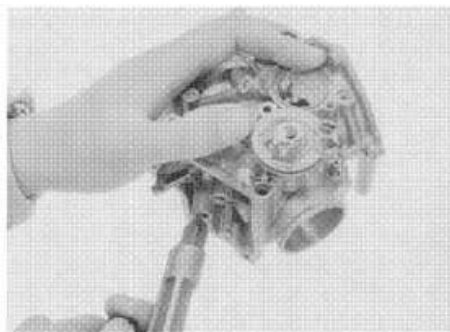


## CARBURETOR CLEANING

Separate the carburetors (see previous page).  
Remove all parts (diaphragm/vacuum chamber, float valve, all jets, pilot screw, air cut-off valve and sub-air cleaner hose joint) from the carburetor.

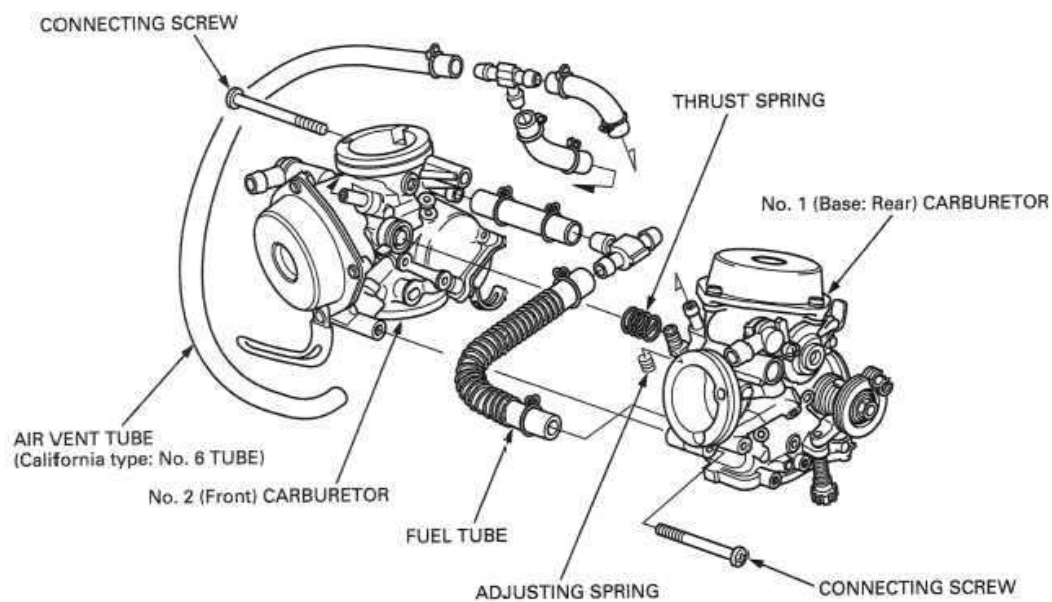
*Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.*

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

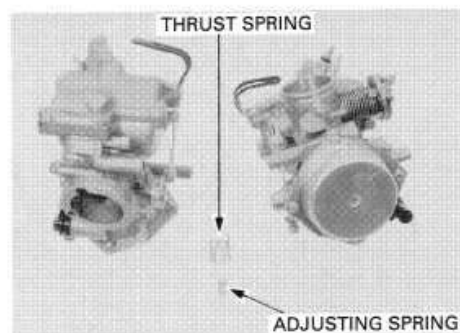


## FUEL SYSTEM

### CARBURETOR COMBINATION

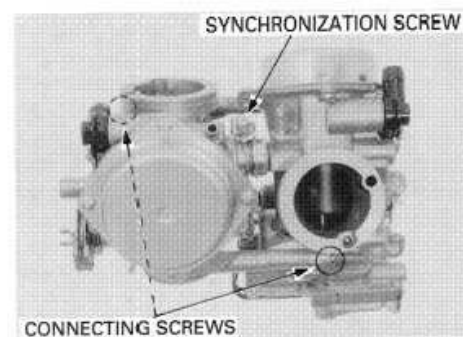


Assemble the No. 1 (base: rear) and No. 2 (front) carburetors together with the thrust spring.

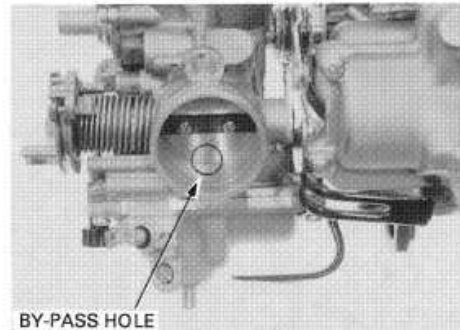


Be sure there is no clearance at the joint portion of the carburetor bodies.  
Install and tighten the connecting screws alternately and gradually.

Install the adjusting spring.



Turn the throttle stop screw to align the throttle valve with the edge of the outside by-pass hole in carburetor No. 1 (base: rear).

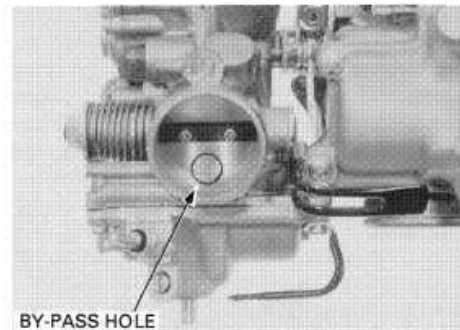


BY-PASS HOLE

Align the No. 2 (front) throttle valve with the outside by-pass hole edge by turning the synchronization adjusting screw.

Check for throttle operations described below:

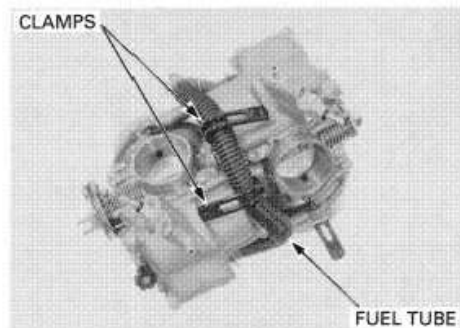
- Open the throttle valves slightly by pressing the throttle linkage and be sure they return smoothly.
- Rotate the throttle drum and be sure each throttle valve opens and closes smoothly.



BY-PASS HOLE

## **CARBURETOR INSTALLATION**

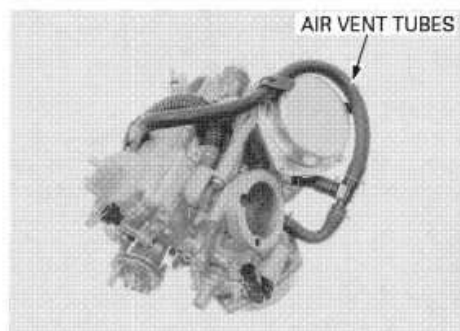
Connect the fuel tube to the carburetors.  
Set the fuel tube to the clamps.



CLAMPS

FUEL TUBE

Connect the carburetor air vent tubes (California type: No. 6 tube) to the carburetors.  
Set the air vent tubes to the clamps.



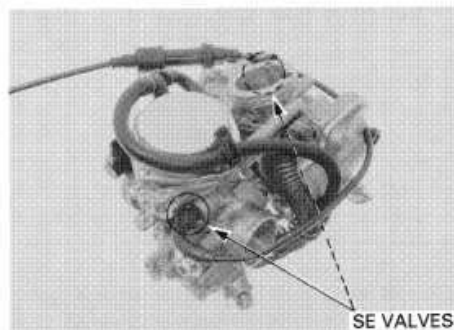
AIR VENT TUBES

## FUEL SYSTEM

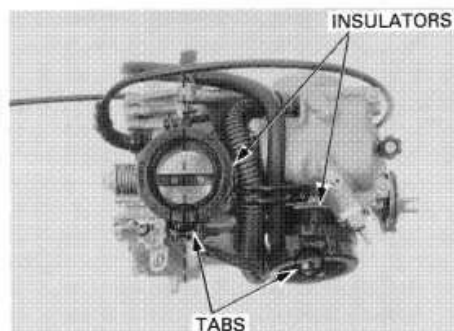
**NOTE:**

- Refer to SE valve inspection on page 3-5 for "Carburetor Choke".

Install the SE valves to the carburetors.  
Tighten the lock nuts.  
Install the choke cable boots.



Install the carburetor insulators onto the carburetors  
with the insulator tabs facing down vertically.  
Temporarily tighten the band screws.

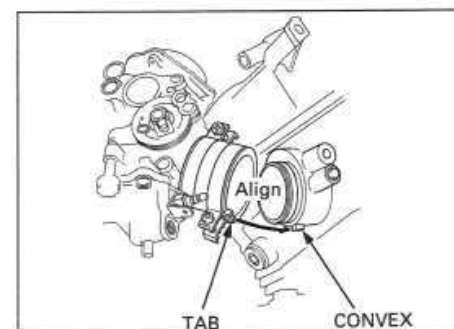


Set the carburetor assembly near the right side of the engine.  
Connect the fuel tube to the carburetor, then install  
the carburetor assembly onto the cylinder head  
intake ports.



**NOTE:**

- Align the convex of the cylinder head intake port  
with the insulator tabs as shown.



## FUEL SYSTEM

*California type only:* The tube number of the evaporative emission control system is printed on all tubes.

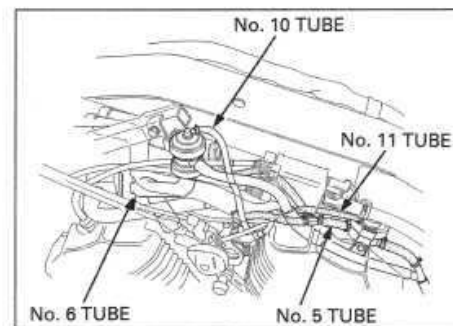
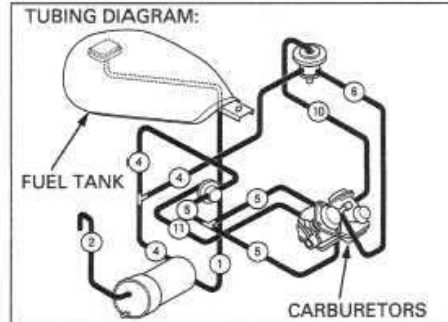
Refer to the tubing diagram for tube connections.

*Route the tubes properly (page 1-18).*

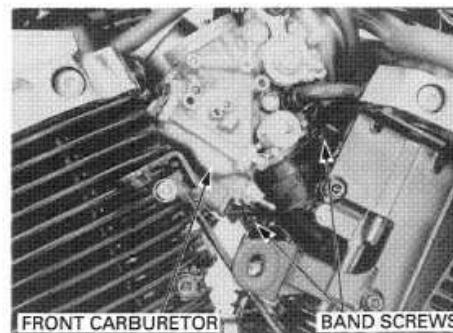
Connect the No. 5 tube and No. 10 tube to the rear carburetor.

Connect the No. 5 tube and No. 11 tube to the front carburetor.

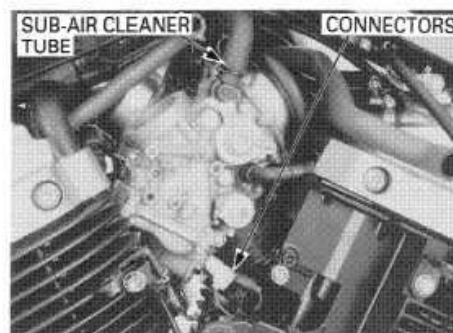
Connect the No. 6 tube (49 state/Canada type: air vent tube) to the Evaporative Emission Carburetor Air Vent (EVAP CAV) control valve.



Tighten the insulator side and carburetor side band screws securely.

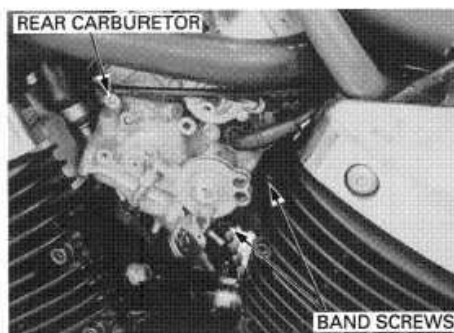


Connect the carburetor heater connectors to the front carburetor.  
Connect the sub-air cleaner tube to the front carburetor.

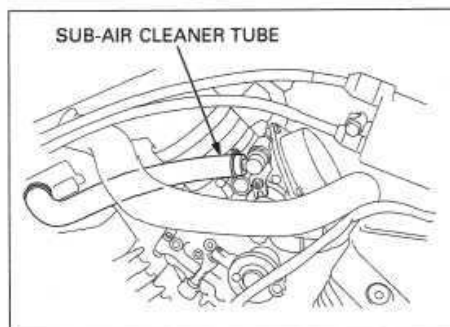


## FUEL SYSTEM

Tighten the insulator side and carburetor side band screws securely.

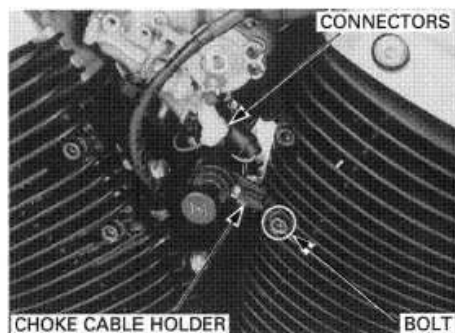


Connect the sub-air cleaner tube to the rear carburetor.



Connect the carburetor heater connectors to the rear carburetor.  
Install the choke cable holder with the mounting bolt.  
Tighten the bolt.

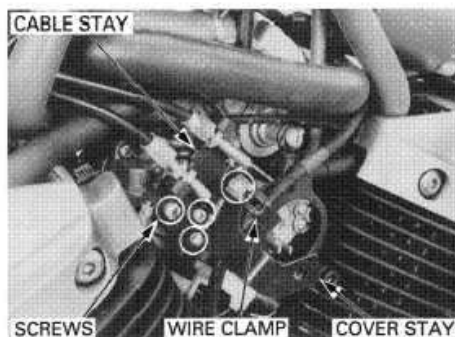
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



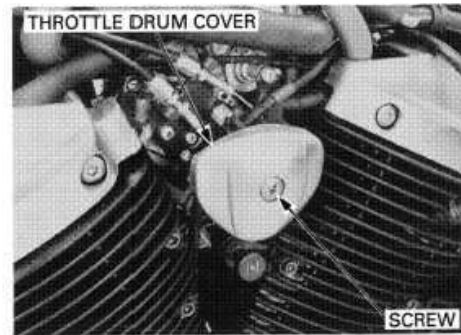
Connect the throttle cables to the throttle drum.

Install the following:

- throttle cable stay and three screws
- throttle drum cover stay and screw
- wire clamp and screw



- throttle drum cover
- screw

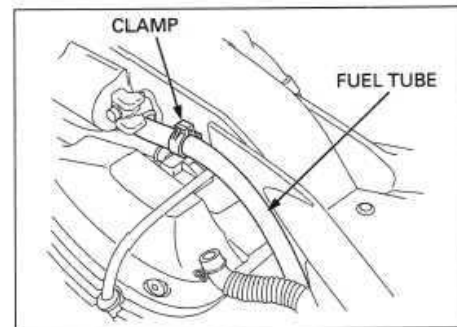


Clamp the fuel tube onto the tube clamp.

Install the air cleaner chamber (page 5-3).

Perform the following adjustments.

- throttle grip free play (page 3-4)
- carburetor synchronization (page 3-11)
- engine idle speed (page 3-12)



## FUEL SYSTEM

### PILOT SCREW ADJUSTMENT

#### IDLE DROP PROCEDURE

**NOTE:**

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

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

1. Turn each pilot screw clockwise until it seats lightly, then back it out the specified number of turns. This is an initial setting prior to the final pilot screw adjustment.

**TOOL:**

Pilot screw wrench

07KMA – MS60101

**INITIAL OPENING:** 2- $\frac{3}{8}$  turns out

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

**IDLE SPEED:** 1,000  $\pm$  100 rpm

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by successive 1/2 turn increments until the engine speed does not increase.
7. Adjust the idle speed to the specified rpm with the throttle stop screw.
8. Turn the rear cylinder carburetor pilot screw in until the engine speed drops by 50 rpm.
9. Turn the rear cylinder carburetor pilot screw out to the final opening from the position obtained in step 8.

**FINAL OPENING:**  $\frac{1}{2}$  turn out

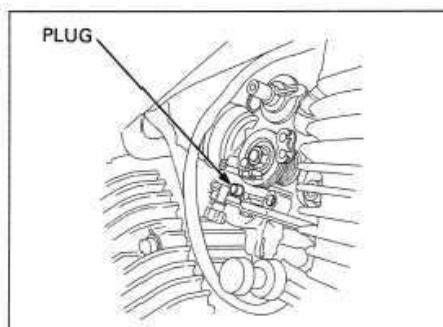
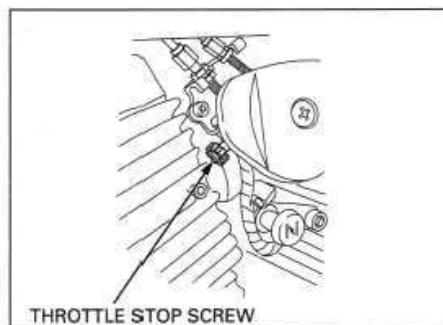
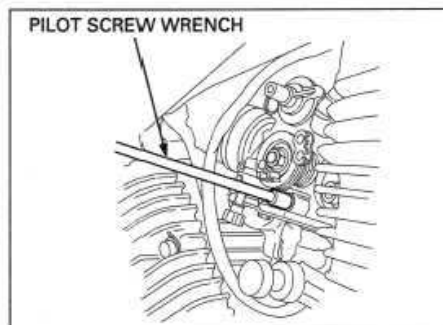
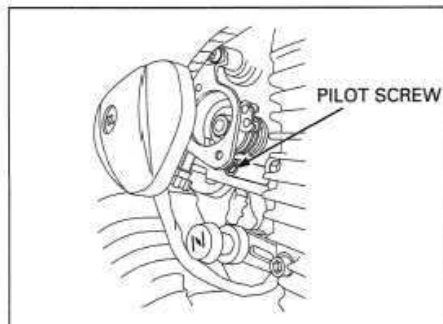
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the front cylinder carburetor pilot screw.

Drive new pilot screw plugs into the pilot screw bores with the special tool. When fully seated, the plug surface will be recessed 1 mm.

**TOOL:**

Valve guide driver, 6.6 mm

07942 – 6570100





## HIGH ALTITUDE ADJUSTMENT

*These adjustments must be made at high altitude to ensure proper high altitude operation.*

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

Warm up the engine to operating temperature and ride the motorcycle for approximately 10 minutes.

Turn each pilot screw to the high altitude setting specified below.

### TOOL:

Pilot screw wrench

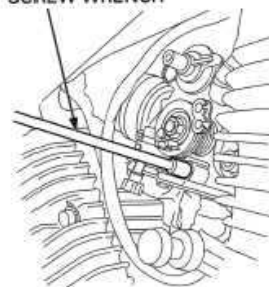
07KMA – MS60101

**HIGH ALTITUDE SETTING:**  $\frac{1}{2}$  turn in

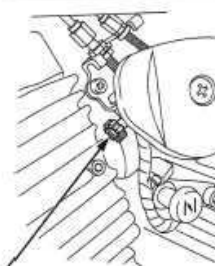
Adjust the idle speed to the specified rpm with the throttle stop screw.

**IDLE SPEED:** 1,000  $\pm$  100 rpm

PILOT SCREW WRENCH



THROTTLE STOP SCREW



Remove the left side cover (page 2-3).

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

Attach the Vehicle Emission Control Information Update Label on the reverse side of the left side cover as shown.

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

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

When the vehicle is to be operated continuously below 1,500 meters (5,000 feet), turn each pilot screw to the low altitude setting specified below (its original position).

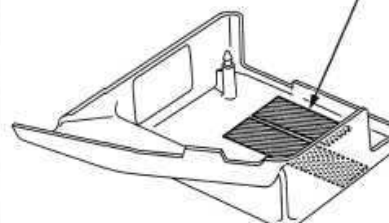
**LOW ALTITUDE SETTING:**  $\frac{1}{2}$  turn out

Adjust the idle speed to the specified rpm (1,000  $\pm$  100 rpm).

Be sure to do these adjustments at low altitude with the engine at normal operating temperature.

Remove the Vehicle Emission Control Information Update Label that is attached to the reverse side of the left side cover after adjusting for low altitude.

UPDATE LABEL



VEHICLE EMISSION CONTROL INFORMATION UPDATE  
HONDA MOTOR CO., LTD.

THIS VEHICLE HAS BEEN ADJUSTED TO  
IMPROVE EMISSION CONTROL PERFORMANCE  
WHEN OPERATED AT HIGH ALTITUDE.

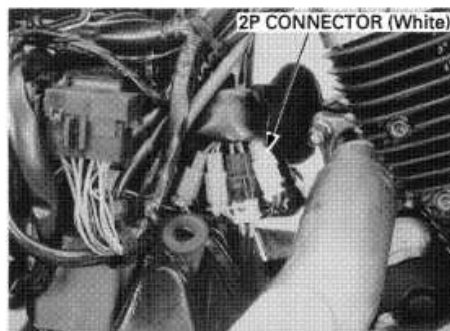
ALTITUDE PERFORMANCE ADJUSTMENT INSTRUCTIONS  
ARE AVAILABLE AT YOUR AUTHORIZED HONDA DEALER.

## FUEL SYSTEM

### FUEL PUMP REMOVAL/INSTALLATION

Remove both side covers (page 2-3).

Disconnect the fuel pump 2P connector (White) in the connector boot.  
Release the fuel pump wire from the wire band.

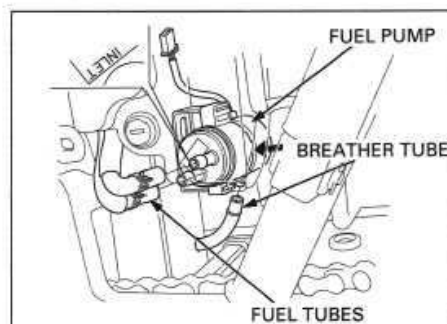


Disconnect the fuel tubes and fuel pump breather tube from the fuel pump.  
Remove the fuel pump from the mounting rubber.

Installation is in the reverse order of removal.

**NOTE:**

- The "INLET" mark indicates the inlet tube side.



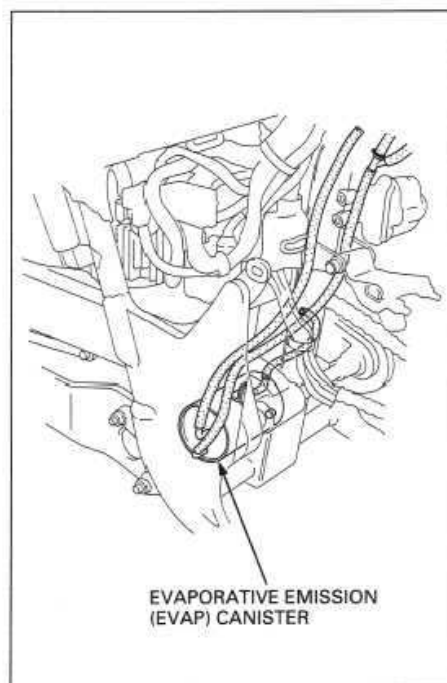
### EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION (California type only)

**NOTE:**

- Refer to the tubing diagram on page 1-27 for tube connections.

#### EVAPORATIVE EMISSION (EVAP) CANISTER

Check the fuel tank, Evaporative Emission (EVAP) purge control valve, and EVAP canister hoses to be sure they are not kinked and are securely connected. Replace any hose that shows signs of damage or deterioration.



## EVAPORATIVE EMISSION (EVAP) PURGE CONTROL VALVE

### NOTE:

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

Remove the fuel tank (page 2-2).

Disconnect the EVAP purge control valve hoses from their connections.

Remove the EVAP purge control valve from its mount.

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

### TOOL:

Vacuum/pressure pump	A937X - 041 - XXXXX
	or
Vacuum pump	ST - AH - 260 - MC7
	(U.S.A. only)

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

The specified vacuum should be maintained.

Replace the EVAP purge control valve if vacuum is not maintained. Remove the vacuum pump and connect it to the No. 11 tube fitting (vacuum port) that goes to the rear carburetor.

Apply the specified vacuum to the EVAP purge control valve.

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

The specified vacuum should be maintained.

Replace the EVAP purge control valve if vacuum is not maintained.

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

### TOOL:

Vacuum/pressure pump	A937X - 041 - XXXXX
	or
Pressure pump	ST - AH - 255 - MC7
	(U.S.A. only)

### NOTICE

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

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

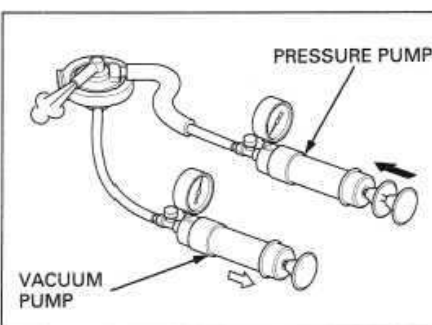
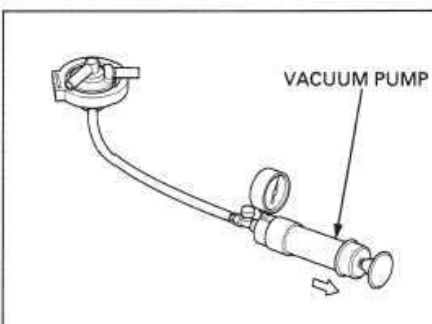
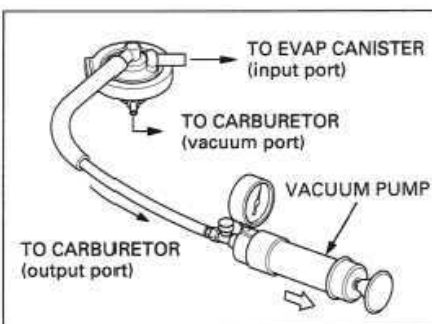
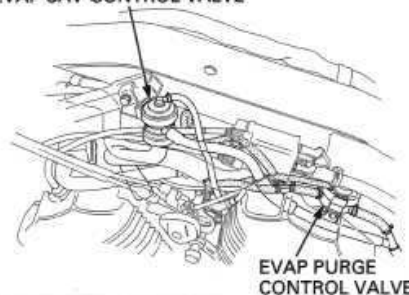
**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

Air should flow through the EVAP purge control valve and out the output port that goes to the carburetors.

Replace the EVAP purge control valve if air does not flow out.

Remove the pumps and install the EVAP purge control valve in the reverse order of removal.

EVAP CAV CONTROL VALVE



## FUEL SYSTEM

### EVAPORATIVE EMISSION CARBURETOR AIR VENT (EVAP CAV) CONTROL VALVE

#### NOTE:

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

Remove the fuel tank (page 2-2).

Disconnect the Evaporative Emission Carburetor Air Vent (EVAP CAV) control valve hoses from their connections and remove the EVAP CAV control valve from its mount.

Connect a vacuum pump to the No. 10 tube fitting (vacuum port) that goes to the front carburetor. Apply the specified vacuum to the EVAP CAV control valve.

#### TOOL:

Vacuum/pressure pump      A937X - 041 - XXXXX  
or  
Vacuum pump                ST - AH - 260 - MC7  
(U.S.A. only)

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

The specified vacuum should be maintained.

Replace the EVAP CAV control valve if vacuum is not maintained.

Remove the vacuum pump and connect it to the air vent tube fitting that goes to open air.

Apply vacuum to the EVAP CAV control valve. The vacuum should hold steady.

Replace the EVAP CAV control valve if vacuum leaks.

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

#### TOOL:

Vacuum/pressure pump      A937X - 041 - XXXXX  
or  
Pressure pump                ST - AH - 255 - MC7  
(U.S.A. only)

#### NOTICE

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

While applying vacuum to the EVAP CAV control valve vacuum port, pump air through the open air port.

Air should flow through the EVAP CAV control valve and out the air vent port that goes to the carburetor air vent joint.

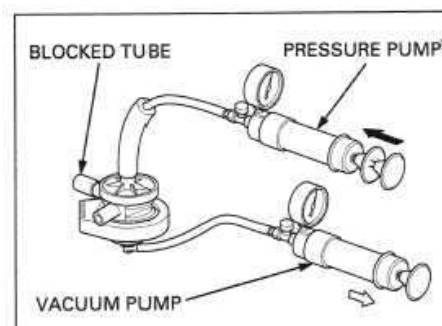
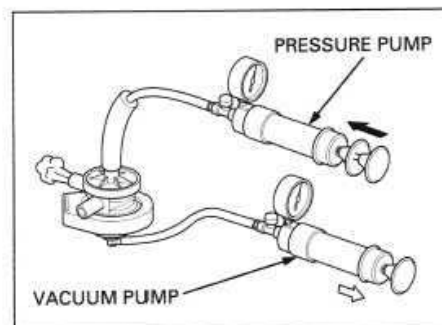
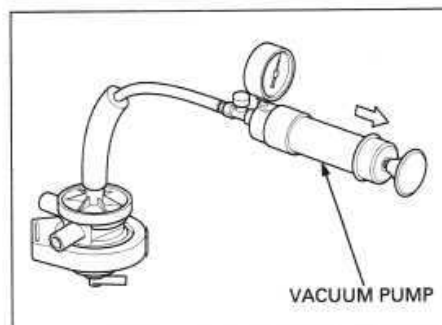
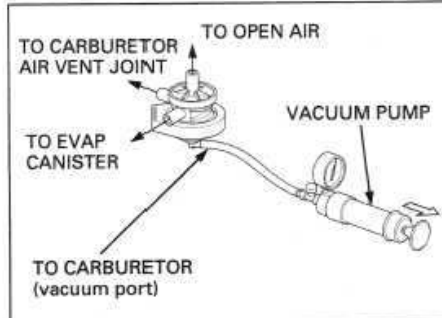
Plug the air vent port (No. 6 tube fitting) that goes to the carburetor air vent joint.

While applying vacuum to the vacuum port, apply air pressure to the open air port.

It should hold steady.

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

Remove the pumps and install the EVAP CAV control valve in the reverse order of removal.

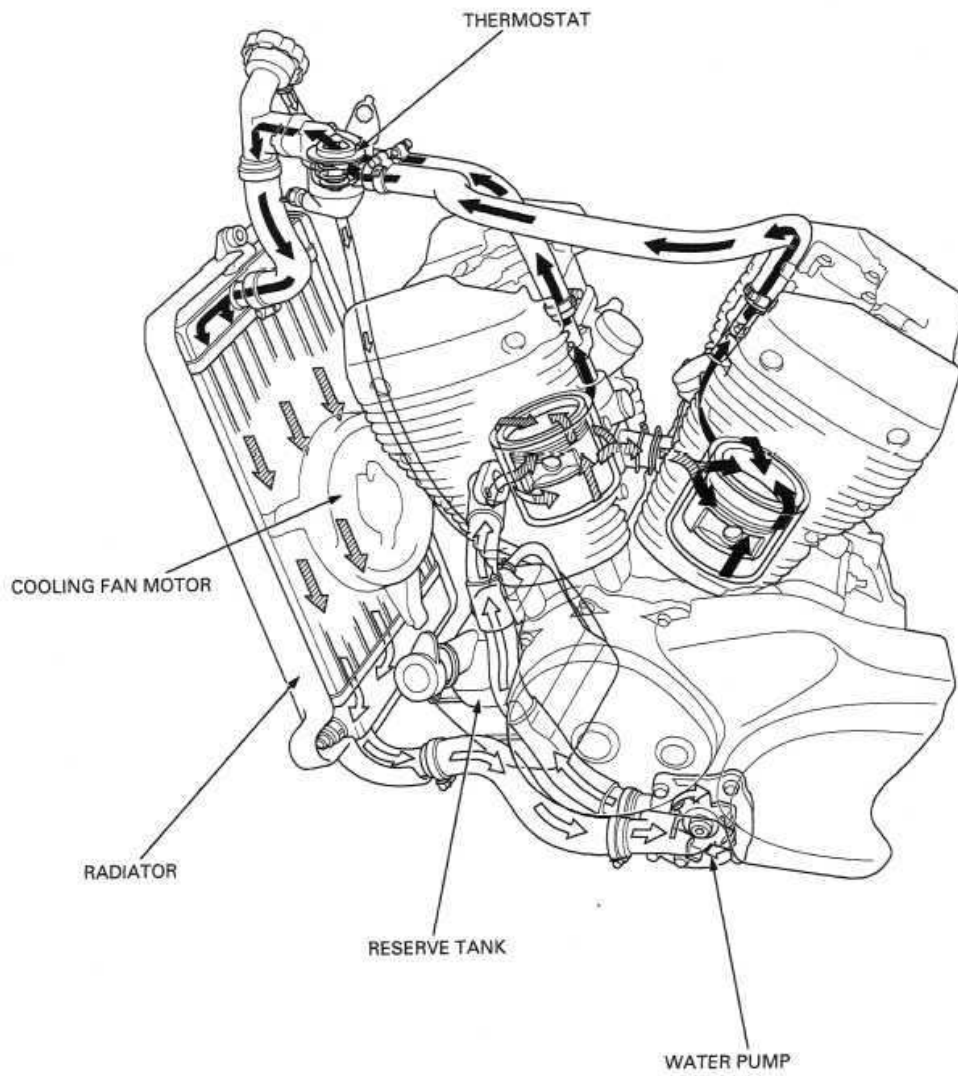


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## MEMO

## COOLING SYSTEM

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## 6. COOLING SYSTEM

SERVICE INFORMATION	6-1	THERMOSTAT	6-6
TROUBLESHOOTING	6-2	RADIATOR/COOLING FAN	6-8
SYSTEM TESTING	6-3	WATER PUMP	6-12
COOLANT REPLACEMENT	6-4	RADIATOR RESERVE TANK	6-14

### SERVICE INFORMATION

#### GENERAL

#### ⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding.

Always let the engine and radiator cool down before removing the radiator cap.

6

#### NOTICE

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- 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.
- Refer to section 19 for fan motor switch and thermosensor information.

#### SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	1.75 liters (1.85 US qt, 1.54 Imp qt)
	Reserve tank	0.4 liter (0.42 US qt, 0.35 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	Begin to open	80 – 84°C (176 – 183°F)
	Fully open	95°C (203°F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

#### TORQUE VALUES

Water pump bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Radiator mounting bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	page 19-9
Thermosensor	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	page 19-8
Drive chain guide plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

## **COOLING SYSTEM**

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### **TROUBLESHOOTING**

#### **Engine temperature too high**

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

#### **Engine temperature too low**

- Thermostat stuck open
- Faulty fan motor switch

#### **Coolant leaks**

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



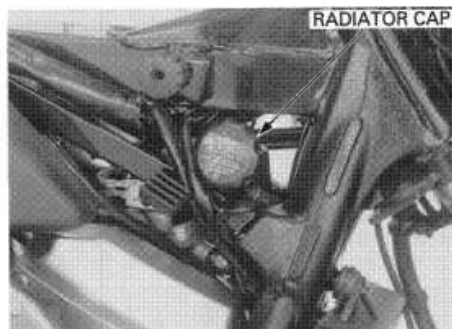
## SYSTEM TESTING

### COOLANT (HYDROMETER TEST)

Remove the fuel tank (page 2-2).

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

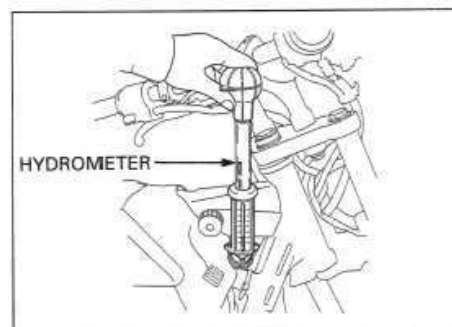
Remove the radiator cap.



Test the coolant gravity using a hydrometer.

**STANDARD COOLANT CONCENTRATION: 50%**

Look for contamination and replace the coolant if necessary.



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

## COOLING SYSTEM

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap.  
Wet the sealing surfaces of the cap, then install the cap to the tester.

*Excessive pressure can damage the cooling system components.*

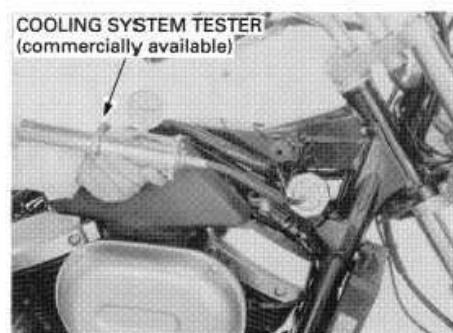
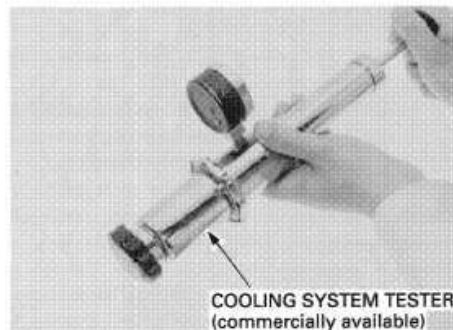
*Do not exceed  
137 kPa (1.4  
kgf/cm<sup>2</sup>, 20 psi).*

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 the specified pressure for at least 6 seconds.

**RADIATOR CAP RELIEF PRESSURE:**  
**108 – 137 kPa (1.1 – 1.4 kgf/cm<sup>2</sup>, 16 – 20 psi)**

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

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



## COOLANT REPLACEMENT

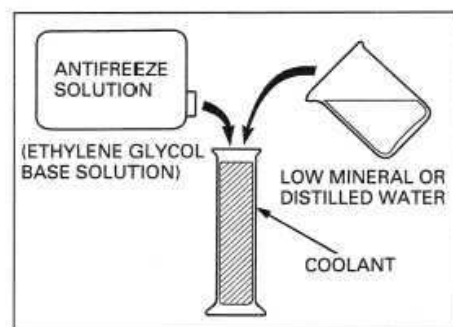
The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.  
Mix only distilled, low mineral water with the antifreeze.

**RECOMMENDED MIXTURE:**  
**50 – 50 (distilled water and antifreeze)**

**RECOMMENDED ANTIFREEZE:**  
Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors.

#### NOTICE

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



## REPLACEMENT/AIR BLEEDING

### NOTE:

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

Remove the fuel tank (page 2-2).

Remove the radiator cap.

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

Reinstall the drain bolt with a new sealing washer.

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

Remove the radiator reserve tank (page 6-14).

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

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

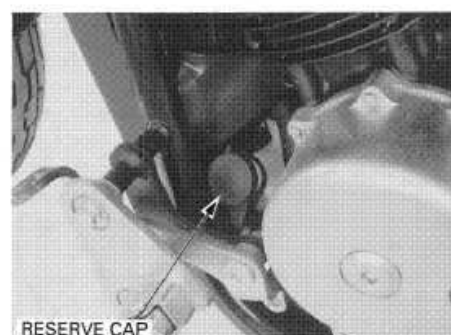
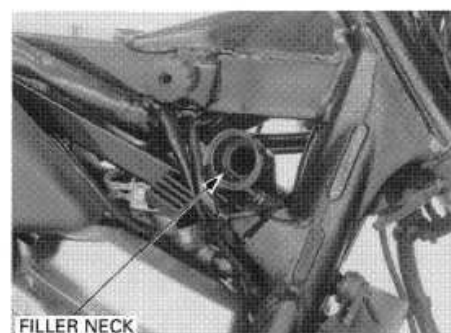
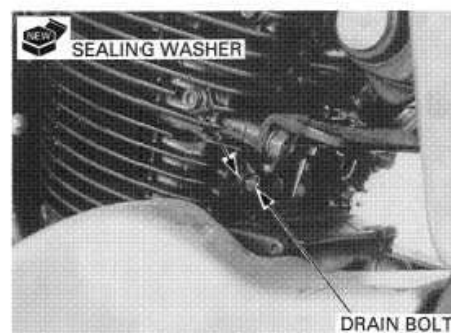
Install the radiator reserve tank. (page 6-14).

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

Remove the reserve cap and fill the radiator 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 to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the radiator reserve tank and fill to the upper level if it is low.



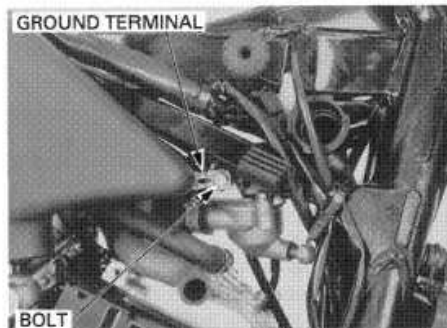
## COOLING SYSTEM

### THERMOSTAT

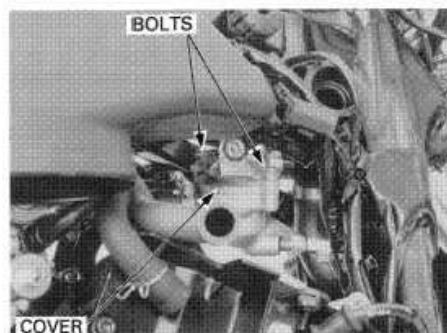
#### REMOVAL

Drain the coolant (page 6-4).  
Remove the air cleaner housing (page 5-3).  
Remove the sub-air cleaner (page 5-4).  
Remove the front cylinder right overhead cover (page 10-4).

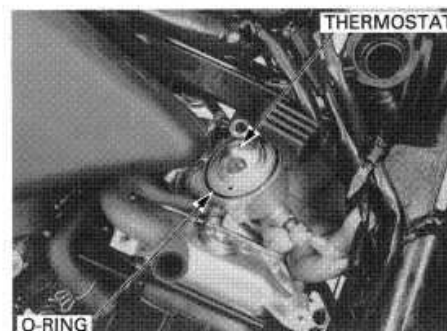
Remove the thermostat housing mounting bolt with the ground terminal.



Remove the thermostat housing cover bolts and cover.



Remove the O-ring and thermostat.



#### INSPECTION

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

*Wear insulated gloves and adequate eye protection.*

*Keep flammable materials away from the electric heating element.*

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

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

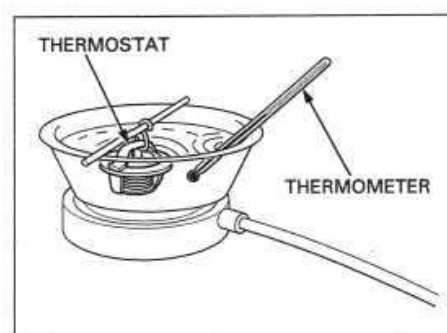
#### THERMOSTAT BEGINS TO OPEN:

80 – 84°C (176 – 183°F)

#### VALVE LIFT:

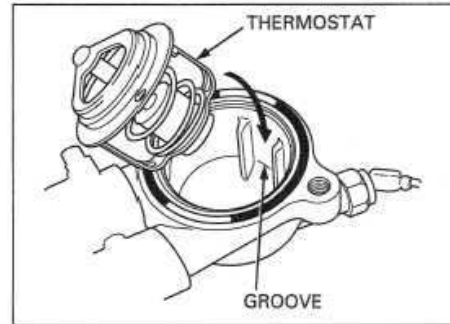
8 mm (0.3 in) minimum at 95°C (203°F)

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

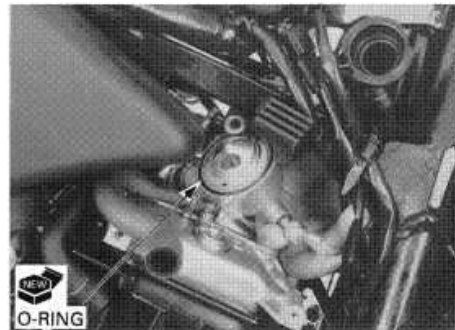


## INSTALLATION

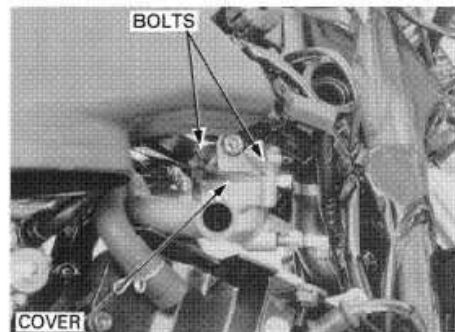
Install the thermostat into the housing by aligning the housing groove as shown. Make sure the thermostat is securely installed.



Install a new O-ring into the housing.

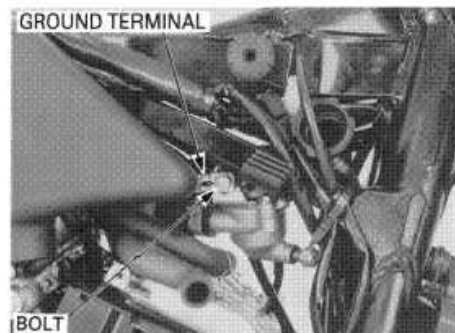


Install the thermostat housing cover with bolts and tighten the cover bolts securely.



Install the thermostat housing and tighten the mounting bolt with the ground terminal.

Install the front cylinder right overhead cover (page 10-19).  
Install the sub-air cleaner (page 5-4).  
Install the air cleaner housing (page 5-3).  
Fill and bleed the cooling system (page 6-4).



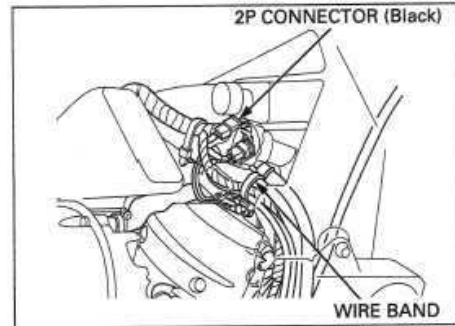
## COOLING SYSTEM

### RADIATOR/COOLING FAN

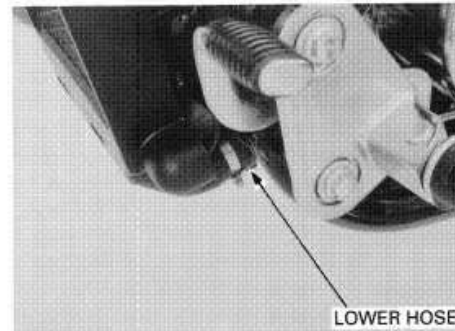
#### REMOVAL

Drain the coolant (page 6-4).

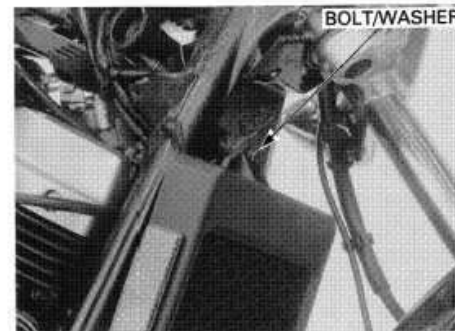
Disconnect the fan motor switch 2P connector (Black).  
Release the fan motor switch wire from the wire band.



Loosen the hose band and disconnect the lower radiator hose.

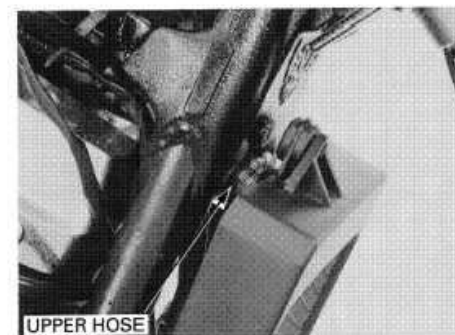


Remove the radiator mounting bolt/washer, then pull out the radiator.



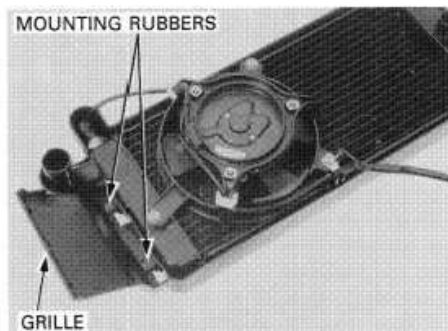
Loosen the hose band and disconnect the upper radiator hose.

Remove the radiator grille/radiator by releasing the mounting rubbers from the radiator stay.

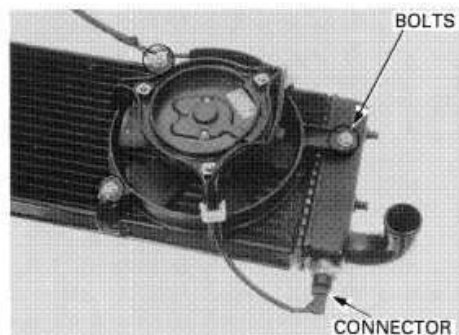


**DISASSEMBLY**

Remove the radiator mounting rubbers and radiator grille from the radiator.

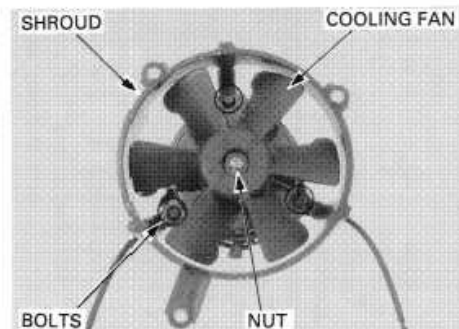


Disconnect the fan motor switch connector. Remove the fan motor assembly by removing the three bolts, wire clamp and ground terminal.

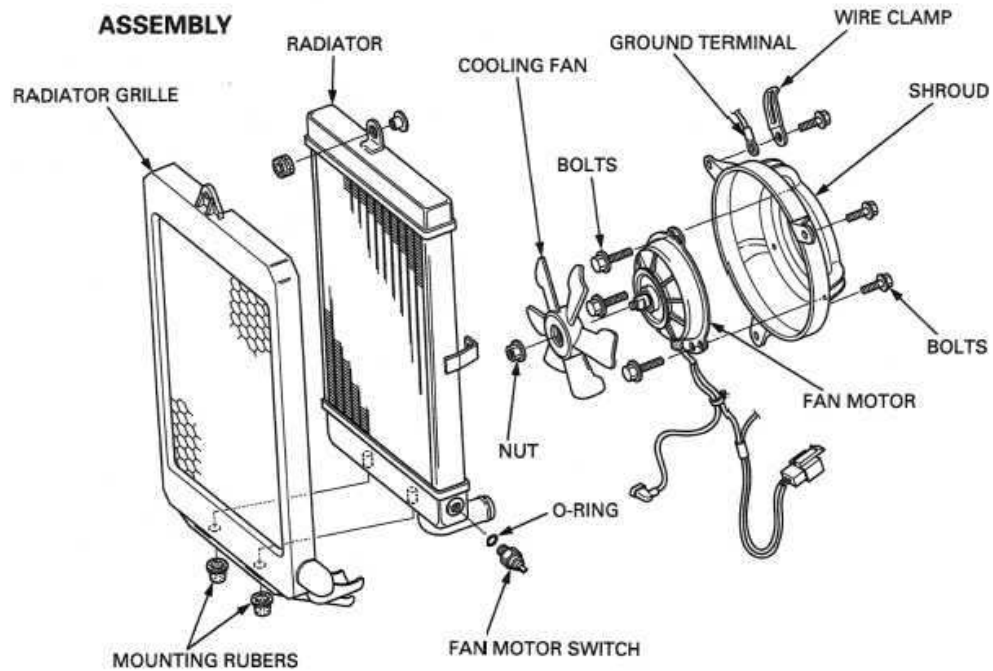


Remove the fan nut and cooling fan. Remove the fan motor wires from the clamps of the shroud. Remove the three mounting bolts and fan motor.

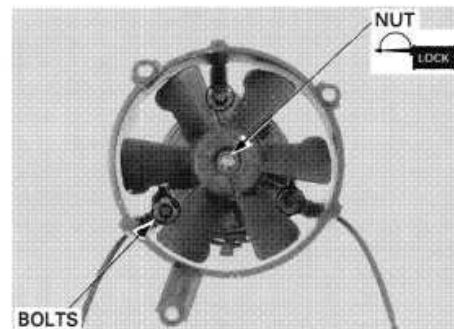
For fan motor switch information, refer to page 19-8.



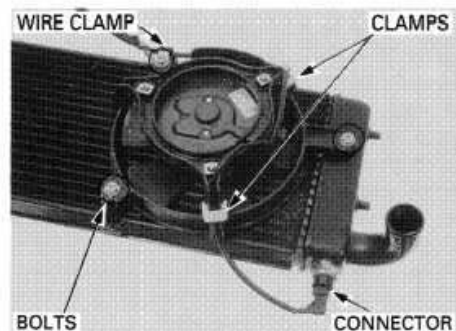
## COOLING SYSTEM



Install the fan motor onto the shroud and tighten the mounting bolts.  
Apply locking agent to the fan motor nut threads.  
Install the cooling fan onto the motor shaft by aligning the flat surfaces. Tighten the fan nut.  
Clamp the fan motor wires securely.

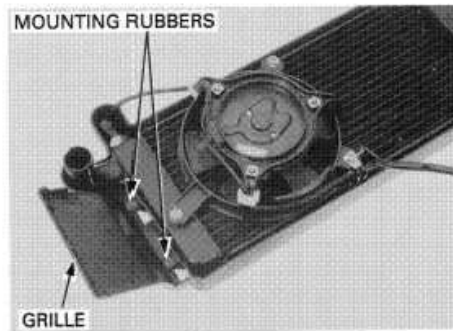


Install the fan motor assembly, ground terminal and wire clamp onto the radiator, then tighten the mounting bolts.  
Clamp the fan motor wire and bend the wire clamp as shown.  
Connect the fan motor switch connector.



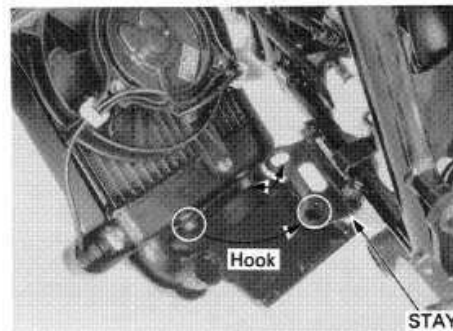


Install the radiator grille to the radiator by aligning its holes with the bosses on the radiator.  
Install the radiator mounting rubbers to the radiator bosses.

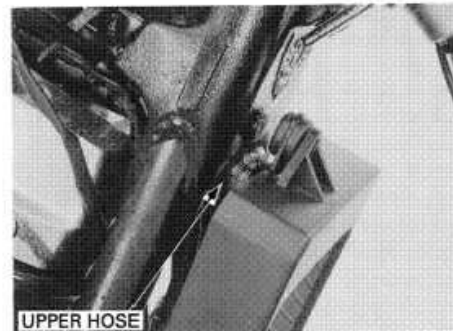


### INSTALLATION

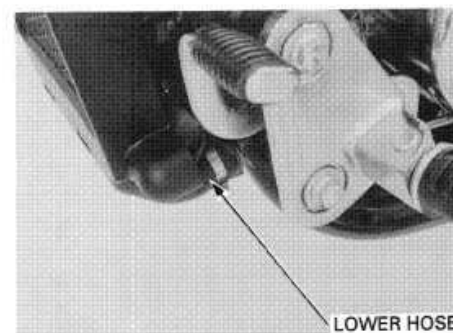
Hook the radiator mounting rubbers to the radiator stay.



Connect the upper radiator hose and tighten the radiator hose band.



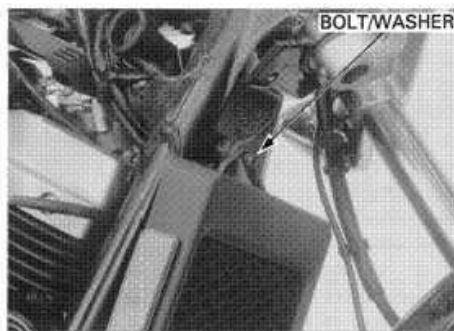
Connect the lower radiator hose and tighten the radiator hose band.



## COOLING SYSTEM

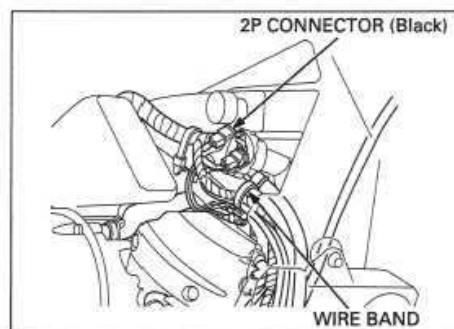
Install the radiator mounting bolt/washer, then tighten to the specified torque.

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



Connect the fan motor switch 2P connector (Black). Set the fan motor wire to the wire band.

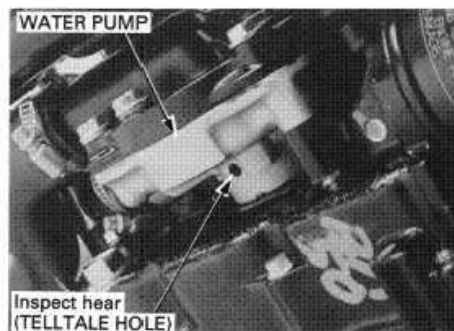
Fill and bleed the cooling system (page 6-4).  
Install the fuel tank (page 2-2).



## WATER PUMP

### MECHANICAL SEAL INSPECTION

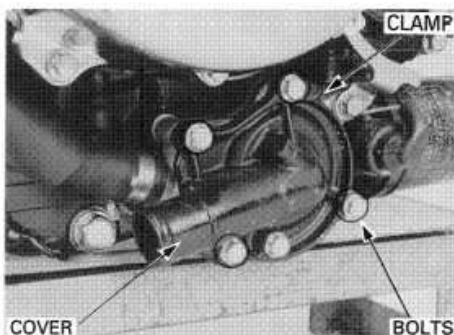
Inspect the telltale hole for signs of coolant leakage. If there is leakage, the mechanical seal is defective, and it should be replaced (see below).



### REMOVAL

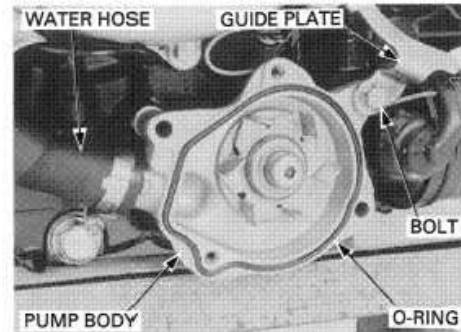
Remove the engine from the frame (see section 9).

Remove the four bolts, clamp and water pump cover.

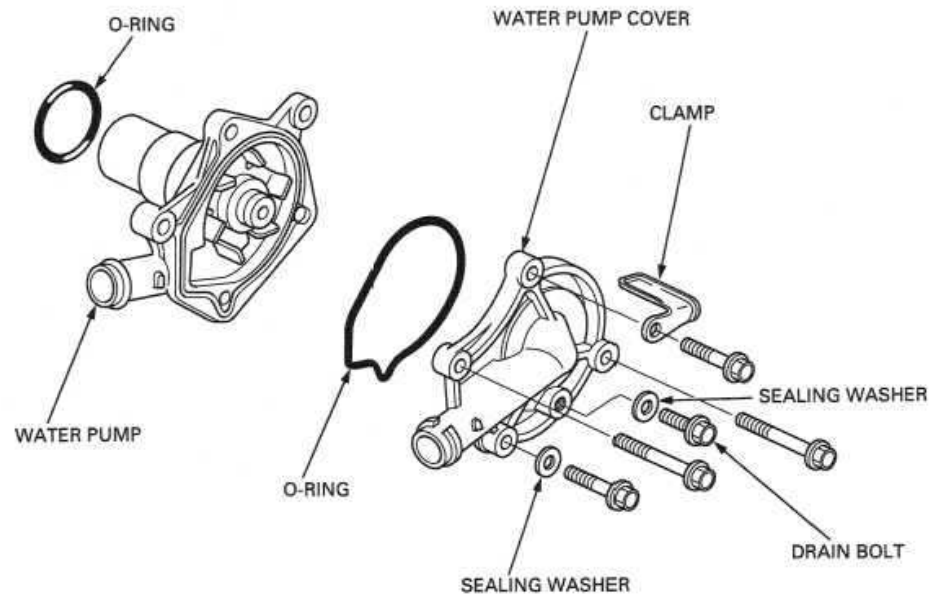


Remove the O-ring from the water pump body.  
Remove the drive chain guide plate bolts and guide plate.  
Disconnect the water hose, then remove the water pump body from the crankcase.

Remove the O-ring from the water pump body.



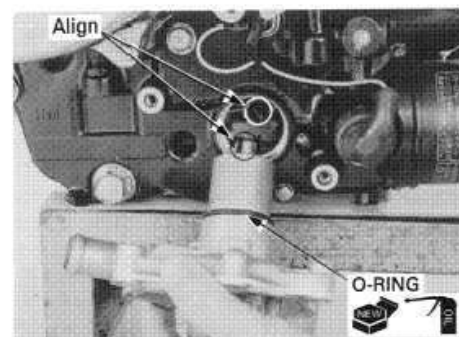
### ASSEMBLY



### INSTALLATION

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

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

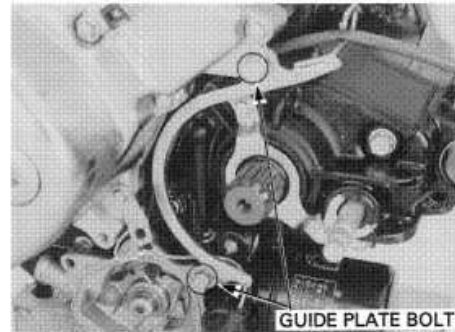


## COOLING SYSTEM

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

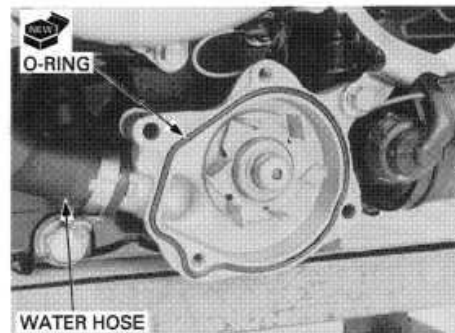
Route the oil pressure switch wire and neutral switch wire securely (page 1-18).

Install the drive chain guide plate and guide plate bolts.



Connect the water hose and tighten the hose band securely.

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



Install the water pump cover, clamp and four mounting bolts.

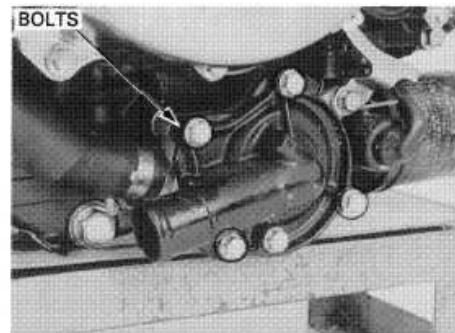
Tighten the drive chain guide plate bolts to the specified torque.

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

Tighten the water pump bolts to the specified torque.

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

Install the engine in the frame (see section 9).



## RADIATOR RESERVE TANK

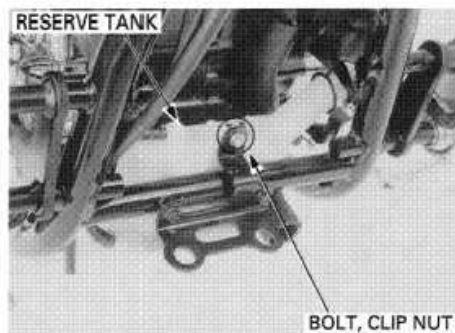
### REMOVAL/INSTALLATION

Remove the radiator/cooling fan (page 6-8).

Disconnect the reserve tank overflow tube.  
Disconnect the siphon tube and drain the coolant.  
Remove the reserve tank cap from the reserve tank and drain the coolant.  
Remove the mounting bolt, clip nut and reserve tank.

Install the removed parts in the reverse order of removal.

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



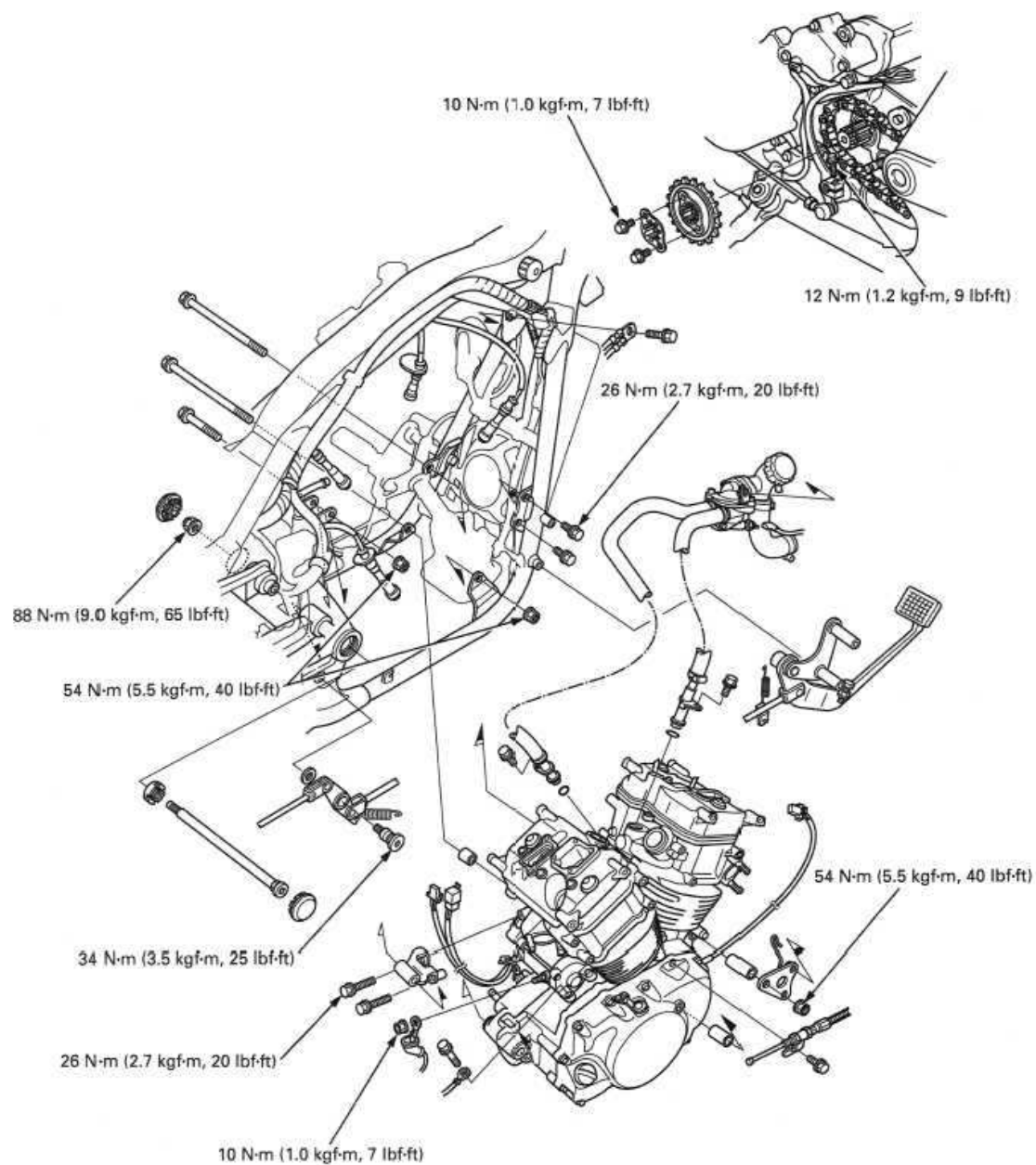
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MEMO

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## ENGINE REMOVAL/INSTALLATION

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# 7. ENGINE REMOVAL/INSTALLATION

**SERVICE INFORMATION**  
**ENGINE REMOVAL**

**7-1**  
**7-2**

**ENGINE INSTALLATION**

**7-7**

## SERVICE INFORMATION

### GENERAL

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

#### NOTICE

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

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for service.
  - Oil pump (section 4)
  - Water pump (section 6)
  - Cylinder head (section 10)
  - Cylinder, piston (section 11)
  - Crankshaft/connecting rod (section 12)
  - Transmission, gearshift drum, shift fork (section 12)
  - Crankcase (section 12)
- The following components can be serviced with the engine in the frame.
  - Carburetor (section 5)
  - Clutch, gearshift linkage (section 8)
  - Ignition pulse generator, primary drive gear (section 8)
  - Alternator (section 9)
  - Flywheel/starter clutch and starter reduction gear, idle gear (section 9)
  - Camshaft (section 10)
  - Starter motor (section 17)
- Swingarm pivot bolt removing/tightening procedure, see section 14.

**7**

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	68.6 kg (151 lbs)
Engine oil capacity after at disassembly	2.9 liters (3.06 US qt, 2.55 Imp qt)
Coolant capacity (radiator and engine)	1.75 liters (1.85 US qt, 1.54 Imp qt)

### TORQUE VALUES

Front engine upper/lower mounting nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Rear engine mounting nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Front engine bracket bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Rear engine bracket bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Drive sprocket fixing plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut.
Swingarm pivot adjusting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Swingarm pivot lock nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Radiator mounting bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Starter motor cable nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Rear brake middle rod joint bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Overhead cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

#### TOOL:

Pivot lock nut wrench

07GMA – KT70200

Not available in U.S.A.

## ENGINE REMOVAL/INSTALLATION

### ENGINE REMOVAL

Remove the fuel tank (page 2-2).

Drain the coolant (page 6-4).

Drain the engine oil if the crankcase is to be serviced (page 3-10).

Support the motorcycle securely.

Remove the following:

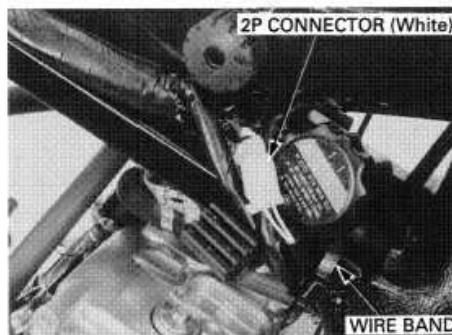
- right side cover (page 2-3)
- exhaust system (page 2-5)
- sub-air cleaner (page 5-4)
- carburetor (page 5-5)
- gearshift pedal/rod (page 8-20)
- cylinder head fin (page 10-4)
- crankcase breather cover (page 10-5)

Remove the overhead covers.

Disconnect the spark plug caps.

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

Release the ignition pulse generator wire from the wire band.

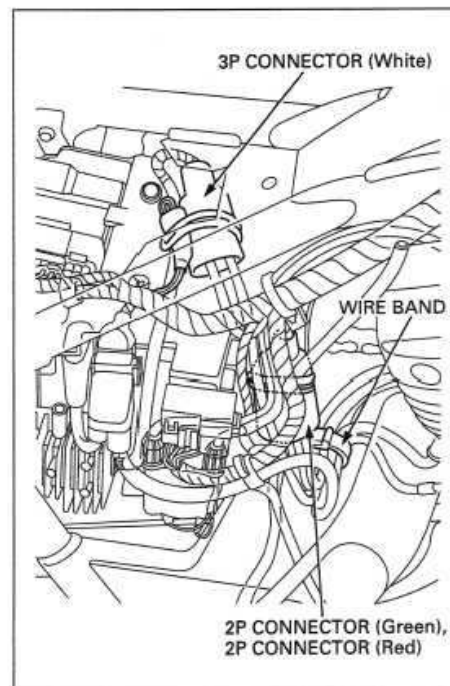


Disconnect the side stand switch 2P connector (Green).

Disconnect the neutral switch and oil pressure switch 2P connector (Red).

Disconnect the alternator 3P connector (White).

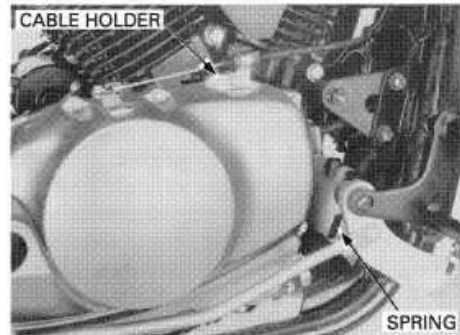
Release the alternator wire, engine sub-harness (neutral switch and oil pressure switch wire) and side stand switch wire from the wire band.



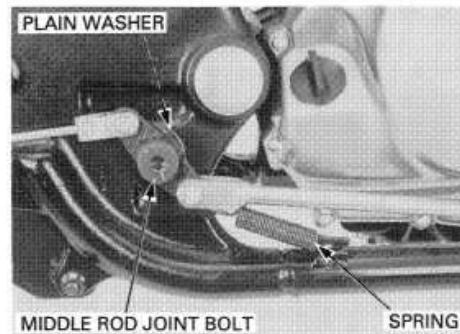


## ENGINE REMOVAL/INSTALLATION

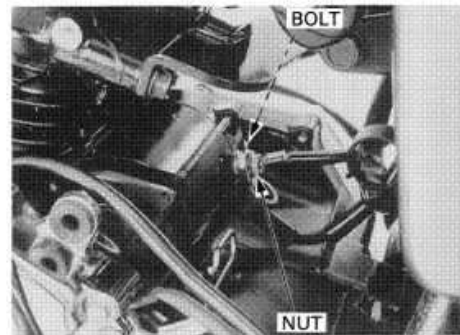
Remove the bolt and clutch cable holder, then disconnect the clutch cable from the clutch lifter arm. Unhook the rear brake light switch spring from the rear brake middle rod.



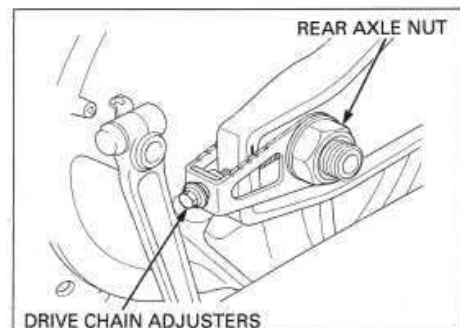
Remove the rear brake pedal middle rod joint bolt and unhook the brake pedal spring. Remove the brake pedal/rod and plain washer.



Remove the nut and starter motor cable. Remove the bolt and starter motor ground terminal.



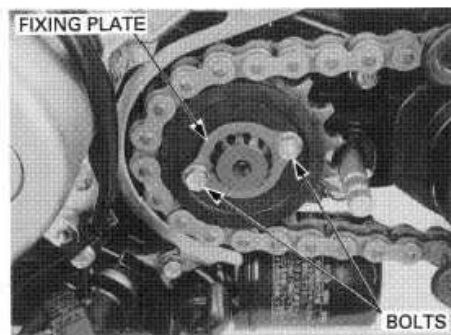
Loosen the rear axle nut. Turn the drive chain adjusters on both sides of the swingarm as necessary. Move the rear wheel forward fully, making the drive chain fully slack.



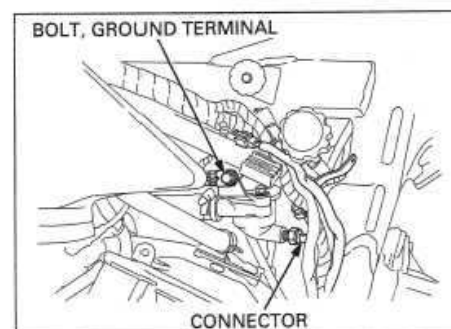
## ENGINE REMOVAL/INSTALLATION

Remove the bolts and drive sprocket fixing plate.

Remove the drive sprocket.

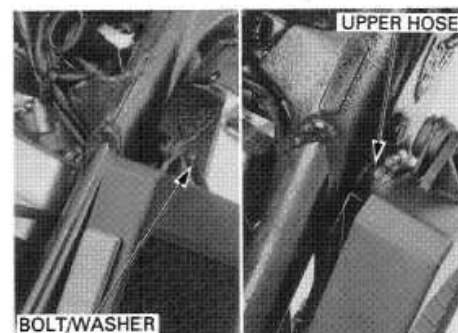


Remove the thermostat housing mounting bolt with the ground terminal.  
Disconnect the thermosensor connector.



Remove the radiator mounting bolt/washer, then pull out the radiator.

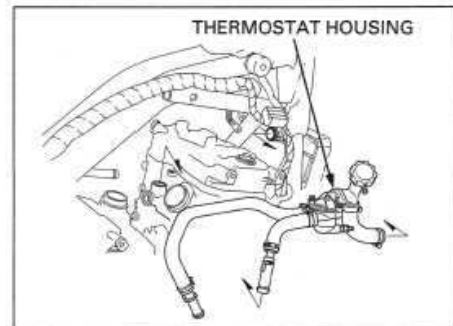
Loosen the hose band and disconnect the upper radiator hose.



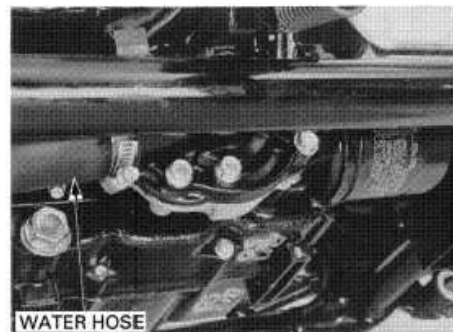
Remove the bolts and water hose pipes from the both cylinder heads.  
Remove the O-rings from the water hose pipes.



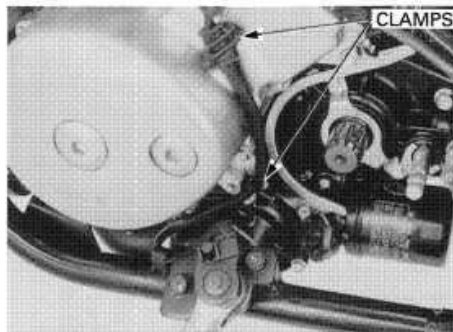
Remove the thermostat housing assembly as shown.



Loosen the hose band and disconnect the water hose from the water pump.



Release the side stand switch wire from the two clamps.



