



**HONDA**  
CB750K · CB750C  
CB750F

## INTRODUCTION

This shop manual is for these models:

'79: CB750K, CB750K LTD, CB750F  
'80: CB750K, CB750C, CB750F  
'81: CB750K, CB750C, CB750F  
'82: CB750K, CB750C, CB750F, CB750SC

## HOW TO USE THIS MANUAL

Follow the Maintenance Schedule 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 19 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 for the section.

If you are not familiar with this motorcycle, read TECHNICAL FEATURES, section 20.

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

Beginning with section 22 are addendums. These contain information for 1979 and subsequent model years.

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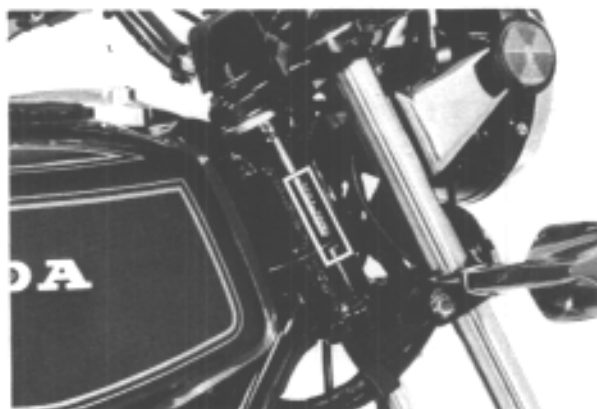
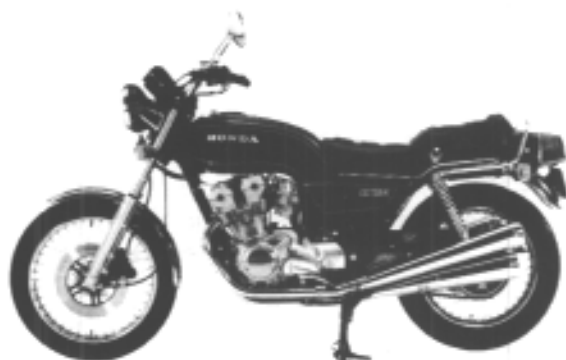
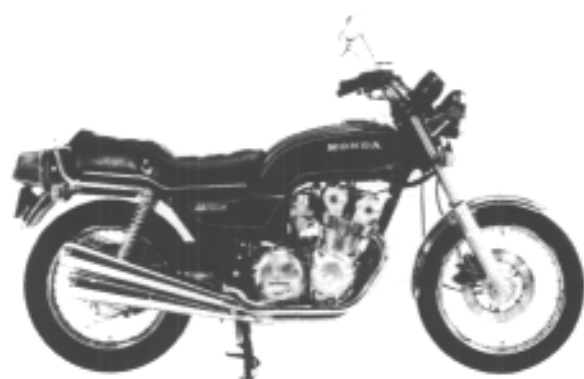
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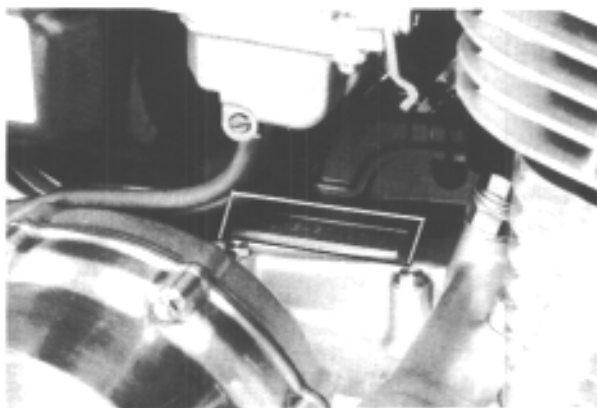
## MODEL IDENTIFICATION



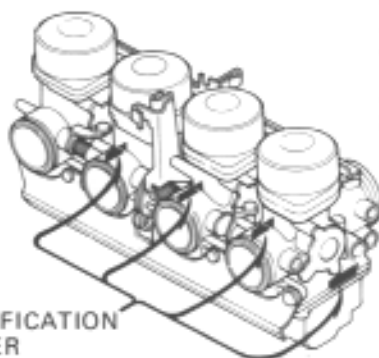
The frame serial number is stamped on the right side of the steering head.



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



The engine serial number is stamped on top of the crankcase.



IDENTIFICATION  
NUMBER

The carburetor identification number is on the left side of the carburetor body.





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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 your eyes were exposed.*
- *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. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
4. When torquing bolts or nuts, begin with larger-diameter or inner bolt first, and tighten to the specified torque diagonally, unless a particular sequence is specified.
5. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
6. When installing a new oil seal, make sure that the sealing lip is lubricated with grease. If an oil seal and related parts have been washed, apply proper grease to the lip of the oil seal.
7. After reassembly, check all parts for proper installation and operation.
8. 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.



## SPECIFICATIONS

ITEM		
DIMENSIONS	Overall length	2,200 mm (87.4 in)
	Overall width	880 mm (34.6 in)
	Overall height	1,160 mm (45.7 in)
	Wheelbase	1,520 mm (59.8 in)
	Seat height	800 mm (31.5 in)
	Foot peg height	335 mm (13.2 in)
	Ground clearance	150 mm (5.9 in)
	Dry weight	233 kg (512 lb)
FRAME	Type	Double cradle
	Front suspension, travel	Telescopic fork 160 mm (6.3 in)
	Rear suspension, travel	Swing arm 112 mm (4.4 in)
	Front tire size	3.50H19 (4PR)
	Rear tire size	4.25H18 (4PR)
	Cold tire pressures	Up to 90 kg (200 lbs) load
		Front 2.0 kg/cm <sup>2</sup> (28 psi) Rear 2.25 kg/cm <sup>2</sup> (32 psi)
		Up to vehicle capacity load
		Front 2.0 kg/cm <sup>2</sup> (28 psi) Rear 2.8 kg/cm <sup>2</sup> (40 psi)
	Front brake, lining swept area	Disc brake, 306 cm <sup>2</sup> (47.43 sq in)
	Rear brake, lining swept area	Internal expanding shoes, 218 cm <sup>2</sup> (33.79 sq in)
ENGINE	Fuel capacity	20.0 liters (5.3 US gal)
	Fuel reserve capacity	5.0 liters (1.3 US gal)
	Caster angle	62°30'
	Trail	121 mm (4.8 in)
	Front fork oil capacity	172.5–177.5 cc (5.8–6.0 ozs) 155 cc (5.2 ozs) at draining
	Type	Air cooled 4-stroke
	Cylinder arrangement	Vertical parallel four
	Bore and stroke	62.0 x 62.0 mm (2.44 x 2.44 in)
	Displacement	749 cc (45.7 cu in)
	Compression ratio	9.0 : 1
	Valve train	Chain driven D.O.H.C. 4 valve
	Maximum horsepower	72 BHP/9,000 rpm
	Maximum torque	6.4 kg-m (45.6 ft-lb) /7,500 rpm
	Oil capacity	4.5 liters (4.7 US qt)
CARBURETION	Lubrication system	Wet sump
	Air filtration	Paper
	Cylinder compression	12.0 ± 1.0 kg/cm <sup>2</sup> (170 ± 14 psi)
	Intake valve	Opens 5° (BTDC) at 1 mm lift, 58° (BTDC) at 0 lift Closes 35° (ABDC) at 1 mm lift, 101° (ABDC) at 0 lift
	Exhaust valve	Opens 35° (BBDC) at 1 mm lift, 87° (BBDC) at 0 lift Closes 5° (ATDC) at 1 mm lift, 72° (ATDC) at 0 lift
	Valve clearance	IN: } 0.08 mm (0.003 in) +0.05 mm (+0.002 in) EX: } -0.02 mm (-0.001 in)
	Engine weight	88.5 kg (195 lb)
	Idle speed	1,000 ± 100 rpm
	Carburetor type	VB type, 30 mm (1.18 in) venturi bore
	Identification number	VB42A, VB42C
	Pilot screw	Refer to 4-17.
	Float level	15.5 mm (0.61 in)



ITEM		
DRIVE TRAIN	Clutch	Wet, multi-plate
	Transmission	5-speed constant-mesh
	Primary reduction	2.382
	Gear ratio I	2.533
	Gear ratio II	1.789
	Gear ratio III	1.391
	Gear ratio IV	1.160
	Gear ratio V	0.964
	Final reduction	2.533 (15/38)
	Gear shift pattern	Left foot operated return system
Drive chain	RK630SO or DID630V, 90 links	
ELECTRICAL	Ignition	Transistorized
	Ignition timing "F-I" mark	10° BTDC at 1,000 rpm idle
	Full advance	40° BTDC/6,000 rpm—36° BTDC/7,400 rpm
	Starting system	Starting motor only
	Generator	Three phase A.C. generator 0.26 kw/5,000 rpm
	Battery capacity	12V—14AH
	Spark plug	
	( ): Canada model	
	Spark plug gap	0.6—0.7 mm (0.024—0.028 in)
	Firing order	1—2—4—3
Fuse	10A, 30A	
LIGHTS	Headlight (high/low beam)	65/50W sealed beam
	Tail/stoplight	3/32 cp SAE NO. 1157
	Turn signal light (front/rear)	32/32 cp SAE NO. F. 1034, R. 1073
	Speedometer light	2 cp SAE NO. 57
	Tachometer light	2 cp SAE NO. 57
	Neutral indicator light	2 cp SAE NO. 57
	Turn signal indicator light	2 cp SAE NO. 57
	High beam indicator light	2 cp SAE NO. 57



## TORQUE VALUES

### • ENGINE

Item	Qty	Thread Dia mm	Torque kg-m (ft-lb)	Remarks
Cylinder head cover	8	6	0.8-1.2 (6-9)	Apply molybdenum disulfide grease to threads and under-side of nuts
Cam holder	24	6	1.2-1.6 (9-12)	
Cylinder head	12	10	3.6-4.0 (26-29)	
Cam sprocket	4	7	2.2-2.6 (16-19)	
Spark plug	4		1.2-1.6 (9-12)	Apply molybdenum disulfide grease to threads and under-side of nuts
Crankcase		8	2.1-2.5 (15-18)	
A.C. generator	1	12	8.0-10.0 (58-72)	
Primary shaft	1	12	8.0-10.0 (58-72)	
Mainshaft	1	16	3.8-4.2 (28-30)	Apply liquid sealant
Drive sprocket	1	10	5.0-5.4 (36-39)	
Connecting rod nut	12		3.0-3.4 (22-25)	
Oil filter center bolt	1		2.8-3.2 (20-23)	
Oil pressure switch	1		1.5-2.0 (11-14)	
Neutral switch	1		1.6-2.0 (11-14)	
Oil drain plug	1	14	3.5-4.0 (25-29)	
Oil pipe	2	10	3.1-3.5 (22-25)	
Spark advancer	1	8	3.3-3.7 (24-27)	
Starting clutch	3	8	2.6-3.0 (19-22)	
Oil filter bolt boss	1		3.5-4.5 (25-33)	

### • CHASSIS

Item	Qty	Thread Dia mm	Torque kg-m (ft-lb)	Remarks
Steering stem nut	1	24	8.0-12.0 (58-87)	UBS
Steering handlebar	4	8	1.8-2.5 (13-18)	
Front fork top bridge	2	7	0.9-1.3 (7-9)	
Front fork cap bolt	2		2.0-3.0 (15-22)	
Front fork bottom bridge	2	10	3.0-4.0 (22-29)	
Front axle holder	4	8	1.8-2.5 (13-18)	
Front axle nut	1	12	5.5-6.5 (40-47)	
Front brake disc	5	8	2.7-3.3 (20-24)	
Brake hose bolt	5	10	2.5-3.5 (18-25)	
Front brake caliper carrier	2	10	3.0-4.0 (22-29)	
Front brake caliper A	2	10	3.0-4.0 (22-29)	UBS
Rear axle	1	18	8.0-10.0 (58-72)	
Final driven sprocket	4	12	8.0-10.0 (58-72)	
Swing arm pivot bolt	1	14	5.5-7.0 (40-51)	
Rear brake torque link	1	8	1.8-2.5 (13-18)	
Rear shock absorber				
Upper	1	10	2.0-3.0 (14-22)	
Lower	1	10	3.0-4.0 (22-29)	
Engine hanger bolt	4	10	3.0-4.0 (22-29)	
	1	12	5.5-6.5 (40-48)	See page 13-27
Steering adjustment nut	1	26	→	
Foot peg	1	12	5.5-6.5 (40-47)	
Gearshift pedal	1	6	0.8-1.2 (6-9)	

Fasteners not listed should be tightened to standard torques listed below.

### STANDARD TORQUE VALUES

Type	Torque kg-m (ft-lb)	Type	Torque kg-m (ft-lb)
5 mm bolt, nut	0.45-0.6 (3.5-4.5)	5 mm screw	0.35-0.5 (2.5-3.6)
6 mm bolt, nut	0.8-1.2 (6-9)	6 mm screw	0.7-1.1 (5-8)
8 mm bolt, nut	1.8-2.5 (13-18)	6 mm flange bolt, nut	1.0-1.4 (7-10)
10 mm bolt, nut	3.0-4.0 (22-29)	8 mm flange bolt, nut	2.4-3.0 (17-22)
12 mm bolt, nut	5.0-6.0 (36-43)	10 mm flange bolt, nut	3.0-4.0 (22-29)



## SPECIAL TOOLS/COMMON TOOLS

- SPECIAL TOOLS (New)  
CB750K SPECIAL TOOLS SET (Includes special tool case)

Tool Name	Part No.	Q'ty	Ref. page
Primary gear holder	07924-4220000	1	8-6
Rotor puller	07933-4250000	1	16-6
Steering stem driver	07953-4250000	1	13-26

- SPECIAL TOOLS (Other models)

Tool Name	Part No.	Q'ty	Ref. page
Vacuum gauge set	07404-0020000 (H/C No. 20176)	1	3-13
Oil pressure gauge	07506-3000000	1	2-3
Oil pressure gauge attachment	07510-4220100	1	2-3
Carburetor throttle wrench	07908-4220100	1	3-14, 4-8
Carburetor pilot screw wrench	07908-4220200	1	4-7
Snap ring pliers	07914-3230001	1	15-6
Steering stem socket	07916-3710100	1	13-27
6 mm hollow set wrench	07917-3230000	1	13-20, 13-23
Bearing race remover	07946-3710500	1	13-26
Steering stem driver	07946-3710600	1	13-26
Bearing driver attachment	07946-3710700	1	13-27
Bearing driver	07947-6340000	1	13-27
Piston base	07958-2500001	2	7-8
Valve lifter holder	07964-4220001	1	3-8
Valve guide reamer (5.5 mm)	07984-2000000	1	6-15
Piston ring compressor	07954-3000000	2	7-8
Valve lifter bore	07999-4220000	1	6-11, 6-17
Bearing driver	07947-6340000	1	13-27


**• COMMON TOOL**

Tool	Part No.	Q'ty	Alternate Tool Part No.	Ref. Page
Float level gauge	07401-0010000	1		4-8
Retainer wrench (A)	07710-0010100	1	Bearing retainer wrench 07910-2830000	14-4, 14-8
Retainer wrench (B)	07710-0010200	1	Bearing retainer wrench 07920-3230101	13-15, 13-17
Retainer wrench (C)	07710-0010300	1	Bearing retainer wrench 07910-3230201	14-4, 14-8
Retainer wrench body	07710-0010400			13-15, 13-17
				14-4, 14-8
Lock nut wrench socket (20 x 24 mm)	07716-0020100	1	Lock nut wrench 07916-6390001	8-4, 8-9
Lock nut wrench socket (30 x 32 mm)	07716-0020400	1		13-25, 13-28
Extension bar	07716-0020500	1		8-4, 8-9
				13-25, 13-28
Universal holder	07725-0010101	1		8-3
Valve guide remover (5.5 mm)	07742-0010100	1	Valve guide driver 07942-3290100	6-15
Valve guide driver (B)	07742-0020200	1	Valve guide driver 07942-3290200	6-15
Bearing driver outer (42 x 47)	07746-0010300	1	Bearing driver 07945-3330100	13-17
Bearing driver outer (52 x 55)	07746-0010400	1	Bearing driver 07946-3290000	14-8
Bearing driver outer (62 x 68)	07746-0010500	1	Bearing driver 07946-3600000	14-8
Bearing driver handle (C)	07746-0030100	1		11-8, 12-12
Bearing driver inner (25 mm)	07746-0030200	1		11-8
Bearing driver pilot (15 mm)	07746-0040300	1		13-17
Bearing driver pilot (20 mm)	07746-0040500	1		14-8
Bearing driver pilot (25 mm)	07746-0040600	1		14-8
Bearing driver handle (B)	07746-0020100	1		11-8, 12-12
Bearing driver handle (20 mm)	07746-0020400	1		12-12
Front fork oil seal driver body	07747-0010100	1		13-22
Front fork oil seal attachment (E)	07747-0010600	1	Fork seal driver 07947-3290000	13-22
Bearing driver handle (A)	07749-0010000	1	Driver handle attachment 07949-6110000	13-17, 14-8
Valve spring compressor	07757-0010000	1	Valve spring compressor 07957-3290001	6-11, 6-17
Shock absorber compressor	07959-3290001	1		14-10, 14-11



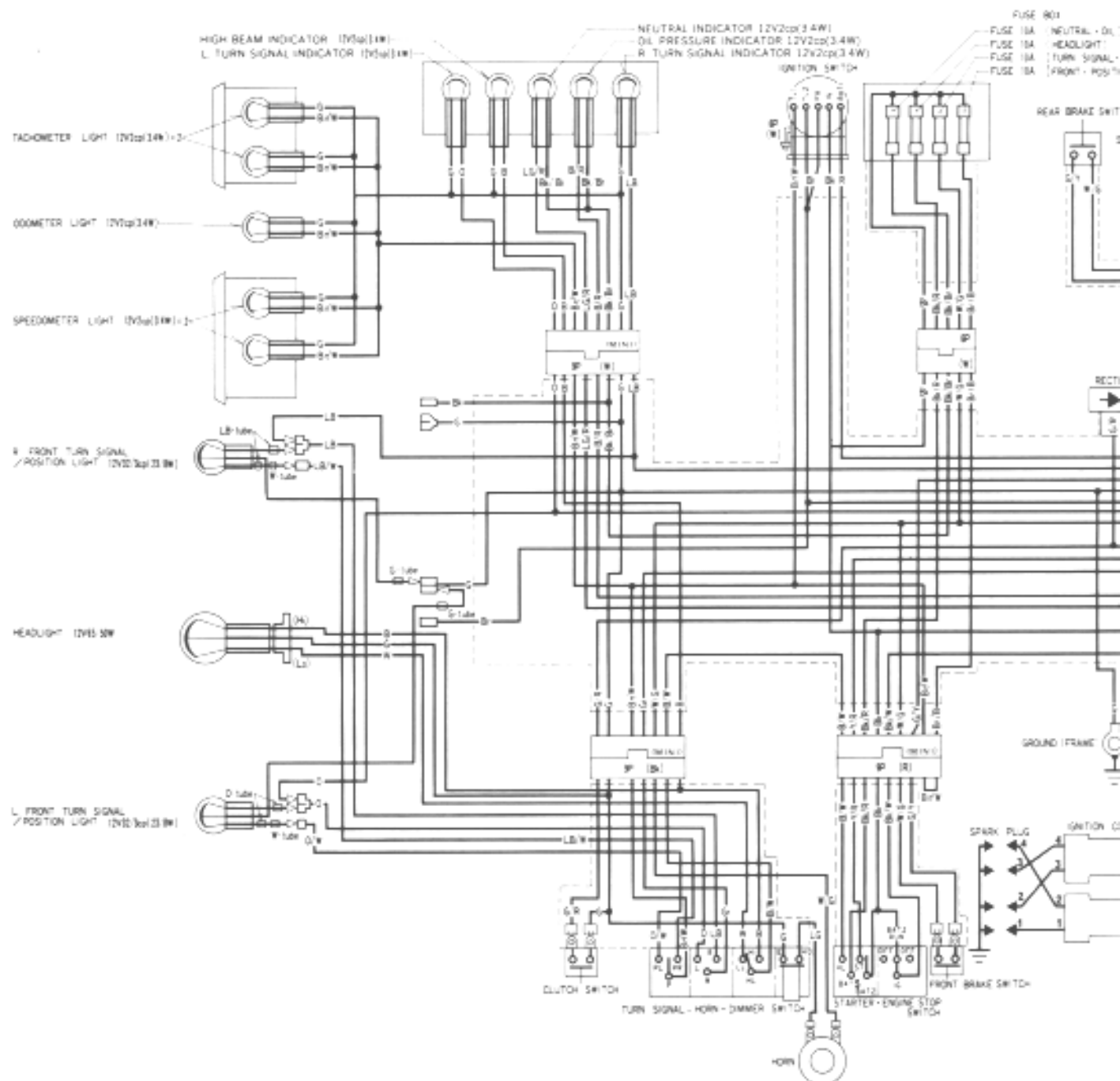


**HONDA**  
**CB750K**

GENERAL INFORMATION

## WIRING DIAGRAMS

## CB750K



### SWITCH CONTINUITY

#### IGNITION SWITCH

	BAT	IG	TL	TL2	P
OFF					
ON					
P					

#### STARTER SWITCH

	BAT1	HL	BAT1	ST
FREE				
PUSH				

#### ENGINE STOP SWITCH

	BAT2	IG
OFF		
RUN		
OFF		

#### TURN SIGNAL SWITCH

	N	R	L	P	RR	RL
R						
N						
L						

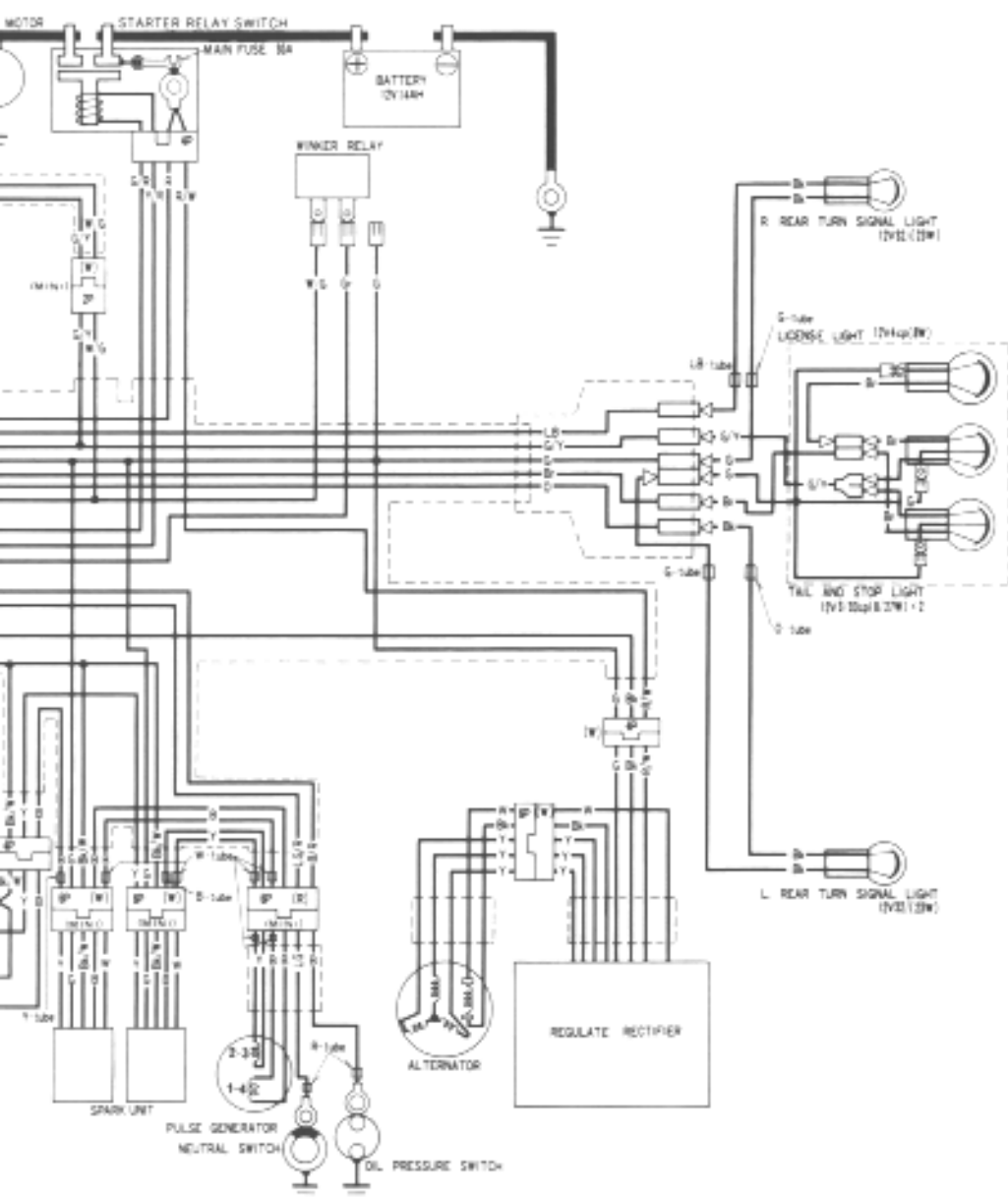
#### DIMMER SWITCH

	HL	LL	H
L			
N			
H			

#### HORN SWITCH

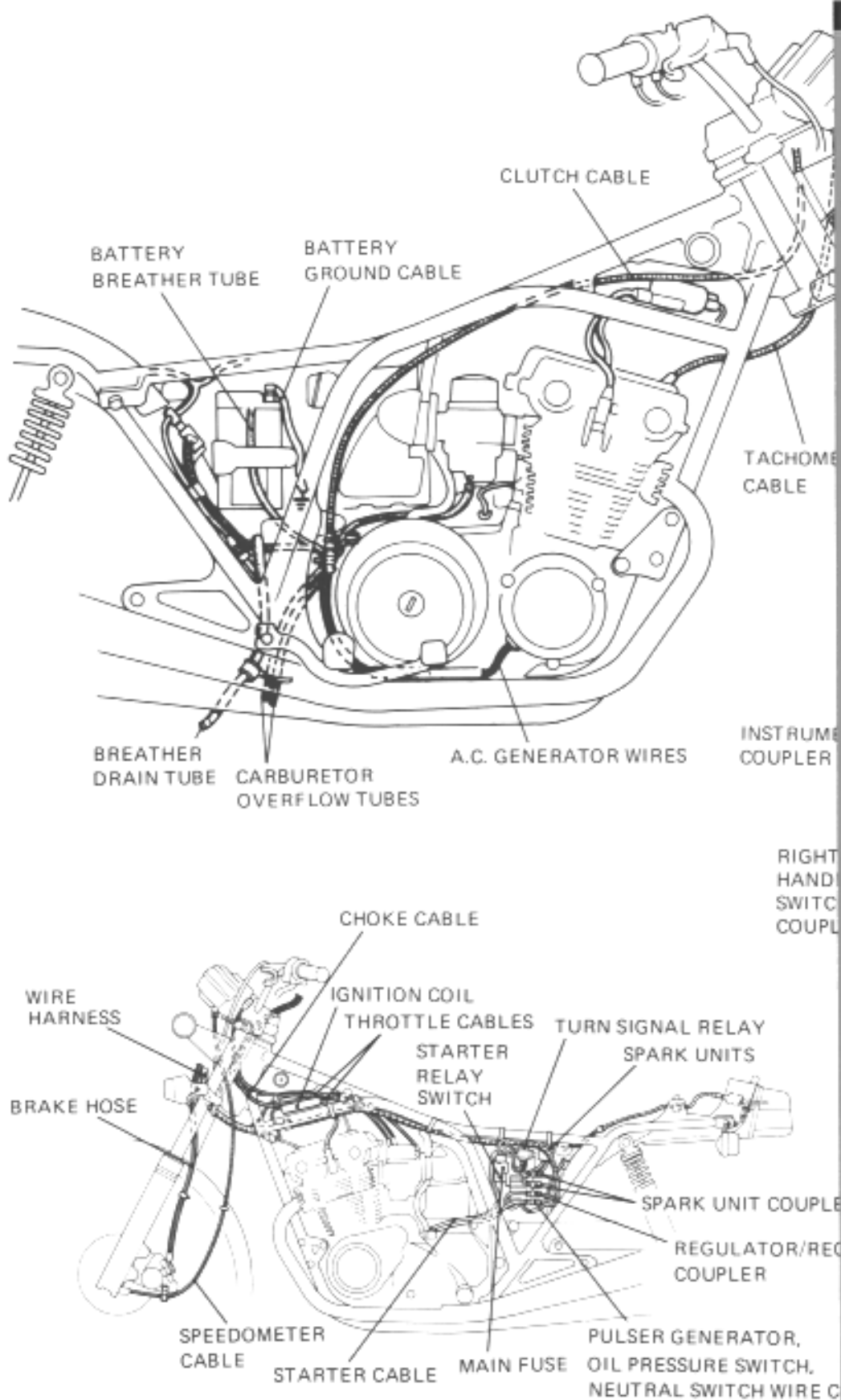
	HO	E
FREE		
PUSH		

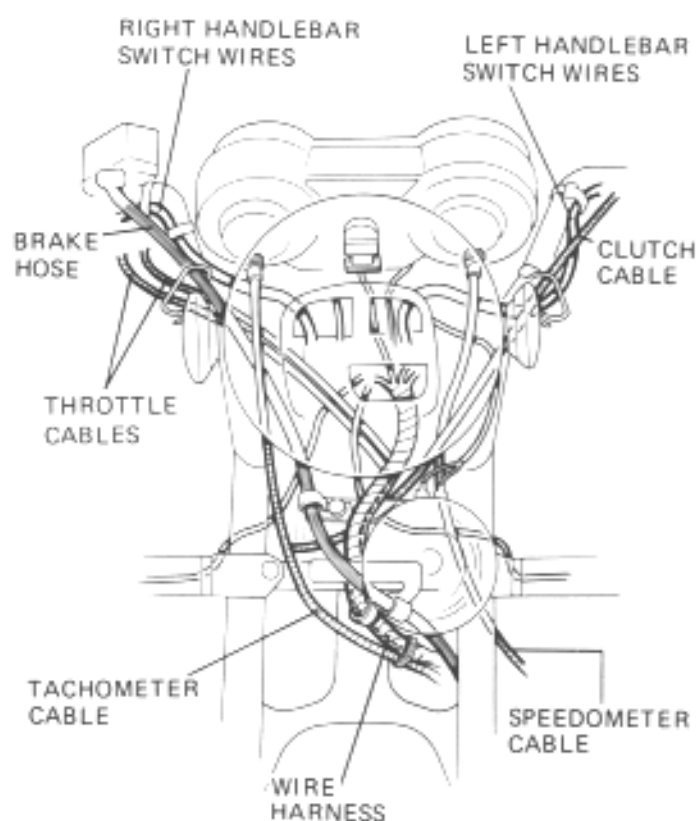
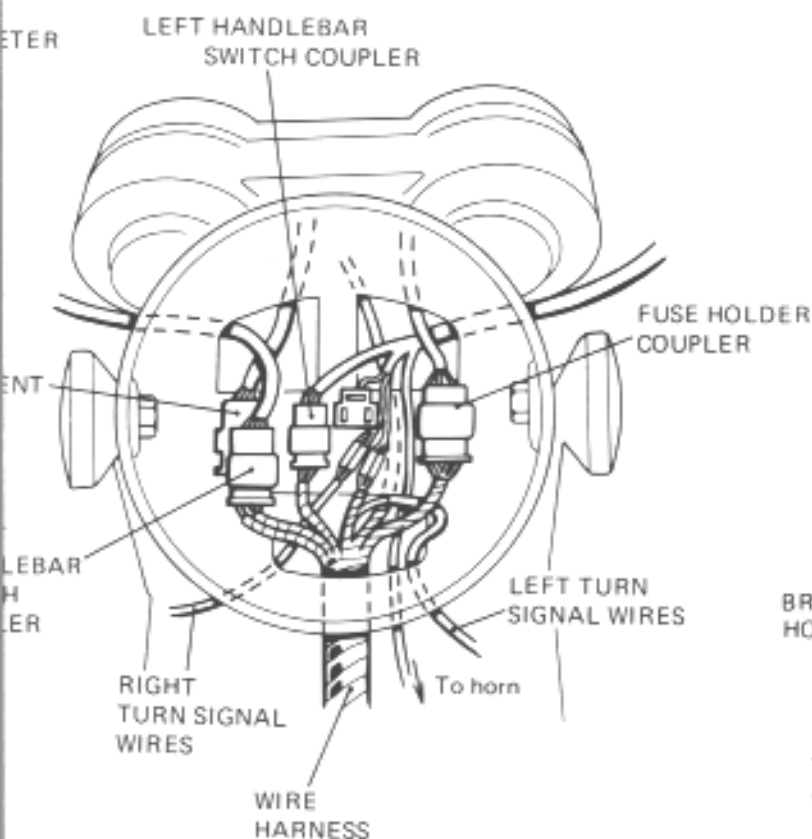
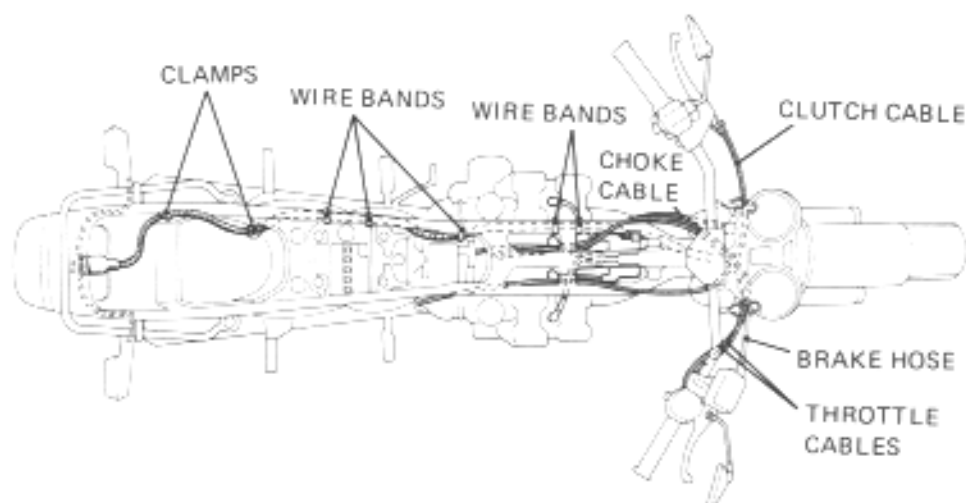
REAR STOP - HORN  
OR - TAIL



B	Brown	Y	Yellow
BK	Black	B	Blue
W	White	GR	Grey
LG	Light Green	LB	Light Blue
R	Red	O	Orange
G	Green	P	Pink

0030Z-425-6700







## MAINTENANCE SCHEDULE

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

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

C: CLEAN

R: REPLACE

A: ADJUST

L: LUBRICATE

FREQUENCY		WHICHEVER COMES FIRST ↓	ODOMETER READING (NOTE 3)						
			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)	Refer to
EMISSION RELATED ITEMS	ENGINE OIL	YEAR	R	R	R	R	R	R	Page 2- 2
	ENGINE OIL FILTER	YEAR	R	R	R	R	R	R	Page 2- 2
	CRANKCASE BREATHER	NOTE 1		C	C	C	C	C	Page 3- 2
	AIR CLEANER	NOTE 2		C	R	C	R	C	Page 3- 2
	* FUEL LINES			I	I	I	I	I	Page 3- 3
	SPARK PLUGS			I	R	I	R	I	Page 3- 4
	* VALVE CLEARANCE		I	I	I	I	I	I	Page 3- 7
	* CAM CHAIN TENSION		A	A	A	A	A	A	Page 3-11
	* THROTTLE OPERATION		I	I	I	I	I	I	Page 3-12
	* CARBURETOR CHOKE			I	I	I	I	I	Page 3-12
	* CARBURETOR SYNCHRONIZE		I	I	I	I	I	I	Page 3-13
	* CARBURETOR IDLE SPEED		I	I	I	I	I	I	Page 3-15
NON-EMISSION RELATED ITEMS	DRIVE CHAIN		I, L EVERY 300 mi (500 km)						Page 3-16
	BATTERY	MONTH	I	I	I	I	I	I	Page 3-17
	BRAKE FLUID (FRONT)	MONTH I 2 YEARS R	I	I	I	*R	I	I	Page 3-17
	BRAKE PAD/SHOE WEAR			I	I	I	I	I	Page 3-18
	BRAKE SYSTEM		I	I	I	I	I	I	Page 3-18
	* BRAKE LIGHT SWITCH		I	I	I	I	I	I	Page 3-19
	* HEADLIGHT AIM		I	I	I	I	I	I	Page 3-19
	CLUTCH FREE PLAY		I	I	I	I	I	I	Page 3-20
	SIDE STAND			I	I	I	I	I	Page 3-21
	* SUSPENSION		I	I	I	I	I	I	Page 3-22
	* NUTS, BOLTS, FASTENERS		I	I	I	I	I	I	Page 3-23
	** WHEELS/SPOKES		I	I	I	I	I	I	Page 3-22
	** STEERING HEAD BEARING		I		I		I		Page 3-23

\* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.

\*\* IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTES: (1) SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE. (U.S.A. ONLY)

(2) SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.

(3) FOR HIGHER ODOMETER READINGS, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.



## EMISSION CONTROL SYSTEM

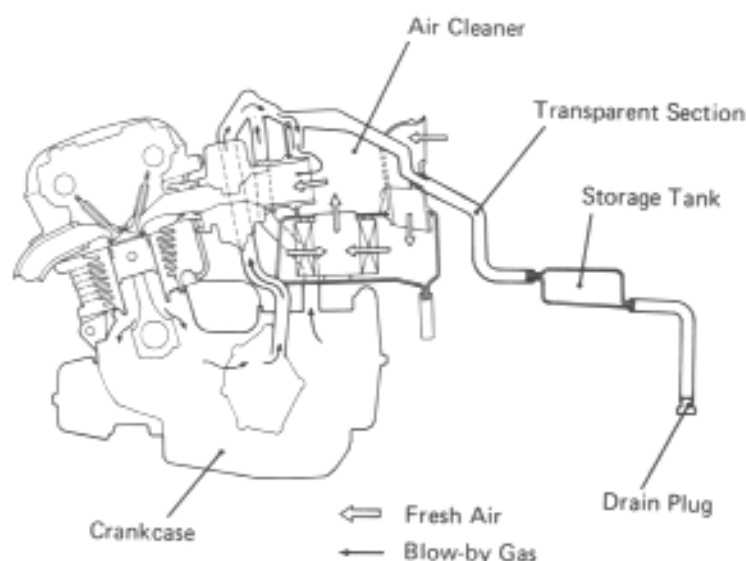
The CB750K is equipped with two Emission Control Systems.

### EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of a factory pre-set carburetor. No adjustment should be made except to the idle speed with the throttle stop screw.

### CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a "Closed System" to prevent crankcase emissions entering the atmosphere. Blow-by gas is returned to the combustion chamber through air cleaner and carburetor. Liquids are collected in the storage tank.



### EMISSION CONTROL INFORMATION LABEL

An Emission Control Information Label is located on the frame as shown. It contains basic tune-up specifications.



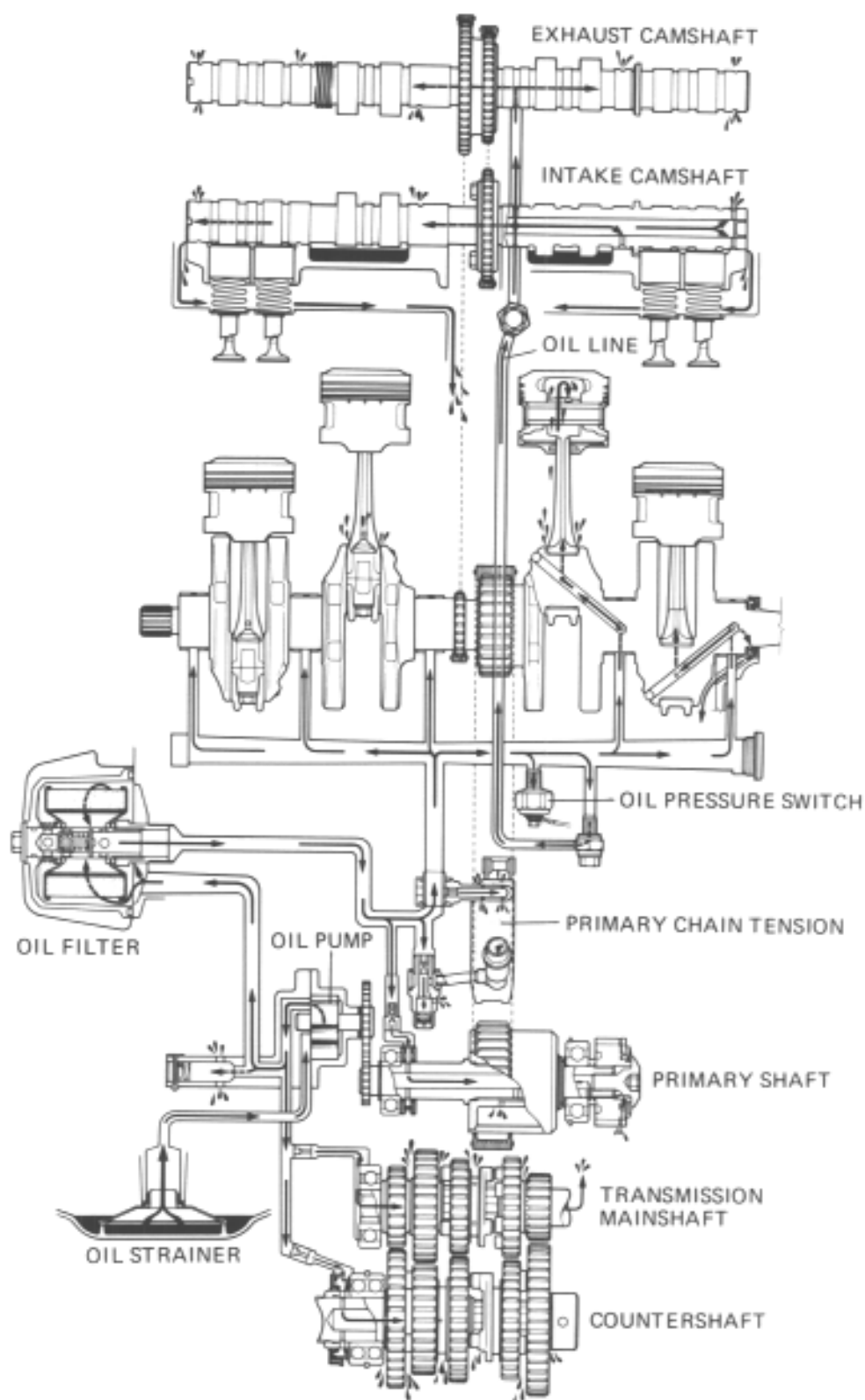




MEMO



## ENGINE LUBRICATION SYSTEM





SERVICE INFORMATION	2-1	OIL PRESSURE	2-3
TROUBLESHOOTING	2-1	OIL PUMP	2-4
<u>ENGINE LUBRICATION</u>		<u>CHASSIS LUBRICATION</u>	
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OIL STRAINER CLEANING	2-3		

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

Oil pressure relief valve: See Section 12

### SPECIFICATIONS

Oil capacity	Approximately 3.5 liter (3.7 US qt) at change 4.5 liter (4.7 US qt) at engine assembly	
Recommended oil	HONDA 4-stroke oil or equivalent General, all temperature Alternate Above 15°C (60°F) -10° to 15°C (15° to 60°F) Above -10°C (15°F) Below 0°C (32°F)	API service classification-SE SAE 10W-40 SAE 30 SAE 20 or 20W SAE 20W-50 SAE 10W
Oil pump delivery	41 liter/min./7,000 rpm (43.4 US qt/min./7,000 rpm)	
Oil pressure (at oil pressure switch)	5.0 kg/cm <sup>2</sup> (71 psi)/7,000 rpm	80°C (176°F)

### SPECIAL TOOLS

#### Special Tools

Oil Pressure Gauge	07506-3000000
Oil Pressure Gauge Attachment	07510-4220100

### TORQUE VALUES

Oil drain plug	3.5-4.0 kg-m (25-29 ft-lb)	Oil pan bolt	1.0-1.4 kg-m ( 7-10 ft-lb)
Oil filter bolt	2.8-3.2 kg-m (20-23 ft-lb)	Pressure switch	1.5-2.0 kg-m (11-14 ft-lb)

## 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 gear broken
3. Oil pump faulty
4. Internal oil leakage



## ENGINE LUBRICATION

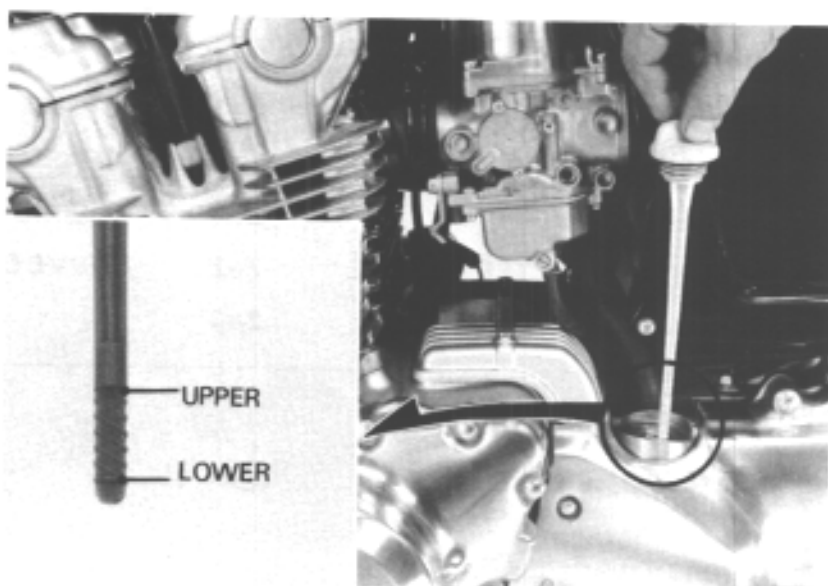
### ENGINE OIL LEVEL

Run the engine and allow to idle for a few minutes.

Stop the engine and support the motorcycle on the center stand. Check the oil level with the filler cap dipstick after a few minutes. Do not screw in the cap when making this check. If the level is below the lower level mark on the dipstick, fill to the upper level mark.

Check the oil pressure warning light. This light should go off when the engine starts.

If it does not, check the oil pump function and/or oil circuit.



### ENGINE OIL & FILTER CHANGE

Warm the engine to normal operating temperature.

Stop the engine.

Place the motorcycle on its center stand.

Remove the oil filler cap, drain plug and oil filter bolt and drain the oil.

Make sure that the sealing washer on the drain plug and the O-rings on the oil filter bolt and oil filter cover are in good condition.

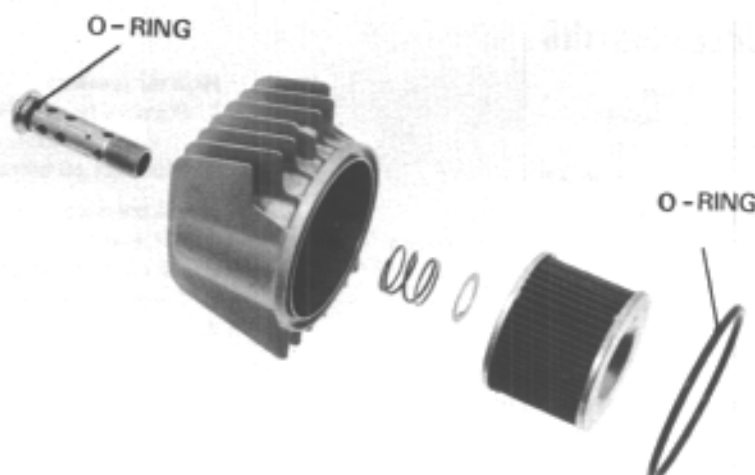
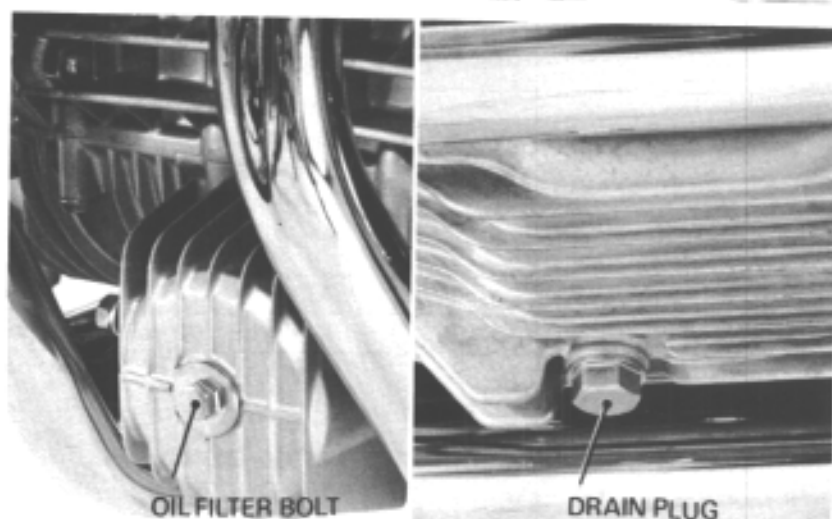
After completely draining, replace the oil filter and install the oil filter bolt and drain plug.

Fill the crankcase with 3.5 lit (3.7 US qt) of the recommended oil.

Reinstall the oil filler cap.

Start the engine and let it idle for 2-3 minutes. Stop the engine.

Add the recommended oil to the upper level. Make sure that there are no oil leaks.



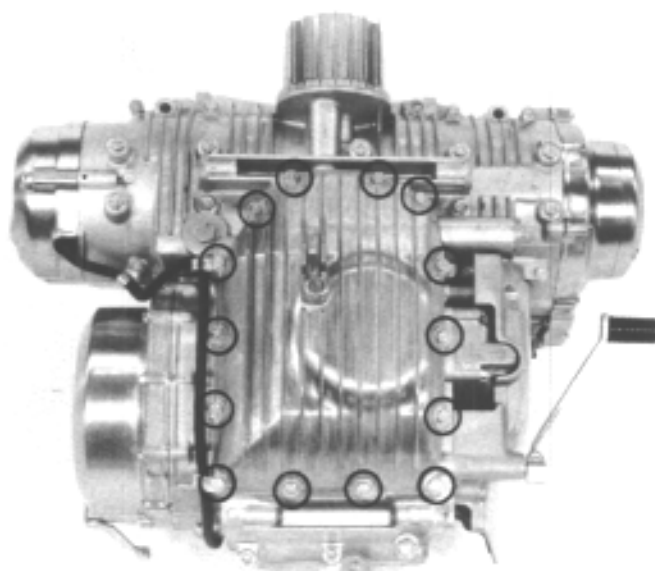


### OIL STRAINER CLEANING

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

Remove the oil filler cap, drain plug and oil filter bolt.

Remove the oil pan bolts and oil pan.

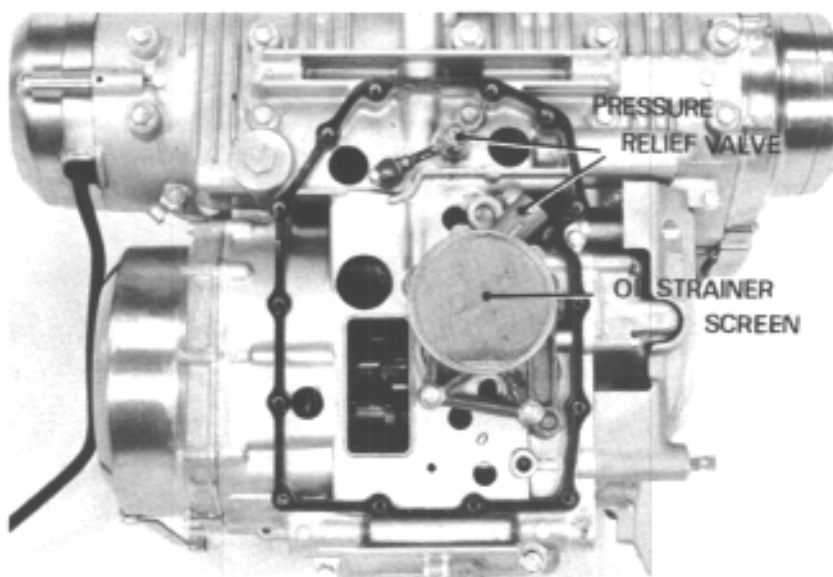


Remove and clean the oil strainer.

Install the oil strainer and oil pan.

Fill the crankcase with recommended oil (Page 2-2).

Check the operation of the pressure relief valves.



### OIL PRESSURE

Warm the engine up to normal operating temperature (approximately 80°C=176°F) stop the engine.

Remove the oil pressure switch.

Connect an oil pressure gauge to the pressure switch hole.

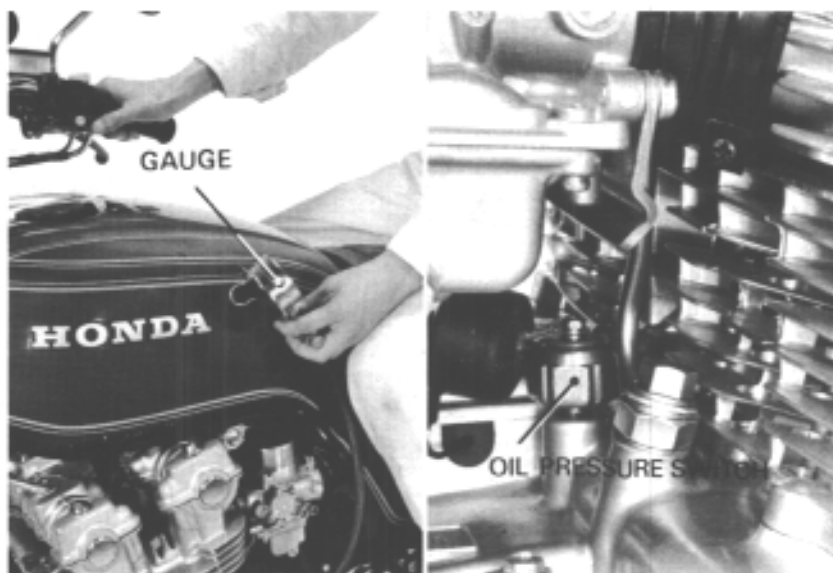
Check the oil level.

Check the oil pressure at 7,000 rpm.

**STANDARD: 5.0 kg/cm<sup>2</sup> (71 psi) at  
7,000 rpm 80°C (176°F)**

Apply a liquid sealant to the pressure switch threads and install.

Check that the oil pressure warning light goes out. If the oil pressure warning light stays on, stop the engine immediately and determine the cause.





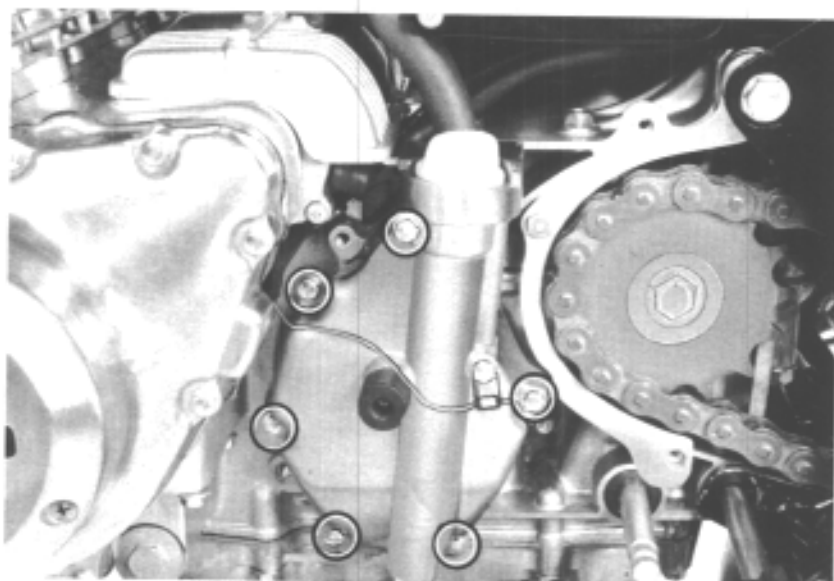
## OIL PUMP

### OIL PUMP REMOVAL

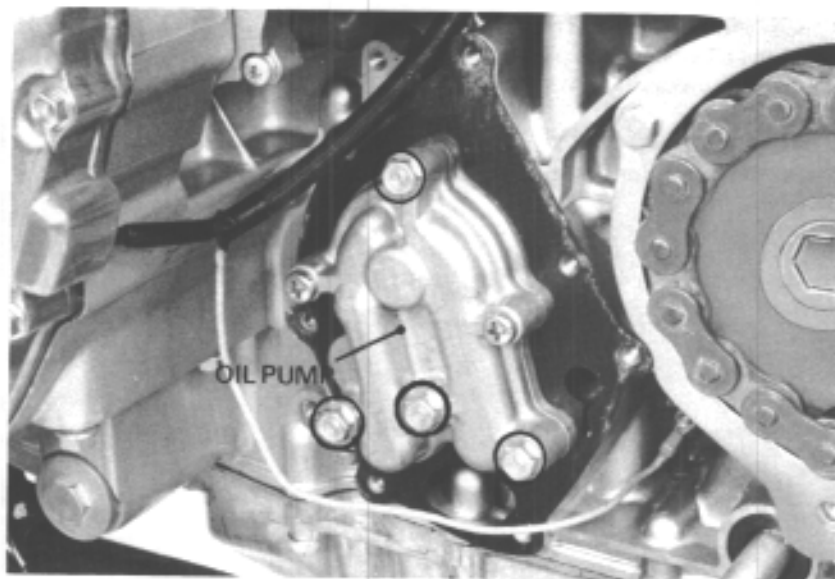
#### NOTE

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

Remove the foot pegs and gearshift pedal.  
Remove the left crankcase rear cover.  
Remove the oil pump cover.

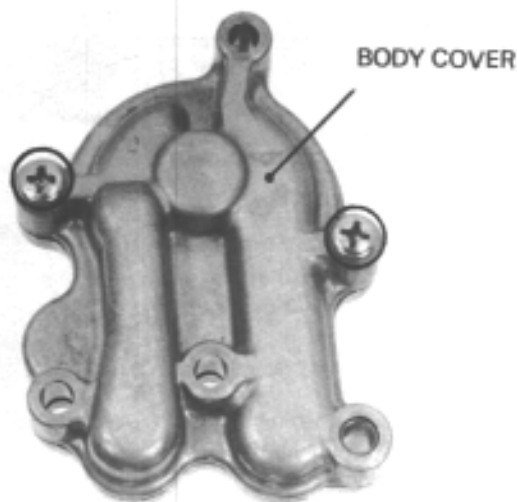


Remove the oil pump.



### OIL PUMP DISASSEMBLY

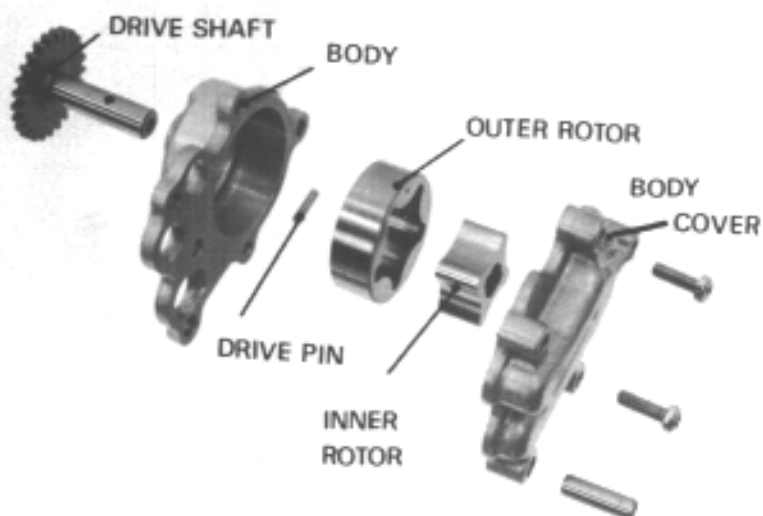
Remove the oil pump body cover.







Remove the inner and outer rotors.  
Remove the drive pin and drive shaft.



### OIL PUMP INSPECTION

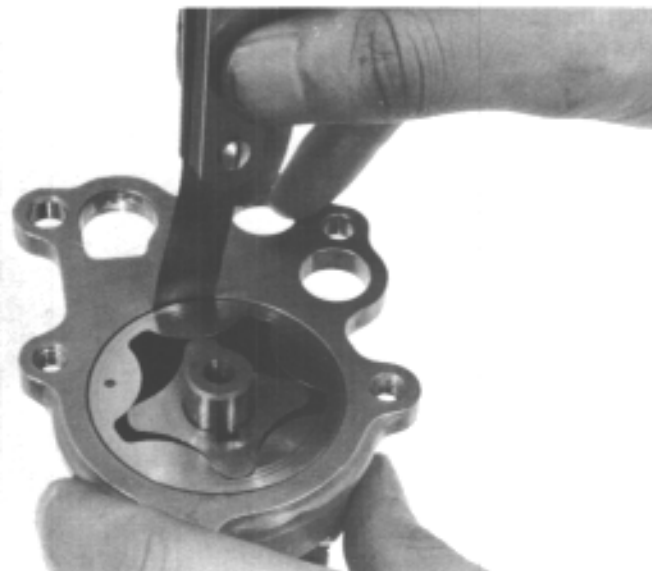
Measure the rotor tip clearance.

**SERVICE LIMIT: 0.15 mm (0.006 in)**



Measure the pump body clearance.

