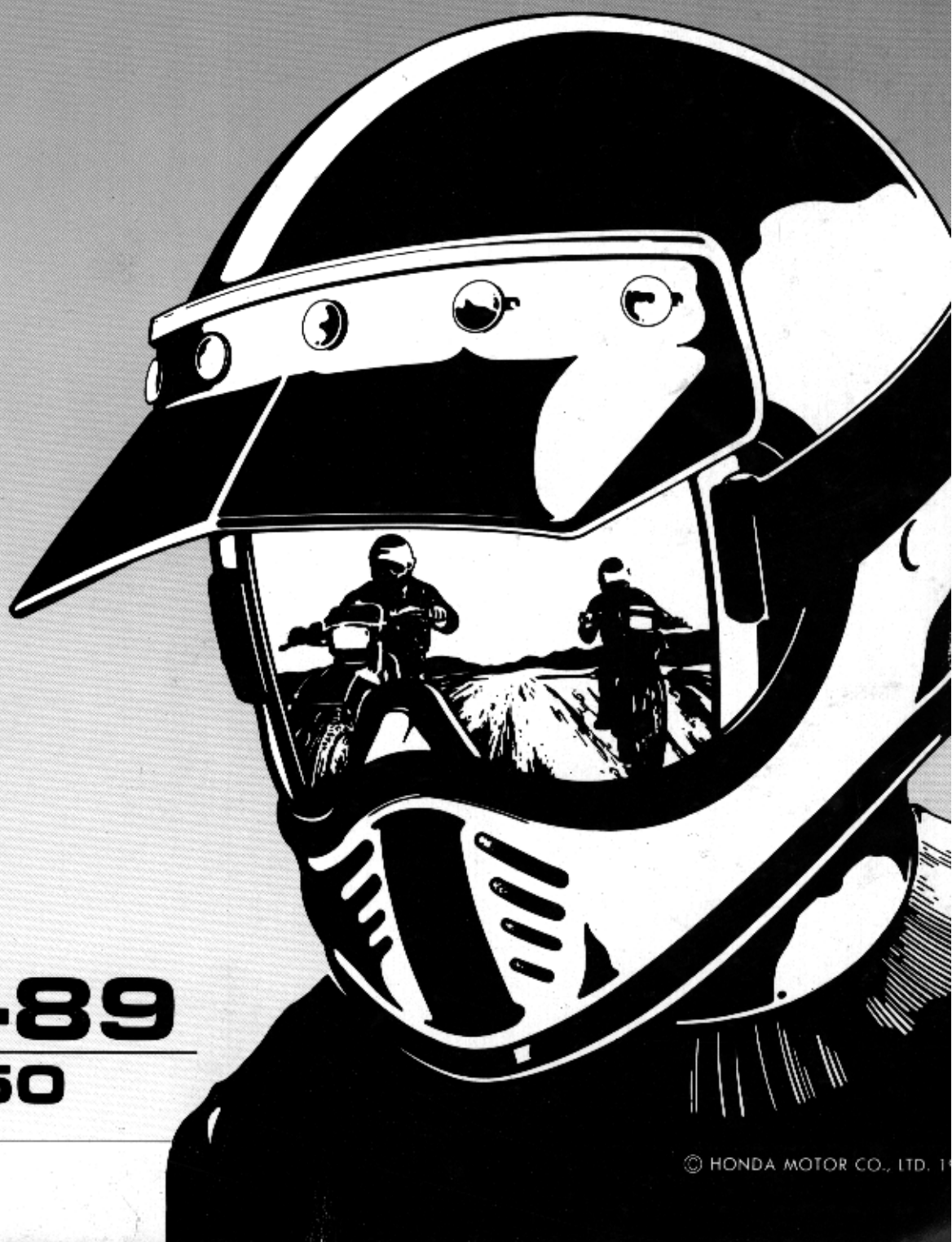


# HONDA

## SERVICE MANUAL



**88-89**  
**NX650**

## HOW TO USE THIS MANUAL

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standard set by U.S. Environmental Protection Agency and California Air Resources Board. Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 20 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on page 1 of that 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.

All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of the approval for printing. HONDA MOTOR CO., LTD. Reserves the right to make changes at any time without notice and without incurring any obligation whatever.

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HONDA MOTOR CO., LTD.  
SERVICE PUBLICATIONS OFFICE

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# 1. GENERAL INFORMATION

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## GENERAL SAFETY

### ▲ WARNING

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

### ▲ WARNING

*Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your working area or where gasoline is stored.*

### ▲ WARNING

*Brake dust may contain asbestos.*

- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.*
- *In the United States, use an OSHA approved vacuum cleaner or alternate method approved by OSHA designed to minimize the hazard caused by airborne asbestos fibers.*

### ▲ 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.*
- *Electrolyte is poisonous.*
  - *If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.*

### CAUTION

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

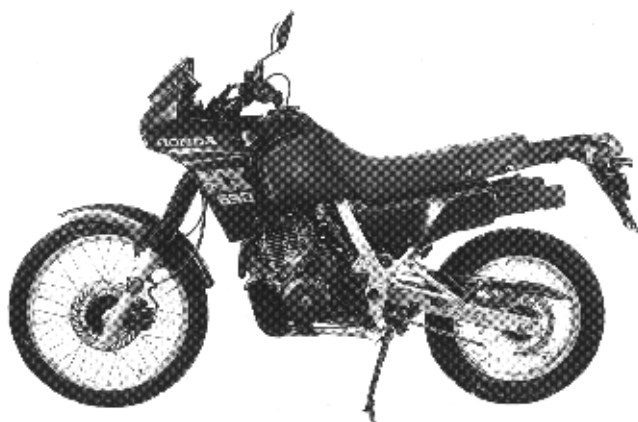
## SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening a series of bolts or nuts, begin with the larger-diameter or inner bolts first, and tighten to the specified torque diagonally, 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.

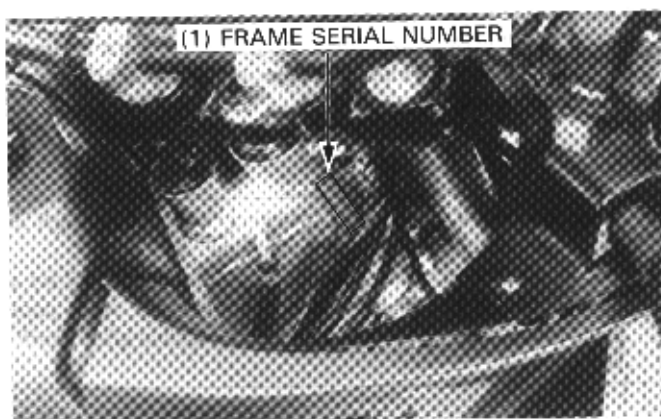
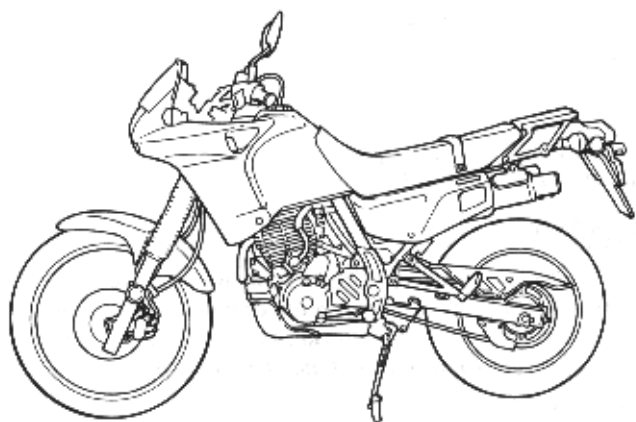
**GENERAL INFORMATION**

**MODEL IDENTIFICATION**

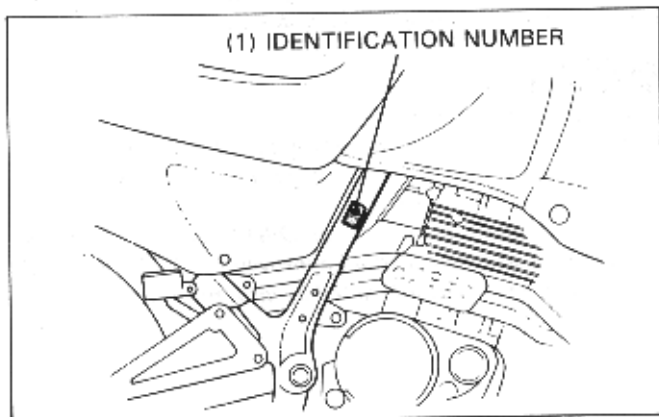
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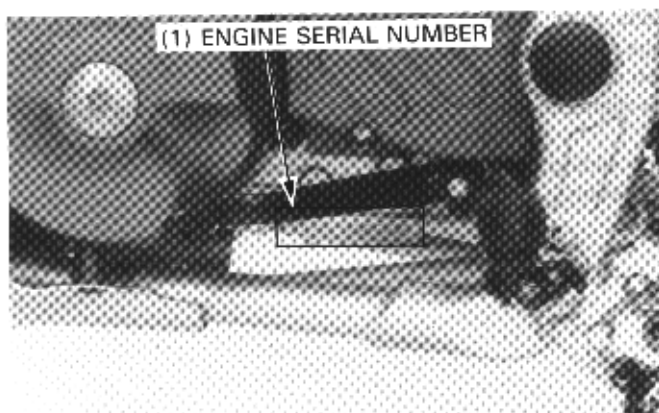
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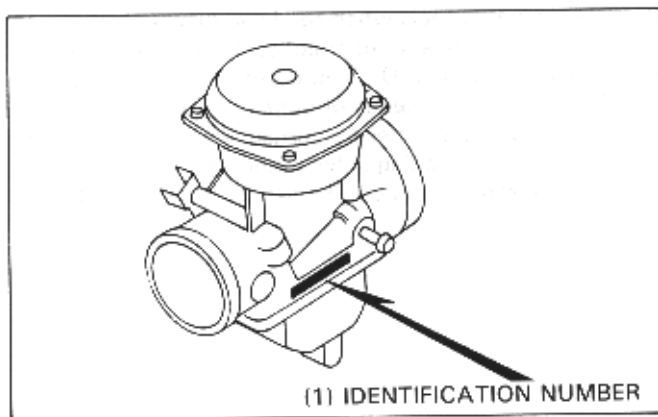
The frame serial number is stamped on the right side of the steering head.



The vehicle identification number (VIN) is on the right side of the frame pipe.



The engine serial number is stamped on the right crankcase.



The carburetor identification number is stamped on the carburetor body.

**SPECIFICATIONS**

< >: California model

ITEM		SPECIFICATIONS		
DIMENSIONS	Overall length	2,195 mm (86.4 in)		
	Overall width	890 mm (35.0 in)		
	Overall height	1,220 mm (48.0 in)		
	Wheel base	1,435 mm (56.4 in)		
	Seat height	870 mm (34.3 in)		
	Ground clearance	255 mm (10.0 in)		
	Dry weight	152 kg (335.1 lb)		
	Curb weight	168 kg (370.3 lb)		
FRAME	Type	Semi-double cradle		
	Front suspension, travel	Telescopic fork, 220 mm (8.7 in)		
	Rear suspension, travel	Swing arm, 195 mm (7.7 in)		
	Front tire size	90/90-21 54S		
	Rear tire size	120/90-17 64S		
	Cold tire pressures	Rider only	Front	150 kPa (1.50 kg/cm <sup>2</sup> , 22 psi)
			Rear	150 kPa (1.50 kg/cm <sup>2</sup> , 22 psi)
		Rider and one passenger	Front	150 kPa (1.50 kg/cm <sup>2</sup> , 22 psi)
			Rear	200 kPa (2.00 kg/cm <sup>2</sup> , 29 psi)
	Front brake	Hydraulic, single disc		
Rear brake	Internal expanding shoes			
Fuel capacity	13 liters (3.4 US gal, 2.9 Imp gal)			
Fuel reserve capacity	2.5 liters (0.66 US gal, 0.55 Imp gal)			
Caster angle	28°30'			
Trail	117 mm (4.6 in)			
Fork oil capacity	592 cc (20.0 US oz, 20.8 Imp oz)			
ENGINE	Type	Air cooled 4-stroke		
	Cylinder arrangement	Single cylinder, 15° inclined from vertical		
	Bore and stroke	100 x 82 mm (3.94 x 3.23 in)		
	Displacement	644.0 cc (39.29 cu in)		
	Compression ratio	8.3 : 1		
	Valve train	OHC, chain drive, 4-valve		
	Oil capacity	2.3 liters (2.43 US qt, 2.02 Imp qt) after disassembly 1.9 liters (2.01 US qt, 1.67 Imp qt) after draining		
	Lubrication system	Forced pressure and dry sump		
	Air filtration	Paper filter		
	Cylinder compression	125 kPa (12.5 kg/cm <sup>2</sup> , 178 psi)		
	Intake valve	Opens	5° (BTDC)	} at 1 mm lift
		Closes		
	Exhaust valve	Opens	40° (ABDC)	
		Closes	45° (BBDC)	
	Valve clearance (cold)	IN	5° (ATDC)	
EX		0.10 mm (0.004 in)		
Engine dry weight		0.12 mm (0.005 in)		
		50 kg (110 lb)		
CARBURETOR	Type	Constant Vacuum, single carburetor		
	I.D. number	VE81A <VE82A>		
	Main jet	#155		
	Pilot screw opening	3 turns out		
	Float level	18.5 mm (0.7 in)		
	Idle speed	1,300 ± 100 rpm		

## GENERAL INFORMATION

ITEM		SPECIFICATIONS		
DRIVE TRAIN	Clutch	Wet, multi-plate		
	Transmission	5-speed constant mesh		
	Primary driven	2.029 (69/34)		
	Final reduction	3.000 (45/15)		
	Gear ratio I	2.666 (32/12)		
	Gear ratio II	1.750 (28/16)		
	Gear ratio III	1.250 (25/20)		
	Gear ratio IV	1.000 (23/23)		
	Gear ratio V	0.840 (21/25)		
	Gear shift pattern	Left foot operated return system, 1-N-2-3-4-5		
ELECTRICAL	Ignition	DC-CDI		
	Ignition timing	Initial	8° BTDC at idle	
		Full advance	28° BTDC at 4,000 rpm	
	Alternator	AC generator 0.18 kw/5,000 rpm		
	Battery capacity	12V 8AH		
	Spark plug		NGK	ND
		Standard	DPR8EA-9	X24EPR-U9
		For extended high speed riding	DPR9EA-9	X27EPR-U9
	Spark plug gap	0.8-0.9 mm (0.031-0.035 in)		
	Fuse	Main	20A	
Sub		10A x 2 + 15A		
Starting system	Electrical stator			
Headlight	12V 60/55W			
Tail/brake light	12V 32/3cp			
Front turn signal/running light	12V 32cp x 2			
Rear turn signal light	12V 32cp x 2			
Meter lights	12V 1.7W x 4			
High beam indicator	12V 1.7W			
Turn signal indicator	12V 3.4W x 2			
Neutral indicator	12V 3.4W			

## TORQUE VALUES

## ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg·m, ft·lb)	REMARKS
Crankcase drain plug	1	12	25 (2.5, 18)	Apply oil to the threads Apply a locking agent to the threads
Oil filter cover bolt	3	6	9 (0.9, 7)	
Valve adjusting screw lock nut	4	8	25 (2.5, 18)	
Cylinder head bolt	6	9	36 (3.6, 26)	
Cam sprocket bolt	2	7	20 (2.0, 14)	
Rocker arm shaft	2	14	28 (2.8, 20)	
Sub-rocker arm shaft (IN)	2	14	28 (2.8, 20)	
(EX)	2	12	23 (2.3, 17)	
Cylinder head cover bolt (8 mm)	1	8	23 (2.3, 17)	
(6 mm)	1	6	10 (1.0, 7)	
(6 mm SH)	11	6	12 (1.2, 9)	
Spark plug	1	12	18 (1.8, 13)	Apply oil to the threads
Cylinder bolt	4	10	50 (5.0, 36)	
Cylinder nut	2	6	10 (1.0, 7)	
Clutch lock nut	1	18	110 (11.0, 80)	
Primary drive gear nut	1	18	110 (11.0, 80)	Apply a locking agent to the threads
Gearshift cam bolt	1	6	12 (1.2, 9)	
Stopper arm bolt	1	8	25 (2.5, 18)	Apply a locking agent to the threads
Right crankcase cover bolt/nut	11	6	12 (1.2, 9)	
Starter clutch bolt	6	8	30 (3.0, 22)	
Flywheel bolt	1	12	125 (12.5, 90)	Apply MoS <sub>2</sub> paste to the threads
Left crankcase cover bolt	7	6	12 (1.2, 9)	
Starter gear cover	5	6	12 (1.2, 9)	
Crankcase bolt	11	6	12 (1.2, 9)	
Center shift fork bolt	1	7	15 (1.5, 11)	

## FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg·m, ft·lb)	REMARKS
Down tube drain plug	1	10	35 (3.5, 25)	Apply a locking agent to the threads
Oil strainer nut	1	18	40 (4.0, 29)	
Oil hose flare nut	2	16	40 (4.0, 29)	
Fuel valve cup	1	—	4 (0.4, 3)	
Spoke	—	—	4 (0.4, 3)	
Engine hanger nut (10 mm)	5	10	60 (6.0, 43)	
(8 mm)	6	8	34 (3.4, 25)	
Skid plate bolt	3	6	10 (1.0, 7)	
Oil pipe flare nut	1	18	40 (4.0, 29)	
Handlebar upper holder	4	8	26 (2.6, 19)	
Handlebar lower holder	2	8	26 (2.6, 19)	
Brake disc bolt	4	8	38 (3.8, 27)	
Front axle nut	1	12	65 (6.5, 47)	
Front axle holder nut	4	6	12 (1.2, 9)	
Fork slider socket bolt	2	8	20 (2.0, 14)	
Lower fork pinch bolt	4	8	33 (3.3, 24)	
Fork cap bolt	2	—	23 (2.3, 17)	
Upper fork pinch bolt	4	8	28 (2.8, 20)	
Brake caliper bracket bolt	2	8	27 (2.7, 20)	
Steering adjustment nut	1	26	5 (0.5, 3.6)	
Steering stem nut	1	24	100 (10.0, 72)	

## GENERAL INFORMATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE (kg-m, ft-lb)	REMARKS
Driven sprocket nut	6	10	46 (4.6, 33)	Apply oil to the threads
Rear axle nut	1	16	95 (9.5, 69)	
Brake arm nut	1	6	10 (1.0, 7)	
Shock absorber spring lock nut	1	—	90 (9.0, 65)	
Shock absorber mount nut	1	10	75 (7.5, 54)	
Shock absorber lower mount bolt	1	10	45 (4.5, 32)	
Shock arm-to-shock link nut	1	10	45 (4.5, 32)	
Shock link-to-swing arm nut	1	10	45 (4.5, 32)	
Shock arm-to-frame nut	1	10	45 (4.5, 32)	
Swingarm pivot nut	1	14	110 (11.0, 80)	
Breed valve	1	7	6 (0.6, 4)	Apply oil to the threads
Front brake caliper bracket bolt	2	8	27 (2.7, 20)	
Hanger pin	2	10	18 (1.8, 13)	
Hanger pin plug	2	10	2.5 (0.25, 1.8)	
Brake lever pivot nut	1	6	6 (0.6, 4)	
Master cylinder holder bolt	2	6	12 (1.2, 9)	
Brake hose nut (master cylinder side)	1	10	35 (3.5, 25)	
Brake hose joint nut	1	10	14 (1.4, 10)	
Brake pipe nut	1	10	14 (1.4, 10)	
Brake hose bolt	1	10	35 (3.5, 25)	
Caliper pin bolt	1	8	23 (2.3, 17)	Apply a locking agent to the threads
Caliper bracket pin bolt	1	8	13 (1.3, 9)	
Exhaust pipe joint nut	4	8	22 (2.2, 16)	Apply a locking agent to the threads
Exhaust pipe protector bolt	2	6	10 (1.0, 7)	
Muffler band bolt	2	8	20 (2.0, 14)	Apply a locking agent to the threads
Muffler mounting bolt	3	8	25 (2.5, 18)	
Side stand pivot bolt	1	10	50 (5.0, 36)	
Rear carrier mounting bolt (AFTER '88:)	2	8	35 (3.5, 25)	

Torque specifications listed above are for the most important tightening points. If a specification is not listed, follow the standards below.

### STANDARD TORQUE VALUES

Item	Torque Values N·m (kg-m, ft-lb)	Item	Torque Values N·m (kg-m, ft-lb)
5 mm bolt and nut	5 (0.5, 3.5)	5 mm screw	4 (0.4, 3)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 7)
8 mm bolt and nut	22 (2.2, 16)	6 mm bolt with 8 mm head	9 (0.9, 7)
10 mm bolt and nut	35 (3.5, 25)	6 mm flange bolt and nut	12 (1.2, 9)
12 mm bolt and nut	55 (5.5, 40)	8 mm flange bolt and nut	27 (2.7, 20)
		10 mm flange bolt and nut	40 (4.0, 29)



## TOOLS

## SPECIAL

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Compression gauge attachment	07908—KK60000 or equivalent commercially available in U.S.A.	3
Cam chain tensioner holder	07973—MG30002 or 07973—MG30003	6
Valve guide reamer	07984—5510000 or 07984—657010C (U.S.A. only)	6
Universal bearing puller	07631—0010000	10
Bearing puller catch	07931—MK20100	10
Bearing remover	07936—MK50100	10
Remover handle	07936—KC10100	10
Remover sliding weight	07741—0010201	10
Needle race remover	07GMC—MK50100	10
Bearing remover shaft	07746—0060100	10
Puller shaft	07931—ME40000 or 07931—ME4000A	10
Assembly collar	07931—KF00100	10
Thread adaptor	07931—KF00200	10
Attachment, 78 x 90 mm	07GAD—SD40101	10
Fork seal driver	07947—KA50100	12
Fork seal driver attachment	07947—KF00100	12
Steering stem socket	07916—KA50100	12
Steering stem driver	07946—4300101 or 07946—MB00000	12
Ball race remover	07953—MJ10000	12
Ball race remover attachment	07953—MJ00100	12
Driver handle	07953—MJ00200	12
Driver shaft	07946—MJ00100	13
Needle bearing remover	07931—MA70000	13
Snap ring pliers	07914—3230001	14
Honda battery tester	07GMJ—0010000	16
Christie battery charger	MC 1012/2	16
Adjustable pin spanner	07702—0020001	12
Steering bearing attachment	GN HT54 (U.S.A. only)	
Bearing remover, 20 mm	07936—3710600	
Remover handle	07936—3710100	
Remover sliding weight	07936—3710200	

## GENERAL INFORMATION

### COMMON

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Spoke wrench C, 5.8 x 6.1 mm	07701-0020300 or equivalent commercially available in U.S.A.	3
Float level gauge	07401-0010000	4
Valve spring compressor	07757-0010000	6
Valve guide remover, 6.6 mm	07742-0010200 or 07984-6570100	6
Clutch center holder	07724-0050001 or equivalent commercially available in U.S.A.	8
Gear holder	07724-0010100 Not available in U.S.A.	8
Flywheel holder	07725-0040000 or equivalent commercially available in U.S.A.	9
Rotor puller	07733-0020001 or 07933-3290001 (U.S.A. only)	9
Torx bit (T40)	07703-0010100 or equivalent commercially available in U.S.A.	9
Driver	07749-0010000	10, 12, 13
Pilot, 35 mm	07746-0040800	10
Attachment, 52 x 55 mm	07746-0010400	10
Pilot, 25 mm	07746-0040800	10
Attachment, 42 x 47 mm	07746-0010300	10, 12, 13
Pilot, 40 mm	07746-0040900	10
Attachment, 32 x 35 mm	07746-0010100	10, 12, 13
Attachment, 62 x 68 mm	07746-0010500	10
Attachment I.D., 35 mm	07746-0030400	10
Bearing remover head, 15 mm	07746-0050400	10
Bearing remover shaft	07746-0050100	10, 13
Attachment, 72 x 75 mm	07746-0010800	10
Pilot, 20 mm	07746-0040500	10
Pilot, 15 mm	07746-0040300	12
Lock nut wrench, 30 x 32 mm	07716-0020400	12
Extension bar	07716-0020500	12
Bearing remover head, 17 mm	07746-0050500	13
Attachment, 37 x 40 mm	07746-0010200	13
Pilot, 17 mm	07746-0040400	13
Attachment, 24 x 26 mm	07746-0010700	13
Pilot, 20 mm	07746-0040500	13
Pilot, 22 mm	07746-0041000	13

### VALVE SEAT CUTTER

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Cutter holder, 6.6 mm	07781-0010201	} 9
Float cutter IN/EX 38.5 mm (32°)	07780-0012400	
Interior cutter IN/EX 37.5 mm (60°)	07780-0014100	
Seat cutter IN 40.0 mm (45°)	07780-0010500	
Seat cutter EX 35.0 mm (45°)	07780-0010400	

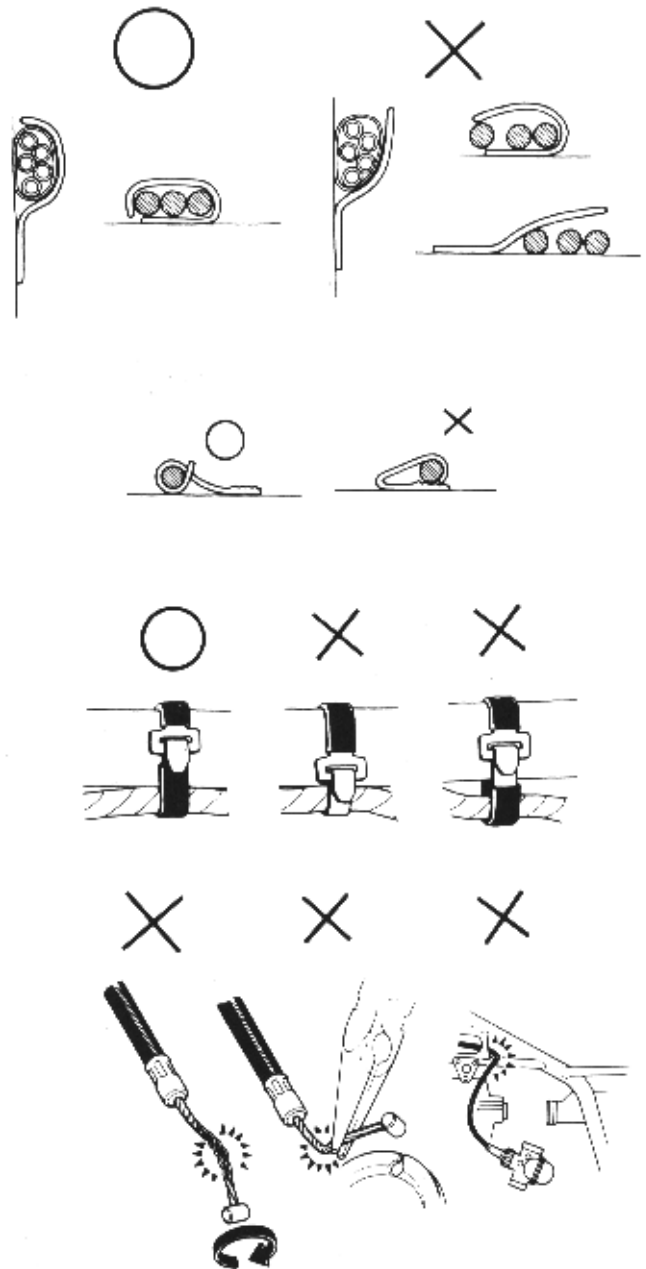
### TESTERS

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Digital multi-tester (KOWA)	07411-0020000 or KS-AHM-32-003 (U.S.A. only)	16, 17, 18, 19
Circuit tester (SANWA) or Circuit tester (KOWA)	07308-0020000 TH-5H	

## CABLE & HARNESS ROUTING

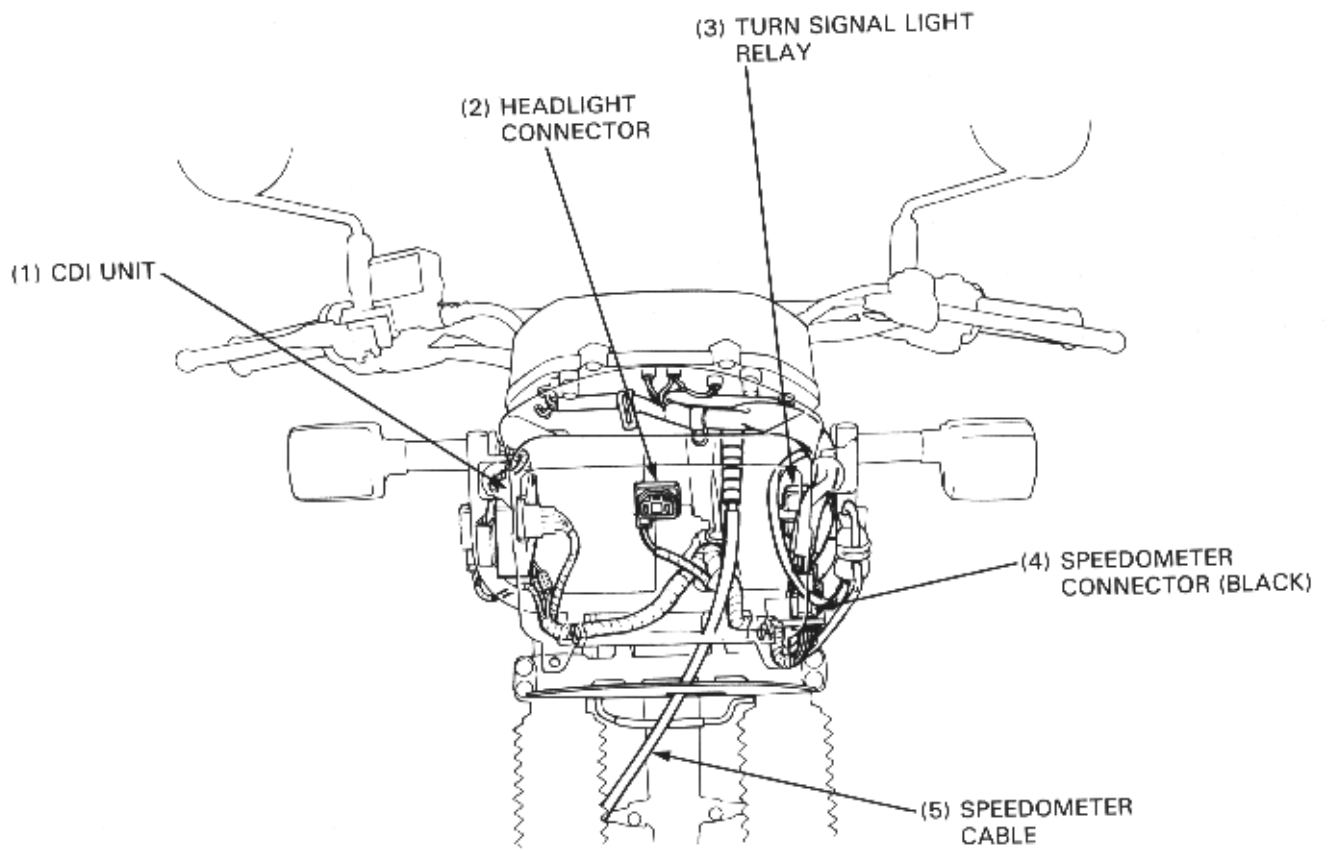
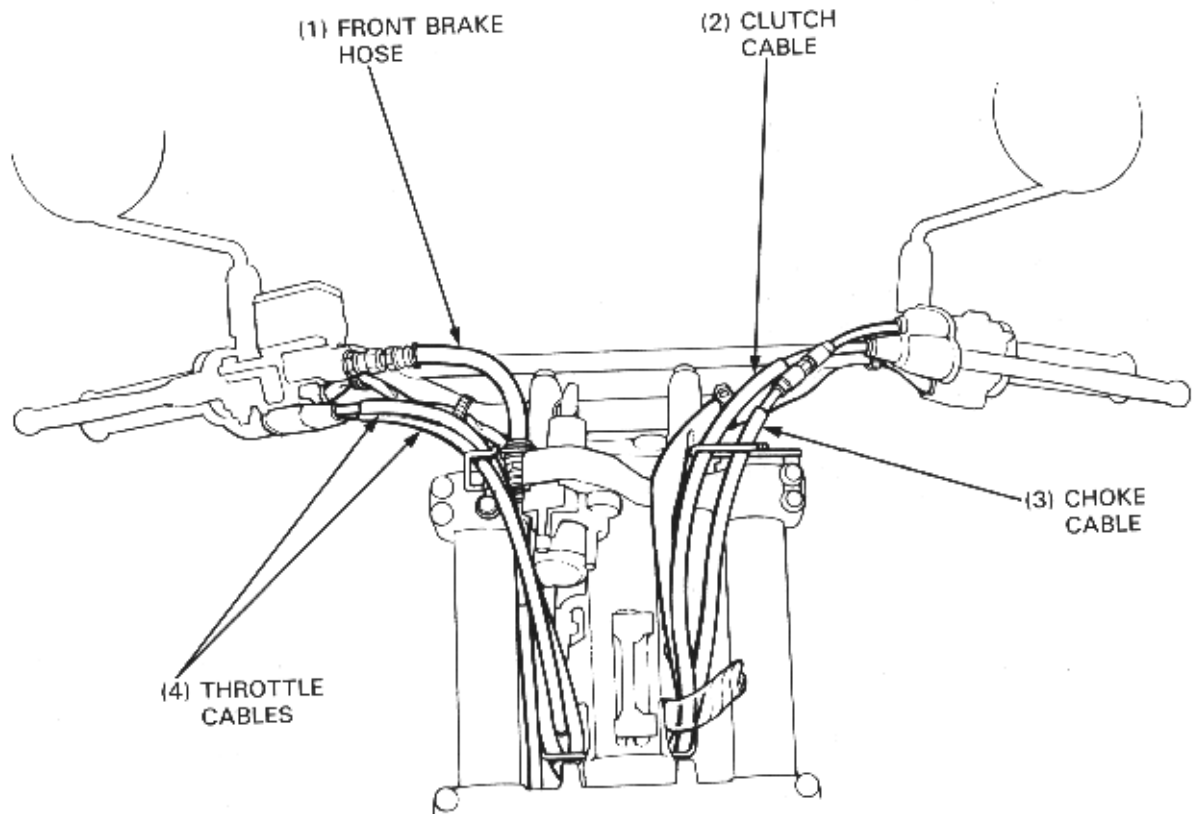
Note the following when routing cables and wire harnesses:

- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against a weld or the end of a clamp.
- Secure wires and wire harnesses to the frame with bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are not pulled taut or have no excessive slack.
- Protect wires and harnesses with electrical tape or tubing where they contact a sharp edge or corner.
- Do not use wires or harnesses with damaged insulation. Repair by wrapping them with protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners.
- Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebar should not be pulled taut, have excessive slack, or interfere with adjacent or surrounding parts in all steering positions.
- Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

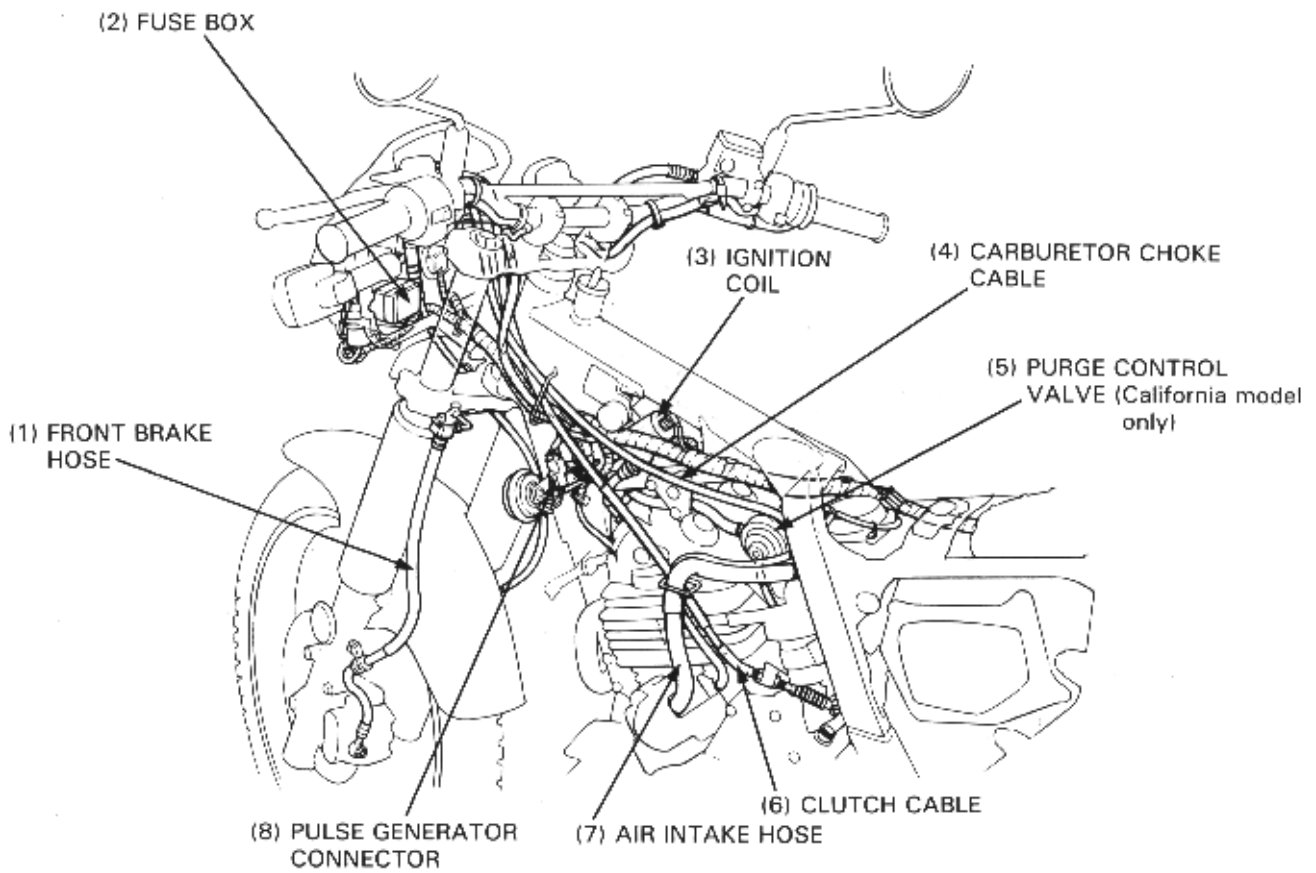


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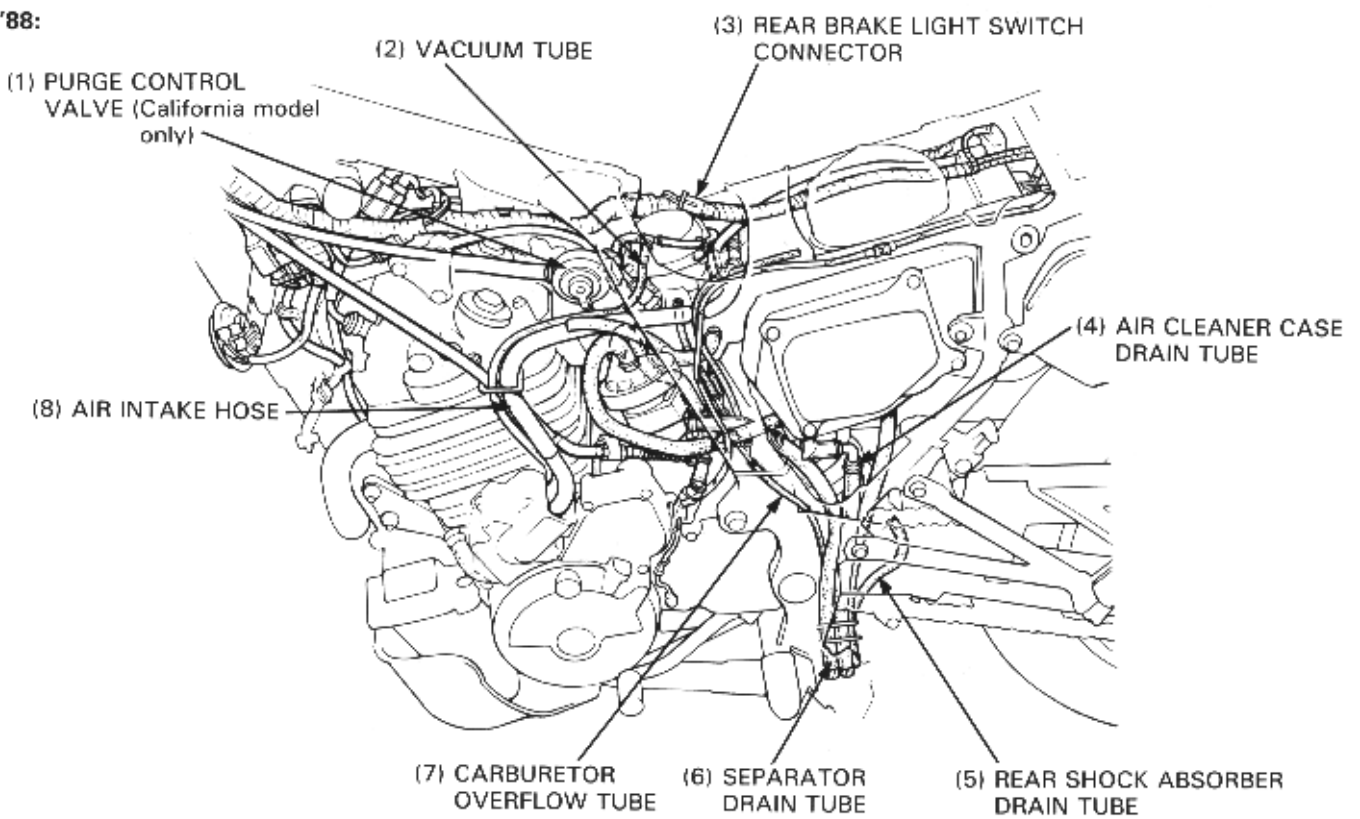
**GENERAL INFORMATION**



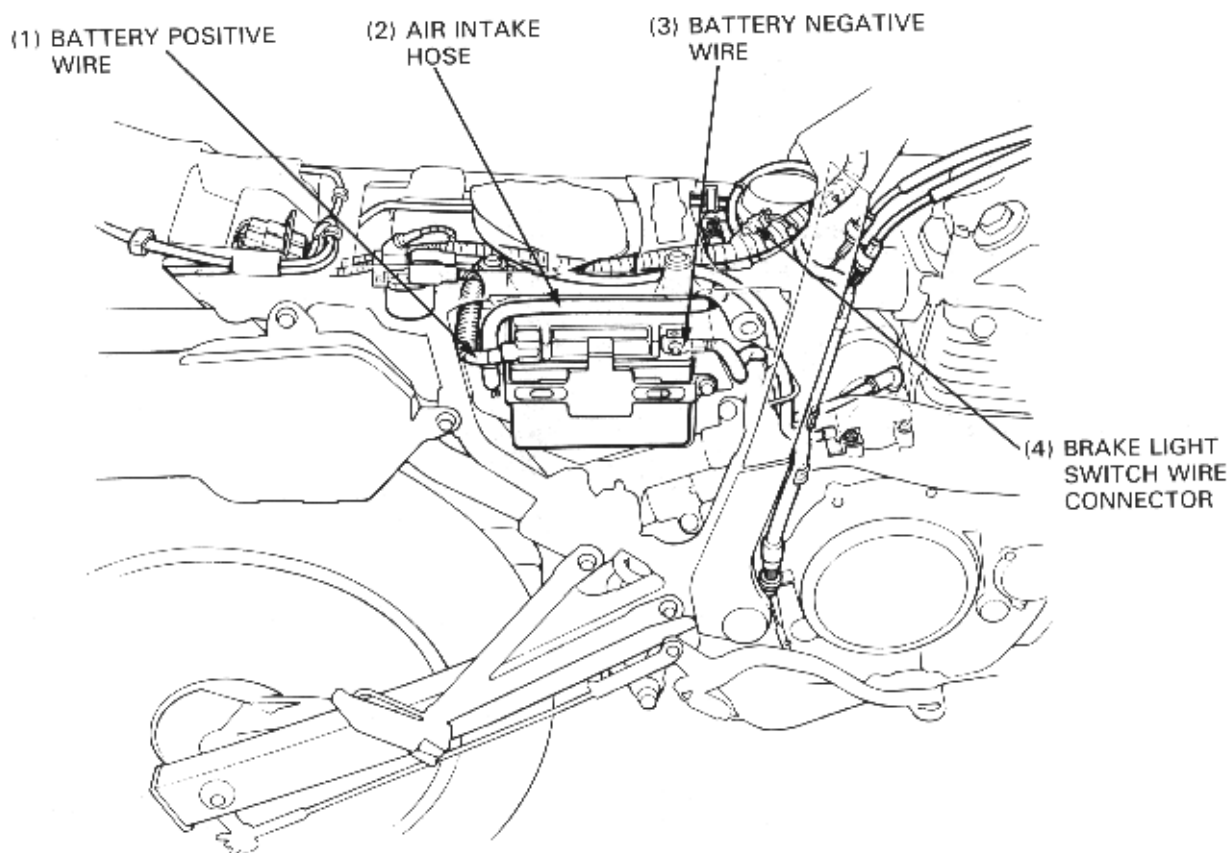
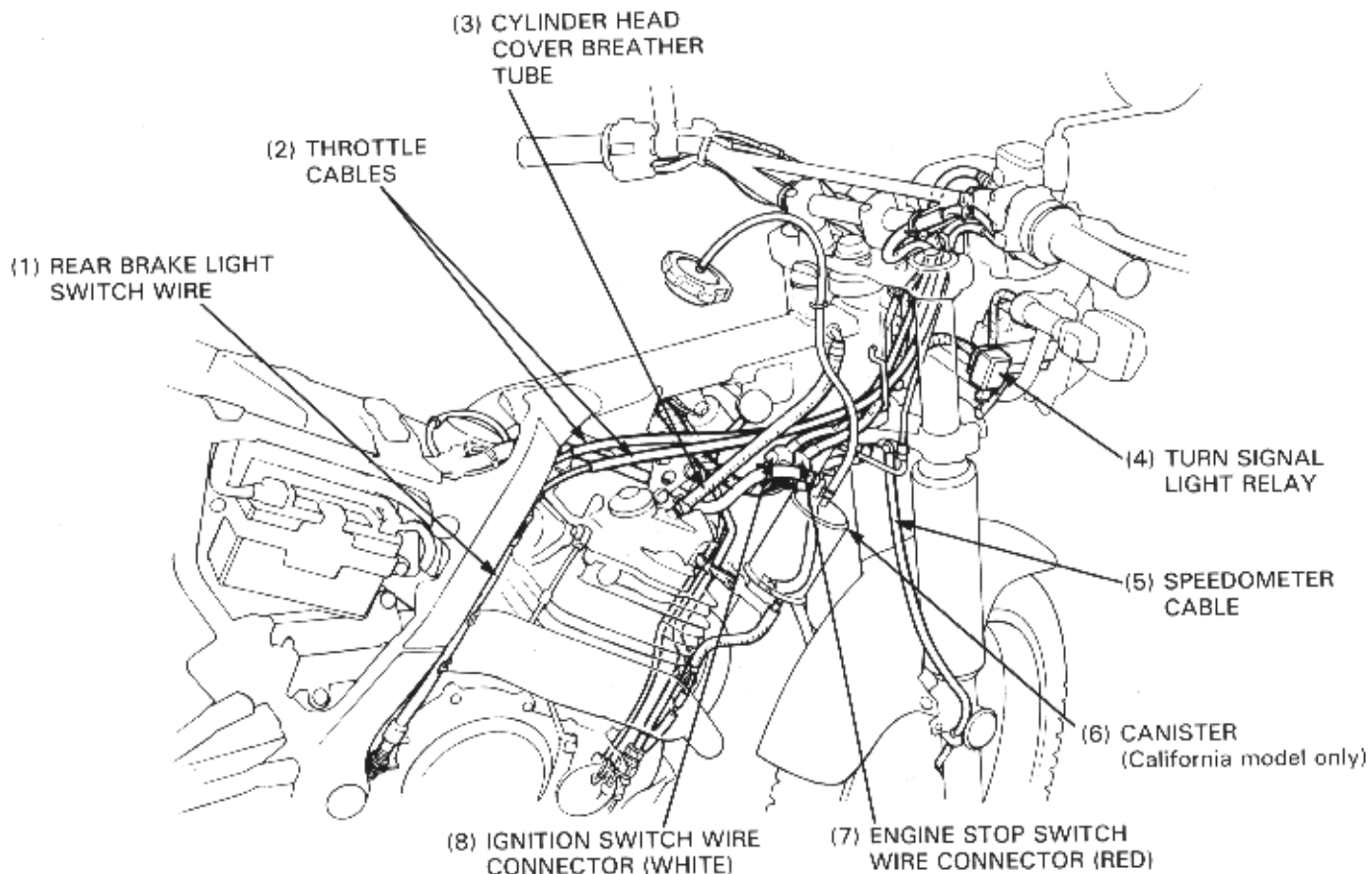
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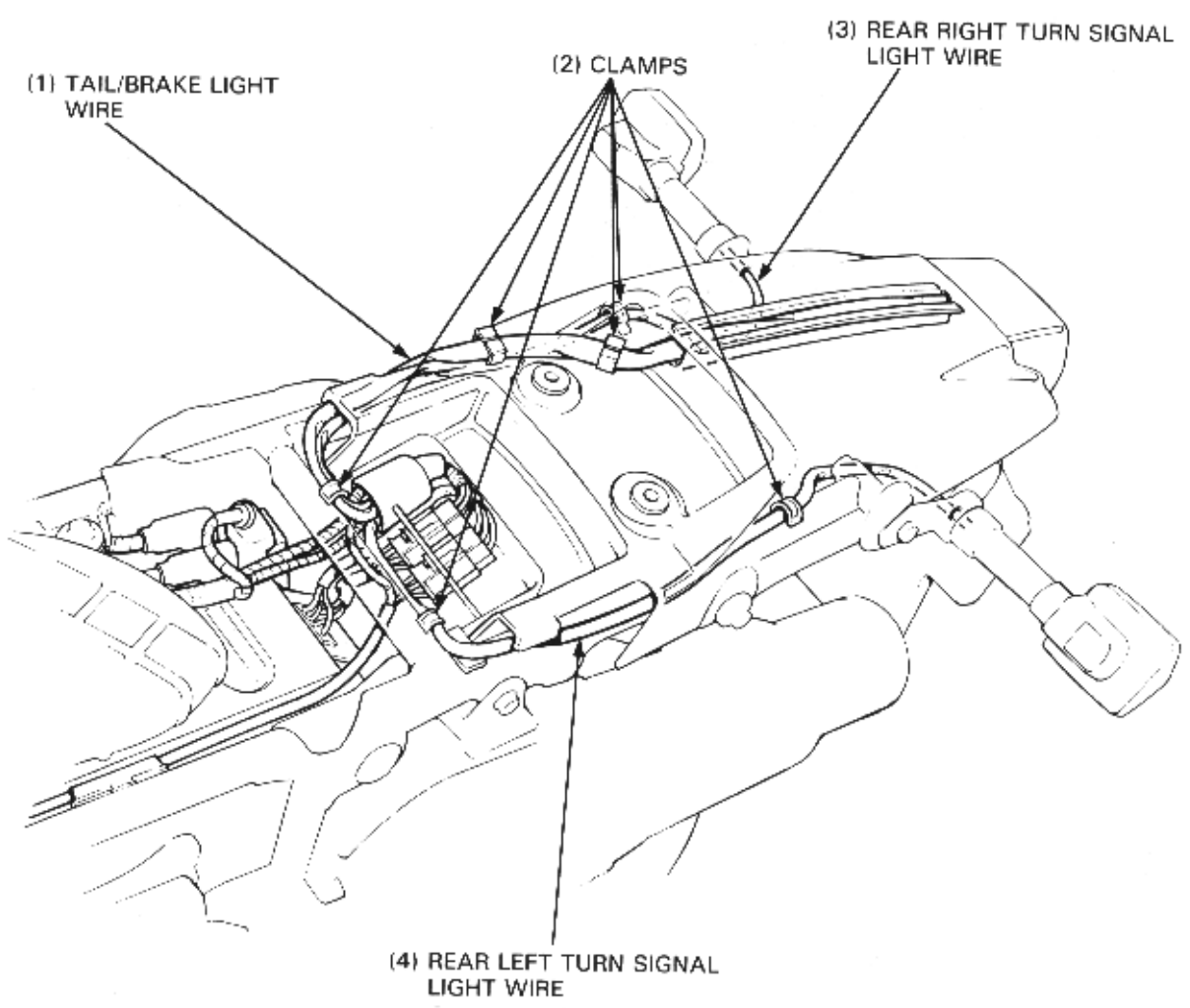
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**GENERAL INFORMATION**

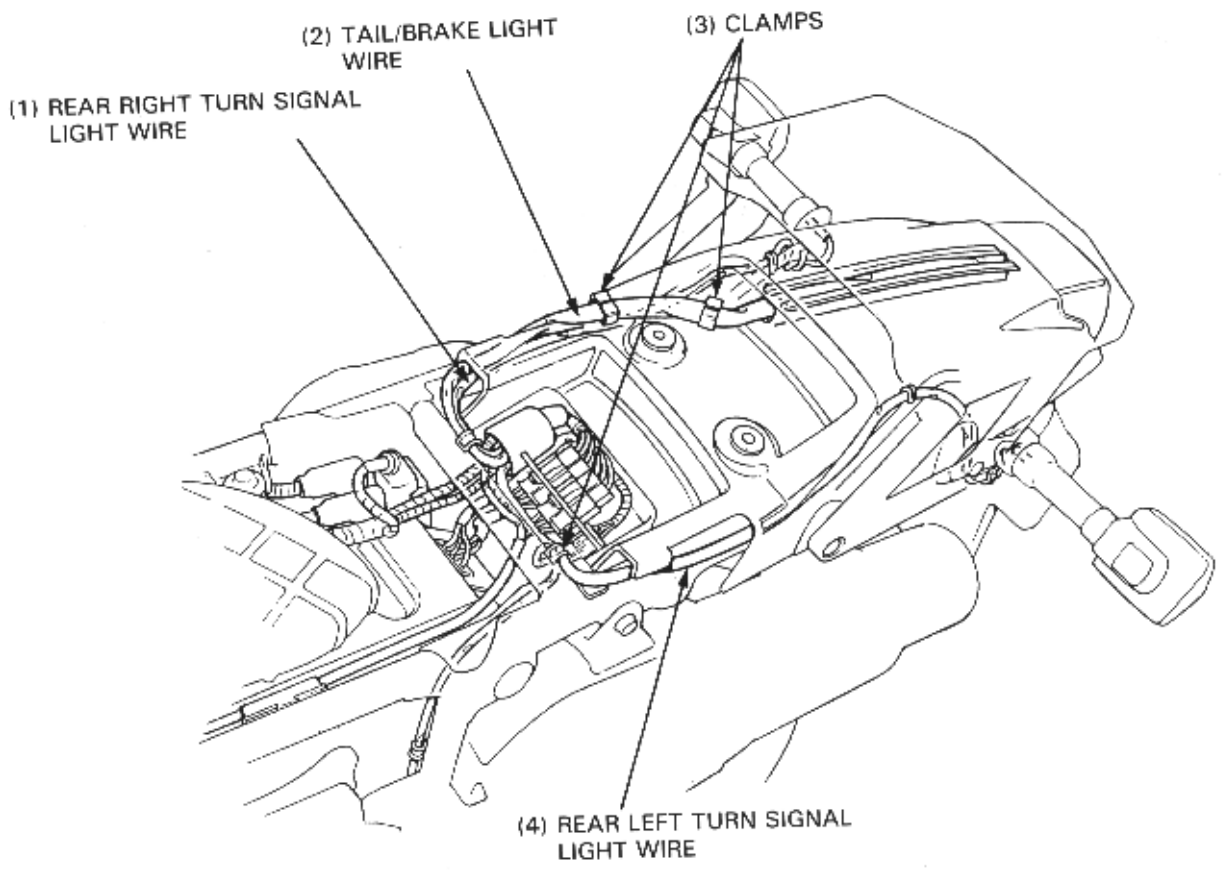
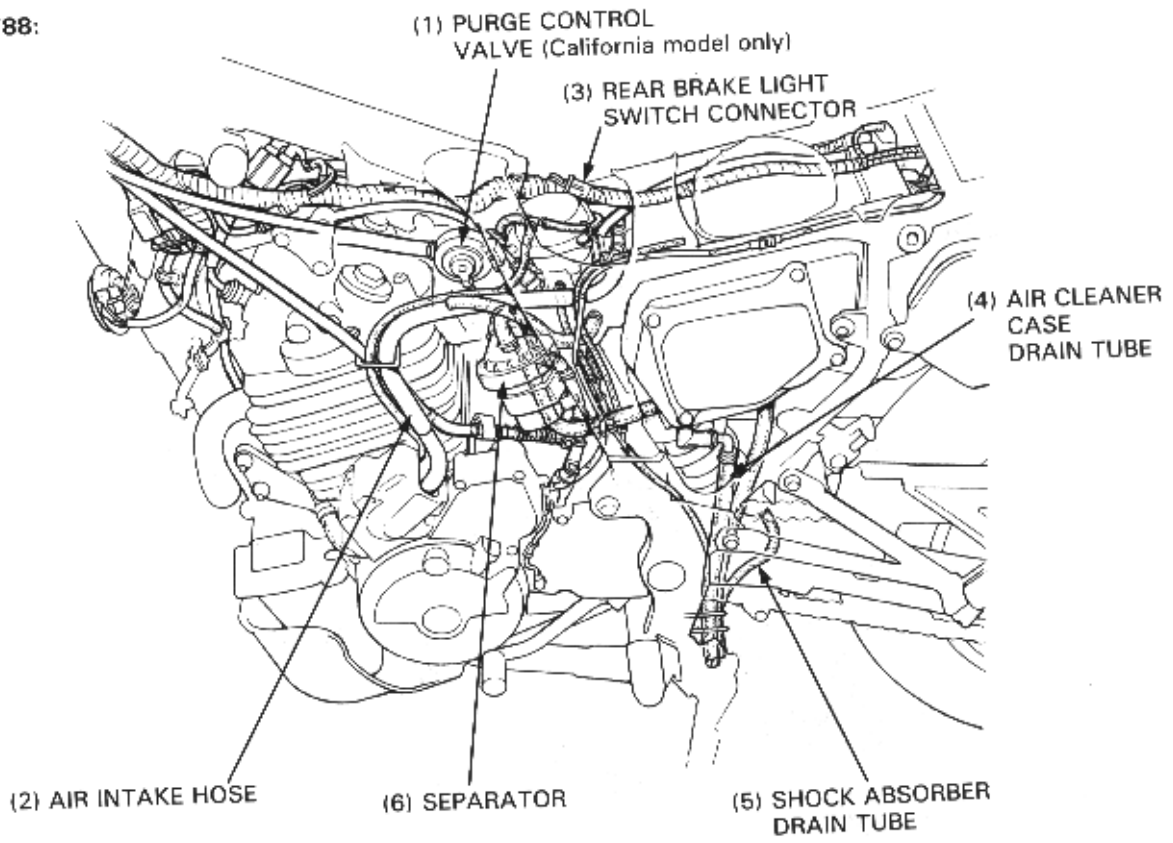


'88:



# GENERAL INFORMATION

AFTER '88:





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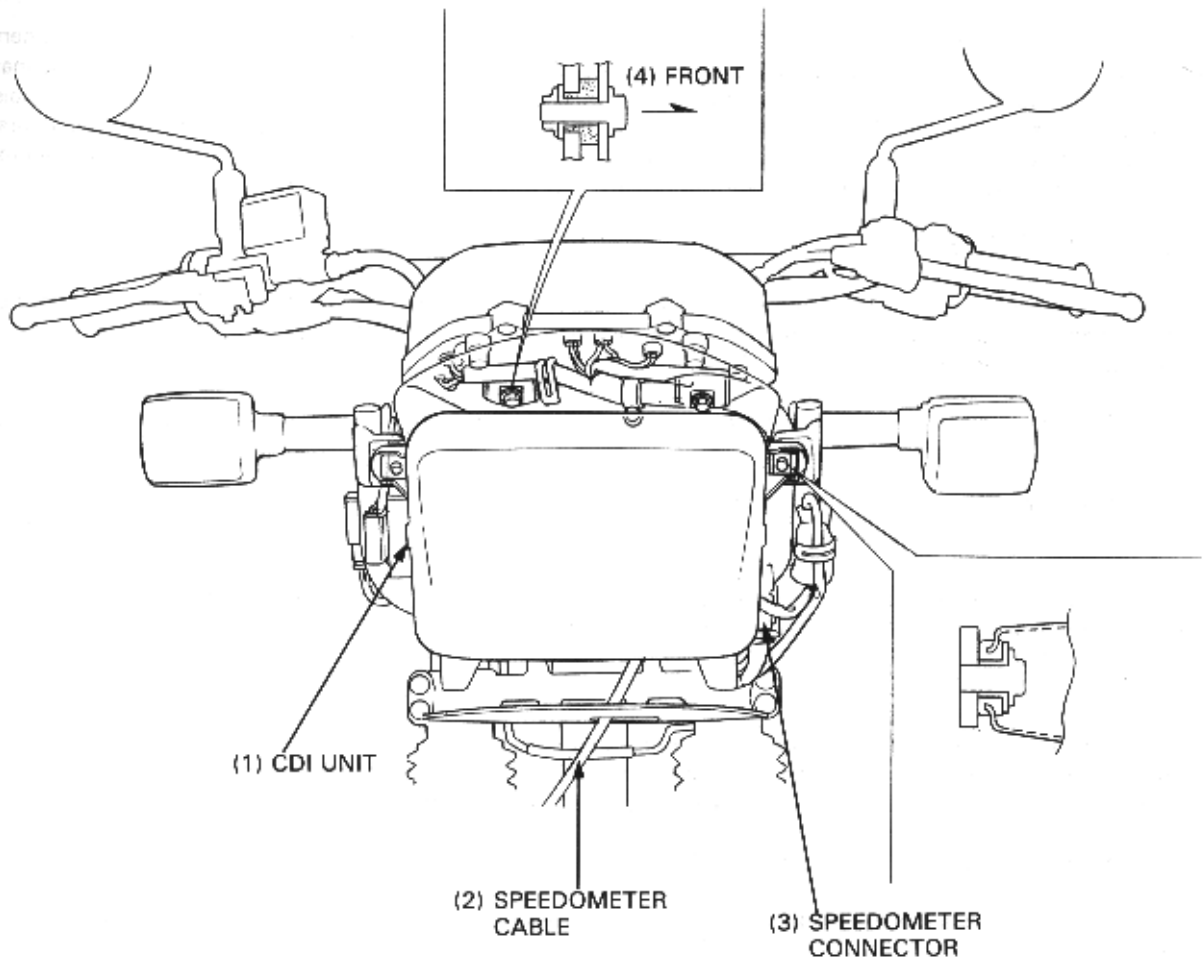
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## GENERAL INFORMATION

# 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

### Except for California:

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.

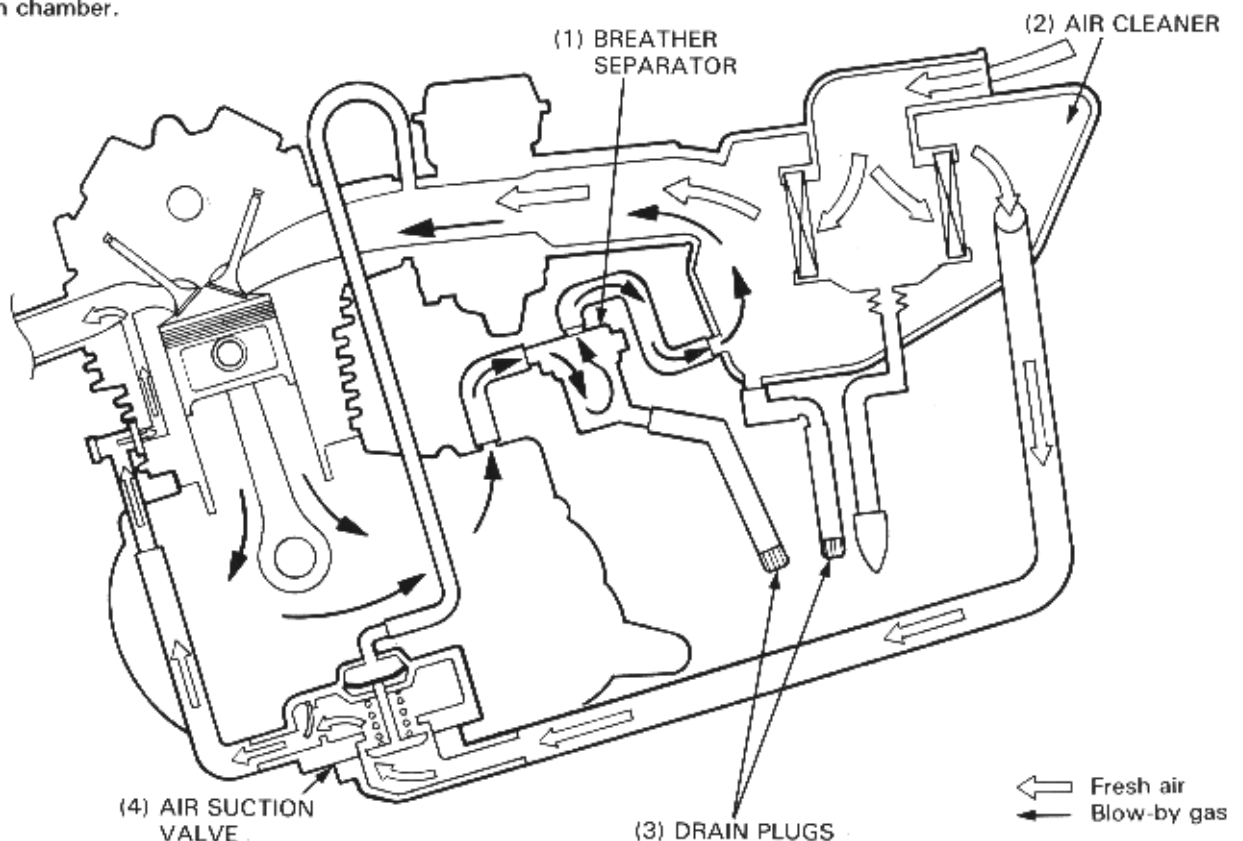
### California only:

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. No adjustments to this system should be made, although periodic inspection of the components is recommended. The secondary air supply system helps improve emission performance.

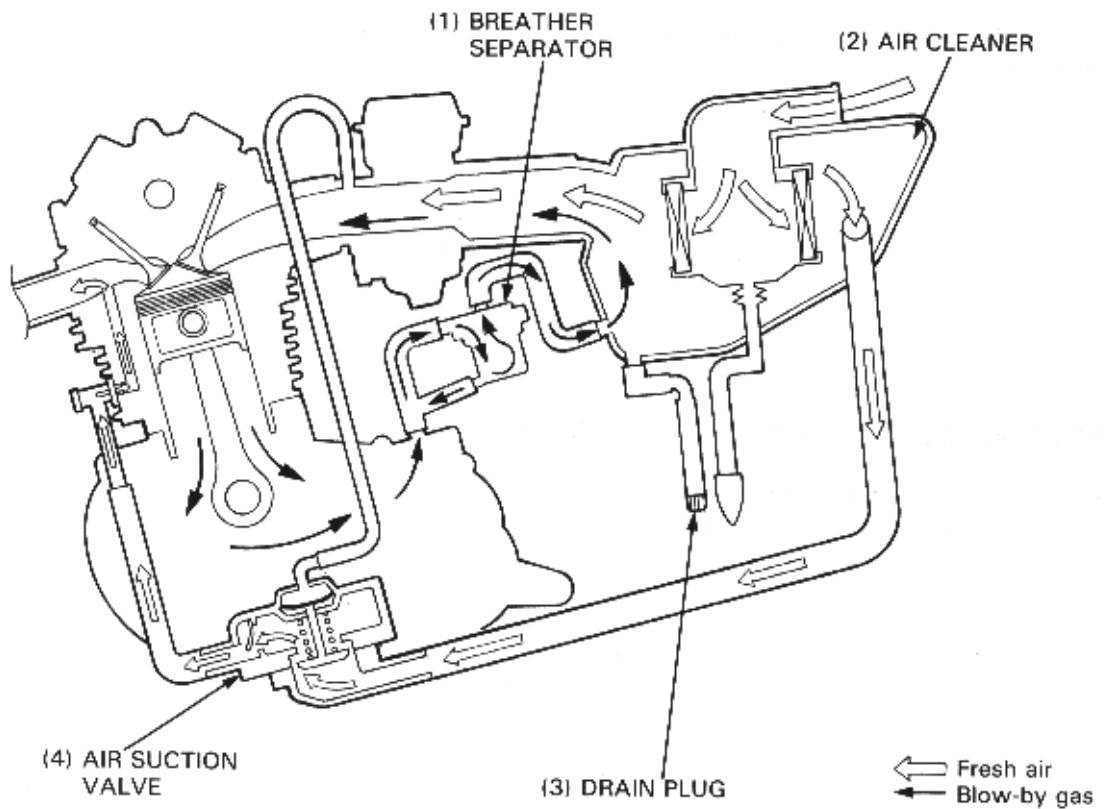
## CRANKCASE EMISSION CONTROL SYSTEM

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

'88:

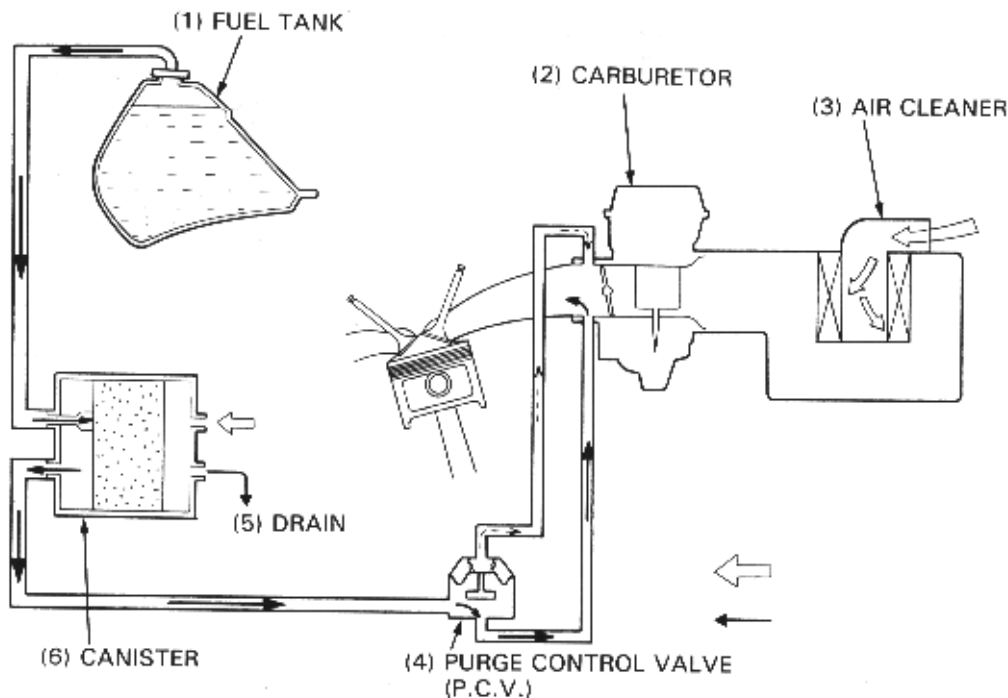


AFTER '88:



EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

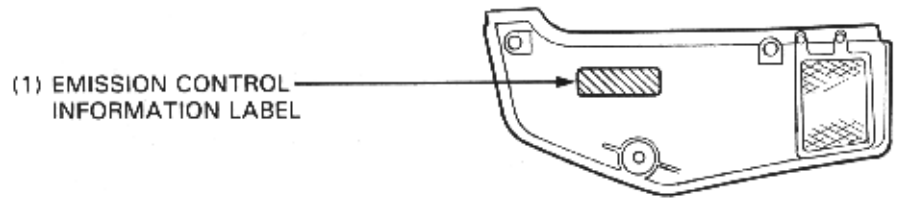
This model complies with California Air Resources Board evaporative emission requirements. Fuel vapor from the fuel tank and carburetor is directed into the charcoal canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the purge control diaphragm valve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



## GENERAL INFORMATION

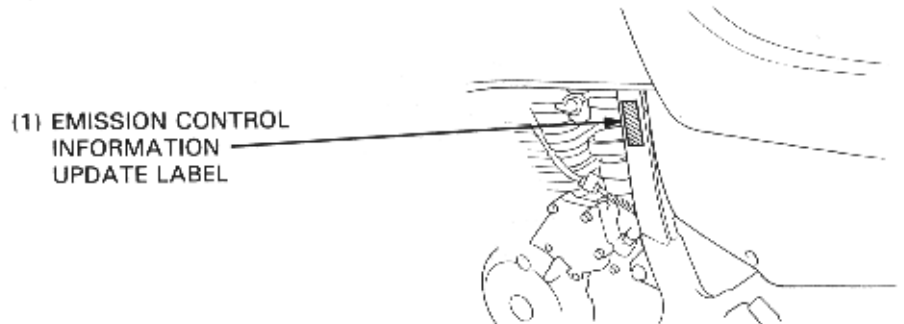
### EMISSION CONTROL INFORMATION LABELS (U.S.A. only)

An Emission Control Information Label is located on the inside of the right side cover as shown. It contains basic tune-up specifications.



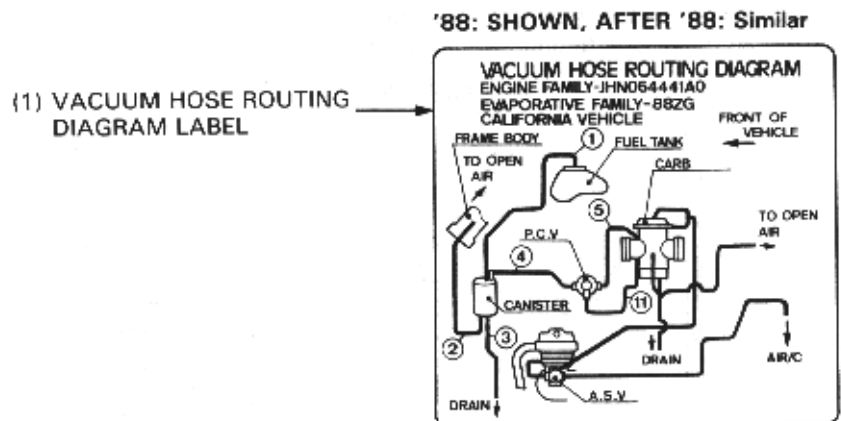
### EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment (page 4-17), attach an update label on the right side frame down pipe. Instructions for obtaining the update label are given in Service Letter No. 132.



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

The Vacuum Hose Routing Diagram Label is on the inside of the left side cover. Route the vacuum hoses as shown on this label.



## NOISE EMISSION CONTROL SYSTEM

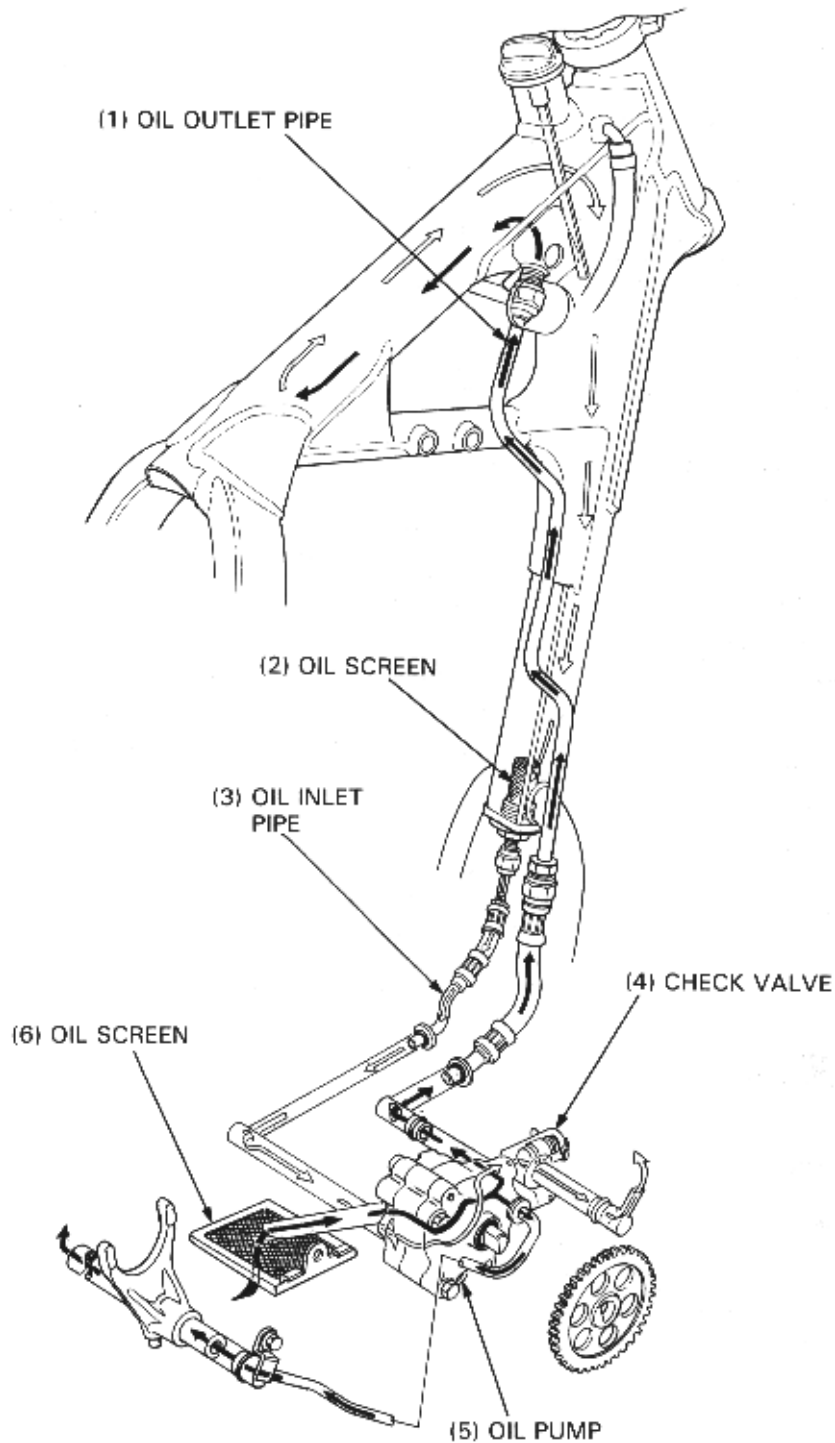
**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new 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 conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

## 2. LUBRICATION

SERVICE INFORMATION	2-2	OIL PIPE INSPECTION	2-4
TROUBLESHOOTING	2-2	OIL STRAINER SCREEN CLEANING	2-4
ENGINE OIL LEVEL CHECK	2-3	OIL STRAINER NUT	2-5
ENGINE OIL CHANGE	2-3	OIL PUMP	2-5
ENGINE OIL FILTER REPLACEMENT	2-4	LUBRICATION POINTS	2-14



## LUBRICATION

# SERVICE INFORMATION

### GENERAL

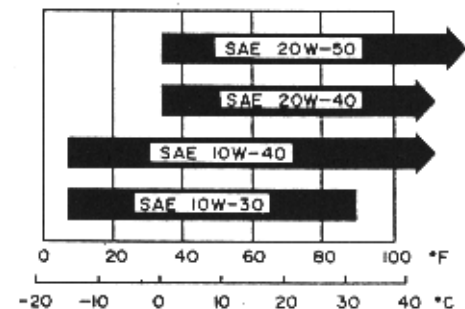
- This section describes inspection and replacement of engine oil and the oil filter, the cleaning of the oil strainer and oil pump servicing procedures.

### CAUTION

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

### SPECIFICATIONS

Oil capacity	2.3 liters (2.4 U.S. qt, 2.0 Imp qt) at engine assembly 1.9 liters (2.0 U.S. qt, 1.7 Imp qt) at oil change 1.95 liters (2.06 U.S. qt, 1.72 Imp qt) at oil and oil filter change
Recommended oil	Honda 4-Stroke Oil or equivalent API Service Classification: SE or SF VISCOSITY: SAE 10 W-40 or 20 W-50



### NOTE

- Use SAE 10 W-40 oil when the outside temperature is below 0° C (32° F).

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

ITEM	STANDARD	SERVICE LIMIT
Oil pump tip clearance	0.15 mm (0.006 in) MAX.	0.20 mm (0.008 in)
Oil pump body clearance	0.15-0.21 mm (0.006-0.008 in)	0.25 mm (0.010 in)
Oil pump end clearance	0.02-0.08 mm (0.001-0.003 in)	0.12 mm (0.005 in)
Oil pump delivery	Pump A: 7.5 liters (7.9 U.S. qt)/min. at 5,300 rpm Pump B: 10.0 liters (10.6 U.S. qt)/min. at 5,300 rpm	—

### TORQUE VALUES

Crankcase drain plug	25 N·m (2.5 kg-m, 18 ft-lb)
Down tube drain plug	35 N·m (3.5 kg-m, 25 ft-lb)
Oil filter cover bolt	9 N·m (0.9 kg-m, 7 ft-lb)
Oil strainer nut	40 N·m (4.0 kg-m, 29 ft-lb)
Oil inlet hose nut	40 N·m (4.0 kg-m, 29 ft-lb)

## TROUBLESHOOTING

#### Oil level too low

- Normal oil consumption
- External oil leaks
- Worn piston rings

#### Oil contamination

- Oil not changed often enough
- Faulty head gasket

#### Low oil pressure

- Faulty oil pump
- Oil pump driven gear broken

## ENGINE OIL LEVEL CHECK

Support the motorcycle upright on level ground.  
Start the engine and let it idle for approximately 5 minutes.  
Stop the engine then check the oil level with the oil filler cap/dipstick by inserting it in until the threads touch the filler neck.  
Do not screw the cap in when making this check.  
If the oil level is below the lower mark on the dipstick, fill to the upper level mark with the recommended oil.

## ENGINE OIL CHANGE

### NOTE

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

Remove the oil filler cap and drain plugs on the frame down tube and the left crankcase.

### CAUTION

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

After the oil has drained, check that the drain plug sealing washers are in good condition, then install the plugs.

### TORQUE:

**Crankcase drain plug: 25 N-m (2.5 kg-m, 18 ft-lb)**

**Downtube drain plug: 35 N-m (3.5 kg-m, 25 ft-lb)**

### NOTE

- If maintenance is also scheduled for the oil filter and the strainer, do these before filling the frame oil tank with oil.
- The engine takes about 1.9 liters (2.0 U.S. qt, 1.7 Imp qt) at oil change. But since only a portion of that oil is held in the frame's oil tank, you cannot add the full amount initially.

Pour one liter (1.05 U.S. qt) of recommended oil (page 2-1) into the oil tank.

Install the oil filler cap/dipstick.

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

Stop the engine and add the recommended oil up to the upper level mark with the motorcycle upright.

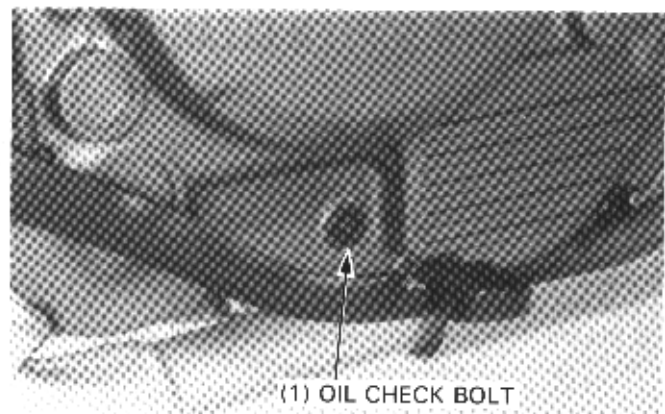
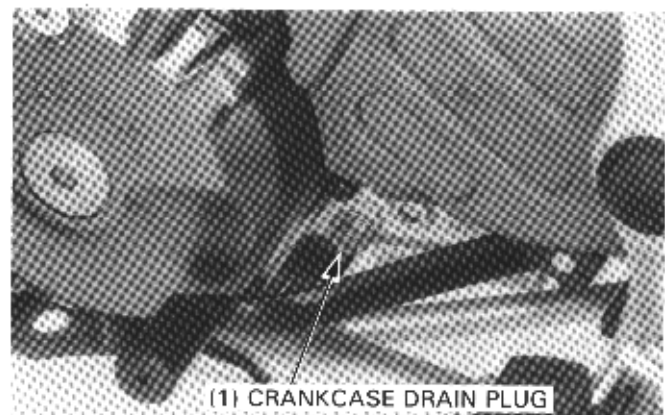
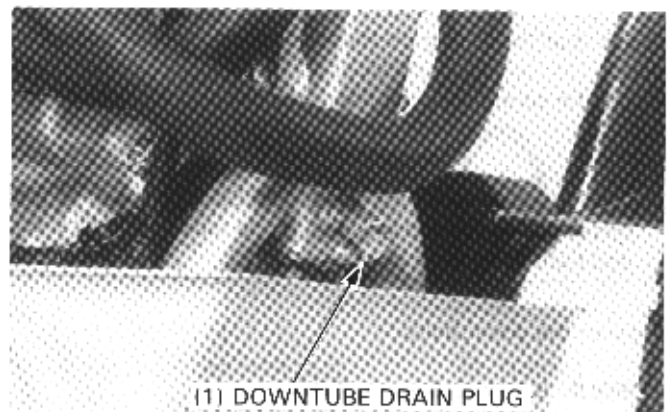
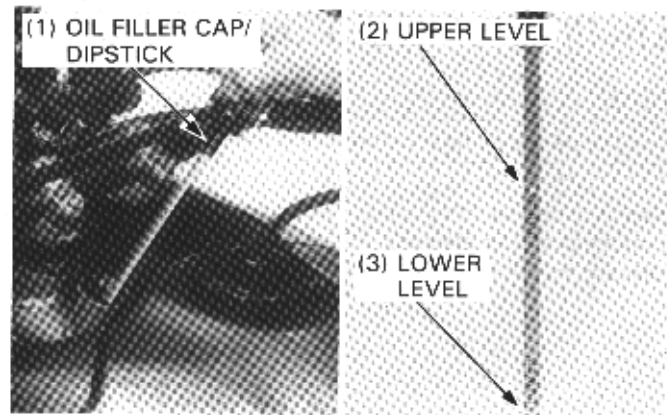
## CRANKCASE OIL CHECK BOLT

### NOTE

- The crankcase oil level check bolt is useful when checking the lubrication system; the oil pump adjusts the oil level so that the crankcase is always kept at the proper level. If this check shows otherwise, some portion of the lubrication system is not working properly.

Run the engine first, then stop the engine and wait a few minutes. Remove the oil check bolt.

The crankcase oil level is correct if the oil is flush with the bottom of the check bolt hole. Install the oil check bolt. Re-check the oil level with the oil filter cap/dipstick.





## LUBRICATION

### ENGINE OIL FILTER REPLACEMENT

#### NOTE

- Change the oil filter before filling the frame oil tank with oil.

Remove the oil filter cover from the right crankcase, then remove the filter element.  
Discard the oil filter element.

Check that the O-ring on the oil filter cover is in good condition.  
Install the spring, new oil filter element and oil filter cover.

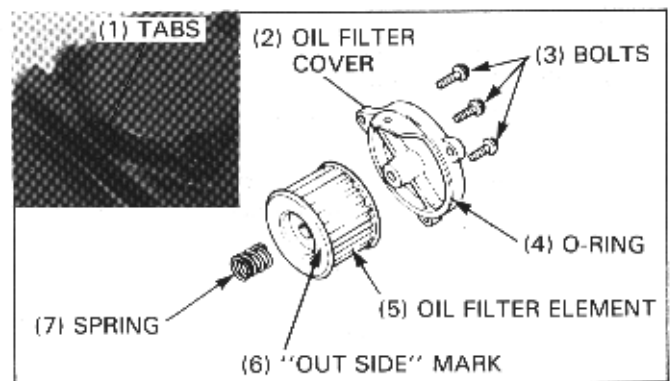
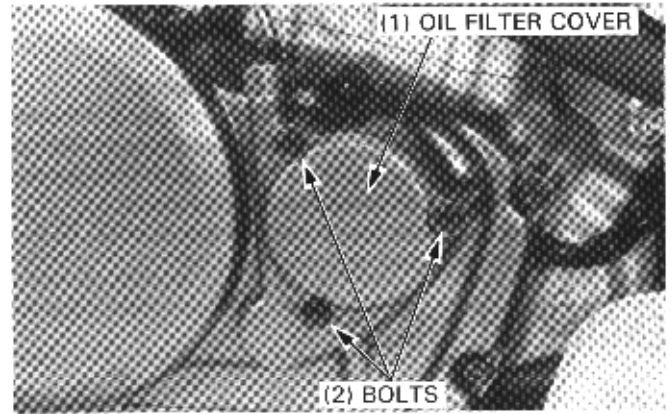
#### NOTE

- Install the element with the "OUT SIDE" mark facing out.
- Install the oil filter cover aligning the tabs on the filter cover and right crankcase cover.

Tighten the cover bolts.

**TORQUE: 9 N·m (0.9 kg-m, 7 ft-lb)**

Pour in the recommended oil (page 2-3) to the upper level on the fillter cap/dipstick.

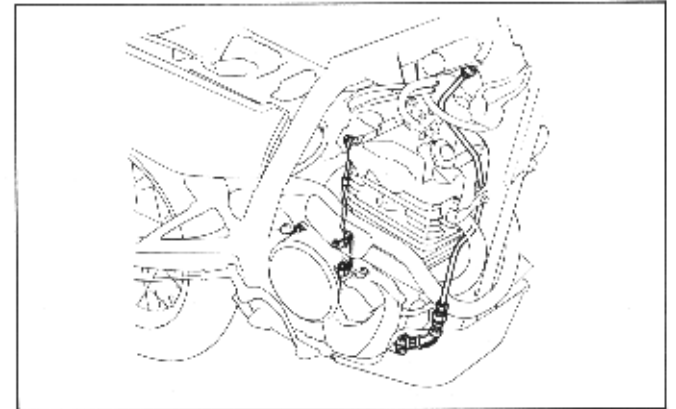


### OIL PIPE INSPECTION

Inspect the oil pipes for damage, bends or clogging and replace if necessary.

Refer to the following page for oil pipe replacement.

- Oil pass pipe (page 6-3)
- Oil outlet pipe (page 5-4, 5)
- Oil inlet hose (page 5-4, 5)

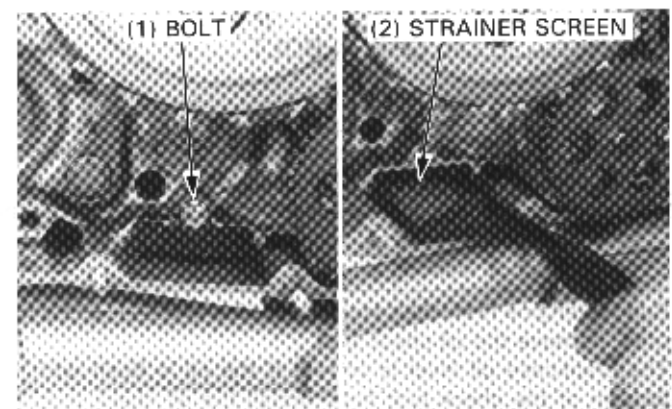


### OIL STRAINER SCREEN CLEANING

#### NOTE

- Perform this maintenance before filling the engine with oil.

Remove the right crankcase cover (page 8-3).  
Remove the oil strainer and clean it.  
Install and secure the oil strainer with a bolt.  
Install the right crankcase cover (page 8-9).  
Fill the crankcase with the recommended oil (page 2-1).



## OIL STRAINER NUT

### NOTE

- Clean the screen on the oil strainer nut before filling the frame oil tank with oil.

Remove the oil drain bolt on the frame down tube to drain the oil.

Remove the skid plate (page 5-2).

Loosen the oil joint nut and disconnect the hose from the oil strainer nut.

Remove the oil strainer nut from the frame down tube.

Clean the screen on the oil strainer nut in solvent and blow dry with compressed air.

Check that the O-ring is in good condition.

Reinstall and tighten the oil strainer nut.

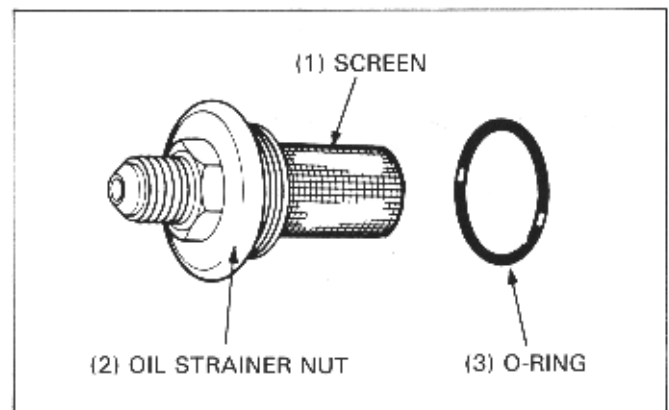
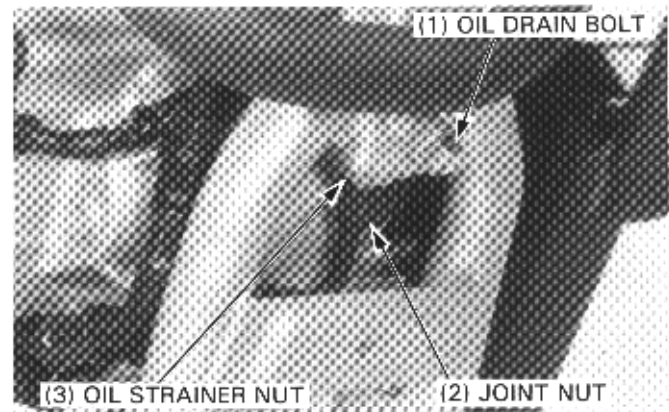
**TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)**

Connect the oil hose and secure it with the nut.

**TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)**

Reinstall the skid plate (page 5-5)

Fill the oil tank to the upper level with the recommended oil (page 2-1).

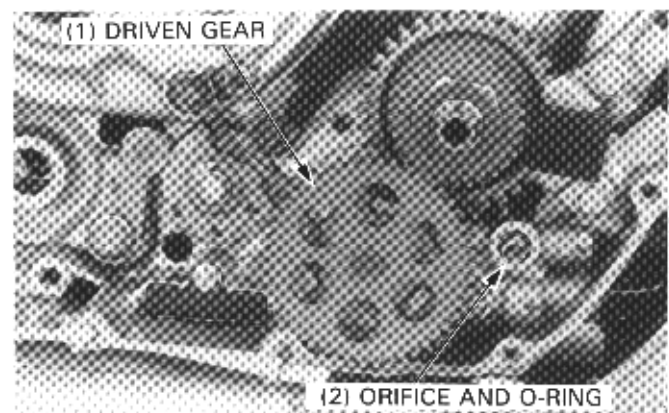


## OIL PUMP

### REMOVAL

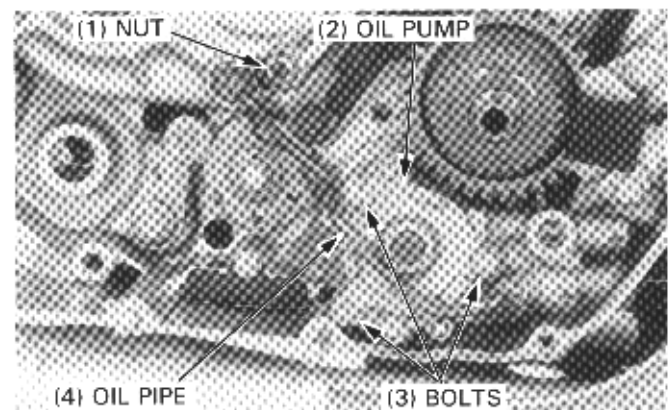
Remove the following:

- clutch (page 8-2)
- oil pump driven gear
- orifice and O-ring



Remove the following:

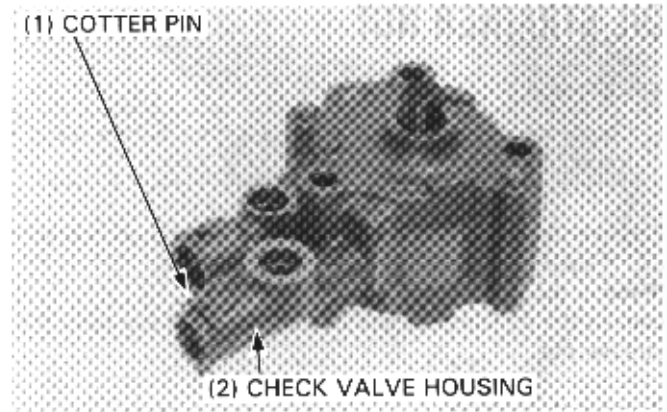
- bolt, nut and oil pipe
- oil pump attaching bolts and oil pump



## LUBRICATION

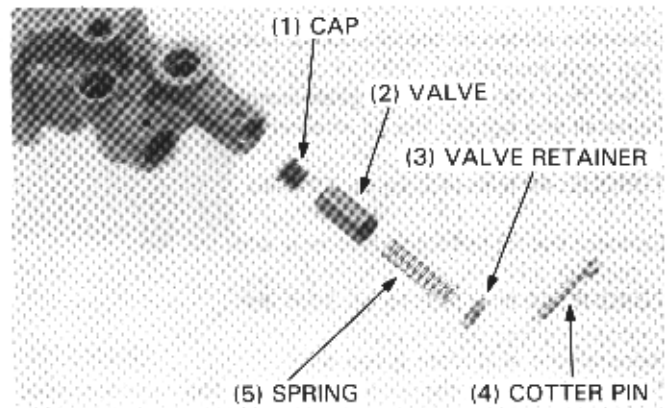
### CHECK VALVE

Remove the cotter pin, valve retainer, spring and check valve from the check valve housing.  
Discard the removed cotter pin.



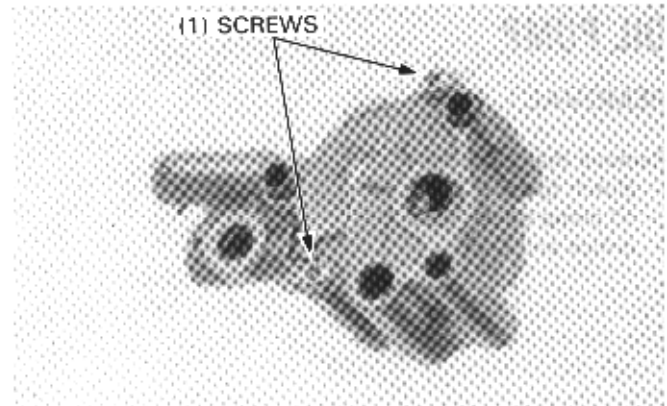
Inspect the valve and valve bore for scoring or contamination.  
Clean or replace as necessary.

Install the check valve, spring and valve retainer into the check valve housing, and secure them with a new cotter pin.



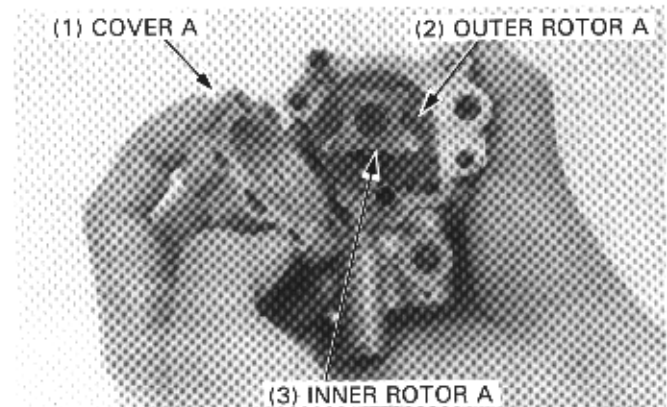
### DISASSEMBLY

Remove the oil pump screws.



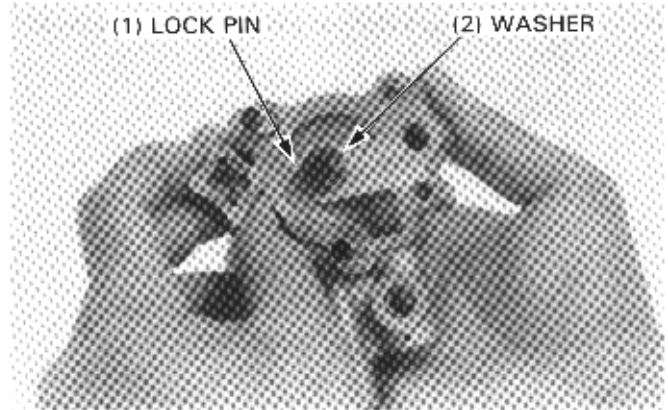
Remove the following from the oil pump body.

- Oil pump cover A
- Outer rotor A
- Inner rotor A



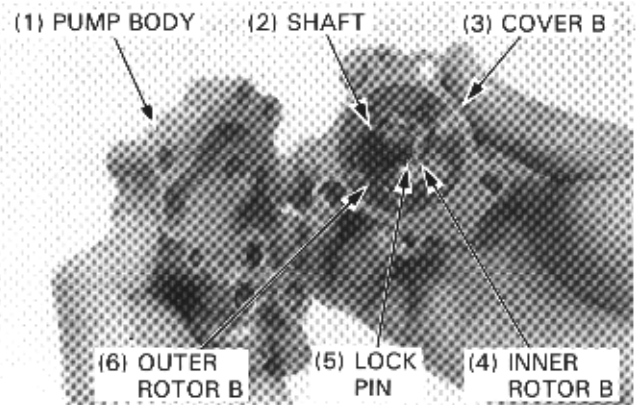
Remove the following:

- lock pin
- thrust washer



Separate the oil pump body from the oil pump cover B.  
Remove the following from the cover B.

- Oil pump shaft and lock pin
- Inner rotor B
- Outer rotor B



**INSPECTION**

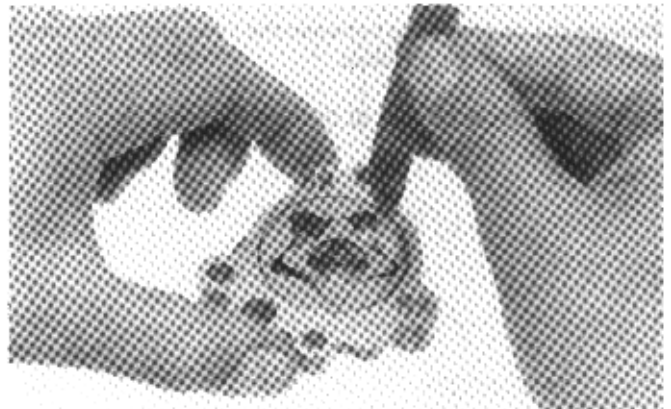
Measure the tip clearance between the inner and outer rotor As.

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



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

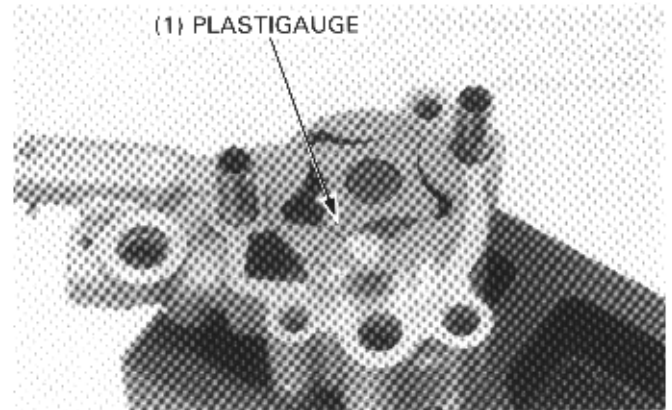
**SERVICE LIMIT: 0.25 mm (0.010 in)**



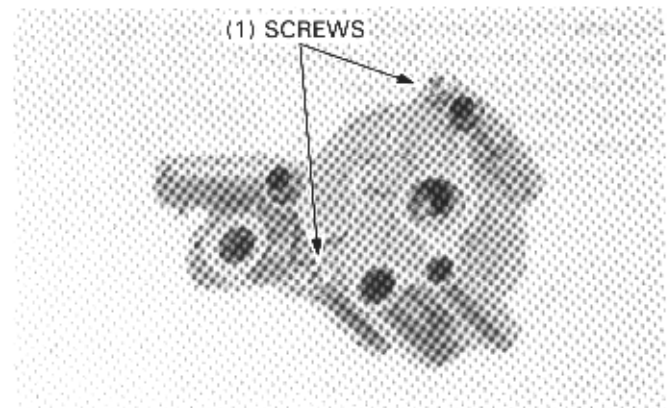
## LUBRICATION

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Wipe oil from the rotors and put a piece of plastigauge across them as shown.

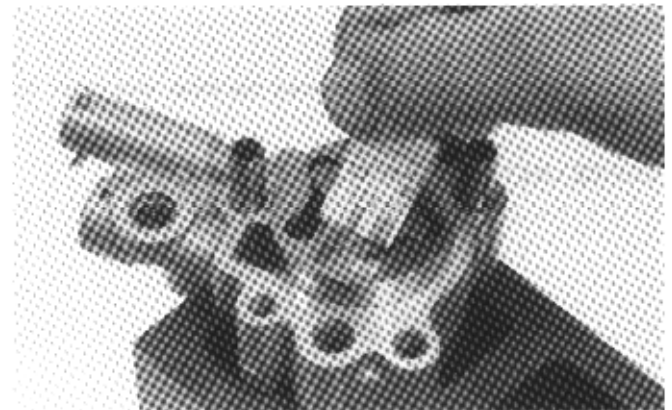


Install the oil pump cover A and tighten the oil pump screws.



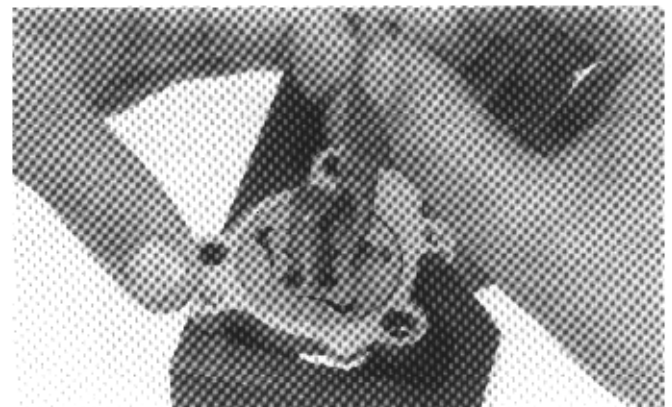
Remove the oil pump cover A and measure the width of the plastigauge. The widest thickness determines the pump end clearance.

**SERVICE LIMIT: 0.12 mm (0.005 in).**



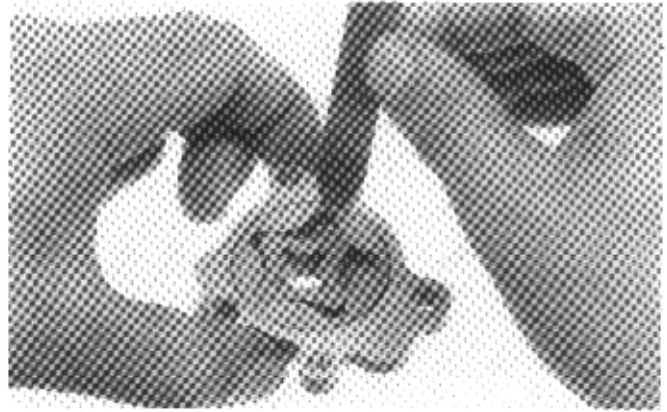
Measure the tip clearance between the inner and outer rotor Bs with the pump shaft installed.

