HONDA

SERVICE MANUAL



88-89

VTR

VTR250

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IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

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

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 standards set by the U.S. Environmental Protection Agency and California Air Resources Board. Performing the first sheduled 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 approval for printing. HONDA MOTOR CO., LTD. reserves the right to make changes at any time without notice and without incurring any obligation whatever. No part of this publication may be reproduced without written permission.

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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 an enclosed 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

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

⚠WARNING

Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.

⚠WARNING

The rear shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.

⚠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

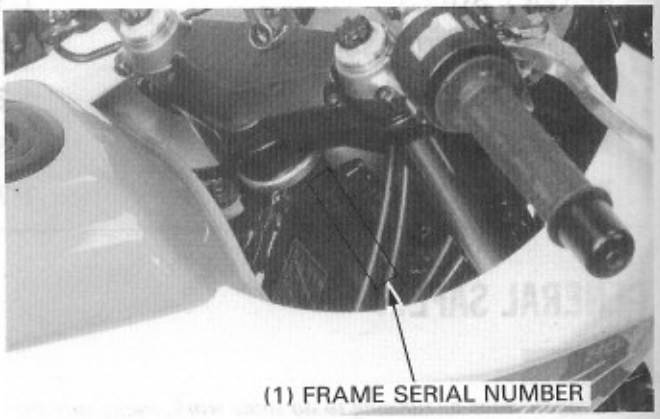
Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

SERVICE RULES

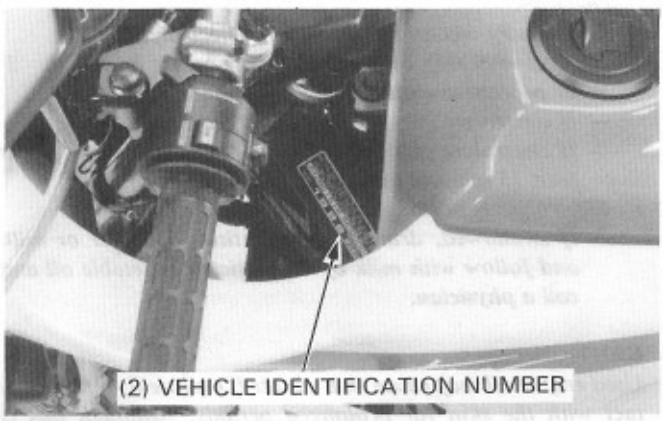
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with the larger-diameter of 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.
8. Route all electrical wires as shown on pages 1-9 through 1-14, Cable and Harness Routing.

MODEL IDENTIFICATION





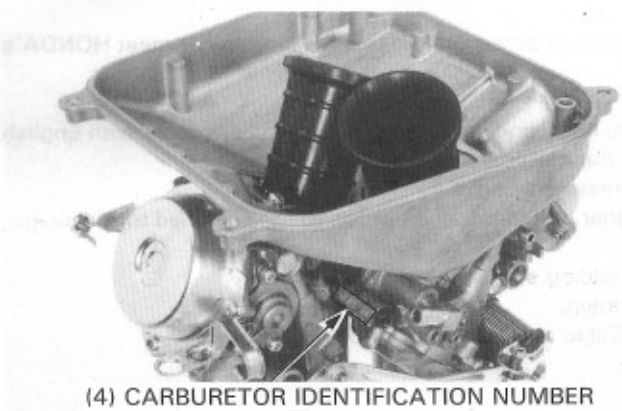
The frame serial number is stamped on the right side of the steering head.



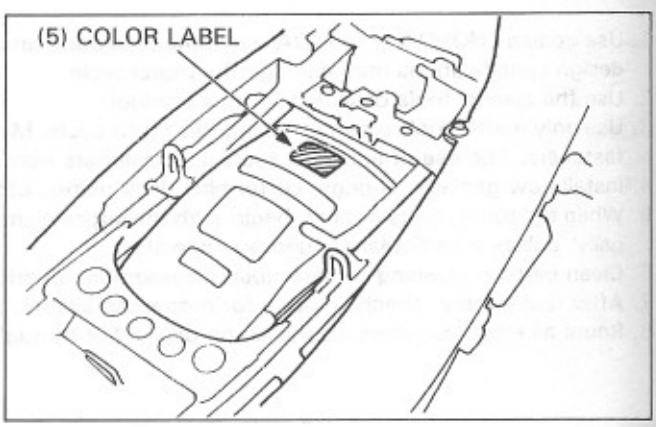
The vehicle identificaiton number (VIN) is attached on the left side of the steering head.



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



The carburetor identification number is stamped on the carburetor body intake side.



The color label is attached on the rear fender below the seat.

SPECIFICATIONS

[ ]: California model

ITEM				SPECIFICATIONS
DIMENSIONS	Overall length	'88:		2,040 mm (80.3 in) [2,030 mm (79.9 in)]
	Overall width	AFTER '88:		2,030 mm (79.9 in)
	Overall height			715 mm (28.1 in)
	Wheelbase			1,140 mm (44.9 in)
	Seat height	'88:		1,370 mm (53.9 in)
	Foot peg height	AFTER '88:		1,375 mm (54.1 in)
	Ground clearance			760 mm (29.9 in)
	Dry weight			340 mm (13.4 in)
	Curb weight			140 mm (5.5 in)
				150 kg (331 lb)
				165 kg (364 lb)
FRAME	Type			Diamond
	Front suspension, travel			Telescopic fork, 130 mm (5.1 in)
	Front suspension, air pressure			0–40 kPa (0–0.4 kg/cm², 0–6 psi)
	Rear suspension, travel			Swingarm, 100 mm (3.9 in)
	Vehicle capacity load			156 kg (345 lb)
	Front tire size			100/90–16 54S Tubeless
	Rear tire size			120/80–17 61S Tubeless
	Cold tire pressure	Up to 90 kg (200 lb) load	Front	225 kPa (2.25 kg/cm², 33 psi)
			Rear	225 kPa (2.25 kg/cm², 33 psi)
		Up to vehicle capacity load	Front	225 kPa (2.25 kg/cm², 33 psi)
			Rear	250 kPa (2.50 kg/cm², 36 psi)
	Front brake, lining swept area			Hydraulic single disc, 338 cm² (52.4 sq in)
	Rear brake, lining swept area			Mechanical drum, 132 cm² (20.5 sq in)
	Fuel capacity			13.0 lit (3.4 US gal, 2.9 Imp gal)
	Fuel reserve capacity			2.2 lit (0.6 US gal, 0.5 Imp gal)
	Caster angle			63°55'
	Trail length			100 mm (3.9 in)
	Fork oil capacity			306 cc (10.3 US oz, 10.7 Imp oz)
	Fork oil level			124 mm (4.9 in)
ENGINE	Type			Water cooled twin, 4-stroke DOHC (Dual Over Head Camshaft) engine
	Cylinder arrangement			2 Cylinders 90°V
	Bore and stroke			60.0 x 44.2 mm (2.36 x 1.74 in)
	Displacement			250 cc (15.3 cu-in)
	Compression ratio			11.0:1
	Valve train			Silent, multi-link chain drive and DOHC with rocker arms
	Oil capacity			2.5 lit (2.64 US qt, 2.20 Imp qt) after assembly
				1.8 lit (1.90 US qt, 1.58 Imp qt) after draining
	Coolant capacity			1.4 lit (1.48 US qt, 1.23 Imp qt) engine and radiator
				0.3 lit (0.32 US qt, 0.26 Imp qt) reserve tank
	Lubrication system			Forced pressure and wet sump
	Air filtration			Paper filter
	Cylinder compression			1320 ± 200 kPa (13.2 ± 20 kg/cm², 188 ± 28 psi)
	Intake valve : Opens			5° ATDC ┐
	: Closes			35° ABDC ┤ at 1 mm lift
	Exhaust valve: Opens			35° BBDC ┤
	: Closes			5° BTDC ┘
	Valve clearance (below 35°C/95°F)			IN, EX: 0.17 ± 0.02 mm (0.007 ± 0.001 in)
	Engine dry weight			46.5 kg (102.5 lb)
	Idle speed			1,500 ± 100 rpm

ITEM		SPECIFICATIONS
CARBURETION	Carburetor type	Constant Velocity dual carburetor
	Identification number	VD10C [VD10D]
	Pilot screw initial setting	See page 4-16
	Float level	6.8 mm (0.27 in)
DRIVE TRAIN	Clutch	Mechanical operating, multi-plate, wet
	Transmission	6-speed
	Primary reduction	2.821
	Final reducation '88:	3.214 (45/14)
	Final reducation AFTER '88:	3.000 (51/17)
	Gear ratio I '88:	2.562 (41/16)
	Gear ratio I AFTER '88:	2.733 (41/15)
	Gear ratio II '88:	1.850 (37/20)
	Gear ratio II AFTER '88:	2.000 (38/19)
	Gear ratio III '88:	1.478 (34/23)
	Gear ratio III AFTER '88:	1.590 (35/22)
	Gear ratio IV '88:	1.240 (31/25)
	Gear ratio IV AFTER '88:	1.333 (32/24)
	Gear ratio V '88:	1.074 (29/27)
	Gear ratio V AFTER '88:	1.071 (30/28)
	Gear ratio VI '88:	0.965 (28/29)
	Gear ratio VI AFTER '88:	1.035 (29/28)
	Gear shift pattern	Left foot operated return system, 1-N-2-3-4-5-6
ELECTRICAL	Ignition	Full transistor ignition
	Ignition timing "F" mark	10° BTDC at idle
	Starting system	Starter motor
	Alternator	330 W/5,000 rpm
	Battery capacity	12 V— 9 AH
	Spark plug	

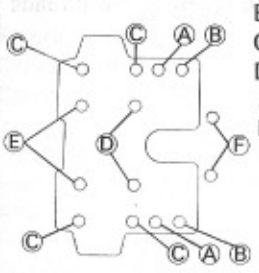
		NGK	ND
Standard	'88:	DPR8EA-9	X24EPR-U9
	AFTER '88:	CR8EH-9	U24FER-9
For extended high speed riding	'88:	DPR9EA-9	X27EPR-U9
	AFTER '88:	CR9EH-9	U27FER-9

	Spark plug gap	0.8—0.9 mm (0.031—0.035 in)
	Firing order	Front—270°—Rear—450°—Front
	Fuse/Main fuse	10 A x 6, 15 A/30 A
LIGHTS	Headlight (high/low beam)	12 V—60/55 W
	Brake/taillight	12 V—27/8 W (32/3 cp) SAE No. 1157
	License light	12 V—8 W (4 cp)
	Turn signal light	12 V—23 W (32 cp) x 4 SAE No. 1034
	Instrument light	12 V—3.4 W x 3, 12 V—3 W
	Oil pressure warning indicator	12 V—3 W
	High beam indicator	12 V—3 W
	Turn signal indicator	12 V—3.4 W x 2
	Neutral indicator	12 V—3 W

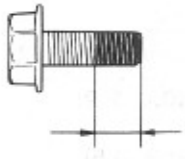
TORQUE VALUES

ENGINE

ITEM	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remark
Cylinder head cover bolt	8	6	10 (1.0, 7.2)	
Cam shaft holder bolt A '88:	4	6	12 (1.2, 9)	Flange bolt 6 x 48 mm (NOTE 1)
AFTER '88:	4	6	12 (1.2, 9)	Flange bolt 6 x 38 mm (NOTE 1)
B	4	6	12 (1.2, 9)	UBS flange bolt 6 x 40 mm (NOTE 1)
C	8	8	23 (2.3, 17)	UBS bolt 8 x 130 mm (NOTE 1)
D '88:	4	8	32 (3.2, 23)	UBS bolt 8 x 151 mm (NOTE 1)
AFTER '88:	4	8	36 (3.6, 26)	
E	4	6	12 (1.2, 9)	Flange bolt 6 x 43 mm (NOTE 1)
Cylinder head bolt F '88:	4	8	32 (3.2, 23)	UBS bolt 8 x 80 mm
AFTER '88:	4	8	36 (3.6, 26)	
Cam sprocket bolt	8	7	19 (1.9, 14)	Apply locking agent to the threads
Spark plug '88:	2	12	14 (1.4, 10)	
AFTER '88:	2	10	12 (1.2, 9)	
Connecting rod bearing nut	4	—	24 (2.4, 17)	Apply oil to the threads and seat
Oil pipe bolt ('88 only)	3	10	23 (2.3, 17)	
Flywheel bolt	1	10	85 (8.5, 61)	UBS bolt
Starter clutch cover bolt	3	8	28 (2.8, 20)	Flange bolt: Apply locking agent to the threads
Starter clutch bolt	1	10	85 (8.5, 61)	UBS bolt
Clutch center lock nut	1	20	65 (6.5, 47)	
Gearshift return spring pin	1	8	25 (2.5, 18)	Apply locking agent to the threads
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Apply locking agent to the threads (NOTE 2)
Oil pressure switch	1	—	12 (1.2, 9)	Apply sealant to the threads (NOTE 3)
Neutral switch	1	10	12 (1.2, 9)	
Oil filter center bolt	1	20	18 (1.8, 13)	
Oil drain bolt	1	12	38 (3.8, 27)	
Crankcase bolt	11	6	12 (1.2, 9)	(NOTE 1)
	9	8	23 (2.3, 17)	(NOTE 1)
Rocker arm shaft	4	20	50 (5.0, 36)	Apply locking agent to the threads
Valve adjusting lock nut	8	5	11 (1.1, 8)	Apply oil to the threads and seat

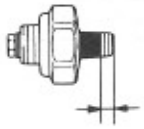


NOTE 1: Apply oil to all seats except for the one at the lower rear end.
NOTE 2: Apply locking agent as shown.



5.5–7.5 mm (0.22–0.30 in)

NOTE 3: Do not apply sealant as shown.



FRAME

ITEM	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remark
Engine hanger bolt and nut	5	10	45 (4.5, 33)	
Side stand pivot bolt	1	10	15 (1.5, 11)	
nut	1	10	35 (3.5, 25)	
Gearshift pedal bolt	1	6	10 (1.0, 7.2)	
Exhaust pipe joint cap nut	4	6	13 (1.3, 9)	
Rear shock absorber damper rod lock nut	1	14	68 (6.8, 49)	Apply locking agent to the threads
Front brake master cylinder holder bolt	2	6	12 (1.2, 9)	
Shock absorber mounting bolt	2	10	55 (5.5, 40)	
Swingarm pivot bolt (right)	1	25	16 (1.6, 12)	
(left)	1	25	95 (9.5, 69)	
Swingarm pivot lock nut	1	25	95 (9.5, 69)	
Rear axle nut	1	16	90 (9.0, 65)	
Shock link-to-shock arm bolt	1	10	65 (6.5, 47)	
Shock arm-to-swingarm bolt	1	10	65 (6.5, 47)	
Shock link-to-frame bolt	1	10	65 (6.5, 47)	
Brake pedal bolt	1	6	10 (1.0, 7.2)	
Foot peg bolt	4	8	23 (2.3, 17)	
Brake hose oil bolt '88:	2	10	30 (3.0, 22)	
AFTER '88:	2	10	35 (3.5, 25)	
Brake pad pin	1	8	18 (1.8, 13)	
Fuel tank mounting bolt (rear)	1	8	22 (2.2, 16)	
Front disc cover bolt	3	6	18 (1.8, 13)	
Caliper bleed valve	1	8	6 (0.6, 4.3)	
Caliper pin bolt	2	10	18 (1.8, 13)	
Steering bearing adjustment nut	1	26	22 (2.2, 16)	Apply oil to the threads
Clutch lever pivot nut	1	6	10 (1.0, 7.2)	
Handlebar pinch bolt	2	8	45 (4.5, 33)	
Front axle	1	12	60 (6.0, 43)	
Front axle holder nut	2	8	22 (2.2, 16)	
Fork socket bolt	2	8	20 (2.0, 14)	
Fork cap	2	31	23 (2.3, 17)	
Fork top pinch bolt	2	7	11 (1.1, 8)	
Fork bottom pinch bolt	2	10	50 (5.0, 36)	
Steering stem nut	1	24	105 (10.5, 76)	
Thermostatic switch	1	16	18 (1.8, 13)	
Temperature sensor	1	—	12 (1.2, 9)	Apply sealant to the threads
Driven sprocket nut	6	8	31 (3.1, 22)	Apply oil to the seat

Torque specifications listed above are for specific tightening points. If a specification is not listed, follow the standard torque values below.

STANDARD TORQUE VALUES

TYPE	TORQUE N·m (kg-m, ft-lb)	TYPE	TORQUE N·m (kg-m, ft-lb)
5 mm bolt, nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt, nut	10 (1.0, 7.2)	6 mm screw, 6 mm	
8 mm bolt, nut	22 (2.2, 16)	bolt with 8 mm head	9 (0.9, 6.5)
10 mm bolt, nut	35 (3.5, 25)	6 mm flange bolt, nut	12 (1.2, 9)
12 mm bolt, nut	55 (5.5, 40)	8 mm flange bolt, nut	27 (2.7, 20)
		10 mm flange bolt, nut	40 (4.0, 29)

TOOLS

SPECIAL

Description	Tool number	Alternative tool	Tool number	Refer to Section
Vacuum gauge set	07404—0030000	Vacuum gauge set (U.S.A. only)	M937B—021—XXXXX	3
Snap ring pliers	07914—3230001	equivalent commercially available in U.S.A.		15
Steering stem socket	07916—3710100			13
Clutch center holder	07HGB—001010A	U.S.A. only		7
Compression gauge	07305—0010000	equivalent commercially available in U.S.A.		3
Pressure pump (U.S.A. only)	ST—AH—255—MC7	Vacuum/Pressure pump (U.S.A. only)	A937X—041—XXXXX	4
Vacuum pump (U.S.A. only)	ST—AH—260—MC7			4
Attachment	07946—GC4000A	U.S.A. only		14
Remover weight	07741—0010201	Remover weight	07936—3710200	14
Remover handle	07936—3710100			14
Bearing remover	07936—8890300			14
Valve guide driver	07942—MA60000			9
Attachment ('88 only)	07945—3330300			13
Attachment ('88 only)	07946—3290000			13
Steering stem driver	07946—MB00000			13
Fork seal driver	07947—KA50100			13
Fork seal driver attachment	07947—KL40100			13
Ball race remover '88:	07GMD—KS40100			13
AFTER '88:	07953—4250002			
Ball race remover attachment ('88 only)	07953—KM10100	Ball race remover attachment	07953—MJ1000A	13
Bearing race remover (AFTER '88)	07946—3710500			
Shock absorber compressor attachment	07959—MB10000			14
Valve compressor attachment	07959—KM30101			9
Cam shaft holder	07979—MK30000			3
Valve guide reamer, 5.0 mm	07984—MA60000	Valve guide reamer	07984—MA6000B	9
Oil pressure gauge	07506—3000000	equivalent commercially available in U.S.A.		2
Oil pressure gauge attachment	07510—4220100			2
Christie battery charger	#MC1012/2	U.S.A. only		16
Honda battery tester	07GMJ—0010000	U.S.A. only		16
Digital multitester or	07411—0020000	Digital multitester (U.S.A. only)	KS—AHM—32—003	16
Circuit tester or	07308—0020001			16
Circuit tester	TH—5H			16

COMMON

Description	Tool number	Alternative tool	Tool number	Refer to Section
Float level gauge	07401—0010000			4
Wrench, 8 x 9 mm	07708—0030100	equivalent commercially available in U.S.A.		3
Lock nut wrench, 26 x 30 mm	07716—0020203			7
Lock nut wrench, 30 x 32 mm	07716—0020400	equivalent commercially available in U.S.A.		13
Flywheel holder	07725—0040000			7, 8
Rotor puller	07733—0020001	Rotor puller	07933—3950000	8
Attachment, 32 x 35 mm	07746—0010100			13, 14
Attachment, 37 x 40 mm	07746—0010200			14
Attachment, 42 x 47 mm	07746—0010300			13, 14
Attachment, 24 x 26 mm	07746—0010700			14
Driver, 22 mm I.D.	07746—0020100			11
Pilot, 10 mm	07746—0040100			14
Pilot, 20 mm	07746—0040500			14
Pilot, 15 mm	07746—0040300			13, 14
Pilot, 17 mm	07746—0040400			14
Bearing remover head, 15 mm	07746—0050400	equivalent commercially available in U.S.A.		13
Bearing remover shaft	07746—0050100			13, 14
Bearing remover head, 17 mm	07746—0050500			14
Valve adjusting wrench, B	07708—0030400	Valve adjusting wrench	89201—200—000 or 07908—KE90200	3
Driver	07749—0010000			13, 14
Valve spring compressor	07757—0010000			9
Shock absorber compressor — compressor screw assembly	07GME—0010000 07GME—0010100			14
Attachment, 52 x 55 mm (AFTER '88)	07746—0010400			13
Driver, Torx bit 50 (AFTER '88)	07HJA-0010100-T50	Commercially available in U.S.A.		19

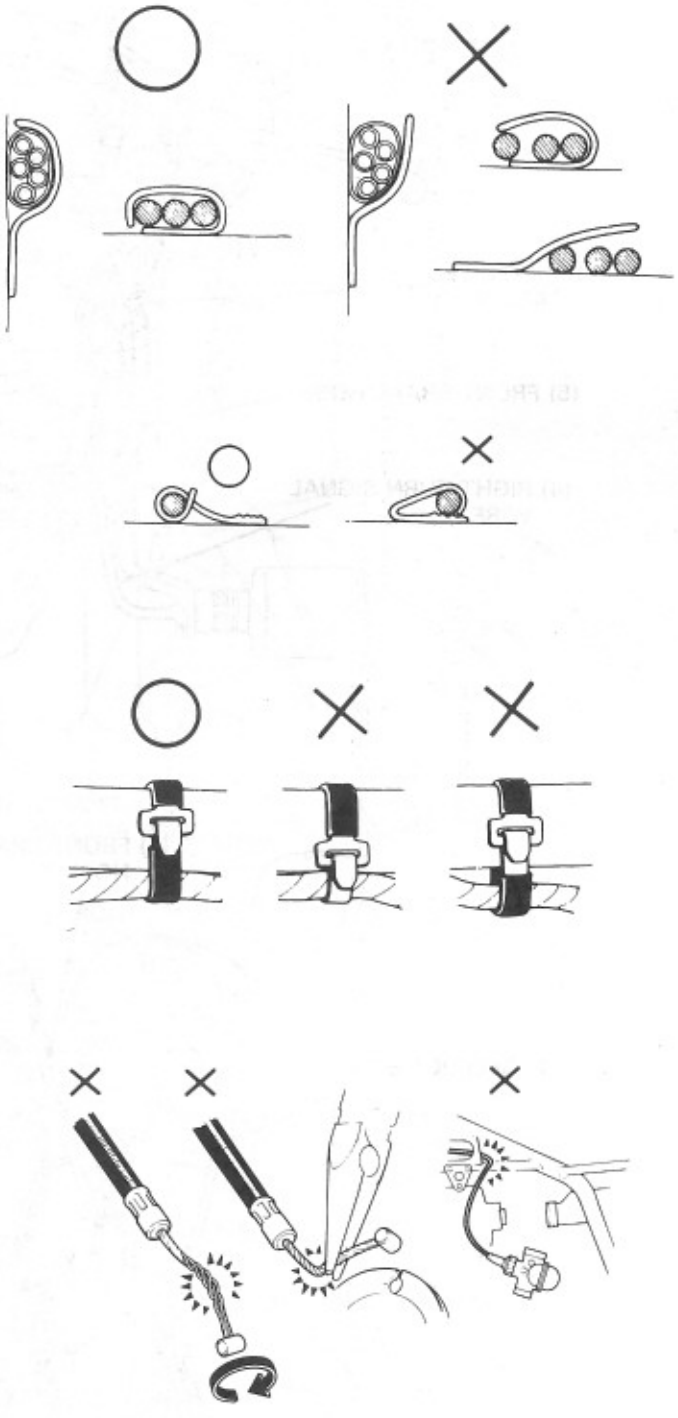
VALVE SEAT CUTTER (NOT AVAILABLE IN U.S.A.)

Description	Tool number	Remarks	Refer to Section
Seat cutter, 24.5 mm	07780—0010100	45° IN	9
Seat cutter, 22 mm	07780—0010701	45° EX	9
Seat cutter, 24 mm	07780—0012500	32° IN	9
Seat cutter, 22 mm	07780—0012601	32° EX	9
Seat cutter, 22 mm	07780—0014202	60° IN/EX	9
Cutter holder, 5 mm	07781—0010400		9

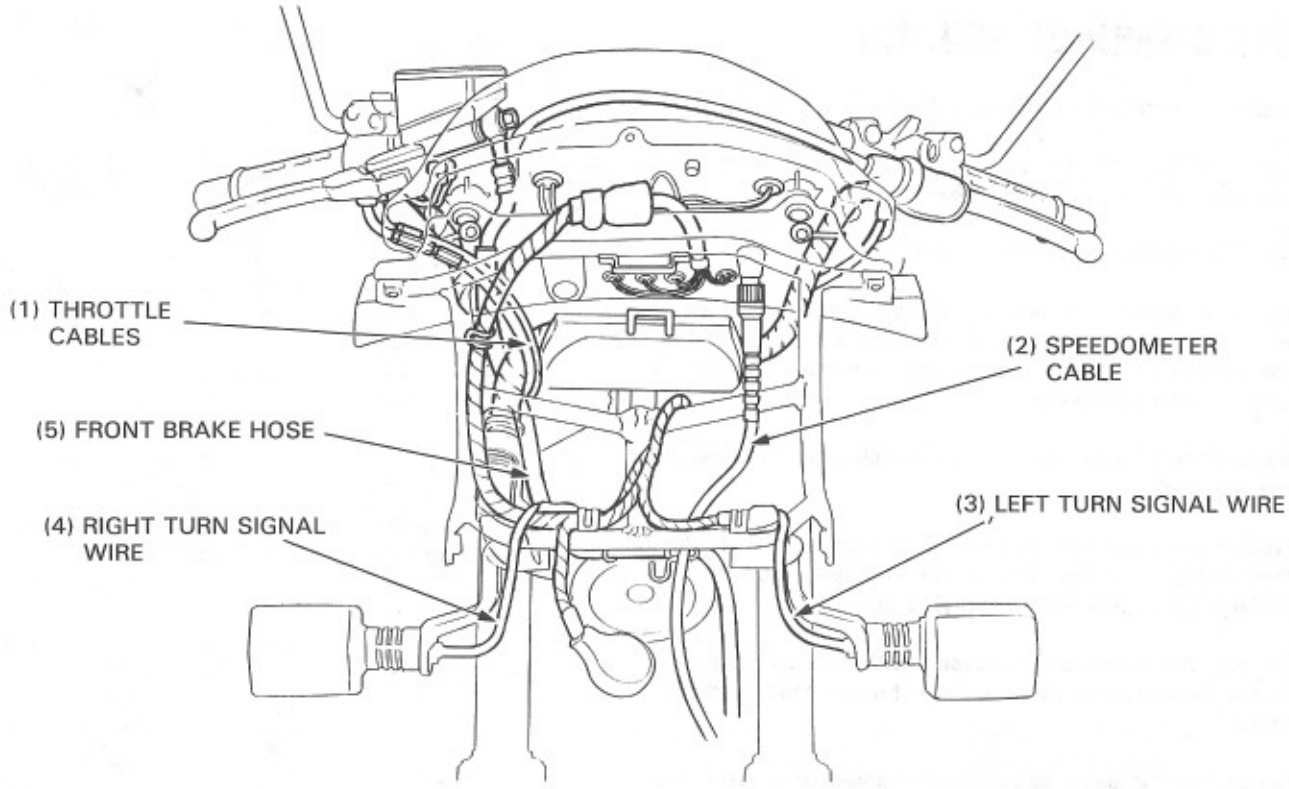
CABLE & HARNESS ROUTING

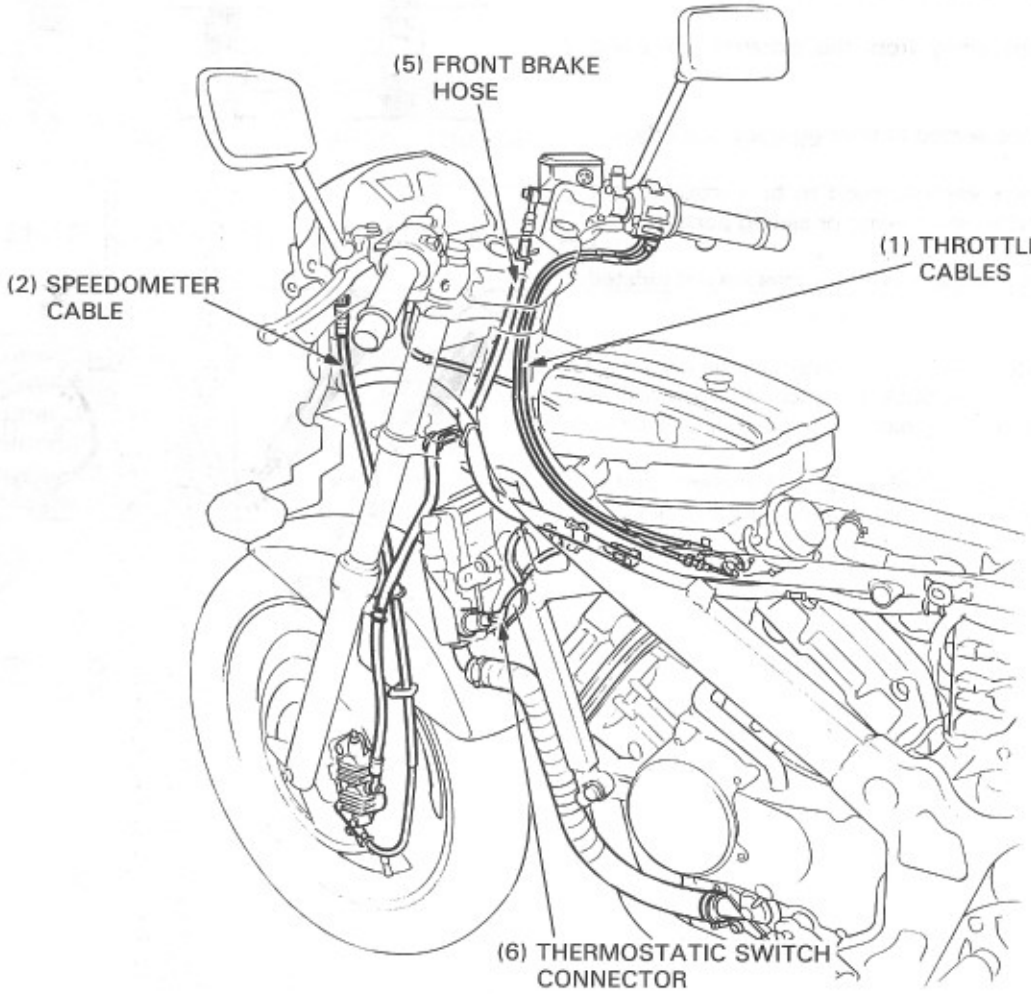
Note the following when routing cables and wire harnesses:

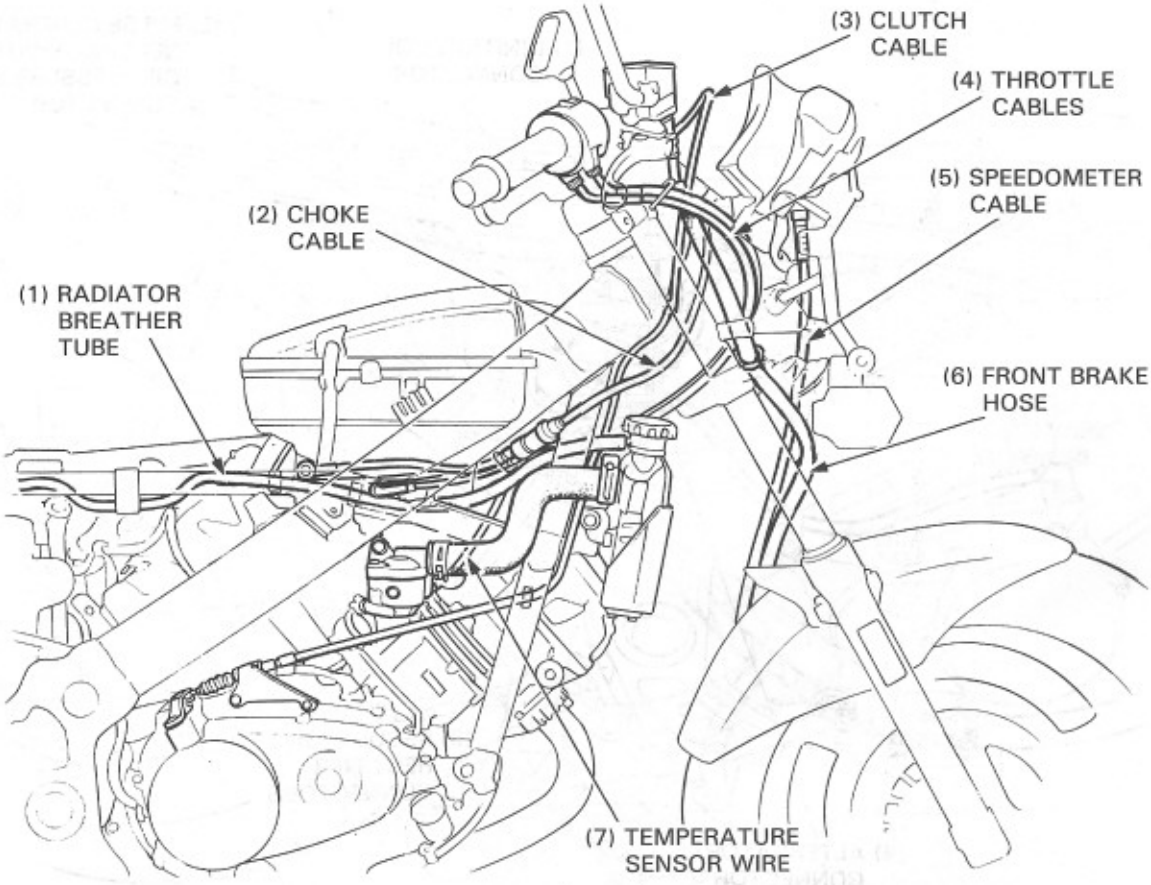
- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against welds or clamps.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are neither pulled taut nor have excessive slack.
- Protect wires and harnesses with electrical tape or a tube if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use wires or harnesses with broken 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 does not interfere with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched by 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.

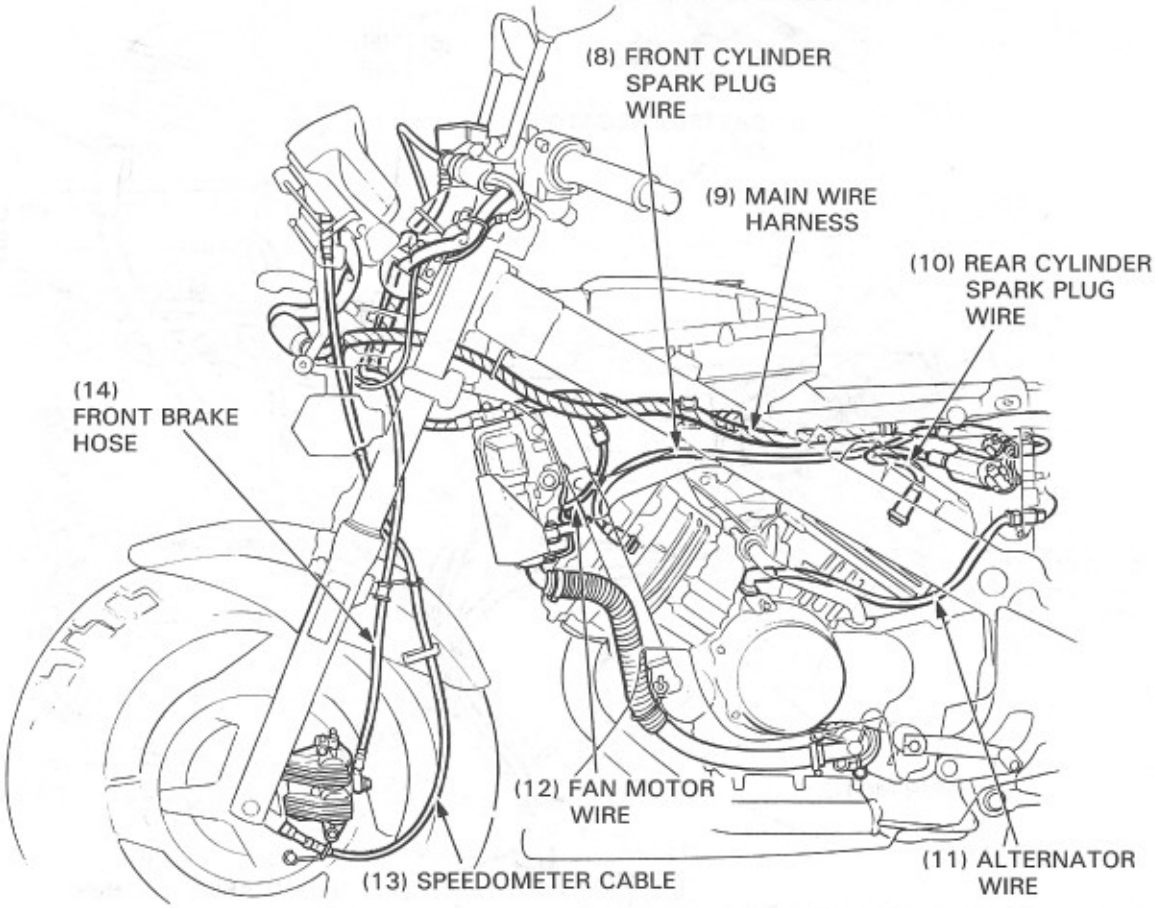


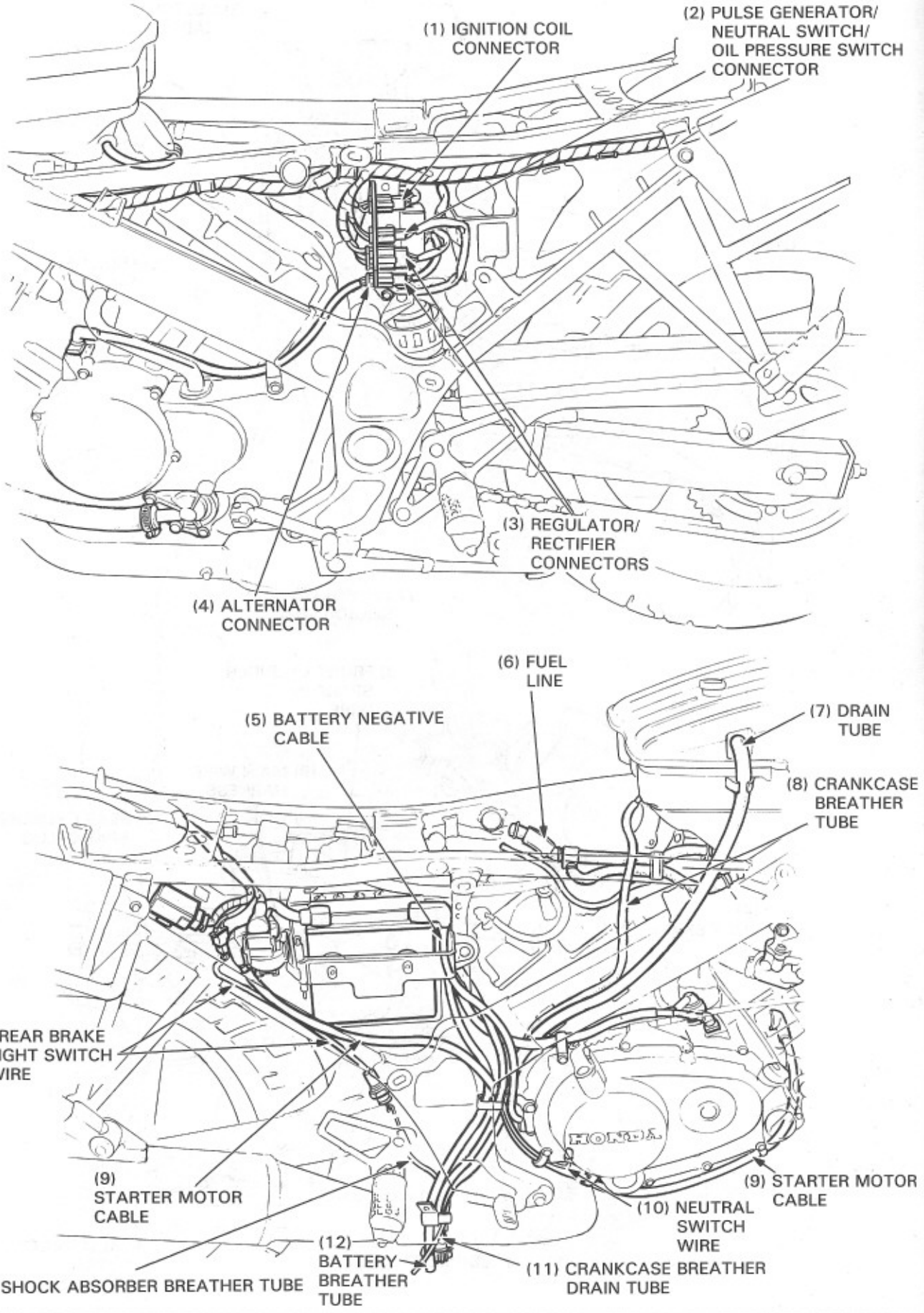
O: CORRECT
X: INCORRECT

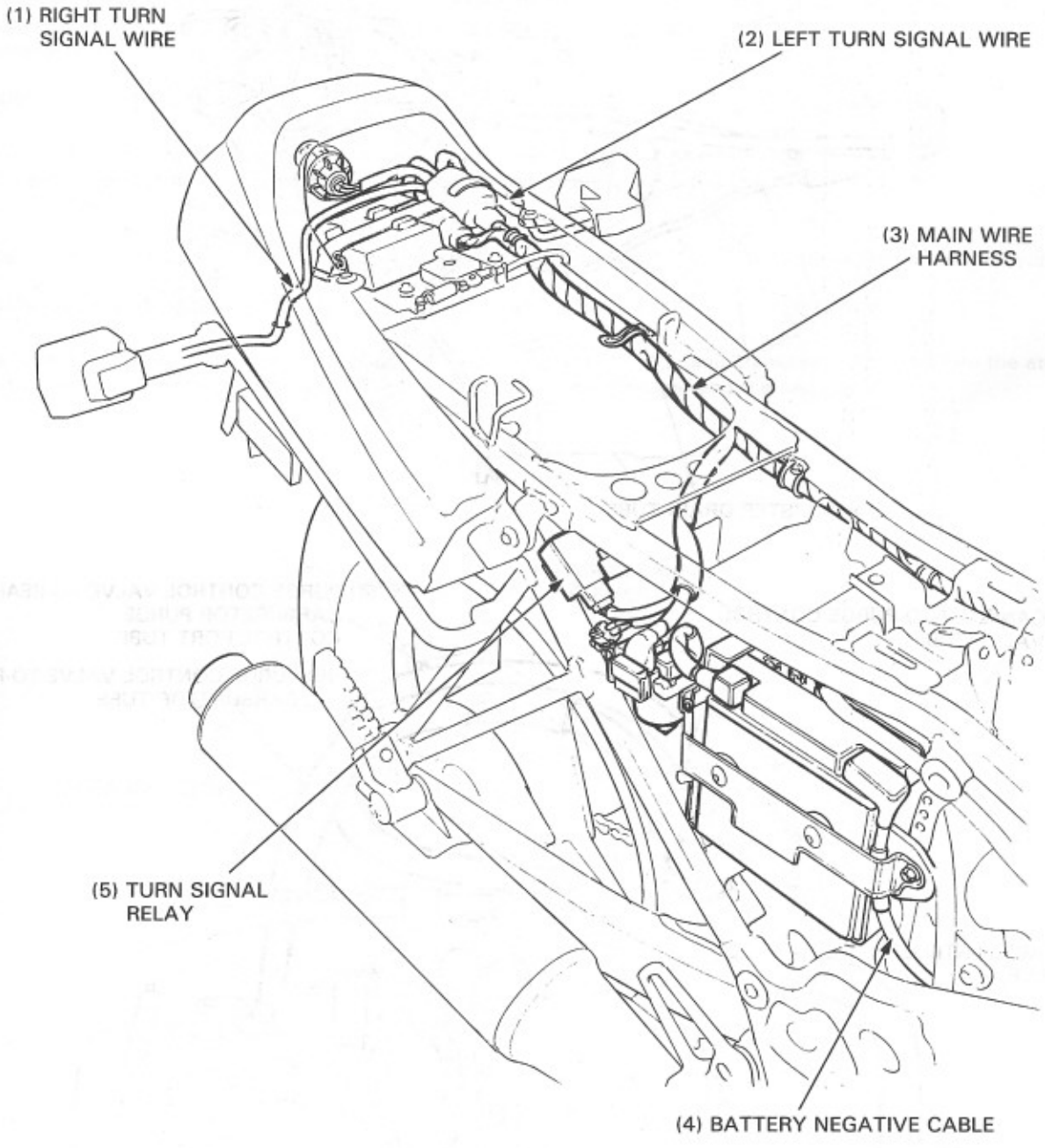

(1) THROTTLE CABLES
(2) SPEEDOMETER CABLE
(5) FRONT BRAKE HOSE
(3) LEFT TURN SIGNAL WIRE
(4) RIGHT TURN SIGNAL WIRE


(5) FRONT BRAKE HOSE
(1) THROTTLE CABLES
(2) SPEEDOMETER CABLE
(6) THERMOSTATIC SWITCH CONNECTOR

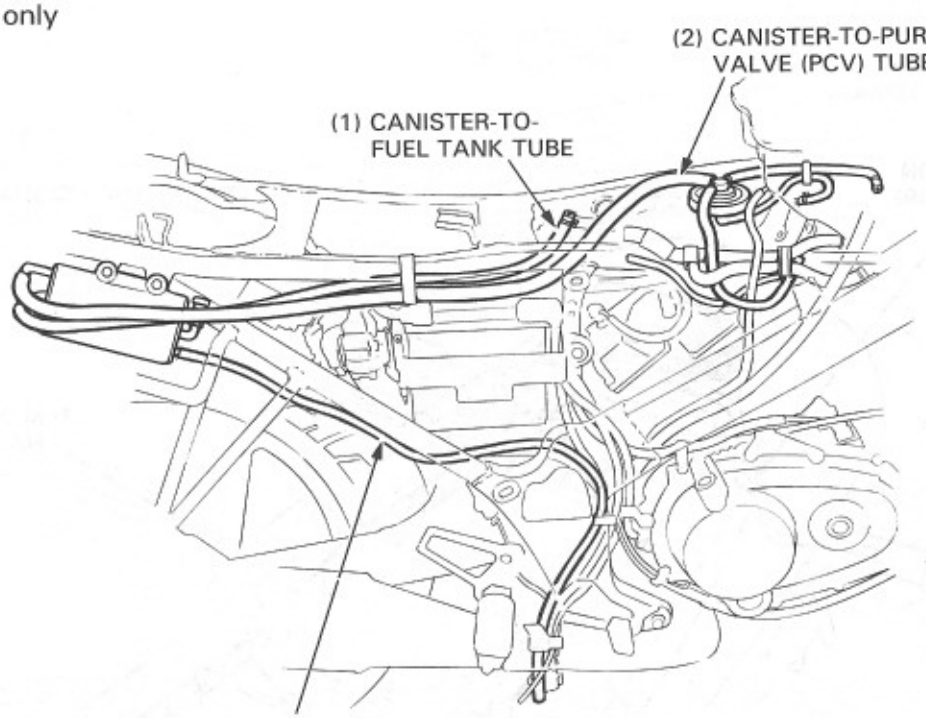

(3) CLUTCH CABLE
(4) THROTTLE CABLES
(5) SPEEDOMETER CABLE
(2) CHOKE CABLE
(1) RADIATOR BREATHER TUBE
(6) FRONT BRAKE HOSE
(7) TEMPERATURE SENSOR WIRE

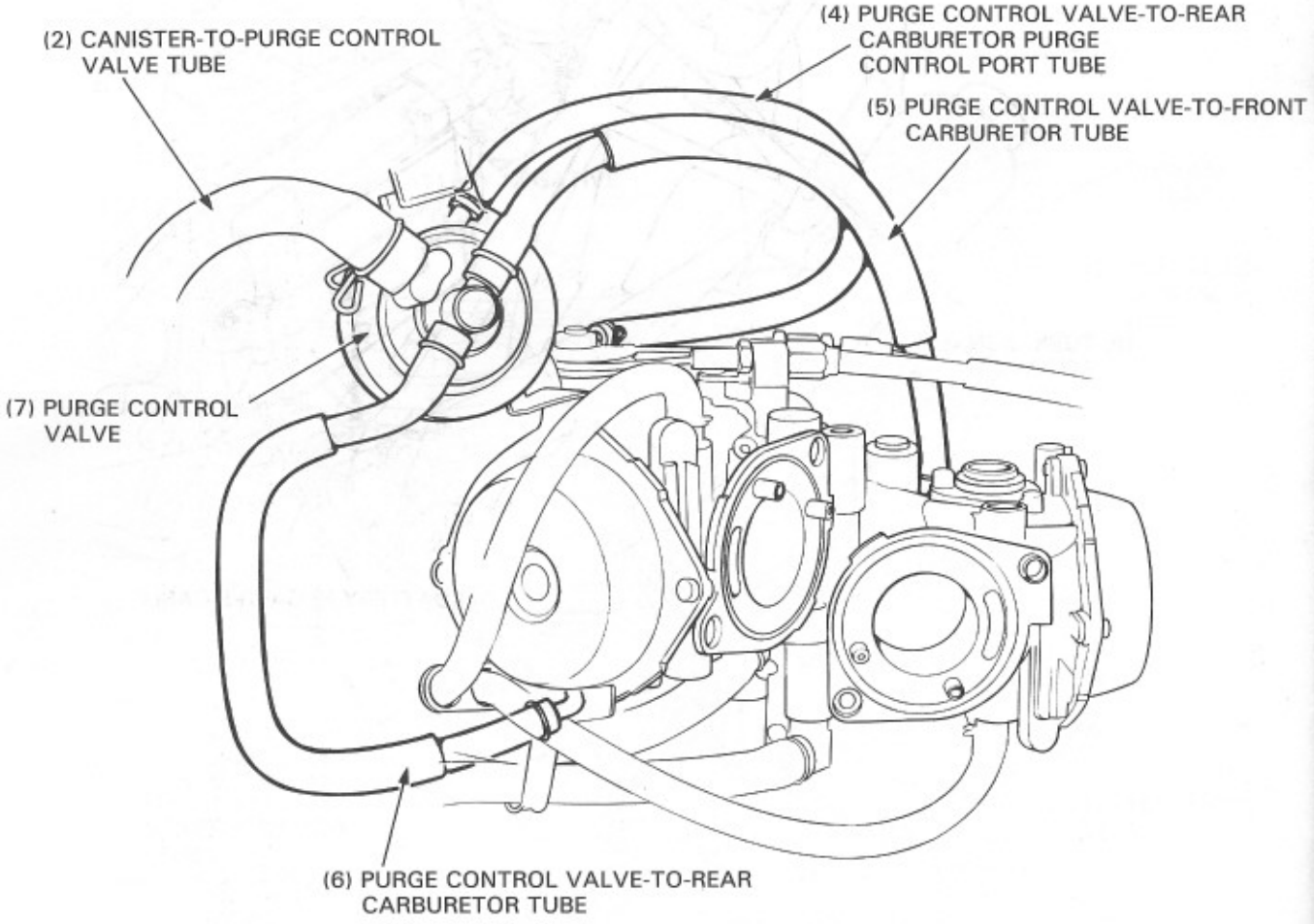

(8) FRONT CYLINDER SPARK PLUG WIRE
(9) MAIN WIRE HARNESS
(10) REAR CYLINDER SPARK PLUG WIRE
(14) FRONT BRAKE HOSE
(12) FAN MOTOR WIRE
(13) SPEEDOMETER CABLE
(11) ALTERNATOR WIRE


(1) IGNITION COIL CONNECTOR
(2) PULSE GENERATOR/ NEUTRAL SWITCH/ OIL PRESSURE SWITCH CONNECTOR
(3) REGULATOR/ RECTIFIER CONNECTORS
(4) ALTERNATOR CONNECTOR
(5) BATTERY NEGATIVE CABLE
(6) FUEL LINE
(7) DRAIN TUBE
(8) CRANKCASE BREATHER TUBE
(9) STARTER MOTOR CABLE
(9) STARTER MOTOR CABLE
(10) NEUTRAL SWITCH WIRE
(11) CRANKCASE BREATHER DRAIN TUBE
(12) BATTERY BREATHER TUBE
(13) REAR SHOCK ABSORBER BREATHER TUBE
(14) REAR BRAKE LIGHT SWITCH WIRE


(1) RIGHT TURN SIGNAL WIRE
(2) LEFT TURN SIGNAL WIRE
(3) MAIN WIRE HARNESS
(5) TURN SIGNAL RELAY
(4) BATTERY NEGATIVE CABLE

California model only





EMISSION CONTROL SYSTEMS (U.S.A. only)

The U.S. Environmental Protection Agency and California Air Resources Board (CARB) require manufactures 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.

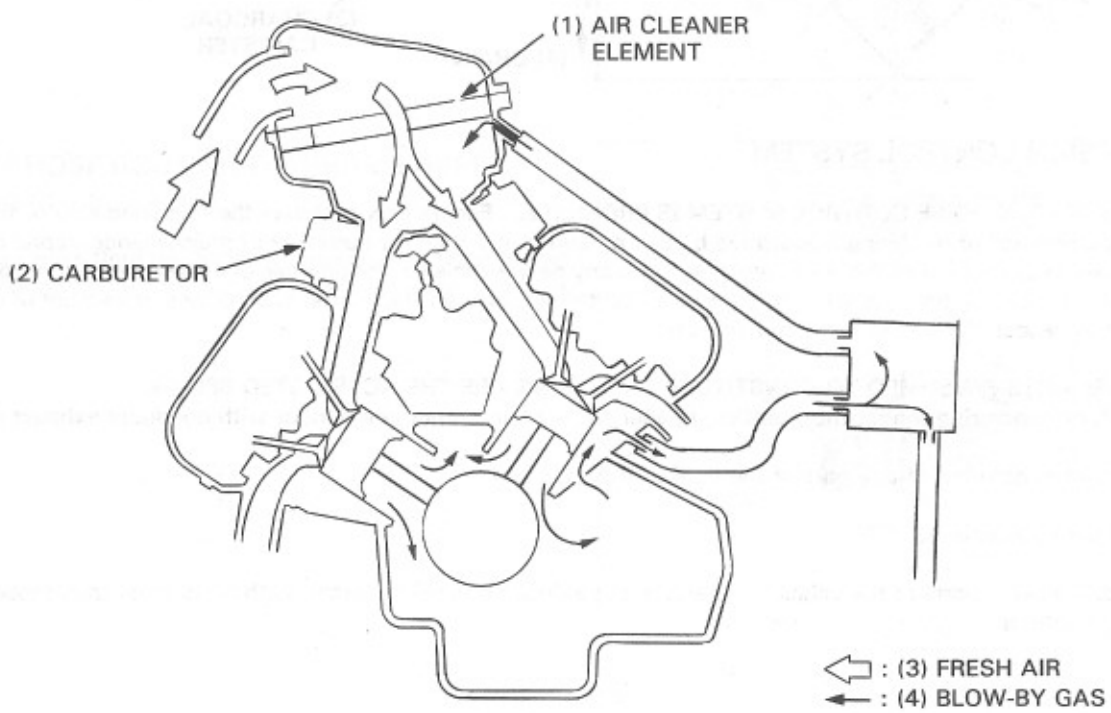
SOURCE OF EMISSIONS

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 and other systems to reduce carbon monoxide and hydrocarbons.

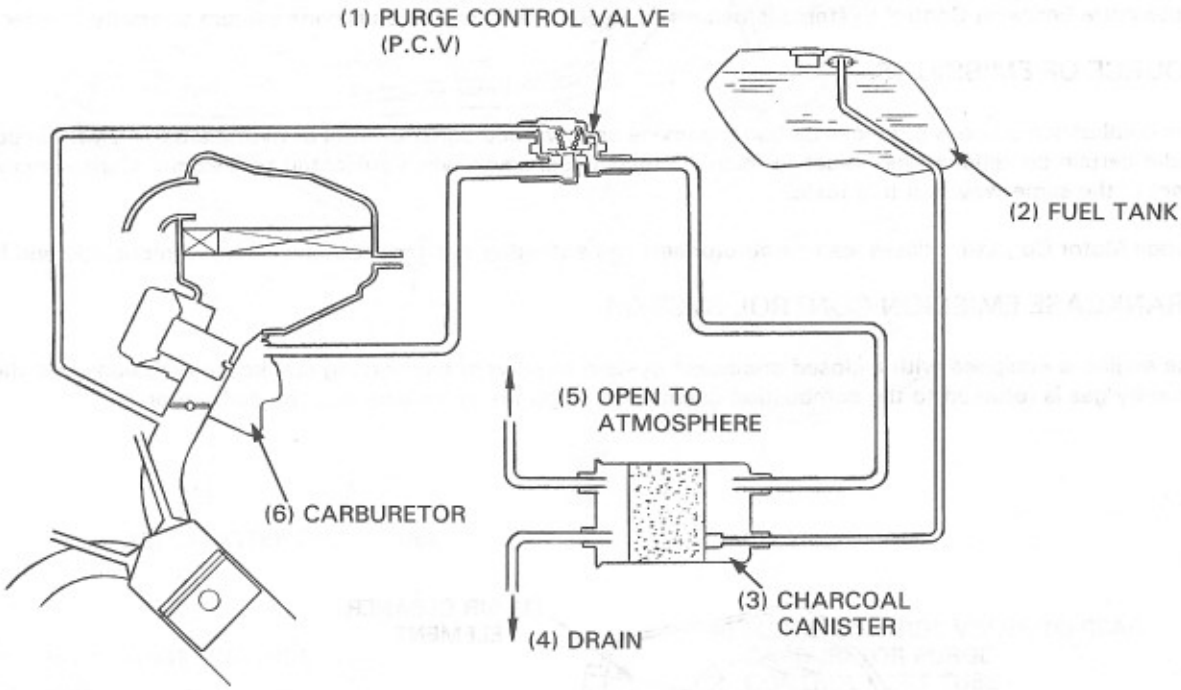
CRANKCASE EMISSION CONTROL SYSTEM

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



EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

This model complies with California Air Resources Board evaporative emission requirements.
Fuel vapor from the fuel tank 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.



NOISE EMISSION CONTROL SYSTEM

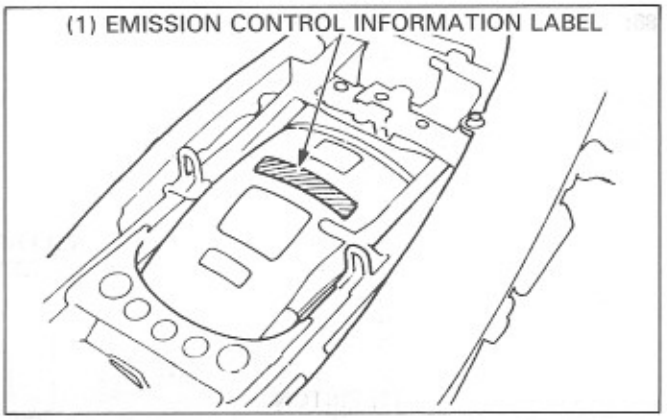
TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle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

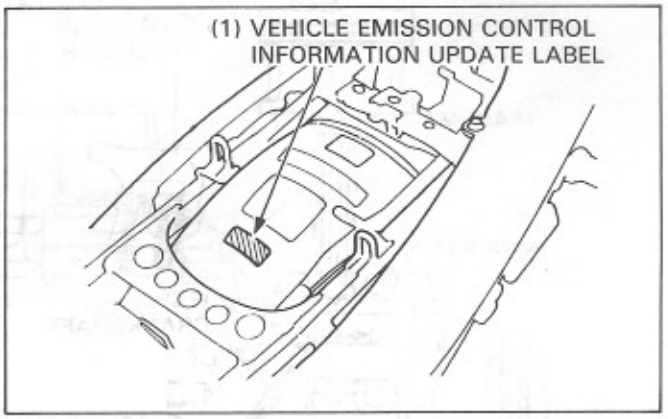
EMISSION CONTROL INFORMATION LABELS (U.S.A. only)

An Emission Control Information Label is located on the rear fender under the seat as shown. It gives basic tune-up specifications.



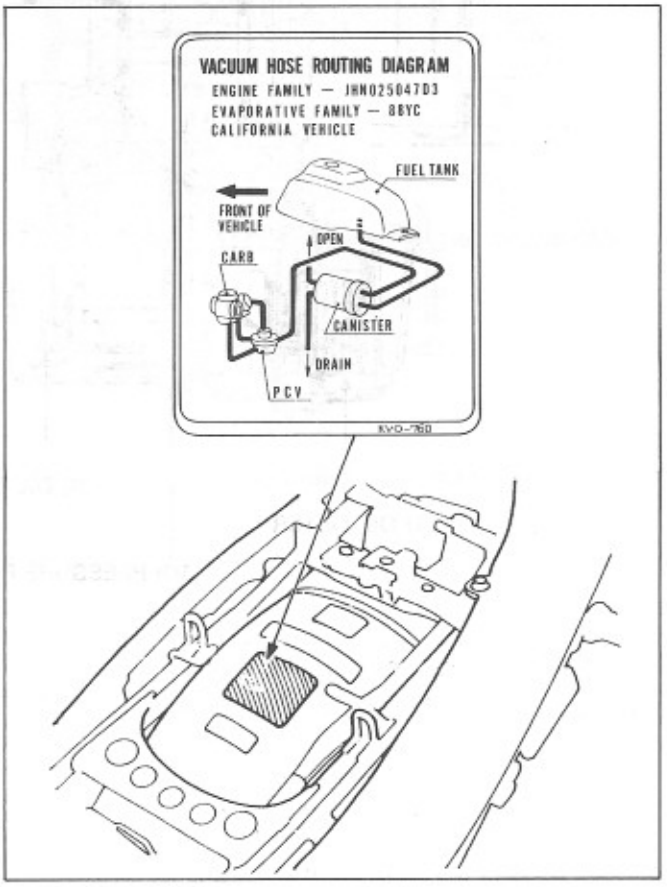
EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment (page 4-17), attach an update label on the rear fender under the seat as shown.
Instructions for obtaining the update label are given in Service Letter No. 132.

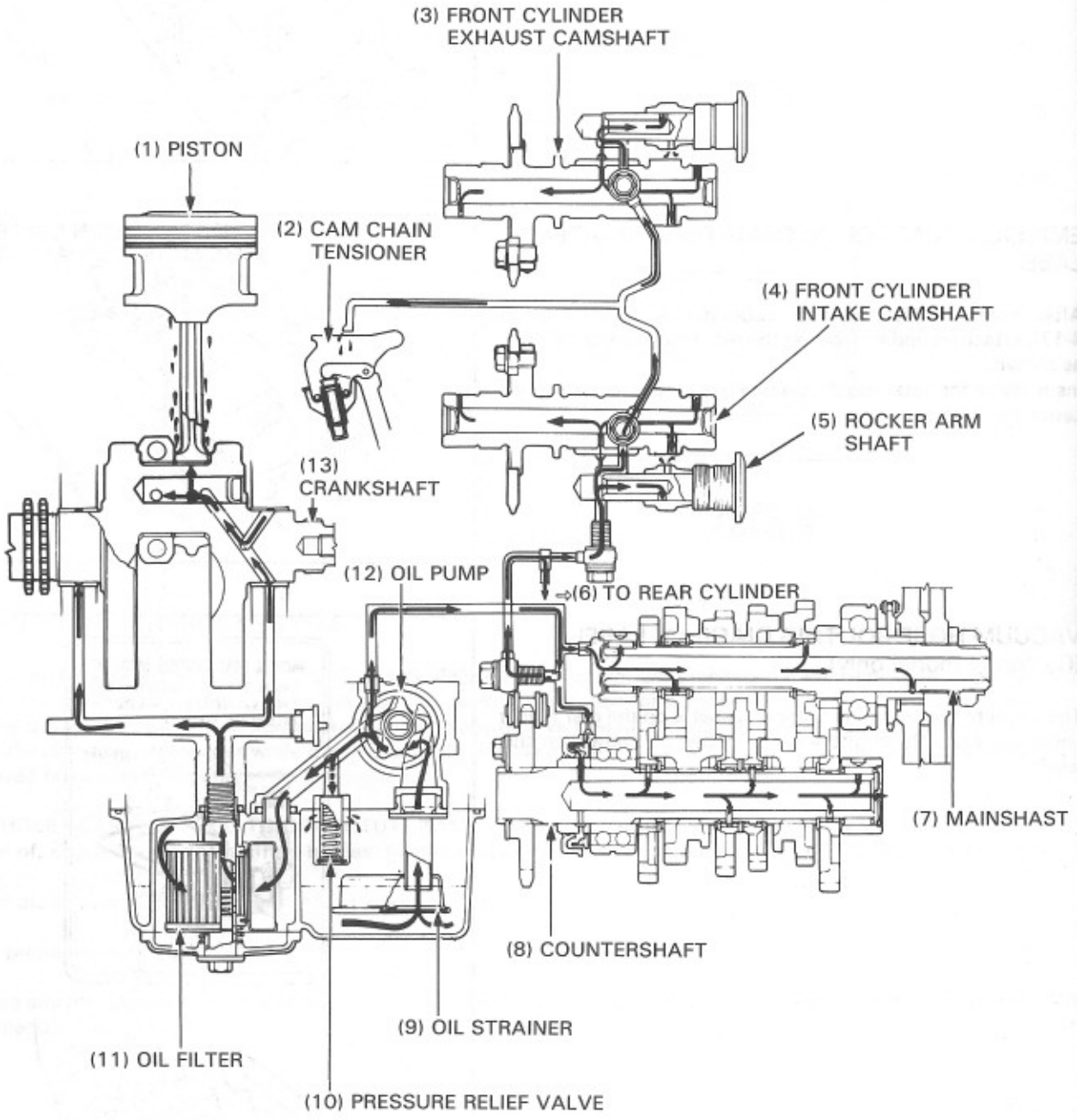


VACUUM HOSE ROUTING DIAGRAM LABEL (California model only)

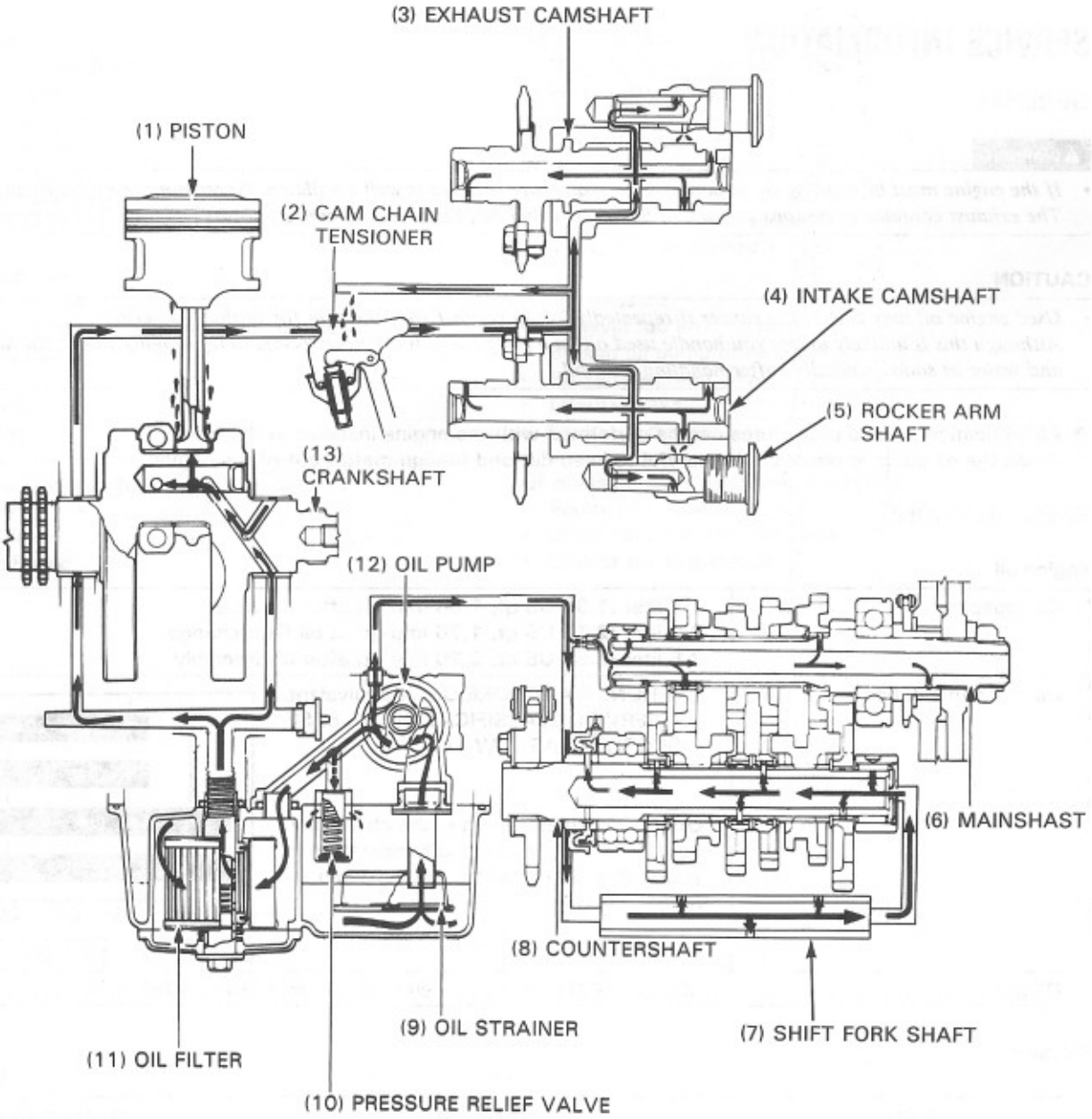
The Vacuum Hose Routing Diagram Label is on the rear fender under the seat. Route the vacuum hoses as shown on this label.



'88:


(3) FRONT CYLINDER EXHAUST CAMSHAFT
(1) PISTON
(2) CAM CHAIN TENSIONER
(4) FRONT CYLINDER INTAKE CAMSHAFT
(5) ROCKER ARM SHAFT
(13) CRANKSHAFT
(12) OIL PUMP
⇨(6) TO REAR CYLINDER
(7) MAINSHAST
(8) COUNTERSHAFT
(9) OIL STRAINER
(11) OIL FILTER
(10) PRESSURE RELIEF VALVE

AFTER '88:


(3) EXHAUST CAMSHAFT
(1) PISTON
(2) CAM CHAIN TENSIONER
(4) INTAKE CAMSHAFT
(5) ROCKER ARM SHAFT
(13) CRANKSHAFT
(12) OIL PUMP
(6) MAINSHAST
(8) COUNTERSHAFT
(9) OIL STRAINER
(7) SHIFT FORK SHAFT
(11) OIL FILTER
(10) PRESSURE RELIEF VALVE

SERVICE INFORMATION	2-2	OIL PRESSURE CHECK	2-4
TROUBLESHOOTING	2-3	OIL PUMP	2-5
ENGINE OIL LEVEL	2-4	LUBRICATION POINTS	2-10
ENGINE OIL & FILTER CHANGE	2-4		

SERVICE INFORMATION

GENERAL

⚠WARNING

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

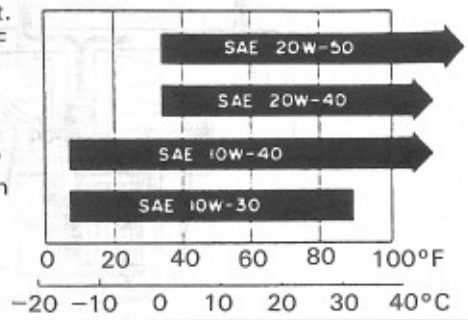
CAUTION

- *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.*

- All lubrication service procedures can be performed with the engine installed in the frame.
- When the oil pump is removed, be careful to keep dirt and foreign matter out of the engine.

SPECIFICATIONS

Engine oil

Oil capacity	1.8 liter (1.90 US qt, 1.58 Imp qt) after draining 2.0 liter (2.11 US qt, 1.76 Imp qt) at oil filter change 2.5 liter (2.64 US qt, 2.20 Imp qt) after disassembly
Oil recommendation	Use HONDA 4-STROKE OIL or equivalent. API SERVICE CLASSIFICATION: SE or SF VISCOSITY: SAE 10W—40 Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. 
Oil pressure	500 kPa (5.0 kg/cm², 71 psi) at 6,000 rpm (80°C/176°F)

Oil pump

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Rotor tip clearance	0.15 (0.006)	0.20 (0.008)
Pump body clearance	0.15—0.22 (0.006—0.009)	0.35 (0.014)
Pump end clearance	0.02—0.07 (0.001—0.003)	0.10 (0.004)

TORQUE VALUES

Engine oil drain bolt	38 N·m (3.8 kg-m, 27 ft-lb)
Oil filter center bolt	18 N·m (1.8 kg-m, 13 ft-lb)
Oil pressure switch	12 N·m (1.2 kg-m, 9 ft-lb) Apply sealant to the threads (page 1-5)
Oil pump driven sprocket bolt	15 N·m (1.5 kg-m, 11 ft-lb) Apply locking agent to the threads (page 1-5)

TOOLS

Special

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

TROUBLESHOOTING

Oil level too low
- Oil not replenished frequently enough
- External oil leaks
- Worn valve stem seal
- Worn valve guide
- Worn piston rings
- Improperly installed piston rings
- Worn cylinder

Oil pressure too high
- Pressure relief valve stuck closed
- Clogged oil filter, gallery, or metering orifice
- Incorrect oil used

Low oil pressure
- Oil level low
- Plugged oil filter or screen
- Pressure relief valve stuck open
- Oil pump faulty
- Internal oil leaks
- Incorrect oil used

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

Oil emulsification
- Radiator coolant contamination
  - — Blown cylinder head gasket
  - — Leaky coolant passage
- Water contamination

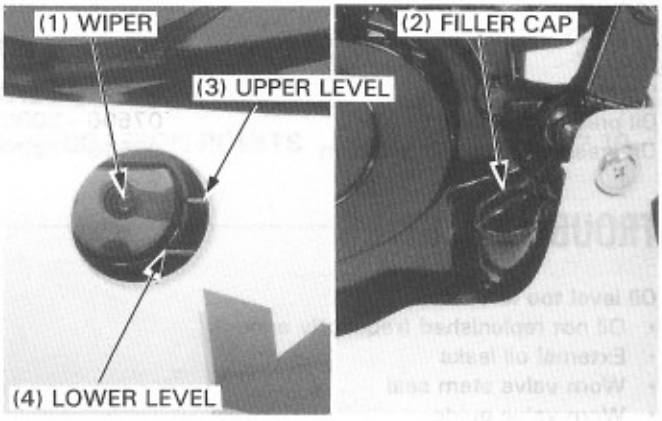
No oil pressure
- Oil level too low; no oil
- Broken oil pump drive chain
- Broken oil pump drive shaft
- Internal leaks
- Faulty oil pump

Oil pressure warning indicator stays on
- Faulty oil pressure switch
- Short circuit in indicator wire
- Low or no oil pressure

ENGINE OIL LEVEL

Run the engine and allow to idle for 2—3 minutes.

Stop the engine and support the motorcycle in an upright position on level ground.
Check the oil level at the engine oil inspection window on the right crankcase cover after a few minutes.
If the inspection window is dirty, clean it by turning the wiper with a screwdriver.
If the oil level is below the lower level mark on the inspection window, remove the filler cap and fill to the upper level mark.



ENGINE OIL & FILTER CHANGE

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.

NOTE

- Change engine oil with the engine warm and support the motorcycle in an upright position on level ground to assure complete and rapid draining.

Stop the engine and remove the oil filler cap.
Remove the drain bolt and drain the engine oil.
Remove the oil filter center bolt and oil filter element.
Remove the O-rings from the oil filter cover and center bolt.
Install new O-rings onto the oil filter center bolt and cover.
Apply oil to the O-rings.

Make sure the sealing washer is in good condition and install the drain plug.

TORQUE: 38 N-m (3.8 kg-m, 27 ft-lb)

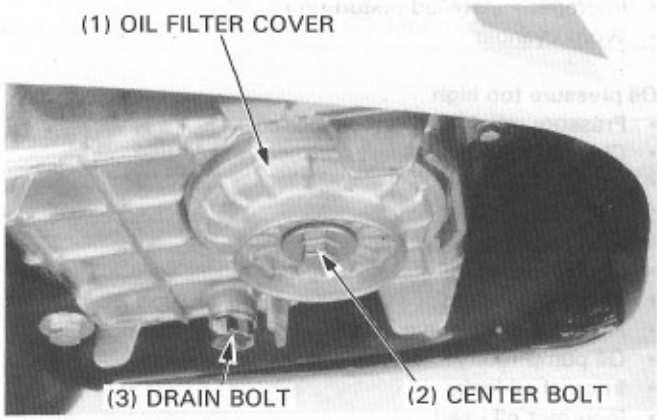
Install the new oil filter with the oil filter center bolt.

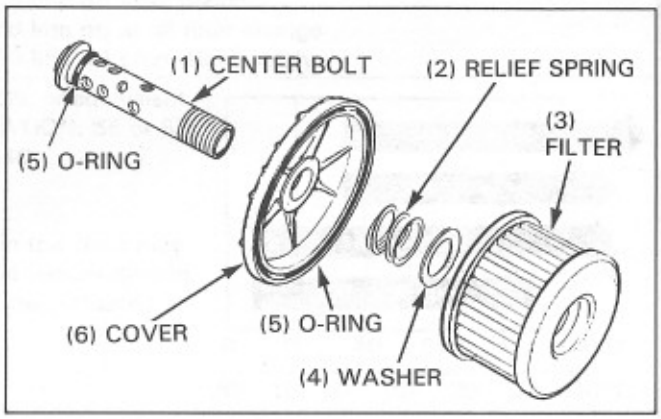
TORQUE: 18 N-m (1.8 kg-m, 13 ft-lb)

Fill the crankcase with the recommended oil.

OIL CAPACITY: 2.0 liter (2.11 US qt 1.76 Imp qt)
after oil filter change

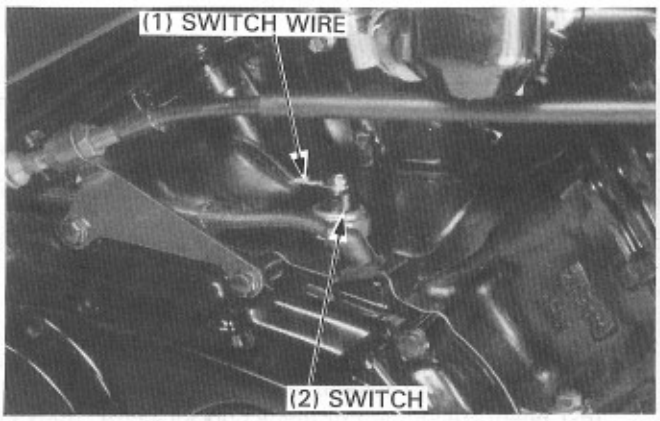
Start the engine and let it idle for 2—3 minutes, then stop the engine.
Make sure that the oil level is at the upper level mark in the inspecetion window and that there are no oil leaks.





OIL PRESSURE CHECK

Check the oil level.
Warm the engine up to normal operating temperature (approximately 80°C/176°F).
Stop the engine, disconnect the oil pressure switch wire and remove the oil pressure switch.



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

TOOLS:

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

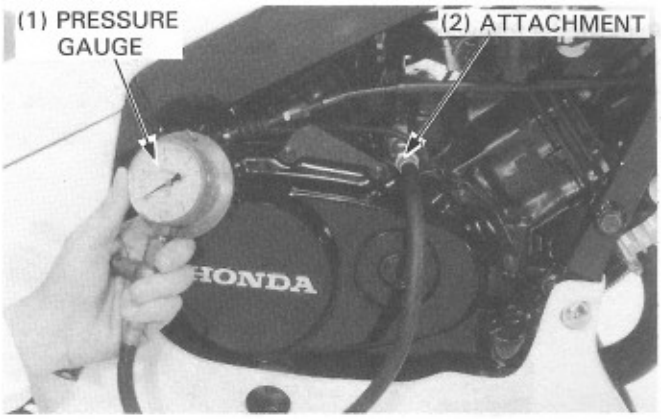
Start the engine.
Check the oil pressure at 6,000 rpm.

OIL PRESSURE: 500 kPa (5.0 kg/cm², 71 psi)

Stop the engine.
Apply sealant to the pressure switch threads (page 1-5) and tighten the switch.

TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)

Connect the oil pressure switch wire.



OIL PUMP

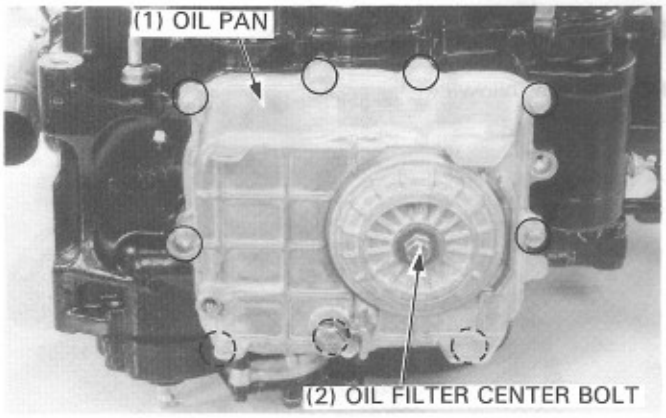
REMOVAL

NOTE

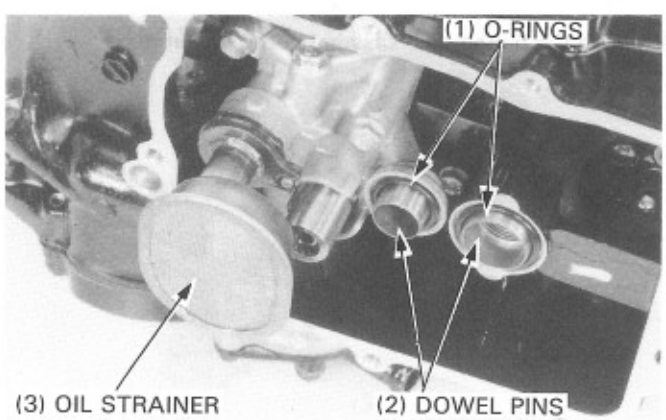
- The oil pump can be removed with the engine in the frame.

Remove the exhaust pipe and muffler (page 12-4).
Drain the engine oil (page 2-4).

Remove the following:
– oil filter
– oil pan

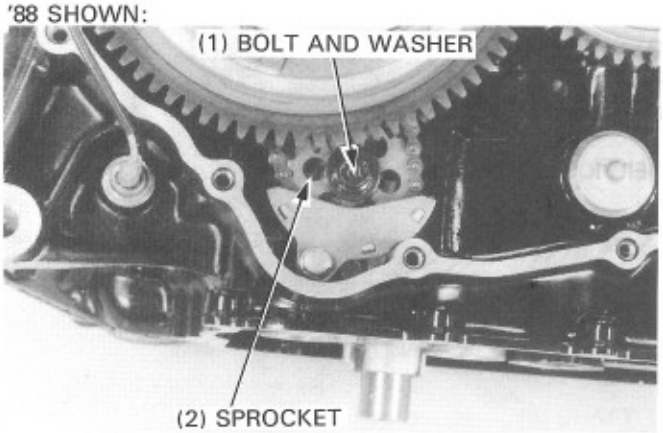


– dowel pins and O-rings
– oil strainer
Clean the oil strainer and oil pan.



Remove the right crankcase cover (page 7-3).
Remove the oil pump driven sprocket bolt, washer and sprocket.

'88 SHOWN:



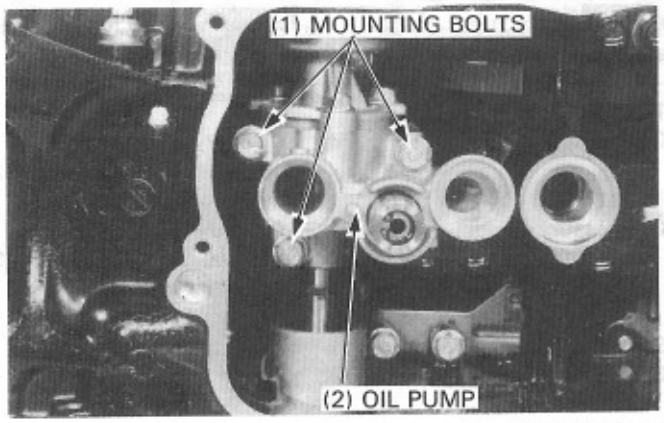
CAUTION

- *A locking agent is applied to the bolt threads. Be careful not to wrench off the bolt head.*

NOTE

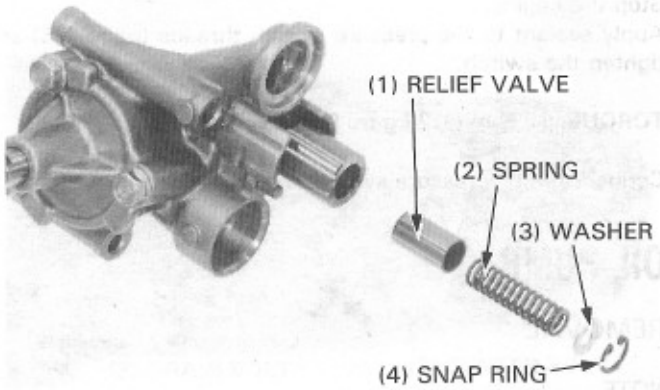
- The oil pump drive sprocket and drive chain can be removed after the clutch is removed.

Remove the following:
- oil pump mounting bolts
- oil pump
- dowel pin, oil orifice and O-ring

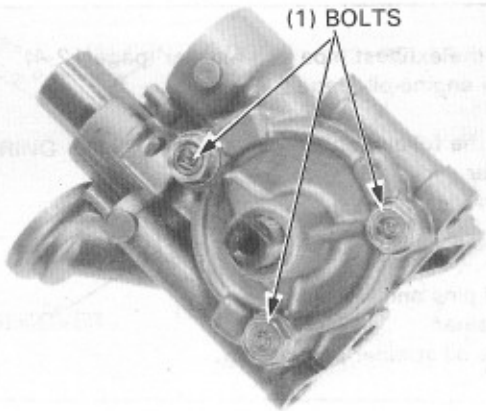


DISASSEMBLY

Remove the following:
- snap ring
- washer
- spring
- pressure relief valve



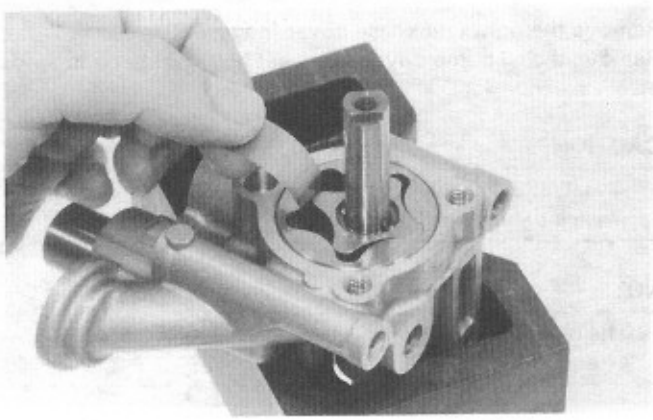
Remove the bolts and disassemble the oil pump.



INSPECTION

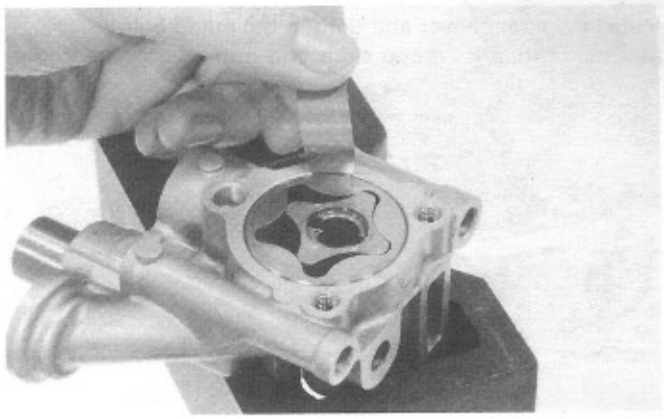
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



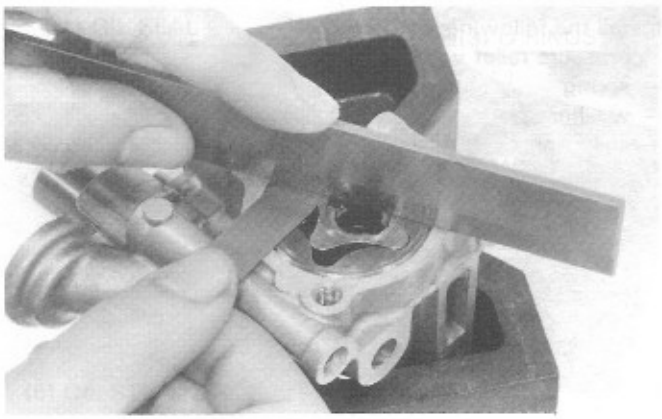
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



Remove the rotor shaft and measure the pump end clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



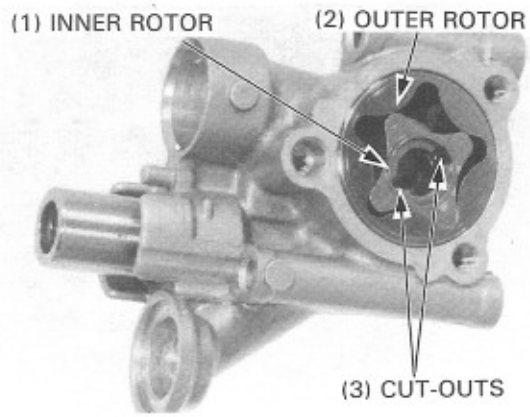
ASSEMBLY

Clean all the disassembled parts and coat them with clean engine oil.

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

NOTE

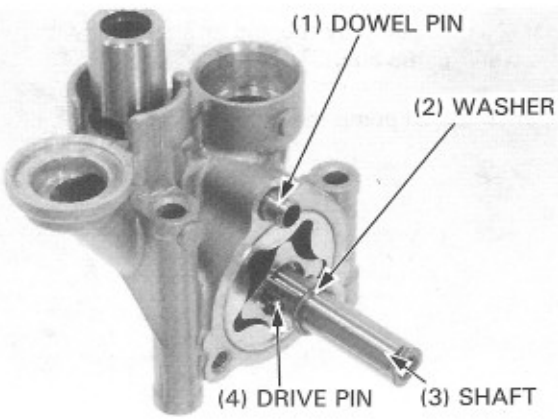
- Install the inner rotor by facing the cut-outs toward the cover.



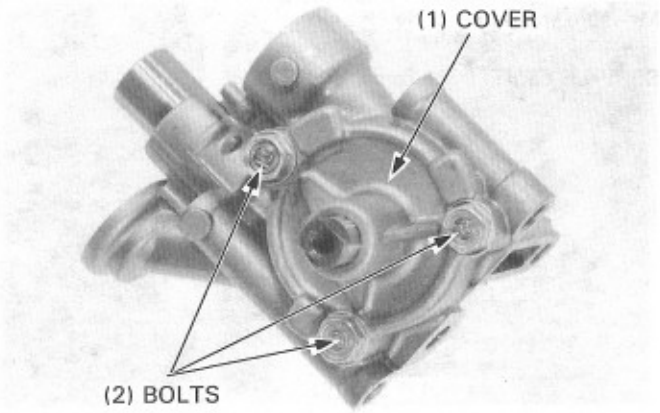
Install the drive pin into the drive shaft hole.
Install the drive shaft into the pump body.

Position the drive pin in the cut-outs of the inner rotor then push it in the correct position.

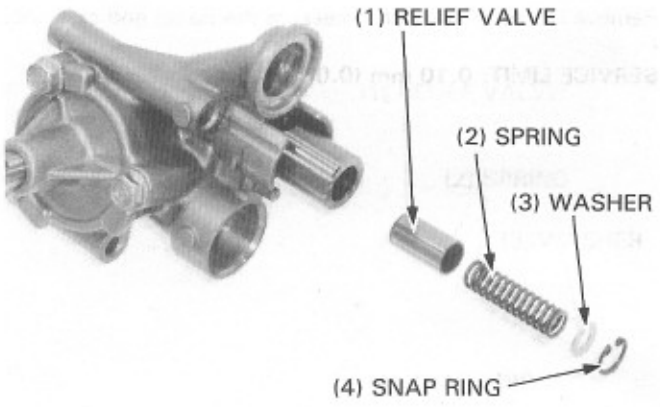
Install the thrust washer onto the drive shaft.
Install the dowel pin in the pump body.



Install the pump cover and tighten the pump bolts.
Make sure that the pump shaft and rotors turn smoothly.

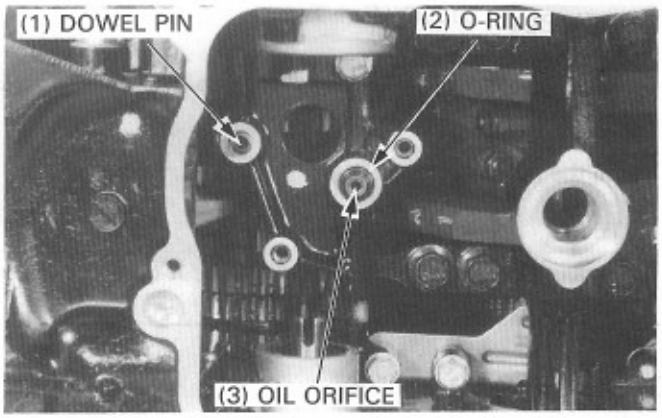


Install the following:
- pressure relief valve
- spring
- washer
- snap ring



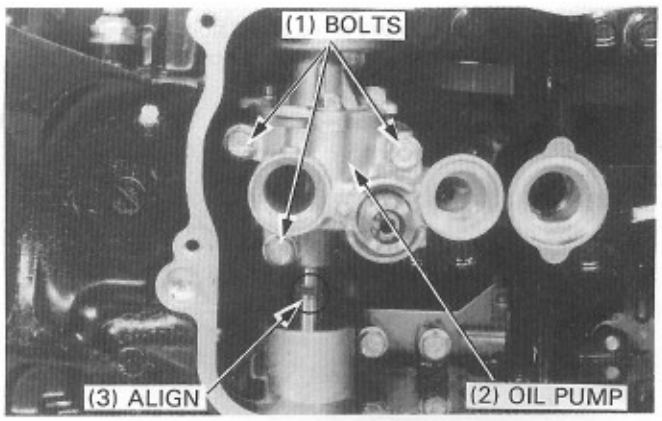
INSTALLATION

Install the dowel pin, oil orifice and O-ring.



Install the oil pump by aligning its shaft end with the cut-out in the water pump shaft.

Tighten the oil pump mounting bolts securely.



Install the oil pump driven sprocket by aligning the cut-out of the sprocket with the cutout of the drive shaft.

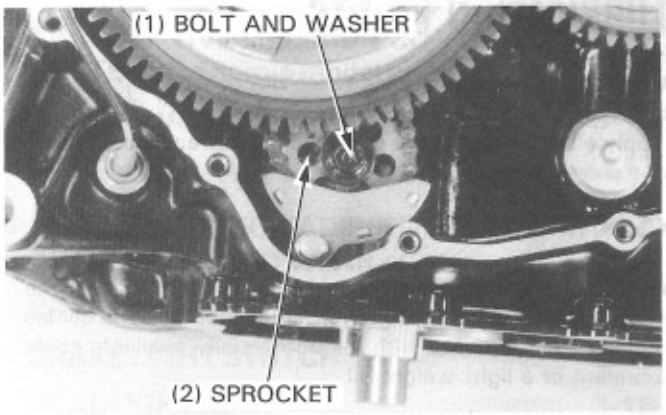
NOTE

- Note the installation direction (page 7-10).

Apply locking agent to the driven sprocket bolt threads (page 1-5).
Tighten the driven sprocket bolt with the washer to the specified torque.

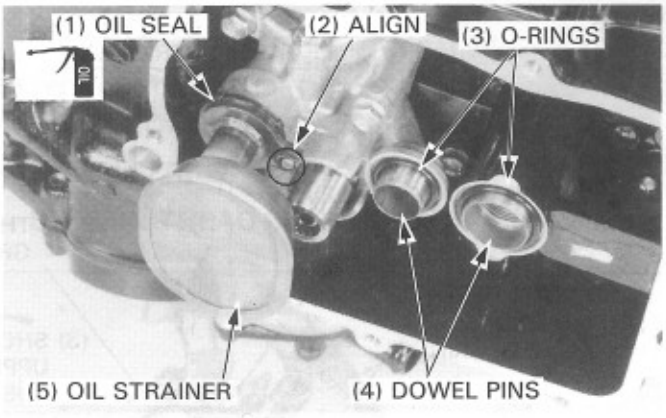
TORQUE: 15 N·m (1.5 kg-m, 11 ft-lb)

Install the right crankcase cover (page 7-13).

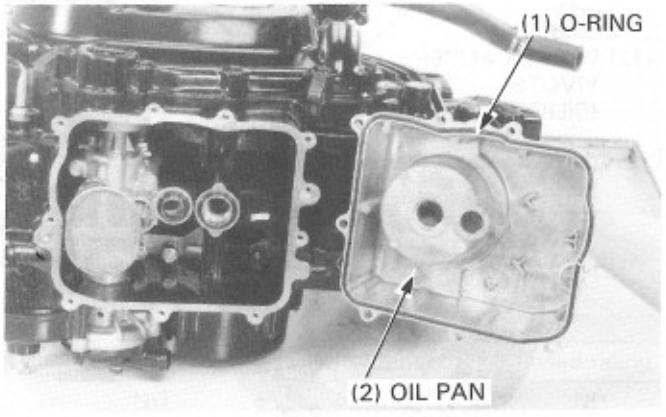


Install the oil strainer with a new oil seal by aligning its cut-out with the projection on the oil pump.

Install the O-rings and dowel pins.



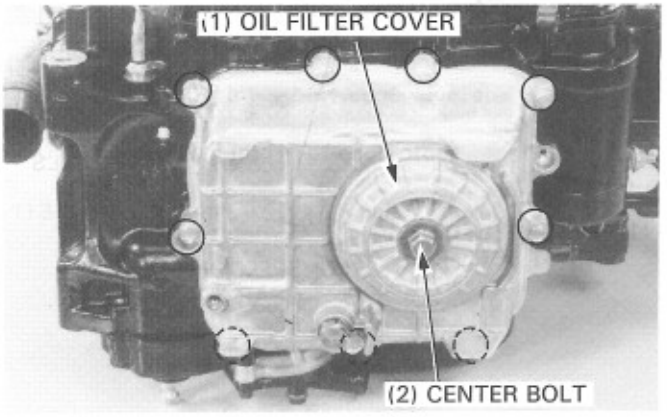
Check the condition of the oil pan O-ring. Install a new one if necessary.



Install the oil pan and tighten the bolts securely.
Install the oil filter and tighten the filter center bolt to the specified torque.

TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)

Install the exhaust pipe and muffler (page 12-4).
Fill the crankcase with the recommended engine oil (page 2-2).



LUBRICATION POINTS

Use general purpose grease when not otherwise specified here.
Apply oil or grease to the other sliding surfaces and cables not shown here.

CONTROL CABLE LUBRICATION

Periodically disconnect the throttle, clutch and choke cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

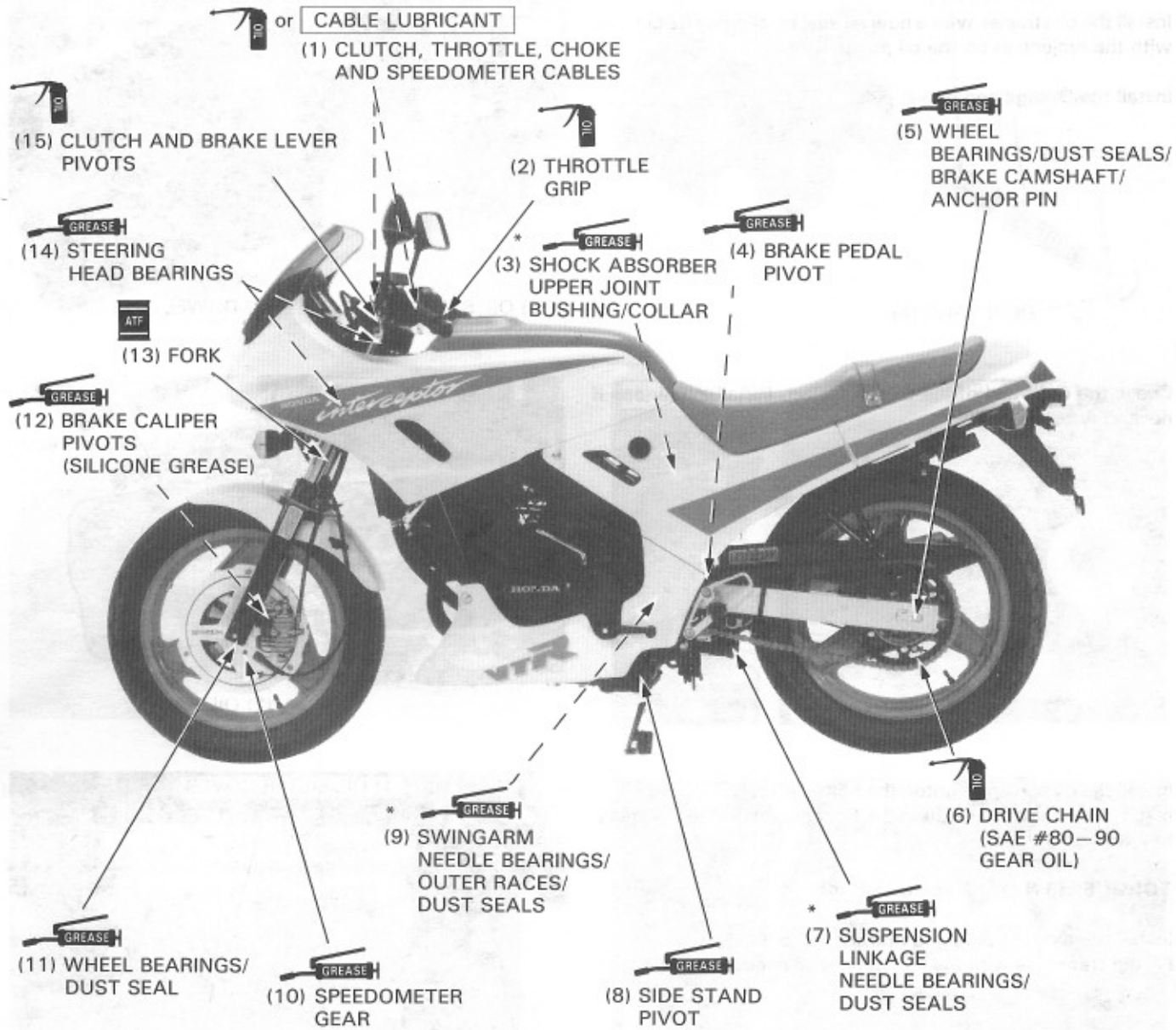
Apply a paste grease with 40% or more molybdenum disulfide to the * mark components (3, 7 and 9 below).

NOTE

Some sources of MoS_2 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.



SERVICE INFORMATION	3-1	EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)	3-12
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN	3-12
FUEL LINE	3-4	BATTERY	3-13
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CARBURETOR CHOKE	3-5	BRAKE SYSTEM	3-15
AIR CLEANER	3-5	BRAKE LIGHT SWITCH	3-16
CRANKCASE BREATHER	3-6	HEADLIGHT AIM	3-16
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CARBURETOR SYNCHRONIZATION	3-10	SUSPENSION	3-17
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SERVICE INFORMATION

GENERAL

Engine oil — See page 2-4
Engine oil filter — See page 2-4

⚠ WARNING

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

SPECIFICATIONS

Throttle grip free play: 2–6 mm (1/8–1/4 in)

Spark plugs:

	Standard		For extended high speed riding	
	NGK	ND	NGK	ND
'88	DPR8EA-9	X24EPR-U9	DPR9EA-9	X27EPR-U9
AFTER '88	CR8EH-9	U24FER-9	CR9EH-9	U27FER-9

Spark plug gap: 0.8–0.9 mm (0.031–0.035 in)
Valve clearance: IN/EX: 0.17 ± 0.02 mm (0.007 ± 0.001 in) —between valve stem and adjusting screw.
Carburetor synchronization: Both carburetors within 40 mm (1.6 in) Hg of each other
Idle speed: 1,500 ± 100 rpm
Cylinder compression: 1,320 ± 200 kPa (13.2 ± 2.0 kg/cm², 188 ± 28 psi)

Drive chain slack:	15—25 mm (5/8—1 in)
Clutch lever free play:	10—20 mm (3/8—3/4 in)
Fork air pressure:	0—40 kPa (0—0.4 kg/cm², 0—6 psi)
Brake pedal free play:	20—30 mm (3/4—1-1/4 in)

Tires:

		Front	Rear
Tire size		100/90-16 54S (Tubeless)	120/80-17 61S (Tubeless)
Cold tire pressure kPa (kg/cm², psi)	Up to 90 kg (200 lbs) load	225 (2.25, 33)	225 (2.25, 33)
	Up to vehicle capacity load	225 (2.25, 33)	250 (2.50, 36)
Tire brand	BRIDGESTONE	G539	G 540

Minimum tire tread depth: Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)

TORQUE VALVE

Spark plug '88:	14 N•m (1.4 kg-m, 10 ft-lb)
AFTER '88:	12 N•m (1.2 kg-m, 9 ft-lb)
Valve adjusting lock nut	11 N•m (1.1 kg-m, 8 ft-lb)
Cylinder head cover bolt	10 N•m (1.0 kg-m, 7.2 ft-lb)
Rear axle nut	90 N•m (9.0 kg-m, 65 ft-lb)
Side stand pivot bolt	15 N•m (1.5 kg-m, 11 ft-lb)
nut	35 N•m (3.5 kg-m, 25 ft-lb)

TOOLS

Special

Vacuum gauge set	07404—0030000 or M937B—021—XXXXX (U.S.A. only)
Camshaft holder	07979—MK30000
Compression gauge	07305—0010000 or equivalent commercially available in U.S.A.

Common

Wrench, 8 x 9 mm	07708—0030100 or equivalent commercially available in U.S.A.
Valve adjusting wrench, B	07708—0030400 or 89201—200—000 or 07908—KE90200

MAINTENANCE SCHEDULE

The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. VTR250 owners should consult their authorized Honda dealer.

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

R: Replace C: Clean L: Lubricate

		ITEM / FREQUENCY	NOTE	ODOMETER READING (NOTE 1)								Refer to page
				x 1,000 mi	0.6	4	8	12	16	20	24	
				x 100 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	*	FUEL LINE					I		I		I	3-4
	*	FUEL STRAINER SCREEN				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					R			R	3-5
		CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-6
		SPARK PLUG				R	R	R	R	R	R	3-6
	*	VALVE CLEARANCE			I		I		I		I	3-7
		ENGINE OIL			R		R		R		R	2-4
		ENGINE OIL FILTER			R		R		R		R	2-4
	*	CARBURETOR-SYNCHRONIZATION			I		I		I		I	3-10
	*	CARBURETOR-IDLE SPEED			I	I	I	I	I	I	I	3-10
		RADIATOR COOLANT	NOTE 5				I		I		R	3-11
	*	COOLING SYSTEM					I		I		I	3-11
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-12
NON-EMISSION RELATED ITEMS		DRIVE CHAIN			I, L EVERY 600 mi (1,000 km)							3-12
		BATTERY				I	I	I	I	I	I	3-13
		BRAKE FLUID	NOTE 5			I	I	R	I	I	R	3-14
		BRAKE SHOE/PAD WEAR				I	I	I	I	I	I	3-14
		BRAKE SYSTEM			I		I		I		I	3-15
	*	BRAKE LIGHT SWITCH					I		I		I	3-16
	*	HEADLIGHT AIM					I		I		I	3-16
		CLUTCH SYSTEM			I	I	I	I	I	I	I	3-16
		SIDE STAND					I		I		I	3-17
	*	SUSPENSION					I		I		I	3-17
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-18
	**	WHEELS/TIRES					I		I		I	3-18
	**	STEERING HEAD BEARINGS			I		I		I		I	3-19

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

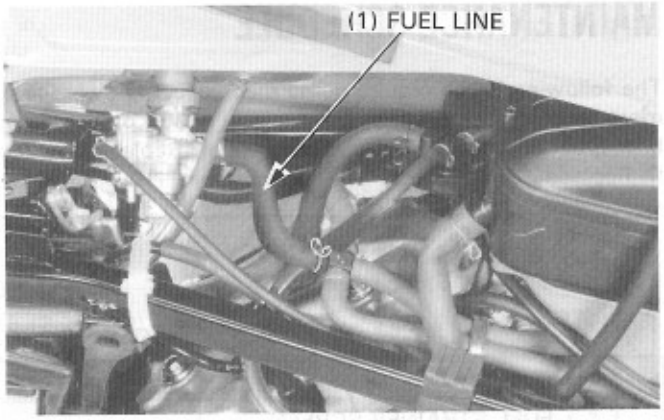
** In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

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

FUEL LINE

Remove the fuel tank mounting bolts (page 4-3).
Raise the fuel tank and inspect the fuel line.
Replace any parts which show deterioration, damage or leakage.



FUEL STRAINER SCREEN

⚠ WARNING

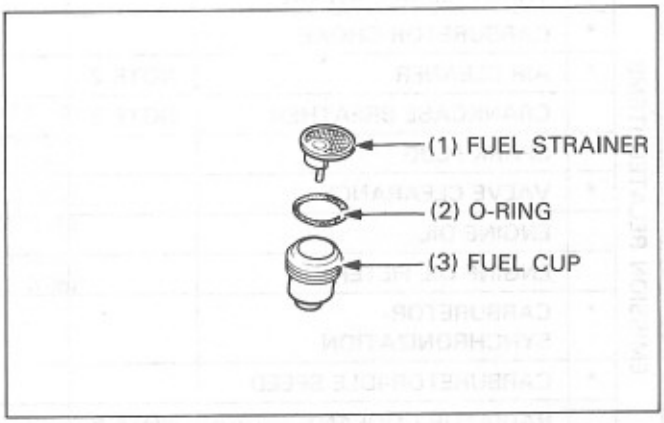
- ***Gasoline is extremely flammable and is explosive under certain conditions. Work in well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your working ares or where gasoline is stored.***

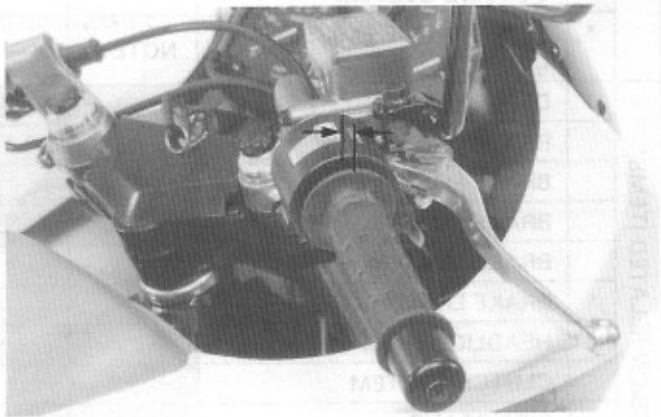
Remove the fuel tank mounting bolts (page 4-3).
Turn the fuel valve OFF.
Remove the fuel cap, O-ring and strainer and pour the contents of the cup into a suitable container.
Wash the filter screen and cup in clean non-flammable or high flash point solvent.
Reinstall the strainer, O-ring and fuel cup into the fuel valve body, making sure that the O-ring is in place.
Hand tighten the fuel cup and then torque it.

NOTE

- Do not over-tighten the fuel cup.