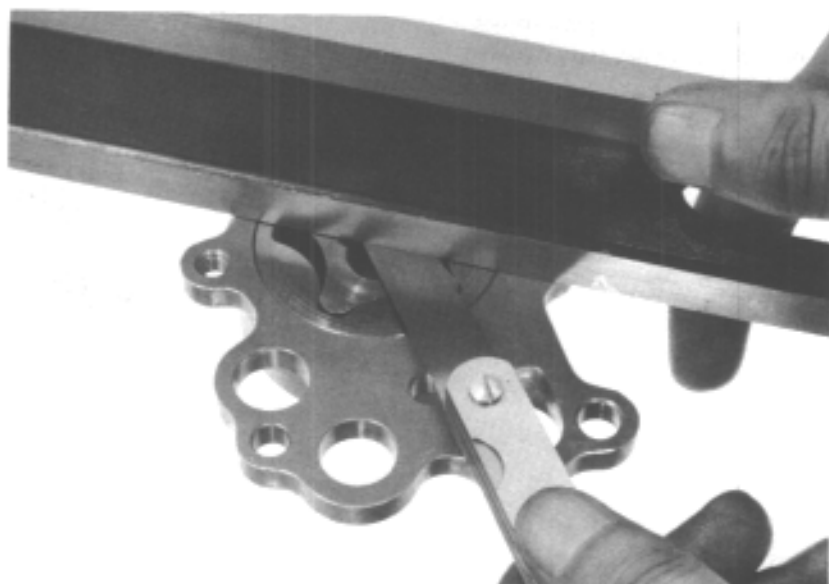
**SERVICE LIMIT: 0.35 mm (0.014 in)**





Measure the pump end clearance.

**SERVICE LIMIT: 0.1 mm (0.004 in)**

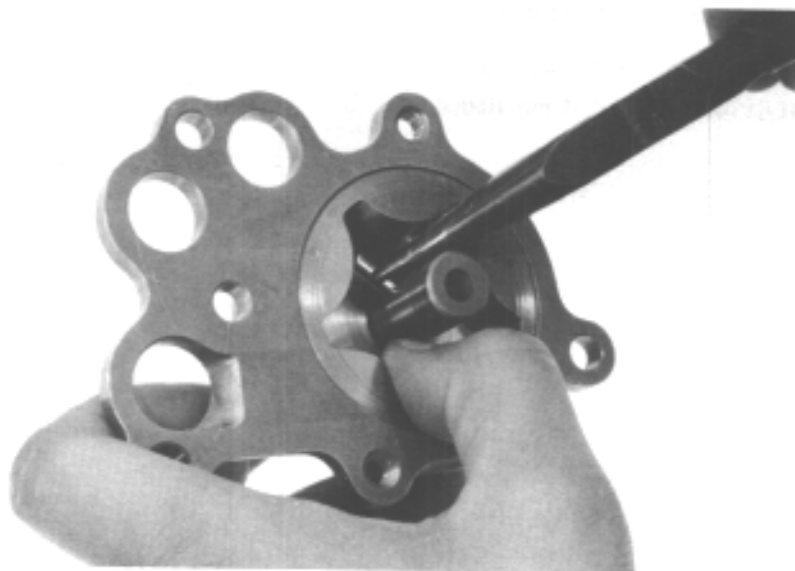


### OIL PUMP ASSEMBLY

Install the outer rotor into the body.

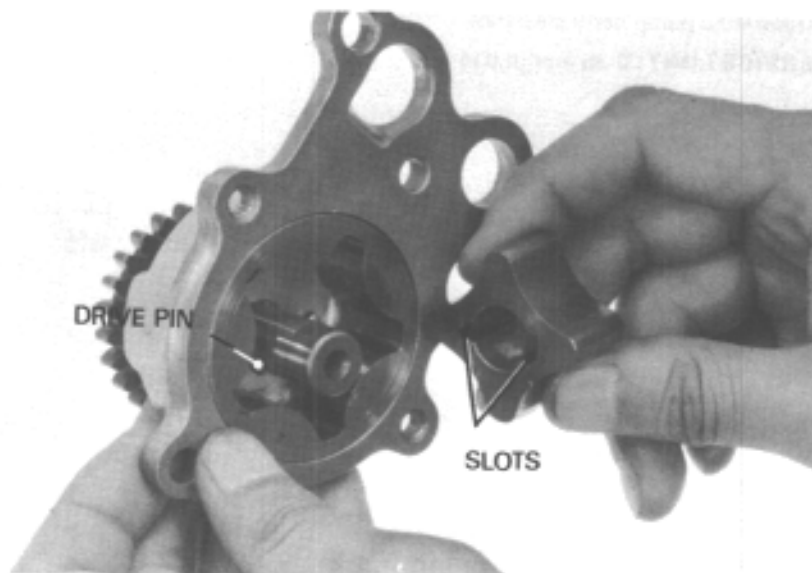
Insert the drive shaft.

Insert the drive pin into the drive shaft.



Align the slots in the inner rotor with the drive pin.

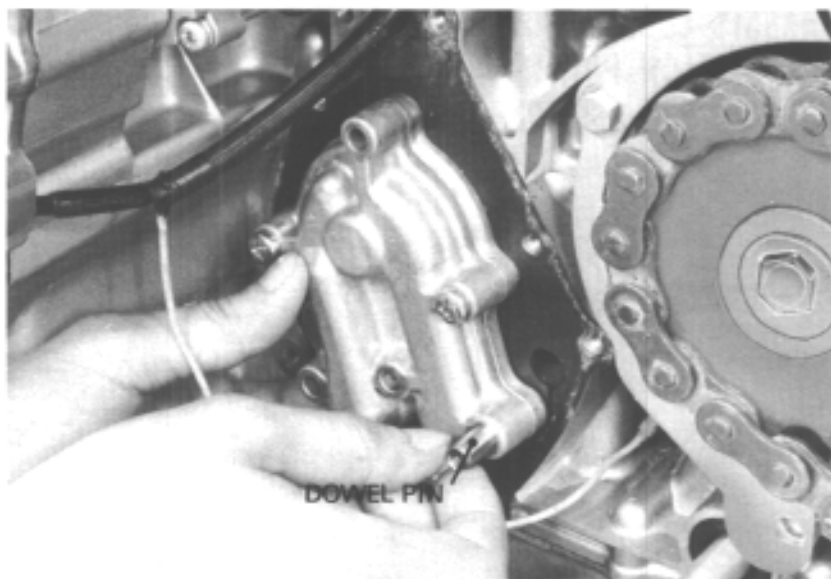
Install the body cover.



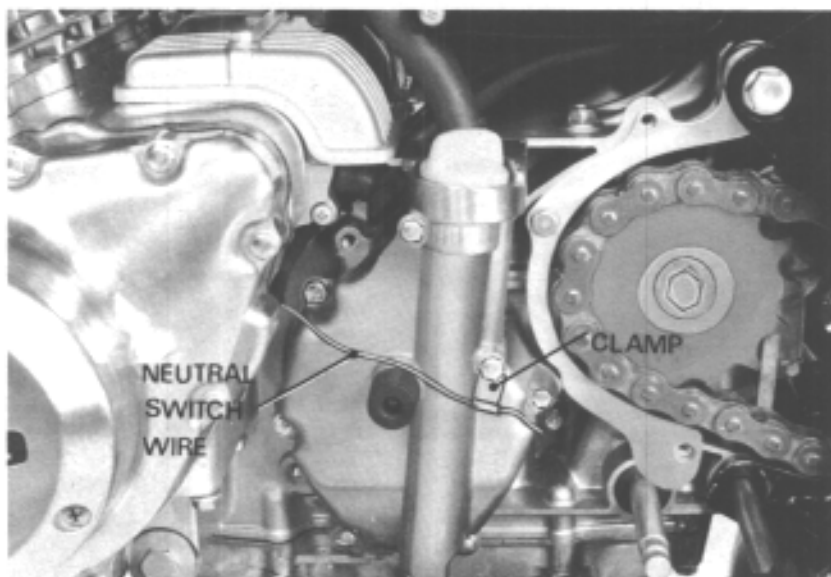


### OIL PUMP INSTALLATION

Install a new gasket.  
Engage the oil pump drive and driven gears.  
Install the dowel pin.



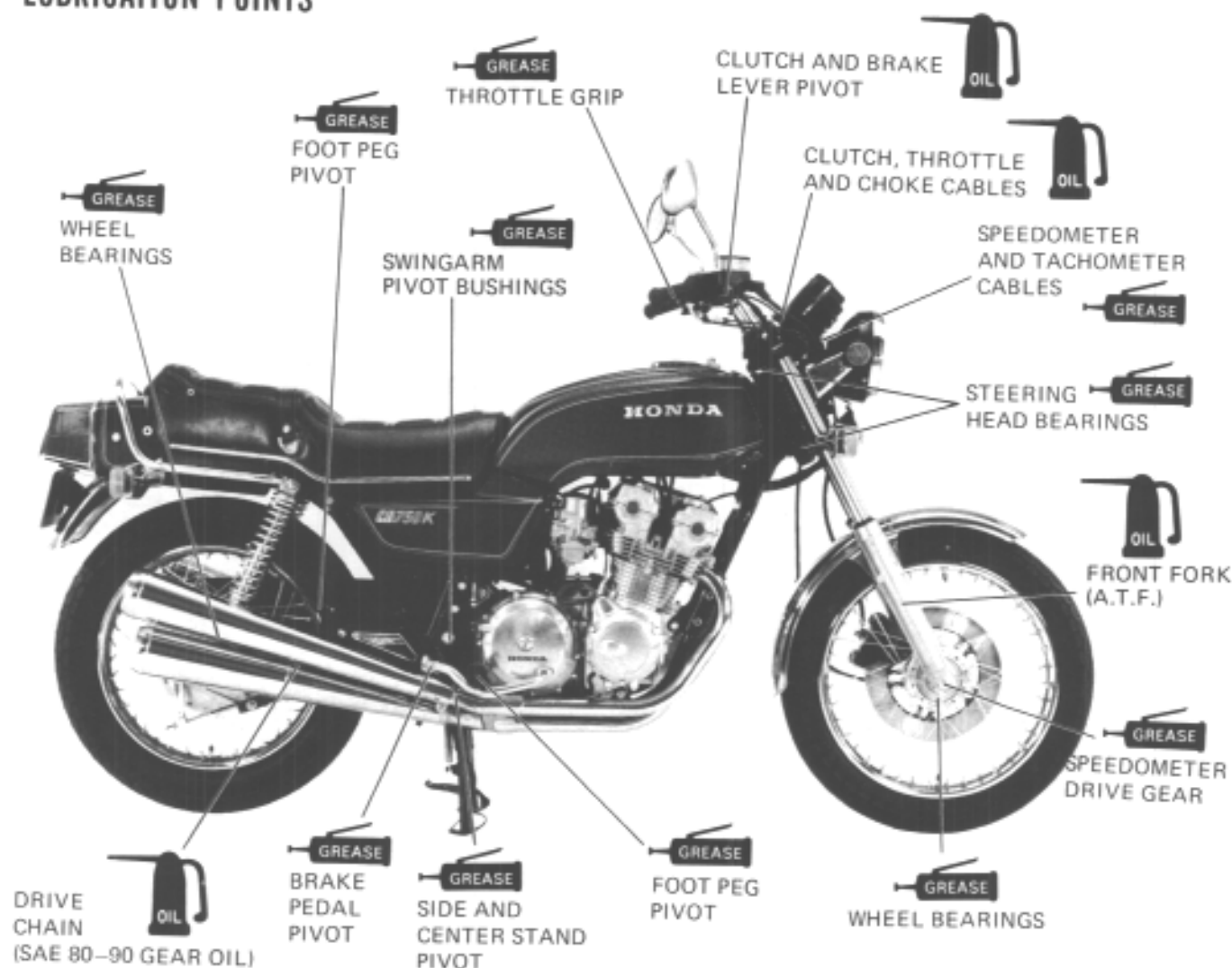
Install the oil pump cover.  
Route the neutral switch wire as shown.  
Install the left rear crankcase cover, gearshift pedal and foot pegs.





## CHASSIS LUBRICATION

### LUBRICATION POINTS



## DRIVE CHAIN

Clean the drive chain with kerosene and wipe dry.

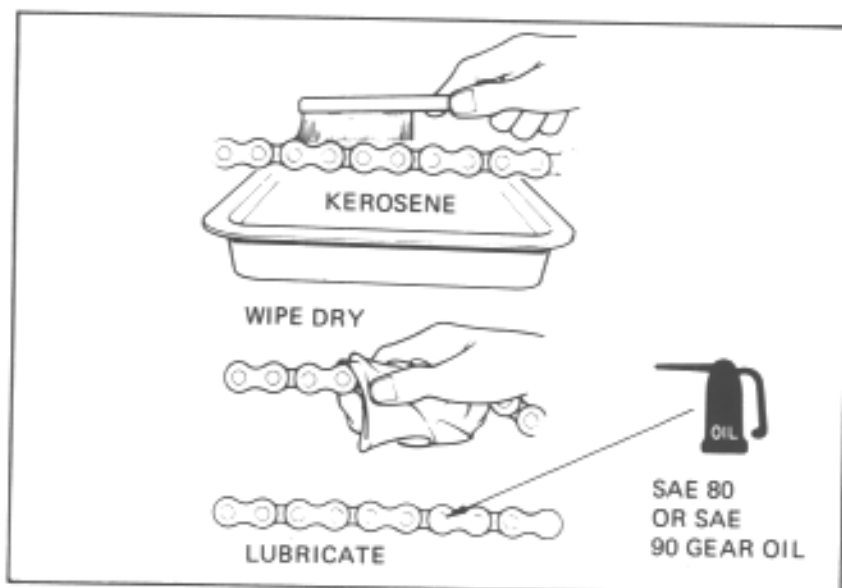
### CAUTION

Do not use a steam cleaner, high pressure washers or solvents as these will damage the O-rings.

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

### CAUTION

Do not use commercial aerosol chain lubricants. They contain solvents which could damage the O-rings.





## «ENGINE»

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## «CHASSIS»

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## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

Engine oil level check	See page 2-2
Engine oil change	See page 2-2
Engine oil filter change	See page 2-2

### SPECIFICATION

#### <ENGINE>

Spark plug gap	0.6-0.7 mm (0.024-0.028 in)
Spark plug type	
U.S.A. model only	

Usage Manu- facturer	For cold climate (below 5°C, 41°F)	Standard	Foreextended high speed driving
ND	X22ES-U	X24ES-U	X27ES-U
NGK	D7EA	D8EA	D9EA

#### CANADA model only

ND: X24ESR-U	ND: Nippondenso Co., Ltd.
NGK: DR8ES-L	NGK: NGK Spark Plug Co., Ltd.

Ignition timing	Initial 10° (BTDC)
Valve clearance:	0.08 +0.05 mm (0.003 +0.002 in)
IN. and EX.	-0.02 -0.001
Idle speed	1,000 ± 100 rpm
Synchronization	Difference of each
vacuum	cylinder 60 mmHg (2.4 in Hg) or less
Compression	12 ± 1 Kg/cm² (170 ± 14 psi)

### SPECIAL TOOLS

Valve lifter holder	07964-4220001
Carb. throttle wrench	07908-4220100
Vacuum gauge	07404-0020000 or H/C 20176

#### <CHASSIS>

Drive chain free play	15-25 mm (5/8-1 in)
Clutch free play	10-20 mm (3/8-3/4 in)

#### Tire

Cold tire pressures Kg/cm² (psi)	Up to 90 kg (200 lb) load	Front 2.0 (28) Rear 2.25 (32)
	Up to vehicle capacity load	Front 2.0 (28) Rear 2.8 (40)
Vehicle capacity load limit	163 Kg (360 lbs)	
Tire size	Front	3.50H19-4PR
	Rear	4.25H18-4PR
Tire brand	Front	BRIDGESTONE MaG. MOPUS-S703 DUNLOP GOLD SEAL F11
	Rear	BRIDGESTONE MaG. MOPUS-S710 DUNLOP GOLD SEAL K127

### TORQUES

Front axle holder nut	1.8- 2.5 kg-m (13-18 ft-lb)
Rear axle nut	8.0-10.0 kg-m (58-72 ft-lb)



## CRANKCASE BREATHER

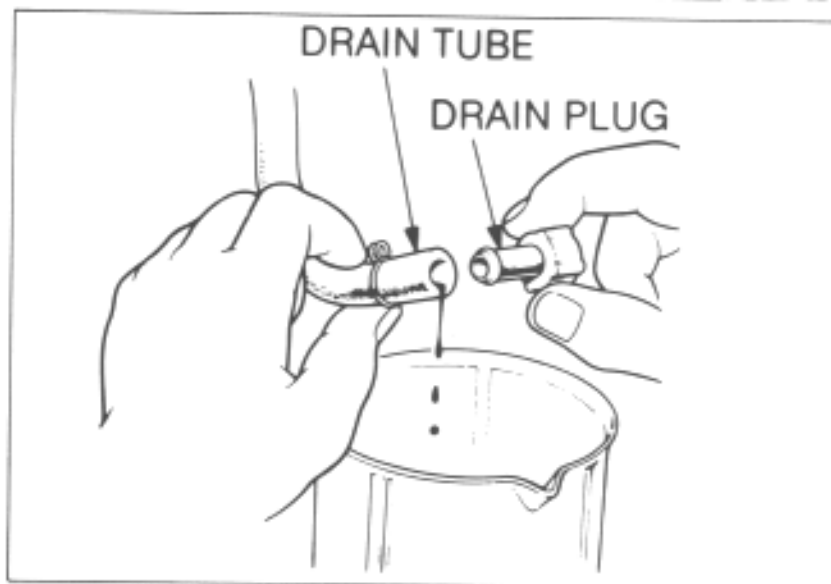
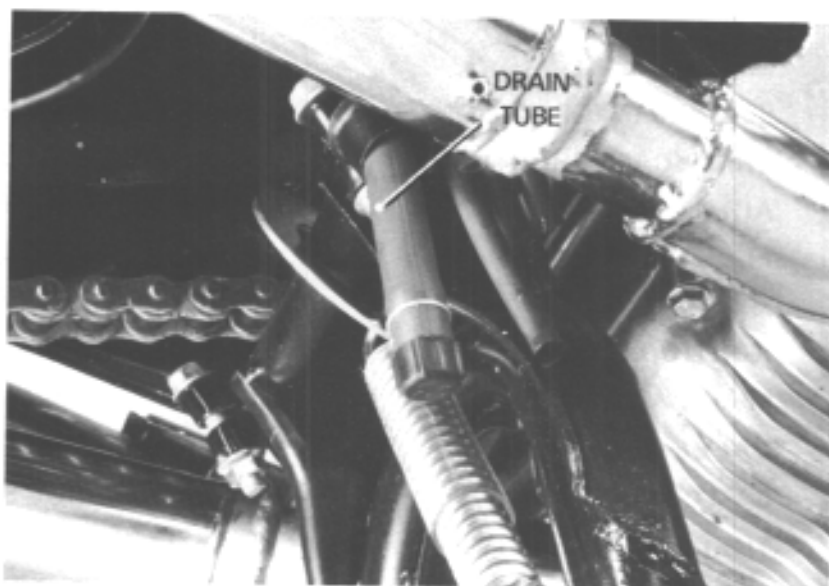
U.S.A. model only

Remove the drain plug from the tube and drain deposits.

Reinstall the drain plug.

### NOTE

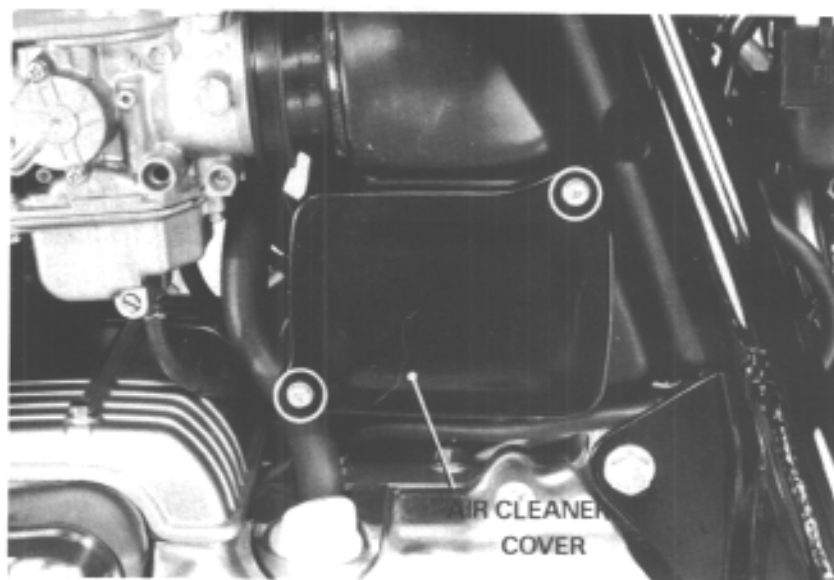
Service more frequently when driven in rainy conditions or at wide open throttle, or when the deposit level can be seen in the transparent section of the drain tube.



## AIR CLEANER

Remove the left side cover.

Remove the two air cleaner cover screws and cover.







Pull out the air cleaner element set spring and remove the element.



Clean the element by tapping it lightly to loosen dust. Blow away the remaining dust by applying compressed air from inside the element.

Replace the element if it is excessively dirty, broken or damaged.

Reinstall the element, element set spring, air cleaner cover and left side cover.



## FUEL LINES

Replace any parts which show deterioration, damage or leakage.





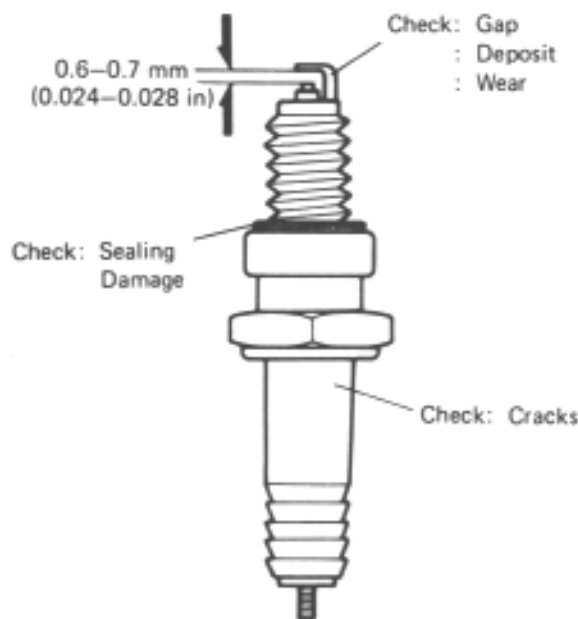
## SPARK PLUGS

Disconnect the spark plug caps and remove the spark plugs.

Visually inspect the spark plug. Discard the spark plug if the insulator is cracked or chipped. Measure the spark plug gap with a wire-type feeler gauge.

Adjust the spark plug gap by bending the side electrode.

**SPARK PLUG GAP:** 0.6–0.7 mm  
(0.024–0.028 in)



### RECOMMENDED SPARK PLUG

U. S. A. model only

Usage Manufacturer	For cold climate (below 5°C, 41°F)	Standard	For extended high speed riding
ND	X22ES-U	X24ES-U	X27ES-U
NGK	D7EA	D8EA	D9EA

CANADA model only

ND: X24ESR-U

NGK: DR8ES-L

Manufacturer: ND: Nippondenso Co., Ltd.

NGK: NGK Spark Plug Co., Ltd.

Install the spark plugs making sure the sealing washers are in good condition and reconnect the spark plug caps.

#### NOTE

First tighten the spark plug fingertight, then tighten with a spark plug wrench.



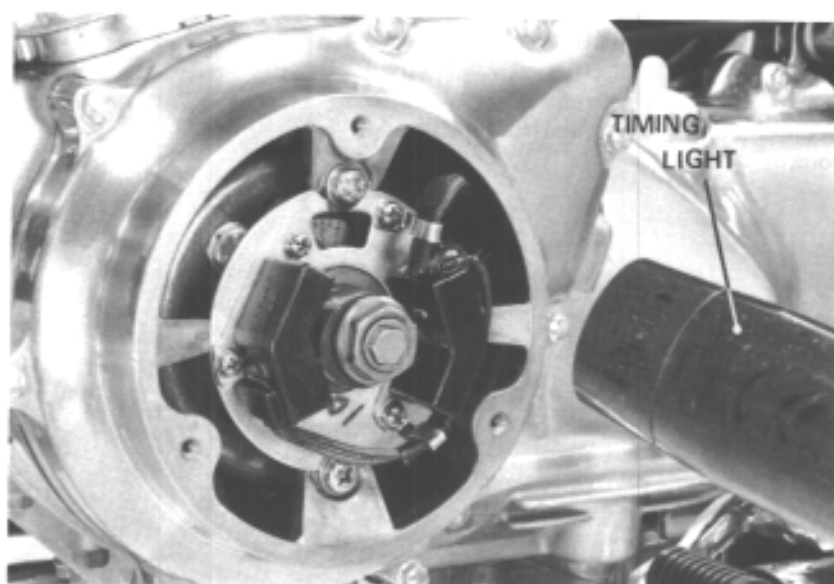
### IGNITION TIMING

#### • DYNAMIC

Remove the pulser generator cover.  
Connect a stroboscopic timing light to the No. 1 cylinder's high tension cord.  
Start the engine and let it idle.

**IDLE SPEED: 1,000 ± 100 rpm**

Aim the timing light at the timing mark.  
The "1.4 F-I" mark should align with the index mark.



### ADJUSTMENT

Adjust by loosening the two pulser base plate screws and rotating the plate.  
Tighten the screws and recheck the timing.



### ALTERNATIVE METHOD

#### • STATIC

Remove the pulser generator cover.  
Rotate the crankshaft counterclockwise and align the "1.4 S-F" mark with the index mark.

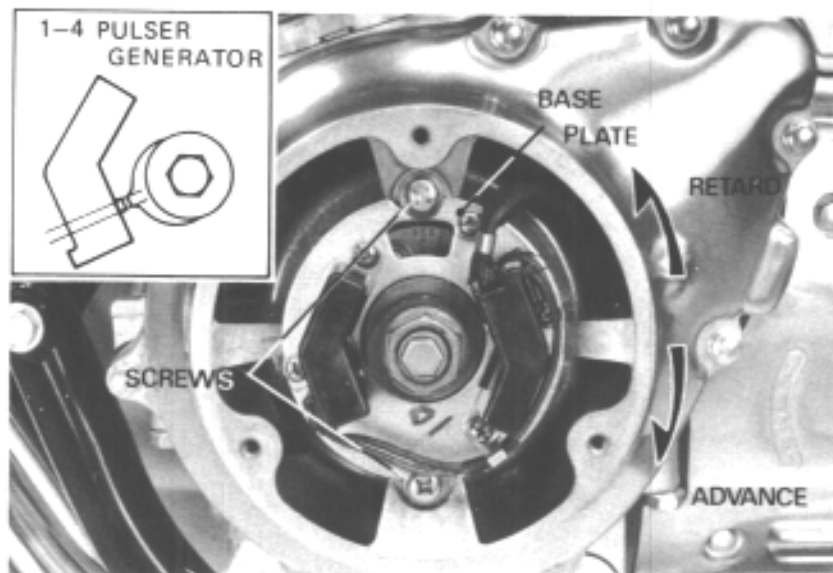
#### NOTE

Either No. 1 or No. 4 piston must be near T.D.C. of the compression stroke at this time.

The timing is correct if the narrow projection of "1-4" pulser generator aligns with the rotor tooth.

#### WARNING

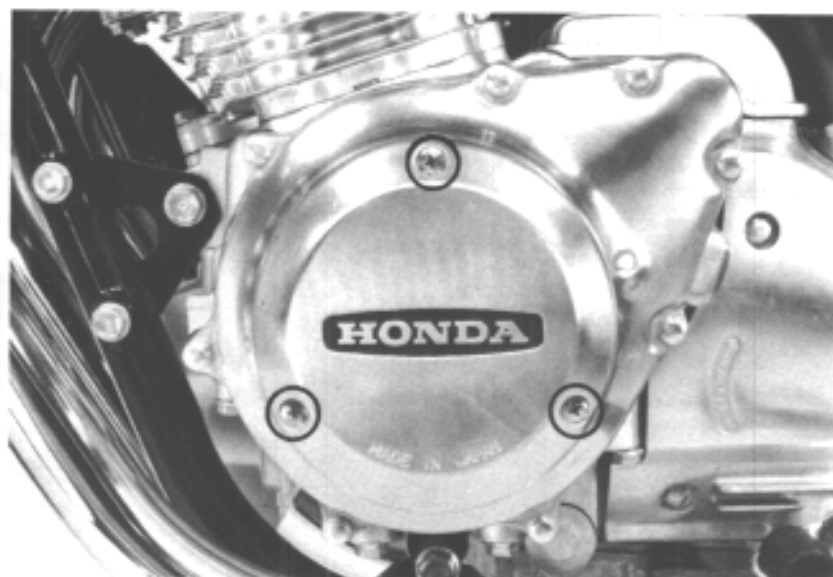
*Be careful not to touch the pulser generator coil while turning the crankshaft with the wrench.*





## SPARK ADVANCER

Remove the pulser generator cover.  
Connect a timing light to the No. 1 high tension cord.



Start the engine.  
Bring engine speed to 6,000 rpm or above and check that the index mark is between the full advance marks.

### CAUTION

*Do not allow engine speed to exceed 8,000 rpm or engine damage may result.*

Replace the advancer assembly if it is not functioning properly.  
Install the pulser generator cover.

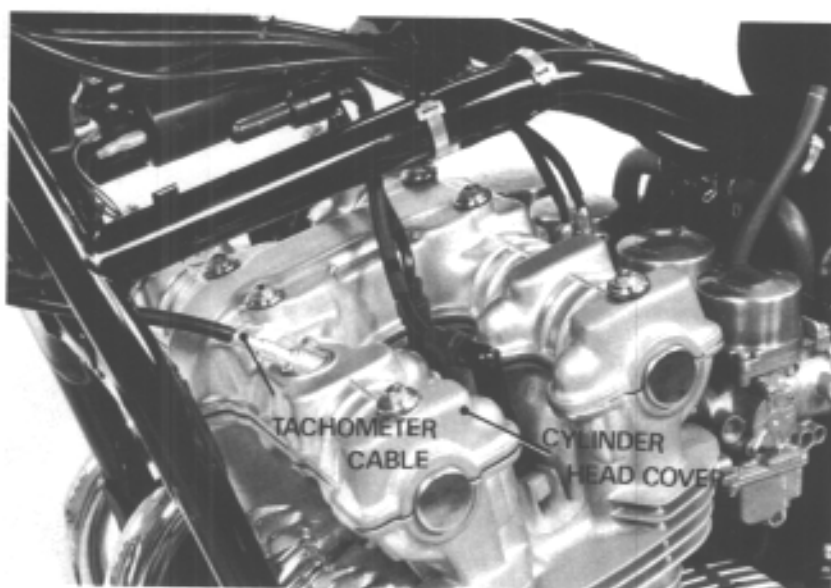




### VALVE CLEARANCE

#### NOTE

- Inspect and adjust valve clearance while the engine is cold. (Below 35°C, 95°F).
- Lean the motorcycle right and left to drain residual oil from the cylinder head.



Remove the right and left side covers and raise the seat.

Turn the fuel valve OFF and remove the fuel tube and fuel tank.

Remove the tachometer cable.

Remove the spark plug caps.

Remove the cylinder head cover bolts and cylinder head cover.

Remove the A. C. generator cover.

#### INSPECTION

Measure intake and exhaust valve clearances by inserting a feeler gauge between the camshaft and valve lifter shim.

#### VALVE CLEARANCE:

0.08  $\begin{smallmatrix} +0.05 \\ -0.02 \end{smallmatrix}$  mm (0.003  $\begin{smallmatrix} +0.002 \\ -0.001 \end{smallmatrix}$  in)

Rotate the crankshaft clockwise (from the right side) and align the index mark on the exhaust camshaft right end with the front cylinder head mating surface.

Check and record the valve clearance: of the No. 1 EX. and No. 3 EX.

Rotate the camshaft 90° clockwise (via the crankshaft 180°) and check the:

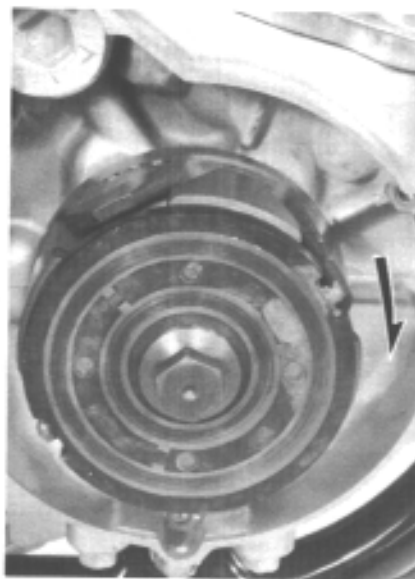
No. 1 IN. and No. 3 IN.

Rotate the camshaft 90° clockwise and check the:

No. 2 EX. and No. 4 EX.

Rotate the camshaft 90° clockwise and check the:

No. 2 IN. and No. 4 IN.





## ADJUSTMENT

### NOTE

- Adjustment shims are available in 0.05 mm increments, from 2.30 to 3.50 mm.
- The No. 2 EX. shim must be removed from the front.

Select a replacement shim to achieve the specified valve clearance, using the following procedures.

Rotate the valve lifter until the notch of the lifter appears on the shim so that the shim can be removed.

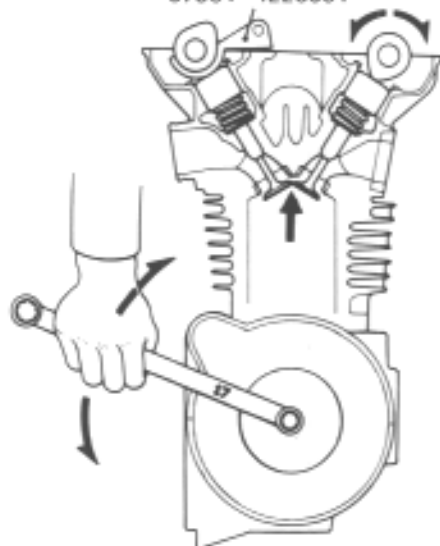
Rotate the crankshaft so that the valve being adjusted is at maximum lift.

Insert the Valve Lifter Holder tool between the camshaft and two adjacent lifters.

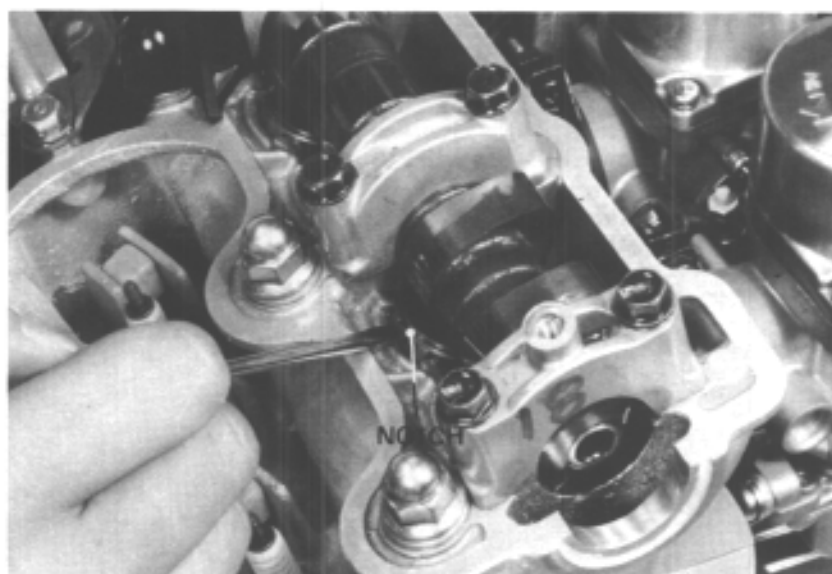
### CAUTION

After installing the tool, make sure that the opposite camshaft lobes does not depress its valves (when you turn the crankshaft). If the other valves are depressed, they will contact the valves being held by the tool, which could cause damage.

VALVE LIFTER HOLDER  
07964-4220001

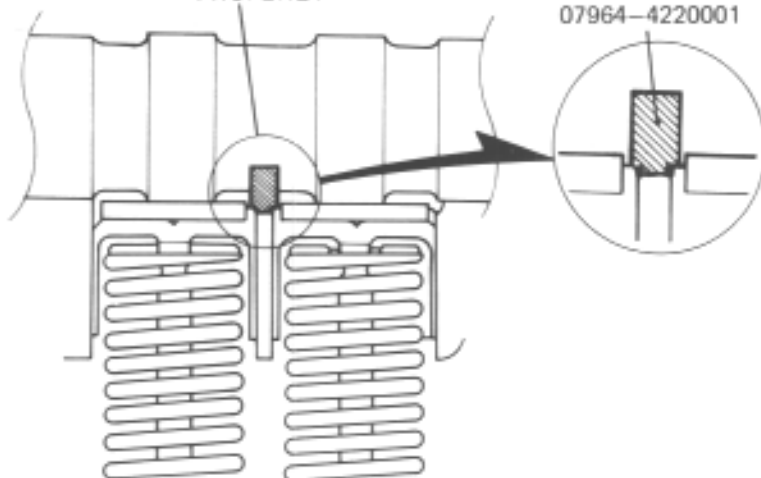


Rotate the crankshaft one turn so the cam lobes turn away from the valve lifter holder.



INSTALL THE SPECIAL TOOL  
PROPERLY

VALVE LIFTER HOLDER  
07964-4220001

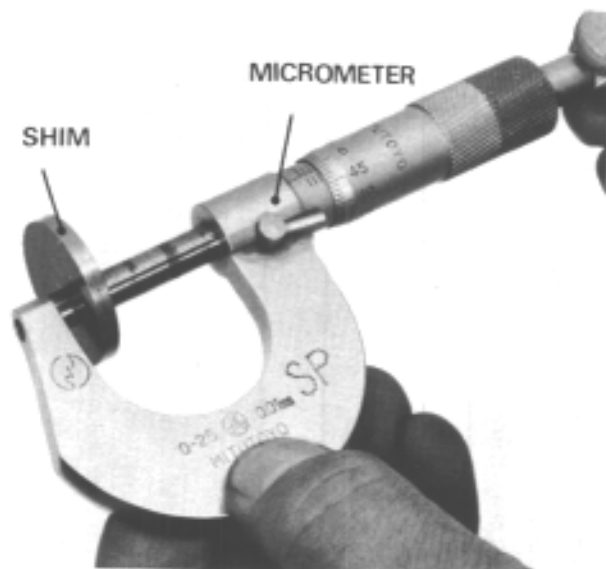




Remove the shim with a tweezer.



Measure the thickness of the removed shim with a micrometer.  
Select a replacement shim using the chart on Page 3-10.



Insert the replacement shim.

**CAUTION**

*Make sure the opposite pair of valves does not open. The valves could be bent or damaged if the crankshaft is rotated incorrectly.*

Rotate the crankshaft one turn until the valves are at maximum lift.

Remove the special tool "Valve Lifter Holder".

Rotate the crankshaft 2-3 revolutions to fully seat the replacement shim.

Recheck the valve clearance.





EXAMPLE: 1. Measure valve clearance = 0.16 mm 3. Refer to chart. (See shaded columns)  
 2. Measure present shim size = 2.50 mm 4. Replacement shim size = 2.55 mm

**VALVE SHIM SELECTION CHART**

		STANDARD VALVE CLEARANCE = 0.08 $\begin{smallmatrix} +0.05 \\ -0.02 \end{smallmatrix}$ mm																	
		PRESENT SHIM SIZE mm																	
VALVE CLEARANCE mm	SHIM mm	SPECIFIED CLEARANCE																	
		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15
		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15
		2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20
		2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25
		2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30
		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35
		2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40
		2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45
		2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
		2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	
		2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50		
		2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
		2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
		2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
		2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
		3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
		3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
		3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
		3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
		3.20	3.25	3.30	3.35	3.40	3.45	3.50											
		3.25	3.30	3.35	3.40	3.45	3.50												
		3.30	3.35	3.40	3.45	3.50													
		3.35	3.40	3.45	3.50														
		3.40	3.45	3.50															
		3.45	3.50																
		3.50																	

**NOTE**

- (1) Measure the valve clearance while the engine is cold.
- (2) For shim replacement, see page 3-11.
- (3) Measure old and new shims with a micrometer.
- (4) The chart is for reference purpose only. After installing new shims, recheck the valve clearance and adjust if necessary. Before rechecking, rotate the camshafts several times to seat the shims in the lifters.
- (5) If the shim thickness required exceeds 3.5 mm, there is carbon build-up on the valve seat. Remove the carbon and reface the seat.



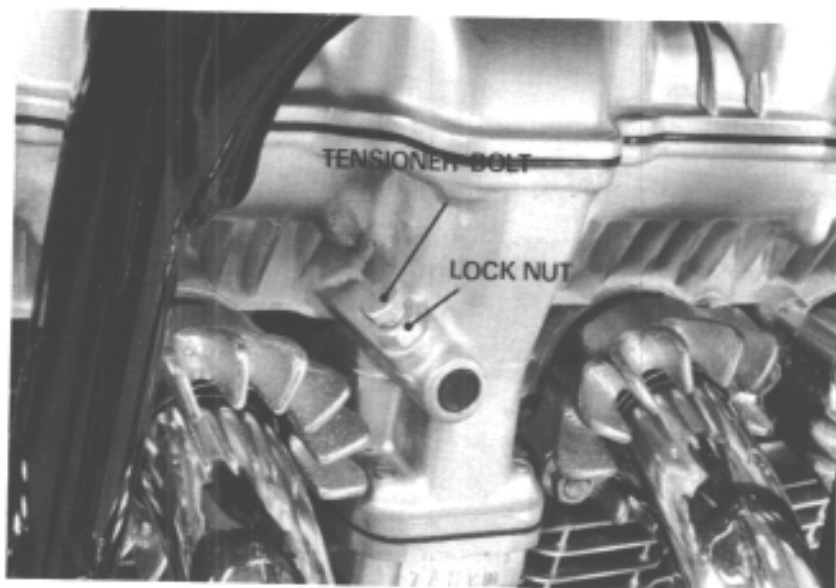


## CAM CHAIN

Start the engine and let it idle.

Loosen the front cam chain tensioner lock nut and bolt 1/2 turn.

Tighten the bolt and lock nut.

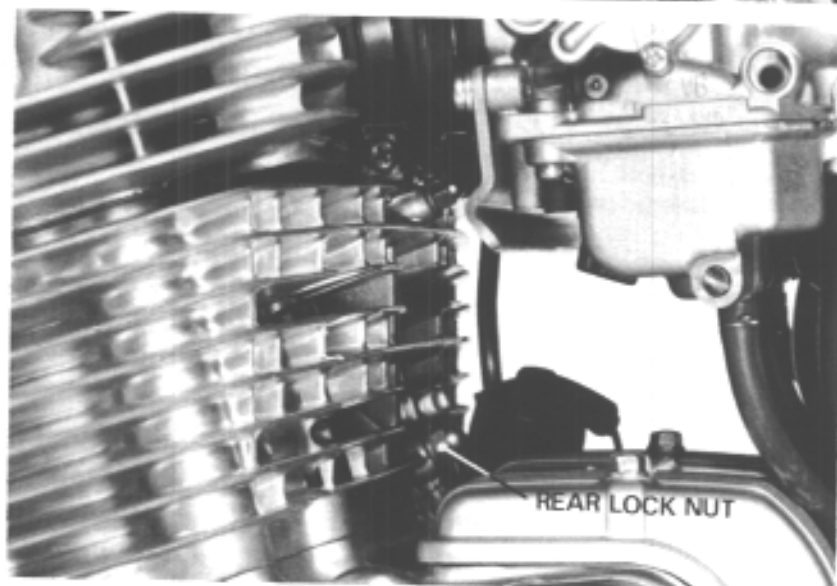


Loosen the rear cam chain tensioner lock nut 1/2 turn.

Tighten the lock nut.

### NOTE

The tensioner will automatically position itself to provide the correct tension when the lock nut or bolt is loosened.





## THROTTLE OPERATION

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

Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Adjust if necessary.

### NOTE

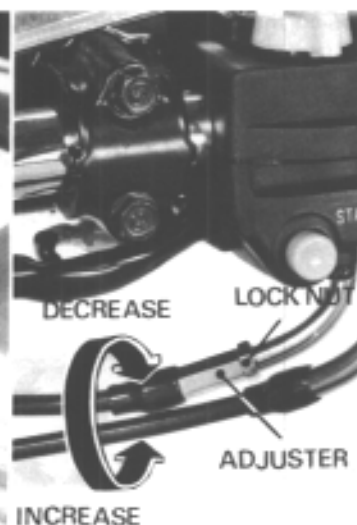
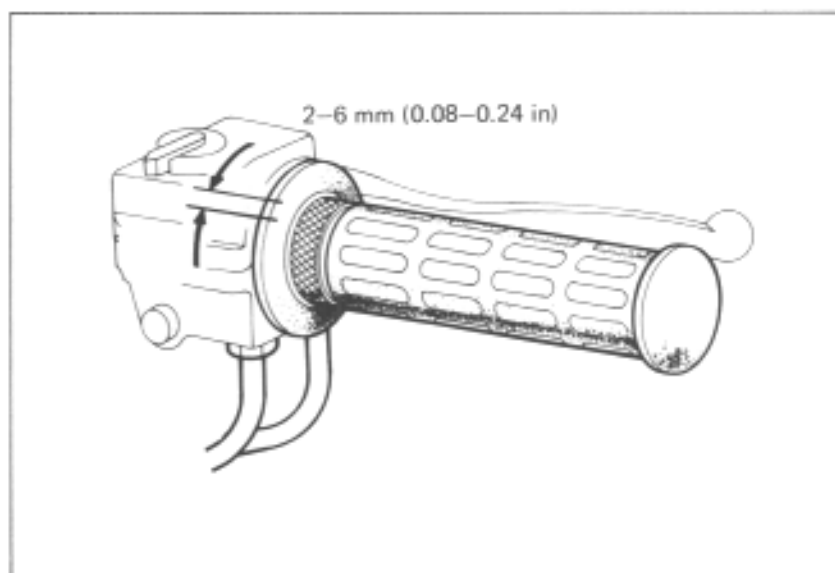
The accelerator pump may flood the carburetors during this inspection.

Major adjustments are made at the lower adjuster. To adjust, remove the fuel tank, loosen the grip play adjuster lock nut and turn the adjuster.

Tighten the lock nut.

Minor adjustments are performed at the upper adjuster.

Recheck throttle operation.  
Replace any damaged parts.



## CHOKE MECHANISM

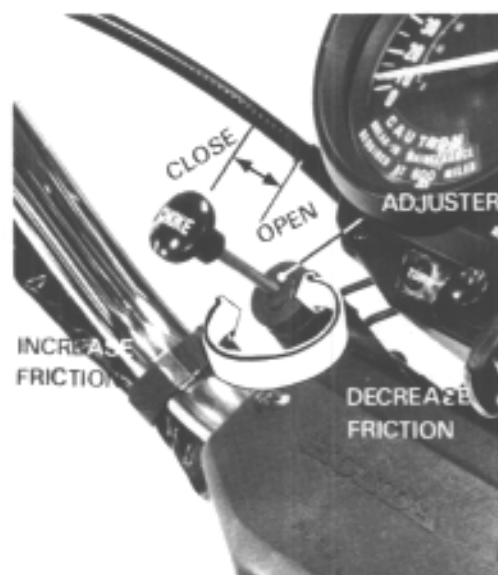
Operate the choke knob and check for choke knob free play and smooth operation of the choke knob, choke lever and choke shaft.

Make sure the choke lever does not move upward (closed side) when the choke knob is pulled all the way out.

Adjust by loosening the choke cable clamp and moving the choke cable.  
Tighten the clamp, holding the choke lever fully closed.

Adjust the choke operating friction by turning the adjuster.

The choke knob must move smoothly and stay where positioned.





## CARBURETOR SYNCHRONIZATION

### NOTE

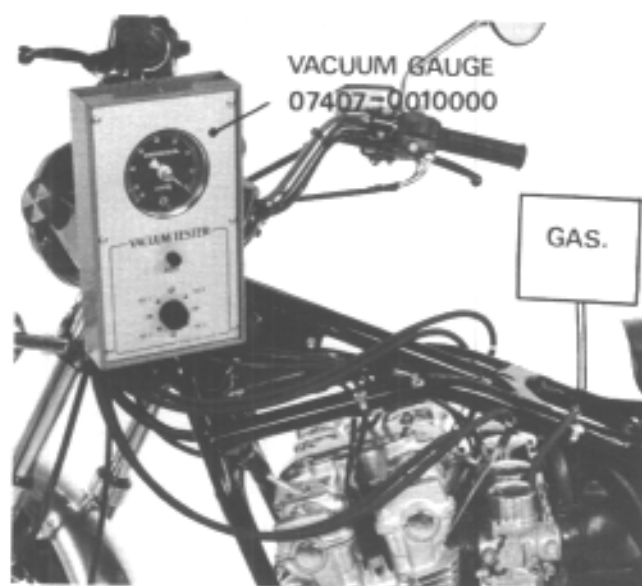
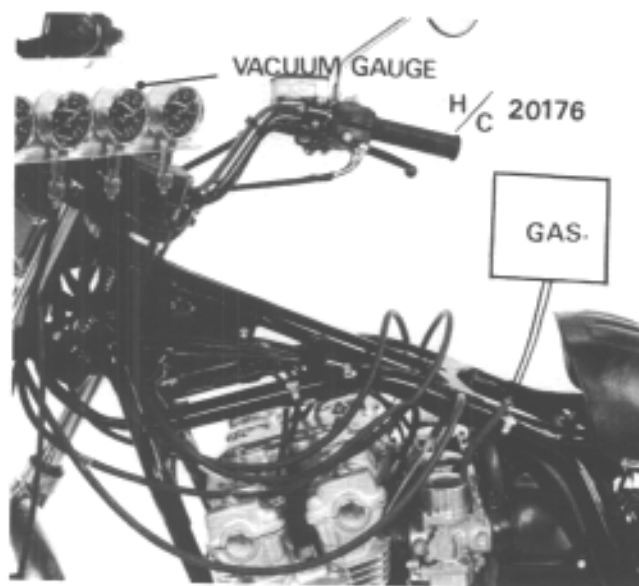
Synchronize the carburetors with the engine at normal operating temperature, transmission in neutral and motorcycle on the center stand.

Remove both side covers and raise the seat. Turn the fuel valve OFF and remove the fuel line and fuel tank.

Prepare a longer fuel line and reconnect it between the fuel tank and carburetor.

Position the fuel tank higher than normal.

Remove the plugs from the intake ports and install the vacuum gauge adapters. Connect the vacuum gauges.



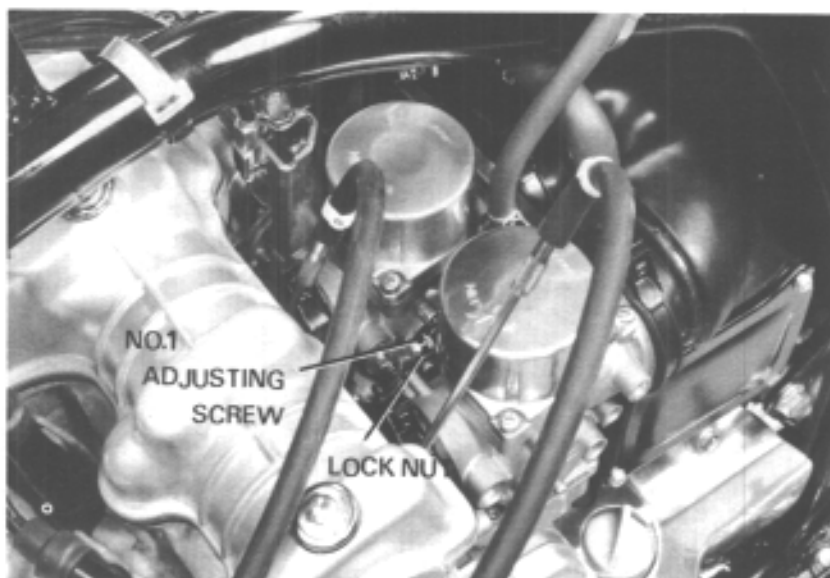
**ADJUSTMENT****NOTE**

The No.2 carburetor cannot be adjusted;  
it is the base.

Start the engine and adjust the idle speed.

**IDLE SPEED:  $1000 \pm 100$  rpm**

Check that the difference in vacuum readings  
is 60 mmHg (2.4 inHg) or less.



Adjust by loosening the lock nuts and turning  
the adjusting screws with the "Carburetor  
Throttle Wrench" tool.

**CARB. THROTTLE  
WRENCH**  
07908-20100



Tighten the lock nuts and recheck the idle  
speed and synchronization.



### IDLE SPEED ADJUSTMENT

#### NOTE

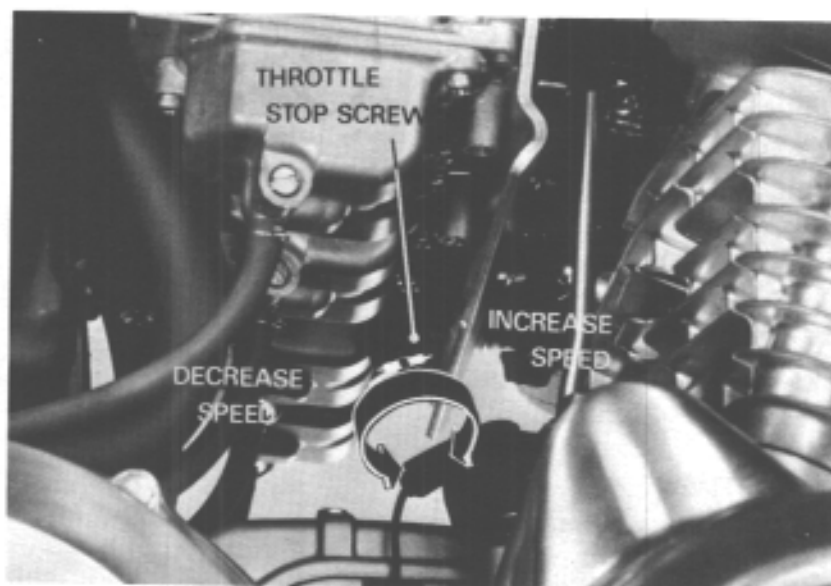
Inspect and adjust idle speed after all other engine adjustments are within specifications.

The engine must be warm for accurate idle adjustment. Ten minutes of stop-and-go driving 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: 1000 ± 100 rpm**



### COMPRESSION TEST

Warm up the engine.

Remove all spark plugs.

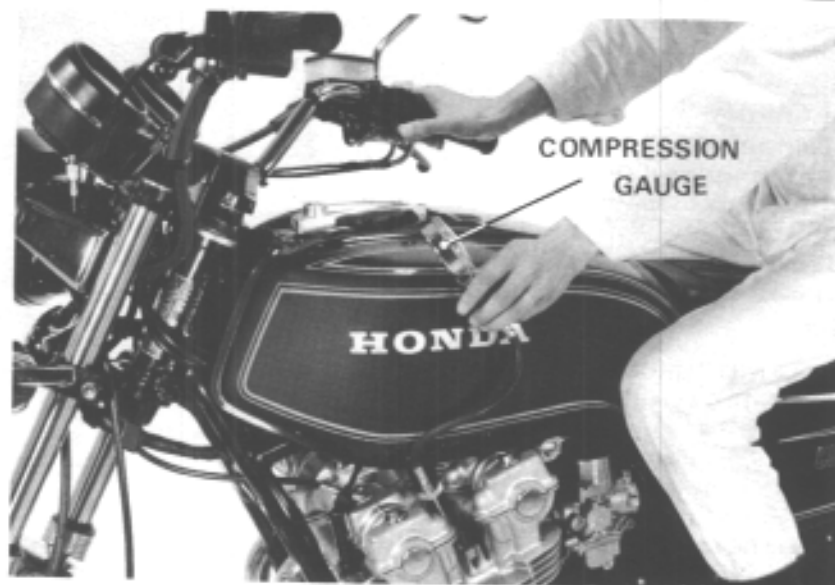
Insert the compression gauge.

Open the choke and throttle valves fully.

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:**  
**12 ± 1 kg/cm<sup>2</sup> (170 ± 14 psi)**

**If compression is low, check the following:**

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

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



## DRIVE CHAIN

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

**FREE PLAY:** 15–25 mm (5/8–1 in)

### CAUTION

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

## ADJUSTMENT

Remove the rear axle cotter pin and loosen the axle nut.

Loosen the adjuster bolt lock nuts.

Turn the adjuster bolts an equal number of turns to obtain the specified free play.

### CAUTION

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

Tighten the adjuster bolt lock nuts.

Tighten the axle nut and install a new cotter pin.

### AXLE NUT TORQUE:

8.0–10.0 kg-m (58–72 ft-lb)

Recheck free play and free wheel rotation.

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

inspect brake pedal free play (page 3–19).

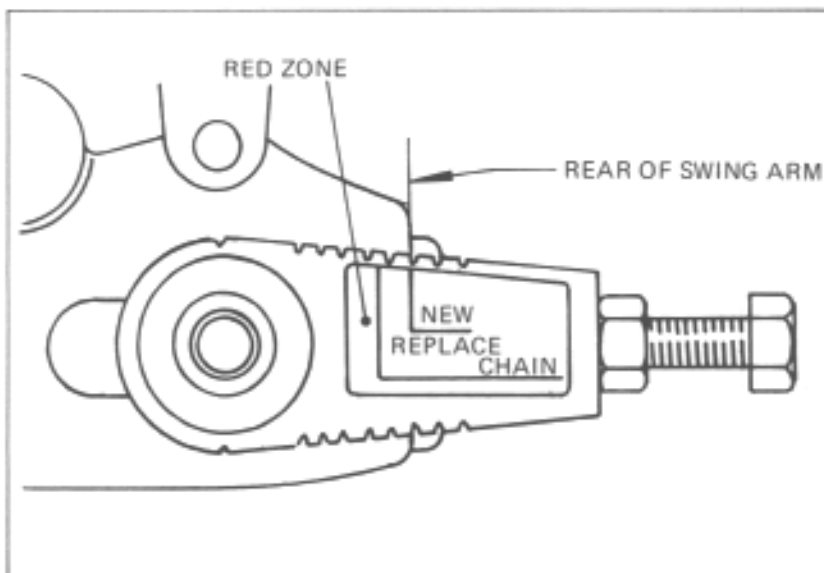
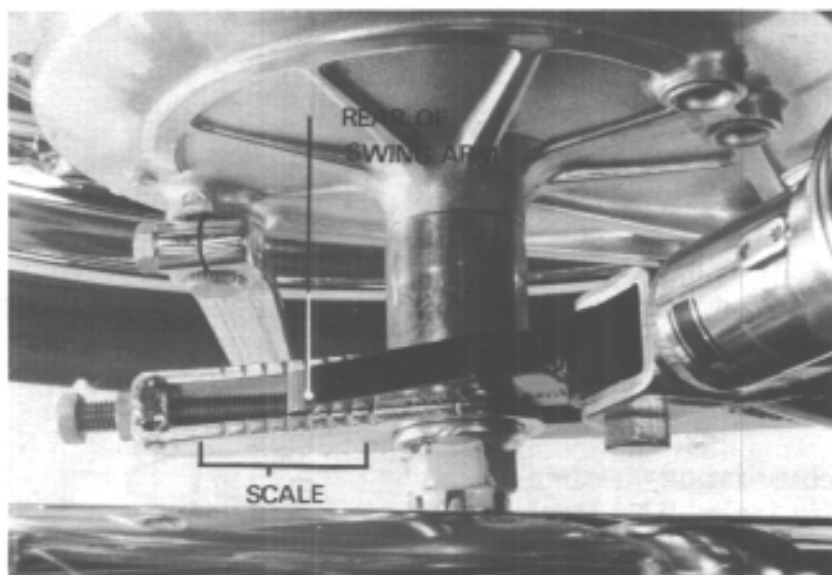
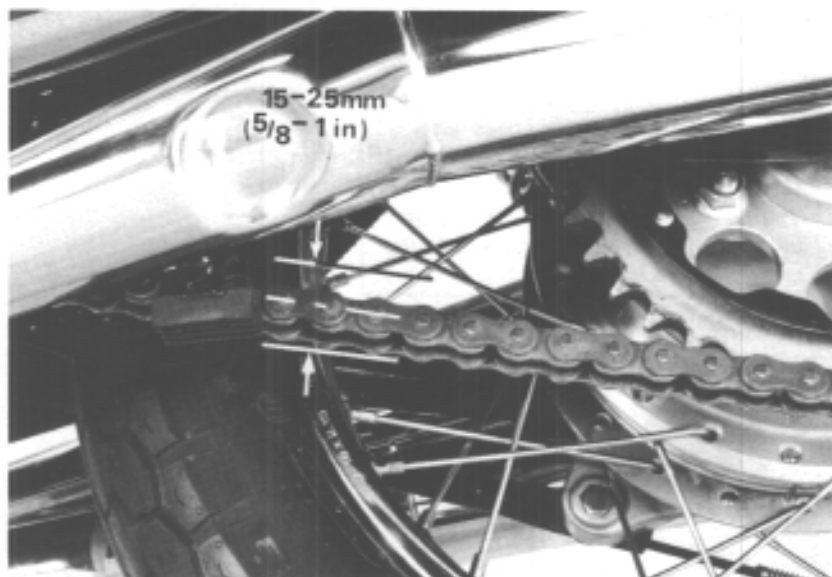
Replace the drive chain when the red zone on the label aligns with the rear of the swing arm and free play exceeds 20 mm (3/4 in).

**Replacement chain:** RK 630SO or DID 630VL  
90 links

Inspect the drive chain and sprockets for damage or wear. A drive chain with damaged rollers, loose pins, or missing O-ring 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 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 and left side covers.  
Disconnect the ground cable at the battery terminal.  
Disconnect the positive cable at the magnetic switch terminal.  
Remove the battery holder plate bolt.  
Remove the battery.  
Inspect the battery fluid level.  
When the fluid level nears the lower level, refill with distilled water to the upper level.