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



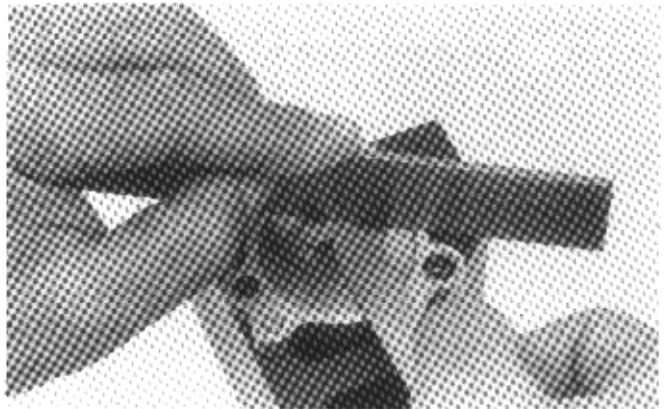
Measure the clearance between the outer rotor B and the pump B body.

**SERVICE LIMIT: 0.25 mm (0.010 in)**



Measure the end clearance of pump B.

**SERVICE LIMIT: 0.12 mm (0.005 in)**



**AFTER '88:**

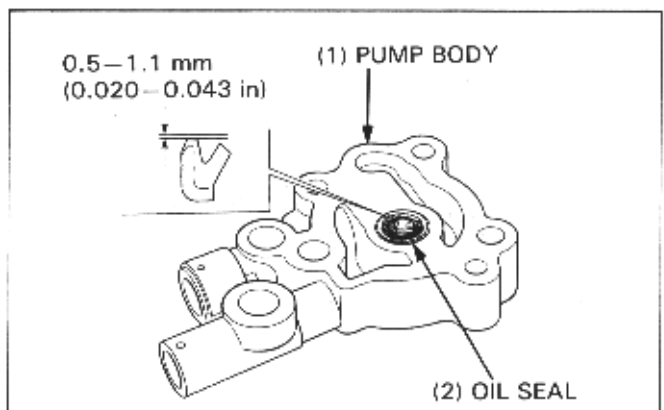
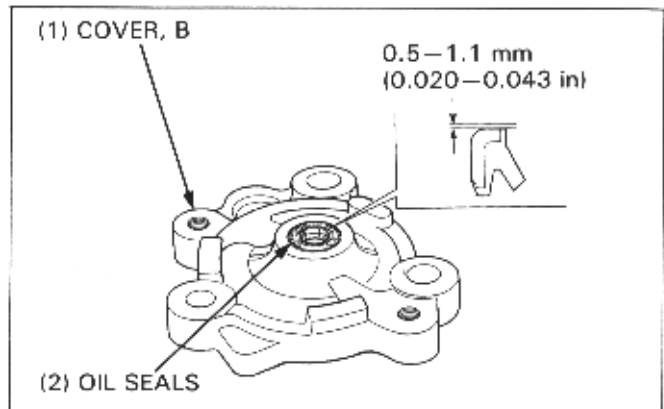
Replace the oil seals if they show any signs of wear or damage.

**NOTE**

- When removing the oil seal, note which surface of the oil seal faces out.

Install new oil seals into the holes squarely in the specified depth from the outer surfaces as shown.

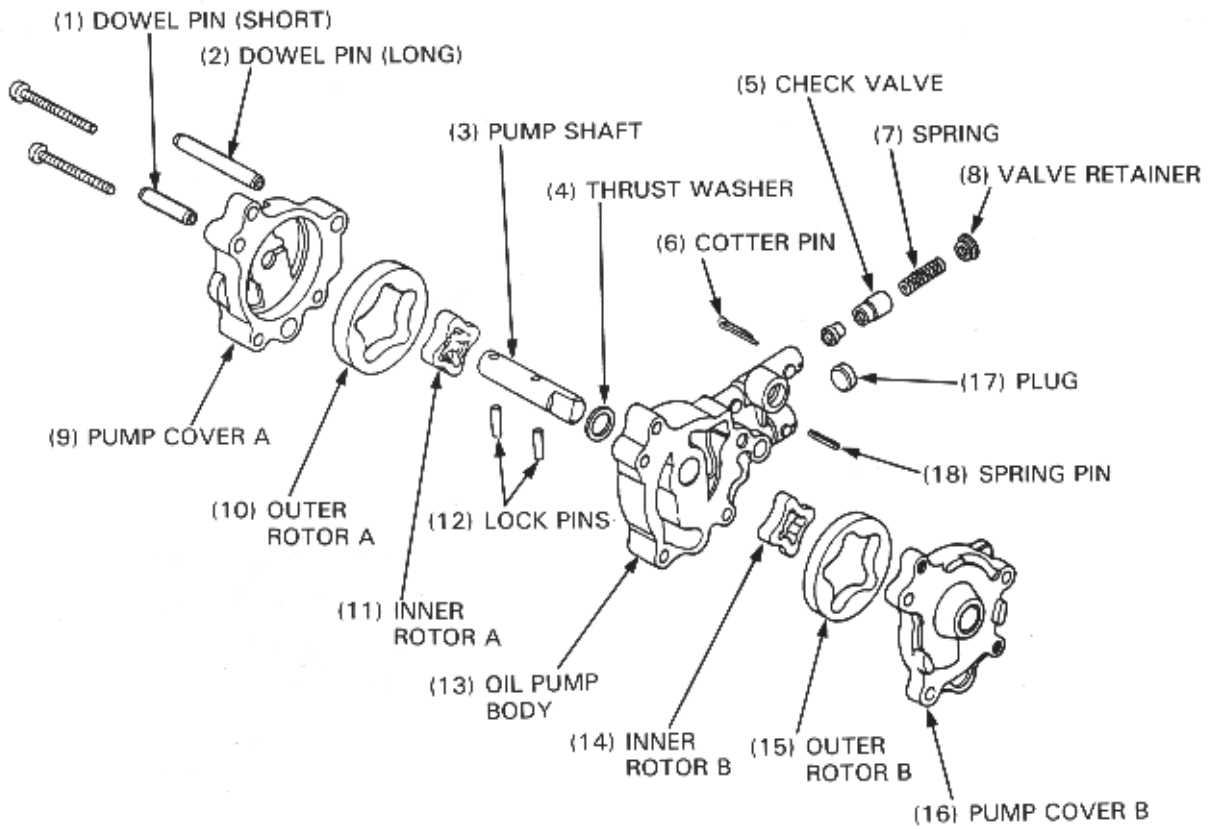
**SPECIFIED DEPTHS: 0.5–1.1 mm (0.020–0.043 in)**



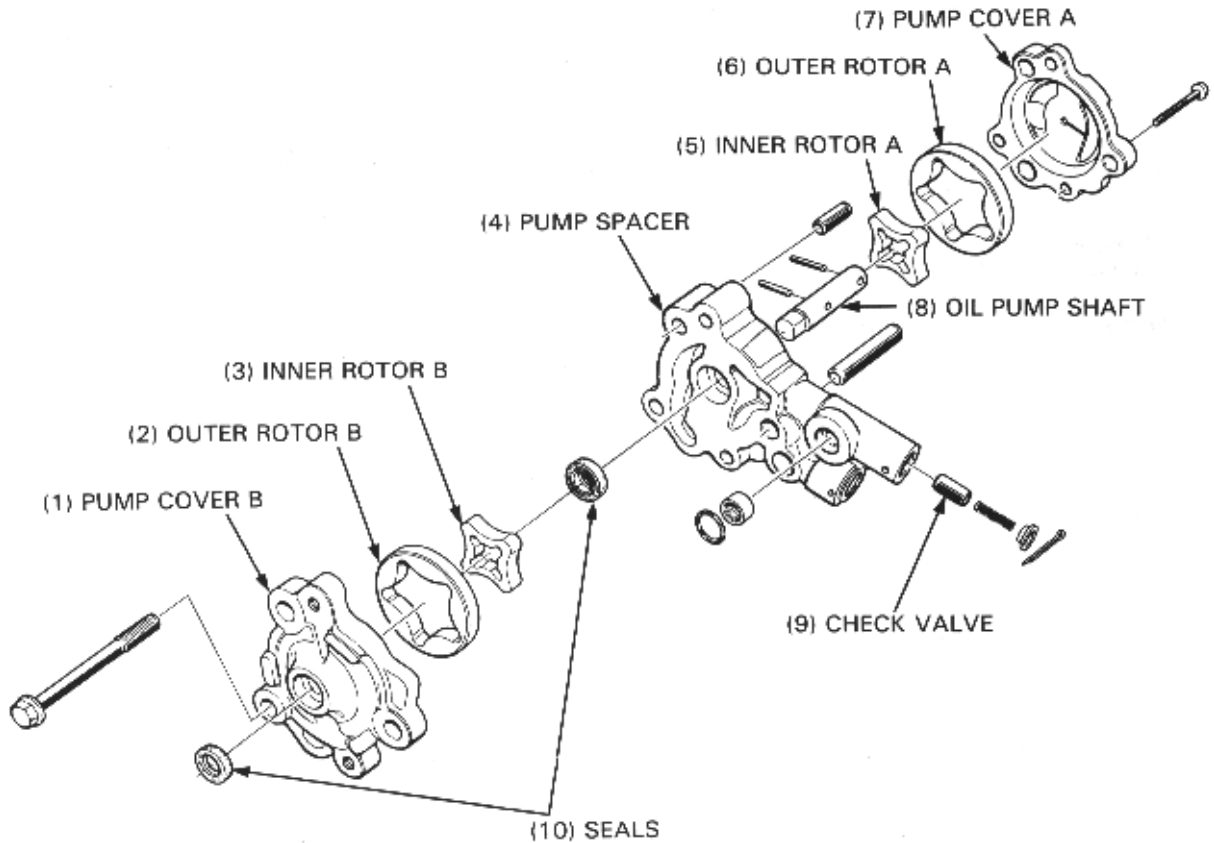
# LUBRICATION

## ASSEMBLY

'88:



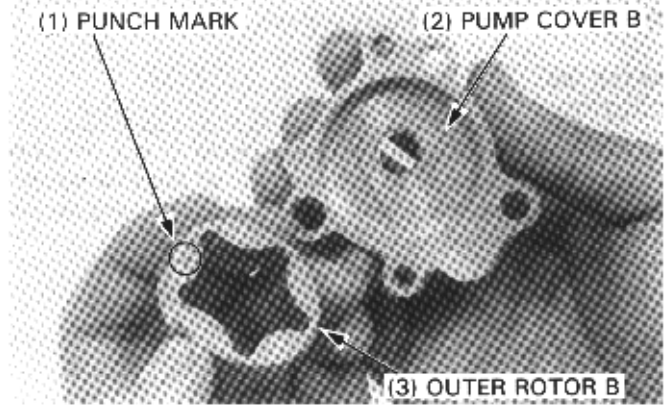
AFTER '88:



Install the outer rotor B in the oil pump cover B with the punch mark on the rotor facing inside.

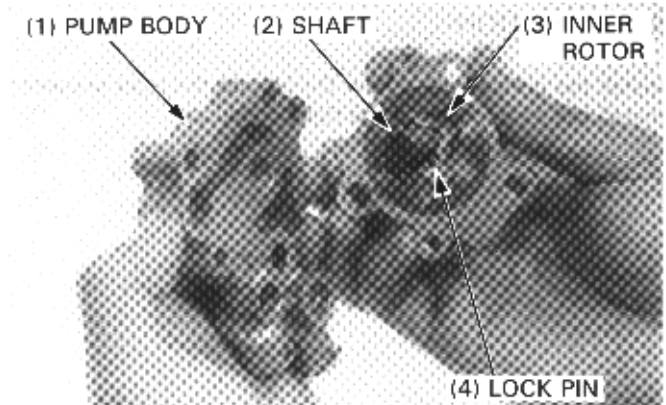
**CAUTION**

- Before installation, pour the clean engine oil into the oil pass hole in the oil pump body B until the oil flows out of the oil pass hole in the check valve housing side as turning the pump shaft.



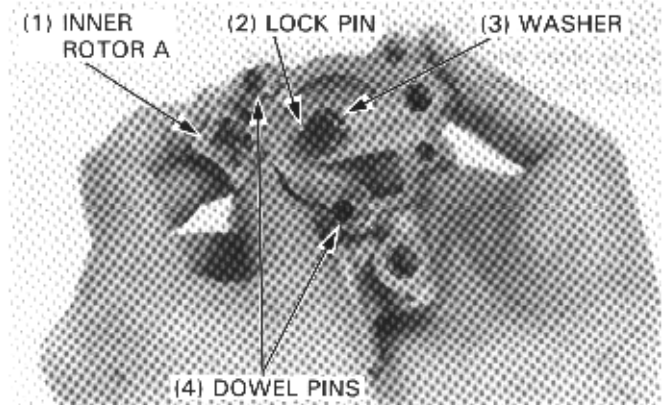
Install the inner rotor B in the pump cover B. Insert the lock pin through the oil pump shaft, and insert the shaft through the inner rotor and pump cover with the lock pin aligned with the groove in the inner rotor.

Install the oil pump body onto the pump cover B.

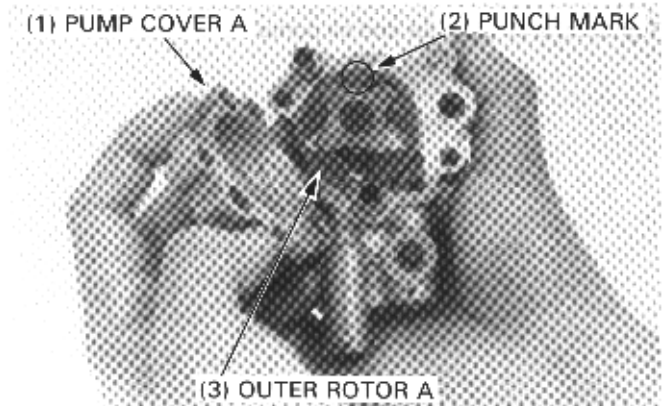


Insert the dowel pins through the pump body and pump cover B.

Install the thrust washer onto the pump shaft. Insert the lock pin through the hole in the shaft. Install the inner rotor A onto the shaft, aligning its groove with the lock pin.



Install the outer rotor A with the punch mark on the rotor faced outside. Install the pump cover A onto the pump body.





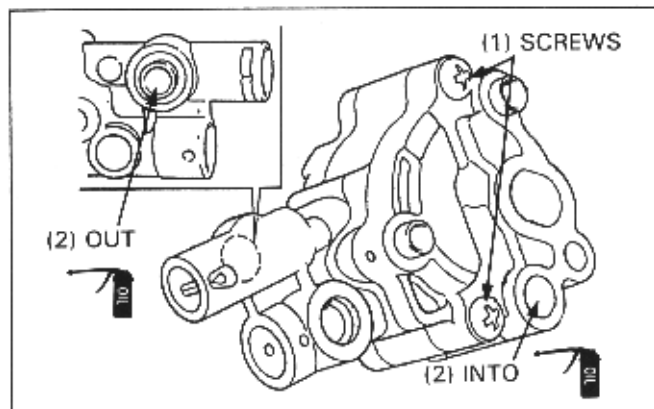
## LUBRICATION

Tighten the oil pump screws securely.

**AFTER '88:**

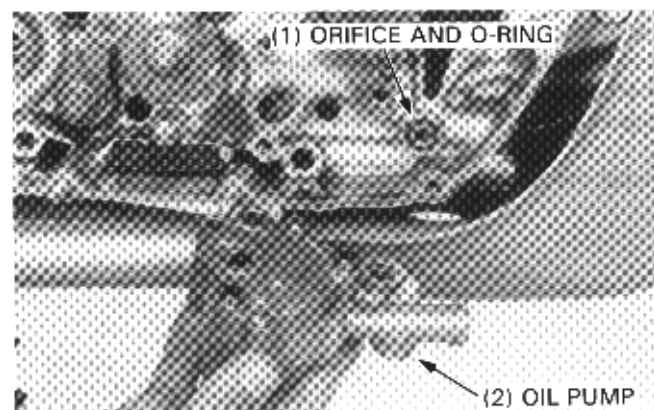
### CAUTION

- *Before installation, pour the clean engine oil into the oil pass hole in the oil pump body B until the oil flows out of the oil pass hole in the check valve housing side as turning the pump shaft counterclockwise.*

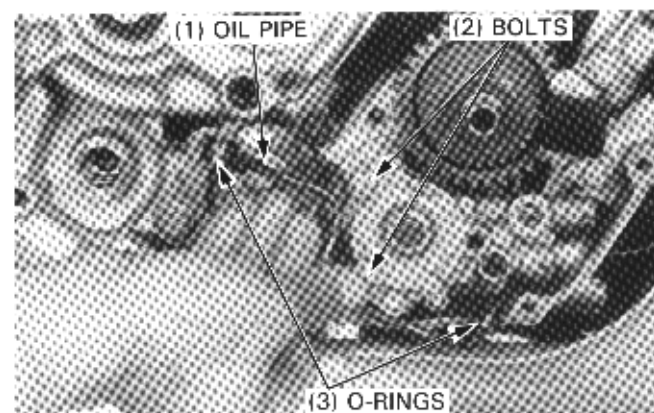


## INSTALLATION

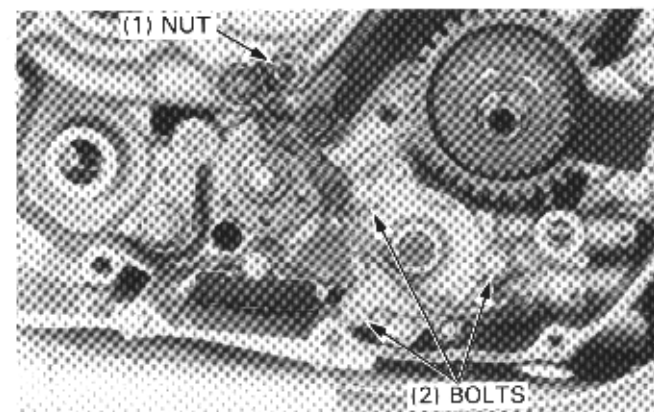
Install the orifice with a new O-ring into the right crankcase. Install the oil pump onto the right crankcase.



Tighten the two oil pump bolts loosely. Apply clean engine oil to new O-rings. Install the oil pipe with the new O-rings.



Tighten the oil pipe nut and oil pump bolts securely.



Apply clean engine oil to a new O-ring.  
Install the orifice with the new O-ring.

Install the oil pump driven gear onto the oil pump shaft.

Install the following:

- clutch (page 8-5)
- right crankcase cover (page 8-9)

Fill the engine with the recommended oil (page 2-3).

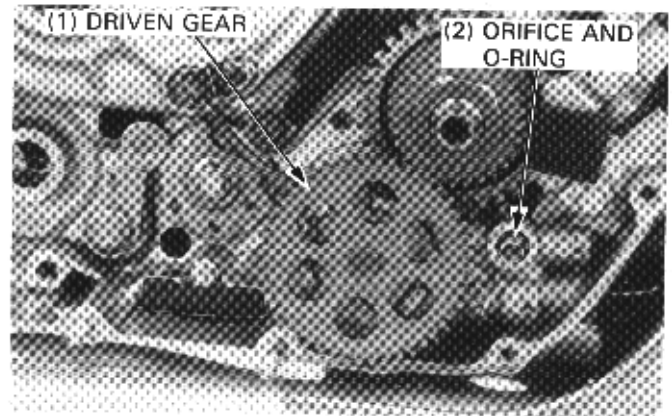
**AFTER '88:**

After installation, support the motorcycle upright on firm, level ground and start the engine and let it idle for a minute.

Loosen the oil pipe bolt on the right crankcase cover (page 8-10) and check that the oil flows out.

Tighten the oil pipe bolt.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**



## LUBRICATION

### LUBRICATION POINTS

Unless otherwise specified, use general purpose grease. Apply oil or grease to any other sliding surfaces not shown here.

#### CONTROL CABLE LUBRICATION

Periodically disconnect the throttle and clutch cables at their upper ends. Clean the cable end mount in the throttle and clutch lever, then oil the cable ends and reinstall. It is not necessary to oil the cables; if a cable begins to bind, it must be replaced.

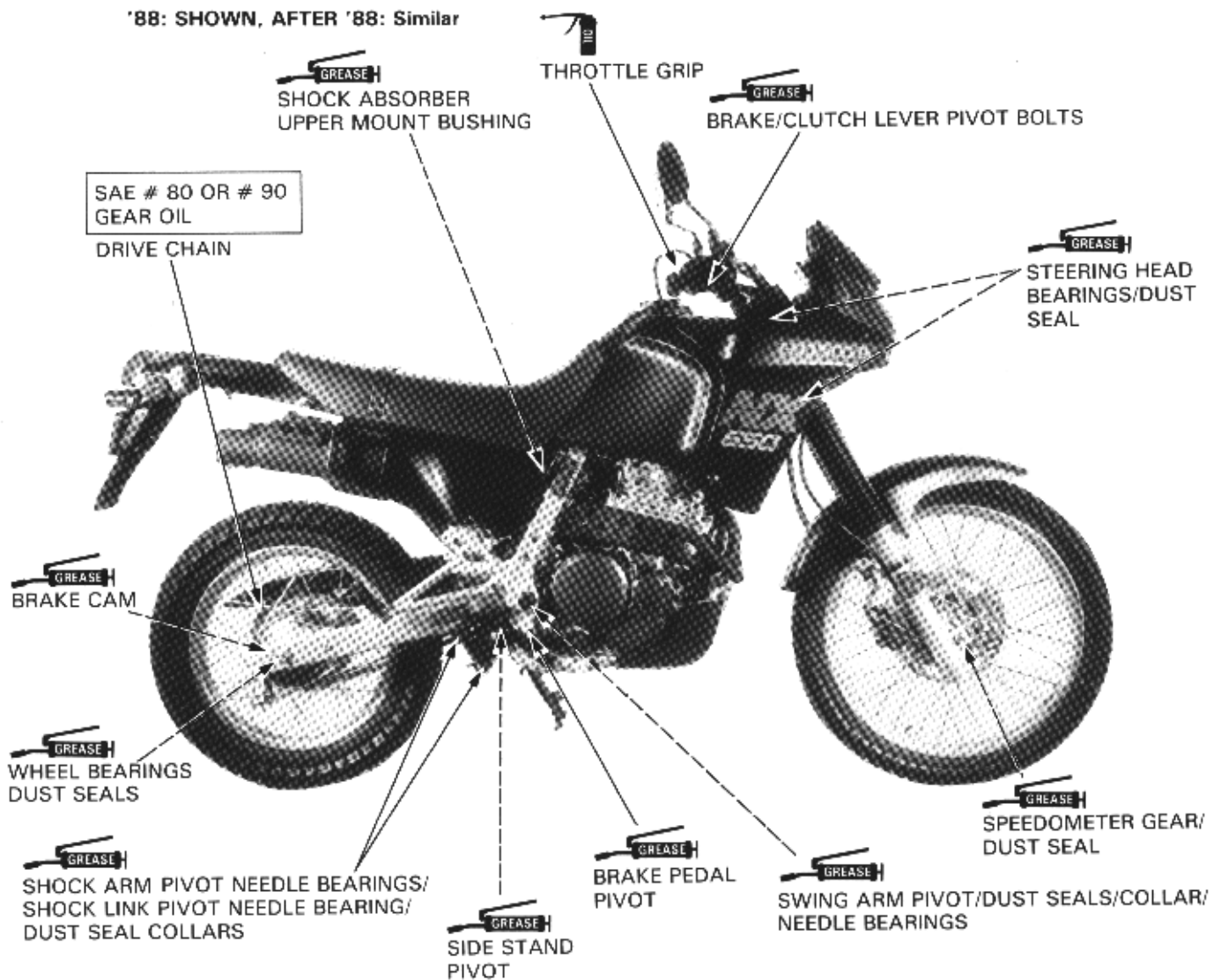
#### WHEEL BEARING

Grease new wheel bearings and dust seals before installation. Do not reinstall used wheel bearings or seals.

#### NOTE

Some sources of MoS<sub>2</sub> paste grease with 40% or more molybdenum are:

- Molykote® G-n Paste manufactured by Dow Corning, U.S.A.
  - Honda Moly 45 (U.S.A. only)
  - Rocol ASP manufactured by Rocol Limited, U.K.
  - Rocol Paste manufactured by Sumico Lubricant, Japan.
- Any other manufacturer's paste grease equivalent to the above may also be used.



# 3. MAINTENANCE

<b>SERVICE INFORMATION</b>	<b>3-1</b>	<b>BRAKE FLUID</b>	<b>3-10</b>
<b>MAINTENANCE SCHEDULE</b>	<b>3-3</b>	<b>BRAKE SHOE/PAD WEAR</b>	<b>3-10</b>
<b>FUEL LINE/FUEL STRAINER</b>	<b>3-4</b>	<b>BRAKE SYSTEM</b>	<b>3-11</b>
<b>THROTTLE OPERATION</b>	<b>3-4</b>	<b>BRAKELIGHT SWITCH</b>	<b>3-11</b>
<b>CARBURETOR CHOKE</b>	<b>3-5</b>	<b>HEADLIGHT AIM</b>	<b>3-12</b>
<b>AIR CLEANER</b>	<b>3-6</b>	<b>CLUTCH SYSTEM</b>	<b>3-12</b>
<b>SPARK PLUG</b>	<b>3-6</b>	<b>SIDE STAND</b>	<b>3-13</b>
<b>VALVE CLEARANCE</b>	<b>3-6</b>	<b>SPARK ARRESTER (U.S.A. only)</b>	<b>3-13</b>
<b>CYLINDER COMPRESSION</b>	<b>3-7</b>	<b>SUSPENSION</b>	<b>3-14</b>
<b>CARBURETOR IDLE SPEED</b>	<b>3-8</b>	<b>NUTS, BOLTS, FASTENERS</b>	<b>3-15</b>
<b>DRIVE CHAIN</b>	<b>3-8</b>	<b>WHEELS/TIRES</b>	<b>3-15</b>
<b>DRIVE CHAIN SLIDER</b>	<b>3-10</b>	<b>STEERING HEAD BEARINGS</b>	<b>3-15</b>

## SERVICE INFORMATION

### GENERAL

Engine oil level check	Page 2-3
Engine oil change	Page 2-3
Engine oil filter replacement	Page 2-4
Engine oil strainer nut cleaning	Page 2-5

### SPECIFICATIONS

#### ENGINE

Spark plug:	Plug gap:	0.8 – 0.9 mm (0.031 – 0.035 in)
Plug type:		

Standard		For extended high speed riding	
ND	NGK	ND	NGK
X24EPR-U9	DPR8EA-9	X27EPR-U9	DPR9EA-9

Valve clearance:	INTAKE:	0.10 mm (0.004 in)
	EXHAUST:	0.12 mm (0.005 in)
Throttle grip free play:		2 – 6 mm (1/8 – 1/4 in)
Carburetor idle speed:		1,300 ± 100 rpm
Cylinder compression:		12.5 kg-cm <sup>2</sup> (177.75 psi) with the right exhaust valve clearance about 1 mm (0.04 in)

#### FRAME

Choke valve travel:		10 – 11 mm (0.39 – 0.43 in)
Chain slider service limit:		3 mm (1/8 in)
Drive chain slack:		30 – 40 mm (1-1/4 – 1-5/8 in)
Rear brake pedal free play:		20 – 30 mm (4/8 – 1-1/4 in)
Clutch lever free play:		10 – 20 mm (3/8 – 3/4 in)
Tire pressures (rider only):	Front:	150 kPa (1.5 kg/cm <sup>2</sup> , 22 psi)
	Rear:	150 kPa (1.5 kg/cm <sup>2</sup> , 22 psi)
Tire size:	Front:	90/90 – 21 54S
	Rear:	120/90 – 17 64S

## MAINTENANCE

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### TORQUE VALUES

Fuel cup	4 N·m (0.4 kg-m, 3 ft-lb)
Valve adjusting screw lock nut	25 N·m (2.5 kg-m, 18 ft-lb)
Rear axle nut	95 N·m (9.5 kg-m, 69 ft-lb)
Spoke nipple	4 N·m (0.4 kg-m, 3 ft-lb)

### TOOLS

#### Special

Compression gauge attachment 07908—KK60000—or equivalent commercially available in U.S.A.

#### Common

Spanner C, 5.8 x 6.1 mm 07701—0020300—or equivalent commercially available in U.S.A.

# MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION at each scheduled maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY.

C: CLEAN R: REPLACE A:ADJUST L:LUBRICATE

ITEMS	FREQUENCY	NOTES	ODOMETER READING (NOTE (1))								Refer to page	
			x 1,000 mi	0.6	4	8	12	16	20	24		
			x 1,000 km	1	6.4	12.8	19.2	25.6	32.0	38.4		
EMISSION RELATED ITEMS	* FUEL LINE					I			I		I	3-4
	* FUEL STRAINER SCREEN				C	C	C	C	C	C	C	3-4
	* THROTTLE OPERATION					I			I		I	3-4
	* CARBURETOR-CHOKE					I			I		I	3-5
	AIR CLEANER	(NOTE 2)			C	C	R	C	C	R		3-6
	CRANKCASE BREATHER ('88)	(NOTE 3)			C	C	C	C	C	C		4-7
	SPARK PLUG				R	R	R	R	R	R		3-6
	* VALVE CLEARANCE			I	I	I	I	I	I	I		3-6
	ENGINE OIL			R	EVERY 2,000 mi (3,200 km) R							2-3
	ENGINE OIL FILTER			R		R		R		R		2-4
	* ENGINE OIL STRAINER SCREEN IN DOWN TUBE					C		C		C		2-5
	* CARBURETOR IDLE SPEED			I	I	I	I	I	I	I		3-8
	* SECONDARY AIR SUPPLY SYSTEM						I			I		4-19
	* EVAPORATIVE EMISSION CONTROL SYSTEM	(NOTE 4)					I			I		4-17
NON EMISSION RELATED ITEMS	DRIVE CHAIN	(NOTE 5)		EVERY 600 mi (1,000 km) I, L							3-8	
	DRIVE CHAIN SLIDER				I	I	I	I	I	I		3-10
	BRAKE FLUID	(NOTE 7)			I	I	R	I	I	R		3-10
	BRAKE SHOE/PAD WEAR				I	I	I	I	I	I		3-10
	BRAKE SYSTEM			I		I		I		I		3-11
	* BRAKE LIGHT SWITCH					I		I		I		3-11
	* HEADLIGHT AIM					I		I		I		3-12
	CLUTCH SYSTEM			I	I	I	I	I	I	I		3-12
	SIDE STAND					I		I		I		3-13
	* SUSPENSION					I		I		I		3-14
	* SPARK ARRESTER	(NOTE 6)			C	C	C	C	C	C	C	3-13
	* NUTS, BOLTS, FASTENERS	(NOTE 5)		I		I		I		I		3-14
	** WHEELS/TIRES	(NOTE 5)		I	I	I	I	I	I	I		3-15
	** STEERING HEAD BEARINGS			I		I		I		I		3-15

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

\*\* In the interest of safety, we recommend these items be serviced ONLY by an authorized Honda dealer.

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

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

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

4. California type only.

5. Service more frequently when riding OFF-ROAD.

6. USA only.

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

## MAINTENANCE

### FUEL LINE/FUEL STRAINER

Check the fuel line for damage, cracks or fatigue, and replace if necessary.

Turn the fuel valve "OFF".

Remove the fuel cup, O-ring and strainer screen and drain the gasoline into a suitable container.

#### ⚠ WARNING

- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow flames or sparks in the work area.*

Wash the cup and strainer screen in clean non-flammable or high flash point solvent.

Reinstall the screen, aligning the index marks on the fuel valve body and strainer screen.

Install a new O-ring into the fuel valve body.

Reinstall the fuel cup, making sure the O-ring is in place.

Hand tighten the fuel cup and then torque it to specification.

**TORQUE: 4 N·m (0.4 kg-m, 3 ft-lb)**

#### CAUTION

- *Do not overtighten the fuel cup.*

After installing, turn the fuel valve "ON" and check that there are no fuel leaks.

### THROTTLE OPERATION

Check that the throttle grip opens smoothly to full throttle and fully closes automatically in all steering positions.

Make sure there is no deterioration, damage, or kinking in the throttle cables, and that the throttle grip free play is 2–6 mm (1/8–1/4 in) at the throttle grip flange.

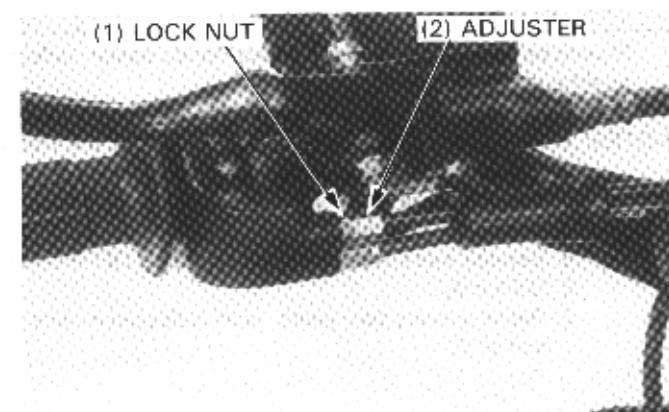
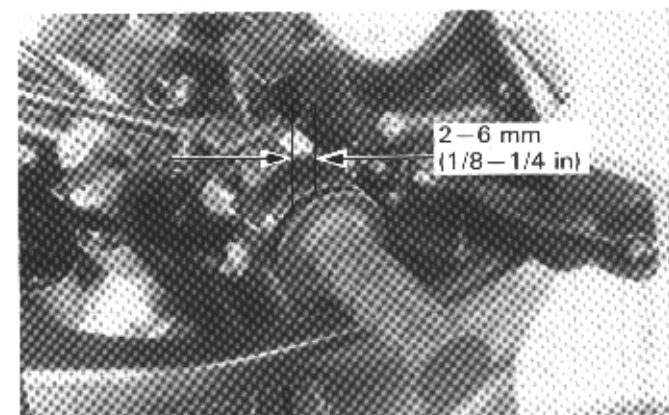
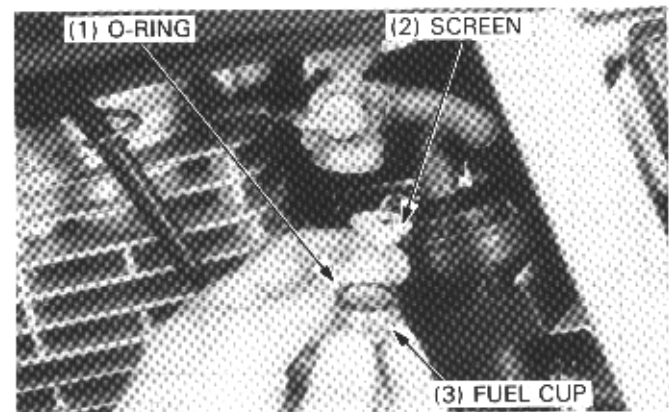
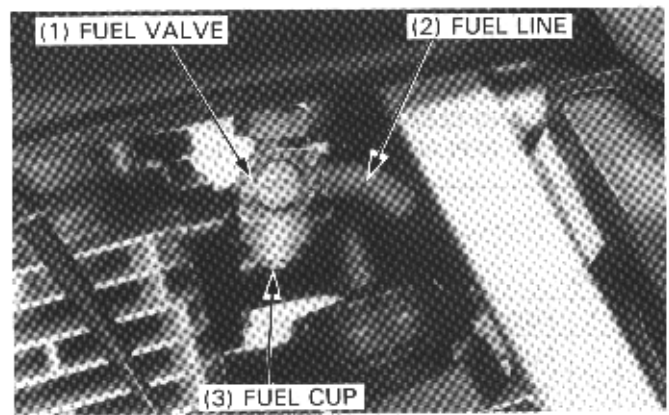
Throttle grip free play can be adjusted at either end of the throttle cable. Replace any damaged parts before beginning this adjustment.

Minor adjustments are made with the upper throttle cable adjuster.

Adjust free play by loosening the lock nut and turning the adjuster.

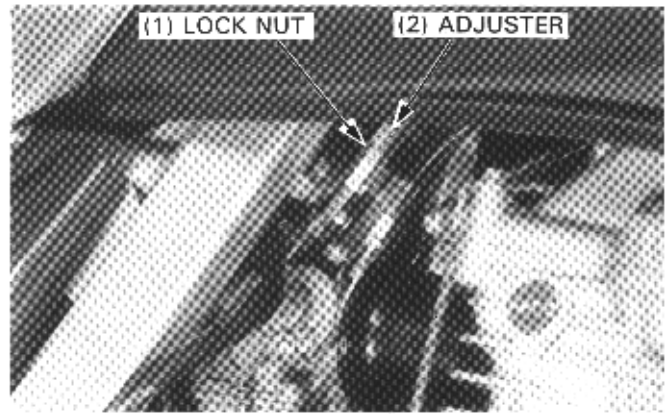
Tighten the lock nut.

Recheck throttle operation.



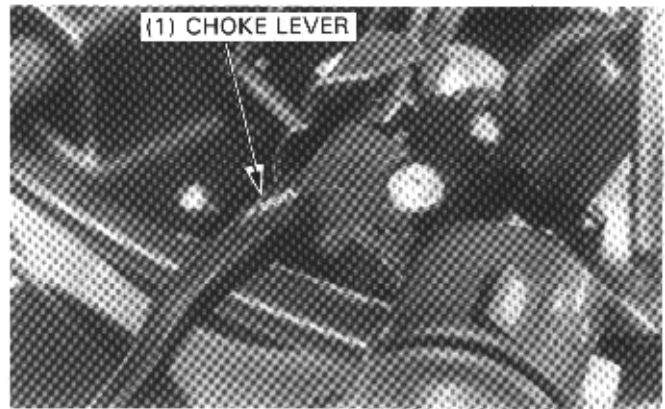
Major adjustment is made with the lower adjuster.  
Adjust free play by loosening the lock nut and turning the adjuster.  
After adjustment, tighten the lock nut.

Recheck the throttle operation.  
Replace any damaged parts, if necessary.



## CARBURETOR CHOKE

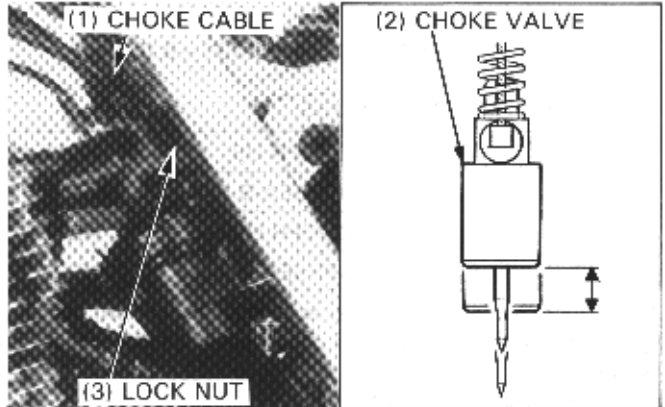
Check that the choke lever moves smoothly.  
Lubricate the choke cable if the operation is not smooth.



Remove the fuel tank (page 4-3).  
Loosen the choke cable nut and disconnect the choke cable from the carburetor.

Measure the choke valve stroke, moving the choke lever from the full open position to the close position.

**Choke valve stroke: 10–11 mm (0.39–0.43 in)**



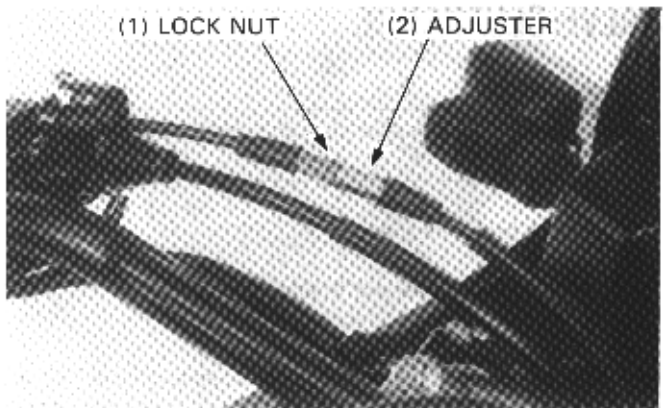
If the choke valve stroke is out of the standard, adjust by loosening the lock nut and turning the adjuster.

Operate the choke lever and make sure the choke valve stroke is within the standard.

Connect the choke cable to the carburetor and tighten the choke cable nut.

Tighten the adjuster lock nut.

Connect the choke cable to the carburetor and tighten the choke cable nut.



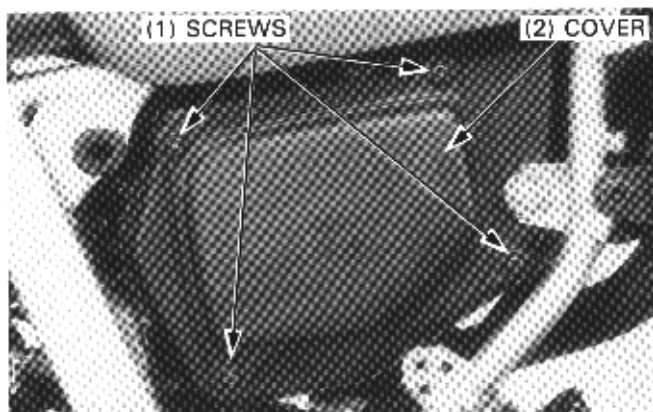
Install the fuel tank (page 4-3), seat and side cover (page 15-1).



## MAINTENANCE

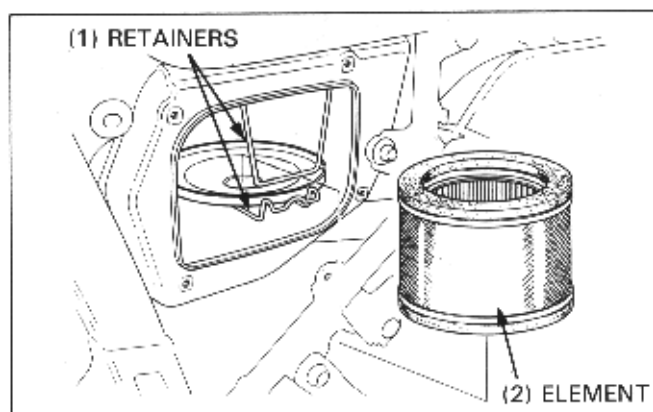
### AIR CLEANER

Remove the left side cover.  
Remove the air cleaner cover screws and the cover.



Unhook the upper element retainer from the lower retainer, and remove the element.

According to the maintenance schedule, clean the element by applying compressed air from the outside and if necessary, replace the element with a new one.  
Install the element in the reverse order of removal.



### SPARK PLUG

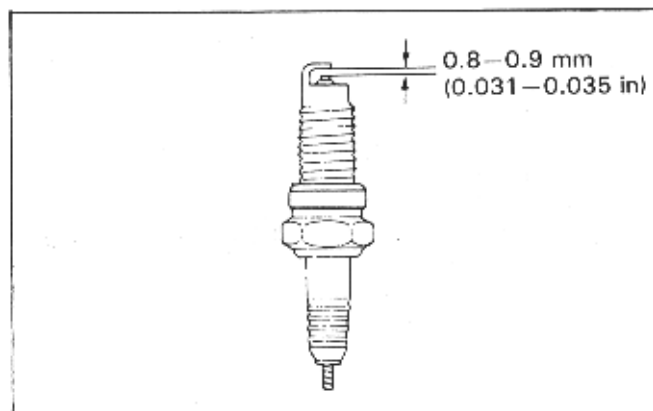
Disconnect the spark plug cap and remove the spark plug. Visually inspect the spark plug. Discard it if the insulator is cracked or chipped.  
Measure the spark plug gap with a wire-type feeler gauge. Adjust the gap by bending the side electrode carefully.

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

RECOMMENDED SPARK PLUGS:

Standard	X24EPR-U9	ND
	DPR8EA-9	NGK
For extended high speed riding	X27EPR-U9	ND
	DPR9EA-9	NGK

Make sure the sealing washer is in good condition. Install the spark plug, tighten it by hand, then tighten with a spark plug wrench.  
Connect the spark plug cap.



### VALVE CLEARANCE

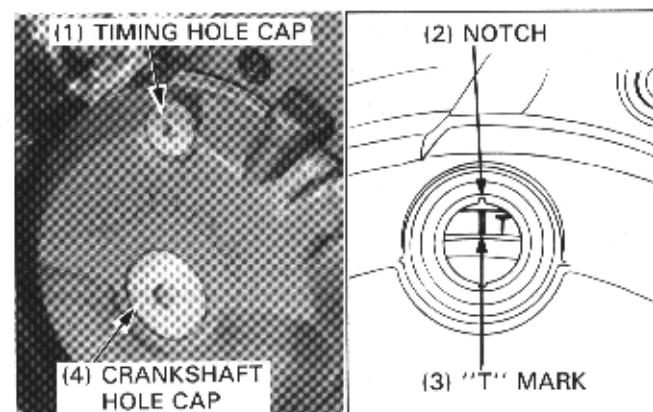
#### NOTE

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

Remove the fuel tank (page 4-3).

Remove the crankshaft and timing hole caps.  
Remove the valve adjuster caps.

Rotate the crankshaft counterclockwise to align the "T" mark on the flywheel with the notch on the left crankcase cover.



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

Check the clearance of the left exhaust, and left and right intake valves by inserting a feeler gauge between the adjusting screw and the sub-rocker arm.

**NOTE**

- When checking the clearance, slide the feeler gauge from the inside out in the direction of the arrow.

**Valve clearance:**

**Intake:** 0.10 mm (0.004 in)  
**Exhaust:** 0.12 mm (0.005 in)

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

Hold the adjusting screw and tighten the lock nut.

**TORQUE: 25 N·m (2.5 kg·m, 18 ft·lb)**

**Right exhaust valve:**

**NOTE**

- Special care must be taken when measuring valve clearance at the right-hand exhaust valve.  
 The Half-decompressor slightly lifts the right hand, exhaust valve when the crankshaft position is before compression TDC.  
 Therefore it is necessary to position the crankshaft where there is no valve lift in order to obtain the correct valve clearance.

**CAUTION**

- If the crankshaft passed the "T" mark (aligning mark), rotate the crankshaft counterclockwise again and align it with the "T" mark. This must be done to prevent the one-way decompressor system from functioning and to obtain the correct valve clearance.

After tightening the valve adjusting lock nut, recheck the valve clearance.

Install the removed parts in the reverse order of the removal.

**CYLINDER COMPRESSION**

Before measuring cylinder compression, adjust the right exhaust valve with the valve clearance approximately 1 mm (0.04 in) (page 3-6).

Warm up the engine.

Stop the engine and remove the spark plug.

Install the attachment to the compression gauge.

**TOOL:**

**Compression gauge attachment**

07908—KK6000 or equivalent commercially available in U.S.A.

Connect the compression gauge.

Position the engine stop switch OFF.

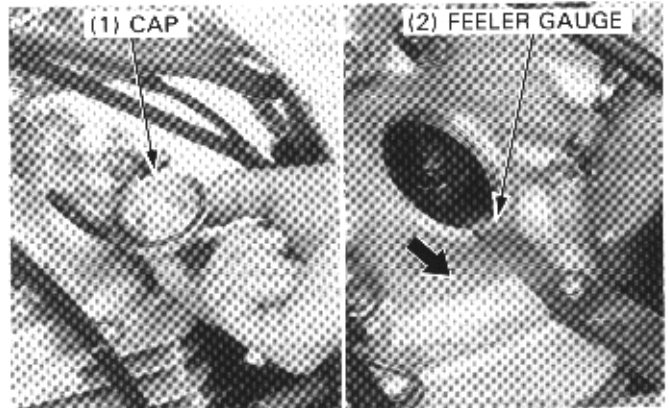
Open the throttle grip all the way. Crank the engine with the starter motor until the gauge stops rising.

Check the gauge reading.

**NOTE**

- Check that there is no leakage at the gauge connection.

**COMPRESSION: 12.5 kg/cm (177.75 psi)**



## MAINTENANCE

### Low compression can be caused by:

- Improper valve clearance adjustment
- Valve leakage
- Leaking cylinder head gasket
- Worn piston rings or cylinder

### High compression can be caused by:

- Carbon deposits in the combustion chamber or on the piston head.

#### NOTE

- After inspection, reinstall the spark plug and adjust the valve clearance (page 3-6).

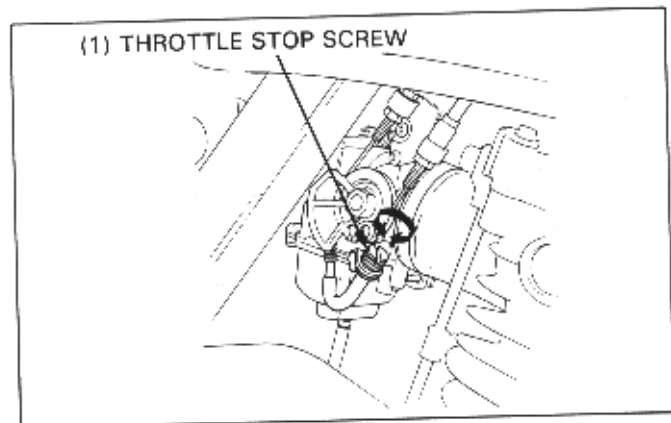
## CARBURETOR IDLE SPEED

#### NOTE

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

Warm up the engine, shift to neutral, and hold the motorcycle upright. Connect a tachometer. Turn the throttle stop screw to obtain the specified idle speed.

**IDLE SPEED: 1,300 ± 100 rpm**



## DRIVE CHAIN

### DRIVE CHAIN SLACK INSPECTION

#### ▲ WARNING

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

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

**STANDARD SLACK: 30–40 mm (1-1/4–1-5/8 in)**

### DRIVEN CHAIN ADJUSTMENT

Loosen the rear axle nut.  
Loosen both lock nuts and turn both adjusting nuts as necessary.

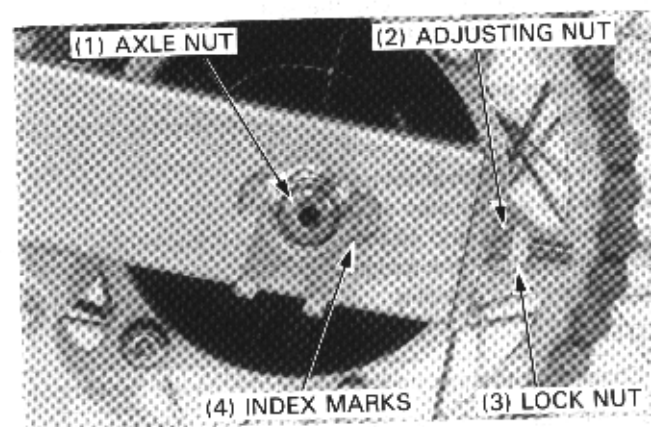
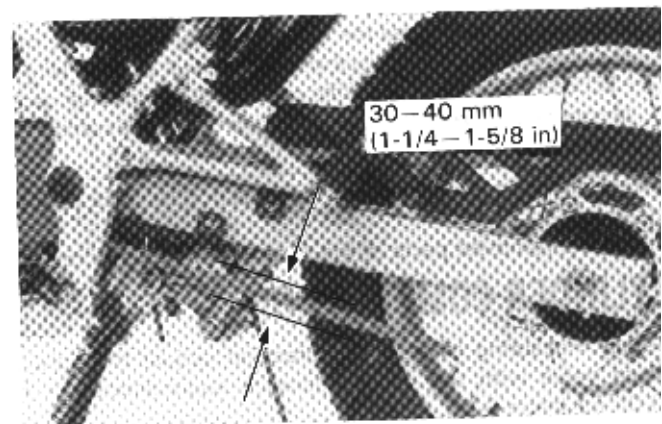
#### CAUTION

- *Be sure the index marks of the same position are aligned with the rear edges of the swing arm holes.*

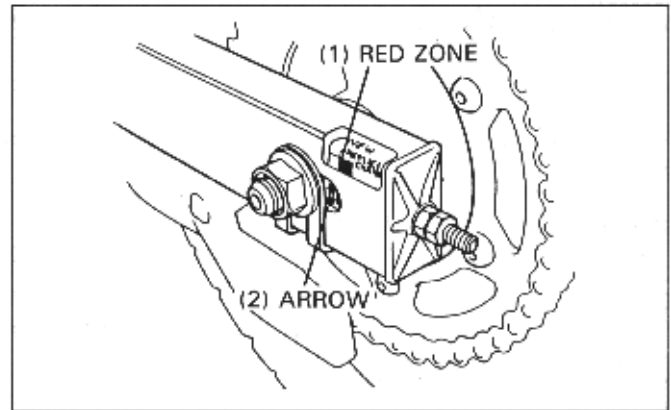
Tighten the rear axle nut.

**TORQUE: 95 N·m (9.5 kg·m, 69 ft·lb)**

Snug the adjuster nuts up against the swing arm end caps. Tighten both lock nuts.



Check the chain wear label. If the red zone on the label aligns with the arrow of the chain adjuster after the chain has been adjusted, the chain must be replaced.

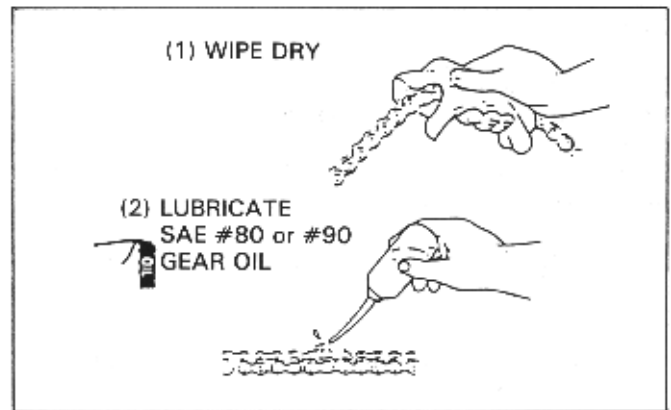


When the drive chain becomes extremely dirty, it should be cleaned prior to lubrication.

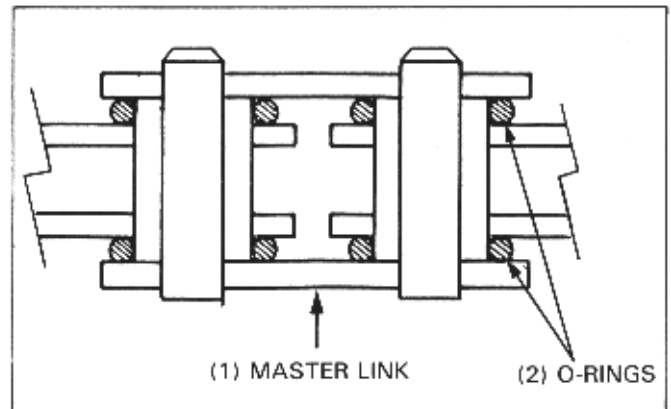
Remove the rear wheel (page 13-3).  
Remove the drive sprocket cover and chain cover.

Clean the drive chain with a non-flammable or high flash point and wipe dry.

Lubricate only with SAE #80 or 90 gear oil.  
Commercial chain lubricants may contain solvents which could damage the rubber O-rings.



Inspect the drive chain and O-rings for possible wear or damage.  
Replace the chain if it is worn excessively or damaged.

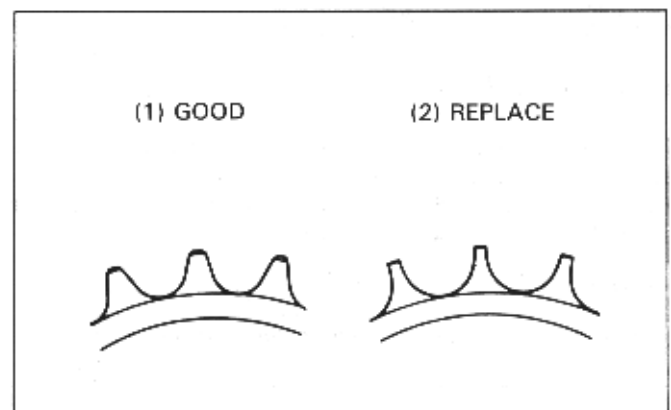


Inspect the sprocket teeth for excessive wear or damage. Replace if necessary.  
Drive sprocket replacement: page 5-4  
Driven sprocket replacement: page 13-5,6

NOTE

- Never install a new drive chain on worn sprockets or a worn chain on new sprockets. Both chain and sprockets must be in good condition, or the new replacement chain or sprockets will wear rapidly.

Reinstall the rear wheel (page 13-7) and chain cover.



## MAINTENANCE

### DRIVE CHAIN SLIDER

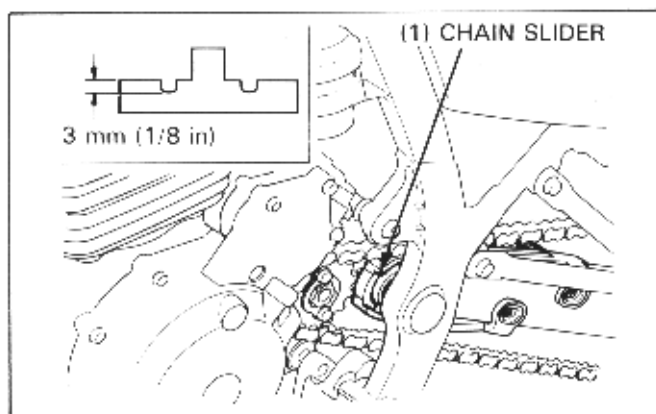
Check the chain slider for wear or damage.

Replace the drive chain slider if the thickness exceeds the service limit.

**SERVICE LIMIT: 3 mm (1/8 in)**

#### CAUTION

- *If the chain slider becomes worn down through to the swing arm, the chain will wear against the swing arm.*



### BRAKE FLUID

Check the front brake fluid reservoir level.

If the level is near the lower level mark, remove the cover and diaphragm.

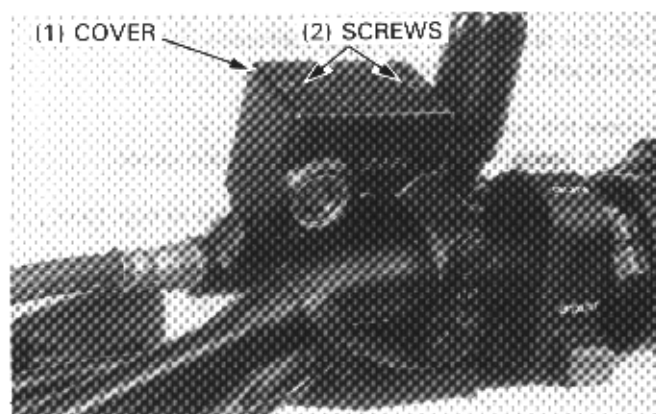
Fill the reservoir with DOT 3 or DOT 4 BRAKE FLUID to the upper level.

Check the entire system for leaks, if the level is low.

#### CAUTION

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Avoid operating the brake lever with the cap removed. Brake fluid will squirt out if the lever is pulled.*
- *Do not mix different types of fluid, they are not compatible with each other.*

Refer to section 14 for brake bleeding procedures.



### BRAKE SHOE/PAD WEAR

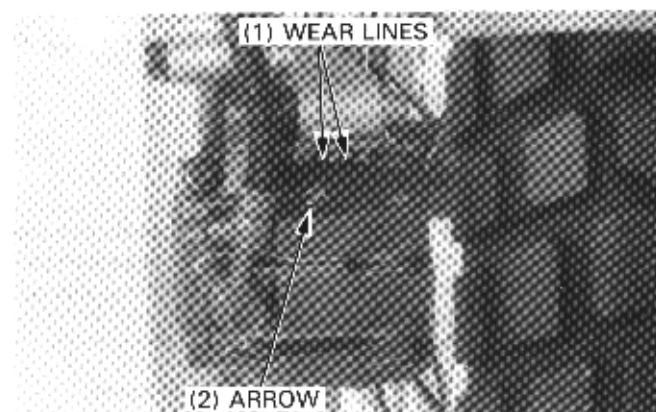
#### BRAKE PAD WEAR

Check the brake pads for wear by looking through slot indicated by arrow cast on the caliper assembly.

Replace the brake pads if the wear line on the pads reaches the edge of the brake disc (page 14-4)

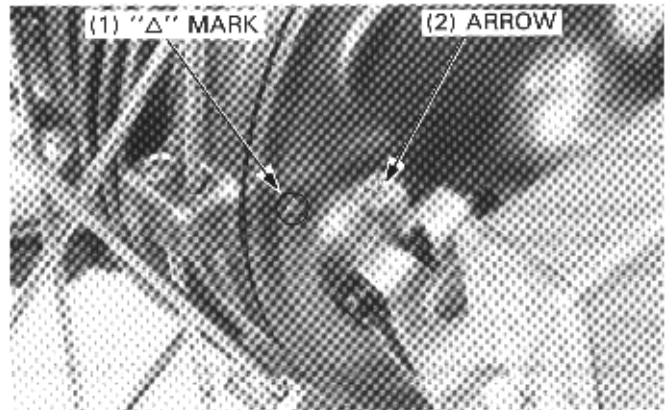
#### CAUTION

- *Always replace the brake pads in pairs to assure even disc pressure.*



### BRAKE SHOE WEAR

Replace the brake shoes if the arrow on the indicator plate aligns with the "Δ" mark on the brake panel when the brake is applied.



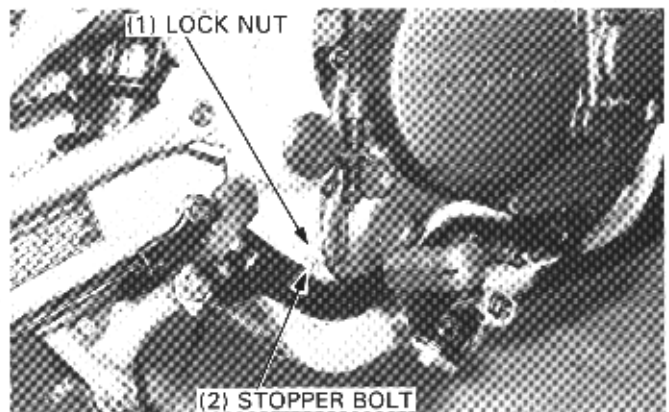
## BRAKE SYSTEM

### BRAKE PEDAL HEIGHT

Loosen the lock nut and adjust the pedal height by turning the stopper bolt.

Tighten the lock nut.

Adjust the brake pedal free play.



### BRAKE PEDAL FREE PLAY

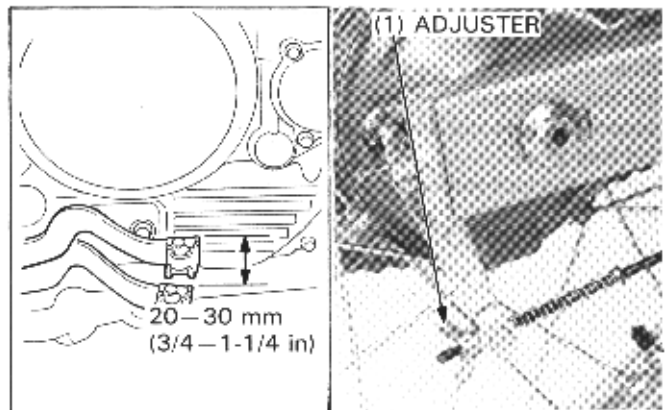
#### NOTE

- Adjust the rear brake pedal free play after adjusting the brake pedal height.

Measure the rear brake pedal free play.

**FREE PLAY: 20–30 mm (3/4–1-1/4 in)**

Adjust the free play by turning the adjuster.



## BRAKE LIGHT SWITCH

#### NOTE

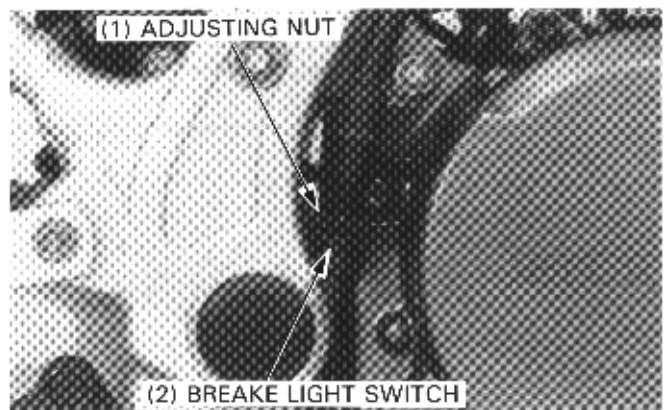
- Perform this adjustment after adjusting brake pedal height and free play.

The brake light should go on when the brake pedal is depressed 10 mm (3/8 in).

Adjust by turning the adjusting nut.

#### CAUTION

- Do not turn the switch body.



## MAINTENANCE

### HEADLIGHT AIM

Adjust vertically by turning the vertical adjuster.  
Turn the adjuster counterclockwise (clockwise) to direct the beam down.

Adjust horizontally by turning the horizontal adjuster.  
Turn the adjuster clockwise (counterclockwise) to direct the beam toward the right side of the rider.

#### NOTE

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

#### ▲ WARNING

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

### CLUTCH SYSTEM

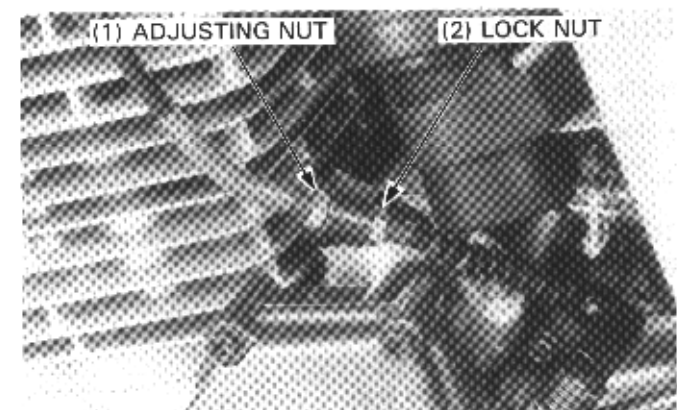
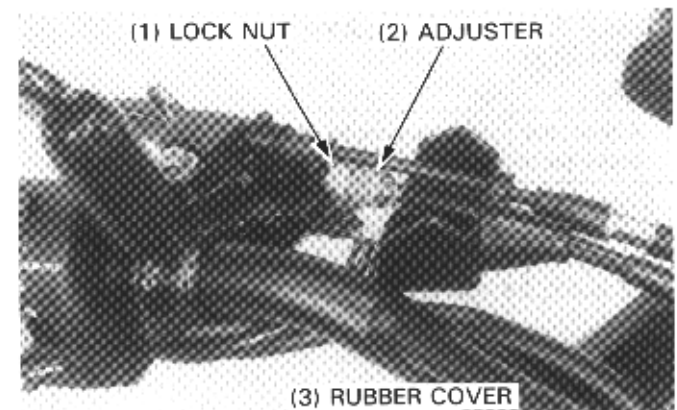
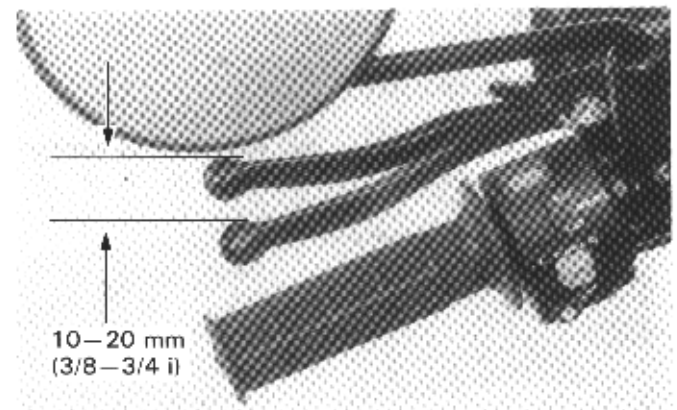
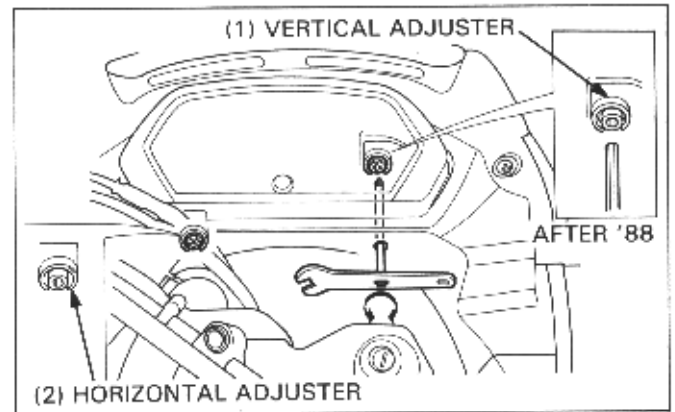
Measure the clutch lever free play at the lever end.

**FREE PLAY: 10–20 mm (3/8–3/4 in)**

Adjust as follows:

Minor adjustments are made with the upper adjuster.  
Pull the cover back.  
Loosen the lock nut and turn the adjuster to obtain the specified free play.  
Tighten the lock nut and install the cover. Check clutch operation.

Major adjustments are made with the lower adjusting nut. If major adjustment is required, turn the upper adjuster in all the way and back out 1 turn.  
Loosen the lock nut and turn the lower adjusting nut to obtain the specified free play.  
Tighten the lock nut.  
Check clutch operation.



## SIDE STAND

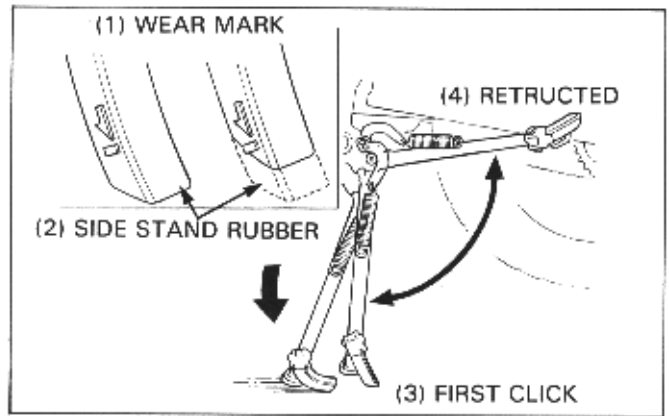
Check the rubber pad on the side stand for deterioration and wear.

Replace the rubber pad if wear extends to the wear line.

Check the side stand operation:

When lowered, the stand should move easily to the first stop, then lock forward to support the motorcycle when the pad touches the ground and the weight of the motorcycle is supported.

When the motorcycle is raised, the stand should automatically move to the first stop, then retract easily when kicked.



If the side stand does not operate smoothly, disassemble and check the side stand assembly as following procedure:

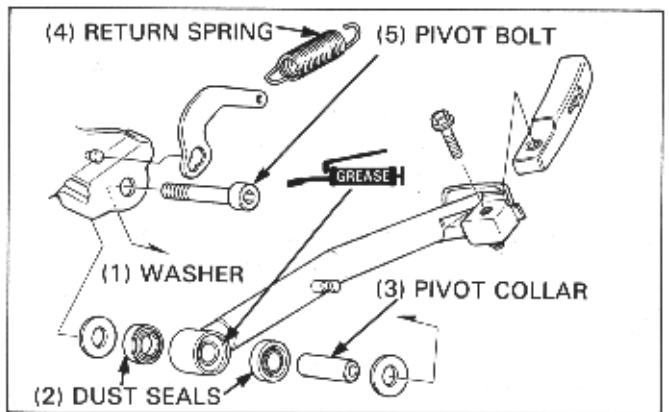
Remove the return spring at the retracted position.

Remove the pivot bolt and side stand.

Check the following parts:

- Inside of the pivot and pivot collar for wear or damage.
- Pivot dust seals for damage.

Lubricate the pivot area with clean grease and reassemble the side stand. Apply a locking agent to the bolt threads. Tighten the pivot bolt securely.



**TORQUE: 50 N·m (5.0 kg·m, 36 ft·lb)**

### CAUTION

- Install the dust seal with its mark side facing in.
- Make sure that the dust seal lip spring is seated on the outside of the dust seal lips securely.

Check the side stand operation as indicated above.

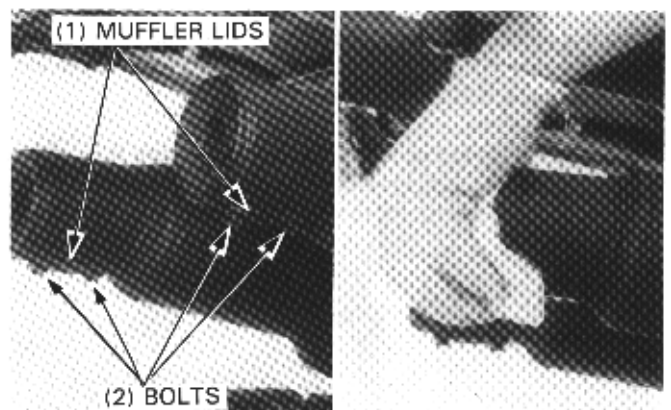
## SPARK ARRESTER (U.S.A. only)

Remove the muffler lid.

Start the engine and increase rpm's to blow carbon out of the exhaust pipe while momentarily creating exhaust system back pressure by blocking the end of the muffler with a shop towel. Repeat until carbon stops coming out.

### WARNING

- Do not perform this operation while the exhaust pipe is hot.
- Perform this operation in a well ventilated area, free from fire hazard.
- Use adequate eye protection.



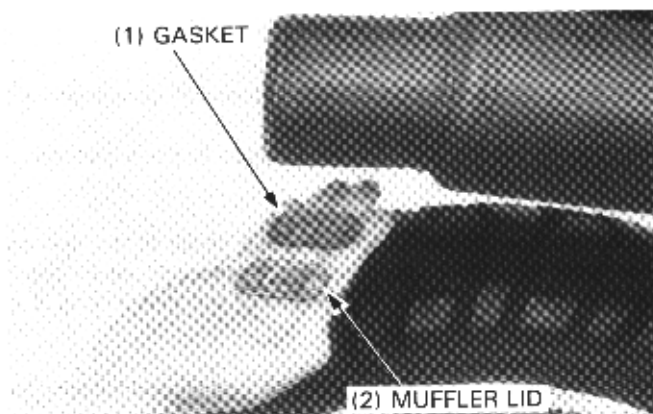


## MAINTENANCE

After cleaning the spark arrester, install the muffler lid and gasket.

### NOTE

- Check that the muffler lid and gasket are in good condition and the bolts are tightened securely.



## SUSPENSION

### FRONT

Check the action of the front suspension by compressing it several times with the front brake applied. Check the entire fork assembly for signs of leaks or damage. Replace any components which are unrepairable. Tighten all nuts and bolts to their specified torque values.

#### ▲ WARNING

- *Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts may affect stability and rider control.*



### REAR

Check the action of the rear suspension components by compressing the suspension several times. Check the entire suspension assembly, to be sure that all of the components are securely mounted and that none are damaged or distorted.

Tighten all nuts and bolts to their specified torque.

Place the vehicle on a support to raise the rear wheel. Move the rear wheel sideways with force to see if the swing arm pivot or wheel bearings are worn. Replace if excessively worn. Check the entire suspension system to be sure it is securely mounted and not damaged or distorted. Tighten all nuts and bolts to their specified torque values.



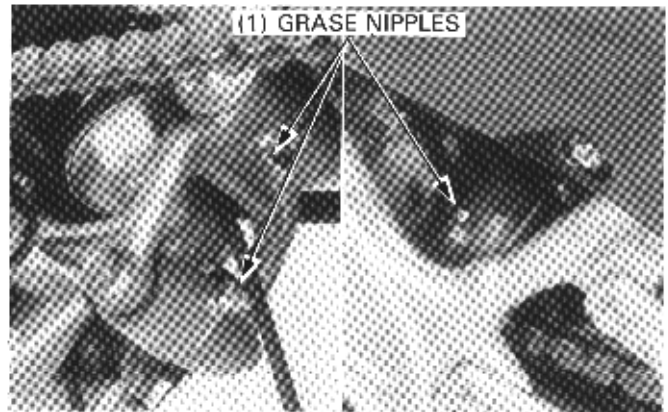
Grease the swing arm and shock linkage pivot bearings through their grease nipples.

## NUTS, BOLTS, FASTENERS

Tighten the bolts, nuts and fasteners at the intervals shown in the Maintenance Schedule (Page 3-3).

Check that all chassis nuts and bolts are tightened to their correct torque values (Page 1-5 and 6).

Check all cotter pins and safety clips.



## WHEELS/TIRES

### TIRE PRESSURE

#### NOTE

- Tire pressure should be checked when the tires are COLD.

#### PRESSURE:

FRONT: 150 kPa (1.5 kg/cm<sup>2</sup>, 22 psi)

REAR: 150 kPa (1.5 kg/cm<sup>2</sup>, 22 psi)

#### SIZE:

FRONT: 90/90-21 54S

REAR: 120/90-17 64S

Check the tires for cuts, embedded nails, or other sharp objects.

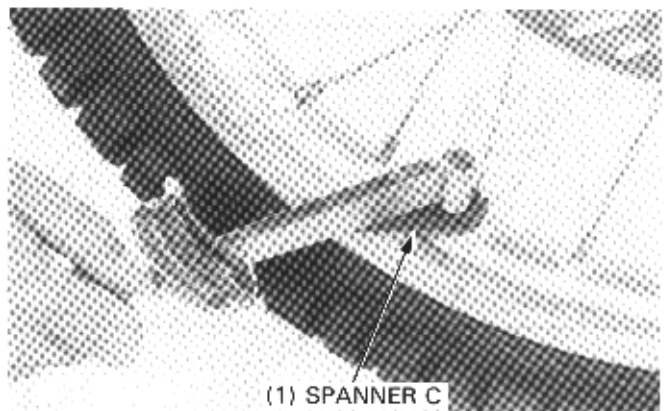
Tighten the wheel spokes periodically. More frequent inspection is necessary when riding off-road.

**TORQUE (front/rear): 4 N·m (0.4 ft-lb, 3 ft-lb)**

#### TOOL:

Spanner C, 5.8 x 6.1 mm

07701-0020300  
Equivalent commercially  
available in U.S.A.



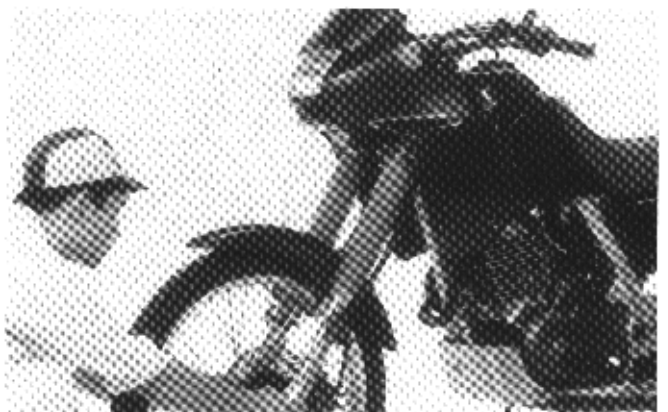
## STEERING HEAD BEARINGS

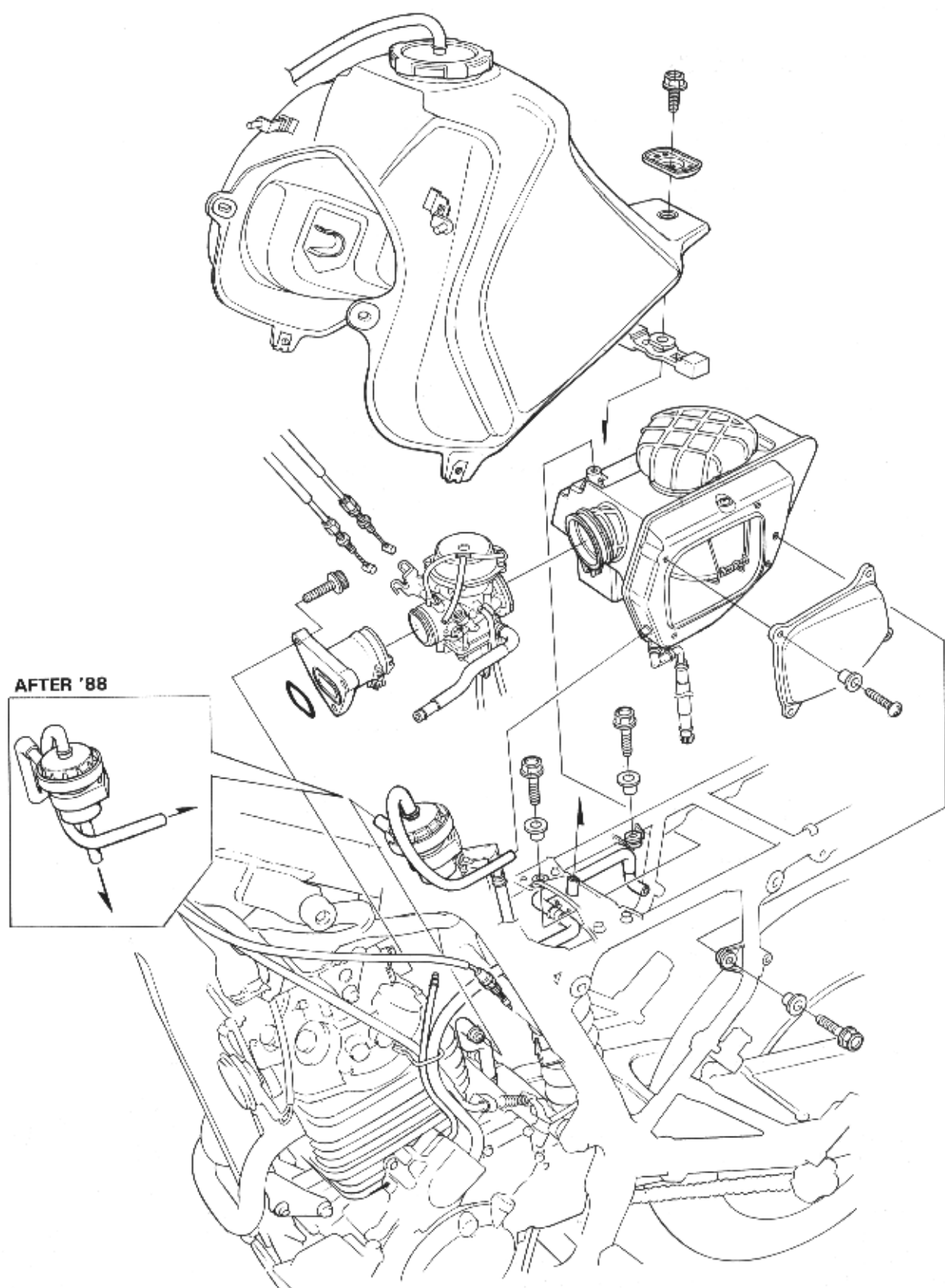
#### NOTE

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

Raise the front wheel off the ground and check that the handlebars rotates freely.

If the handlebars moves unevenly, bind or have vertical movement, adjust the steering head bearings by turning the steering head adjustment nut with a pin spanner. (page 12-20).





# 4. FUEL SYSTEM

SERVICE INFORMATION	4-1	HIGH ALTITUDE ADJUSTMENT (U.S.A. only)	4-17
TROUBLESHOOTING	4-2	PURGE CONTROL VALVE INSPECTION (California model)	4-17
FUEL TANK	4-3	SECONDARY AIR SUPPLY SYSTEM (California model)	4-19
AIR CLEANER CASE	4-4		
CRANKCASE BREATHER	4-6		
CARBURETOR	4-7		
PILOT SCREW ADJUSTMENT (IDLE DROP PROCEDURE)	4-16		

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

• Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area, do not smoke or allow flames or sparks in the work area or where gasoline is stored.

- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The carburetor float chamber has a drain screw that can be loosened to drain residual gasoline.

#### CAUTION

• Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

#### NOTE

• If 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.

## SPECIFICATIONS

Fuel tank capacity 13.0 liters (3.43 US gal, 2.86 Imp gal)  
Fuel reserve capacity 2.5 liters (0.66 US gal, 0.55 Imp gal)

< >: California model

Throttle bore	42.5 mm
Identification No.	VE81A <VE82A>
Float level	18.5 mm (0.73 in)
Main jet	#155
Slow jet	#48
Idle speed	1,300 ± 100 rpm
Throttle grip free play	2–6 mm (1/8–1/4 in)
Pilot screw opening	3 turns out
Air cut-off valve operating pressure	390 ± 20 mm Hg

## TOOL

Common  
Float level gauge 07401–0010000

### TROUBLESHOOTING

#### Engine Turns But Won't Start

- No fuel in tank
- No fuel to cylinder
- Too much fuel getting to cylinder
- No spark at plug (ignition malfunction or fouled spark plug)
- Air cleaner clogged
- Improper throttle operation

#### Engine Idles Faster, Roughly, Stalls, or Runs Poorly

- Idle speed incorrect
  - Ignition malfunction
  - Rich mixture
  - Lean mixture
  - Air cleaner clogged
  - Air leaking into manifold
  - Fuel contaminated
  - Incorrect air screw adjustment
  - Fuel tank breather tube clogged
- (California model only:)
- Faulty purge control valve
  - Faulty emission control system hoses

#### Lean Mixture

- Carburetor fuel jets clogged
- Fuel tank breather tube clogged
- Fuel filter clogged
- Fuel tube kinked or restricted
- Float valve faulty
- Float level too low
- Vacuum stuck piston

#### Rich Mixture

- Worn or damaged starter valve
- Float valve faulty
- Float level too high
- Carburetor air jets clogged
- Sticking float
- Dirty air cleaner
- Vacuum diaphragm damaged

#### Idle Speed Too High

- Incorrect throttle stop screw adjustment
- Faulty choke valve
- Starter valve stuck open

#### Engine Does Not Slow Down Smoothly

- Incorrect pilot screw adjustment

#### Engine Lacks Power at Low and Idle Speeds

- Incorrect air screw adjustment

#### After burning during deceleration

- Faulty ignition system
  - Faulty air cut off valve
  - Lean mixture
- (California model only:)
- : Faulty secondary air supply system
  - : Faulty hoses of the emission control system

#### Poor performance (driveability) and poor fuel economy

- Clogged fuel system
  - Faulty ignition system
  - Dirty air cleaner
- (California model only:)
- : Faulty purge control valve
  - : Faulty hoses in the emission control system

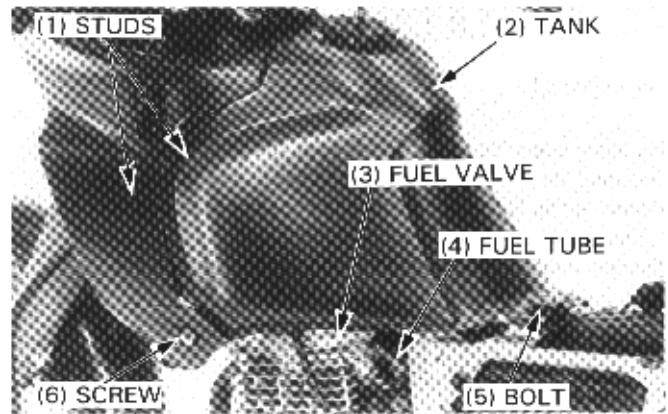
## FUEL TANK

### REMOVAL

Remove the side covers and seat (page 15-2).  
Turn the fuel valve OFF and disconnect the fuel tube at the fuel valve.

**▲ WARNING**

- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area, do not smoke or allow flames or sparks in the work area or where gasoline is stored.*



Remove the right and left front fairing mounting screws.  
Pull the fairing studs out of the gromets of the fuel tank.

### NOTE

- When removing the fairing, be careful not to break them.

Remove the fuel tank mounting bolt and remove the fuel tank by sliding it backward.

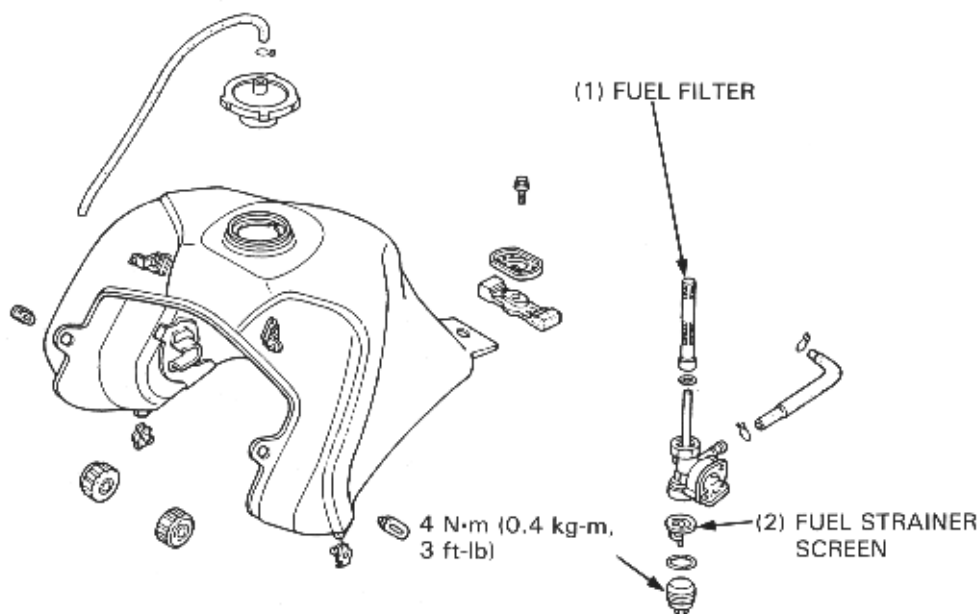
Check that fuel flows out of the fuel valve freely. If flow is restricted, clean the fuel strainer (page 3-4).

### INSTALLATION

Install the fuel tank in the reverse order of removal.

### NOTE

- After assembling, make sure there are no fuel leaks.
- Do not overtighten the fuel valve nut.

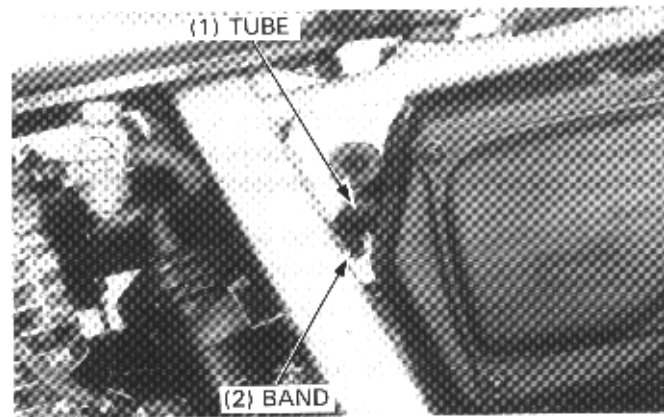


## FUEL SYSTEM

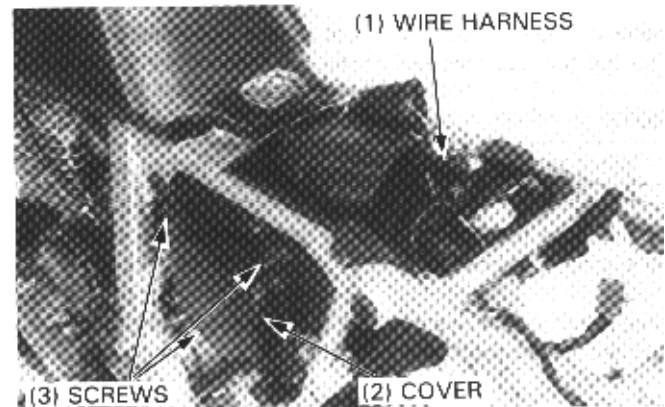
### AIR CLEANER CASE

#### REMOVAL

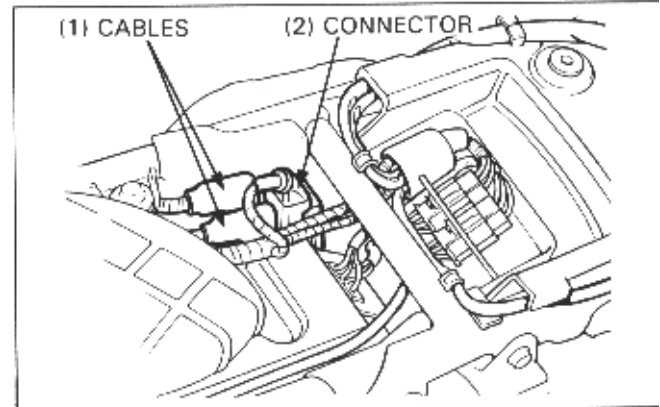
Remove the side covers and seat (page 15-2).  
Remove the rear fender (page 15-5)  
Remove the battery from the air cleaner case (page 16-3).  
Loosen the air cleaner case duct band.  
Disconnect the separator-to-air cleaner case tube.



Disconnect the regulator/rectifier 3P connector. Separate the wire harness from the holder on the air cleaner case.  
Remove the air cleaner element cover by removing three screws.



Disconnect the starter relay switch connector.  
Disconnect the negative and positive battery cables at the starter relay switch.

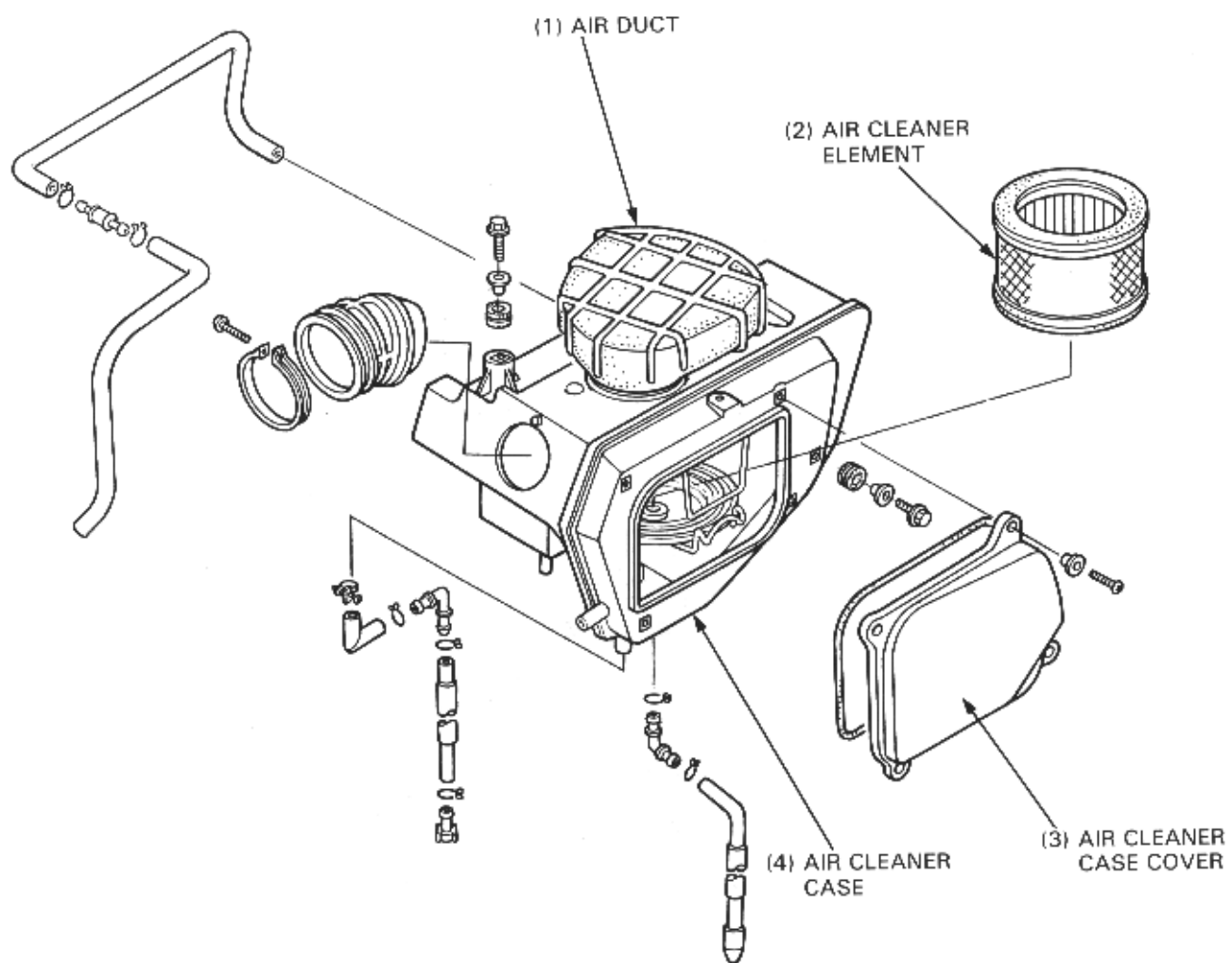


Remove the air cleaner case from the frame as shown.  
Check the air cleaner case for cracks or other damage.  
Refer to page 3-6 for the air cleaner service.



INSTALLATION

Installation is the reverse order of removal.  
Route the wire harness properly (page 1-11 and 12).



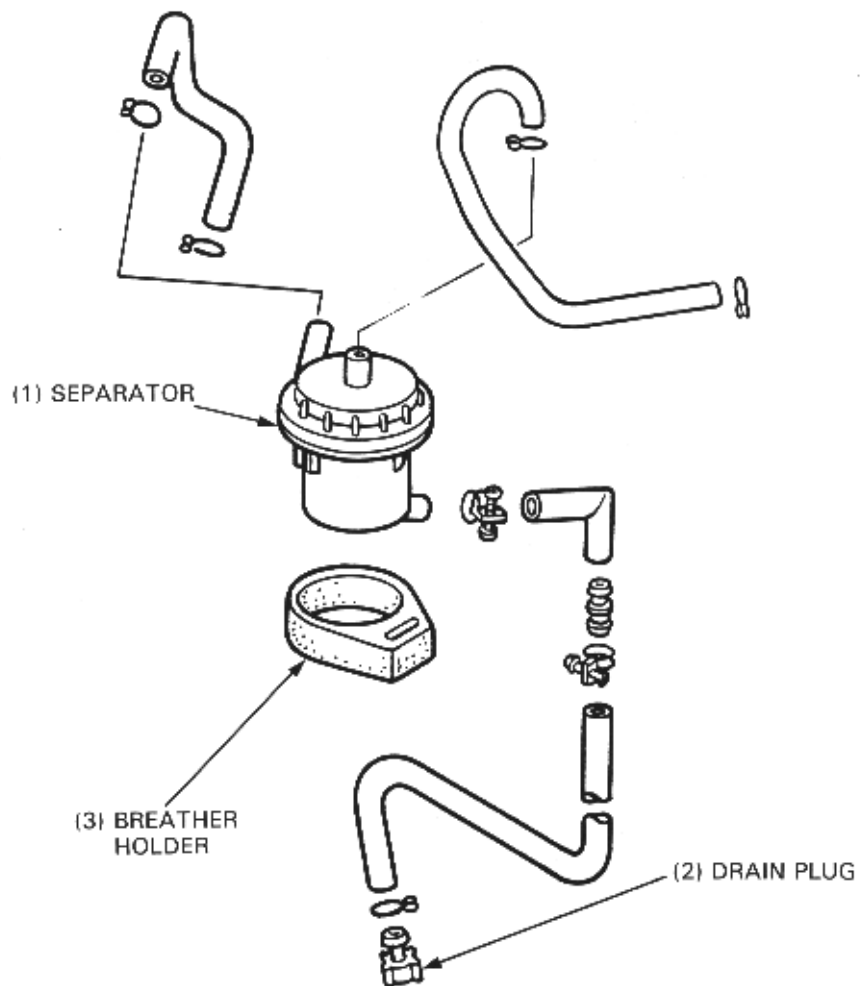


# CRANKCASE BREATHER

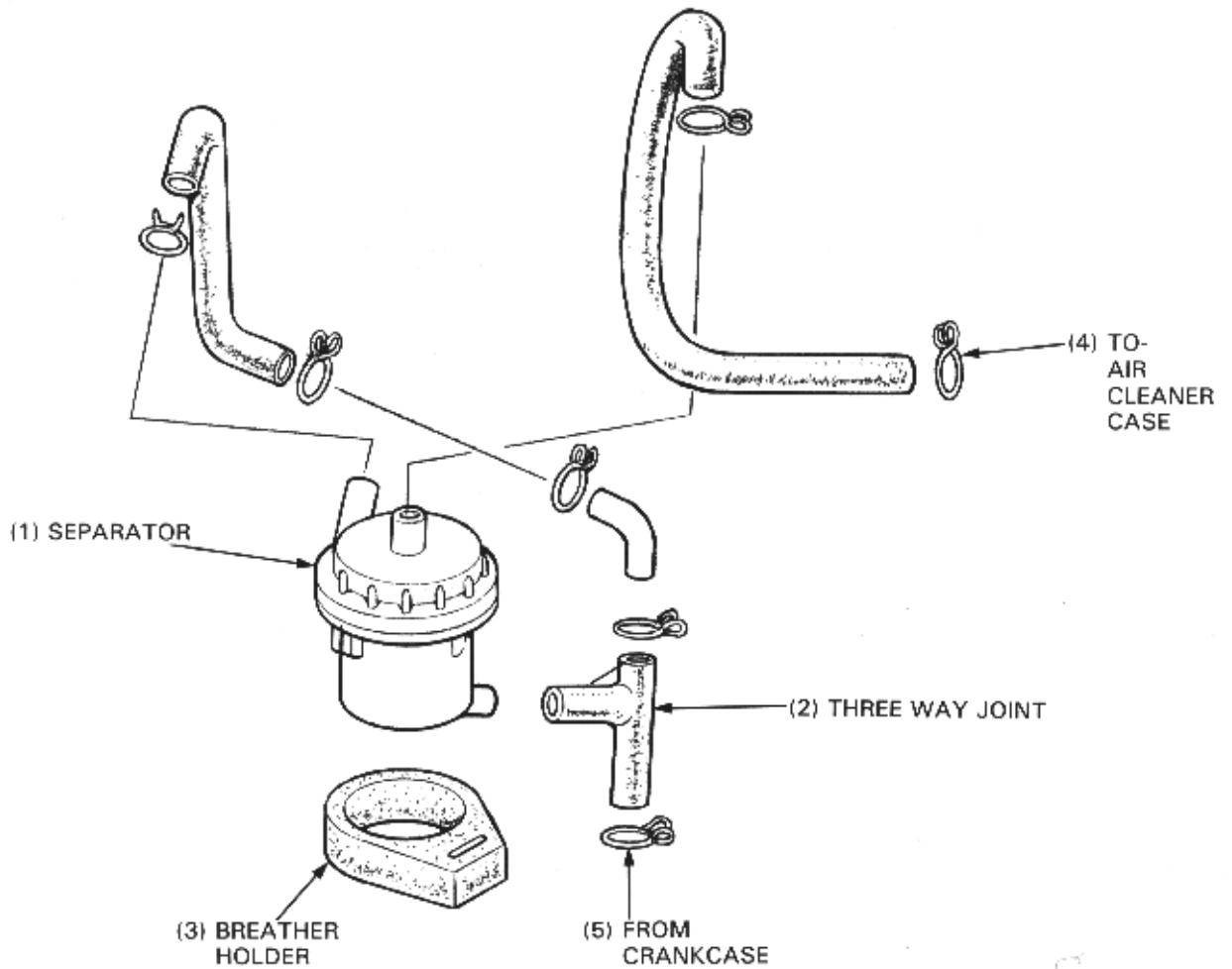
## INSPECTION

Check the crankcase breather tubes for secure connection.  
Check the crankcase breather tubes and separator for damage, cracks, deterioration or blockage.  
Refer to page 1-11 for correct crankcase breather tube routing.

'88:



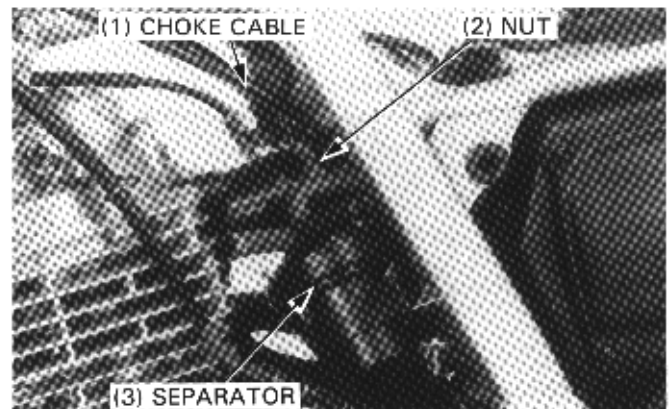
AFTER '88:



## CARBURETOR

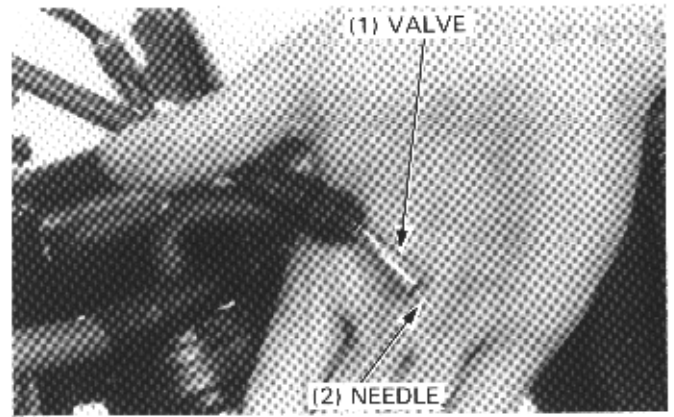
### REMOVAL

Remove the fuel tank (page 4-3)  
 Disconnect the crankcase breather tubes and pull the separator out of the rubber holder.  
 Loosen the nut and disconnect the choke cable at the carburetor.

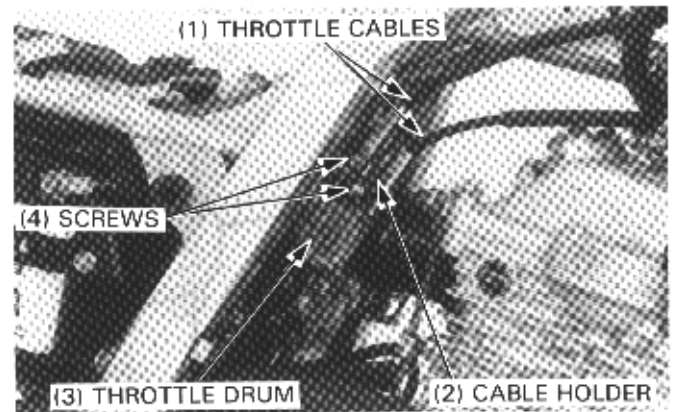


## FUEL SYSTEM

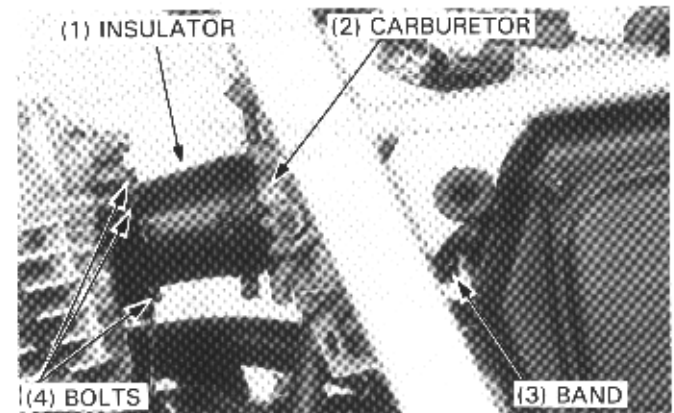
Check the valve and needle for wear or damage.  
If necessary, replace the starter valve.  
Compress the spring into the choke valve nut and remove the choke valve from the choke cable.  
Install a new choke valve in the reverse order of removal.



Remove the throttle cable holder by removing two screws.  
Disconnect the throttle cables from the throttle drum.

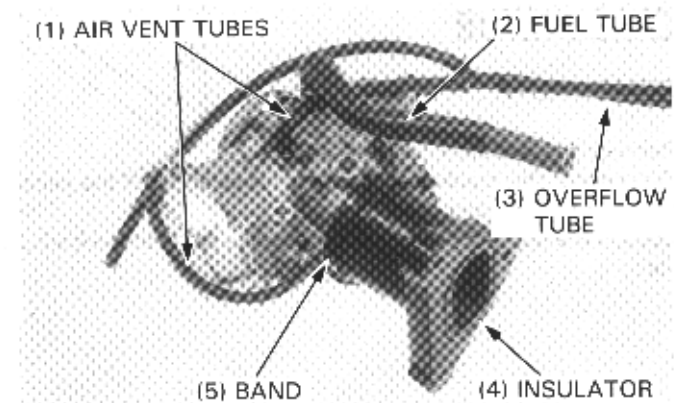


Loosen the air cleaner case duct band.  
Remove the carburetor insulator mounting bolts and remove the carburetor from the left side with the carburetor insulator.

