

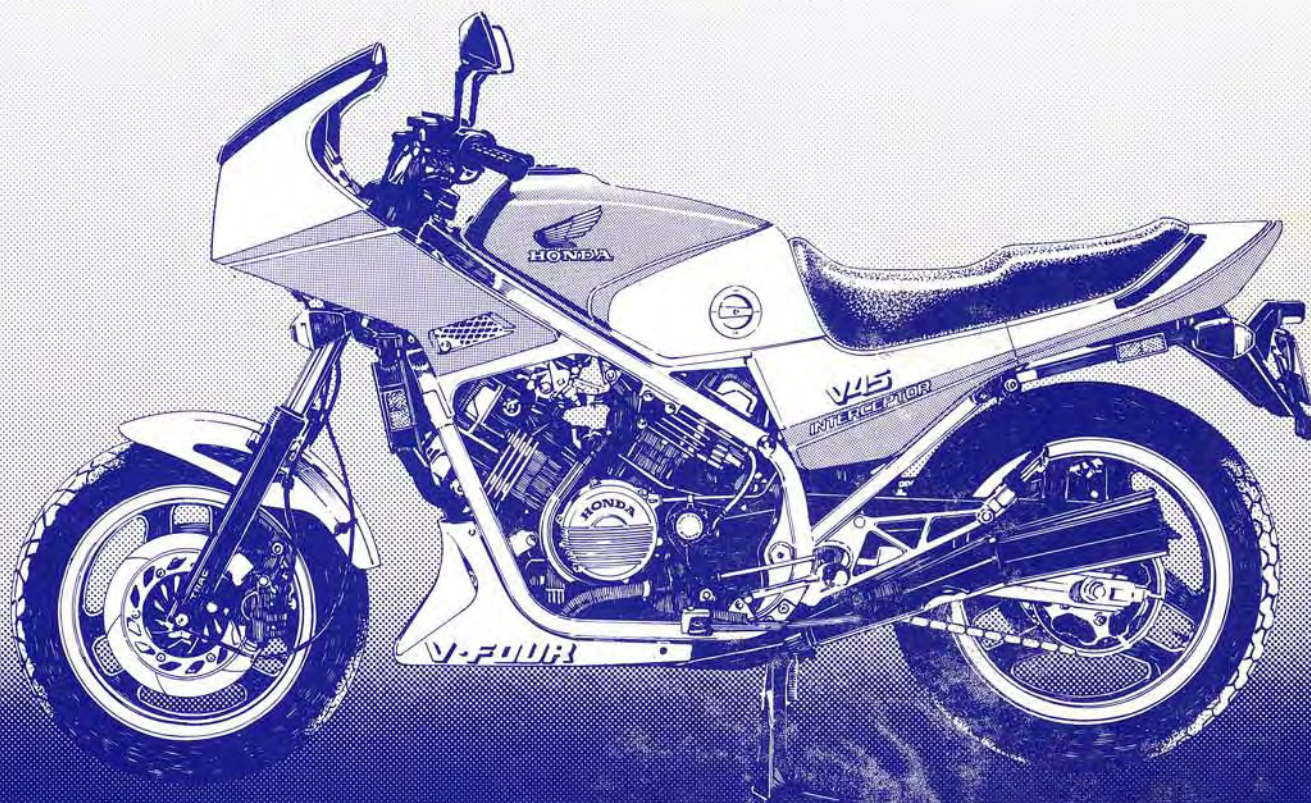
**Official**

# **HONDA**

## **SHOP MANUAL**

### **VF700F/VF750F**

#### **INTERCEPTOR**



**VF750F: '83-'84**


**VF700F: '84-'85**

Color Scheme

PB-127C-U

PB-127A

## 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 possible 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 method or tools selected.



## HOW TO USE THIS MANUAL

This manual is based on the VF750F. Any information that differs between the VF700F and VF750F is called out in the text or in a note.

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

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

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

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

If you are not familiar with this motorcycle, read TECHNICAL FEATURES, section 22.

If you don't know the source of the trouble, go to section 23, TROUBLESHOOTING.

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HONDA MOTOR CO., LTD.  
Service Publications Office

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## GENERAL SAFETY

**WARNING**

*If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas.*

**WARNING**

*Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.*

**WARNING**

*The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.*

**WARNING**

*The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.*

## SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA’s design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with larger-diameter or inner bolts first, and tighten to the specified torque diagonally, unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.



**GENERAL INFORMATION**

**MODEL IDENTIFICATION**



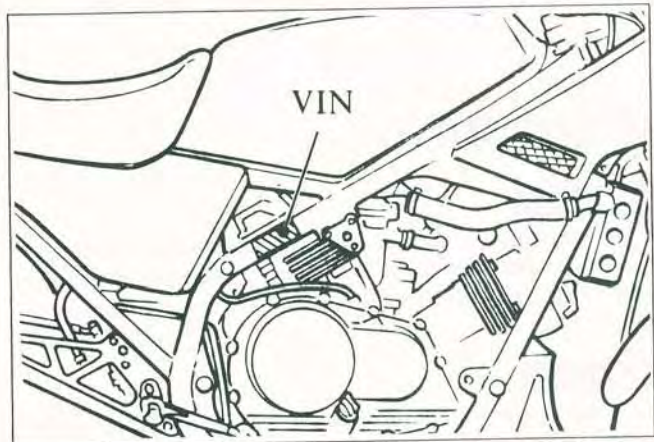
BEGINNING Frame No. JH2RC150\*DM000001 ~  
EngineNo. RC15E-2000001 ~



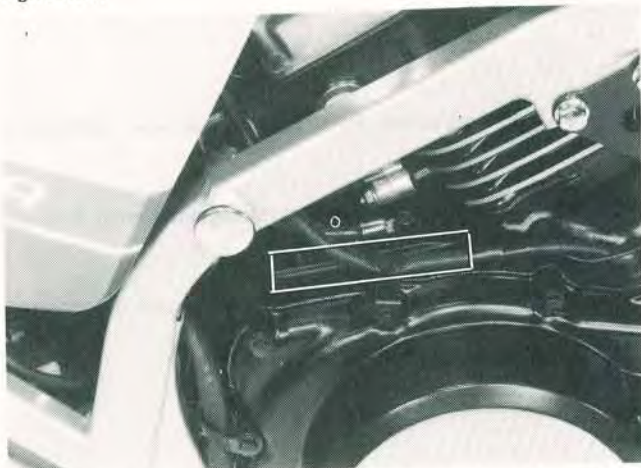
The color label is affixed to the rear fender, under the seat.



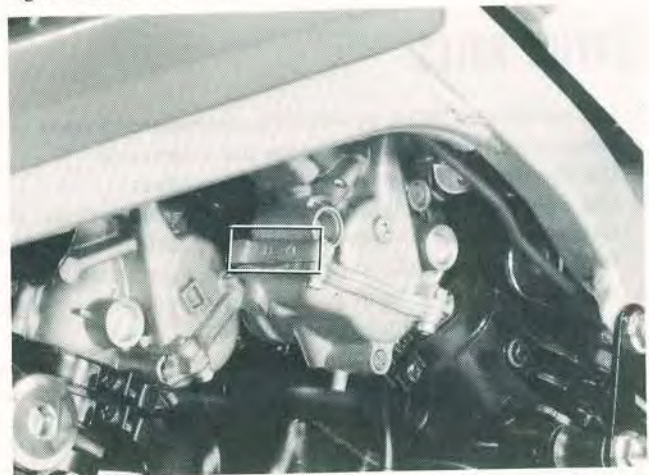
The frame serial number is stamped on the steering head's right side.



The vehicle identification number (VIN) is on the upper right tube of the frame.



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



The carburetor identification numbers are stamped onto each carburetor.



**SPECIFICATIONS**

ITEM		SPECIFICATIONS	
DIMENSIONS	Overall length	2,160 mm (85.0 in)	
	Overall width	770 mm (30.3 in)	
	Overall height	1,215 mm (47.8 in)	
	Wheelbase	1,495 mm (58.9 in)	
	Seat height	820 mm (32.3 in)	
	Foot peg height	VF750F: 348 mm (13.7 in) VF700F: 343 mm (13.5 in)	
	Ground clearance	155 mm (6.1 in)	
Dry weight	'83-'84 VF750F: 221 kg (487 lb)		
	'84 VF700F: 220 kg (485 lb)		
Curb weight	After '84 VF700F: 223 kg (492 lb)		
	243 kg (536 lb)		
FRAME	Type	Double cradle	
	Front suspension, travel	Telescopic fork 160 mm (6.3 in)	
	Rear suspension, travel	Swingarm/Shock absorber, 120 mm (4.7 in)	
	Front suspension air pressure	0—40 kPa (0—0.4 kg/cm <sup>2</sup> , 0—6 psi)	
	Rear suspension air pressure	50—300 kPa (0.5—3.0 kg/cm <sup>2</sup> , 7—43 psi)	
	Gross vehicle weight rating	413 kg (910 lb)	
	Vehicle capacity load	168 kg (370 lb)	
	Front tire size	M120/80-16 Tubeless	
	Rear tire size	M130/80-18 Tubeless	
	Cold tire pressures	Up to 90 kg (200 lbs) load	Front
Rear			32 psi (225 kPa, 2.25 kg/cm <sup>2</sup> )
Up to vehicle capacity load		Front	32 psi (225 kPa, 2.25 kg/cm <sup>2</sup> )
		Rear	40 psi (280 kPa, 2.8 kg/cm <sup>2</sup> )
Front brake, lining swept area	Double disc 904 cm <sup>2</sup> (140 sq in)		
Rear brake, lining swept area	'83-'84: Single disc 490 cm <sup>2</sup> (76 sq in) After '84 VF700F: Single disc 452 cm <sup>2</sup> (70 sq in)		
Fuel capacity	22 liters (5.8 US gal, 4.8 Imp gal)		
Fuel reserve capacity	4 liters (1.1 US gal, 0.9 Imp gal)		
Caster angle	28°10'		
Trail	96 mm (3.8 in)		
Front fork oil capacity	VF750F: Right: 360 cc (12.2 oz), Left: 380 cc (12.8 oz) VF700F: Right: 350 cc (11.9 oz), Left: 370 cc (12.5 oz) After '84 VF700F: Right: 350 cc (11.9 oz), Left: 375 cc (13.2 oz)		
ENGINE	Type	Water cooled 4-stroke, DOHC engine	
	Cylinder arrangement	4 cylinders 90°V	
	Bore and stroke	VF750F: 70 x 48.6 mm (2.76 x 1.91 in) VF700F: 70 x 45.4 mm (2.76 x 1.79 in)	
	Displacement	VF750F: 748 cc (45.6 cu in) VF700F: 699 cc (42.7 cu in)	
	Compression ratio	10.5 : 1	
	Valve train	Silent, multi-link chain drive and OHC with rocker arms	
	Maximum horsepower	VF750F: 86 BHP/10,000 rpm VF700F: 81 BHP/10,000 rpm	
	Maximum torque	VF750F: 6.4 kg-m (46.3 ft-lb)/7,500 rpm VF700F: 6.2 kg-m (44.8 ft-lb)/8,500 rpm	
	Oil capacity	3.0 liters (3.2 US qt, 2.6 Imp qt) after disassembly 2.7 liters (2.9 US qt, 2.4 Imp qt) after draining	
	Coolant capacity	3.0 liters (3.2 US qt, 2.6 Imp qt)	
	Lubrication system	Forced pressure and wet sump	
	Air filtration	Paper filter	
	Cylinder compression	1,300 ± 200 kPa (13.0 ± 2.0 kg/cm <sup>2</sup> , 188 ± 29 psi)	



**GENERAL INFORMATION**

ITEM		SPECIFICATIONS		
ENGINE	Intake valve	VF750F/VF700F	VF750F/VF700F	
		8°/ 5° (BTDC)	61°/ 58° (BTDC)	
		40°/40° (ABDC)	107°/105° (ABDC)	
	Exhaust valve	43°/43° (BBDC)	96°/ 96° (BBDC)	
		7°/ 5° (ATDC)	74°/ 70° (ATDC)	
	Valve clearance (Cold)	IN: } 0.15 mm (0.006 in) EX: }		
	Engine weight (Dry)	81.5 kg (179.7 lb)		
Idle speed	1,200 – 1,300 rpm			
Cylinder numbering	No. 1 – Left rear No. 2 – Left front No. 3 – Right rear No. 4 – Right front			
CARBURE-TION	Carburetor type/throttle bore	KEIHIN VD / 32 mm (1.26 in)		
	Identification number	Refer to page 4-1		
	Pilot screw initial setting	Refer to page 4-1		
	Float level	See page 4-16 7.0 mm (0.28 in)		
DRIVE TRAIN	Clutch	Wet, multi-plate		
	Transmission	5-speed		
	Primary reduction	2.152		
	Final reduction	VF750F: 2.588 VF700F: 2.750		
	Gear ratio I	2.733		
	Gear ratio II	1.895		
	Gear ratio III	1.500		
	Gear ratio IV	1.240		
	Gear ratio V	1.074		
	Gear shift pattern	Left foot operated return system, 1–N–2–3–4–5		
ELECTRICAL	Ignition	Full transistor ignition		
	Ignition timing "F" mark	VF750F: 10° BTDC at idle VF700F: 15° BTDC at idle		
	Full advance	37° BTDC at 3,300 rpm		
	Starting system	Starting motor		
	Alternator	VF750F: 300W/5,000 rpm VF700F: 350W/5,000 rpm		
	Battery capacity	12V–14 AH		
	Spark plug	NGK	ND	
		Standard	DPR8EA-9	X24EPR-U9
		For cold climate (Below 5°C, 41°F)	DPR7EA-9	X22EPR-U9
		For extended high speed riding	DPR9EA-9	X27EPR-U9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)			
Firing order	1–4–3–2			
Fuse/main fuse	15A/30A			
LIGHTS	Headlight (high/low beam)	60/55 W		
	Tail/stoptlight	8/27 W (3/32 cp) SAE NO. 1157		
	Front turn signal/running light	23/8 W (32/3 cp) SAE NO. 1034		
	Rear turn signal	23 W (32 cp) SAE NO. 1073		
	Instrument lights	3 W		
	Neutral indicator	3 W		
	Turn signal indicator	3 W		
	High beam indicator	3 W		





**TORQUE VALUES**

• ENGINE

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg·m, ft·lb)	Remarks
Cylinder head cover	8	6	8-12 (0.8-1.2, 6-9)	<p>Apply LOCTITE 271 to the threads.</p> <p>Apply 3-Bond Sealant, or its equivalent, to the threads.</p>
Cam holder	16	6	10-14 (1.0-1.4, 7-10)	
Cylinder head	8	8	21-25 (2.1-2.5, 15-18)	
	16	9	33-37 (3.3-3.7, 24-27)	
Alternator	1	12	80-100 (8.0-10.0, 58-72)	
Primary drive gear	1	12	80-100 (8.0-10.0, 58-72)	
Clutch lock nut	1	22	62-68 (6.2-6.8, 45-49)	
Crankcase	14	9	30-34 (3.0-3.4, 22-25)	
	2	8	21-25 (2.0-2.5, 14-18)	
	15	6	10-14 (1.0-1.4, 7-10)	
Rocker arm shaft	8	22	45-50 (4.5-5.0, 32-36)	
Cam sprocket	8	7	18-20 (1.8-2.0, 13-14)	
Starter clutch	3	8	26-30 (2.6-3.0, 19-22)	
Shift fork center	1	7	16-20 (1.6-2.0, 12-14)	
Cam chain guide bolt	1	12	21-25 (2.1-2.5, 15-18)	
Oil filter	1	20	15-20 (1.5-2.0, 11-14)	
Countershaft bearing holder	3	8	21-25 (2.0-2.5, 14-18)	
Drive sprocket	1	10	50-54 (5.0-5.4, 36-39)	
Valve adjustment nuts	16	7	21-25 (2.1-2.5, 15-18)	
Drain plug	1	12	35-40 (3.5-4.0, 25-29)	
Connecting rod nuts	8	8	30-34 (3.0-3.4, 22-25)	
Drum stopper pivot shaft	1	6	8-12 (0.8-1.2, 6-9)	
Oil pressure switch	1	-	15-20 (1.5-2.0, 11-14)	
Spark plugs	4	12	12-16 (1.2-1.6, 9-12)	

• CHASSIS

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg·m, ft·lb)	Remarks
Steering stem nut	1	24	90-120 (9.0-12.0, 65-87)	
Steering bearing adjustment nut	1	26	10-12 (1.0-1.2, 7-9) 19-23 (1.9-2.3, 14-17)	
Top bridge pinch bolt	1	8	30-40 (3.0-4.0, 22-29)	
Front axle holder	4	8	18-25 (1.8-2.5, 13-18)	
Front axle nut	1	12	55-65 (5.5-6.5, 40-47)	
Front fork top pinch bolts	2	7	9-13 (0.9-1.3, 7-10)	
Front fork bottom pinch bolts	2	10	45-55 (4.5-5.5, 33-40)	

**GENERAL INFORMATION**

Item	Q'ty	Thread Dia. (mm)	Torque N-m (kg-m, ft-lb)	Remarks
Brake caliper bracket	2	10	30-40 (3.0-4.0, 22-29)	} Front brake calipers
mount bolts (Right)	1	10	30-40 (3.0-4.0, 22-29)	
(Left-upper)	1	8	20-25 (2.0-2.5, 14-18)	
Brake caliper mount bolts	3	8	20-25 (2.0-2.5, 14-18)	} Front and rear brake calipers
Brake caliper pivot bolts	3	12	25-30 (2.5-3.0, 18-22)	
Front brake discs	12	8	35-40 (3.5-4.0, 25-29)	
Shock arm to frame bolts	2	10	40-50 (4.0-5.0, 29-36)	
Shock link to shock arm bolt	1	10	40-50 (4.0-5.0, 29-36)	
Shock absorber mount bolts	2	10	40-50 (4.0-5.0, 29-36)	
Swingarm pinch bolt	1	8	20-30 (2.0-3.0, 14-22)	
Swingarm left pivot bolt	1	25	85-105 (8.5-10.5, 61-76)	
Swingarm right pivot bolt	1	16	85-105 (8.5-10.5, 61-76)	
Rear brake torque rod				
8 mm	1	8	18-25 (1.8-2.5, 13-18)	
10 mm	1	10	30-40 (3.0-4.0, 22-29)	
Final driven sprocket	5	12	80-100 (8.0-10.0, 58-72)	
Rear brake disc	6	8	35-40 (3.5-4.0, 25-29)	
Rear axle nut	1	18	85-105 (8.5-10.5, 61-76)	
Sub-frame bolts (upper and lower)	4	10	35-45 (3.5-4.5, 25-33)	} Apply oil to lower bolts
Handlebar pinch bolts	2	8	30-40 (3.0-4.0, 22-29)	
Rear brake actuating	1	6	10-15 (1.0-1.5, 7-11)	
Side stand	1	10	35-45 (3.5-4.5, 25-33)	
Engine rear hanger bolts (upper and lower)	2	10	45-55 (4.5-5.5, 33-40)	
Engine center hanger bolts	6	8	24-30 (2.4-3.0, 17-22)	
Engine front hanger bolts	2	10	35-45 (3.5-4.5, 25-33)	
Gearshift pedal pivot bolt	1	10	35-45 (3.5-4.5, 25-33)	

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

- STANDARD TORQUE VALUES

Item	Torque Values N-m (kg-m, ft-lb)	Item	Torque Values N-m (kg-m, ft-lb)
5 mm bolt and nut	4-6 (0.4-0.6, 3-4)	5 mm screw	3-5 (0.3-0.5, 2-4)
6 mm bolt and nut	8-12 (0.8-1.2, 6-9)	6 mm screw	7-11 (0.7-1.1, 5-8)
8 mm bolt and nut	18-25 (1.8-2.5, 13-18)	6 mm flange bolt and nut	10-14 (1.0-1.4, 7-10)
10 mm bolt and nut	30-40 (3.0-4.0, 22-29)	8 mm flange bolt and nut	24-30 (2.4-3.0, 17-22)
12 mm bolt and nut	50-60 (5.0-6.0, 36-43)	10 mm flange bolt and nut	35-45 (3.5-4.5, 25-33)



**TOOLS**

• SPECIAL

DESCRIPTION	TOOL NUMBER	ALTERNATE TOOL	TOOL NUMBER	REF. PAGE		
Oil pressure gauge attachment	07510-4220100	Equivalent tool commercially available in U.S.A.		2-5		
Compression gauge attachment	07510-MB00101			3-12		
Carburetor pilot screw wrench	07908-4220201			3-11		
Snap ring pliers	07914-3230001	Equivalent tool commercially available in U.S.A.		7-5, 14-21 14-27, 16-8 16-16		
Steering stem socket	07916-3710100	Equivalent tool commercially available in U.S.A.		14-32, 14-35		
Hex wrench, 6 mm	07917-3230000			14-20		
Primary gear holder	07924-MC70002	or Gear holder modified —	07924-MC70001 07924-MC70000 07924-4150000	7-11, 7-22		
Needle bearing remover	07931-MA70000	Not available in U.S.A.		15-15		
Bearing race remover	07946-3710500			14-33		
Steering stem driver	07946-MB00000	Steering stem driver Attachment	07946-3710601 07964-MB00200	14-34		
Fork seal driver	07947-4630100	U.S.A. only		14-27		
Driver	07949-3710000			11-3		
Ball race remover	07953-4250002			14-33		
Oil seal driver attachment	07965-MC70100			15-9, 15-10		
Attachment ring	07965-ME70100			15-10		
Oil seal driver	07965-MB00100			15-10		
Seal remover pump	07971-M01000A			15-19		
Valve guide reamer, 5.5 mm	07984-2000000			10-12, 10-13		
Ignition timing inspection cover	07998-MB00000			or 07404-0020000 or Vacuum gauge (U.S.A. only)	M937B-021-XXXXX	18-5
Vacuum gauge	07404-00301100			Equivalent tool commercially available in U.S.A.		3-10
Oil pressure gauge	07506-3000000					2-5
Pressure pump	ST-AH-255-MC7			U.S.A. only—Included in Turbo kit		4-19
Vacuum pump	ST-AH-260-MC7					
Camshaft holder	07979-MK30000	3-9				

• COMMON

DESCRIPTION	TOOL NUMBER	ALTERNATE TOOL	TOOL NUMBER	REF. PAGE
Float level gauge	07401-0010000	Equivalent tool commercially available in U.S.A.		4-6
Lock nut wrench, 10 x 12 mm	07708-0030200			3-9
Lock nut wrench, 17 x 27 mm	07716-0020300			7-11, 7-19
Lock nut wrench, 30 x 32 mm	07716-0020400			14-31, 14-36
Extension	07716-0020500			7-11, 7-19 14-31, 14-36
Universal holder	07725-0030000	Band strap wrench-commercially available in U.S.A.		7-12, 7-19
Flywheel holder	07725-0040000			9-2, 9-3
Rotor puller	07733-0020001	Rotor puller	07933-3290001	9-2
Valve guide remover, 5.5 mm	07742-0010100	Valve guide driver	07942-3290100	10-13
Driver	07746-0030100	Driver	07945-3710200	13-9
Attachment, 25 mm I.D.	07746-0030200			13-9

**GENERAL INFORMATION**

DESCRIPTION	TOOL NUMBER	ALTERNATE TOOL	TOOL NUMBER	REF. PAGE
Attachment, 32 x 35 mm	07746-0010100			15-5
Attachment, 37 x 40 mm	07746-0010200			7-16, 15-15
Attachment, 42 x 47 mm	07746-0010300			14-15, 14-33
Attachment, 52 x 55 mm	07746-0010400			11-3, 14-34
				15-6
				15-6
Attachment, 62 x 68 mm	07746-0010500			14-15
Pilot, 15 mm	07746-0040300			15-15
Pilot, 17 mm	07746-0040400			15-6, 15-15
Pilot, 20 mm	07746-0040500			15-6
Pilot, 25 mm	07746-0040600			7-16
Pilot, 35 mm	07746-0040700			7-16, 14-15
Driver	07749-0010000			14-33, 14-34
				15-6, 15-15
				10-10, 10-15
Valve spring compressor	07757-0010000			14-14, 15-5
Bearing remover shaft	07746-0050100	Equivalent tool commercially available in U.S.A.		14-14
Bearing remover corret, 15 mm	07746-0050400			15-5
Bearing remover corret, 20 mm	07746-0050600			

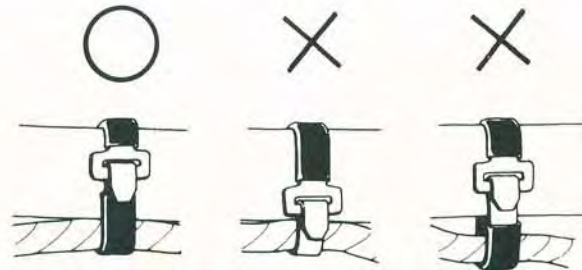
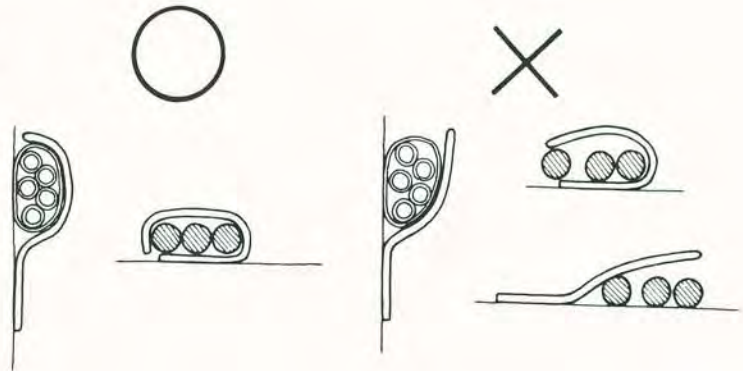


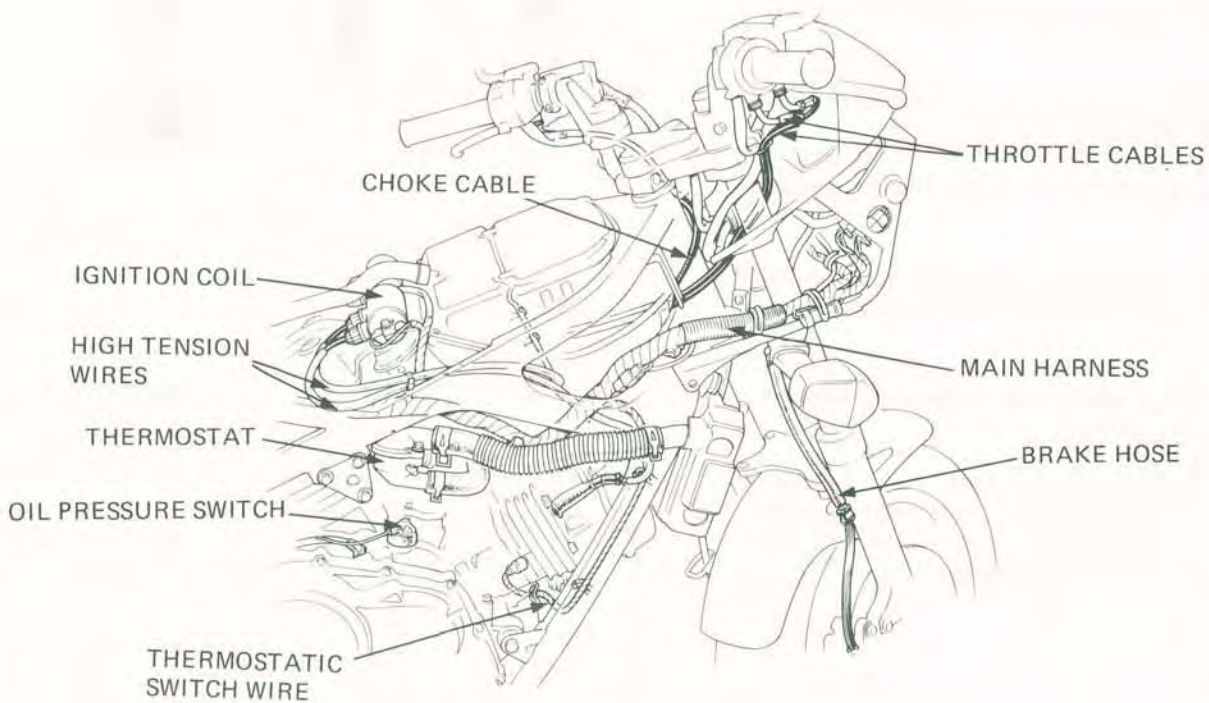
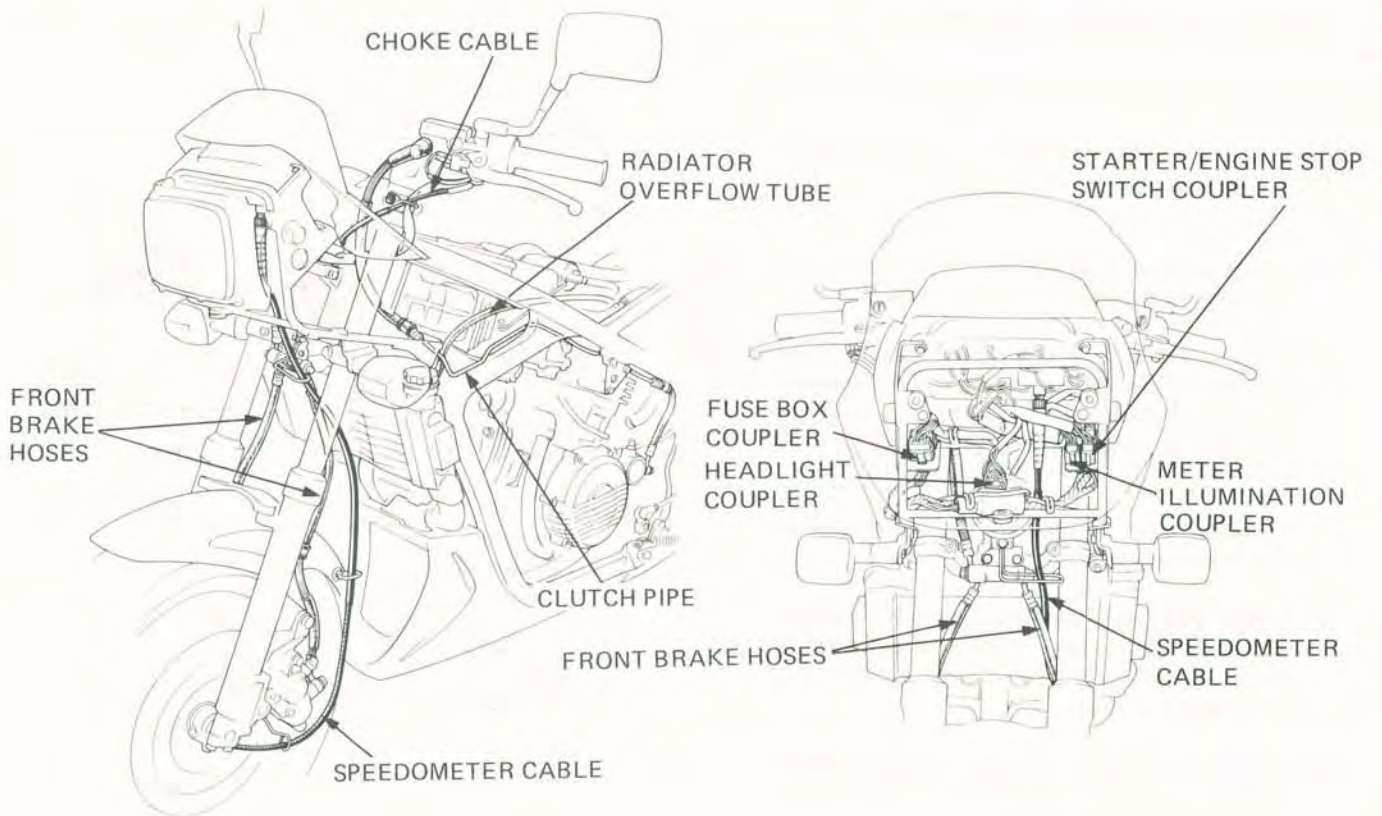
## CABLE & HARNESS ROUTING

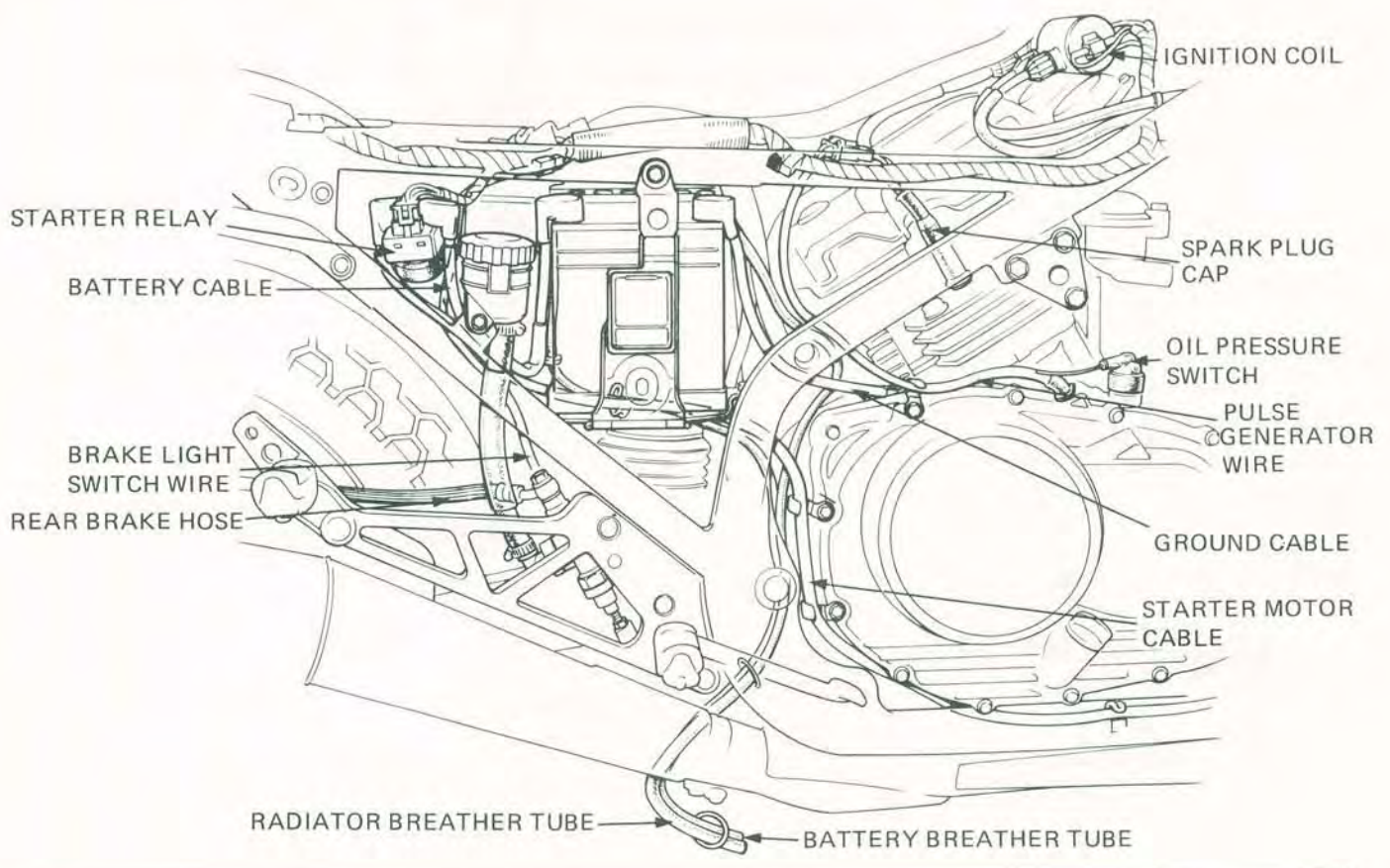
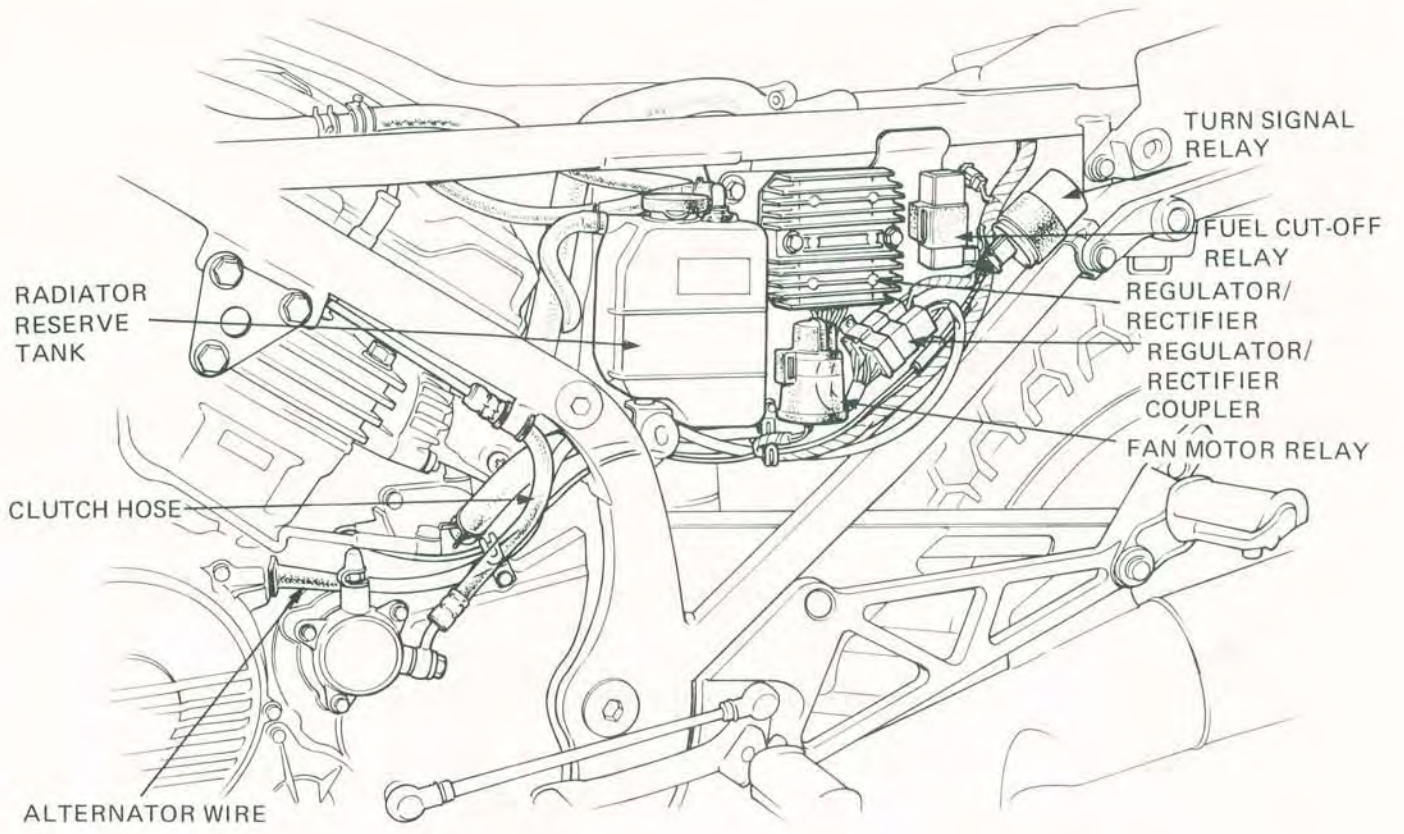
Note the following when routing cables and wire harnesses.

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 the weld or end of its clamp when a weld-on clamp is used.
- 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 not pulled that or have excessive slack.
- Protect wires and harnesses with electrical tape or tube if they are contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use wires or harnesses with a broken insulator. Repair by wrapping them with a protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners.
- Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in all steering positions.

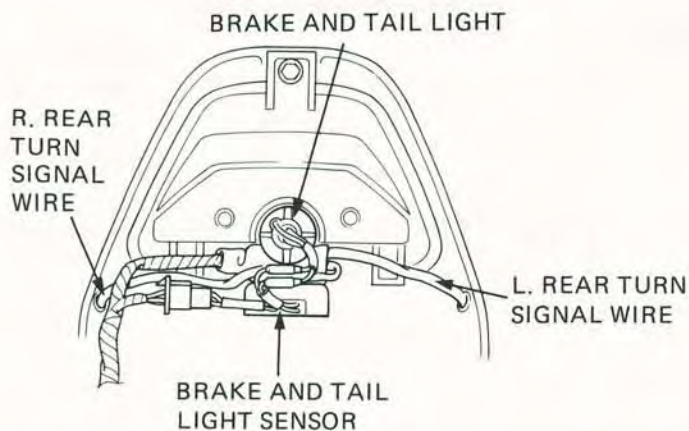
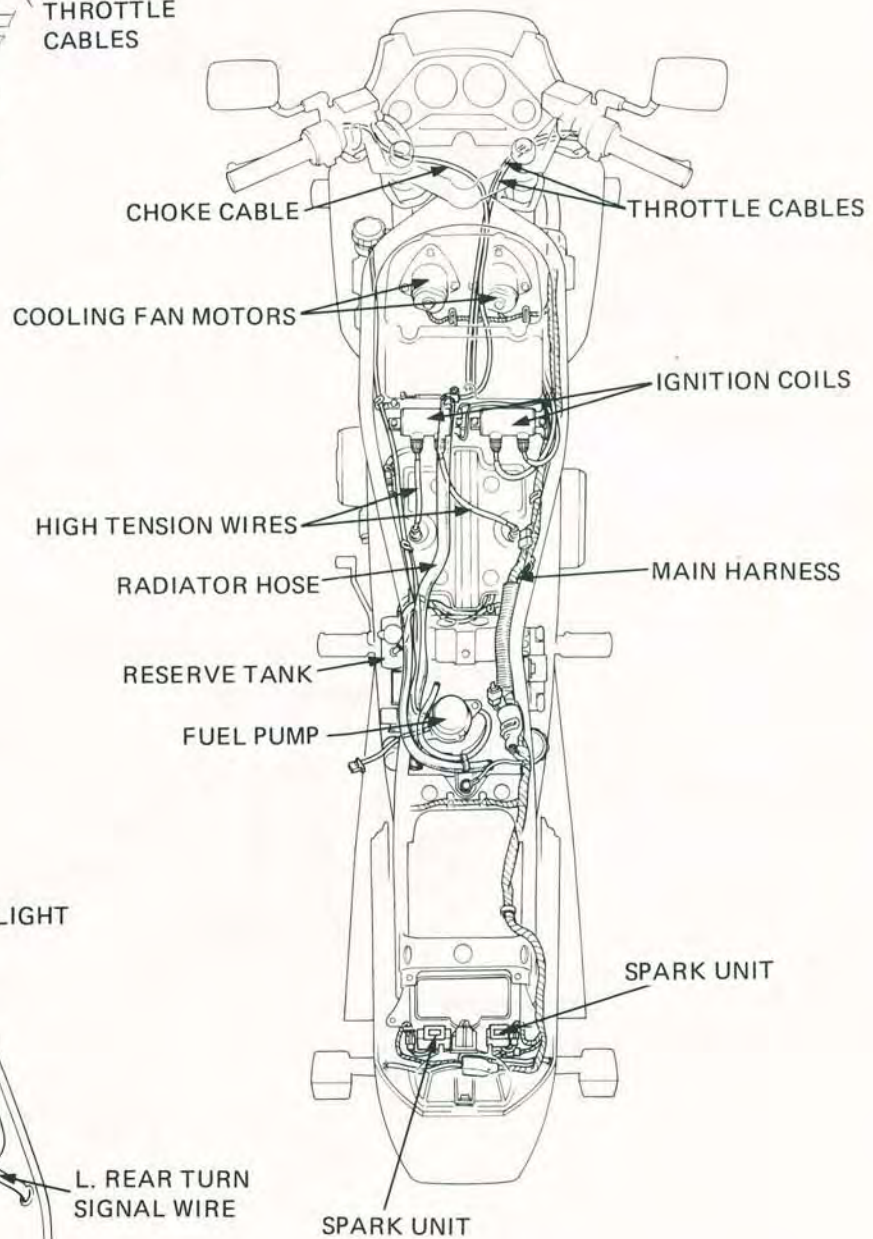
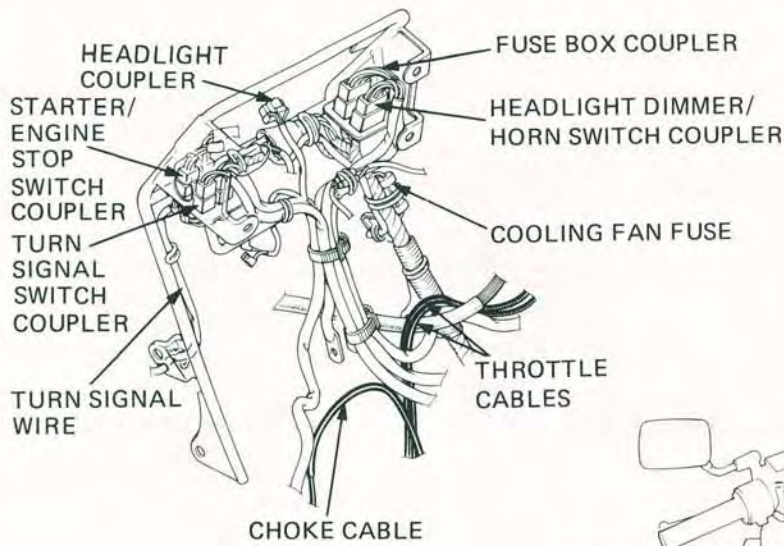








**GENERAL INFORMATION**







## EMISSION CONTROL SYSTEMS

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

### SOURCE OF EMISSIONS

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

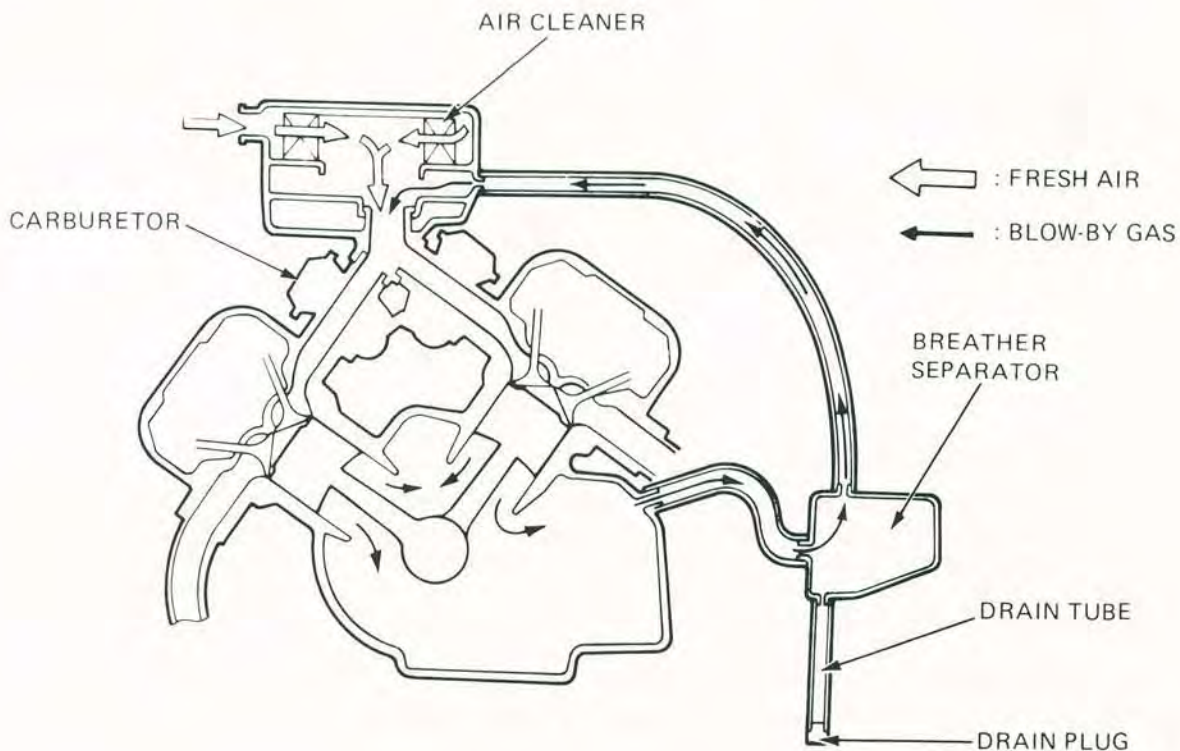
Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

### EXHAUST EMISSION CONTROL SYSTEM

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

### CRANKCASE EMISSION CONTROL SYSTEM

The V45 engine is equipped with a crankcase emission control system which routes crankcase emissions through the air cleaner and into the combustion chamber. Condensed crankcase vapors are accumulated in a storage tank which must be emptied periodically. See the Maintenance Schedule in Section 3.



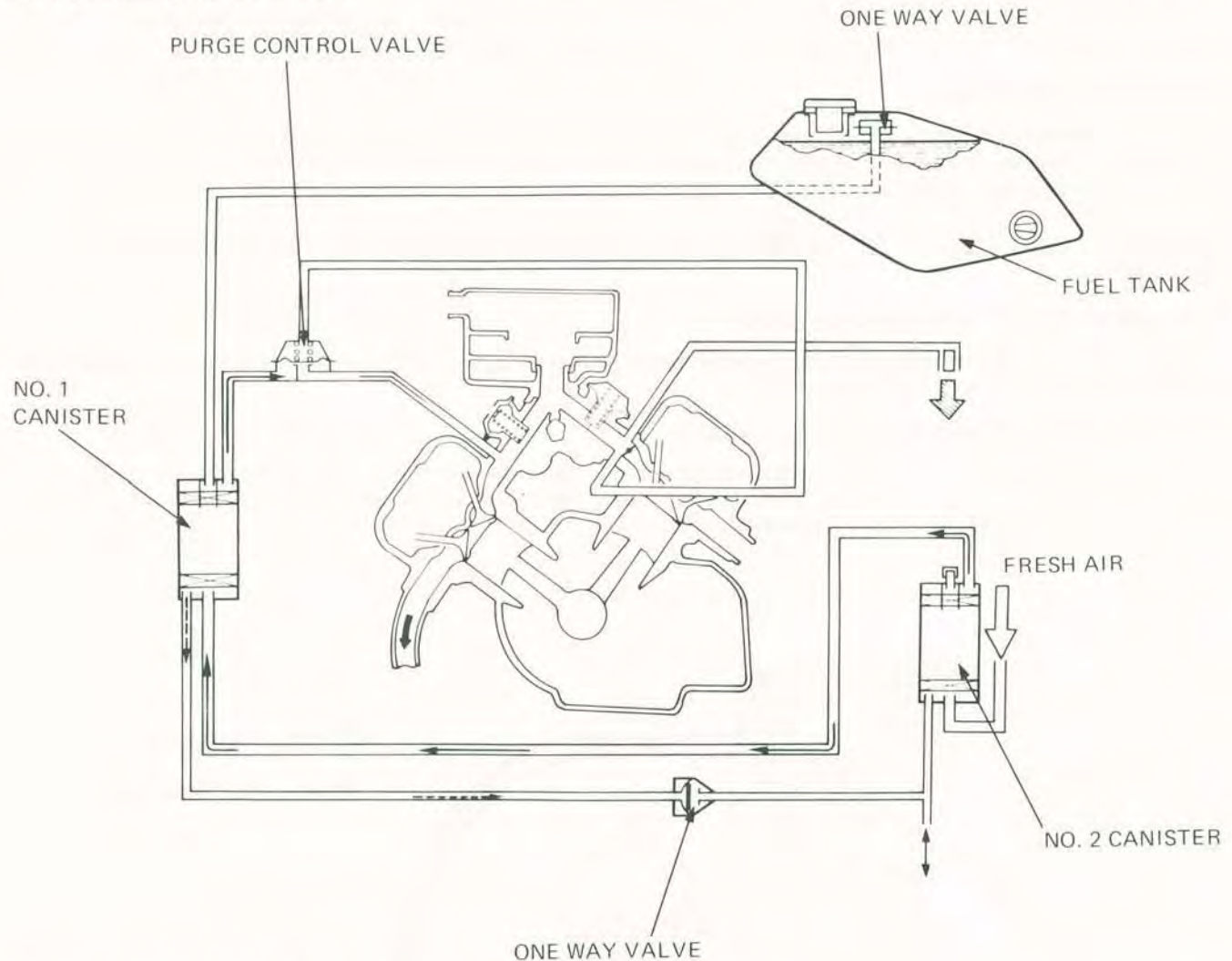


## GENERAL INFORMATION

### EVAPORATIVE EMISSION CONTROL SYSTEM ('84 California model only)

This model complies with California Air Resources Board requirements for evaporative emission regulations.

Fuel vapor from the fuel tank is routed into a charcoal canister where it is absorbed and stored while the engine is stopped. When the motorcycle 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.

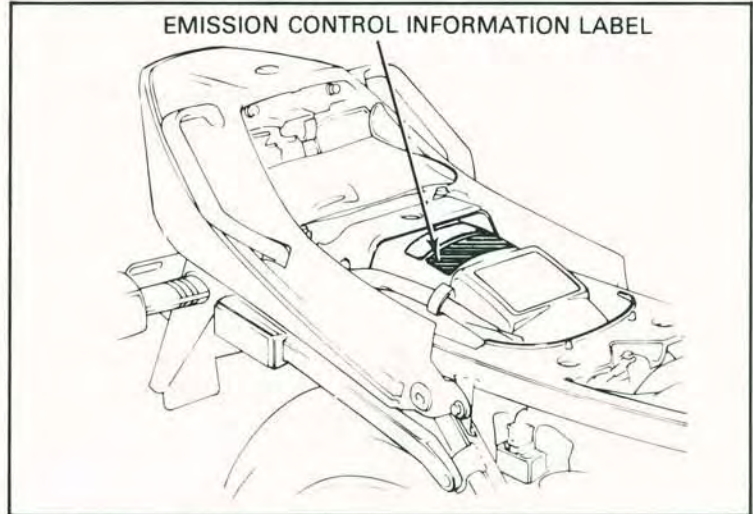
AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

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



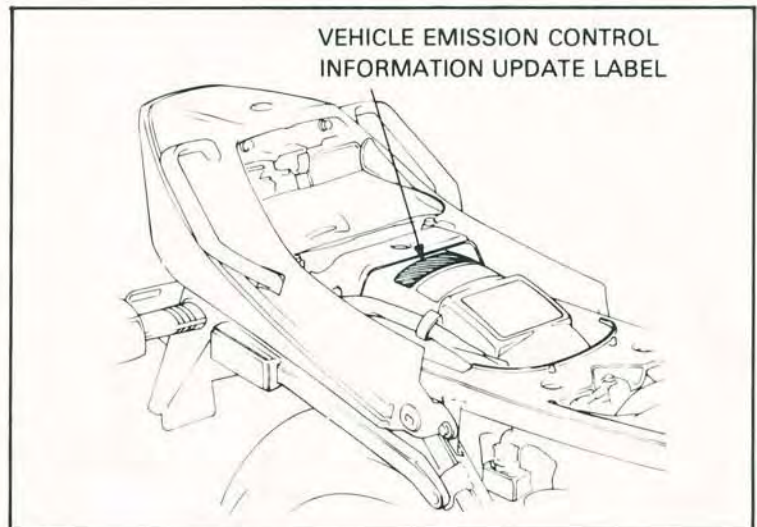
## EMISSION CONTROL INFORMATION LABEL

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



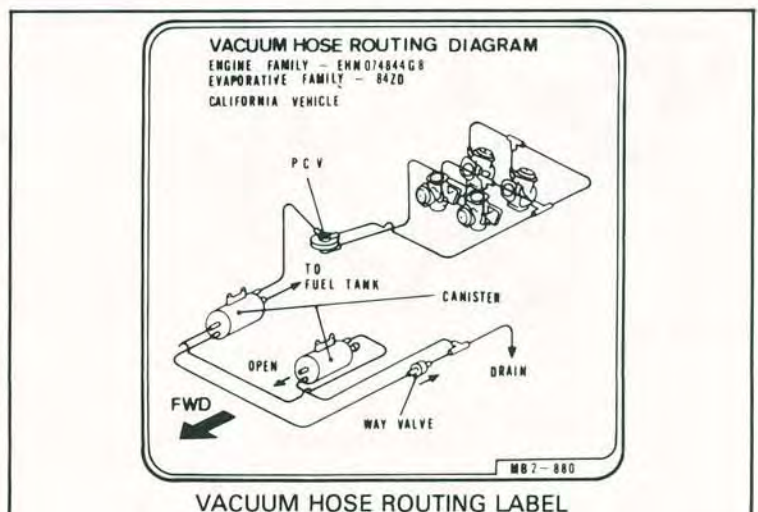
## EMISSION CONTROL INFORMATION UPDATE LABEL

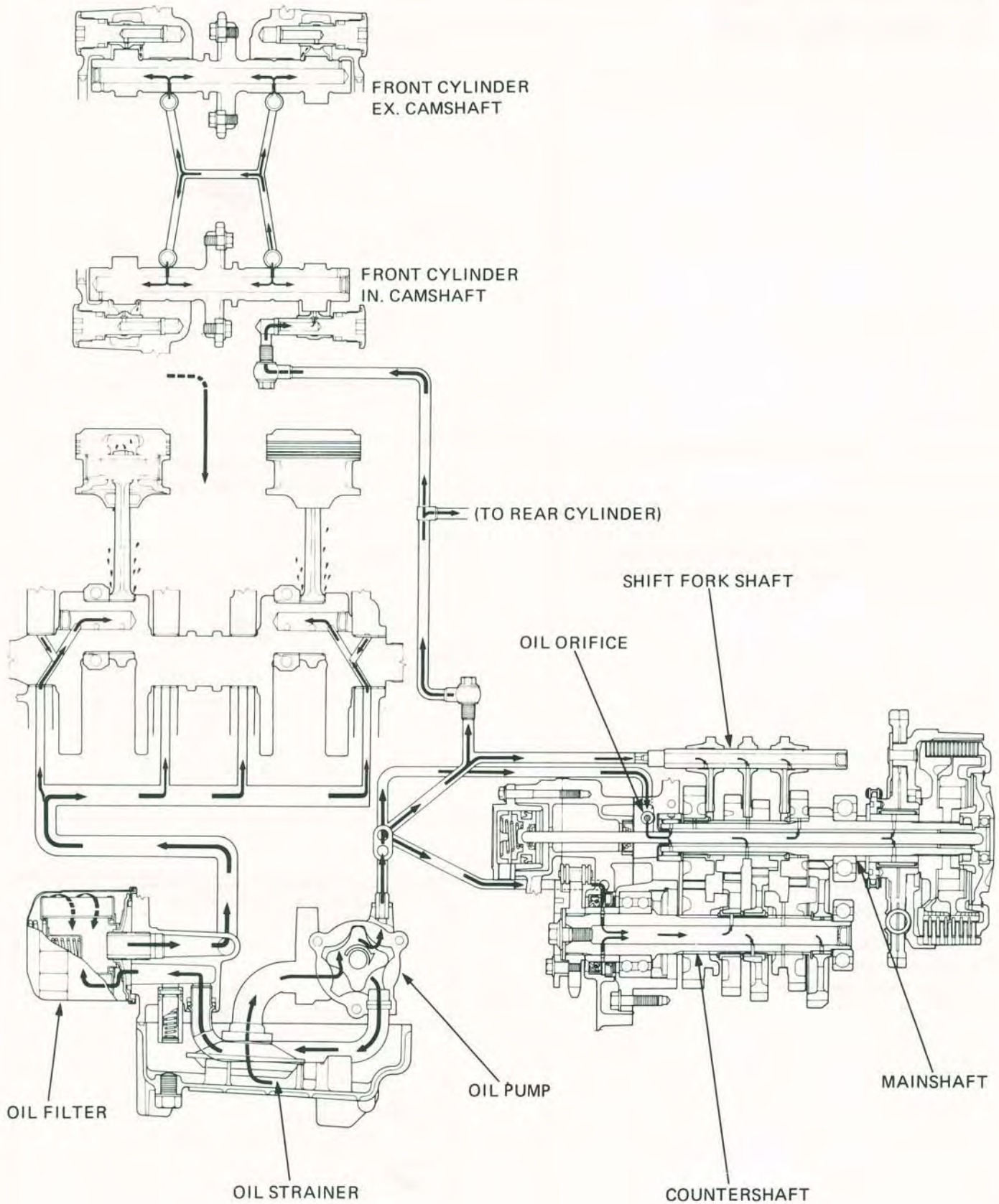
After making a high altitude carburetor adjustment (page 4-18), attach an update label on the rear fender under the seat as shown. Instructions for obtaining the update label are given in Service Letter No. 132.