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





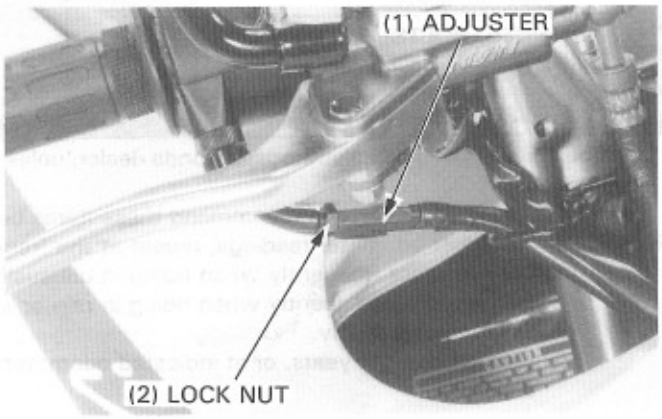
THROTTLE OPERATION

Check for smooth throttle grip full opening and automatic full closing in all steering positions.
Check the throttle cables and replace them if they are deteriorated, kinked or damaged.
Lubricate the throttle cables (page 2-10), if throttle operation is not smooth.
Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2—6 mm (1/8—1/4 in)

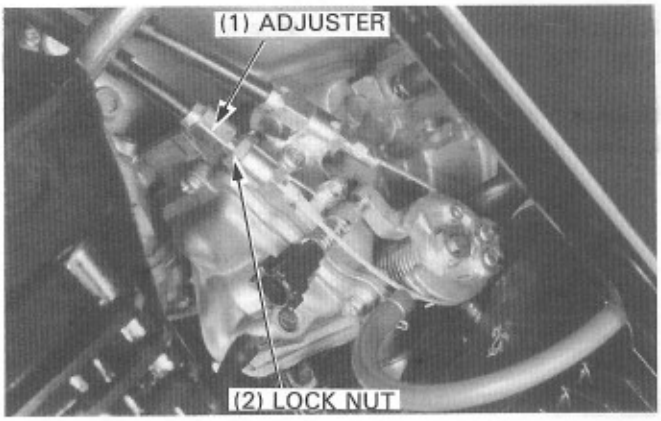
Adjustment can be made at either end of the throttle cable.
Minor adjustments are made with the upper adjuster.

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



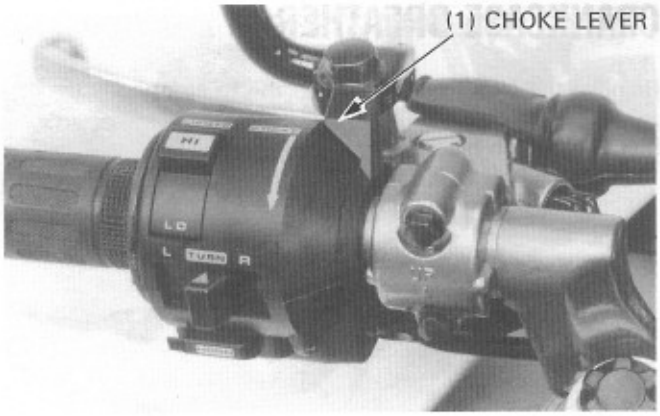
Major adjustments are made with the lower adjuster.

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



CARBURETOR CHOKE

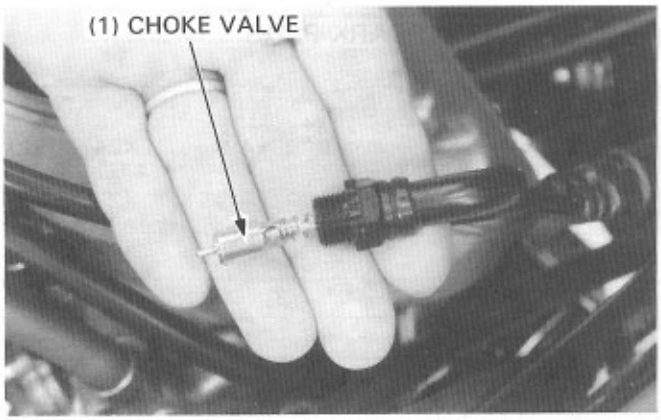
The VTR250 choke system uses a fuel enriching circuit controlled by a bystarter valve. The bystarter valve opens the enriching circuit via a cable when the choke lever on the handlebar is pulled down.
Check for smooth upper choke lever operation.
Lubricate the choke cable if operation is not smooth.



ADJUSTMENT

Remove the carburetor (page 4-5).
Loosen the choke valve nuts on the carburetor.
Remove the choke valves from the carburetors.
Pull the choke lever on the handlebar down all the way to fully open and make sure that the choke valves move to the valve nut side and there is no free play.

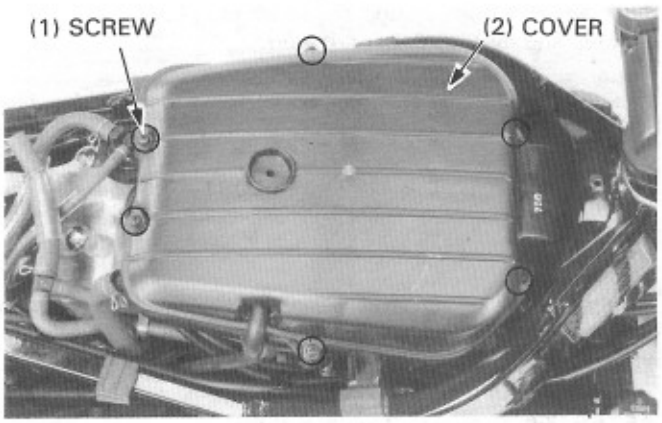
To adjust, loosen the lock nut and turn the cable elbow at the handlebar choke lever bousing. Tighten the lock nut and recheck.
Thread the choke valves in by hand and tighten the nuts 1/4 turn with a wrench.



AIR CLEANER

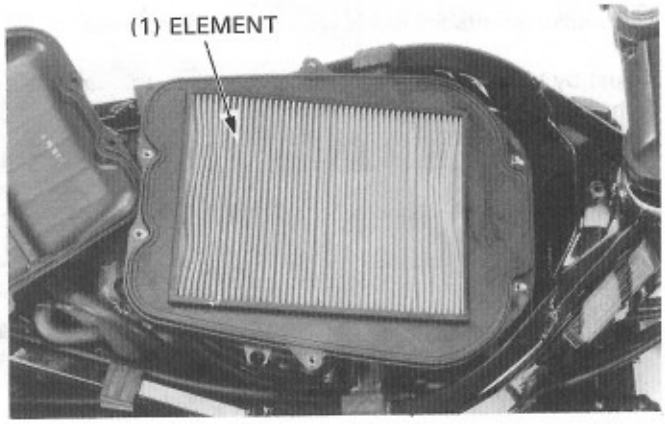
Remove the fuel tank (page 4-3).

Remove the cover screws and the air cleaner case cover.



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

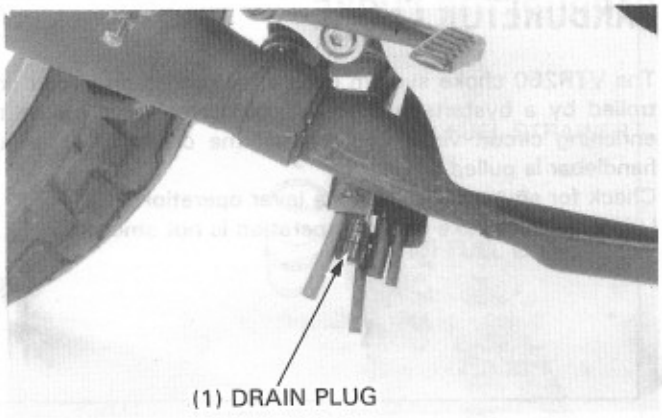
Install the air cleaner case cover.
Install the fuel tank (page 4-3).



CRANKCASE BREATHER

Remove the plug from the drain tube to empty any deposits.

Install the drain plug.



SPARK PLUG

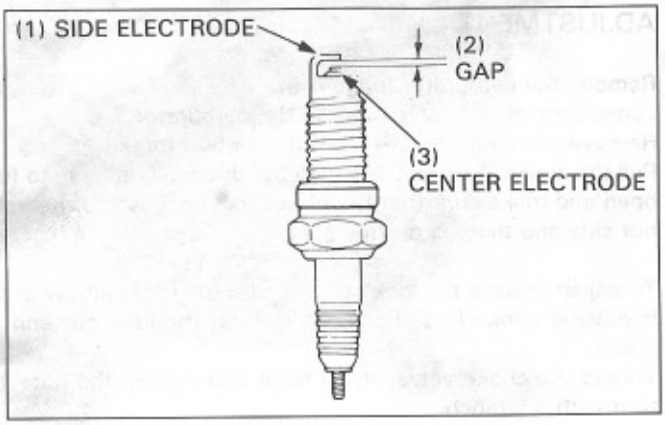
RECOMMENDED SPARK PLUG

'88:

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

AFTER '88:

	NGK	ND
Standard	CR8EH-9	U24FER-9
For extended high-speed riding	CR9EH-9	U27FER-9



Disconnect the spark plug caps.
Clean any dirt from around the spark plug base.
Remove and discard the spark plug.

Measure the new spark plug gaps using a wire type feeler gauge.

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

Adjust by bending the side electrode carefully.

With the plug washer attached, thread each spark plug in by hand to prevent crossthreading, then tighten securely.

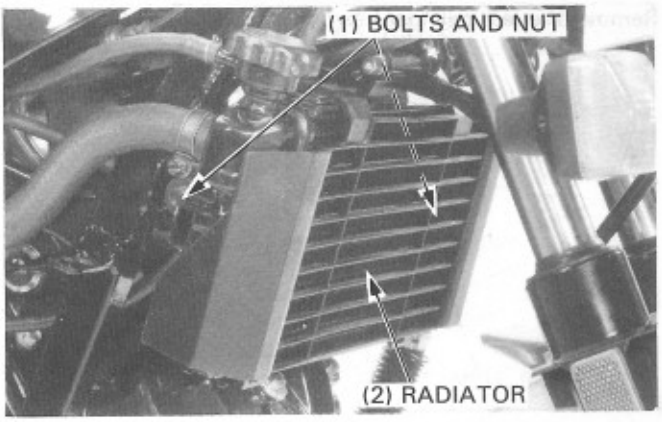
TORQUE:
'88: 14 N·m (1.4 kg-m, 10 ft-lb)
AFTER '88: 12 N·m (1.2 kg-m, 9 ft-lb)

VALVE CLEARANCE

NOTE

- Inspect and adjust valve clearance while the engine is cold (below 35°C/95°F).
- Lean the vehicle approximately 20° right and left several times to drain the oil from the cylinder head into crankcase.

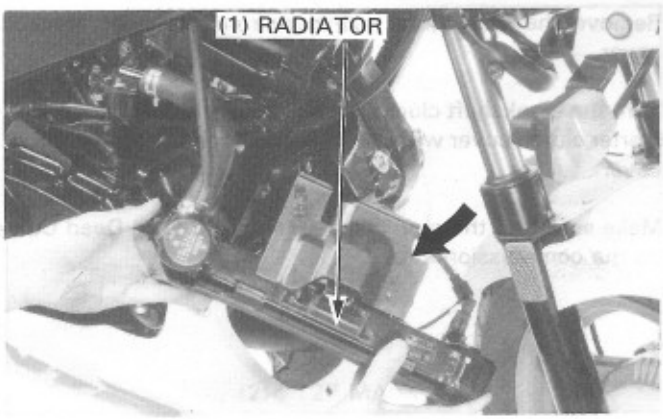
Remove the fuel tank (page 4-3).
Remove the radiator mounting bolts and nut.



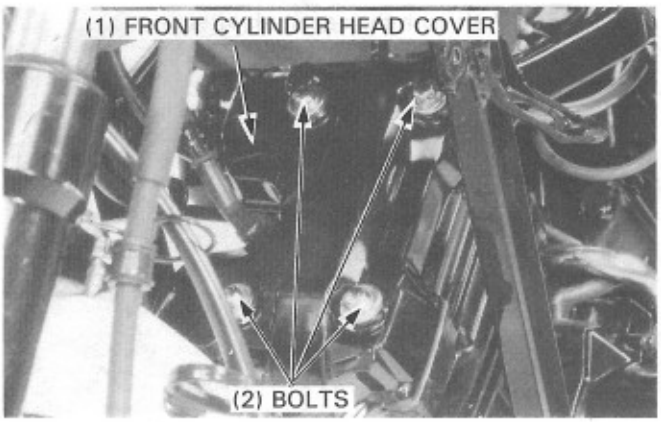
Lower the radiator from the right side and secure it with a rope or equivalent.

CAUTION

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

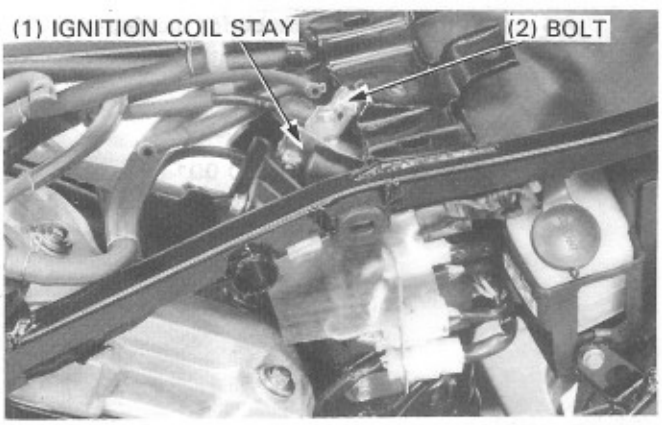


Remove the front cylinder head cover.

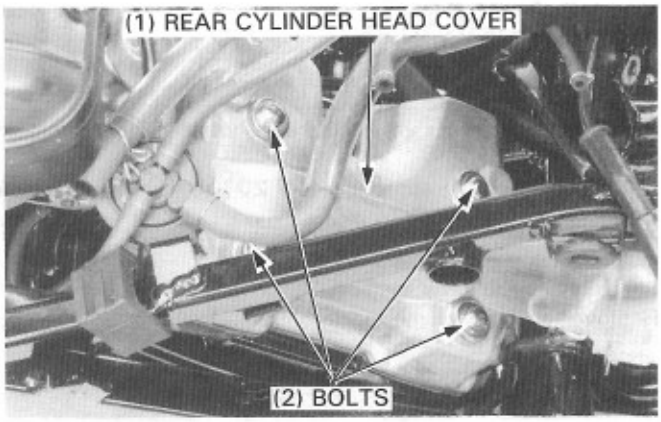


Disconnect the spark plug caps and remove the ignition coil stay mounting bolt.

Pull the ignition coil stay out and put it on the frame.



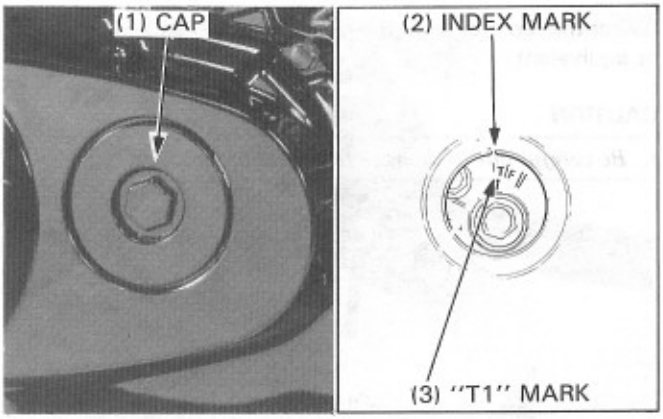
Remove the rear cylinder head cover.



Remove the crankshaft hole cap from the right crankcase cover.

Turn the crankshaft clockwise and align the "T1" mark on the starter clutch cover with the index mark on the right crankcase cover.

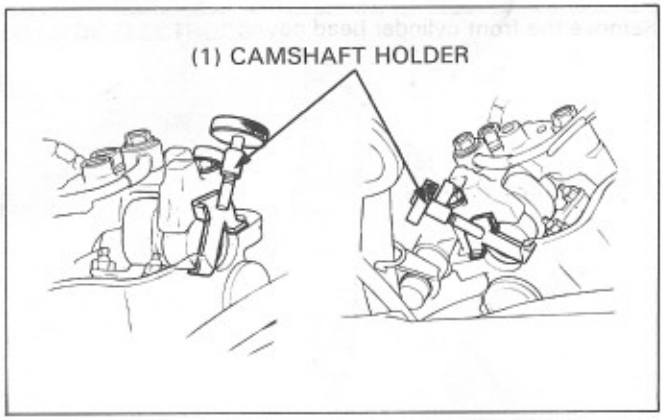
Make sure that the rear cylinder is at TDC (Top Dead Center) on the compression stroke.



Hold the camshaft with the camshaft lifter.

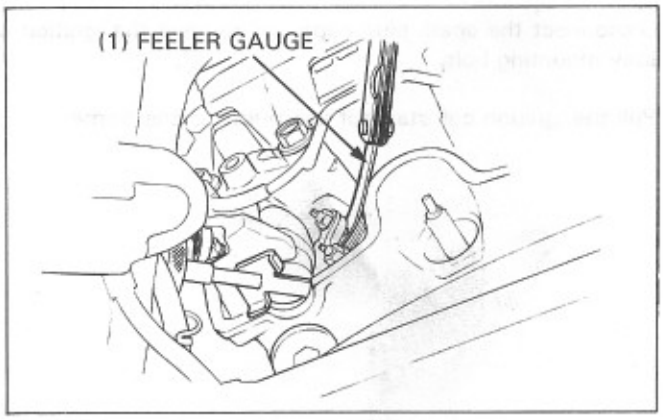
TOOL:

Camshaft holder	**07979—MK30000**



Check and record the valve clearance for the rear cylinder by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCE:
IN/EX: 0.17 ± 0.02 mm (0.007 ± 0.001 in)

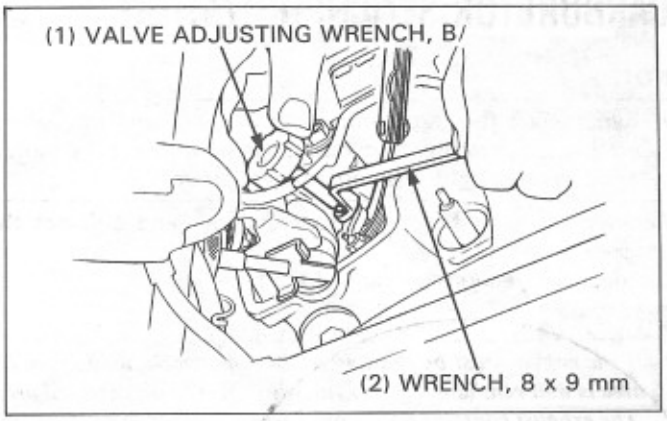


Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge. Hold the adjusting screw and tighten the lock nut.

TOOLS:

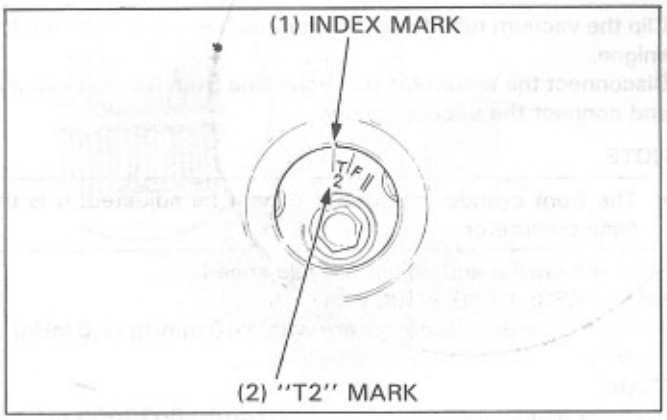
Wrench, 8 x 9 mm	**07708—0030100 or equivalent commercially available in U.S.A.**
Valve adjusting wrench, B	**07708—0030400 or 89201—200—000 or 07908—KE90200**

TORQUE: 11 N·m (1.1 kg-m, 8 ft-lb)



Recheck the valve clearance.

Turn the crankshaft clockwise 450 degrees and align the "T2" mark on the starter clutch cover with the index mark on the rignt crankcase cover.
Inspect and adjust the valve clearance for the front cylinder following same procedures as for the rear cylinder.

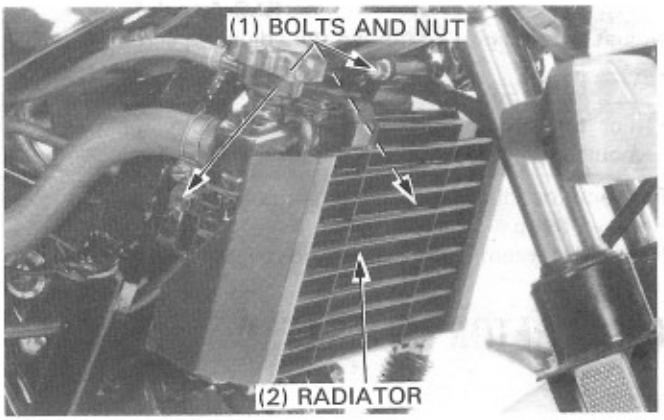


CAUTION

- *The lock nuts may come loose if the proper torque is not applied.*

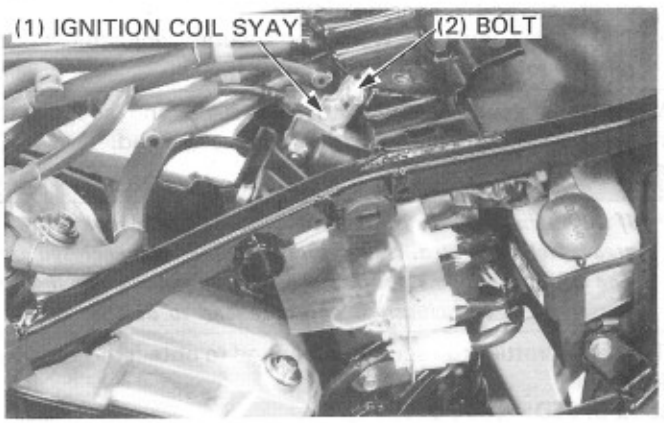
Install the cylinder head covers (page 9-21).

Install the radiator and tighten the bolts securely.



Install the ignition coil stay.

Install the remaining removed parts.



CARBURETOR SYNCHRONIZATION

NOTE

- Synchronize the carburetors with the engine at normal operating temperature, transmission in neutral and the motorcycle in an upright position on level ground.

Remove the plug from the front cylinder and connect the vacuum gauge adapter.
Connect the vacuum gauge and start the engine.

⚠ WARNING

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

Clip the vacuum tube for the automatic fuel valve and stop the enigne.
Disconnect the automatic fuel valve line from the rear cylinder and connect the vacuum gauge.

NOTE

- The front cylinder carburetor cannot be adjusted; it is the base carburetor.

Start the engine and adjust the idle speed.
IDLE SPEED: 1,500 ± 100 rpm
Check that both carburetors are within 40 mmHg (1.6 inHg) of each other.
TOOL:

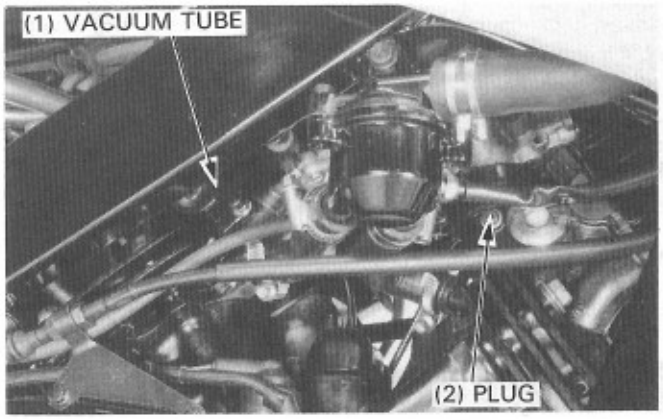
Vacuum gauge set	**07404—0030000 or M937B—021—XXXXX (U.S.A. only)**

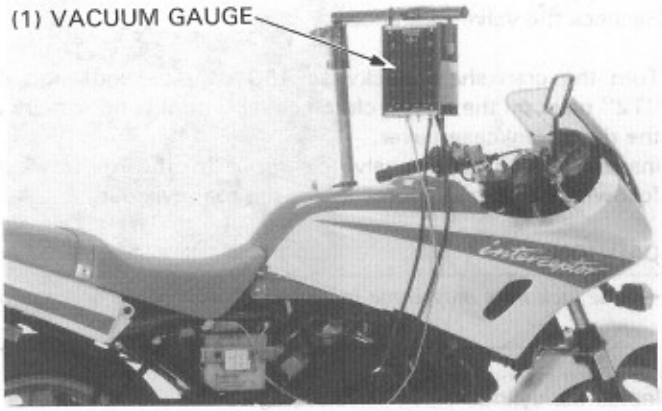
Adjust if necessary by turning the adjusting screw.

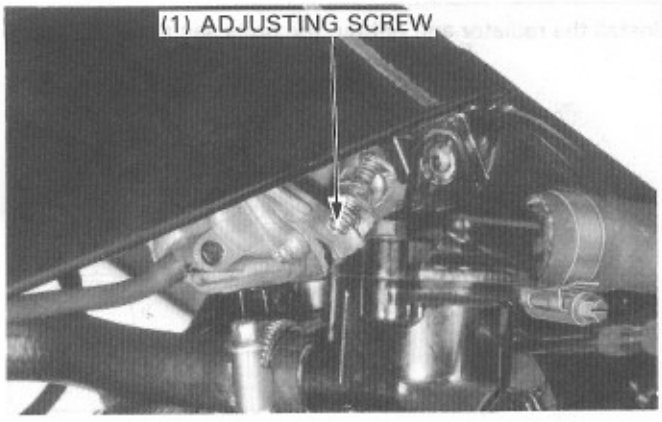
NOTE

- For better access to the screw, remove the thermostat housing bolt and move the housing sideways.

Recheck the idle speed and synchronization.
Remove the gauge and adapters.
Reinstall the removed parts in the reverse order of removal.







CARBURETOR IDLE SPEED

NOTE

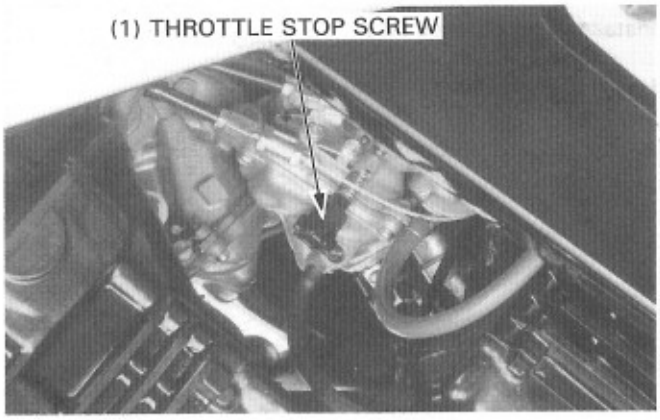
- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine, shift to NEUTRAL, and support the motorcycle in an upright position on level ground.

⚠ WARNING

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

Turn the throttle stop screw as required to obtain the specified idle speed.
IDLE SPEED: 1,500 ± 100 rpm



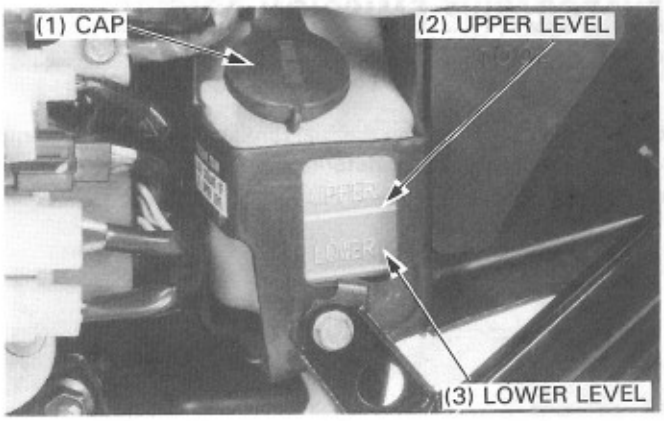
RADIATOR COOLANT

Support the motorcycle in an upright position on level ground.
Remove the left side cover.
Check the coolant level of the reserve tank with the engine running at normla operating temperature.

⚠WARNING

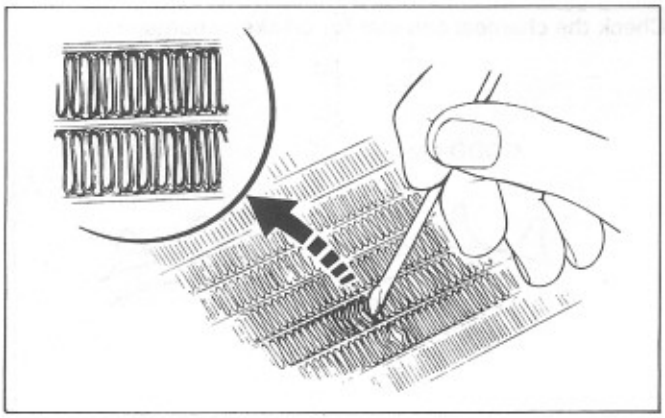
- ***If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.***

The level should be between the "UPPER" and "LOWER" level lines.
Remove the reserve tank cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and anti-freeze.
Reinstall the cap and left side cover.



COOLING SYSTEM

Check the radiator air passages for clogging or damage.
Straighten bent fins, remove insects, mud or any obstruction with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.
Inspect the hoses for cracks or deterioration, and replace if necessary.
Check the tightness of all hose clamps.



CYLINDER COMPRESSION

Warm up the engine.

⚠WARNING

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

Stop the engine, then disconnect the spark plug caps and remove the spark plugs.
Install the compression gauge.
TOOL:

Compression gauge	**07305—0010000 or equivalent commercially available in U.S.A.**

Turn the engine stop switch OFF.
Open the throttle valve fully and crank the engine with the starter motor.

NOTE

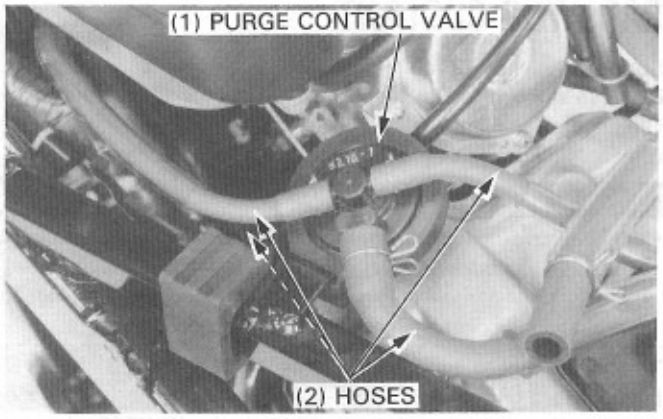
- Crank the engien until the gauge reading stops rising. The maximum reading is usually reached within 4—7 seconds.

COMPRESSION PRESSURE:
1,320 ± 200 kPa (13.2 ± 2.0 kg/cm², 188 ± 28 psi)
If compression is low, check for the following:
– Leaky valves
– Improper valve clearance
– Leaking cylinder head gasket
– Worn piston/ring/cylinder
If compression is high, check for the following: deposits have accumulated on the combustion chamber and/or the piston crown.

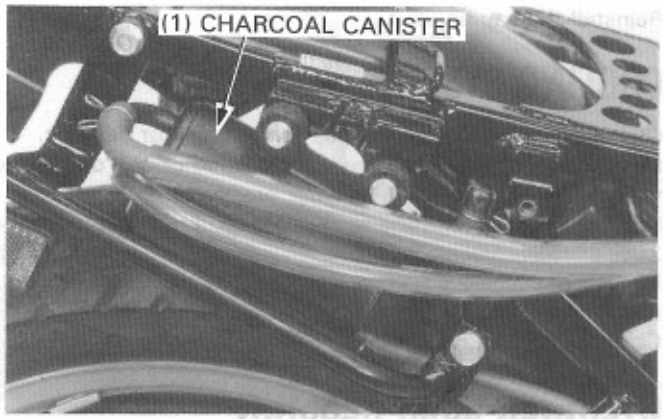


EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

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



Check the charcoal canister for cracks or damage.



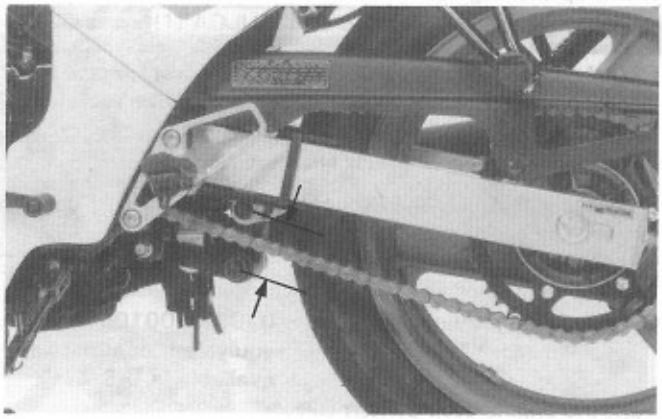
DRIVE CHAIN

Place the motorcycle on its side stand, shift the transmission in neutral, and turn the ignition switch off.
Inspect the drive chain free play midway between the sprockets on the lower chain run.

FREE PLAY: 15—25 mm (5/8—1 in)

CAUTION

- *Excessive chain free play 50 mm (2 in) or more, may damage the frame.*

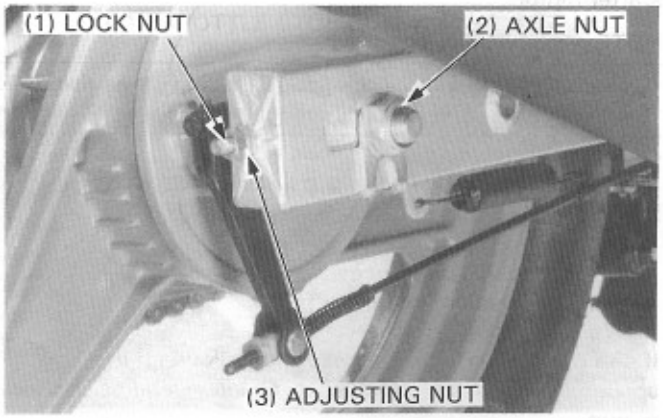


ADJUSTMENT

Loosen the axle nut.
Loosen the lock nut and turn the adjusting nut to obtain the specified free play.

CAUTION

- *Be sure that the rear of the swingarm aligns with the same graduation of the scale on both sides.*

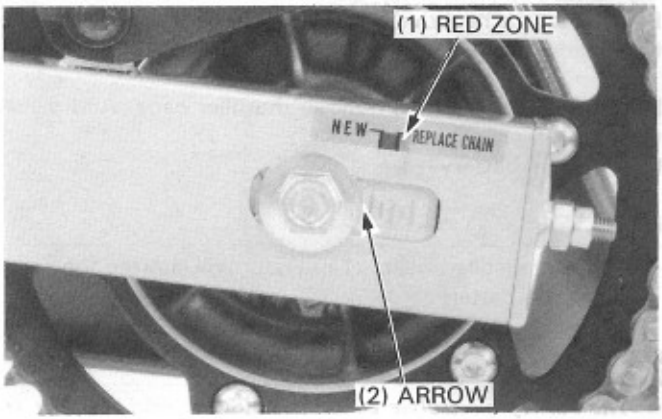


Tighten the axle nut.

TORQUE: 90 N·m (9.0 kg-m, 65 ft-lb)

Tighten the adjusting nuts and lock nuts.

Replace the drive chain when the red zone on the label aligns with the arrow.



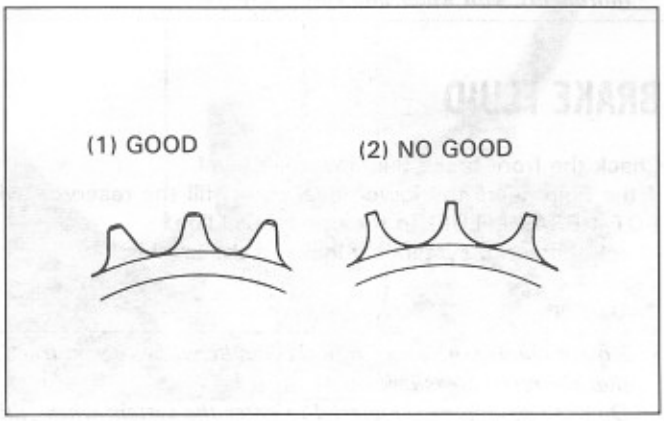
Replacement chain:

TAKASAGO: '88: RK520SMO – 104L
AFTER '88: RK428SHO-Z1 – 128LE
DAIDO: '88: DID520V4 – 104L
AFTER '88: DID428VS1 – 128LE

NOTE

- Replace the drive chain after removing the swingarm (page 14-16) and drive sprocket (page 6-2).

Inspect the drive chain, sprockets and drive chain slider for damage or wear. A drive chain with damaged rollers, loose pins, or missing O-rings must be replaced. Replace any sprocket which is damaged or excessively worn.



NOTE

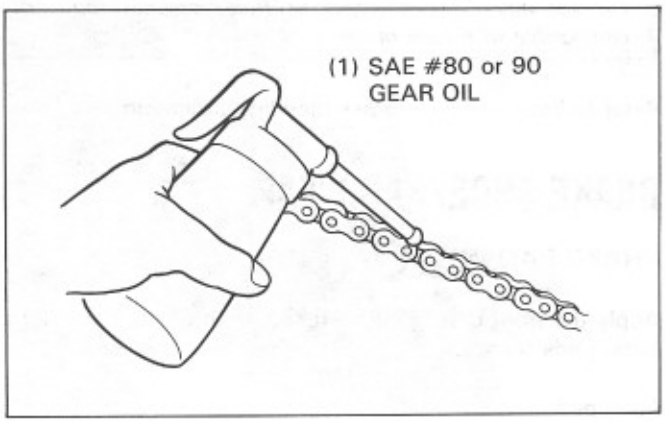
- Never install a new drive chain on worn sprockets or a worn drive chain on new sprockets. Both chain and sprockets must be in good condition or the replacement chain or sprockets will wear rapidly.
- Refer to page 14-17 for drive chain slider replacement.

LUBRICATION AND CLEANING

The drive chain on this motorcycle is equipped with small O-rings between the link plates. The O-rings can be damaged by steam cleaners, high pressure washers, and certain solvents.

Clean the drive chain with a small amount of kerosene 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.

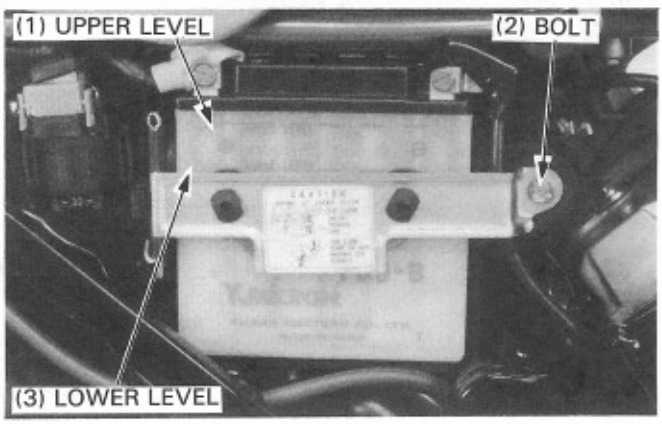


BATTERY

Remove the right side cover. Support the motorcycle in an upright position and inspect the battery fluid level.

When the fluid nears the lower level, remove the battery and add distilled water to the upper level mark as follows:

Remove the battery holder bolt, then swing the holder out of the way.



Disconnect the negative cable at the battery, then disconnect the positive cable.

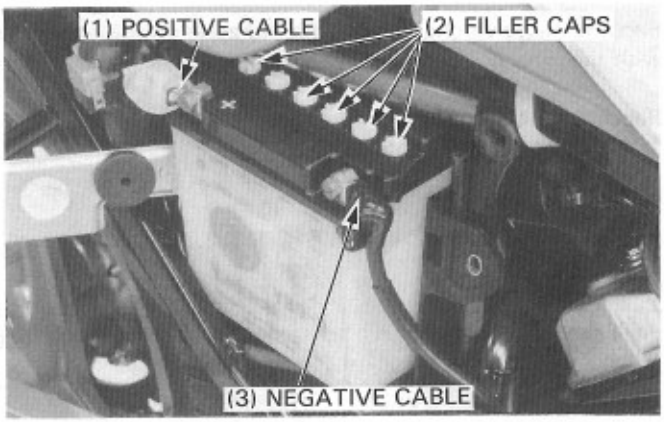
Pull out the battery and remove the filler caps. Add distilled water to the upper level line.
Reinstall the battery.

NOTE

- Add only distilled water. Tap water will shorten the service life of the battery.

⚠ WARNING

- ***The battery electrolyte contains sulphuric acid. Protect your eyes, skin and clothing. If electrolyte gets in your eyes, flush thoroughly with water and call a physician***

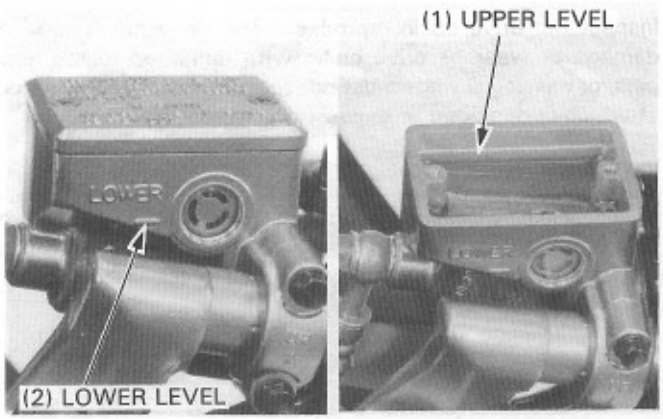


BRAKE FLUID

Check the front brake fluid reservoir level.
If the fluid nears the lower level mark, fill the reservoir with DOT-4 BRAKE FLUID to the upper level line.
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.*
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Do not mix different types of fluid, as they may not be compatible with each other.*



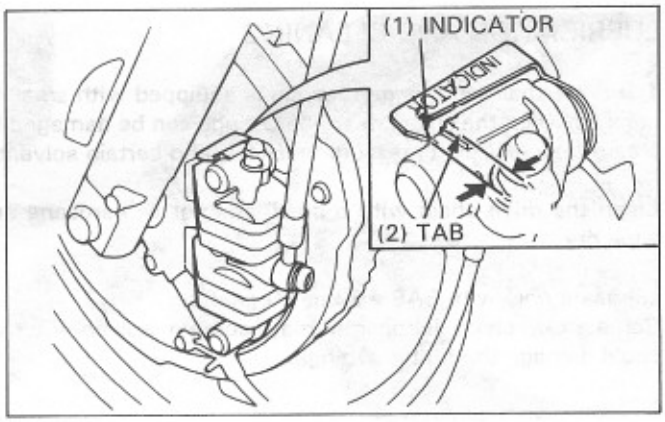
Refer to section 15 for brake bleeding procedures.

BRAKE SHOE/PAD WEAR

BRAKE PAD WEAR

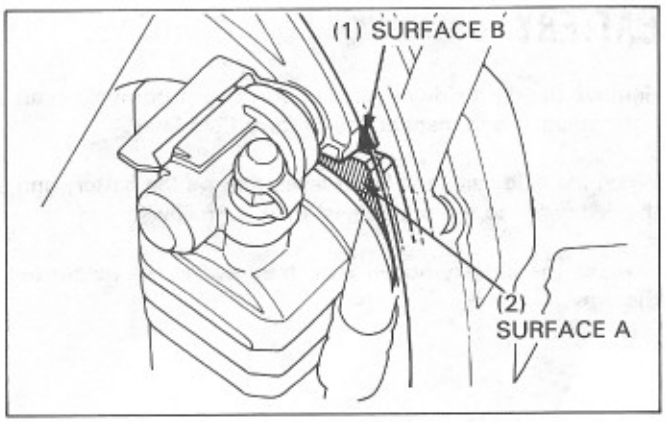
Apply the front brake several times, then check the inner and outer pads for wear.

Inner pad:
Replace the inner pad if the end of the wear indicator aligns with the tab.



Outer pad:
Replace the outer pad if the surface A (back of the brake pad) aligns with the surface B as shown.

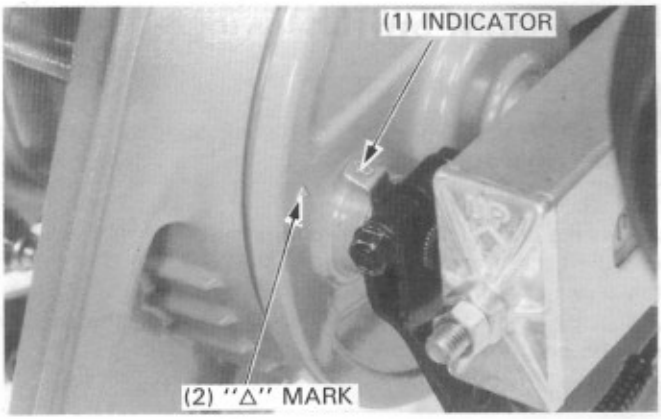
For brake pad replacement refer to section 15.



BRAKE SHOE INSPECTION (WEAR INDICATOR)

Replace the brake shoes if the arrow on the indicator plate aligns with the reference mark "△" on full application of the rear brake pedal.

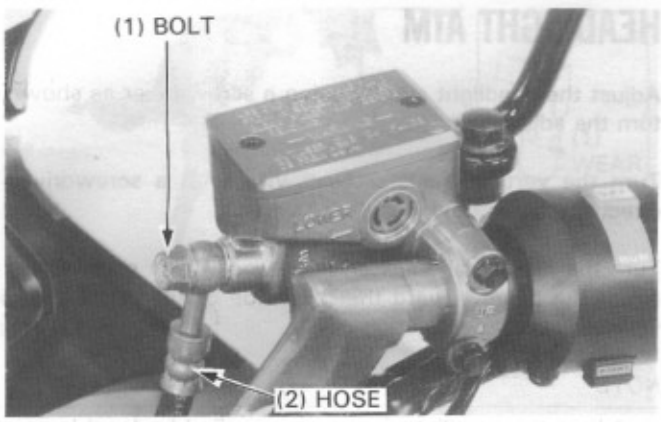
For brake shoe replacement refer to section 14.



BRAKE SYSTEM

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage. Tighten any loose fittings.

Replace the hose and fittings as required.



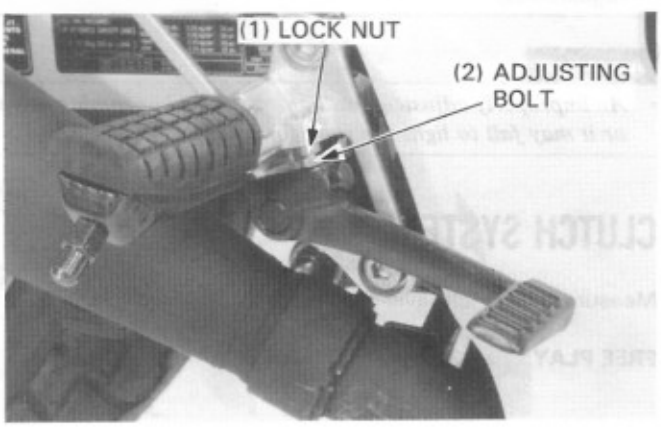
BRAKE PEDAL HEIGHT

Check the rear brake pedal height.
Adjust if necessary by loosening the lock nut and turning the adjusting bolt.

Retighten the lock nut.

NOTE

- Adjust the brake light switch (page 3-16) after adjustig the brake pedal height.



BRAKE PEDAL FREE PLAY

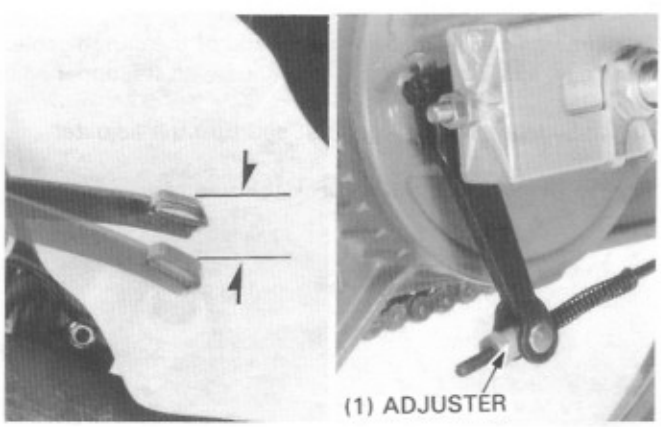
NOTE

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

Check the brake pedal free play.

FREE PALY: 20—30 mm (3/4—1-1/4 in)

If adjustment is necessary, turn the rear brake adjuster.

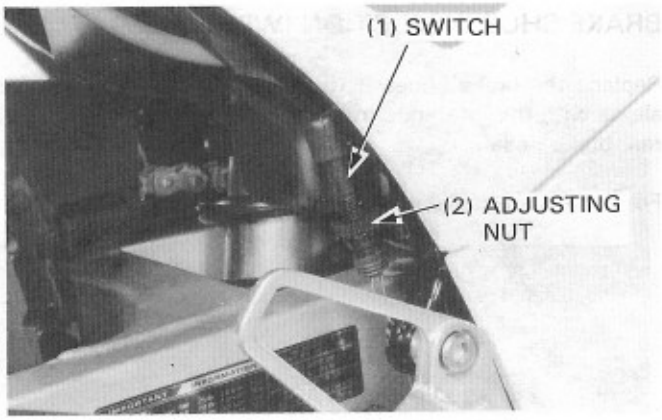


BRAKE LIGHT SWITCH

NOTE

- Adjust the brake light switch after adjusting the brake pedal free play and height.

Adjust the brake light switch so that the brake light will come on when the brake pedal is depressed 20 mm (3/4 in), and brake engagement begins.
Adjust by holding the switch body and turning the adjusting nut. Do not turn the switch body.



HEADLIGHT AIM

Adjust the headlight aim by using a screwdriver as shown to turn the adjusters.

Turn the vertical adjuster clockwise with a screwdriver to direct the beam down, and vice versa.

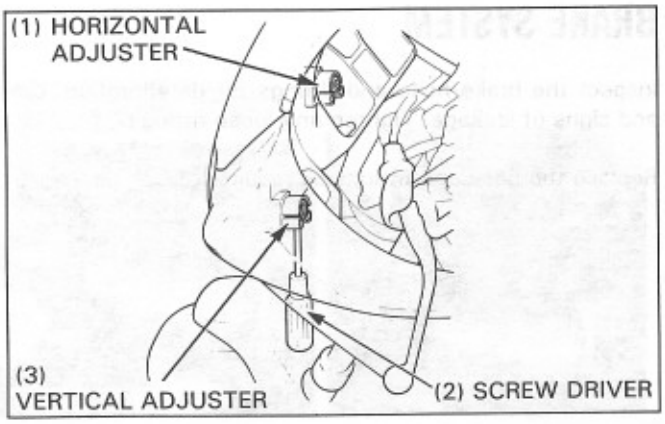
Turn the horizontal adjuster clockwise with a screwdriver to direct the beam toward the right side of the rider, and vice versa.

NOTE

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

⚠WARNING

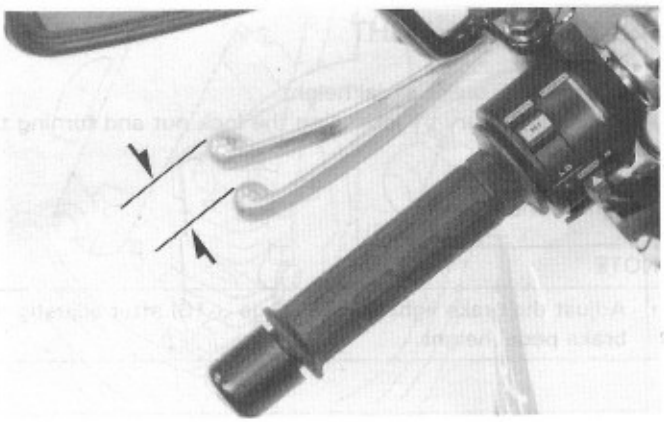
- ***An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.***



CLUTCH SYSTEM

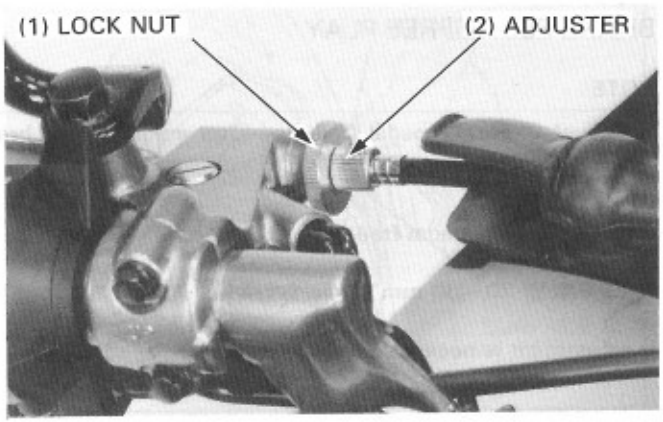
Measure the clutch lever free play at the lever end.

FREE PLAY: 10—20 mm (3/8—3/4 in)



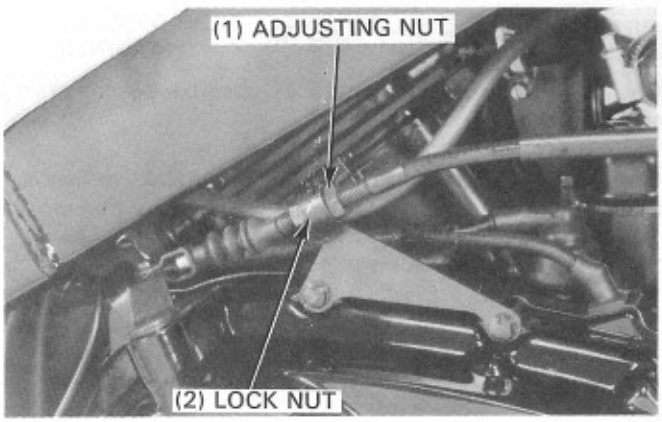
Adjustments can be made at either end of the clutch cable.
Generally, minor adjustments are made with the upper adjuster.
Adjust by loosening the lock nut and turn the adjuster.

Tighten the lock nut and recheck the free play.



Major adjustments are made with the lower adjuster.
Adjust by loosening the lock nut and turning the adjusting nut.

Tighten the lock nut and recheck the free play.



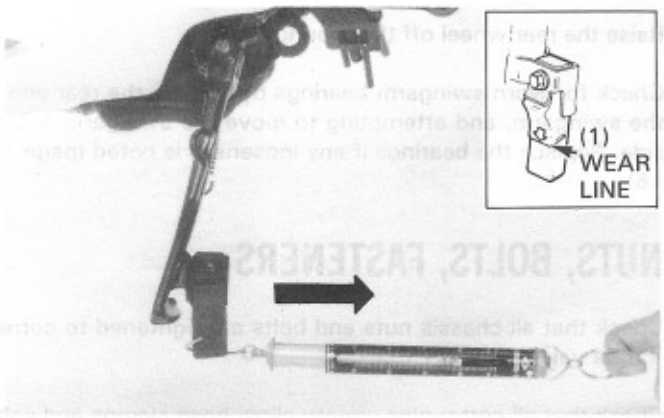
SIDE STAND

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 spring for damage or loss of tension.
Using a spring scale, measure the force required to retract the side stand. It should be within 2—3 kg (4.4—6.6 lbs), as shown.
Check the side stand assembly for freedom of movement.
Make sure that the side stand is not bent.

TORQUE:

Side stand pivot bolt: 15 N·m (1.5 kg-m, 11 ft-lb)
Side stand pivot nut: 35 N·m (3.5 kg-m, 25 ft-lb)



SUSPENSION

⚠WARNING

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

FRONT

Check the action of the fork by compressing it several times.

Check the entire fork assembly for leaks or damage. Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

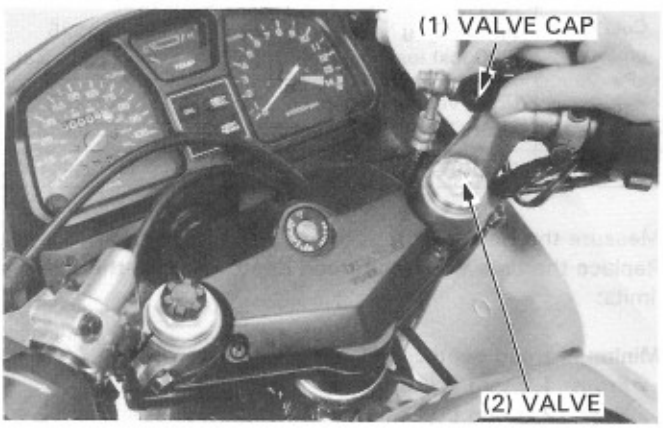


Check the fork leg air pressure when the legs are cold.

Raise the front wheel off the ground.

Remove each air valve cap and measure the air pressure.

AIR PRESSURE: 0—40 kPa (0—0.4 kg/cm², 0—6 psi)



REAR

Check the action of the rear shock absorber by compressing the rear end several times.

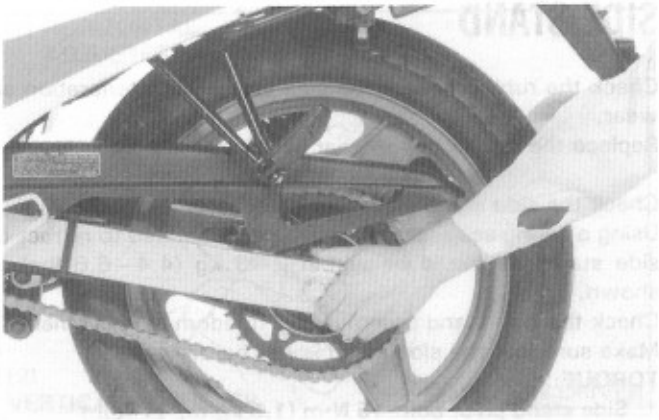
Check entire shock absorber assembly for leaks or damage. Replace any damaged components which cannot be repaired.

Tighten all nuts and bolts.



Raise the rear wheel off the ground.

Check for worn swingarm bearings by holding the rear end of the swingarm, and attempting to move the swingarm side to side. Replace the bearings if any looseness is noted (page 14-16).



NUTS, BOLTS, FASTENERS

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

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

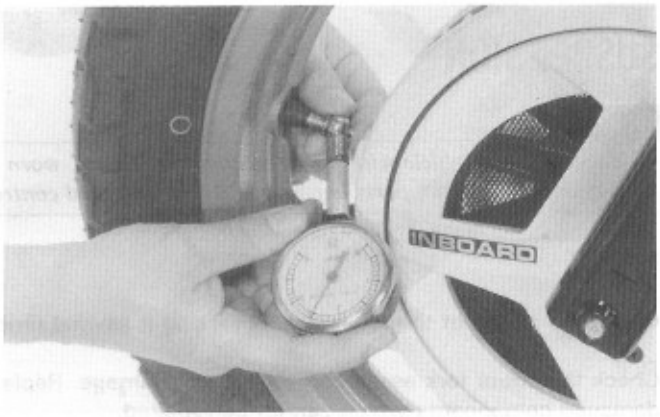
WHEELS/TIRES

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

TIRE PRESSURE

NOTE

- Tire pressure should be checked when tires are COLD.



Recommended tire pressures and tire sizes:

		Front	Rear
Tire size		100/80-16 54S	120/80-17 61S
Cold tire pressure kPa (kg/cm², psi)	Up to 90 kg (200 lbs) load	225 (2.25, 33)	225 (2.25, 33)
	Up to vehicle capacity load	225 (2.25, 33)	250 (2.50, 36)
Tire brand	BRIDGESTONE	G539	G540

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

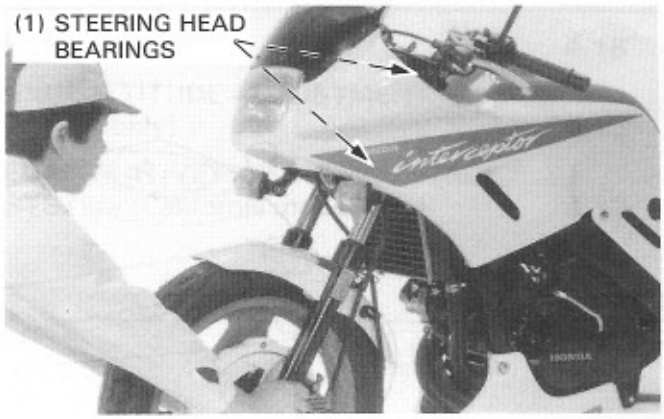
Minimum tread depth:
Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (1/12 in)

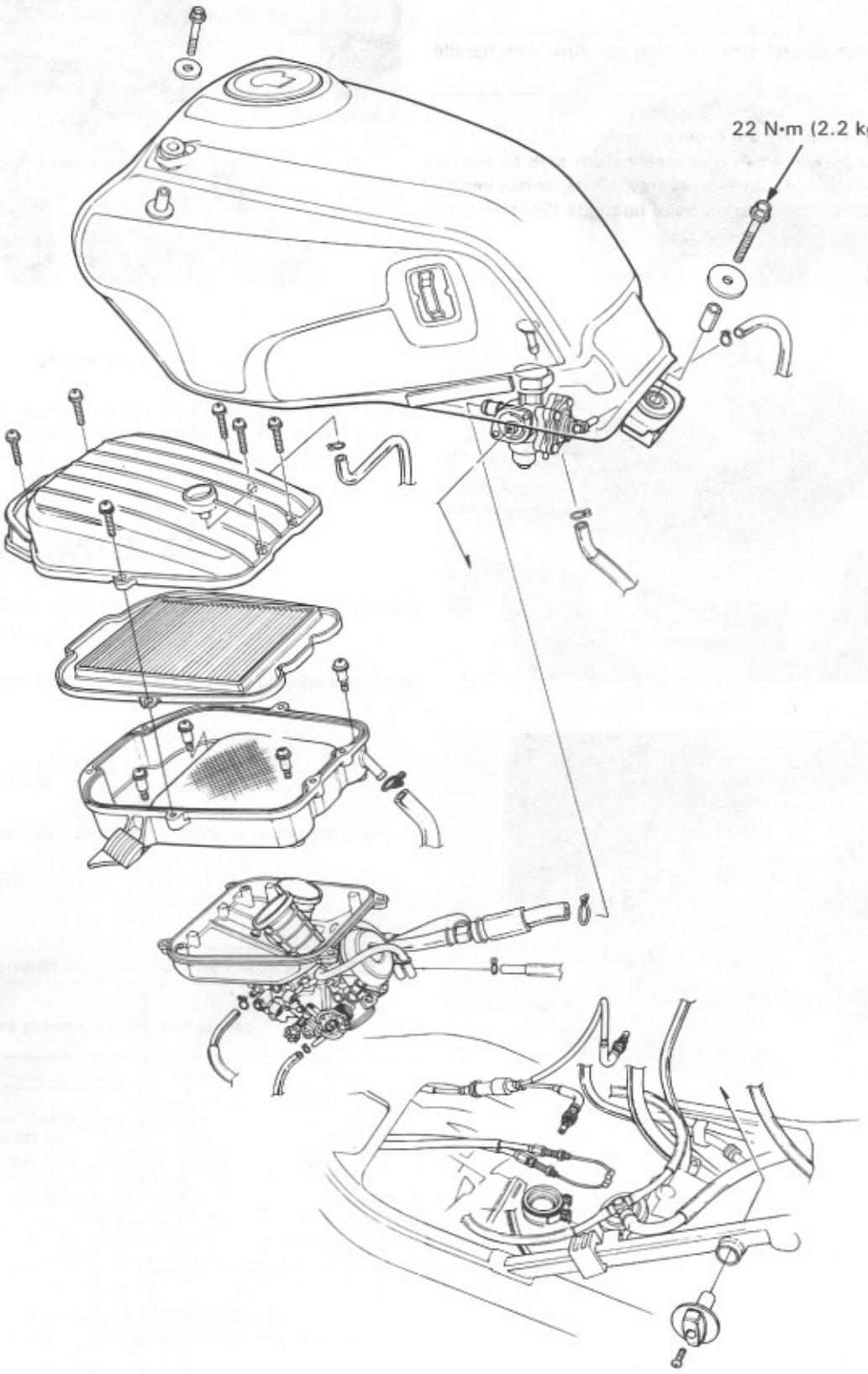
STEERING HEAD BEARINGS

NOTE

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

Raise the front wheel off the ground.
Check that the handlebar moves freely from side to side as shown. If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 13).




22 N·m (2.2 kg-m, 16 ft-lb)

SERVICE INFORMATION	4-1	PILOT SCREW	4-15
TROUBLESHOOTING	4-2	HIGH ALTITUDE ADJUSTMENT (U.S.A. only)	4-17
FUEL TANK	4-3	EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)	4-18
AUTOMATIC FUEL VALVE	4-4		
AIR CLEANER CASE	4-4		
CARBURETOR	4-5		

SERVICE INFORMATION

GENERAL

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

CAUTION

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

NOTE

* If the vehicle is to be stored for more than one month, drain the float chamber. Fuel left in the float chamber may cause clogged jets resulting in hard starting or poor driveability.

- The engine uses down draft carburetors.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- Refer to the label on the rear fender under the seat for the hose connections of the evaporative emission control system (California model only).
- All hoses used in the evaporative emission control system are numbered for identification. When connecting one of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label on page 1-17 (California model only), for its routing.

SPECIFICATIONS

Item	49 St. model	California model
Type	Constant Velocity dual carburetor	
Throttle bore	32.0 mm (1.26 in)	
Identification No.	VD10C	VD10D
Float level	6.8 mm (0.27 in)	
Main jet	#115	
Slow jet	#35	
Idle speed	1,500 ± 100 rpm	
Throttle grip free play	2–6 mm (1/8–1/4 in)	
Pilot screw initial opening	See page 4-16	

TORQUE VALUE

Fuel tank mounting bolt (rear)	22 N·m (2.2 kg-m, 16 ft-lb)

TOOLS

Special

Vacuum/Pressure pump	A937X—041—XXXXX (U.S.A. only)
or	
Pressure pump	ST—AH—255—MC7 (U.S.A. only)
Vacuum pump	ST—AH—260—MC7 (U.S.A. only)

Common

Float level gauge	07401—0010000

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetor
  - clogged fuel line
  - clogged automatic fuel valve vacuum tube
  - clogged fuel strainer
  - faulty diaphragm in the fuel valve
  - faulty float valve
- Engine flooded with fuel
- No spark at plug (ignition system faulty)
- Clogged air cleaner
- Clogged fuel tank breather
- Intake air leak
- Improper choke operation
- Improper throttle operation

After-burning during deceleration
- Faulty ignition system
- Faulty air cut off valve
- Lean mixture

Misfiring during acceleration
- Faulty ignition system
- Lean mixture

Backfiring
- Faulty ignition system
- Faulty carburetor
- Lean mixture

Lean mixture
- Clogged fuel jets
- Stuck vacuum piston
- Faulty float valve
- Low float level
- Clogged fuel tank breather
- Clogged fuel strainer screen
- Restricted fuel line
- Intake air leak
- Restricted or faulty fuel valve

Engine idles roughly, stalls or runs poorly
- Clogged air cleaner
- Intake air leak
- Faulty ignition system
- Incorrect idle speed
- Incorrect carburetor synchronization
- Faulty carburetor
- Fuel contaminated
- Faulty air cut off valve
  (California model only:)
  : Faulty purge control valve
  : Faulty hoses of the emission control system

Poor performance (driveability) and poor fuel economy
- Clogged fuel system
- Faulty ignition system
- Clogged air cleaner

Rich mixture
- Clogged air jets
- Faulty float valve
- Float level too high
- Bystarter valve stuck open
- Clogged air cleaner
- Worn jet needle or needle jet

FUEL TANK

REMOVAL

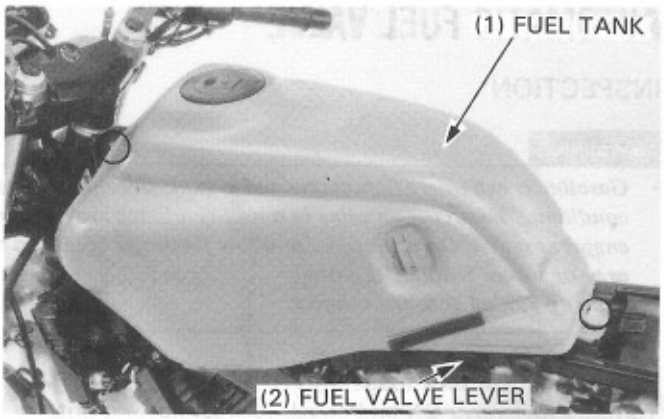
⚠WARNING

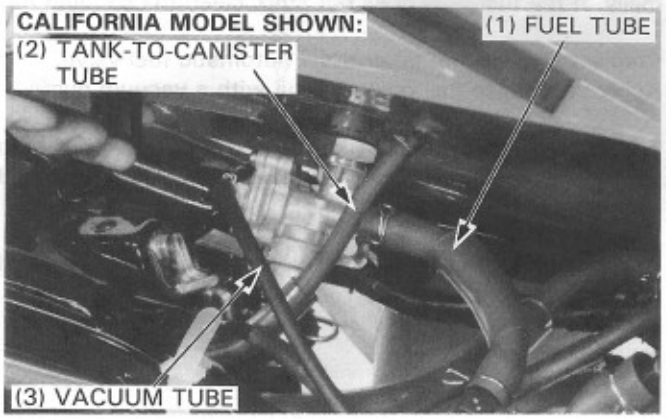
- ***Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area or where gasoline is stored.***
- ***Wipe up spilled gasoline at once.***

Turn the fuel valve "OFF".
Remove the following:
– seat
– side fairings (page 12-2)
– fuel valve lever
– fuel tank mounting bolts

Disconnect the tubes as follows:
– fuel tube
– automatic fuel valve vacuum tube
– fuel tank-to-charcoal canister tube (California model only)

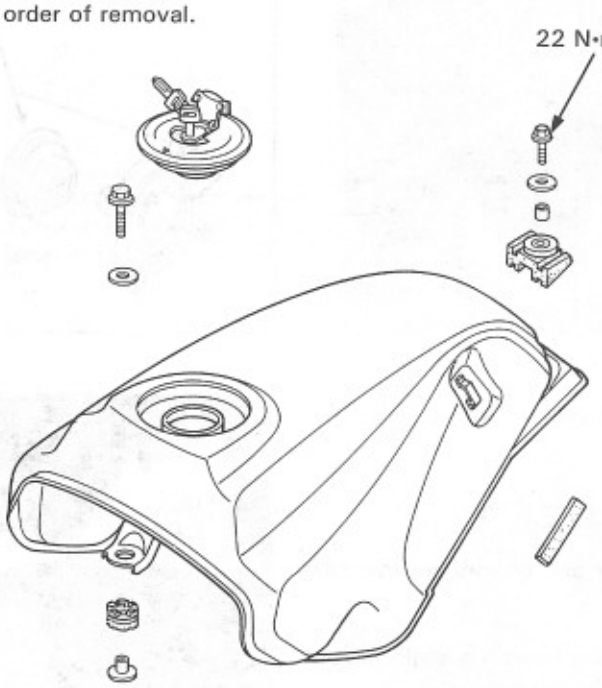
Remove the fuel tank.
Check the automatic fuel valve (page 4-4).





INSTALLATION

Install the fuel tank in the reverse order of removal.

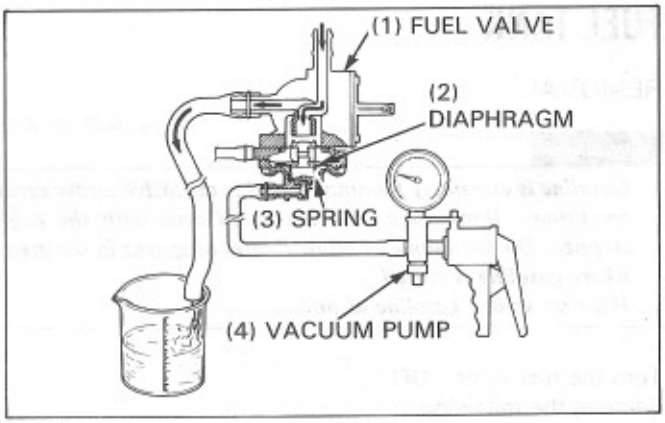


AUTOMATIC FUEL VALVE

INSPECTION

⚠ WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions. Drain the gasoline in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area or where gasoline is stored.***
- ***Wipe up spilled gasoline at once.***

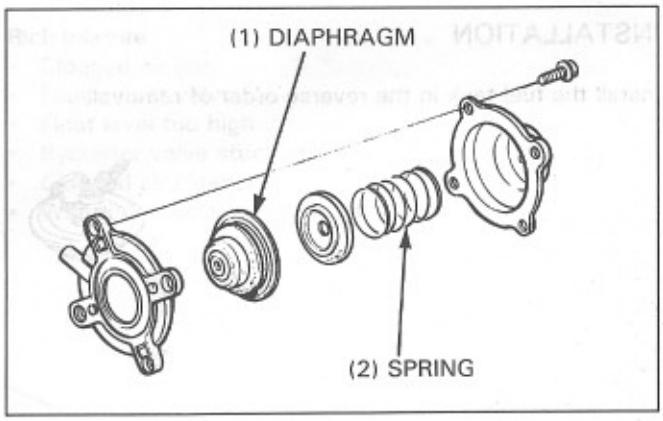


Remove the fuel tank (page 4-3).
Turn the fuel valve ON and check for fuel flowing out.
If the fuel flow stops, the automatic fuel valve is operating normally. If the fuel flow does not stop, clean the vacuum tube.

Connect the vacuum tube to the automatic fuel valve.
Apply vacuum to the vacuum tube with a vacuum pump.

The fuel valve is operating normally if fuel flows out of the valve when vacuum is applied, and stops flowing out when the vacuum pump is disconnected.

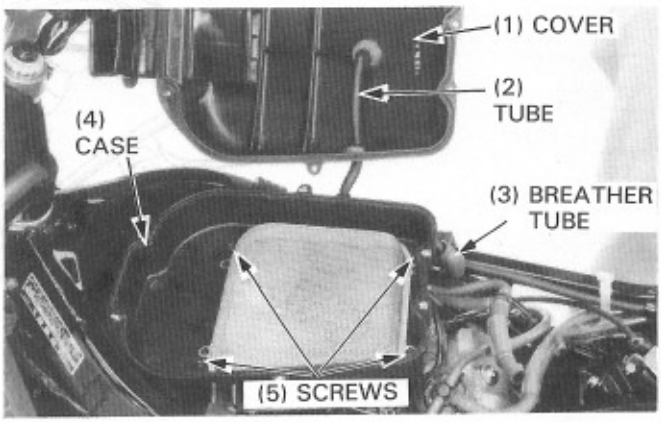
Check the diaphragm if fuel continues to flow when the vacuum is disconnected.



Disassemble the automatic fuel valve and check the diaphragm for tears or other deterioration.
Replace the diaphragm if necessary.
Assemble the automatic fuel valve.

AIR CLEANER CASE

REMOVAL



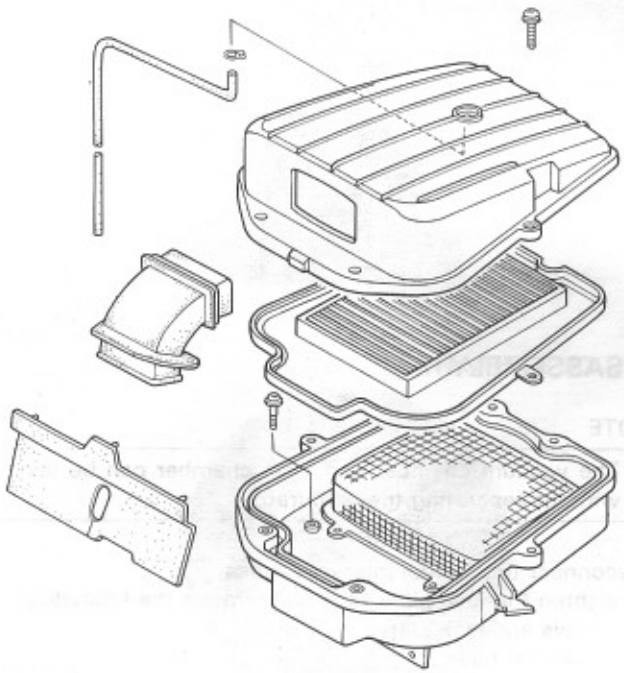
Remove the fuel tank (page 4-3).
Remove the air cleaner case cover and disconnect the tube from the cover.
Remove the air cleaner element.
Remove the air cleaner case mounting screws and disconnect the crankcase breather tube from the case.
Remove the air cleaner case.

INSTALLATION

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

NOTE

- Connect the tube to the air cleaner case cover securely.



CARBURETOR

REMOVAL

Remove the following:
– fuel tank (page 4-3).

⚠WARNING

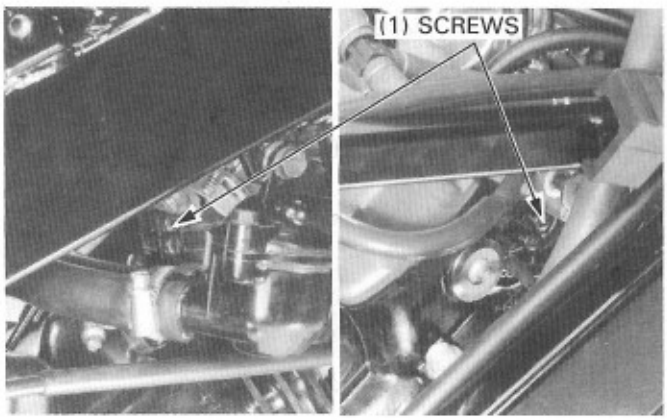
- ***Gasoline is extremely flammable and is explosive under certain conditions. Work in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area or where gasoline is stored.***
- ***Wipe up spilled gasoline at once.***

– air cleaner case (page 4-4).

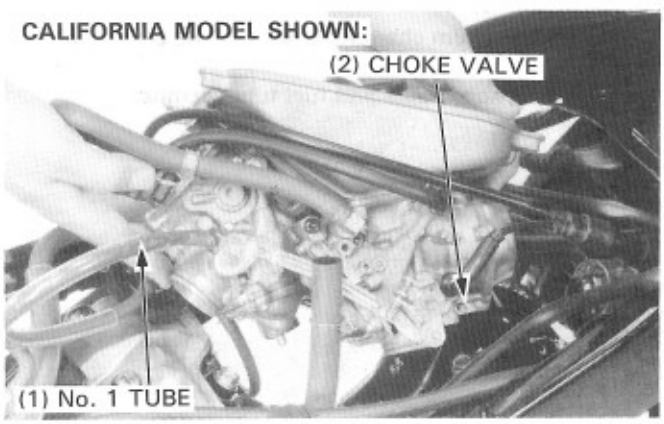
Loosen the carburetor insulator bands screws.

Remove the carburetors from the cylinder head and disconnect the choke valves.

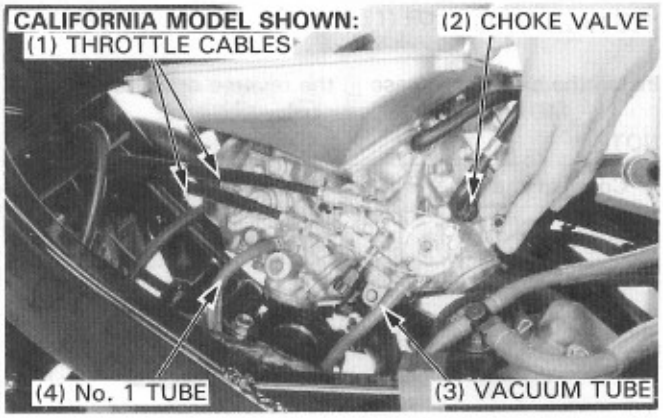
California model only:
Disconnect the Purge Control Valve (PCV) tubes from the carburetor.



CALIFORNIA MODEL SHOWN:



Disconnect the throttle cables from the throttle drum.

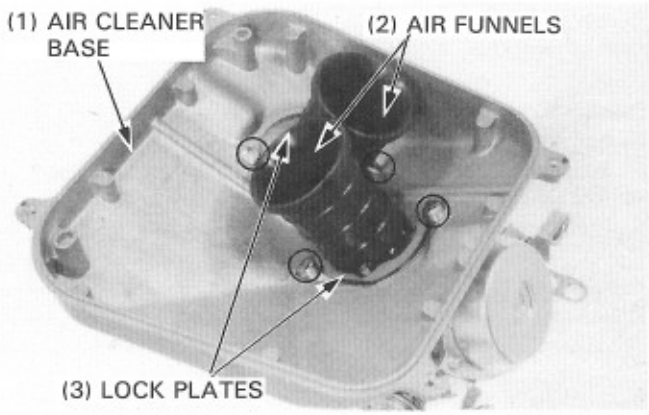


DISASSEMBLY

NOTE

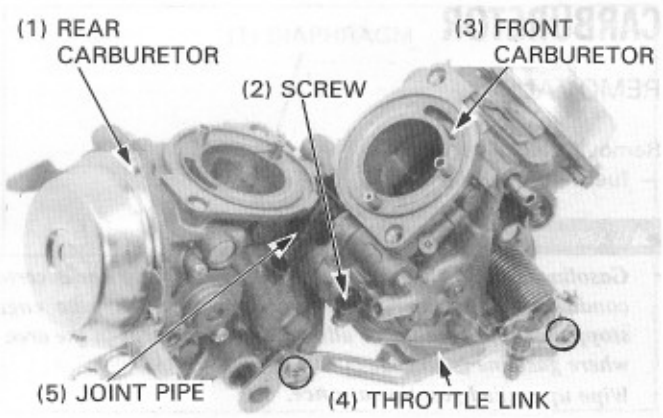
- The vacuum chamber and float chamber can be serviced without separating the carburetors.

Disconnect the fuel and air vent tubes.
Straighten the lock plate tabs and remove the following:
— screws and lock plates
— air cleaner base
— air funnels
— dowel pins



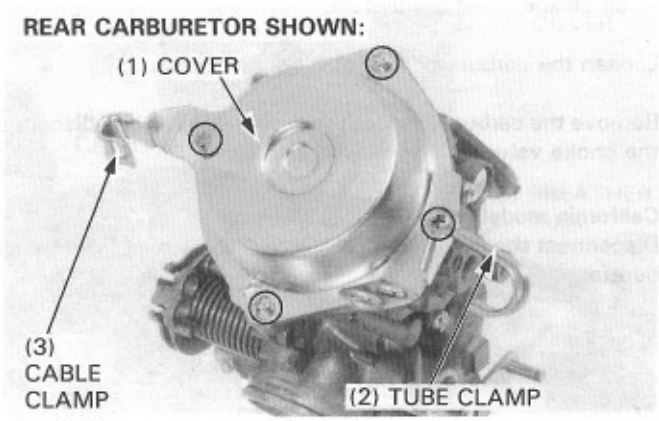
— cotter pins
— washers and throttle link
— joint screw

Separate the carburetors and remove the fuel joint pipe.



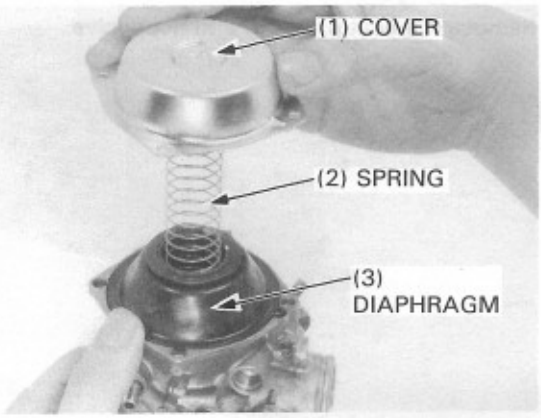
Remove the vacuum chamber cover screws and cover.

Remove the choke cable and fuel tube clamps.

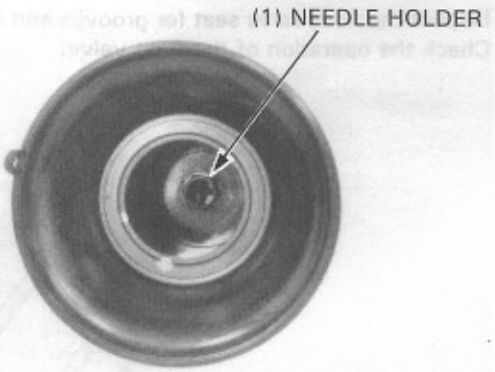


Remove the compression spring, diaphragm/vacuum piston.

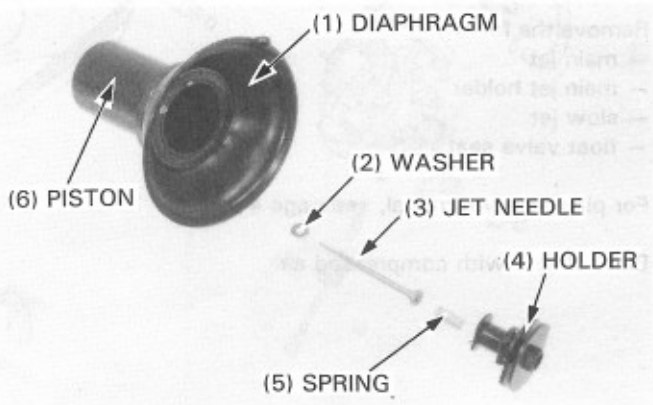
Make sure the piston moves up and down freely in the chamber.



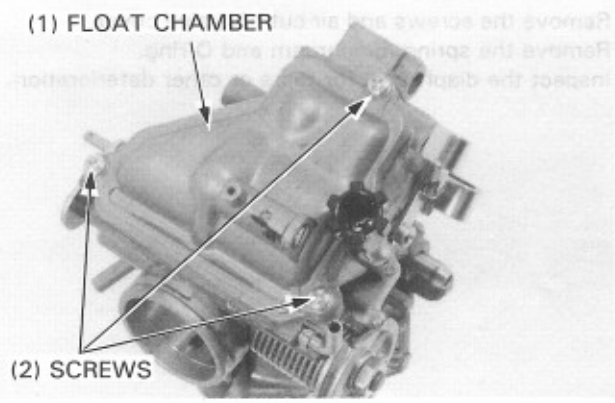
Push the needle holder in and turn it counterclockwise 60 degrees with a screwdriver.
Remove the following:
- needle holder
- spring
- jet needle
- washer



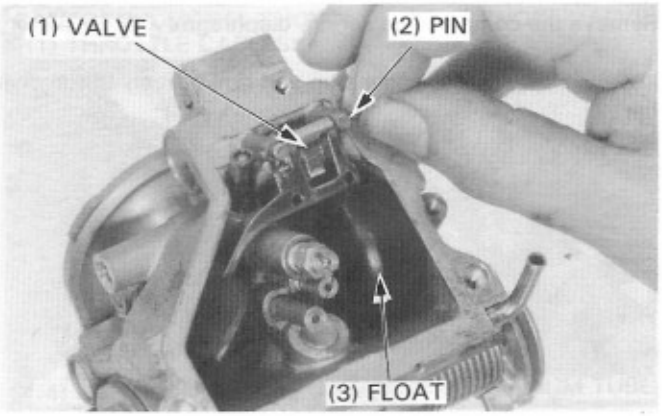
Inspect the diaphragm for tears or other deterioration.
Inspect the vacuum piston for wear, nicks, scratches or other damage.
Inspect the needle for excessive wear at the tip and for bending, or other damage.



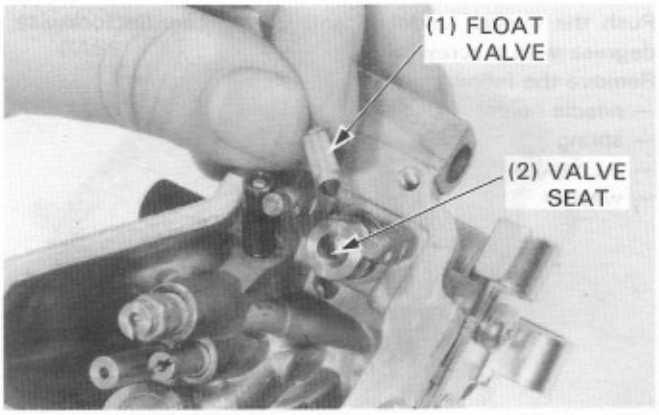
Remove the float chamber screws and the float chamber.



Remove the float pin, float and float valve.



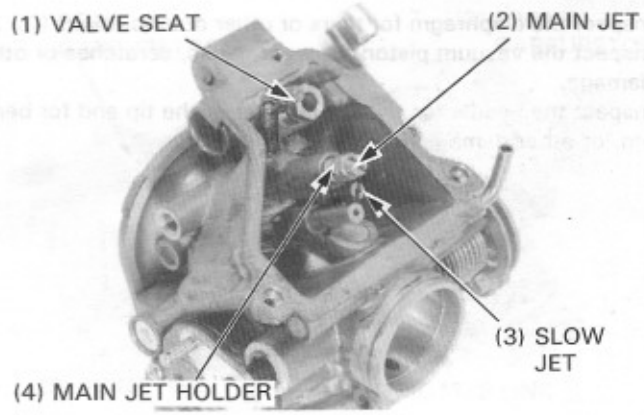
Inspect the float valve seat for grooves and nicks.
Check the operation of the float valve.



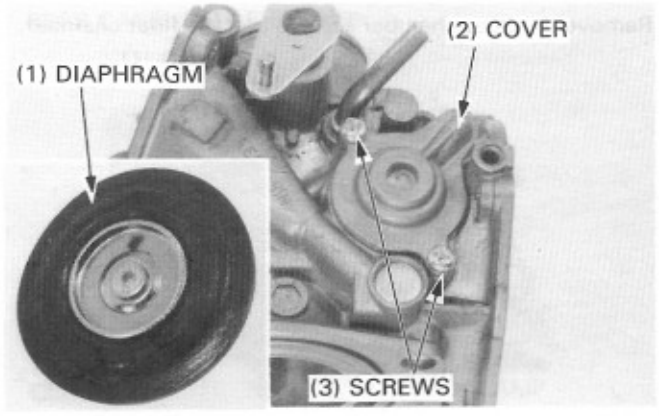
Remove the following:
- main jet
- main jet holder
- slow jet
- float valve seat

For pilot screw removal, see page 4-15.

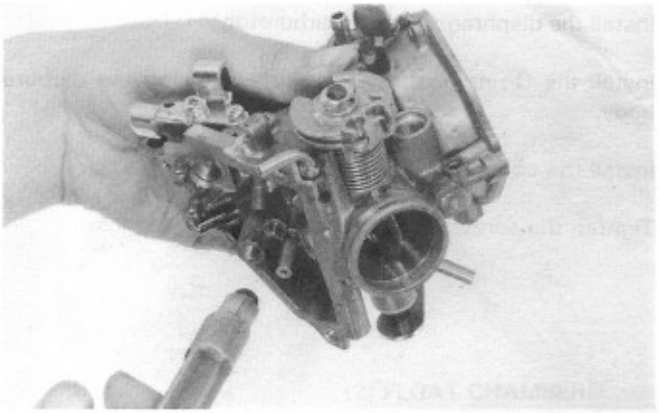
Blow all jets with compressed air.



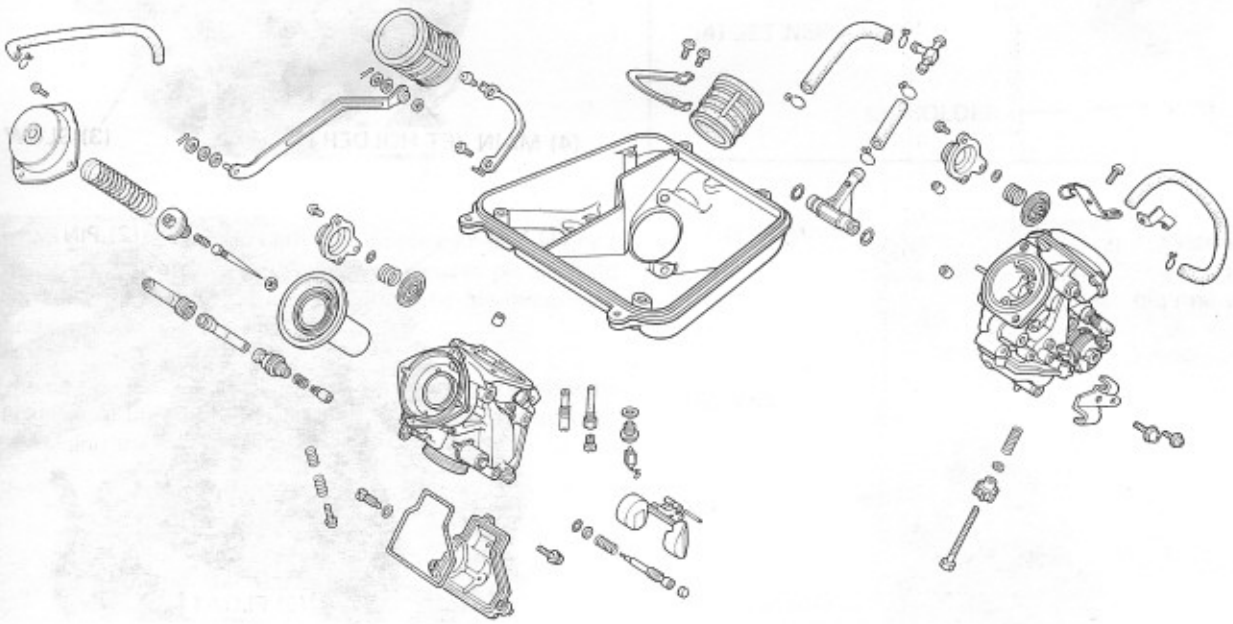
Remove the screws and air cut off valve cover.
Remove the spring, diaphragm and O-ring.
Inspect the diaphragm for tears or other deterioration.



Blow body passages with compressed air.



ASSEMBLY

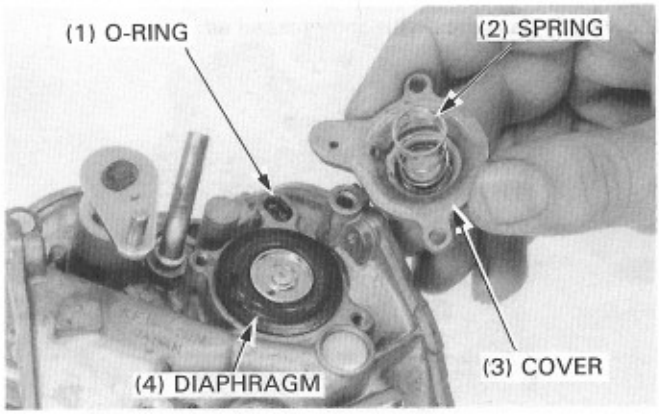


Install the diaphragm on the carburetor.

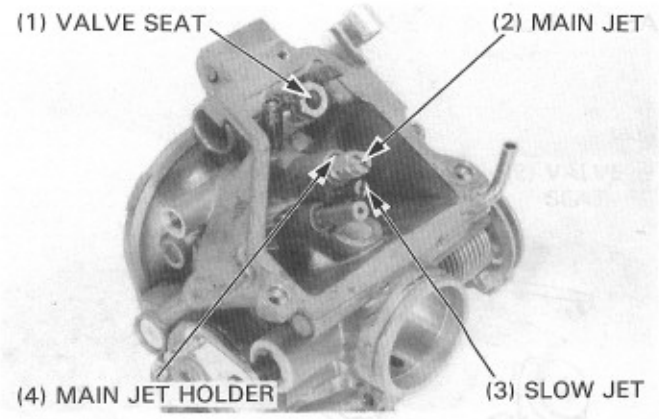
Install the O-ring with its flat surface facing the carburetor body.

Install the cover with the spring.

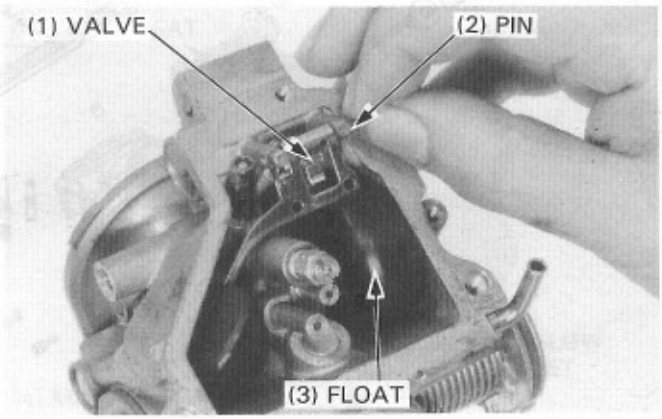
Tighten the screws securely.



Install the following:
- float valve seat
- main jet holder
- main jet
- slow jet



- float valve
- float
- float arm pin

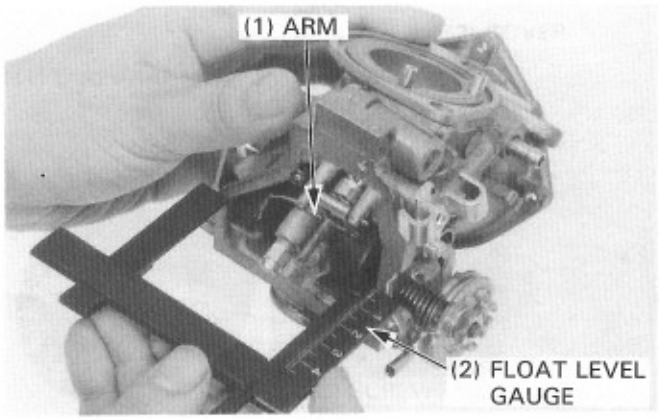


Measure the float level with the float tip just contacting the float valve and the carburetor inclined 15°—45° from vertical.

FLOAT LEVEL: 6.8 mm (0.27 in)

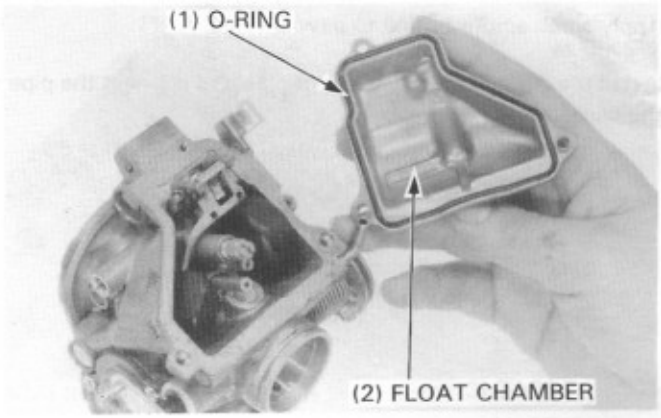
TOOL:
Float level gauge **07401—0010000**

Adjust the float level, if necessary, by bending the float arm carefully until it just contacts the float valve.



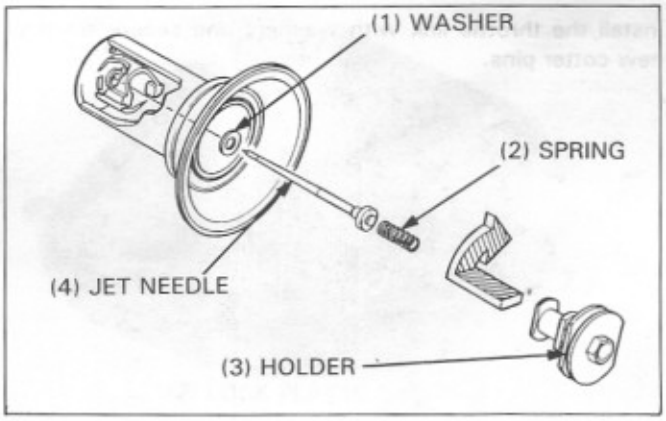
Check that the O-ring is in good condition.

Install the float chamber and tighten the screws securely.



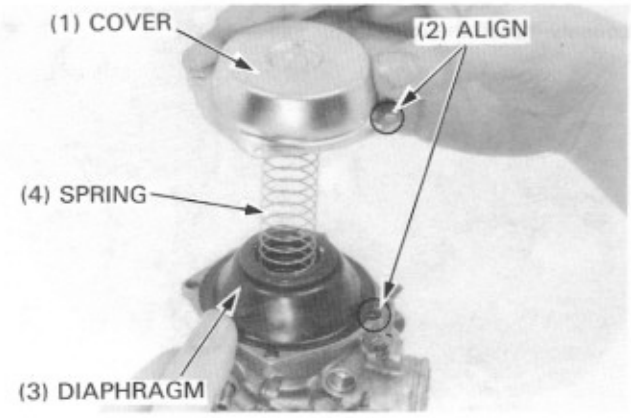
Install the washer, jet needle, spring and needle holder to the vacuum piston.

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



Install the vacuum chamber with the diaphragm tab aligned with the carburetor groove and with the vacuum piston held up to almost full open so it does not pinch the diaphragm on the chamber cover.

Install the chamber cover with the spring, aligning its tab with the hole in the carburetor, and secure with at least two screws before releasing the vacuum piston.

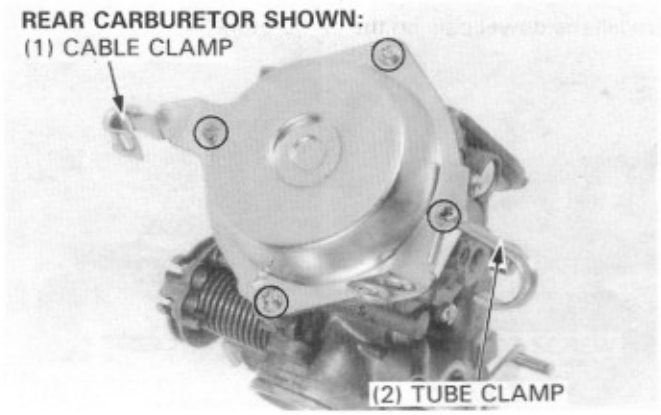


Install the remaining vacuum chamber cover screws with the clamps.

CAUTION

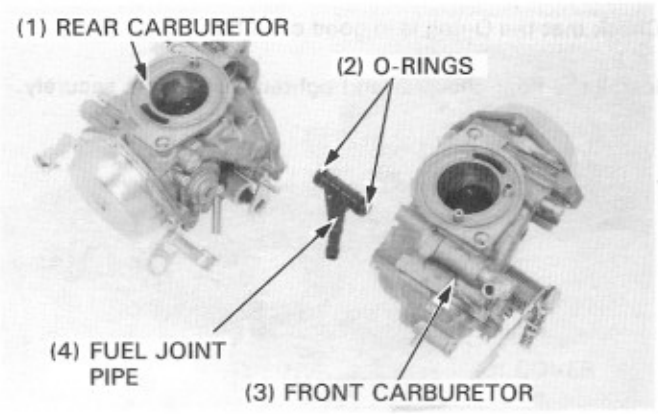
* *Do not pinch the diaphragm with the chamber cover.*

REAR CARBURETOR SHOWN:

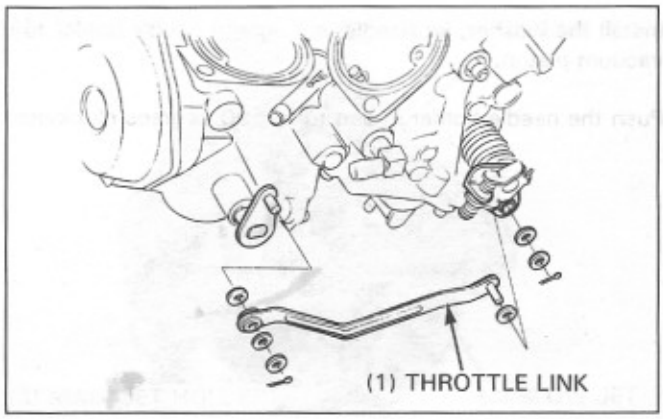


Apply small amount of oil to new O-rings.

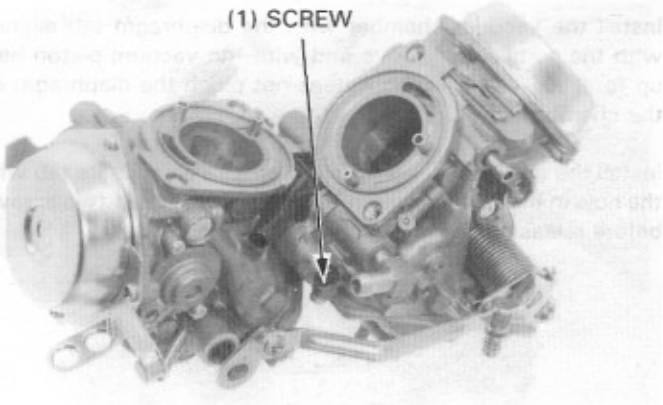
Install the O-rings on the fuel joint pipe and connect the pipe to the carburetors.



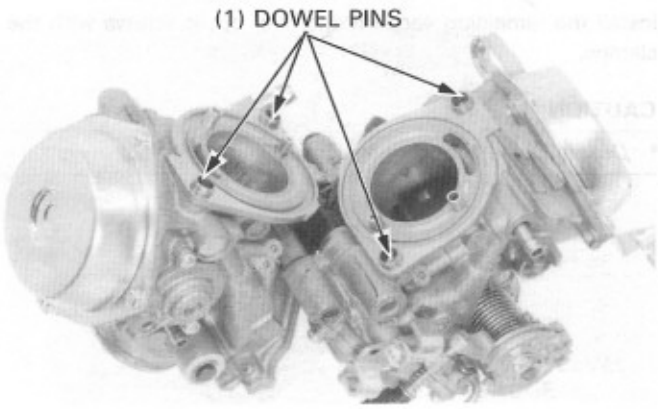
Install the throttle link with washers and secure them with new cotter pins.



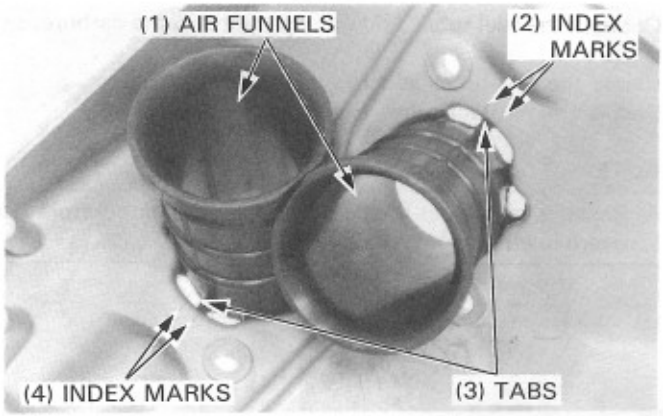
Loosely install the carburetor joint screw.



Install the dowel pins on the carburetors.



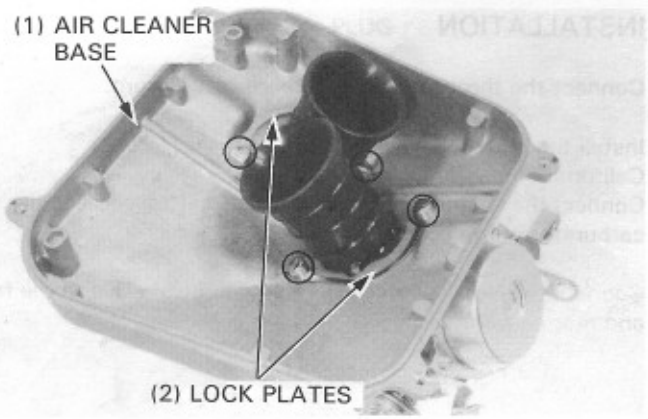
Set the air funnels on the air cleaner base, aligning the narrow tab of the funnel with the index marks on the base.



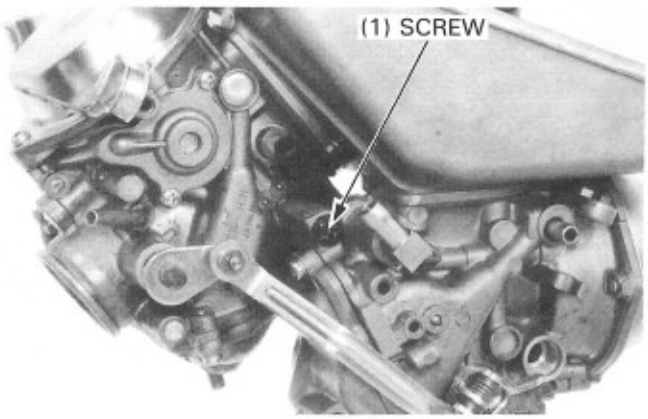
Install the carburetors on the air cleaner base.

Install new lock plates and tighten the screws securely.

Bend the tabs of the lock plates to lock the screws.



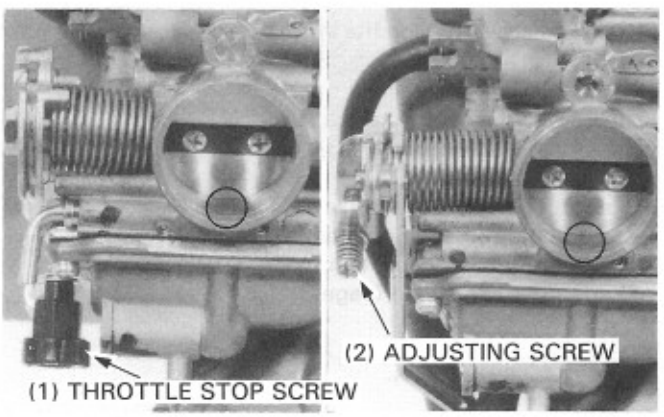
Tighten the carburetor joint screw securely.



Turn the throttle stop screw to align the front carburetor throttle valve with the edge of the by-pass hole.

Align the rear carburetor throttle valve with the by-pass hole edge by turning the synchronization adjusting screw.
Inspect throttle operation as described below:

- Open the throttle slightly by pressing the throttle linkage. Then release the throttle.
- Make sure that it returns smoothly.
- Make sure that there is no drag when opening and closing the throttle.

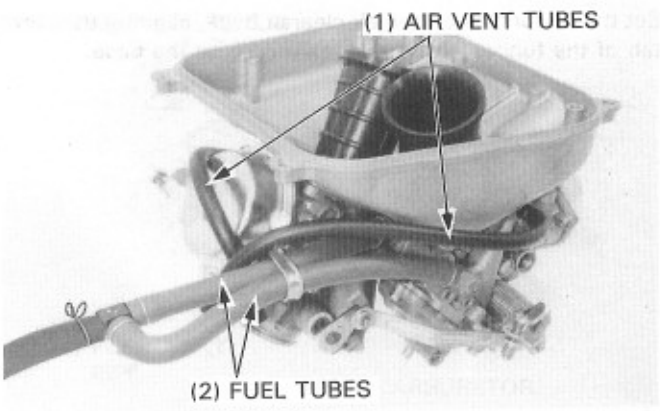


Connect the fuel tubes and air vent tubes to the carburetors.

Clamp the fuel tubes securely.
Secure the air vent tubes to the tube setting plate.

NOTE

- Replace and adjust the pilot screws if the carburetors were overhauled (page 4-15).

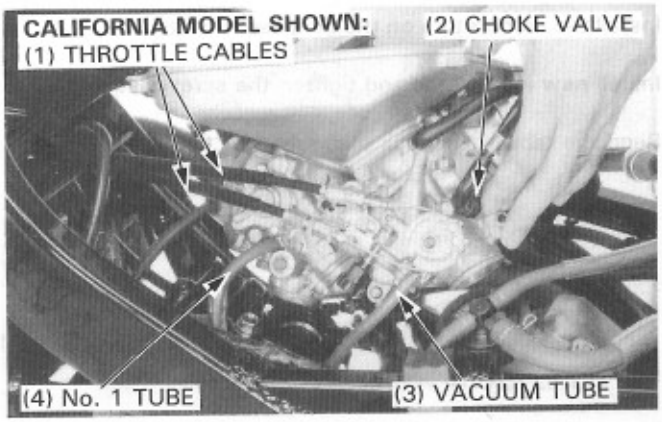


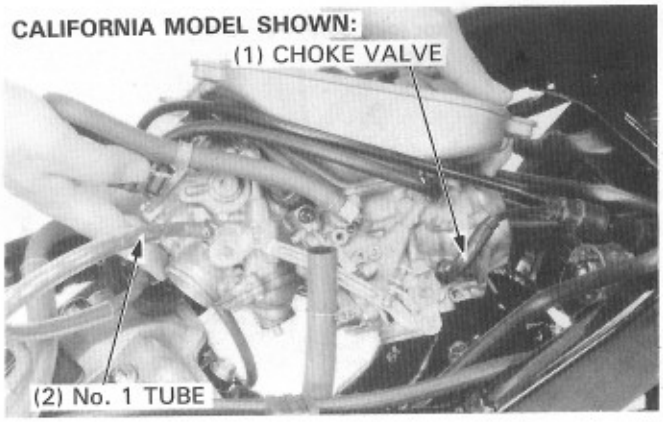
INSTALLATION

Connect the throttle cables to the throttle drum.

Install the choke valves.
California model only:
Connect the vacuum tube of the purge control valve to the rear carburetor purge control port.

Connect the No. 1 tubes of the purge control valve to the front and rear carburetors.

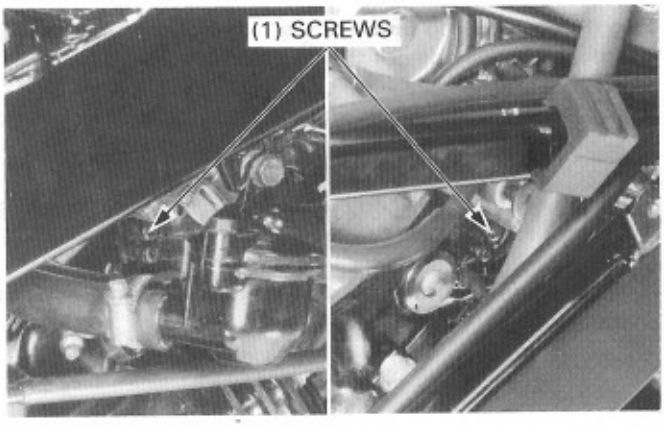




Install the carburetors on the insulators and tighten the screws securely.