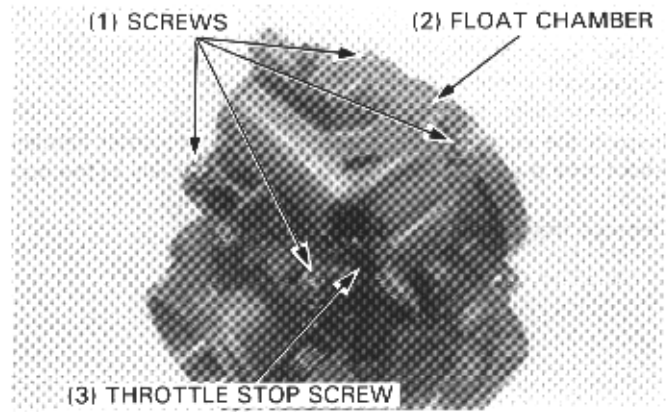


## DISASSEMBLY

Loosen the carburetor insulator band.  
Remove the following parts from the carburetor.  
– Carburetor insulator  
– Fuel tube  
– Air vent tubes  
– Overflow tube

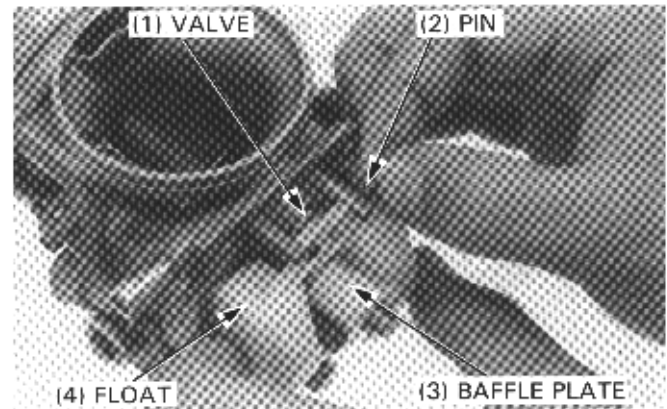


Remove the throttle stop screw.  
Remove the four screws, float chamber and O-ring.

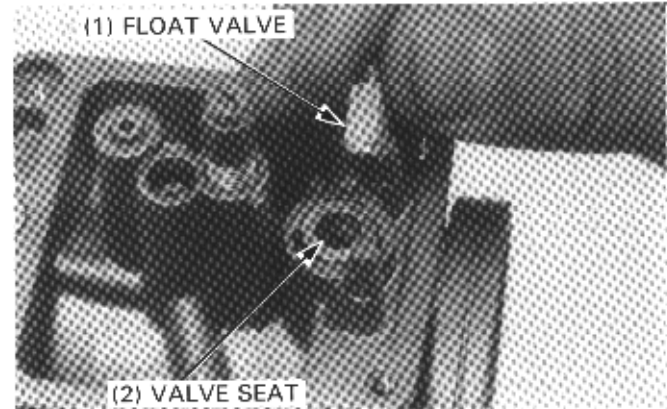


Remove the following.

- float pin
- float
- float valve
- baffle plate



Inspect the float valve and valve seat for wear or damage.



Remove the following.

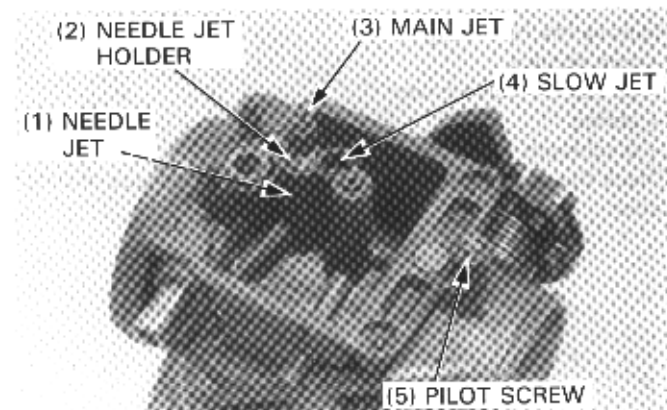
- main jet
- needle jet holder
- needle jet
- slow jet

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

**CAUTION**

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

Remove the pilot screw.



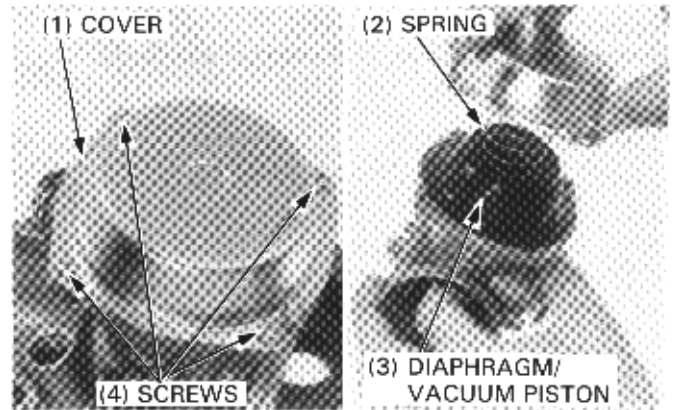
## FUEL SYSTEM

Remove the following.

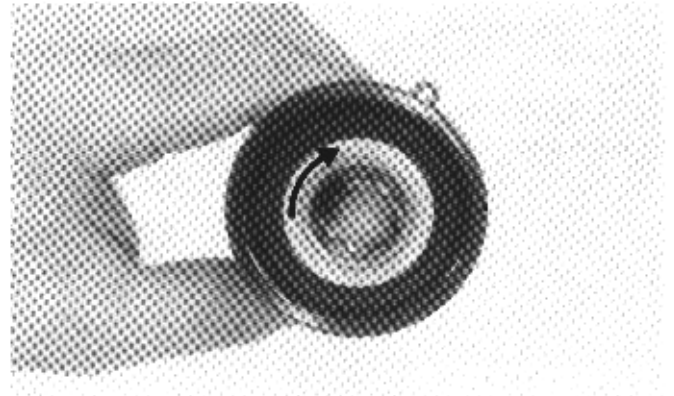
- four screws
- vacuum chamber cover
- compression spring

Inspect the vacuum piston for wear, nicks or other damage. Make sure the piston moves up and down freely in the piston bore.

Remove the diaphragm/vacuum piston.

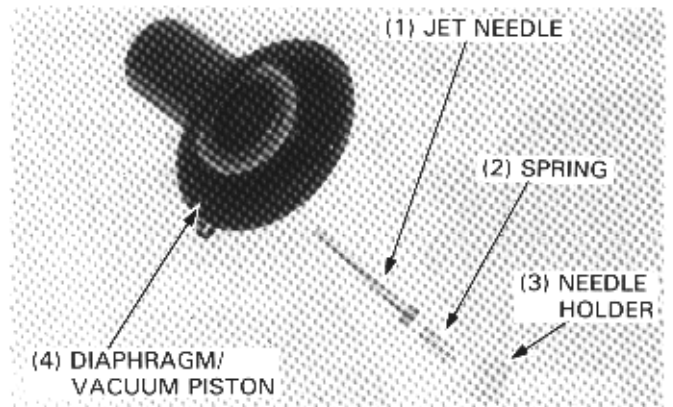


Push the jet needle holder and turn it clockwise 90 degrees with an 8 mm socket. Then remove the needle holder, spring and jet needle from the vacuum piston.



Inspect the jet needle for excessive wear at the tip or other damage.

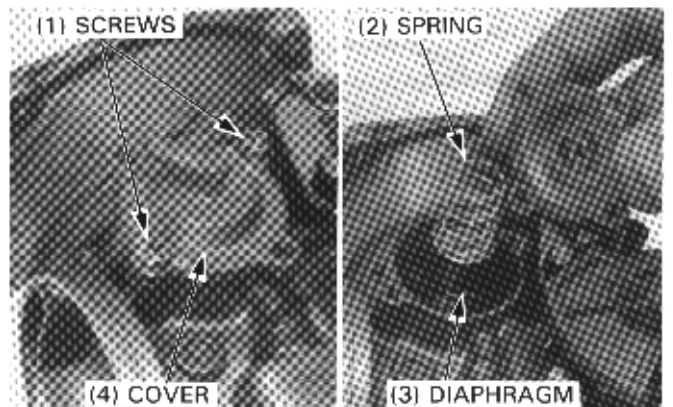
Check for diaphragm for tear or deterioration.



Remove the following.

- two screws
- air cut off valve cover
- spring
- diaphragm

Check the diaphragm and spring for wear, damage or deterioration.



Remove the two screws and carburetor link arm.  
 Draw out the carburetor link shaft with its spring.

Remove

NOTE

• Inspect  
 the

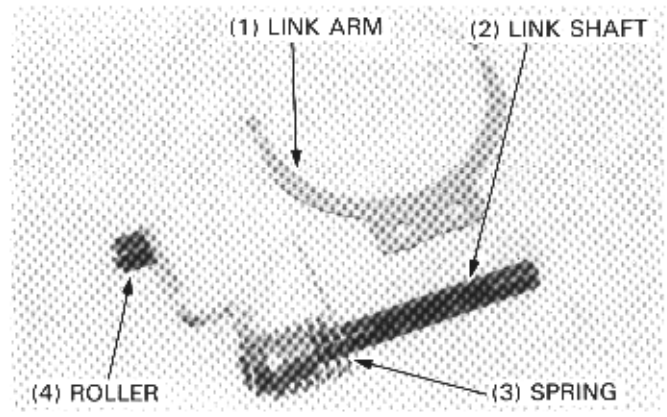
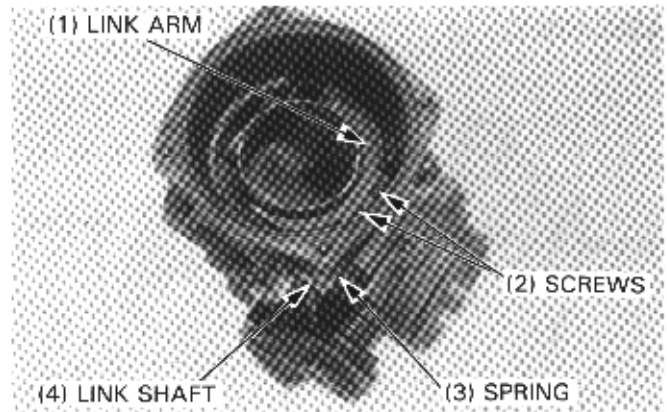
INITIAL

CAUTION

• Do not  
 touch

Check the link arm and link shaft for bends or other damage.  
 Check the spring and roller for wear or damage.  
 If the linkshaft, spring and roller are dirty, clean them thoroughly.

Wash  
 the



Insert the link shaft with the spring and secure the link arm with two screws.  
 Check the link shaft and arm for smooth operation when turning the throttle drum.

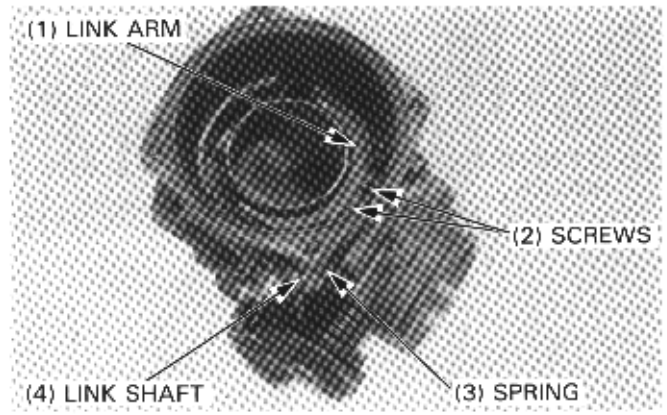
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Wash

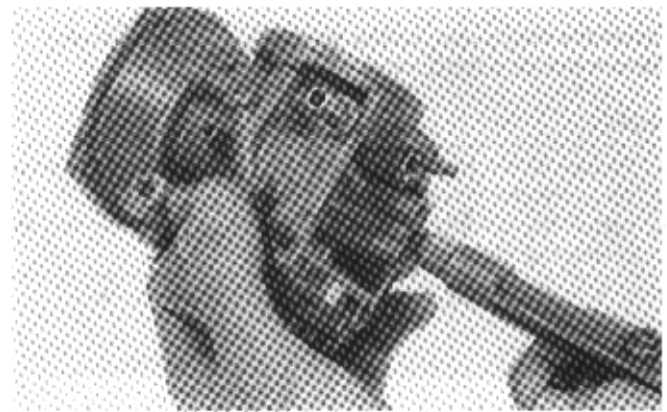
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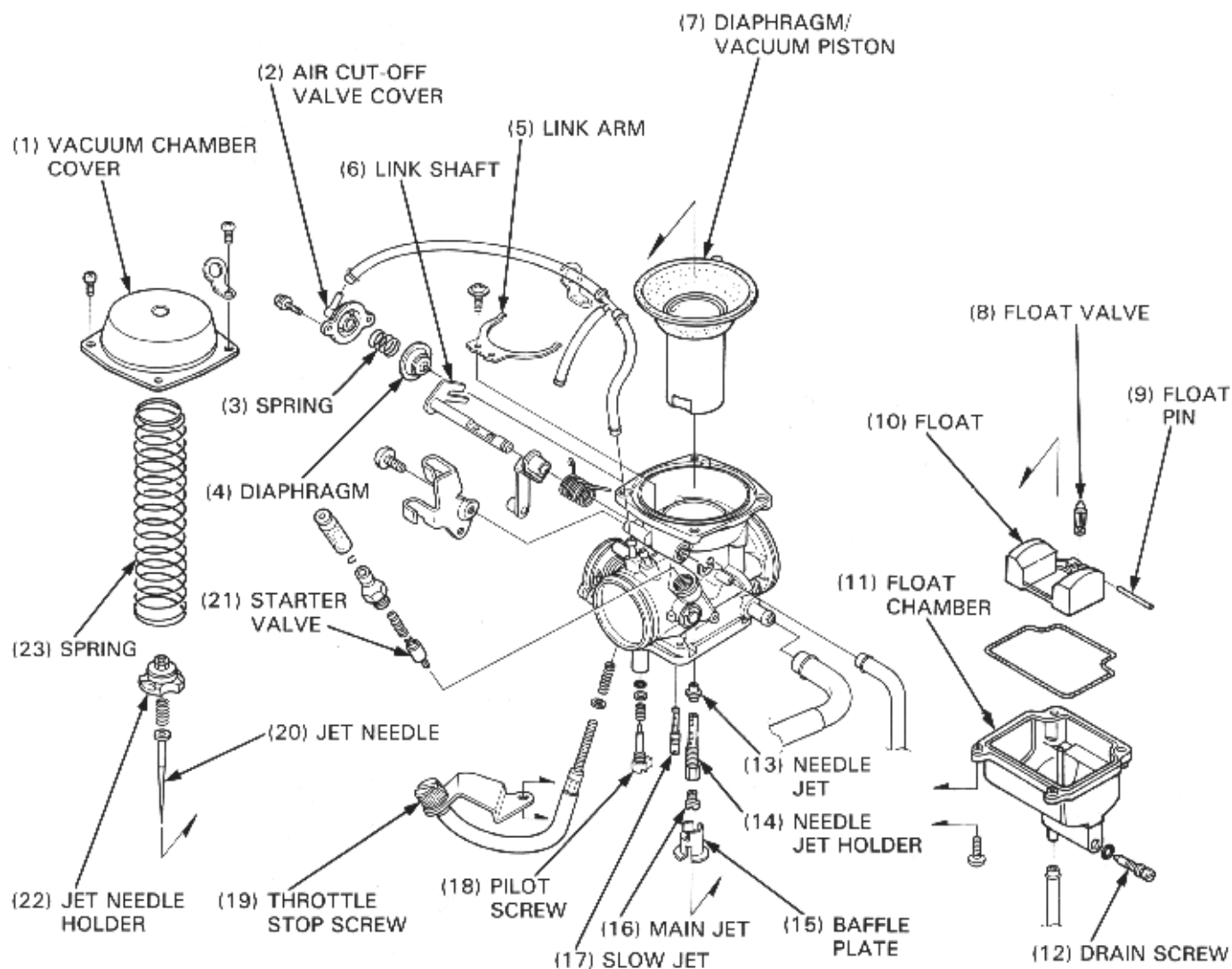


Blow compressed air through each jet to be sure it is clean.



## FUEL SYSTEM

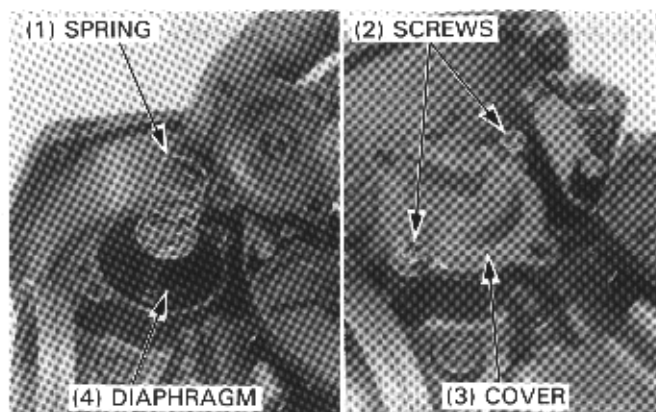
### ASSEMBLY



Install the diaphragm, spring and air cut-off valve cover.  
Secure the air cut-off valve with two screws.

#### NOTE

- Be careful not to pinch the diaphragm between the carburetor body and air cut-off valve cover.
- Install the diaphragm with its valve side (projection side) facing the carburetor body.



Install the pilot screw and screw in until it seats lightly. Return the pilot screw to its original position as noted during removal.

**NOTE**

- Install the pilot screw by referring to the pilot screw adjustment on page 4-17.

**INITIAL OPENING: 3 turns out**

**CAUTION**

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

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

Set the float valve into the valve seat.  
Install the float, aligning its tangs with the gap of the float valve.  
Insert the float pin and install the baffle plate.

Set the float level gauge above the main jet perpendicular to the carburetor body edge.  
Incline the carburetor body edge.  
Incline the carburetor slowly and measure the float level when the float tang just contacts the float valve.

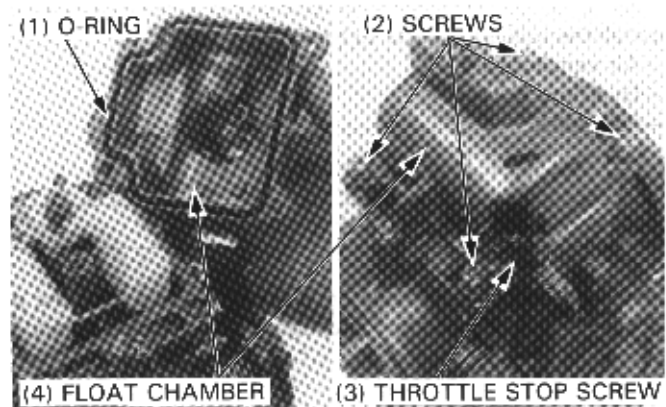
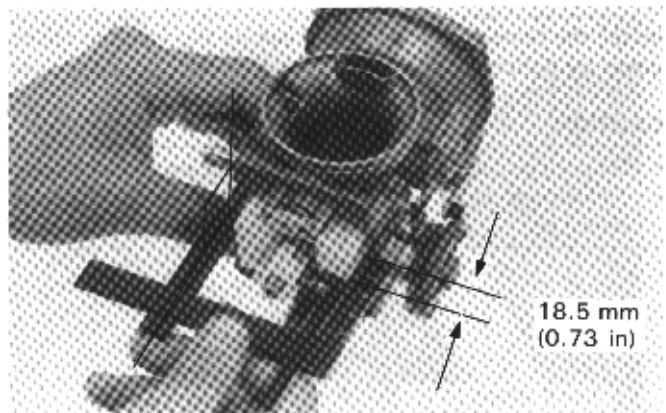
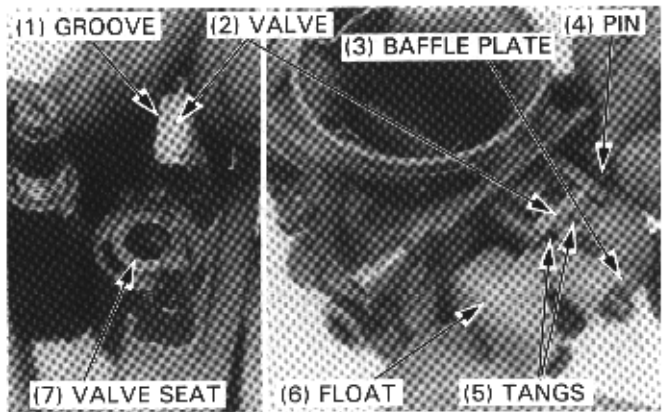
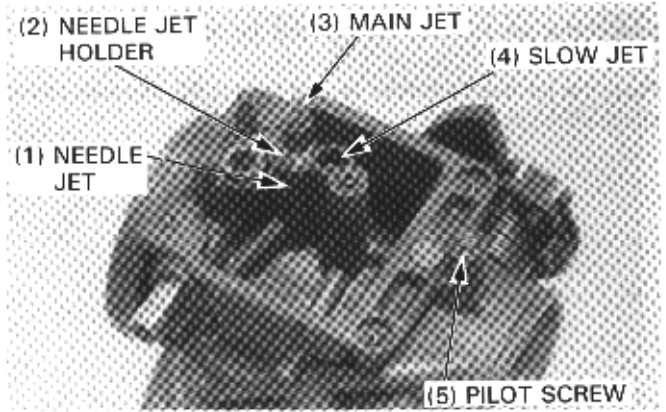
**FLOAT LEVEL: 18.5 mm (0.73 in)**

**TOOL:**

Float level gauge **07401-0010000**

Replace the float if necessary.

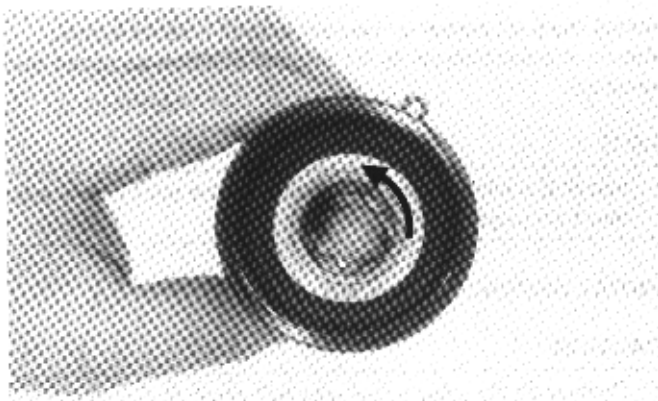
Install the float chamber with a new O-ring.  
Secure the float chamber with the four screws.  
Install the throttle stop screw.





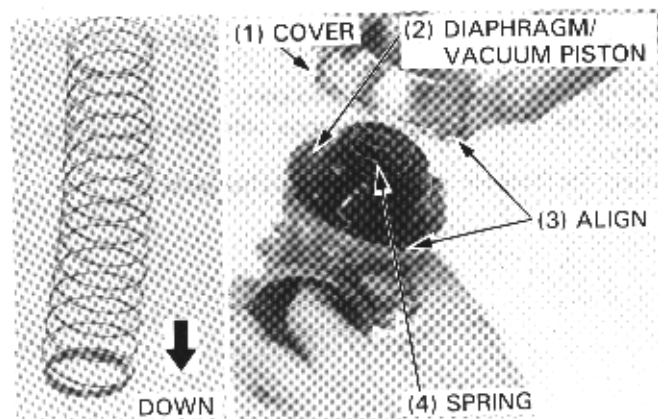
## FUEL SYSTEM

Install the jet needle, spring and jet needle holder to the vacuum piston.  
Push the jet needle holder in and turn it 90 degrees counter-clockwise.



Install the diaphragm/vacuum piston, aligning the tab of the diaphragm with the cut out in the carburetor and with the vacuum piston held up to almost full open so it does not pinch the diaphragm on the chamber cover.

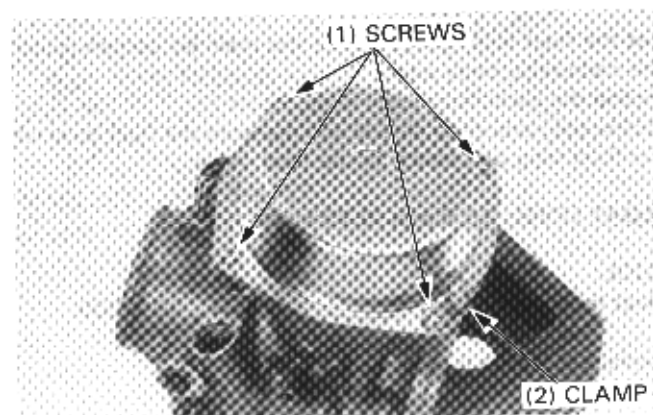
Install the compression spring into the diaphragm/vacuum piston with the tight coil pitch down.  
Install the vacuum chamber cover, aligning the groove in the cover with the tab of the diaphragm, and secure the cover with at least two screws before releasing the vacuum piston.



Install the remaining screws and secure the vacuum chamber cover by tightening the screws.

### CAUTION

- Do not pinch the diaphragm on the vacuum chamber cover.
- Tighten one screw with the tube clamp noting its position as shown.



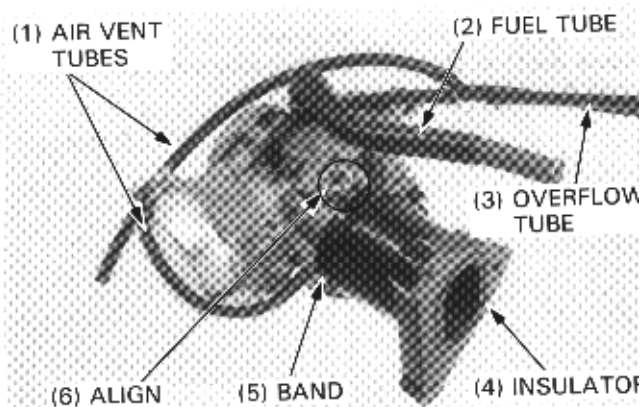
Install the following parts to the carburetor.

- Air vent tubes
- Overflow tube
- Fuel tube

### NOTE

- Secure each tube end with a tube clip.

Install the carburetor insulator, aligning its tabs with the projection on the carburetor, and tighten the insulator band securely.

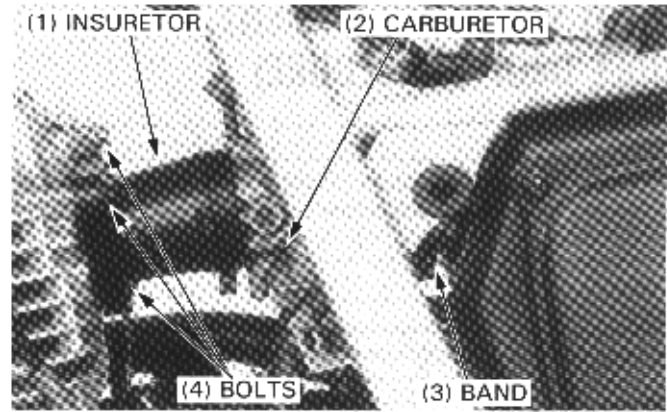


**INSTALLATION**

From the left side, install the carburetor with the carburetor insulator.

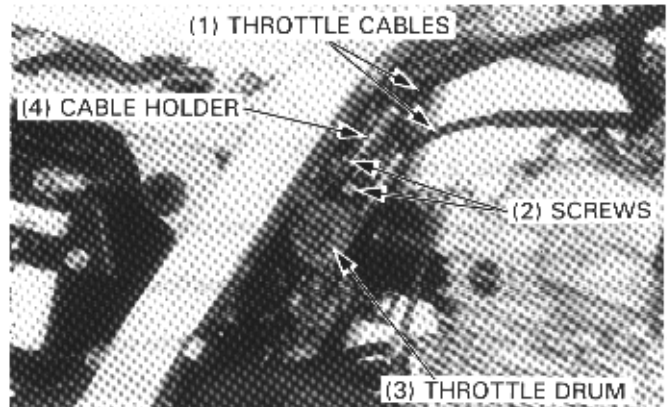
Insert the carburetor intake bore into the air cleaner case duct, and tighten the duct band securely.

Secure the carburetor insulator onto the cylinder head with three bolts.



Connect each throttle cable to the throttle drum.

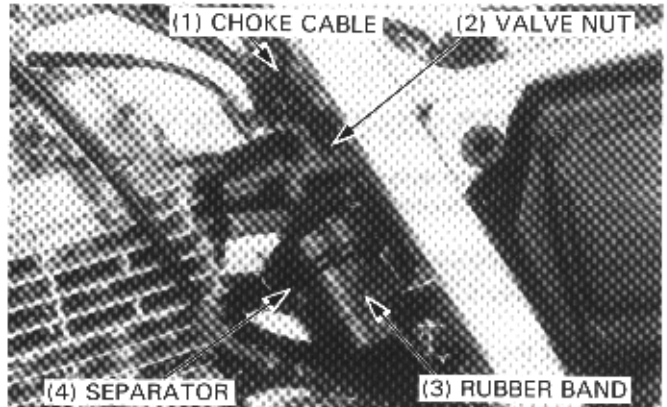
Secure the cable holder on the carburetor with two screws.



Connect the choke cable to the carburetor, and tighten the choke valve nut.

Install the separator into the rubber band, and connect the crankcase breather tubes.

Secure each tube end with tube clip.



Route the air vent tube, overflow tube correctly, referring to page 1-11.

Install the following parts.

- Fuel tank (page 4-3)
- Seat, side covers (page 15-2)

After installation adjust the following.

- throttle grip free play (page 3-4)
- carburetor idle speed (page 3-8)

Start the engine, and check for inhaling air around the carburetor.

## FUEL SYSTEM

### PILOT SCREW ADJUSTMENT (IDLE DROP PROCEDURE)

#### NOTE

- The pilot screw is factory preset and no adjustment is necessary unless the pilot screw is replaced (see page 4-8) for removal.

#### CAUTION

- *Any forcible attempt to remove the pilot screw limiter cap will cause screw breakage.*

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

#### INITIAL OPENING: 3 turns out

2. Install the carburetor (page 4-15) and warm the engine up to the normal operating temperature.  
Stop and go riding for 10 minutes is sufficient.

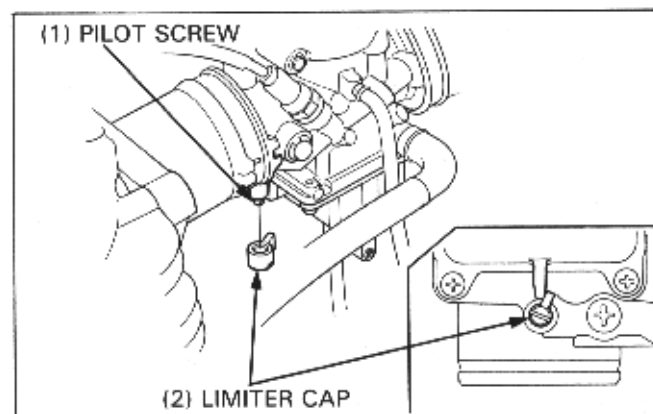
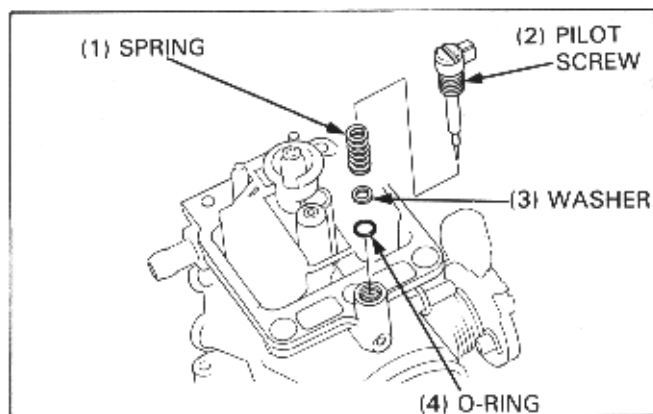
3. Adjust the idle speed by turning the throttle stop screw.

#### IDLE SPEED: 1,300 ± 100 rpm

4. Turn the pilot screw in or out slowly to obtain the highest engine speed.
5. Readjust the idle speed with the throttle screw.
6. Turn the pilot screw in gradually until the engine drops 100 rpm.
7. Turn the pilot screw 1-1/2 turns open from the position obtained in step 6.
8. Readjust the idle speed with the throttle stop screw.
9. Apply Loctite 601 or equivalent to the inside of the limiter cap. Install the limiter cap onto the pilot screw so that its tab rests against the float chamber stop so it can be turned clockwise only. This will prevent adjustment in the counter-clockwise direction which richens the fuel mixture.

#### NOTE

- Be careful not to turn the pilot screw when installing the limiter cap.



## HIGH ALTITUDE ADJUSTMENT (U.S.A. ONLY)

When the vehicle is to be operated continuously above 2,000 m (6,500 feet), the carburetor must be readjusted as follows to improve driveability and decrease exhaust emissions. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient. Turn the pilot screw clockwise 1/2 turn <California type 1/2 turn>.

Adjust the idle speed to specification, with the throttle stop screw.

**IDLE SPEED: 1,300 ± 100 rpm**

### NOTE

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

Attach the Vehicle Emission Control Information Update label as shown. See SL#132 for information on obtaining the label.

### NOTE

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

### ▲ WARNING

- Operation at an altitude lower than 1,500 meters (5,000 feet) with the carburetors adjusted for high altitudes may cause the engine to idle roughly and stall.

When the vehicle is to be operated continuously below 1,500 meters (5,000 feet); turn the pilot screw counterclockwise 1/2 turn to its original position and adjust the idle speed to specification.

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

## PURGE CONTROL VALVE INSPECTION (California model)

### NOTE

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

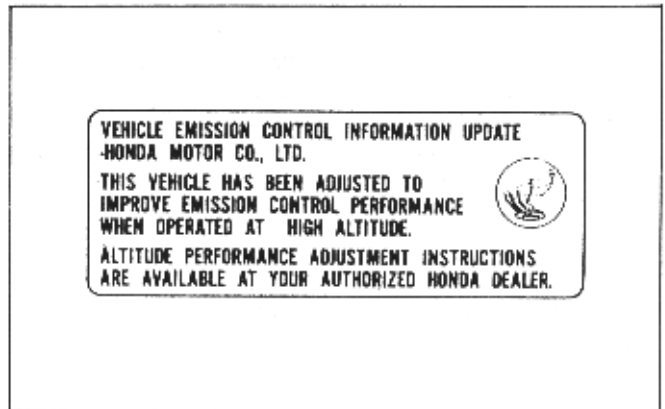
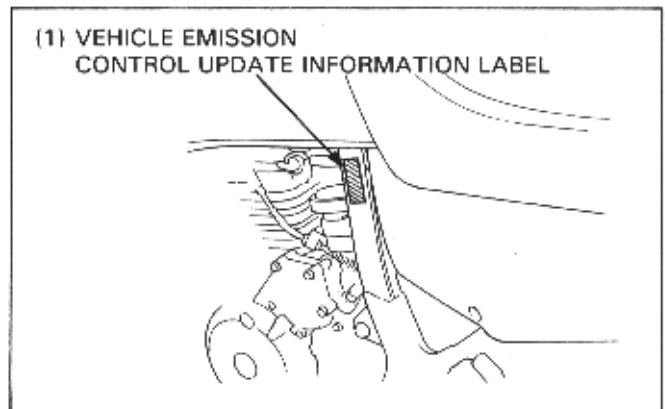
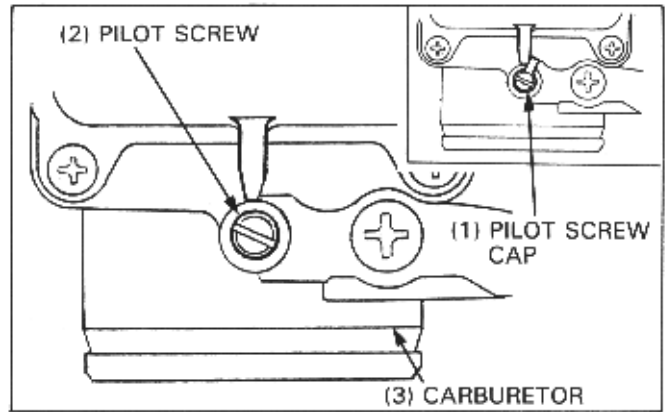
Check all fuel tank, Purge Control Valve (PCV) and charcoal filter hoses to be sure they are not kinked and are surely connected. Replace any hose that shows signs of damage or deterioration.

### NOTE

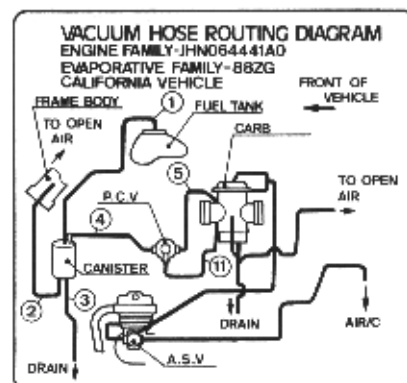
- The PCV is located above the breather separator.

Remove the fuel tank (page 4-3).

Disconnect the PCV hoses from their connections and remove the PCV from its mount. Refer to the routing level on the inside of the left side cover.



'88: SHOWN, AFTER '88: Similar



## FUEL SYSTEM

Connect the vacuum pump to the 4.5 mm (0.18 in) I.D. hose that goes to the carburetor body. Apply the specified vacuum to the PCV.

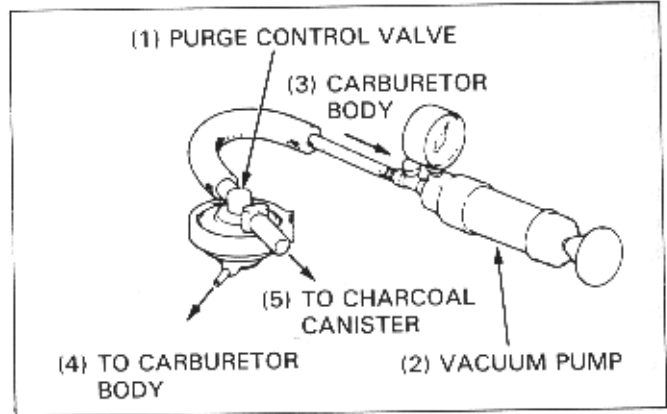
**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

The specified vacuum should be maintained.  
Replace the PCV if vacuum is not maintained.

**TOOL:**

Vacuum/Pressuer pump  
Vacuum pump

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



Remove the vacuum pump and connect it to the vacuum hose that goes to the carburetor body.  
Apply the specified vacuum to the PCV.

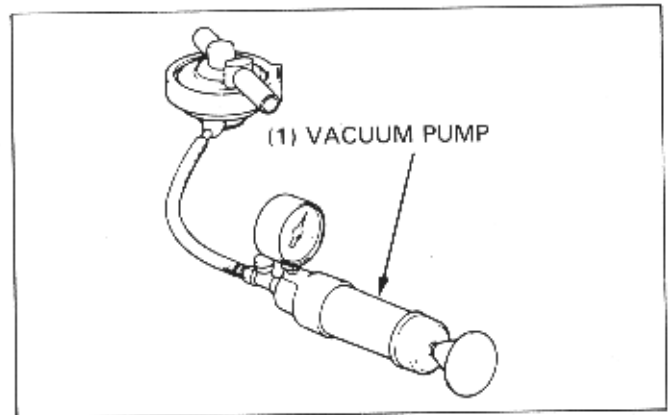
**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

The specified vacuum should be maintained.  
Replace the PCV if vacuum is not maintained.

**TOOL:**

Vacuum/Pressure pump  
Vacuum pump

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



Connect a pressure pump to the 8 mm (0.31 in) I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the PCV hose that goes to the carburetor body, pump air through the canister hose.  
Air should flow through the PCV and out the hose that goes to the carburetor body.  
Replace the PCV if air does not flow out.

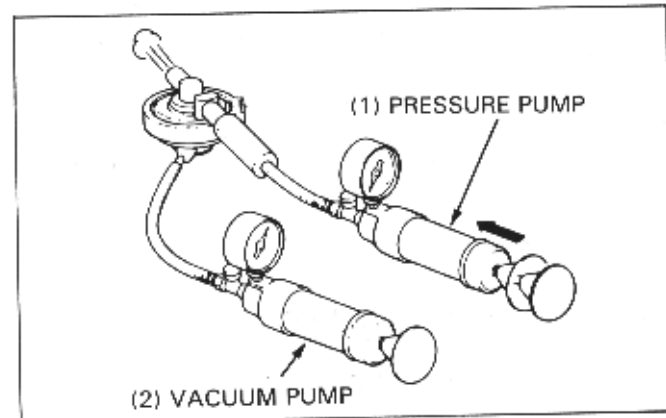
**CAUTION**

- To prevent damage to the purge control valve, do not use high air pressure sorses. Use a hand operated air pump only.

**TOOL:**

Vacuum/Pressure pump  
Vacuum pump  
Pressure pump

A937X-041-XXXXX or  
ST-AH-260-MC7  
ST-AH-255-MC7  
(U.S.A. only)



Remove the pumps, install the PCV its mount, route and re-connect the hoses according to the routing label.

## SECONDARY AIR SUPPLY SYSTEM (California model)

### SYSTEM INSPECTION

Start the engine and warm it up the normal operating temperature.  
Disconnect the secondary air intake hose from the air chamber.

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

Check the secondary air intake hose for clogging, deterioration or damage and replace if necessary.  
Check the reed valve in the air suction valve (ASV) if the intake hose or supply hose is damaged by exhaust gas.  
Connect the vacuum pump to the vacuum tube.

**TOOL:**

Vacuum/Pressure pump  
Vacuum pump

A937-041-XXXXX or  
ST-AH-260-MC7  
(U.S.A. only)

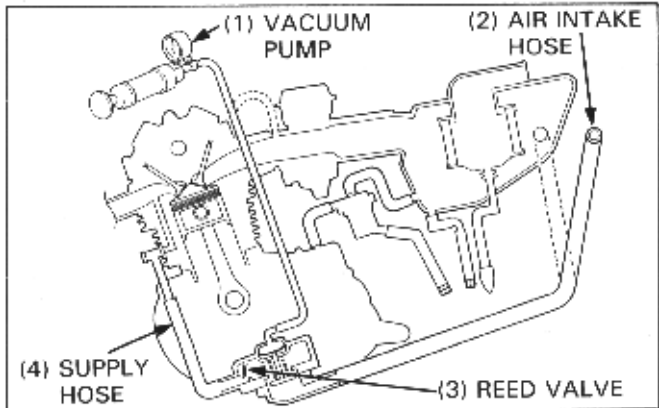
Start the engine and open the throttle slightly to be certain that air is sucked in through the air intake hose.  
If air is not drawn in, check the air supply hose and vacuum tube for clogging.

With the engine running, gradually vacuum to the ASV.  
Check the air intake hose stops drawing air, and that vacuum does not bleed.

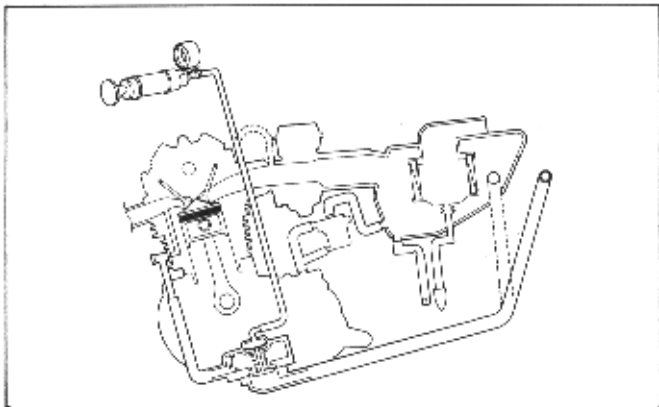
**SPECIFIED VACUUM: 300–360 mm (11.8–14.2 in) Hg**

If air is still drawn in, if the specified vacuum is not maintained, replace the ASV with a new one.  
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut off valve for correct vacuum operation.

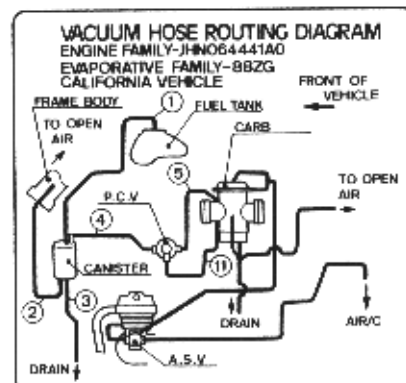
'88:



AFTER '88:



'88: SHOWN, AFTER '88: Similar



## FUEL SYSTEM

### REED VALVE INSPECTION

Disconnect the air supply hoses from the reed valve cover of the ASV.

Disconnect the vacuum tube and air intake hose from the ASV and remove the ASV mounting bolts and ASV.

Check the reed valve for damage or wear, and replace if necessary.

Replace the reed valve with a new one if the seat rubber is cracked or damaged, or if there is any clearance between the seat rubber and valve.

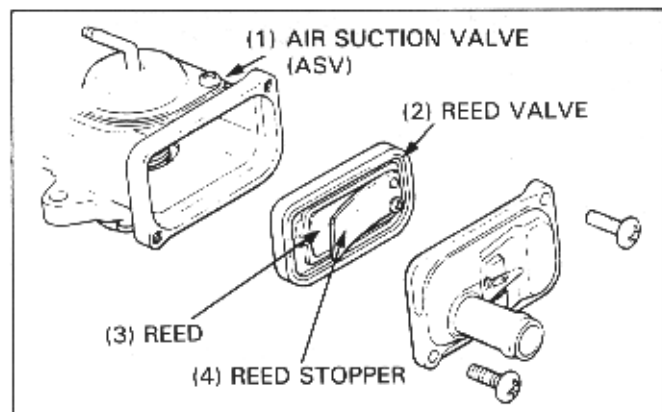
#### CAUTION

- Do not disassemble the reed valve assembly or bend the reed stopper.
- If the stopper, reed or seat is faulty, replace the reed valve as an assembly.

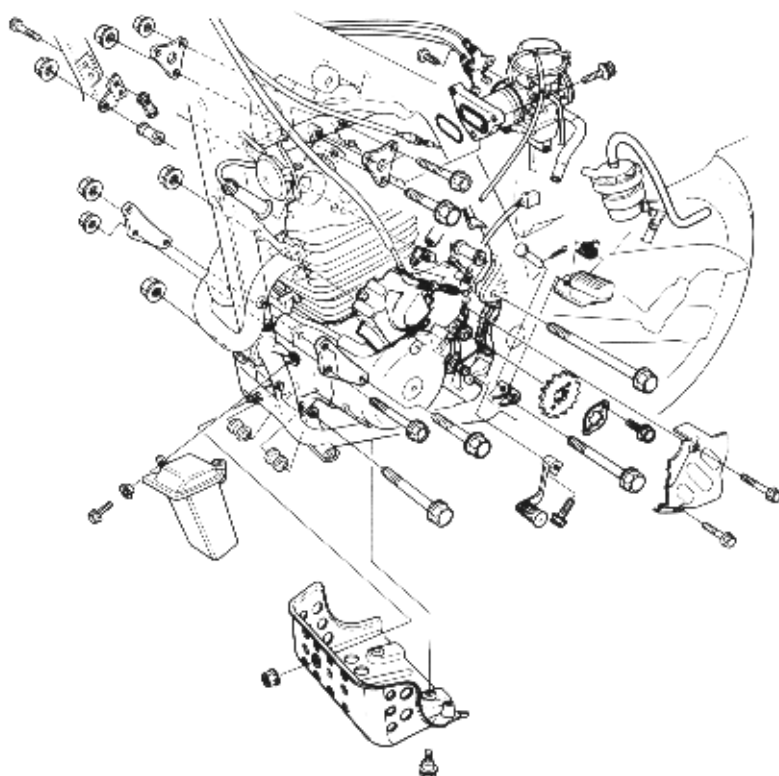
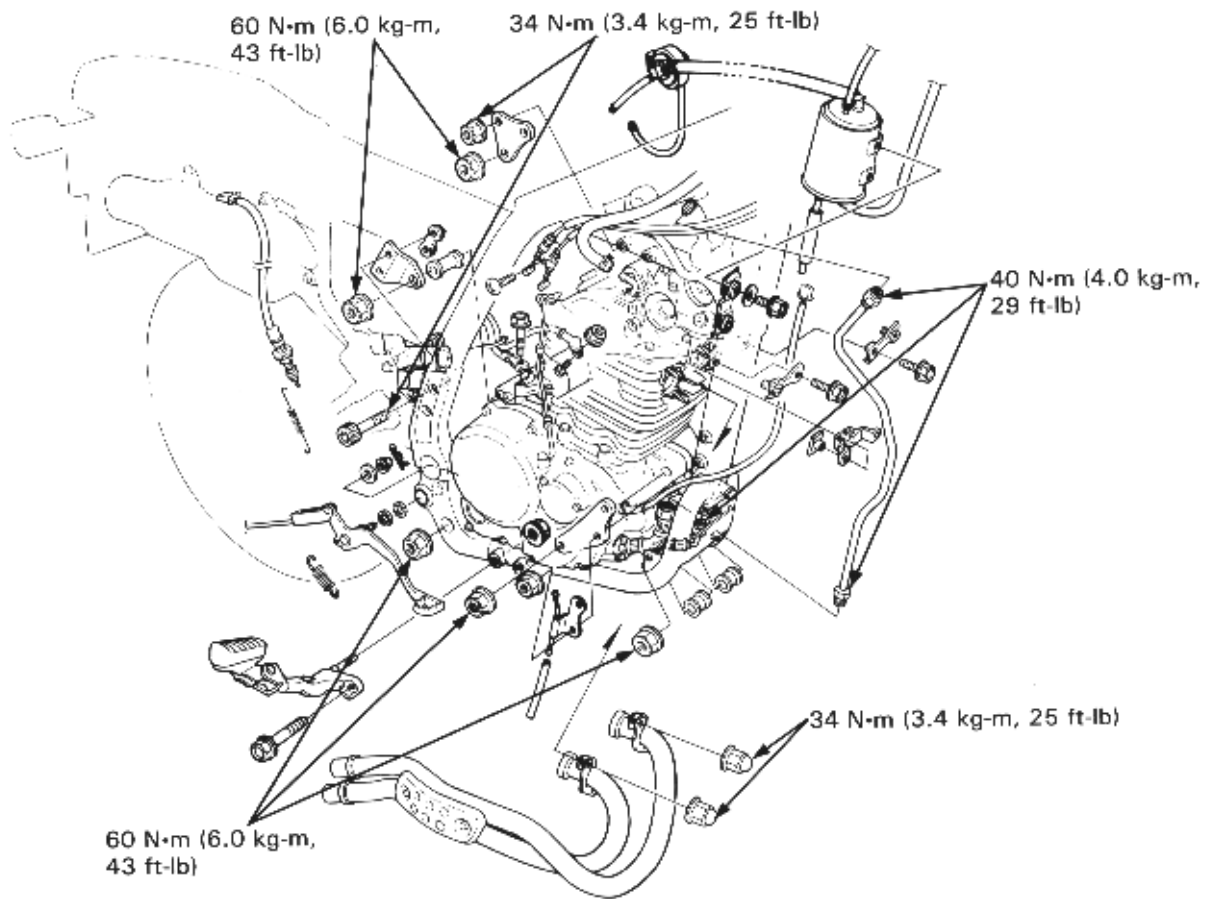
Assemble and install the ASV in the reverse order of disassembly/removal.

#### NOTE

- After installing, make sure the air and vacuum tubes are correctly connected (page 1-11 and 1-14).



# ENGINE REMOVAL/INSTALLATION





# 5. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION  
ENGINE REMOVAL

5-1 ENGINE INSTALLATION  
5-2

5-3

## SEVICE INFORMATION

### GENERAL

- During removal and installation, support the vehicle with suitable blocks.
- Parts requiring engine removal for servicing:

Crankshaft	Section 10
Crankcase	Section 10
Balancer	Section 10
Transmission	Section 11

### SPECIFICATIONS

Engine weight	50 kg (110 lb)
Oil capacity	1.9 liters (2.01 US qt, 1.67 Imp qt) at draining
	2.3 liters (2.43 US qt, 2.02 Imp qt) after disassembly

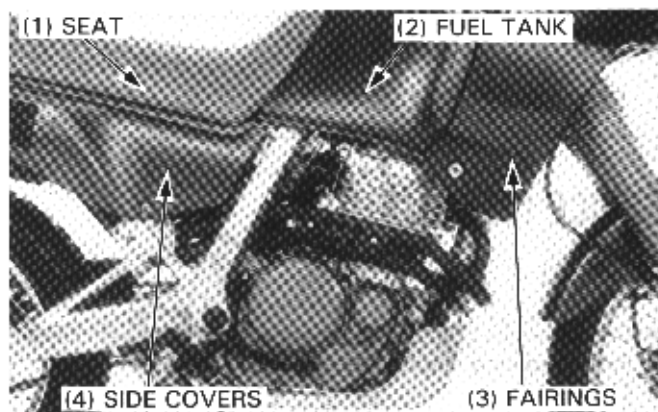
### TORQUE VALUES

Engine hanger nut: 10 mm nut	60 N·m (6.0 kg-m, 43 ft-lb)
: 8 mm nut	34 N·m (3.4 kg-m, 25 ft-lb)
Oil pipe flare nut	40 N·m (4.0 kg-m, 29 ft-lb)
Oil hose flare nut	40 N·m (4.0 kg-m, 29 ft-lb)

## ENGINE REMOVAL

Remove the following:

- seat and side covers (page 15-2)
- fuel tank (page 4-3)
- right and left fairings (page 15-2)

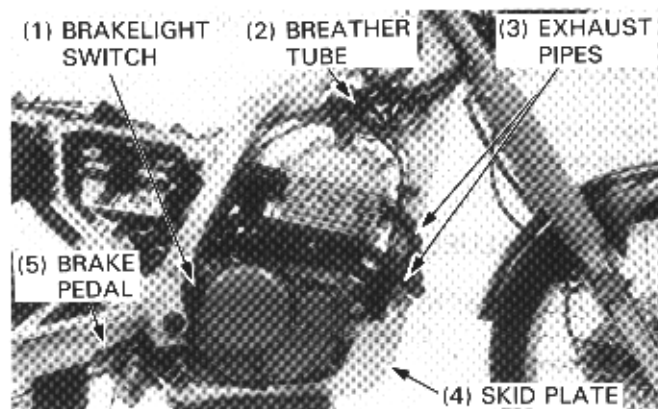


Disconnect the following:

- cylinder head cover breather tube
- alternator connector
- pulse generator connector

Remove the following:

- exhaust pipes (page 15-7)
- brake pedal (page 13-11)
- skid plate
- brakelight switch



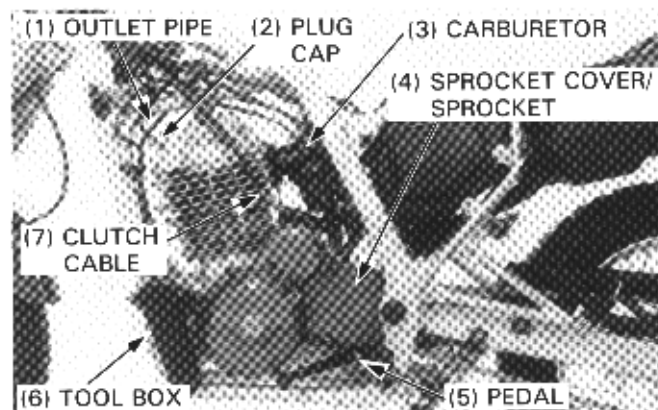
Disconnect the following:

- clutch cable at the clutch lifter arm
- spark plug cap
- starter motor cable

Loosen the drive chain adjuster fully (page 3-8).

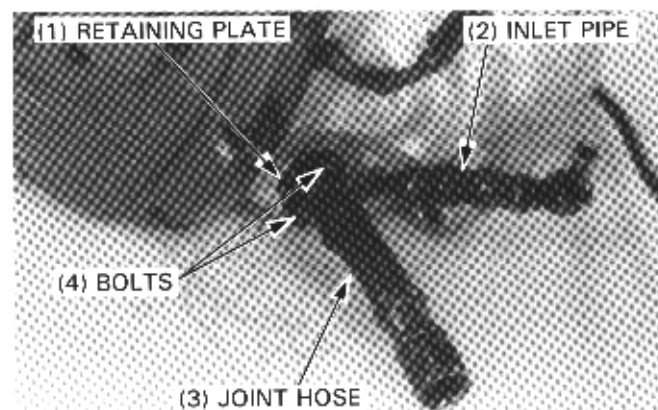
Remove the following:

- carburetor (page 4-7)
- drive sprocket cover and drive sprocket
- gearshift pedal
- tool box
- oil outlet pipe
- oil inlet hose
- engine hanger nuts, bolts and plates



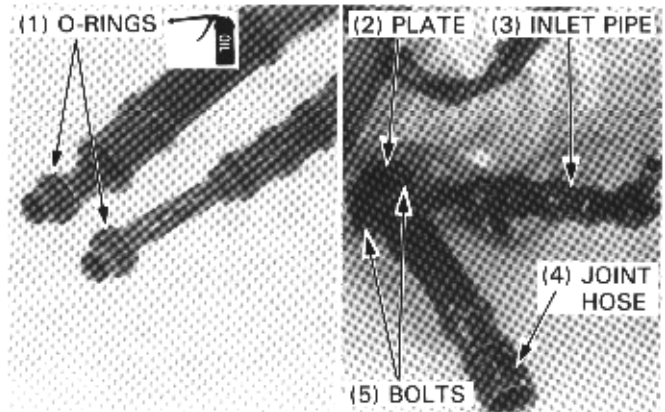
Remove the engine from the right side of the frame.

Remove the retaining plate, oil joint hose and oil inlet pipe.



## ENGINE INSTALLATION

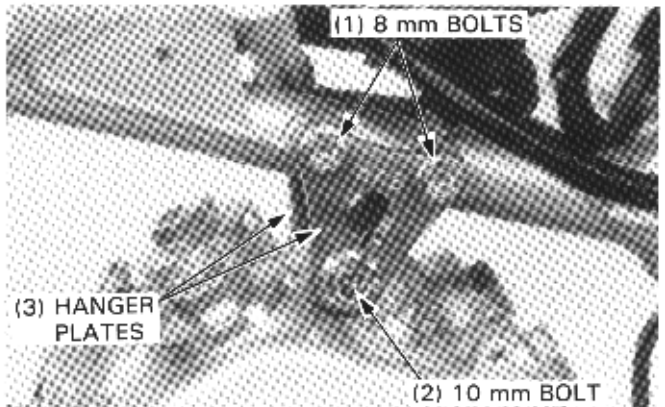
Apply clean engine oil to a new O-rings.  
 With the new O-rings, install the oil joint hose and oil inlet pipe to the engine.  
 Install the retaining plate and secure it with two bolts



Install the engine from the right side of the frame.

Install the top engine hanger plates, and tighten the bolts and nuts.

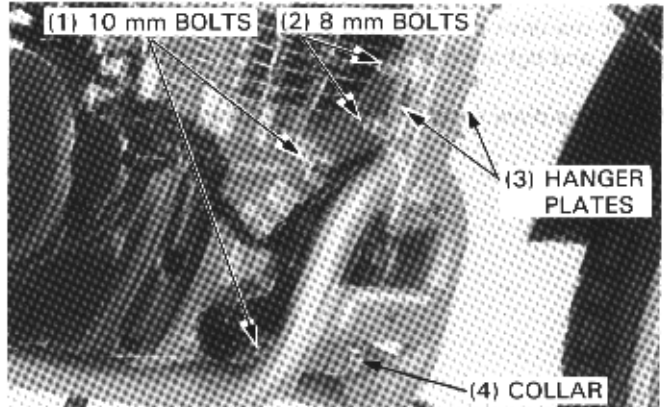
**TORQUE: 10 mm nut: 60 N·m (6.0 kg-m, 43 ft-lb)**  
**8 mm nut: 34 N·m (3.4 kg-m, 25ft-lb)**



Install the front engine hanger plates, and tighten the bolts and nuts.

Install the front lower hanger bolt with the collar and tighten the nut.

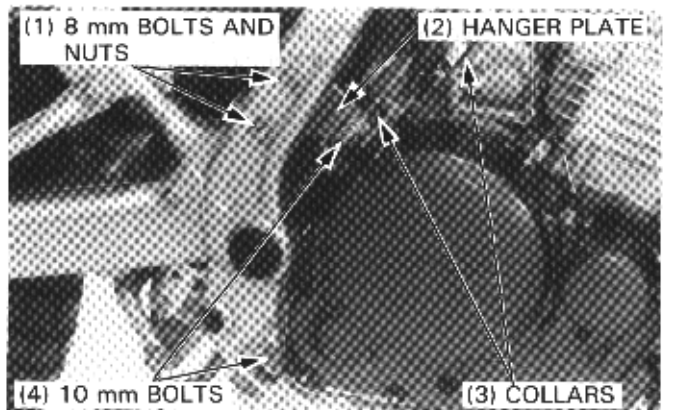
**TORQUE: 10 mm bolt: 60 N·m (6.0 kg-m, 43 ft-lb)**  
**8 mm bolt: 34 N·m (3.4 kg-m, 25 ft-lb)**



Install and tighten the rear lower engine hanger bolt and nut.  
 Install the rear upper engine hanger plate, and tighten the 8 mm bolts and nuts loosely.

Install the collars, 10 mm bolt and nut, then tighten the 8 mm bolts and 10 mm nut.

**TORQUE: 10 mm nut: 60 N·m (6.0 kg-m, 43 ft-lb)**  
**8 mm bolt: 34 N·m (3.4 kg-m, 25 ft-lb)**

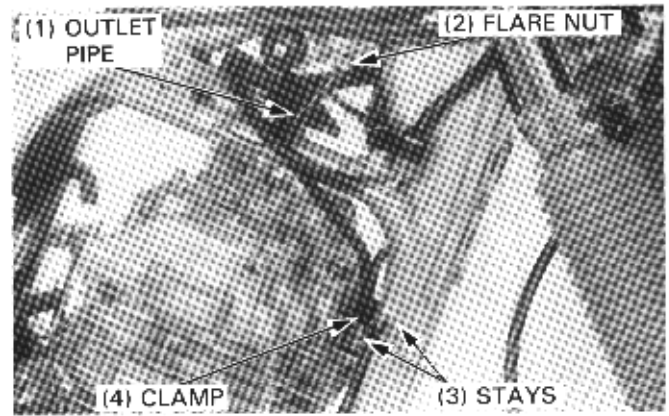


## ENGINE REMOVAL/INSTALLATION

Install the oil outlet pipe, and tighten the oil pipe flare nut.

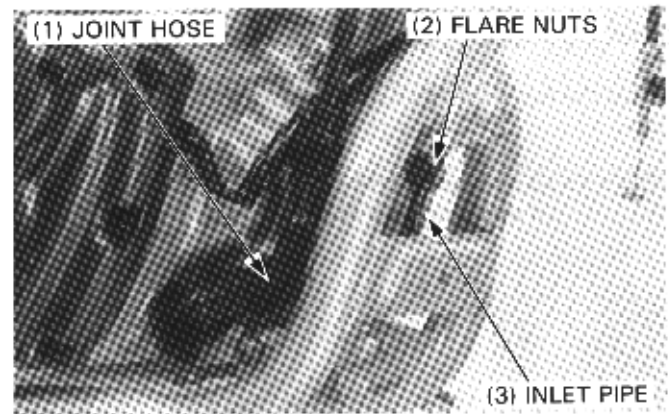
**TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)**

Install the oil pipe/pulse generator wire clamp and fairing stays, and secure them with bolts.



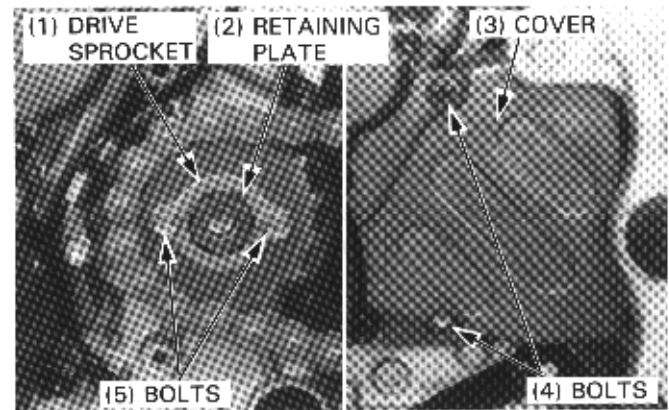
Connect the oil outlet pipe and joint hose, and the oil inlet pipe to the oil strainer nut. Tighten the flare nuts.

**TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)**

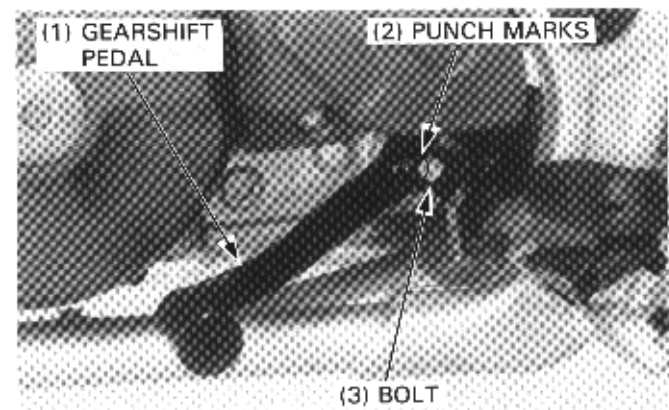


Install the drive sprocket and retaining plate over the counter shaft, and tighten the bolts.

Install the drive sprocket cover and secure it with two bolts.



Install the gearshift pedal aligning the punch marks on the pedal and gearshift spindle, and tighten the bolt.



Install the tool box, aligning the boss on the bottom of the tool box with the gromet. Secure with a bolt.

Install the skid plate and secure it with three bolts.

Install the following parts in the reverse order of removal.

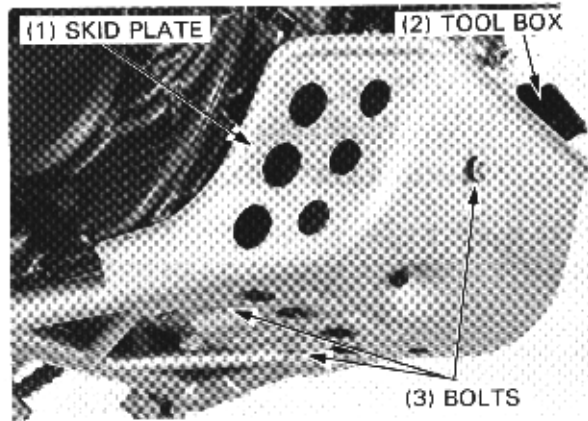
- Starter motor cable
- Spark plug cap
- Clutch cable
- Brakelight switch
- Brake pedal (page 13-11)
- Exhaust pipe (page 15-7)
- Pulse generator connector
- Alternator connector
- Cylinder head cover breather tube
- Fuel tank (page 4-3)
- Right and left fairings (page 15-2)
- Seat and side covers (page 15-2)

Adjust the followings:

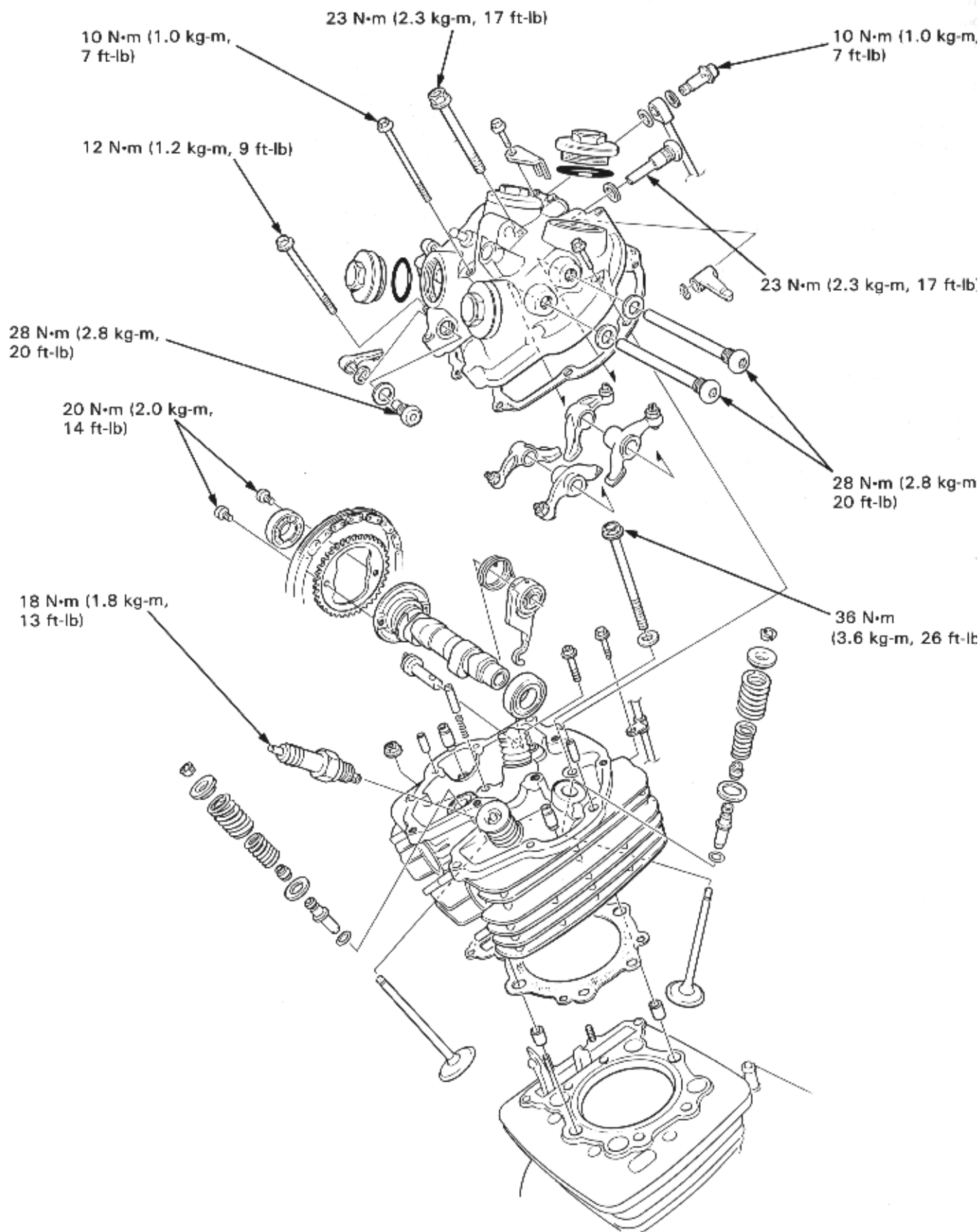
- Drive chain (page 3-8)
- Brake pedal (page 3-10)
- Brakelight switch (page 3-11)
- Clutch lever free play (page 3-11)

Start the engine and check the following:

- Exhaust pipes for leakage
- Oil pipes/hoses for leakage



## CYLINDER HEAD/VALVES



# 6. CYLINDER HEAD/VALVES

SERVICE INFORMATION	6-1	VALVE SEAT INSPECTION AND REFACING	6-12
TROUBLESHOOTING	6-2	CYLINDER HEAD ASSEMBLY	6-15
CYLINDER HEAD COVER REMOVAL	6-3	CYLINDER HEAD INSTALLATION	6-16
CYLINDER HEAD COVER DISASSEMBLY	6-4	CAMSHAFT INSTALLATION	6-17
CAMSHAFT REMOVAL	6-5	CYLINDER HEAD COVER ASSEMBLY	6-18
CYLINDER HEAD REMOVAL	6-9	CYLINDER HEAD COVER INSTALLATION	6-19
CAM CHAIN TENSIONER REMOVAL	6-9		
CYLINDER HEAD DISASSEMBLY	6-10		

6

## SERVICE INFORMATION

### GENERAL

- This section covers maintenance of the cylinder head, valves, camshaft, rocker arms and sub-rocker arms. These procedures can be performed with the engine in the frame.
- Coat the camshaft bearings with clean engine oil to provide initial lubrication.
- Pour clean engine oil into the oil pockets in the cylinder head to lubricate the cam.
- Before assembly, apply molybdenum disulfide grease to camshaft journals to provide initial lubrication.

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			10.5–12.5 kg/cm <sup>2</sup> (149.31–177.75 psi)	—
Camshaft Cam lobe height	'88:	IN	31.155–31.315 mm (1.2266–1.2329 in)	31.05 mm (1.222 in)
		EX	31.091–31.251 mm (1.2241–1.2304 in)	31.00 mm (1.220 in)
	AFTER '88:	IN	31.101–31.341 mm (1.2244–1.2339 in)	30.48 mm (1.200 in)
		EX	31.072–31.312 mm (1.2233–1.2328 in)	30.45 mm (1.199 in)
	Run out		—	0.04 mm (0.002 in)
Rocker arm I.D.			11.500–11.518 mm (0.4528–0.4535 in)	11.55 mm (0.455 in)
Sub-rocker arm I.D.	IN		8.000–8.015 mm (0.3150–0.3156 in)	8.05 mm (0.317 in)
	EX		7.000–7.015 mm (0.2756–0.2762 in)	7.05 mm (0.278 in)
Rocker arm shaft O.D.			11.466–11.484 mm (0.4514–0.4521 in)	11.41 mm (0.449 in)
Sub-rocker arm shaft O.D.	IN		7.969–7.972 mm (0.3137–0.3138 in)	7.92 mm (0.312 in)
	EX		6.969–6.972 mm (0.2744–0.2745 in)	6.92 mm (0.272 in)
Rocker arm shaft-to-arm clearance			0.016–0.052 mm (0.0006–0.0020 in)	0.14 mm (0.006 in)
Sub-rocker arm shaft-to-arm clearance			0.013–0.043 mm (0.0005–0.0017 in)	0.10 mm (0.004 in)
Valve spring	Free length	Inner	35.1 mm (1.38 in)	34.1 mm (1.34 in)
		Outer	36 mm (1.42 in)	35.0 mm (1.38 in)
	Preload/length	Inner	6.14 ± 0.4 kg/28 mm (13.536 ± 0.88 lb/1.1 in)	—
		Outer	11.8 ± 1.0 kg/31.5 mm (26.01 ± 2.20 lb/1.240 in)	—
Valve	Stem O.D.	IN	6.575–6.590 mm (0.2589–0.2594 in)	6.56 mm (0.258 in)
		EX	6.565–6.575 mm (0.2585–0.2589 in)	6.55 mm (0.258 in)
	Guide I.D.	IN	6.600–6.615 mm (0.2598–0.2604 in)	6.63 mm (0.261 in)
		EX	6.600–6.615 mm (0.2598–0.2604 in)	6.63 mm (0.261 in)
	Stem-to-guide Clearance	IN	0.010–0.040 mm (0.0004–0.0016 in)	0.060 mm (0.0024 in)
		EX	0.030–0.055 mm (0.0012–0.0022 in)	0.080 mm (0.0031 in)
	Valve face width	IN	1.20–1.85 mm (0.047–0.073 in)	2.6 mm (0.10 in)
		EX	0.9–1.7 mm (0.04–0.67 in)	2.4 mm (0.09 in)
Cylinder head	Warpage		—	0.10 mm (0.004 in)
	Valve seat width	IN/EX	1.2–1.4 mm (0.05–0.06 in)	2.0 mm (0.08 in)

## CYLINDER HEAD/VALVES

---

### TORQUE VALUES

Cylinder head bolt	30 N·m (3.6 kg-m, 22 ft-lb)	Apply oil to the threads
Cam sprocket bolt	20 N·m (2.0 kg-m, 14 ft-lb)	
Rocker arm shaft	28 N·m (2.8 kg-m, 20 ft-lb)	Apply a locking agent to the threads
Sub-rocker arm shaft (IN)	28 N·m (2.8 kg-m, 20 ft-lb)	
(EX)	23 N·m (2.3 kg-m, 17 ft-lb)	
Cylinder head cover bolt (8 mm)	23 N·m (2.3 kg-m, 17 ft-lb)	
(6 mm)	12 N·m (1.2 kg-m, 9 ft-lb)	
(6 mm SH)	10 N·m (1.0 kg-m, 7 ft-lb)	
Spark plug	18 N·m (1.8 kg-m, 13 ft-lb)	
Engine hanger plate nut (8 mm)	34 N·m (3.4 kg-m, 25 ft-lb)	
(10 mm)	60 N·m (6.0 kg-m, 43 ft-lb)	
Oil pipe bolt	10 N·m (1.0 kg-m, 7 ft-lb)	

### TOOLS

#### Special

Cam chain tensioner holder	07973—MG30002 or 07973—MG30003
Valve guide reamer	07984—5510000 or 07984—657010C (U.S.A. only)

#### Common

Valve spring compressor	07757—0010000
Valve guide remover, 6.6 mm	07742—0010200 or 07984—6570100

## TROUBLESHOOTING

Engine top-end problems are usually performance-related and can usually be diagnosed by a compression test. Engine noises can usually be traced to the top-end with a sounding rod or stethoscope.

#### Low Compression

- Valve
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
- Cylinder head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Cylinder and piston (Refer to Section 7)
- Faulty decompressor cam

#### High compression

- Excessive carbon build-up on piston head or combustion chamber
- Decompressor does not operate or is damaged

#### Excessive Noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn rocker arm or camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Faulty cam chain tensioner

#### Poor idling

- Compression too low
- Faulty decompressor cam



## CYLINDER HEAD COVER REMOVAL

Remove the following components:

- Fuel tank (page 4-3)
- Carburetor and carburetor insulator (page 4-7 and 8)
- Oil pipe bolts, sealing washers and oil pipe
- Cylinder head cover breather tube
- Spark plug cap

- Clutch cable clamp
- Engine hanger plates
- tapet hole caps

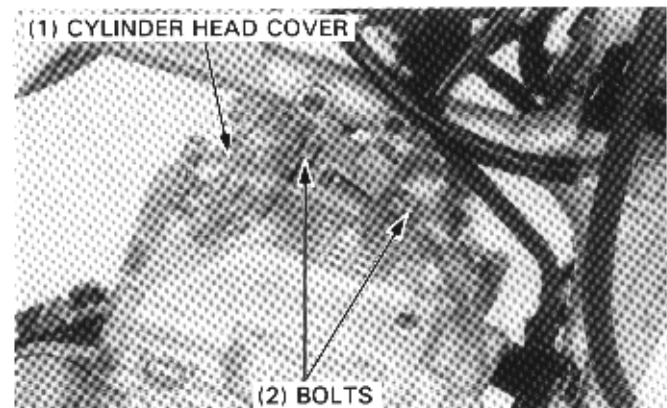
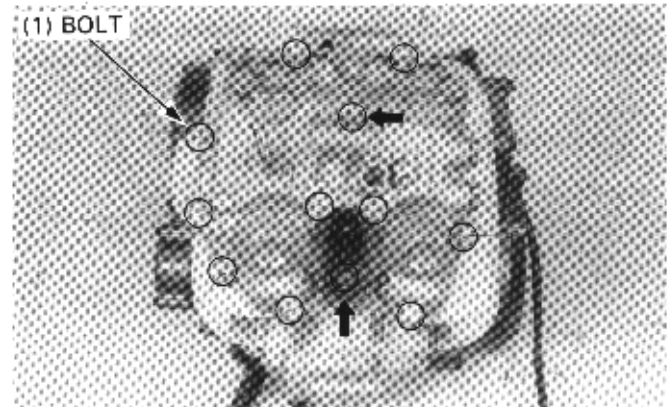
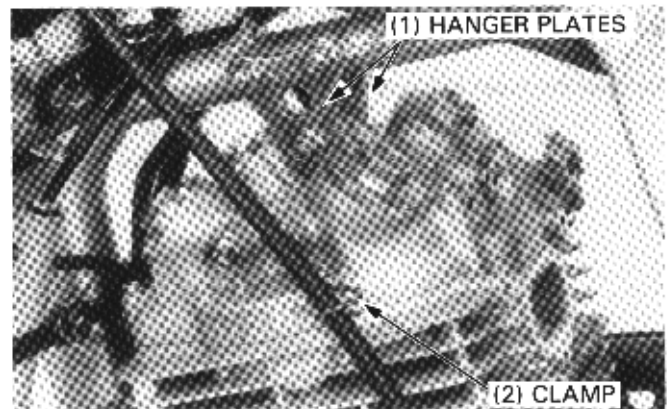
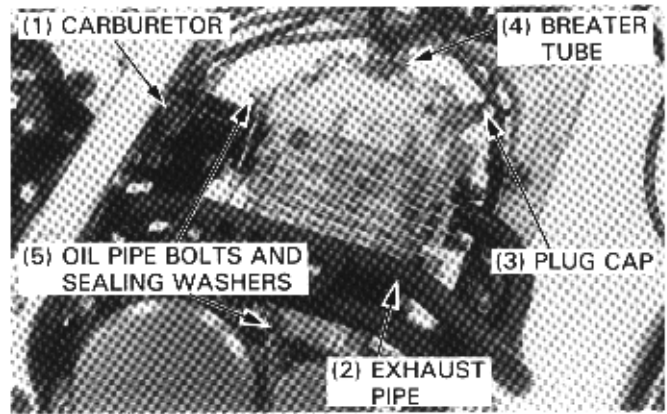
Remove the crankshaft hole cap and timing hole cap. Turn the crankshaft and align the "T" mark on the flywheel with the index notch on the left crankcase cover when on the compression stroke (page 3-6).

Remove the cylinder head cover bolts.

### NOTE

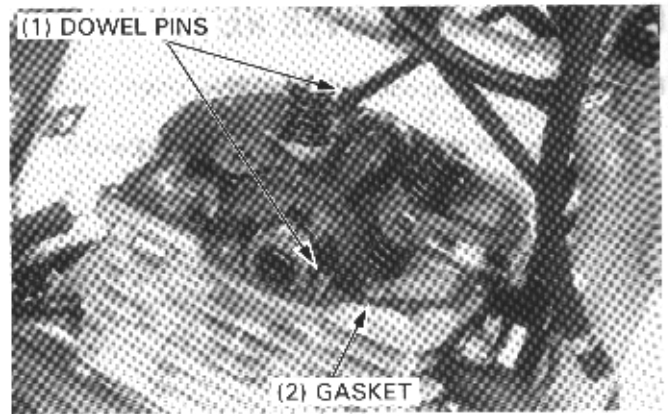
- Loosen the bolts indicated by the arrows. Remove these bolts after removing the cylinder head cover.

Slide the cylinder head cover to the intake side and remove it. Remove the bolts from the cylinder head cover.



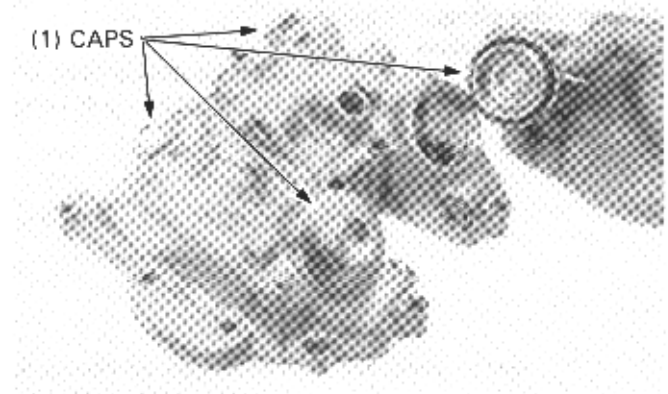
## CYLINDER HEAD/VALVES

Remove the dowel pins and head cover gasket.

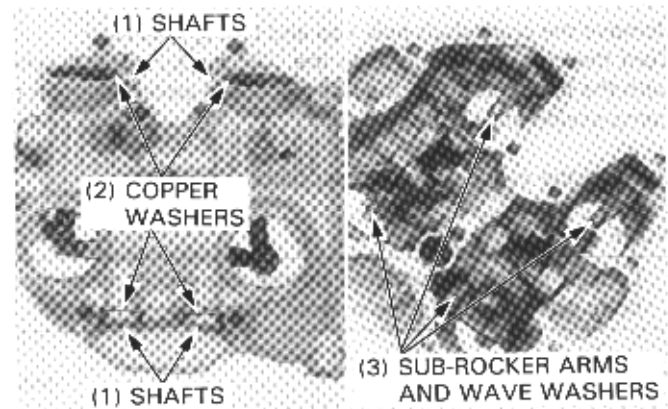


## CYLINDER HEAD COVER DISASSEMBLY

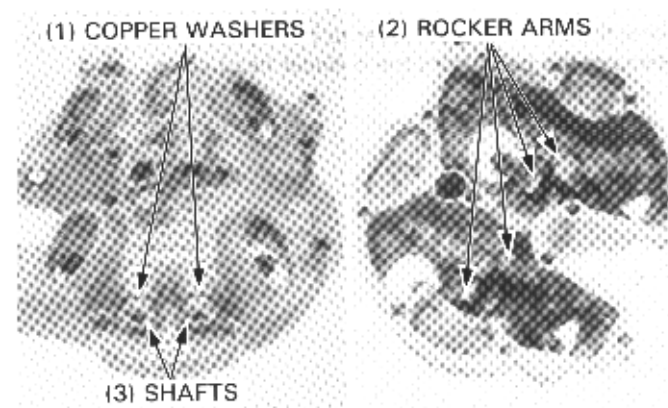
Remove the tapet hole caps from the cylinder head cover.



Remove the sub-rocker arm shafts, sealing washers, wave washers and sub-rocker arms from the cylinder head cover.

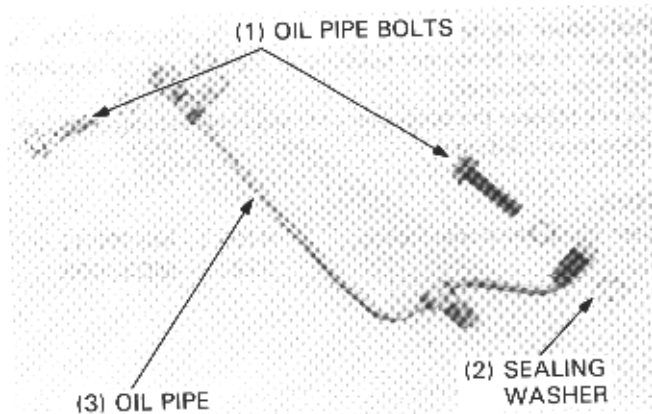


Remove the rocker arm shafts, copper washers and rocker arms from the cylinder head cover.



**OIL PIPE INSPECTION**

Check the oil pipe and oil pipe bolts for bends or clogging.  
Check the condition of the sealing washers.

**ROCKER ARM INSPECTION**

Inspect the rocker arms and sub-rocker arms for wear or damage.

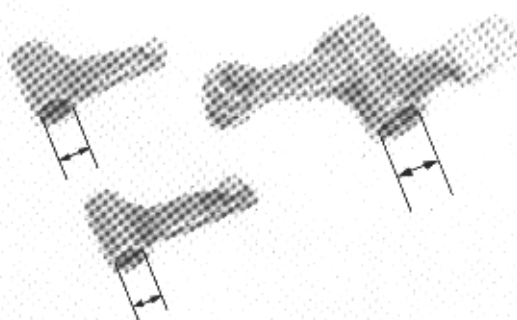
**NOTE**

- If any rocker arms require servicing or replacement, inspect the cam lobes for scoring, chipping or flat spots.

Measure the I.D. of the rocker arms and sub-rocker arms.

**SERVICE LIMITS:**

Rocker arm: 11.55 mm (0.455 in)  
Sub-rocker arm: IN: 8.05 mm (0.317 in)  
EX: 7.05 mm (0.277 in)

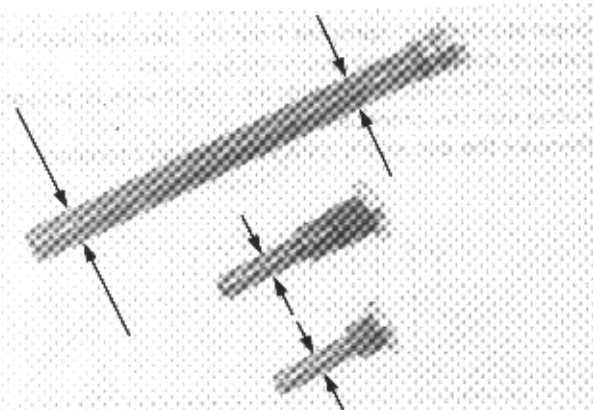
**ROCKER ARM SHAFT INSPECTION**

Inspect the rocker arm and sub-rocker arm shafts for wear or damage.

Measure each shaft O.D.

**SERVICE LIMITS:**

Rocker arm shaft: 11.41 mm (0.449 in)  
Sub-rocker arm shaft: IN: 7.92 mm (0.312 in)  
EX: 6.92 mm (0.272 in)



Calculate the rocker arm-to-shaft clearance.

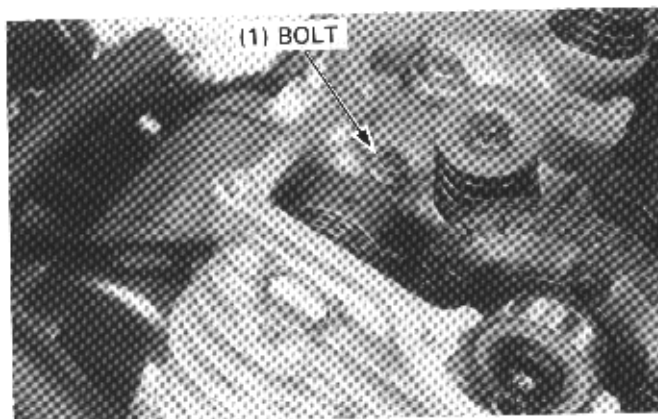
**SERVICE LIMIT: 0.14 mm (0.006 in)**

Calculate the sub-rocker arm-to-shaft clearance.

**SERVICE LIMIT: 0.08 mm (0.003 in)**

**CAMSHAFT REMOVAL**

Remove the cam chain tensioner shaft bolt.



## CYLINDER HEAD/VALVES

Push down the tensioner lever using a screwdriver and insert the pin of the tensioner holder into the hole of the tensioner to hold the tensioner.  
Slowly release the tensioner until the tool rests against the cylinder head casting.

### TOOL:

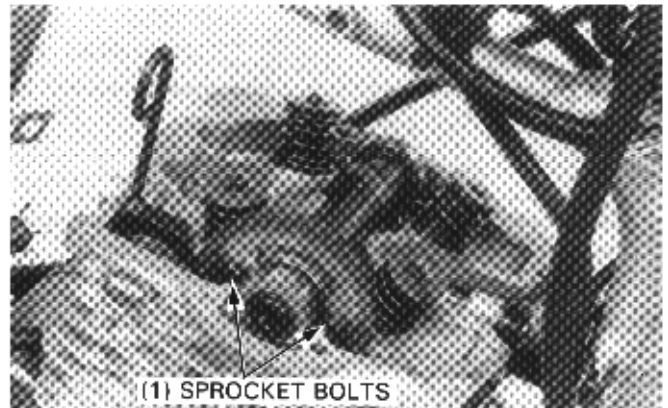
Cam chain tensioner holder      07973-MG30002 or  
07973-MG30003



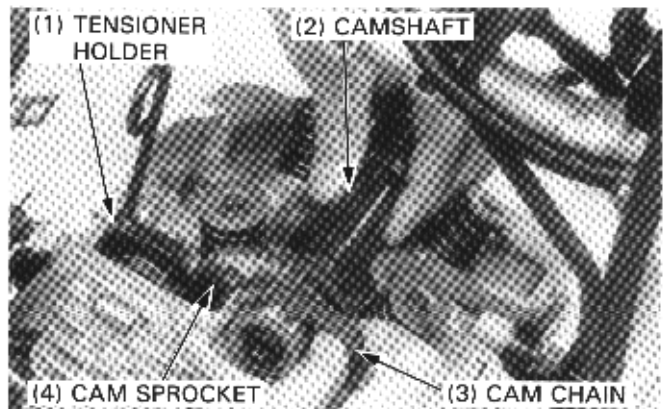
Turn the crankshaft and remove the cam sprocket bolts.

### CAUTION

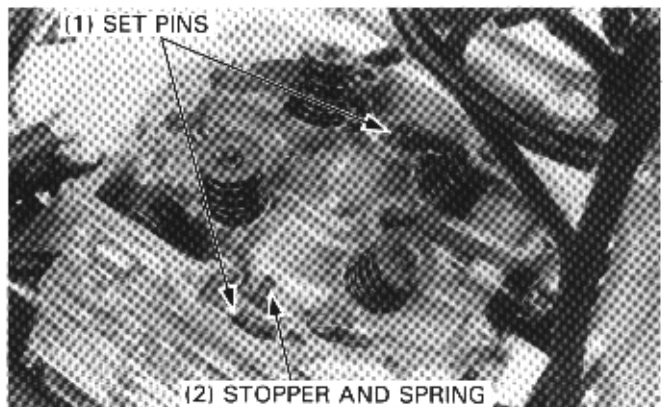
- *Be careful not drop the bolts into the crankcase.*



Separate the cam sprocket from the cam sprocket holder and remove the cam chain from the sprocket.  
Suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.  
Remove the camshaft, cam sprocket and tensioner holder.



Remove the camshaft bearing set pins, reverse decompressor cam stopper and spring.



**CAMSHAFT BEARING INSPECTION**

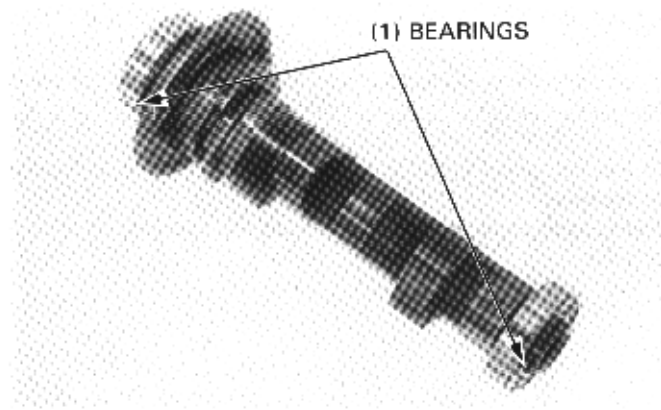
Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the camshaft.

If the outer races do not turn smoothly and quietly or inner races fit loosely on the camshaft, replace the bearings.

**NOTE**

- Always replace the camshaft bearings in pairs.

Remove the bearings from the camshaft.



**CAMSHAFT INSPECTION**

Check each cam lobe for wear or damage. Measure each cam lobe height.

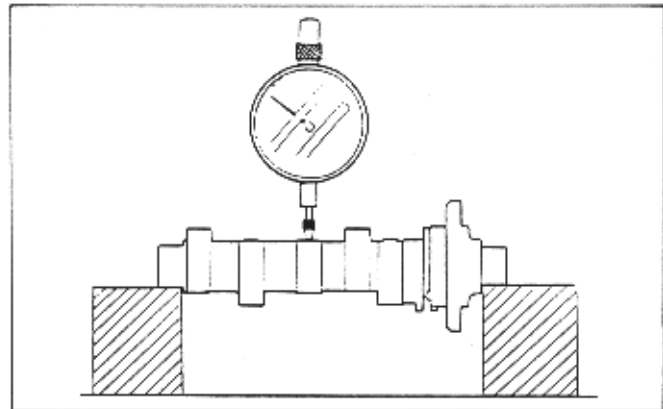
**SERVICE LIMITS:**

- Intake: 31.05 mm (1.222 in)
- Exhaust: 31.00 mm (1.220 in)



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

**SERVICE LIMIT: 0.04 mm (0.002 in)**

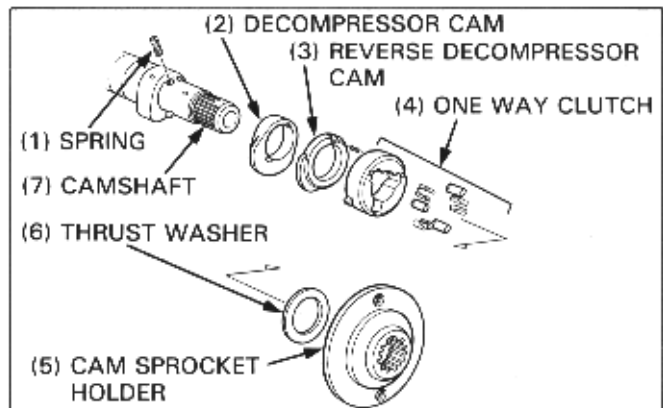


**DECOMPRESSOR SYSTEM DISASSEMBLY**

Press the cam sprocket holder off the camshaft. Remove the thrust washer, one way clutch, reverse decompressor cam and decompressor cam with spring.

**NOTE**

- Do not confuse the cam spring with the clutch spring.



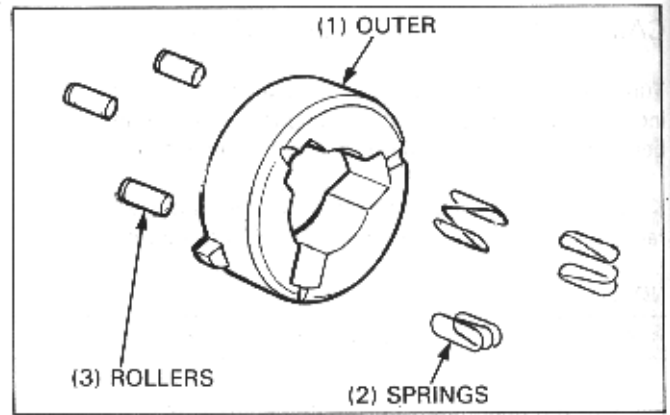
## CYLINDER HEAD/VALVES

### INSPECTION

Check the one way clutch outer, rollers and springs for wear or damage.

Check both decompressor cams for wear or damage, replace if necessary.

Inspect the cams' sliding surface on the camshaft for scoring or wear.

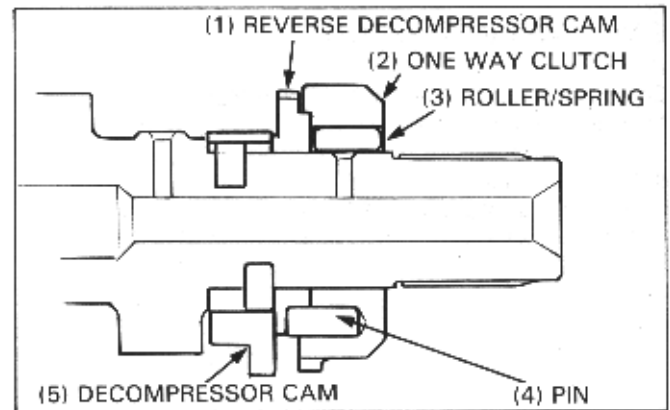


### DECOMPRESSOR SYSTEM ASSEMBLY

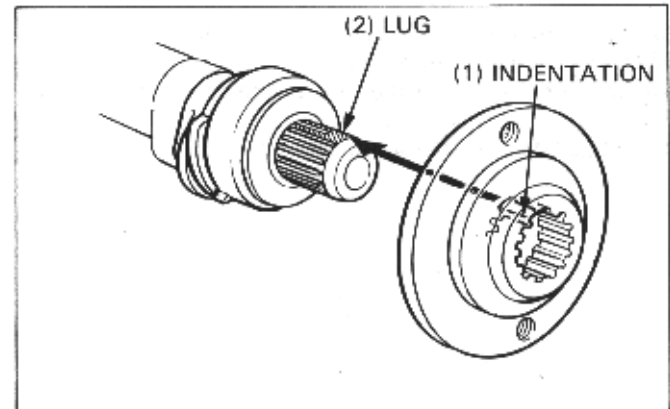
Lubricate both decompressor cams, one way clutch and the thrust washer with oil, then install the decompressor cam with its spring, onto the camshaft.

Install the reverse decompressor cam and the one way clutch with a pin.

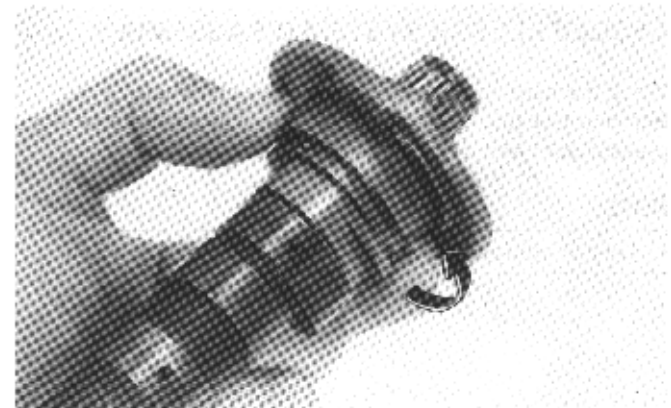
Install the the thrust washer.



Press the cam sprocket holder onto the camshaft after aligning the lug on the camshaft with the indentation on the cam sprocket holder.



Be sure that the one way clutch outer rotates in one direction only.



## CYLINDER HEAD REMOVAL

Remove the following components:

- Exhaust pipes (page 15-7)
- Cylinder head cover (page 6-3)
- Camshaft (page 6-5)
- Cylinder head nuts
- Cylinder head bolts

### NOTE

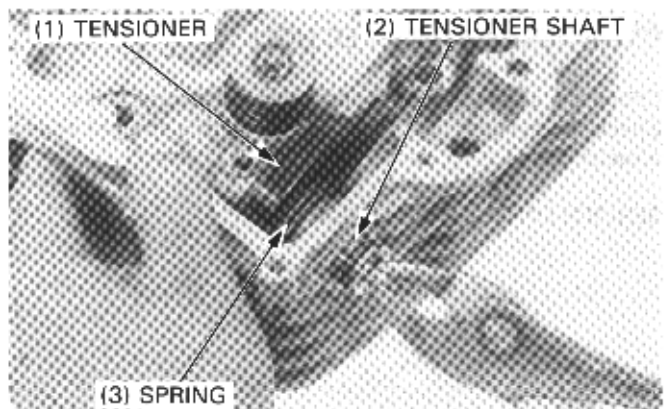
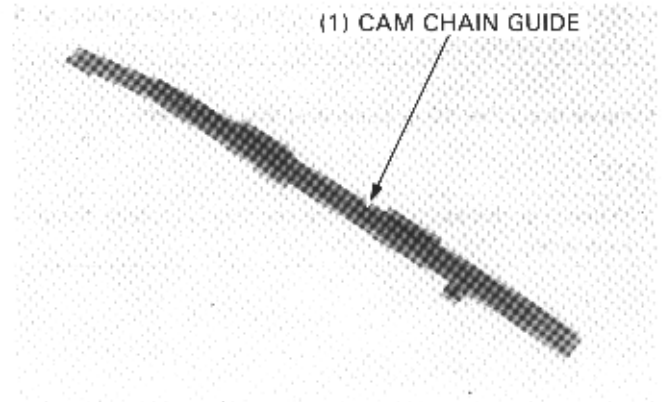
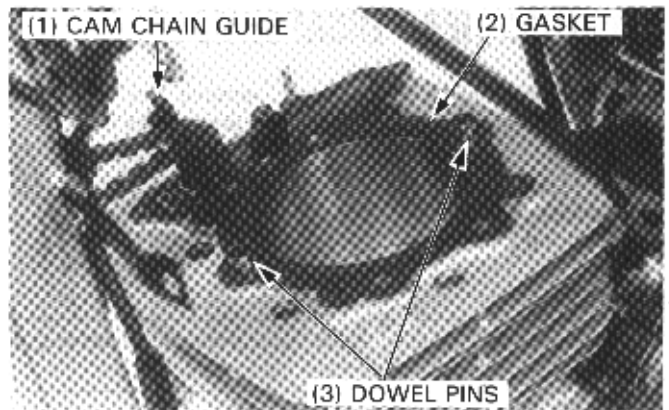
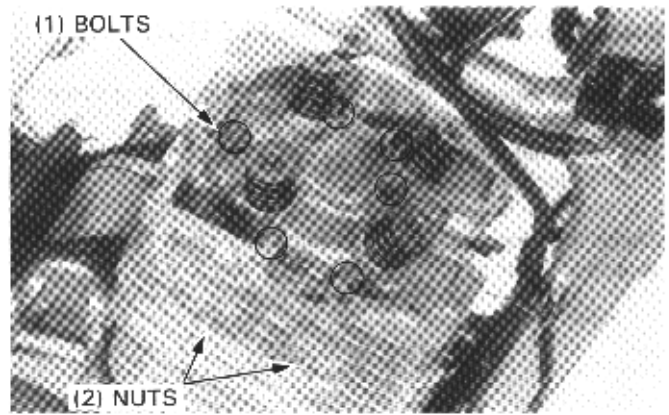
- Loosen the bolts in a crisscross pattern in two or more steps.

Remove the cylinder head.

### CAUTION

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

Remove the dowel pins, cylinder head gasket and cam chain guide.



Inspect the cam chain guide for wear or damage. Replace the guide with a new one, if necessary.

## CAM CHAIN TENSIONER REMOVAL

Remove the tensioner shaft.  
Remove the cam chain tensioner and spring.

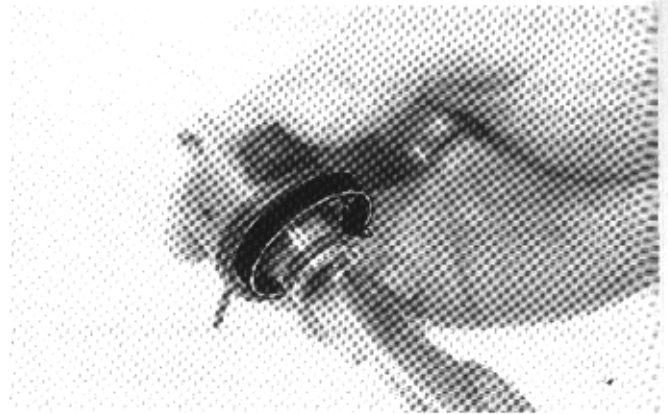
## CYLINDER HEAD/VALVES

### CAM CHAIN TENSIONER INSPECTION

Insert the tensioner shaft into the tensioner and inspect the tensioner by turning the shaft.

The tensioner shaft turns clockwise freely and should not turn counterclockwise.

Check the tensioner lifter and tensioner shaft for excessive or abnormal wear or damage.



### CYLINDER HEAD DISASSEMBLY

Using a valve spring compressor, remove the valve spring cotters, retainers, springs, spring seats and valves from the cylinder head.

#### TOOL:

Valve spring compressor                    07757-0010000

#### CAUTION

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

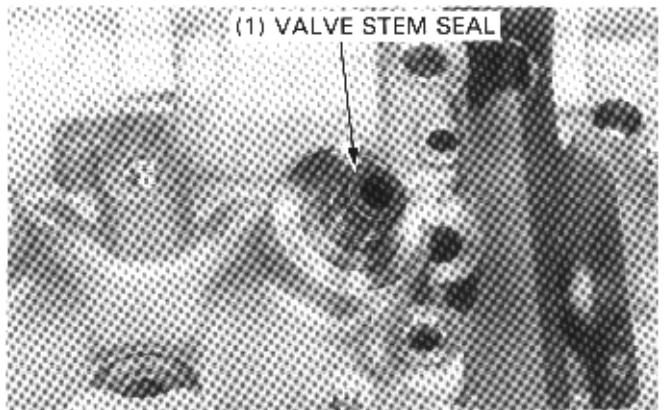
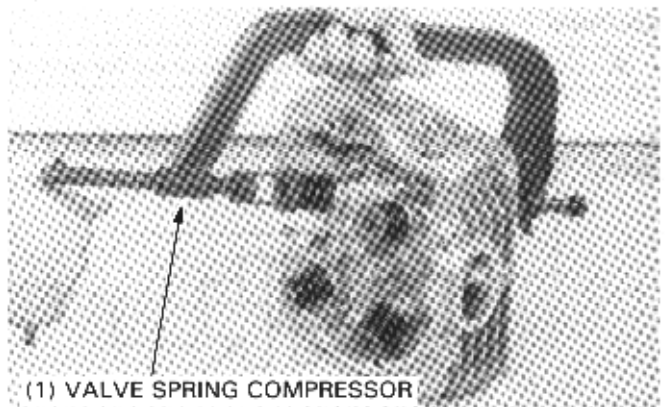
#### NOTE

- Mark all parts to ensure that they are reassembled in their original positions.

Remove the valve stem seals and discard them.