## VACUUM HOSE ROUTING LABEL (After '83 California model only)

The Vacuum Hose Routing Label is attached to the fuel tank below the seat. Route the vacuum hoses as described on this label.







SERVICE INFORMATION	2-1	OIL PRESSURE CHECK	2-4
TROUBLESHOOTING	2-2	OIL PUMP	2-5
ENGINE OIL LEVEL	2-3	CONTROL CABLE LUBRICATION	2-9
ENGINE OIL & FILTER CHANGE	2-3	LUBRICATION POINTS	2-10
OIL STRAINER CLEANING	2-4		

## SERVICE INFORMATION

### GENERAL

To service the oil pump, it is necessary to remove the right side cover and water pump assembly. See section 6 for water pump removal and installation.

### SPECIFICATIONS

#### Engine oil

Oil capacity	'83-'84: 2.9 liters (3.1 US qt, 2.5 Imp qt) after draining After '84: 2.7 liters (2.9 US qt, 2.4 Imp qt) after draining 3.0 liters (3.2 US qt, 2.6 Imp qt) after disassembly	
Oil recommendation	Use HONDA 4-STROKE OIL or equivalent. API SERVICE CLASSIFICATION: SE or SF. VISCOSITY: SAE 10W-40	<p><b>OIL VISCOSITIES</b></p> <p>The chart shows four horizontal bars representing different oil grades and their recommended temperature ranges in degrees Fahrenheit (°F) and degrees Celsius (°C). The x-axis ranges from -20 to 100 °F and -20 to 40 °C.</p> <ul style="list-style-type: none"> <li>SAE 20W-50: Range from approximately 0°F to 100°F.</li> <li>SAE 20W-40: Range from approximately 0°F to 90°F.</li> <li>SAE 10W-40: Range from approximately -10°F to 100°F.</li> <li>SAE 10W-30: Range from approximately -10°F to 80°F.</li> </ul>
Oil pressure (at oil pressure switch)	5.4 ± 0.7 kg/cm <sup>2</sup> (77 ± 10 psi) at 5,000 rpm (80°C/176°F)	
Oil pump delivery	47.8 liters (50.5 US qt)/min at 5,000 rpm of oil pump speed	

#### Oil pump service data

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



## LUBRICATION

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### TORQUE VALUES

Engine oil drain plug	35–40 N·m (3.5–4.0 kg·m, 25–29 ft·lb)
Engine oil filter	15–20 N·m (1.5–2.0 kg·m, 11–14 ft·lb)
Oil pressure switch	15–20 N·m (1.5–2.0 kg·m, 11–14 ft·lb)

### TOOLS

#### Special

Oil pressure gauge	07506–3000000	} or equivalent tools commercially available.
Oil pressure gauge attachment	07510–4220100	

## TROUBLESHOOTING

#### Oil level too low

1. External oil leaks
2. Worn piston rings
3. Worn valve guide or seal

#### Oil contamination

1. Oil or filter not changed often enough
2. Head gasket faulty
3. Worn piston rings

#### Low oil pressure

1. Oil level low
2. Pressure relief valve stuck open
3. Plugged oil pick-up screen
4. Oil pump worn
5. External oil leaks

#### High oil pressure

1. Pressure relief valve stuck closed
2. Plugged oil filter, gallery, or metering orifice
3. Incorrect oil being used

#### No oil pressure

1. Oil level low
2. Oil pump drive chain broken
3. Oil pump faulty
4. Internal oil leakage



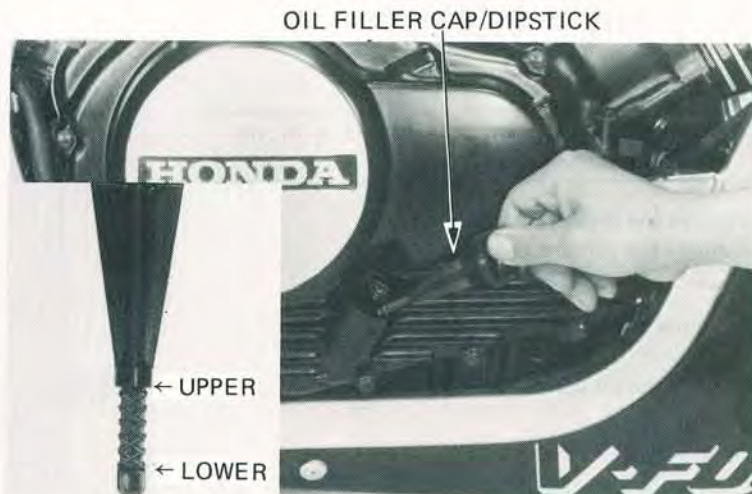
## ENGINE OIL LEVEL

Put the motorcycle on its center stand on level ground. Start the engine and let it idle for 2–3 minutes. Turn off the engine. Remove the filler cap/dipstick, wipe it clean and insert it without screwing it in. Remove the filler cap/dipstick and check the oil level.

If the level is below the lower level mark on the dipstick, fill to the upper level mark with recommended oil.

Check the oil pressure with the oil pressure warning light after the engine starts. The light should go off after one or two seconds.

If it does not, stop the engine and check the oil pump output and/or oil circuit.



## ENGINE OIL & FILTER CHANGE

### NOTE

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

Stop the engine.

Remove the oil filler cap/dipstick, oil drain plug and drain the oil.

Remove the lower radiator cowl, lower radiator mounting bolts and brakcet. Swing the radiator away from the engine, but don't disconnect its hoses. Remove the oil filter with a filter wrench and let the remaining oil drain out. Discard the oil filter.

Check that the sealing washer on the drain plug is in good condition and install the plug. Replace the oil filter with a new one. Check that the oil filter O-ring is in good condition, and coat it with oil before installing it. Install the lower radiator mount bracket, lower radiator mount bolts and lower radiator cowl.

Fill the crankcase with 2.9 liters (3.1 US qt, 2.5 Imp qt) of the recommended oil (page 2-1). Reinstall the oil filler cap/dipstick.

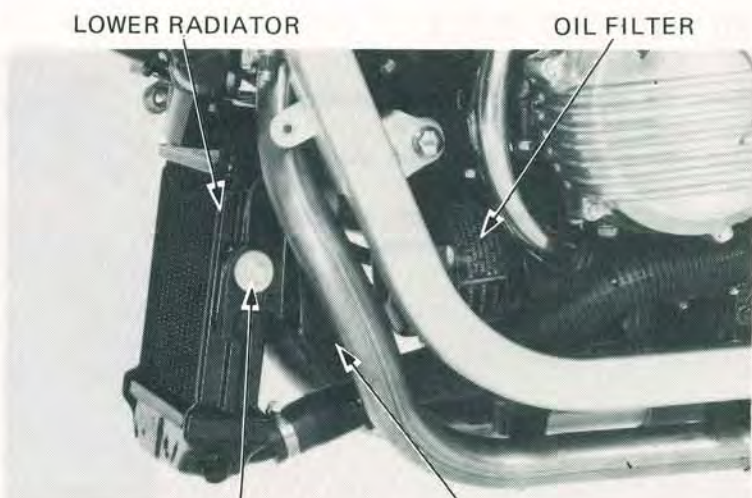
Start the engine and let it idle for 2-3 minutes, then stop the engine.

Make sure that the oil level is at the upper level mark on the dipstick.

Make sure that there are no oil leaks.



OIL DRAIN PLUG



LOWER RADIATOR

OIL FILTER

MOUNT BOLT

MOUNT BRACKET



## LUBRICATION

### OIL STRAINER CLEANING

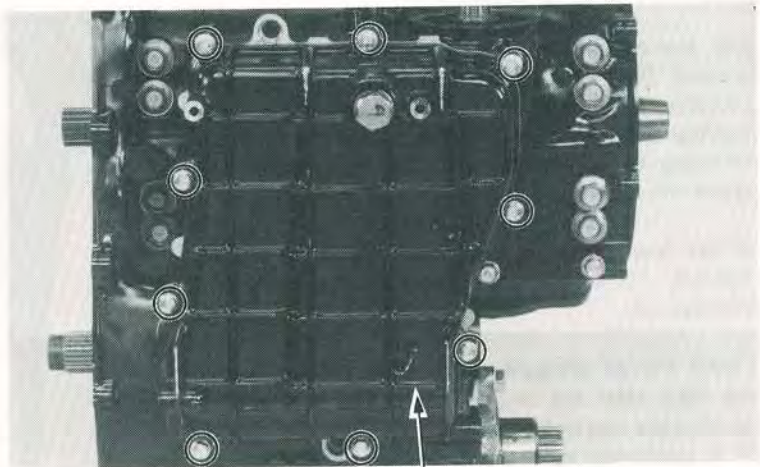
**NOTE:**

The oil strainer can be removed with the engine mounted in the frame.

Remove the lower radiator cowl.  
Remove the exhaust chamber.

Drain the engine oil (page 2-3).

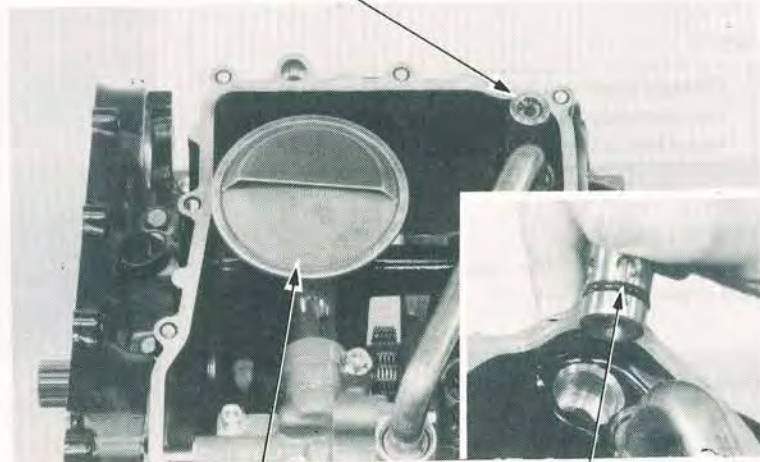
Remove the oil pan bolts and oil pan.



OIL PAN

Remove and clean the oil strainer.  
Check the operation of the pressure relief valve.  
Make sure the O-ring is in good condition whenever the relief valve is removed.  
Install the oil strainer and oil pan.  
Install the exhaust pipes.  
Fill the crankcase with the recommended oil (page 2-1).

RELIEF VALVE

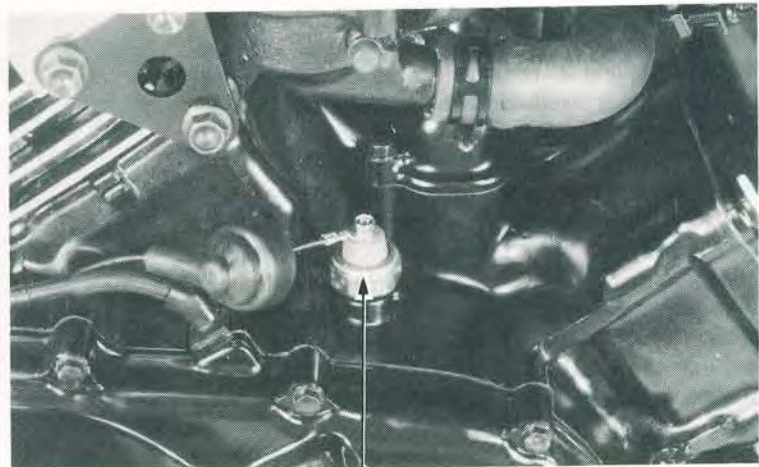


OIL STRAINER

RELIEF VALVE O-RING

### OIL PRESSURE CHECK

Warm the engine up to normal operating temperature (approximately 80°C/176°F).  
Stop the engine and disconnect the oil pressure switch wire.  
Remove the oil pressure switch and connect an oil pressure gauge to the pressure switch hole (page 2-5).  
Check the oil level.



OIL PRESSURE SWITCH





Start the engine and check the oil pressure at 5,000 rpm.

**OIL PRESSURE:**

$5.4 \pm 0.7 \text{ kg/cm}^2$  ( $77 \pm 10 \text{ psi}$ ) at 5,000 rpm  
( $80^\circ\text{C}/176^\circ\text{F}$ )

Stop the engine.

Apply 3-BOND® sealant or equivalent to the pressure switch threads and install.

**TORQUE: 15–20 N·m (1.5–2.0 kg·m, 11–14 ft·lb)**

Connect the oil pressure switch wire.

Start the engine.

Check that the oil pressure warning indicator goes out after one or two seconds.

If the oil pressure warning indicator stays on, stop the engine immediately and determine the cause.

**OIL PRESSURE GAUGE**  
07506–3000000 OR EQUIVALENT TOOL IN U.S.A.



**OIL PRESSURE GAUGE ATTACHMENT**  
07510–4220100 OR EQUIVALENT TOOL IN U.S.A.

## OIL PUMP

### REMOVAL

#### NOTE

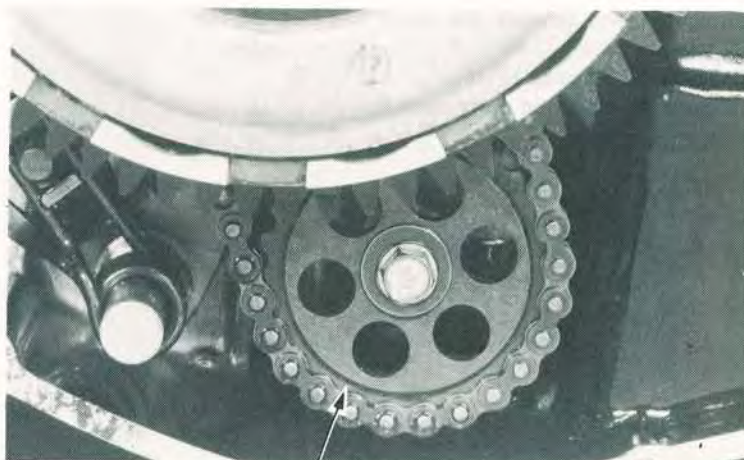
The oil pump can be removed with the engine mounted in the frame.

Remove the lower radiator

Drain the engine oil. Remove the exhaust system.

Remove the right crankcase cover.

Remove the oil pump driven sprocket by removing the bolt and washer.

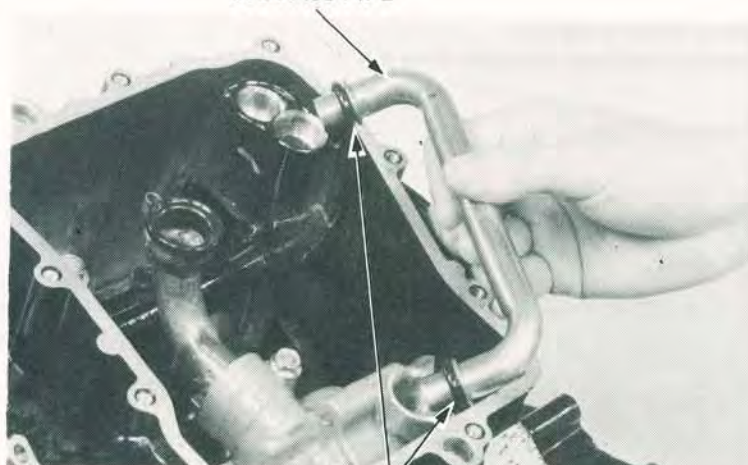


**OIL PUMP DRIVEN SPROCKET**

Remove the oil strainer (page 2-4) and the oil pass pipe.

Make sure the O-rings are in good condition.

**OIL PASS PIPE**

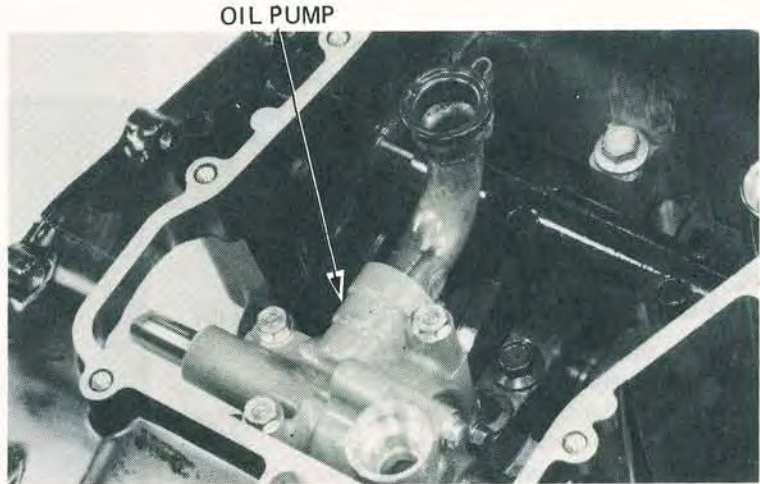


**O-RING**

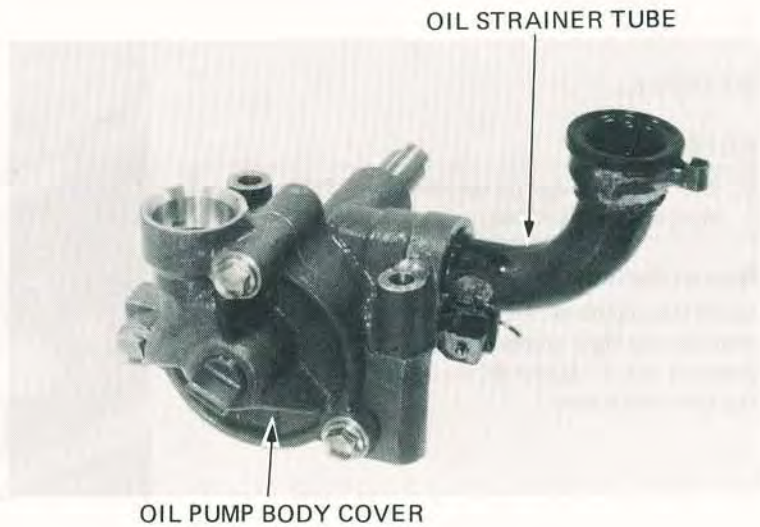


**LUBRICATION**

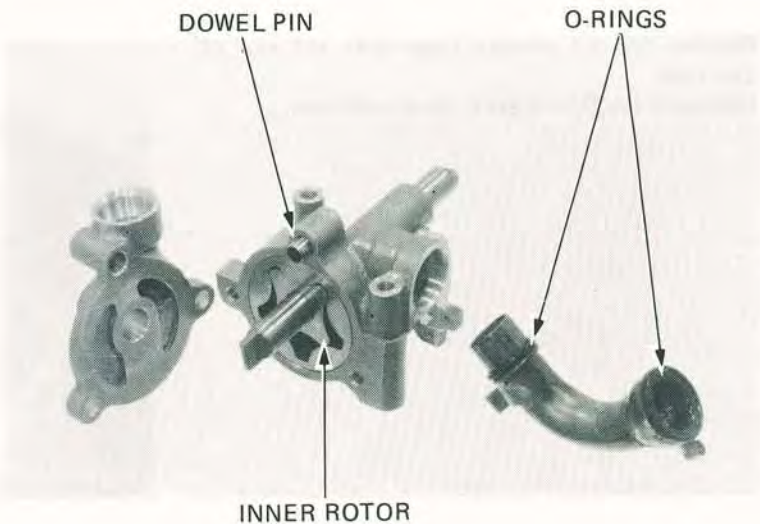
Remove the oil pump by removing the mounting bolts.



Straighten and remove the cotter pin holding the oil strainer tube.  
Remove the oil strainer stay.  
Remove the oil pump body cover.



Remove the dowel pin.  
Remove the inner rotor and drive pin.

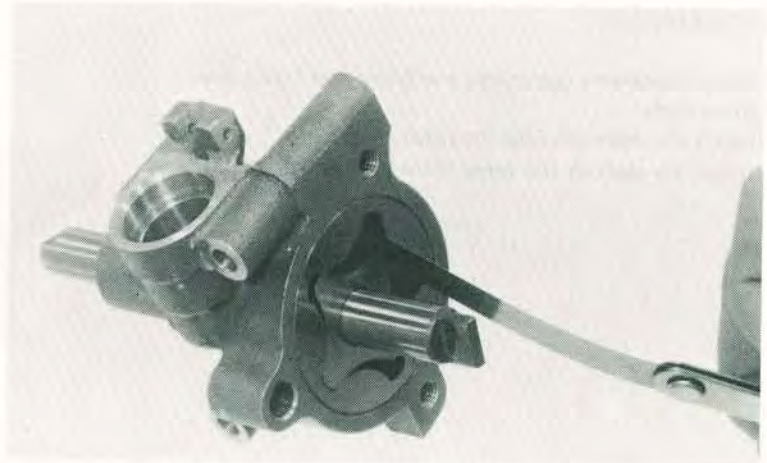




Measure the rotor tip clearance.

**STANDARD: 0.15 mm (0.006 in)**

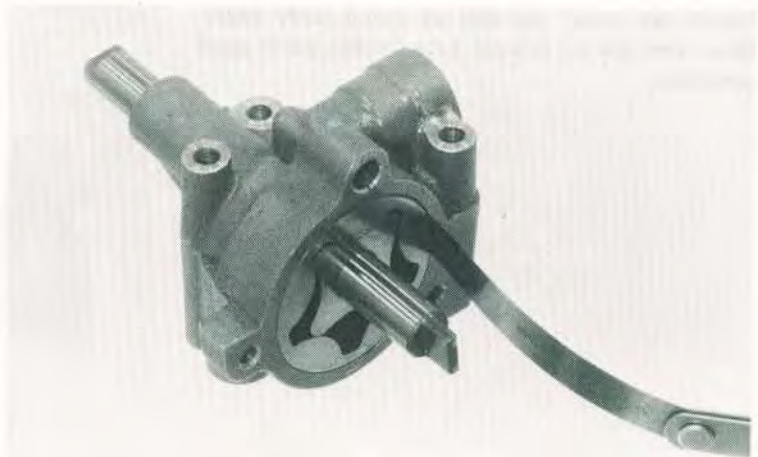
**SERVICE LIMIT: 0.20 mm (0.008 in)**



Measure the pump body clearance.

**STANDARD: 0.15–0.22 mm (0.006–0.009 in)**

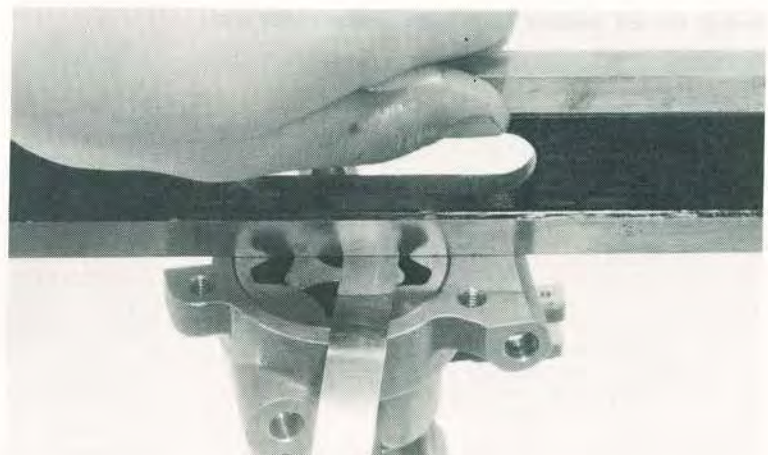
**SERVICE LIMIT: 0.35 mm (0.014 in)**



Remove the rotor shaft and measure the pump end clearance.

**STANDARD: 0.02–0.07 mm (0.001–0.003 in)**

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

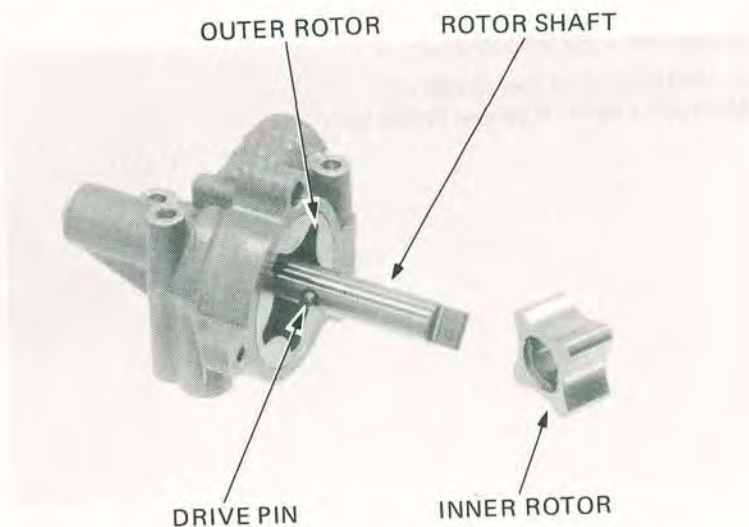




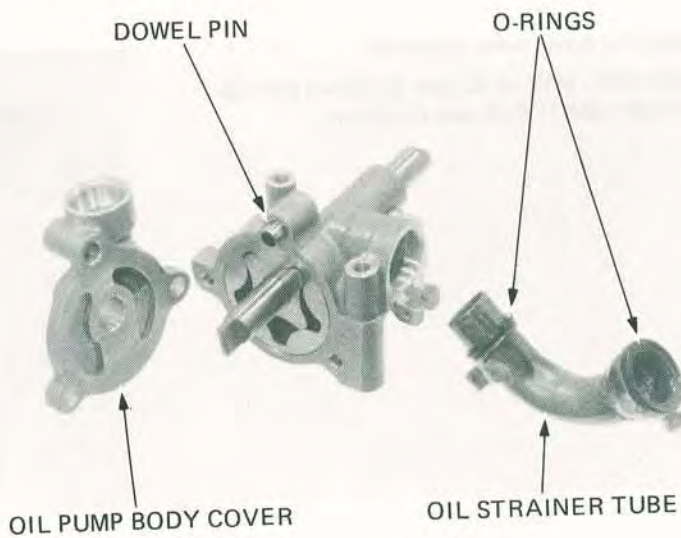
## LUBRICATION

### ASSEMBLY

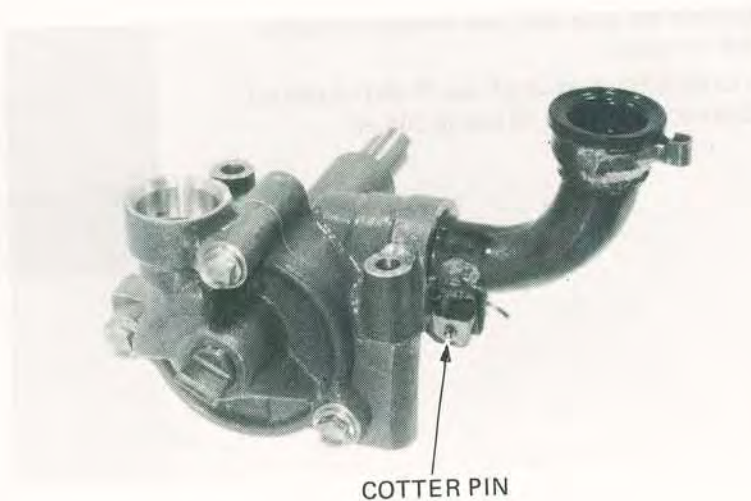
Install the outer rotor into the body and insert the rotor shaft.  
Insert the drive pin into the rotor shaft.  
Align the slots in the inner rotor with the drive pin.



Install the dowel pin and oil pump body cover.  
Make sure the oil strainer tube O-rings are in good condition.



Install the oil strainer tube with a new cotter pin.





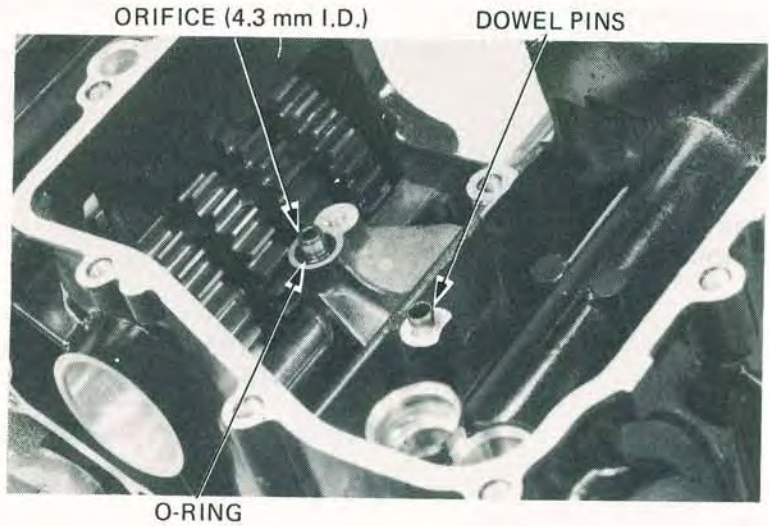
Install the orifice, O-ring and dowel pin.

Install the oil pump and oil pipe.

**NOTE**

Make sure the O-rings are installed on the oil pipe.

Install the oil strainer and oil pan.



Place the oil pump driven sprocket into the drive chain.

**NOTE**

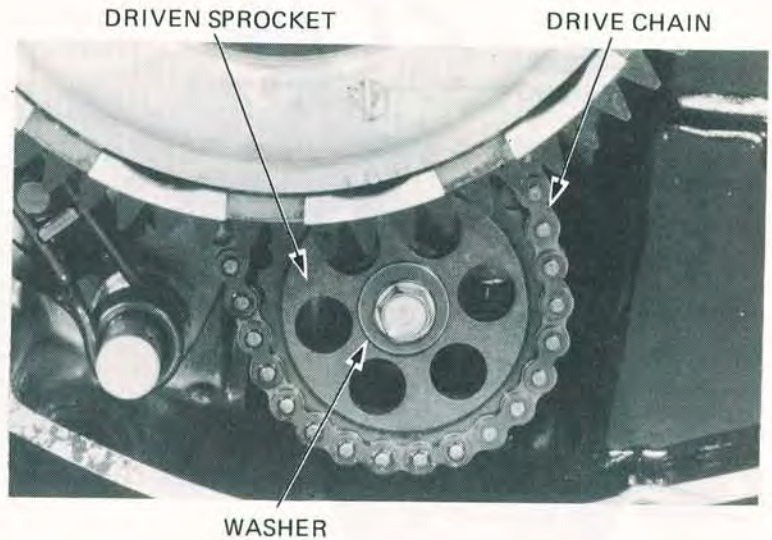
The "IN" mark on the driven sprocket should face the crankcase.

Install the washer and tighten the bolt.

Install the dowel pins and a new gasket.  
Install the right crankcase cover.

Install the exhaust system.

Fill the engine with the recommended oil (page 2-1).



## CONTROL CABLE LUBRICATION

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

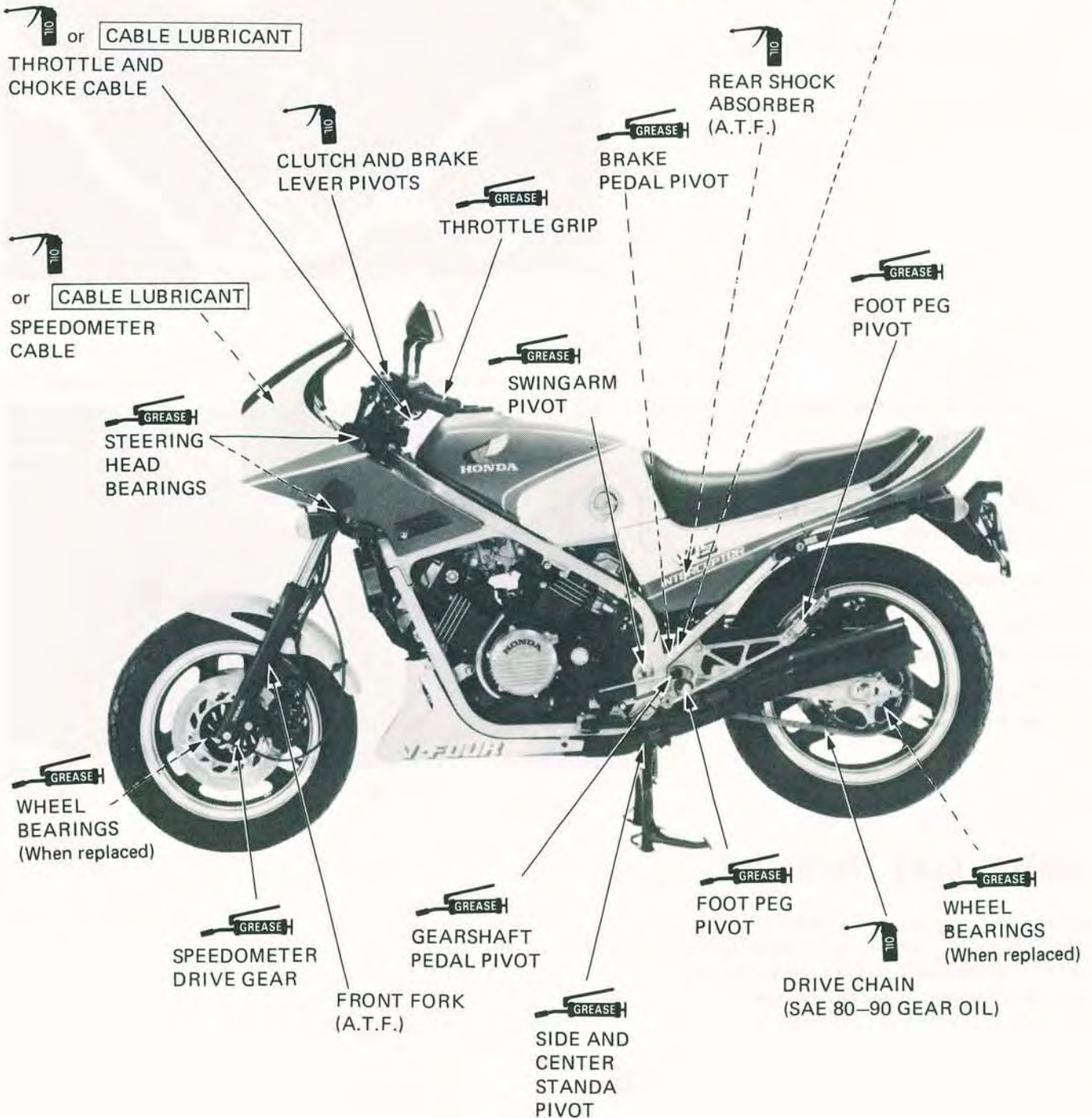


**LUBRICATION**

**LUBRICATION POINTS**

**SPECIAL LUBRICANT**

- SHOCK ABSORBER UPPER MOUNT BUSHING (page 15-11)
- SUSPENSION LINKAGE NEEDLE BEARING (BUSHING FOR '83) (page 15-12)





SERVICE INFORMATION	3-1	EVAPORATIVE EMISSION CONTROL SYSTEM	3-12
MAINTENANCE SCHEDULE	3-3	CYLINDER COMPRESSION	3-13
FUEL LINES	3-4	DRIVE CHAIN	3-14
FUEL FILTER	3-4	BATTERY	3-15
THROTTLE OPERATION	3-5	BRAKE FLUID	3-16
CARBURETOR CHOKE	3-6	BRAKE SHOE/PAD WEAR	3-16
AIR CLEANER	3-6	BRAKE SYSTEM	3-16
CRANKCASE BREATHER	3-7	BRAKE LIGHT SWITCH	3-17
SPARK PLUGS	3-7	HEADLIGHT AIM	3-17
VALVE CLEARANCE	3-8	CLUTCH	3-17
CARBURETOR SYNCHRONIZATION	3-10	SIDE STAND	3-18
CARBURETOR IDLE SPEED	3-11	SUSPENSION	3-18
RADIATOR COOLANT	3-11	NUTS, BOLTS, FASTENERS	3-20
RADIATOR CORE	3-12	WHEELS	3-20
COOLING SYSTEM HOSES & CONNECTIONS	3-12	STEERING HEAD BEARINGS	3-20

## SERVICE INFORMATION

### GENERAL

- Engine oil See page 2-3
- Engine oil filter See page 2-3
- Final drive gear oil See page 2-10

### SPECIFICATIONS

< Engine >

Spark plugs:

Standard		For cold climate (below 5°C, 41°F)		For extended high speed riding	
NGK	ND	NGK	ND	NGK	ND
DPR8EA-9	X24EPR-U9	DPR7EA-9	X22EPR-U9	DPR9EA-9	X27EPR-U9

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



Ignition timing

At idle: VF750F: 10° BTDC  
VF700F: 15° BTDC  
Advance starts: 1,500 rpm  
Full advance: 37° BTDC at 3,300 rpm

Valve clearance

Cold (Below 35°C, 95°F): Intake/Exhaust: 0.15 mm (0.006 in)

Idle speed:

1,200 – 1,300 rpm

Carburetor synchronization:

All carburetors within 60 mm (2.4 in) Hg of each other

Cylinder compression:

1,300 ± 200 kPa (13.0 ± 2.0 kg/cm<sup>2</sup>, 185 ± 28 psi)

Throttle grip free play:

2–6 mm (1/8–1/4 in)

< CHASSIS >

Drive chain slack: 15–25 mm (5/8–1 in)

Tires:

Tire size		Front	Rear
		M120/80–16	M130/80–18
Cold tire pressure, kpa (kg/cm <sup>2</sup> , psi)	Up to 90 kg (200 lbs) load	225 (2.25, 32)	225 (2.25, 32)
	90 kg (200 lbs) load to vehicle capacity load	225 (2.25, 32)	280 (2.80, 40)
Tire brand	Bridgestone	G511	G510
	Dunlop	F11	K627

Suspension air pressure: Front, 0–40 kPa (0–0.4 kg/cm<sup>2</sup>, 0–6 psi)  
Rear, 50–300 kPa (0.5–3.0 kg/cm<sup>2</sup>, 7–43 psi)

TOOLS

**Special**

Vacuum gauge 07404–0030100 or 07404–0020000 or M937B–021–XXXXX (U.S.A. only)  
Carburetor pilot screw wrench 07908–4220201  
Compression gauge attachment 07510–MB00101  
Camshaft holder 07979–MK30000

**Common**

Lock nut wrench, 10 x 12 mm 07708–0030200 or equivalent in U.S.A.





## MAINTENANCE SCHEDULE

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

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

C: CLEAN, R: REPLACE, A: ADJUST

ITEM	FREQUENCY	WHICHEVER COMES FIRST	ODOMETER READING (NOTE 4)								Refer to page		
			EVERY	600 mi (1,000 km)	4,000 mi (6,400 km)	8,000 mi (12,800 km)	12,000 mi (19,200 km)	16,000 mi (25,600 km)	20,000 mi (32,000 km)	24,000 mi (38,400 km)			
EMISSION RELATED ITEMS	* FUEL LINES				I			I			I	3-4	
	* FUEL FILTER										R	3-4	
	* THROTTLE OPERATION		I		I		I		I			3-5	
	* CARBURETOR-CHOKE				I		I		I			3-6	
	* AIR CLEANER	NOTE 1			R		R		R		R	3-6	
	CRANKCASE BREATHER	NOTE 2		C	C	C	C	C	C	C			3-7
	SPARK PLUGS			R	R	R	R	R	R	R			3-7
	* VALVE CLEARANCE		I		I		I		I				3-8
	ENGINE OIL	YEAR	R		R		R		R		R		2-3
	ENGINE OIL FILTER	YEAR	R		R		R		R		R		2-3
	* CARBURETOR-SYNCHRONIZATION		I		I		I		I				3-10
	* CARBURETOR-IDLE SPEED		I	I	I	I	I	I	I	I			3-11
	RADIATOR COOLANT										*R		3-11
	* RADIATOR CORE										I		3-12
	* COOLING SYSTEM HOSES & CONNECTIONS		I		I		I		I				3-12
* EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 3									I		3-12	
NON-EMISSION RELATED ITEMS	DRIVE CHAIN		I EVERY 300 mi (500 km)									3-14	
	BATTERY	MONTH	I	I	I	I	I	I	I	I		3-15	
	BRAKE FLUID	MONTH I 2 YEARS *R	I	I	I	*R	I	I	I	I	*R	3-16	
	BRAKE PAD WEAR			I	I	I	I	I	I	I		3-16	
	BRAKE SYSTEM		I		I		I		I			3-16	
	* BRAKE LIGHT SWITCH		I		I		I		I			3-17	
	* HEADLIGHT AIM		I		I		I		I			3-17	
	CLUTCH FLUID	MONTH I 2 YEARS *R	I	I	I	*R	I	I	I	I	*R	3-17	
	CLUTCH SYSTEM		I		I		I		I			3-17	
	* SIDE STAND				I		I		I			3-18	
	* SUSPENSION		I		I		I		I			3-18	
	* NUTS, BOLTS, FASTENERS		I		I		I		I			3-20	
** WHEELS		I		I		I		I			3-20		
** STEERING HEAD BEARINGS		I		I		I		I			3-20		

\* 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 THAT THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

- NOTES:
- SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.
  - SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE.
  - CALIFORNIA TYPE ONLY (After '83)
  - FOR HIGHER ODOMETER READINGS, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.



## FUEL LINES

Remove the seat and left side cover.  
Check the fuel lines and replace any parts which show deterioration, damage or leakage.



FUEL LINES

## FUEL FILTER

**WARNING**

*Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.*

Replace the fuel filter with a new one when indicated by the maintenance schedule (page 3-3).

Remove the left side cover.  
Remove the electric panel mounting bolts and remove the coolant reserve tank.

Unclip the fuel filter holder from the bottom of the electric panel.

Disconnect the fuel outlet line from the fuel filter.  
Pull the fuel filter out then clip the inlet line closed.  
Disconnect the fuel inlet line.

Install the fuel filter.

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

ELECTRIC PANEL



FUEL FILTER



## THROTTLE OPERATION

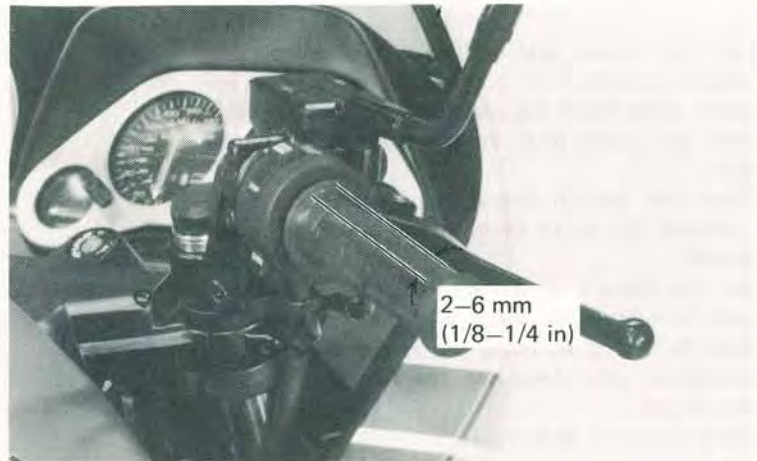
Check that the throttle grip opens smoothly to full throttle and fully closes automatically, in all steering positions.

Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables (page 2-11), 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)**

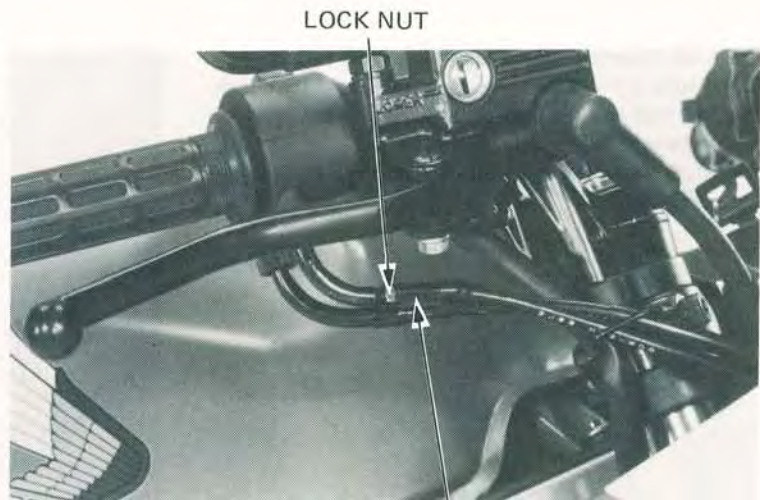


Adjustment can be made at either end of the throttle cable. Minor adjustments are made with the upper adjuster and major adjustments are made with the lower adjuster after removing the fuel tank and air cleaner case.

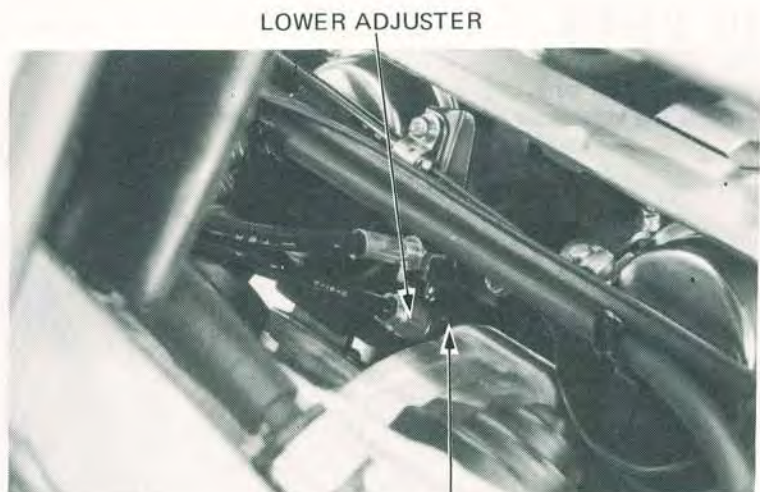
Adjust by loosening the lock nut and turning the adjuster.

Tighten the lock nut and recheck throttle operation.

Install the air cleaner case and fuel tank, and check throttle free play once more. Also check for fuel leaks.



UPPER ADJUSTER



LOCK NUT

## CARBURETOR CHOKE

The V45 choke system uses a fuel enriching circuit controlled by a bystarter valve. The bystarter valve opens the enriching circuit via cable when the choke lever on the handlebar is pulled back.

Check for smooth operation of the choke lever. Lubricate the choke cable, if the operation is not smooth.

Pull the choke lever on the handlebar all the way back to fully open. Make sure the choke valve is open by trying to move the choke lever on the carburetor, after removing the fuel tank and air cleaner case.

There should be no free play.

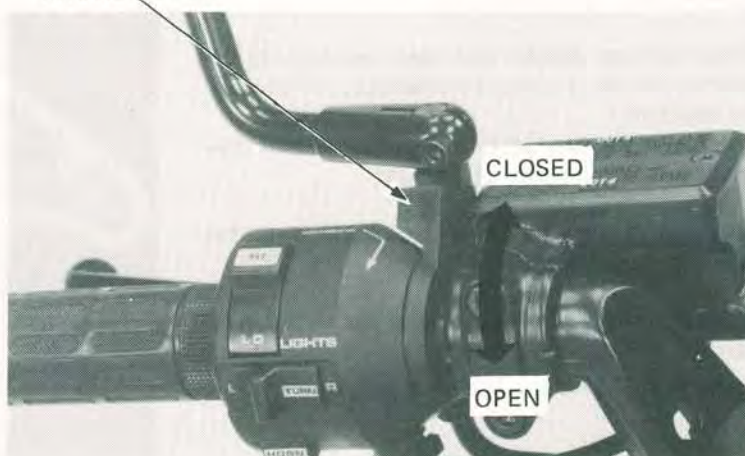
Adjust if necessary, by loosening the choke cable clamp on the carburetor and moving the choke cable casing so the choke lever is fully open.

Tighten the clamp.

Push the choke lever up all the way to fully closed. Make sure the choke valve is fully closed by checking for free play in the cable between the lever on the carburetor and cable casing.

Reinstall the removed parts in the reverse order of disassembly.

CHOKE LEVER



CABLE CLAMP



CHOKE CABLE

## AIR CLEANER

Remove the fuel tank.

Remove the air cleaner cover screws and the cover.

AIR CLEANER CASE COVER





Remove the spring clip and the air cleaner element. Discard the element in accordance with the maintenance schedule.

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

Install a new element and secure it with the spring clip.

Install the air cleaner cover and fuel tank.



**AIR CLEANER ELEMENT**

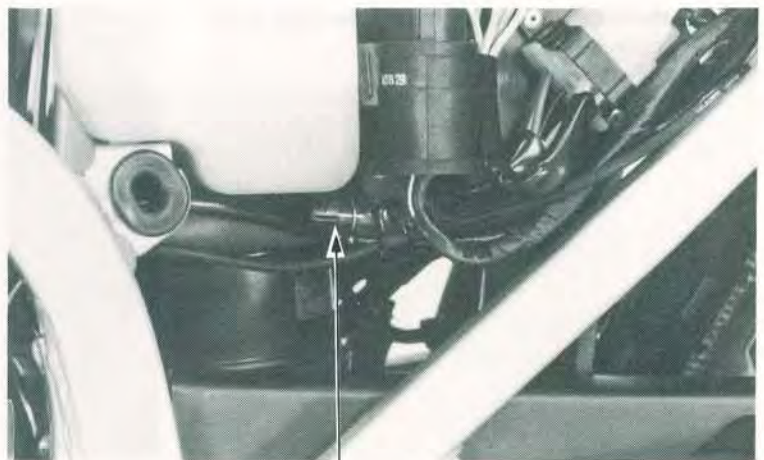
## CRANKCASE BREATHER

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

Install the drain plug.

### NOTE

Service more frequently when riding in rain or at full throttle, or if the deposit level can be seen in the transparent section of the drain tube.



**DRAIN PLUG**

## SPARK PLUGS

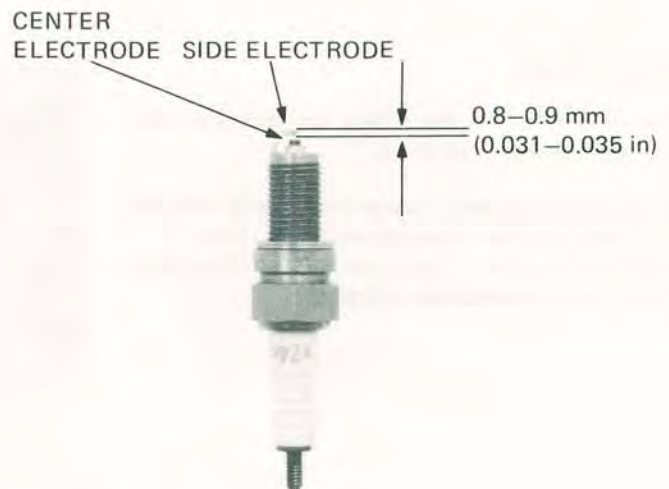
### RECOMMENDED SPARK PLUGS

	NGK	ND
Standard	DPR8EA-9	X24EPR-U9
For cold Climate (Below 5°C, 41°F)	DPR7EA-9	X22EPR-U9
For extended high speed riding	DPR9EA-9	X27EPR-U9

Disconnect the spark plug caps.  
Clean any dirt from around the spark plug bases.  
Remove and discard the spark plugs.  
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. Continue tightening by hand until the spark plug bottoms. Then, tighten the spark plugs another 1/2 turn with a spark plug wrench to compress the plug washer. Connect the spark plug caps.





## MAINTENANCE

### VALVE CLEARANCE

#### NOTE

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

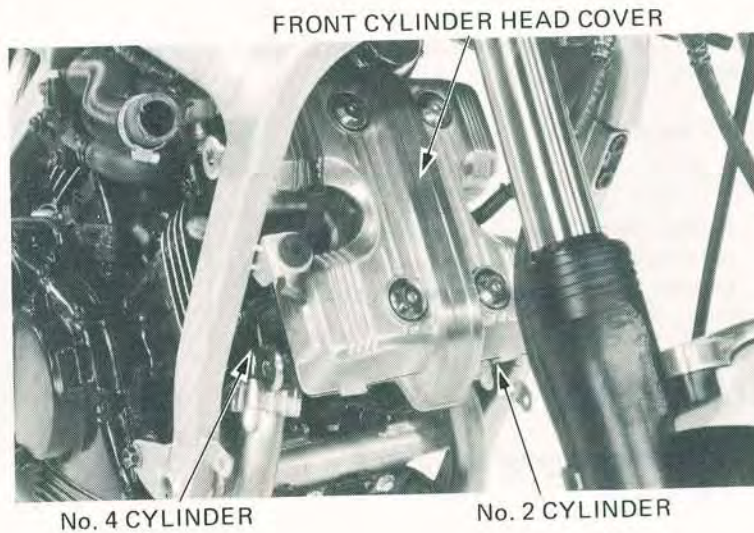
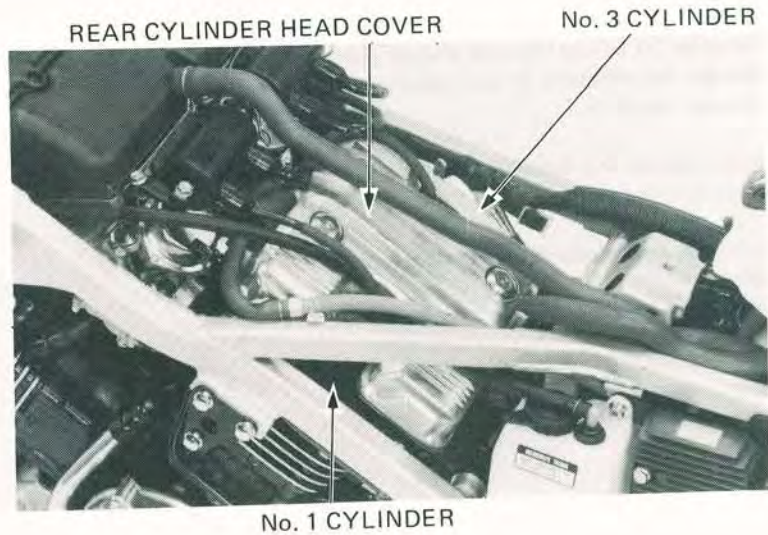
Remove the lower radiator cowl.  
Drain coolant from engine and lower radiator (page 6-3).