Install the air cleaner case (page 4-4).
Install the fuel tank (page 4-3).

Adjust the following:
— throttle grip free play (page 3-4)
— carburetor synchronization (page 3-10)
— carburetor idle speed (page 3-10)



PILOT SCREW

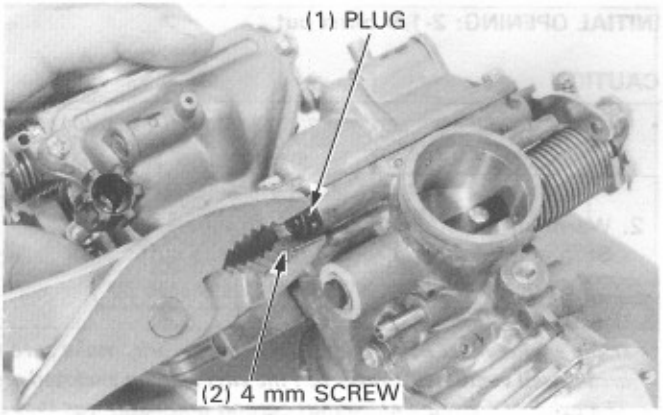
REMOVAL

NOTE

- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.
- The pilot screw plugs are factory installed to prevent pilot screw misadjustment. Do not remove the plugs unless the pilot screws are being removed.
- Cover all openings with tape to keep metal particles out when the plugs are drilled.



Remove the carburetors (page 4-5).
Center punch the pilot screw plug to center the drill point.
Drill through the plug with a 4 mm (5/32 in) drill bit. Attach a drill stop to the bit 3 mm (1/8 in) from the end of prevent drilling into the pilot screw.



CAUTION

- *Be careful not to drill into the pilot screw.*
- *Both pilot screws must be replaced even if only one requires it, for proper pilot screw adjustment (page 4-16).*

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

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

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

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

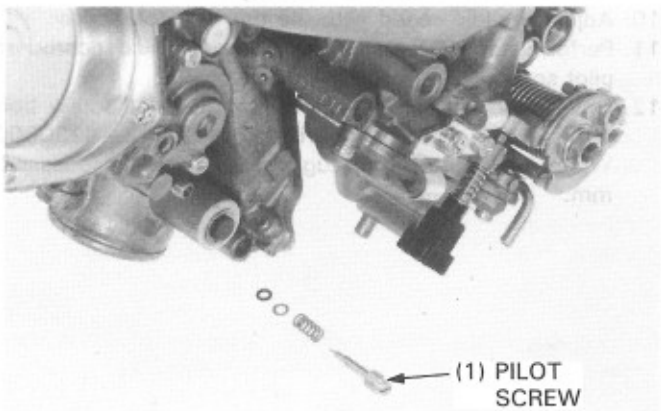
CAUTION

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

Remove the pilot screws and inspect them. Replace them if they are worn or damaged.

INSTALLATION

Install the pilot screws and return them to their original position as noted during removal (as described on the next page). Perform pilot screw adjustment if new pilot screws are installed.



NOTE

- Do not install new plugs on new pilot screw holes until after adjustment has been made.
- If you replace the pilot screw in one carburetor, you must replace the pilot screw in the other carburetor for proper pilot screw adjustment.

Install the carburetors (page 4-14).

ADJUSTMENT (IDLE DROP PROCEDURE, U.S.A. ONLY)

NOTE

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

1. Turn each 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: 2-1/8 turns out

CAUTION

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

2. Warm up the engine to operating temperature.
   Stop and go driving for 10 minutes is sufficient.

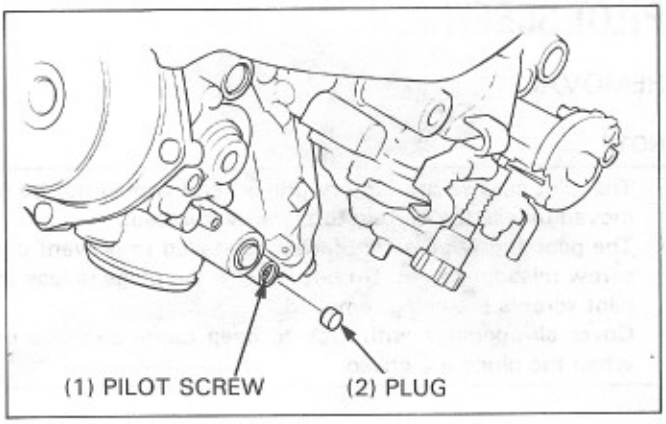
⚠WARNING

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

3. Attach a tachometer according to the manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.

   IDLE SPEED: 1,500 ± 100 rpm

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the rear cylinder carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the rear cylinder carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the front cylinder carburetor pilot screw.
12. Drive new pilot screw plugs into the pilot screw bores with a 7 mm valve guide driver (P/N 07942—8230000). When fully seated the plug surfaces will be recessed 1 mm.



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.

Remove each pilot screw plug (page 4-15).

Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.

⚠WARNING

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

Turn each pilot screw clockwise 1 turn.

Adjust the idle speed to specification (page 4-1), with the throttle stop screw.

Drive new pilot screw plugs into the pilot screw bores (page 4-16).

NOTE

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

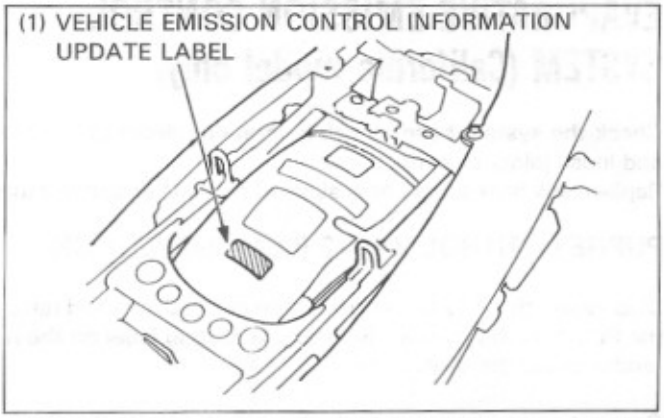
Attach a Vehicle Emission Control Information Update label on the rear fender under the seat as shown. See SL#132 for information on obtaining the label.

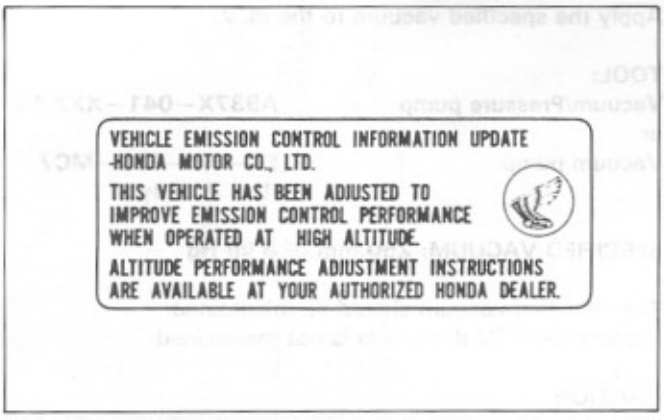
NOTE

- 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 m (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 m (5,000 feet), turn each pilot screw counterclockwise 1 turn to its original position after removing each pilot screw plug and adjust the idle speed to specificaiton (page 4-1). Drive new pilot screw plugs into the pilot screw bores (page 4-16). Be sure to do these adjustments at low altitude.***





	STANDARD (BELOW 1,500 m, 5,000 ft)	HIGH ALTITUDE (ABOVE 2,000 m, 6,500 ft)
PILOT SCREW INITIAL OPENING	2-1/8 turns out	1-1/8 turns out
IDLE SPEED	1,500 ± 100 rpm	

EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

Check the system hoses for deterioration, clogging, damage, and loose joints or connections.
Replace any hoses that show signs of damage or deterioration.

PURGE CONTROL VALVE (PCV) INSPECTION

Disconnect the PCV hoses from their connections and remove the PCV from its mount. Refer to the routing label on the rear fender under the seat.

Connect a vacuum pump to the hose that goes to the rear cylinder carburetor purge control port.
Apply the specified vacuum to the PCV.

TOOL:

Vacuum/Pressure pump	**A937X–041–XXXXX**
or	
Vacuum pump	**ST–AH–260–MC7 (U.S.A. only)**

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

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

CAUTION

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

Plug the hose that goes to the front cylinder carburetor.
Remove the vacuum pump and connect it to the hose that goes to the rear cylinder carburetor.
Apply the specified vacuum to the PCV.

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

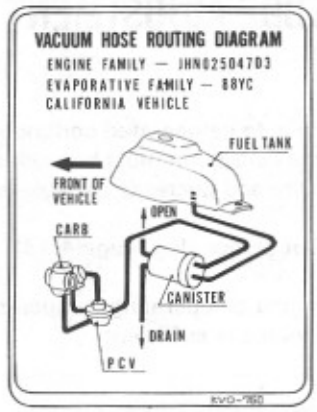
The specified vacuum should be maintained.
Replace the PCV if vacuum is not maintained.

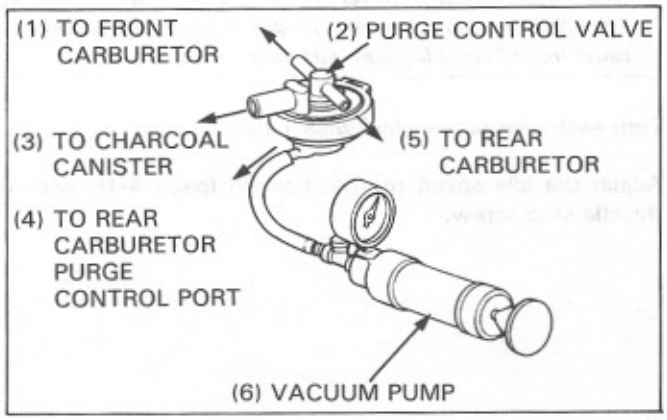
Connect a pressure pump to the 8 mm I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the vacuum tube that goes to the rear cylinder carburetor purge control port, pump air through the canister hose. Air should flow through the PCV and out the hose that goes to the rear cylinder carburetor body. Replace the PCV if air does not flow out.

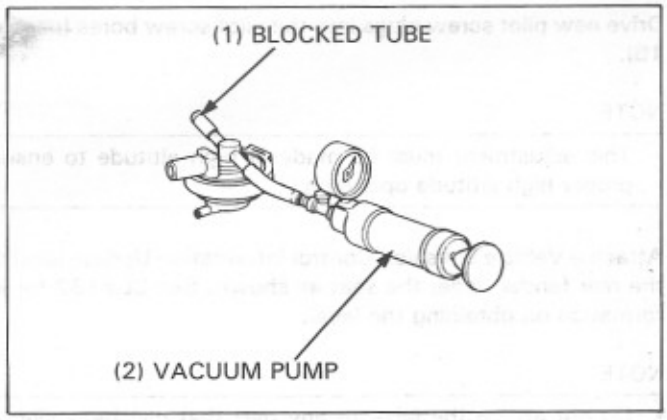
TOOL:

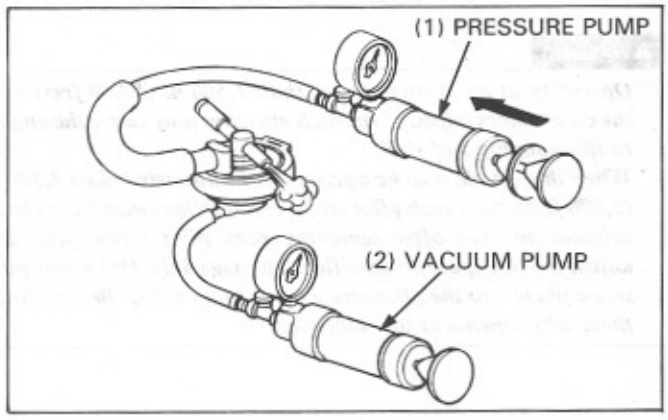
Vacuum/Pressure pump	**A937X–041–XXXXX**
or	
Vacuum pump	**ST–AH–260–MC7**
Pressure pump	**ST–AH–255–MC7 (U.S.A. only)**

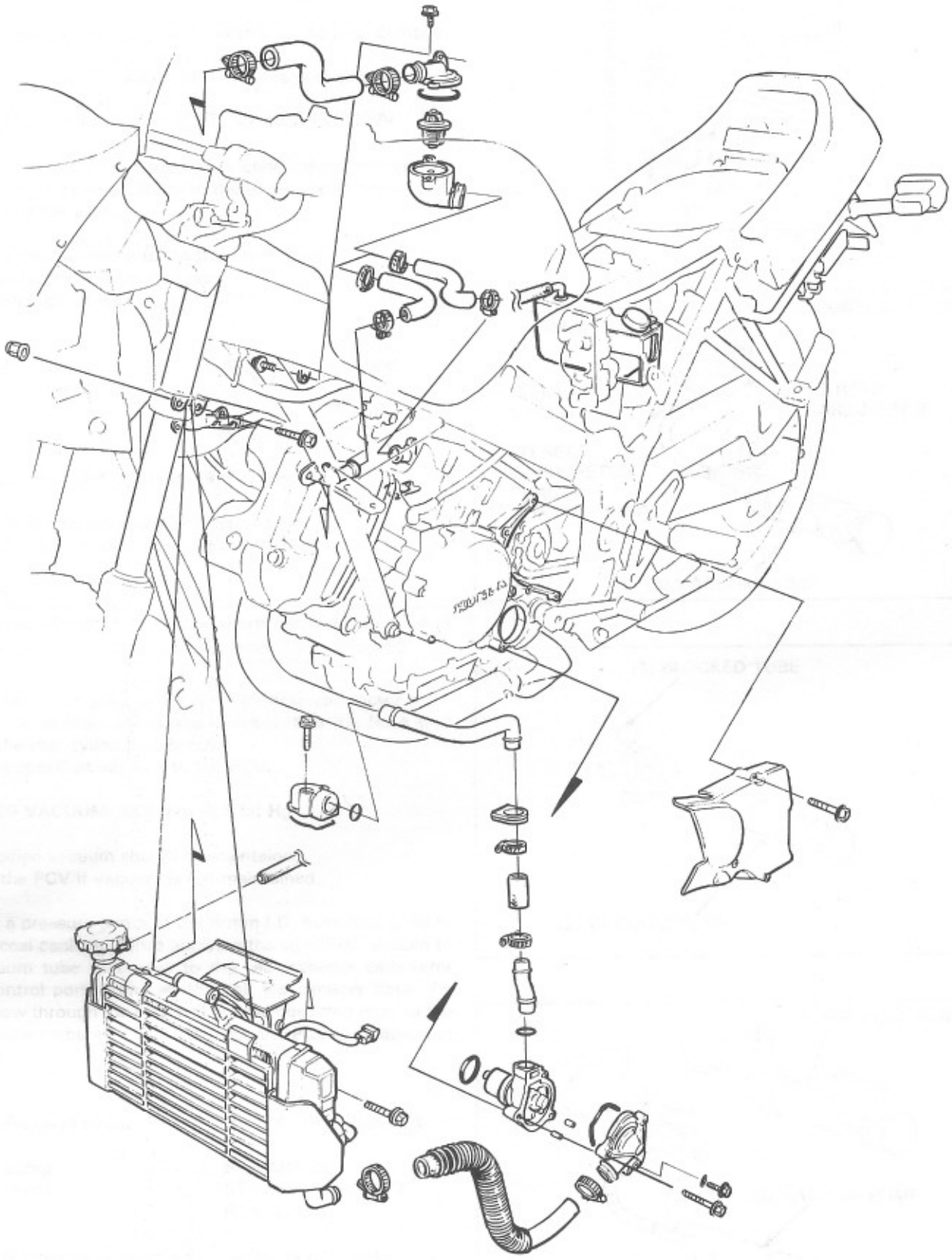
Remove the pumps, install the PCV on its mount, route and reconnect the hoses according to the routing label.











5. COOLING SYSTEM

SERVICE INFORMATION	5-1	THERMOSTAT	5-3
TROUBLESHOOTING	5-1	RADIATOR/COOLING FAN	5-4
SYSTEM TESTING	5-2	WATER PUMP	5-7
COOLANT REPLACEMENT	5-3	RESERVE TANK	5-9

SERVICE INFORMATION

GENERAL

⚠ WARNING

- *Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.*
- *If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.*

- Use only distilled water and ethylene glycol in the cooling system. A 50 : 50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze or an antifreeze with self sealing properties.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be made with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 19 for fan motor thermostatic switch and temperature gauge inspections.

SPECIFICATIONS

Radiator cap relief pressure	75—105 kPa (0.75—1.05 kg/cm², 10.7—14.9 psi)
Freezing point (Hydrometer test):	55% Distilled water + 45% ethylene glycol: −32°C (−25°F) 50% Distilled water + 50% ethylene glycol: −37°C (−34°F) 45% Distilled water + 55% ethylene glycol: −44.5°C (−48°F)
Coolant capacity: Radiator and engine Reserve tank Total system	 1.4 lit (1.48 US qt, 1.23 Imp qt) 0.3 lit (0.32 US qt, 0.26 Imp qt) 1.7 lit (1.80 US qt, 1.50 Imp qt)
Thermostat	Starts to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 7 mm at 95°C (0.28 in at 203°F)
Boiling point (with 50—50 mixture):	Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F)

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature gauge or temperature sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses, or water jacket
- Fan blades bent
- Faulty fan motor or thermostatic switch
- Faulty water pump
- Air bubbles in cooling system

Engine temperature too low
- Faulty temperature gauge or temperature sensor
- Thermostat stuck open
- Faulty thermostatic switch

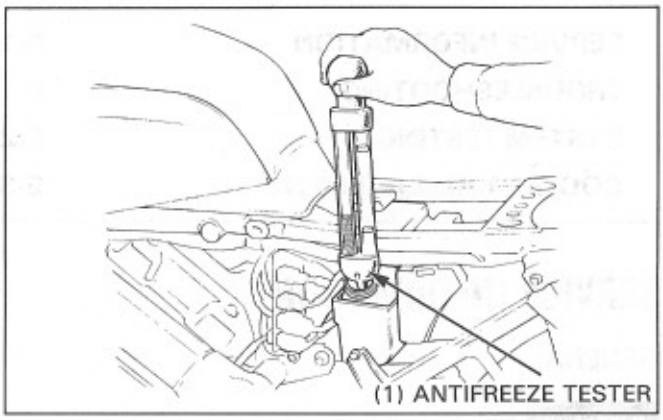
Coolant leak
- Faulty water pump mechanical seal
- Faulty O-ring or gasket
- Faulty radiator cap
- Incorrectly installed radiator hoses

SYSTEM TESTING

COOLANT

Remove the left side cover and reserve tank cap.
Test the coolant mixture with an antifreeze tester.

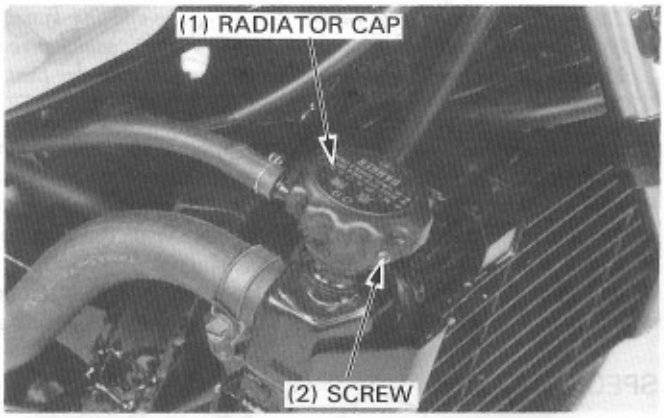
For maximum corrosion protection, a 50 : 50 solution of ethylene glycol and distilled water is recommended.



RADIATOR CAP/SYSTEM INSPECTION

Remove the right side fairing (page 12-2).

Remove the screw and radiator cap.

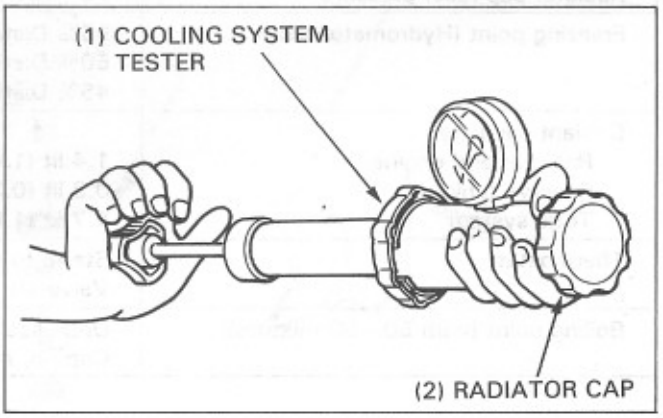


Pressure test the radiator cap. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

NOTE

- Before installing the cap on the tester, apply water to sealing surfaces.

RADIATOR CAP RELIEF PRESSURE:
75—105 kPa (0.75—1.05 kg/cm², 10.7—14.9 psi)

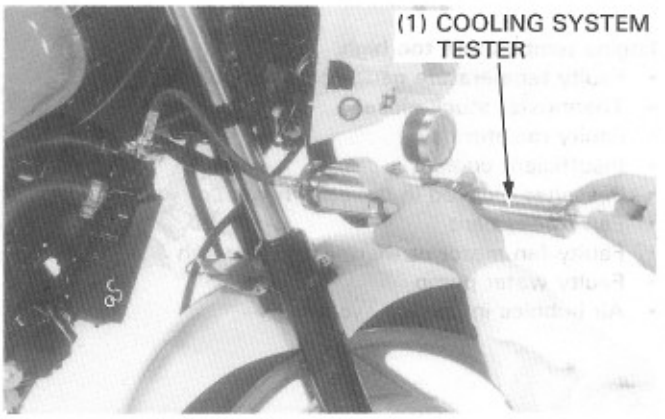


Pressurize the radiator, engine and hoses, and check for leaks.

CAUTION

- *Excessive pressure can damage the radiator. Do not exceed 105 kPa (1.05 kg/cm², 14.9 psi).*

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



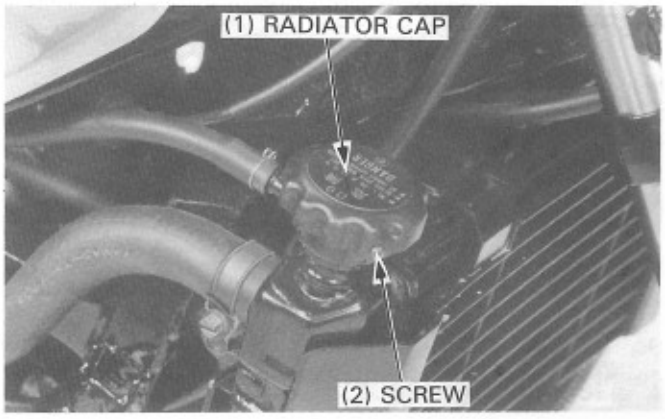
COOLANT REPLACEMENT

⚠WARNING

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

Remove the right side fairing and the lower fairing (Section 12).

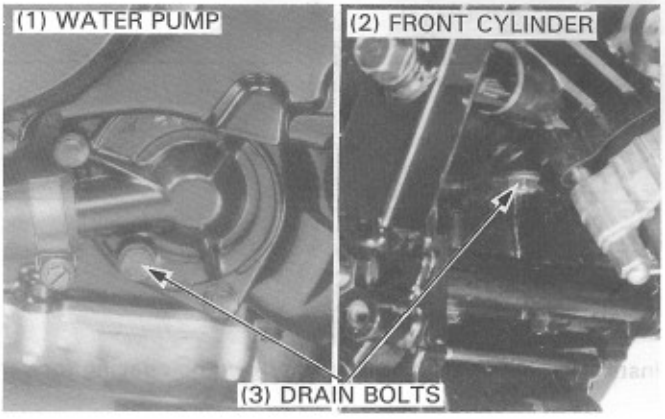
Remove the screw and radiator cap.



Drain the coolant from the cooling system by removing the drain bolts located at the water pump and front cylinder.

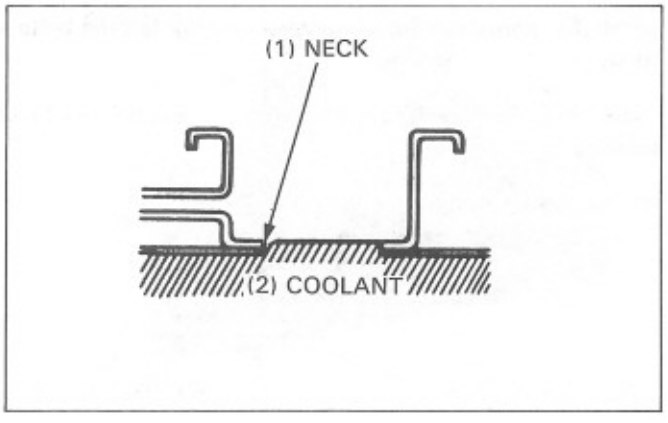
Remove the reserve tank (page 5-9).
Drain the coolant from the reserve tank.
Reinstall the reserve tank.

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



Fill the system with a mixture of distilled water and ethylene glycol (see page 5-1).
Bleed air from the cooling system as follows:

- Support the motorcycle in an upright position on level ground and shift the transmission into neutral.
- Start the engine and snap the throttle grip 3 or 4 times at 4,000–5,000 rpm, then add coolant to fill the radiator up to the bottom of the filler neck.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level.
- Reinstall the lower fairing (page 12-3).



THERMOSTAT

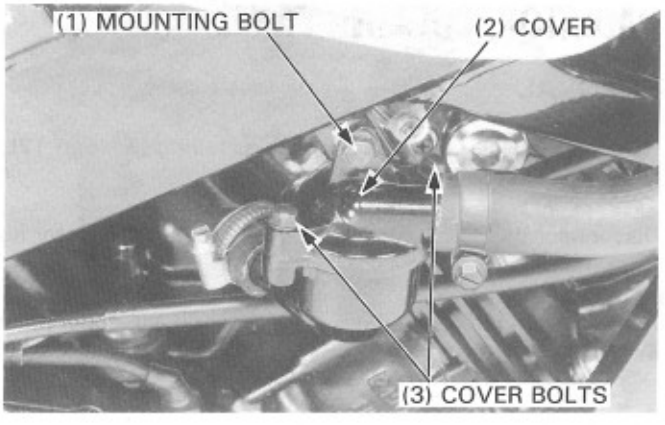
REMOVAL

Drain the coolant.

Remove the thermostat housing mounting bolt.

Remove the bolts and thermostat housing cover.

Remove the thermostat from the housing.



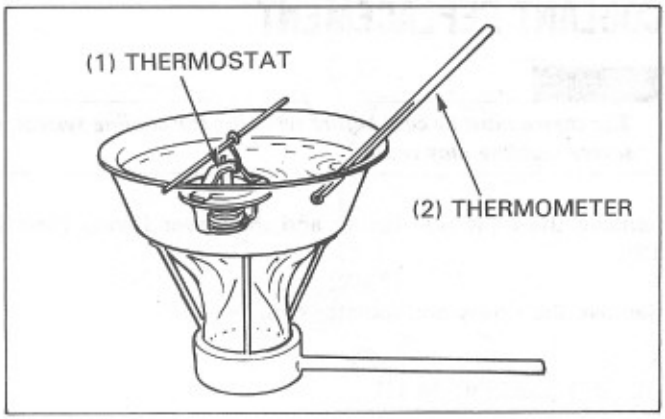
INSPECTION

Inspect the thermostat visually for damage.
Suspend the thermostat in heated water to check its operation.

NOTE

- If the thermostat or thermometer touches the pan, you'll get a false reading.

Replace thermostat if valve stays open at room temperature, or if it responds at temeratures other than those specified.



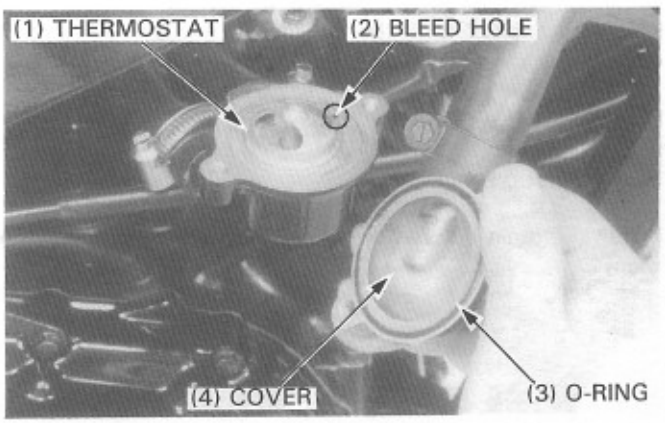
Technical Data

Starts to open	80° to 84°C (176—183°F)
Valve lift	7 mm (0.28 in) minimum when heated to 95°C (203°F) for five minutes.

INSTALLATION

Install a new O-ring on the thermostat housing cover.

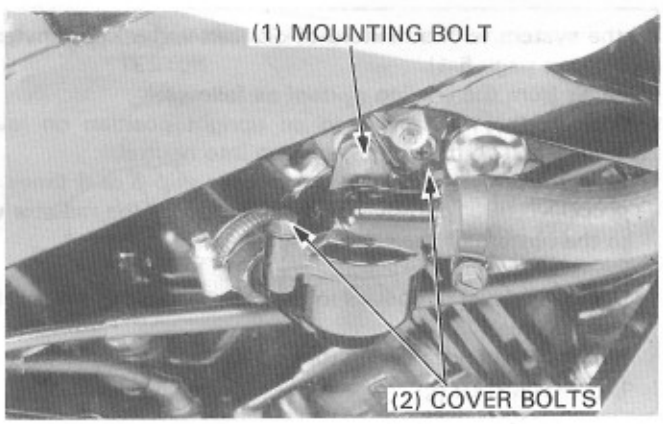
Install the thermostsat with its air bleed hole facing forward.



Install the thermostat housing cover and tighten the bolts securely.

Install the thermostat housing to the frame and tighten the bolt securely.

Fill the cooling system (page 5-3).



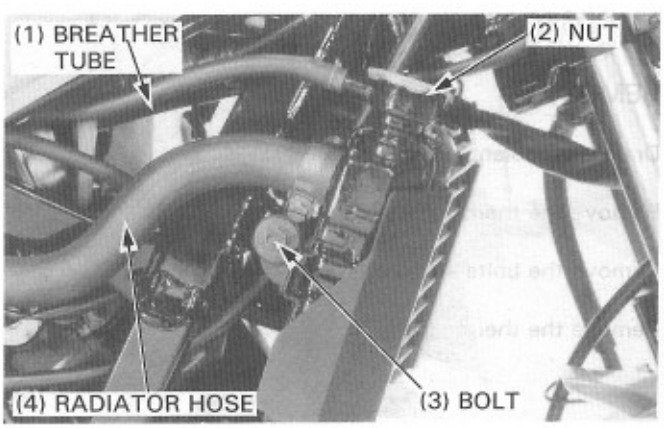
RADIATOR/COOLING FAN

REMOVAL

Remove the side fairing and the lower fairing (Section 12).
Drain the coolant (page 5-3).

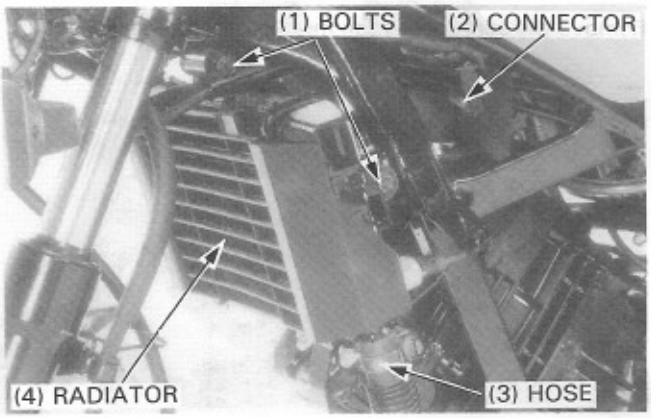
Disconnect the radiator breather tube and upper radiator hose from the radiator.

Remove the right side radiator mounting bolt and upper mounting nut.



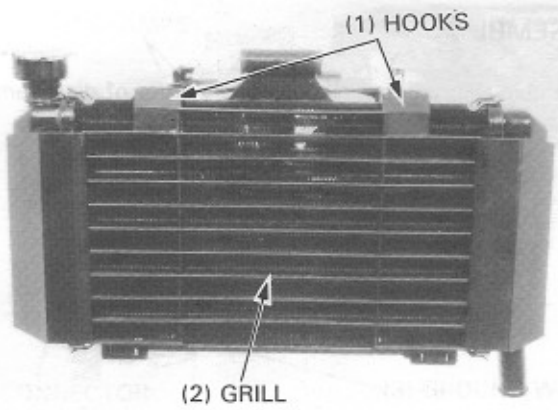
Disconnect the fan motor wire connector and the lower radiator hose.
Remove the left side radiator mounting bolt.

Remove the radiator upper mounting bolt and radiator.

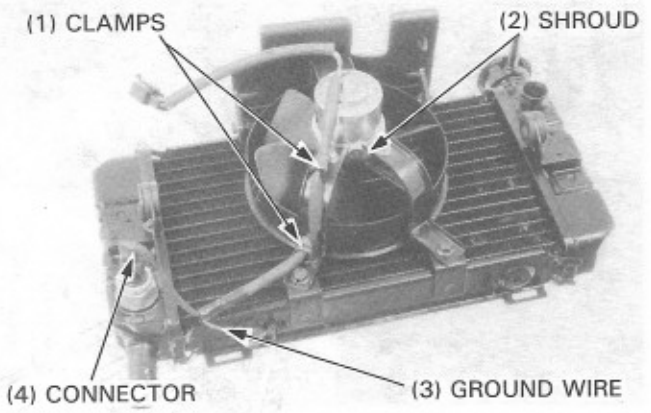


DISASSEMBLY

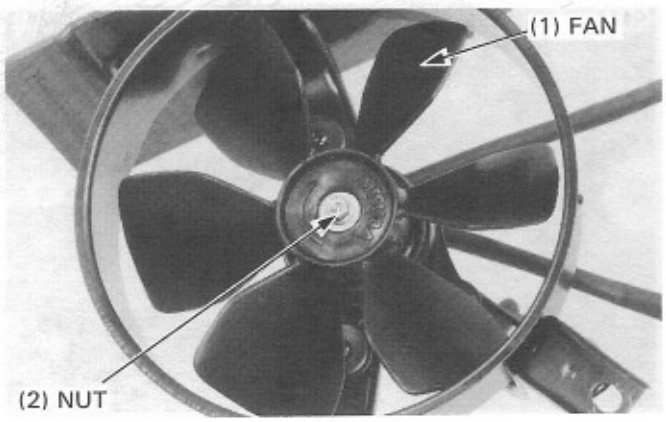
Pry off the radiator grill hooks from the radiator and remove the grill.



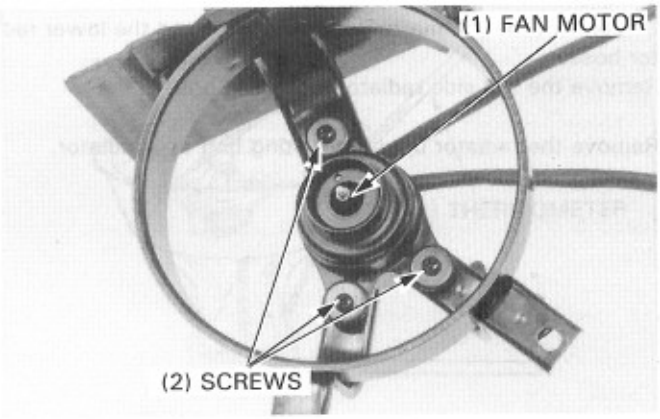
Disconnect the thermostatic switch wire connector and ground wire. Free the wire from the clamps.
Remove the fan shroud mounting bolts and fan shroud.



Remove the nut and fan.

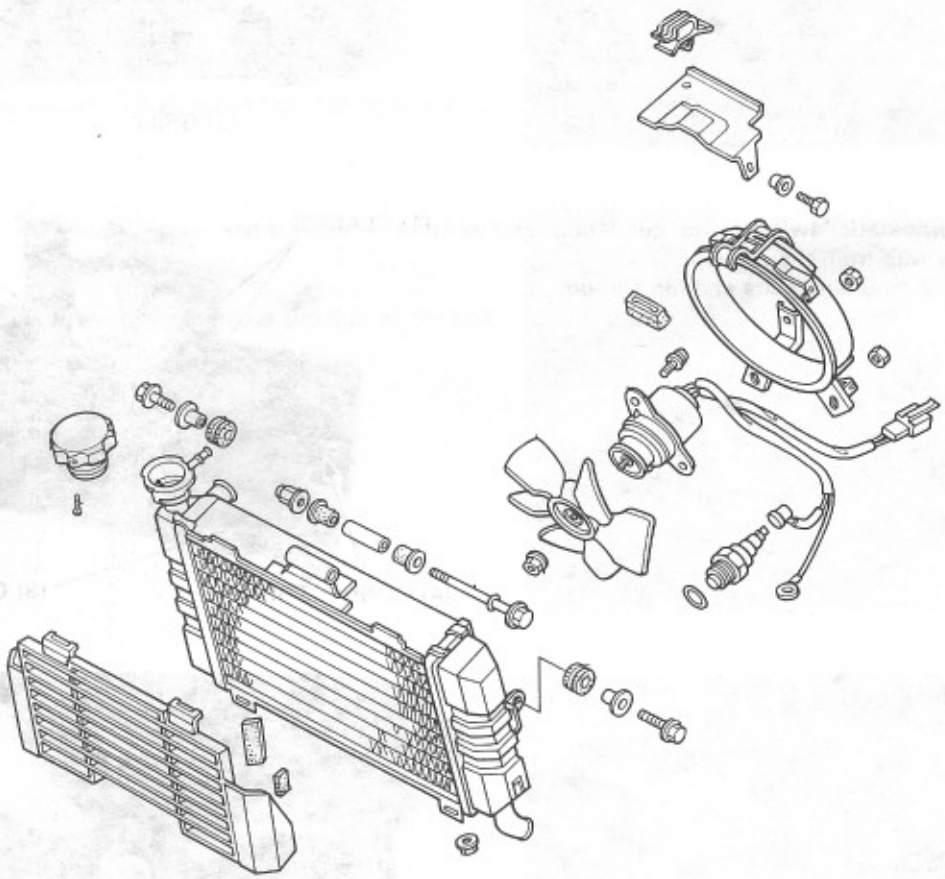


Remove the screws and fan motor from the fan shroud.



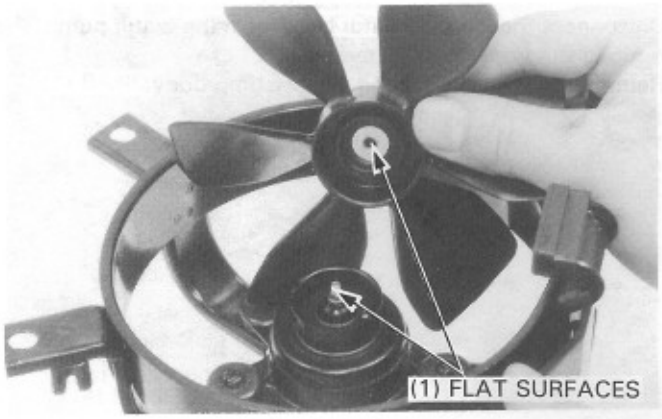
ASSEMBLY

Assemble the radiator in the reverse order of disassembly.



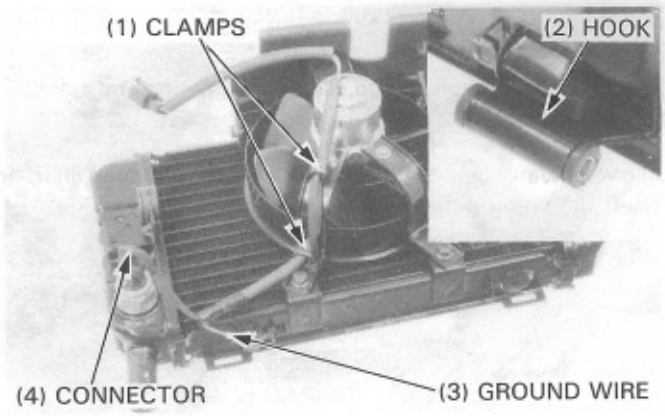
NOTE

- Install the fan to the fan motor shaft by aligning their flat surfaces.



NOTE

- Hook the fan shroud to the groove in the radiator.
- Connect the thermostatic switch and ground wires correctly and secure the wires with clamps on the fan shroud.



INSTALLATION

Install the radiator in the reverse order of removal.

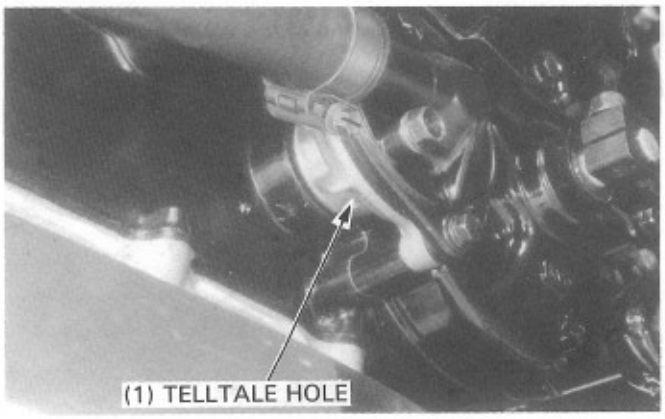
Fill the cooling system (page 5-3).

WATER PUMP

MECHANICAL SEAL INSPECTION

Inspect the telltale hole for signs of coolant leakage from the water pump, mechanical seal.

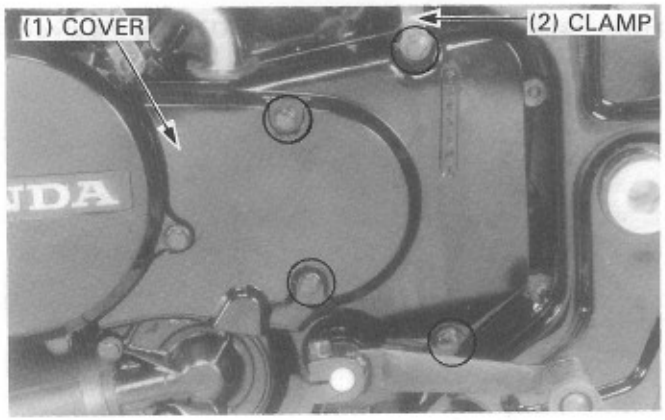
Replace the water pump as an assembly if the mechanical seal is leaking.



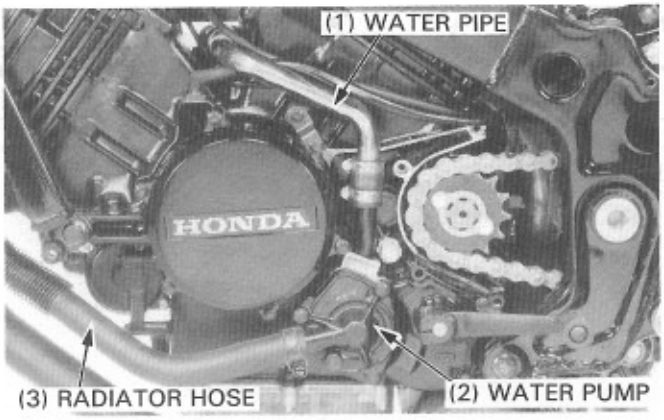
REMOVAL

Drain the engine oil (page 2-4).
Drain the coolant (page 5-3).

Remove the drive sprocket cover and alternator wire clamp.



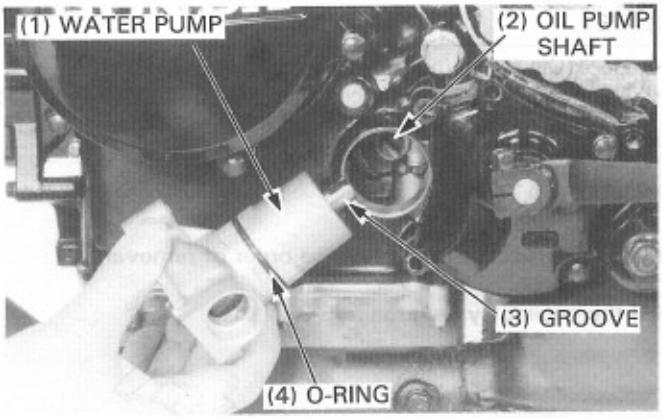
Disconnect the lower radiator hose from the water pump, then remove the water pump cover.
Remove the water pipe and water pump body.



INSTALLATION

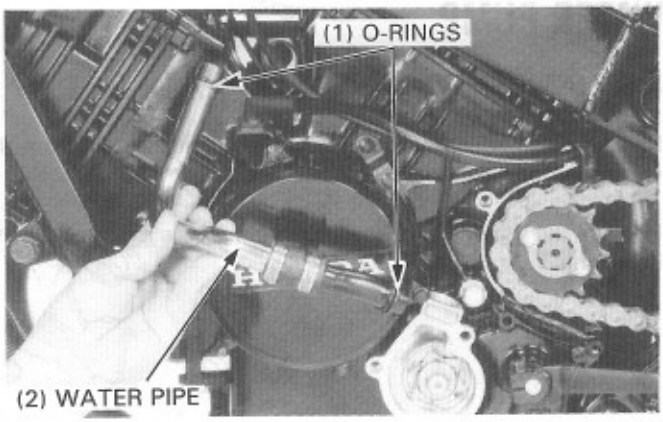
Apply a coat of clean engine oil to a new O-ring and install it in the water pump groove.

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

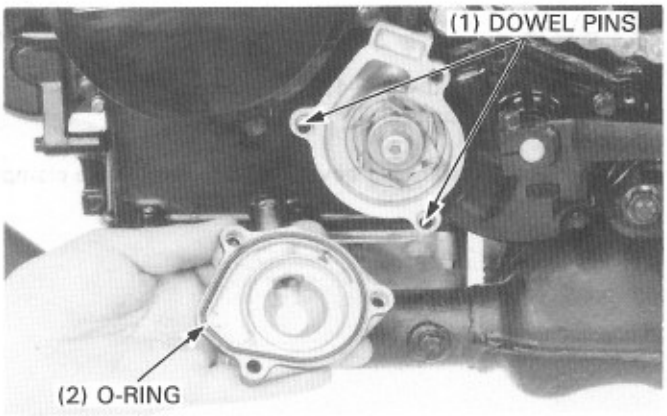


Insert new O-rings over the end of the water pipe.

Install the water pipe.

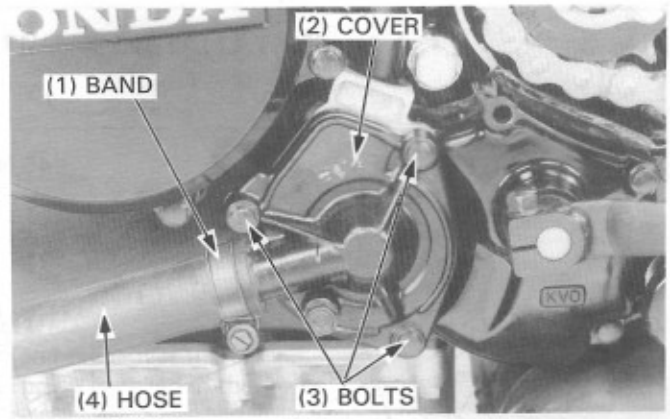


Install the dowel pins and install a new O-ring in the groove of the water pump cover.



Install the water pump cover and tighten the cover mounting bolts.

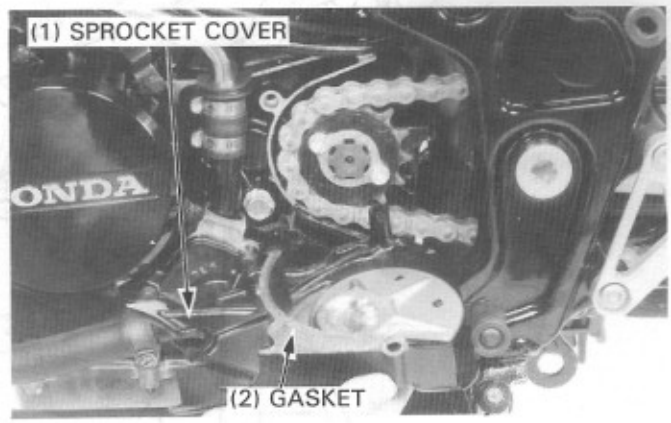
Connect the lower radiator hose to the water pump.
Secure the hose with the band.



Install a new gasket on the drive sprocket cover.
Install the drive sprocket cover and tighten the bolts securely.

Fill the crankcase with the recommended engine oil (page 2-4).

Fill the cooling system (page 5-3).



RESERVE TANK

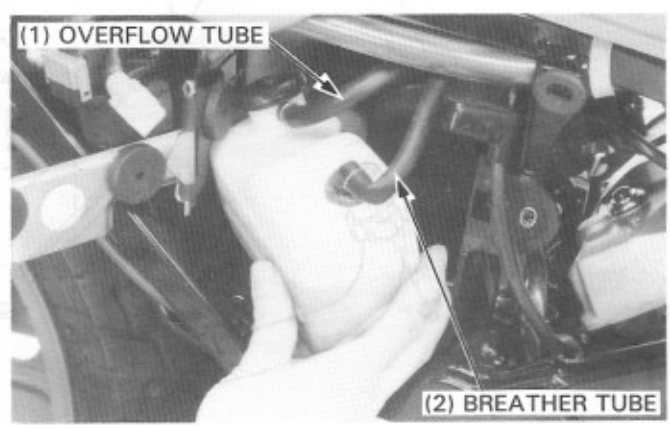
REMOVAL/INSTALLATION

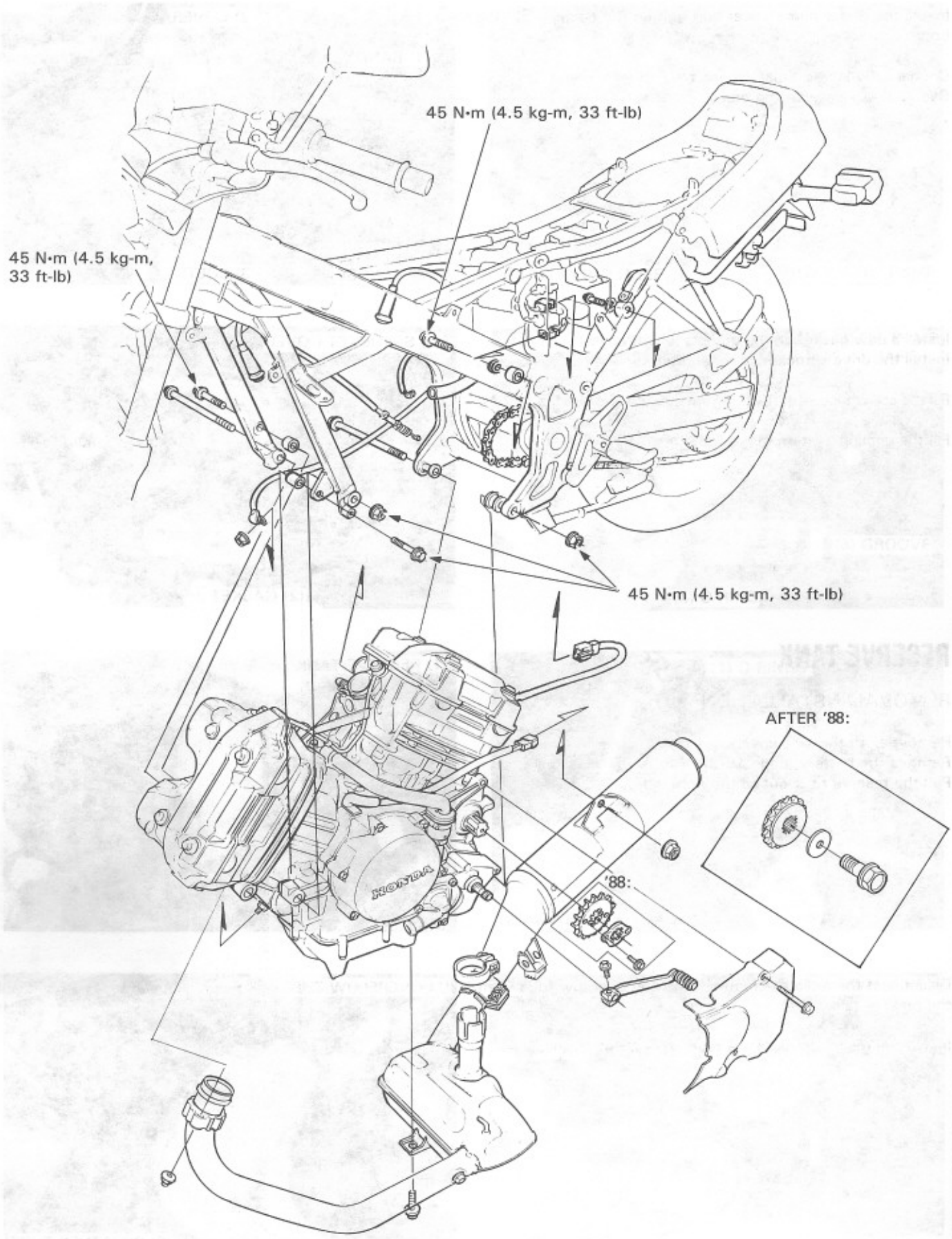
Remove both the side covers.
Remove the battery (page 16-3).
Pull the reserve tank out to the right side.



Disconnect the radiator breather tube and overflow tube from the reserve tank.

Install the reserve tank in the reverse order of removal.




45 N•m (4.5 kg-m, 33 ft-lb)
45 N•m (4.5 kg-m, 33 ft-lb)
45 N•m (4.5 kg-m, 33 ft-lb)
AFTER '88:
'88:
HONDA

6. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	6-1	ENGINE INSTALLATION	6-3
ENGINE REMOVAL	6-2		

SERVICE INFORMATION

GENERAL

- Support the motorcycle in an upright position on level ground.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following parts or components can be serviced with the engine installed in the frame:
  - Clutch
  - Cooling system
  - Cylinder heads
  - Oil pump
  - Alternator
  - Starter motor
  - Carburetors

SPECIFICATIONS

Engine dry weight	46.5 kg (102.5 lb)
Oil capacity	2.5 liter (2.64 US qt, 2.20 Imp qt) at disassembly
Coolant capacity	1.4 liter (1.48 US qt, 1.23 Imp qt) except reserve tank

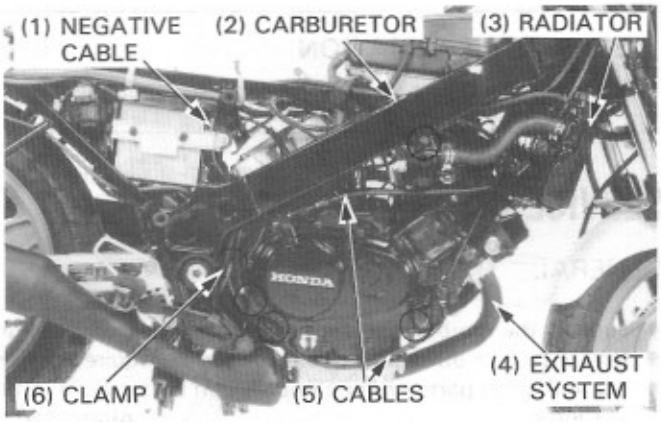
TORQUE VALUE

Engine hanger bolt and nut	45 N·m (4.5 kg-m, 33 ft-lb)

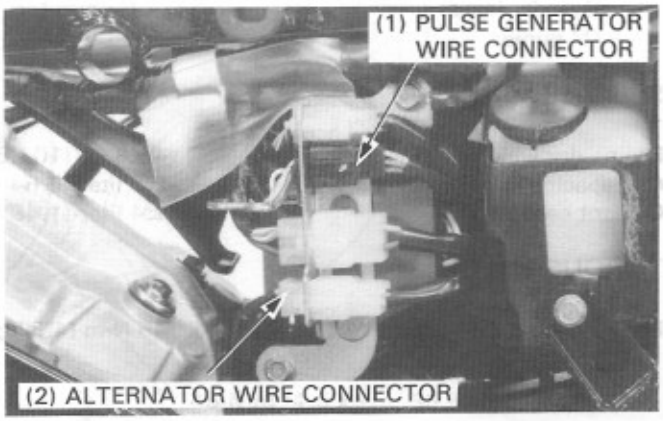
ENGINE REMOVAL

Drain the oil from the engine (page 2-4).
Drain the coolant from the cooling system (page 5-3).

Remove the following:
- side covers
- side and lower fairings (Section 12)
- air cleaner case (page 4-4)
- carburetor (page 4-5)
- radiator (page 5-4)
- exhaust system (page 12-4)
- tube clamp
- thermostat housing mounting bolt
- drive sprocket cover



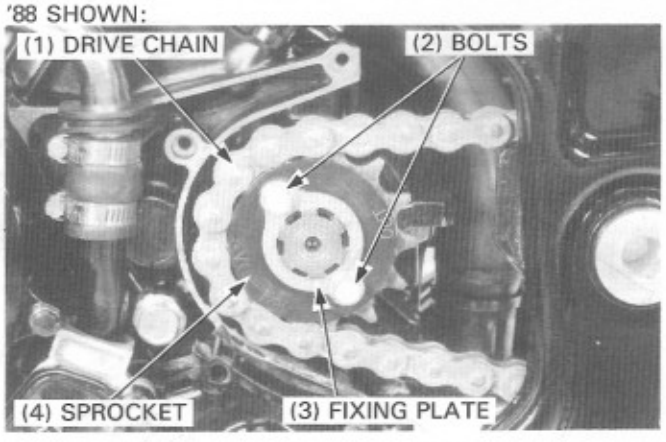
Disconnect the following:
- battery negative cable from the battery
- clutch cable with cable holder
- temperature sensor wire connector
- starter motor cable (and free it from clamps)
- spark plug caps
- alternator wire connector
- pulse generator/neutral switch/oil pressure switch wire connector
- crankcase breather tube from the cylinder head



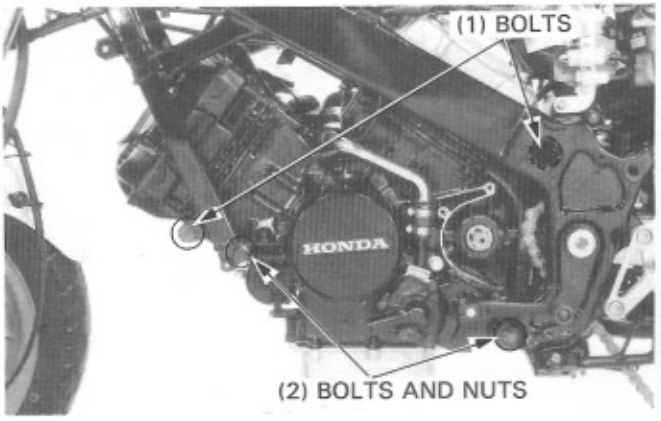
Loosen the drive chain adjusters all the way and push the rear wheel forward.

Remove the drive sprocket.

'88 SHOWN:



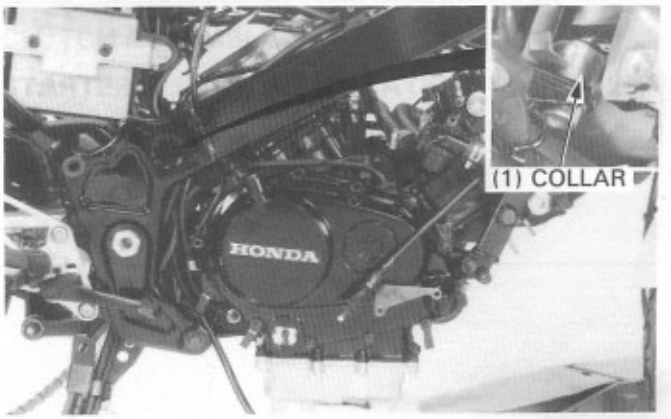
Support the engine with a floor jack or adjustable support.
Remove the engine hanger bolts, nuts and collars.
Carefully lower the engine and remove it.



ENGINE INSTALLATION

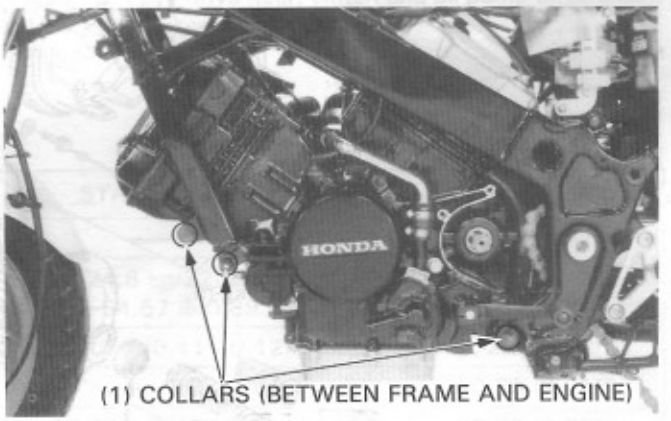
Install the engine in the frame and tighten the hanger bolts and nuts to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 ft-lb)



NOTE

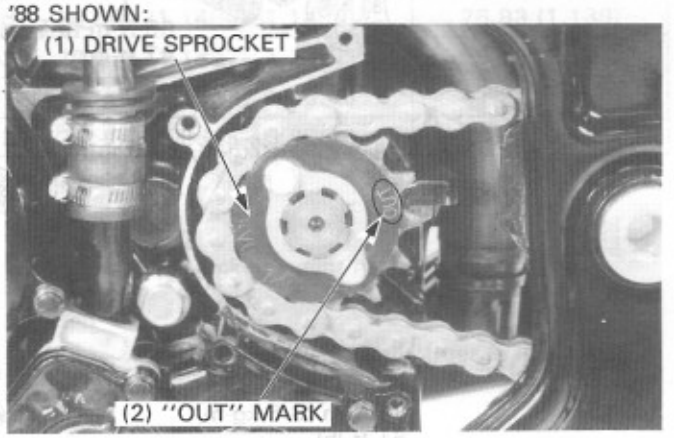
- Carefully align mounting positions with the jack to prevent damage to the hanger bolt threads and wire harness and cables.
- Route the wires and cables properly (page 1-9).
- Note the collars locations.



NOTE

- '88: Install the drive sprocket facing its "OUT" mark outside.

'88 SHOWN:

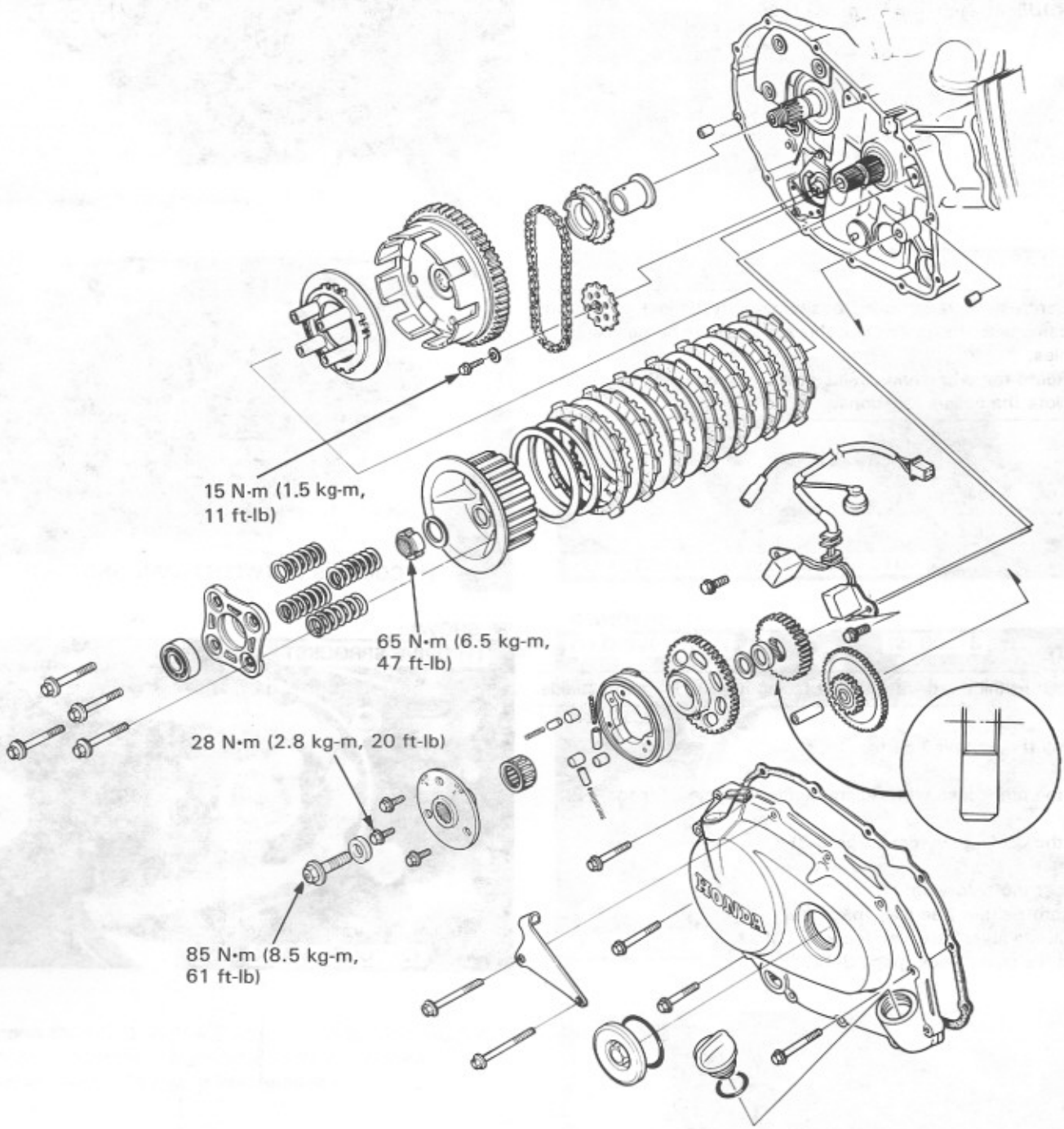


Install the removed parts.

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

Fill the cooling system (page 5-3).

Adjust the following:
- throttle grip free play (page 3-4)
- clutch lever free play (page 3-16)
- drive chain slack (page 3-12)


15 N·m (1.5 kg-m, 11 ft-lb)
65 N·m (6.5 kg-m, 47 ft-lb)
28 N·m (2.8 kg-m, 20 ft-lb)
85 N·m (8.5 kg-m, 61 ft-lb)
HONDA

SERVICE INFORMATION	7-1	CLUTCH ASSEMBLY	7-10
TROUBLESHOOTING	7-2	STARTER CLUTCH INSTALLATION	7-12
RIGHT CRANKCASE COVER REMOVAL	7-3	RIGHT CRANKCASE COVER INSTALLATION	7-13
STARTER CLUTCH REMOVAL	7-4		
CLUTCH DISASSEMBLY	7-7		

SERVICE INFORMATION

GENERAL

- This section covers the removal and installation of the starter clutch, primary drive gear, clutch and oil pump drive chain.
- If the transmission requires servicing, remove the engine and separate the crankcase (Section 11).
- Coat the new clutch discs with clean engine oil before reassembly.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch	Spring free length		—	29.7 (1.17)
	Spring preload/length		20.2–24.8 kg/22.5 mm (44.53–54.67 lb/0.89 in)	—
	Disc thickness		2.9–3.0 (0.11–0.12)	2.6 (0.10)
	Plate warpage		—	0.30 (0.012)
	Outer guide	I.D.	21.995–22.015 (0.8659–0.8667)	22.05 (0.868)
		O.D.	28.967–28.980 (1.1404–1.1409)	28.93 (1.139)
Oil pump drive sprocket I.D.			29.025–29.075 (1.1427–1.1447)	29.11 (1.146)
Starter driven gear O.D.			41.975–42.000 (1.6526–1.6535)	41.96 (1.652)
Mainshaft O.D. at clutch outer guide			21.959–21.980 (0.8645–0.8654)	21.92 (0.863)

TORQUE VALUES

Starter clutch cover bolt	28 N·m (2.8 kg-m, 20 ft-lb)	Apply locking agent to the threads
Starter clutch bolt	85 N·m (8.5 kg-m, 61 ft-lb)	
Clutch center lock nut	65 N·m (6.5 kg-m, 47 ft-lb)	
Oil pump driven sprocket bolt	15 N·m (1.5 kg-m, 11 ft-lb)	Apply locking agent to the threads (page 1-5)

TOOLS

Special

Clutch center holder	07HGB—001010A (U.S.A. only)

Common

Flywheel holder	07725—0040000 or equivalent commercially available in U.S.A.
Lock nut wrench, 26 x 30 mm	07716—0020203

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

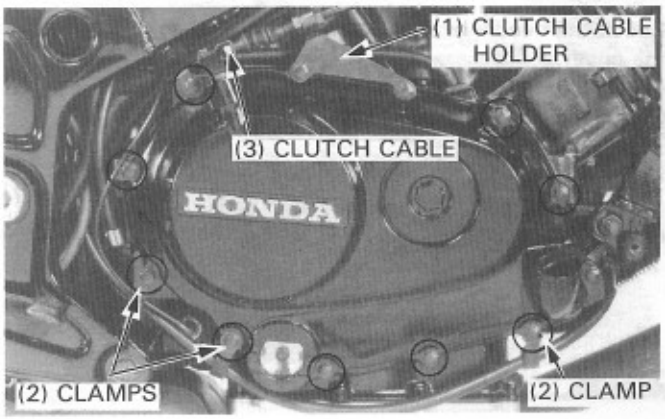
Clutch operation feels rough
- Clutch outer slots rough
- Dirty clutch cable

RIGHT CRANKCASE COVER REMOVAL

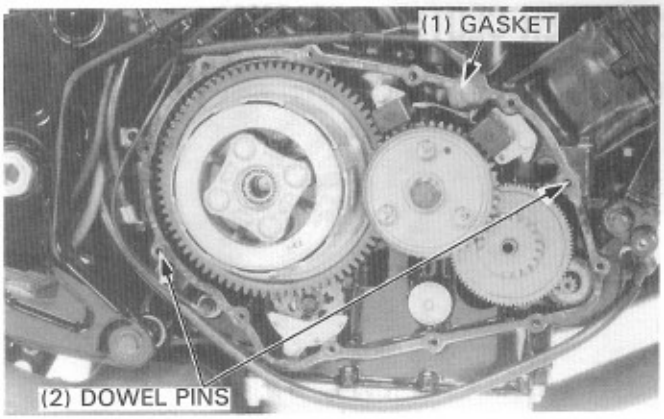
Drain the engine oil (page 2-4).
Disconnect the clutch cable from the clutch lifter by removing the cable holder.

Remove the right crankcase cover bolts and clamps.

Remove the right crankcase cover.

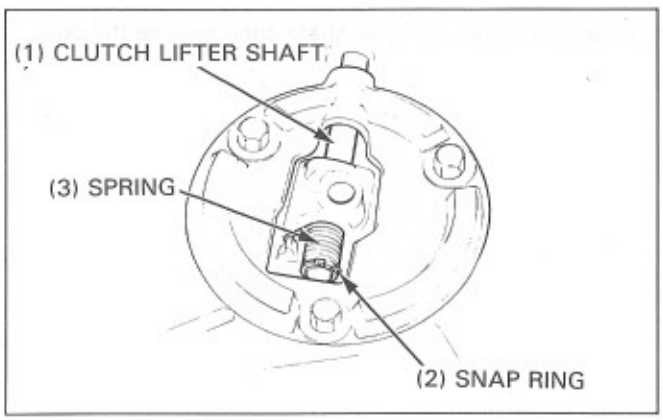


Remove the gasket and dowel pins.



CLUTCH LIFTER REMOVAL

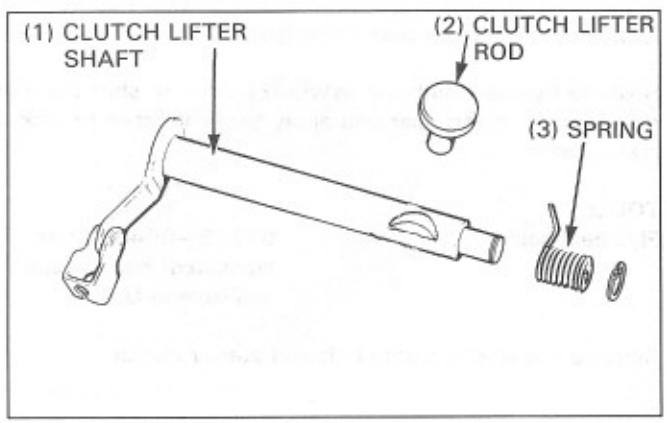
Remove the clutch lifter rod, then remove the snap ring and spring from the right crankcase cover.



Remove the clutch lifter shaft.

Check the clutch lifter rod and shaft for damage or excessive scratching.

Check the return spring for fatigue or damage.

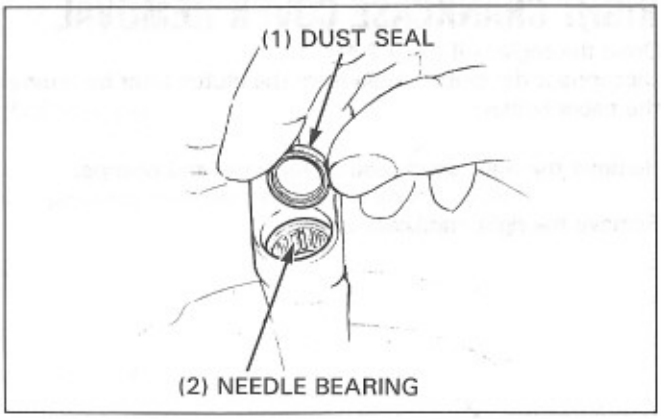


Check the needle bearing for wear or damage or a loose fit in the cover.

Check the dust seal for fatique or damage.

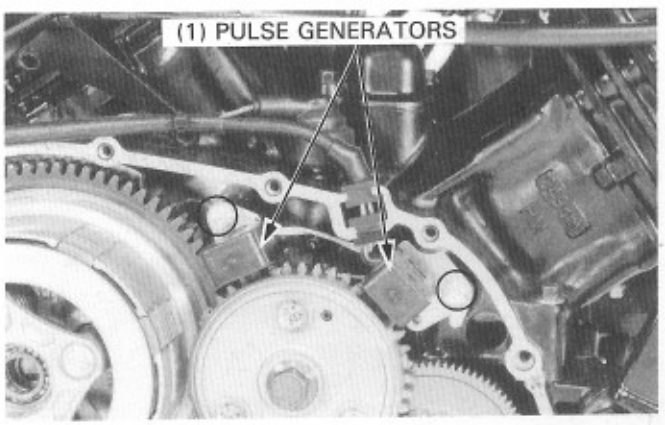
Apply a grease to the dust seal and needle bearing.

Install the clutch lifter shaft with a new snap ring in the reverse order of removal.

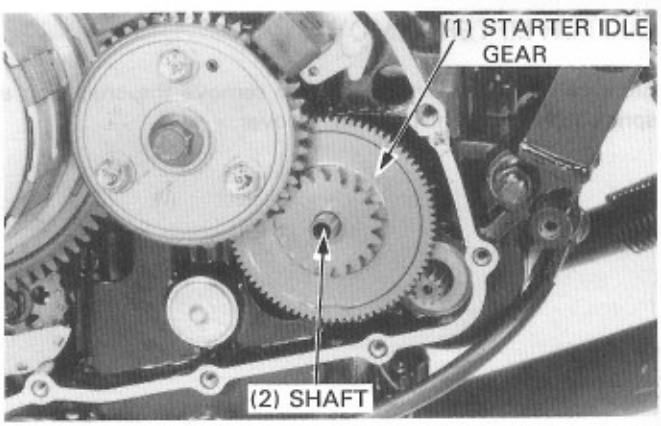


STARTER CLUTCH REMOVAL

If necessary, remove the pulse generators.



Remove the starter idle gear shaft, then remove the gear.



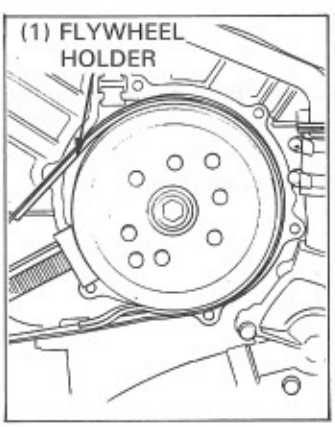
Remove the left crankcase cover (page 8-2).

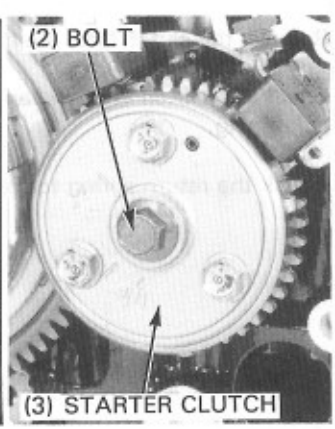
Hold the flywheel with the flywheel holder, or shift the transmission gear in top gear and apply the rear brake to lock the crankshaft.

TOOL:

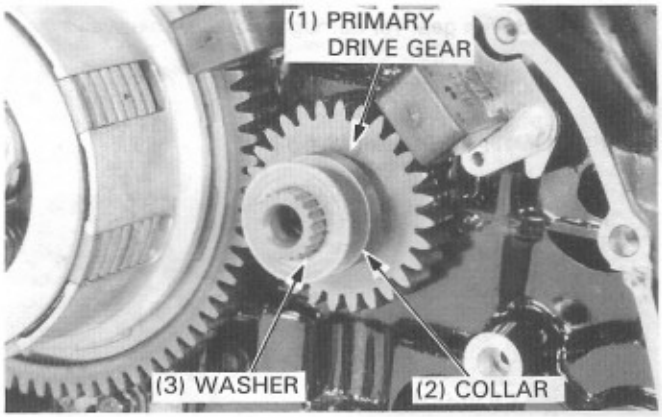
Flywheel holder	**07725—0040000 or equivalent commercially available in U.S.A.**

Remove the starter clutch bolt and starter clutch.





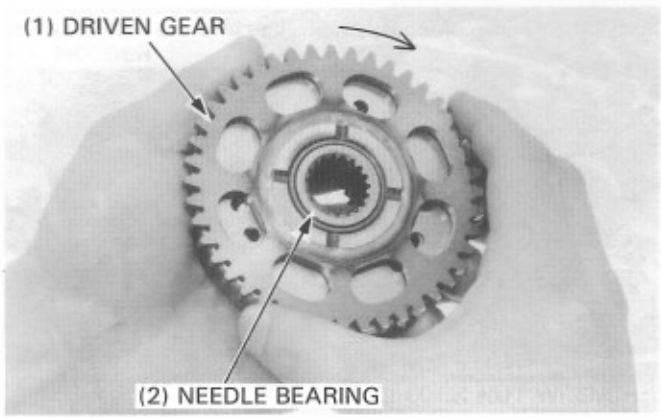
Remove the washer, collar and primary drive gear.



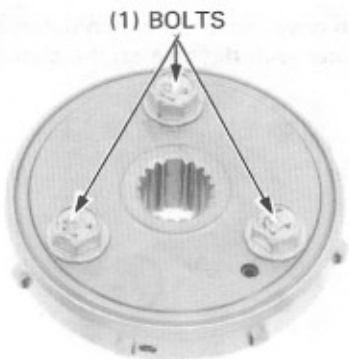
INSPECTION

Check the operation of the one-way clutch.
The starter driven gear should not turn counterclockwise. It should only turn clockwise.

Remove the gear and needle bearing from the starter clutch.



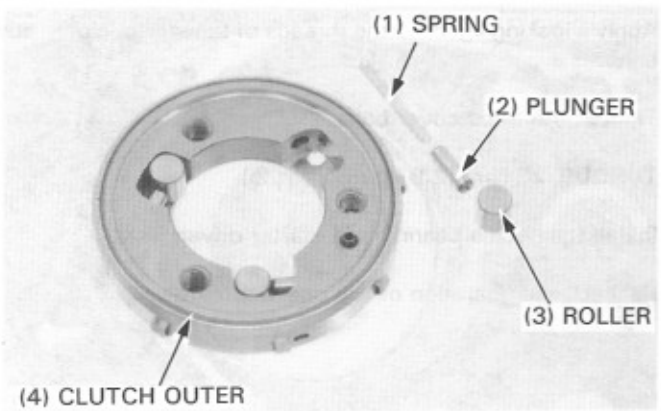
Remove the starter clutch cover by removing three bolts.



Check the clutch outer rollers for freedom of movement, wear or damage.

Check the clutch outer roller connecting surfaces for wear or damage.

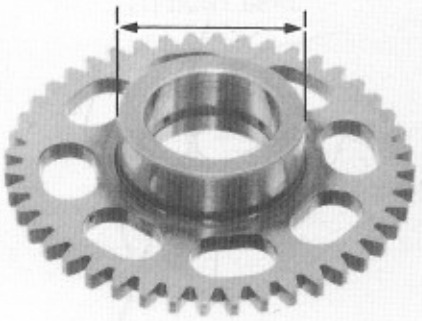
Check the plungers for wear, and the spring for loss or tension.



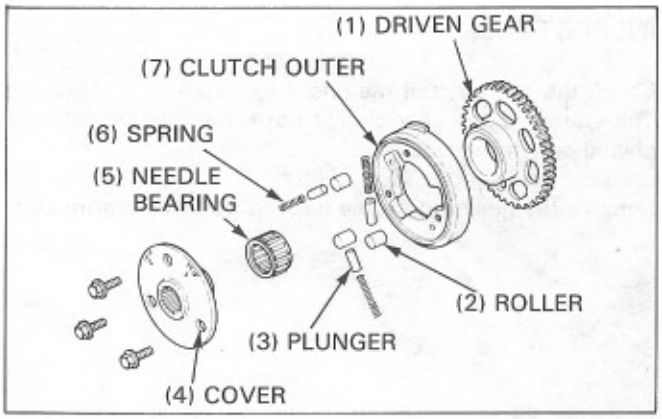
Inspect the driven gear for damage or excessive wear.

Measure the drive gear O.D.

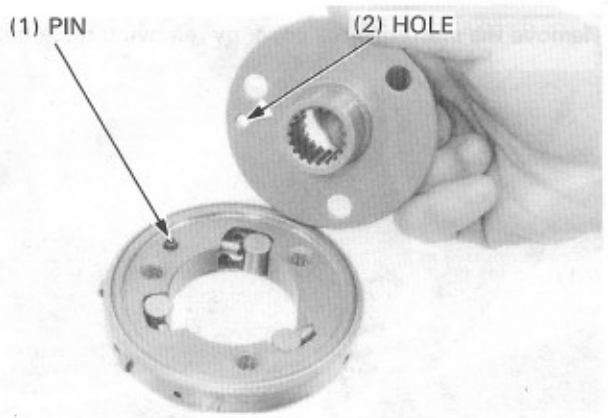
SERVICE LIMIT: 41.96 mm (1.652 in)



Install the spring, plungers and rollers into the clutch outer.



Install the clutch cover onto the clutch outer, aligning the pin on the clutch outer with the hole on the clutch cover.



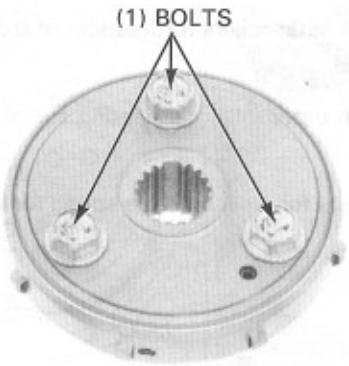
Apply a locking agent to the threads of the starter clutch cover bolts.

Tighten the three cover bolts.

TORQUE: 28 N·m (2.8 kg-m, 20 ft-lb)

Install the needle bearing and starter driven gear.

Recheck the operation of the one-way clutch.



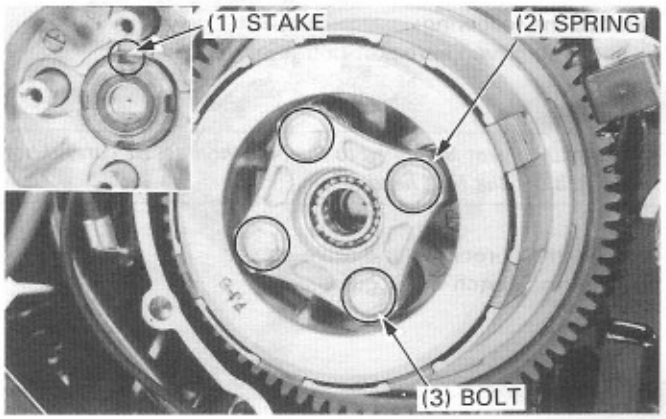
CLUTCH DISASSEMBLY

Remove the clutch bolts, springs and clutch lifter plate.

NOTE

- Loosen the bolts in a crisscross pattern in 2 or 3 steps.

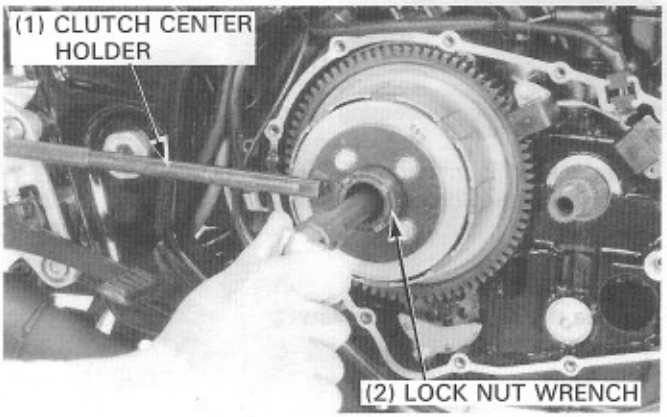
Unstake the lock nut.
Oil pump driven sprocket bolt and washer
Oil pump drive chain and driven sprocket.



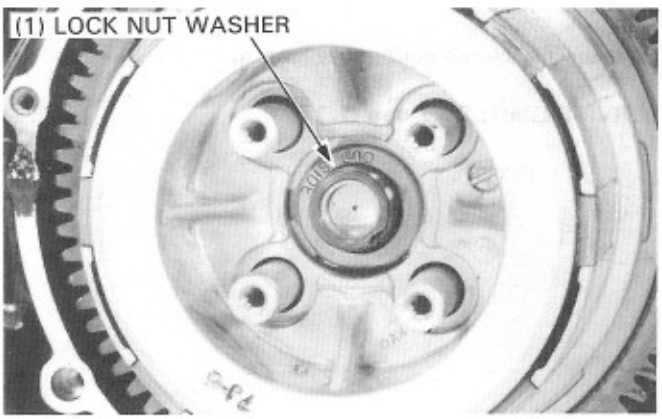
Hold the clutch center with the clutch center holder and remove the lock nut.

TOOLS:

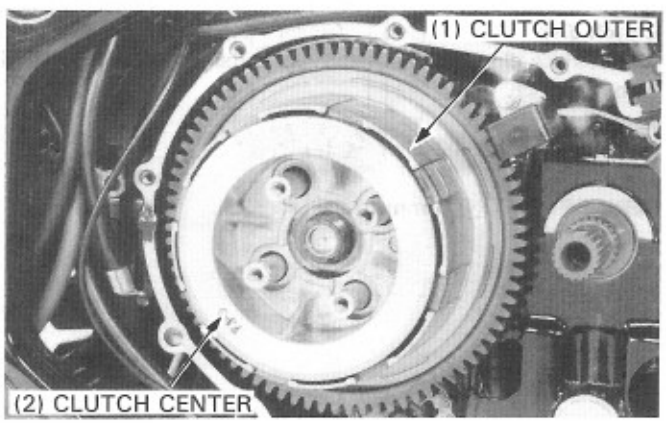
Clutch center holder	**07HGB–001010A (U.S.A. only)**
Lock nut wrench, 26 x 30 mm	**07716–0020203**



Remove the lock nut washer.



Remove the clutch center, plates, discs and clutch outer.

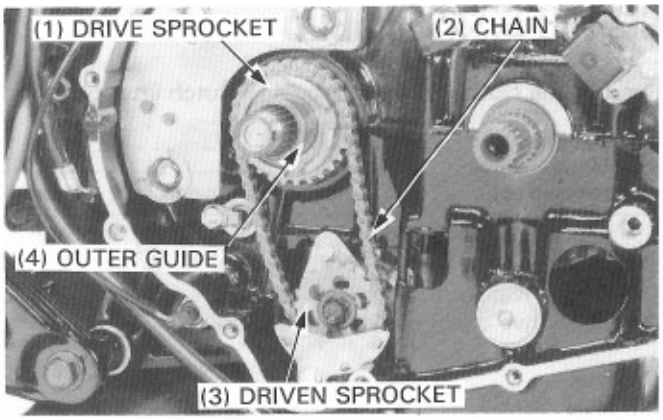


Remove the following:
— oil pump driven sprocket bolt and washer

CAUTION

- *A locking agent is applied to the bolt threads. Be careful not to wrench off the bolt head.*

Remove the sprockets and drive chain.
Remove the clutch outer guide.

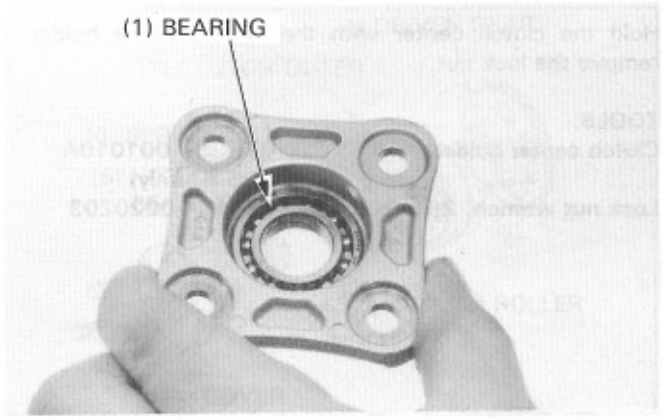


INSPECTION

Lifter plate
Check the lifter plate bearing for damage.

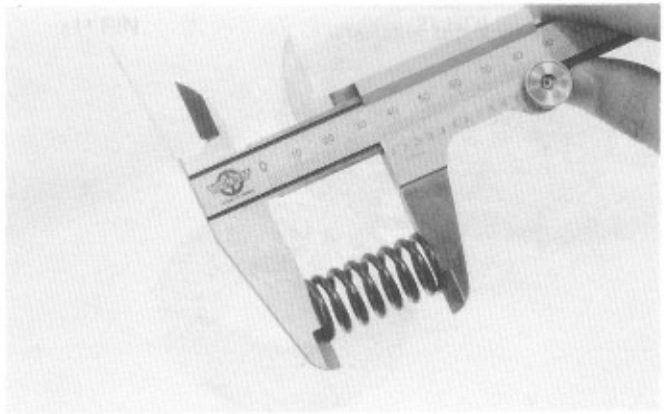
Turn the bearing inner race with your finger.
The bearing should lturn smoothly and quietly.
Also check that the bearing outer race fits tightly in the clutch lifter plate.

Replace the bearing if necessary.



Spring
Measure the clutch spring free length.

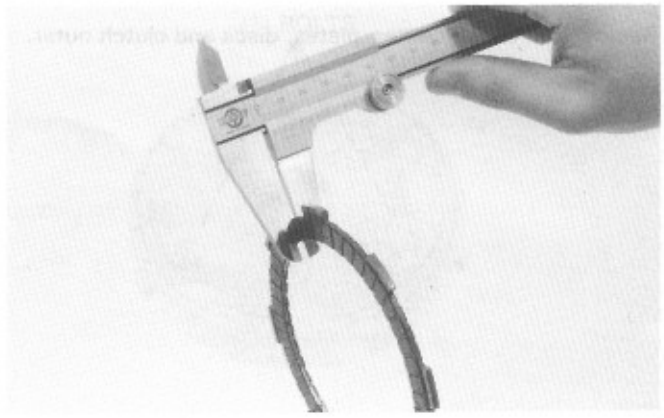
SERVICE LIMIT: 29.7 mm (1.17 in)



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

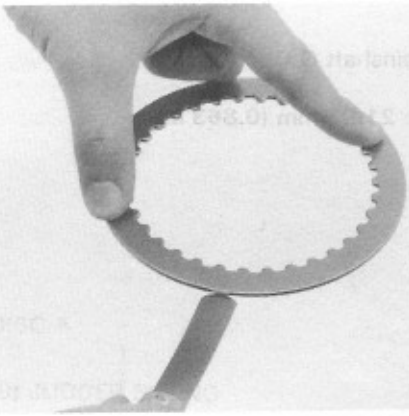
Measure the thickness of each disc.

SERVICE LIMIT: 2.6 mm (0.10 in)

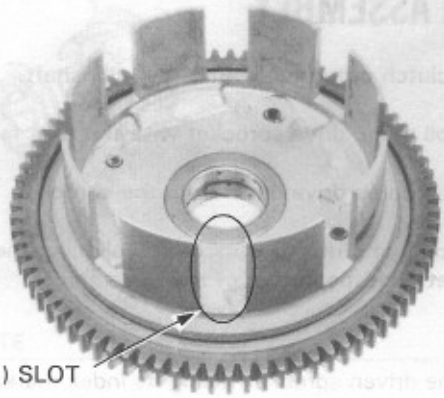


Clutch plate
Check the plate warpage on a surface plate, using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)

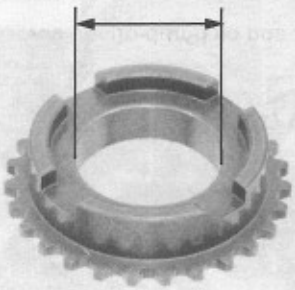


Clutch outer
Check the slots in the clutch outer for nicks, or indentations made by the friction discs.



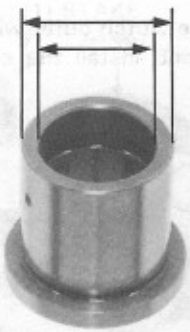
Oil pump drive sprocket
Measure the I.D. of the oil pump drive sprocket.

SERVICE LIMIT: 29.11 mm (1.146 in)



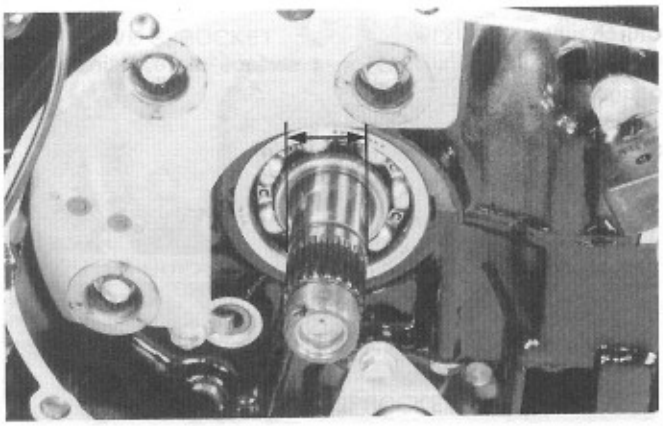
Clutch outer guide
Measure the I.D. and O.D. of the clutch outer guide.

SERVICE LIMITS:
I.D.: 22.05 mm (0.868 in)
O.D.: 28.93 mm (1.139 in)



Mainshaft
Measure the mainshaft O.D.

SERVICE LIMIT: 21.92 mm (0.863 in)



CLUTCH ASSEMBLY

Install the clutch outer guide onto the mainshaft.

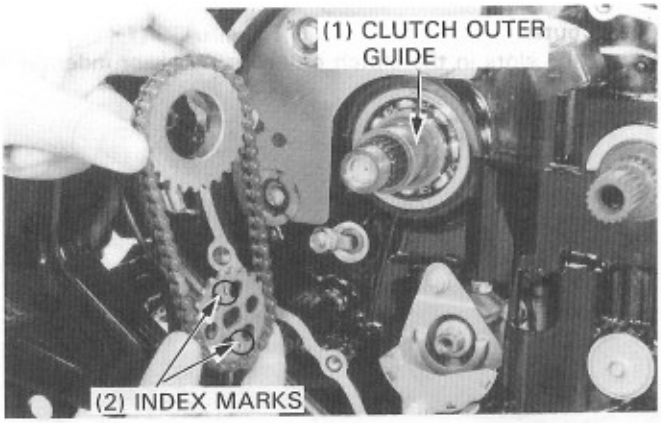
Install the oil pump drive sprocket with the tabs facing out.

Install the oil pump drive chain onto the sprocket.

Install the oil pump driven sprocket by aligning the cutout of the sprocket with the cutout of the drive shaft.

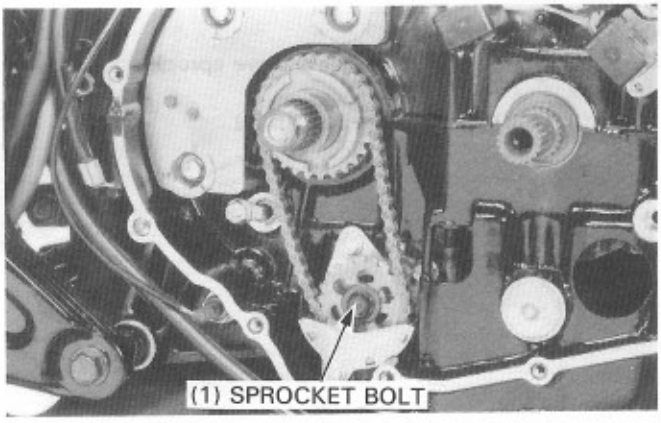
NOTE

- Install the driven sprocket facing its index marks to inside.

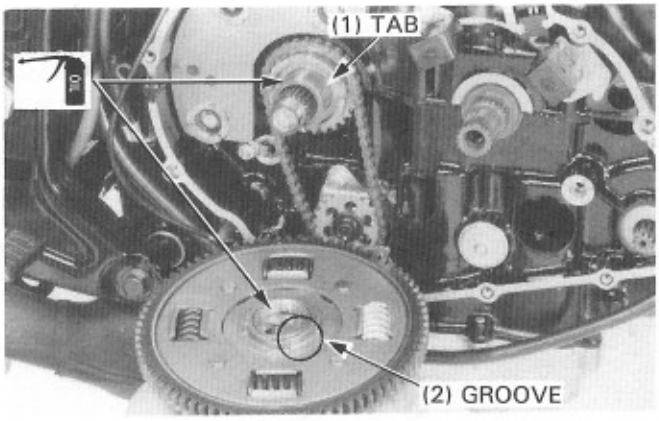


Apply locking agent to the driven sprocket bolt threads (page 1-5).
Install the washer and oil pump driven sprocket bolt and tighten the bolt.

TORQUE: 15 N·m (1.5 kg-m, 11 ft-lb)



Align the grooves in the clutch outer with the tabs on the oil pump drive sprocket and install the clutch outer onto the guide.



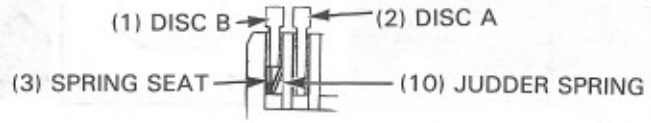
Coat the discs, plates, spring seat and judder spring with clean oil.

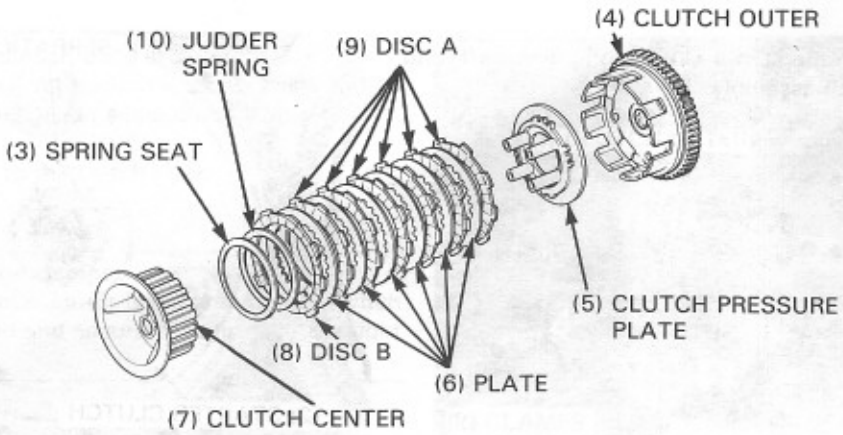
Install the spring seat, judder spring and clutch disc B.

Install the 6 discs and 6 plates alternately.

NOTE

- Note the direction of the judder spring.



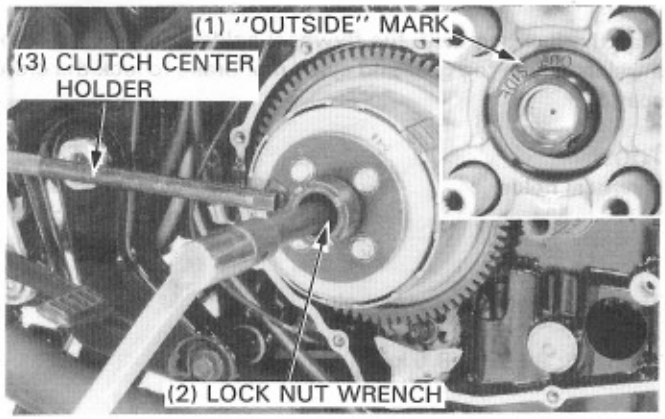


Install the lock washer with OUTSIDE mark facing out, then install the lock nut.
Install the clutch center holder and tighten the lock nut.

TOOLS:

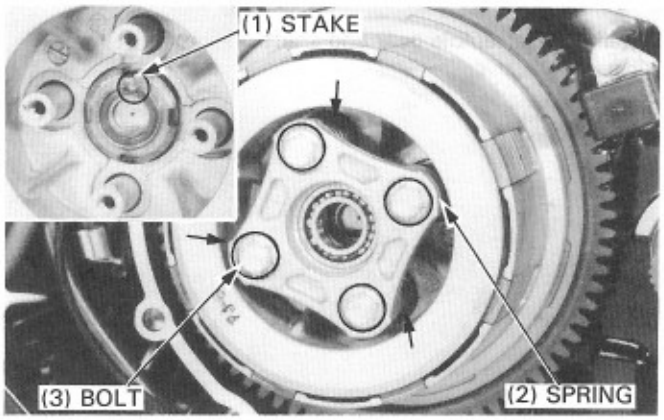
Clutch center holder	**07HGB–001010A (U.S.A. only)**
Lock nut wrench, 26 x 30 mm	**07716–0020203**

TORQUE: 65 N·m (6.5 kg-m, 47 ft-lb)



Stake the lock nut into the mainshaft groove securely.

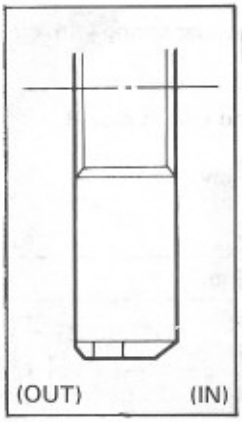
Install the clutch springs and bolts then tighten the bolts in a crisscross pattern in 2 or 3 steps.

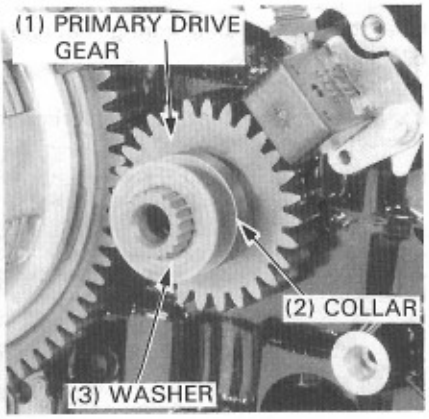


STARTER CLUTCH INSTALLATION

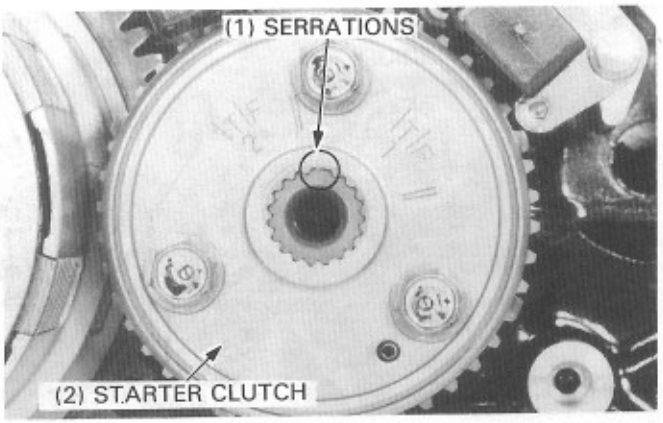
Install the primary drive gear with the tapered side facing in.

Install the collar and washer.





Align the serrations on the starter clutch and crankshaft, and install the starter clutch assembly.



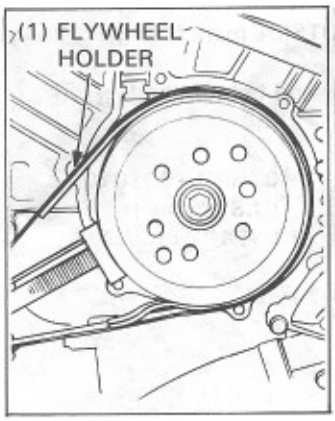
Hold the flywheel with the flywheel holder, or shift the transmission gear in top gear and apply rear brake to lock the crankshaft.

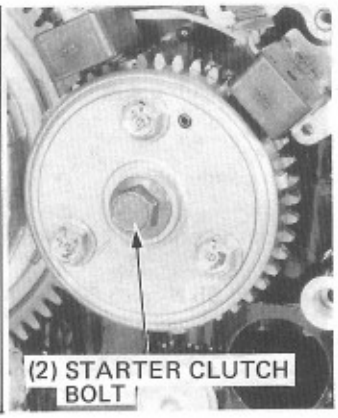
TOOL:

Flywheel holder	**07725—0040000 or equivalent commercially available in U.S.A.**

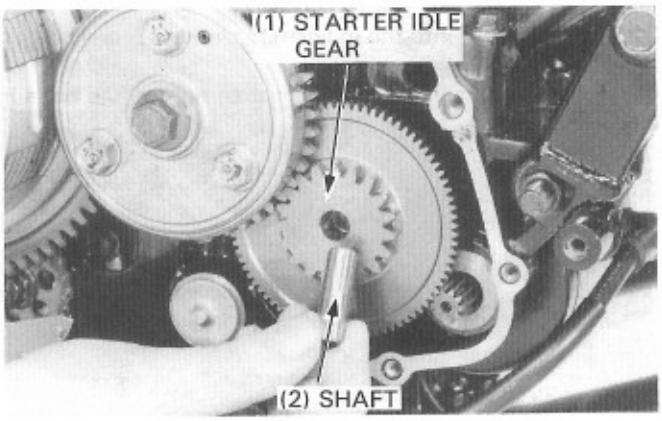
Tighten the starter clutch bolt.

TORQUE: 85 N·m (8.5 kg-m, 61 ft-lb)



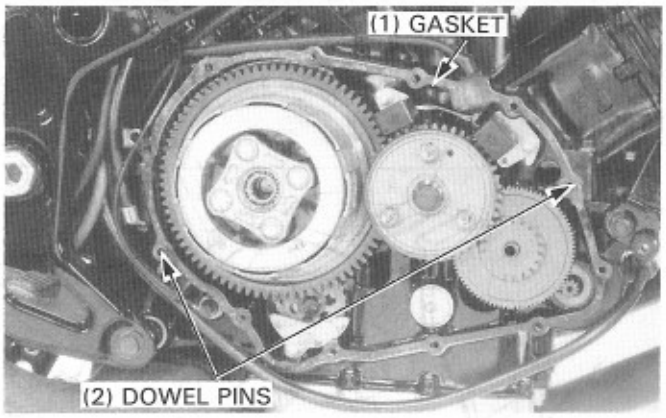


Install the starter idle gear and shaft.



RIGHT CRANKCASE COVER INSTALLATION

Install the dowel pins and a new gasket.

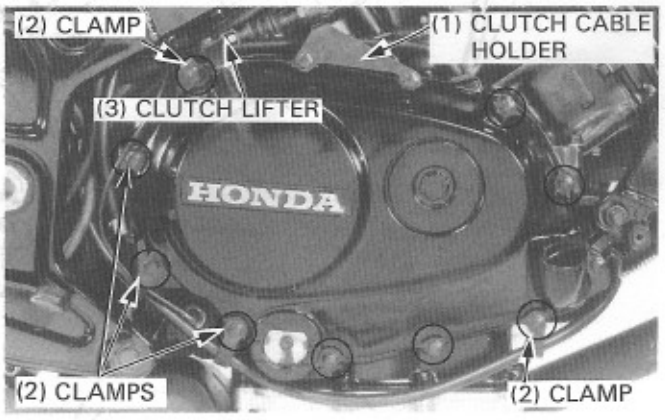


Install the right crankcase cover, bolts and clamps.
Tighten the bolts in a crisscross pattern in 2 or 3 steps and install the clutch cable holder at the same time.

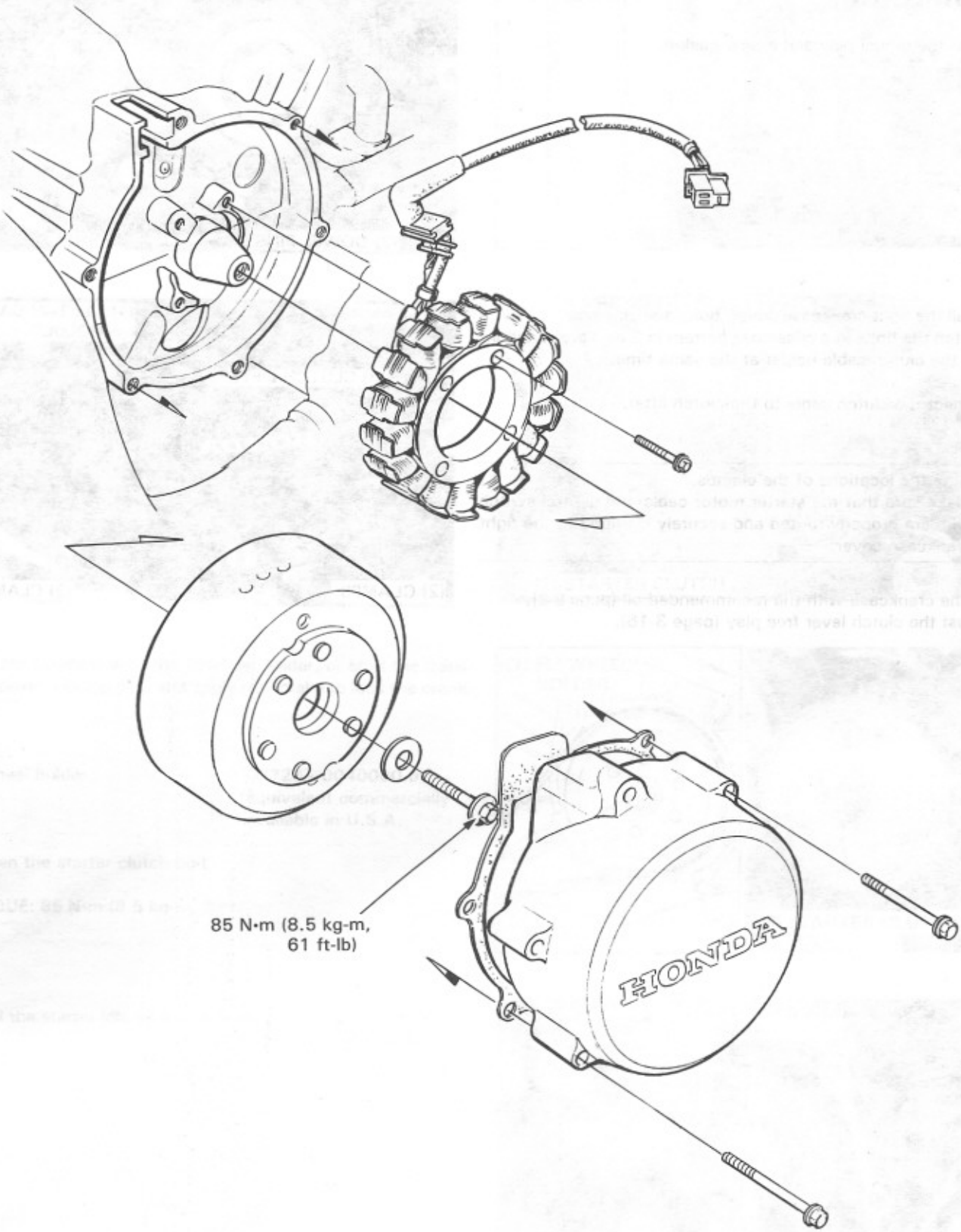
Connect the clutch cable to the clutch lifter.