## ENGINE REMOVAL/INSTALLATION

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

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

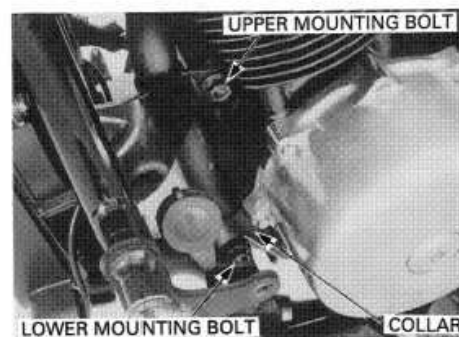
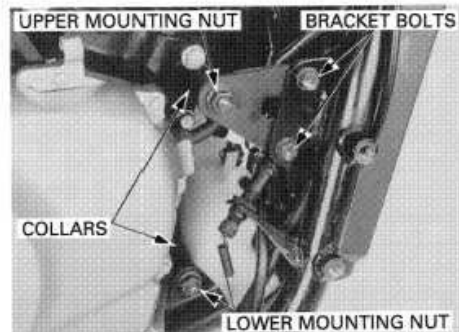
**NOTE:**

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

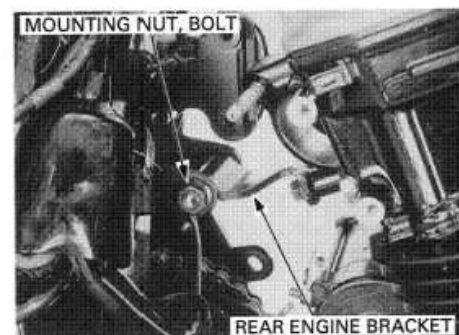
Remove the front engine upper mounting nut.  
Remove the front engine lower mounting nut.

Remove the front engine upper mounting bolt and collar.  
Remove the front engine bracket bolts and bracket.

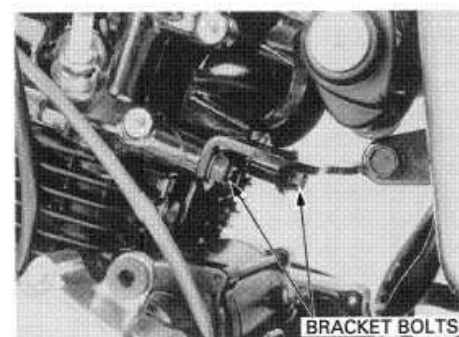
Remove the front engine lower mounting bolt and two collars.



Remove the rear engine mounting nut and bolt.



Remove the bolts and rear engine bracket.

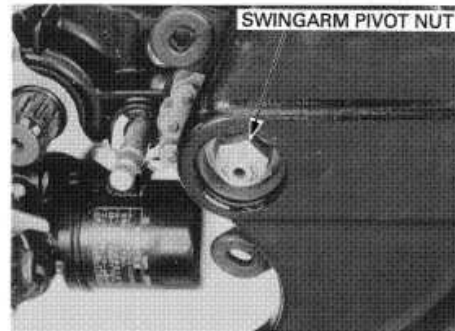


## ENGINE REMOVAL/INSTALLATION

### NOTE:

- Swingarm pivot bolt removing procedure, see page 14-15.

Remove the pivot bolt caps and swingarm pivot nut.



Remove the swingarm pivot lock nut while holding the pivot bolt.

### TOOL:

Pivot lock nut wrench

07GMA - KT70200

Not available in U.S.A.

Loosen the swingarm adjusting bolt by turning the pivot bolt.

Pull out the swingarm pivot bolt to remove it, then remove the swingarm pivot collars and distance collar.

Remove the engine from the right side of the frame.



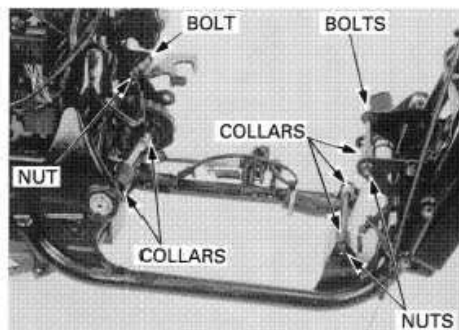
## ENGINE INSTALLATION

### NOTE:

- Route the wires and tubes properly (page 1-18).
- Finger tighten the mounting bolts and nuts, then tighten the bolts and nuts to the specified torque.

Be sure to use the engine mounting bolts in their correct positions.

Use a floor jack or other adjustable support to carefully maneuver the engine into place. Carefully align the bolt holes in the frame and engine.



## ENGINE REMOVAL/INSTALLATION

Use a floor jack or other adjustable support to carefully maneuver the engine into place. Carefully align the bolt holes in the frame and engine.

### NOTE:

- Swingarm pivot bolt tightening procedure, see page 14-20.

### Install the following:

- swingarm pivot distance collar
- swingarm pivot collars
- swingarm pivot bolt
- adjusting bolt
- lock nut
- pivot nut
- pivot bolt caps

### TOOL:

Pivot lock nut wrench

07GMA – KT70200  
Not available in U.S.A.

### TORQUE:

#### Swingarm pivot nut:

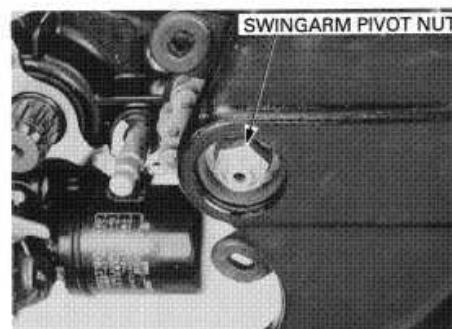
88 N·m (9.0 kgf-m, 65 lbf-ft)

#### Swingarm pivot adjusting bolt:

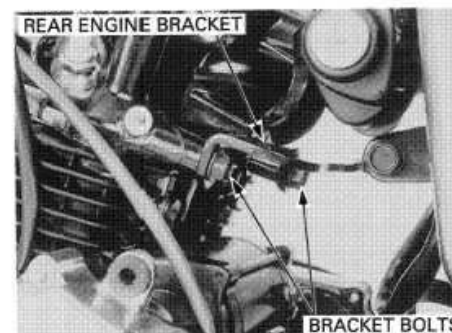
25 N·m (2.5 kgf-m, 18 lbf-ft)

#### Swingarm pivot lock nut:

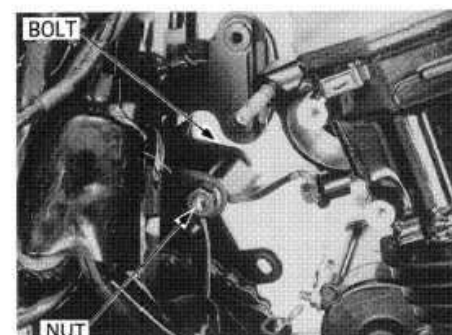
64 N·m (6.5 kgf-m, 47 lbf-ft)



Install the rear engine bracket and bracket bolts.



Install the rear engine mounting bolt and nut.



## ENGINE REMOVAL/INSTALLATION

Install the two collars and front engine lower mounting bolt.

Install the front engine bracket and bracket bolts.

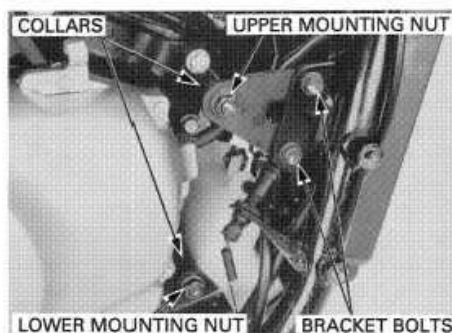
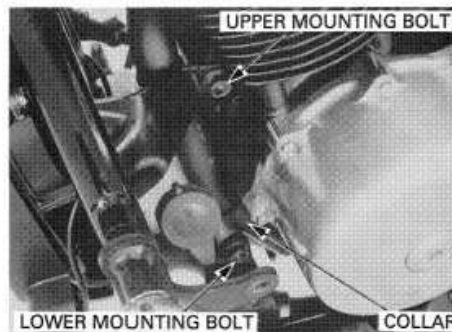
Install the collar and front engine upper mounting bolt.

Install the front engine lower mounting nut.  
Install the front engine upper mounting nut.

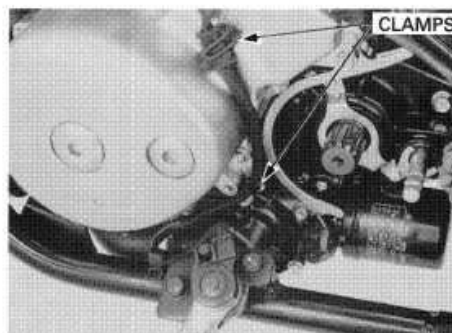
Tighten all the engine bracket bolts and mounting bolts/nuts to the specified torque.

### TORQUE:

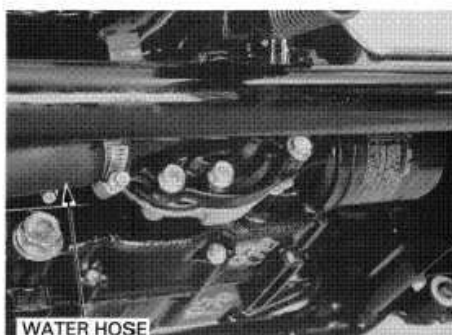
- Front engine upper/lower mounting nut:  
54 N-m (5.5 kgf-m, 40 lbf-ft)
- Rear engine mounting nut:  
54 N-m (5.5 kgf-m, 40 lbf-ft)
- Front engine bracket bolt:  
26 N-m (2.7 kgf-m, 20 lbf-ft)
- Rear engine bracket bolt:  
26 N-m (2.7 kgf-m, 20 lbf-ft)



Clamp the side stand switch wire to the wire clamps and route the side stand switch wire properly (page 1-18).

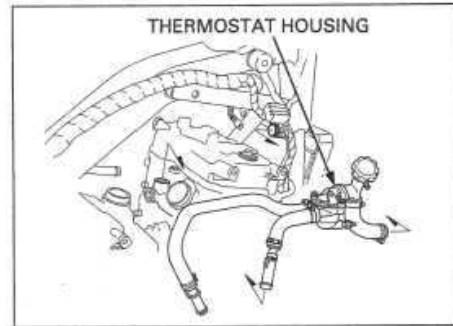


Connect the water hose to the water pump and tighten the hose band.



## ENGINE REMOVAL/INSTALLATION

Install the thermostat housing assembly as shown.



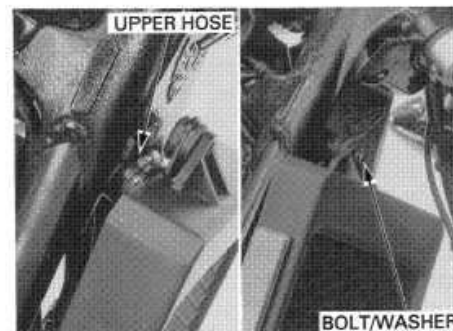
Coat the new O-rings with coolant and install them onto the water hose pipes.  
Connect the water hose pipes to the both cylinder heads.  
Install and tighten the water hose pipe bolts.



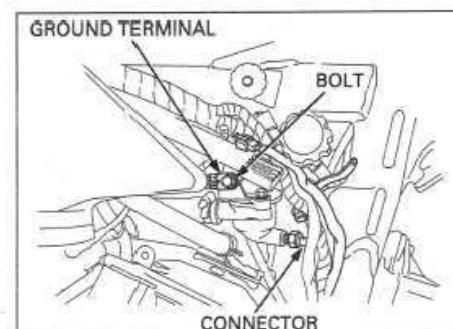
Connect the upper radiator hose and tighten the hose band.

Install the radiator mounting bolt/washer, then tighten to the specified torque.

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



Connect the thermosensor connector.  
Install the thermostat housing and tighten the mounting bolt with the ground terminal.





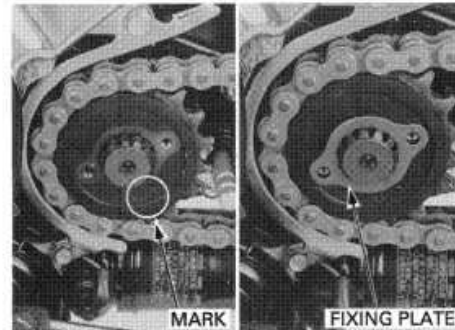
## ENGINE REMOVAL/INSTALLATION

Install the drive chain to the drive sprocket.  
Install the drive sprocket to the countershaft with the mark facing out.

Align the drive sprocket fixing plate tooth and countershaft groove, then install the fixing plate.

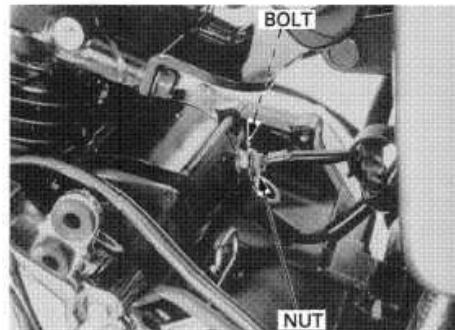
Install and tighten the drive sprocket fixing plate bolts to the specified torque.

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



Connect the starter motor ground terminal with the bolt and tighten the bolt.  
Connect the starter motor cable.  
Tighten the nut to the specified torque.

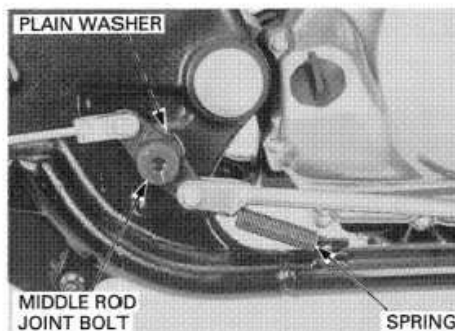
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



Install the plain washer and brake pedal/rod with the middle rod joint bolt.  
Tighten the middle rod joint bolt to the specified torque.

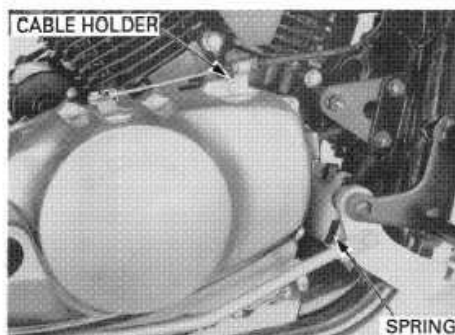
**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Hook the brake pedal spring.



Hook the clutch cable end to the clutch lifter arm, then install the clutch cable holder with the bolt.

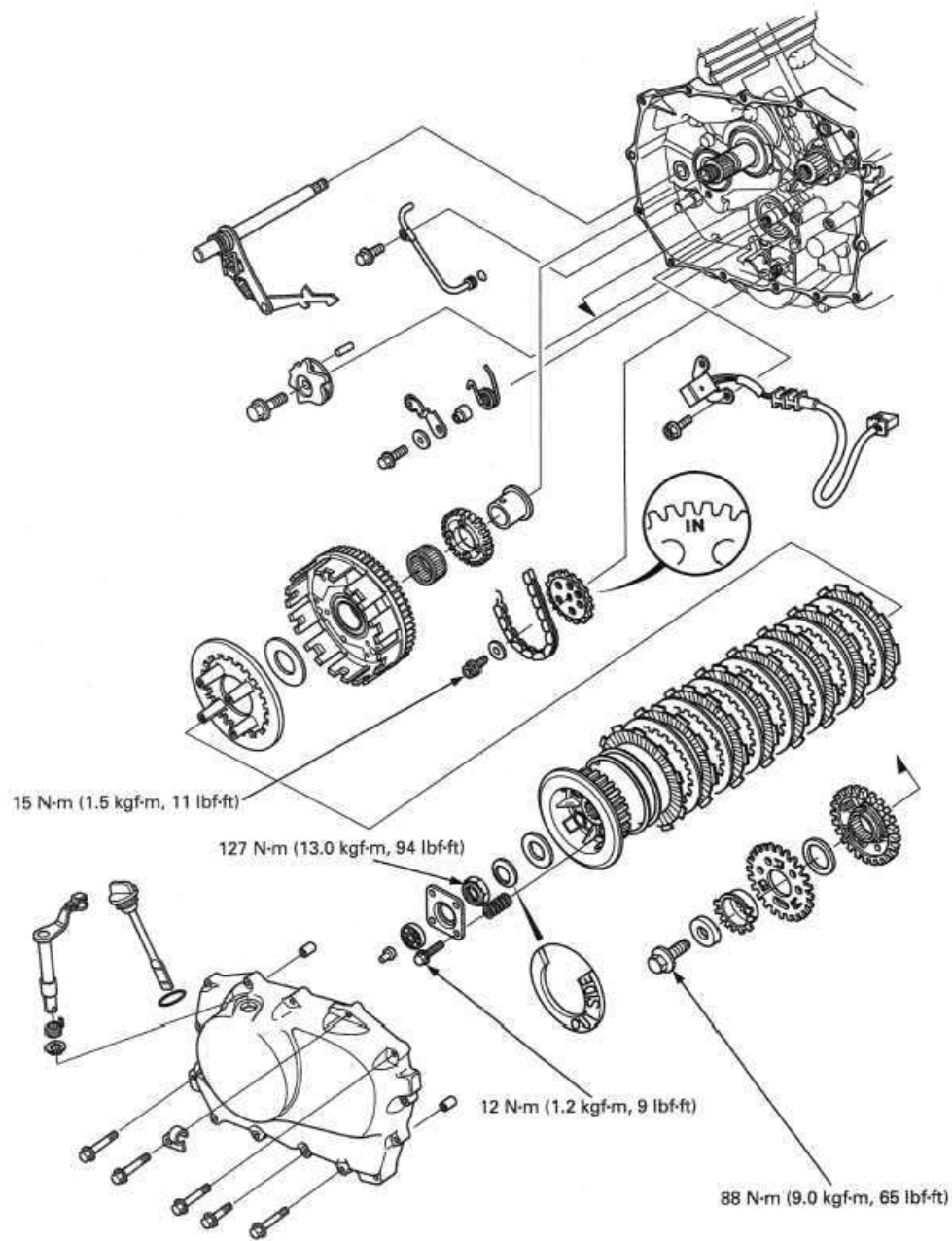
Hook the rear brake light switch spring to the rear brake middle rod.



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**MEMO**

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# 8. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	8-1	GEARSHIFT LINKAGE	8-12
TROUBLESHOOTING	8-2	CLUTCH INSTALLATION	8-14
RIGHT CRANKCASE COVER REMOVAL	8-3	RIGHT CRANKCASE COVER INSTALLATION	8-18
CLUTCH REMOVAL	8-4	GEARSHIFT PEDAL/ROD	8-20
PRIMARY DRIVE GEAR	8-9		

## SERVICE INFORMATION

### GENERAL

- The clutch and gearshift linkage parts can be serviced with the engine installed in the frame.
- Engine oil viscosity and level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil viscosity and level before servicing the clutch system.
- The crankcase must be separated when the transmission, shift drum and shift forks require service (see section 12).

8

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Clutch lever free play	10 – 20 (0.375 – 0.750)	—
Clutch spring free length	45.5 (1.79)	43.9 (1.73)
Clutch disc thickness	A	2.62 – 2.78 (0.103 – 0.107)
	B	2.92 – 3.08 (0.115 – 0.121)
Clutch plate warpage	—	0.30 (0.012)
Clutch outer guide	I.D.	21.991 – 22.016 (0.8658 – 0.8668)
	O.D.	29.994 – 30.007 (1.1809 – 1.1804)
Oil pump drive sprocket I.D.	30.025 – 30.145 (1.1821 – 1.1868)	30.15 (1.187)
Mainshaft O.D. at clutch outer guide	21.967 – 21.980 (0.8648 – 0.8654)	21.95 (0.864)

### TORQUE VALUES

Clutch lifter plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch center lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	Apply oil to the threads and seating surface. Stake.
Primary drive gear bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply oil to the threads and seating surface.
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply locking agent to the threads.
Gearshift arm pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift pedal pivot bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Gearshift return spring pin bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	

### TOOLS

Gear holder	07724 – 0010100	Not available in U.S.A.
Attachment, 37 x 40 mm	07746 – 0010200	
Pilot, 30 mm	07746 – 0040700	
Driver	07749 – 00100000	
Clutch center holder	07JMB – MN50301	or 07HGB – 001000A (U.S.A. only) or
Holder plate	07HGB – 001010B	(U.S.A. only)
	or	
	07HGB – 001010A	
	and	
Holder collars "A"	07HGB – 001020B or	
(set of 4)	07HGB – 001020A	

## **TROUBLESHOOTING**

### **Clutch lever too hard**

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

### **Clutch will not disengage or motorcycle creeps with clutch disengaged**

- Too much clutch lever free play
- Warpage clutch plate
- Loose clutch center lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

### **Clutch slips**

- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever free play
- Engine oil level too low or oil additive used

### **Hard to shift**

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged shift drum cam grooves (section 12)
- Bent shift forks or fork shaft (section 12).

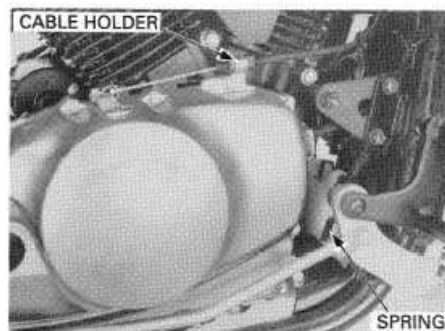
### **Transmission jumps out of gear**

- Broken shift drum stopper arm
- Broken gear shift linkage return springs
- Damaged shift drum cam grooves
- Bent shift fork shaft (section 12)
- Worn or bent shift forks (section 12)
- Worn gear dogs or slots (section 12)

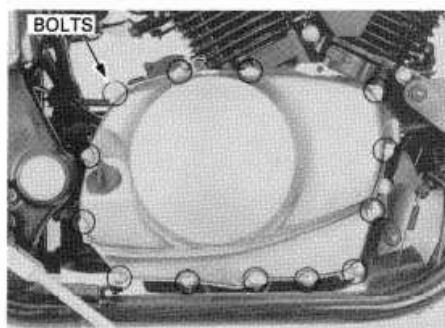
**RIGHT CRANKCASE COVER REMOVAL**

Drain the engine oil (page 3-10).  
Remove the exhaust system (page 2-5).

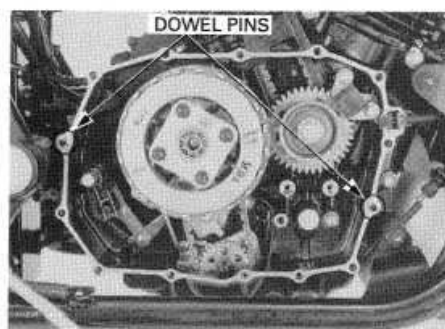
Remove the bolt and clutch cable holder, then disconnect the clutch cable from the clutch lifter arm. Unhook the rear brake light switch spring from the rear brake middle rod.



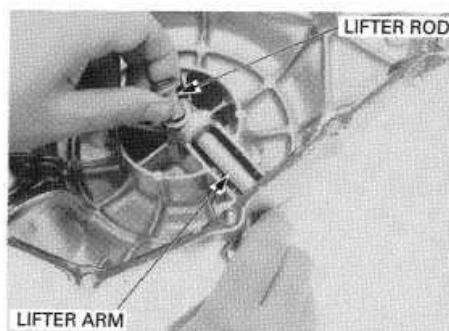
Remove the cover bolts and right crankcase cover.



Remove the dowel pins.

**DISASSEMBLY**

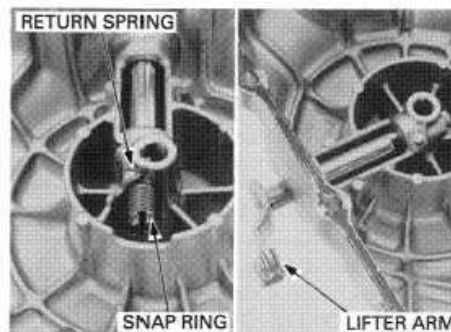
Remove the clutch lifter rod by turning the lifter arm clockwise.



## CLUTCH/GEARSHIFT LINKAGE

Remove the snap ring and return spring.

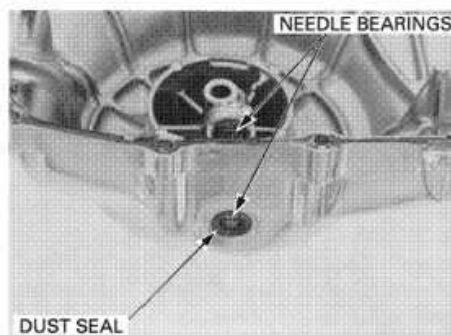
Remove the clutch lifter arm.



### INSPECTION

Check the dust seal for fatigue or damage.  
Check the needle bearing for wear, damage or loose fit.  
Check the clutch lifter arm for damage or bending.  
Check the return spring for fatigue or damage.

Replace these parts if necessary.

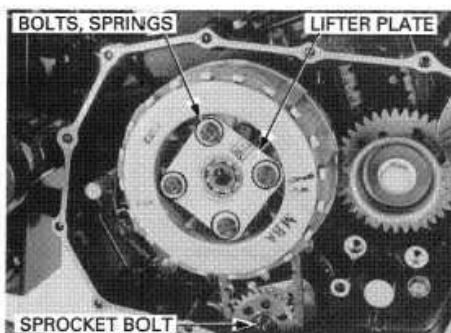


## CLUTCH REMOVAL

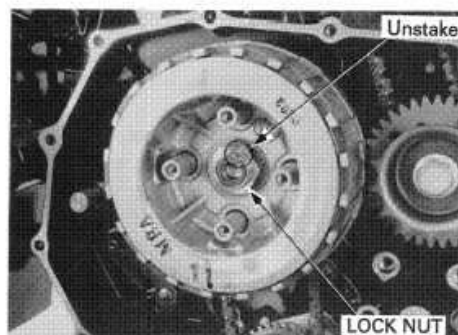
Remove the right crankcase cover (see previous page).

Loosen the clutch lifter plate bolts in a crisscross pattern in two or three steps, and remove the bolts, clutch springs and lifter plate.

If the clutch outer guide will be removed, loosen the driven sprocket bolt while the clutch is still installed.



Unstake the clutch center lock nut to avoid damaging the mainshaft threads.



## CLUTCH/GEARSHIFT LINKAGE

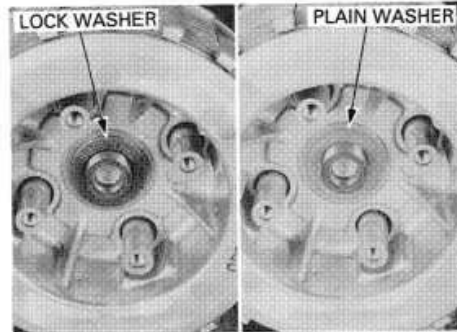
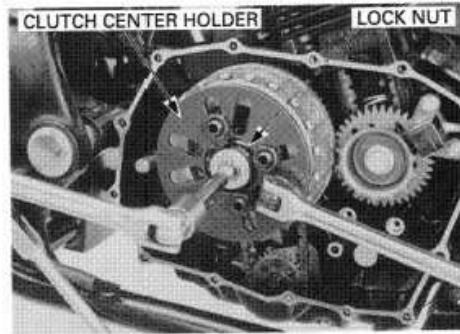
Hold the pressure plate with the clutch center holder and loosen the clutch center lock nut.

### TOOLS:

Clutch center holder	07JMB - MN50301 or 07HGB - 001000A (U.S.A. only) or 07HGB - 001010B or 07HGB - 001010A (U.S.A. only) and 07HGB - 001020B or 07HGB - 001020A (U.S.A. only)
Holder plate	
Holder collars "A" (set of 4)	

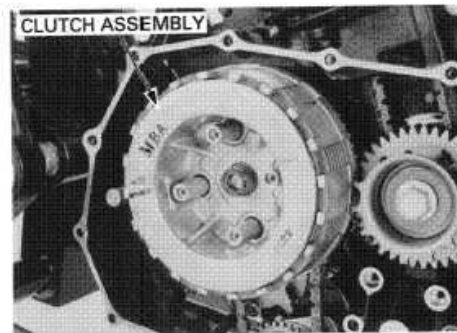
Remove the lock nut.

Remove the lock washer and plain washer.

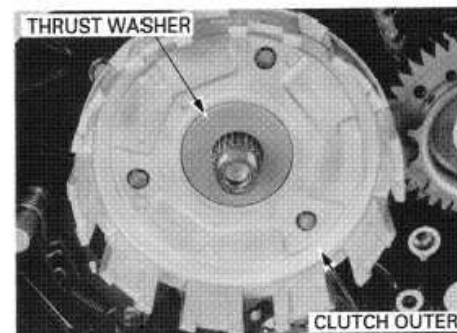


Remove the following:

- clutch center
- judder spring, spring seat
- clutch discs
- clutch plates
- pressure plate



Remove the thrust washer and clutch outer.

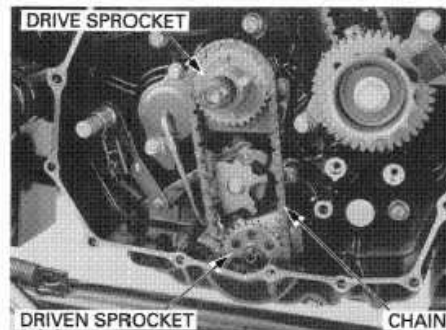




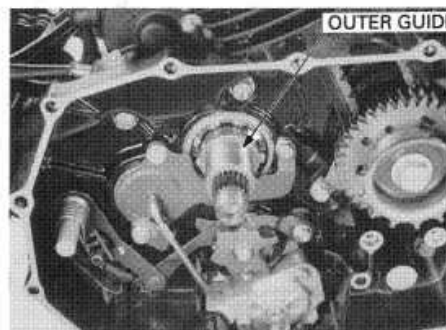
## CLUTCH/GEARSHIFT LINKAGE

Remove the oil pump driven sprocket bolt and washer.

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



Remove the clutch outer guide from the mainshaft.

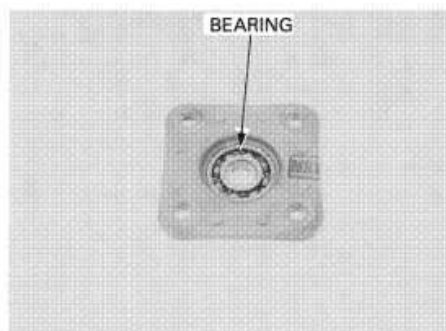


### INSPECTION

#### CLUTCH LIFTER PLATE BEARING

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

Replace the bearing if necessary.

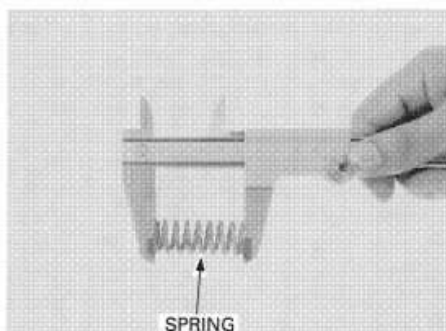


*Replace the clutch springs as a set.*

#### CLUTCH SPRING

Measure the clutch spring free length.

**SERVICE LIMIT: 43.9 mm (1.73 in)**



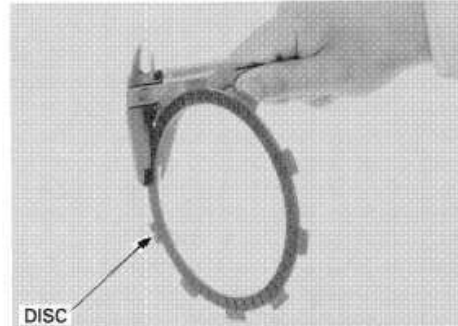
Replace the discs  
and plates as a  
set.

#### CLUTCH DISC

Check the clutch discs for signs of scoring or discoloration.

Measure the thickness of clutch discs A and B.

**SERVICE LIMITS:** Disc A: 2.3 mm (0.09 in)  
Disc B: 2.6 mm (0.10 in)

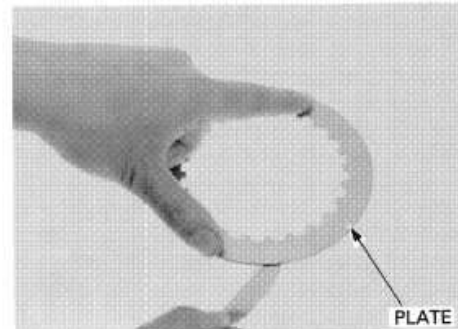


Replace the discs  
and plates as a  
set.

#### CLUTCH PLATE

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

**SERVICE LIMIT:** 0.30 mm (0.012 in)



#### CLUTCH OUTER GUIDE

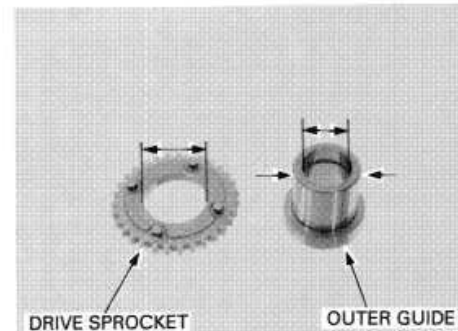
Measure the clutch outer guide I.D. and O.D.

**SERVICE LIMITS:** I.D.: 22.03 mm (0.867 in)  
O.D.: 29.98 mm (1.180 in)

#### OIL PUMP DRIVE SPROCKET

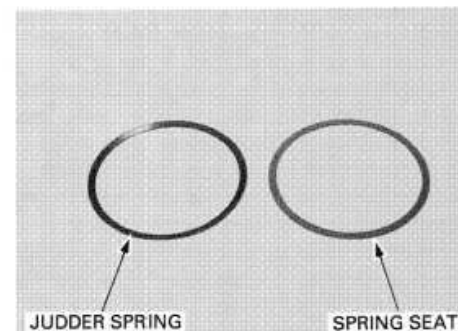
Check the oil pump drive sprocket for damage.  
Measure the drive sprocket I.D.

**SERVICE LIMIT:** 30.15 mm (1.187 in)



#### JUDDER SPRING, SPRING SEAT

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



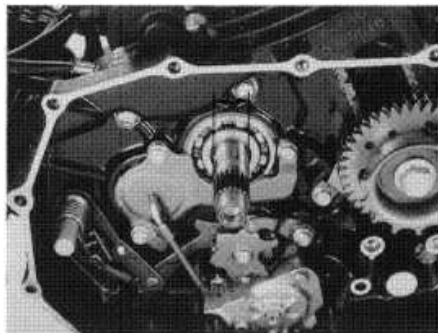
## CLUTCH/GEARSHIFT LINKAGE

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### MAINSHAFT

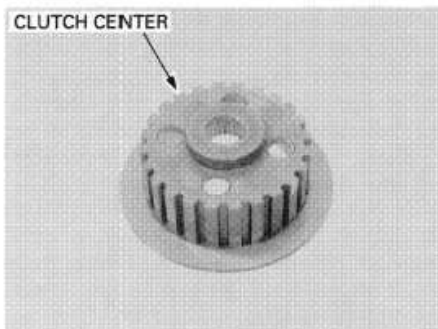
Measure the mainshaft O.D. at the clutch outer guide.

**SERVICE LIMIT: 21.95 mm (0.864 in)**



### CLUTCH CENTER

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



### CLUTCH OUTER

Check the primary driven gear teeth for wear or damage.

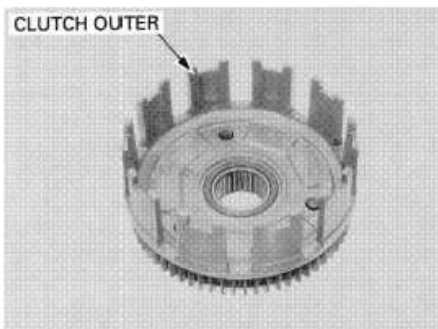
Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

Check the needle bearing for damage.

The bearing should turn smoothly and quietly without play.

Also check that the bearing outer race fits tightly in the clutch outer.

Replace the bearing if necessary (see next page).



**CLUTCH OUTER NEEDLE BEARING REPLACEMENT**

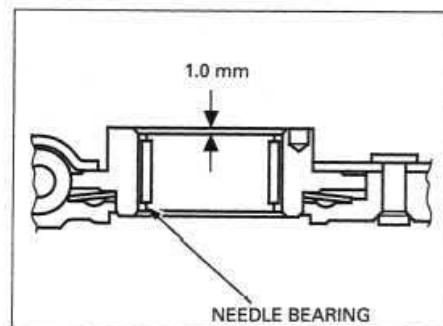
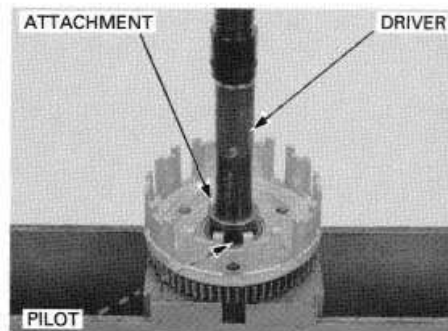
Press the needle bearing out of the clutch outer.

Press the new needle bearing into the clutch outer with the mark facing out.

The needle bearing outer surface is 1.0 mm (0.03 in) below the outer edge of the clutch outer needle bearing cavity.

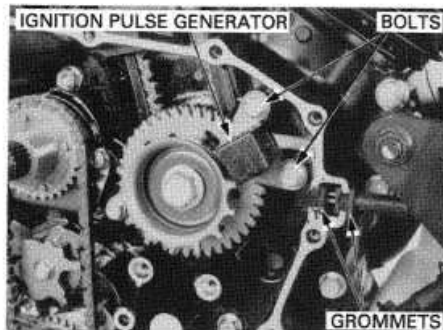
**TOOL:**

<b>Driver</b>	07749 - 0010000
<b>Attachment, 37 x 40 mm</b>	07746 - 0010200
<b>Pilot, 30 mm</b>	07746 - 0040700

**PRIMARY DRIVE GEAR****REMOVAL**

Remove the clutch (page 8-4).

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

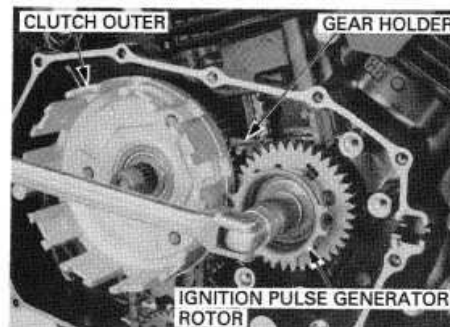


Temporarily install the clutch outer onto the mainshaft. (page 8-14).

Hold the primary drive gear with the gear holder. Loosen the primary drive gear bolt to avoid damaging the ignition pulse generator rotor.

**TOOL:**

<b>Gear holder</b>	07724 - 0010100
	Not available in U.S.A.

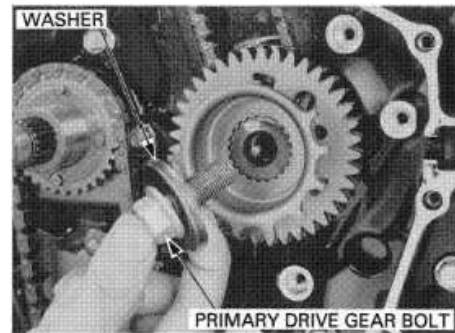


## CLUTCH/GEARSHIFT LINKAGE

Remove the clutch outer.

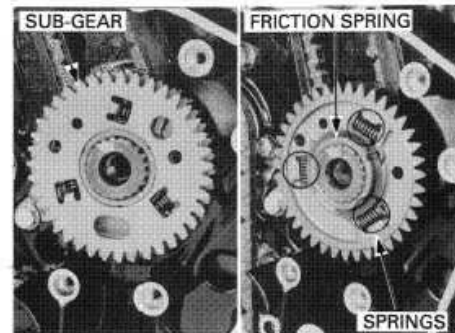
Remove the primary drive gear bolt and washer.

Remove the ignition pulse generator rotor.



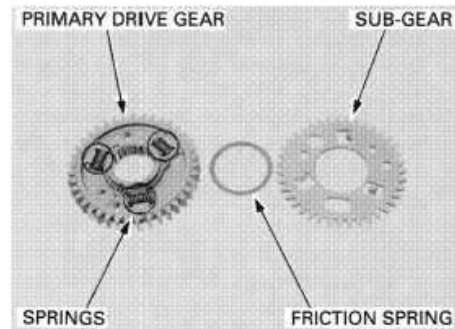
Remove the following:

- primary drive sub-gear
- friction spring
- primary drive gear and springs



### INSPECTION

Check the serrated teeth of the primary drive gear and sub-gear for wear or damage.  
Check the primary drive gear spring and friction spring for fatigue or damage.



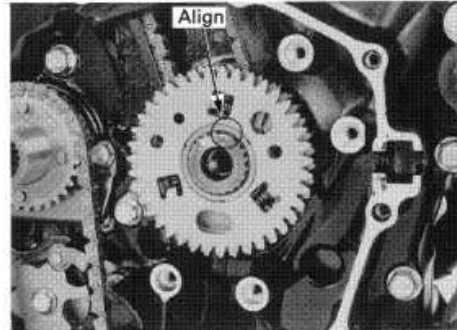
### INSTALLATION

Be sure to install the springs into the primary drive gear grooves.  
Install the friction spring.  
Set the sub-gear onto the drive gear by aligning the three holes on the sub-gear and primary drive gear, and contacting the sub-gear tabs against the drive gear springs.



## CLUTCH/GEARSHIFT LINKAGE

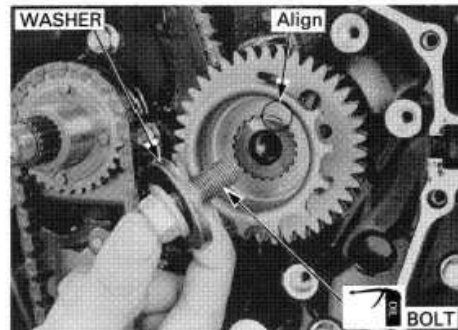
Install the primary drive gear assembly by aligning the wide groove with the wide tooth.



Apply engine oil to the primary drive gear bolt threads.

Install the ignition pulse generator rotor by aligning the wide groove with the wide tooth.

Install the primary drive gear bolt and washer and loosely tighten the bolt.



Temporarily install the clutch outer (page 8-14).

Hold the primary drive gear with the gear holder. Tighten the primary drive gear bolt to the specified torque.

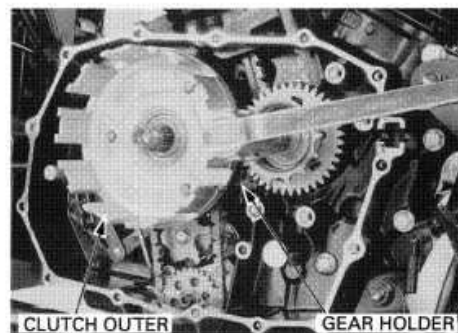
### TOOL:

Gear holder

07724 - 0010100

Not available in U.S.A.

**TORQUE: 88 N·m (9.0 kgf-m, 65 lbf-ft)**

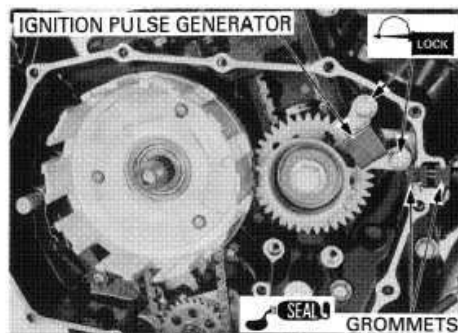


Apply locking agent to the ignition pulse generator bolt thread.

Install the ignition pulse generator and tighten the mounting bolts securely.

Apply sealant to the wire grommets and install them to the crankcase groove securely.

Install the clutch (page 8-14).



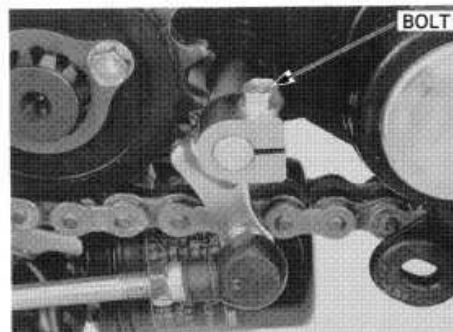
## CLUTCH/GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE

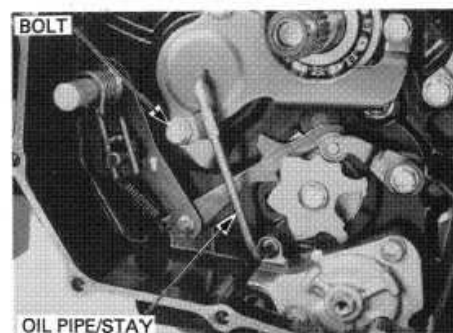
#### REMOVAL

Remove the clutch (page 8-4).  
Remove the left crankcase rear cover (page 2-3).

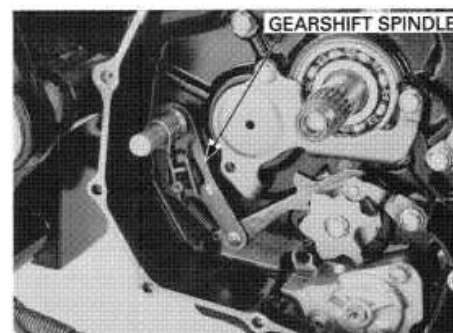
Remove the gearshift arm pinch bolt and gearshift arm from the gearshift spindle.



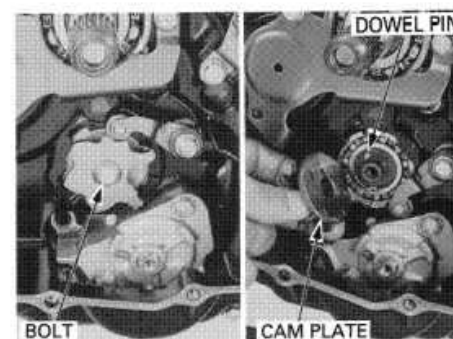
Remove the oil pipe stay mounting bolt and oil pipe/stay.  
Remove the O-ring from the oil pipe/stay.



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

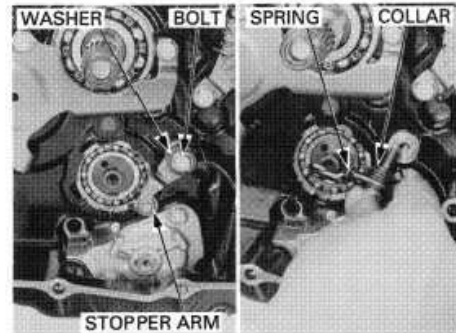


Remove the gearshift cam plate bolt and cam plate.  
Remove the dowel pin from the gearshift drum.



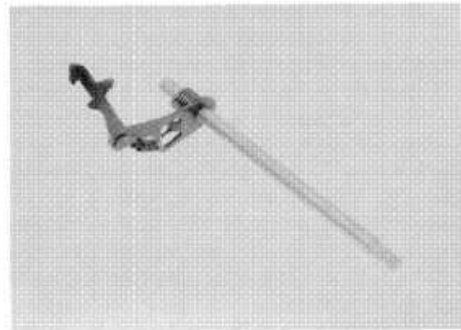
Remove the following:

- stopper arm bolt
- washer
- stopper arm
- return spring
- collar



### INSPECTION

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

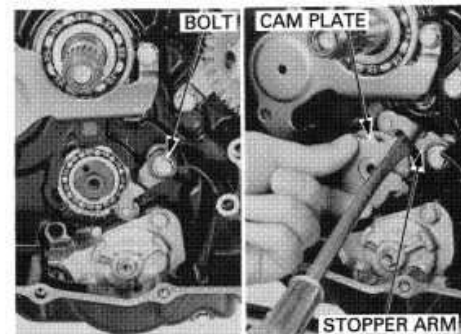


### INSTALLATION

Install the following:

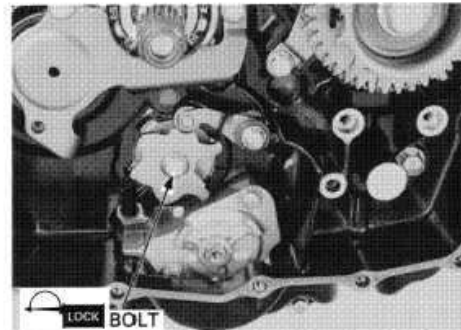
- collar
- return spring
- stopper arm
- washer
- stopper arm bolt

Install the dowel pin into the gearshift drum.  
Install the cam plate by aligning the hole in the cam plate with the dowel pin while lift up the stopper arm with a screwdriver.



Apply a locking agent to the cam plate bolt threads and install it.

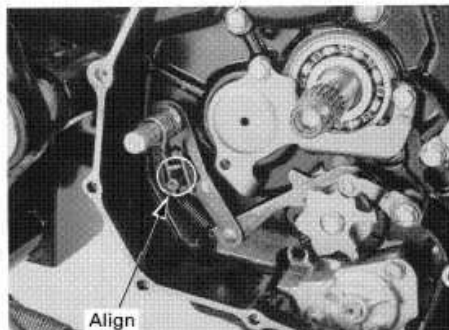
Tighten the stopper arm bolt and cam plate bolt securely.



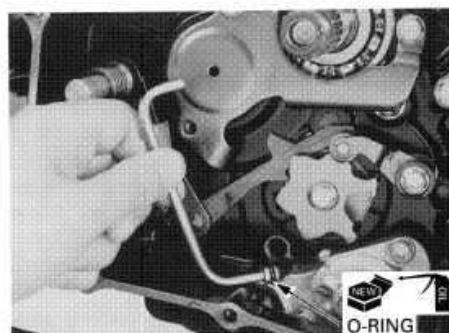


## CLUTCH/GEARSHIFT LINKAGE

Install the gearshift spindle into the crankcase by aligning the return spring ends with the return spring pin bolt to avoid damaging the spindle oil seal (left crankcase side).



Coat a new O-ring with engine oil and install it onto the oil pipe/stay groove. Install the oil pipe/stay with the mounting bolt and tighten the bolt securely.

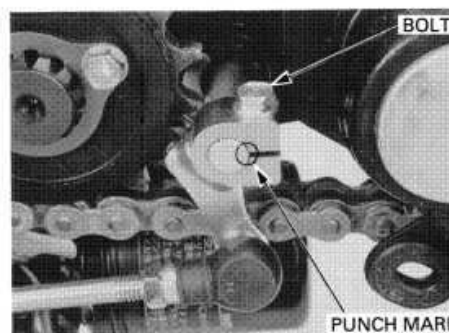


Install the gearshift arm to the gearshift spindle by aligning the punch mark on the spindle with the cutout in the gearshift arm.

Install and tighten the gearshift arm pinch bolt to the specified torque.

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

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



## CLUTCH INSTALLATION

Apply molybdenum oil solution to the outer surface of the clutch outer guide and install it to the mainshaft.



## CLUTCH/GEARSHIFT LINKAGE

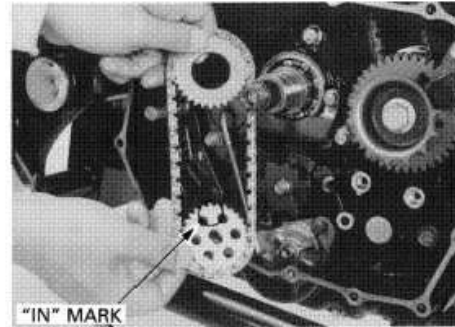
*Install the oil pump driven sprocket with the "IN" mark facing inside.*

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

Apply locking agent to the driven sprocket bolt threads and install it with the washer.

**NOTE:**

- Tighten the driven sprocket bolt, after installing the clutch assembly.

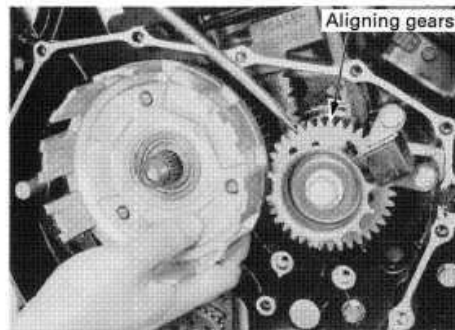
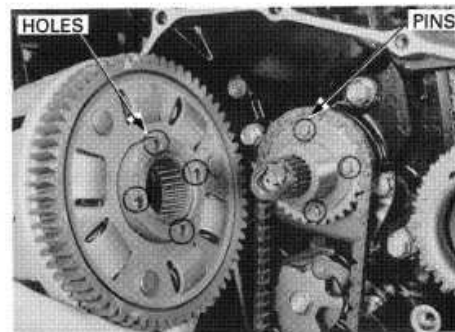


Install the clutch outer by aligning the holes in the clutch outer with the pins on the oil pump drive sprocket while turning the oil pump driven sprocket.

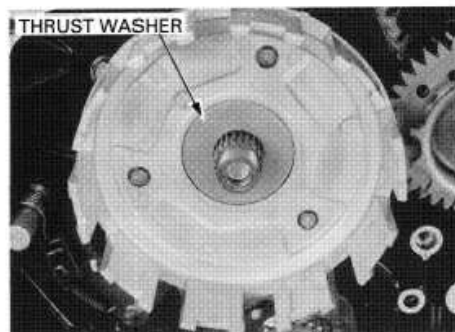
Be sure to install the clutch outer securely by aligning the primary drive gear and sub-gear teeth with a slot-head screwdriver.

**NOTE:**

- Align the holes in the clutch outer with the pins on the oil pump drive sprocket while turning the driven sprocket with the drive chain and pushing the clutch outer onto the mainshaft.



Install the thrust washer onto the mainshaft.



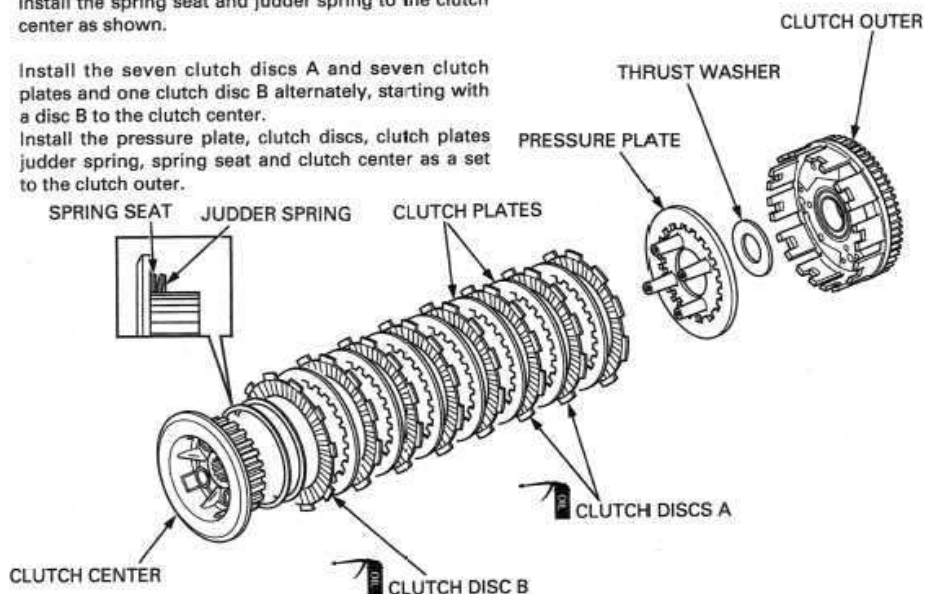
## CLUTCH/GEARSHIFT LINKAGE

Coat the clutch discs with engine oil.

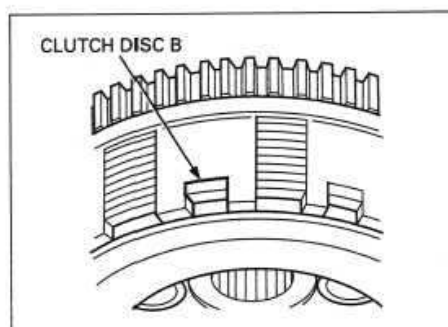
Install the spring seat and judder spring to the clutch center as shown.

Install the seven clutch discs A and seven clutch plates and one clutch disc B alternately, starting with a disc B to the clutch center.

Install the pressure plate, clutch discs, clutch plates judder spring, spring seat and clutch center as a set to the clutch outer.

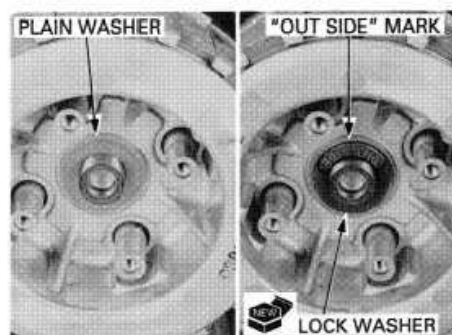


When installing the clutch disc B, align the end grooves in the clutch outer with the tabs of disc.



Install the plain washer.

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



## CLUTCH/GEARSHIFT LINKAGE

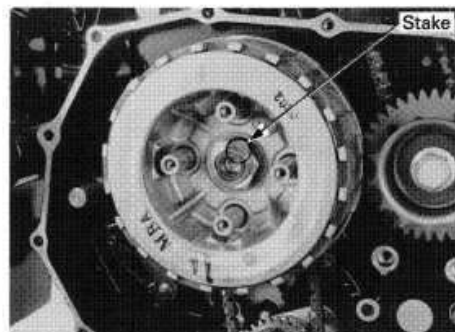
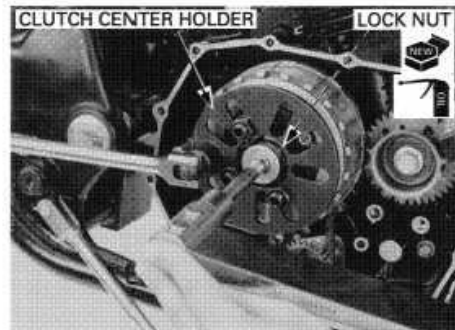
Apply engine oil to the threads of the new clutch center lock nut, and install and loosely tighten it. Hold the clutch pressure plate with the clutch center holder and tighten the clutch center lock nut to the specified torque.

### TOOLS:

Clutch center holder	07JMB - MN50301 or 07HGB - 001000A (U.S.A. only) or 07HGB - 001010B
Holder plate	or 07HGB - 001010A (U.S.A. only) and 07HGB - 001020B
Holder collars "A" (set of 4)	or 07HGB - 001020A (U.S.A. only)

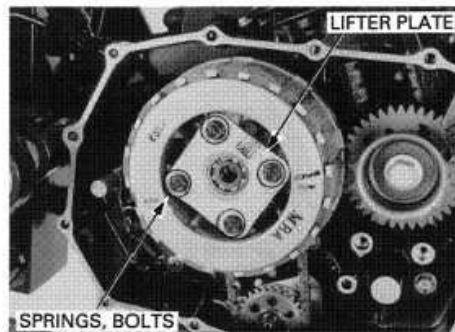
**TORQUE: 127 N-m (13.0 kgf-m, 94 lbf-ft)**

Stake the lock nut into the mainshaft groove.



Install the clutch springs and clutch lifter plate with the bolts. Tighten the clutch lifter plate bolts in a crisscross pattern in several steps.

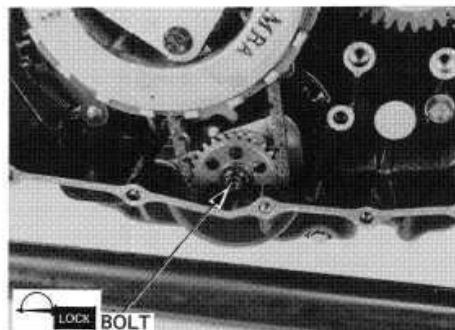
**TORQUE: 12 N-m (1.2 kgf-m, 9 lbf-ft)**



If the oil pump driven sprocket is removed, tighten the driven sprocket bolt to the specified torque.

**TORQUE: 15 N-m (1.5 kgf-m, 11 lbf-ft)**

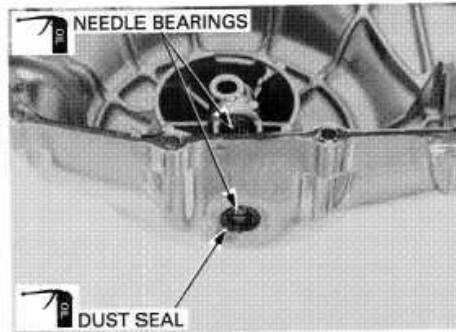
Install the right crankcase cover (see next page).



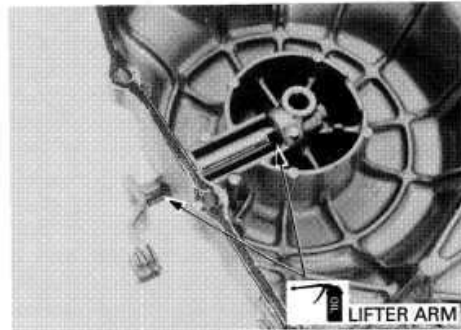
## RIGHT CRANKCASE COVER INSTALLATION

### ASSEMBLY

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



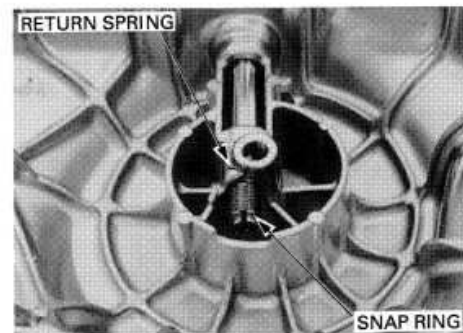
Apply engine oil to the clutch lifter arm sliding surface and install it into the right crankcase cover.



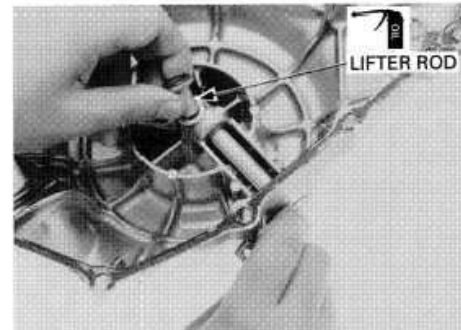
Install the return spring.  
Install the snap ring to the lifter arm shaft groove securely.

#### NOTE:

- Make sure the return spring end is hooked in the case cover tab by turning the clutch lifter arm shaft.



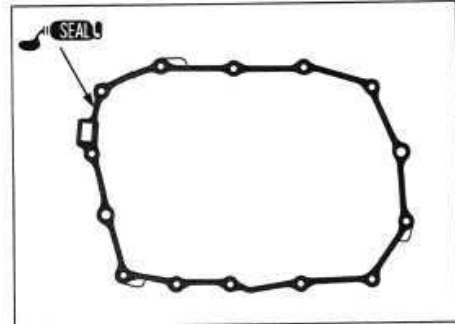
Apply engine oil to the clutch lifter rod sliding surface.  
Turn the clutch lifter arm clockwise and install the lifter rod by aligning the rod end with the groove in the clutch lifter arm shaft.



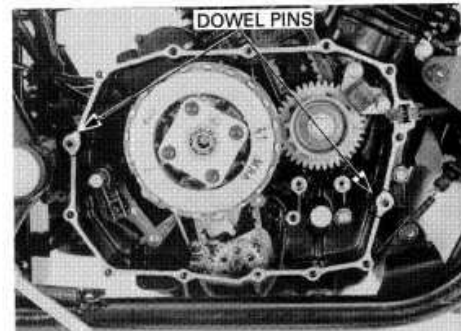
**INSTALLATION**

Clean the right crankcase and right crankcase cover mating surfaces thoroughly, being careful not to damage them.

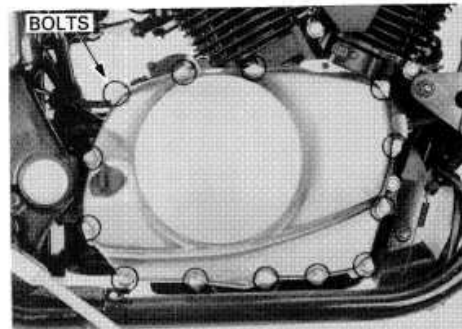
Apply a thick coating of liquid sealant to the right crankcase cover side.



Install the dowel pins.



Install the right crankcase cover with the cover bolts.



Hook the clutch cable end to the clutch lifter arm, then install the clutch cable holder with the bolt.

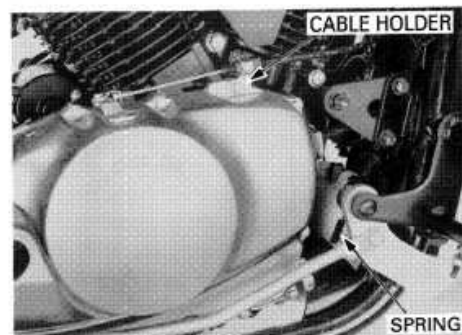
Tighten the right crankcase cover bolts in a crisscross pattern in several steps.

Hook the rear brake light switch spring to the rear brake middle rod.

Install the exhaust system (page 2-6).

Fill the engine oil (page 3-10).

Perform the clutch system adjustment (page 3-20).



## GEARSHIFT PEDAL/ROD

### REMOVAL

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

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

Remove the pivot bolt, cap nut and gearshift pedal/rod from the frame.

### INSTALLATION

Apply grease to the gearshift pedal pivot bolt sliding area.

Install the gearshift pedal/rod with the pivot bolt.

Install the cap nut and tighten the pivot bolt by holding the nut.

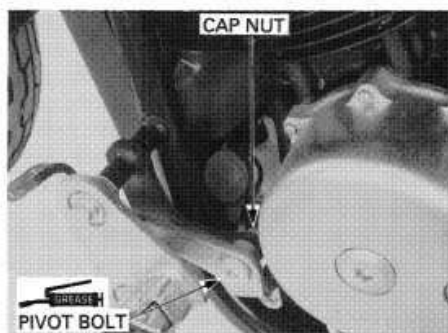
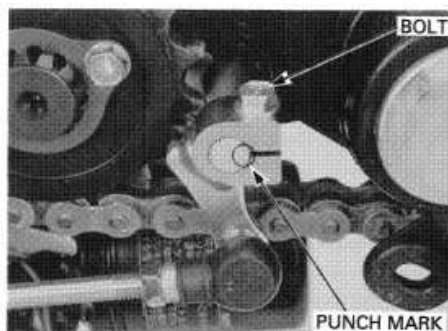
**TORQUE: 34 N·m (3.5 kgf-m, 25 lbf-ft)**

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

Install and tighten the gearshift arm pinch bolt to the specified torque.

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

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



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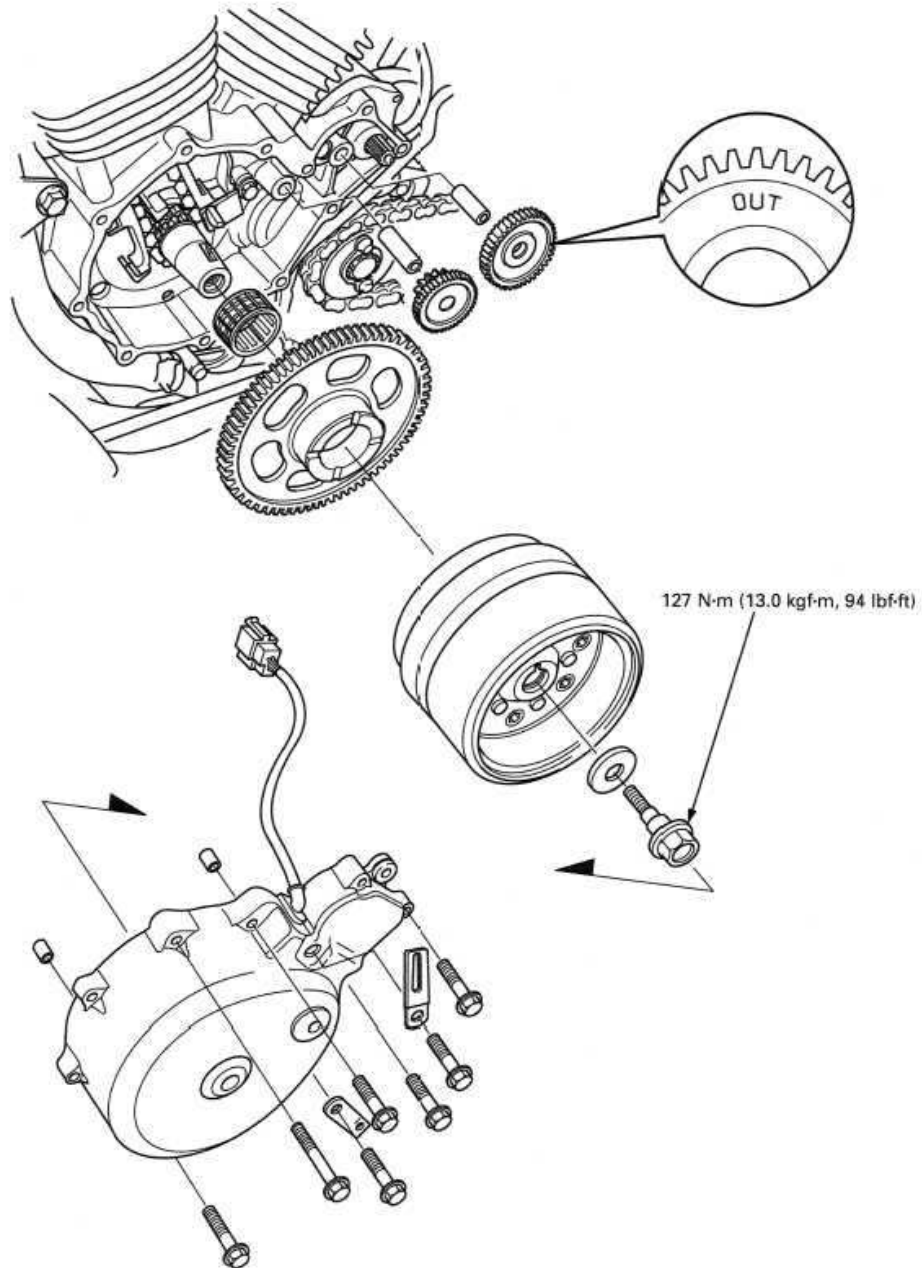
**MEMO**

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## ALTERNATOR/STARTER CLUTCH

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# 9. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	9-1	STATOR REPLACEMENT	9-2
TROUBLESHOOTING	9-1	LEFT CRANKCASE COVER INSTALLATION	9-3
LEFT CRANKCASE COVER REMOVAL	9-2	FLYWHEEL, STARTER CLUTCH	9-4

## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. These parts can be serviced with the engine installed in the frame.
- Refer to section 16 for alternator stator inspection.
- Refer to section 18 for starter motor servicing.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	40.000 – 40.021 (1.5748 – 1.5756)	40.10 (1.579)
	O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.73 (2.273)
Starter clutch outer I.D.		74.414 – 74.440 (2.9297 – 2.9307)	74.46 (2.931)

9

### TORQUE VALUES

Flywheel bolt	127 N-m (13.0 kgf-m, 94 lbf-ft)	Apply oil to the threads and seating surface. Left-hand threads.
Stator mounting bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	Apply locking agent to the threads.
Stator wire holder bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	Apply locking agent to the threads.
Starter clutch housing bolt	29 N-m (3.0 kgf-m, 22 lbf-ft)	Apply locking agent to the threads.
Drive chain guide plate bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	
Left crankcase rear cover bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	

### TOOLS

Flywheel holder	07725 – 0040000	or equivalent commercially available in U.S.A.
Rotor puller	07733 – 0020001	or 07933 – 3280001

## TROUBLESHOOTING

### Engine does not turn

- Faulty starter clutch
- Damaged starter reduction gear
- Damaged starter idler gear

## ALTERNATOR/STARTER CLUTCH

### LEFT CRANKCASE COVER REMOVAL

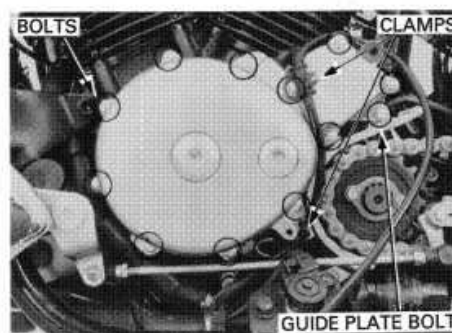
Remove the seat (page 2-2).  
Remove the left crankcase rear cover (page 2-3).

Release the alternator wire from the wire band.  
Disconnect the alternator 3P connector (White) in the connector boot.

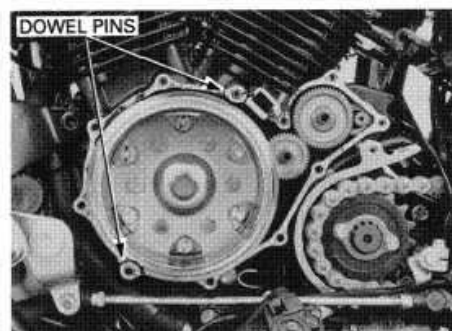


*Be careful during removal, because the left crankcase cover (stator) is magnetically attached to the flywheel.*

Release the side stand switch wire from the two wire clamps.  
Remove the eleven cover bolts and two wire clamps.  
Remove the drive chain guide plate bolt (upper bolt only), then remove the left crankcase cover.



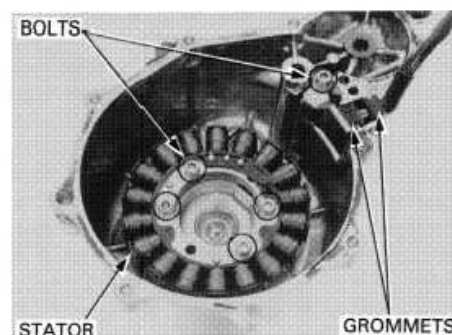
Remove the dowel pins.



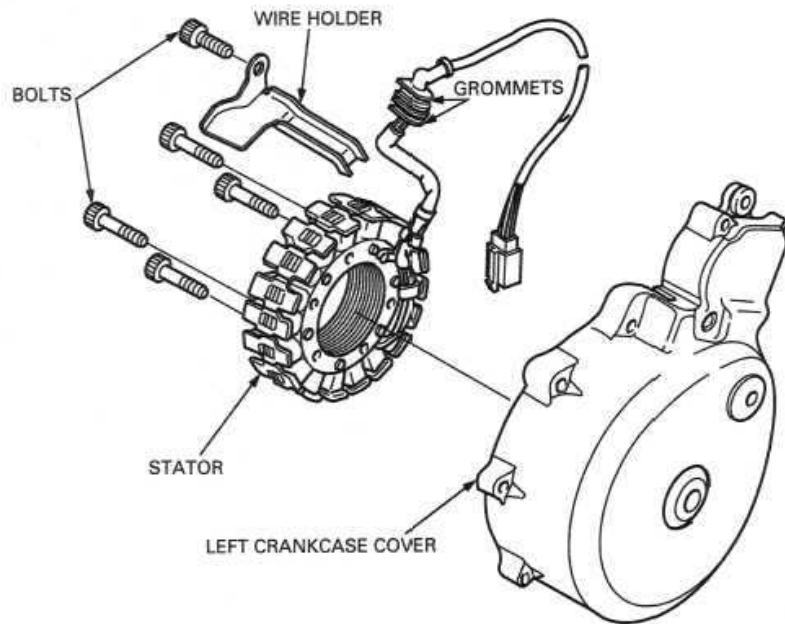
### STATOR REPLACEMENT

#### REMOVAL

Remove the stator wire holder bolt and holder.  
Remove the stator wire grommets from the crankcase cover groove.  
Remove the four stator mounting bolts and stator.



## INSTALLATION



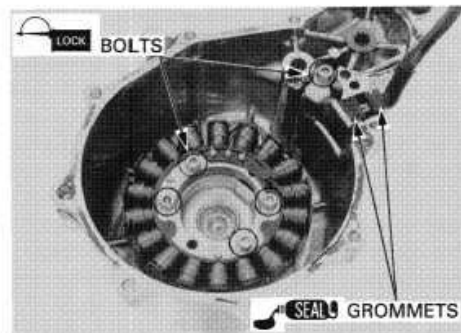
Apply locking agent to the stator mounting bolts and wire holder bolt threads.

Route the stator wire properly, then install the stator to the left crankcase cover with the mounting bolts. Tighten the stator mounting bolts to the specified torque.

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

Apply sealant to the wire grommets and install them to the left crankcase cover groove securely. Install the wire holder with the bolt and tighten it specified torque.

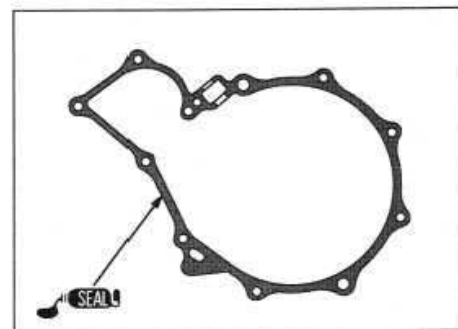
**TORQUE: 12 N-m (1.2 kgf-m, 9 lbf-ft)**



## LEFT CRANKCASE COVER INSTALLATION

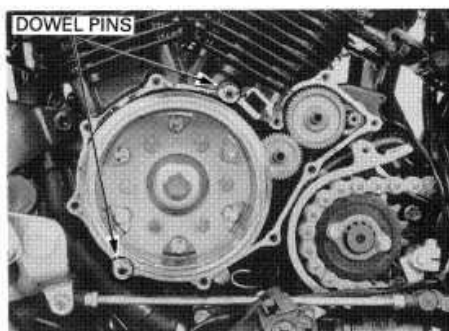
Clean the left crankcase and left crankcase cover mating surfaces thoroughly, being careful not to damage them.

Apply a thick coating of liquid sealant to the left crankcase cover side.



## ALTERNATOR/STARTER CLUTCH

Install the dowel pins.



*Be careful during installation, because the left crankcase cover (stator) is magnetically attached to the flywheel.*

Install the left crankcase cover.

Apply locking agent to only the specified crankcase cover bolt as shown.

Install the 2 wire clamps and 11 crankcase cover bolts.

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

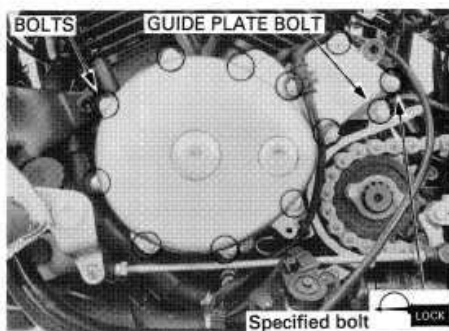
Install and tighten the drive chain guide plate bolt to the specified torque.