#### NOTE

Drain the coolant into a clean container for reuse. Scheduled coolant replacement is every 24,000 miles (38,400 km).

Remove the seat and remove the left and right side covers.  
Turn the fuel valve off and remove the fuel tank.  
Remove the upper radiator (page 6-5).  
Remove the spark plug caps.

Remove the front and rear cylinder head cover bolts and both cylinder head covers.  
Remove the alternator cover.



### INSPECTION

Measure and adjust the intake and exhaust valve clearances as described below.

Rotate the crankshaft counterclockwise to align the T1.3 mark with the crankcase mating surfaces.  
Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.





Install the camshaft holder

- Slide the "claw" under the end of the camshaft.
- Slip the "ring" over the head of the camshaft journal bolt.
- Finger tighten the adjusting knob. This will raise the camshaft up into the camshaft holder.

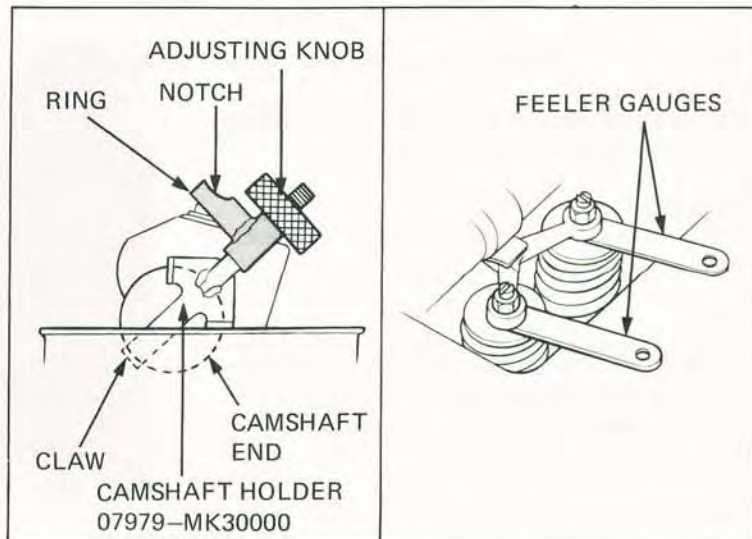
**CAUTION**

*Overtightening the adjusting knob may damage the tool.*

Check the valve clearances for the No. 1 cylinder using two feeler gauges for each pair of valves; one for each valve that shares a common rocker arm.

**VALVE CLEARANCE (IN, EX):**

0.15 mm (0.006 in)



If adjustment is needed, loosen the lock nuts and turn the adjusting screws until there is a slight drag on both feeler gauges. Both feeler gauges should remain inserted during adjustment.

remove the oil pipe bolt and oil pipe if necessary. Hold the adjusting screws and tighten the lock nuts.

**TORQUE: 21-25 N·m (2.1-2.5 kg·m, 15-18 ft·lb)**

**CAUTION**

*The lock nuts will come loose if not tightened to the correct torque value.*

Recheck the valve clearance.

Rotate the crankshaft 90° counterclockwise to align the T2.4 mark with the crankcase mating surfaces and check the valve clearances for the No. 4 cylinder.

Adjust using the procedures for the No. 1 cylinder.

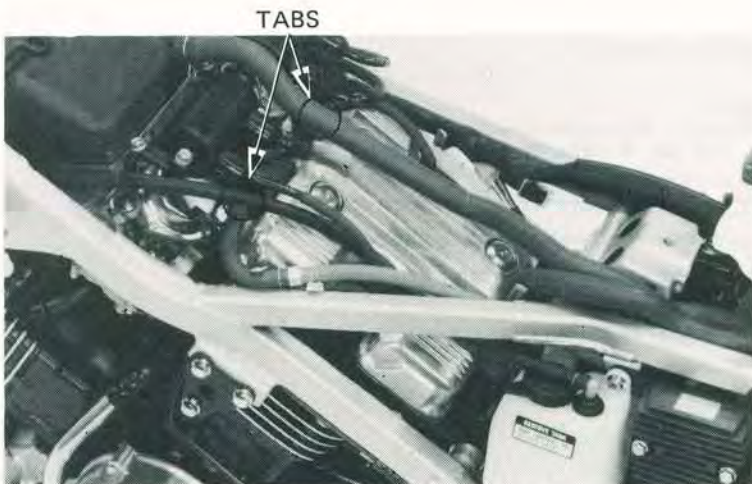
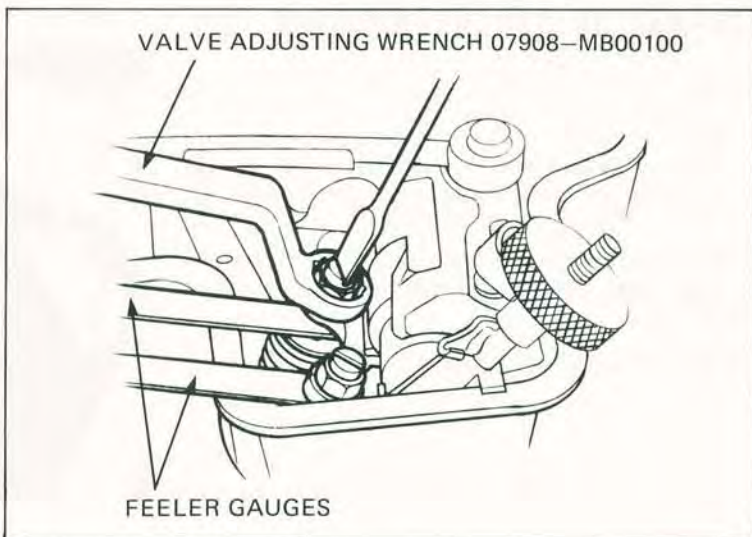
Rotate the crankshaft 270° counterclockwise to align the T1.3 mark with the crankcase mating surfaces and check the valve clearances for the No. 3 cylinder.

Adjust using the procedures for the No. 1 cylinder.

Rotate the crankshaft 90° counterclockwise to align the T2.4 mark with the crankcase mating surfaces and check the valve clearances for the No. 2 cylinder.

Adjust using the same procedures as for the No. 1 cylinder.

Install the rear cylinder head cover with its tabs facing forward.





## MAINTENANCE

Install the front cylinder head cover with its tabs facing down.

Install the removed parts, except the radiator cap, in the reverse order of disassembly.

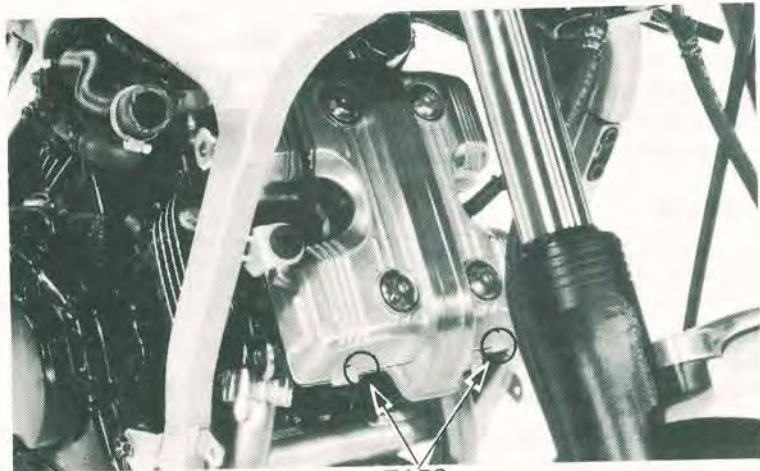
Check the engine oil level.

Fill the radiator with clean coolant to the specified level.

### NOTE

After filling the radiator, start the engine and rev it at least three times to remove any air bubbles from the cooling system. Add more coolant mixture as necessary.

Install the radiator cap.



TABS

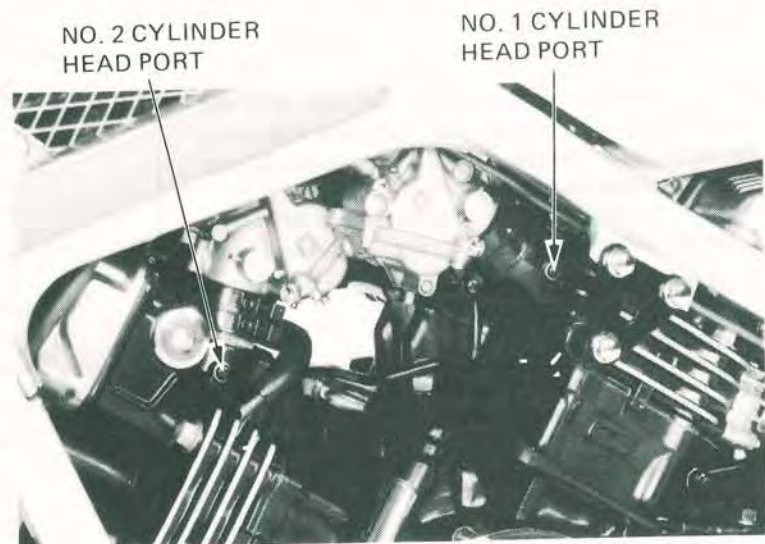
## CARBURETOR SYNCHRONIZATION

### NOTE

Synchronize the carburetors with the engine at normal operating temperature, transmission in neutral and motorcycle on the centerstand.

Remove the plugs from the No. 1, 2, 3 and 4 cylinder head ports and install the vacuum gauge adapters.

Connect the vacuum gauges.



NO. 2 CYLINDER  
HEAD PORT

NO. 1 CYLINDER  
HEAD PORT

## ADJUSTMENT

### NOTE

The No. 4 carburetor cannot be adjusted; It is the base carburetor.

Start the engine and adjust the idle speed.

**IDLE SPEED: 1,200 – 1,300 rpm**

Check that all carburetors are within 60 mm (2.4 in) Hg.

VACUUM GAUGE 07404-0020000  
or M937B-021-XXXXX (U.S.A. only)



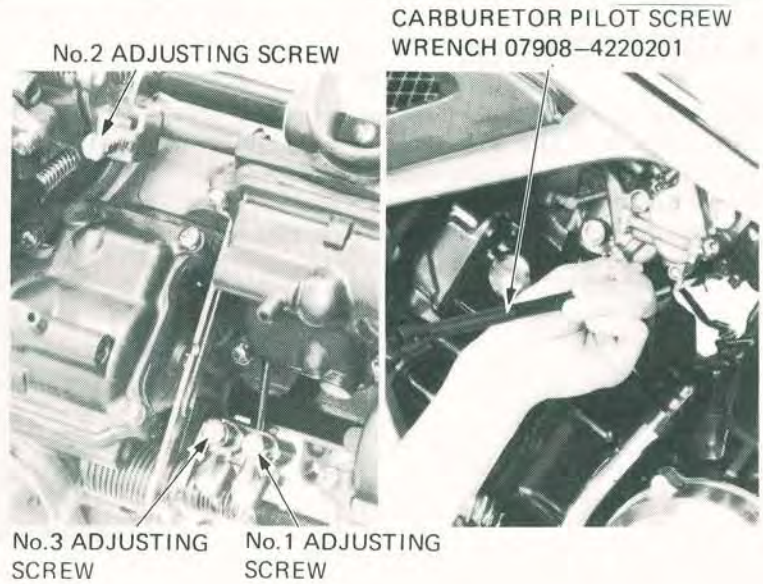
ADAPTERS





Synchronize to specification by turning the adjusting screws with carburetor pilot screw wrench (07908-422021).

Recheck the idle speed and synchronization.  
Remove the gauge adapters and install the plugs.



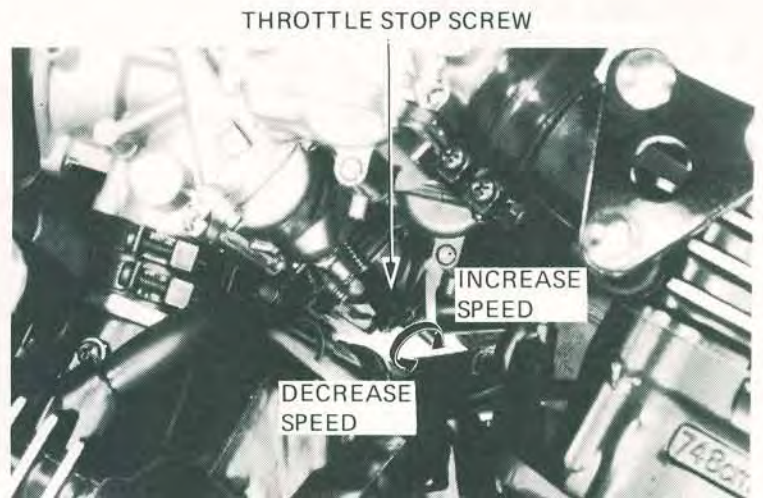
## CARBURETOR IDLE SPEED

### 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 place the motorcycle on its center stand.  
Turn the throttle stop screw as required to obtain the specified idle speed.

**IDLE SPEED: 1,200 – 1,300 rpm**



## RADIATOR COOLANT

Remove the frame left side cover.

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

If necessary, 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 frame side cover.

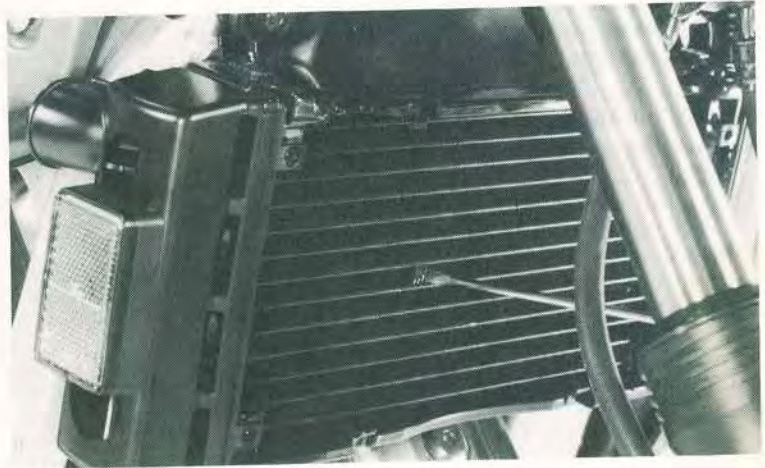




**MAINTENANCE**

## RADIATOR CORE

Check the air passages for clogging or damage. Straighten bent fins and collapsed core tubes. 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.



## COOLING SYSTEM HOSES & CONNECTIONS

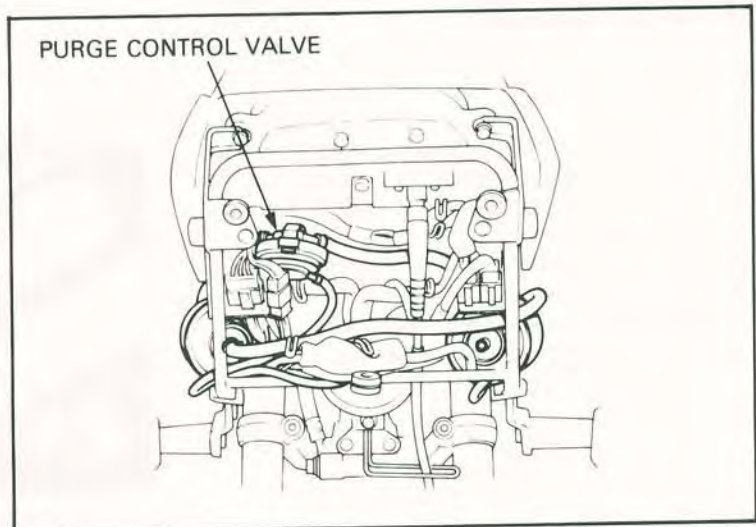
Inspect the hoses for cracks or deterioration, and replace if necessary. Check the tightness of all hose clamps.



WATER HOSES

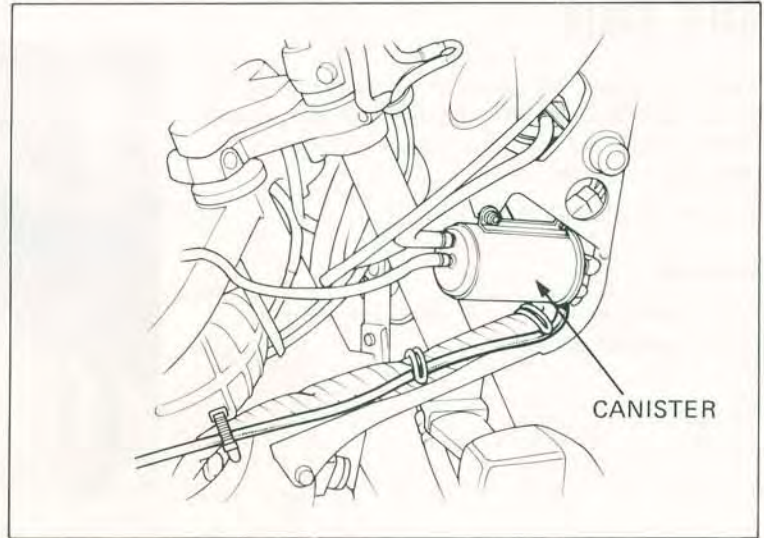
## EVAPORATIVE EMISSION CONTROL SYSTEM (After '83 California model only)

Check the fuel tank breather tube between the tank cap and the canister, and the vacuum tube between the canister and the purge control valve for deterioration, clogging, damage or loose joints or connections.





Check the canisters for cracks or damage.



## CYLINDER COMPRESSION

Warm up the engine.

Stop the engine, then disconnect the spark plug caps and remove the spark plugs.

Insert the compression gauge.

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

### NOTE:

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

### COMPRESSION PRESSURE:

1,300 ± 200 kPa (13.0 ± 2.0 kg/cm<sup>2</sup>, 185 ± 28 psi)

If compression is low, check for the following:

- Improper valve clearance
- Leaky valves
- Leaking cylinder head gasket
- Worn piston/ring/cylinder

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



COMPRESSION GAUGE ATTACHMENT  
07510-MB00101 or commercially available in U.S.A.

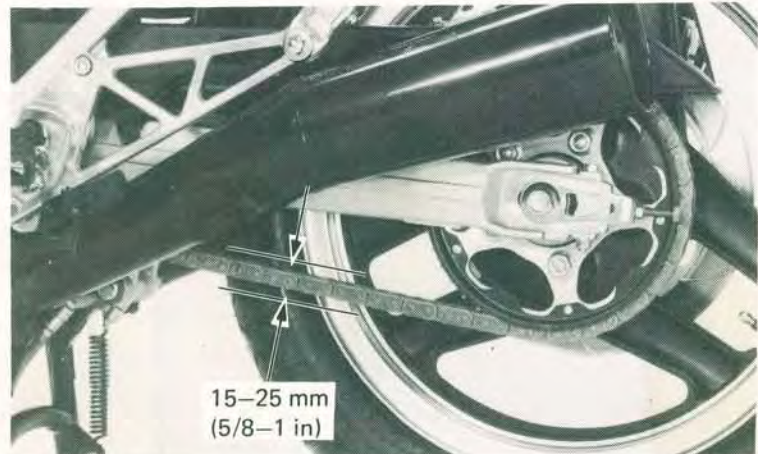
**MAINTENANCE**
**DRIVE CHAIN**

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

**SLACK:** 15–25 mm (5/8–1 in)

**CAUTION**

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



Adjust as follows:

Loosen the axle nut.

Loosen the adjusting bolt lock nuts.

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

**CAUTION**

*Make sure that the same alignment marks on both adjusting plates align with the ends of the swingarm.*

Tighten the adjusting bolt lock nuts.

Tighten the rear axle nut.

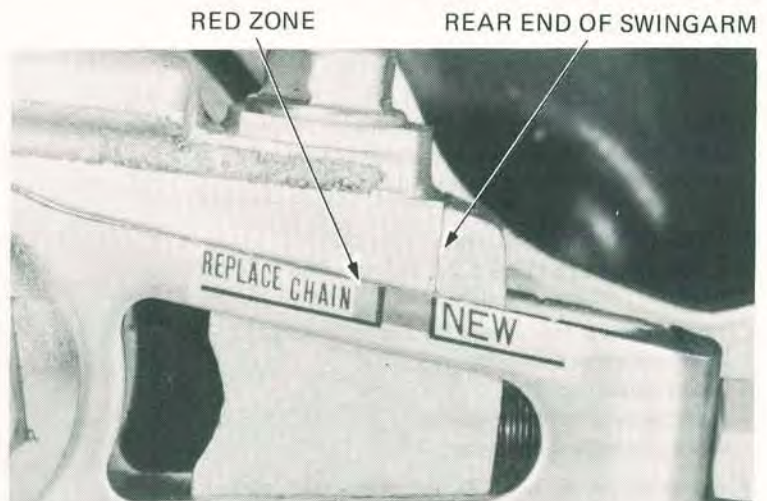
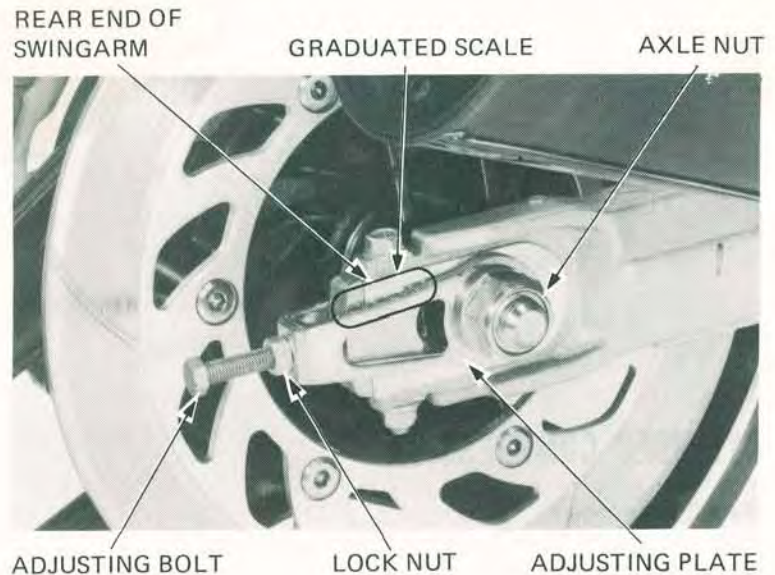
**TORQUE:** 85–105 N·m (8.5–10.5 kg·m,  
61–76 ft·lb)

Recheck chain slack and free wheel rotation.

Lubricate the drive chain with SAE 80 or 90 gear oil.

Check the chain wear label. If the red zone on the label align, or is beyond, the rear end of the swingarm after the chain has been adjusted, the chain must be replaced.

**REPLACEMENT CHAIN:** D.I.D. 50V or RK50MO

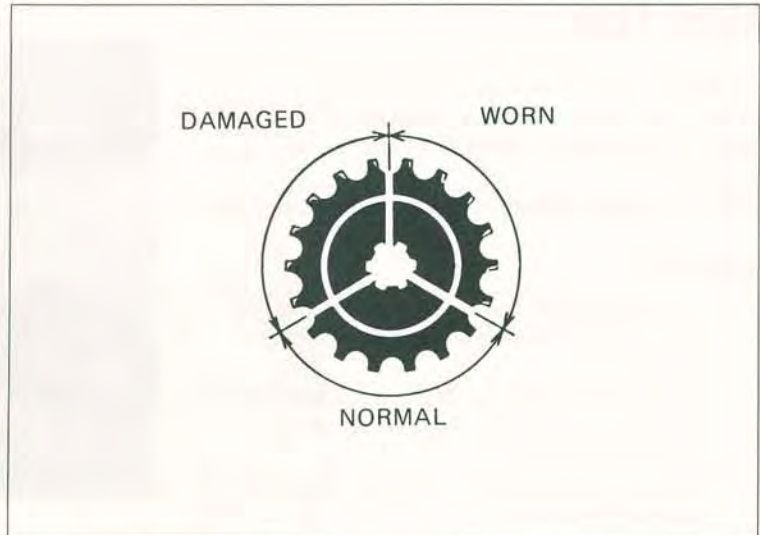




Inspect the drive chain and sprockets for damage or wear. A drive chain with damaged rollers, loose pins, or missing O-rings must be replaced. Replace any sprocket which is damaged or excessively worn.

**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.

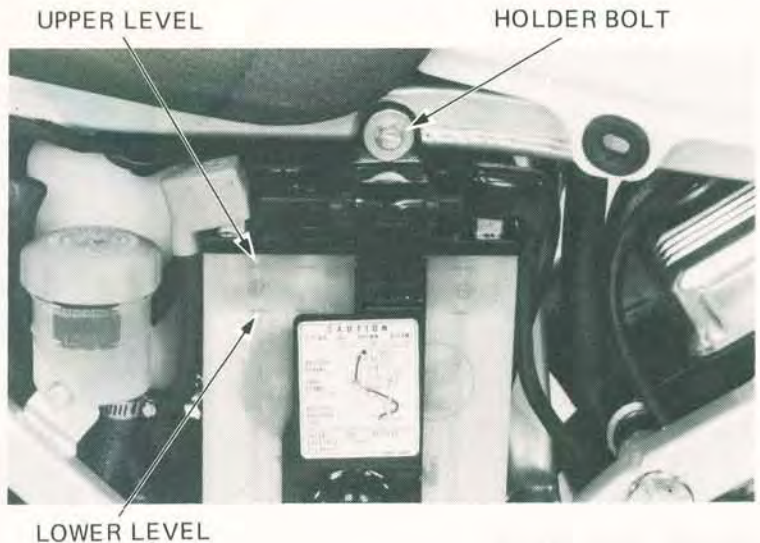


**BATTERY**

Remove the right frame side cover and inspect the battery fluid level.

When the fluid level nears the lower level, remove the battery and add distilled water to the upper level line 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.

Disconnect the battery breather hose from the battery.

Pull the battery out, remove the filler caps and add distilled water to the upper level line.

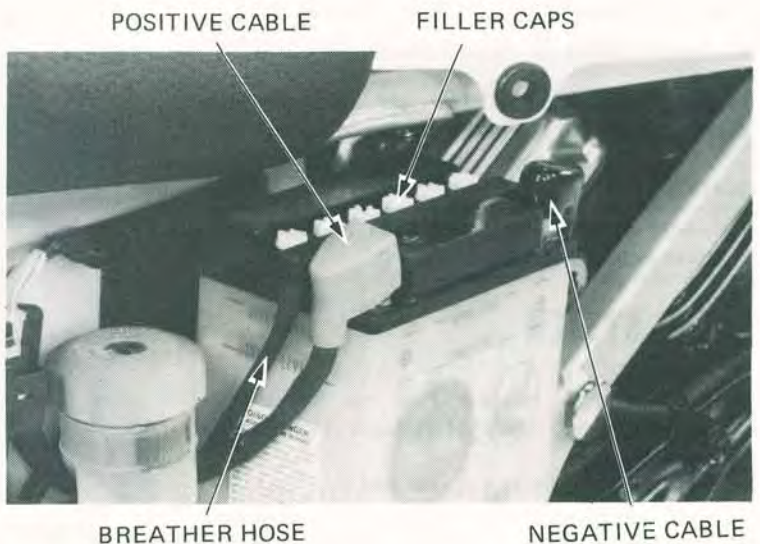
Reinstall the filler caps and the battery.

**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 them thoroughly with water and get prompt medical attention.*



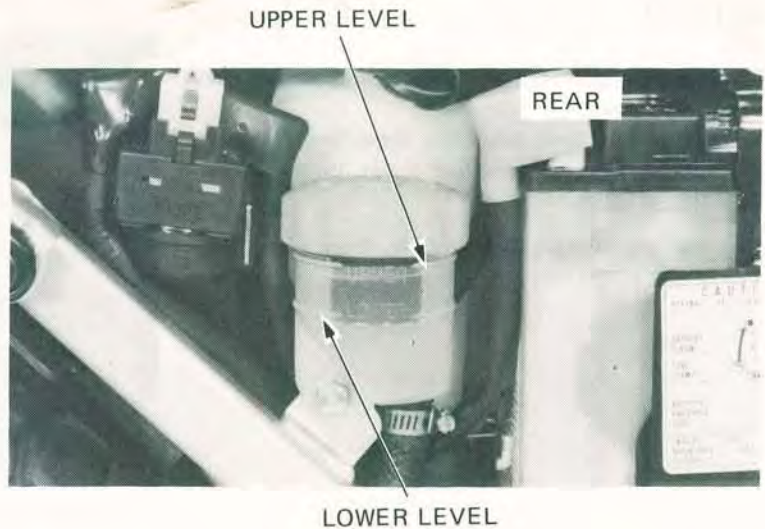
**MAINTENANCE**
**BRAKE FLUID**

Check the front brake fluid reservoir level. If the level nears the lower level mark, fill the reservoir with **DOT-4 BRAKE FLUID** to the upper level mark. Check the entire system for leaks, if the level is low.

**CAUTION**

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

Refer to section 16 for brake bleeding procedures.


**BRAKE PAD WEAR**

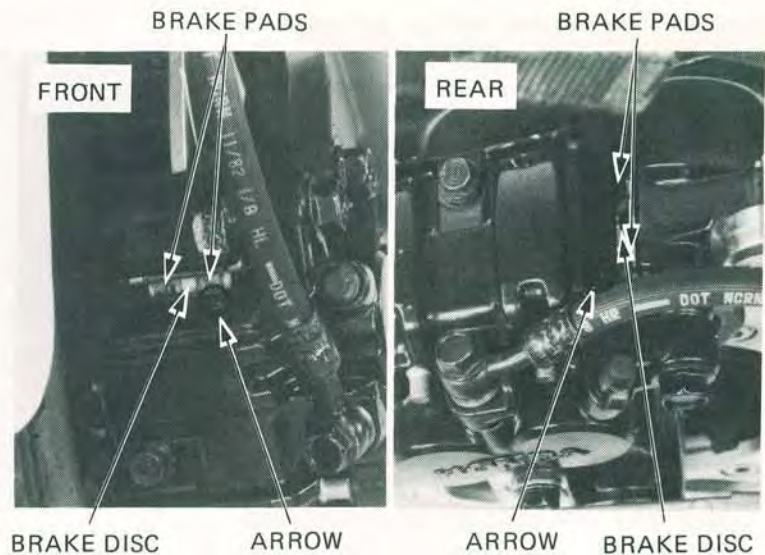
Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly. Replace the brake pads if the wear line on the pads reaches the edge of the brake disc (page 16-5).

**CAUTION**

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

**BRAKE SYSTEM**

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





## BRAKE LIGHT SWITCH

Adjust the brake light switch so that the brake light will come on when the brake engagement begins. Adjust by holding the switch body and turning the adjusting nut. Do not turn the switch body.

Turn the adjusting nut clockwise if the brake light comes on too late.

BRAKE LIGHT SWITCH      ADJUSTING NUT



## HEADLIGHT AIM

Adjust vertically by turning the vertical adjusting screw. Turn the adjusting screw clockwise to direct the beam down.

Adjust horizontally by turning the horizontal adjusting screw. Turn the adjusting screw clockwise to direct the beam toward the right side of the rider.

### NOTE

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

### WARNING

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

HORIZONTAL ADJUSTING SCREW



VERTICAL ADJUSTING SCREW

## CLUTCH

Check the clutch fluid reservoir level.

If the level nears the lower level mark, fill the reservoir with **DOT-4 BRAKE FLUID** until the level is between the upper and lower level mark. Check the entire system for leaks, if the level is low.

### CAUTION

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

UPPER LEVEL MARK



LOWER LEVEL MARK



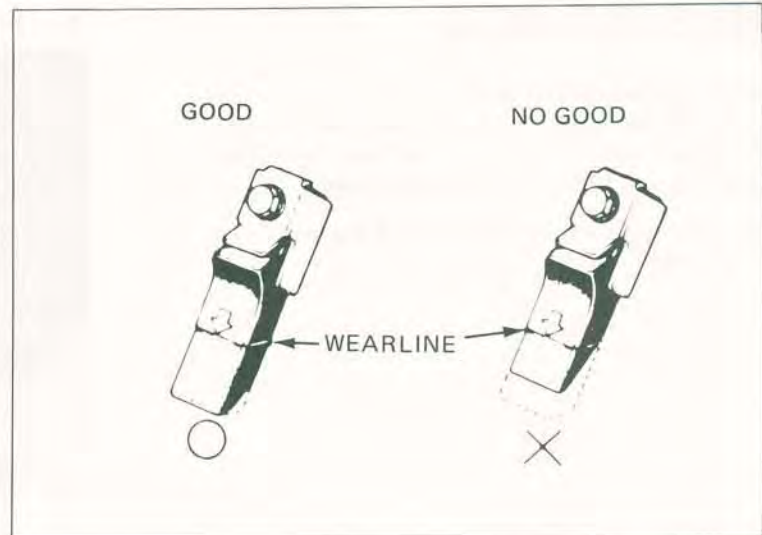
## MAINTENANCE

### SIDE STAND

Check the rubber pad for deterioration or wear. Replace if any wear extends to wear line as shown. Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement. Make sure the side stand is not bent.

#### NOTE

- When replacing, use a rubber pad with the mark "Over 260 lbs ONLY".
- Spring tension is correct if the measurements fall within 2–3 kg (4.4–6.6 lb), when pulling the side stand lower end with a spring scale.



### 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 front forks by compressing them 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 front fork air pressure when the forks are cold.

Place the vehicle on its center stand.

Remove the air valve cap and measure the air pressure.

#### AIR PRESSURE:

0–40 kPa (0–0.4 kg/cm<sup>2</sup>, 0–6 psi)



AIR VALVE





### ANTI-DIVE SYSTEM INSPECTION

**WARNING**

Select a safe place away from traffic to perform this inspection.

Check the operation of the anti-dive system by riding the motorcycle and firmly applying the brakes.

Position	Anti-dive damper force
I	LIGHT ANTI-DIVE
II	MEDIUM
III	HARD
IV	MAXIMUM ANTI-DIVE

Inspect and if necessary, repair the system (Refer to section 14).



ADJUSTER

### REAR

Place the motorcycle on its center stand.  
Move the rear wheel sideways with force to see if the swingarm bearings are worn.  
Replace the bearings if there is any looseness (page 15-14).  
Check the shock absorber for leaks or damage.  
Tighten all rear suspension nuts and bolts.



Remove the frame left side cover.  
Remove the valve cap and measure the shock absorber air pressure.

**REAR SHOCK ABSORBER AIR PRESSURE:**  
50–300 kPa (0.5–3.0 kg/cm<sup>2</sup>, 7–43 psi)

### NOTE

Check the air pressure when the shock absorber is cold.



AIR VALVE

**MAINTENANCE**

## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (Section 1) at the intervals shown in the Maintenance Schedule (Page 3-3).

Check all cotter pins, safety clips, hose clamps and cable stays.

## WHEELS

**NOTE**

Tire pressure should be checked when tires are COLD.

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


**RECOMMENDED TIRES AND PRESSURES:**

		Front	Rear
Tire size		M120/80-16	M130/80-18
Cold tire pressure psi kPa, (kg/cm <sup>2</sup> , psi)	Up to 90 kg (200 lbs) load	225 (2.25, 32)	225 (2.24, 32)
	90 kg (200 lbs) load to vehicle capacity load	225 (2.25, 32)	280 (2.8, 40)
Tire brand	BRIDGE-STONE	G511	G510
	DUNLOP	K527A	K627

Check the front and rear wheels for trueness (Section 14 and 15).

Measure the tread depth at the center of the tires. Replace the tires if the tread depth reaches the following limit:

**Minimum tread depth:**

Front: 1.5 mm (1/16 in)

Rear: 2.0 mm (3/32 in)

## STEERING HEAD BEARINGS

**NOTE**

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

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

If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 14-34).

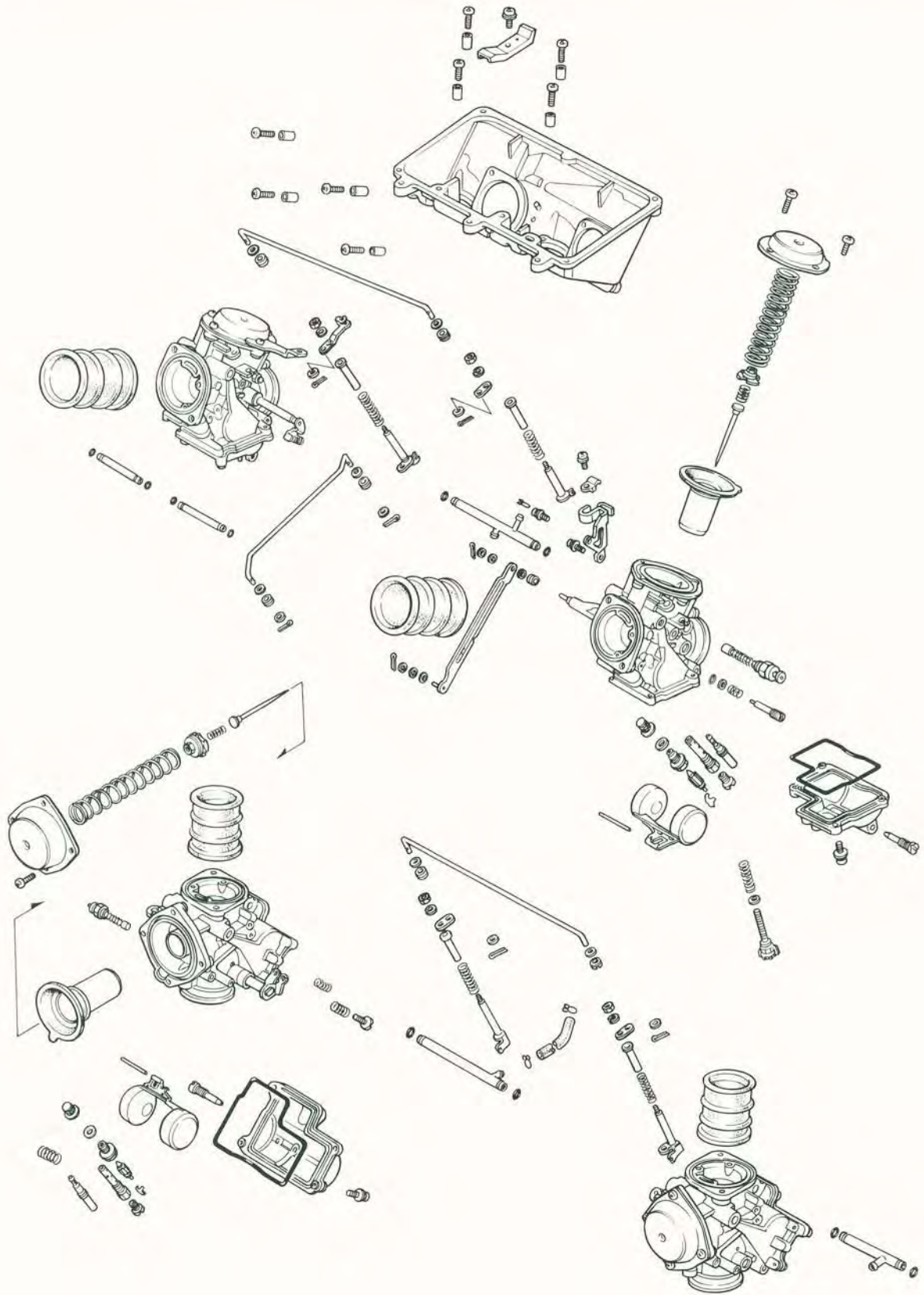




MEMO



**FUEL SYSTEM**





SERVICE INFORMATION	4-1	CARBURETOR INSTALLATION	4-15
TROUBLESHOOTING	4-2	PILOT SCREW ADJUSTMENT	4-16
CARBURETOR REMOVAL	4-3	FUEL TANK	4-17
VACUUM CHAMBER	4-4	AIR CLEANER	4-17
FLOAT CHAMBER	4-6	FUEL PUMP	4-18
PILOT SCREW	4-8	HIGH ALTITUDE ADJUSTMENT (USA only)	4-18
CARBURETOR SEPARATION	4-9	EVAPORATIVE EMISSION CONTROL SYSTEM (After '83 California model only)	4-19
CARBURETOR ASSEMBLY	4-12		

## SERVICE INFORMATION

### GENERAL

**WARNING**

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

The front cylinders use down draft carburetors.

When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.

The float bowls have drain screws that can be loosened to drain residual gasoline.

Fuel pump inspection is in section 20.

The No. 1 and No. 3 carburetors use different jet needles (thinner) and shorter springs than the No. 2 and No. 4 carburetors.

Do not interchange these parts.

### TOOLS

#### Special

Valve guide driver, 7 mm	07942-8230000 (U.S.A. only)
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
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### SPECIFICATIONS

		'83	After '83	After '83 Cal.
Carburetor type		KEIHIN VD		
Throttle bore		32 mm (1.26 in)		
Venturi bore		30 mm (1.18 in)		
I.D. No. VF750F/VF700F		VD52B	VD52C/VD52D	VD05A/VD05B
Main jet	VF750F	Front and rear: #128	Front: #112, Rear: #110	Front and rear: #128
	VF700F	—————	Front: #112, Rear: #110	Front and rear: #122
Float level		7.0 mm (0.28 in)		
Idle speed		1,200 - 1,300 rpm		
Throttle grip free play		2-6 mm (0.08-0.24 in)		
Pilot screw initial opening		See page 4-16		



## TROUBLESHOOTING

### Engine cranks but won't start

1. No fuel in tank
2. No fuel to carburetors
3. Engine flooded with fuel
4. No spark at plug (ignition system faulty)
5. Air cleaner clogged
6. Intake air leak
7. Improper choke operation
8. Improper throttle operation

### Hard starting or stalling after starting

1. Improper choke operation
2. Ignition malfunction
3. Carburetor faulty
4. Fuel contaminated
5. Intake air leak
6. Idle speed incorrect

### Rough idle

1. Ignition system faulty
2. Idle speed incorrect
3. Incorrect carburetor synchronization
4. Carburetor faulty
5. Fuel contaminated

### Misfiring during acceleration

1. Ignition system faulty

### Backfiring

1. Ignition system faulty
2. Carburetor faulty

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

1. Fuel system clogged
2. Ignition system faulty

### Lean mixture

1. Clogged fuel jets
2. Faulty float valve
3. Float level low
4. Fuel cap vent blocked
5. Fuel strainer screen clogged
6. Restricted fuel line
7. Air vent tube clogged
8. Intake air leak
9. Restricted or faulty fuel pump

### Rich mixture

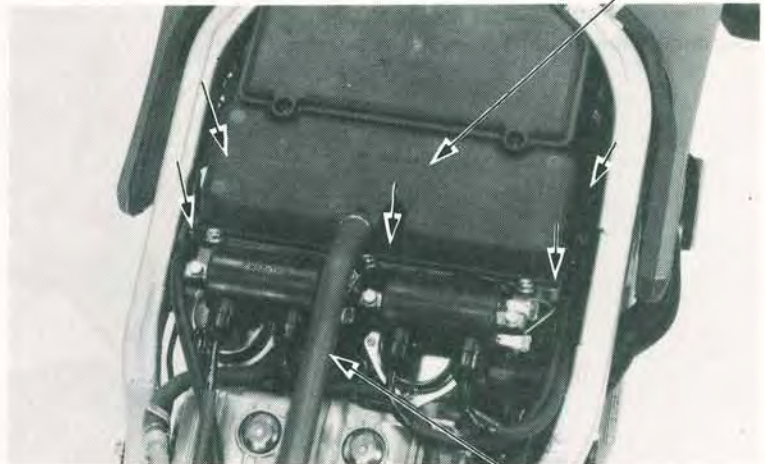
1. Clogged air jets
2. Vacuum piston stuck closed
3. Faulty float valve
4. Float level too high
5. Choke stuck or clogged
6. Dirty air cleaner



## CARBURETOR REMOVAL

Turn the fuel valve off.  
 Remove the left and right side covers.  
 Remove the seat and fuel tank.  
 Remove the fairing.  
 Disconnect the breather hose and remove the air cleaner case by removing five screws.

AIR CLEANER CASE



BREATHER HOSE

Remove the heat insulator plate.  
 Disconnect the choke and throttle cables from the carburetor.

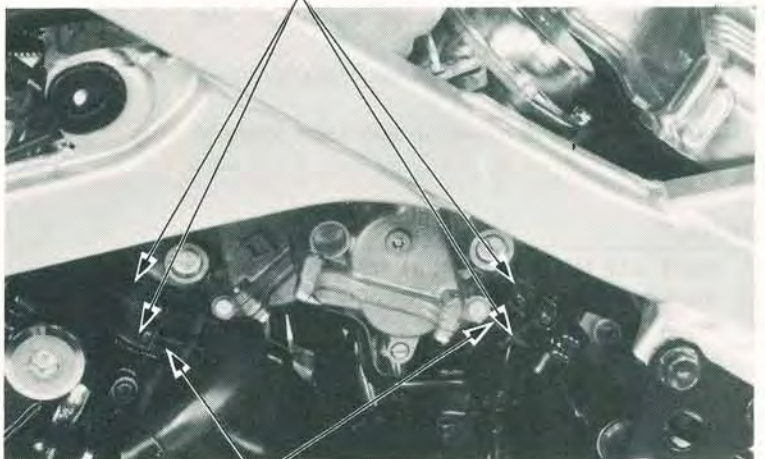
CHOKE CABLE



THROTTLE CABLES

Loosen all carburetor bands and remove the carburetor assembly from the intake pipes.

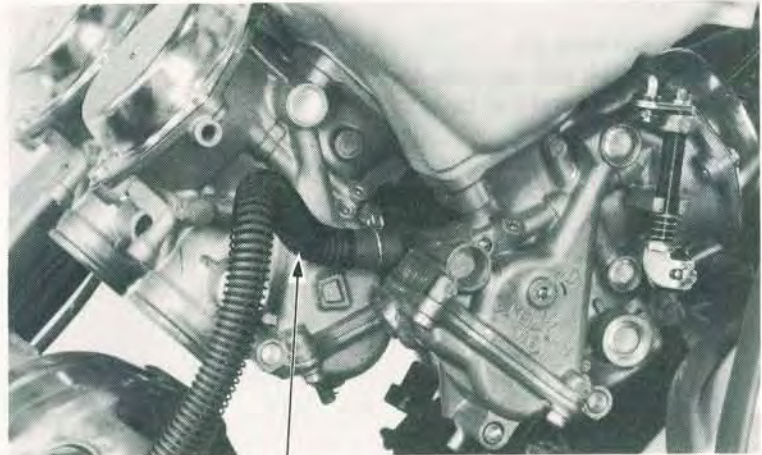
CARBURETOR BANDS



INTAKE PIPES

## FUEL SYSTEM

Lift the carburetors out of the frame.  
Disconnect the fuel line from the carburetor.



FUEL LINE

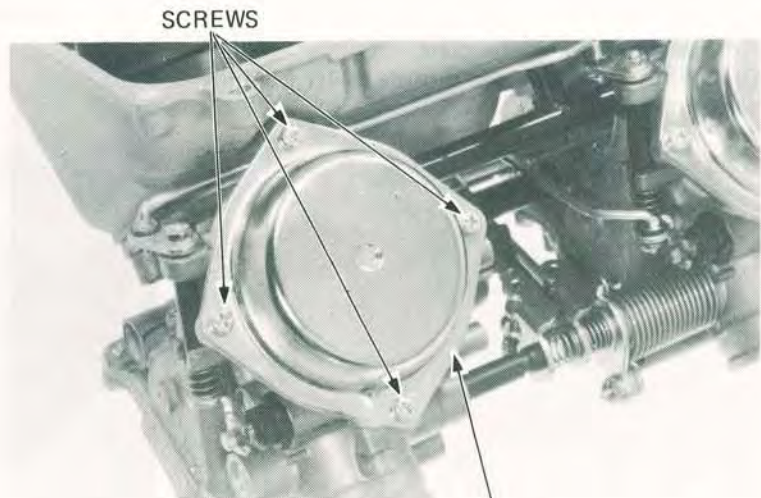
## VACUUM CHAMBER

### REMOVAL

Remove the four vacuum chamber cover screws and cover.

### CAUTION

*Do not interchange vacuum chamber covers, springs, pistons or jet needles between carburetors.*



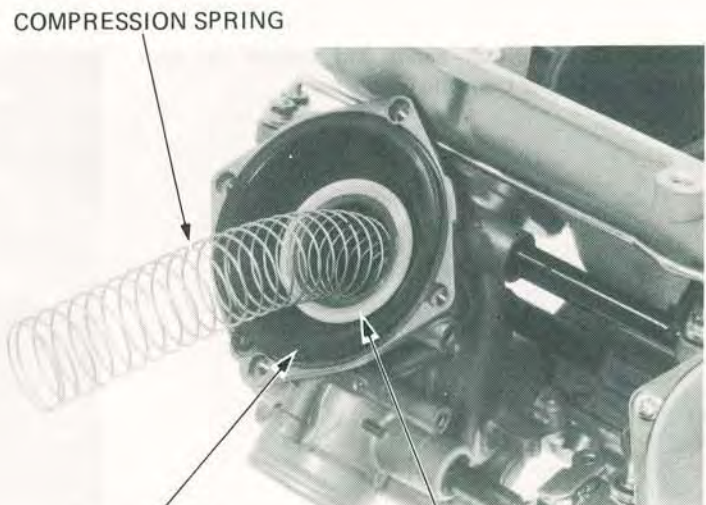
SCREWS

COVER

Remove the compression spring, diaphragm and vacuum piston.  
Inspect the vacuum piston for wear, nicks, scratches or other damage.  
Make sure the piston moves up and down freely in the chamber.

### NOTE

No. 1 and No. 3 carburetors use thinner jet needles and shorter springs than the No. 2 and No. 4 carburetors.



COMPRESSION SPRING

DIAPHRAGM

VACUUM PISTON



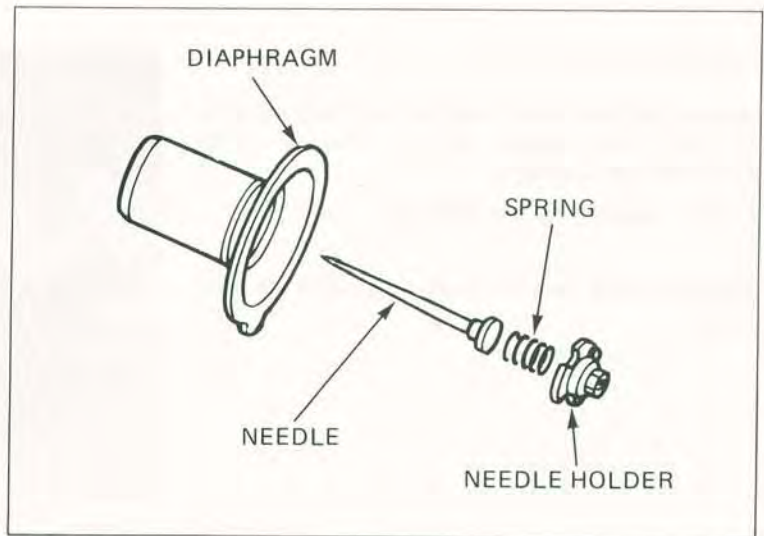


Push the needle holder in and turn it 60 degrees with an 8 mm socket. Then remove the needle holder, spring and needle from the piston.



Inspect the needle for excessive wear at the tip and for bending, or other damage.

Check for a torn diaphragm or other deterioration.



**INSTALLATION**

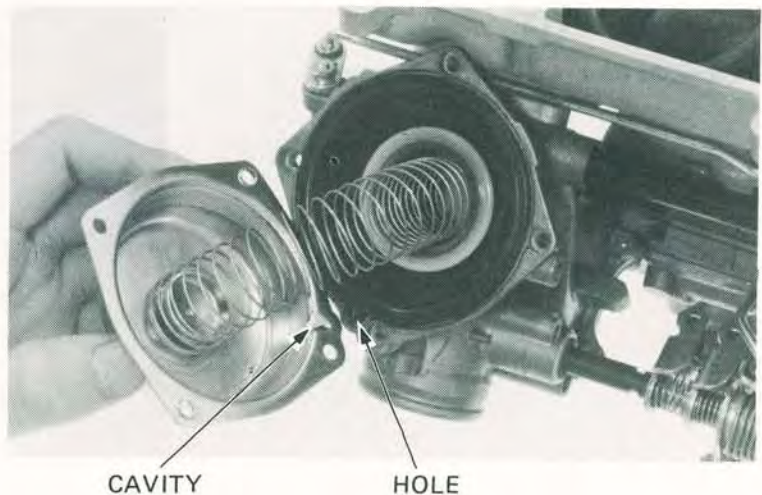
Installation is essentially the reverse of removal but to keep from distorting the diaphragm, install the vacuum piston/diaphragm as follows:

Insert the vacuum piston into the carburetor. Stick your finger into the carburetor bore and hold the vacuum piston in the full throttle position, then turn down the diaphragm so its lip fits into the carburetor groove.

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

**NOTE**

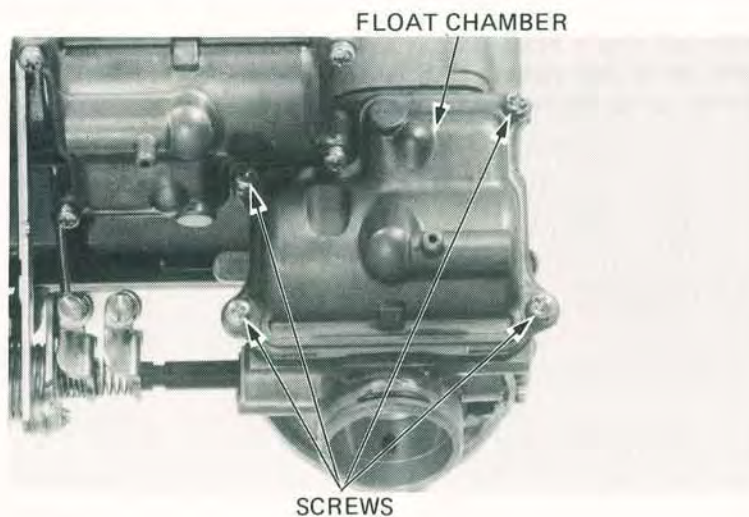
Be sure the thinner jet needles and shorter springs are installed in the No. 1 and No. 3 carburetors.



## FLOAT CHAMBER

### REMOVAL

Remove the four float chamber screws and the float chamber.

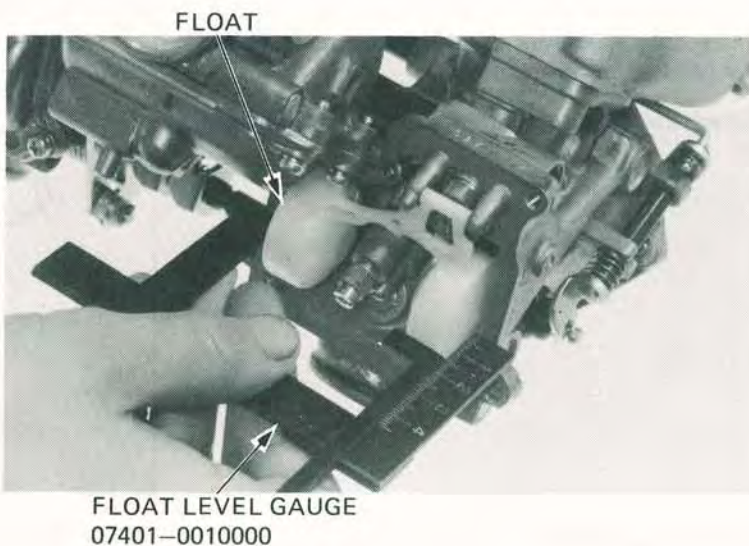


### FLOAT LEVEL

Measure the float level with the carburetor inclined  $15^{\circ}$ – $45^{\circ}$  from vertical and the float tang just contacting the float valve.

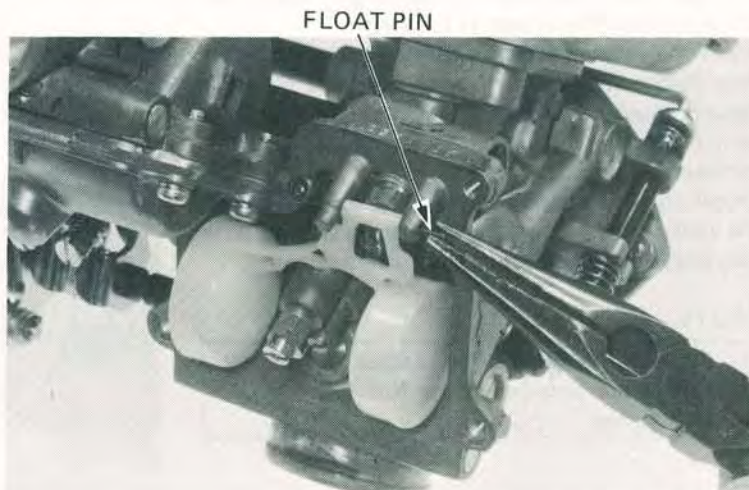
**FLOAT LEVEL: 7.0 mm (0.28 in)**

Adjust the float level by carefully bending the float tang.