#### NOTE

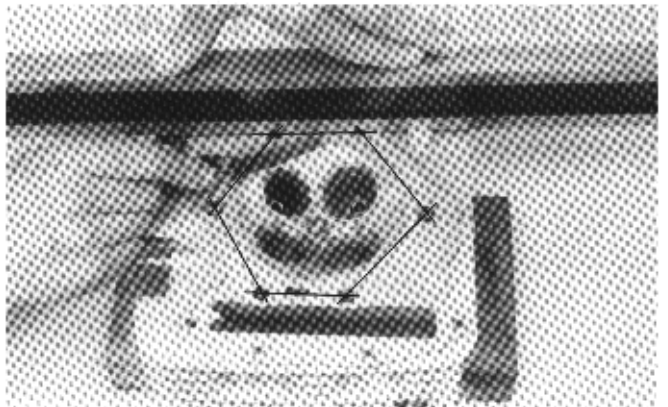
- Whenever the stem seals are removed, replace them with new ones.



### CYLINDER HEAD INSPECTION

Check the spark plug hole and valve areas for cracks. Check the cylinder head for warpage with a straight edge and a feeler gauge.

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





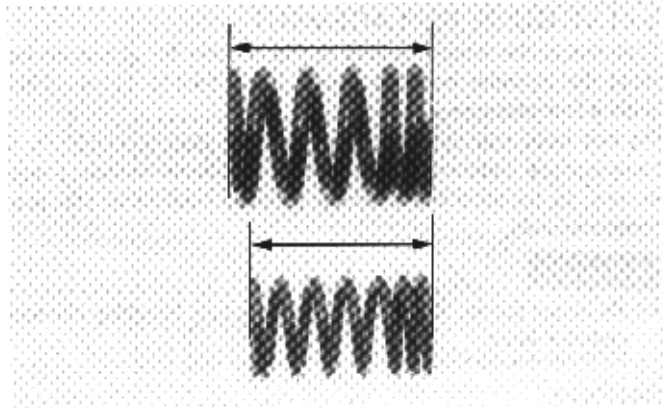
## VALVE SPRING INSPECTION

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

## SERVICE LIMITS:

INNER: 34.1 mm (1.34 in)

OUTER: 35.0 mm (1.38 in)

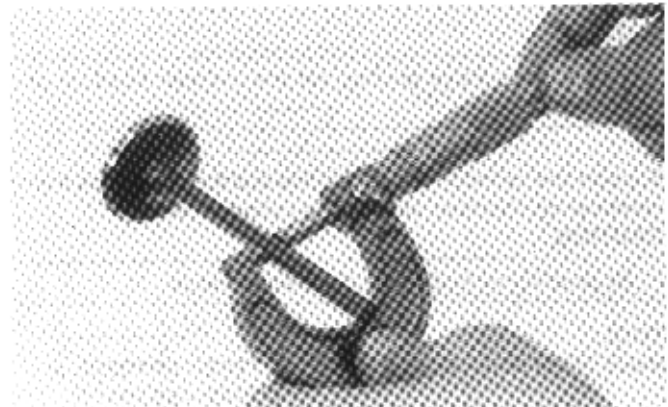


Inspect each valve for bending, burning, scratches or abnormal stem wear.

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

SERVICE LIMITS: IN: 6.56 mm (0.258 in)

EX: 6.55 mm (0.258 in)



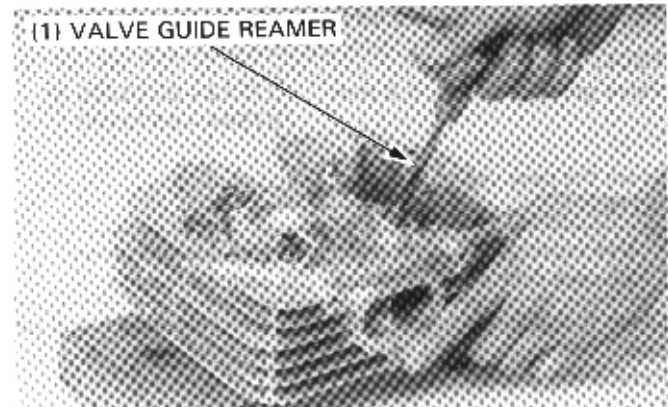
Ream the valve guides to remove any carbon deposits before checking clearances.

## NOTE

- It is important that the reamer is always rotated in the same direction when it is inserted or removed.

## TOOL:

Valve guide reamer: 07984-5510000 or  
07984-657010C  
(U.S.A. only)



Measure and record each valve guide I.D.

SERVICE LIMITS: IN: 6.63 mm (0.261 in)

EX: 6.63 mm (0.261 in)

Calculate the valve stem-to-guide clearance.

SERVICE LIMITS: IN: 0.065 mm (0.0026 in)

EX: 0.080 mm (0.0031 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 guides as necessary and ream to fit.

If stem-to-guide clearance still exceeds the service limit when new guides are installed, replace the valves.



## NOTE

- Reface valve seats whenever new valve guides are installed.

## CYLINDER HEAD/VALVES

### VALVE GUIDE REPLACEMENT

Chill the replacement guides in the freezer for about an hour. Heat the cylinder head to about 130–140°C (275–290°F) with a hot plate or an oven.

Do not heat the cylinder head beyond 300°F (150°C). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

#### ⚠ WARNING

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

#### CAUTION

- Do not use a torch to heat the cylinder, it may cause warping.

#### NOTE

- To clear the valve guides, set the cylinder head on proper blocks.

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

#### CAUTION

- Be careful not to damage the cylinder head.

#### TOOL:

Valve guide remover, 6.6 mm    07742–0010200 or  
07942–6570100

Place a new O-ring on the new valve guide.  
Drive in the valve from the rocker arm side.  
Inspect the valve guides for damage.

#### TOOL:

Valve guide remover, 6.6 mm    07742–0010200 or  
07984–6570100

Ream the new valve guides after installation.

#### NOTE

- Use cutting oil on the reamer during this operation.
- Always rotate the reamer in the same direction.

Clean the cylinder head thoroughly to remove any metal particles.

Reface the valve seats (page 6-13).

#### TOOL:

Valve guide reamer, 6.6 mm    07984–5510000 or  
07984–657010C  
(U.S.A. only)

### VALVE SEAT INSPECTION AND REFACING

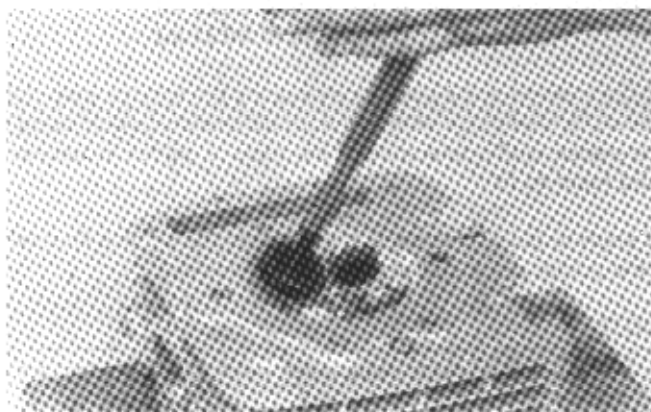
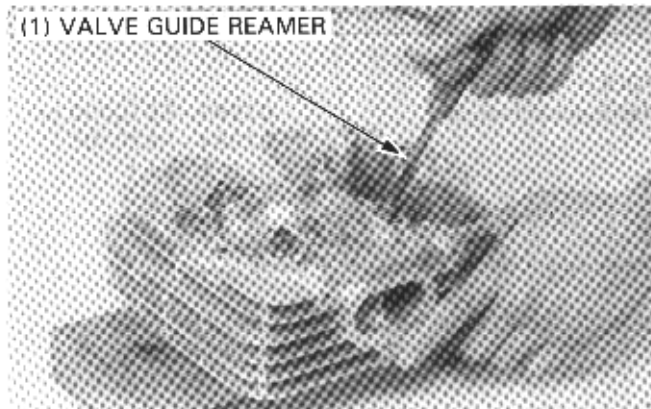
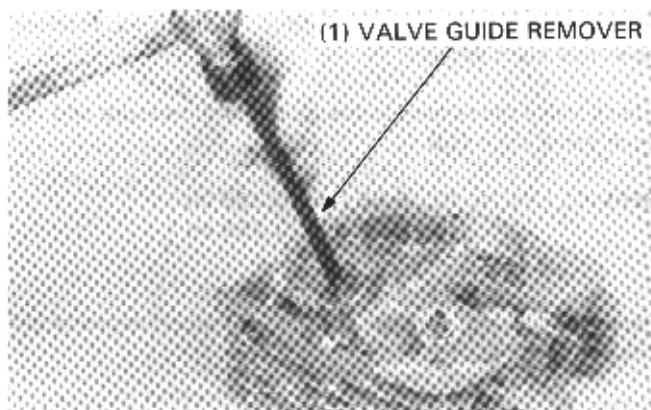
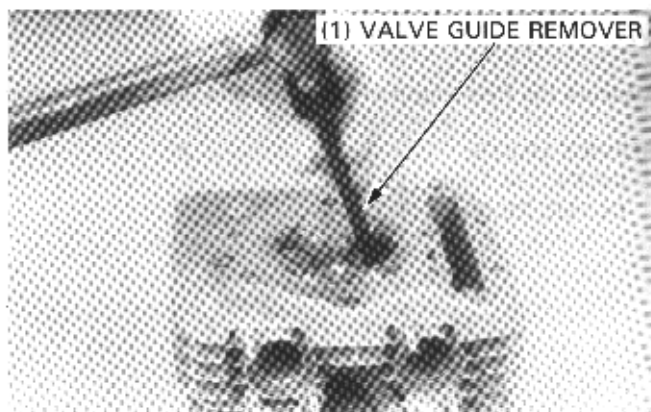
Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

Remove and inspect each valve.

#### CAUTION

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



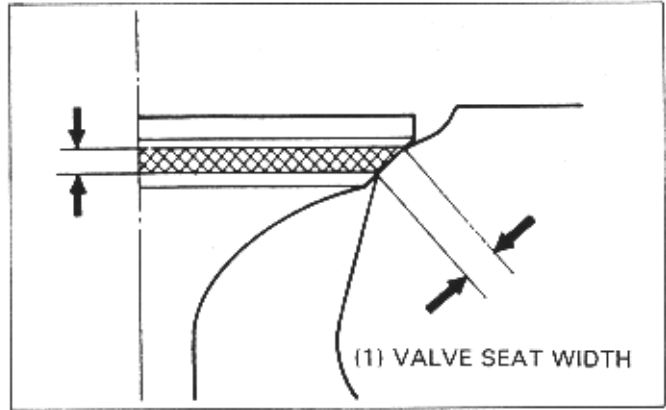
Inspect the width of each valve seat.

**SERVICE LIMITS:**

**INTAKE:** 2.6 mm (0.10 in)

**EXHAUST:** 2.4 mm (0.09 in)

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

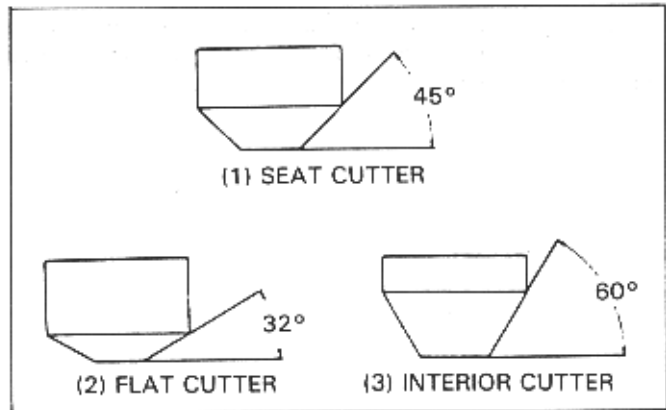


**VALVE SEAT CUTTERS**

Honda Valve Seat Cutters, grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

**NOTE**

- Follow the refacer manufacturer's operating instructions.

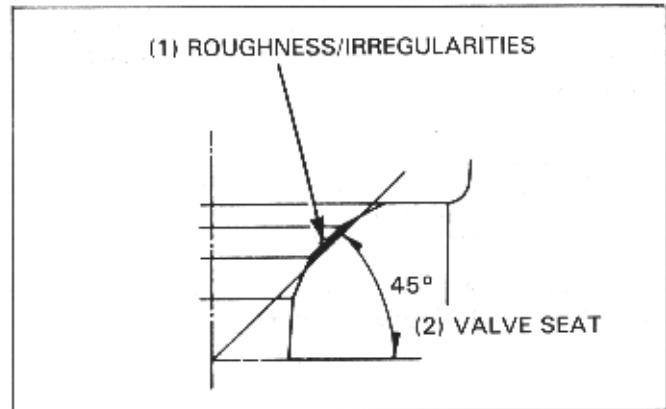


**VALVE SEAT REFACING**

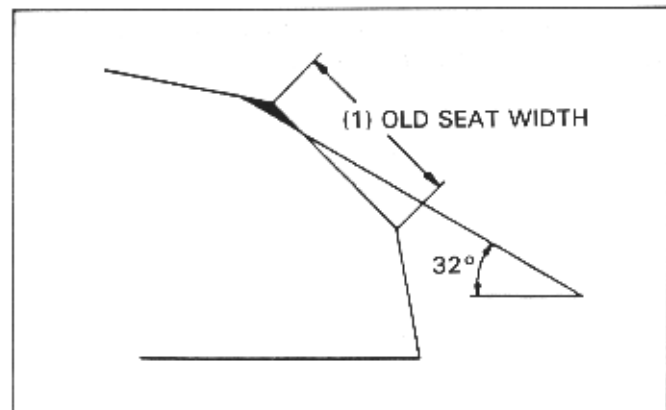
Use a 45 degree cutter to remove any roughness or irregularities from the seat.

**NOTE**

- Reface the seat with a 45 degree cutter when a valve guide is replaced.

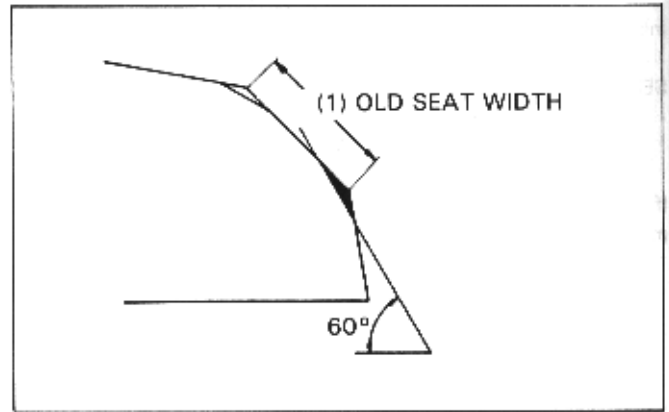


Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.

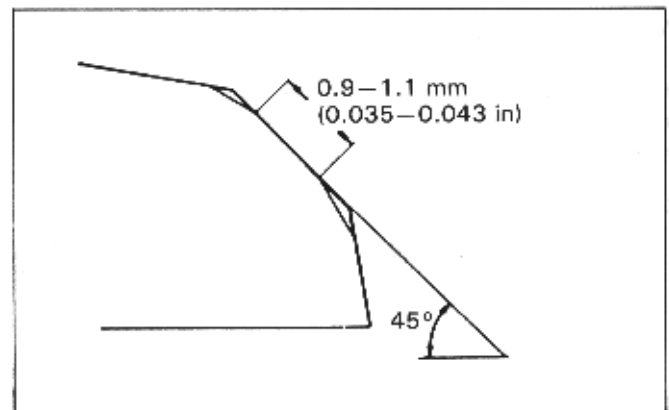


## CYLINDER HEAD/VALVES

Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have refaced.



Install a 45 degree finish cutter and cut the seat to the proper width. Make sure that all pitting and irregularities are removed. Refinish if necessary.

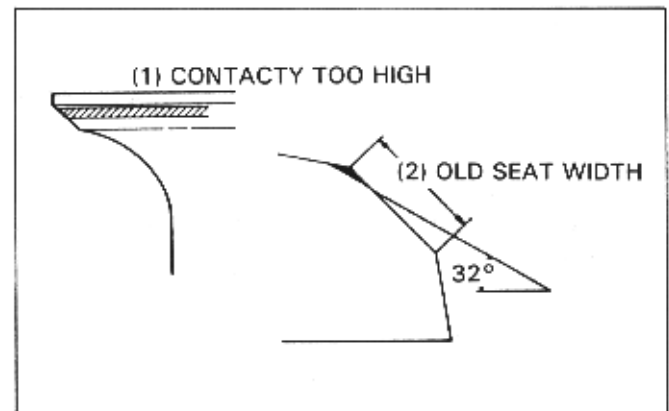


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

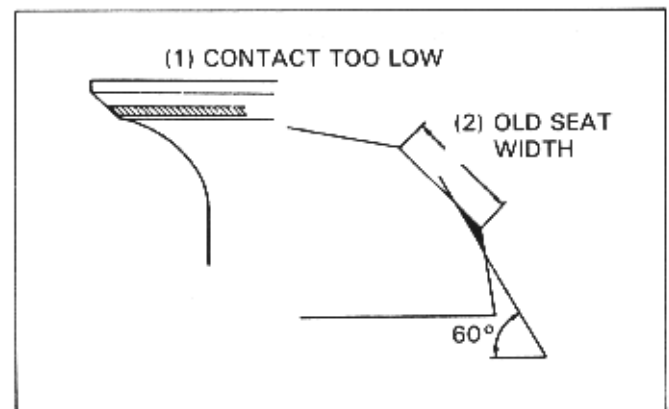
### NOTE

- The location of the valve seat in relation to the valve face is very important for good sealing.

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



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



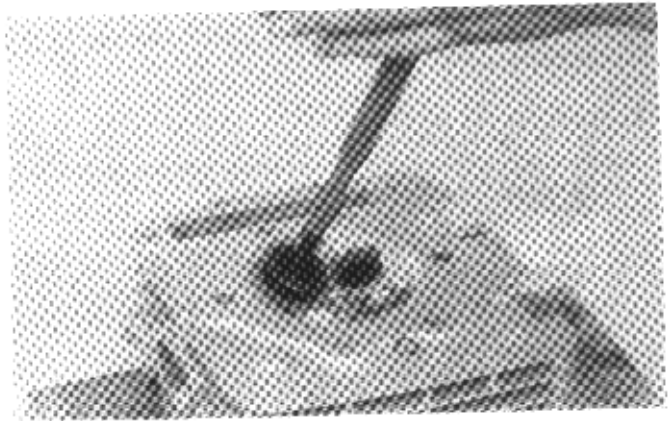
Refinish the seat to specifications, using a 45 degree finish cutter.

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

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

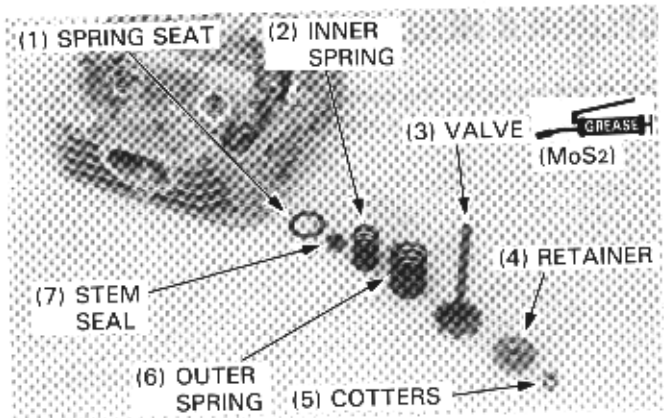
## NOTE

- Do not allow lapping compound to enter the guides.



## CYLINDER HEAD ASSEMBLY

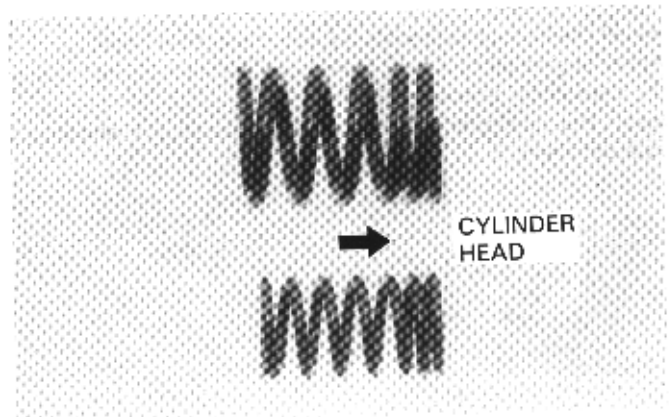
Install the valve spring seats and new stem seals. Lubricate each valve stem with MoS<sub>2</sub> paste grease (page 2-14) and insert the valve into the valve guide.



Install the valve springs and retainers.

## NOTE

- Install the valve springs with their narrower pitches facing to the cylinder head.
- Replace the stem seals with new ones whenever they are removed.
- Install the valves into the valve guides, turning them slowly so you do not damage the stem seals.



Compress the valve springs using the valve spring compressor, then install the valve cotters.

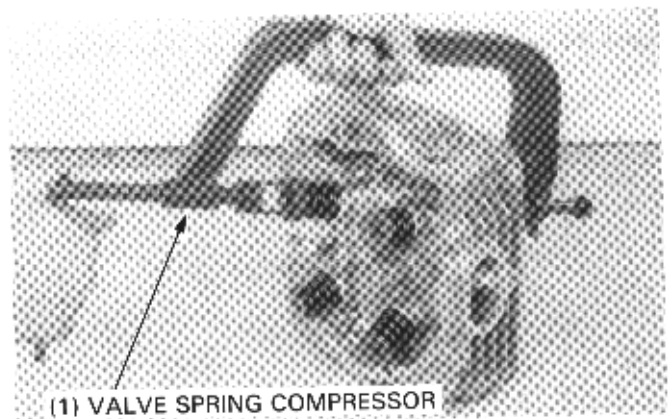
## CAUTION

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

## TOOL:

Valve spring compressor

07757-0010000

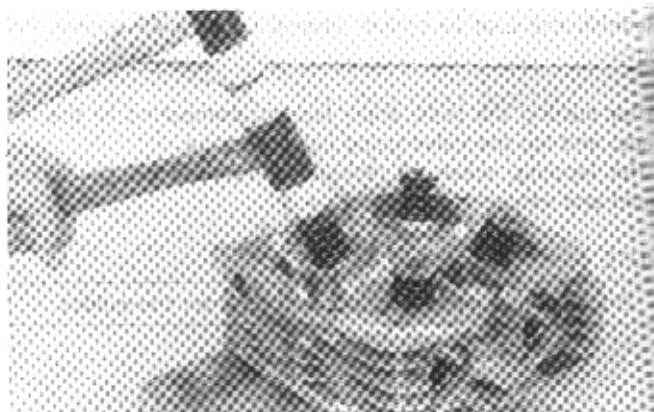


## CYLINDER HEAD/VALVES

Tap the valve stems gently with a plastic hammer to firmly seat the cotters.

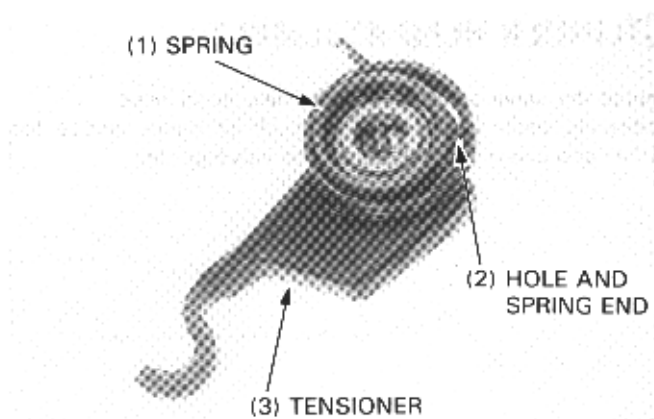
### CAUTION

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

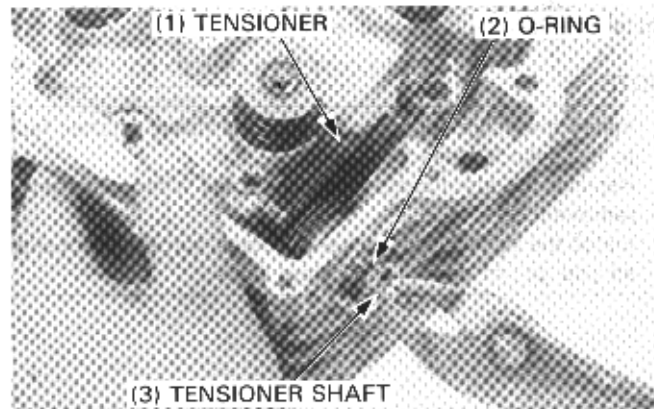


## CYLINDER HEAD INSTALLATION

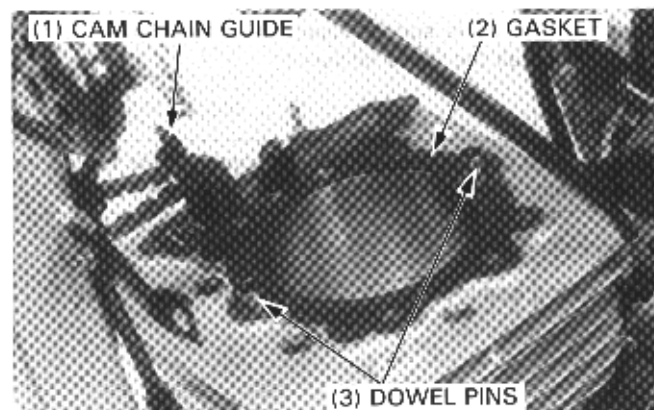
Install the spring on the cam chain tensioner aligning, the hole in the tensioner with the spring end.



Install the cam chain tensioner into the cylinder head. Apply engine oil to a new O-ring and install it in the groove of the cam chain tensioner shaft. Insert the tensioner shaft through the tensioner and into the cylinder head.



Install the cam chain guide, dowel pins and a new head gasket.

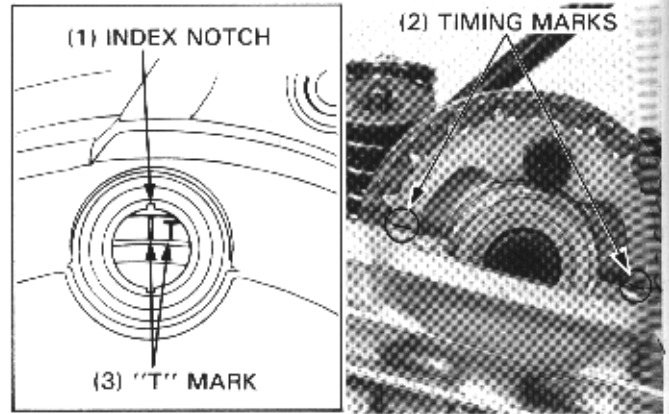




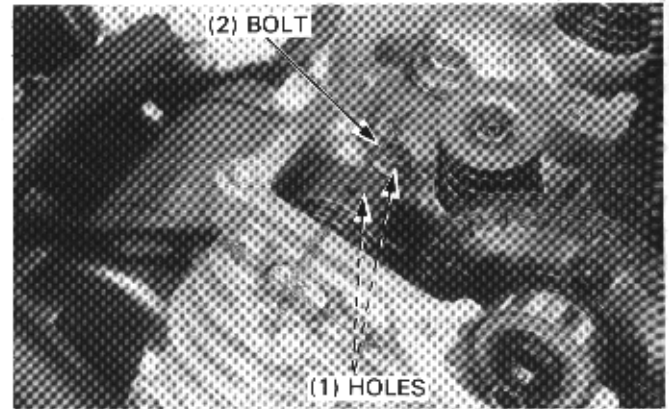
## CYLINDER HEAD/VALVES

Turn the crankshaft counterclockwise 360° and align the "T" mark on the flywheel with the index notch on left crankcase cover again.

Make sure that the timing marks on the cam sprocket align with the upper surface of the cylinder head.



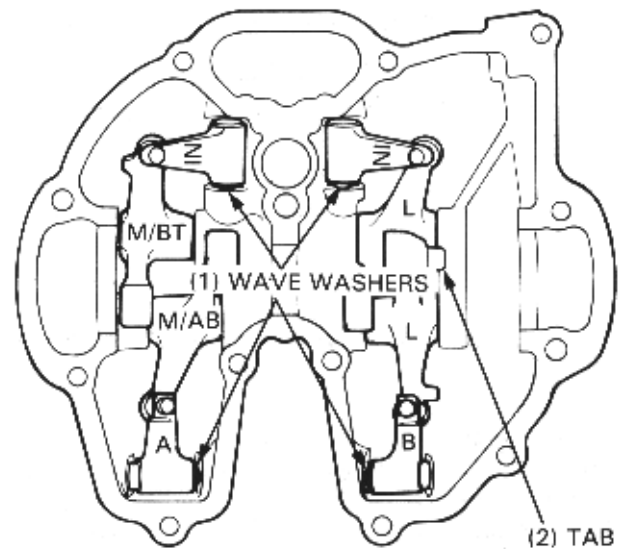
Align the holes in the cylinder head and tensioner shaft by turning the tensioner shaft clockwise. Install and tighten the bolt.



## CYLINDER HEAD COVER ASSEMBLY

### NOTE

- Each rocker arm is stamped with its letter code in the location as shown. Install properly.
- Note the locations of the wave washers.





Install each rocker arm in the correct position, referring to the illustration on page 6-18.

Apply oil to the rocker arm shaft sliding surface.  
Apply a locking agent to the threads of the rocker arm shafts.

With the copper washers, insert the rocker arm shafts through the cylinder head cover and rocker arms, and tighten them to the specified torque.

**TORQUE: 28 N·m (2.8 kg-m, 20 ft-lb)**

Apply MoS<sub>2</sub> paste (page 2-14) to the rocker arm slipper surfaces.

Install the sub-rocker arms and wave washers in the correct positions, referring to the illustration on page 6-18.

Apply oil to the sub-rocker arm shaft sliding surfaces.  
Apply a locking agent to the threads of the sub-rocker arm shafts, then insert them through the cylinder head cover and sub-rocker arm with copper washers.  
Tighten the sub-rocker arm shaft.

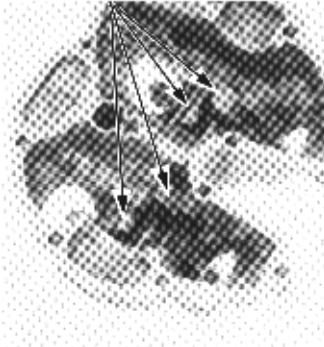
**TORQUE:**

**INTAKE: 28 N·m (2.8 kg-m, 20 ft-lb)**

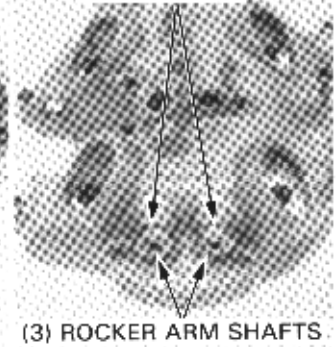
**EXHAUST: 23 N·m (2.3 kg-m, 17 ft-lb)**

Apply MoS<sub>2</sub> paste (page 2-14) to the sub-rocker arm slipper surfaces.

(1) ROCKER ARMS



(2) COPPER WASHERS

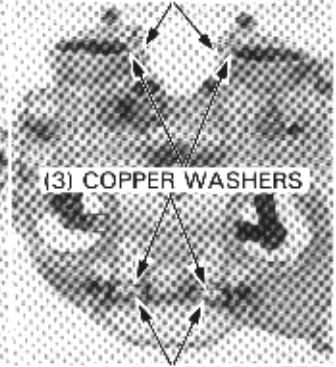


(3) ROCKER ARM SHAFTS

(1) WAVE WASHERS



(2) SUB-ROCKER ARM SHAFTS



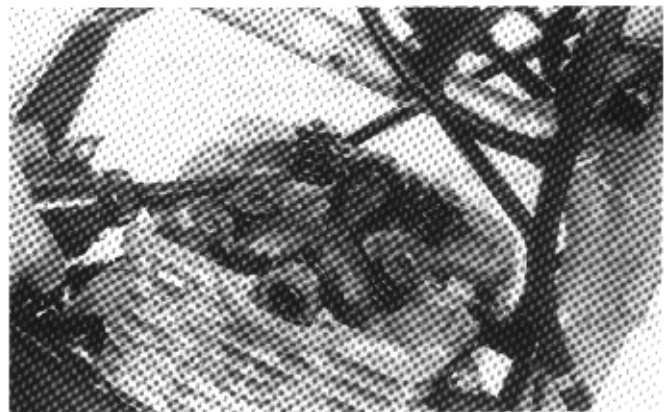
(3) COPPER WASHERS

(4) SUB-ROCKER ARMS (2) SUB-ROCKER ARM SHAFTS

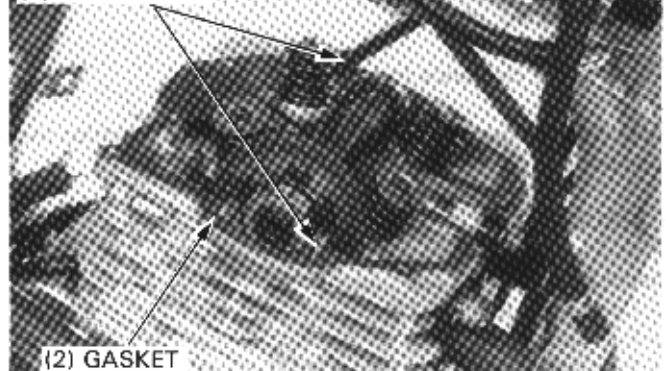
## CYLINDER HEAD COVER INSTALLATION

Pour clean engine oil into the oil pockets in the cylinder head so that the cam lobes are submerged.

Install the dowel pins and a new gasket.



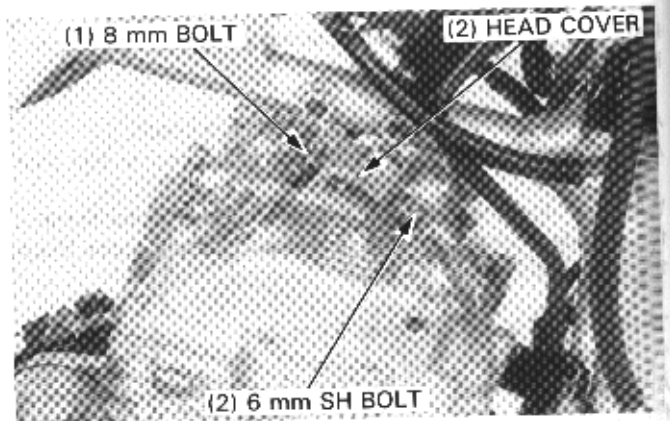
(1) DOWEL PINS



(2) GASKET

## CYLINDER HEAD/VALVES

Set the 8 mm bolt and 6 mm SH bolt on the head cover, then slide the cylinder head cover over the cylinder head.



Tighten the cylinder head cover bolts.

### TORQUE:

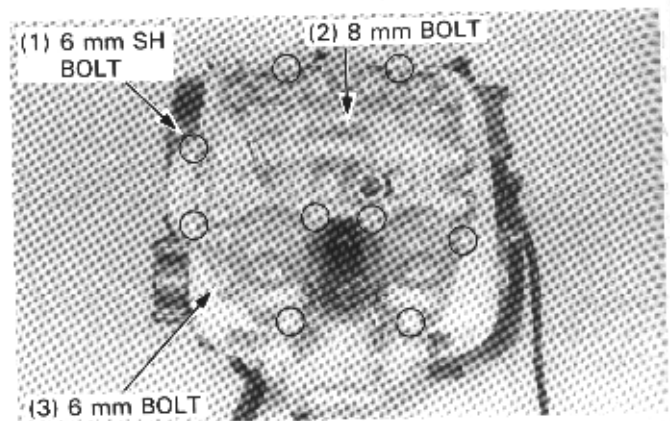
8 mm bolt:	23 N·m (2.3 kg-m, 17 ft-lb)
6 mm bolt:	12 N·m (1.2 kg-m, 9 ft-lb)
6 mm SH bolt:	10 N·m (1.0 kg-m, 7 ft-lb)

### NOTE

- Tighten the cylinder head cover bolts in a crisscross pattern in two or more steps.

Install and tighten the spark plug.

**TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)**



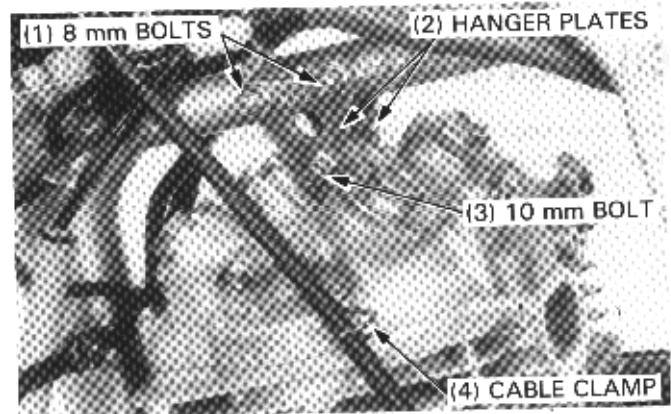
Install the engine hanger plates, bolts and nuts. Tighten the nuts to the specified torque.

### TORQUE:

8 mm bolts:	34 N·m (3.4 kg-m, 25 ft-lb)
10 mm bolt:	60 N·m (6.0 kg-m, 43 ft-lb)

Install the clutch cable clamp and tighten the bolt.

**TORQUE: 10 N·m (1.0 kg-m, 7 ft-lb)**



Connect the cylinder head cover breather tube, and secure it with the clip. Install the spark plug cap.

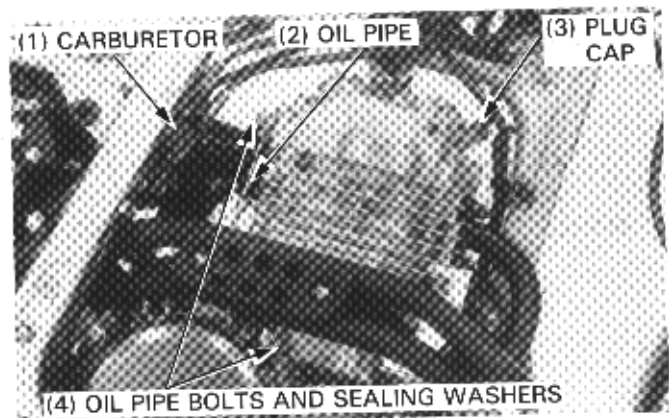
Adjust valve clearance (page 3-6).

Install the oil pipe with four sealing washers, and tighten the oil pipe bolts.

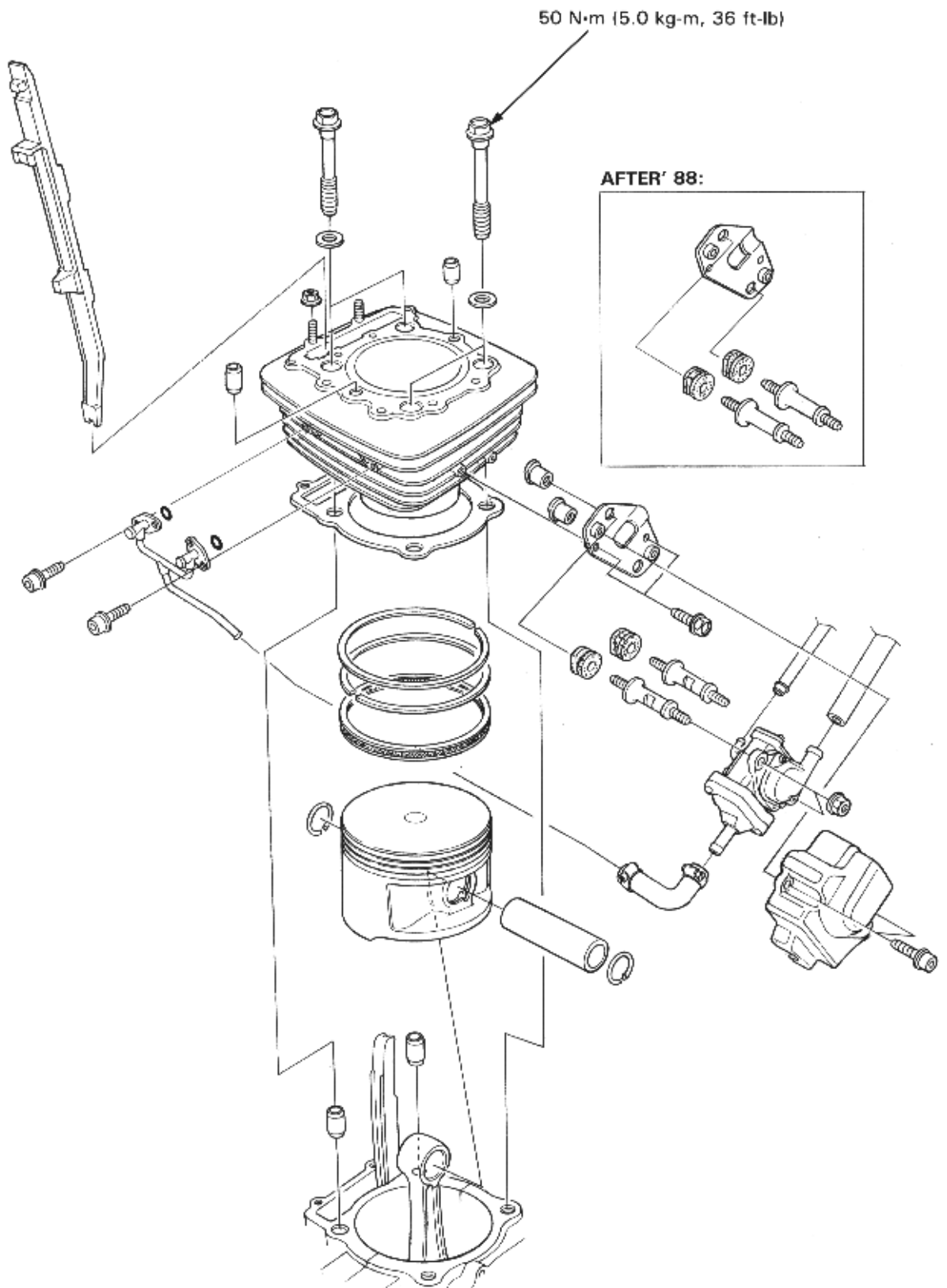
**TORQUE: 10 N·m (1.0 kg-m, 7 ft-lb)**

Install the following components:

- Carburetor (page 4-15)
- Fuel tank (page 4-3)
- Seat and side covers (page 15-2)



CYLINDER/PISTON



# 7. CYLINDER/PISTON

SERVICE INFORMATION	7-1	PISTON REMOVAL	7-3
TROUBLESHOOTING	7-1	PISTON INSTALLATION	7-5
CYLINDER REMOVAL	7-2	CYLINDER INSTALLATION	7-6

## SERVICE INFORMATION

### GENERAL

- This section covers service of the cylinder and piston. These procedures can be performed with the engine in the frame.
- If the connecting rod small end I.D. exceeds the service limit, see section 10 for the crankshaft removal.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.	100.000–100.010 mm (3.9354–3.9374 in)	100.12 mm (3.942 in)
	Taper	—	0.05 mm (0.002 in)
	Out of round	—	0.05 mm (0.002 in)
	Warpage across top	—	0.10 mm (0.004 in)
Piston	O.D. at skirt	99.960–99.980 mm (3.9370–3.9362 in)	99.85 mm (3.931 in)
	Piston pin bore	24.002–24.008 mm (0.9450–0.9452 in)	24.03 mm (0.946 in)
	Piston pin-to-piston clearance	0.002–0.014 mm (0.0001–0.0006 in)	0.07 mm (0.003 in)
Piston ring end gap	Top	0.20–0.40 mm (0.008–0.016 in)	0.50 mm (0.020 in)
	Second	0.35–0.55 mm (0.014–0.022 in)	0.65 mm (0.026 in)
	Oil (side Rail)	0.2–0.9 mm (0.01–0.04 in)	—
Piston ring-to-groove clearance	Top	0.030–0.065 mm (0.0012–0.0026 in)	0.12 mm (0.005 in)
	Second	0.015–0.045 mm (0.0006–0.0018 in)	0.12 mm (0.005 in)
Cylinder-to-piston clearance		0.02–0.05 mm (0.0008–0.0020 in)	0.10 mm (0.004 in)
Piston pin O.D.		23.989–23.995 mm (0.9444–0.9447 in)	23.96 mm (0.943 in)
Connecting rod small end I.D.		24.020–24.041 mm (0.9457–0.9465 in)	24.07 mm (0.948 in)

### TORQUE VALUES

Cylinder bolt 10 mm bolt:	50 N·m (5.0 kg-m, 36 ft-lb)	Apply oil to the threads
6 mm SH bolt:	10 N·m (1.0 kg-m, 7 ft-lb)	

## TROUBLESHOOTING

### Low or Unstable Compression

- Worn cylinder or piston rings
- Faulty decompressor cam

### Excessive Smoke

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

### Overheating

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

### Knocking or Abnormal Noise

- Worn piston and cylinder
- Excessive carbon build-up on piston head or combustion chamber

### NOTE

- If the piston, rings or cylinder show excessive wear, check for dirt passing the air filter due to improper installation or sealing.

## CYLINDER/PISTON

### CYLINDER REMOVAL

Remove the cylinder head (Section 6).  
Remove the cam chain guide.

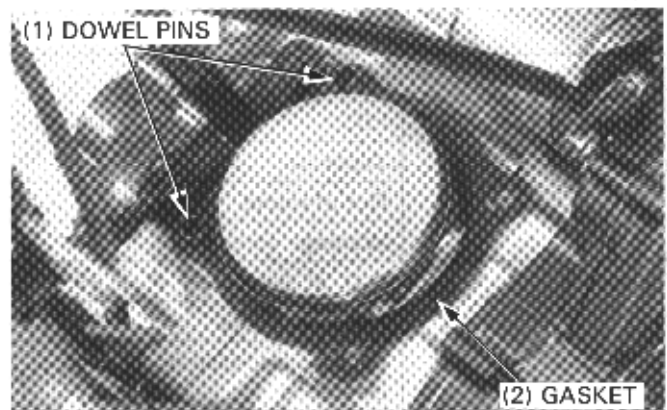
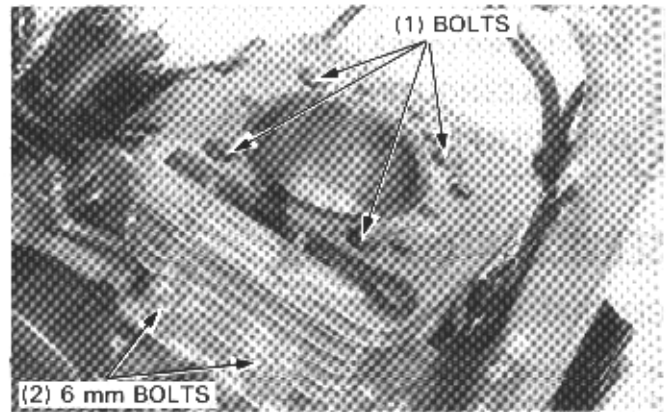
Remove the two 6 mm small head bolts on the right side of the cylinder.

Remove the four cylinder mounting bolts, then remove the cylinder.

#### NOTE

- Loosen the bolts in a crisscross pattern in two or more steps.

Remove the dowel pins and cylinder gasket.



### CYLINDER INSPECTION

Inspect the cylinder wall for scratches and wear.

Measure and record the cylinder I.D. at three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 100.12 mm (3.942 in)**

Calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance.

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

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

**SERVICE LIMIT: 0.05 mm (0.002 in)**

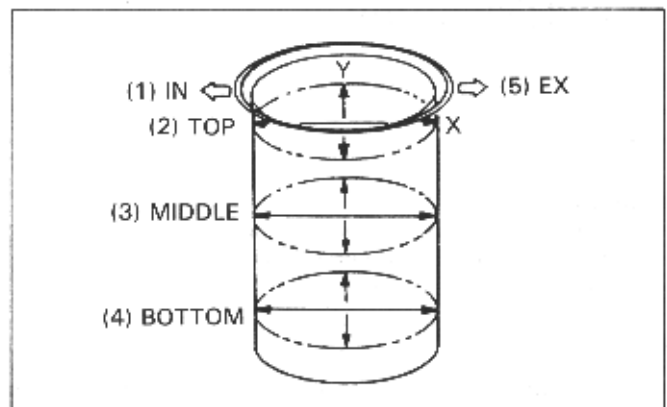
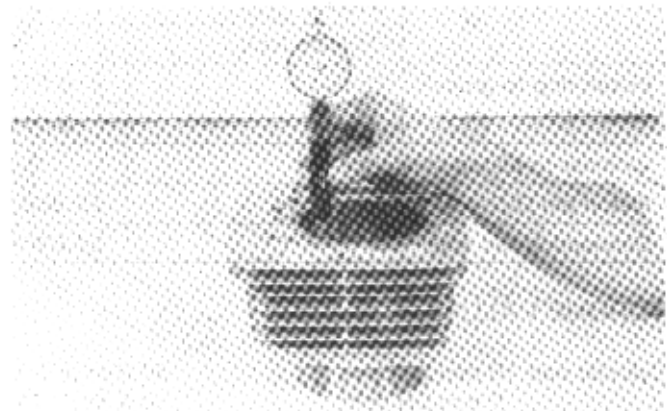
Calculate the cylinder for out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the out-of-round.

**SERVICE LIMIT: 0.05 mm (0.002 in)**

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

**The following oversize piston are available:  
100.25 mm (3.947 in) and 100.50 mm (3.957 in)**

The cylinder must be rebored so that the clearance to an oversize piston is 0.02 – 0.05 mm (0.0008 – 0.0020 in)

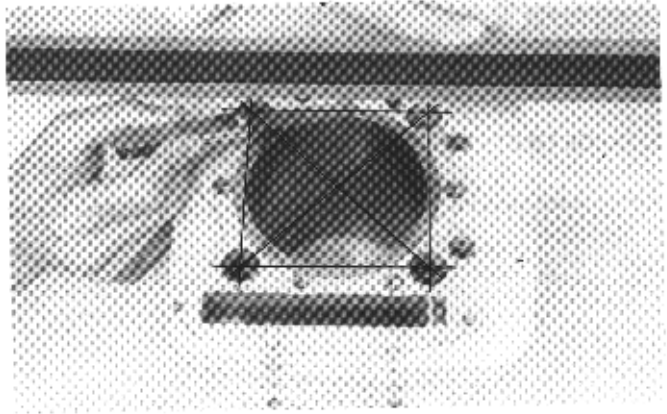


Clean the cylinder gasket surface.  
Inspect the cylinder for transverse warpage across the top.

## NOTE

- Measure the warpage using a straight edge and feeler gauge in the directions as shown.

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



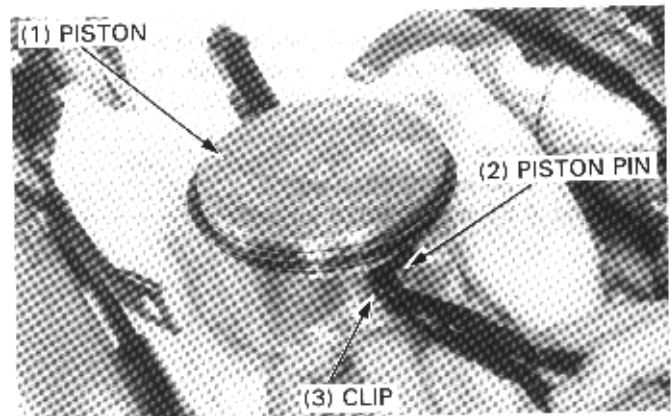
## PISTON REMOVAL

Place a shop towel into the crankcase opening and remove the piston clips and discard them.

## NOTE

- Do not let the clips fall into the crankcase.

Push the piston pin out and remove the piston.



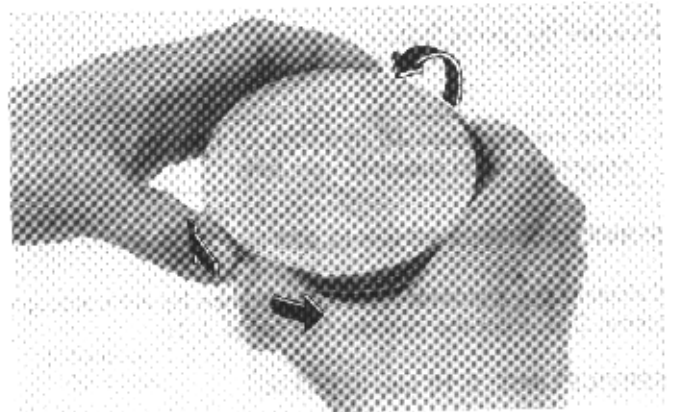
## PISTON/PISTON RING INSPECTION

Remove the piston rings from the piston.

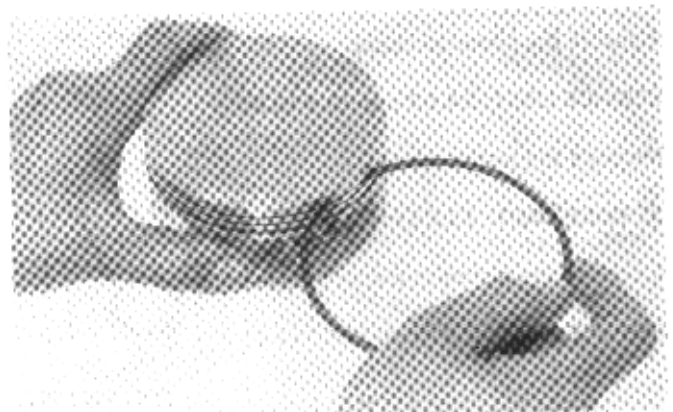
## NOTE

- Do not damage the piston rings when removing them.

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



Insert the outside surface of the ring into the proper ring groove and roll it around in the groove to make sure that the ring has a free fit around the piston's circumference and clean the ring grooves.

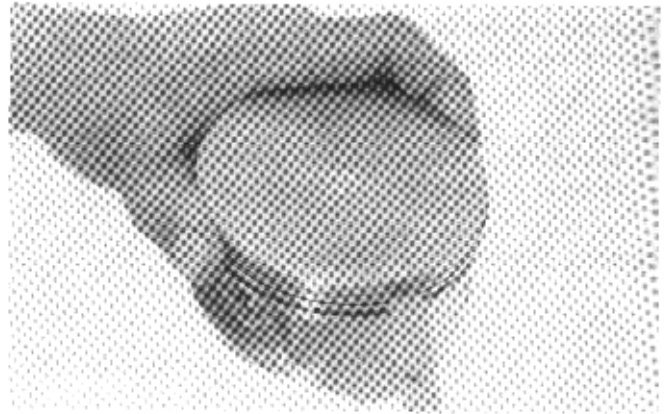


## CYLINDER/PISTON

Install the piston rings into the piston ring grooves (page 7-5). Measure the piston ring-to-groove clearance, pushing the piston rings into the ring grooves.

**SERVICE LIMIT: Top/Second: 0.12 mm (0.005 in)**

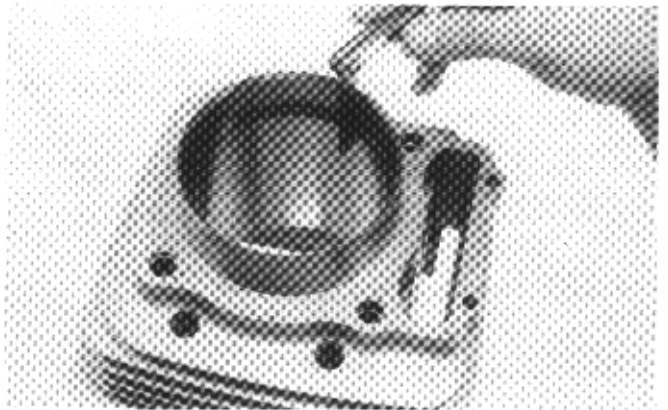
After measurement, remove the piston ring from the piston.



Measure each piston ring end gap; using a piston, push the ring into the cylinder squarely to the position as shown and make the measurement.

**SERVICE LIMITS:**

Top: 0.50 mm (0.0020 in)  
Second: 0.65 mm (0.0026 in)



Measure the piston O.D.

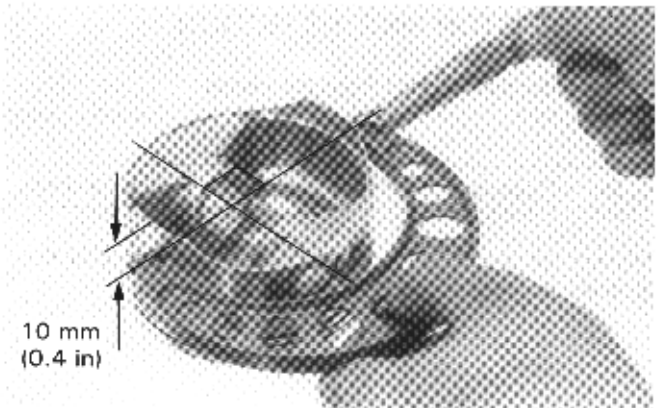
**NOTE**

- Take measurement 10 mm (0.4 in) from the bottom, and perpendicular to the piston pin hole.

**SERVICE LIMIT: 99.85 mm (3.931 in)**

Calculate the piston-to-cylinder clearance by subtracting the piston O.D. from the cylinder I.D. (page 7-2)

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



Measure the piston pin bore.

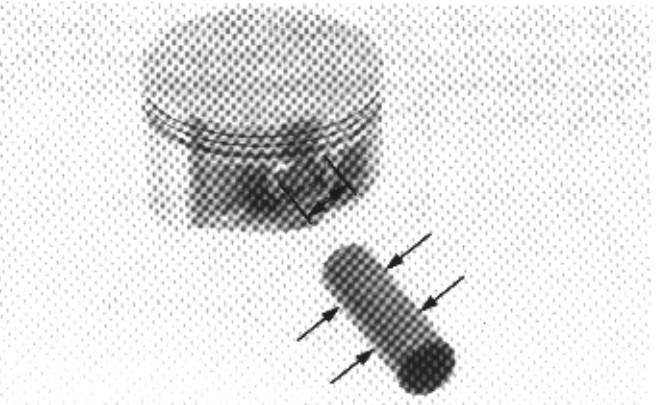
**SERVICE LIMIT: 24.03 mm (0.946 in)**

Measure the piston pin O.D.

**SERVICE LIMIT: 23.96 mm (0.943 in)**

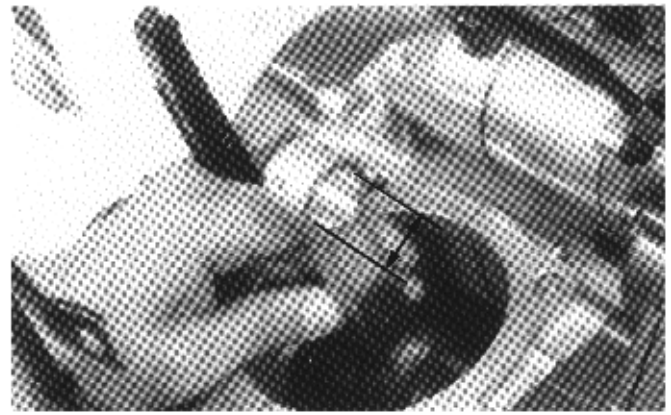
Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**



Measure the I.D. of the connecting rod small end.

**SERVICE LIMIT: 24.07 mm (0.948 in)**



### PISTON RING INSTALLATION

Apply clean engine oil to the piston rings. Install the piston rings into the piston ring grooves with the marks facing up.

**NOTE**

- Be careful not to damage the piston and piston rings during assembly.

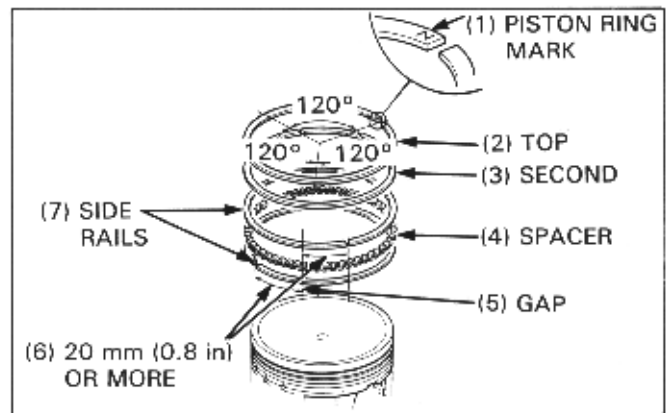
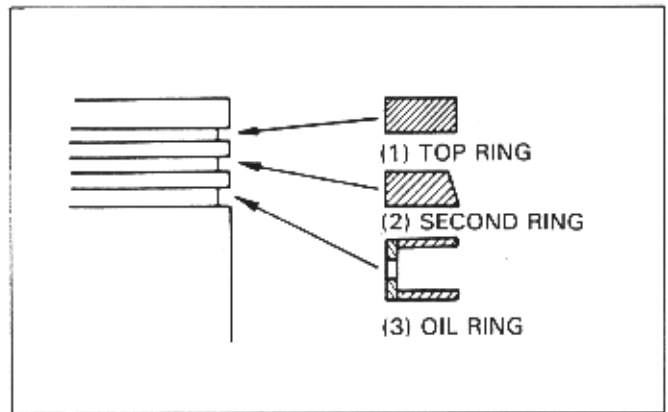
Stagger the ring end gaps 120 degrees from each other as shown.

Do not align the oil ring (side rail) gaps.

**NOTE**

- To install the oil ring, install the spacer first, then install the side rails.

After installing the rings, check that they rotate freely without sticking.



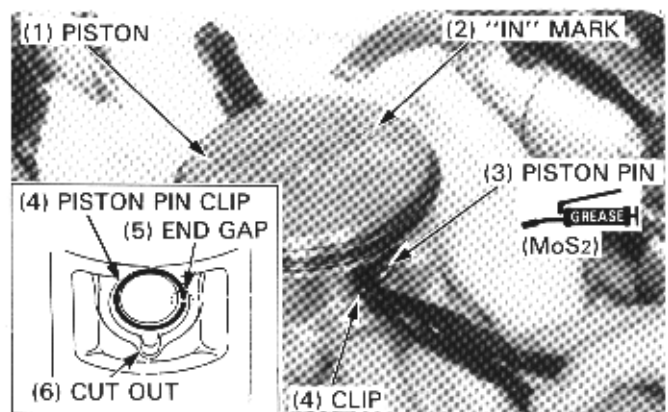
### PISTON INSTALLATION

Cover the crankcase opening with a shop towel. Apply MoS<sub>2</sub> paste (page 2-14) to the sliding surfaces of the piston pin and connecting rod small end. Insert the piston pin through the piston and connecting rod, and secure them with new piston pin clips.

**NOTE**

- Install the piston with the mark "IN" facing the intake side.
- After installing the piston pin clips, make sure that they are seated properly and the end gaps are not aligned with the cut-out in the piston.
- Be careful not to let the clips fall into the crankcase.

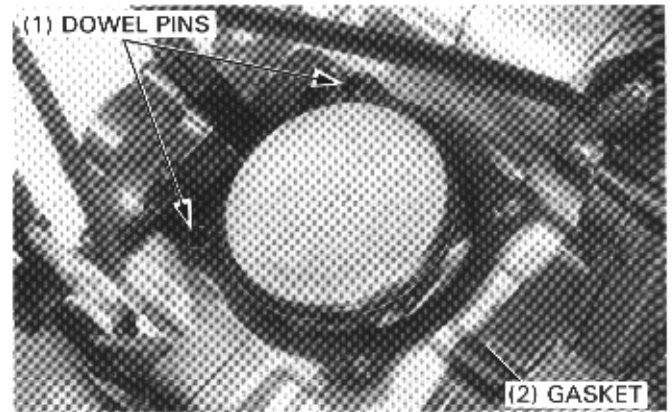
Clean any gasket material from the cylinder base surface.





## CYLINDER INSTALLATION

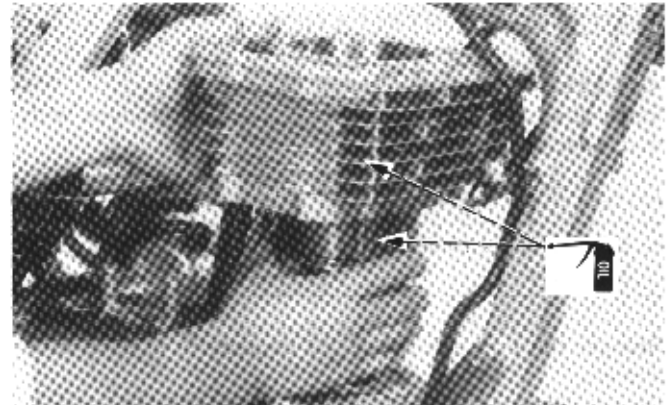
Install the dowel pins and a new gasket.



Coat the outer surface of the piston and inner surface of the cylinder with clean engine oil. Position the piston at the T.D.C. (Top dead center on compression stroke), and install it into the cylinder while compressing the piston rings with your fingers.

### NOTE

- Be careful not to damage the piston rings during assembly.
- When the cylinder is halfway over the piston, route the cam chain through the cylinder.



Apply oil to the cylinder bolts (10 mm) and washers, and tighten the bolts in a crisscross pattern in two or more steps.

**TORQUE: 50 N·m (5.0 kg·m, 36 ft·lb)**

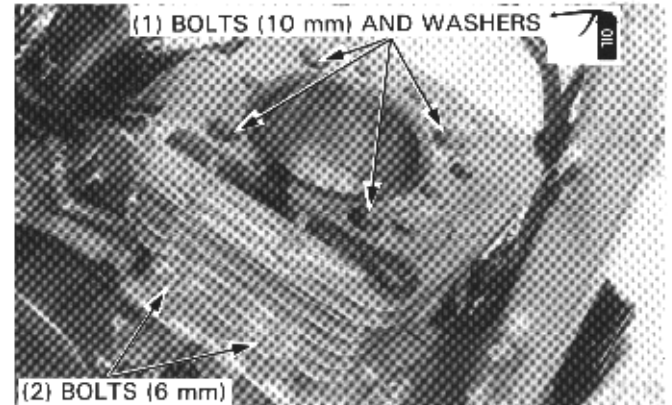
Tighten the cylinder bolts (6 mm).

**TORQUE: 10 N·m (1.0 kg·m, 7 ft·lb)**

Install the cam chain guide.

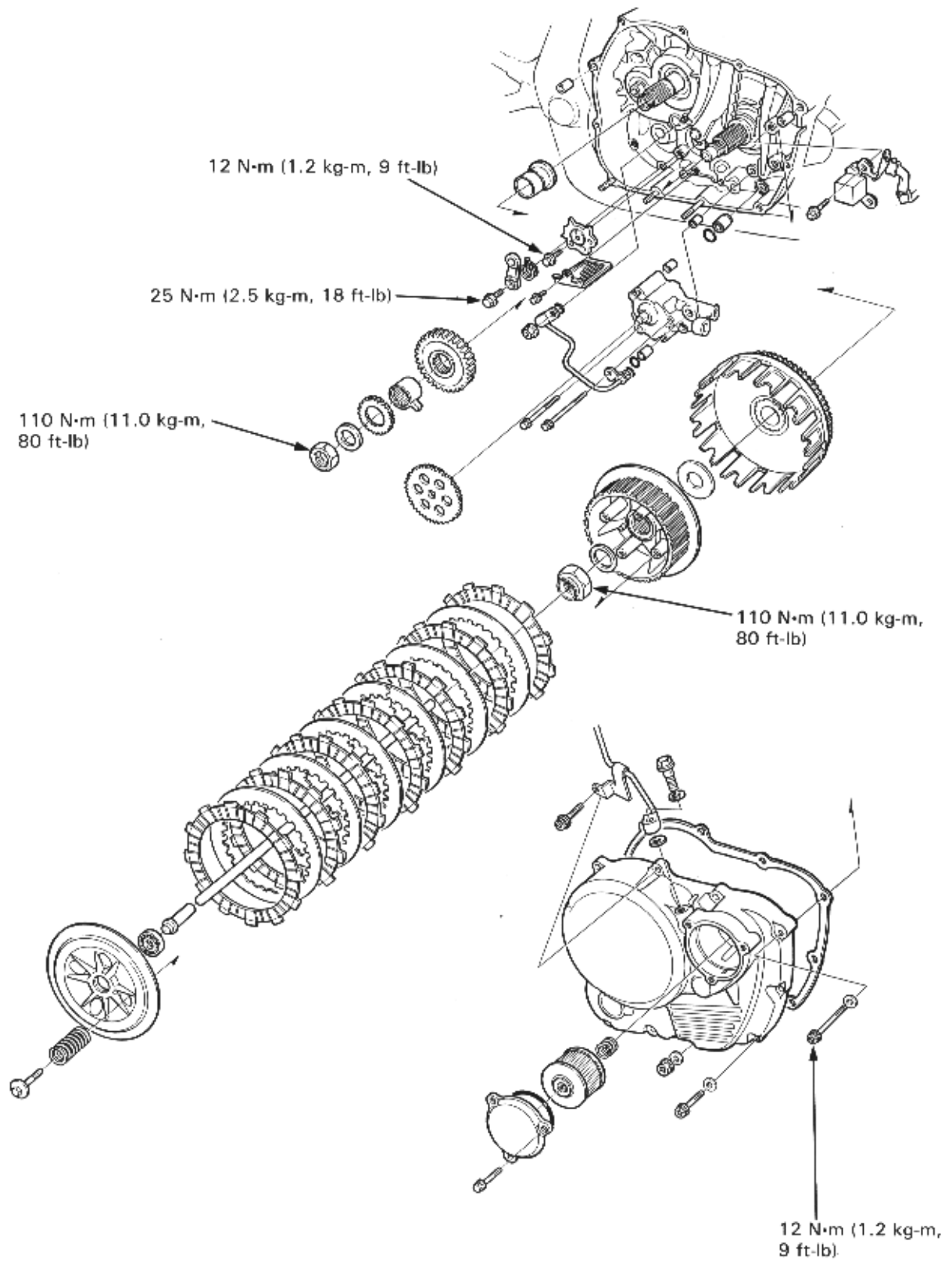
### NOTE

- Fit the cam chain guide tab in the cylinder cut-out and push the guide until it bottoms in the crankcase guide hole.



Install the cylinder head (page 6-16).

# CLUTCH



<b>SERVICE INFORMATION</b>	<b>8-1</b>	<b>PRIMARY DRIVE GEAR</b>	<b>8-7</b>
<b>TROUBLESHOOTING</b>	<b>8-1</b>	<b>GEARSHIFT CAM</b>	<b>8-9</b>
<b>RIGHT CRANKCASE COVER REMOVAL</b>	<b>8-2</b>	<b>RIGHT CRANKCASE COVER INSTALLATION</b>	<b>8-9</b>
<b>CLUTCH</b>	<b>8-2</b>		

## SERVICE INFORMATION

### GENERAL

- This section covers removal and installation of the clutch, gearshift cam and right crankcase cover. All these operations can be performed with the engine in the frame.
- When the clutch discs are replaced, coat new discs with engine oil prior to assembly.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Clutch	Lever free play (at lever end)	10–20 mm (3/8–3/4 in)	—
	Spring free length	44.7 mm (1.76 in)	43.1 mm (1.70 in)
	Spring preload/length	30 ± 1.5 kg/28.5 mm (66.2 ± 3.31 lb/1.12 in)	—
	Disc thickness	2.92–3.08 mm (0.115–0.121 in)	2.6 mm (0.10 in)
	Plate warpage	—	0.15 mm (0.006 in)
	Clutch outer I.D.	27.000–27.021 mm (1.0630–1.0638 in)	27.05 mm (1.065 in)
	Outer guide	O.D.	26.959–26.980 mm (1.0630–1.0622 in)
I.D.		21.990–22.035 mm (0.8657–0.8675 in)	22.05 mm (0.868 in)

### TORQUE VALUES

Clutch lock nut	110 N·m (11.0 kg-m, 80 ft-lb)
Primary drive gear nut	110 N·m (11.0 kg-m, 80 ft-lb)
Gearshift cam bolt	12 N·m (1.2 kg-m, 9 ft-lb) Apply locking agent to the threads
Stopper arm bolt	25 N·m (2.5 kg-m, 18 ft-lb)
Right crankcase cover bolt/nut	12 N·m (1.2 kg-m, 9 ft-lb)

### TOOLS

#### Common

Clutch center holder	07724–0050001—or equivalent commercially available in U.S.A.
Gear holder	07724–0010100—Not available in U.S.A.

## TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch lever free play.

#### Clutch Slips When Accelerating

- No free play
- Discs worn
- Springs weak

#### Clutch Will Not Disengage

- Too much free play
- Plates warped

#### Motorcycle Creeps With Clutch Disengaged

- Too much free play
- Plates warped

#### Excessive Lever Pressure

- Clutch cable kinked, damaged, or dirty
- Lifter mechanism damaged

#### Clutch Operation Feels Rough

- Outer drum slots rough
- Dirty clutch cable

## CLUTCH

### RIGHT CRANKCASE COVER REMOVAL

Drain oil from engine and oil tank (page 2-3).

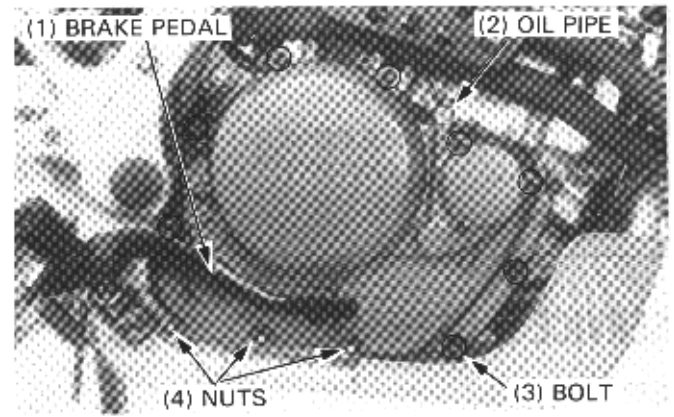
Remove the following components:

- Brake pedal (page 13-10)
- Oil pipe (page 6-3)

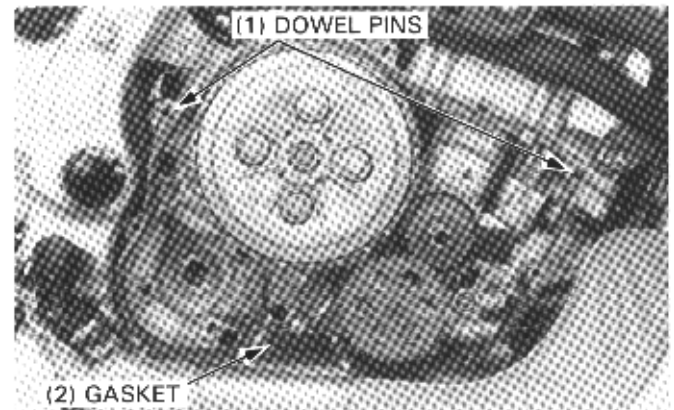
Remove the right crankcase cover bolts, nuts and right crankcase cover.

#### NOTE

- Loosen the bolts and nuts in a crisscross pattern in two or more steps.



Remove the dowel pins and gasket.



### OIL SEAL REPLACEMENT

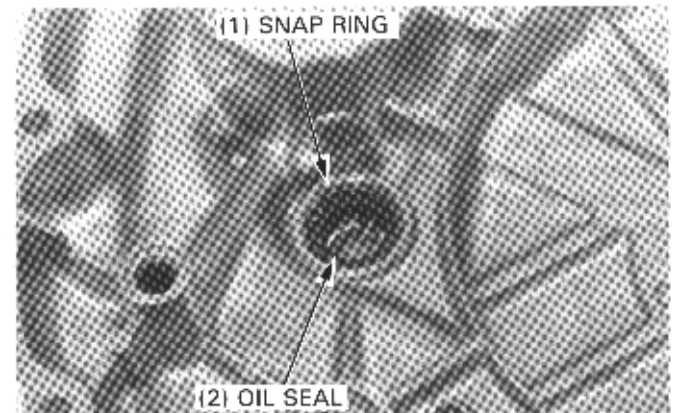
Check for the oil seal for damage or deterioration.

Remove the snap ring and oil seal.

Install the new oil seal and snap ring.

#### NOTE

- Make sure the snap ring is seated in the groove in the right crankcase cover.



## CLUTCH

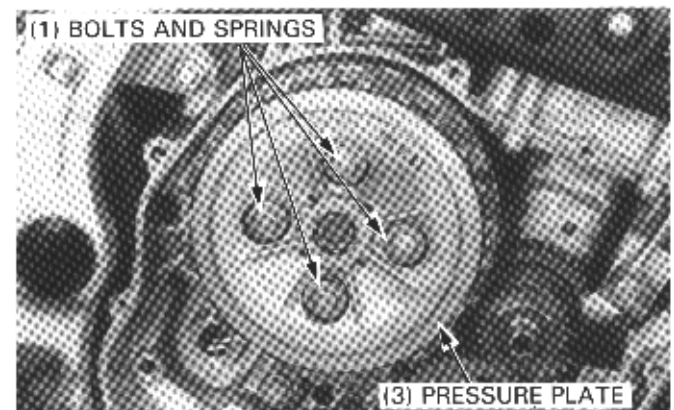
### REMOVAL

Remove the right crankcase cover.

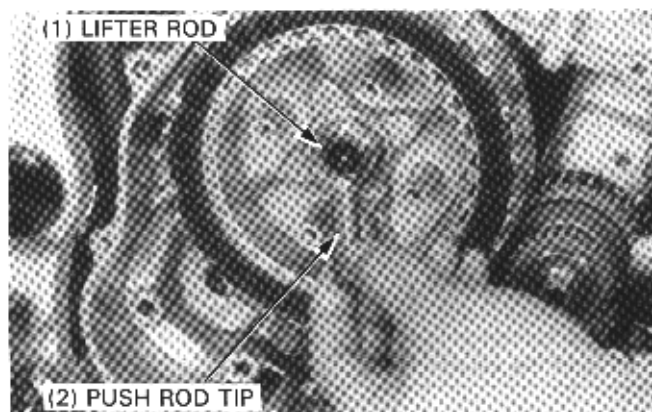
Remove the four clutch bolts and springs.

#### NOTE

- Loosen the bolts in a crisscross pattern in two or more steps.



Remove the push rod tip and clutch lifter rod.



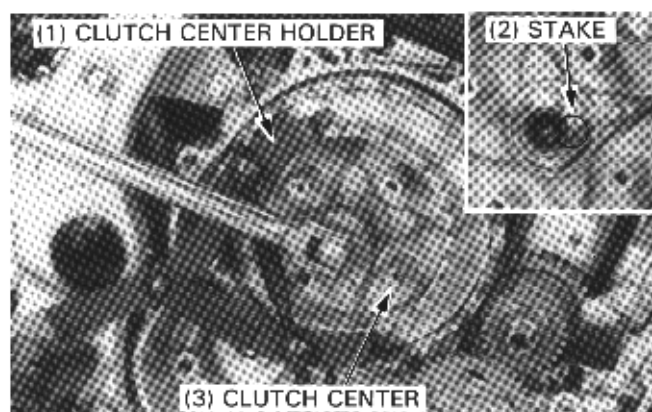
Unstake the clutch lock nut with a drill or grinder.

Remove the clutch lock nut, plain washer and clutch center, holding with the clutch center holder.

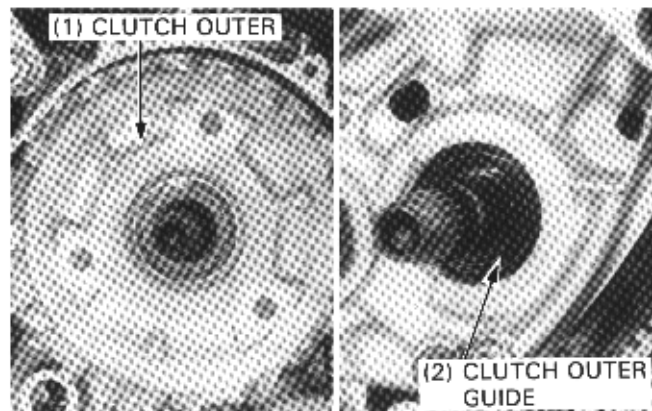
**TOOL:**

Clutch center holder

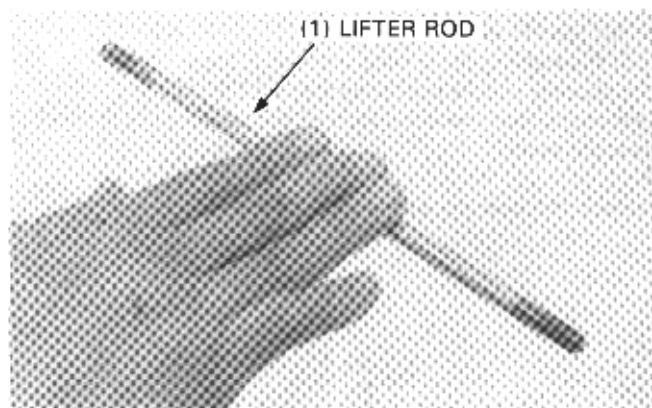
07724-0050001  
or equivalent commercially  
available in U.S.A.



Remove the clutch outer and clutch outer guide.



Inspect the clutch lifter rod for wear or damage.  
Check the lifter rod for straightness by rolling the rod on a flat surface.



## CLUTCH

### INSPECTION

#### ● CLUTCH SPRING

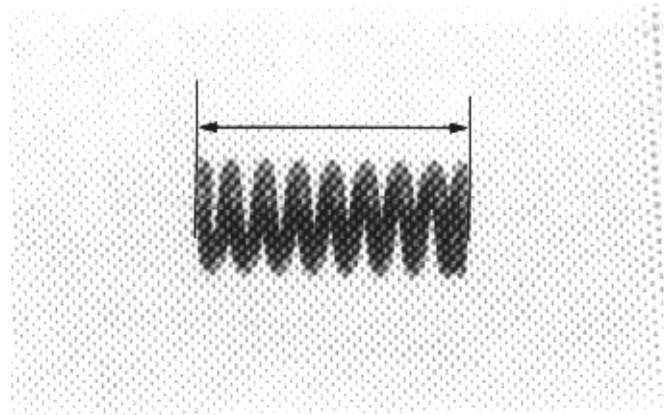
Measure the free length of each spring.

**SERVICE LIMIT: 43.1 mm (1.70 in)**

Replace if shorter than the service limit.

#### NOTE

- Clutch springs should be replaced as a set if one or more are beyond the service limit.



#### ● CLUTCH DISC

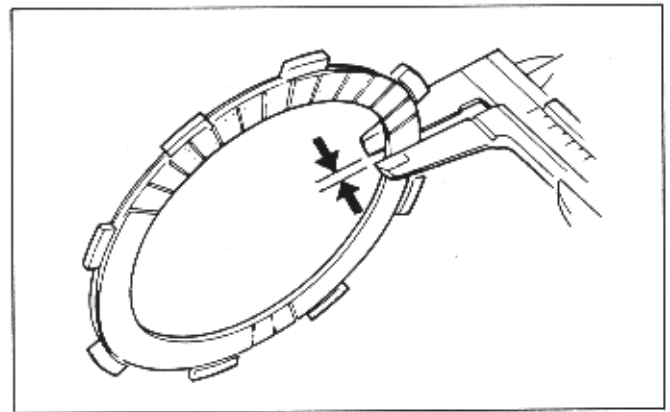
Replace the discs if they show signs of scoring or discoloration.

Measure the disc thickness.

**SERVICE LIMIT: 2.6 mm (0.10 in)**

#### NOTE

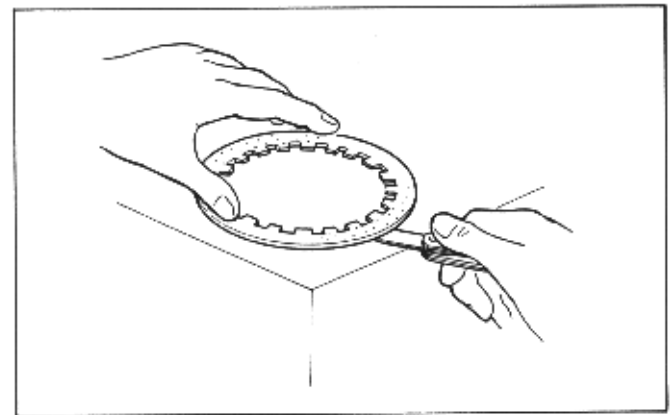
- Clutch discs and plates should be replaced as a set if any one is beyond the service limit.



#### ● CLUTCH PLATE

Check for plate warpage on a surface plate, using a feeler gauge.

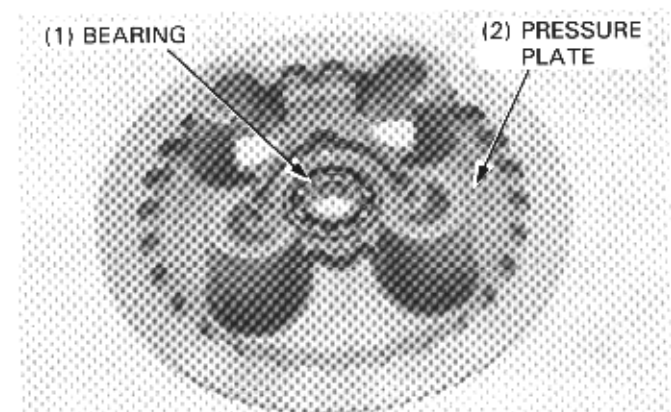
**SERVICE LIMIT: 0.3 mm (0.01 in)**



#### ● PRESSURE PLATE BEARING

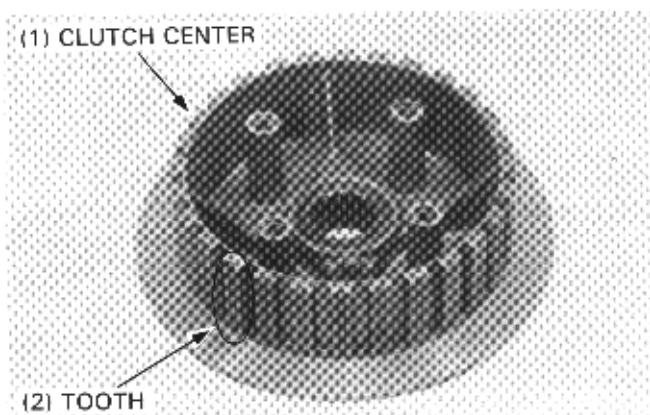
Turn the bearing inner race with your finger. The bearing should turn smoothly and quietly. Also check that the outer race of the bearing fits tightly in the pressure plate.

Replace the bearing with a new one, if necessary.



### ● CLUTCH CENTER

Check the teeth of the clutch center for wear, damage or cracks.



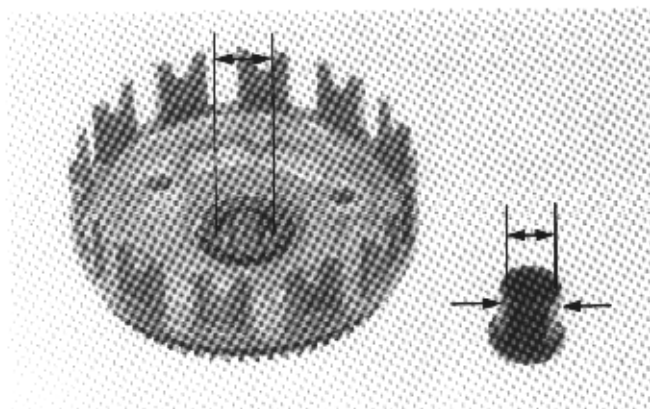
### ● CLUTCH OUTER AND OUTER GUIDE

Check the slots in the outer drum for nicks, cuts or indentations made by the friction discs.

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

#### SERVICE LIMITS:

Clutch outer I.D.:	27.05 mm (1.065 in)
Clutch outer guide O.D.:	26.91 mm (1.059 in)
I.D.:	22.05 mm (0.868 in)

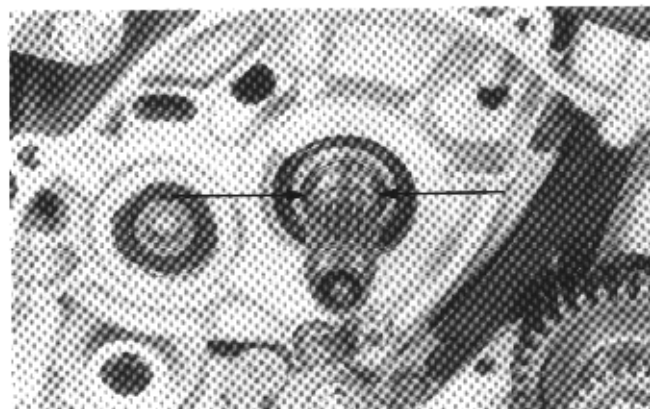


Measure the mainshaft O.D. at the clutch outer guide area.

**SERVICE LIMIT: 21.91 mm (0.863 in)**

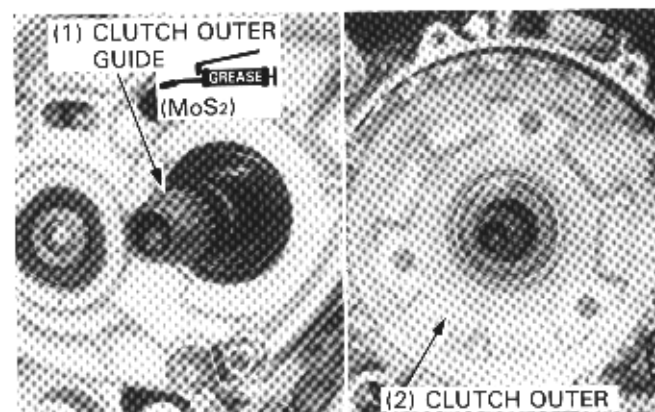
Calculate the mainshaft-to-clutch outer guide clearance.

**SERVICE LIMIT: 0.14 mm (0.006 in)**



### INSTALLATION

Apply MoS<sub>2</sub> paste (page 2-14) to the clutch outer guide sliding surfaces, and install the outer guide over the mainshaft. Install the clutch outer over the outer guide.



## CLUTCH

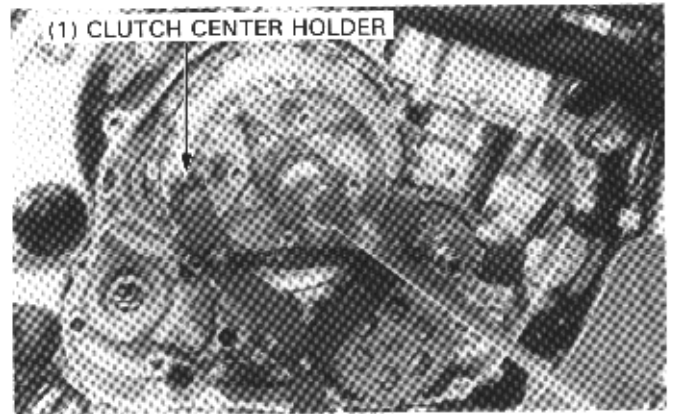
Install the clutch lock nut and tighten it, holding with clutch center holder.

**TORQUE: 110 N·m (11.0 kg-m, 80 ft-lb)**

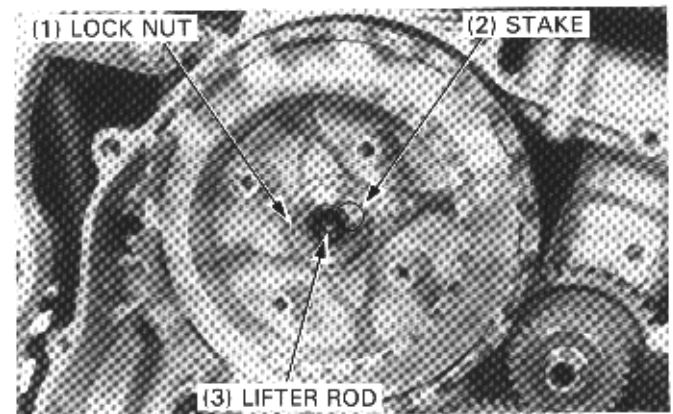
**TOOL:**

Clutch center holder

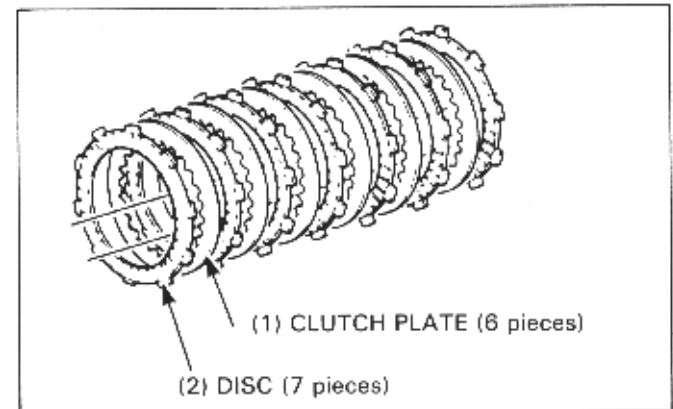
**07724-0050001**  
or equivalent commercially  
available in U.S.A.



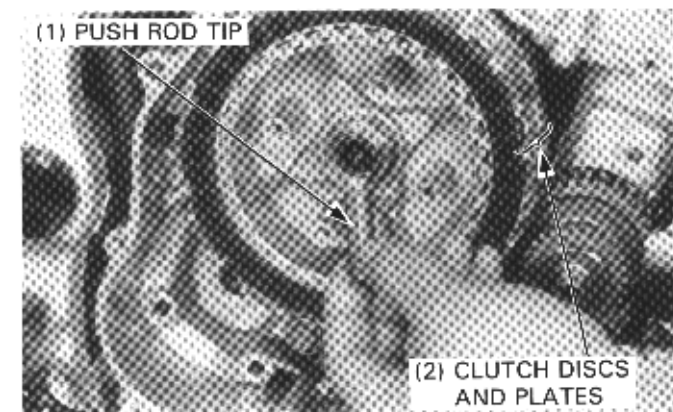
Stake the clutch lock nut with a punch.  
Insert the clutch lifter rod through the mainshaft.



Coat the 7 discs and 6 plates with clean engine oil and install them as shown.

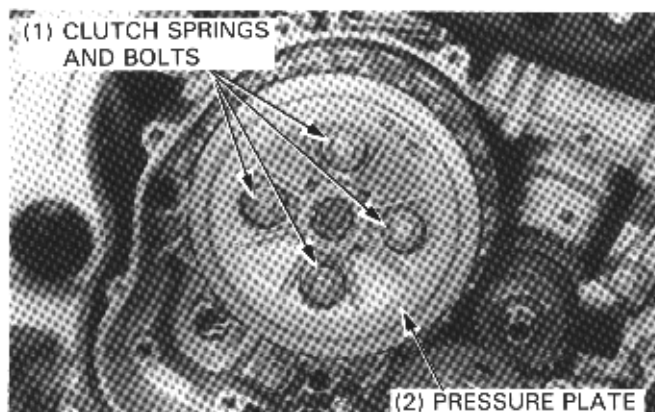


Install the clutch push rod tip into the mainshaft.





Install the pressure plate, clutch springs and clutch bolts, and tighten the bolts in a crisscross pattern in two or more steps.



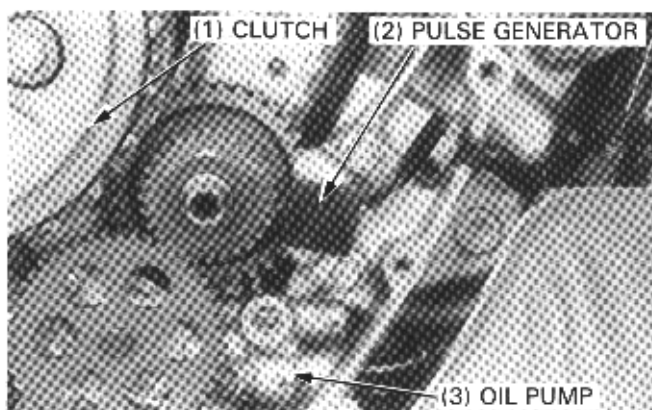
## PRIMARY DRIVE GEAR

### REMOVAL

Remove the pulse generator by removing the bolts and gromet.

Remove the following components:

- Clutch (page 8-2)
- Oil pump (page 2-5)



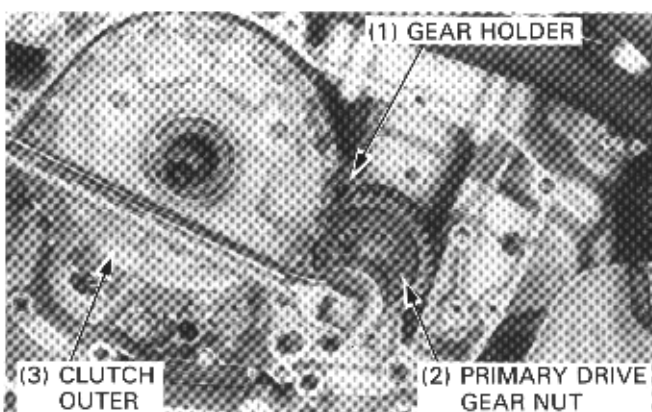
Temporarily install the clutch outer, then install the gear holder between the primary drive gear and driven gear as shown.

### TOOL:

**Gear holder**

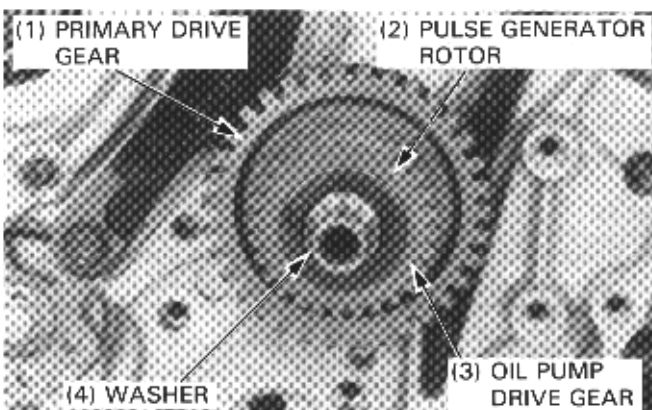
**07724-0010100**  
**Not available in U.S.A.**

Remove the primary drive gear nut, then remove the gear holder and clutch outer.



Remove the following:

- washer
- oil pump drive gear
- pulse generator rotor
- primary drive gear



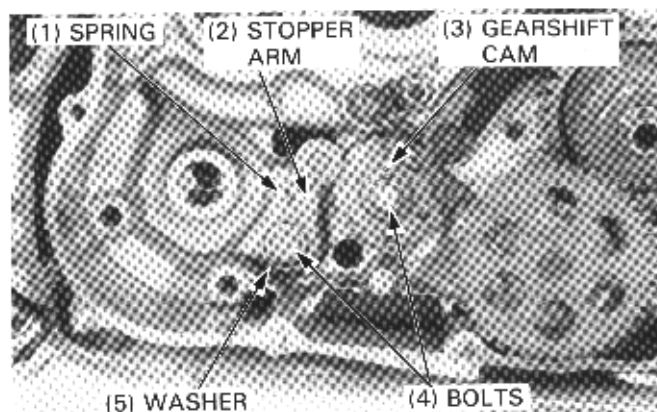


## GEARSHIFT CAM

### REMOVAL

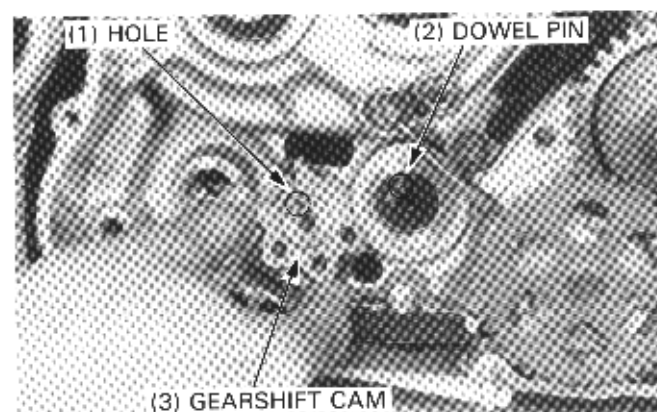
Remove the following:

- clutch (page 8-2)
- bolt, washer, stopper arm and spring
- bolt and gearshift cam



### INSTALLATION

Install the gearshift cam on the shift drum, aligning the hole in the cam with the dowel pin.

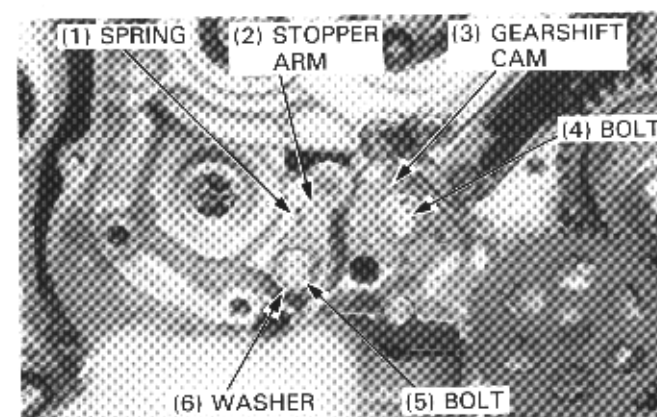


Apply a locking agent to the threads of the gearshift cam bolt, and tighten it to the specified torque.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**

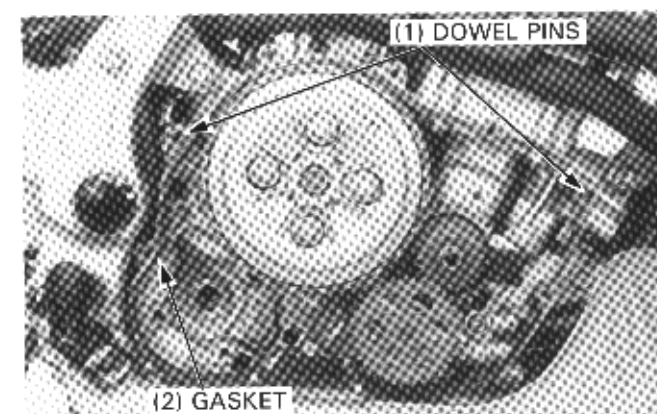
Install the spring, stopper arm, washer and bolt, holding the stopper arm with a screw driver. Tighten the stopper arm bolt.

Install the clutch (page 8-5)



## RIGHT CRANKCASE COVER INSTALLATION

Install the dowel pins and a new gasket.



## CLUTCH

Install the right crankcase cover, and install and tighten the bolts and nuts in a crisscross pattern in two or more steps.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**

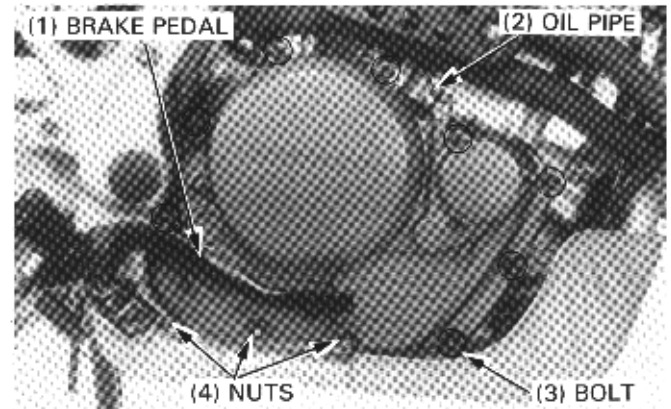
Install the following components:

- Oil pipe (page 6-20)
- Brake pedal (page 13-11)

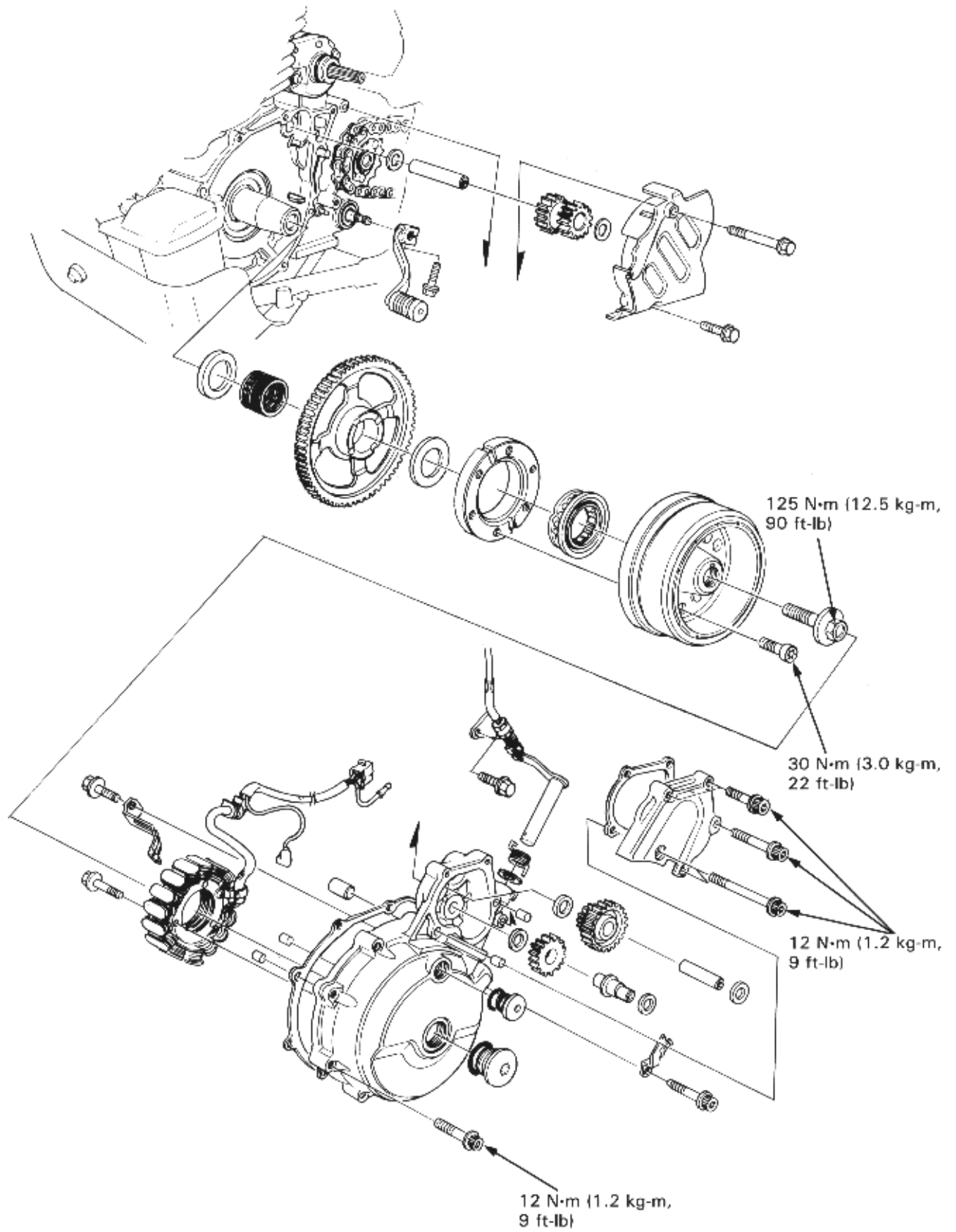
Fill the engine and oil tank with recommended oil (page 2-2).

Adjust the followings:

- Clutch lever free play (page 3-12)
- Brake pedal free play (page 3-11)



# ALTERNATOR/STARTER CLUTCH



# 9. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	9-1	STARTER CLUTCH	9-4
TROUBLESHOOTING	9-1	FLYWHEEL INSTALLATION	9-6
LEFT CRANKCASE COVER REMOVAL	9-2	LEFT CRANKCASE COVER ASSEMBLY	9-7
LEFT CRANKCASE COVER DISASSEMBLY	9-3	LEFT CRANKCASE COVER INSTALLATION	9-7
FLYWHEEL REMOVAL	9-3		

## SERVICE INFORMATION

### GENERAL

- This section covers servicing of the alternator and starter clutch. These operations can be accomplished with the engine in the frame.
- For alternator inspection and troubleshooting, refer to the section 16 and 17.

### SPECIFICATION

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear O.D.	57.755–57.768 mm (2.2738–2.2743 in)	57.66 mm (2.270 in)

### TORQUE VALUES

Starter clutch bolts	30 N·m (3.0 kg-m, 22 ft-lb) Apply a locking agent to the threads
Flywheel bolt	125 N·m (12.5 kg-m, 90 ft-lb) Apply MoS2 paste (page 2-14) to the threads
Left crankcase cover bolt	12 N·m (1.2 kg-m, 9 ft-lb)
Starter gear cover	12 N·m (1.2 kg-m, 9 ft-lb)

### TOOLS

#### Common

Flywheel holder	07725–0040000 or equivalent commercially available in U.S.A.
Rotor puller	07733–0020001 or 07933–3290001 (U.S.A. only)
Torx bit (T40)	07703–0010100 or equivalent commercially available in U.S.A.