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

Clamp the side stand switch wire to the wire clamps and route the alternator wire properly (page 1-18).

Connect the alternator 3P connector (White).  
Set the alternator wire to the wire band.

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

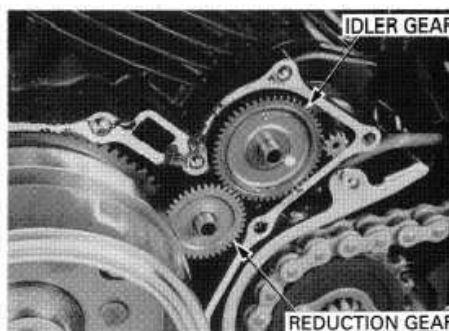


## FLYWHEEL, STARTER CLUTCH

### FLYWHEEL REMOVAL

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

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

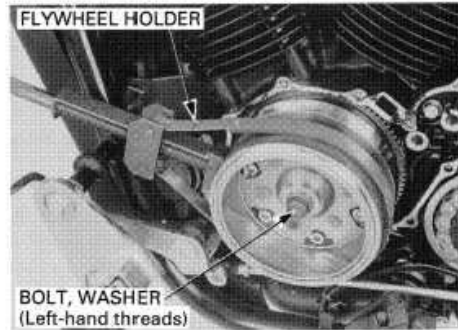


## ALTERNATOR/STARTER CLUTCH

*The flywheel bolt has left-hand threads.*

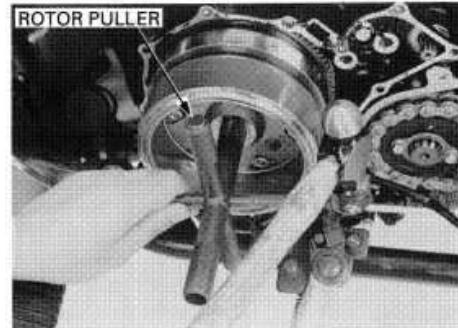
Hold the flywheel with the flywheel holder.  
Remove the flywheel bolt and washer.

**TOOL:**  
**Flywheel holder** 07725 - 0040000  
or equivalent commercially available in U.S.A.



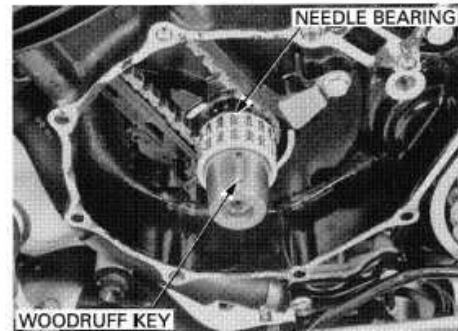
Remove the flywheel and starter driven gear using the rotor puller.

**TOOL:**  
**Rotor puller** 07733 - 0020001  
or  
07933 - 3290001  
(U.S.A. only)



Remove the needle bearing.  
Remove the woodruff key from the crankshaft to avoid damaging the crankshaft.

Check the needle bearing for abnormal wear or damage, replace if necessary.

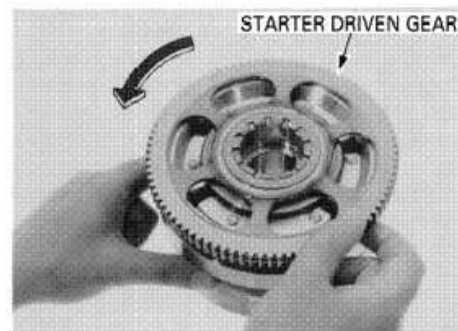


### STARTER DRIVEN GEAR, STARTER CLUTCH HOUSING REMOVAL

#### ONE-WAY CLUTCH OPERATION

You should be able to turn the starter driven gear counterclockwise smoothly, but the driven gear should not turn clockwise.

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



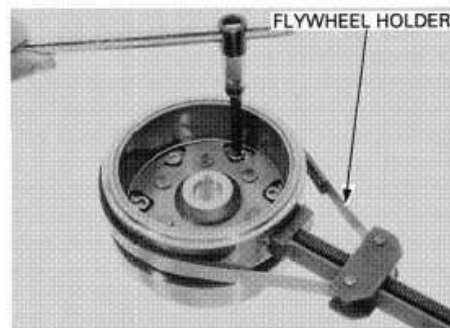
## ALTERNATOR/STARTER CLUTCH

*Do not remove the clutch housing, unless it is necessary to inspect it.*

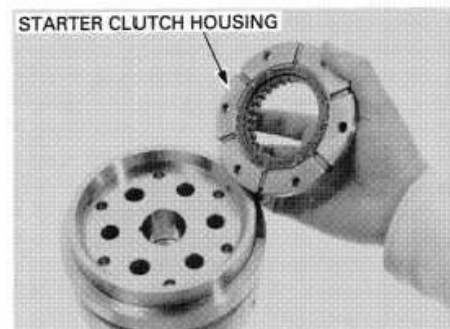
Hold the flywheel with the flywheel holder.  
Remove the starter clutch housing bolts.

### TOOL:

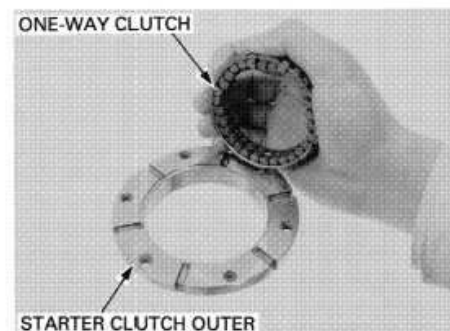
**Flywheel holder** 07725 - 0040000  
or equivalent commercially available in U.S.A.



Separate the starter clutch housing from the flywheel.



Remove the one-way clutch from the starter clutch outer, being careful that the spring does not come off the one-way clutch.  
If the spring was out of the clutch groove, replace the one-way clutch (clutch and spring) as an assembly when installing.



## INSPECTION

### ONE-WAY CLUTCH

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

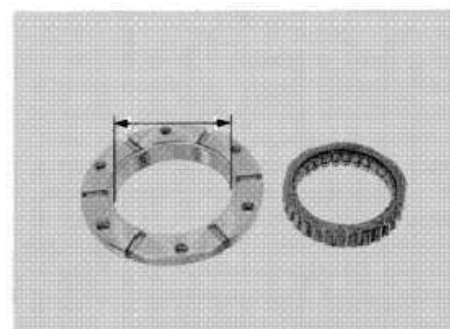
*If the starter clutch outer replacement is necessary, replace the clutch outer and one-way clutch as a set.*

### STARTER CLUTCH OUTER

Check the starter clutch outer inner contact surface for abnormal wear or damage.

Measure the starter clutch outer I.D.

**SERVICE LIMIT: 74.46 mm (2.931 in)**

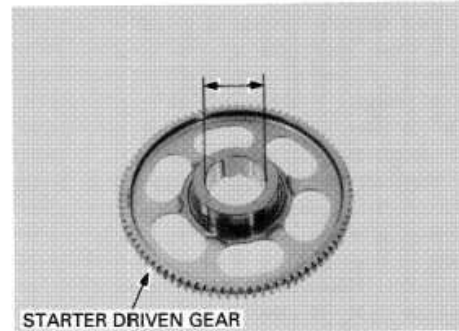


**STARTER DRIVEN GEAR INSPECTION**

Check the roller contact surface for abnormal wear or damage.

Measure the starter driven gear I.D.

**SERVICE LIMITS:** 57.639 mm (2.2692 in)

**STARTER REDUCTION GEAR**

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

**STARTER IDLER GEAR**

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

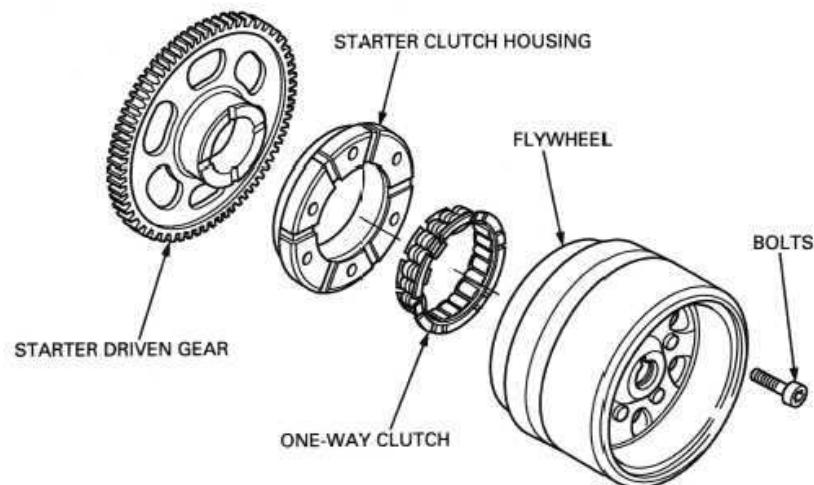
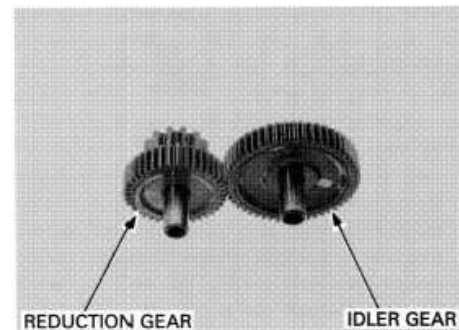
**STARTER DRIVEN GEAR, STARTER CLUTCH HOUSING INSTALLATION**

Make sure the spring is held into the groove in the one-way clutch.

Apply engine oil to the one-way clutch sprag and install the one-way clutch into the starter clutch outer with the flanged side facing the flywheel. Make sure the spring does not come off the one-way clutch.

Apply locking agent to the starter clutch housing bolt threads.

Install the starter clutch housing onto the flywheel with the bolts.



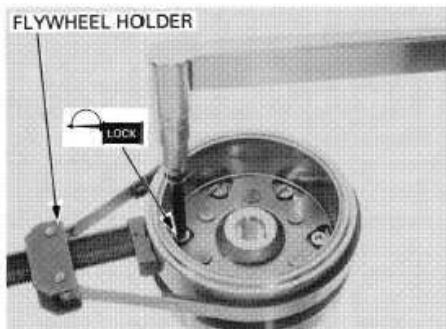


## ALTERNATOR/STARTER CLUTCH

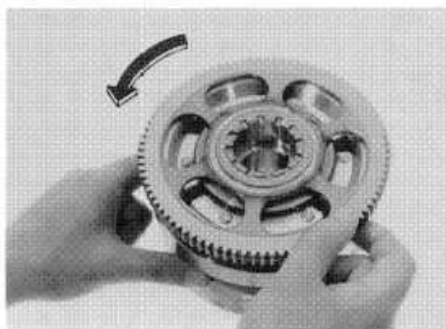
Hold the flywheel with the flywheel holder.  
Tighten the starter clutch housing bolts to the specified torque.

**TOOL:**  
Flywheel holder 07725 - 0040000  
or equivalent commercially available in U.S.A.

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

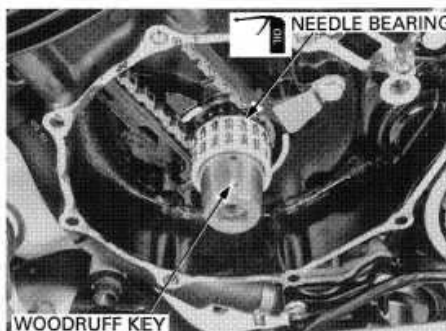


Install the starter driven gear to the flywheel while turning the driven gear counterclockwise.

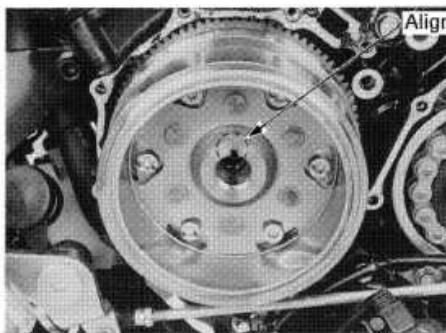


## FLYWHEEL INSTALLATION

Clean the tapered area of the crankshaft with a degreasing agent and wipe it off completely.  
Install the woodruff key in the key groove of the crankshaft.  
Apply engine oil to the needle bearing and install it to the crankshaft.



Clean the tapered area of the flywheel with a degreasing agent and wipe it off completely.  
Set the flywheel over the crankshaft by aligning the its groove with the woodruff key and install it.



## ALTERNATOR/STARTER CLUTCH

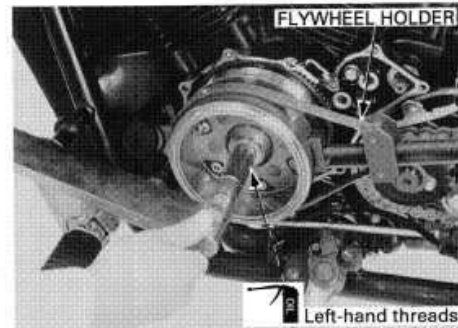
*The flywheel bolt has left-hand threads.*

Apply engine oil to the flywheel bolt threads and install it with the washer. Hold the flywheel and tighten the flywheel bolt to the specified torque.

**TOOL:**

Flywheel holder 07725 - 0040000  
or equivalent commercially available in U.S.A.

**TORQUE:** 127 N-m (13.0 kgf-m, 94 lbf-ft)

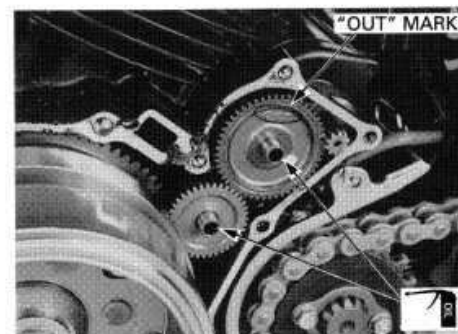


Apply engine oil to the starter reduction gear shaft and idler gear shaft outer surfaces.

Install the starter idler gear with the "OUT" mark facing out and install the shaft.

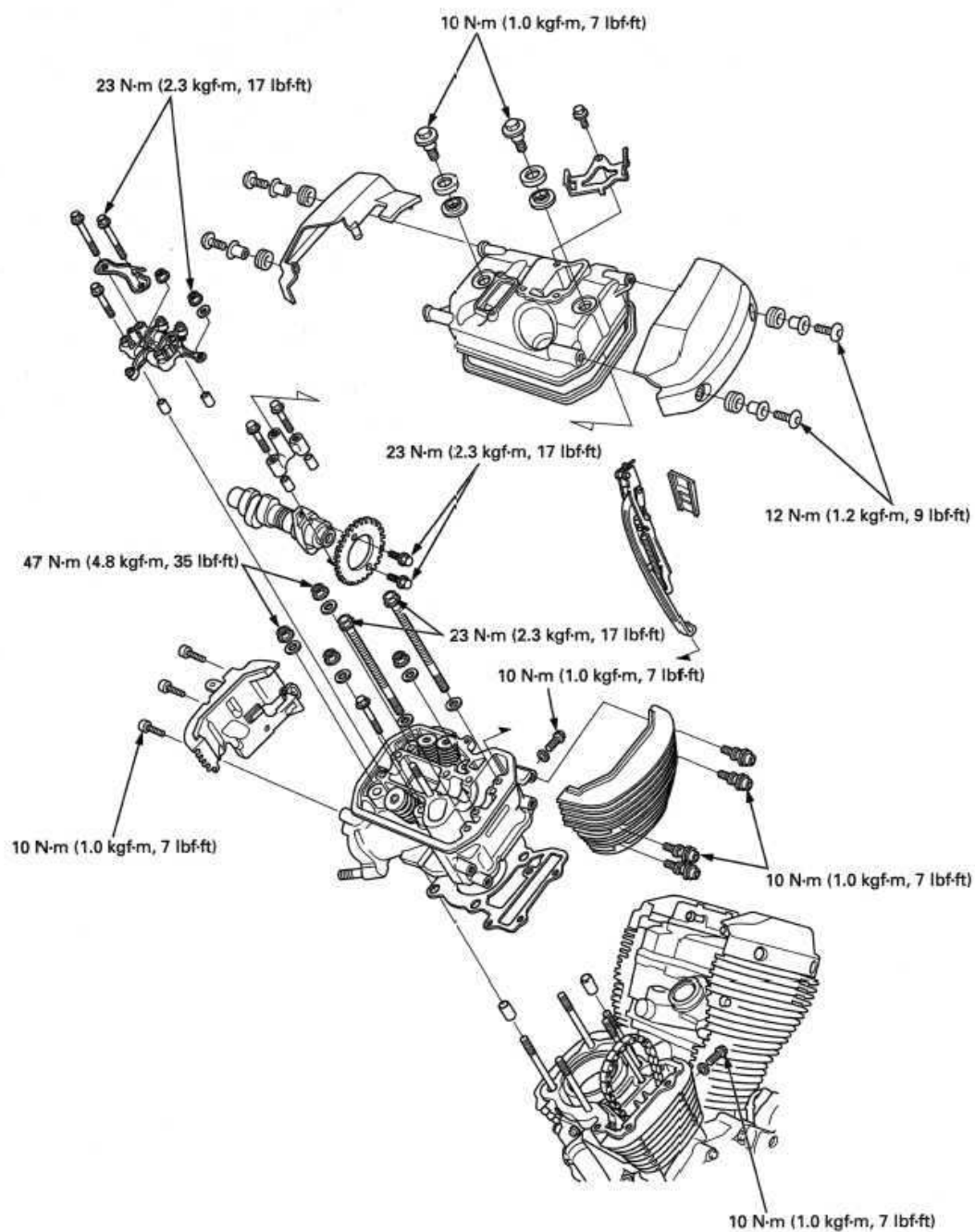
Install the starter reduction gear and shaft.

Install the left crankcase cover (page 9-3).



## CYLINDER HEAD/VALVE

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# 10. CYLINDER HEAD/VALVE

<b>SERVICE INFORMATION</b>	<b>10-1</b>	<b>CYLINDER HEAD REMOVAL</b>	<b>10-19</b>
<b>TROUBLESHOOTING</b>	<b>10-2</b>	<b>CYLINDER HEAD DISASSEMBLY</b>	<b>10-20</b>
<b>CYLINDER COMPRESSION</b>	<b>10-3</b>	<b>VALVE GUIDE REPLACEMENT</b>	<b>10-23</b>
<b>CYLINDER HEAD COVER REMOVAL</b>	<b>10-4</b>	<b>VALVE SEAT INSPECTION/REFACING</b>	<b>10-24</b>
<b>CAMSHAFT CAMSHAFT HOLDER</b>	<b>10-6</b>	<b>CYLINDER HEAD ASSEMBLY</b>	<b>10-27</b>
<b>CYLINDER HEAD COVER INSTALLATION</b>	<b>10-16</b>	<b>CYLINDER HEAD INSTALLATION</b>	<b>10-28</b>

## SERVICE INFORMATION

### GENERAL

- This section covers service of the cylinder head, valves and camshafts.
- The camshaft can be serviced with the engine installed in the frame.
- To service the cylinder head and valves, the engine must be removed from the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Pour clean engine oil into the oil pockets in the cylinder head during assembly to lubricate the camshaft.
- Be careful not to damage the mating surfaces when removing the head cover and cylinder head.

10

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,275 ± 98 kPa (13.0 ± 1.0 kgf / cm <sup>2</sup> , 185 ± 14 psi) at 400 rpm	—
Cylinder head warpage			—	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.0008)	—
		EX	0.20 ± 0.02 (0.008 ± 0.0008)	—
	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.45 (0.215)
		EX	6.600 – 6.615 (0.2598 – 0.2604)	6.55 (0.258)
	Valve guide I.D.	IN	5.500 – 5.512 (0.2165 – 0.2170)	5.56 (0.219)
		EX	6.600 – 6.615 (0.2598 – 0.2604)	6.65 (0.262)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.10 (0.004)
		EX	0.030 – 0.060 (0.0012 – 0.0024)	0.11 (0.004)
	Valve guide projection above cylinder head	IN	19.5 (0.77)	—
		EX	18.0 (0.71)	—
	Valve seat width		IN/EX 0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN	42.14 (1.659)	40.58 (1.598)
		EX	42.83 (1.686)	41.25 (1.624)
Camshaft	Cam lobe height	IN	37.188 – 37.348 (1.4641 – 1.4704)	37.16 (1.463)
		EX	37.605 – 37.765 (1.4805 – 1.4868)	37.58 (1.480)
	Journal O.D.		21.959 – 21.980 (0.8645 – 0.8654)	21.90 (0.862)
	Runout		—	0.03 (0.012)
	Oil clearance		0.050 – 0.111 (0.0020 – 0.0044)	0.13 (0.005)
	Identification marks		"F": Front, "R": Rear	—
Rocker arm I.D.		IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Rocker arm shaft O.D.		IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.83 (0.466)
Rocker arm-to-rocker arm shaft clearance			0.016 – 0.052 (0.0006 – 0.0020)	0.07 (0.003)

10-1

## CYLINDER HEAD/VALVE

### TORQUE VALUES

Cylinder head cover bolt	10 N-m (1.0 kgf-m, 7 lbf-ft)	
Overhead cover bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	
Air cleaner housing stay bolt	12 N-m (1.2 kgf-m, 9 lbf-ft)	
Cam sprocket bolt	23 N-m (2.3 kgf-m, 17 lbf-ft)	Apply locking agent to the treads.
Cam chain tensioner mounting bolt	10 N-m (1.0 kgf-m, 7 lbf-ft)	
Camshaft holder 8-mm bolt	23 N-m (2.3 kgf-m, 17 lbf-ft)	
8-mm nut	23 N-m (2.3 kgf-m, 17 lbf-ft)	
Cylinder head 8-mm bolt	23 N-m (2.3 kgf-m, 17 lbf-ft)	Apply oil to the threads and seating surface.
10-mm nut	47 N-m (4.8 kgf-m, 35 lbf-ft)	Apply oil to the threads and seating surface.
Cylinder head fin mounting bolt	10 N-m (1.0 kgf-m, 7 lbf-ft)	
Spark plug	14 N-m (1.4 kgf-m, 10 lbf-ft)	
Crankshaft hole cap	15 N-m (1.5 kgf-m, 11 lbf-ft)	Apply grease to the threads.
Timing hole cap	15 N-m (1.5 kgf-m, 11 lbf-ft)	Apply grease to the threads.
Valve adjusting screw lock nut	23 N-m (2.3 kgf-m, 17 lbf-ft)	Apply oil to the threads and seating surface.

### TOOLS

Valve guide driver, 5.5 mm (IN)	07742 - 0010100	
Valve guide driver, 6.6 mm (EX)	07742 - 0010200	or 07933 - 3290001 (U.S.A. only)
Valve guide driver (adjustable type)	07743 - 0020000	Not available in U.S.A.
Valve spring compressor	07757 - 0010000	
Valve seat cutter		
— seat cutter, 27.5 mm (45° IN)	07780 - 0010200	Equivalent commercially available in U.S.A.
— seat cutter, 35 mm (45° EX)	07780 - 0010400	
— flat cutter, 28 mm (32° IN)	07780 - 0012100	
— flat cutter, 35 mm (32° EX)	07780 - 0012300	
— interior cutter, 30 mm (60° IN)	07780 - 0014000	
— interior cutter, 37.5 mm (60° EX)	07780 - 0014100	
— cutter holder, 5.5 mm (IN)	07781 - 0010101	
— cutter holder, 6.6 mm (EX)	07781 - 0010202	
Valve guide reamer, 5.5 mm (IN)	07984 - 2000001	
Valve guide reamer, 6.6 mm (EX)	07984 - ZE20001	or 07984 - ZE2000D (U.S.A. only)

## TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top end noise with a sounding rod or stethoscope (see page 10-3 for engine compression testing).

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

- Valves
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston (see section 11)

### Compression too high

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

### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (see section 11)

### Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Cylinder/piston problem (see section 11)

### Rough idle

- Low cylinder compression

## CYLINDER COMPRESSION

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.

Install the compression gauge into the spark plug hole.

Shift the transmission into neutral.

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

**COMPRESSION PRESSURE:**

**1,275 ± 98 kPa (13.0 ± 1.0 kgf/cm<sup>2</sup>, 185 ± 14 psi)  
at 400 rpm**

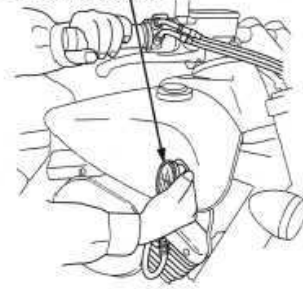
If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

If the 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.

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

COMPRESSION GAUGE



## CYLINDER HEAD COVER REMOVAL

### FRONT

Remove the air cleaner housing (page 5-3).  
Drain the coolant (page 6-4).

Remove the mounting bolts and front overhead cover.  
Disconnect the spark plug cap, then remove the mounting bolts and right front cylinder head fin.

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

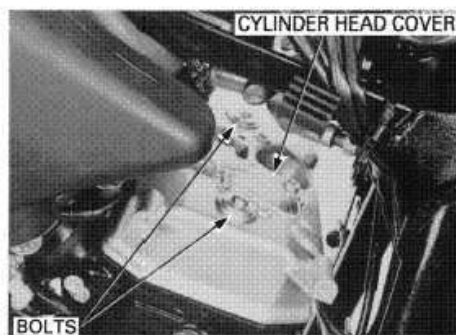
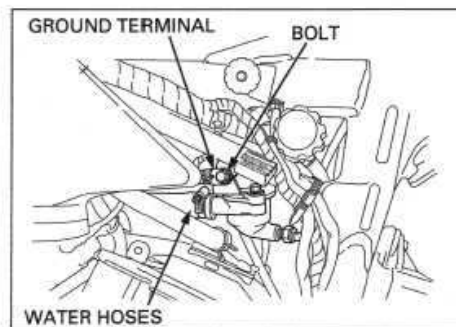
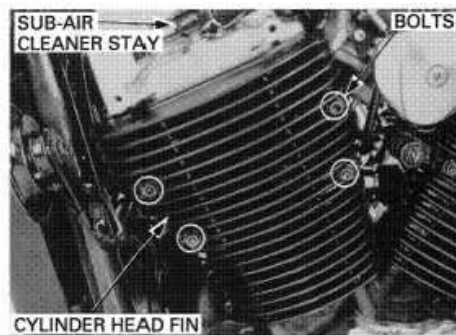
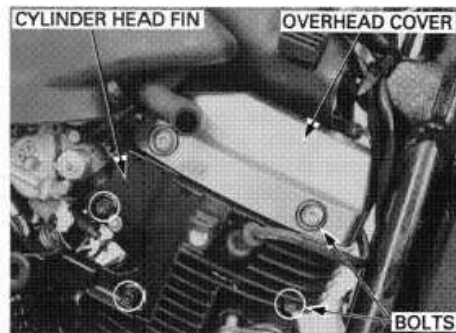
Disconnect the spark plug cap.  
Remove the mounting bolts and left front cylinder head fin.  
Remove the bolt and sub-air cleaner case stay from the cylinder head cover.

Remove the thermostat housing mounting bolt with the ground terminal.  
Disconnect the water hoses from the thermostat housing.

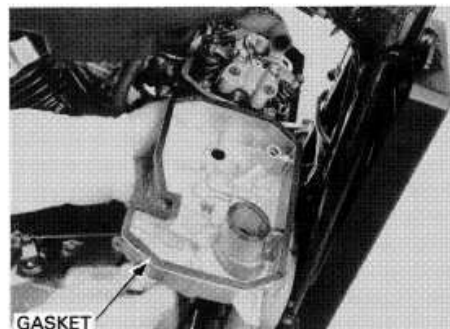
Remove the following:

- cylinder head cover bolts
- rubber washers
- mounting rubber seals

Remove the cylinder head cover to avoid damaging the head cover mating surface.



Remove the head cover gasket.



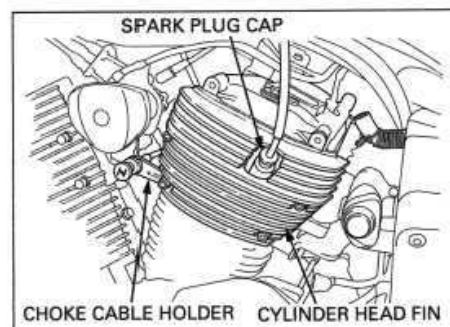
## REAR

Remove the fuel tank (page 2-2).

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

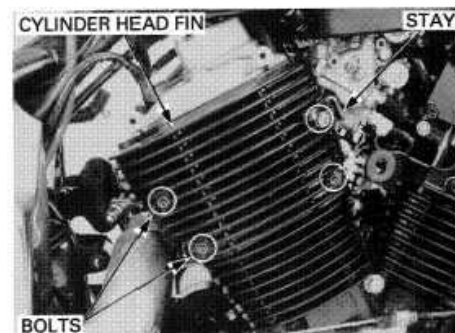
Remove the mounting bolts, left and right overhead covers.

Disconnect the spark plug cap, then remove the mounting bolts, choke cable holder and left rear cylinder head fin.



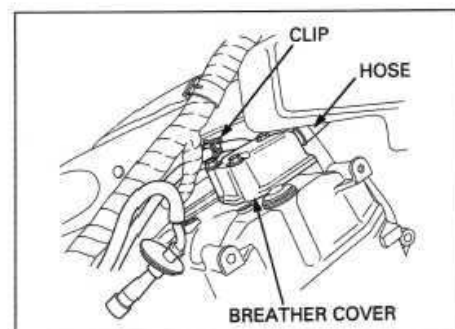
Disconnect the spark plug cap.

Remove the mounting bolts, air cleaner case stay and right rear cylinder head fin.



Remove the rear left spark plug wire mounting clip from the frame.

Remove the mounting bolts and crankcase breather cover. Disconnect the air supply hose from the breather cover.



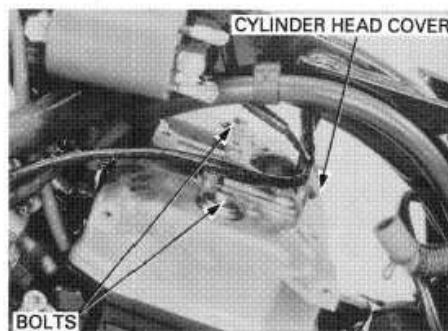


## CYLINDER HEAD/VALVE

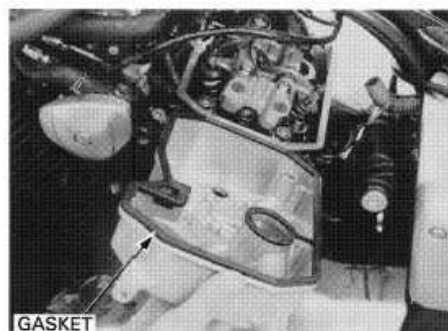
Remove the following:

- cylinder head cover bolts
- rubber washers
- mounting rubber seals

Remove the cylinder head cover to avoid damaging the head cover mating surface.



Remove the head cover gasket.



## CAMSHAFT, CAMSHAFT HOLDER

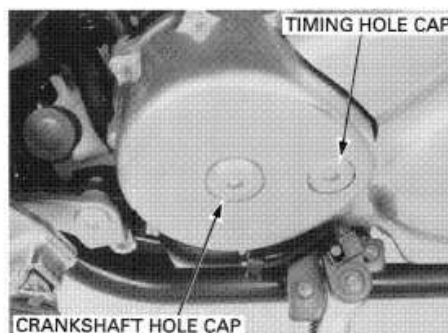
### REMOVAL

#### NOTE:

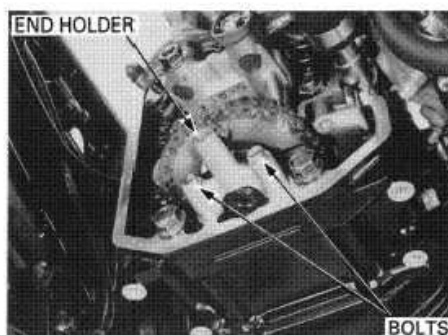
- The camshaft can be serviced with the engine installed in the frame.
- The rear cylinder camshaft service uses the same procedure as for the front cylinder.

Remove the front cylinder head cover (page 10-4).

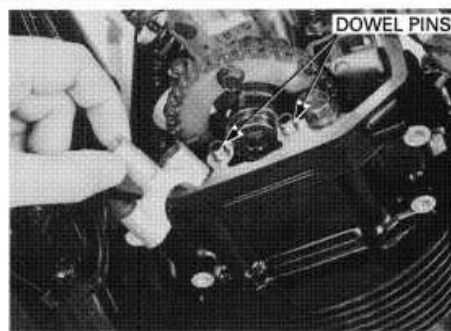
Remove the crankshaft hole cap and timing hole cap.



Remove the camshaft end holder bolts and camshaft end holder.



Remove the dowel pins.



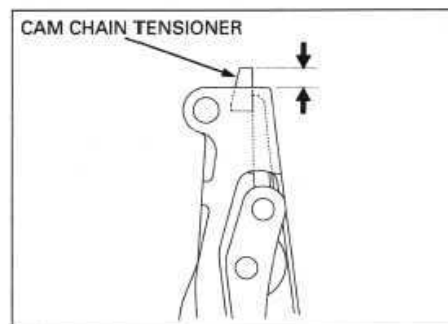
Before releasing the cam chain tensioner, measure the cam chain tensioner wedge B length as shown.

**SERVICE LIMIT: 6 mm (0.2 in)**

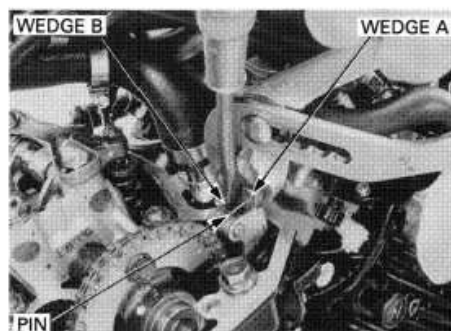
When the service limit is exceeded, replace the cam chain.

To replace the cam chain, remove the following parts:

- cam sprocket (see below)
- front cylinder: flywheel (see section 9)
- rear cylinder: primary drive gear (see section 8)

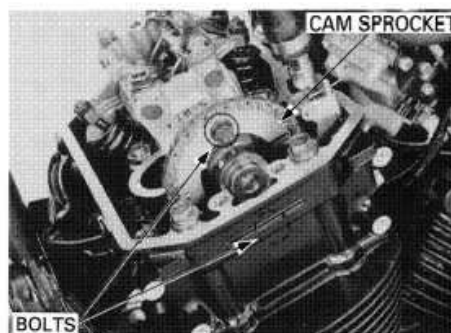


Release the cam chain tensioner by pulling wedge A straight up while holding wedge B down then secure the wedge A with a 2-mm pin as shown.



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

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



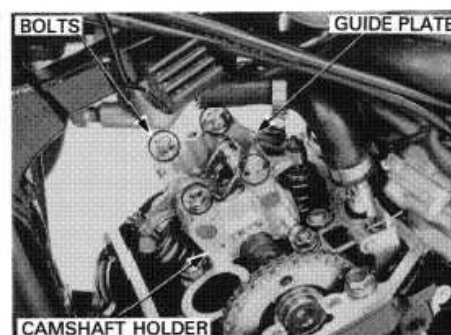
## CYLINDER HEAD/VALVE

Remove the cam sprocket from the camshaft flange with the cam chain.

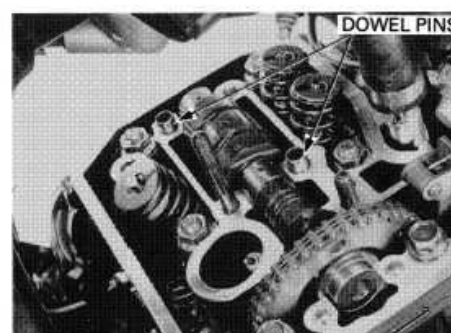


Remove the following:

- three 8-mm bolts
- oil guide plate
- two 8-mm nuts
- washer
- camshaft holder assembly

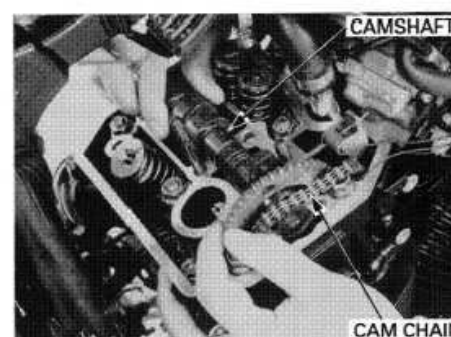


Remove the dowel pins.



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

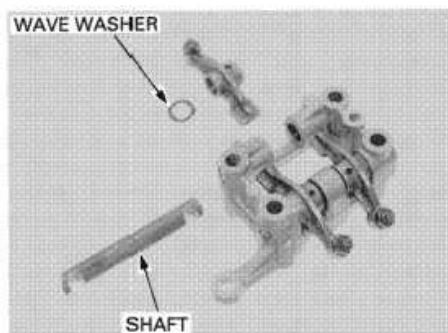
Lift the camshaft and remove it.  
Remove the cam sprocket.



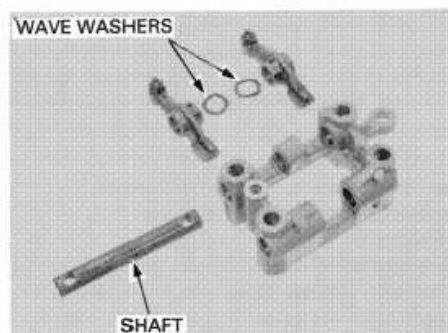
**CAMSHAFT HOLDER DISASSEMBLY**

*When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.*

Remove the exhaust rocker arm shaft, exhaust rocker arm and wave washer from the camshaft holder.

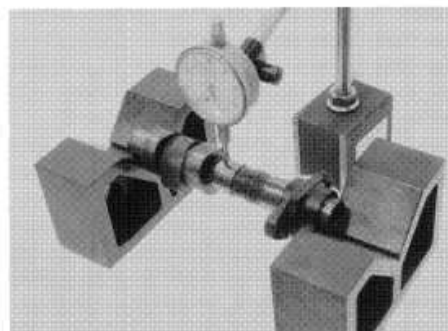


Remove the intake rocker arm shaft, intake rocker arms and wave washers from the camshaft holder.

**INSPECTION****CAMSHAFT RUNOUT**

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial indicator.

**SERVICE LIMIT: 0.05 mm (0.002 in)**

**CAM LOBE HEIGHT**

Measure the height of each cam lobe using a micrometer.

**SERVICE LIMITS: IN: 37.16 mm (1.463 in)**

**EX: 37.58 mm (1.480 in)**



## CYLINDER HEAD/VALVE

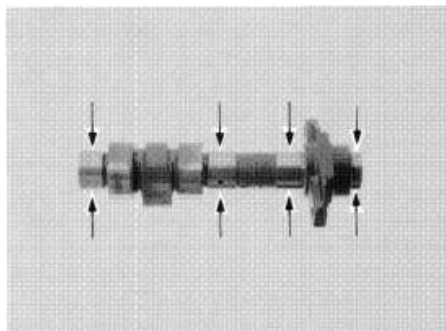
### CAMSHAFT JOURNAL O.D.

Measure the O.D. of each camshaft journal.

**SERVICE LIMIT: 21.90 mm (0.862 in)**

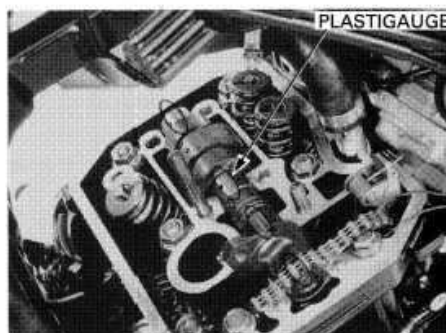
Inspect the oil passages of the camshaft.

Inspect the camshaft journal surfaces of the camshaft holder, end holder and cylinder head for scoring or evidence of insufficient lubrication.



### CAMSHAFT OIL CLEARANCE

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



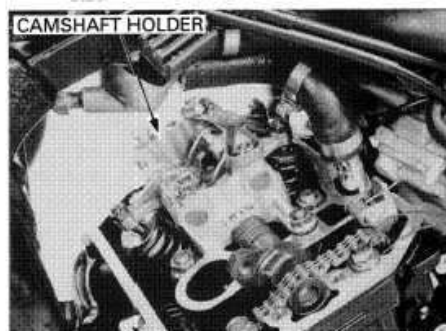
Install the following:

- dowel pins
- camshaft holder assembly
- oil guide plate
- three 8-mm bolts
- washer
- two 8-mm nuts
- dowel pins
- camshaft end holder
- end holder bolts

*Do not rotate the camshaft during inspection.*

Tighten the end holder bolts.

Tighten the camshaft holder 8-mm bolts and 8-mm nuts in a crisscross pattern in several steps.



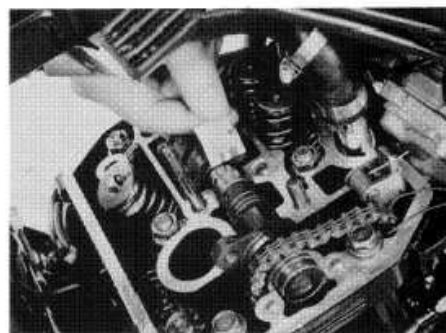
**TORQUE: 23 N-m (2.3 kgf-m, 17 lbf-ft)**

Remove the camshaft holder and end holder. Measure the width of each plastigauge. The widest thickness determines the oil clearance.

**SERVICE LIMIT: 0.13 mm (0.005 in)**

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

Replace the cylinder head, camshaft holder and end holder if the clearance still exceeds the service limit.



**ROCKER ARM, ROCKER ARM SHAFT**

Inspect the rocker arm shafts and rocker arms for abnormal wear or damage.

Check the rocker arm shafts and rocker arms for clogged oil holes.

Measure the O.D. of each rocker arm shaft.

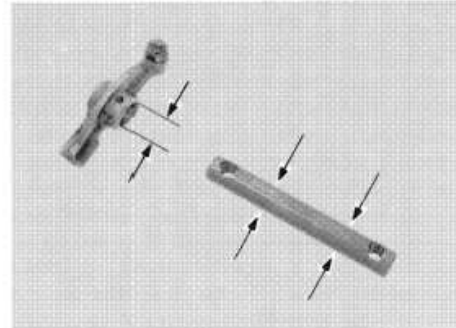
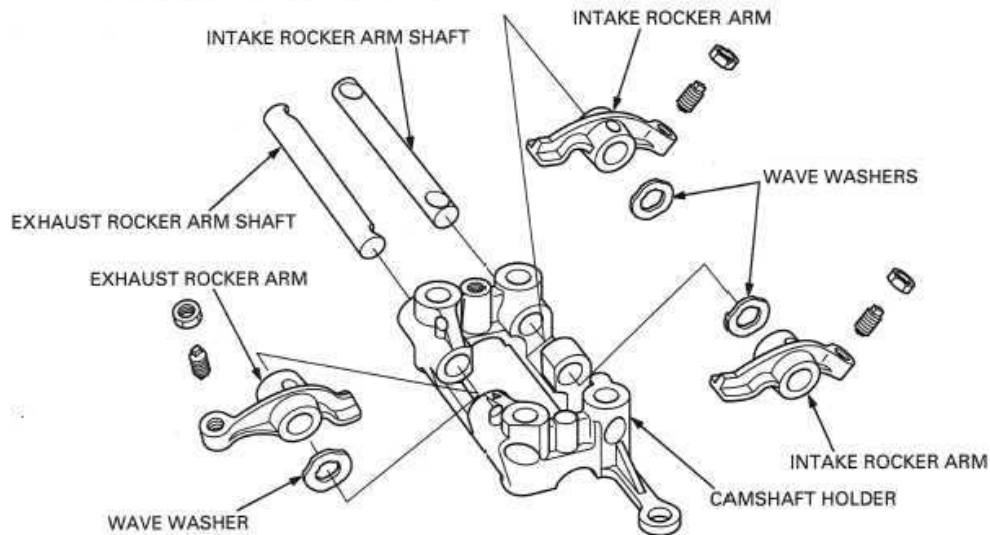
**SERVICE LIMIT: 11.83 mm (0.466 in)**

Measure the I.D. of each rocker arm.

**SERVICE LIMIT: 12.05 mm (0.474 in)**

Subtract each rocker arm shaft O.D. from the corresponding rocker arm I.D. to obtain the rocker arm-to-rocker arm shaft clearance.

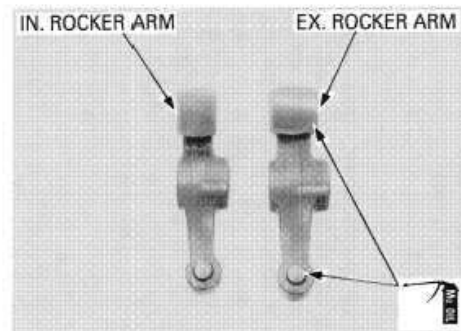
**SERVICE LIMIT: 0.07 mm (0.003 in)**

**CAMSHAFT HOLDER ASSEMBLY**

Apply molybdenum oil solution to the rocker arm slipper surfaces.

**NOTE:**

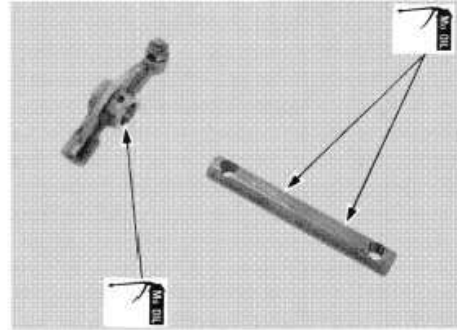
- The exhaust rocker arm has a larger slipper face than the intake rocker arm.



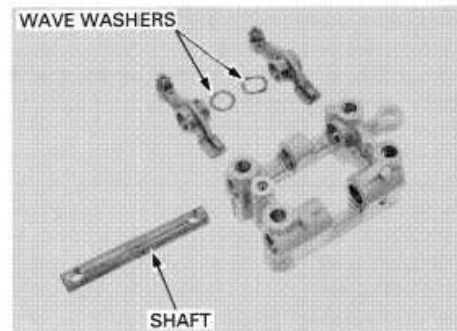
## CYLINDER HEAD/VALVE

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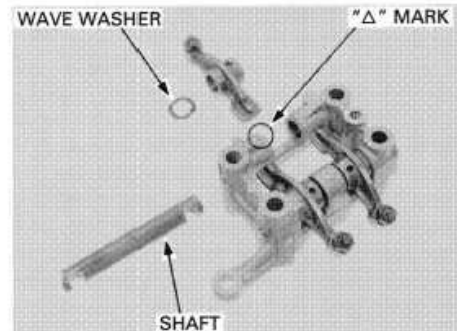
Apply molybdenum oil solution to the rocker arm shaft sliding surfaces.



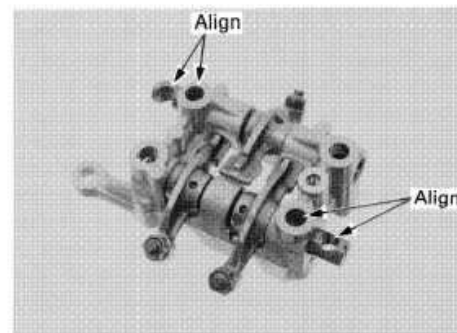
Install the wave washers, intake rocker arms and intake rocker arm shaft to the camshaft holder.



Install the wave washer to the "Δ" mark side on the camshaft holder.  
Install the exhaust rocker arm and exhaust rocker arm shaft to the camshaft holder.

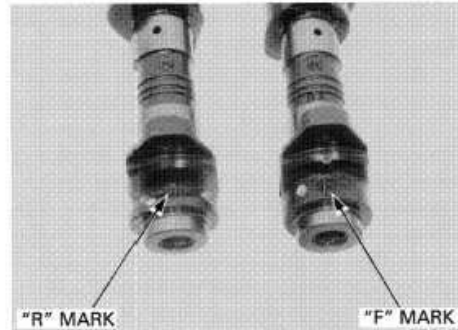


Position the grooves and holes in the rocker arm shafts vertically, aligning the bolt holes of the camshaft holder.

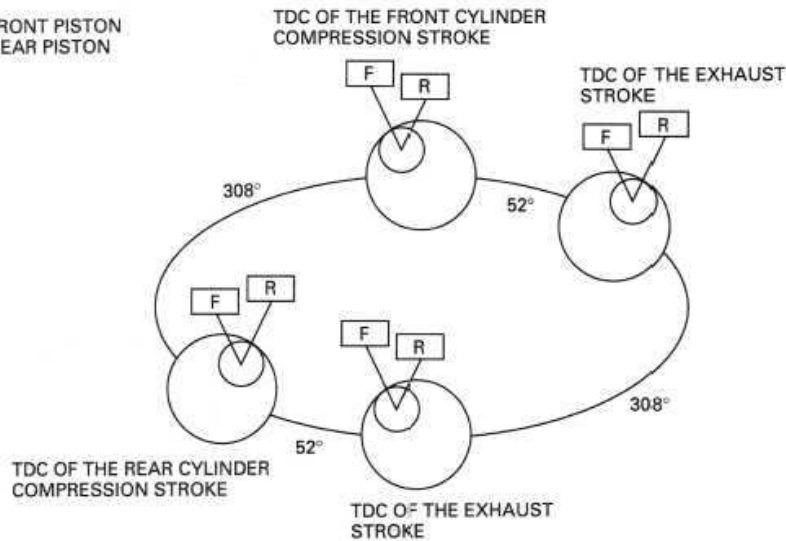


**INSTALLATION****NOTE:**

- The camshafts are identified by marks on their flanges.  
Front cylinder camshaft: index notch (TDC; Top Dead Center) mark and "F" mark  
Rear cylinder camshaft: "R" mark
- If both (front and rear) camshafts were removed, install the front cylinder camshaft first, then install the rear camshaft.
- If the rear camshaft was not serviced, remove the rear cylinder head cover (page 10-5) to check the camshaft position.
- If the front camshaft was not serviced, remove the front cylinder head cover (page 10-4) to check the camshaft position.

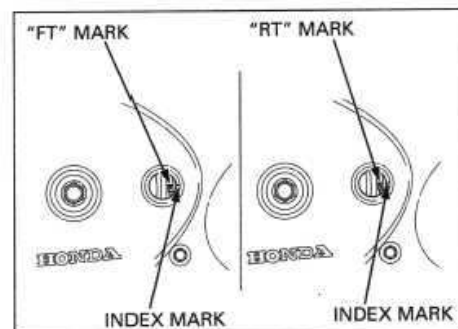
**PISTON AND CRANKPIN LOCATION DIAGRAM:**

F: FRONT PISTON  
R: REAR PISTON

**BOTH CAMSHAFTS INSTALLATION**

Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the left crankcase cover, then make sure the front cylinder piston is at "TDC (Top Dead Center)". Install the front cylinder camshaft (see next page).

After installing the front camshaft, face up the "F" mark on the front camshaft, then turn the crankshaft counterclockwise 308° and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then install the rear camshaft (page 10-16).





## CYLINDER HEAD/VALVE

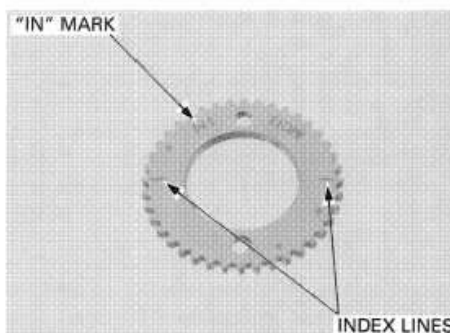
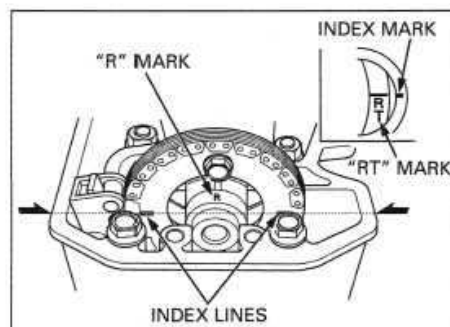
### FRONT CAMSHAFT INSTALLATION

Remove the rear cylinder head cover and camshaft end holder. Check the rear cylinder camshaft position as follows:

Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover, then check the "R" mark on the rear camshaft flange.

- If the "R" mark faces up, turn the crankshaft counterclockwise 412° (align the "FT" mark on the flywheel with the index mark on the left crankcase cover) and begin installation of the front camshaft.
- If the "R" mark faces down (cannot be seen), turn the crankshaft clockwise 52° (align the "FT" mark on the flywheel with the index mark on the left crankcase cover) and begin installation of the front camshaft.

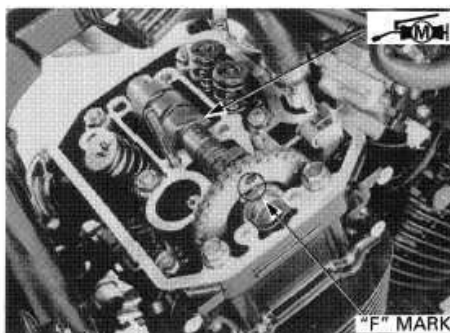
Install the cam sprocket with the "IN" mark facing inside.



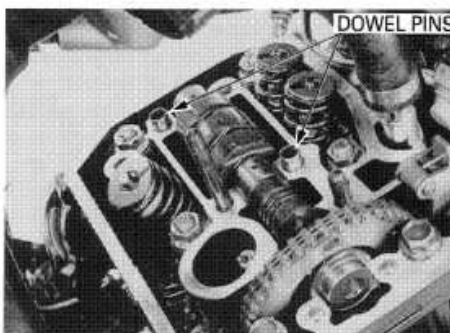
Lubricate the camshaft lobes and journals with molybdenum oil solution.

Install the camshaft onto the cylinder head through the cam sprocket. Temporarily align the index lines of the cam sprocket with the upper surface of the cylinder head.

Place the camshaft into its correct position with the "F" mark on the flange facing up and install the cam chain onto the cam sprocket by the aligning the index lines with the upper surface of the cylinder head.



Install the dowel pins.



Lubricate each rocker arm slipper surfaces with molybdenum oil solution.

**NOTE:**

- Before camshaft holder installation, loosen the valve adjusting screws and lock nuts.

Install the following:

- camshaft holder assembly
- washer
- two 8-mm nuts
- oil guide plate
- three 8-mm bolts

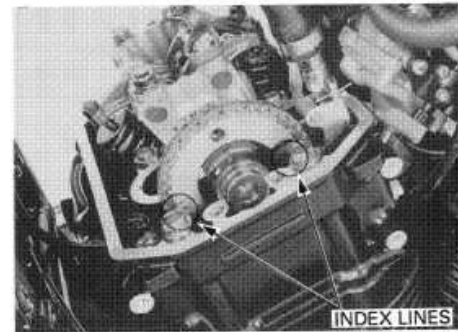
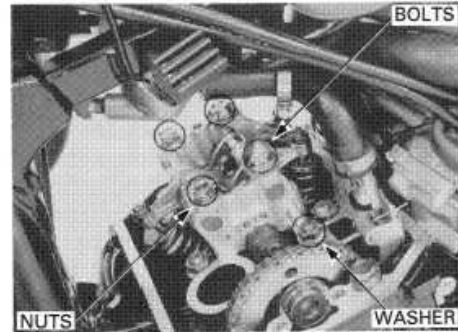
Tighten the camshaft holder 8-mm bolts and 8-mm nuts in a crisscross pattern in several steps.

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

Install the cam sprocket onto the camshaft flange.

**NOTE:**

- Be sure the index lines on the cam sprocket align with the upper surface of the cylinder head when the "FT" mark on the flywheel is aligned with the index mark on the left crankcase cover.

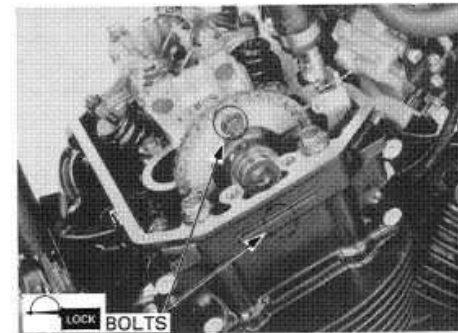


Apply a locking agent to the cam sprocket bolt threads. Align the bolt hole in the sprocket and camshaft flange and install the cam sprocket bolt.

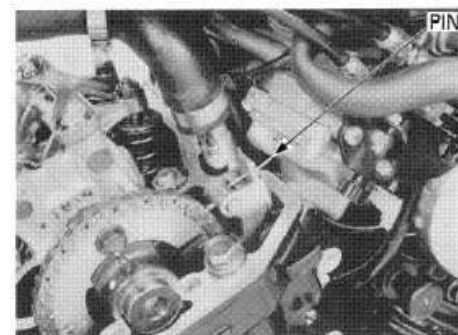
Turn the crankshaft one revolution. Apply a locking agent to the remaining sprocket bolt threads and install the cam sprocket bolt. Tighten it to the specified torque.

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

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



Remove the 2-mm pin holding cam chain tensioner wedge A.



## CYLINDER HEAD/VALVE

Install the dowel pins.  
Install the camshaft end holder with the flat surface facing inside.

Install and tighten the camshaft end holder bolts.

Adjust the valve clearance (page 3-8).

### REAR CAMSHAFT INSTALLATION

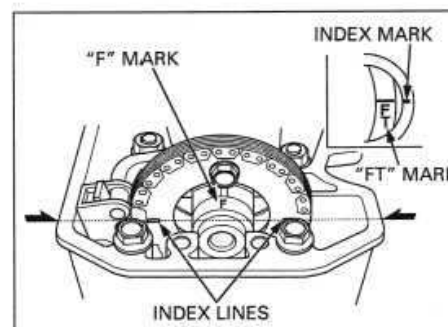
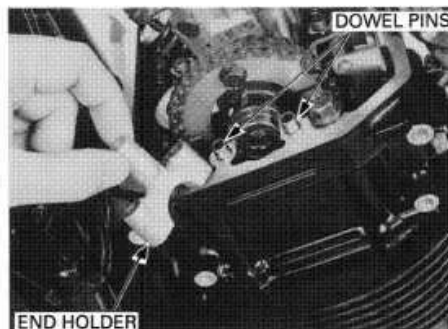
Remove the front cylinder head cover and camshaft end holder. Check the front cylinder camshaft position as follows:

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

— If the "F" mark on the front camshaft flange faces up, turn the crankshaft counterclockwise 308° and align the "RT" mark with the index mark.

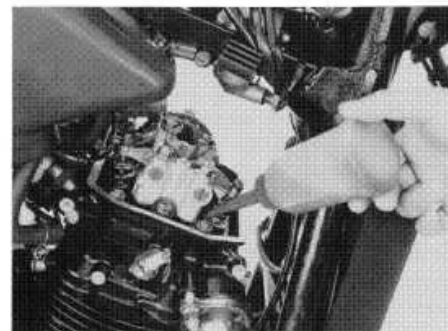
— If the "F" mark on the front camshaft flange faces down (cannot be seen), turn the crankshaft counterclockwise 668° and align the "RT" mark with the index mark.

The remainder of the rear cylinder camshaft installation is the same as the procedures described on page 10-14, except the mark on the camshaft flange that should face up should be an "R".



## CYLINDER HEAD COVER INSTALLATION

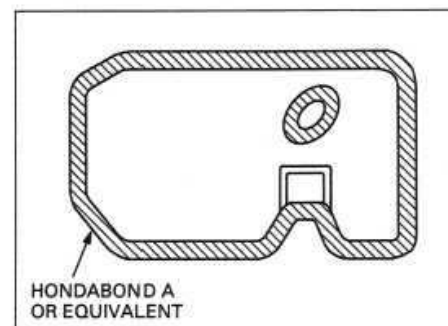
Pour engine oil into the oil pocket in the cylinder head until the cam lobes are covered.



Clean the gasket groove of the cylinder head cover thoroughly.

### NOTE:

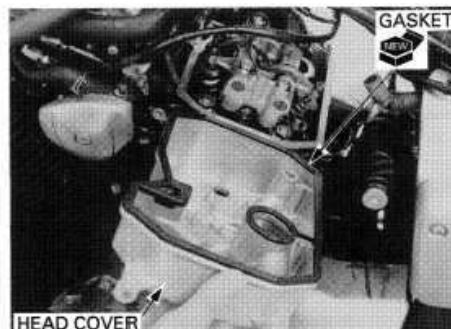
- It is easier to install the cylinder head cover gasket, apply HondaBond A or equivalent to the gasket groove of the cylinder head cover.



**REAR**

Clean the cylinder head cover mating surface of the cylinder head.

Install the new gasket onto the cylinder head cover. Install the rear cylinder head cover to avoid damaging the head cover mating surface.



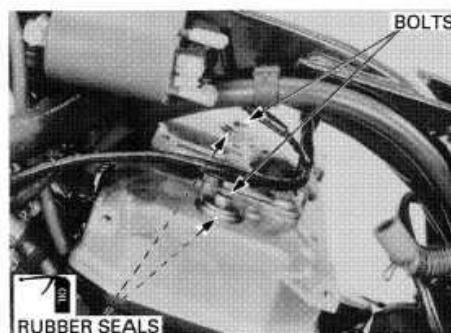
Apply engine oil to all the mounting rubber seal surfaces.

Install the following:

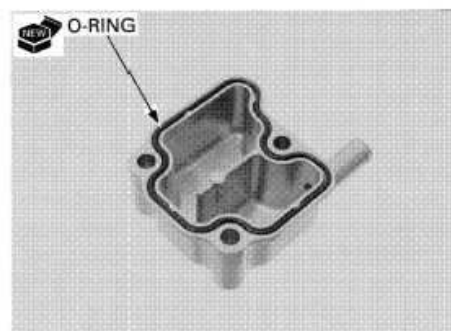
- mounting rubber seals
- rubber washers
- head cover bolts

Tighten the cylinder head cover bolts to the specified torque.

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

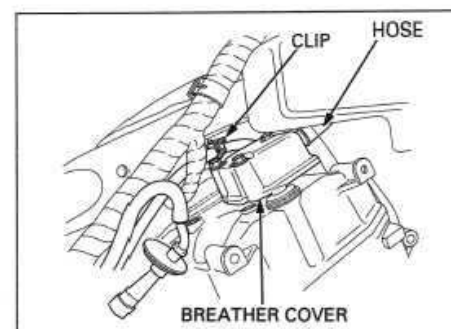


Install the new O-ring into the crankcase breather cover groove.



Install the crankcase breather cover with the bolts. Tighten the crankcase breather cover bolts.

Connect the air supply hose. Install the rear left spark plug wire mounting clip.



## CYLINDER HEAD/VALVE

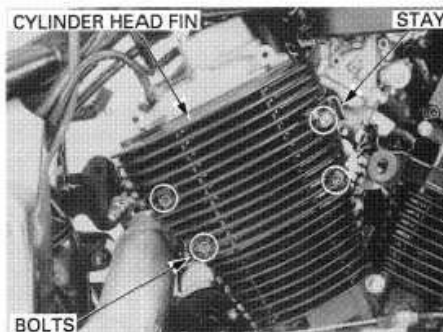
Install the right rear cylinder head fin with the air cleaner case stay and mounting bolts to the specified torque.

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

Tighten the cylinder head fin mounting bolts to the specified torque.

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

Connect the spark plug cap.



Install the left rear cylinder head fin with the choke cable holder and mounting bolts. Tighten the mounting bolts to the specified torque.

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

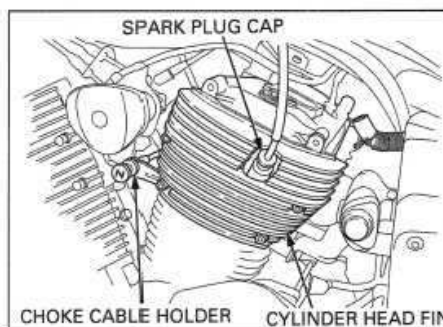
Connect the spark plug cap.

Install the left and right overhead cover with the mounting bolts. Tighten the bolts to the specified torque.

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

Install the air cleaner housing (page 5-3)

Install the fuel tank (page 2-2)



## FRONT

Clean the cylinder head cover mating surface of the cylinder head.

Install the new gasket onto the cylinder head cover. Install the front cylinder head cover to avoid damaging the head cover mating surface.



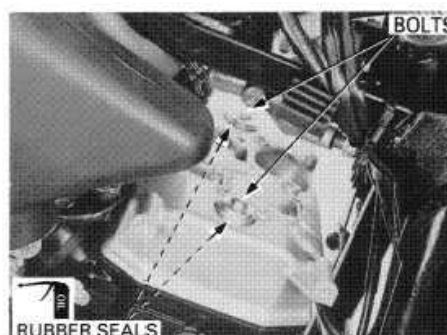
Apply engine oil to the mounting rubber seal whole surfaces.

Install the following:

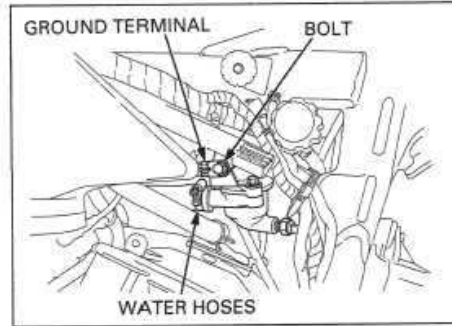
- mounting rubber seals
- rubber washers
- head cover bolts

Tighten the cylinder head cover bolts to the specified torque.

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



Install the thermostat housing with the ground terminal and mounting bolt. Tighten the bolt.  
Connect the water hoses to thermostat housing.



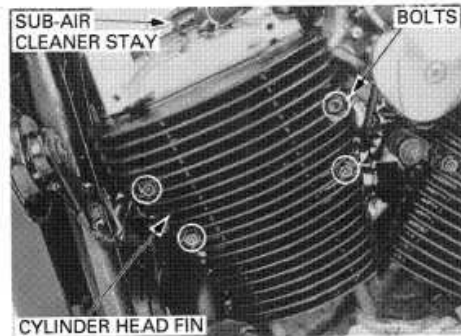
Install the left front cylinder head fin with the mounting bolts.  
Tighten the bolts to the specified torque.

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

Install the sub-air cleaner stay with the bolt and tighten the bolt.

Install the sub-air cleaner (page 5-4).

Connect the spark plug cap.



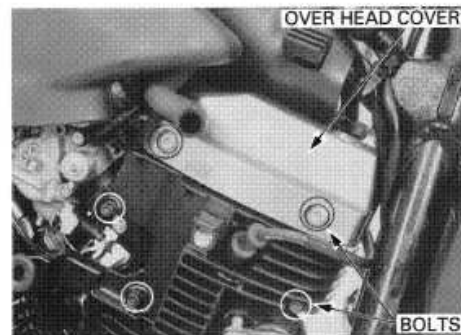
Install the right front cylinder head fin with the mounting bolts.  
Tighten the bolts to the specified torque.

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

Connect the spark plug cap.  
Install the front overhead cover with the mounting bolts. Tighten the bolts to the specified torque.

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

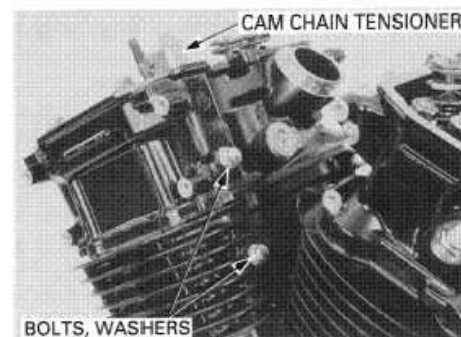
Install the air cleaner housing (page 5-3).  
Fill and bleed the cooling system (page 6-4).



## CYLINDER HEAD REMOVAL

Remove the engine from the frame (see section 7).  
Remove the camshaft holder and camshaft (page 10-6).

Remove the mounting bolts, washers, cushion rubber and cam chain tensioner.

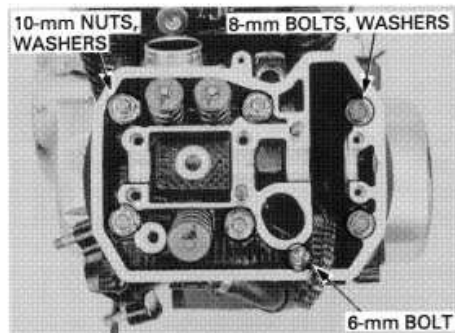


## CYLINDER HEAD/VALVE

Remove the following:

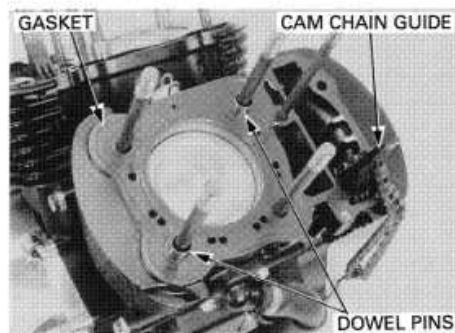
- two 8-mm bolts and washers
- 6-mm bolt
- four 10-mm nuts and washers

Pry the cylinder head at the prying using a screwdriver and remove the cylinder head.



Remove the gasket and dowel pins.

Remove the cam chain guide.



## CYLINDER HEAD DISASSEMBLY

NOTE:

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

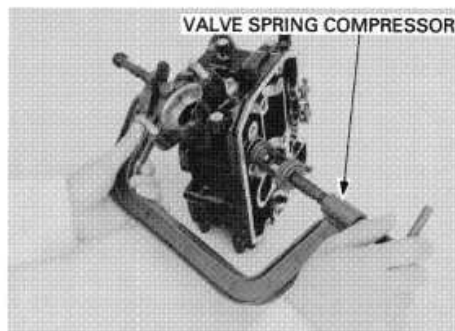
*Compressing the valve springs more than necessary will cause loss of valve spring tension.*

Remove the valve spring cotters using the valve spring compressor.

TOOL:

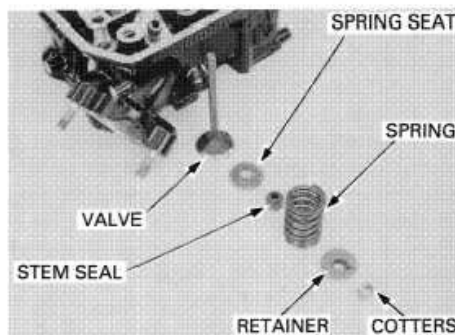
Valve spring compressor

07757 - 0010000



Remove the following:

- spring retainer
- valve spring
- valve
- stem seal
- spring seat



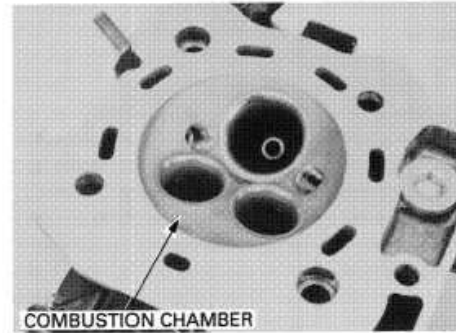


**INSPECTION**

*Gasket material will come off easier if soaked in high flash point cleaning solvent.*

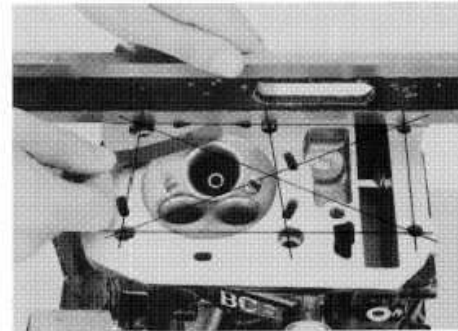
**CYLINDER HEAD**

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



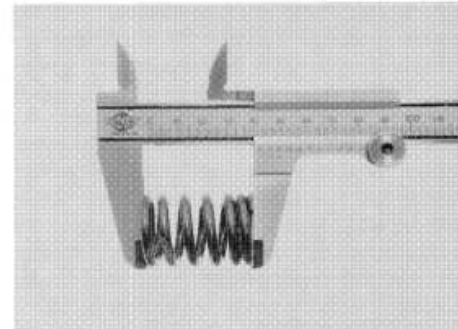
Check the cylinder head for warpage with a straight edge and feeler gauge.

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

**VALVE SPRING**

Measure the valve spring free length.

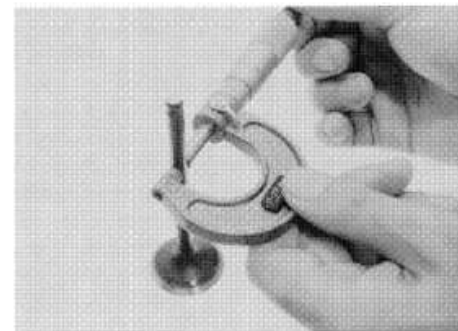
**SERVICE LIMITS: IN: 40.58 mm (1.598 in)**  
**EX: 41.25 mm (1.624 in)**

**VALVE/VALVE GUIDE**

Check that the valve moves smoothly in the guide. Check the valve for bending, burning or abnormal wear.

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

**SERVICE LIMITS: IN: 5.45 mm (0.215 in)**  
**EX: 6.55 mm (0.258 in)**





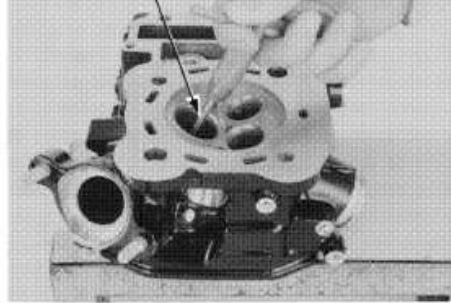
## CYLINDER HEAD/VALVE

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

### TOOLS:

Valve guide reamer, 5.5 mm (IN)	07984 - 2000001
Valve guide reamer, 6.6 mm (EX)	07984 - ZE20001
	or
	07984 - ZE2000D (U.S.A. only)

VALVE GUIDE REAMER



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

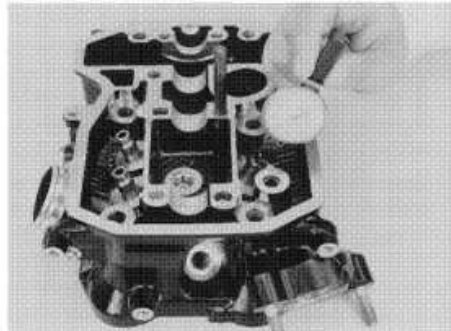
**SERVICE LIMITS:** IN: 5.56 mm (0.219 in)  
EX: 6.65 mm (0.262 in)

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

**SERVICE LIMITS:** IN: 0.10 mm (0.004 in)  
EX: 0.11 mm (0.004 in)

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

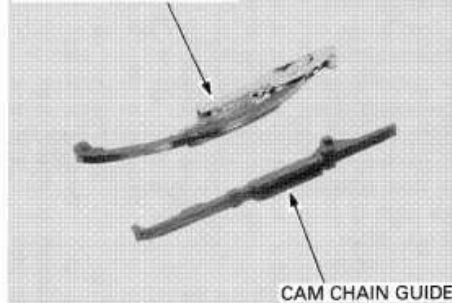
Inspect and reface the valve seats whenever the valve guides are replaced (see next page).



### CAM CHAIN TENSIONER, CAM CHAIN GUIDE

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

CAM CHAIN TENSIONER



## VALVE GUIDE REPLACEMENT

Chill the valve guide in a freezer for about an hour.

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

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

### NOTICE

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

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

### TOOLS:

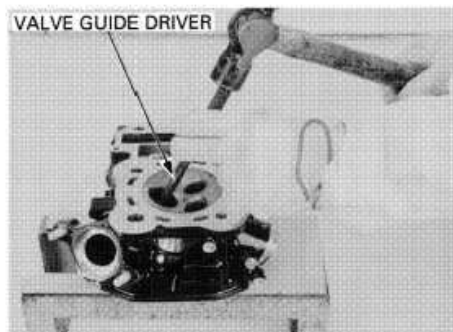
Valve guide driver,  
5.5 mm (IN)  
Valve guide driver,  
6.6 mm (EX)

07742 – 0010100

07742 – 0010200

or

07933 – 3290001  
(U.S.A. only)



*Be careful not to damage the cylinder head.*

Adjust the valve guide driver to the valve guide height.

### TOOL:

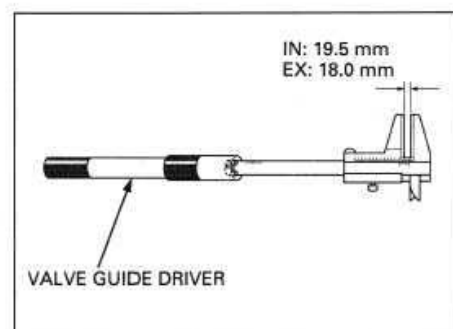
Valve guide driver

07743 – 0020000

Not available in U.S.A.

### VALVE GUIDE PROJECTION

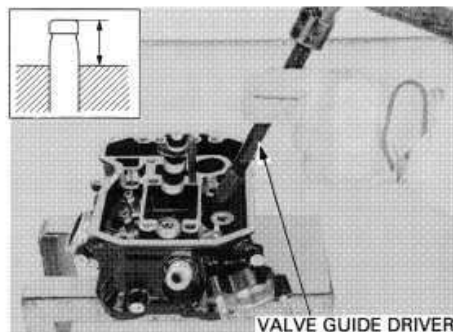
ABOVE CYLINDER HEAD: IN: 19.5 mm (0.77 in)  
EX: 18.0 mm (0.71 in)



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

### U.S.A. only procedure:

- Using a marker, mark the valve guide with a line at the correct height as specified above.
- Chill the guides.
- Drive in the valve guide to the line.
- Check the projection height with calipers to verify they are within specification.



## CYLINDER HEAD/VALVE

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

### TOOLS:

Valve guide reamer, 07984 - 2000001

5.5 mm (IN)

Valve guide reamer, 07984 - ZE20001

6.6 mm (EX)

or

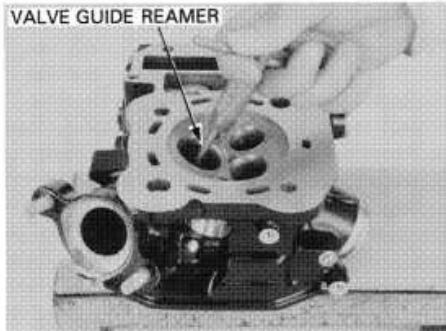
07984 - ZE2000D  
(U.S.A. only)

### NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming. If the valve is installed slanted oil leaks from the stem seal and improper valve seat contact will result and you will not be able to reface the valve seats.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

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

VALVE GUIDE REAMER



## VALVE SEAT INSPECTION/REFACING

### INSPECTION

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

Apply a light coating of Prussian Blue to each valve face.