NOTE

- Note the locations of the clamps.
  Make sure that the starter motor cable and neutral switch wire are properly routed and securely clamped to the right crankcase cover.



Fill the crankcase with the recommended oil (page 2-2).
Adjust the clutch lever free play (page 3-16).


85 N·m (8.5 kg-m,
61 ft-lb)
HONDA

SERVICE INFORMATION	8-1	STATOR INSTALLATION	8-3
FLYWHEEL REMOVAL	8-2	FLYWHEEL INSTALLATION	8-3
STATOR REMOVAL	8-2		

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the alternator.
- Refer to Section 16 for troubleshooting and inspection of the alternator.

TORQUE VALVE

Flywheel bolt	85 N·m (8.5 kg-m, 61 ft-lb)

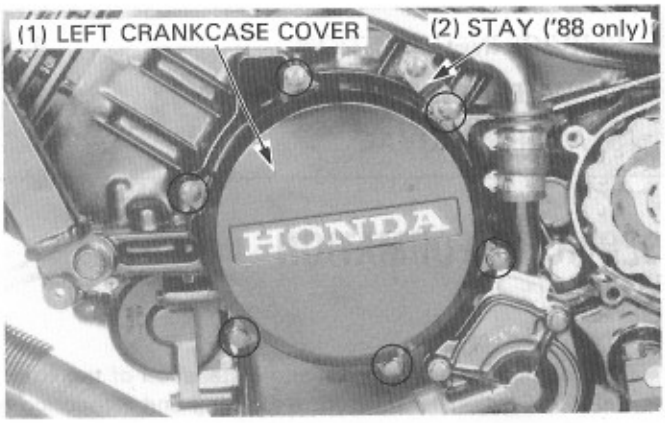
TOOLS

Common

Flywheel holder	07725—0040000 or equivalent commercially available in U.S.A.
Rotor puller	07733—0020001 or 07933—3950000

FLYWHEEL REMOVAL

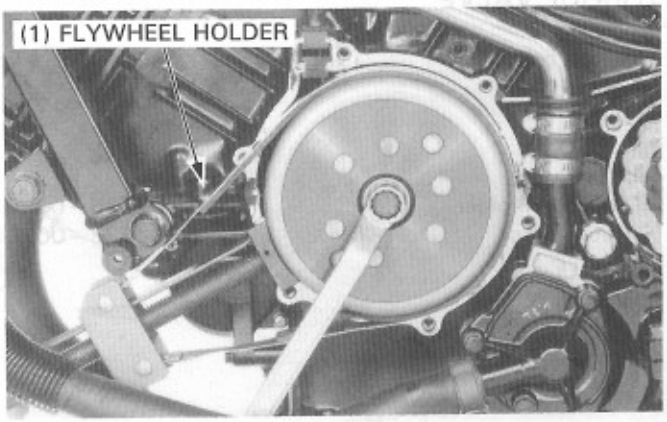
Remove the drive sprocket cover (page 5-7).
Remove the oil pipe stay ('88 only) and left crankcase cover.



Hold the flywheel with the flywheel holder and remove the flywheel bolt.

TOOL:

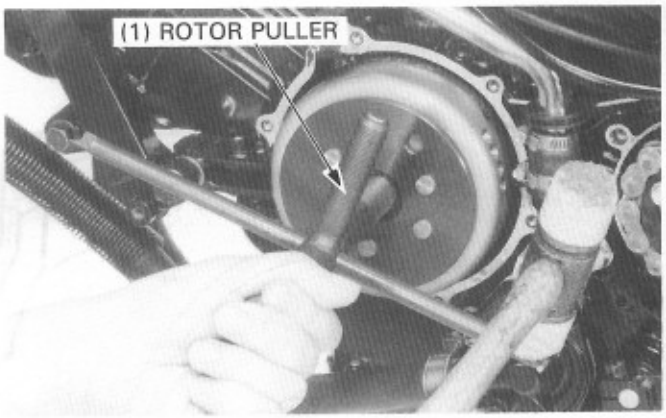
Flyweel holder	**07725—0040000 or equivalent commercially available in U.S.A.**



Remove the flywheel with the rotor puller.

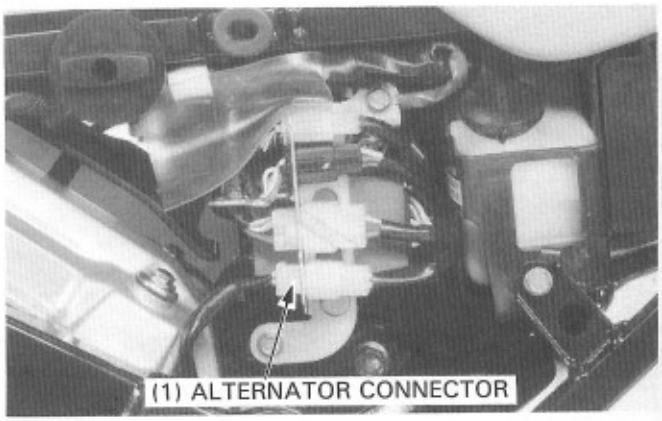
TOOL:

Rotor puller	**07733—0020001 or 07933—3950000**

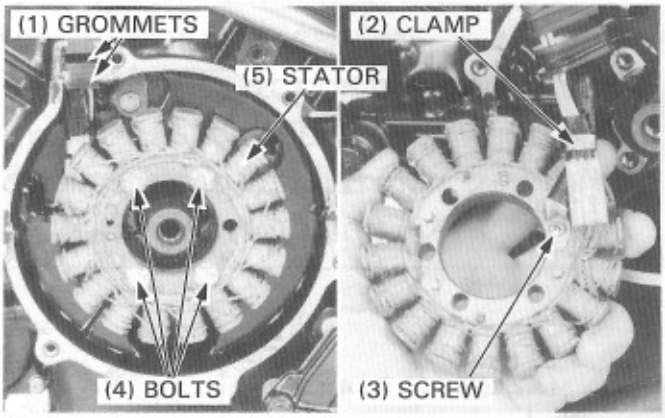


STATOR REMOVAL

Remove the left side cover.
Disconnect the alternator wire connector.



Remove the stator coil by removing the mounting bolts.

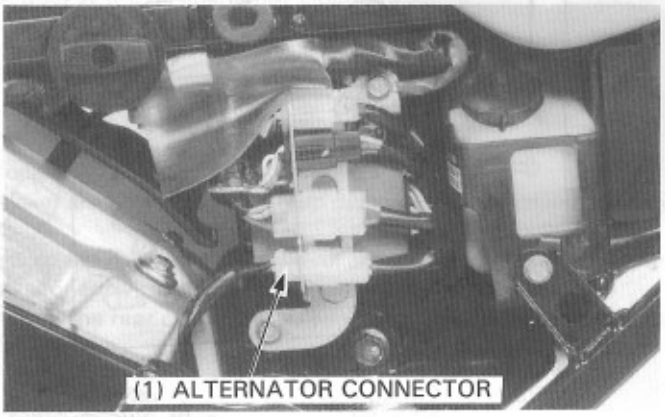


STATOR INSTALLATION

Secure the alternator wires with the clamp and tighten the clamp screw securely.

Install the stator and tighten the bolts securely set the grommets in the crankcase grooves correctly.

Route the alternator wire properly (page 1-12) and connect the connector.



Install the left side cover.

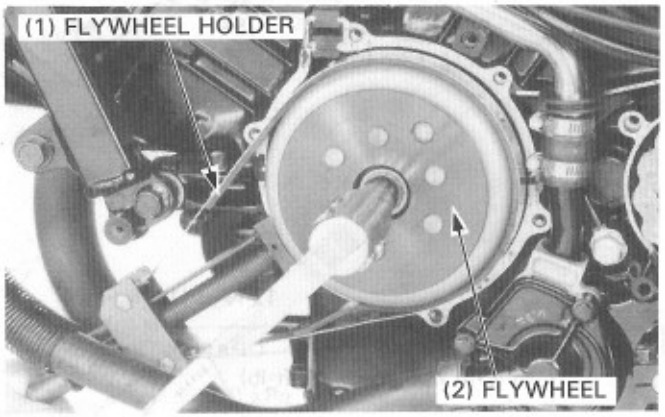
FLYWHEEL INSTALLATION

Clean the inside of the flywheel and install it onto the crankshaft.
Hold the flywheel with the flywheel holder and tighten the flywheel bolt.

TORQUE: 85 N·m (8.5 kg-m, 61 ft-lb)

TOOL:

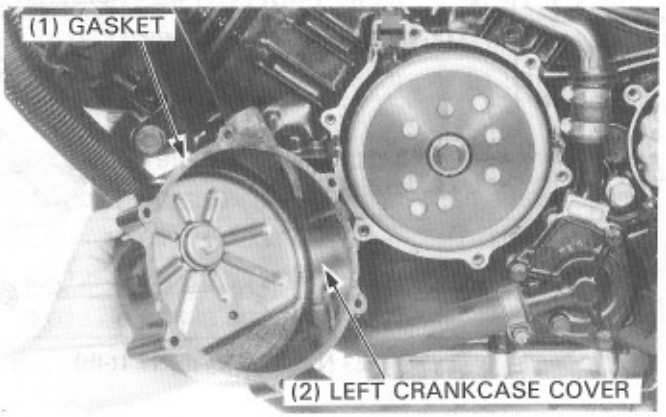
Flywheel holder	**07725—0040000 or equivalent commercially available in U.S.A.**

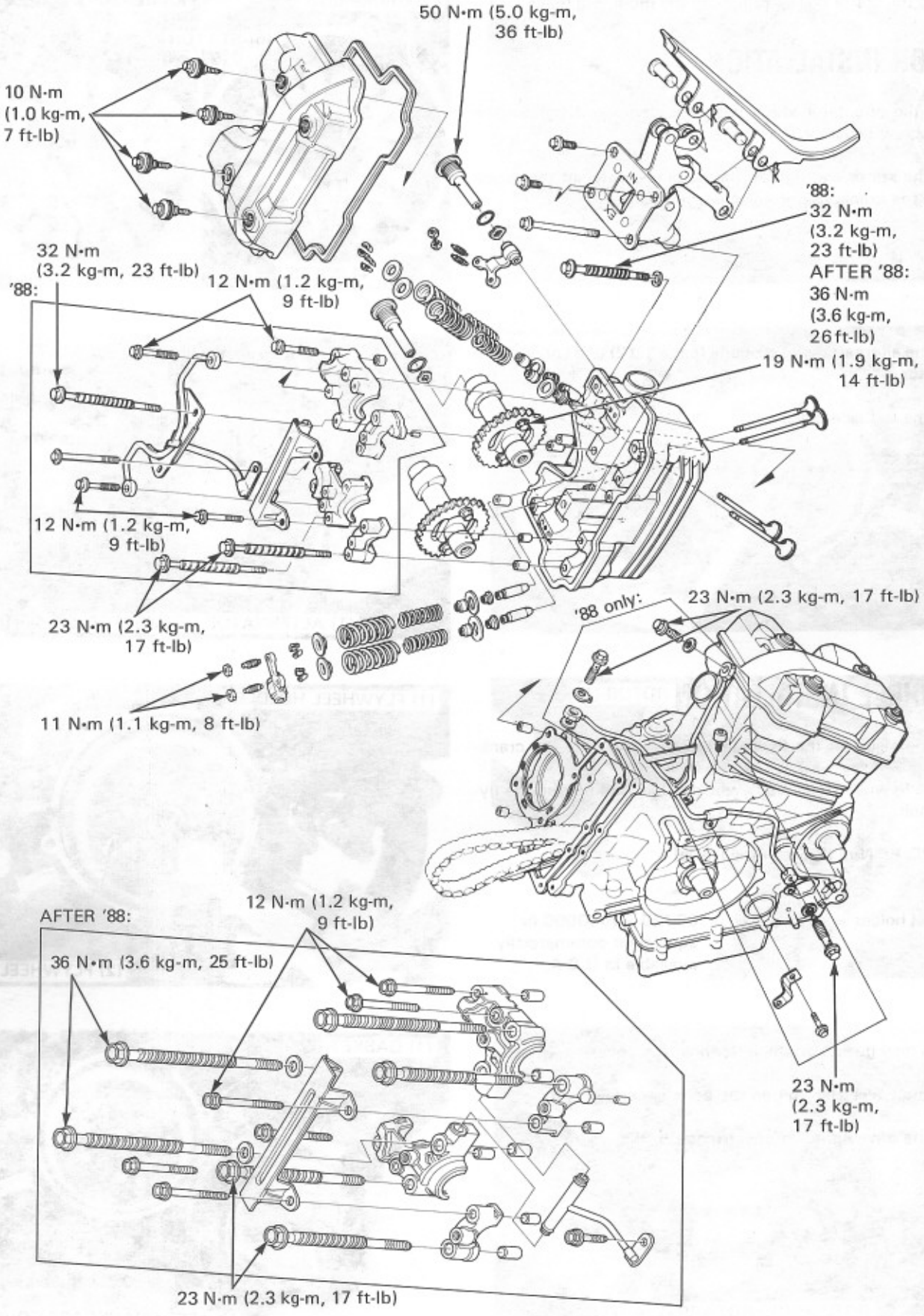


Install a new gasket on the left crankcase cover.

Install the cover and tighten the bolts securely.

Install the drive sprocket cover (page 5-9).



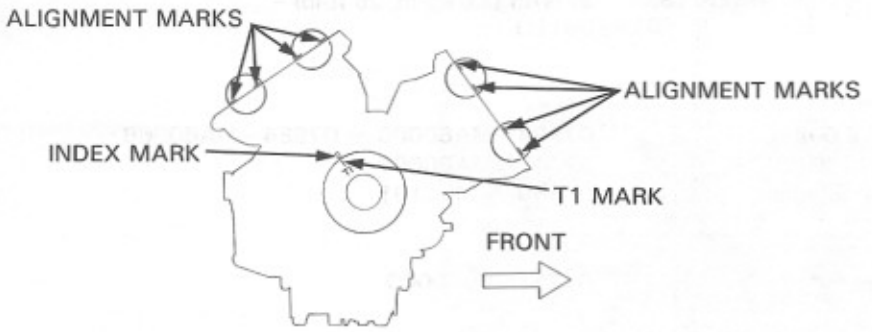

50 N·m (5.0 kg-m, 36 ft-lb)
10 N·m (1.0 kg-m, 7 ft-lb)
'88: 32 N·m (3.2 kg-m, 23 ft-lb)
AFTER '88: 36 N·m (3.6 kg-m, 26 ft-lb)
32 N·m (3.2 kg-m, 23 ft-lb)
'88:
12 N·m (1.2 kg-m, 9 ft-lb)
19 N·m (1.9 kg-m, 14 ft-lb)
12 N·m (1.2 kg-m, 9 ft-lb)
23 N·m (2.3 kg-m, 17 ft-lb)
11 N·m (1.1 kg-m, 8 ft-lb)
'88 only:
23 N·m (2.3 kg-m, 17 ft-lb)
AFTER '88:
12 N·m (1.2 kg-m, 9 ft-lb)
36 N·m (3.6 kg-m, 25 ft-lb)
23 N·m (2.3 kg-m, 17 ft-lb)
23 N·m (2.3 kg-m, 17 ft-lb)

SERVICE INFORMATION	9-1	VALVE GUIDE REPLACEMENT	9-13
TROUBLESHOOTING	9-2	VALVE SEAT INSPECTION/REFACING	9-14
CAMSHAFT REMOVAL	9-3	CYLINDER HEAD ASSEMBLY	9-16
CYLINDER HEAD REMOVAL	9-7	CYLINDER HEAD INSTALLATION	9-18
CYLINDER HEAD DISASSEMBLY	9-10	CAMSHAFT INSTALLATION	9-19

SERVICE INFORMATION

GENERAL

- Camshaft lubricating oil is fed through an oil line. Be sure the hole in the oil line is not clogged.
- The camshafts have the following identification marks:
  - INF for front cylinder intake camshaft
  - EXF for front cylinder exhaust camshaft
  - INR for rear cylinder intake camshaft
  - EXR for rear cylinder exhaust camshaft
- The cylinder heads and camshafts can be removed with the engine in the frame.
- Lubricate the camshaft journals, cam lobes, valve stems and rocker arms with molybdenum disulfide grease for initial lubrication.
- When the "T1" mark on the starter clutch cover and index mark on the right crankcase cover are aligned (rear cylinder is at Top Dead Center), alignment marks on the cam sprockets are aligned with the cylinder head upper surfaces.
  And camshaft identification marks (page 9-19) are facing up when the rear cylinder is at Top Dead Center on the exhaust stroke.



SPECIFICATION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression pressure			1320 ± 200 kPa (13.2 ± 2.0 kg/cm², 188 ± 28 psi)	—
Camshaft	Cam lobe height	IN/EX	32.435–32.595 (1.2770–1.2833)	32.41 (1.276)
	Journal O.D.	Center	21.861–21.882 (0.8607–0.8615)	21.84 (0.860)
		Both ends	21.949–21.970 (0.8641–0.8650)	21.93 (0.863)
	Runout		—	0.05 (0.002)
	Oil clearance	Center	0.148–0.199 (0.0058–0.0078)	0.205 (0.0081)
		Both ends	0.030–0.091 (0.0019–0.0036)	0.095 (0.0037)
Rocker arm	Rocker arm I.D.		10.000–10.015 (0.3937–0.3943)	10.05 (0.396)
	Shaft O.D.		9.972–9.987 (0.3926–0.3932)	9.93 (0.391)
	Rocker arm-to-shaft clearance		0.013–0.043 (0.0005–0.0017)	0.08 (0.003)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Valve, valve guide	Valve stem O.D.	IN	4.975—4.990 (0.1959—0.1965)	4.97 (0.196)
		EX	4.955—4.970 (0.1951—0.1957)	4.94 (0.194)
	Valve guide I.D.		5.000—5.012 (0.1969—0.1973)	5.04 (0.198)
	Stem-to-guide Clearance	IN	0.010—0.037 (0.0004—0.0015)	0.07 (0.003)
		EX	0.030—0.057 (0.0012—0.0022)	0.10 (0.004)
	Valve seat width		0.9—1.1 (0.035—0.043)	1.5 (0.06)
	Valve guide height		11.4—11.6 (0.45—0.46)	—
Valve spring	Free length	Inner	—	34.23 (1.348)
		Outer	—	31.05 (1.222)
Cylinder head	Warpage		—	0.10 (0.004)

TORQUE VALUES

Cylinder head cover bolt		10 N•m (1.0 kg-m, 7.2 ft-lb)
Oil pipe bolt ('88 ONLY)		23 N•m (2.3 kg-m, 17 ft-lb)
Cylinder head bolt	'88:	32 N•m (3.2 kg-m, 23 ft-lb)
	AFTER '88:	36 N•m (3.6 kg-m, 26 ft-lb)
Rocker arm shaft		50 N•m (5.0 kg-m, 36 ft-lb) ┐ Apply locking agent to the threads
Cam sprocket bolt		19 N•m (1.9 kg-m, 14 ft-lb) ┘
Camshaft holder bolt 6 mm		12 N•m (1.2 kg-m, 9 ft-lb)
	8 x 130 mm	23 N•m (2.3 kg-m, 17 ft-lb) ┐ Apply oil to the seat
	8 x 151 mm '88:	32 N•m (3.2 kg-m, 23 ft-lb) ┤
	AFTER '88:	36 N•m (3.6 kg-m, 26 ft-lb) ┘

TOOLS

Special

Valve guide reamer, 5.0 mm	07984—MA60000 or 07984—MA6000B
Valve guide driver	07942—MA60000
Valve compressor attachment	07959—KM30101

Common

Valve spring compressor	07757—0010000

TROUBLESHOOTING

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

Low compression
- Valves
  - — 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 11)

Excessive smoke
- Worn valve guide or valve stem
- Damaged valve stem seal
- Worn or damaged piston ring (Refer to Section 11)

Compression too high
- Excessive carbon build-up on piston or combustion chamber

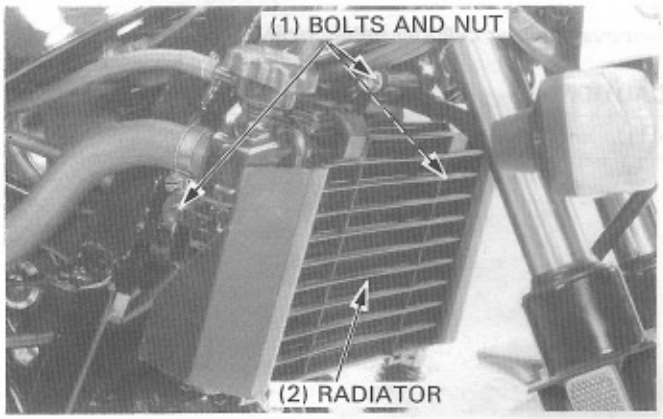
Excessive noise
- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Damaged rocker arm or rocker arm shaft
- Faulty cam chain tensioner
- Loosened spark plug

CAMSHAFT REMOVAL

Remove the fuel tank (page 4-3).

FRONT CYLINDER HEAD COVER REMOVAL

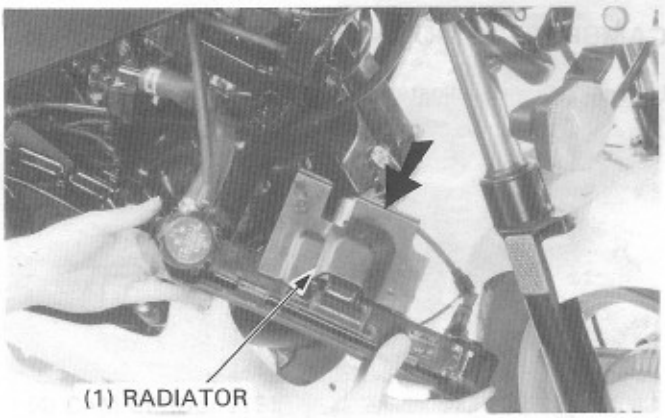
Remove the radiator mounting bolts and nut.



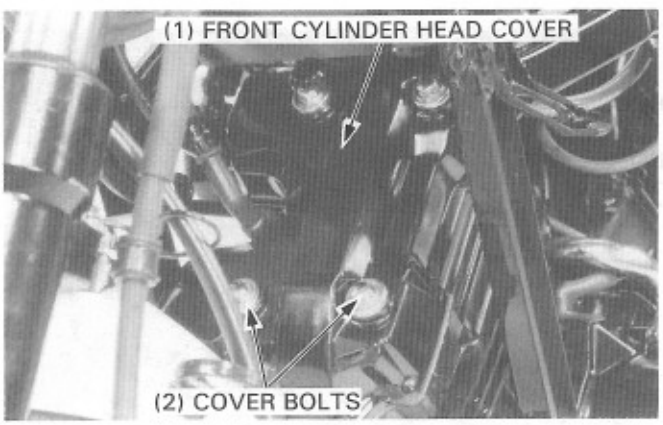
Lower the radiator from the right side and secure it with a rope or equivalent.

CAUTION

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



Remove the front cylinder head cover.

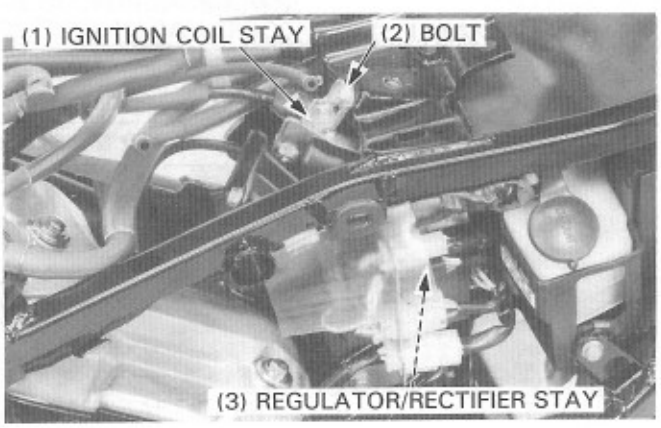


REAR CYLINDER HEAD COVER REMOVAL

Remove the ignition coil stay mounting bolt and disconnect the spark plug caps.
Pull the ignition coil stay out and put it on the frame.

NOTE

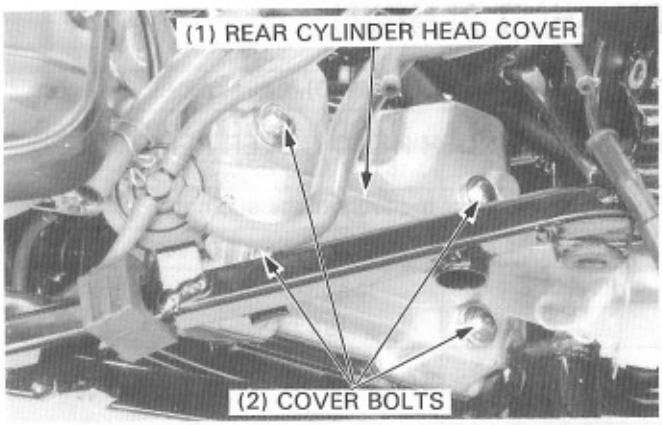
- Remove the regulator/rectifier stay if removing the rear cylinder exhaust camshaft.



Remove the rear cylinder head cover.

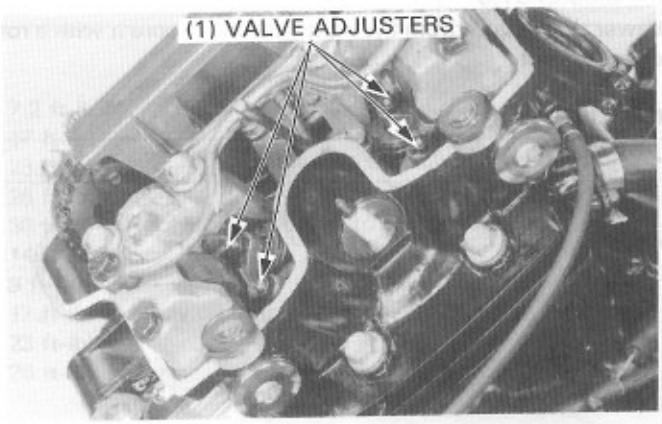
CAUTION

- *Do not damage the cylinder head cover gasket.*



CAMSHAFT REMOVAL

Loosen the valve adjusters all the way.

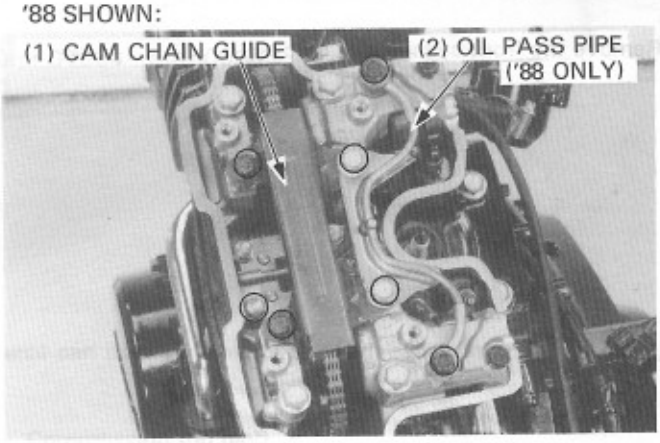


Remove the oil pass pipe ('88 only) and cam chain guide.

NOTE

- Do not let the bolts fall into crankcase.

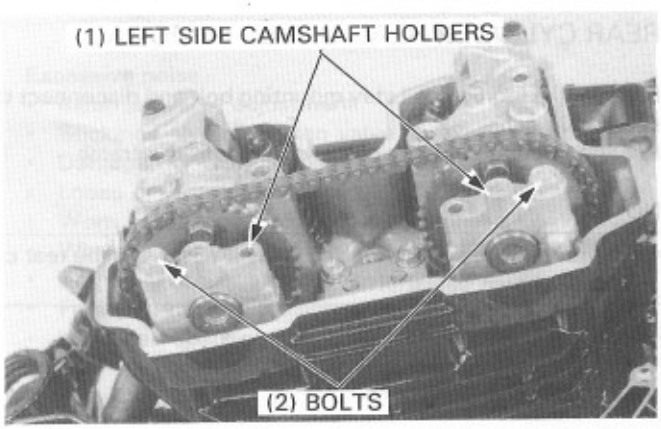
'88 SHOWN:



Remove the left side camshaft holders.

NOTE

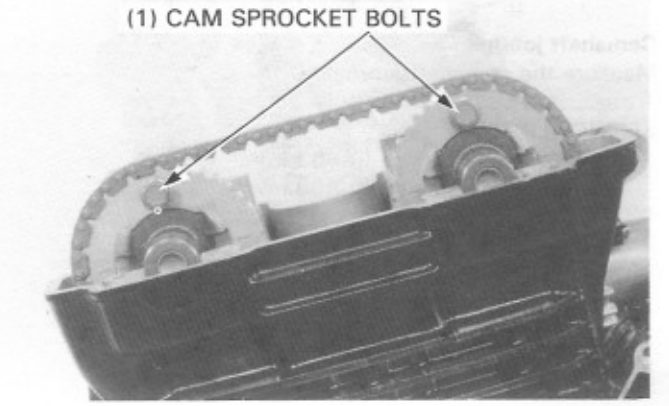
- Mark all disassembled parts to ensure correct reassembly.



With the piston at top dead center of the exhaust stroke, remove the first two cam sprocket bolts.

Next, turn the crankshaft clockwise and remove the other cam sprocket bolts with the piston at top dead center of the compression stroke.

Slide the cam sprockets with the cam chains off the camshaft flanges.



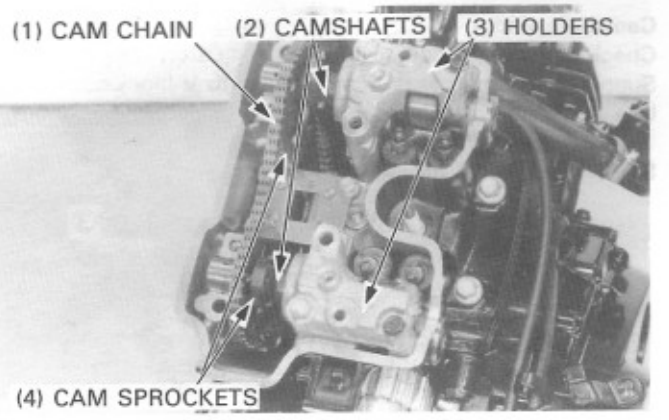
'88:

Remove the cam chain from the sprockets and remove the camshaft holders.

Remove the camshafts and sprockets from the cylinder head.

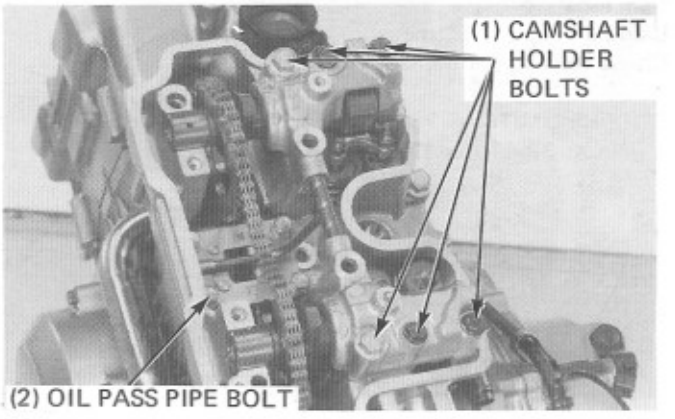
NOTE

- Mark the camshaft holders to ensure correct reassembly.



AFTER '88

Remove the camshaft holder and oil pass pipe bolts.



Slide the oil pass pipe into the exhaust (front: intake) camshaft holder.

Rear: Remove the intake camshaft holder, then remove the exhaust camshaft holder with the oil pass pipe.

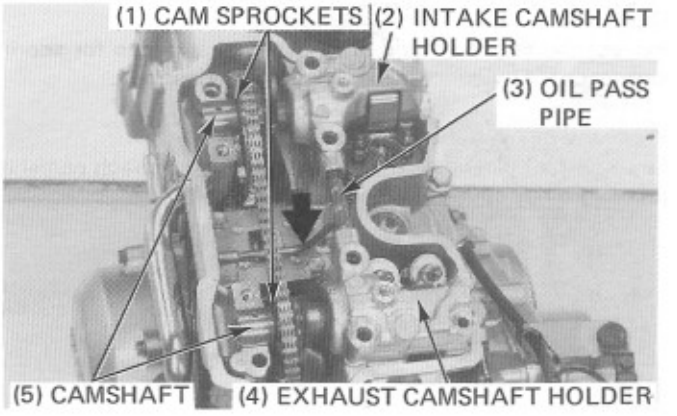
Front: Remove the exhaust camshaft holder, then remove the intake camshaft holder with the oil pass pipe.

NOTE

- Mark the camshaft holders to ensure correct reassembly

Remove the camshafts and sprockets from the cylinder head.

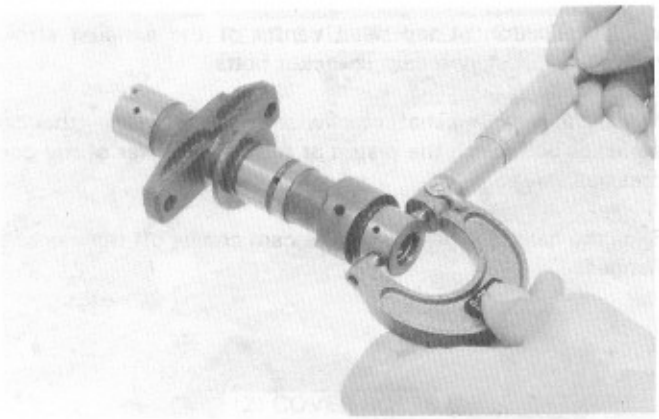
REAR CYLINDER SHOWN:



INSPECTION

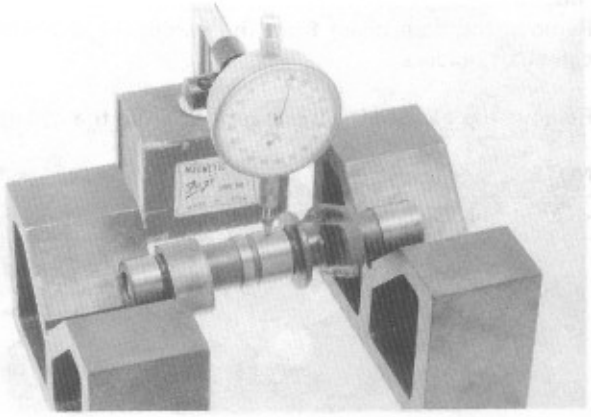
Camshaft journal
Measure the camshaft journals O.D.

SERVICE LIMITS:
Both ends: 21.93 mm (0.863 in)
Center: 21.84 mm (0.860 in)



Camshaft runout
Check camshaft runout with a dial indicator.
Support both ends of the camshaft with V-blocks.
Use 1/2 of the total indicator reading to determine runout.

SERVICE LIMIT: 0.05 mm (0.002 in)



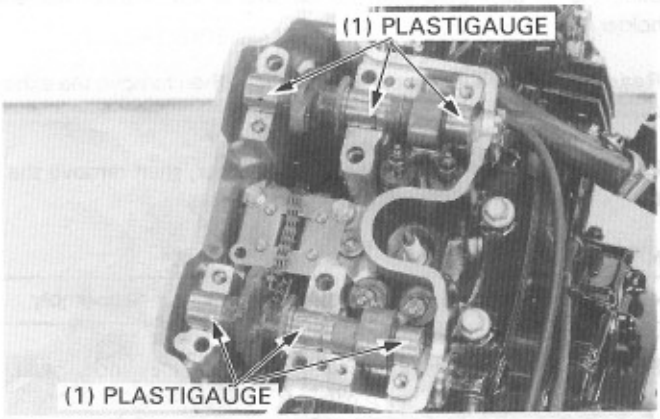
Cam lobe
Using a micrometer, measure each cam lobe.
Check for wear or damage.

SERVICE LIMITS:
IN/EX: 32.41 mm (1.276 in)



Oil clearance
Inspect the camshaft and holder journal surfaces for scoring scratches, or evidence of insufficient lubrication.

Wipe any oil from the journals.
Lay a strip of plastigauge lengthwise on top of each camshaft journal do not cover the oil orifice.



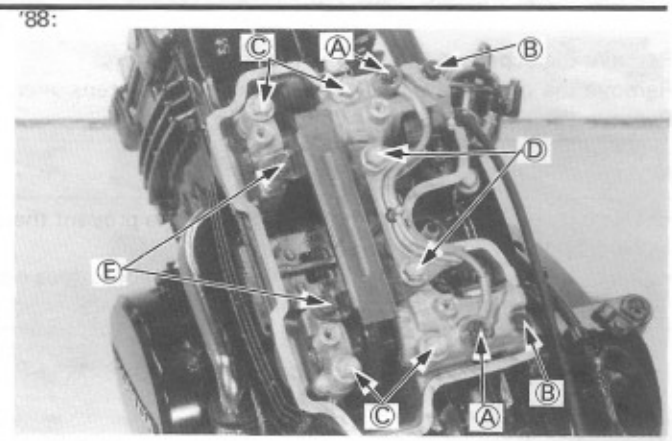
Install the camshaft holders, oil pass pipe ('88 only) and cam chain guide. Tighten the bolts in a crisscross pattern.

NOTE

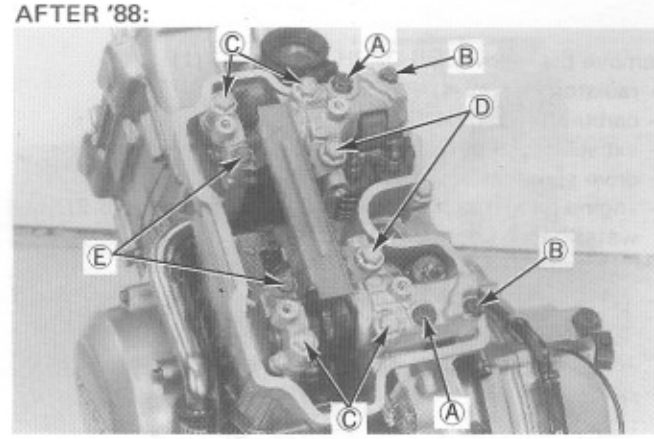
- Do not rotate the camshaft when using plastigauge.

TORQUE:
A ('88: 6 x 48 mm, AFTER '88: 6 x 38 mm),
B (6 x 40 mm), E (6 x 43 mm): 12 N·m (1.2 kg-m, 9 ft-lb)
C (8 x 130 mm): 23 N·m (2.3 kg-m, 17 ft-lb)
D (8 x 151 mm):
'88: 32 N·m (3.2 kg-m, 23 ft-lb)
AFTER '88: 36 N·m (3.6 kg-m, 26 ft-lb)

'88:



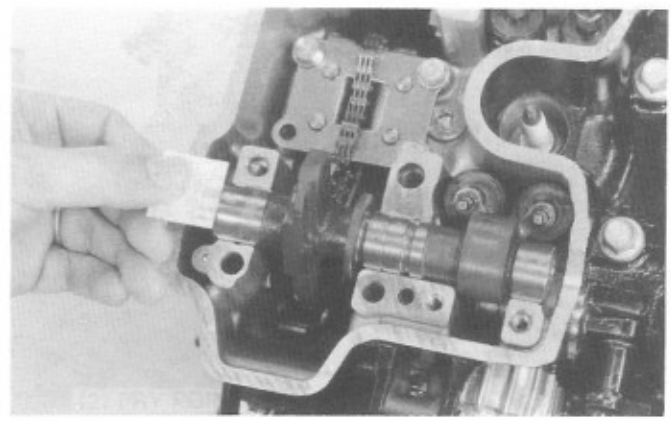
AFTER '88:



Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

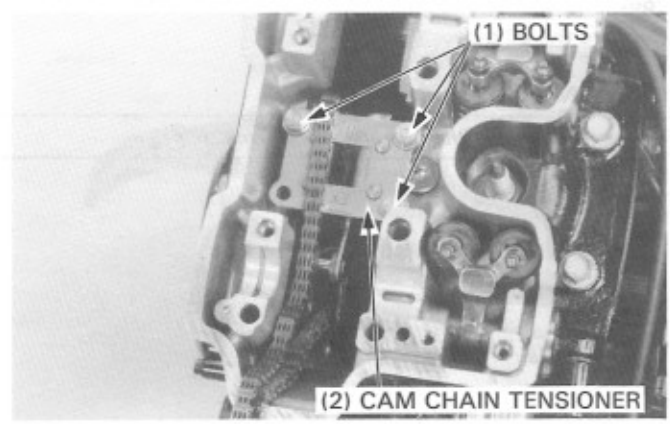
SERVICE LIMITS:
CENTER: 0.205 mm (0.0081 in)
BOTH END: 0.095 mm (0.0037 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders if the clearance still exceeds service limits.



CYLINDER HEAD REMOVAL

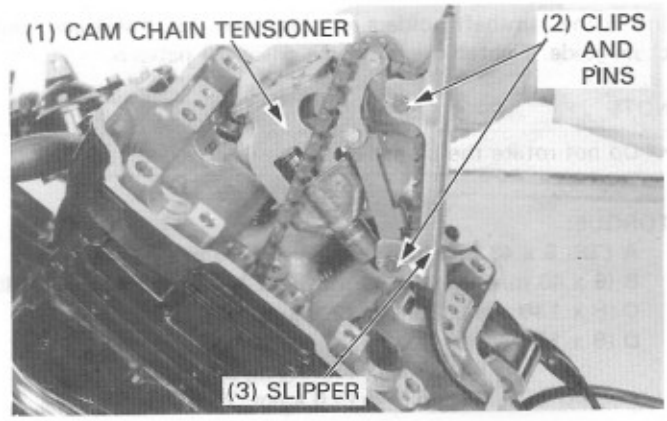
Remove the camshafts (page 9-3).
Remove the cam chain tensioner mounting bolts and pull up the cam chain tensioner.



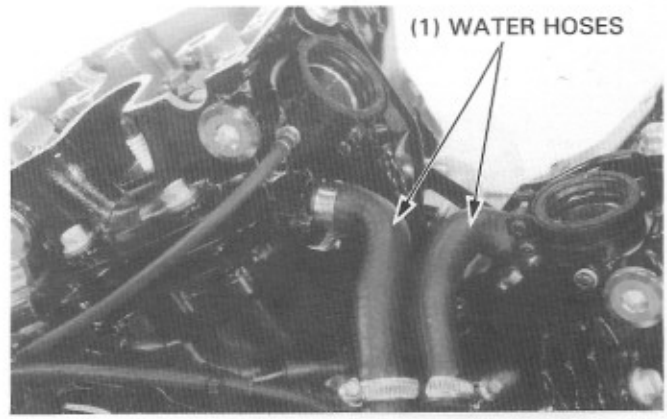
Remove the clips and pull out the pins.
Remove the cam chain tensioner slipper from the tensioner.
Remove the tensioner base from the cylinder head.

NOTE

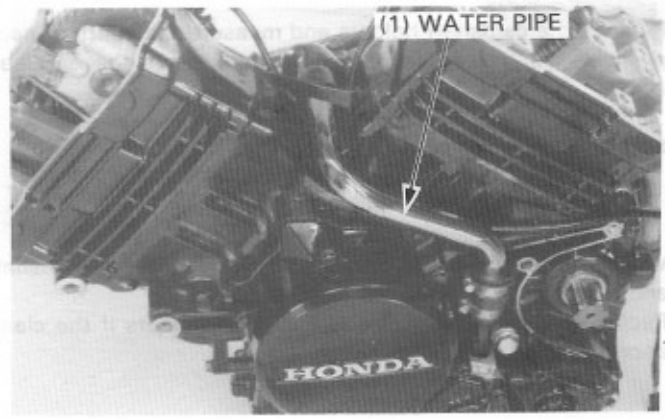
- Use care when removing the clips and pins to prevent them from falling into the crankcase.
- Tie the cam chain with a piece of wire so the chain does not fall into the crankcase.



Remove the following:
— radiator (page 5-4)
— carburetor (page 4-5)
— exhaust system (page 12-4)
— drive sprocket cover (page 5-7)
— engine hanger bolts at the cylinder head (page 6-2)
— water hoses and thermostat housing



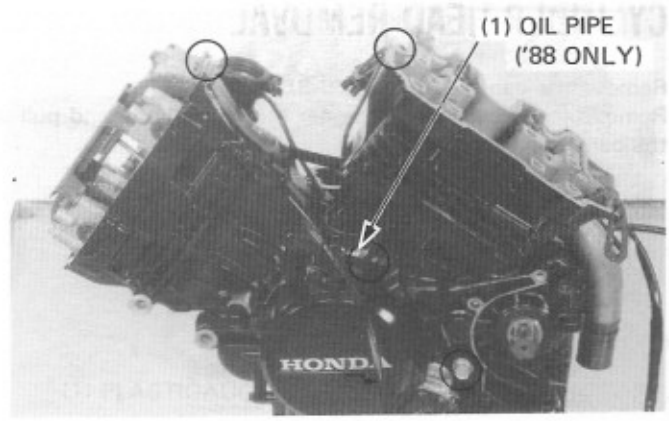
'88:
Remove the water pipe.



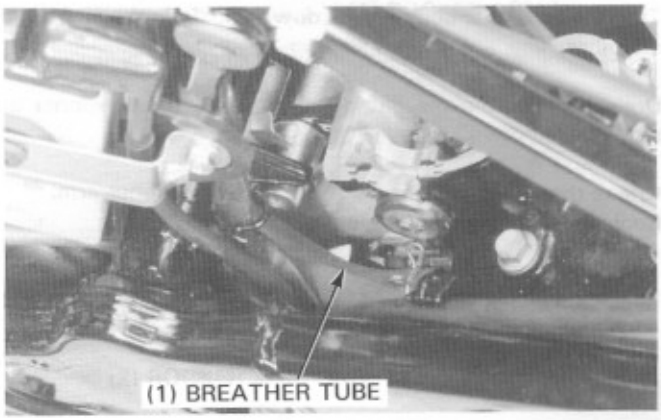
'88:
Remove the oil pipe.

CAUTION

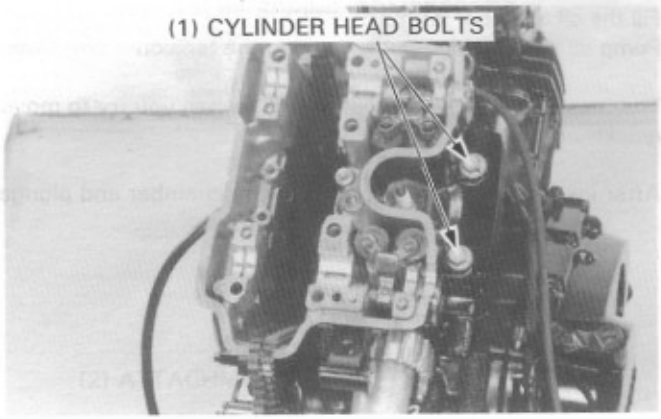
- *Do not damage the oil pipe when removing it.*



Disconnect the crankcase breather tube from the cylinder head.

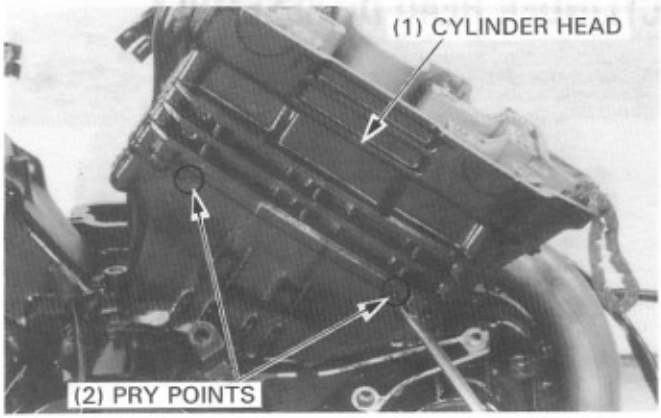


Remove the cylinder head bolts.



Remove the cylinder head using a screwdriver at the pry points.

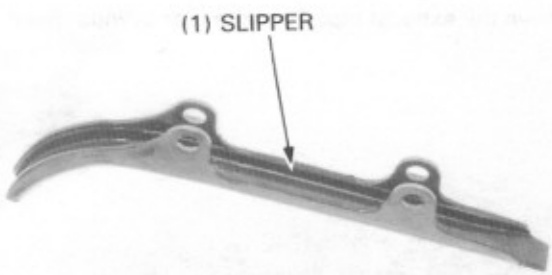
Remove the cylinder head gasket and dowel pins.



CAM CHAIN GUIDE AND TENSIONER INSPECTION

Inspect the cam chain guide and tensioner for damage or excessive wear.

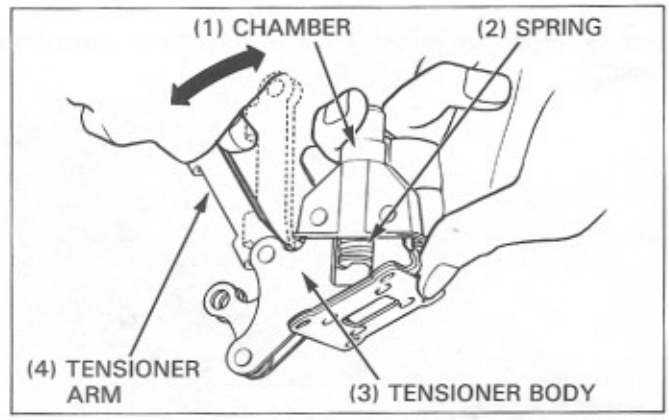
Inspect the cam chain tensioner slipper for damage or excessive wear.



Turn the tensioner body upside down and drain the oil from the chamber.

Drain the oil from the plunger by moving the tensioner arm slowly as shown.

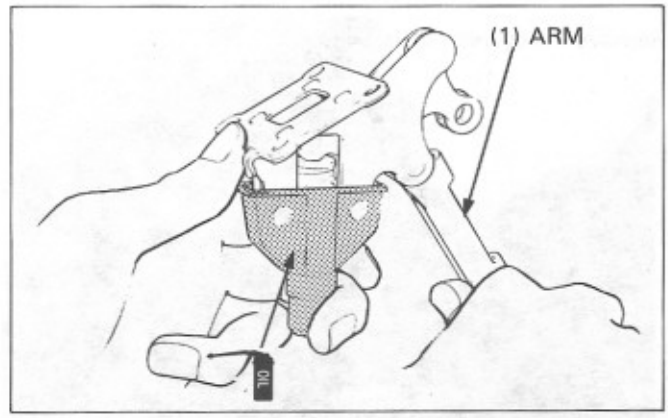
Check the spring tension by moving the tensioner arm.
Replace the tensioner body if necessary.



Fill the oil chamber with oil.
Pump oil into the plunger by moving the tensioner arm slowly.

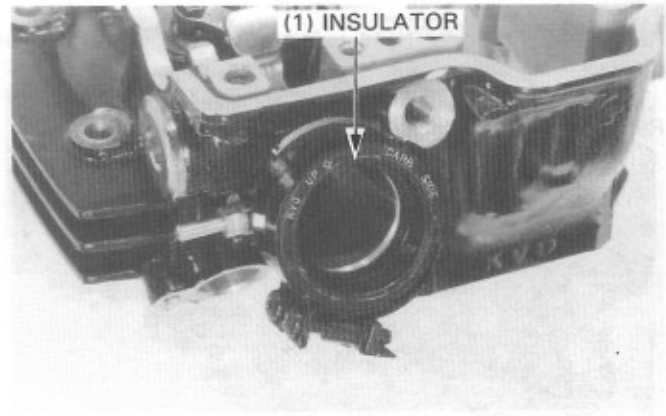
The tensioner is good if the arm locks when you try to move it quickly.

After inspection, drain the oil from the chamber and plunger.

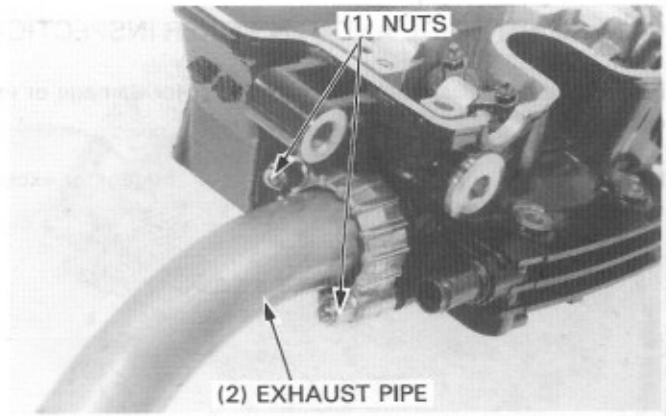


CYLINDER HEAD DISASSEMBLY

Remove the carburetor insulator.



Remove the exhaust pipe from the rear cylinder head.



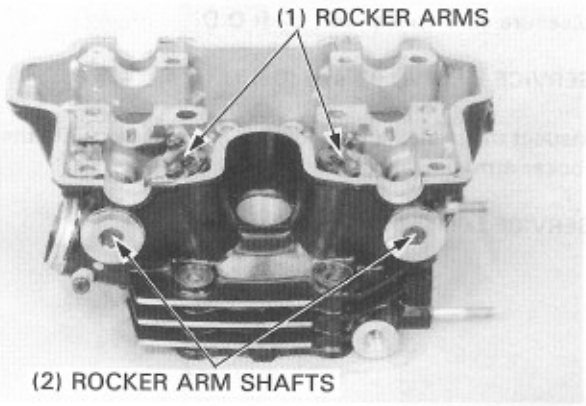
Remove the rocker arm shafts and rocker arms.

CAUTION

- *A locking agent is applied to the shaft threads. Be careful not to damage the shafts while removing them.*

Remove the wave washer and O-ring from the shafts.

Remove the following:
- valve cotters
- retainers
- valve springs
- valves
- spring seats



TOOLS:

Valve spring compressor	**07757—0010000**
Valve compressor attachment	**07959—KM30101**

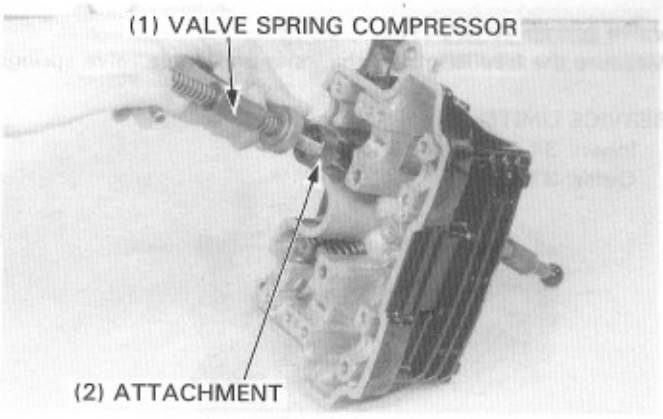
CAUTION

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

NOTE

- Mark all disassembled parts to ensure correct reassembly.

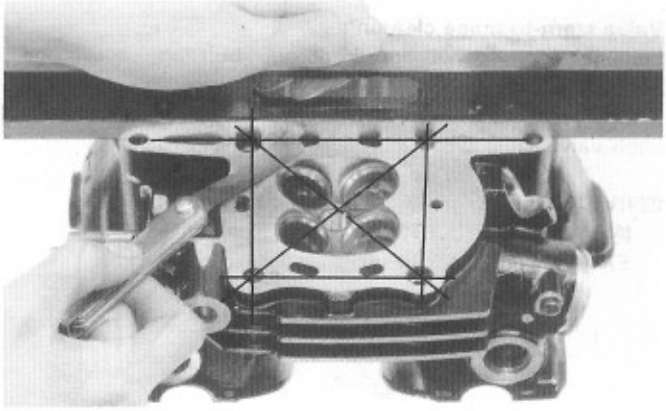
Remove the valve stem seals.



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

NOTE

- Avoid damaging the gasket surfaces.
- Gaskets will come off easier if soaked in solvent.

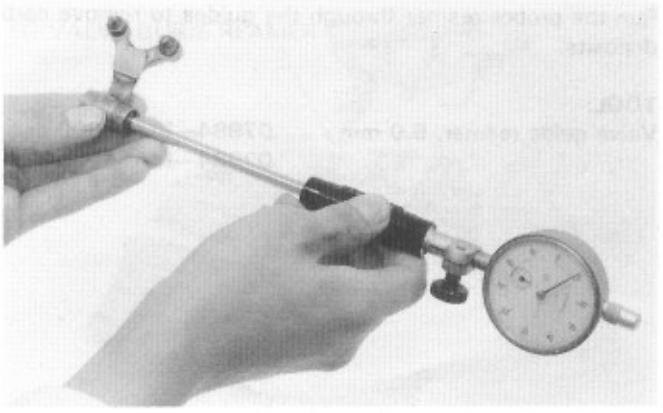


INSPECTION

Cylinder head

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

SERVICE LIMIT: 0.10 mm (0.004 in)



Rocker arm and shaft

Inspect the rocker arms for wear or damage to the camshaft contact surface or for a clogged oil hole.

Measure the I.D. of each rocker arm.

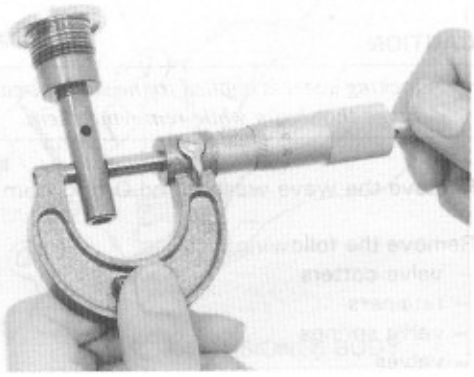
SERVICE LIMIT: 10.05 mm (0.396 in)

Measure each rocker arm shaft O.D.

SERVICE LIMIT: 9.93 mm (0.931 in)

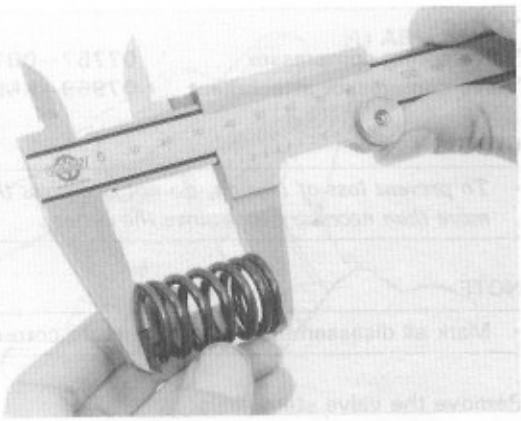
Inspect the shaft for wear or damage and calculate the shaft to rocker arm clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)



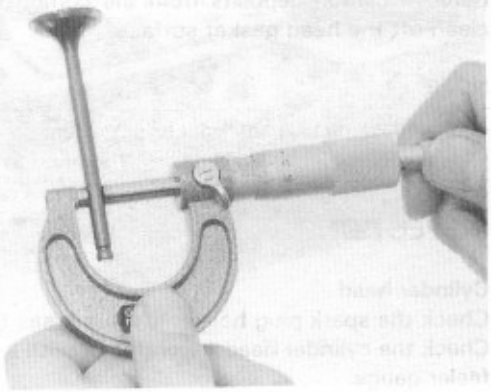
Valve springs
Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:
Inner: 34.23 mm (1.348 in)
Outer: 31.05 mm (1.222 in)



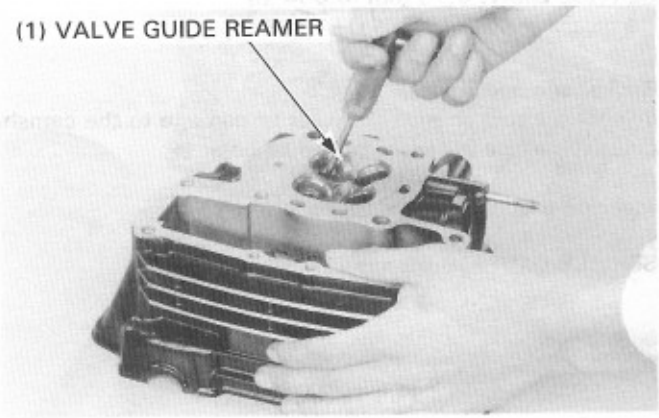
Valve stem-to-guide clearance
Inspect each valve for bending, burning, scratches or abnormal stem wear.
Check valve movement in the guide and measure and record each valve stem O.D.

SERVICE LIMITS:
IN: 4.97 mm (0.196 in)
EX: 4.94 mm (0.194 in)



Run the proper reamer through the guides to remove carbon deposits.

TOOL:
Valve guide reamer, 5.0 mm **07984—MA60000 or 07984—MA6000B**



Measure and record the I.D. of each valve guide.

SERVICE LIMIT: 5.04 mm (0.198 in)

Calculate the valve stem-to-guide clearance.

SERVICE LIMITS:
IN: 0.07 mm (0.003 in)
EX: 0.10 mm (0.004 in)

If the stem-to-guide clearance exceeds the service limits, determine if a new guide would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.
If clearance is still over the service limit, replace the valves.

VALVE GUIDE REPLACEMENT

NOTE

- Reface the valve seats whenever the valve guides are replaced.

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

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

CAUTION

- *Do not use a torch to heat the cylinder, it may cause warping.*
- *To avoid burns, wear heavy gloves when handling the heated cylinder head.*

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

TOOL:
Valve guide driver **07942—MA60000**

Drive in new guides to the specified height from the rocker arm side.

VALVE GUIDE HEIGHT: 11.4—11.6 mm (0.45—0.46 in)

TOOL:
Valve guide driver **07942—MA60000**

NOTE

- The cylinder head should still be heated to 100—150°C (212—302°F) for installation of the new guides.

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

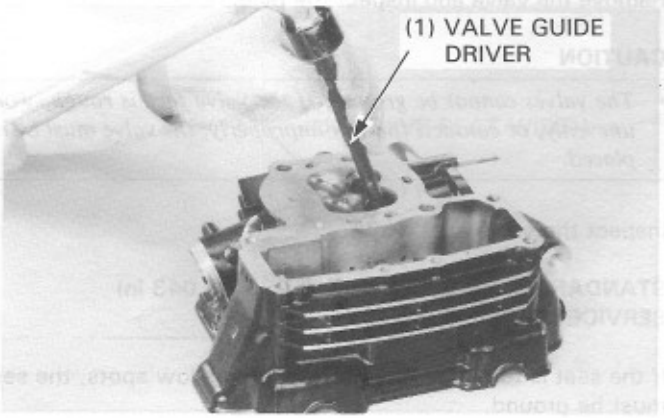
TOOL:
Valve guide reamer, 5.0 mm **07984—MA60000 or 07984—MA6000B**

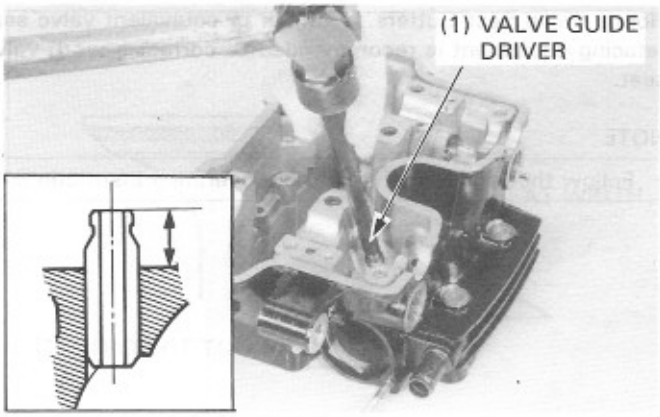
NOTE

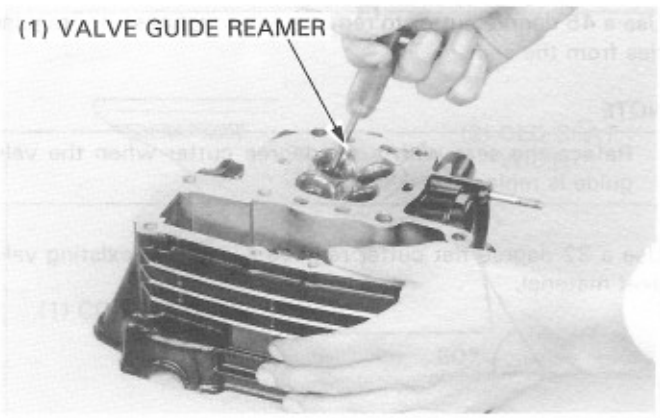
- Rotate the reamer in the same direction when inserting and removing.

Reface the valve seats and clean the cylinder head thoroughly to remove any metal particles.

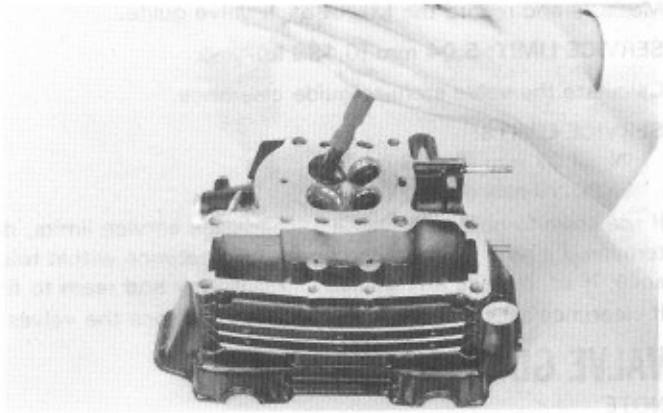








VALVE SEAT INSPECTION/REFACING



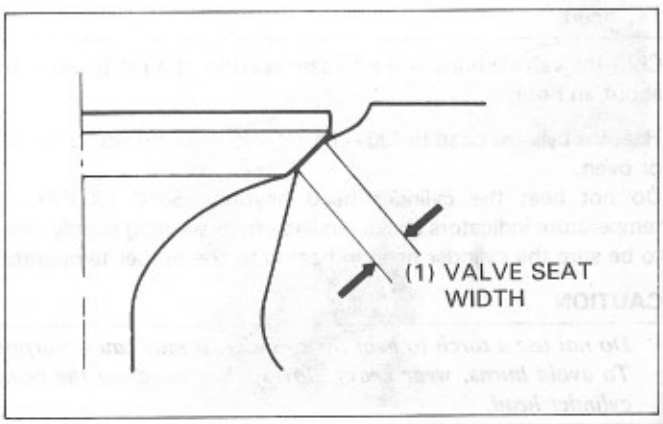
Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian blue to each valve face. Lap each valve and seat using a rubber hose or other handlapping tool.

Remove the valve and inspect the face.

CAUTION

- *The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.*



Inspect the valve seat width.

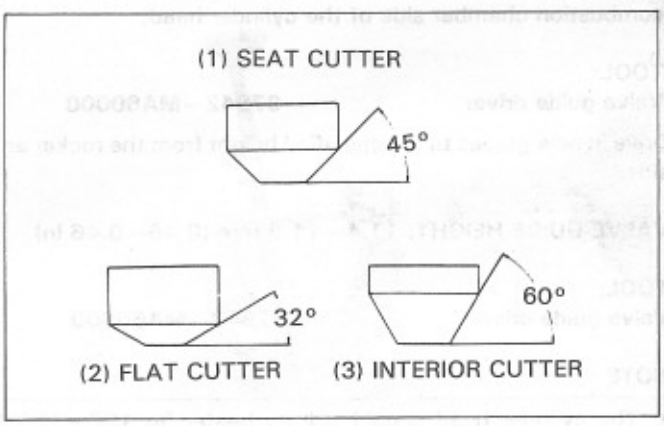
STANDARD: 0.9–1.1 mm (0.035–0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

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

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

NOTE

- Follow the refacer manufacture's operating instructions.

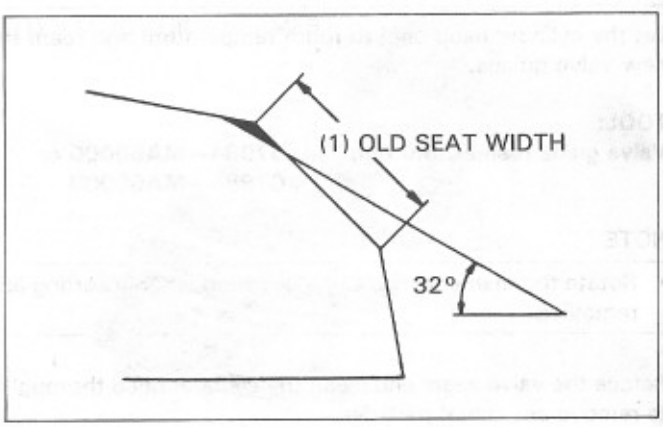


Use a 45 degree cutter to remove any roughness or irregularities from the seat.

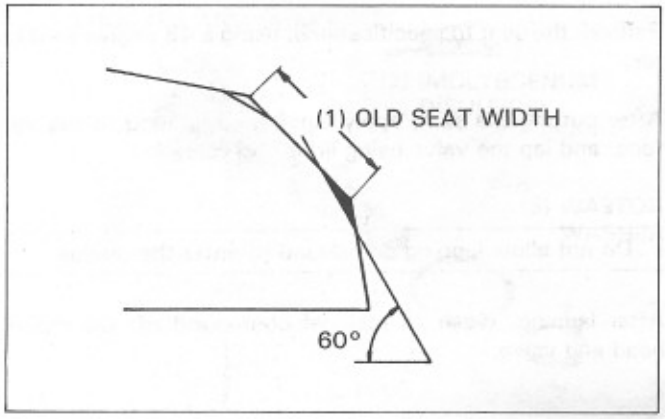
NOTE

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

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

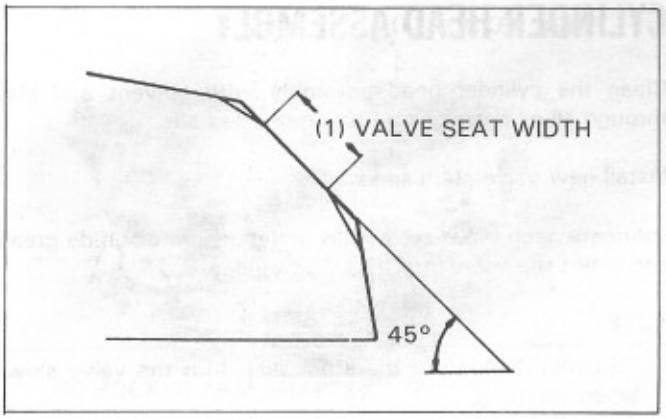


Use a 60 degree interior cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area.



Install a 45 degree seat cutter and cut the seat to the proper width.

STANDARD: 0.9—1.1 mm (0.035—0.043 in)



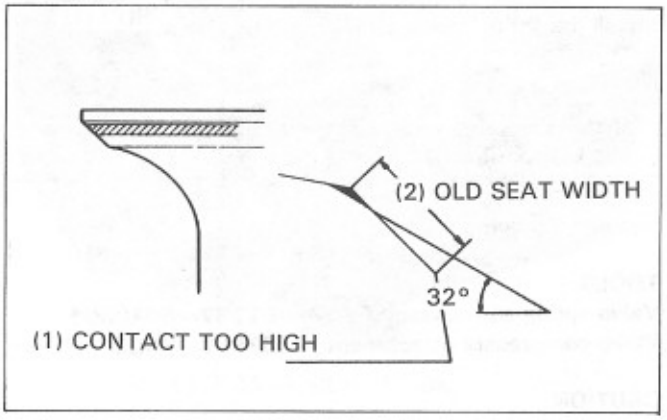
Apply a thin coating of Prussian Blue to the valve seat.

Press the valve through the valve guide and onto the seat to make a clear pattern.

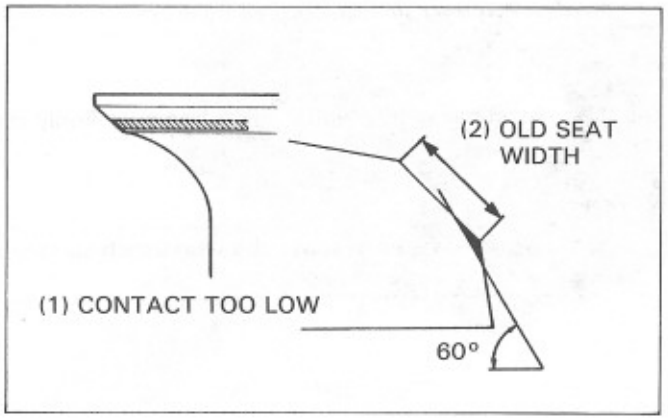
NOTE

- 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 the 32 degree flat cutter.



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



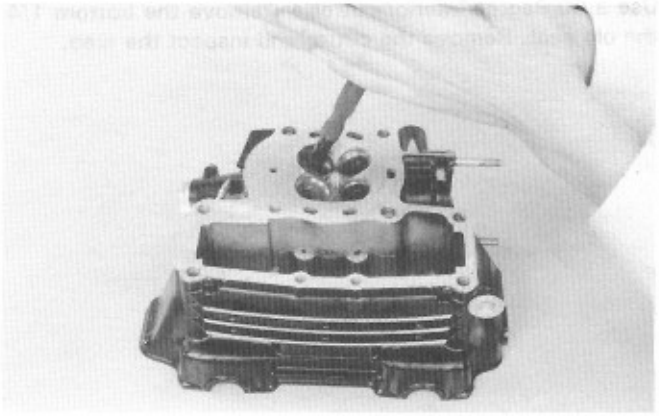
Refinish the seat to specifications, using a 45 degree seat cutter.

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

NOTE

- Do not allow lapping compound to enter the guides.

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



CYLINDER HEAD ASSEMBLY

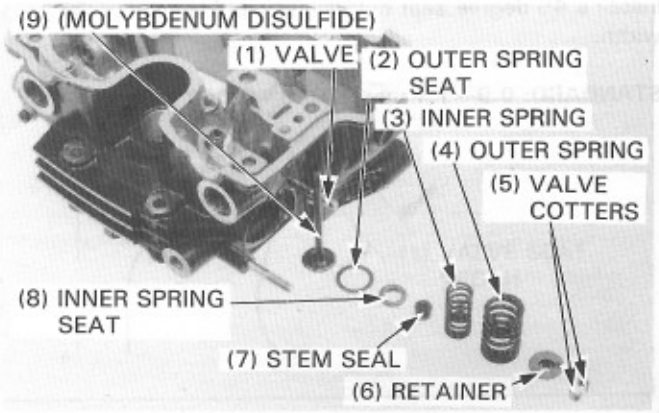
Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install new valve stem seals.

Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide.

NOTE

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



Install the spring seats, springs and retainers.

NOTE

- Install the valve springs with the tightly wound coils facing the cylinder head.

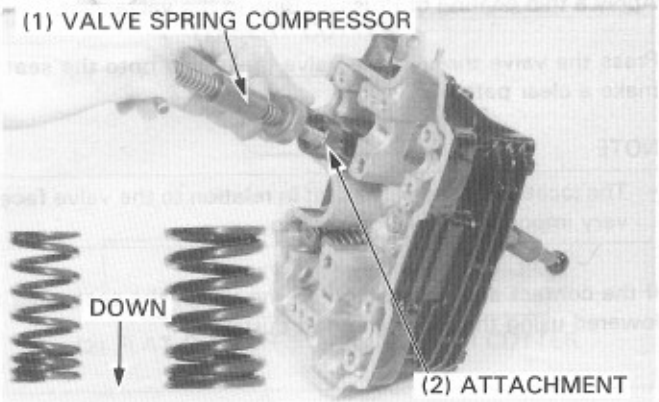
Install the valve cotters.

TOOLS:

Valve spring compressor	**07757–0010000**
Valve compressor attachment	**07959–KM30101**

CAUTION

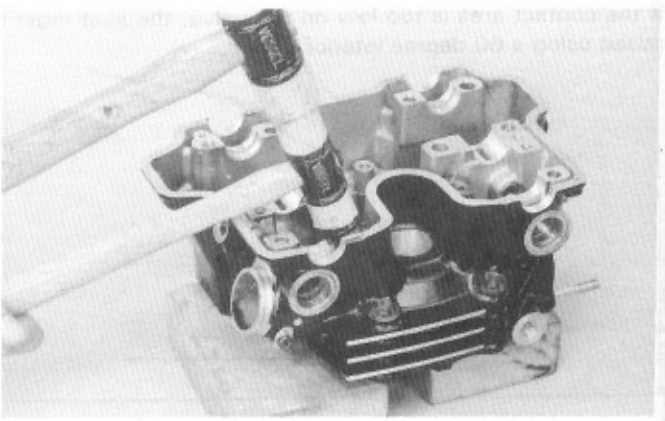
- *To prevent loss of tension, do not compress the valve spring more than necessary to install the valve cotters.*



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

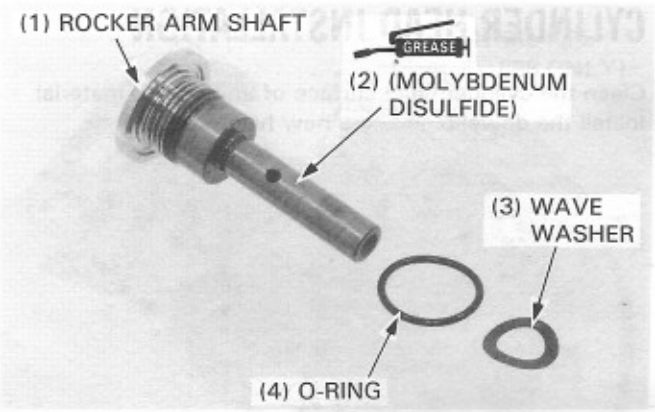
NOTE

- Support the cylinder head above the workbench surface to prevent possible valve damage.



Install the O-ring and wave washer onto the rocker arm shaft.

Apply molybdenum disulfide grease to the shaft sliding surface and locking agent to the threads.



Apply molybdenum disulfide grease to the rocker arm slipper surface.

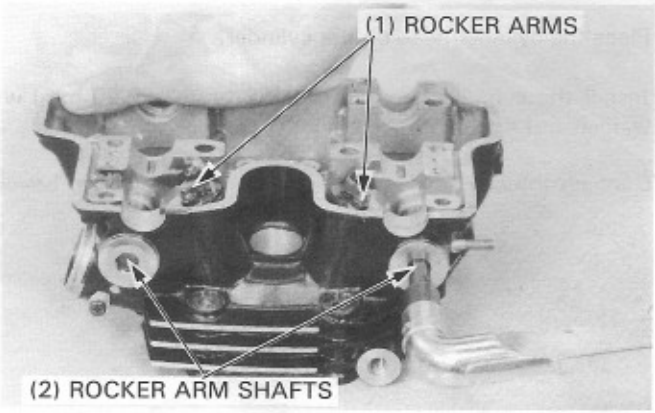
Apply oil to valve adjusting screws and lock nuts.

Install the rocker arms and tighten the shafts to the specified torque.

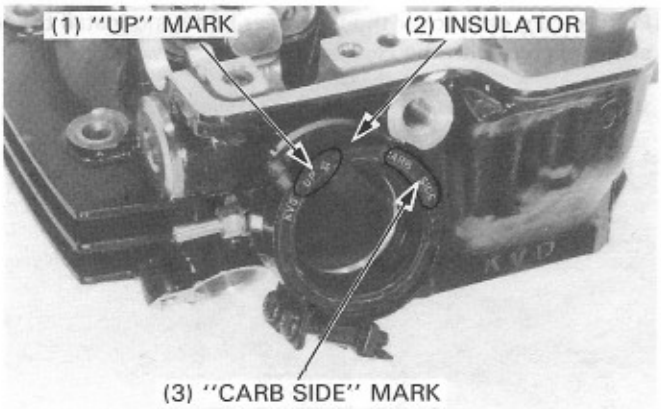
TORQUE: 50 N·m (5.0 kg-m, 36 ft-lb)

CAUTION

- *The rocker arm shaft will come loose if the proper torque is not applied.*



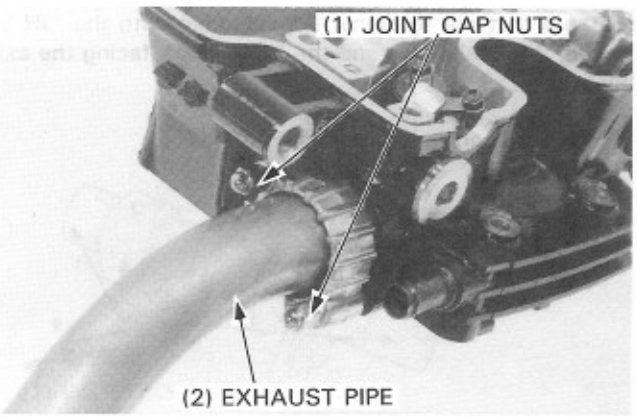
Install the carburetor insulator as shown.



Install the exhaust pipe on the rear cylinder head.

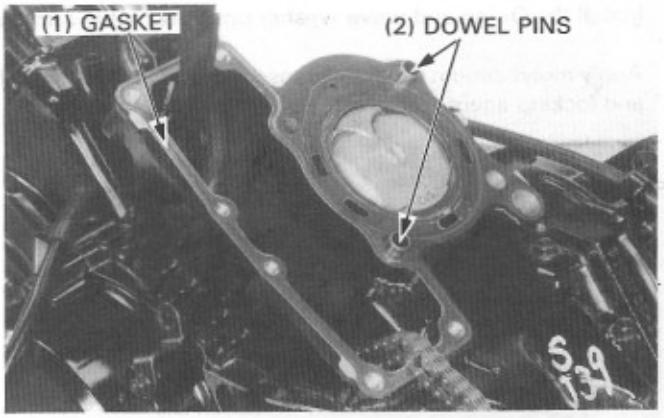
Tighten the exhaust pipe joint cap nuts to the specified torque.

TORQUE: 13 N·m (1.3 kg-m, 9 ft-lb)



CYLINDER HEAD INSTALLATION

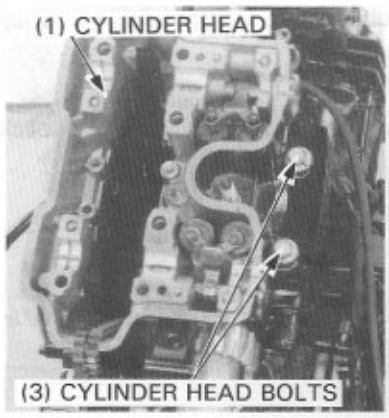
Clean the cylinder head surface of any gasket material. Install the dowel pins and a new head gasket.



Place the cylinder head on the cylinder.

Install the cylinder head bolts (UBS bolt, 8 x 80 mm) with washers but do not torque the bolts yet.

Connect the crankcase breather tube to the cylinder head.

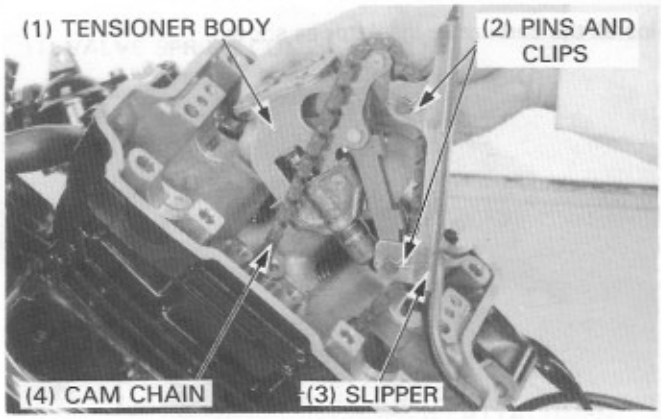




Put the cam chain over the tensioner body and install the tensioner slipper with the clips and pins as shown.

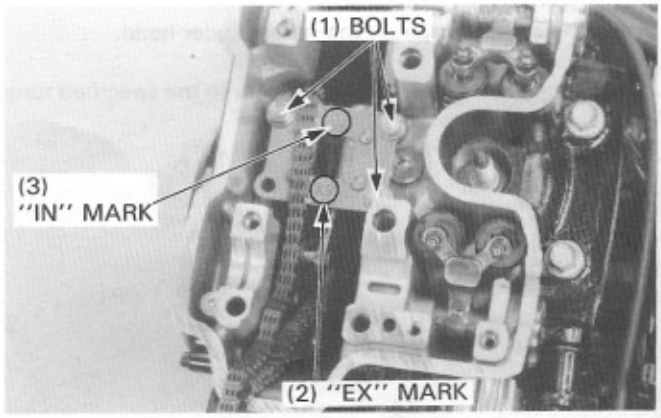
NOTE

- Be careful not to drop the pins and clips into the crankcase.



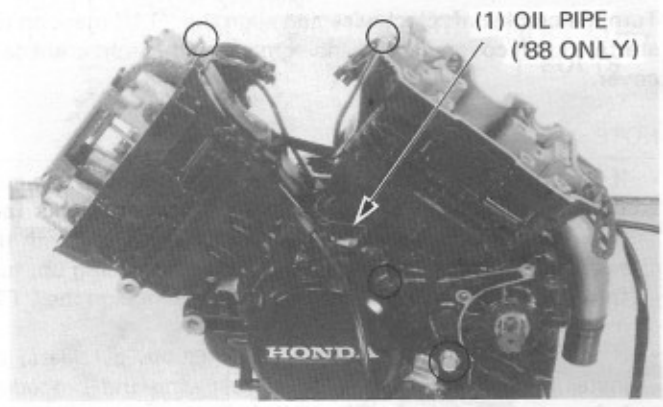
Be sure that the tensioner is positioned with the "IN" mark facing the intake side and the "EX" mark facing the exhaust side.

Tighten the tensioner mounting bolts.

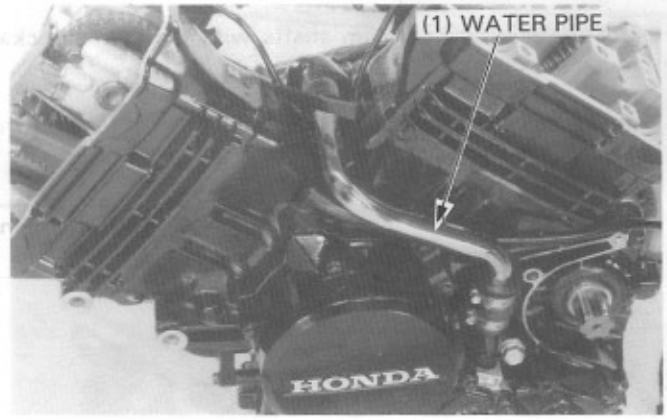


'88:
Install the oil pipe and tighten the oil pipe bolts to the specified torque, with new sealing washers.

TORQUE: 23 N·m (2.3 kg-m, 17 ft-lb)

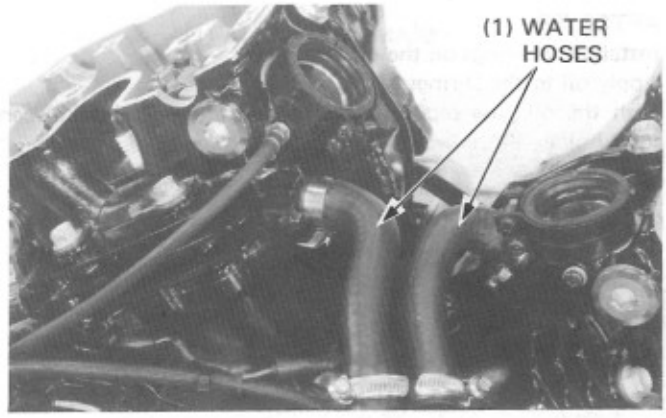


'88:
Install the water pipe securely.



Install the radiator and connect the water hoses with the thermostat housing to the cylinder heads.

Install the following:
- carburetors (page 4-14)
- exhaust system (page 12-4)
- engine hanger bolts (page 6-3)
- drive sprocket cover (page 5-9)

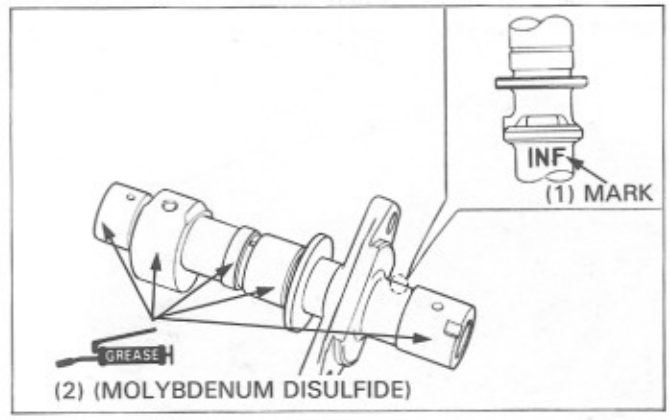


CAMSHAFT INSTALLATION

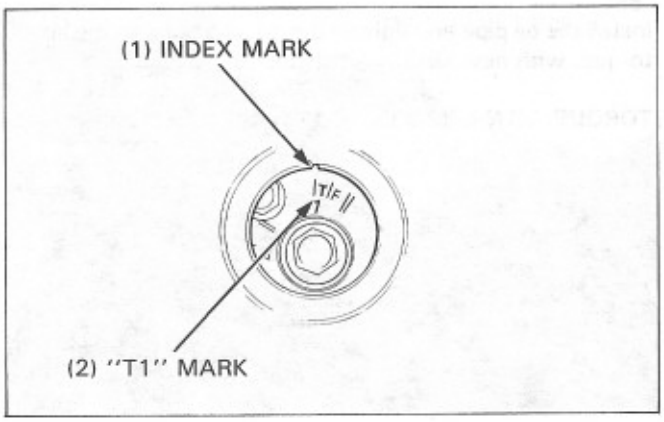
NOTE

- The camshafts have the following identification marks:
  - INF for front cylinder intake camshaft
  - EXF for front cylinder exhaust camshaft
  - INR for rear cylinder intake camshaft
  - EXR for rear cylinder exhaust camshaft

Apply molybdenum disulfide grease to the camshaft journals and lobes.



Turn the crankshaft clockwise and align the "T1" mark on the starter clutch cover with the index mark on the right crankcase cover.

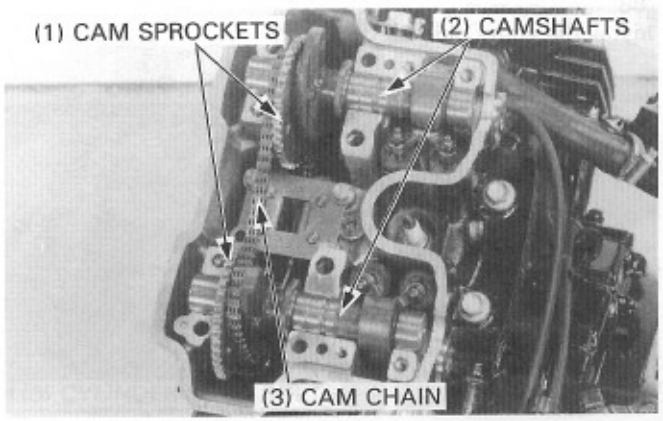


NOTE

- If only the rear cylinder camshafts were removed, be sure that the front cylinder camshaft identification marks face down with the sprocket alignment marks aligned with the head surface. If the identification marks are facing up, turn the crankshaft clockwise 360 degrees and realign the "T1" mark with the index mark.
- If the camshafts were removed from both cylinders, re-install the rear camshafts first, following the procedure below.

Install the rear cylinder cam shafts with the cam sprockets through the cam chain.

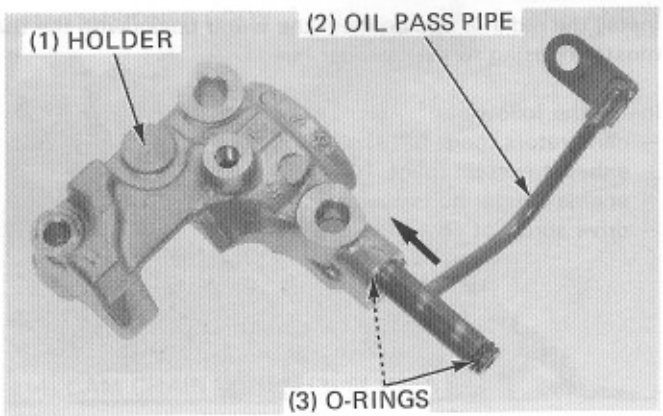
Turn the camshafts so their identification marks face down.



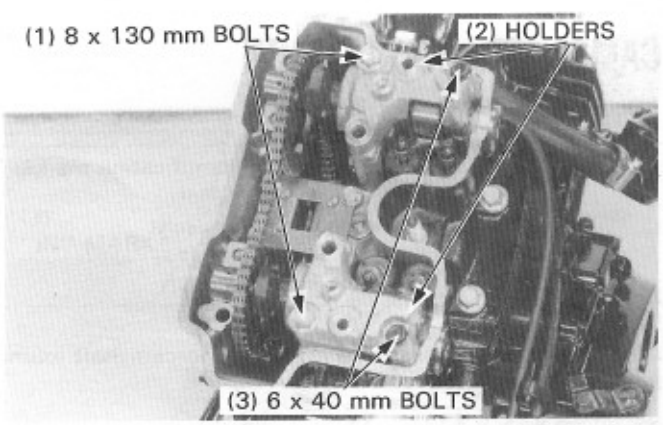
NOTE

- Make sure that the cam chain is engaged with the crankshaft sprocket.

AFTER '88:
Install new O-rings on the oil pass pipe.
Apply oil to the O-rings.
Push the oil pass pipe into the exhaust (front: intake) camshaft holder all the way.



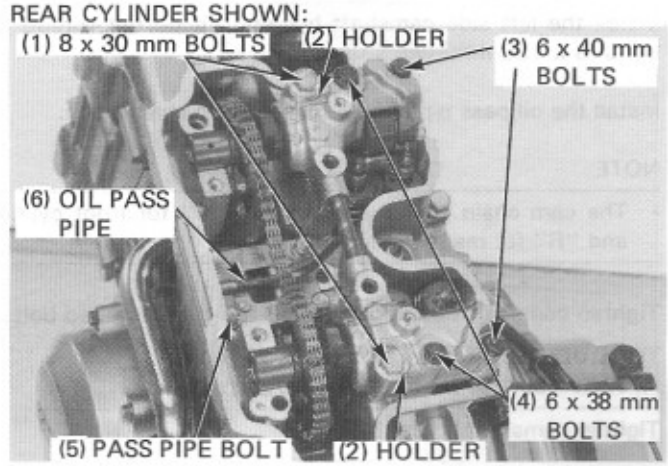
'88:
Install the right side camshaft holders and bolts but do not tighten the bolts yet.



AFTER '88:
Install the intake (front: exhaust) camshaft holder and exhaust (front: intake) camshaft holder with the oil pass pipe.
Loosely install the bolts.

Slide the oil pass pipe into the intake (front: exhaust) camshaft holder aligning the pass pipe bolt holes.
Install the oil pass pipe bolt but do not tighten it yet.

REAR CYLINDER SHOWN:

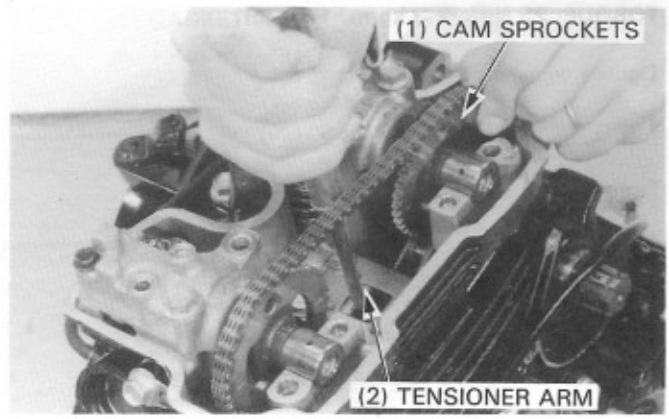


Place the cam chain over the intake cam sprockets aligning the alignment marks on the sprockets with the cylinder head upper surface.

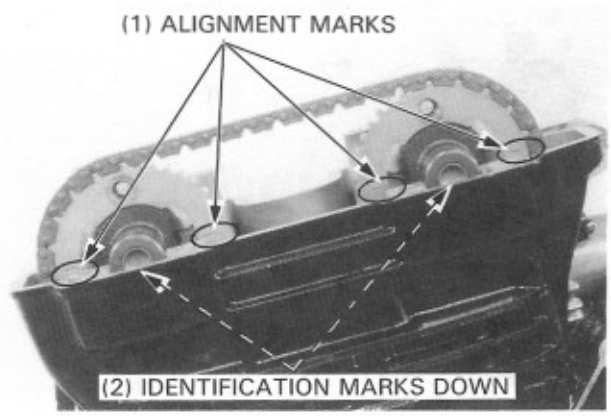
Move the intake cam sprocket onto the camshaft flange shoulder.

Place the cam chain over the exhaust cam sprocket.

Move the exhaust cam sprocket onto the camshaft flange shoulder while depressing the cam chain tensioner arm with a screwdriver.



Make sure that the alignment marks on the sprockets align with the cylinder head upper surface.



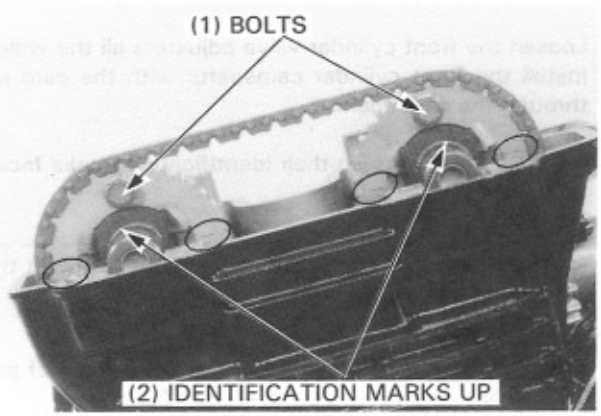
Apply a locking agent to the cam sprocket bolts threads, then tighten the bolts to the specified torque.

TORQUE: 19 N·m (1.9 kg-m, 14 ft-lb)

Turn the crankshaft clockwise 360 degrees so that the other sprocket bolt holes are exposed and the camshaft identification marks (page 9-19) are facing up.

Make sure that the alignment marks on the sprockets align with the cylinder head upper surface.

Tighten the other sprocket bolts to same torque.



Install the left side camshaft holders but do not torque the bolts (8 x 130 mm) yet.

Install the oil pass pipe ('88 only) and cam chain guide.

NOTE

- The cam chain guides are marked; "F" for front cylinder and "R" for rear cylinder.

Tighten camshaft holder bolt D and the cylinder head bolts.

TORQUE: '88: 32 N·m (3.2 kg-m, 23 ft-lb)
AFTER: '88: 36 N·m (3.6 kg-m, 26 ft-lb)

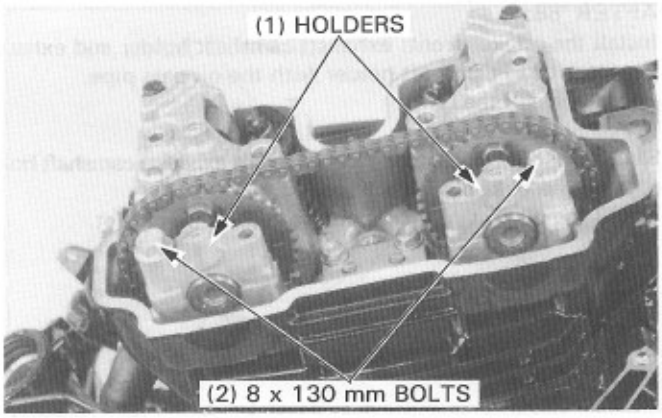
Tighten camshaft holder bolt C.

TORQUE: 23 N·m (2.3 kg-m, 17 ft-lb)

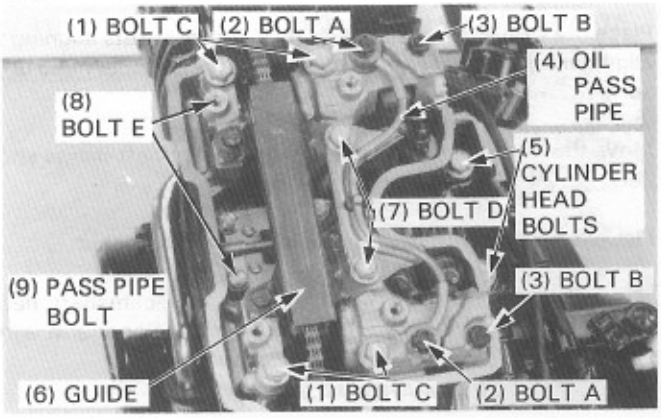
Tighten camshaft holder bolts A, B and E.

TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)

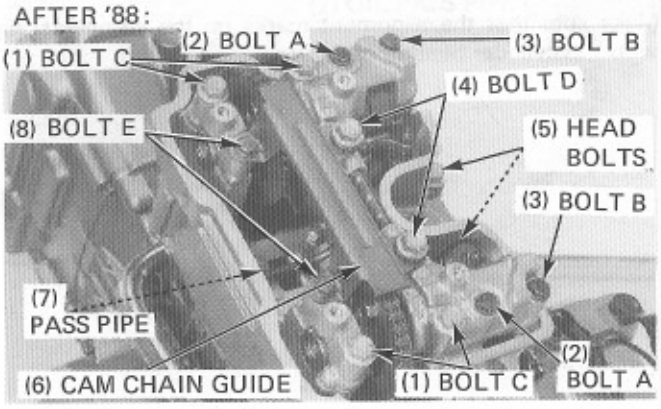
Tighten the oil pass pipe bolt.



'88:



AFTER '88:



To install the front cylinder camshafts:

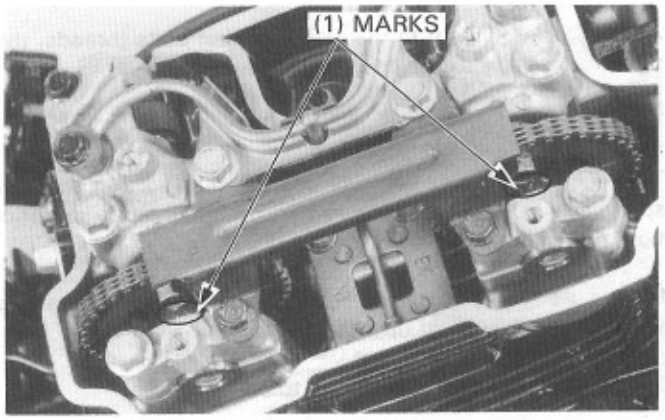
Make sure that the rear cylinder camshaft identification marks ("INR" and "EXR") are facing up.

Loosen the front cylinder valve adjusters all the way.
Install the front cylinder camshafts with the cam sprockets through the cam chain.

Turn the camshafts so their identification marks face up.

NOTE

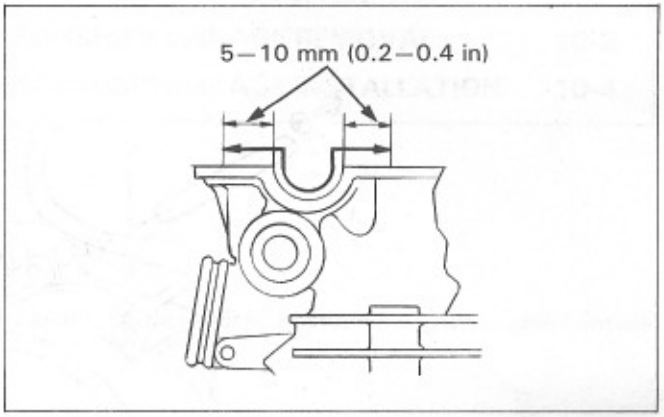
- Make sure that the cam chain is engaged with the crankshaft sprocket.



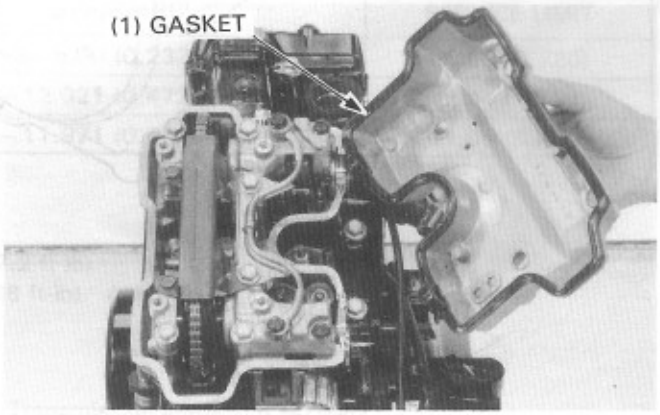
Continue the installation procedure at the bottom of page 9-20. Adjust the valve clearance (page 3-7).

CYLINDER HEAD COVER INSTALLATION

Apply sealant to the cylinder head as shown.



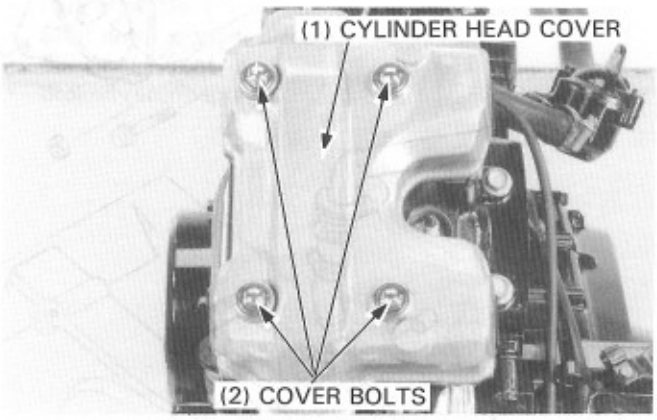
Check that the cylinder head cover gasket is in good condition.

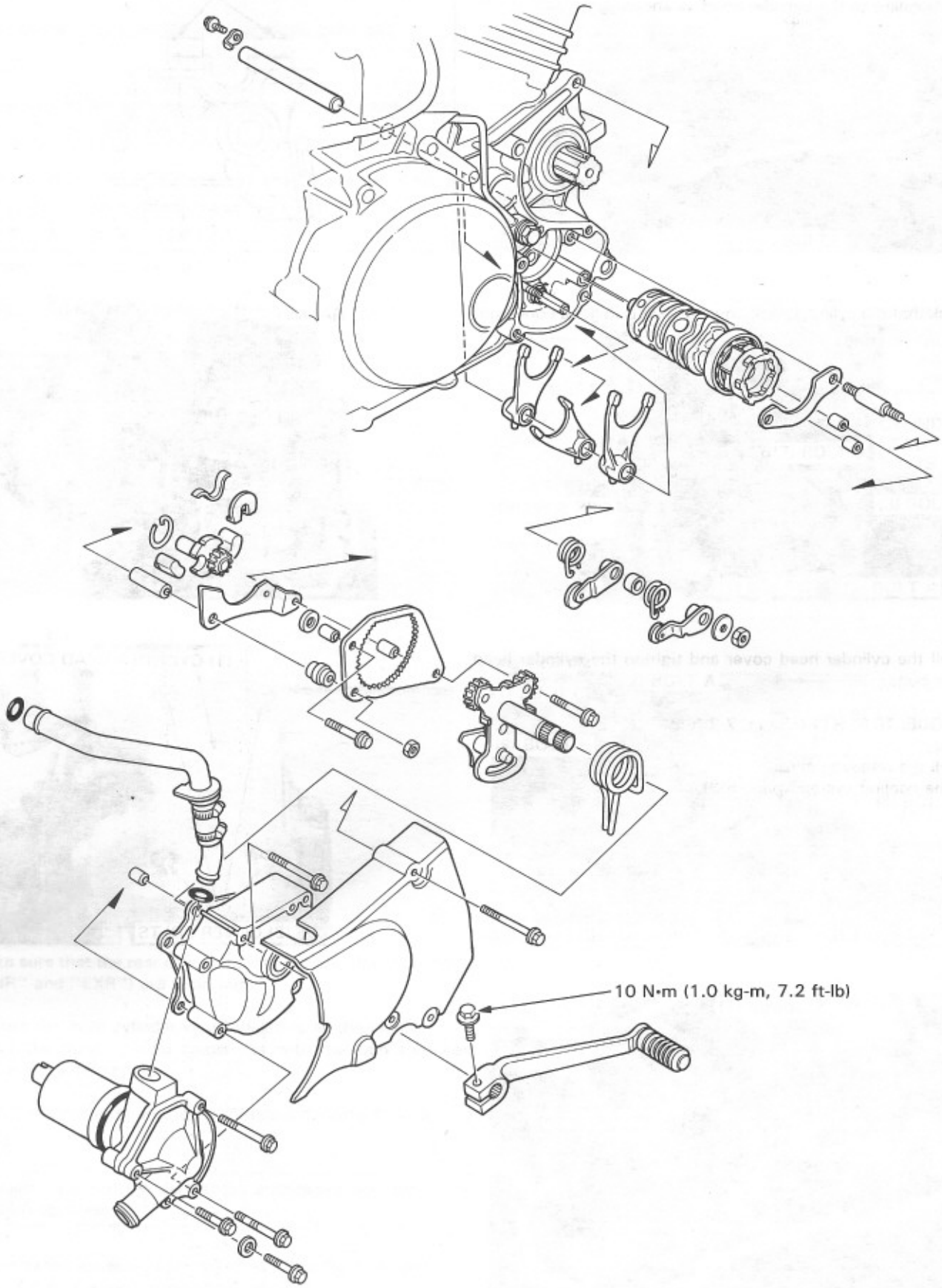


Install the cylinder head cover and tighten the cylinder head cover bolts.

TORQUE: 10 N·m (1.0 kg-m, 7.2 ft-lb)

Install the removed parts.
Fill the cooling system (page 5-3).




10 N•m (1.0 kg-m, 7.2 ft-lb)

SERVICE INFORMATION	10-1	GEARSHIFT LINKAGE REMOVAL	10-2
TROUBLESHOOTING	10-1	GEARSHIFT LINKAGE INSTALLATION	10-4

SERVICE INFORMATION

GENERAL

- The gearshift linkage (including the shift drum, shift fork and fork shaft) can be serviced after removing the engine from the frame (section 6).

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Shift fork	Claw thickness	5.93–6.00 (0.233–0.236)	5.60 (0.220)
	I.D.	12.000–12.021 (0.4724–0.4733)	12.04 (0.474)
Fork shaft	O.D.	11.960–11.971 (0.4709–0.4713)	11.90 (0.469)

TORQUE VALUE

Gearshift pedal bolt	10 N·m (1.0 kg-m, 7.2 ft-lb)
Gearshift return spring pin	25 N·m (2.5 kg-m, 18 ft-lb) Apply locking agent to the threads

TROUBLESHOOTING

Hard to shift
- Improper clutch operation
- Shift fork bent
- Fork shaft bent
- Shift claw bent
- Shift drum cam grooves damaged
- Shift spindle bent
- Incorrect engine oil weight

Transmission jumps out of gear
- Gear dogs worn
- Fork shaft bent
- Shift drum stopper broken
- Shift forks bent
- Broken return spring

GEARSHIFT LINKAGE REMOVAL

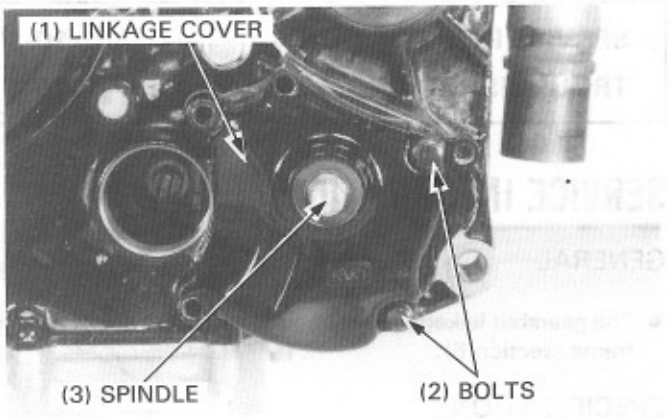
LINKAGE REMOVAL

Remove the engine from the frame (Section 6).
Remove the water pump (page 5-7).
Shift the transmission into neutral.

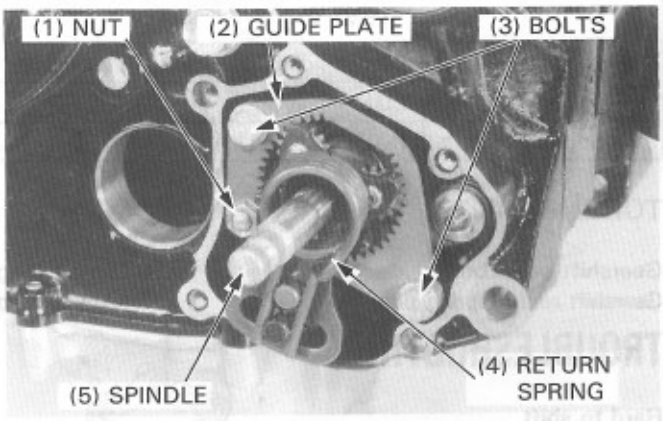
Remove the gearshift pedal.

Remove the gearshift linkage cover bolts.