## TROUBLESHOOTING

### Starter motor turns, but engine does not crank:

- Faulty starter clutch
- Faulty starter idle gears
- Faulty starter driven gear

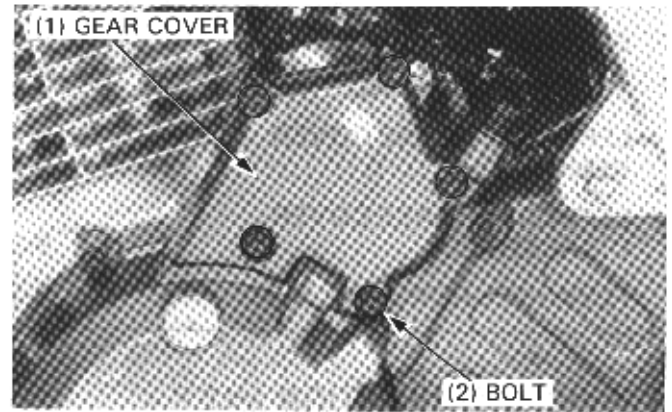
### Starter motor does not turn:

- Faulty starter motor (section 18)
- Faulty starting circuit (section 18)
- Bound idle gears

## LEFT CRANKCASE COVER REMOVAL

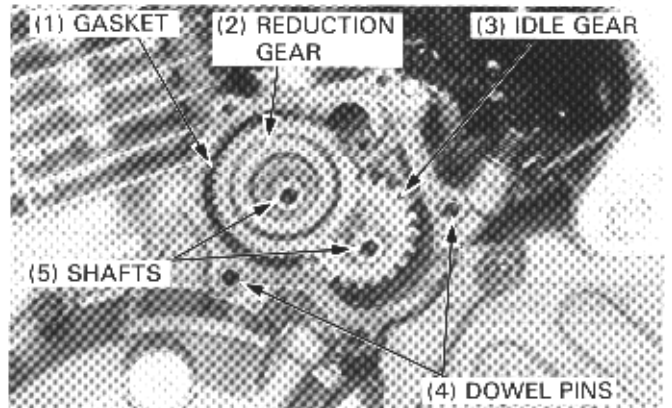
Remove the following:

- five socket bolts
- starter gear cover



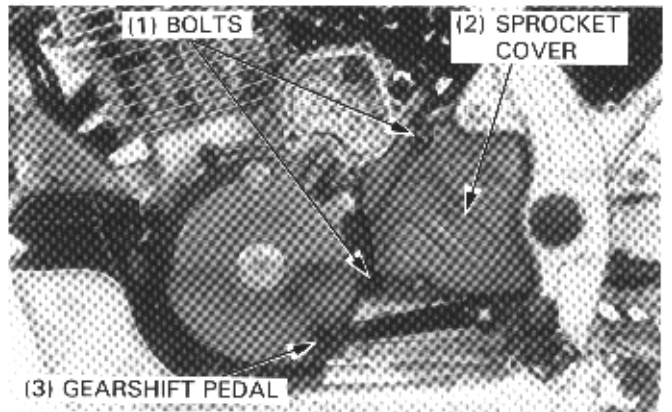
- dowel pins
- gasket
- shaft, reduction gear and washers
- shaft, idle gear and washers

Check the idle gear and reduction gear for excessive wear or damage.



Remove the following:

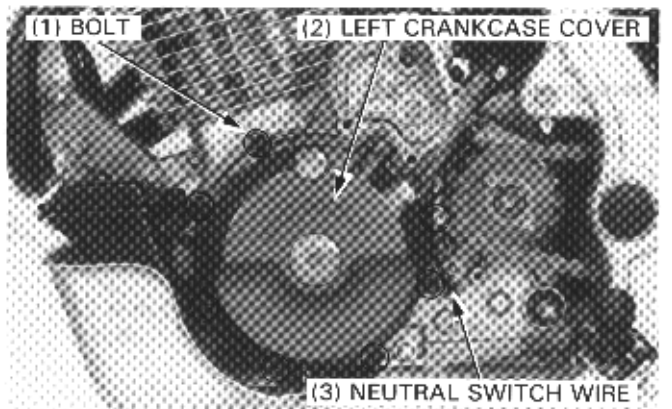
- gearshift pedal
- drive sprocket cover



Disconnect the neutral switch wire from the neutral switch. Remove the bolts and left crankcase cover.

### NOTE

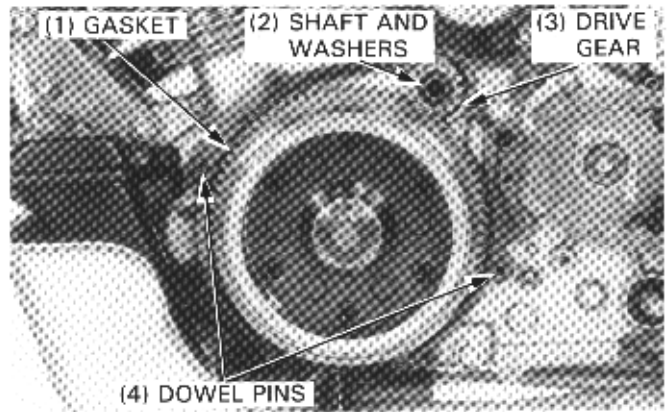
- Loosen the bolts in a crisscross pattern in two or more steps.



Remove the following:

- dowel pins
- gasket
- shaft, starter drive gear and washers

Check the starter drive gear for excessive wear or damage.

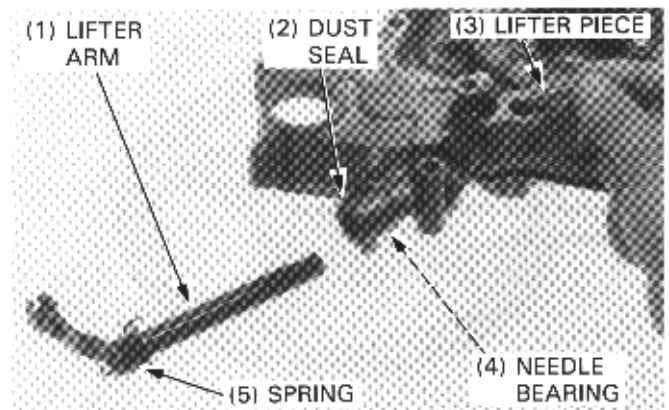


## LEFT CRANKCASE COVER DISASSEMBLY

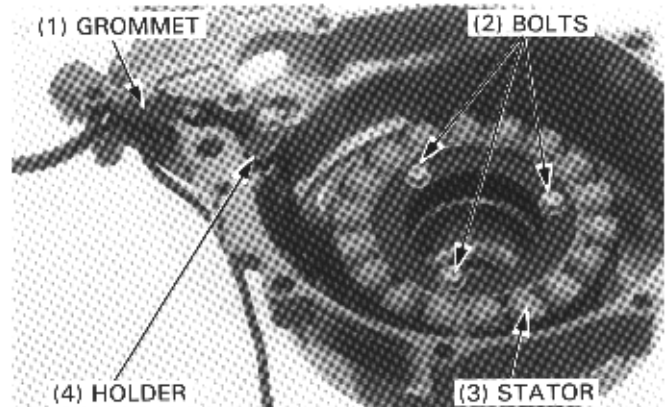
Remove the followings:

- Clutch lifter piece
- Clutch lifter arm
- Spring

Check the dust seal for damage or deterioration.  
Check the needle bearing for wear or damage.



Remove the alternator wire holder and grommet.  
Remove the three bolts and alternator stator.



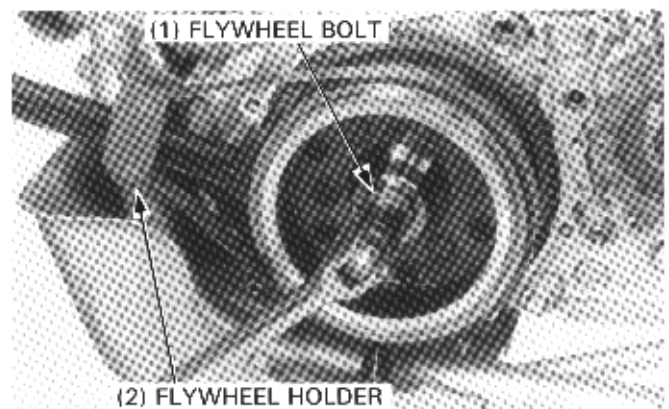
## FLYWHEEL REMOVAL

Remove the flywheel bolt while holding the flywheel with the flywheel holder.

**TOOL:**

Flywheel holder

**07725-0040000**  
or equivalent commercially  
available in U.S.A.





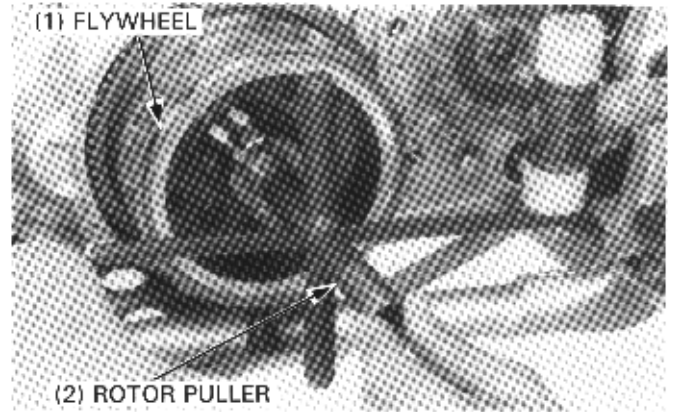
## ALTERNATOR/STARTER CLUTCH

Remove the flywheel using the rotor puller.

### TOOL:

Rotor puller

07733-0020001  
or 07933-3290001  
(U.S.A. only)

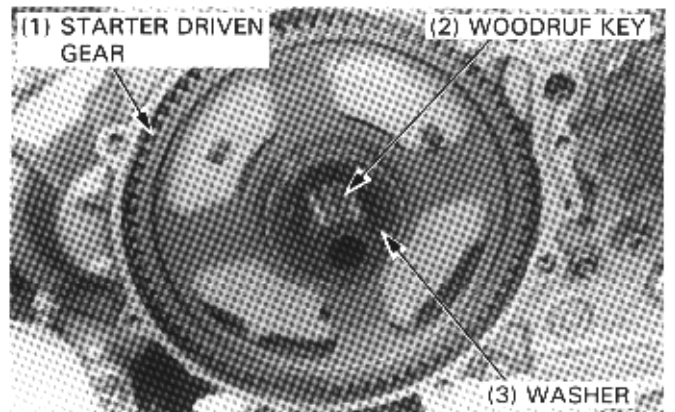


## STARTER CLUTCH

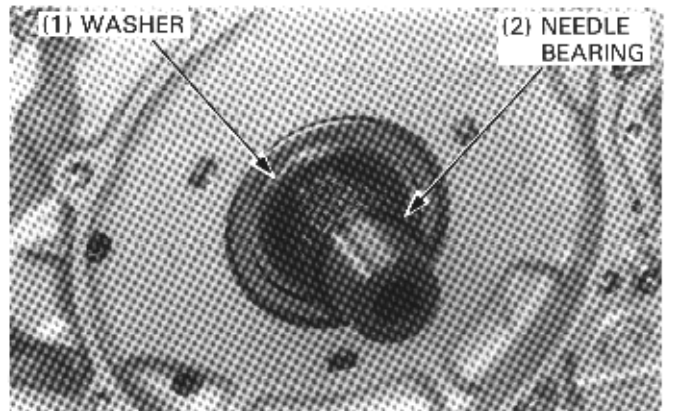
### REMOVAL/DISASSEMBLY

Remove the followings:

- Flywheel (page 9-3)
- Washer and starter driven gear
- Woodruff key

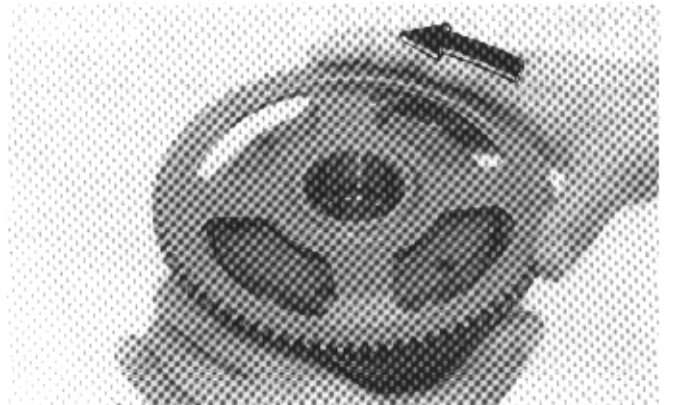


Remove the needle bearing and washer, and check the needle bearing for wear or damage.



Install the starter driven gear onto the flywheel and inspect the starter clutch by turning the starter driven gear. The driven gear should turn counter clockwise freely and should not turn clockwise, if not so, replace the starter clutch.

After inspection, remove the starter driven gear.



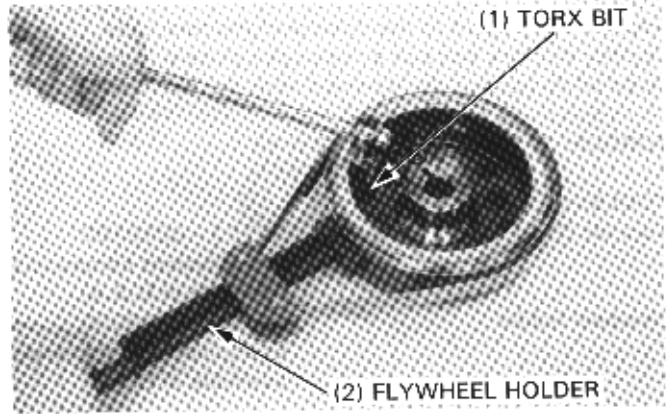
Loosen and remove the six torx bolts in a crisscross pattern in two or more steps, holding the flywheel with the flywheel holder.

**TOOLS:**

Torx bit (T40)

07703-0010100  
or equivalent commercially  
available in U.S.A.  
Flywheel holder  
07725-0040000  
or equivalent commercially  
available in U.S.A.

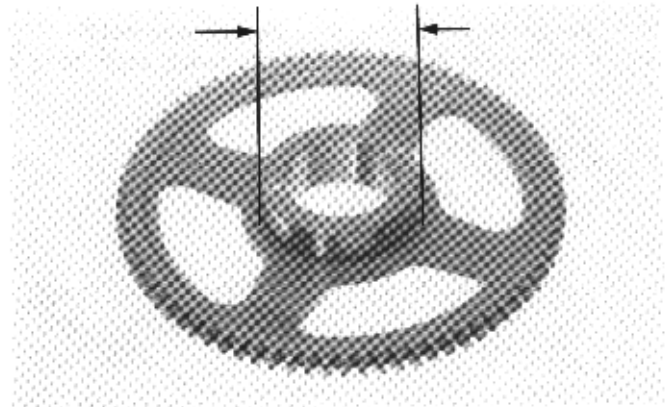
Flywheel holder



**INSPECTION**

Inspect the starter driven gear for excessive wear or damage. Measure the O.D. of the starter driven gear hub.

**SERVICE LIMIT: 57.66 mm (2.270 in)**

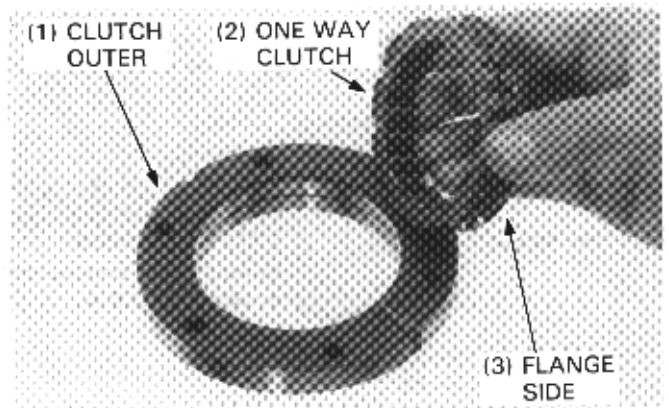


Inspect the one way clutch for wear or damage and replace if necessary.



**ASSEMBLY/INSTALLATION**

Install the one way clutch onto the clutch outer so that the flange side faces flywheel.



## ALTERNATOR/STARTER CLUTCH

Apply locking agent to the threads of the torx bolts. Tighten the torx bolts in a crisscross pattern in two or more steps while holding the flywheel with the flywheel holder.

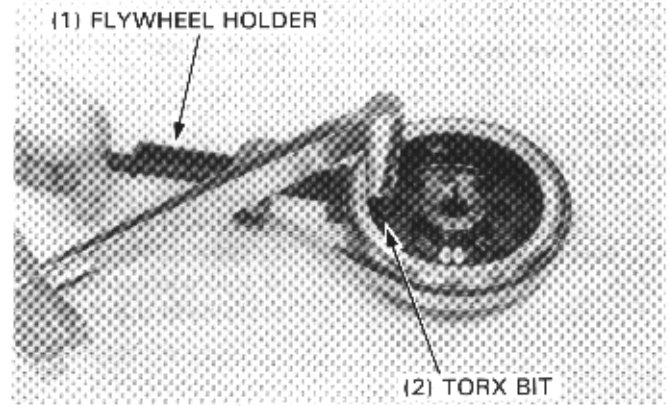
**TORQUE: 30 N·m (3.0 kg-m, 22 ft-lb)**

### TOOLS:

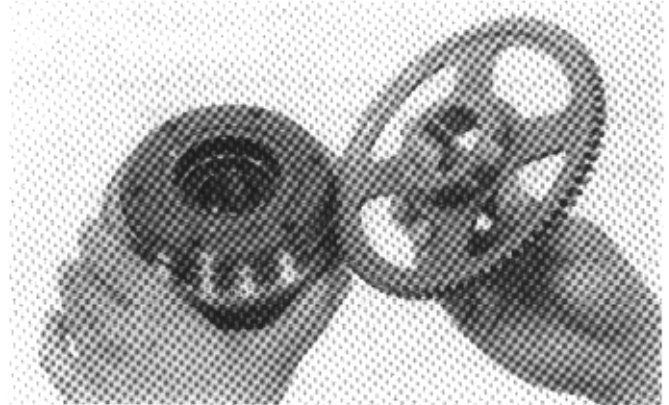
Torx bit (T40)

07703-0010100  
or equivalent commercially  
available in U.S.A.  
07725-0040000  
or equivalent commercially  
available in U.S.A.

Flywheel holder



Install the starter driven gear onto the one way clutch. With the flywheel, install the starter clutch assy, onto the crankshaft.



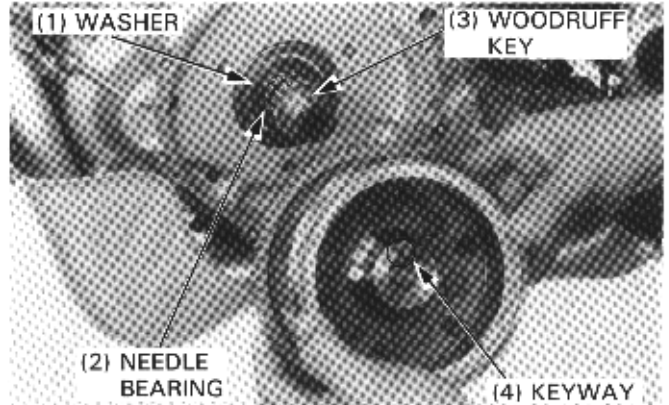
## FLYWHEEL INSTALLATION

Wipe all oil off the crankshaft and from within the tapered hole in the flywheel.

Install the following:

- woodruff key
- washer
- needle bearing

Install the flywheel onto the crankshaft, aligning the woodruff key with the keyway.



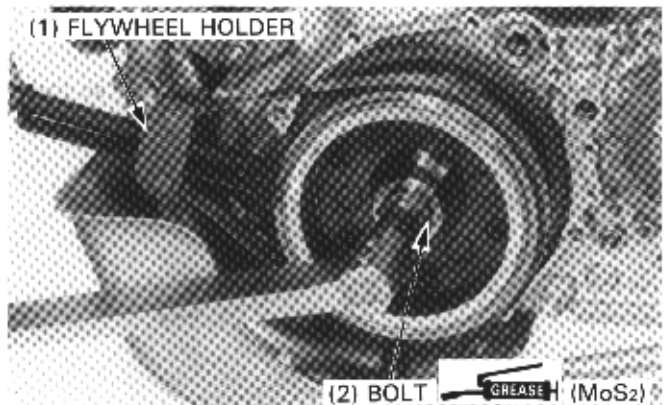
Apply MoS<sub>2</sub> paste to the threads of the flywheel bolt. Install the bolt and washer, and tighten the bolt while holding the flywheel.

**TORQUE: 125 N·m (12.5 kg-m, 90 ft-lb)**

### TOOL:

Flywheel holder

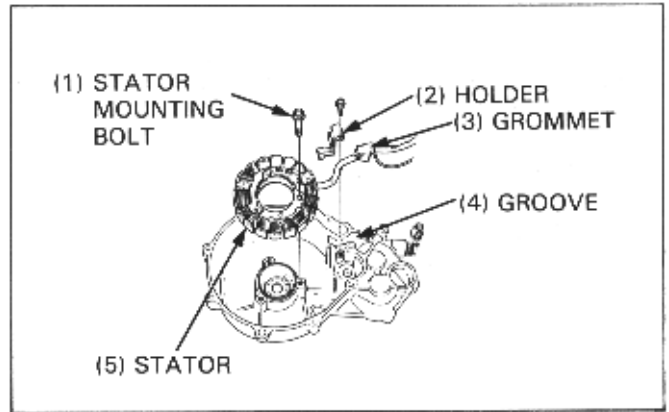
07725-0040000  
or equivalent commercially  
available in U.S.A.



## LEFT CRANKCASE COVER ASSEMBLY

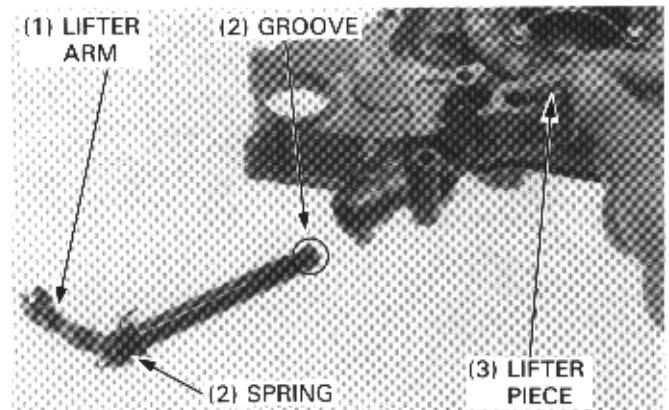
### ALTERNATOR STATOR INSTALLATION

Install the stator onto the left crankcase cover and apply a locking agent to the threads of the stator mounting bolts. Tighten the three bolts.  
Route the stator wire and install the wire grommet into the groove of the cover as shown.



### CLUTCH LIFTER ARM INSTALLATION

Install the spring onto the lifter arm.  
Insert the lifter arm and hook the spring to the left crankcase cover.  
Turn the lifter arm and install the lifter piece, aligning the groove on the lifter arm with the bottom of the lifter piece.



## LEFT CRANKCASE COVER INSTALLATION

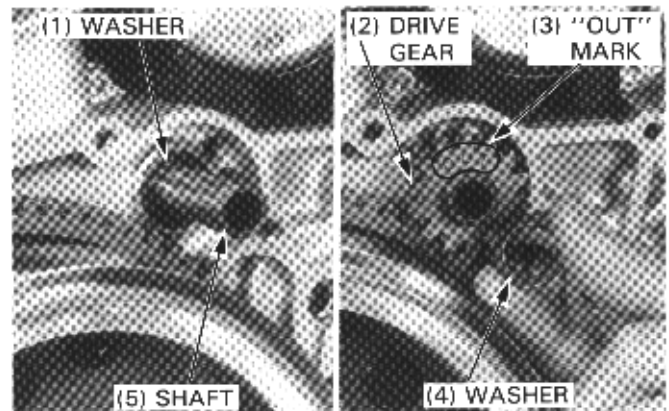
Install the following:

- washer and shaft
- starter drive gear

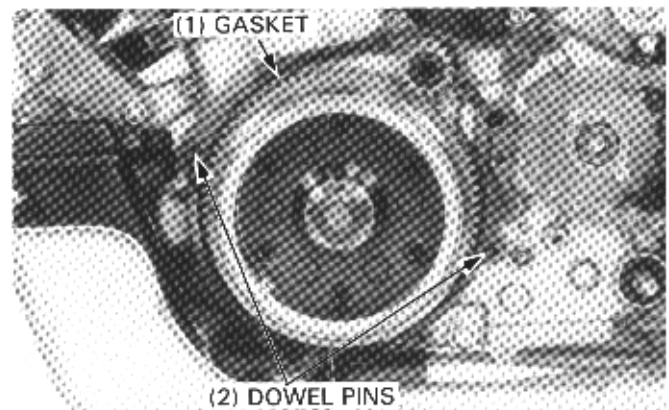
### NOTE

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

- washer



Install the dowel pins and a new gasket.



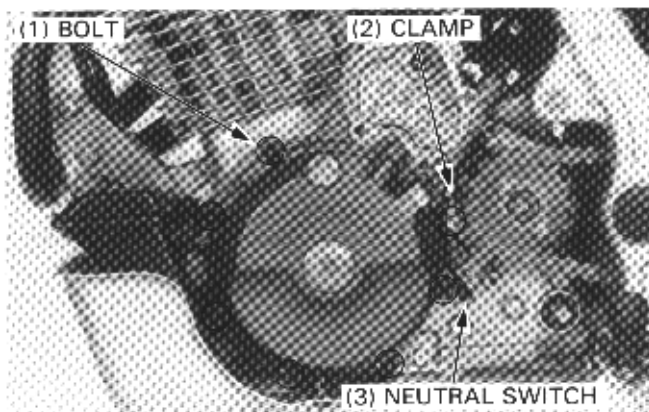
## ALTERNATOR/STARTER CLUTCH

Install the left crankcase cover and connect the neutral switch wire.

Put the neutral switch wire into the groove of the left crankcase cover.

Install the left crankcase cover with a clamp, and tighten the left crankcase cover bolts in a crisscross pattern in two or more steps.

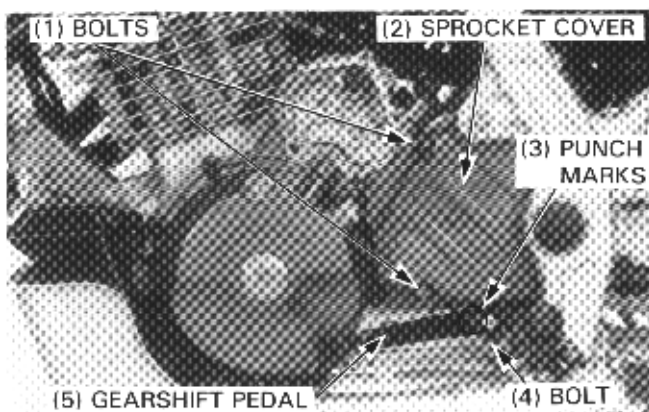
**TORQUE: 12 N·m (1.2 kg·m, 9 ft·lb)**



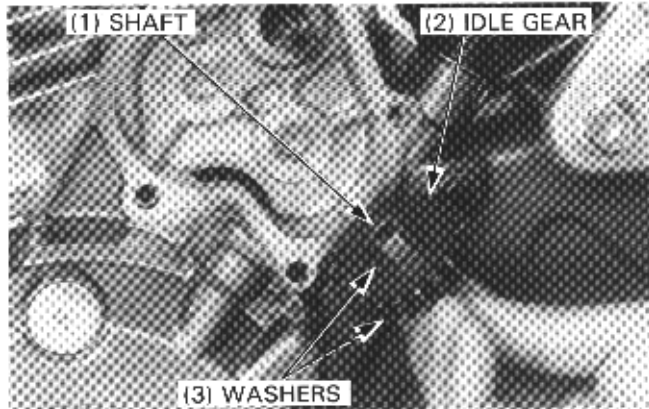
Install the drive sprocket cover and secure it with three bolts.

Install the gearshift pedal, aligning the punch marks on the pedal and gearshift spindle.

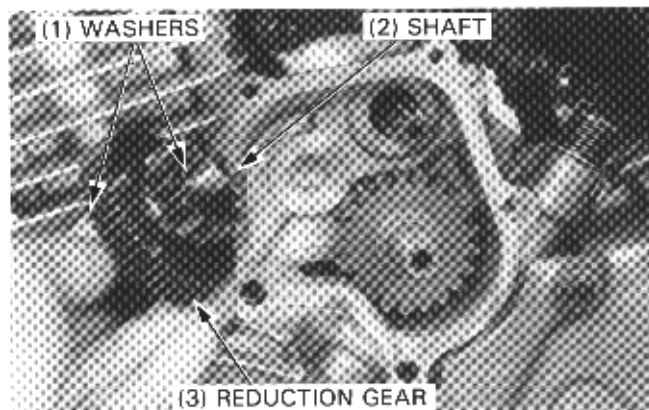
Secure the pedal with a bolt.



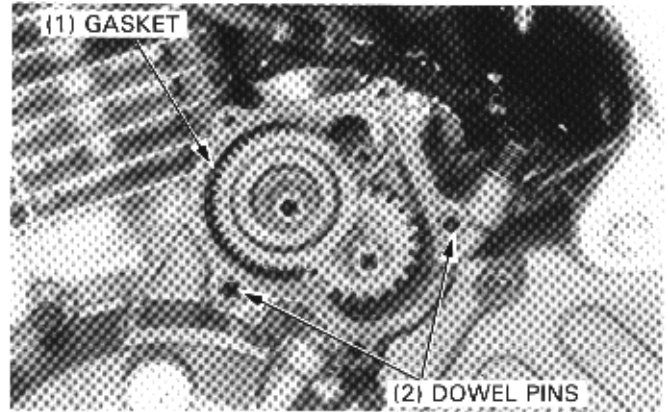
Install the shaft and idle gear with the washers.



Install the shaft and reduction gear with the washers.

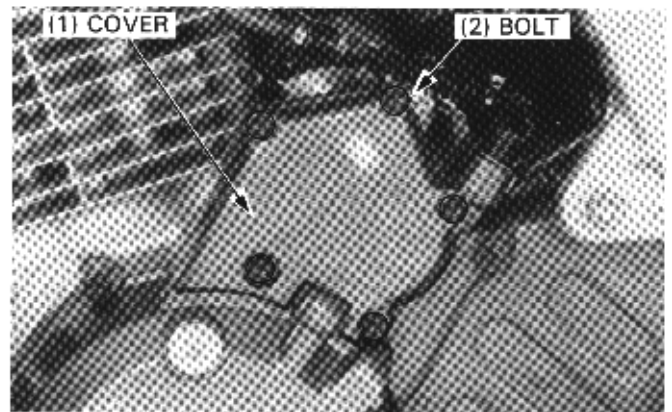


Install the dowel pins and a new gasket.

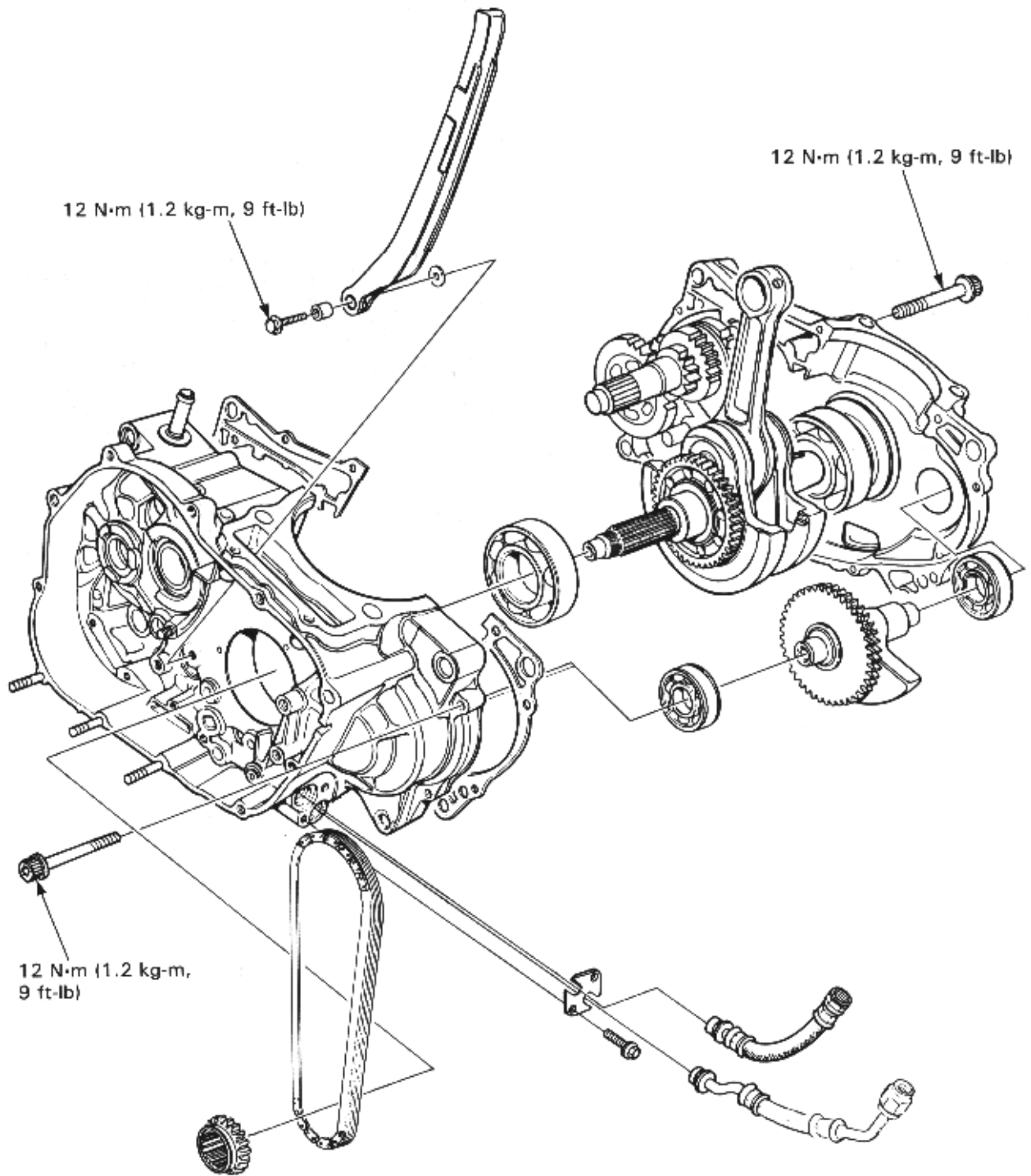


Install the starter gear cover and secure it with the five bolts.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**



# CRANKSHAFT/BALANCER



# 10. CRANKSHAFT/BALANCER

<b>SERVICE INFORMATION</b>	<b>10-1</b>	<b>CRANKCASE BEARING REPLACEMENT</b>	<b>10-6</b>
<b>TROUBLESHOOTING</b>	<b>10-2</b>	<b>CRANKSHAFT/BALANCER INSTALLATION</b>	<b>10-10</b>
<b>CRANKCASE SEPARATION</b>	<b>10-3</b>	<b>CRANKCASE ASSEMBLY</b>	<b>10-11</b>
<b>BALANCER/CRANKSHAFT REMOVAL</b>	<b>10-4</b>		

## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the crankshaft, connecting rod, transmission and balancer.
- Remove the following parts before separating the crankcase.

Engine	Section 5
Oil pump	Section 2
Cylinder head	Section 6
Cylinder/piston	Section 7
Clutch	Section 8
Alternator	Section 9

### SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Connecting rod big end side clearance	0.050–0.650 mm (0.0020–0.0256 in)	0.80 mm (0.031 in)
Connecting rod big end radial clearance	0.006–0.018 mm (0.0002–0.0007 in)	0.05 mm (0.002 in)
Crankshaft runout	—	0.10 mm (0.004 in)

### TORQUE VALUE

Crankcase bolt 12 N·m (1.2 kg-m, 9 ft-lb)

### TOOLS

#### Special

Universal bearing puller	07631–0010000	
Bearing puller catch	07931–MK20100	
Bearing remover	07936–MK50100	or equivalent commercially available in U.S.A.
Remover handle	07936–KC10100	
Remover sliding weight	07741–0010201	
Needle race remover	07GMC–MK50100	
Bearing remover shaft	07746–0060100	
Puller shaft	07931–ME40000	or 07931–ME4000A
Assembly collar	07931–KF00100	
Thread adaptor	07931–KF00200	
Attachment, 78 x 90 mm	07GAD–SD40101	

#### Common

Driver	07749–0010000
Pilot, 35 mm	07746–0040800
Attachment, 52 x 55 mm	07746–0010400
Pilot, 25 mm	07746–0040600
Attachment, 42 x 47 mm	07746–0010300
Pilot, 40 mm	07746–0040900
Attachment, 32 x 35 mm	07746–0010100
Attachment, 62 x 68 mm	07746–0010500
Attachment, 35 mm I.D.	07746–0030400
Attachment, 72 x 75 mm	07746–0010600
Pilot, 20 mm	07746–0040500



## **TROUBLESHOOTING**

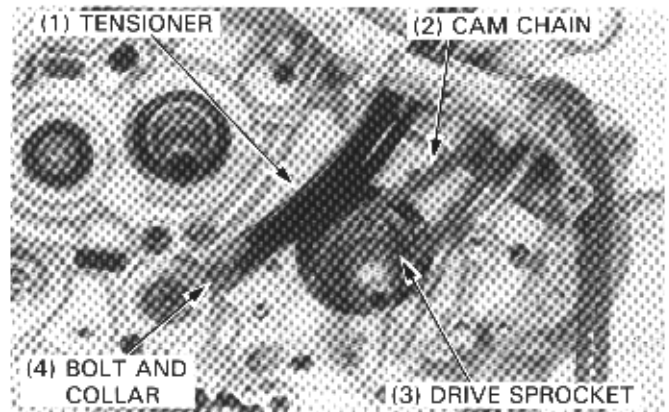
### **Excessive Noise**

- Crankshaft
  - Worn connecting rod bearings
  - Bent connecting rod
  - Worn crankshaft bearings
  
- Balancer
  - Improper installation
  - Worn balancer bearings

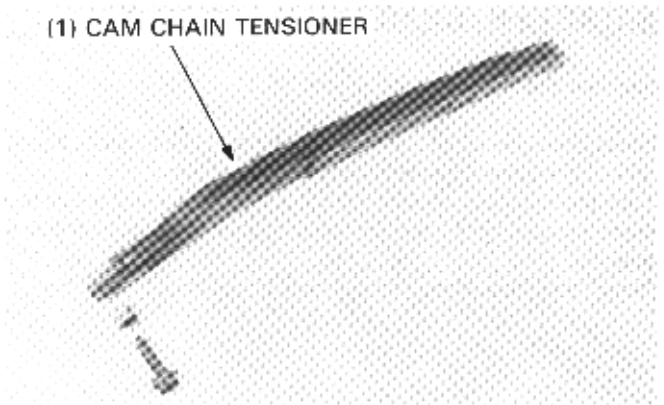
## CRANKCASE SEPARATION

Remove the following:

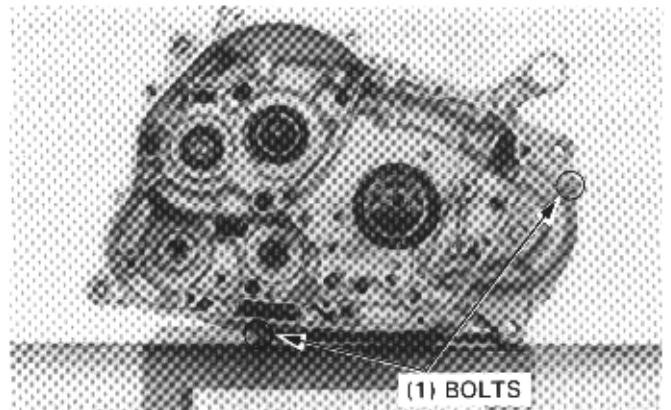
- bolt, collar and cam chain tensioner
- cam chain
- cam chain drive sprocket



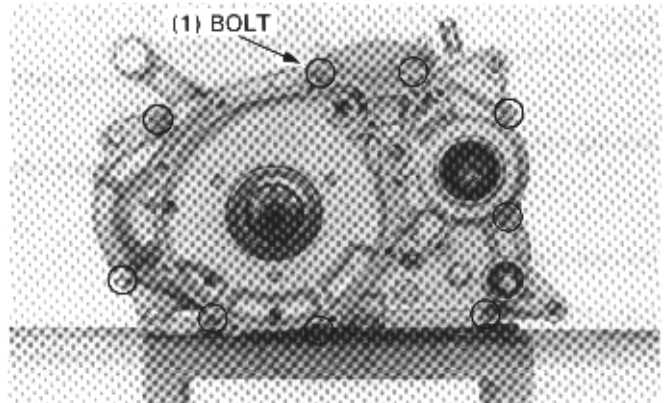
Inspect the cam chain tensioner for excessive wear or damage.



Loosen and remove the right crankcase bolts.



Loosen and remove the left crankcase bolts in a crisscross pattern in two or more steps.



## CRANKSHAFT/BALANCER

Remove the right crankcase from the left crankcase.

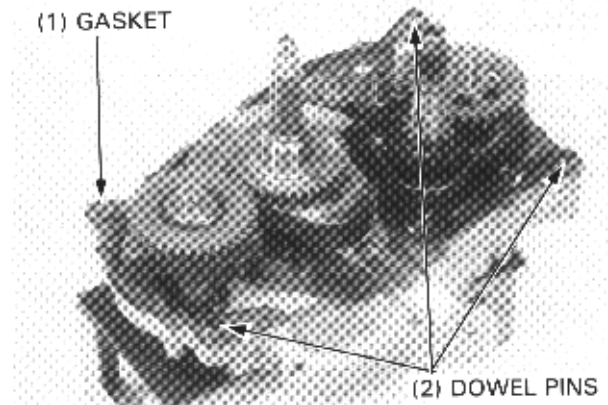
### NOTE

- Separate the right and left crankcases from each other while tapping them at several locations with a soft hammer.

### CAUTION

- Do not pry the crankcases apart with a screwdriver.

Remove the gasket and dowel pins.

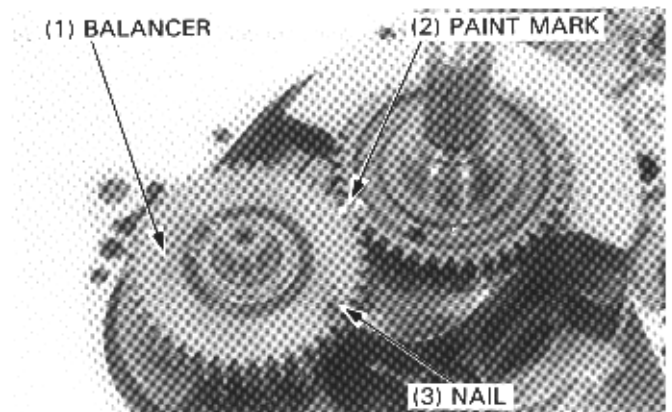


## BALANCER/CRANKSHAFT REMOVAL

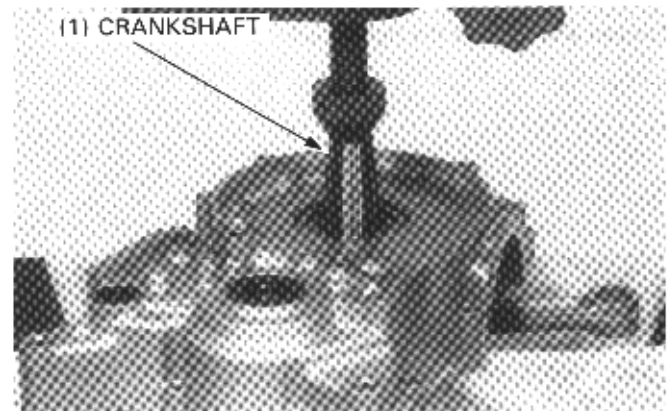
Remove the transmission (page 11-3).

Insert a proper sized nail into the holes in the balancer, while prying the scissors gears with a screwdriver. Turn the balancer weight with the balancer weight out of the crank weight, and paint on the balancer drive gear and driven gear.

Remove the balancer and pull out the nail.



Using a hydraulic press, press the crankshaft out of the left crankcase.



Remove the left crankshaft bearing with a bearing puller if it comes out with the crankshaft.

### TOOL:

Universal bearing puller

07631-0010000  
or equivalent commercially  
available in U.S.A.

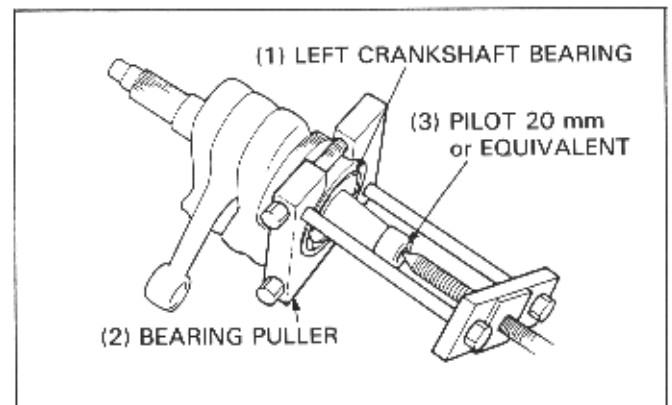
Bearing puller catch

07931-MK20100  
or equivalent commercially  
available in U.S.A.

Discard the bearing.

### CAUTION

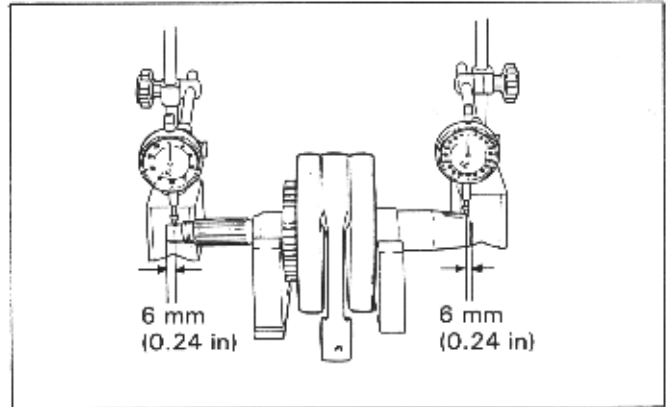
- Always replace the left bearing with a new one if it comes with the crankshaft.



**CRANKSHAFT INSPECTION**

Set the crankshaft on a truing stand or V blocks and measure the runout using a dial indicator.

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



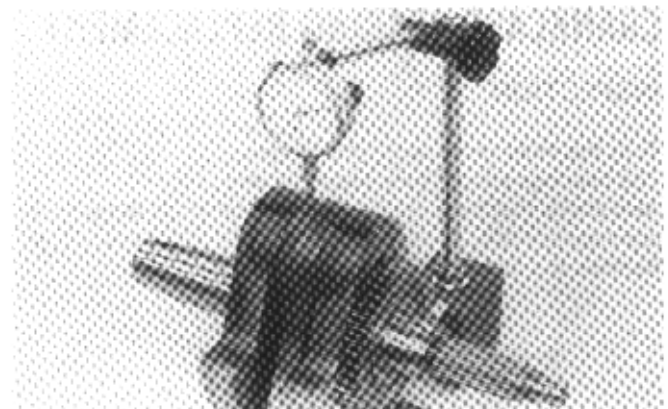
Measure the side clearance of the connecting rod big end with a feeler gauge.

**SERVICE LIMIT: 0.80 mm (0.031 in)**



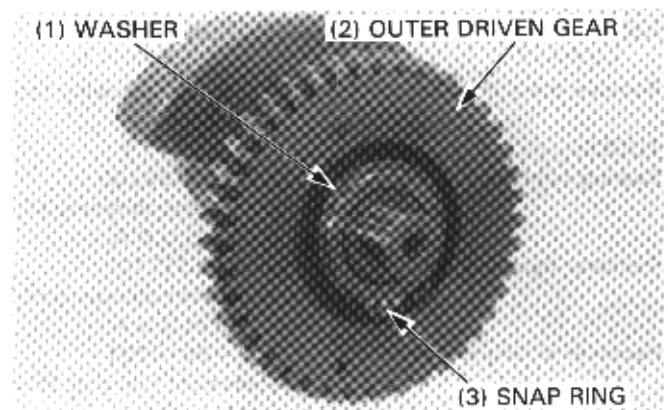
Measure the connecting rod big end radial clearance.

**SERVICE LIMIT: 0.05 mm (0.002 in)**



**BALANCER DISASSEMBLY/ASSEMBLY**

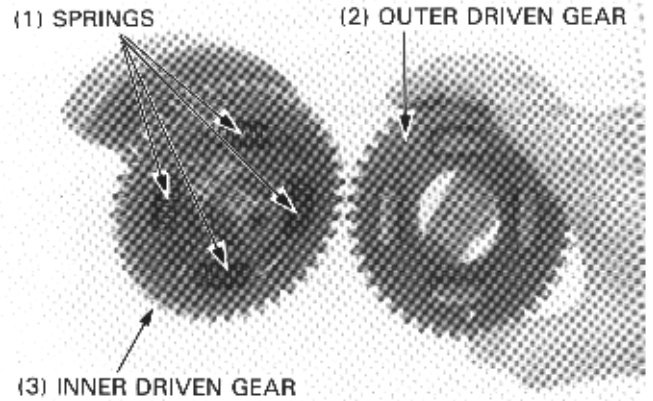
Separate the outer driven gear from the inner driven gear by removing the snap ring and cone spring washer. Remove the four springs from the inner driven gear.



## CRANKSHAFT/BALANCER

Check the gears and springs for wear, damage or fatigue, and replace if necessary.

Install the four springs into the inner driven gear.

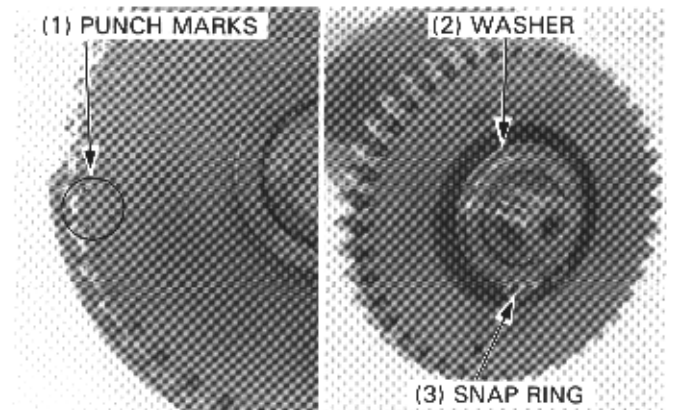


Install the outer driven gear onto the inner driven gear.

### NOTE

- Position the punch mark on the outer gear between the punch marks on the inner gear.

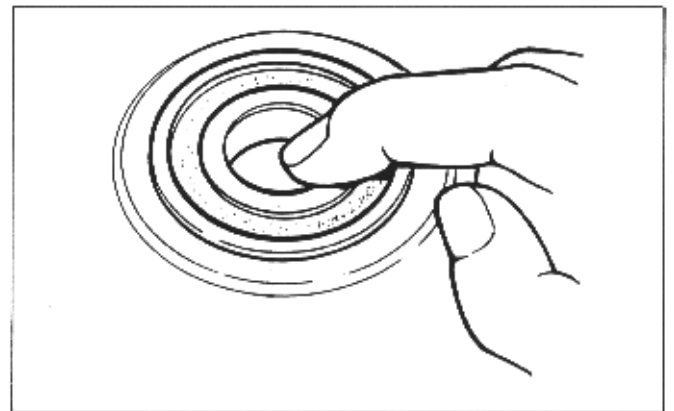
Install the cone spring washer and the snap ring securely.



## CRANKCASE BEARING REPLACEMENT

### INSPECTION

Turn the inner races with your finger.  
The bearings should turn smoothly and quietly.  
Also check that the outer races of the bearings fit tightly in the crankcase.  
Replace the bearings if necessary.

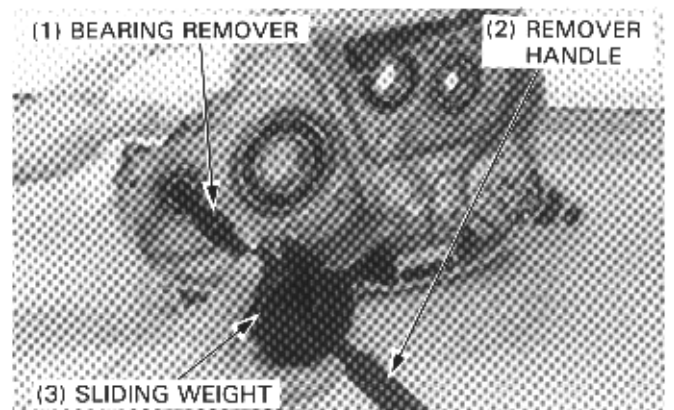


### RIGHT CRANKCASE BEARING REPLACEMENT

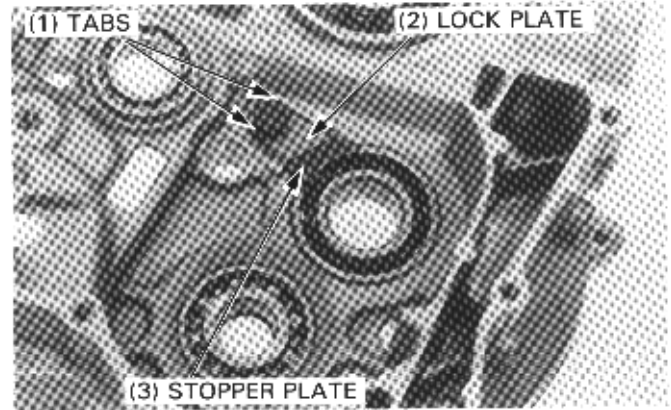
Remove the right balancer bearing using the following tools.

#### TOOLS:

Bearing remover	07936—MK50100 or equivalent commercially available in U.S.A.
Remover handle	07936—KC10100 or equivalent commercially available in U.S.A.
Remover sliding weight	07741—0010201 or equivalent commercially available in U.S.A.



Bend down the tabs of the lock plate, and remove the bolt, lock plate and bearing stopper plate.  
Discard the lock plate.



Remove each bearing out of the right crankcase.  
Remove the oil seal and discard it after removing the right crankshaft bearing.  
Apply clean engine oil to the lip of the new right counter shaft oil seal and install it securely.



Apply oil to each new bearings, and drive each bearing into the right crankcase.

**NOTE**

- Drive in the bearing perpendicularly to the right crankcase.

**TOOLS:**

**Crankshaft bearing**

Driver	07749-0010000
Attachment, 72 x 75 mm	07746-0010600
Pilot, 35 mm	07746-0040800

**Right mainshaft bearing**

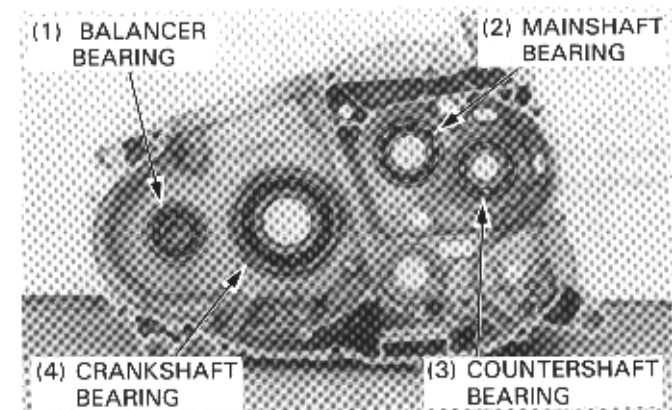
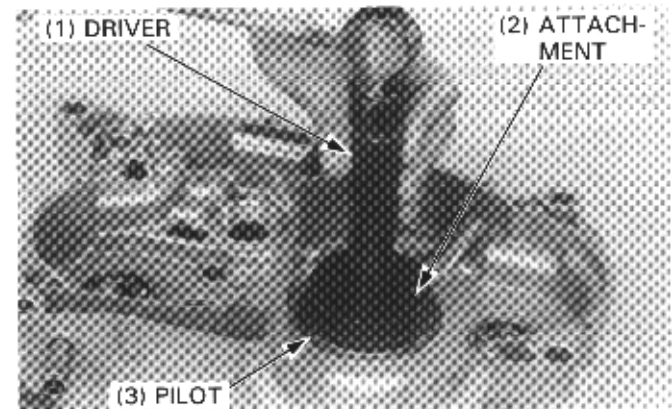
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 25 mm	07746-0040800

**Right countershaft bearing**

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

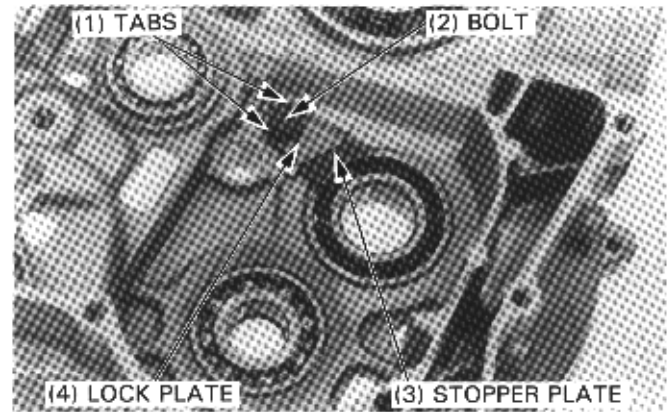
**Right balancer bearing**

Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300



## CRANKSHAFT/BALANCER

Install the bearing stopper plate and new lock plate, and secure them with a bolt.  
Bend up the tabs of the lock plate against the bolt.

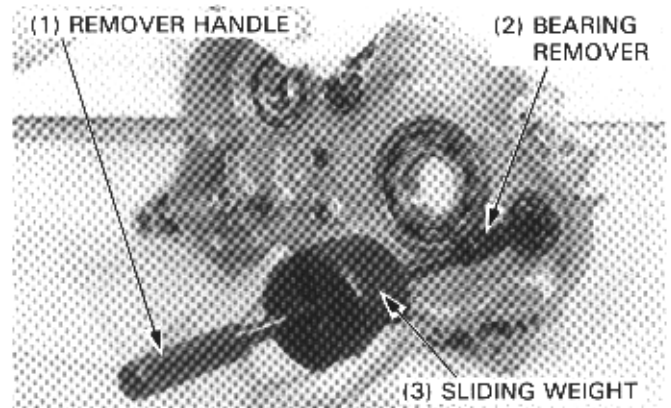


### LEFT CRANKCASE BEARING REPLACEMENT

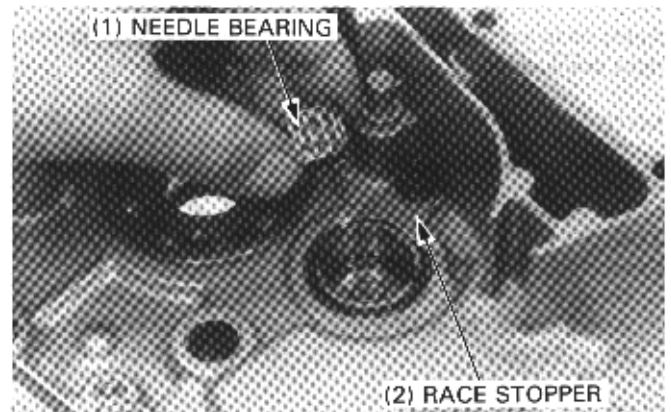
Remove the left balancer bearing using the following tools.

#### TOOLS:

Bearing remover	07936—MK50100 or equivalent commercially available in U.S.A.
Remover handle	07936—KC10100 or equivalent commercially available in U.S.A.
Remover sliding weight	07741—0010201 or equivalent commercially available in U.S.A.



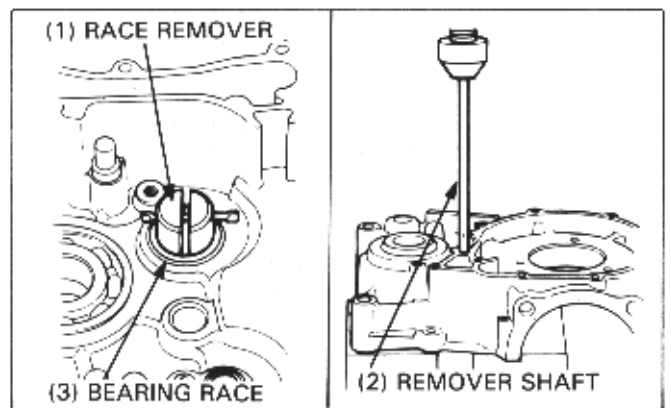
Remove the needle bearing and check it for wear or damage, and replace if necessary.  
Remove the bolt and bearing race stopper.



Remove the needle bearing race from the right crankcase using the following tools.

#### TOOLS:

Needle race remover	07GMC—MK50100
Bearing remover shaft	07746—0060100



Remove the left countershaft bearing oil seal and discard it. Check the gearshift spindle oil seal for wear, damage or fatigue, and replace it if necessary.

Remove each bearing out of the left crankcase.

Replace the bearing plate if necessary.

Apply oil to each new bearing, and drive each bearing into the left crankcase.

**NOTE**

- Drive in the bearings perpendicularly to the left crankcase.

**TOOLS:**

**Left crankshaft bearing**

Driver	07749-0010000
Attachment, 78 x 90 mm	07GAD-SD40101
Pilot, 40 mm	07746-0040900

**Left mainshaft bearing race**

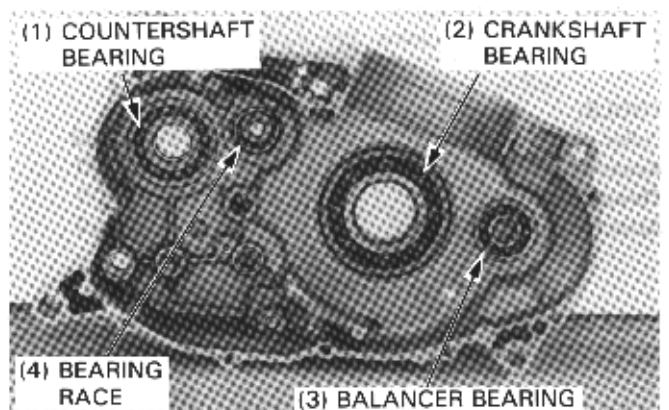
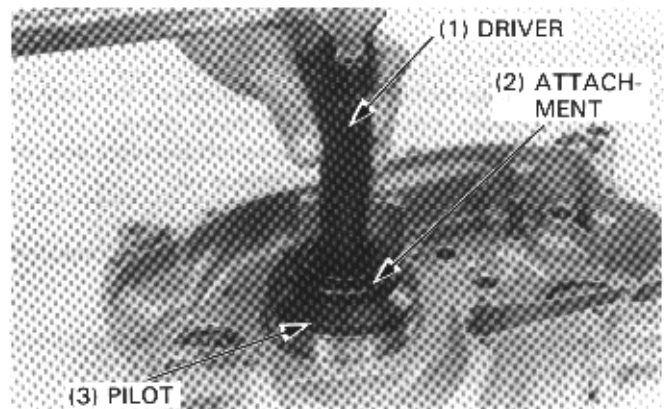
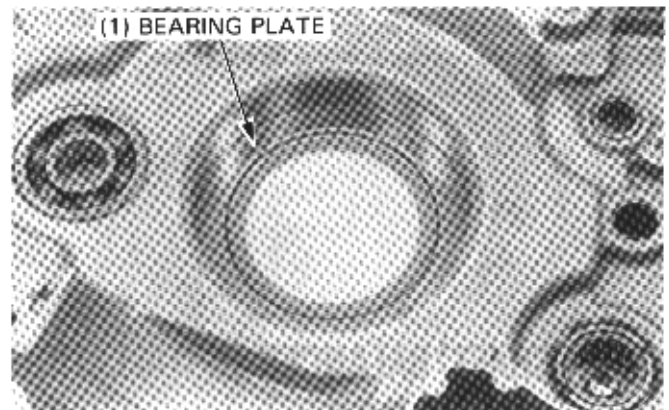
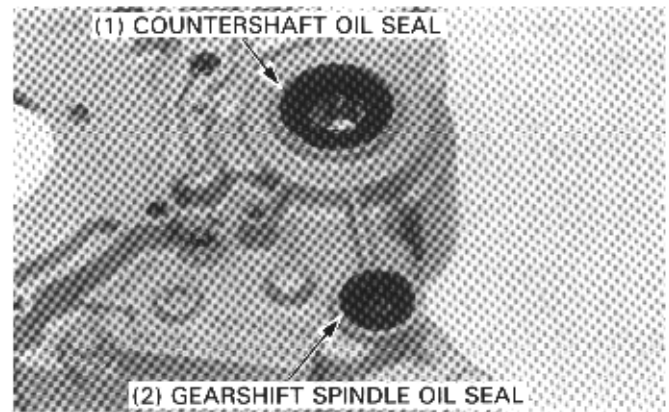
Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100

**Left countershaft bearing**

Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500
Pilot, 25 mm	07746-040600

**Left balancer bearing**

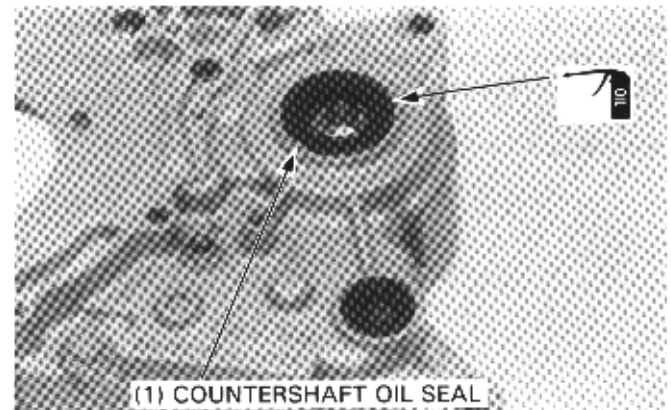
Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300



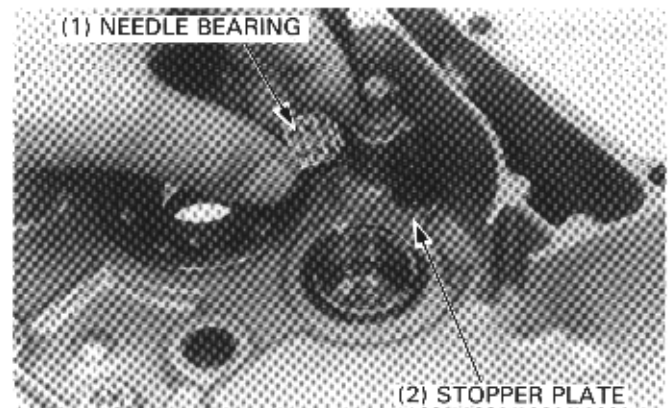


## CRANKSHAFT/BALANCER

Install a new countershaft oil seal in the left crankcase, and apply oil to the oil seal lip.



Secure the bearing race stopper plate with the bolt. Install the needle bearing into the bearing race.



## CRANKSHAFT/BALANCER INSTALLATION

Clean the crankcase mating surfaces before assembling and check for wear or damage.

### NOTE

- If there is minor roughness or irregularities on the crankcase mating surfaces, dress them with an oil stone.
- After cleaning, lubricate the crankshaft bearings and other contacting surfaces with clean engine oil.

Install the special tool into the thread end of the crankshaft. Position the crankshaft into the left crankcase.

Draw the crankshaft into the left crankcase with the following tools:

### NOTE

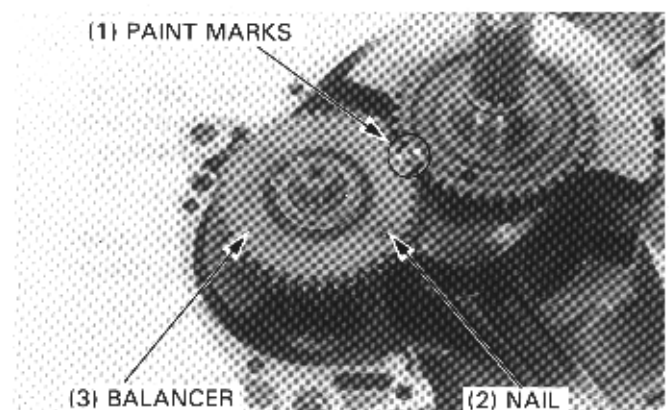
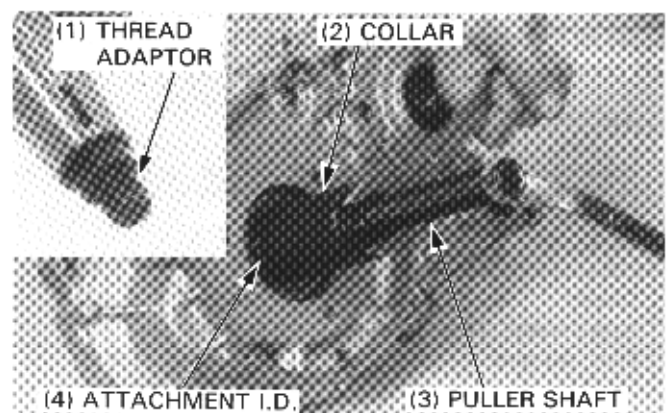
- Draw in the crankshaft, making sure the connecting rod is not compressed against the crankcase edge.

### TOOLS:

Puller shaft	07931 – ME40000
Assembly collar	07931 – KF00100
Thread adaptor	07931 – KF00200
Attachment I.D. 35 mm	07746 – 0030400

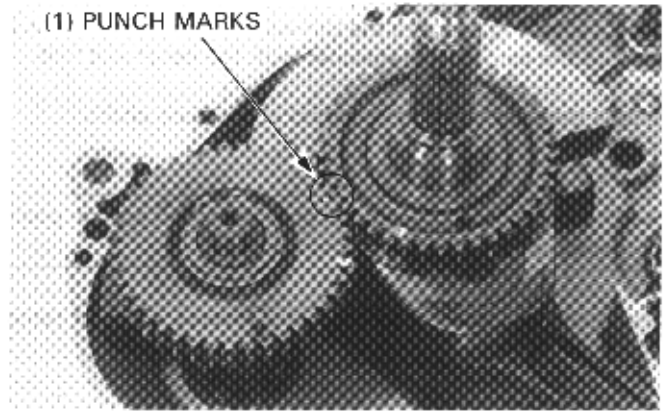
Insert a proper sized nail into the hole in the balancer, while prying the scissors gears with a screw driver.

Install the balancer with the paint marks aligned.



Turn the balancer, and make sure the punch marks on the balancer drive gear and driven gear are aligned. Draw the nail out of the balancer.

Install the transmission (section 11).



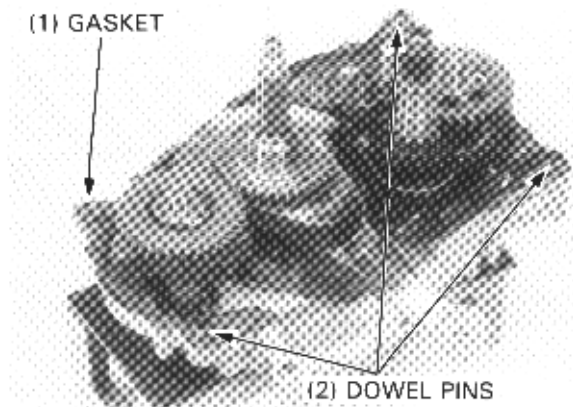
## CRANKCASE ASSEMBLY

Install the three dowel pins and a new gasket.

Assemble the right and left crankcases being careful to align the dowel pins and shafts.

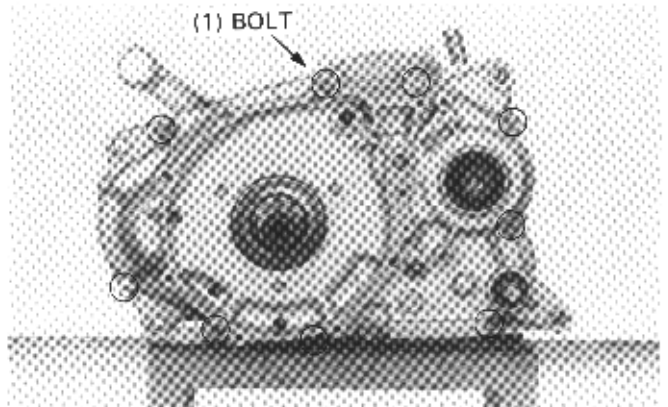
### CAUTION

- *Don't force the crankcase halves together; if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.*



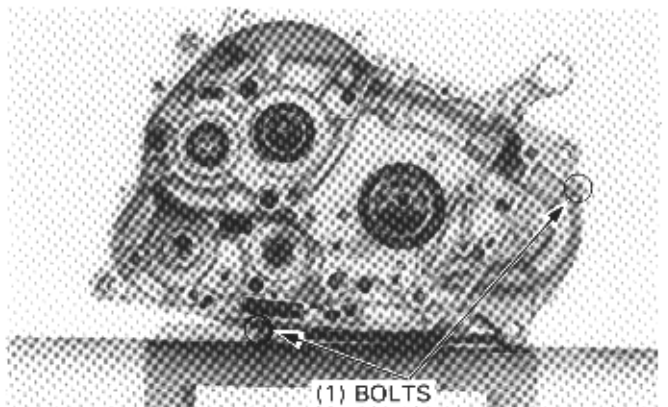
Tighten the left crankcase bolts in a crisscross pattern in two or more steps.

**TORQUE: 12 N-m (1.2 kg-m, 9 ft-lb)**



Tighten the right crankcase bolts.

**TORQUE: 12 N-m (1.2 kg-m, 9 ft-lb)**



## CRANKSHAFT/BALANCER

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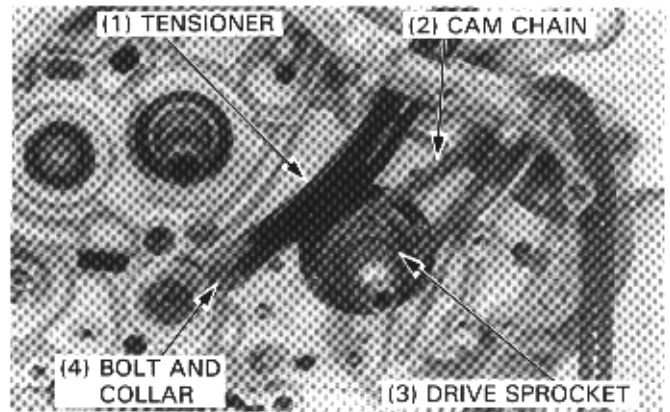
Apply a locking agent to the threads of the tensioner bolt. Secure the cam chain tensioner with the collar and bolt.

Install the cam chain drive sprocket and cam chain.

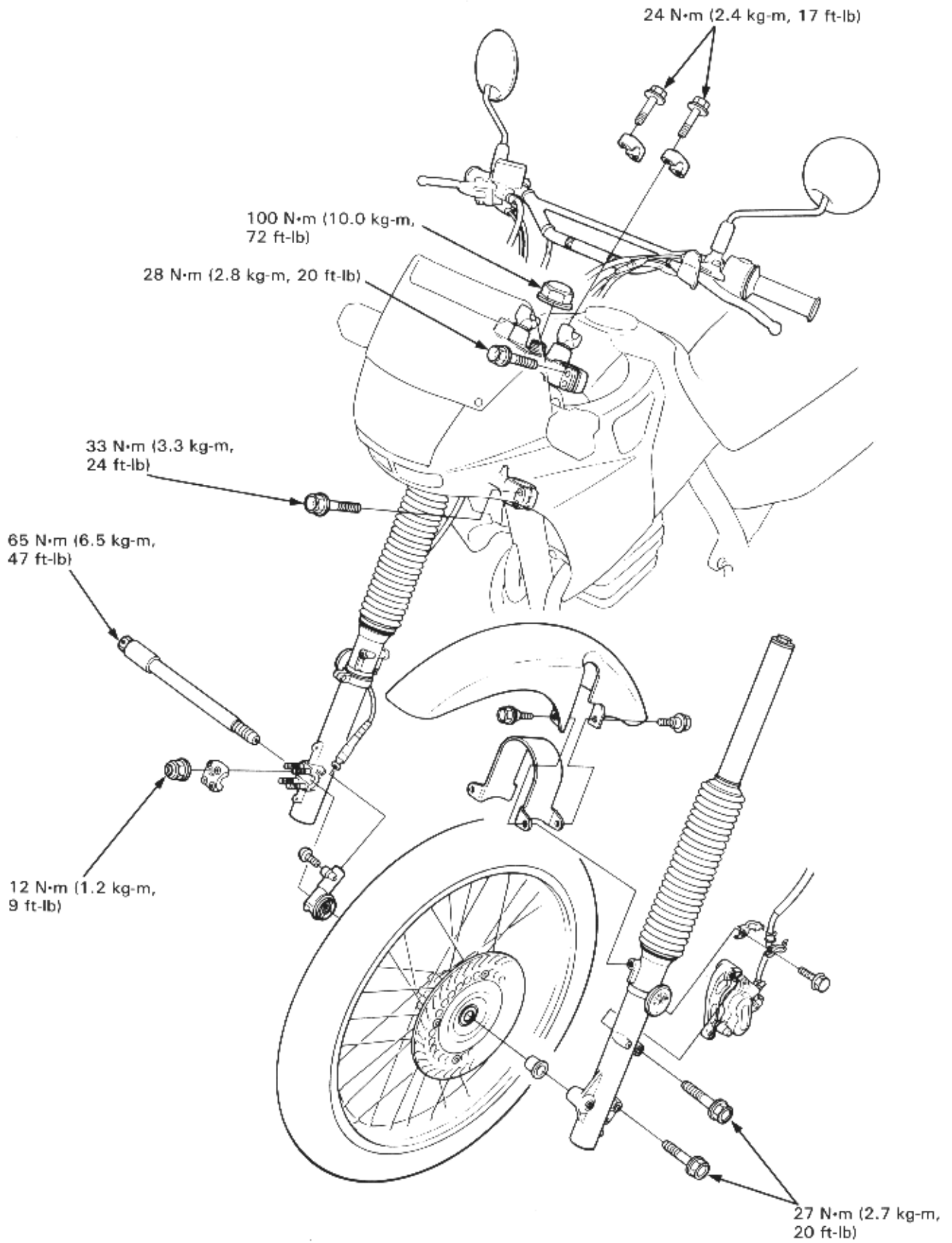
### NOTE

- The cam chain drive sprocket will only go on one position because of extra-wide aligning spline.

Reinstall the removed parts in the reverse order of removal (page 10-1).



# FRONT WHEEL/SUSPENSION/STEERING



# 12. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	12-1	FRONT WHEEL	12-5
TROUBLESHOOTING	12-2	FORK	12-10
HANDLEBARS	12-3	STEERING STEM	12-17

## SERVICE INFORMATION

### GENERAL

- A box or work stand is required to support the motorcycle.

#### ⚠ WARNING

*Brake dust may contain asbestos.*

- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.*
- *In the United States, use an OSHA approved vacuum cleaner or alternate method approved by OSHA designed to minimize the hazard caused by airborne asbestos fibers.*

### SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Axle runout	—	0.2 mm (0.01 in)
Front wheel rim runout	Radial	2.0 mm (0.08 in)
	Axial	2.0 mm (0.08 in)
Fork spring free length	599.3 mm (23.59 in)	593.3 mm (23.36 in)
Fork tube runout	—	0.2 mm (0.01 in)
Front fork oil capacity	592 cc (20.0 US oz, 20.8 Imp oz)	—
Fork oil level	120 mm (4.7 in)	—

12

### TORQUE VALUES

Handlebars upper holder	24 N·m (2.4 kg-m, 17 ft-lb)
Handlebars lower holder	24 N·m (2.4 kg-m, 17 ft-lb)
Front hub cover screw	1.5 N·m (0.15 kg-m, 1.1 ft-lb)
Brake disc bolt	15 N·m (1.5 kg-m, 11 ft-lb)
Front axle	65 N·m (6.5 kg-m, 47 ft-lb)
Front axle holder nut	12 N·m (1.2 kg-m, 9 ft-lb)
Fork slider socket bolt	20 N·m (2.0 kg-m, 14 ft-lb) Apply locking agent to the threads
Lower fork pinch bolt	33 N·m (3.3 kg-m, 24 ft-lb)
Fork cap bolt	23 N·m (2.3 kg-m, 17 ft-lb)
Upper fork pinch bolt	24 N·m (2.4 kg-m, 17 ft-lb)
Brake caliper bracket bolt	25 N·m (2.5 kg-m, 18 ft-lb)
Steering adjustment nut	5 N·m (0.5 kg-m, 3.6 ft-lb)
Steering stem nut	100 N·m (10.0 kg-m, 72 ft-lb)

### TOOLS

#### Special

Fork seal driver	07947-KA50100
Fork seal driver attachment	07947-KF00100
Steering stem socket	07916-KA50100
Steering stem driver	07946-4300101 or 07946-MB00000
Ball race remover	07953-MJ10000 or 07953-MJ1000A (U.S.A. only)
— Ball race remover attachment	07953-MJ10100
— Driver handle	07953-MJ10200
Adjustable pin spanner	07702-0020001
Steering bearing attachment	GN HT54 (U.S.A. only)

## FRONT WHELL/SUSPENSION/STEERING

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### Common

Bearing remover head, 15mm	07746-0050400	} or equivalent commercially available in U.S.A.
Bearing remover shaft	07746-0050100	
Driver	07749-0010000	
Attachment, 32 x 35 mm	07746-0010100	
Pilot, 15 mm	07746-0040300	
Lock nut wrench, 30 x 32 mm	07716-0020400	} or equivalent commercially available in U.S.A.
Extension bar	07716-0020500	
Attachment, 42 x 47 mm	07746-0010300	

## TROUBLESHOOTING

### Hard Steering

- Steering adjustment too tight
- Faulty steering stem bearings
- Insufficient air in front tire

### Steers to One Side or Does Not Track Straight

- Bent fork
- Bent front axle, wheel installed incorrectly
- Unequal oil quantity in fork tubes

### Front Wheel Wobbling

- Distorted rim
- Worn front wheel bearings
- Loose or broken spokes
- Faulty tire
- Axle or axle holder not tightened properly

### Soft Suspension

- Weak fork springs
- Insufficient fluid in fork legs

### Hard Suspension

- Fork oil level too high
- Fork tube(s) bent or fork slider(s) damaged

### Front Suspension Noise

- Fork slider binding
- Insufficient fluid in fork legs
- Loose fork fasteners

## HANDLEBARS

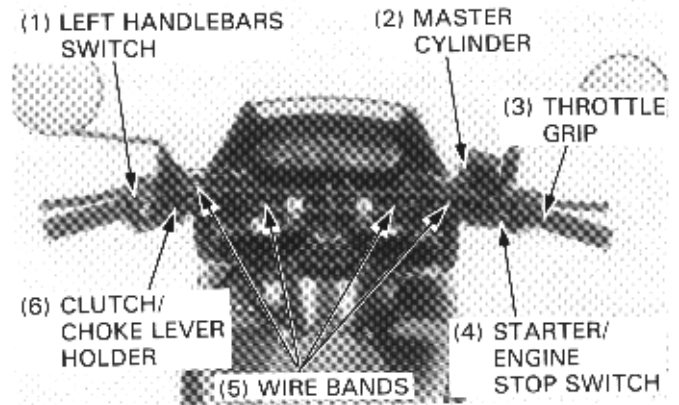
### REMOVAL

Remove the following parts:

- Wire bands
- Left handlebars switch
- Clutch/choke lever holder
- Front brake master cylinder
- Starter/engine stop switch
- Throttle grip

Remove the upper holders and handlebars.

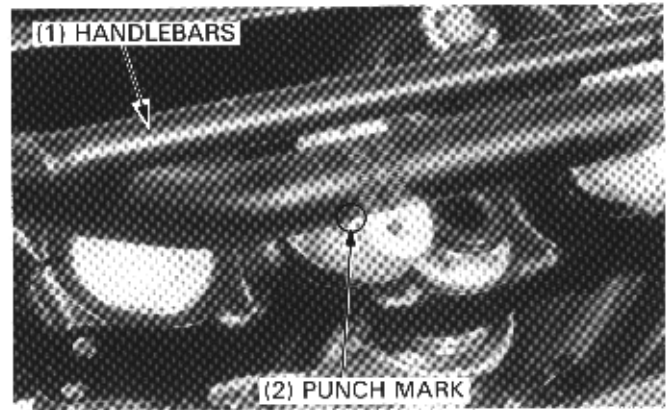
Remove the lower holders if necessary.



### INSTALLATION

Install the washers, lower holders and nuts if removed.

Place the handlebars on the lower holders by aligning the punch marks on the handlebars with the upper surface of the lower holder.



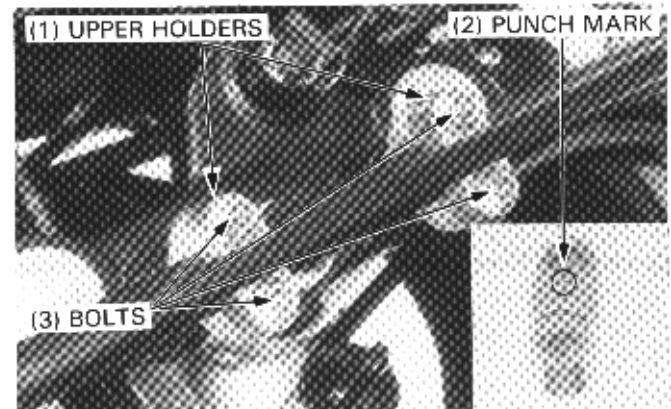
Install the upper holders with the punch marks facing forward.

Tighten the forward bolts first then the rearward.

**TORQUE: 24 N·m (2.4 kg-m, 17 ft-lb)**

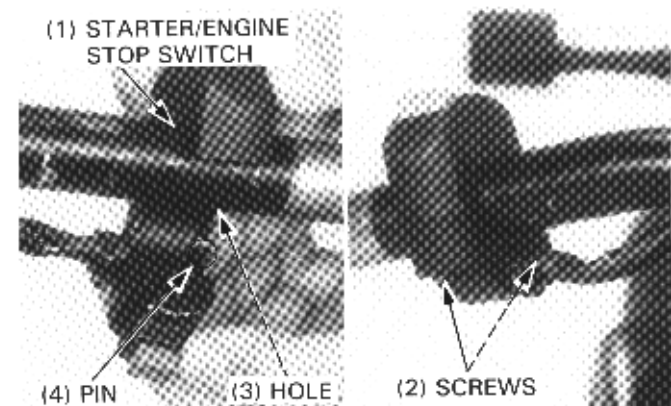
Tighten the lower holder nuts to the specified torque.

**TORQUE: 24 N·m (2.4 kg-m, 17 ft-lb)**



Install the starter/engine stop switch by aligning the pin with the hole in the handlebars.

Tighten the forward screw first, then tighten the rearward.



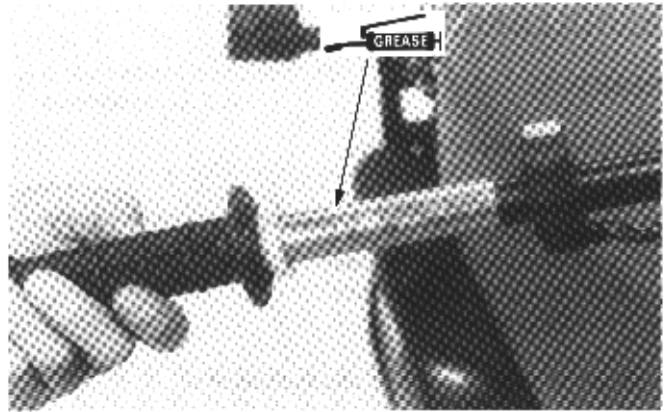
## FRONT WHEEL/SUSPENSION/STEERING

If the grips were removed, apply Honda Bond A or Honda Grip Cement (U.S.A. only) to the inside surfaces of the grips and to the clean surface of the left handlebar and throttle grip pipe. Wait 3–5 minutes and install the grips. Rotate the grips for even application of the adhesive.

### NOTE

- Allow the adhesive to dry for an hour before using.

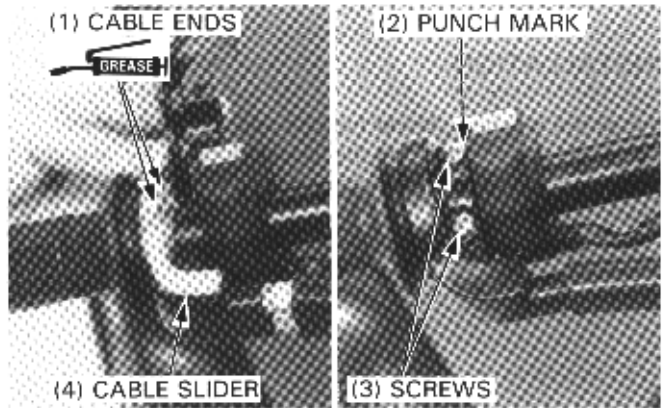
Apply grease to the throttle grip sliding surface and cable guide.



Apply grease to the throttle cable ends, and connect the throttle cable ends to the throttle grip.

Apply grease to the throttle cable slider, and install the slider as shown.

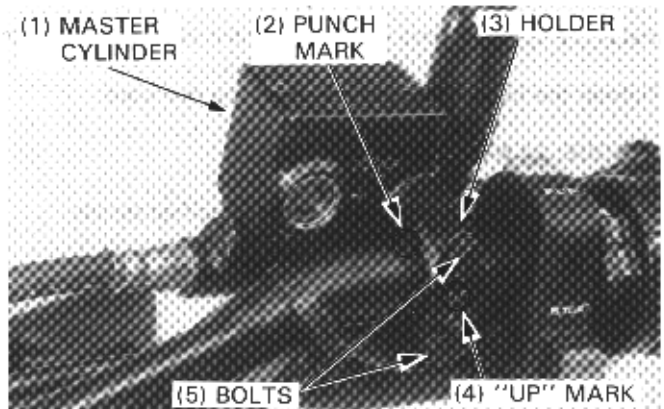
Assemble the throttle housing halves, and align the mating surface of the halves with the punch mark on the handlebars. Tighten the upper screw first, then the lower one.



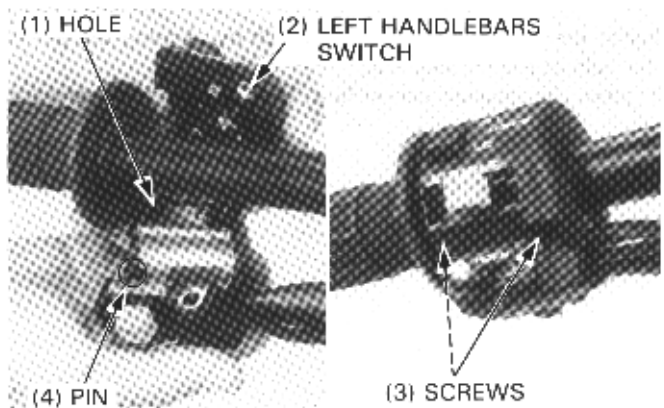
Install the master cylinder and position the master cylinder holder with "up" mark facing up, and loosely install the holder bolts.

Align the edge of the master cylinder with the punch mark on the handlebars and tighten the upper bolt first, then the lower bolt.

Connect the front stop switch wires to the switch terminals.



Install the left handlebars switch by aligning the pin with the hole in the handlebars, and tighten the forward screw first, then the rearward screw.





Install the clutch/choke lever holders and loosely install the holder bolts.

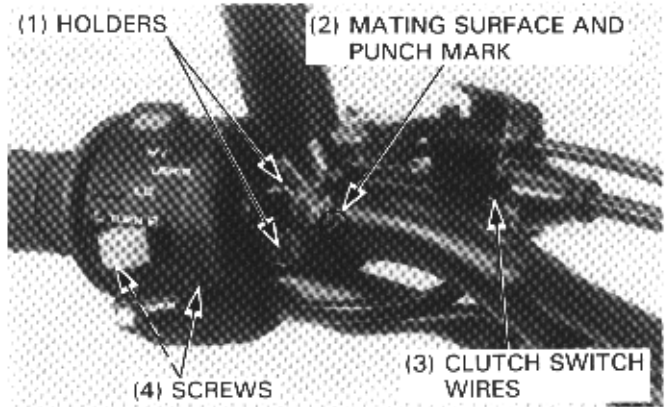
Align the mating surface of the clutch/choke lever holder with the punch mark on the handlebars and tighten the forward screw first, then tighten the rearward screw.

Connect the clutch switch wires to the switch terminals.

Route the switch wires and secure them with the wire bands (page 1-12).

Adjust the following:

- throttle grip free play (page 3-4)
- clutch lever free play (page 3-12).



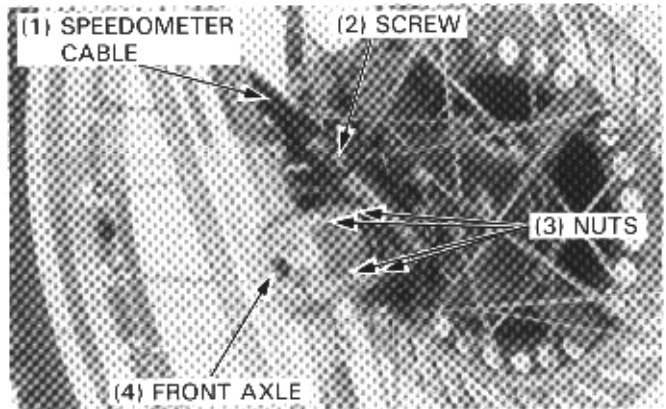
## FRONT WHEEL

### REMOVAL

Raise the front wheel off the ground by placing a box or work stand under the engine.

Disconnect the speedometer cable from the speedometer gearbox at the front wheel.

Loosen the axle holder nuts and then remove the front axle. Remove the front wheel.

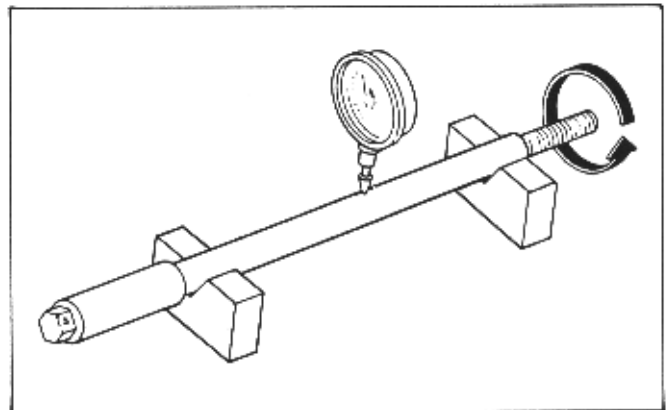


### INSPECTION

#### FRONT AXLE

Set the axle in V blocks and measure the runout. The actual runout is 1/2 of the total reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**



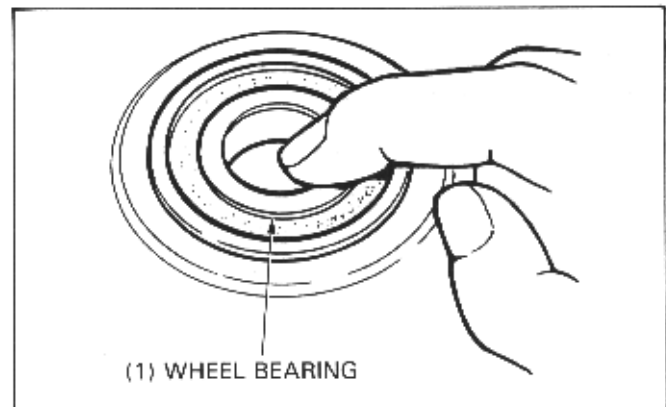
#### WHEEL BEARINGS

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.

#### NOTE

- Replace wheel bearings in pairs.

For bearings replacement, see page 12-7.



## FRONT WHEEL/SUSPENSION/STEERING

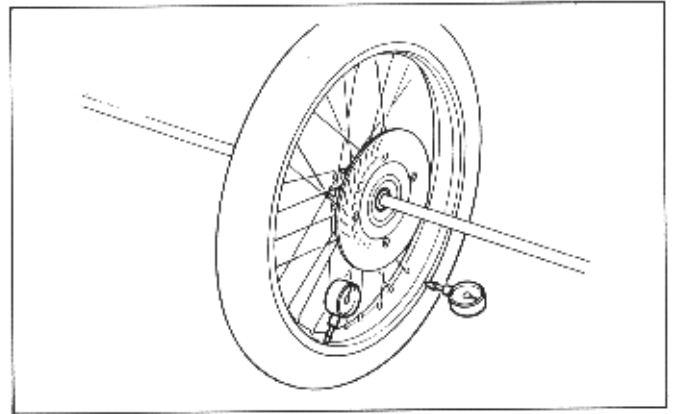
### WHEEL RIM RUNOUT

Check the rim runout by placing the wheel on a truing stand. Then spin the wheel by hand, and read the runout using a dial indicator.

### SERVICE LIMITS:

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

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



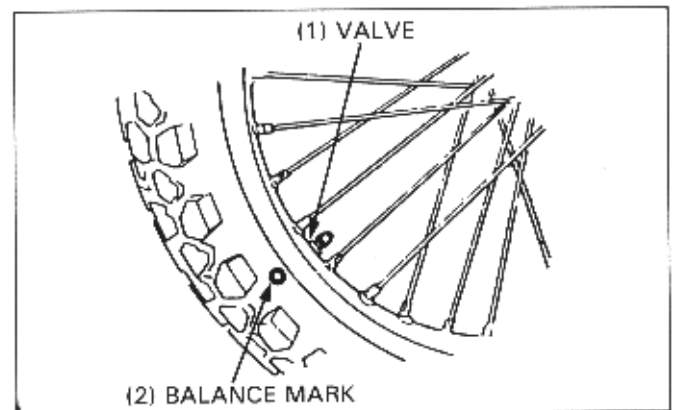
### WHEEL BALANCING

#### CAUTION

- *Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire are removed from the rim.*

#### NOTE

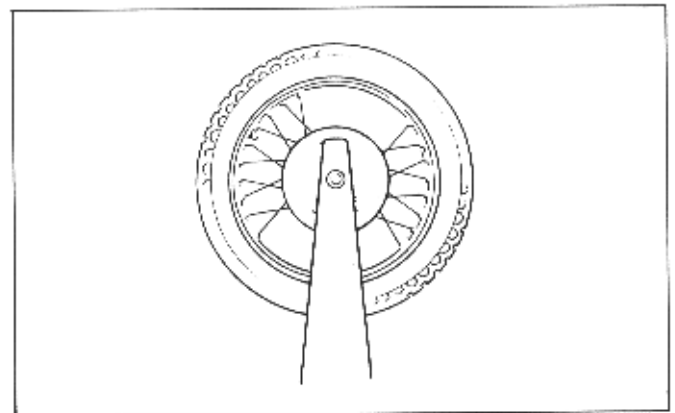
- For optimum balance, the tire balance mark (a paint dot on the sidewall) must be located next to the valve stem.



Mount the front wheel in a inspection stand.

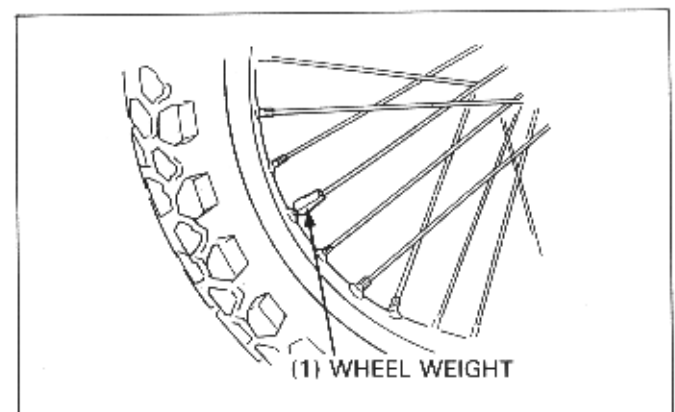
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk. Do this two or three times to verify the heaviest area.

If the wheel is balanced, it will not stop consistently in the same position.



To balance the wheel, install wheel weights on the highest side of the rim, the side opposite to the chalk marks. Add just enough weight so the wheel does not stop in the same position when it is spun.

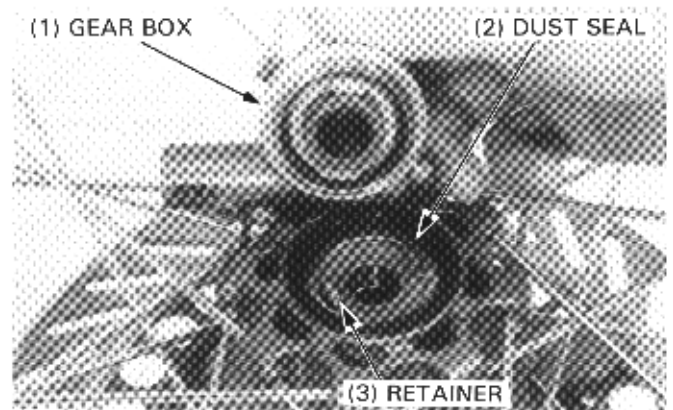
Do not add more than 60 grams.



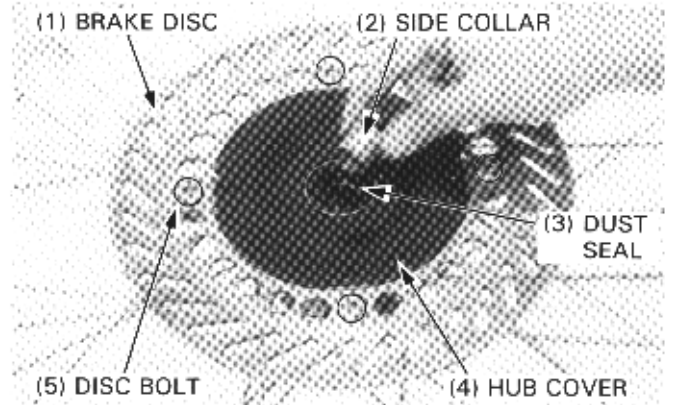
DISASSEMBLY

Remove the speedometer gearbox from the right side of wheel hub.

Remove the dust seal and speedometer gear retainer.



Remove the side collar, front brake disc, dust seal and the hub cover.



Remove the wheel bearings and distance collar.

TOOLS:

Bearing remover head

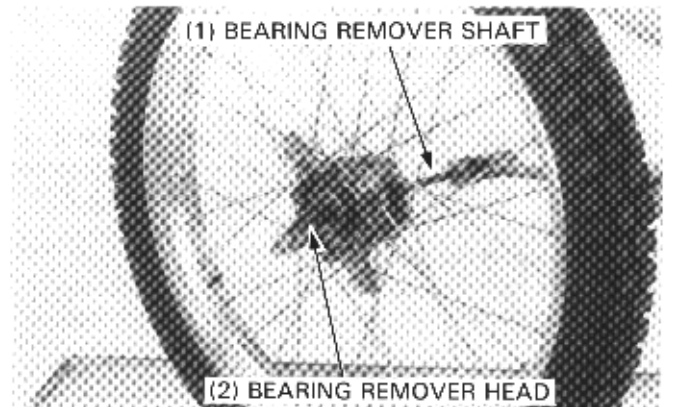
07746-0050400 or equivalent commercially available in U.S.A.

Bearing remover shaft

07746-0050100 or equivalent commercially available in U.S.A.

NOTE

- Replace the wheel bearing with a new one, whenever the bearing is removed.
- Replace the wheel bearings in pairs.

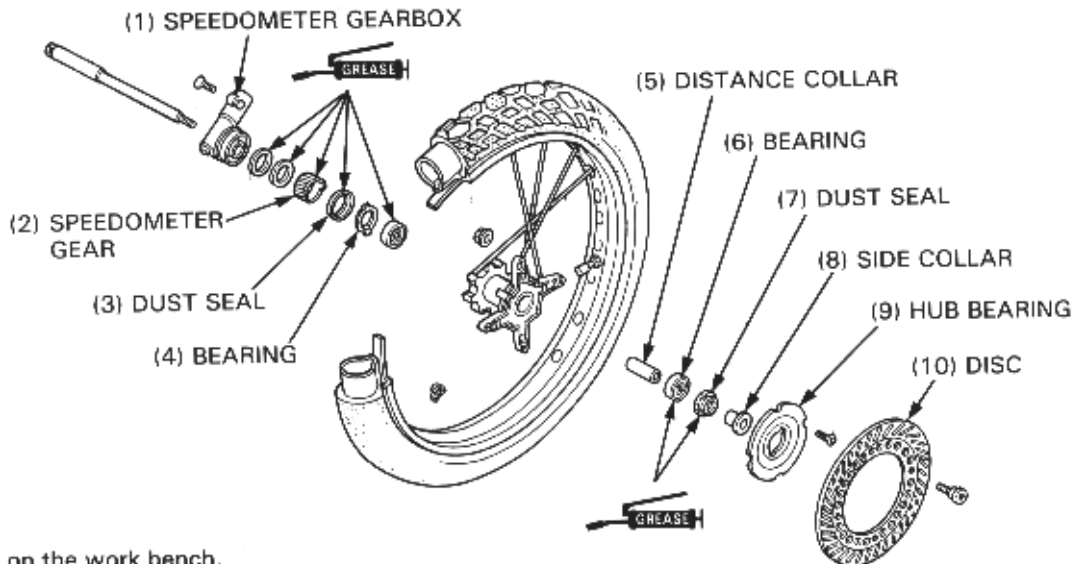


## FRONT WHEEL/SUSPENSION/STEERING

### ASSEMBLY

#### ⚠ WARNING

- Do not get grease on the brake disc or stopping power will be reduced.



Place the rim on the work bench.

Place the hub with the disc side down and begin lacing with new spokes.

Adjust the hub position so that the distance from the disc outside surface to the side of rim is 22.25 mm (0.876 in) as shown.

Tighten the spokes in 2 or 3 progressive steps.

**TORQUE: 4 N·m (0.4 kg-m, 3 ft-lb)**

#### TOOL:

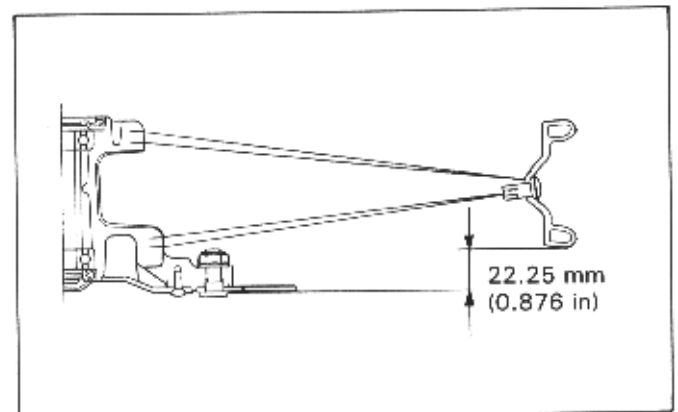
**SPOKE WRENCH C, 5.8 x 6.1 mm 07701-0020300 or equivalent commercially available in U.S.A.**

Pack new wheel bearings with grease.

Drive in the right bearing first until it seats completely. Install the distance collar and drive in the left bearing.

#### NOTE

- Install the bearings with their sealed ends facing outside.
- Drive the bearings in perpendicularly.



#### TOOLS:

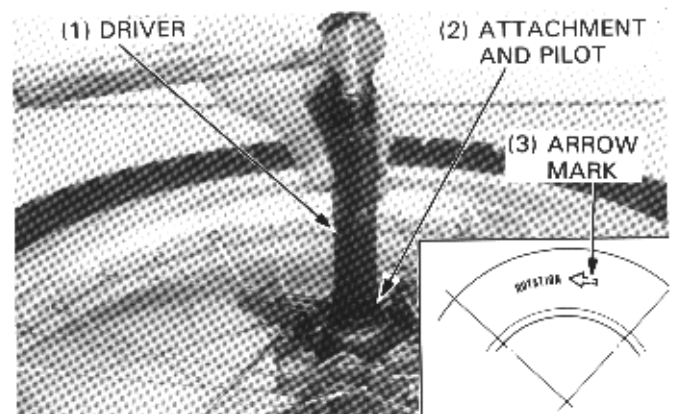
<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 32 x 35 mm</b>	<b>07746-0010100</b>
<b>Pilot, 15 mm</b>	<b>07746-0040300</b>

Check the wheel runout (page 12-6).