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

Remove the valve and inspect the valve seat face (see following page).

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

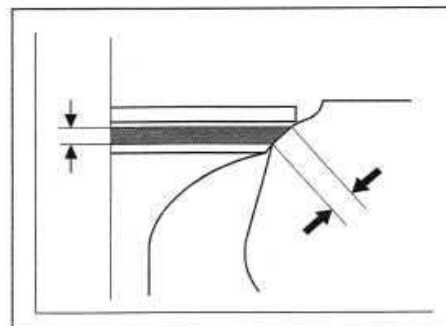
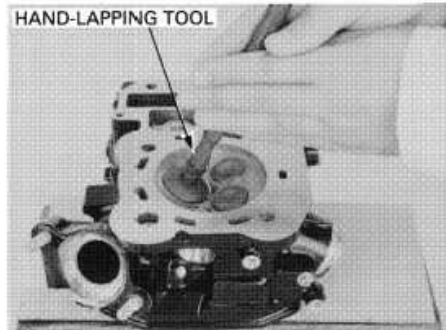
The valve seat contact should be within the specified width and even all around the circumference.

**STANDARDS:** 0.90 - 1.10 mm (0.035 - 0.043 in)

**SERVICE LIMITS:** 1.5 mm (0.06 in)

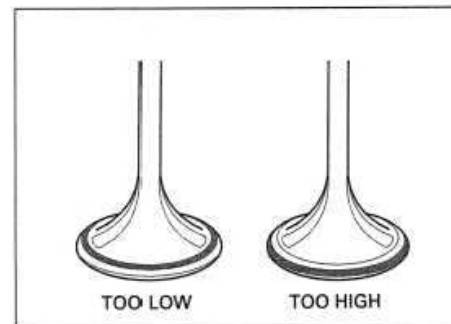
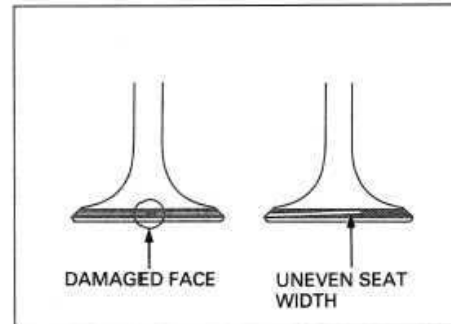
If the valve seat width is not within specification, reface the valve seat (see next page).

HAND-LAPPING TOOL



Inspect the valve seat face for:

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



## REFACING

### NOTE:

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

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

### TOOLS:

Flat cutter, 28 mm (32° IN) 07780 - 0012100  
 Flat cutter, 35 mm (32° EX) 07780 - 0012300

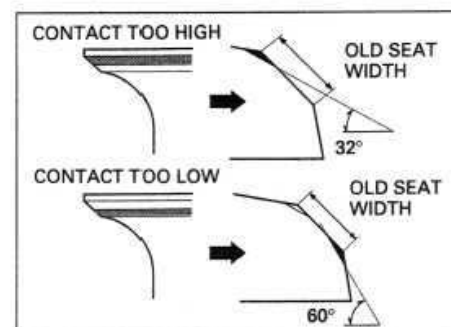
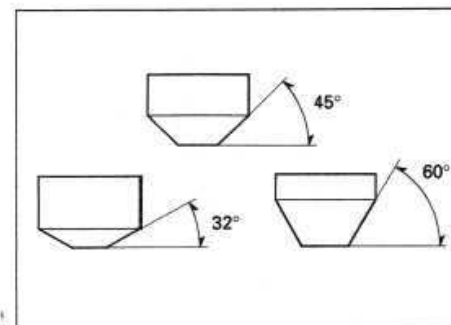
or equivalent commercially available in U.S.A.

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

### TOOLS:

Interior cutter, 30 mm (60° IN) 07780 - 0014000  
 Interior cutter, 37.5 mm (60° EX) 07780 - 0014100

or equivalent commercially available in U.S.A.



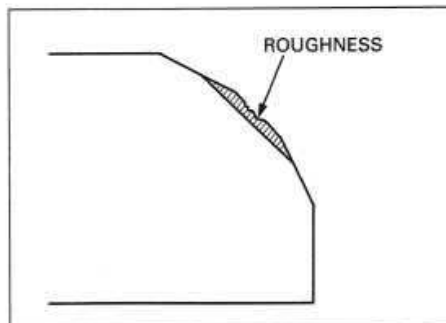
## CYLINDER HEAD/VALVE

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

**TOOLS:**

Seat cutter, 27.5 mm (45° IN) 07780 - 0010200  
Seat cutter, 35 mm (45° EX) 07780 - 0010400

or equivalent commercially available in U.S.A.

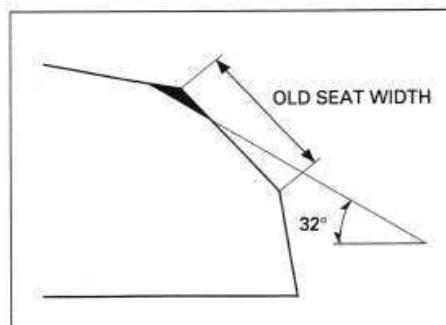


Using a 32° flat cutter, remove 1/4 of the existing valve seat material.

**TOOLS:**

Flat cutter, 28 mm (32° IN) 07780 - 0012100  
Flat cutter, 35 mm (32° EX) 07780 - 0012300

or equivalent commercially available in U.S.A.

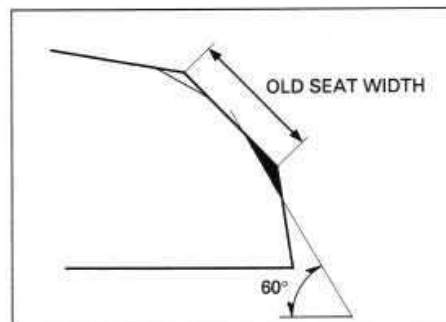


Using a 60° interior cutter, remove 1/4 of the existing valve seat material.

**TOOLS:**

Interior cutter, 30 mm (60° IN) 07780 - 0014000  
Interior cutter, 37.5 mm (60° EX) 07780 - 0014100

or equivalent commercially available in U.S.A.



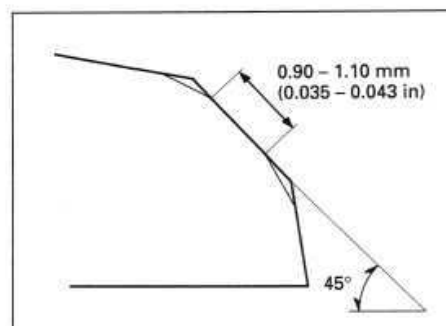
Using a 45° seat cutter, cut the seat to the proper width.

**TOOLS:**

Seat cutter, 27.5 mm (45° IN) 07780 - 0010200  
Seat cutter, 35 mm (45° EX) 07780 - 0010400

or equivalent commercially available in U.S.A.

Make sure all pitting and irregularities are removed.



**NOTE**

- Change the angle of the lapping tool frequently to prevent uneven seat wear.

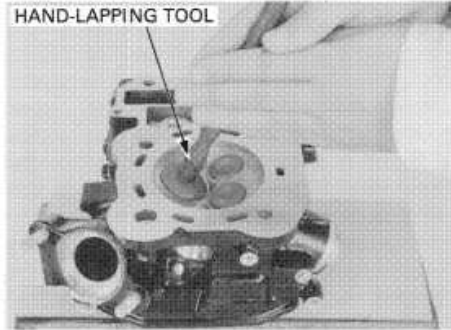
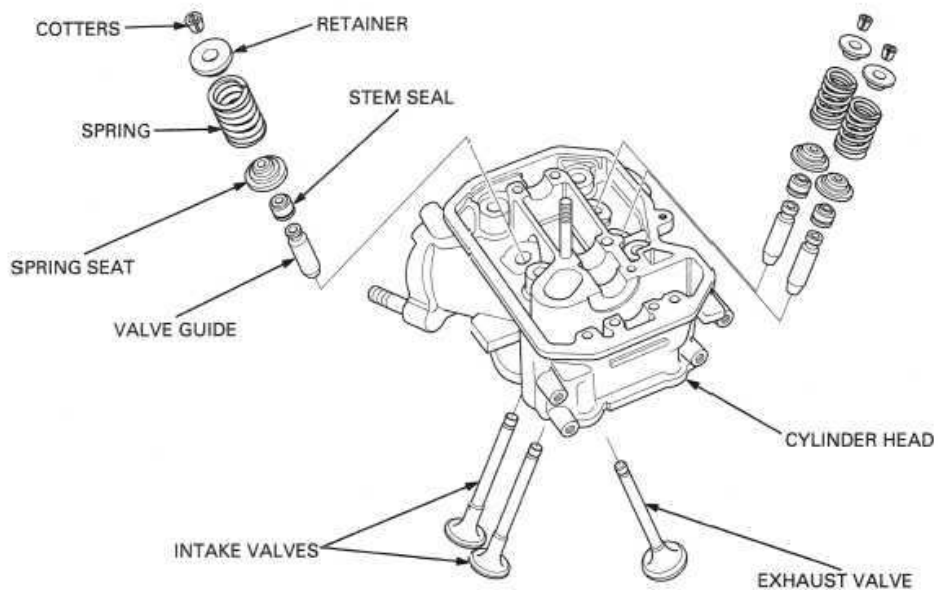
*Lapping compound can cause damage if it enters between the valve stem and guide.*

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

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

Recheck the seat contact after lapping.

HAND-LAPPING TOOL

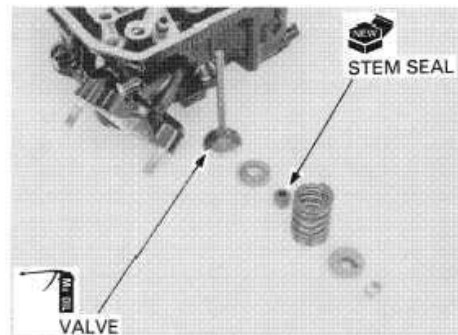
**CYLINDER HEAD ASSEMBLY**

Blow through all oil passage in the cylinder head with compressed air.

Install the spring seats and new stem seals. Lubricate each valve stem with molybdenum oil solution and insert the valves into the valve guides. Insert the valve into the guide while turning it slowly to avoid damaging the stem seal.

**NOTE:**

- Do not interchange the intake and exhaust valves. The exhaust valve is larger than the intake valves.



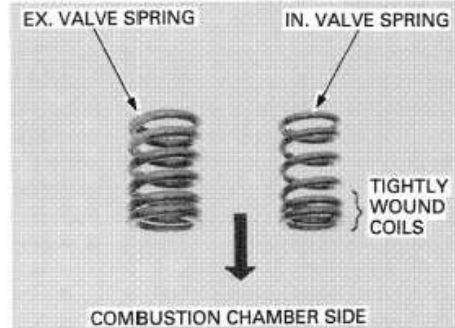
## CYLINDER HEAD/VALVE

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

**NOTE:**

- Do not interchange the intake and exhaust valve springs. The exhaust valve springs are thicker than the intake valve springs.

Install the valve spring retainer.



**NOTE:**

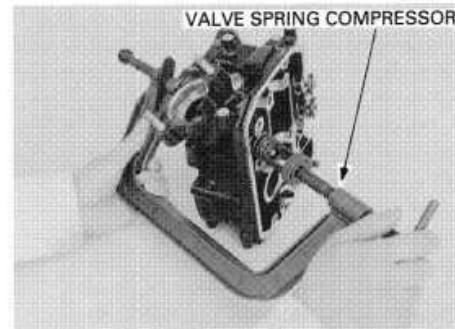
- To ease installation of the cotters, grease them first.

*Compressing the valve spring more than necessary when installing the valve cotters may cause loss of valve spring tension.*

Compress the valve spring with the valve spring compressor and install the valve cotters.

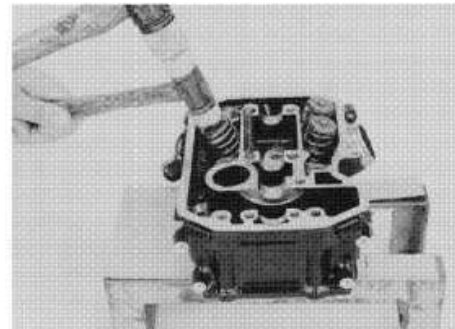
**TOOL:**

Valve spring compressor 07757 - 0010000



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

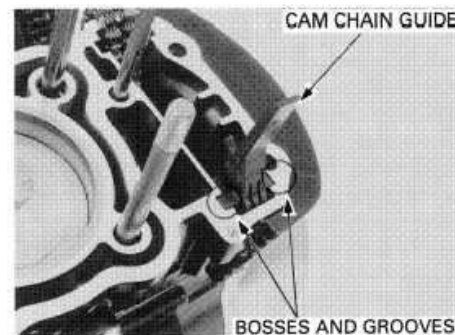
Tap the valve stems gently with a soft hammer to firmly seat the cotters.



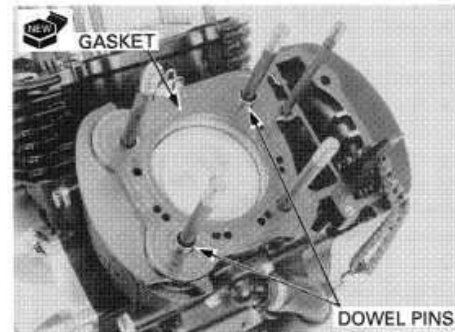
## CYLINDER HEAD INSTALLATION

Clean any gasket material from the cylinder mating surfaces.

Make sure the cam chain guide bosses are in the grooved of the cylinder.



Install the dowel pins and new gasket.



Route the cam chain through the cylinder head and install the cylinder head onto the cylinder. Apply engine oil to the cylinder head 10-mm nuts and 8-mm bolts threads.

Install the following:

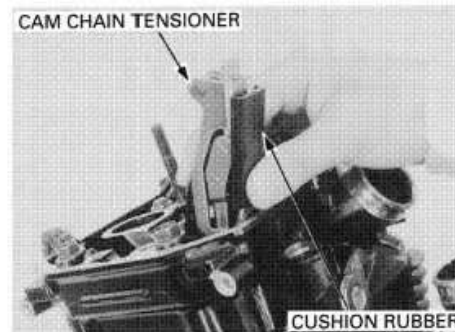
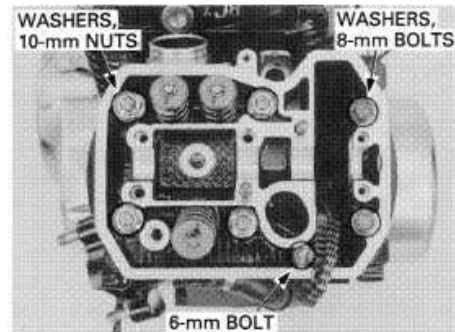
- washers and four 10-mm nuts
- 6-mm bolt
- washers and two 8-mm bolts

Tighten the 6-mm bolt.

Tighten the 8-mm bolts and 10-mm nuts to the criss-cross pattern in several steps.

**TORQUE: 8-mm bolt: 23 N·m (2.3 kgf·m, 17 lbf·ft)**  
**10-mm nut: 47 N·m (4.8 kgf·m, 35 lbf·ft)**

Install the cushion rubber and cam chain tensioner with the tensioner mounting bolts and new sealing washers.



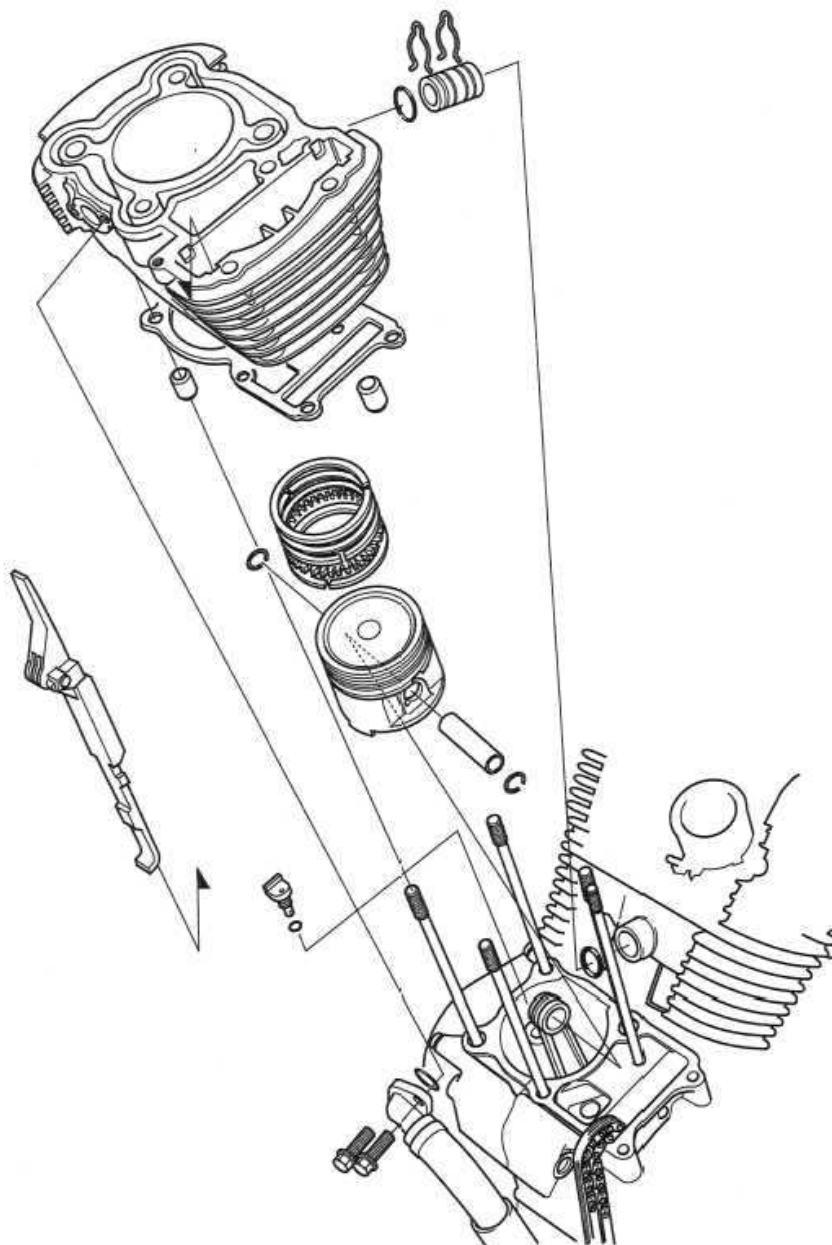
Tighten the mounting bolts to the specified torque.

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

Install the camshaft and camshaft holder (page 10-13).  
Install the engine onto the frame (page 7-7).







# 11. CYLINDER/PISTON

<b>SERVICE INFORMATION</b>	<b>11-1</b>	<b>PISTON RING INSTALLATION</b>	<b>11-7</b>
<b>TROUBLESHOOTING</b>	<b>11-2</b>	<b>PISTON INSTALLATION</b>	<b>11-8</b>
<b>CYLINDER REMOVAL</b>	<b>11-3</b>	<b>CYLINDER INSTALLATION</b>	<b>11-9</b>
<b>PISTON REMOVAL</b>	<b>11-4</b>		

## SERVICE INFORMATION

### GENERAL

- To service the cylinder/piston, the engine must be removed from the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces when removing the cylinder.
- When removing the piston, clean carbon and sludge from the top of the cylinder.
- 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.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out-of-round		————	0.06 (0.002)
	Taper		————	0.06 (0.002)
	Warpage		————	0.10 (0.004)
Piston, piston rings	Piston mark direction		“IN” mark facing toward the intake side	————
	Piston O.D.		78.97 – 78.99 (3.109 – 3.110)	78.90 (3.106)
	Piston O.D. measurement point		7 – 17 (0.3 – 0.7) from bottom of skirt	————
	Piston pin hole I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.05 (0.711)
	Piston pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.98 (0.708)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring-to-ring groove clearance	Top	0.025 – 0.055 (0.0010 – 0.0022)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.07 (0.003)
	Piston ring end gap	Top	0.15 – 0.25 (0.006 – 0.010)	0.30 (0.012)
		Second	0.25 – 0.40 (0.010 – 0.016)	0.50 (0.02)
		Oil (side rail)	0.20 – 0.80 (0.008 – 0.031)	1.0 (0.04)
	Piston ring mark	Top	“R” mark	————
		Second	“RN” mark	————
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			18.016 – 18.034 (0.7093 – 0.7100)	18.07 (0.711)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

11

## **CYLINDER/PISTON**

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### **TROUBLESHOOTING**

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

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

#### **Compression too high, overheating or knocking**

- Excessive carbon built-up on piston or combustion chamber

#### **Excessive smoke**

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

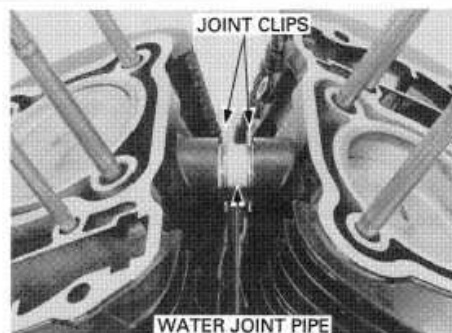
#### **Abnormal noise (piston)**

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

## CYLINDER REMOVAL

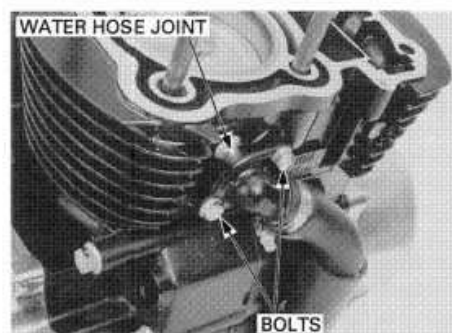
Remove the cylinder head (page 10-19).

Remove the joint clips and disconnect the water joint pipe by sliding it.  
Remove the O-ring.



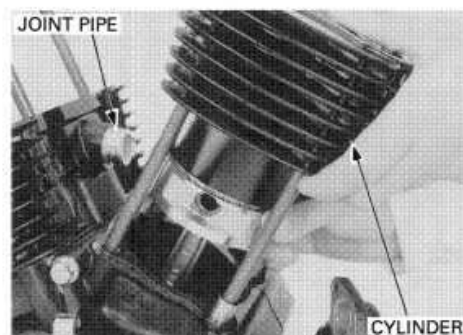
Front cylinder only:

Remove the two bolts and water hose joint.  
Remove the O-ring from the water hose joint.



Remove the cylinder.

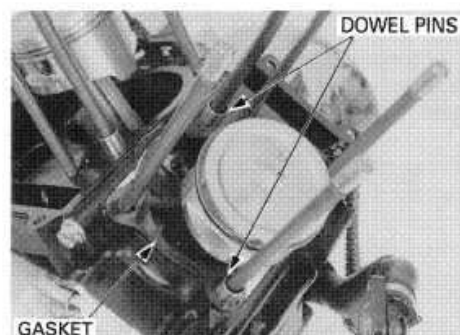
Remove the water joint pipe and O-ring.



Remove the gasket and dowel pins.

*The gasket will come off easier if it is soaked in solvent.*

Clean the top of each cylinder thoroughly to avoid damaging the gasket surfaces.



## CYLINDER/PISTON

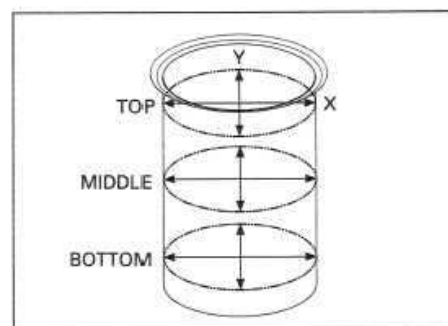
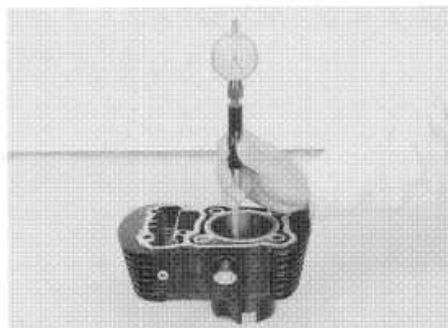
### CYLINDER INSPECTION

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

**SERVICE LIMIT: 79.10 mm (3.114 mm)**

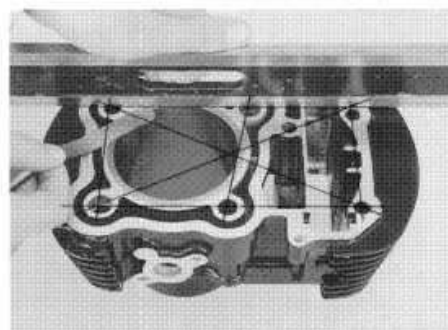
Measure the cylinder for taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.

**SERVICE LIMIT: Taper: 0.06 mm (0.002 in)**  
**Out of round: 0.06 mm (0.002 in)**



Check the cylinder for warpage by placing a straight edge and a feeler gauge across the stud holes as shown.

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

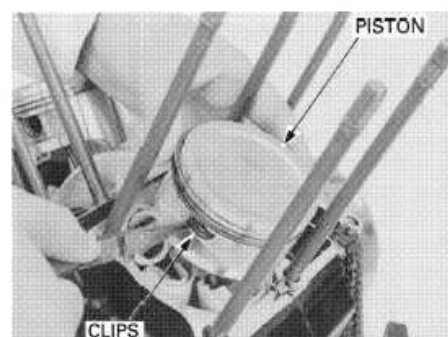


### PISTON REMOVAL

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

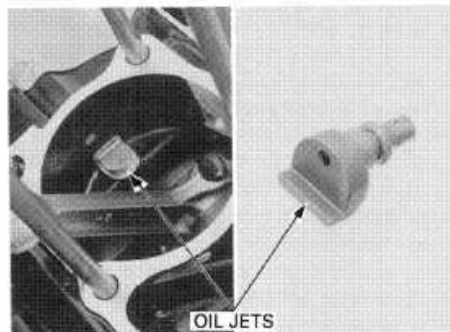
Remove the piston pin clip using a pair of pliers.

Remove the piston pin.  
Remove the piston.



Remove the oil jets and check for clogging.

Remove the O-rings from the oil jets.



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

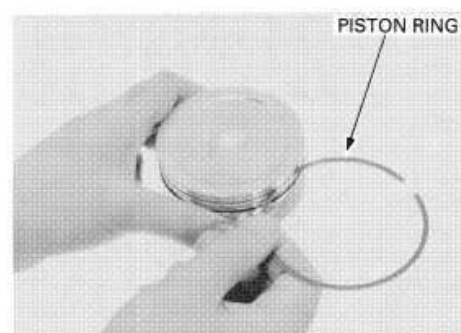
*Do not damage the piston ring by spreading the end too far.*

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



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

Clean carbon deposits from the piston ring grooves.



## PISTON/PISTON RING INSPECTION

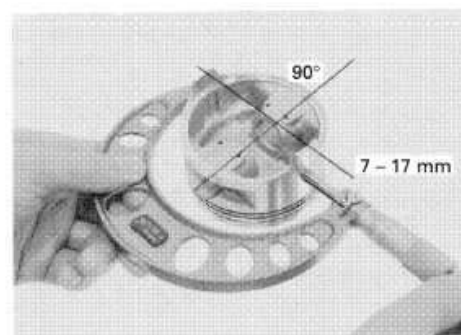
Inspect the piston for abnormal wear or damage.

Measure the diameter of the piston at 7 – 17 mm (0.3 – 0.7 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT: 78.90 mm (3.106 in)**

Calculate the cylinder-to-piston clearance (cylinder I.D.: see previous page).

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



## CYLINDER/PISTON

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

**SERVICE LIMIT: 18.05 mm (0.711 in)**

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

**SERVICE LIMIT: 17.98 mm (0.708 in)**

Calculate the piston-to-piston pin clearance by subtracting the piston pin O.D. from the piston pin hole I.D.

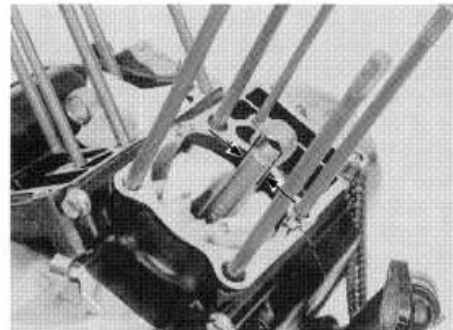
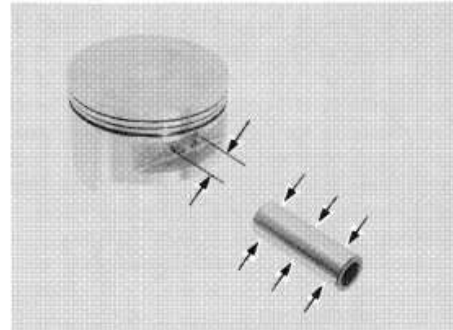
**SERVICE LIMIT: 0.04 mm (0.002 in)**

Measure and record the connecting rod small end I.D.

**SERVICE LIMIT: 18.07 mm (0.711 in)**

Calculate the connecting rod-to-piston pin clearance by subtracting the piston pin O.D. from the small end I.D.

**SERVICE LIMIT: 0.06 mm (0.002 in)**



Temporarily install the piston rings to their proper position with the mark facing up.

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

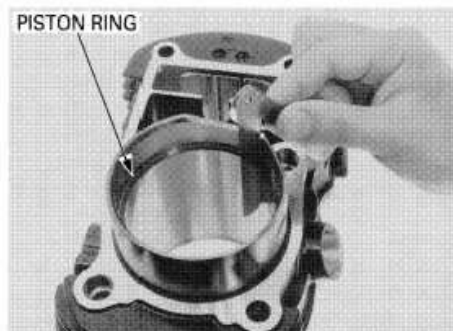
**SERVICE LIMITS: Top: 0.08 mm (0.003 in)**  
**Second: 0.07 mm (0.003 in)**



Insert the piston ring into the bottom of the cylinder squarely using the piston.

Measure the end gap using a feeler gauge.

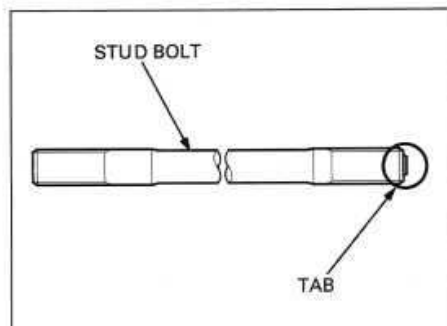
**SERVICE LIMITS: TOP: 0.30 mm (0.012 in)**  
**Second: 0.50 mm (0.02 in)**  
**Oil (side rail): 1.0 mm (0.04 in)**



**CYLINDER STUD BOLT REPLACEMENT**

If it is necessary to replace the cylinder stud bolts, remove the stud bolts from the crankcase.

Apply engine oil to the stud bolt threads.  
Install the stud bolts with the tab side facing the cylinder head side.



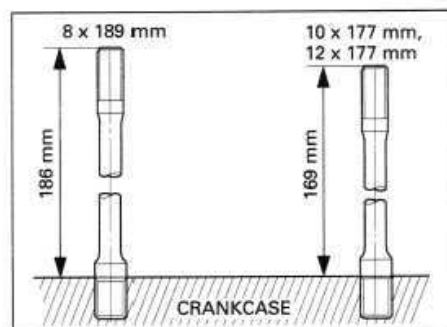
After installing, be sure to measure the distance from the top of each stud bolt to the crankcase surface as shown.

**STANDARD LENGTH:**

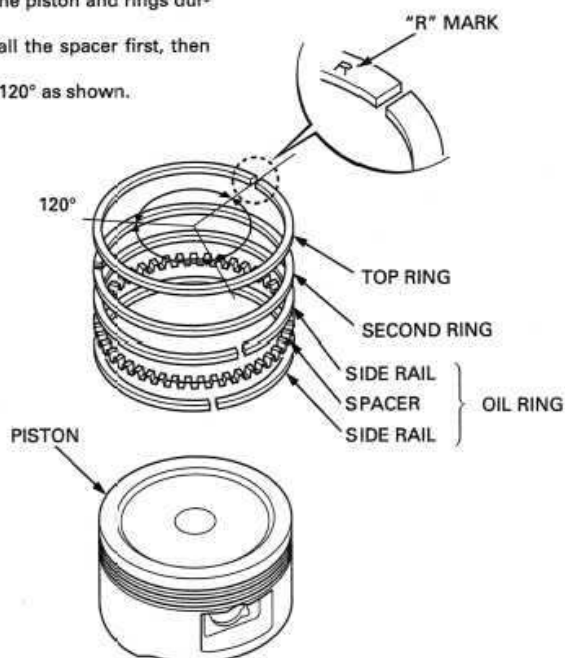
8 x 189 mm: 186 mm (7.3 in)

10 x 177 mm: 169 mm (6.6 in)

12 x 177 mm: 169 mm (6.6 in)

**PISTON RING INSTALLATION****NOTE:**

- Do not confuse the top and second rings: The top ring indicates the "R" mark and second ring indicates the "RN" mark.
- Be careful not to damage the piston and rings during assembly.
- To install the oil ring, install the spacer first, then install the side rails.
- Stagger the ring end gaps 120° as shown.



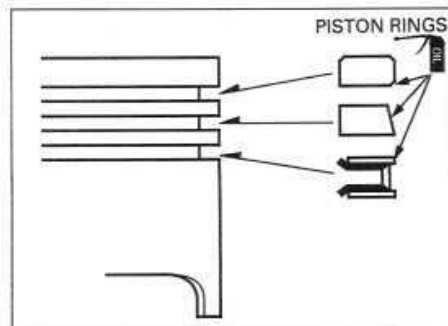


## CYLINDER/PISTON

Clean the piston heads, ring lands and skirts.

Apply engine oil to the piston rings outer surfaces.  
Carefully install the piston rings onto the piston with the markings facing up.

After installing the rings, check that they rotate freely without sticking.



## PISTON INSTALLATION

Coat the new O-rings with engine oil and install them onto the oil jets.

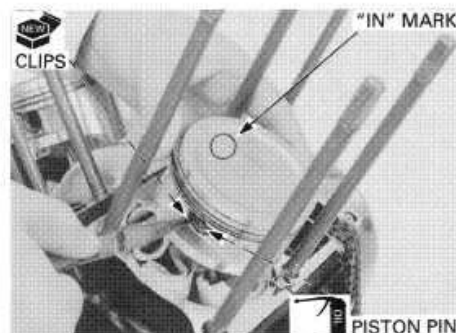
Install the oil jets into the crankcase properly with the jet hole facing toward the connecting rod side.



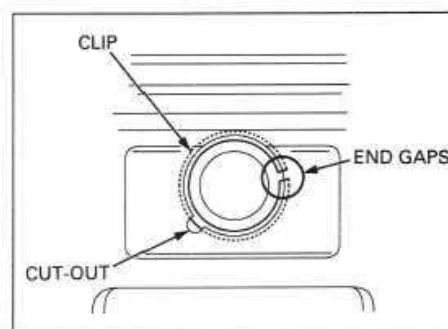
Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Apply engine oil to the piston pin outer surface.  
Set the piston over the connecting rod with the "IN" mark facing towards the intake side and install the piston pin through the piston and connecting rod.

Install the new piston pin clips.



Make sure the piston pin clips are seated properly and their end gaps are not aligned with the cut-outs in the position.

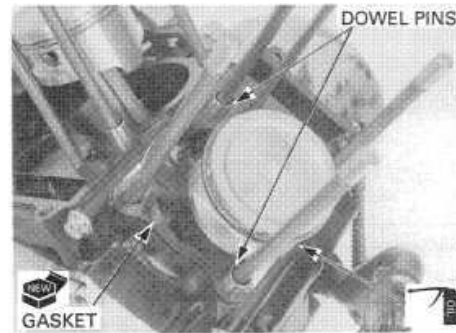


## CYLINDER INSTALLATION

Clean the gasket surface of the crankcase thoroughly, being careful not to damage it, and careful not to allow gasket material into the crankcase.

Install the new gasket and dowel pins.

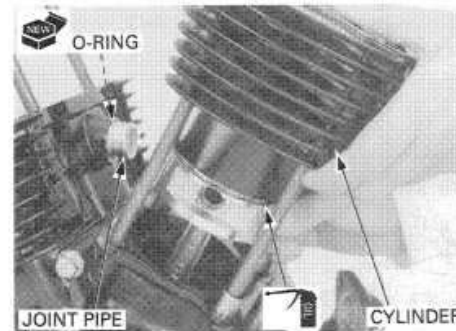
Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.



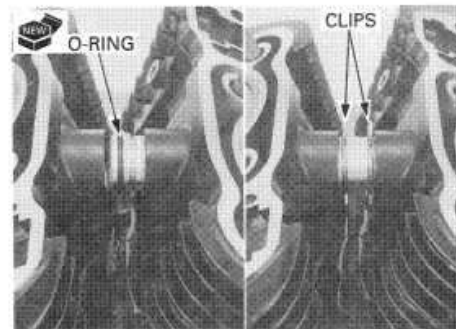
Before installing the cylinder, coat new O-rings with coolant and install them into the end grooves in the water joint pipe and install the joint pipe into the cylinder.

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

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



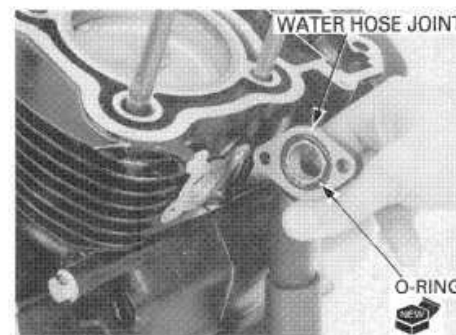
Slide the water joint pipe in position and connect the cylinders.  
Install the joint clips in the joint grooves.

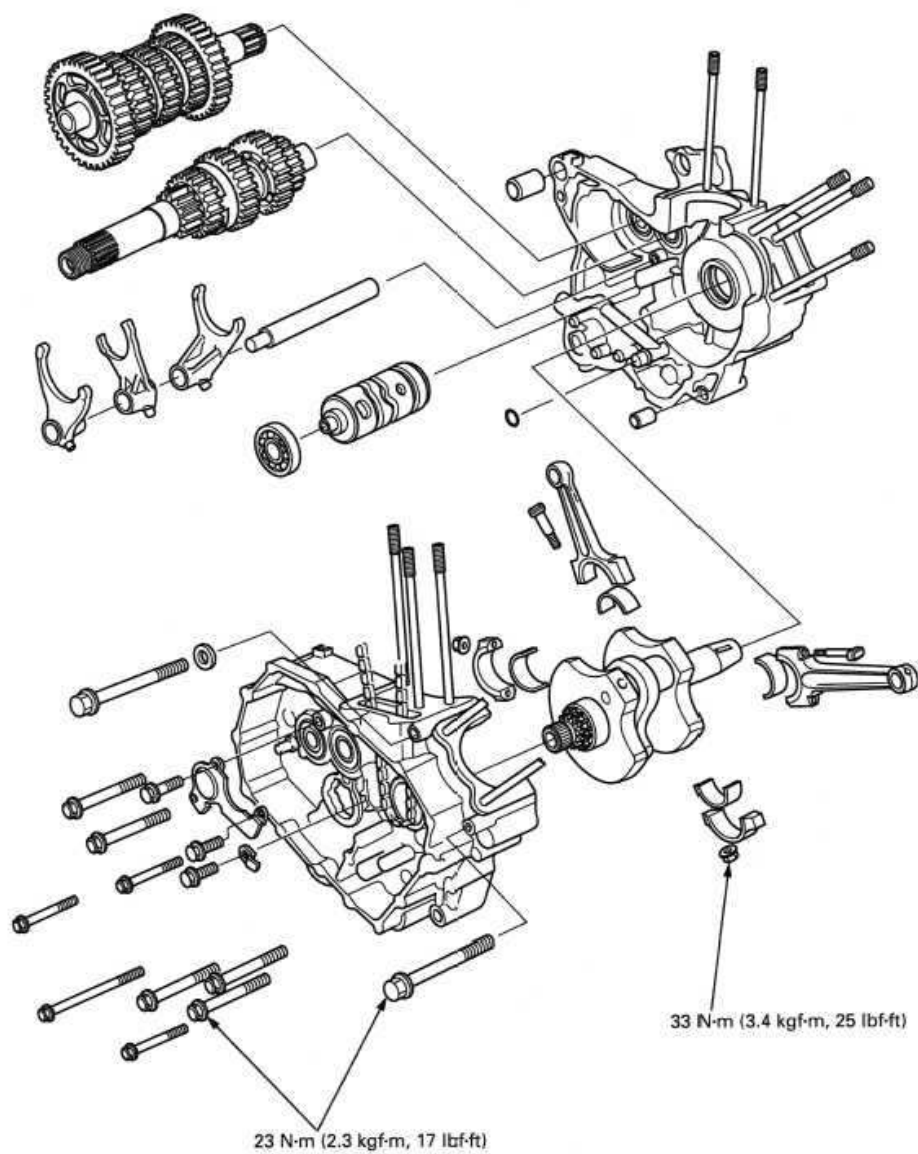


Coat a new O-ring with coolant and install it in the water hose joint groove.

Install the water hose joint with bolts onto the front cylinder and tighten the water hose joint bolts.

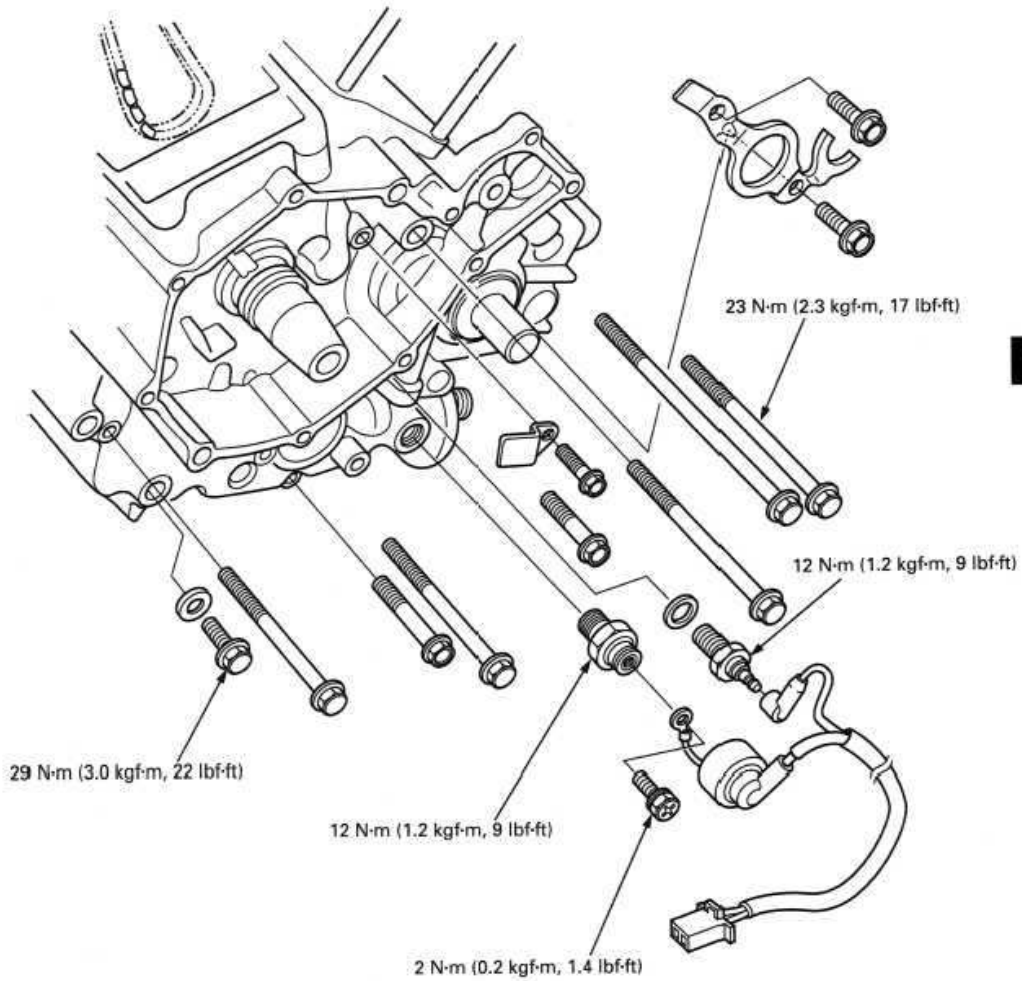
Install the cylinder head (page 10-28).





# 12. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	12-2	TRANSMISSION	12-12
TROUBLESHOOTING	12-3	CRANKCASE BEARING REPLACEMENT	12-18
CRANKCASE SEPARATION	12-4	CRANKCASE ASSEMBLY	12-20
CRANKSHAFT/CONNECTING ROD	12-6		



12

## CRANKSHAFT/TRANSMISSION

### SERVICE INFORMATION

#### GENERAL

- The crankcase halves must be separated to service the connecting rod, crankshaft, transmission (including the shift fork and shift drum) and oil pump (section 4). To service these parts, the engine must be removed from the frame (section 9).
- The following parts must be removed before disassembling the crankcase.
  - Engine oil filter (page 3-10)
  - Water pump (section 6)
  - Ignition pulse generator and primary drive gear (section 8)
  - Clutch and gearshift linkage (section 8)
  - Alternator (section 9)
  - Flywheel/starter clutch and starter reduction gear, idle gear (section 9)
  - Cylinder head (section 10)
  - Cylinder/piston (section 11)
  - Starter motor (section 18)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Mark and store the connecting rod and bearings to be sure of their correct locations. If the bearings are improperly installed they will block the oil holes, causing insufficient lubrication and eventual engine seizure.
- Be careful not to damage the main journal bearing inserts during crankshaft removal and installation.
- Connecting rod bearing inserts are select fitted and are identified by color code. Select replacement bearings from the code table. Check the oil clearance using a plastigauge after replacing bearing inserts.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

#### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		—	0.03 (0.001)
	Crankpin oil clearance		0.028 – 0.052 (0.0011 – 0.0020)	0.07 (0.003)
	Main journal oil clearance		0.030 – 0.046 (0.0012 – 0.0018)	0.07 (0.003)
Transmission	Gear I.D.	M3, M5	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1, C2, C4	31.000 – 31.025 (1.2204 – 1.2215)	31.05 (1.222)
	Bushing O.D.	M3, M5	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C1, C2, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Bushing I.D.	M3	25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
		C2	27.995 – 28.016 (1.1021 – 1.1030)	28.04 (1.104)
	Gear-to-bushing clearance	M3, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C1, C2, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D. at M3 bushing		24.972 – 24.993 (0.9831 – 0.9840)	24.95 (0.982)
	Countershaft O.D. at C2 bushing		27.967 – 27.980 (1.1011 – 1.1016)	27.95 (1.100)
Shift fork I.D.	Shift fork claw thickness	Shift fork shaft O.D.	Shift drum O.D. (at left side journal)	
				Shift drum O.D. (at left side journal)
Shift fork I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.04 (0.513)	
Shift fork claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.6 (0.22)	
Shift fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)	
Shift drum O.D. (at left side journal)		11.966 – 11.984 (0.4711 – 0.4718)	11.94 (0.470)	

**TORQUE VALUES**

Crankcase 8-mm bolt	23 N-m (2.3 kgf-m, 17 lbf-ft)	
Connecting rod bearing cap nut	33 N-m (3.4 kgf-m, 25 lbf-ft)	Apply oil to the threads and seating surface.
Drive chain guide plate bolt	10 N-m (1.0 kgf-m, 7 lbf-ft)	
Neutral switch	12 N-m (1.2 kgf-m, 9 lbf-ft)	
Oil pressure switch	12 N-m (1.2 kgf-m, 9 lbf-ft)	Apply sealant to the threads.
Oil pressure switch wire terminal screw	2 N-m (0.2 kgf-m, 1.4 lbf-ft)	
Oil filter cartridge	10 N-m (1.0 kgf-m, 7 lbf-ft)	Apply oil to the threads and seating surface.

**TOOLS:**

Attachment, 42 x 47 mm	07746 - 0020300	
Attachment, 52 x 55 mm	07746 - 0010400	
Pilot, 20 mm	07746 - 0040500	
Pilot, 25 mm	07746 - 0040600	
Pilot, 28 mm	07746 - 0041100	
Driver	07749 - 0010000	
Bearing remover set	07936 - 3710001	Not available in U.S.A.
— remover weight	07741 - 0010201	or 07936 - 371020A (U.S.A. only) or 07936 - 3710200
— remover handle	07936 - 3710100	
— remover head	07936 - 3710600	

**TROUBLESHOOTING**
**Excessive noise**

- Worn crankshaft main journal bearings
- Worn connecting rod bearings
- Worn connecting rod small end
- Worn, seized or chipped transmission gear
- Worn or damaged transmission bearing

**Hard to shift**

- Bent shift fork
- Bent shift fork shaft
- Damaged shift drum guide groove
- Damaged shift fork guide pin

**Transmission jumps out of gear**

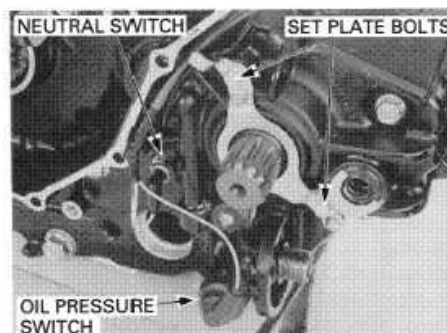
- Worn gear dogs or slots
- Worn shift drum guide groove
- Worn shift fork guide pin
- Worn shift fork groove in gear

## CRANKCASE SEPARATION

Refer to Service Information (page 12-2) for removal of necessary parts before disassembling the crankcase.

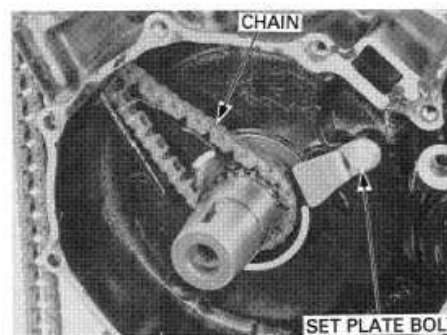
Disconnect the neutral switch connector and remove the neutral switch and washer.  
Remove the switch cover and disconnect the oil pressure switch wire by removing the terminal screw.  
Remove the oil pressure switch.

Remove the bolts and countershaft bearing oil seal set plate.



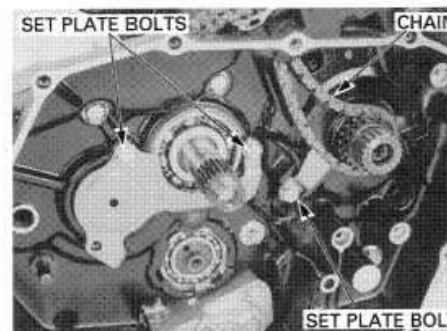
Remove the bolt and front cam chain tensioner set plate.

Remove the front cam chain from the crankshaft.

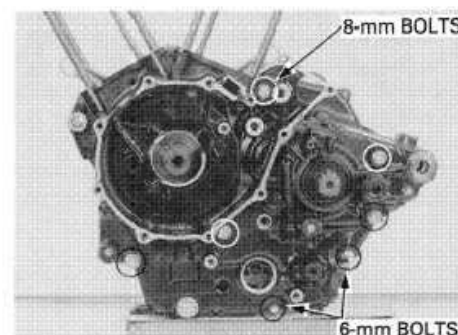


Remove the bolts and transmission bearing set plate.  
Remove the bolt and rear cam chain tensioner set plate.

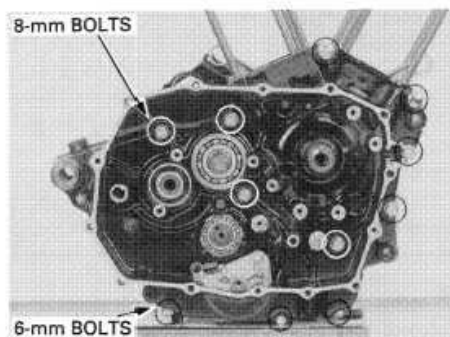
Remove the rear cam chain from the crankshaft.



Loosen the two 6-mm bolts and five 8-mm bolts and remove them from the left crankcase.

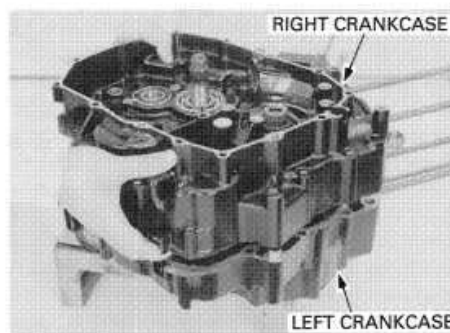


Loosen the three 6-mm bolts and eight 8-mm bolts and remove them with a washer from the right crankcase.



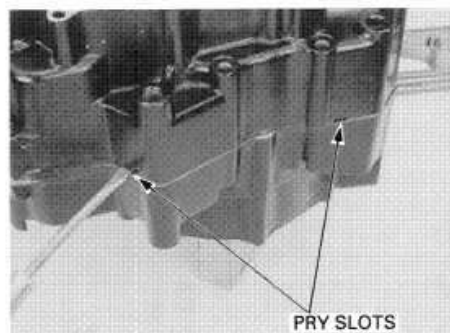
Place the crankcase assembly with the left side down.

Carefully separate the right crankcase from the left crankcase.

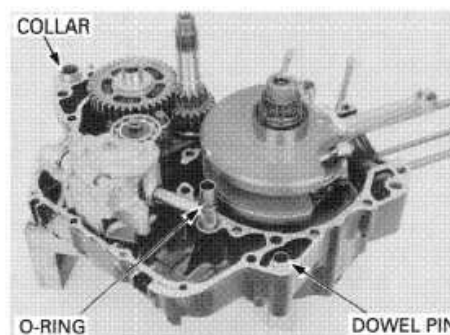


**NOTE:**

- Use the pry slots at the front and rear of the crankcase if necessary.



Remove the dowel pin and collar.  
Remove the O-ring from the oil pipe.





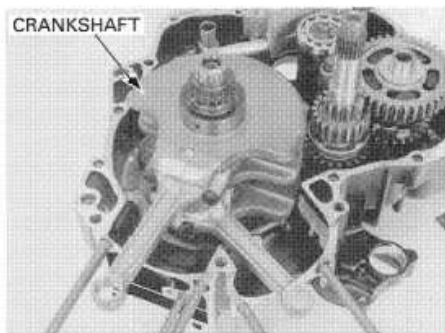
## CRANKSHAFT/CONNECTING ROD

### CRANKSHAFT REMOVAL

Separate the crankcase (page 12-4).

*During crankshaft and connecting rod service, be careful not to damage the main journal or connecting rod bearing inserts.*

Remove the crankshaft from the left crankcase.



### CONNECTING ROD REMOVAL

Before removing the connecting rods, check the big end side clearance.

Measure the clearance by inserting a feeler gauge between the crankshaft and connecting rod big end.

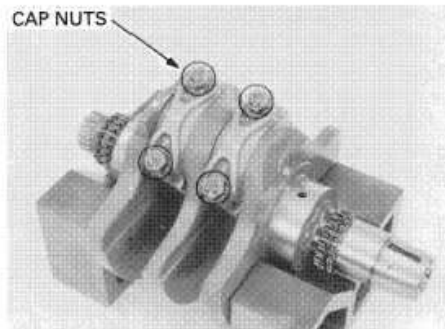
**SERVICE LIMIT: 0.30 mm (0.012 in)**



Remove the connecting rod bearing cap nuts and bearing caps.

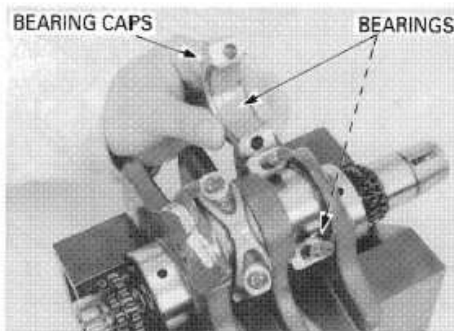
**NOTE:**

- Tap the side of the cap lightly if the bearing cap is hard to remove.



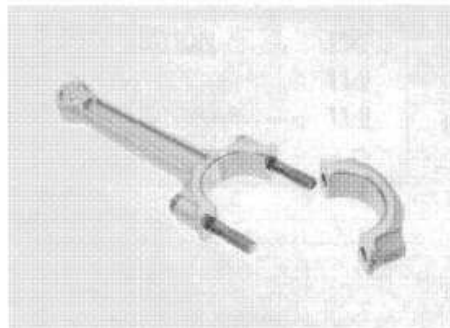
Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

For the connecting rod small end inspection, see page 11-6.



### CONNECTING ROD BEARING INSPECTION

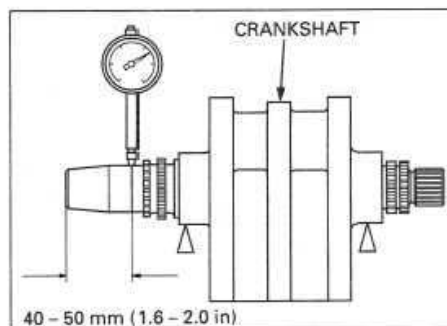
Inspect the bearing inserts for unusual wear, damage or peeling and replace if necessary.



### CRANKSHAFT RUNOUT

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

**SERVICE LIMIT: 0.03 mm (0.001 in)**

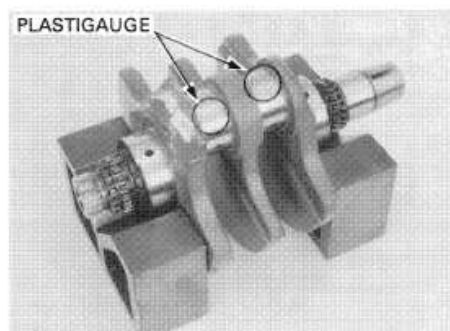


### CRANKPIN OIL CLEARANCE

Clean off any oil from the bearing inserts and crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

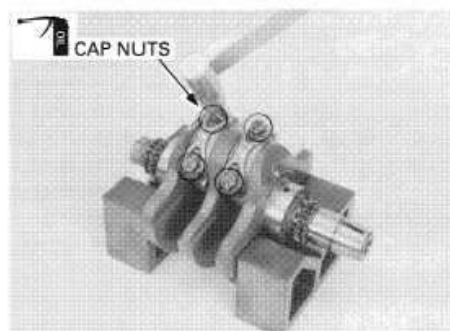
Carefully install the connecting rods and bearing caps on the correct crankpins.



*Do not rotate the crankshaft during inspection.*

Apply engine oil to the threads and seating surfaces of the bearing cap nuts. Install the nuts and tighten them evenly.

**TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)**

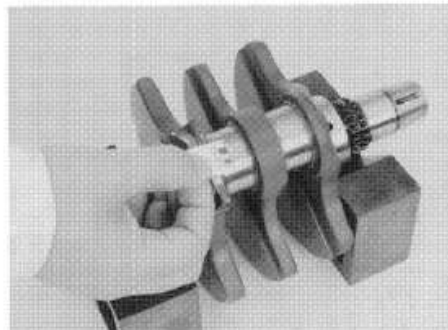


## CRANKSHAFT/TRANSMISSION

Remove the bearing caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**

If the clearance exceeds the service limit, select the correct replacement bearings as follows.

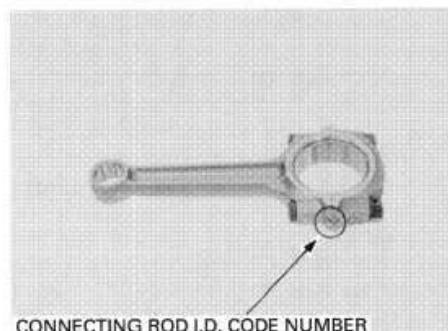


### CONNECTING ROD BEARING SELECTION

Record the connecting rod I.D. code number.

**NOTE:**

- Number 1 or 2 on the connecting rod is the code for the connecting rod I.D.



CONNECTING ROD I.D. CODE NUMBER

Record the crankpin O.D. code letter.

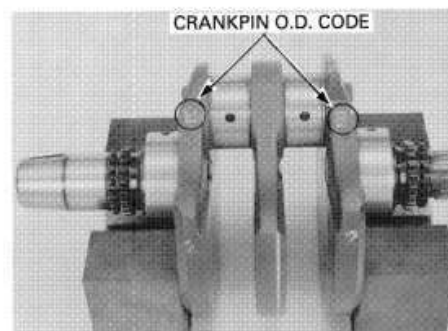
**NOTE:**

- Letters A or B on each crank weight is the code for the crankpin O.D.

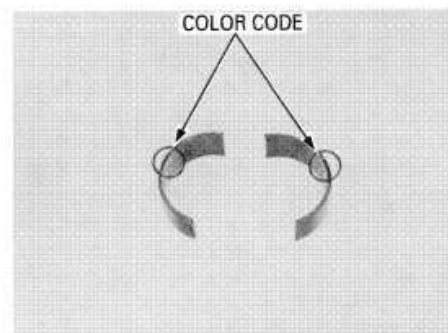
Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

Connecting rod I.D. code	1	2
Crankpin O.D. code	43.000 – 43.007 (1.6929 – 1.6932)	43.008 – 43.016 (1.6932 – 1.6935)
A 39.982 – 39.990 (1.5741 – 1.5744)	Brown	Black
B 39.974 – 39.982 (1.5738 – 1.5741)	Black	Blue

**CRANKPIN BEARING INSERT THICKNESS:**  
Blue: 1.495 – 1.499 mm (0.0589 – 0.0590 in)  
Black: 1.491 – 1.495 mm (0.0587 – 0.0598 in)  
Brown: 1.487 – 1.491 mm (0.0585 – 0.0587 in)



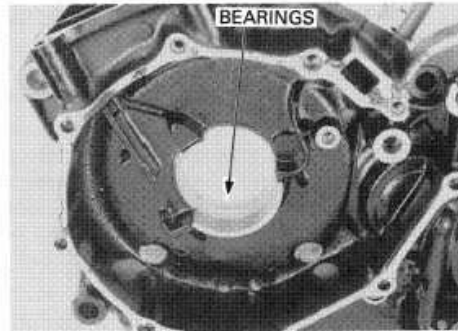
CRANKPIN O.D. CODE



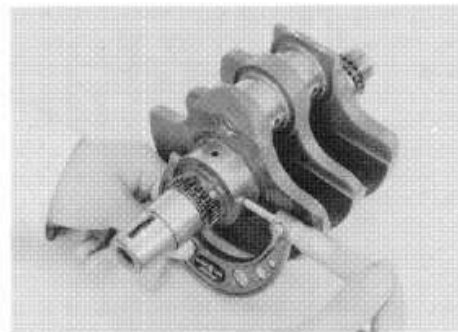
COLOR CODE

### MAIN BEARING INSPECTION

Clean off any oil from the bearings and the crankshaft journals.



Measure and record the crankshaft main journal O.D.



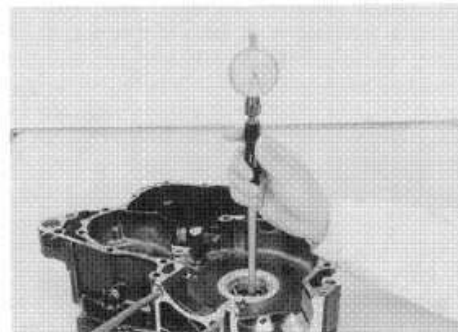
*Be careful not to damage the inside of the bearing while measuring it.*

Measure and record the main bearing I.D. in the crankcase.

Calculate the clearance between the main journal and main bearing.

**SERVICE LIMIT: 0.07 mm (0.003 in)**

If the oil clearance exceeds the service limit, replace the crankcase.



## CRANKSHAFT/TRANSMISSION

### CONNECTING ROD/CRANK SHAFT SELECTION

An alphabetical weight code is stamped on the connecting rod.

If a connecting rod requires replacement, you should select a rod with the same weight code as the original.

But if that is unavailable, you may use one of the others specified in the following chart.

The "O" mark in the table indicates that matching is possible in the crossed codes.

Front connecting rod weight code	A	B	C
Rear connecting rod weight code			
A	*	O	O
B	O	O	O
C	O	O	**

For selecting crankshaft weight.

- select "L" crankshaft weight, if the front rod and rear rod have code A (\*).
- select "R" crankshaft weight, if the front rod and rear rod have code C (\*\*).
- select crankshaft weight with no code, other than the above two cases.

### CRANKSHAFT/CRANKCASE SELECTION

Crankshaft and crankcase are select fitted.

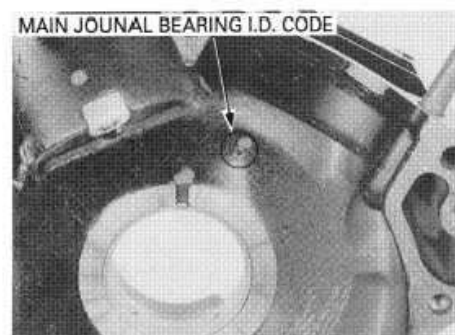
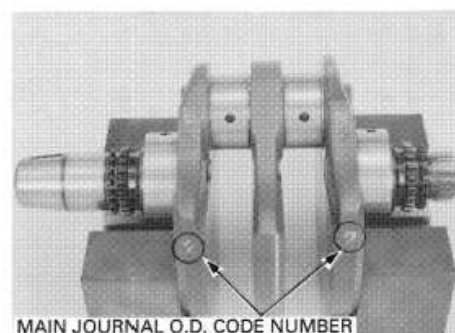
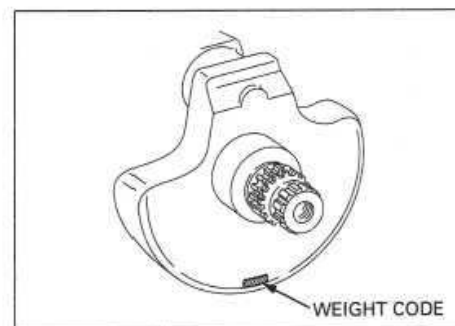
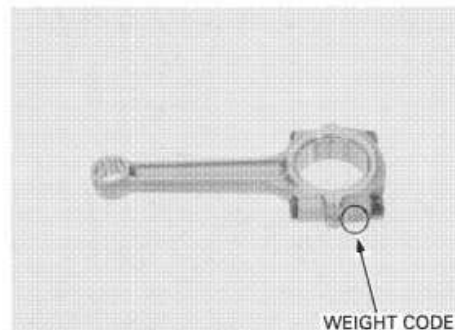
Record the main journal O.D. code number 1 or 2.

Record the main journal bearing I.D. code A or B.

If the crankshaft and/or crankcase are replaced, select them with the following fitting table.

The "O" mark in the table indicates that mating is possible in the crossed code.

Main journal O.D. code	1	2
Main journal bearing I.D. code		
A	O	
B		O

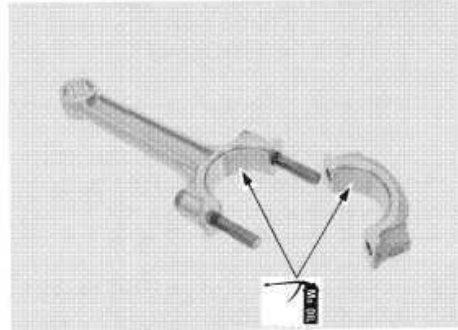


### CONNECTING ROD INSTALLATION

Wipe any oil off of the connecting rod, cap and bearing inserts.

Install the bearing inserts on the connecting rods and caps by aligning the tab with the groove.

Apply molybdenum oil solution to the thrust surface of the bearings.



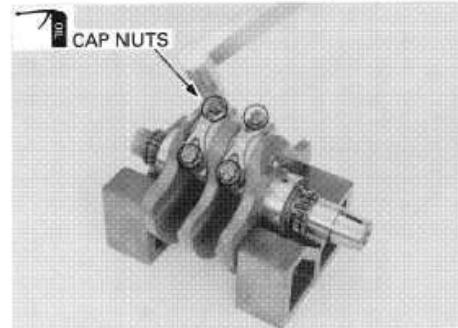
Install the rods and caps on the crankshaft by aligning the I.D. code on the rod and cap. Be sure each part is installed in its original position, as noted during removal.

Apply engine oil to the threads and seating surfaces of the bearing cap nuts.

Install the nuts and tighten them in several steps.

**TORQUE: 33 N-m (3.4 kgf-m, 25 lbf-ft)**

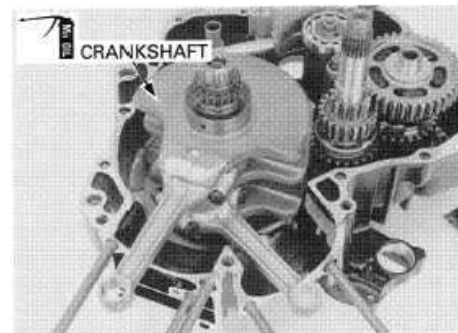
After tightening the nuts, check that the connecting rods move freely without binding.



### CRANKSHAFT INSTALLATION

Apply molybdenum oil solution to the main bearing inserts and install the crankshaft into the left crankcase.

Assemble the crankcase (page 12-20).

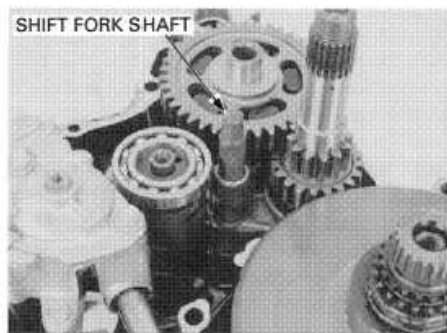


## **TRANSMISSION**

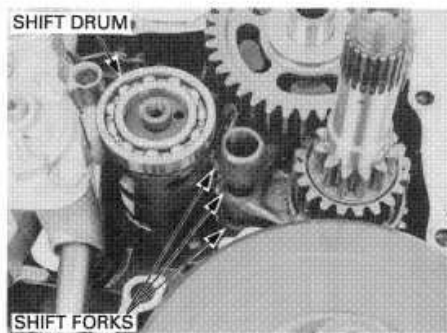
### **REMOVAL**

Separate the crankcase (page 12-4).

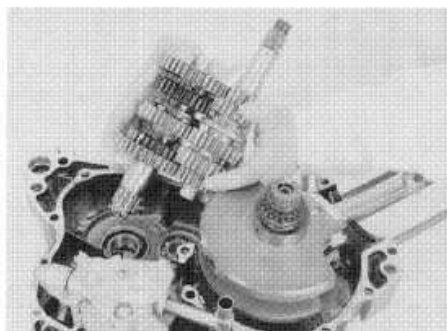
Pull the shift fork shaft and remove it from the shift forks.



Remove the shift drum and shift forks.

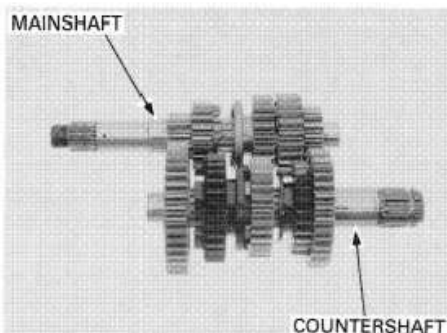


Remove the mainshaft and countershaft from the left crankcase as assembly.



### **DISASSEMBLY**

Disassemble the mainshaft and countershaft.

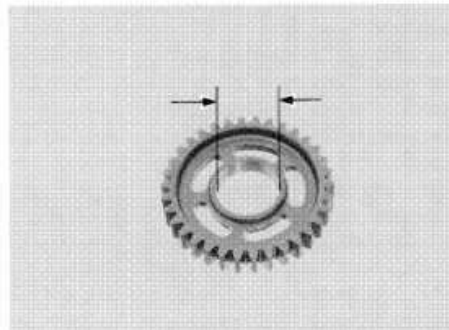


**INSPECTION**
**GEARS**

Check the gear dogs, dog holes and teeth for damage or excessive wear.  
Measure the I.D. of each gear.

**SERVICE LIMITS:**

M3, M5 gears: 28.04 mm (1.104 in)  
C1, C2, C4 gears: 31.05 mm (1.222 in)


**BUSHING**

Check the bushing for wear or damage.  
Measure the O.D. of each bushing.

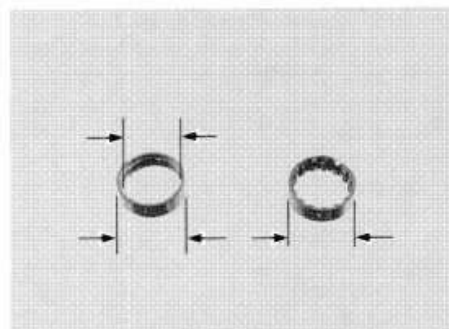
**SERVICE LIMITS:**

M3, M5 gear bushing: 27.94 mm (1.100 in)  
C1, C2, C4 gear bushing: 30.93 mm (1.218 in)

Measure the I.D. of each bushing.

**SERVICE LIMITS:**

M3 gear bushing: 25.04 mm (0.986 in)  
C2 gear bushing: 28.04 mm (1.104 in)


**MAINSHAFT/COUNTERSHAFT**

Check the spline grooves and sliding surfaces for abnormal wear or damage.  
Measure the O.D. of the mainshaft and countershaft at the gear bushing sliding areas.

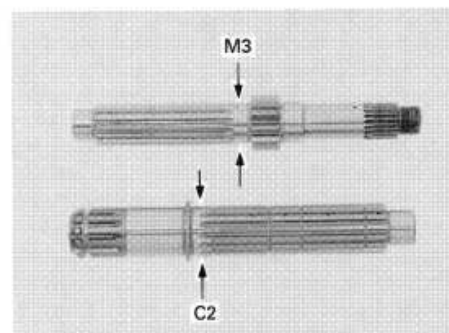
**SERVICE LIMITS:**

Mainshaft at M3 gear bushing: 24.95 mm (0.982 in)  
Countershaft at C2 gear bushing: 27.95 mm (1.100 in)

Calculate the gear-to-bushing and bushing-to-shaft clearance.

**SERVICE LIMITS:**

Gear-to-bushing (M3, M5): 0.10 mm (0.004 in)  
(C1, C2, C4): 0.10 mm (0.004 in)  
Bushing-to-shaft (M3): 0.08 mm (0.003 in)  
(C2): 0.08 mm (0.003 in)





## CRANKSHAFT/TRANSMISSION

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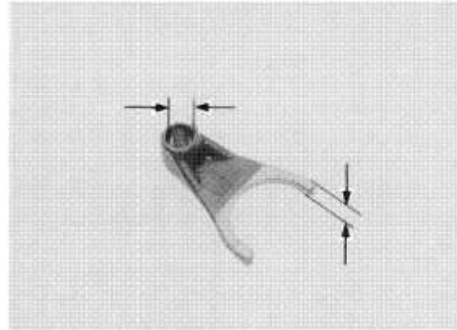
### SHIFT FORK

Check for deformation or abnormal wear.  
Measure the shift fork claw thickness.

**SERVICE LIMIT: 5.6 mm (0.22 in)**

Measure the shift fork I.D.

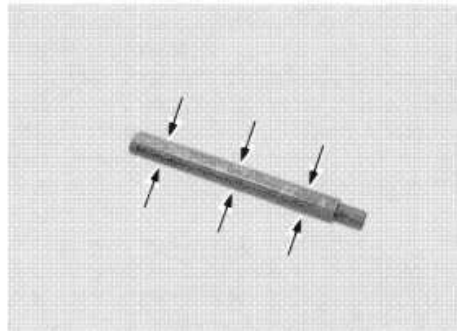
**SERVICE LIMIT: 13.04 mm (0.513 in)**



### SHIFT FORK SHAFT

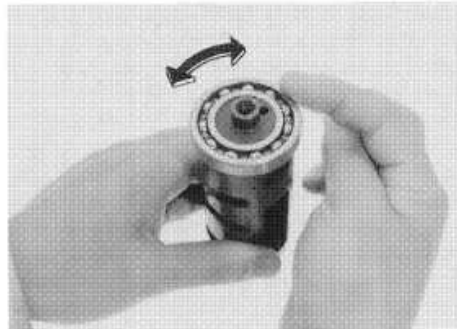
Check for bends, abnormal wear or damage.  
Measure the shift fork shaft O.D.

**SERVICE LIMIT: 12.90 mm (0.508 in)**



### SHIFT DRUM

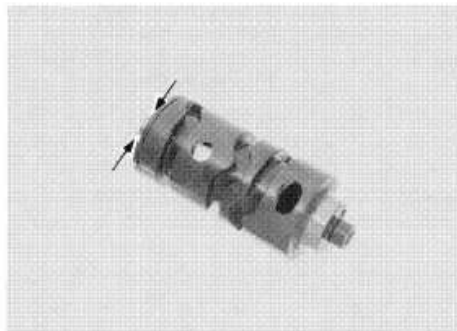
Check the shift drum bearing for excessive play or damage.  
Turn the outer race of the bearing with your finger.  
The bearing should turn smoothly and quietly.



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

Measure the shift drum O.D. at the left end.