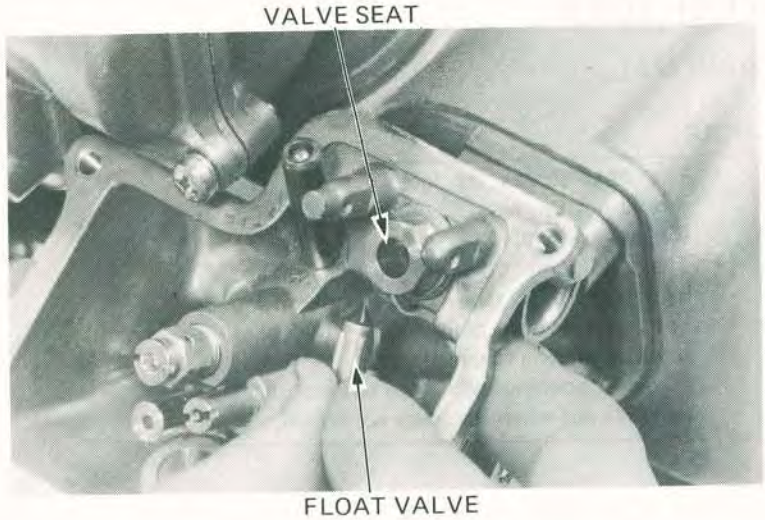
### FLOAT AND JETS

Remove the float pin, float and float valve.

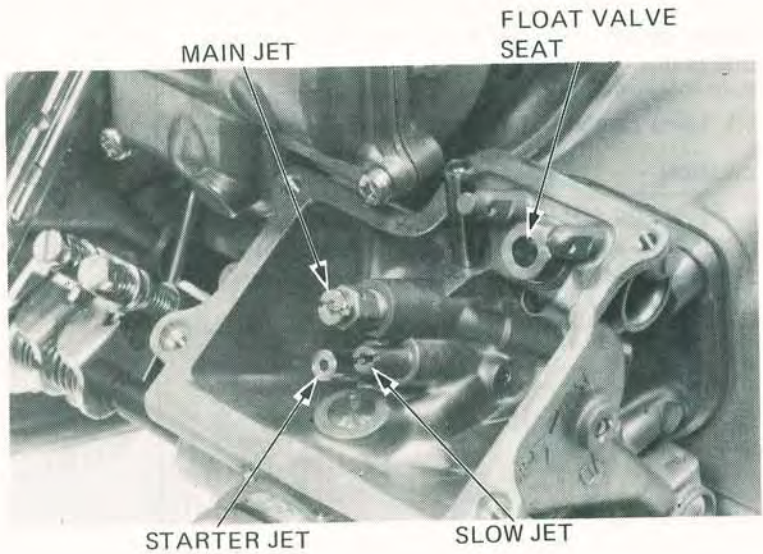




Inspect the float valve for grooves and nicks.  
Inspect the operation of the float valve.



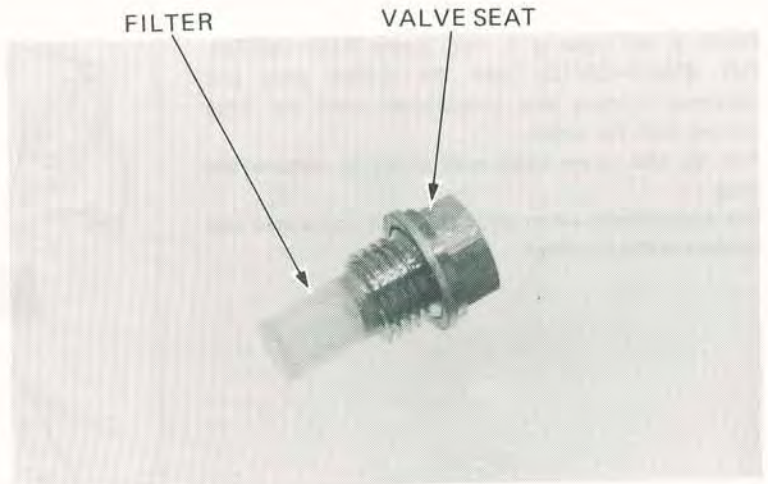
Remove the starter jet, main jet and slow jet.  
Remove the float valve seat and filter.



Inspect the float valve seat and filter for grooves,  
nicks or deposits.

**ASSEMBLY**

Assemble the float chamber components in the  
reverse order of disassembly.



## PILOT SCREW

### REMOVAL

#### NOTE

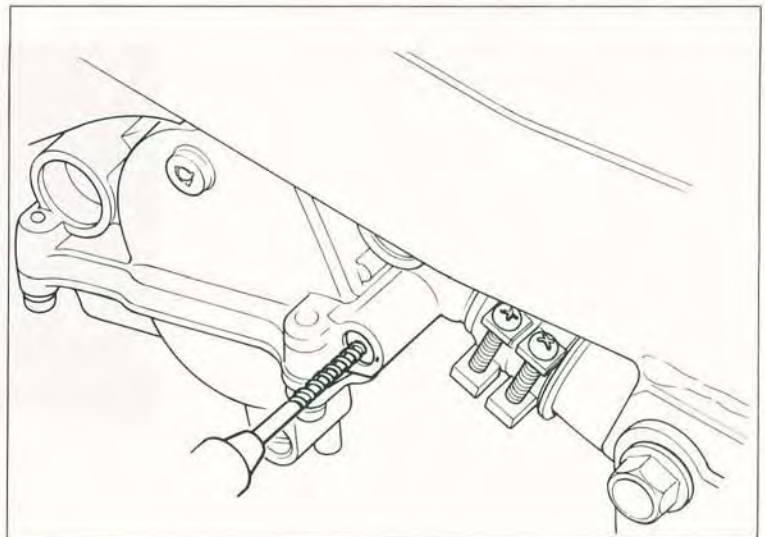
- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.
- The pilot screw plugs are factory installed to prevent pilot screw misadjustment. Do not remove the plugs unless the pilot screws are being removed.
- Cover all openings with tape to keep metal particles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

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

Drill through the plug with a 4 mm (5/32 in) drill bit, being careful not to drill into the pilot screw.

#### CAUTION

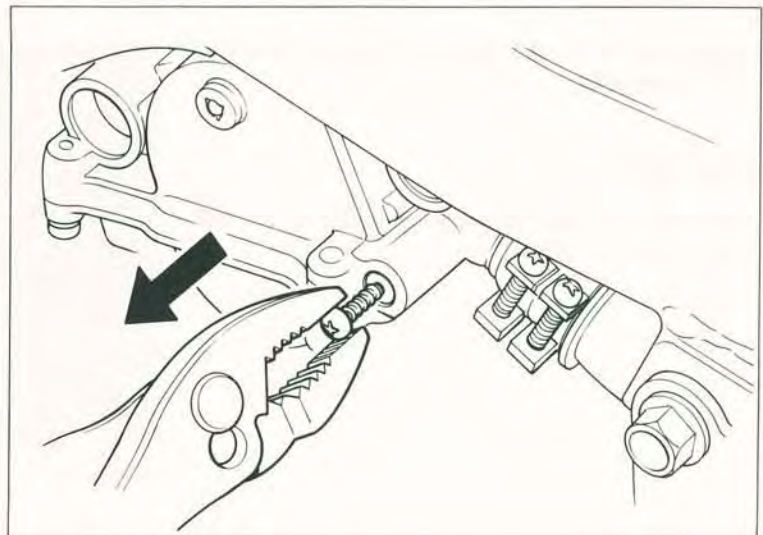
*Be careful not to drill into the pilot screw. All pilot screws must be replaced even if only one requires it for proper pilot screw adjustment (page 4-16).*



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.



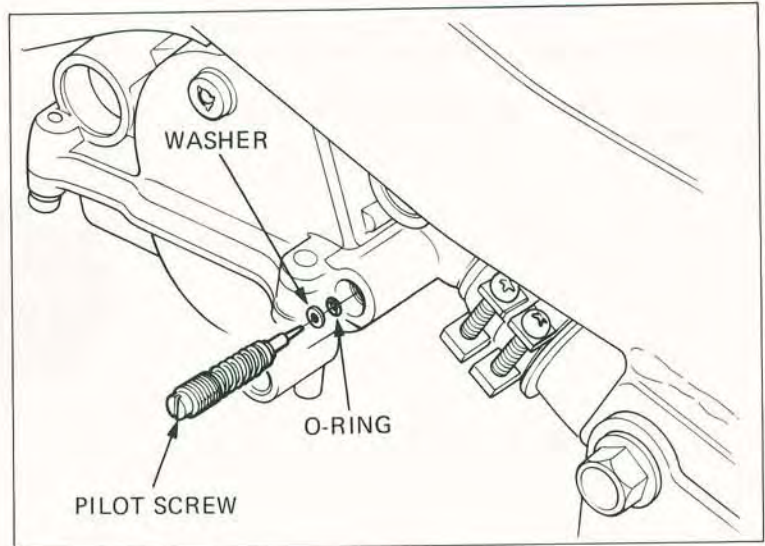


Turn each pilot screw in and carefully count the number of turns before it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screws.

**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. Perform pilot screw adjustment if new pilot screws are installed (page 4-16).

**NOTE**

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

**CARBURETOR SEPARATION**

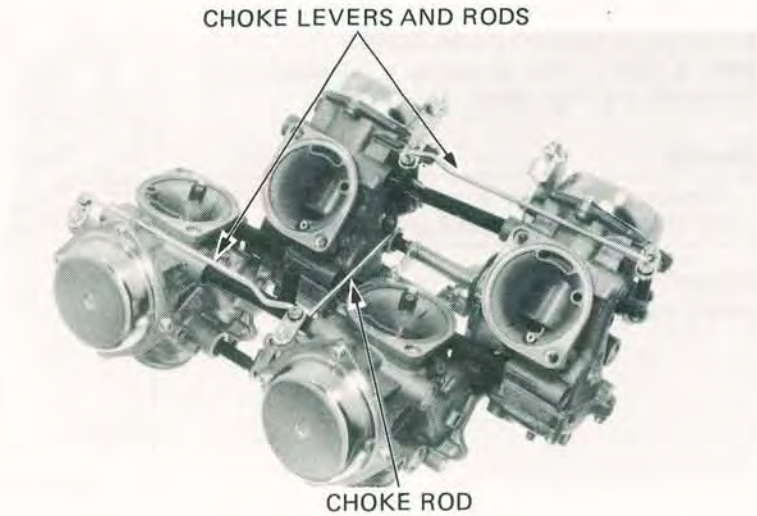
Remove the screws attaching the air chamber to the carburetors and separate the chamber and carburetors.



**FUEL SYSTEM**

Remove the nuts, and remove the choke levers and rods.

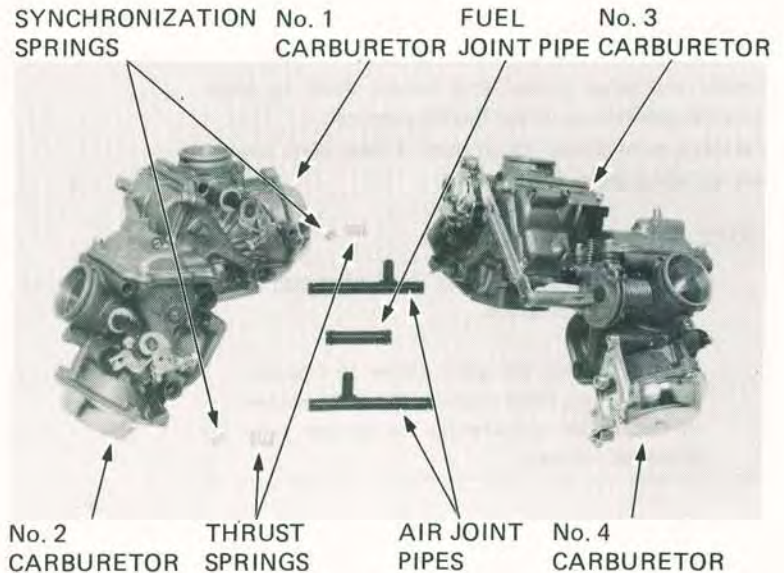
Remove the cotter pins and washers, and remove the choke rod.



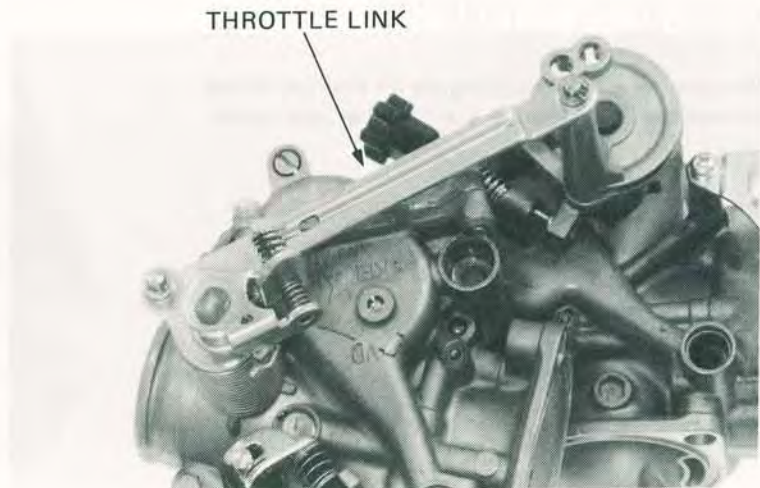
Carefully separate the No. 1 carburetor from the assembly. Then separate the No. 2 carburetor.

**CAUTION**

*Separate the carburetors horizontally to prevent damage to the joint pipes.*

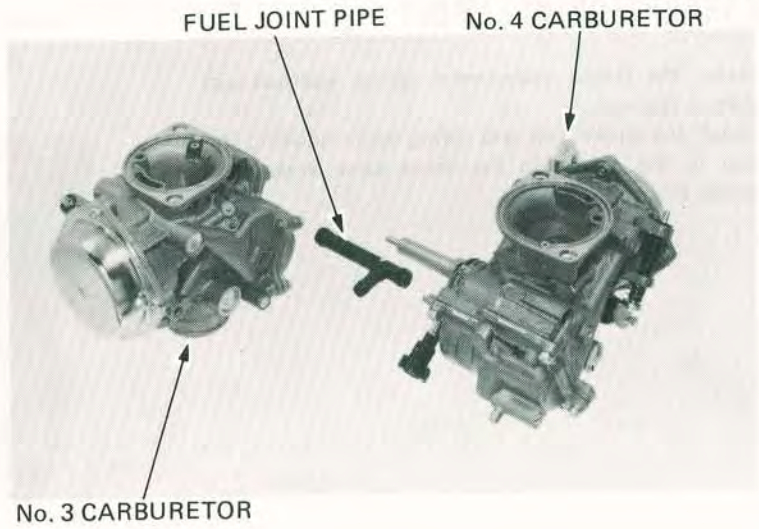


Disconnect the throttle link from the No. 3 and 4 carburetors by removing the cotter pins.

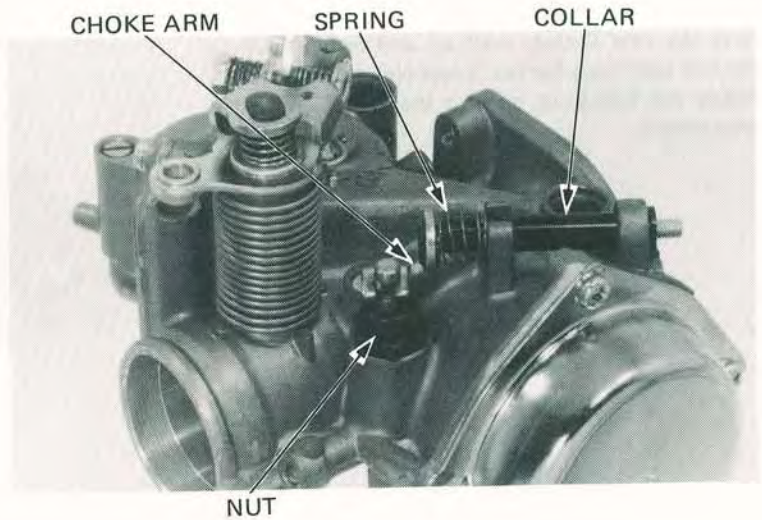




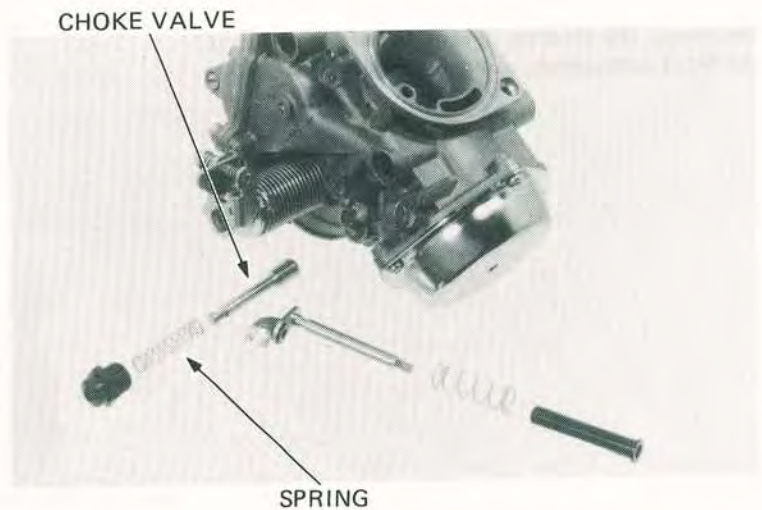
Carefully separate the No. 3 and No. 4 carburetors.



Remove the choke arm collar and remove the choke arm and spring.  
Remove the choke valve nut, spring and valve.



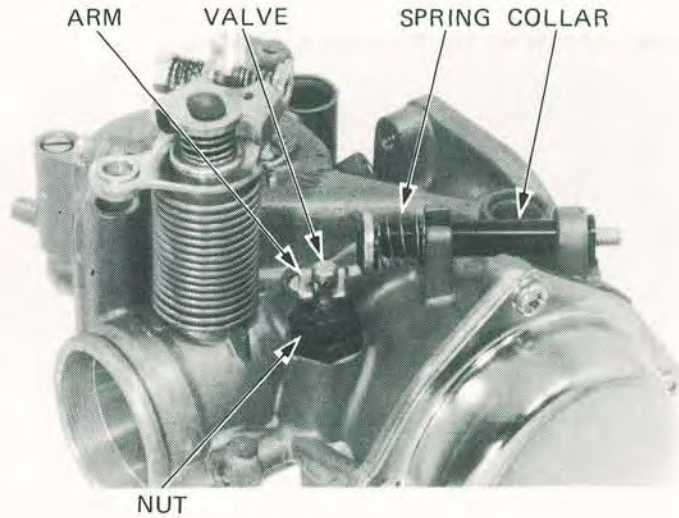
Check the choke valve and spring for nicks, grooves, or other damage.



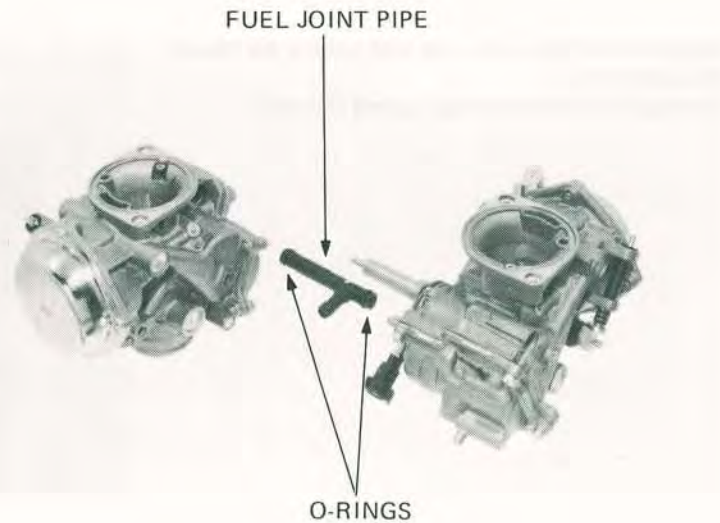
## CARBURETOR ASSEMBLY

Install the choke valve, valve spring and nut and tighten the nut.

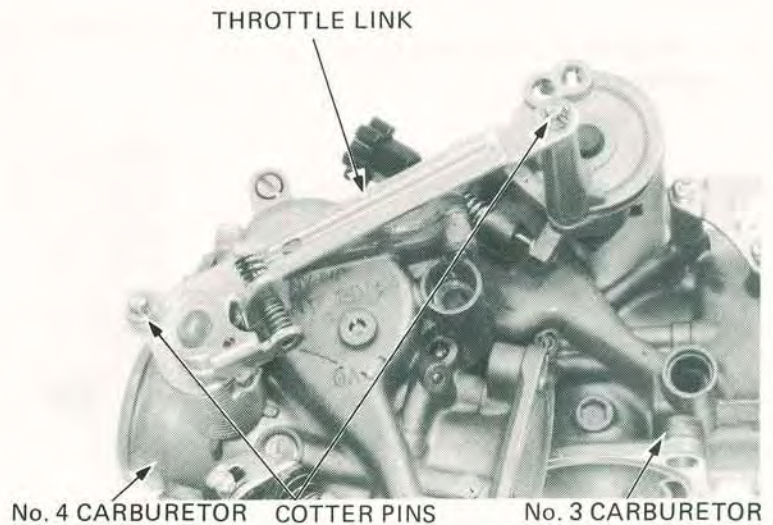
Install the choke arm and spring while hooking the arm to the groove in the choke valve. Install the choke arm collar.



Coat the new O-rings with oil and install them on the fuel joint pipe for No. 3 and No. 4 carburetors. Install the fuel joint pipe to the No. 3 and No. 4 carburetors.



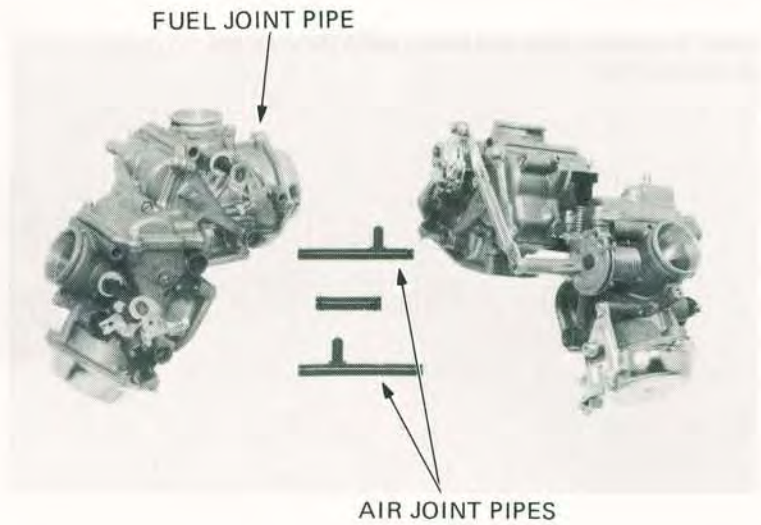
Reconnect the throttle linkage between the No. 3 and No. 4 carburetors, using new cotter pins.



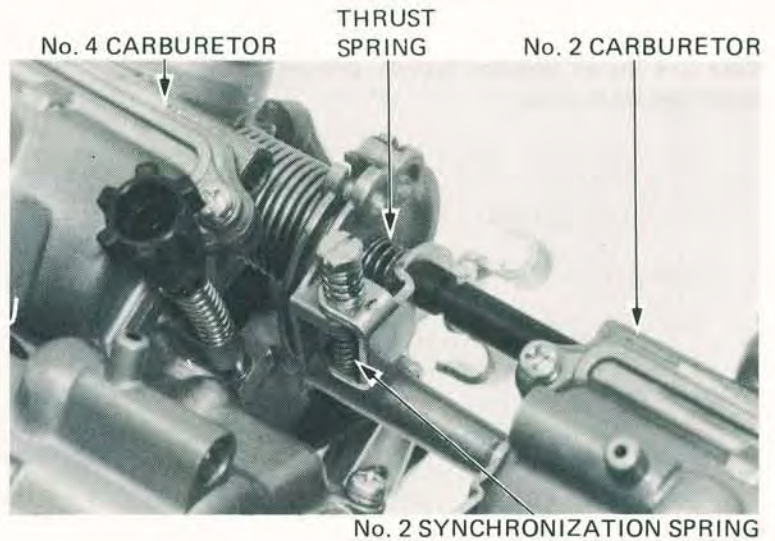




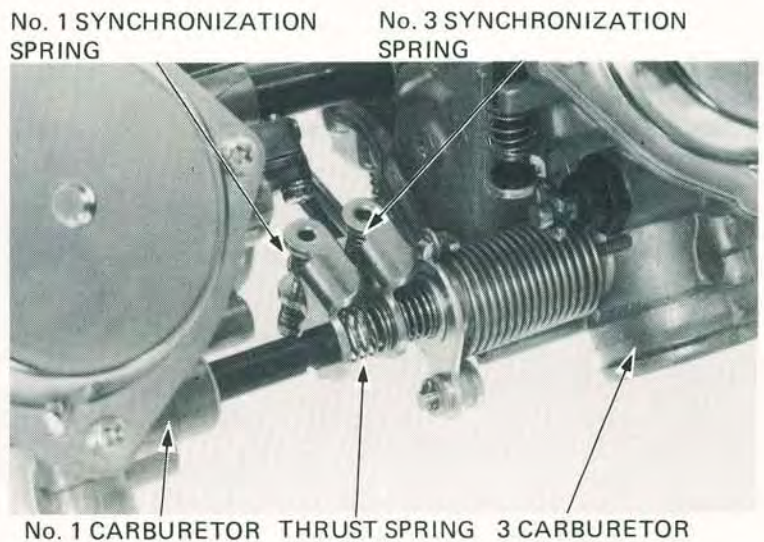
Coat new O-rings with oil and install them on the fuel and air joint pipes.  
Put the No. 1 and No. 2 carburetors together with the joint pipes.



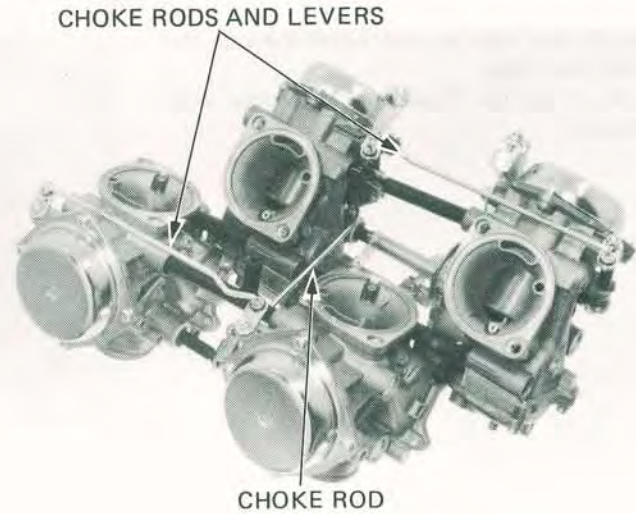
Loosen the synchronization adjusting screws until there is no tension.  
Install the synchronization springs.  
Install the thrust springs between the throttle valve shafts.



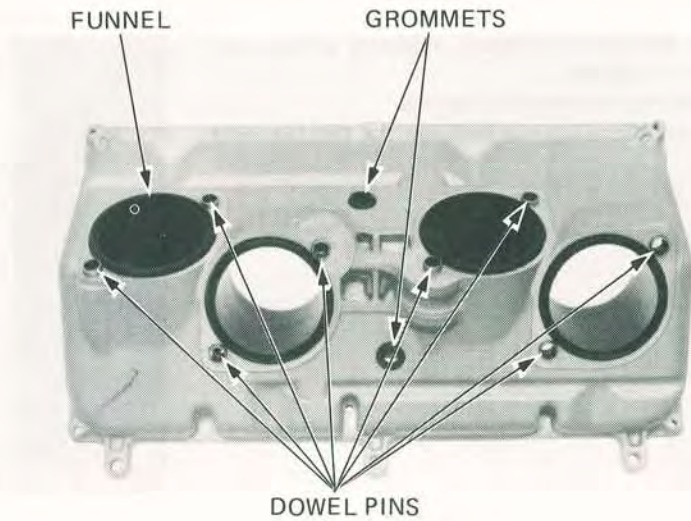
Make sure the fuel joint and air joint pipes are securely installed.



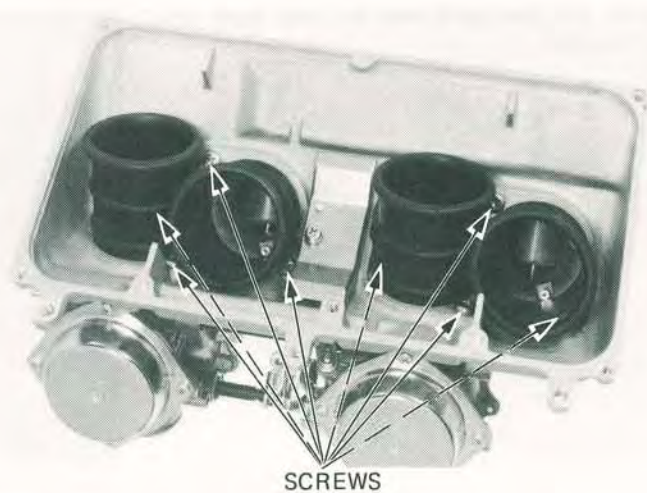
Install the choke rods and levers, using the nuts and new cotter pins.



Make sure the air chamber funnels, grommets and dowel pins are in place.

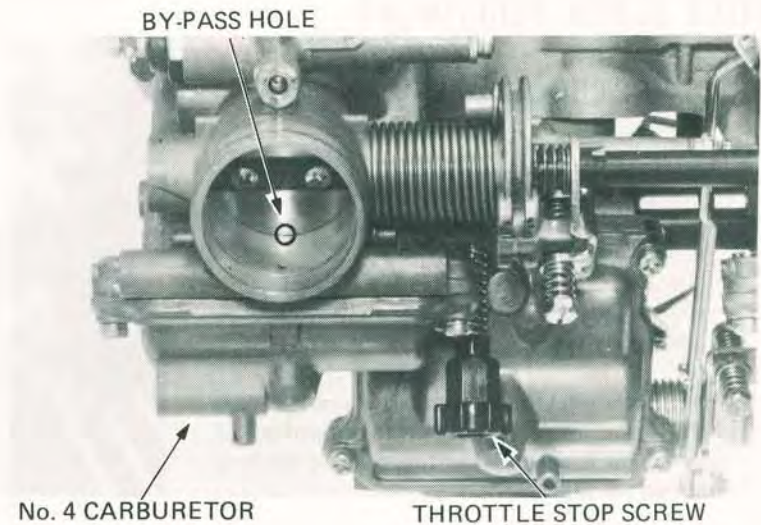


Place the air chamber over the carburetors aligning the dowel pins with the carburetor holes. Attach the air chamber to the carburetors with the eight screws.





Turn the throttle stop screw to align the No. 4 throttle valve with the edge of the by-pass hole.



Align each throttle valve with the by-pass hole edge by turning the synchronization adjusting screws.

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.

Make sure that choke valve operation is smooth by moving the choke linkage.

Close the choke valve by turning the choke linkage. Release the choke linkage and make sure that it returns smoothly.



## CARBURETOR INSTALLATION

Installation is essentially the reverse of removal.

### NOTE

Route the throttle and choke cables properly (page 1-10 to 1-12).

Perform the following inspections and adjustments.

- Throttle operation (page 3-5).
- Carburetor choke (page 3-6).
- Carburetor idle speed (page 3-11).
- Carburetor synchronization (page 3-10).



**FUEL SYSTEM**

**PILOT SCREW 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 (page 4-8).
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

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:**

**VF750F: 2-1/2 turns out**

**VF700F: 3 turns out**

**CAUTION**

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

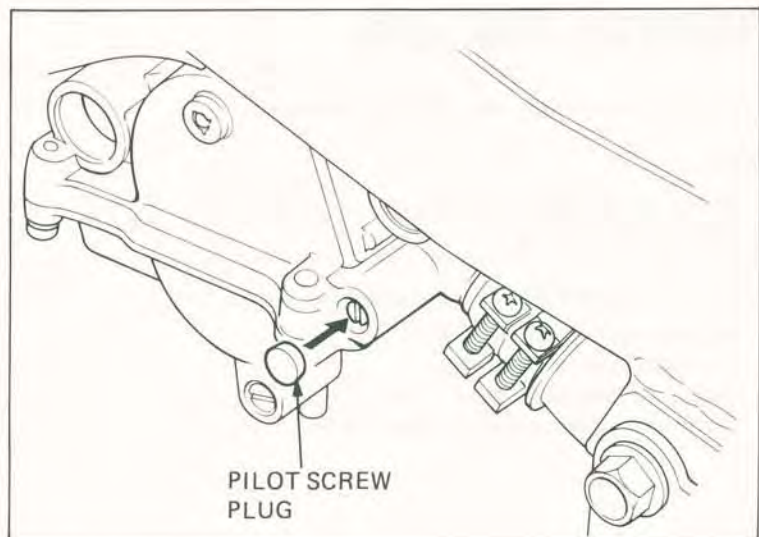
2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to its manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,200 – 1,300 rpm**

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by successive 1/2 turns until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 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 No. 2, 3 and 4 carburetor pilot screws.
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 into the pilot screw bore.



THROTTLE STOP SCREW



PILOT SCREW PLUG

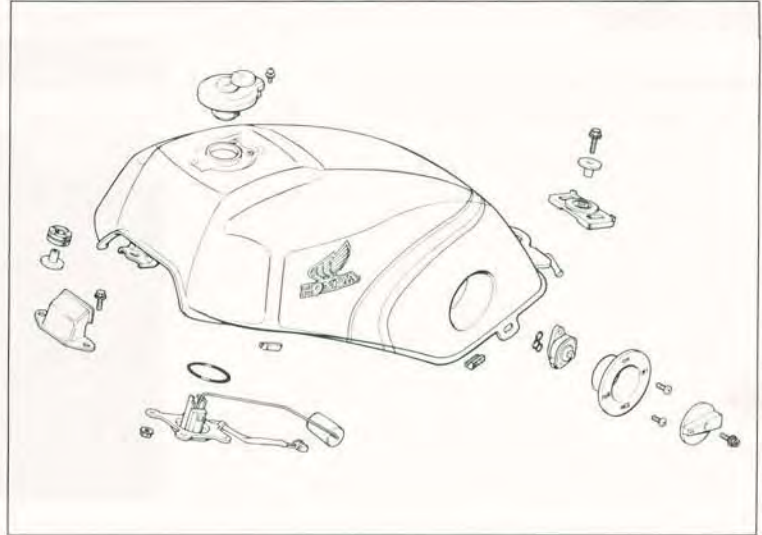


## FUEL TANK

**WARNING**

*Do not allow flames or sparks near gasoline.  
Wipe up spilled gasoline at once.*

Check the vent hole of the filler cap for blockage.  
Check that fuel is flowing out of the fuel valve freely.  
Make sure that there are no fuel leaks.



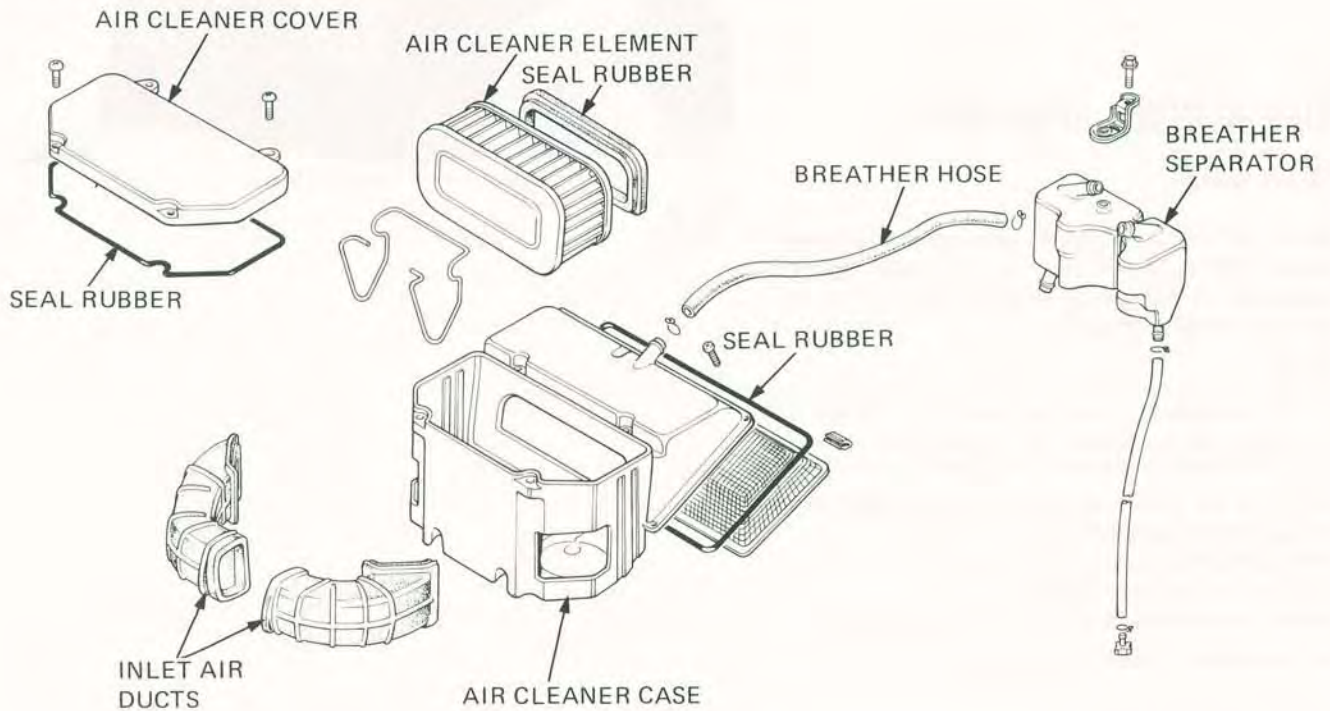
## AIR CLEANER

### CASE/CHAMBER

Check the air cleaner case seal rubbers for deterioration.

### CRANKCASE VENTILATION SYSTEM

Check that the breather tube is not restricted.





## FUEL SYSTEM

### FUEL PUMP

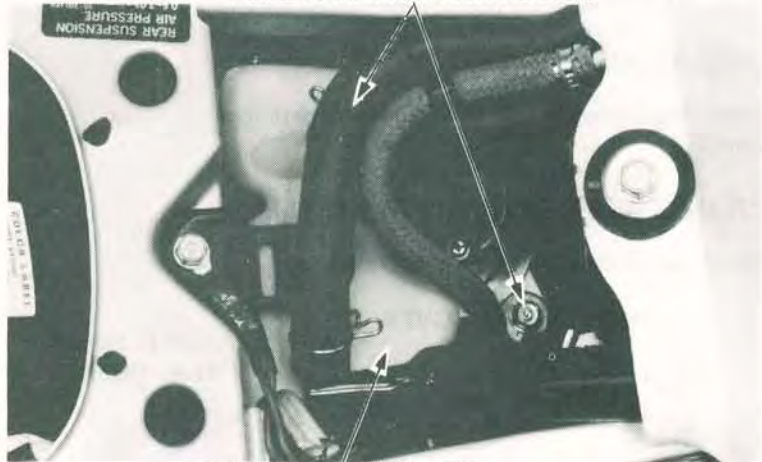
Remove the seat and left side cover.  
Disconnect the fuel pump coupler.

FUEL PUMP COUPLER



Turn the fuel valve off.  
Remove the breather separator.  
Clip the fuel inlet line, then disconnect the fuel inlet and outlet lines from the fuel pump.  
Remove the fuel pump mounting bolts and fuel pump.  
Install the fuel pump in the reverse order of removal.

FUEL PUMP MOUNTING BOLTS



BREATHER SEPARATOR

### HIGH ALTITUDE ADJUSTMENT (USA 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.

#### NOTE

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

Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.  
Remove each pilot screw plug (page 4-8).  
Turn each pilot screw clockwise 1 turn.  
Adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,200 – 1,300 rpm**

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



Attach a Vehicle Emission Control Information Update label onto the frame as shown. Refer to Service Bulletin #SL132 for information on obtaining the label.

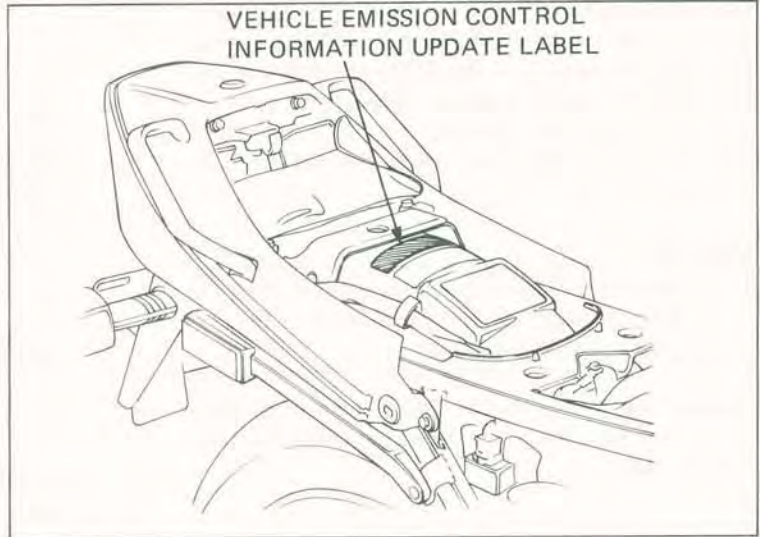
**NOTE:**

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 1,200 – 1,300 rpm. Drive new pilot screw plugs into the pilot screw bores (page 4-16). Be sure to do these adjustments at low altitude.



### PURGE CONTROL VALVE INSPECTION (CALIFORNIA MODEL)

**NOTE:**

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

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

**NOTE:**

The PCV is located under the instrument assembly.

Disconnect the PCV hoses from their connections, at the 3-way joint and remove the PCV from its mount. Refer to the routing label attached to the fuel tank below the seat for hose connections.

Connect a vacuum pump to the 8 mm I.D. hose that goes to the 3-way joint. Apply the specified vacuum to the PCV.

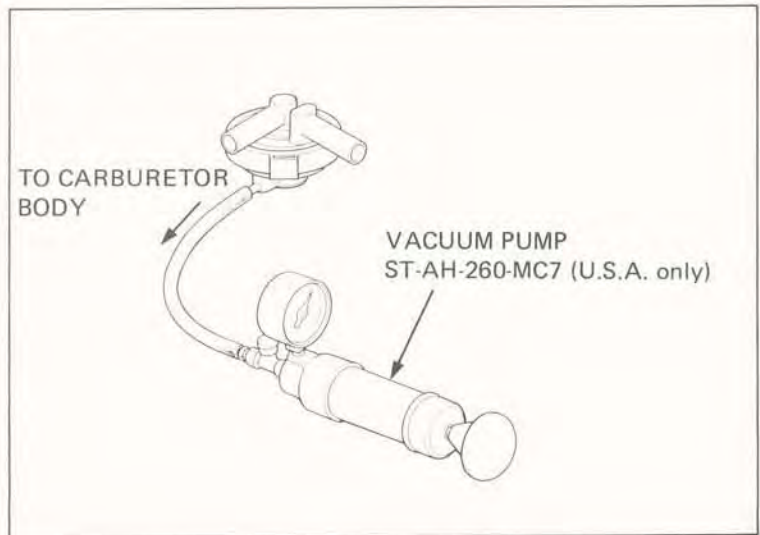
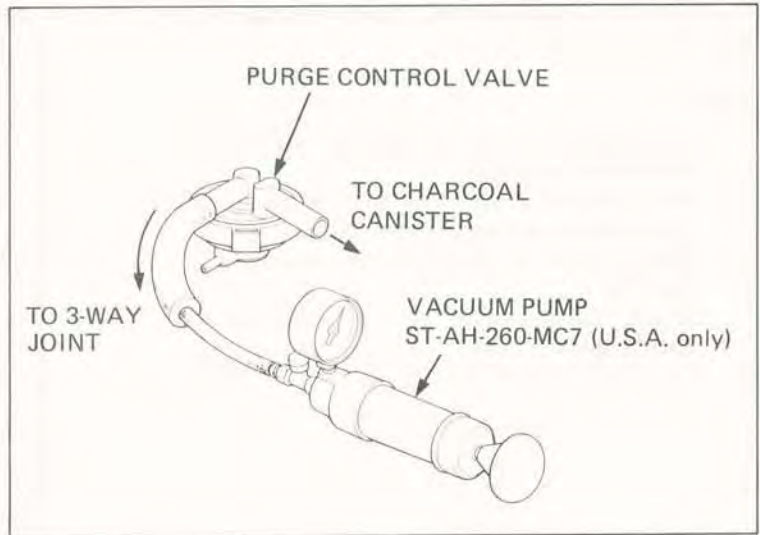
**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

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

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

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

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





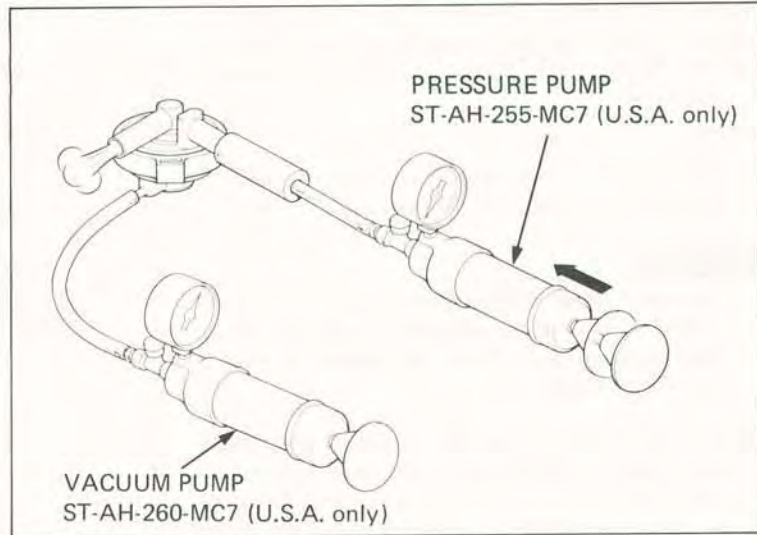
## FUEL SYSTEM

Connect a pressure pump to the 8 mm I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the PCV hose that goes to the carburetor body, pump air through the canister hose. Air should flow through the PCV and cut the hose that goes to the 3-way joint. Replace the PCV if air does not flow out.

**CAUTION:**

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

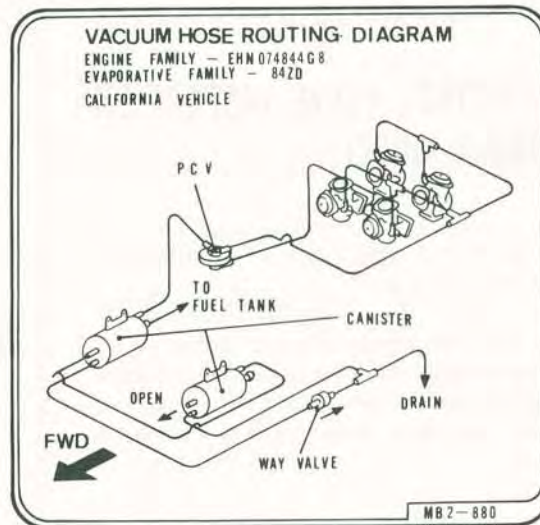
Remove the pumps, install the PCV on its mount, route and reconnect the hoses according to the routing label.



Route the vacuum tubes as described on the Vacuum Hose Routing Label.

**NOTE:**

- Be careful not to bend, twist or kink the tubes when installing.
- Slide the end of each tube onto its fitting fully and secure with the hose clamps.
- Secure with the hose clamps whenever specified.
- Check that the hoses are not contacting sharp edges or corners.



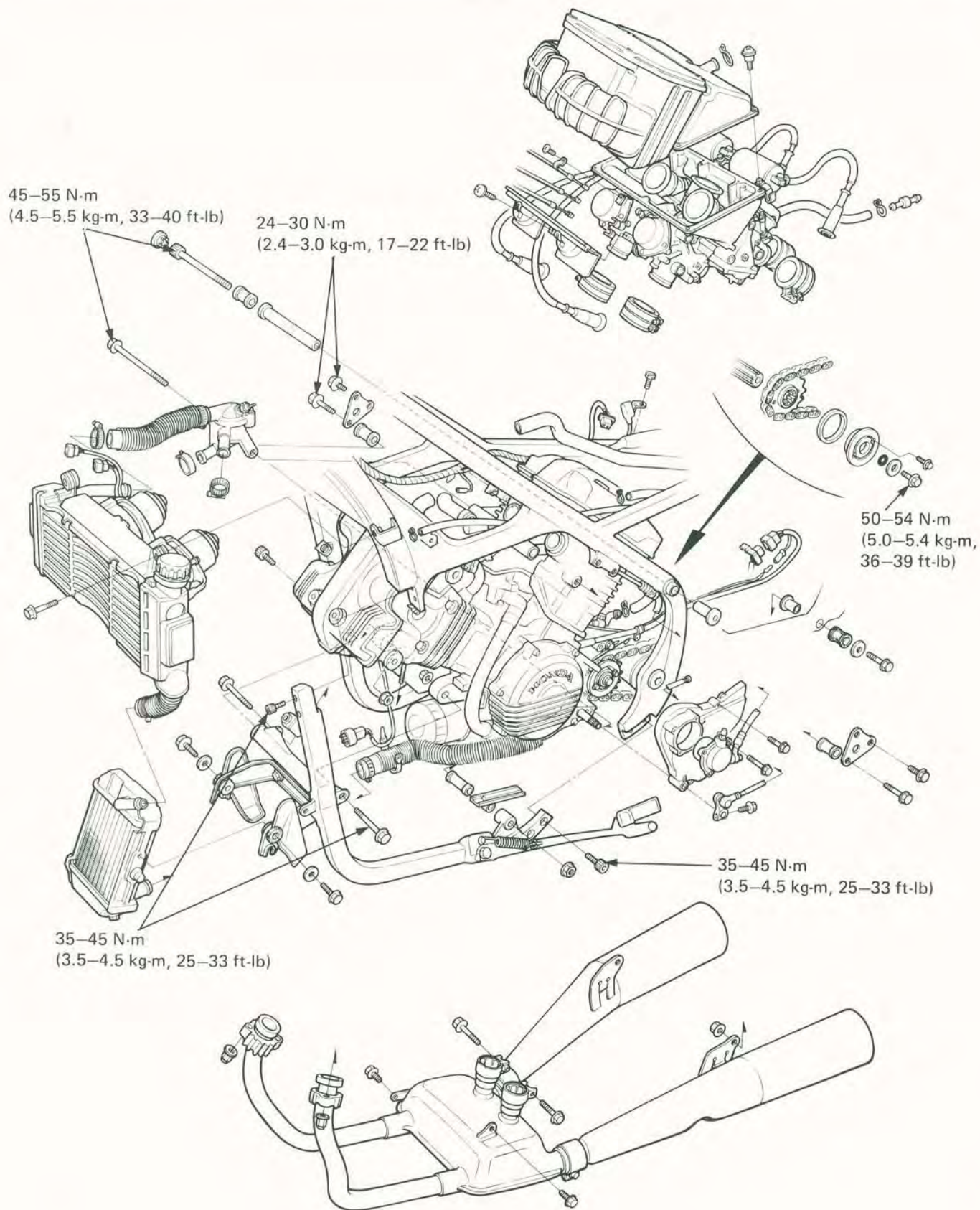




MEMO



**ENGINE REMOVAL/INSTALLATION**





SERVICE INFORMATION	5-1
ENGINE REMOVAL	5-2
ENGINE INSTALLATION	5-6

## SERVICE INFORMATION

### GENERAL

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

Apply a heat-resist and black paint if the black chrome plating is scratched or scored.

The interceptor muffler is chrome-plated black. To clean the muffler, use a soft sponge and flush with a sufficient water.

After washing, let it dry and coat with non-compounded silicon wax.

The following parts or components can be serviced with the engine installed in the frame:

Clutch	Alternator
Gearshift linkage	Starter motor
Front cylinder head	Carburetors

### SPECIFICATIONS

Engine dry weight	81.5 kg (180 lb)
Oil capacity	'83-'84: 3.0 liters (3.2 U.S. qtz) After '84: 2.7 liters (2.9 U.S. qt, 2.4 Imp qt)

### TORQUE VALUES

Drive sprocket bolt	50—54 N.m (5.0—5.4 kg-m, 36—39 ft-lb)
Engine rear hanger bolts	45—55 N.m (4.5—5.5 kg-m, 33—40 ft-lb)
Engine center hanger bolts	24—30 N.m (2.4—3.0 kg-m, 17—22 ft-lb)
Engine front hanger bolts	35—45 N.m (3.5—4.5 kg-m, 25—33 ft-lb)
Sub-frame bolts	35—45 N.m (3.5—4.5 kg-m, 25—33 ft-lb)

## ENGINE REMOVAL/INSTALLATION

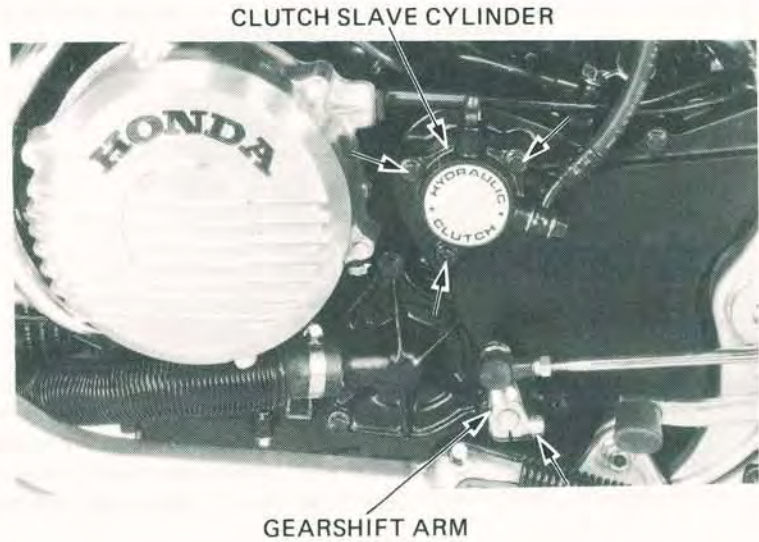
### ENGINE REMOVAL

Place the motorcycle on its center stand.  
Remove the seat and left and right side covers.  
Remove the fuel tank.  
Drain the engine oil (page 2-3) and coolant (page 6-3).  
Remove the upper and lower radiators (page 6-5).  
Remove the clutch slave cylinder.

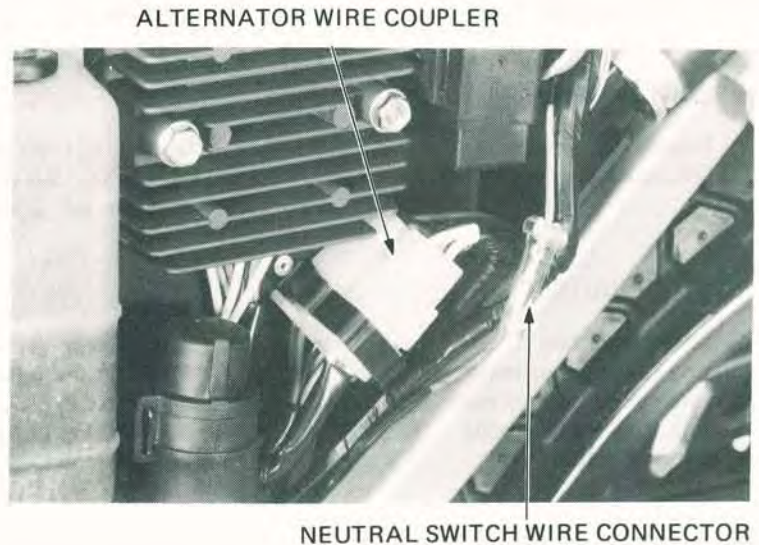
#### NOTE

Do not operate the clutch lever after removing the clutch slave cylinder; It will cause difficulty when reinstalling the slave cylinder

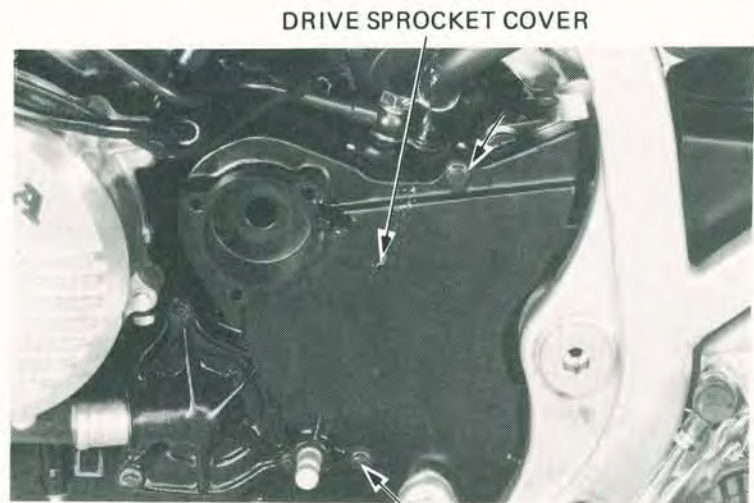
Remove the gearshift arm from the shift shaft.