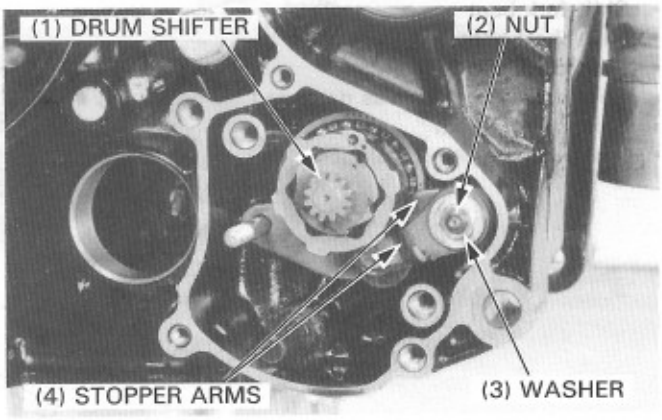
Push on the spindle to keep it in place and pull the gearshift linkage cover off.
Remove the gasket and dowel pins.



Remove the following:
- guide plate mounting bolts and nut
- return spring, spindle and guide plate as an assembly
- collar

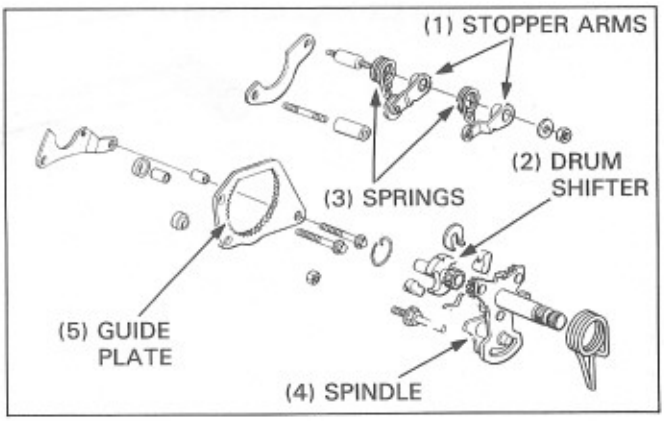


- drum shifter
- nut
- neutral stopper arm and drum stopper arm with their springs



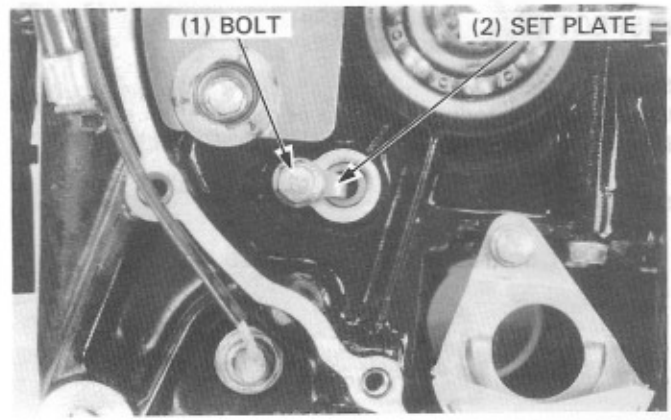
INSPECTION

Check all parts for wear or damage.
Replace if necessary.

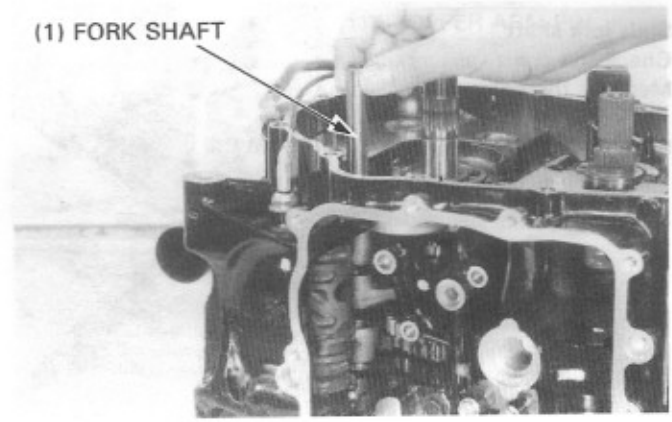


SHIFT FORKS AND SHIFT DRUM REMOVAL

Remove the following:
- clutch (page 7-3)
- oil pump (page 2-4)
- bolt
- shift fork shaft set plate

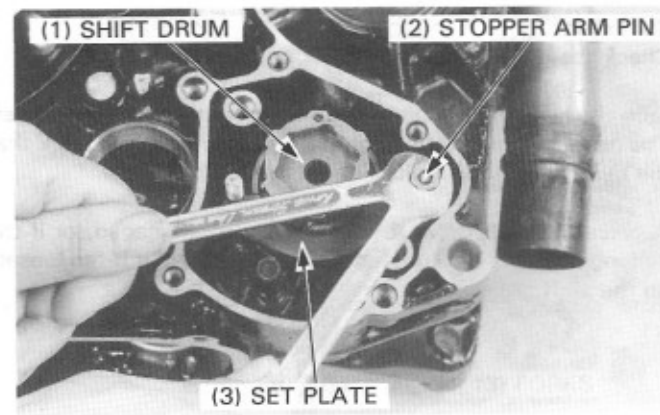


Pull the shift fork shaft out.

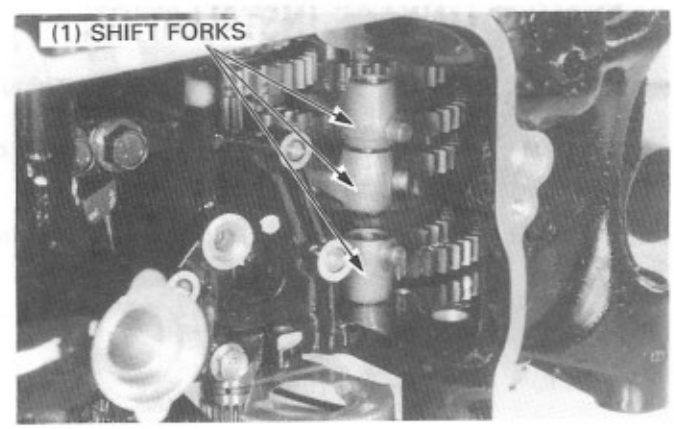


Screw in two 6 mm nuts to the stopper arm pin and turn the lower nut and remove the stopper arm pin.

Remove the shift drum with the set plate.



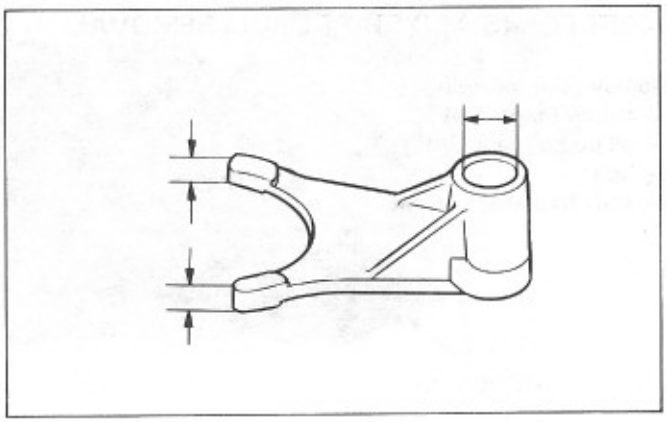
Remove the shift forks.



INSPECTION

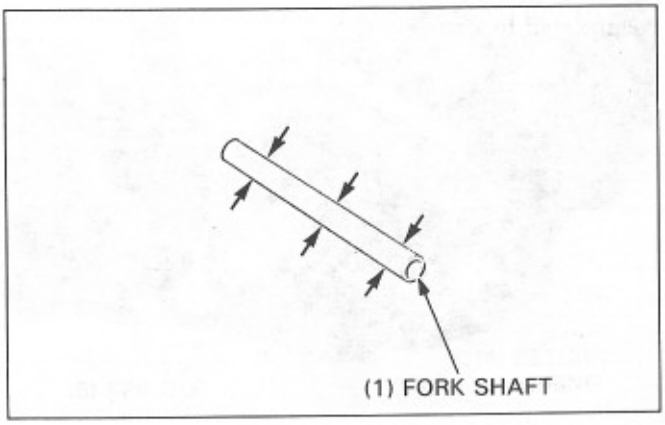
Shift fork
Chekc the shift fork for damage or deformation.
Measure the shift fork I.D. and claw thickness.

SERVICE LIMITS:
I.D.: 12.04 mm (0.474 in)
CLAW THICKNESS: 5.60 mm (0.220 in)



Shift fork shaft
Check the shaft for damage.
Measure the shaft O.D.

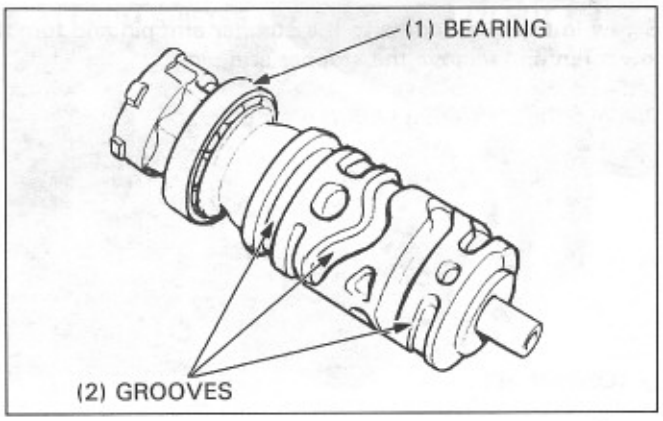
SERVICE LIMIT: 11.90 mm (0.469 in)



Shift drum
Check the shift drum grooves for damage.

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

Replace the shift drum if the grooves are damaged, or if the bearing races do not turn smoothly, quietly, or if it fits loosely on the shift drum.

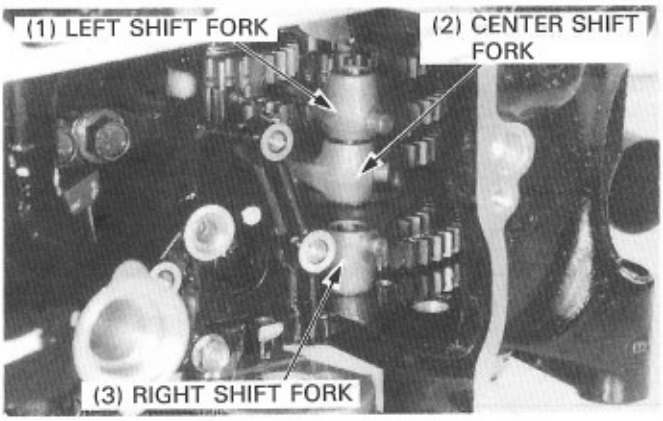


GEARSHIFT LINKAGE INSTALLATION

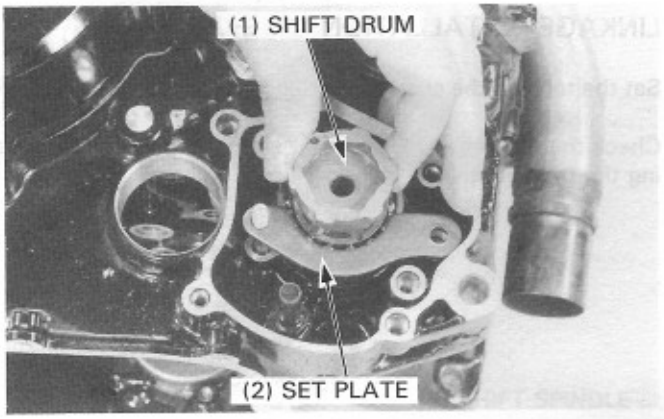
SHIFT FORKS AND SHIFT DRUM INSTALLATION

Apply molybdenum disulfide grease to the shift fork grooves of the M3/M4, C5 and C6 gears.

Install the shift forks by facing their identification marks to the clutch side.

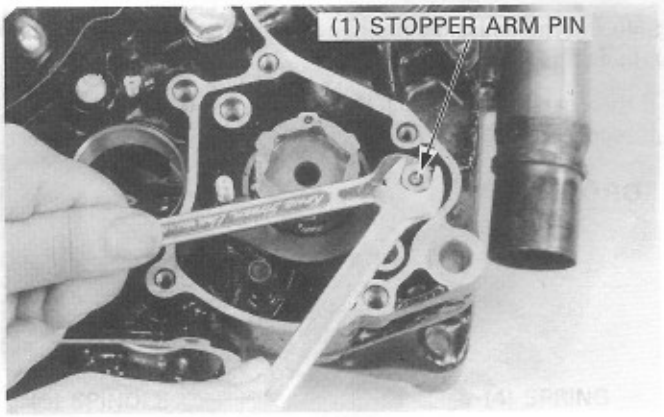


Install the shift drum with the set plate.



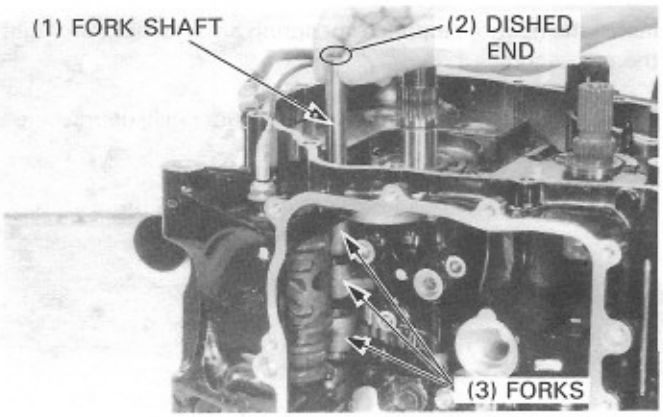
Apply locking agent to the stopper arm pin threads.

Tighten the stopper arm pin securely using double 6 mm nuts.



Set the guide pins of the shift forks in the shift drum grooves.

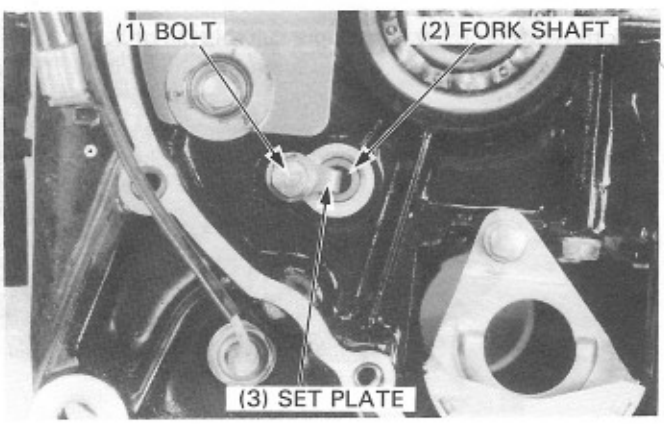
Install the shift fork shaft through the forks facing its dished end to the clutch side.



Apply locking agent to the set plate bolt threads.

Install the set plate and tighten the bolt securely.

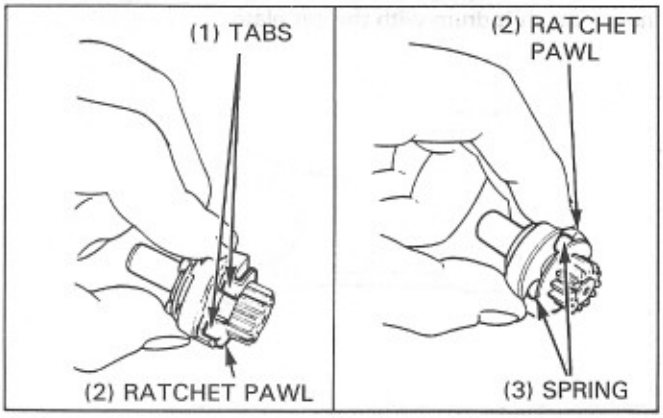
Install the following:
– clutch (page 7-10)
– oil pump (page 2-7)



LINKAGE INSTALLATION

Set the tabs on the stopper washer against the ratchet pawls.

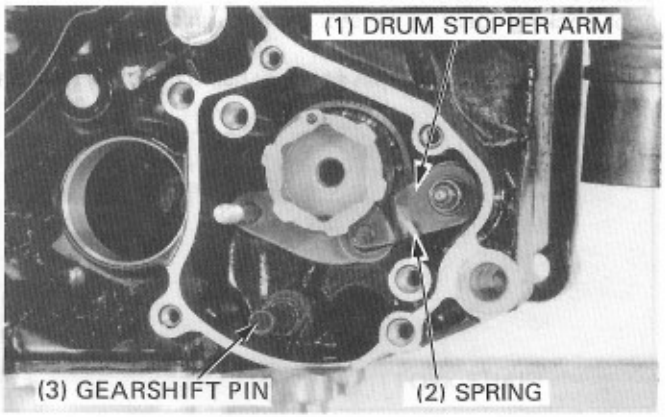
Check the ratchet pawl spring for smooth operation by pressing the ratchet pawls.



Shift the transmission into neutral and install the drum stopper arm and spring.

If the gearshift pin was removed, apply locking agent to the threads and tighten it.

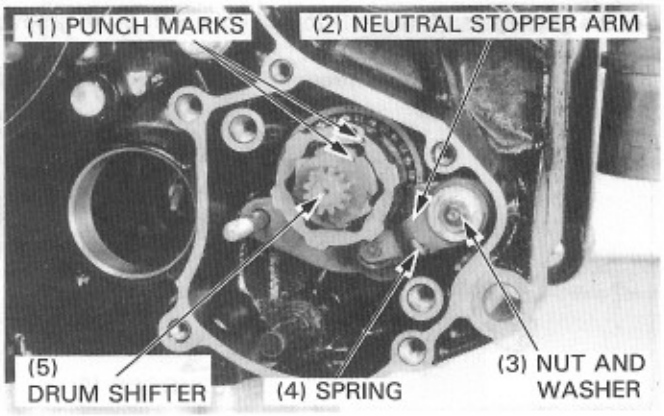
TORQUE: 25 N·m (2.5 kg-m, 18 ft-lb)



Install the neutral stopper arm, spring and washer, and tighten the nut securely.

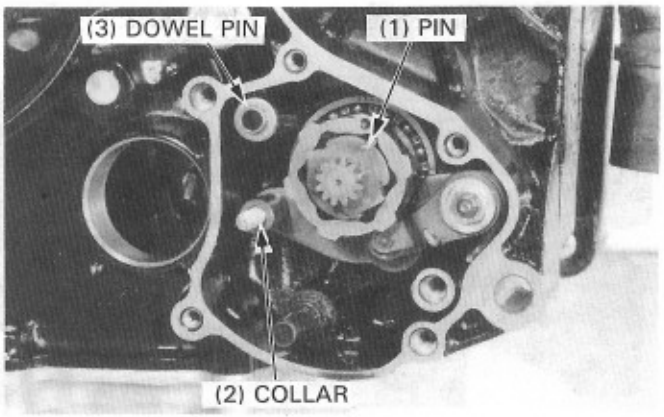
Install the drum shifter into the shift drum while depressing the ratchet pawls.

Align the punch marks on the shift drum and drum shifter.



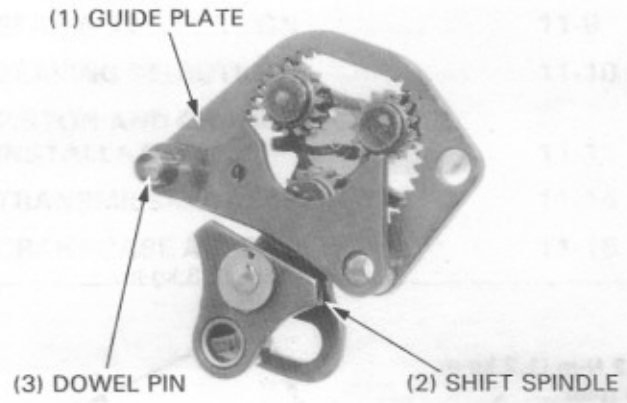
Lock the shift drum by inserting a suitable pin of 3.0 mm (0.12 in) diameter into the groove between the shift drum and drum shifter.

Install the guide plate collar, washer and dowel pin.



Assemble the guide plate and shift spindle as shown.

Install the dowel pin as shown.

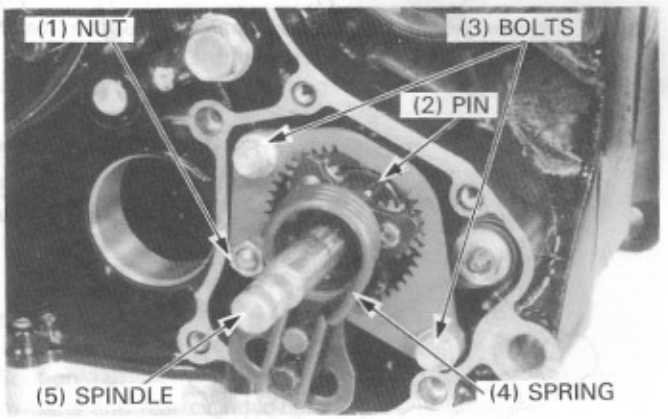


Apply locking agent to the guide plate mounting bolts and nut threads.

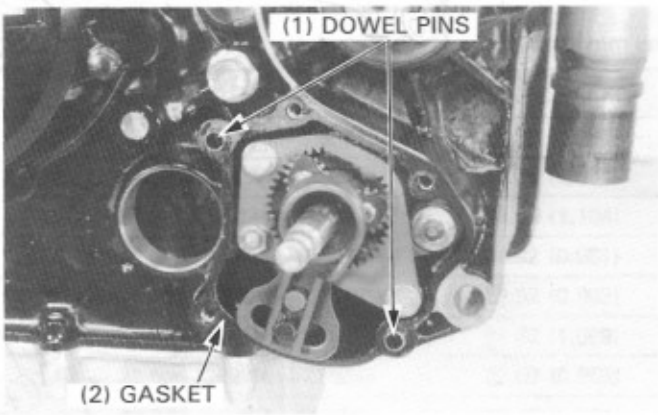
Align the hole in the spindle with the gearshift pin and install the spindle assembly.
Tighten the mounting bolts and nut securely.

Remove the pin locking the shift drum and drum shifter.

Apply oil to the gearshift linkage.
Install the return spring.



Install the dowel pins and a new gasket.



Install the gearshift linkage cover and tighten the bolts securely.

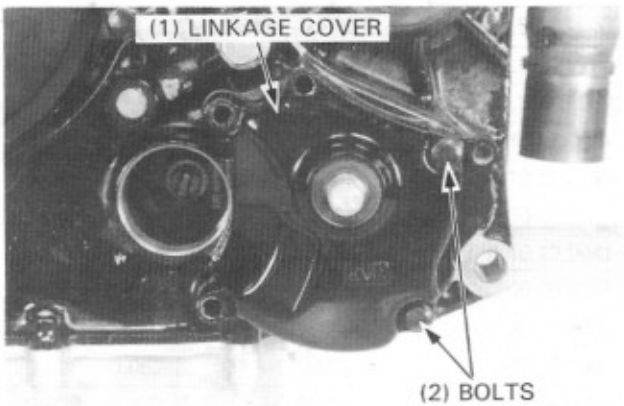
Install the following:
– gearshift pedal

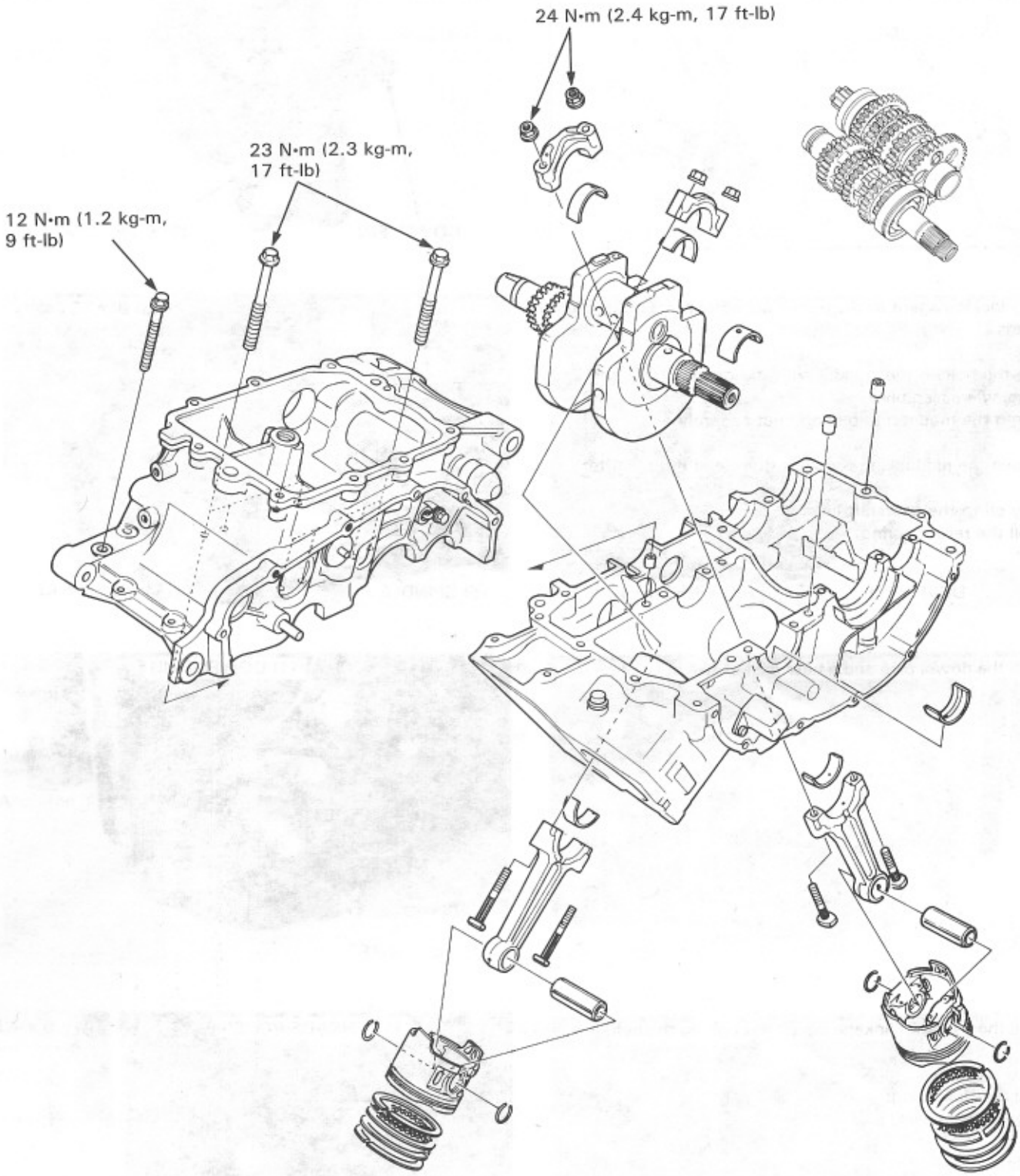
NOTE

- Check the operation of the gearshift linkage.

– water pump (page 5-8)

Install the engine in the frame (Section 6).




24 N·m (2.4 kg-m, 17 ft-lb)
23 N·m (2.3 kg-m, 17 ft-lb)
12 N·m (1.2 kg-m, 9 ft-lb)

11. CYLINDER/CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	11-1	BEARING INSPECTION	11-8
TROUBLESHOOTING	11-2	BEARING SELECTION	11-10
CRANKCASE SEPARATION	11-3	PISTON AND CRANKSHAFT INSTALLATION	11-11
TRANSMISSION DISASSEMBLY	11-3	TRANSMISSION ASSEMBLY	11-14
PISTON AND CRANKSHAFT REMOVAL	11-5	CRANKCASE ASSEMBLY	11-16

SERVICE INFORMATION

GENERAL

- To service the piston, crankshaft, connecting rod and transmission, the crankcase halves must be separated.
- Before removing the piston and connecting rod assemblies, clean the top of the cylinder of any carbon deposits.
- All bearing inserts are select fit and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfide grease or molybdenum disulfide oil to the following:
  - crankpin and main journal bearings
  - shift fork grooves of the M3/4, C5 and C6 gear
  - connecting rod small end
  - C1 gear bushing
- The following parts must be removed before disassembling the crankcase.
  - oil pump (Section 2)
  - water pump (Section 5)
  - clutch/starter clutch (Section 7)
  - alternator (Section 8)
  - cylinder heads (Section 9)*
  - starter motor (Section 18)

  *: If you service only the crankshaft, remove both cylinder camshafts and rear cylinder head.
  : If you service only the transmission, remove the rear cylinder head.
- For shift fork and shift drum servicing, refer to section 10.

SPECIFICATONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M5, M6	25.000—25.021 (0.9843—0.9851)	25.05 (0.986)
		C1	23.000—23.021 (0.9055—0.9063)	23.05 (0.907)
		C2, C3, C4	28.000—28.021 (1.1024—1.1032)	28.05 (1.104)
	Gear bushing O.D.	M5, M6	24.959—24.980 (0.9826—0.9835)	24.92 (0.981)
		C1	22.959—22.980 (0.9039—0.9047)	22.92 (0.902)
		C2, C3, C4	27.959—27.980 (1.1007—1.1016)	27.92 (1.099)
	Gear bushing I.D.	M5	21.985—22.006 (0.8656—0.8664)	22.07 (0.869)
		C1	20.007—20.028 (0.7877—0.7885)	20.10 (0.791)
		C2 (AFTER '88)	25.000—25.021 (0.9843—0.9851)	25.05 (0.986)
	Mainshaft O.D.	at M5	21.959—21.980 (0.8645—0.8654)	21.92 (0.863)
	Countershaft O.D.	at C1	19,987—20.000 (0.7869—0.7874)	19.97 (0.786)
		at C2 (AFTER '88)	24.967—24.980 (0.9830—0.9835)	24.95 (0.982)
	Gear-to-bushing clearance		0.020—0.062 (0.0008—0.0019)	0.10 (0.004)
	Bushing-to-shaft clearance	M5	0.005—0.047 (0.0002—0.0024)	0.10 (0.004)
		C1	0.007—0.041 (0.0003—0.0016)	0.10 (0.004)
		C2 (AFTER '88)	0.020—0.054 (0.0008—0.0021)	0.10 (0.004)
Crankshaft	Connecting rod big end side clearance		0.10—0.30 (0.004—0.012)	0.40 (0.016)
	Runout		—	0.03 (0.001)
	Crankpin oil clearance		0.028—0.052 (0.0011—0.0020)	0.07 (0.003)
	Main journal oil clearance		0.028—0.052 (0.0011—0.0020)	0.07 (0.003)

unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		60.000–60.015 (2.3622–2.3628)	60.10 (2.366)
	Warpage		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Out-of-round		—	0.10 (0.004)
Piston	Ring-to-groove clearance	Top	0.025–0.055 (0.0010–0.0022)	0.10 (0.004)
		Second	0.025–0.055 (0.0010–0.0022)	0.10 (0.004)
	Ring end gap	Top	0.10–0.30 (0.004–0.012)	0.40 (0.016)
		Second	0.10–0.30 (0.004–0.012)	0.40 (0.016)
		Oil (Side rail)	0.30–0.90 (0.012–0.035)	1.10 (0.043)
	Piston O.D.		59.970–59.990 (2.3610–2.3618)	59.86 (2.357)
	Piston to cylinder clearance		0.010–0.045 (0.0004–0.0018)	0.10 (0.004)
	Piston pin bore		16.017–16.028 (0.6306–0.6310)	16.08 (0.633)
	Piston pin O.D.		15.994–16.000 (0.6297–0.6299)	15.98 (0.629)
	Piston-to-piston pin clearance		0.017–0.034 (0.0007–0.0013)	0.06 (0.002)
	Connecting rod small end I.D.		16.016–16.034 (0.6305–0.6313)	16.08 (0.633)
	Piston pin-to-connecting rod clearance		0.016–0.040 (0.0006–0.0016)	0.06 (0.002)

TORQUE VALUES

Crankcase bolt (8 mm)	23 N·m (2.3 kg-m, 17 ft-lb) Apply oil to the seat (inside the engine)
(6 mm)	12 N·m (1.2 kg-m, 9 ft-lb)
Connecting rod bearing nut	24 N·m (2.4 kg-m, 17 ft-lb) Apply oil to the threads and seat

TOOL

Common

Driver, 22 mm I.D.	07746–0020100

TROUBLESHOOTING

Excessive smoke
- Worn cylinder,piston or piston rings
- Improperly installed piston rings
- Damaged piston or cylinder

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

Knocking or abnormal noise
- Worn pistons and cylinders
- Excessive carbon build-up on piston head or in combustion chamber

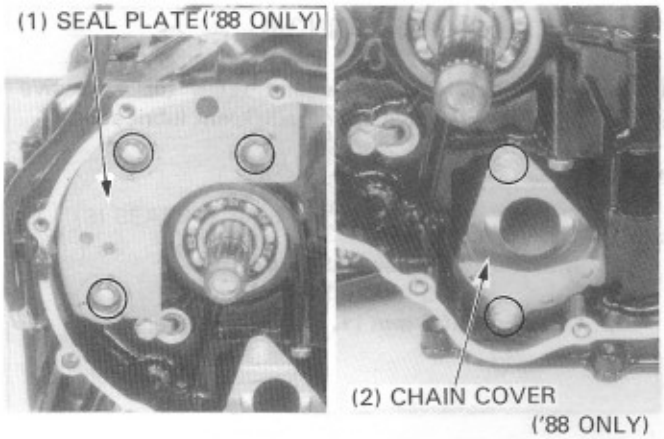
Excessive noise
- Worn main journal bearing
- Worn crankpin bearing
- Worn piston or cylinder
- Worn piston pin or pin hole
- Worn connecting rod small end

Low compression or uneven compression
- Worn cylinder or piston ring
- Broken piston ring

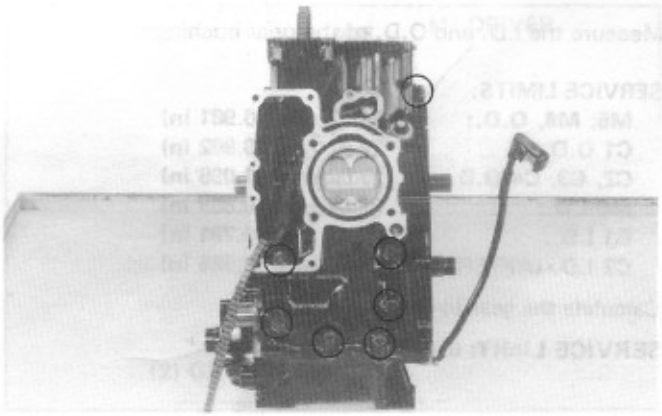
CRANKCASE SEPARATION

Remove the engine form the frame (Section 6).

Remove the necessary parts before separating the crankcase (page 11-1).
'88:
Remove the seal plate and oil pump drive chain cover.



Remove the upper crankcase bolts.



Turn the engine over and remove the lower crankcase bolts.

NOTE

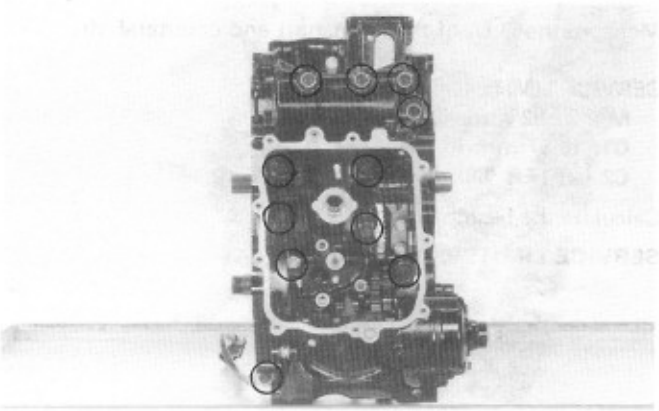
- Loosen the crankcase bolts in 2 or 3 steps and in a crisscross pattern to prevent crankcase warpage.

Remove the lower crankcase from the upper crankcase.

CAUTION

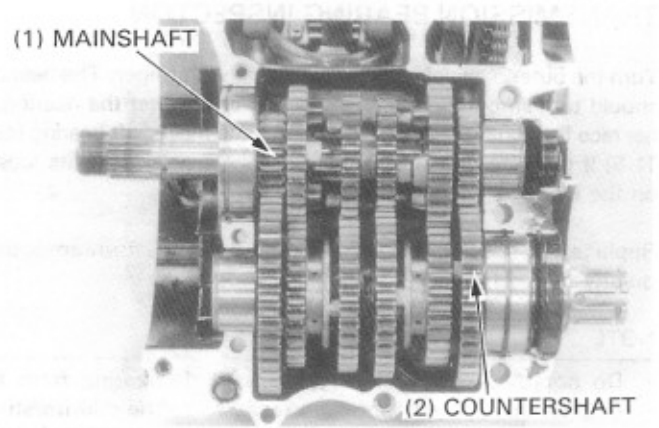
- *Do not pry between the upper and lower cases.*

Remove the dowel pins.



TRANSMISSION DISASSEMBLY

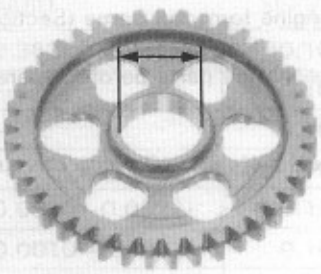
Remove the mainshaft and countershaft and disassemble them.



TRANSMISSION INSPECTION

Check gear dogs, dog holes and teeth for excessive or abnormal wear, or evidence or insufficient lubrication.

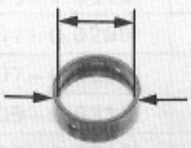
Measure the I.D. of each gear.



SERVICE LIMITS:

M5, M6:	**25.05 mm (0.986 in)**
C1:	**23.05 mm (0.907 in)**
C2, C3, C4:	**28.05 mm (1.104 in)**

Measure the I.D. and O.D. of the gear bushings.



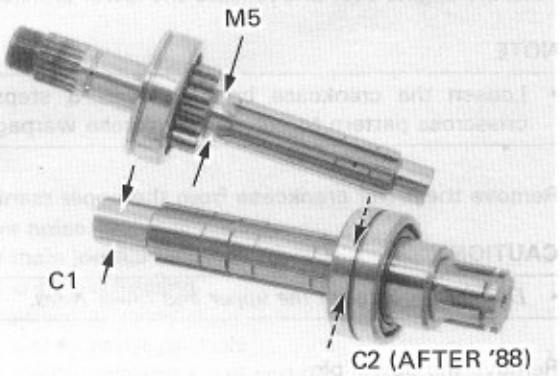
SERVICE LIMITS:

M5, M6, O.D.:	**24.92 mm (0.981 in)**
C1 O.D.:	**22.92 mm (0.902 in)**
C2, C3, C4 O.D.:	**27.92 mm (1.099 in)**
M5 I.D.:	**22.07 mm (0.869 in)**
C1 I.D.:	**20.10 mm (0.791 in)**
C2 I.D. (AFTER '88):	**25.05 mm (0.986 in)**

Calculate the gear-to-bushing clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

Measure the O.D. of the mainshaft and countershaft.



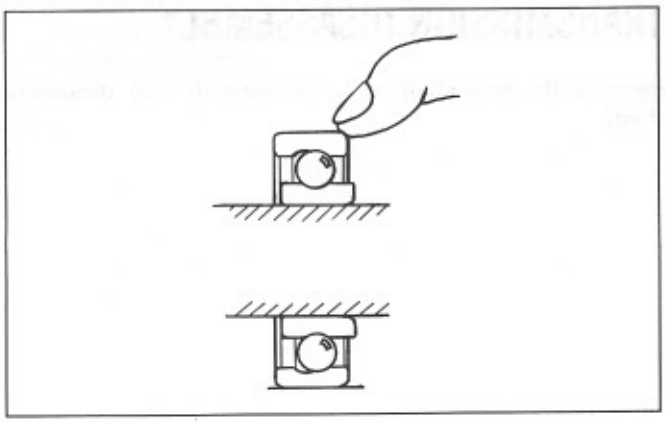
SERVICE LIMIT:

M5: 21.92 mm (0.863 in)
C1: 19.97 mm (0.786 in)
C2 (AFTER '88): 24.95 mm (0.982 in)

Calculate the bushing-to-shaft clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

TRANSMISSION BEARING INSPECTON



Turn the outer races of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft. Replace the mainshaft bearing (page 11-5) if the race does not turn smoothly, quietly or if fits loosely on the mainshaft.

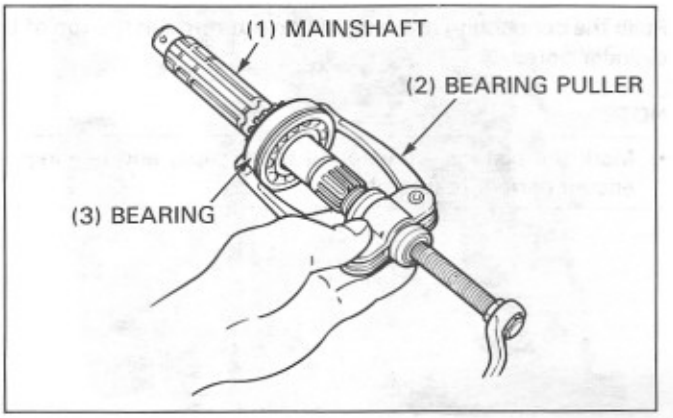
Replace the countershaft if the race does not turn smoothly, quietly or if it fits loosely on the countershaft.

NOTE

- Do not try to remove the countershaft bearing from the countershaft. The bearing is pressed into the countershaft.

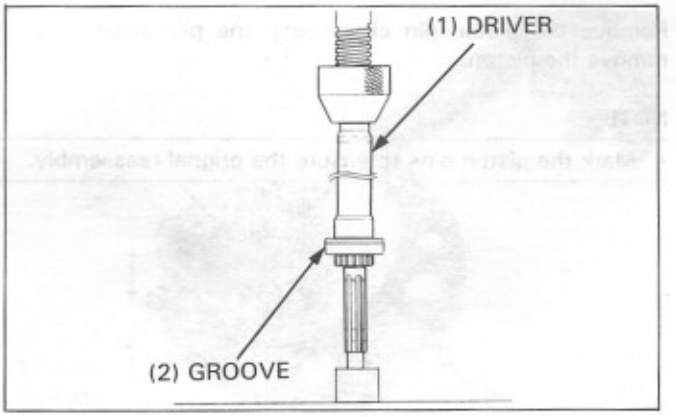
MAINSHAFT BEARING REPLACEMENT

Remove the mainshaft bearing with a bearing puller.



Press a new bearing on the mainshaft with its groove facing out.

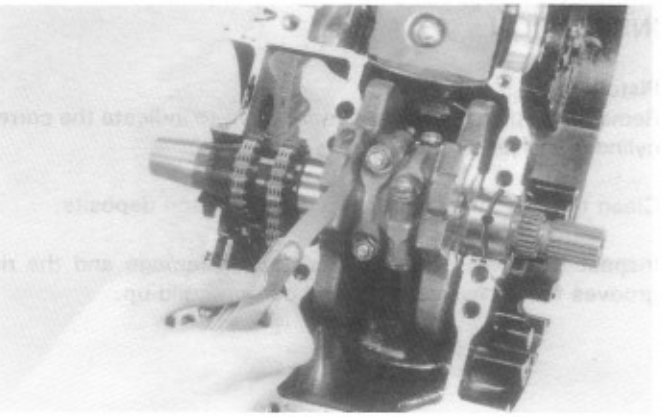
TOOL:
Driver, 22 mm I.D. **07746–0020100**



PISTON AND CRANKSHAFT REMOVAL

Check the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)

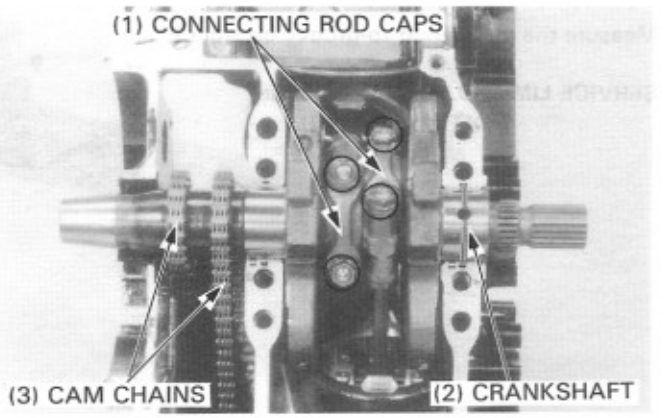


Remove the connecting rod bearing caps.

Remove the crankshaft with the cam chains.

CAUTION

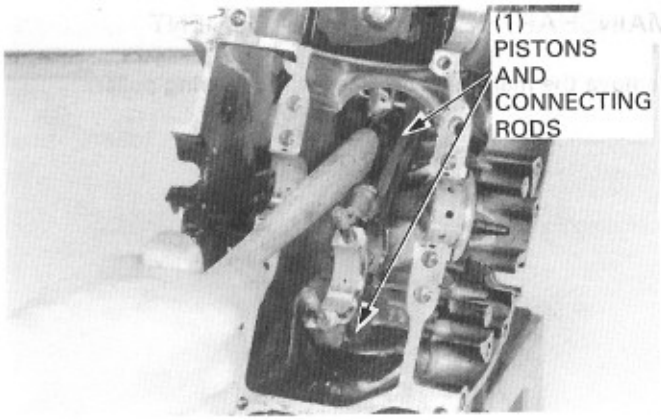
- *Do not interchange the bearing inserts. They must be installed in their original positions or the correct bearing oil clearance may not be obtained causing engine damage.*



Push the connecting rods and piston out through the top of the cylinder bores.

NOTE

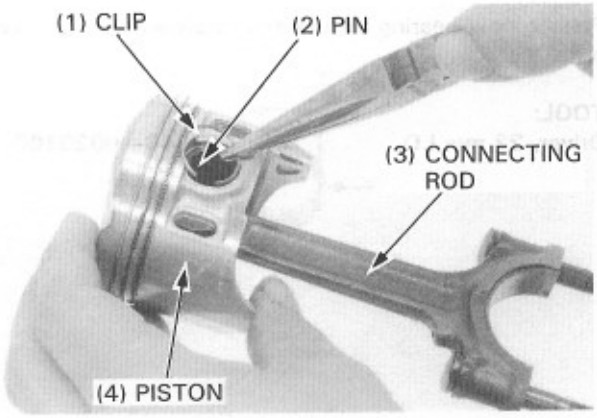
- Mark the pistons, connecting rods, caps, and bearings to ensure correct reassembly.



Remove the piston pin clips, push the piston pin out and remove the piston.

NOTE

- Mark the piston pins to ensure the orignal reassembly.



INSPECTION

Piston

Remove the piston rings and mark them to indicate the correct cylinder and piston position.

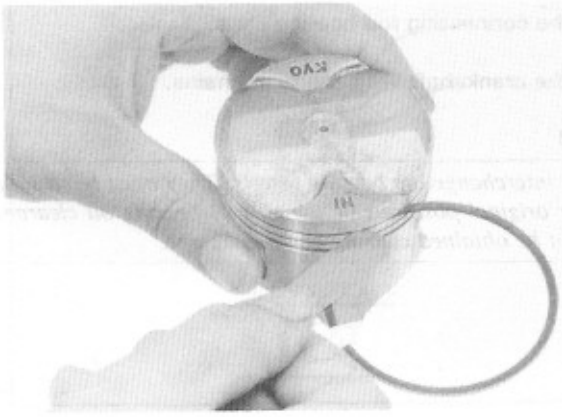
Clean the piston crown, removing all carbon deposits.

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

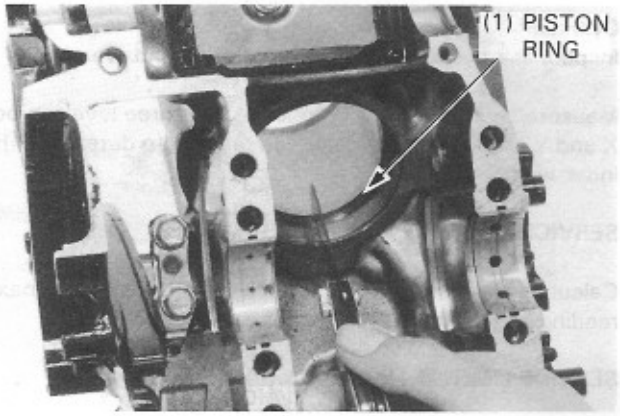


Measure the piston ring-to-groove clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)
(TOP/SECOND)



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



SERVICE LIMITS:

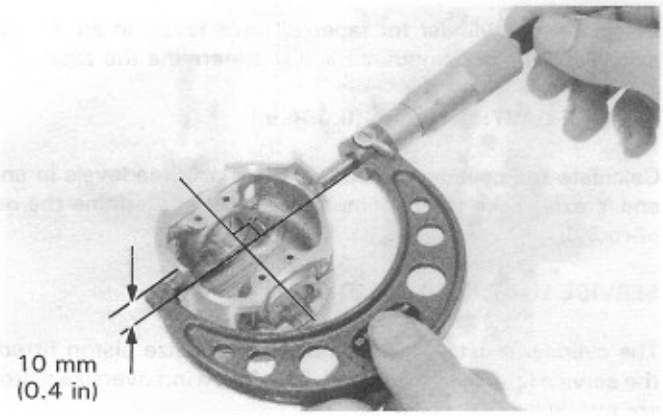
TOP:	**0.40 mm (0.016 in)**
SECOND:	**0.40 mm (0.016 in)**
OIL (Side rail):	**1.10 mm (0.043 in)**

Measure the piston O.D.

NOTE

- Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT: 59.86 mm (2.357 in)



Measure each piston pin bore I.D.

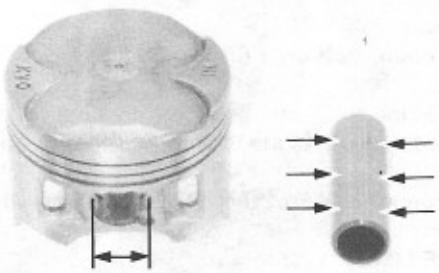
SERVICE LIMIT: 16.08 mm (0.633 in)

Piston pin
Measure each piston pin O.D.

SERVICE LIMIT: 15.98 mm (0.629 in)

Calculate the piston pin to piston clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

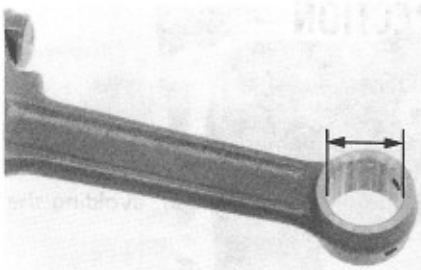


Connecting rod
Measure the connecting rod small end I.D.

SERVICE LIMIT: 16.08 mm (0.633 in)

Calculate the connecting rod to piston pin clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)



Cylinder
Inspect the cylinder walls for scratches and wear.

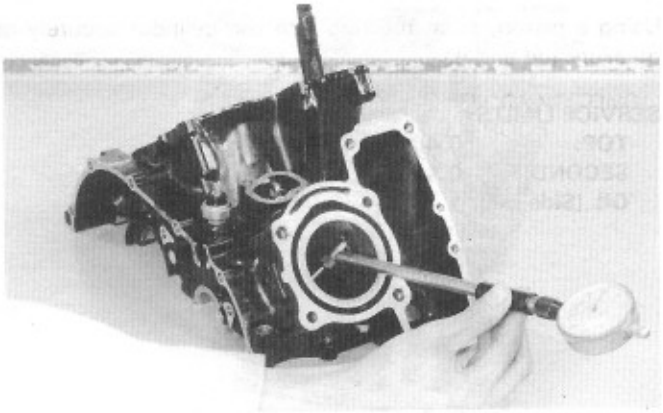
Measure and record the cylinder I.D. at three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 60.10 mm (2.366 in)

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

SERVICE LIMIT: 0.10 mm (0.004 in)

Refer to page 11-7 for measurement piston O.D.

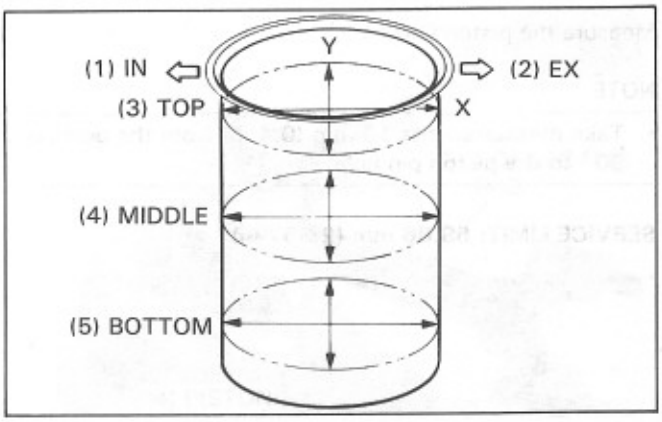


Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.

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



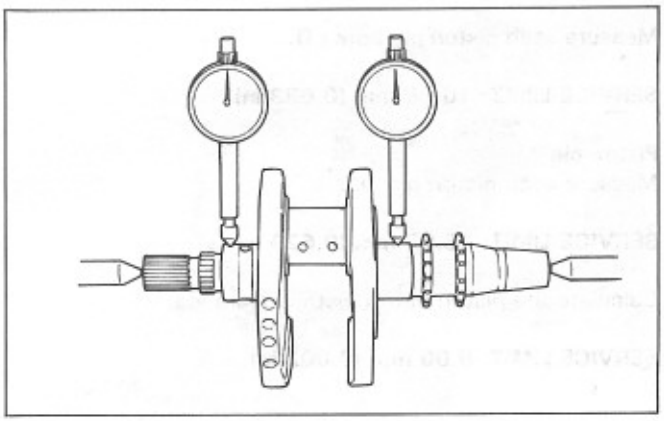
The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded. The following oversize pistons are available:
0.25 mm (0.010 in) and 0.50 mm (0.020 in)
The cylinder must be rebored so that the clearance to an oversize piston is 0.010—0.045 mm (0.0004—0.0018 in)

Crankshaft
Set the crankshaft on a turning stand.

Set a dial indicator on each main bearing journal. Rotate the crankshaft two revolutions and read the runout.

Actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT: 0.03 mm (0.001 in)



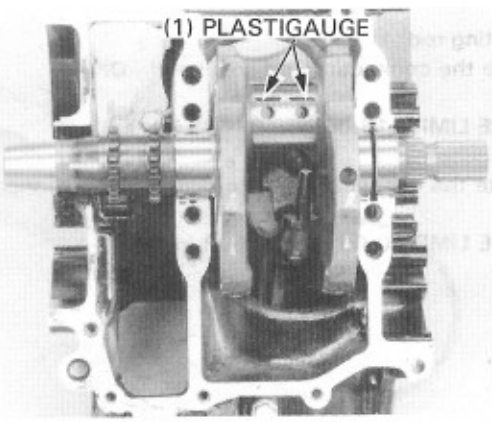
BEARING INSPECTION

CONNECTING RODS

Inspect the bearing inserts for damage or separation.
Clean all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin, avoiding the oil hole.

CAUTION

- *The bearing tabs should face toward the intake ports. Remember the front and rear cylinder intake ports face opposite directions.*

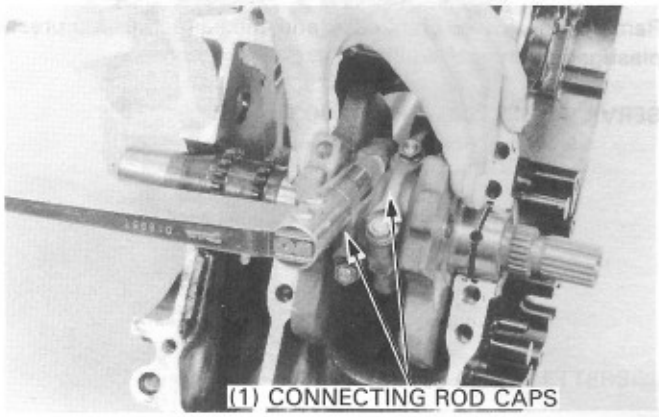


Install the connecting rod caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 24 N·m (2.4 kg-m, 17 ft-lb)

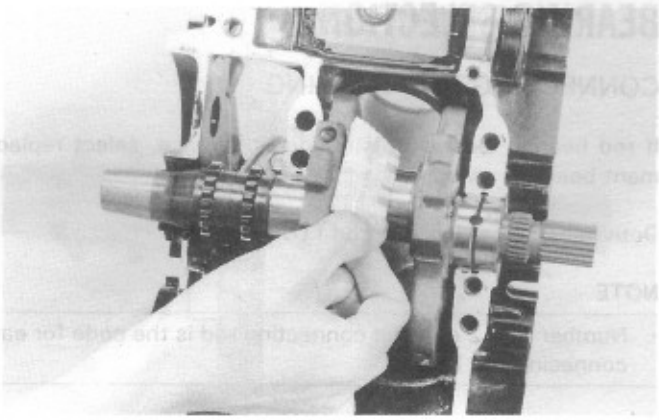
NOTE

- Do not rotate the crankshaft during inspection.



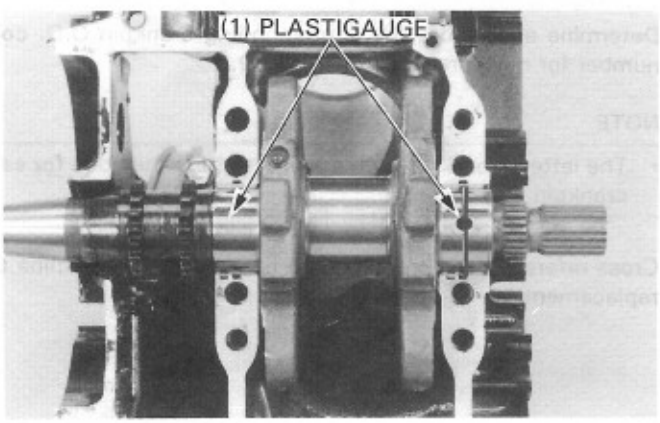
Remove the caps and measure the compressed plastigauge on each crankpin.

SERVICE LIMIT: 0.07 mm (0.003 in)



MAIN BEARINGS

Inspect the bearing inserts for damage or separation.
Clean all oil from the bearing inserts and journals.
Put a piece of plastigauge on each journal, avoiding the oil holes.

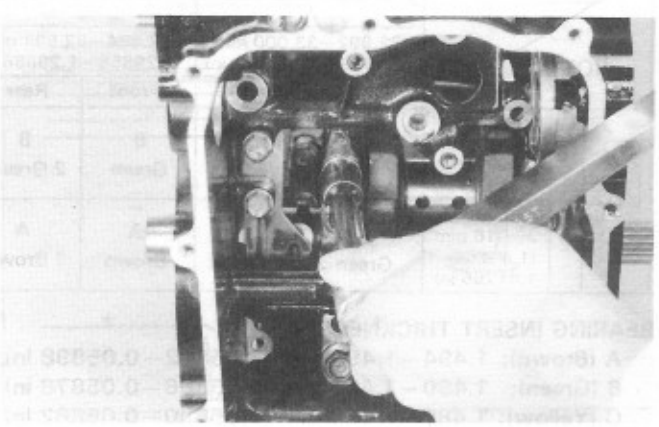


Install the main bearings on the correct journals on the lower crankcase and tighten the 8 mm bolts.

TORQUE VALUE: 23 N·m (2.3 kg-m, 17 ft-lb)

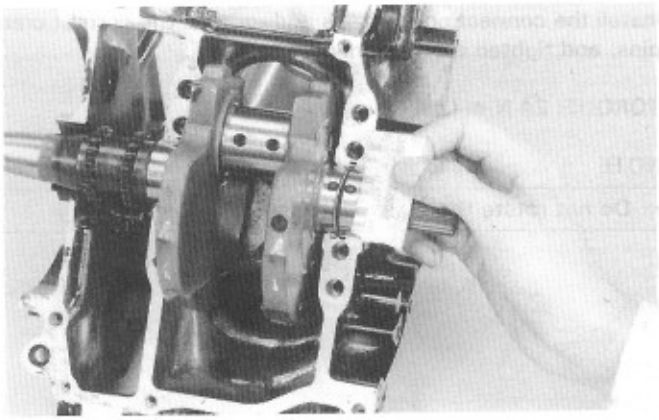
NOTE

- Do not rotate the crankshaft during inspection.



Remove the lower crankcase and measure the compressed plastigauge on each journal.

SERVICE LIMIT: 0.07 mm (0.003 in)



BEARING SELECTION

CONNECTING ROD BEARING

If rod bearing clearance is beyond tolerance, select replacement bearings as follows:

Determine and record the rod I.D. code number.

NOTE

- Number 1 or 2 on each connecting rod is the code for each connecing rod I.D.

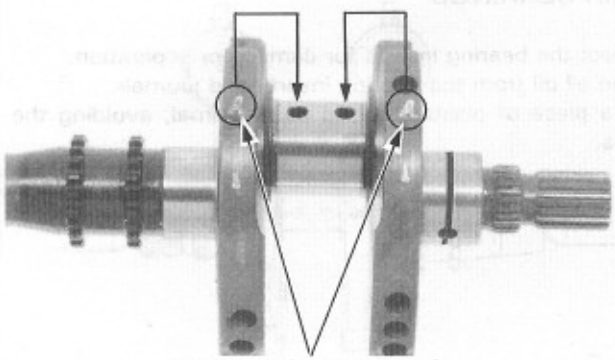


(1) I.D. CODE NUMBER

Determine and record the corresponding crankpin O.D. code number (or measure the crankpin O.D.).

NOTE

- The letter A or B on each crank weight is the code for each crankpin O.D.

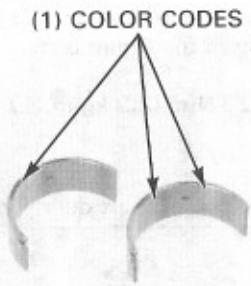


(1) O.D. CODE LETTERS

Cross reference the crankpin and rod codes to determine the replacement bearing color.

			CRANKPIN O.D. CODE LETTER			
			A		B	
			32.992–33.000 mm (1.29890–1.29921 in)		32.984–32.991 mm (1.29858–1.29886 in)	
			Front	Rear	Front	Rear
CONNECTING ROD I.D. CODE NO.	1	36.000–36.007 mm (1.41732–1.41760 in)	C Yellow	C 2 Yellows	B Green	B 2 Greens
	2	36.008–36.016 mm (1.41764–1.41795 in)	B Green	B 2 Greens	A Brown	A 2 Browns

REAR BEARINGS SHOWN:



BEARING INSERT THICKNESS:

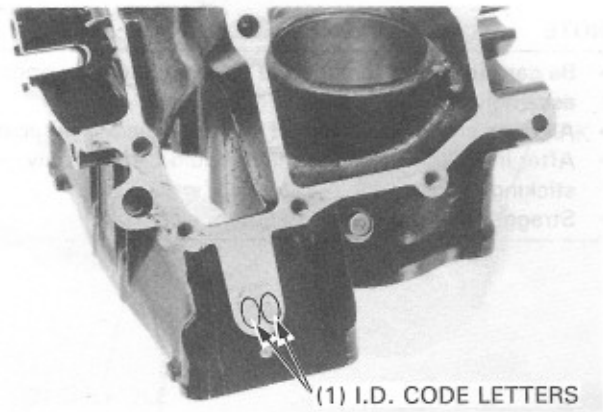
A (Brown): 1.494–1.498 mm (0.05882–0.05898 in)
B (Green): 1.490–1.493 mm (0.05866–0.05878 in)
C (Yellow): 1.486–1.489 mm (0.05850–0.05862 in)

MAIN BEARING

Determine and record the crankcase I.D. code letter.

NOTE

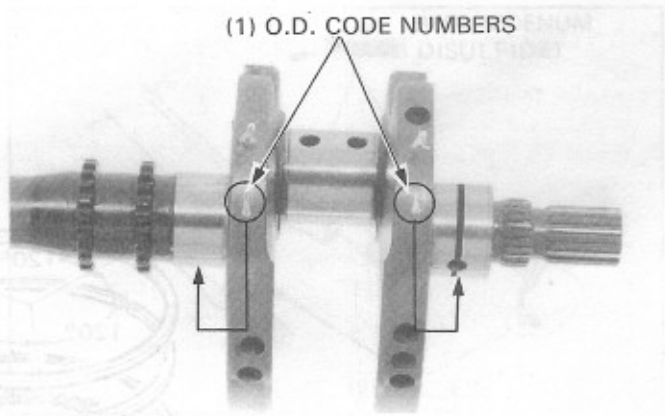
- Letters (A or B) on the upper crankcase are the I.D. codes for the main journals from left to right. For example, the I.D. code for the left main journal is B.



Determine and record the corresponding main journal O.D. code numbers (or measure the main journal O.D.).

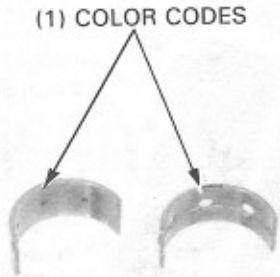
NOTE

- A number 1 or 2 on each crank weight is the code for the adjacent main journal O.D.



Cross reference the case and journal codes to determine the replacement bearing.

			MAIN JOURNAL O.D. CODE NO.	
			1	2
			31.992–32.000 mm (1.25953–1.25984 in)	31.984–31.991 mm (1.25921–1.25949 in)
	A	35.000–35.007 mm (1.37795–1.37823 in)	D	C
	B	35.008–35.016 mm (1.37827–1.37858 in)	C	B



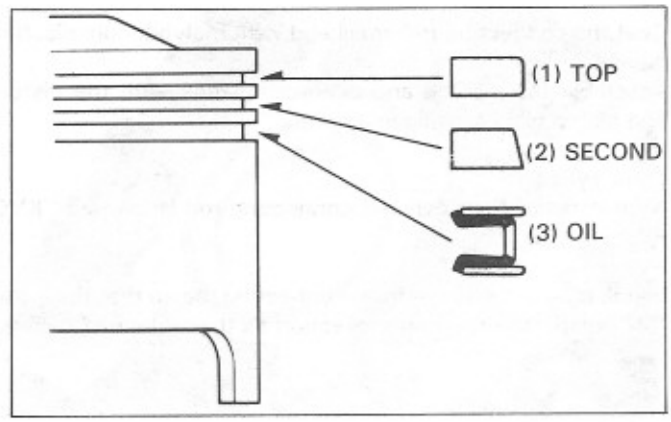
BEARING INSERT THICKNESS:

B (Brown): 1.498–1.502 mm (0.05898–0.05913 in)
C (Green): 1.494–1.497 mm (0.05882–0.05894 in)
D (Yellow): 1.490–1.493 mm (0.05866–0.05878 in)

PISTON AND CRANKSHAFT INSTALLTION

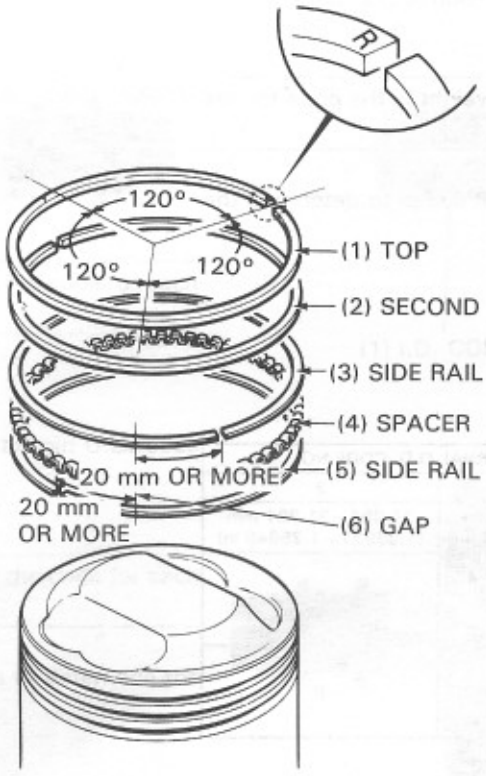
Clean the piston domes, ring lands, and skirts.

Carefully install the piston rings onto the piston.



NOTE

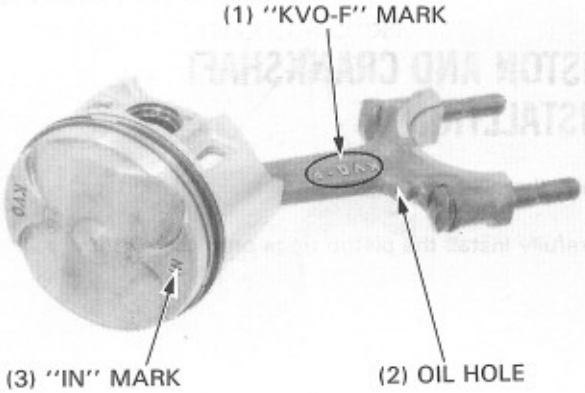
- Be careful not to damage the piston and piston rings during assembly.
- All rings should be installed with the markings facing up.
- After installing the rings they should rotate freely, without sticking.
- Stragger the end gaps as shown.



Coat the connecting rod small end with molybdenum disulfide grease.
Assemble the pistons and connecting rods with the pistons and piston clips as follows.

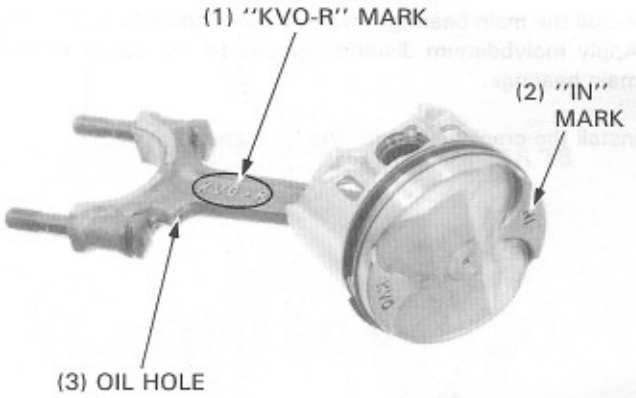
Front cylinder:
Note that the front cylinder connecting rod is marked "KVO-F".

Install the piston on the front connecting rod so that the intake "IN" mark is facing same direction as the oil hole in the rod.



Rear cylinder:
Note that the rear cylinder connecting rod is marked "KVO-R".

Install the piston on the rear rod so that the intake "IN" mark is facing opposite the oil hole in the rod.

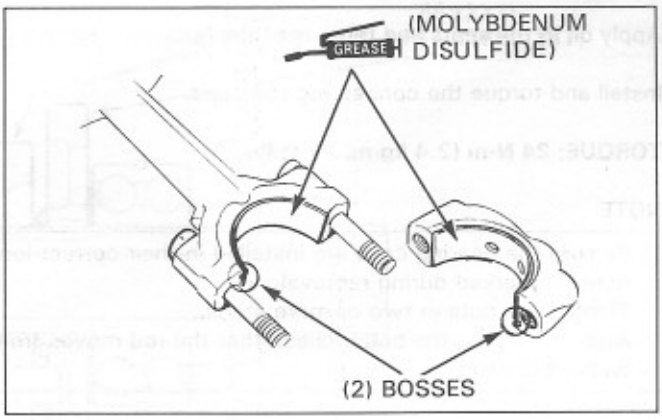


NOTE

- Do not interchange the pistons, piston pins or connecting rods.
- Make sure that the piston pin clips are properly seated.

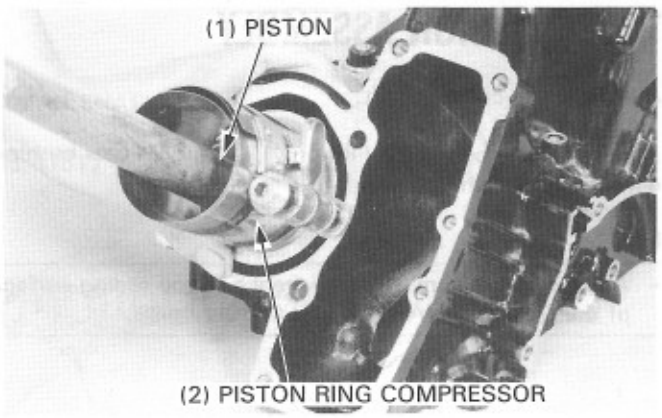
Coat the bearings with molybdenum disulfide grease.

Align the boss of the bearing with the groove of the connecting rod.



Install the rod and piston assemblies into the cylinders from the top of the crankcase. Be sure each assembly is returned to its original positon as noted during removal.

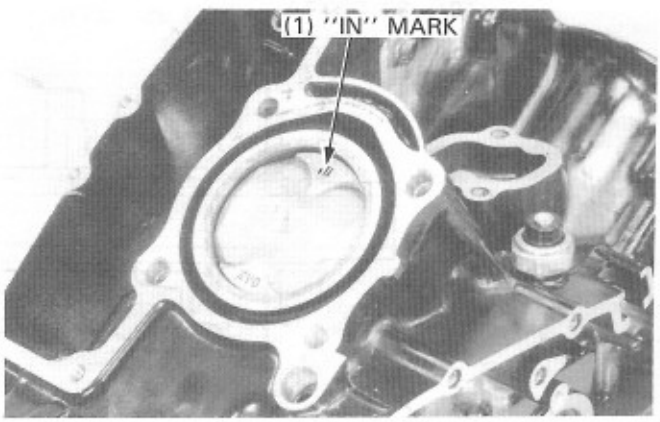
Compress the piston rings with a ring compressor and insert the piston and rod into the cylinder.



NOTE

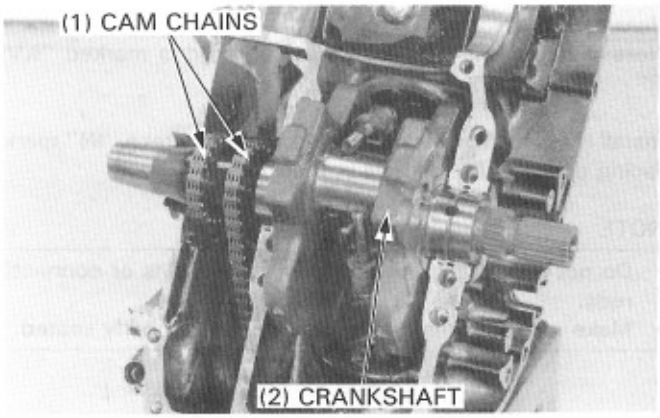
- Be careful not to damage the pistons or rings during assembly.
- To prevent damaging the crankshaft, slip short sections of rubber base over the rod bolts before installation.

Make sure the piston intake "IN" marks are facing intake side.



Install the main bearings into the upper crankcase.
Apply molybdenum disulfide grease to the upper and lower main bearings.

Install the crankshaft with the cam chain.



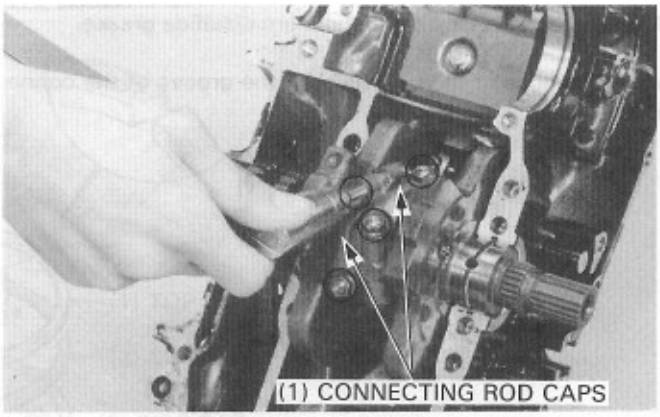
Apply oil to the seats and threads of the nuts.

Install and torque the connecting rod caps.

TORQUE: 24 N·m (2.4 kg-m, 17 ft-lb)

NOTE

- Be sure the bearing caps are installed in their correct locations as marked during removal.
- Tighten the nuts in two or more steps.
- After tightening the bolts, check that the rod moves freely without binding.



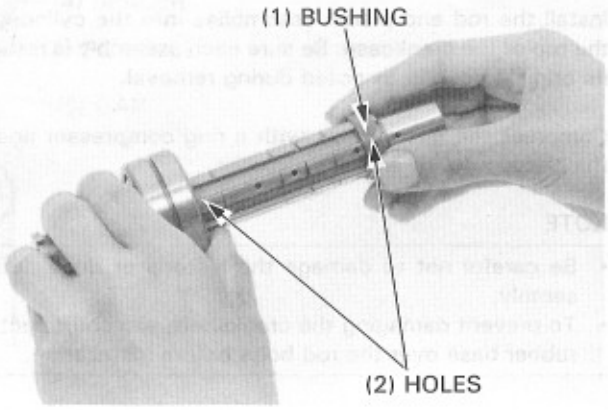
TRANSMISSION ASSEMBLY

Assemble the countershaft.

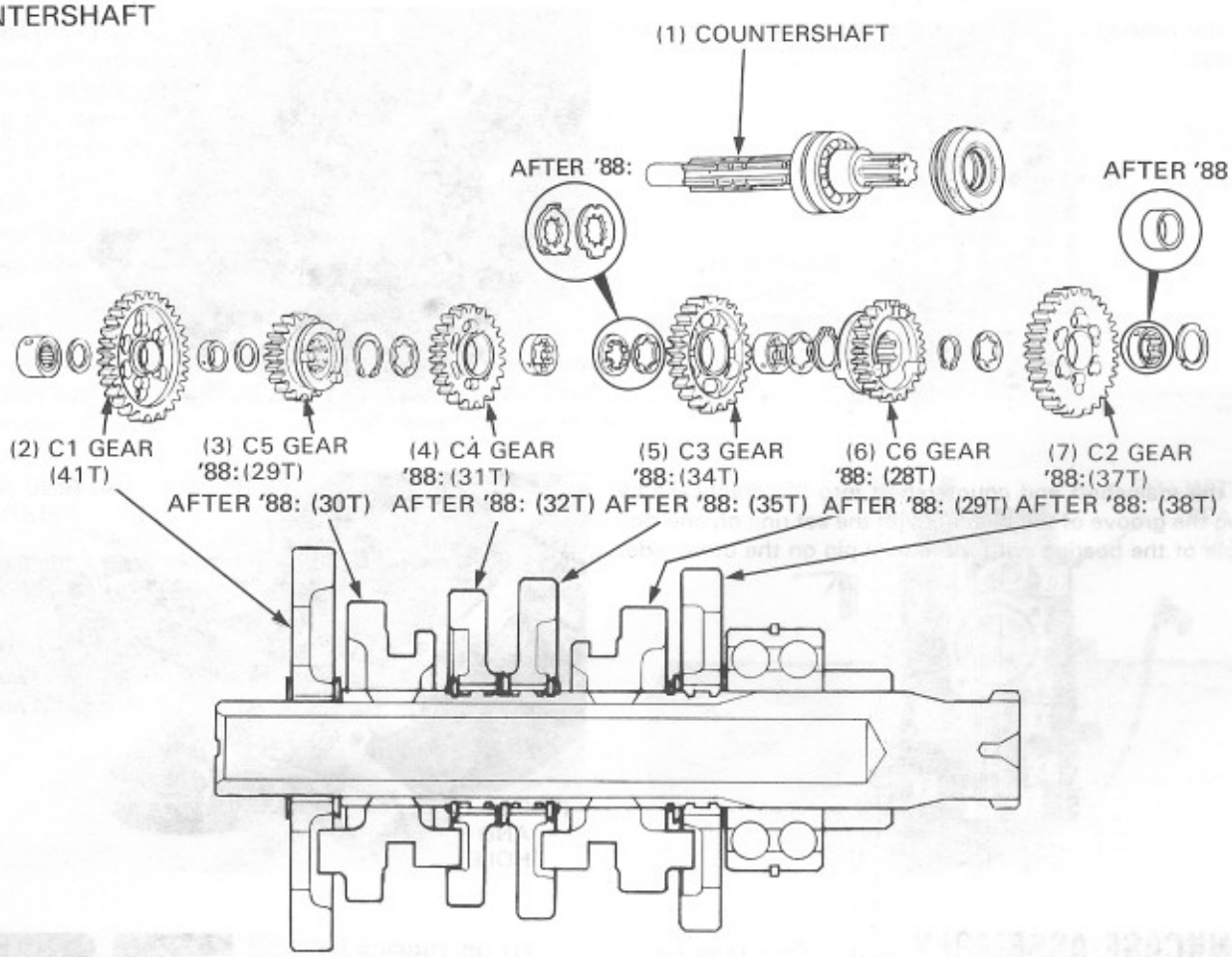
Align the holes of the C2 ('88 only), C3 and C4 gear bushings with the countershaft holes.

NOTE

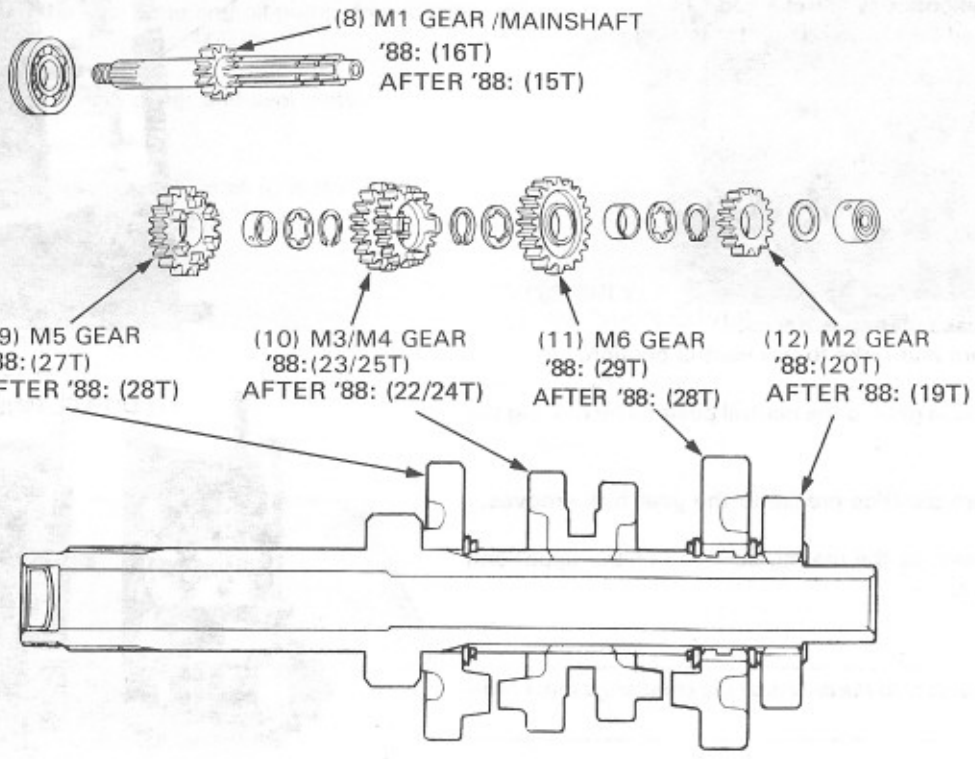
- Apply molybdenum disulfide grease to the sliding surfaces of the C1 and C2 (AFTER '88) gear bushings.



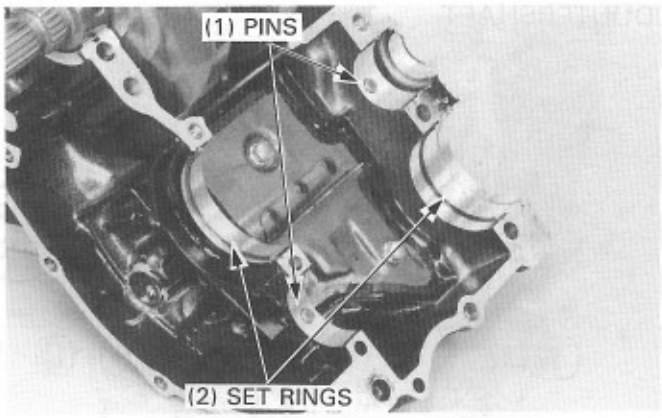
COUNTERSHAFT



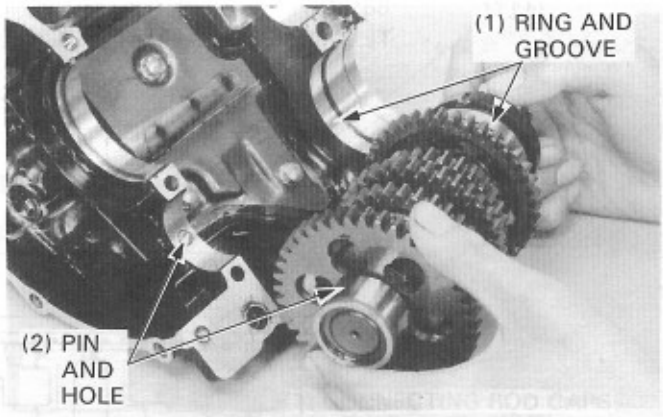
MAINSHAFT



Install the bearing set rings and dowel pins onto the upper crankcase.

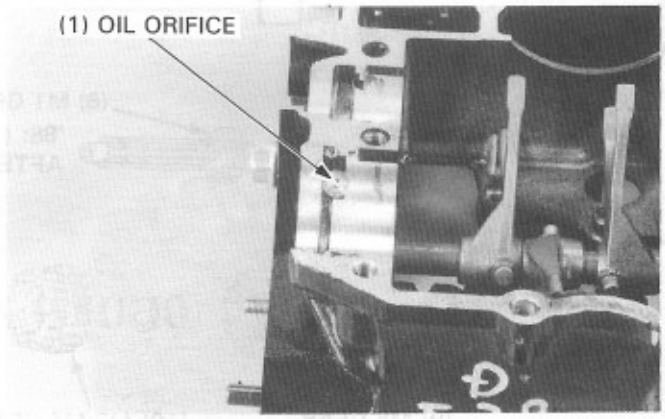


Install the mainshaft and countershaft into the crankcase by aligning the groove of the bearing with the set ring on one side and hole of the bearing with the dowel pin on the other side.



CRANKCASE ASSEMBLY

Make sure the oil orifice is not clogged.
Apply compressed air to the orifice if it is clogged.



Clean the crankcase mating surfaces.
Set the shift drum and forks to the neutral postion.

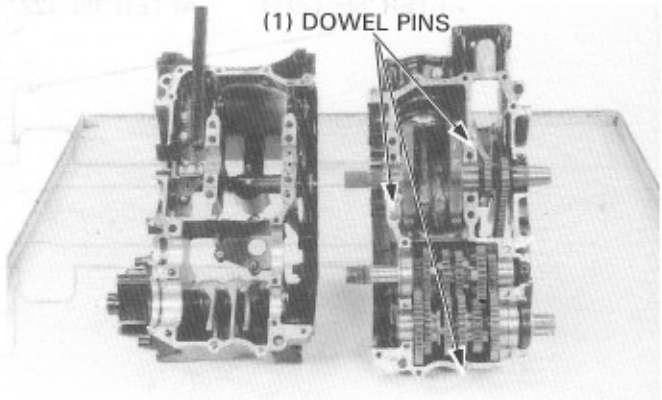
Set the transmission gear to the neutral position by moving the gears.

Apply molydenum disulfide grease to the gear fork grooves.

Apply liquid sealant to the mating surfaces of the upper and lower crankcases.

CAUTION

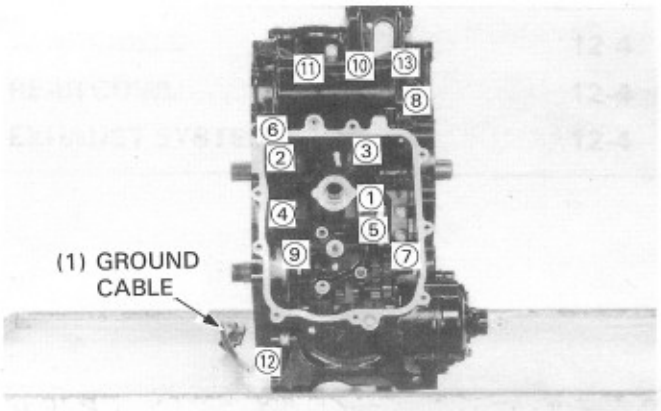
- *Do not apply sealant to the area near the crankshaft main bearings.*



Install the dowel pins.

Apply oil to the ①—⑦ and ⑨ bolt seats.
Assemble the crankcase halves, aligning the shift fork claws with the gear grooves.
Tighten the lower crankcase bolts to the specified torque in the sequence as shown.

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)

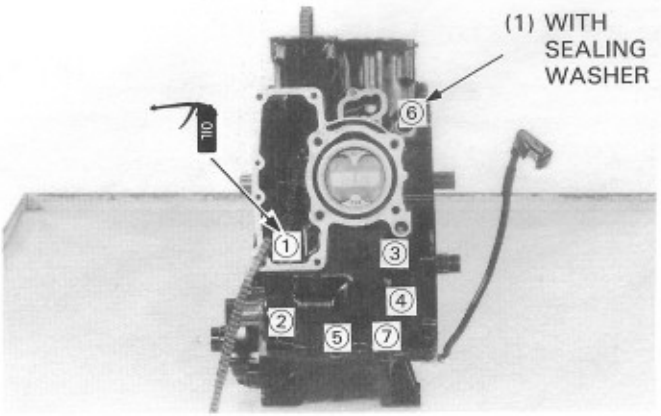


CAUTION

- *Be sure that the components are properly engaged when mating the case halves and that the case halves slide together easily. Improper component engagement will cause damage when tightening crankcase bolts.*

Turn over the crankcase and tighten the upper crankcase bolts to specified torque in the sequence shown.

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)



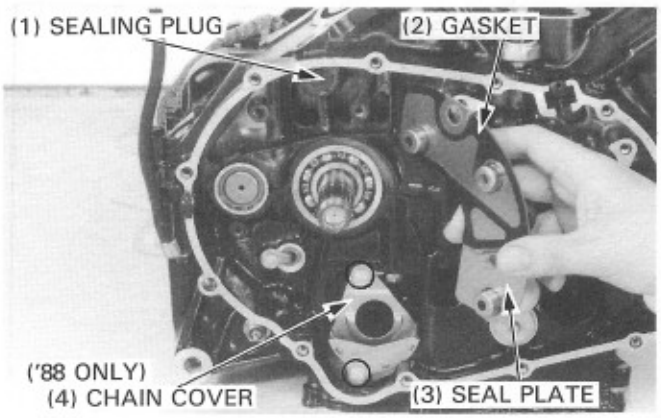
'88:
Apply sealant to the sealing plug and install it.

Apply locking agent to the seal plate and oil pump drive chain cover bolt threads.

Install the oil pump drive chain cover and seal plate.

AFTER '88:
Apply sealant to the sealing plug and install it, if removed.
Apply locking agent to the seal plate bolt threads.
Install the seal plate.

'88 and AFTER:



Install the removed parts (page 11-1).
Install the engine (Section 6).

12. FAIRING/EXHAUST SYSTEM

SERVICE INFORMATION	12-1	WINDSHIELD	12-4
SIDE COVER	12-1	REAR COWL	12-4
FAIRING	12-1	EXHAUST SYSTEM	12-4

SERVICE INFORMATION

GENERAL

⚠WARNING

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

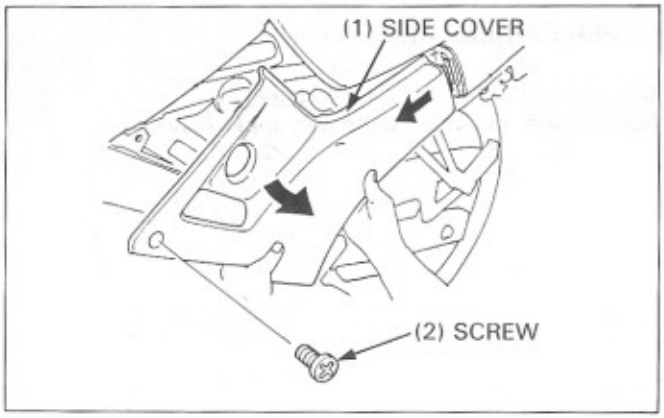
TORQUE VALUE

Exhaust pipe joint cap nut	13 N·m (1.3 kg-m, 9 ft-lb)

SIDE COVER

Loosen the side cover mounting screw all the way, pull the front of the cover out until the hook is free of the retaining grommets, and slide the cover foward in the arrow direction.

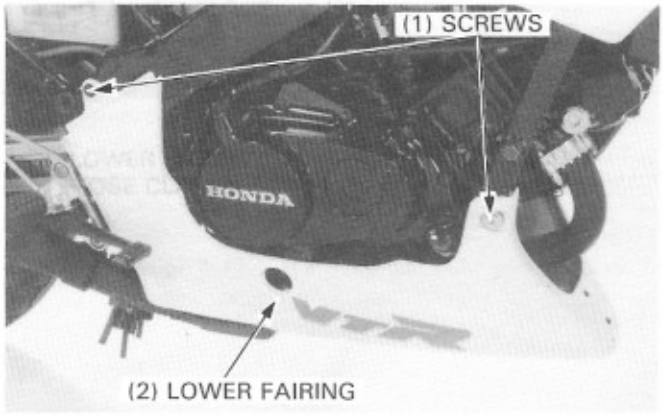
Install in the reverse order of removal.



FAIRING

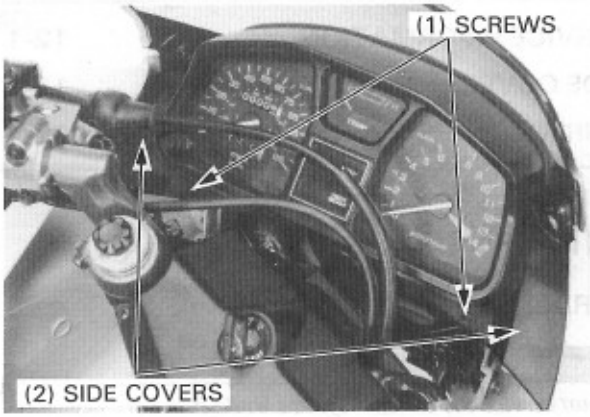
LOWER FAIRING REMOVAL

Remove the following:
- side covers.
- lower fairing mounting screws.
- lower fairing and lower radiator hose clamp.



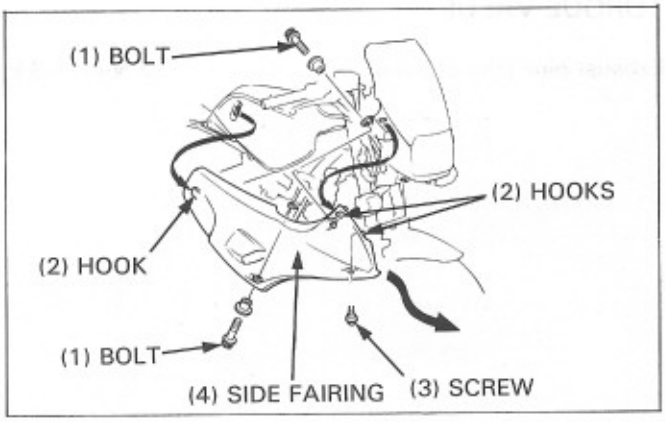
SIDE FAIRING REMOVAL

Remove the instrument side covers.



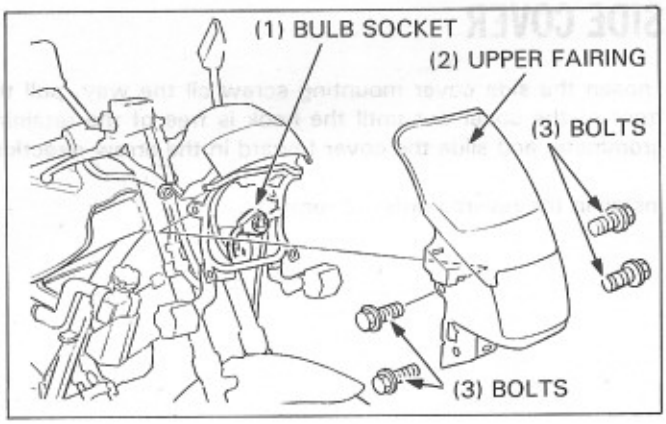
Remove the side fairing mounting bolts and screw.

Pull the front of the side fairing out until the hooks are free from the upper fairing grooves, and slide the fairing forward in the arrow direction.

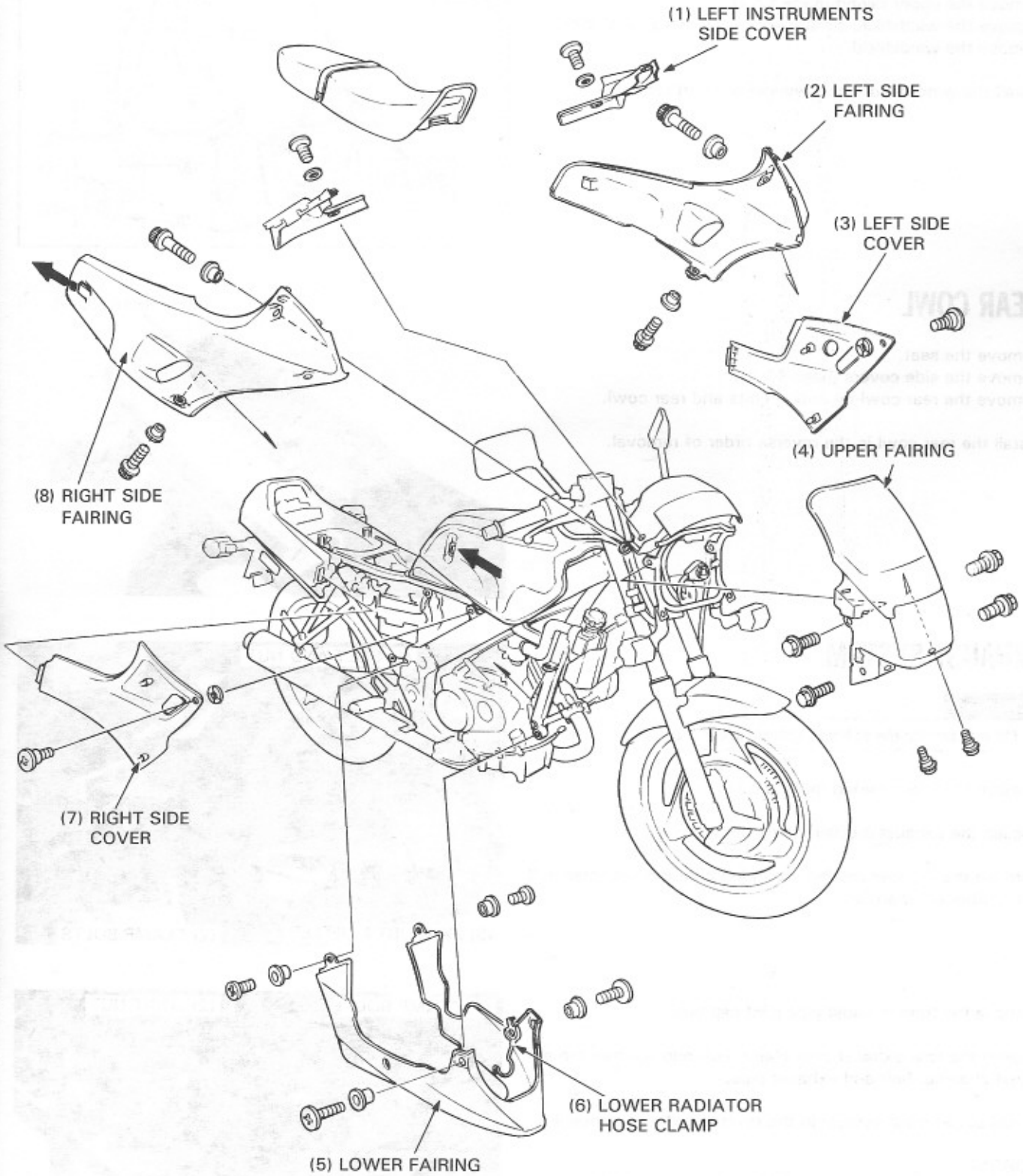


UPPER FAIRING REMOVAL

Disconnect the headlight bulb socket.
Remove the mounting bolts and upper fairing.



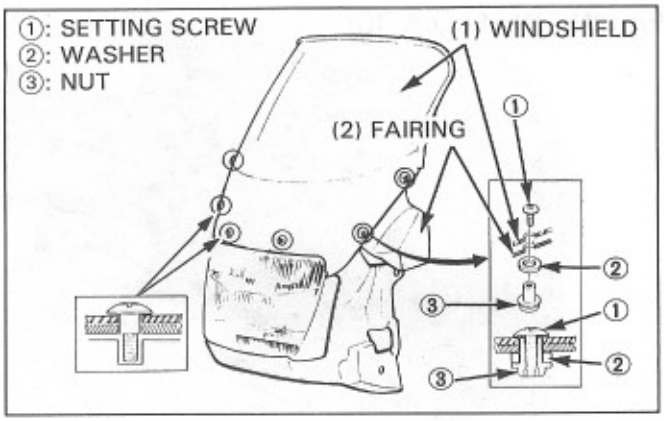
FAIRING INSTALLATION



WINDSHIELD

Remove the upper fairing (page 12-2).
Remove the windshield setting screws, washers and nuts.
Remove the windshield.

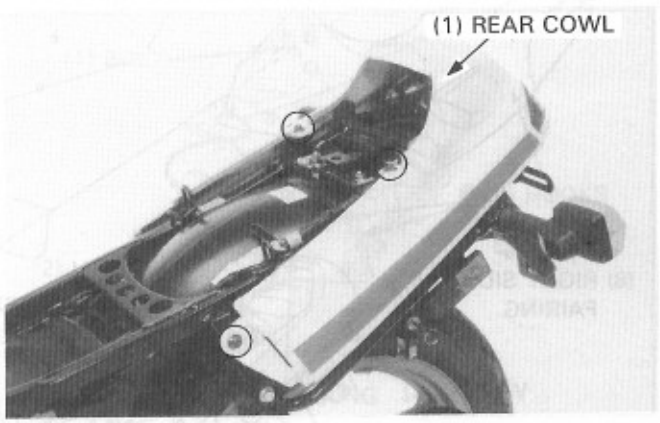
Install the windshield in the reverse order of removal.



REAR COWL

Remove the seat.
Remove the side covers (page 12-1).
Remove the rear cowl mounting bolts and rear cowl.

Install the rear cowl in the reverse order of removal.



EXHAUST SYSTEM

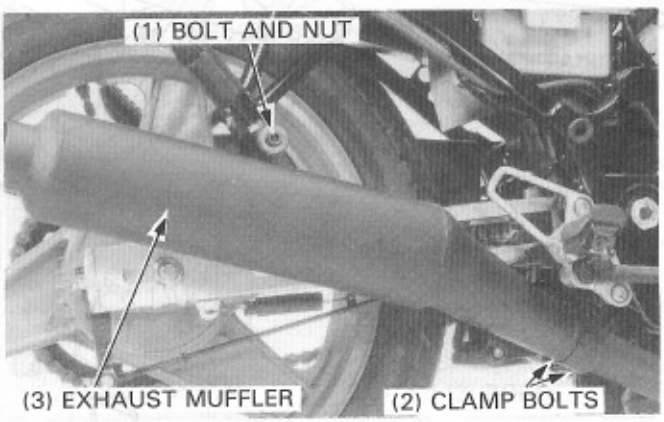
⚠ WARNING

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

Remove the lower fairing (page 12-1).

Loosen the exhaust muffler clamp bolts.

Remove the exhaust muffler mounting bolt and nut, then pull the muffler off rearward.

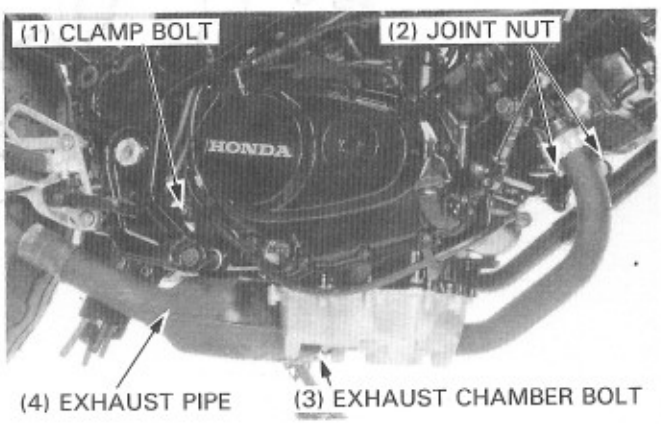


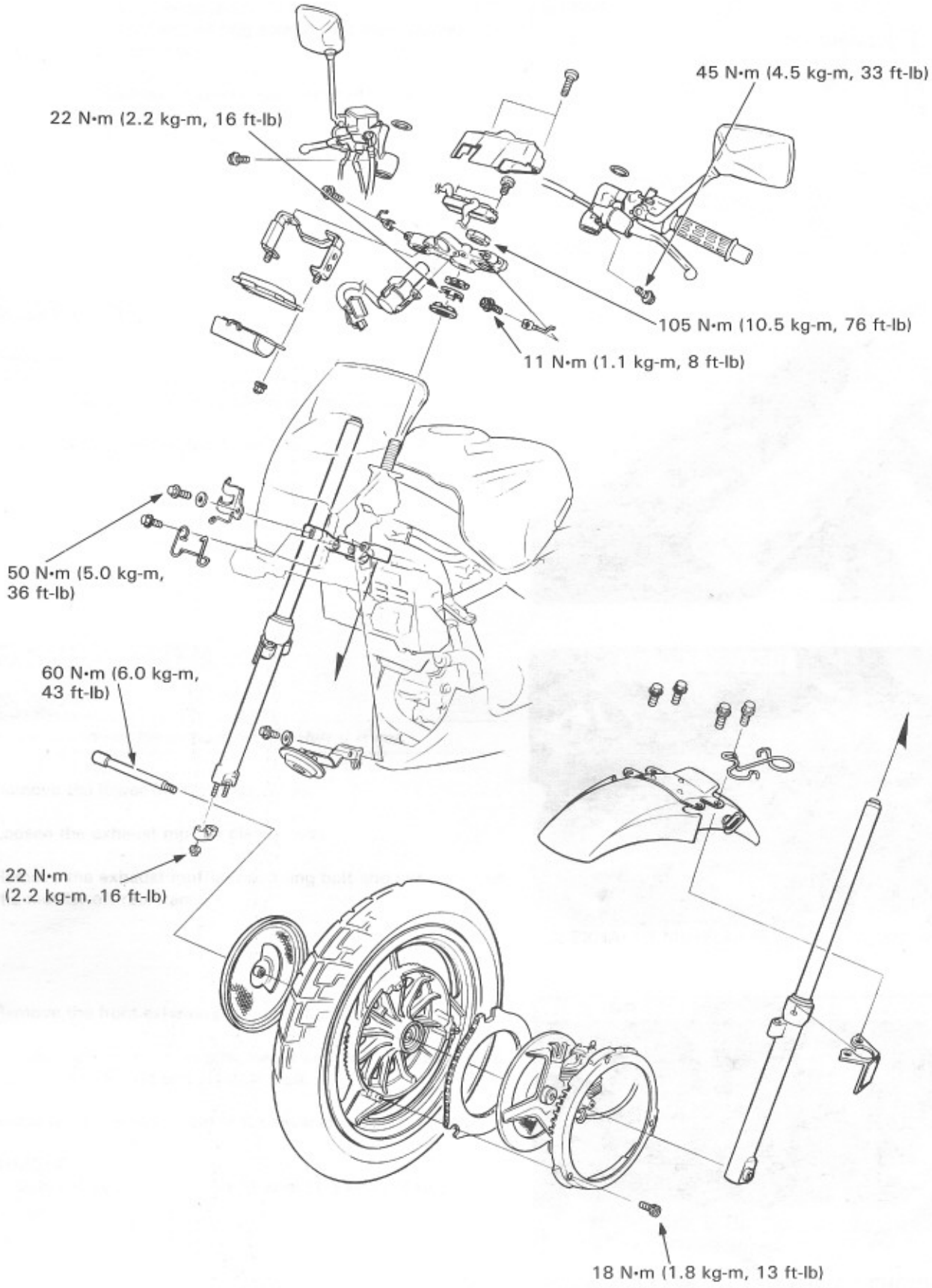
Remove the front exhaust pipe joint cap nut.

Loosen the rear exhaust pipe clamp bolt and remove the exhaust chamber bolt and exhaust pipe.

Install the exhaust system in the reverse order of removal.

TORQUE:
Exhaust pipe joint cap nut 13 N·m (1.3 kg-m, 9 ft-lb)




45 N·m (4.5 kg-m, 33 ft-lb)
22 N·m (2.2 kg-m, 16 ft-lb)
105 N·m (10.5 kg-m, 76 ft-lb)
11 N·m (1.1 kg-m, 8 ft-lb)
50 N·m (5.0 kg-m, 36 ft-lb)
60 N·m (6.0 kg-m, 43 ft-lb)
22 N·m (2.2 kg-m, 16 ft-lb)
18 N·m (1.8 kg-m, 13 ft-lb)

13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-6
TROUBLESHOOTING	13-2	FORK	13-12
HANDLEBARS	13-3	STEERING STEM	13-19

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

- A jack or other support is required to support the motorcycle during front end service.
- For front brake service, refer to section 15.
- For headlight, instrument and ignition switch services and inspections, refer to section 19.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Fork spring free length		—	426.3 (16.78)
Fork tube runout		—	0.20 (0.008)
Fork oil capacity		306 cc (10.3 US oz, 10.7 Imp oz)	—
Fork oil level		124.0 (4.88)	—
Fork air pressure		0–40 kPa (0–0.4 kg/cm², 0–6 psi)	—
Steering bearing preload		1.0–1.5 kg (2.20–3.31 lb)	—

TORQUE VALUES

Handlebar pinch bolt	45 N·m (4.5 kg-m, 33 ft-lb)
Front axle	60 N·m (6.0 kg-m, 43 ft-lb)
Front axle holder nut	22 N·m (2.2 kg-m, 16 ft-lb)
Fork socket bolt	20 N·m (2.0 kg-m, 14 ft-lb)
Fork cap	23 N·m (2.3 kg-m, 17 ft-lb)
Fork top pinch bolt	11 N·m (1.1 kg-m, 8 ft-lb)
Fork bottom pinch bolt	50 N·m (5.0 kg-m, 36 ft-lb)
Steering stem nut	105 N·m (10.5 kg-m, 76 ft-lb)
Steering bearing adjustment nut	22 N·m (2.2 kg-m, 16 ft-lb)
Master cylinder holder bolt	12 N·m (1.2 kg-m, 9 ft-lb)
Disc cover bolt	18 N·m (1.8 kg-m, 13 ft-lb)

TOOLS

Special		
Steering stem driver		07946—MB00000
Ball race remover	'88:	07GMD—KS40100
	AFTER '88:	07953—4250002
Ball race remover attachment ('88 ONLY)		07953—KM10100 or 07953—MJ1000A
Bearing race remover (AFTER '88)		07946—3710500
Fork seal driver attachment		07947—KL40100
Fork seal driver		07947—KA50100
Attachment ('88 ONLY)		07946—3290000
Attachment ('88 ONLY)		07946—3330300
Steering stem socket		07916—3710100
Common		
Driver		07749—0010000
Attachment, 32 x 35 mm		07746—0010100
Attachment, 42 x 47 mm		07746—0010300
Pilot, 15 mm		07746—0040300
Lock nut wrench, 30 x 32 mm		07716—0020400 — or equivalent commercialy available in U.S.A.
Bearing remover shaft		07746—0050100
Remover head, 15 mm		00746—0050400
Attachment, 52 x 55 mm (AFTER '88)		07746—0010400

TROUBLESHOOTING

Hard steering
- Steering bearing adjustment nut too tight
- Faulty steering bearings
- Damaged steering bearings
- Insufficient tire pressure

Steers to one side or does not track straight
- Bent fork
- Bent front axle; wheel installed incorrectly

Front wheel wobbling
- Bent rim
- Worn front wheel bearings
- Faulty tire
- Axle nut tightened improperly
- Wheel out of balance

Soft suspension
- Weak fork springs
- Insufficient oil in fork

Hard suspension
- Incorrect oil weight in fork
- Bent fork tubes
- Clogged oil passage

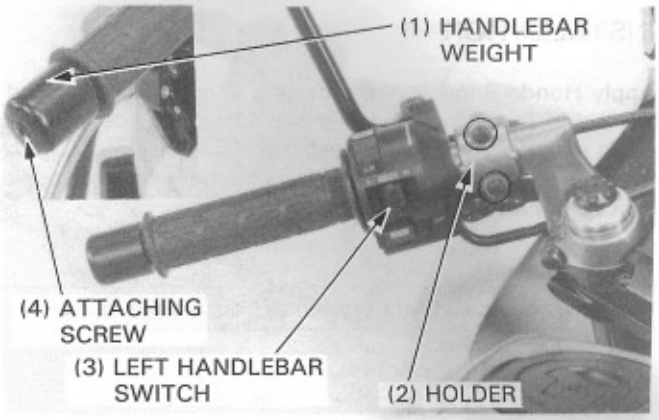
HANDLEBARS

REMOVAL

Left handlebar
Remove the handlebar weight attaching screw and weight, then pull the grip off the handlebar.