**SERVICE LIMIT: 11.94 mm (0.470 in)**



#### SHIFT DRUM, 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 ASSEMBLY

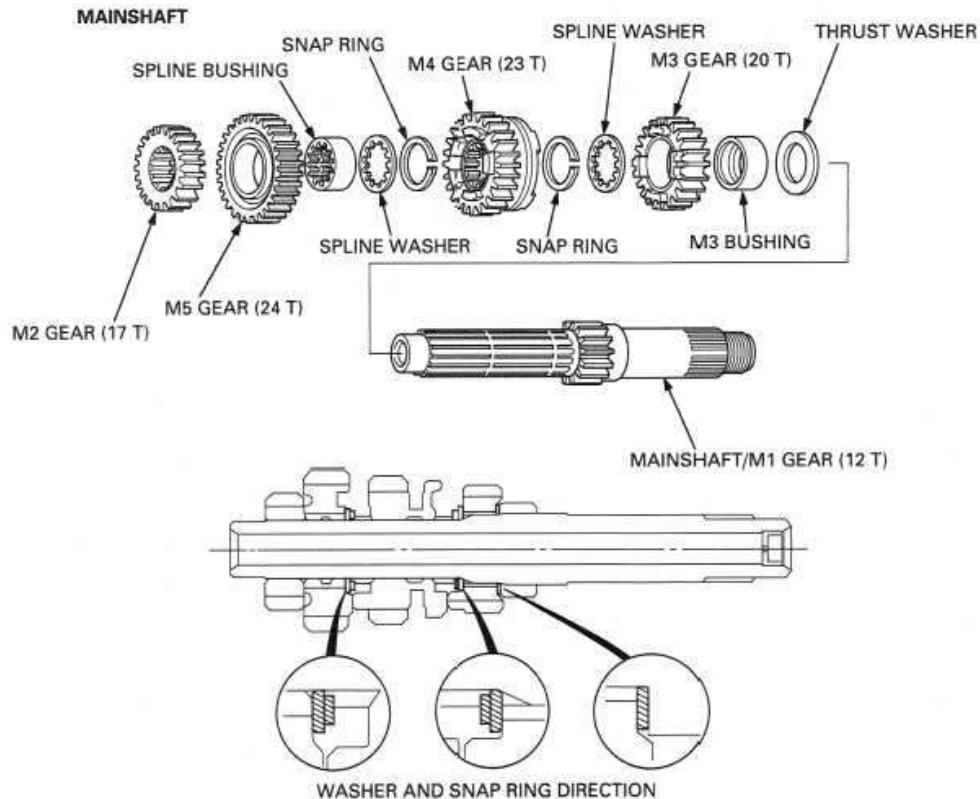
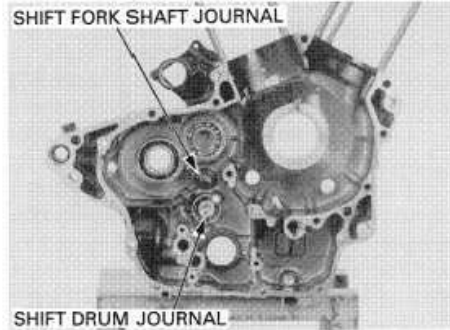
Clean all parts in solvent.

Apply molybdenum oil solution to the gear and bushing sliding surface and shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

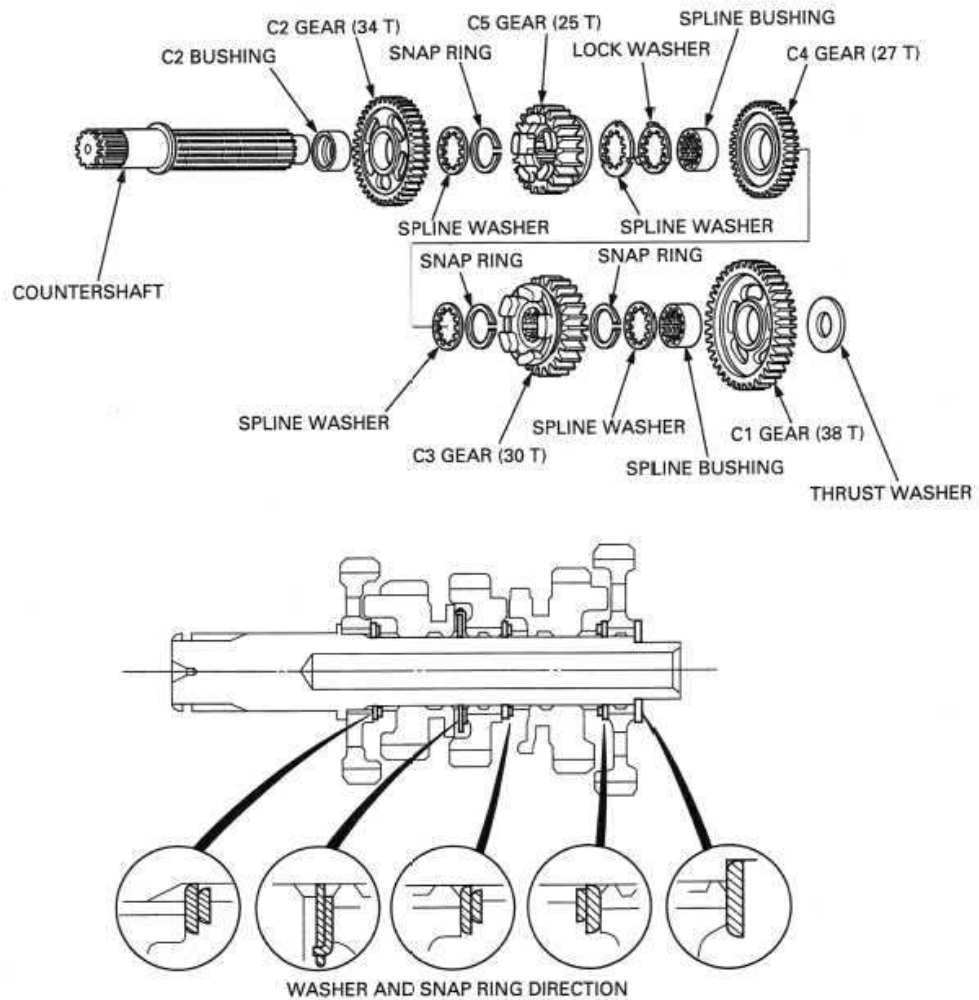
#### NOTE:

- Check the gears for freedom of movement or rotation of the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust road side. Do not reuse a worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.



## CRANKSHAFT/TRANSMISSION

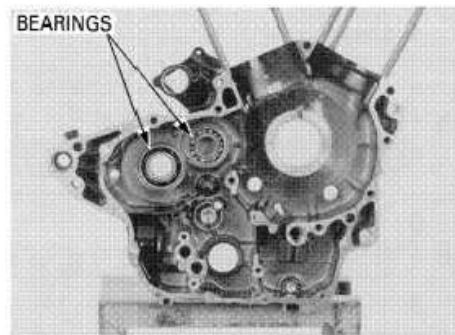
### COUNTERSHAFT



### INSTALLATION

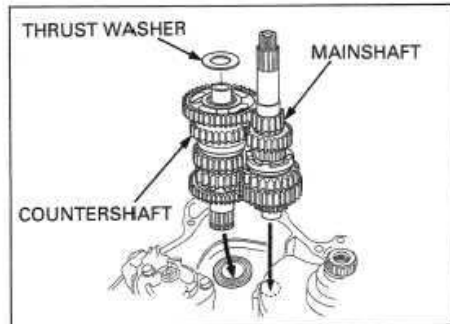
Apply engine oil to the following parts:

- mainshaft bearing
- countershaft bearing
- shift drum bearing



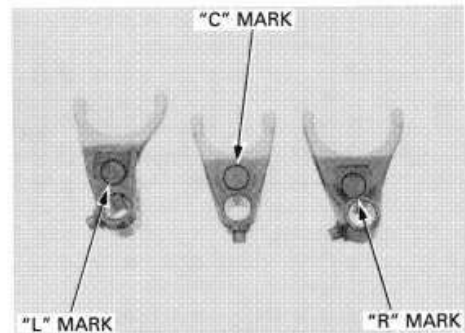
Install the mainshaft and countershaft to the left crankcase as an assembly to avoid damaging the countershaft oil seal.

Be sure to install the countershaft thrust washer.

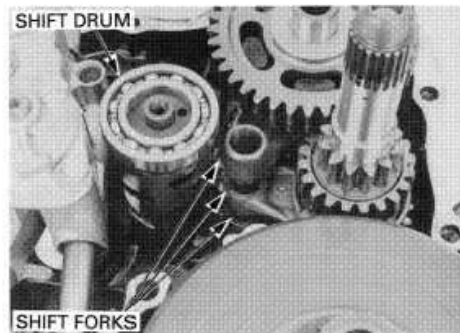


**NOTE:**

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



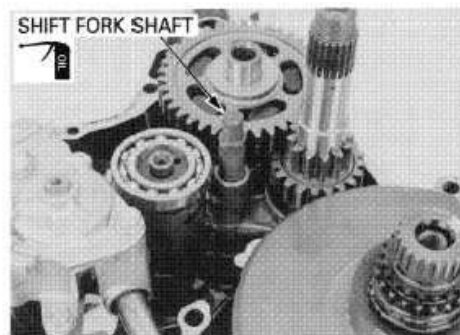
Install the shift forks into the shifter gear grooves with the markings facing up.  
Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.



Apply engine oil to the shift fork shaft and insert it through the shift forks into the left crankcase with the stepped end facing up.

After installing, check for smooth transmission operation.

Assemble the crankcase (page 12-20).



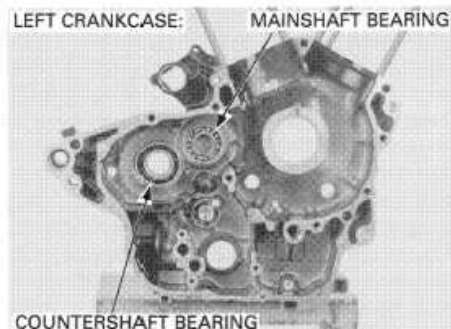
## CRANKCASE BEARING REPLACEMENT

### LEFT CRANKCASE BEARING

Remove the following:

- crankshaft (page 12-6)
- transmission (page 12-12)
- oil pump (page 4-4)

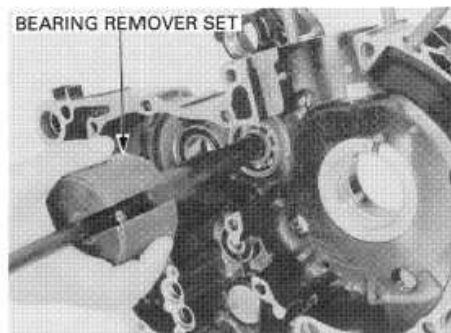
Drive the left countershaft bearing out of the left crankcase and remove the oil seal.



Remove the left mainshaft bearing using the special tools.

#### TOOLS:

<b>Bearing remover set</b>	07936 - 3710001
	Not available in U.S.A.
— remover head	07936 - 3710600
— remover handle	07936 - 3710100
— remover weight	07741 - 0010201
	or
	07936 - 371020A
	(U.S.A. only)
	or
	07936 - 3710200



Drive the left mainshaft bearing into the left crankcase with the seal side facing down.

#### TOOLS:

<b>Mainshaft bearing:</b>	
Driver	07749 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 20 mm	07746 - 0040500

Drive the left countershaft bearing into the left crankcase with the marking side facing up.

#### TOOLS:

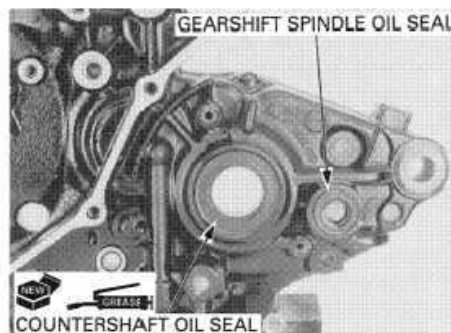
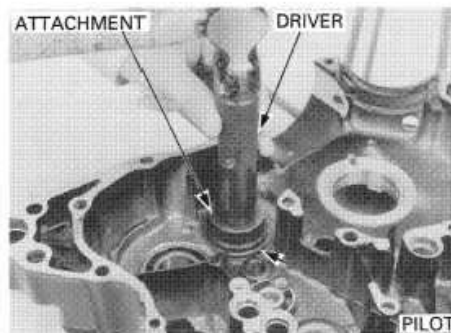
<b>Countershaft bearing:</b>	
Driver	07749 - 0010000
Attachment, 52 x 55 mm	07746 - 0010400
Pilot, 28 mm	07746 - 0041100

Apply grease to the new countershaft oil seal lip and install it.

Check the gearshift spindle oil seal for damage. Replace the gearshift spindle oil seal if necessary.

Install the following:

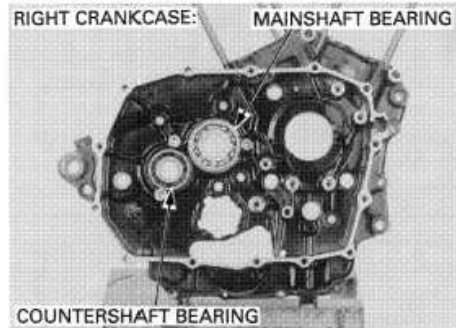
- oil pump (page 4-8)
- transmission (page 12-16)
- crankshaft (page 12-11)



## RIGHT CRANKCASE BEARING

Separate the crankcase (page 12-4).

Drive the right mainshaft bearing and countershaft bearing out of the right crankcase.



Drive the right mainshaft bearing into the right crankcase with the marking side facing up.

### TOOLS:

#### Mainshaft bearing:

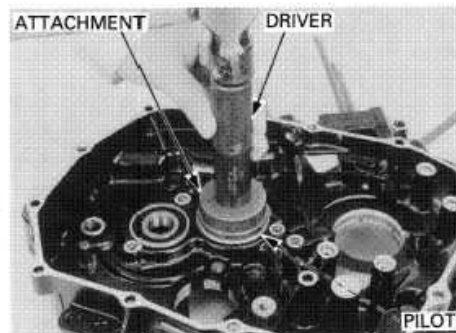
Driver	07749 - 0010000
Attachment, 52 x 55 mm	07746 - 0010400
Pilot, 25 mm	07746 - 0040600

Drive the right countershaft bearing into the right crankcase with the seal side facing up.

### TOOLS:

#### Countershaft bearing:

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



Assemble the crankcase (see next page).

## CRANKCASE ASSEMBLY

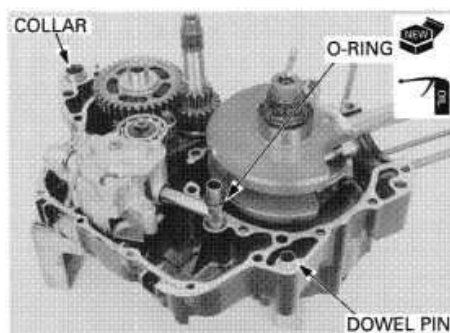
Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them.

Install the following:

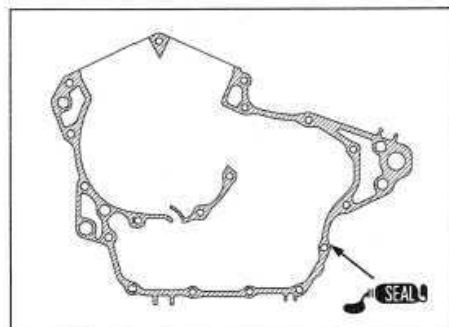
- crankshaft (page 12-11)
- transmission (page 12-16)
- oil pump (page 4-8)

Install the dowel pin and collar.

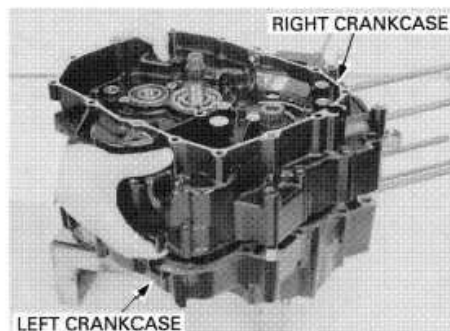
Coat a new O-ring with engine oil and install it to the oil pipe.



Apply liquid sealant to the crankcase mating surfaces.



Carefully install the right crankcase over the left crankcase.

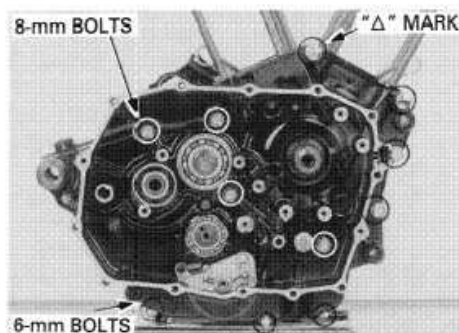


Install the three 6-mm bolts.  
Install the eight 8-mm bolts with the washer (washer position is indicated by the "Δ" mark).

Tighten the 6-mm bolts.

Tighten the 8-mm bolts in a crisscross pattern in several steps.

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

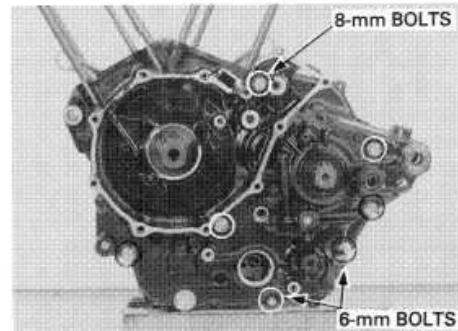


Install the two 6-mm bolts and five 8-mm bolts.

Tighten the 6-mm bolts.

Tighten the 8-mm bolts in a crisscross pattern in several steps.

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

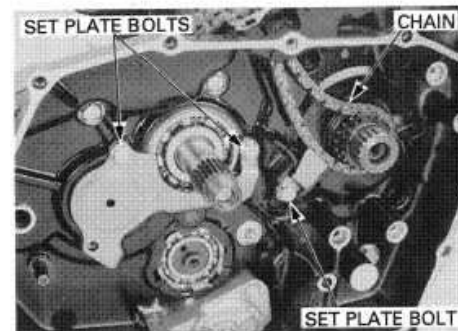


Apply a locking agent to the cam chain tensioner set plate bolt and transmission bearing set plate bolt threads.

Install the transmission bearing set plate with the bolts, then tighten the bolts.

Install the rear cam chain tensioner set plate with the bolt, then tighten the bolt.

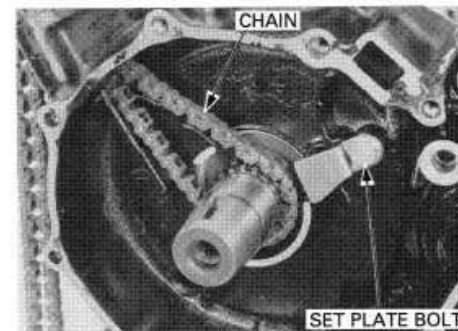
Install the rear cam chain through the crankcase.



Apply a locking agent to the cam chain tensioner set plate bolt threads.

Install the front cam chain tensioner set plate with the bolt, then tighten the bolt.

Install the front cam chain through the crankcase.

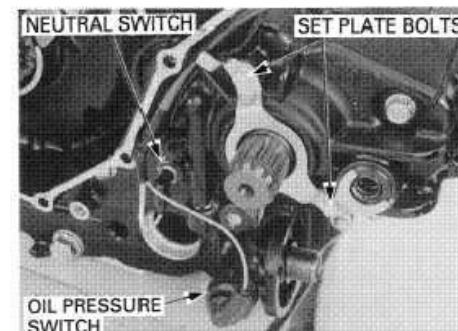


Install the oil pressure switch (page 4-3).  
Install the neutral switch (page 19-13).

Apply a locking agent to the countershaft oil seal set plate bolt threads.

Route the engine sub-harness properly and install the countershaft bearing oil seal set plate with the bolts, then tighten the bolts.

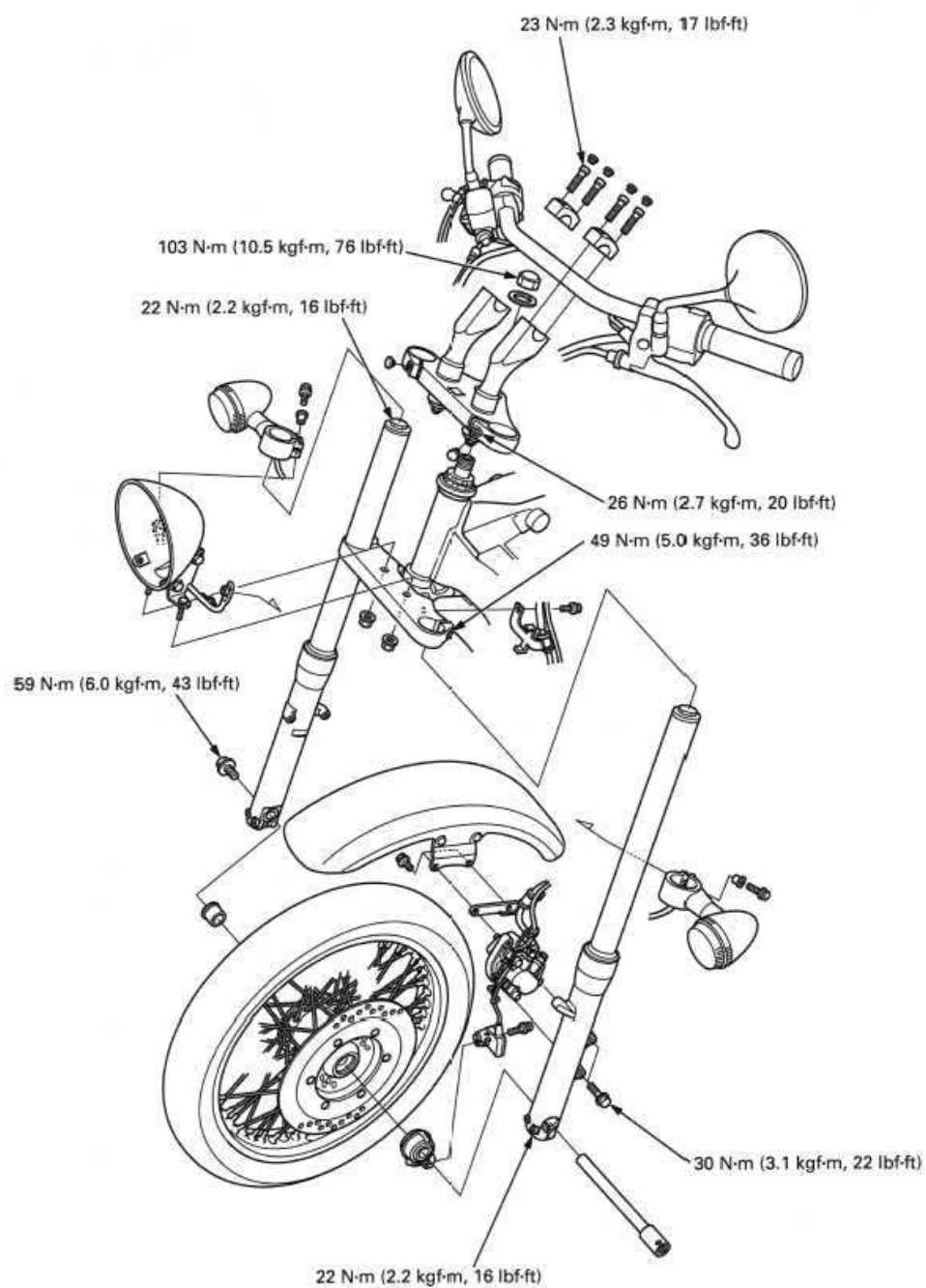
Install the other remaining parts.





## FRONT WHEEL/SUSPENSION/STEERING

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# 13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-8
TROUBLESHOOTING	13-2	FORK	13-15
HANDLEBAR	13-3	STEERING STEM	13-23

## SERVICE INFORMATION

### GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Raise the front wheel off the ground by supporting the frame securely.
- Refer to section 15 for hydraulic brake system service.
- Refer to section 19 for light, meter and switch service.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
	Up to maximum weight capacity	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		Page 13-12	—
Wheel balance weight		—	60 g (2.1 oz)
Fork	Spring free length	492.4 (19.39)	482.5 (19.00)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fork fluid level	124 (4.9)	—
	Fork fluid capacity	473 ± 2.5 cm <sup>3</sup> (16.0 ± 0.08 US oz, 16.6 ± 0.09 Imp oz)	—
Steering head bearing preload		0.43 – 1.04 kgf (0.95 – 2.29 lbf)	—

13

### TORQUE VALUES

Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Steering bearing adjustment nut	21 N·m (2.1 kgf·m, 15 lbf·ft)	Apply oil to the threads and seating surface.
Top bridge pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Bottom bridge pinch bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Handlebar upper holder bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Handlebar lower holder nut	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one.
Fork cap	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply locking agent to the threads.
Brake master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one.

## FRONT WHEEL/SUSPENSION/STEERING

---

### TOOLS

Attachment, 42 x 47 mm	07746 – 0010300	
Attachment, 52 x 55 mm	07746 – 0010400	
Driver 30 mm I.D.	07746 – 0030300	
Pilot, 20 mm	07746 – 0040500	
Bearing remover shaft	07746 – 0050100	
Bearing remover head, 20 mm	07746 – 0050600	
Driver	07749 – 0010000	
Steering stem socket	07916 – 3710101	or 07916-3710100
Bearing race remover	07946 – 3710500	or M9360-277-91774 (U.S.A. only)
Fork seal driver	07947 – KA50100	
Fork seal driver attachment, 41 mm I.D.	07947 – KF00100	
Ball race remover set	07953 – MJ10000	or 07953-MJ1000B or 07953-MJ1000A (U.S.A. only)
— driver attachment	07953 – MJ10100	
— driver handle	07953 – MJ10200	
Spoke wrench	07JMA – MR60100	or equivalent commercially available in U.S.A.

### TROUBLESHOOTING

#### Hard steering

- Steering bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Worn or damaged steering head bearing races
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

#### Steers to one side or does not track straight

- Bent fork
- Faulty steering head bearings
- Damaged steering head bearings
- Bent frame
- Worn wheel bearings
- Bent front axle
- Worn swingarm pivot component (section 14)

#### Front wheel wobbling

- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel

#### Soft suspension

- Weak fork spring
- Low fluid level in fork
- Insufficient fluid in fork
- Low tire pressure

#### Hard suspension

- High tire pressure
- Bent fork
- High fluid level in fork
- Incorrect fluid weight
- Clogged fluid passage

#### Front suspension noisy

- Loose fork fasteners
- Insufficient fluid in fork

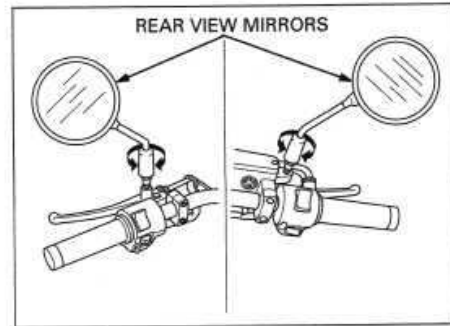
#### Wheel hard to turn

- Faulty wheel bearings
- Bent front axle
- Brake drag
- Faulty speedometer gear

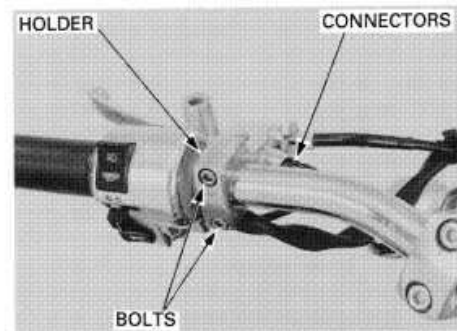
## HANDLEBAR

### REMOVAL

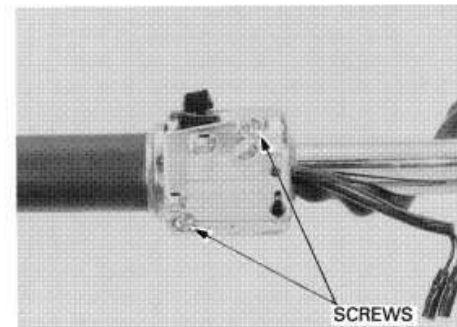
Remove the rear view mirrors.



Disconnect the clutch switch connectors. Remove the two bolts, clutch lever bracket holder and clutch lever bracket from the handlebar.

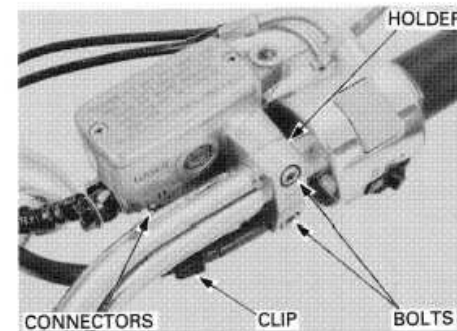


Remove the two attaching screws and the left handlebar switch housing from the handlebar.



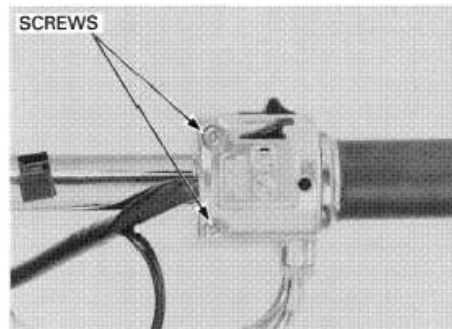
*Keep the master cylinder upright to prevent air from entering the hydraulic system.*

Disconnect the front brake light switch connectors. Remove the front brake switch wire from the wire clip on the handlebar. Remove the bolts, master cylinder holder and master cylinder from the handlebar.

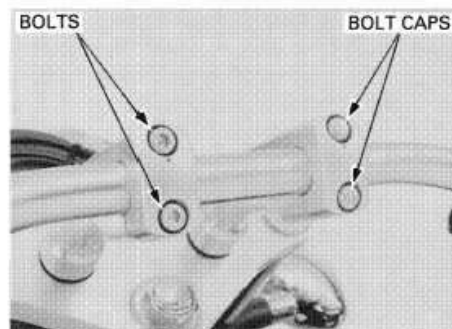


## FRONT WHEEL/SUSPENSION/STEERING

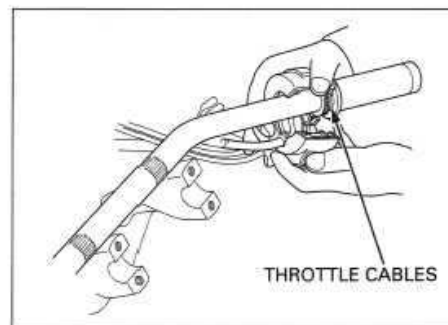
Remove the two attaching screws.



Remove the bolt caps, socket bolts and handlebar upper holders.  
Remove the handlebar from the lower holders.



Move the handlebar to obtain sufficient slack in the throttle cables so they can be disconnected from the throttle grip flange.  
Remove the right handlebar switch housing from the handlebar.

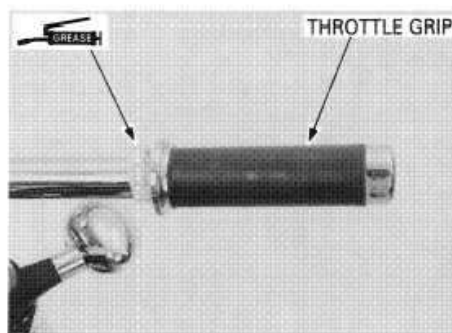


Remove the throttle grip.  
Remove the handlebar.

Remove the left handlebar grip and/or grip ring if necessary.  
Handlebar grip replacement, see page 13-7.

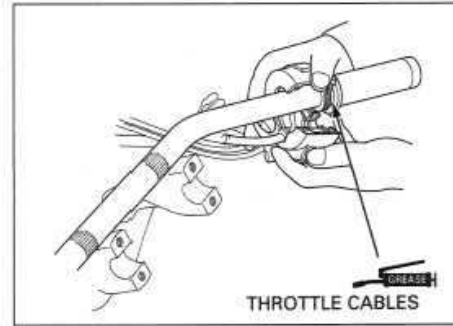
### INSTALLATION

Apply grease to the throttle grip flange groove and install the throttle grip onto the handlebar.



Route the cable and wires properly (page 1-18).

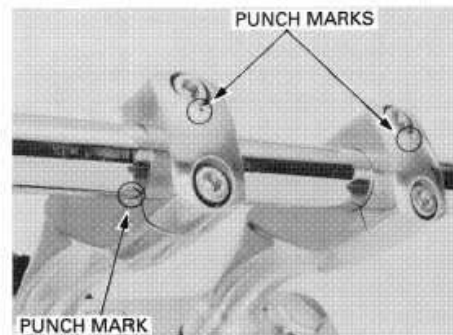
Apply grease to the throttle cable ends.  
Connect the throttle cables to the throttle grip flange.



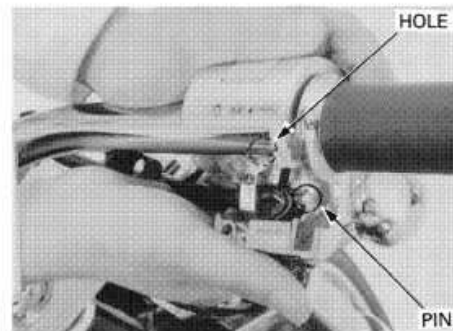
Place the handlebar onto the lower holders and align the punch mark on the handlebar with the top of the lower holder.  
Install the upper holders with the punch marks facing forward. Install the socket bolts and tighten the forward bolts first, then tighten the rear bolts.

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

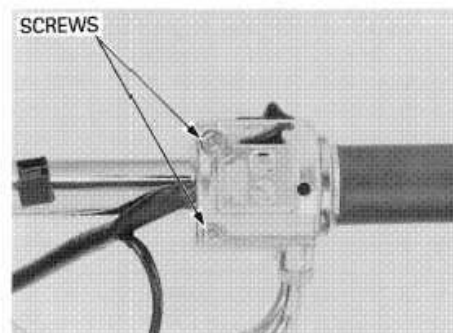
Install the bolt caps.



Install the right handlebar switch housing onto the handlebar, aligning the locating pin with the hole in the handlebar.



Install the attaching screws and tighten the forward screw first, then tighten the rear screw.



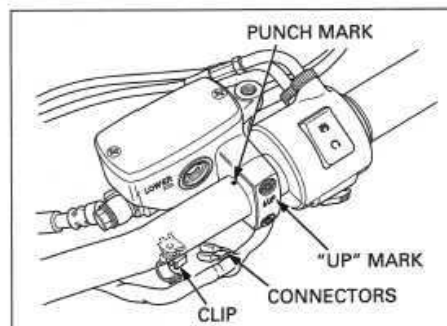
## FRONT WHEEL/SUSPENSION/STEERING

Install the master cylinder and master cylinder holder with the "UP" mark facing up.

Align the end of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

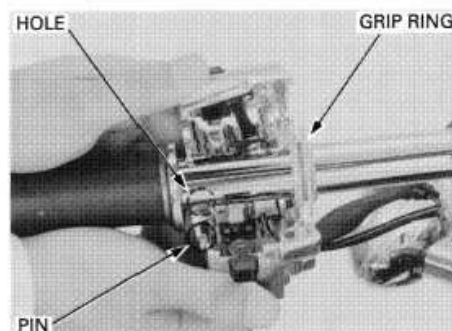
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Set the front brake light switch wire to the wire clip.  
Connect the front brake light switch connectors.

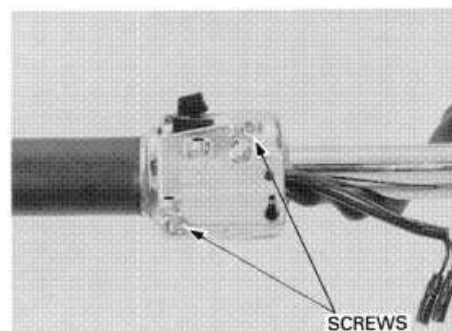


Set the grip ring onto the left handlebar switch housing.

Install the left handlebar switch housing onto the handlebar, aligning the locating pin with the hole in the handlebar.



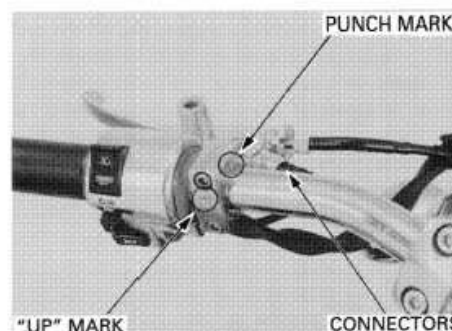
Install the attaching screws and tighten the forward screw first, then tighten the rear screw.



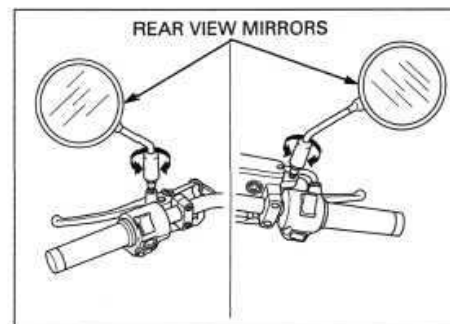
Install the clutch lever bracket and bracket holder with the "UP" mark facing up.

Align the end of the clutch lever bracket with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

Connect the clutch switch connectors.



Install the rear view mirrors.



## HANDLEBAR GRIP REPLACEMENT

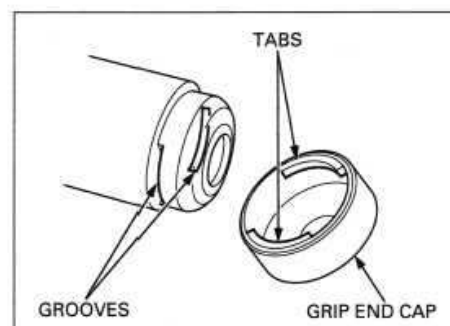
### NOTE:

- Install the grip end cap to the handlebar grip first, then install the grip to the handlebar.

### GRIP END CAP

Remove the handlebar grip end cap by prying it with a screwdriver.

Install the grip end cap while aligning the tabs with the grooves in the handlebar.



### LEFT HANDLEBAR GRIP

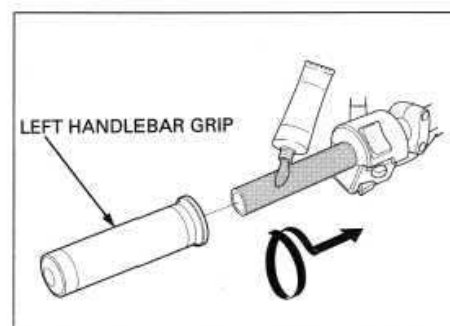
Clean the inside surface of the left handlebar grip and the outside surface of the handlebar.

Install the grip end cap to the handlebar grip.

Apply HondaBond A or Honda Grip Cement (U.S.A. only) or equivalent to the inside surface of the left handlebar grip and to the outside surface of the left handlebar. Wait 3 – 5 minutes and install the grip.

Rotate the grip for even application of the adhesive.

*Allow the adhesive to dry for an hour before using.*



### THROTTLE GRIP

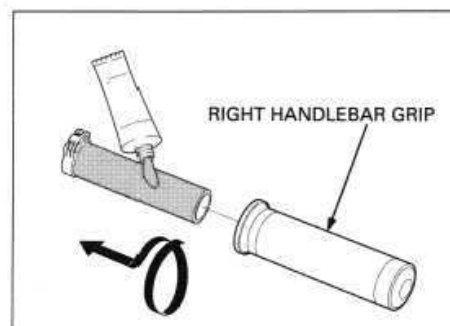
Clean the inside surface of the throttle grip and the outside surface of the throttle pipe.

Install the grip end cap to the throttle grip.

Apply HondaBond A or Honda Grip Cement (U.S.A. only) or equivalent to the inside surface of the throttle grip and to the outside surface of the throttle pipe. Wait 3 – 5 minutes and install the grip.

Rotate the grip for even application of the adhesive.

*Allow the adhesive to dry for an hour before using.*





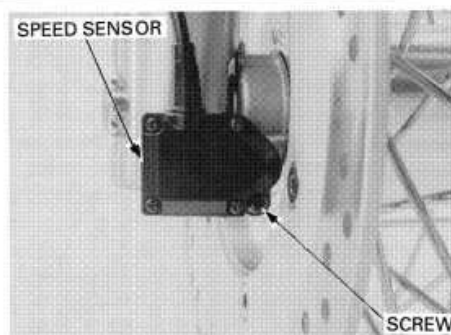
## FRONT WHEEL/SUSPENSION/STEERING

### FRONT WHEEL

#### REMOVAL

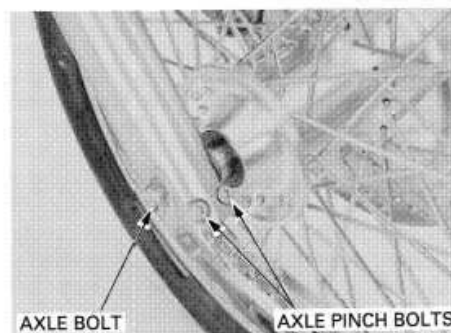
Raise the front wheel off the ground by supporting the frame securely.

Remove the screw and speed sensor.



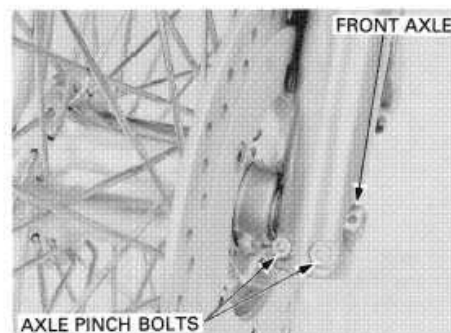
Loosen the right axle pinch bolts.

Remove the front axle bolt.

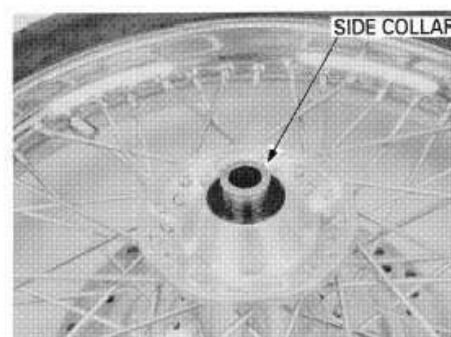


*Do not operate the front brake lever after removing the front wheel or it will be very difficult to separate the brake pads.*

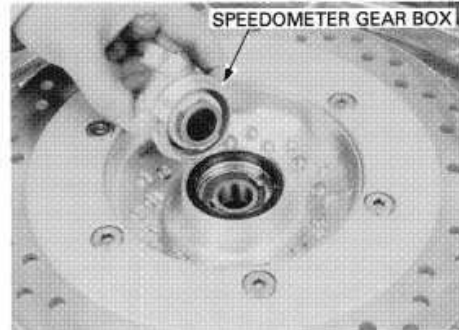
Loosen the left axle pinch bolts.  
Pull the front axle out and remove the front wheel.



Remove the side collar from the right side of the wheel.



Remove the speedometer gear box from the left side of the wheel.

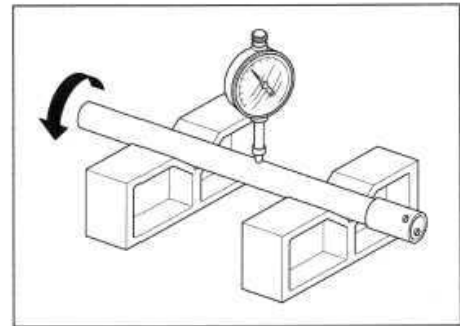


### **INSPECTION**

#### **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**

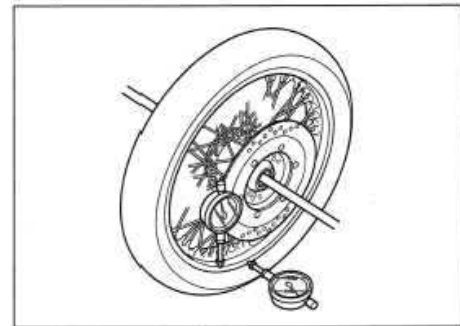
Check the rim runout by placing the wheel in a truing stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS: Radial: 2.0 mm (0.08 in)**

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



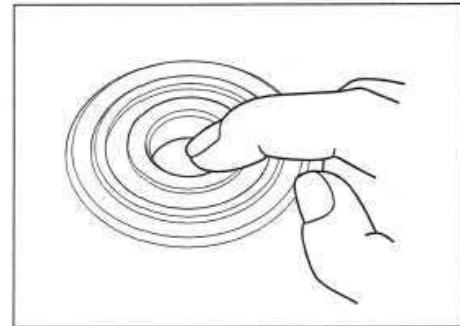
#### **WHEEL BEARING**

Turn the inner race of each bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

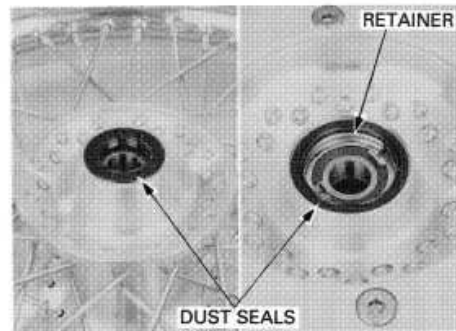


## FRONT WHEEL/SUSPENSION/STEERING

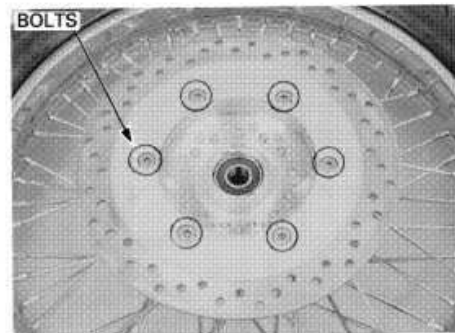
### DISASSEMBLY

Remove the dust seals from both sides of the wheel.

Remove the speedometer gear retainer.



Remove the six socket bolts and brake disc.



*If the bearings are removed, they must be replaced with new ones.*

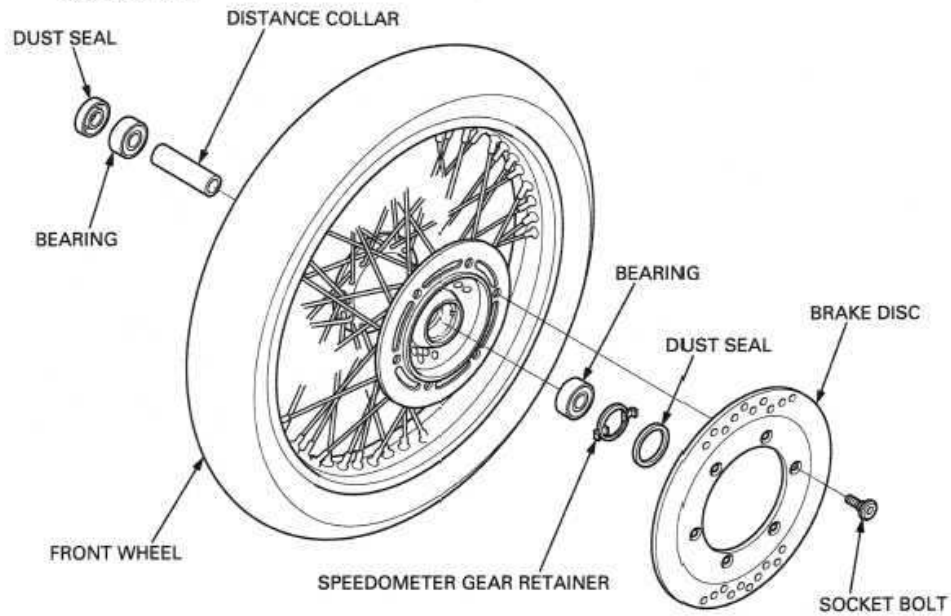
Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

#### TOOLS:

Bearing remover shaft	07746 - 0050100
Bearing remover head, 20 mm	07746 - 0050600



# ASSEMBLY

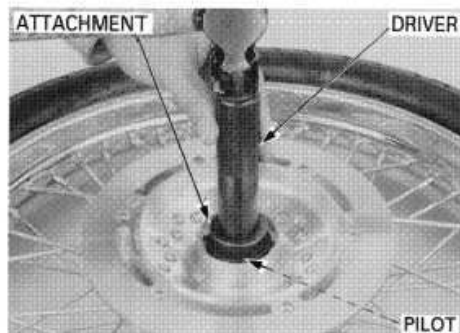
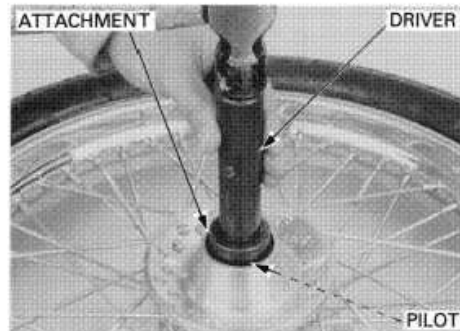


Drive in a new right bearing squarely with the marking facing up until it is fully seated.  
Install the distance collar.  
Drive in a new left wheel bearing squarely with the marking facing up until it is seated using the special tools.

## TOOLS:

Driver  
Attachment, 42 x 47 mm  
Pilot, 20 mm

07749 - 0010000  
07746 - 0010300  
07746 - 0040500



## FRONT WHEEL/SUSPENSION/STEERING

### WHEEL CENTER ADJUSTMENT

Wheel center adjustment is necessary when new spokes are installed.

Measure distance B (rim width) and calculate distance A as follows:

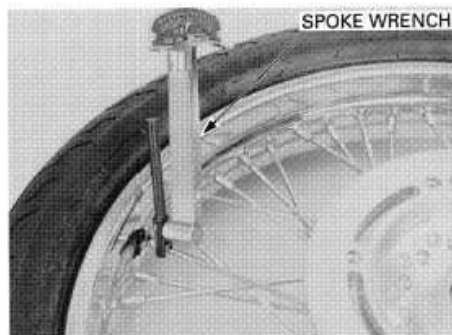
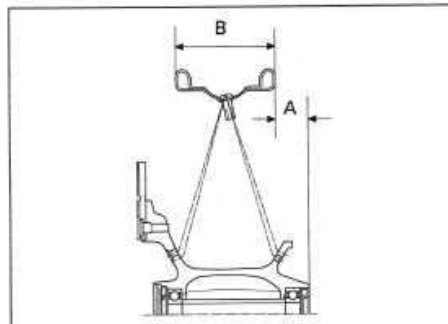
$$A = 79 \text{ mm (3.1 in)} - B/2$$

Adjust the rim position and distance A by tightening the spokes to the specified torque in two or three progressive steps.

#### TOOL:

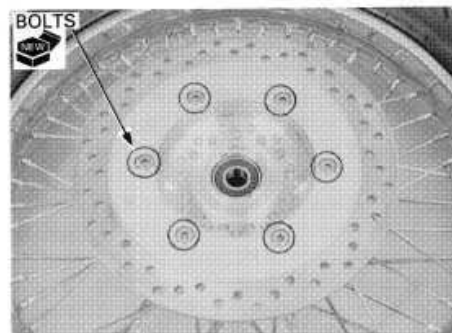
Spoke wrench **07JMA – MR60100**  
or equivalent commercially available in U.S.A.

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



Install the brake disc onto the wheel hub with the stamp facing out.  
Install new socket bolts and tighten them in a criss-cross pattern in several steps.

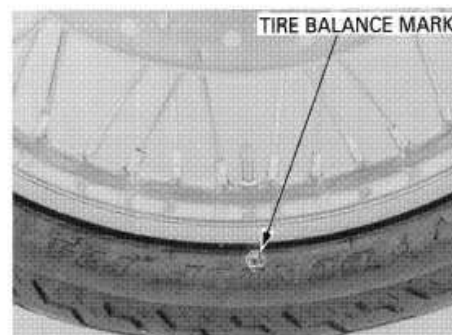
**TORQUE: 42 N-m (4.3 kgf-m, 31 lbf-ft)**



### WHEEL BALANCE

#### NOTE:

- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

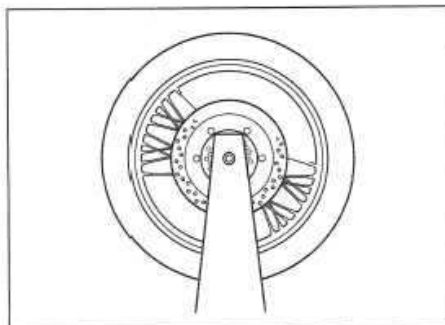


*Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.*

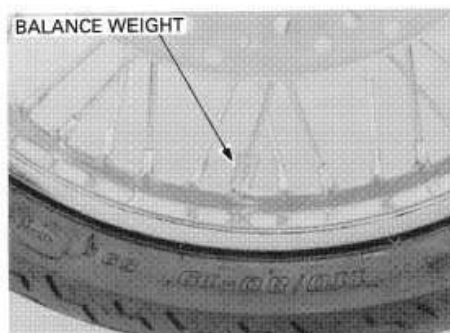
Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



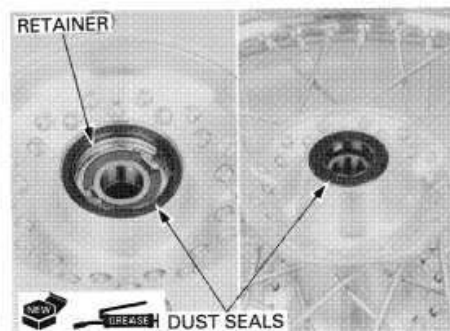
To balance the wheel, install a balance weight on the lightest side of the spoke, opposite the chalk marks, add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 g (2.1 oz) to the front wheel.



Install the speedometer gear retainer into the left wheel hub, aligning the tangs with the slots in the hub.

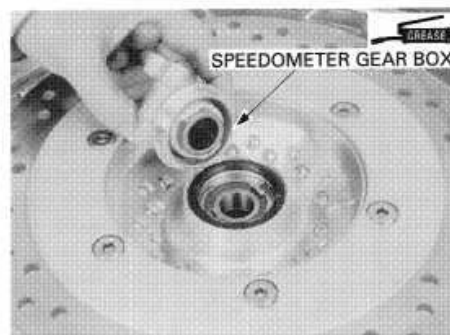
*Do not get grease on the brake disc or stopping power will be reduced.*

Apply grease to the new dust seal lips and install the dust seals into both sides of the wheel until they are fully seated.



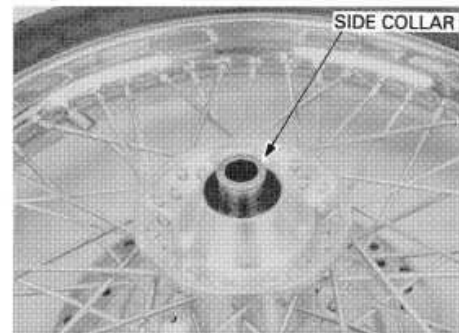
## INSTALLATION

Apply grease to the inside of the speedometer gear box, and install the gear box into the left wheel hub.



## FRONT WHEEL/SUSPENSION/STEERING

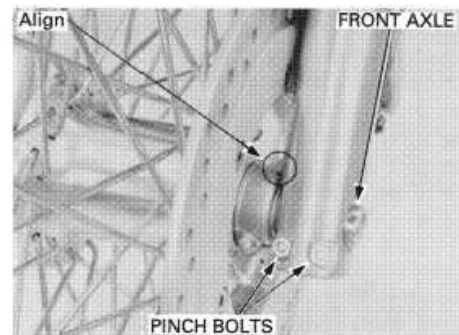
Install the side collar into the right wheel hub.



Place the front wheel between the fork legs so the brake disc is positioned between the pads, being careful not to damage the pads.  
Align the groove in the speedometer gear box with the lug on the left fork leg.  
Insert the front axle from the left side until it is fully seated.

Make sure the index line on the axle is aligned with the fork leg and tighten the left axle pinch bolts.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

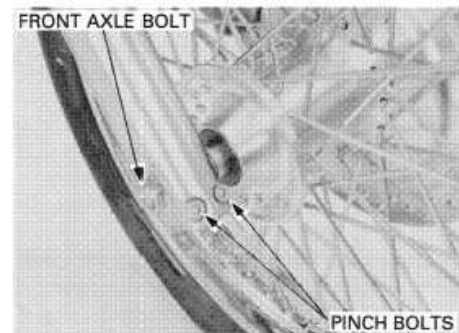


Install and tighten the front axle bolt.

**TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)**

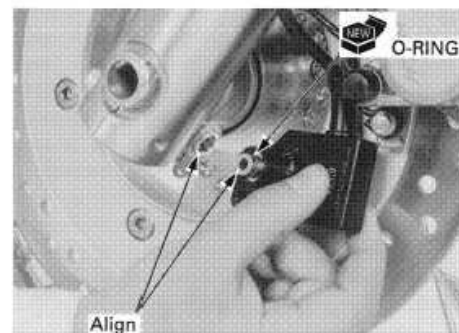
Tighten the right axle pinch bolts.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Install a new O-ring onto the speed sensor shaft groove.

Install the speed sensor by aligning the slot with the tang of the gear box.  
Install and tighten the screw securely.

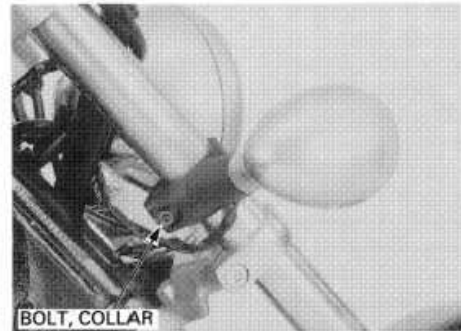


## FORK

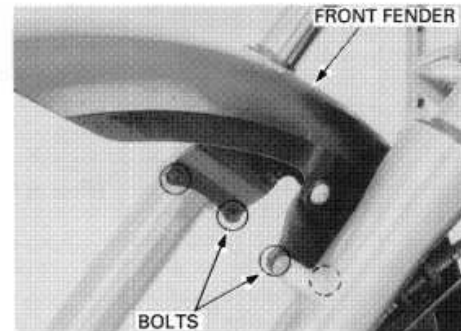
### REMOVAL

Remove the front wheel (page 13-8).  
Remove the headlight (page 19-3).

Release the wire clamps and disconnect the front turn signal light wire connectors.  
Remove the bolt, collar and turn signal light assembly.

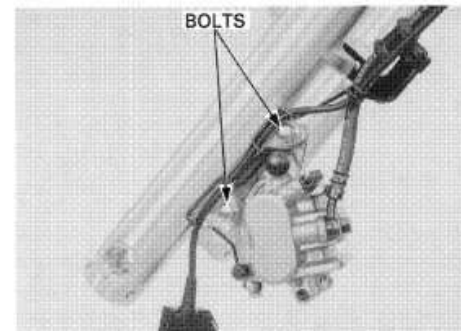


Remove the four bolts and front brake hose clamp and front fender.

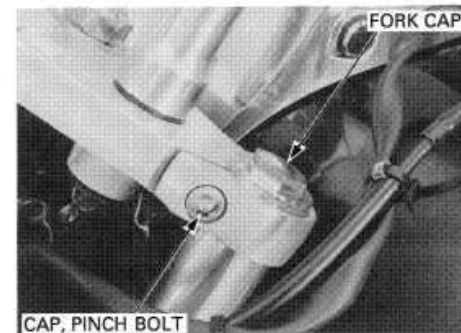


*Do not hang the brake caliper from the brake hose.*

Remove the brake caliper mounting bolts and the brake caliper from the fork leg.



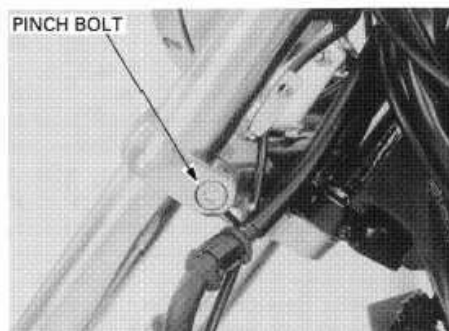
Remove the bolt cap.  
Loosen the fork top bridge pinch bolt.  
When the fork is ready to be disassembled, loosen the fork cap, but do not remove it.





## FRONT WHEEL/SUSPENSION/STEERING

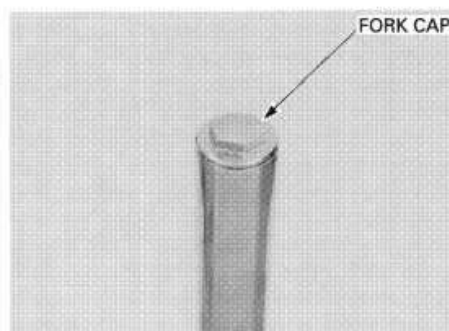
Loosen the bottom bridge pinch bolt and remove the front fork from the fork top bridge and steering stem.



### DISASSEMBLY

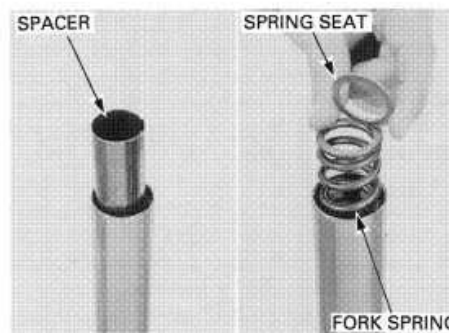
*The fork cap is under spring pressure. Use care when removing it.*

Remove the fork cap.  
Remove the O-ring from the fork cap.

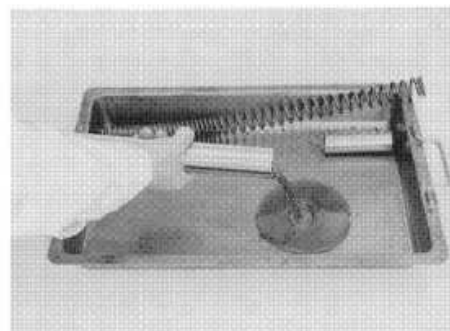


Remove the following:

- spacer
- spring seat
- fork spring



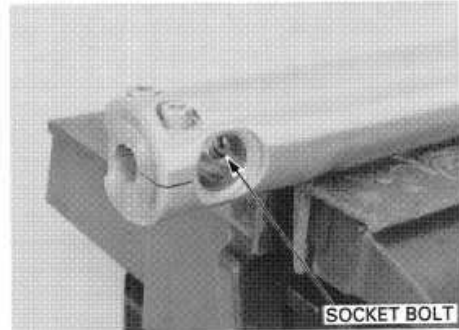
Pour out the fork fluid by pumping the fork tube up and down several times.



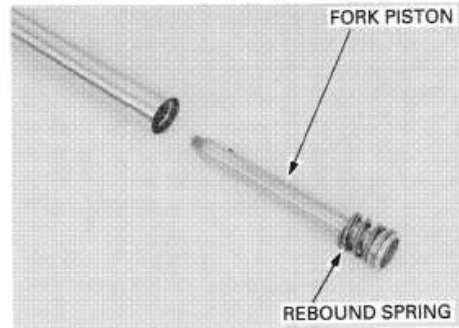
Hold the front fork in a vise with soft jaws or a shop towel.

*If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spacer and fork cap.*

Remove the fork socket bolt and sealing washer.

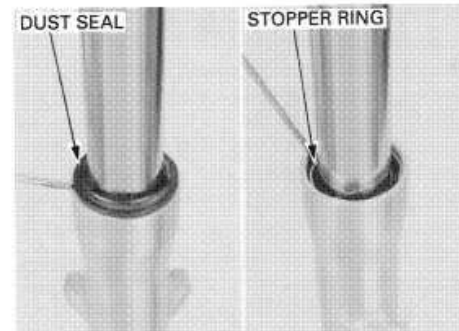


Remove the fork piston and rebound spring from the fork tube.

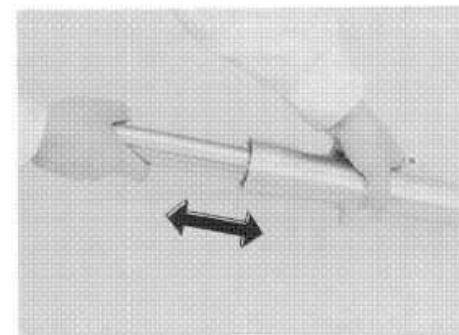


Remove the dust seal.

Remove the stopper ring.

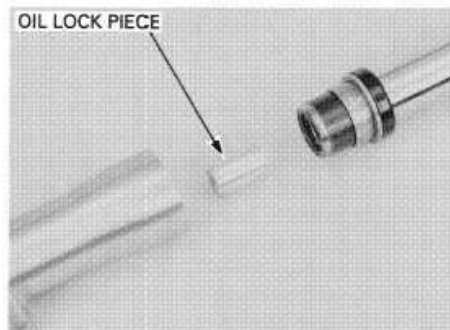


Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider. The slider bushing will be forced out by the fork tube bushing.



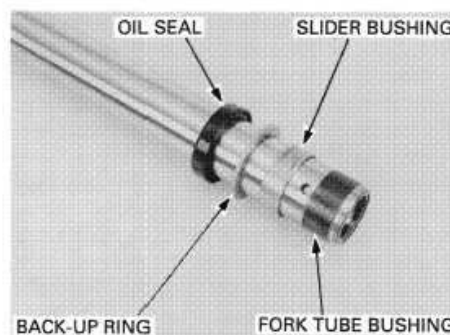
## FRONT WHEEL/SUSPENSION/STEERING

Remove the oil lock piece.



*Do not remove the fork tube bushing unless it is necessary to replace it with a new one.*

Remove the oil seal, back-up ring and slider bushing from the fork tube.

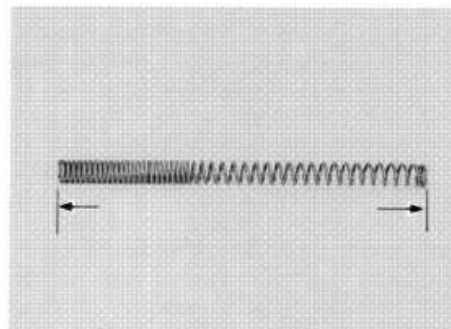


### INSPECTION

#### FORK SPRING

Measure the fork spring free length.

**SERVICE LIMIT: 482.5 mm (19.00 in)**

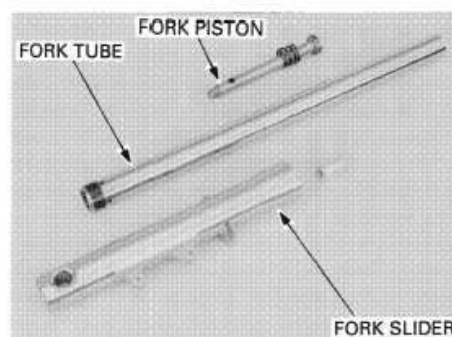


#### FORK TUBE/SLIDER/PISTON

Check the fork tube, fork slider, oil lock piece and fork piston for score marks, and excessive or abnormal wear.

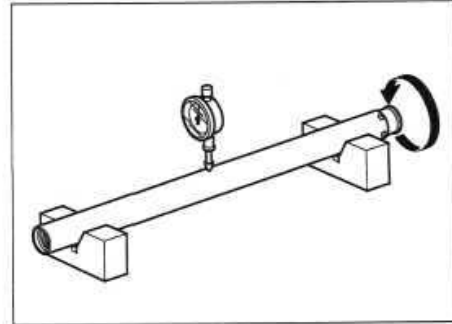
Check the fork piston ring for wear or damage.  
Check the rebound spring for fatigue or damage.

Replace the component if necessary.



Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator. Actual runout is 1/2 the total indicator reading.

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

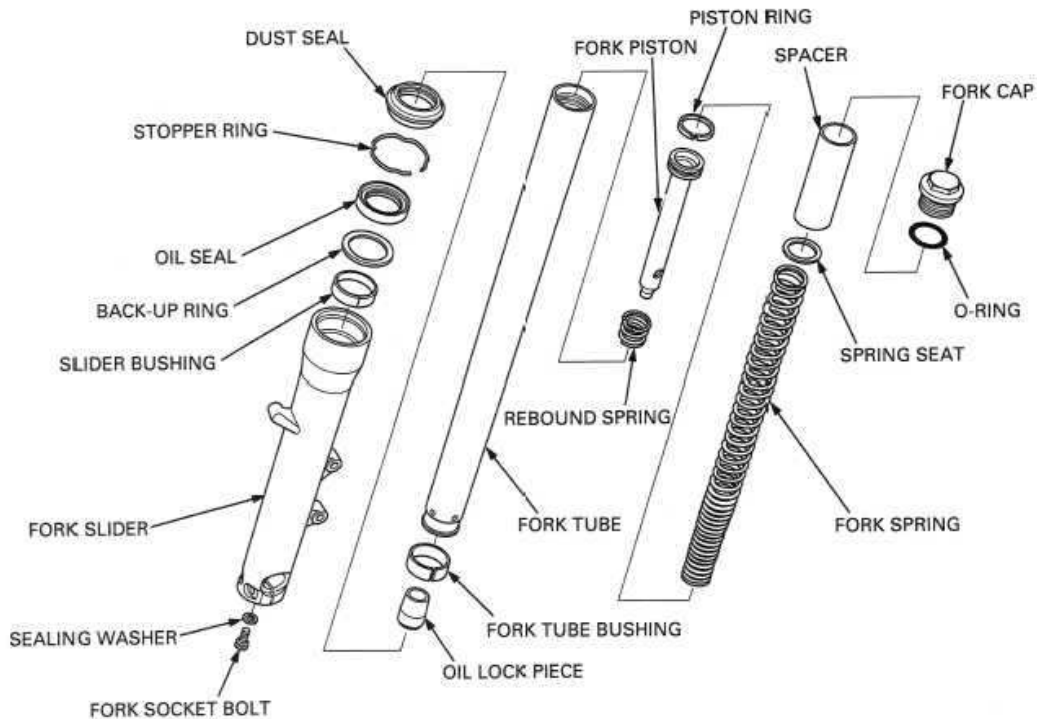
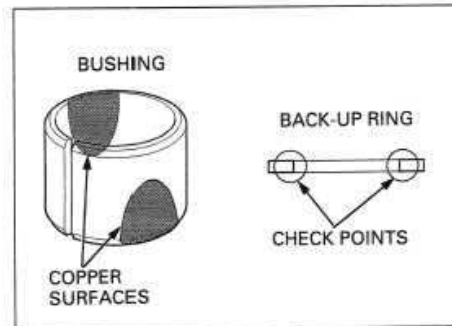


Visually inspect the slider and guide bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring: replace it if there is any distortion at the points shown.

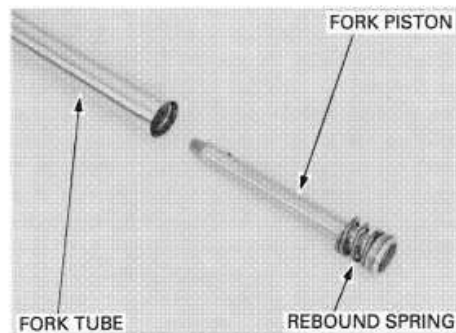
### ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



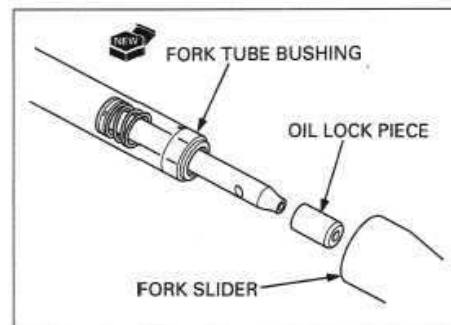
## FRONT WHEEL/SUSPENSION/STEERING

Install the rebound spring onto the fork piston.  
Install the fork piston into the fork tube.



Install the oil lock piece onto the fork piston end.  
Install the fork tube into the fork slider.

Install the new fork tube bushing if the bushing has been removed.



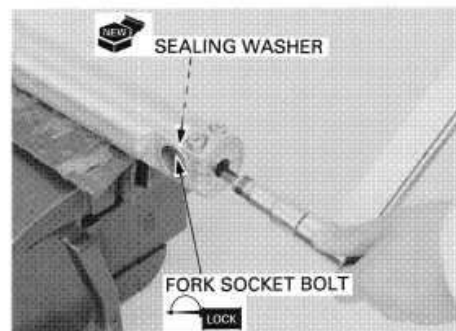
Hold the fork slider in a vise with soft jaws or a shop towel.

Apply locking agent to the fork socket bolt threads and install the socket bolt with a new sealing washer into the fork piston.

Tighten the 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, spacer and fork cap.*



Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top of the slider bushing. Drive the bushing into place and remove the old bushing or equivalent tool.

Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip. Coat a new oil seal with fork fluid and install it over the fork tube with the marked side facing up.

Drive the oil seal into place.

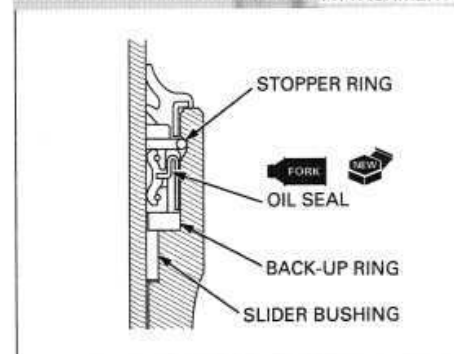
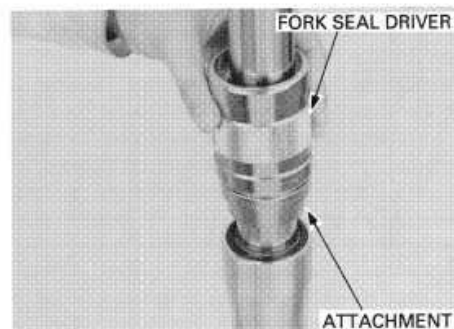
**TOOLS:**

Fork seal driver

07947 - KA50100

Fork seal driver attachment,  
41 mm I.D.

07947 - KF00100



Install the stopper ring into the groove in the fork slider. Apply fork fluid to the lip of a new dust seal and install the dust seal.

Remove the vinyl tape from the fork tube top end.

Pour the specified amount of the recommended fork fluid in the fork tube.

**RECOMMENDED FORK FLUID:**

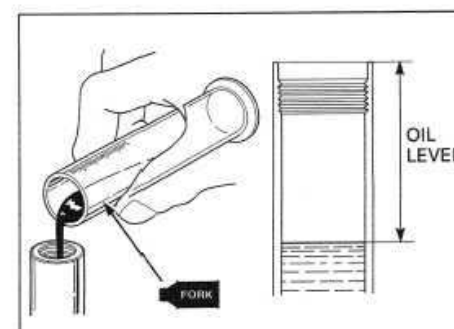
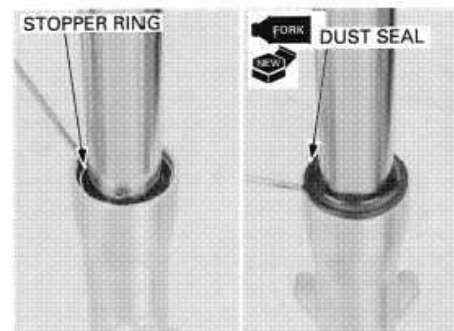
Pro Honda Suspension Fluid SS-8

**FORK FLUID CAPACITY:**

$473 \pm 2.5 \text{ cm}^3$  (16.0  $\pm$  0.08 US oz,  
16.6  $\pm$  0.09 Imp oz)

Pump the fork tube several times to remove the trapped air from the lower portion of the fork tube. Compress the fork tube fully. Measure the oil level from the top of the fork tube.

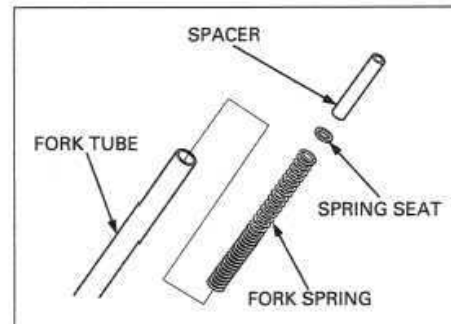
**FORK FLUID LEVEL: 124 mm (4.9 in)**



## FRONT WHEEL/SUSPENSION/STEERING

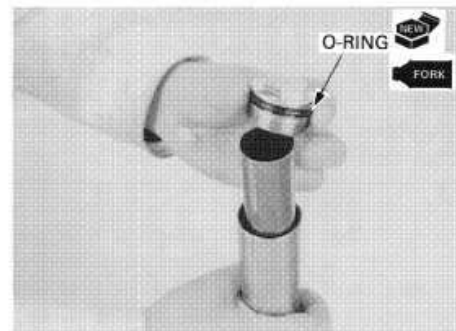
Pull the fork tube up and install the fork spring with the tightly wound coil side facing down.

Install the spring seat and spacer.



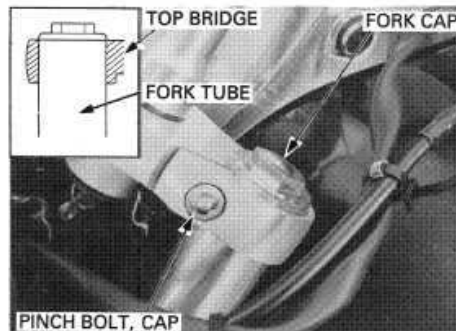
*Tighten the fork cap after installing the fork tube into the fork bridges.*

Coat a new O-ring with fork fluid and install it into the fork cap groove.  
Install the fork cap into the fork tube.



### 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 bolt.

**TORQUE: 49 N·m (5.0 kgf-m, 36 lbf-ft)**

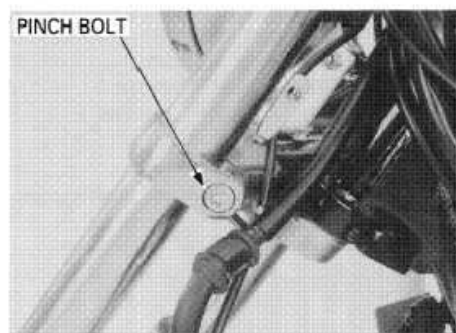
Tighten the fork top bridge pinch bolt.

**TORQUE: 26 N·m (2.7 kgf-m, 20 lbf-ft)**

Tighten the fork cap.

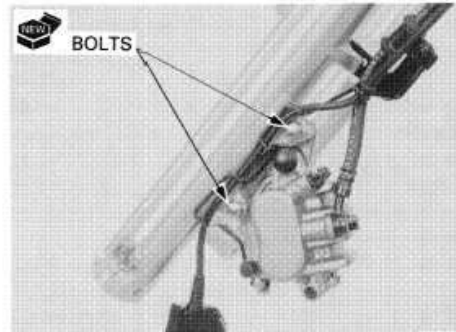
**TORQUE: 22 N·m (2.2 kgf-m, 16 lbf-ft)**

Install the bolt cap to the fork top bridge pinch bolt.