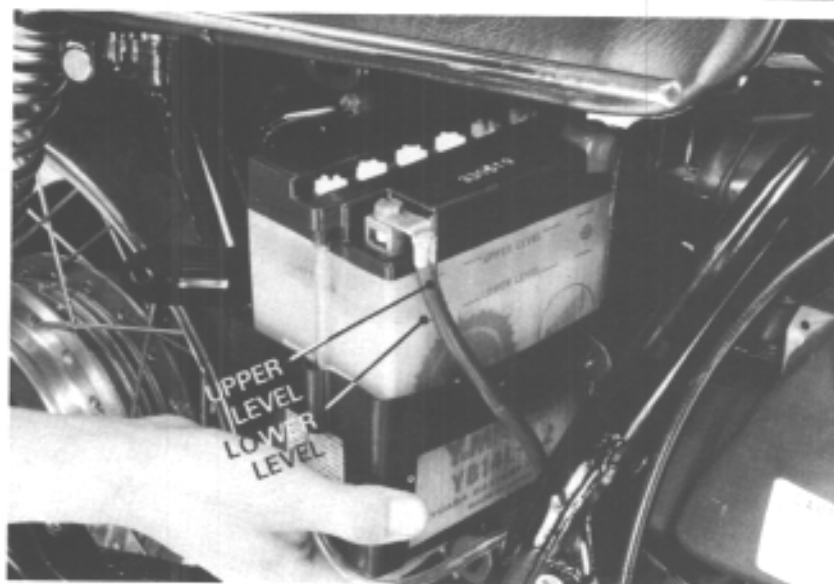
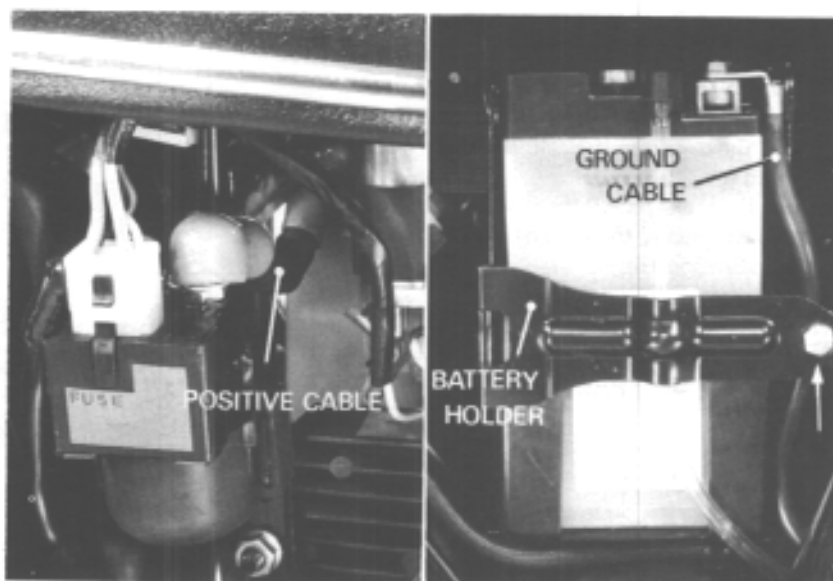
#### NOTE

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

#### 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.*

Replace the battery, if sulfation forms or sediments accumulate on the bottom.

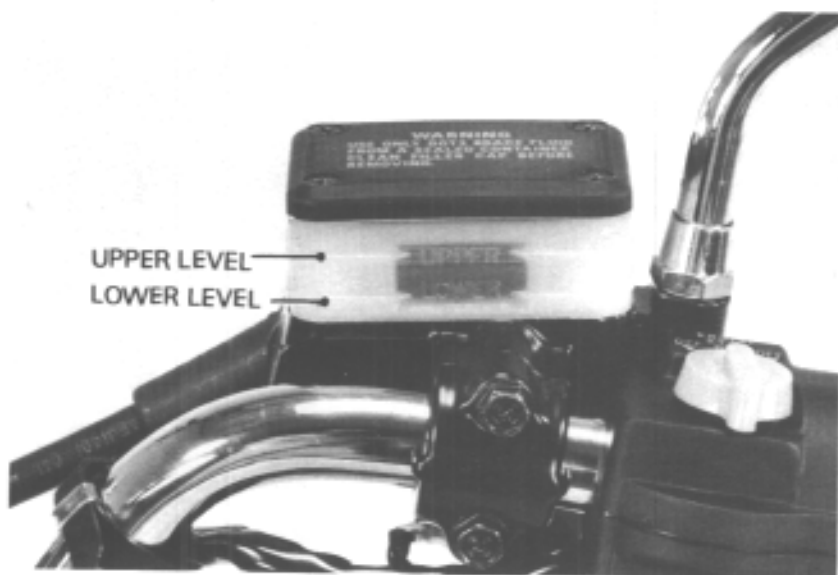


### BRAKE FLUID

Check the front brake fluid reservoir level.  
If the level nears the lower level mark, fill the reservoir with DOT-3 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 full right 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.





## BRAK PADS/SHOES WEAR

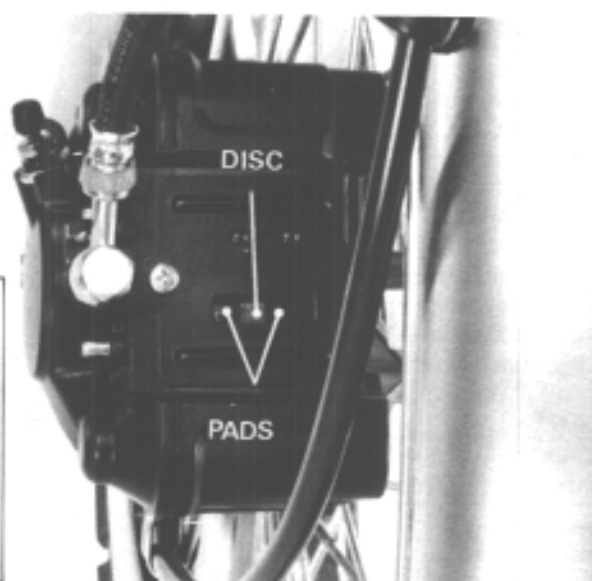
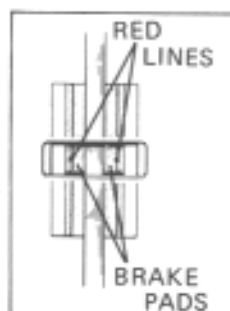
### BRAKE PAD WEAR

Remove the cap from the caliper and check for brake pad wear.

Replace the brake pads if the red line on the top of the pads reaches the edge of the brake disc. (Refer to Section 15).

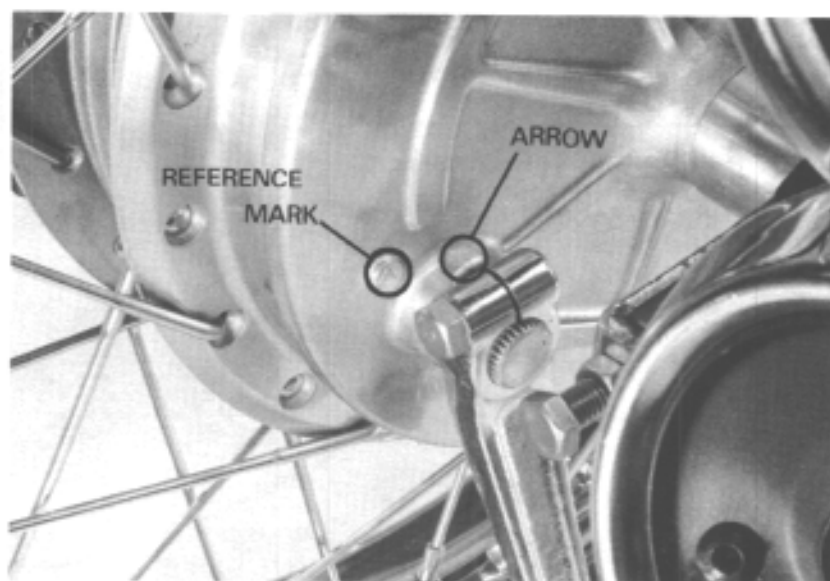
#### CAUTION

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



### BRAKE SHOE WEAR

Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "▼" on full application of the rear brake.



## BRAKE SYSTEM

Check that there is no deterioration, damage or leaks in brake lines and fittings.

Check the brake rod for loose connections, excessive play, or damage.

Inspect the brake stopper arm for a loose connection or damage.

Inspect the mounting of the rear brake arm to the brake cam to make sure the locking bolt is tight and the splines undamaged.

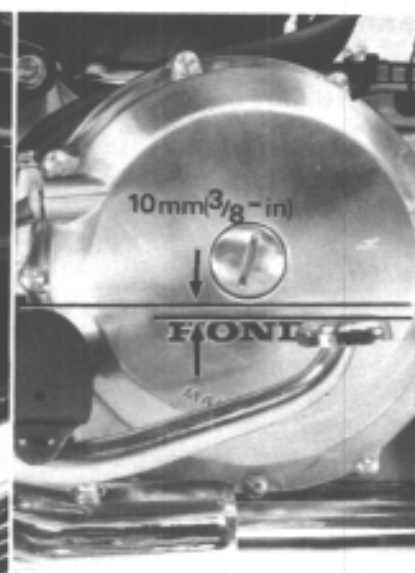
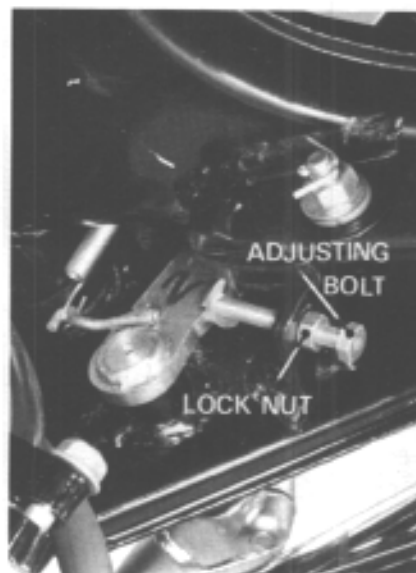
Check that the cotter pin is properly installed. Replace or repair if necessary.

### BRAKE PEDAL HEIGHT

Loosen the lock nut.

Adjust the pedal height so that the distance between the pedal and upper face of the foot-peg is 10 mm (3/8 in) by turning the adjusting bolt.

Tighten the lock nut.





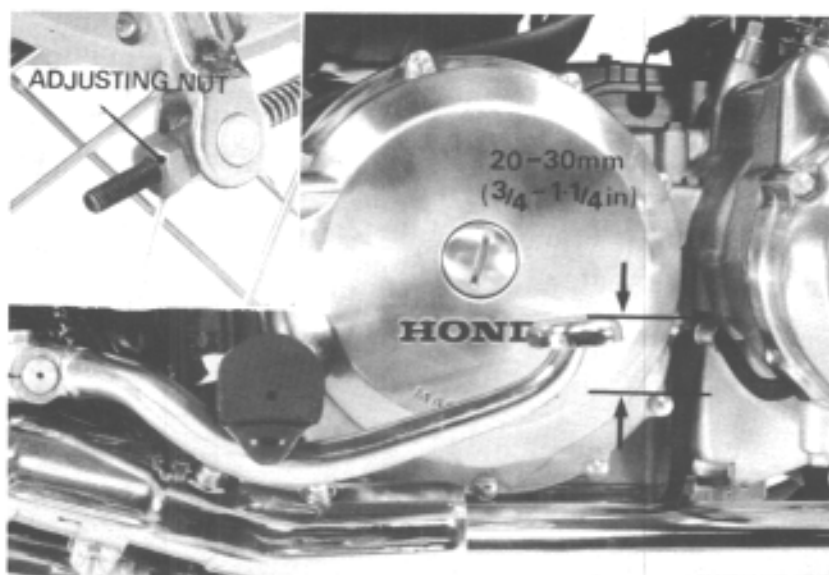


### BRAKE PEDAL FREE PLAY

Check the brake pedal free play.

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

Turn the rear brake adjusting nut, if necessary.



### BRAKELIGHT SWITCH

Adjust the brakelight switch so that the brakelight will light when the brake pedal is depressed and the brake begins engagement.

#### NOTE

- Do not turn the switch body.
- The front brakelight switch does not require adjustment.

Adjust by turning the switch adjusting nut as shown.



### HEADLIGHT AIM

Adjust vertically by loosening both headlight case mounting bolts.

Adjust horizontally by turning the adjusting screw on the headlight rim.

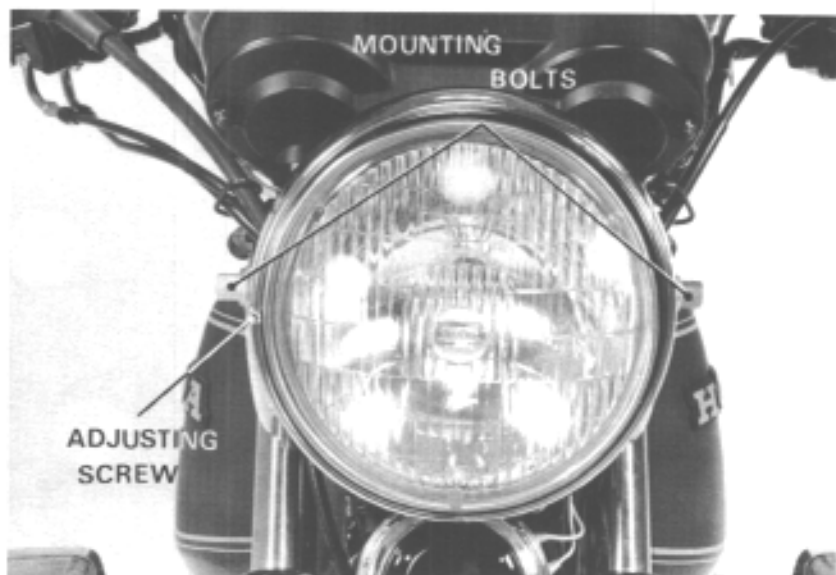
Turn the adjusting screw clockwise to direct the beam toward the right side of the rider.

#### 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.*

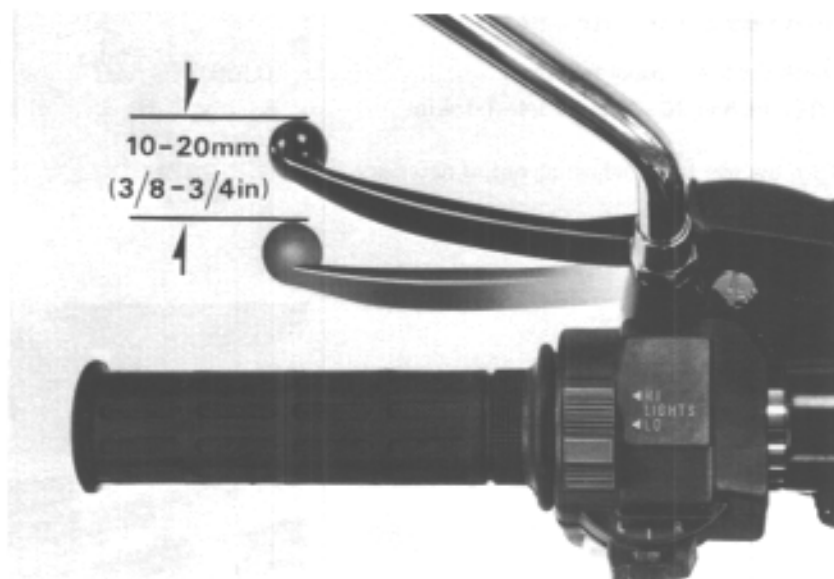




## CLUTCH FREE PLAY

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

**FREE PLAY:** 10–20 mm (3/8–3/4 in)



## ADJUSTMENT

Loosen the upper adjusting bolt's lock nut and turn the adjusting bolt until the correct free play is obtained.

Tighten the lock nut.

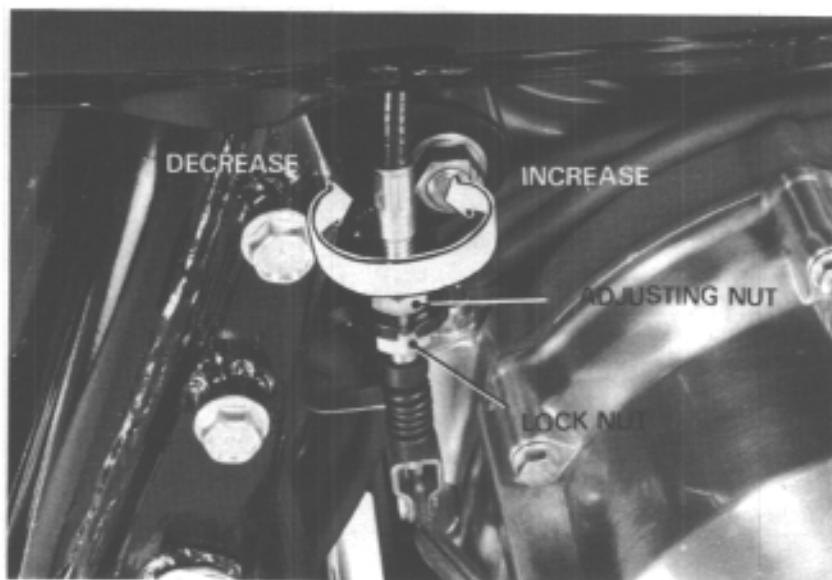
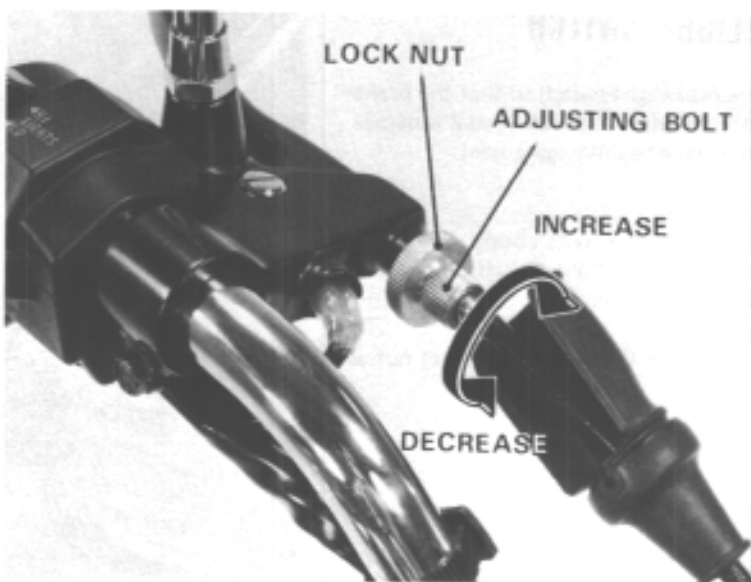
### NOTE

Do not expose the adjusting bolt threads more than 8 mm (5/16 in).

If adjustment cannot be made with the clutch lever adjusting bolt, screw the adjusting bolt all the way in.

Adjustment must be made at the clutch housing.

Loosen the lower clutch cable adjusting lock nut and turn the adjusting nut all the way out to obtain maximum free play.





Remove the clutch lifter cap, loosen the clutch lifter lock nut. Then turn the adjusting screw clockwise until a slight resistance is felt. From this position, turn the clutch adjusting screw counterclockwise  $3/4$  turn, and tighten the lock nut.

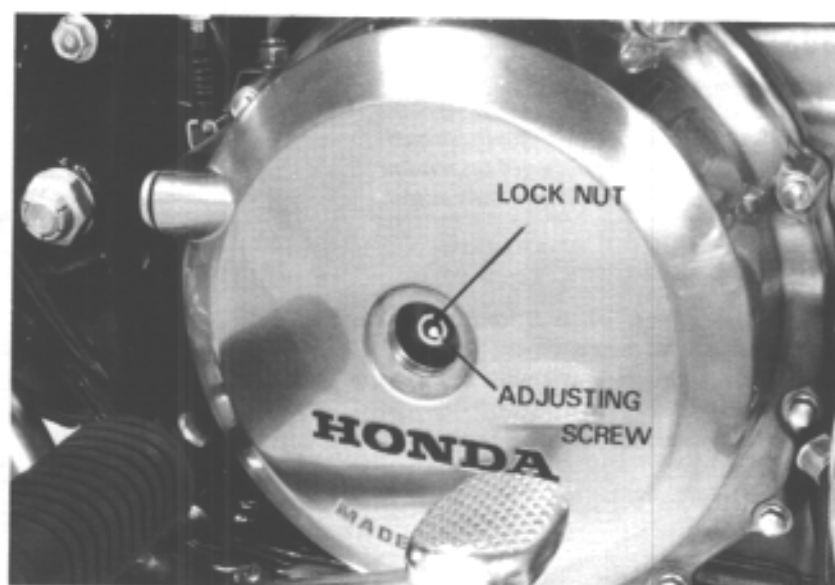
Install the lifter cap.

Turn the clutch cable lower adjusting nut so that there is 10–20 mm ( $3/8$ – $3/4$  in) of free play at the end of the clutch lever. Tighten the lock nut.

Any minor adjustment can be obtained with the adjusting bolt and lock nut at the clutch lever.

After adjustment, be sure all lock nuts are tightened securely.

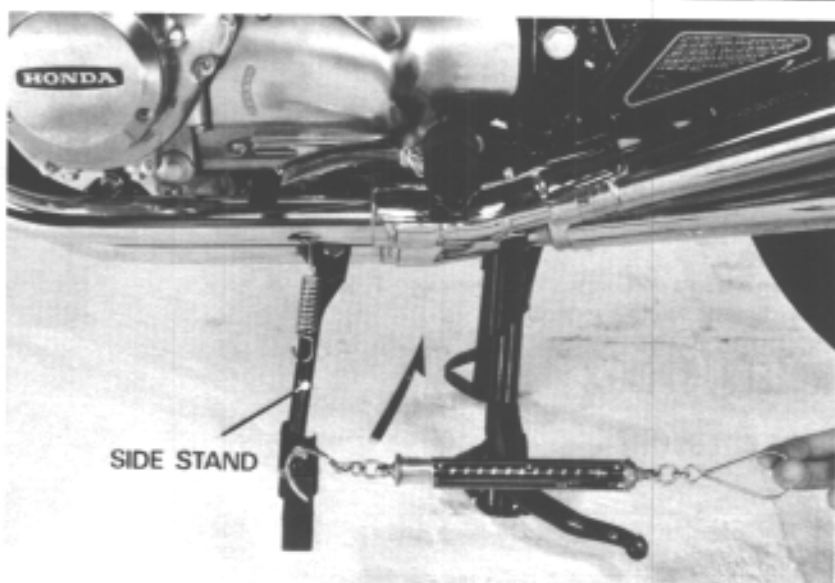
Check to see that the clutch is not slipping and is properly disengaging.



### SIDE STAND

Check the rubber pad for deterioration or wear. Replace if any wear exceeds to the wear line as shown.

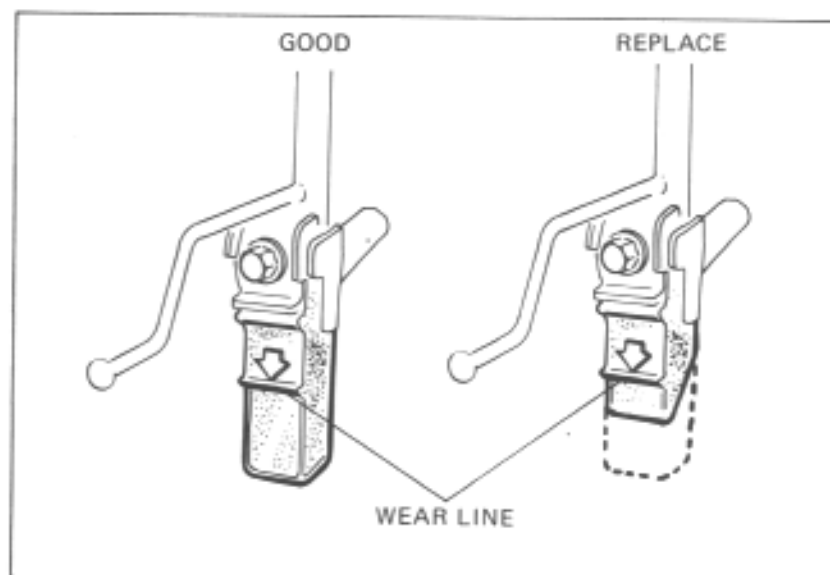
Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement and bending.



#### NOTE

When replacing, use a rubber pad with the mark "OVER 260 lbs ONLY".

Spring tension is correct if the measurements fall within 1.5–2.5 kg (3.3–5.5 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.



### REAR

Place the motorcycle on its center stand.

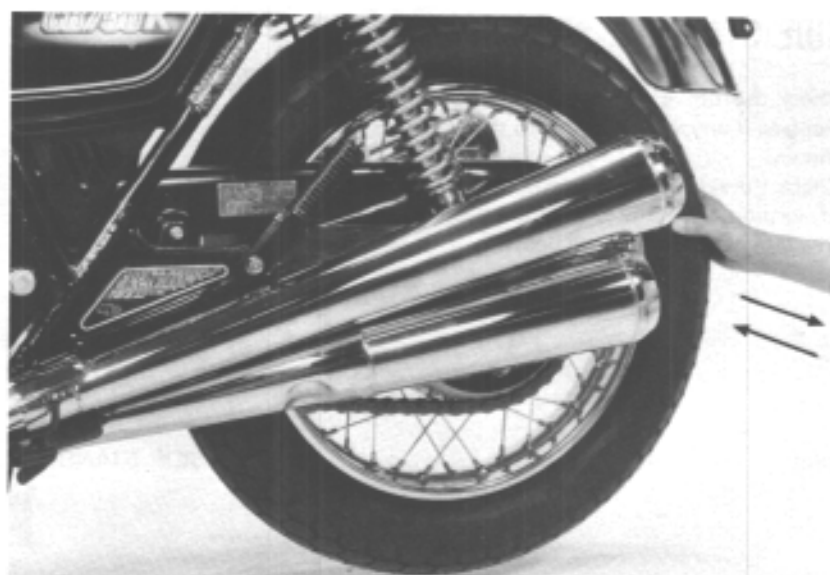
Move the rear wheel sideways with force to see if the swing arm bushings are worn.

Replace if excessively worn.

Check the entire suspension assembly to see if it is securely mounted, and not damaged or distorted.

Tighten all nuts and bolts.

Lubricate the swing arm bushings.



## WHEELS/SPOKES

### TIRE PRESSURE

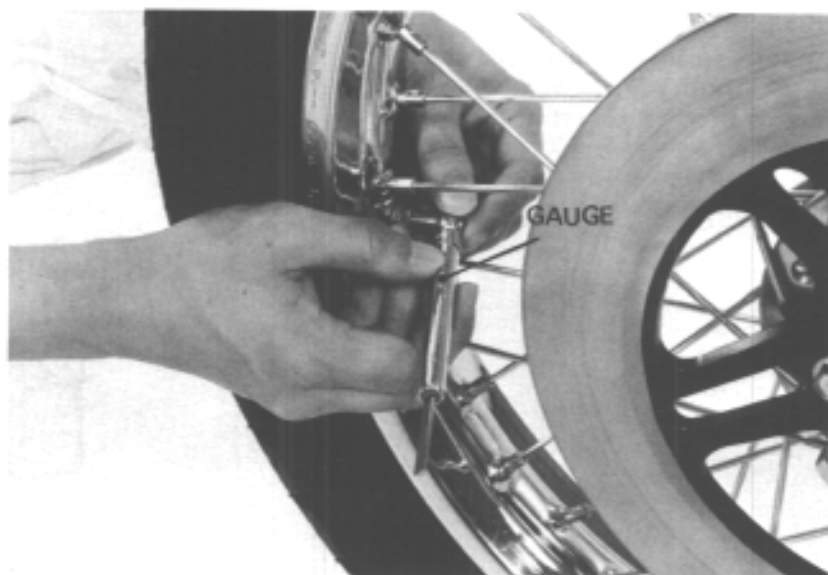
#### NOTE

Tire pressure should be checked when tires are **COLD**.

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

#### Recommended tire pressure and tire size:

Cold tire pressure kg/cm <sup>2</sup> (psi)	Up to 90 kg (200 lb) load	Front 2.0 (28) Rear 2.25 (32)
	Up to vehicle capacity load	Front 2.0 (28) Rear 2.8 (40)
Vehicle capacity load limit	163 kg (360 lbs)	
Tire size	Front	3.50H19-4PR
	Rear	4.25H18-4PR
Tire brand	Front	BRIDGESTONE S703
		DUNLOP F11
	Rear	BRIDGESTONE S710
		DUNLOP K127



Check the front and rear wheels for trueness.



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)

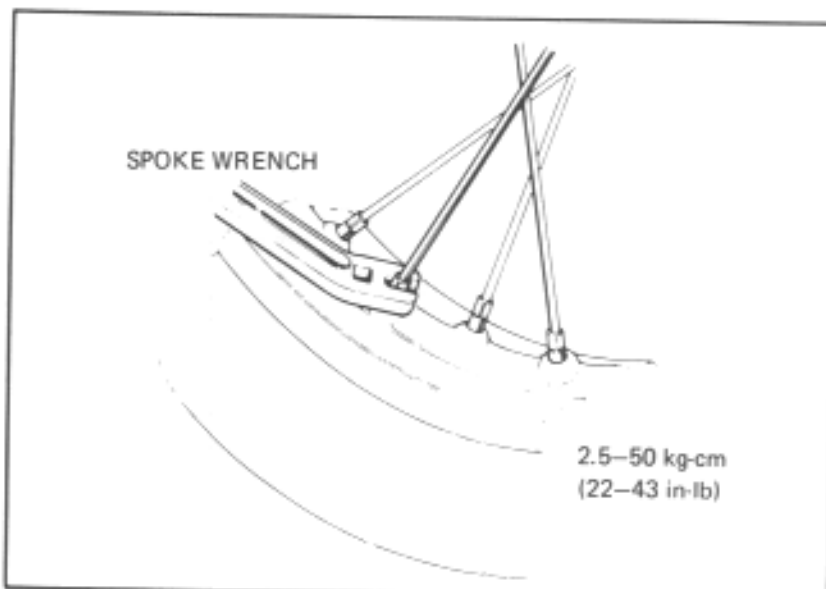
Rear: 2.0 mm (3/32 in)

### WHEEL SPOKES

Tighten the wheel spokes and recheck rim runout.

#### TORQUE:

25–50 kg-cm (22–43 in-lb)



### STEERING HEAD BEARINGS

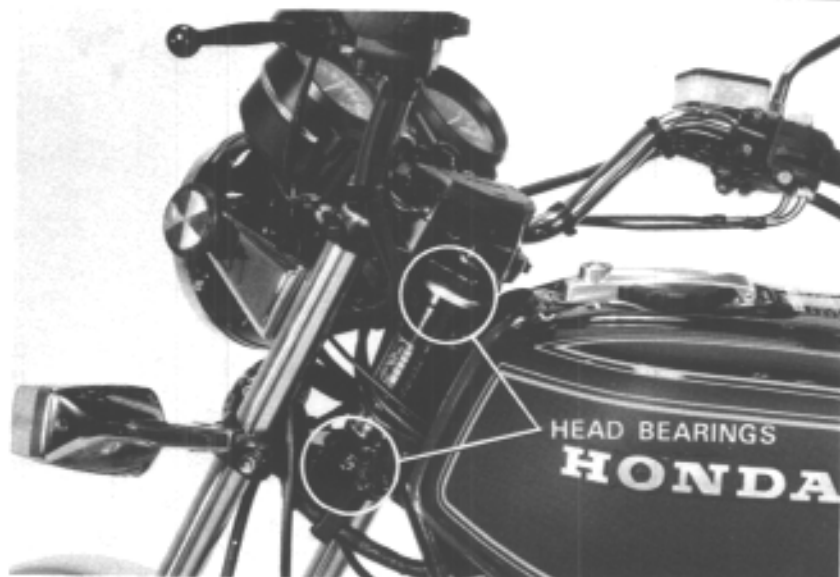
#### NOTE

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

Raise the front wheel off the ground.

Check that the handlebar rotates freely.

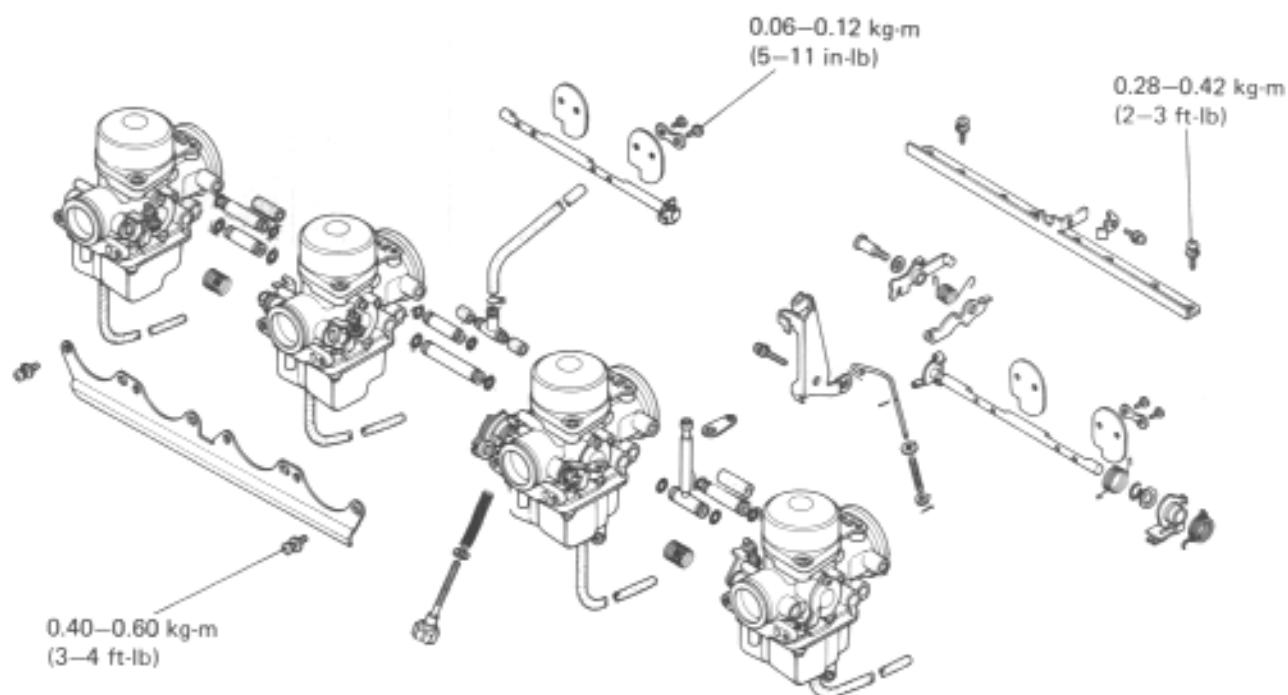
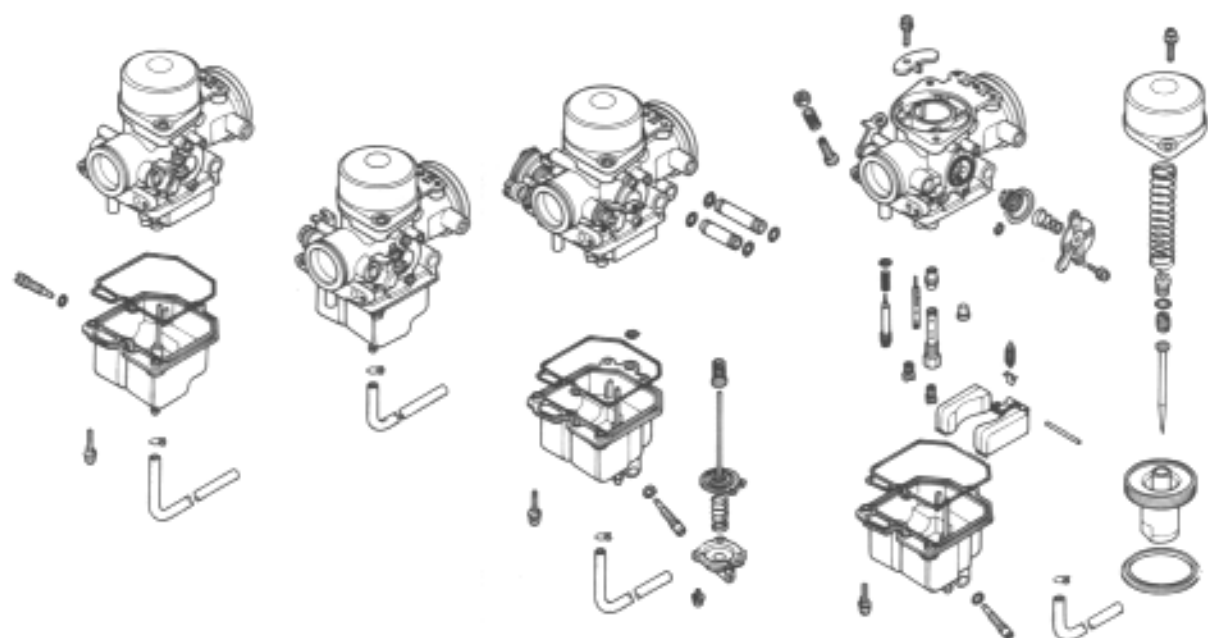
If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut with a pin spanner (page 13–27).



### NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to correct torque values.

Check all cotter pins and safety clips.





SERVICE INFORMATION	4-1	CARBURETOR SEPARATION	4-8
TROUBLESHOOTING	4-2	LINKAGE DISASSEMBLY	4-11
CARBURETOR REMOVAL	4-3	LINKAGE ASSEMBLY	4-12
VACUUM CYLINDER DISASSEMBLY	4-4	CARBURETOR ASSEMBLY	4-12
FLOAT CHAMBER DISASSEMBLY	4-5	FAST IDLE ADJUSTMENT	4-16
AIR CUTOFF VALVE DISASSEMBLY	4-6	ACCELERATOR PUMP ADJUSTMENT	4-16
ACCELERATOR PUMP DISASSEMBLY	4-7	PILOT SCREW ADJUSTMENT	4-17
COMPONENT ASSEMBLY	4-7	FUEL TANK	4-18
FLOAT LEVEL ADJUSTMENT	4-8	AIR CLEANER CASE	4-18

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- Use caution when working with gasoline. Always work in a well-ventilated area and away from sparks or flames.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them during assembly.
- The float bowls have drain plugs that can be loosened to drain residual gasoline.

### SPECIAL TOOLS

#### Special Tools

Carburetor Throttle Wrench	07908-4220100
Carburetor Pilot Screw Wrench	07908-4220200

#### Common Tool

Float gauge	07401-0010000
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### TORQUE VALUES

Front bracket	0.40-0.60 kg-m (3-4 ft-lb)
Rear bracket	0.28-0.42 kg-m (2-3 ft-lb)
Choke valve	0.06-0.12 kg-m (5-11 in-lb)

### SPECIFICATIONS

Venturi dia.	30 mm (1.18 in)
Setting mark	VB42A or VB42C
Float level	15.5 mm (0.61 in)
Main jet	Pri.: 68 2nd: 102
Idle speed	1000 ± 100 rpm
Throttle grip free play	2-6 mm (0.08-0.24 in)
Fast idle	2,000±500 rpm (after break-in)
Pilot screw	See page 4-17





## TROUBLESHOOTING

### Engine cranks but won't start

1. No fuel in tank
2. No fuel to carburetor
3. Engine flooded with fuel
4. No spark at plug (ignition malfunction)
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. Fast idle speed incorrect
4. Carburetor malfunction
5. Fuel contaminated
6. Intake air leak
7. Idle speed incorrect

### Rough idle

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

### Misfiring during acceleration

1. Ignition malfunction
2. Faulty air cutoff valve or accelerator pump

### Backfiring

1. Ignition malfunction
2. Carburetor malfunction
3. Faulty air cutoff valve or accelerator pump

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

1. Fuel system clogged
2. Ignition malfunction
3. Faulty accelerator pump

### Lean mixture

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

### Rich mixture

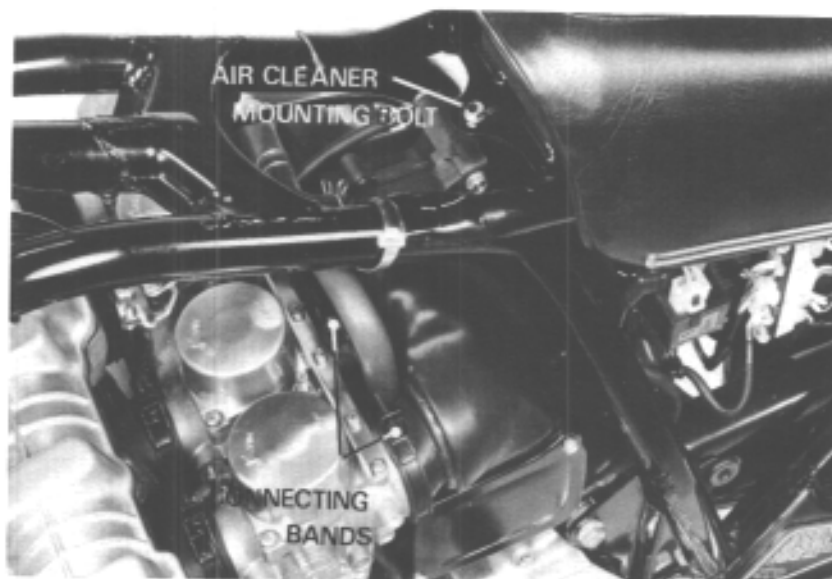
1. Clogged air jets
2. Faulty float valve
3. Float valve too high
4. Choke stuck closed
5. Stuck closed air cutoff valve
6. Dirty air cleaner



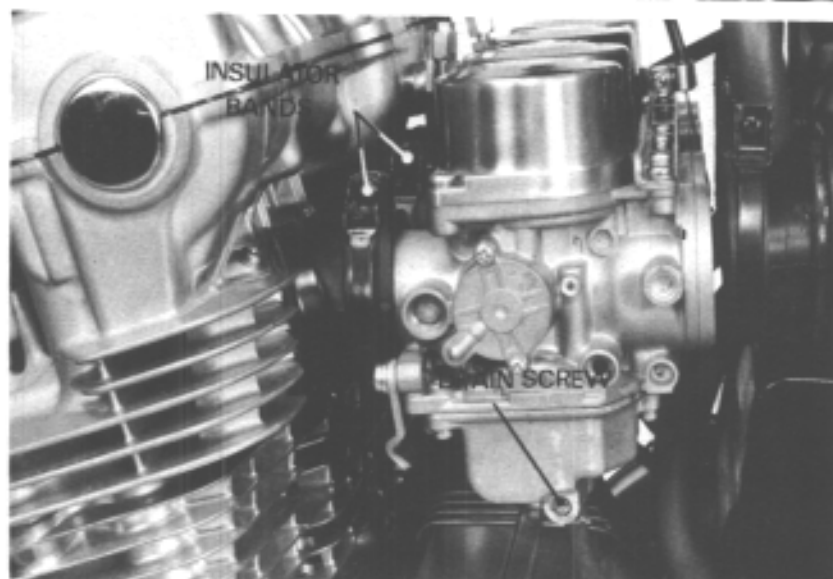


## CARBURETOR REMOVAL

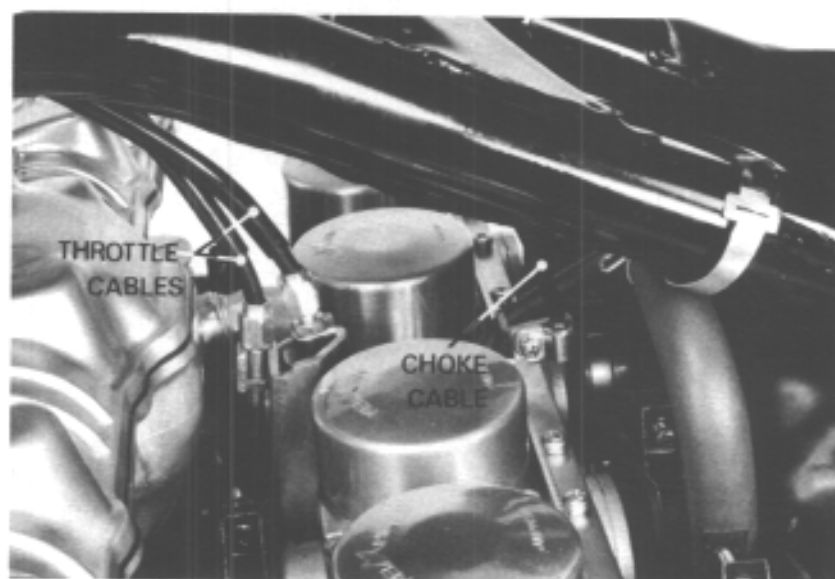
Turn the fuel valve "OFF" and disconnect the fuel line at the carburetor.  
Remove both side covers and raise the seat.  
Loosen the air cleaner connecting bands.  
Move the air cleaner to the rear.



Loosen the carburetor manifold bands.  
Drain residual fuel by loosening each drain screw.



Remove the carburetor assembly.  
Disconnect the throttle and choke cables.





## VACUUM CYLINDER DISASSEMBLY

Remove the vacuum cylinders from the carburetor bodies.

Carefully lift the vacuum piston out with the needle and compression spring.

Inspect the vacuum piston and cylinder for wear, nicks, scratches or other damage. Make sure that the piston and jet needle move up and down freely in the cylinder.

Remove the full open stopper.

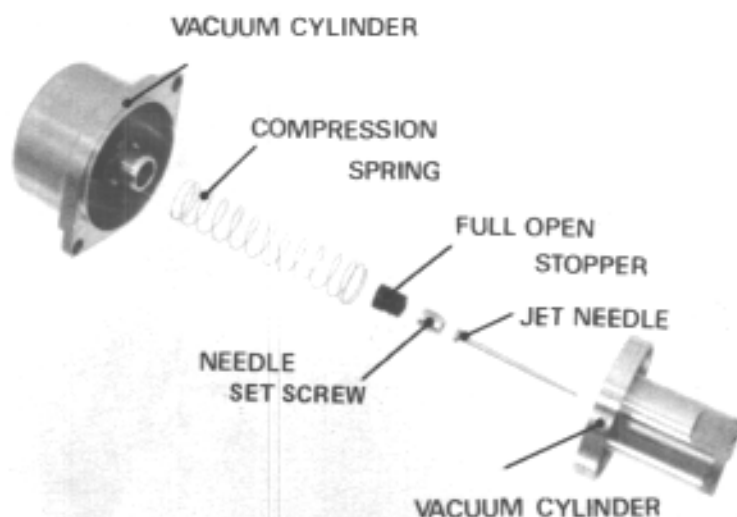
Remove the needle set screw.

Separate the jet needle from the piston.

Inspect the needle and seat for deposits, bending, grooves, or other damage.

Carefully lift the seal ring off the carburetor body.

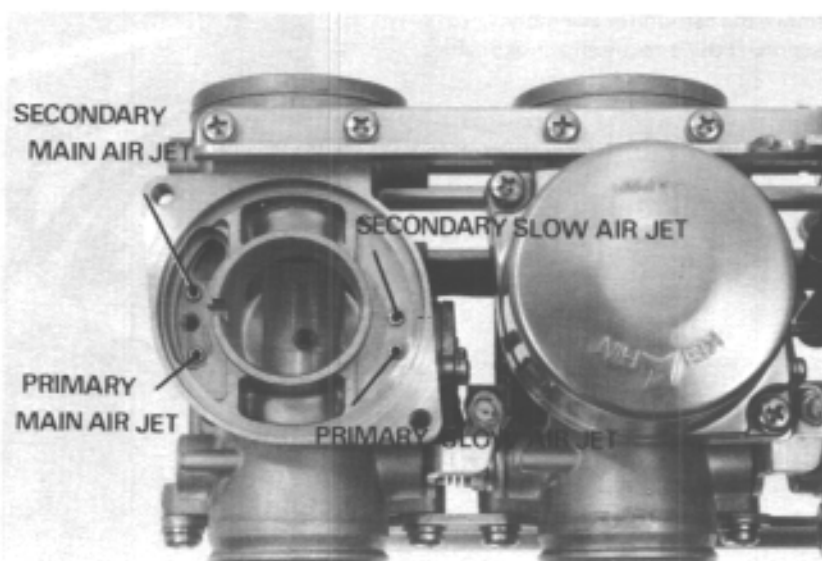
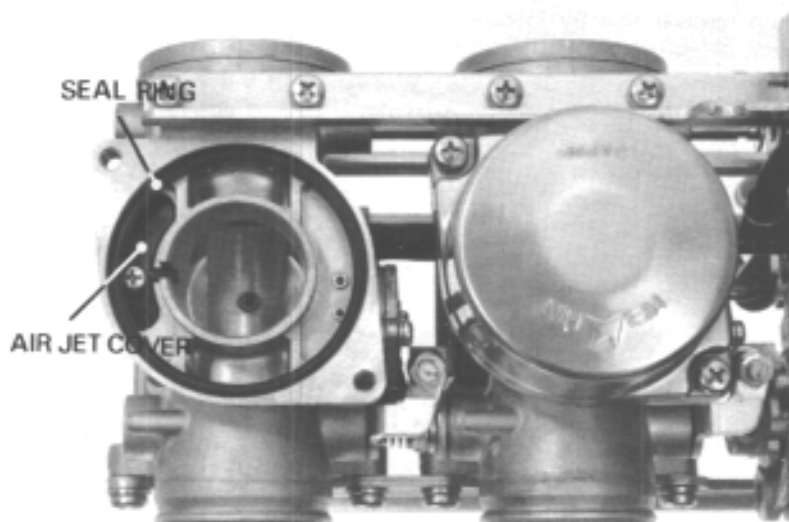
Remove the air jet cover.



Blow open the primary main air jet, secondary main air jet and slow air jet with compressed air.

### NOTE

Never clean carburetor jets with wire or drills. This will enlarge the openings and result in excessive fuel consumption.





## FLOAT CHAMBER DISASSEMBLY

Remove the float chamber body.

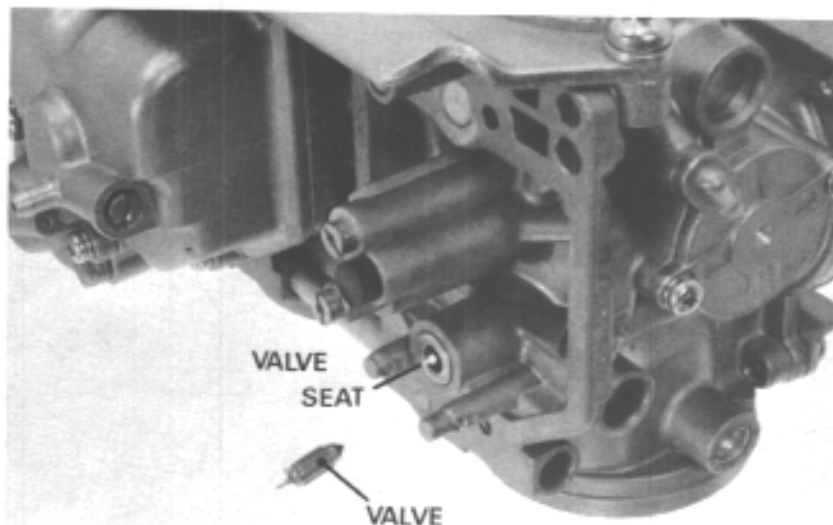
Pull out the float arm pin with a pair of pliers.

Remove the float and float valve.



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

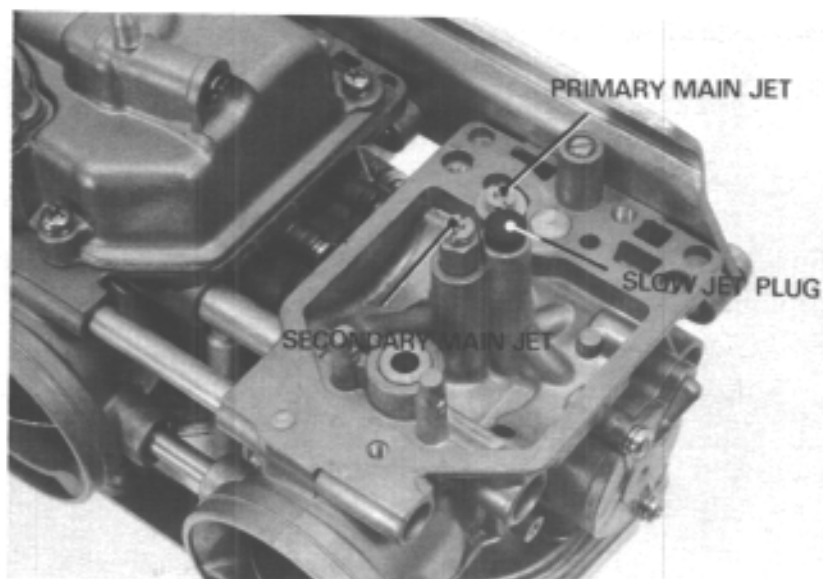
Inspect the float valve operation.



Remove the secondary main jet.

Remove the primary main jet.

Remove the slow jet plugs.




**NOTE**

The slow air jet cannot be removed.  
It is a press fit.

Remove the primary nozzle.

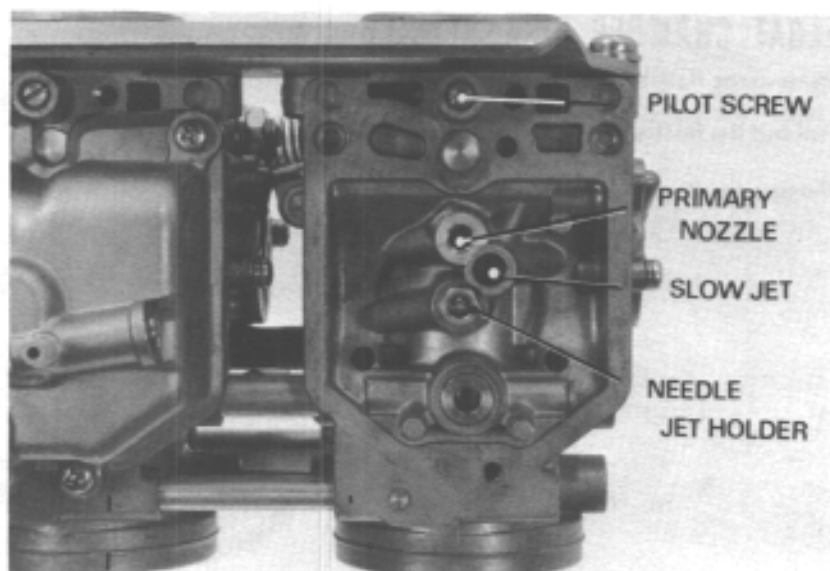
Remove the needle jet holder.

Tilt the carburetor to remove the needle jet.

Blow all jets and body passages with compressed air.

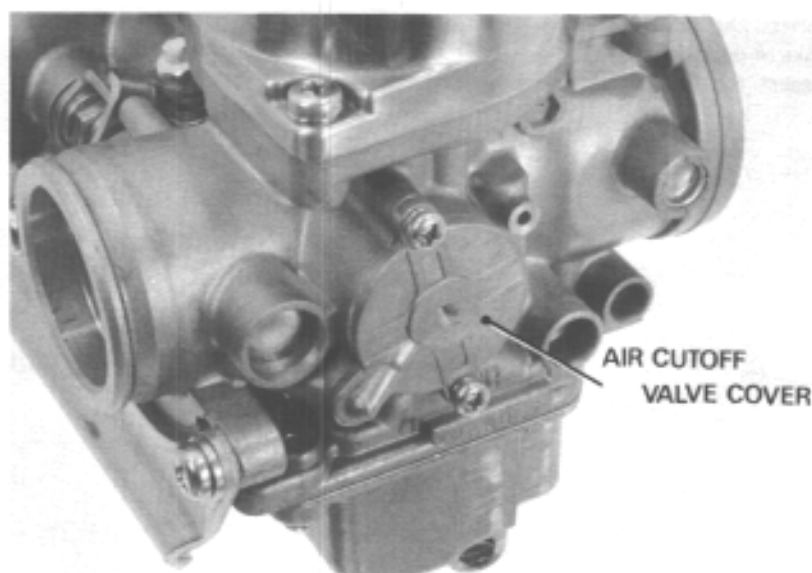
**NOTE**

- If the needle jet is difficult to remove, carefully press the needle jet from the cylinder side with a soft material.
- Before removing the pilot screws, record the number of turns necessary to make them seat to ensure original assembly.
- Do not damage the pilot screw threads when removing the plain washer and O-ring.

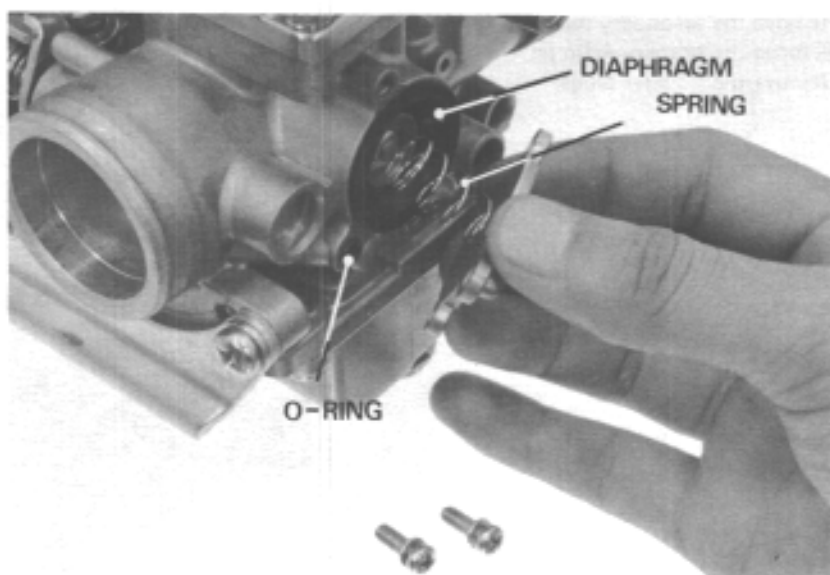


## AIR CUTOFF VALVE DISASSEMBLY

Remove the air cutoff valve cover and spring.

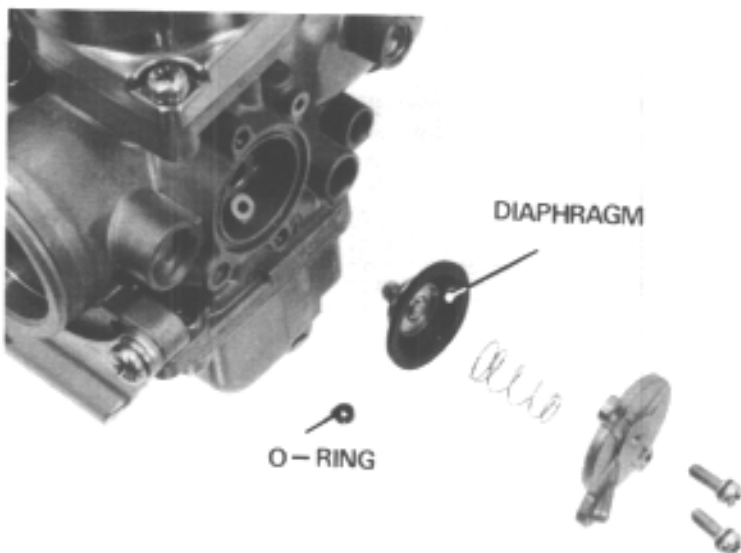


Remove the diaphragm and O-ring.



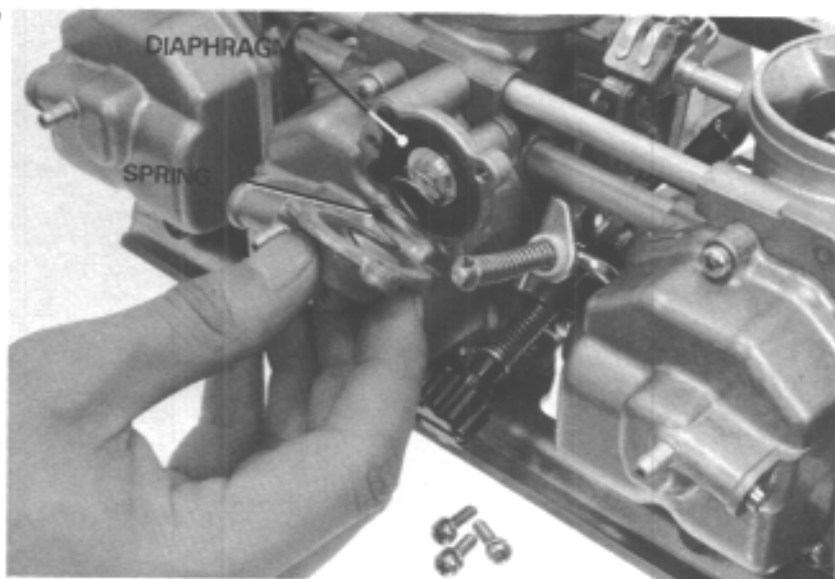


Inspect the diaphragm and valve for cracks and brittleness.



### ACCELERATOR PUMP DISASSEMBLY

Remove the accelerator pump cover and spring.



Remove the diaphragm.  
Inspect the diaphragm for cracks and brittleness.