Install the rim lock, rim band, tube and tire.

#### NOTE

- Install the tire with its directional arrow pointing in the direction of normal rotation for forward motion.



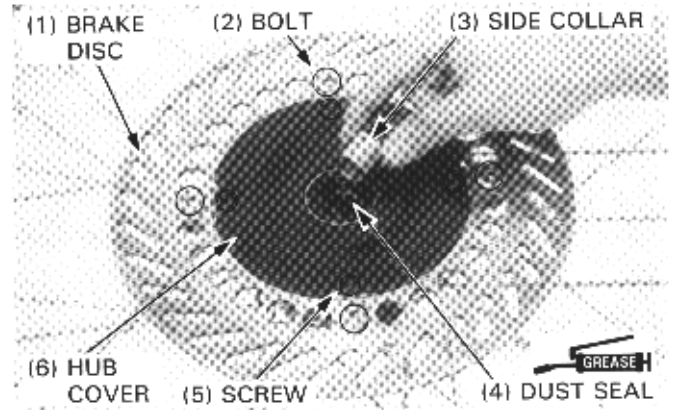
## FRONT WHEEL/SUSPENSION/STEERING

Apply a locking agent to the threads of the hub cover screws, and secure the hub cover with the screws.

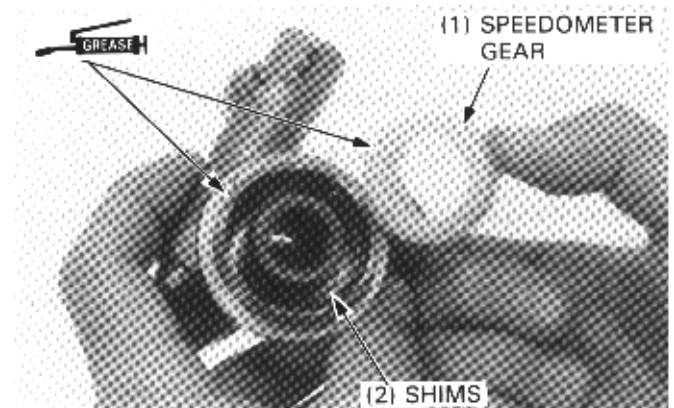
Install the brake disc with the stamped side facing out, and secure the disc with four bolts.

**TORQUE: 15 N·m (1.5 kg·m, 11 ft·lb)**

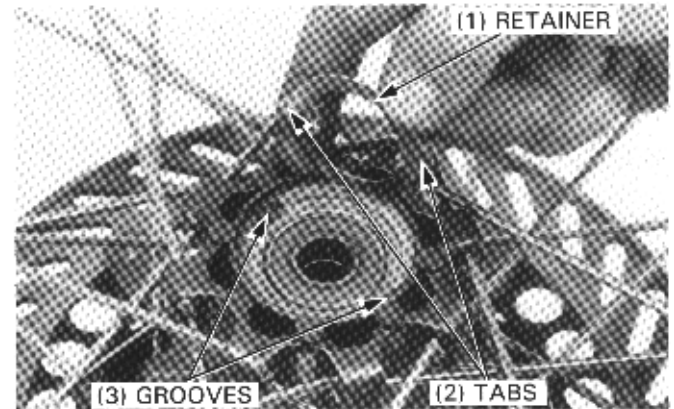
Apply grease to the dust seal lips and install it. Install the left side collar.



Install the shims into the speedometer gearbox. Apply grease to the inside surface of the gearbox and gear teeth, and install the gear into the gearbox.

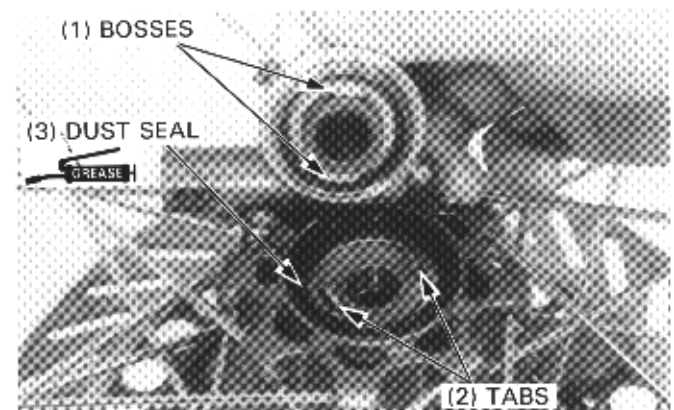


Install the speedometer gear retainer, aligning tabs of the retainer with the grooves in the wheel hub.



Apply grease to the dust seal lip, and install it into the wheel hub.

Install the speedometer gearbox onto the dust seal, engaging the tabs of the gear retainer with the bosses of the speedometer gear each other.



## FRONT WHEEL/SUSPENSION/STEERING

### INSTALLATION

Place the front wheel between the fork legs.  
Fit the caliper over the brake disc, taking care not to damage the brake pads.

Clean the axle and holder.  
Install the axle through the speedometer gearbox and wheel hub.

Set the speedometer gearbox tab against the behind of the tang on the fork slider.

If you removed the axle holder, install it with "UP" mark facing up.

Install the axle holder nuts loosely.

Tighten the front axle to the specified torque.

**TORQUE: 65 N·m (6.5 kg·m, 47 ft-lb)**

Connect the speedometer cable to the gearbox, and secure it with the screw.

With the front brake applied, pump the front suspension up and down several times to seat the axle.

Tighten the front axle holder nuts, the upper nuts first, then the lower nuts in 2–3 steps.

**TORQUE: 12 N·m (1.2 kg·m, 9 ft-lb)**

## FORK

### REMOVAL

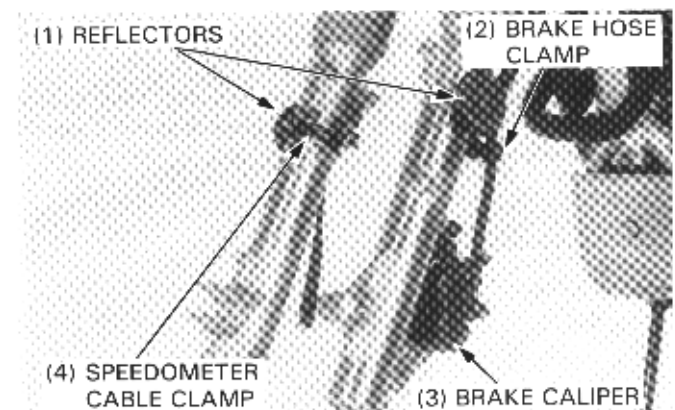
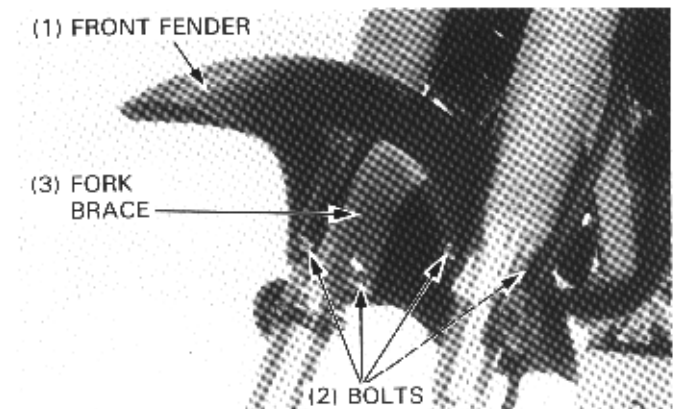
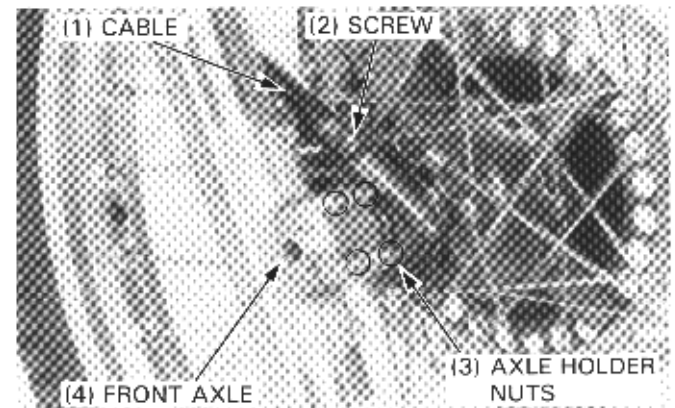
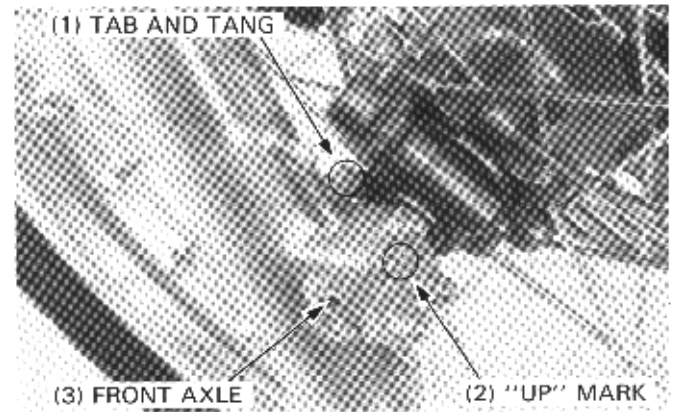
Remove the following parts.

- Front wheel (page 12-5)
- Front fender
- Fork brace

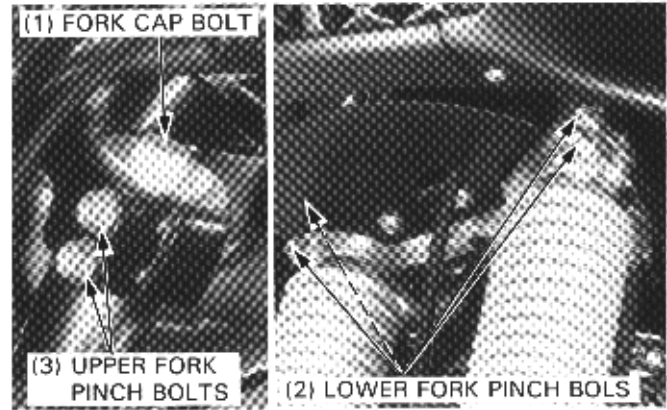
- Reflectors
- Speedometer cable clamp.
- Brake hose clamp
- Brake caliper (page 14-9)

### NOTE

- It is not necessary to disconnect the brake hose.

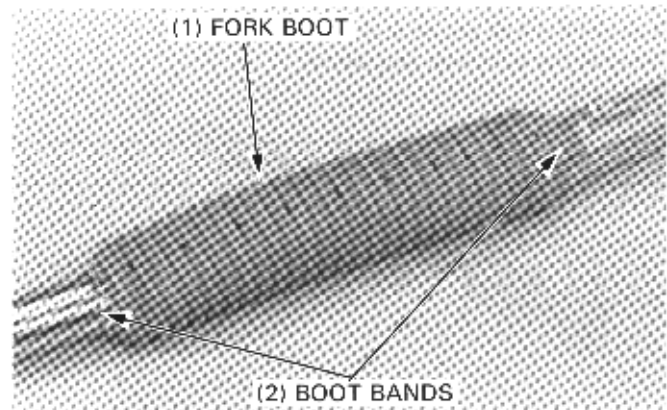


Loosen the upper fork pinch bolts first, then the fork cap bolts. Holding the fork legs, loosen the lower fork pinch bolts, then remove the fork legs.



### DISASSEMBLY

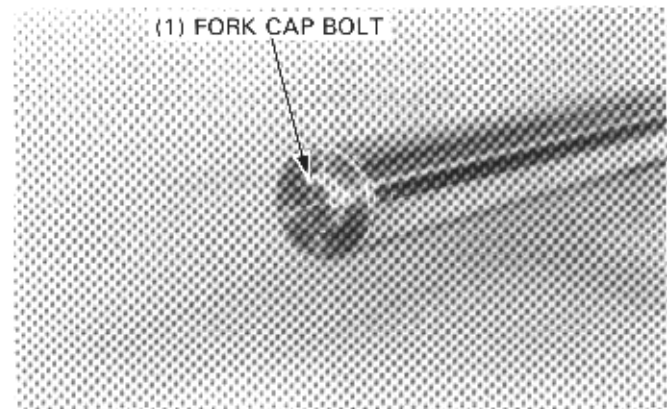
Loosen the boot band screws and remove the fork boot and boot bands.



Remove the fork cap bolt.

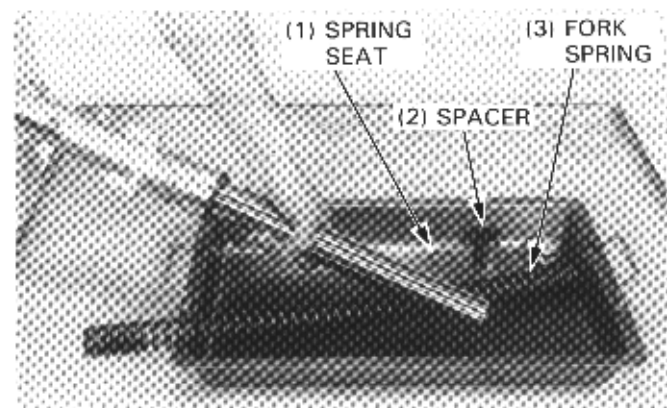
#### ⚠ WARNING

- *The cap bolts are under spring pressure. Use care when removing and wear eye and face protection.*



Remove the spacer, spring seat and fork spring. Drain the fork fluid by pumping the fork tube in and out several times.

Check the spacer and spring seat for wear or damage.

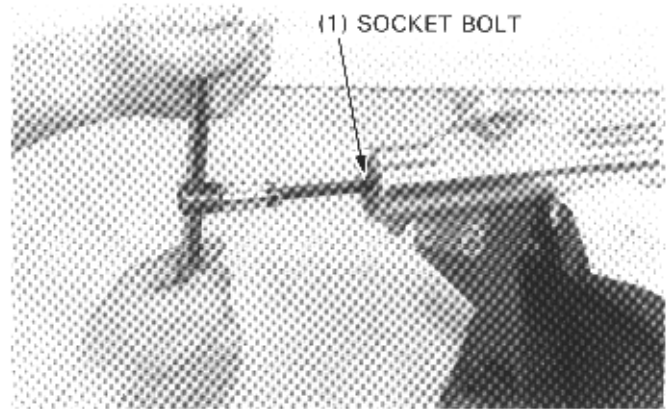


## FRONT WHEEL/SUSPENSION/STEERING

Hold the fork slider in a vise with soft jaws or a shop towel.  
Remove the fork slider socket bolt.

### CAUTION

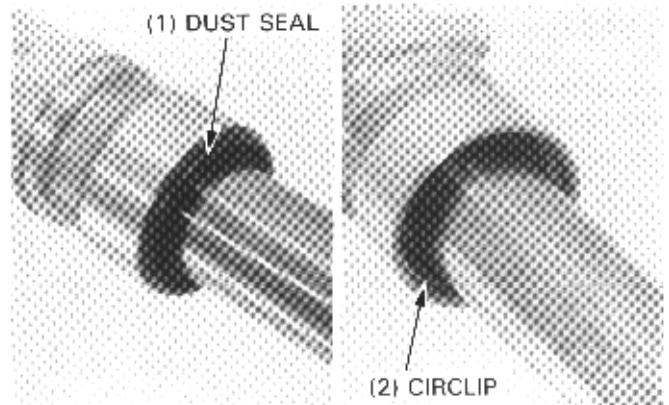
- *Do not distort the fork slider in a vise.*



Remove the fork piston and rebound spring.  
Remove the dust seal and circlip.

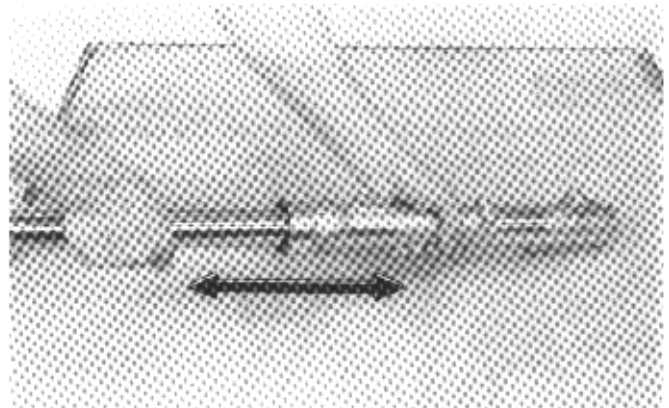
### CAUTION

- *Be careful not to damage the fork tube.*



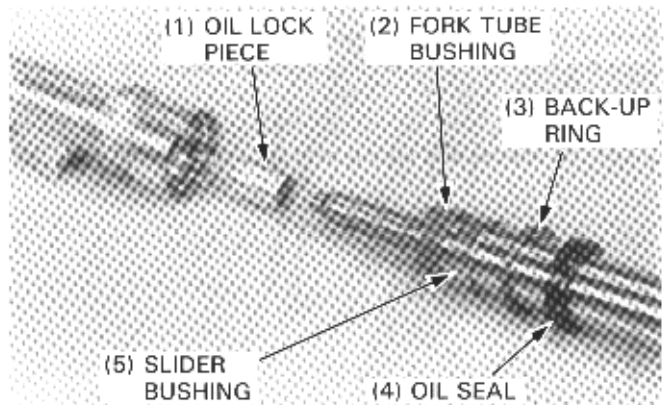
Pull the fork tube out until it stops. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider. The slider bushing will be forced out by the fork tube bushing.

Remove the oil lock piece from the fork slider.



Remove the oil seal, back-up ring and slider bushing from the fork tube.

Do not remove the fork tube bushing until inspection determines it is necessary (page 12-13).





INSPECTION

Measure the fork spring free length.

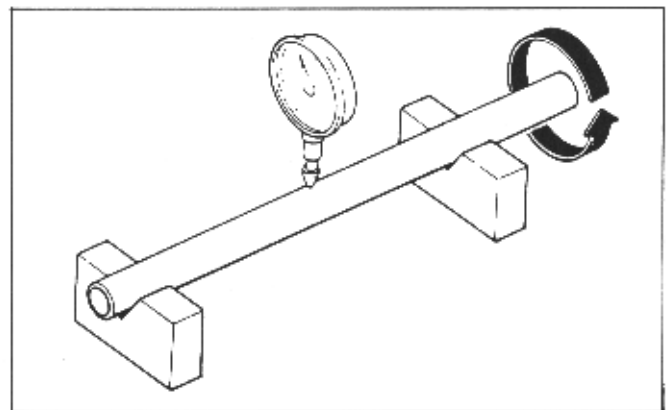
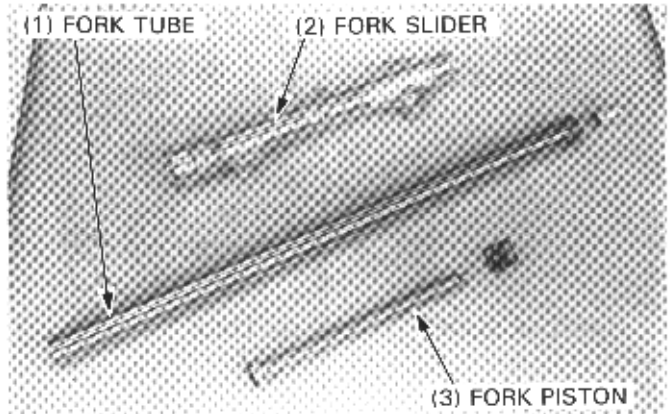
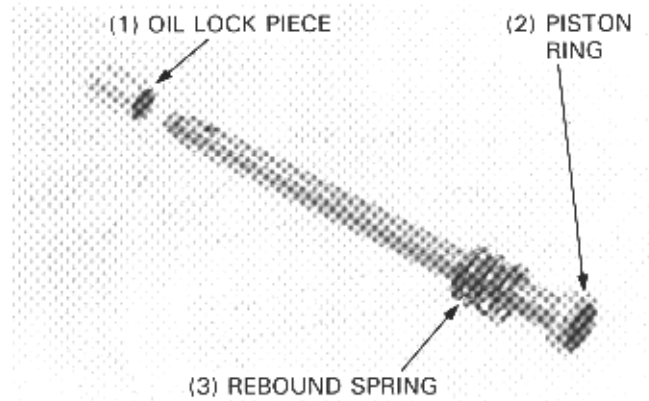
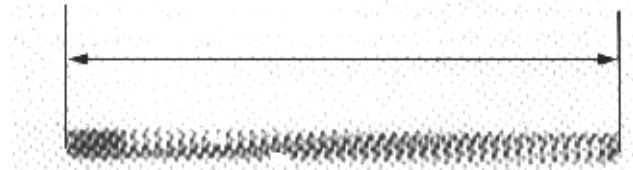
**SERVICE LIMIT: 593.3 mm (23.36 in)**

Check the oil lock piece, rebound spring and fork tube piston ring for damage or wear.  
Replace if necessary.

Check the fork slider, fork tube and fork piston for scoring, scratches, deformation or excessive wear.  
Replace any components which are worn or damaged.

Set the fork tube on V blocks and measure the runout.  
The actual runout is 1/2 of the total indicator reading.

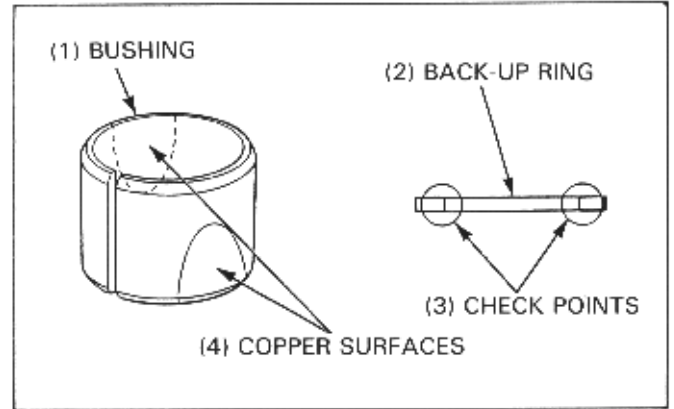
**SERVICE LIMIT: 0.2 mm (0.01 in)**



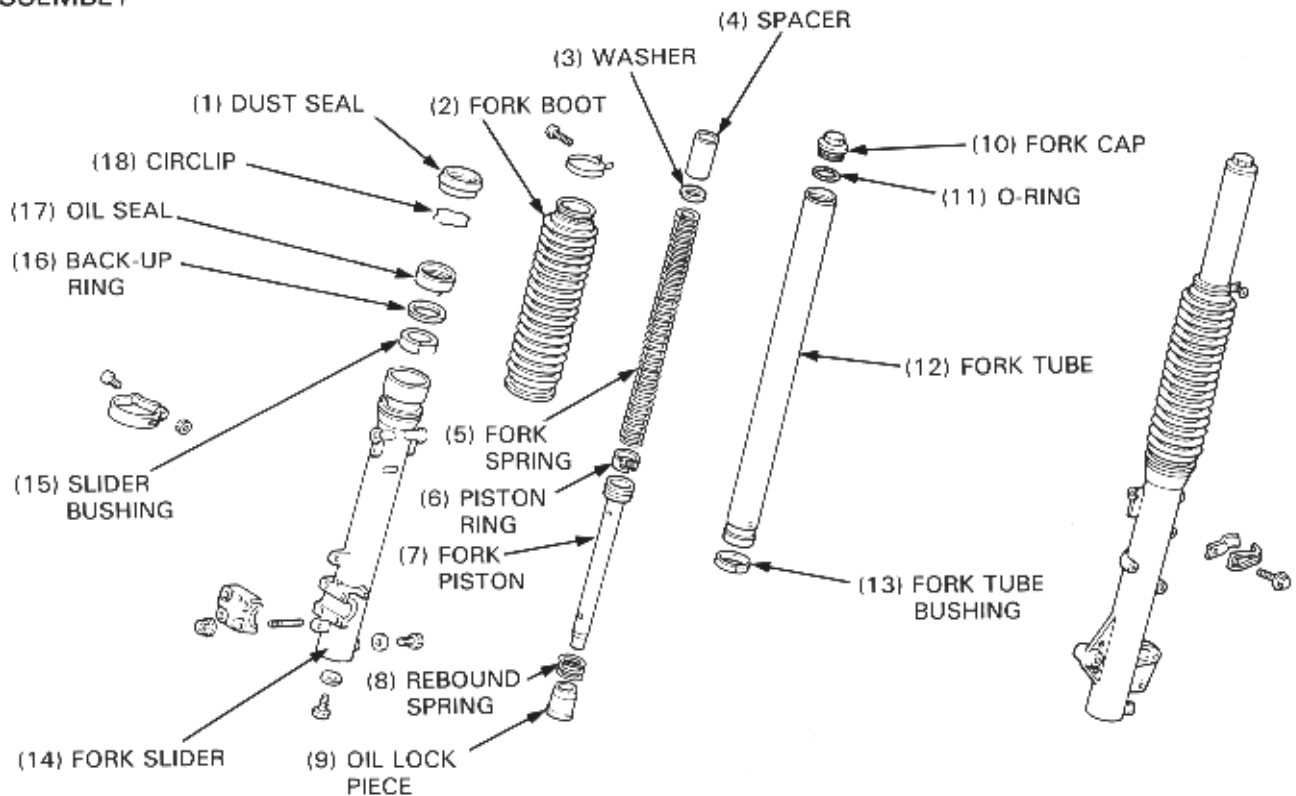
## FRONT WHEEL/SUSPENSION/STEERING

Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



## ASSEMBLY



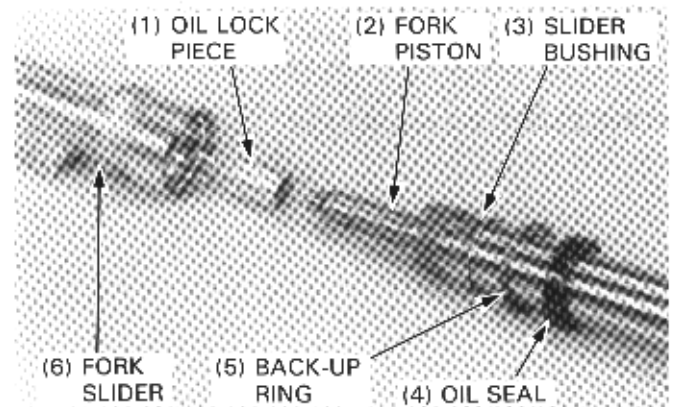
Insert the fork piston with the rebound spring and with its piston ring side facing up.

Apply ATF to a new oil seal lip. Install the slider bushing, back-up ring and new oil seal onto the fork tube.

### NOTE

- Install the oil seal with the marks facing up.

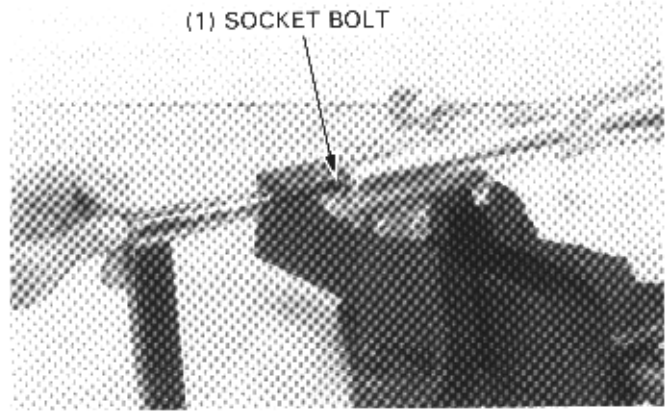
Set the oil lock piece onto the end of the fork piston, then insert the fork tube into the fork slider.



Temporarily install the fork spring, spring seat, spacer, washer and fork cap bolt into the fork tube.

Place the fork slider in a vise with soft jaws or a shop towel. Apply a locking agent to the socket bolt threads and torque the fork slider socket bolt.

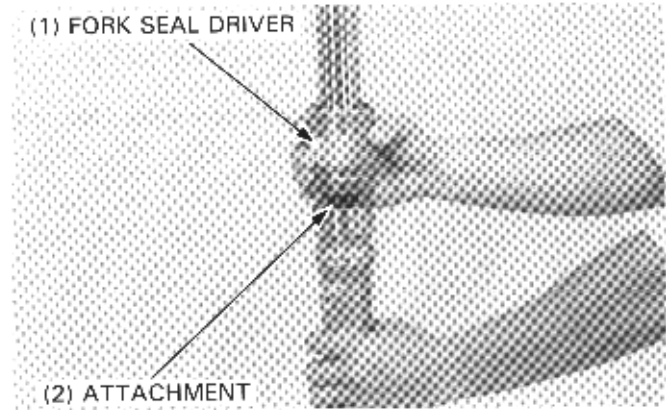
**TORQUE: 20 N·m (2.0 kg-m, 14 ft-lb)**



Drive the oil seal into place using a fork seal driver and attachment.

**TOOLS:**

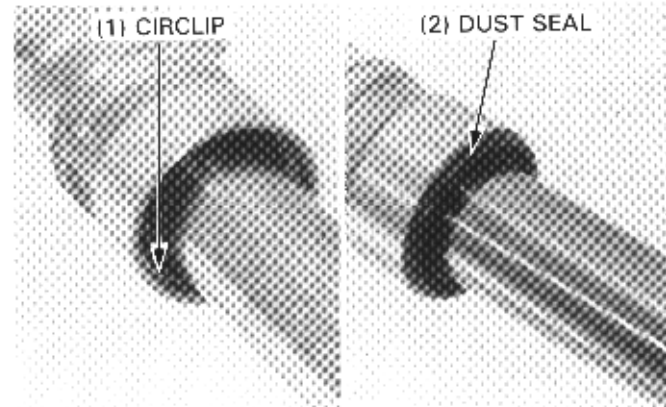
- Fork seal driver **07947-KA50100**
- Fork seal driver attachment **07947-KF00100**



Install the circlip and dust seal.

**NOTE**

- Be careful not to damage the fork tube sliding surface.
- Make sure the circlip is seated securely in the fork slider groove.



Remove the fork cap bolt, washer, spacer, spring seat and fork spring.

Pour in the specified amount of ATF.

**SPECIFIED FLUID: ATF**

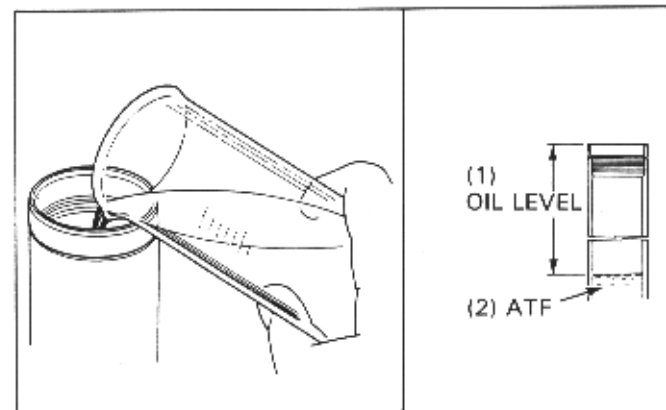
**CAPACITY: 592 cc (20.0 US oz, 20.8 Imp oz)**

Slowly compress the fork leg up and down about five times, then measure the oil level from the top of the tube with the fork leg fully compressed.

**NOTE**

- Make sure the oil level is the same in both fork tubes.

**STANDARD OIL LEVEL: 120 mm (4.7 in)**

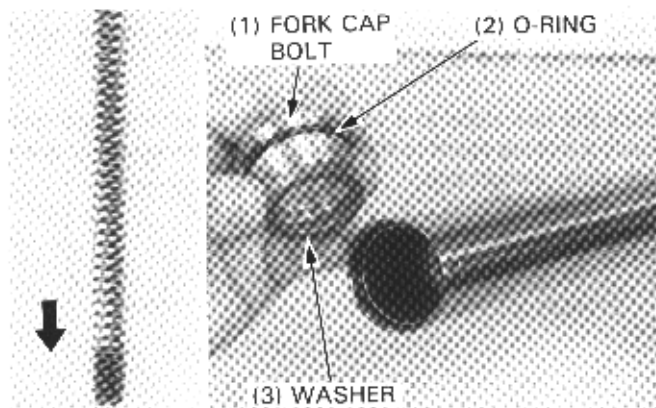


## FRONT WHEEL/SUSPENSION/STEERING

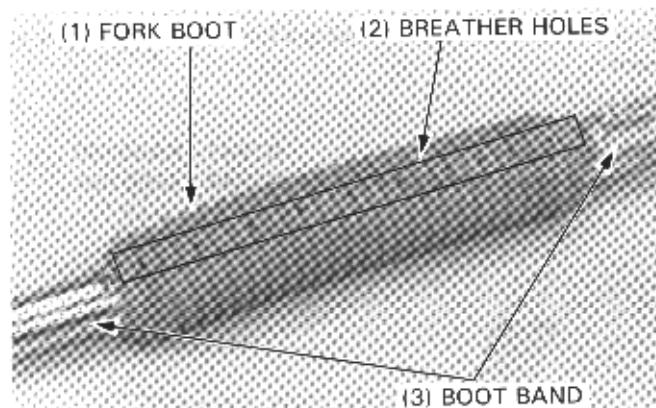
Wipe any oil off the fork spring.

Install the fork spring into the fork tube with its narrow pitch end facing down, and install the spring seat and spacer.

Apply ATF to a new O-ring and install it onto the fork cap bolt. Put the washer onto the fork cap bolt, and screw the cap bolt in the fork tube.



Install the fork boot with the breather holes facing the rear. Install the lower band with the screw head facing out, and tighten it. Loosely install the upper band with the screw head facing out.

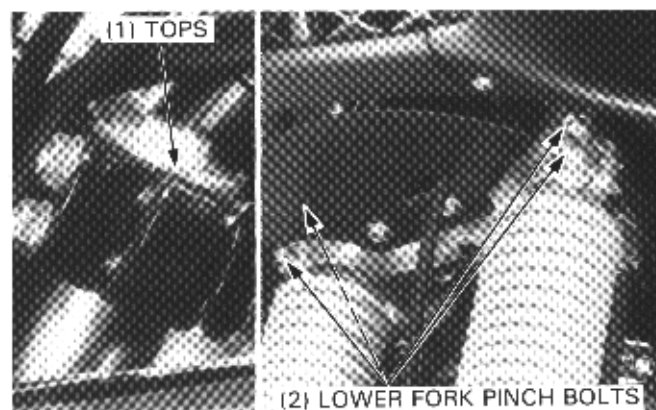


## INSTALLATION

Install the fork legs through the steering stem and steering top bridge.

Align the tops of the fork tube and steering top bridge and tighten the lower fork pinch bolts.

**TORQUE: 33 N·m (3.3 kg-m, 24 ft-lb)**

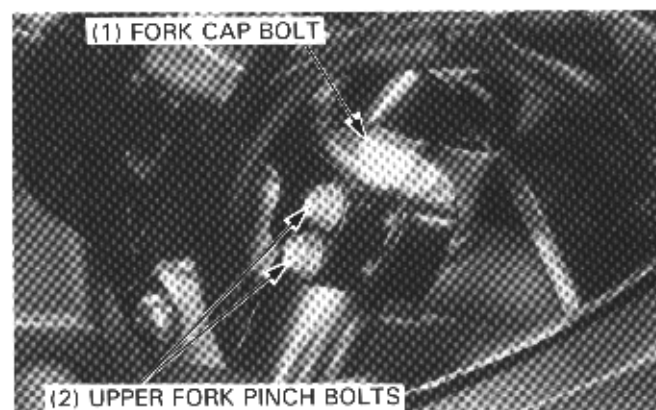


Tighten the fork cap bolts to the specified torque.

**TORQUE: 34 N·m (2.3 kg-m, 17 ft-lb)**

Tighten the upper fork pinch bolts to the specified torque.

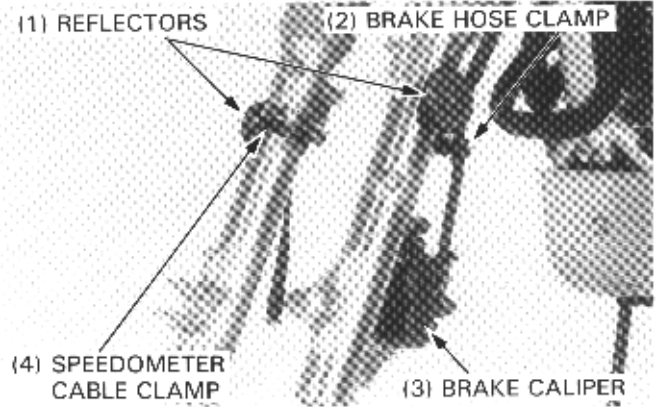
**TORQUE: 28 N·m (2.8 kg-m, 20 ft-lb)**



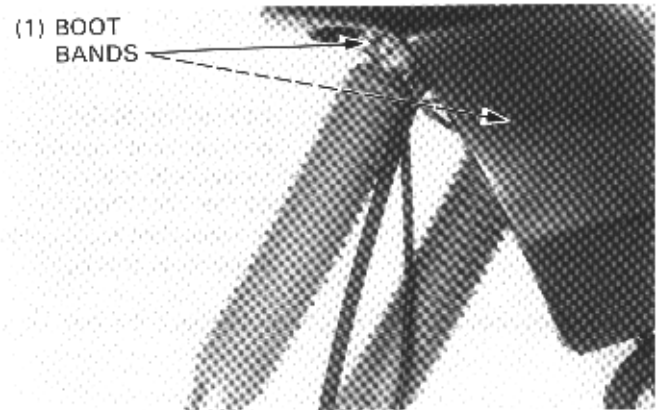
Install the brake caliper and caliper bracket onto the left fork slider, and secure the bracket with the bolts.

**TORQUE: 25 N·m (2.5 kg-m, 18 ft-lb)**

Secure the brake hose with the brake hose clamp.  
Secure the speedometer with the speedometer clamp.  
Install the reflectors as shown.

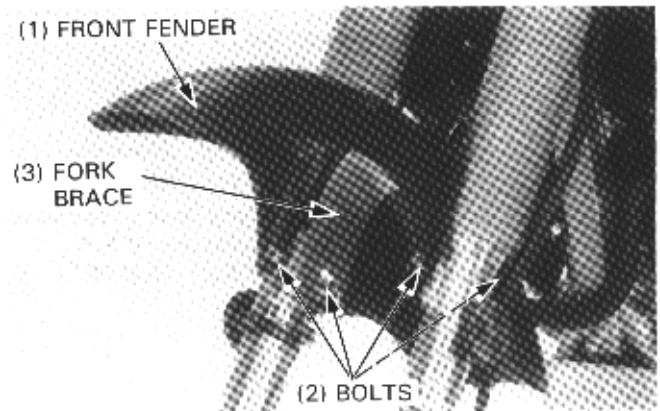


Pull the fork boots up to the steering bottom bridge, and tighten the boot band screws.



Install the fork brace and front fender onto the fork legs and secure them with the four bolts.

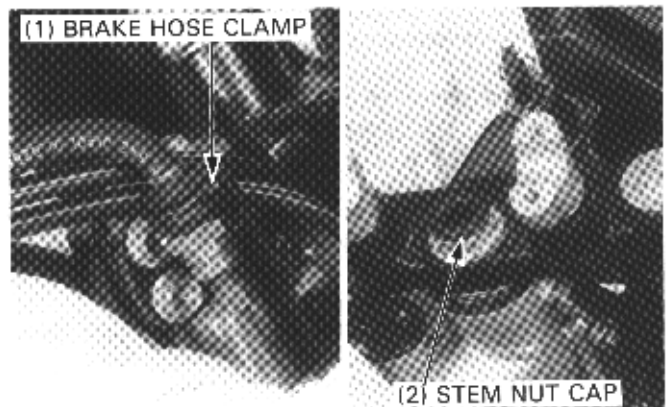
Install the front wheel (page 12-10)



## STEERING STEM

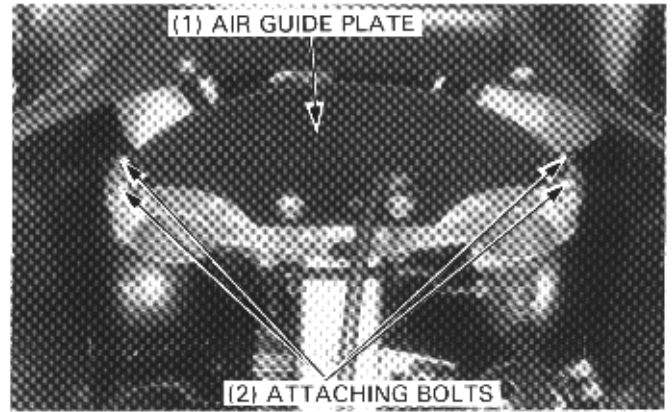
### REMOVAL

- Remove the following:
- handlebars (page 12-3)
  - ignition switch (page 19-6)
  - front wheel (page 12-5)
  - stem nut cap
  - brake hose clamp



## FRONT WHEEL/SUSPENSION/STEERING

Remove the air guide plate and brake pipe attaching bolts.

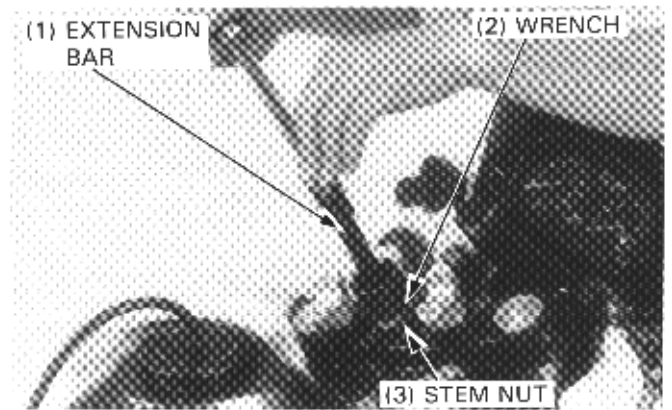


Remove the steering stem nut.

### TOOLS:

**Lock nut wrench, 30 x 32 mm** 07716-0020400  
or equivalent commercially available in U.S.A.

**Extension bar** 07716-0020500  
or equivalent commercially available in U.S.A.



Loosen the upper fork pinch bolts and remove the steering top bridge.

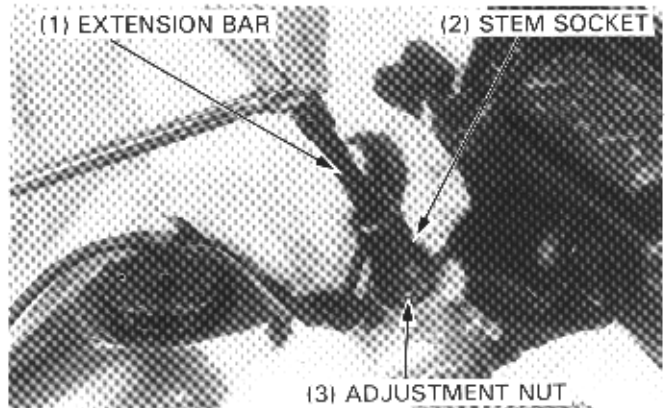
Remove the fork legs.

Hold the steering stem to prevent it from falling.  
Remove the steering adjustment nut.

### TOOLS:

**Steering stem socket** 07916-KA50100  
**Extension bar** 07716-0020500  
or equivalent commercially available in U.S.A.

**Adjustable pin spanner** 07702-0020001

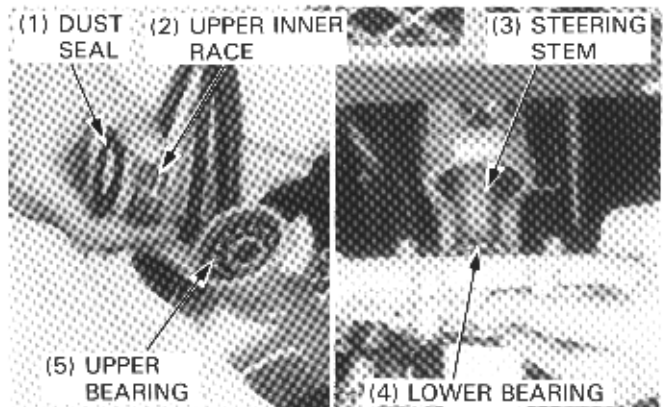


Remove the following:

- dust seal
- upper bearing inner race
- upper bearing
- steering stem

Check the dust seal, inner race, upper and lower bearings and outer races for wear or damage.  
Replace if necessary.

Remove the lower bearing from the steering stem.



**BEARING REPLACEMENT**

**NOTE**

- Always replace the bearing and race as a set.

Remove the bearing inner race and dust seal from the steering stem.

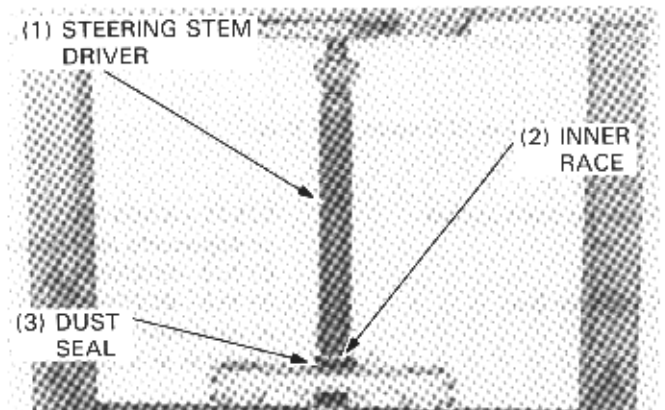
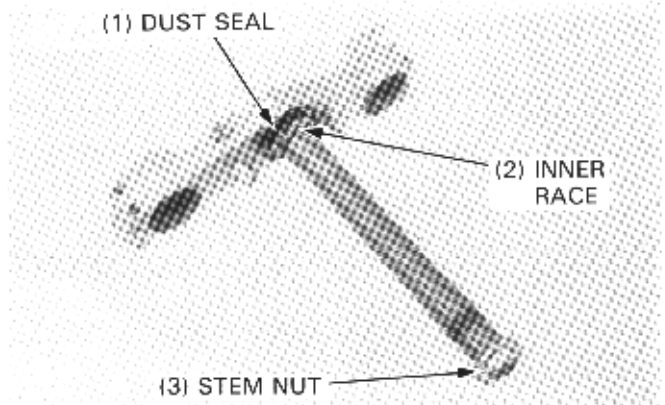
**NOTE**

- Temporarily install the steering stem nut onto the steering stem to prevent the stem threads from being damaged when removing lower inner race.

Install a new dust seal onto the steering stem and press the lower bearing inner race onto the stem with the special tool.

**TOOLS:**

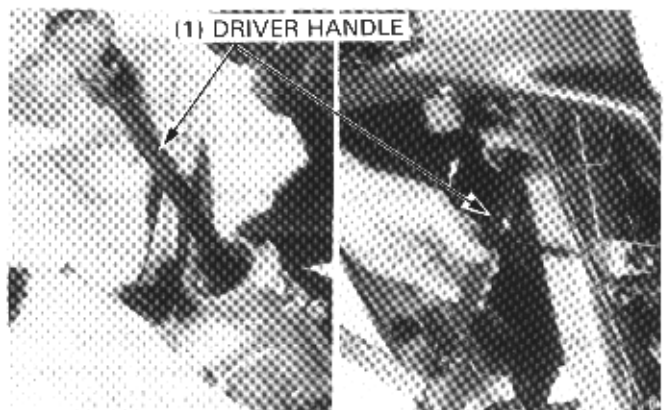
- |                             |                         |
|-----------------------------|-------------------------|
| Steering stem driver        | 07946-4300101           |
| or                          | Not available in U.S.A. |
| Steering stem driver with   | 07946-MB00000           |
| Steering bearing attachment | GN HT54 (U.S.A. only)   |



Remove the upper and lower outer races using special tool.

**TOOLS:**

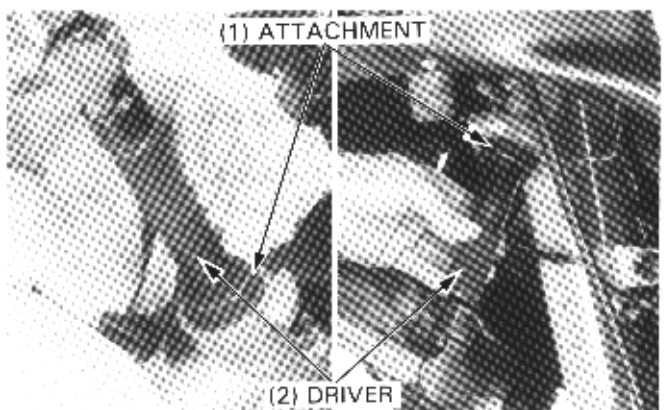
- |                                |                         |
|--------------------------------|-------------------------|
| Ball race remover              | 07953-MJ10000           |
|                                | Not available in U.S.A. |
| - Ball race remover attachment | 07953-MJ10100           |
|                                | Not available in U.S.A. |
| - Driver handle                | 07953-MJ10200           |
| or                             | Not available in U.S.A. |
| Ball race remover              | 07953-MJ1000A           |
|                                | (U.S.A. only)           |



Drive new outer races into the steering head.

**TOOLS:**

- |                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 42 x 47 mm | 07746-0010300 |



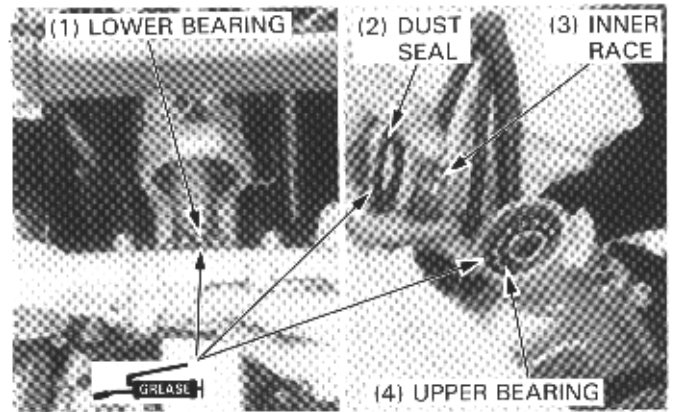
## FRONT WHEEL/SUSPENSION/STEERING

### INSTALLATION

Pack a new bearing cavities with grease.

Install the lower bearing onto the steering stem, then insert the steering stem through the steering head.  
Install the upper bearing and bearing inner race.

Apply grease to the dust seal, and install it onto the steering head.



Install and tighten the steering adjustment nut to the specified torque.

**TORQUE: 5 N·m (0.5 kg-m, 3.6 ft-lb)**

#### TOOLS:

Steering stem socket

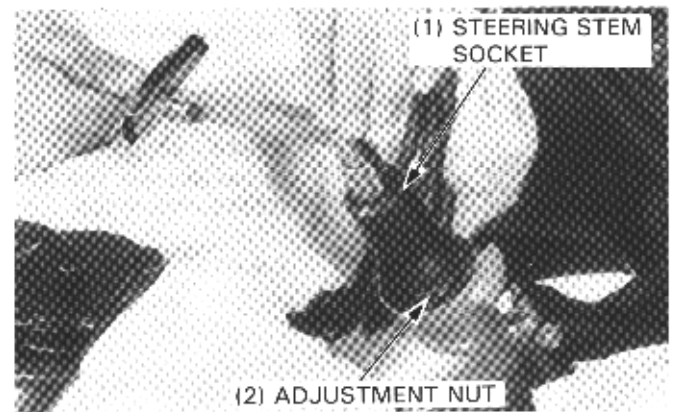
07916—KA50100  
or Adjustable pin spanner  
07702—0020001

Extension bar

07716—0020500  
or equivalent commercially  
available in U.S.A.

Turn the steering stem lock to lock 5—6 times to seat the bearings, and check the steering stem for up-and-down movement.

Tighten the adjustment nut to the specified torque again.



Install the steering top bridge and steering stem nut.  
Temporarily install the fork legs.  
Tighten the steering stem nut to the specified torque.

**TORQUE: 100 N·m (10.0 kg-m, 72 ft-lb)**

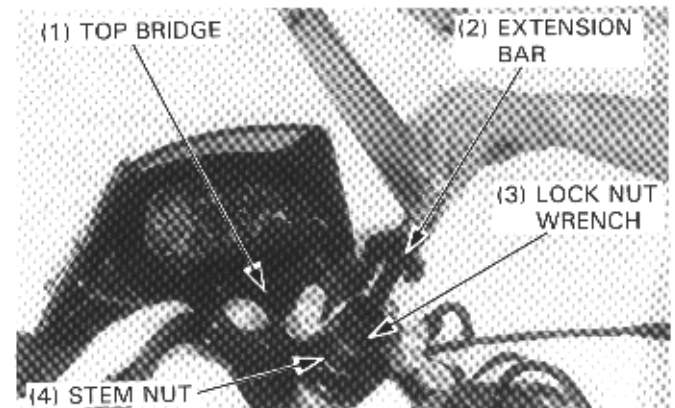
#### TOOLS:

Lock nut wrench, 30 x 32 mm

07716—0020400  
or equivalent commercially  
available in U.S.A.

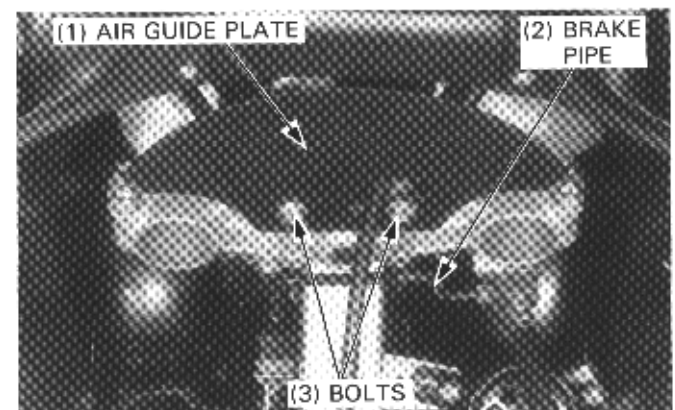
Extension bar

07716—0020500  
or equivalent commercially  
available in U.S.A.



Secure the brake pipe to the steering bottom bridge with two bolts.

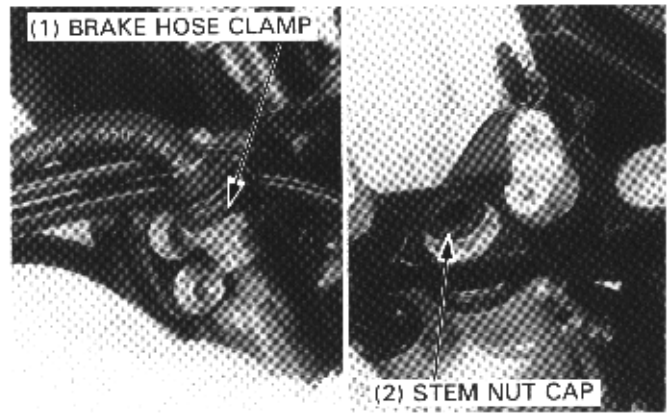
Install the air guide plate with two bolts.



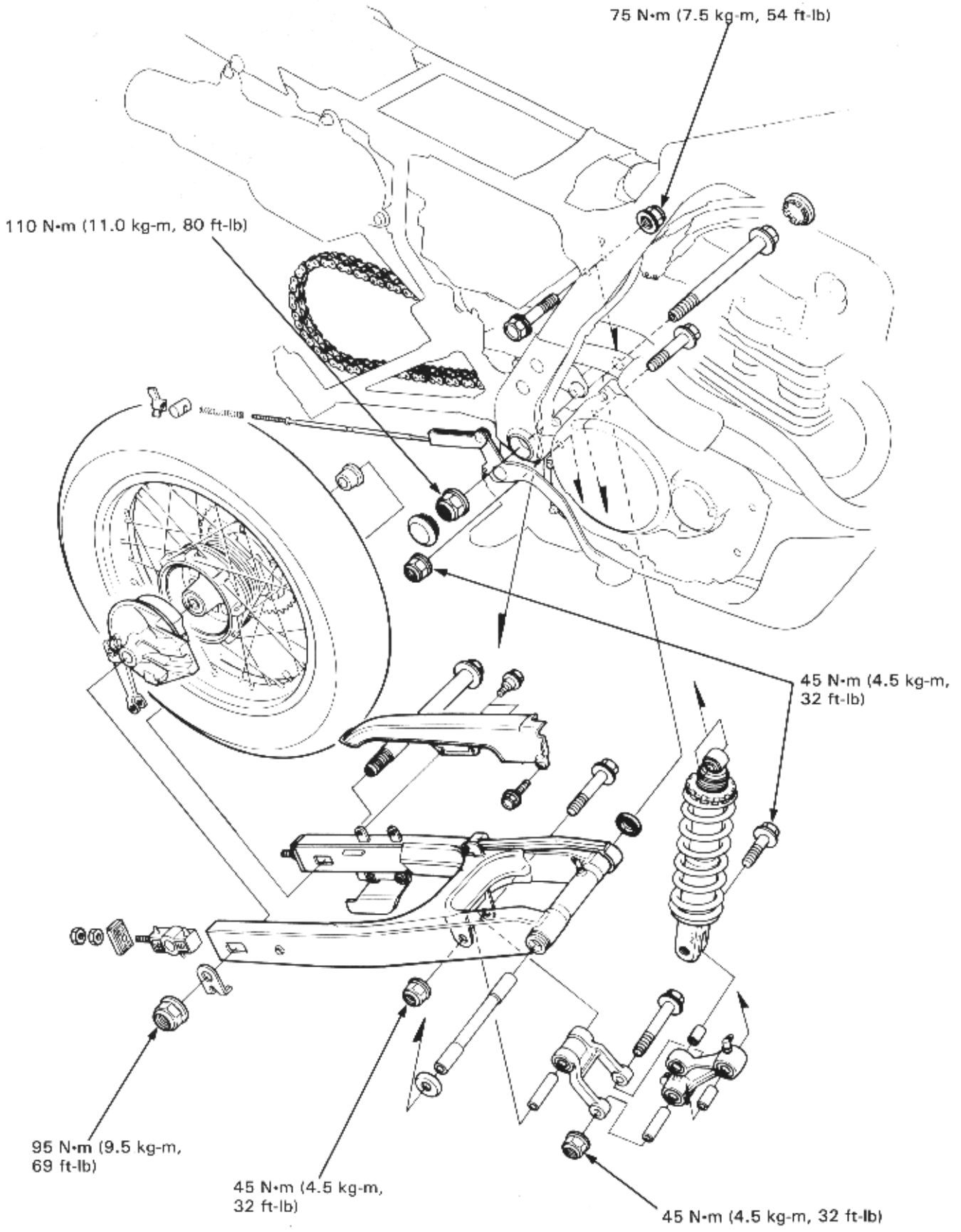


Install the following components:

- Fork legs (page 12-16)
- Brake hose clamp
- Stem nut cap
- Ignition switch (page 19-7)
- Handlebars (page 12-3)
- Front wheel (page 12-10)



**REAR WHEEL/BRAKE/SUSPENSION**



# 13. REAR WHEEL/BRAKE/SUSPENSION

SERVICE INFORMATION	13-1	SHOCK ABSORBER	13-12
TROUBLESHOOTING	13-2	SHOCK LINKAGE	13-15
REAR WHEEL	13-3	SWING ARM	13-18
REAR BRAKE	13-9		

## SERVICE INFORMATION

### GENERAL

- A box or work stand is required to support the motorcycle.
- Use genuine suspension linkage and shock absorber pivot/mount bolts. Note installation direction of the bolts.

#### ▲ WARNING

- *The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber. Before disposal of the shock absorber, release the nitrogen (see page 13-14).*
- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.*
- *In the United States, use an OSHA-approved vacuum cleaner or alternate method approved by OSHA designed to minimize the hazard caused by airborne asbestos fibers.*

### SPECIFICATION

ITEM		STANDARD	SERVICE LIMIT
Rear wheel runout	Radial	—	2.0 mm (0.08 in)
	Axial	—	2.0 mm (0.08 in)
Rear axle runout		—	0.2 mm (0.01 in)
Rear brake drum I.D.		130.0 mm (5.12 in)	131.0 mm (5.16 in)
Rear brake shoe thickness		4.0 mm (0.16 in)	2.0 mm (0.08 in)
Shock absorber spring free length		237.5 mm (9.35 in)	235.1 mm (9.26 in)
Rear suspension damper compression		33 kg (72.8 lb)	28 kg (61.7 lb)

### TORQUE VALUES

Driven sprocket nut	46 N·m (4.6 kg-m, 33 ft-lb)	Apply oil to the threads
Rear axle nut	95 N·m (9.5 kg-m, 69 ft-lb)	
Brake arm nut	10 N·m (1.0 kg-m, 7 ft-lb)	
Shock absorber spring lock nut	90 N·m (9.0 kg-m, 65 ft-lb)	
Shock absorber upper mount nut	75 N·m (7.5 kg-m, 54 ft-lb)	
Shock absorber lower mount bolt	45 N·m (4.5 kg-m, 32 ft-lb)	
Shock arm-to-shock link nut	45 N·m (4.5 kg-m, 32 ft-lb)	
Shock link-to-swing arm nut	45 N·m (4.5 kg-m, 32 ft-lb)	
Shock arm-to-frame nut	45 N·m (4.5 kg-m, 32 ft-lb)	
Swing arm pivot nut	110 N·m (11.0 kg-m, 80 ft-lb)	

### TOOLS

#### Special

Driver shaft	07946 - MJ00100	} Not available in U.S.A.
Needle bearing remover	07931 - MA70000	
Bearing remover, 20 mm	07936 - 3710600	
Remover handle	07936 - 3710100	
Remover sliding weight	07936 - 3710200	

## REAR WHEEL/BRAKE/SUSPENSION

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### Common

Bearing remover head, 17 mm	07746-0050500	] or equivalent commercially available in U.S.A.
Bearing remover shaft	07746-0050100	
Driver	07749-0010000	
Attachment, 37 x 40 mm	07746-0010200	
Pilot, 17 mm	07746-0040400	
Attachment, 42 x 47 mm	07746-0010300	
Attachment, 24 x 26 mm	07746-0010700	
Pilot, 20 mm	07746-0040500	
Pilot, 22 mm	07746-0041000	

## TROUBLESHOOTING

### Wobble or vibration in motorcycle

- Bent rim
- Loose wheel bearing(s)
- Loose or bent spokes
- Damaged tire
- Axle not tightened properly
- Swing arm pivot bearing worn
- Chain adjusters not adjusted equally

### Soft suspension

- Weak spring
- Improper shock absorber spring preload

### Hard suspension

- Improper shock absorber spring preload
- Bent damper rod
- Swing arm pivot bearings damaged
- Bent frame or swing arm

### Suspension noise

- Faulty damper
- Loose fasteners
- Worn suspension linkage pivot bearing(s)

### Poor brake performance

- Improper brake adjustment
- Worn brake shoes
- Brake linings oily, greasy or dirty
- Worn brake cam
- Worn brake drum
- Brake arm serrations improperly engaged
- Brake shoes worn at cam contact area

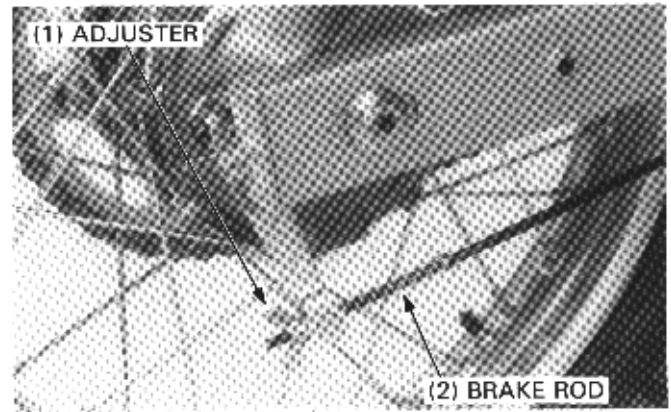
## REAR WHEEL

### REMOVAL

Raise the rear wheel off the ground by placing a box or work stand under the engine.

Remove the adjuster from the brake rod.

Disconnect the brake rod from the brake arm.

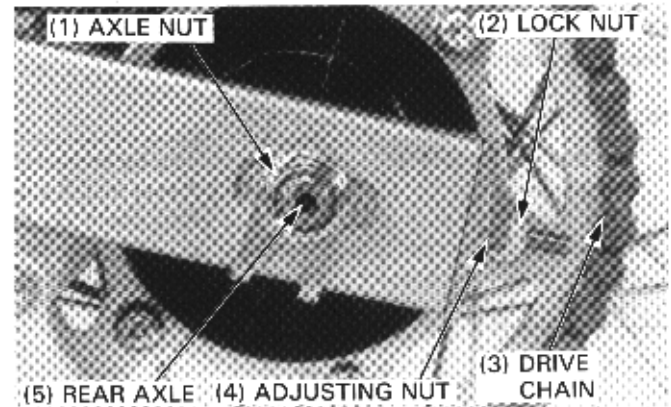


Remove the axle nut and loosen the drive chain adjuster lock nut and adjusting nut.

Move the rear wheel forward all the way and detach the drive chain from the driven sprocket.

Remove the rear axle and rear wheel.

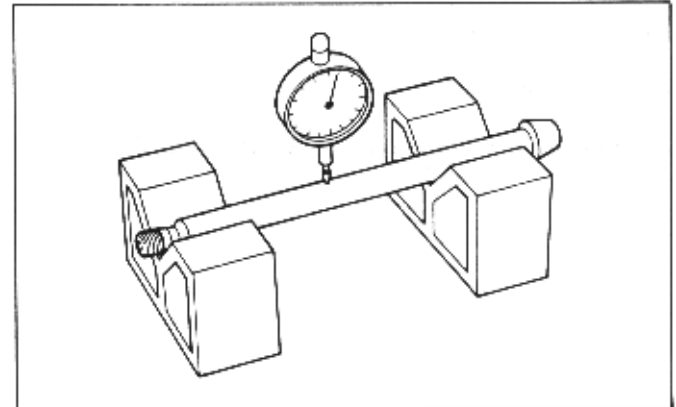
Remove the rear brake panel from the rear wheel.



### INSPECTION

Set the axle on V blocks and measure the runout. The actual runout is 1/2 of the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**

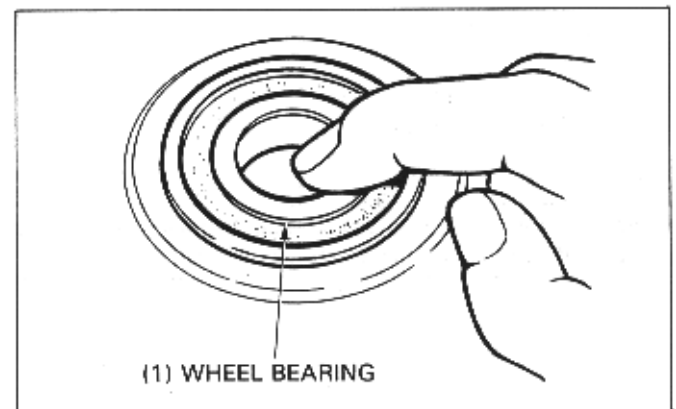


Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub. Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

### NOTE

- Replace wheel bearings in pairs.

For bearing replacement, see page 13-6.

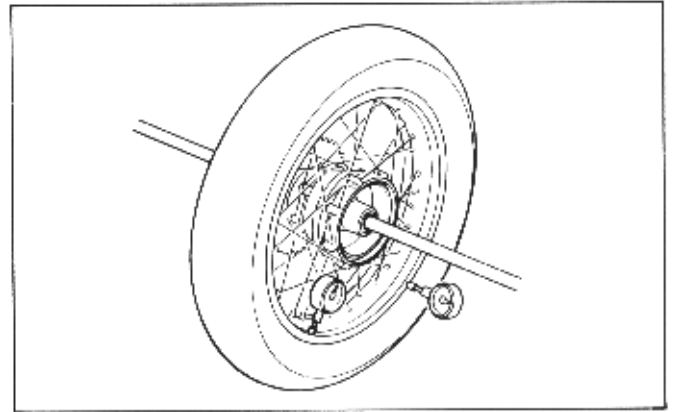


## REAR WHEEL/BRAKE/SUSPENSION

Check the rim runout by placing the wheel on a truing stand. Turn the wheel by hand and measure the runout using a dial indicator.

### SERVICE LIMITS:

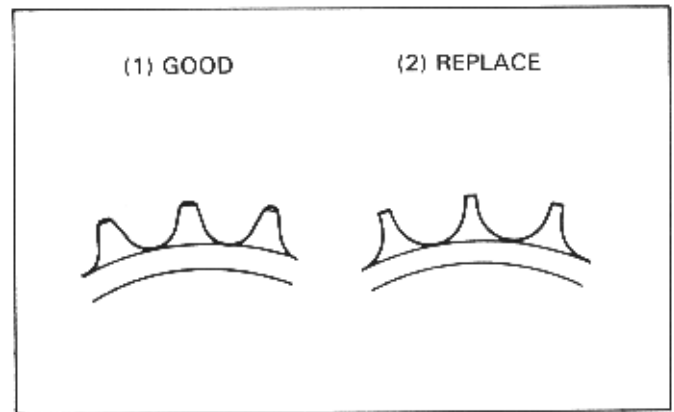
- RADIAL: 2.0 mm (0.08 in)
- AXIAL: 2.0 mm (0.08 in)



Check the condition of the final driven sprocket teeth. Replace a worn or damaged sprocket.

### NOTE

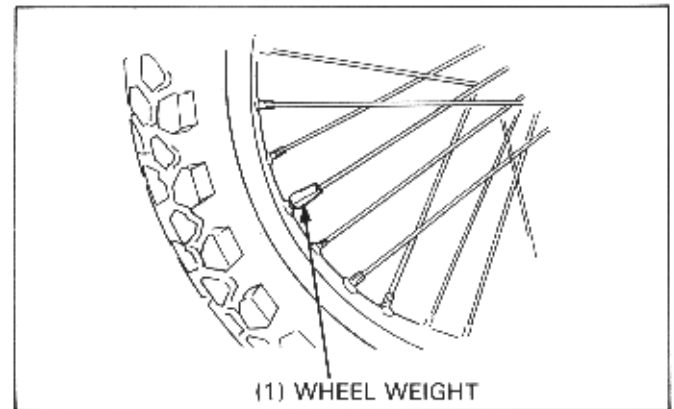
- The drive chain and drive sprocket must also be inspected if the driven sprocket is worn or damaged. Never install a new drive chain on worn sprockets or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the new replacement chain or sprockets will wear rapidly.



## WHEEL BALANCING

Refer to page 12-6.

Do not add the wheel weight more than 60 grams.

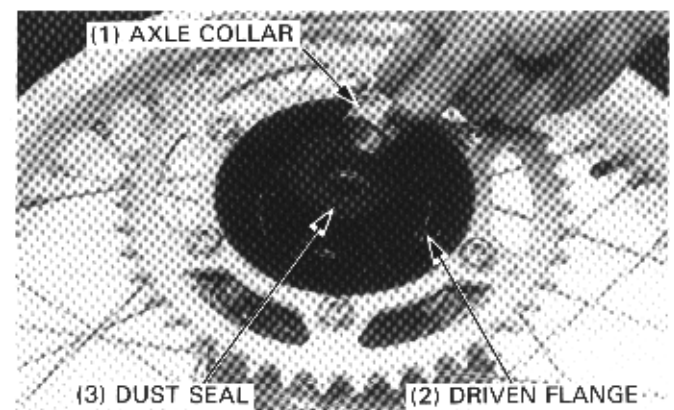


## DISASSEMBLY

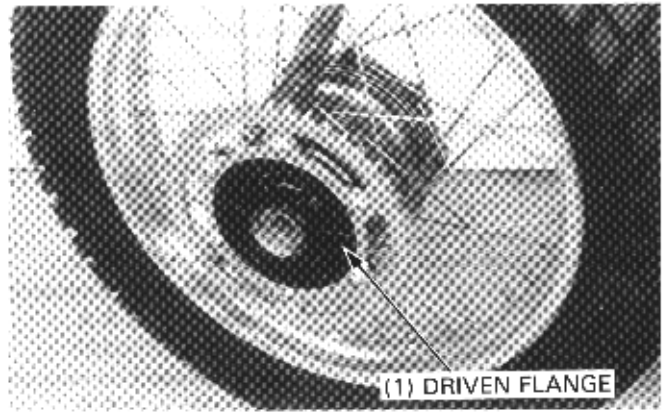
Remove the axle collar and dust seal.  
Remove the final driven flange.

### NOTE

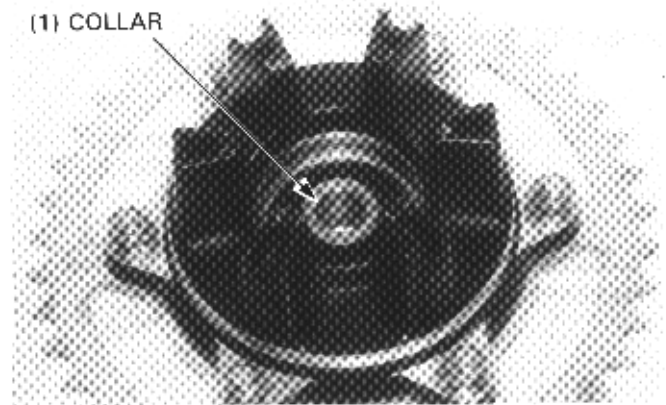
- When removing the driven sprocket, loosen the sprocket bolt with the driven flange installed.



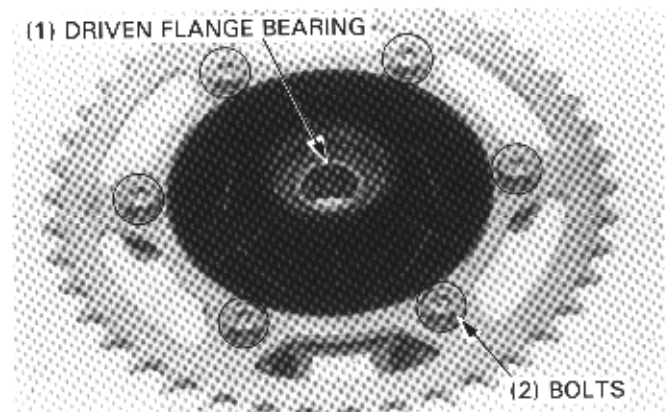
If the driven flange fits tightly in the hub, drive it out by tapping several locations.



When replacing the driven flange bearing, remove the collar from the bearing.



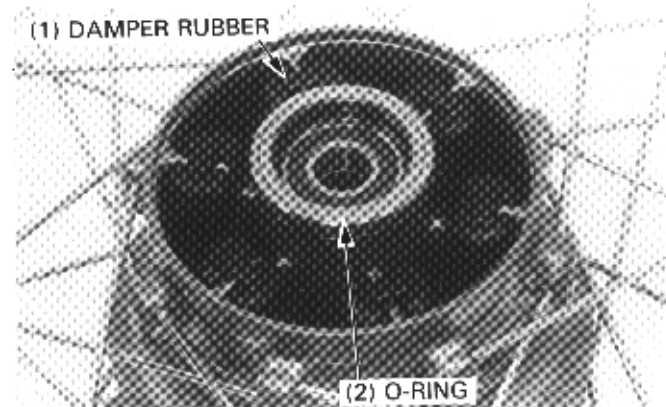
Drive out the driven flange bearing, if necessary.  
Remove the driven sprocket from the driven flange, if necessary.



Remove the damper rubbers.

Replace the damper rubbers if they are damaged or deteriorated.

Remove the O-ring.



## REAR WHEEL/BRAKE/SUSPENSION

Drive out the wheel bearings and the distance collar.

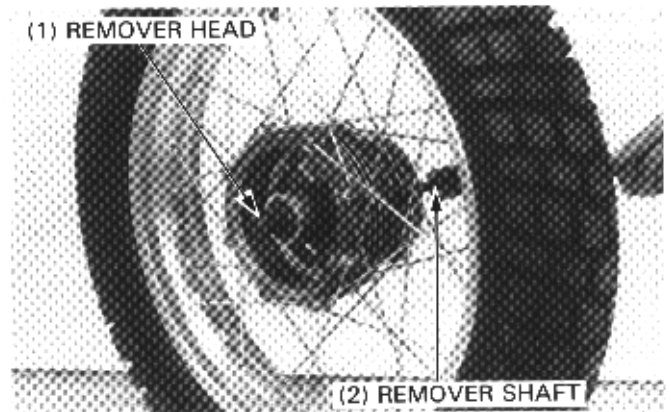
### NOTE

- If the bearings are removed, they should be replaced with new ones.

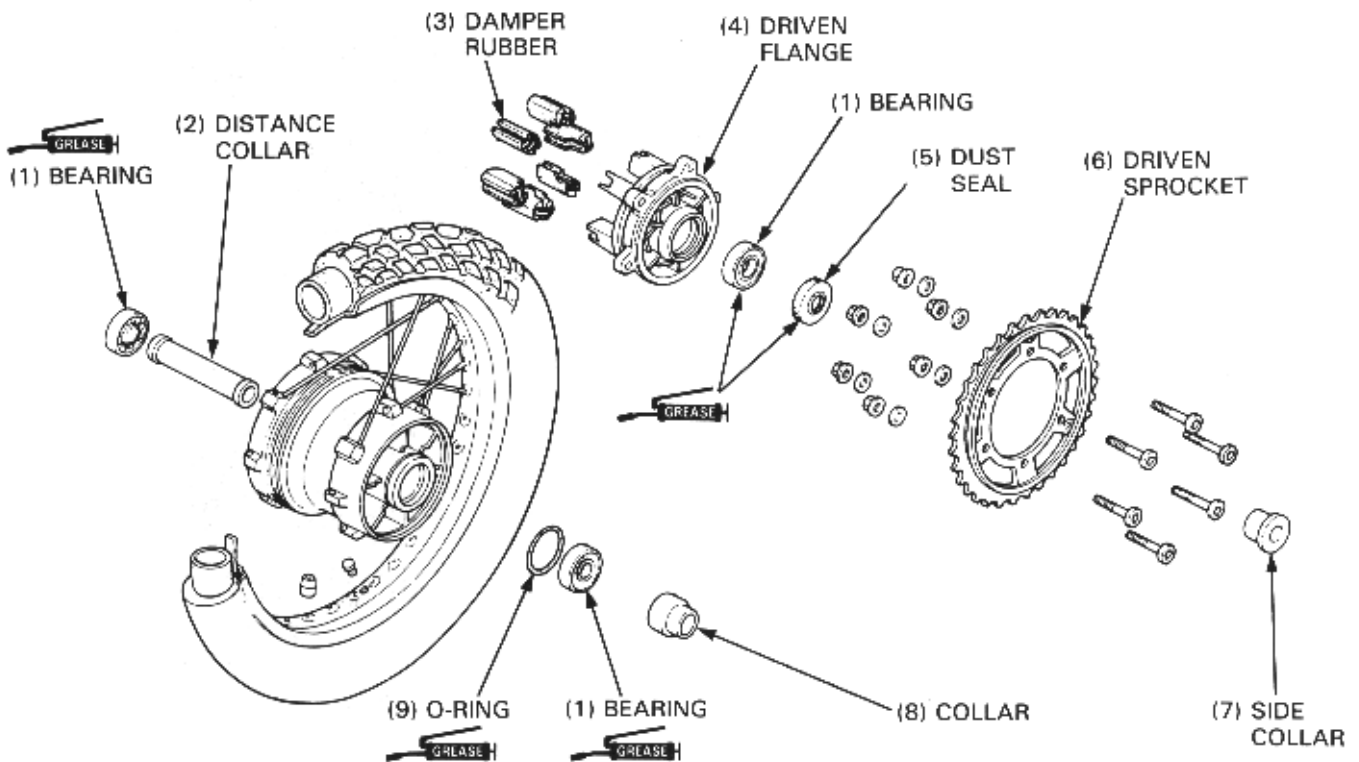
### TOOLS:

Bearing remover head, 17 mm      07746-0050500  
or equivalent commercially  
available in U.S.A.

Bearing remover shaft      07746-0050100  
or equivalent commercially  
available in U.S.A.



### ASSEMBLY





Place the rim and tire on the work bench.

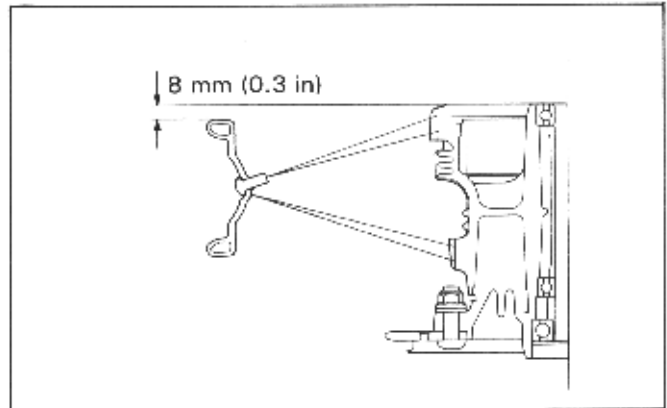
Adjust the position so that the distance from the right end surface of the hub to the side of rim is 8 mm (0.3 in) as shown.

Tighten the spokes in 2 or 3 progressive steps.

**TORQUE: 4 N·m (0.4 kg-m, 3 ft-lb)**

**TOOL:**

**Spoke wrench C, 5.8 x 6.1 mm 07701-0020300**  
**or equivalent commercially available in U.S.A.**



Install the rim band, rim lock, tube and the tire with its directional arrow mark pointing in the direction of normal rotation for forward motion.

Tighten the rim lock.

**TORQUE: 13 N·m (1.3 kg-m, 9.4 ft-lb)**

Check the wheel rim runout as shown on page 13-4, and adjust as required.

Pack the bearing cavities with grease.

Drive in the right bearing with the sealed side of the bearing facing out away from the center of the hub.

Be careful not to tilt the bearing while driving it into the hub and make sure that it is fully seated.

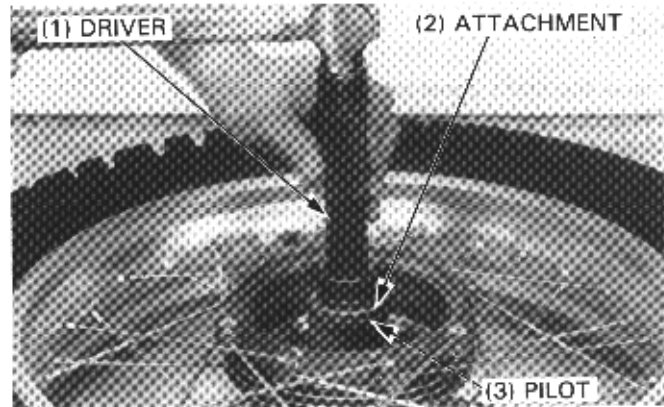
Install the distance collar in the hub, then drive in the left bearing with its sealed side facing out.

**▲ WARNING**

- Grease on the brake drum reduces stopping power. Keep grease off the brake drum.

**TOOLS:**

**Driver 07749-0010000**  
**Attachment, 37 x 40 mm 07746-0010200**  
**Pilot, 17 mm 07746-0040400**



Pack a new driven flange bearing with grease, then drive it into the driven flange with its sealed end facing out.

**TOOLS:**

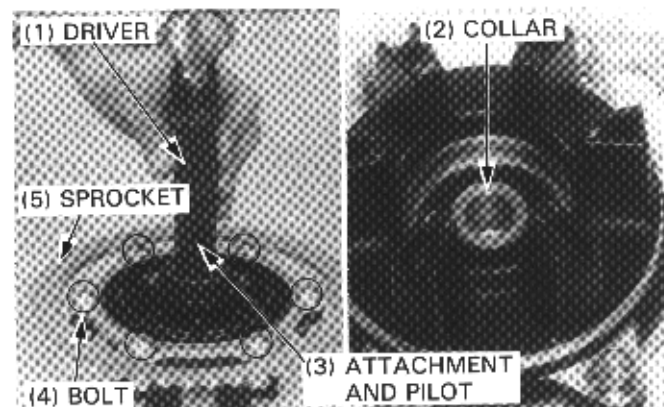
**Driver 07749-0010000**  
**Attachment, 42 x 47 mm 07746-0010300**  
**Pilot, 20 mm 07746-0040500**

Install the collar onto the driven flange bearing.

If the driven sprocket was removed, install it with the teeth number facing out.

Apply oil to the threads of the driven sprocket bolts and tighten the sprocket nuts to the specified torque.

**TORQUE: 46 N·m (4.6 kg-m, 33 ft-lb)**

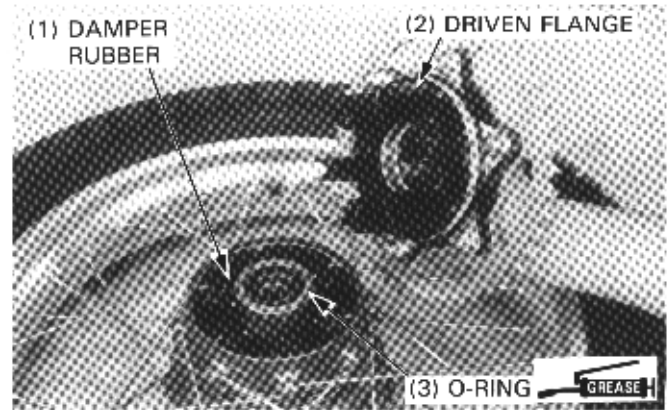


## REAR WHEEL/BRAKE/SUSPENSION

Install the damper rubbers.

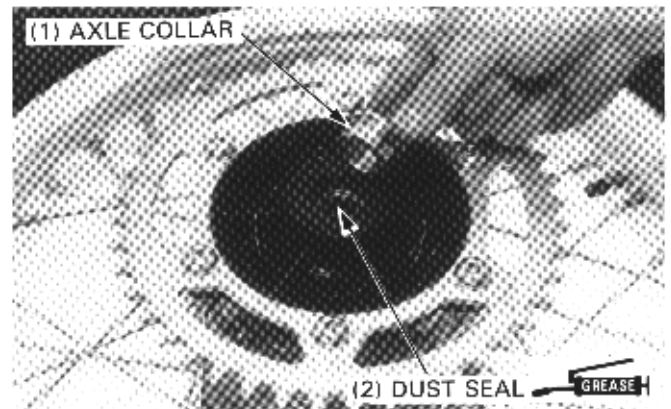
Apply grease to a new O-ring and install it onto the groove of the wheel hub.

Install the driven flange.



Apply grease to the dust seal lip and install it.

Install the axle collar.

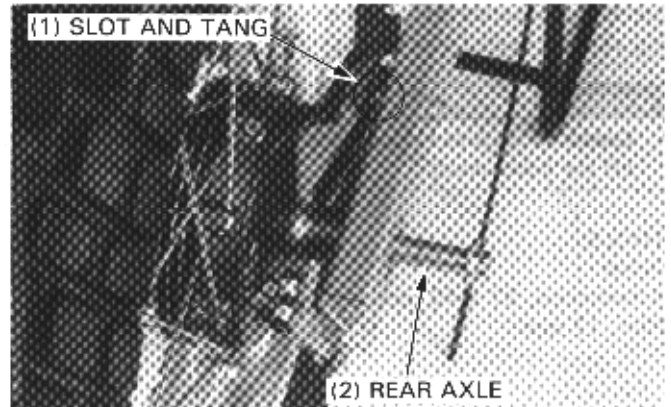


## INSTALLATION

Install the brake panel on the wheel hub.

Place the rear wheel between the swing arm and rail the drive chain over the driven sprocket.

Lift the rear wheel and insert the tang on the swing arm into the slot in the brake panel, then insert the rear axle from right side through swing arm.

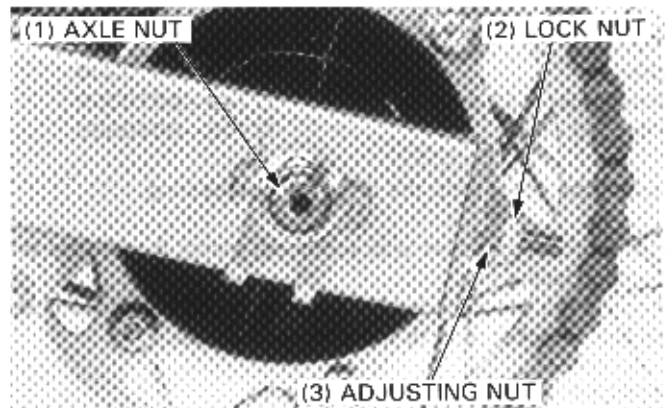


Loosely install the axle nut.

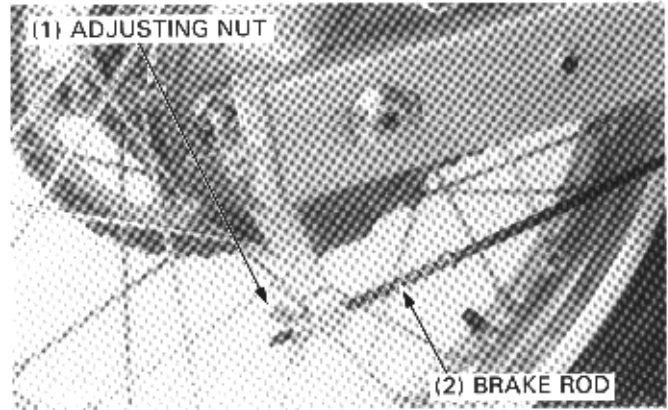
Adjust the drive chain (page 3-8).

Tighten the rear axle nut.

**TORQUE: 90 N·m (9.0 kg-m, 65 ft-lb)**



Connect the brake rod to the brake arm and install the adjusting nut.  
Adjust the rear brake pedal free play (page 3-11).

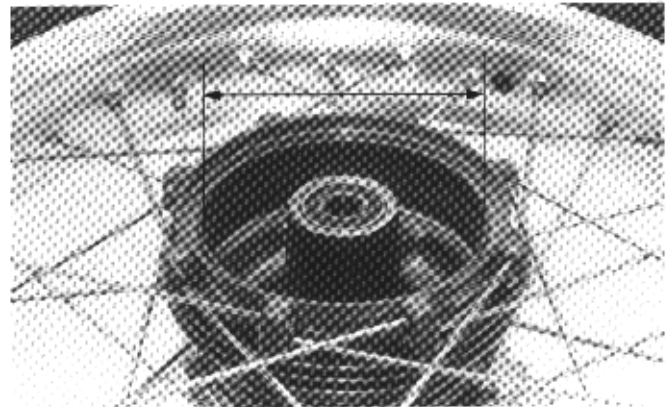


## REAR BRAKE

### INSPECTION

Remove the rear wheel (page 13-3).  
Remove the rear brake panel.  
Measure the rear brake drum I.D.

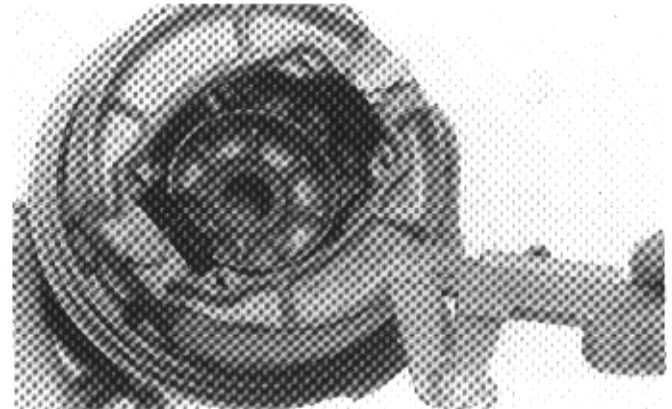
**SERVICE LIMIT: 131 mm (5.16 in)**



Measure the rear brake lining thickness.

**SERVICE LIMIT: 2.0 mm (0.08 in)**

Replace the brake shoes if thinner than the service limit.

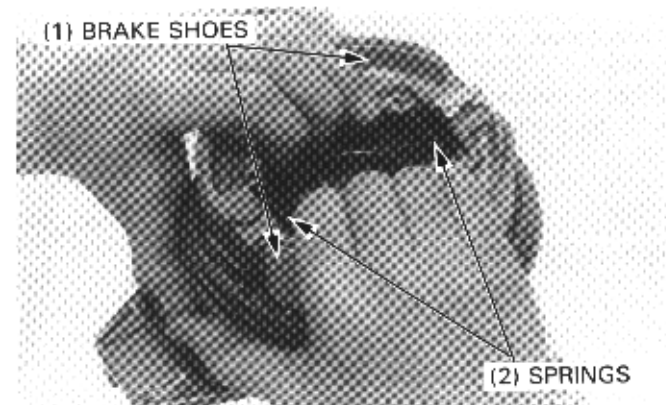


### DISASSEMBLY

Remove the brake shoes and springs from the brake panel.

#### NOTE

- Mark the shoes to indicate their original positions before removing them.

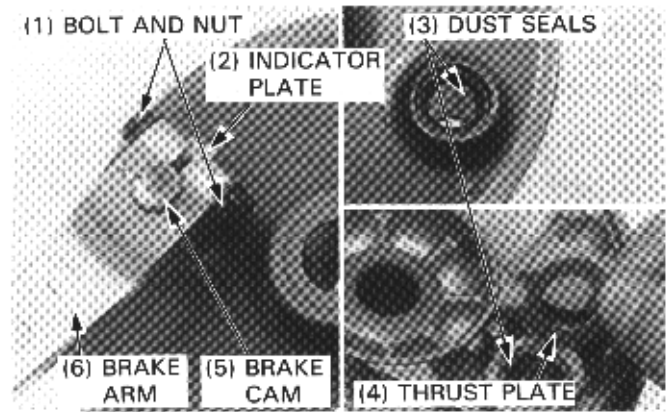


## REAR WHEEL/BRAKE/SUSPENSION

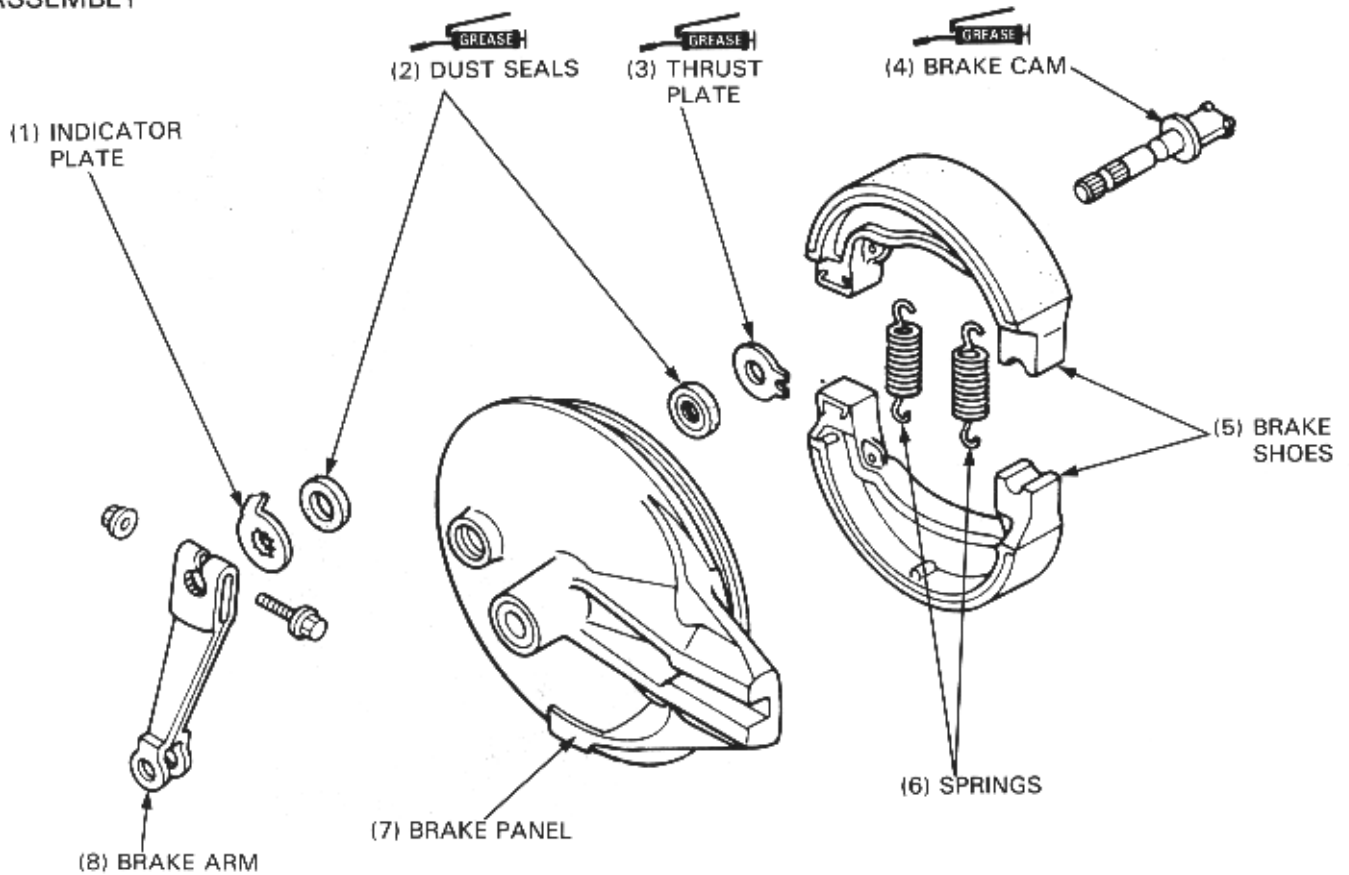
Remove the following parts from the brake panel:

- Bolt nut, and brake arm
- Indicator plate
- Brake cam
- Thrust plate
- Dust seals

Clean all parts thoroughly.

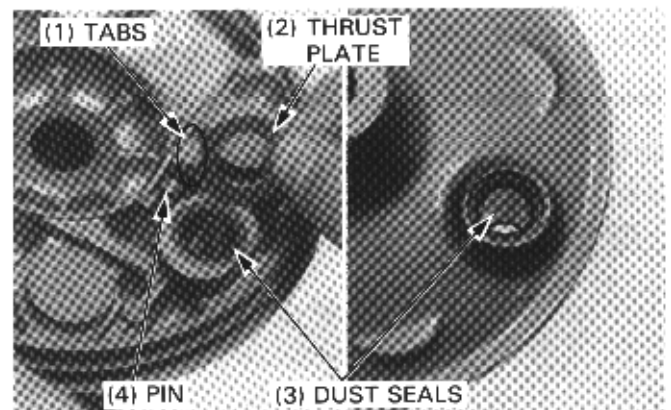


## ASSEMBLY



Apply grease to the dust seals, and install them into the brake panel.

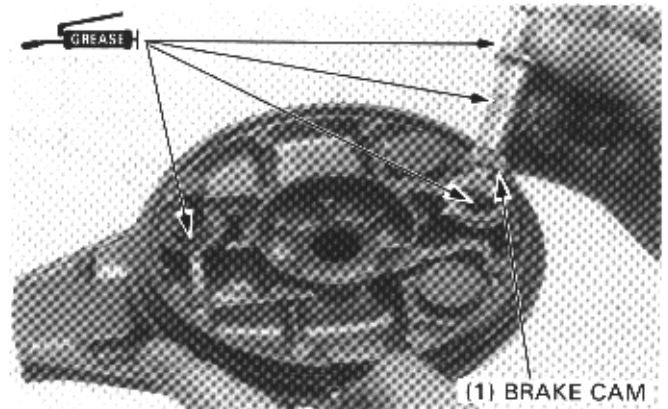
Install the thrust plate by aligning the pin on the brake panel with the slot in the plate.



Apply grease to the brake cam and install it.  
Apply grease to the anchor pin and thrust plate.

**WARNING**

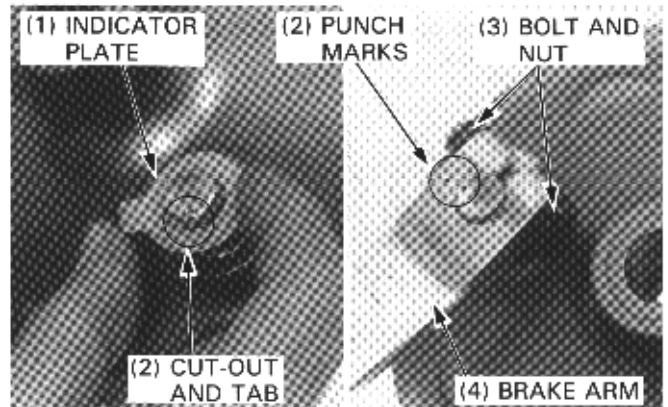
- Grease on the brake linings will reduce stopping power. Keep grease off the brake linings. Wipe excess grease off the cam and anchor pin.



Install the indicator plate onto the brake cam, aligning its tab with cut-out on the brake cam.

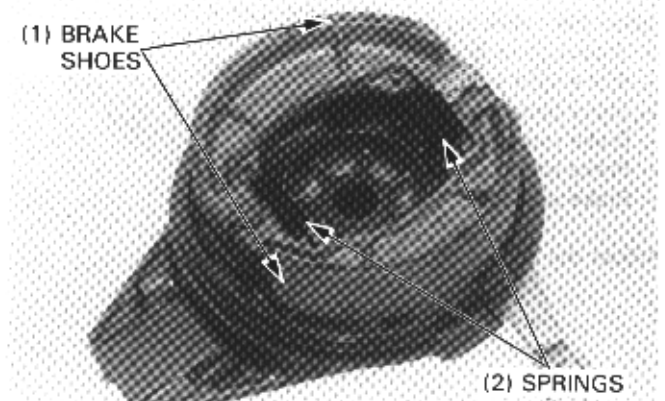
Install the brake arm by aligning the punch marks. Install the bolt and tighten the nut to the specified torque.

**TORQUE: 10 N·m (1.0 kg·m, 7 ft·lb)**



Position the brake shoes in their original positions and install the springs.

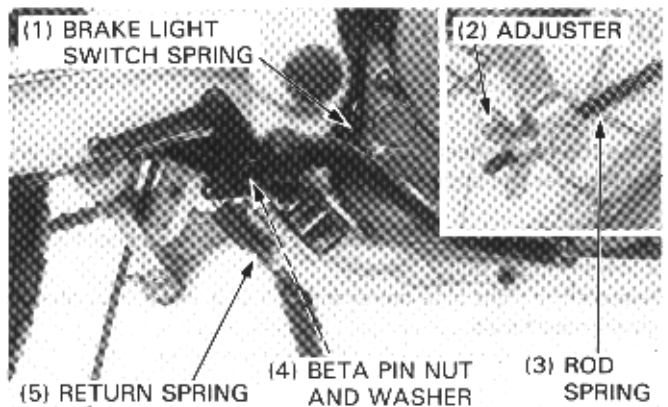
Check the rear brake assembly for smooth operation by moving the brake arm.



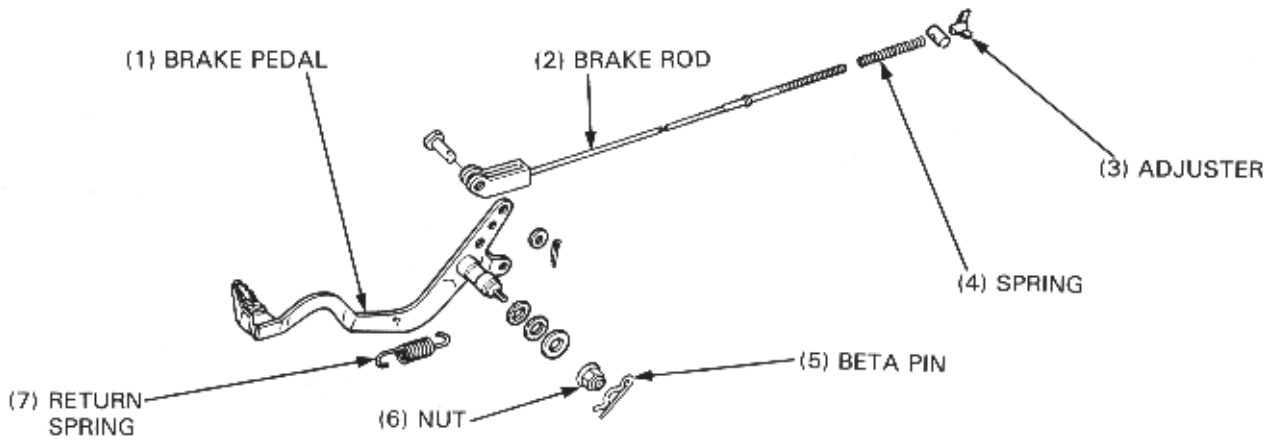
**BRAKE PEDAL REMOVAL/INSTALLATION**

Remove the following parts:

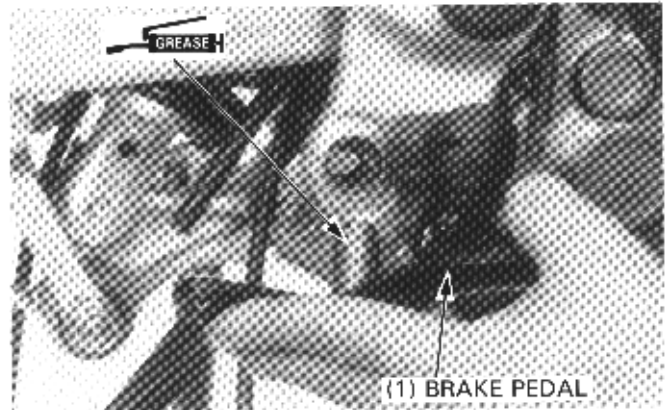
- Brake adjuster
- Brake rod from the brake arm
- Brake rod spring
- Brake pedal return spring
- Brake light switch spring
- Beta pin, nut and washer
- Brake pedal



## REAR WHEEL/BRAKE/SUSPENSION



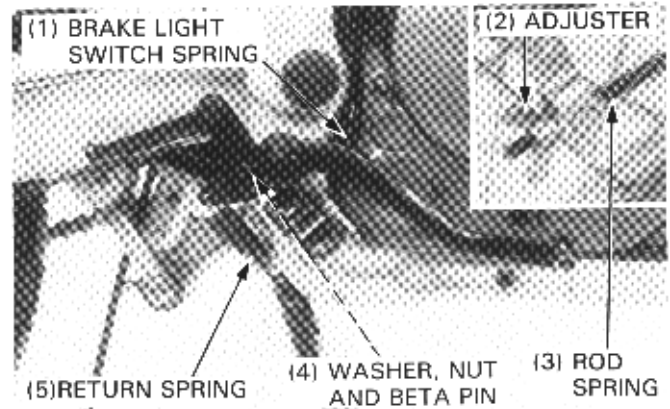
Apply grease to the dust seal lips and brake pedal pivot, and install the brake pedal.



Install the following parts:

- Washer, nut and beta pin
- Brake light switch spring
- Brake pedal return spring
- Brake rod spring
- Brake rod to the brake arm
- Brake adjuster

Adjust the brake pedal free play (page 3-11).



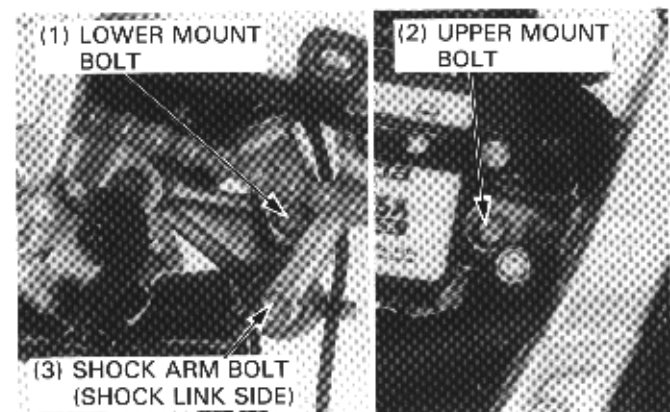
## SHOCK ABSORBER

### REMOVAL

Raise the rear wheel off the ground by placing a box or work stand under the engine.

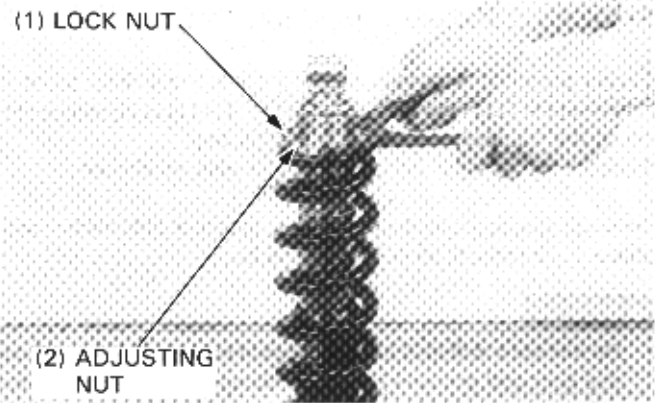
Remove the shock arm bolt (shock link side) and shock absorber lower mount bolt.