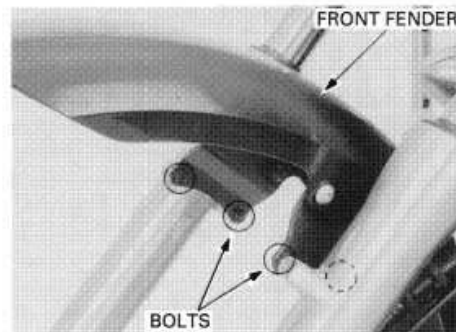


Install the brake caliper onto the front fork with the new mounting bolts.  
Tighten the mounting bolts to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

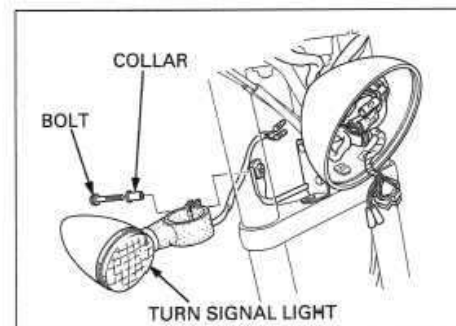


Install the front fender and brake hose clamp.  
Install and tighten the front fender bolts.



Install the turn signal light assembly, collar and bolt onto the front fork. Tighten the bolt securely.  
Route the front turn signal light wire properly.  
Connect the wire connectors and clamp them.

Install the front wheel (page 13-13).  
Install the headlight (page 19-3).

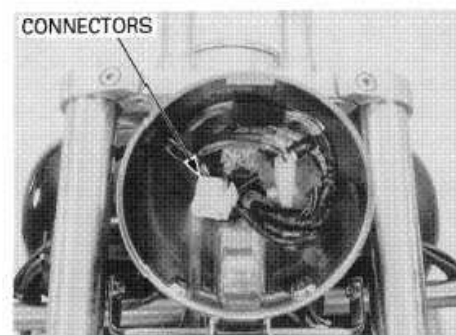


## STEERING STEM

### REMOVAL

Remove the handlebar (page 13-3).  
Remove the front wheel (page 13-8).  
Remove the headlight (page 19-3) and the front turn signal assembly (page 13-15).

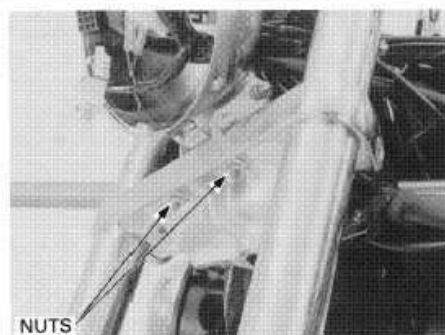
Release the wire clamps and disconnect all the connectors in the headlight case.



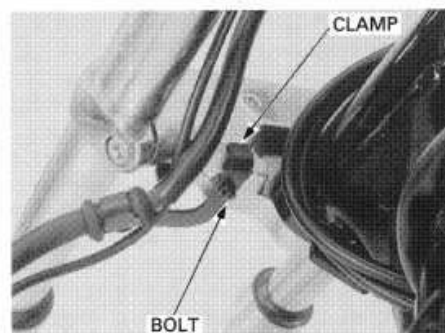


## FRONT WHEEL/SUSPENSION/STEERING

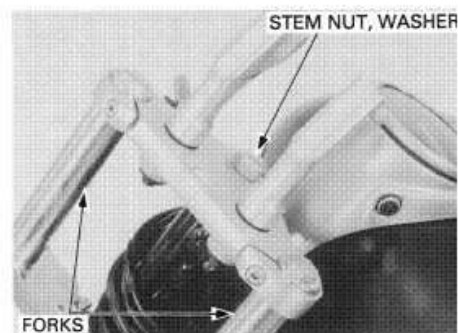
Remove the two nuts and headlight case with the bracket.



Remove the bolt and brake hose clamp from the steering stem.



Loosen the steering stem nut.  
Remove the following:  
— front forks (page 13-15)  
— stem nut and washer  
— fork top bridge



Straighten the lock washer tabs, and remove the lock nut and lock washer.



STEERING STEM SOCKET

ADJUSTMENT NUT

INNER RACE

DUST SEAL

- 
- UPPER BEARING
- LOWER BEARING

**ATTACHMENT**

**DRIVER HANDLE**

## FRONT WHEEL/SUSPENSION/STEERING

Remove the lower bearing outer race using the special tool.

### TOOLS:

Bearing race remover

07946 - 3710500 or  
M9360 - 277 - 91774  
(U.S.A. only)

or

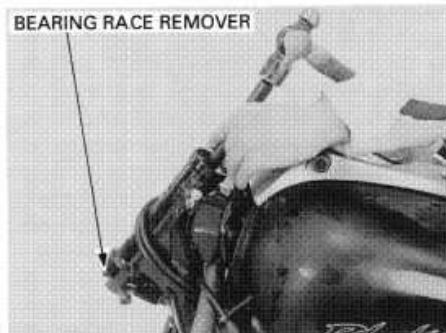
Driver

07949 - 3710001

Attachment, 37 x 40 mm

07746 - 0010200

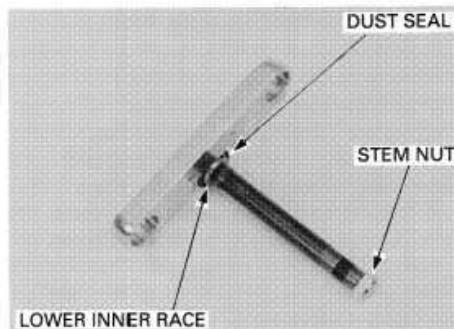
BEARING RACE REMOVER



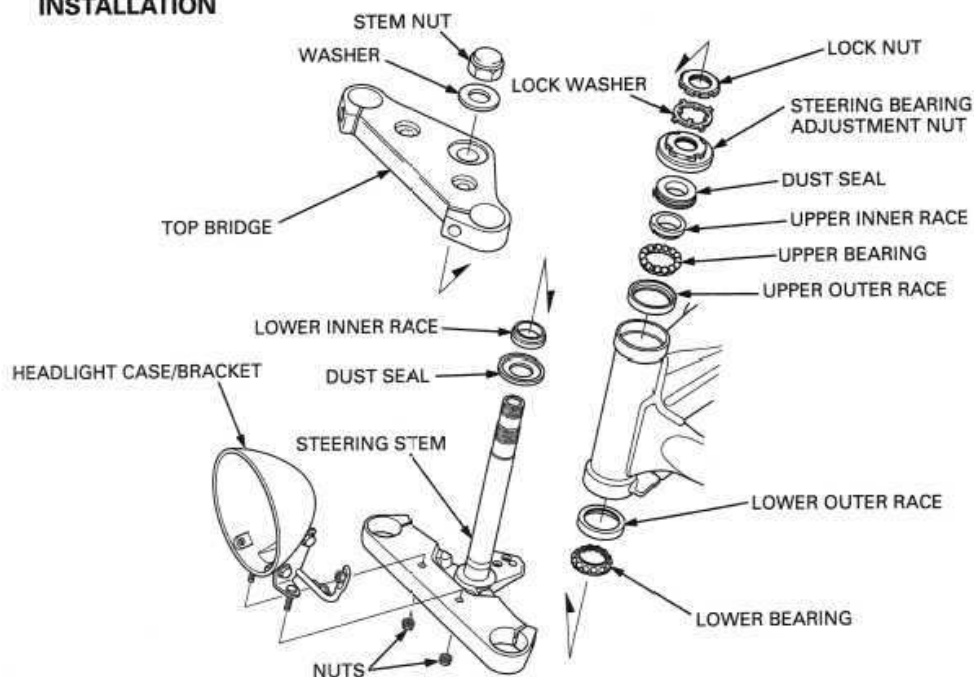
Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.



## INSTALLATION

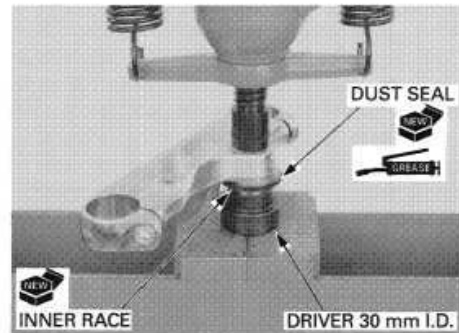


## FRONT WHEEL/SUSPENSION/STEERING

Apply grease to the new dust seal lip and install it over the steering stem.  
Install the new lower bearing inner race using a hydraulic press.

**TOOL:**  
Driver 30 mm I.D.

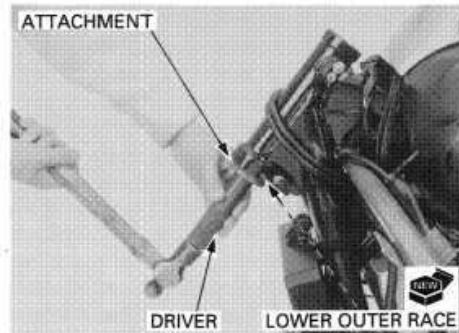
07746 - 0030300



Drive the new lower bearing outer race into the steering head pipe.

**TOOLS:**  
Driver  
Attachment, 52 x 55 mm

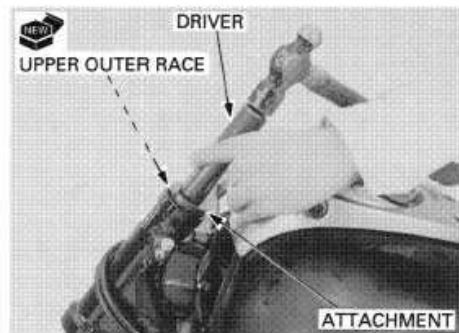
07749 - 0010000  
07746 - 0010400



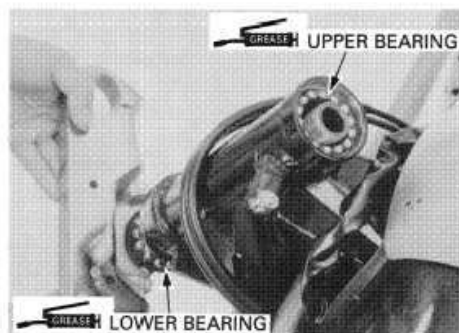
Drive the new upper bearing outer race into the steering head pipe.

**TOOLS:**  
Driver  
Attachment, 42 x 47 mm

07749 - 0010000  
07746 - 0010300



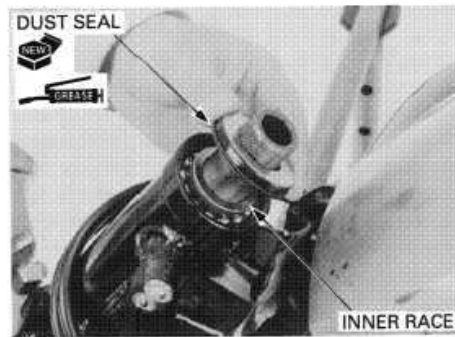
Apply grease to each new steering stem bearing rolling contact surface and fill it up.  
Install the lower bearing onto the steering stem.  
Install the upper bearing onto the steering head pipe.  
Insert the stem into the steering head pipe.



## FRONT WHEEL/SUSPENSION/STEERING

Install the upper inner race.

Apply grease to the new upper dust seal lip and install it.



Apply oil to the steering bearing adjustment nut threads and install it.

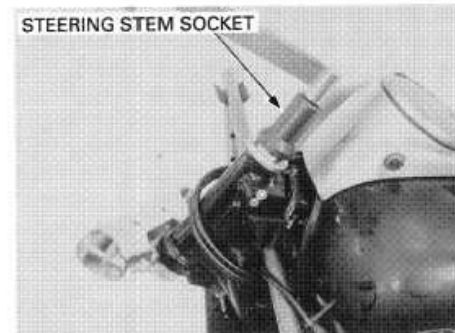


Tighten the steering bearing adjustment nut to the specified torque using the special tool.

**TOOL:**

**Steering stem socket**      07916 - 3710101 or  
07916 - 3710100

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

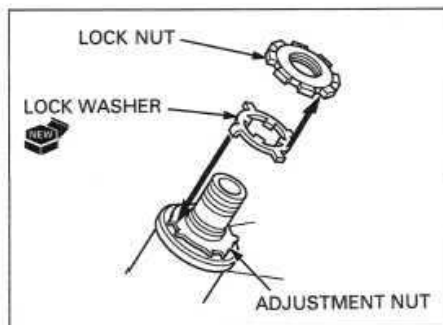


Turn the steering stem lock-to-lock five times.  
Retighten the adjustment nut to the same torque.



Install the new lock washer to align its bent tabs with the grooves in the adjustment nut.

Install and finger tighten the lock nut all the way. Further tighten the lock nut, within 90°, to align its grooves with the tabs of the lock washer. Bend up the lock washer tabs into the grooves of the lock nut.



Install the following:

- steering top bridge
- washer
- steering stem nut

*Route the cables and wire properly (page 1-18)*

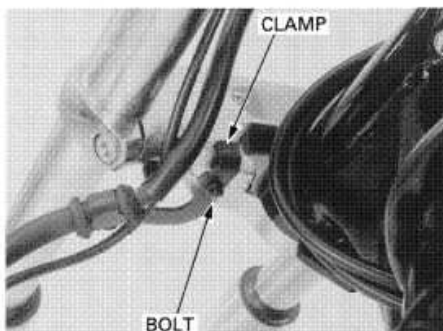
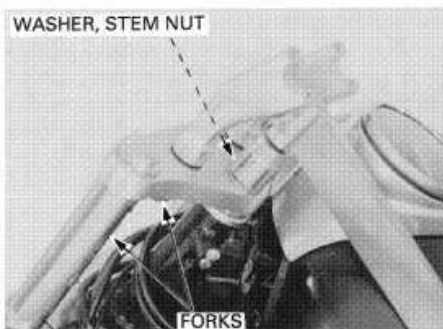
Temporarily install the front forks. Tighten the stem nut to the specified torque.

**TORQUE: 103 N·m (10.5 kfg·m, 76 lbf·ft)**

Make sure the steering stem moves smoothly without play or binding.

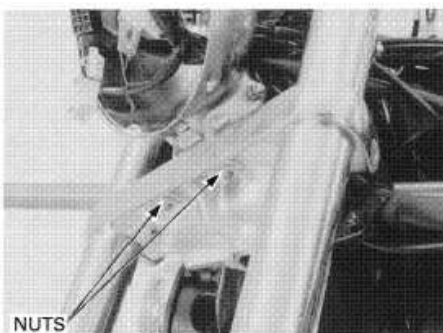
Install the front fork (page 13-22).

Install the brake hose clamp by tightening the bolt.



Install the headlight case with the bracket onto the steering stem and tighten the mounting nut. Route all the connectors into the headlight case. Connect all the connectors in the headlight case and clamp them.

Install the front turn signal assembly (page 13-23) and the headlight (page 19-3). Install the front wheel (page 13-13). Install the handlebar (page 13-4).



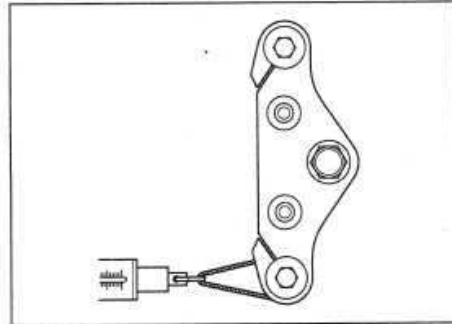
**STEERING BEARING PRELOAD**

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 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 right and left.

**STEERING BEARING PRELOAD:**  
**0.43 – 1.04 kgf (0.95 – 2.29 lbf)**

If the readings do not fall within the limits, readjust the steering bearing adjustment nut.

Install the removed parts in the reverse order of removal.



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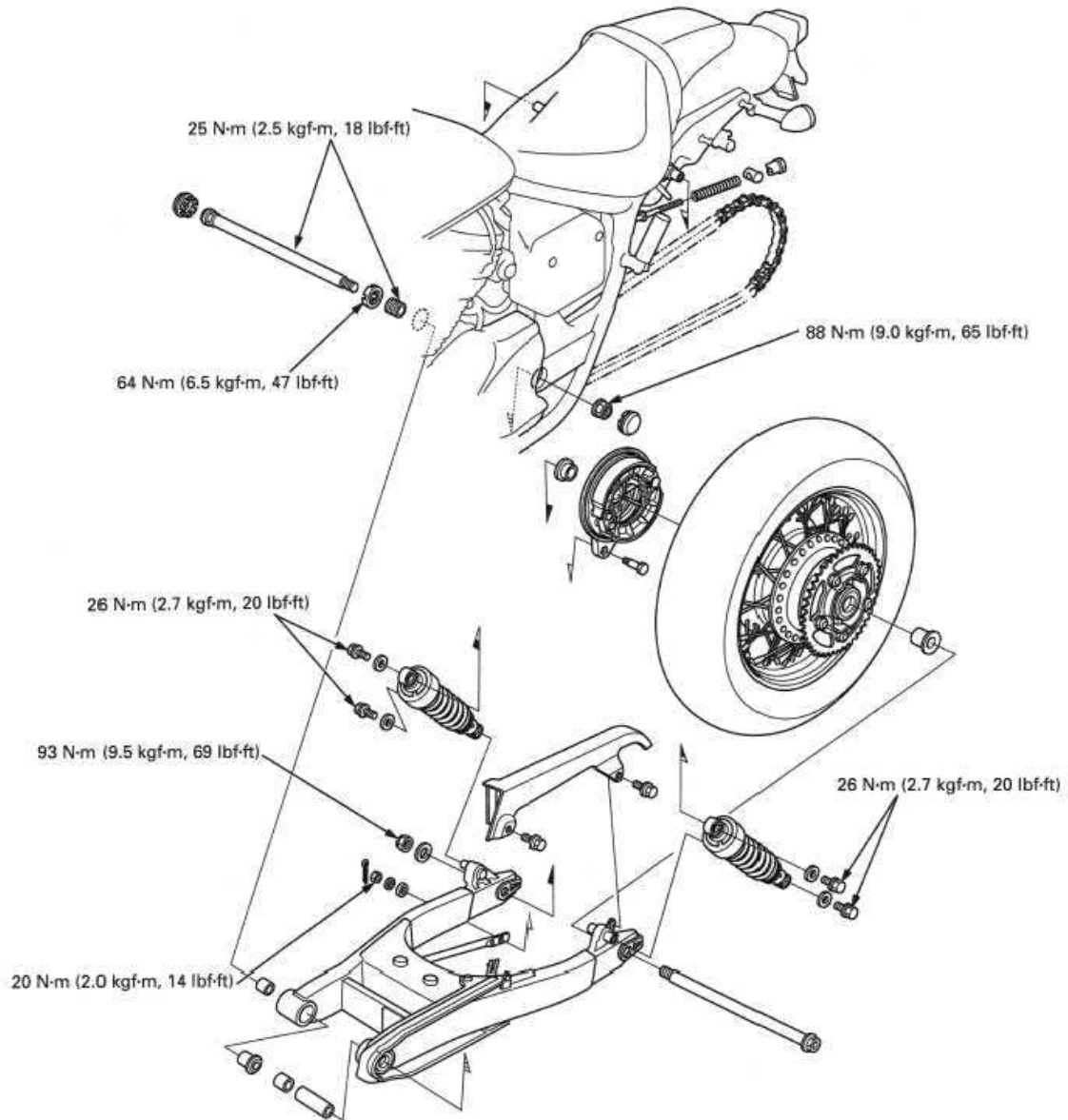
**MEMO**

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## REAR WHEEL/BRAKE/SUSPENSION

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# 14. REAR WHEEL/BRAKE/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-14
TROUBLESHOOTING	14-2	SWINGARM	14-15
REAR WHEEL	14-3	REAR BRAKE PEDAL/ROD	14-22
REAR BRAKE	14-11		

## SERVICE INFORMATION

### GENERAL

- When servicing the rear wheel, shock absorber, or swingarm, raise the rear wheel off the ground by supporting the frame securely.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.
- When using the lock nut wrench, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given on the next page is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives both actual and indicated.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel hub-to-rim distance		Page 14-8	—
Wheel balance weight		—	70 g (2.5 oz)
Drive chain slack		15 – 25 (0.600 – 1)	40 (1.6)
Drive chain size/link	RK	525 SMOZ5/124 L	—
Rear brake	Drum I.D.	180.0 – 180.3 (7.09 – 7.10)	181 (7.13)
	Lining thickness	5 (0.2)	2 (0.1)
	Pedal free play	20 – 30 (3/4 – 1-1/4)	—
Shock absorber spring preload adjuster setting		2nd position	—

14

## REAR WHEEL/BRAKE/SUSPENSION

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### TORQUE VALUES

Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut.
Driven sprocket nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut.
Shock absorber upper/lower mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut.
Swingarm pivot adjusting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Swingarm pivot lock nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Drive chain slider screw	3 N·m (0.3 kgf·m, 2.2 lbf·ft)	
Rear brake stopper arm nut	20 N·m (2.0 kgf·m, 14 lbf·ft)	
Rear brake arm bolt	28 N·m (2.9 kgf·m, 21 lbf·ft)	
Rear brake middle rod joint bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Spoke nipple	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	

### TOOLS:

Attachment, 32 x 35 mm	07746 – 0010100	
Attachment, 42 x 47 mm	07746 – 0010300	
Pilot, 15 mm	07746 – 0040300	
Pilot, 20 mm	07746 – 0040500	
Bearing remover shaft	07746 – 0050100	
Bearing remover head, 20 mm	07746 – 0050600	
Driver	07749 – 0010000	
Snap ring pliers	07914 – SA50001	
Bearing driver remover	07946 – KA50000	
Driver shaft	07946 – MJC0100	Not available in U.S.A.
Attachment	07946 – MJC0201	Not available in U.S.A.
Pivot lock nut wrench	07GMA – KT70200	Not available in U.S.A.
Spoke wrench	07JMA – MR60100	Equivalent commercially available in U.S.A.

## TROUBLESHOOTING

### Soft suspension

- Weak shock absorber spring
- Oil leakage from damper unit
- Incorrect suspension adjustment
- Low tire pressure

### Hard suspension

- Damaged shock absorber mounting bushing
- Incorrect suspension adjustment
- Damaged swingarm pivot bearing
- Bent damper rod
- High tire pressure

### Rear wheel wobbling

- Bent rim
- Worn wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Low tire pressure
- Faulty swingarm pivot bearings

### Wheel turns hard

- Faulty wheel bearings
- Brake drag (section 15)
- Bent rear axle

### Suspension noise

- Binding shock case
- Faulty rear damper
- Loose fasteners
- Worn suspension pivot bushings

## REAR WHEEL

### REMOVAL

Raise the rear wheel off the ground and support it firmly.

Remove the rear brake adjusting nut, disconnect the brake rod from the brake arm, and remove the brake arm joint and spring.

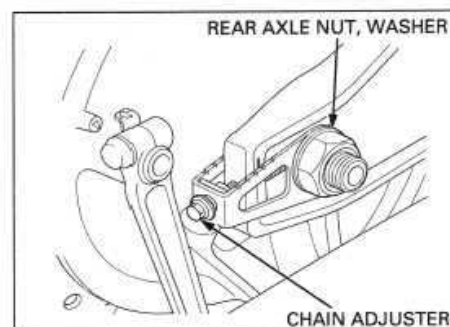
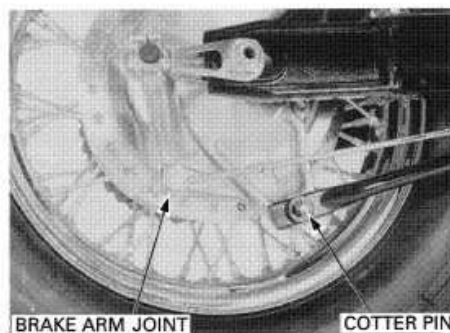
Remove the following:

- cotter pin
- nut
- plain washer
- brake stopper arm rubber
- brake stopper bolt

Loosen and remove the rear axle nut and washer.

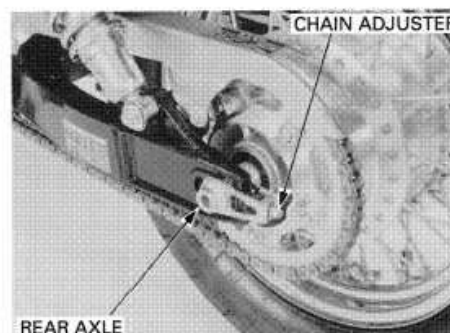
Turn the drive chain adjusters on both sides of the swingarm as necessary.

Move the rear wheel forward fully, making the drive chain fully slack.

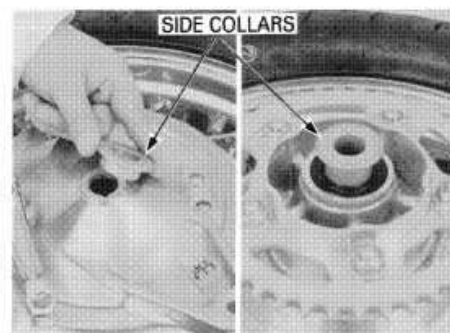


Remove the drive chain from the final driven sprocket.

Pull out the rear axle, then remove the rear wheel.

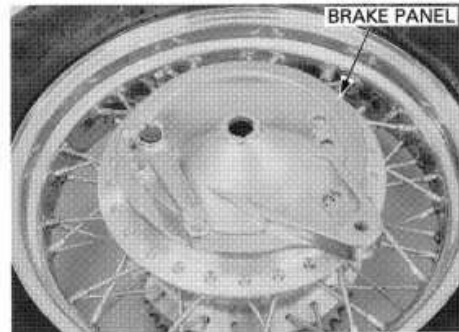


Remove both side collars.



## REAR WHEEL/BRAKE/SUSPENSION

Remove the brake panel from the brake drum.

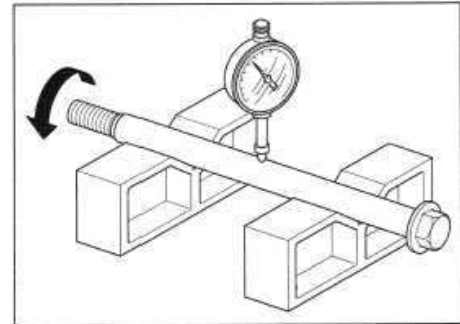


### INSPECTION

#### 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)**



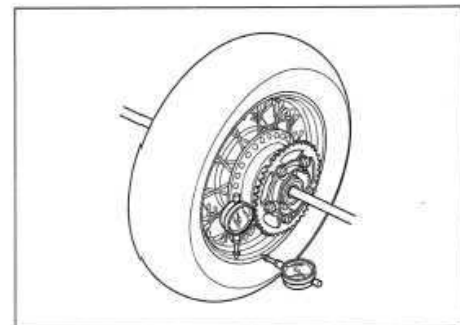
#### WHEEL

Check the rim runout by placing the wheel in a truing stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS: Radial: 2.0 mm (0.08 in)**  
**Axial: 2.0 mm (0.08 in)**

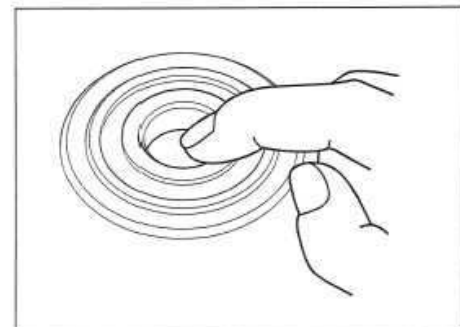


#### WHEEL BEARING

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

*Replace the wheel bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



### FINAL DRIVEN SPROCKET

Check the condition of the final driven sprocket teeth. Replace the sprocket if it is worn or damaged.

Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprockets must be in good condition or the replacement chain or sprocket will wear rapidly.

Final driven sprocket replacement, see below.

### FINAL DRIVEN SPROCKET REPLACEMENT

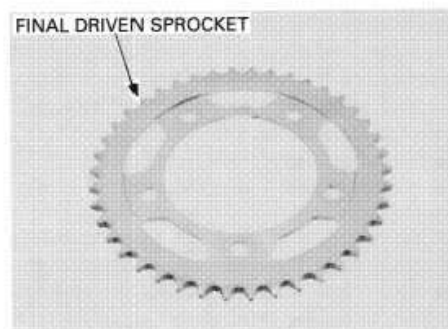
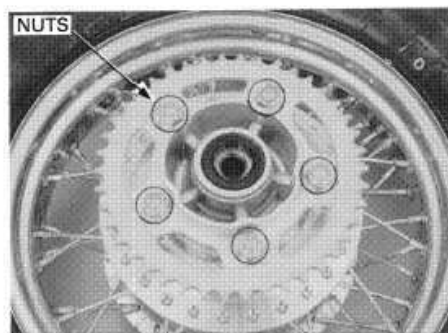
#### NOTE:

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.

Remove the five nuts by holding the rear wheel, then remove the sprocket from the bolts.

Install the new driven sprocket with the nuts, then tighten the nuts to the specified torque.

**TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)**

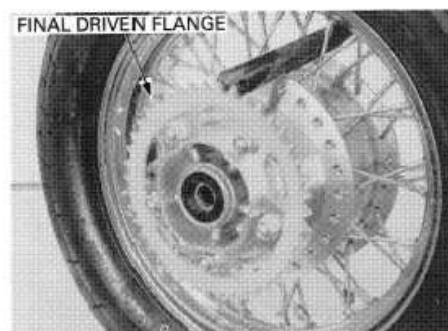


### DISASSEMBLY

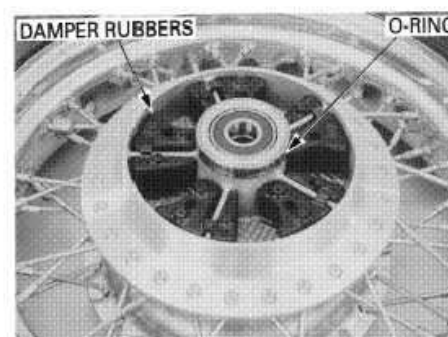
Remove the final driven flange with the sprocket from the wheel hub.

#### NOTE:

- If it is hard to remove the final driven flange, tap the sprocket in several locations with a piece of wood or a soft hammer.



Remove the damper rubbers and O-ring.



## REAR WHEEL/BRAKE/SUSPENSION

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.

*If the bearings are removed, they must be replaced with new ones.*

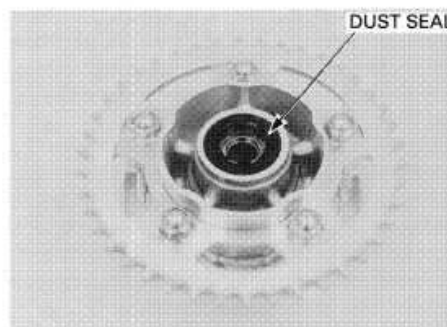
### TOOLS:

Bearing remover shaft 07746 - 0050100  
Bearing remover head, 20 mm 07746 - 0050600

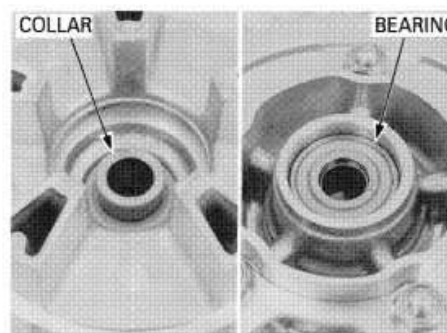


### FINAL DRIVEN FLANGE

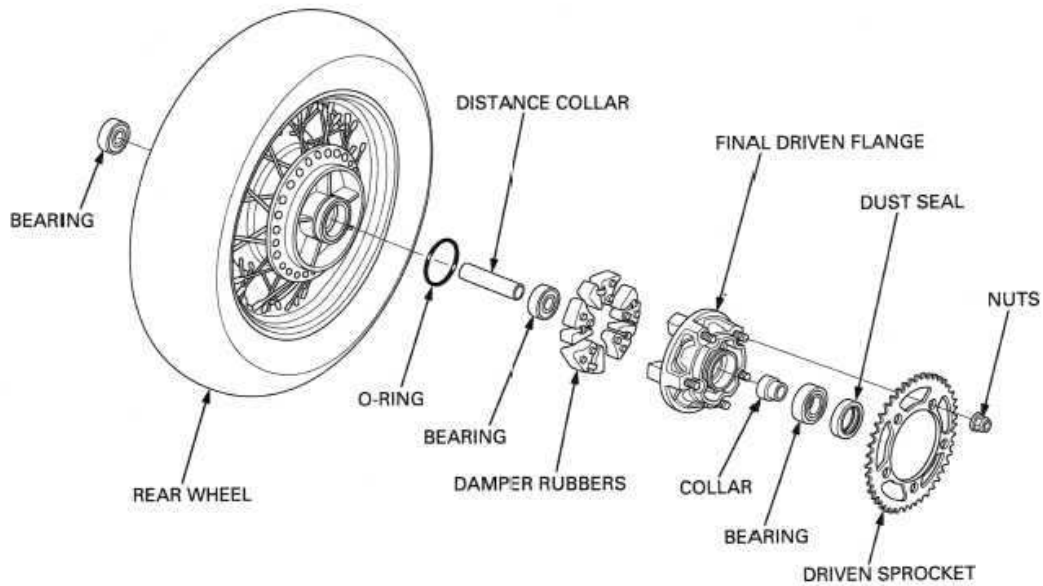
Remove the dust seal from the final driven flange.



Drive the bearing and collar out of the driven flange using the suitable tool.



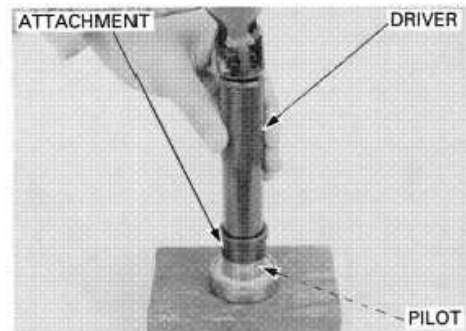
ASSEMBLY



Place the new driven flange bearing with the marking facing down.  
From the opposite side drive in the driven flange collar squarely to the driven flange bearing using the special tool.

**TOOLS:**

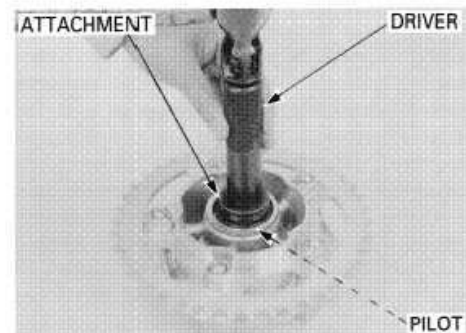
Driver	07749 - 0010000
Attachment, 32 x 35 mm	07746 - 0010100
Pilot, 20 mm	07746 - 0010300



Drive in the new bearing and collar into the final driven flange with the marking facing up until it is seated.

**TOOLS:**

Driver	07749 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 20 mm	07746 - 0010300





## REAR WHEEL/BRAKE/SUSPENSION

Drive in a right bearing squarely with the marking facing up until it is fully seated.  
Install the distance collar.  
Drive in a new left bearing squarely with the marking facing up until it is seated.

### TOOLS:

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



### WHEEL CENTER ADJUSTMENT

Wheel center adjustment is necessary when new spokes are installed.

Measure distance B (rim width) and calculate distance A as follows:

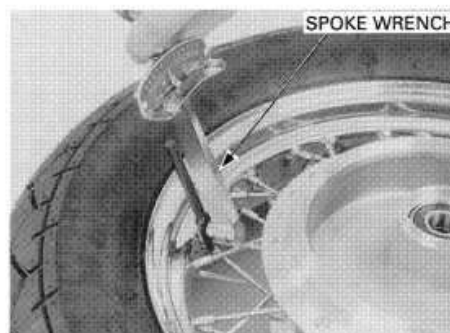
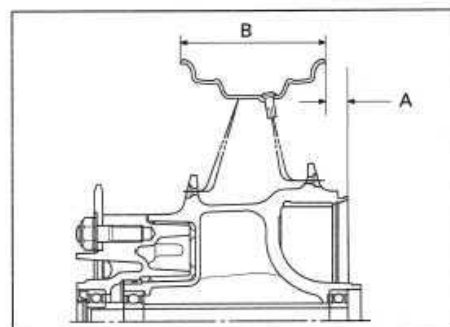
$$A = 72.7 \text{ mm (2.86 in)} - B/2$$

Adjust the rim position and distance A by tightening the spokes to the specified torque in two or three progressive steps.

### TOOL:

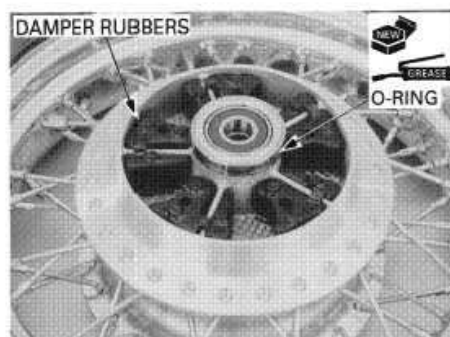
Spoke wrench	07JMA - MR60100
or equivalent commercially available in U.S.A.	

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



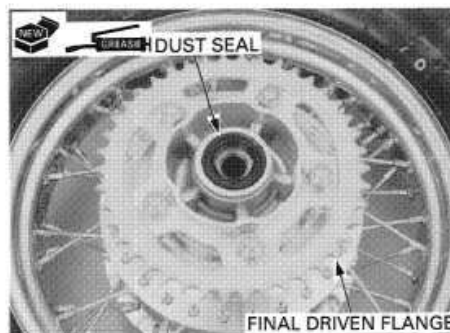
Check the damper rubber for deterioration or damage and replace the rear wheel assembly with a new one if necessary.

Coat a new O-ring with grease.  
Install the damper rubbers and O-ring into the wheel hub.



Install the final driven flange assembly onto the left wheel hub.

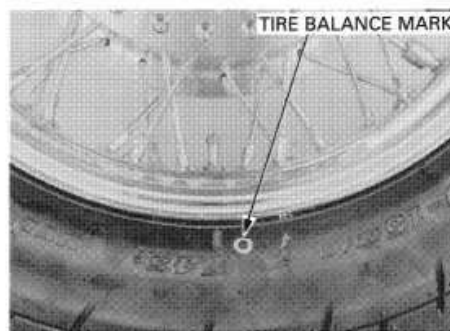
Apply grease to the new dust seal lips, then install it into the driven flange.



### WHEEL BALANCE

#### NOTE:

- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

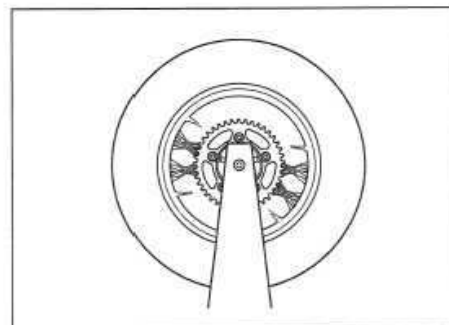


*Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.*

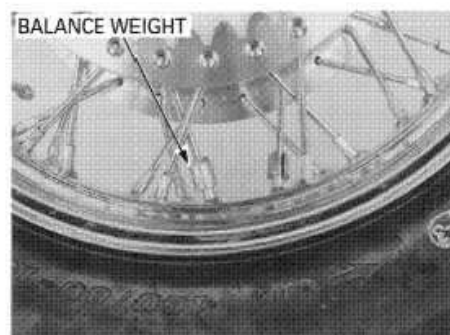
Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



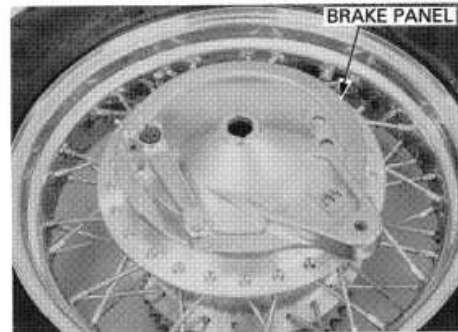
To balance the wheel, install balance weights on the lightest side of the wheel, the side opposite the chalk marks, add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 70 g (2.5 oz) to the rear wheel.



## REAR WHEEL/BRAKE/SUSPENSION

### INSTALLATION

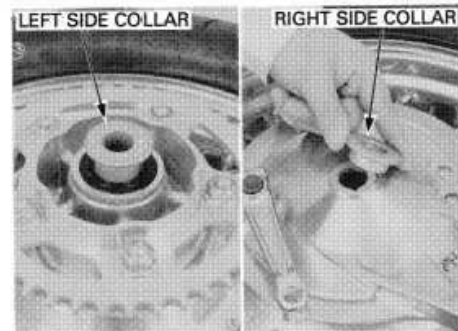
Install the brake panel assembly into the right wheel hub.



Install both side collars.

**NOTE:**

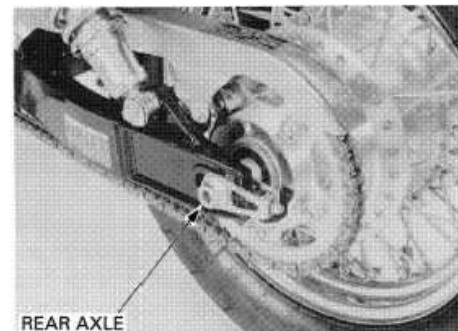
- Do not interchange the left and right side collar. The left side collar is longer than the right side collar.



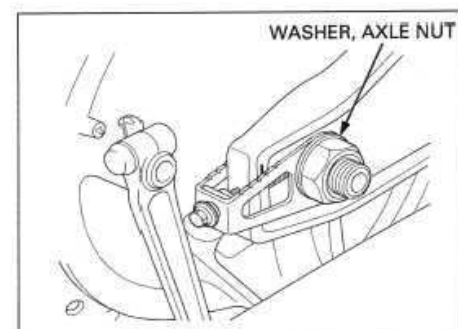
Position the rear wheel between the swingarm.

Insert the rear axle through the swingarm, wheel hub and side collars.

Install the drive chain over the driven sprocket.



Install the washer and rear axle nut.



Install the brake stopper arm bolt.  
Install the following:

- brake stopper arm rubber
- plain washer
- stopper arm nut

Tighten the nut to the specified torque.

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

Install a new cotter pin.

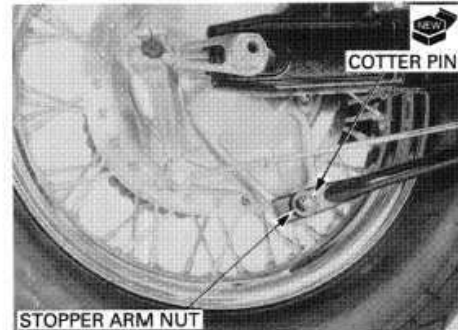
Connect the brake rod to the brake arm with the spring and brake arm joint.  
Install the rear brake adjusting nut.

Adjust the drive chain slack (page 3-15).

Tighten the rear axle nut to the specified torque.

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

Adjust the rear brake pedal free play (page 3-19).



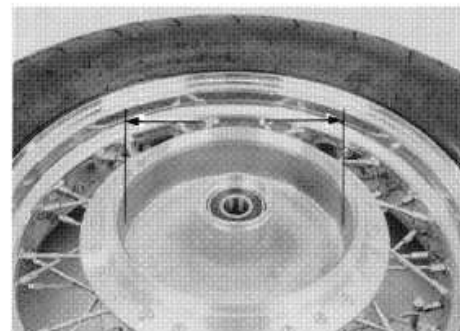
## **REAR BRAKE**

Remove the rear brake panel from the rear wheel (page 14-3).

### **INSPECTION**

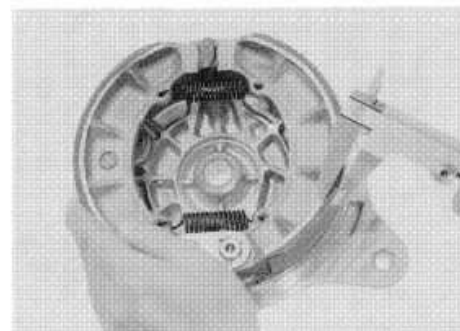
Measure the rear brake drum I.D.

**SERVICE LIMIT: 181 mm (7.13 in)**



Measure the brake lining thickness.

**SERVICE LIMIT: 2 mm (0.1 in)**

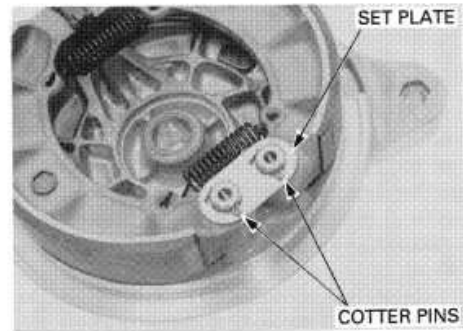


## REAR WHEEL/BRAKE/SUSPENSION

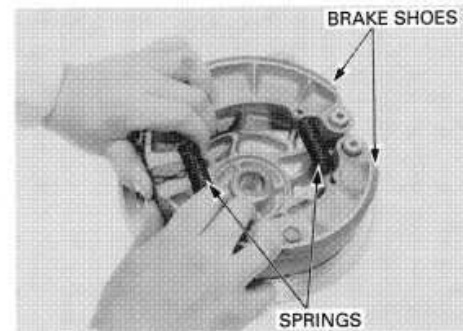
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### DISASSEMBLY

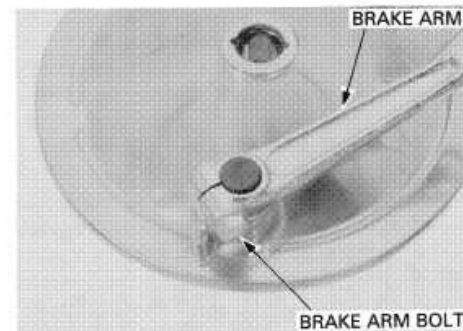
Remove the cotter pins and set plate.



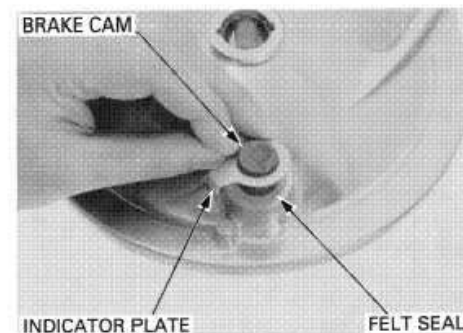
Expand the brake shoes and remove them from the brake cam and anchor pin.  
Remove the shoe springs from the shoes.



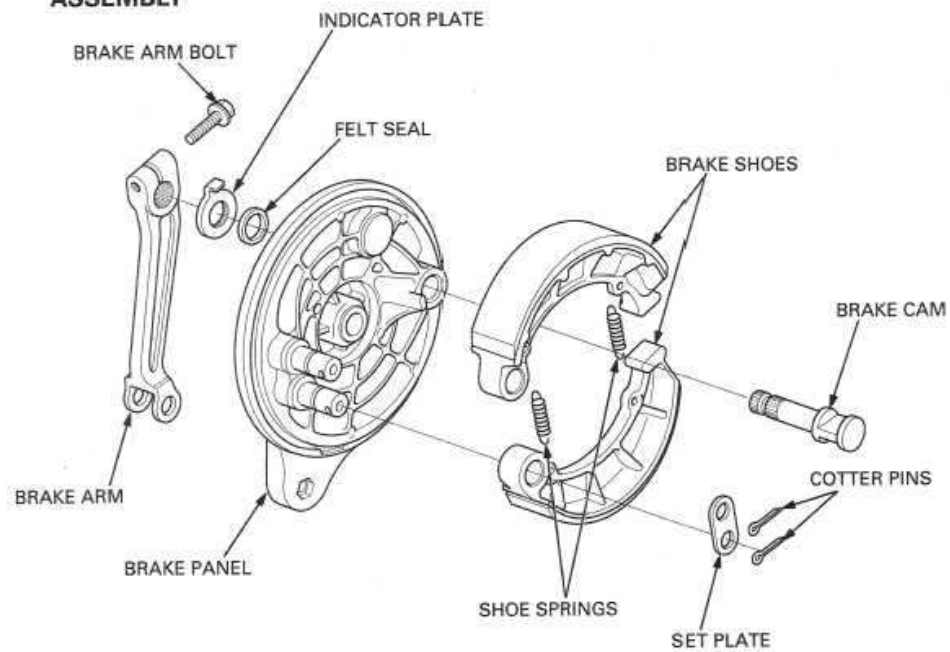
Remove the brake arm bolt and arm from the brake cam.



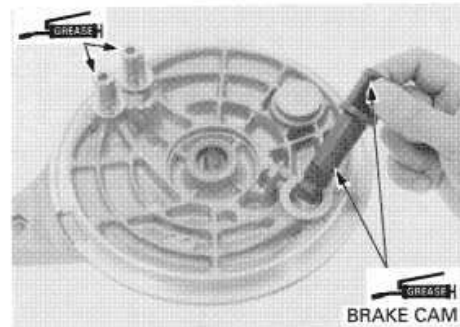
Remove the indicator plate, felt seal and brake cam from the brake panel.



**ASSEMBLY**

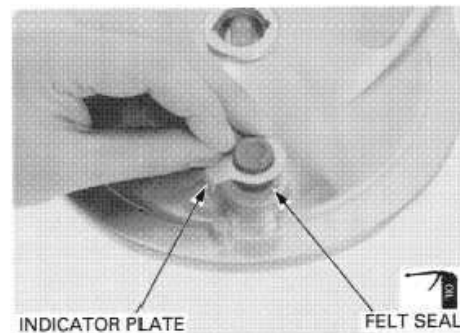


Apply grease to the anchor pin.  
Apply grease to the sliding and shoe contacting surfaces of the brake cam and install the cam into the brake panel.



Apply oil to the felt seal and install the seal on the brake panel.

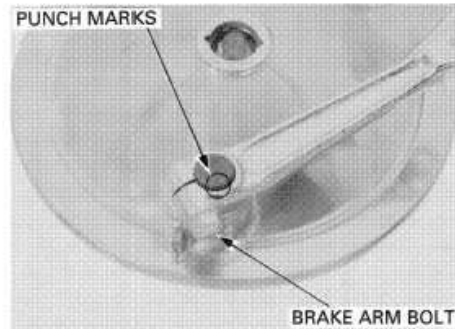
Install the indicator plate, aligning its wide tooth with the wide groove in the brake cam.



## REAR WHEEL/BRAKE/SUSPENSION

Install the brake arm, aligning the punch marks on the arm and brake cam.  
Install the brake arm bolt and tighten the bolt.

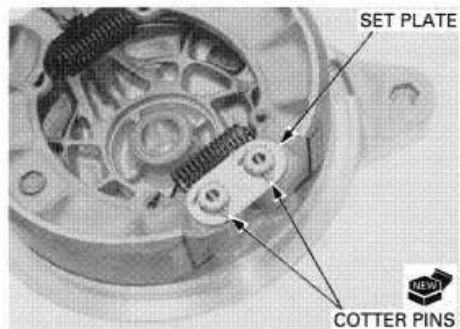
**TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)**



Install the shoe springs onto the brake shoes.  
Install the brake shoes onto the brake cam and anchor pin.

Install the set plate and new cotter pins.

Install the rear wheel (page 14-10).



## SHOCK ABSORBER

### REMOVAL

Raise the rear wheel off the ground by supporting the frame securely.

Remove the upper and lower mounting bolts and washers.  
Remove the shock absorber.

### INSPECTION

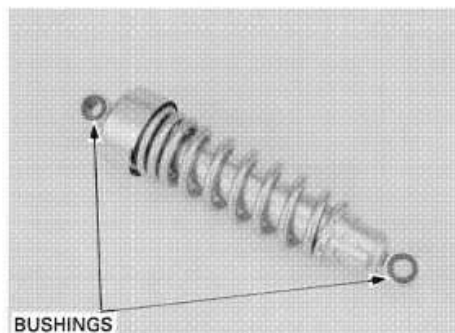
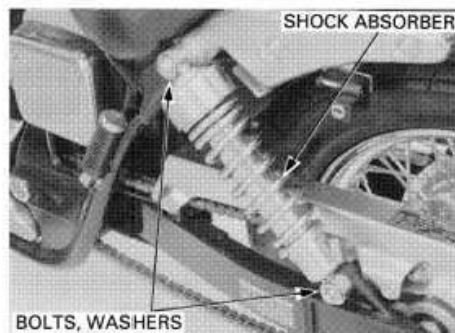
Visually inspect the following:

- damper for oil leaks
- damper rod for bend
- spring for damage
- mounting bushings for wear, damage or deterioration

Replace the shock absorber assembly if necessary.

### TORQUE:

Shock absorber upper/lower mounting bolt:  
26 N·m (2.7 kgf·m, 20 lbf·ft)



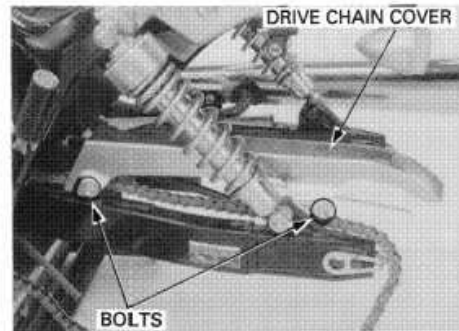
## SWINGARM

### REMOVAL

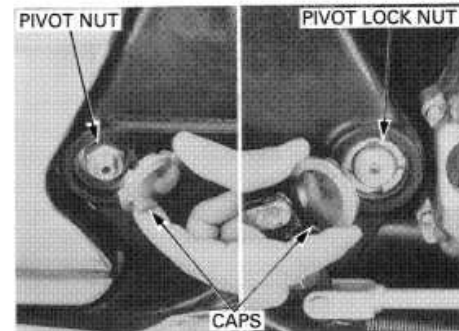
Remove the following:  
 — exhaust system (page 2-5)  
 — rear wheel (page 14-3)

Remove the bolts and drive chain cover.

Remove the shock absorbers (see previous page).



Remove the pivot bolt caps and swingarm pivot nut.

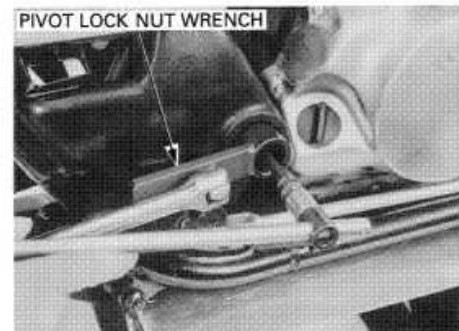


Remove the swingarm pivot lock nut while holding the pivot bolt.

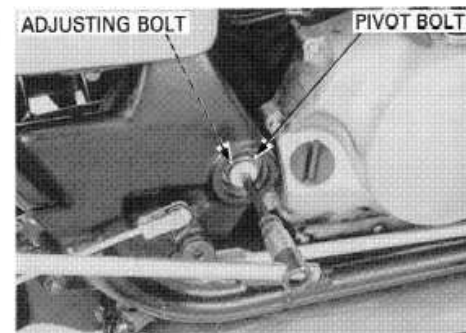
### TOOL:

Pivot lock nut wrench

07GMA – KT70200  
 Not available in U.S.A.



Loosen the swingarm adjusting bolt by turning the pivot bolt.  
 Remove the pivot bolt and swingarm.

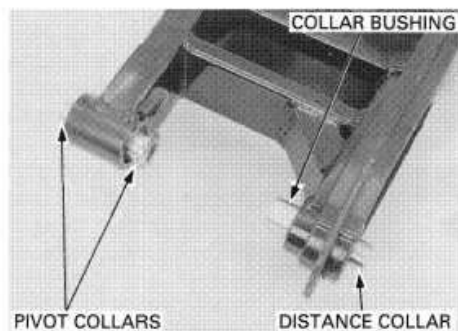




## REAR WHEEL/BRAKE/SUSPENSION

Remove the swingarm pivot collars from the right side pivot.

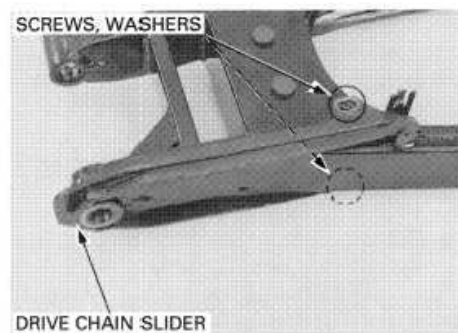
Remove the swingarm pivot distance collar from the left side pivot and remove the collar bushing from the distance collar.



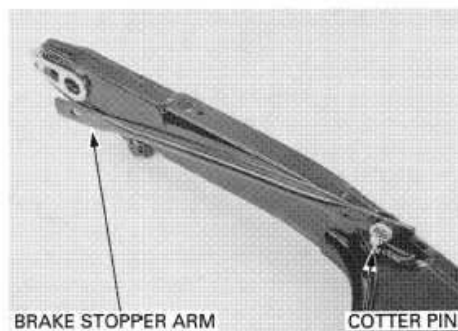
### DISASSEMBLY

Remove the following:

- two screws
- two chain slider washers
- drive chain slider

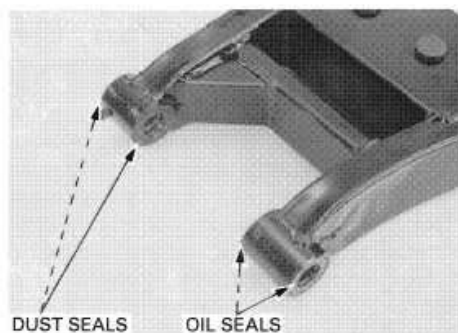


- cotter pin
- nut
- plain washer
- spring washer
- brake stopper arm bolt
- brake stopper arm



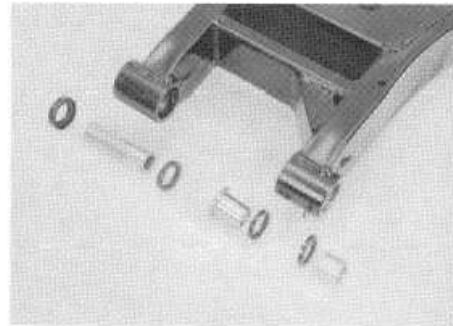
Remove the dust seals from the left side pivot.

Remove the oil seals from the right side pivot.



## INSPECTION

Check the swingarm for cracks or other damage.  
Check the distance collar, collar bushing and pivot collars.  
Check the dust seals and oil seals.  
Check the pivot bearings.



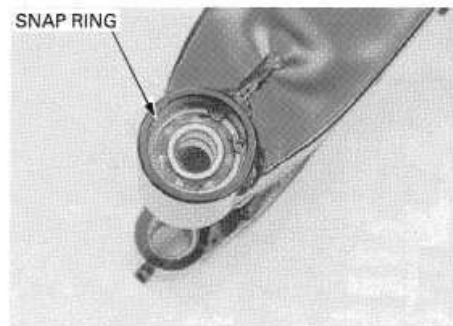
## PIVOT BEARING REPLACEMENT

Remove the snap ring from the right pivot.

### TOOL:

Snap ring pliers

07914 - SA50001



Drive the ball bearings out of the swingarm using a hydraulic press and special tools.

### TOOLS:

Driver shaft

07946 - MJ00100

Not available in U.S.A.

Attachment

07946 - MJ00201

Not available in U.S.A.

or

Pilot, 15 mm

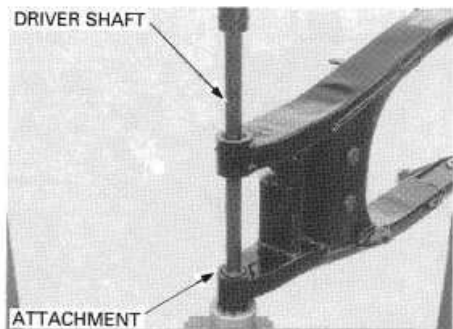
07746 - 0040300

Attachment, 28 x 30 mm

07946 - 1870100

Driver shaft

07946 - 3710001



Drive the needle bearing out of the swingarm using a hydraulic press and special tools.

### TOOLS:

Bearing driver remover

07946 - KA50000

Attachment

07946 - MJ00201

Not available in U.S.A.

or

Pilot, 20 mm

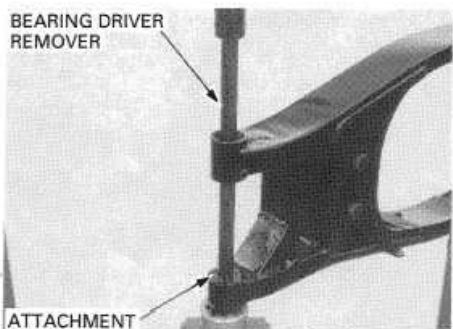
07746 - 0040500

Attachment, 28 x 30 mm

07946 - 1870100

Driver shaft

07946 - 3710001

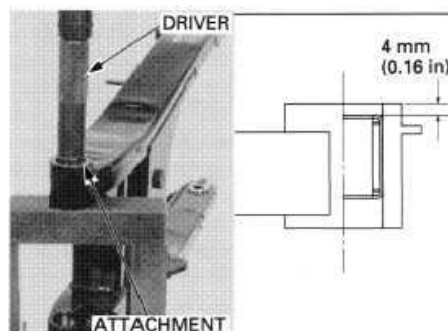


## REAR WHEEL/BRAKE/SUSPENSION

Apply grease to the new needle bearing.  
Press the needle bearing into the swingarm with the marking side facing out so the needle bearing outer surface is 4.0 mm (0.16 in) below the outer edge of the swingarm pivot bearing cavity.

### TOOLS:

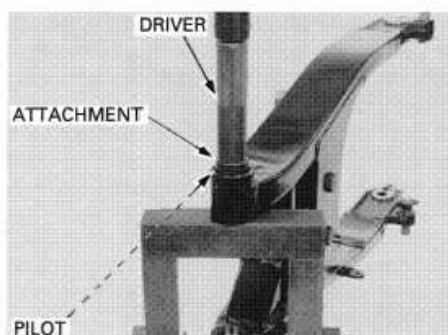
Driver	07749 - 0010000
Attachment	07946 - MJ00201
	Not available in U.S.A.
	or
Attachment, 28 x 30 mm	07946 - 1870100



Apply grease to the new ball bearings.  
Press the ball bearings into the swingarm with the marking side facing out until they are fully seated.

### TOOLS:

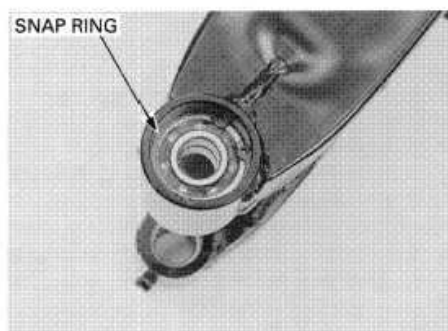
Driver	07749 - 0010000
Attachment, 32 x 35 mm	07746 - 0010100
Pilot, 15 mm	07746 - 0040300



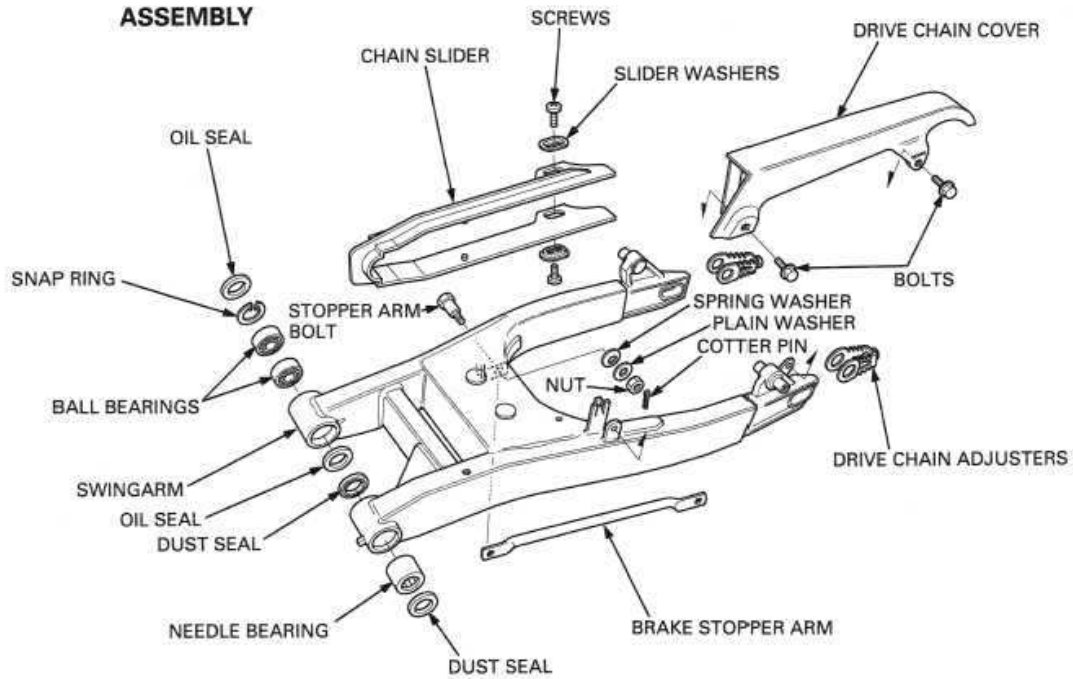
Install the new snap ring into the right pivot.

### TOOL:

Snap ring pliers	07914 - SA50001
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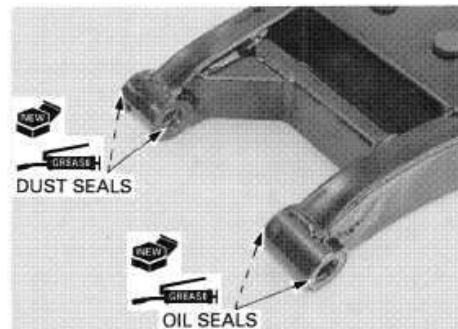
**ASSEMBLY**



Apply grease to the new dust seal lip and oil seal lips.

Install the dust seals into the left side pivot.

Install the oil seals into the right side pivot.



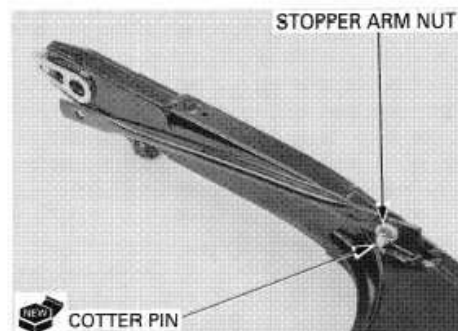
Install the following:

- brake stopper arm bolt
- brake stopper arm
- spring washer
- plain washer
- nut

Tighten the nut to the specified torque.

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

Install a new cotter pin.



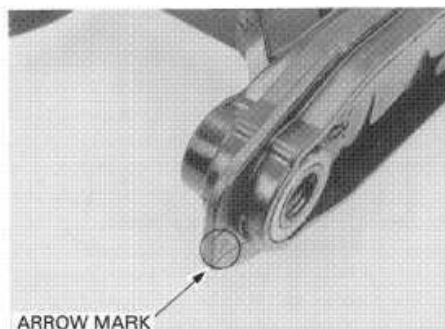
## REAR WHEEL/BRAKE/SUSPENSION

Install the drive chain slider with the arrow mark facing down.

Install the chain slider washers and screws.

Tighten the screws to the specified torque.

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



### INSTALLATION

Apply gear oil to the pivot distance collar inner surfaces.

Apply grease to the pivot distance collar outer surfaces.

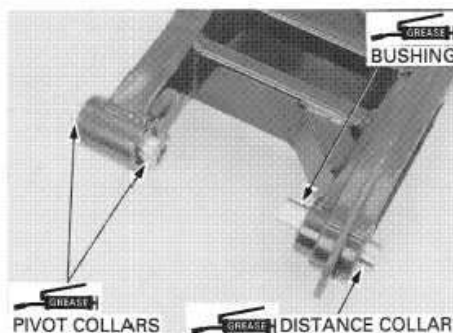
Apply grease to the distance collar bushing outer and inner surfaces.

Apply grease to the pivot collar outer surfaces.

Install the collar bushing to the distance collar and

install the distance collar in the left side pivot.

Install the pivot collars in the right side pivot.



Place the swingarm into the frame.

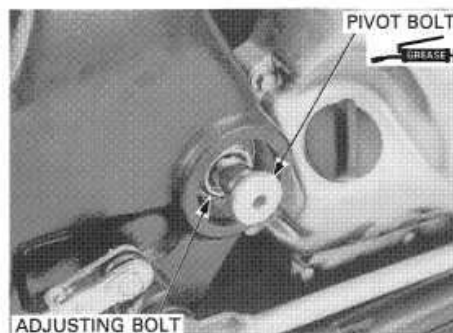
Apply gear oil to the swingarm pivot bolt outer surface.

Insert the swingarm pivot bolt.

Be sure the tip of the adjusting bolt does not protrude inward.

Turn the swingarm adjusting bolt completely in by hand.

Push the pivot bolt's hex shank into the adjusting bolt's socket head.



Tighten the swingarm pivot adjusting bolt with the pivot bolt.

**TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)**



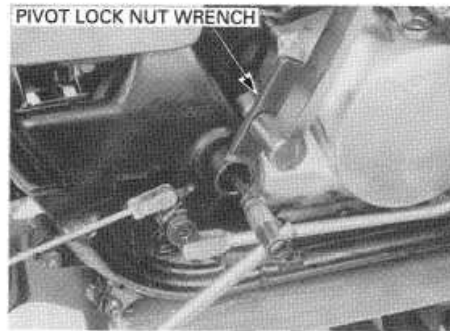
Refer to torque wrench reading information on page 14-1 "Service information".

Install and tighten the swingarm pivot lock nut fully by hand, then tighten the lock nut to the specified torque while holding the pivot bolt using the special tool.

**TOOL:**

Pivot lock nut wrench 07GMA - KT70200  
Not available in U.S.A.

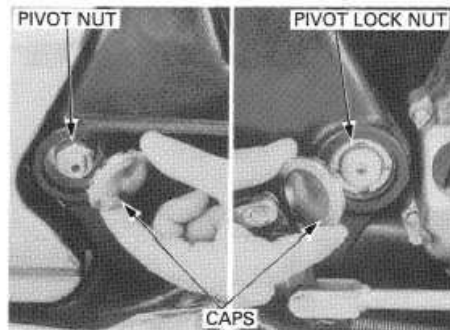
**TORQUE:** Actual: 64 N·m (6.5 kgf·m, 47 lbf·ft)  
Indicated: 58 N·m (5.9 kgf·m, 43 lbf·ft)



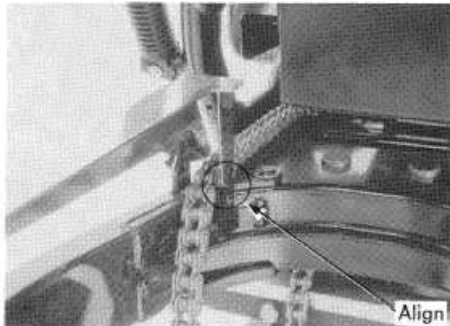
Install and tighten the swingarm pivot nut to the specified torque.

**TORQUE:** 88 N·m (9.0 kgf·m, 65 lbf·ft)

Install the pivot bolt caps.



Install the drive chain cover by aligning the set plate with the tab on the swingarm.

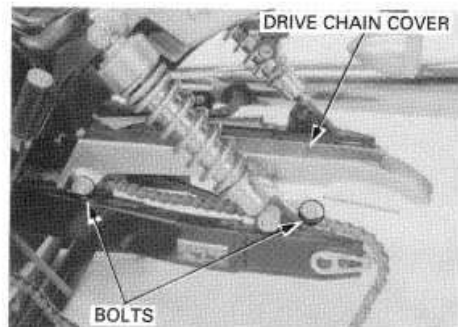


Install the shock absorbers (page 14-14).

Install and tighten the drive chain cover bolts.

Install the rear wheel (page 14-10).

Install the exhaust system (page 2-6).

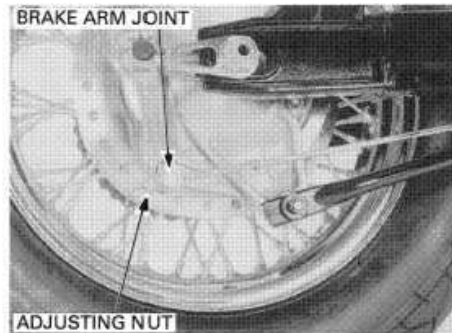


## REAR BRAKE PEDAL/ROD

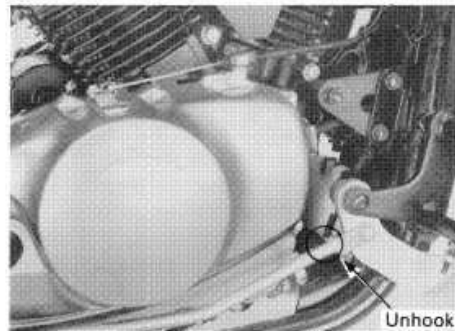
### REMOVAL

Remove the exhaust system (page 2-5).

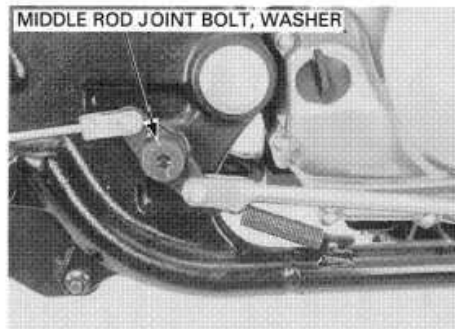
Remove the rear brake adjusting nut, disconnect the brake rod from the brake arm, and remove the brake arm joint and spring.



Unhook the rear brake light switch spring from the rear brake middle rod and remove the right footpeg bracket.



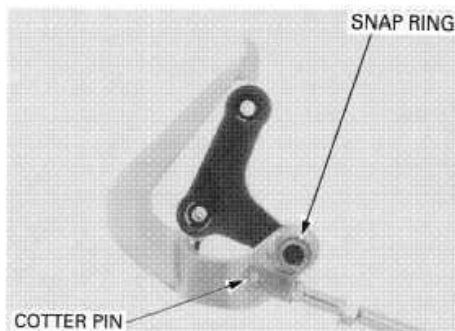
Remove the rear brake middle rod joint bolt and unhook the brake pedal spring. Remove the brake pedal/rod assembly and plain washer.



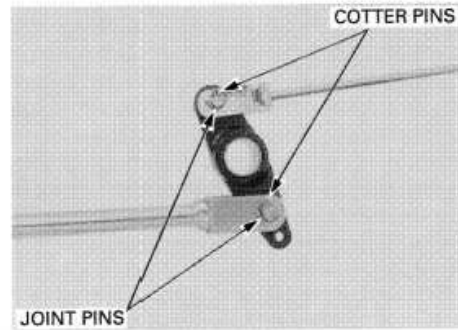
Remove the cotter pin, joint pin and middle rod.

Remove the following:

- snap ring
- bushing washer
- dust seals
- footpeg bracket
- rear brake pedal

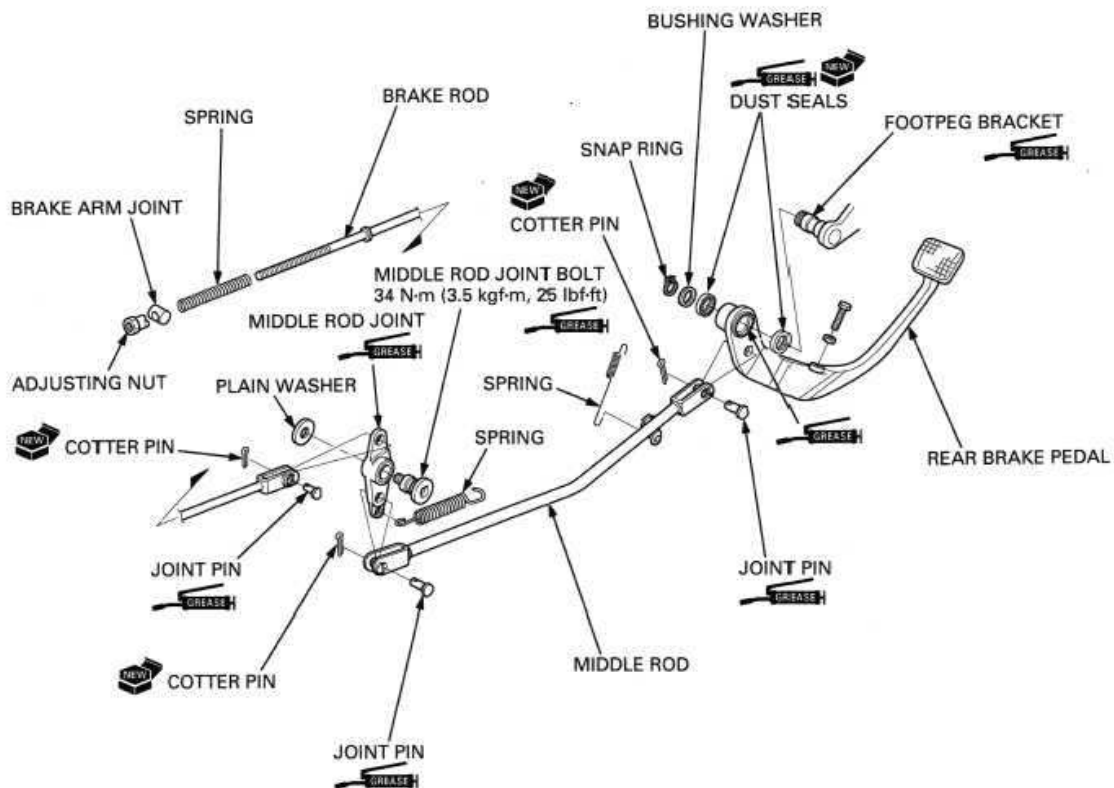


Remove the cotter pins, joint pins and rear brake middle arm.