#### NOTE

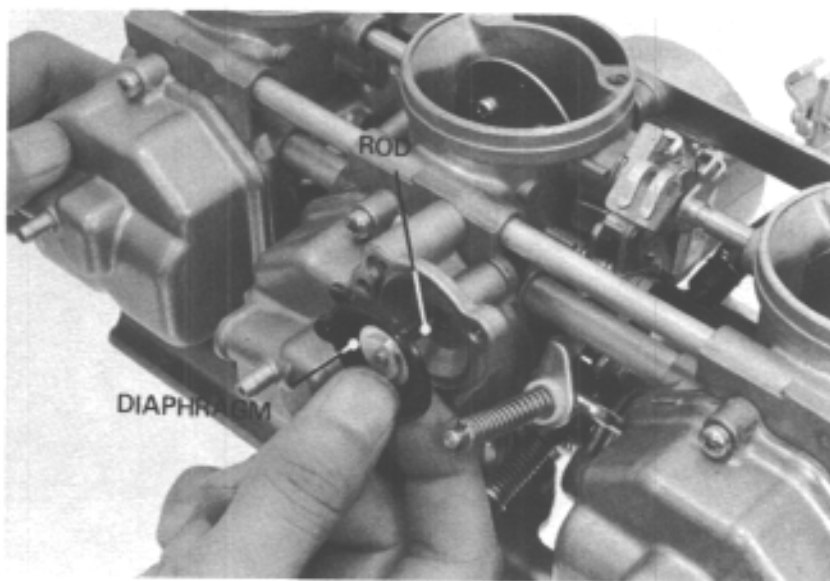
Be sure the accelerator pump rod is not bent.

### COMPONENT ASSEMBLY

To assemble the accelerator pump, air cutoff valve, float chamber and vacuum cylinder, reverse the disassembly procedure.

#### NOTE

When installing the air cutoff valve O-ring, make sure the flat surface is toward the body.





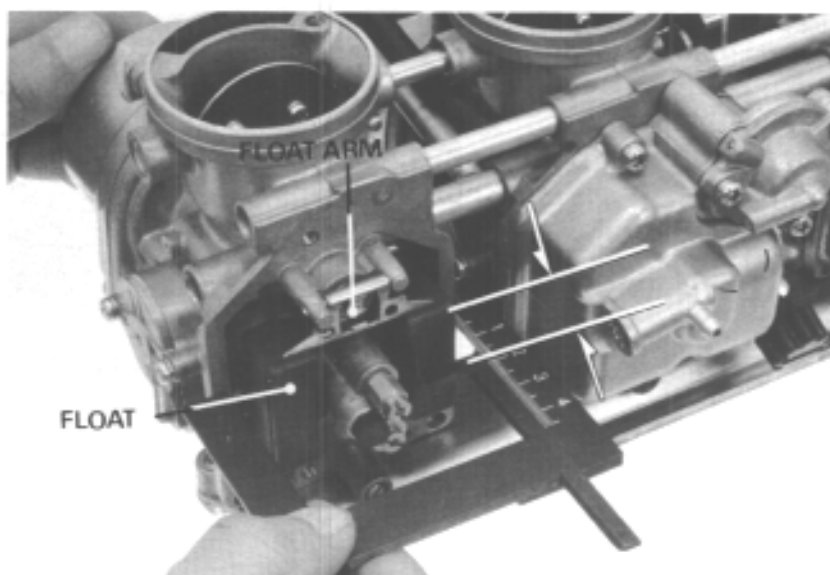
## FLOAT LEVEL ADJUSTMENT

To adjust the float level, bend the float arm carefully until it just contacts the float valve.

**FLOAT LEVEL: 15.5 mm (0.61 in)**

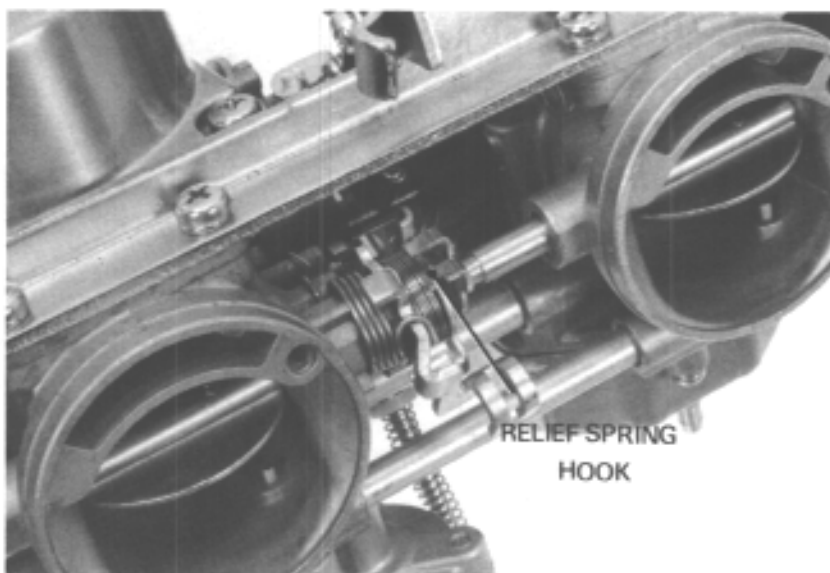
### NOTE

Before adjusting, remove the adjacent chambers.



## CARBURETOR SEPARATION

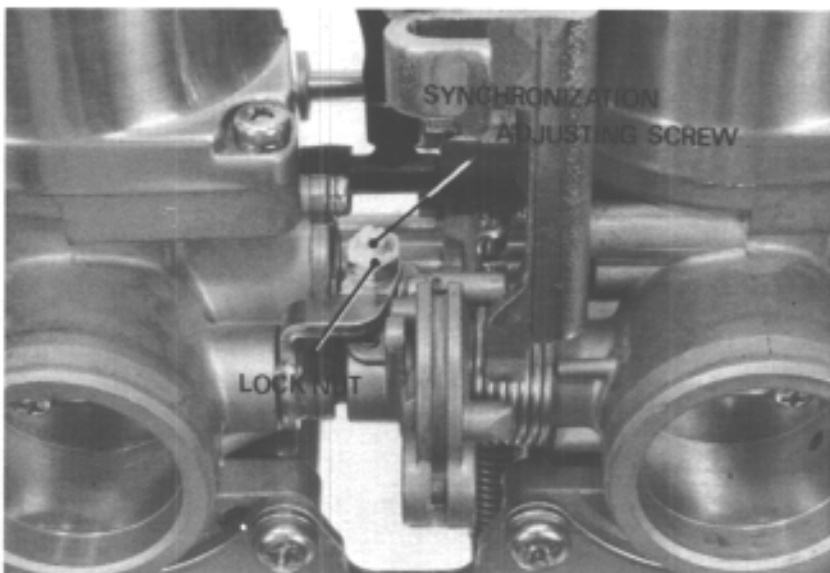
Unhook the choke relief spring from the choke shaft arm of the No.3 and No.4 carburetors.



Loosen the synchronization adjusting screw lock nuts and adjusting screw until there is no tension.

### NOTE

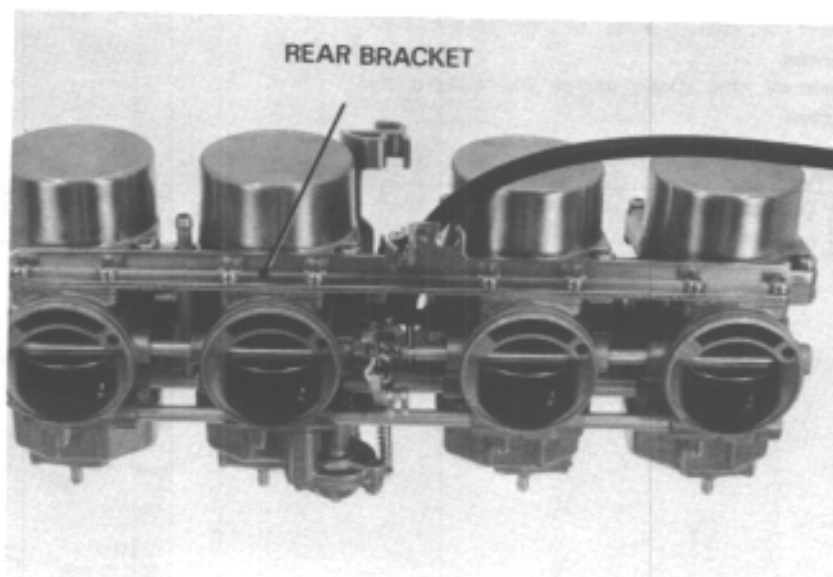
Turn the synchronization screws in until they seat and note the number of turns to ensure original positioning.



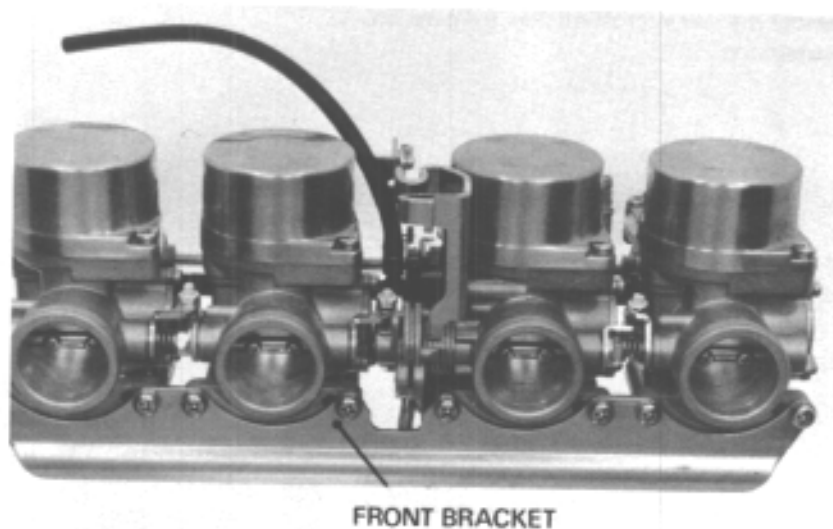




Remove the rear bracket.



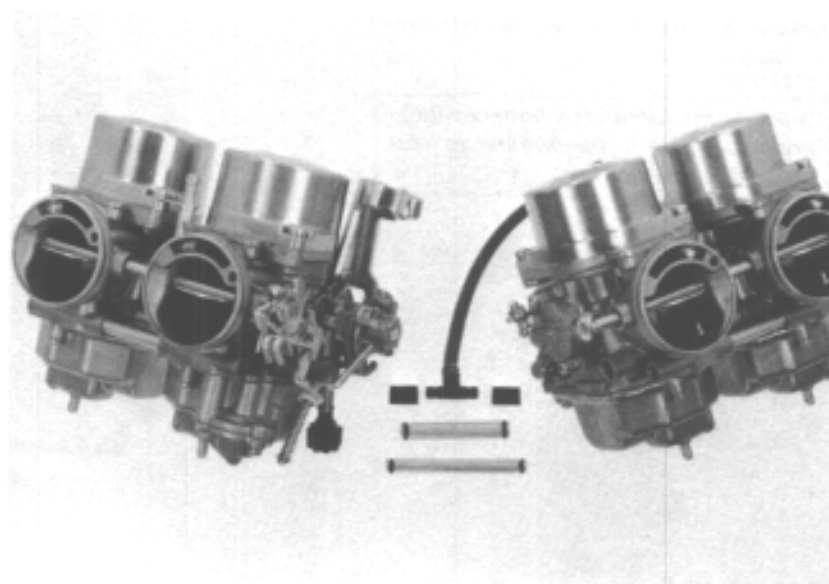
Remove the front bracket.



Carefully separate the carburetors into No. 1,2 and No. 3,4.

**CAUTION**

*Separate the carburetors horizontally to prevent damage to the fuel and air joint pipes and choke linkage.*

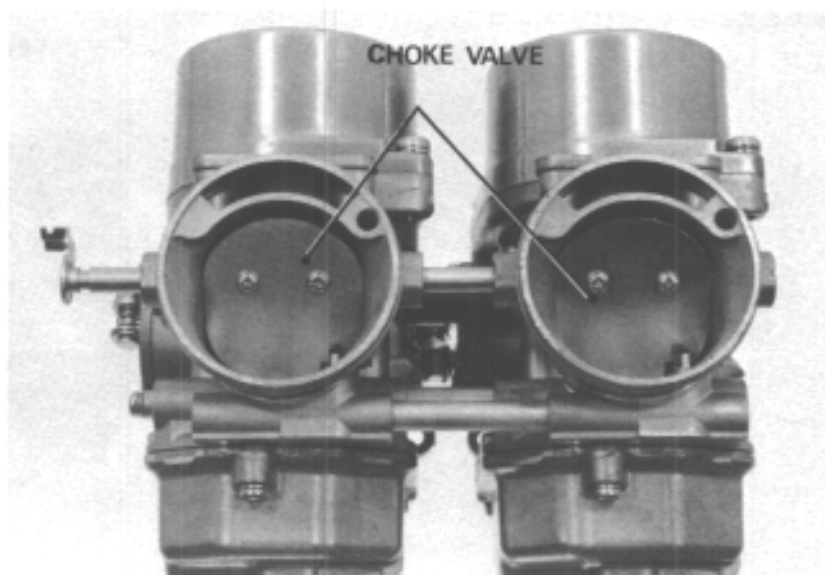




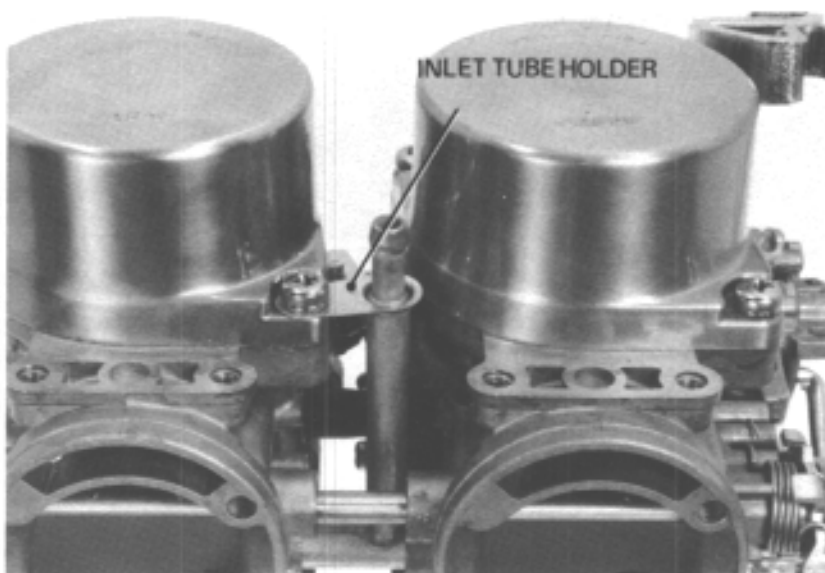
File the staked ends of the choke valve screws.  
 Remove the choke valves and discard the screws.

**NOTE**

Do not allow the cut ends to enter the carburetors.



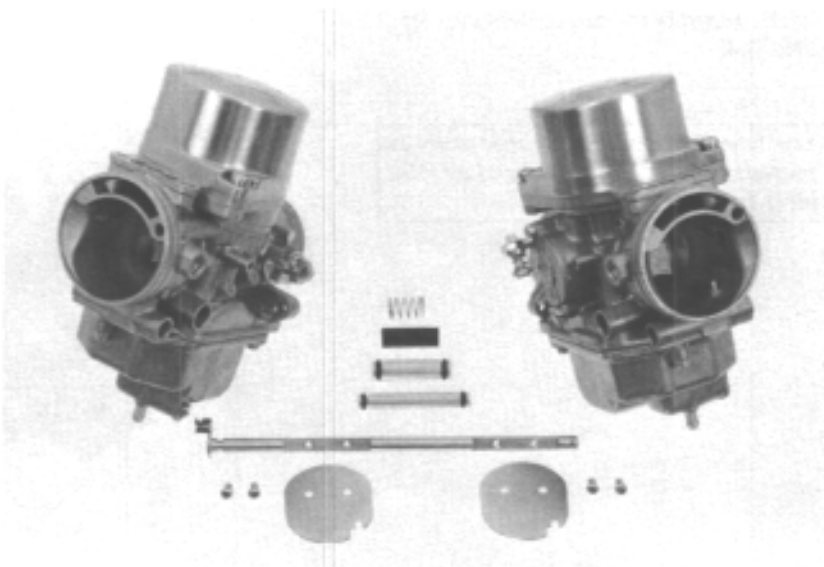
Remove the fuel inlet tube holder from the No. 1 carburetor.



Carefully separate the individual carburetors.

**CAUTION**

*Separate the carburetors horizontally to prevent damage to the fuel and air joint pipes and choke link.*





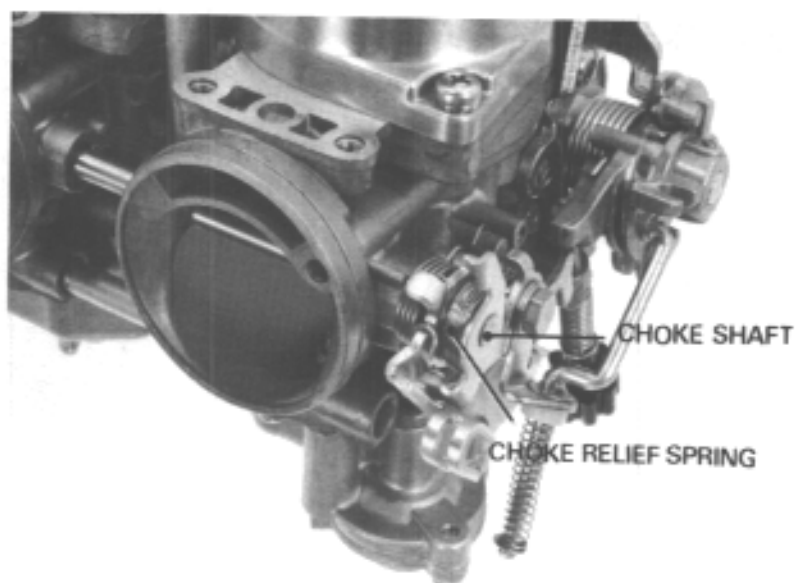


## LINKAGE DISASSEMBLY

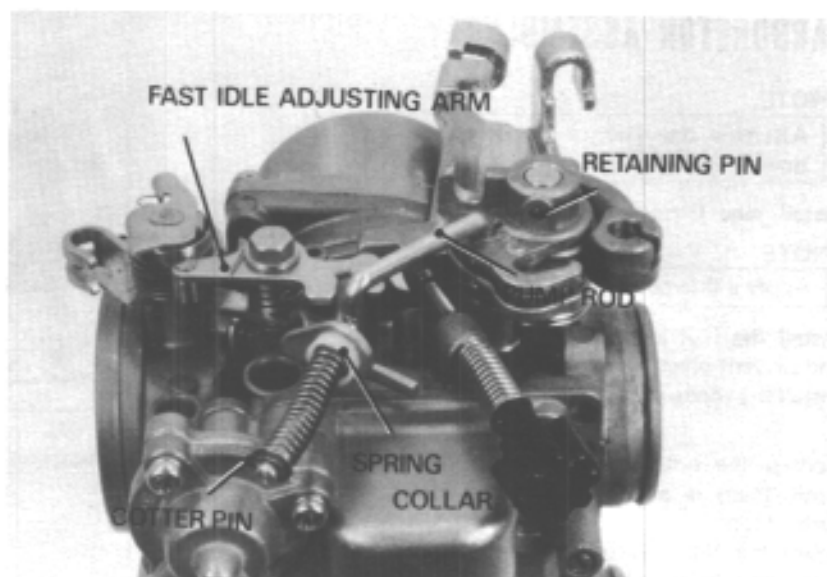
Note the spring positions.  
Remove the choke relief spring from the choke link and pull the choke shaft out.

**CAUTION**

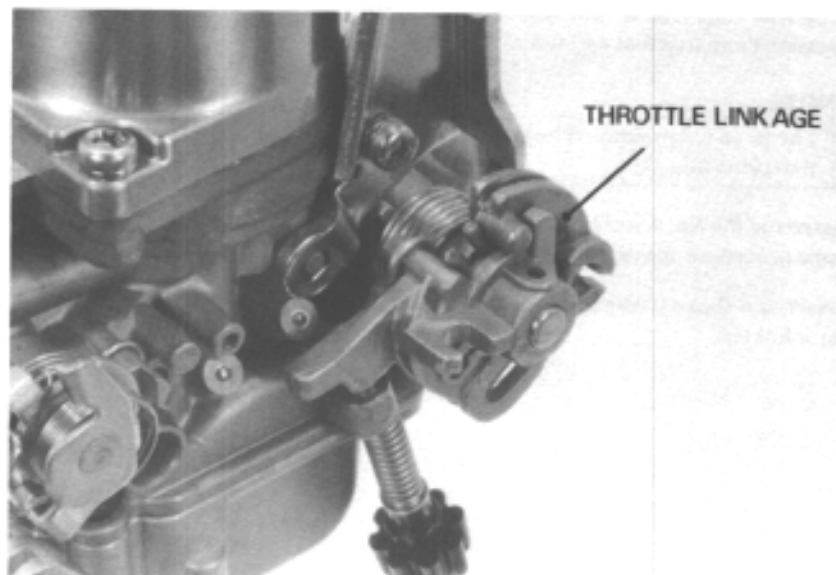
*Do not reuse the choke shaft, or choke valves and screws.*



Remove the cotter pin from the accelerator pump rod.  
Remove the plain washers, spring and collar.  
Remove the fast idle adjusting arm bolt.  
Remove the fast idle adjusting arm and springs.  
Remove the accelerator pump rod.  
Drive out the throttle link retaining pin.



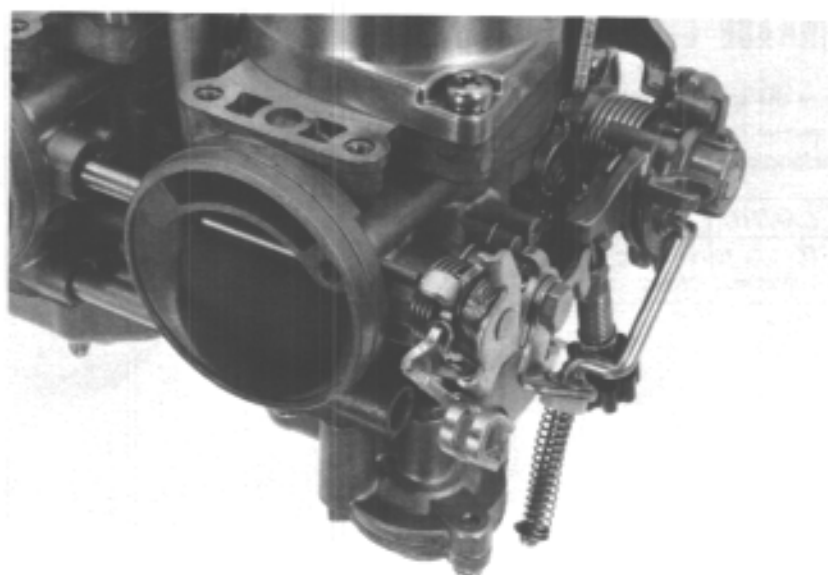
Remove the throttle linkage.





## LINKAGE ASSEMBLY

To assemble the carburetor linkage, reverse the disassembly procedure.



## CARBURETOR ASSEMBLY

### NOTE

Assemble one pair of carburetors at a time.

Install new O-rings on the fuel joint pipes.

### NOTE

Apply a thin coating of oil to the O-rings.

Install the fuel joint, accelerator pump joint and air vent pipes on the No. 3 carburetor.  
Install the choke dust tube.

Loosen the synchronization adjusting screw until there is no tension when assembling carburetors.

Insert the No. 3 carburetor throttle link between the plain washers.

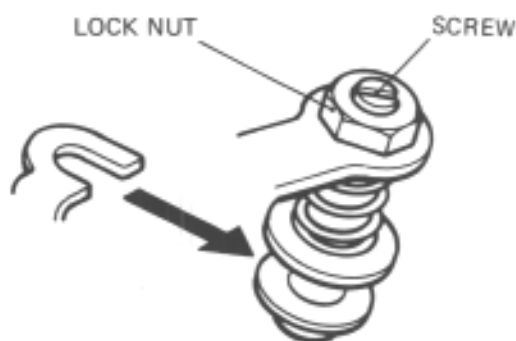
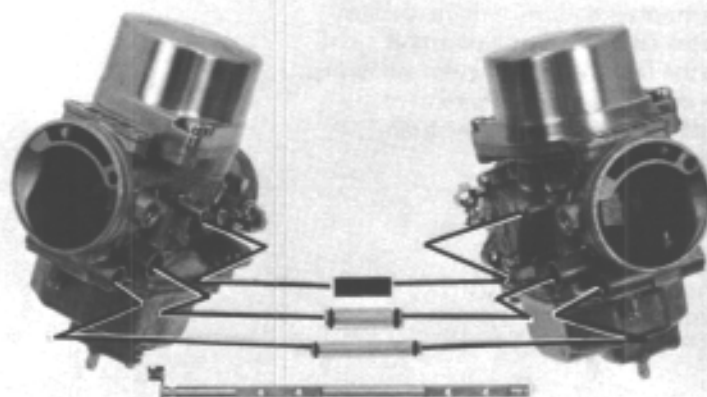
Assemble the No. 3 and No. 4 carburetors, pressing them together carefully.

### NOTE

The large washer should be positioned on the spring side.

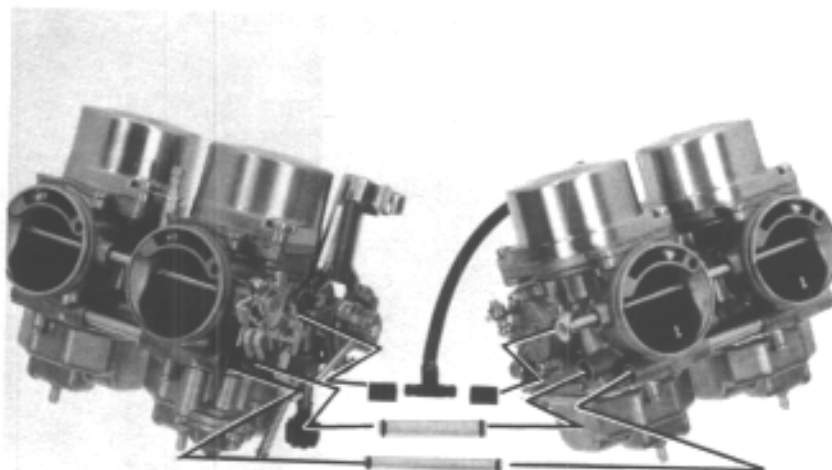
Assemble the No. 1 and No. 2 carburetors in the same procedure above.

Insert new choke shafts and assemble the carburetor linkage.





Assemble each pair of carburetor by following the procedure described for the No. 3 and 4 carburetors.



Install the front bracket loosely.  
Place the carburetors on a flat surface with the float chamber up.  
Press the carburetors together carefully and evenly tighten the screws in the sequence shown in two or more steps to prevent carburetor misalignment.

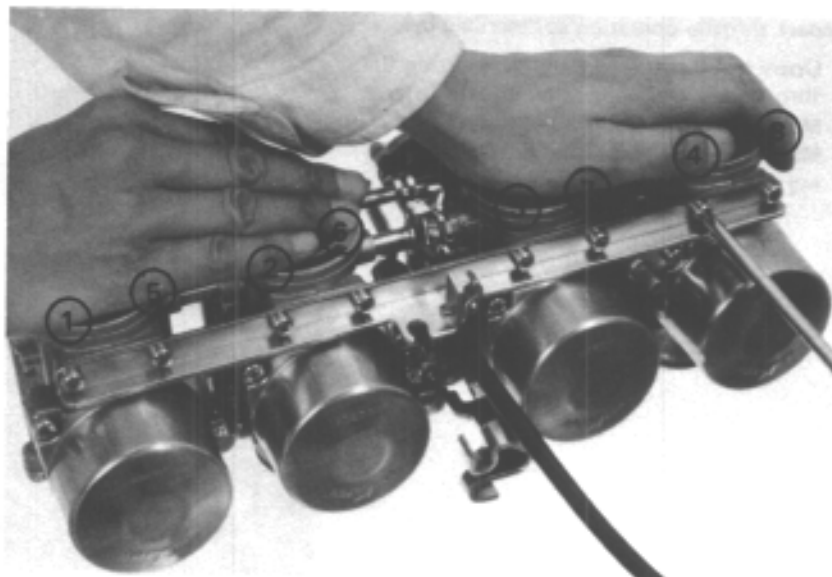
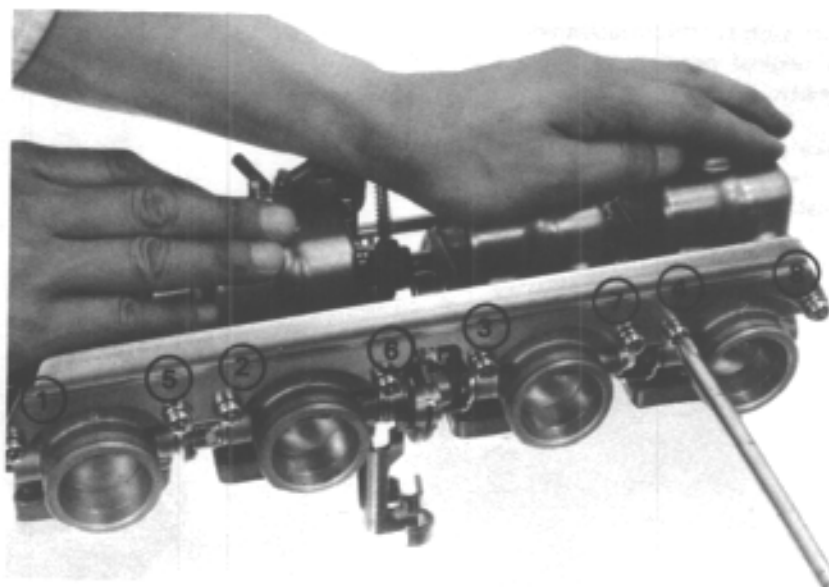
**TORQUE:** 0.4–0.6 kg-m  
(3–4 ft-lb, 36–48 in-lb)

### NOTE

Check for smooth choke shaft operation. If it is not, recheck the carburetor alignment.

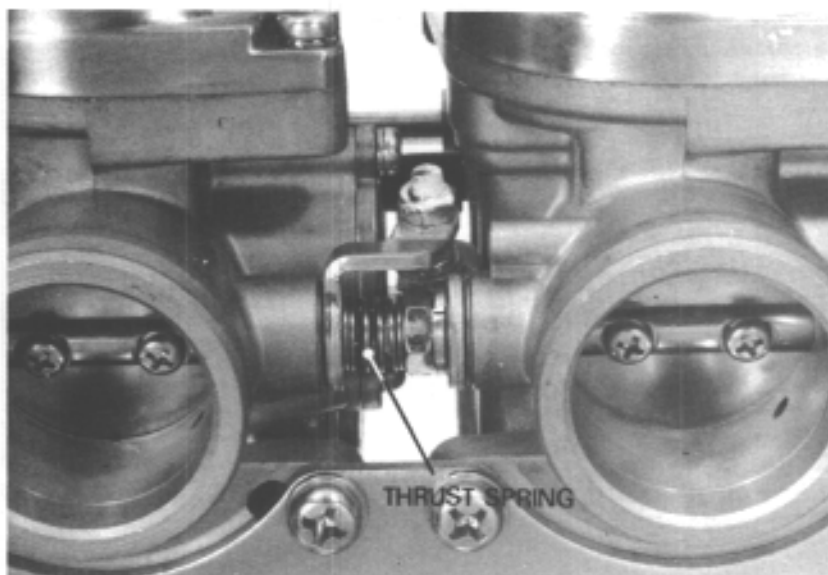
Install the rear bracket using the same procedure as for the front bracket.

**TORQUE:** 0.28–0.42 kg-m  
(2–3 ft-lb, 24–36 in-lb)



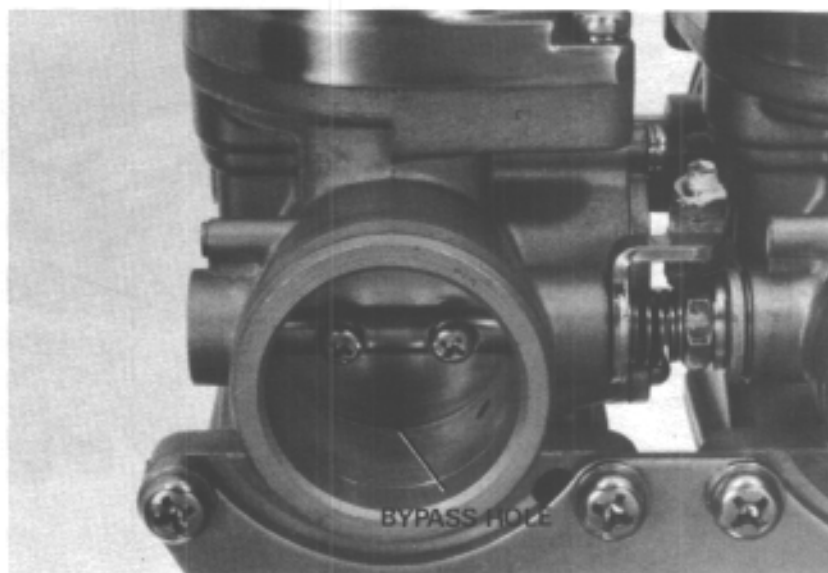


Install the thrust springs between the No. 1 and 2, and No. 3 and 4 carburetor throttle links.



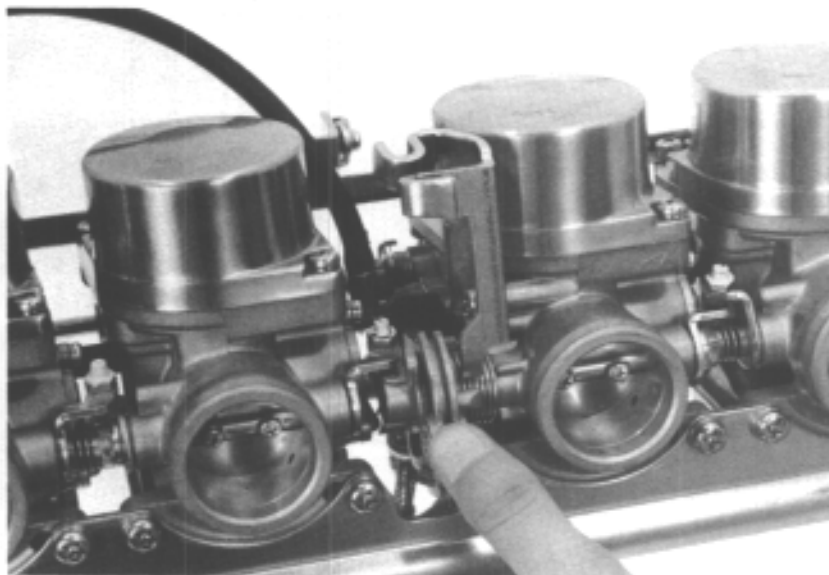
Turn each synchronization adjusting screw to its original position as noted during disassembly.

Make each distance between the by-pass hole in the carburetor body and throttle valve equal.



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.

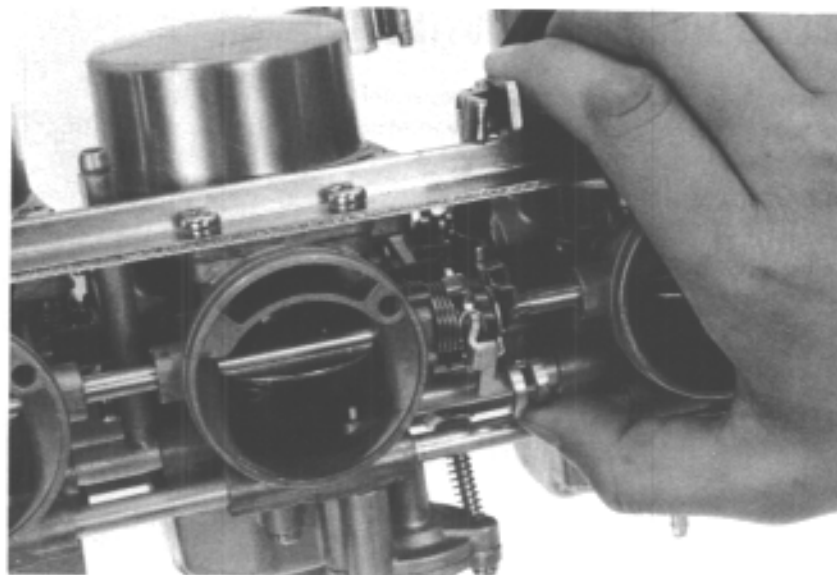




Hook the choke relief spring to the choke shaft arm of the No. 3, 4 carburetors. Install the choke valves, but do not tighten the bolts.



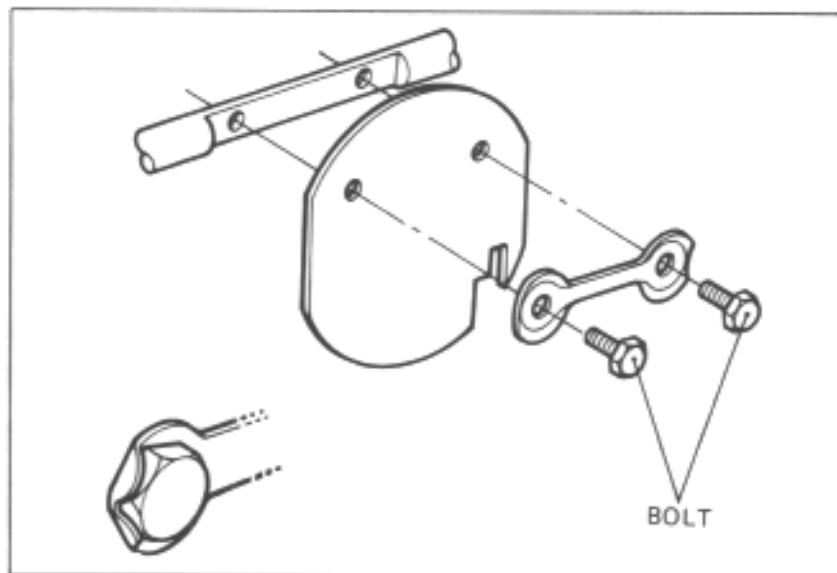
Make sure that choke valve operation is smooth by moving the choke linkage. Close the choke valve by turning the choke linkage. Release the choke linkage and make sure that it returns smoothly.



Tighten the choke valve bolts.

**TORQUE:** 0.06–0.12 kg-m  
(0.4–0.9 ft-lb, 5–11 in-lb)

Fold the tabs of the lock washer up.  
Recheck the throttle and choke operation.





## FAST IDLE ADJUSTMENT

**FAST IDLE:**  $2000 \pm 500$  rpm

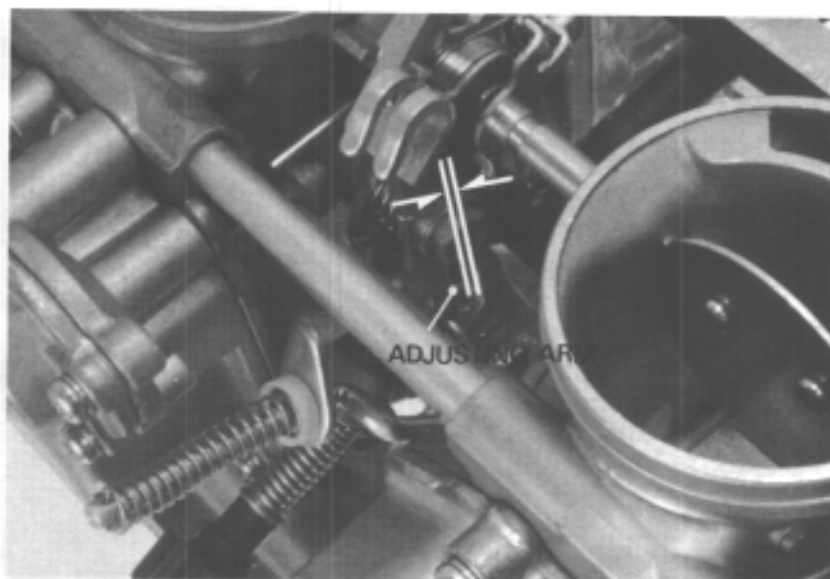
Close the throttle valve and open the choke valve.

Measure the clearance between the throttle link and fast idle adjusting arm pin.

**CLEARANCE:**

0.7–1.0 mm (0.03–0.04 in)

Adjust by opening and closing the fork end of the fast idle adjusting arm.



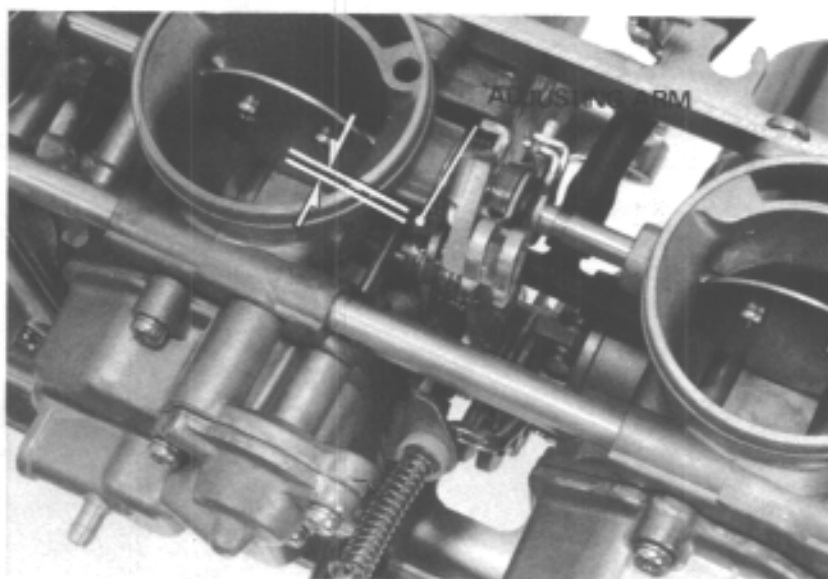
## ACCELERATOR PUMP ADJUSTMENT

Measure the clearance between the accelerator pump rod and adjusting arm with the throttle valve closed.

**CLEARANCE:**

0–0.04 mm (0–0.0016 in)

Adjust by bending the adjusting arm.

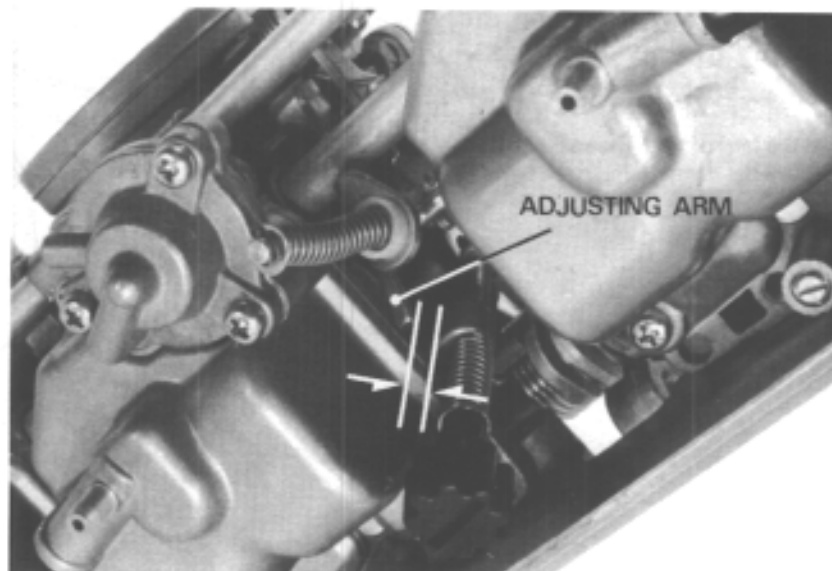


Measure the clearance between the adjusting arm and stopper on the carburetor body.

**CLEARANCE:**

3.1–3.3 mm (0.12–0.13 in)

Adjust by bending the adjusting arm.







## PILOT SCREW ADJUSTMENT

### IDLE DROP PROCEDURE

#### NOTE

The pilot screw is factory pre-set and no adjustment is necessary unless the carburetor is overhauled.

#### NOTE

Use a tachometer with graduations of 50 rpm.

Turn the pilot screw clockwise until it seats lightly and back it out to the specification. This is a preliminary setting prior to the final pilot screw adjustment.

**PILOT SCREW OPENING: 1-1/2 (VB42A)  
1-3/4 (VB42C)**

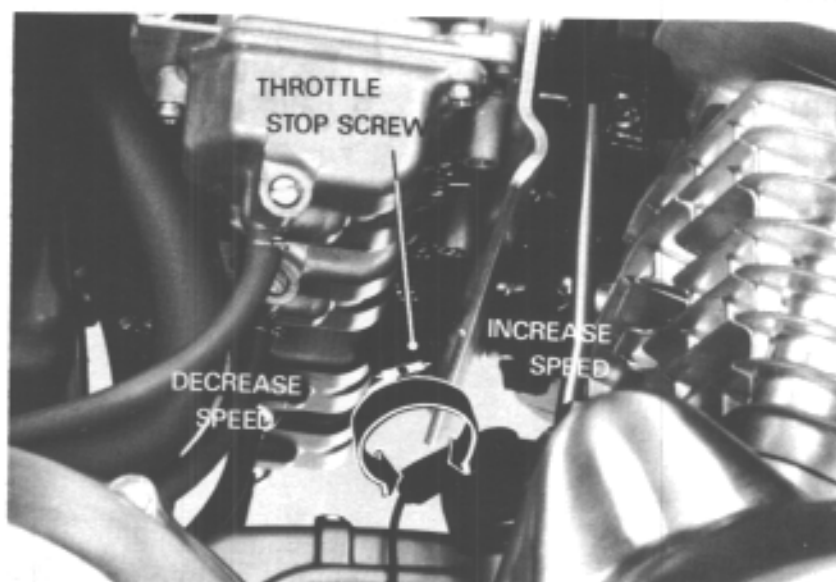
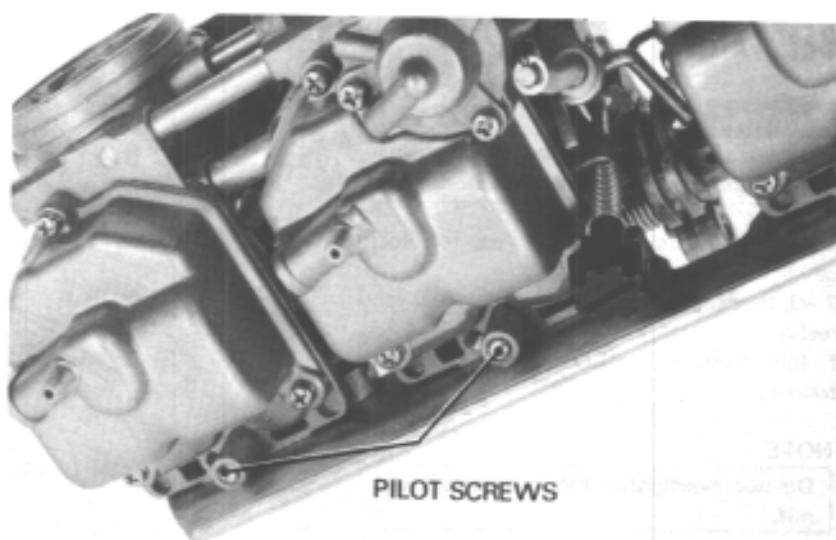
#### CAUTION

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

1. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
2. Attach a tachometer.
3. Adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,000 ± 100 rpm**

4. Turn each pilot screw 1/2 turn out from the initial setting position.
5. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until it drops by 50 rpm or less.
6. Adjust the idle speed with the throttle stop screw.
7. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
8. Turn the No. 1 carburetor pilot screw (3/8 = VB42A, 3/4 = VB42C) turn out from the position obtained in Step 7.
9. Adjust the idle speed with the throttle stop screw.
10. Perform Steps 7, 8 and 9 for the 2, 3 and 4 carburetor pilot screws.





## 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.

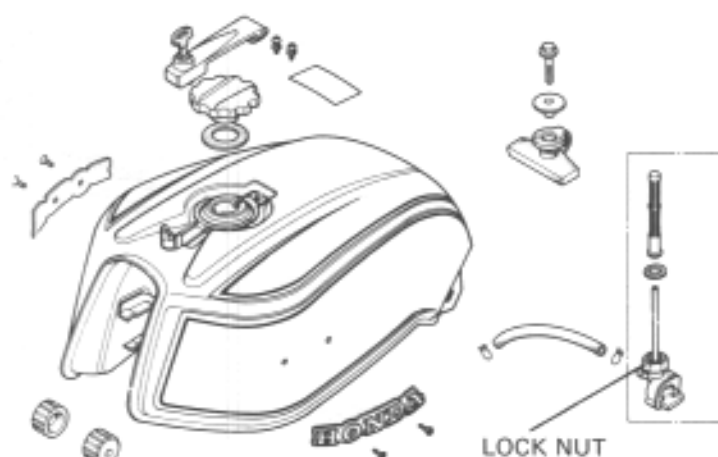
Check that fuel is flowing out of the fuel valve freely.

If fuel flow is restricted, clean the fuel strainer.

### NOTE

Do not overtighten the fuel valve lock nut.

Make sure there are no fuel leaks.



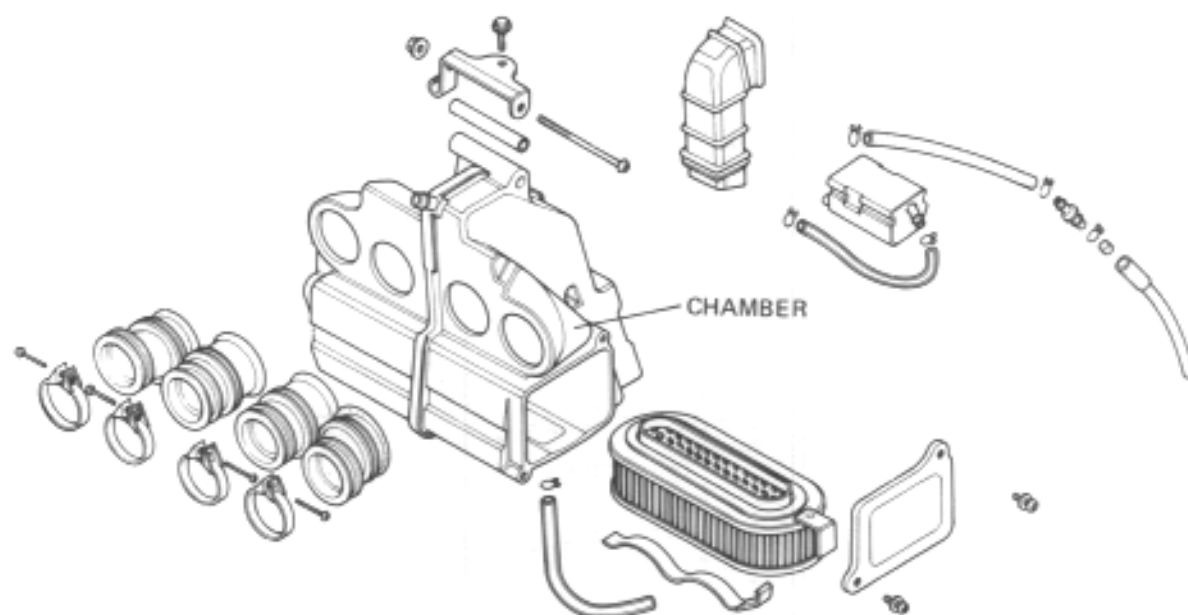
## AIR CLEANER CASE

### AIR CLEANER CASE/CHAMBER

Check the air cleaner case for deterioration.

### CRANKCASE VENTILATION SYSTEM

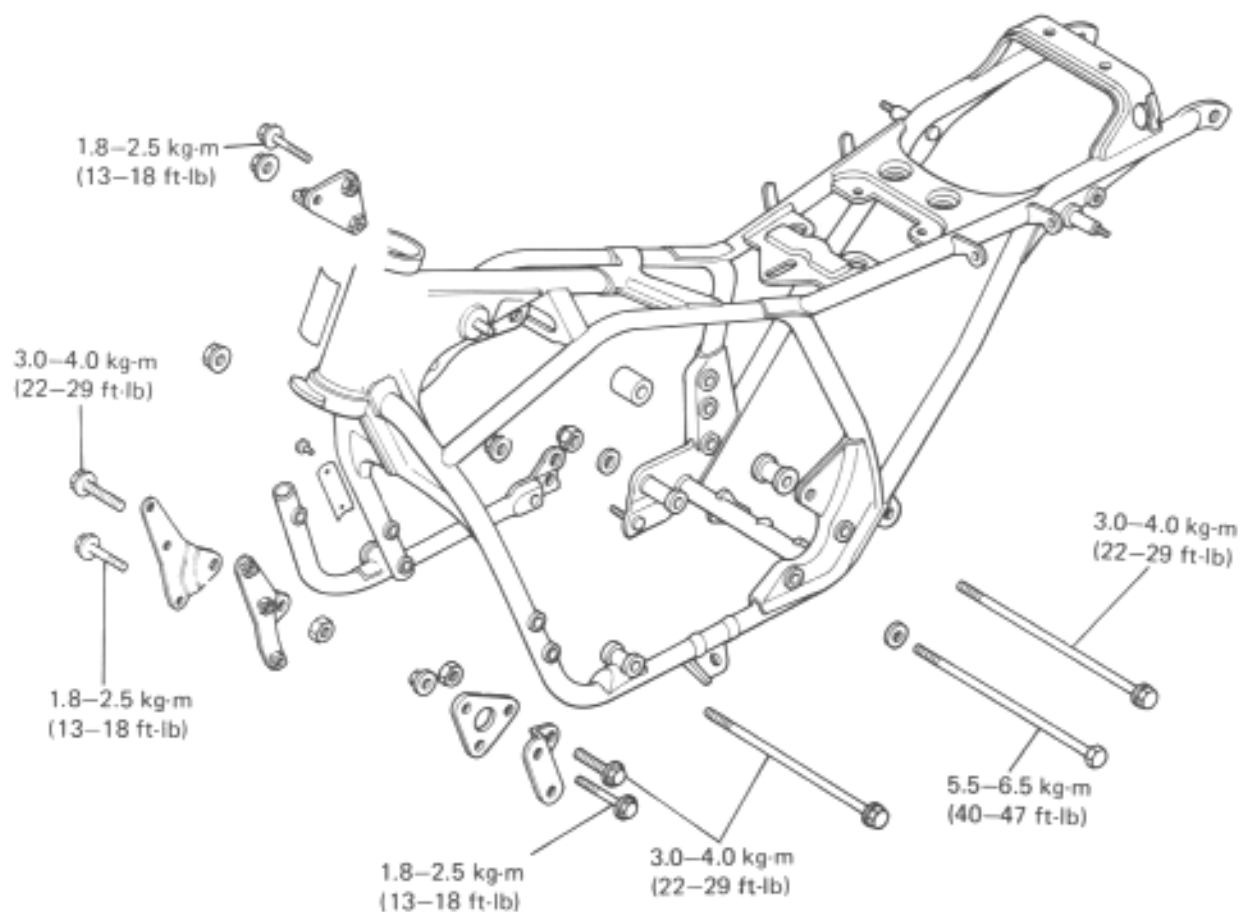
Check that the breather tube is not restricted.







MEMO





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

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

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

- Clutch
- Shift linkage
- Camshaft
- Carburetor
- A.C. generator
- Starter motor
- Cylinder head

### SPECIFICATIONS

Engine dry weight	88.5 kg (195 lb) approx.
Oil capacity	4.5 lit (4.7 US qt) at engine assembly
	3.5 lit (3.7 US qt) at change

### TORQUE VALUES

8 mm bolt	1.8-2.5 kg-m (13-18 ft-lb)
10 mm bolt	3.0-4.0 kg-m (22-29 ft-lb)
12 mm bolt	5.5-6.5 kg-m (40-47 ft-lb)
Rear axle nut	8.0-10.0 kg-m (58-72 ft-lb)
Drive sprocket	5.0-5.4 kg-m (36-39 ft-lb)
Spark plug	1.2-1.6 kg-m (9-12 ft-lb)

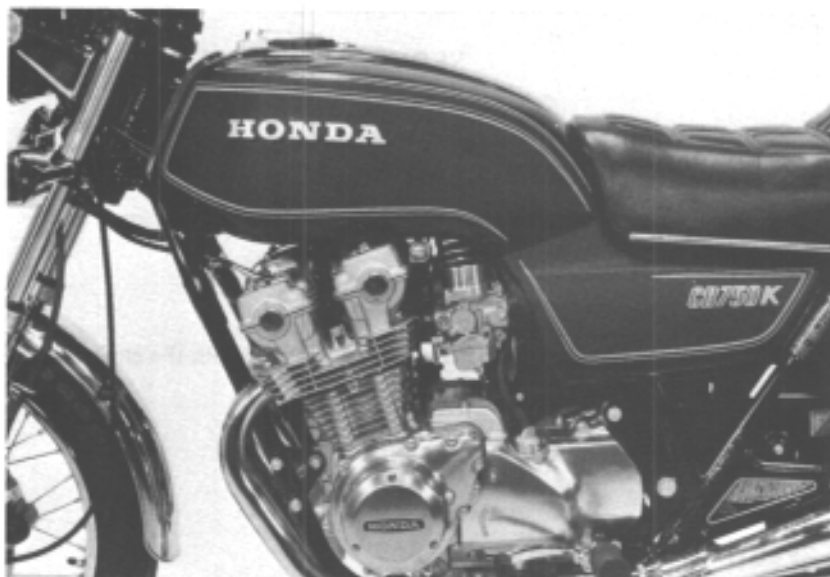


## ENGINE REMOVAL

Drain oil from engine (Page 2-2).

Turn the fuel valve OFF.

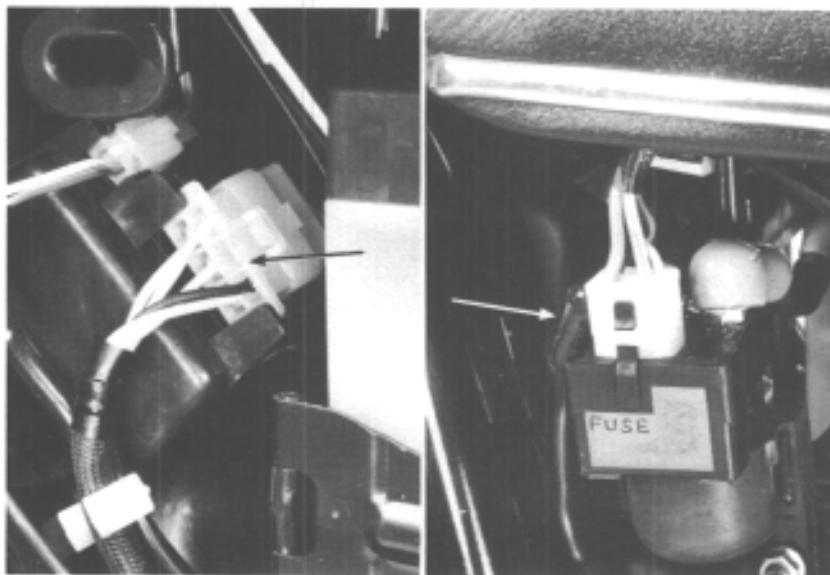
Raise the seat and remove the overflow tube, fuel lines, both side covers and fuel tank.



Remove the carburetor and the air cleaner (Section 4).

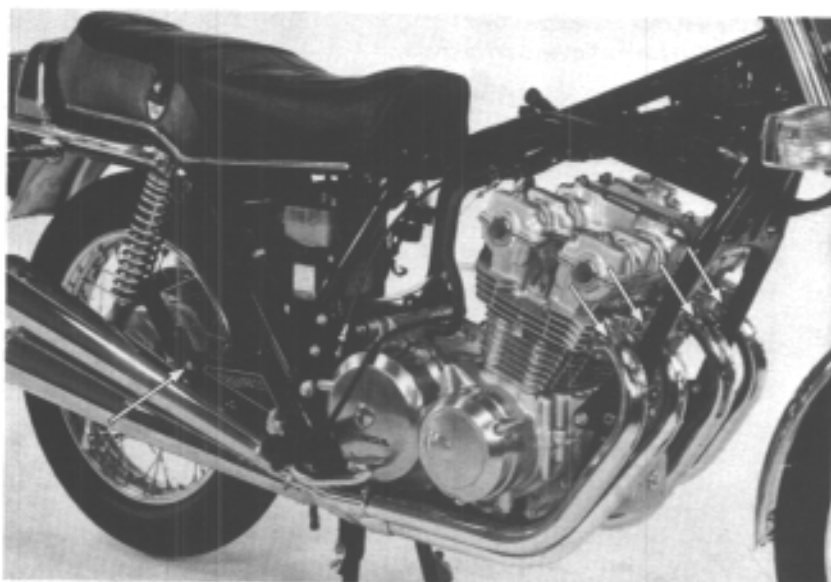


Disconnect the electrical wires.





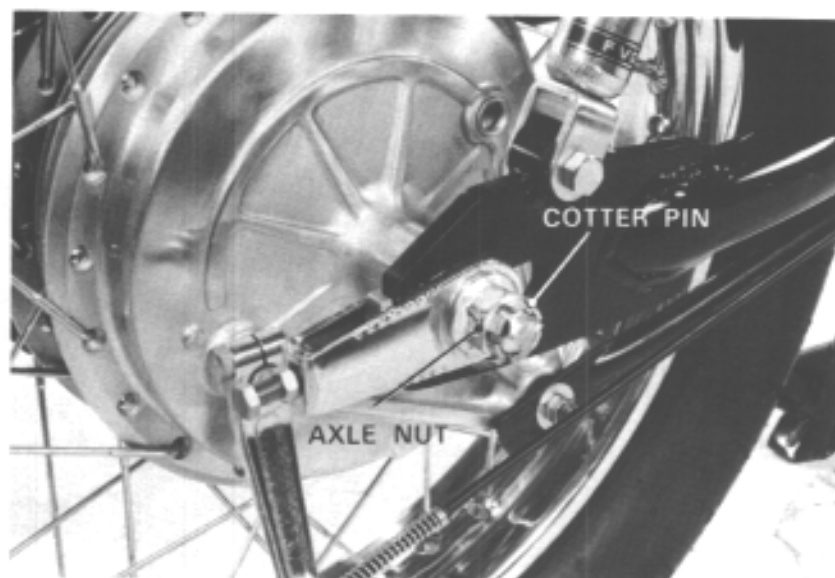
Remove the exhaust system.