Disconnect the neutral switch wire connector and alternator wire coupler.

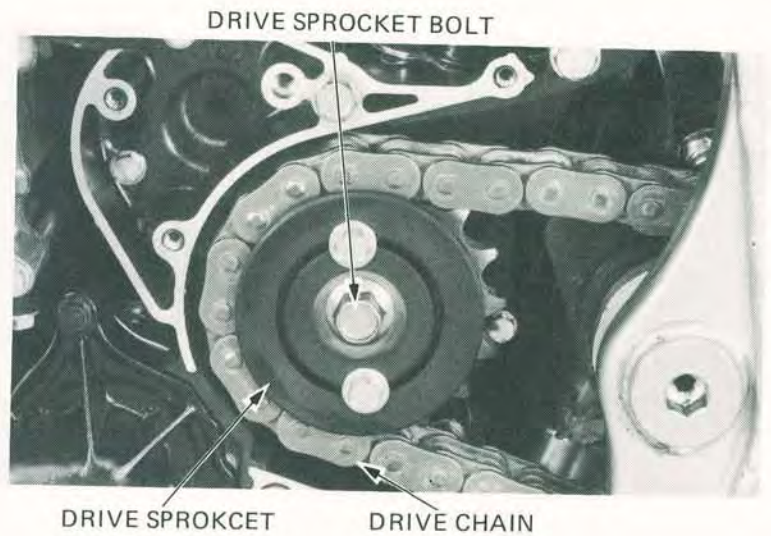


Remove the drive sprocket cover.





Remove the drive sprocket bolt. Then remove the drive sprocket with the drive chain.

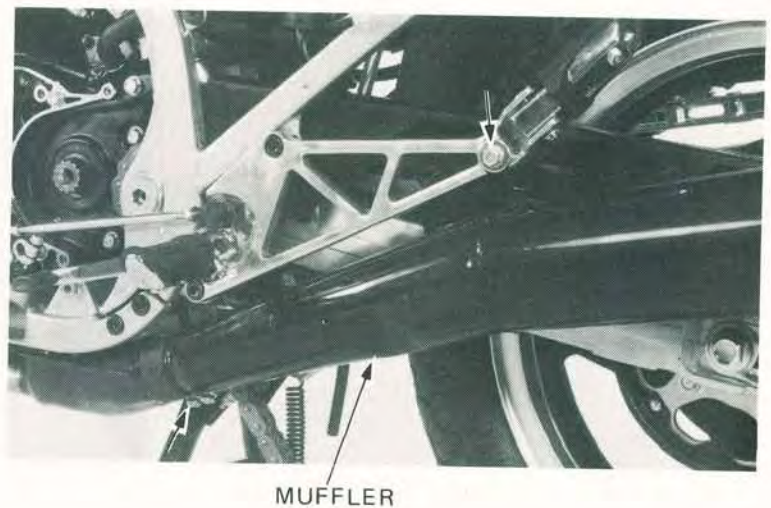


Remove the air cleaner case and the carburetors (page 4-3).

Remove the spark plug caps from the spark plugs.

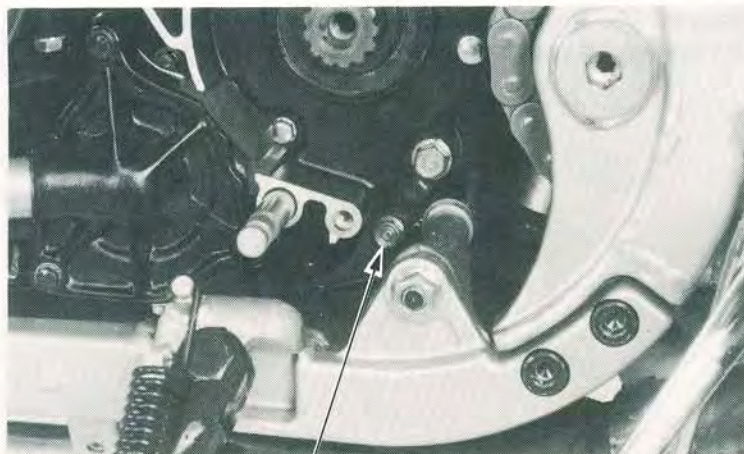


Remove the right and left mufflers.



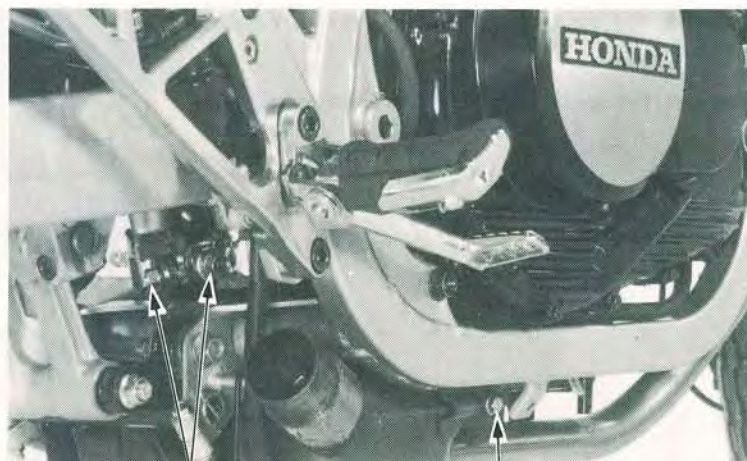
**ENGINE REMOVAL/INSTALLATION**

Remove the bolt attaching the exhaust chamber to the left side of the engine.

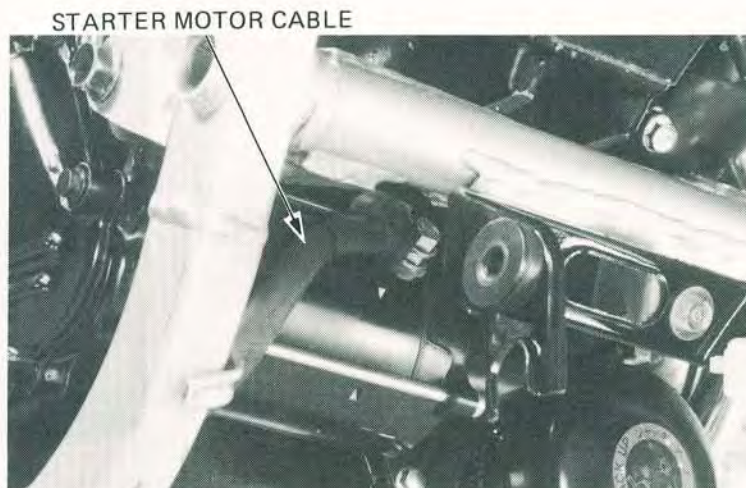
**BOLT**

Remove the bolt attaching the exhaust chamber to the right side of the frame.  
Remove the rear exhaust pipe clamp bolts.  
Remove the front exhaust pipe attaching nuts at the front cylinder heads.

Remove the exhaust chamber from the engine.

**REAR EXHAUST PIPE  
CLAMP BOLTS****BOLT**

Disconnect the starter motor cable from the starter motor.

**STARTER MOTOR CABLE**

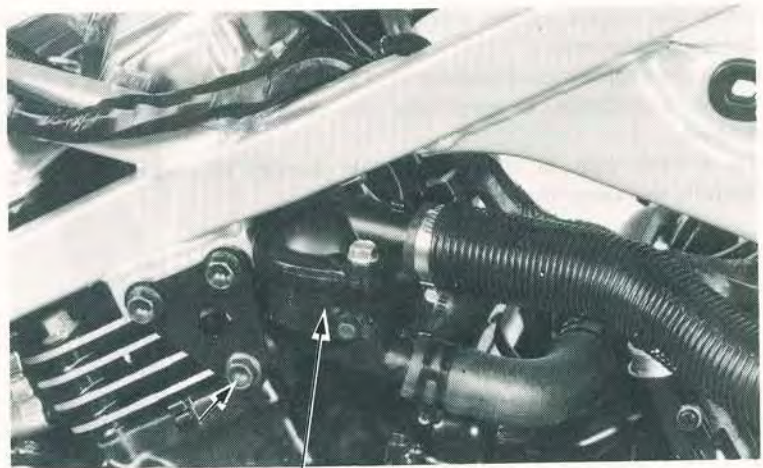


Disconnect the pulse generator wire coupler.

PULSE GENERATOR WIRE COUPLER



Disconnect the water hoses and the temperature sensor wire from the thermostat.  
Remove the thermostat housing.



THERMOSTAT HOUSING

Disconnect the battery negative cable from the battery terminal.

Free the starter motor cable from the clamp.

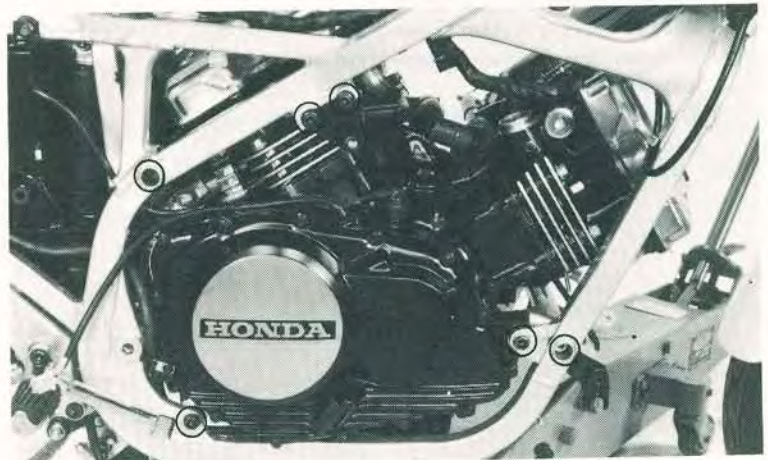
Place the floor jack or other adjustable support under the engine.

**NOTE**

The jack height must be continuously adjusted to relieve stress from bolts that are being removed.

Remove the engine hanger bolts from the right side.

Remove the frame-to-sub-frame bolt.





## ENGINE REMOVAL/INSTALLATION

Disconnect the crankcase breather hose.  
Remove the engine hanger bolts and nuts from the left side.

Remove the sub-frame bolts.

Carefully lower the engine and remove it from the left side.



## ENGINE INSTALLATION

Check the engine mount rubbers for damage and replace if necessary.

Install the engine mount rubbers.

Engine installation is essentially the reverse of removal.

Use a floor jack or other adjustable support to carefully maneuver the engine into place.

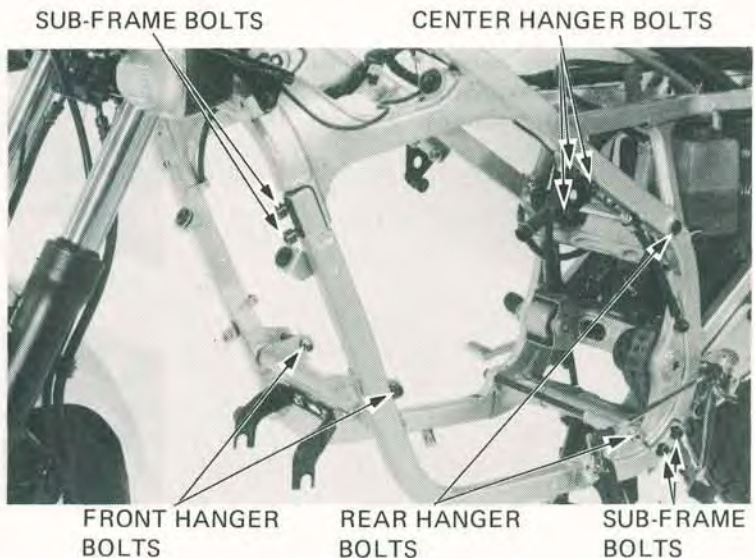
### CAUTION

*Carefully align mounting points with the jack to prevent damage to mounting bolt threads and wire harness and cables.*

Tighten all fasteners to the torque values given on page 5-1.

### NOTE

- Route the wires and cables properly (pages 1-10 thru 1-12).
- Fill the crankcase to the proper level with the recommended oil (Page 2-1).
- Fill the cooling system (Page 6-3).
- Perform the following inspection and adjustments:  
Throttle operation (Page 3-5).  
Clutch (Page 3-17).

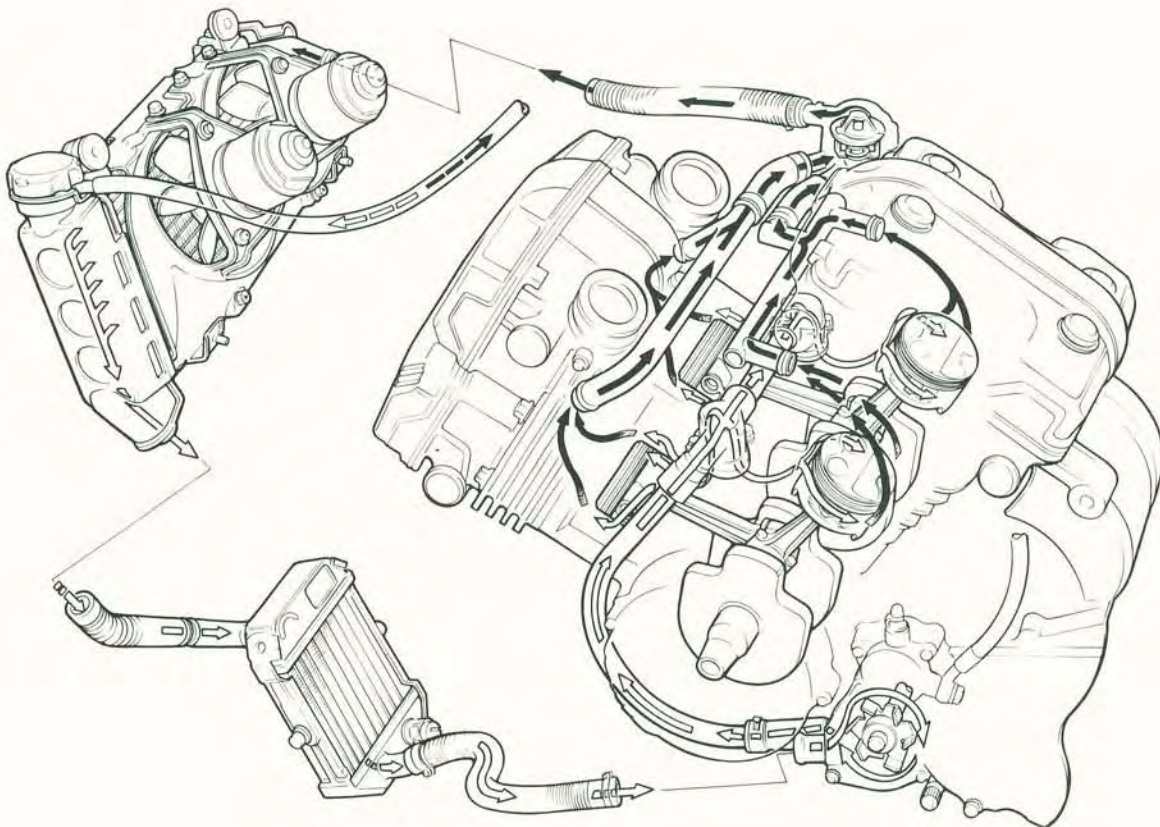






MEMO







SERVICE INFORMATION	6-1	THERMOSTAT	6-4
TROUBLESHOOTING	6-1	RADIATOR/COOLING FAN	6-5
SYSTEM TESTING	6-2	WATER PUMP	6-9
COOLANT REPLACEMENT	6-3		

## 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.*

- 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.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 20 for fan motor thermostatic switch and temperature sensor inspections.

### SPECIFICATIONS

Radiator cap relief pressure	75–105 kPa (0.75–1.05 kg/cm <sup>2</sup> , 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	2.5 liters (2.65 US qt)
Reserve tank	0.4 liters (0.42 US qt)
Total system	2.9 liters (3.07 US qt)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 8 mm at 95°C (0.315 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

1. Faulty temperature gauge or gauge sensor
2. Thermostat stuck closed
3. Faulty radiator cap
4. Insufficient coolant
5. Passages blocked in radiator, hoses, or water jacket
6. Fan blades bent
7. Faulty fan motor

### Engine temperature too low

1. Faulty temperature gauge or gauge sensor
2. Thermostat stuck open

### Coolant leaks

1. Faulty pump mechanical seal
2. Deteriorated O-rings



## COOLING SYSTEM

### SYSTEM TESTING

#### COOLANT

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 INSPECTION

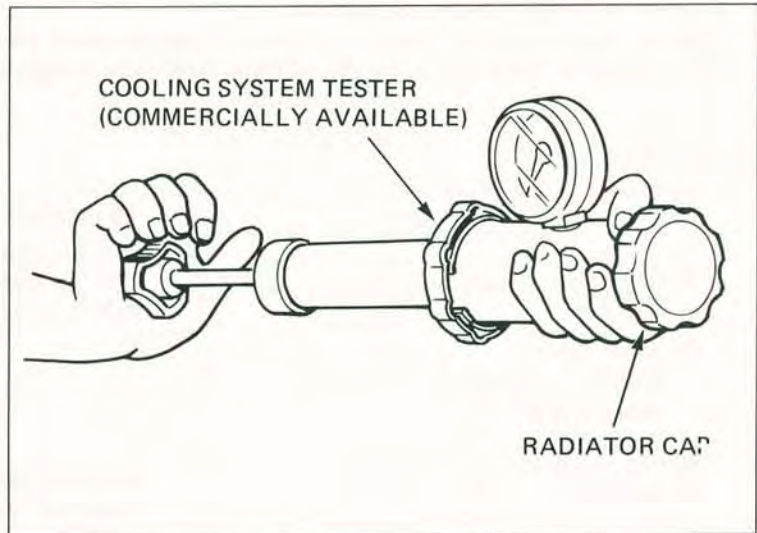
Pressure test the radiator cap. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

#### 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/cm<sup>2</sup>, 10.7–14.9 psi)

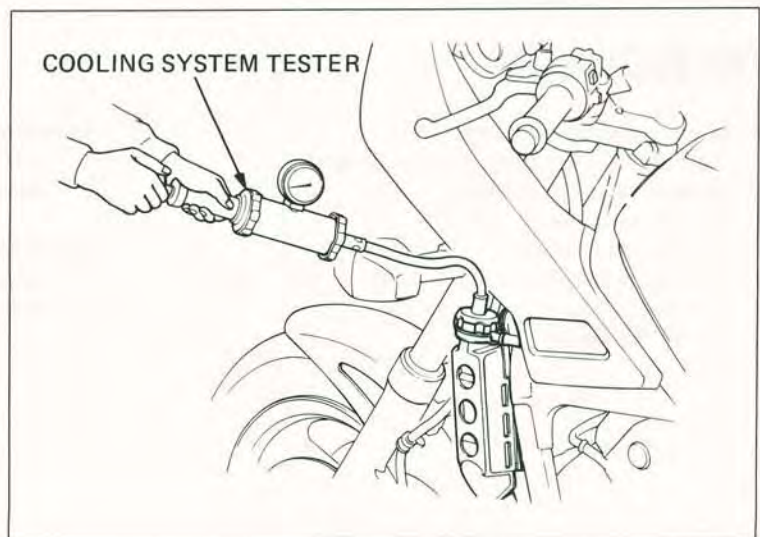


Pressurize the radiator, engine and hoses, and check for leaks.

#### CAUTION

*Excessive pressure can damage the radiator.  
Do not exceed 1.05 kg/cm<sup>2</sup> (14.9 Psi)*

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





## COOLANT REPLACEMENT

### CAUTION

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

Remove the radiator cap.



Remove the lower radiator cowl.  
Drain the coolant from the radiator by removing the drain plug at the lower radiator.



LOWER RADIATOR COWL



DRAIN PLUG

Drain the coolant from the engine by removing the drain bolts at the water pump cover and cylinder heads.

Replace the drain plug and bolts.

Fill the system with a 50–50 mixture of distilled water and ethylene glycol.

Bleed air from the radiator.

- Start the engine and run until there are no air bubbles in the coolant, and the level stabilizes.
- Stop the engine and add coolant up to the proper level if necessary.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level if the level is low.
- Install the lower radiator cowl.

### WATER PUMP COVER



DRAIN BOLT

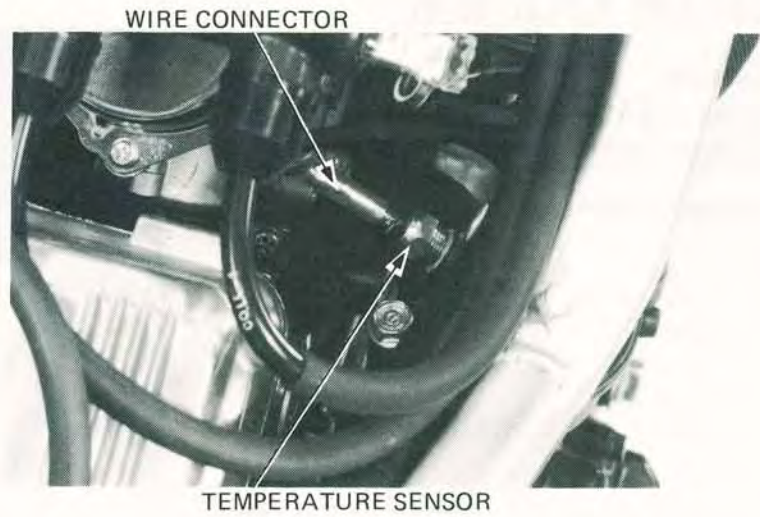


DRAIN BOLT

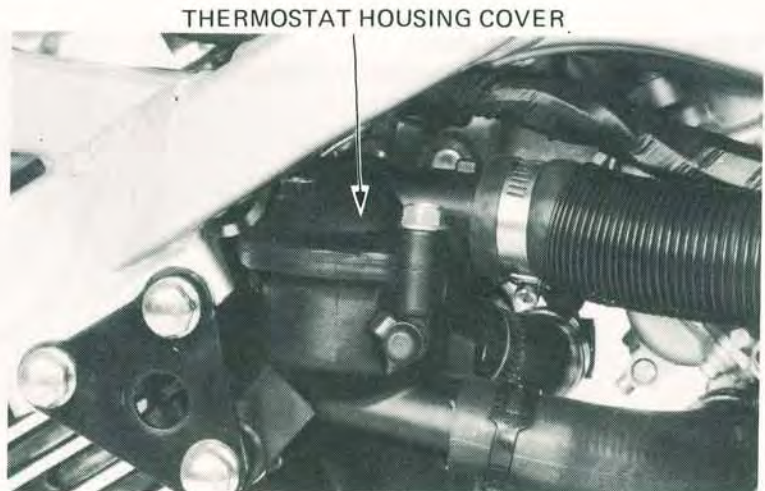
## THERMOSTAT

### REMOVAL

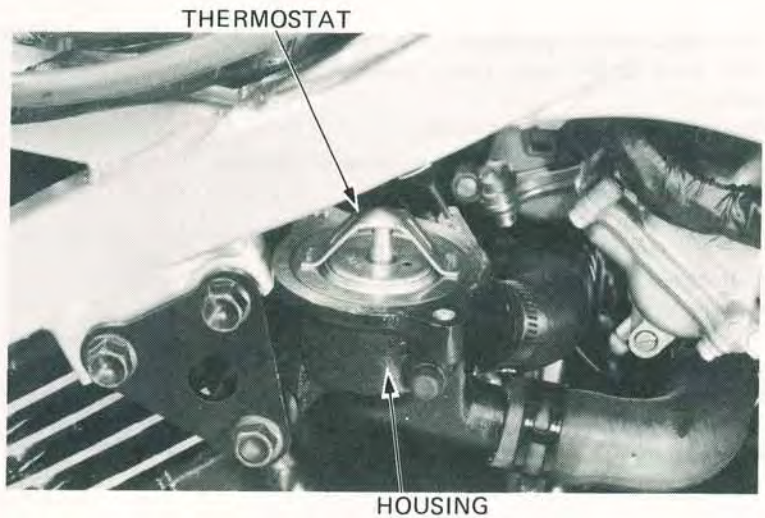
Turn the fuel valve OFF.  
Remove the seat, frame side covers and fuel tank.  
Drain the coolant (page 6-3).  
Disconnect the temperature sensor wire connector from the sensor.



Remove the thermostat housing cover by removing two bolts.



Remove the thermostat from the housing.





**INSPECTION**

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

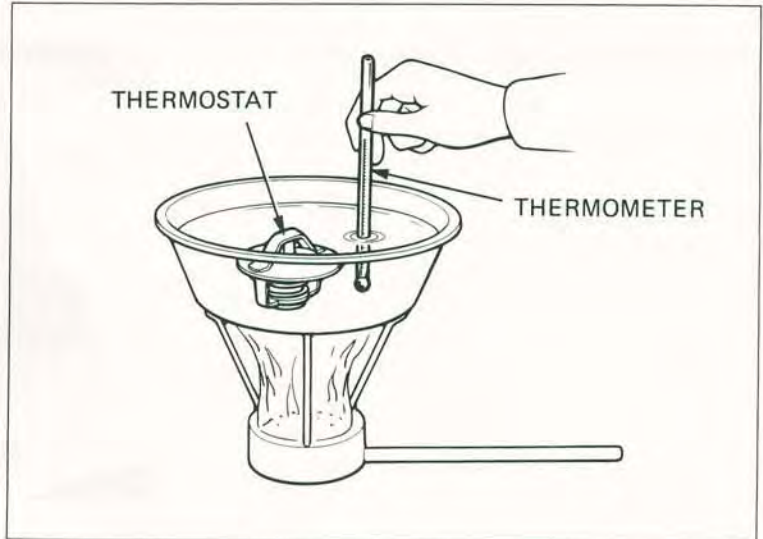
**NOTE**

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 temperatures other than those specified.

**Technical Data**

Start to open	80° to 84°C (176° – 183°F)
Valve lift	8 mm minimum (0.31 in) when heated to 95°C (203°F) for five minutes.



**INSTALLATION**

Install the thermostat into the housing.  
Install the thermostat housing cover with a new O-ring.  
Connect the temperature sensor wire connector.  
Install the fuel tank, frame side covers and seat.  
Fill the cooling system (page 6-3).



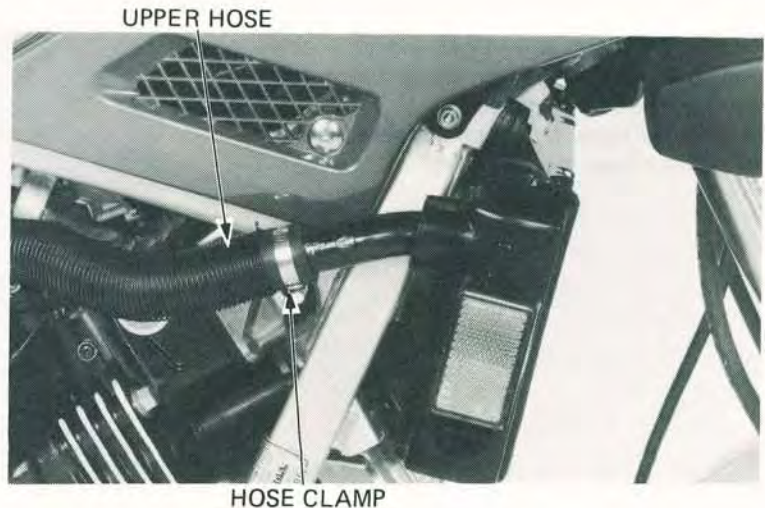
**RADIATOR/COOLING FAN**

**REMOVAL**

Remove the lower radiator cowl and radiator drain plug and drain the coolant.

● **UPPER RADIATOR**

Loosen the upper hose clamp and disconnect the upper hose.

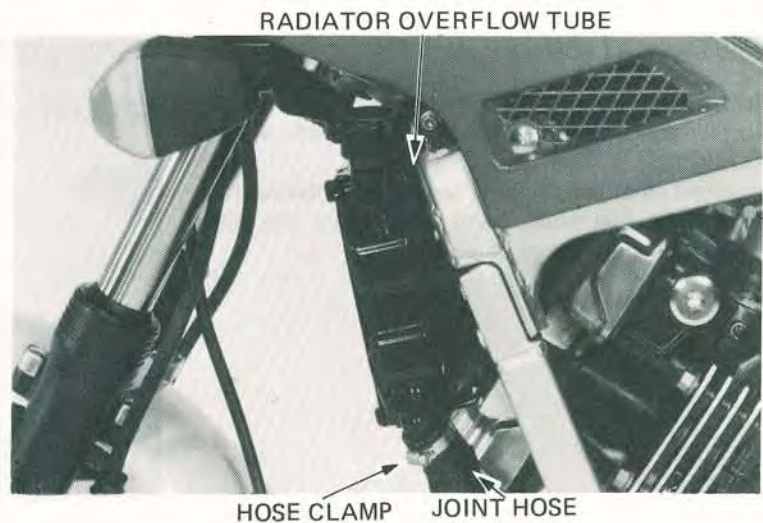


## COOLING SYSTEM

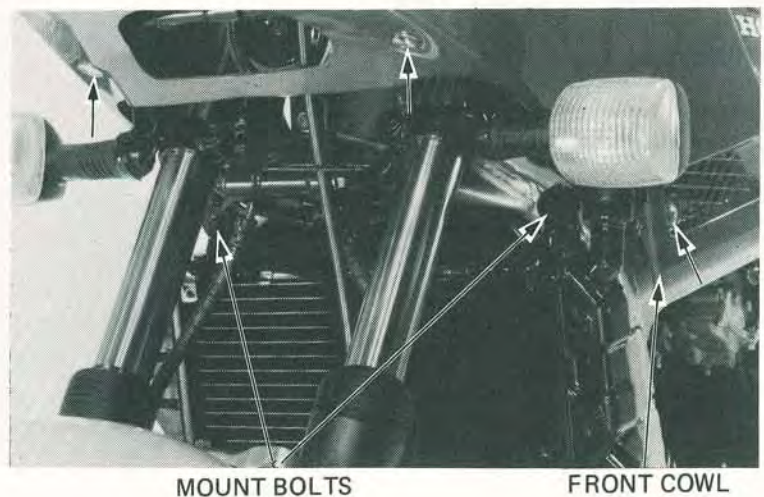
Remove the radiator grille and side covers.



Disconnect the radiator overflow tube.  
Loosen the joint hose clamp and disconnect the  
joint hose from the upper radiator.



Remove the fairing (page 14-3).  
Disconnect the fan motor wire couplers from the  
main harness at the right side.  
Remove the upper radiator mount bolts and remove  
the radiator from the frame.

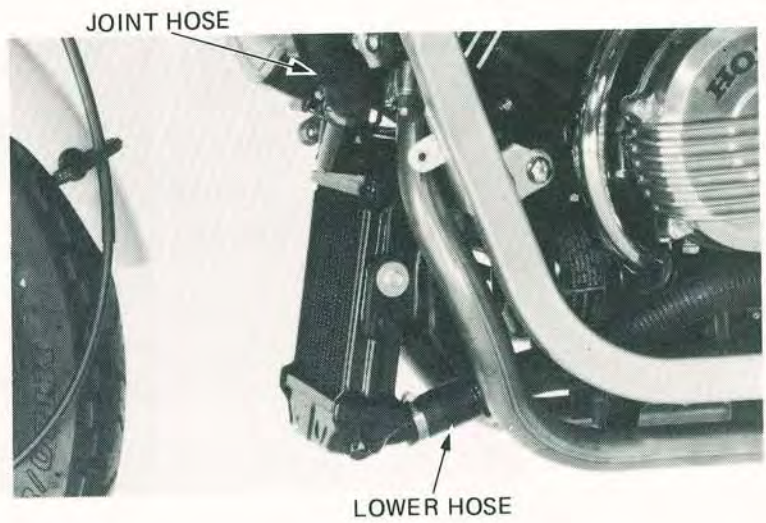




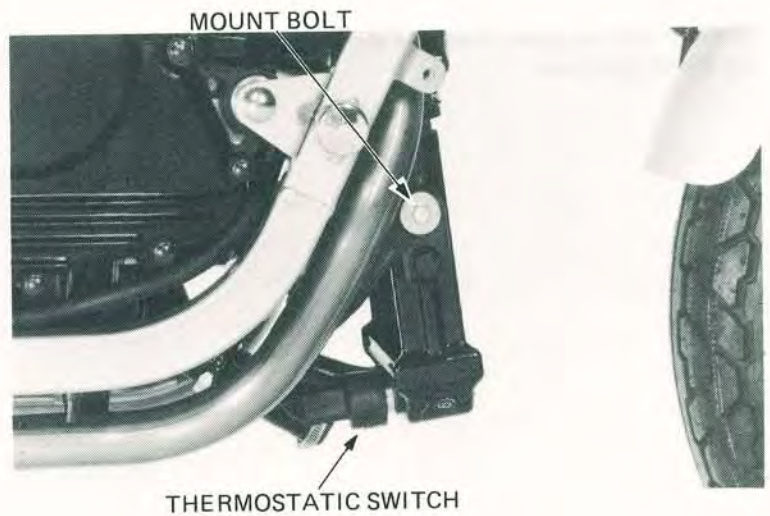


● LOWER RADIATOR

Loosen the joint hose clamp and disconnect the joint hose from the lower radiator.  
Loosen the lower hose clamp and disconnect the lower hose.

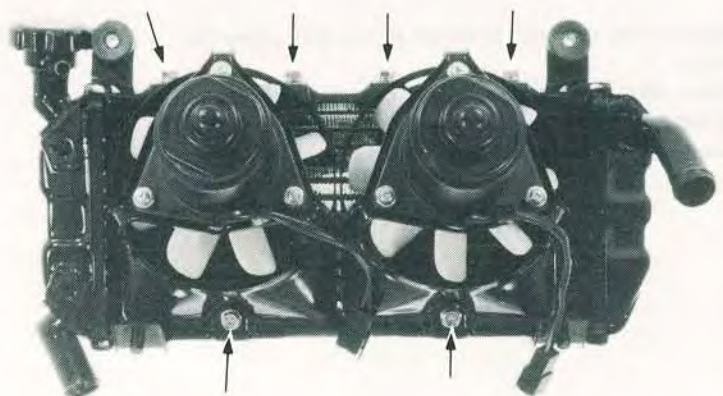


Disconnect the wires from the thermostatic switch.  
Remove the lower radiator mount bolt and remove the radiator from the bracket.



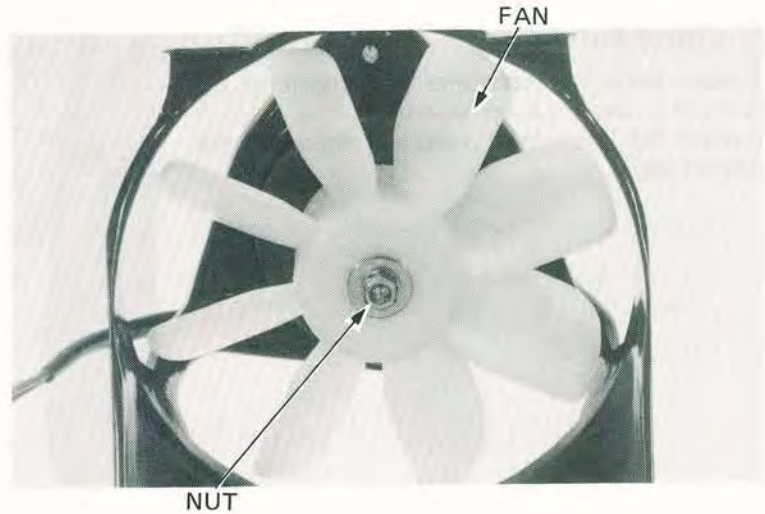
DISASSEMBLY

Remove the fan shrouds with the fans and motors.



## COOLING SYSTEM

Remove the fan from the motor by removing the nut.



Remove the fan motor from the shroud by removing the three screws.



## RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.

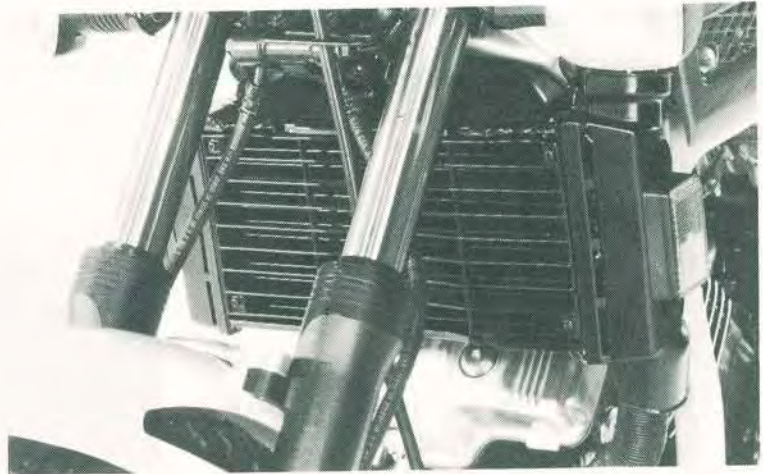
Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.





### ASSEMBLY/INSTALLATION

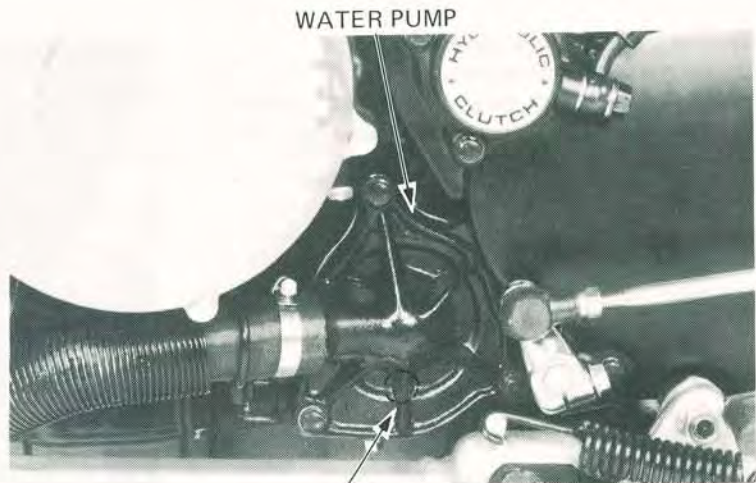
Assemble and install the radiators in the reverse order of removal.  
After installation, fill the cooling system (page 6-3).



### WATER PUMP

#### MECHANICAL SEAL INSPECTION

Inspect the telltale hole for signs of mechanical seal coolant leakage.  
Replace the water pump as an assembly if the mechanical seal is leaking.



TELLTALE HOLE

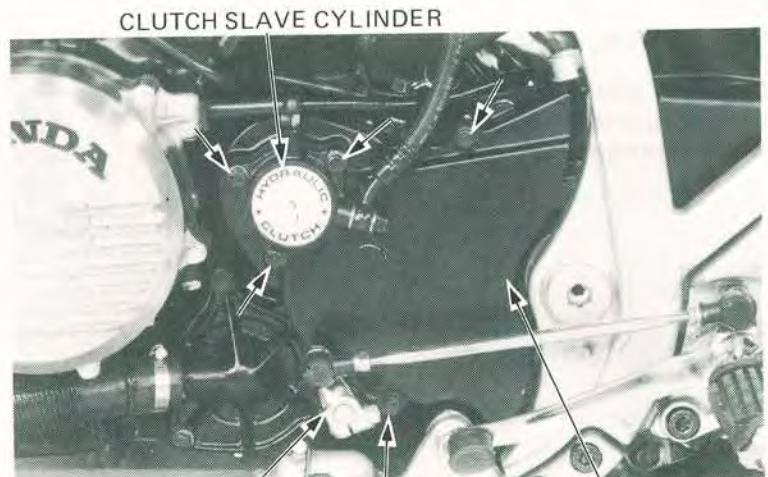
### REMOVAL

Drain the coolant (page 6-3).  
Remove the clutch slave cylinder.

#### NOTE

Do not operate the clutch lever after removing the clutch slave cylinder. To do so will cause difficulty in reinstalling the slave cylinder.

Remove the gearshift arm from the shift shaft.  
Remove the drive sprocket cover.



GEARSHIFT ARM

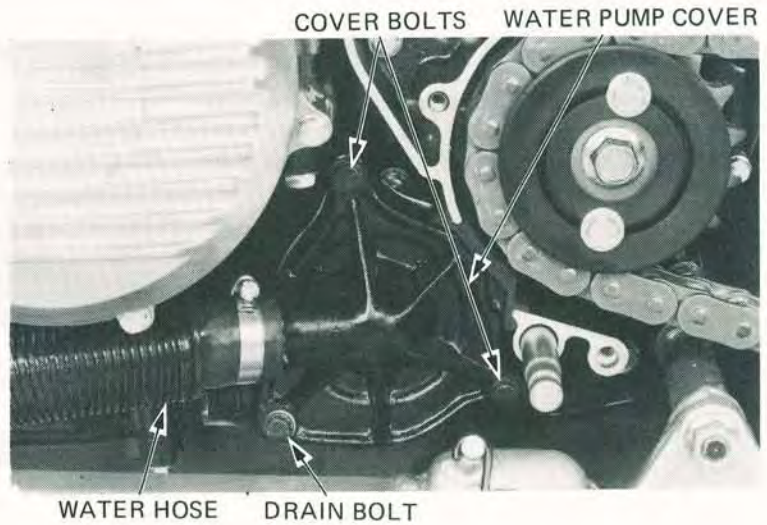
DRIVE SPROCKET COVER



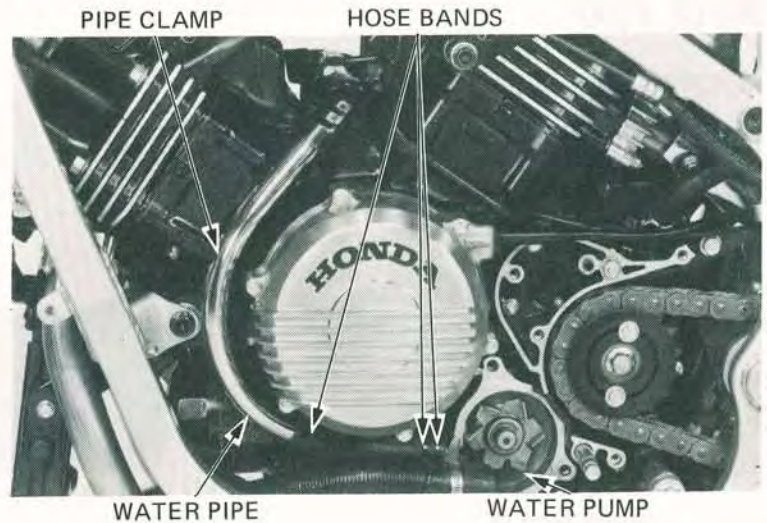
**COOLING SYSTEM**

Disconnect the water hose from the water pump cover.

Remove the water pump cover bolts and cover.



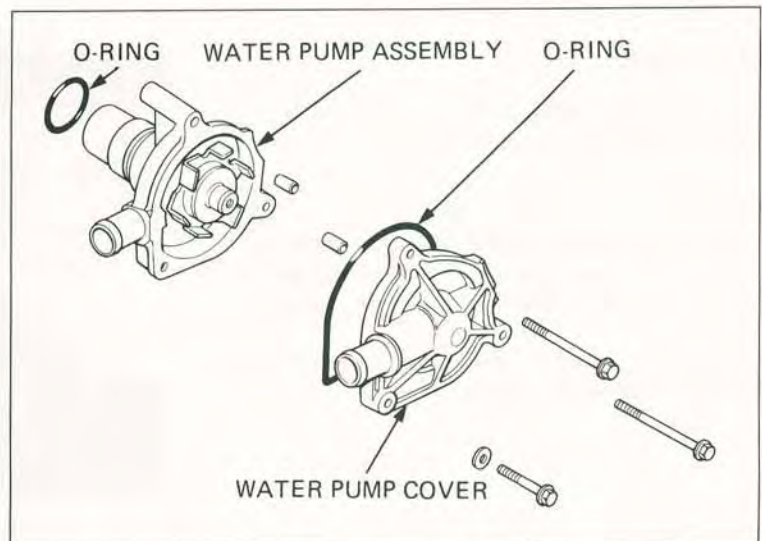
Remove the water pipe clamp bolt.  
Loosen the water hose bands.  
Pull off the water pump from the crankcase.  
Remove the water pipe from the water pump.



**INSPECTION**

Check the water pump for mechanical seal leakage and bearing deterioration.

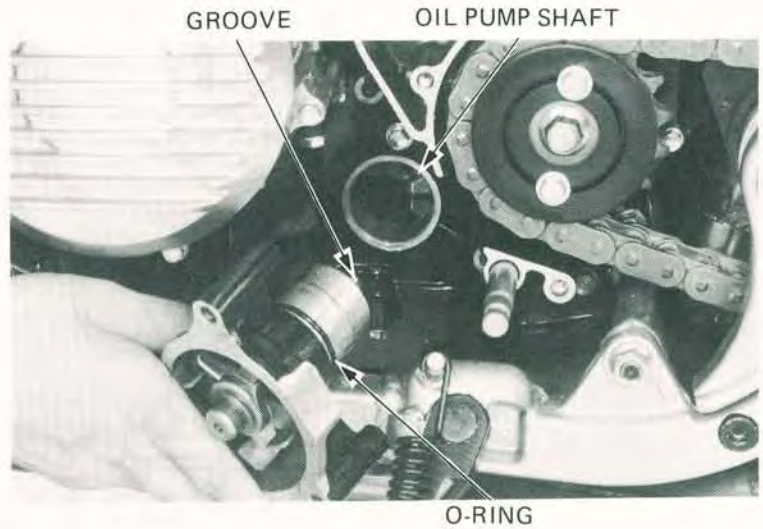
Replace the water pump as an assembly if necessary.



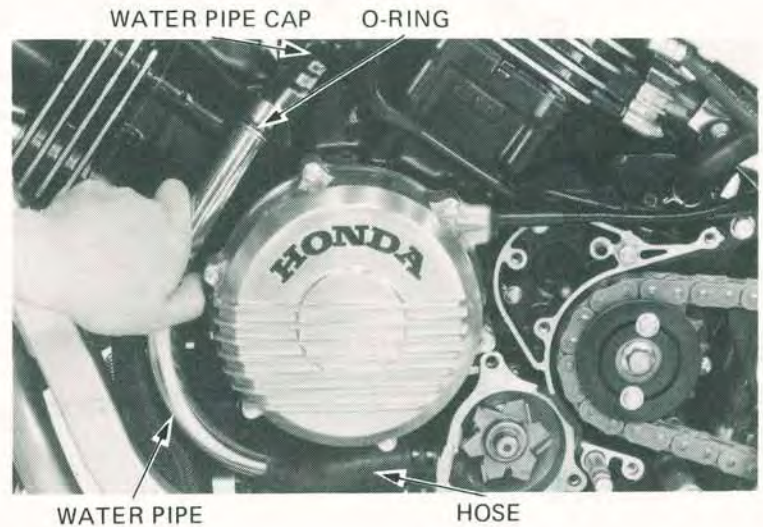


**INSTALLATION**

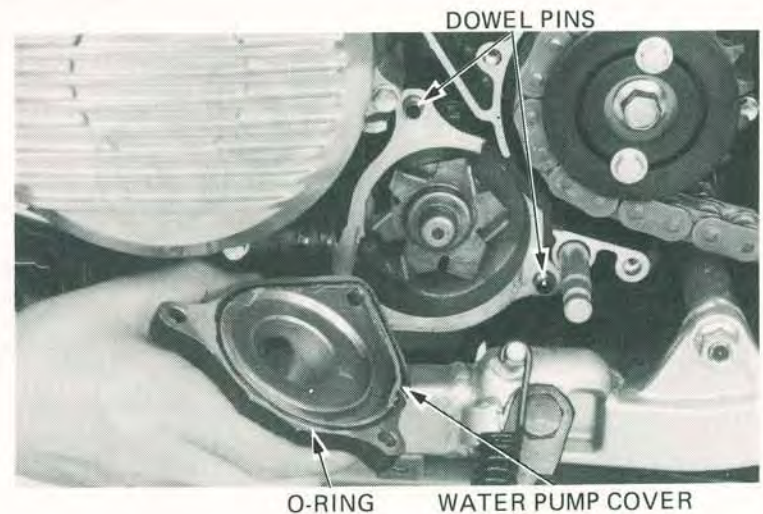
Apply a coat of clean engine oil to a new O-ring and install it in the water pump groove. Align the water pump shaft groove with the oil pump shaft and insert the water pump in the crankcase.

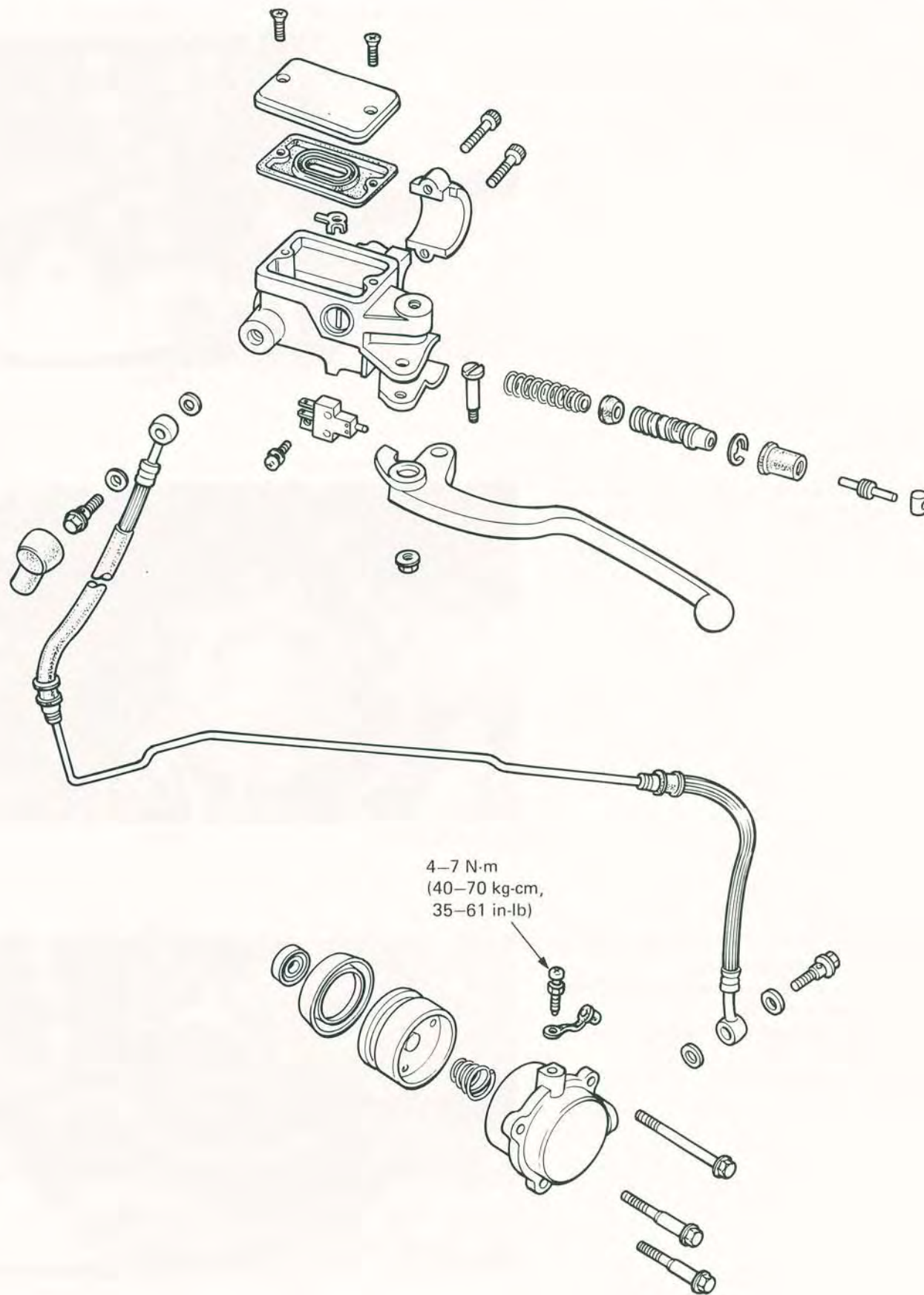


Insert a new O-ring over the end of the water pipe. Connect the water pipe to the pump hose and water pipe cap.



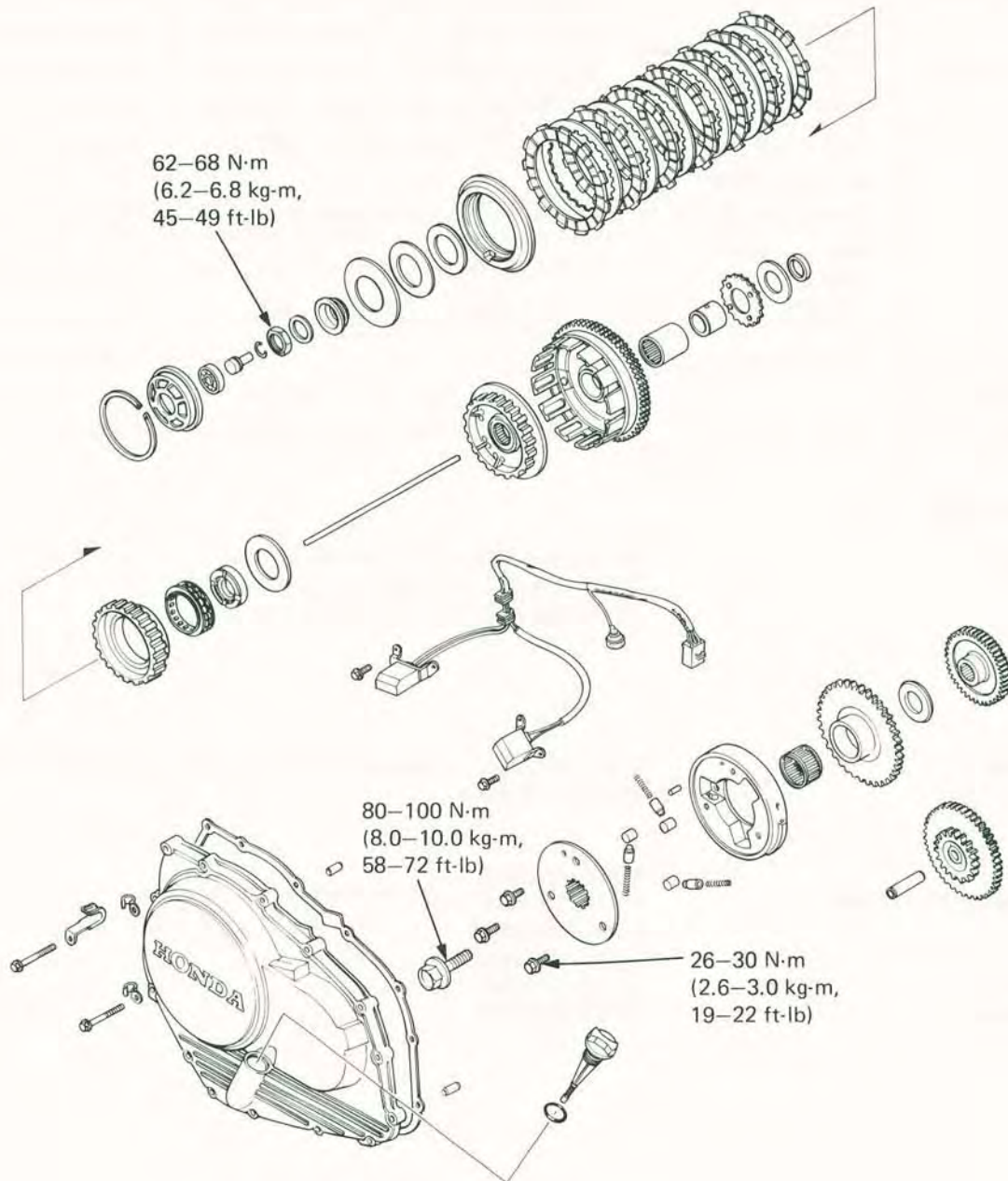
Install the dowel pins and install a new O-ring in the groove of the water pump cover. Install the water pump cover and torque the bolts. Connect the water inlet hose. Install the drive sprocket cover, gearshift arm and clutch slave cylinder. Fill the cooling system (page 6-3).







SERVICE INFORMATION	7-2	CLUTCH COVER REMOVAL	7-10
TROUBLESHOOTING	7-3	STARTER CLUTCH DISASSEMBLY	7-10
CLUTCH FLUID REPLACEMENT/ AIR BLEEDING	7-4	CLUTCH DISASSEMBLY	7-12
CLUTCH MASTER CYLINDER	7-5	CLUTCH ASSEMBLY	7-17
CLUTCH SLAVE CYLINDER	7-8	STARTER CLUTCH ASSEMBLY	7-20
		CLUTCH COVER INSTALLATION	7-22



**CLUTCH SYSTEM****SERVICE INFORMATION****GENERAL**

- This section covers removal and installation of the clutch hydraulic system, clutch and starter clutch.
- DOT-4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in the section. Do not use other types of fluid as they are not compatible.
- Clutch maintenance can be done with the engine in the frame.