### INSTALLATION

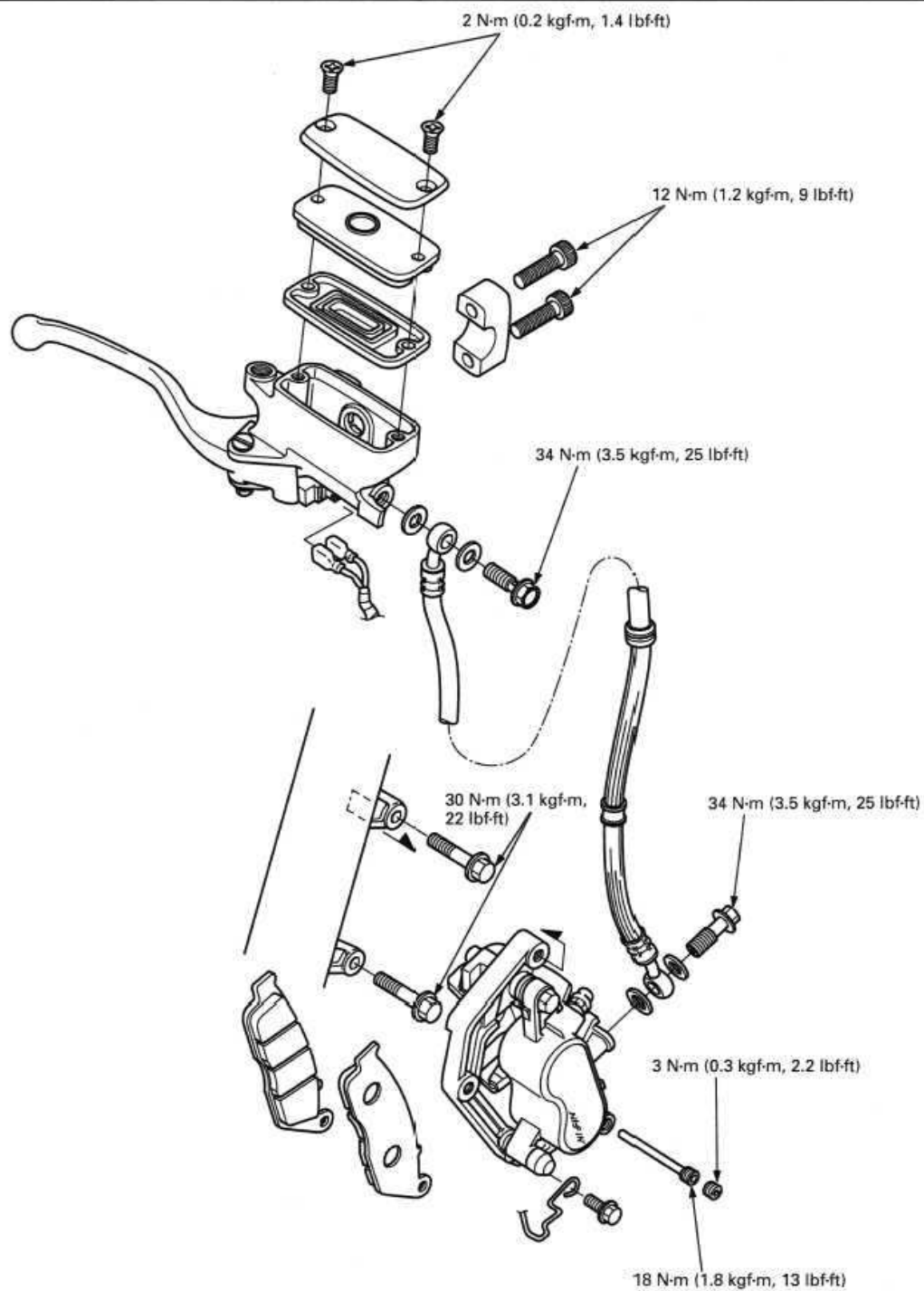
Install the removed parts in the reverse order of removal.





## HYDRAULIC DISC BRAKE

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# 15. HYDRAULIC DISC BRAKE

SERVICE INFORMATION	15-1	BRAKE PAD/DISC	15-4
TROUBLESHOOTING	15-2	BRAKE MASTER CYLINDER	15-6
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-3	BRAKE CALIPER	15-10

## SERVICE INFORMATION

### GENERAL

#### ⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.
- Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Bleed the hydraulic system if it has been disassembled or if the brake feels spongy.
- Never allow contaminants (dirt, water, etc) to get into an open reservoir.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check the brake operation before riding the motorcycle.

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Specified brake fluid	DOT 4	—
Brake disc thickness	5.8 – 6.2 (0.23 – 0.24)	5 (0.2)
Brake disc runout	—	0.30 (0.012)
Master cylinder I.D.	11.000 – 11.043 (0.4331 – 0.4348)	11.05 (0.435)
Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
Caliper cylinder I.D.	27.000 – 27.050 (1.0630 – 1.0650)	27.06 (1.065)
Caliper piston O.D.	26.918 – 26.968 (1.0598 – 1.0617)	26.91 (1.059)

Brake caliper mounting bolt  
Brake caliper pin bolt  
Brake caliper bracket pin bolt  
Pad pin  
Pad pin plug  
Brake caliper bleed valve  
Brake lever pivot bolt  
Brake lever pivot nut  
Brake master cylinder holder bolt  
Brake master cylinder reservoir cap screw  
Front brake light switch screw  
Brake hose oil bolt

30 N·m (3.1 kgf·m, 22 lbf·ft)  
13 N·m (1.3 kgf·m, 9 lbf·ft)  
27 N·m (2.8 kgf·m, 28 lbf·ft)  
18 N·m (1.8 kgf·m, 13 lbf·ft)  
3 N·m (0.3 kgf·m, 2.2 lbf·ft)  
6 N·m (0.6 kgf·m, 4.3 lbf·ft)  
1 N·m (0.1 kgf·m, 0.7 lbf·ft)  
6 N·m (0.6 kgf·m, 4.3 lbf·ft)  
12 N·m (1.2 kgf·m, 9 lbf·ft)  
2 N·m (0.2 kgf·m, 1.4 lbf·ft)  
1 N·m (0.1 kgf·m, 0.7 lbf·ft)  
34 N·m (3.5 kgf·m, 25 lbf·ft)

ALOC bolt: replace with a new one.  
Apply locking agent to the threads.  
Apply locking agent to the threads.

### TOOL:

Snap ring pliers 07914 – SA50001

15

## TROUBLESHOOTING

### Brake lever soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cup
- Worn brake pad/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

### Brake lever 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

### Brake drag

- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking/worn caliper piston

## BRAKE FLUID REPLACEMENT/ AIR BLEEDING

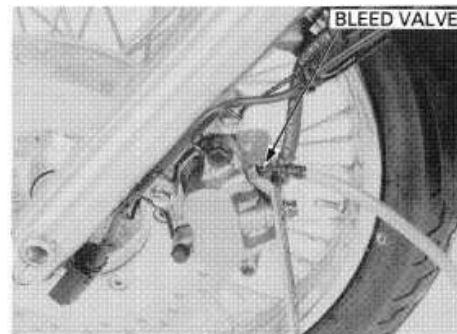
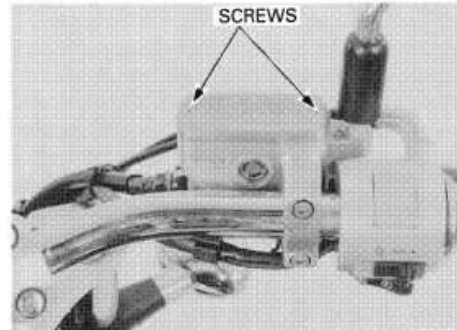
### BRAKE FLUID DRAINING

*A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

Position the handlebar to the straight ahead position so the reservoir is level before removing the reservoir cap. Remove the screws, reservoir cap, set plate and diaphragm.

*Do not allow foreign material to enter the system when filling the reservoir.*

Connect the bleed hose to the bleed valve. Loosen the bleed valve and pump the brake lever until no more fluid, flows out of the bleed valve.



### BRAKE FLUID FILLING/BLEEDING

*Use only DOT 4 brake fluid from a sealed container.*

*Do not mix different types of fluid. They are not compatible.*

Fill the reservoir with DOT 4 brake fluid from a sealed container. Connect a commercially available brake bleeder to the bleed valve. Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the reservoir is low.

#### NOTE:

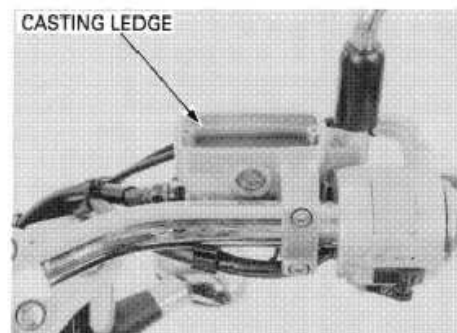
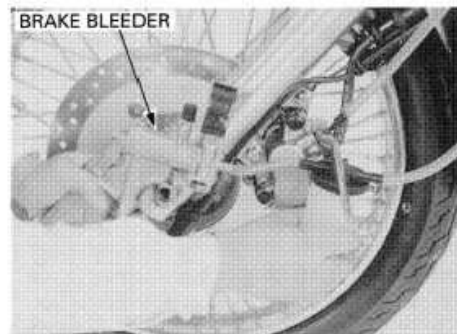
- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system. When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat the previous procedures until air bubbles do not appear in the plastic hose.

#### NOTE:

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever. If it is still spongy, bleed the system again.



## HYDRAULIC DISC BRAKE

If a brake bleeder is not available, use the following procedure:

Connect a plastic hose to the bleed valve.

Pump up the system pressure with the brake lever until lever resistance is felt.

1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.  
Do not release the brake lever until the bleed valve has been closed.
2. Release brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat the steps 1 – 2 until air bubbles do not appear in the bleed hose.

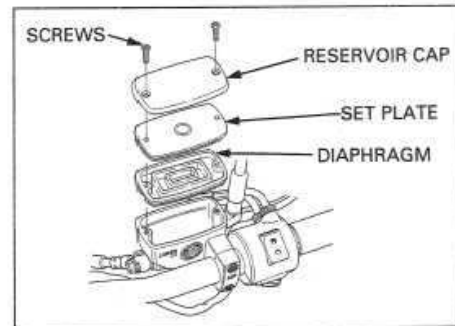
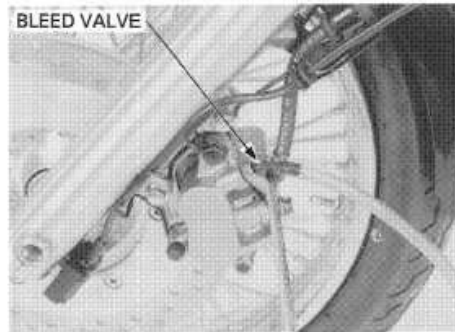
Tighten the bleed valve.

**TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)**

Fill the reservoir to the upper level line with the DOT 4 brake fluid.

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

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

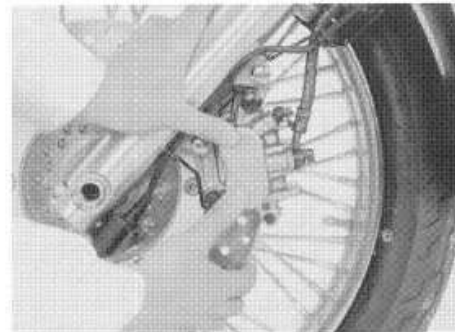


## BRAKE PAD/DISC

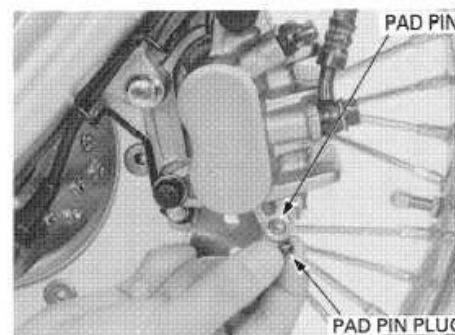
### BRAKE PAD REPLACEMENT

*Always replace the brake pads in pairs to assure even disc pressure.*

Push the caliper pistons all the way in by pushing the caliper body inward to provide clearance for the new pads.

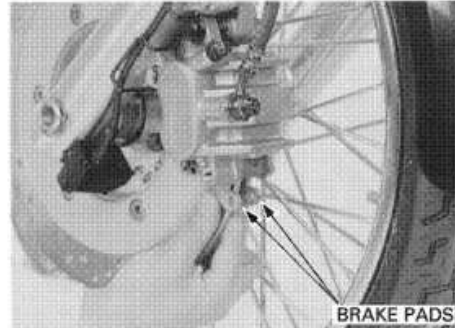


Remove the pad pin plug and loosen the pad pin.



Remove the pad pin and brake pads.

Make sure the pad spring is installed in position.  
Install new pads so their ends rest on the pad retain-  
er on the bracket properly.



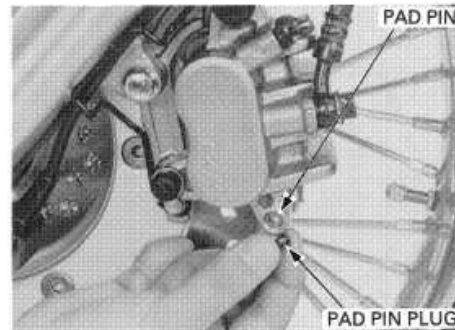
Install the pad pin by pushing the pads against the  
pad spring to align the pad pin holes in the pads and  
caliper.  
Tighten the pad pin.

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

Install and tighten the pad pin plug.

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

Operate the brake lever to seat the caliper pistons  
against the pads.

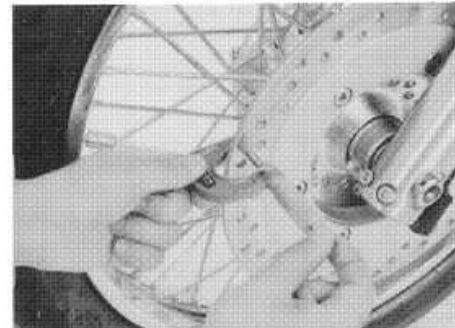


## BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.  
Measure the brake disc thickness at the several  
points.

**SERVICE LIMIT: 5.0 mm (0.20 in)**

Replace the brake disc if the smallest measurement is  
less than service limit.



First make sure the wheel bearings are normal, or you  
will not get accurate results.

Check the brake disc for runout.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

Replace the brake disc if the runout exceeds the ser-  
vice limit.

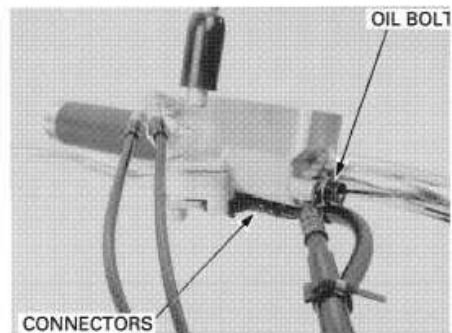


## BRAKE MASTER CYLINDER

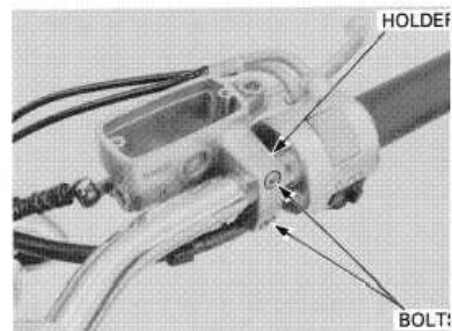
### REMOVAL

Drain the brake fluid from the hydraulic system (page15-3).

Remove the rear view mirror.  
Disconnect the front brake light switch connectors.  
Disconnect the brake hose by removing the oil bolt and sealing washers.

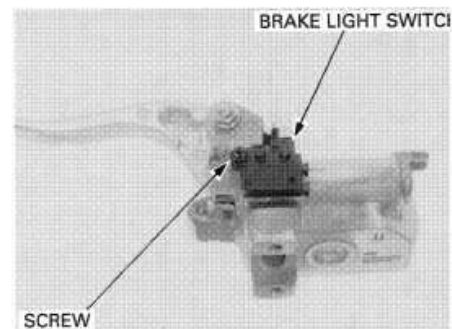


Remove the bolts, master cylinder holder and master cylinder from the handlebar.

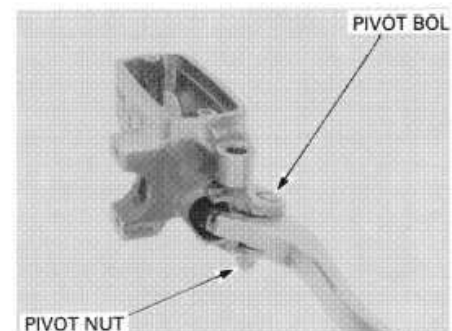


### DISASSEMBLY

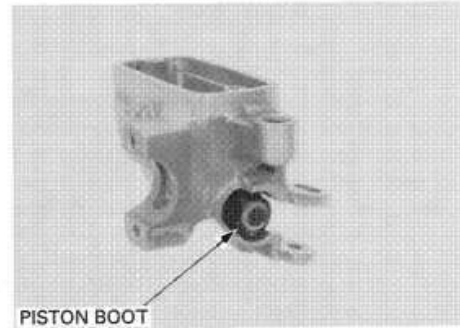
Remove the following:  
— screw  
— front brake light switch



— brake lever pivot nut  
— brake lever pivot bolt  
— brake lever



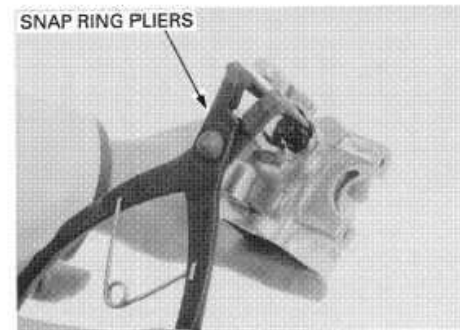
— piston boot



— snap ring

**TOOL:**  
Snap ring pliers

07914 – SA50001

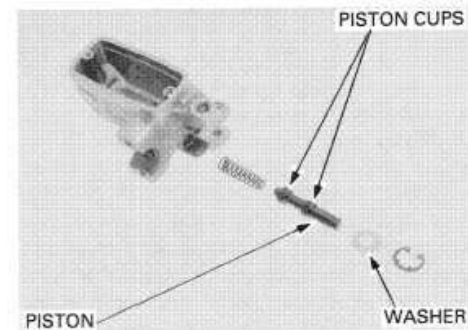


— washer  
— master piston  
— spring

Clean the master cylinder, reservoir and master piston in clean brake fluid.

### INSPECTION

Check the piston cups for wear, deterioration or damage.  
Check the master cylinder and piston for scoring or damage.

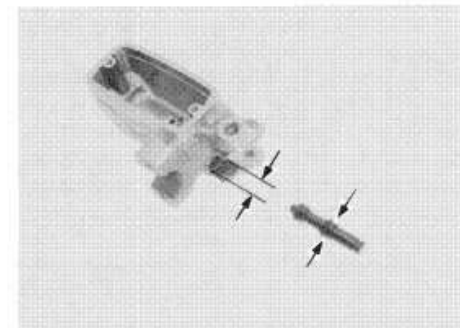


Measure the master cylinder I.D.

**SERVICE LIMIT: 11.05 mm (0.435 in)**

Measure the master piston O.D.

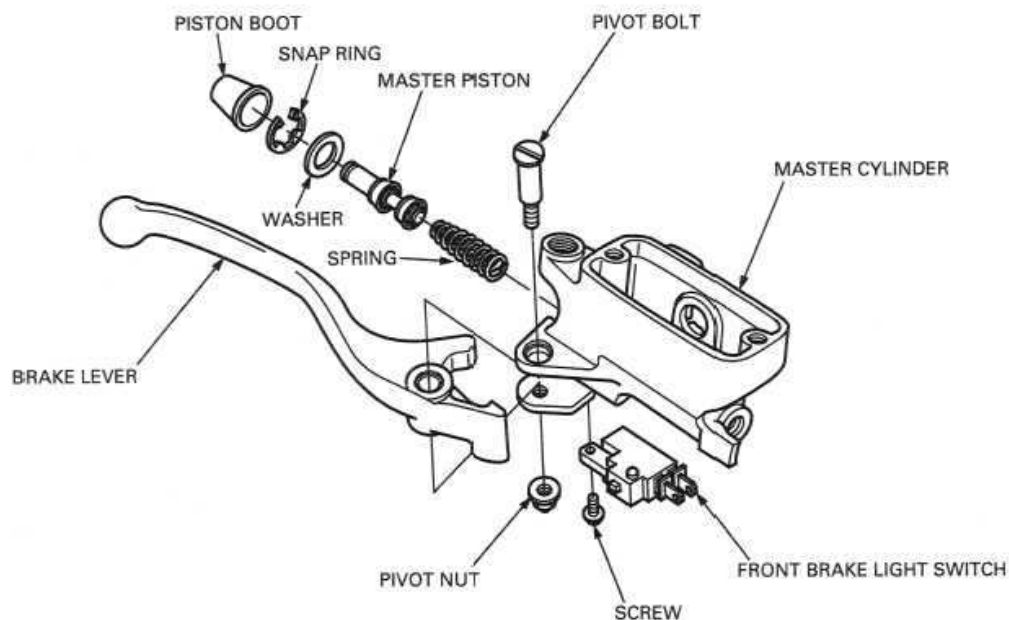
**SERVICE LIMIT: 10.945 mm (0.4309 in)**





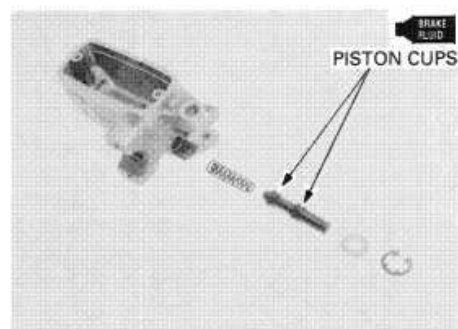
## HYDRAULIC DISC BRAKE

### ASSEMBLY



*Do not allow the piston cup lips to turn inside out.*

Coat the master piston and piston cups with clean brake fluid.  
Install the spring onto the piston end.  
Install the piston/spring into the master cylinder.  
Install the washer.

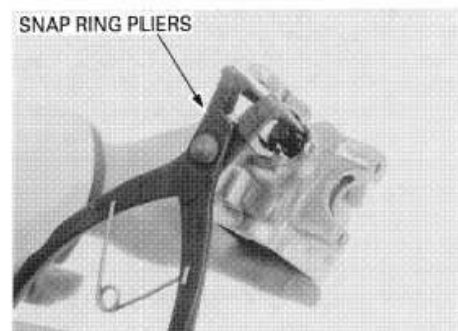


*Be certain the snap ring is firmly seated in the groove.*

Install the snap ring into the groove in the master cylinder.

**TOOL:**  
Snap ring pliers

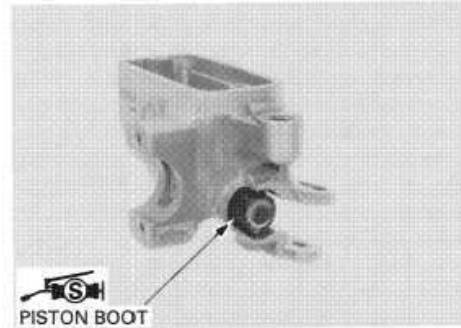
07914 - SA50001



## HYDRAULIC DISC BRAKE

Install the piston boot into the master cylinder and the groove in the master piston.

Apply silicone grease to the brake lever contacting surface of the master piston.

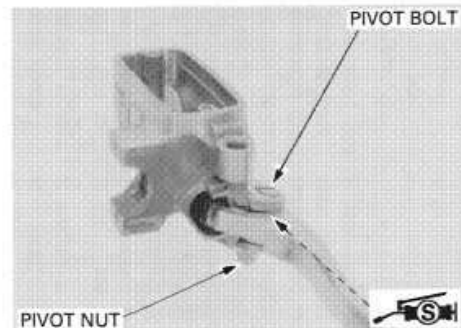


Apply silicone grease to the brake lever pivot. Install the brake lever and pivot bolt, and tighten the pivot bolt.

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

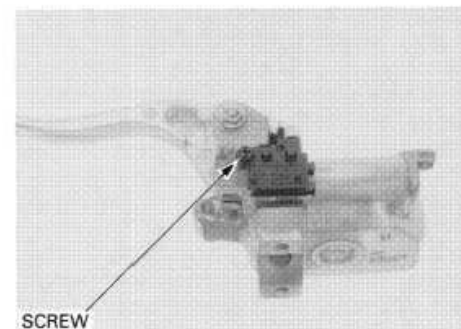
Install and tighten the brake lever pivot nut.

**TORQUE: 6 N-m (0.6 kgf-m, 4.3 lbf-ft)**



Install the front brake light switch and tighten the screw.

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

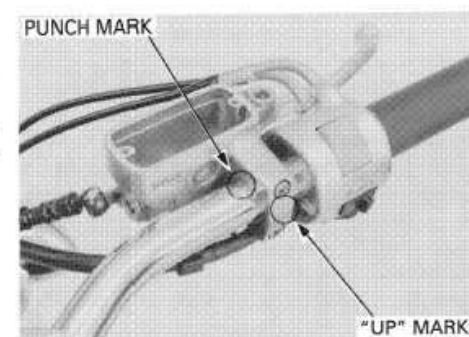


### INSTALLATION

Install the master cylinder and holder with the "UP" mark facing up.

Align the end of master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

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



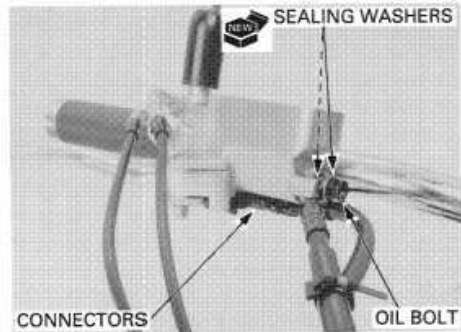
## HYDRAULIC DISC BRAKE

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers, and tighten the brake hose oil bolt.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Connect the front brake light switch connectors. Install the right rear view mirror.

Fill and bleed the hydraulic system (page 15-3).

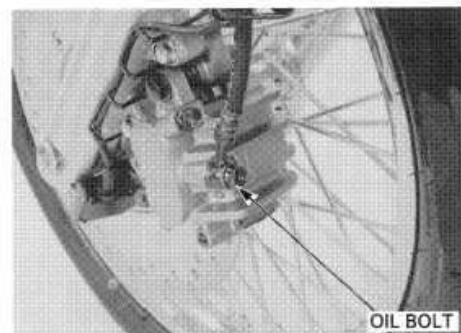


## BRAKE CALIPER

### REMOVAL

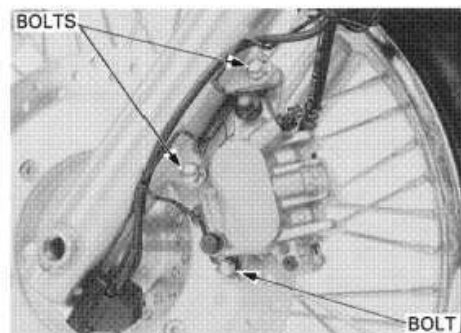
Drain the brake fluid from the hydraulic system (page 15-3).

Disconnect the brake hose from the caliper by removing the oil bolt and sealing washers.



Remove the brake caliper mounting bolts and speed sensor wire guide bolt. Remove the brake caliper.

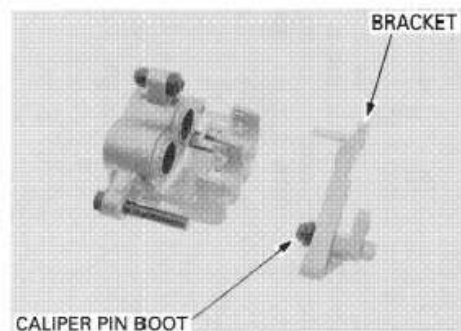
Remove the brake pads (page 15-4).



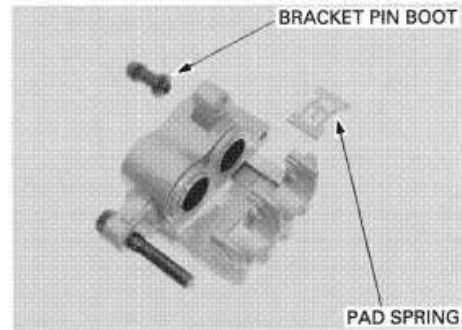
### DISASSEMBLY

Remove the following:

- caliper bracket from the caliper body
- caliper pin boot from the bracket

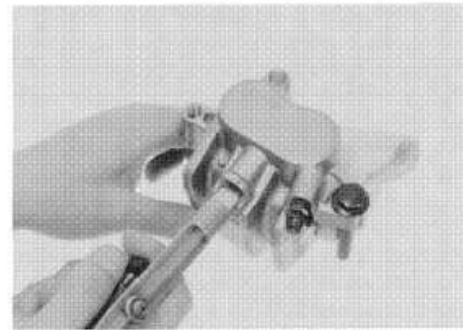


- bracket pin boot from the caliper body
- pad spring



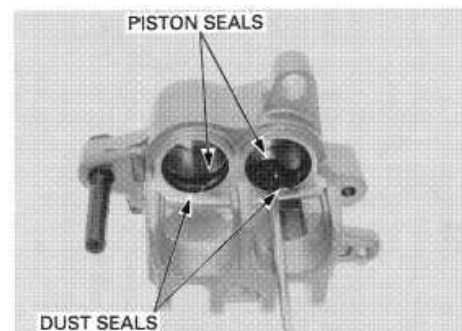
*Do not use high pressure air or bring the nozzle too close to the inlet.*

Place a shop towel over the pistons. Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



Push the dust seals and piston seals in and lift them out to avoid damaging the piston sliding surface.

Clean the seal grooves with clean brake fluid.



## INSPECTION

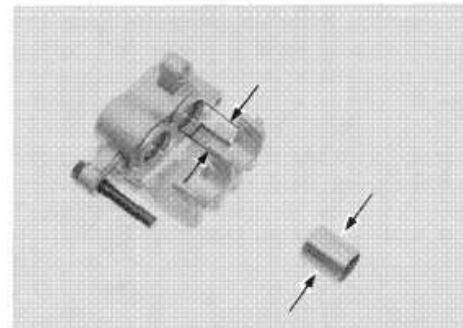
Check the caliper cylinder and pistons for scoring or other damage.

Measure the caliper cylinder I.D.

**SERVICE LIMIT: 27.06 mm (1.065 in)**

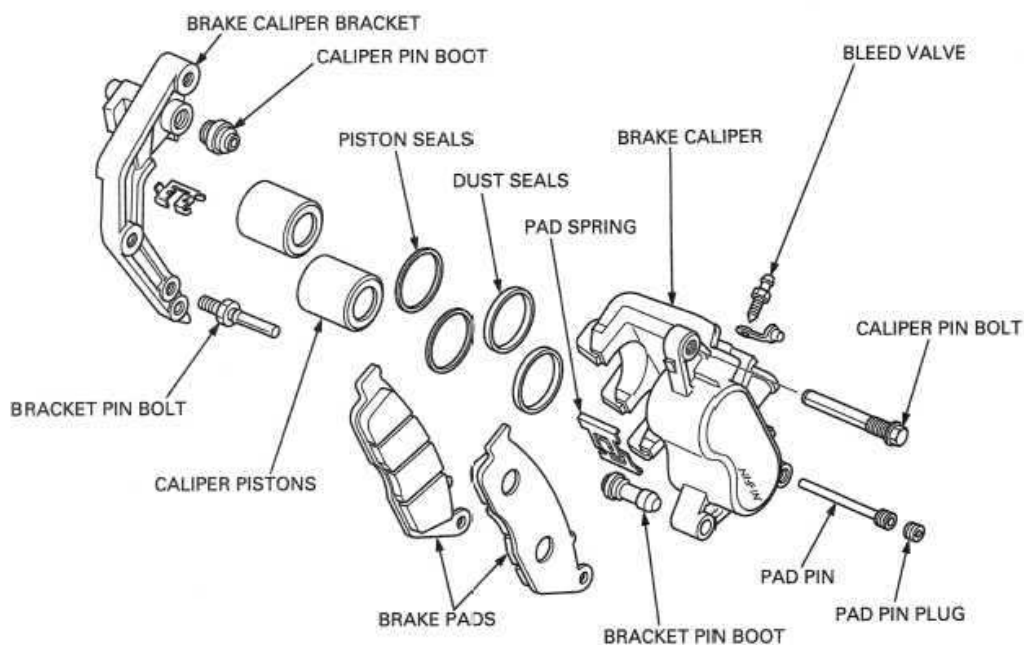
Measure the caliper piston O.D.

**SERVICE LIMIT: 26.91 mm (1.059 in)**



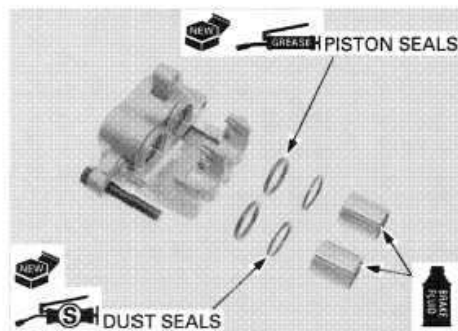
## HYDRAULIC DISC BRAKE

### ASSEMBLY



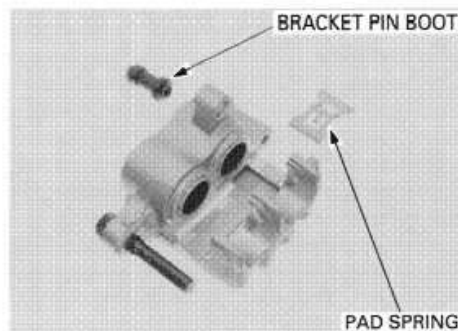
Coat new dust and piston seals with silicone grease and install them into the seal grooves in the caliper.

Coat the caliper pistons with clean brake fluid and install them into the caliper with the opening toward the pads.



If the bracket pin boot is hard or deteriorated, replace it with new one.

Install the bracket pin boot into the caliper.  
Install the pad spring.

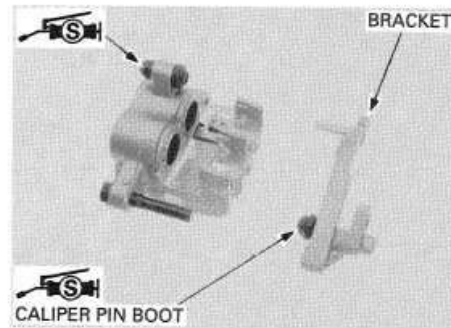


If the caliper pin boot are hard or deteriorated, replace them with new ones.

Install the caliper pin boot into the bracket.

Pack silicone grease to the inside of the caliper pin boot and bracket pin boot.

Install the caliper bracket over the caliper body.



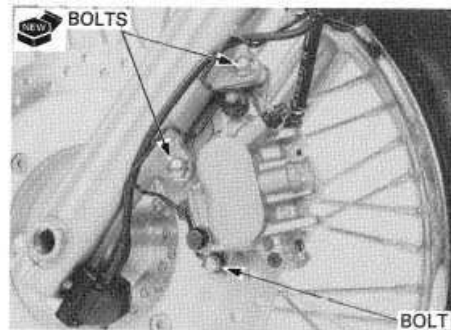
Install the brake pads (page 15-4).

Install the brake caliper assembly over the brake disc and onto the front fork.

Install and tighten new caliper bracket mounting bolts.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

Install and tighten the speed sensor wire guide bolt.  
Clamp the speed sensor wire.



Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the brake hose oil bolt.

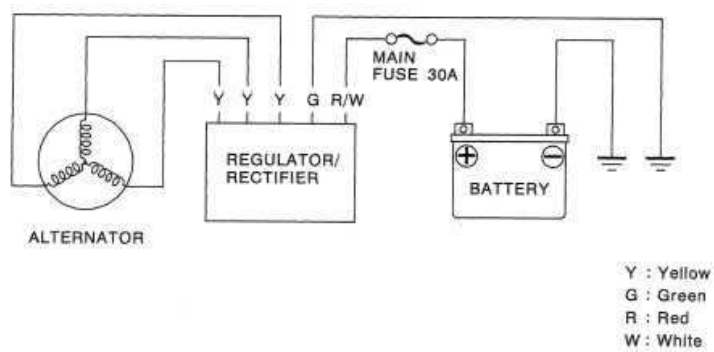
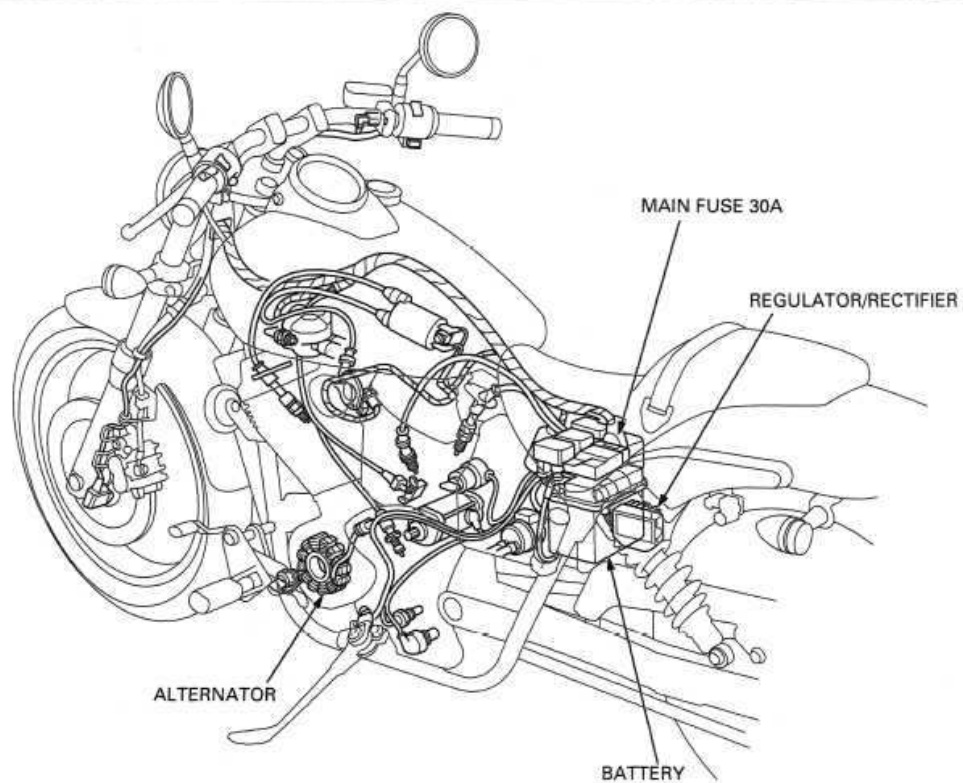
**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill and bleed the hydraulic system (page 15-3).



## BATTERY/CHARGING SYSTEM

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# 16. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	16-1	CHARGING SYSTEM INSPECTION	16-7
TROUBLESHOOTING	16-3	ALTERNATOR CHARGING COIL	16-8
BATTERY	16-4	REGULATOR/RECTIFIER	16-8

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a physician immediately.
- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is in the on position and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- For alternator service, refer to section 9.

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### BATTERY CHARGING

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals again.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.



## BATTERY/CHARGING SYSTEM

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### BATTERY TESTING

Refer to the Operation Manual for the recommended battery tester for detailed battery testing.  
The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

**Recommended battery tester**

**BM – 210 – AH, BM – 210 or BATTERY MATE, or equivalent**

### SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 12 Ah
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.1 A x 5 – 10 h
		Quick	5.5 A x 1.0 h
Alternator	Capacity		0.333 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

### TORQUE

Battery case cover screw

9 N·m (0.9 kgf·m, 6.5 lbf·ft)

## TROUBLESHOOTING

## Battery is damaged or weak

Remove the battery (page 16-4).  
Check the battery condition using the recommended battery tester.

**RECOMMENDED BATTERY TESTER:**  
BM - 210 - AH, BM - 210 or BATTERY MATE,  
or equivalent

Incorrect → • Faulty battery

Correct

Install the battery (page 16-4).  
Check the battery current leakage (Leak test:  
page 16-7).

**SPECIFIED CURRENT LEAKAGE: 1 mA max.**

Incorrect → Disconnect the regulator/rectifier 2P connector and  
recheck the battery current leakage.

Incorrect

Correct

• Faulty regulator/rectifier

• Shorted wire harness  
• Faulty ignition switch

Correct

Check the alternator charging coil (page 16-8)

Incorrect → • Faulty charging coil

**STANDARD: 0.1 - 1.0  $\Omega$  (20°C/68°F)**

Correct

Measure and record the battery voltage using a  
digital multimeter (page 16-4).  
Start the engine.  
Measure the charging voltage (page 16-7).  
Compare the measurements to the result of the  
following calculation.

**MEASURED BATTERY VOLTAGE < MEASURED  
CHARGING VOLTAGE < 15.5 V**

Correct → • Faulty battery

Incorrect

Perform the regulator/rectifier wire harness  
inspection (page 16-8).

Incorrect → • Open circuit in related wire  
• Loose or poor contacts of related terminal

Correct

• Faulty regulator/rectifier

## BATTERY

### REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Remove the ignition control module (ICM) off the battery case cover.

Remove the cover screw and case cover by releasing the case tabs from the cover slits.

With the ignition switch OFF, disconnect the negative (-) cable first, then disconnect the positive (+) cable. Remove the battery.

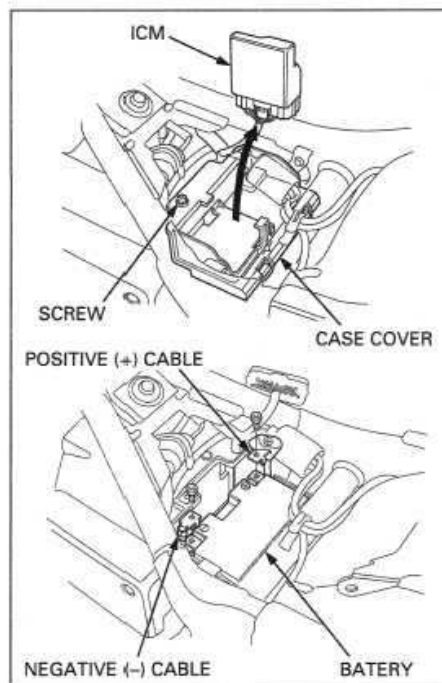
*Set the connector boot and ICM properly (page 1-18).*

Install the battery in the reverse order of removal.

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

#### NOTE:

- Connect the positive (+) cable first, then connect the negative (-) cable.
- After connecting the battery cables, coat the terminals with grease.

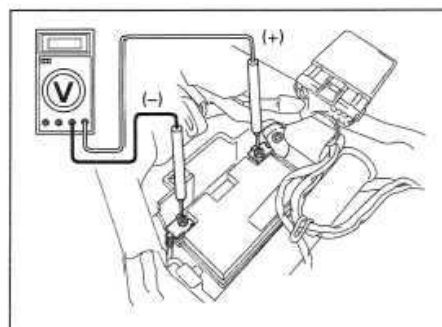


### VOLTAGE INSPECTION

Remove the battery case cover.

Measure the battery voltage using a commercially available digital multimeter.

**VOLTAGE (20°C/68°F): Fully charged: 13.0 – 13.2 V**  
**Under charged: Below 12.3 V**



## BATTERY TESTING

### NOTE:

- Always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels when operating the tester, the heat generated by the tester may cause a fire.

Remove the battery.

Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

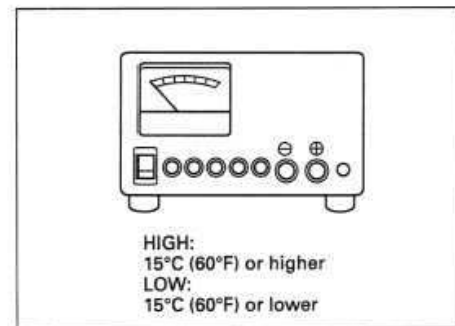
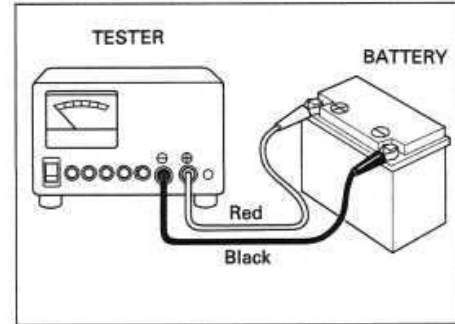
### TOOL:

**Battery tester**

**BM-210-AH or BM-210  
(U.S.A. only)**

Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.

*For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.*



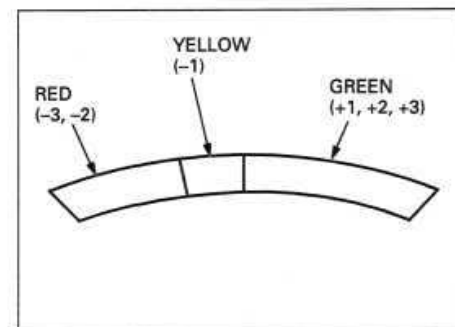
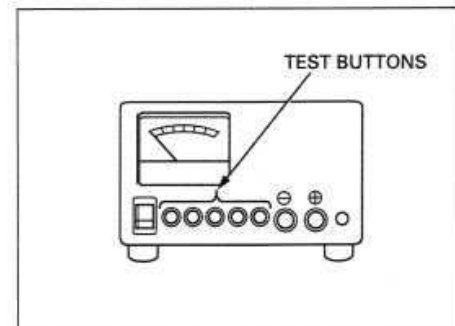
*For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.*

Push in the appropriate test button for three seconds and read the condition of the battery on the meter.

### NOTICE

- To avoid damaging the tester, only test batteries with an amperage rating of less than 30 Ah.
- Tester damage can result from overheating when:
  - The test button is pushed in for more than three seconds.
  - The tester is used without being allowed to cool for at least one minute when testing more than one battery.
  - More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.

The result of a test on the meter scale is relative to the amp. hour rating of the battery. ANY BATTERY READING IN THE GREEN ZONE IS OK. Batteries should only be charged if they register in the YELLOW or RED zone.



## BATTERY/CHARGING SYSTEM

### BATTERY CHARGING

Remove the battery (page 16-4).

#### NOTE:

- Be sure that the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger — gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

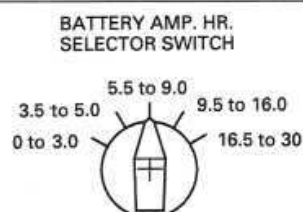
*Turn the power on/off at the charger, not at the battery terminals.*

1. Turn the Power Switch to the off position.
2. Set the battery Amp. Hr. Selector Switch for the size of the battery being charged.

#### TOOL:

Christle battery charger

MC1012/2  
(U.S.A only)



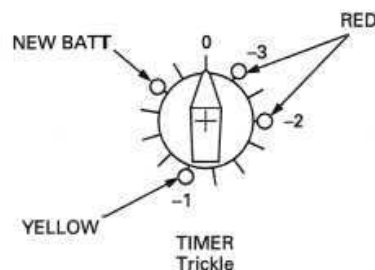
Set the appropriate amp. hour rating.

3. Set the Timer to the position indicated by the Honda Battery Tester; RED-3, RED-2 or YELLOW 1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: RED to Positive, BLACK to Negative.

Connect the battery cables only when turn the Power Switch to the off position.

*The charger will automatically switch to the "trickle" mode after the set charging time has elapsed.*

5. Turn the Power Switch to the on position.
6. When the timer reaches the "trickle" position, the charging cycle is complete. Turn the Power Switch to the off position and disconnect the clamps.
7. Let the battery cool for at least ten minutes or until gassing subsides after charging.
8. Retest the battery using the Honda Battery Tester and recharge if necessary using the above steps.



## CHARGING SYSTEM INSPECTION

Remove the battery case cover (page 16-4).

### CURRENT LEAKAGE TEST

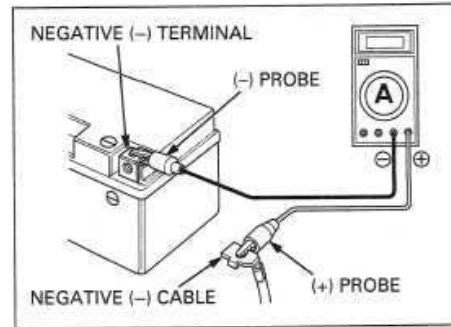
Turn the ignition switch OFF, and disconnect the negative (-) cable from the battery. Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal. With the ignition switch OFF, check for current leakage.

#### NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

**SPECIFIED CURRENT LEAKAGE: 1 mA max.**

If current leakage exceeds the specified value, a shorted circuits is likely. Locate the short by disconnecting connections one by one and measuring the current.



### CHARGING VOLTAGE INSPECTION

#### NOTE:

- Be sure that the battery is in good condition before performing this test.

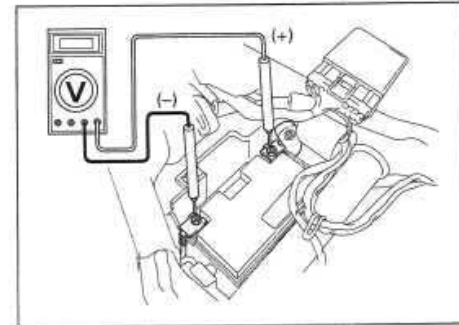
*Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

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.

#### NOTE:

- To prevent a short, make absolutely certain which are the positive and negative terminals or cables.

With the headlight on Hi beam, restart the engine. Measure the voltage on the multimeter when the engine runs at 5,000 rpm.



#### STANDARD:

Measured battery voltage (page 16-4) < Measured charging voltage (see above) < 15.5 V

## **ALTERNATOR CHARGING COIL**

### **INSPECTION**

Remove the seat (page 2-2).

Disconnect the alternator 3P connector (white).  
Measure the resistance between the Yellow wire terminals of the alternator side connector.

**STANDARD: 0.1 – 1.0  $\Omega$  (20°C/68°F)**

Check for continuity between each Yellow wire terminal of the alternator side connector and ground.  
There should be no continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

Refer to section 9 for alternator stator replacement.



## **REGULATOR/RECTIFIER**

### **WIRE HARNESS INSPECTION**

Remove the seat (page 2-2).

Disconnect the regulator/rectifier 2P connector (white).  
Check the connector for loose contacts or corroded terminals.

### **BATTERY LINE**

Measure the voltage between the Red/white wire terminal and ground.  
There should be battery voltage at all times.

### **GROUND LINE**

Check the continuity between the Green wire terminal and ground.  
There should be continuity at all times.

### **REMOVAL INSTALLATION**

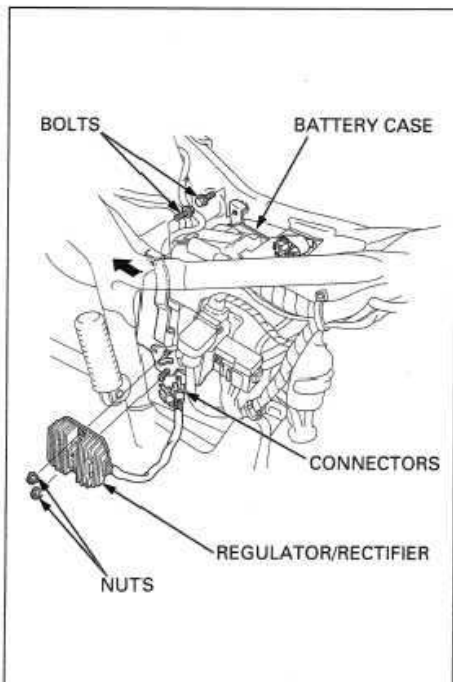
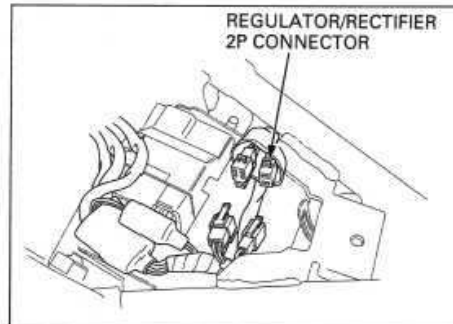
Remove the following:

- seat (page 2-2)
- right side cover (page 2-3)

Disconnect the alternator 3P connector and regulator/rectifier 2P connector.

Remove the battery case mounting bolts and move the battery box rearward.  
Remove the mounting nuts and the regulator/rectifier.

Installation is in the reverse order of removal.



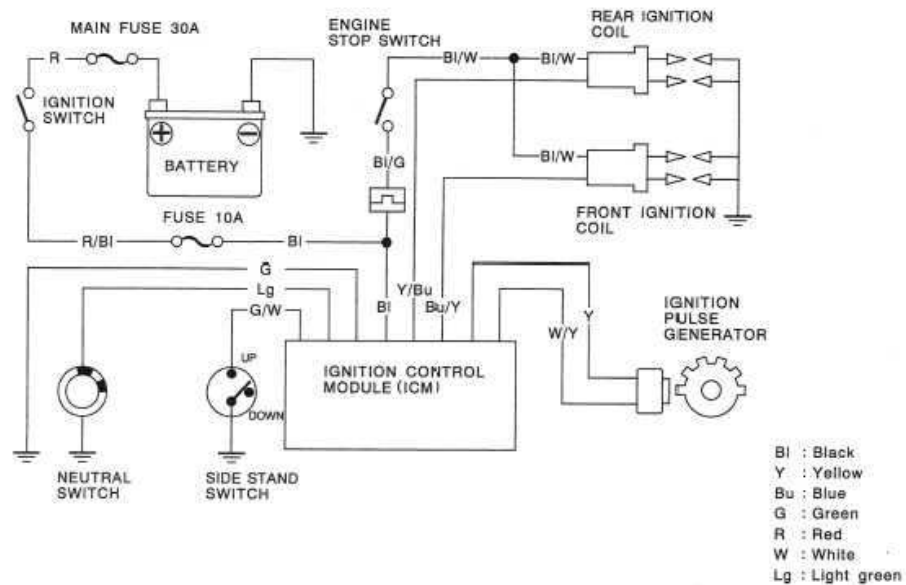
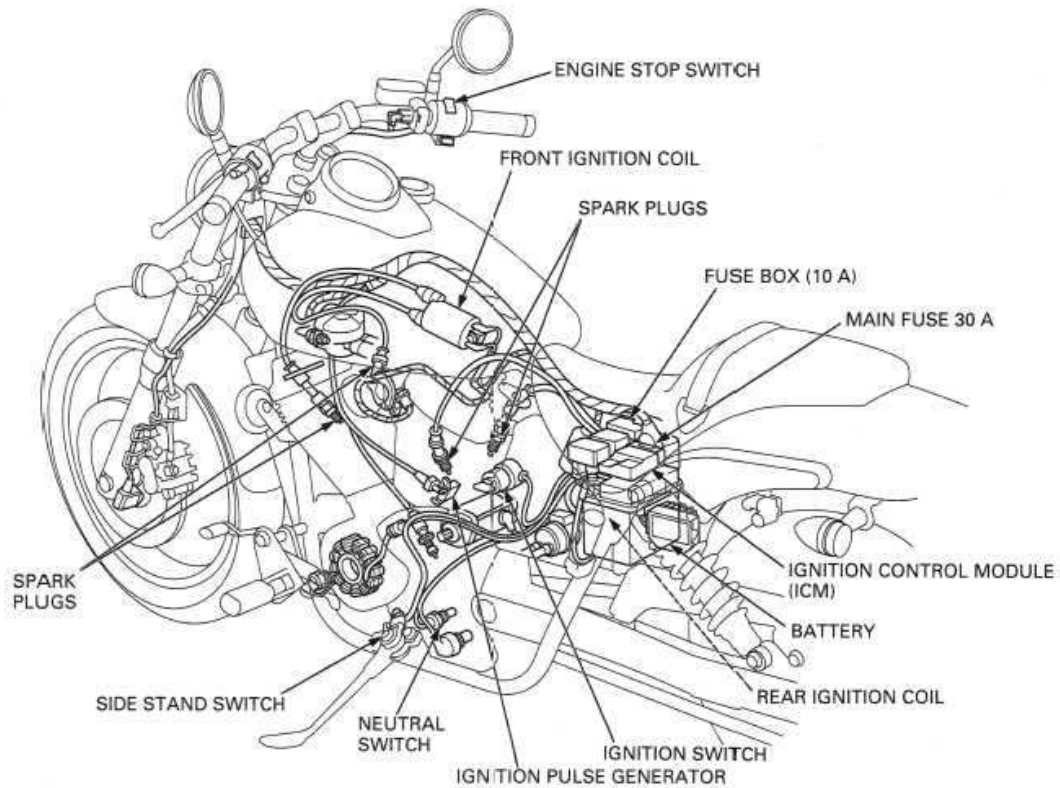
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**MEMO**

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## IGNITION SYSTEM



# 17. IGNITION SYSTEM

SERVICE INFORMATION	17-1	IGNITION COIL	17-5
TROUBLESHOOTING	17-2	IGNITION TIMING	17-6
IGNITION SYSTEM INSPECTION	17-3		

## SERVICE INFORMATION

### GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is in the on position and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting on page 17-2.
- The ignition timing cannot be adjusted since the ignition control module (ICM) is factory preset.
- 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.
- Use a spark plug of the correct heat range. Using a spark plug with an incorrect heat range can damage the engine.
- See section 8 for ignition pulse generator removal/installation.
- See section 19 for following components:
  - ignition switch
  - engine stop switch
  - neutral switch
  - side stand switch

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	DPR8EA-9 (NGK), X24EPR-U9 (DENSO)
	For cold climate (below 5°C/41°F)	DPR7EA-9 (NGK), X22EPR-U9 (DENSO)
	For extend high speed riding	DPR9EA-9 (NGK), X27EPR-U9 (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		6.2° BTDC at idle

**17**

### TORQUE

Timing hole cap 15 N·m (1.5 kgf·m, 11 lbf·ft) Apply grease to the threads and seating surface

### TOOL

Peak voltage tester (U.S.A. only) or  
Peak voltage adaptor 07HGJ – 0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

## IGNITION SYSTEM

### TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug.
  - Loose spark plug cap or spark plug wire connections.
  - Water got into the spark plug cap (ignition coil secondary voltage leak).
- If there is no spark at either cylinder, temporarily exchange the ignition coil with a good one and perform the spark test.
- If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch in the on position and engine stop switch in the run position (when the engine is not cranked by the starter motor).

#### No spark at spark plugs

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch in the on position and engine stop switch in the run position. (Other electrical components are normal.)	1. Faulty engine stop switch. 2. An open circuit in the black/white wire between the ignition coil and engine stop switch. 3. Loose or poor connection of the ignition coil primary wire terminal, or an open circuit in primary coil. 4. Faulty ICM when the initial voltage is normal while disconnecting ICM connector.
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Battery is undercharged. (Large voltage drops when the engine is started.) 3. No voltage between the black (+) and ground (–) of the ICM connector, or loose or poorly connected ICM. 4. Poor connection or open circuit in green (ground) wire of the ICM. 5. Loose or poor connections, or open circuit in blue/yellow and yellow/blue between the ignition coils and ICM. 6. Faulty side stand switch or neutral switch. 7. An open circuit or loose connection in No.6 related circuit wires. <ul style="list-style-type: none"><li>• Side stand switch line: green/white wire</li><li>• Neutral switch line: light green wire</li></ul> 8. Faulty ignition pulse generator. (Measure peak voltage.) 9. Faulty ICM (when above No. 1 through 8 are normal).
	Initial voltage is normal, but no peak voltage exists while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ICM (when above No. 1 and 2 are normal).
	Initial voltage is normal, but peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ICM (when above No. 1 through 3 are normal).
	Initial voltage and peak voltage are normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current amperage. 2. Faulty ignition coil(s).
Ignition pulse generator	Peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (when above No. 1 through 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

## IGNITION SYSTEM INSPECTION

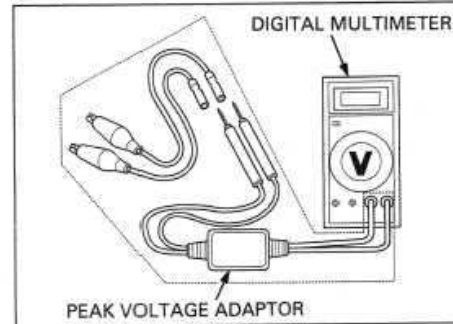
**NOTE:**

- If no spark jumps at the plugs, check all connections for loose or poor contact before measuring each peak voltage.
- Use the recommended digital multimeter or a commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter, or use the peak voltage tester.

**TOOLS:**

**Peak voltage tester (U.S.A. only) or**  
**Peak voltage adaptor 07HGJ - 0020100**  
 (not available in U.S.A.)  
 with commercially available digital multimeter  
 (impedance 10 M $\Omega$ /DCV minimum)



## IGNITION PRIMARY PEAK VOLTAGE

**NOTE:**

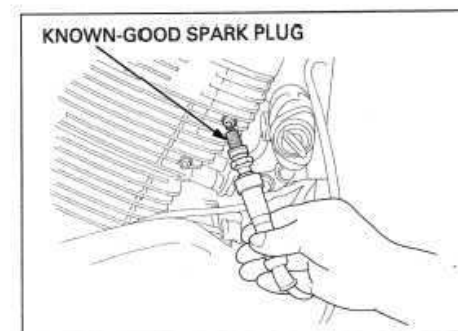
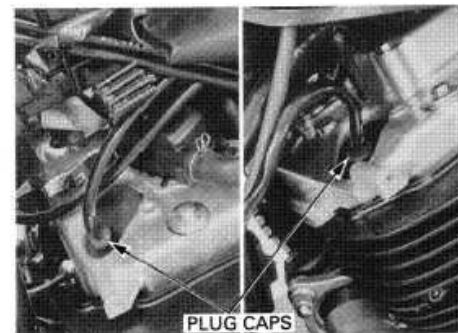
- Check all system connections before this inspection. Poorly connected connectors can cause incorrect readings.
- Check the cylinder compression at each cylinder and check that the spark plugs are installed correctly in each cylinder.

Remove the following:

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

Disconnect the spark plug caps from the spark plugs on each cylinder head (page 3-7).

Connect known-good spark plugs to each spark plug cap and ground the spark plugs to the cylinder heads as done in a spark test.



## IGNITION SYSTEM

With the connector connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and body ground.

### TOOLS:

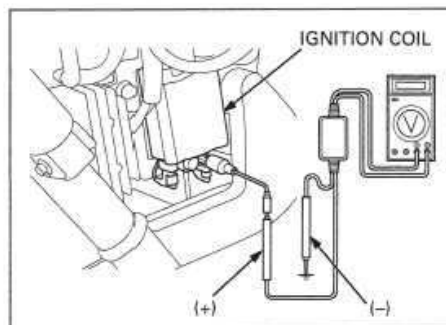
Peak voltage tester (U.S.A. only) or  
Peak voltage adaptor 07HGJ - 0020100  
(not available in U.S.A.)  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)

### CONNECTIONS: Front ignition coil:

Blue/yellow (+) — Body ground (-)

### Rear ignition coil:

Yellow/blue (+) — Body ground (-)



Turn the ignition switch to the on position and engine stop switch to the run position.  
Check for the initial battery voltage.  
If battery voltage is not present, follow the checks described in the troubleshooting on page 17-2.

Shift the transmission into neutral.

Crank the engine with the starter motor and read the ignition coil primary voltage.

### PEAK VOLTAGE: 100 V minimum

### NOTE:

- Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting on page 17-2.

## IGNITION PULSE GENERATOR PEAK VOLTAGE

### NOTE:

- Check that the cylinder compression is normal and the spark plugs are installed correctly in the cylinder heads.

Remove the seat (page 2-2).

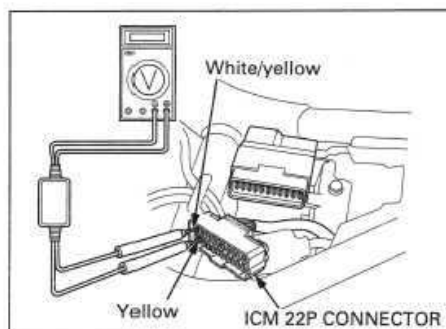
Disconnect the ignition control module (ICM) 22P connector.

Connect the peak voltage tester or adaptor probes to the White/yellow and Yellow wire terminals of the wire harness side connector.

### TOOLS:

Peak voltage tester (U.S.A. only) or  
Peak voltage adaptor 07HGJ - 0020100  
(not available in U.S.A.)  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)

### CONNECTION: White/yellow — Yellow



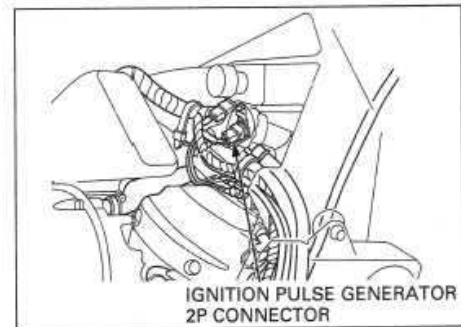
Shift the transmission into neutral.  
Turn the ignition switch to the on position and the engine stop switch to the run position.  
Crank the engine with the starter motor and read the ignition pulse generator peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**

If the voltage measured at the ICM connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Remove the fuel tank (page 2-2).  
Disconnect the ignition pulse generator 2P connector (white) and connect the peak voltage tester or adaptor probes to the terminals of the pulse generator side connector.  
In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM connector is abnormal and the one measured at the alternator connector is normal, the White, yellow or Yellow wire has an open or short circuit, or loose connections.
- If both peak voltages are abnormal, follow the checks described in the troubleshooting on page 17-2.



## IGNITION COIL

### REPLACEMENT

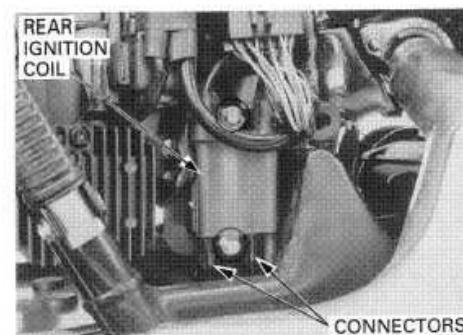
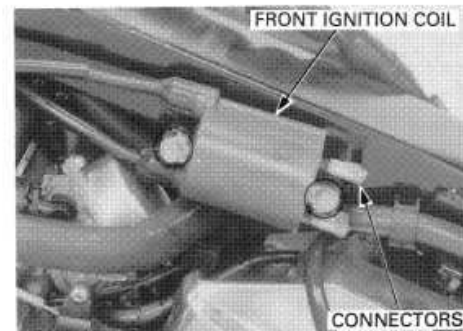
Front: Remove the fuel tank (page 2-2).  
Rear: Remove the right side cover (page 2-3).

Disconnect the spark plug caps from the plugs (page 3-7).

- Remove the following:
- spark plug wires from wire band and clip (rear ignition coil only)
  - ignition coil primary wire connectors
  - mounting bolts
  - collars (rear ignition coil only)
  - ignition coil
  - spacers

*Route the spark plug wires properly (page 1-18).*

Install the new ignition coil and removed parts in the reverse order of removal.



## IGNITION SYSTEM

### IGNITION TIMING

Start the engine and warm it up to operating temperature.

Stop the engine and remove the timing hole cap from the left crankcase cover.

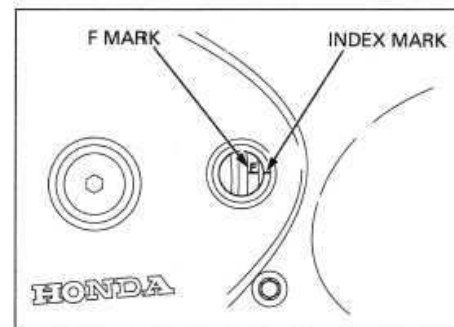
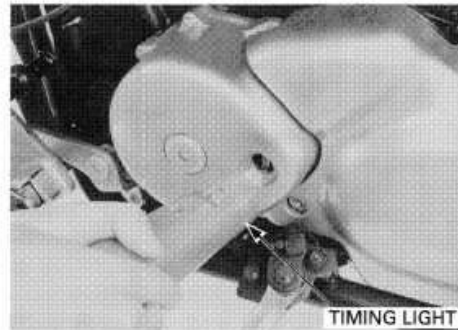
Connect the timing light and tachometer.

Start the engine, let it idle (1,000 rpm) and check the ignition timing.

The ignition timing is correct if the F mark on the flywheel aligns with the index mark on the crankcase cover at idle.

Increase the engine speed and make sure the F mark begins to move.

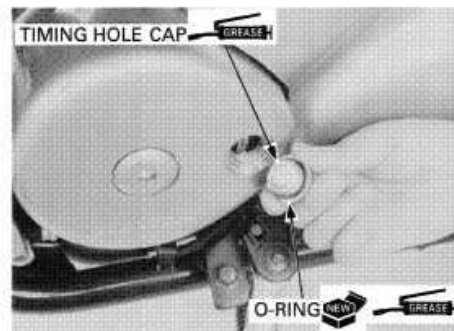
Connect the timing light to the other cylinder's spark plug wire and check the ignition timing in the same manner as above procedure.



Coat a new O-ring with grease and install it onto the timing hole cap.

Apply grease to the timing hole cap threads and seating surface. Install the timing hole cap and tighten it.

**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**



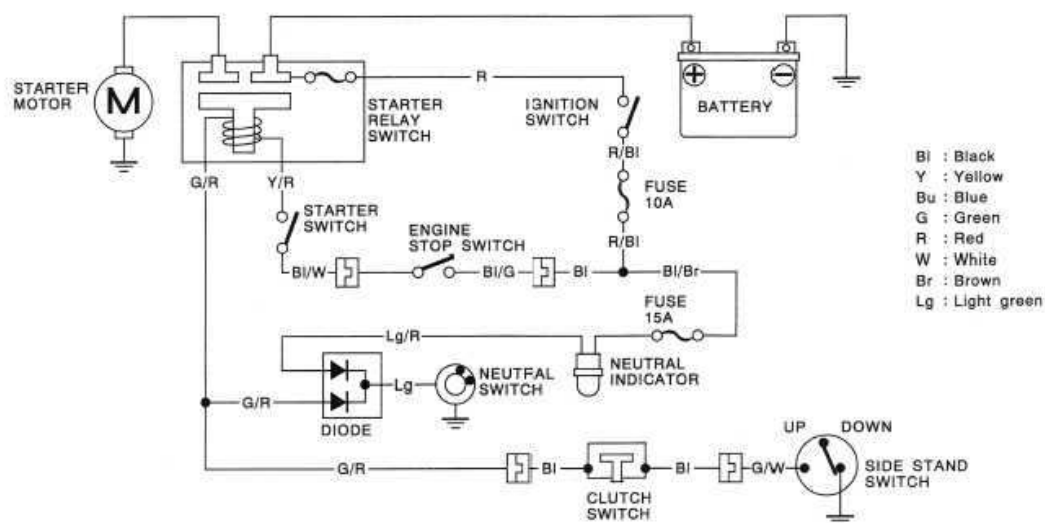
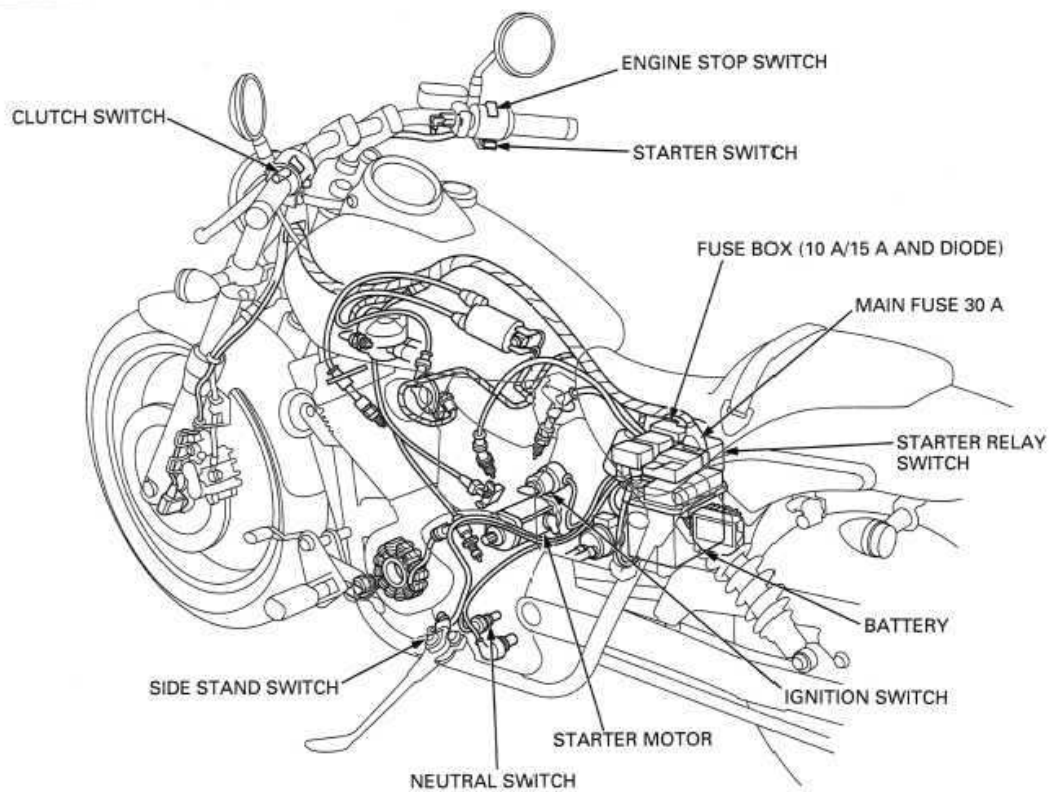
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**MEMO**

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## ELECTRIC STARTER



# 18. ELECTRIC STARTER

SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	DIODE	18-11
STARTER MOTOR	18-4		

## SERVICE INFORMATION

### GENERAL

- Always turn the ignition switch to the off position before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 9 for starter clutch servicing.
- See section 19 for following components:
  - ignition switch
  - engine stop switch
  - starter switch
  - side stand switch
  - neutral switch
  - clutch switch

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	6.5 (0.26)

### TORQUE

Starter motor cable terminal nut      10 N·m (1.0 kgf·m, 7 lbf·ft)

## ELECTRIC STARTER

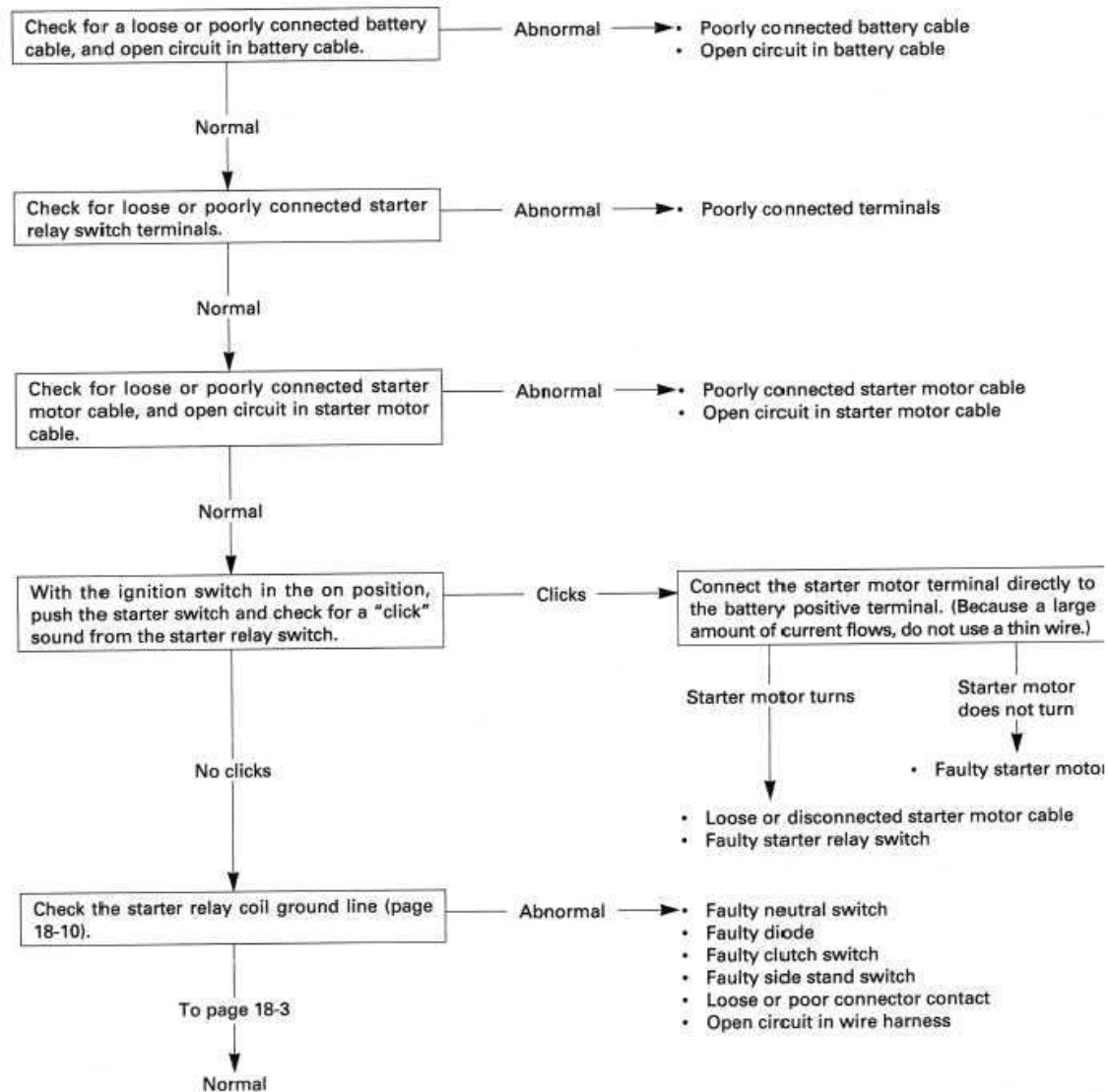
### TROUBLESHOOTING

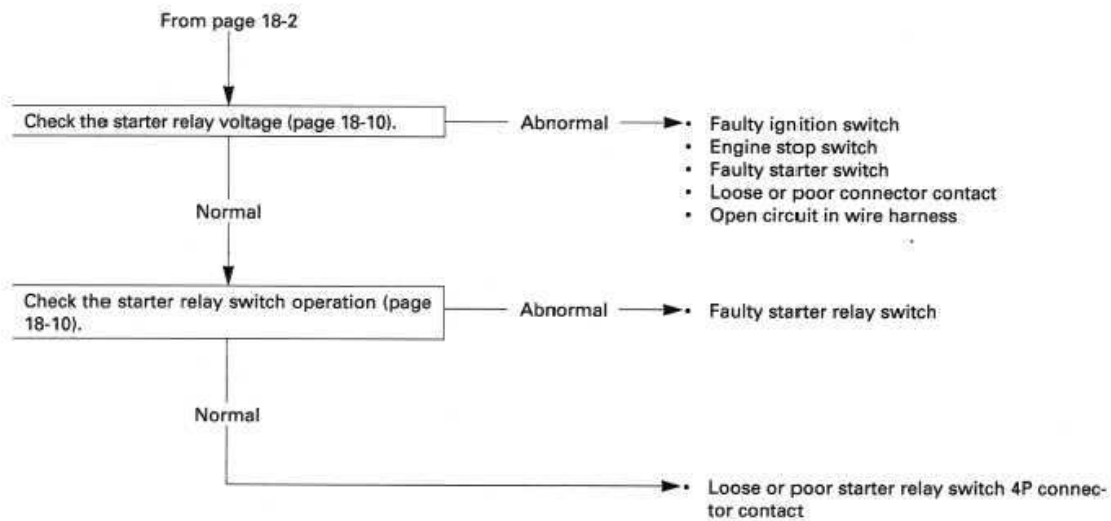
#### NOTE:

- The starter motor should operate in either of the following conditions with the ignition switch in the on position and the engine stop switch in the run position.
  - The transmission is in neutral.
  - The transmission is in any gear except neutral, clutch lever squeezed, and the side stand is retracted.