Remove the tachometer cable from the cylinder head cover.  
Remove all spark plug caps.

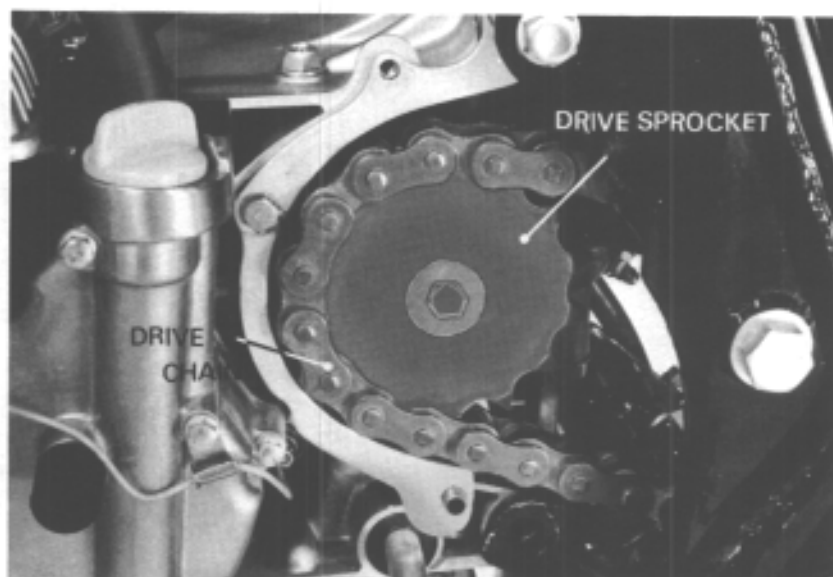


Remove the cotter pin and loosen the rear axle nut.  
Loosen both chain adjusters and push the rear wheel forward.

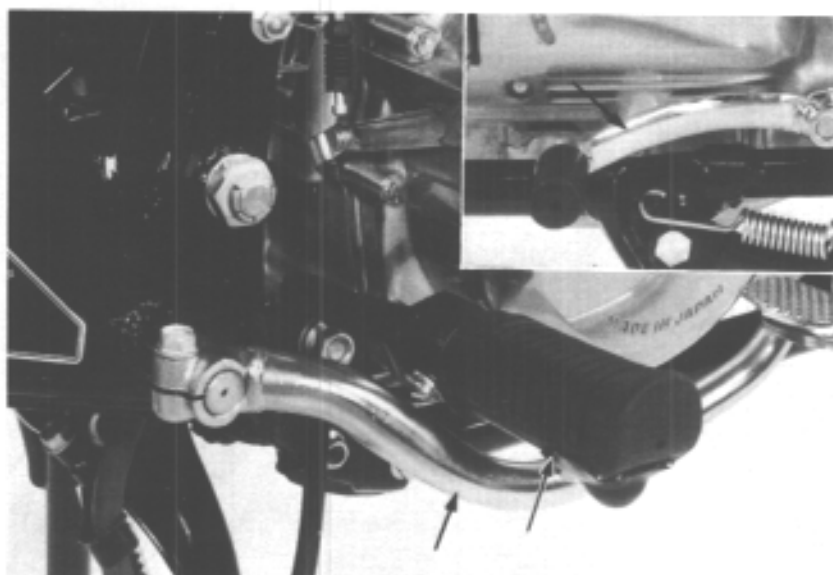




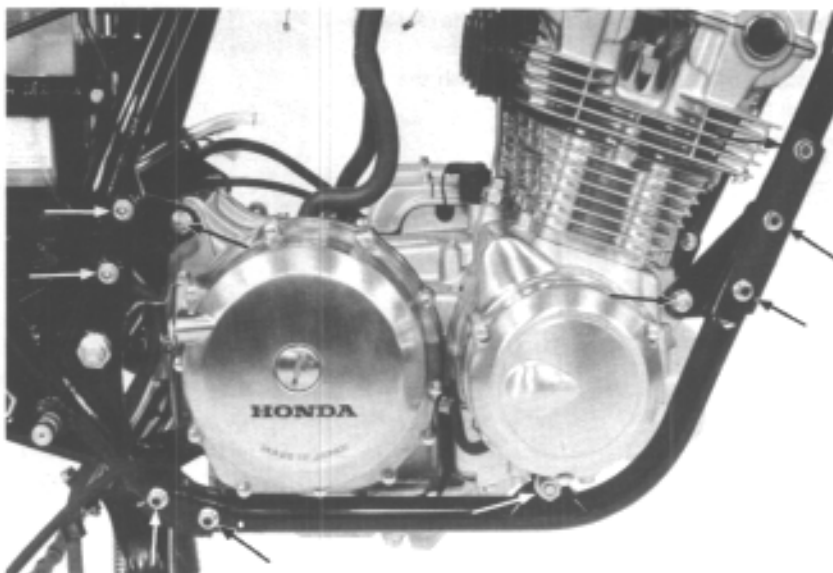
Remove the left rear crankcase cover.  
Remove the drive sprocket and drive chain.



Remove the clutch cable at the clutch arm, rear brake pedal, foot pegs and gear shift pedal.



Place a jack under the engine.  
Remove the engine hanger brackets and bolts.  
Remove the engine toward the right.





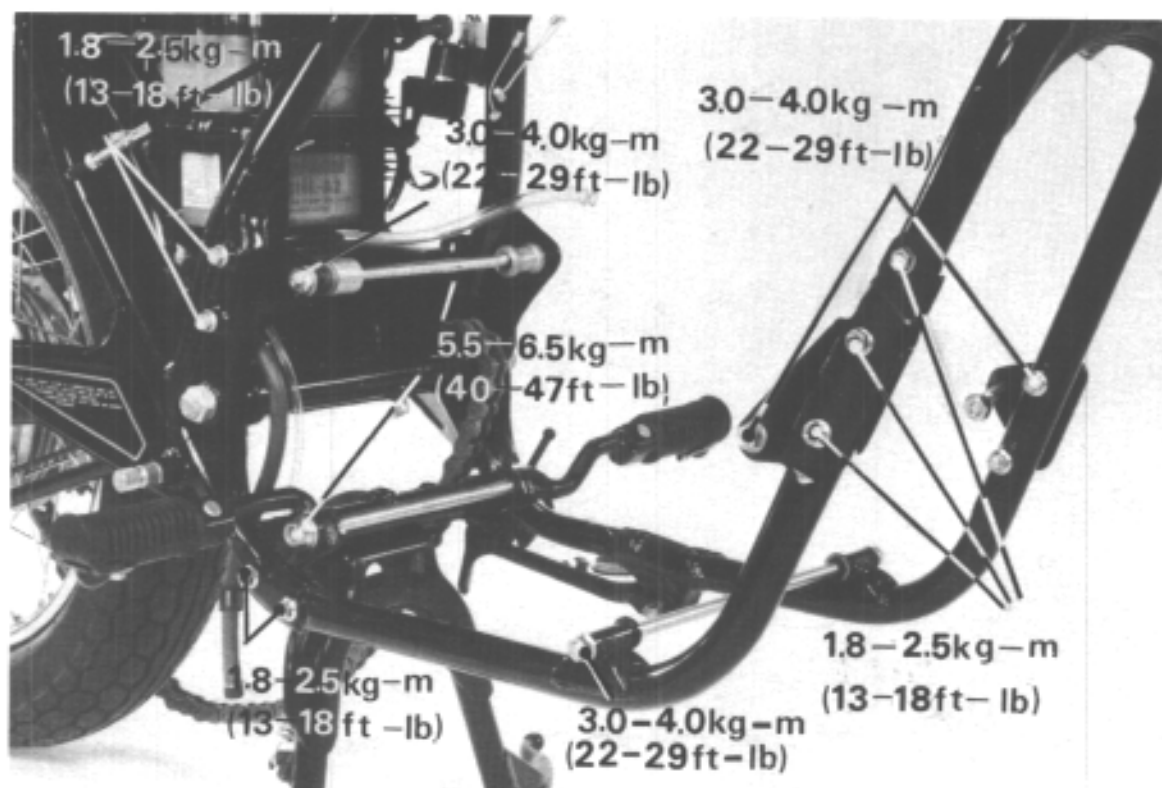
### ENGINE INSTALLATION

The installation sequence is the reverse of removal.

#### NOTE

- Do not damage parts during installation.
- Route the wires and cables properly (Page 1-8).
- Fill the crankcase to the proper level (Page 2-1).
- Perform the following inspection and adjustments:
  - Throttle cable free play (Page 3-12).
  - Clutch lever free play (Page 3-20).
  - Drive chain tension (Page 3-16).
  - Choke cable free play (Page 3-12).

Torque values:	8 mm flange bolt/nut	1.8–2.5 kg-m (13–18 ft-lb)
	10 mm flange bolt/nut	3.0–4.0 kg-m (22–29 ft-lb)
	12 mm flange bolt/nut	5.5–6.5 kg-m (40–47 ft-lb)
	Drive sprocket	5.0–5.4 kg-m (36–39 ft-lb)

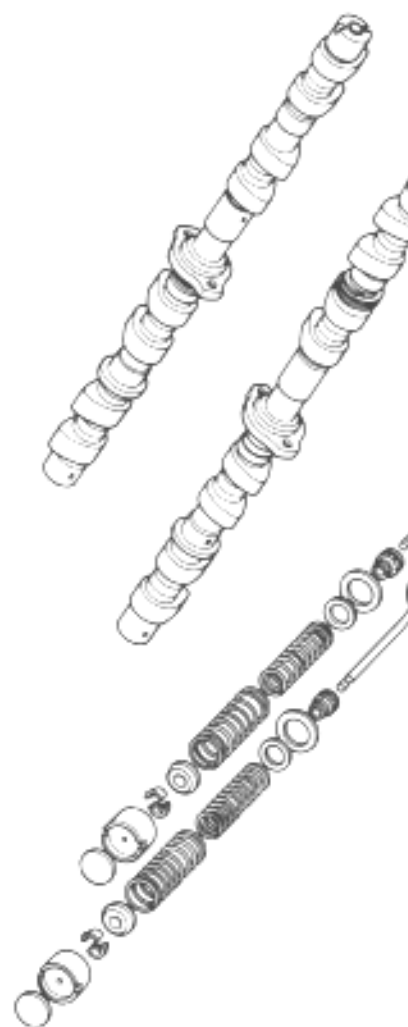
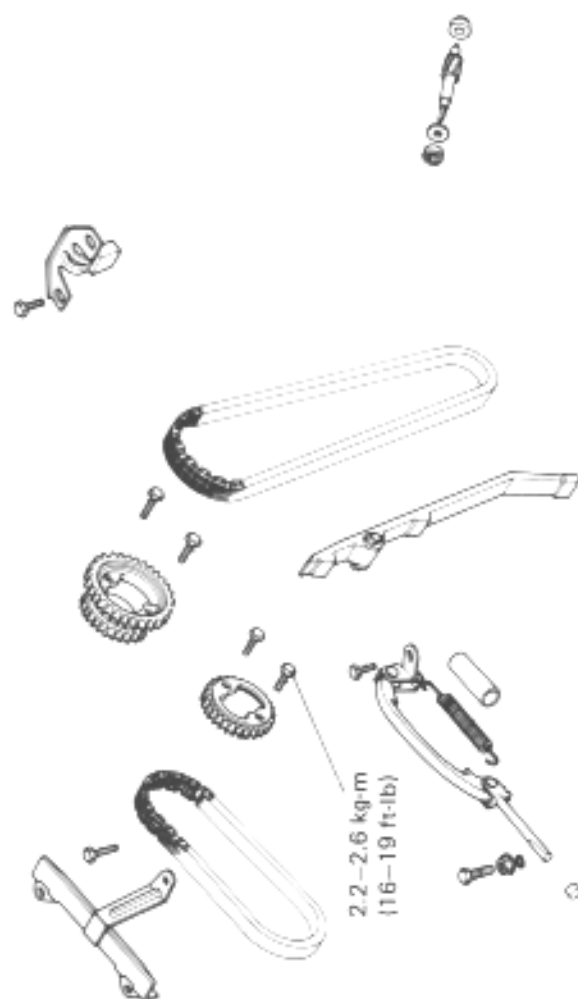
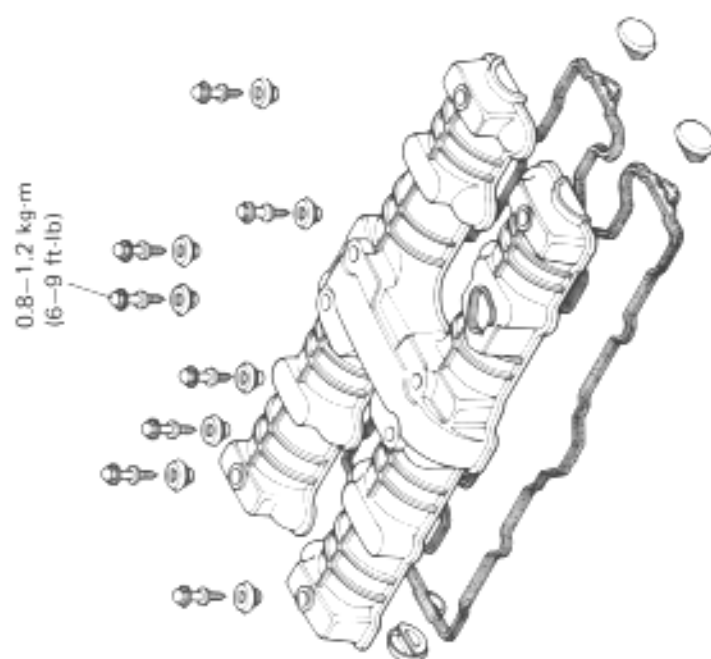


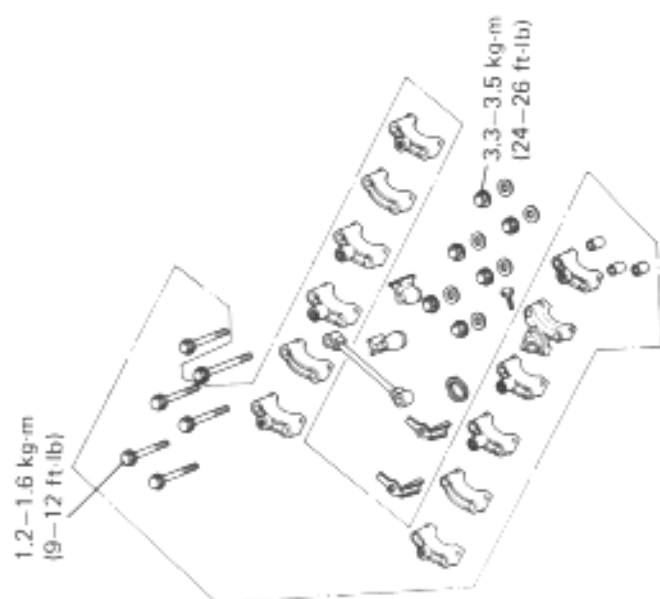
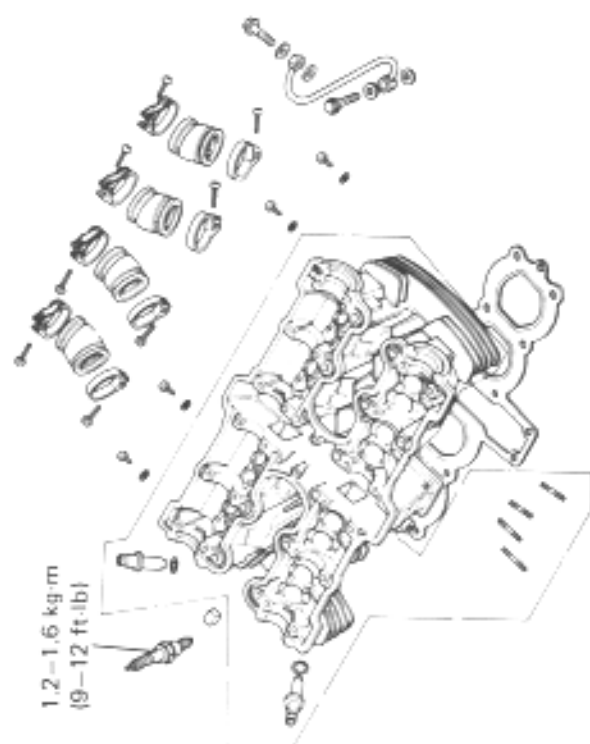




**HONDA**  
**CB750K**

CYLINDER HEAD/VALV







SERVICE INFORMATION	6-1	VALVE GUIDE REPLACEMENT	6-15
TROUBLESHOOTING	6-2	VALVE SEAT INSPECTION/REFACING	6-16
CAMSHAFT REMOVAL	6-3	CYLINDER HEAD ASSEMBLY	6-17
CYLINDER HEAD REMOVAL	6-9	CYLINDER HEAD INSTALLATION	6-18
CYLINDER HEAD DISASSEMBLY	6-11	CAMSHAFT INSTALLATION	6-20

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- The engine must be removed from the frame to remove the cylinder head.
- Camshaft lubricating oil is fed through an oil line. Be sure the hole in the oil line is not clogged.
- During assembly, apply molybdenum disulfide to the camshaft bearings to provide initial lubrication. Pour clean engine oil into the oil pockets in the cylinder head to lubricate the camshafts.
- Marks A thru L on the camshaft holders mean position of holders to be installed; A to E are for EX. side and F to L for IN. side from left to right respectively. When installing, be sure the mark faces forward.

### SPECIAL TOOLS

#### Special Tools

Valve Guide Reamer	07984-2000000
Tappet Hole Protector	07999-4220000

#### Common Tools

Valve Guide Remover (5.5 mm)	07742-0010100
Valve Guide Driver	07742-0020200
Valve Spring Compressor	07757-0010000

### TORQUE VALUES

Cylinder head cover	0.8-1.2 kg-m ( 6- 9 ft-lb)
Camshaft holder	1.2-1.6 kg-m ( 9-12 ft-lb)
Cylinder head	3.6-4.0 kg-m (26-29 ft-lb)
Cam sprocket	2.2-2.6 kg-m (16-19 ft-lb)
Spark plug	1.2-1.6 kg-m ( 9-12 ft-lb)

### SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Compression pressure			12 ± 1 kg/cm <sup>2</sup> (171 ± 14 psi)	—
Camshaft	Cam height	IN.	37.000-37.160 mm (1.4567-1.4630 in)	36.9 mm (1.45 in)
		EX.	37.500-37.660 mm (1.4763-1.4827 in)	37.4 mm (1.47 in)
	Oil clearance	A and F	0.040- 0.082 mm (0.0016-0.0032 in)	0.13 mm (0.0051 in)
		Gear holder and G	0.062- 0.109 mm (0.0024-0.0043 in)	0.16 mm (0.0063 in)
		B and H	0.085- 0.139 mm (0.0033-0.0055 in)	0.19 mm (0.0075 in)
		C and J	0.085- 0.139 mm (0.0033-0.0055 in)	0.19 mm (0.0075 in)
		D and K	0.062- 0.109 mm (0.0024-0.0043 in)	0.16 mm (0.0063 in)
		E and L	0.040- 0.082 mm (0.0016-0.0032 in)	0.13 mm (0.0051 in)
		Run out	—	0.05 mm (0.002 in)



			STANDARD	SERVICE LIMIT
Valve lifter	Valve lifter O.D.		27.972–27.993 mm (1.1013–1.1021 in)	27.96 mm (1.101 in)
	Valve lifter bore I.D.		28.000–28.016 mm (1.1024–1.1030 in)	28.04 mm (1.104 in)
	Lifter to cylinder head clearance		—	0.07 mm (0.003 in)
Valve spring	Free length	IN. Outer	43.9 mm (1.73 in)	42.5 mm (1.67 in)
		IN. Inner	40.7 mm (1.60 in)	39.8 mm (1.57 in)
		EX. Outer	43.9 mm (1.73 in)	42.5 mm (1.67 in)
		EX. Inner	40.7 mm (1.60 in)	39.8 mm (1.57 in)
	Preload/length	IN. Outer	12.6–14.6 kg/37.5 mm (27.78–32.19 lbs/1.48 in)	12.0 kg/37.5 mm (26.46 lbs/1.48 in)
		IN. Inner	6.39–7.81 kg/34.5 mm (14.087–17.218 lbs/1.36 in)	6.0 kg/34.5 mm (13.23 lbs/1.36 in)
		EX. Outer	12.6–14.6 kg/37.5 mm (27.78–32.19 lbs/1.48 in)	12.0 kg/37.5 mm (26.46 lbs/1.48 in)
		EX. Inner	6.39–7.81 kg/34.5 mm (14.087–17.218 lbs/1.36 in)	6.0 kg/34.5 mm (13.23 lbs/1.36 in)
Valve guide	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)	5.44 mm (0.214 in)
	Valve guide I.D.	IN.	5.500–5.515 mm (0.2165–0.2171 in)	5.54 mm (0.218 in)
		EX.	5.500–5.515 mm (0.2165–0.2171 in)	5.54 mm (0.218 in)
	Stem-to-guide clearance	IN.	—	0.07 mm (0.003 in)
		EX.	—	0.09 mm (0.004 in)
	Valve seat width		0.99–1.27 mm (0.039–0.050 in)	1.5 mm (0.06 in)
Cylinder head	Warpage		—	0.10 mm (0.004 in)
Cam chain	Length		175.70–175.92 mm (6.917–6.926 in)	177.1 mm (6.97 in)

## TROUBLESHOOTING

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

### Low compression

#### 1. Valves

- Incorrect valve adjustment
- Burned or bent valves
- Incorrect valve timing
- Broken valve spring

#### 2. Cylinder head

- Leaking or damaged head gasket
- Warped or cracked cylinder head

#### 3. Cylinder and piston (Refer to Section 7)

### Compression too high

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

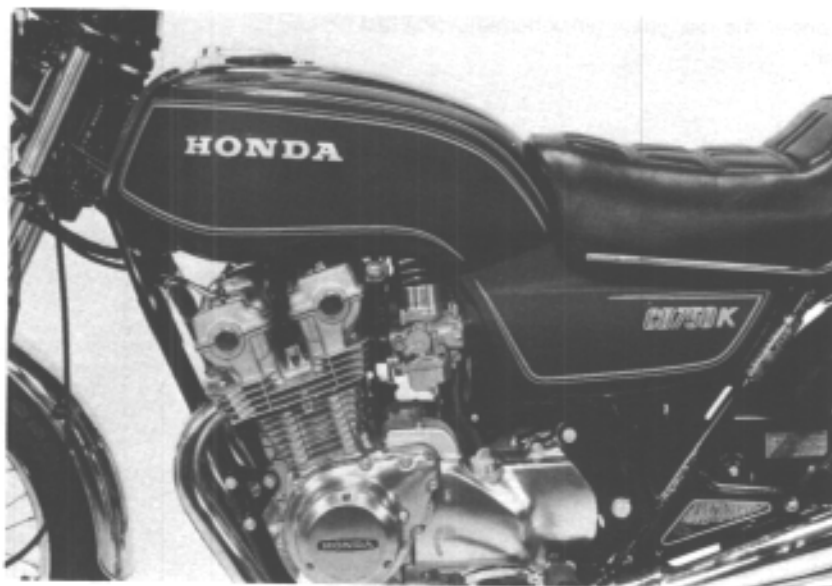
### Excessive noise

1. Incorrect valve adjustment
2. Sticking valve or broken valve spring
3. Damaged or worn camshaft
4. Loose or worn cam chain
5. Worn or damaged cam chain tensioner
6. Worn cam sprocket teeth

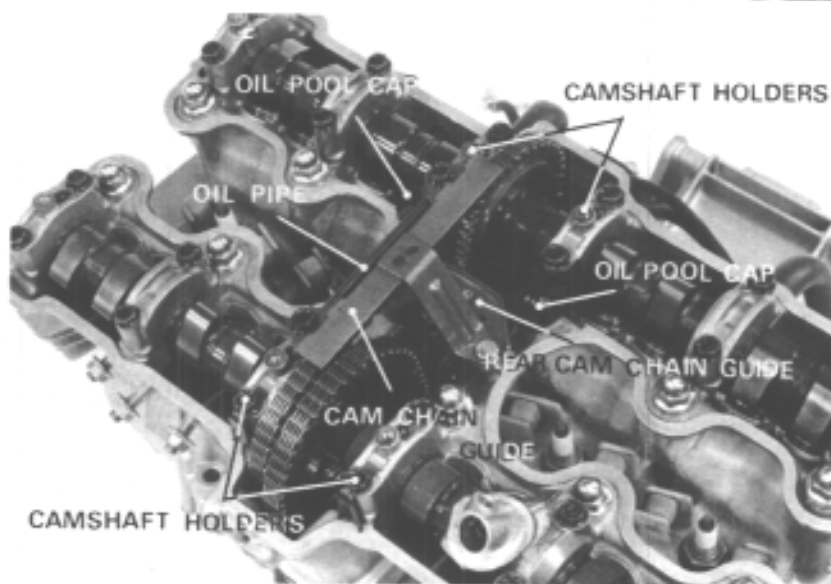


### CAMSHAFT REMOVAL

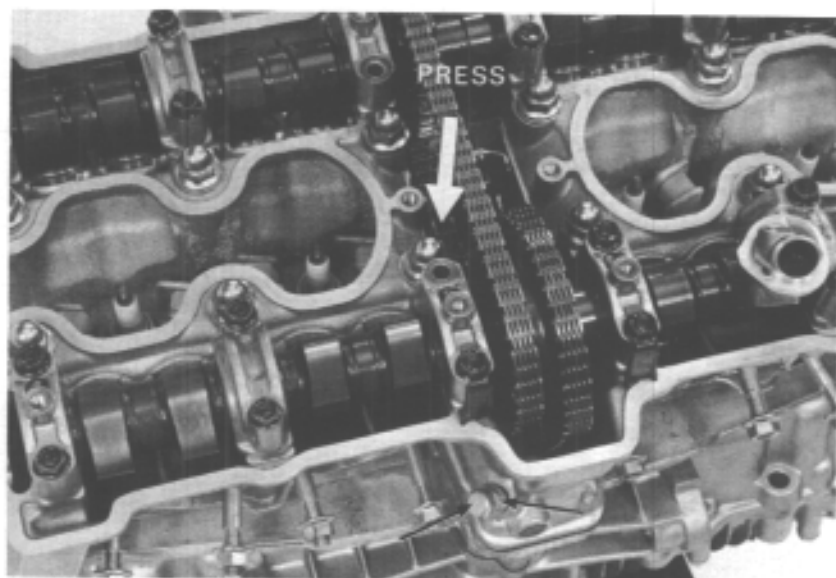
Place the motorcycle on its center stand.  
Raise the seat and remove the fuel lines and fuel tank.  
Disconnect the tachometer cable, and remove the spark plug caps.



Remove the cylinder head cover bolts and the cylinder head cover.  
Remove the oil line and cam chain guide.  
Remove the No. B, No. C, No. H and No. J camshaft holders.  
Remove the oil pool caps and REAR cam chain guide attaching plate.  
Remove the dowel pins.

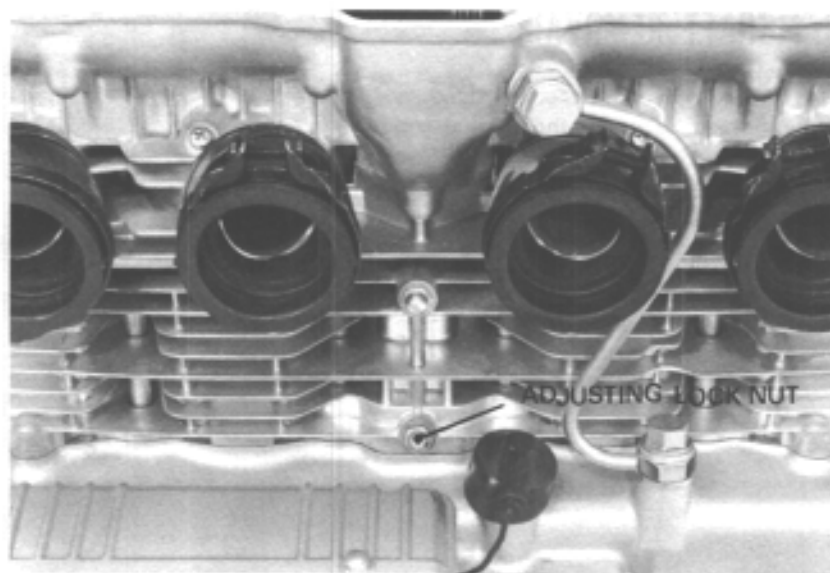


Loosen the front cam chain tensioner lock nut and bolt.  
Press the cam chain tensioner down to reduce chain tension.  
Tighten the lock bolt and nut.

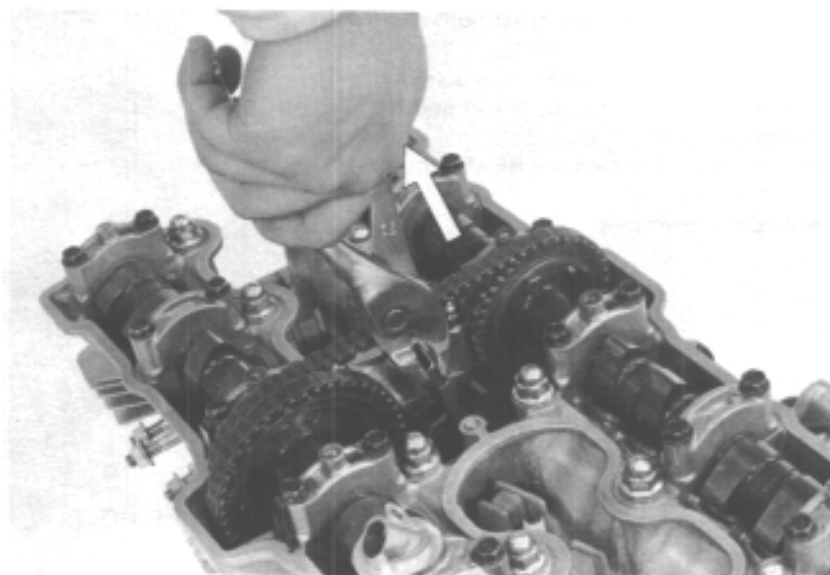




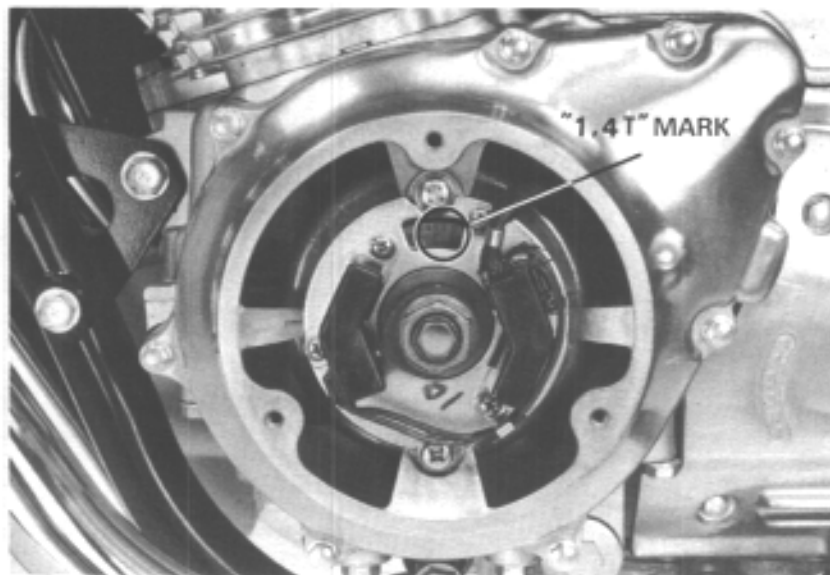
Loosen the rear chain tensioner adjusting lock nut.



Pull the rear cam chain tensioner up to reduce chain tension and tighten the adjusting lock nut.



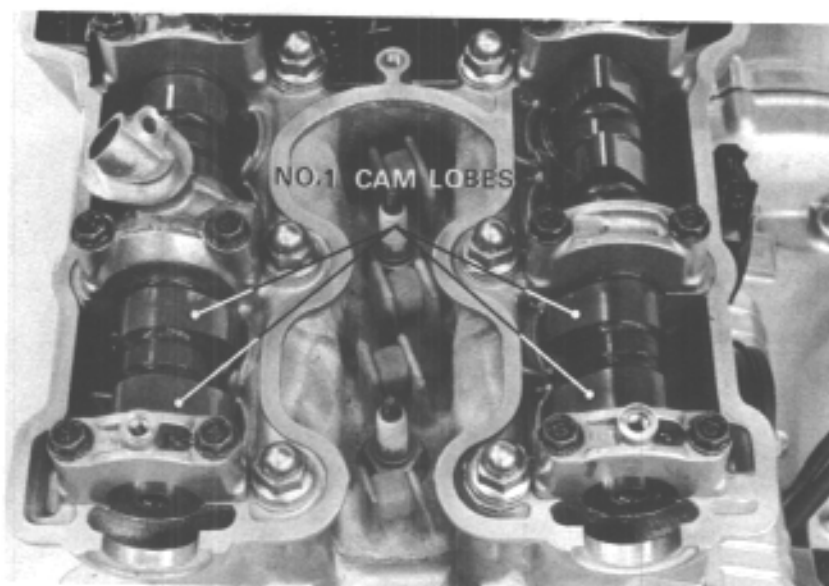
Remove the pulser generator cover.  
Turn the crankshaft counterclockwise until the "1.4T" mark aligns with the index mark.



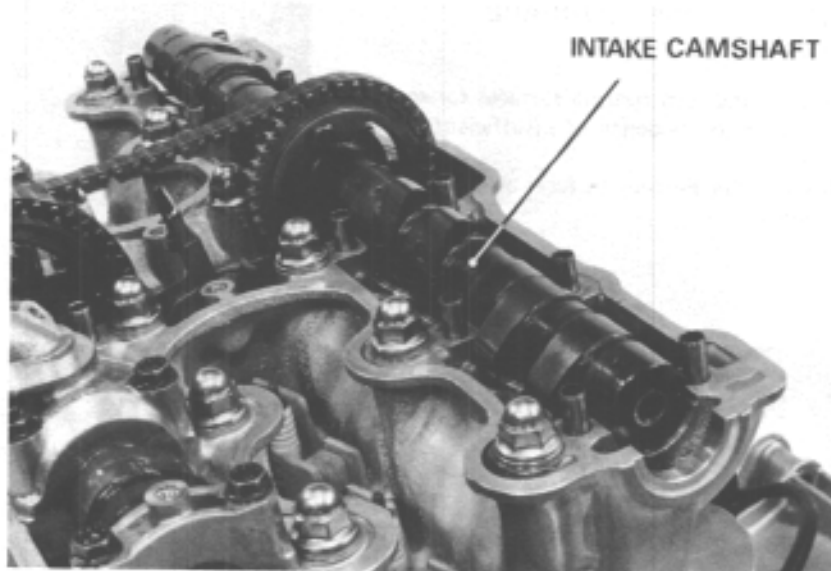


Make sure the No. 1 or 4 cylinder intake and exhaust cam lobes face the spark plug.

Remove the No. G and K camshaft holders.  
Remove the No. F and L holders.  
Remove the dowel pins.



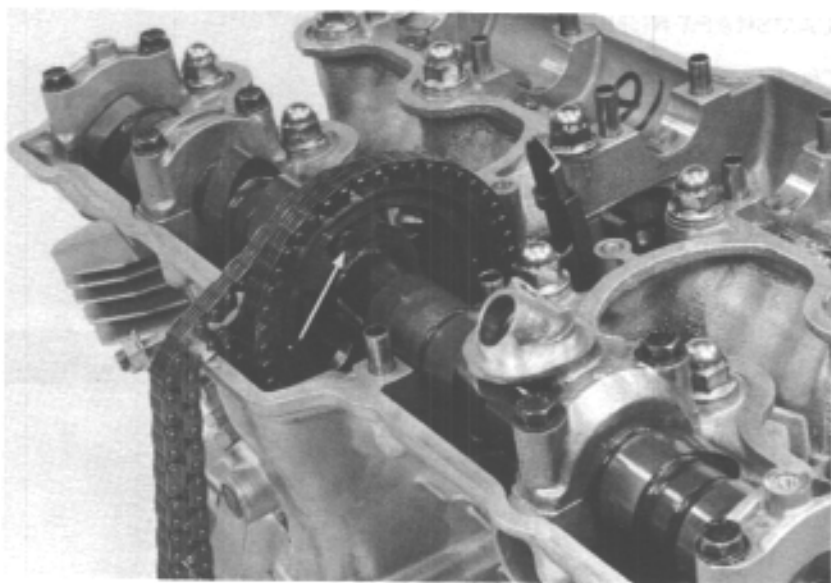
Remove the intake camshaft.



Loosen the exhaust cam sprocket bolt.  
Turn the crankshaft counterclockwise until cam lift is minimal and the other cam sprocket bolt can be removed.

Remove the No. D and gear camshaft holders.  
Remove the No. A and E holders.

Remove the exhaust camshaft.  
Remove the dowel pins.





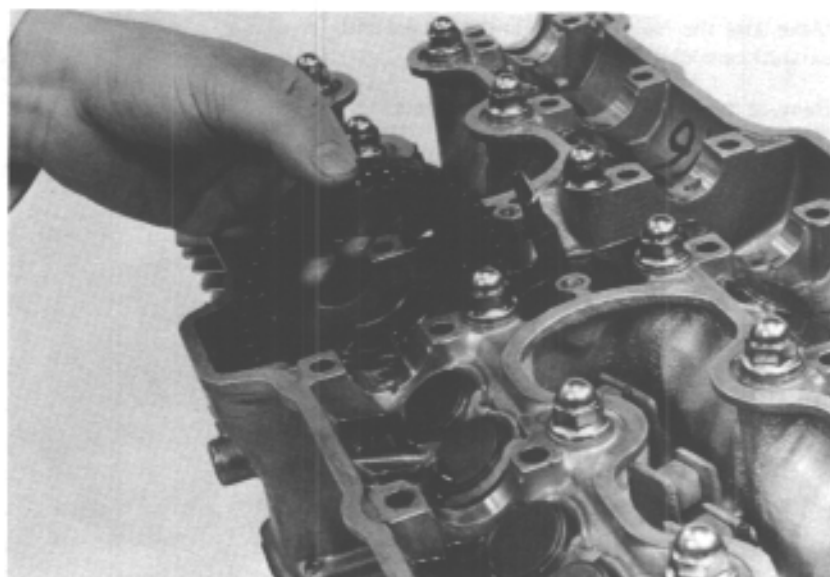
**NOTE**

Suspend the cam chain with a piece of wire to keep it from falling into the engine.

Remove the cam sprocket and cam chain.

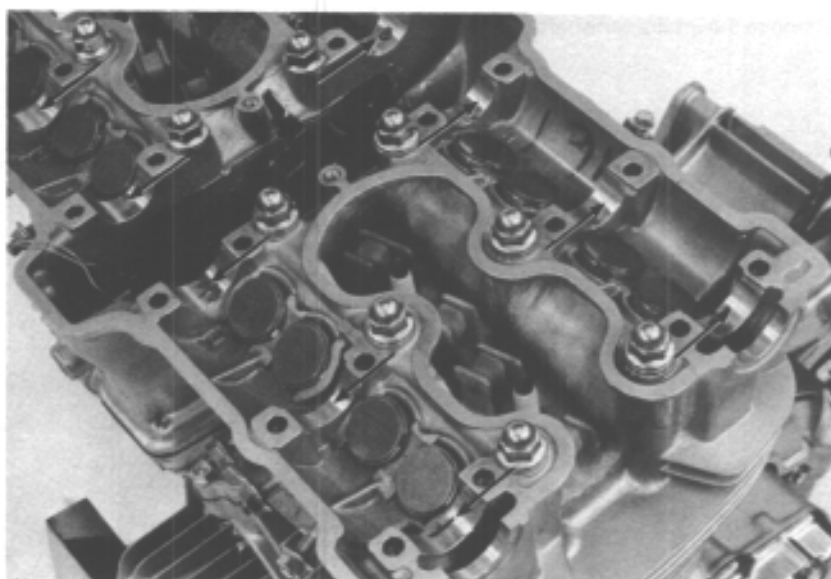
**NOTE**

After removing the camshaft, the valve clearance adjusting shims and valve lifters can be removed.

**CAM BEARING SURFACE  
INSPECTION**

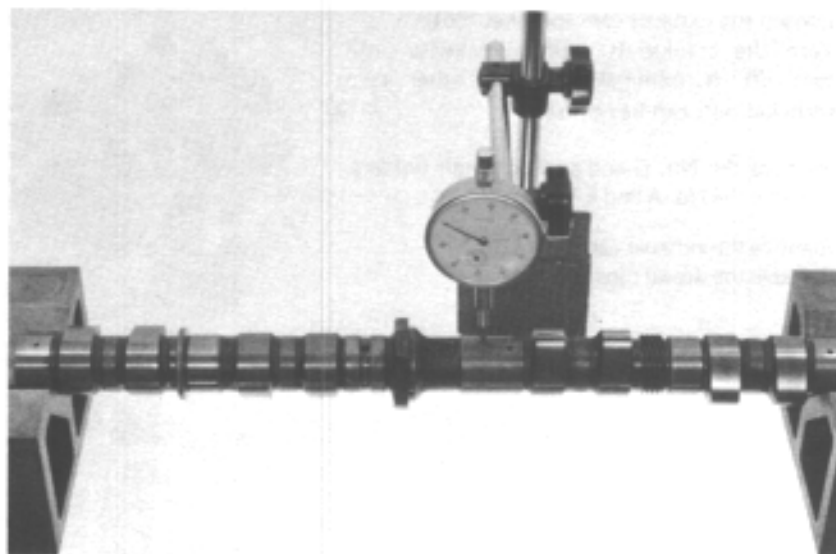
Inspect the cam bearing surfaces for scoring, scratches, or evidence of insufficient lubrication.

Inspect the bearing surface of the camshaft holders.

**CAMSHAFT RUNOUT**

Check camshaft runout with a dial indicator. Support both ends of the camshaft with V-blocks.

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

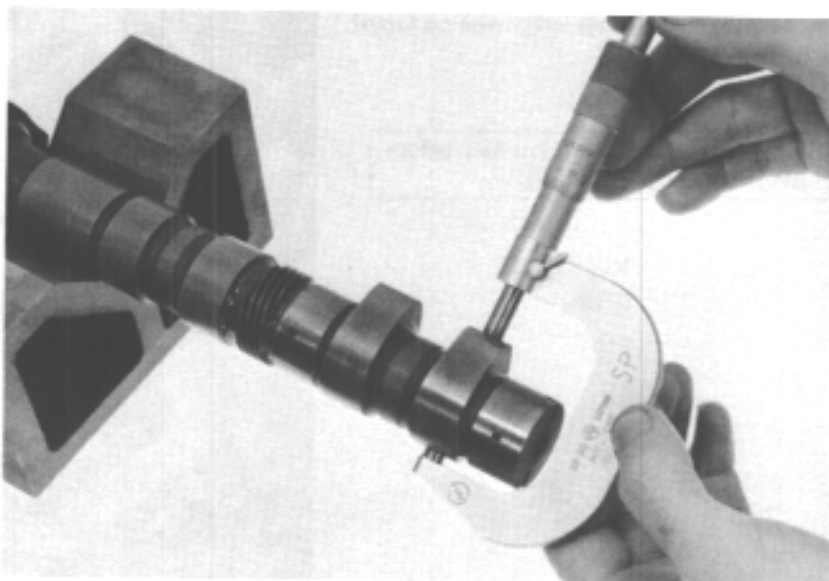




### CAM INSPECTION

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

**SERVICE LIMITS:** IN: 36.9 mm (1.45 in)  
EX: 37.4 mm (1.47 in)



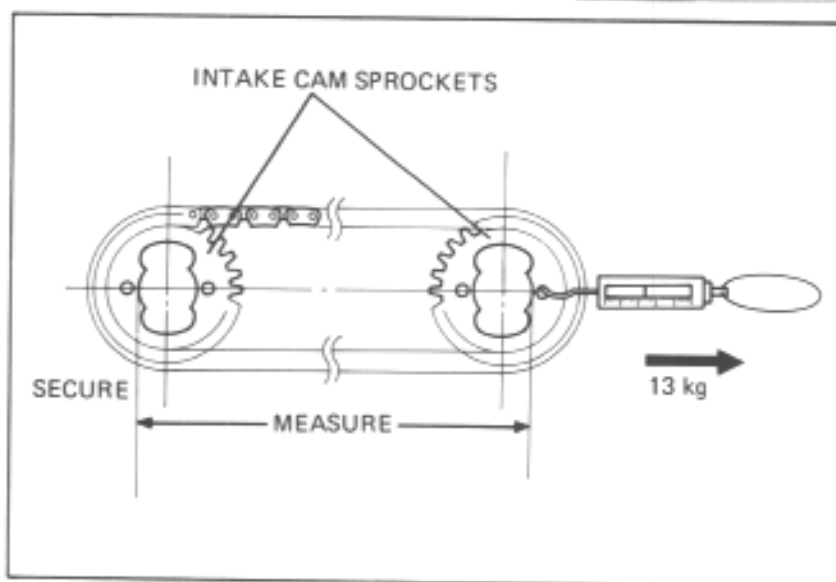
### CAM CHAIN LENGTH MEASUREMENT

Place the cam chain over the intake camshaft sprockets. Secure one sprocket and apply 13 kg (29 lb) of tension with a spring scale. Measure the distance between the points as shown.

**SERVICE LIMIT:** 177.1 mm (6.97 in)

### CAM CHAIN GUIDE INSPECTION

Inspect the upper cam chain guide for damage or excessive wear.

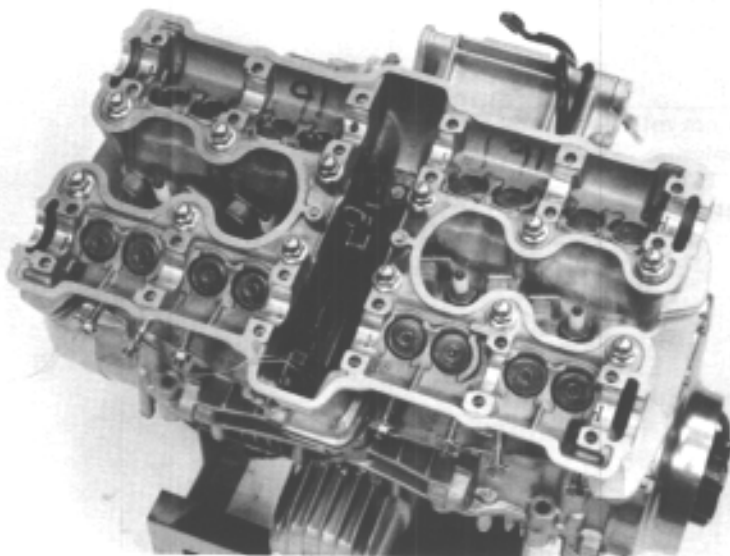


### CAMSHAFT OIL CLEARANCE

Remove the adjusting shims and the valve lifters.

#### NOTE

Mark each part to ensure correct re-assembly.

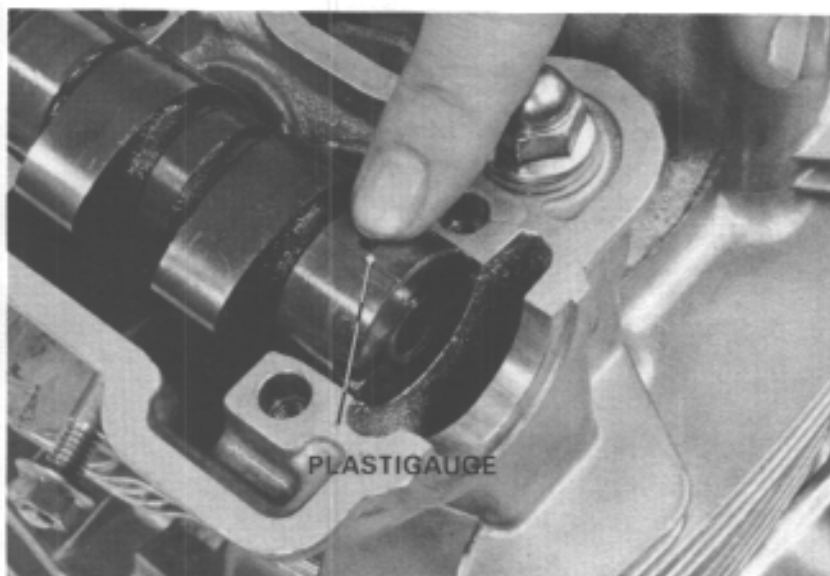




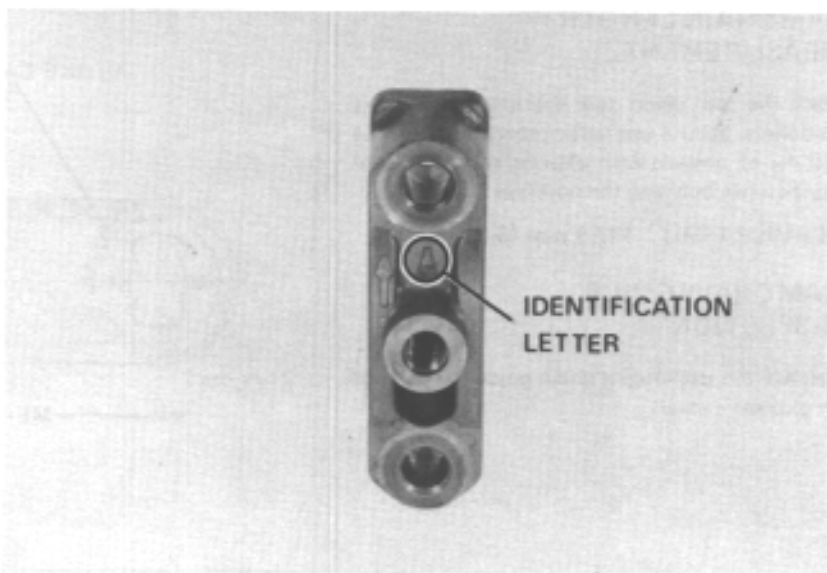
Lay a strip of plastigauge lengthwise on top of each camshaft journal.

**NOTE**

Wipe any oil from the journals before using plastigauge.



Check the camshaft holder identification letter before installing.



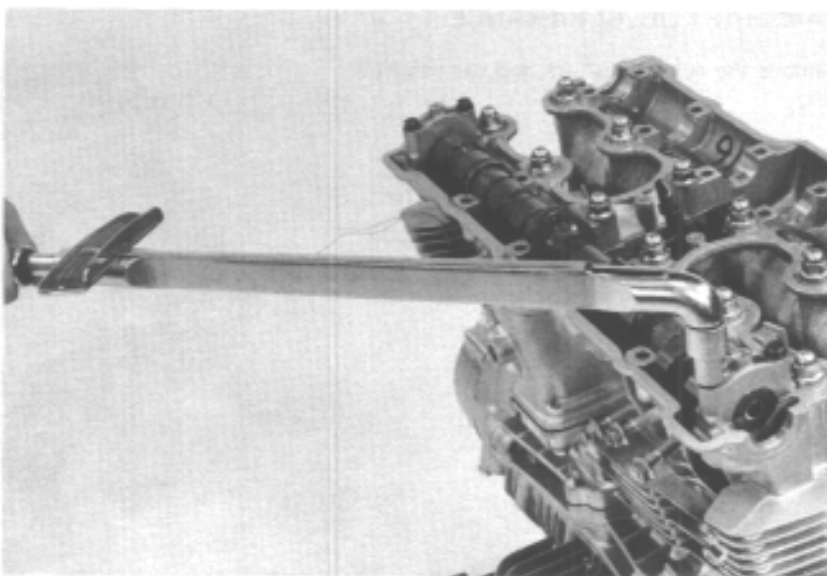
Install the camshaft holders and tighten in a criss-cross pattern.

**NOTE**

Do not rotate the camshaft when using plastigauge

**SPECIFIED TORQUE:**

1.2–1.6 kg-m (9–12 ft-lb)





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

### SERVICE LIMITS:

No. A, E, F and L:

0.13 mm (0.0051 in)

Gear holder, No. D, G and K:

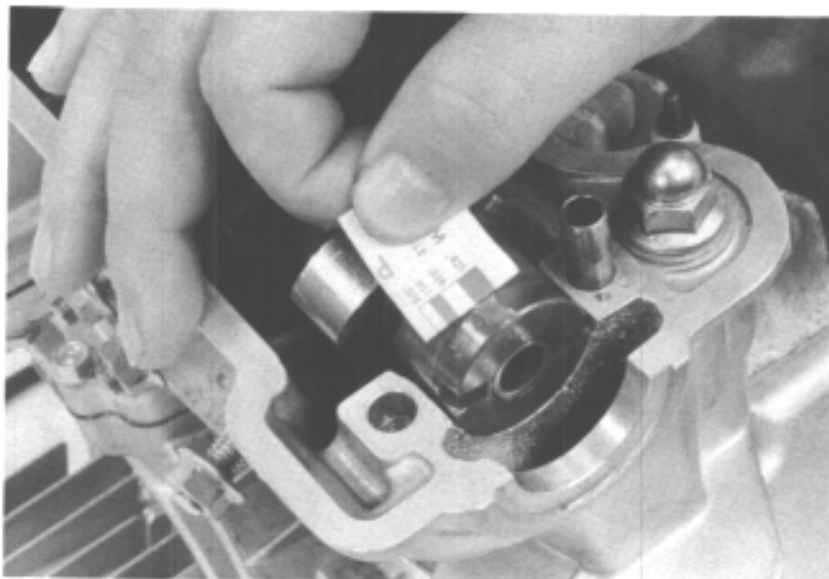
0.16 mm (0.0063 in)

No. B, C, H and J:

0.19 mm (0.0075 in)

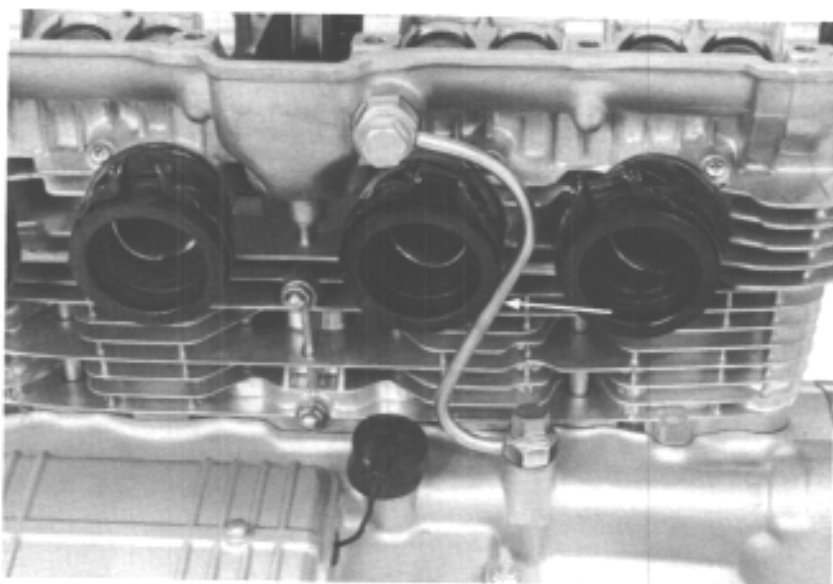
When the service limits are exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holders if the clearance still exceeds service limits.

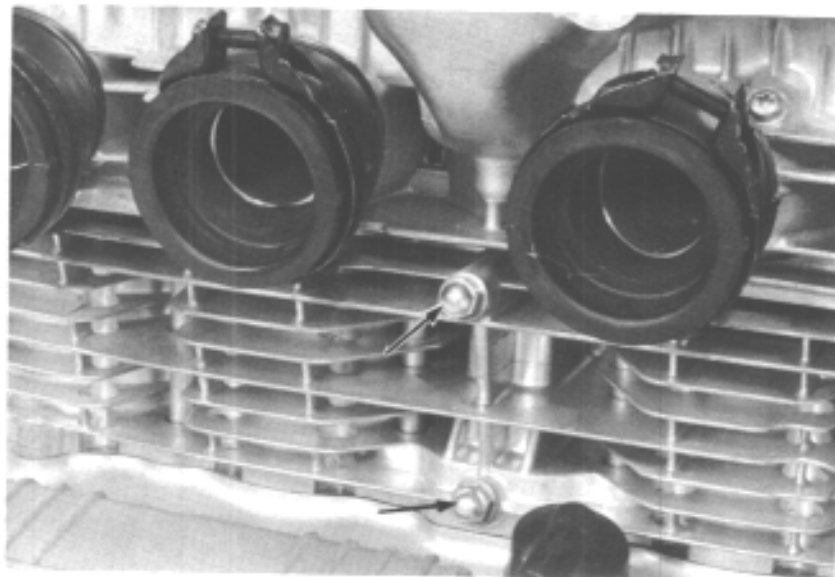


## CYLINDER HEAD REMOVAL

Remove the oil line.

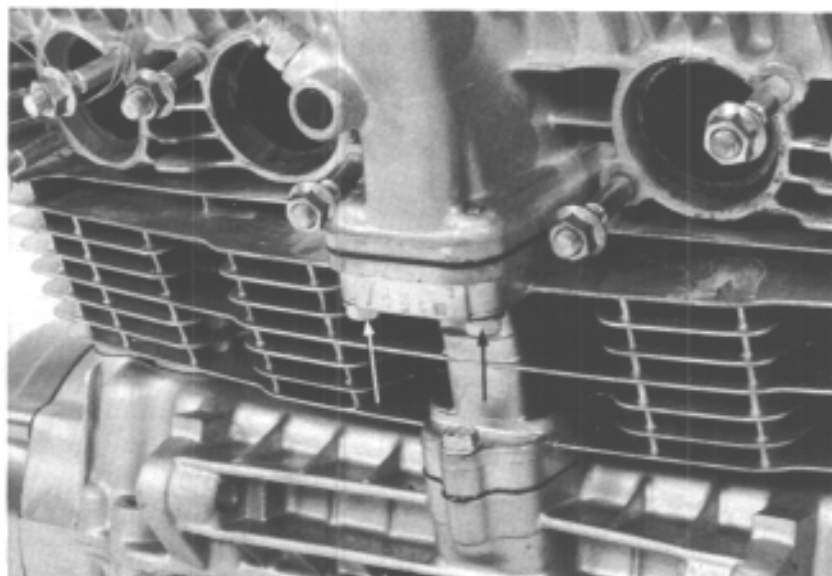


Remove the two rear cam chain tensioner lock nuts.





Remove the two bolts at the cam chain housing.

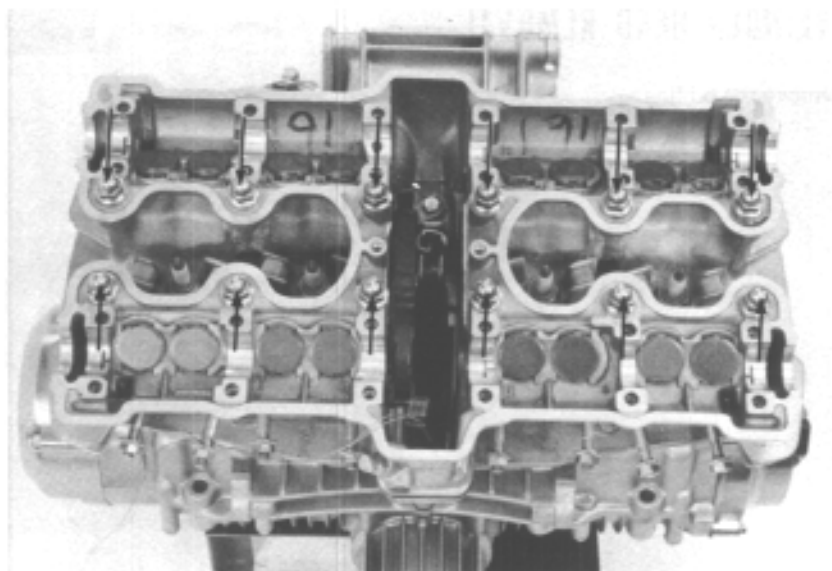


Remove the 12 cap nuts.

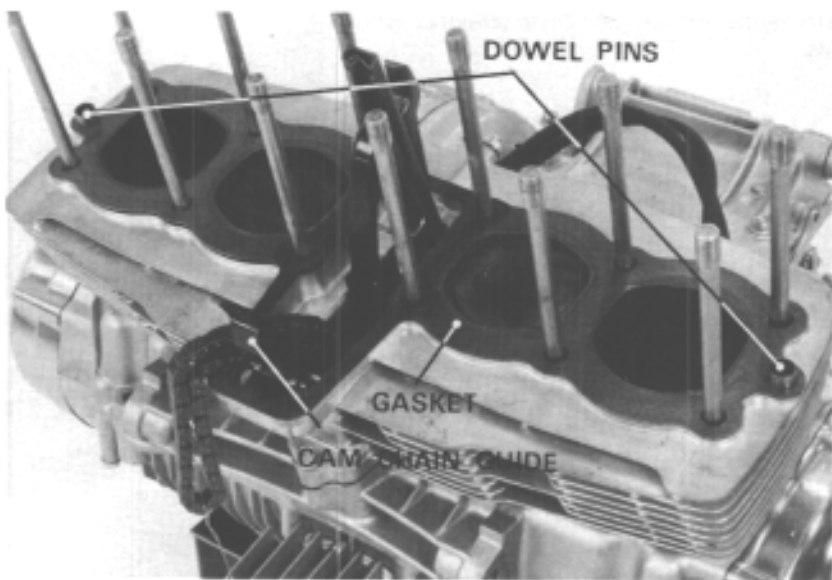
**NOTE**

Remove the nuts in 2-3 steps in a criss-cross pattern to prevent warpage.