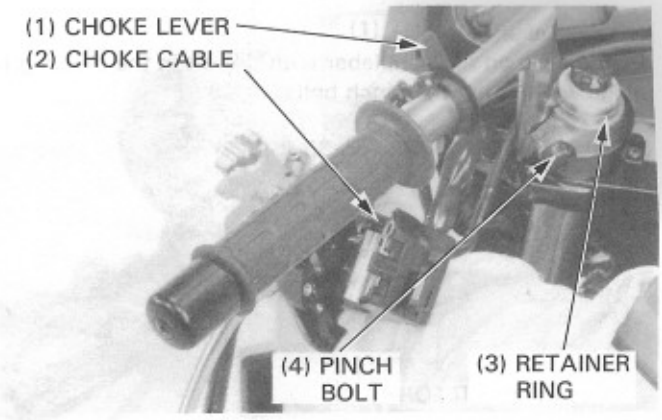
Replace the grip if necessary.

Remove the following:
– clutch lever holder bolts, holder and bracket
– left handlebar switch screws

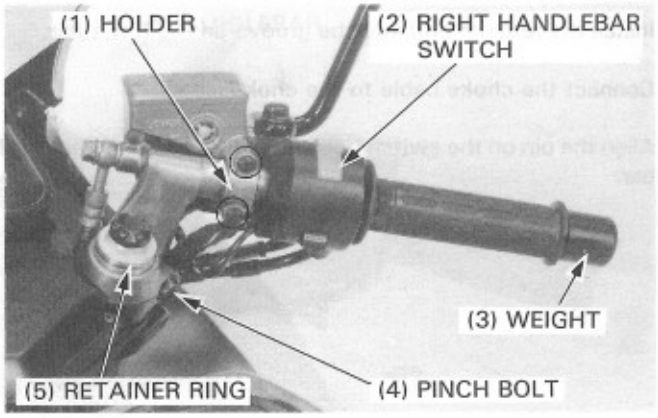


Disconnect the choke cable from the choke lever.

Remove the handlebar pinch bolt and retainer ring, then remove the handlebar.

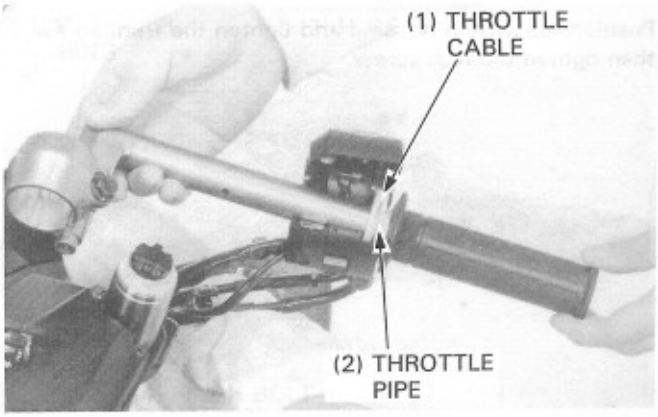


Right handlebar
Disconnect the front brake switch wires from the switch terminals.
Remove the following:
– master cylinder holder bolts, holder and master cylinder
– right handlebar switch screws
– handlebar pinch bolt and retainer ring
– handlebar weight



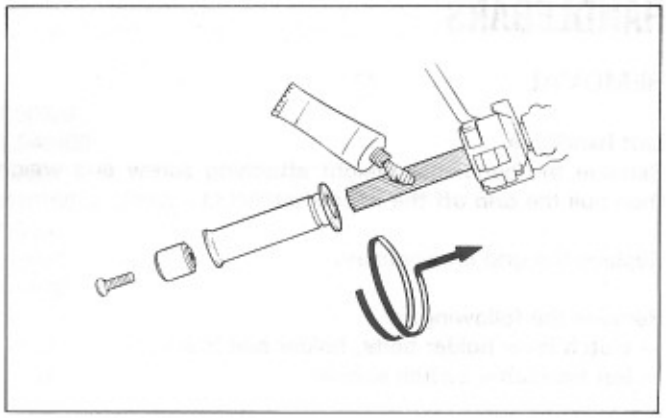
Remove the handlebar and disconnect the throttle cables from the throttle pipe.

Replace the grip if necessary.



INSTALLATION

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

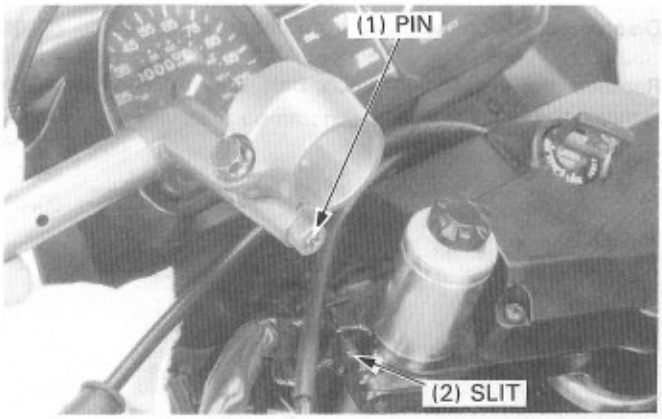


NOTE

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

Left handlebar
Align the pin on the handlebar with the slit in the steering top bridge and tighten the pinch bolts.

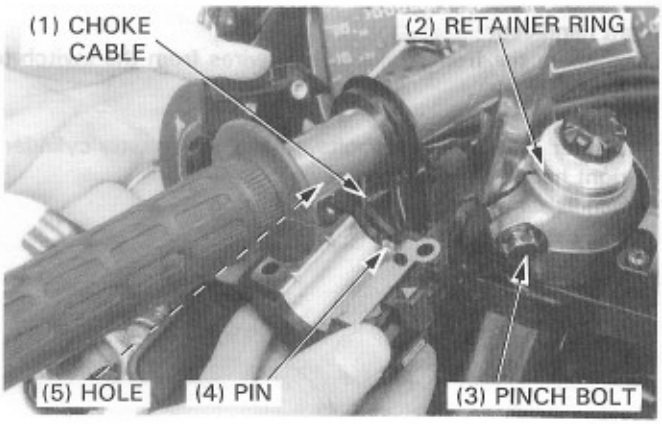
TORQUE: 45 N·m (4.5 kg-m, 33 ft-lb)



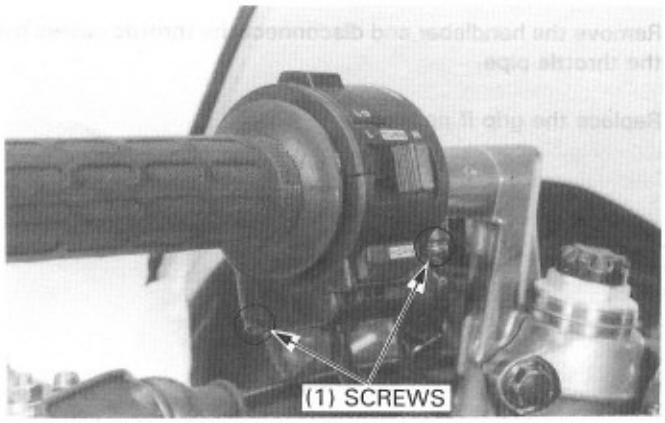
Install the retainer ring into the groove on the fork tube.

Connect the choke cable to the choke lever.

Align the pin on the switch housing with the hole in the handlebar.



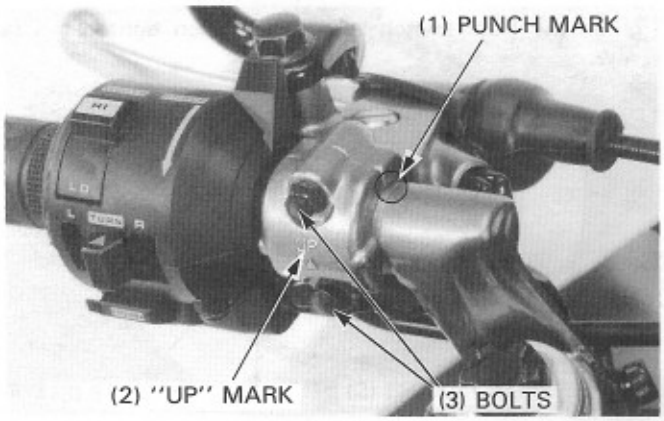
Position the switch housing and tighten the front screw first, then tighten the rear screw.



Install the clutch lever bracket and holder with the "UP" mark facing up.

Align the end of the holder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

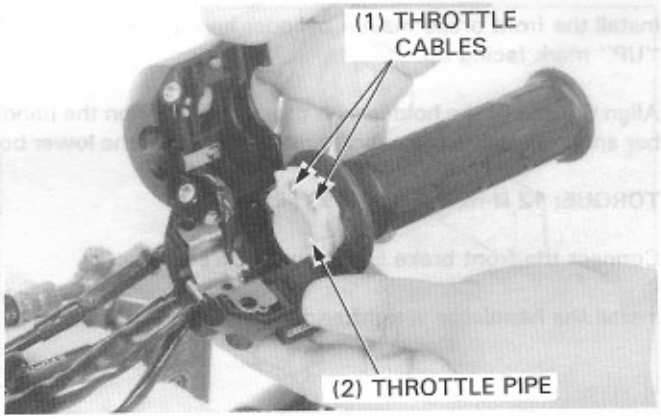
Install the weight and tighten the screw.



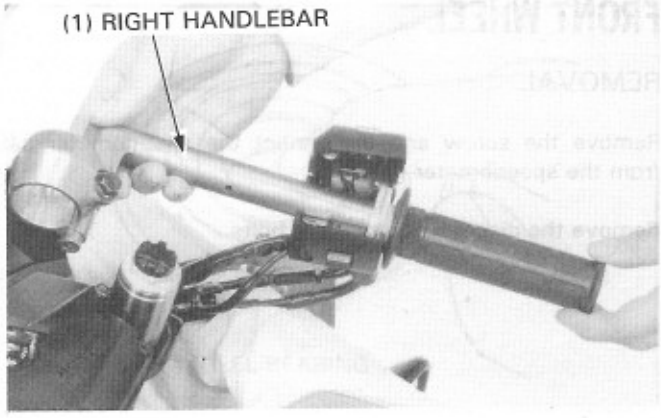
Right handlebar

Apply grease to the throttle cable ends and the sliding surface of the throttle pipe.

Connect the throttle cables.



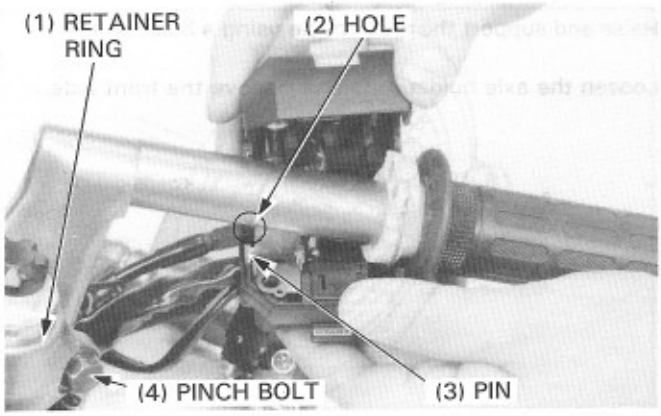
Install the handlebar into the throttle pipe then install the handlebar, aligning the pin on the handlebar with the slit in the steering top bridge.



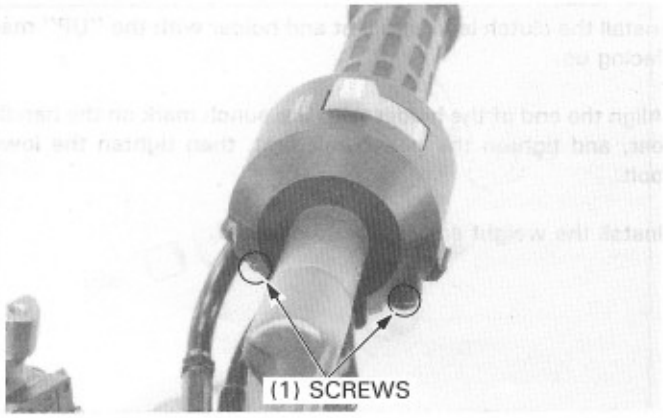
Tighten the handlebar pinch bolt and install the retainer clip.

TORQUE: 45 N·m (4.5 kg-m, 33 ft-lb)

Align the pin on the switch with the hole in the handlebar.



Tighten the front switch screw first, then tighten the rear screw.



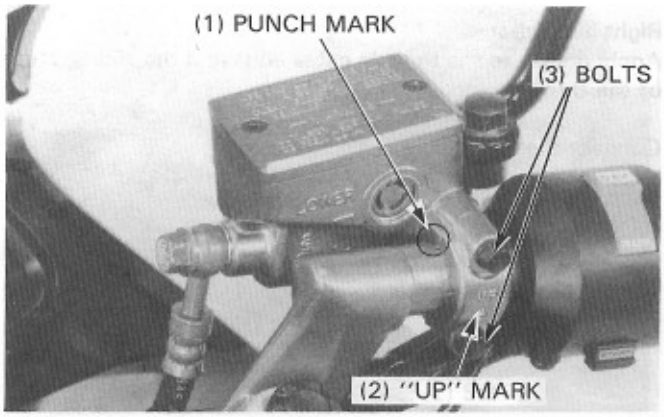
Install the front brake master cylinder and the holder with the "UP" mark facing up.

Align the end of the holder with the punch mark on the handlebar and tighten the upper bolt first then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)

Connect the front brake light switch wires.

Install the handlebar weight and tighten the screw.

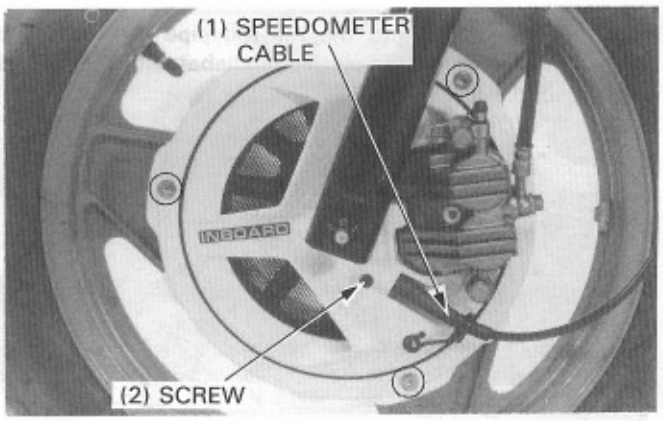


FRONT WHEEL

REMOVAL

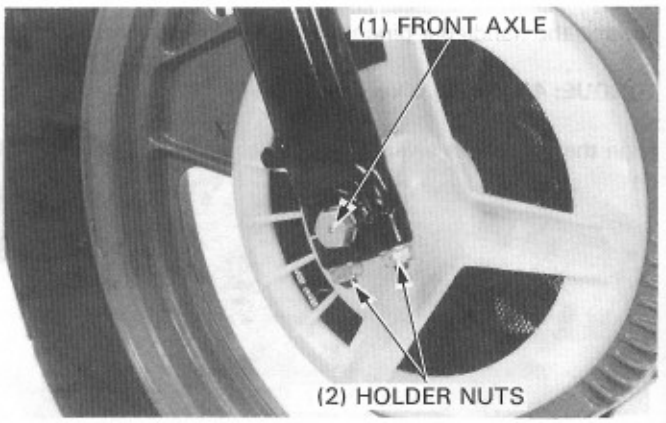
Remove the screw and disconnect the speedometer cable from the speedometer gear box.

Remove the disc cover mounting bolts.

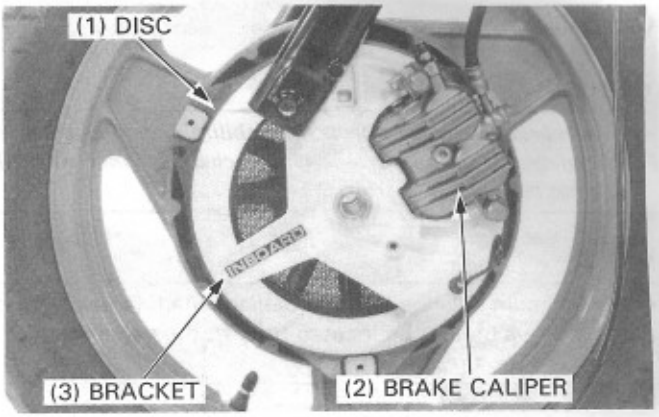


Raise and support the motorcycle using a hoist or a jack.

Loosen the axle holder nuts and remove the front axle.



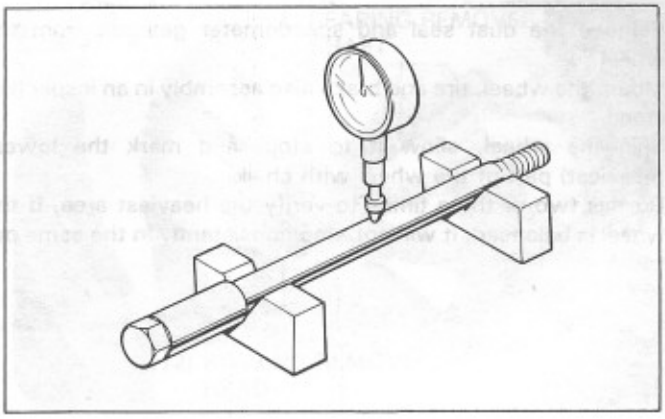
Remove the brake caliper/bracket/disc assembly and support it on the work bench or a convenient stand.
Remove the front wheel.



INSPECTION

Axle
Set the axle in V blocks and measure the runout.

SERVICE LIMIT: 0.2 mm (0.01 in)

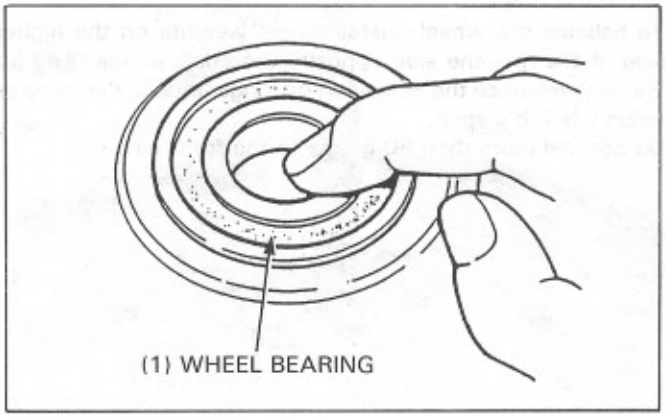


Wheel bearing
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings (page 13-8) if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE

- Replace wheel bearings in pairs.

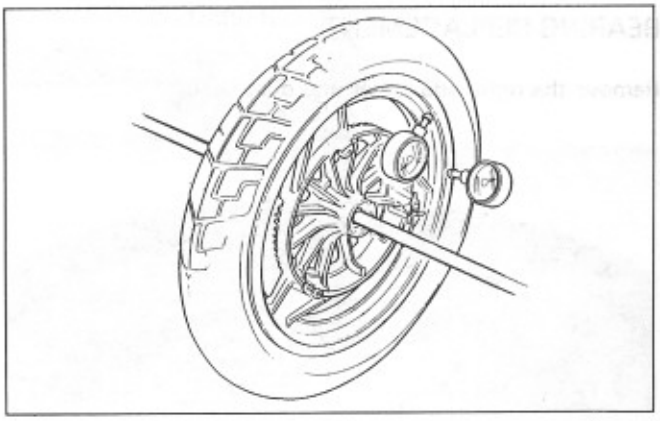


Wheel
Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

NOTE

- The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



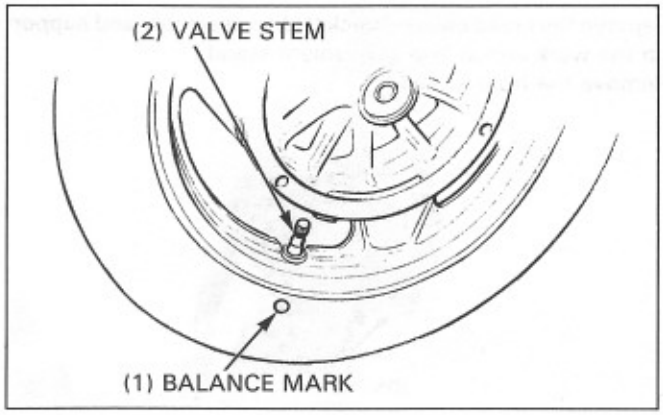
Wheel Balance

CAUTION

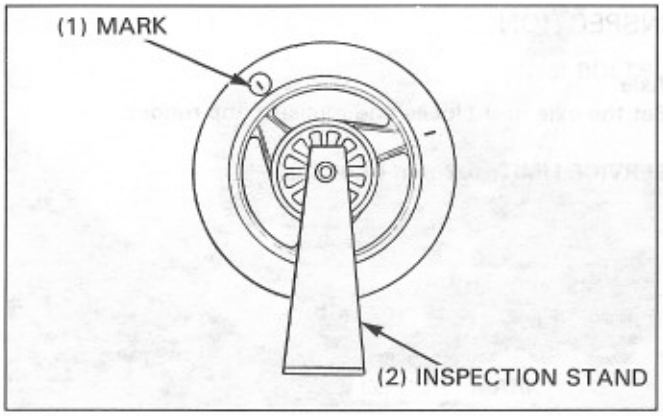
- *Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.*

NOTE

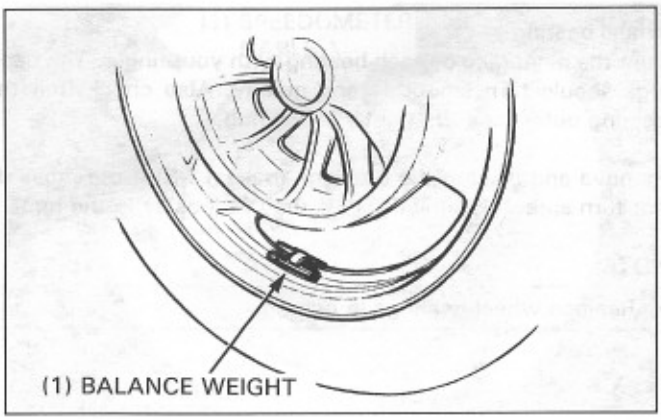
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



Remove the dust seal and speedometer gearbox from the wheel.
Mount the wheel, tire and brake disc assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

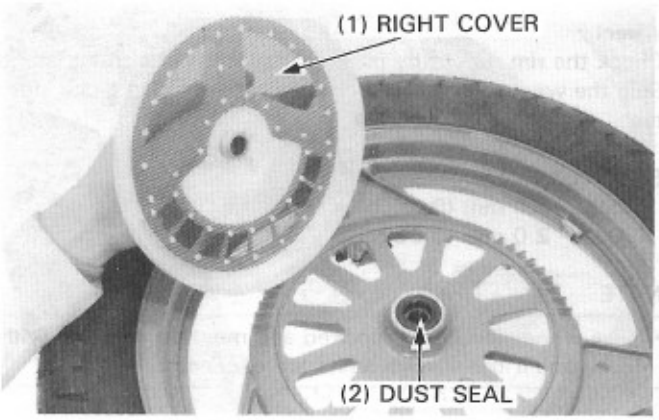


To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it's spun.
Do not add more than 60 grams to the front wheel.

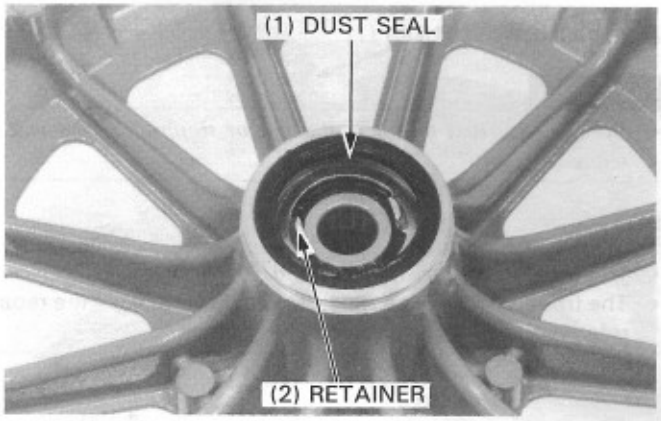


BEARING REPLACEMENT

Remove the right side cover and dust seal.



Remove the dust seal and speedometer gear box retainer from the left side.



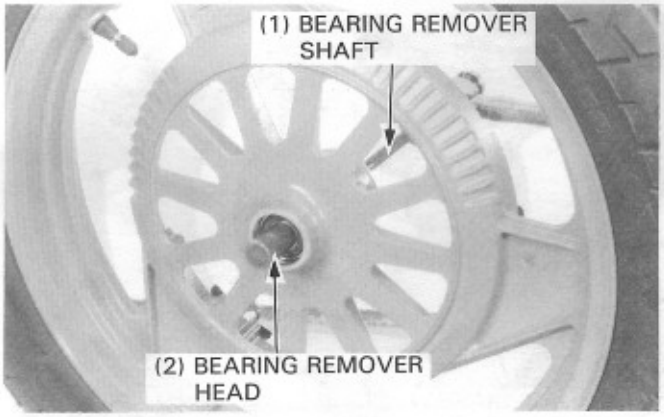
Install the bearing remover head into the bearing.
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel.
Remove the distance collar and drive out other bearing.

NOTE

- If the bearings are removed, they must be replaced with new ones.

TOOLS:

Bearing remover shaft	**07746—0050100**
Bearing remover head, 15 mm	**07746—0050400 or equivalent commercially available in U.S.A.**



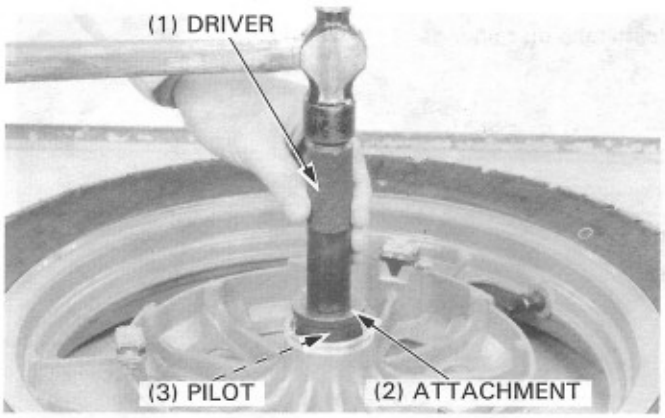
Pack all bearing cavities with grease.

Drive a new left bearing into the wheel securely, until it's seated.
Install the distance collar and drive a new right bearing in securely, until it's seated.

TOOLS:

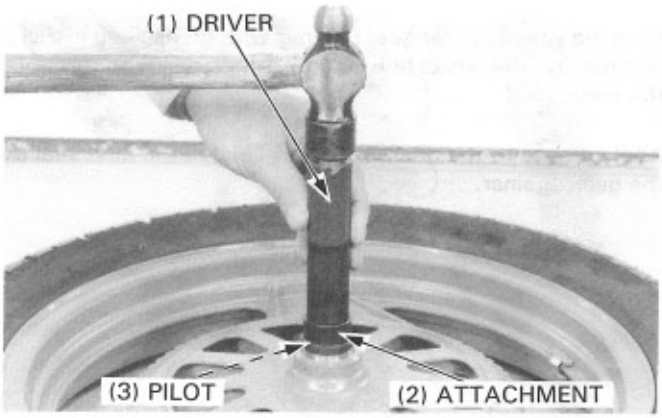
Left side:

Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**
Pilot, 15 mm	**07746—0040300**



Right side:

Driver	**07749—0010000**
Attachment, 32 x 35 mm	**07746—0010100**
Pilot, 15 mm	**07746—0040300**



NOTE

- Do not allow the bearings to tilt while driving them in.
- Never install an old bearing. Once a bearing is removed, it must be replaced with a new one.

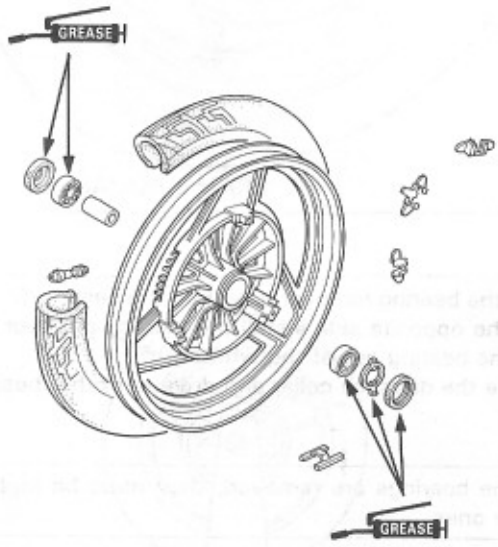
ASSEMBLY

⚠ WARNING

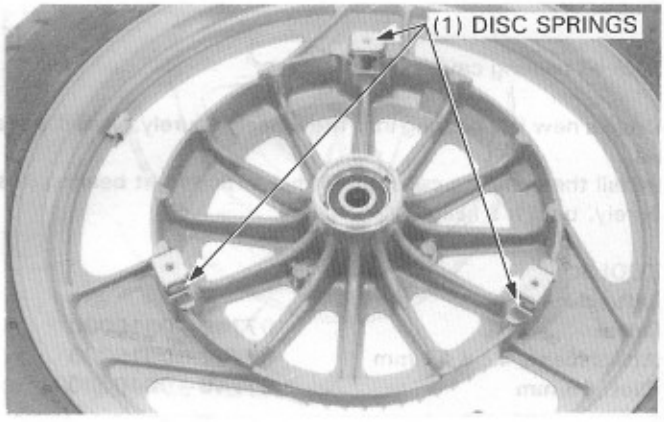
- ***Do not get grease on the brake disc or stopping power will be reduced.***

NOTE

- The cast wheel has no rim band.
- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the Honda Tubeless Tire Manual.

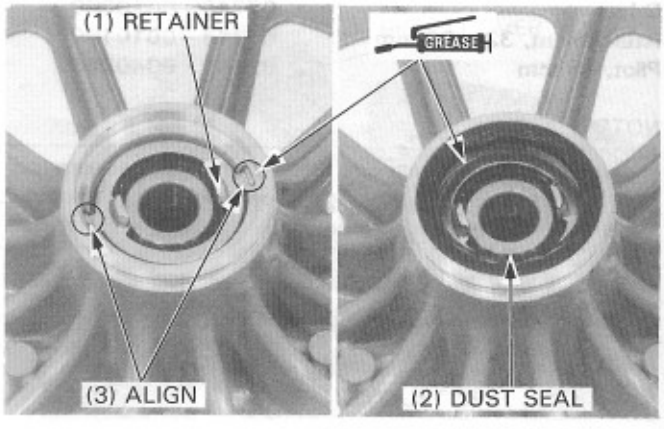


Install the disc springs.



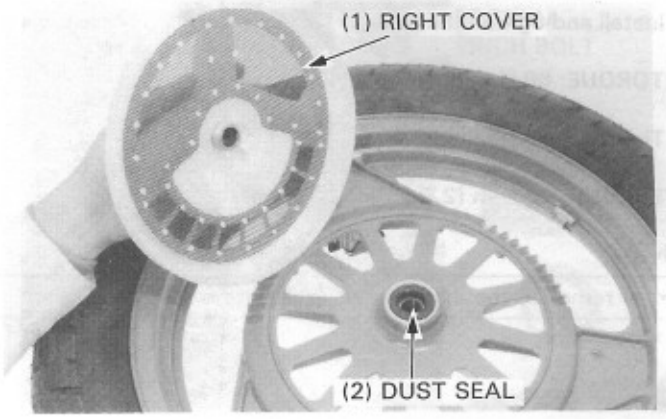
Coat the speedometer gear retainer with grease and install the retainer into the wheel hub, aligning the tangs with the slots in the hub.

Apply grease to the dust seal lip and install the dust seal over the gear retainer.



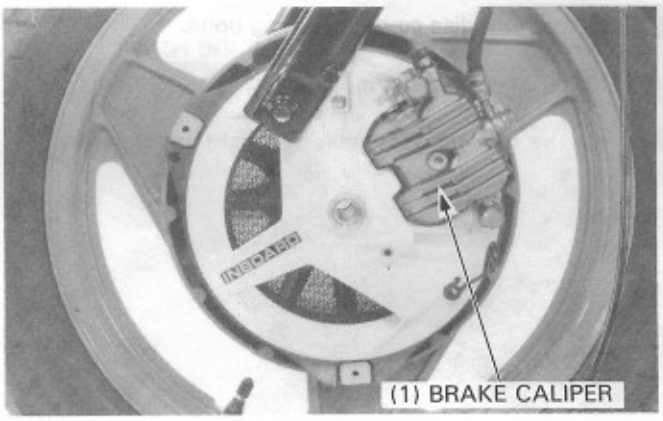
Apply grease to the new dust seal lips.

Install the dust seal and right side cover.

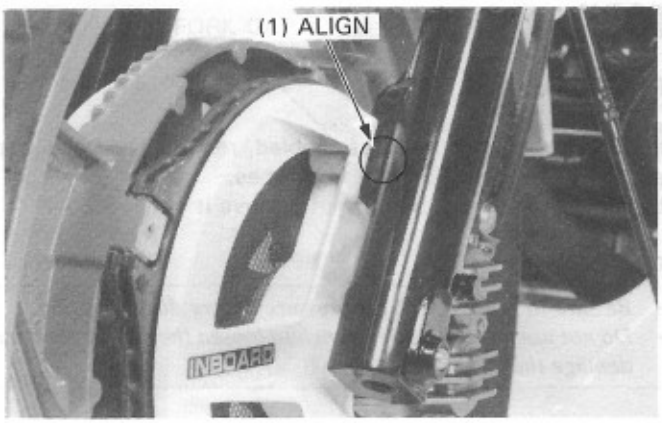


INSTALLATION

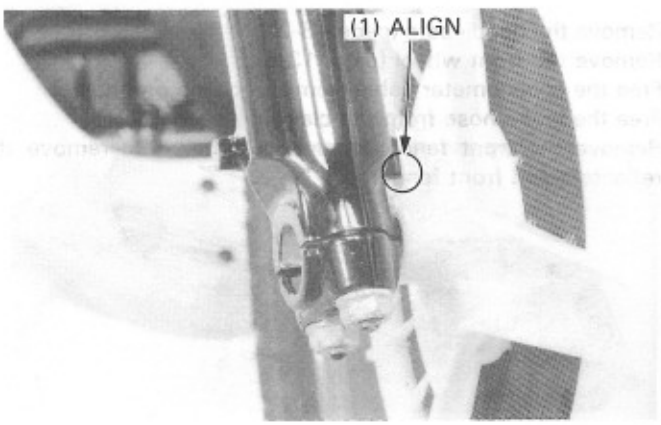
Position the wheel between the fork legs.
Install the brake caliper/bracket/disc assembly and disc cover onto the wheel.



Align the groove in the caliper bracket with the left fork leg boss.



Align the groove in the right side cover with the right fork leg boss.



Install and tighten the axle.

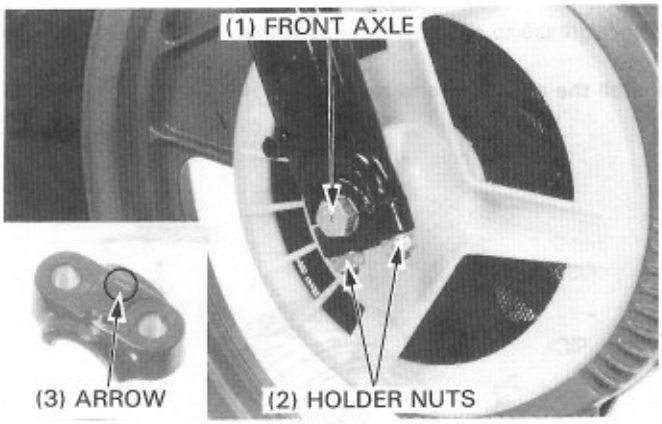
TORQUE: 60 N·m (6.0 kg-m, 43 ft-lb)

Tighten the axle holder nut.

TORQUE: 22 N·m (2.2 kg-m, 16 ft-lb)

NOTE

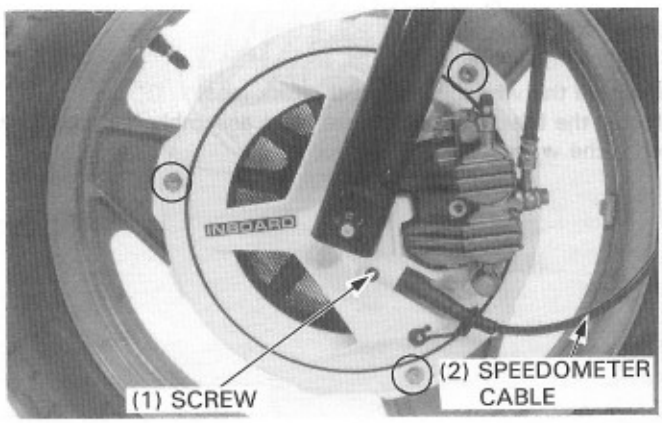
- If removed the axle holder, facing its arrow forward.



Tighten the front disc cover mounting bolts.

TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)

Connect the speedometer cable and tighten the screw.



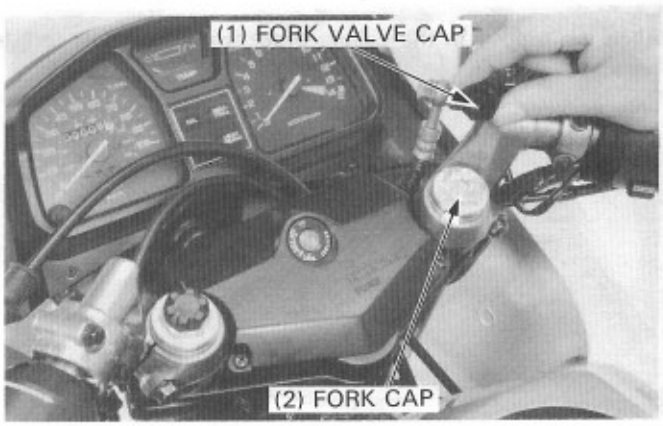
FORK

REMOVAL

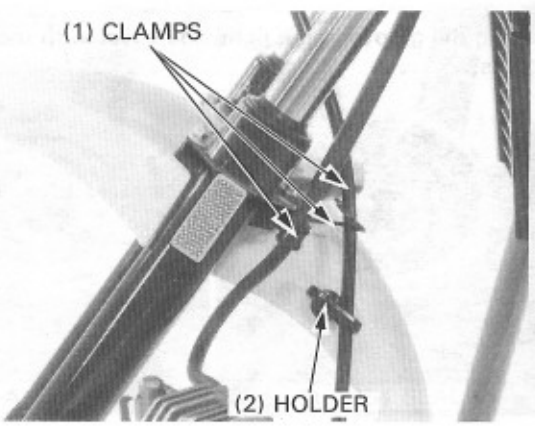
If the fork legs will be disassembled, remove the valve caps and release the air from the fork tubes.
Loosen the fork cap, but do not remove it yet.

CAUTION

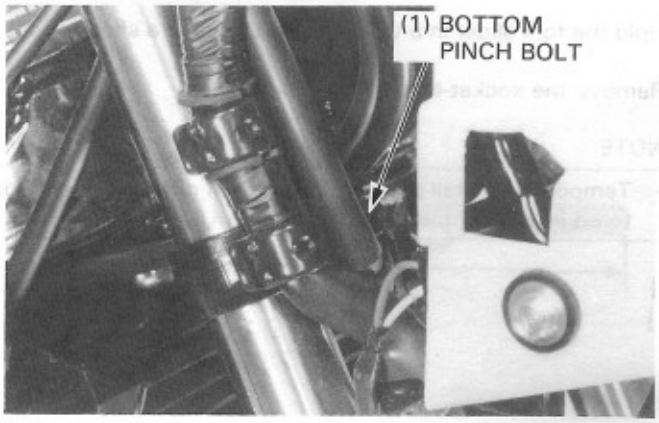
- *Be sure to release fork air pressure before disassembling.*
- *Do not use an adjustable wrench to loosen the fork caps: it may damage them.*



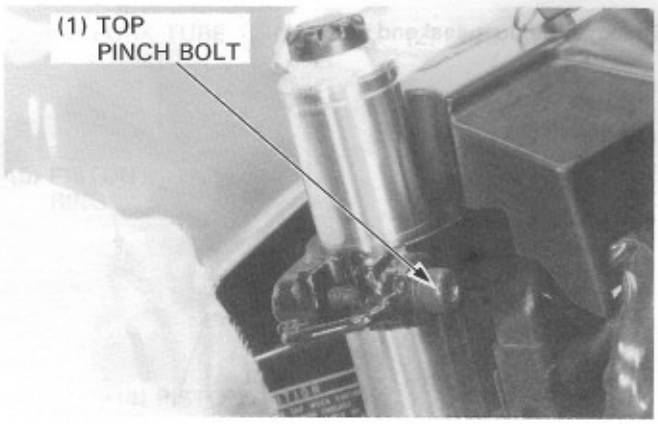
Remove the handlebars (page 13-3).
Remove the front wheel (page 13-6).
Free the speedometer cable from the clamp and holder.
Free the brake hose from the clamp.
Remove the front fender mounting bolts, then remove the reflectors and front fender.



Loosen the bottom pinch bolt.



Loosen the top pinch bolt then pull the fork tube down and out.

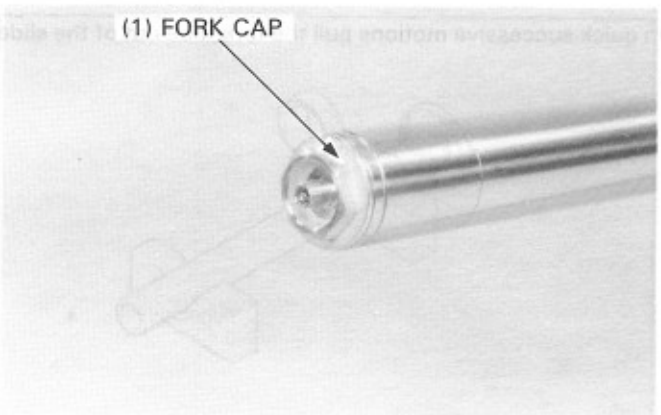


DISASSEMBLY

Remove the fork cap.

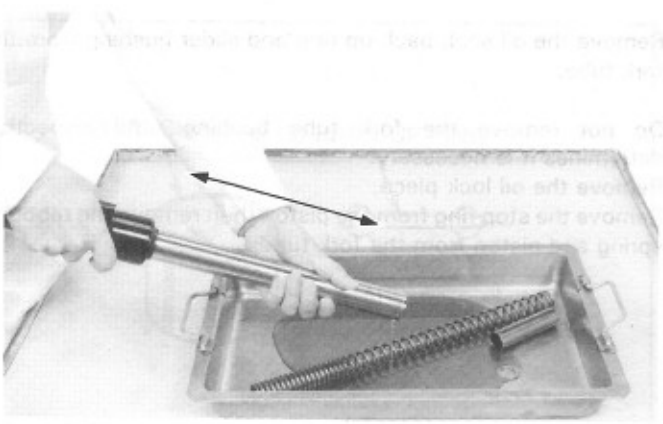
CAUTION

- *The cap is under spring pressure. Use care when removing and wear eye and face protection.*



Remove the spacer, spring seat and fork spring.

Drain the fork oil by pumping the tube up and down several times.

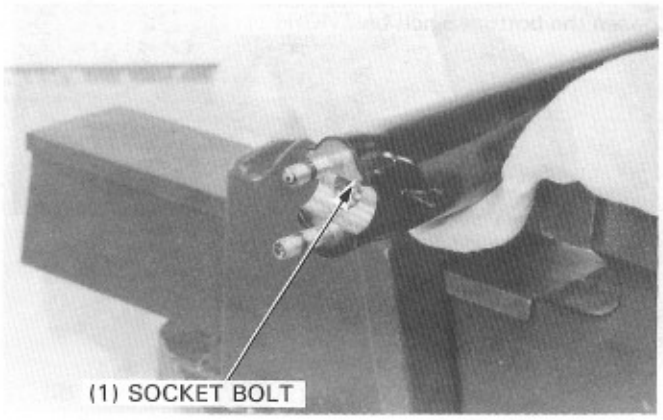


Hold the fork slider in a vise with soft jaws or a shop towel.

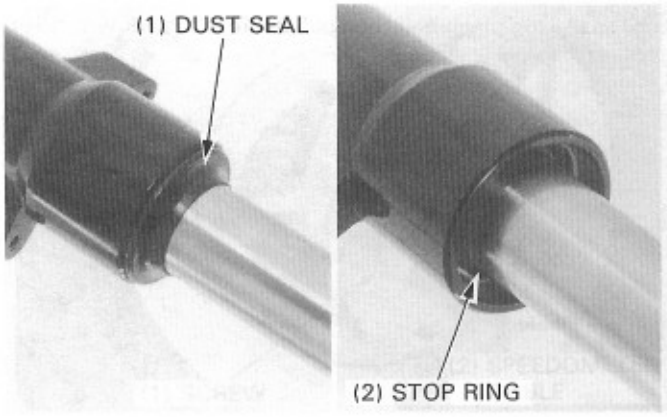
Remove the socket-bolt with a hex wrench.

NOTE

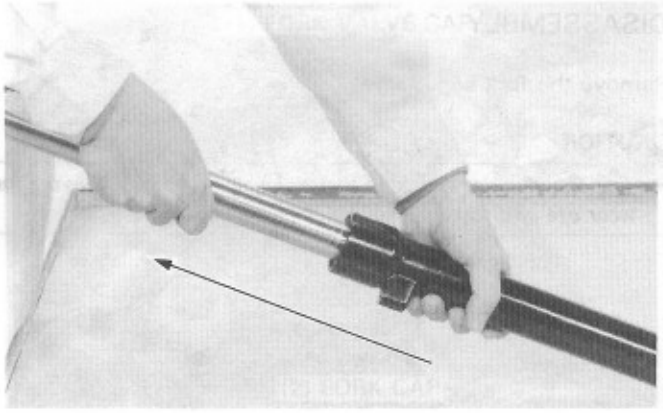
- Temporarily install the spring and cap if difficulty is encountered in removing the bolt.



Remove the dust seal and stop ring.

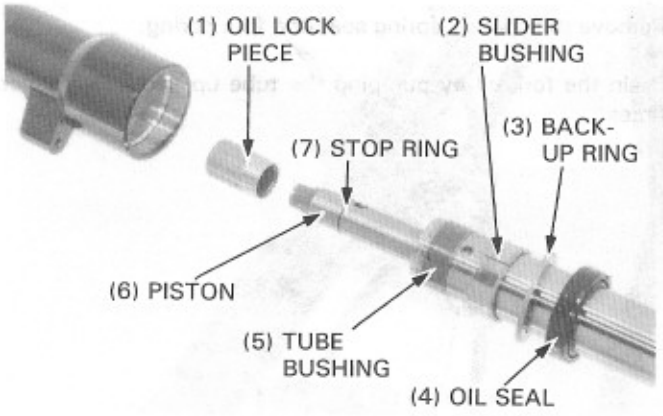


In quick successive motions pull the fork tube out of the slider.



Remove the oil seal, back-up ring and slider bushing from the fork tube.

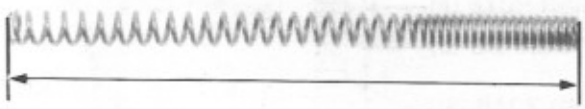
Do not remove the fork tube bushing until inspection determines it is necessary.
Remove the oil lock piece.
Remove the stop ring from the piston then remove the rebound spring and piston from the fork tube.



INSPECTION

Fork spring free length.
Measure the fork spring free length.

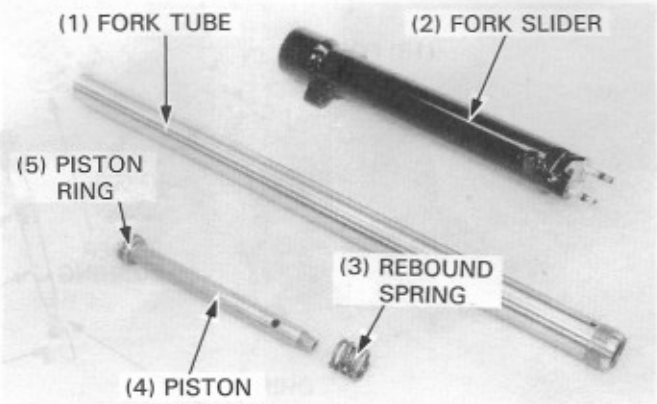
SERVICE LIMIT: 426.3 mm (16.78 in)



Fork tube/fork slider/piston
Check the fork tube, slider and piston for score marks, scratches, or excessive or abnormal wear.
Replace any components which are worn or damaged.

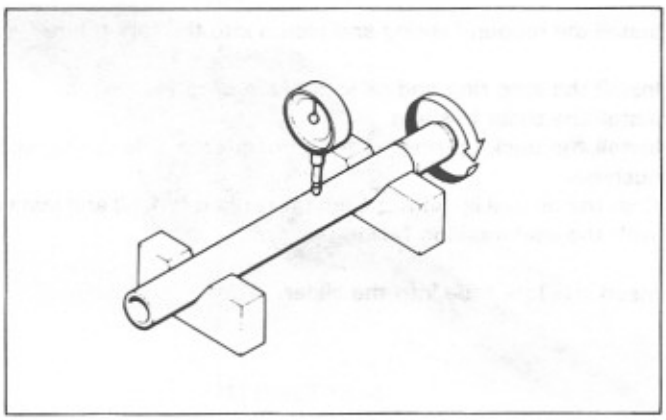
Check the piston ring for wear or damage.

Check the rebound spring for fatigue or damage.



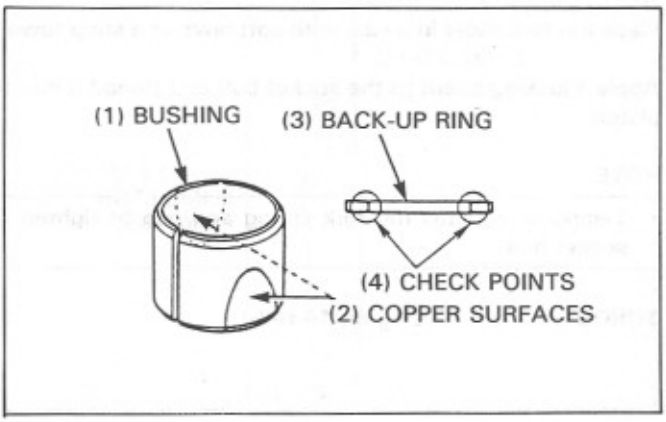
Fork tube
Set the fork tube in V blocks and read the runout.
Use 1/2 the total indicator reading to determine the actual runout.

SERVICE LIMIT: 0.20 mm (0.008 in)



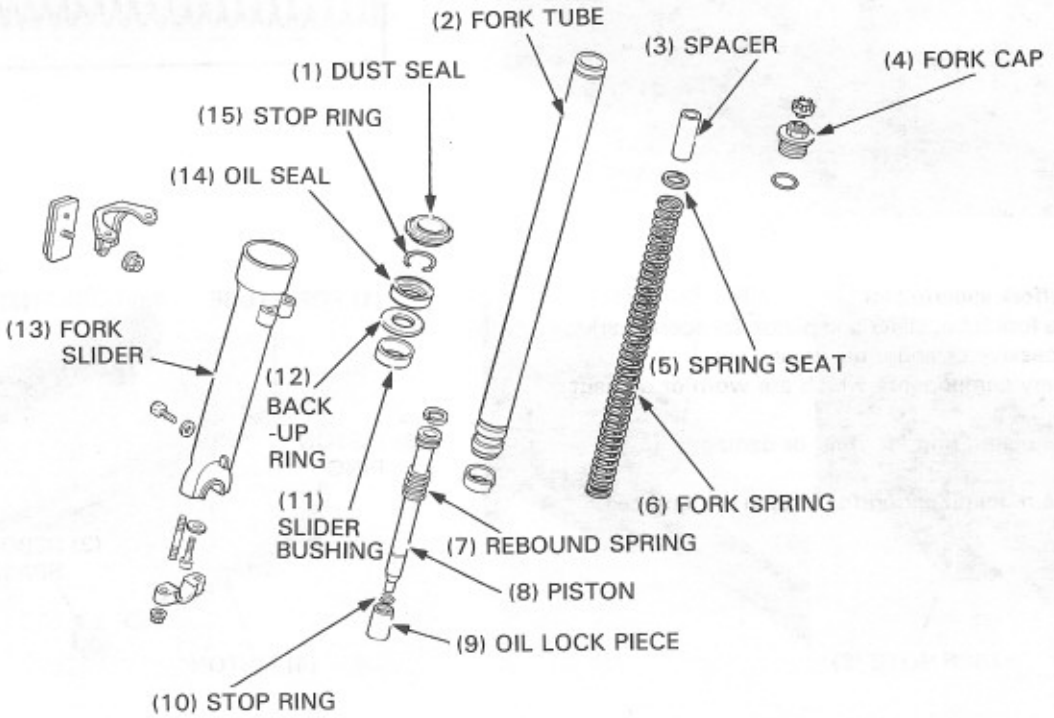
Bushing/back-up ring
Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



ASSEMBLY

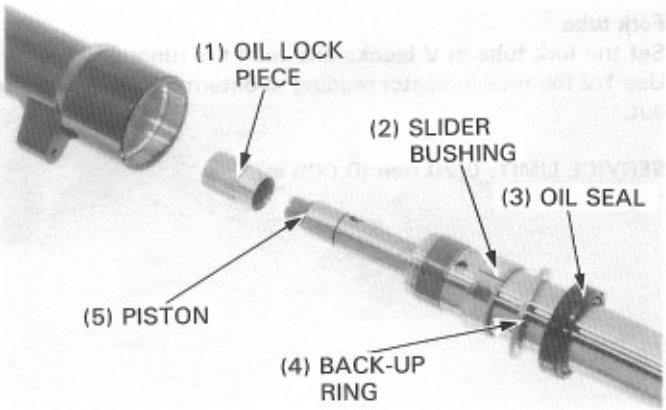
Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Install the rebound spring and piston into the fork tube.

Install the stop ring and oil lock piece onto the piston.
Install the slider bushing.
Install the back-up ring with its chamfered side facing slider bushing.
Coat the oil seal lip with the recommended fork oil and install it with the seal marking facing up.

Insert the fork tube into the slider.



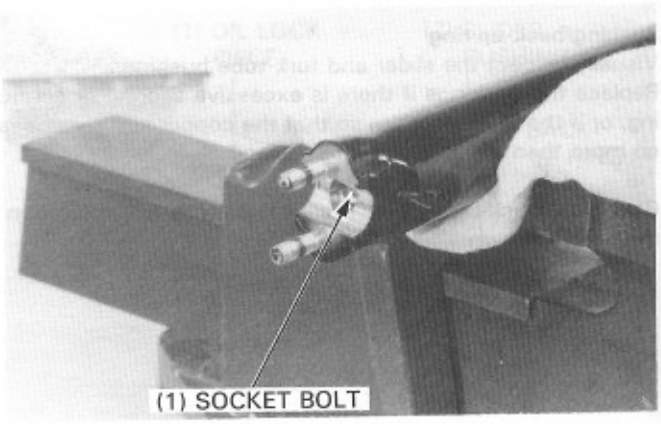
Place the fork slider in a vise with soft jaws or a shop towel.

Apply a locking agent to the socket bolt and thread it into the piston.

NOTE

- Temporarily install the fork spring and cap to tighten the socket bolt.

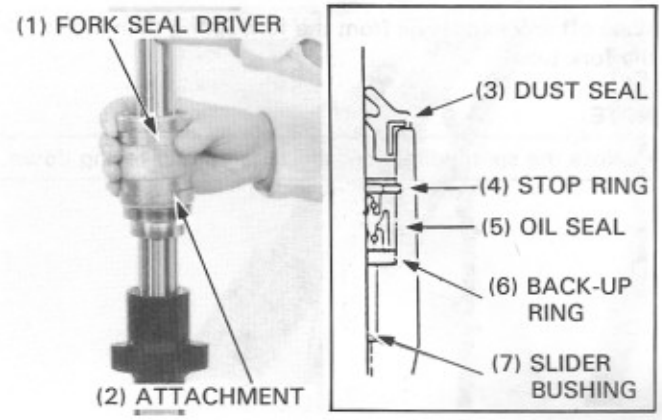
TORQUE: 20 N·m (2.0 kg-m, 14 ft-lb)



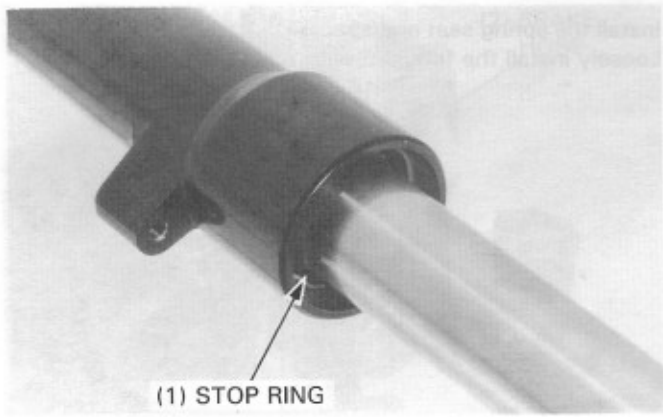
Using a fork seal driver and attachment, drive in the bushing, back-up ring and oil seal.

TOOLS:

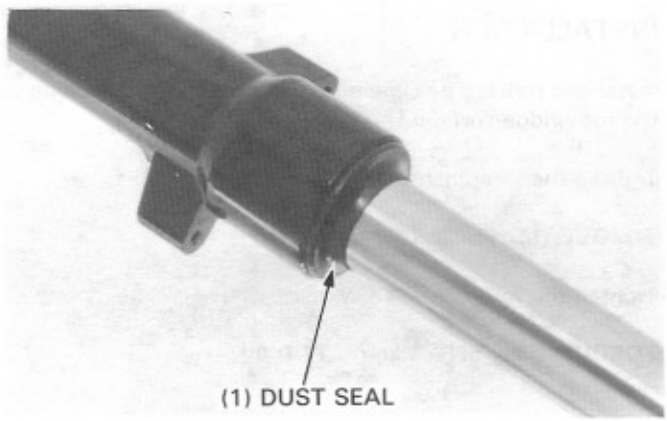
Fork seal driver attachment	**07947–KL40100**
Fork seal driver	**07947–KA50100**



Install the stop ring.



Install the dust seal.



Pour in the specified amount of fork oil.

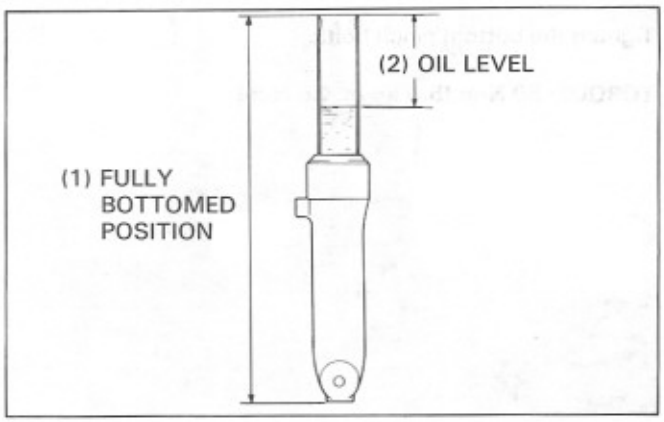
RECOMMENDED OIL: ATF or equivalent
OIL CAPACITY: 306 cc (10.3 US oz, 10.7 Imp oz)

Stroke the fork tube slowly more than 5 times.
Push the fork tube all the way into the fork slider.
Measure the fork oil level from the top of the tube.

OIL LEVEL: 124.0 mm (4.88 in)

NOTE

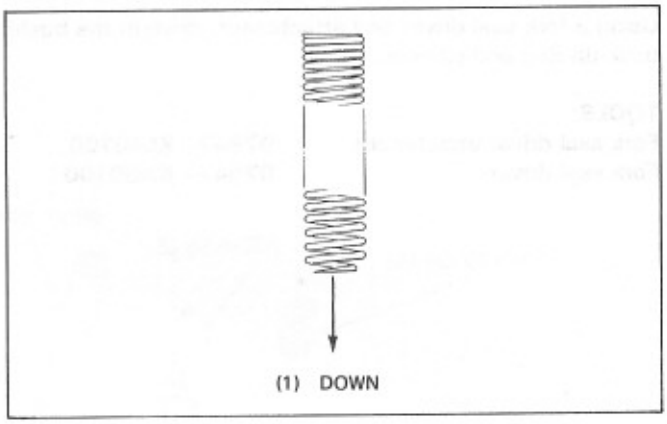
- Be sure the oil level is the same in both fork tubes.



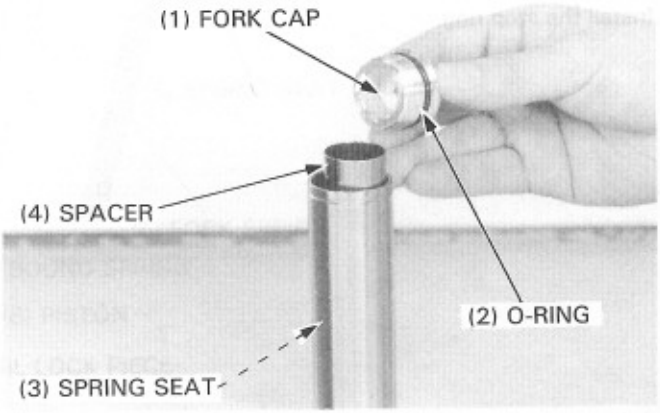
Wipe off any excess oil from the fork spring then insert it into the fork tube.

NOTE

- Note the spring direction: the tapered and facing down.



Install the spring seat and spacer.
Loosely install the fork cap with a new O-ring.



INSTALLATION

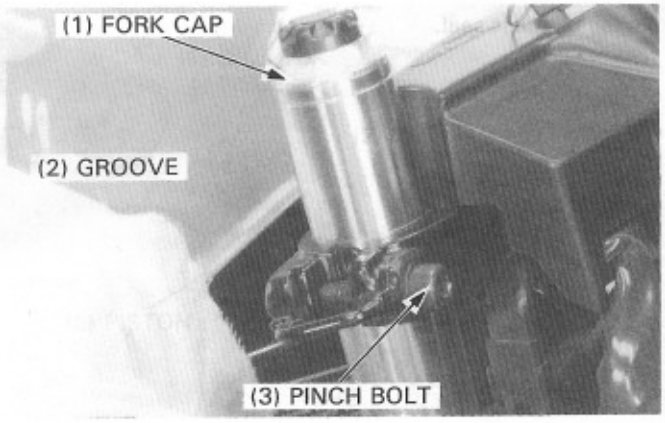
Install the fork leg by aligning the groove of the fork tube with the top bridge surface.

Tighten the top pinch bolts.

TORQUE: 11 N·m (1.1 kg-m, 8 ft-lb)

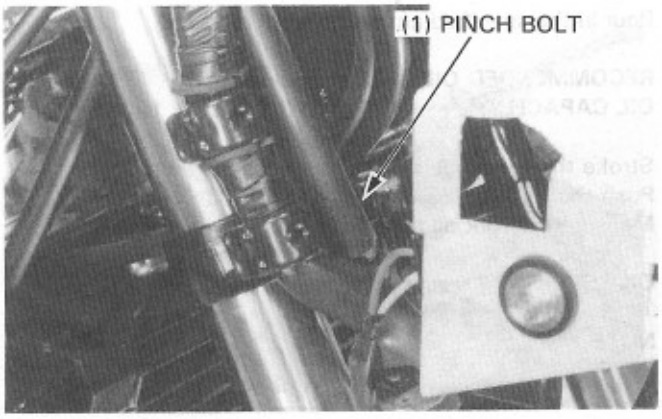
Tighten the fork cap.

TORQUE: 23 N·m (2.3 kg-m, 17 ft-lb)

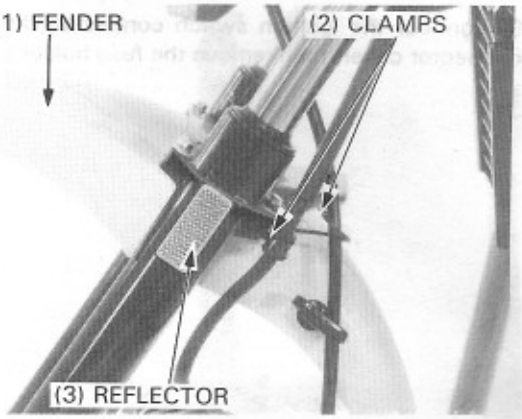


Tighten the bottom pinch bolts.

TORQUE: 50 N·m (5.0 kg-m, 36 ft-lb)



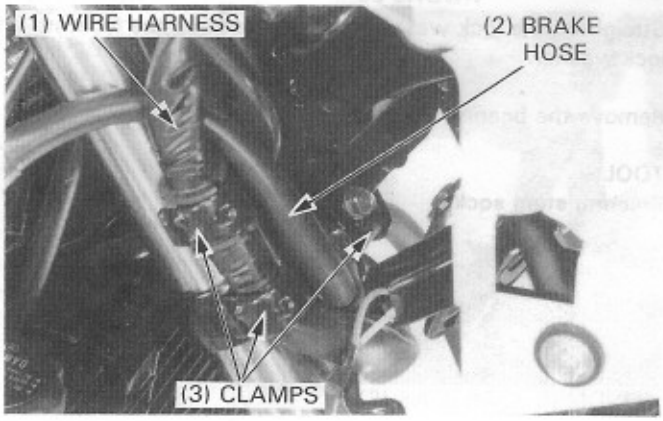
Install the front fender and reflectors, then secure the brake hose and speedometer cable.
Install the front wheel (page 13-11).
Install the handlebars (page 13-4).



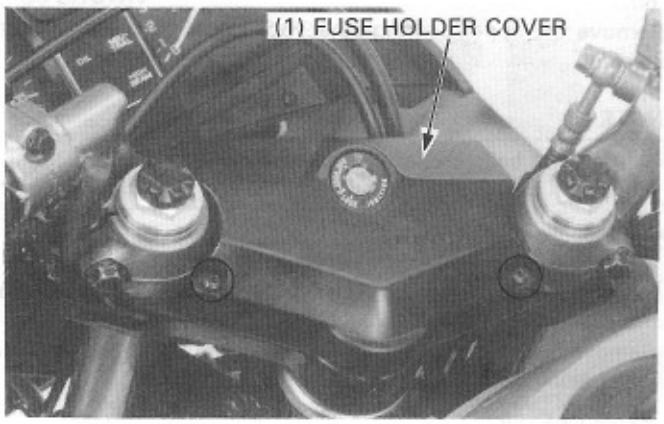
STEERING STEM

REMOVAL

Remove the wire harness and brake hose clamps.



Remove the fuse holder cover.
Remove the handlebars (page 13-3).

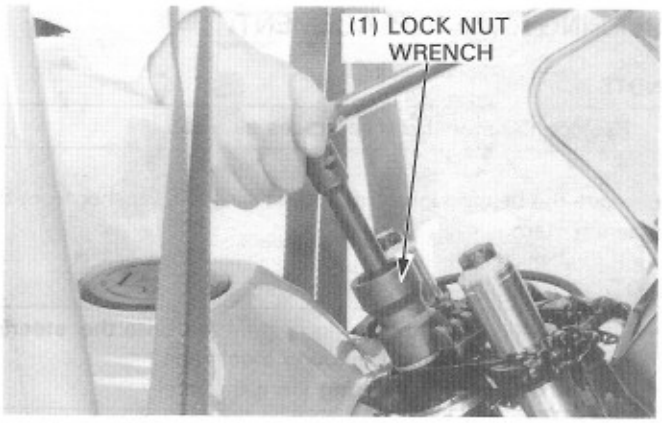


Remove the steering stem nut.

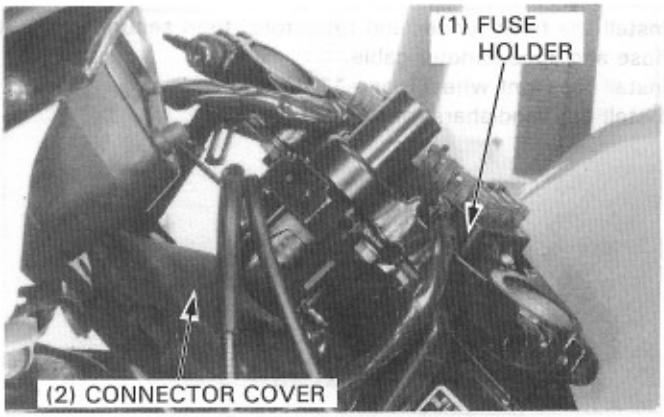
TOOL:

Lock nut wrench, 30 x 32 mm	**07716—0020400 or equivalent commercially available in U.S.A.**

Remove the fork legs (page 13-12).



Disconnect the ignition switch connectors by removing the connector cover, then remove the fuse holder and fork bridge.

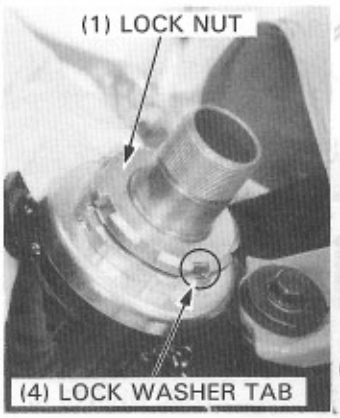


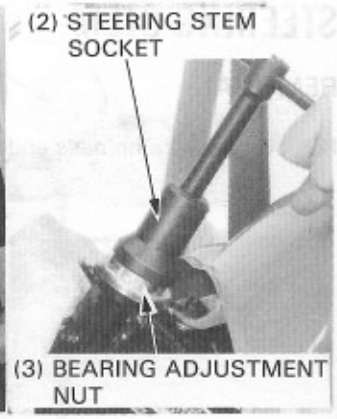
Straighten the lock washer tabs and remove the lock nut and lock washer.

Remove the bearing adjustment nut.

TOOL:

Steering stem socket	**07916–3710100**



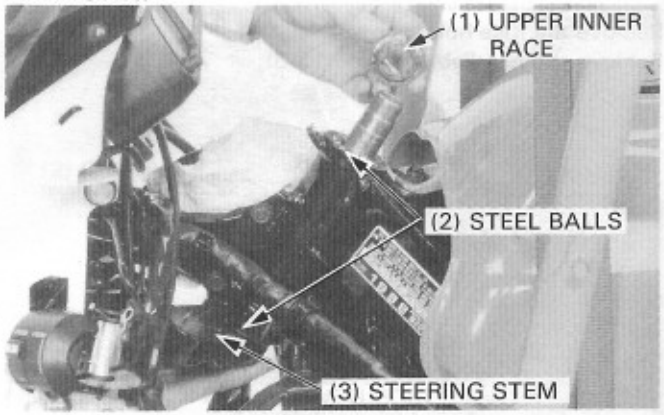


'88:
Remove the upper bearing inner race, steel balls and steering stem.

NOTE

- The steel balls are loose and easily dropped. Place shop towels on the floor to catch any that do drop.

'88 SHOWN:



AFTER '88:
Remove the dust seal, upper bearing inner race and upper bearing.
Remove the steering stem, then remove the lower bearing from the steering stem.

'88 and AFTER:
Check the steering stem bearings for damage or wear.

BEARING RACE REPLACEMENT

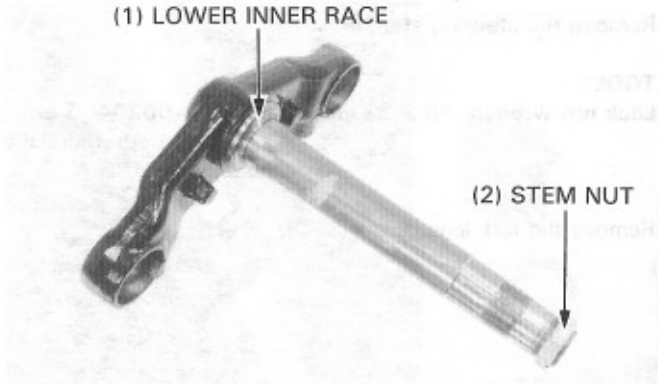
NOTE

- Replace the steel balls and races as a set.

Remove the bearing inner race, dust seal and washer from the steering stem.

NOTE

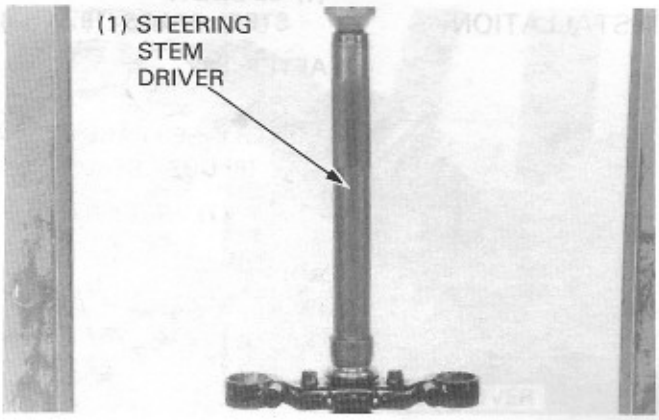
- Temporarily install the steering stem nut onto the steering stem when removing the lower inner race.
- Do not damage the steering stem threads.



Install the washer and dust seal onto the steering stem and press the lower bearing inner race over the stem with the special tool.

TOOL:

Steering stem driver	**07946—MB00000**



Install the attachment onto the lower outer race and drive the outer race out using the ball race remover.

TOOLS:

Ball race remover attachment ('88 ONLY)	**07953—KM10100 or 07953—MJ1000A (U.S.A. only)**
Bearing race remover (AFTER '88) with	**07946—3710500**
Ball race remover '88:	**07GMD—KS40100**
AFTER '88:	**07953—4250002**

'88 SHOWN



'88 SHOWN



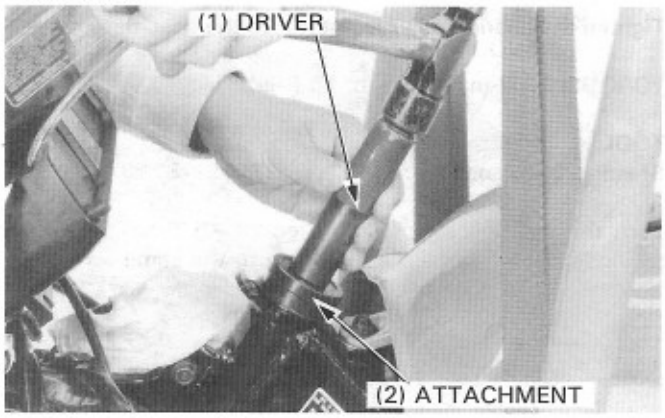
'88:
Drive out the upper outer race using the same remover.

AFTER '88:
Drive out the upper outer race.

TOOL:

Ball race remover	**07953—4250002**

'88 SHOWN



Drive a new upper outer race in with the special tools.

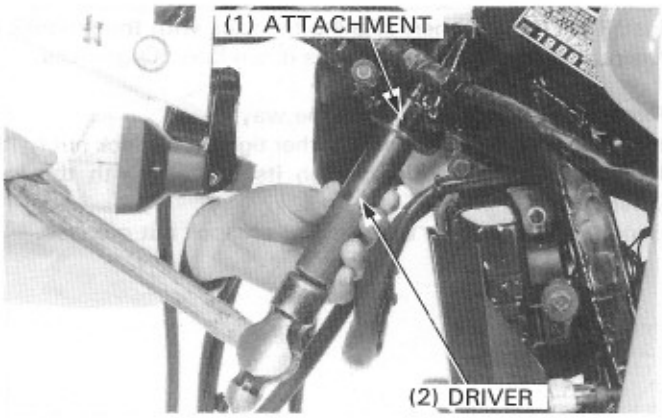
TOOLS:

Driver	**07749—0010000**
'88: Attachment	**07946—3290000**
AFTER '88:	
Attachment, 42 x 47mm	**07746—0010300**

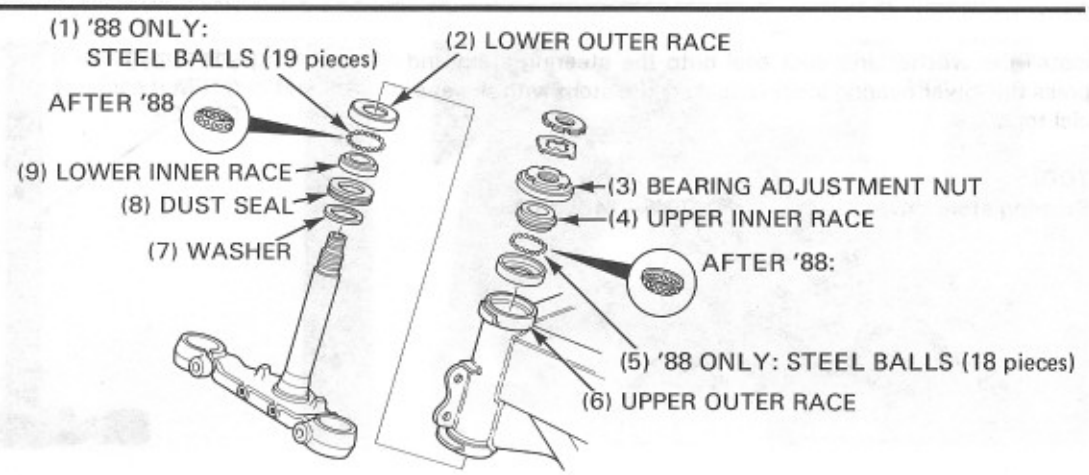
Drive a new lower outer race in with the special tools.

TOOLS:

Driver	**07749—0010000**
'88: Attachment	**07945—3330300**
AFTER '88:	
Attachment, 52 x 55 mm	**07746—0010400**



INSTALLATION

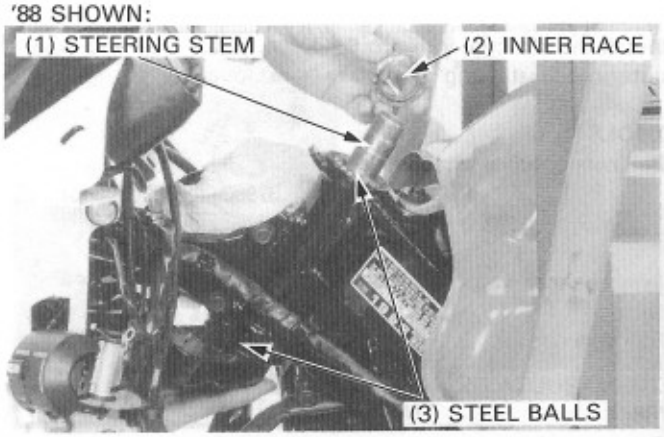


'88:
Apply grease to the steel balls and bearing races.
Install the 18 steel balls onto the upper outer race and 19 steel balls onto the lower outer race.
Insert the steering stem through the steering head.
Install the upper inner race.

AFTER '88:
Apply grease to the bearings and bearing races. Install the lower bearing on the steering stem. Insert the steering stem through the steering head. Install the upper bearing, inner race and dust seal.

'88 and AFTER:
Loosely install the bearing adjustment nut.

'88 SHOWN:

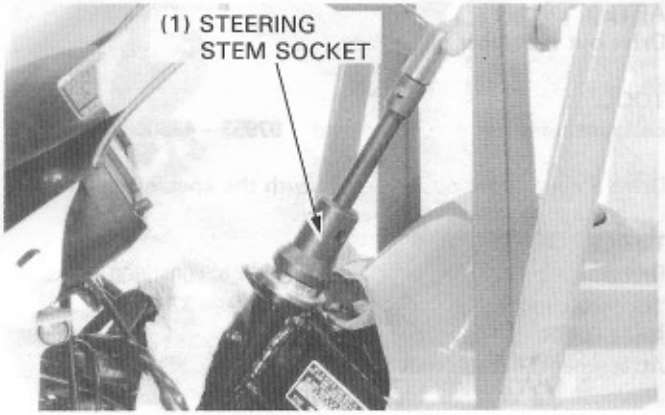


Tighten the bearing adjustment nut to the specified torque.

TORQUE: 22 N·m (2.2 kg-m, 16 ft-lb)

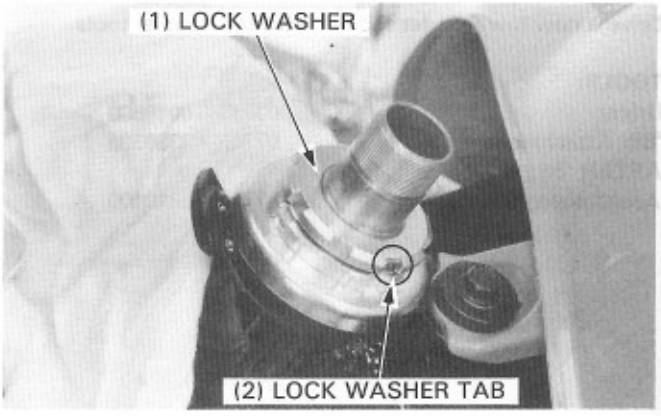
TOOL:
Steering stem socket **07916—3710100**

Turn the steering stem lock-to-lock 4—5 times to seat the bearings, then tighten the nut again to the same torque.

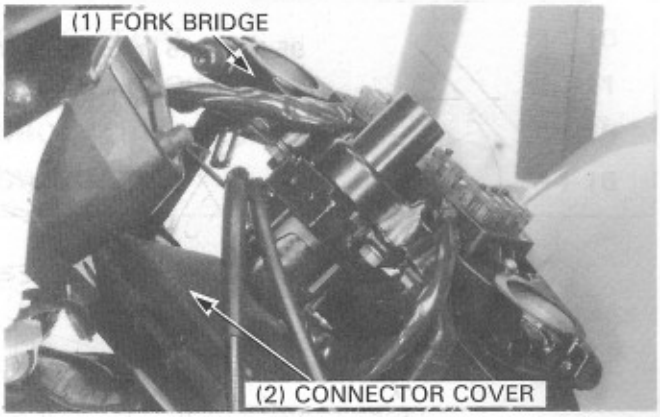


Install the lock washer, aligning the tabs with the grooves in the nut. Bend two opposite tabs down into the grooves.

Finger tighten the lock nut all the way.
Hold the adjustment nut and further tighten the lock nut (within 90 degrees) enough to align its grooves with the lock washer tabs.
Bend the lock washer tabs up into the lock nut grooves.



Install fork bridge and connect the ignition switch connectors, then install the connector cover.

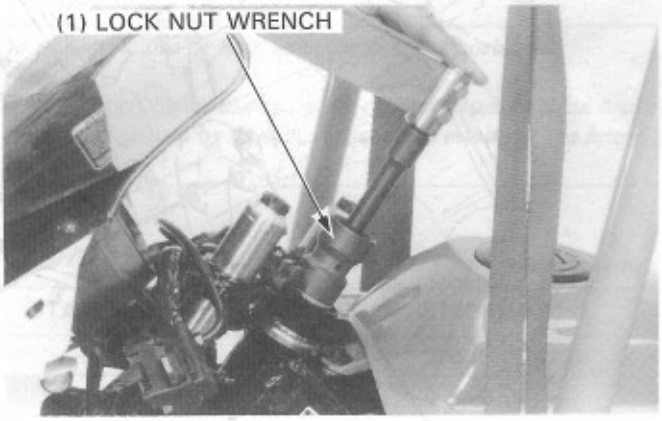


Install the washer and steering stem nut.

Temporarily install the fork legs.
Tighten the steering stem nut.

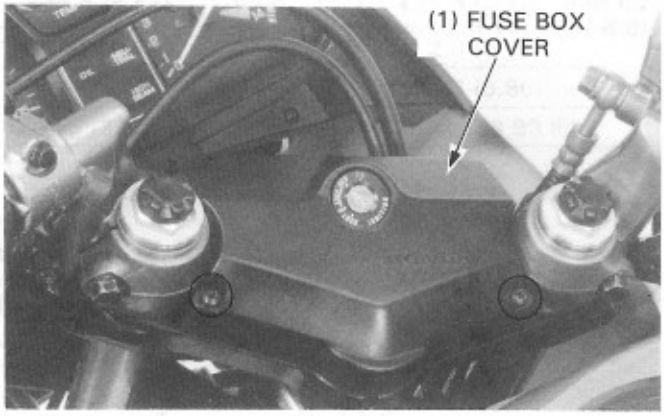
TORQUE: 105 N·m (10.5 kg-m, 76 ft-lb)

TOOL:
Lock nut wrench, 30 x 32 mm **07716—0020400 or equivalent commercially available in U.S.A.**



Install the following:
– fork legs (page 13-18)
– fuse box cover
– handlebar (page 13-4)

Secure the main harness and the brake hose.

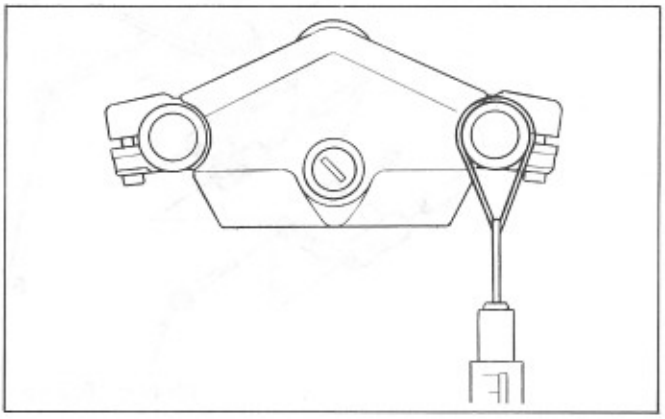


STEERING HEAD BEARING PRELOAD

Raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring balancer to the fork tube and measure the steering head bearing preload.

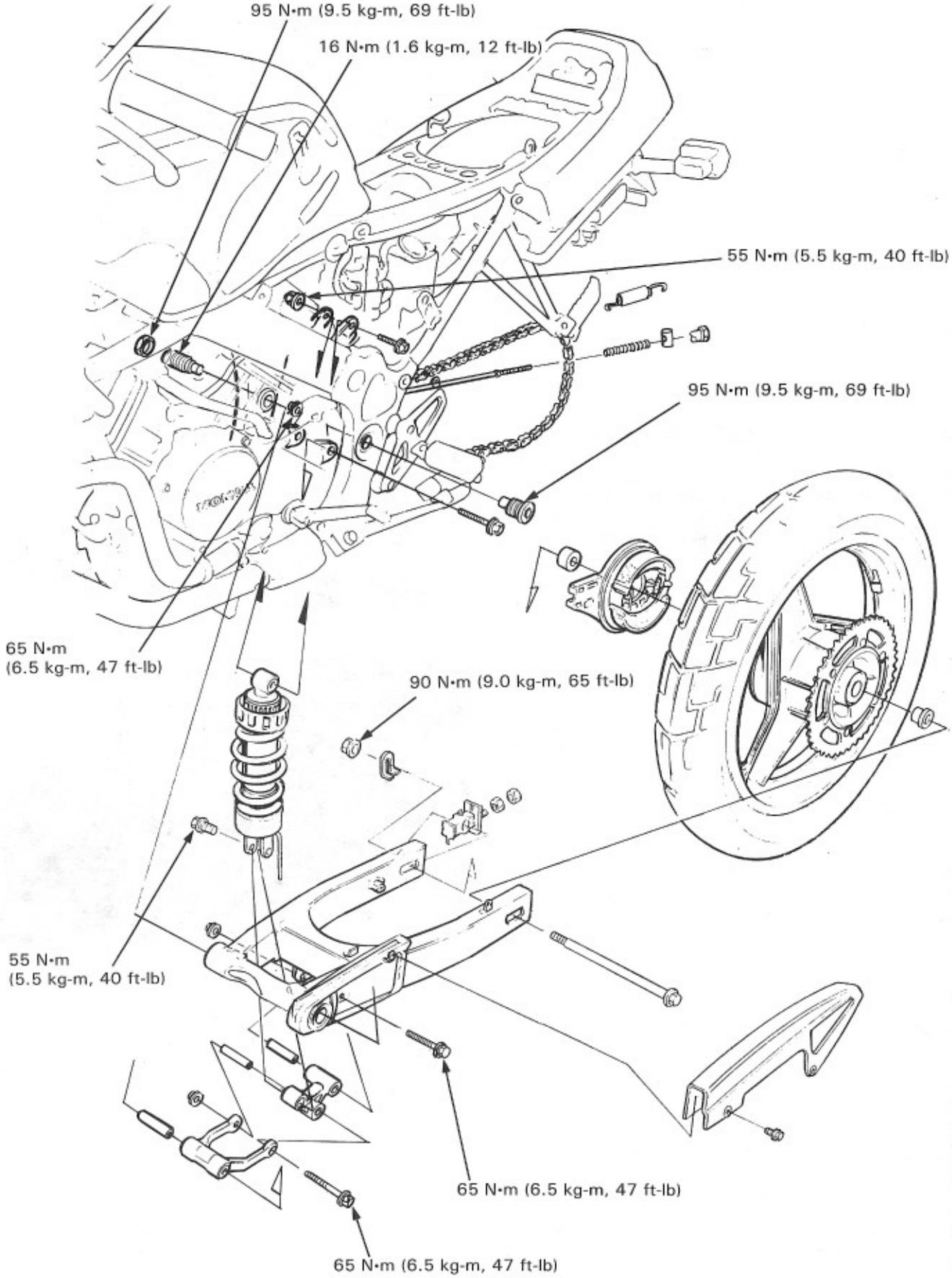
NOTE

- Make sure that there is no cable or wire harness interference.



The preload should be within 1.0—1.5 kg (2.20—3.31 lb) for right and left turns.
If the readings do not fall within the limits, lower the front wheel on the ground and adjust the steering bearing adjustment nut.

After making sure of the bearing preload, install the removed parts in the reverse order of removal.


95 N•m (9.5 kg-m, 69 ft-lb)
16 N•m (1.6 kg-m, 12 ft-lb)
55 N•m (5.5 kg-m, 40 ft-lb)
95 N•m (9.5 kg-m, 69 ft-lb)
65 N•m
(6.5 kg-m, 47 ft-lb)
90 N•m (9.0 kg-m, 65 ft-lb)
55 N•m
(5.5 kg-m, 40 ft-lb)
65 N•m (6.5 kg-m, 47 ft-lb)
65 N•m (6.5 kg-m, 47 ft-lb)

14. REAR WHEEL/BRAKE/SUSPENSION

SERVICE INFORMATION	14-1	BRAKE PEDAL	14-10
TROUBLESHOOTING	14-2	SHOCK ABSORBER	14-11
REAR WHEEL	14-3	SHOCK LINKAGE	14-15
REAR BRAKE	14-8	SWINGARM	14-16

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the TUBELESS TIRE MANUAL.

⚠WARNING

- ***The rear shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.***
- ***For shock absorber disposal procedure see page 14-13***
- ***Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.***

SPECIFICATION

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Axle runout		—	0.2 (0.01)
Brake drum I.D.		140.0 (5.51)	141.0 (5.55)
Brake lining thickness		4.0 (0.16)	2.0 (0.08)
Shock absorber spring free length		—	174.2 (6.86)
Rear suspension damper compression		15.4 kg (33.95 lb)	15.39 kg (33.93 lb)

TORQUE VALUES

Rear axle nut	90 N•m (9.0 kg-m, 65 ft-lb)
Damper rod lock nut	68 N•m (6.8 kg-m, 49 ft-lb) Apply locking agent to the threads
Shock absorber mounting bolt	55 N•m (5.5 kg-m, 40 ft-lb)
Shock link-to-shock arm bolt	65 N•m (6.5 kg-m, 47 ft-lb)
Shock arm-to-swingarm bolt	65 N•m (6.5 kg-m, 47 ft-lb)
Shock link-to-frame bolt	65 N•m (6.5 kg-m, 47 ft-lb)
Swingarm right pivot bolt	16 N•m (1.6 kg-m, 12 ft-lb)
Swingarm right pivot lock nut	95 N•m (9.5 kg-m, 69 ft-lb)
Swingarm left pivot bolt	95 N•m (9.5 kg-m, 69 ft-lb)
Driven sprocket nut	31 N•m (3.1 kg-m, 22 ft-lb) Apply oil to the seat

TOOLS

Special	
Shock absorber compressor attachment	07959—MB10000
Remover handle	07936—3710100
Remover weight	07741—0010201 or 07936—3710200
Bearing remover	07936—8890300
Attachment	07946—GC4000A (U.S.A. only)
Common	
Bearing remover head, 17 mm	07746—0050500 ┐ or equivalent commercially available in U.S.A.
Bearing remover shaft	07746—0050100 ┘
Shock absorber compressor	07GME—0010000
—compressor screw assembly	07GME—0010100
Driver	07749—0010000
Attachment, 24 x 26 mm	07746—0010700
Attachment, 37 x 40 mm	07746—0010200
Attachment, 32 x 35 mm	07746—0010100
Attachment, 42 x 47 mm	07746—0010300
Pilot, 10 mm	07746—0040100
Pilot, 15 mm	07746—0040300
Pilot, 20 mm	07746—0040500
Pilot, 17 mm	07746—0040400

TROUBLESHOOTING

Wobble or vibration in motorcycle
- Bent rim
- Loose wheel bearing(s)
- Damaged tire
- Axle not tightened properly
- Swingarm pivot bearing worn
- Chain adjusters not adjusted equally
- Bent frame or swingarm

Soft suspension
- Weak spring
- Improper shock absorber spring preload

Hard suspension
- Improper shock absorber spring preload
- Bent shock absorber rod
- Swingarm pivot bearings damaged
- Bent frame or swingarm
- Damaged shock linkage pivot bearings

Suspension noise
- Faulty rear damper
- Loose fasteners
- Shock linkage pivots worn or need lubrication
- Swingarm pivots worn or need lubrication

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

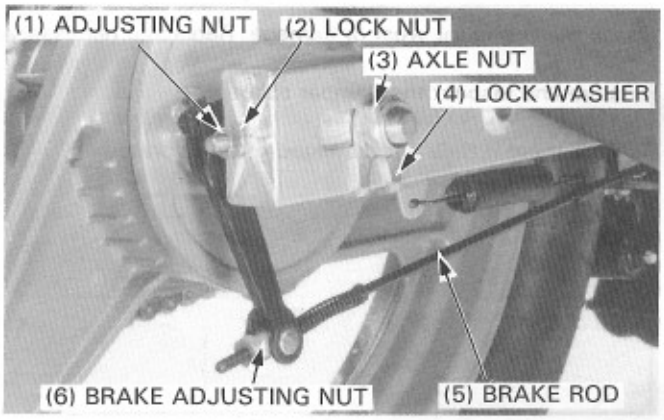
REAR WHEEL

REMOVAL

Raise the rear wheel off the ground.
Loosen the drive chain adjusting nuts and lock nuts all the way.

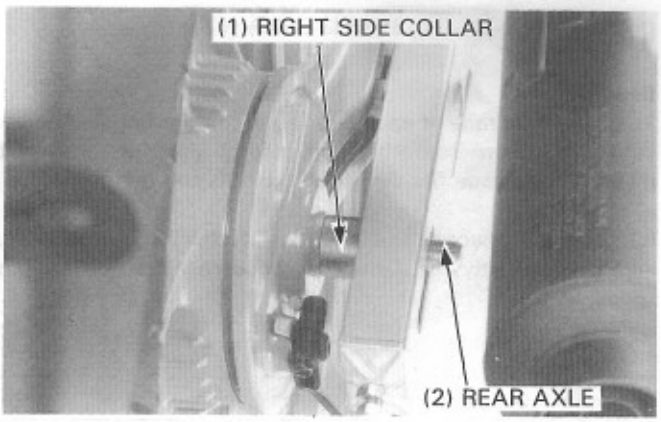
Remove the rear brake adjusting nut and disconnect the brake rod from the brake arm.

Remove the axle nut and lock washer.



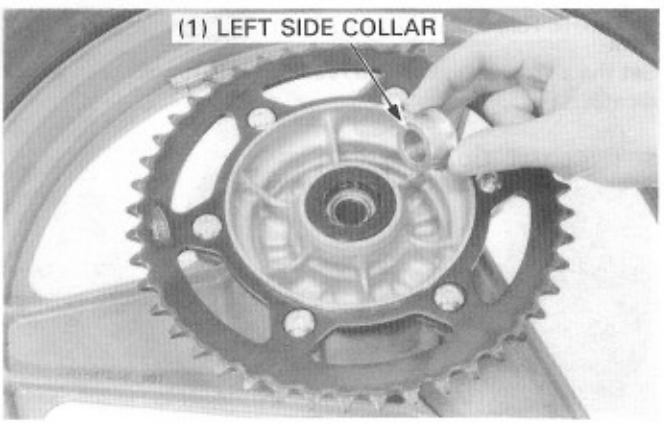
Push the wheel forward and remove the drive chain from the driven sprocket.

Remove the rear axle and right side collar, then remove the rear wheel and brake panel.



DISASSEMBLY

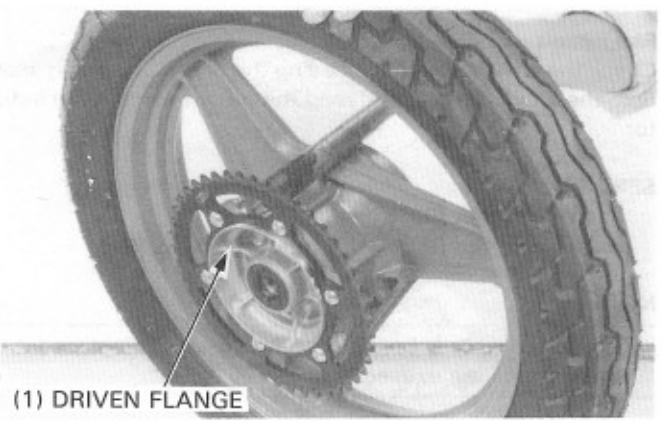
Remove the left side collar.



Remove the final driven sprocket and flange together.

NOTE

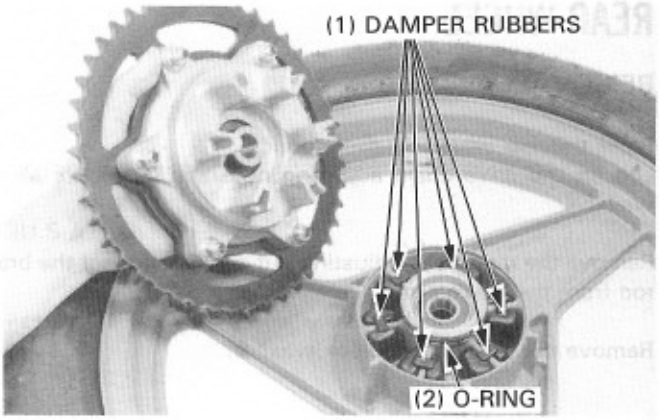
- Do not separate the driven sprocket and flange unless either part needs replacing.



Check the O-ring for wear or damage. Replace if necessary.

Remove and inspect the damper rubbers.

Replace them if they are damaged or deteriorated.



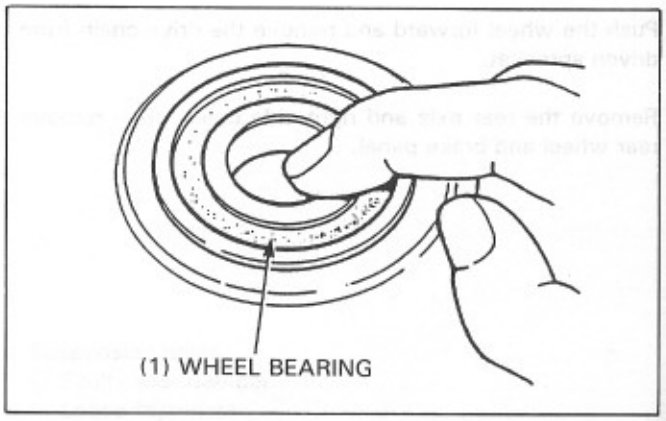
INSPECTION

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 and driven flange.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub or flange (page 14-5).

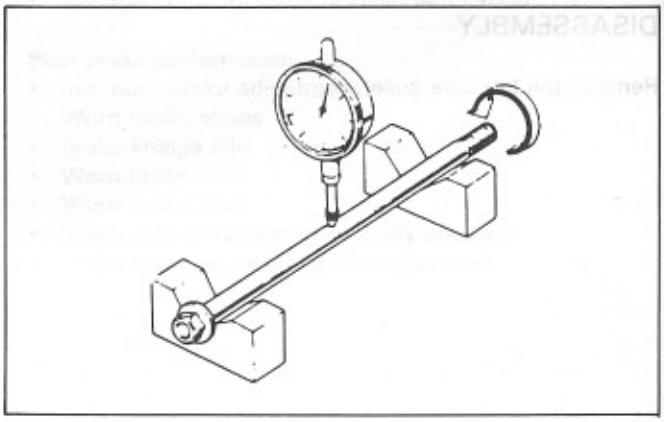
NOTE

- Replace hub bearings as a set.



Axle
Set the axle in V blocks and read the axle runout with a dial indicator.

SERVICE LIMIT: 0.2 mm (0.01 in)

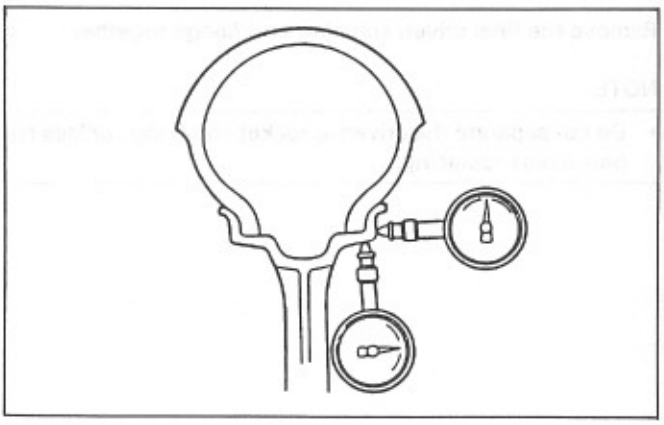


Rim runout
Check the rim for runout by placing the wheel in a truing stand. Spin the wheel slowly, and read the runout using a dial indicator.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

NOTE

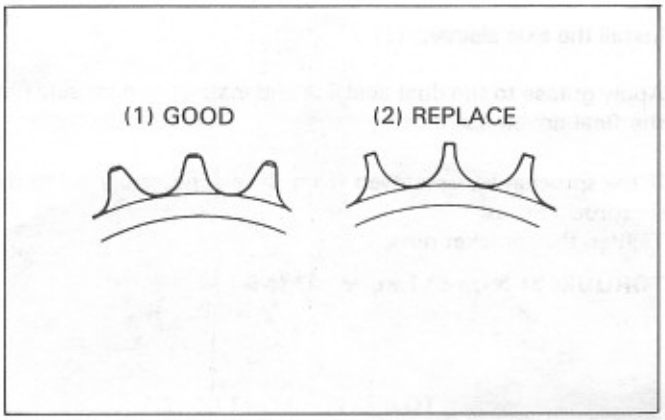
- The wheel cannot be serviced and must be replaced if the above limits are exceeded.



Driven sprocket
Check the condition of the driven sprocket teeth. Replace the sprocket if worn or distorted.

NOTE

- If the driven sprocket requires replacement, inspect the drive chain and drive sprocket.



BEARING REPLACEMENT

Driven flange bearing
Remove the dust seal and axle sleeve.

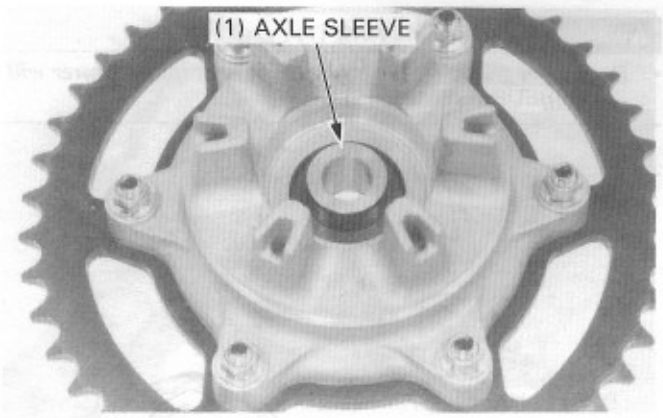
TOOLS:

Driver	**07749–0010000**
Pilot, 20 mm	**07746–0040500**

Drive out the bearing.

TOOLS:

Driver	**07749–0010000**
Attachment, 32 x 35 mm	**07746–0010100**

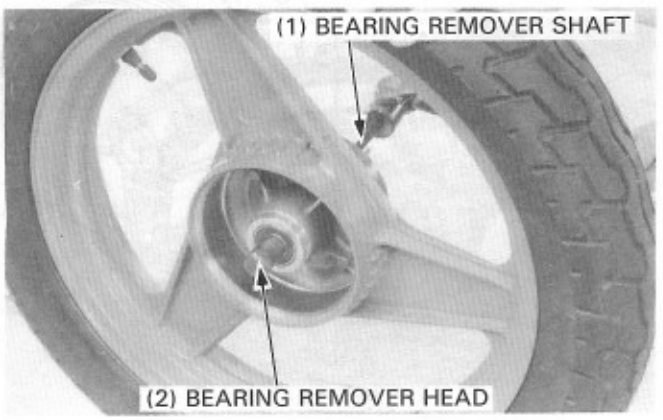


Wheel bearing
Remove the wheel bearings and distance collar from the wheel hub.

TOOLS:

Bearing remover head, 17 mm	**07746–0050500**
Bearing remover shaft	**07746–0050100**

or equivalent commercially available in U.S.A.



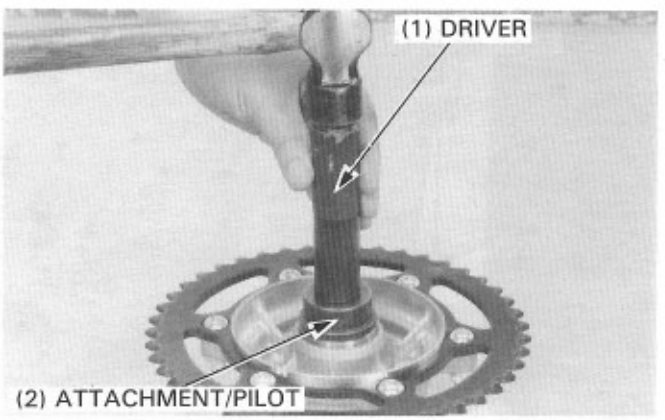
NOTE

- Never install old bearings; once the bearings have been removed, they must be replaced with new ones.

Drive a new bearing into the final driven sprocket.

TOOLS:

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

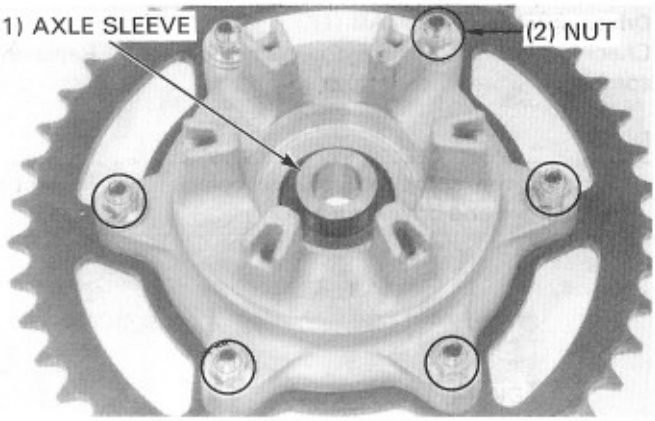


Install the axle sleeve.

Apply grease to the dust seal lips and install the dust seal onto the final driven sprocket.

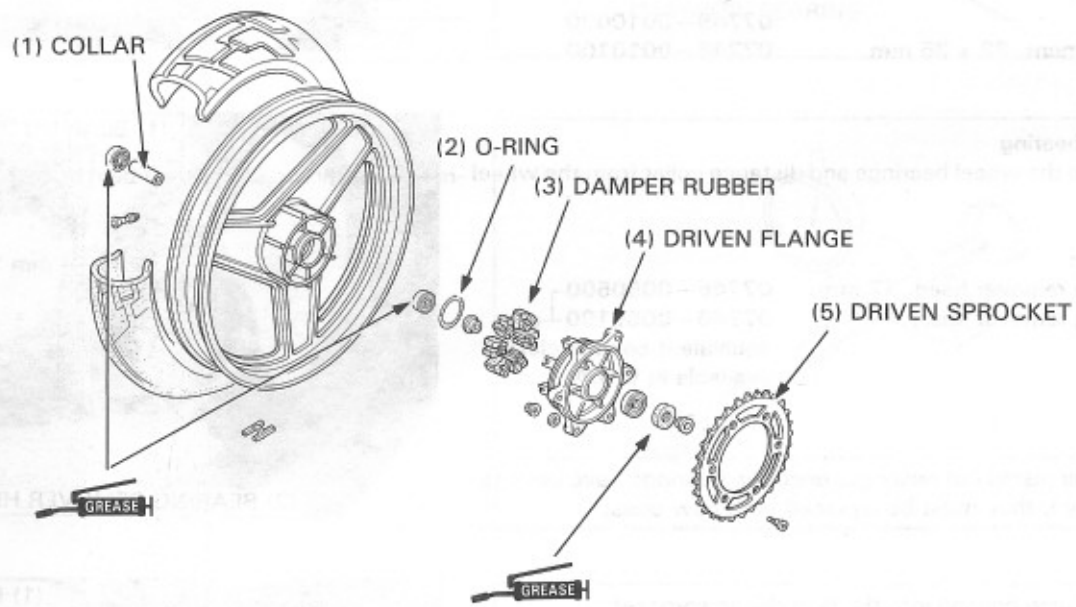
If the sprocket was removed from the flange, apply oil to the six sprocket nuts.
Tighten the sprocket nuts.

TORQUE: 31 N•m (3.1 kg-m, 22 ft-lb)



⚠WARNING

- ***Do not get grease on the brake drum or stopping power will be reduced.***

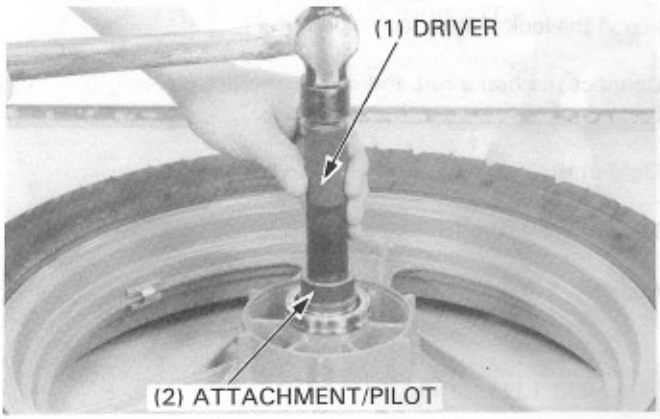


Pack all bearing cavities with grease.

Drive the left bearing in first, then install the distance collar and right bearing.

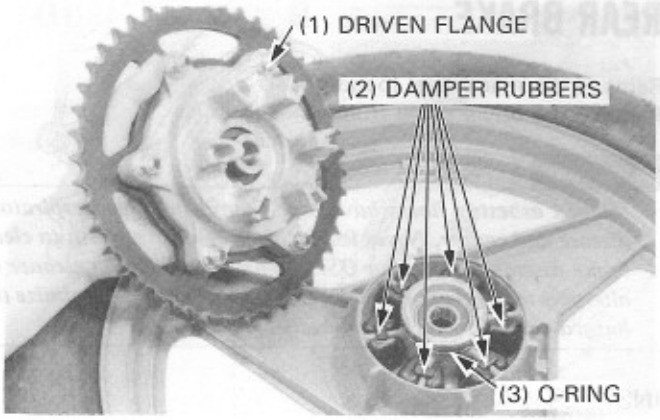
TOOLS:

Driver	07749—0010000
Attachment, 37 x 40 mm	07746—0010200
Pilot, 17 mm	07746—0040400

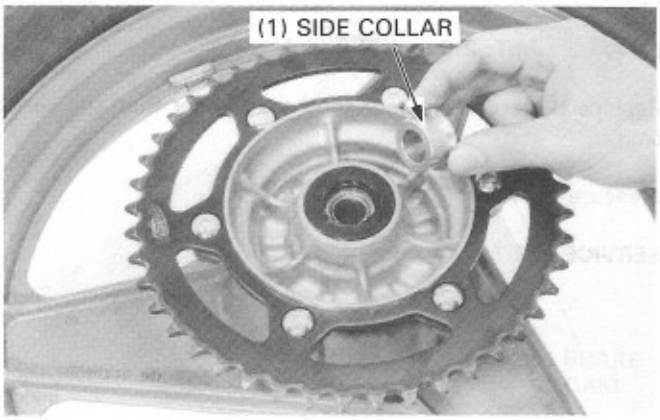


ASSEMBLY

Install the damper rubbers and O-ring in the hub.
Apply grease to the O-ring, then install the flange.



Install the left side collar.

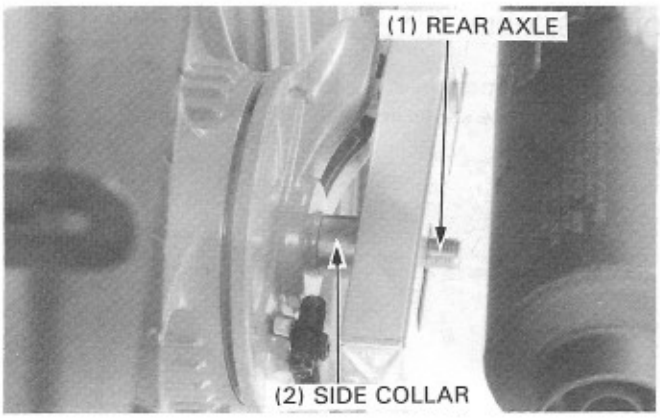


INSTALLATION

Install the brake panel onto the rear wheel.
Install the rear wheel by aligning the boss on the swingarm with the groove in the brake panel.