#### Starter motor will not turn

- Check for a blown fuse (10 A).
- Check that the battery is fully charged and in good condition.



**Starter motor turns slowly**

- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

**Starter motor turns, but engine does not turn**

- Faulty starter clutch (section 9)

**Starter relay switch "clicks", but engine does not turn over**

- Crankshaft does not turn due to engine problem
- Faulty starter reduction gear or idler gear (section 9)

## ELECTRIC STARTER

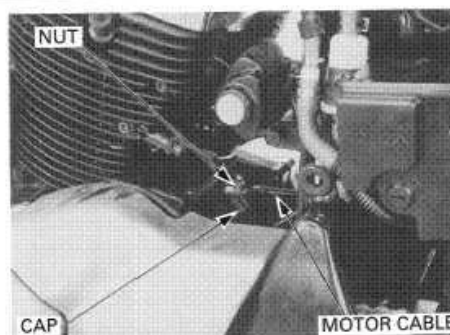
### STARTER MOTOR

#### REMOVAL

Remove the left side cover (page 2-3).

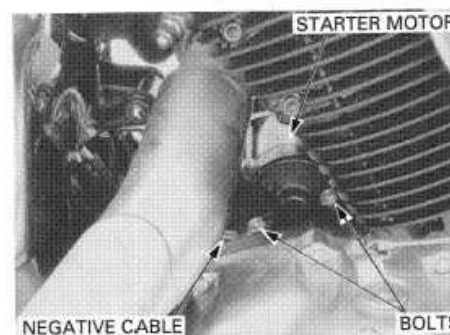
*Always turn the ignition switch to the off position before servicing the starter motor.*

Slide the rubber cap off the starter motor terminal and remove the terminal nut and starter motor cable.



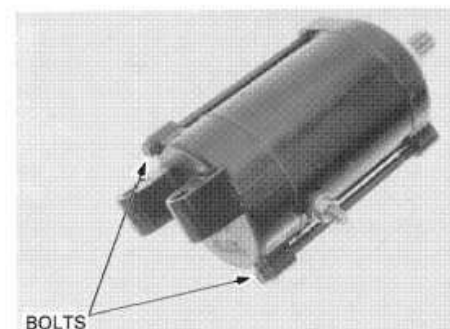
Remove the two mounting bolts and negative cable (-), and the starter motor from the crankcase.

Remove the O-ring from the starter motor.



#### DISASSEMBLY/INSPECTION

Remove the starter motor case bolts.

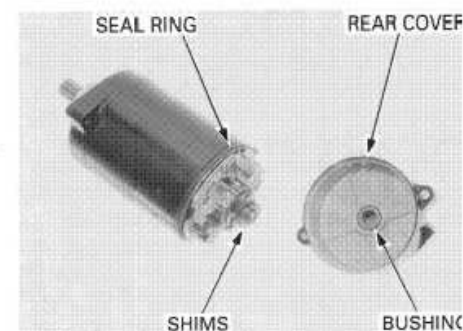


*Record the location and number of shims.*

Remove the following:

- rear cover
- shims
- seal ring

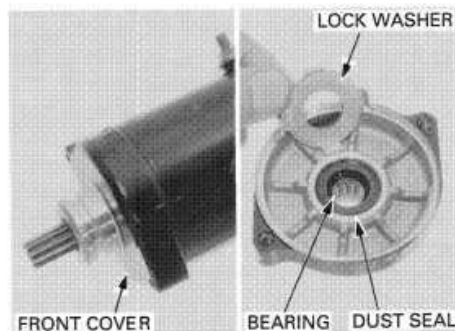
Check the bushing in the rear cover for wear or damage.



Remove the following:

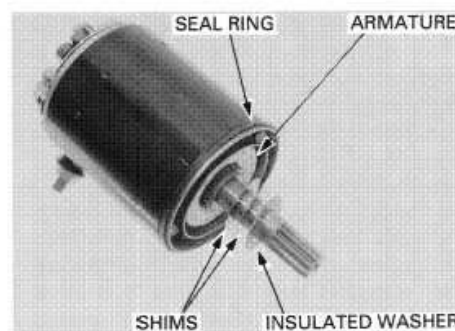
- front cover
- lock washer

Check the dust seal and needle bearing in the front cover for deterioration, wear or damage.



Remove the following:

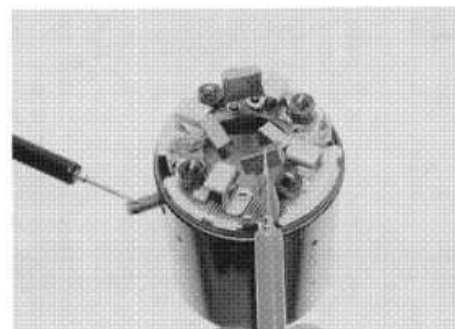
- insulated washer
- shims
- seal ring
- armature



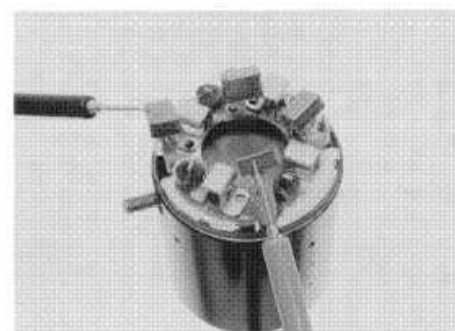
Measure the brush length.

**SERVICE LIMIT: 6.5 mm (0.26 in)**

Check for continuity between each insulated brush and cable terminal.  
There should be continuity.



Check for continuity between each positive (+) brush (insulated) and negative (-) brushes.  
There should be no continuity.

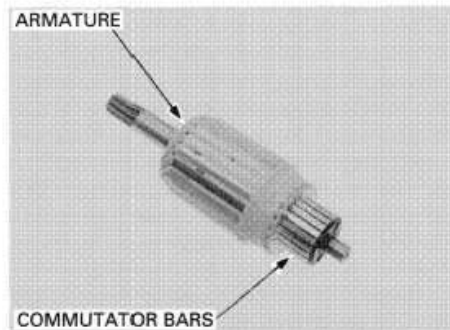


## ELECTRIC STARTER

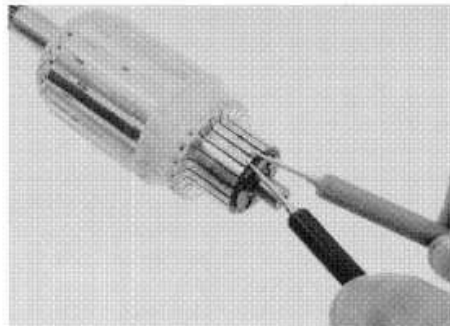
Check the commutator bars of the armature for discoloration.

**NOTE:**

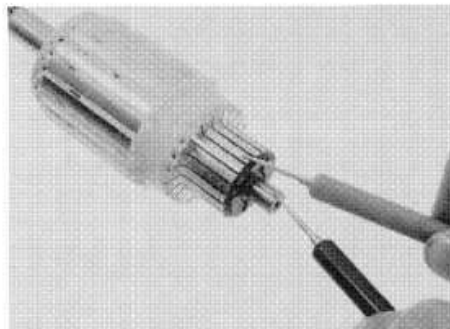
- Do not use emery or sand paper on the commutator.



Check for continuity between pairs of commutator bars.  
There should be continuity.

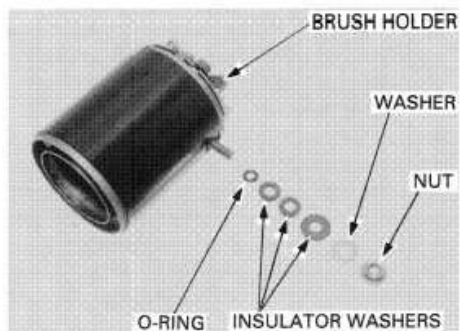


Check for continuity between each commutator bar and the armature shaft.  
There should be no continuity.



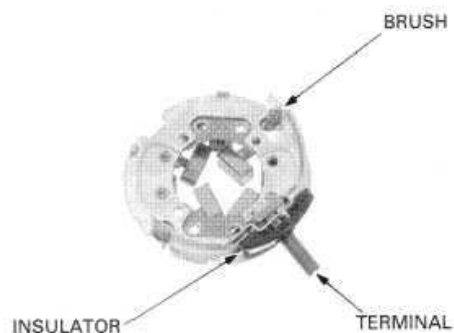
Remove the following:

- nut
- washer
- insulator washers
- O-ring
- brush holder assembly

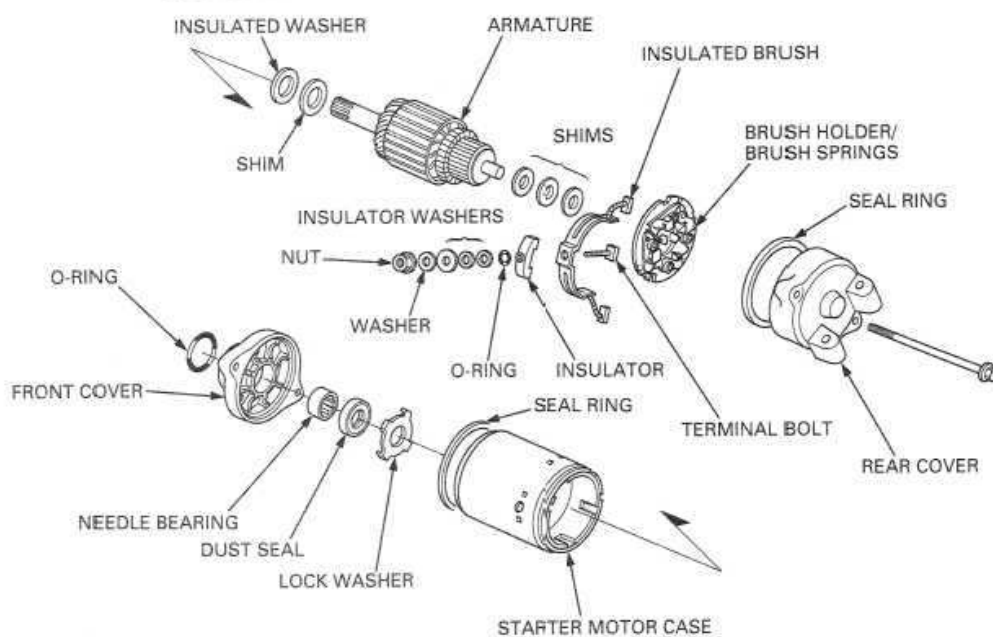


## ELECTRIC STARTER

- cable terminal
- insulator
- insulated brush



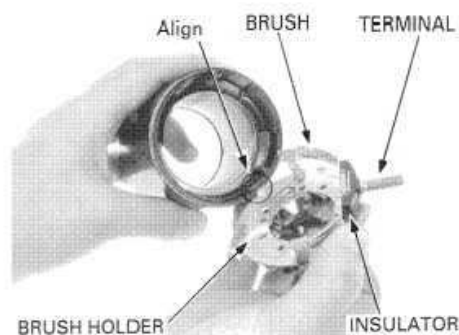
### ASSEMBLY



Install the following onto the brush holder:

- cable terminal
- insulator
- insulated brush

Install the brush holder assembly by aligning the tab with the groove in the motor case.

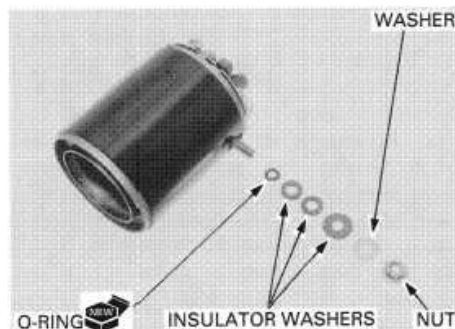




## ELECTRIC STARTER

Install the following onto the cable terminal:

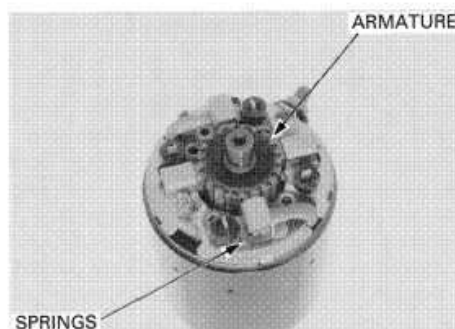
- new O-ring
- insulator washers
- washer
- nut



Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.

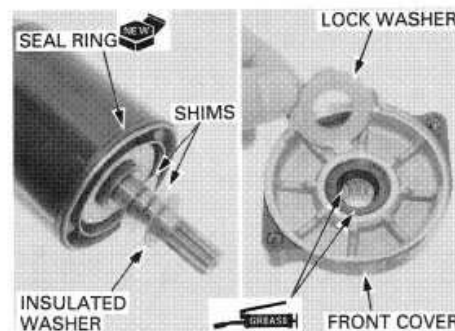
*The coil may be damaged if the magnet pulls the armature against the case.*

When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it. Set the brush springs onto the brushes properly.



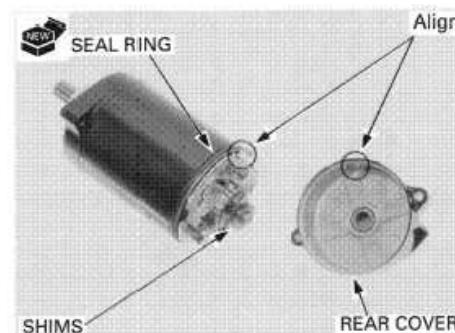
Install a new seal ring onto the motor case. Install the shims and insulated washer onto the armature shaft.

Apply grease to the dust seal lip and needle bearing in the front cover. Install the lock washer onto the front cover and the front cover onto the motor case.

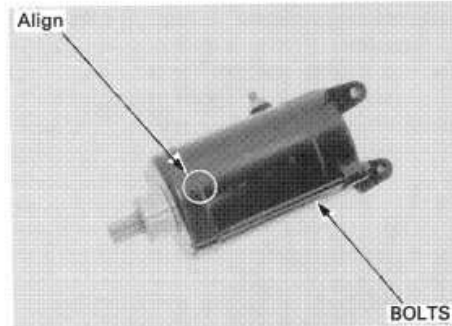


Install a new seal ring onto the motor case. Install the same number of shims in the same locations as noted during disassembly.

Install the rear cover onto the motor case by aligning the groove with the brush holder tab (aligning the index lines).

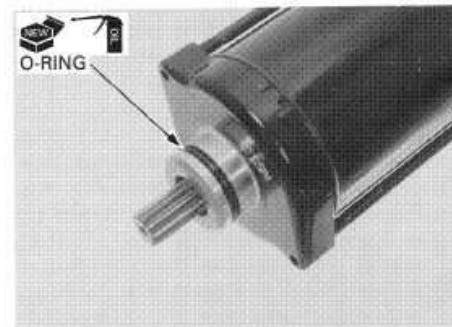


Align the index lines on the front cover and motor case.  
Install the motor case bolts and tighten them.

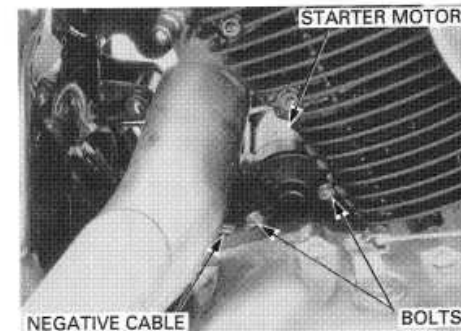


### INSTALLATION

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



Install the starter motor into the crankcase.  
Install the two mounting bolts with the negative cable (-) as shown and tighten them securely.

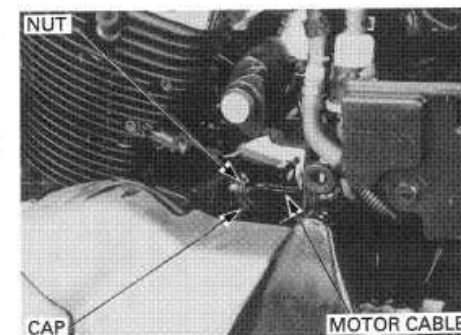


Connect the starter motor cable onto the motor terminal with the terminal nut and tighten it.

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

Install the rubber cap over the starter motor terminal properly.

Install the left side cover (page 2-3).



## ELECTRIC STARTER

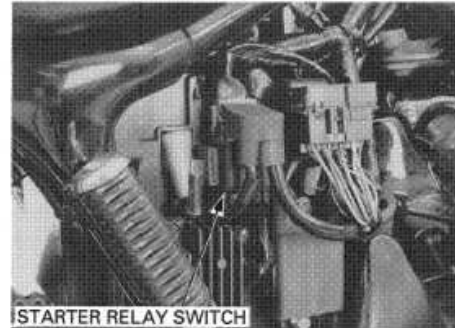
### STARTER RELAY SWITCH

#### INSPECTION

Remove the right side cover (page 2-3).

Shift the transmission into neutral.  
Turn the ignition switch to the on position and engine stop switch to the run position.  
Push the starter switch.  
The coil is normal if the starter relay switch clicks.

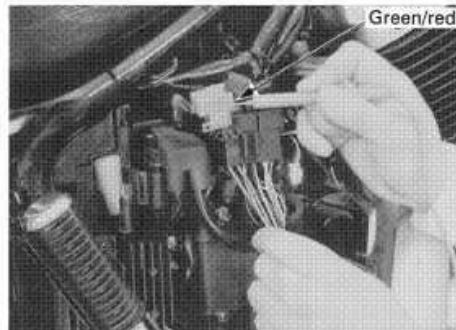
If you don't hear the switch "click", inspect the relay switch using the procedure below.



#### GROUND LINE

Disconnect the starter relay switch 4P connector.  
Check for continuity between the Green/red wire (ground line) terminal and ground.

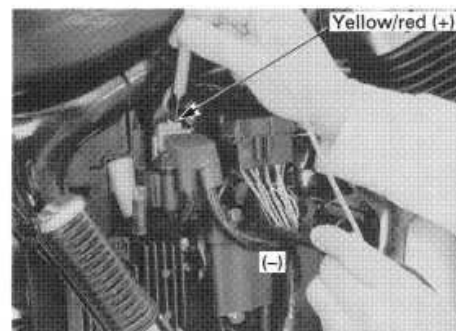
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is retracted, the ground circuit is normal. (In neutral, there is a slight resistance due to the diode.)



#### STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.  
Shift the transmission into neutral.  
Measure the voltage between the Yellow/red wire terminal (+) and ground (-).

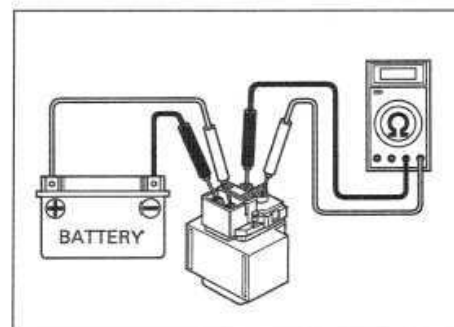
If the battery voltage appears only when the starter switch is pushed with the ignition switch in the on position and engine stop switch in the run position, the circuit is normal.



#### OPERATION CHECK

Disconnect the 4P connector and cables from the starter relay switch.  
Connect the fully charged 12-V battery positive wire to the Yellow/red wire terminal and negative wire to the Green/red wire terminal.

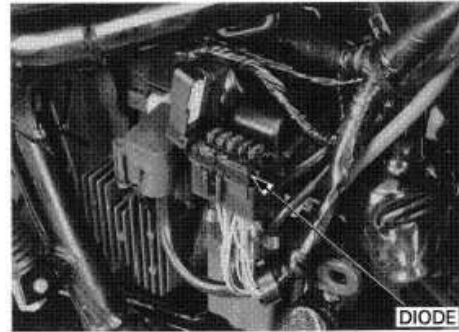
There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



**DIODE****INSPECTION**

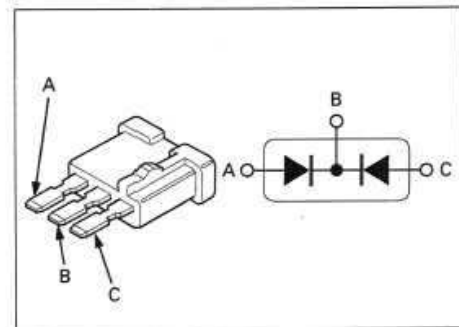
Remove the right side cover (page 2-3).

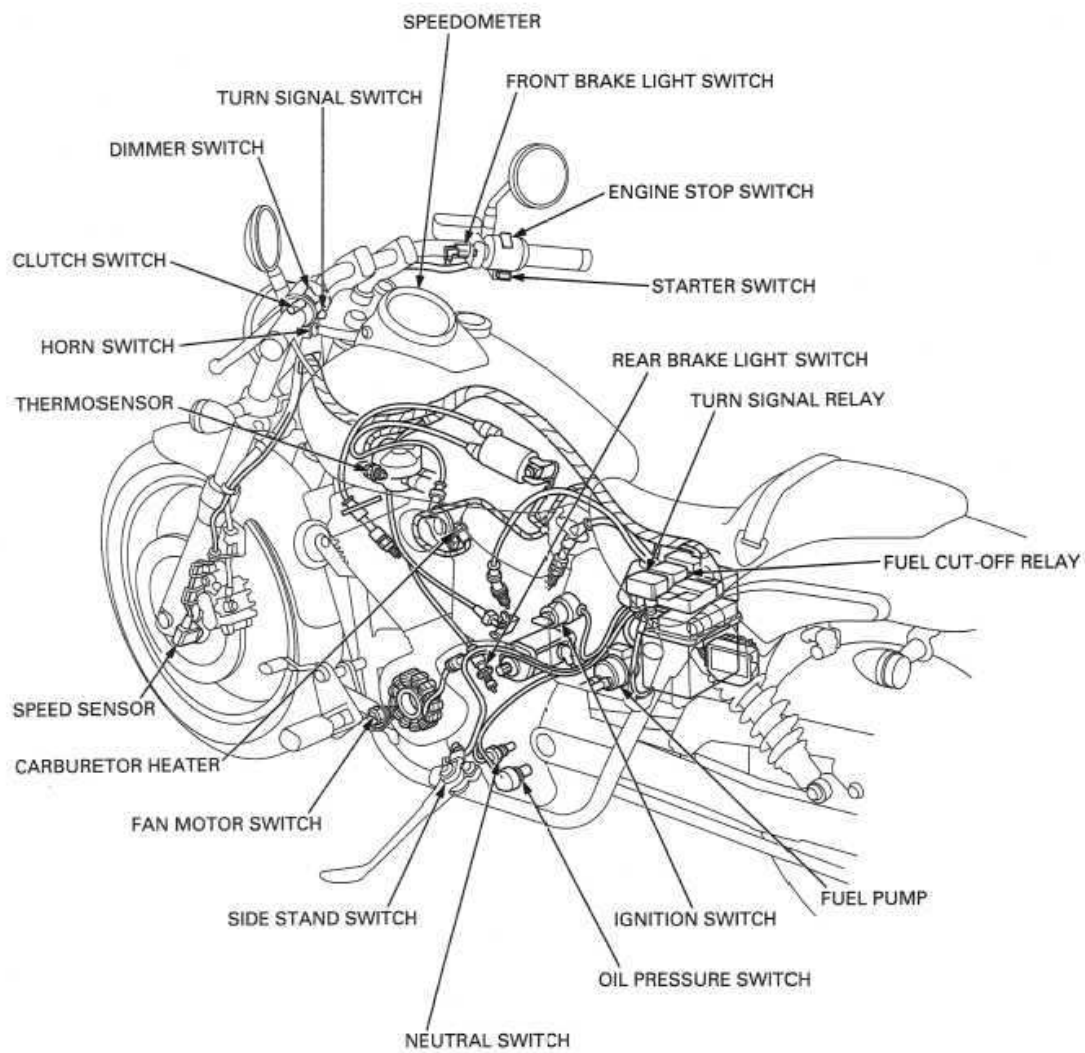
Open the fuse box and remove the diode.



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.





# 19. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION	19-1	IGNITION SWITCH	19-11
HEADLIGHT	19-3	HANDLEBAR SWITCHES	19-11
TURN SIGNAL LIGHT	19-4	BRAKE LIGHT SWITCH	19-12
BRAKE/TAILLIGHT	19-4	CLUTCH SWITCH	19-13
METER ASSEMBLY	19-4	NEUTRAL SWITCH	19-13
SPEEDOMETER/SPEED SENSOR	19-6	SIDE STAND SWITCH	19-14
COOLANT TEMPERATURE INDICATOR/ THERMOSENSOR	19-7	FUEL PUMP	19-14
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CARBURETOR HEATER	19-10		

## SERVICE INFORMATION

### GENERAL

#### NOTICE

*A halogen headlight bulb becomes very hot while the headlight is on, and remains hot for a while after it is turned off. Be sure to let it cool down before servicing.*

- Use an electric heating element to heat the water/coolant mixture for the thermosensor inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put fingerprints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be performed with the switches installed on the motorcycle.
- The trip meter data is erased when the battery is removed.
- The following color codes used are indicated throughout this section.

Bu: Blue	G: Green	Lg: Light Green	R: Red
Bl: Black	Gr: Gray	O: Orange	W: White
Br: Brown	Lb: Light Blue	P: Pink	Y: Yellow

## LIGHTS/METERS/SWITCHES

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (high/low beam)	12 V – 60/55 W
	Brake/taillight	12 V – 21/5 W
	Front turn signal/running light	12 V – 21/5 W x 2
	Rear turn signal light	12 V – 21 W x 2
	Instrument light	LED x 6
	Turn signal indicator	LED
	High beam indicator	LED
	Neutral indicator	LED
	Coolant temperature indicator	LED
	Oil pressure indicator	LED
Fuse	Main fuse	30 A
	Sub-fuse	10 A x 4, 15 A x 1
Fan motor switch	Starts to close (ON)	98 – 102°C (208 – 216°F)
	Stops to open (OFF)	93 – 97°C (199 – 207°F)
Thermosensor resistance	at 80°C (176°F)	45 – 60 Ω
	at 120°C (248°F)	10 – 20 Ω
Carburetor heater resistance at 20°C (68°F)		13 – 15 Ω
Fuel pump flow capacity		Minimum 900 cm <sup>3</sup> (30.4 US oz, 31.7 Imp oz) per minute

### TORQUE VALUES

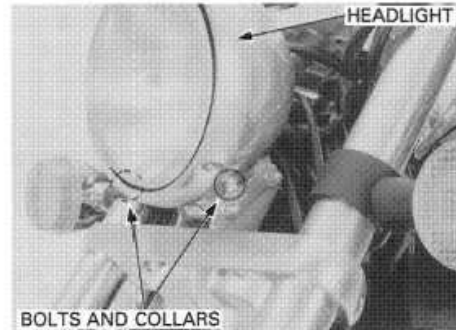
Speedometer cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Thermosensor	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	Apply sealant to the threads
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Ignition switch mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Break-off bolt
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Horn mounting bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)	

## HEADLIGHT

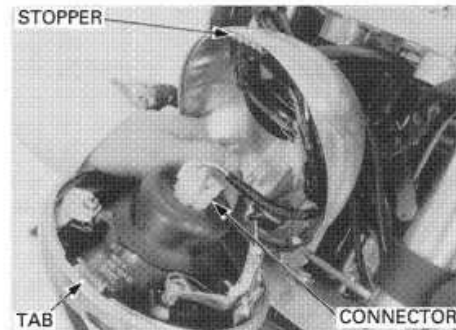
### BULB REPLACEMENT

A halogen headlight bulb becomes very hot while the headlight is on, and will remain hot for a while after it is turned off. Be sure to let it cool down before servicing.

Remove the two bolts and collars.



Carefully raise the lower portion of the headlight and remove the headlight by releasing the tab from the stopper of the case.  
Disconnect the headlight connector.



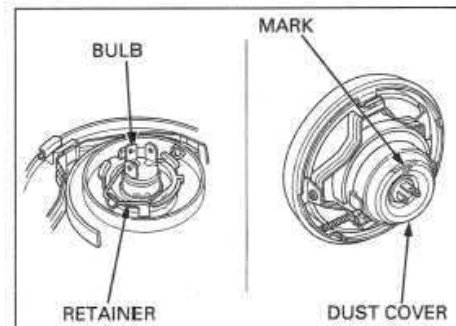
Remove the dust cover.  
Unhook the bulb retainer and replace the headlight bulb with a new one.

#### NOTICE

*Avoid touching halogen headlight bulb. Fingerprints can create hot spots that cause a bulb to break.*

If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.

Install the bulb by aligning the tabs with the headlight grooves and hook the bulb retainer properly.  
Install the dust cover tightly against the headlight with the "TOP" mark facing up.

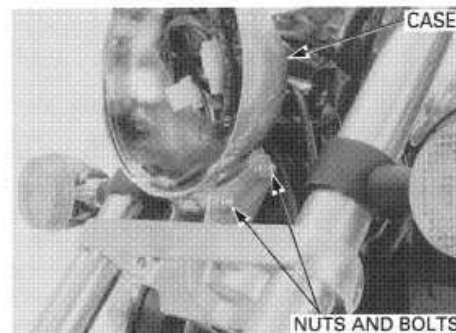


Install the headlight in the reverse order of removal.

### CASE REMOVAL/INSTALLATION

Remove the following:

- headlight
- wire harnesses from clamps
- two nuts and bolts
- headlight case (remove wires out of the case)



Route the wires properly (page 1-18).  
Install the case and headlight in the reverse order of removal.



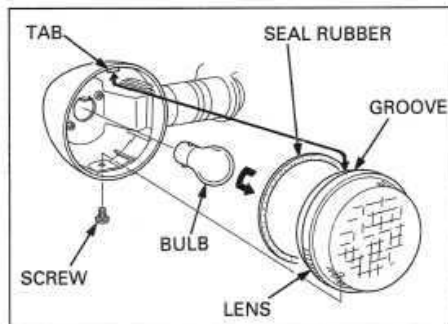
## TURN SIGNAL LIGHT

### BULB REPLACEMENT

Remove the screw and turn signal light lens. While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure the rubber seal is installed in position and is in good condition, and replace it with new one if necessary.

Install the lens by aligning the groove with the tab of the turn signal case and tighten the screw.



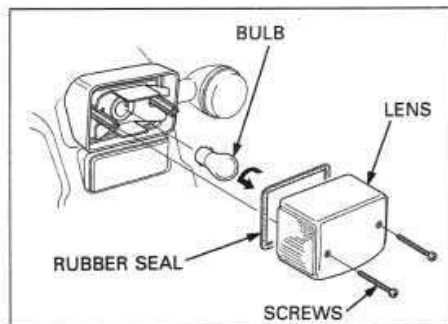
## BRAKE/TAILLIGHT

### BULB REPLACEMENT

Remove the two screws and brake/tailight lens. While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure the rubber seal is installed in position and is in good condition, and replace it with new one if necessary.

Install the lens and tighten the screws.



## METER ASSEMBLY

### REMOVAL

Remove the following:

- two cover bolts
- meter assembly by sliding it forward
- meter 12P connector

### INSTALLATION

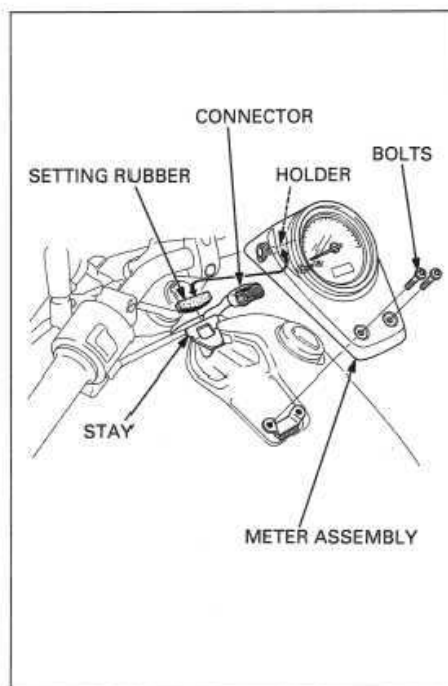
Connect the meter 12P connector and install the dust cover into the meter groove.

Be sure to install the setting rubber onto the stay of fuel tank properly.

Install the meter assembly onto the fuel tank by aligning the holder of the meter cover with the setting rubber.

Install the cover bolts and tighten them.

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



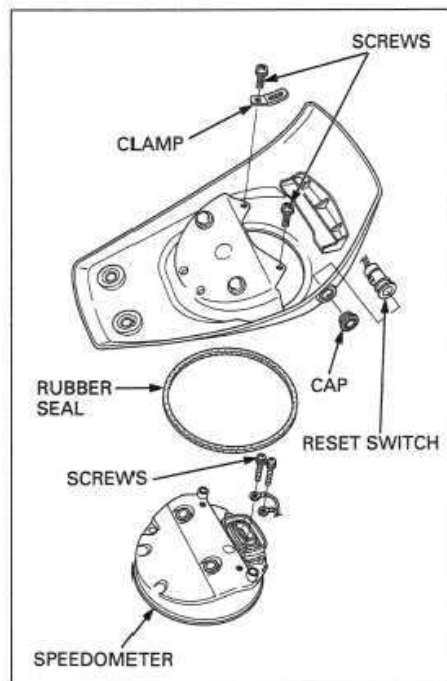
## DISASSEMBLY/ASSEMBLY

Remove the meter assembly (page 19-4).

Remove the following:

- two terminal screws
- two mounting screws and clamp
- speedometer and rubber seal
- switch cap and trip meter reset switch

Assembly is in the reverse order of disassembly.



## POWER/GROUND LINE INSPECTION

Remove the meter assembly (page 19-4).

Check the following at the meter 12P connector.

### POWER INPUT LINE

Measure the voltage between the Black/brown wire terminal (+) and ground (-).

There should be battery voltage with the ignition switch in the on position.

### BACK-UP VOLTAGE LINE

Measure the voltage between the Pink wire terminal (+) and ground (-).

There should be battery voltage at all times.

### GROUND LINE

Check for continuity between the Green wire terminal and ground.

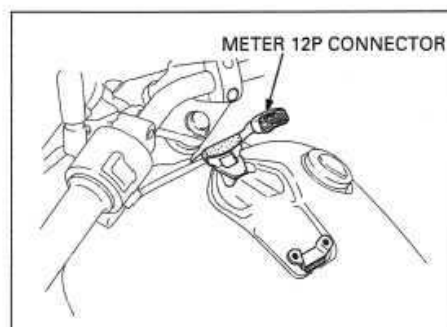
There should be continuity at all times.

### SENSOR GROUND LINE

Check for continuity between the Green/black wire terminal and ground.

There should be continuity at all times.

If there is no continuity, check for an open circuit in the related wire and/or blown fuse.



## SPEEDOMETER/SPEED SENSOR

### SYSTEM INSPECTION

Check that the odometer/trip meter functions properly.

- If they do not function properly, perform the power/ground line inspection (page 19-5).
- If they function properly, check the following.

Remove the meter assembly (page 19-4).

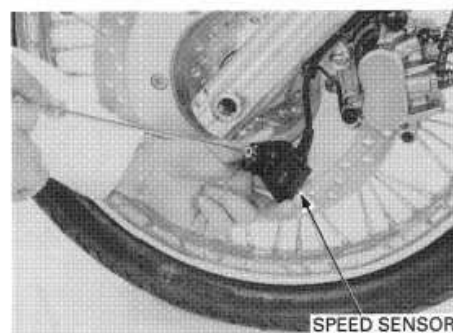
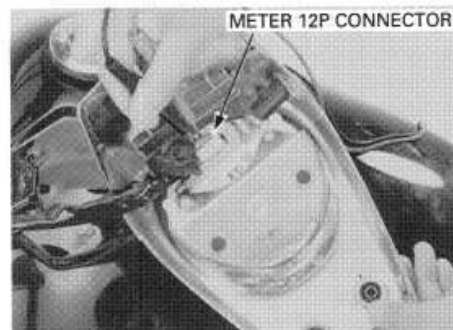
Remove the speed sensor from the speedometer gear box (page 13-8).

Measure the voltage between the Black/yellow (+) and Green/black (-) wire terminals at the meter 12P connector.

With the ignition switch in the on position, slowly turn the sensor shaft by using a screwdriver.

There should be 0 to 5-V pulse voltage.

- If the pulse voltage is present, check the speedometer gear box function. If it is OK, replace the speedometer.
- If the pulse voltage is absent, check for open or short circuit in the Black/yellow wire. If the wire is OK, check the speed sensor.



### SPEED SENSOR INSPECTION

Remove the headlight (page 19-3).

Turn the ignition switch to the on position and measure the voltage between the Black/brown (+) and Green/black (-) wire terminals of the speed sensor 3P connector with the connector connected.

There should be battery voltage.

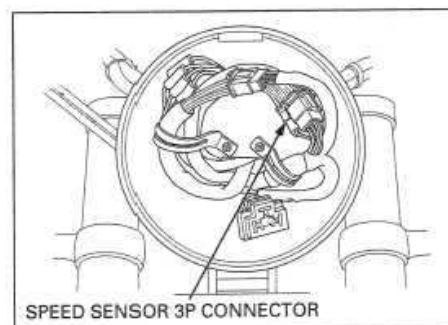
If there is no voltage, check for open circuit in the Black/brown and Green/black wires.

Measure the voltage between the Black/yellow (+) and Green/black (-) wire terminal of the sensor 3P connector with the connector connected.

Slowly turn the sensor shaft by using a screwdriver.

There should be 0 to 5-V pulse voltage.

If pulse voltage is absent, replace the speed sensor.



## COOLANT TEMPERATURE INDICATOR/THERMOSENSOR

### INSPECTION

Check that the speedometer and other indicators function properly.

- If they do not function, perform the power/ground line inspection (page 19-5).
- If they function, check the following.

Disconnect the thermosensor connector and ground the connector (Green/blue) terminal with a jumper wire.

Turn the ignition switch to the on position and check the temperature indicator.

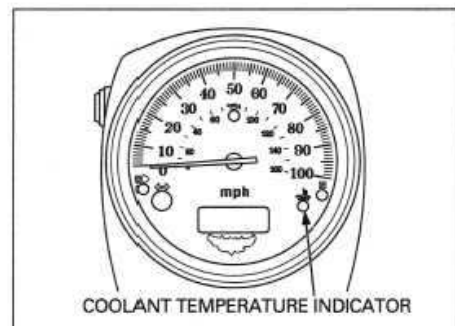
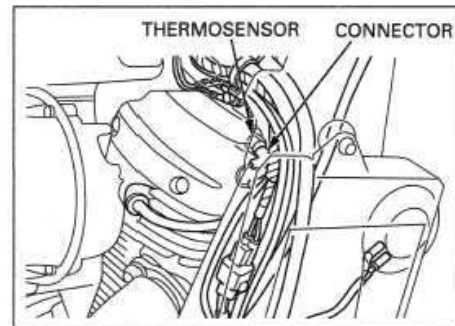
- If the indicator comes on (indicator circuit is normal), check the thermosensor.
- If the indicator does not come on, check for open circuit in the Green/blue wire. If the wire is OK, replace the speedometer.

#### The indicator comes on when the engine is cooled

Disconnect the thermosensor connector.

Turn the ignition switch to the on position and check the temperature indicator.

- If the indicator does not come on, check the thermosensor.
- If the indicator comes on, check for a short circuit in the Green/blue wire. If the wire is OK, replace the speedometer.



### THERMOSENSOR INSPECTION

Drain the coolant (page 6-5).

Disconnect the thermosensor connector and remove the thermosensor.

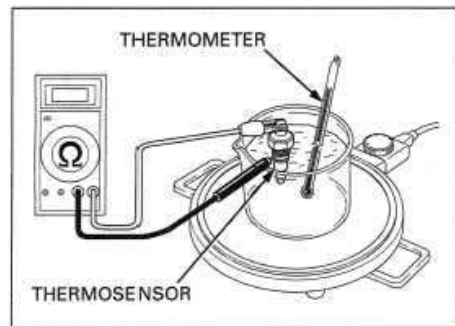
*Wear protective clothing, insulated gloves and eye protection.*

Suspend the thermosensor in a pan of coolant (50 – 50 mixture) on an electric heating element and measure the resistance through the sensor as the coolant heats up.

*Keep all flammable materials away from the electric heating element.*

#### NOTE:

- Soak the thermosensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or thermosensor touch the pan.



## LIGHTS/METERS/SWITCHES

Temperature	80°C (176°F)	120°C (248°F)
Resistance	45 – 60 $\Omega$	10 – 20 $\Omega$

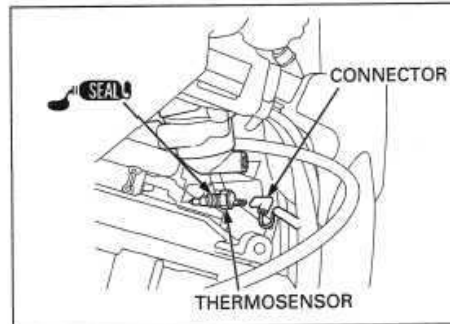
Replace the thermosensor if it is out of specification by more than 10% at any temperature listed.

Apply sealant to the thermosensor threads. Do not apply sealant to the sensor head.  
Install and tighten the thermosensor.

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

Connect the thermosensor connector.

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



## COOLING FAN MOTOR SWITCH

### INSPECTION

#### Fan motor does not stop

Turn the ignition switch to the off position, disconnect the connector from the fan motor switch and turn the ignition switch to the on position again.

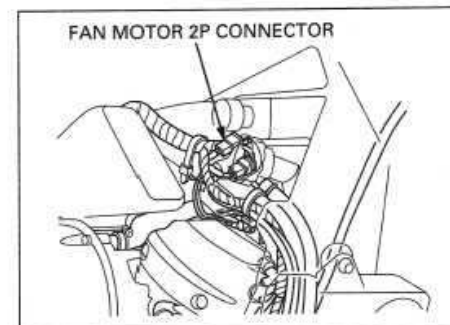
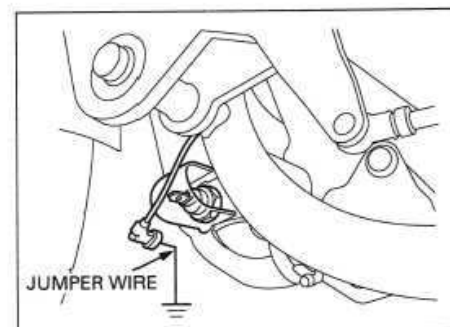
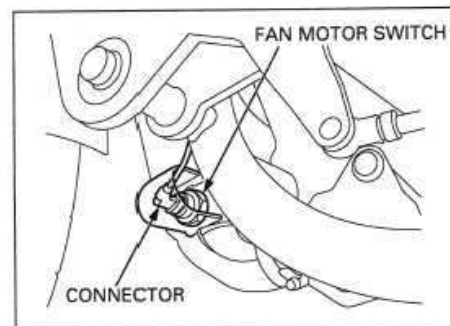
- If the fan motor does not stop, check for a short circuit in the Black wire between the fan motor and switch.
- If the fan motor stops, replace the fan motor switch.

#### Fan motor does not start

Before testing, check for a blown fan motor fuse.  
Warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector with a jumper wire.  
Turn the ignition switch to the on position and check the fan motor.

- If the motor starts, check the connection at the fan motor switch terminal. If it is OK, replace the fan motor switch.
  - If the fan motor does not start, remove the fuel tank (page 2-2) and disconnect the fan motor 2P connector. Measure the voltage between the Blue/black(+) and Green (-) wire terminals at the main harness side 2P connector. There should be battery voltage.
- If there is battery voltage, replace the fan motor.
  - If there is no voltage, check for open circuit in the Blue/black and Green wires.



## REMOVAL/INSTALLATION

Remove the radiator (page 6-8).

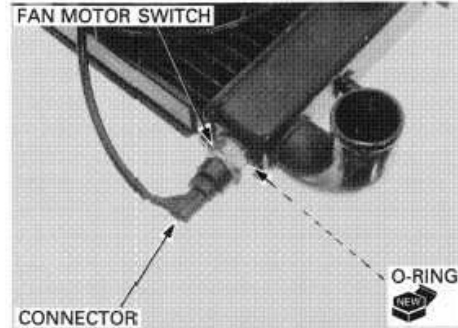
Disconnect the fan motor switch connector and remove the switch.

Install a new O-ring onto the fan motor switch. Install and tighten the fan motor switch.

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

Connect the fan motor switch connector.

Install the radiator (page 6-11).



## OIL PRESSURE INDICATOR

### INSPECTION

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

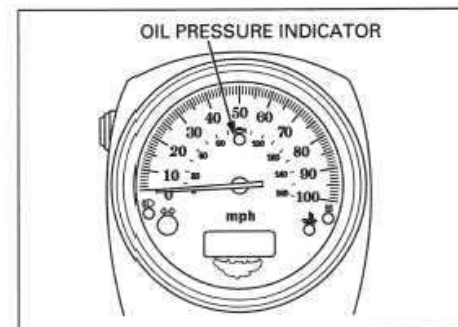
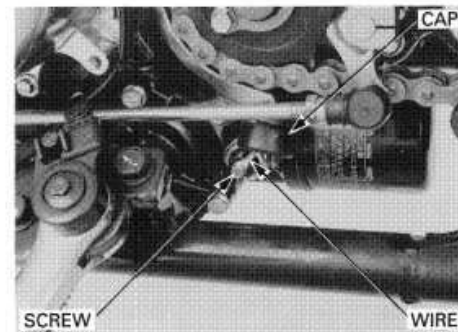
Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw.

**Indicator does not come on with the ignition switch turned to the on position**

Ground the wire terminal to the engine with a jumper wire.

Turn the ignition switch to the on position and check the oil pressure indicator.

- If the indicator comes on, replace the oil pressure switch (page 4-3).
- If the indicator does not come on, check for an open circuit in the Blue /red wire between the oil pressure switch and speedometer.



**Indicator stays on while the engine is running**

Check for continuity between the wire terminal and ground.

- If there is continuity, check for a short circuit in the Blue/red wire between the oil pressure switch and speedometer.
- If there is no continuity, check the oil pressure (page 4-3). If the oil pressure is normal, replace the oil pressure switch.

## CARBURETOR HEATER

### INSPECTION

Remove the seat (page 2-2).  
Remove the air cleaner housing (page 5-3).

Disconnect the air temperature switch 2P connector.  
Disconnect the carburetor heater Brown/black wire connectors from each carburetor.

Check for continuity between the Brown/black terminal of the 2P connector and each heater connector terminal (Brown/black).

There should be continuity.

If there is no continuity, check for an open circuit in the Brown/black wire.

Measure the voltage between the Black/brown (+) terminal of the 2P connector and each heater Green (-) wire terminal.

There should be battery voltage with the ignition switch in the on position.

If there is no voltage, check for an open circuit in related wires.

If there is voltage, check the carburetor heater and air temperature switch as follows.

Measure the resistance between the carburetor heater terminals.

**STANDARD: 13 – 15  $\Omega$  (20°C/68°F)**

If the resistance is out of the above ranges, replace the carburetor heater.

Check for continuity between the temperature switch terminals.

**Above 20°C (68°F): No continuity**

**Below 7°C (45°F): Continuity**

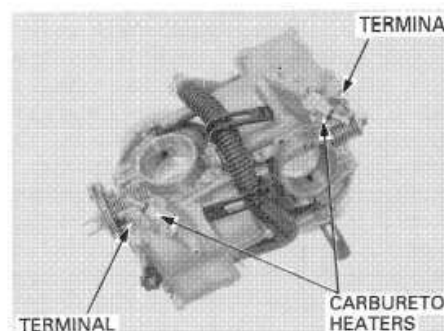
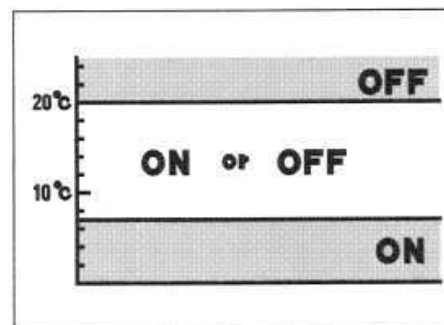
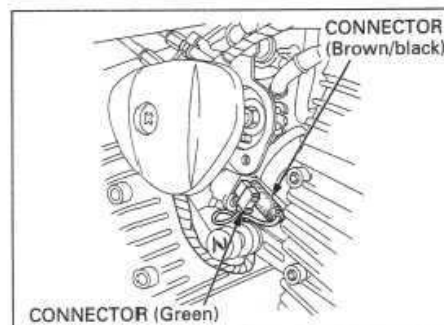
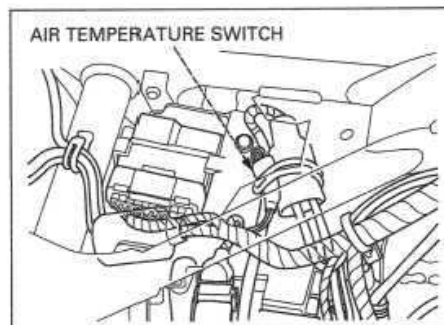
If the reading is out of specification, replace the air temperature switch.

### REMOVAL/INSTALLATION

Disconnect the carburetor heater wire connectors.  
Remove the carburetor heater and ground terminal.

Install the ground terminal and carburetor heater with the end of the ground terminal facing out, and tighten the carburetor heater.  
Connect the heater connectors.

Install the removed parts in the reverse order.



## IGNITION SWITCH

### INSPECTION

Remove the right side cover (page 2-3).  
Disconnect the ignition switch 3P connector (White).

Check for continuity between the switch side connector terminals in each switch position.  
Continuity should exist between the color coded wires as follows:

Color Position	Bu/O	R/BI	R
ON	○	○	○
OFF			

### REMOVAL/INSTALLATION

Release the ignition switch wire from the wire band and disconnect the 3P connector.

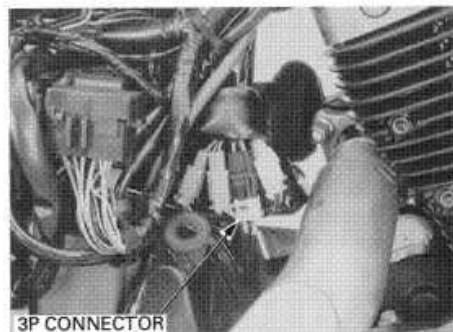
Remove the following:

- screw and switch cover
- mounting bolts
- ignition switch

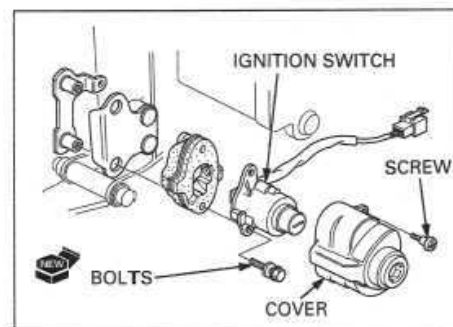
Install the ignition switch with new mounting bolts and tighten them.

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

Install the switch cover with the screw and tighten it.  
Route the wire properly and connect the 3P connector (page 1-18).  
Install the right side cover.



3P CONNECTOR



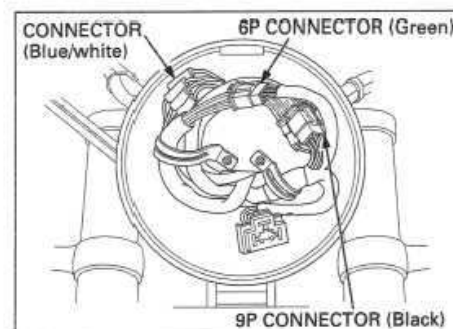
## HANDLEBAR SWITCHES

Remove the headlight (page 19-3).

Disconnect the left handlebar switch 9P (Black) and blue/white wire connectors, and right handlebar switch 6P connector (Green).

Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wires as shown in the charts:





## RIGHT HANDLEBAR SWITCH

### ENGINE STOP SWITCH

Position \ Color	Bl/W	Bl/G
OFF		
RUN	○	○

### STARTER SWITCH

Position \ Color	Y/R	Bl/W
FREE		
PUSH	○	○

## LEFT HANDLEBAR SWITCH

### TURN SIGNAL SWITCH

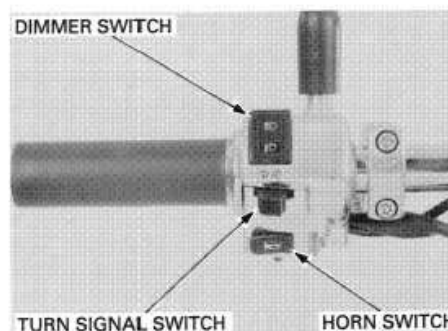
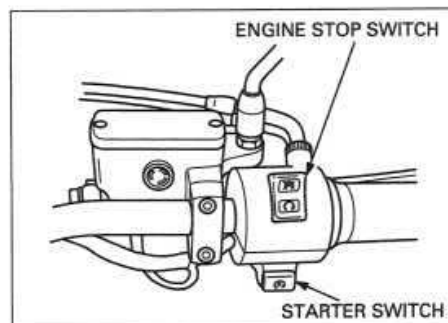
Position \ Color	Gr	O	Lb
L	○	○	
N			
R	○		○

### DIMMER SWITCH

Position \ Color	Bu/W	W	Bu
Low	○	○	
(N)	○	○	○
High	○		○

### HORN SWITCH

Position \ Color	Lg	Bl/Br
FREE		
PUSH	○	○

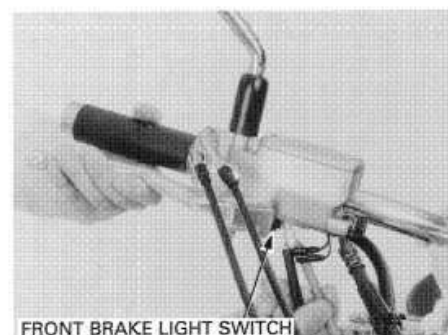


## BRAKE LIGHT SWITCH

### FRONT

Disconnect the front brake light switch connectors and check for continuity between the switch terminals.

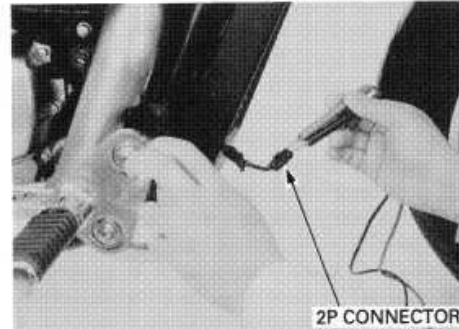
There should be continuity with the front brake lever squeezed and no continuity with the lever released.



## REAR

Remove the radiator mounting bolt and carefully move the radiator grille forward. Disconnect the rear brake light switch 2P connector (Black) and check for continuity between the connector terminals.

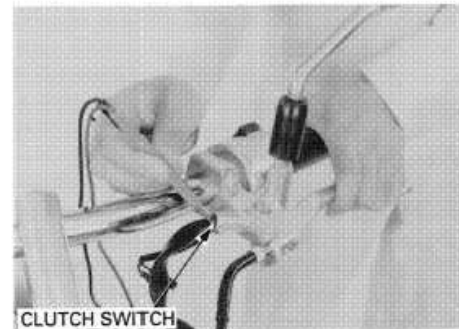
There should be continuity with the rear brake pedal depressed and no continuity with the pedal released.



## CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.



## NEUTRAL SWITCH

### INSPECTION

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

Disconnect the neutral switch wire connector. Check for continuity between the switch terminal and engine ground.

There should be continuity with the transmission in neutral, and no continuity with the transmission in gear except neutral.

### REMOVAL/INSTALLATION

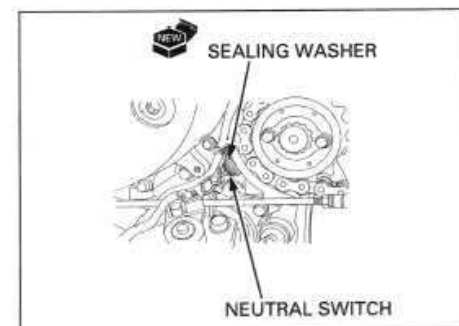
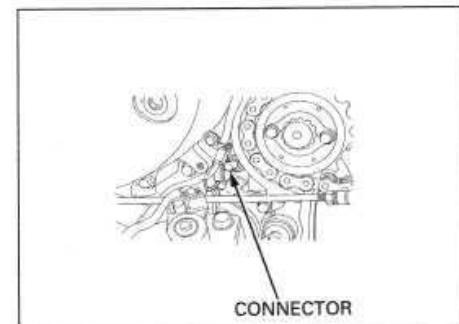
Disconnect the neutral switch wire connector. Remove the neutral switch from the crankcase.

Install the neutral switch with a new sealing washer and tighten it.

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

Connect the neutral switch wire connector.

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

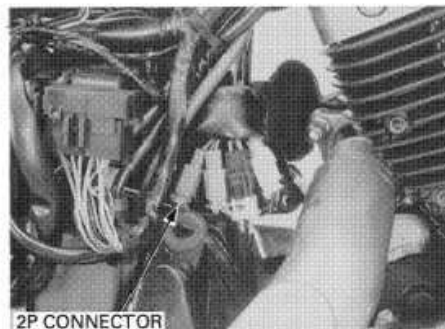


## SIDE STAND SWITCH

### INSPECTION

Remove the right side cover (page 2-3).

Disconnect the side stand switch 2P connector (Green).  
Check for continuity between the connector terminals.  
There should be continuity with the side stand retracted and no continuity with the side stand lowered.



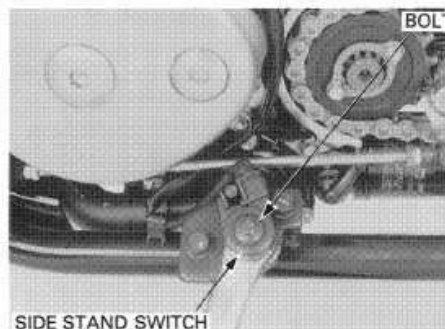
2P CONNECTOR

### REMOVAL/INSTALLATION

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

Disconnect the side stand switch 2P connector (Green) and release the switch wire from the wire clips and guide.

Remove the side stand switch bolt and the switch.



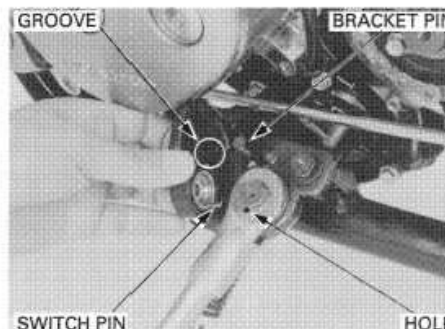
SIDE STAND SWITCH

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the bracket pin.  
Install the side stand switch bolt and tighten it.

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

*Route the side stand switch wire properly (page 1-18).*

Install the removed parts in the reverse order of removal.



SWITCH PIN

HOLE

## FUEL PUMP

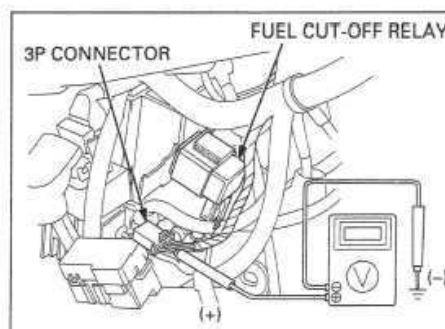
### SYSTEM INSPECTION

Remove the right side cover (page 2-3).

Disconnect the fuel cut-off relay 3P connector (White).

Measure the voltage between the Black (+) wire terminal of the 3P connector and ground (-).  
There should be battery voltage with the ignition switch in the on position.

If there is no voltage, check for an open circuit in the Black wire.



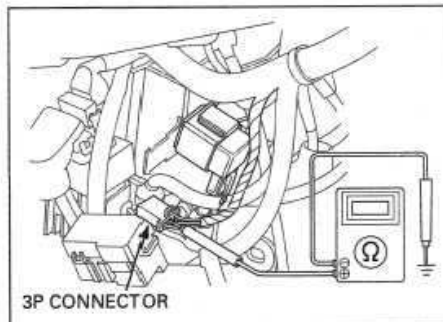
3P CONNECTOR

FUEL CUT-OFF RELAY

Check for continuity between the Black/blue wire terminal of the 3P connector and ground.

There should be continuity.

- If there is continuity, check for open circuit in the Yellow/blue wire between the fuel cut-off relay and ignition control module (ICM). If the wire is OK, replace the fuel cut-off relay.
- If there is no continuity, check as follows.

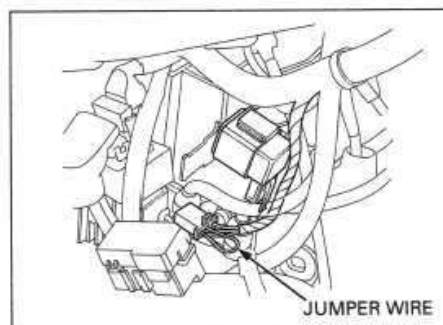


Disconnect the fuel pump 2P connector. Short the Black and Black/blue terminals of the relay 3P connector with a jumper wire.

Measure the voltage between the Black/blue (+) and Green (-) wire terminals on the wire harness side pump 2P connector.

- If there is voltage, replace the fuel pump.
- If there is no voltage, check for an open circuit in the Black/blue and Green wires.

For fuel pump replacement, see page 5-24.



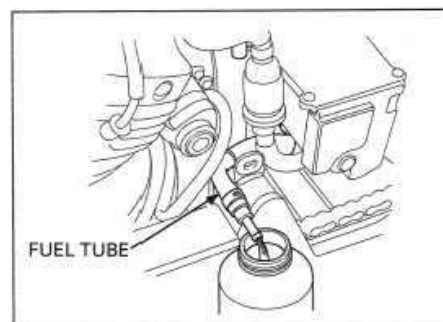
## DISCHARGE VOLUME INSPECTION

Remove the left and right side covers (page 2-3).

Disconnect the fuel cut-off relay 3P connector (white) and short the Black and Black/blue terminals of the 3P connector with a jumper wire (refer to above inspection).

Turn the fuel valve to the off position and disconnect the fuel tube from the tube joint.

Hold a graduated beaker under the fuel tube. Turn the ignition switch to the on position (engine stopped) and let fuel flow into a beaker for 5 seconds, then turn the ignition switch to the off position.



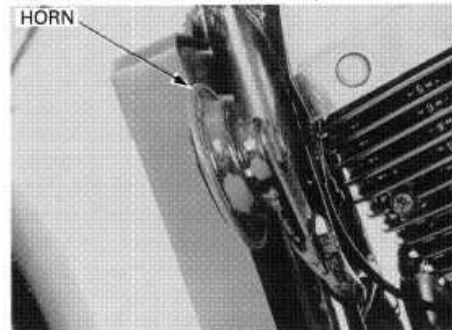
Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

**FUEL PUMP FLOW CAPACITY:**  
900 cm<sup>3</sup> (30.4 US oz, 31.7 Imp oz) minimum/minute

## HORN

Disconnect the wire connectors from the horn.  
Connect a 12-V battery to the horn terminals.

The horn is normal if it sounds when the 12-V battery is connected across the horn terminals.

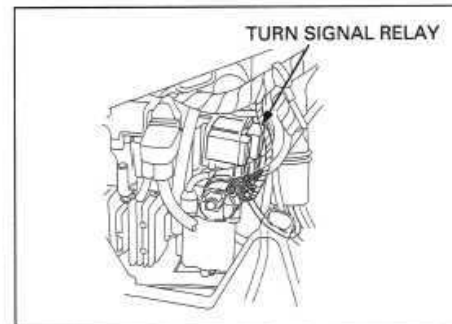


## TURN SIGNAL RELAY

**Turn signal light does not blink**  
Remove the right side cover (page 2-3).

Disconnect the turn signal relay connector.  
Connect the Black/brown and Gray wire terminals of the wire harness side connector with a jumper wire.  
Turn the ignition switch to the on position and check the turn signal light by operating the turn signal switch.

- If the light does not come on, check for an open circuit in Black/brown and Gray wires.
  - If the light comes on, check for continuity between the Green wire terminal and body ground.
- If there is no continuity, check for an open circuit in Green wire.
- If there is continuity, check the connector terminals for loose or poor contact.  
If the connector terminals are OK, replace the turn signal relay.



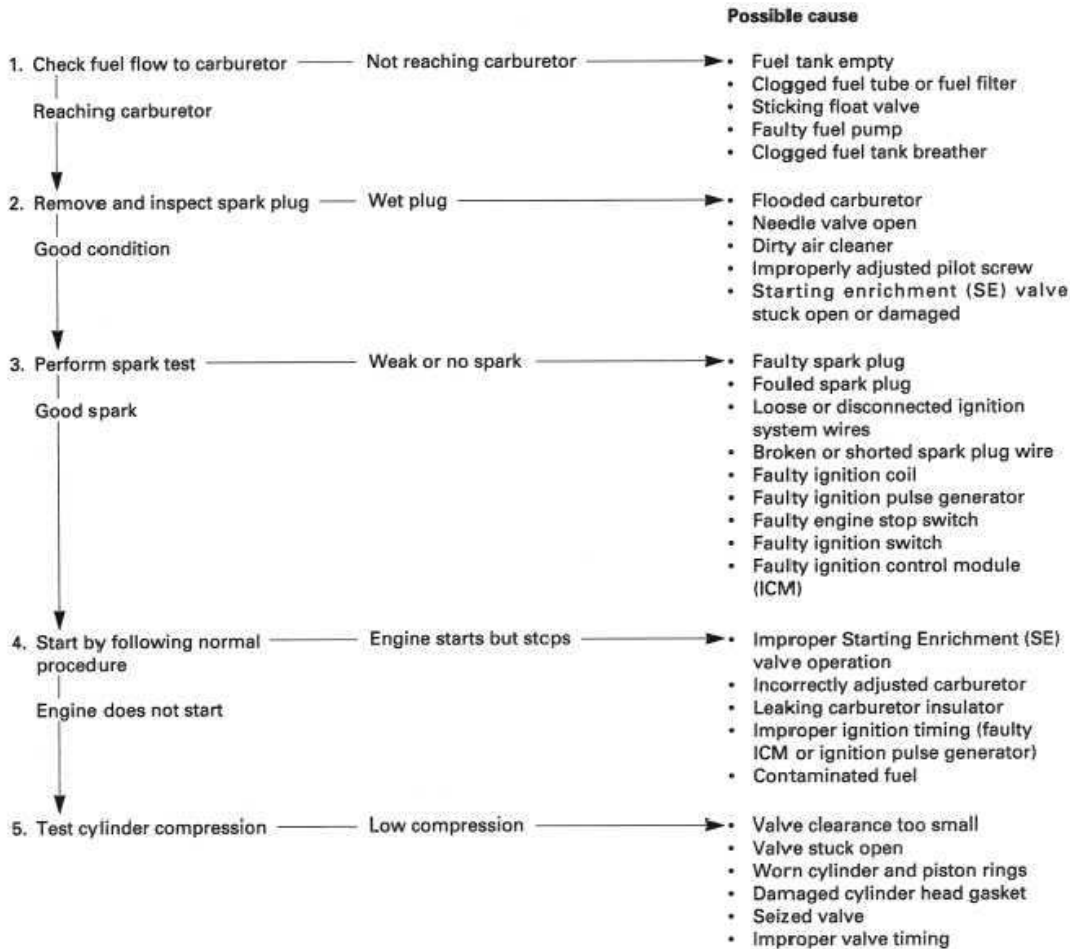
## 20. WIRING DIAGRAM



# 21. TROUBLESHOOTING

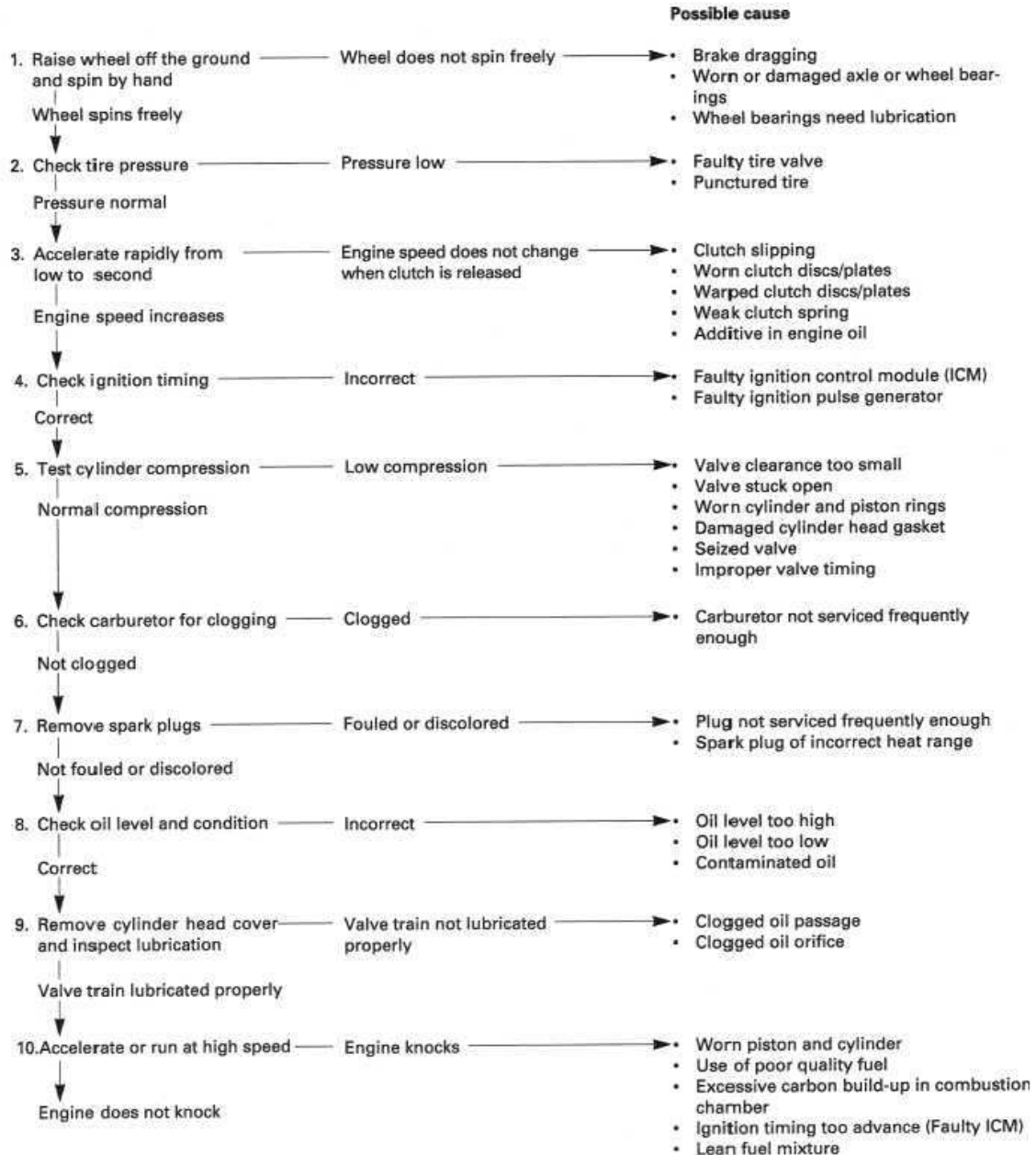
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ENGINE LACKS POWER	21-2	POOR HANDLING	21-4
POOR PERFORMANCE AT LOW AND IDLE SPEED	21-3		

## ENGINE DOES NOT START OR IS HARD TO START



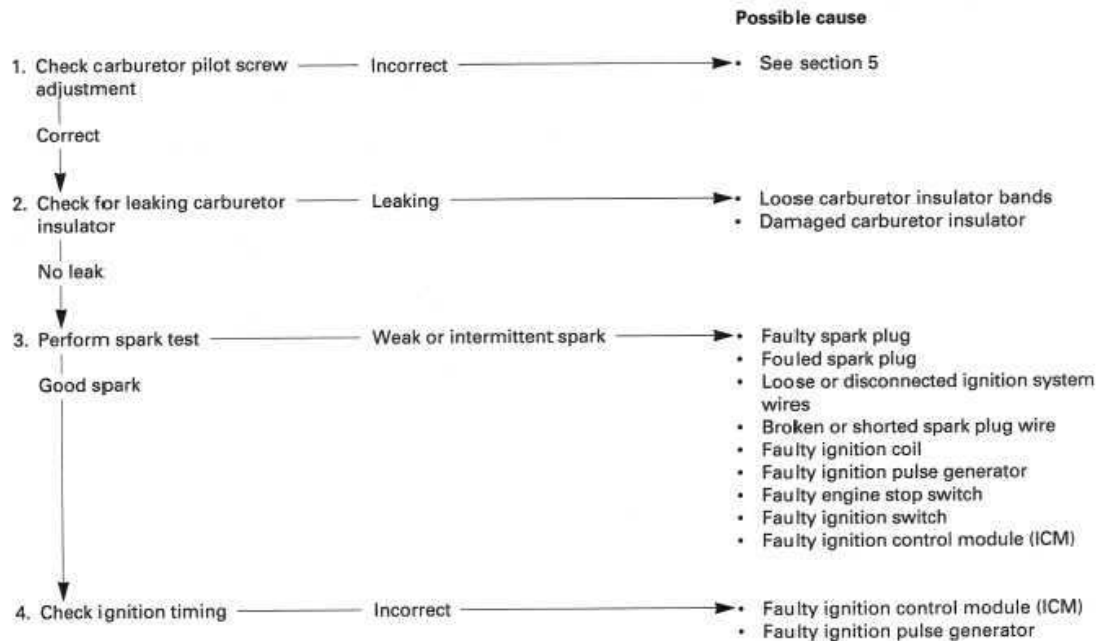
## TROUBLESHOOTING

### ENGINE LACKS POWER

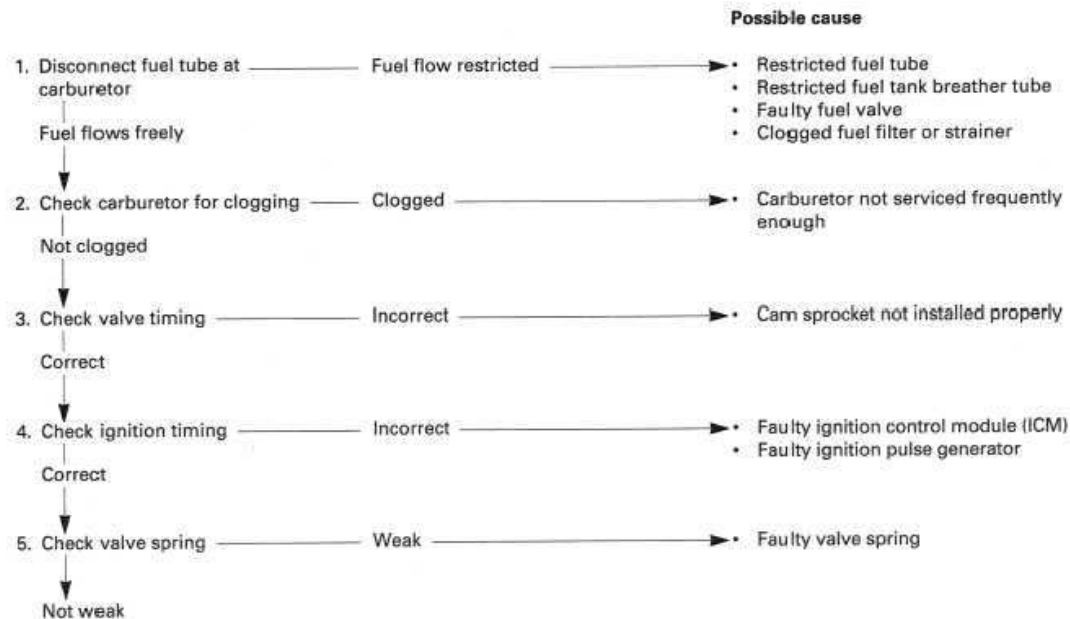




## POOR PERFORMANCE AT LOW AND IDLE SPEED



## POOR PERFORMANCE AT HIGH SPEED



## TROUBLESHOOTING

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### POOR HANDLING

	Possible cause
1. If steering is heavy	<ul style="list-style-type: none"><li>• Steering bearing adjustment nut too tight</li><li>• Damaged steering head bearings</li></ul>
2. If either wheel is wobbling	<ul style="list-style-type: none"><li>• Excessive wheel bearing play</li><li>• Bent rim</li><li>• Improperly installed wheel hub</li><li>• Excessively worn swingarm pivot bearings</li><li>• Bent frame</li></ul>
3. If the motorcycle pulls to one side	<ul style="list-style-type: none"><li>• Tire air pressure incorrect</li><li>• Faulty shock absorber</li><li>• Bent fork</li><li>• Bent swingarm</li><li>• Bent frame</li><li>• Bent front axle</li><li>• Improper wheel alignment</li></ul>

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