Remove the cylinder head.



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



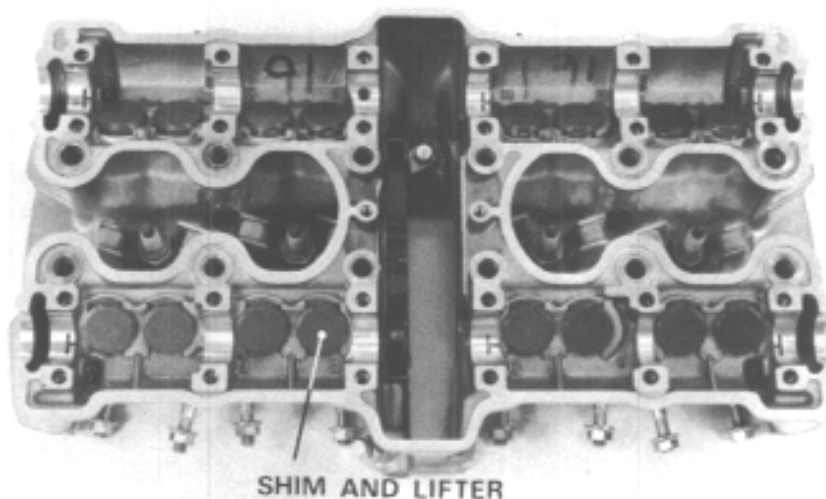


## CYLINDER HEAD DISASSEMBLY

Remove the valve clearance adjusting shims.  
Remove the valve lifters.

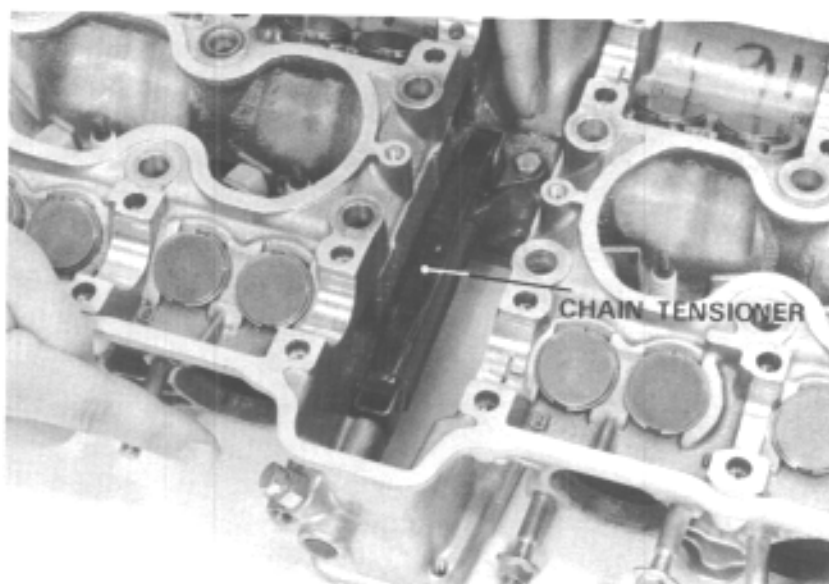
### NOTE

Mark all disassembled parts to ensure correct reassembly.



Loosen the cam chain tensioner lock nut and bolts.

Remove the bolt in the cylinder head.  
Pull the chain tensioner back and remove.



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

### CAUTION

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

### NOTE

Avoid damaging the lifter sliding surface.

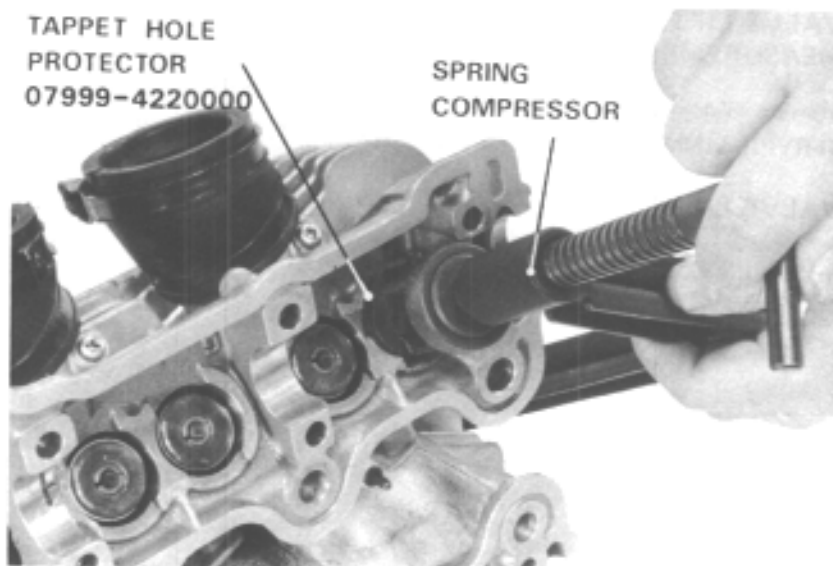
### NOTE

Mark all disassembled parts to ensure correct reassembly.

Remove the valve stem seals.

TAPPET HOLE  
PROTECTOR  
07999-4220000

SPRING  
COMPRESSOR





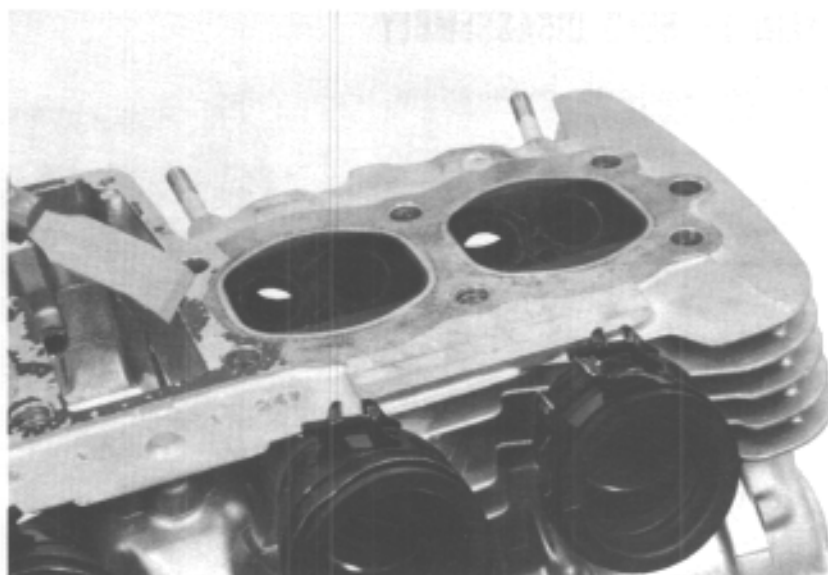


Remove carbon deposits from the combustion chamber.

Clean off the head gasket surfaces.

#### NOTE

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



#### VALVE LIFTER O.D. MEASUREMENT

Measure valve lifter O.D..

**SERVICE LIMIT: 27.96 mm (1.101 in)**



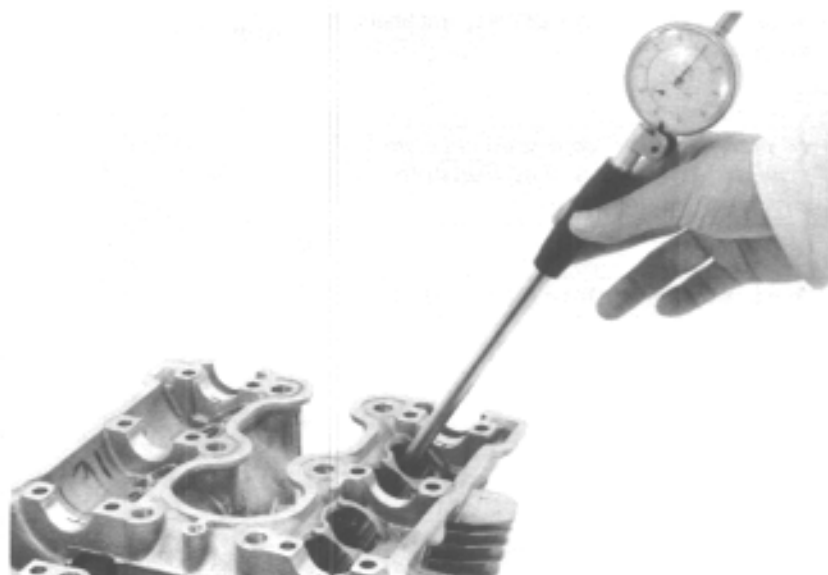
#### VALVE LIFTER BORE MEASUREMENT

Measure valve lifter bore I.D..

**SERVICE LIMIT: 28.04 mm (1.104 in)**

#### VALVE LIFTER BORE

Inspect the valve lifter for scoring, scratches, or evidence of insufficient lubrication.



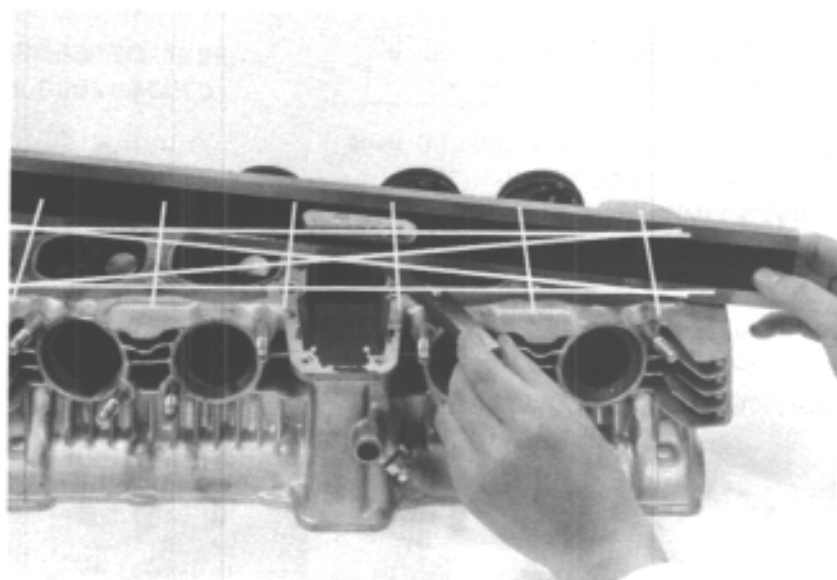




Check the spark plug hole and valve areas for cracks.

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

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

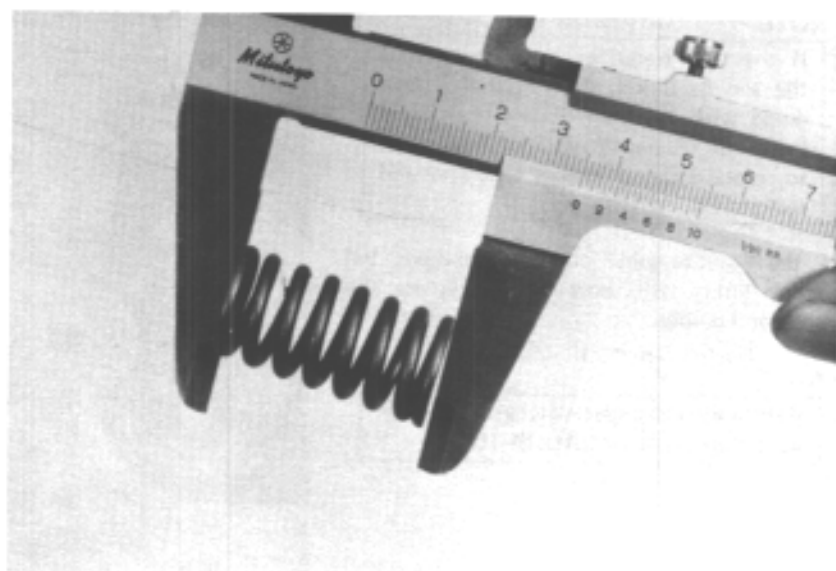


### VALVE SPRING FREE LENGTH INSPECTION

Measure the length of the inner and outer valve springs.

**SERVICE LIMITS:**

Inner:	IN.	39.8 mm (1.57 in)
	EX.	39.8 mm (1.57 in)
Outer:	IN.	42.5 mm (1.67 in)
	EX.	42.5 mm (1.67 in)



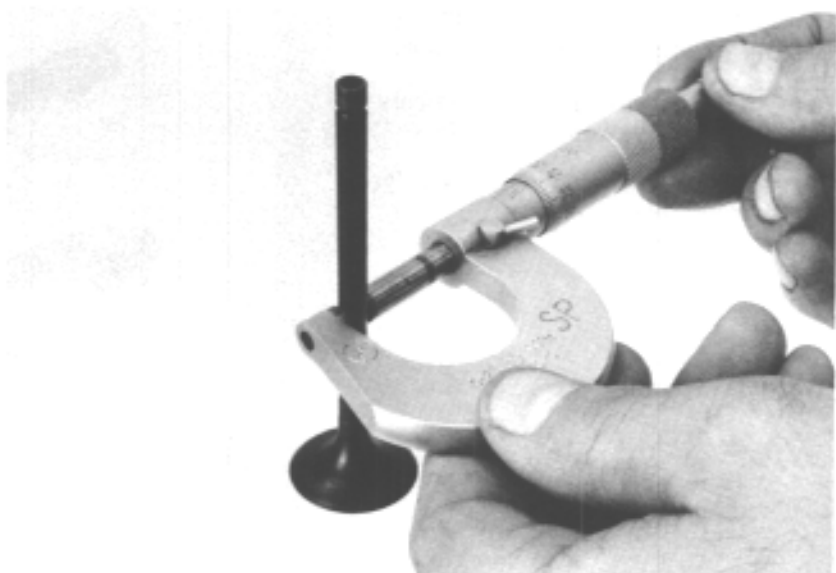
### VALVE STEM-TO-GUIDE CLEARANCE

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

Check valve movement in the guide.

Measure and record each valve stem O.D.

**SERVICE LIMITS:** IN: 5.47 mm (0.215 in)  
EX: 5.44 mm (0.214 in)




**NOTE**

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

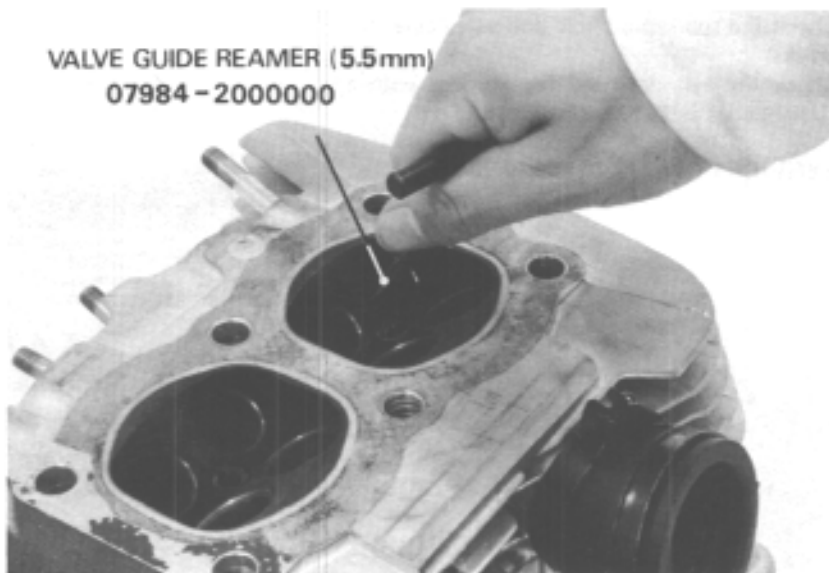
Measure and record each valve guide I.D. using a ball gauge or inside micrometer.

**SERVICE LIMIT:** IN. 5.54 mm (0.218 in)  
 EX. 5.54 mm (0.218 in)

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

**SERVICE LIMITS:** IN. 0.07 mm (0.003 in)  
 EX. 0.09 mm (0.004 in)

VALVE GUIDE REAMER (5.5mm)  
 07984-2000000

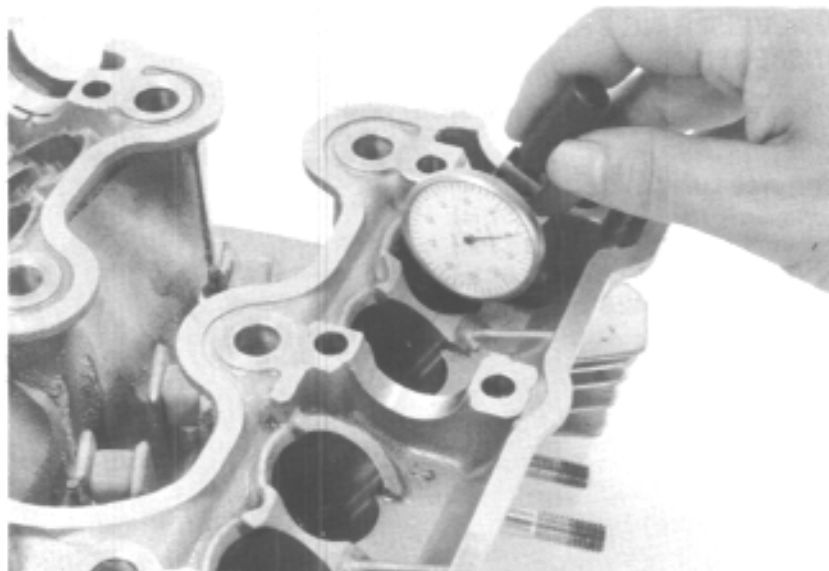

**NOTE**

If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.

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

**NOTE**

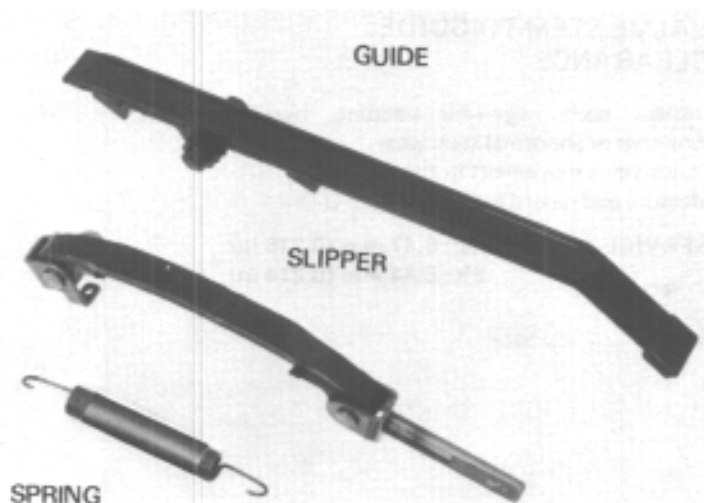
Reface the valve seats whenever the valve guides are replaced (page 6-16).


**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 local or excessive wear.

Inspect the spring for tension.



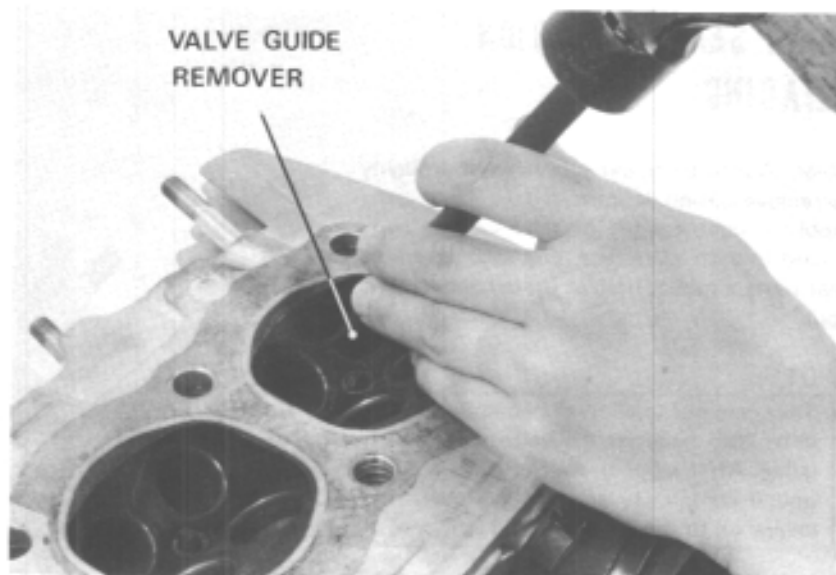


## VALVE GUIDE REPLACEMENT

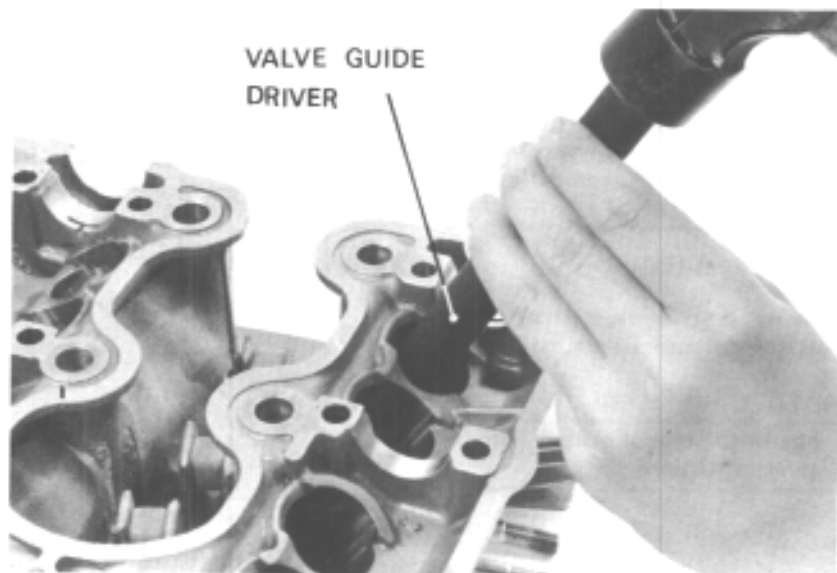
Support the cylinder head and drive out the guide from the valve port.

### NOTE

When driving out the valve guide, do not damage the head.



Install an oversize valve guide from the top of the head.



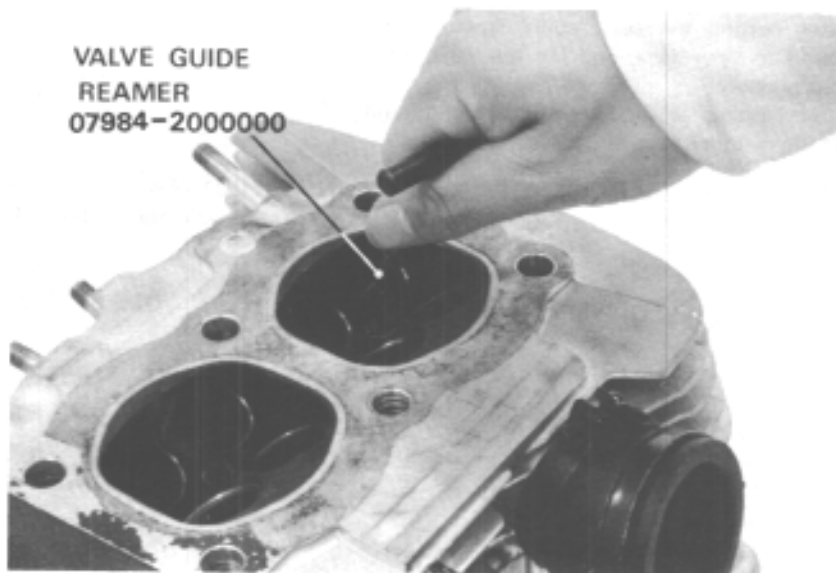
Ream the new valve guide after installation.

### NOTE

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

Reface the valve seat (page 6-16).

Clean the cylinder head thoroughly to remove any metal particles.





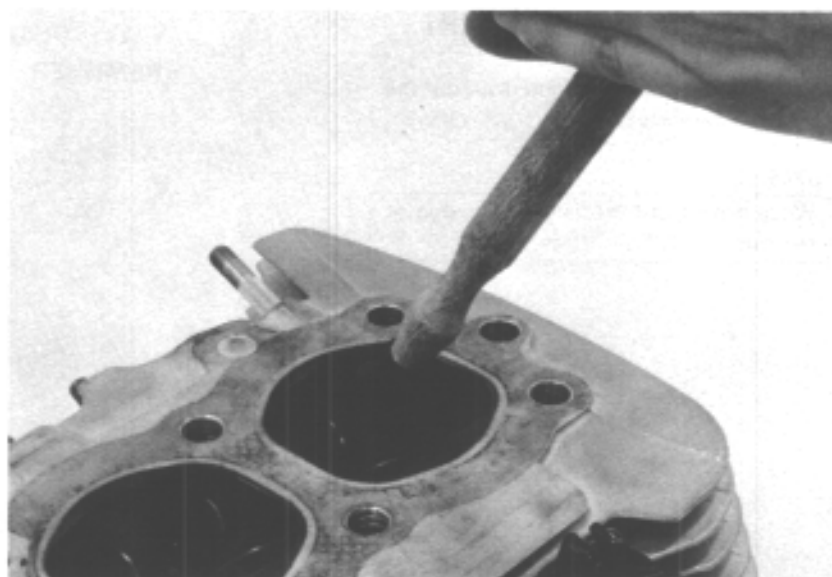
## VALVE SEAT INSPECTION/ REFACING

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

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

### NOTE

Take care not to allow the compound to enter into between the valve stem and guide. After lapping, wash out the compound completely and apply a coat of engine oil to the valve face and seat.



Remove the valve and inspect the face.

### CAUTION

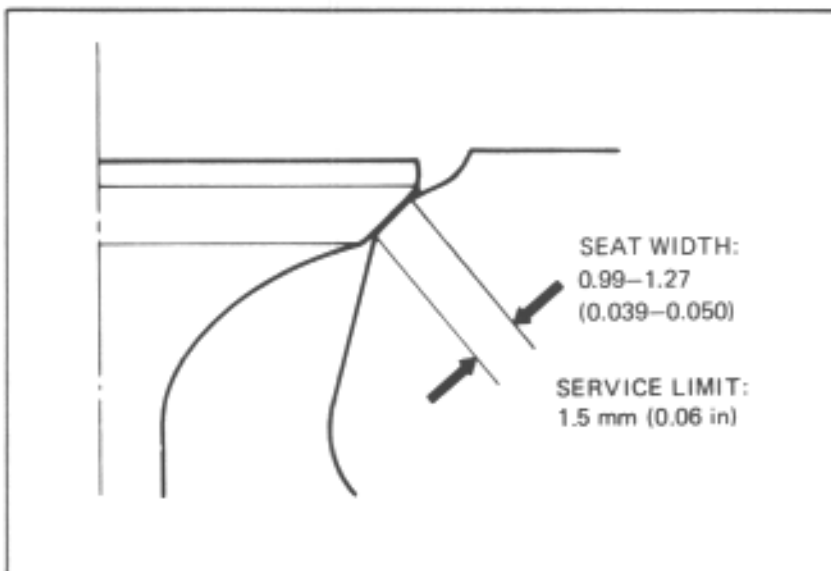
The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.

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.



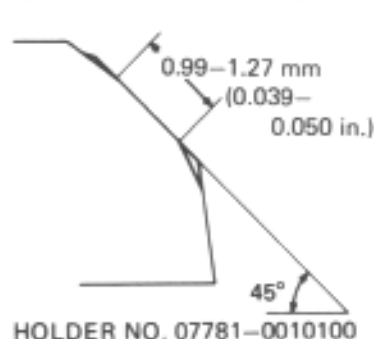
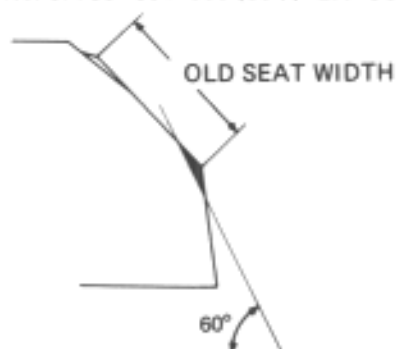
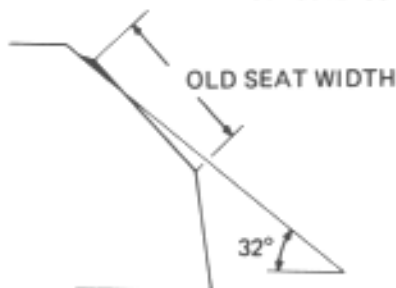
After cutting the seat, apply lapping compound to valve face, and lap the valve using light pressure.

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

IN: CUTTER No. 07780-0012200 (30  $\phi$ )  
 EX: CUTTER No. 07780-0012100 (28  $\phi$ )

IN, EX: CUTTER  
 No. 07780-0014000 (30  $\phi$ )

IN: CUTTER No. 07780-0010200 (27.5  $\phi$ )  
 EX: CUTTER No. 07780-0010100 (24.5  $\phi$ )





## 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.

### NOTE

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

Install the valve springs and retainers.

### NOTE

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

Install the valve cotters.

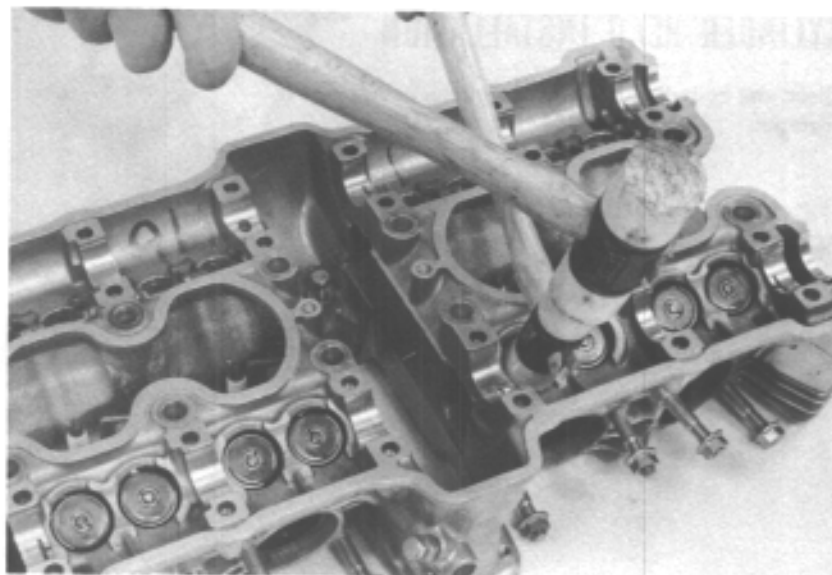
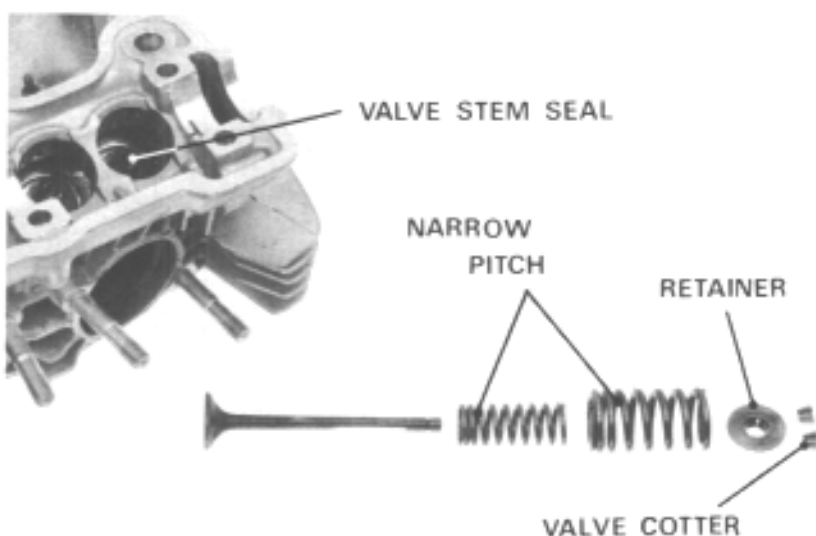
### CAUTION

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

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

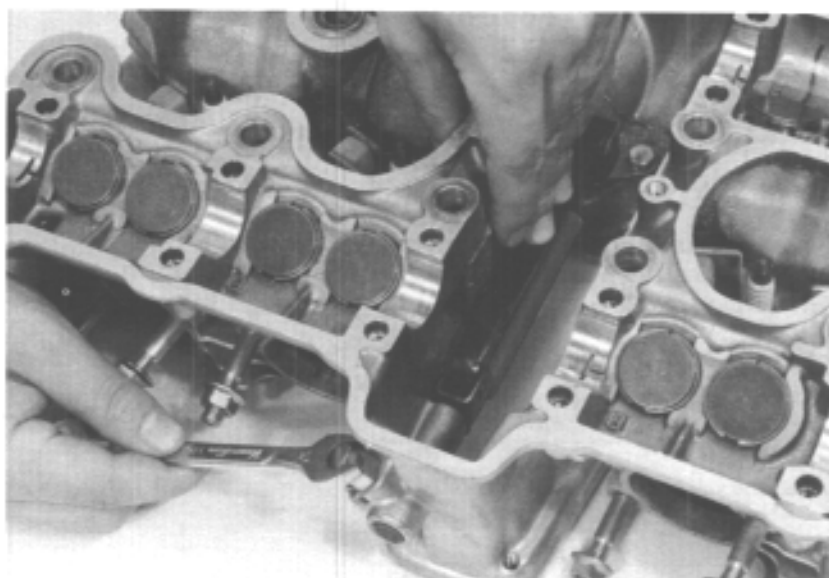
### NOTE

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





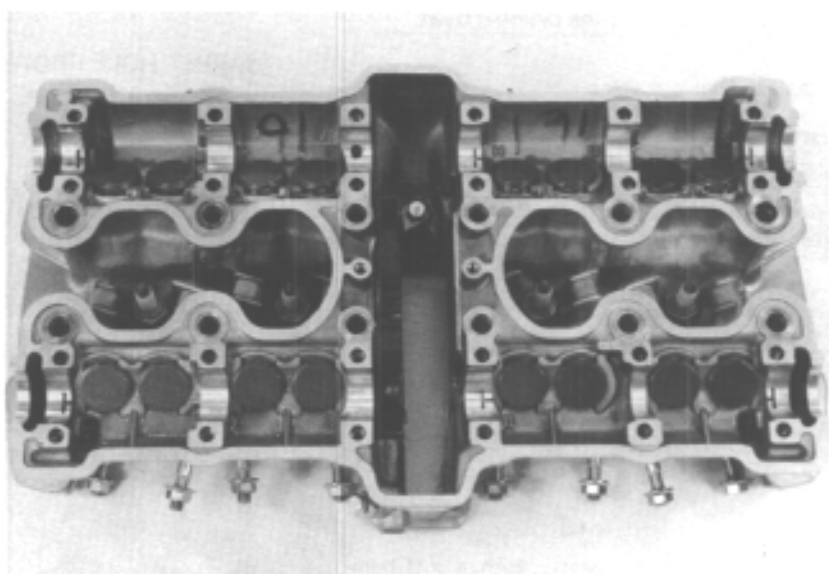
Install the front cam chain tensioner.  
Push the chain tensioner and tighten the lock nut.



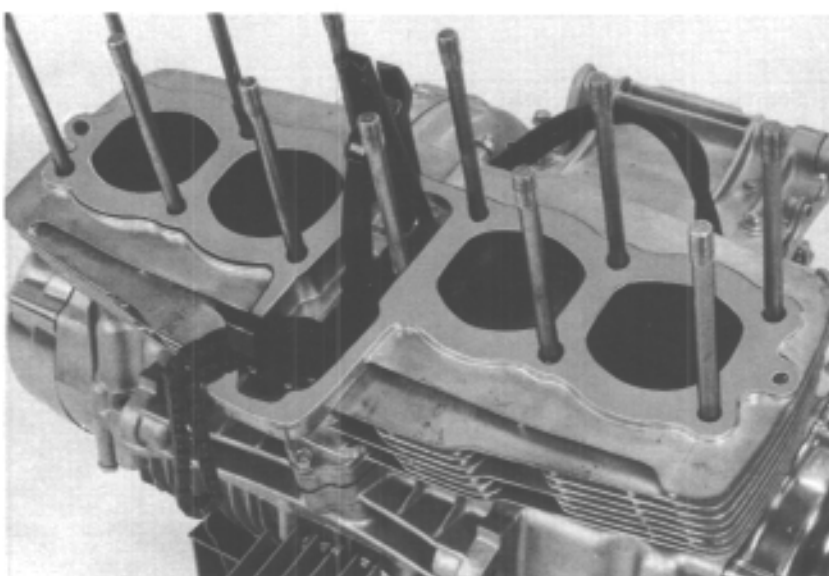
Install the valve lifters and adjustment shims.

**NOTE**

Make sure that the valve lifters and shims are in their original positions.

**CYLINDER HEAD INSTALLATION**

Clean the cylinder head surfaces of any gasket material.







Tighten the two cam chain tensioner lock nuts.

Loosen the adjusting lock nut and pull the tensioner up.

Retighten the lock nut.

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

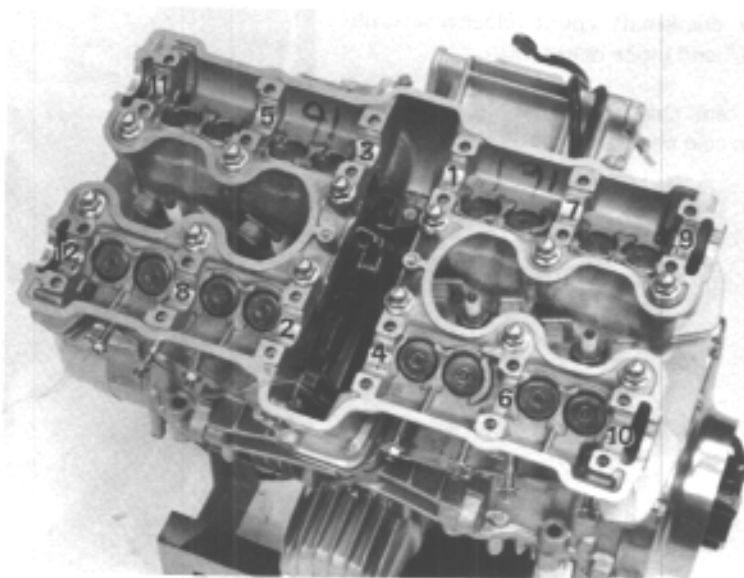


Install the cylinder head assembly.

Tighten the cap nuts in the sequence shown.

### SPECIFIED TORQUE:

10 mm cap nut: 3.6–4.0 kg-m  
(26–29 ft-lb)



Tighten the two bolts at the cam chain housing.

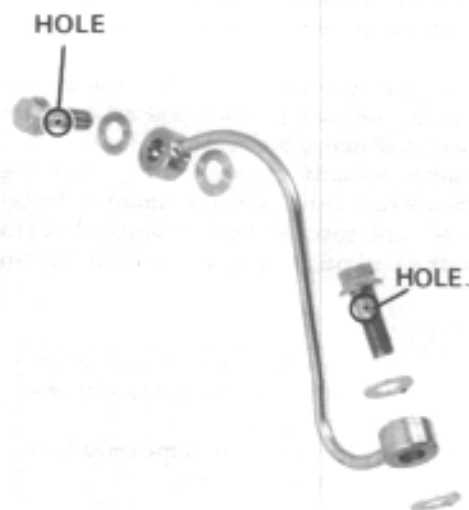
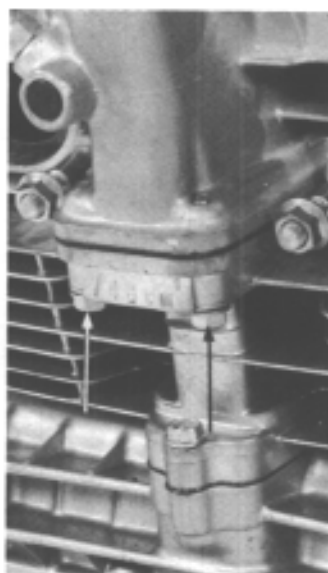
### NOTE

Apply molybdenum disulfide grease to the threads of the cylinder bolts.

Tighten the two oil pipe bolts.

### NOTE

Install the bolt with bigger hole to tighten the upper oil pipe.



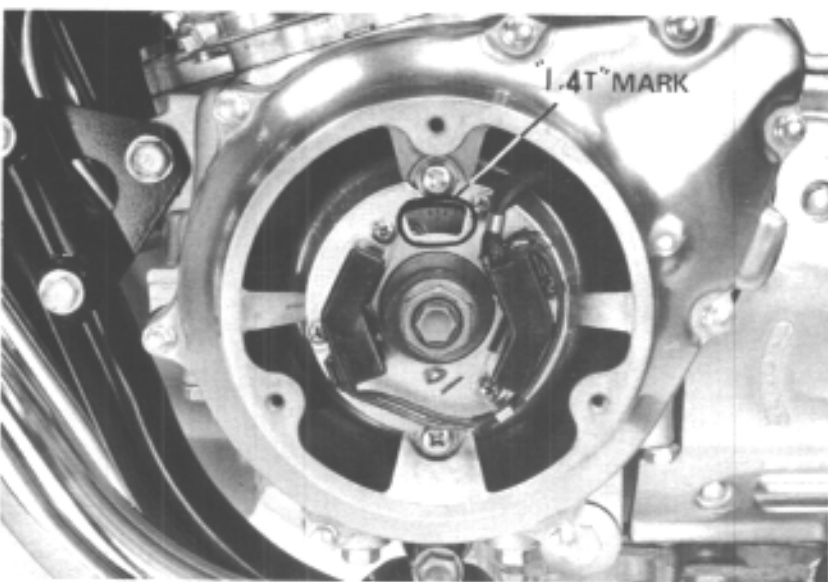
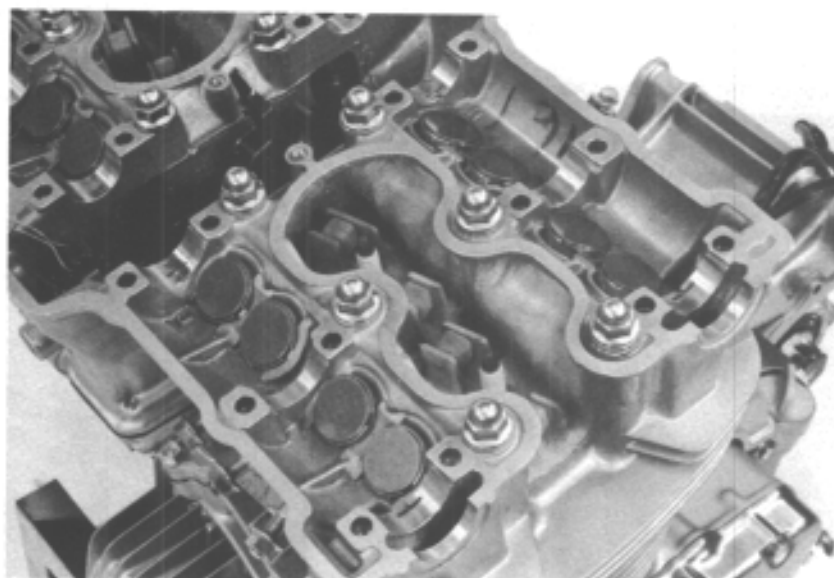


## CAMSHAFT INSTALLATION

Lubricate the camshaft bearings with molybdenum disulfide grease.

Turn the crankshaft counterclockwise until the "1,4T" and index marks align.

Pull the cam chain tensioner up to provide maximum cam chain slack.

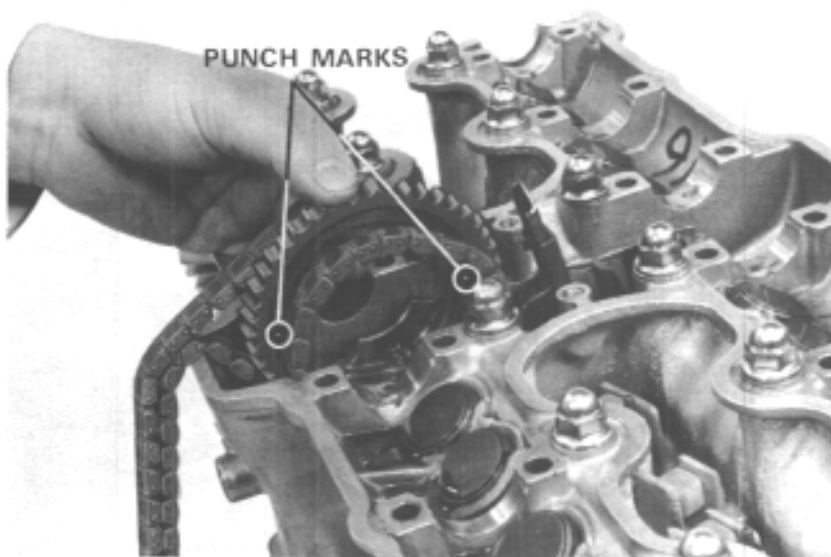


Place the intake cam chain over the exhaust camshaft sprocket, aligning the sprocket punch marks with the cylinder head surface.

Place the exhaust camshaft through the exhaust camshaft sprocket and exhaust cam chain, positioning the cam lobes for the No. 1 cylinder towards the spark plug. Place the exhaust cam chain over the sprocket. Install the A and E camshaft holders loosely. Install a camshaft sprocket bolt, but do not tighten yet.

### NOTE

- Install camshaft holders with directional arrows pointing towards the front of the engine.
- Apply locking agent to the threads of camshaft sprocket bolts.







Loosely install the D camshaft holder and the tachometer drive gear/camshaft holder. Position the camshaft so its flange fits into the slot in the D holder.

Turn the crankshaft counterclockwise 360° and install the other camshaft sprocket bolt and tighten to the specified torque. Turn the crankshaft another 360° and tighten the sprocket bolt which was installed earlier.

### NOTE

Apply locking agent to the threads of camshaft sprocket bolts.

**TORQUE: 2.2–2.6 kg-m (16–19 ft-lb)**

Tighten the camshaft holder bolts in a criss-cross pattern.

**TORQUE: 1.2–1.6 kg-m (9–12 ft-lb)**

Adjust the front cam chain with the lock nut on the rear of the engine (page 3-11).

Make sure that the "1,4T" and index marks are aligned as shown on page 6-20 and the cam lobes for the No. 1 cylinder face toward the spark plug. Recheck the position of the exhaust camshaft sprocket; the punch marks must align with the cylinder head surface. Place the intake cam chain over the intake camshaft and sprocket, aligning the sprocket punch marks with the cylinder head surface.

Install the intake camshaft, positioning the cam lobes for the No. 1 cylinder toward the spark plugs. Install a camshaft sprocket bolt, but do not tighten yet.

### NOTE

If the sprocket was not removed from the camshaft during disassembly, then reinstall as an assembled set.

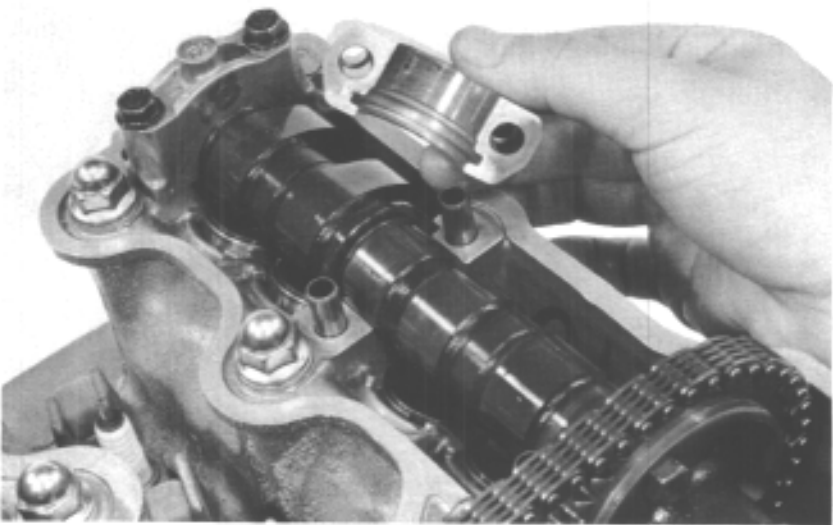
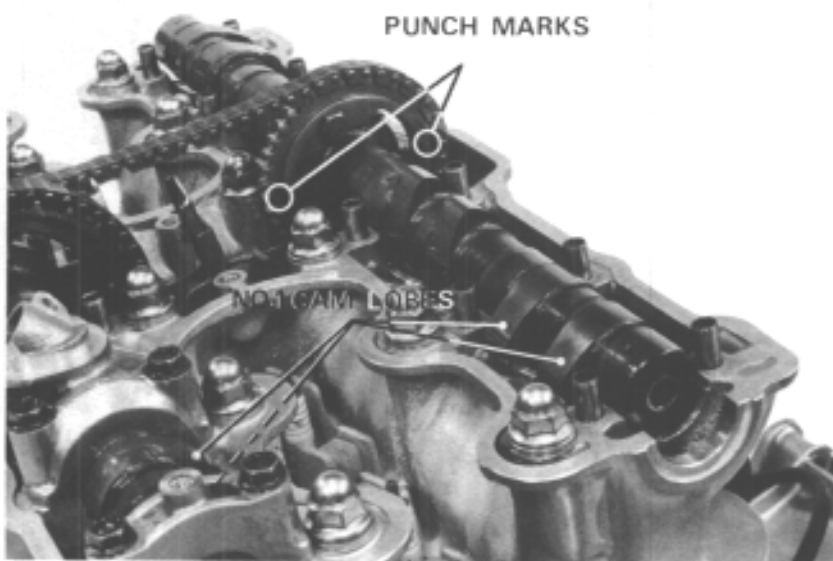
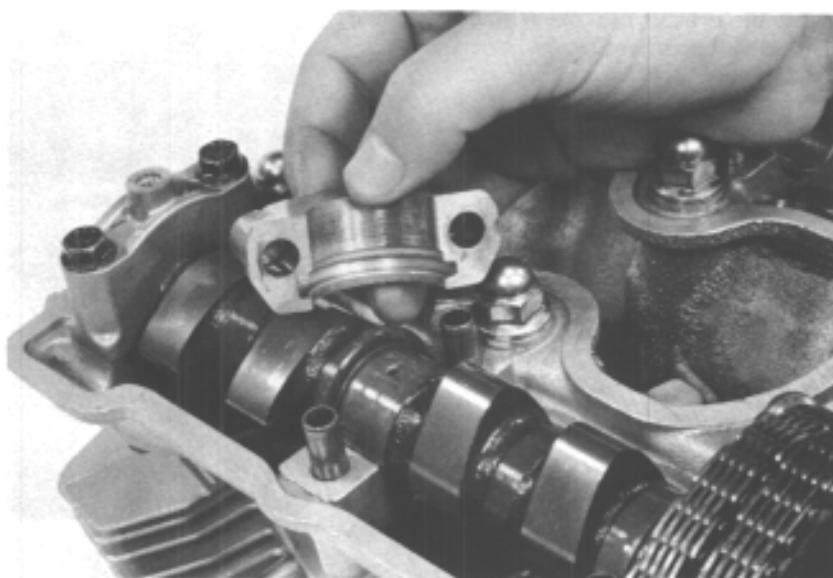
Loosely install the F and L camshaft holders. Install the G and K holders loosely, positioning the camshaft so its flange fits into the slot in the K holder.

Install and tighten the camshaft sprocket bolts, following the same procedures described for exhaust camshaft installation.

Tighten the camshaft holder bolts in a criss-cross pattern.

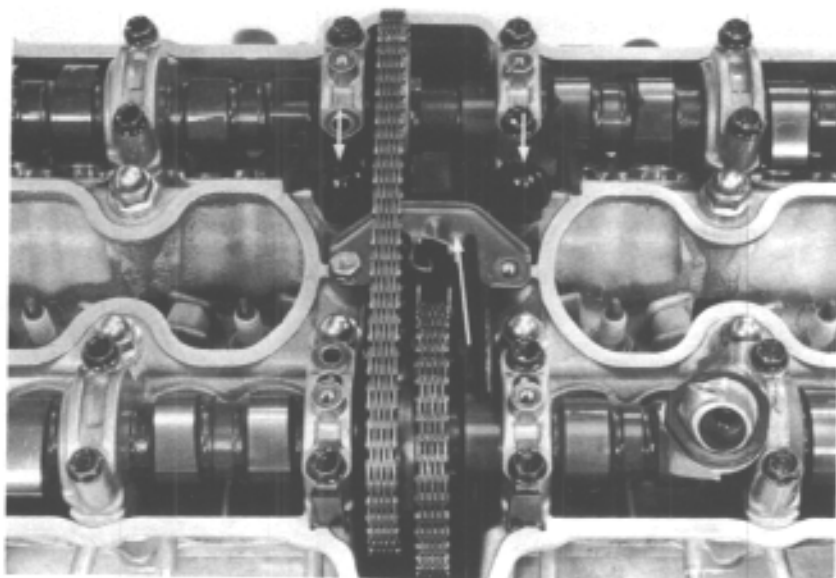
Adjust the intake cam chain tensioner with the lock nut on the front of the engine (page 3-11).

Recheck the crankshaft and camshaft sprocket alignment.

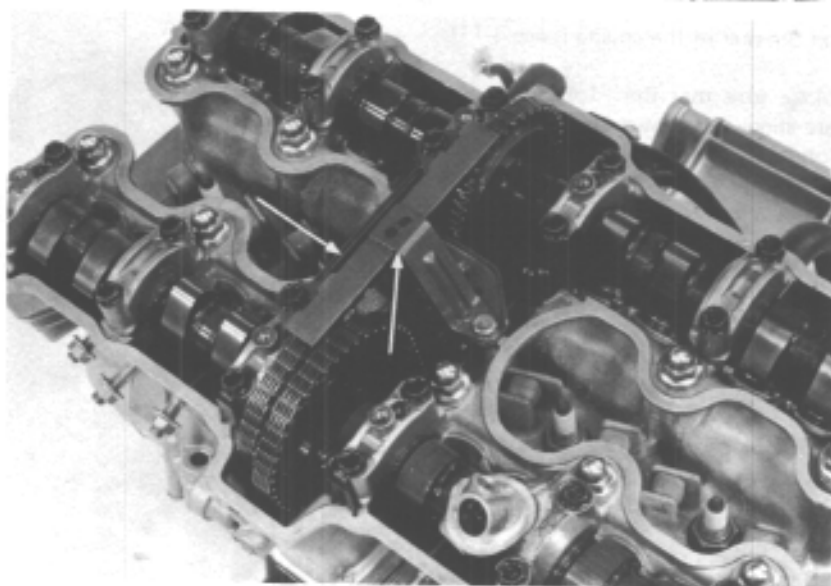




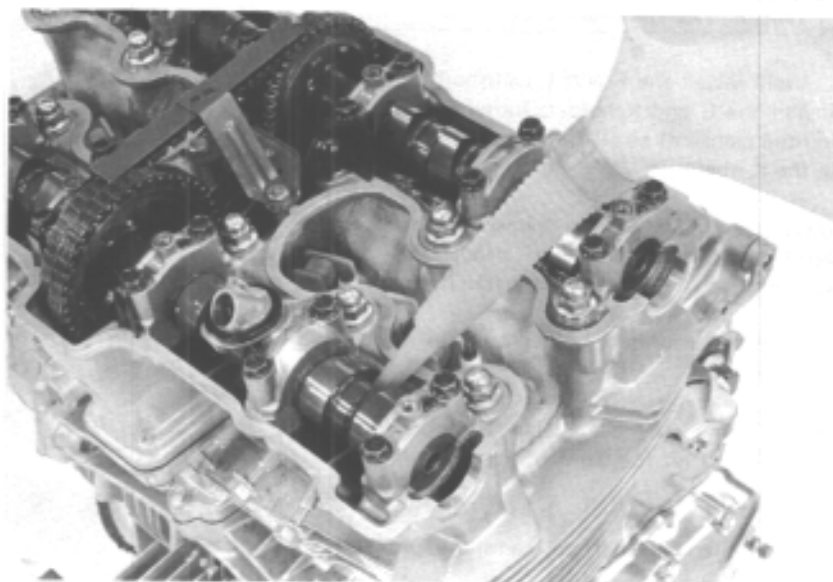
Install the exhaust cam chain guide attaching plate and oil pool caps.



Install the oil line and cam chain guide with the B, C, H and J holders. Tighten in a criss-cross pattern.



Fill the oil pockets in the head with oil so that the cam lobes are submerged. Adjust the valve clearance (page 3-7).

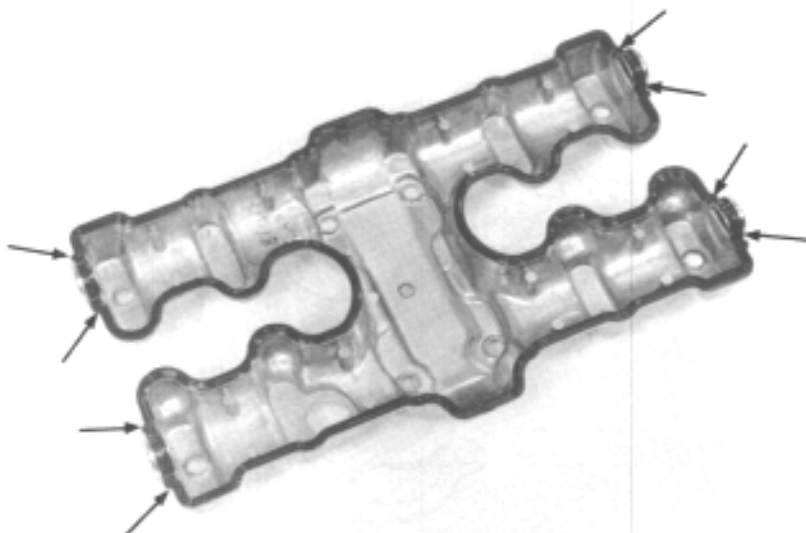




Inspect the cylinder head cover gasket for damage or deterioration.  
Apply a sealant on the cylinder gasket at eight places as shown.

**NOTE**

Clean the gasket before applying sealant.



Install the cylinder head cover.

Connect the tachometer cable.  
Install the spark plug caps.



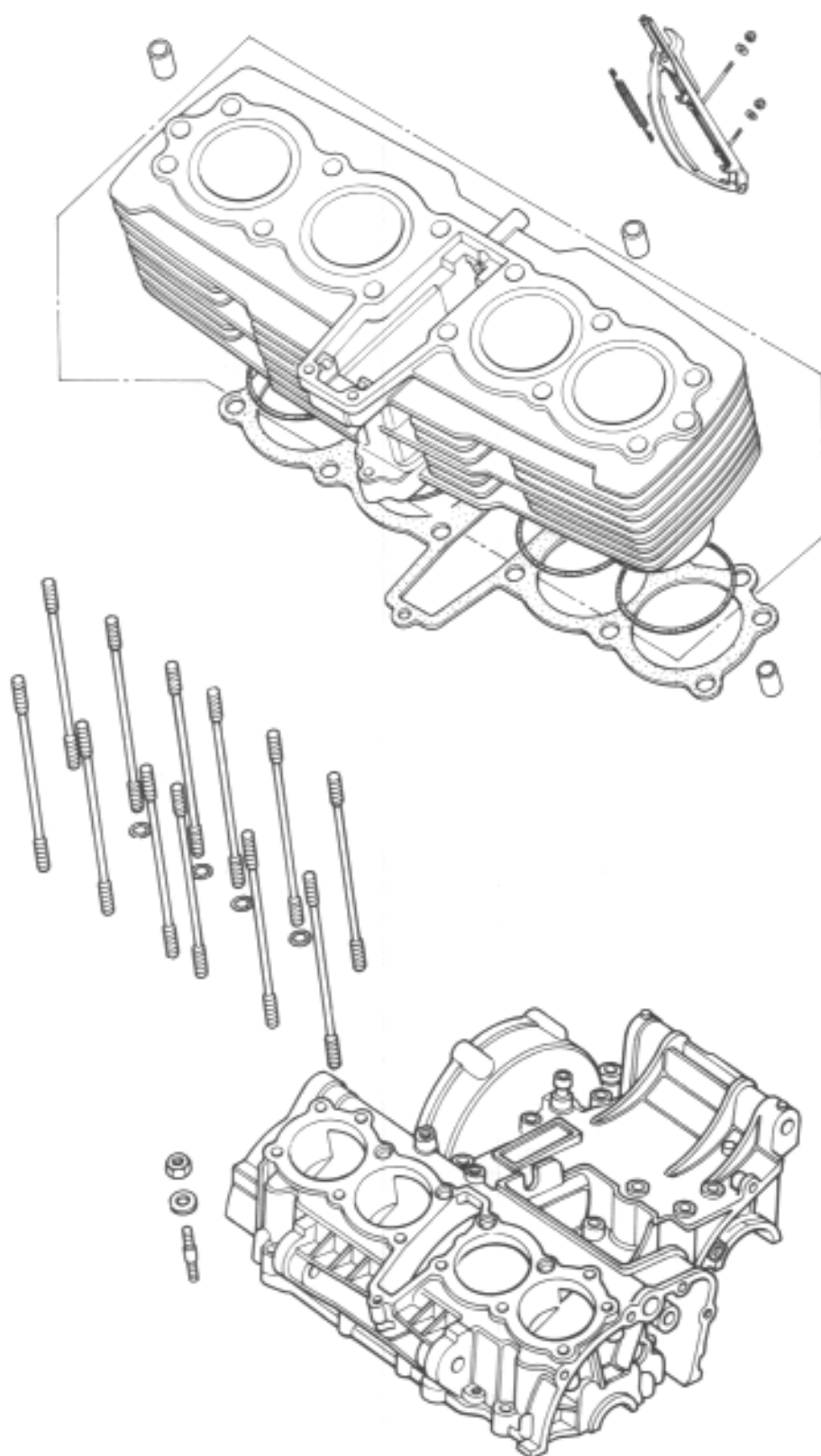
Install the pulser generator cover.