Install the right side collar.

Install the drive chain and rear axle.



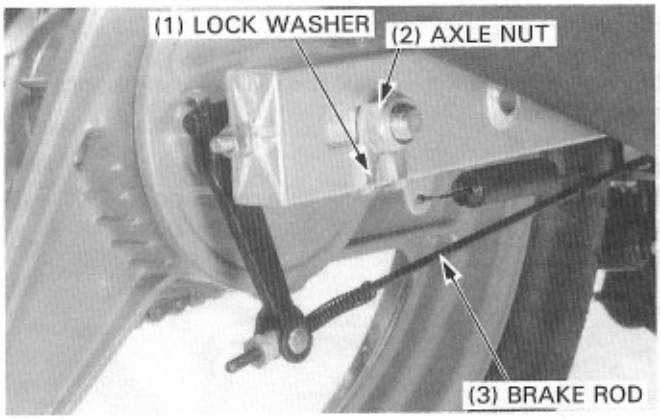
Install the lock washer and axle nut.

Connect the brake rod and adjust the drive chain slack (page 3-12).

Tighten the rear axle nut.

TORQUE: 90 N·m (9.0 kg-m, 65 ft-lb)

Adjust the brake pedal free play (page 3-15).

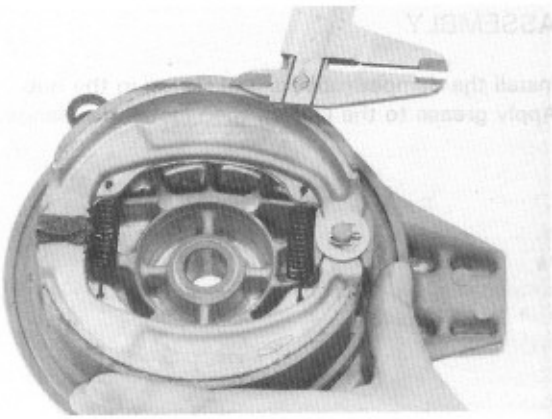


REAR BRAKE

Remove the rear wheel (page 14-3).
Remove the brake panel from wheel hub.

⚠WARNING

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



INSPECTION

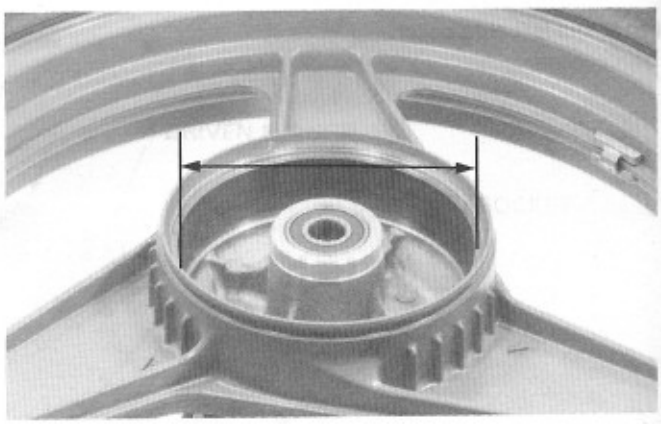
Measure the rear brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

Replace the brake shoes if they are thinner than the service limit.

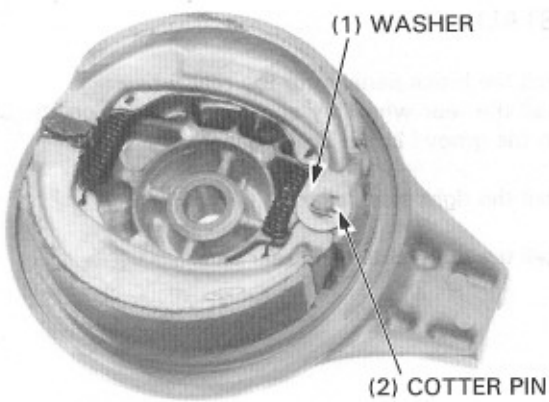
Measure the rear brake drum I.D.

SERVICE LIMIT: 141.0 mm (15.55 in)



DISASSEMBLY

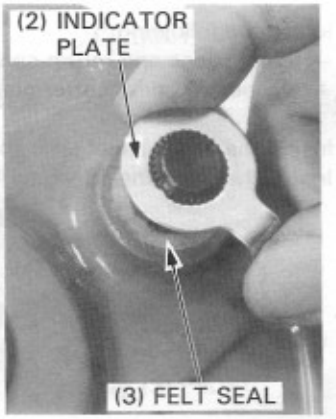
Remove the cotter pin and washer.
Spread the brake shoes apart and lift them off the anchor pivot and brake cam.



Remove the brake arm bolt and brake arm.

Remove the indicator plate, felt seal and brake cam.

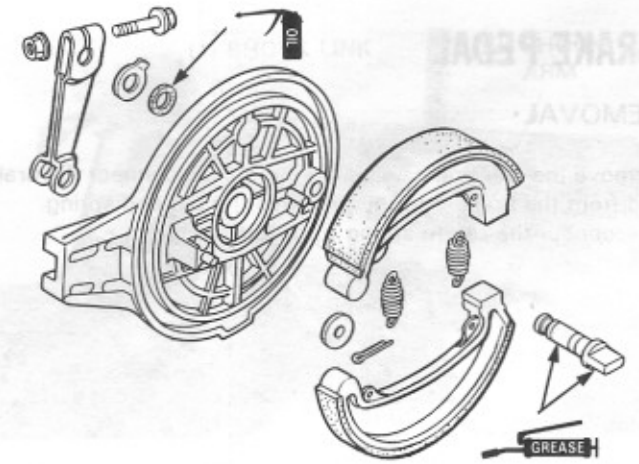




ASSEMBLY

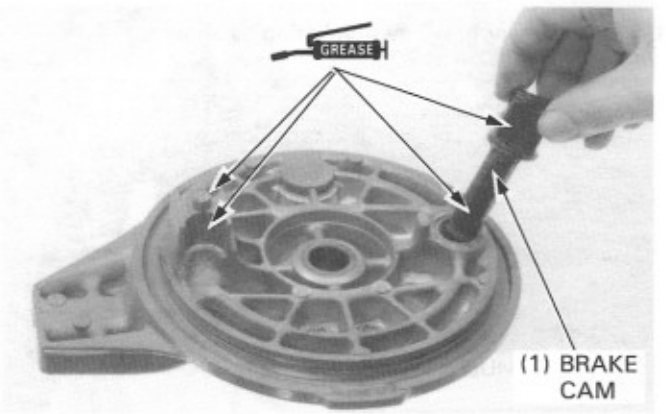
⚠WARNING

- ***Contaminated brake linings reduce stopping power. Keep grease off the brake linings. Wipe any excess grease off the cam.***



Apply grease to the brake shoe contacting surface of the brake cam and anchor pin.

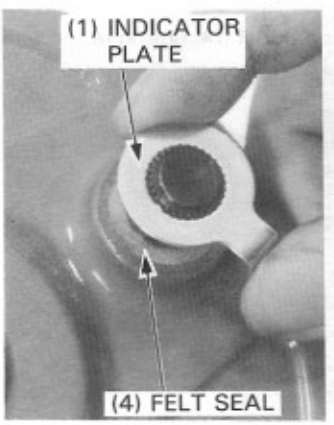
Install the brake cam.

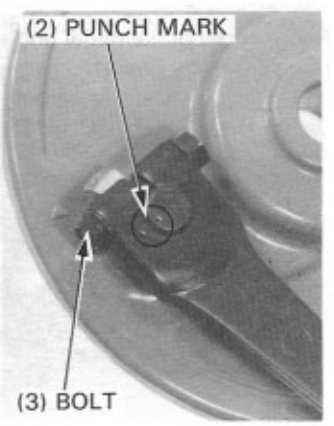


Soak the felt seal with clean engine oil and install it onto the brake panel.
Install the indicator plate by aligning the cutouts of the plate and brake cam.

Install the brake arm by aligning the punch marks on the brake cam and arm.

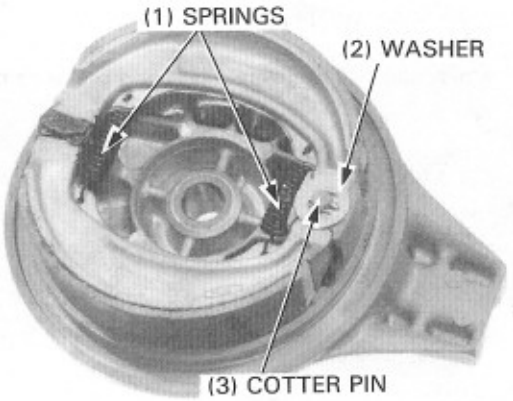
Tighten the brake arm bolt.





Install the following:
— brake shoes and return springs.
— washer and new cotter pin.

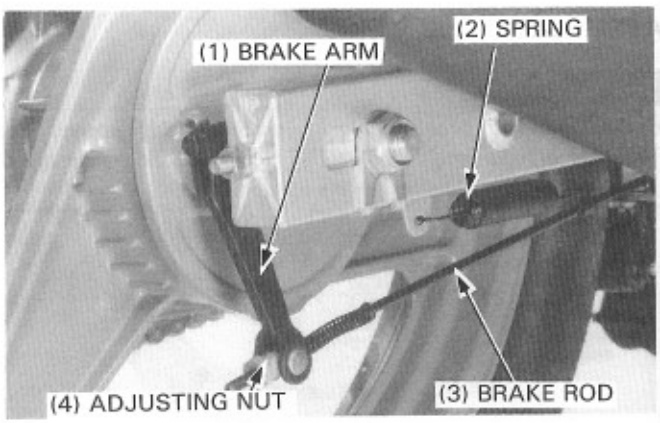
Install the brake panel onto the hub.
Install the rear wheel (page 14-7).



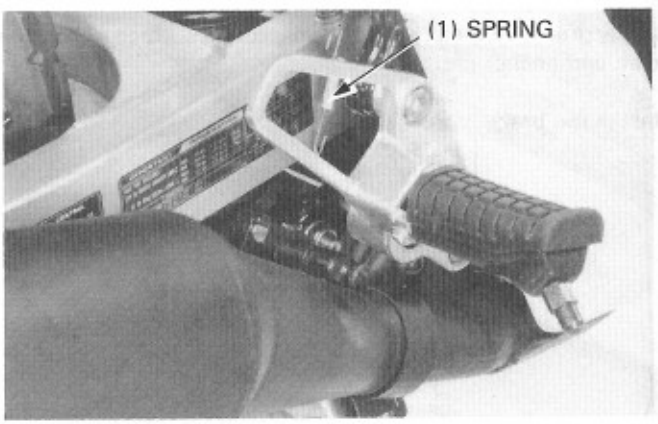
BRAKE PEDAL

REMOVAL

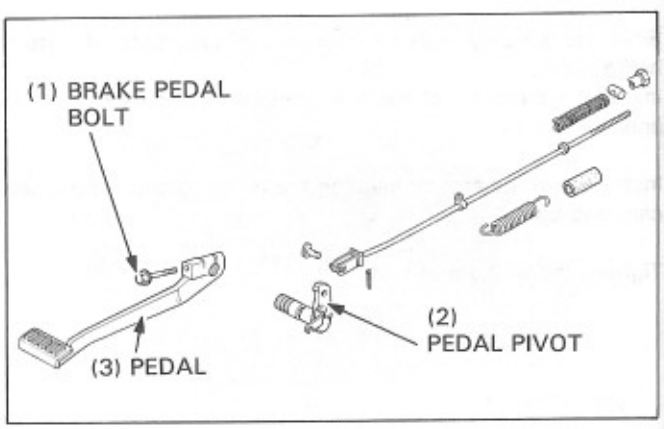
Remove the rear brake adjusting nut and disconnect the brake rod from the brake arm then remove the pin and spring. Disconnect the return spring from the swingarm.



Unhook the rear brake switch spring as shown.



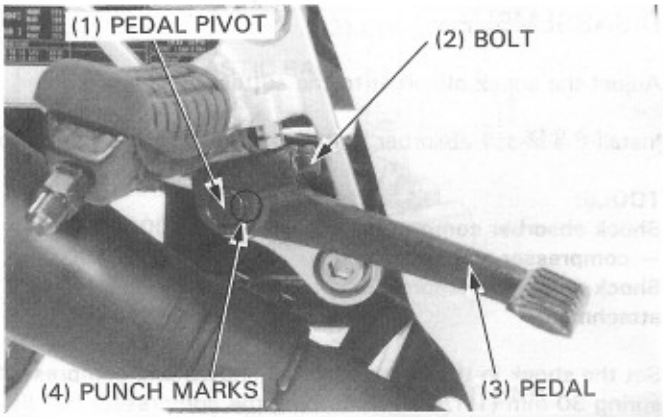
Remove the brake pedal bolt and pedal then remove the pedal pivot from the braket.



Apply a grease to the brake pedal pivot and reinstall the brake rod and brake pedal in the reverse order of removal.

NOTE

- Align the brake pedal punch mark with the brake pivot punch mark.



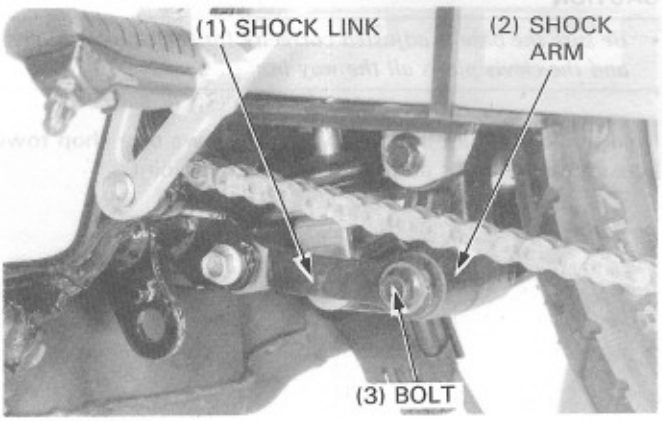
SHOCK ABSORBER

REMOVAL

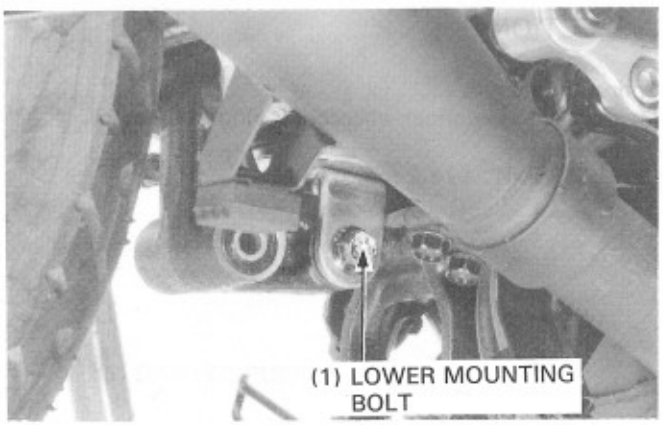
Raise the rear wheel off the ground.

Remove the seat and side covers.

Remove the shock arm-to-shock link bolt and nut.



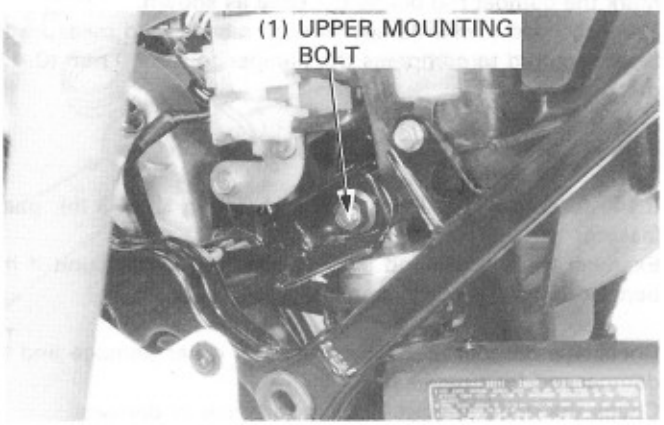
Remove the shock absorber lower mounting bolt.



Remove the upper mounting bolt and nut, then remove the shock absorber.

⚠WARNING

- ***The rear shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.***



DISASSEMBLY

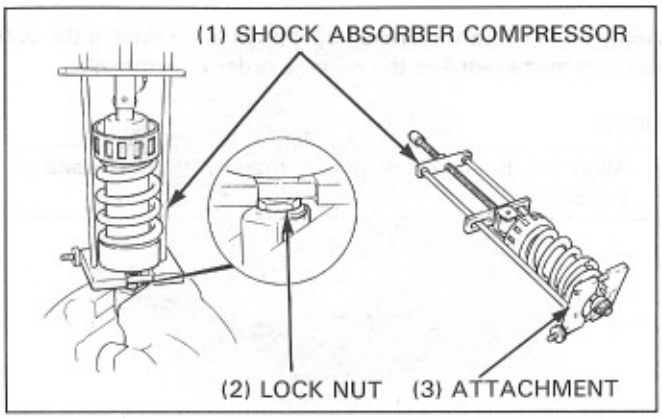
Adjust the shock absorber to the softest position.

Install the shock absorber in the shock absorber compressor.

TOOLS:

Shock absorber compressor	**07GME–0010000**
— compressor screw assembly	**07GME–0010100**
Shock absorber compressor attachment	**07959–MB10000**

Set the shock in the compressor as shown and compress the spring 30 mm (1-1/4 in) by turning the compressor handle.



CAUTION

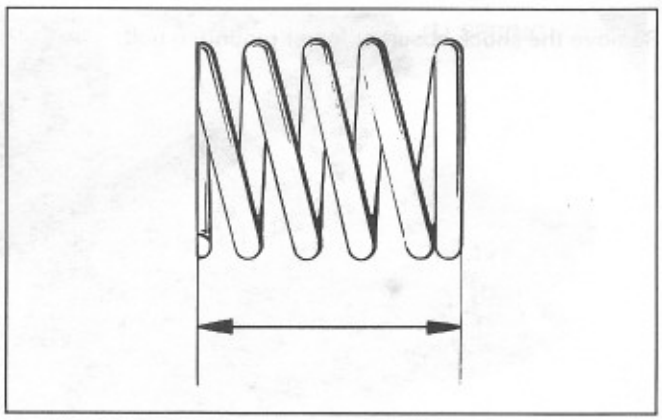
- *Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.*

Hold the lower joint in a vise with soft jaws or a shop towel.
Loosen the lock nut and remove the lower joint.

INSPECTION

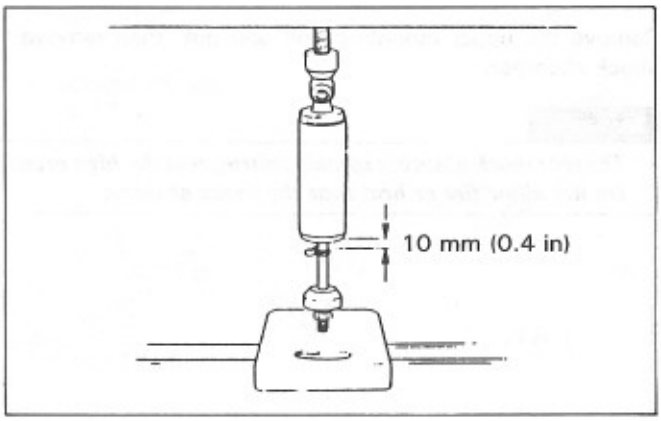
Spring free length
Measure the rear shock absorber spring free length.

SERVICE LIMIT: 174.2 mm (6.86 in)



Mark the damper rod below the case as shown.
Place the end of the damper rod on a scale and measure the force required to compress the damper to the 10 mm (0.4 in) mark.

COMPRESSION FORCE: 15.4 kg (33.95 lb)



If the force required is less than 15.39 kg (33.93 lb), gas is leaking.
Examine the damper rod and replace the damper unit if it is bent or scored.

Check the damper unit for oil leaks or other damage and the damper rod for trueness.
Check the upper mount bushing for wear or damage.

SHOCK ABSORBER DISPOSAL PROCEDURE

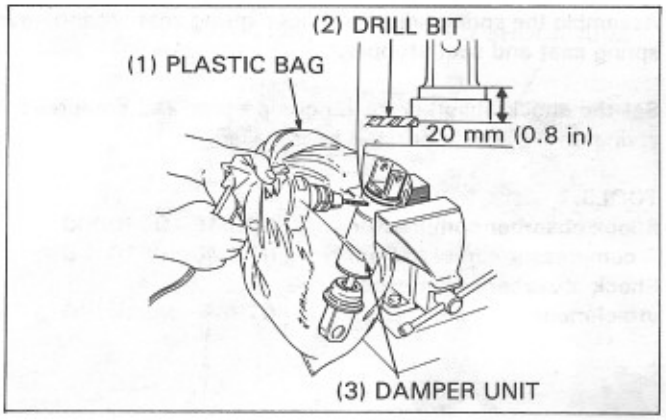
Center punch the damper case to mark the drilling point, approximately 20 mm (0.8 in) from the top surface.
Wrap the damper unit inside a plastic bag and support the damper unit upright in a vise as shown.

Through the open end of the bag, insert a drill motor with a sharp 2 or 3 mm (5/64—1/8 in) drill bit.

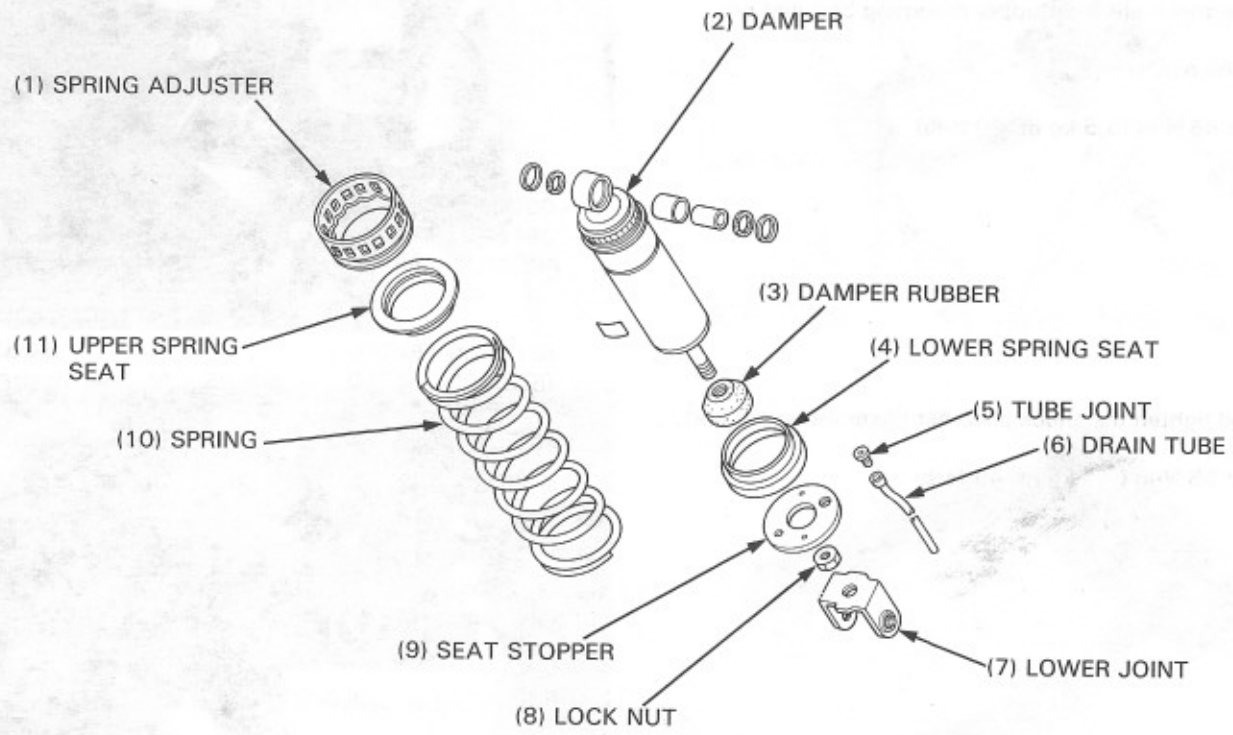
⚠WARNING

- ***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

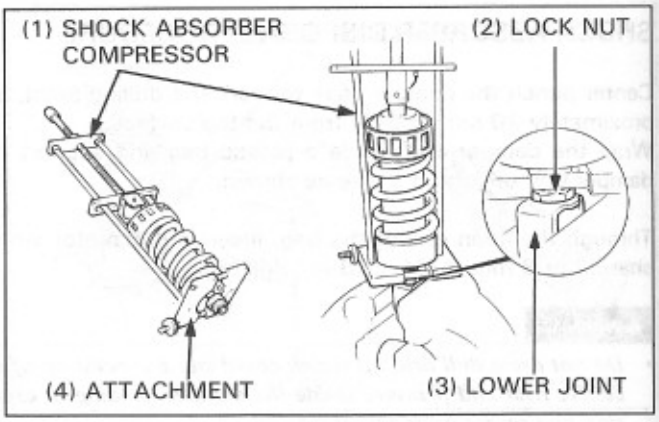


Assemble the spring adjuster, upper spring seat, spring, lower spring seat and seat stopper.

Set the shock absorber in the compressor and compress the spring until the lock nut can be installed.

TOOLS:

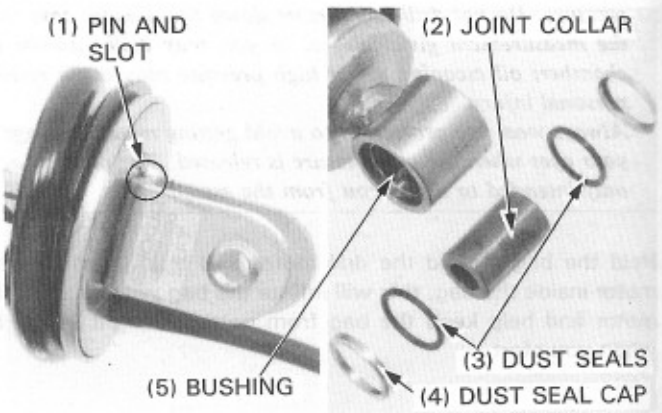
Shock absorber compressor	**07GME–0010000**
–compressor screw assembly	**07GME–0010100**
Shock absorber compressor attachment	**07959–MB10000**



Apply a locking agent to the lock nut threads and install the nut on the damper rod.
Install the lower joint onto the damper rod fully and hold it, then tighten the lock nut.

TORQUE: 68 N·m (6.8 kg-m, 49 ft-lb)

Align the pin in the seat stopper with the slot in the lower joint.
Install the drain tube securely.
Apply a paste grease with 40% or more molybdenum disulfide (page 2-10) to the upper joint bushing and joint collar.
Install the dust seals and dust seal caps.

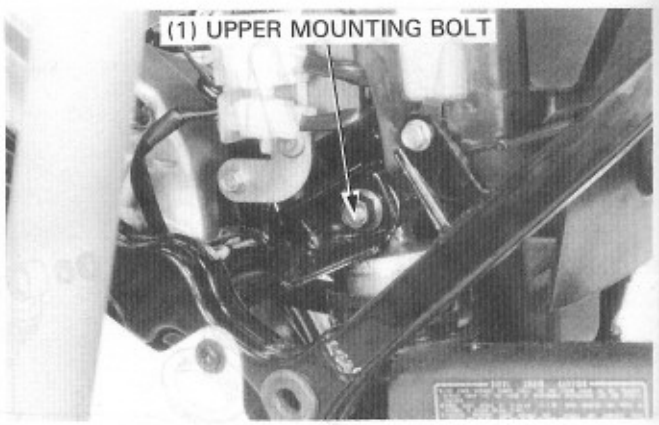


INSTALLATION

Install the shock absorber upper mounting bolt and nut.

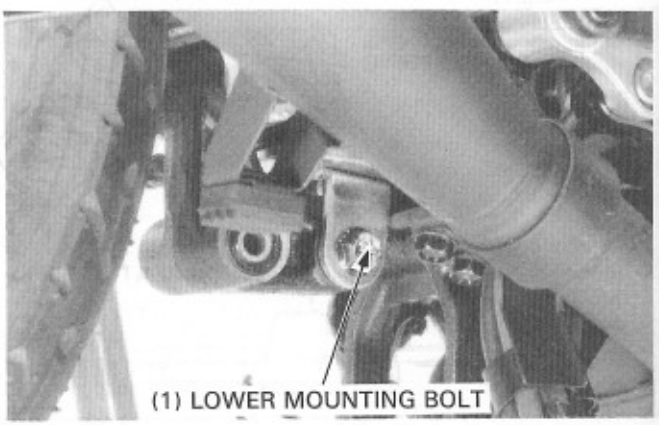
Tighten the nut.

TORQUE: 55 N·m (5.5 kg-m, 40 ft-lb)



Install and tighten the shock absorber lower mounting bolt.

TORQUE: 55 N·m (5.5 kg-m, 40 ft-lb)

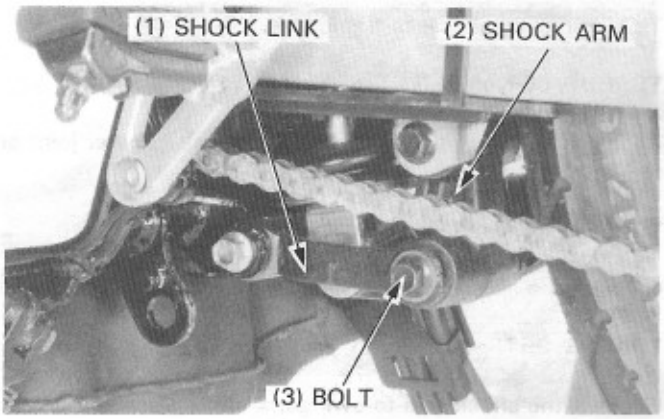


Install the shock link-to-shock arm bolt and nut.

Tighten the bolt.

TORQUE: 65 N·m (6.5 kg-m, 47 ft-lb)

Install the side covers and seat.
Adjust the shock absorber spring preload.

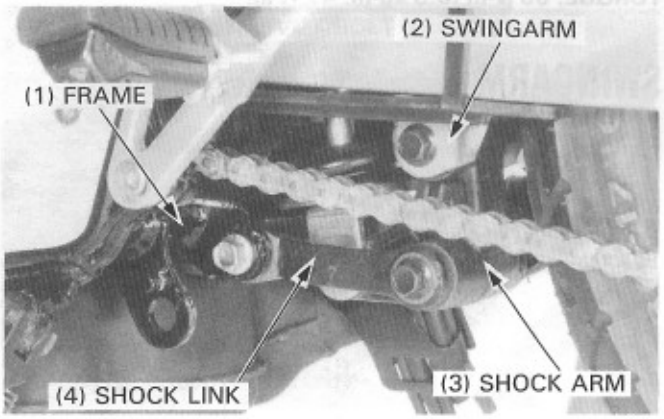


SHOCK LINKAGE

REMOVAL

Support the motorcycle in an upright position and raise the rear wheel off the ground.

Remove the following:
- shock link-to-shock arm bolt and nut
- shock absorber lower mounting bolt
- shock arm-to-swingarm bolt and nut
- shock link-to-frame bolt and nut



INSPECTION

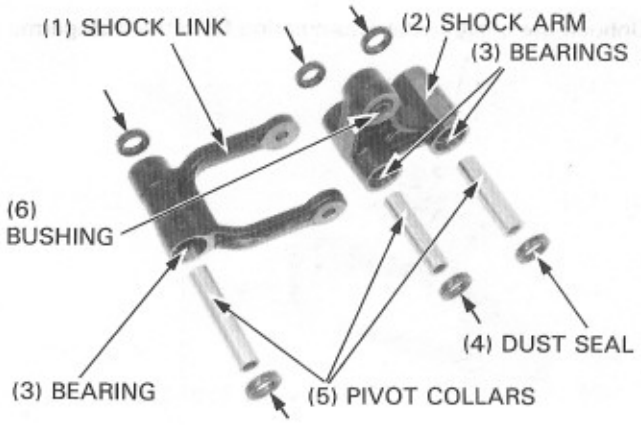
Check the shock arm, shock link dust seals, pivot bearings and pivot collars for wear or damage.
Replace the shock arm and/or link if the body or pivot bearings show damage.

BUSHING REPLACEMENT

Replace the bushing if damaged.

TOOLS:

For removal:	
Driver	**07749–0010000**
Pilot, 20 mm	**07746–0040400**
Attachment	**07946–GC4000A (U.S.A. only)**
For installation:	
Driver	**07749–0010000**
Attachment, 24 x 26 mm	**07746–0010700**
Pilot, 10 mm	**07746–0040100**
Attachment	**07946–GC4000A (U.S.A. only)**



INSTALLATION

Apply a paste grease with 40% or more molybdenum disulfide (page 2-10) to the dust seal lips and between the rollers of the pivot bearings.

Install the dust seals and pivot collars to the shock arm and link.
Install the shock link onto the frame with the "UP" mark facing up.



Tighten the shock link-to-frame bolt.

TORQUE: 65 N·m (6.5 kg-m, 47 ft-lb)

Align the shock arm with the shock absorber lower joint and tighten the lower mounting bolt.

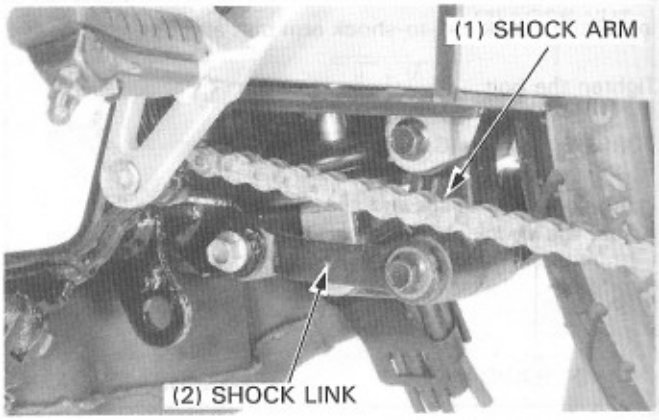
TORQUE: 55 N·m (5.5 kg-m, 40 ft-lb)

Connect the shock link-to-shock arm and tighten the bolt.

TORQUE: 65 N·m (6.5 kg-m, 47 ft-lb)

Connect the shock arm-to-swingarm and tighten the bolt.

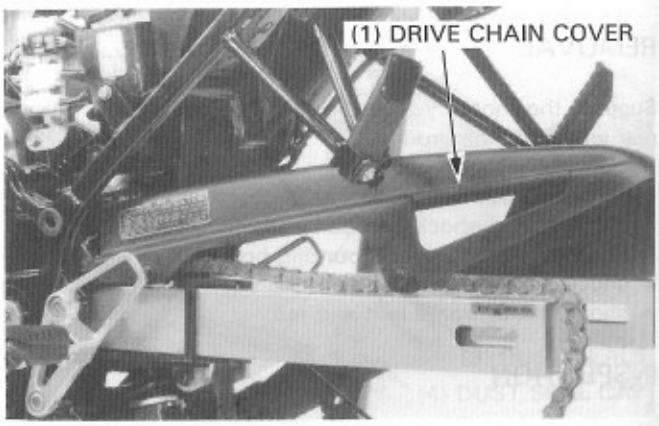
TORQUE: 65 N·m (6.5 kg-m, 47 ft-lb)



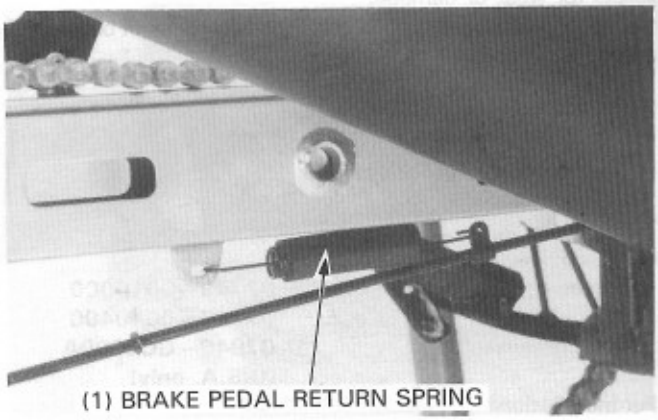
SWINGARM

REMOVAL

Remove the following:
— rear wheel (page 13-3)
— drive chain cover



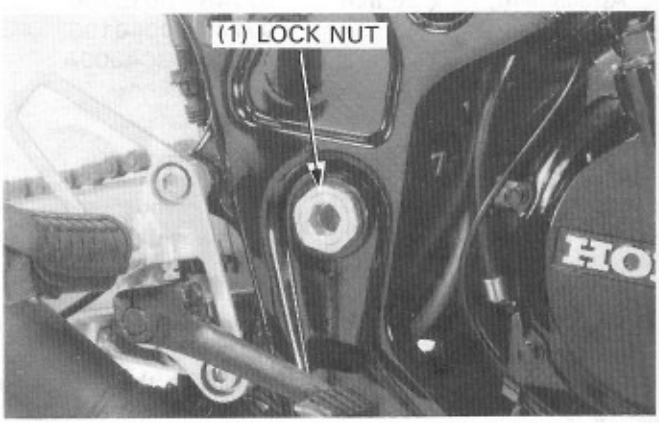
Unhook the brake pedal return spring from the swingarm.



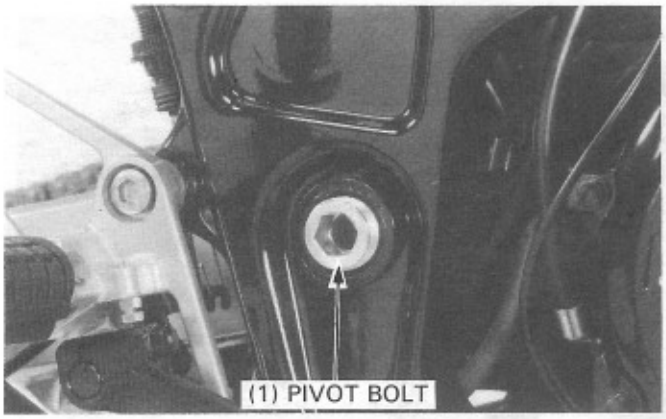
Remove the shock link-to-shock arm bolt (page 14-15).

Remove the rear shock absorber lower mounting bolt and nut (page 14-15).

Remove the right swingarm pivot lock nut.

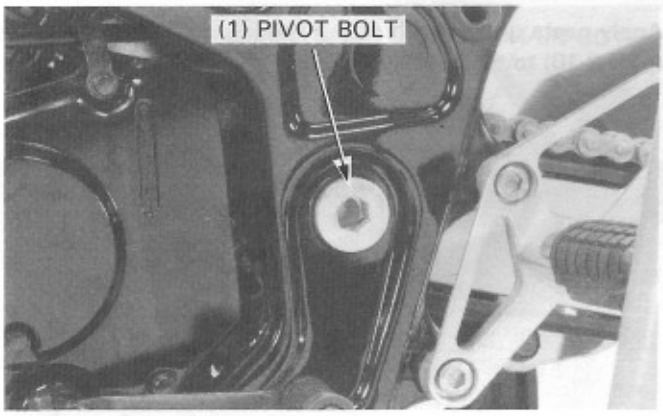


Remove the right swingarm pivot bolt.



Remove the left swingarm pivot bolt.

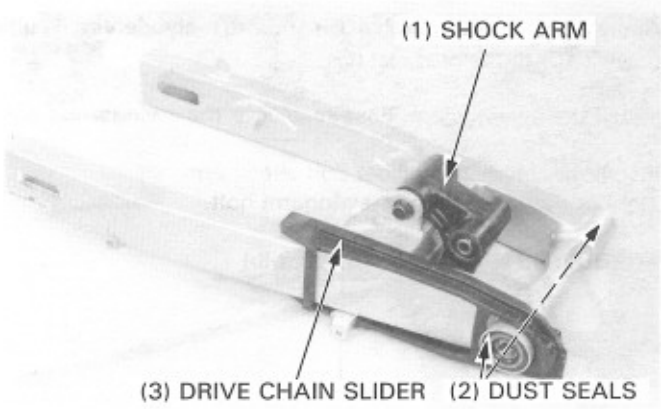
Remove the swingarm from the frame.



DISASSEMBLY

Remove the drive chain slider and the shock arm.

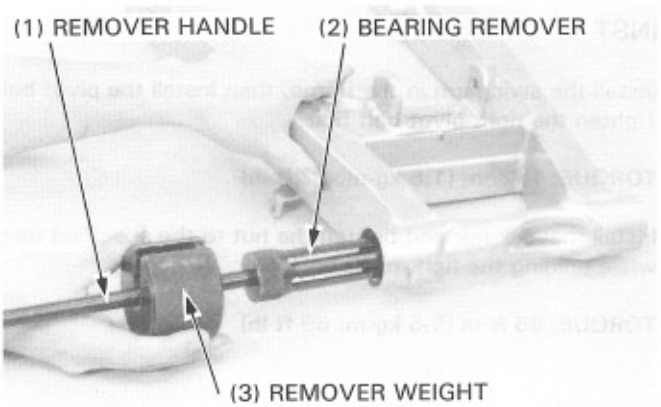
Remove the dust seals and bearings.



Remove the outer races with the bearing remover.

TOOLS:

Bearing remover	**07936—8890300**
Remover handle	**07936—3710100**
Remover weight	**07741—0010201 or 07936—3710200**

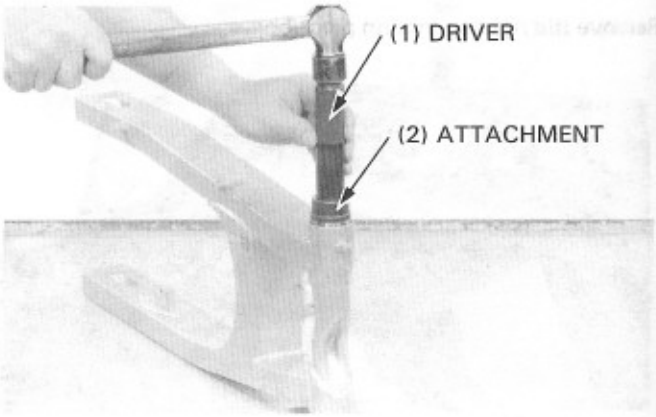


ASSEMBLY

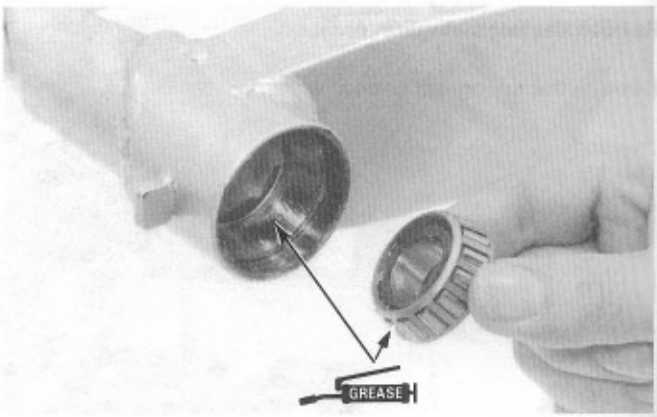
Drive new right and left outer races into the swingarm.

TOOLS:

Driver	**07749—0010000**
Attachment, 37 x 40 mm	**07746—0010200**



Apply paste grease with 40% or more molybdenum disulfide (page 2-10) to the bearings and outer races.

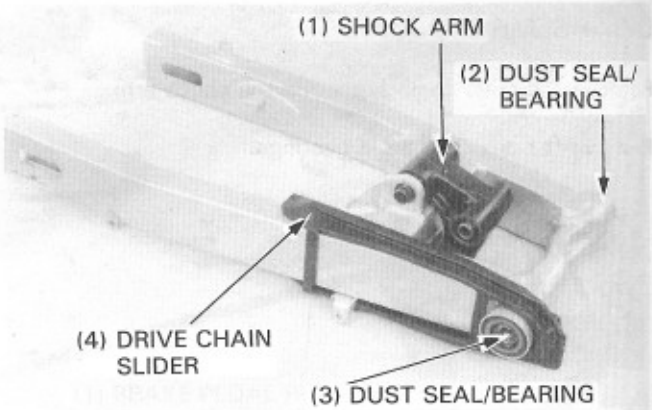


Apply a paste grease with 40% or more molybdenum disulfide (page 2-10) to the dust seal lips.

Install the bearings and dust seals into the swingarm.

Install the drive chain slider and shock arm.
Tighten the shock arm-to-swingarm bolt.

TORQUE: 65 N·m (6.5 kg-m, 47 ft-lb)



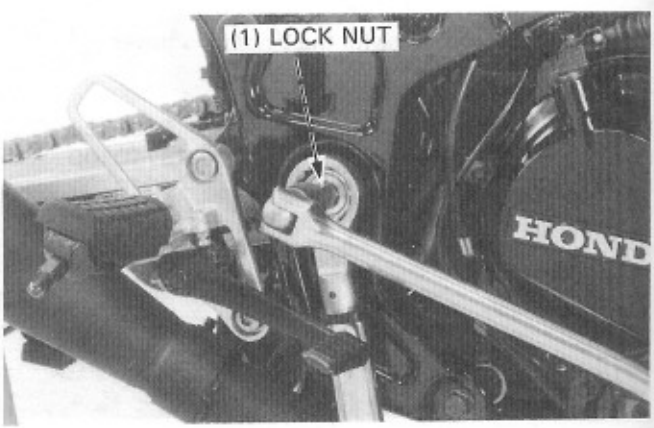
INSTALLATION

Install the swingarm in the frame, then install the pivot bolts. Tighten the right pivot bolt first.

TORQUE: 16 N·m (1.6 kg-m, 12 ft-lb)

Install the lock nut and tighten the nut to the specified torque while holding the right pivot bolt.

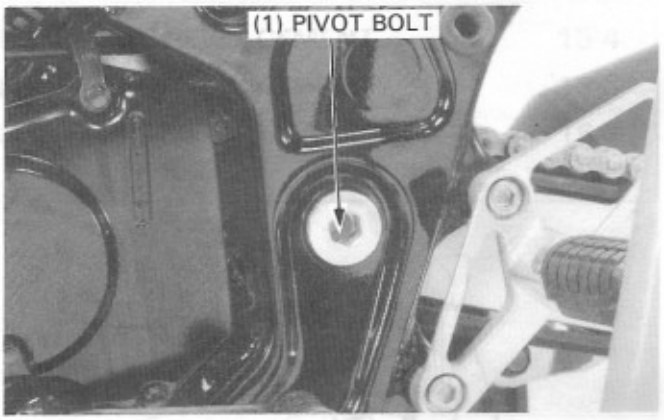
TORQUE: 95 N·m (9.5 kg-m, 69 ft-lb)



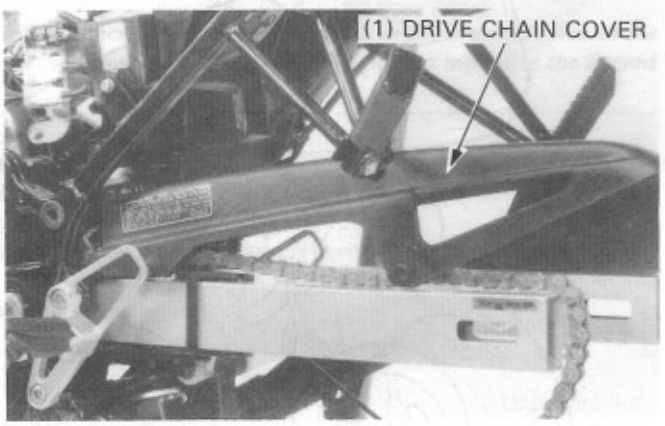
Tighten the left pivot bolt to the specified torque.

TORQUE: 95 N·m (9.5 kg-m, 69 ft-lb)

Install the rear shock absorber lower mounting bolt (page 14-14).
Install the shock link-to-shock arm bolt (page 14-16).

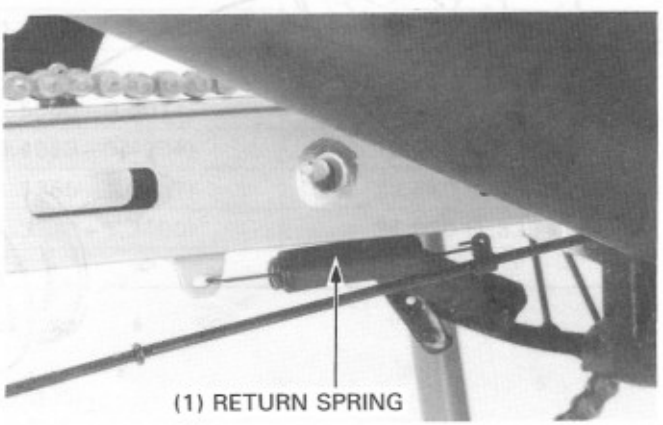


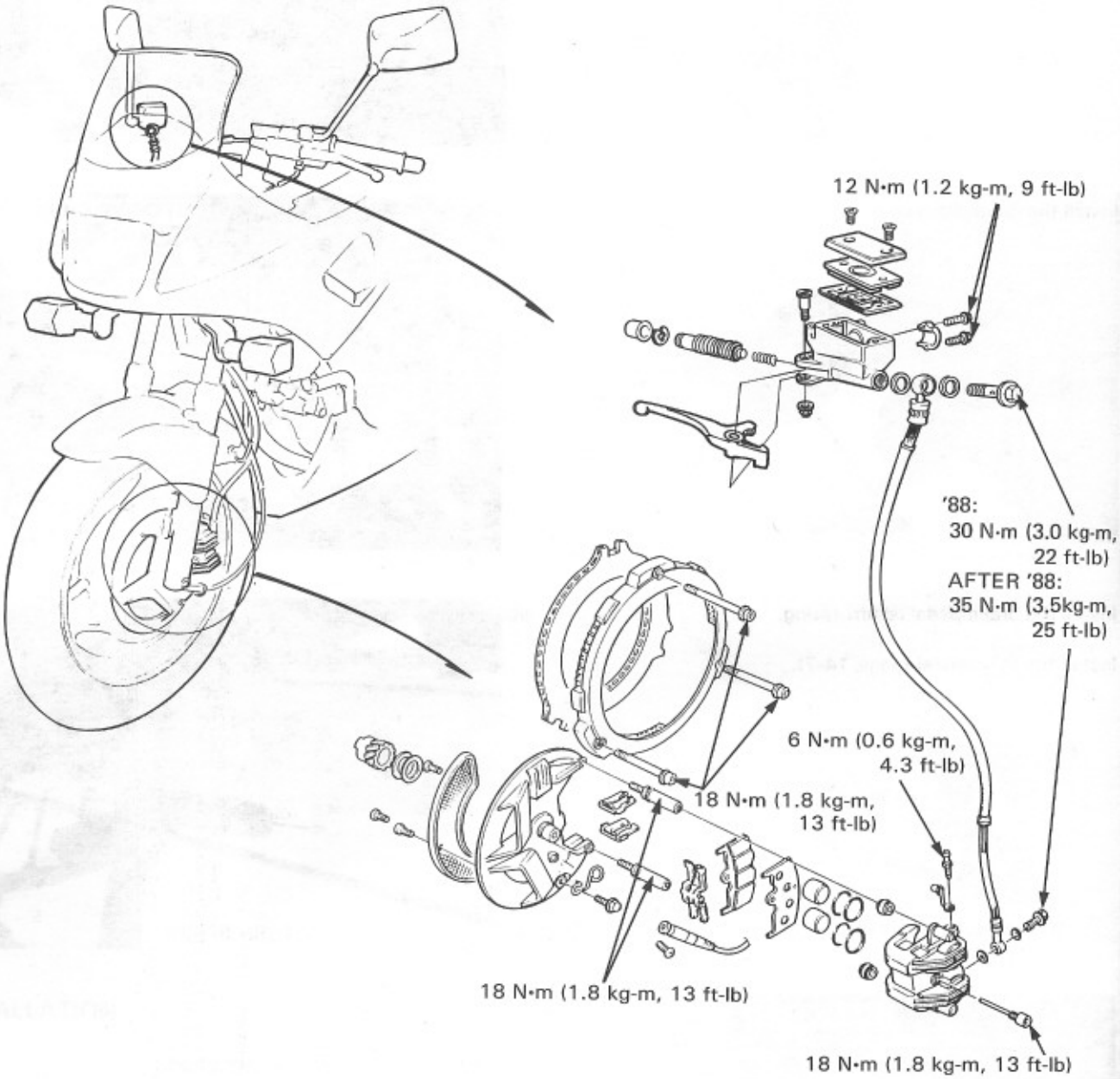
Install the drive chain cover.



Install the brake pedal return spring.

Install the rear wheel (page 14-7).




12 N·m (1.2 kg-m, 9 ft-lb)
'88:
30 N·m (3.0 kg-m, 22 ft-lb)
AFTER '88:
35 N·m (3.5kg-m, 25 ft-lb)
6 N·m (0.6 kg-m, 4.3 ft-lb)
18 N·m (1.8 kg-m, 13 ft-lb)
18 N·m (1.8 kg-m, 13 ft-lb)
18 N·m (1.8 kg-m, 13 ft-lb)

15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-1	BRAKE PAD REPLACEMENT	15-4
TROUBLESHOOTING	15-2	FRONT MASTER CYLINDER	15-4
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-3	FRONT BRAKE CALIPER/DISC	15-7

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

- 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.
- Always use new brake hose sealing washers when reinstalling the brake hose.

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Disk thickness	11.0—11.2 (0.43—0.44)	10.0 (0.39)
Disk runout	——	0.30 (0.012)
Master cylinder I.D.	12.700—12.743 (0.5000—0.5017)	12.755 (0.5022)
Master piston O.D.	12.657—12.684 (0.4983—0.4994)	12.645 (0.4978)
Caliper piston O.D.	33.923—33.928 (1.3355—1.3357)	33.870 (1.3335)
Caliper cylinder I.D.	33.960—34.010 (1.3370—1.3400)	34.020 (1.3394)
Brake fluid	DOT 4	——

TORQUE VALUES

Brake hose oil bolt	'88:	30 N•m (3.0 kg-m, 22 ft-lb)
	AFTER '88:	35 N•m (3.5 kg-m, 25 ft-lb)
Pad pin		18 N•m (1.8 kg-m, 13 ft-lb)
Disc cover bolt		18 N•m (1.8 kg-m, 13 ft-lb)
Caliper pin bolt		18 N•m (1.8 kg-m, 13 ft-lb)
Master cylinder holder bolt		12 N•m (1.2 kg-m, 9 ft-lb)
Caliper bleed valve		6 N•m (0.6 kg-m, 4.3 ft-lb)

TOOL

Special

Snap ring pliers	07914—3230001 or equivalent commercially available in U.S.A.

TROUBLESHOOTING

Brake lever soft or spongy
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

Brake lever too hard (requires greater than normal application pressure)
- Sticking piston (s)
- Clogged hydraulic system
- Pads glazed or worn excessively

Brake drag
- Hydraulic system sticking
- Sticking piston (s)
- Clogged hydraulic system
- Caliper slide pins sticking
- Disc or wheel misaligned

Brake grab
- Pads contaminated
- Disc or wheel misaligned

Brake chatter or squeal
- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly

BRAKE FLUID REPLACEMENT/AIR BLEEDING

⚠ WARNING

- *A brake fluid contaminated brake disc or pad reduces stopping power. Discard pads and clean a contaminated disc with a high quality brake degreasing agent.*

CAUTION

- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

NOTE

- Be sure the fluid reservoir is parallel to the ground before removing the cover and diaphragm.

BRAKE FLUID DRAINING

Remove the reservoir cover, and diaphragm.
Connect a bleed hose to the bleed valve.
Loosen the caliper bleed valve and slowly pump the brake lever.
Stop operating the lever when fluid stops flowing out of the bleed valve.

BRAKE FLUID FILLING

Fill the reservoir with DOT 4 brake fluid from a sealed container.

CAUTION

- *Use only DOT 4 brake fluid from a sealed container.*
- *Do not mix brake fluid of different types and never reuse the contaminated fluid.*

NOTE

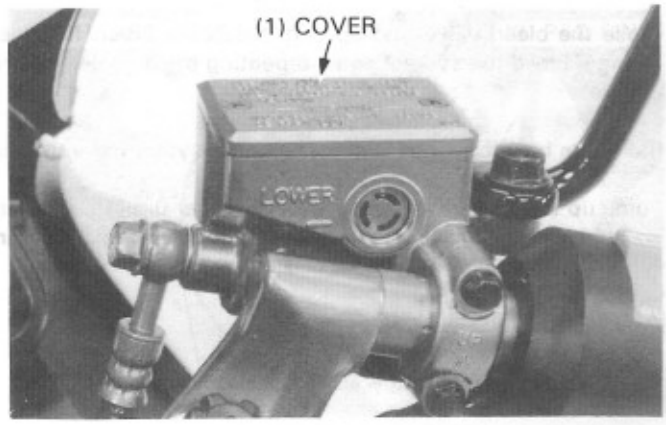
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using the Brake Bleeder, follow the manufacturer's instructions.

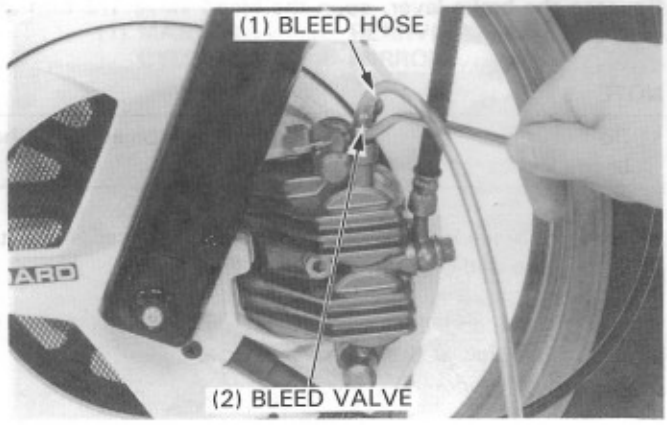
Connect a Brake Bleeder or equivalent to the bleed valve.

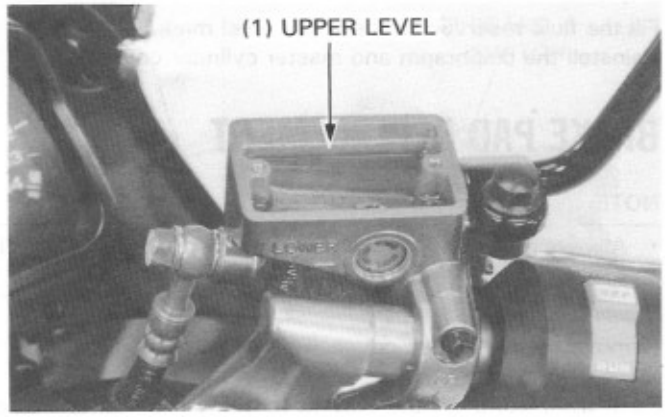
Pump the brake bleeder and loosen the bleed valve.
Add fluid when the fluid level in the master cylinder reservoir is low.
Repeat above procedures until no air bubbles appear in the plastic hose.

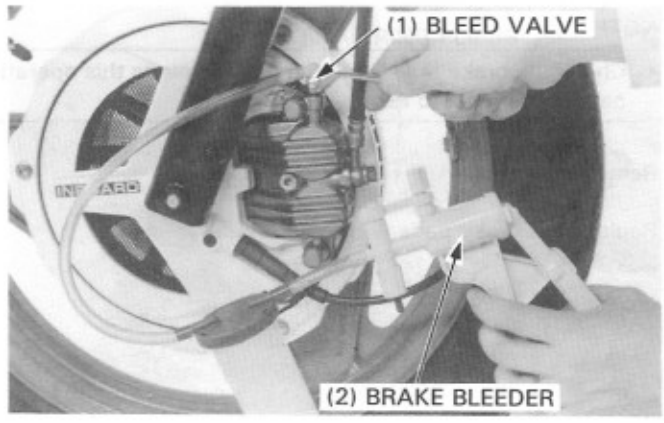
NOTE

- If air is entering the bleed from around the bleed valve threads, seal the threads with teflon tape.









Close the bleed valve and operate the brake lever. If it feels spongy, bleed the system again repeating the air bleeding procedure.

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:

Connect a bleed tube to the bleed valve.
Squeeze the brake lever, open the bleed valve 1/2 turn and then close the valve.

NOTE

- Do not release the brake lever untill the bleed valve has been closed.

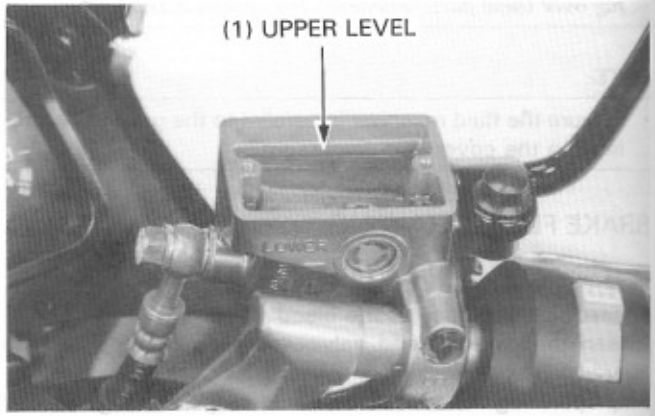
Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat the second and third steps 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, 4.3 ft-lb)

Fill the fluid reservoir to the upper level mark.
Reinstall the diaphragm and master cylinder cover.





BRAKE PAD REPLACEMENT

NOTE

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

Remove the brake disc cover.

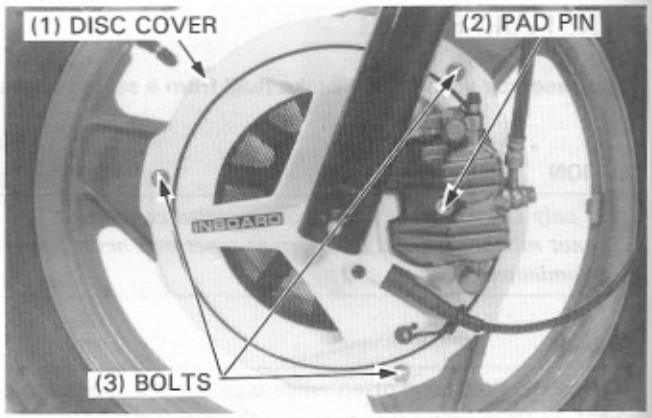
Push the pistons all the way in to allow installation of new brake pads.

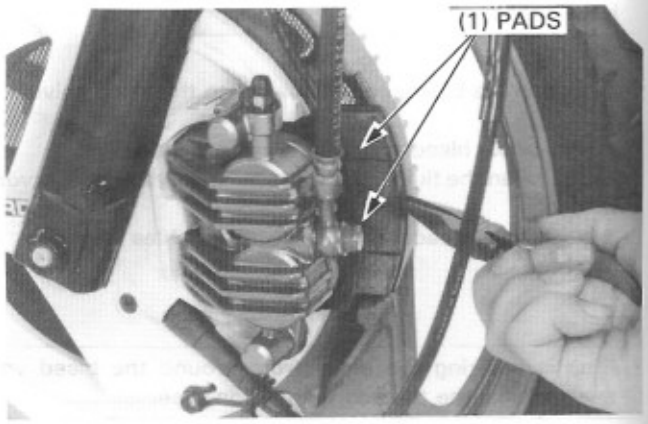
NOTE

- Check the brake fluid level in the reservoir as this operation causes the level to rise.

Remove the pad pin.

Replace the brake pads with new ones.



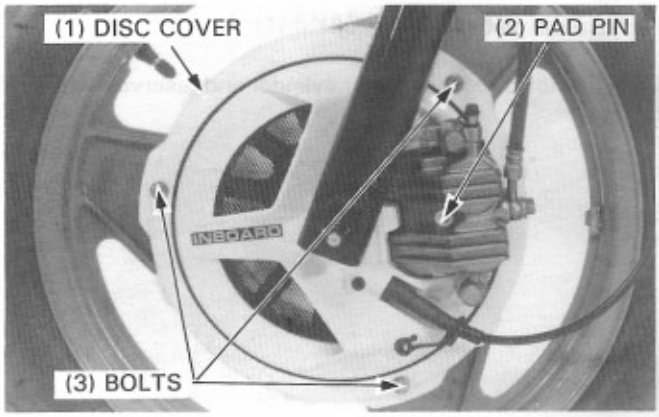


Install the pad pin through the holes in the new pads.
Tighen the pad pin.

TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)

Install the disc cover and tighten the bolts.

TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)



FRONT MASTER CYLINDER

DISASSEMBLY

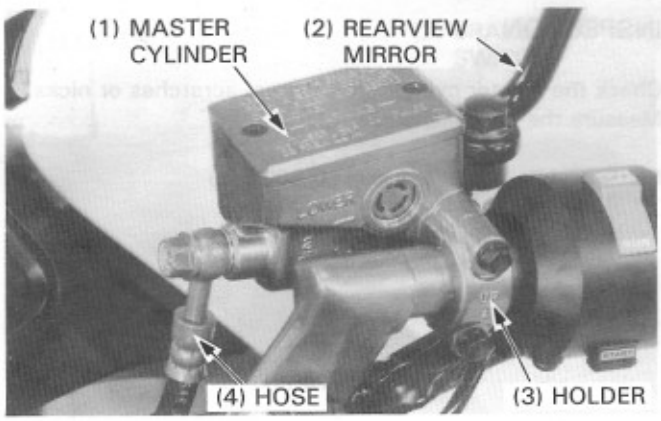
Drain the brake fluid from the hydraulic system.
Remove the brake hose bolt and sealing washers to disconnect the brake hose from the master cylinder.

CAUTION

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

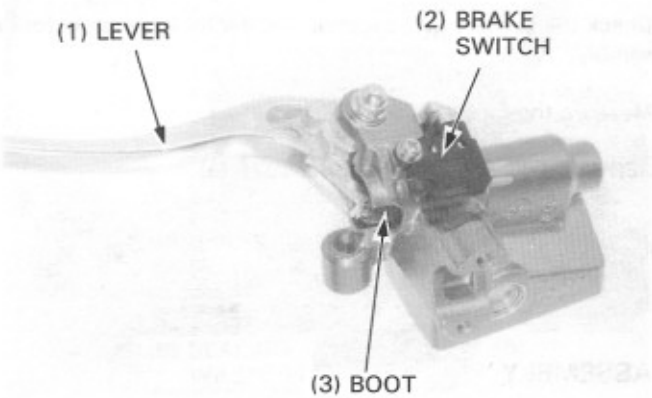
NOTE

- When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.



Disconnect the front brake switch wires.
Remove the rearview mirror.
Remove the master cylinder holder bolts and master cylinder.

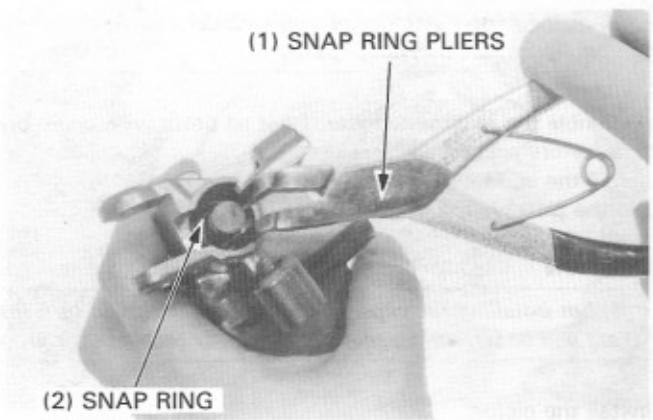
Remove the following:
— brake light switch
— brake lever
— piston boot



Remove the snap ring from the master cylinder body.

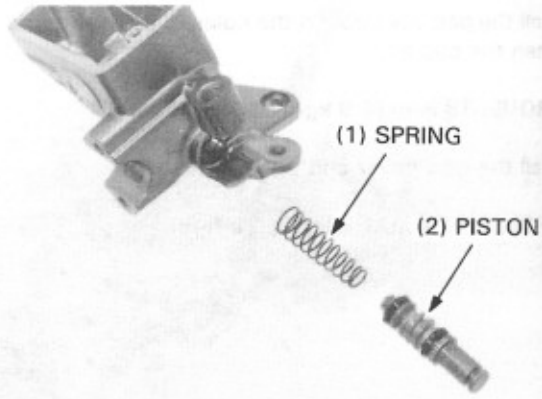
TOOL:

Snap ring pliers	**07914—3230001 or equivalent commercially available in U.S.A.**



Remove the piston and spring.

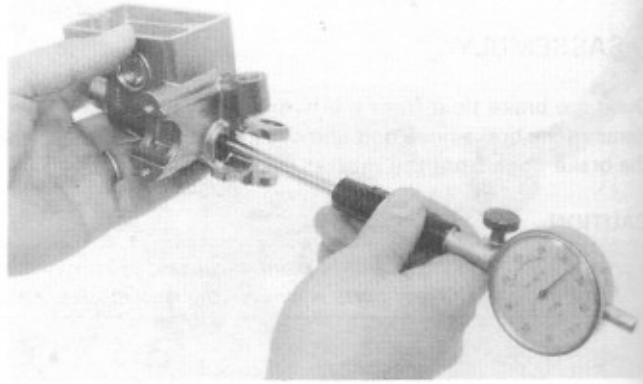
Clean the inside of the master cylinder and reservoir with brake fluid.



INSPECTON

Check the master cylinder for scores, scratches or nicks.
Measure the master cylinder I.D.

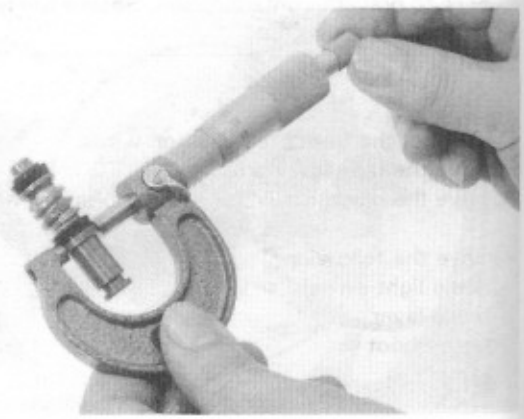
SERVICE LIMIT: 12.755 mm (0.5022 in)



Check the primary and secondary cups for damage before assembly.

Measure the master piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



ASSEMBLY

CAUTION

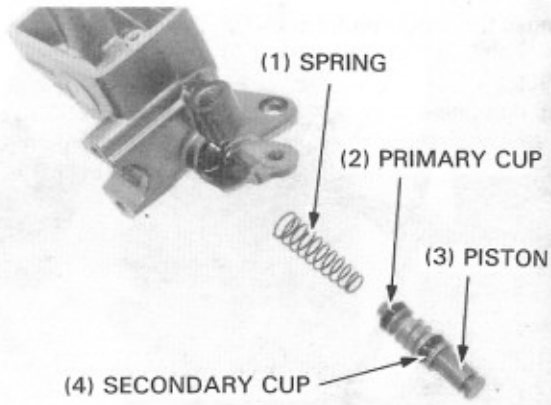
- *Keep the master cylinder piston, cylinder and spring as a set; don't substitute individual parts.*

Assemble the master cylinder. Coat all parts with clean brake fluid before assembly.
Install the spring.
Dip the piston cups in brake fluid before assembly.

CAUTION

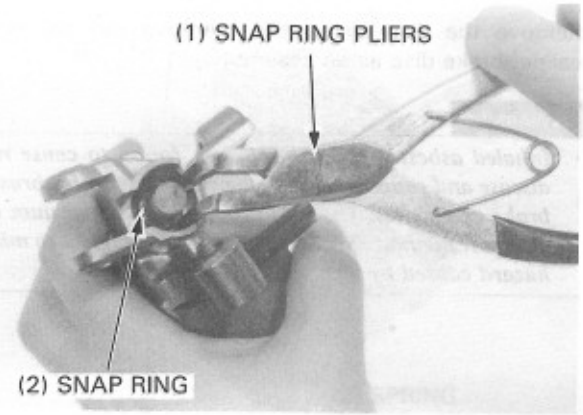
- *When installing the cups, do not allow the lips to turn inside out and be certain the snap ring is firmly seated in the groove.*

Install the piston.

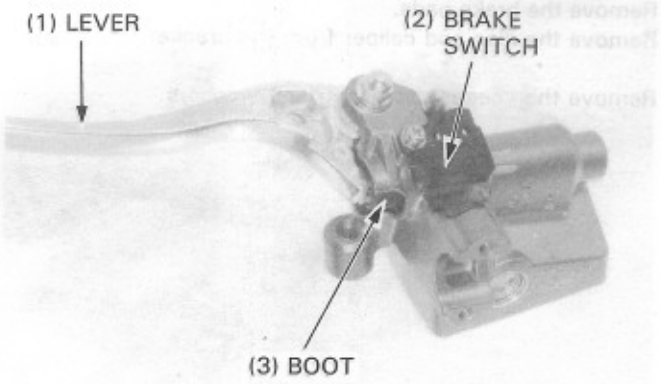


Install the snap ring.

TOOL:
Snap ring pliers — **07914—3230001 or equivalent commercially available in U.S.A.**



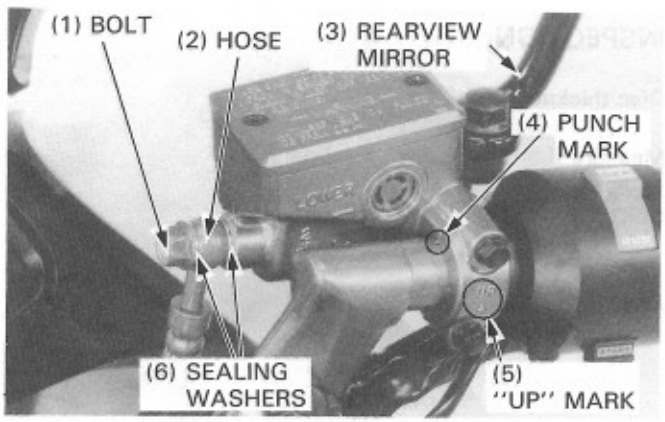
Install the following:
- piston boot
- brake light switch
- brake lever



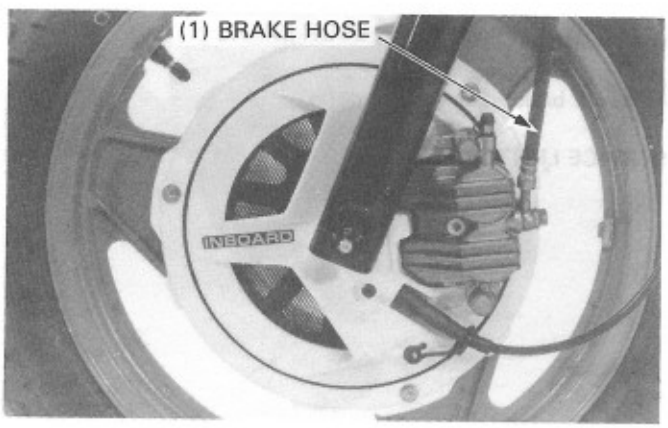
Place the front master cylinder on the handlebar and install the holder with its "UP" mark facing up.
Align the end of the holder with the punch mark on the handlebar. Tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)

Install the brake hose with the bolt and two sealing washers. Tighten the brake hose oil bolt.
TORQUE:
'88: 30 N·m (3.0 kg-m, 22 ft-lb)
AFTER '88: 35 N·m (3.5 kg-m, 25 ft-lb)
Install the rearview mirror.



Connect the front brake switch wires.
Fill the reservoir to the upper level and bleed the brake system according to page 15-3.



FRONT BRAKE CALIPER/DISC

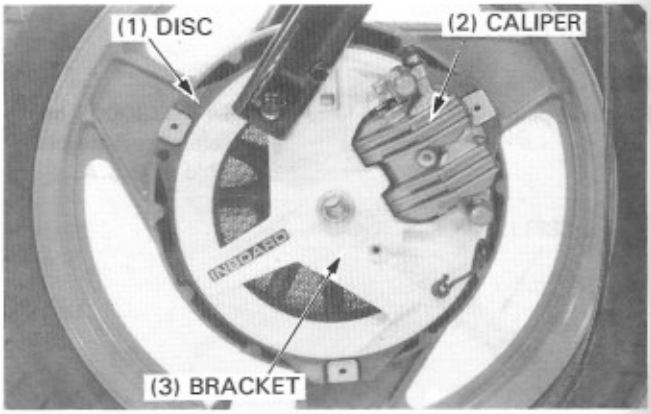
REMOVAL

Support the motorocycle in an upright postion on level ground.
Place a clean container under the caliper and disconnect the brake hose from the caliper.
Remove the front wheel (page 13-6).

Remove the disc cover, then remove the caliper bracket/caliper/brake disc as an assembly.

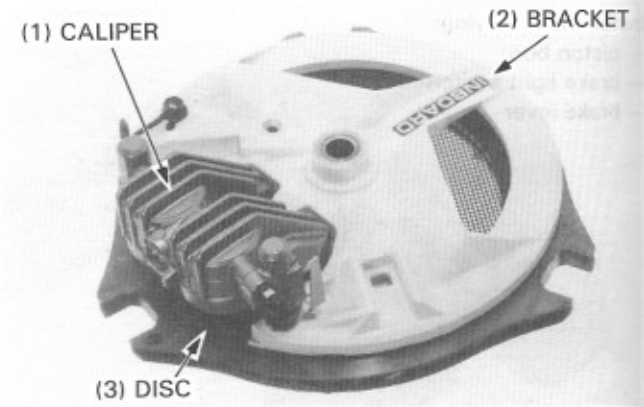
⚠WARNING

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

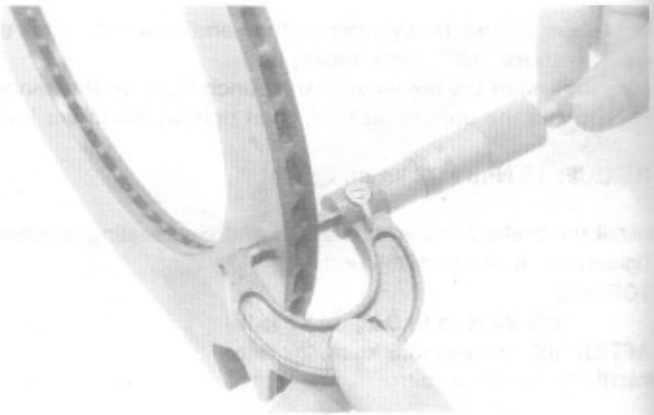


Remove the brake pads.
Remove the disc and caliper from the bracket.

Remove the speedometer gear and washers.



INSPECTION



Disc thickness

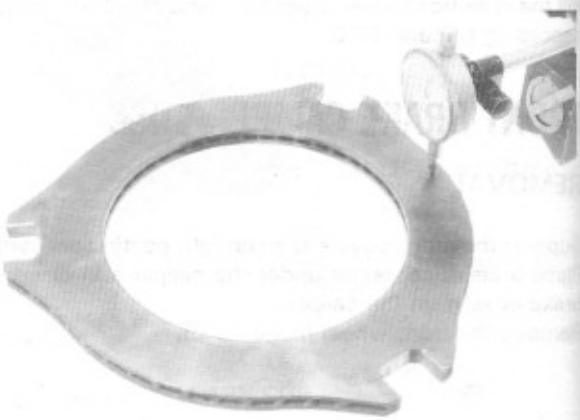
Measure the thickness of the brake disc.

SERVICE LIMIT: 10.0 mm (0.39 in)

Disc warpage

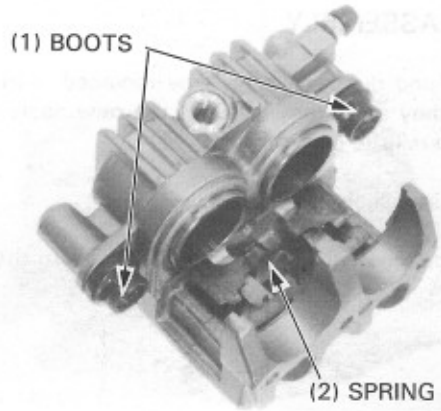
Measure brake disc for warpage.

SERVICE LIMIT: 0.30 mm (0.012 in)



CALIPER DISASSEMBLY

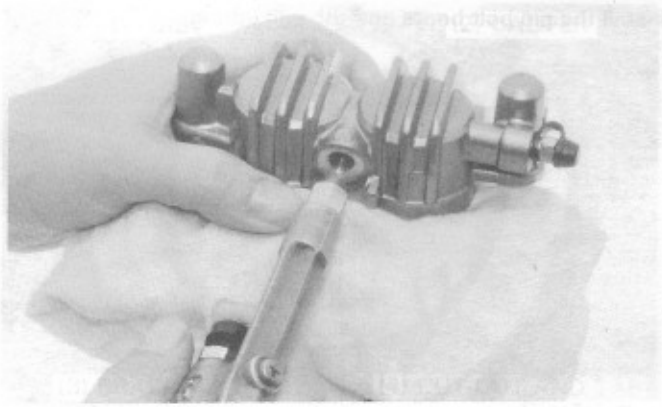
Remove the pin bolt boots and pad spring from the caliper.



If necessary, apply compressed air to the caliper fluid inlet to get the pistons out. Place a shop rag under the caliper to cushion the pistons when they are forced out. Use the air in short spurts.

⚠WARNING

- ***Do not bring the nozzle too close to the inlet.***

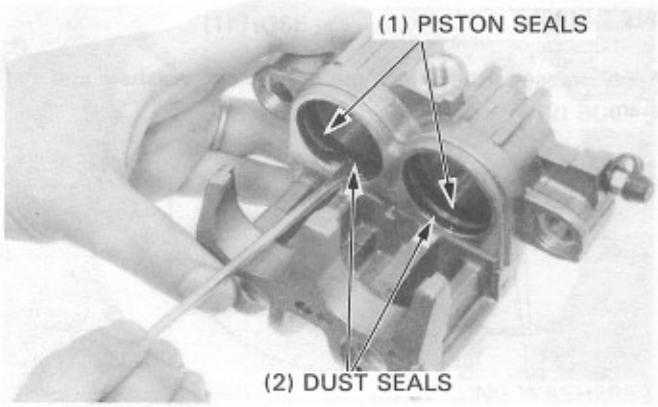


Push the piston and dust seals in, lift them out and discard them.

Clean the piston seal grooves with brake fluid.

CAUTION

- *Be careful not to damage the piston sliding surfaces.*



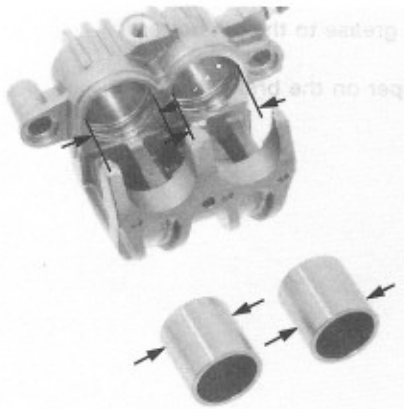
CALIPER INSPECTION

Check the caliper cylinder for scoring, scratches or other damage. Measure the caliper cylinder bore.

SERVICE LIMIT: 34.020 mm (1.3394 in)

Check the pistons for scoring, scratches or other damage. Measure the piston diameter with a micrometer.

SERVICE LIMIT: 33.870 mm (1.3335 in)

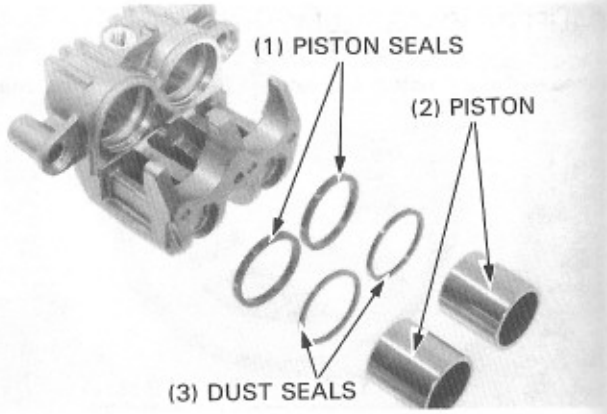


CALIPER ASSEMBLY

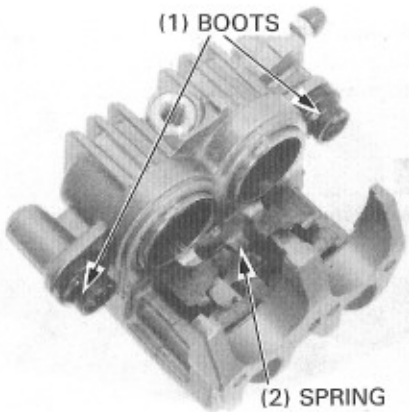
The piston and dust seals must be replaced with new ones whenever they are removed. Coat the new seals with brake fluid and install the piston seals.

Install the dust seals.

Install the pistons with the dished ends toward the pads.

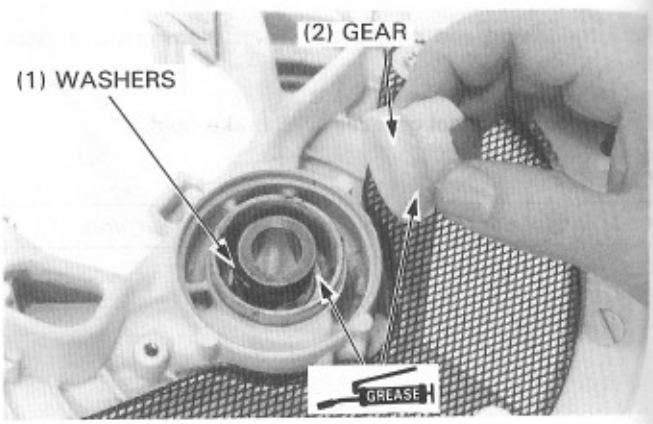


Install the pin bolt boots and the pad spring.



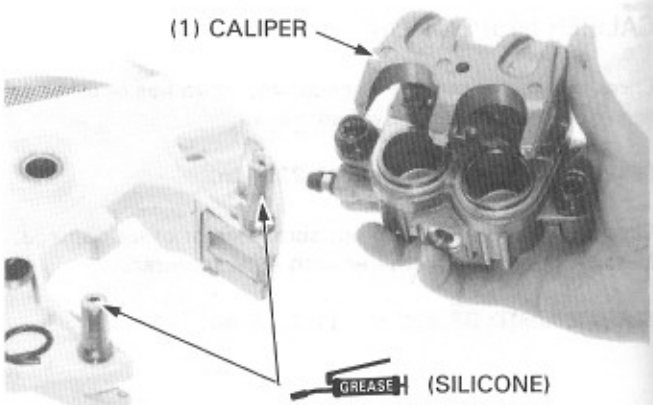
INSTALLATION

Apply grease to the speedometer gear and washers and install them.

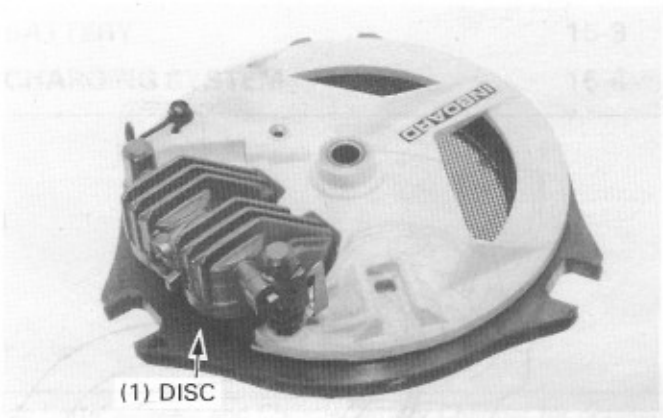


Apply silicone grease to the pin bolts.

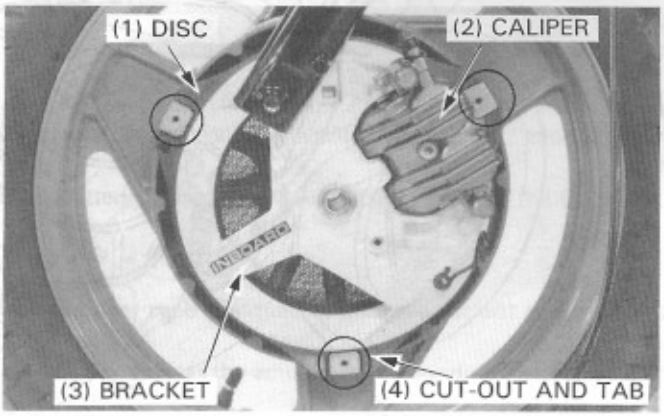
Install the caliper on the brakcet.



Install the brake disc.



Install the caliper/bracket/disc assembly on the front wheel, aligning the cut-out in the disc with the tab on the wheel.

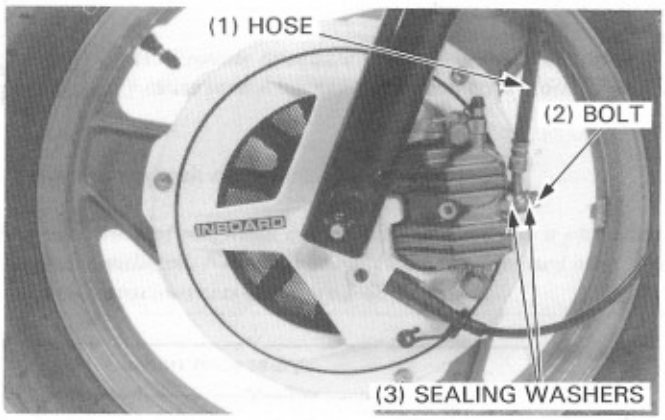


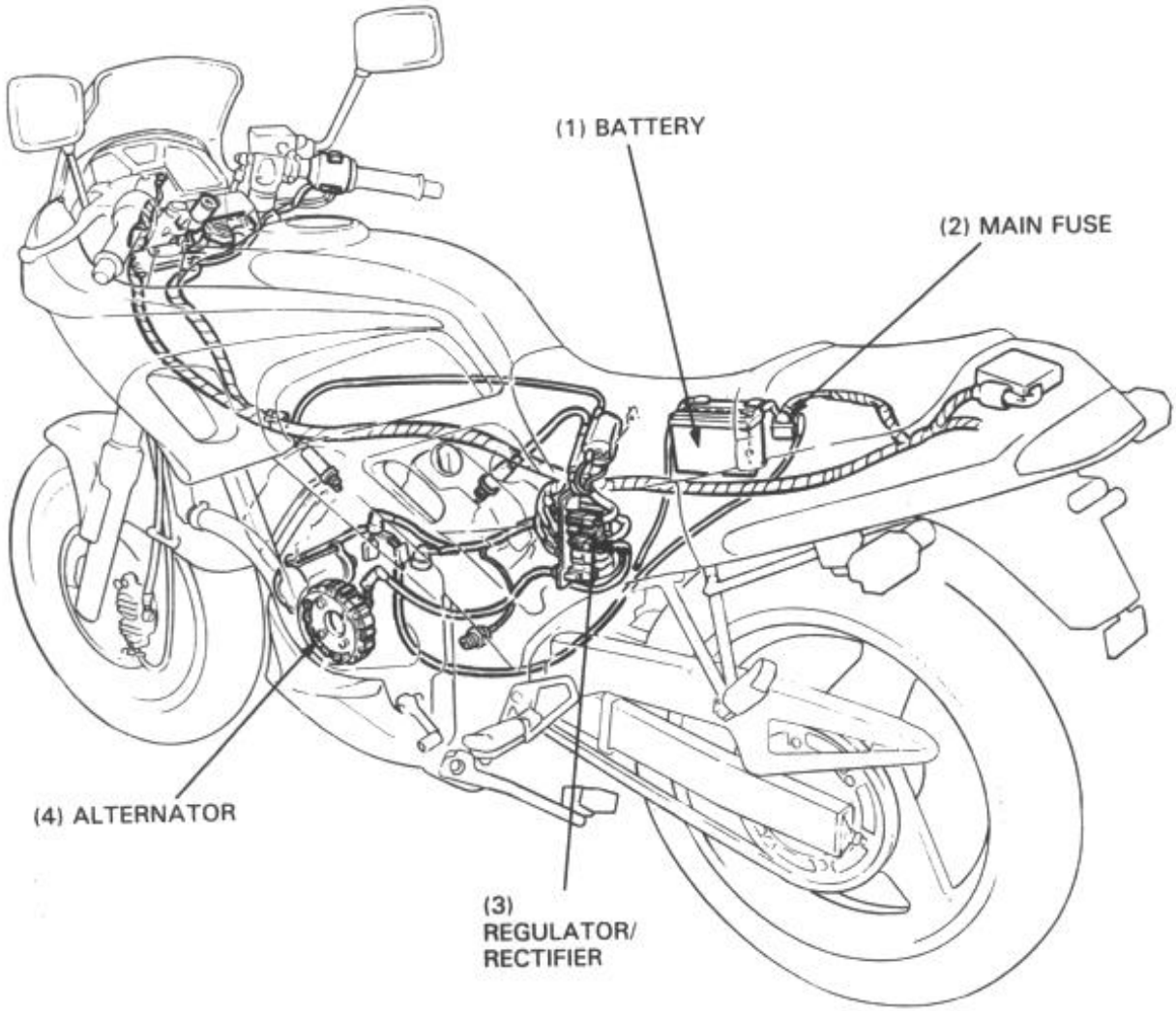
Install the front wheel (page 13-11).
Connect the brake hose to the caliper with new sealing washers.
Tighten the brake hose oil bolt.

TORQUE:

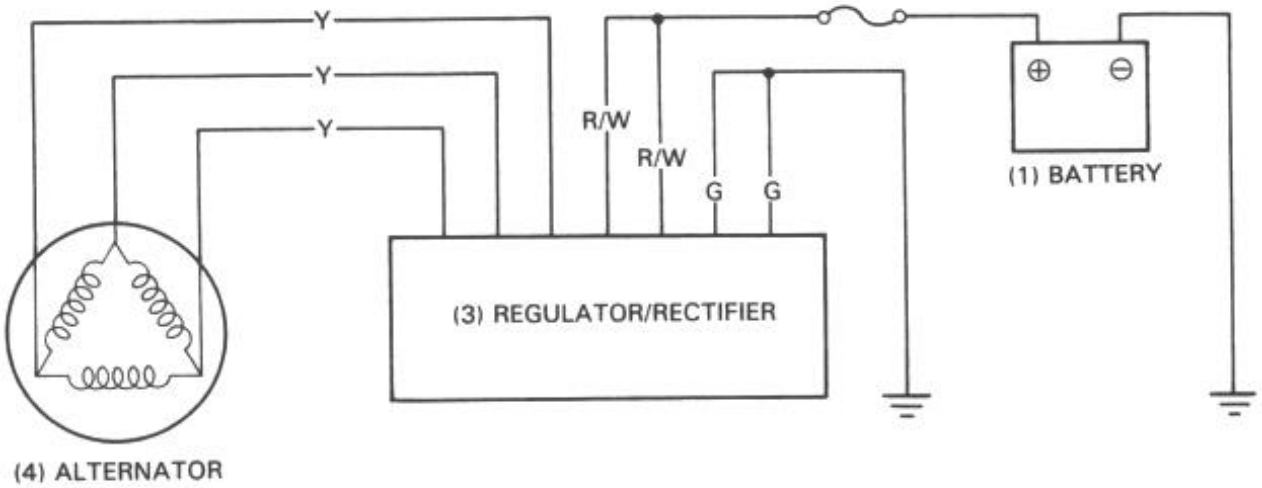
'88: 30 N·m (3.0 kg-m, 22 ft-lb)
AFTER '88: 35 N·m (3.5 kg-m, 25 ft-lb)

Fill the brake fluid reservoir and bleed the brake system (page 15-3).





(2) MAIN FUSE 30 A



SERVICE INFORMATION	16-1	BATTERY	16-3
TROUBLESHOOTING	16-2	CHARGING SYSTEM	16-4

SERVICE INFORMATION

GENERAL

Battery charging

NOTE

- Refer to the instructions in the Operation Manual for the Honda Battery Tester and Christie Battery Changer for detailed battery charging steps.

After activation, both conventional and maintenance-free batteries must be charged at the appropriate ampere-hour rating for the proper length of time.
Set the Battery Amp. Hr. Selector Switch on the Christie Battery Charger (#MC1012/2) for the size of the battery being charged. Set the Timer to the NEW BATT position and connect the battery clamps. When the timer reaches the "trickle" position, the charging cycle is complete.
After charging, test the condition of the new battery using the Honda Battery Tester (07GMJ-0010000)---refer to the Operation, Manual for complete details.

Battery charging/Testing equipment
The Christie Battery Charger (#MC1012/2) is a constant current (amperage) type designed to produce current at a constant rate for the duration of the charge, even if the voltage varies.
The Honda Battery Tester (07GMJ-0010000) puts a "load" on the battery so that the actual battery condition at the time of the load can be measured.
This provides an accurate determination of the battery condition --- good (green), fair (yellow), or poor (red).

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

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery only in an emergency. Slow-charging is preferred.
- Remove the battery from the motorcycle when charging. If the battery must be charged on the motorcycle, disconnect the battery cables.
- When inspecting the charging system, check the system components and lines step-by-step according to the trouble-shooting on the next page.
- All charging system components can be tested on the motorcycle.
- Alternator removal is in Section 8.
- 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

SPECIFICATIONS

ITEM			STANDARD
Battery	Capacity		12 V–9 AH
	Specific gravity at 20°C (68°F)	Fully charged	1.270–1.290
		Needs charging	Below 1.260
	Charging current		0.9 amperes max.
Alternator capacity			330 W/5,000 rpm
Regulator/rectifier	Type		Transistorized, non-adjustable
	Regulated voltage at 5,000 rpm		13.5–15.5 V
Charging start rpm (at no load)			1,100–1,300 rpm

TOOLS

Special

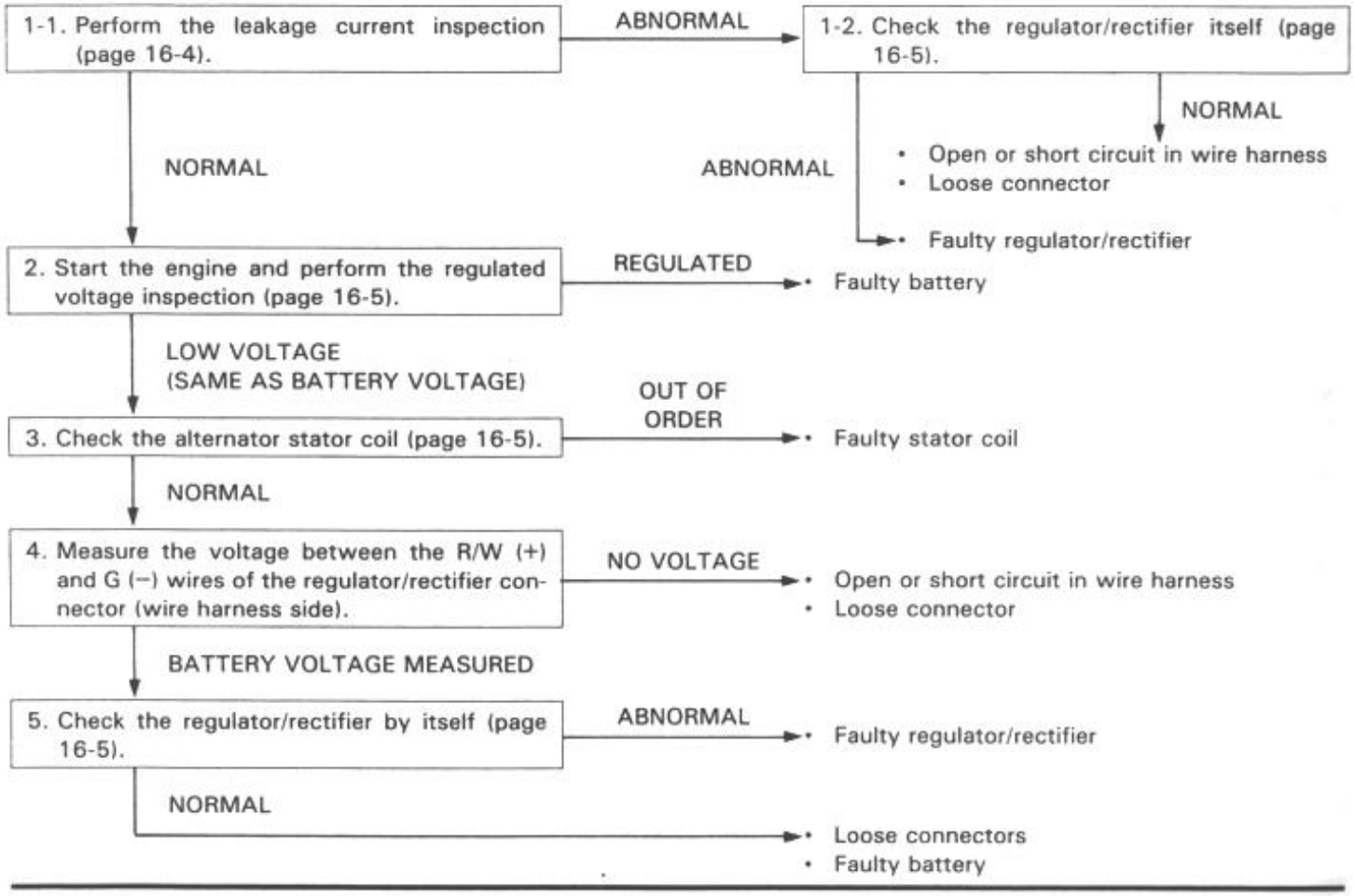
Christie battery charger	#MC1012/2 (U.S.A. only)
Honda battery tester	07GMJ–0010000 (U.S.A. only)
Digital multitester	07411–0020000 or KS–AHM–32–003 (U.S.A. only)
or	
Circuit tester (SANWA)	07308–0020001
or	
Circuit tester (KOWA)	TH–5H

TROUBLESHOOTING

NOTE

- If the battery is overcharged, replace the regulator/rectifier.

Battery undercharged

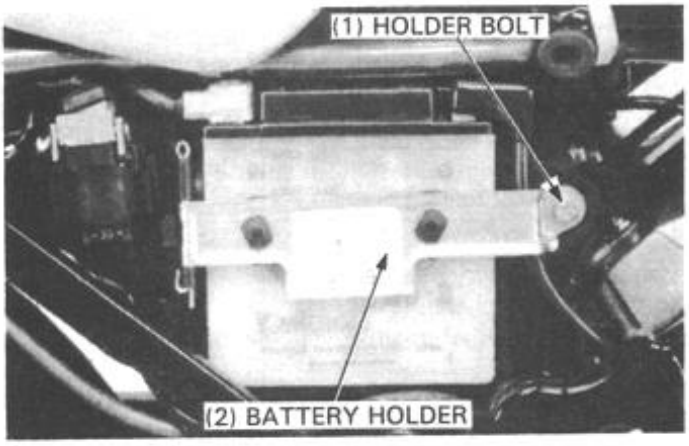


BATTERY

REMOVAL

Remove the following:
- right side cover
- battery holder bolt
- first the battery negative cable, then the positive cable

Disconnect the battery breather tube and remove the battery.



INSPECTION

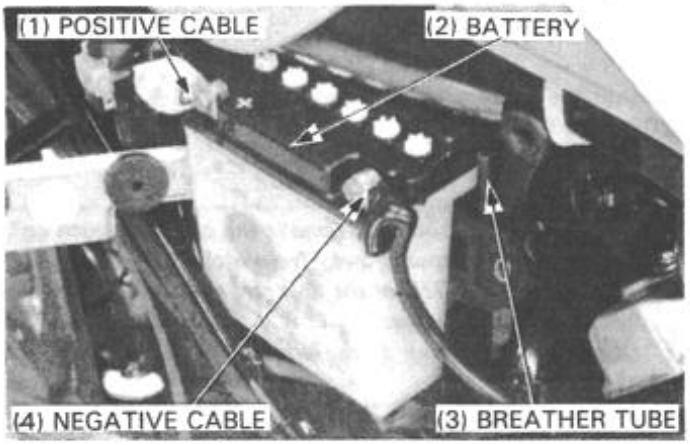
NOTE

- In order to obtain accurate test reading when checking the charging system, the battery must be fully charged and in good condition. Perform the following inspections and tests before attempting to troubleshoot charging system problems.

Check for cracked or broken case or plates. Check the plates for sulfation.

Replace the battery if it is damaged or sulfated.

Check each cell's electrolyte level. If low, add distilled water to bring the level to the upper mark.



TESTING

NOTE

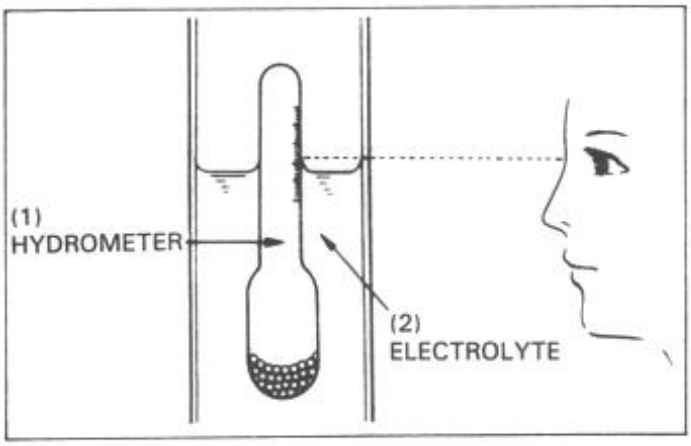
- Refer to the instructions in the Operation Manual for the Honda Battery Tester and Christie Battery Charger for detailed battery testing steps.

SPECIFIC GRAVITY

The specific gravity must be checked with a hydrometer. Test each cell by drawing electrolyte into the hydrometer.

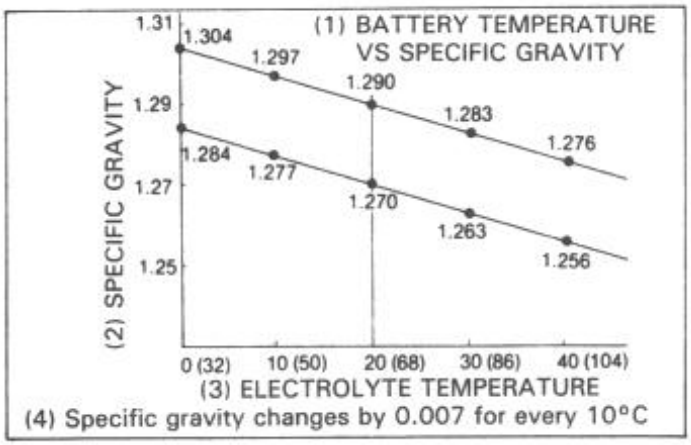
Fully Charged: 1.270–1.290 at 20°C (68°F)
Needs Charging: Below 1.260 at 20°C (68°F)

Make sure the variation between the high and low cells is less than 0.05.



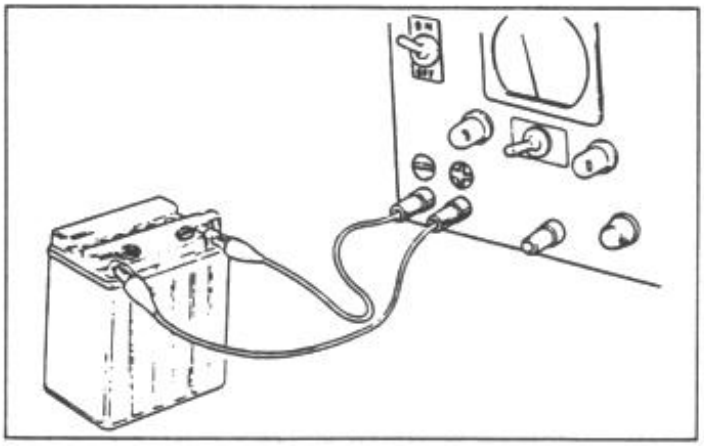
⚠ WARNING

- ***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.***



(4) Specific gravity changes by 0.007 for every 10°C

CHARGING

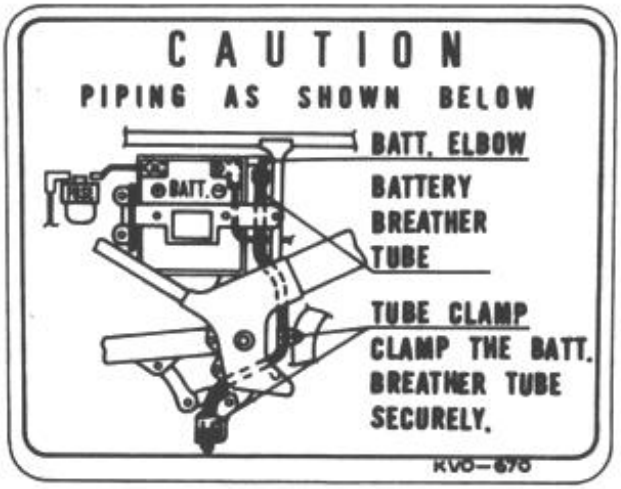


NOTE

- Refer to the instructions in the Operation Manual for the Honda Battery Tester and Christie Battery Charger for detailed battery testing steps.

Remove the battery cell caps. Fill the cells with distilled water to the upper level line, if necessary.
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.

Charging current: 0.9 amperes max.



Charge the battery until specific gravity is 1.270—1.290 at 20°C (68°F).

⚠WARNING

- ***Before charging a battery, remove the cap from each cell.***
- ***Keep flames and sparks away from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals, to prevent sparks.***
- ***Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).***

CAUTION

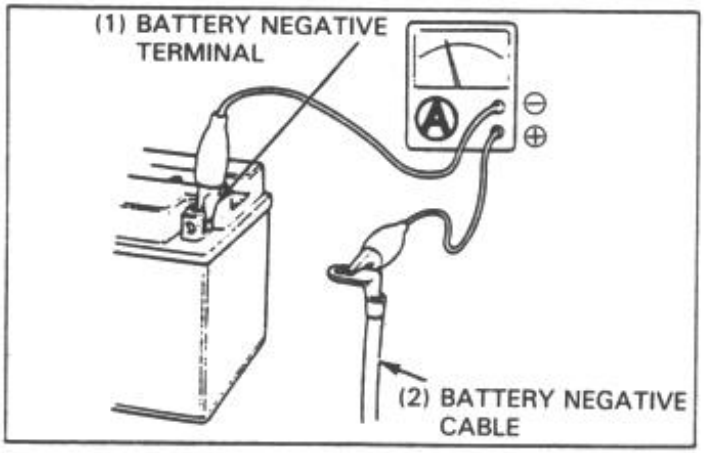
- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Route the breather tube as shown on the battery caution label.*

After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

LEAKAGE CURRENT INSPECTION

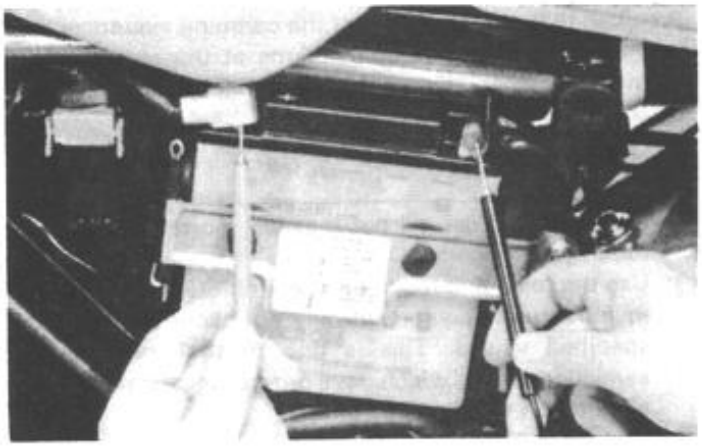
Check the battery for ampere leakage before making a charging output inspection.
Turn the ignition switch OFF. Remove the negative cable from the battery.
Connect an ammeter between the negative cable and battery negative (−) terminal.
The ammeter should indicate below 1 mA with the ignition switch OFF.



CAUTION

- *The fuse in the ammeter will burn out if you read the ampere over the ammeter range. Measure the ampere step by step changing the ammeter change over switch from large range to small range.*
- *Do not turn the ignition switch ON.*

REGULATED VOLTAGE INSPECTION



NOTE

- Use a fully charged 12 V battery (electrolyte specific gravity above 1.280) to test the regulated voltage. Use of a weak battery will result in false readings.

Start the engine and warm it up to operating temperature.

⚠ WARNING

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

Remove the right side cover.
Connect a voltmeter positive probe to the battery positive terminal and negative probe to the negative terminal.