**SPECIFICATIONS**

		STANDARD	SERVICE LIMIT
Clutch master cylinder	Cylinder I.D.	14.000–14.043 mm (0.5512–0.5524 in)	14.06 mm (0.553 in)
	Piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.94 mm (0.549 in)
Clutch slave cylinder	Cylinder I.D.	38.100–38.162 mm (1.5000–1.5024 in)	38.18 mm (1.503 in)
	Piston O.D.	38.036–38.075 mm (1.4975–1.4990 in)	38.02 mm (1.497 in)
Clutch	Outer guide I.D.	24.995–25.012 mm (0.9841–0.9847 in)	25.08 mm (0.987 in)
	Spring free height	4.1 mm (0.16 in)	3.9 mm (0.15 in)
	Clutch center B I.D.	74.414–74.440 mm (2.9297–2.9307 in)	74.47 mm (2.932 in)
	One way clutch inner O.D.	57.710–57.840 mm (2.2720–2.2772 in)	57.60 mm (2.268 in)
	Disc thickness	3.72–3.88 mm (0.147–0.153 in)	3.1 mm (0.12 in)
	Plate warpage	—	0.30 mm (0.012 in)
Pulse coil air gap		0.35–0.85 mm (0.014–0.033 in)	—
Starter clutch	Driven gear O.D.	47.175–47.200 mm (1.8573–1.8583 in)	47.16 mm (1.857 in)

**TORQUE VALUES**

Primary drive gear	80–100 N·m (8.0–10.0 kg·m, 58–72 ft·lb)
Clutch lock nut	62–68 N·m (6.2–6.8 kg·m, 45–49 ft·lb)
Starter clutch	26–30 N·m (2.6–3.0 kg·m, 19–22 ft·lb)

**TOOLS****Special**

Snap ring pliers	07924–MC70002 or modified 07024–MC70001 or 07924–MC70000
Gear holder	or 07924–4150000

**Common**

Extension	07716–0020500	} — or equivalent in U.S.A.
Lock nut wrench, 17 x 27 mm	07716–0020300	
Driver	07749–0010000	
Attachment, 37 x 40 mm	07746–0010200	
Pilot, 35 mm	07746–0040800	
Universal holder	07725–0030000	





## **TROUBLESHOOTING**

### **Clutch lever soft or spongy**

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking

### **Clutch lever too hard**

1. Sticking piston(s)
2. Clogged hydraulic system

### **Clutch slips**

1. Hydraulic system sticking
2. Discs worn
3. Springs weak

### **Clutch will not disengage**

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking
4. Hydraulic system sticking
5. Plates warped

### **Motocycle creeps with clutch disengaged**

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking
4. Hydraulic system sticking
5. Plates warped

### **Excessive lever pressure**

1. Hydraulic system sticking
2. Lifter mechanism damaged

### **Clutch operation feels rough**

1. Outer drum slots rough
2. Sticking piston(s)

## CLUTCH SYSTEM

### CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

Check the fluid level with the fluid reservoir parallel to the ground.

#### CAUTION

- Install the diaphragm on the reservoir when operating the clutch lever. Failure to do so will allow clutch fluid to squirt out of the reservoir during clutch operation.
- Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.



LOWER LEVEL

### CLUTCH FLUID DRAINING

Connect a bleed hose to the bleed valve. Loosen the slave cylinder bleed valve and pump the clutch lever. Stop operating the lever when no fluid flows out of the bleed valve.

### CLUTCH FLUID FILLING

#### NOTE

Do not mix different types of fluid since they may not be compatible.

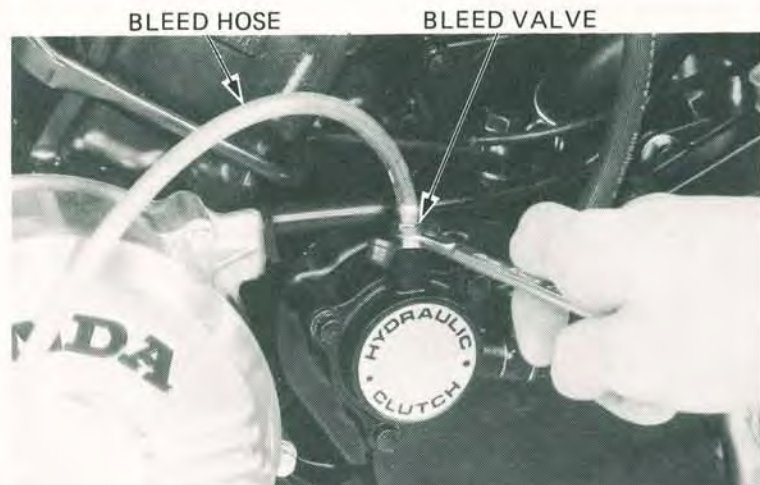
Close the bleed valve, fill the reservoir, and install the diaphragm.

To prevent piston overtravel and clutch fluid seepage, keep a 20 mm (3/4 in) spacer between the handlebar grip and lever when bleeding the clutch system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt. Then bleed the system.

### AIR BLEEDING

#### NOTE

- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- Use only **DOT 4 brake fluid** from a sealed container.
- Do not mix brake fluid types and never reuse the fluid which has been pumped out during bleeding, or the efficiency of the clutch system will be impaired.





- 1) Squeeze the clutch lever, open the bleed valve 1/2 turn then close the valve.

**NOTE**

Do not release the clutch lever until the bleed valve has been closed again.

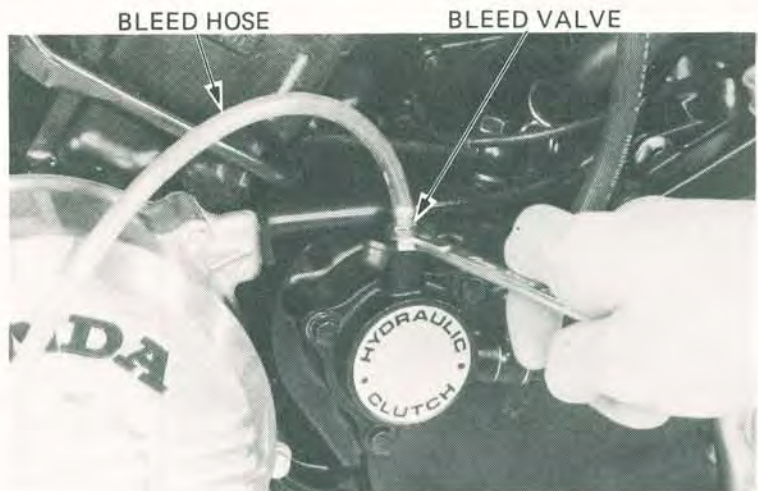
- 2) Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

Repeat the above steps until bubbles cease to appear in the fluid at the end of the hose.

Tighten the bleed valve.

**TORQUE: 4–7 N·m (0.4–0.7 kg·m, 35–61 in·lb)**

Fill the fluid reservoir to the upper level.



## CLUTCH MASTER CYLINDER

### DISASSEMBLY

Drain clutch fluid from the hydraulic system. Remove the rear view mirror and clutch lever. Disconnect the clutch switch wires and remove the clutch hose.

**CAUTION**

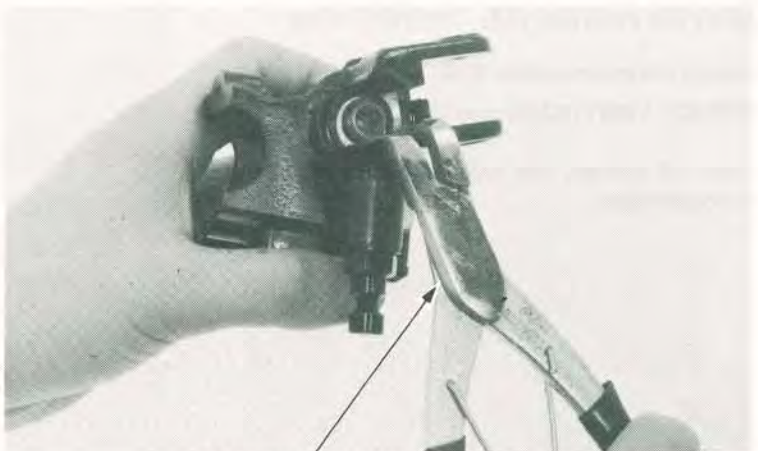
*Avoid spilling clutch fluid on painted surfaces. Place a rag over the fuel tank whenever the clutch system is serviced.*

**NOTE**

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

Remove the master cylinder.

Remove the push rod, boot and snap ring from the master cylinder body.



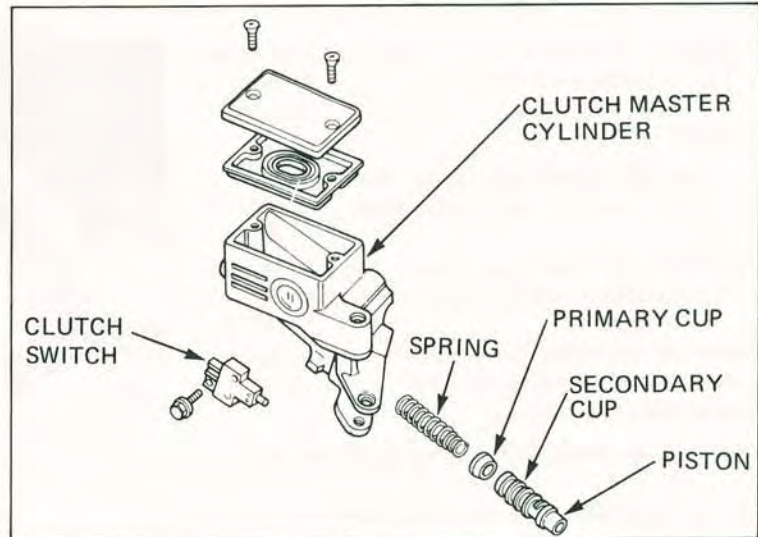
**SNAP RING PLIERS**  
07914-3230001 OR EQUIVALENT



## CLUTCH SYSTEM

Remove the following:

- piston and secondary cup.
- primary cup and spring.
- clutch switch, if necessary.

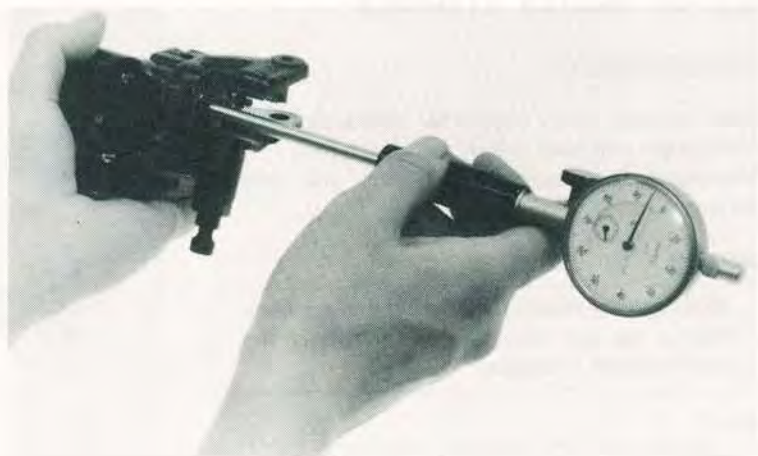


### MASTER CYLINDER I.D. INSPECTION

Measure the master cylinder I.D.

Check the master cylinder for scores, scratches or nicks.

**SERVICE LIMIT: 14.06 mm (0.553 in)**



### MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

**SERVICE LIMIT: 13.94 mm (0.549 in)**

Check the primary and secondary cups for damage before assembly.





### ASSEMBLY

#### CAUTION

*Handle the master piston, spring, primary cup and secondary cup as a set.*

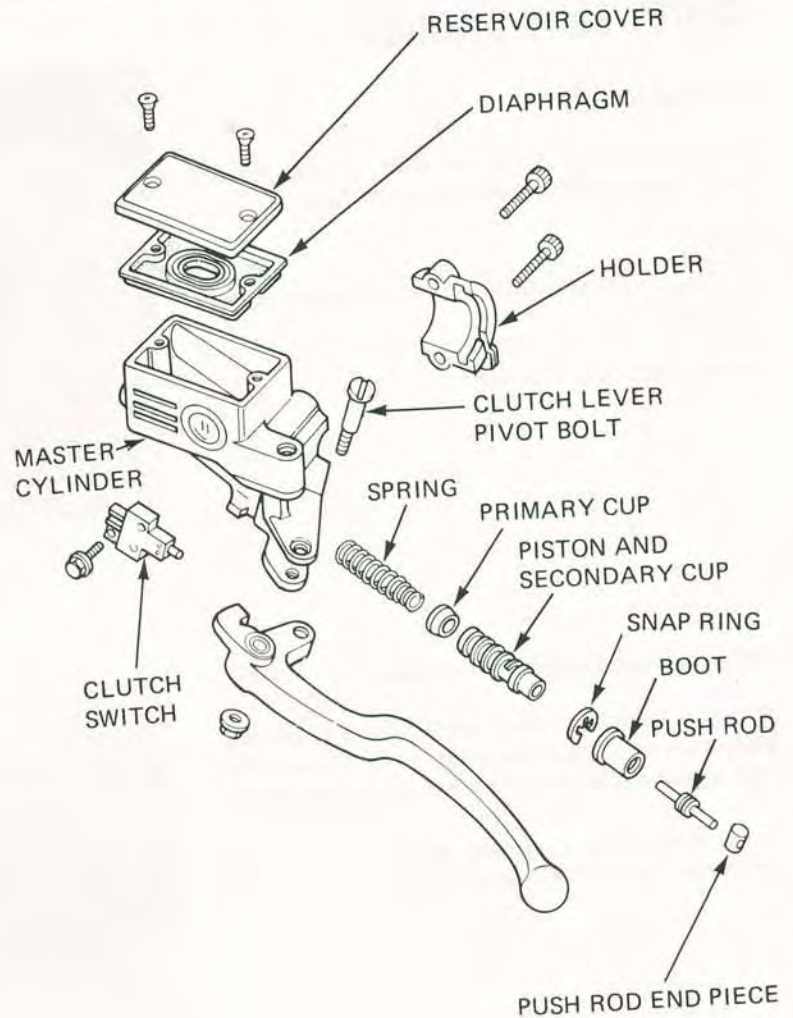
Coat all parts with clean brake fluid before assembly.

Install the spring, primary cup and piston.

#### CAUTION

*When installing the cups, do not allow the lips to turn inside out.*

Install the snap ring making sure it is seated firmly in the groove. Then install the boot and push rod. Install the clutch switch, if it was removed.



Place the master cylinder on the handlebar and install the holder with the "UP" mark facing up and the two mounting bolts. Align the mark of the holder with the handlebar punch mark. Tighten the top bolt first, then the bottom bolt.

Install the oil hose with the bolt and its two sealing washers. Install the push rod end piece into the clutch lever hole and install the clutch lever. Connect the clutch switch wires to the switch terminals. Fill the reservoir and bleed the clutch system (page 7-4).





**CLUTCH SYSTEM**

**CLUTCH SLAVE CYLINDER**

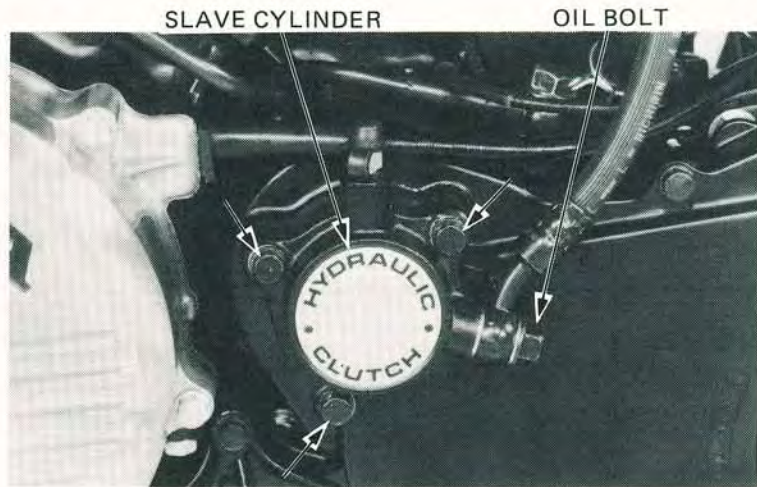
**DISASSEMBLY**

Place a container under the slave cylinder, remove the oil bolt and disconnect the clutch hose.

**NOTE**

Avoid spilling clutch fluid on painted surfaces.

Remove the slave cylinder.



Remove the piston from the cylinder.

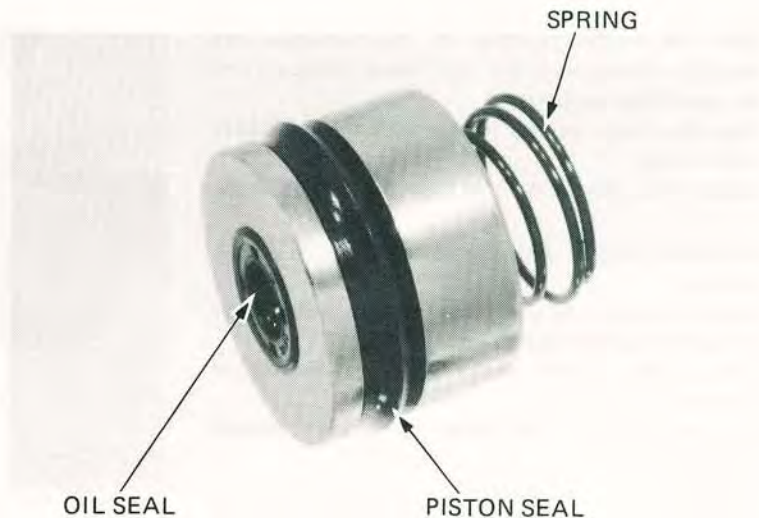
If piston removal is hard, place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

Apply compressed air to the fluid inlet to remove the piston. Use the air in short spurts.



Remove the spring from the slave cylinder.

Remove the oil and piston seals.  
Clean the piston groove with clutch fluid.  
Check the piston spring for weakness or damage.





### PISTON O.D. INSPECTION

Check the piston for scoring or scratches.  
Measure the outside diameter of the piston with a micrometer.

**SERVICE LIMIT: 38.02 mm (1.497 in)**



### CYLINDER I.D. INSPECTION

Check the slave cylinder for scoring or scratches.  
Measure the inside diameter of the cylinder bore.

**SERVICE LIMIT: 38.18 mm (1.503 in)**

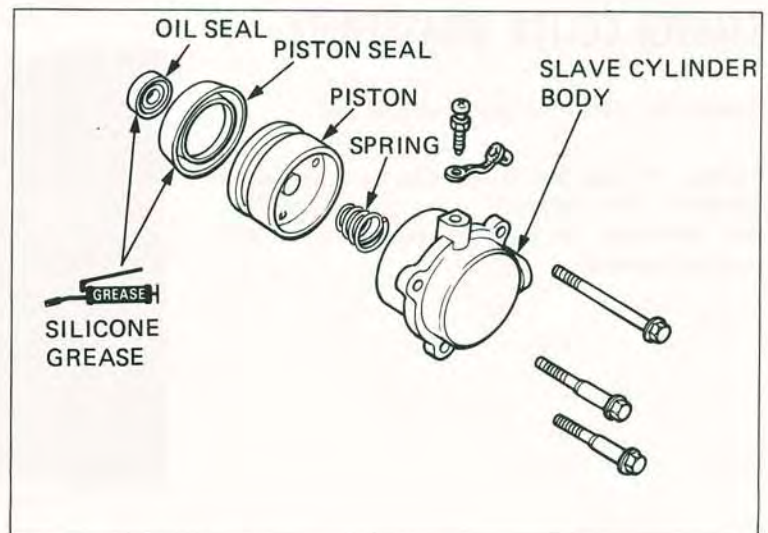


### ASSEMBLY

Assemble the slave cylinder in the reverse order of disassembly. The oil seals must be replaced with new ones whenever they have been removed.

Lubricate the piston and piston seal with a medium grade of Hi-Temperature silicone grease or brake fluid before assembly.

Be certain the piston seal is seated in the piston groove. Place the piston in the cylinder with the seal end facing out.

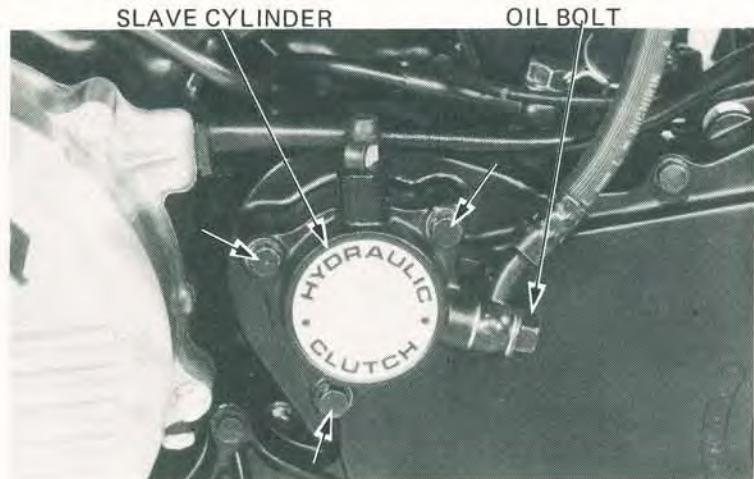




## CLUTCH SYSTEM

Install the insulator and slave cylinder.  
Connect the clutch hose with the oil bolt and the two sealing washers.

Fill the clutch fluid reservoir and bleed the clutch system (page 7-4).



## CLUTCH COVER REMOVAL

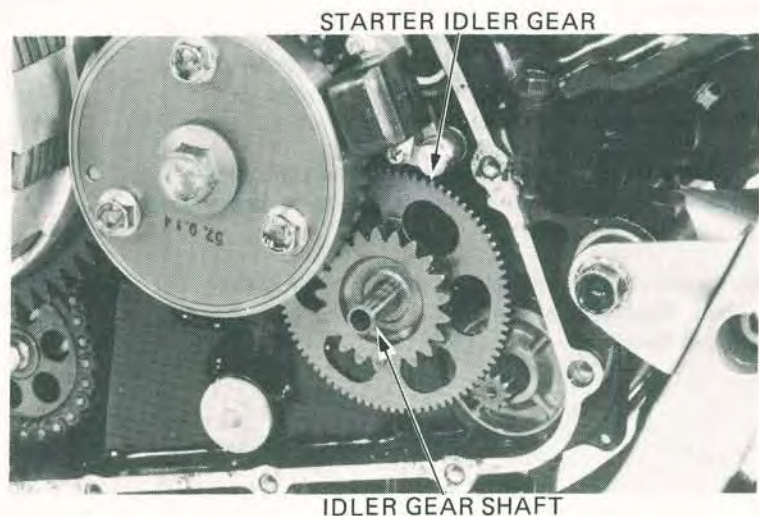
Drain the engine oil.  
Remove the clutch cover, gasket and dowel pins.



## STARTER CLUTCH DISASSEMBLY

Remove the starter idle gear shaft and gear.

Remove the idler gear by rotating the starter clutch clockwise with a wrench, or by rotating the idler gear clockwise to turn the starter motor shaft counterclockwise.

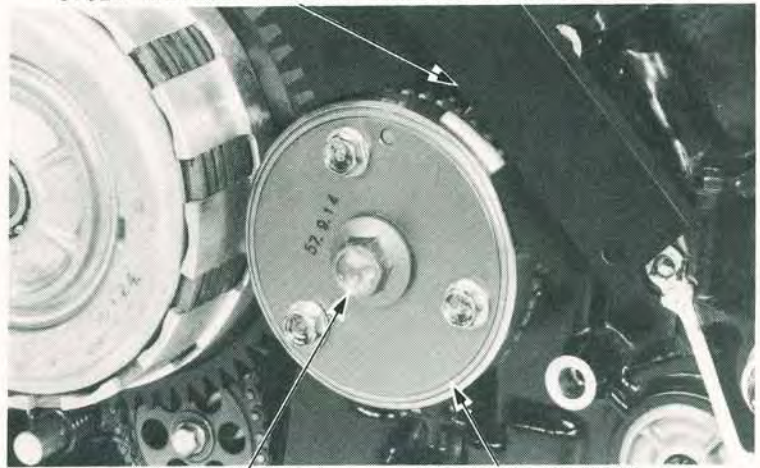






Hold the primary gear with the gear holder and remove the bolt.  
Remove the starter clutch.

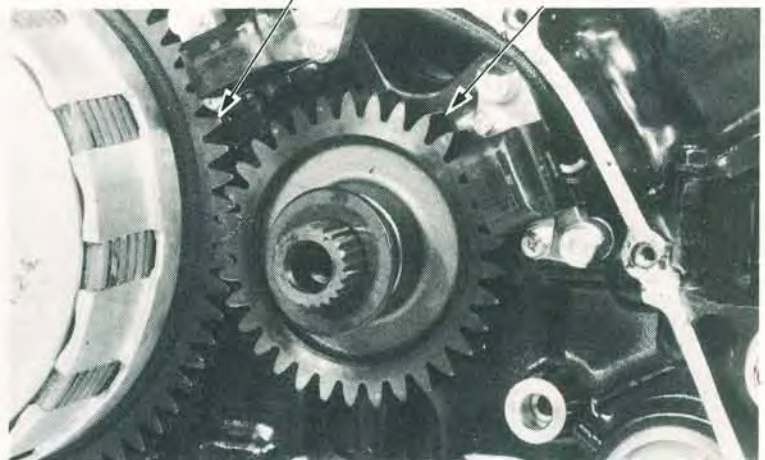
GEAR HOLDER 07924-MC70002 or modified  
07924-MC70001 or 07924-MC70000 or 07924-4150000



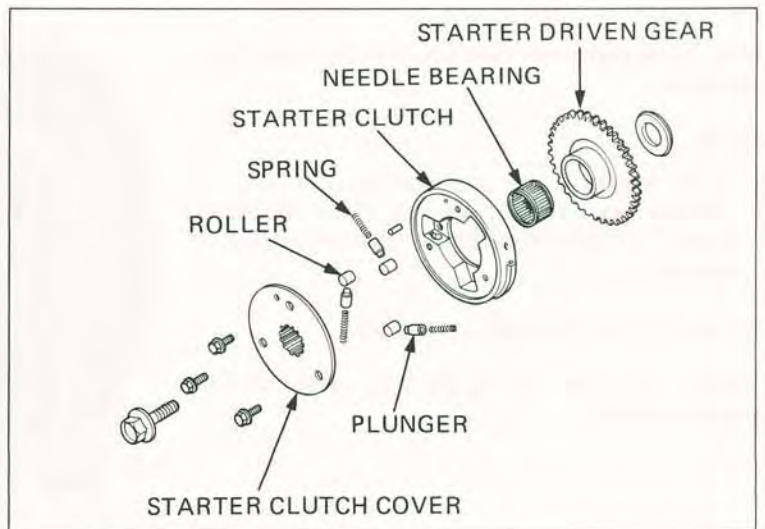
PRIMARY GEAR BOLT      STARTER CLUTCH

Shift the primary driven sub gear with a screwdriver to take preload off the primary drive gear and remove the primary drive gear.

PRIMARY DRIVEN SUB GEAR      PRIMARY DRIVE GEAR



Remove the starter driven gear and needle bearing from the starter clutch.  
Inspect the rollers for smooth operation.  
Remove the starter clutch cover by removing the three bolts.  
Remove the clutch rollers, plungers and springs.  
Check the rollers for excessive wear.



## CLUTCH SYSTEM

### STARTER DRIVEN GEAR INSPECTION

Inspect the driven gear for damage or excessive wear.

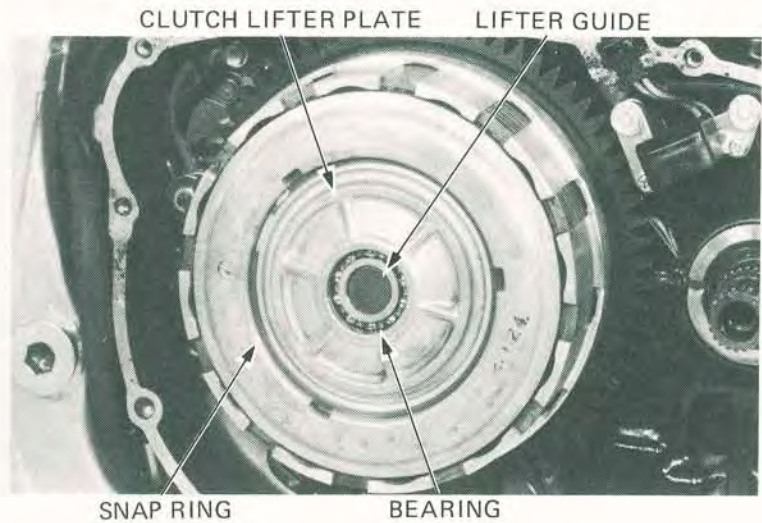
Measure the driven gear O.D.

**SERVICE LIMIT: 47.16 mm (1.857 in)**



### CLUTCH DISASSEMBLY

Remove the snap ring, clutch lifter plate, bearing, lifter guide and lifter rod.



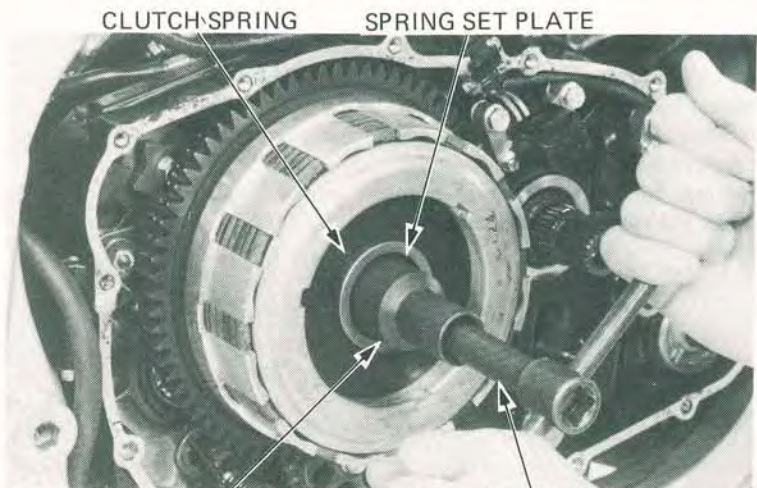
Shift the transmission into 5th gear and apply the rear brake.

#### NOTE

If the engine is not in the frame, shift the transmission into gear and use the universal holder (07725-0030000) to hold the drive sprocket.

Remove the lock nut and lock washer.

Remove the clutch spring set plate, clutch spring and two washers.

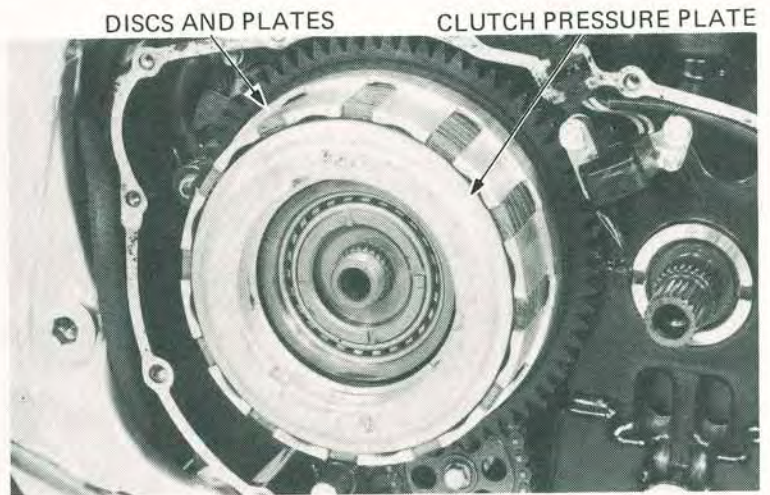


LOCK NUT WRENCH, 17 x 27 mm  
 07716-0020300 OR EQUIVALENT IN U.S.A.

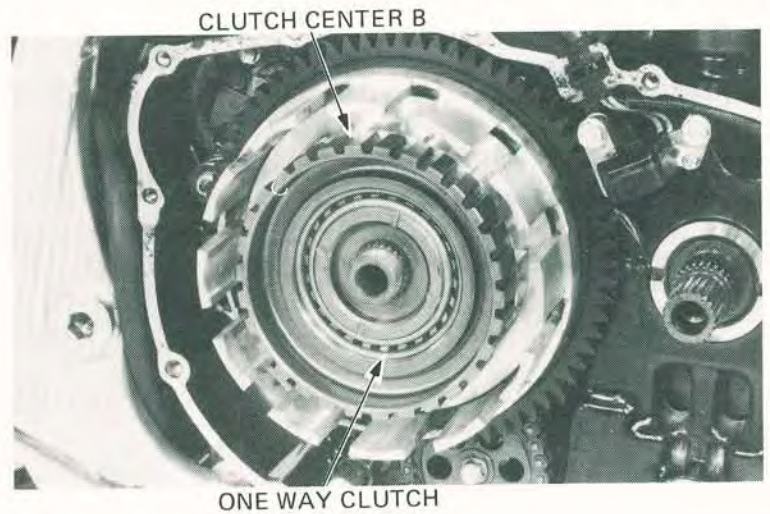


Remove the clutch pressure plate.

Remove the clutch plates and discs.



Remove clutch center B and the one-way clutch as an assembly.



Remove clutch center A and washer.



## CLUTCH SYSTEM

Remove the clutch outer and outer guide.



### INSPECTION

- CLUTCH SPRING

Measure the height of the clutch spring.

**SERVICE LIMIT: 3.9 mm (0.15 in)**

Replace the spring if it is shorter than the service limit.



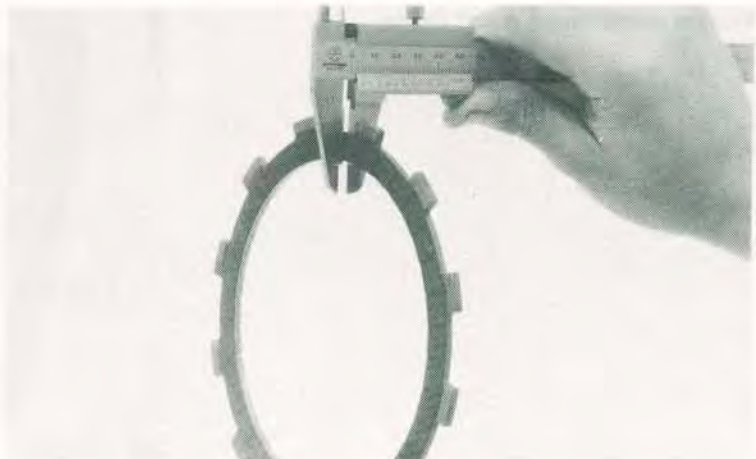
- CLUTCH DISC

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

Measure the thickness of each disc.

**SERVICE LIMIT: 3.1 mm (0.12 in)**

Replace any discs that are thinner than the service limit.

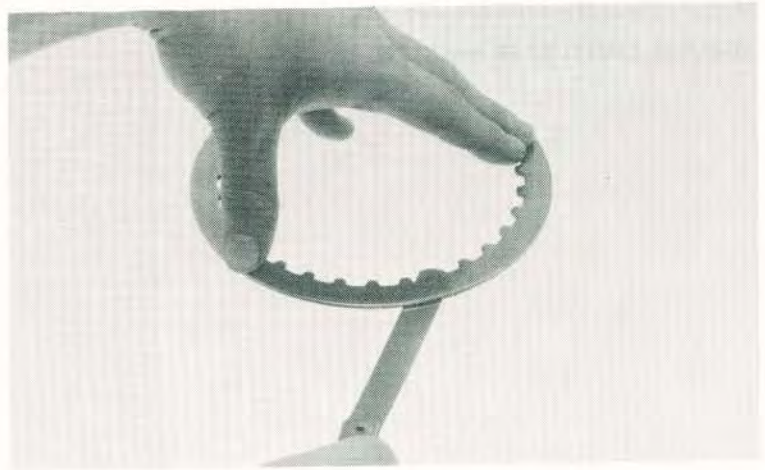




- CLUTCH PLATE

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

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



- ONE WAY CLUTCH INSPECTION

Inspect the one way clutch for smooth operation.

Check the rollers for excessive wear.



Measure the I.D. of clutch center B.

**SERVICE LIMIT: 74.47 mm (2.932 in)**



## CLUTCH SYSTEM

Measure the O.D. of the one way clutch inner.

**SERVICE LIMIT: 57.60 mm (2.268 in)**

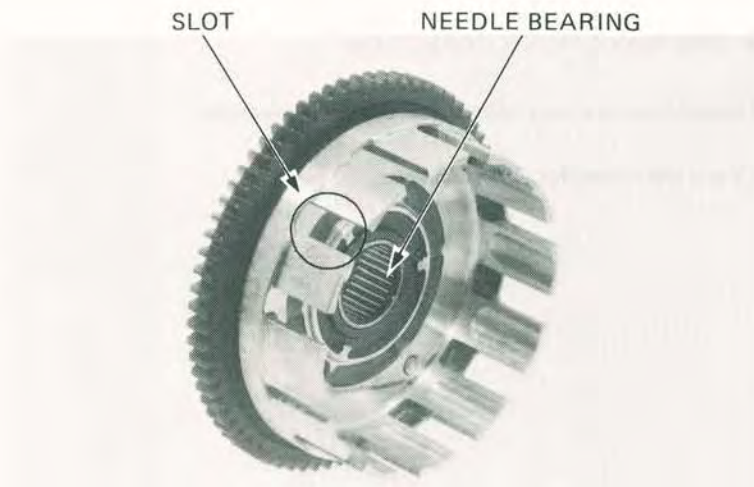


### INSPECTION

#### ● CLUTCH OUTER

Check the slots in the clutch outer for nicks, cuts or indentations made by the friction discs. Check the clutch outer needle bearing for damage or excessive play.

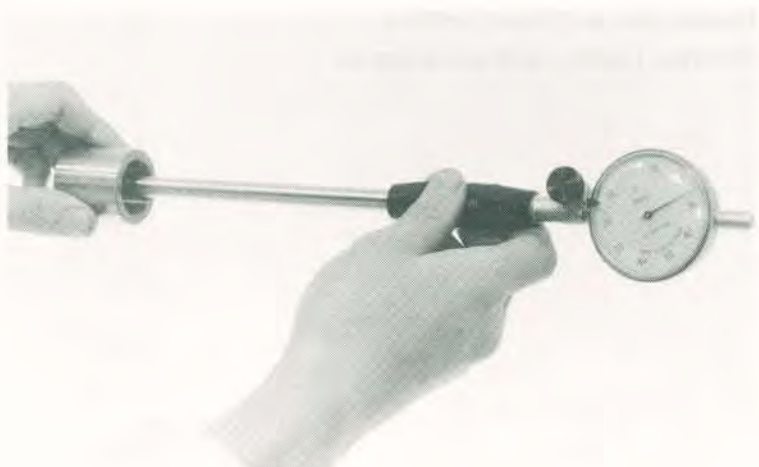
If the needle bearing is difficult to remove from the clutch housing, use the following tools:  
Driver: 07749-0010000  
Attachment, 37 x 40 mm: 07746-0010200  
Pilot, 35 mm: 07746-0040800



#### ● CLUTCH OUTER GUIDE

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

**SERVICE LIMIT: 25.08 mm (0.987 in)**

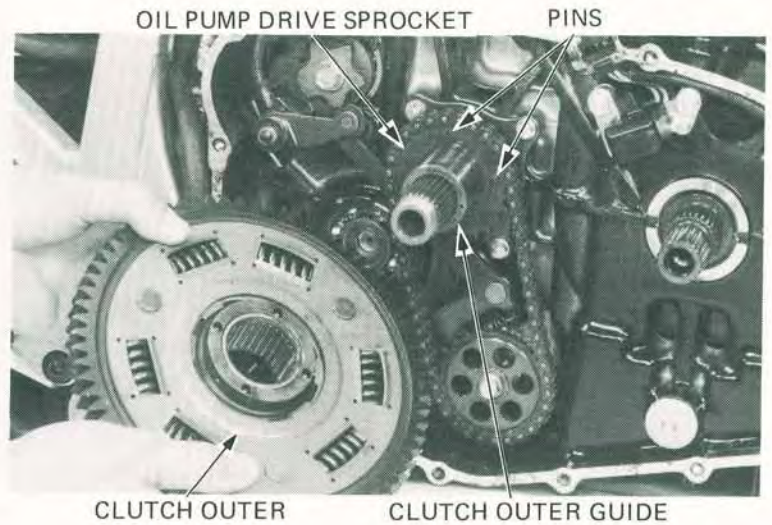




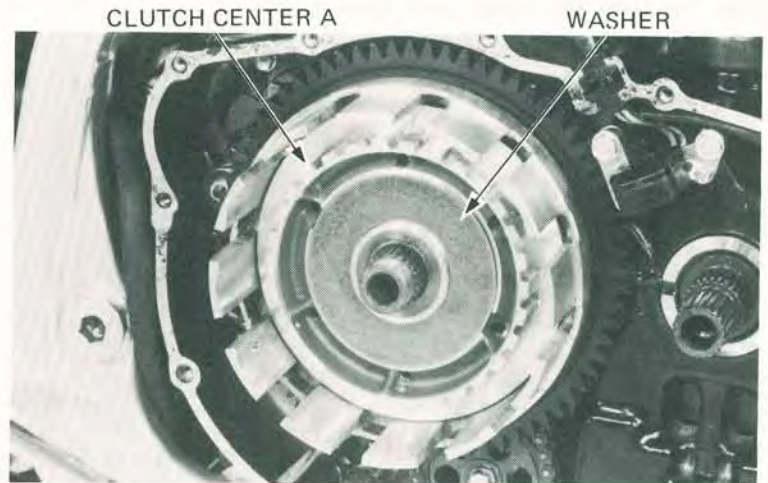
## CLUTCH ASSEMBLY

Install the clutch outer guide over the mainshaft. Install the needle bearing into the clutch outer.

Align the holes in the clutch outer with the pins on the oil pump drive sprocket and install the clutch outer over the guide.



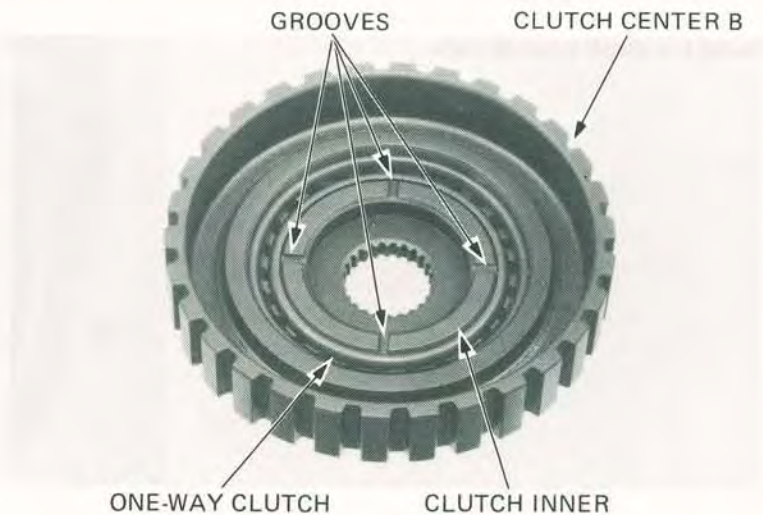
Install clutch center A and the washer.



Place the clutch center B with the grooved side facing down.

Install the one-way clutch into the clutch center B with its flanged cage facing up.

Install the clutch inner into the one-way clutch with its grooves facing up. Turn it counterclockwise as you install it.





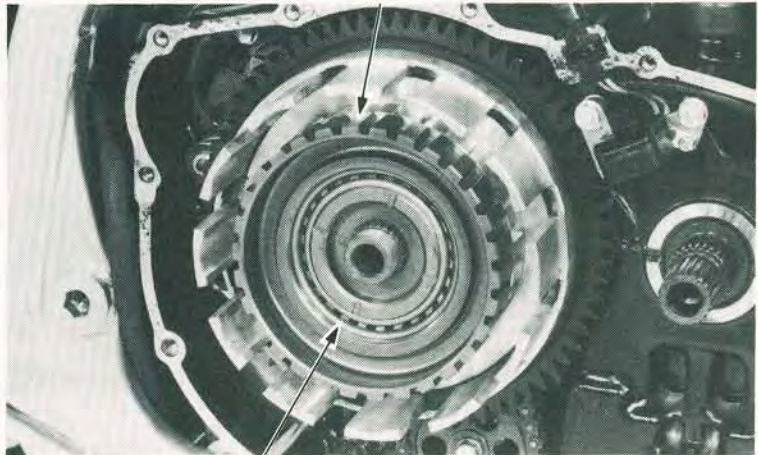
## CLUTCH SYSTEM

Install the one-way clutch/clutch center B assembly over the mainshaft.

### NOTE

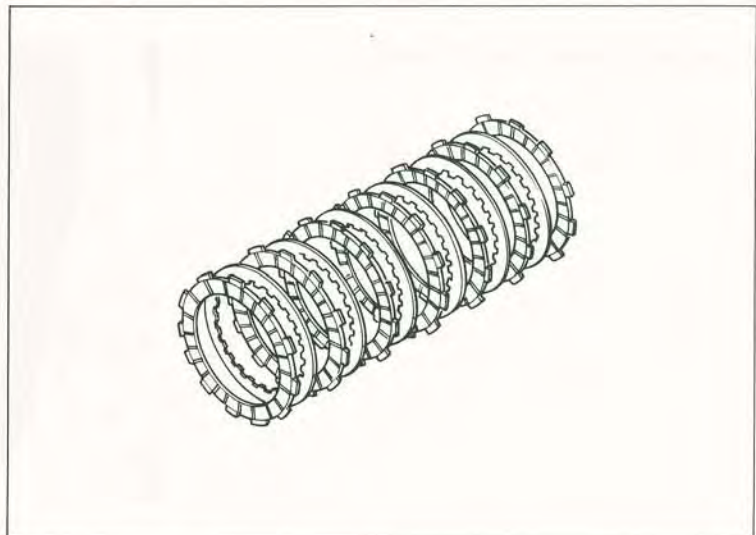
Make sure the one way clutch assembly is installed correctly by turning the clutch center B. The clutch center should turn clockwise freely and should not turn counter-clockwise.

CLUTCH CENTER B (Turns clockwise)



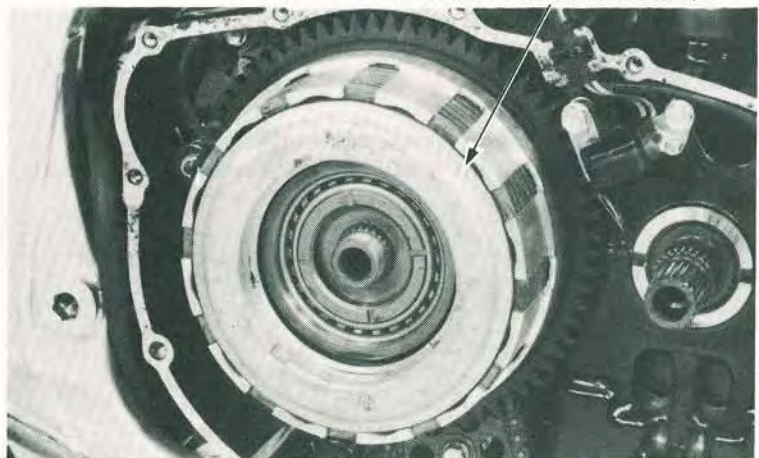
ONE-WAY CLUTCH

Coat the discs and plates with clean engine oil, and install them.



Install the clutch pressure plate.

CLUTCH PRESSURE PLATE



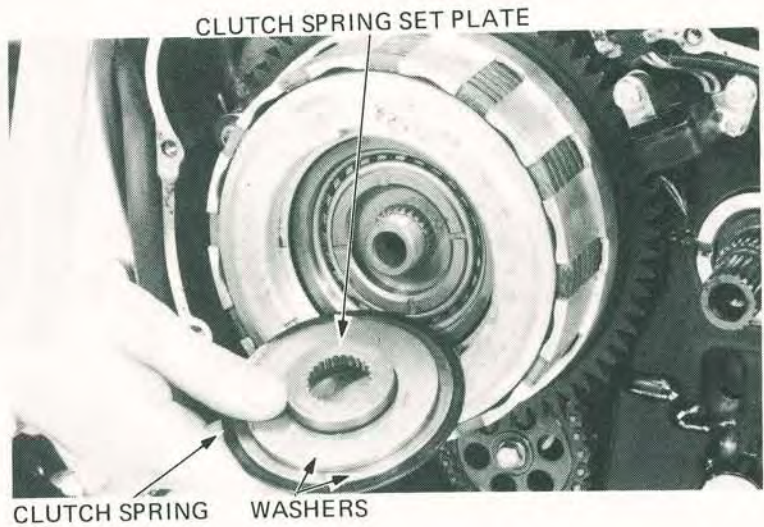




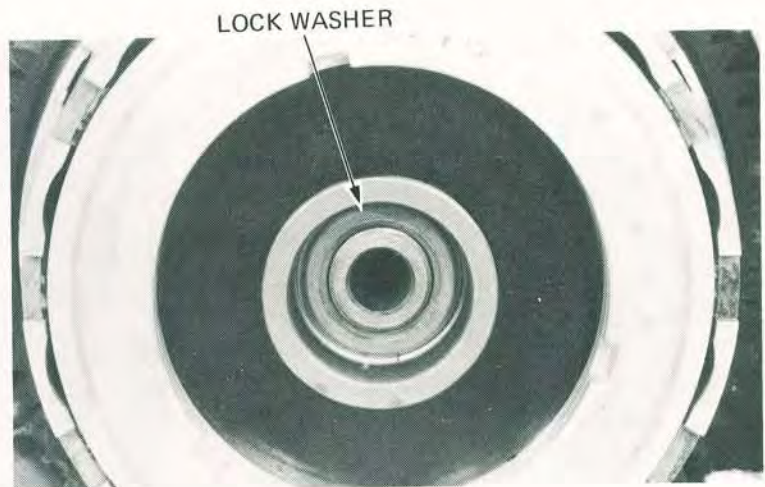
Install the clutch spring set plate, clutch spring, and washers.

**NOTE**

Install the clutch spring with the dished face towards the inside.



Install the lock washer with its dished face towards the inside.



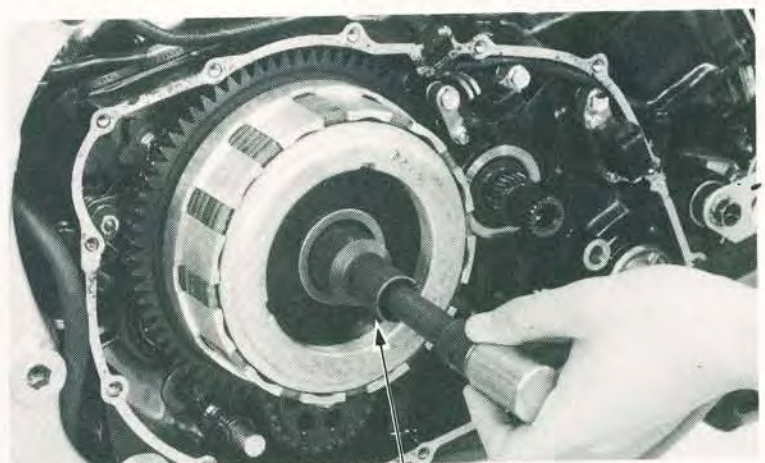
Place the transmission in 5th gear.

**NOTE**

If servicing the clutch with the engine out of the frame, shift the transmission into gear and hold the drive sprocket with the HOLDER 07725-0030000.

**TORQUE:**

62-68 N·m (6.2-6.8 kg-m, 45-49 ft-lb)

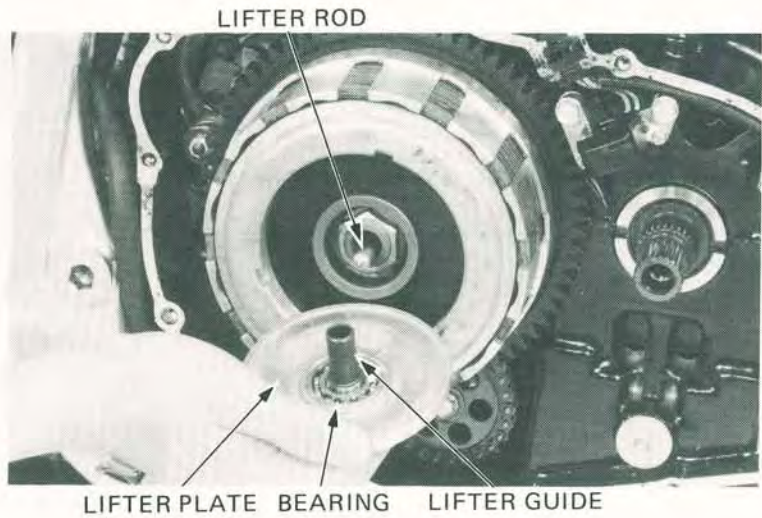


07716-0020300 OR EQUIVALENT IN U.S.A.

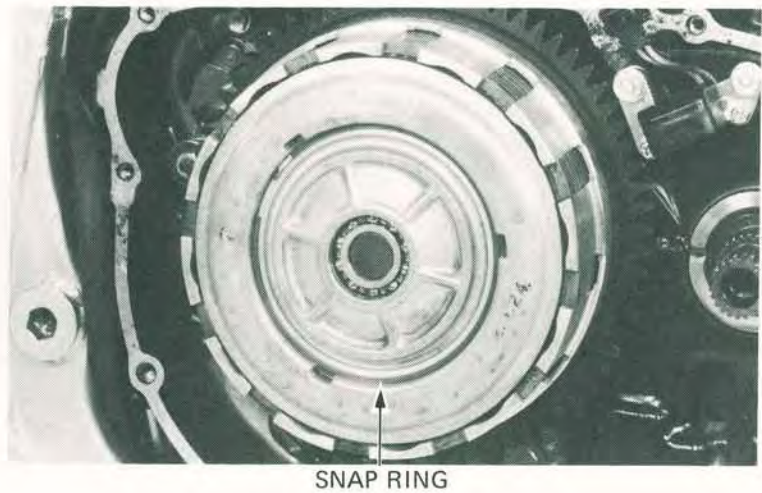
## CLUTCH SYSTEM

Install the clutch lifted rod.

Install the clutch lifter plate, lifter guide and bearing.



Install the snap ring.



## STARTER CLUTCH ASSEMBLY

Install the primary drive gear onto the crankshaft while moving the primary driven gear with a screwdriver.

Install the thrust washer on the crankshaft.





Install the springs, plungers and rollers into the starter clutch.

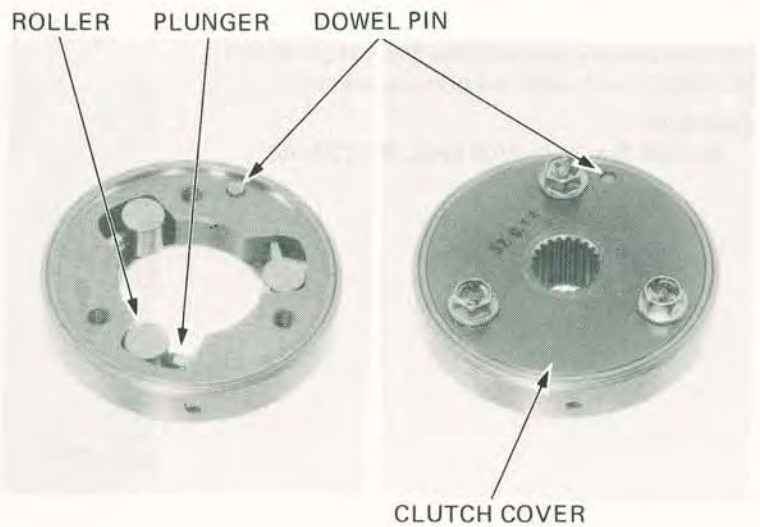
Install the dowel pin.

Install the starter clutch cover aligning the dowel pin hole with the dowel pin and tighten the bolts.

**TORQUE: 26–30 N·m (2.6–3.0 kg·m, 19–22 ft·lb)**

**NOTE**

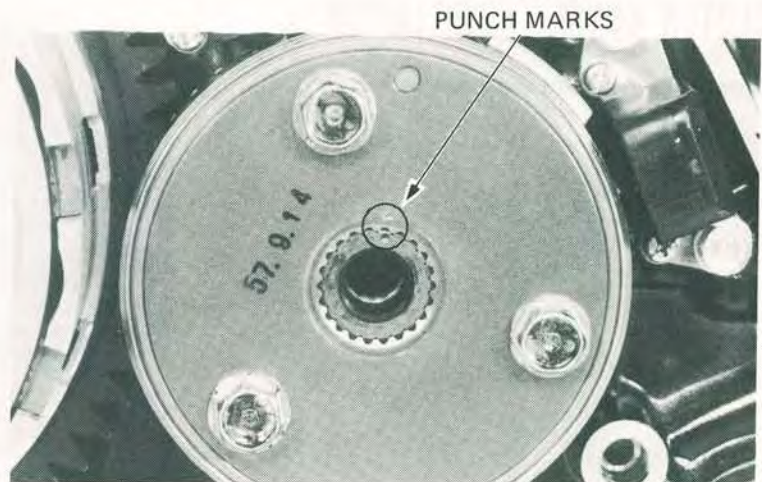
Apply a locking agent to the bolt threads.