Adjust cam chain tension (page 3-11).





## MEMO





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

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

All cylinder/piston maintenance and inspection can be accomplished with the engine removed.

### SPECIAL TOOLS

#### Special Tools

Piston Base (2 required)	07958-2500001
Piston Ring Compressor (2 required)	07954-3000000

### SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Cylinder	I.D.		62.000-62.010 mm (2.4409-2.4413 in)	62.10 mm (2.445 in)
	Warpage		—	0.10 mm (0.004 in)
Piston, piston rings and piston pin	Piston ring-to-ring groove clearance	TOP	0.030-0.065 mm (0.0012-0.0026 in)	0.09 mm (0.004 in)
		SECOND	0.025-0.055 mm (0.0010-0.0022 in)	0.09 mm (0.004 in)
	Ring end gap	TOP	0.10-0.30 mm (0.004-0.012 in)	0.5 mm (0.020 in)
		SECOND	0.10-0.30 mm (0.004-0.012 in)	0.5 mm (0.020 in)
		OIL (SIDE RAIL)	0.3-0.9 mm (0.012-0.035 in)	1.1 mm (0.043 in)
	Piston O.D.		61.95-61.98 mm (2.439-2.440 in)	61.90 mm (2.437 in)
	Piston pin bore		15.002-15.008 mm (0.5906-0.5909 in)	15.05 mm (0.593 in)
	Connecting rod small end I.D.		15.016-15.034 mm (0.5912-0.5919 in)	15.07 mm (0.593 in)
	Piston pin O.D.		14.994-15.000 mm (0.5903-0.5906 in)	14.98 mm (0.590 in)
	Piston-to-piston pin clearance		—	0.04 mm (0.002 in)
	Cylinder-to-piston clearance		—	0.10 mm (0.004 in)

## TROUBLESHOOTING

#### Compression low

1. Worn cylinder or piston rings

#### Excessive smoke

1. Worn cylinder or piston
2. Improper installation of piston rings
3. Scored or scratched piston or cylinder wall

#### Overheating

1. Excessive carbon build-up on the piston or combustion chamber wall.

#### Knocking or abnormal noise

1. Worn piston and cylinder
2. Excessive carbon build-up



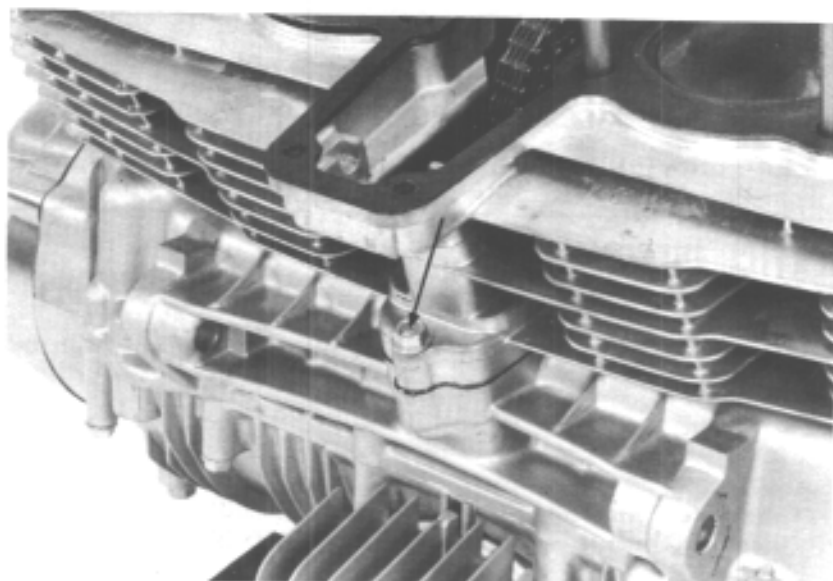
## CYLINDER REMOVAL

Remove the cylinder head (Section 6).

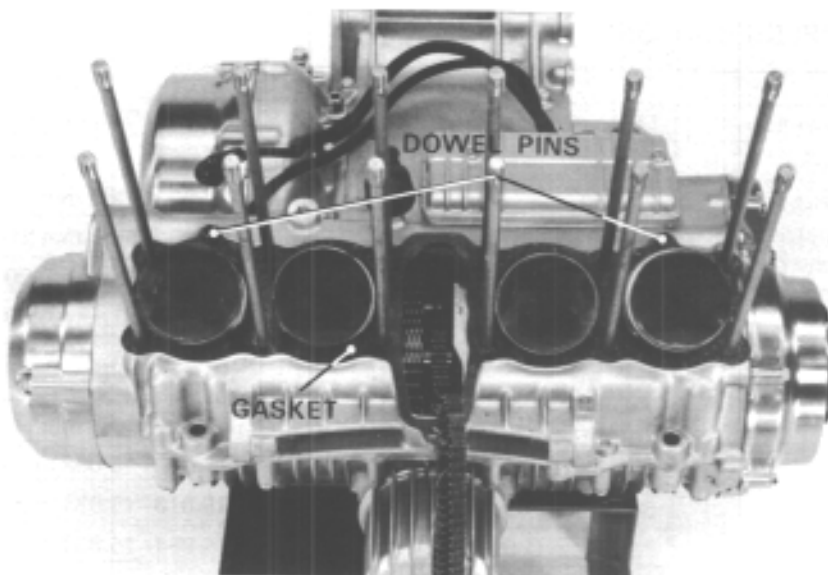
Remove the bolt at the lower front cylinder base.

Remove the cylinder.

Remove the cam chain tensioner from the cylinder.



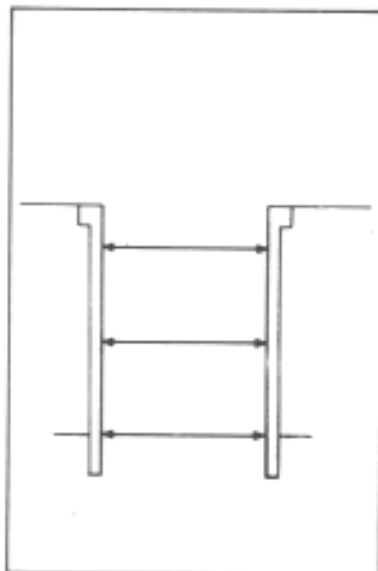
Remove the cylinder gasket and dowel pins.



## CYLINDER INSPECTION

Inspect the cylinder bores for wear or damage.  
Measure the cylinder I. D. at three levels in X and Y axis.

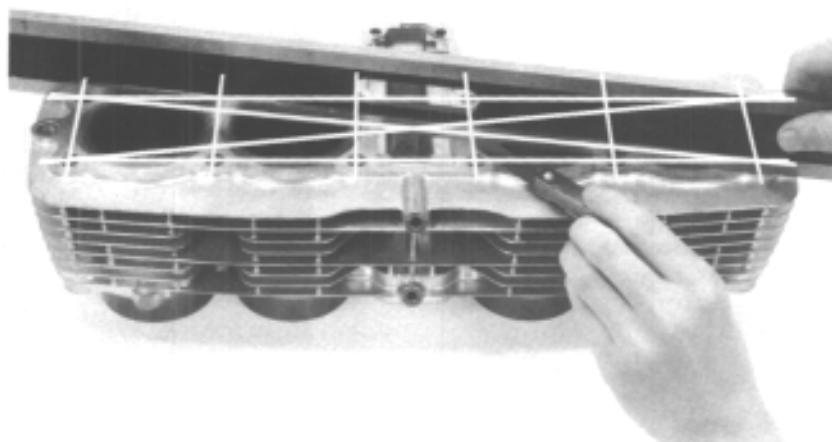
**SERVICE LIMIT: 62.10 mm (2.445 in)**





Inspect the top of the cylinders for warpage.  
Check in an X pattern as shown.

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



### CAM CHAIN TENSIONER INSPECTION

Inspect the slipper of the cam chain tensioner  
for damage or excessive wear.  
Inspect the tension spring for weakness.



### PISTON REMOVAL

Remove each piston pin clip with needle nose  
pliers.

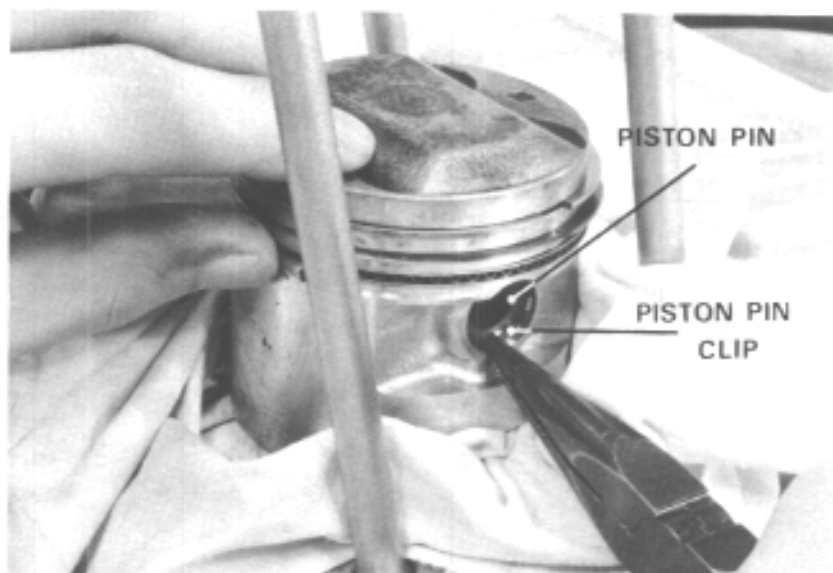
#### NOTE

Do not allow clips to fall into the crank-  
case.

Press the piston pin out.

#### NOTE

Mark the pistons to indicate the cyl-  
inder positions.







# **PISTON/PISTON RING INSPECTION**

Inspect the piston ring-to-groove clearance.

## **SERVICE LIMIT:**

TOP: 0.09 mm (0.004 in)

SECOND: 0.09 mm (0.004 in)

## **NOTE**

Mark the rings so that they can be returned to their original locations.

Inspect the pistons for damage and cracks; ring grooves for wear.



Insert each piston ring into the cylinder, and inspect the end gap.

## **SERVICE LIMITS:**

TOP: 0.5 mm (0.020 in)

SECOND: 0.5 mm (0.020 in)

OIL (Side rail): 1.1 mm (0.043 in)

## **STANDARD END GAPS:**

TOP: 0.10–0.30 mm  
(0.004–0.012 in)

SECOND: 0.10–0.30 mm  
(0.004–0.012 in)

OIL (Side rail): 0.3–0.9 mm  
(0.012–0.035 in)



Measure the piston O. D. at the skirt.

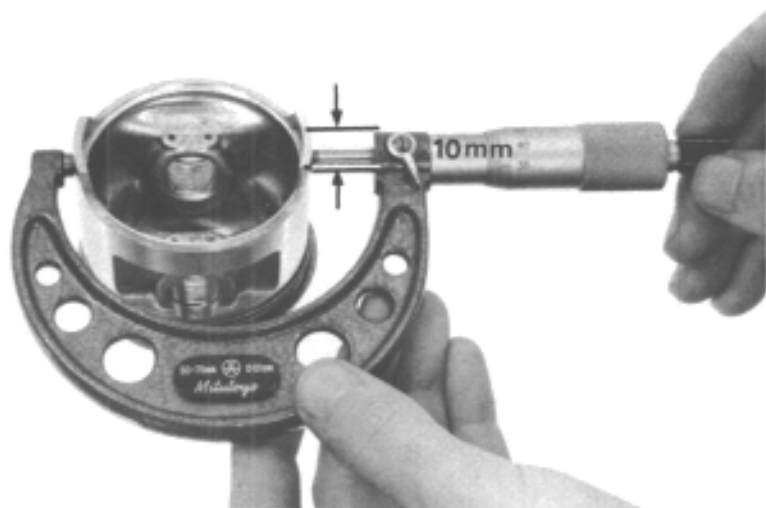
**SERVICE LIMIT:** 61.90 mm (2.437 in)

## **NOTE**

Measurements should be taken 10 mm (0.4 in) from the bottom.

Calculate the cylinder-to-piston clearance.

**SERVICE LIMIT:** 0.1 mm (0.004 in)





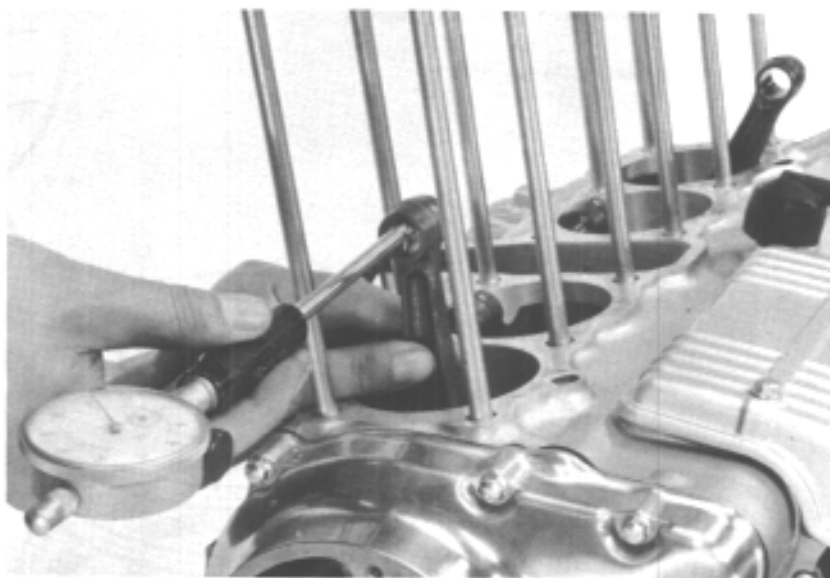
Measure the piston pin hole I. D.,

**SERVICE LIMIT: 15.05 mm (0.593 in)**



Measure the connecting rod small end I. D.,  
(See Section 12 for replacement procedure)

**SERVICE LIMIT: 15.07 mm (0.593 in)**

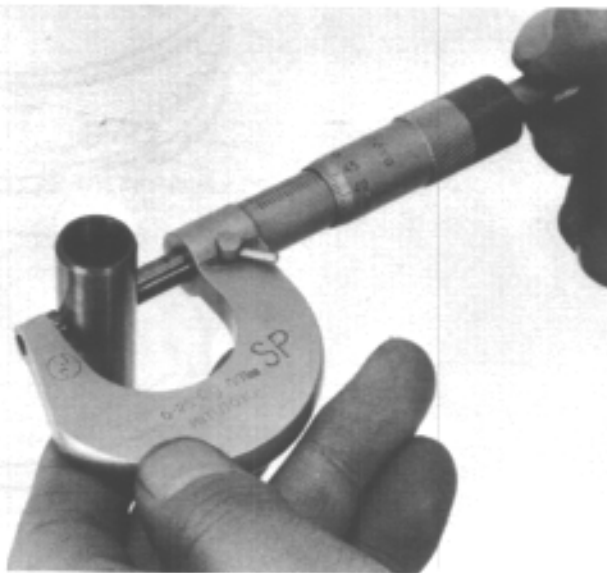


Measure the piston pin O. D.,

**SERVICE LIMIT: 14.98 mm (0.590 in)**

Determine the piston-to-piston pin clearance,

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



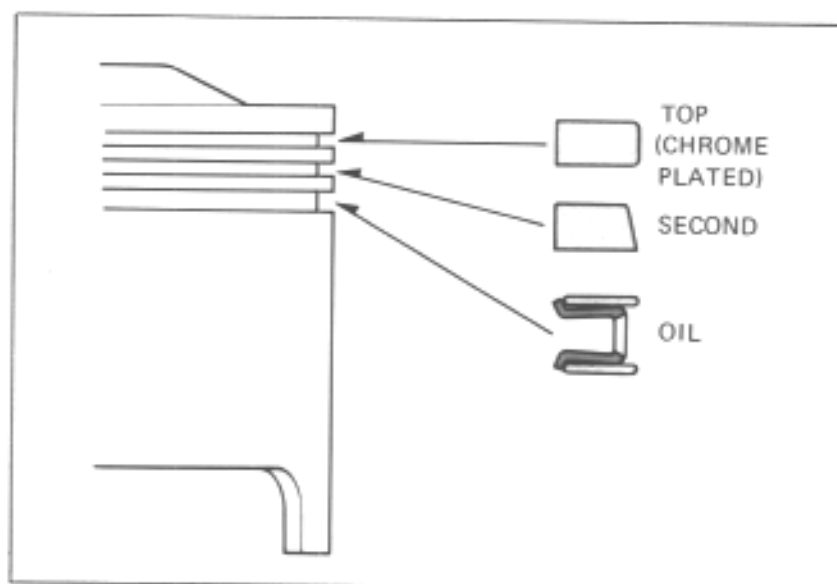


# PISTON RING INSTALLATION

Install the piston rings.

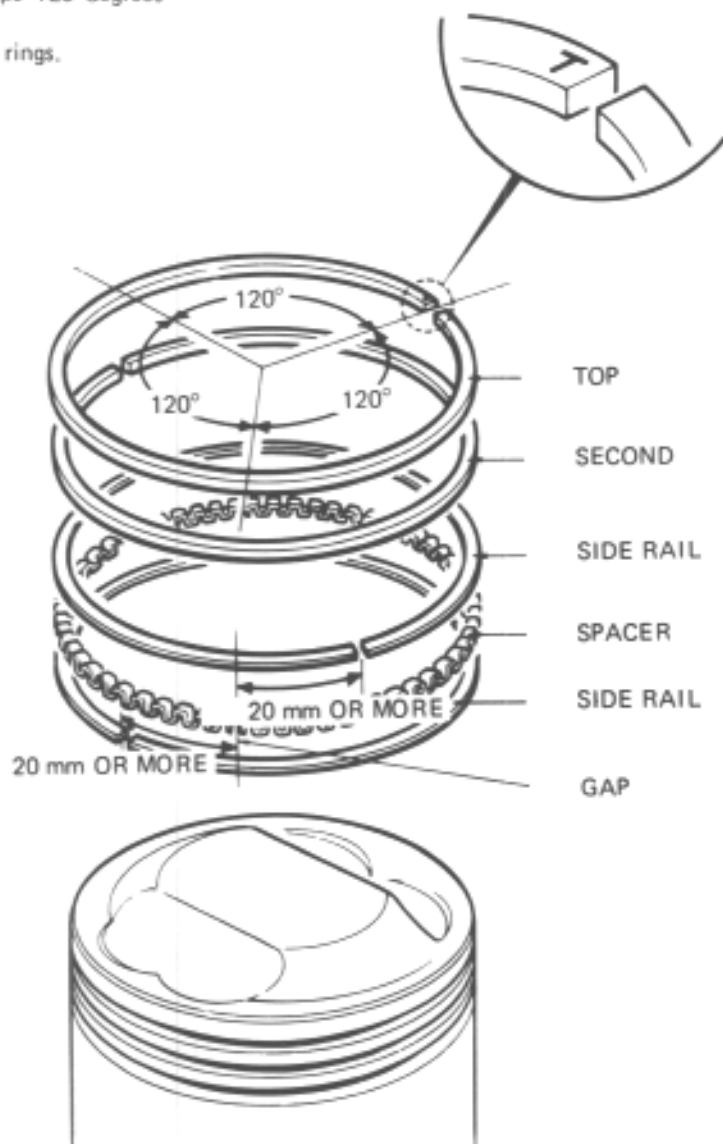
## NOTE

- All rings should be installed with the markings facing up.
- After installation, the rings should rotate freely.



Space the piston ring end gaps 120 degrees apart.

Do not align the gaps in the oil rings.





## PISTON INSTALLATION

Apply molybdenum disulfide grease to the connecting rod small ends.  
Install the pistons, piston pins and clips.

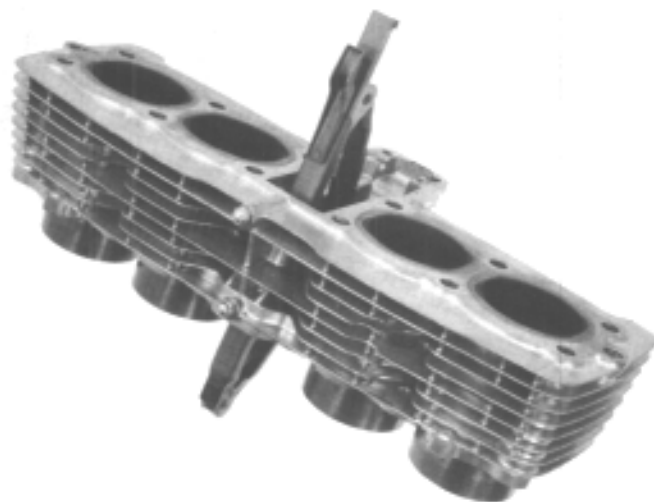
### NOTE

- Position the mark "IN" on the piston to the intake side.
- Install the pistons in their original positions.
- Do not allow piston pin clips to fall into the crankcase.

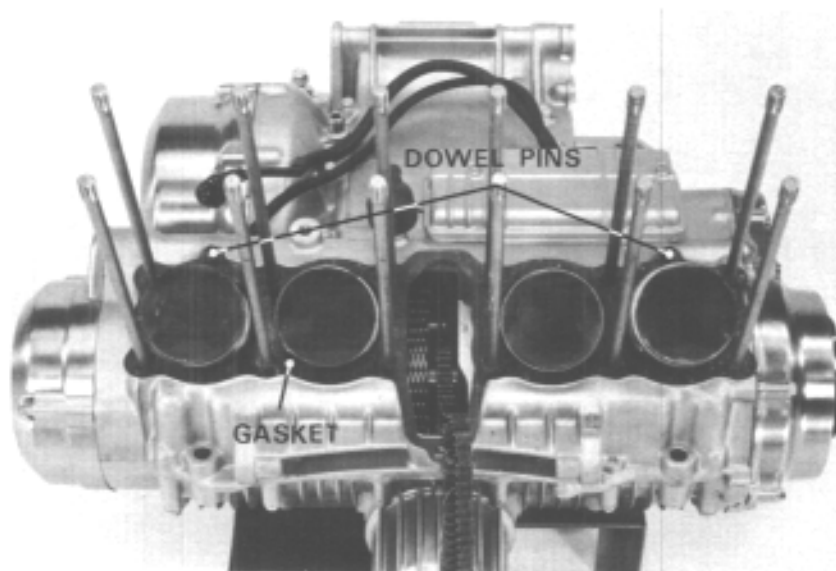


## CYLINDER INSTALLATION

Install the cam chain tensioner.



Install the dowel pins and gasket.



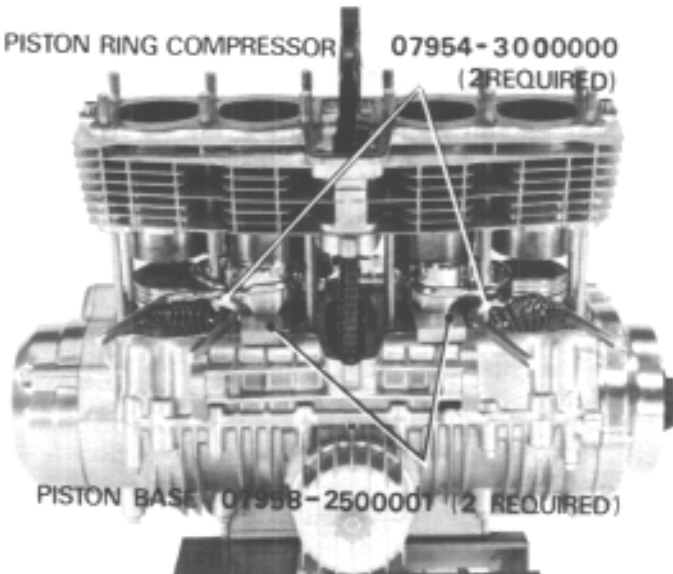


Install the cylinder.

**NOTE**

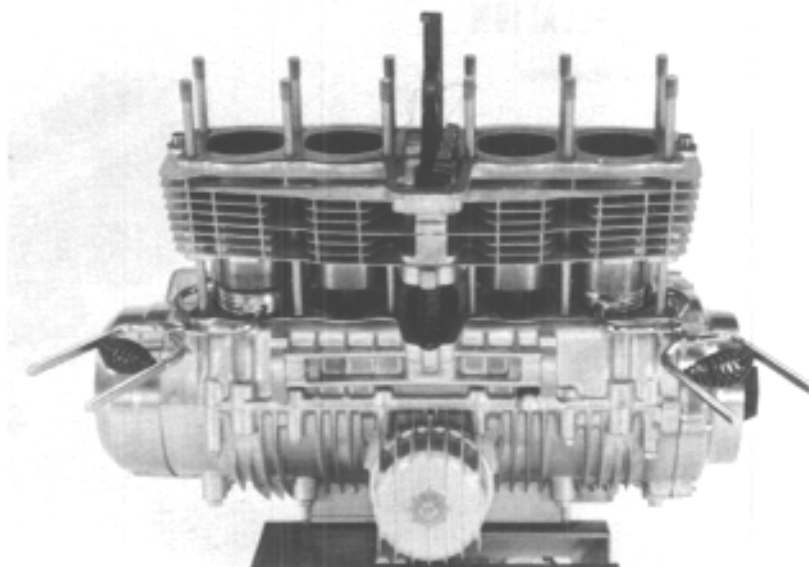
Before using the special tools, position the No. 2 and No. 3 pistons at T. D. C. (Top Dead Center).

PISTON RING COMPRESSOR 07954-3000000  
(2 REQUIRED)



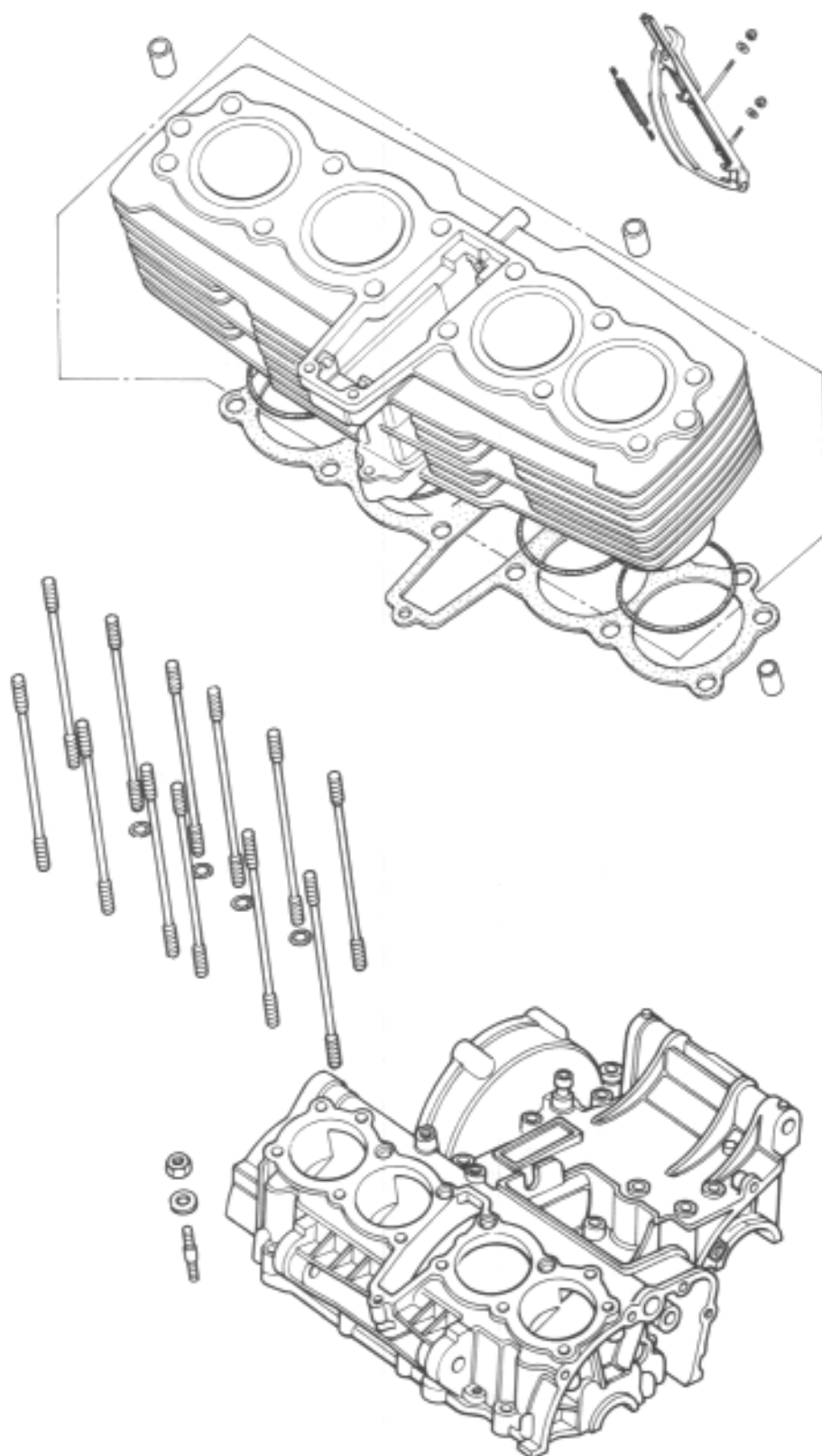
PISTON BASE 07958-2500001 (2 REQUIRED)

Tighten the cylinder base nut securely after installation.





MEMO





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

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

All cylinder/piston maintenance and inspection can be accomplished with the engine removed.

### SPECIAL TOOLS

#### Special Tools

Piston Base (2 required)	07958-2500001
Piston Ring Compressor (2 required)	07954-3000000

### SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Cylinder	I.D.		62.000–62.010 mm (2.4409–2.4413 in)	62.10 mm (2.445 in)
	Warpage		—————	0.10 mm (0.004 in)
Piston, piston rings and piston pin	Piston ring-to-ring groove clearance	TOP	0.030–0.065 mm (0.0012–0.0026 in)	0.09 mm (0.004 in)
		SECOND	0.025–0.055 mm (0.0010–0.0022 in)	0.09 mm (0.004 in)
	Ring end gap	TOP	0.10–0.30 mm (0.004–0.012 in)	0.5 mm (0.020 in)
		SECOND	0.10–0.30 mm (0.004–0.012 in)	0.5 mm (0.020 in)
		OIL (SIDE RAIL)	0.3–0.9 mm (0.012–0.035 in)	1.1 mm (0.043 in)
	Piston O.D.		61.95–61.98 mm (2.439–2.440 in)	61.90 mm (2.437 in)
	Piston pin bore		15.002–15.008 mm (0.5906–0.5909 in)	15.05 mm (0.593 in)
	Connecting rod small end I.D.		15.016–15.034 mm (0.5912–0.5919 in)	15.07 mm (0.593 in)
	Piston pin O.D.		14.994–15.000 mm (0.5903–0.5906 in)	14.98 mm (0.590 in)
Piston-to-piston pin clearance		—————	0.04 mm (0.002 in)	
Cylinder-to-piston clearance		—————	0.10 mm (0.004 in)	

## TROUBLESHOOTING

### Compression low

1. Worn cylinder or piston rings

### Excessive smoke

1. Worn cylinder or piston
2. Improper installation of piston rings
3. Scored or scratched piston or cylinder wall

### Overheating

1. Excessive carbon build-up on the piston or combustion chamber wall.

### Knocking or abnormal noise

1. Worn piston and cylinder
2. Excessive carbon build-up





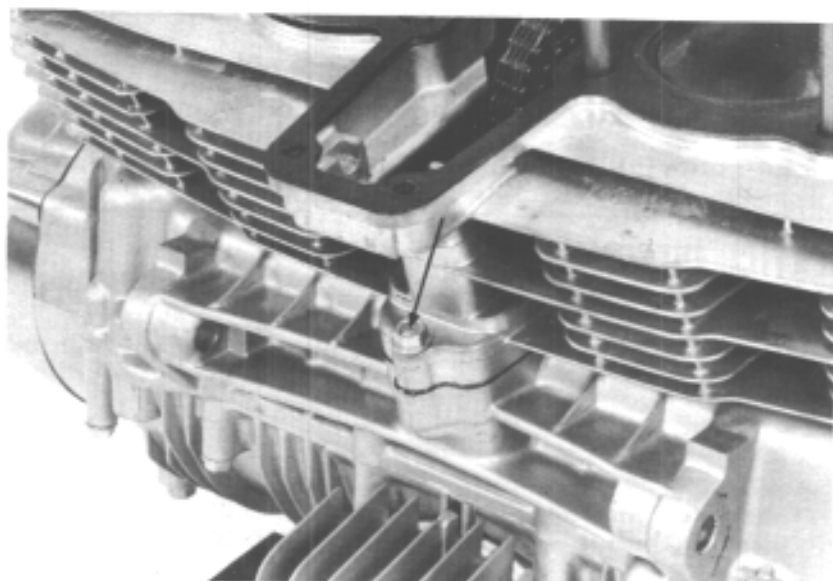
## CYLINDER REMOVAL

Remove the cylinder head (Section 6).

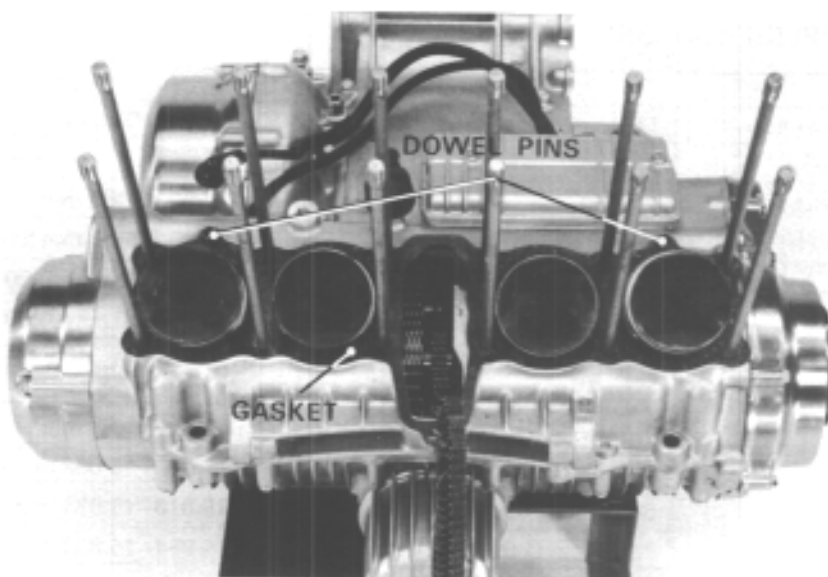
Remove the bolt at the lower front cylinder base.

Remove the cylinder.

Remove the cam chain tensioner from the cylinder.



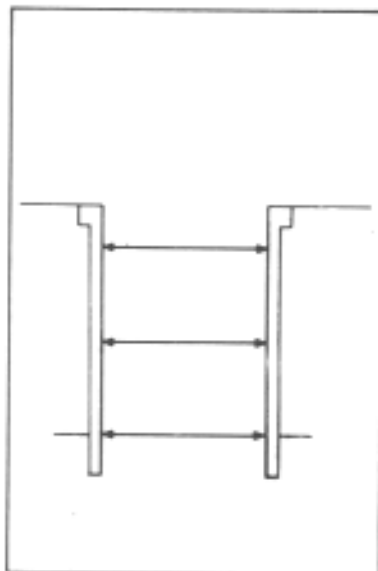
Remove the cylinder gasket and dowel pins.



## CYLINDER INSPECTION

Inspect the cylinder bores for wear or damage.  
Measure the cylinder I. D. at three levels in X and Y axis.

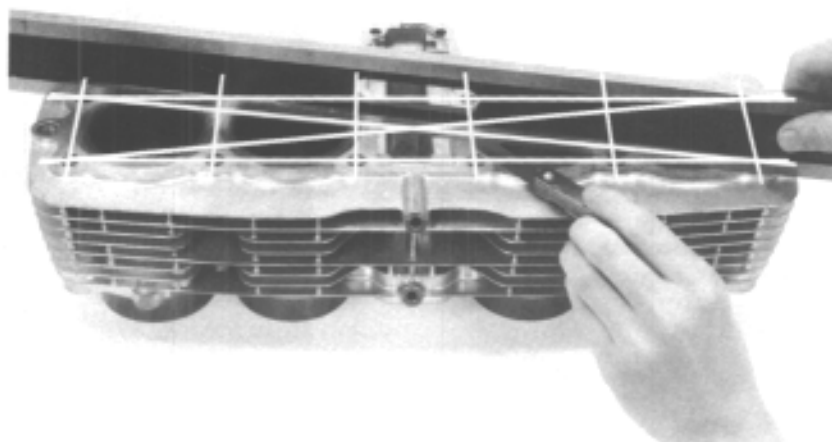
**SERVICE LIMIT: 62.10 mm (2.445 in)**





Inspect the top of the cylinders for warpage.  
Check in an X pattern as shown.

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



### CAM CHAIN TENSIONER INSPECTION

Inspect the slipper of the cam chain tensioner  
for damage or excessive wear.  
Inspect the tension spring for weakness.



### PISTON REMOVAL

Remove each piston pin clip with needle nose  
pliers.

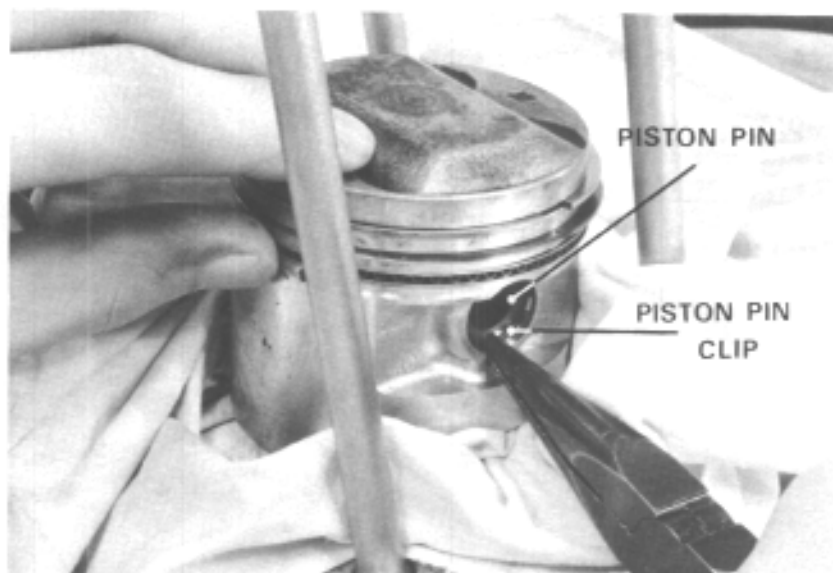
#### NOTE

Do not allow clips to fall into the crank-  
case.

Press the piston pin out.

#### NOTE

Mark the pistons to indicate the cyl-  
inder positions.





# **PISTON/PISTON RING INSPECTION**

Inspect the piston ring-to-groove clearance.

## **SERVICE LIMIT:**

TOP: 0.09 mm (0.004 in)

SECOND: 0.09 mm (0.004 in)

## **NOTE**

Mark the rings so that they can be returned to their original locations.

Inspect the pistons for damage and cracks; ring grooves for wear.



Insert each piston ring into the cylinder, and inspect the end gap.

## **SERVICE LIMITS:**

TOP: 0.5 mm (0.020 in)

SECOND: 0.5 mm (0.020 in)

OIL (Side rail): 1.1 mm (0.043 in)

## **STANDARD END GAPS:**

TOP: 0.10–0.30 mm  
(0.004–0.012 in)

SECOND: 0.10–0.30 mm  
(0.004–0.012 in)

OIL (Side rail): 0.3–0.9 mm  
(0.012–0.035 in)



Measure the piston O. D. at the skirt.

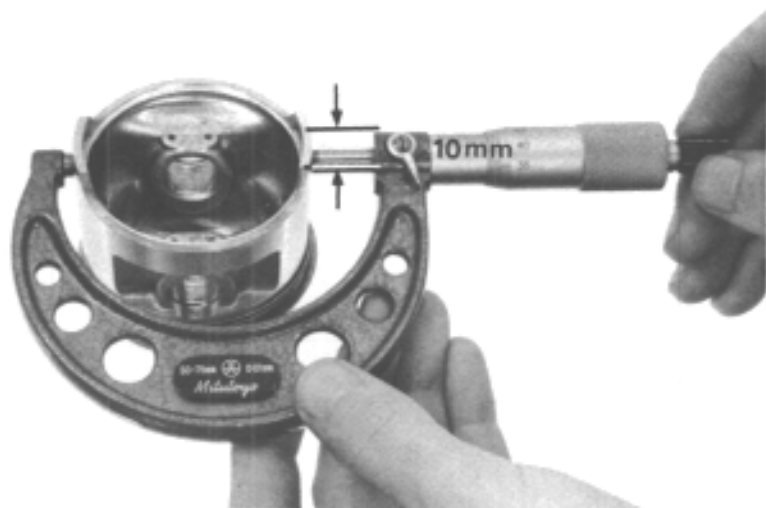
**SERVICE LIMIT:** 61.90 mm (2.437 in)

## **NOTE**

Measurements should be taken 10 mm (0.4 in) from the bottom.

Calculate the cylinder-to-piston clearance.

**SERVICE LIMIT:** 0.1 mm (0.004 in)





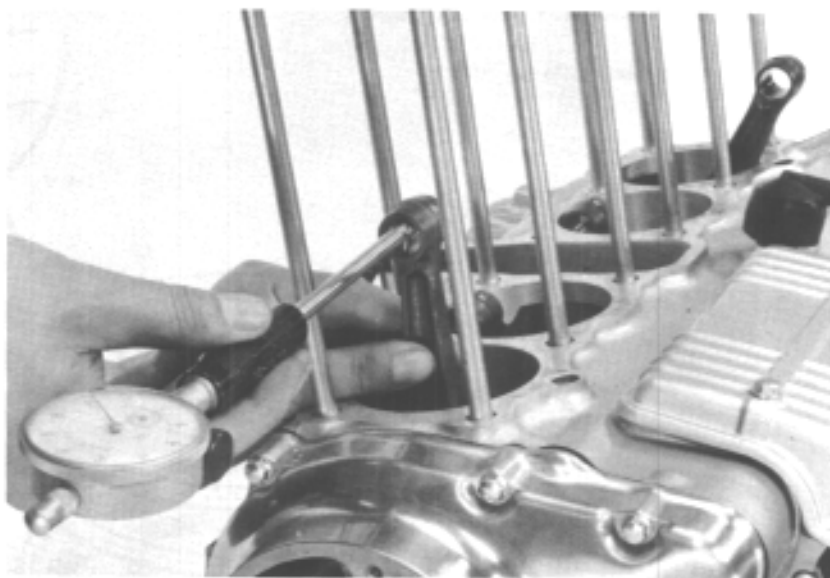
Measure the piston pin hole I. D.,

**SERVICE LIMIT: 15.05 mm (0.593 in)**



Measure the connecting rod small end I. D.,  
(See Section 12 for replacement procedure)

**SERVICE LIMIT: 15.07 mm (0.593 in)**

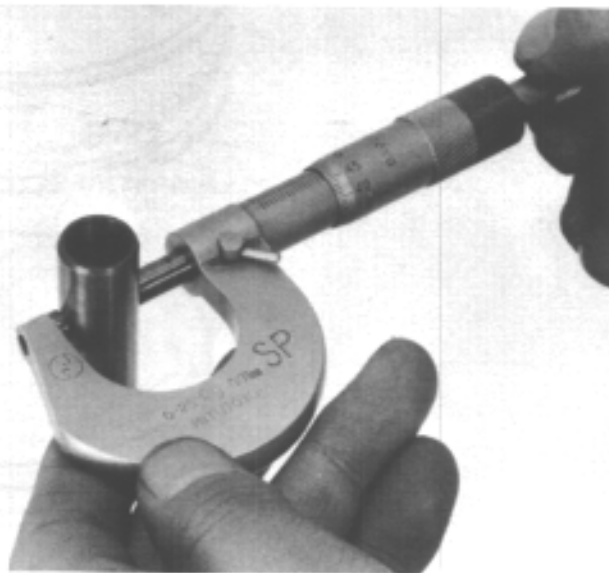


Measure the piston pin O. D.,

**SERVICE LIMIT: 14.98 mm (0.590 in)**

Determine the piston-to-piston pin clearance,

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



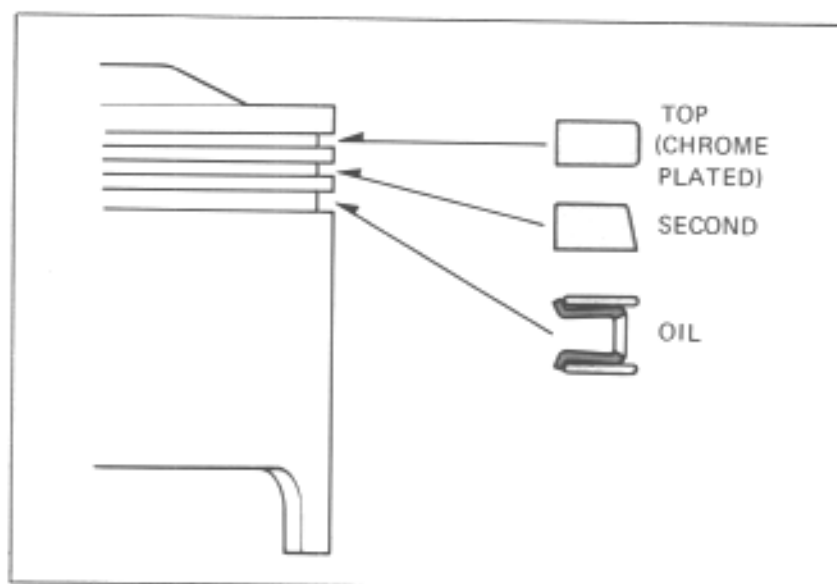


# PISTON RING INSTALLATION

Install the piston rings.

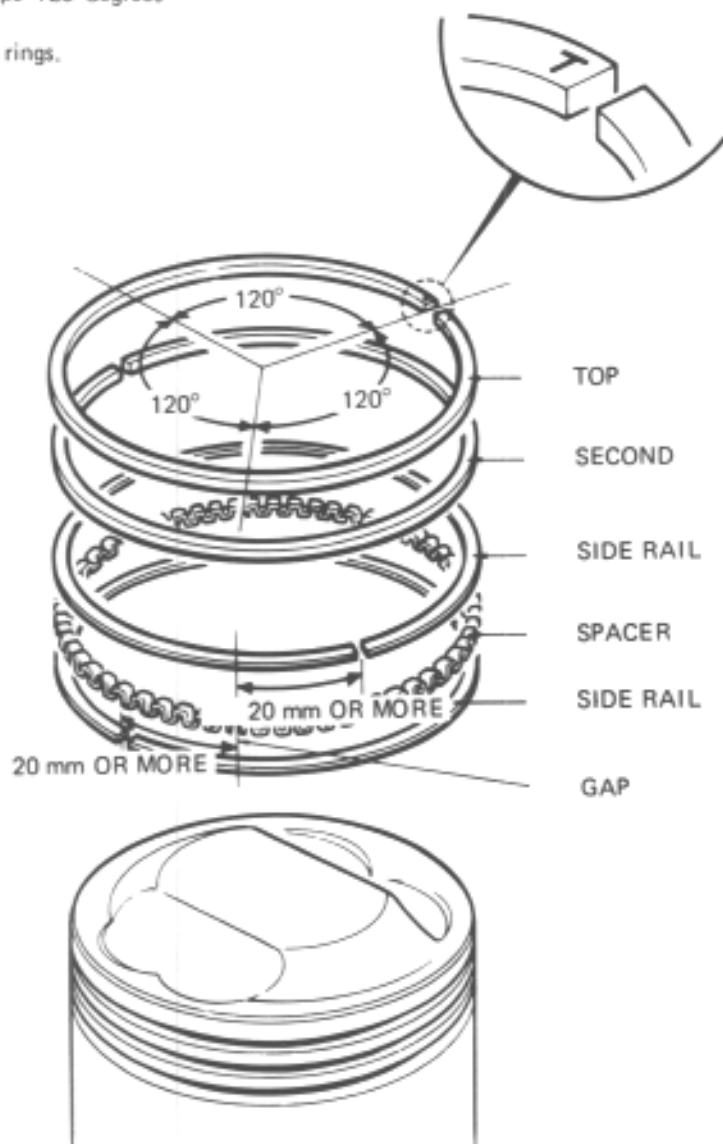
## NOTE

- All rings should be installed with the markings facing up.
- After installation, the rings should rotate freely.



Space the piston ring end gaps 120 degrees apart.

Do not align the gaps in the oil rings.





## PISTON INSTALLATION

Apply molybdenum disulfide grease to the connecting rod small ends.  
Install the pistons, piston pins and clips.

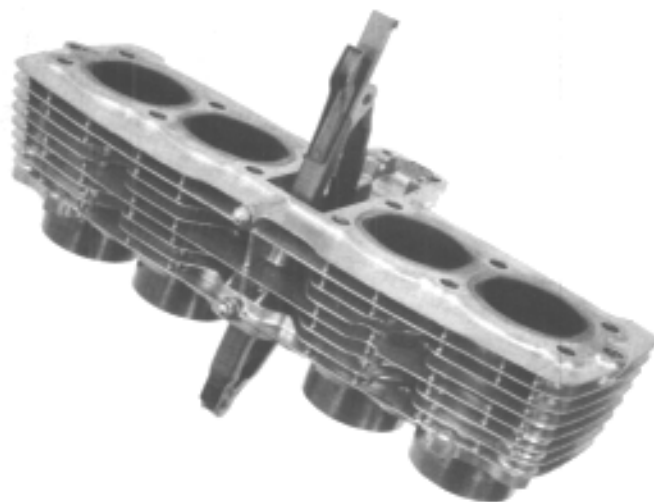
### NOTE

- Position the mark "IN" on the piston to the intake side.
- Install the pistons in their original positions.
- Do not allow piston pin clips to fall into the crankcase.

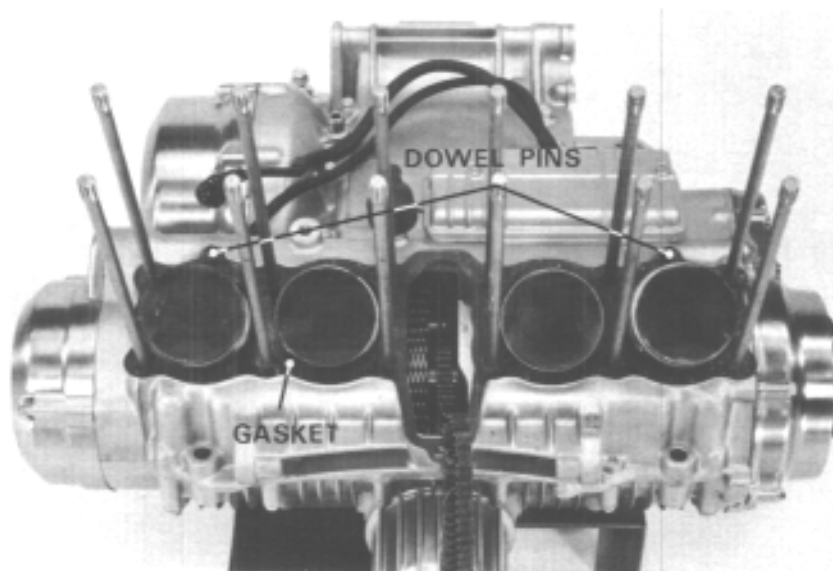


## CYLINDER INSTALLATION

Install the cam chain tensioner.



Install the dowel pins and gasket.



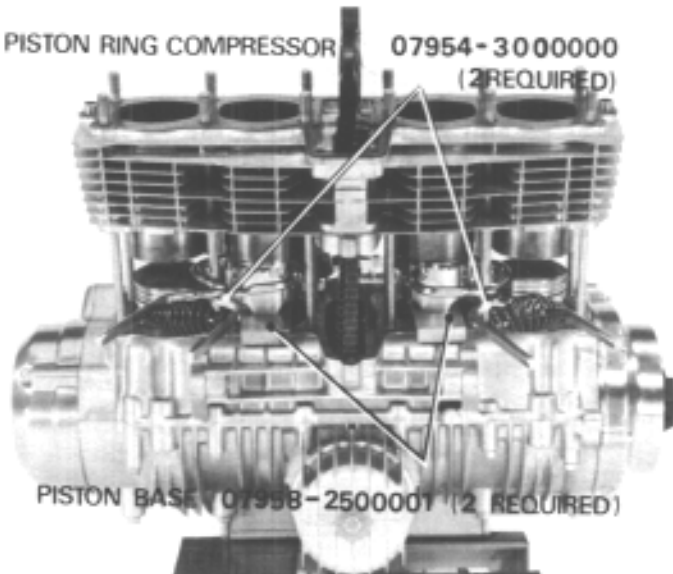


Install the cylinder.

**NOTE**

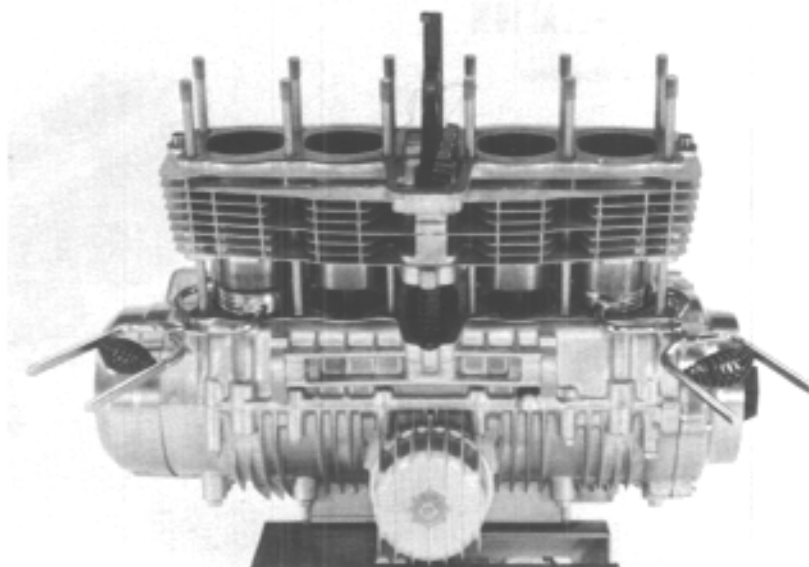
Before using the special tools, position the No. 2 and No. 3 pistons at T. D. C. (Top Dead Center).

PISTON RING COMPRESSOR 07954-3000000  
(2 REQUIRED)



PISTON BASE 07958-2500001 (2 REQUIRED)

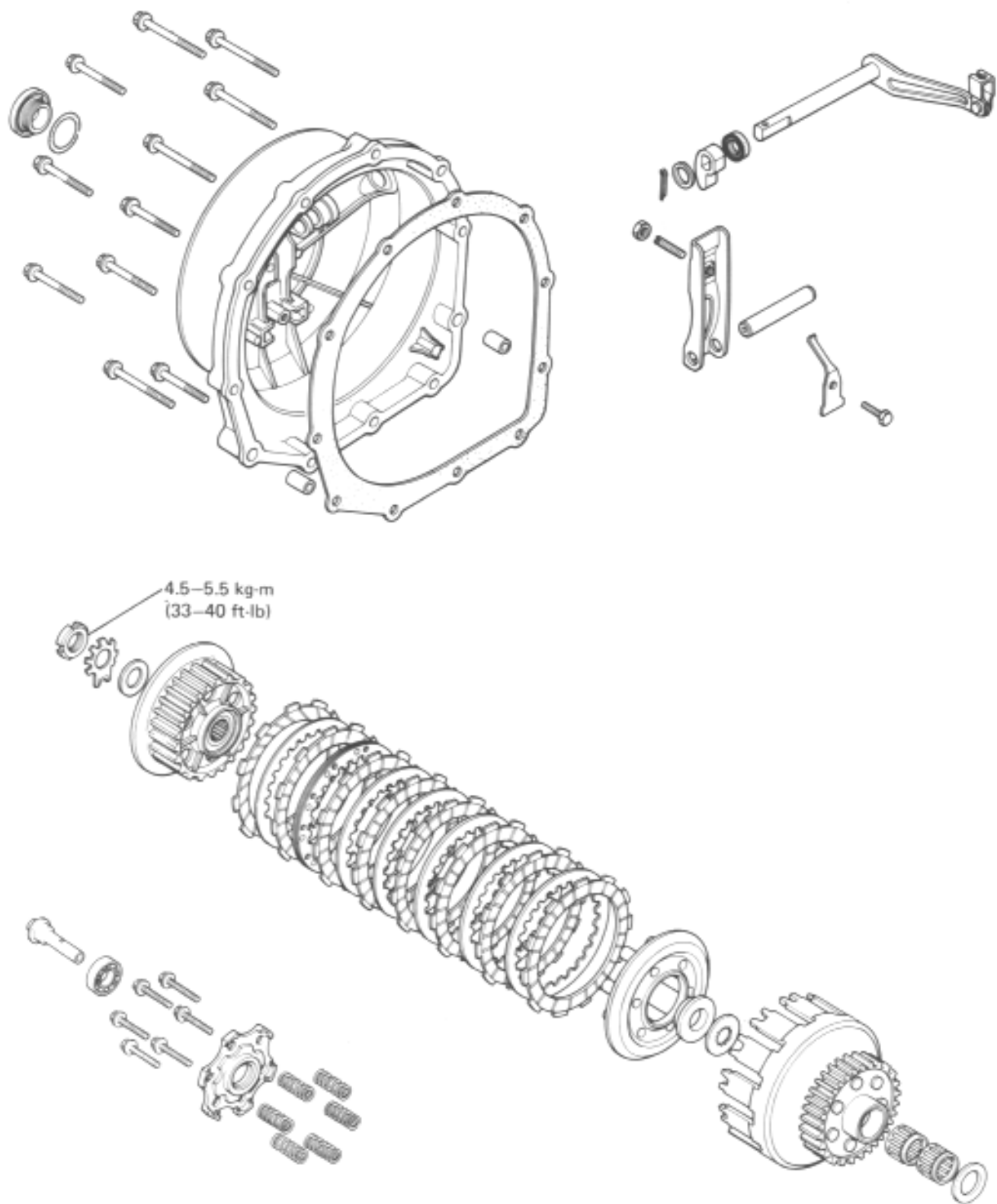
Tighten the cylinder base nut securely after installation.







MEMO





SERVICE INFORMATION	8-1	CLUTCH INSTALLATION	8-6
TROUBLESHOOTING	8-2	CLUTCH COVER INSTALLATION	8-9
CLUTCH COVER REMOVAL	8-3	STARTER CLUTCH DISASSEMBLY	8-11
CLUTCH REMOVAL	8-3	STARTER CLUTCH ASSEMBLY	8-13

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

This section covers removal and installation of the clutch and starter clutch.  
 This operation can be accomplished with the engine in the frame.

### SPECIAL TOOLS

#### Special Tool

Primary Gear Holder 07924-4250000

#### Common Tools

Lock Nut Wrench 07716-0020100

Universal Holder 07725-0010101

Handle 07716-0020500

### TORQUE VALUES

Clutch lock nut	4.5-5.5 kg-m (33-40 ft-lb)
Primary drive gear lock bolt	8.0-10.0 kg-m (60-72 ft-lb)
Starter clutch locking bolt	2.6-3.0 kg-m (19-22 ft-lb)
Spark advancer bolt	3.3-3.7 kg-m (24-27 ft-lb)

### SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Clutch	Lever free play (at lever end)	10-20 mm (3/8-3/4 in)	—
	Spring free length	34.2 mm (1.35 in)	32.8 mm (1.29 in)
	Spring preload/length	16.6-18.4 kg/25.0 mm (36.60-40.57 lbs/0.98 in)	14.9 kg/25.0 mm (37.85 lbs/0.98 in)
	Disc thickness	A	3.72-3.88 mm (0.146-0.153 in)
		B	3.72-3.88 mm (0.146-0.153 in)
	Plate warpage	—	0.3 mm (0.012 in)
Starter clutch	Drive gear O.D.	42.275-42.300 mm (1.6644-1.6654 in)	42.255 mm (1.6636 in)
Ignition timing	Refer to Section 3.		