Remove the right side cover (page 15-2) and shock absorber upper mount bolt.



DISASSEMBLY

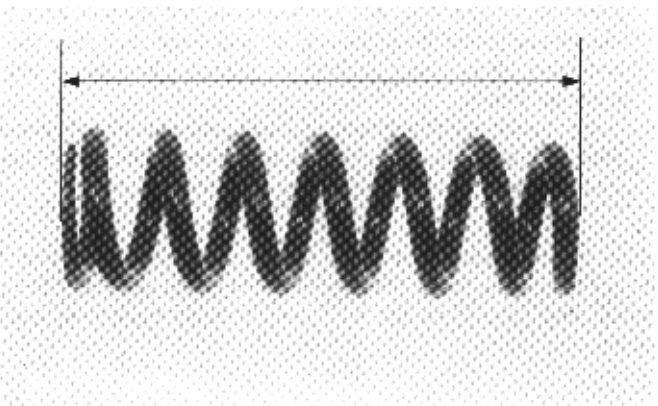
Hold the shock upper mount in a vise with soft jaws or a shop towel.  
 Remove the lock nut and adjusting nut.  
 Remove the shock spring.



Check the spring for damage, and measure the spring free length.

**SERVICE LIMIT: 235.1 mm (9.26 in)**

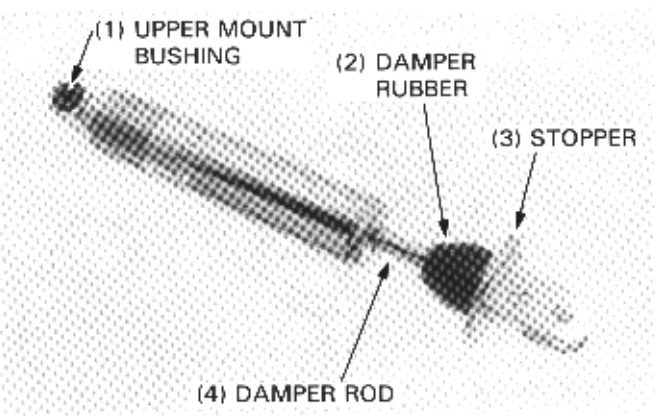
**⚠ WARNING**  
 • *The damper unit is filled with nitrogen gas under high pressure, do not try to disassemble.*



Check the damper unit for oil leaks or other damage and the damper rod for trueness.

Check the spring seat stopper, spring seat, spring guide and damper rubber for wear or damage.

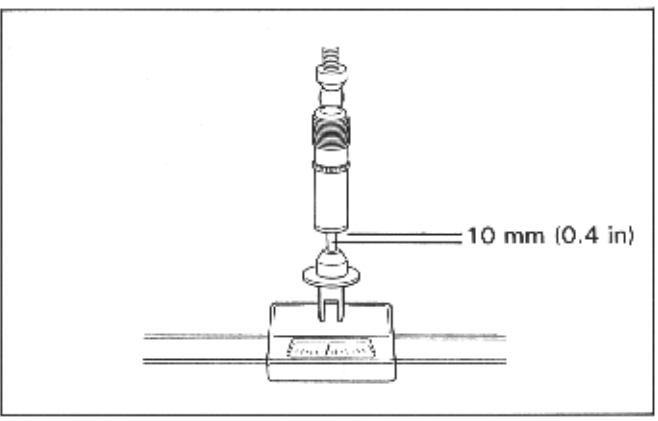
Check the upper mount bushing for wear or damage.



Mark the 10 mm position as shown of the damper rod.  
 Place the damper rod on a scale and measure the force required to compress the damper 10 mm (0.4 in).

**COMPRESSION FORCE: 33 kg (72.8 lb)**

If the force required is less than 28 kg (61.7 lb), gas is leaking. Examine the damper rod and replace the damper unit if it is bent or scored.



## REAR WHEEL/BRAKE/SUSPENSION

### SHOCK ABSORBER DISPOSAL PROCEDURE

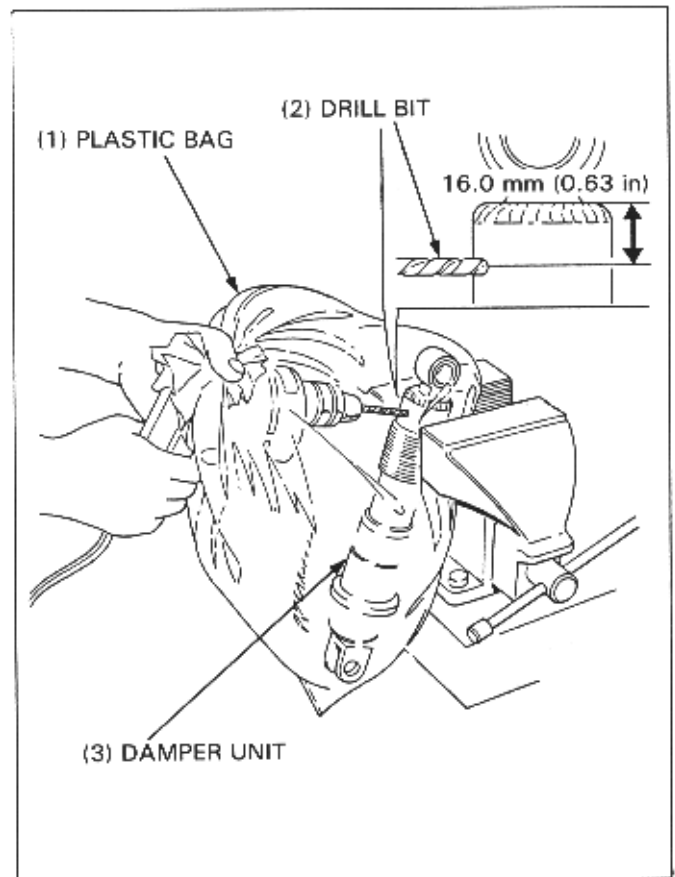
Center punch the damper case to mark the drilling point, approximately 16.0 mm (0.63 in) from the top surface. Wrap the damper unit inside a plastic bag. Support the damper unit upright in a vise as shown.

Through the open end of the bag, insert a drill motor with a sharp 2–3 mm (5/64–1/8 in) drill bit.

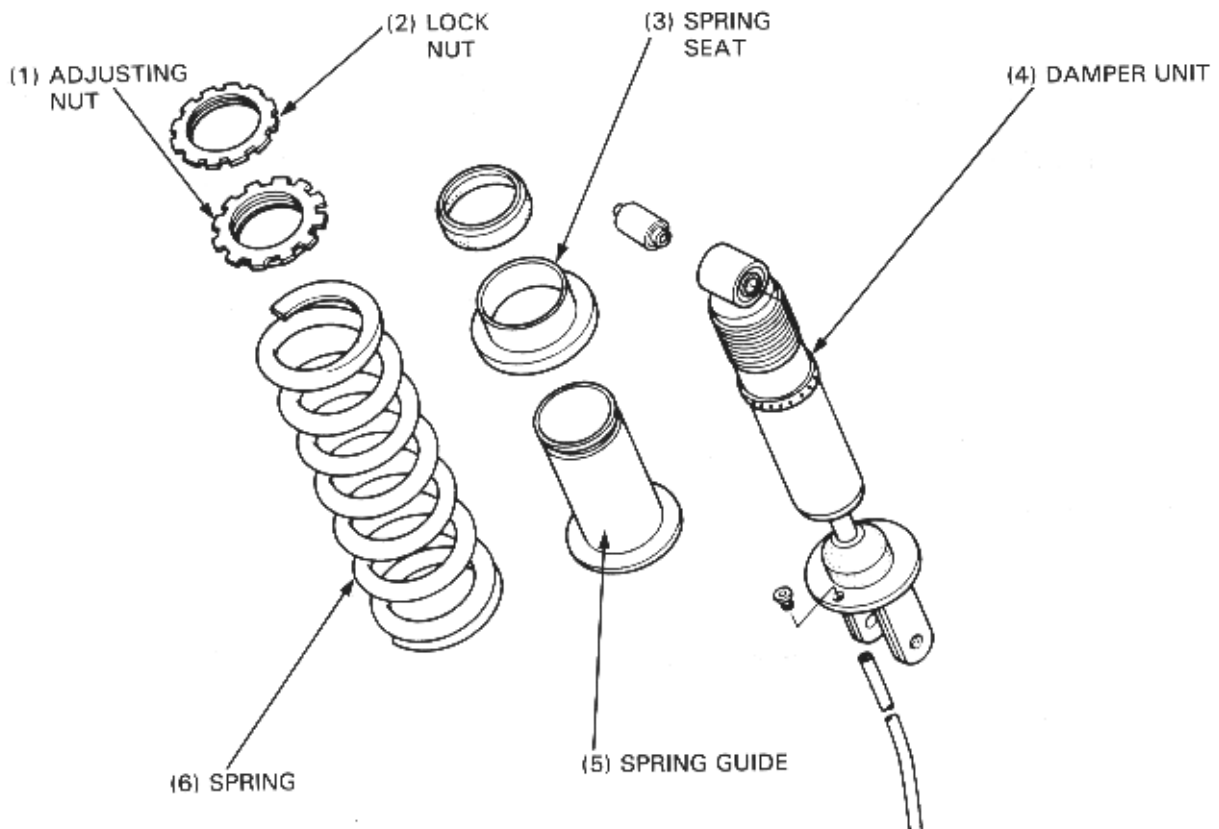
#### ▲ WARNING

- Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.
- The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any farther down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.
- Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.

Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.



### ASSEMBLY





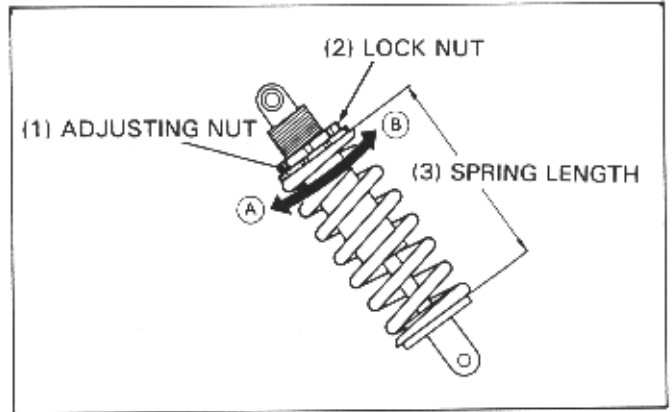
Install the spring, adjusting nut and lock nut.  
Turn the spring adjusting nut until the spring length is as specified.

- A: DECREASE THE SPRING LENGTH
- B: INCREASE THE SPRING LENGTH

**STANDARD SPRING LENGTH: 237.5 mm (9.35 in)**  
**MAXIMUM LENGTH: 239.9 mm (9.44 in)**  
**MINIMUM LENGTH: 235.1 mm (9.26 in)**

**NOTE**

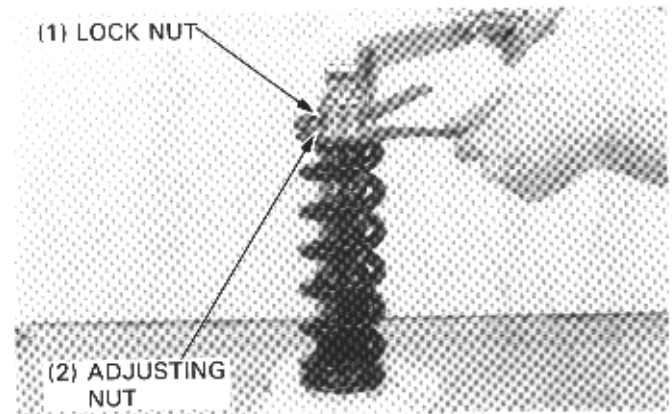
- One turn of the adjusting nut changes the spring length by 1.5 mm.



Hold the shock absorber upper mount in a vice with soft jaws or a shop towel.  
Using pin spanners, tighten the lock nut while holding the adjusting nut.

**TORQUE: 90 N·m (9.0 kg·m, 65 ft·lb)**

Install the breather tube to the seat stopper.



Install the shock absorber to the frame with the breather tube toward the rear.  
Install and tighten the shock absorber upper mount bolt and nut.

**TORQUE: 75 N·m (7.5 kg·m, 54 ft·lb)**

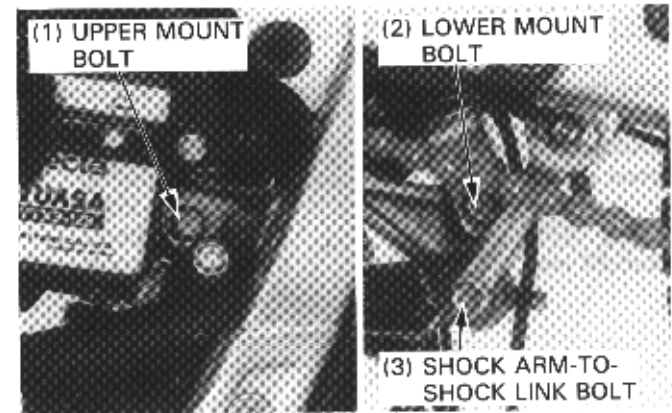
Install and tighten the shock absorber lower mount bolt.

**TORQUE: 45 N·m (4.5 kg·m, 32 ft·lb)**

Install and tighten the shock arm-to-shock link bolt.

**TORQUE: 45 N·m (4.5 kg·m, 32 ft·lb)**

Install the right side cover (page 15-2).  
Check the operation of the shock absorber (page 3-14).



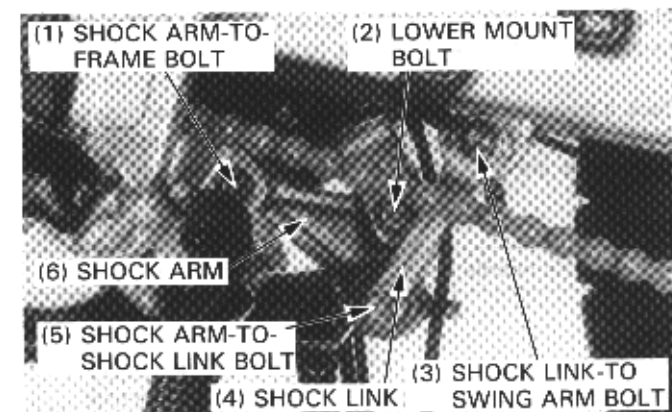
## SHOCK LINKAGE

### REMOVAL

Raise the rear wheel off the ground by placing a work stand or box under the engine.

Remove the following components:

- Shock arm-to-shock link bolt
- Shock link-to-swing arm bolt
- Shock link
- Shock absorber lower mount bolt
- Shock arm-to-frame bolt
- Shock arm



## REAR WHEEL/BRAKE/SUSPENSION

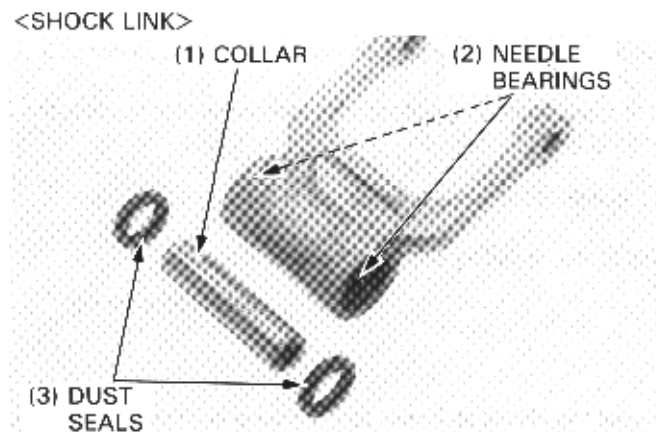
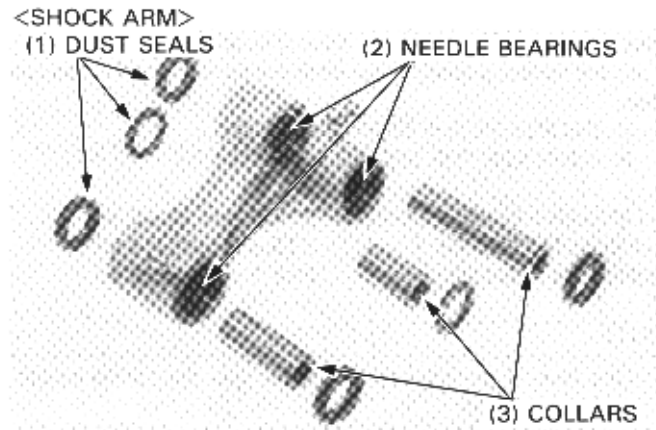
### INSPECTION

Inspect the dust seals, collars and needle bearings.

Replace them if they have score marks, scratches, or excessive or abnormal wear.

#### NOTE

- Be careful not to lose the needle rollers of the shock arm and link pivot needle bearings.
- If the needle rollers are out of place, inspect them for wear or damage and install into place using molybdenum disulfide grease.



### NEEDLE BEARING REPLACEMENT

Drive the needle bearings out of the shock arm and shock link.

#### TOOLS:

Driver shaft

or

Driver

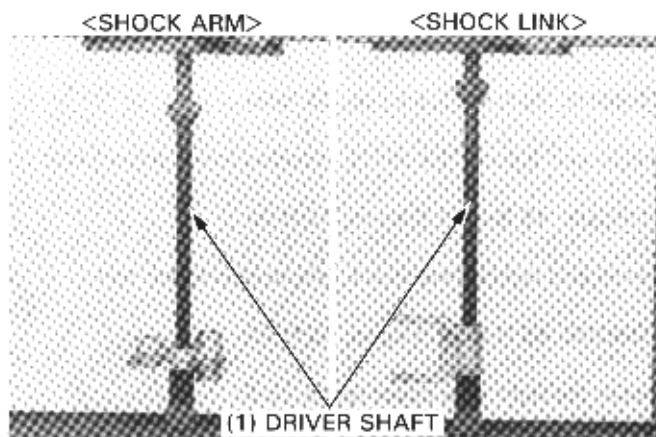
Pilot, 22 mm

07946-MJ00100

Not available in U.S.A.

07749-0010000

07746-0041000



### SHOCK ABSORBER LOWER MOUNT BOLT PIVOT AND SHOCK ARM-TO-SHOCK LINK BOLT PIVOT

Pack a new needle bearings with multi purpose grease. Press the needle bearings into the shock arm until the bearing outer ends are on a level with the shock arm inner edges.

#### NOTE

- Press the needle bearing on the stamped end.

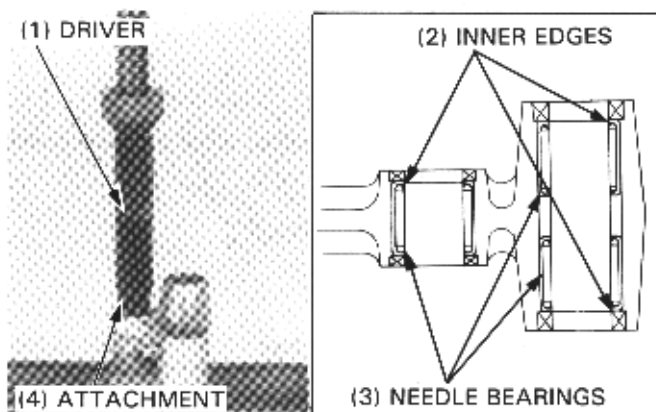
#### TOOLS:

Driver

Attachment, 24 x 26 mm

07749-0010000

07746-0010700



**SHOCK ARM-TO-FRAME BOLT PIVOT**

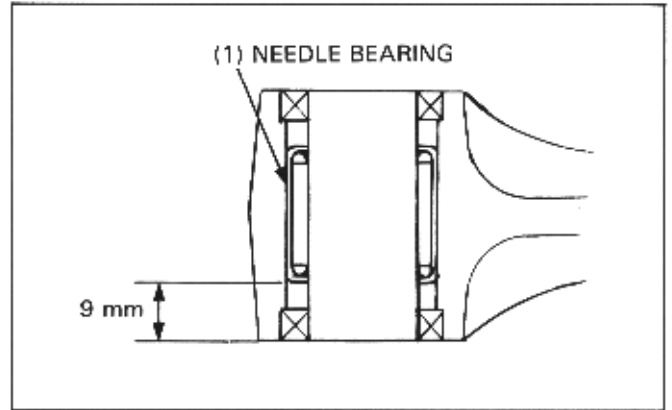
Pack a new needle bearing with multi purpose grease. Measuring with a vernier caliper, press the needle bearing into the shock arm 9 mm (0.35 in) below the outer edge of the shock arm.

**NOTE**

- Press the needle bearing on the stamped end.

**TOOLS:**

Driver 07749-0010000  
Attachment, 24 x 26 mm 07746-0010700



**SHOCK LINK-TO-SWING ARM BOLT PIVOT**

Pack a new needle bearings with multi purpose grease. Fill the space between needle bearings with grease.

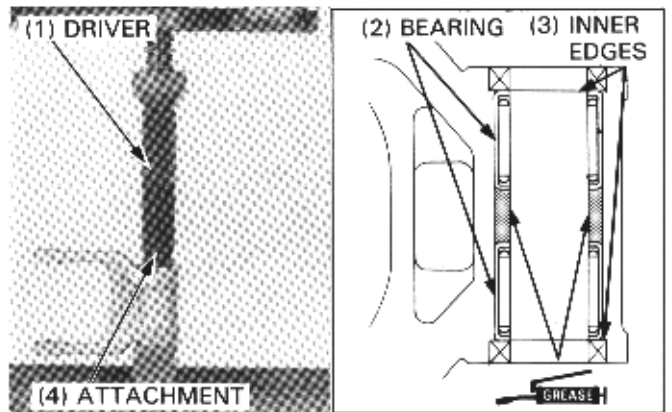
Press the needle bearings into the shock link until the bearing outer ends are on a level with the shock link inner edges.

**NOTE**

- Press the needle bearing on the stamped end.

**TOOLS:**

Driver 07749-0010000  
Attachment, 24 x 26 mm 07746-0010700

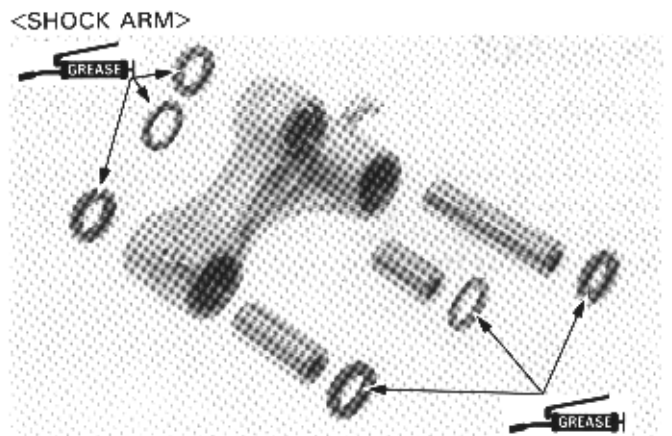


**INSTALLATION**

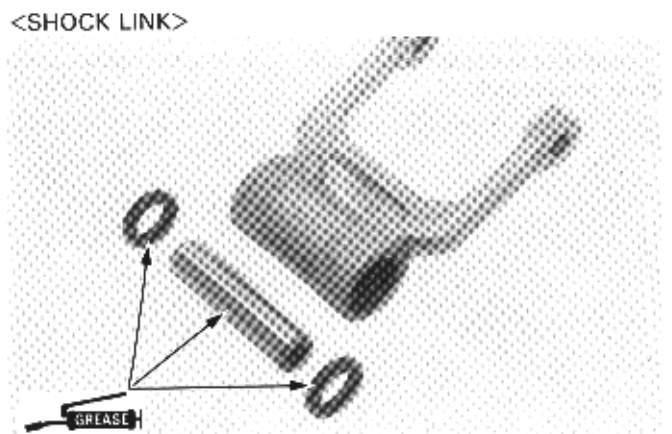
**NOTE**

- Make sure that the needle rollers of the needle bearings are in position before installing the pivot collars.

Apply multi purpose grease to the shock arm pivot collar surfaces and dust seal lips. Install the collars and dust seals into the shock arm.



Apply multi purpose grease to the shock link pivot collar surfaces and dust seal lips. Install the collars and dust seals into the shock link.

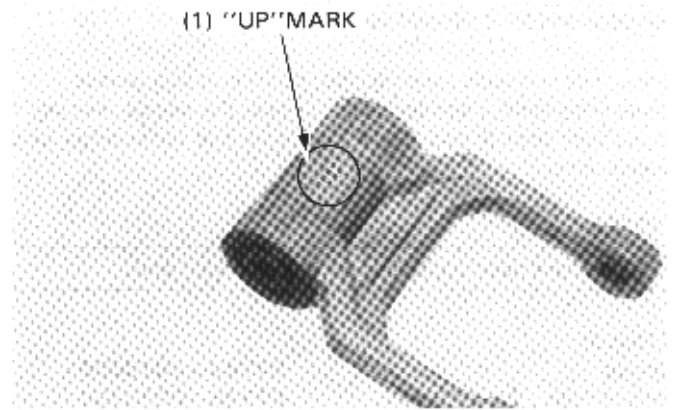


## REAR WHEEL/BRAKE/SUSPENSION

Install the shock arm and shock link, and loosely install each bolt and nut.

### NOTE

- Install the shock link with the "UP" mark facing up.



Tighten each bolt and nut to the specified torque.

### TORQUE:

Shock link-to-swing arm nut:

45 N·m (4.5 kg-m, 32 ft-lb)

Shock absorber lower mount bolt:

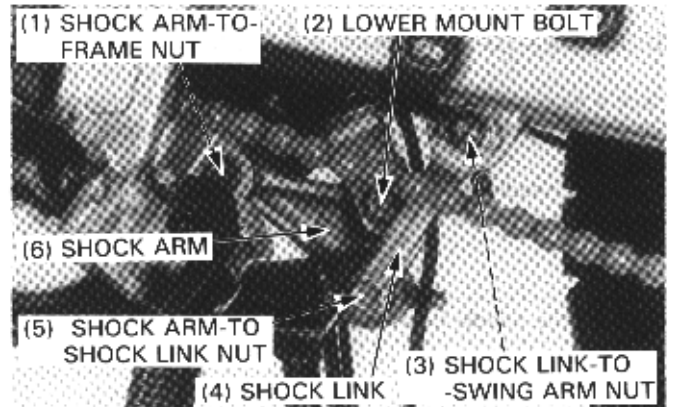
45 N·m (4.5 kg-m, 32 ft-lb)

Shock arm-to-shock link nut:

45 N·m (4.5 kg-m, 32 ft-lb)

Shock arm-to-frame nut:

45 N·m (4.5 kg-m, 32 ft-lb)



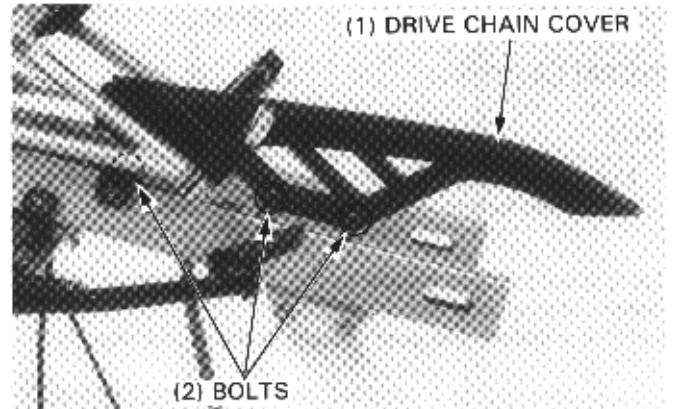
## SWING ARM

### REMOVAL

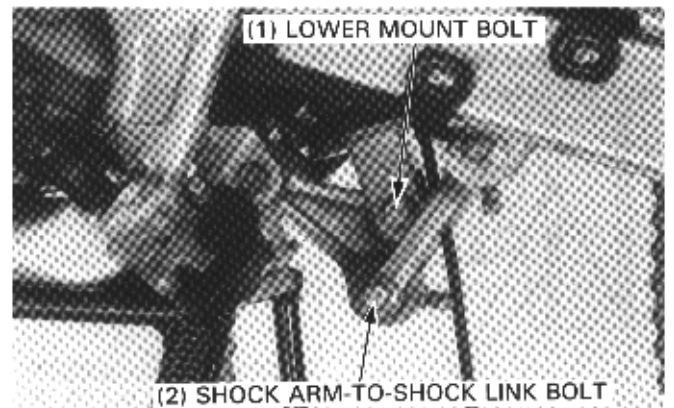
Raise the rear wheel off the ground by placing box or work stand under the engine.

Remove the rear wheel (page 13-3).

Remove the drive chain cover.

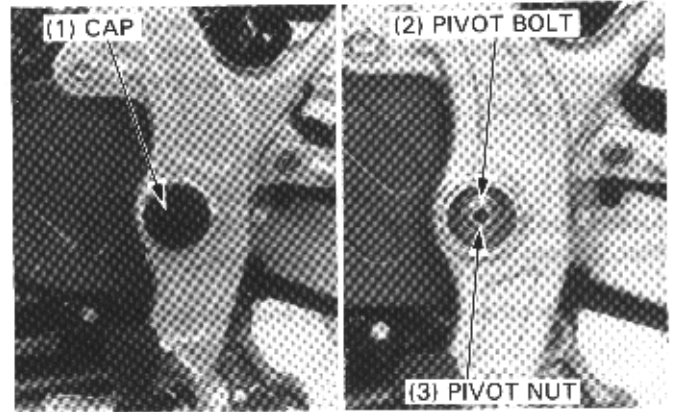


Remove the shock arm-to-shock link bolt and shock absorber lower mount bolt.



Remove the following parts:

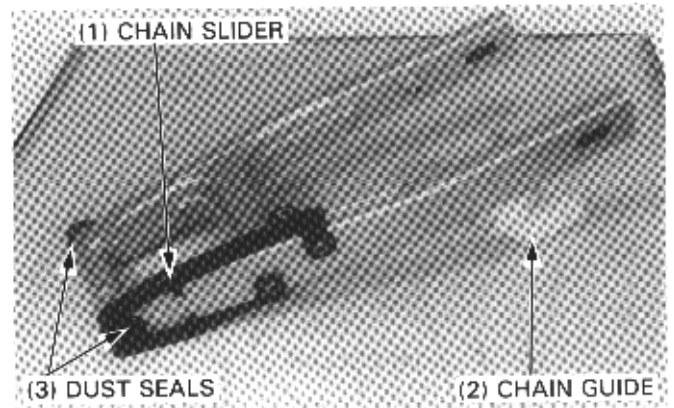
- Swing arm pivot cap
- Swing arm pivot nut and bolt
- Swing arm



### DISASSEMBLY

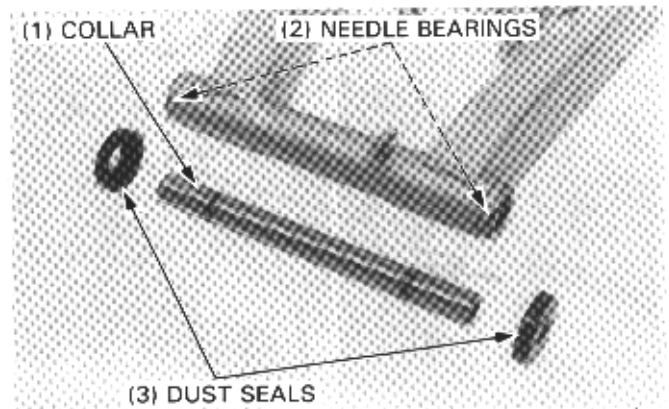
Remove the following parts from the swing arm.

- Dust seals
- Swing arm pivot collar
- Drive chain slider
- Drive chain guide



### INSPECTION

Inspect the dust seals, pivot collar and needle bearings for wear or damage. Replace them if they have score marks, scratches, or excessive or abnormal wear.

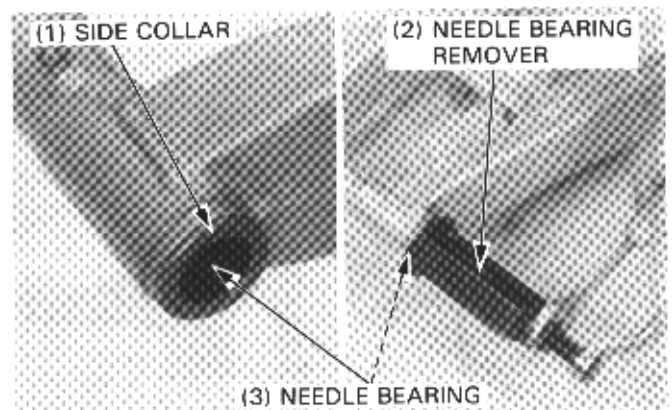


### PIVOT BEARING REPLACEMENT

Remove the pivot side collars. Set the needle bearing remover, screw out the pivot bearings and discard them.

**TOOL:**

- |                        |                 |
|------------------------|-----------------|
| Needle bearing remover | 07931 - MA70000 |
| or                     |                 |
| Bearing remover, 20 mm | 07936 - 3710600 |
| Remover handle         | 07936 - 3710100 |
| Remover sliding weight | 07936 - 3710200 |



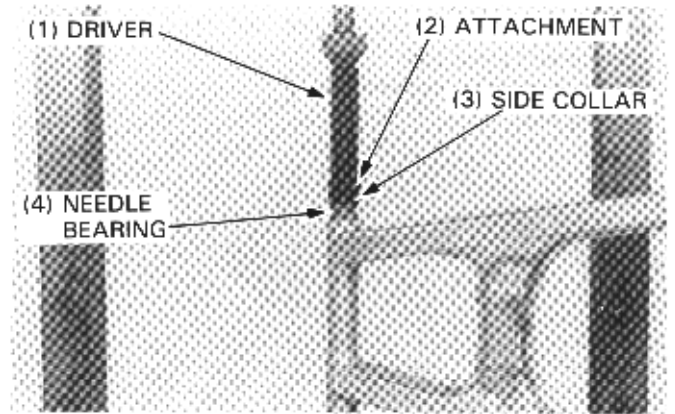
## REAR WHEEL/BRAKE/SUSPENSION

Pack new needle bearings with multi purpose grease. Install the needle bearing to the swing arm pivot with the stamped end facing out, and press it into the pivot with the pivot side collar.

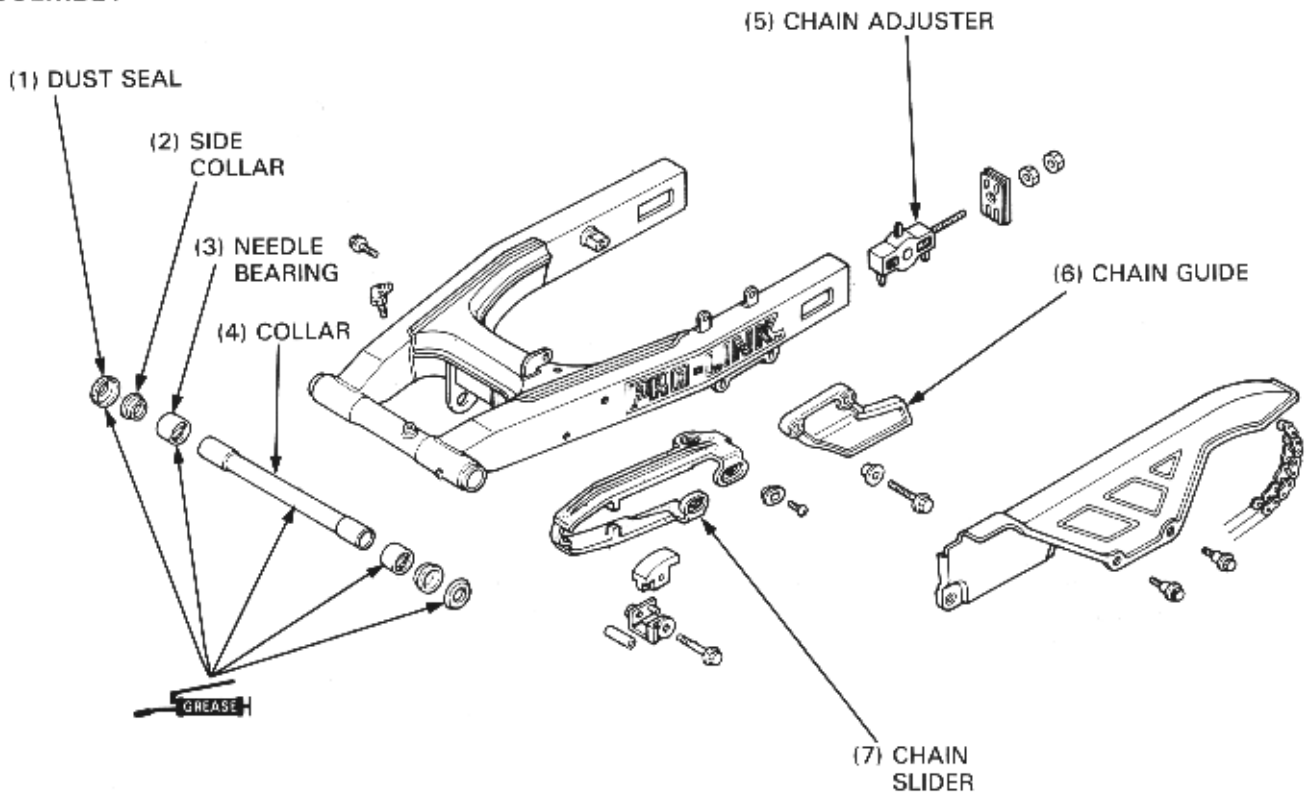
### TOOLS:

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 20 mm	07746-0040500

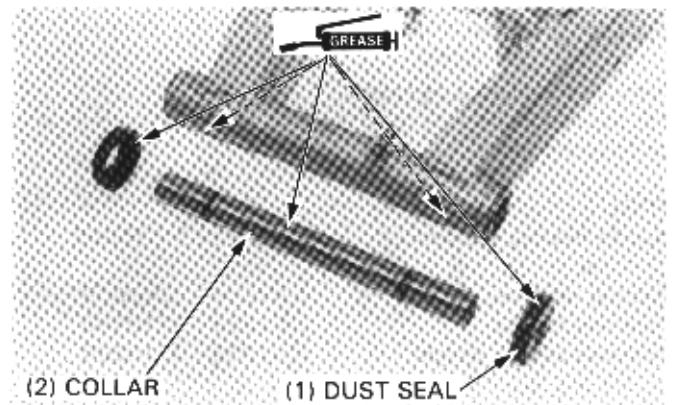
Press in the other needle bearing and side collar.



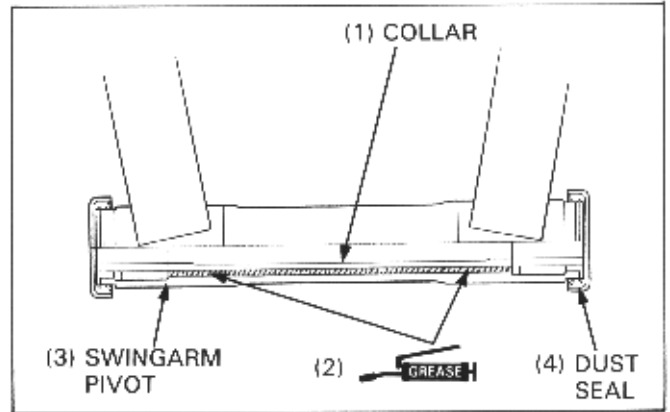
### ASSEMBLY



Apply grease to the pivot collar and dust seal lips.

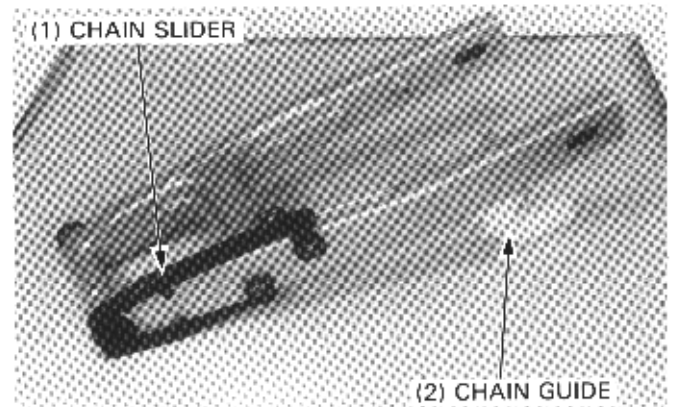


Install the collar and dust seals.



Install the following parts to the swing arm:

- Drive chain slider
- Drive chain guide



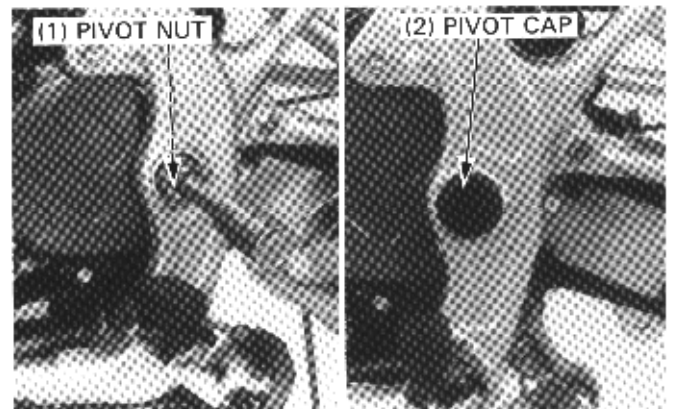
Install the swing arm to the frame.

From the right side, insert the swing arm pivot bolt through the swing arm.

Install and tighten the swing arm pivot nut.

**TORQUE: 110 N·m (11.0 kg-m, 80 ft-lb)**

Install the swing arm pivot cap.

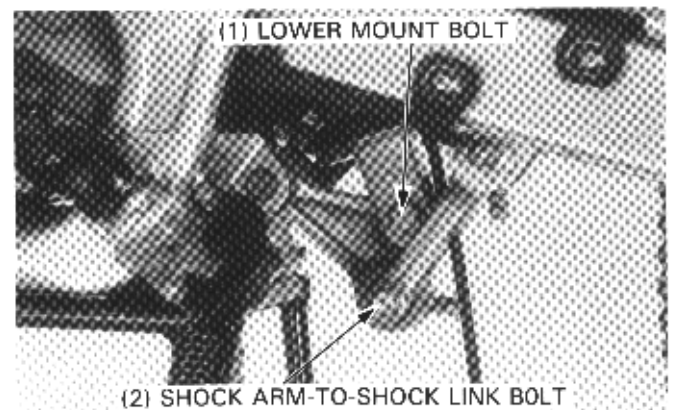


Install and tighten the shock absorber lower mount bolt.

**TORQUE: 45 N·m (4.5 kg-m, 32 ft-lb)**

Install the shock arm-to-shock link bolt and nut, and tighten the nut.

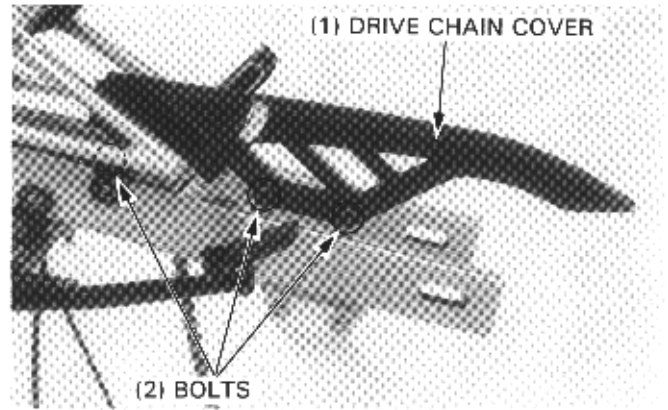
**TORQUE: 45 N·m (4.5 kg-m, 32 ft-lb)**



## REAR WHEEL/BRAKE/SUSPENSION

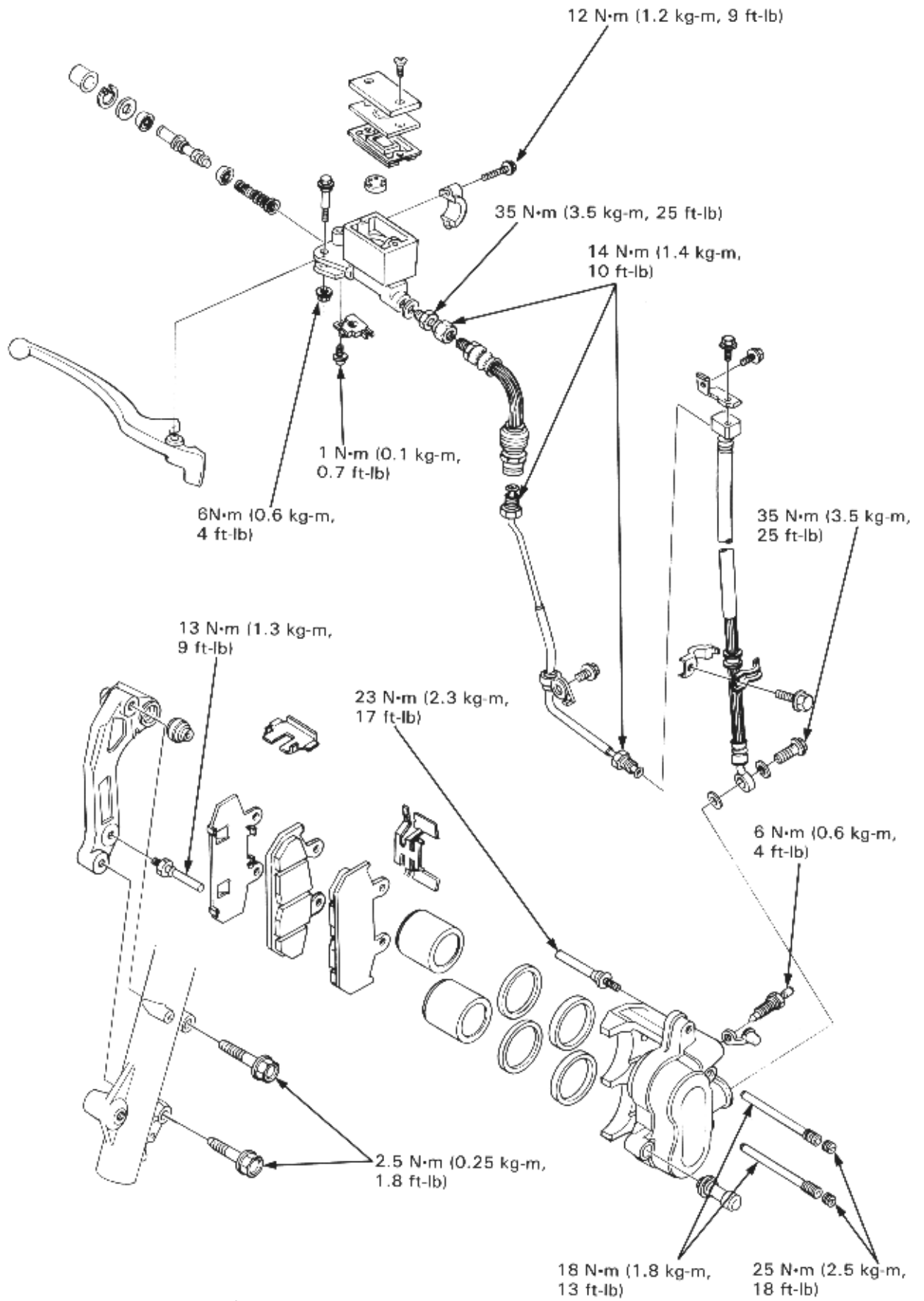
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Install the drive chain cover.  
Install the rear wheel (page 13-8).





# HYDRAULIC BRAKE



# 14. HYDRAULIC BRAKE

SERVICE INFORMATION	14-1	BRAKE PAD/DISC	14-4
TROUBLESHOOTING	14-2	MASTER CYLINDER	14-6
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	14-3	BRAKE CALIPER	14-9

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*
- The brake calipers can be removed without disconnecting the hydraulic system.
- Bleed the hydraulic system if it has been disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- Always check brake operation before riding the motorcycle.

### SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Disc thickness	3.5 mm (0.14 in)	3.0 mm (0.12 in)
Disc runout	—	0.30 mm (0.012 in)
Master cylinder I.D.	12.700–12.743 mm (0.5000–0.5017 in)	12.75 mm (0.502 in)
Master piston O.D.	12.65–12.684 mm (0.4983–0.4994 in)	12.64 mm (0.498 in)
Caliper cylinder I.D.	32.030–32.080 mm (1.2610–1.2630 in)	32.11 mm (1.264 in)
Caliper piston O.D.	31.948–31.998 mm (1.2578–1.2598 in)	31.90 mm (1.256 in)

### TORQUE VALUES

Bleed valve	6 N·m (0.6 kg-m, 4 ft-lb)
Front brake caliper bracket bolt	28 N·m (2.8 kg-m, 20 ft-lb)
Hanger pin	18 N·m (1.8 kg-m, 13 ft-lb)
Hanger pin plug	25 N·m (0.25 kg-m, 1.8 ft-lb)
Brake lever pivot nut	6 N·m (0.6 kg-m, 4 ft-lb) Apply oil to the threads
Brake light switch screw	12 N·m (1.2 kg-m, 9 ft-lb)
Master cylinder holder bolt	12 N·m (1.2 kg-m, 9 ft-lb)
Brake hose nut (master cylinder side)	35 N·m (3.5 kg-m, 25 ft-lb)
Brake hose joint nut	14 N·m (1.4 kg-m, 10 ft-lb)
Brake hose bolt	35 N·m (3.5 kg-m, 25 ft-lb)
Caliper pin bolt	23 N·m (2.3 kg-m, 17 ft-lb) Apply a locking agent to the threads
Caliper bracket pin bolt	13 N·m (1.3 kg-m, 9 ft-lb) Apply a locking agent to the threads

### TOOL

<b>Special</b>	
Snap ring pliers	07914–3230001

### TROUBLESHOOTING

#### **Brake lever soft or spongy**

- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

#### **Brake lever too hard**

- Sticking piston(s)
- Clogged hydraulic system
- Pads grazed or worn excessively

#### **Brakes drag**

- Hydraulic system leaking
- Sticking piston(s)

#### **Brakes grab or pull to one side**

- Pads contaminated
- Disc or wheel misaligned

#### **Brake chatter or squeal**

- Pads contaminated
- Pads worn
- Excessive disc run out
- Caliper installed incorrectly
- Disc or wheel misaligned

## BRAKE FLUID REPLACEMENT/ AIR BLEEDING

### ⚠ WARNING

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

### CAUTION

- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *Use DOT 3 or DOT 4 brake fluid from a sealed container.*
- *Do not mix brake fluid types and never reuse drained fluid.*

### BRAKE FLUID DRAINING

Connect a bleed hose to the bleed valve.  
Remove the reservoir cover.

### NOTE

- **Be sure the fluid reservoir is parallel to the ground before removing the cover and diaphragm.**

Loosen the caliper bleed valve and slowly pump the brake lever.

Stop moving the lever when fluid stops flowing out of the bleed valve.

### BRAKE FLUID FILLING

### NOTE

- **Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.**
- **When using the Brake Bleeder, follow the manufacturer's instructions.**
- **Do not mix brake fluid types and never reuse the fluid which has been pumped out during brake bleeding, because it may impair the efficiency of the brake system.**

Close the bleeder valve, fill the reservoir with DOT 3 or DOT 4 brake fluid to the upper level.

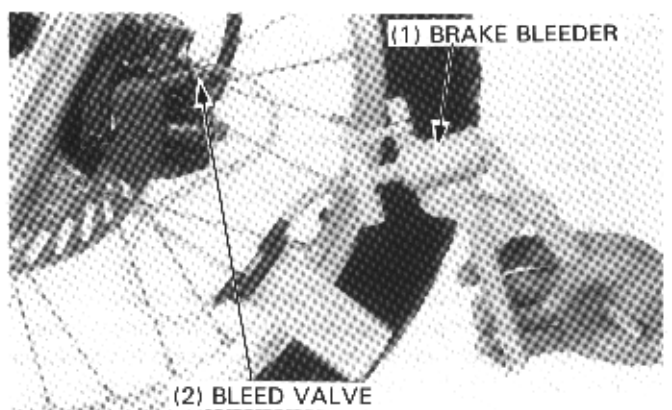
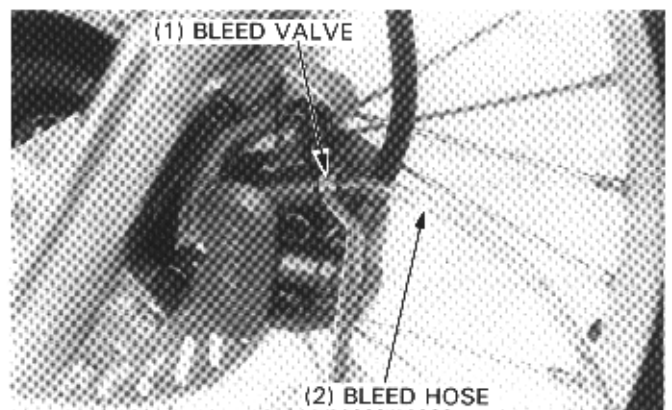
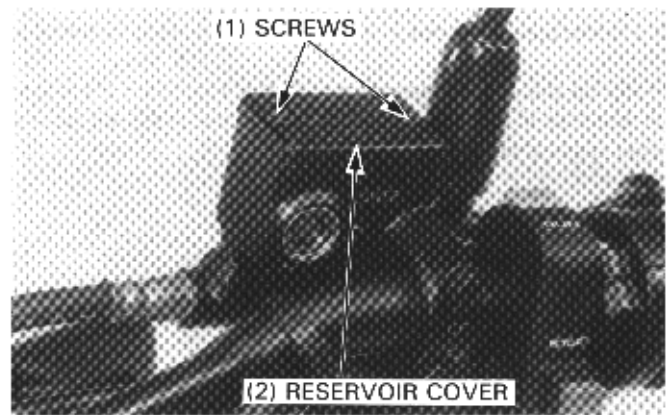
Install the diaphragm and reservoir cover.

Connect a Brake Bleeder or equivalent to the bleed valve.

Pump the brake bleeder and loosen the bleed valve. Add fluid when the fluid level in the master cylinder reservoir is low. Repeat above procedures until no air bubbles appear in the plastic hose.

### NOTE

- **If air entering the bleed from around the bleed valve threads, seal the threads with teflon tape.**



## HYDRAULIC BRAKE

If a brake bleeder is not available, fill the system as follows:

Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir hole and lever resistance is felt.



### AIR BLEEDING

Bleed the system as follows:

- 1) Connect a bleed hose to the bleed valve.
- 2) Squeeze the brake lever, then open the bleed valve 1/2 turn and close the valve.

#### NOTE

- Do not release the brake lever until the bleed valve has been closed.

- 3) Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 2 and 3 until bubbles cease to appear in the fluid at the end of the hose.

Tighten the bleed valve.

**TORQUE: 6 N·m (0.6 kg-m, 4 ft-lb)**

Close the bleed valve, fill the reservoir with DOT 3 or DOT 4 brake fluid to the upper level.

Reinstall the diaphragm and reservoir cover.



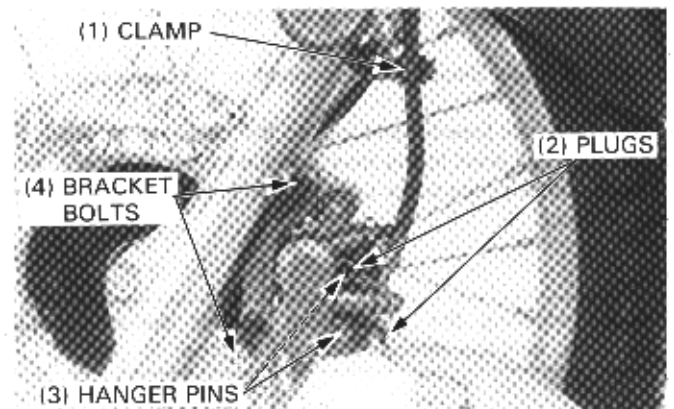
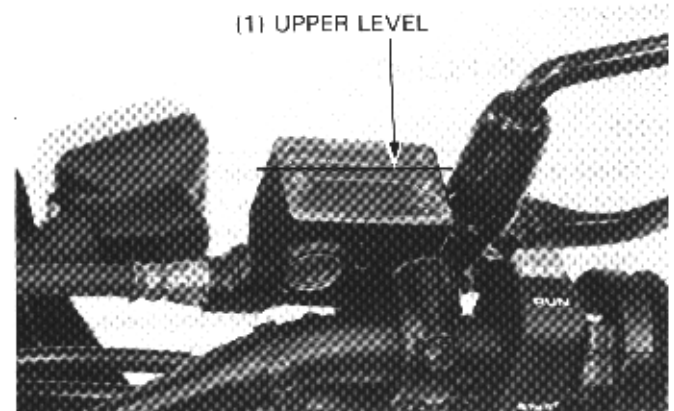
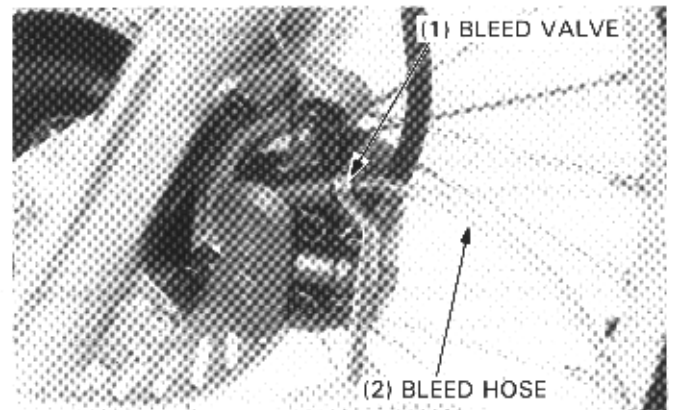
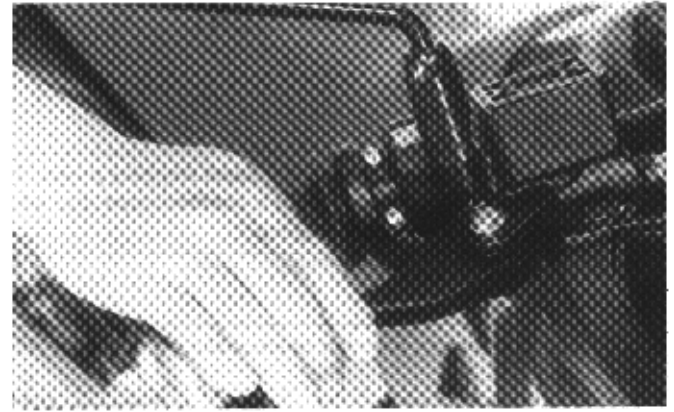
## BRAKE PAD/DISC

### PAD REPLACEMENT

#### NOTE

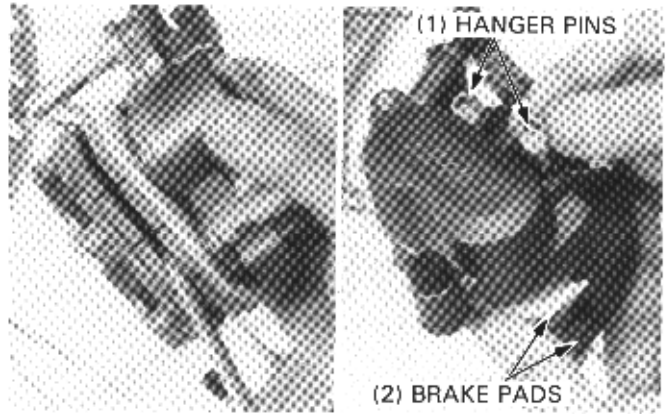
- Always replace the brake pads in pairs to assure even disc pressure.
- It is unnecessary to disconnect the brake hose to replace the brake pads.

Remove the brake hose clamp from the fork slider.  
Remove the hanger pin plugs and loosen the hanger pins.  
Remove the caliper bracket bolts and separate the brake caliper and caliper bracket assembly from the brake disc.  
Separate the bracket from the caliper.

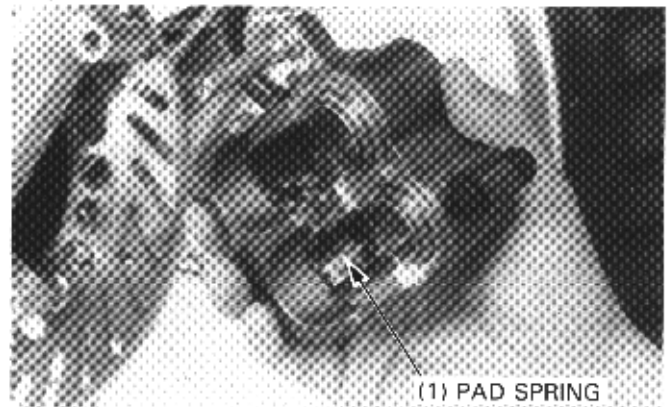


Pry one old pad against the caliper with a screwdriver to push the pistons into the caliper.

Remove the hanger pins and brake pads from the brake caliper.

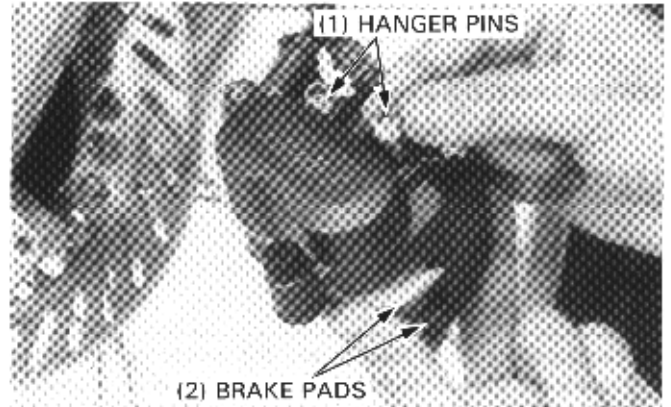


Position the pad spring in the caliper as shown.



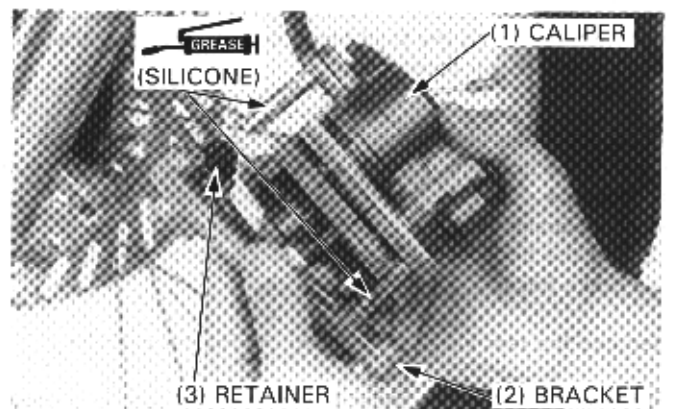
Install new pads in the caliper.

Install the pad pins; one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



Make sure that the brake pad retainer is installed securely. Apply silicone grease to the caliper pin bolt and caliper bracket pin bolt.

Install the bracket to the caliper, aligning the pad end with the pad retainer.



## HYDRAULIC BRAKE

With the caliper bracket, set the caliper onto the brake disc with the disc between the pads.

### NOTE

- When installing the caliper, be careful not to damage the brake pads with the disc.

Tighten the caliper bracket bolts.

**TORQUE: 27 N·m (2.7 kg-m, 20 ft-lb)**

Tighten the hanger pin.

**TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)**

Install and tighten the hanger pin plugs.

**TORQUE: 2.5 N·m (0.25 kg-m, 1.8 ft-lb)**

Secure the brake hose with the brake hose clamp.

### DISC THICKNESS

Measure the thickness of disc.

**SERVICE LIMIT: 3.0 mm (0.12 in)**

### BRAKE DISC WARPAGE

Measure brake disc for warpage on a surface plate.

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

## MASTER CYLINDER

### REMOVAL

#### CAUTION

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

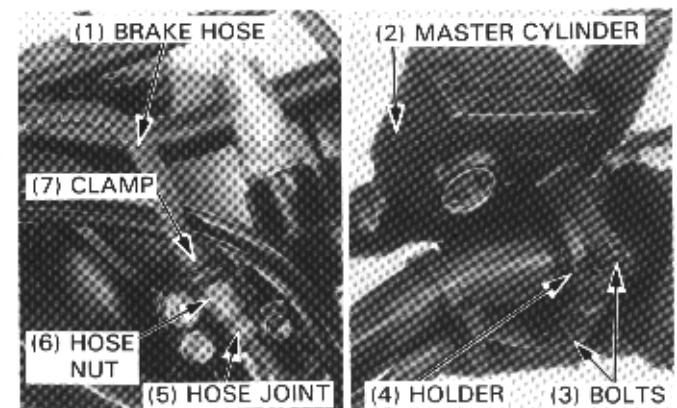
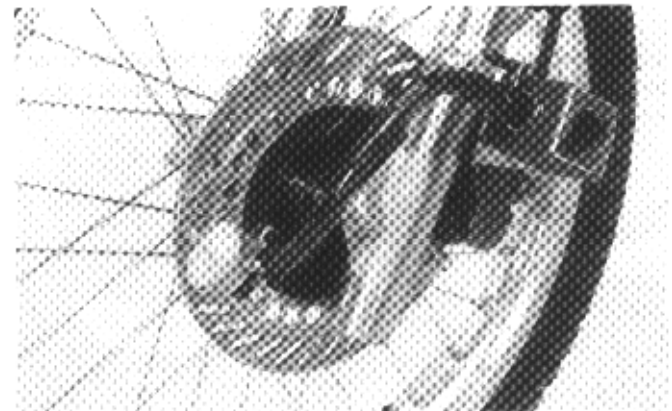
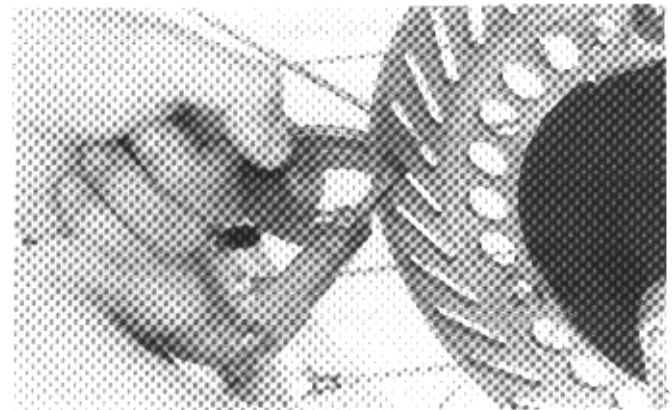
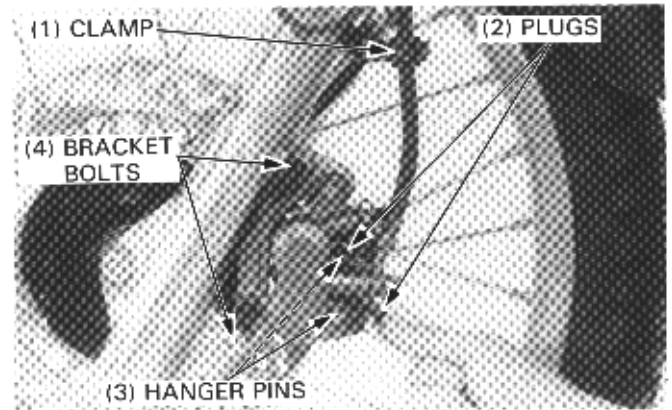
### NOTE

- When removing the fluid hose, cover the end of the brake pipe to prevent contamination.

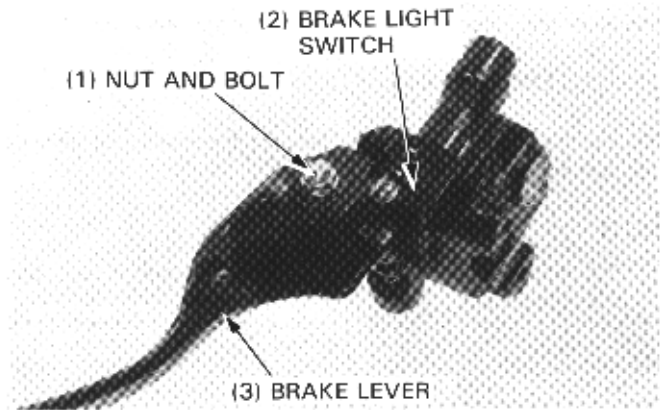
Drain the brake fluid from the brake system (page 14-3). Loosen the brake hose joint while holding the brake hose nut (brake pipe side) with a wrench. Free the brake hose from the clamp. Loosen the brake hose nut (master cylinder side) and remove the brake hose.

Remove the rear view mirror from the master cylinder.

Remove the master cylinder holder bolts, holder and master cylinder.



Remove the front brake light switch.  
Remove the pivot nut, bolt and brake lever.



**DISASSEMBLY**

Remove the piston boot.

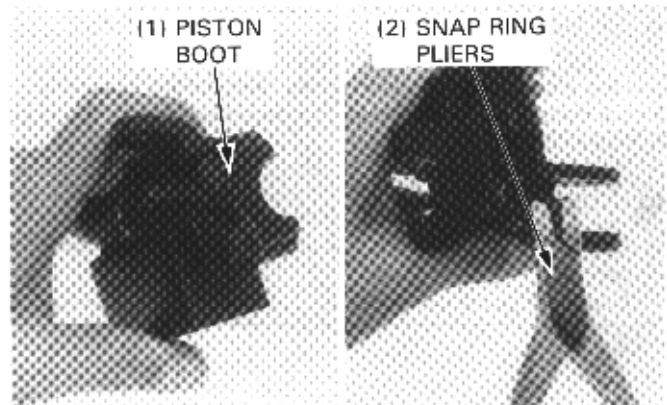
**NOTE**

- Be careful not to damage the piston boot when removing it.

Remove the snap ring from the master cylinder body.

**TOOL:**

Snap ring pliers **07914-3230001**

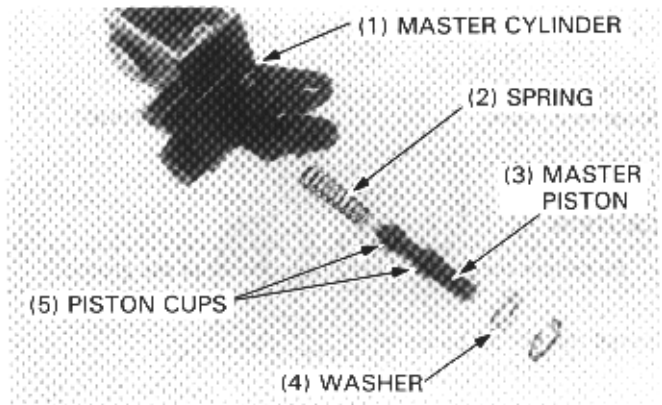


Remove the washer, master piston with the piston cups and spring from the master cylinder.

Clean the inside of the master cylinder and reservoir with clean brake fluid.

**NOTE**

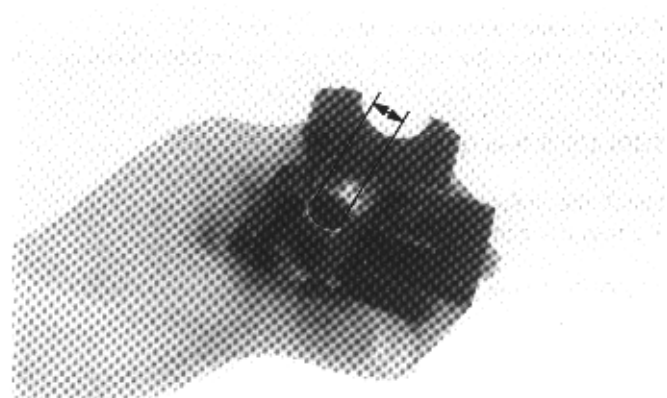
- Clean the disassembled parts with brake fluid and make sure air can flow through the master cylinder port by applying compressed air.



**INSPECTION**

Check the master cylinder for scores, scratches or nicks.  
Measure the master cylinder I.D.

**SERVICE LIMIT: 12.75 mm (0.502 in)**





## HYDRAULIC BRAKE

Measure the master piston O.D. at the primary cap.

**SERVICE LIMIT: 12.64 mm (0.498 in)**

Before the assembly, check the primary and secondary caps for damage or fatigue.

### NOTE

- The master cylinder piston, cups and spring must be replaced as a set.

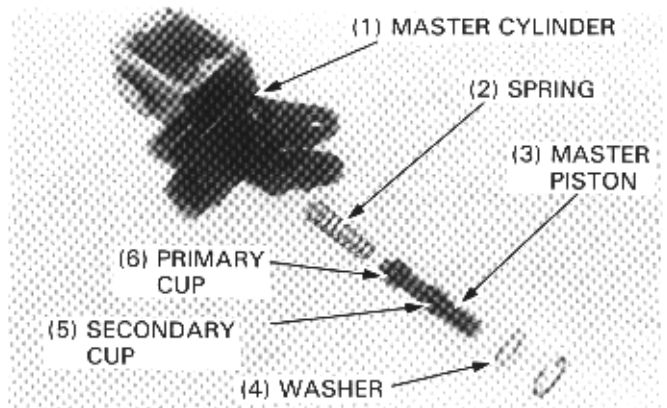


## ASSEMBLY

Dip the piston cups in clean brake fluid before assembly. Install the spring and primary cup together. Install the master cylinder piston.

### CAUTION

- When installing the cups, do not allow the lips to turn inside out.
- Install the spring with its tapered end toward the master piston.



Install the snap ring to the master cylinder body.

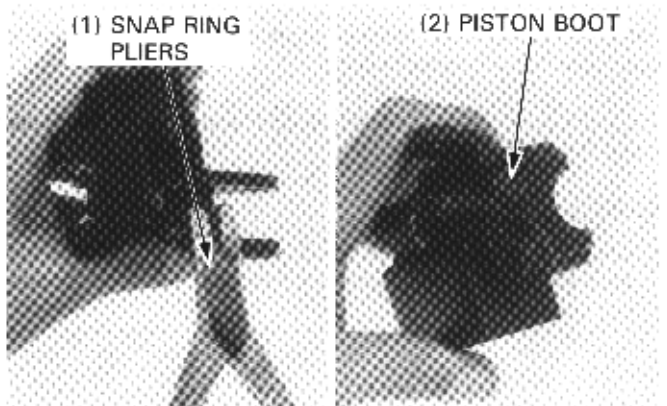
### TOOL:

Snap ring pliers **07914-3230001**

### CAUTION

- Be certain the snap ring is firmly seated in the groove.

Install the piston boot.

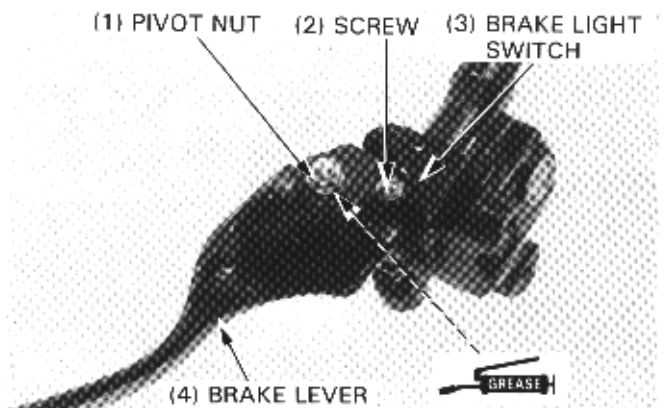


Apply grease to the brake lever pivots. Install the pivot bolt and tighten the pivot bolt to the specified torque.

**TORQUE: 6 N·m (0.6 kg-m, 4 ft-lb)**

Install the brake light switch. Tighten the screw to the specified torque.

**TORQUE: 1 N·m (0.1 kg-m, 0.7 ft-lb)**



Install the master cylinder and master cylinder holder and secure them with two bolts.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**

**NOTE**

- Install the master cylinder holder with its "UP" mark facing up.
- Align the master cylinder mating surface with the punch mark on the handlebar.
- Tighten the upper bolt first then the lower one.

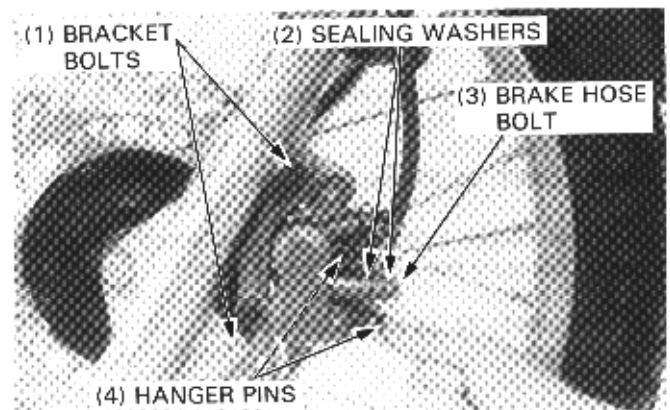
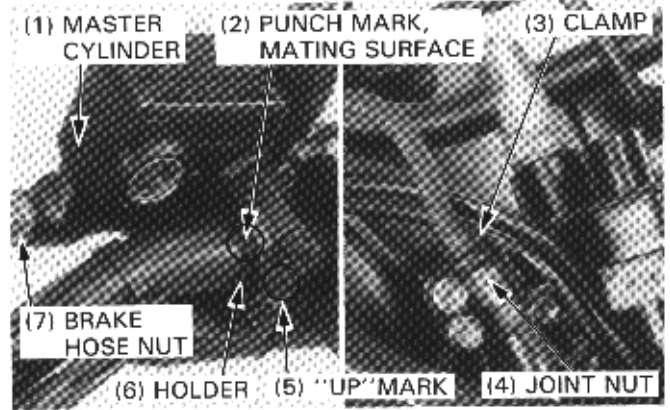
Connect the brake hose to the master cylinder and tighten the brake hose bolt with a new sealing washer.

**TORQUE: 35 N·m (3.5 kg-m, 25 ft-lb)**

Secure the brake hose with the clamp. Tighten the brake hose joint nut while holding the brake hose nut (brake pipe side) with a wrench.

**TORQUE: 14 N·m (1.4 kg-m, 10 ft-lb)**

Connect the front brake switch wires. Fill and bleed the front brake system (page 14-3). Check the front brake system for leaking.



**BRAKE CALIPER**

**REMOVAL**

Place a clean container under the caliper and disconnect the brake hose from brake caliper.

**CAUTION**

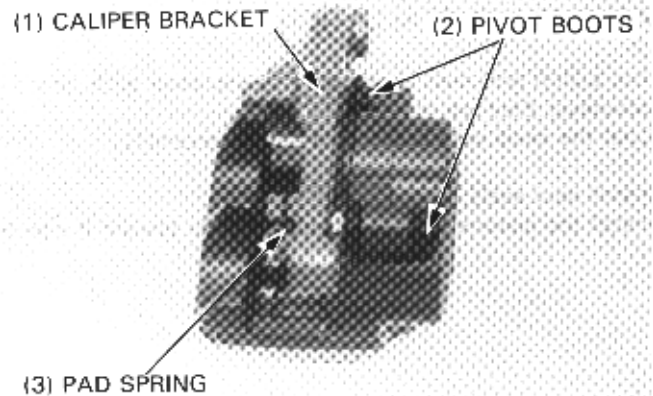
- *Avoid spilling brake fluid on painted surfaces.*

Loosen the hanger pins (page 14-4). Remove the caliper bracket bolts and remove the caliper and caliper bracket as an assembly.

Remove the hanger pins and pads (page 14-5).

Remove the followings from the brake caliper.

- Caliper bracket
- Pad spring
- Pivot boots



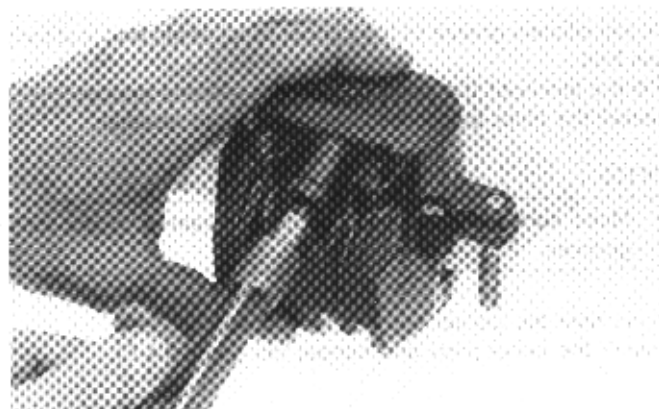
**DISASSEMBLY**

Position the caliper with the pistons down and apply short bursts of air pressure to the fluid inlet.

**▲ WARNING**

- *Do not use high pressure air or bring the nozzle too close to the inlet.*
- *Place a shop towel over the pistons to prevent them from flying out.*

Check the pistons and cylinders for scoring, scratches or other damage and replace if necessary.



## HYDRAULIC BRAKE

Push the piston and dust seals in, lift them out and discard them.

### CAUTION

- *Be careful not to damage the piston sliding surfaces when removing the seals.*

Clean the caliper cylinders, seal grooves and caliper pistons with clean brake fluid.

### INSPECTION

Check the pistons for scoring, scratches or other damage. Measure the piston O.D.

**SERVICE LIMIT: 31.90 mm (1.256 in)**

Check the caliper cylinder for scoring, scratches or other damage. Measure the caliper cylinder bore.

**SERVICE LIMIT: 32.11 mm (1.264 in)**

### ASSEMBLY/INSTALLATION

The piston and dust seals must be replaced with new ones whenever they are removed. Coat the seals with brake fluid before assembly.

Install new seals.

Install the pistons with the insulated ends toward the pads.

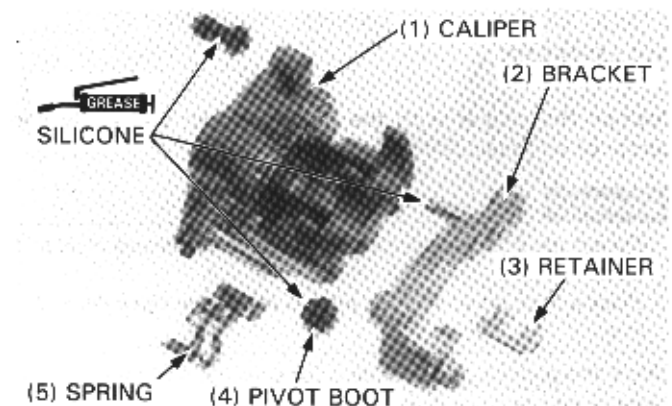
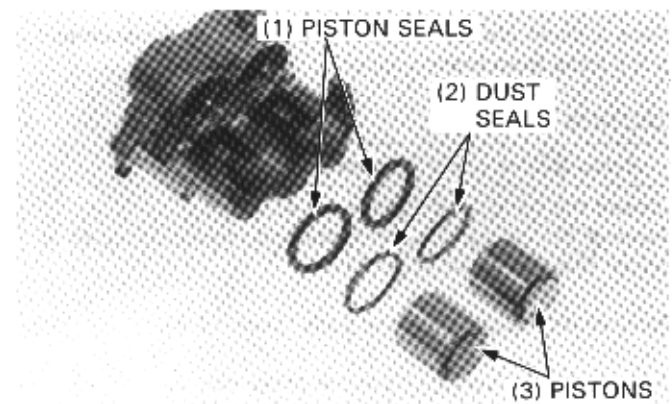
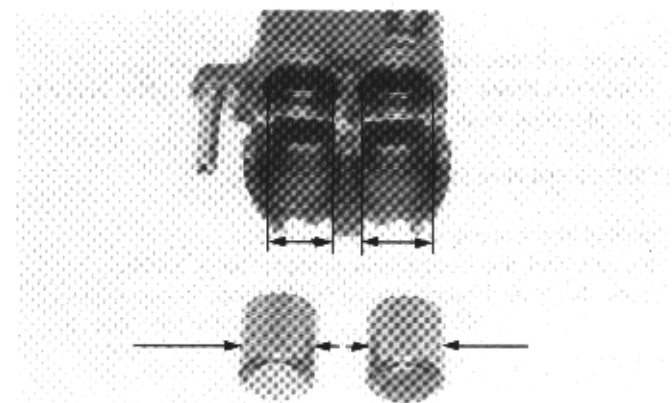
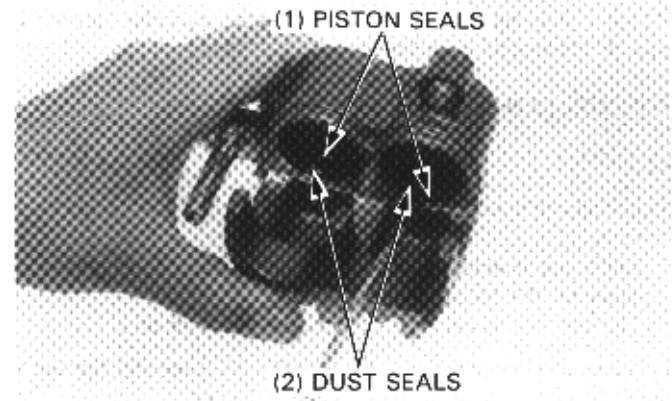
Apply silicone grease to the caliper bracket pin bolt and caliper pin bolt.

Fill the inside of the pivot boots with silicone grease. Install the pivot boots, pad spring and pad retainer.

### NOTE

- Make sure that the pivot boots are seated in the caliper grooves.

Assemble the caliper and caliper bracket. Install the brake pads and hanger pin (page 14-5).



## INSTALLATION

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

### CAUTION

- *Be careful not to damage the brake pads with the brake disc.*

Tighten the caliper bracket bolts.

**TORQUE: 27 N·m (2.7 kg-m, 20 ft-lb)**

Connect the brake hose to the caliper with the new sealing washers and hose bolt.

Tighten the brake hose bolt.

**TORQUE: 35 N·m (3.5 kg-m, 25 ft-lb)**

Tighten the hanger pins.

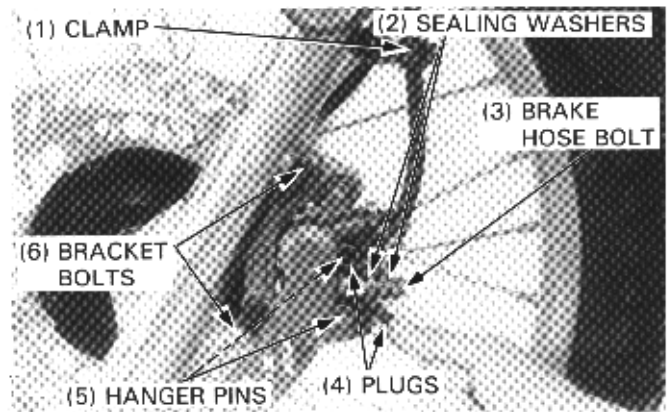
**TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)**

Install the and tighten the hanger pin plugs.

**TORQUE: 2.5 N·m (0.25 kg-m, 1.8 ft-lb)**

Secure the brake hose with the clamp.

Fill and bleed front brake system (page 14-3).



# 15. FAIRING/EXHAUST SYSTEM

SERVICE INFORMATION	15-1	REAR FENDER	15-5
SIDE COVER/SEAT	15-2	EXHAUST PIPE/MUFFLER	15-7
FAIRING	15-2		

## SERVICE INFORMATION

### GENERAL

#### **▲ WARNING**

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

### TORQUE VALUES

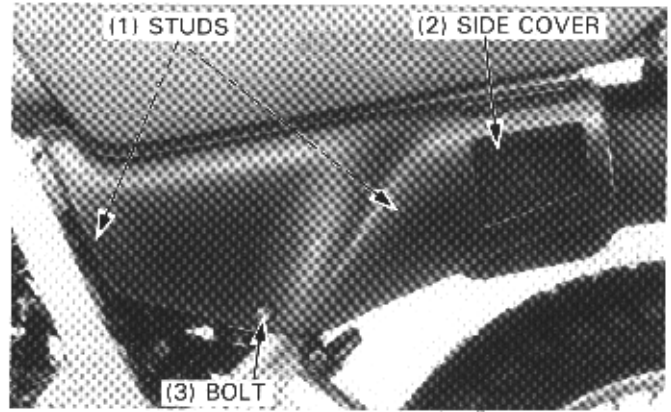
Exhaust pipe joint nut	22 N·m (2.2 kg-m, 16 ft-lb)
Muffler band bolt	20 N·m (2.0 kg-m, 14 ft-lb)
Muffler bolt	25 N·m (2.5 kg-m, 18 ft-lb)
Exhaust pipe heat protector bolt	10 N·m (1.0 kg-m, 7 ft-lb) Apply locking agent to the threads
Rear carrier mounting bolt (AFTER '88)	35 N·m (3.5 kg-m, 25 ft-lb)

## FAIRING/EXHAUST SYSTEM

### SIDE COVER/SEAT

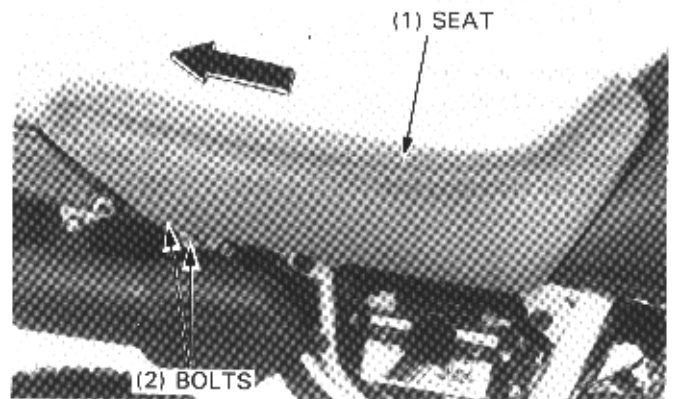
#### REMOVAL/INSTALLATION

Remove the side cover bolts, and remove the side covers by pulling the cover studs out of the gromets.



Remove the seat bolts and remove the seat, sliding it back.

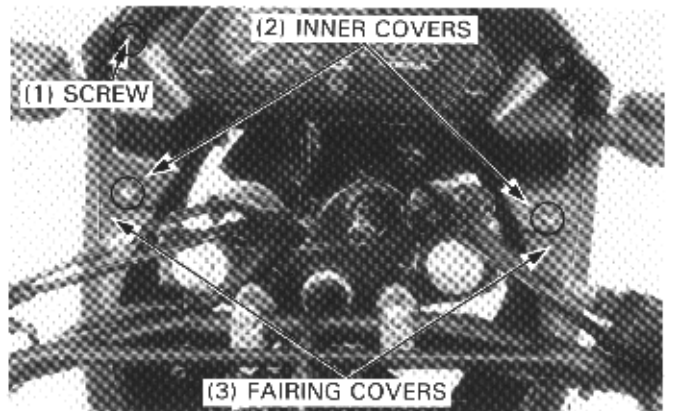
Install the seat and side covers in the reverse order of the removal.



### FAIRING

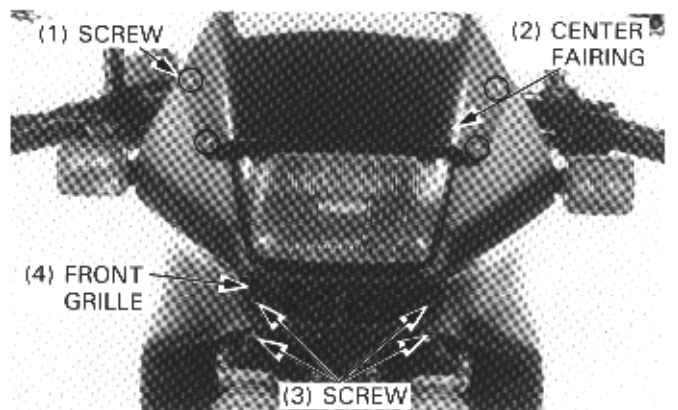
#### REMOVAL/INSTALLATION

Remove the two screws and right and left fairing cover. Remove the two screws and inner cover.

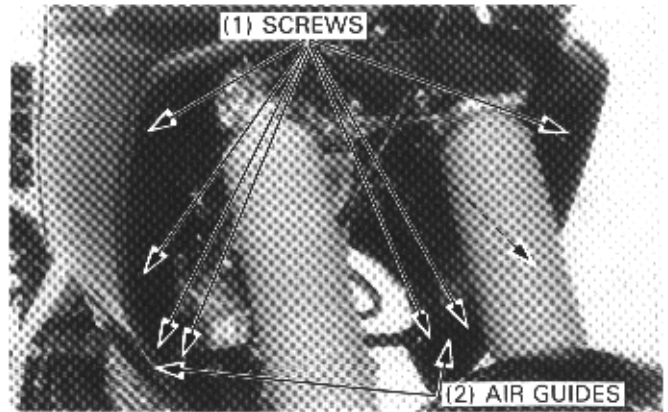


Remove the center fairing and windshield by removing four screws.

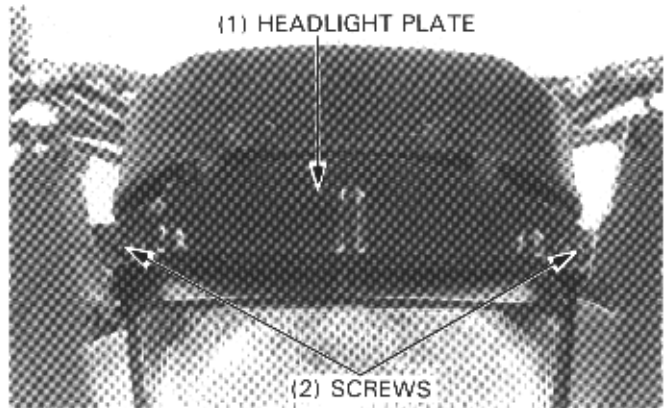
Remove the front grille by removing the four screws.



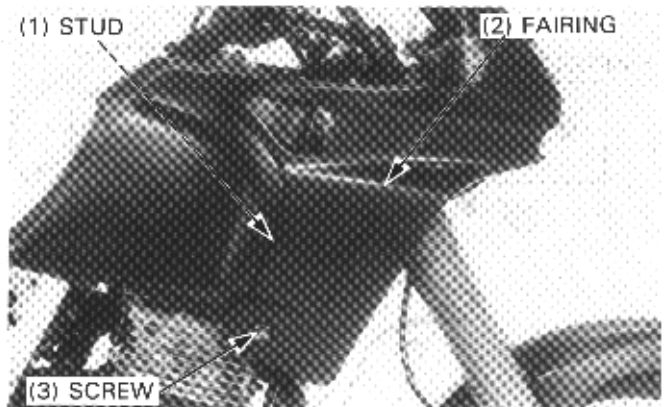
Remove the screws and right and left air guides.



Remove the two screws and headlight plate.

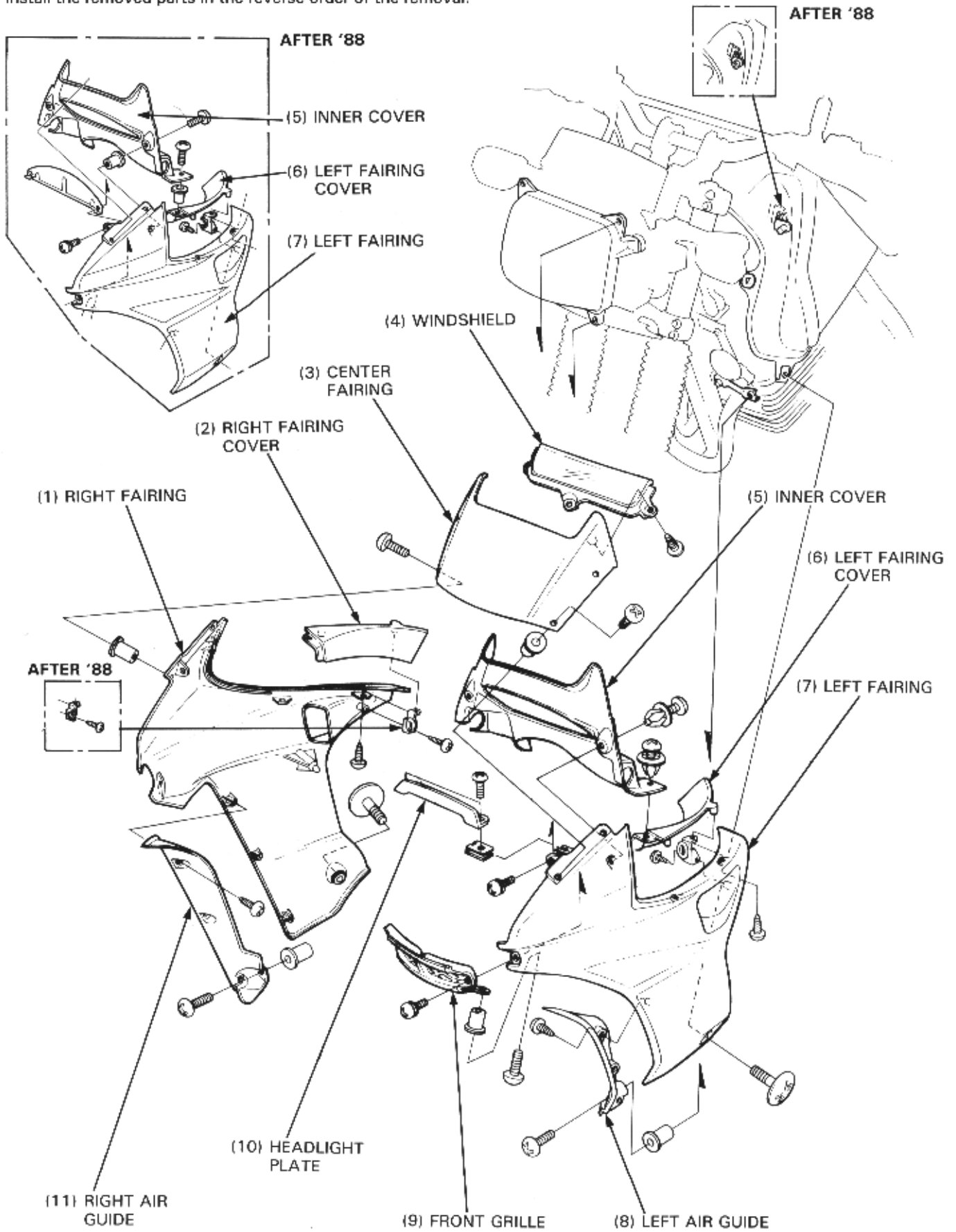


Remove the right and left fairings by removing the screws and pulling the stud out of the fuel tank gromet.



# FAIRING/EXHAUST SYSTEM

Install the removed parts in the reverse order of the removal.





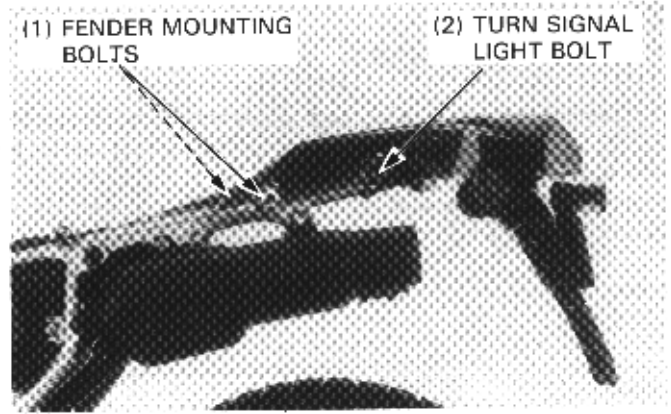
**REAR FENDER****REMOVAL/INSTALLATION****'88:**

Remove the seat (page 15-2), and disconnect the rear turn signal and tail/brakelight connectors.

Remove the rear turn signal light bolts, fender mounting bolts and rear fender assembly.

If necessary, separate the rear fender B from the rear fender A by removing three nuts.

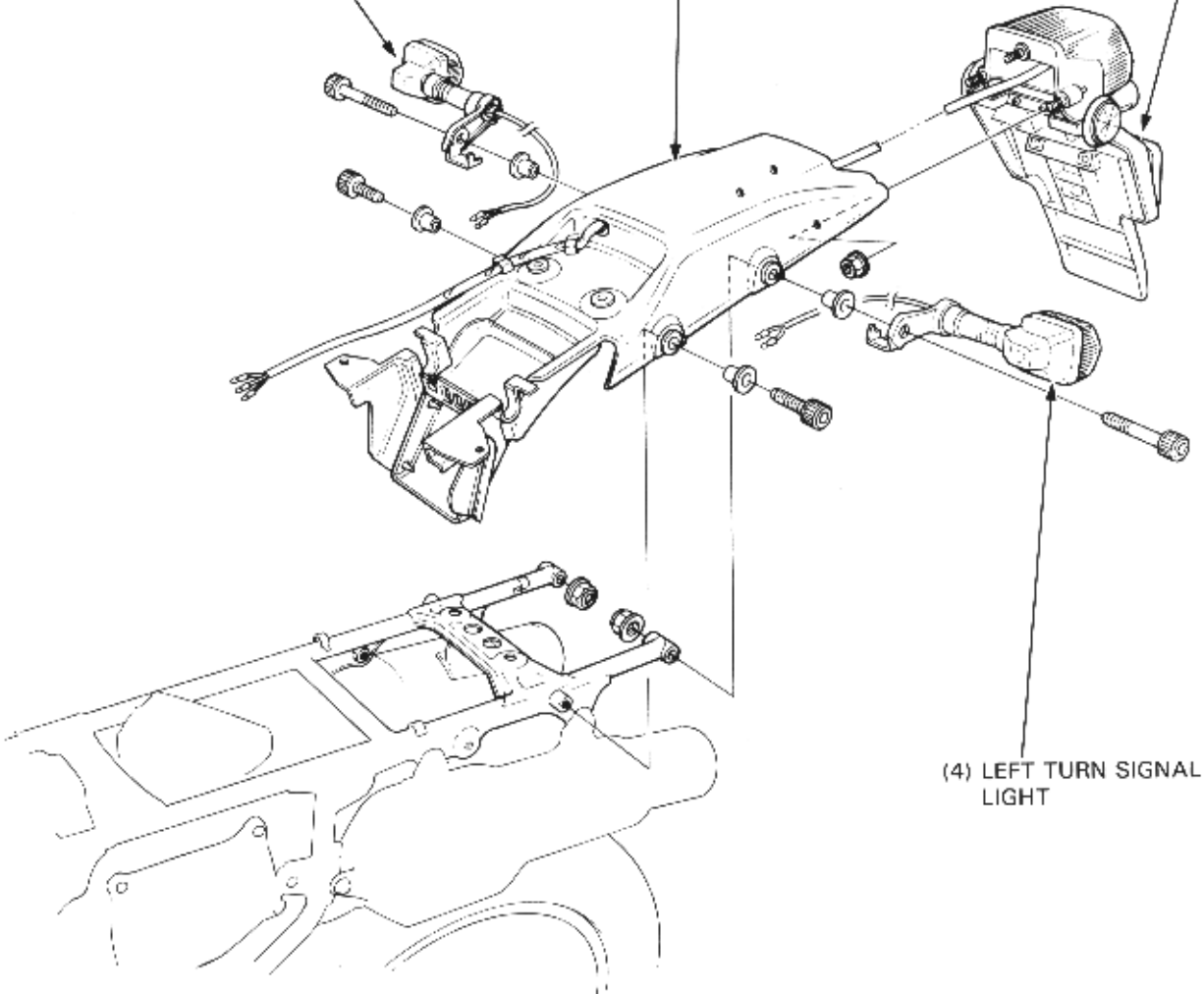
Install the rear fender assembly in the reverse order of the removal.



(1) RIGHT TURN SIGNAL LIGHT

(2) REAR FENDER A

(3) REAR FENDER B



## FAIRING/EXHAUST SYSTEM

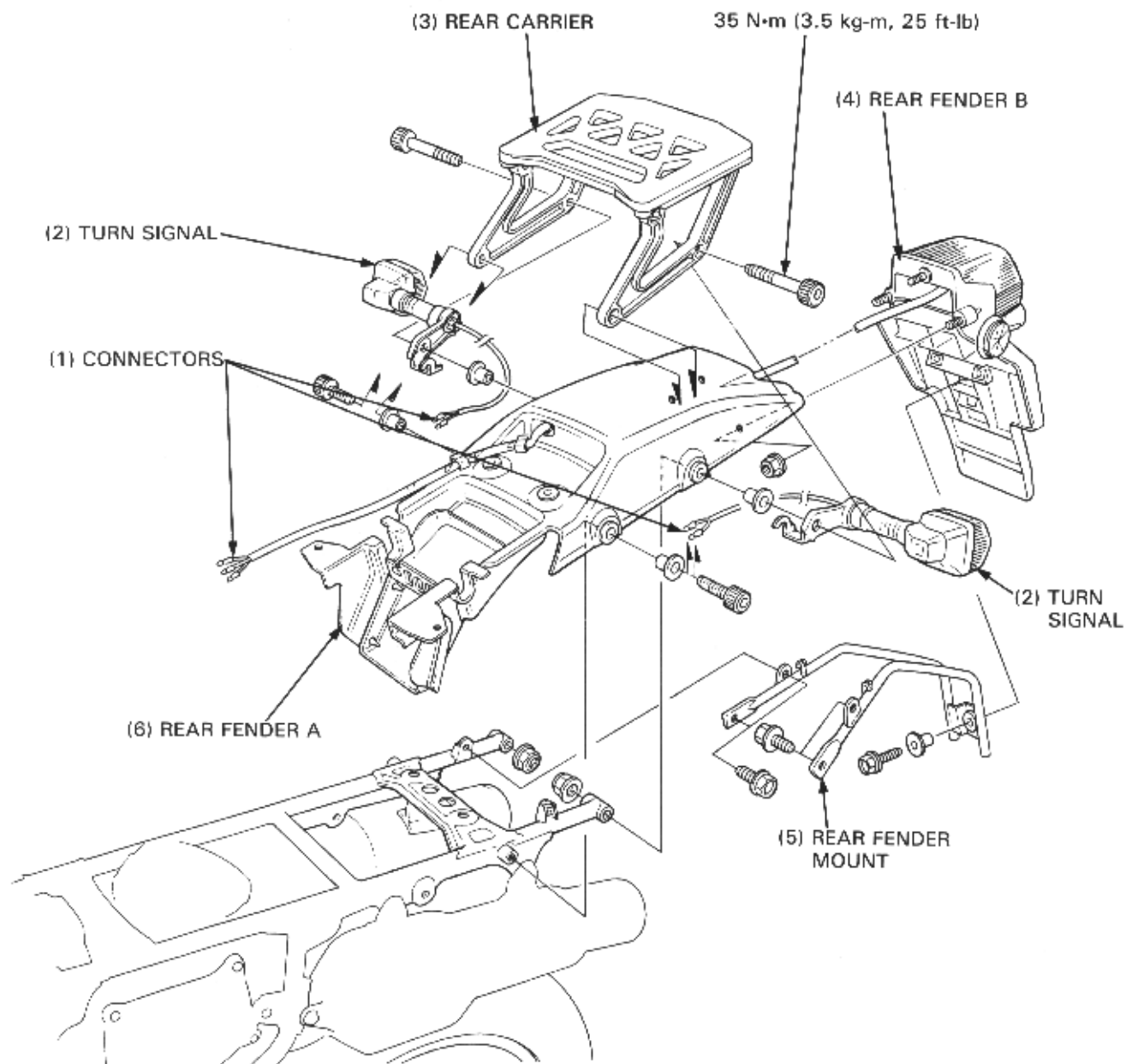
### AFTER 88:

Remove the seat (page 15-2).

Disconnect the rear turn signal and tail/brakelight connectors. Remove the four rear carrier mounting bolts, rear carrier and rear turn signals.

Remove the rear fender A, rear fender B, and rear fender mount by removing the two bolts.

Install the removed parts in the reverse order of the removal.



## EXHAUST PIPE/MUFFLER

### EXHAUST PIPE REMOVAL

Remove the right side cover (page 15-2).

Loosen the muffler band bolts, and remove the exhaust pipe joint nuts, exhaust pipes joint collars and exhaust pipe gaskets.

#### NOTE

- Whenever the exhaust pipe gaskets are removed, replace with new ones.

Remove the exhaust pipe heat protector, if necessary.

### EXHAUST MUFFLER REMOVAL

Remove the side covers (page 15-2).

Loosen the muffler band bolts, and remove the muffler bolts and mufflers.

Install the removed parts in the reverse order of the removal, and tighten the bolts and nuts to the specified torque.