Install the starter driven gear by turning it clockwise.



Align the punch marks on the starter clutch and crankshaft and install the starter clutch.





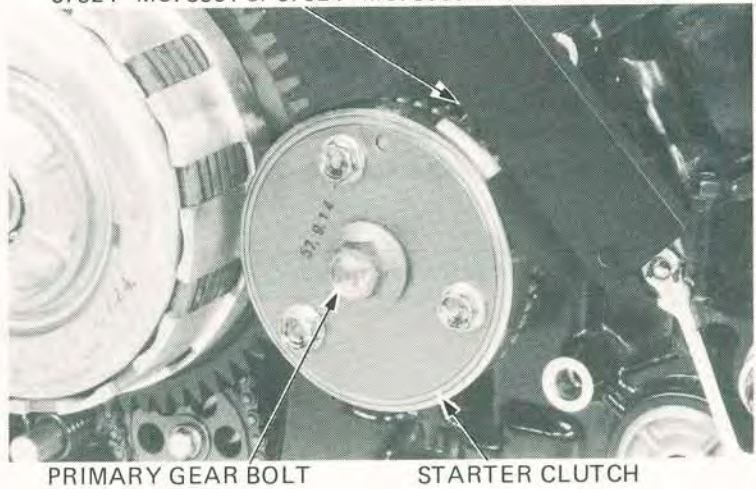
## CLUTCH SYSTEM

Hold the primary gear with the gear holder (07924-MC70002) and tighten the primary gear bolt.

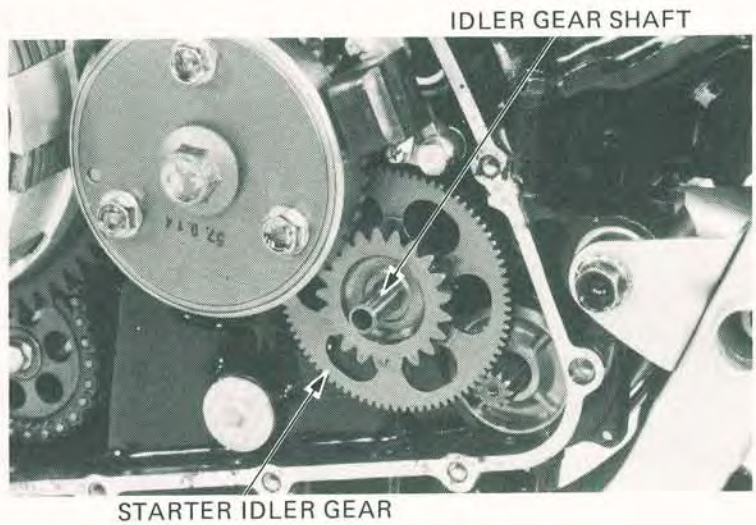
**TORQUE:**

80–100 N·m (8.0–10.0 kg·m, 58–72 ft·lb)

GEAR HOLDER 07924-MC70002 or modified  
07924-MC70001 or 07924-MC70000 or 07924-4150000

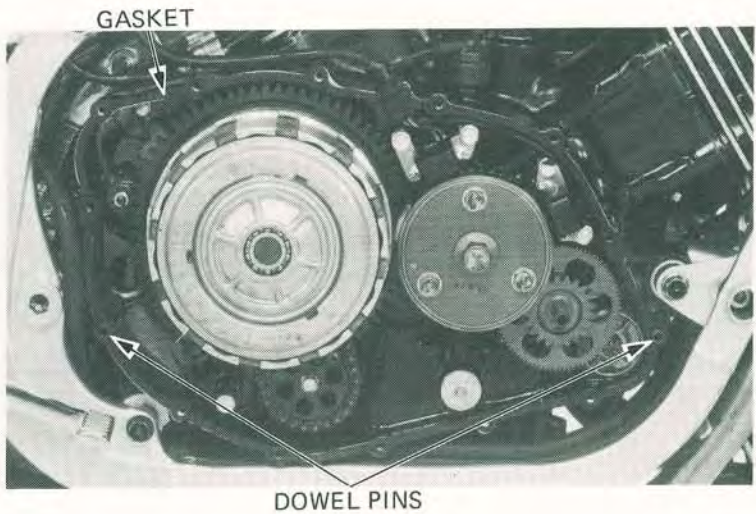


Install the starter idler gear and shaft.



## CLUTCH COVER INSTALLATION

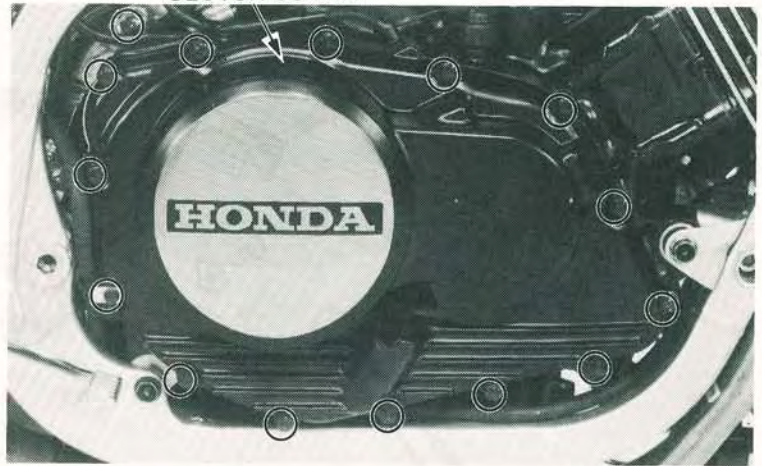
Install the dowel pins and a new gasket.





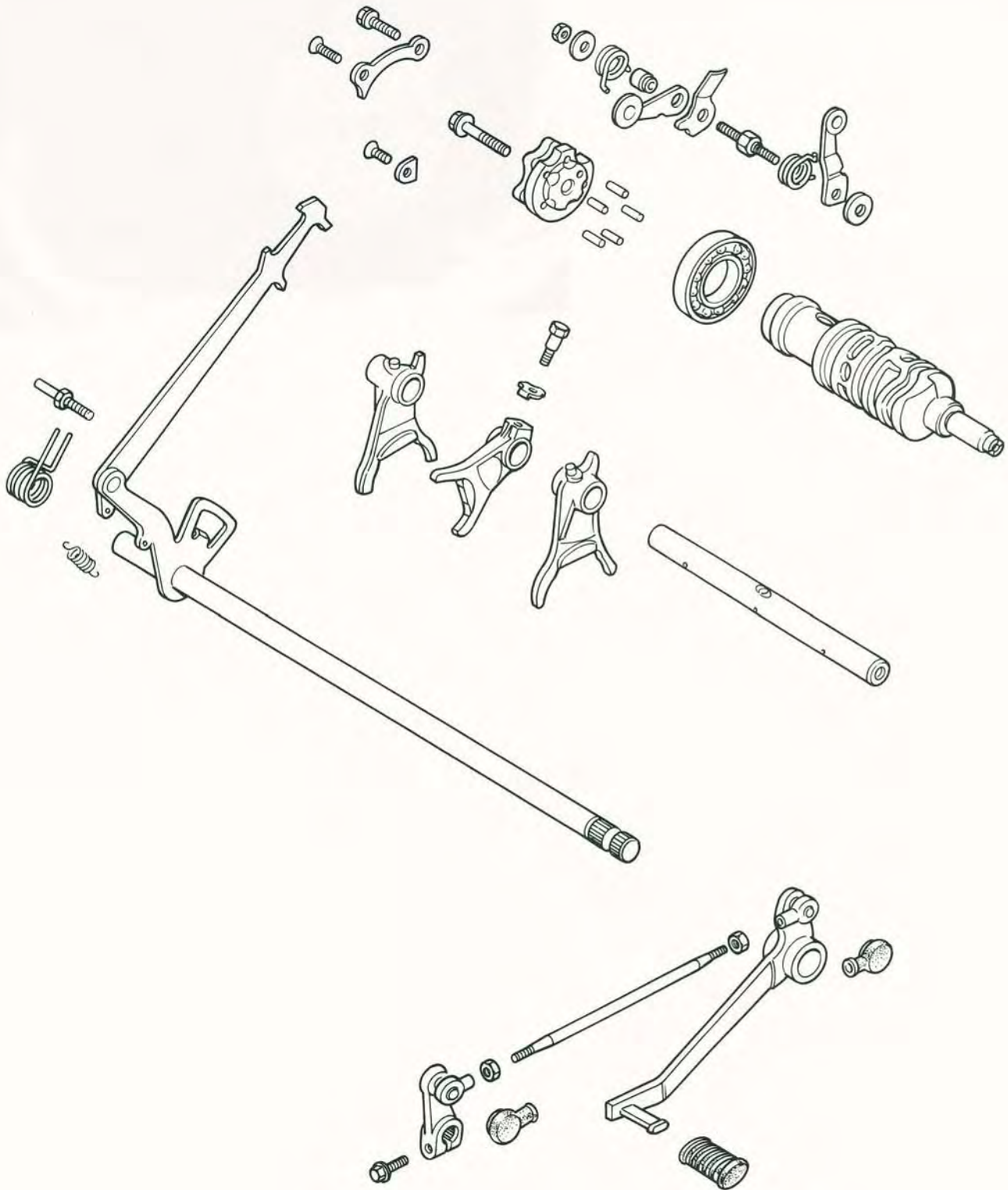
Install the clutch cover.  
Fill the crankcase with oil (page 2-3).

CLUTCH COVER





**GEARSHIFT LINKAGE**





SERVICE INFORMATION	8-1
TROUBLESHOOTING	8-1
GEARSHIFT LINKAGE REMOVAL	8-2
GEARSHIFT LINKAGE INSTALLATION	8-4

## SERVICE INFORMATION

### GENERAL

- The gearshift spindle and stopper arms can be serviced with the engine in the frame.
- If the shift forks, drum and transmission require servicing, remove the engine and separate the crankcase.

## TROUBLESHOOTING

### Hard to shift

1. Air bubbles in the clutch hydraulic system
2. Shift forks bent
3. Shift claw bent
4. Shift drum cam grooves damaged

### Transmission jumps out of gear

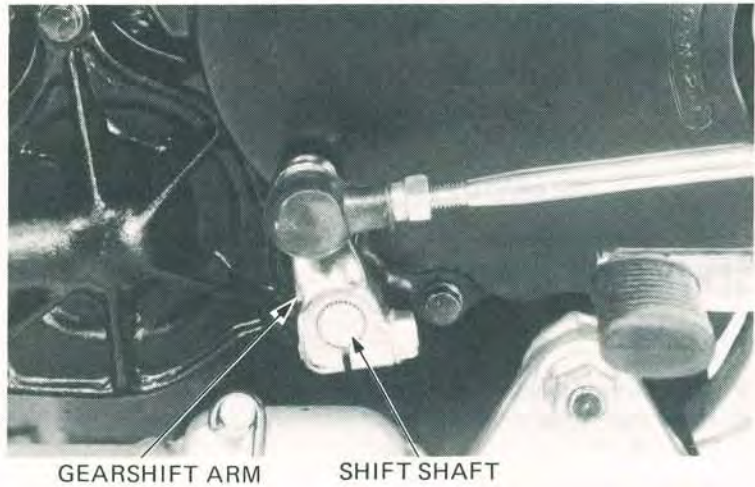
1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper broken
4. Shift forks bent



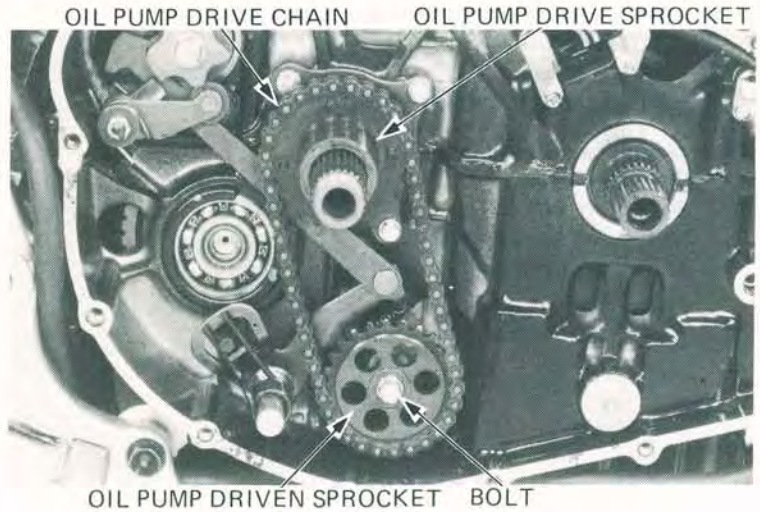
## GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE REMOVAL

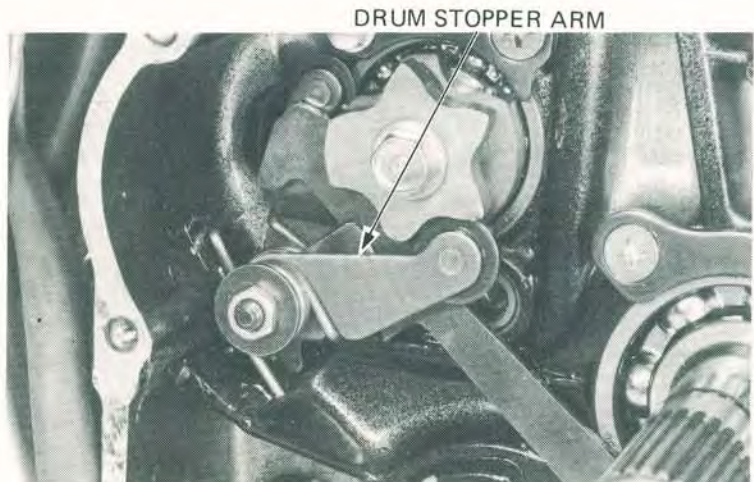
Drain the engine oil (page 2-3).  
Remove the gearshift arm from the shift shaft.  
Remove the clutch cover and clutch assembly  
(Section 7).



Remove the oil pump driven sprocket bolt.  
Remove the oil pump drive chain, drive and driven sprockets.



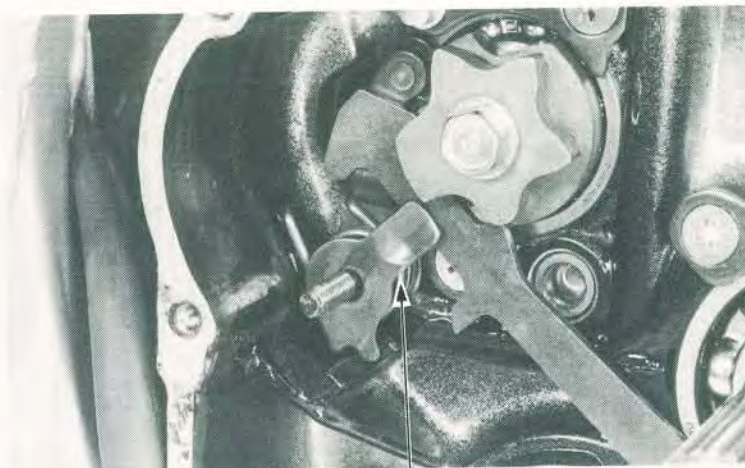
Remove the drum stopper arm nut, washer, spring, collar, and arm.





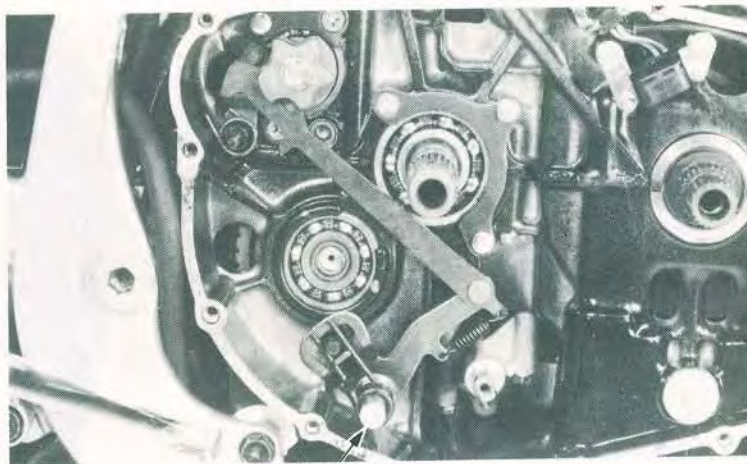


Remove the tab washer.



TAB WASHER

Pull the gearshift spindle assembly out of the crankcase.



GEARSHIFT SPINDLE

Remove the neutral stopper arm bolt, arm and spring and washer.

NEUTRAL STOPPER ARM



ARM BOLT



## GEARSHIFT LINKAGE

Remove the shift drum cam plate bolt and cam plate.

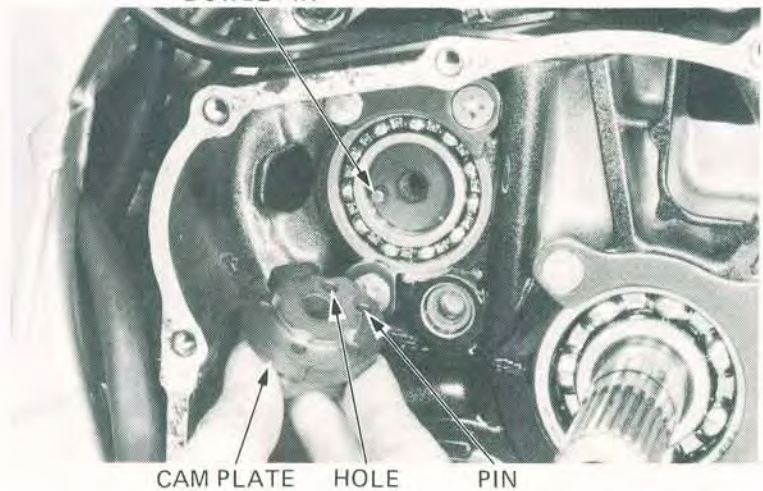
SHIFT DRUM CAM PLATE



## GEARSHIFT LINKAGE INSTALLATION

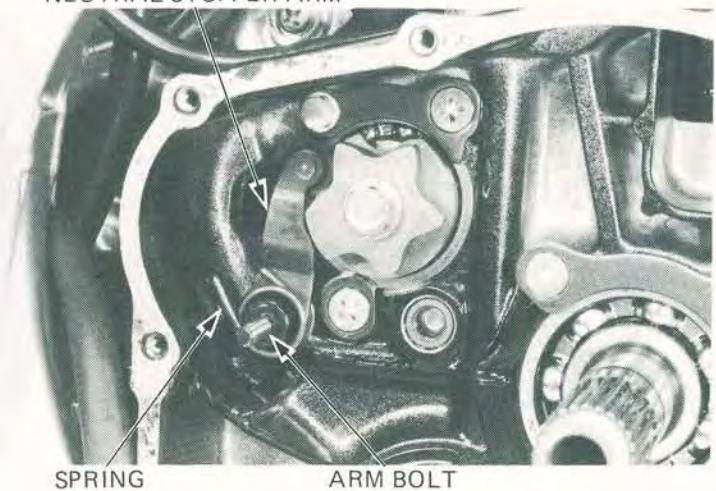
Install the dowel pin in the hole of the shift drum. Insert the five pins in the holes of the cam plate. Align the cam plate hole with the dowel pin on the shift drum and install the cam plate. Tighten the bolt securely.

DOWEL PIN



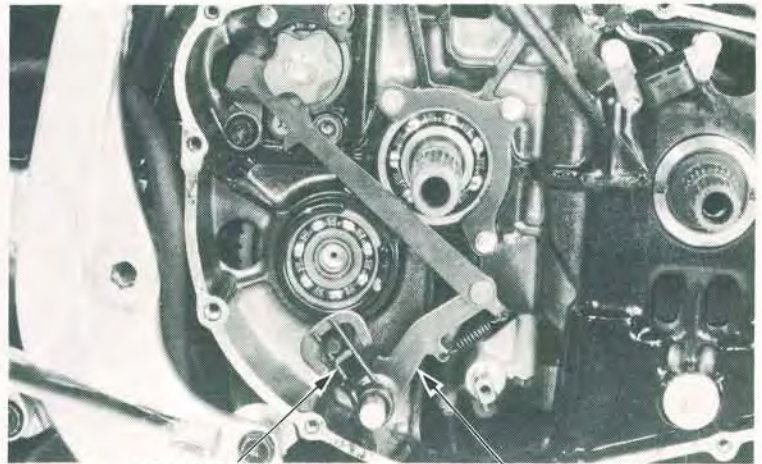
Install the washer, neutral stopper arm, spring and arm bolt. Tighten the arm bolt securely.

NEUTRAL STOPPER ARM





Assemble the gearshift spindle and return spring and install as shown.



RETURN SPRING

GEARSHIFT SPINDLE

Install the tab washer onto the stopper arm bolt.



TAB WASHER

Install the drum stopper arm, collar, spring, washer and nut over the arm bolt.  
Tighten the nut securely.  
Rotate the gearshift spindle and check the linkage for smooth operation.



DRUM STOPPER ARM



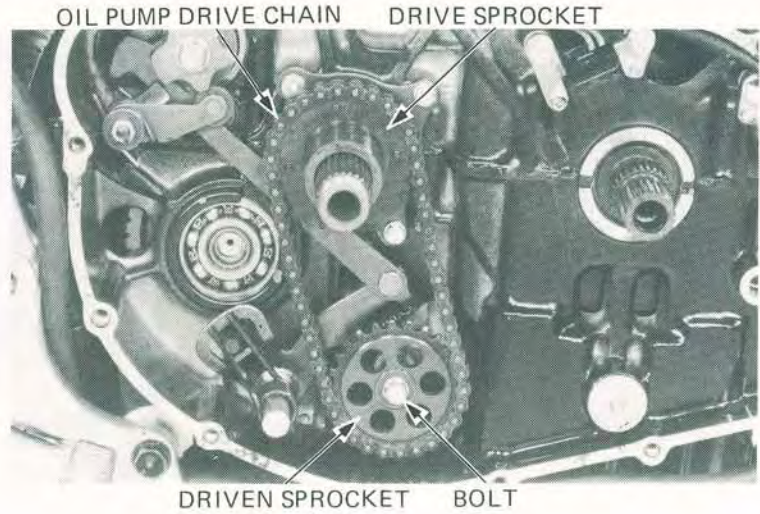
## GEARSHIFT LINKAGE

Install the oil pump drive and driven sprockets with drive chain and tighten the driven sprocket bolt securely.

**NOTE:**

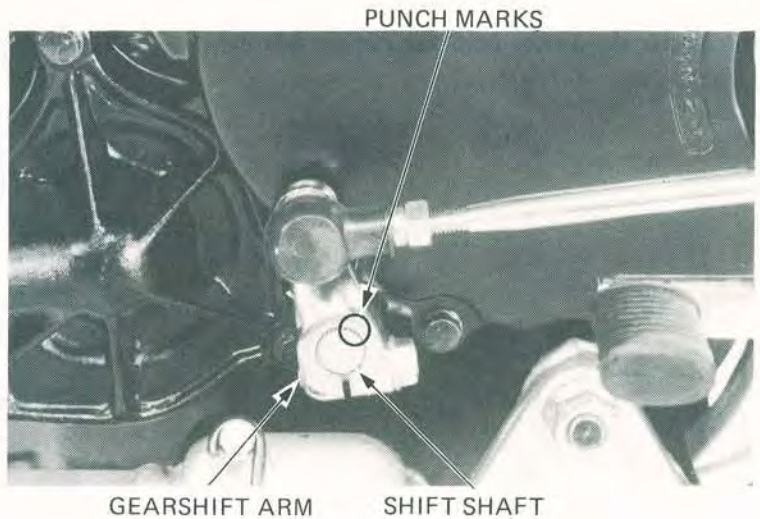
The driven sprocket has an "IN" mark that must face the crankcase.

Install the clutch assembly and cover (section 7).



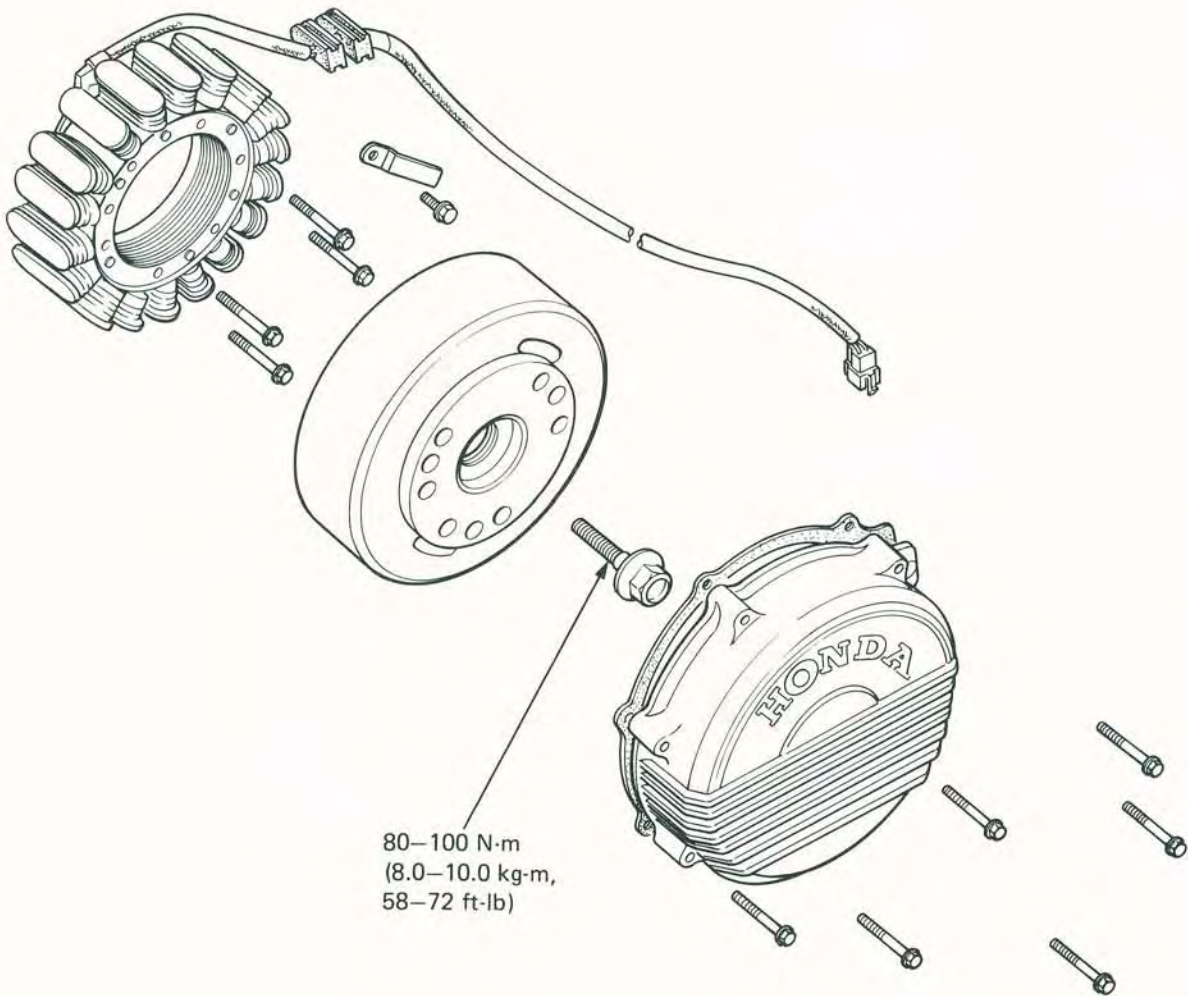
Align the punch marks on the gearshift arm and gearshift spindle and install the gearshift arm on the shift shaft.

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





MEMO



80–100 N·m  
(8.0–10.0 kg·m,  
58–72 ft·lb)



SERVICE INFORMATION	9-1
FLYWHEEL REMOVAL	9-2
STATOR REMOVAL	9-3
STATOR INSTALLATION	9-3
FLYWHEEL INSTALLATION	9-3

## SERVICE INFORMATION

### GENERAL

- This section covers removal and installation of the alternator.  
Refer to section 17 for troubleshooting and inspection of the alternator.

### TORQUE VALUE

Alternator rotor/Flywheel bolt 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

### TOOLS

#### Common

Flywheel holder 07725-0040000  
Rotor puller 07733-0020001 or 07933-3290001



## ALTERNATOR

### FLYWHEEL REMOVAL

Place a container under the alternator cover to catch engine oil.

Remove the alternator cover.

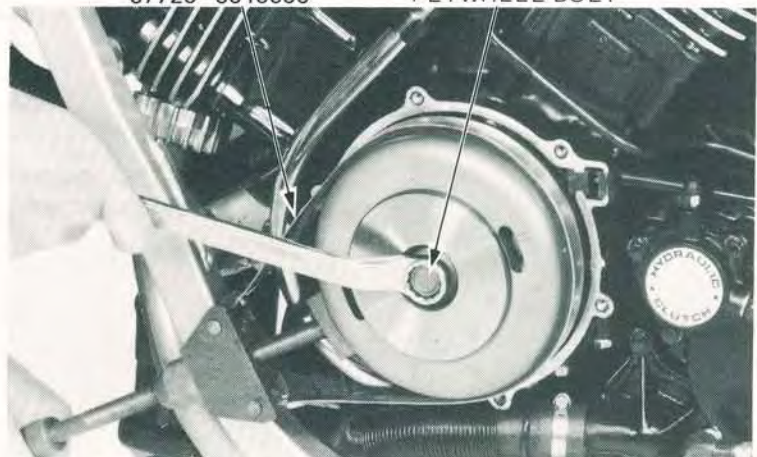
ALTERNATOR COVER



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

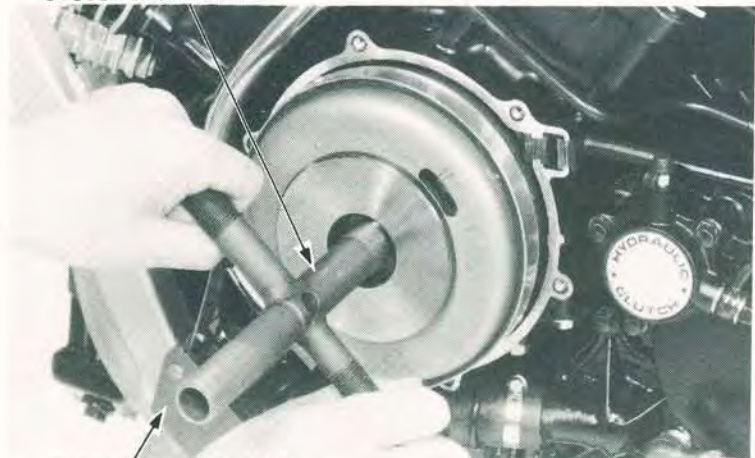
FLYWHEEL HOLDER  
07725-0040000

FLYWHEEL BOLT



Remove the flywheel with the rotor puller.  
Remove the woodruff key from the crankshaft.

ROTOR PULLER  
07733-0020001 OR  
07933-3290001



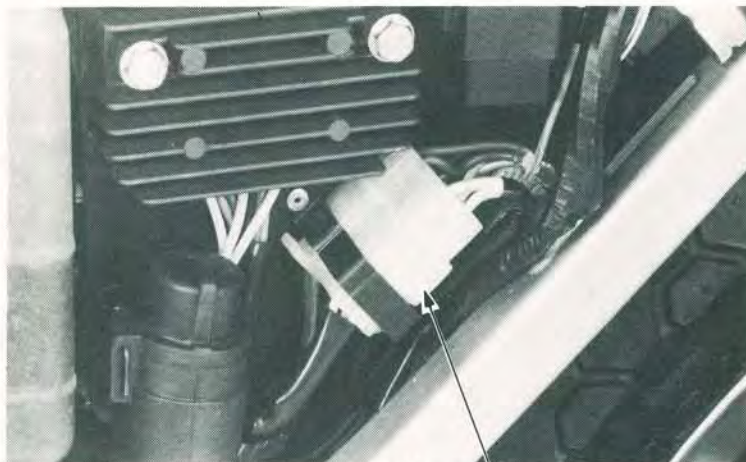
FLYWHEEL HOLDER  
07725-0040000





## STATOR REMOVAL

Remove the frame left side cover.  
Disconnect the alternator wire coupler and free the alternator wire from the clamp.



ALTERNATOR WIRE COUPLER

Remove the stator by removing the bolts and wire clamp.

## STATOR INSTALLATION

Install the stator and wire clamp.

Route the alternator wire properly, secure it with clamp and connect the alternator wire coupler to the main harness.

Install the frame left side cover.



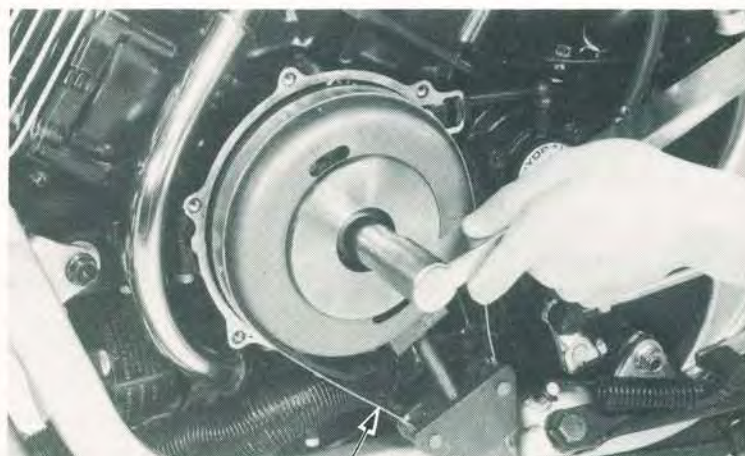
## FLYWHEEL INSTALLATION

Install the woodruff key into the crankshaft.  
Install the flywheel by aligning its keyway with the key in the crankshaft.

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

**TORQUE: 80–100 N·m**  
**(8.0–10.0 kg·m, 58–72 ft·lb)**

Install the alternator cover.  
Check engine oil level and add if necessary (page 2-3).



FLYWHEEL HOLDER  
07725-0040000

8-12 N·m  
(0.8-1.2 kg-m, 6-9 ft-lb)

10-14 N·m  
(1.0-1.4 kg-m, 7-10 ft-lb)

21-25 N·m  
(2.1-2.5 kg-m, 15-18 ft-lb)

38-42 N·m  
(3.8-4.2 kg-m, 27-30 ft-lb)

45-50 N·m  
(4.5-5.0 kg-m, 33-36 ft-lb)

18-20 N·m  
(1.8-2.0 kg-m, 13-14 ft-lb)

38-42 N·m  
(3.8-4.2 kg-m, 27-30 ft-lb)

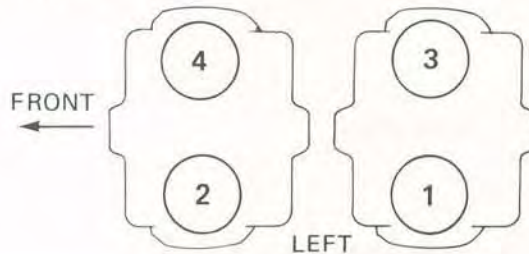


SERVICE INFORMATION	10-1	VALVE GUIDE REPLACEMENT	10-13
TROUBLESHOOTING	10-2	VALVE SEAT INSPECTION/ REFACING	10-14
CAMSHAFT REMOVAL	10-3	CYLINDER HEAD ASSEMBLY	10-15
CYLINDER HEAD REMOVAL	10-7	CYLINDER HEAD INSTALLATION	10-16
CYLINDER HEAD DISASSEMBLY	10-9	CAMSHAFT INSTALLATION	10-19

## SERVICE INFORMATION

### GENERAL

- The front cylinder head can be removed with the engine in the frame.
- The rear cylinder head cannot be removed with the engine in the frame; however its camshafts and rocker arms can be serviced with the engine in the frame.
- If the cam sprockets of either front or rear cylinder are removed, the valve timing of both cylinders must be checked during reinstallation.
- Camshaft lubricating oil is fed through the external oil lines. Be sure the oil lines are not clogged.
- During assembly, apply molybdenum disulfide to the camshaft holder surfaces to provide initial lubrication.
- The cylinder numbering is given below:



### SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Compression pressure			1,300 ± 200 kPa (13 ± 2 kg/cm <sup>2</sup> , 184 ± 28 psi)	—
Camshaft	Cam height	IN	35.335–35.495 mm (1.3911–1.3974 in)	35.3 mm (1.39 in)
		EX	35.335–35.495 mm (1.3911–1.3974 in)	35.3 mm (1.39 in)
	Runout		—	0.10 mm (0.004 in)
	End clearance		0.05–0.25 mm (0.002–0.010 in)	0.30 mm (0.012 in)
	Oil clearance	Center	0.131–0.191 mm (0.0052–0.0075 in)	0.20 mm (0.008 in)
Both ends		0.020–0.081 mm (0.0008–0.0032 in)	0.10 mm (0.004 in)	
Rocker arm	Rocker arm I.D.		12.000–12.018 mm (0.4724–0.4731 in)	12.05 mm (0.474 in)
	Shaft O.D.		11.966–11.984 mm (0.4711–0.4718 in)	11.93 mm (0.470 in)
Valve	Valve stem O.D.	IN	5.475–5.490 mm (0.2156–0.2161 in)	5.47 mm (0.215 in)
		EX	5.455–5.470 mm (0.2148–0.2154 in)	5.45 mm (0.214 in)
	Valve guide I.D.		5.500–5.515 mm (0.2165–0.2171 in)	5.55 mm (0.219 in)
	Stem-to-guide clearance	IN	0.010–0.040 mm (0.0004–0.0016 in)	0.08 mm (0.003 in)
		EX	0.030–0.060 mm (0.0012–0.0024 in)	0.10 mm (0.004 in)
	Valve stem runout		—	0.05 mm (0.002 in)
	Valve length	IN	89.55 mm (3.526 in)	89.05 mm (3.506 in)
		EX	89.35 mm (3.518 in)	88.85 mm (3.498 in)
Valve seat width		0.99–1.27 mm (0.039–0.050 in)	1.5 mm (0.06 in)	

**CYLINDER HEAD/VALVE**

Valve spring	Free length	Inner	41.6 mm (1.64 in)	40.25 mm (1.58 in)
		Outer	43.7 mm (1.72 in)	42.23 mm (1.66 in)
	Preload/length	Inner	7.42–8.72 kg/34.2 mm (16.36–19.22 lb/1.35 in)	7.11 kg/34.2 mm (15.67 lb/1.35 in)
		Outer	12.9–15.1 kg/37.7 mm (28.44–33.29 lb/1.48 in)	12.29 kg/37.7 mm (27.09 lb/1.48 in)
Cylinder head	Warpage	—		0.1 mm (0.004 in)

**TORQUE VALUES**

Cylinder head cover	8–12 N·m (0.8–1.2 kg·m, 6–9 ft·lb)
Camshaft holder 6 mm	10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)
(The camshaft holder bolts in each corner of the cylinder head are longer than the others.)	
Cam chain guide A bolt	21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)
Cylinder head 9 mm	38–42 N·m (3.8–4.2 kg·m, 27–30 ft·lb)
Cylinder head 8 mm	21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)
Rocker arm shaft	45–50 N·m (4.5–5.0 kg·m, 33–36 ft·lb)
Cam sprocket	18–20 N·m (1.8–2.0 kg·m, 13–14 ft·lb)

**TOOLS****Special**

Valve guide reamer, 5.5 mm 07984–2000000

**Common**

Valve spring compressor 07757–0010000  
Valve guide remover, 5.5 mm 07742–0010100

**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 12)

**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
- Worn rocker arm and/or shaft



## CAMSHAFT REMOVAL

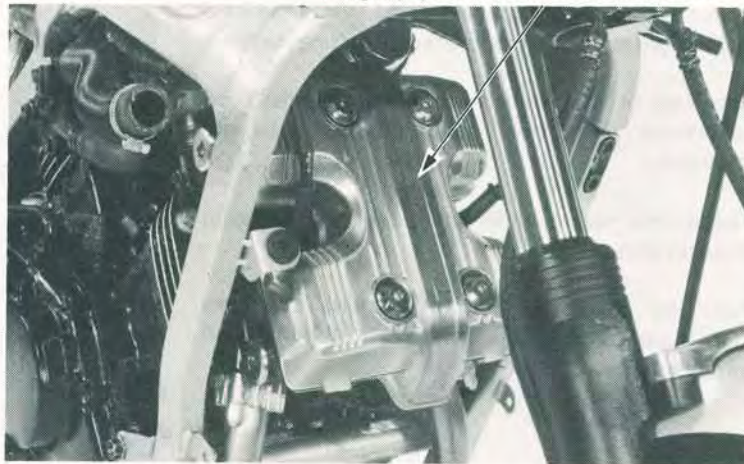
### NOTE

The camshafts can be removed with the engine in the frame.

Drain the coolant and remove the upper radiator (Section 6).

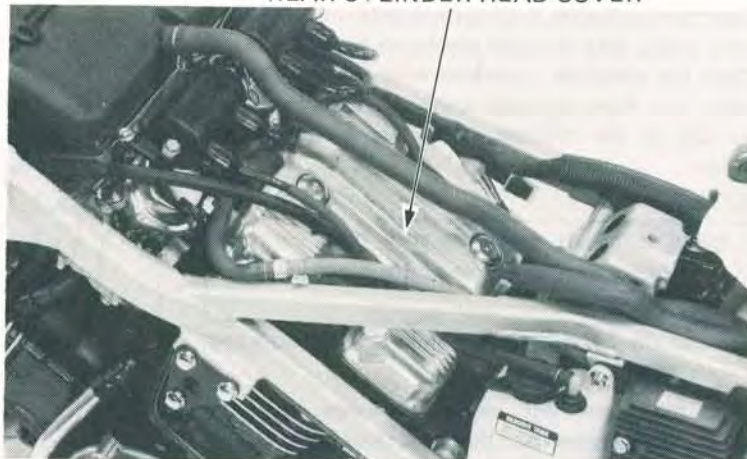
Remove the front cylinder head cover.

FRONT CYLINDER HEAD COVER



Remove the seat, frame side covers and fuel tank.  
Remove the rear cylinder head cover.

REAR CYLINDER HEAD COVER



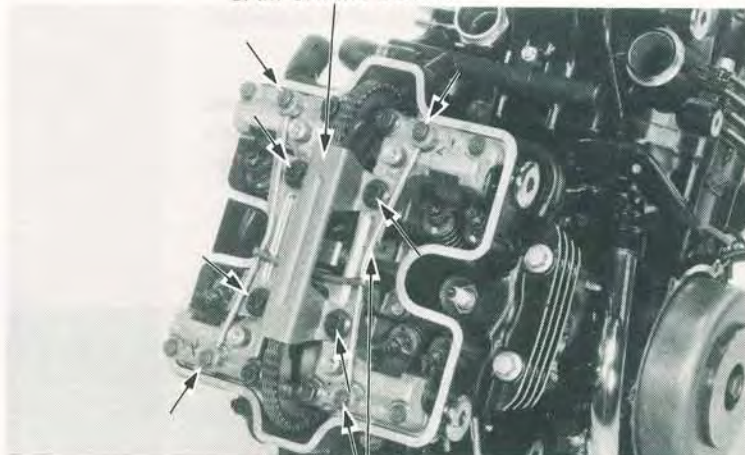
Remove the oil line and cam chain guide mounting bolts, and the cam chain guide.

Remove the alternator cover and rotate the crankshaft counterclockwise until the cam chain has free play.

Remove the oil line by pulling up the middle of the chain.

Remove the alternator cover.

CAM CHAIN GUIDE



OIL LINE

Turn the crankshaft counterclockwise until the T1.3 mark aligns with the rear crankcase mating surfaces.

Place rags or shop towels in the rear cylinder head to prevent parts from being dropped into the crankcase.

Remove the rear cylinder intake and exhaust cam sprocket bolts.

Turn the crankshaft counterclockwise one turn (360°) and remove the other rear cylinder cam sprocket bolts.



T1.3 MARK REAR MATING SURFACE

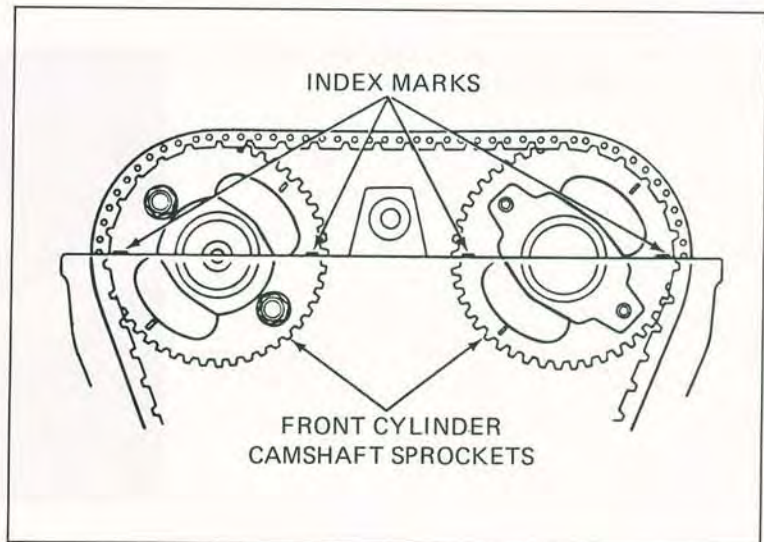
Turn the crankshaft counterclockwise until the T2.4 mark aligns with the rear crankcase mating surface. Clean the camshaft sprockets with contact cleaner. Index the front cylinder camshaft sprockets with the top of the cylinder head. Use a water proof marker.

**NOTE**

Some camshaft sprockets may have permanent index dots as shown and will not require marking.

Remove the front cylinder intake and exhaust cam sprocket bolts.

Turn the crankshaft counterclockwise one turn (360°) and remove the other cam sprocket bolts.



Slide the cam sprockets and chains off the camshaft sprocket flange.

Remove the cam chain from the sprockets and remove the camshaft holders. Mark the camshaft holders so that they can be reinstalled in their original locations.

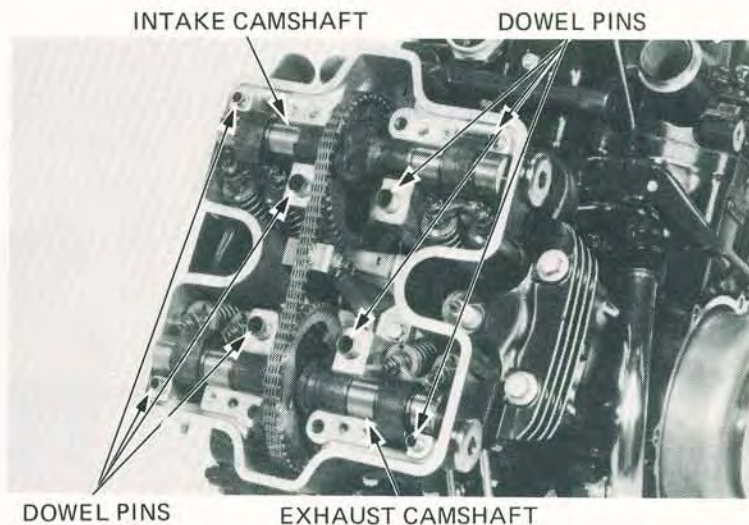


CAMSHAFT HOLDERS



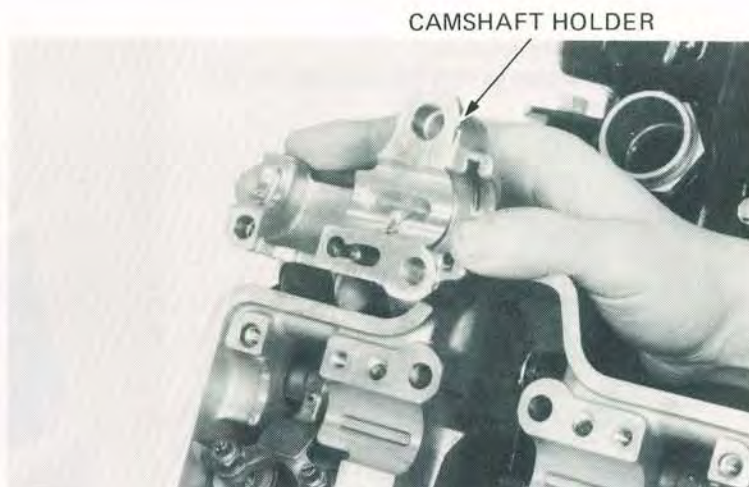
Remove the camshaft holder dowel pins and the intake and exhaust camshaft.

Remove the cam sprockets from the camshafts.



### CAMSHAFT/CAM HOLDER INSPECTION

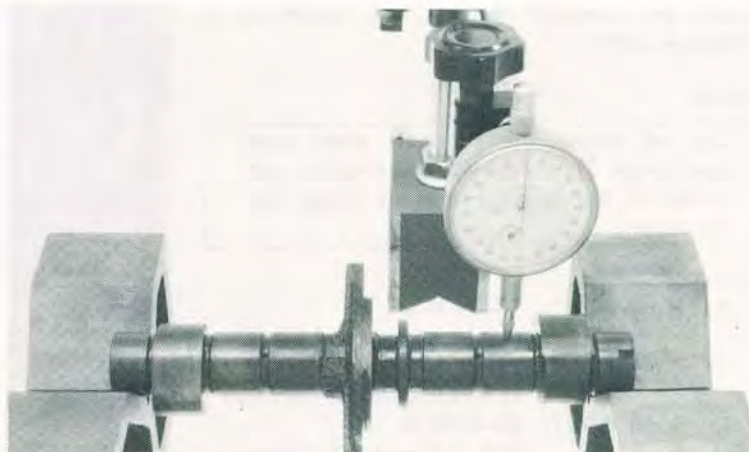
Inspect the camshaft and holder journal surfaces for scoring scratches, or evidence of insufficient lubrication.



### 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: 0.10 mm (0.004 in)**



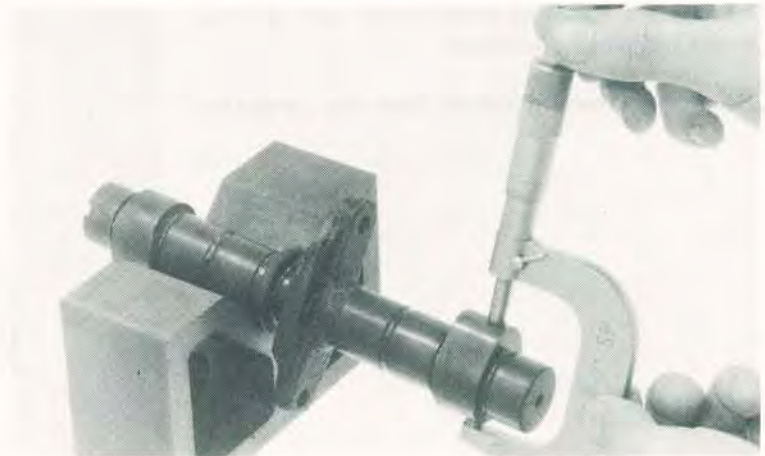
## CYLINDER HEAD/VALVE

### CAM INSPECTION

Using a micrometer, measure each cam lobe.

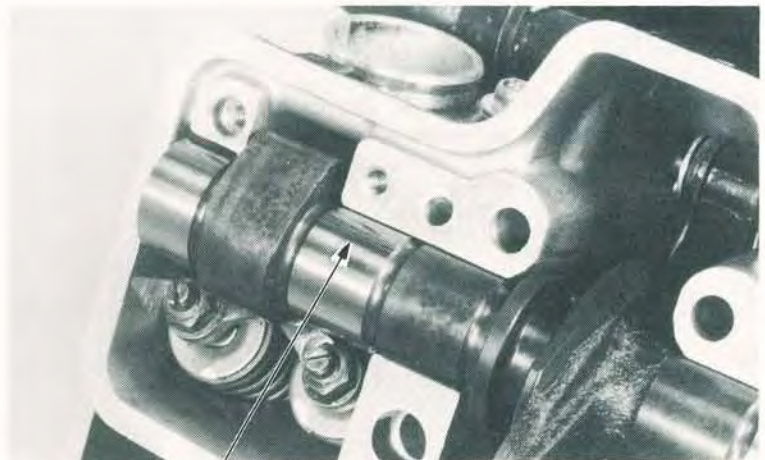
**SERVICE LIMITS: IN, EX: 35.3 mm (1.39 in)**

Check for wear or damage.



Wipe any oil from the journals.

Lay a strip of plastigauge lengthwise on top of each camshaft journal.



PLASTIGAUGE

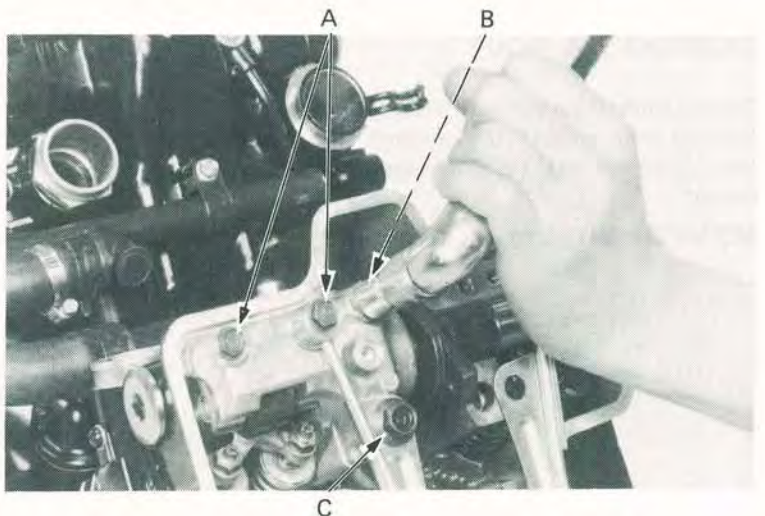
Install the camshaft holders and tighten in a crisscross pattern.

#### NOTE

Do not rotate the camshaft when using plastigauge. The camshaft holder bolts in each corner of the cylinder head are longer than the others.

#### TORQUE:

- A: 6 mm BOLT: 10–14 N·m  
(1.0–1.4 kg·m, 7–10 ft·lb)
- B: 8 mm BOLT: 21–25 N·m  
(2.1–2.5 kg·m, 15–18 ft·lb)
- C: 9 mm BOLT: 38–42 N·m  
(3.8–4.2 kg·m, 27–30 ft·lb)





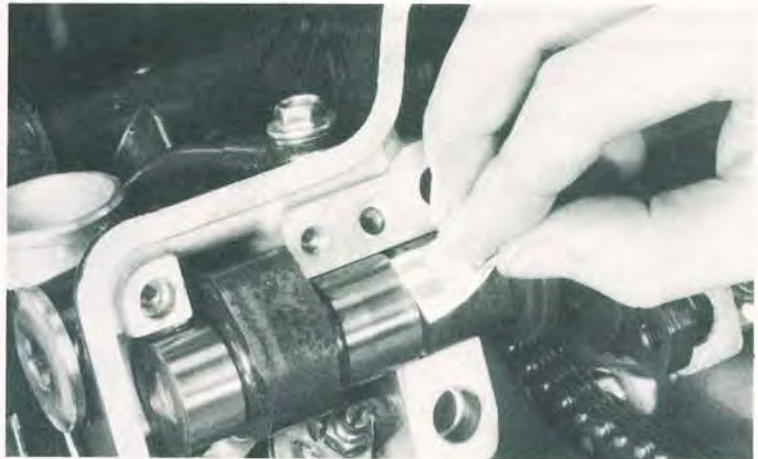


Remove the camshaft holders and measure the Width of each strip of plastigauge. The widest thickness determines the oil clearance.

**SERVICE LIMIT:**

**CENTER: 0.20 mm (0.008 in)**  
**BOTH ENDS: 0.10 mm (0.004 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.



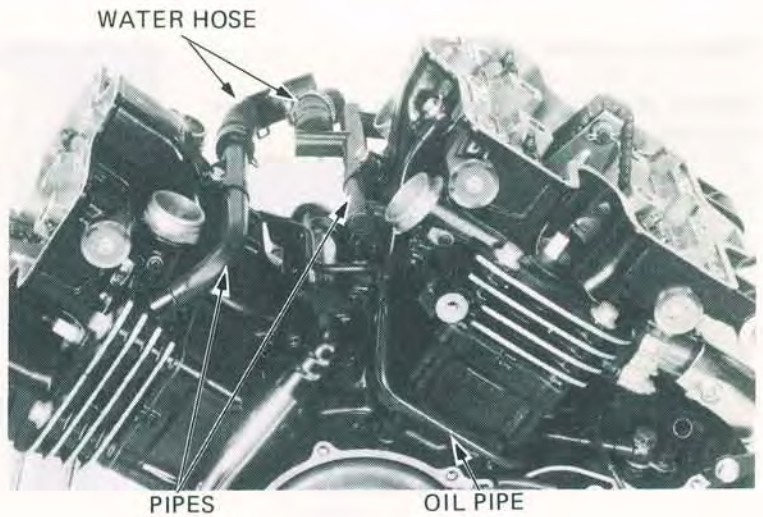
## CYLINDER HEAD REMOVAL

**NOTE**

The front cylinder head can be removed with the engine installed. But to remove the rear cylinder head, you must remove the engine.