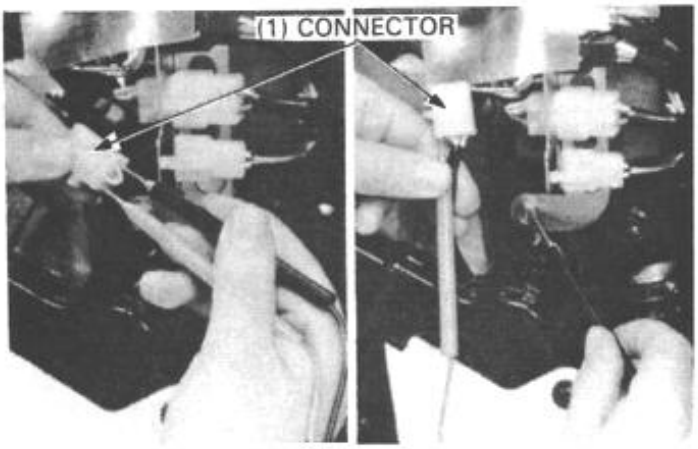
CAUTION

- *Be careful not to let the battery positive cable contact the frame while testing.*

Start the engine.
Gradually increase the engine speed and check that the voltage is regulated.

REGULATED VOLTAGE: 13.5—15.5 V at the 5,000 rpm

If the regulated voltage is not obtained, check for a loose wire harness (alternator-to-battery) connector.
If the regulated voltage is still not obtained, check the regulator/rectifier and alternator stator.



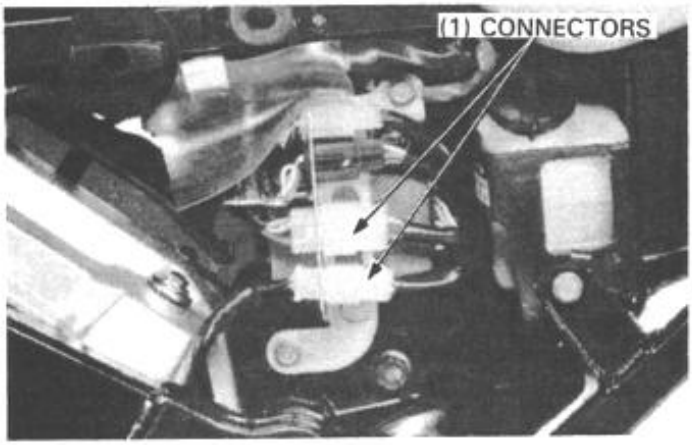
ALTERNATOR STATOR INSPECTION

Remove the left side cover.

Disconnect the alternator 3P connector.

Check the continuity between the connector terminals and between each terminal and ground.

Replace the stator if there is no continuity between the connector terminals or if there is continuity between any terminal and ground.



REGULATOR/RECTIFIER INSPECTION

Remove the left side cover.
Disconnect the regulator/rectifier connectors (3P and 4P).

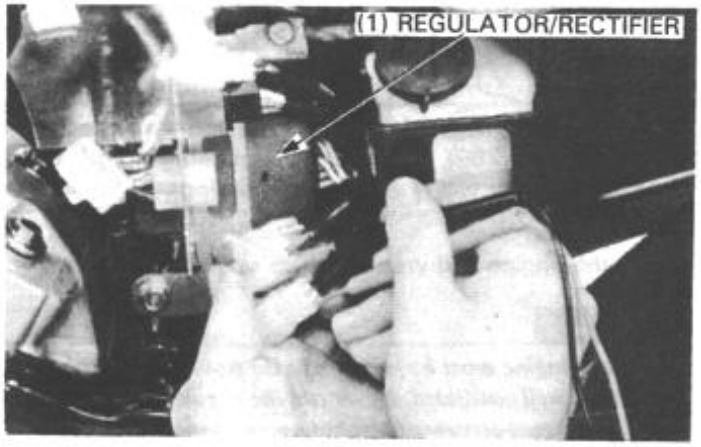
Provided that all inspections of the cahrging system are normal and there are no loose connections at the regulator/rectifeir connector, inspect the regulator/rectifier unit by measuring the resistance between the terminals.

NOTE

- Resistance value will not measure correctly if the probes touch your fingers.
- Use the following recommended multitester. Using another manufacture's equipment may not allow you to obtain the specified values. This is due to the characterristic of semiconductors, which have different resistance values depending on the applied voltage.

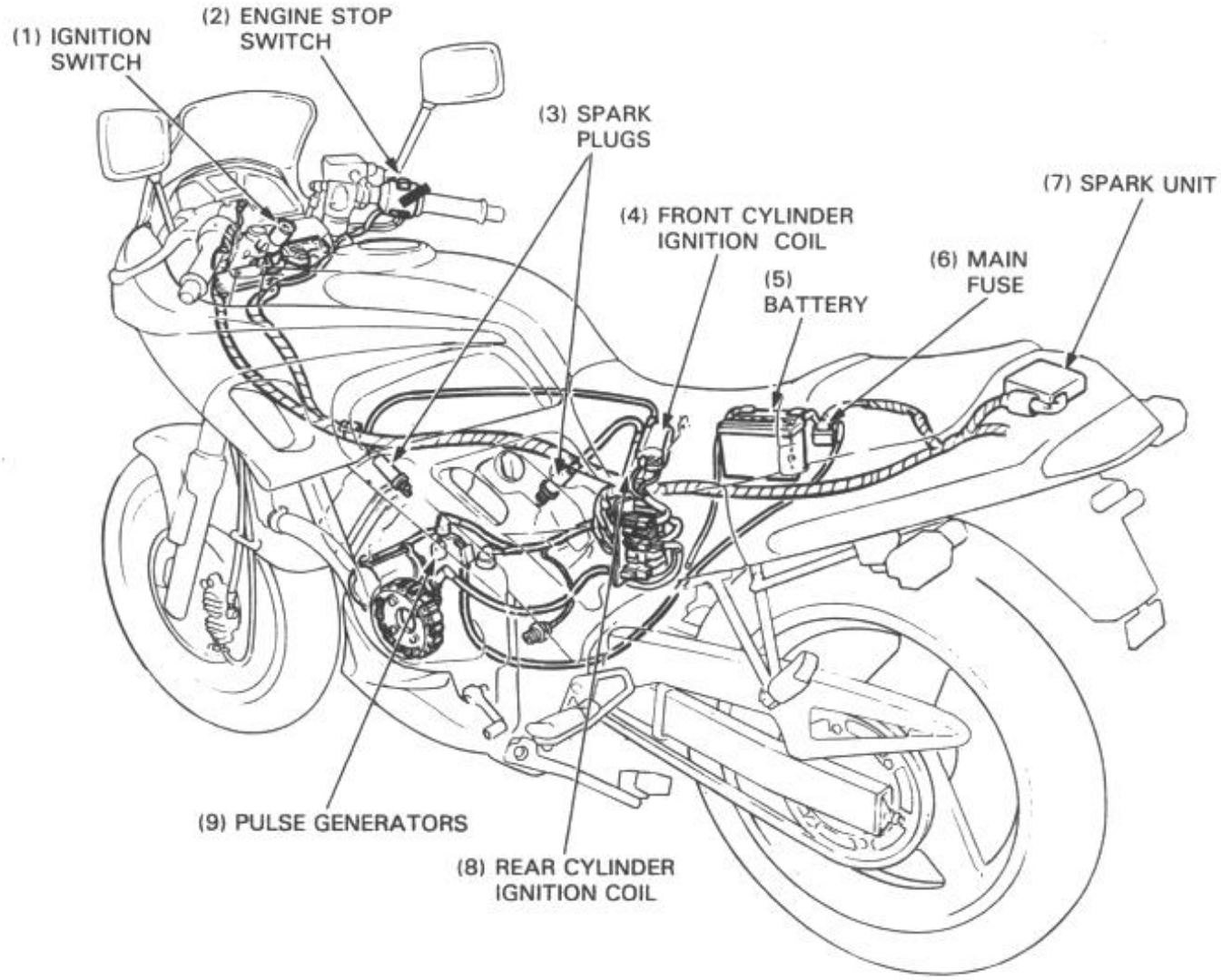
  SPECIFIC MULTITESTER:
  - 07411–0020000 (KOWA digital type)
  - KS–AHM–32–003 (KOWA digital type; U.S.A. only)
  - 07308–0020001 (SANWA analogue type)
  - TH–5H (KOWA analogue type)
- Select the following range.
  Sanwa: kΩ
  Kowa : x100Ω
- An old battery stored in the multitester could cause inaccurate readings. Check the battery if the multitester resisters incorrectly.
- When using the KOWA multitester, remember that all readings should be multiplied by 100.

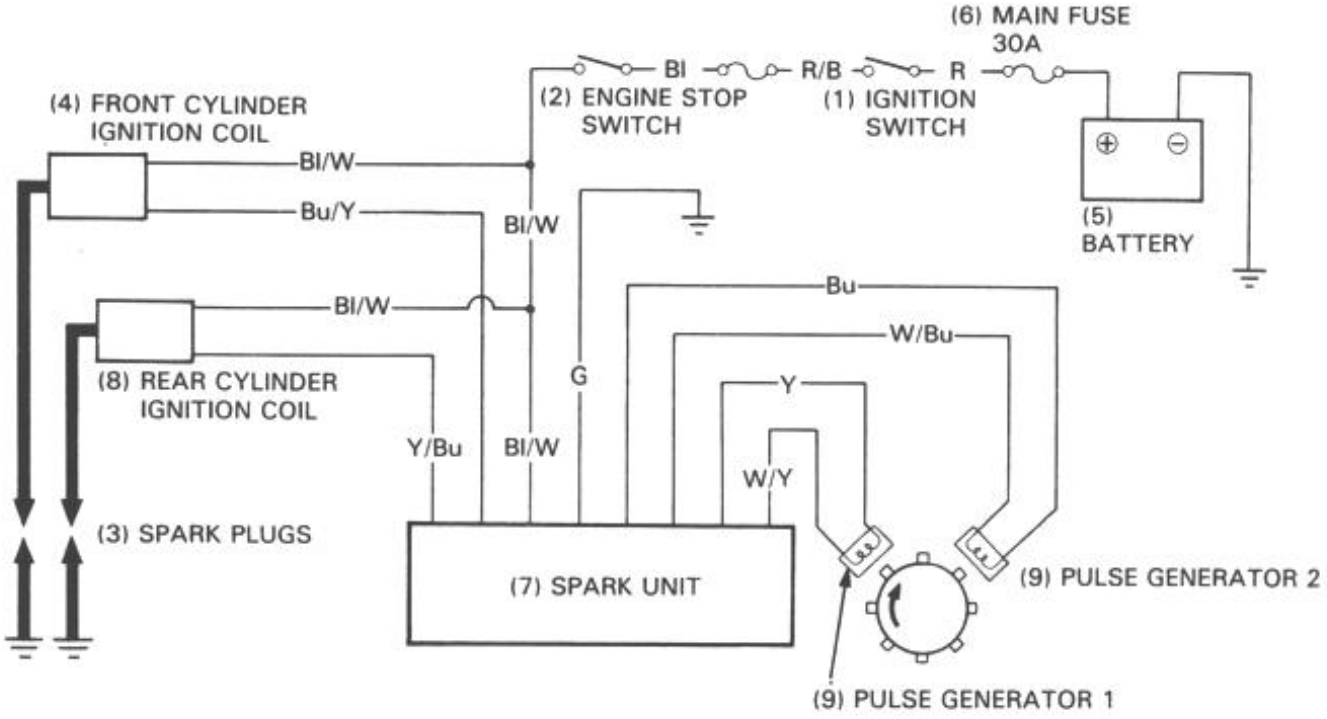
Replace the regulator/rectifier unit if the resistance value between the terminals is abnormal.



Unit: kΩ

⊕ Probe / ⊖ Probe	Red/ White	Green	Yellow 1	Yellow 2	Yellow 3
Red/White		∞	∞	∞	∞
Green	1–20		0.5–10	0.5–10	0.5–10
Yellow 1	0.5–10	∞		∞	∞
Yellow 2	0.5–10	∞	∞		∞
Yellow 3	0.5–10	∞	∞	∞	


(1) IGNITION SWITCH
(2) ENGINE STOP SWITCH
(3) SPARK PLUGS
(4) FRONT CYLINDER IGNITION COIL
(5) BATTERY
(6) MAIN FUSE
(7) SPARK UNIT
(8) REAR CYLINDER IGNITION COIL
(9) PULSE GENERATORS


(6) MAIN FUSE 30A
Bl
R/B
R
(2) ENGINE STOP SWITCH
(1) IGNITION SWITCH
(4) FRONT CYLINDER IGNITION COIL
Bl/W
Bu/Y
Bl/W
Bl/W
(5) BATTERY
Bu
W/Bu
Y
G
(8) REAR CYLINDER IGNITION COIL
Y/Bu
Bl/W
W/Y
(3) SPARK PLUGS
(7) SPARK UNIT
(9) PULSE GENERATOR 2
(9) PULSE GENERATOR 1

SERVICE INFORMATION	17-1	IGNITION COIL	17-3
TROUBLESHOOTING	17-2	PULSE GENRATOR	17-5
SYSTEM INSPECTION	17-3	IGNITION TIMING	17-5

SERVICE INFORMTION

GENERAL

⚠ WARNING

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

- A transistorized ignition system is used and it cannot be adjusted.
- For spark plug inspection, refer to section 3.
- When inspecting the ignition system, check the system components and lines step-by-step according to troubleshooting sequence on the next page.

SPECIFICATIONS

Spark plug	Brand		NGK	ND
	Standard	'88	DPR8EA-9	X24EPR-U9
		AFTER '88	CR8EH-9	U24FER-9
	For extended high speed riding	'88	DPR9EA-9	X27EPR-U9
		AFTER '88	CR9EH-9	U27FER-9
	Gap		0.8–0.9 mm (0.031–0.035 in)	
Ignition coil resistance	Primary coil		2.6–3.2 Ω (20°C/68°F)	
	Secondary coil	without the spark plug cap	11–15 kΩ (20°C/68°F)	
		with the spark plug cap	15–21 kΩ (20°C/68°F)	
Pulse generator resistance			310–390 Ω (20°C/68°F)	

TOOLS

Special

Digital multitester	07411–0020000 or KS–AHM–32–003 (U.S.A. only)
or	
Circuit tester (SANWA)	07308–0020001
or	
Circuit tester (KOWA)	TH–5H

TROUBLESHOOTING

No spark at all plugs

1. Check for loose spark unit connectors.
   - ABNORMAL → • Loose connectors
   - NORMAL ↓
2. Measure voltage between the Bl/W (+) and G (−) and between the Bu/Y or Y/Bu (+) and G (−) of the spark unit 6P connector. Battery voltage should appear with the ignition switch ON and engine stop switch at RUN.
   - ABNORMAL → • Faulty igntion or engine stop switches • Open or short circuit in wire harness • Burned fuse
   - NORMAL ↓
3-1. Check the pulse generator resistances at the spark unit 4P connector (page 17-3).
   - ABNORMAL → 3-2. Check the pulse generator (page 17-5).
     - NORMAL → • Open or short circuit in wire harness • Loose connectors
     - ABNORMAL → • Faulty pulse generator
   - ABNORMAL → • Faulty spark unit

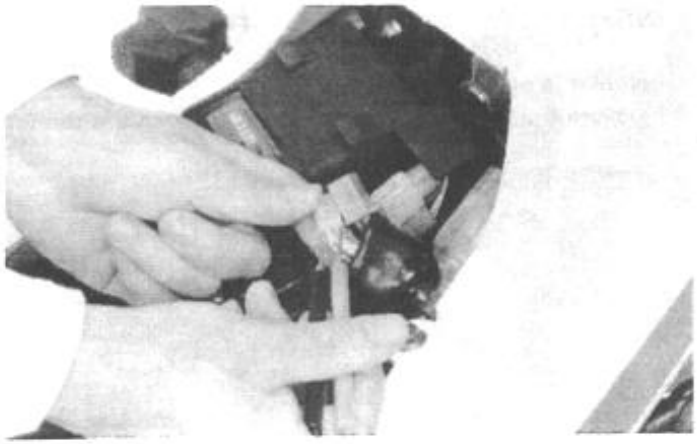
No spark at either spark group (front or rear)—(CHECK NO SPARK CYLINDER)

1-1. Exchange the ignition coil and try the spark test.
   - GOOD JUMP → 1-2. Check the ignition coil (page 17-4).
     - NORMAL → • Loose connectors • Open or short circuit in wire harnes
     - ABNORMAL → • faulty ignition coil
   - DO NOT JUMP ↓
2. Check the ignition primary coil resistance at the spark unit 6P connector (page 17-3).
   - ABNORMAL → • Loose primary coil wire • Open or short circuit in wire harness between the spark unit and ignition coil. • Faulty ignition coil.
   - NORMAL → • Faulty spark unit

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 spark unit.



Disconnect the spark 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:

6P Connector

ITEM		TERMINAL	STANDARD
Ignition coil primary coil	front	Bl/W and Bu/Y	2.6–3.2 Ω (at 20°C/68°F)
	rear	Bl/W and Y/Bu	
Ignition switch and engine stop switch (Turn the ignition switch ON and the engine stop switch RUN)		Bl/W (+) and G (–)	The battery voltage should register.

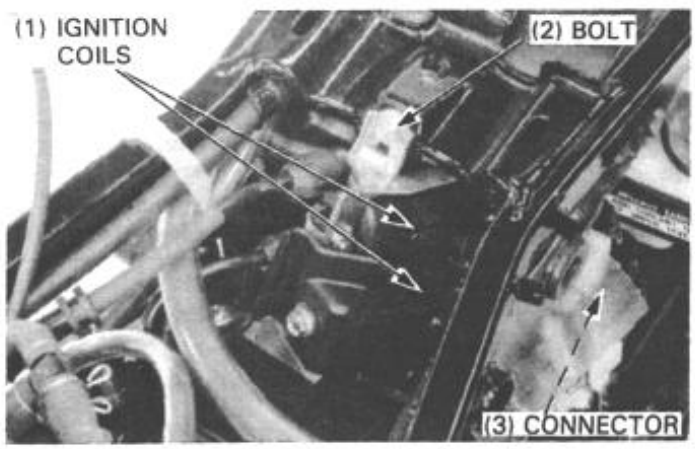
4P Connector

ITEM		TERMINAL	STANDARD
Pulse generator coil	No. 1	W/Y and Y	310–390 Ω (at 20°C/68°F)
	No. 2	W/Bu and Bu	

IGNITON COIL

REMOVAL

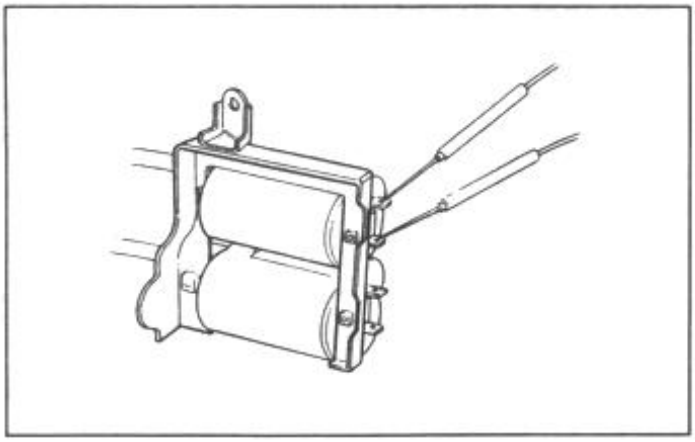
Remove the fuel tank (page 4-3).
Disconnect the spark plug caps from the spark plugs.
Disconnect the igniton coil connector (4P mini).
Remove the ignition coil stay mounting bolt and ignition coils.
Disconnect the primary coil wires from the ignition coils.



INSPECTION

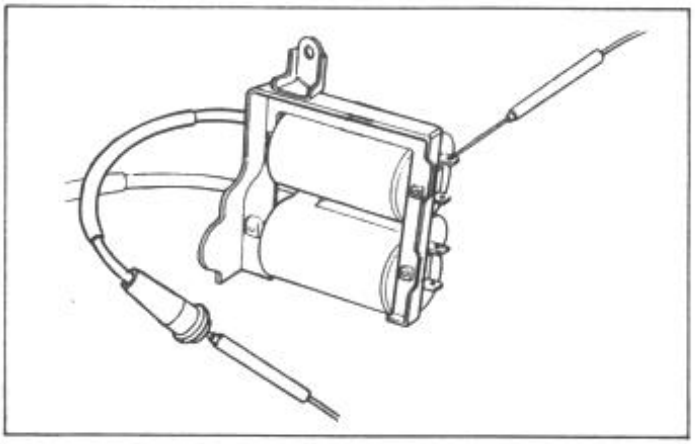
Remove the ignition coil (page 17-3).
Measure the primary coil resistance between the terminals.

STANDARD: 2.6—3.2 Ω (at 20°C/68°F)



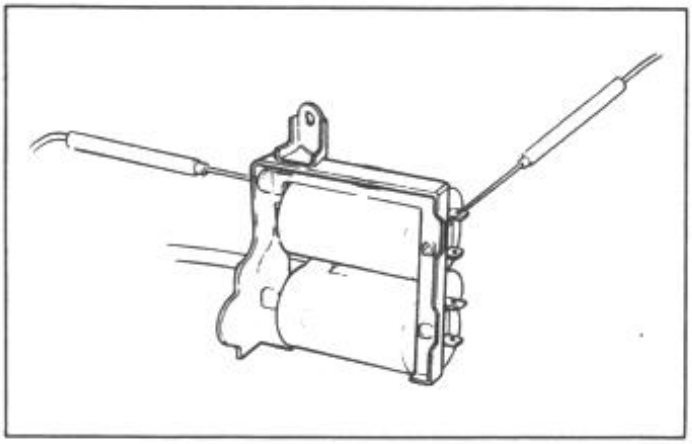
Measure the secondary coil resistance with the spark plug cap between the plug cap and the terminal.

STANDARD: 15—21 kΩ (at 20°C/68°F)



Remove the spark plug wire from teh ignition coil and measure the secondary coil resistance.

STANDARD: 11—15 kΩ (at 20°C/68°F)

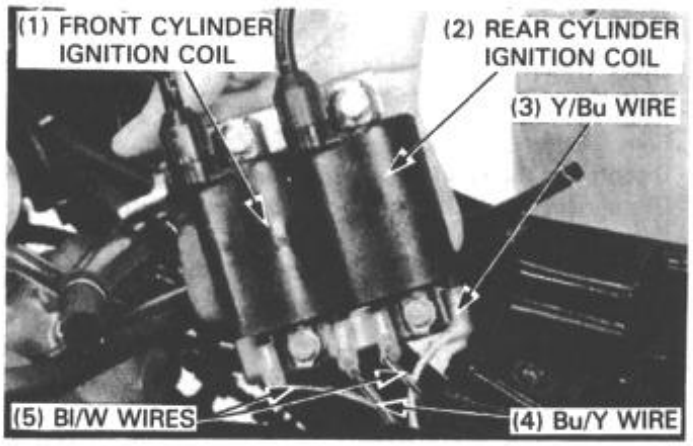


INSTALLATION

NOTE

- Connect the primary coil wires as follow:
  - Bl/W wires to black terminals
  - Bu/Y wire to green terminal (front cylinder)
  - Y/Bu wire to green terminal (rear cylinder)

Install the igntion coils in the reverse order of removal.



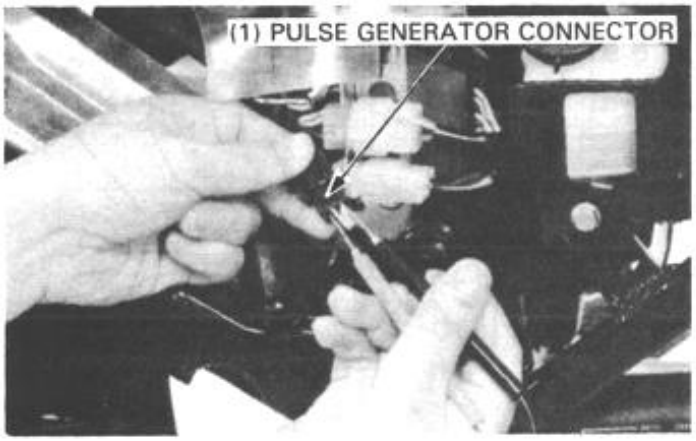
PULSE GENERATOR

INSPECTION

Remove the left side cover.
Disconnect the pulse generator connector (Black).
Measure the resistance between the W/Y (W/Bu) and Y (Bu) at the terminals.

STANDARD: 310–390 Ω (at 20°C/68°F)

For pulse generator removal, see page 7-4.



IGNITION TIMING

⚠ WARNING

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

NOTE

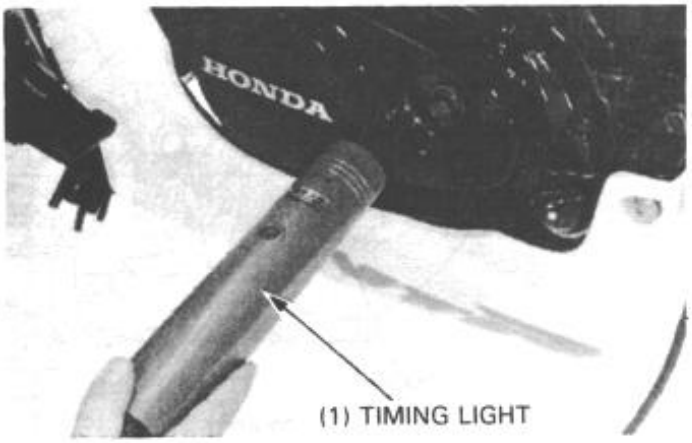
- The spark unit system is factory pre-set and cannot be adjusted. Ignition timing inspection procedures are given to inspect the function of the spark unit components.

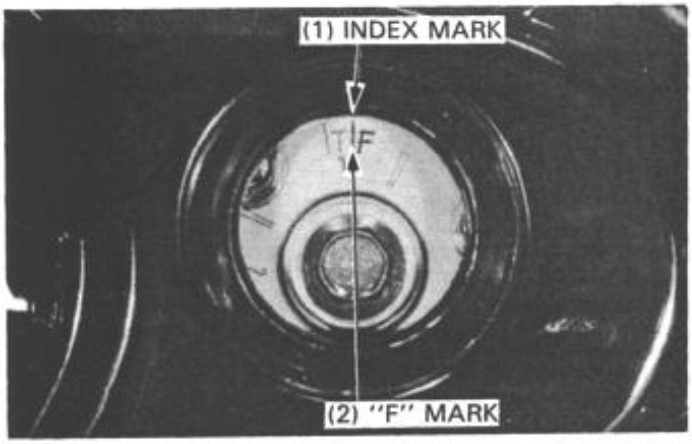
Warm up the engine to operating temperature.
Remove the crankshaft hole cap on the right crankcase cover.
Connect the timing light to the rear cylinder spark plug wire.

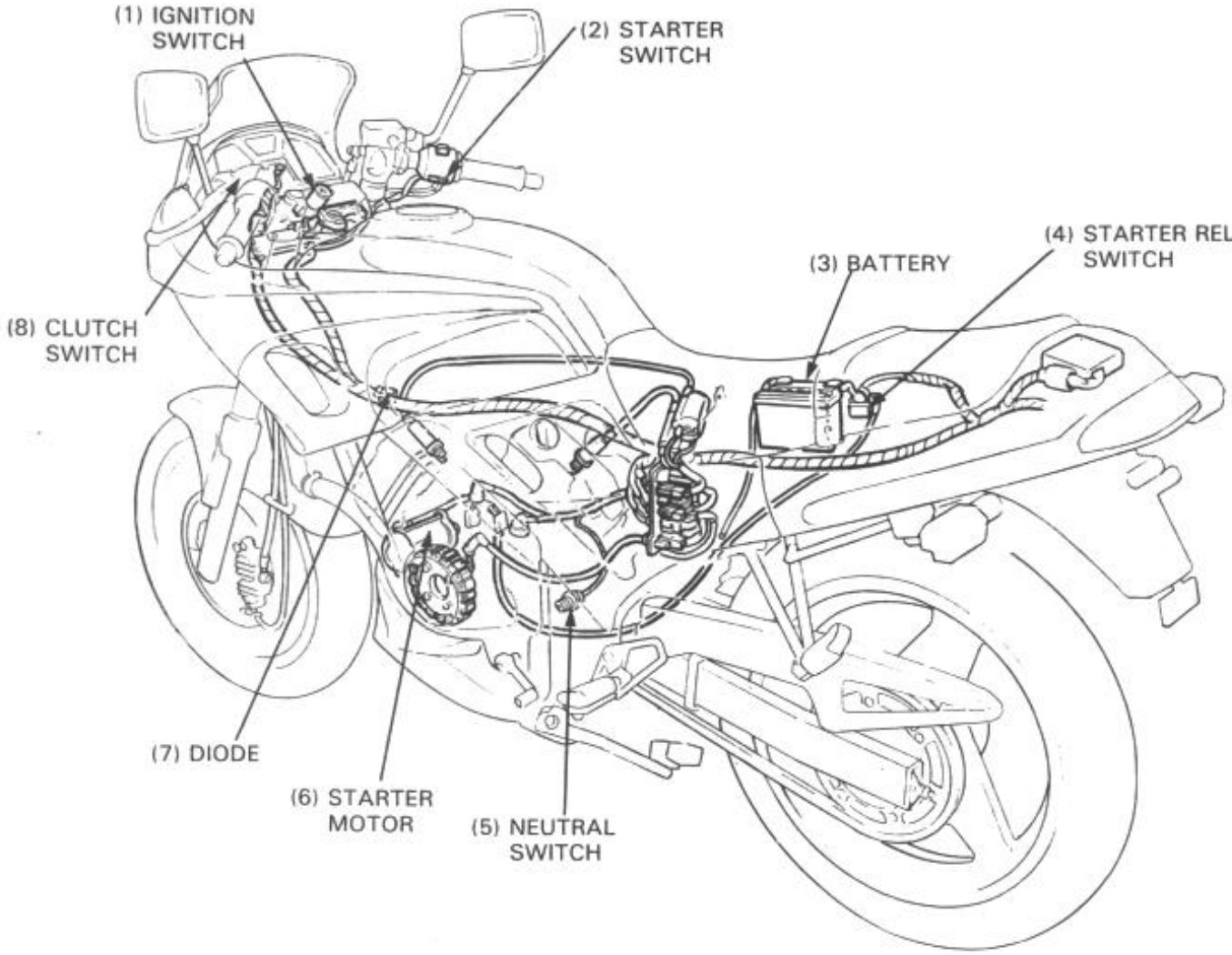
Start the engine and adjust the carburetor idle speed.

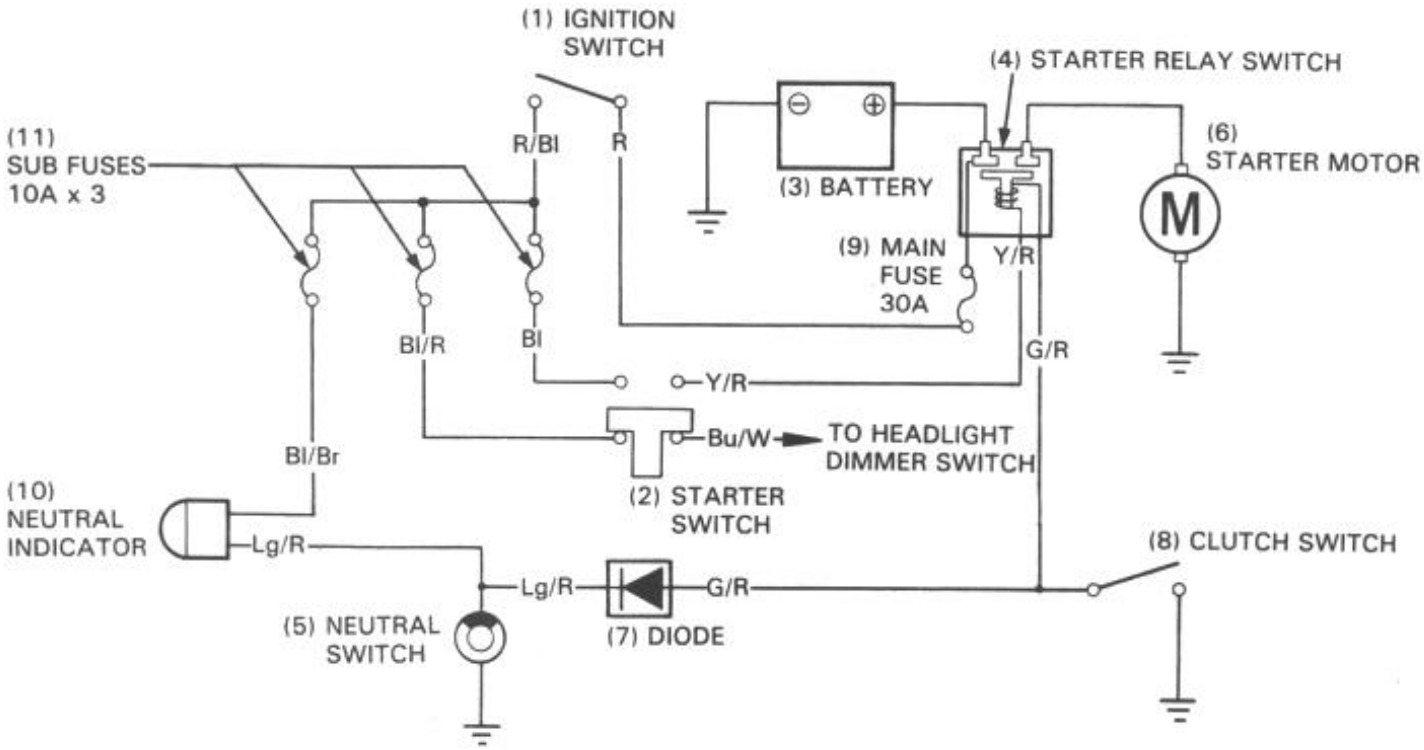
IDLE SPEED: 1,500 ± 100 rpm

The timing is correct if the "F" mark (T1 side) on the starter clutch cover aligns with the index mark on the right crankcase cover.






(1) IGNITION SWITCH
(2) STARTER SWITCH
(3) BATTERY
(4) STARTER RELAY SWITCH
(8) CLUTCH SWITCH
(7) DIODE
(6) STARTER MOTOR
(5) NEUTRAL SWITCH


(1) IGNITION SWITCH
(4) STARTER RELAY SWITCH
(11) SUB FUSES 10A x 3
R/Bl
R
(3) BATTERY
(6) STARTER MOTOR
M
(9) MAIN FUSE 30A
Y/R
Bl/R
Bl
G/R
Y/R
Bu/W
TO HEADLIGHT DIMMER SWITCH
(2) STARTER SWITCH
Bl/Br
(10) NEUTRAL INDICATOR
Lg/R
(8) CLUTCH SWITCH
Lg/R
G/R
(5) NEUTRAL SWITCH
(7) DIODE

SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-6
TROUBLESHOOTING	18-2	CLUTCH DIODE	18-7
STARTER MOTOR	18-3		

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.
- When inspecting the electric starter system, check the system components and lines step-by-step according to the troubleshooting chart on the next page.

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0–13.0 (0.47–0.51)	6.5 (0.26)

TOOLS

Special

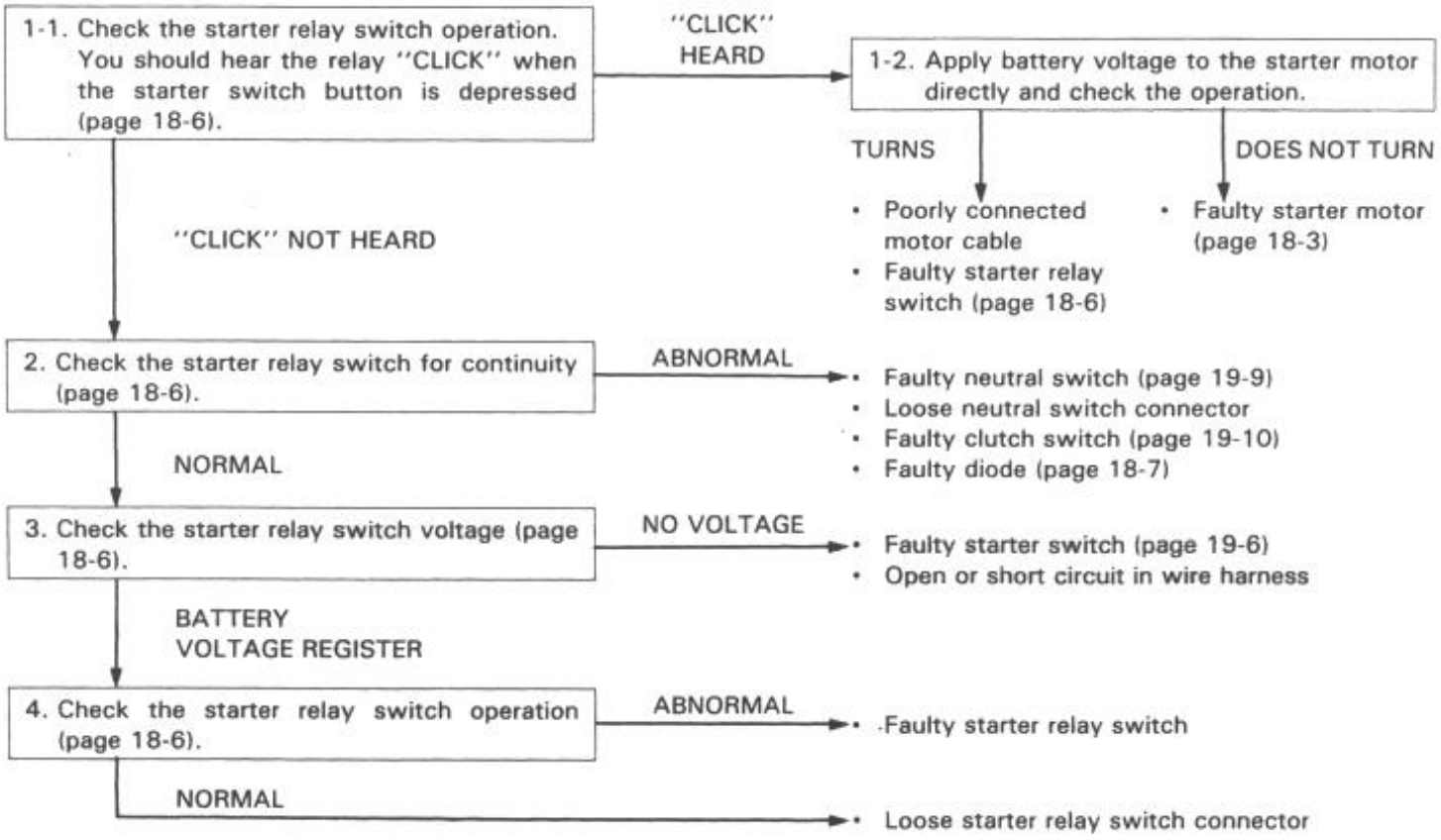
Digital multitester	07411–0020000 or KS–AHM–32–003 (U.S.A. only)
or	
Circuit tester (SANWA)	07308–0020001
or	
Circuit tester (KOWA)	TH–5H

TROUBLESHOOTING

NOTE

- The starter motor could turn when the transmission is in neutral or the clutch disengaged.
- Check the following items before troubleshooting the system.
  - Burned fuse (10 A).
  - Battery and starter motor cables for loose connection.
  - Battery discharged.

Starter motor does not turn



Starter motor turns engine slowly

- Low specific gravity
- Excessive resistance in circuit
- Binding in starter motor
- Worn brush
- Loose starter motor cable, ground cable or battery positive cable

Starter motor turns, but engine does not turn

- Faulty starter clutch (see section 7)
- Faulty starter reduction gears (see section 7)
- Starter motor reverse
  - installed brushes incorrectly
  - installed cable incorrectly

Starter motor and engine turns, but engine does not start

- Faulty ignition system (see section 17)
- Engine problems (see section 3)
  - Low compression
  - Fouled spark plugs

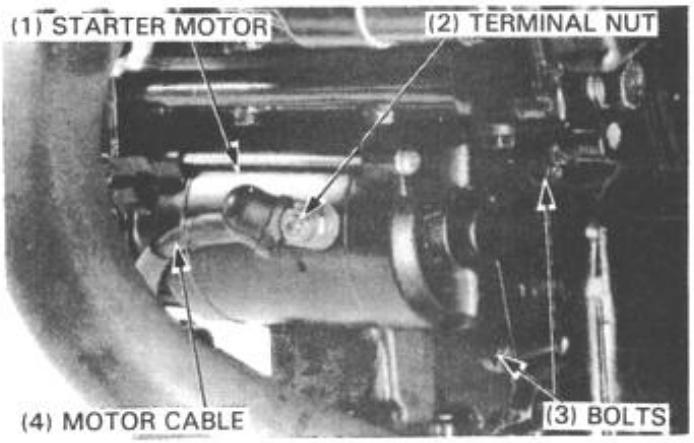
STARTER MOTOR

REMOVAL

⚠WARNING

- ***With the ignition switch OFF, remove the negative calbe at the battery before servicing the starter motor.***

Remove the lower fairing (page 12-1).
Disconnect the starter motor cable at the motor.
Remove the starter motor mounting bolts and starter motor.

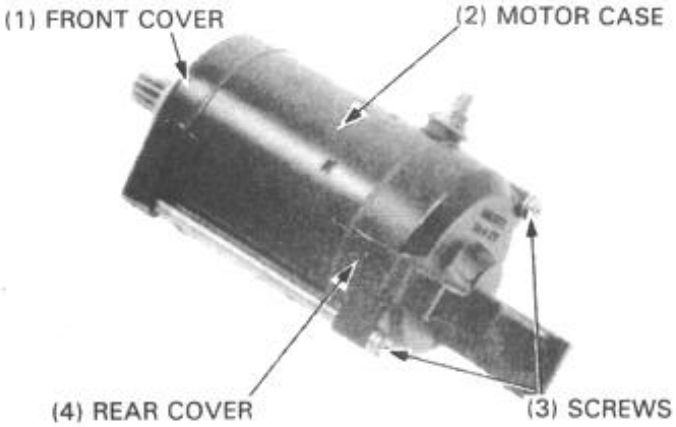


DISASSEMBLY

Remove the following:
- motor case serews
- front and rear covers
- armature

NOTE

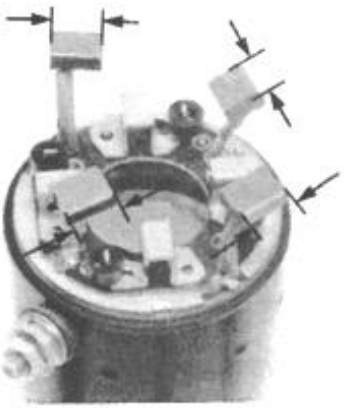
- Record the location and number of shims.



INSPECTION

Inspect the brushes and measure the brush length.

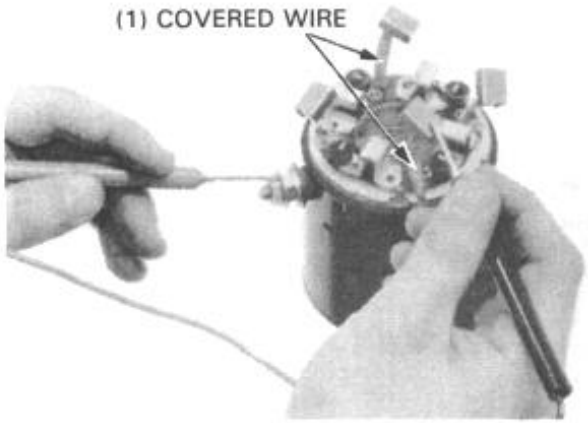
SERVICE LIMIT: 6.5 mm (0.26 in)



Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wires (covered).

CABLE TERMINAL—MOTOR CASE:
NO CONTINUITY: NORMAL

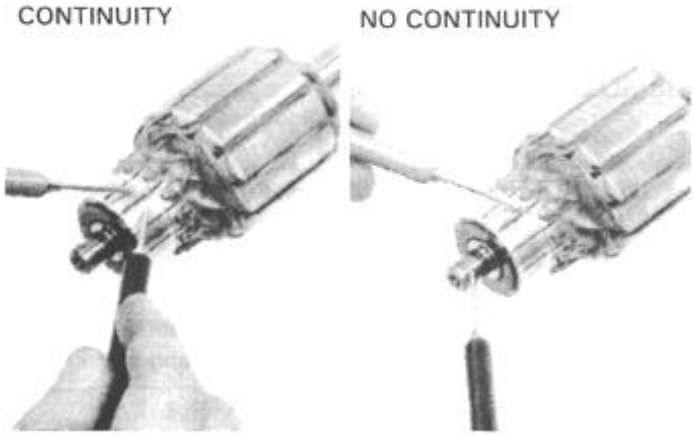
CABLE TERMINAL—BRUSH (COVERED WIRE):
CONTINUITY: NORMAL



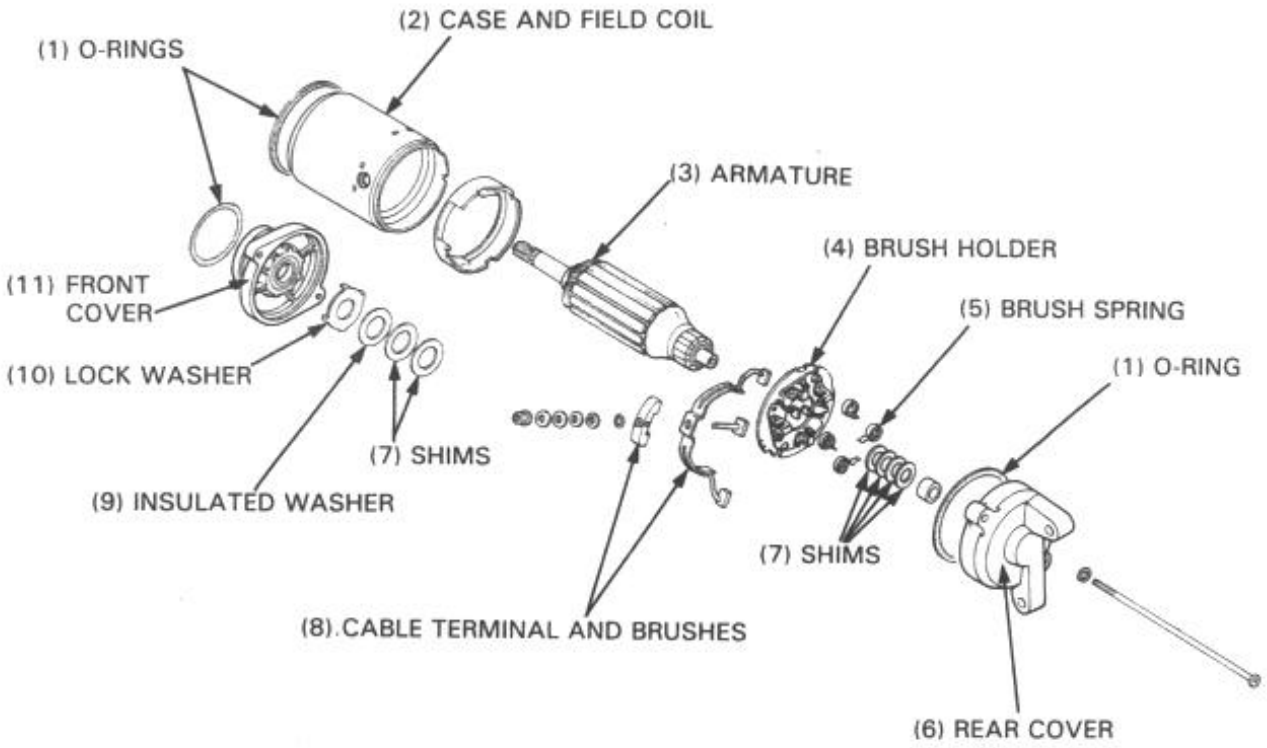
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.

Check for continuity between pairs of commutator bars, and also between commutator bars and armature shaft.

BETWEEN COMMUTATOR BARS: CONTINUITY
COMMUTATOR BAR—SHAFT: NO CONTINUITY



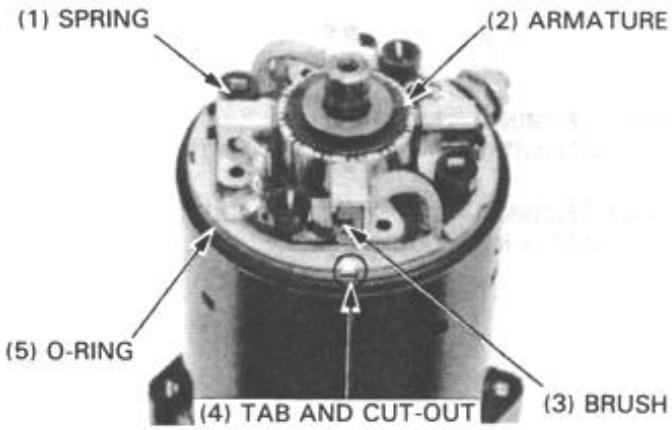
ASSEMBLY



Install the brush holder on the motor case aligning the holder tab with the cut-out in the case.
Set the brushes.

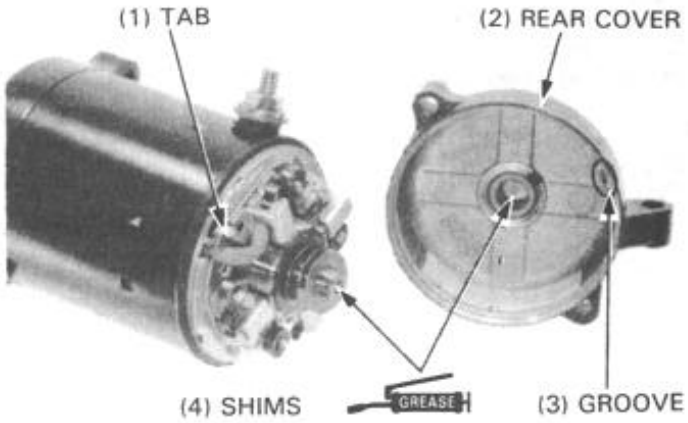
Install the armature into the case and secure the brushes with the springs.

Install the O-ring on the motor case.

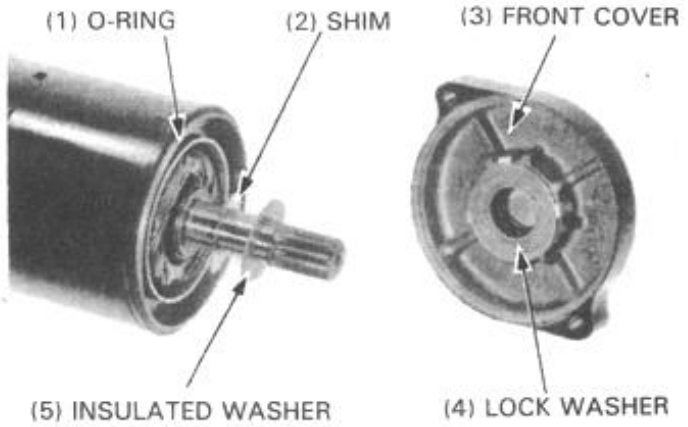


Install the shims on the armature shaft.
Apply grease to the shaft and its journal in the rear cover.

Install the rear cover aligning the tab on the brush holder with the groove in the cover.

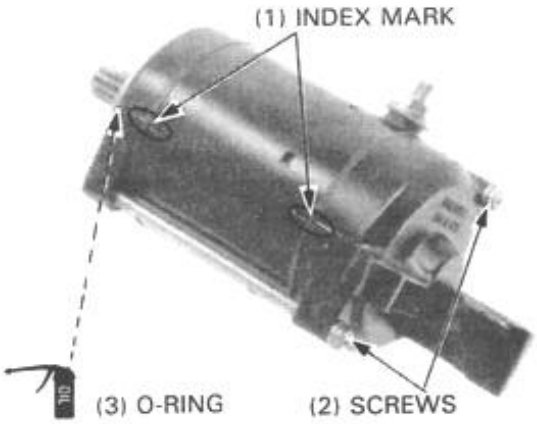


Install the following:
- shim and insulated washer on the shaft.
- lock washer on the front cover.
- O-ring on the case.
- front cover on the motor case.



Align the index marks and tighten the case screws securely.

Apply oil to the front cover O-ring.

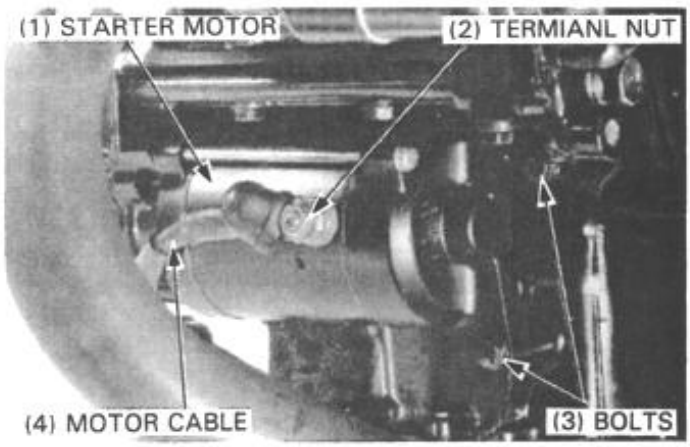


INSTALLATION

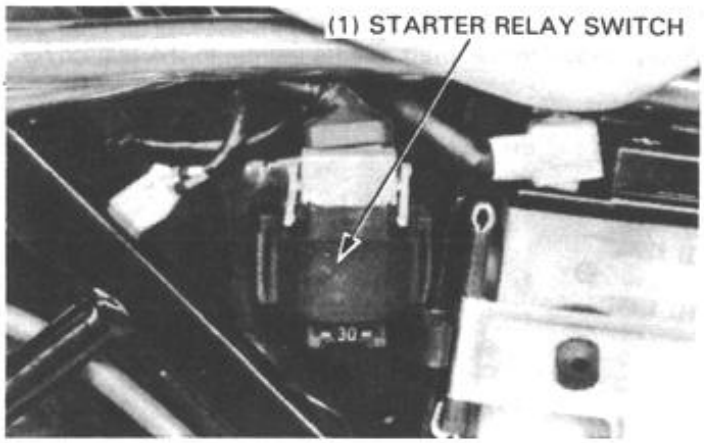
Install the starter motor on the engine and tighten its mouning bolts secruely.

Connect the starter motor cable and cover the terminal with rubber cap.
Connect the battery negative cable.

Install the lower fairing (page 12-3).



STARTER RELAY SWITCH



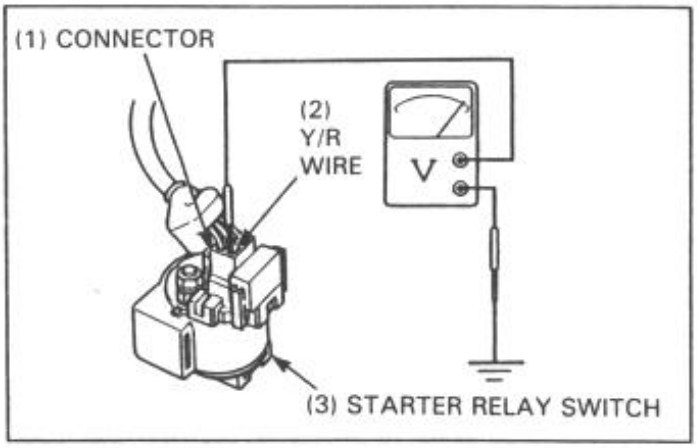
Depress the starter switch button with the ignition switch ON.

If the switch clicks, make on operational inspecton.
If the switch does not click, check the voltage and continuity.

INSPECTION

Voltage
Measure the voltage between the Y/R wire of the starter relay switch connector and body ground.

The battery voltage should appear when the starter switch button is depressed with ignition switch ON and the transmission in neutral.

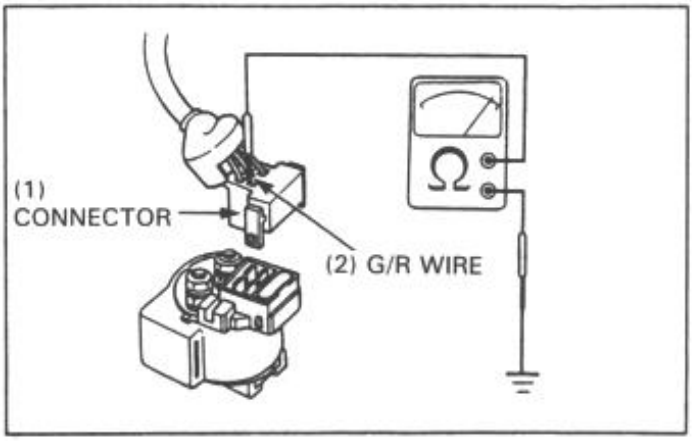


Continuity
Disconnect the starter relay switch connector.

Check the continuity between the G/R wire of the connector and body ground.
There should be continuity when the transmission is in neutral or when the clutch lever is pulled.

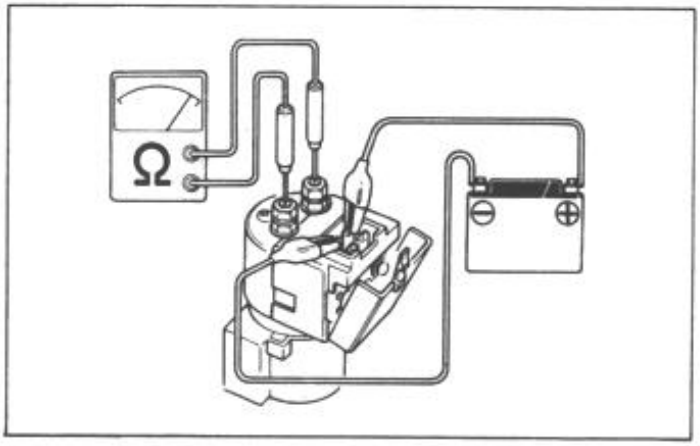
NOTE

- Because of the diode, there will be some resistance when transmission is in neutral.

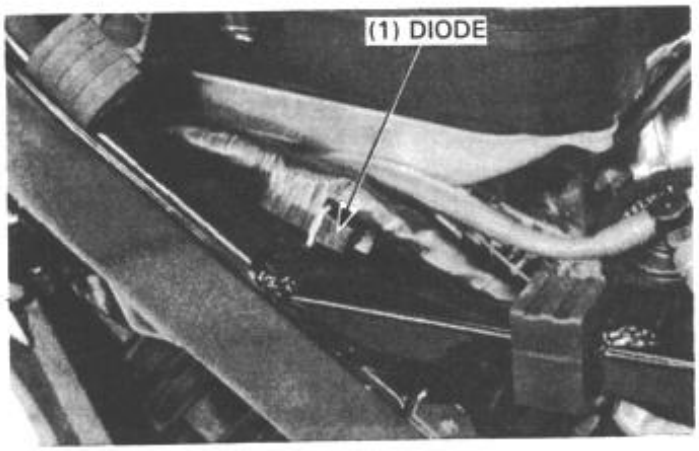


Operation
Connect an ohmmeter to the starter relay switch large terminals.
Connect a fully charged 12 V battery positive wire to the Y/R wire terminal; connect the battery negative wire to the G/R wire terminal.

The switch is normal if there is continuity.



CLUTCH DIODE



REMOVAL

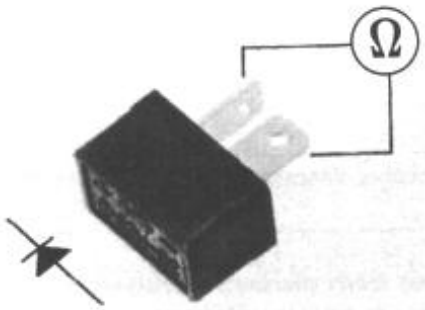
Remove the fuel tank (page 4-3).

Remove the clutch diode from the wire harness.

INSPECTION

Check for continuity with an ohmmeter.

NORMAL DIRECTION: CONTINUITY
REVERSE DIRECTION: NO CONTINUITY



19. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION	19-1	OIL PRESSURE SWITCH	19-7
HEADLIGHT	19-2	TEMPERATURE GAUGE	19-7
TAILLIGHT	19-3	THERMOSTATIC SWITCH	19-8
TURN SIGNAL	19-3	NEUTRAL SWITCH	19-9
LICENSE LIGHT	19-3	TACHOMETER	19-9
INSTRUMENT	19-4	BRAKE LIGHT SWITCH	19-9
IGNITION SWITCH	19-5	CLUTCH SWITCH	19-10
HANDLEBAR SWITCH	19-6	HORN	19-10

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***Use a heating element to heat the water/coolant mixture for thermo sensor inspection. Keep al flammable materials away from the heating element. Wear protective clothing, gloves and eye protection.***

- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance caused by corroded connections.

SPECIFICATIONS

Headlight (high/low)	12 V — 60/55 W
Brake/taillight	12 V — 27/8 W (32/3 cp) SAE No. 1157
License light	12 V — 8 W (4 cp)
Turn signal light	12 V — 23 W (32 cp) x 4 SAE No. 1034
Instrument light	12 V — 3.4 W x 3, 12 V — 3 W
Indicator light	12 V — 3 W x 3
Turn signal indicator light	12 V — 3.4 W x 2
Main fuse	30 A
Sub fuse	10 A x 6, 15 A

TORQUE VALUES

Thermostatic switch	18 N·m (1.8 kg-m, 13 ft-lb)
Temperature sensor	12 N·m (1.2 kg-m, 9 ft-lb) Apply sealant to the threads

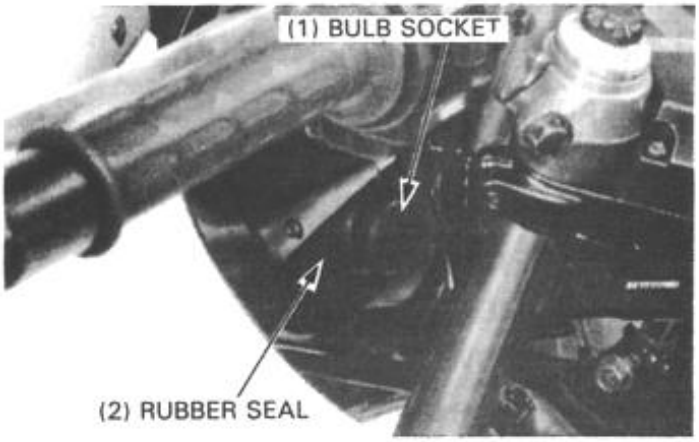
TOOLS

Special	
Digital multitester	07411—0020000 or KS—AHM—32—003 (U.S.A. only)
or	
Circuit tester (SANWA)	07308—0020001
or	
Circuit tester (KOWA)	TH—5H

HEADLIGHT

BULB REPLACEMENT

Disconnect the headlight bulb socket and remove the rubber seal.

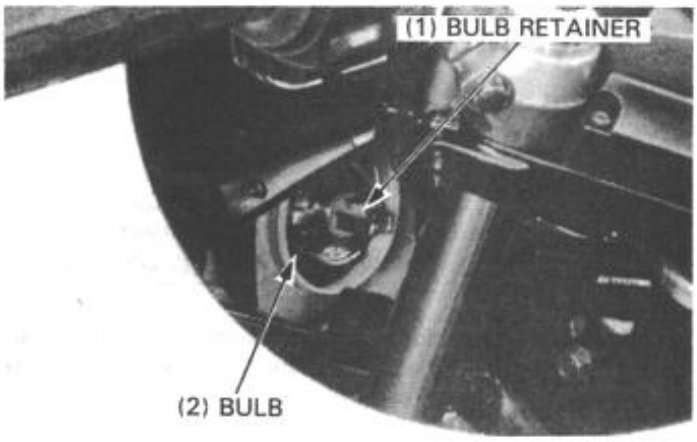


Unhook the bulb retainer and replace the headlight bulb with a new one.

CAUTION

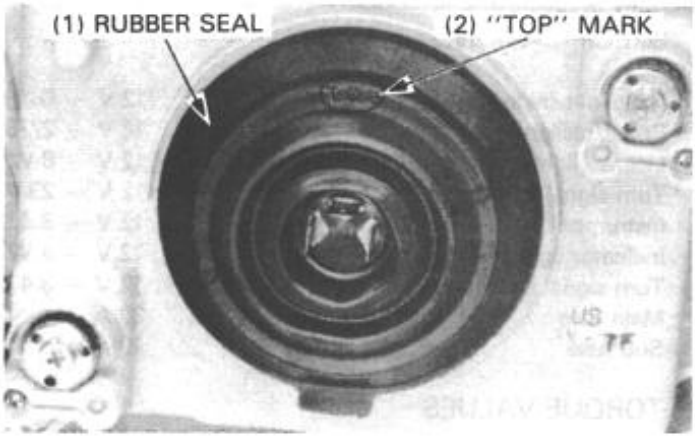
- *Wear clean gloves when installing the halogen bulb. If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.*

Install the bulb retainer.



Install the seal with the "TOP" mark facing up.

Connect the headlight bulb socket correctly.



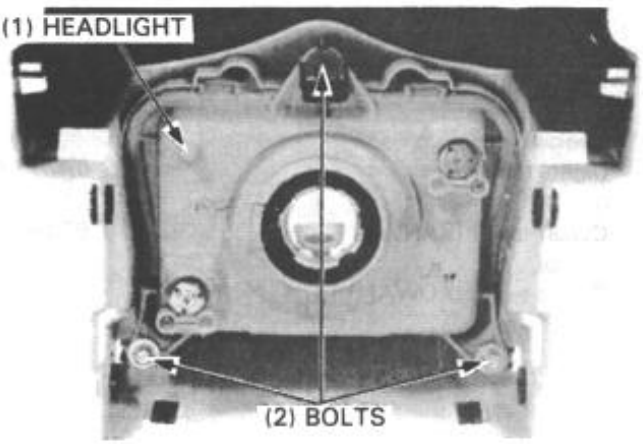
REMOVAL/INSTALLATION

Remove the upper fairing (page 12-3).
Remove the headlight mounting bolts and headlight.

Install the headlight and upper fairing (page 12-3).

NOTE

- Adjust the headlight aim after installation (page 3-16).



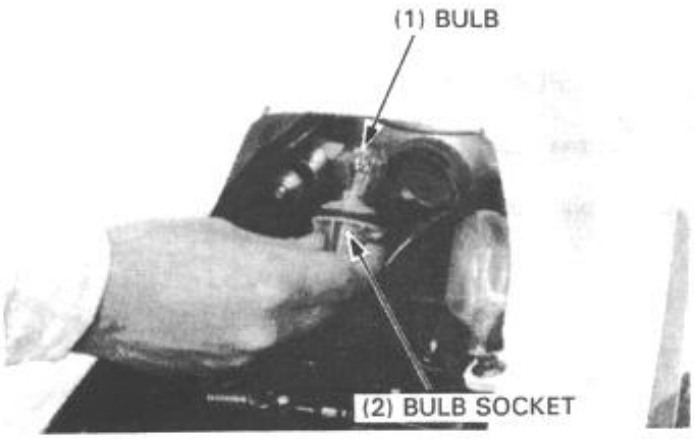
TAILLIGHT

BULB REPLACEMENT

Remove the seat.

Remove the bulb socket and bulb, rotating the socket to realease its tabs.

Replace the bulb with a new one.

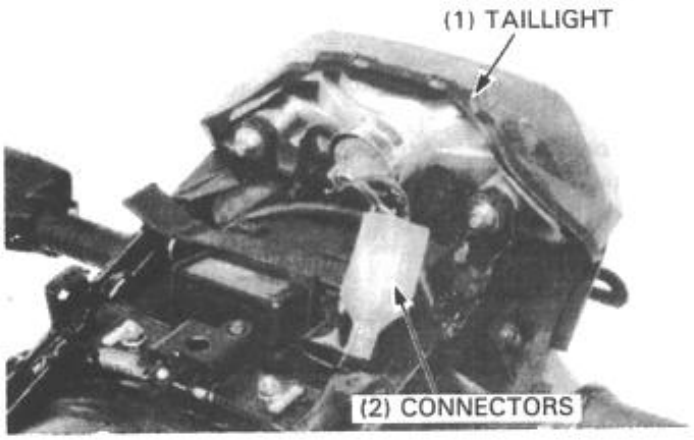


REMOVAL/INSTALLATION

Remove the rear cowl (page 12-4).

Disconnect the taillight wire connectors, remove the mounting nut and taillight.

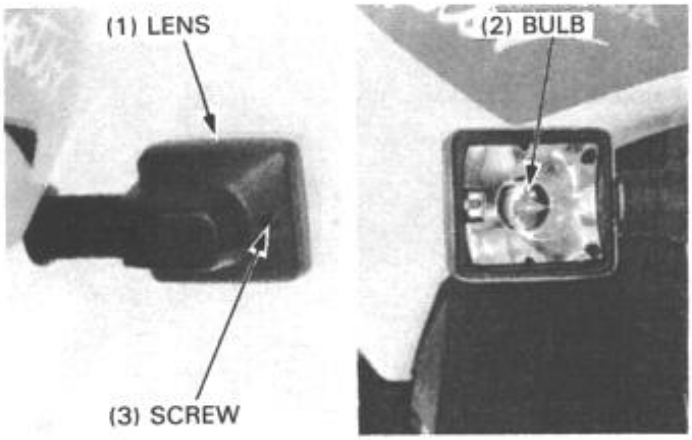
Install the taillight in the reverse order of removal.



TURN SIGNAL

Remove the screw and lens.

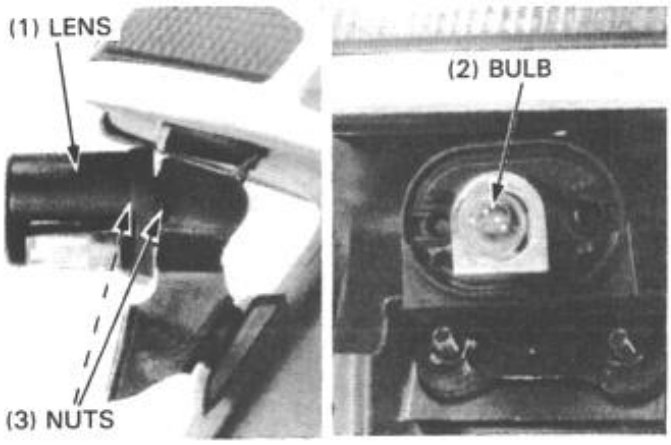
Replace the bulb with a new noe.



LICENSE LIGHT

Remove the nuts and lens.

Replace the bulb with a new one.

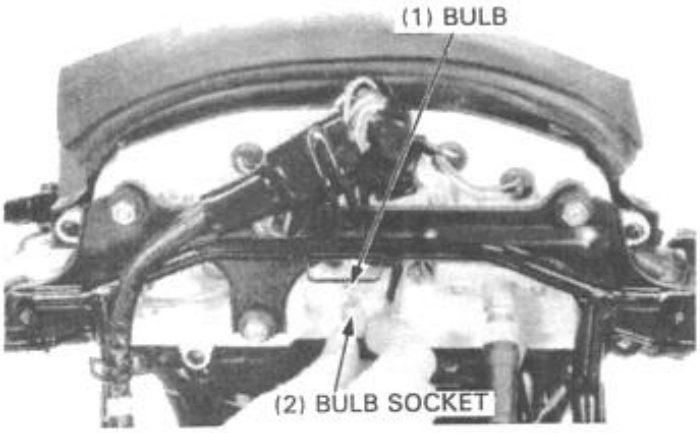


INSTRUMENT

BULB REPLACEMENT

Remove the upper fairing (page 12-3).

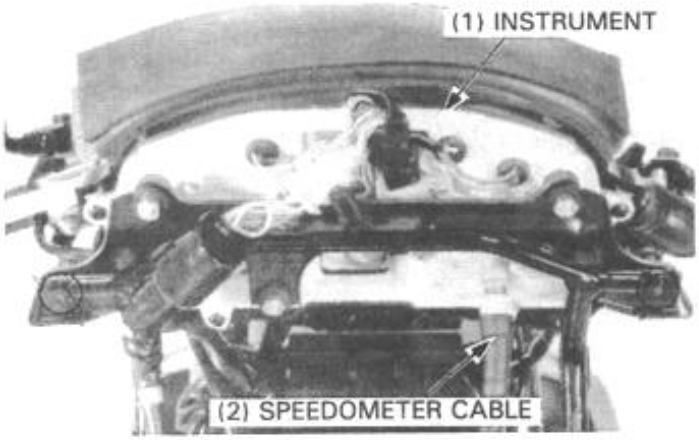
Pull the bulb socket out and replace the bulb with a new one.



REMOVAL

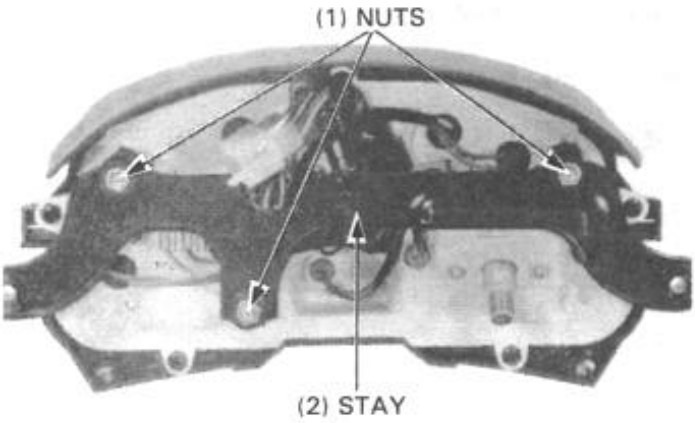
Disconnect the instrument wire connectors.

Disconnect the speedometer cable and remove the instrument mounting bolts and the instrument.

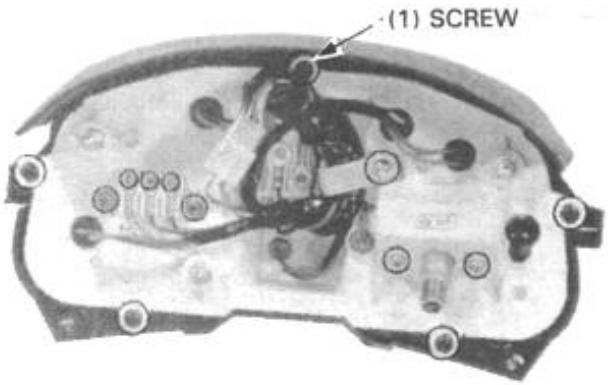


DISASSEMBLY

Remove the instrument stay.

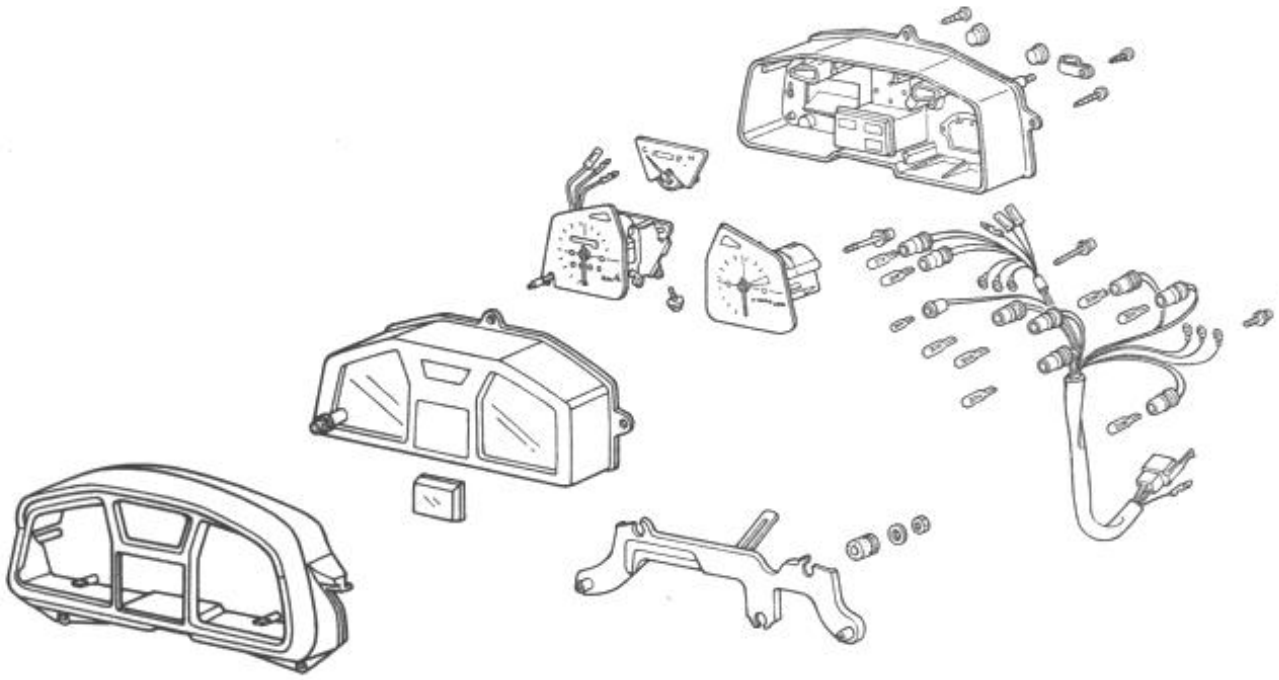


Remove the screws and disassemble the instrument.



ASSEMBLY

Assemble the instrument in the reverse order of disassembly and removal.

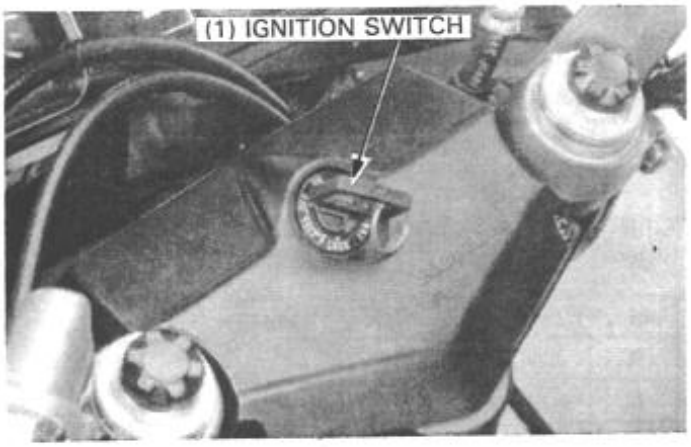


IGNITION SWITCH

INSPECTION

Check the continuity of the ignition switch coupler terminals in each switch position.

color	R	R/Bl	Bu/O	Br/W	Br	Y/Bl
ON	O	O	O	O	O	
OFF						
P. LOCK	O					O
LOCK						

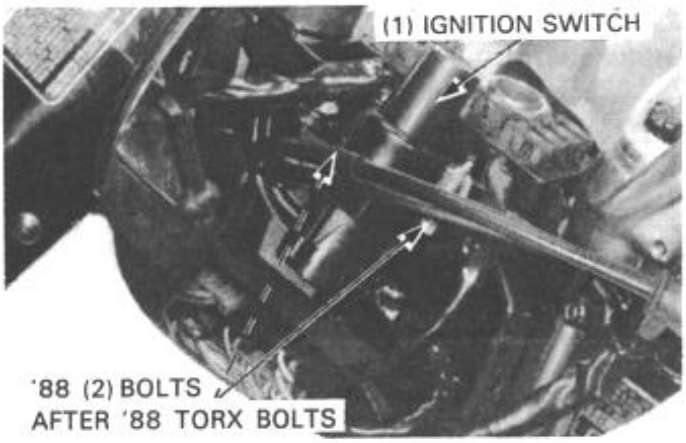


REMOVAL

Disconnect the ignition switch wire coupler.
Remove the mounting bolts and the ignition switch.

AFTER '88
TOOL:
Driver, Torx bit 50 07HJA-0010100-T50

Commercially available in U.S.A.

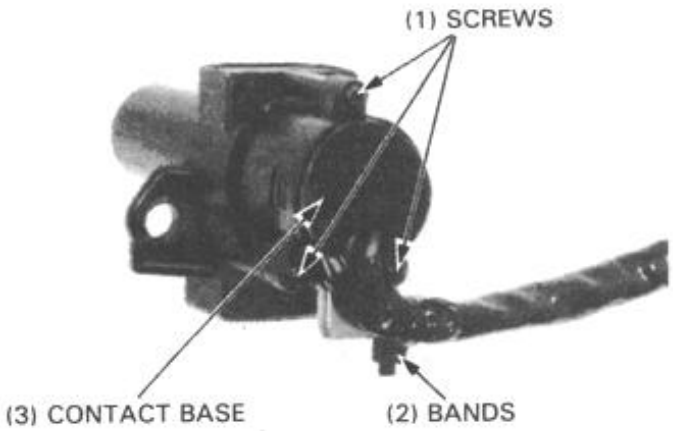


DISASSEMBLY

Cut the wire band.

Remove the three screws and pull the contact base out of the cylinder.

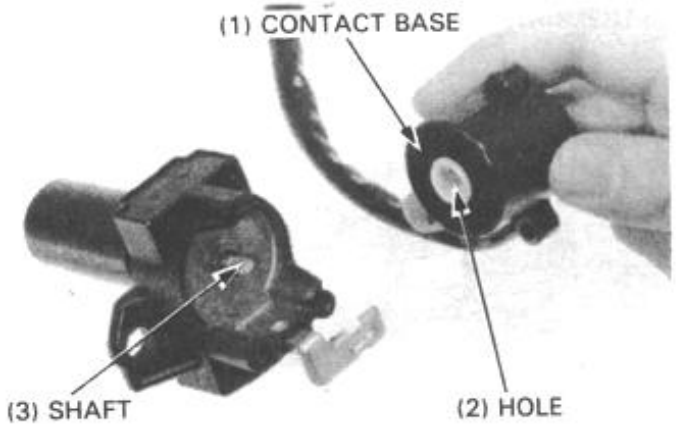
Replace the contact base with a new one.



ASSEMBLY

Install the contact base aligning the hole in the base with the shaft of the cylinder. Tighten the screws securely.
Clamp the wire to the stay securely with a new wire band.

Install the ignition switch in the reverse order of removal.



HANDLEBAR SWITCH

The handlebar switches must be replaced as assemblies.

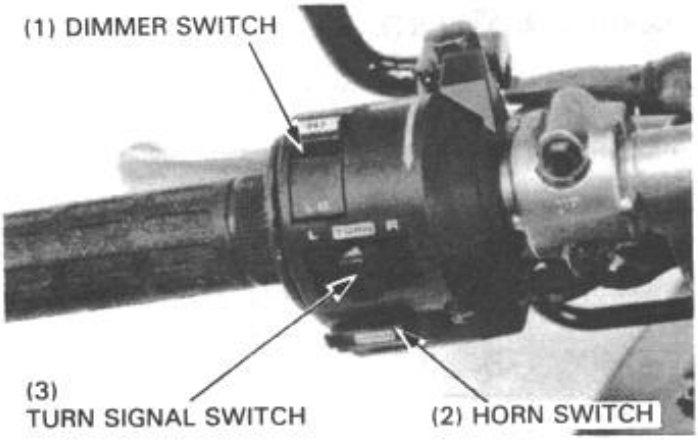
Continuity checks for the components of the handlebar cluster switches follow. Continuity should exsist between the color coded wires in each chart below.

TURN SIGNAL SWITCH

color	Gr	Lb	O
R	O	O	
N			
L	O		O

DIMMER SWITCH

color	Bu/W	W	L
Lo	O	O	
(N)	O	O	O
Hi	O		O

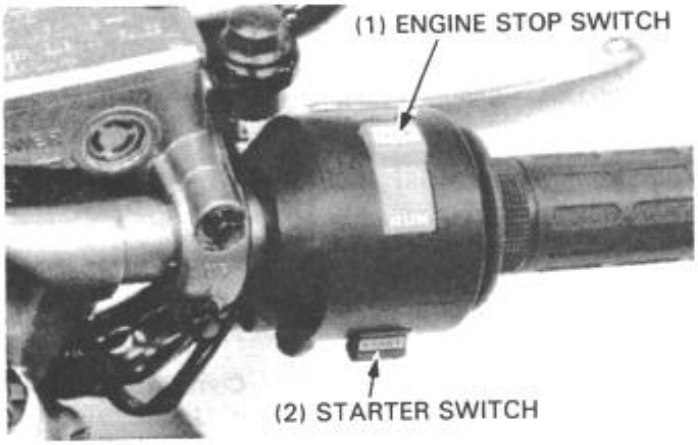


HORN SWITCH

color	W/G	Lg
FREE		
PUSH	O	O

ENGINE STOP SWITCH

color	Bl/W	Bl
OFF		
RUN	O	O



STARTER SWITCH

color	Y/R	Bl	Bu/W	Bl/R
FREE			O	O
PUSH	O	O		

OIL PRESSURE SWITCH

Check that the oil pressure warning indicator comes on when the ignition switch is turned "ON".

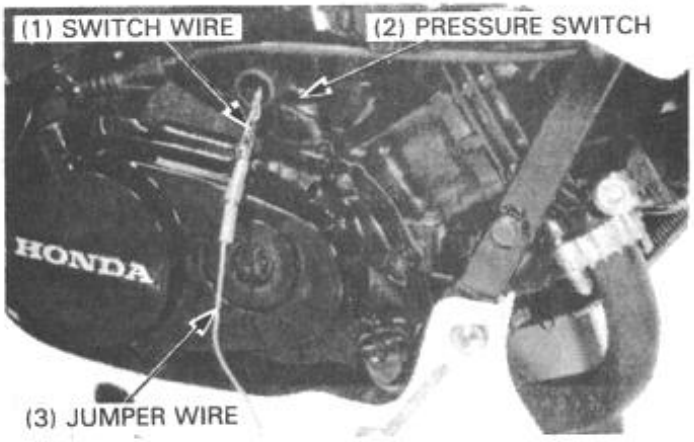
DOES NOT COME ON

Disconnect the oil pressure switch wire from the switch by removing the terminal screw.
Turn the ignition switch ON and ground the oil pressure switch wire to the engine.
If the pressure warning light comes on, the oil pressure switch is faulty.
If the pressure warning light does not come on, either the bulb is burned out or there is a short circuit in the wiring. Check the sub fuse also.

COMES ON WHEN ENGINE IS RUNNING

Check the engine oil level (page 2-4).
If the oil level is correct, disconnect the oil pressure switch wire from the switch and turn the ignition switch ON.
If the pressure warning light comes on, the wire between the bulb and switch is probably shorted.
If the pressure warning light does not come on, check the oil pressure (page 2-4).
Replace the oil pressure switch if the oil pressure is correct.





TEMPERATURE GAUGE

Remove the fuel tank (page 4-3).
Disconnect the sensor wire from the temperature sensor and short it to ground using a jumper wire.

CAUTION

- *Do not leave the temperature sensor wire grounded for longer than a few seconds, or the temperature gauge will be damaged.*

Turn the ignition switch ON.
The temperature gauge needle should move all the way to "H".
If the needle moves, the sensor is faulty.
Measure the voltage between the wire (+) and body ground (−) if the needle did not move.
If there is voltage, the temperature gauge is faulty.
Measure the voltage between the Bl/Br (+) and G/Bu (−) gauge wires if there was no voltage.

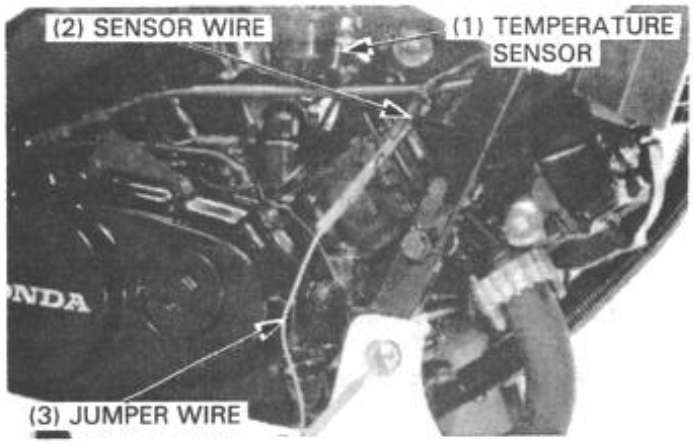
NOTE

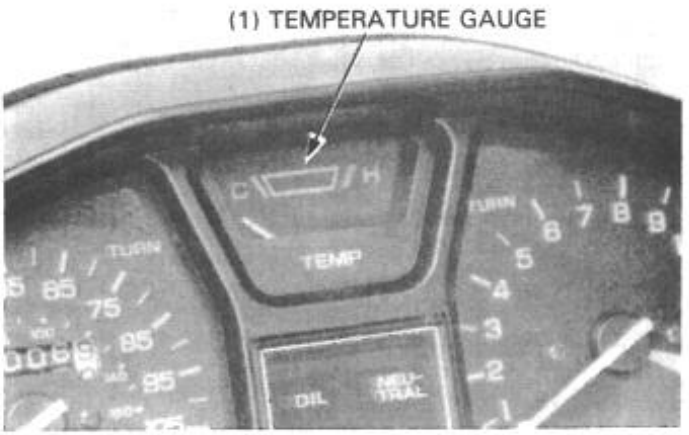
- Ground the temperature sensor wire.

CAUTION

- *Do not leave the temperature sensor wire grounded for longer than a few seconds, or the temperature gauge will be damaged.*

If there is voltage, the temperature gauge is faulty.
If there is no voltage, there is an open circuit in one or both of the gauge wires.





Drain the coolant (page 5-3) and remove the temperature sensor.

Suspend the unit in oil over a burner and measure the resistance through the unit as the oil heats up.

Temperature	50°C	80°C	100°C	120°C
	122°F	176°F	212°F	248°F
Resistance	123–179 Ω	47–57 Ω	26–30 Ω	14–18 Ω

⚠ WARNING

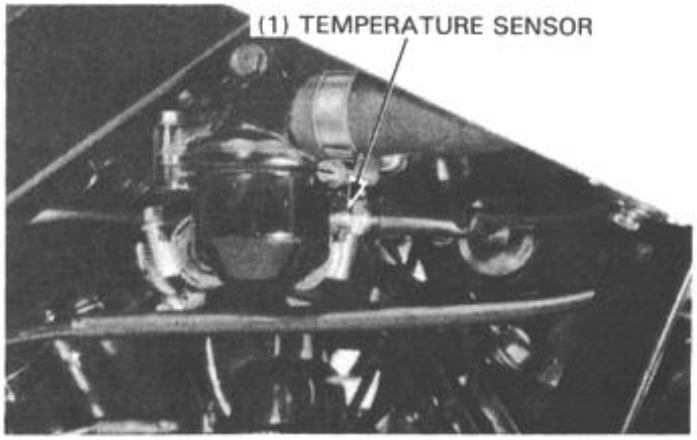
- ***Wear gloves and eye protection.***
- ***Heated oil is highly flammable. Keep it away from open flames.***

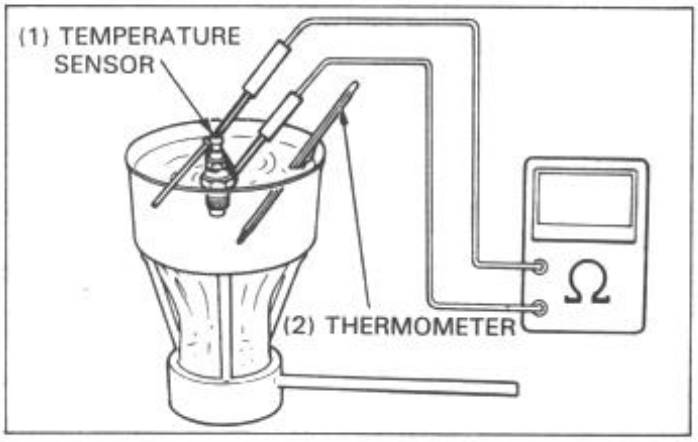
NOTE

- Oil must be used as the heated liquid to check operation above 100°C (212°F).
- You'll get false readings if either the thermometer or temperature unit touches the pan.

Apply sealant to the temperature sensor threads. Tighten the temperature sensor.

TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)





THERMOSTATIC SWITCH

NOTE

- Perform this inspection while the engine is cold.

The cooling fan motor is actuated by the thermostatic switch located in the radiator.

THE FAN DOES NOT STOP

Disconnect the thermostatic switch wire connector from the switch and turn the ignition switch ON.
If the fan stops the switch is faulty. If it does not stop, there is a short circuit between the switch and the fan motor.

THE FAN DOES NOT TURN

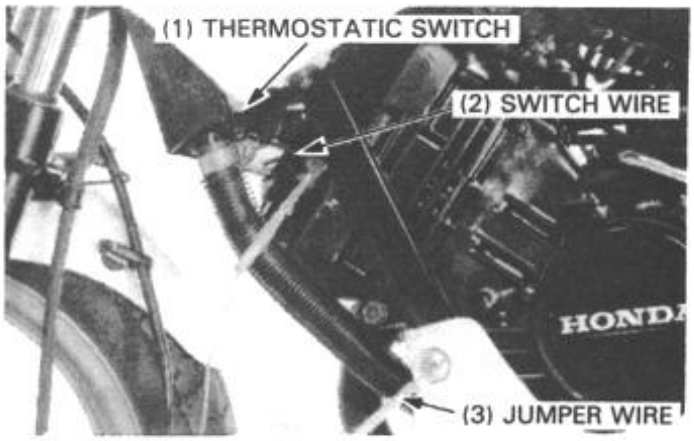
Inspect the coolant level (page 3-11) first.

Fill the cooling system and recheck the cooling fan operation if the coolant level is low.
Disconnect the thermostatic switch wire connector and ground the wire with a jumper wire.
Turn the ignition switch ON. The fan should turn. If it does, check for an open circuit in wire harness, burned sub-fuse, faulty ignition switch or loose connection between the ignition switch and fuse holder.

If the fan does not turn, measure the voltage between the connector terminal (+) and body ground (–).
If battery voltage resisters, replace the fan motor.

Tighten the thermostatic switch to the specified torque.

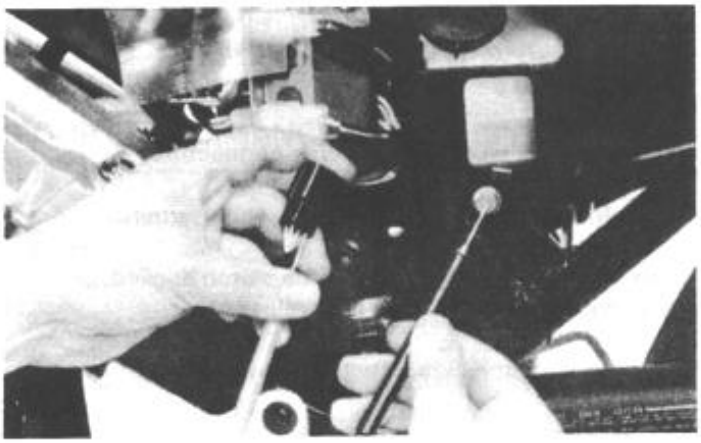
TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb)



NEUTRAL SWITCH

Disconnect the pulse generator connector.
Check continuity between the Lg/R wire and ground in each gear position.

Neutral: Continuity
Other positions: No continuity

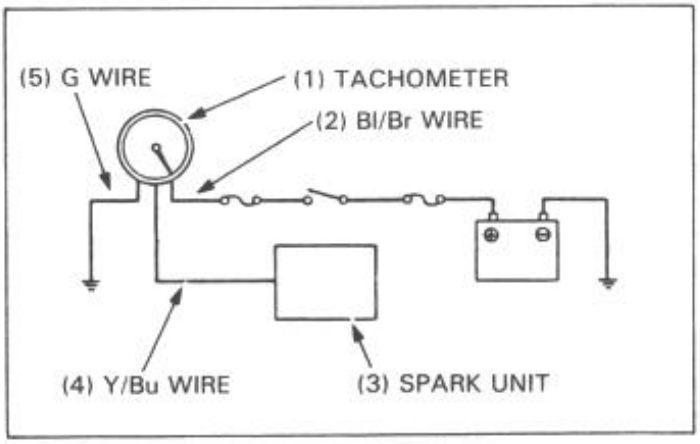


TACHOMETER

If the tachometer does not work properly, remove the upper fairing (page 12-2) and seat.
Measure the battery voltage between the Bl/Br (+) and G (−) wires at the tachometer with the ignition switch ON.
If there is no voltage, check for an open circuit in Bl/Br or G wires.
If there is voltage, check the continuity of the Y/Bu wire between the tachometer and the spark unit.
If there is no continuity, check for an open circuit in Y/Bu wire, or a loose connection.
If there is continuity, measure the voltage between the Y/Bu wire (+) and body ground (−) while the engine is running.

⚠ WARNING

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



If there is voltage, replace the tachometer.
If there is no voltage, replace the spark unit.

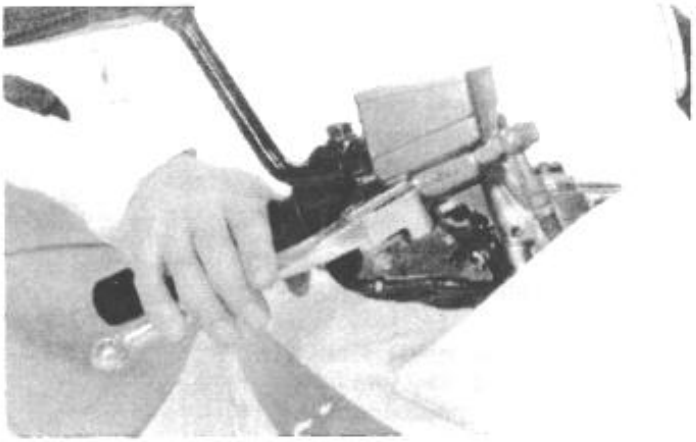
BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the front brake applied, and should be no continuity when the brake is released.

Replace the switch if necessary.



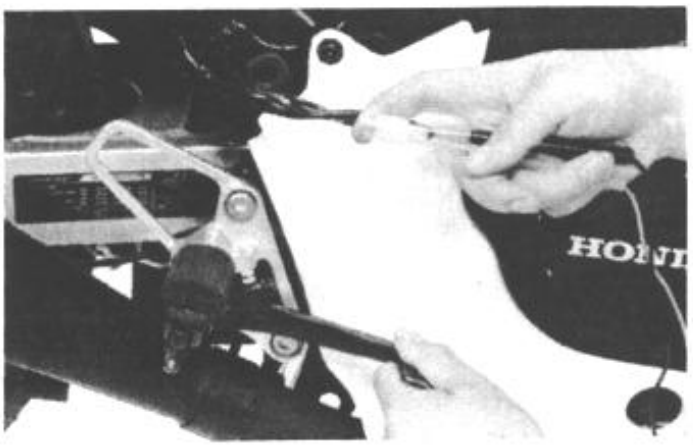
REAR

Remove the right side cover.

Disconnect the rear brake light switch connector and check for continuity between the terminals.

There should be continuity with the rear brake applied and should be no continuity with the brake released.

Replace the rear brake light switch, if necessary.



CLUTCH SWITCH



INSPECTION

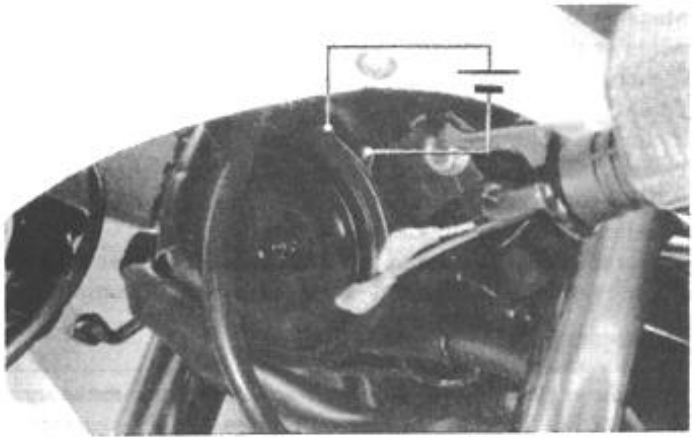
Disconnect the clutch switch wire connectors.

Check for continuity between the switch terminals.

There should be continuity with the clutch applied, and should be no continuity with the clutch released.

Replace the clutch switch with a new one if necessary.

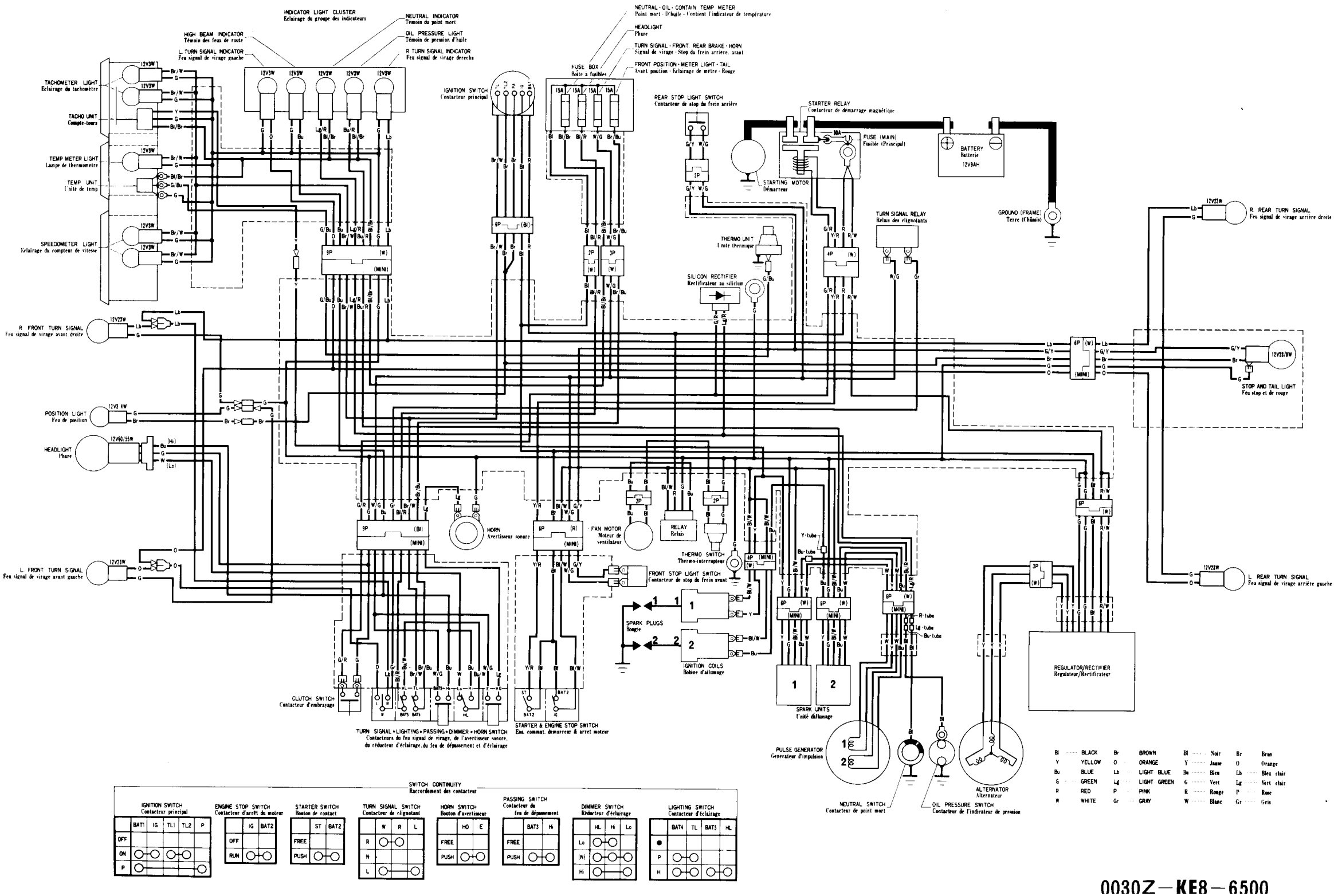
HORN



INSPECTION

Disconnect the horn wire connectors and connect a fully charged 12 V battery to the horn terminals.

The horn is normal if it sounds when the battery is connected across the terminals.


INDICATOR LIGHT CLUSTER
Eclairage du groupe des indicateurs
NEUTRAL INDICATOR
Témoin du point mort
HIGH BEAM INDICATOR
Témoin des feux de route
OIL PRESSURE LIGHT
Témoin de pression d'huile
L TURN SIGNAL INDICATOR
Feu signal de virage gauche
R TURN SIGNAL INDICATOR
Feu signal de virage droite
NEUTRAL · OIL · CONTAIN TEMP METER
Point mort · D'huile · Contient l'indicateur de température
HEADLIGHT
Phare
TURN SIGNAL · FRONT. REAR BRAKE · HORN
Signal de virage · Stop du frein arrière, avant
FRONT POSITION · METER LIGHT · TAIL
Avant position · Eclairage de mètre · Rouge
FUSE BOX
Boite a fusibles
TACHOMETER LIGHT
Eclairage du tachomètre
TACHO UNIT
Compte-tours
TEMP METER LIGHT
Lampe de thermomètre
TEMP. UNIT
Unité de temp
SPEEDOMETER LIGHT
Eclairage du compteur de vitesse
IGNITION SWITCH
Contacteur principal
REAR STOP LIGHT SWITCH
Contacteur de stop du frein arrière
STARTER RELAY
Contacteur de démarrage magnétique
FUSE (MAIN)
Fusible (Principal)
BATTERY
Batterie
12V8AH
STARTING MOTOR
Démarreur
GROUND (FRAME)
Terre (Châssis)
TURN SIGNAL RELAY
Relais des clignotants
THERMO UNIT
Unité thermique
SILICON RECTIFIER
Rectificateur au silicium
R REAR TURN SIGNAL
Feu signal de virage arrière droite
R FRONT TURN SIGNAL
Feu signal de virage avant droite
STOP AND TAIL LIGHT
Feu stop et de rouge
POSITION LIGHT
Feu de position
HEADLIGHT
Phare
HORN
Avertisseur sonore
FAN MOTOR
Moteur de ventilateur
RELAY
Relais
THERMO SWITCH
Thermo-interrupteur
FRONT STOP LIGHT SWITCH
Contacteur de stop du frein avant
SPARK PLUGS
Bougie
IGNITION COILS
Bobine d'allumage
L FRONT TURN SIGNAL
Feu signal de virage avant gauche
L REAR TURN SIGNAL
Feu signal de virage arrière gauche
REGULATOR/RECTIFIER
Régulateur/Rectifirateur
CLUTCH SWITCH
Contacteur d'embrayage
TURN SIGNAL · LIGHTING · PASSING · DIMMER · HORN SWITCH
Contacteurs du feu signal de virage, de l'avertisseur sonore, du réducteur d'éclairage, du feu de dépannement et d'éclairage
STARTER & ENGINE STOP SWITCH
Ens. commut. demarreur & arret moteur
SPARK UNITS
L'nité d'allumage
PULSE GENERATOR
Generateur d'impulsion
NEUTRAL SWITCH
Contacteur de point mort
OIL PRESSURE SWITCH
Contacteur de l'indicateur de pression
ALTERNATOR
Alternateur
SWITCH CONTINUITY
Raccordement des contacteur
IGNITION SWITCH
Contacteur principal
ENGINE STOP SWITCH
Contacteur d'arrêt du moteur
STARTER SWITCH
Bouton de contact
TURN SIGNAL SWITCH
Contacteur de clignotant
HORN SWITCH
Bouton d'avertisseur
PASSING SWITCH
Contacteur de feu de dépannement
DIMMER SWITCH
Réducteur d'éclairage
LIGHTING SWITCH
Contacteur d'éclairage
BLACK Noir
BROWN Brun
YELLOW Jaune
ORANGE Orange
BLUE Bleu
LIGHT BLUE Bleu clair
GREEN Vert
LIGHT GREEN Vert clair
RED Rouge
PINK Rose
WHITE Blanc
GRAY Gris

ENGINE DOES NOT START OR IS HARD TO START	21-1	POOR PERFORMANCE AT LOW AND IDLE SPEED	21-3
ENGINE LACKS POWER	21-2	POOR PERFORMANCE AT HIGH SPEED	21-4

ENGINE DOES NOT START OR IS HARD TO START

		Possible cause
1. Check fuel flow to carburetor	NOT REACHING CARBURETOR →	• Clogged automatic fuel valve • Fuel tank empty • Clogged fuel line or fuel filter • Sticking float valve • Faulty automatic fuel valve • Clogged vacuum tube • Clogged fuel tank vent hole
REACHING CARBUTRETOR ↓		
2. Check spark plug condition	FOULED, DISCOLORED OR WET →	• Mixture too rich • Carburetor flooded • carburetor choke excessively opened • Cylinder flooded • Air cleaner dirty • Spark plugs not serviced frequently enough • Spark plug with incorrect heat range
NORMAL ↓		
3. Perform spark test	WEAK OR NO SPARK →	• GO TO PAGE 17-2
GOOD SPARK ↓		
4. Test cylinder compression	LOW COMPRESSION →	• Low battery charge • Improper valve clearance (too small) • Valve stuck open • Worn cylinder and piston rings • Damaged cylinder head gasket • Seized valve • Improper valve timing
NORMAL ↓		
5. Start by following normal procedure	ENGINE STARTS BUT STOPS →	• Improper choke operation • Carburetor incorrectly adjusted • Insulator leaking • Improper ignition timing • Fuel contaminated
ENGINE DOES NOT START ↓		
6. Start with choke applied		

ENGINE LACKS POWER

		Possible cause
1. Raise wheels off ground and spin by hand WHEELS SPIN FREELY	WHEELS DO NOT SPIN FREELY →	• Brake dragging • Worn or damaged wheel bearings • Drive chain too tight • Rear axle nut excessively tight
2. Check tire pressure PRESSURE NORMAL	PRESSURE LOW →	• Punctured tire • Faulty tire valve
3. Check for slipping clutch CLUTCH ENGAGED PROPERLY	CLUTCH SLIPS →	• Faulty clutch lifter system • Worn clutch disc/plate • Warped clutch disc/plate
4. Accelerate lightly ENGINE SPEED INCREASES	ENGINE SPEED DOES NOT INCREASE →	• Carburetor choke opened • Clogged air cleaner • Restricted fuel flow • Clogged muffler • Clogged fuel tank vent hole
5. Check oil level and condition CORRECT	INCORRECT →	• Oil level too high • Oil level too low • Contaminated oil
6. Check ignition timing CORRECT	INCORRECT →	• GO TO PAGE 17-2
7. Check spark plug condition NORMAL	FOULED, DISCOLORED OR WET →	• Spark plugs not serviced frequently enough • Spark plug with incoreect heat range • Mixture too rich • Carburetor flooded • Carburetor bystarter valve excessively opened • Cylinder flooded • Air cleaner dirty
8. Test cylinder compression NORMAL	LOW COMPRESSION →	• Valve stuck open • Worn cylinder and piston rings • Damaged cylinder head gasket • Improper valve timing • Low battery charge • Improper valve clearance (too small) • Seized valve
9. Remove cylinder head cover and inspect lubrication VALVE TRAIN LUBRICATED PROPERLY	VALVE TRAIN NOT LUBRICATED PROPERLY →	• Clogged oil passage • Clogged oil pipe • Faulty oil pump
10. Check valve clearance COORECT	INCORRECT →	• Improper valve adjustment • Worn vlave seat

11. Check carburetor for clogging	CLOGGED →	• Carburetor not serviced frequently enough • Faulty air cleaner
NOT CLOGGED ↓		
12. Check for engine overheating	OVERHEATING →	• Coolant level low • Fan motor not working (thermostatic switch) • Thermostat stuck closed • Excessive carbon build-up in combustion chamber • Use of poor quality fuel • Faulty radiator
NOT OVERHEATING ↓		
13. Accelerate or run at high speed	ENGINE KNOCKS →	• Worn piston and cylinder • Wrong type of fuel • Excessive carbon build-up in combustion chamber • Ignition timing too advanced
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND ILDE SPEEDS

		Possible cause
1. Perform spark test	WEAK OR INTERMITTENT SPARK →	• GO TO PAGE 17-2
GOOD SPARK ↓		
2. Check for leaking carburetor insulator	LEAKING →	• Loose carburetor • Damaged insulator
NO LEAK ↓		
3. Check carburetor pilot screw adjustment	INCORRECT →	• GO TO PAGE 4-16
CORRECT ↓		
4. Check ignition timing	INCORRECT →	• GO TO PAGE 17-2
CORRECT ↓		
5. Check valve clearance	INCORRECT →	• Improper valve adjustment • Worn valve seat
CORRECT		

POOR PERFORMANCE AT HIGH SPEED

NOTE: Ignition to the cylinders is cut-off at front: 12,950—13,150 rpm, rear: 13,450—13,650 rpm to prevent engine damage.

		Possible cause
1. Check ignition timing	INCORRECT →	GO TO PAGE 17-2
CORRECT ↓		
2. Check fuel flow to carburetor	NOT REACHING CARBURETOR →	• Fuel tank empty • Clogged fuel line or fuel filter • Clogged fuel tank vent hole • Clogged fuel valve vacuum tube • Faulty automatic fuel valve • Clogged automatic fuel valve • Sticking float valve
REACHING CARBURETOR ↓		
3. Check valve timing	INCORRECT →	• Camshaft not installed properly
CORRECT ↓		
4. Check valve clearance	INCORRECT →	• Improper valve adjustment • Worn valve seat
CORRECT ↓		
5. Check valve spring tension	WEAK →	Faulty spring
NOT WEAKENED ↓		
6. Remove carburetors and check for clogged jets	CLOGGED →	Clean
JETS OK		