#### TORQUE:

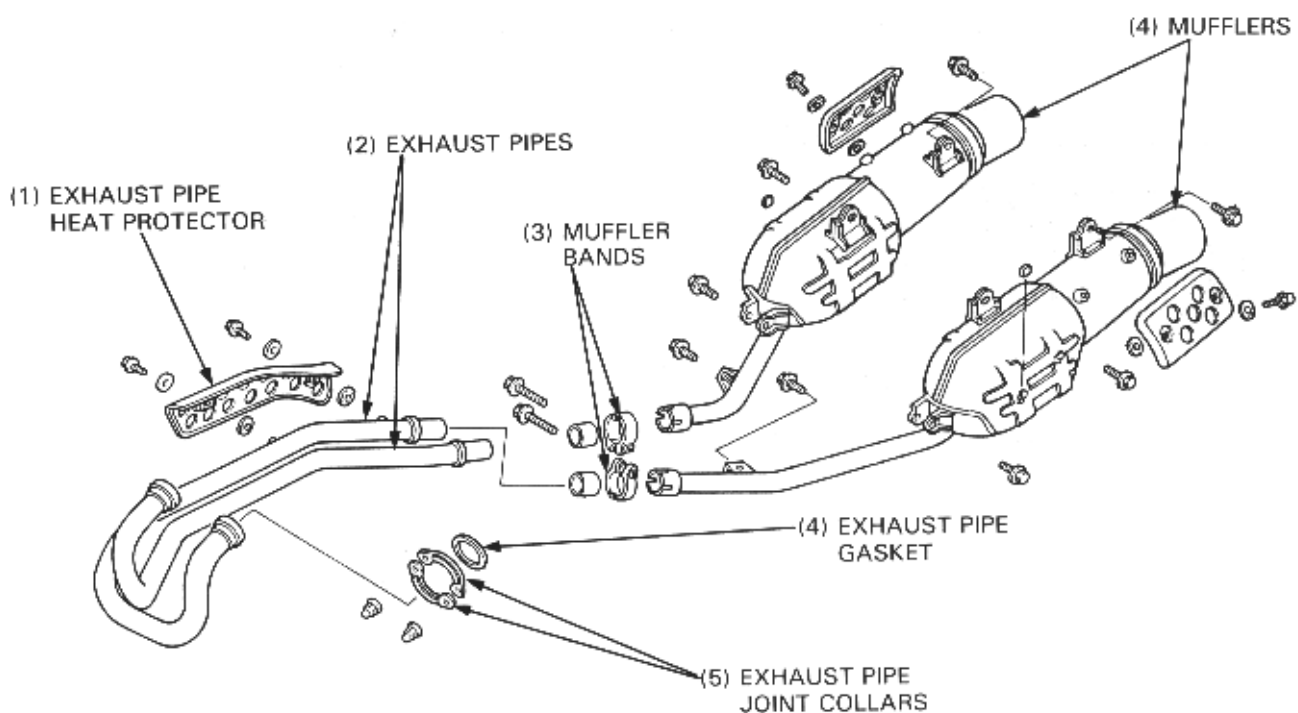
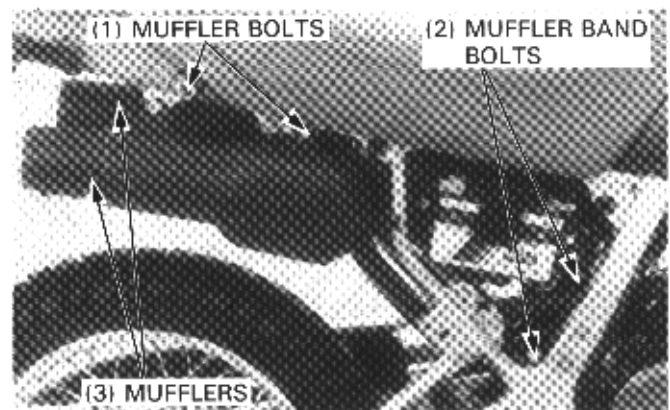
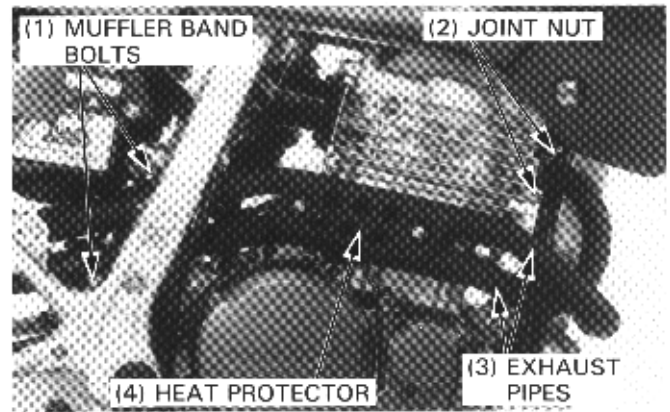
Exhaust pipe joint nut: 22 N·m (2.2 kg·m, 16 ft·lb)

Muffler band bolt: 20 N·m (2.0 kg·m, 14 ft·lb)

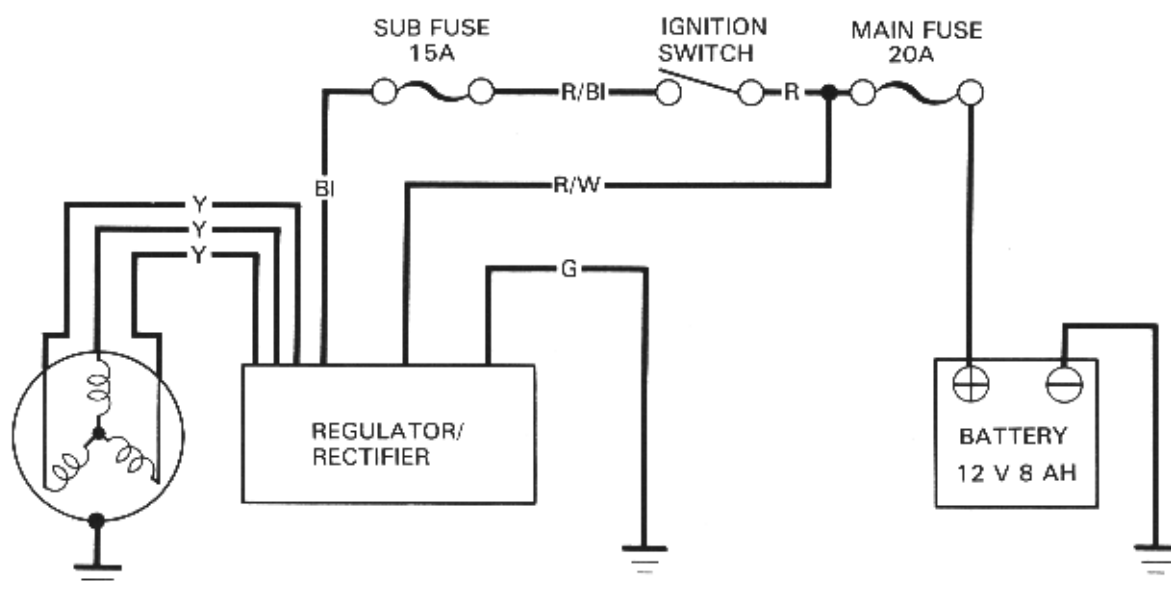
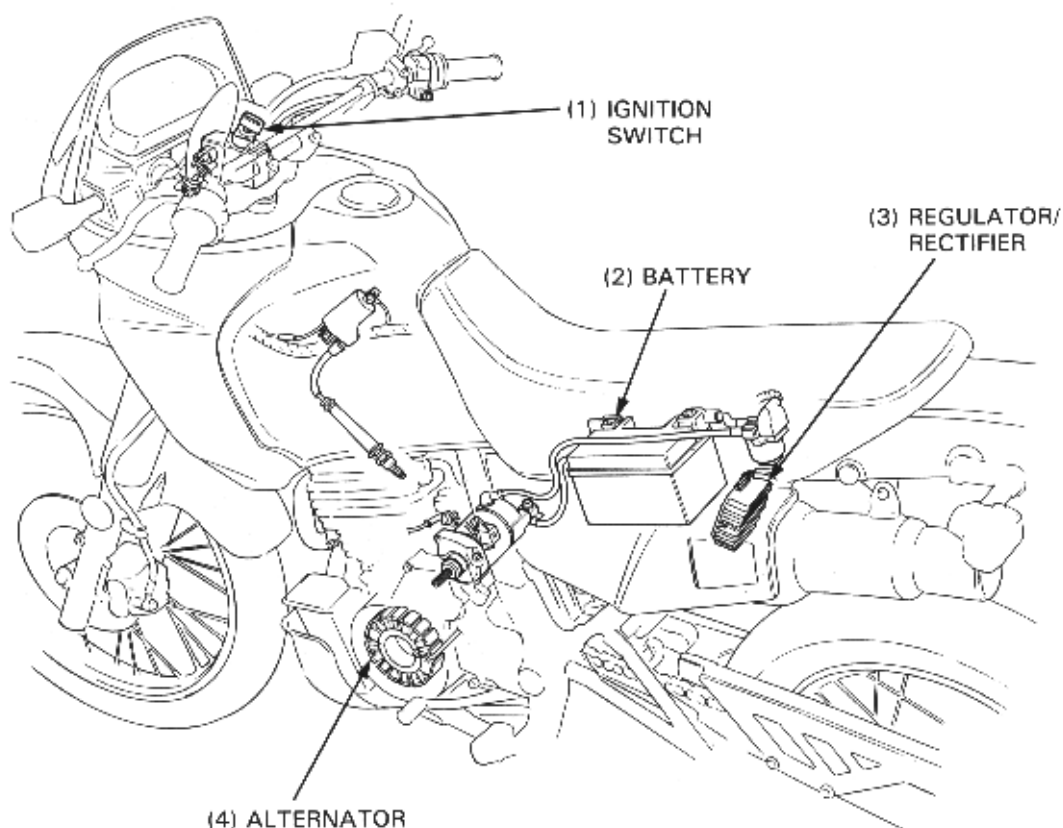
Muffler bolt: 25 N·m (2.5 kg·m, 18 ft·lb)

Exhaust pipe heat protector bolt:

10 N·m (1.0 kg·m, 7 ft·lb) Apply a locking agent to the threads.



SYSTEM DIAGRAM



BI	.....	BLACK	Br	.....	BROWN
Y	.....	YELLOW	O	.....	ORANGE
Bu	.....	BLUE	Lb	.....	LIGHT BLUE
G	.....	GREEN	Lg	.....	LIGHT GREEN
R	.....	RED	P	.....	PINK
W	.....	WHITE	Gr	.....	GRAY

# 16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM	16-5
SERVICE INFORMATION	16-1	REGURETOR/RECTIFIER	16-6
TROUBLESHOOTING	16-2	ALTERNATOR	16-7
BATTERY	16-3		

## 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.
  - 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.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and follow with milk magnesia or vegetable oil and call a physician.

#### CAUTION

- For battery charging, do not exceed the charging current and time specified on the battery (and shown below). Use of excessive current or charging time may damage the battery.

- Refer to Service Letter #48 and Operation Manual for the Honda Battery Tester and the Christie Battery Charger for:
  - Preparation of new batteries
  - Battery testing
  - Battery charging

- The following color codes are used throughout the electrical system.

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

- Slow charge the battery whenever possible, quick charging should be an emergency procedure only.
- Remove the battery from the motorcycle for charging.
- The battery on this motorcycle is a sealed type. Do not try to remove the filler hole caps even during charging. Do not use a non-sealed battery as a replacement.
- All charging system components can be checked on the motorcycle.
- When inspect the charging system, check the system components and lines step-by-step according to the troubleshooting on next page.
- Alternator removal is given in Section 9.

### SPECIFICATIONS

ITEM		STANDARD	
Battery	Capacity	12 V – 8 AH	
	Voltage at 20°C (68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	12.3 V
	Charging current	0.9 amperes	
	Charging time	5 Hr.	
Regulator/rectifier	Type	Three-phase/full-wave rectified	
	Regulated voltage	13.5 – 15.5 V/5000 rpm	
Alternator	Charging coil resistance at 20°C (68°F)	0.1 – 1.0 Ω	
	Output	0.182 kw/5.000 rpm	
	Charging start rpm	1,000 ± 100 rpm.	

## BATTERY/CHARGING SYSTEM

---

### TOOLS

Circuit tester (SANWA)  
Circuit tester (KOWA)  
Digital multimeter (KOWA)  
Honda battery tester  
Christie battery charger

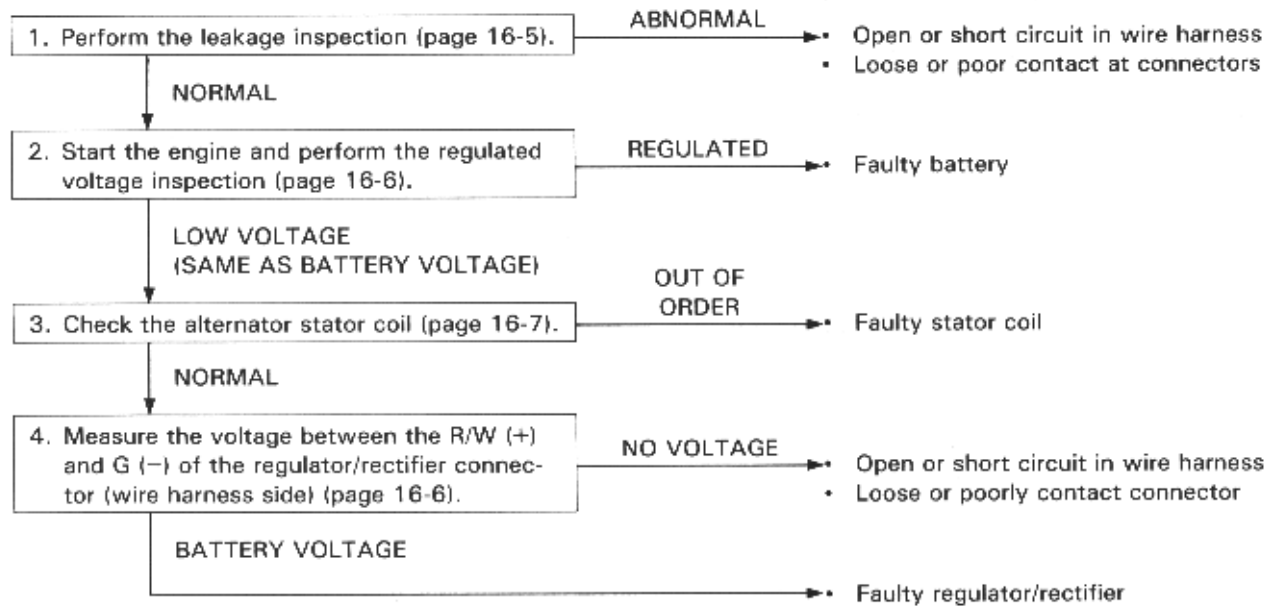
07308-0020000 or  
TH-5H or  
07411-0020000 or KS-AHM-32-003 (U.S.A. only)  
07GMJ-0010000  
MC 1012/2

## TROUBLESHOOTING

### NOTE

- If the battery would be overcharged, replace the regulator/rectifier.
- 

#### Battery undercharged



## BATTERY

### ⚠ 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.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.

### REMOVAL

Remove the right side cover (page 15-2). Disconnect the battery negative (-) cable first, then the positive (+) cable from the battery. Remove the battery holder and battery.

### TESTING

#### NOTE

- Refer to the Service Letter #48 and the Operation Manual for the Honda Battery Tester and the Christie battery Charger for battery Testing Procedure.

#### NOTE

- Use the Honda battery Tester (BM-210) to test the battery.

Remove the battery.

Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

#### NOTE

- 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.

Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.

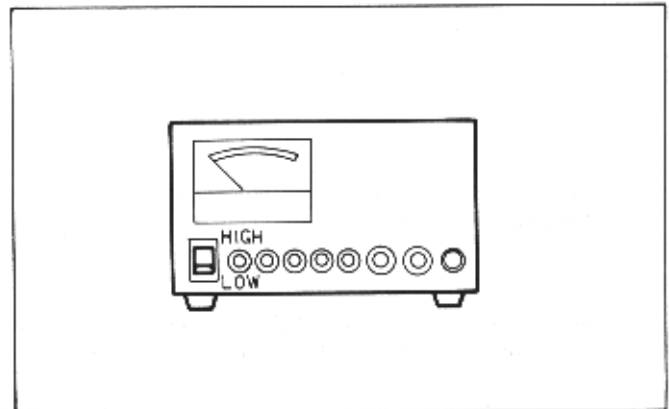
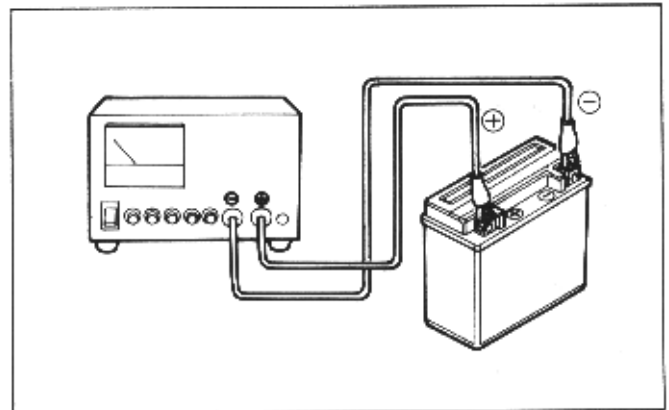
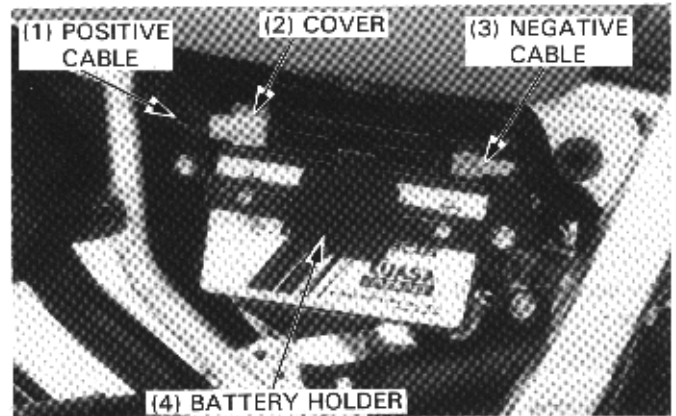
**HIGH: 15°C (60°F) or higher**

**LOW: 15°C (60°F) or lower**

Push in the "5.5 Ah-9 Ah" test button for three seconds and read the condition of the battery on the meter.

#### NOTE

- Be sure to push the correct test button. For the first check. DO NOT charge the battery before testing.



## BATTERY/CHARGING SYSTEM

### CAUTION

- *Tester damage can result from overheating when:*
  - *the test button is pushed in for more than three seconds.*
  - *testing more than one battery and the tester is not allowed to cool for at least one minute between tests.*
  - *more than ten tests are performed consecutively without allowing at least a 30-minute cool-down period.*

The battery is OK if the meter reading registers in the GREEN zone.

If the meter reading registers in the YELLOW or RED zone, charge the battery, and re-test and judge it in accordance with the chart below.

#### First check:

Green : OK  
Yellow, Red : Charge

#### Second check:

##### First check Yellow:

Green : OK  
Yellow : Replace

##### First check Red:

Green : OK  
Yellow : Recharge  
Red : Replace

#### Third check:

Green : OK  
Yellow : Replace

## CHARGING

### NOTE

- Use the CHRISTIE Battery Charger (MC 1012/2) to charge the battery.

#### Before operating the charger:

Be sure the area around the charger is well ventilated and clear of flammable materials, 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 the battery below the charger; gases from the battery may corrode and damage the charger.

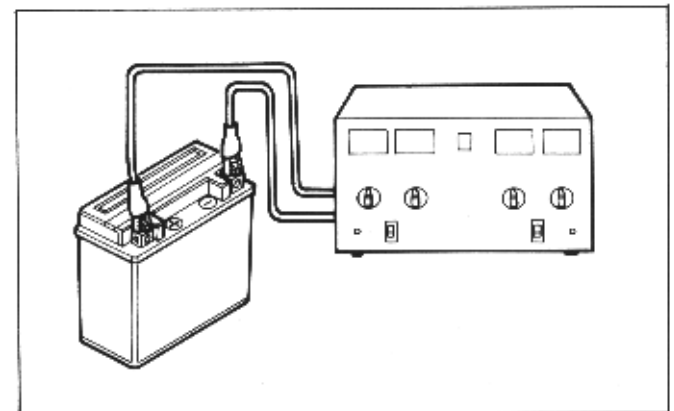
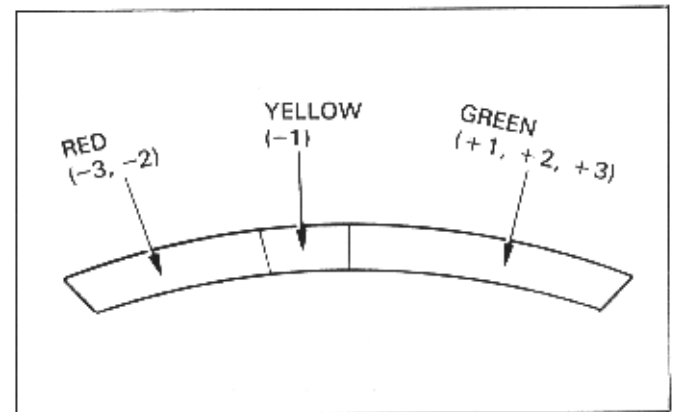
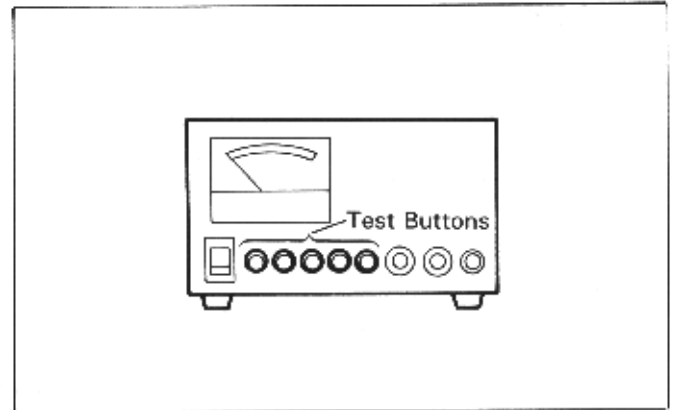
Do not place the battery on top of the charger. Be sure the air vents are not blocked.

### ▲ WARNING

- *During operation, the charger will generate heat. To avoid causing a fire, always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels.*

Turn the Power Switch to the OFF position.

Set the Battery Amp. Hr. Selector Switch to the "5.5 to 9.0" position.





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.

Attach the clamps to the battery terminals; RED to Positive, BLACK to Negative.

**CAUTION**

- Connect the battery cables only when the Power Switch is OFF.

Turn the Power Switch to the ON position.

When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the Power Switch OFF and disconnect the clamps.

**NOTE**

- The charger will automatically switch to the Trickle mode after the set charging time has elapsed.

Re-test the battery using the Honda Battery Tester and re-charge if necessary using the above steps.

**NOTE**

- For accurate test results, let the battery cool for at least ten minutes or until gassing subsides after charging.

**INSTALLATION**

Install the battery onto the air cleaner case and secure it with the battery holder and bolts.

Connect the positive (+) cable first, then connect the negative (-) cable and cover the negative (-) cable with the rubber cover.

Install the right side cover (page 15-2).

**CHARGING SYSTEM**

**NOTE**

- With large capacity circuits that exceed the rating of the fuse contained in the tester, measuring errors can be dangerous.
- Before starting each test, set the tester at the high capacity range first, and it to small capacity circuits range in order that you have the correct range.

**LEAKAGE INSPECTION**

**CAUTION**

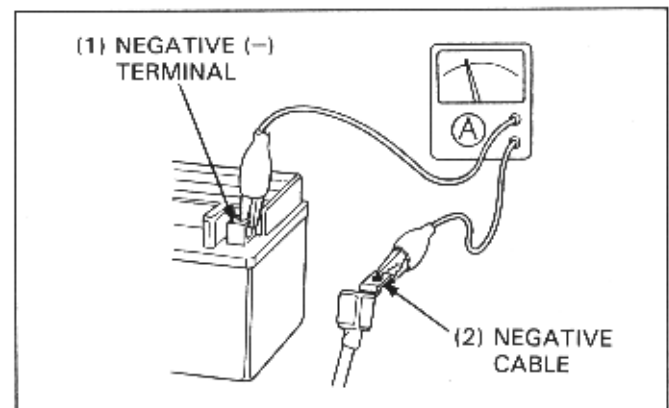
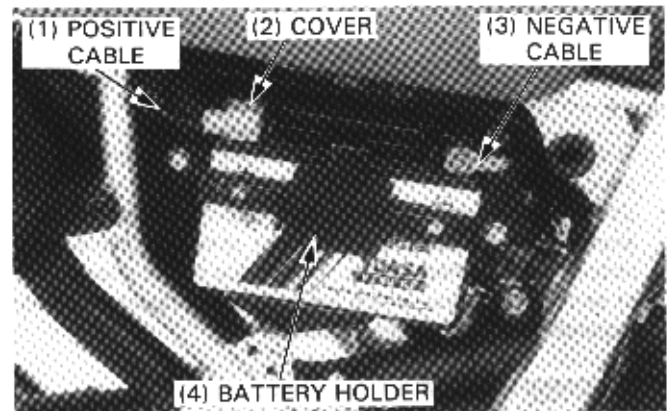
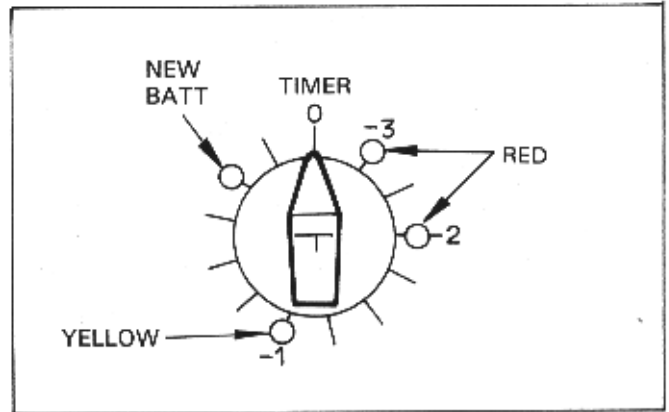
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.

Check the battery ampere leakage before making the regulated ampere inspection.

Turn the ignition switch off and disconnect the battery negative cable from the battery.

Connect the tester between the negative cable and the negative battery terminal.

The ampere meter should indicate within 1 mA with the ignition switch OFF.



## BATTERY/CHARGING SYSTEM

### REGULATED VOLTAGE INSPECTION

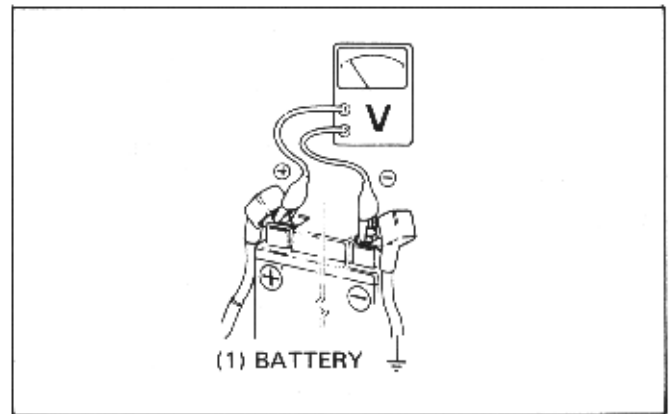
#### NOTE

- Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature. Stop the engine, and connect the voltmeter as shown. Allow the engine to idle, and increase the engine speed gradually. The voltage should be controlled to 13.5–15.5 V at 5,000 rpm.

#### CAUTION

- Be careful not to contact the battery positive cable to the frame while testing.



## REGULATOR/RECTIFIER

### INSPECTION

Remove the fuel tank (page 4-3). Disconnect the 3P connectors of the regulator/rectifier from the holder. Check them for loose contact or corroded terminals. If the regulated voltage reading is out of the specification, check the items between connector terminals (wire harness side and alternator side), following the chart below.

ITEM	TERMINALS	STANDARDS (20°C/68°F)
Battery charging line	Red/White (+) and Green (-)	Battery voltage should come.
Alternator coil line	Yellow and Yellow	0.1 – 1.0 Ω

#### NOTE

- The resistance values will be incorrect if the probes touch your fingers.
- Use one of the following recommended multitesters. Using another manufacturer's equipment may not allow you to obtain the specified values. This is due to the characteristic of semiconductors, which have different resistance values depending on the applied voltage.

#### RECOMMENDED MULTITESTERS:

- 07411–0020000 (KOWA Digital type)
- KS–AHM–32–003 (KOWA Digital type; U.S.A. only)
- 07308–0020001 (SANWA Analogue type)
- TH–5H (KOWA Analogue type)

- Select the following range.  
Sanwa: kΩ  
Kowa: x 100 Ω
- An old battery stored in the multimeter could cause inaccurate readings. Check the battery if the multimeter resisters incorrectly.
- When using the KOWA multimeter, remember that all readings should be multiplied by 100.

Replace the regulator/rectifier unit if any one of the resistance values is abnormal.

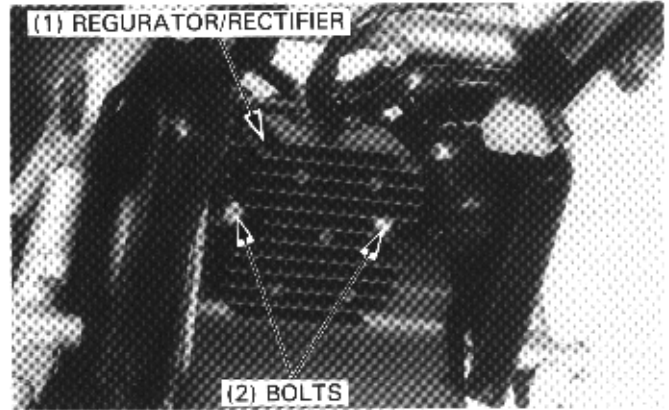
Unit: Ω

Probe ⊕	BI	R/W	Y	Y	Y	G
⊖ Probe						
BI		20 k ~100 k	15 k ~80 k	15 k ~80 k	15 k ~80 k	10 k ~50 k
R/W	∞		∞	∞	∞	∞
Y	∞	500 ~10 k		∞	∞	∞
Y	∞	500 ~10 k	∞		∞	∞
Y	∞	500 ~10 k	∞	∞		∞
G	1 k ~20 k	1 k ~20 k	500 ~10 k	500 ~10 k	500 ~10 k	

**REPLACEMENT**

Remove the rear fender (page 15-5).  
 Disconnect the regurator/rectifier 3P connector, remove the regurator/rectifier.

Install the regurator/rectifier in the reverse order of removal.



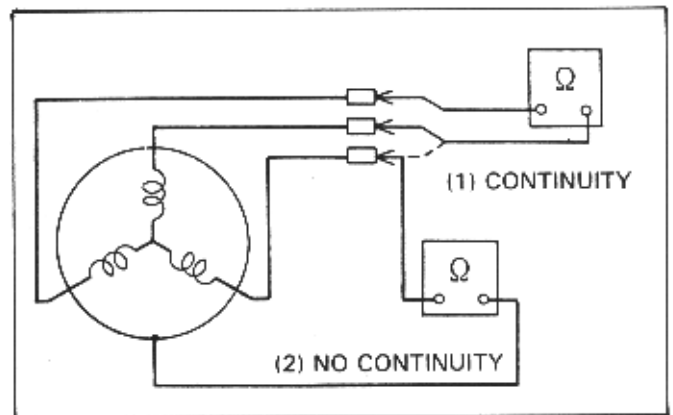
**ALTERNATOR**

**INSPECTION**

**NOTE**

- It is not necessary to remove the stator coil to make this test.

Remove the seat and disconnect the alternator 3P connector.



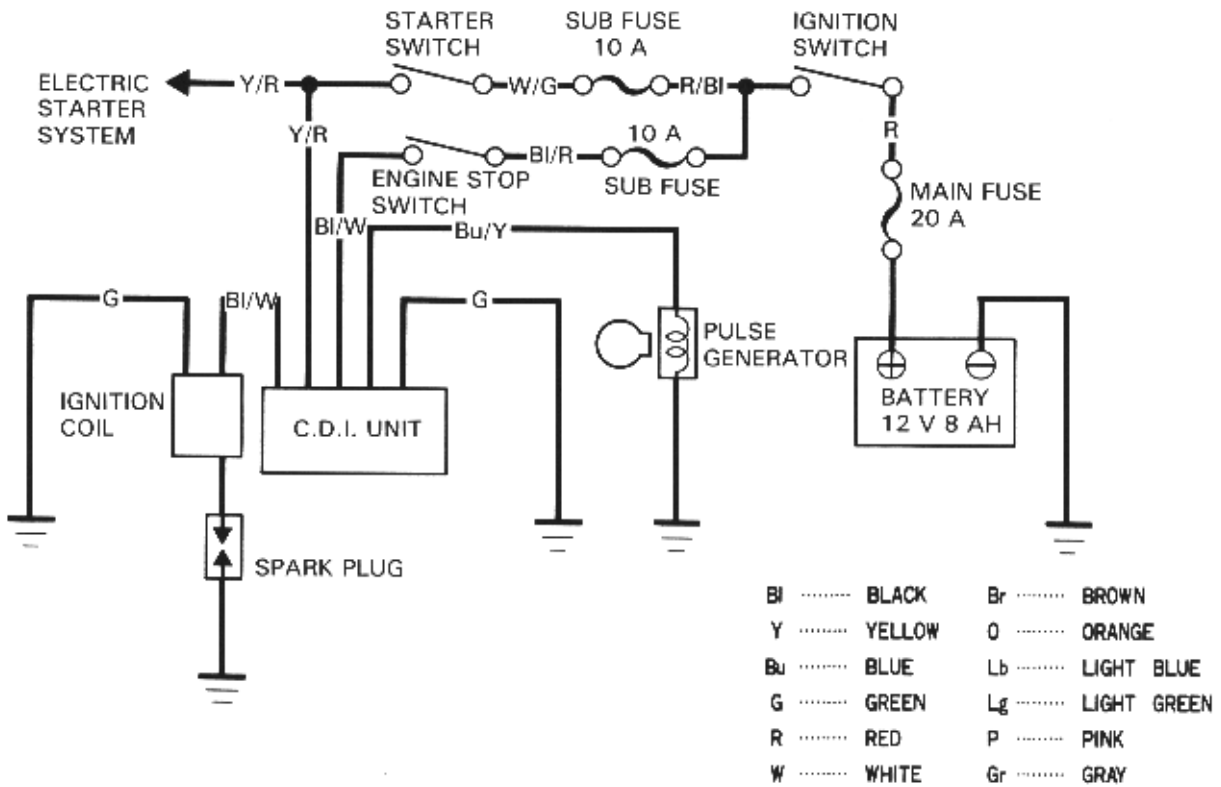
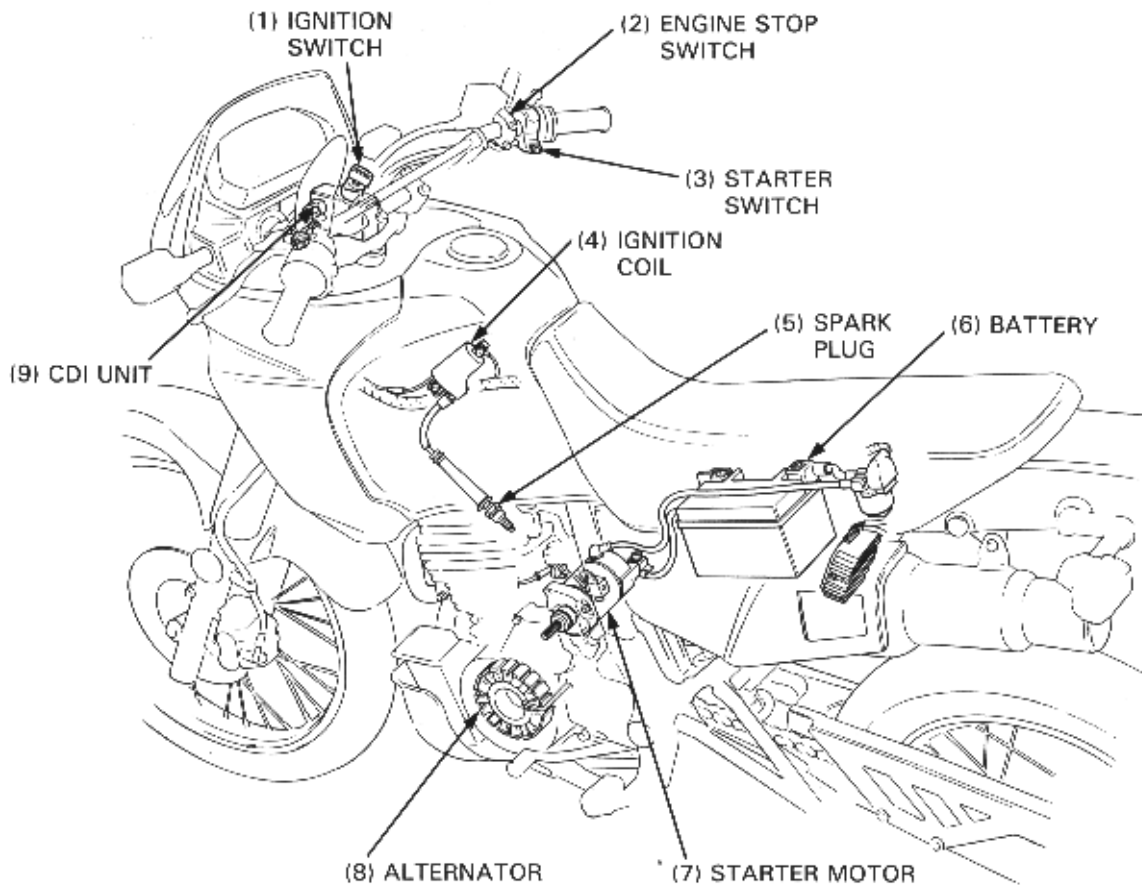
Measure the resistance between the yellow wire terminals and check for no continuity between each terminal and ground.

**STANDARD: 0.1—1.0 Ω (at 20°C/68°F)**

Replace the stator if the resistance is out of specification or if there is continuity between each yellow wire terminal and ground.

# IGNITION SYSTEM

## SYSTEM DIAGRAM



# 17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION COIL	17-5
SERVICE INFORMATION	17-1	PULSE GENERATOR	17-7
TROUBLESHOOTING	17-2	IGNITION TIMING	17-7
SYSTEM INSPECTION	17-3		

## SERVICE INFORMATION

### GENERAL

- When inspecting the ignition system, check the system components and lines step-by-step according to the troubleshooting sequence on the next page.
- Ignition timing cannot be adjusted since the CDI (Capacitive Discharge Ignition) unit is non-adjustable.
- For pulse generator removal and installation, see section 8.
- For alternator removal and installation, see section 9.
- For spark plug gap inspection and adjustment procedure, see page 3-6.

### SPECIFICATIONS

ITEM		STANDARD
Spark plug	Standard	DPR8EA9 (NGK) X24EPR-UP (ND)
	For extended high speed riding	DPR9EA9 (NGK) X27EPR-UP (ND)
Spark plug gap		0.8–0.9 mm (0.031–0.035 in)
Ignition timing	Initial	8° BTDC at idle
	Full advance	28° BTDC at 4,000 rpm
Ignition coil resistance (20°C/68°F)	Primary coil	0.4–0.6 Ω
	Secondary coil (without spark plug cap)	10.5–16.5 kΩ
	Secondary coil (with spark plug cap)	14–23 kΩ
Pulse generator resistance (20°C/68°F)		420–520 Ω

### TOOLS

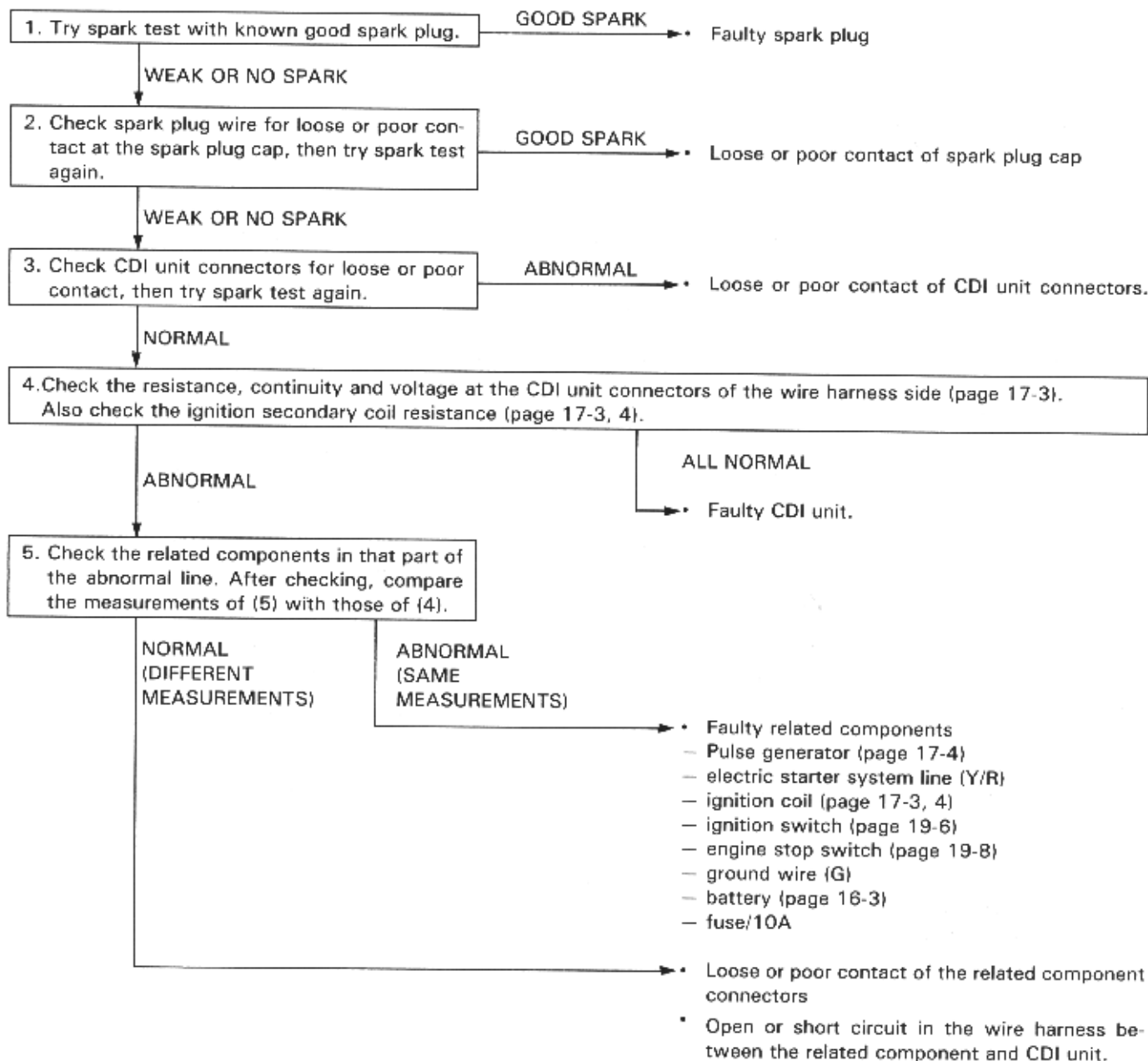
Circuit tester (SANWA) or  
Circuit tester (KOWA) or  
Digital multimeter (KOWA)

07308–0020000  
TH–5H  
07411–0020000 or KS-AHM-32-003 (U.S.A. only)

1

# TROUBLESHOOTING

Weak or no spark at plug



## SYSTEM INSPECTION

## NOTE

- Check the system components and lines step-by-step according to the troubleshooting on page 17-2.
- This method does not include an inspection of the ignition timing advance system at the CDI unit.

Remove the right fairing (page 15-2).

Disconnect the CDI unit connectors and check them for loose contact or corroded terminals.

Measure the resistance, continuity and voltage between connector terminals of the wire harness side as follows:



ITEM	TERMINAL	STANDARD
Ignition coil primary coil	Bl/Y and G	0.4—0.6 $\Omega$ (at 20°C/68°F)
Pulse generator coil	Bu/Y and G	420—520 $\Omega$ (at 20°C/68°F)
Ignition switch and engine stop switch (Turn the ignition switch ON and the engine stop switch RUN)	Bl/W (+) and G (-)	Battery voltage.
Electric starter system line (Turn the ignition switch ON and push the starter switch) NOTE: Transmission must be in neutral.	Y/R (+) and G (-)	Battery voltage.

## IGNITION COIL

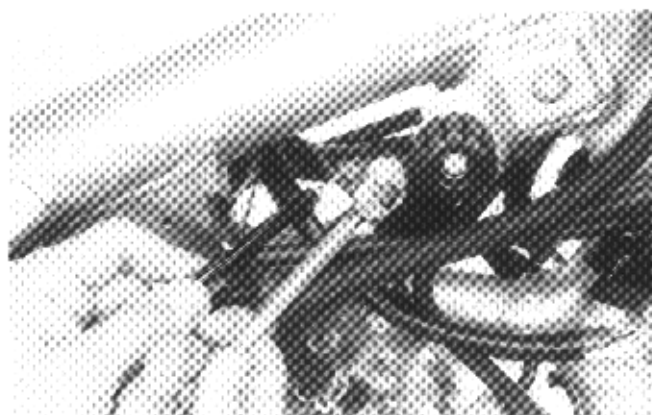
## INSPECTION

Remove the fuel tank (page 4-3).  
Measure the primary coil resistance between terminals.

**STANDARD:** 0.4—0.6  $\Omega$  (at 20°C/68°F)

Measure the secondary coil resistance with the spark plug cap in place by checking for continuity between the plug cap and green terminal.

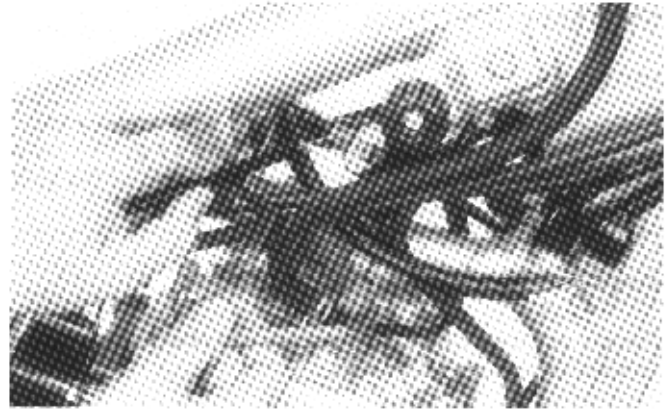
**STANDARD:** 14—23 k $\Omega$  (at 20°C/68°F)



## IGNITION SYSTEM

Remove the spark plug cap from the wires and measure the secondary coil resistance.

**STANDARD:** 10.5–16.5 k $\Omega$  (at 20°C, 68°F)



## PULSE GENERATOR

### NOTE

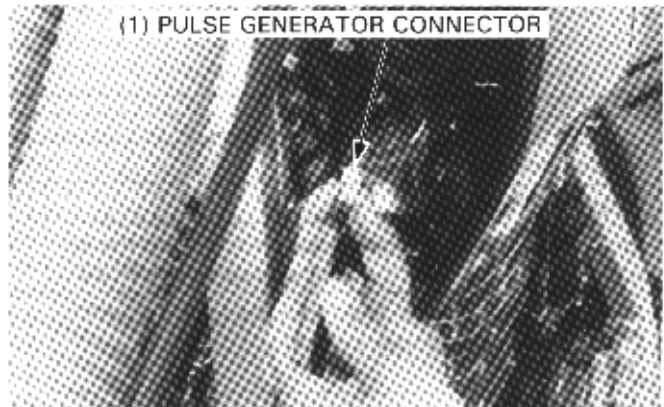
- It is not necessary to remove the fuel tank and fairing to make this test.

### INSPECTION

Disconnect the pulse generator wire connector (2P mini).

Measure the resistance between the connector terminals.

**STANDARD:** 420–520  $\Omega$  (at 20°C/68°F)



## IGNITION TIMING

### NOTE

- The Capacitive Discharge Ignition (CDI) system is factory pre-set and does not require adjustment. To inspect the function of the CDI components, ignition timing inspection procedures are given here.

Warm the engine up to the operating temperature.

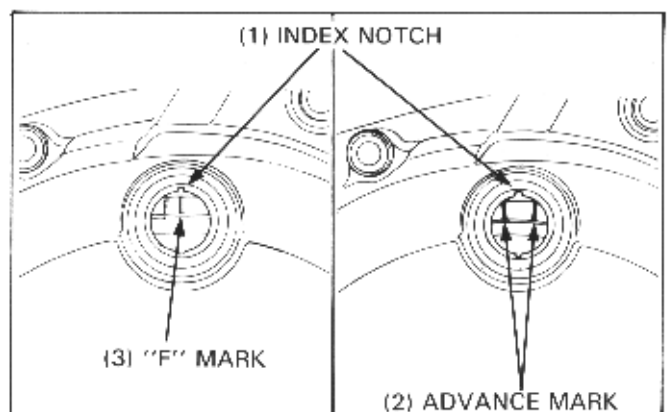
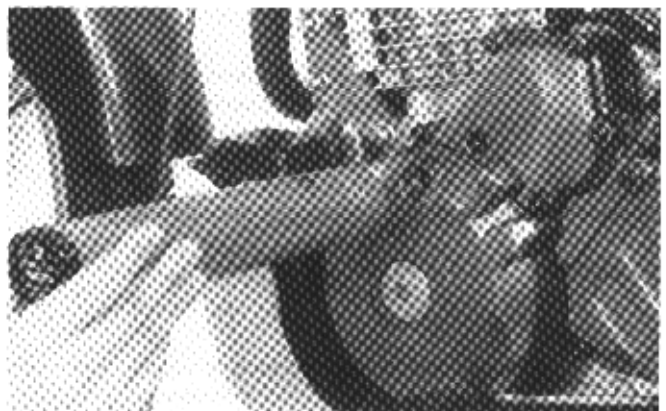
Remove the timing hole cap.  
Connect a tachometer and timing light.  
Start the engine and allow it to idle.

**IDLE SPEED:** 1,300  $\pm$  100 rpm

Inspect the ignition timing.  
Timing is correct if the "F" mark on the alternator rotor is aligned with the index mark on the left crankcase cover at idle.

To check the advance, raise the engine speed to 4,000  $\pm$  100 rpm. The index mark should be between the advance marks.

If the ignition timing is incorrect, perform the system inspection (page 17-3).





# 19. LIGHTS/INSTRUMENTS/SWITCHES

SERVICE INFORMATION	19-1	IGNITION SWITCH	19-6
TROUBLESHOOTING	19-1	LEFT HANDLEBAR SWITCH	19-7
HEADLIGHT	19-2	RIGHT HANDLEBAR SWITCH	19-8
STOP/TAILLIGHT	19-3	CLUTCH SWITCH	19-8
LICENSE LIGHT	19-3	BRAKE LIGHT SWITCH	19-8
TURN SIGNAL LIGHT	19-4	NEUTRAL SWITCH	19-9
INSTRUMENTS	19-4	HORN	19-9

## SERVICE INFORMATION

### GENERAL

- Some wires have different colored bands around them near the connector. These are connected to others with corresponding band colors.
- Color code
  - Bl: Black
  - Br: Brown
  - Y: Yellow
  - O: Orang
  - L: Blue
  - Lb: Light blue
  - R: Red
  - Lg: Light green
  - W: White
  - G: Green
- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- To isolate an electrical failure, check the continuity of the electrical path through the part.
- A continuity check can usually be made removing the part from the motorcycle by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals or connectors.

### SPECIFICATION

Headlight		12V 60/55W
Stop/taillight		12V 32/3CP
Turn signal light	Front/rear	12V 32/CP x 4
License light		12V 4CP
Meter light		12V 1.7W x 4
Indicator light	High beam	12V 1.7W
	Newtral	12V 3.4W

## TROUBLESHOOTING

### No lights come on when ignition switch is turned on:

- Bulb at fault or burned out
- Faulty switch
- Wiring to that component has an open circuit
- Fuse blown
- Wiring loose, broken or at fault
- Battery dead or disconnected

### All lights come on, but dimly, when ignition switch is turned on:

- Battery voltage low
- Wiring or switch has excessive resistance

### Headlight beam does not shift when HI-LO switch is operated:

- Beam filament burned out
- Faulty dimmer switch

## HEADLIGHT

### BULB REPLACEMENT

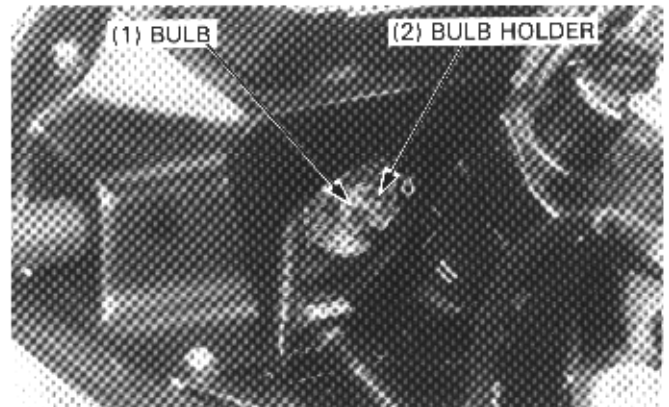
Disconnect the headlight bulb socket and pull the bulb cover off.



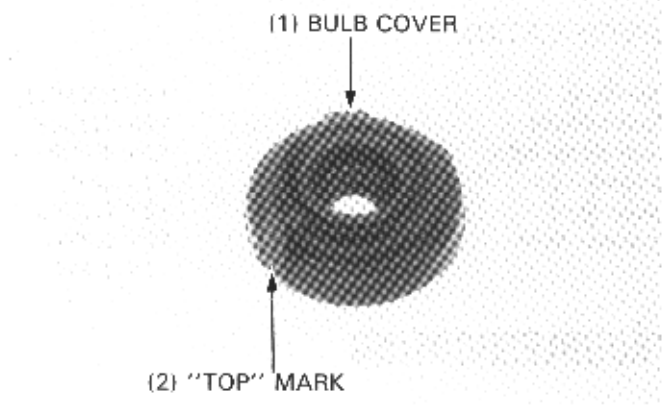
Remove the bulb holder and bulb, and install the new bulb in the reverse order of removal.

#### CAUTION

- *Wear a glove when installing the halogen bulb. If you touched the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.*



Note the top mark on the tab of the bulb cover when installation



Install the bulb cover with the "TOP" mark facing up. Connect the bulb socket to the bulb securely.

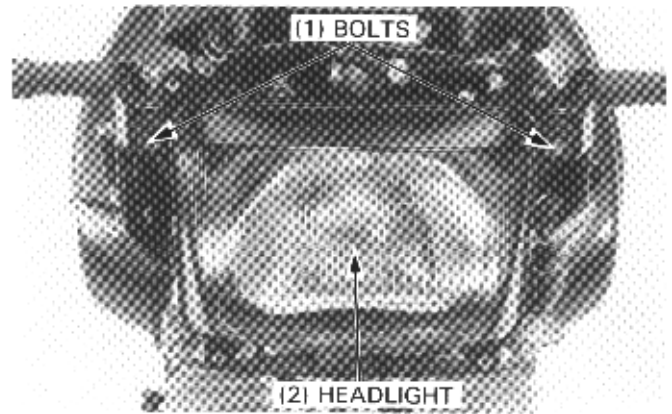


**REMOVAL/INSTALLATION**

Remove the right and left fairings (page 15-2).

Disconnect the headlight bulb connector, and remove the mounting bolts and headlight.

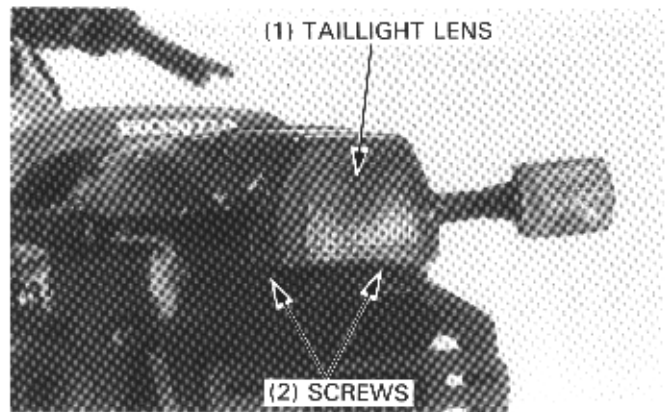
Install the headlight in the reverse order of the removal. Connect the bulb connector, and install the right and left fairings (page 15-4).



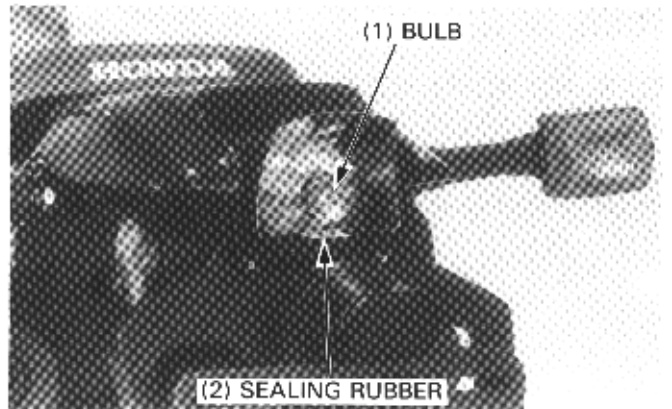
**STOP/TAILLIGHT**

**BULB REPLACEMENT**

Remove the attaching screws and taillight lens. Replace the bulb with a new one.



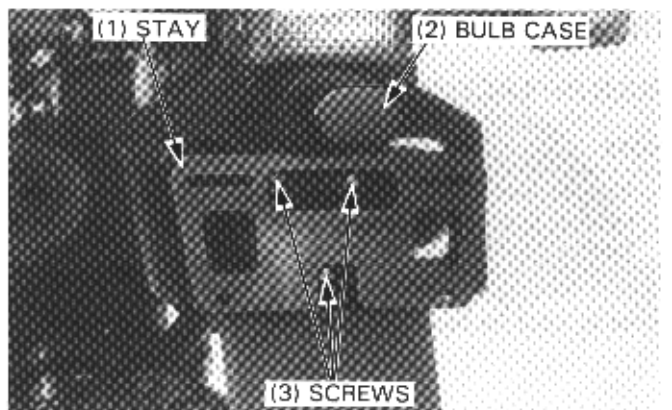
Install the sealing rubber in the groove, and secure the taillight lens with screws.



**LICENSE LIGHT**

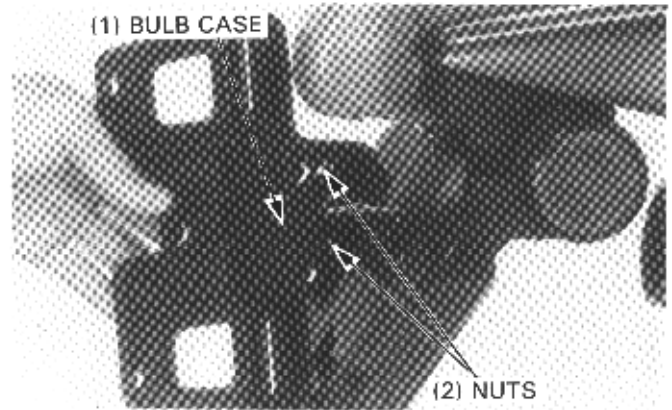
**BULB REPLACEMENT**

Remove the mounting screws and license plate stay.

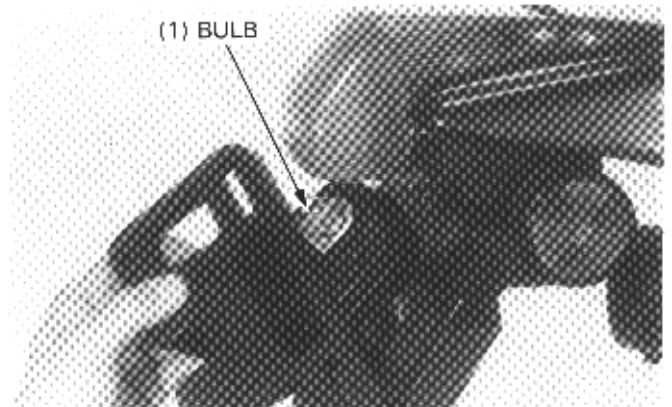


## LIGHTS/INSTRUMENTS/SWITCHES

Remove the nuts and bulb case.



Replace the bulb with a new one, and install the removed parts in the reverse order of the removal.

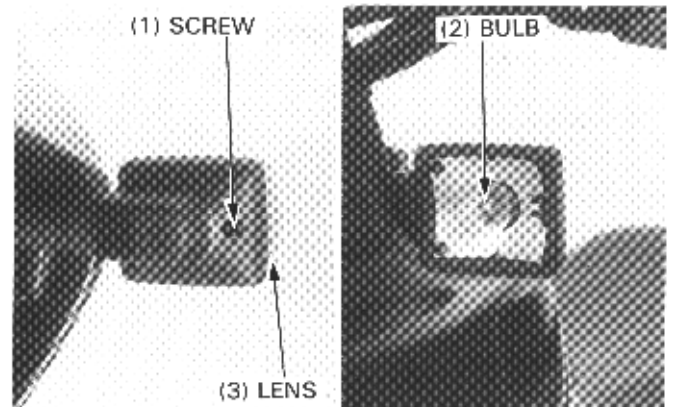


## TURN SIGNAL LIGHT

### BULB REPLACEMENT

Remove the screw and lens, and replace the bulb with a new one.

Reinstall the lens and secure with the screw.



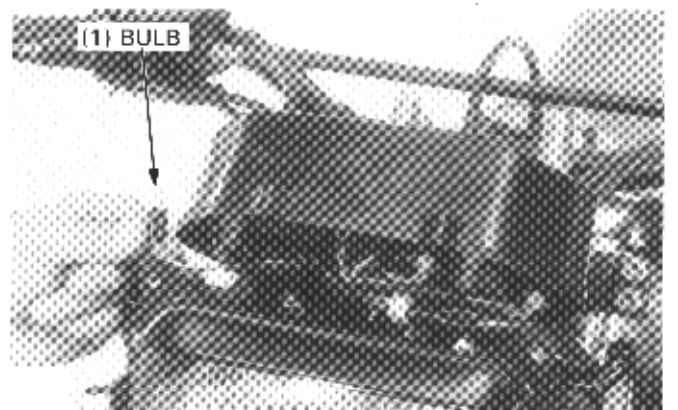
## INSTRUMENTS

### BULB REPLACEMENT

#### NOTE

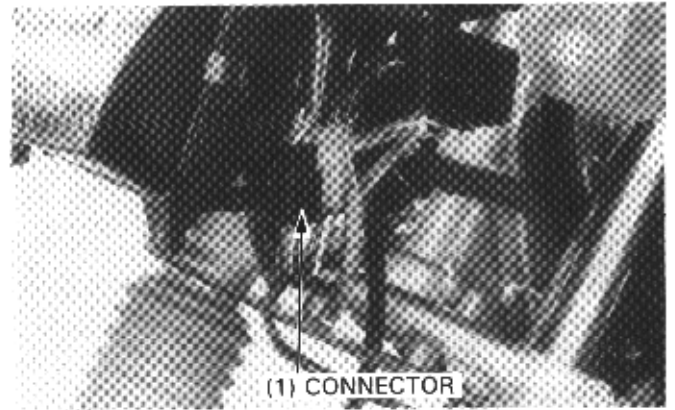
- You can replace the bulb with only the headlight plate removed; it is not necessary to remove the right and left fairings.

Refer to 15-3 for headlight plate removal.

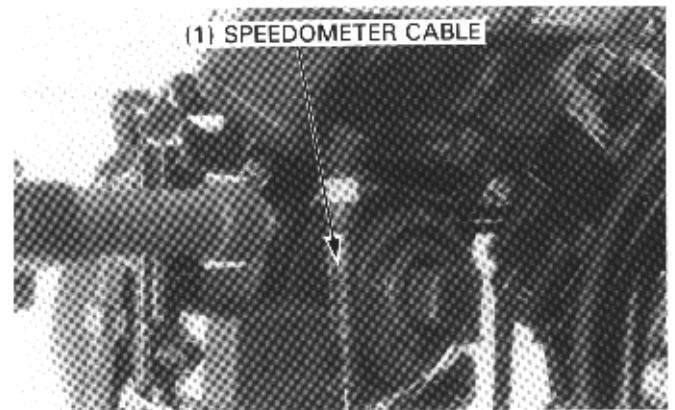


**REMOVAL**

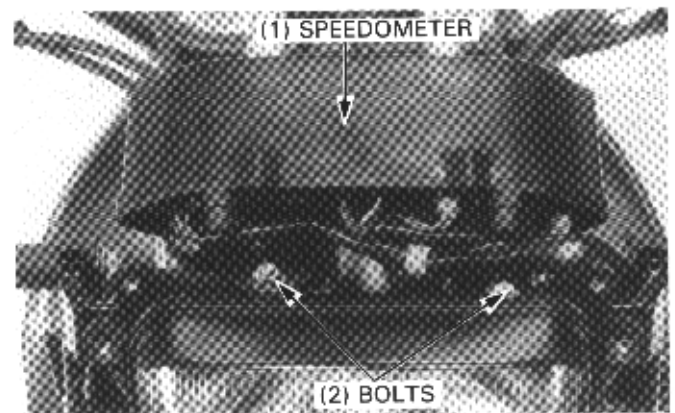
Remove the headlight plate (page 15-3).  
 Disconnect the speedometer 9P connector.



Disconnect the speedometer cable.

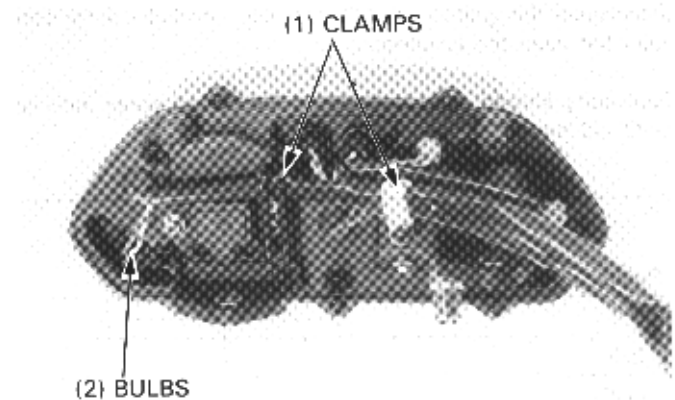


Remove the two mounting bolts and speedometer.



**DISASSEMBLY**

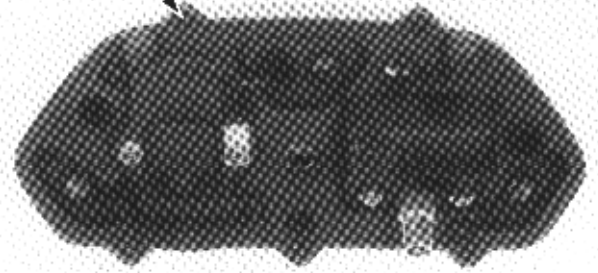
Disconnect one clamp and remove the other clamp with the screw.  
 Pull the bulb sockets out of the meter case.



## LIGHTS/INSTRUMENTS/SWITCHES

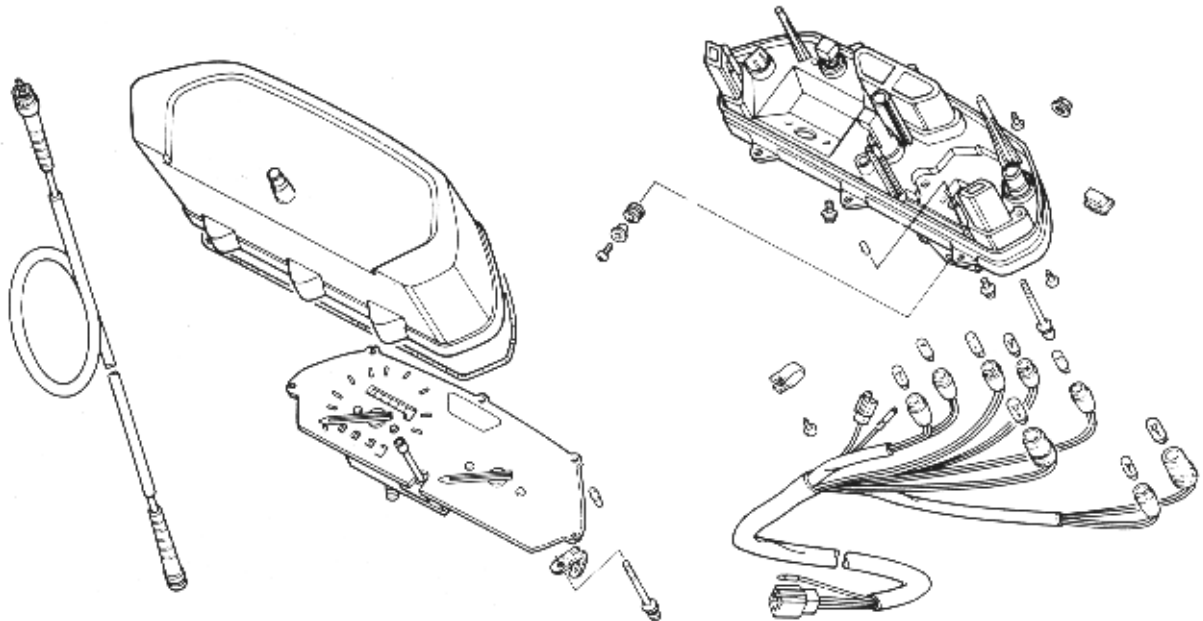
Remove the screws and disassemble the speedometer.

(1) SCREW



## ASSEMBLY/INSTALLATION

Assemble and install the speedometer in the reverse order of removal.



## IGNITION SWITCH

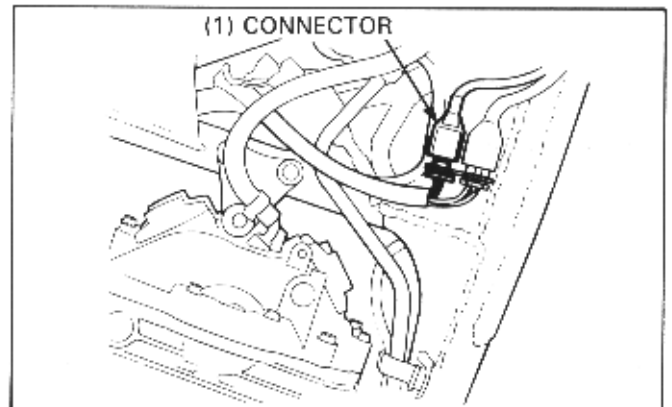
### INSPECTION

Remove the fuel tank (page 4-3). Disconnect the ignition switch connector and check for continuity between the terminals.

Continuity should exist between color coded wires indicated by O—O marks.

Color	R	R/BI
Position		
ON	O—O	O—O
OFF		
LOCK		

(1) CONNECTOR



Disconnect the ignition switch connector.  
Remove the mounting bolts and ignition switch.

**CONTACT BASE REPLACEMENT**

Cut the wire band and discard it.  
Remove the attaching screws and contact base.

Install the new contact base, and secure it with three screws.  
Clamp the ignition switch wire with a new wire band.

Apply a locking agent to the ignition switch mounting bolts.  
Install the ignition switch in the reverse order of the removal,  
and secure with bolts.

**TORQUE: 27 N·m (2.7 kg·m, 20 ft·lb)**

**LEFT HANDLEBAR SWITCH**

**INSPECTION**

Disconnect the 9P connector (white) and check for continuity,  
referring the below charts.  
The switch is normal if there is continuity between O—O  
marks.

**DIMMER SWITCH**

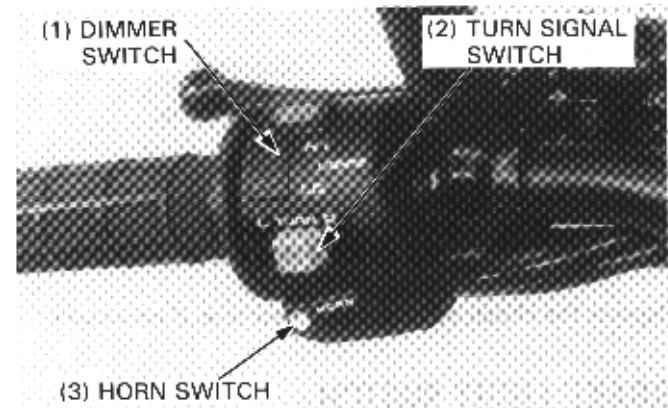
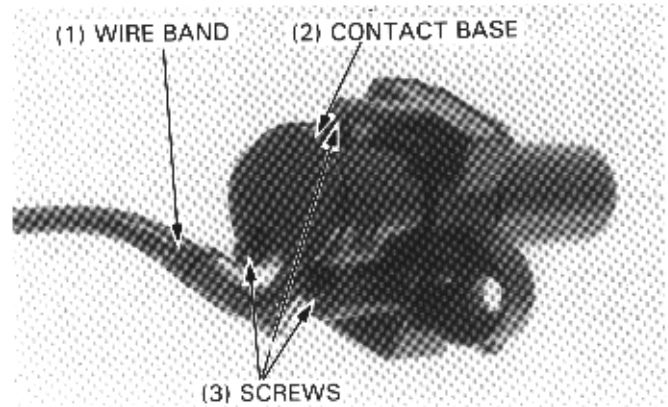
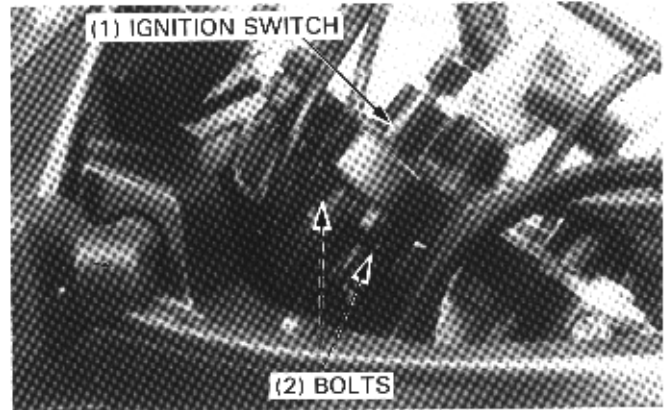
Color \ Position	L/W	W	L
Lo	○	○	
(H)	○	○	○
Hi	○		○

**TURN SIGNAL SWITCH**

Color \ Position	G/R	LB	O
L	○		○
N			
R	○	○	

**HORN SWITCH**

Color \ Position	LG	BI
FREE		
PUSH	○	○



## RIGHT HANDLEBAR SWITCH

### INSPECTION

Disconnect the 9P connector (red), and check for continuity, referring the charts below.

The switch is normal if there is continuity between ○—○ marks.

### ENGINE STOP SWITCH

Position \ Color	BI/R	BI/W
	OFF	
RUN	○—○	○—○

### STARTER SWITCH

Position \ Color	Y/R	L/W	W/G
	FREE		○—○
PUSH	○—○		○—○

## CLUTCH SWITCH

### INSPECTION

Disconnect the clutch switch wire connectors.

Check for continuity between the switch terminals.

There should be continuity with the clutch lever pulled in and should be no continuity with the clutch lever released.

Replace the clutch switch with a new one, if necessary.

## BRAKE LIGHT SWITCH

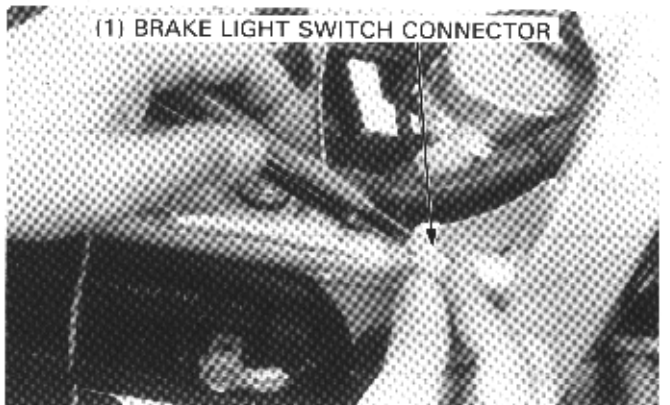
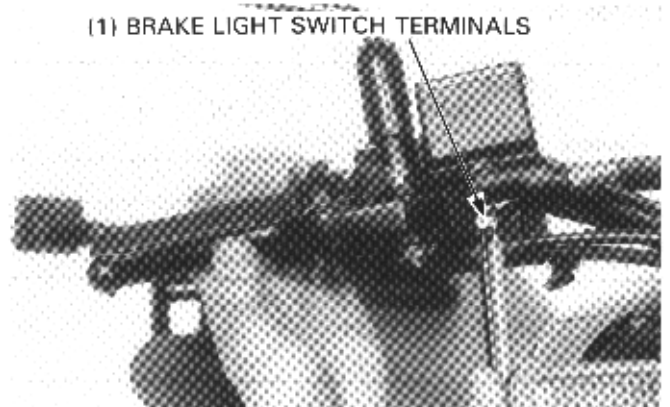
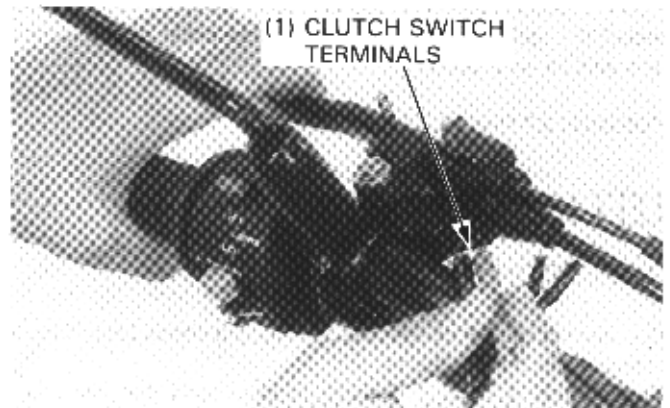
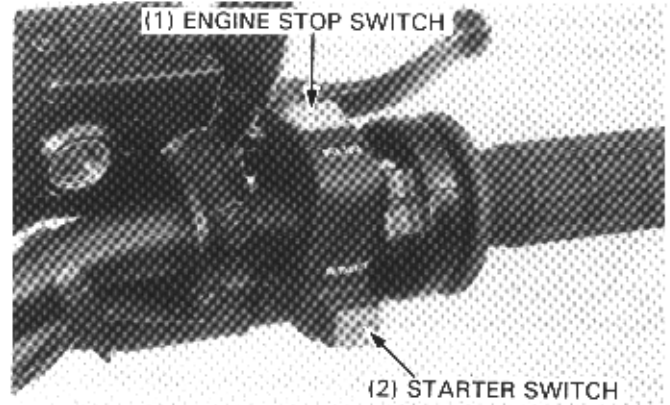
### FRONT

Disconnect the switch wires, and check for continuity. The switch is normal if there is continuity between the terminals with the front brake applied.

### REAR

Remove the seat and disconnect the switch connector. Check for continuity.

The switch is normal if there is continuity between the terminals with the rear brake applied.

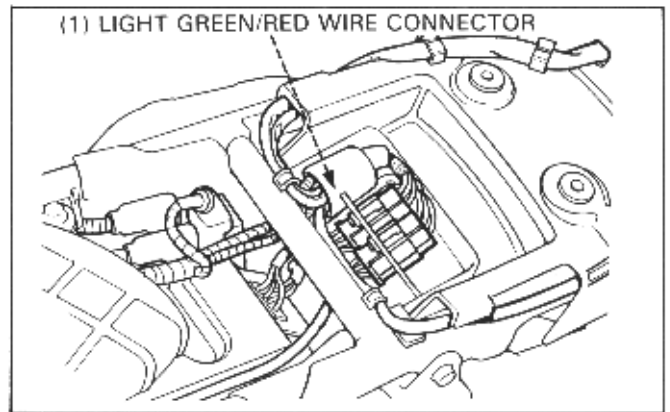




## NEUTRAL SWITCH

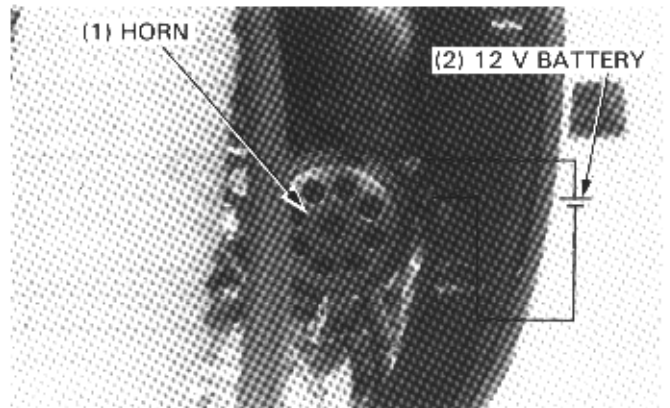
Remove the seat (page 15-2).  
Disconnect the light green/red wire connector.  
Check the continuity between the light green/red wire and ground with any gear position.

There should be continuity between the green/red wire and ground with the transmission in the neutral position, and should be no continuity in any other gear position.



## HORN

The horn is normal when it sounds by connecting 12V battery to the horn terminals.



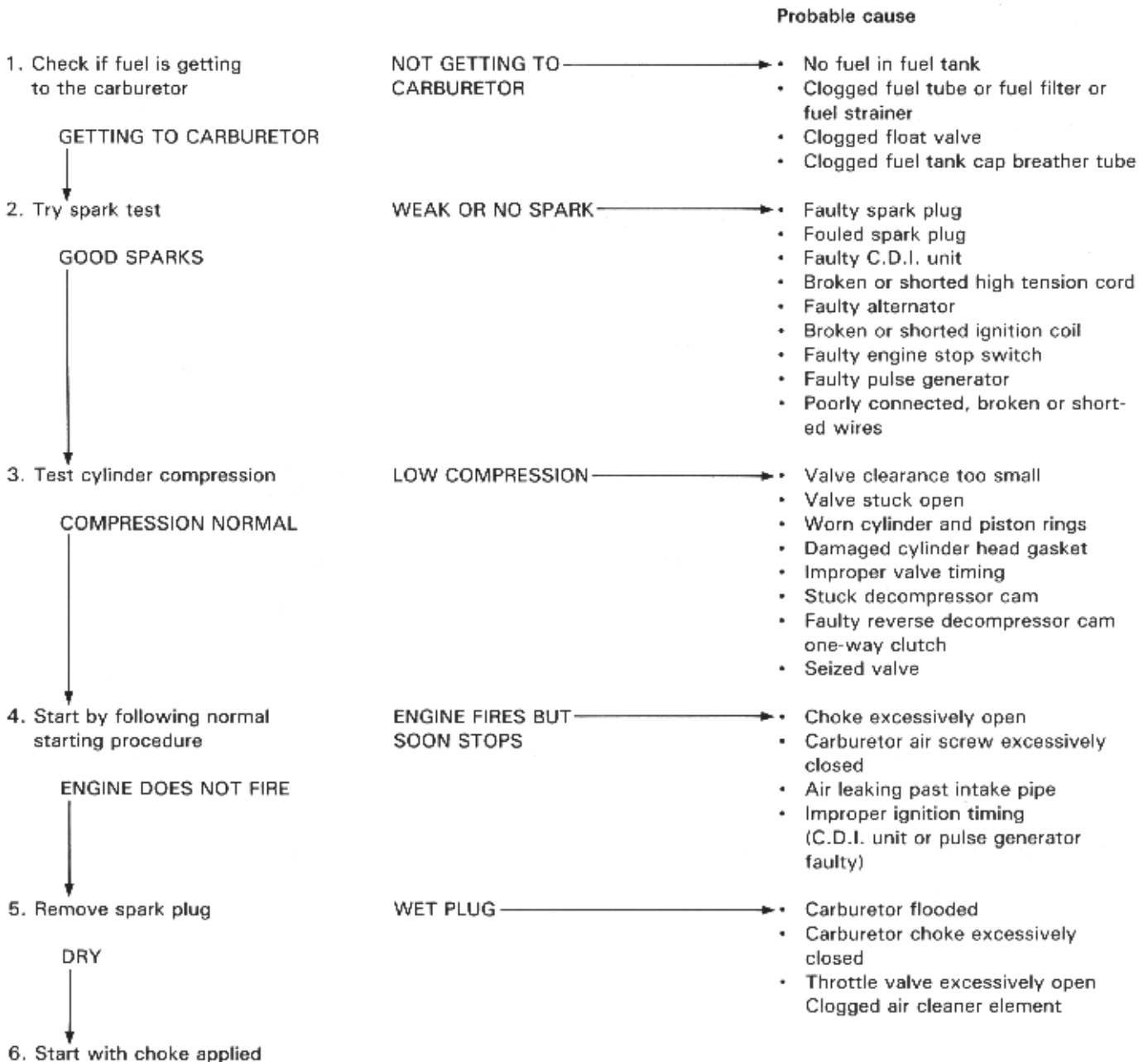




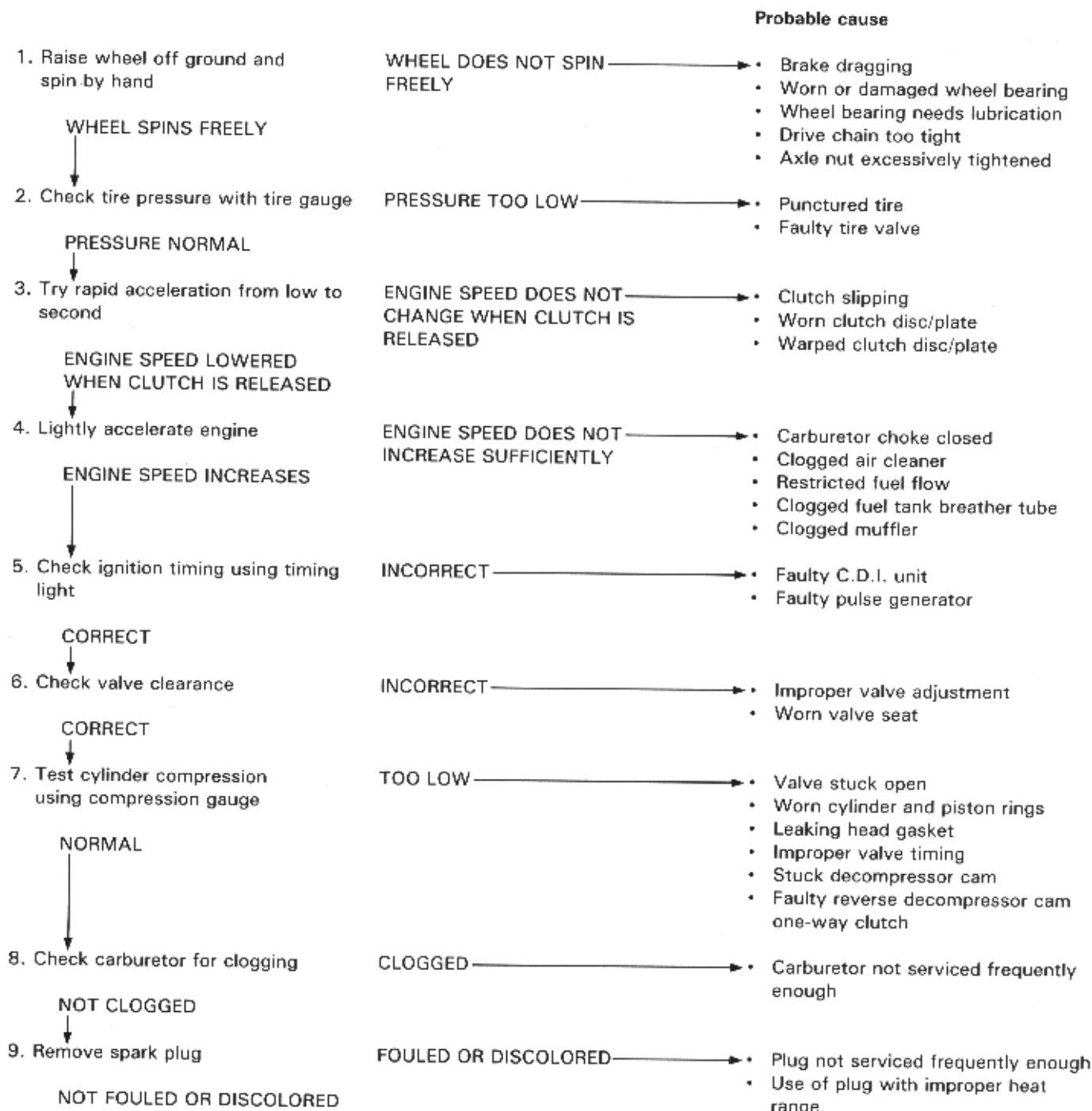
# 21. TROUBLESHOOTING

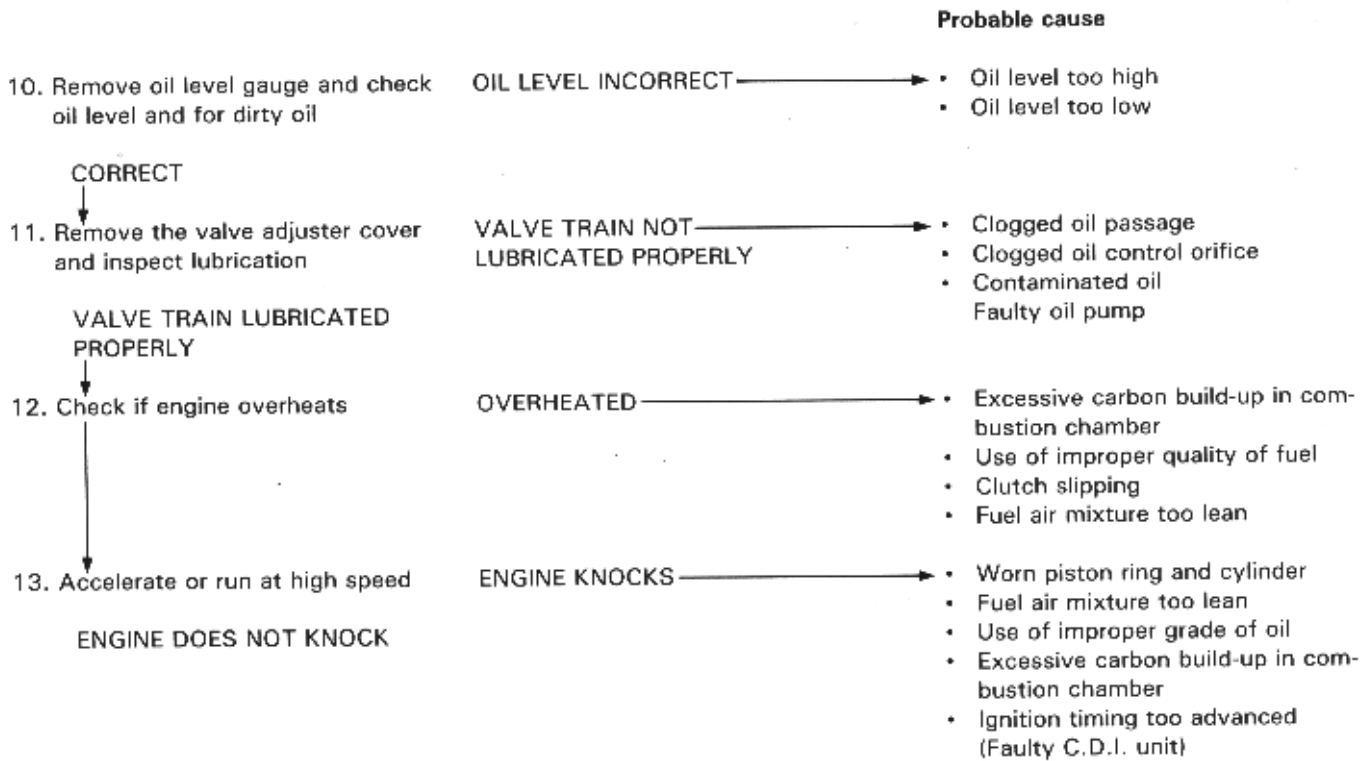
<b>ENGINE DOES NOT START OR IS HARD TO START</b>	<b>21-1</b>	<b>POOR PERFORMANCE AT HIGH SPEED</b>	<b>21-4</b>
<b>ENGINE LACKS POWER</b>	<b>21-2</b>	<b>UNDERCHARGED BATTERY</b>	<b>21-4</b>
<b>POOR PERFORMANCE AT LOW AND IDLE SPEEDS</b>	<b>21-3</b>	<b>OVERCHARGED BATTERY</b>	<b>21-5</b>
		<b>NO SPARKS</b>	<b>21-5</b>

## ENGINE DOES NOT START OR IS HARD TO START

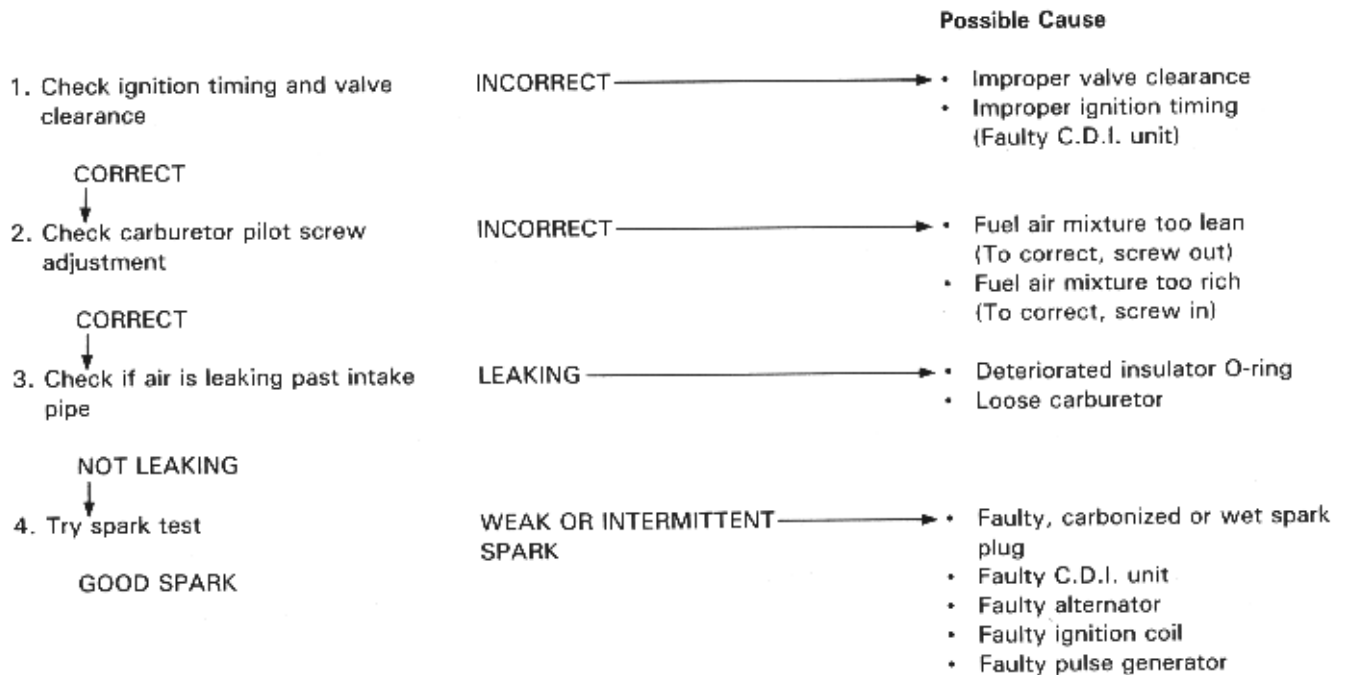


**ENGINE LACKS POWER**

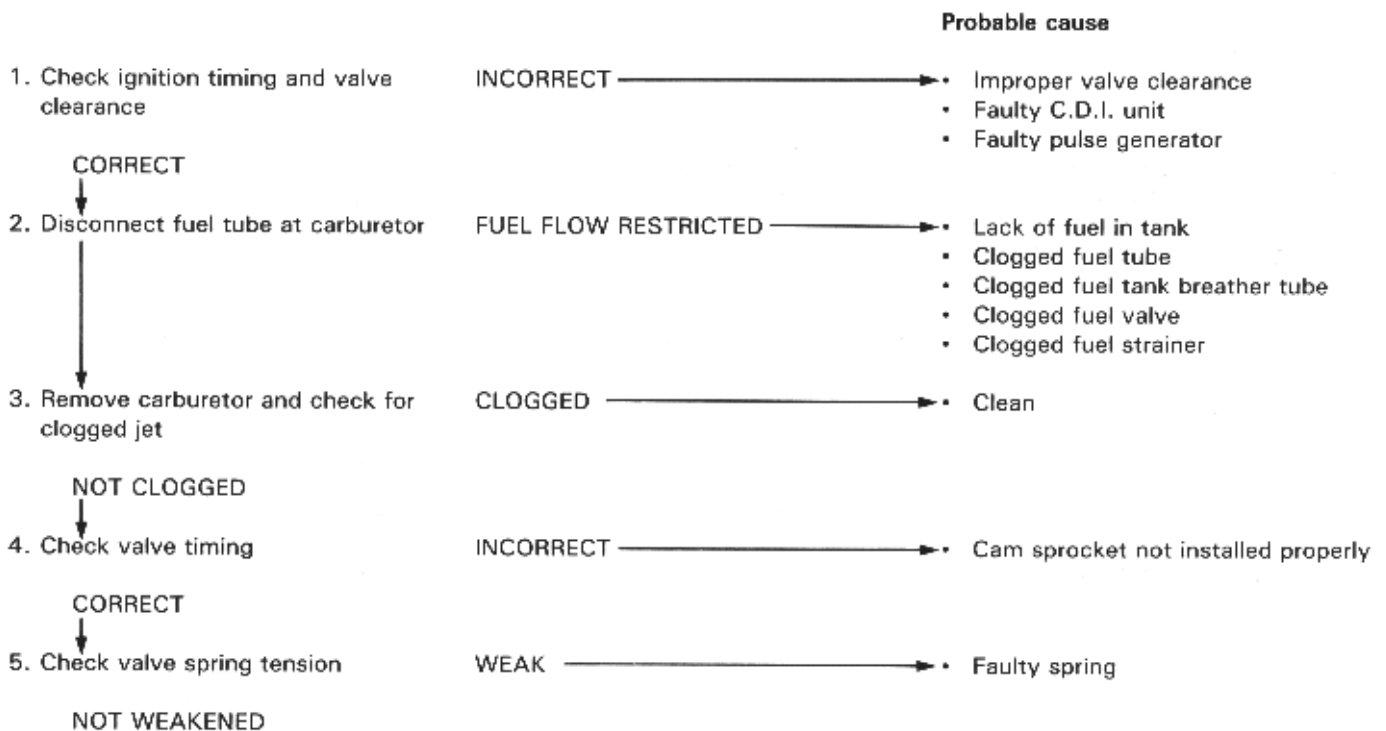




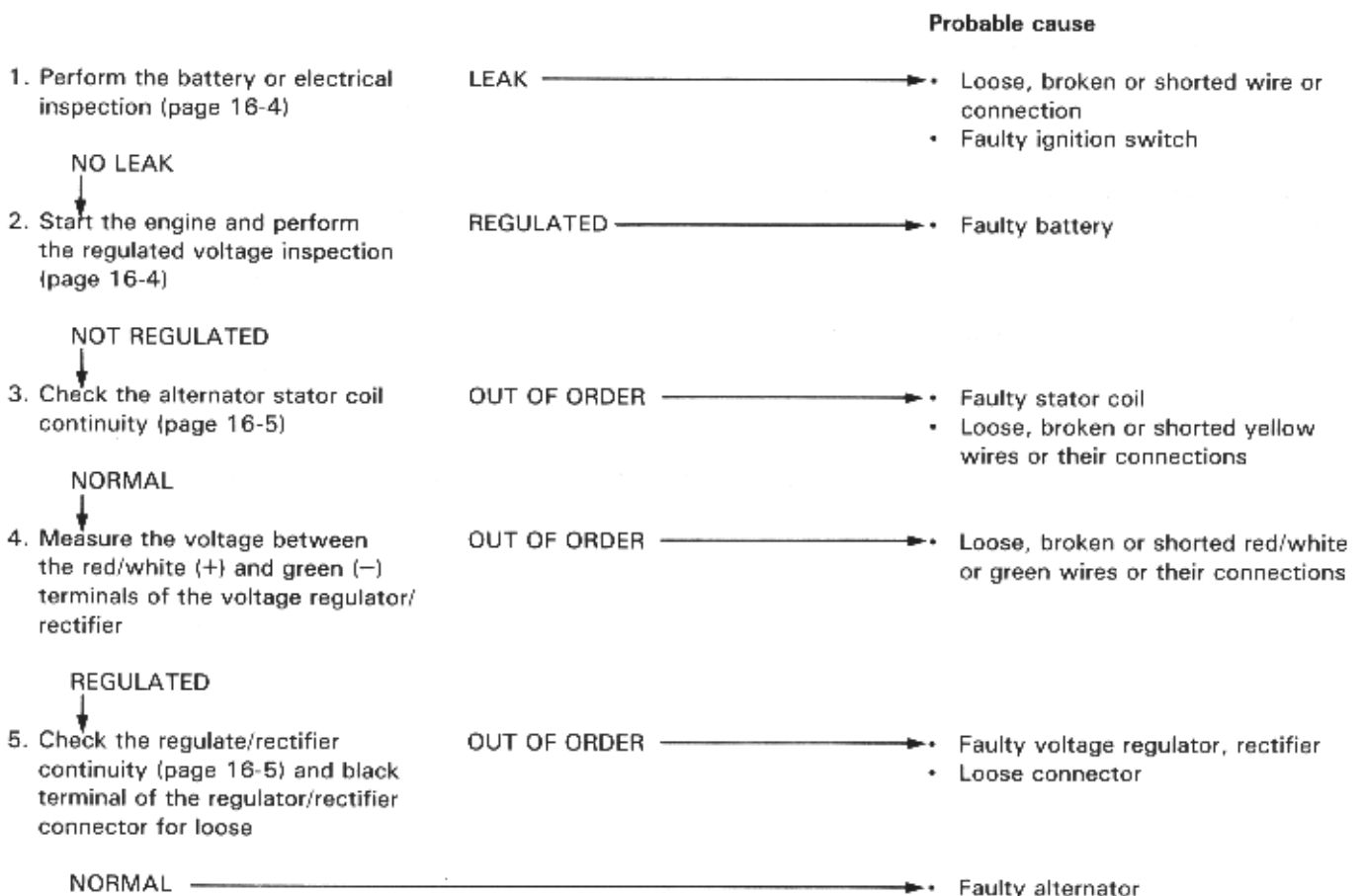
## POOR PERFORMANCE AT LOW AND IDLE SPEEDS



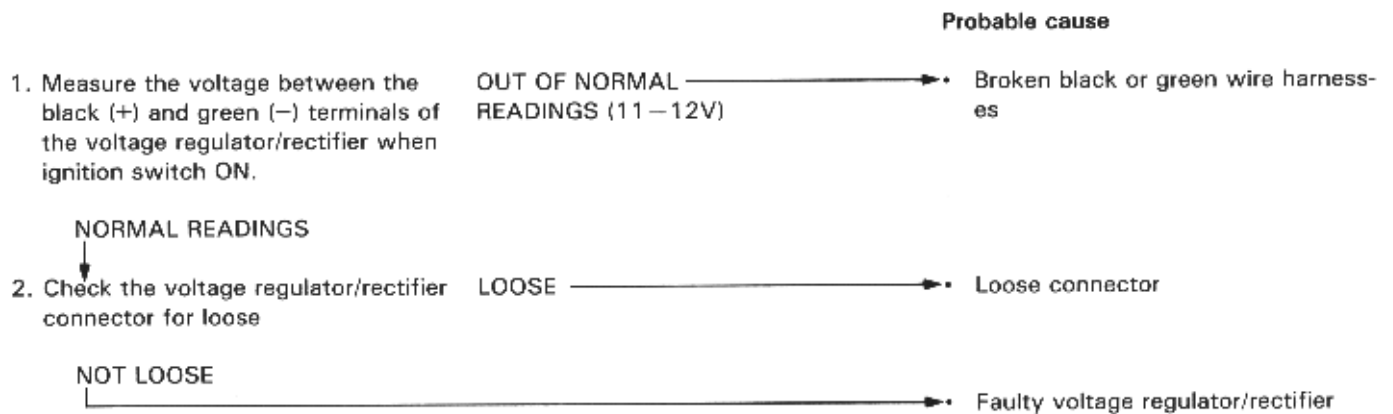
**POOR PERFORMANCE AT HIGH SPEED**



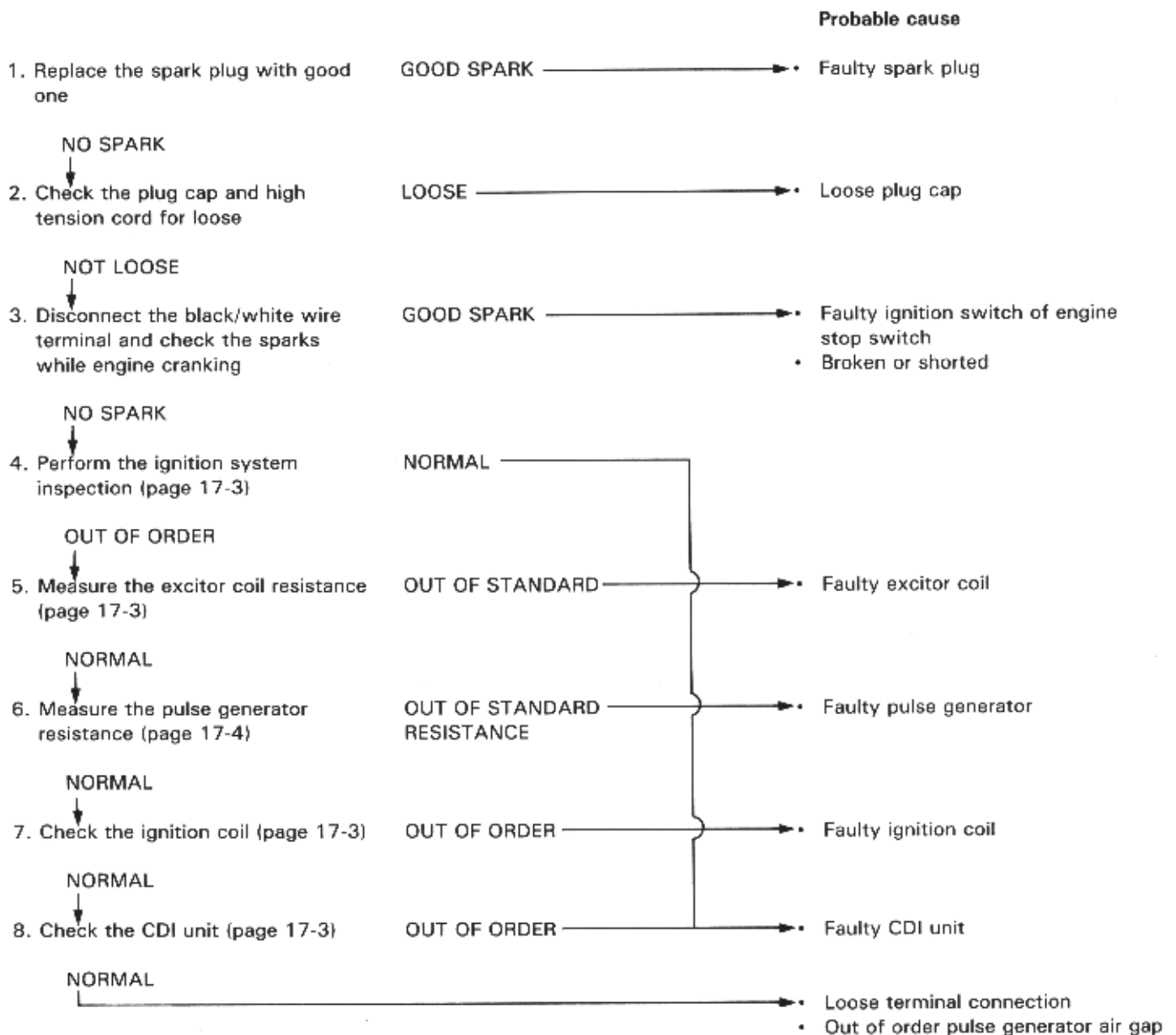
**UNDERCHARGED BATTERY**



## OVERCHARGED BATTERY



## NO SPARKS





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