Loosen the water hose clamps.  
Remove the water pipes and hoses.  
Remove the water pipe O-rings.

Remove the oil pipe and sealing washers.



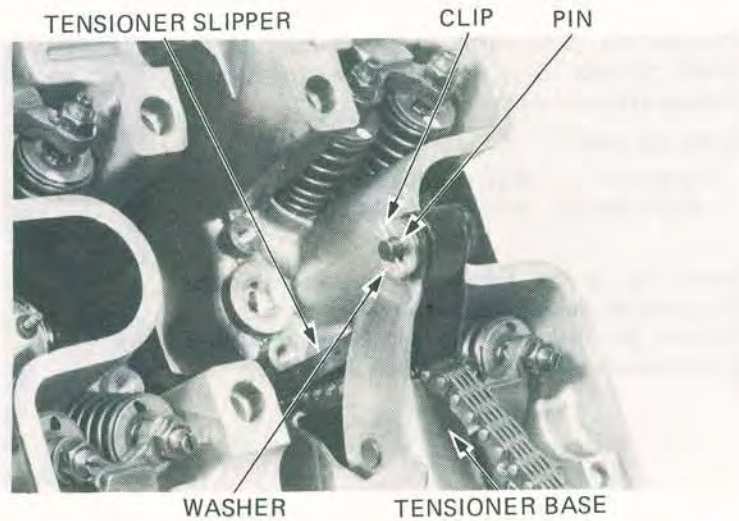
Remove the front and rear cam chain tensioner base mounting bolts.

Pull the cam chain tensioner base up.



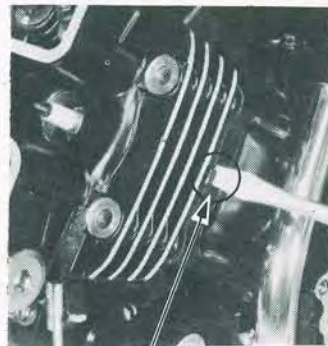
## CYLINDER HEAD/VALVE

Remove the slipper clip, washer and pin and remove the tensioner base.

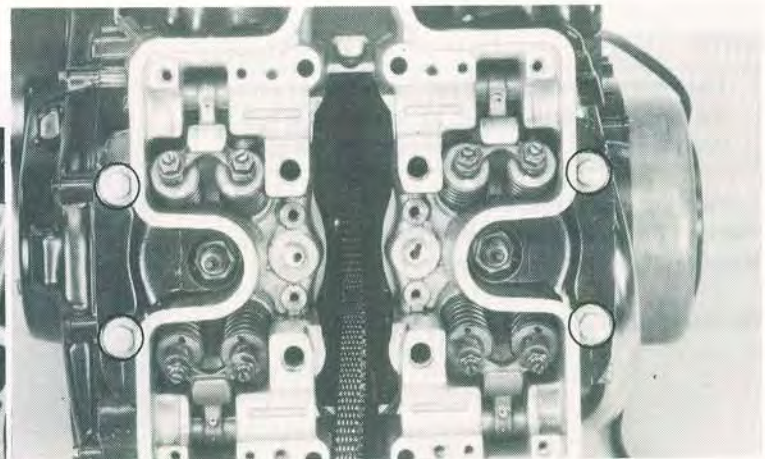


Remove the cylinder head bolts

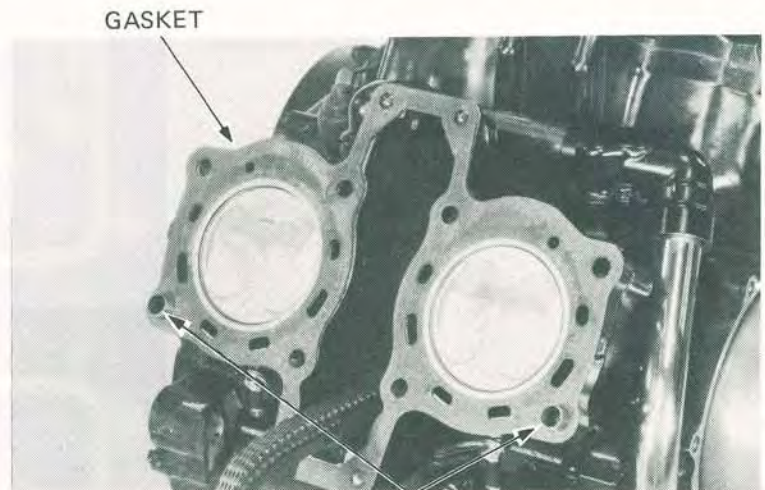
Remove the cylinder heads using a screw driver at the pry points.



PRY POINT



Remove the front and rear cylinder head gaskets and dowel pins.



GASKET  
DOWEL PINS



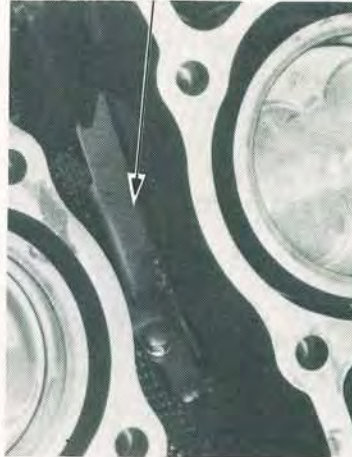
Remove the front cylinder cam chain slipper base, and remove the rear cylinder cam chain guide by removing the clip and washer.

Remove the front cylinder cam chain guide bolts and guide.

**NOTE**

Do not drop the clip, washer and bolts into the crankcase.

**FRONT CYLINDER CAM CHAIN SLIPPER BASE**



**REAR CYLINDER CAM CHAIN GUIDE**



**FRONT CYLINDER CAM CHAIN GUIDE**

**CAM CHAIN GUIDE AND CAM CHAIN TENSIONER INSPECTION**

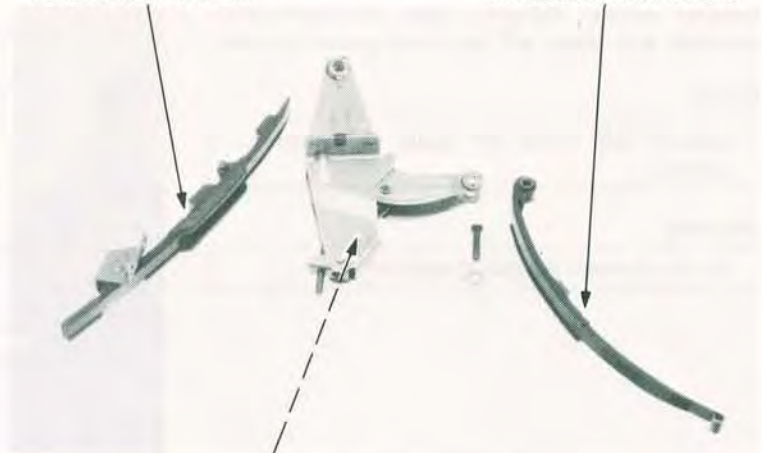
Inspect the cam chain guide and tensioner for damage or excessive wear.

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

Inspect the spring for good tension, replace if necessary.

**TENSIONER GUIDE**

**TENSIONER SLIPPER**



**TENSIONER SPRING**

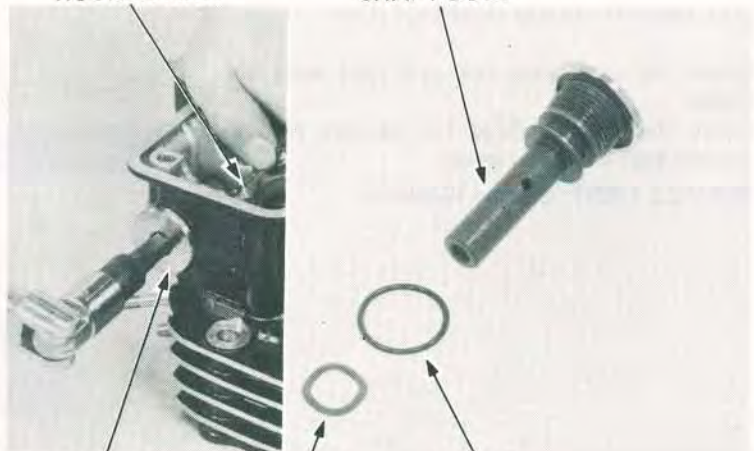
**CYLINDER HEAD DISASSEMBLY**

Remove the rocker arm shaft and rocker arms.

Remove the rocker arm spring and O-ring from the shaft bolt.

**ROCKER ARM**

**ROCKER ARM SHAFT BOLT**



**ROCKER ARM SHAFT BOLT**

**SPRING**

**O-RING**



## CYLINDER HEAD/VALVE

To keep the valve spring compressor from interfering with the cylinder head, remove the large retainer from the compressor attachment.

Remove the valve spring cotters, retainers, springs and valves.

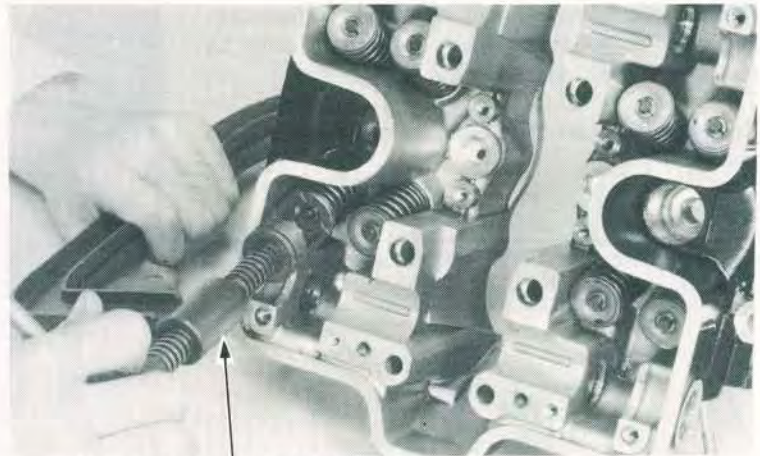
### CAUTION

*To prevent a 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.



VALVE SPRING COMPRESSOR  
07757-0010000

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

### NOTE

Gaskets will come off easier if soaked in solvent.

### CAUTION

*Do not damage the gasket surfaces.*

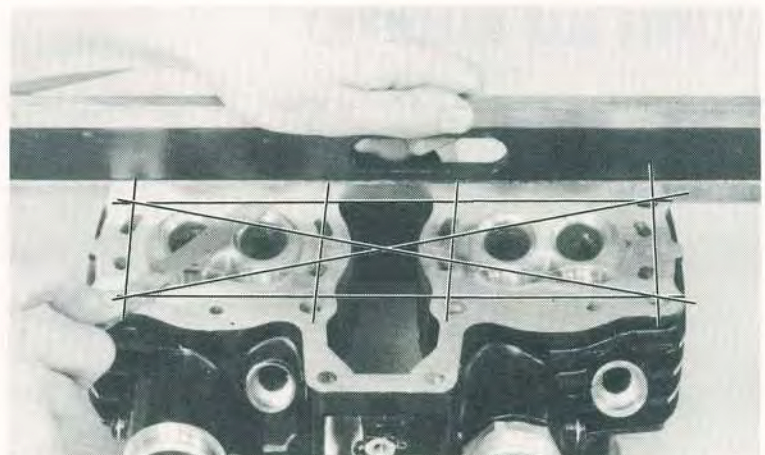


## CYLINDER HEAD INSPECTION

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: 0.1 mm (0.004 in)**





### ROCKER ARM INSPECTION

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: 12.05 mm (0.474 in)**



### ROCKER ARM SHAFT AND SPRING INSPECTION

Measure each rocker arm shaft O.D.

**SERVICE LIMIT: 11.93 mm (0.470 in)**

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

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

Inspect the rocker arm shaft spring for wear or damage.



### VALVE SPRING INSPECTION

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

**SERVICE LIMIT:**

**INNER (IN, EX): 40.25 mm (1.58 in)**

**OUTER (IN, EX): 42.23 mm (1.66 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: 5.47 mm (0.215 in)  
EX: 5.45 mm (0.214 in)



**NOTE**

Ream the guides to remove any carbon build-up before checking clearances.

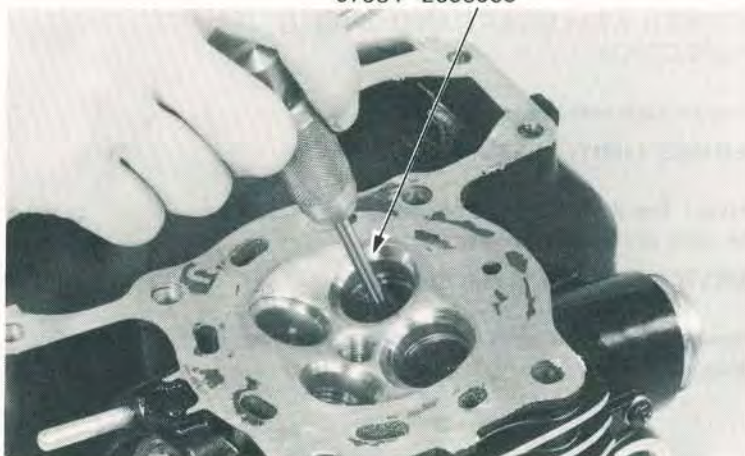
Measure and record each valve guide I.D. using a ball gauge or inside micrometer.

**SERVICE LIMIT:** 5.55 mm (0.219 in)

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

**SERVICE LIMIT:** IN: 0.08 mm (0.003 in)  
EX: 0.10 mm (0.004 in)

VALVE GUIDE REAMER  
07984-2000000



**NOTE**

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 the stem-to-guide clearance exceeds the service limits with new guides, replace the valves.

**NOTE**

Reface the valve seats whenever the valve guides are replaced (page 10-13).





## VALVE GUIDE REPLACEMENT

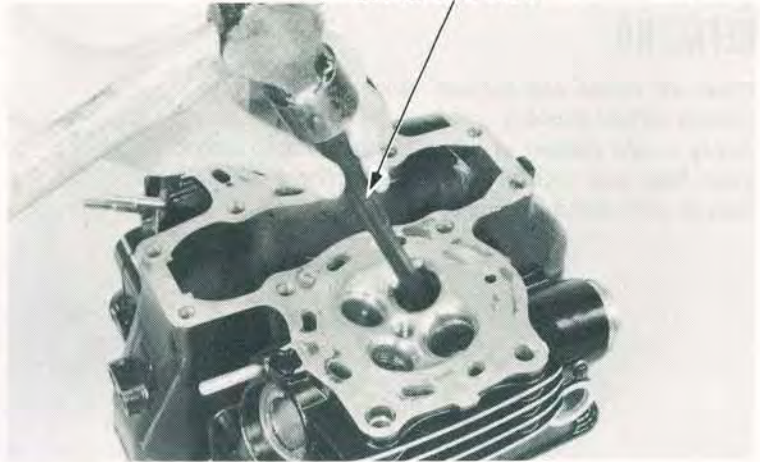
Heat the cylinder head to 100°C (212°F) with a hot plate or oven.

### 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.

VALVE GUIDE REMOVER, 5.5 mm  
07742-0010100

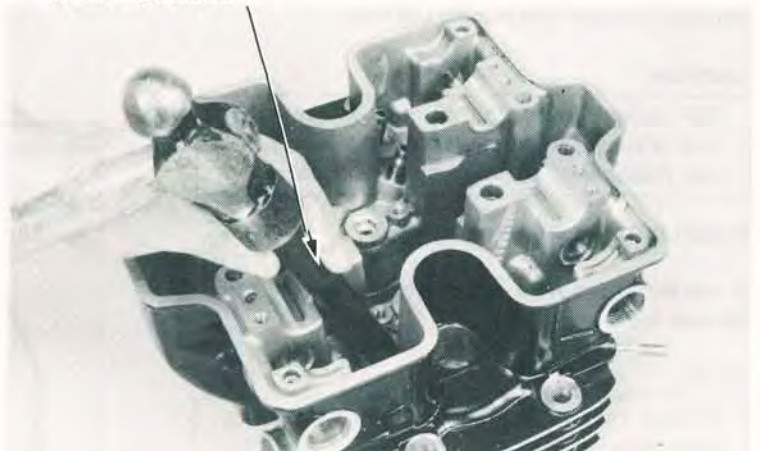


Drive new guides in from the rocker arm side of the cylinder head.

### NOTE

- Cylinder head heat should still be at 100°C (212°F) for installation of the new guides.
- Drive new valve guide in until it protrudes 19 mm above the top of the cylinder head.

VALVE GUIDE REMOVER, 5.5 mm  
07742-0010100



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

### NOTE

- Use cutting oil on the reamer during this operation.
- Rotate the reamer in the same direction when inserting and removing.

Reface the valve seats (page 10-14) and clean the cylinder head thoroughly to remove any metal particles.

VALVE GUIDE REAMER  
07984-2000000





## VALVE SEAT INSPECTION/ REFACING

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

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



Remove the valve and inspect the face.

### CAUTION

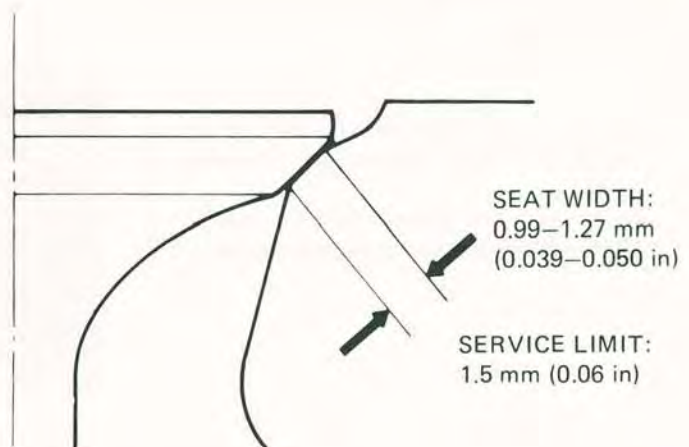
*The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.*

Inspect the valve seat.

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

### NOTE

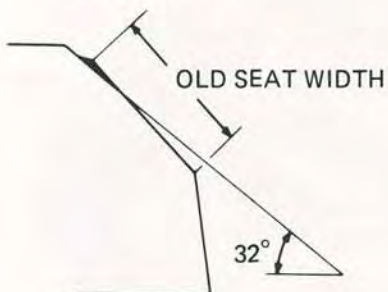
Follow the refacer manufacturer's operating instructions.



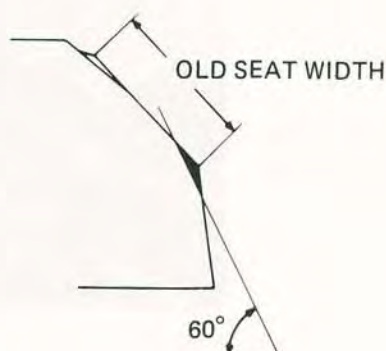
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

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

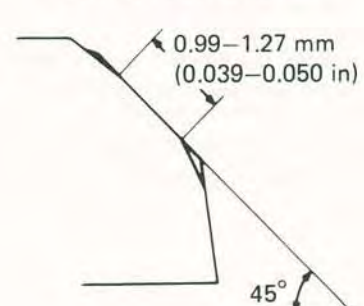
IN: CUTTER 28 mm  
EX: CUTTER 25 mm



IN, EX: CUTTER 30 mm



IN: CUTTER 29 mm  
EX: CUTTER 24.5 mm







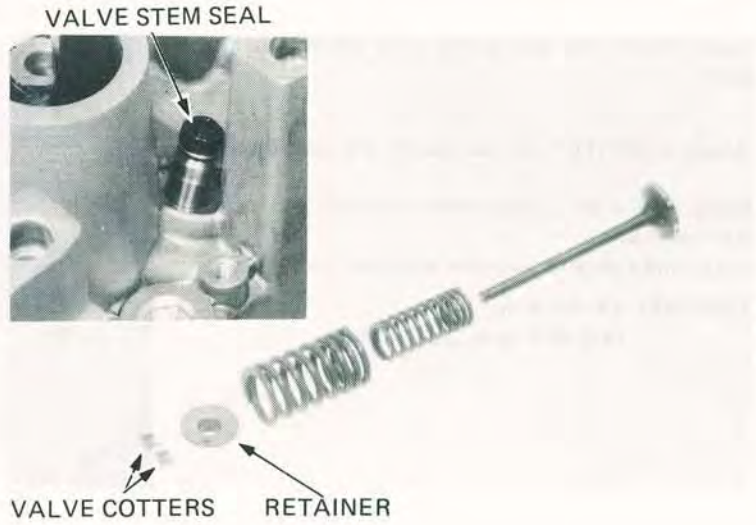
## CYLINDER HEAD ASSEMBLY

### NOTE

Install new valve stem seals when assembling.

Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide. To avoid damage to the stem seal, turn the valve slowly when inserting.

Install the valve springs and retainers. The spring's tightly wound coils should face toward the head.



Install the valve cotter.

### CAUTION.

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



VALVE SPRING COMPRESSOR  
07757-0010000

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

### NOTE

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





## CYLINDER HEAD/VALVE

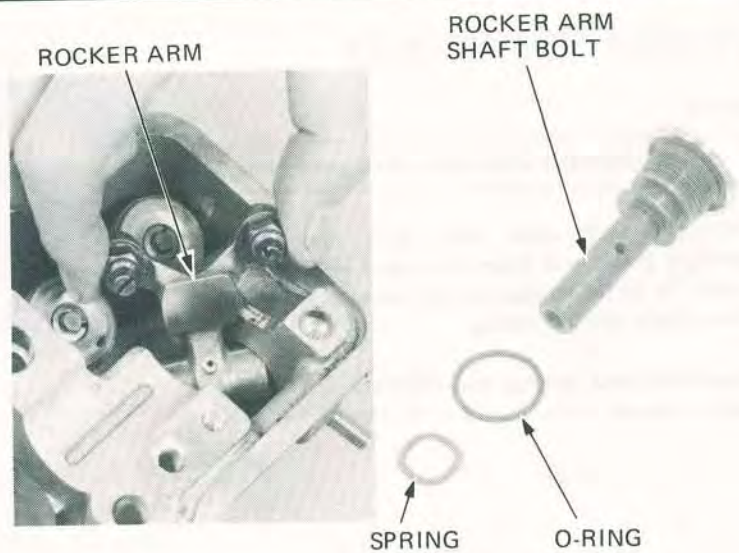
Install the O-ring and spring onto the rocker arm shaft.

Apply LOCTITE® to the rocker arm bolt threads.

Apply engine oil to the rocker arm shaft and install the rocker arm.

Install and tighten the rocker arm shaft bolt.

**TORQUE: 45–50 N·m**  
**(4.5–5.0 kg·m, 33–36 ft·lb)**



## CYLINDER HEAD INSTALLATION

Clean the cylinder head surface of any gasket material.



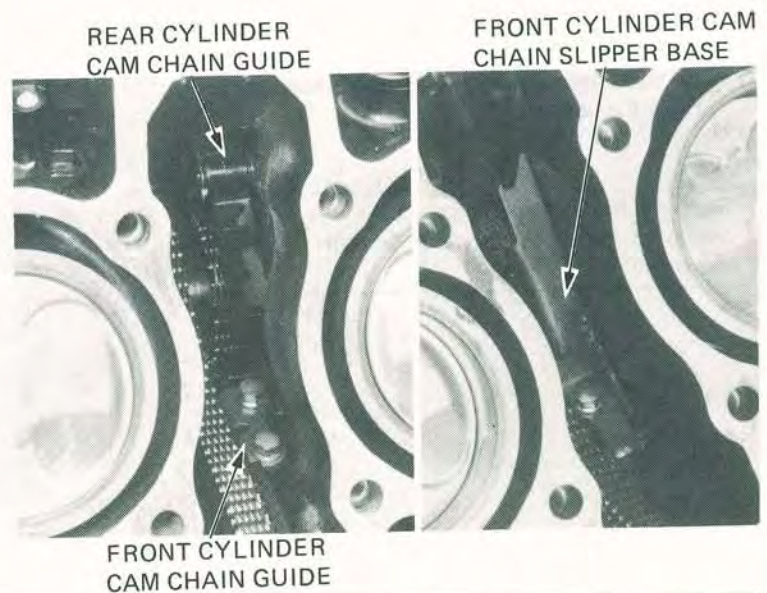
Install the rear cylinder cam chain guide with the washer and clip.

Install the front cylinder cam chain guide.

Install the front cylinder cam chain slipper base.

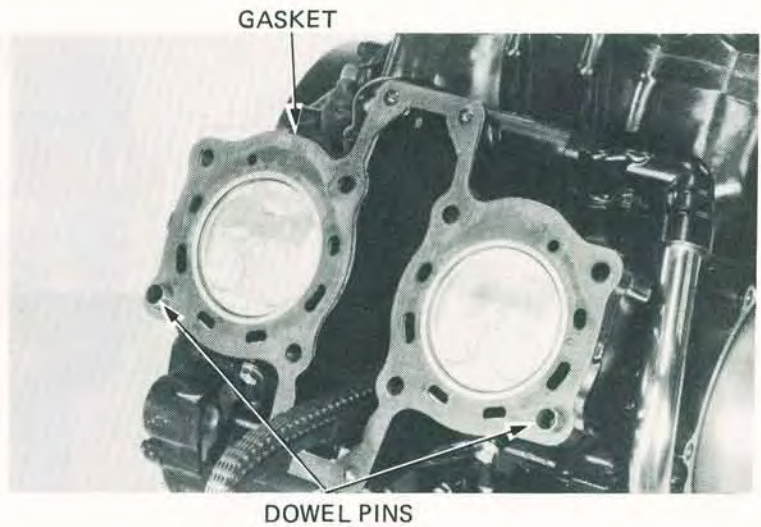
### NOTE

Be careful not to drop the washer, clip or bolts into the crankcase.
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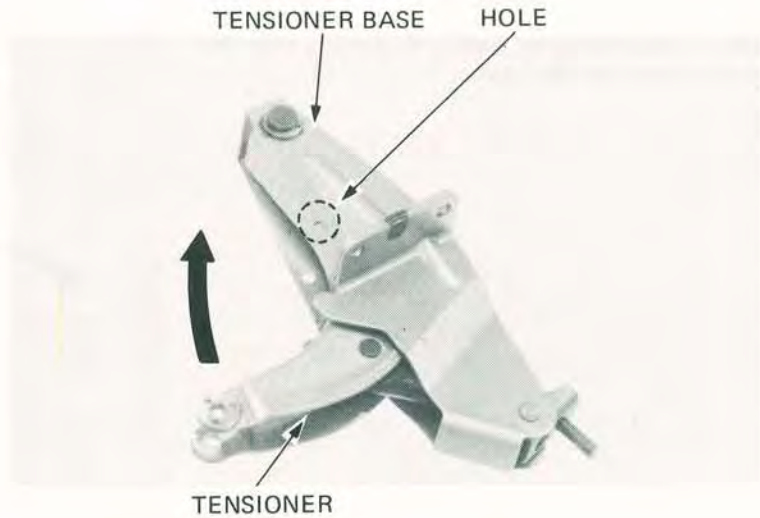




Install the dowel pins and new head gaskets.



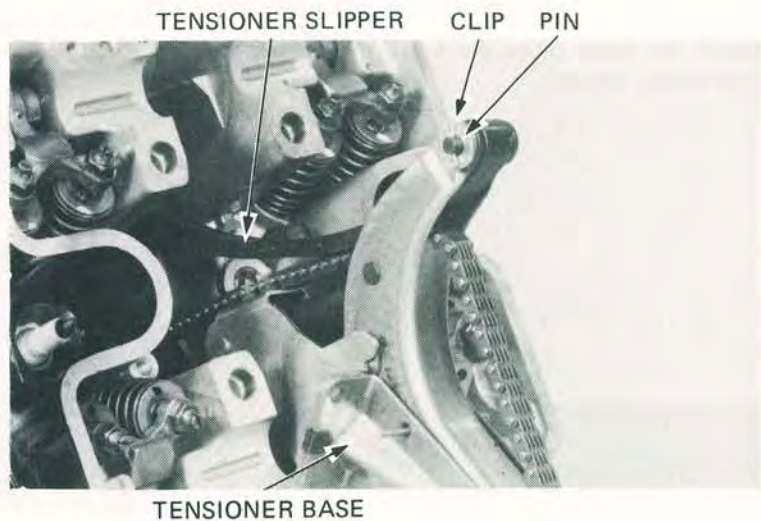
With the cam chain tensioner raised in the direction of the arrow, insert a pin or piece of wire through the hole in the tensioner base and tensioner.



Place the cylinder head on the cylinder. Pass the cam chain through the cam chain tensioner and install the tensioner slipper as shown.

**NOTE**

Check that the lower end of the slipper fits in the slipper base correctly.

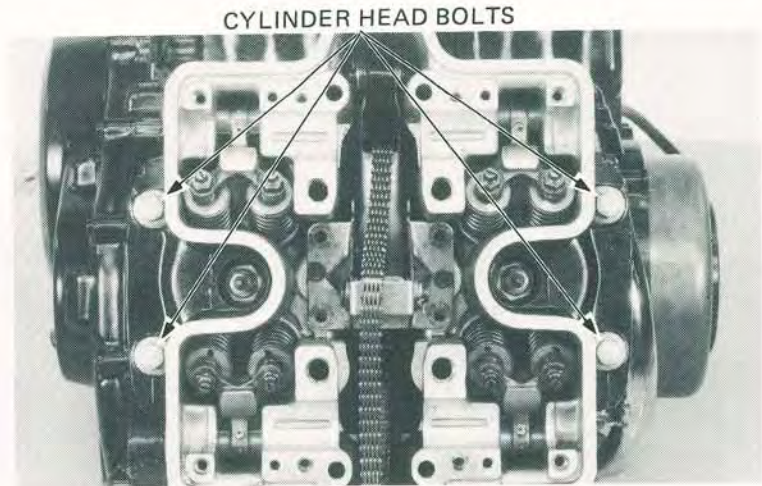


## CYLINDER HEAD/VALVE

Loosely tighten the cylinder head bolts.

### NOTE

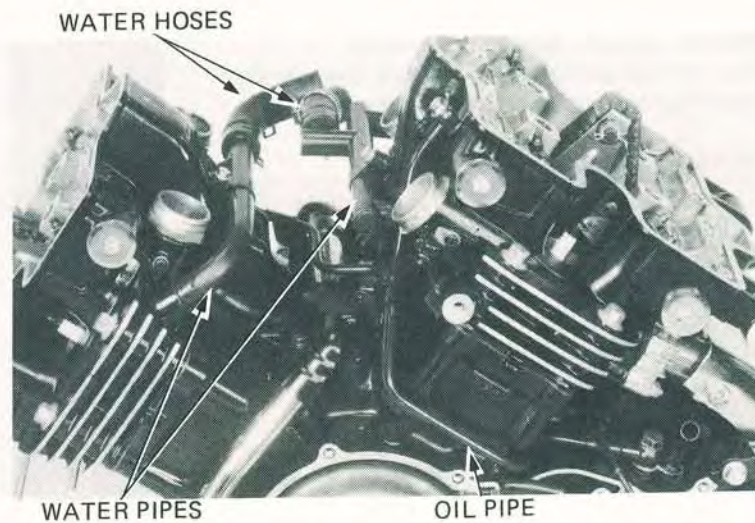
Tighten the cylinder head bolts to the specified torque after all cylinder head bolts are installed.



Install the exterior oil pipe with washers onto the cylinder and cylinder head.



Install the water pipes and hoses and tighten the hose clamps securely.

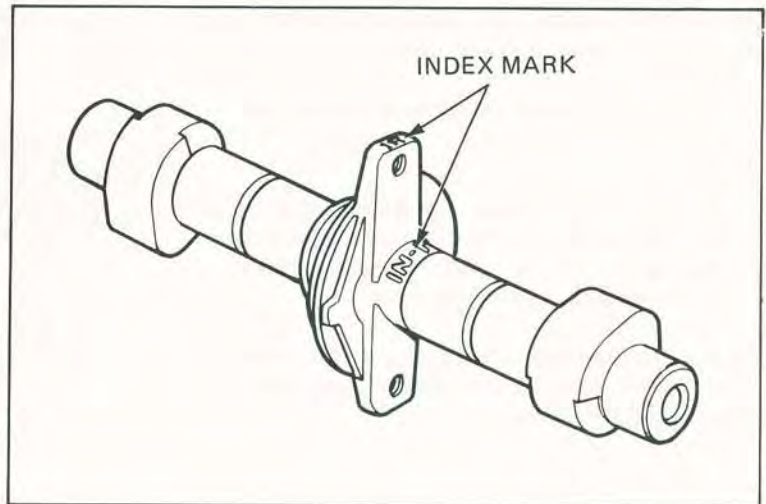




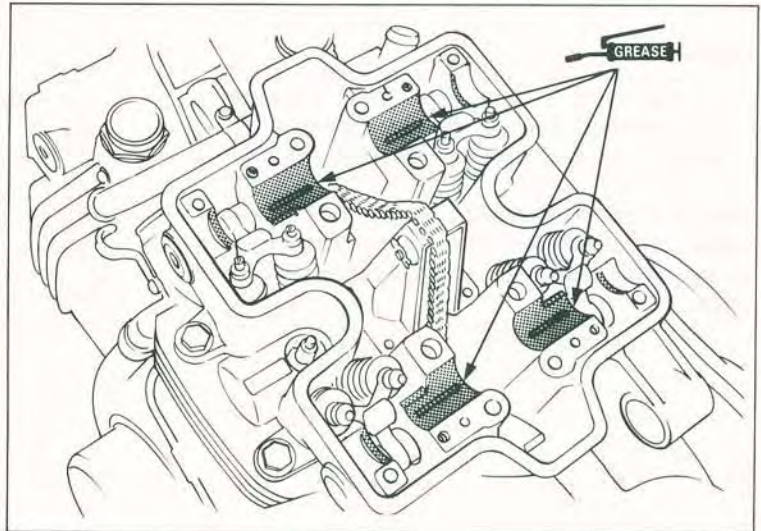
## CAMSHAFT INSTALLATION

### CAUTION

- Follow this procedure from beginning to end, even if you are only servicing one cylinder head.
- Check the camshaft marks so that you install each camshaft in its correct location.
- The marks on the camshaft mean:  
EX RR, ER: Rear cylinder exhaust  
IN RR, IR: Rear cylinder intake  
EX FR, EF: Front cylinder exhaust  
IN FR, IF: Front cylinder intake
- The camshaft sprockets are interchangeable.



Lubricate the cylinder head cam bearing surfaces with molybdenum disulfide grease.

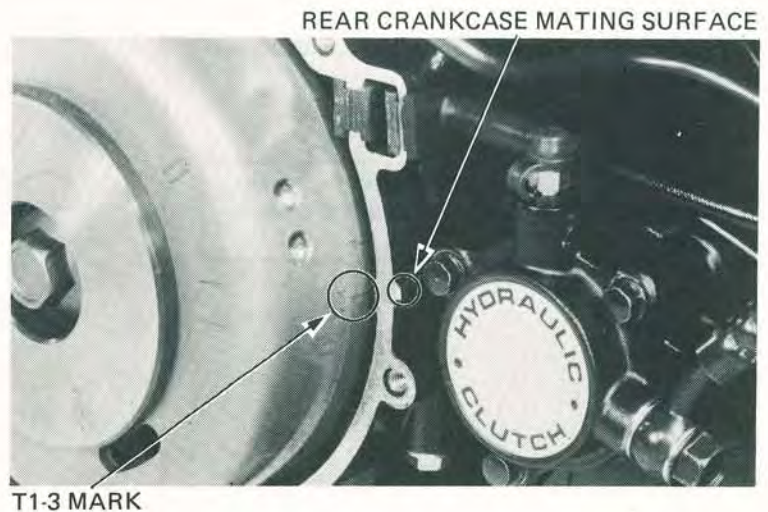


### • Rear Cylinder Camshafts

Turn the crankshaft counterclockwise until the T1-3 mark on the flywheel rotor aligns with the rear crankcase mating surfaces.

### CAUTION

*When turning the crankshaft, make sure the cam chains don't jam at the cam chain tensioners or at the crankshaft.*





## CYLINDER HEAD/VALVE

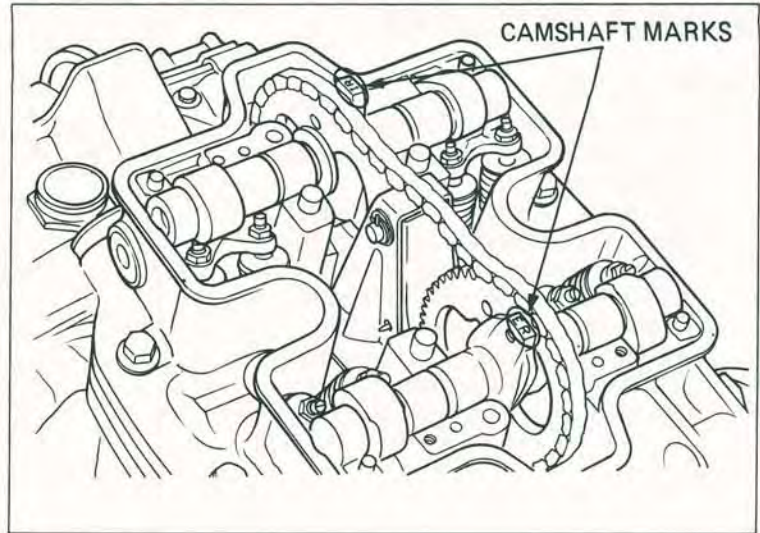
Install the intake and exhaust camshafts and sprockets through the rear cylinder cam chain as shown.

Turn the camshafts so the camshaft marks face up.

### NOTE

If the front cylinder camshafts were not removed, check that the front camshaft marks face up. If not, turn the crankshaft counter-clockwise 360 degrees (one turn).

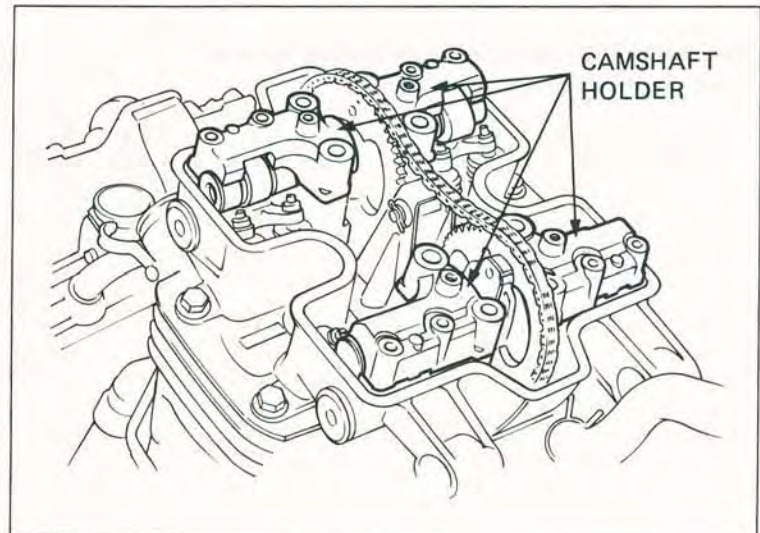
If a valve clearance adjuster keeps the camshaft from seating fully in the cylinder head, back the adjuster out all the way.



### CAUTION

*If you force a valve open while installing the camshaft holders, you may damage the holders or the camshaft bearing surfaces.*

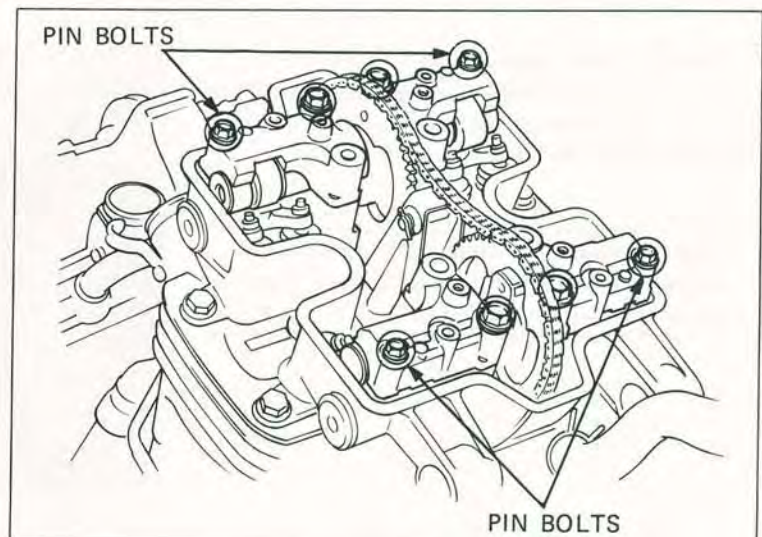
Place the camshaft holders in the same locations noted during removal. The groove in the bottom of the holder must align with the camshaft locating ridge.



Install the camshaft holder bolts, but do not tighten them yet.

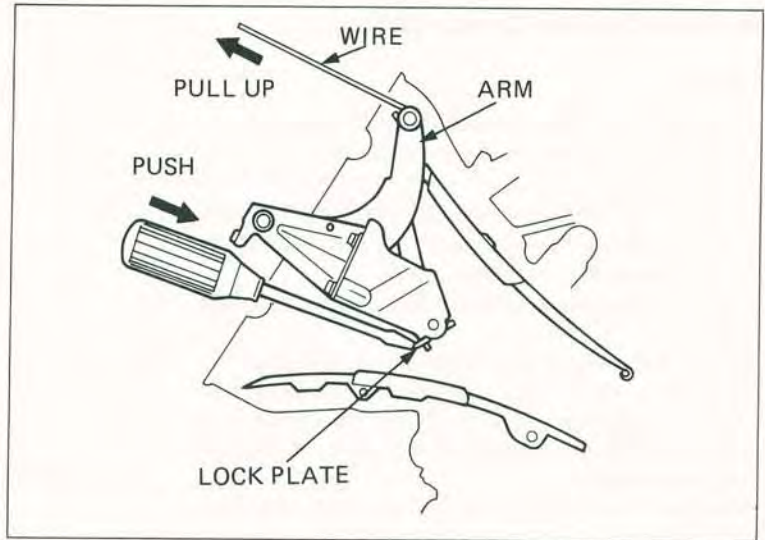
### CAUTION

*Note the location of the 6 mm bolts; the 6 mm pin bolts should be installed at each corner.*

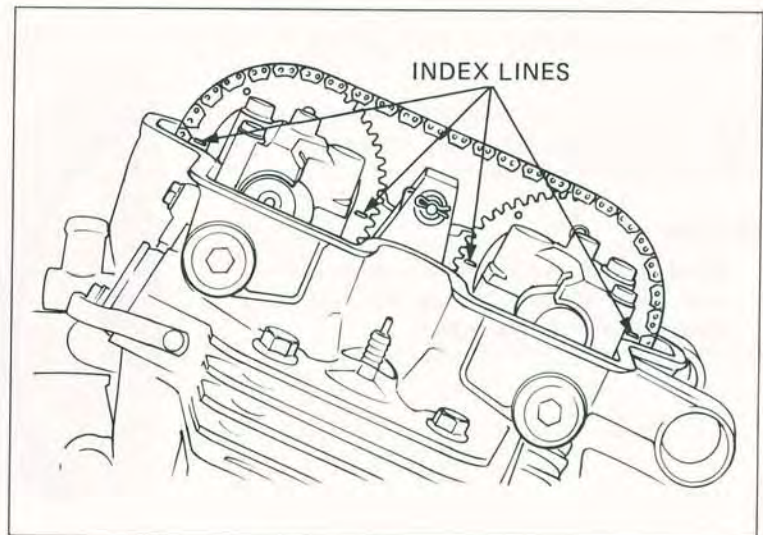




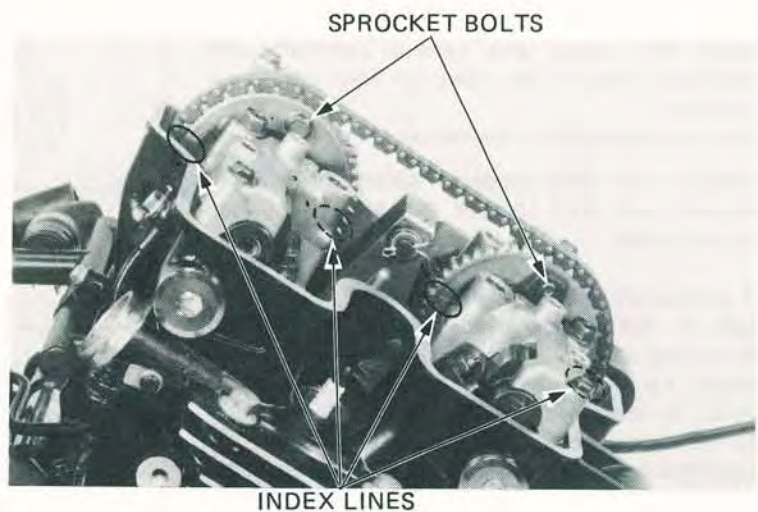
If the cylinders were not removed, lock the cam chain tensioner for minimum tension: push the lock plate down while pulling or prying the tension arm up; hold the arm pin up while you insert a pin or wire through the lock holes.



Check that the camshaft marks are still facing up, then align the sprocket index lines with the top of the rear cylinder head. Place the cam chain on the sprockets.



Slide the sprockets onto the camshaft flanges, and install the sprocket bolts in the exposed holes. Check that the sprocket index lines align at T1-3. Unlock the cam chain tensioner.



## CYLINDER HEAD/VALVE

### • Front Cylinder Camshafts

#### NOTE

Install the rear cylinder head camshafts before you install the front camshafts.

If the front cylinder camshaft sprockets were not indexed during removal and are not marked as shown follow the procedure below:

Clean the sprockets with contact cleaner and wipe dry.

On a piece of paper, draw two lines perpendicular to each other (90°). Use a protractor and draw two diagonal lines at a 45° angle. Center the sprocket on the lines with the original punch marks aligned on the horizontal line.

Make new index marks on the sprocket where the 45° diagonal lines cross the sprocket.

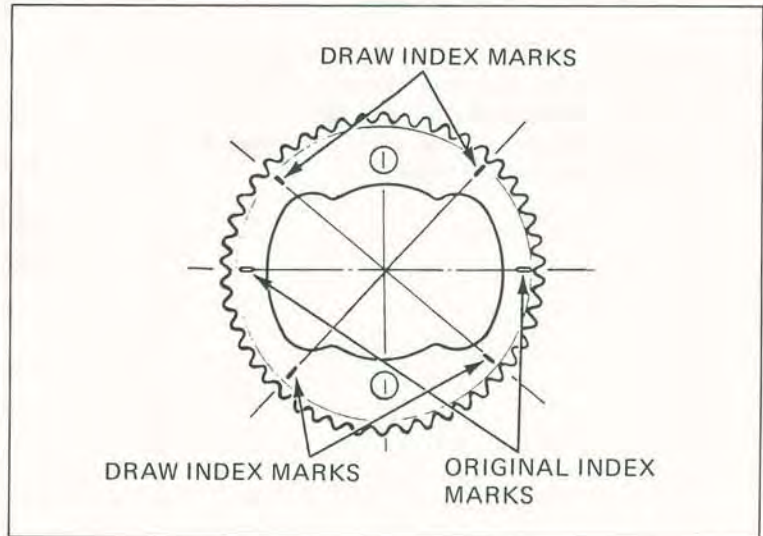
#### NOTE

It is not necessary to make new index marks for the rear cylinder's camshafts sprockets.

Rotate the crankshaft counterclockwise 90 degrees (1/4 turn), until the T2-4 mark aligns with the rear crankcase mating surfaces.

#### CAUTION

*When turning the crankshaft, make sure the cam chain doesn't jam at the cam chain tensioner or at the crankshaft.*



Install the intake and exhaust camshafts and sprockets through the front cylinder cam chain as shown.

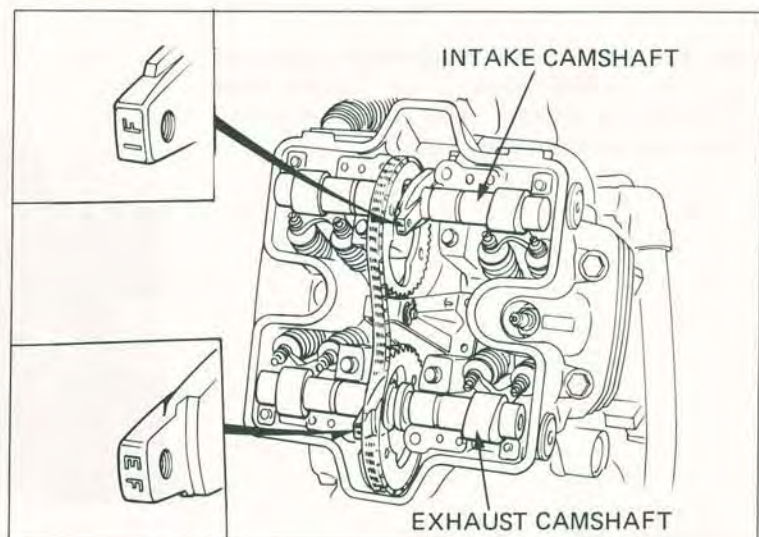
Turn the camshafts so the camshaft marks face up.

Rotate each front camshaft counterclockwise 45 degrees (1/8 turn) to seat the cam fully in the cylinder head.

If a valve adjuster keeps the camshaft from seating fully in the cylinder head, back out the adjuster all the way.

Install the front cylinder camshaft holders and bolts, as described for the rear cylinder head. Do not tighten bolts at this time.

Lock the cam chain tensioner for minimum tension.







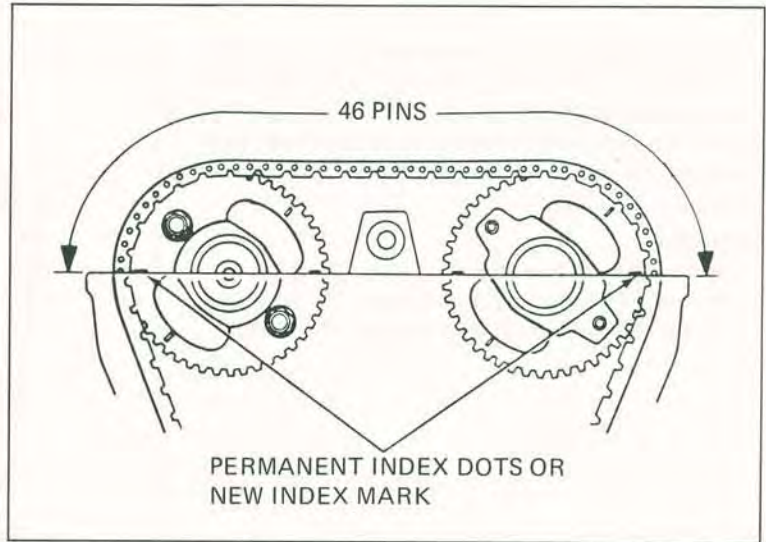
Align the permanent index dots or new index mark on the front cylinder cam sprockets with the top of the cylinder head (viewed from the left side of the engine).

**NOTE**

There should be a total of 46 pins between the index marks on the intake and exhaust cam sprockets as shown.

Slide the sprockets onto the camshaft flanges, and install the sprocket bolts in the exposed holes (rotate the crankshaft counterclockwise a little if necessary).

Check that the sprocket index dots align at T2-4. Unlock the cam chain tensioner.



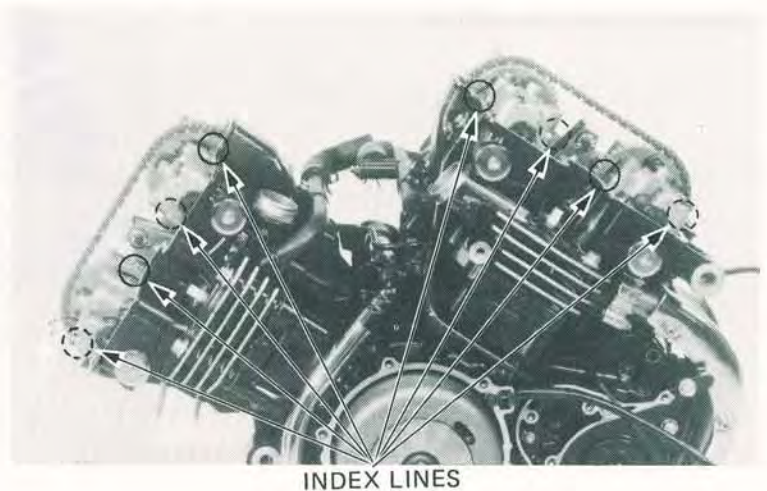
● **Valve Timing Inspection**

Check the front-to-rear cylinder camshaft timing as follows.

- When the T1-3 mark aligns with the rear crankcase mating surface, the index lines on all cam sprockets should align with the top of the cylinder heads.
- All camshaft marks will either face up or down.

Turn the crankshaft as required to install the remaining sprocket bolts at all four camshafts. Tighten the camshaft sprocket bolts to the specified torque.

**TORQUE: 18–20 N·m (1.8–2.0 kg·m, 13–14 ft·lb)**



Tighten the tensioner base bolts securely.



## CYLINDER HEAD/VALVE

Turn the crankshaft counterclockwise until there is maximum cam chain free play, then install the oil pipes under the cam chain.

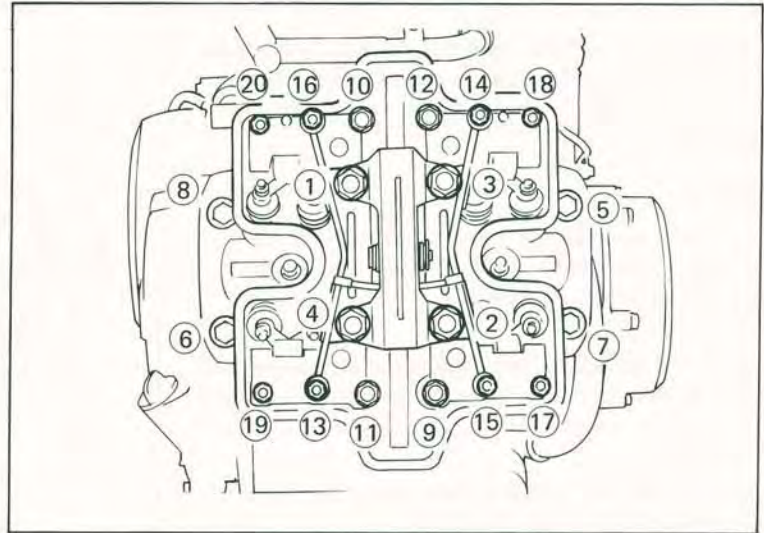
Install the cam chain guide on the oil pipe base plate. Tighten the cylinder head bolts in a criss-cross pattern in 2-3 steps.

### TORQUE:

9 mm: 38–42 N·m (3.8–4.2 kg·m, 27–30 ft·lb)

8 mm: 21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)

6 mm: 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)



Lubricate the cam lobes with oil.



Adjust the valve clearance (page 3-8).  
 Install the new cylinder head cover gasket.

### NOTE

Clean the gasket before applying sealant.

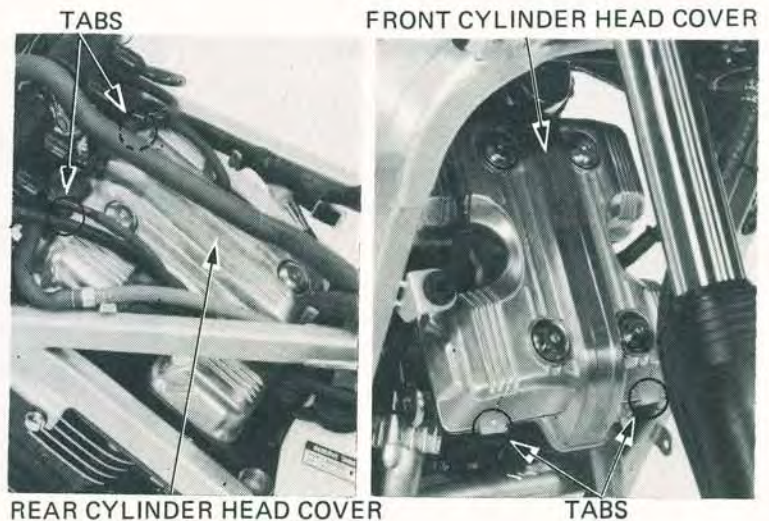
Apply sealant to the cylinder head cover gasket.

Install the rear cylinder head cover with its tabs facing forward, and install the front cylinder head cover with its tabs facing down.

Tighten the cylinder head cover bolts.

**TORQUE: 8–12 N·m (0.8–1.2 kg·m, 6–9 ft·lb)**

Install the remaining parts in the reverse order of removal.





MEMO