## TROUBLESHOOTING

### Clutch

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

#### Clutch slips

1. No free play
2. Discs worn
3. Springs weak

#### Motorcycle creeps with clutch disengaged

1. Too much free play
2. Plates warped

#### Clutch will not disengage

1. Too much free play
2. Plates warped

#### Excessive lever pressure

1. Clutch cable kinked, damaged or dirty
2. Lifter mechanism damaged

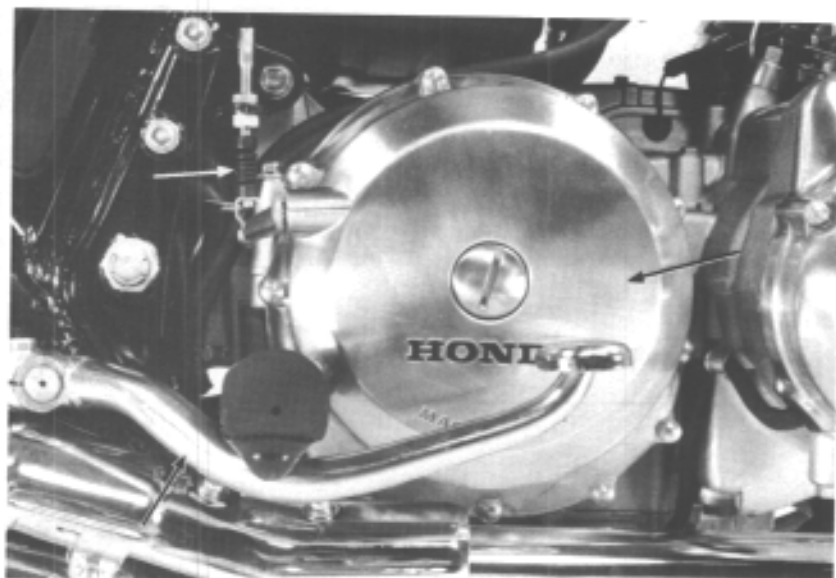
#### Clutch operation feels rough

1. Outer drum slots rough



## CLUTCH COVER REMOVAL

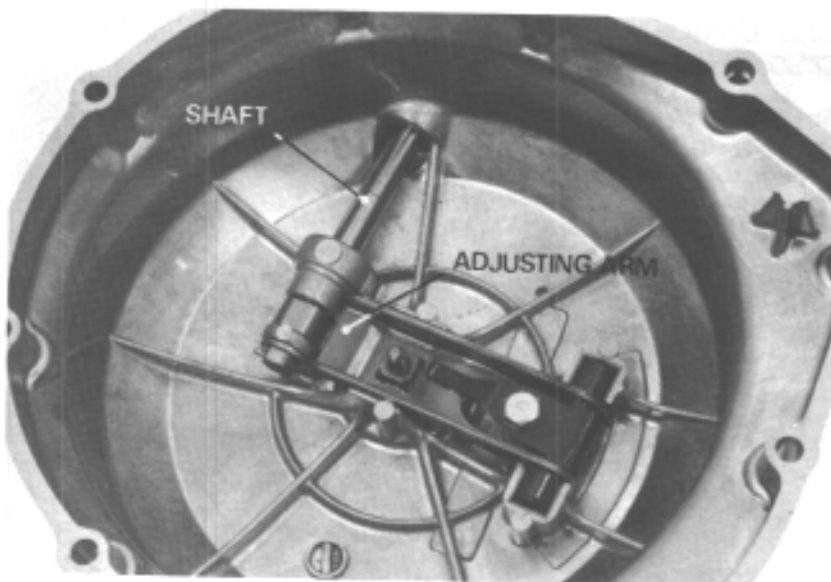
Drain the engine oil thoroughly.  
Disconnect the clutch cable at the lower adjuster.  
Remove the rear brake pedal.  
Remove the clutch cover.  
Remove the gasket and dowel pins.



## CLUTCH REMOVAL

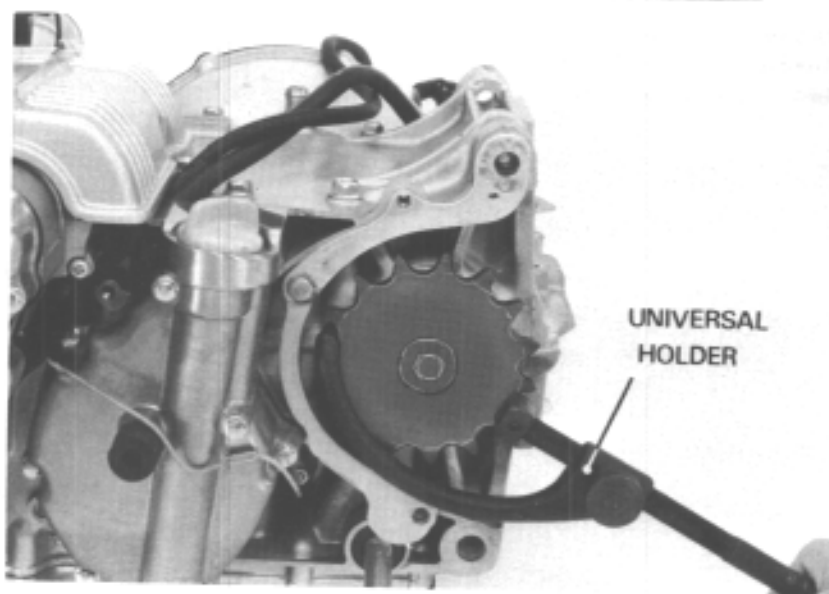
### CLUTCH LIFTER REMOVAL

Remove the clutch lifter shaft and adjusting arm.



### CLUTCH REMOVAL

Use the universal holder if the drive chain is removed.  
Shift the transmission into gear to lock the countershaft and mainshaft.  
Block the drive sprocket to prevent it from turning.





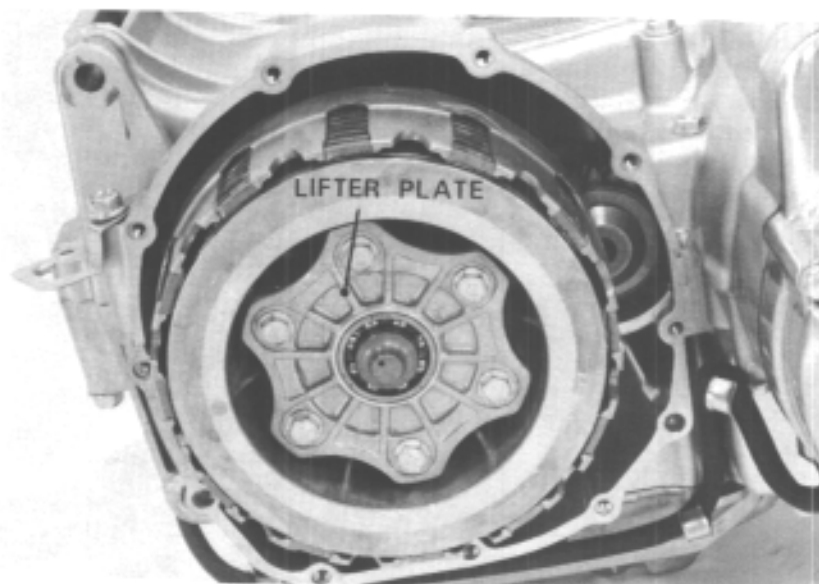
When servicing the clutch in the frame, shift the transmission into gear and press the brake pedal to lock the transmission gear shafts.

### CLUTCH LIFTER PLATE REMOVAL

Remove the bolts and lifter plate with the clutch lifter guide and release bearing.

#### NOTE

Loosen the bolts in a criss cross pattern in 2-3 steps.



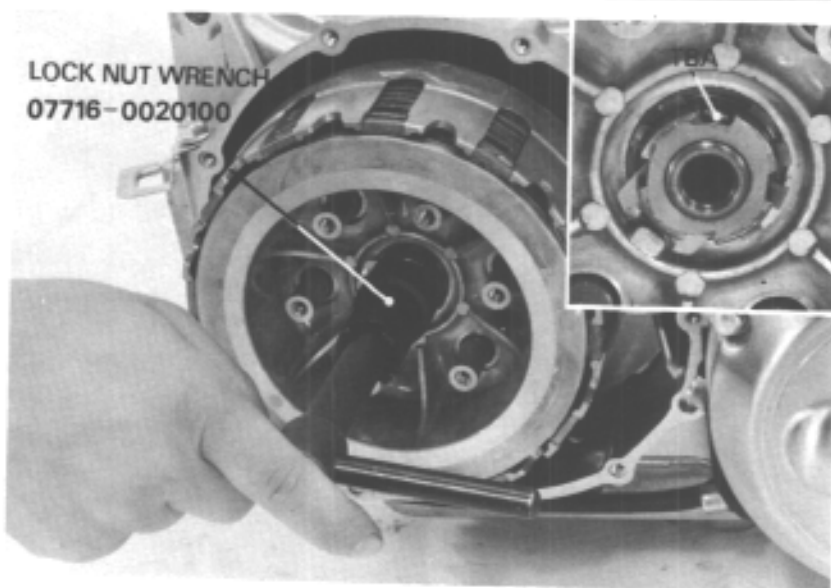
### CLUTCH CENTER PLATE AND DISC REMOVAL

Straighten the lock washer tab.

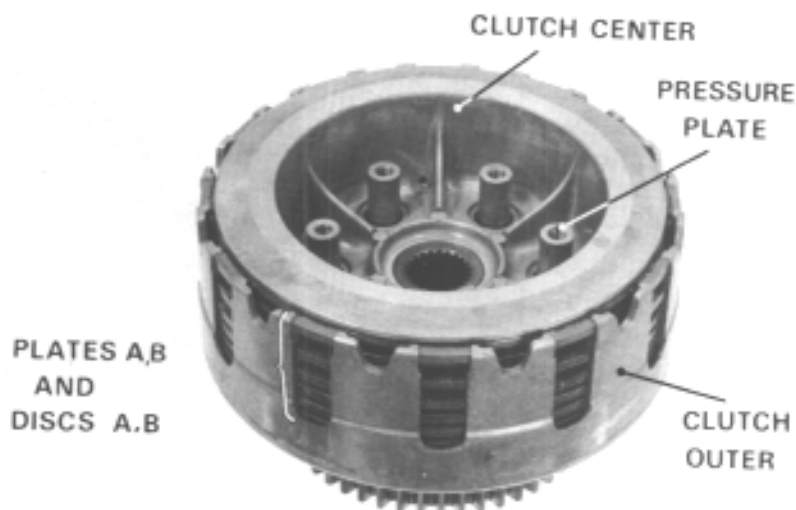
Attach the lock nut wrench.

Remove the lock nut, lock washer and washer.

The clutch can then be removed as a unit.



Remove the clutch center.  
 Remove discs A and B, and plate A.  
 Remove the pressure plate.

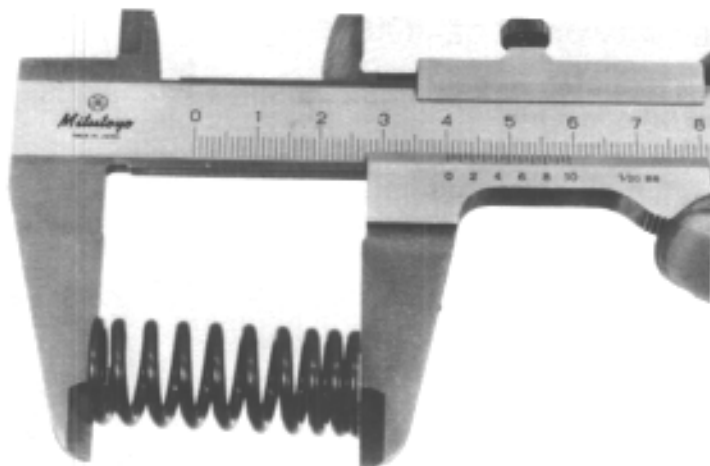




### CLUTCH SPRING INSPECTION

Check spring free length.

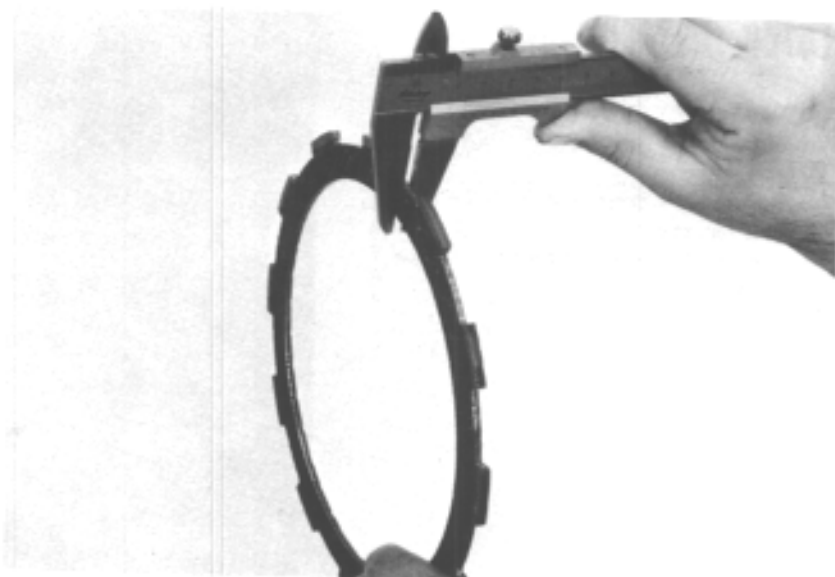
**SERVICE LIMIT: 32.8 mm (1.29 in)**



### CLUTCH DISC INSPECTION

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

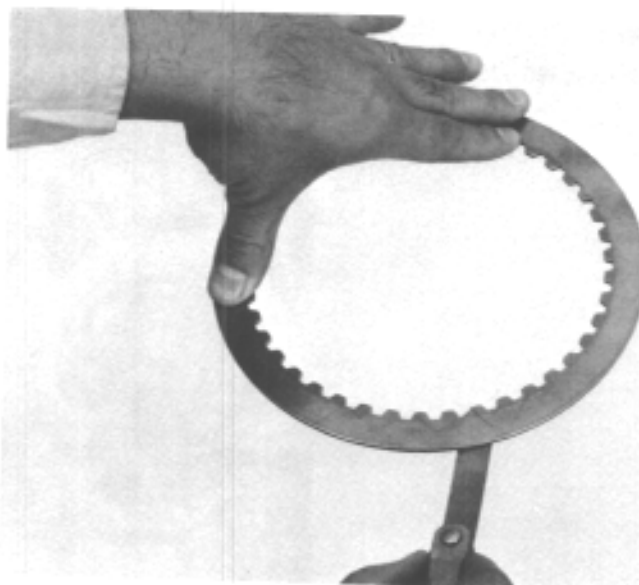
**SERVICE LIMIT: 3.4 mm (0.13 in)**



### PLATE INSPECTION

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

**SERVICE LIMIT: 0.3 mm (0.012 in)**

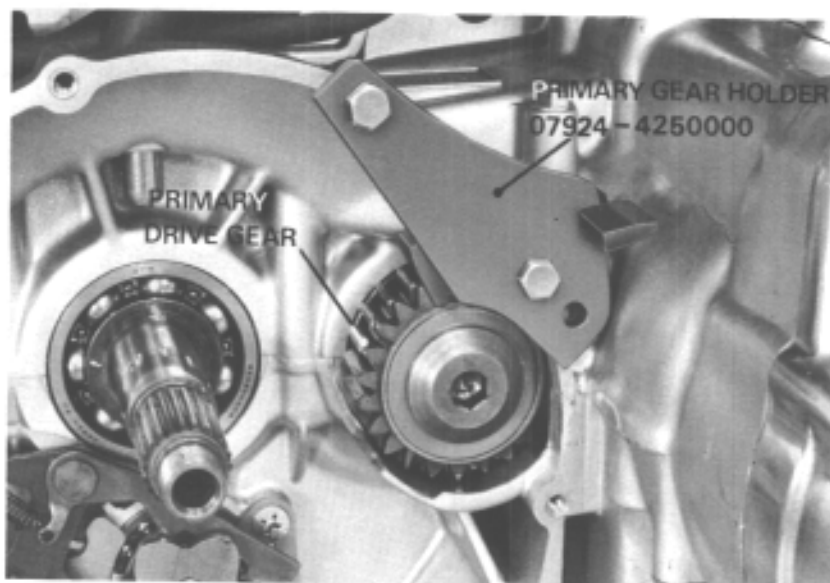






### PRIMARY DRIVE GEAR REMOVAL

Hold the primary drive gear with the primary gear holder as shown.  
Loosen the lock bolt.

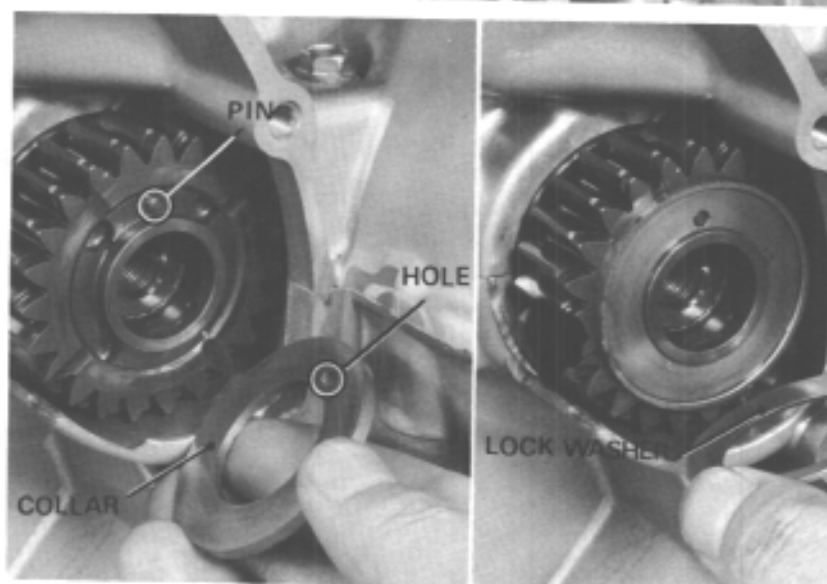


### CLUTCH INSTALLATION

Install the primary drive gear.

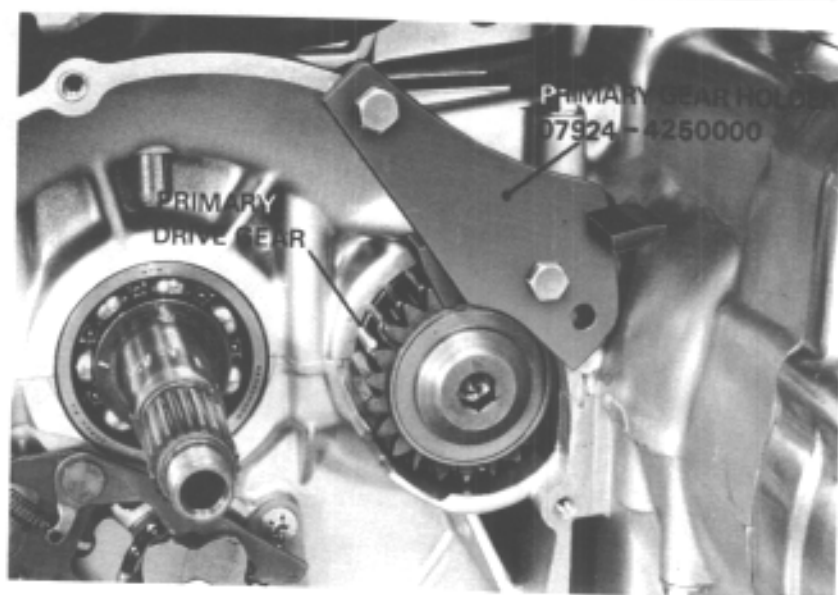
#### NOTE

- Position the drive gear with the large gear facing out.
- Position the collar and lock washer as shown.



Tighten the lock bolt.

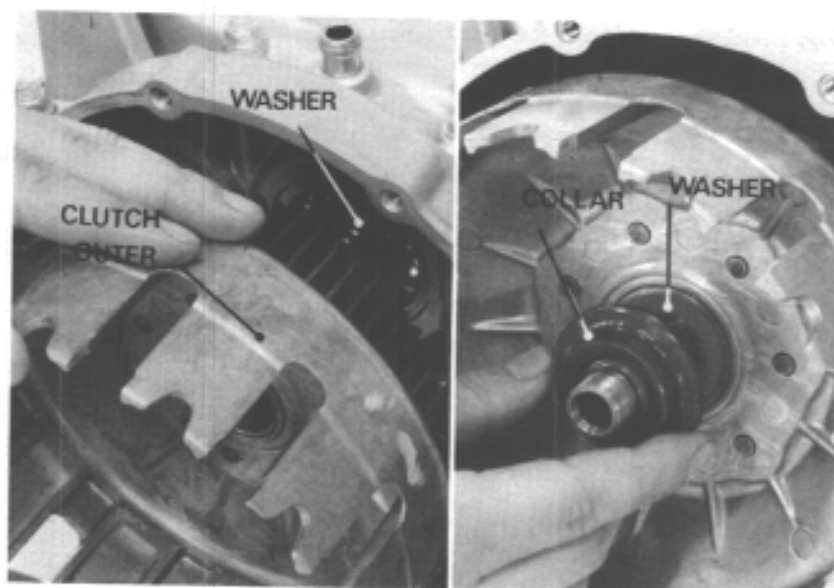
**TORQUE: 8.0-10.0 kg-m (60-72 ft-lb)**





Install the washer and clutch outer.

Install the washer and collar.

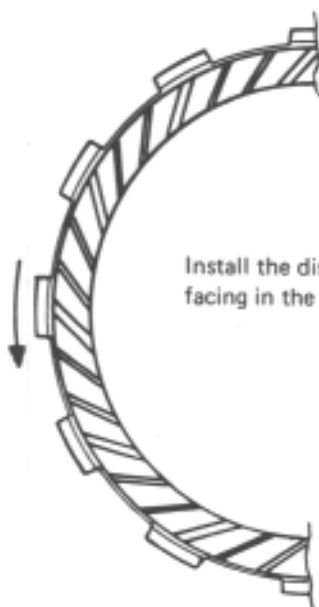
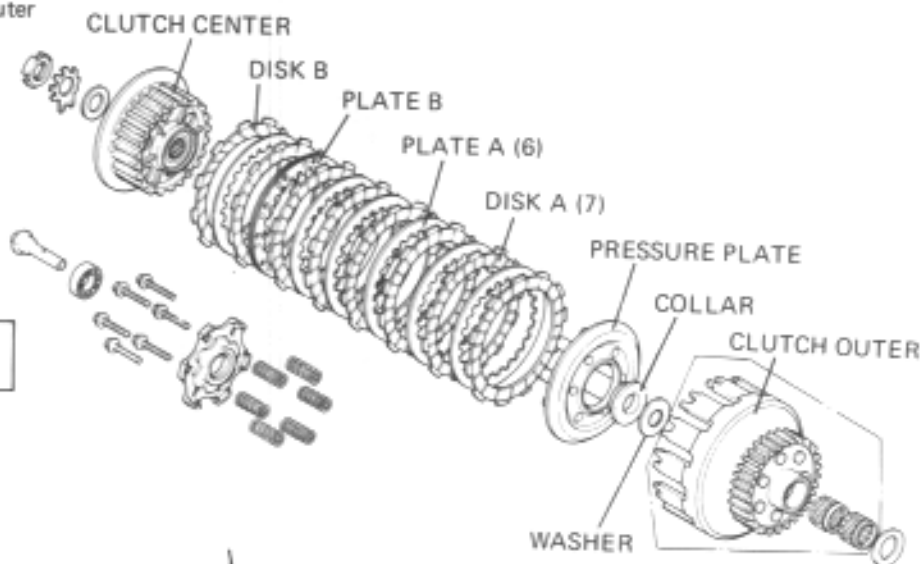


Install the following parts in the clutch outer in the order listed.

- Washer and collar
- Pressure plate
- Discs A (6) and plates A (5) alternately
- PLATE B (spring plate)
- Disc A and plate A
- Disc B
- Clutch center

**NOTE**

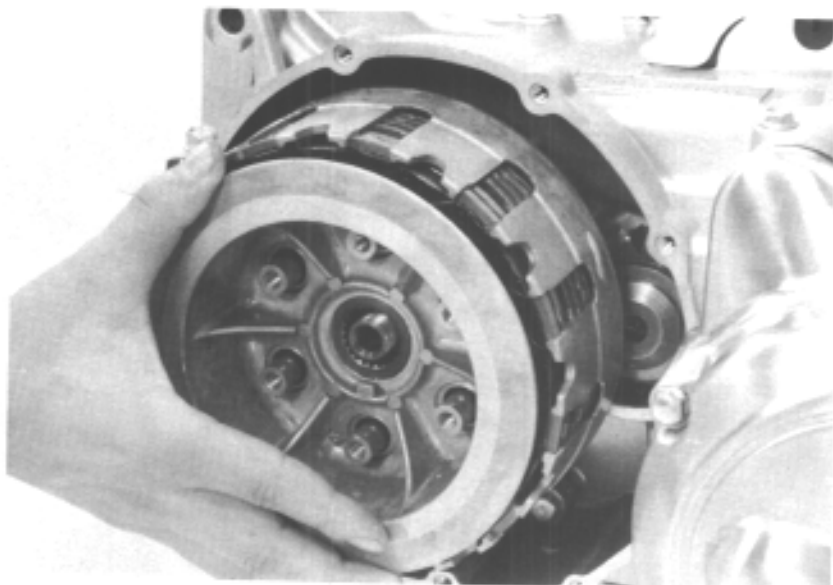
Before installing the clutch, coat the discs and plates with engine oil.



Install the disc B with the groves facing in the direction shown.



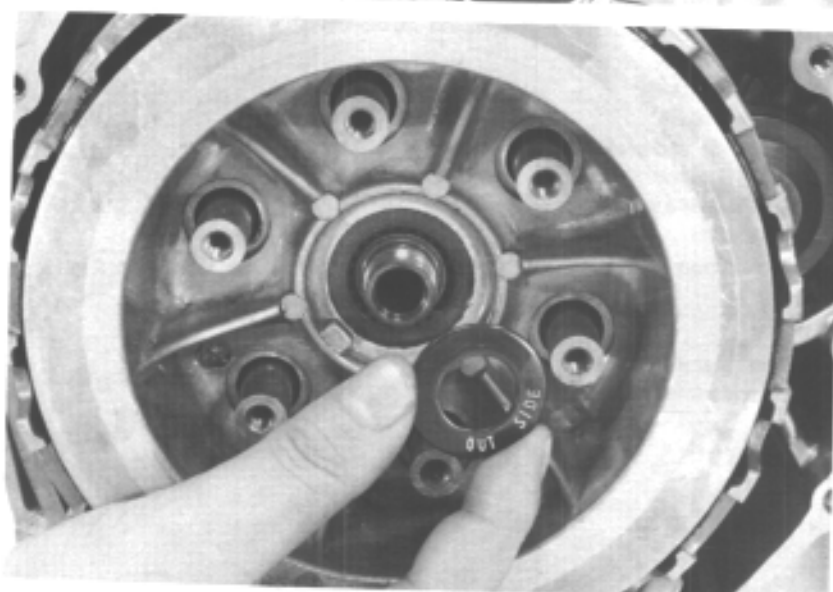
Align the splines by rotating the clutch center.



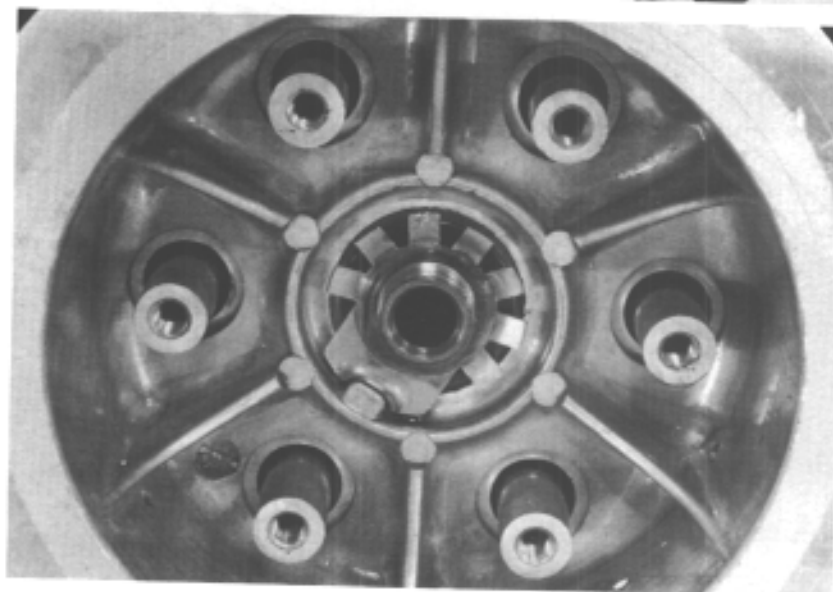
Install the washer.

**NOTE**

Position the mark "OUTSIDE" on the lock washer facing out.



Position the washer as shown and install it.

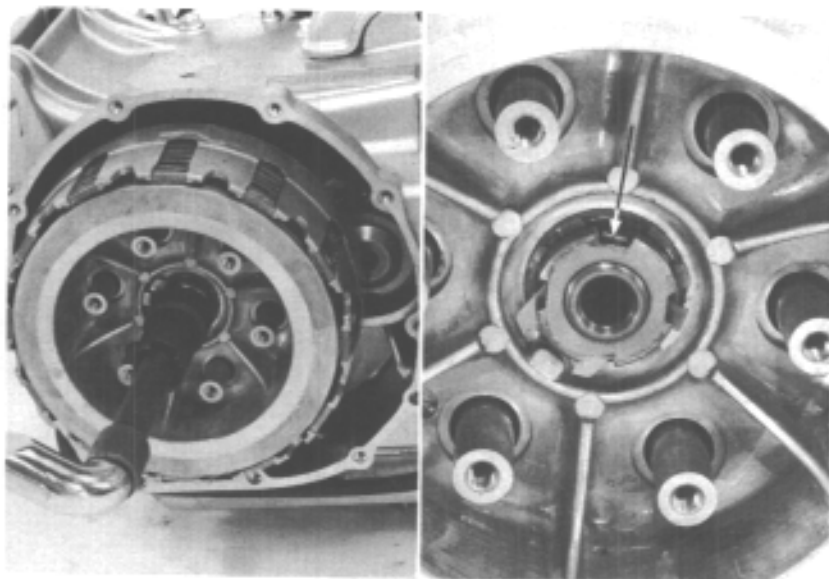




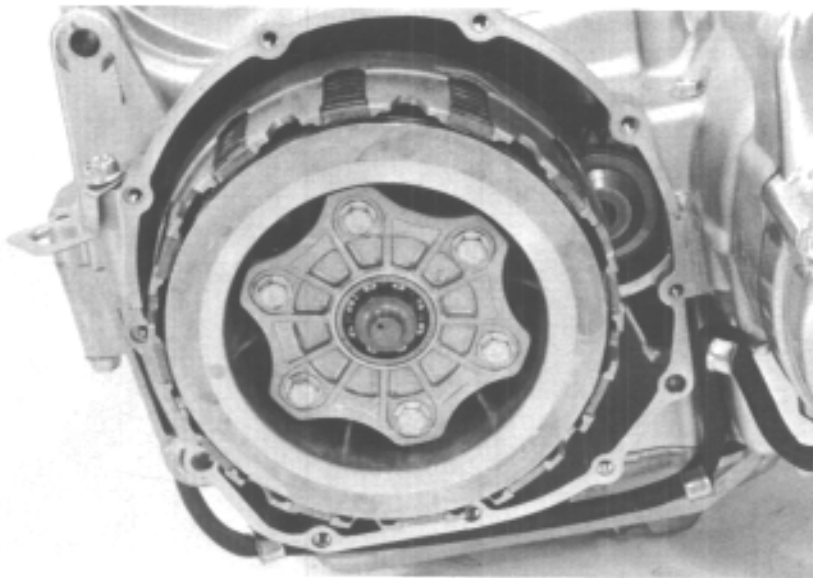
Tighten the lock nut.

**TORQUE: 4.5–5.5 kg-m (33–40 ft-lb)**

Bend the lock washer tab-up.

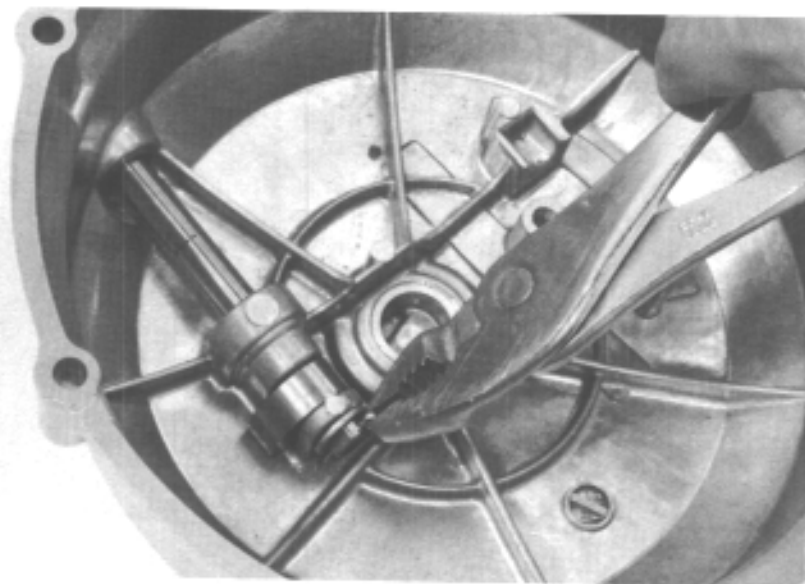


Install the lifter plate with the clutch lifter guide and release bearing. Tighten the bolts.



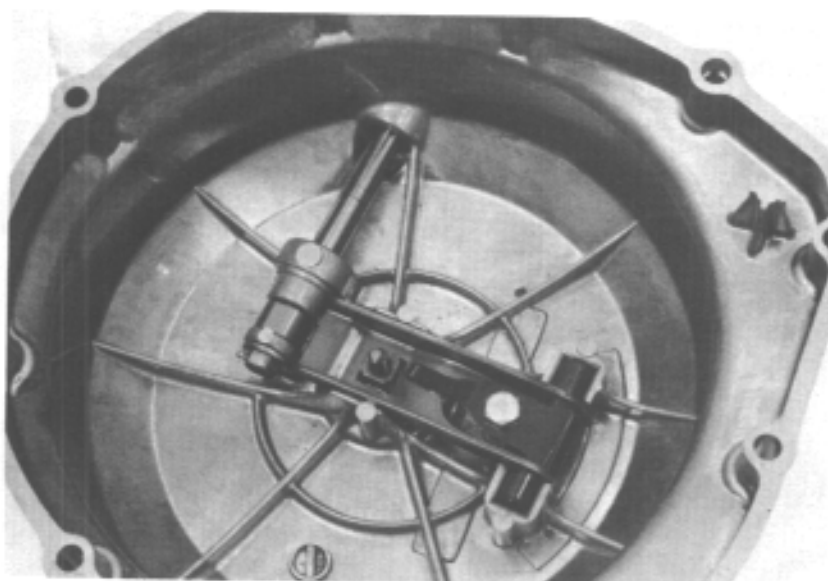
## CLUTCH COVER INSTALLATION

Install the clutch lifter cam and shaft washer.  
Insert the cotter pin and spread the ends.  
Apply molybdenum disulfide grease to the  
advancer shaft hole.

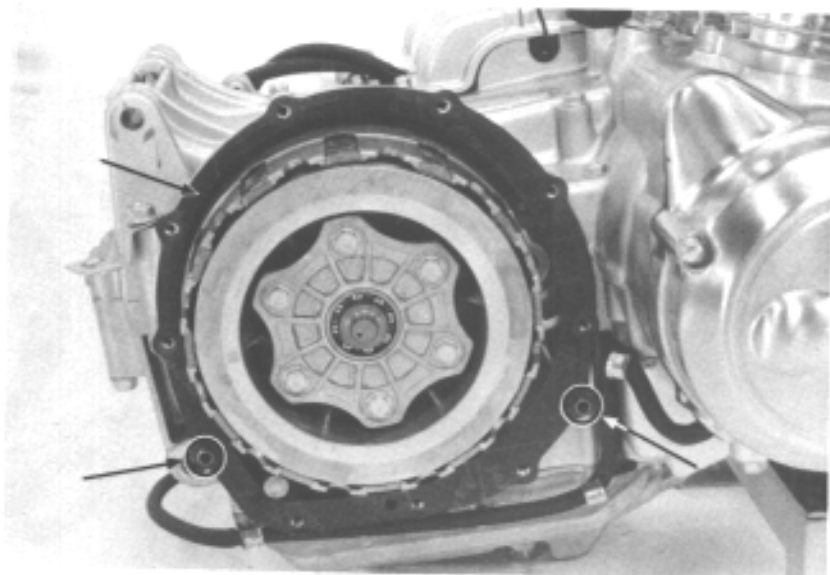




Install the adjusting arm and spring.



Install the dowel pins and gasket, and then install the cover.



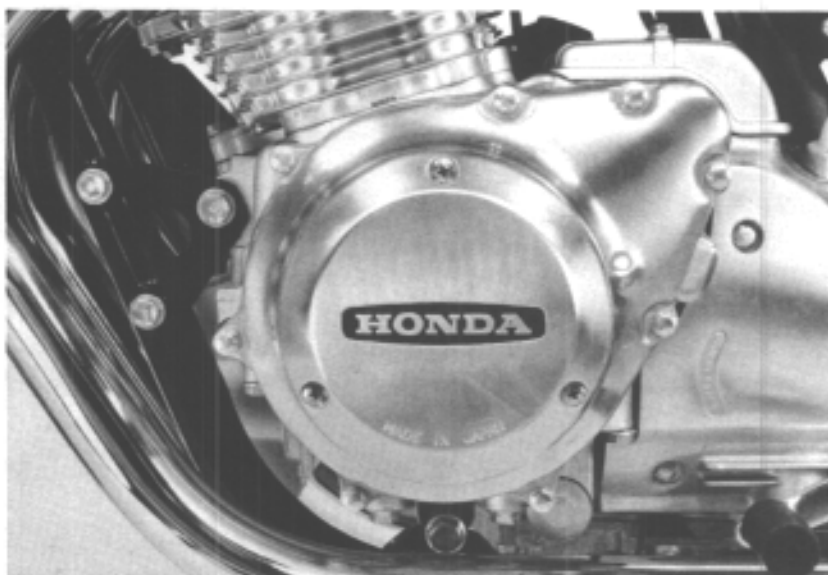
Adjust the clutch free play (page 3-20).  
Apply molybdenum disulfide grease to the  
adjusting hold cap.



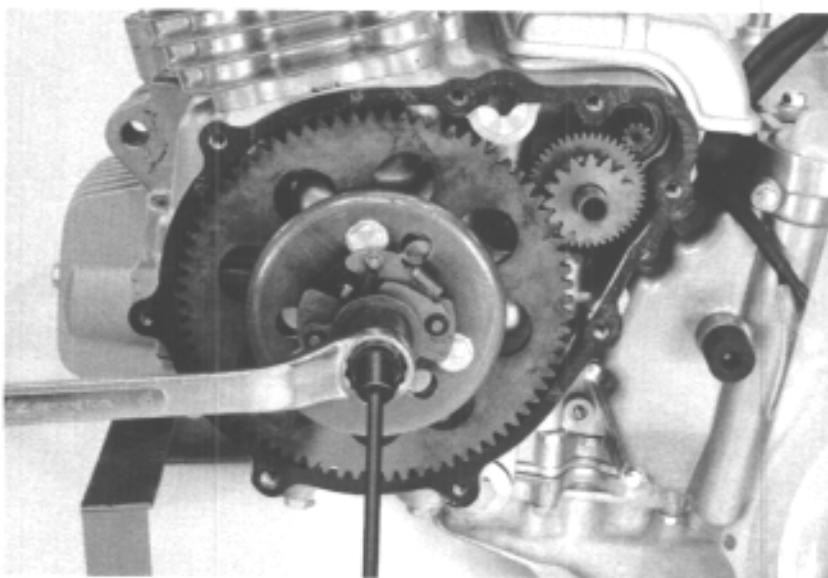
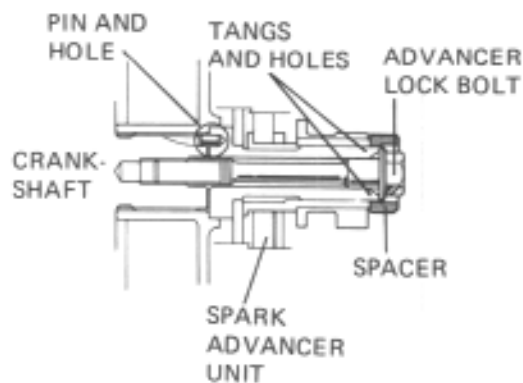


## STARTER CLUTCH DISASSEMBLY

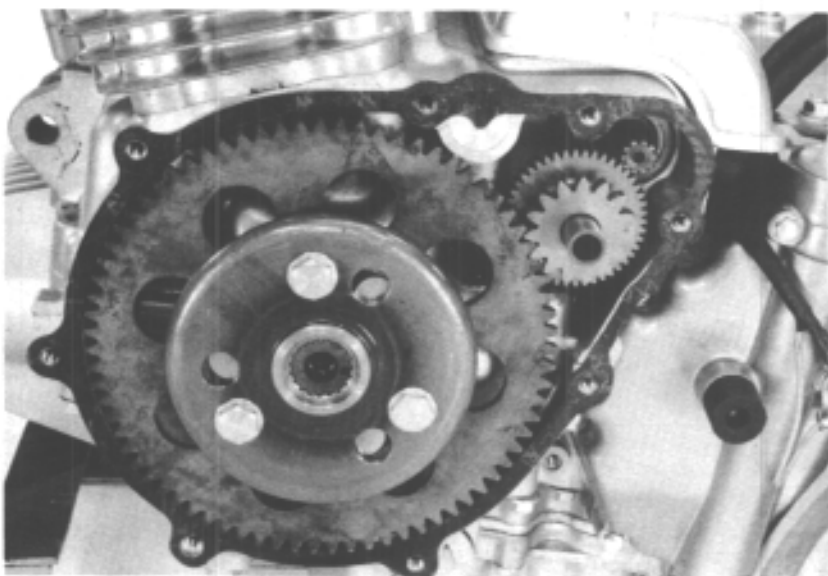
Remove the left crankcase cover with the pulser generator assembly.



Remove the spark advancer unit.



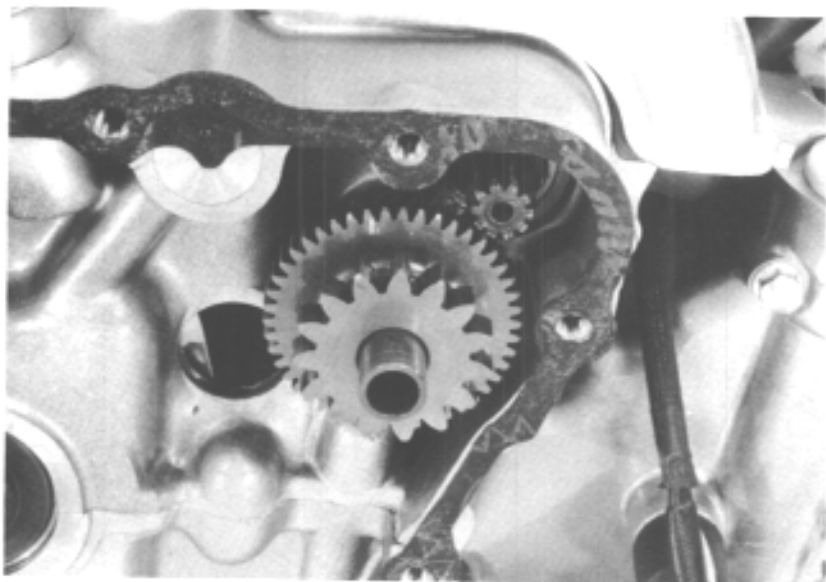
Remove the starter clutch assembly.





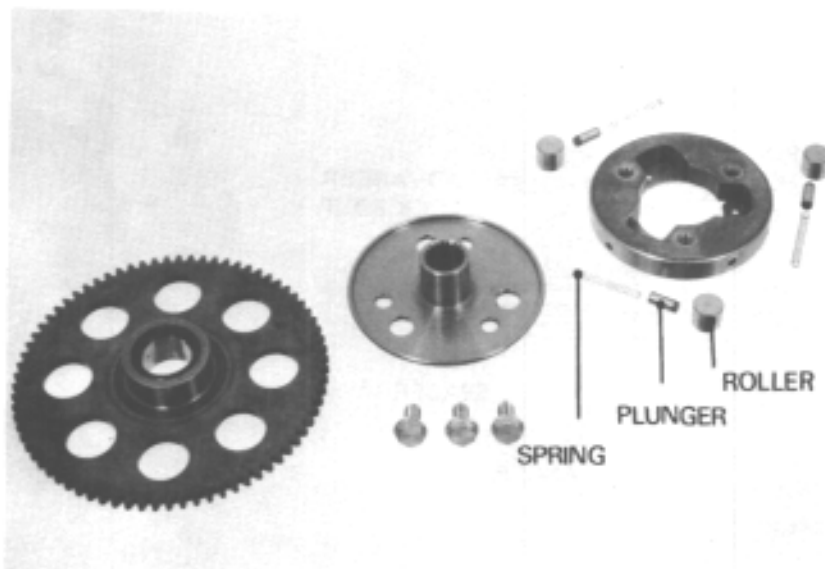


Remove the starter driven gear and shaft.



### STARTER CLUTCH DISASSEMBLY

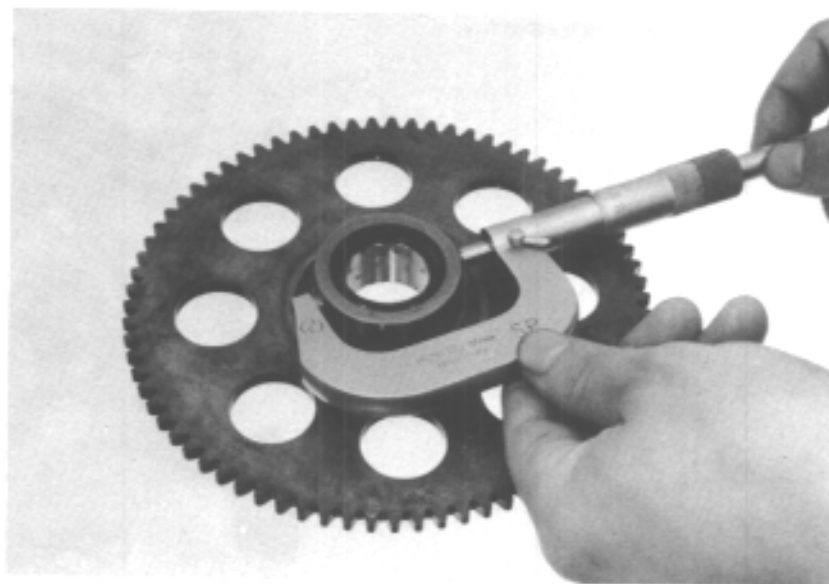
Inspect the rollers for smooth operation.  
 Remove the rollers and check for excessive wear.  
 Clean all parts with non-flammable or high flash point solvent.



### STARTER DRIVE GEAR INSPECTION

Inspect the drive gear for damage or excessive wear.  
 Measure the O. D.,

**SERVICE LIMIT: 42.255 mm (1.6636 in)**





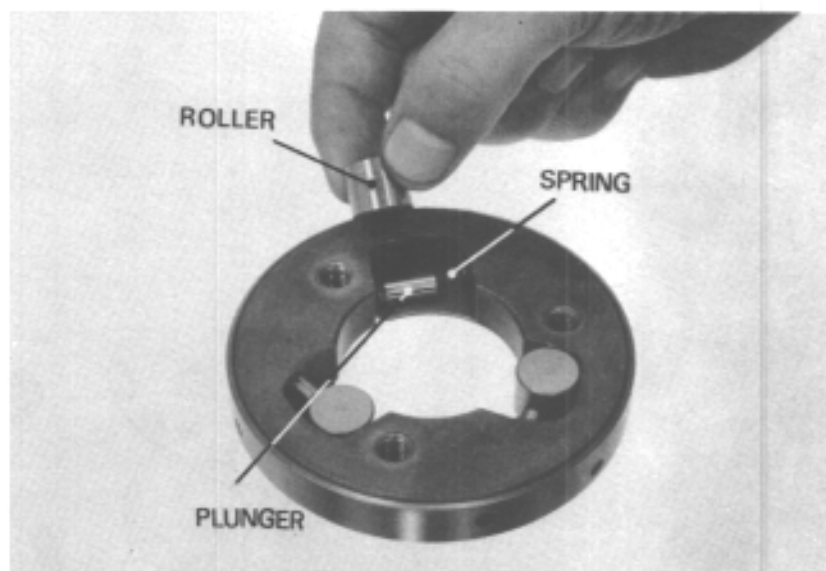
### STARTER CLUTCH ASSEMBLY

Install the springs, plungers and rollers.  
Tighten the locking bolts to the specified torque.

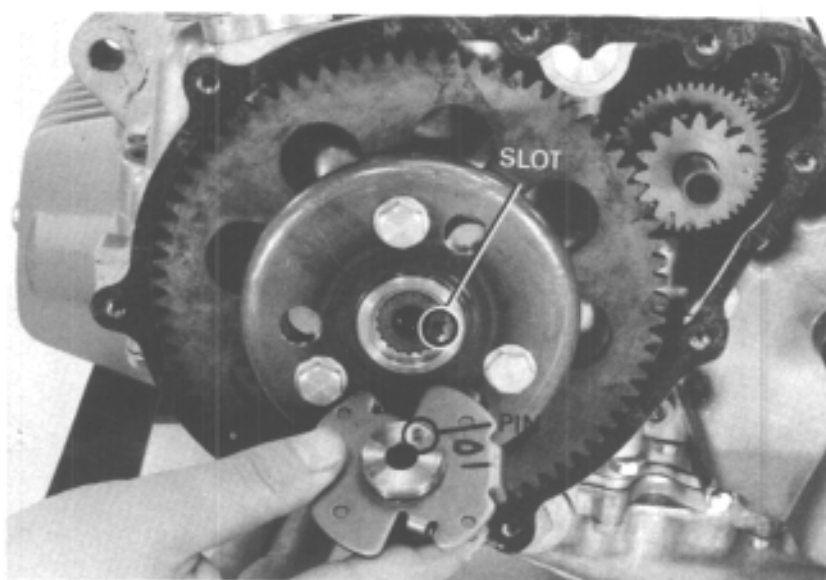
**TORQUE:** 2.6–3.0 kg-m (19–22 ft-lb)

#### NOTE

Apply a locking agent to the locking bolt's threads.



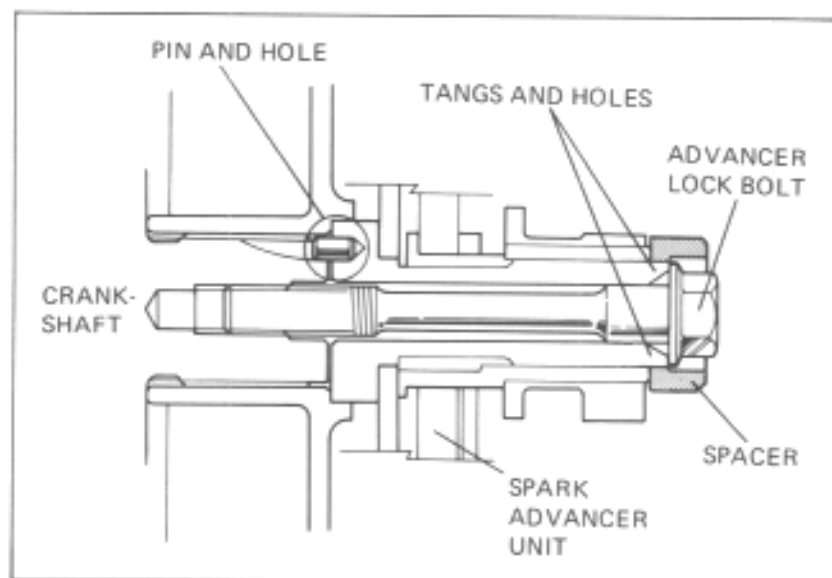
Install the advancer assembly.  
Align the pin on the spark advancer unit with the slot on the crankshaft.



Install the spacer aligning the tangs with the holes, and tighten the advancer lock bolt to the specified torque.

**TORQUE:** 3.3–3.7 kg-m (24–27 ft-lb)

Install the left crankcase cover.









SERVICE INFORMATION	9-1
TROUBLESHOOTING	9-1
GEARSHIFT PEDAL AND LINKAGE REMOVAL	9-2
GEARSHIFT LINKAGE AND PEDAL INSTALLATION	9-4

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

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.

### TORQUE VALUES

Stopper arm shaft	1.0-1.4 kg-m ( 7-10 ft-lb)
Neutral switch	1.6-2.0 kg-m (12-14 ft-lb)

## TROUBLESHOOTING

### Hard to shift

1. Improper clutch adjustment; too much free play
2. Shift forks bent
3. Shift shaft bent
4. Shift claw bent
5. Shift drum cam grooves damaged

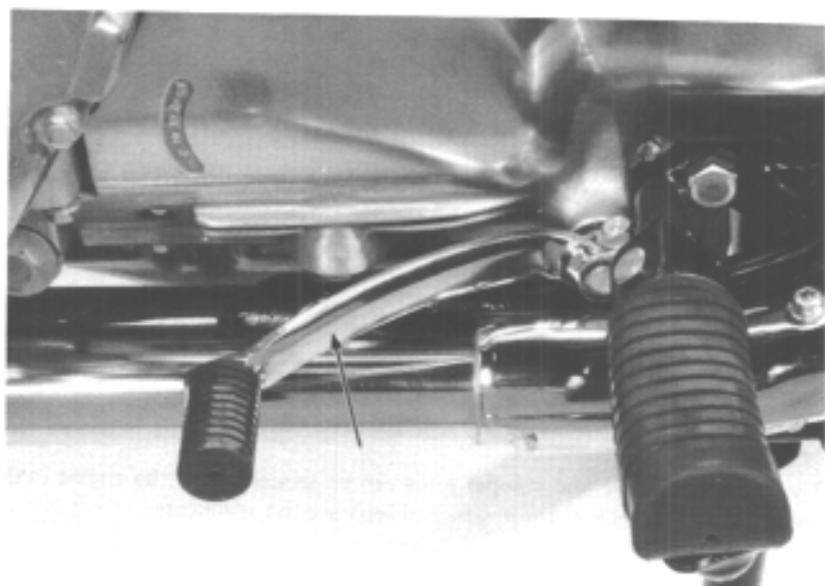
### Transmission jumps out of gear

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



## GEARSHIFT PEDAL AND LINKAGE REMOVAL

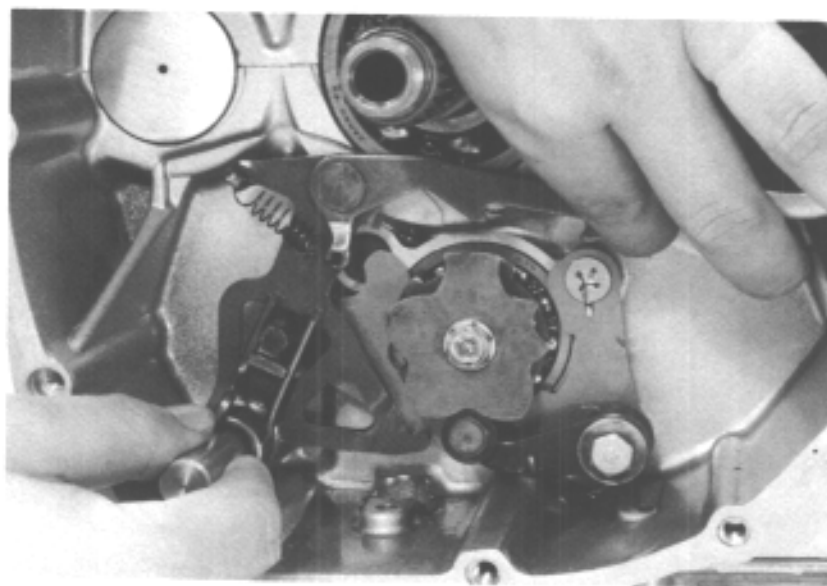
Drain the engine oil.  
Remove the gear shift pedal.



Remove the rear brake pedal.  
Disconnect the clutch cable at the lower  
adjuster.  
Remove the clutch cover and clutch assembly  
(Section 8).



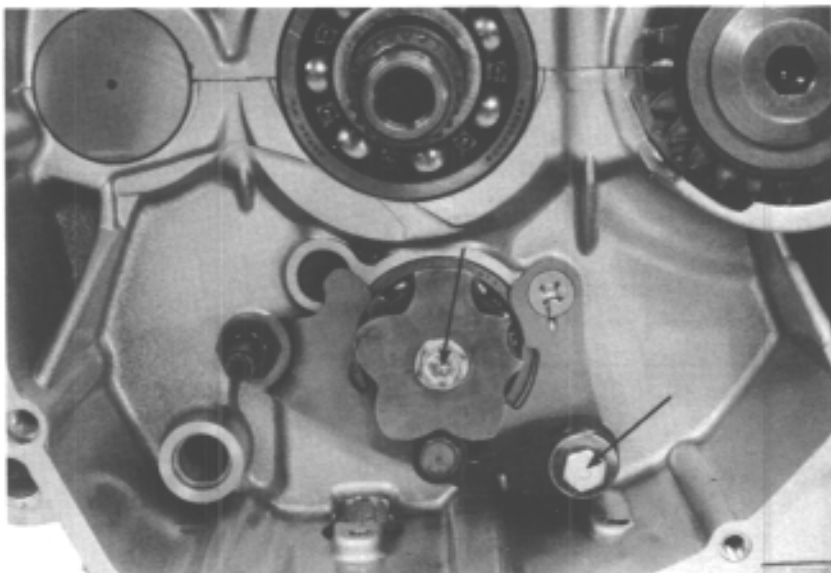
Pull the gearshift spindle assembly out.



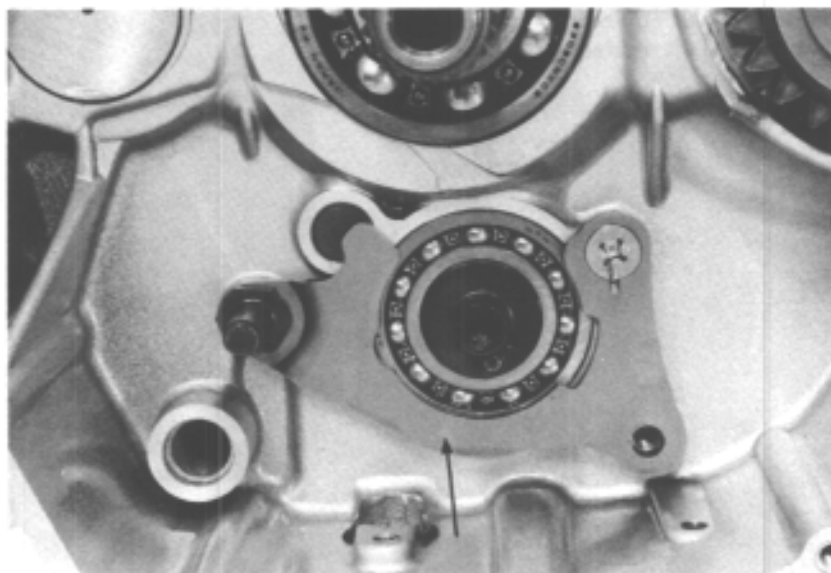


Remove the drum stopper arm bolt, arm and spring.

Remove the roller stopper plate bolt and plate.



If bearing removal is necessary, remove the bearing stopper plate.



### NEUTRAL SWITCH INSPECTION

Remove the left rear crankcase cover and neutral switch.

Check for continuity between the top and bottom terminals.

between the top and bottom terminals.

The switch is normal if there is continuity.

Also check for shorts between the top terminal and any body ground.

Replace the switch if there is continuity.





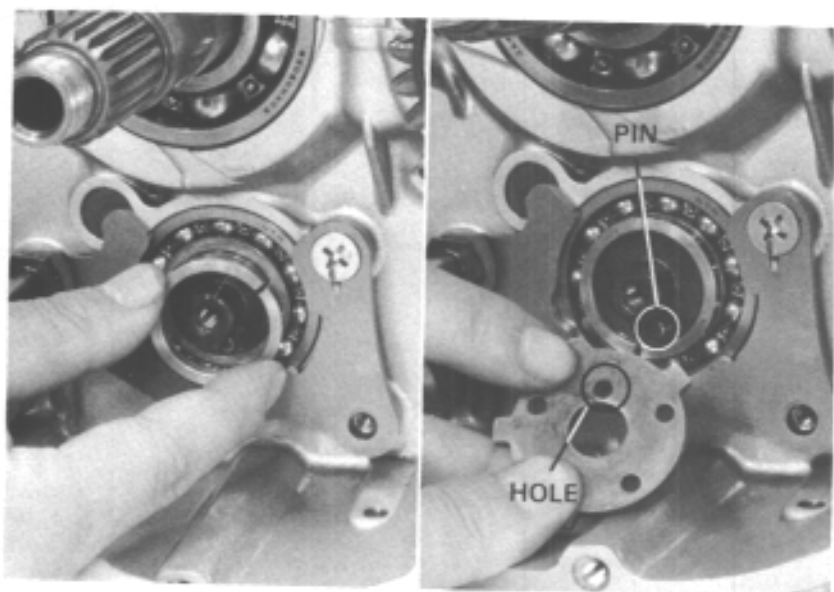
## GEARSHIFT LINKAGE AND PEDAL INSTALLATION

Install the collar.

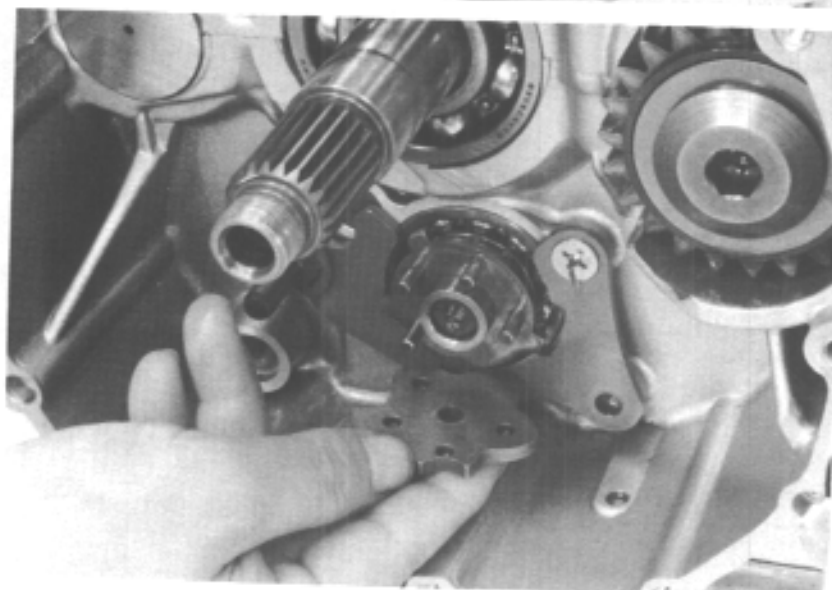
Align the hole in the roller stopper base plate with the pin on the shift drum.

### NOTE

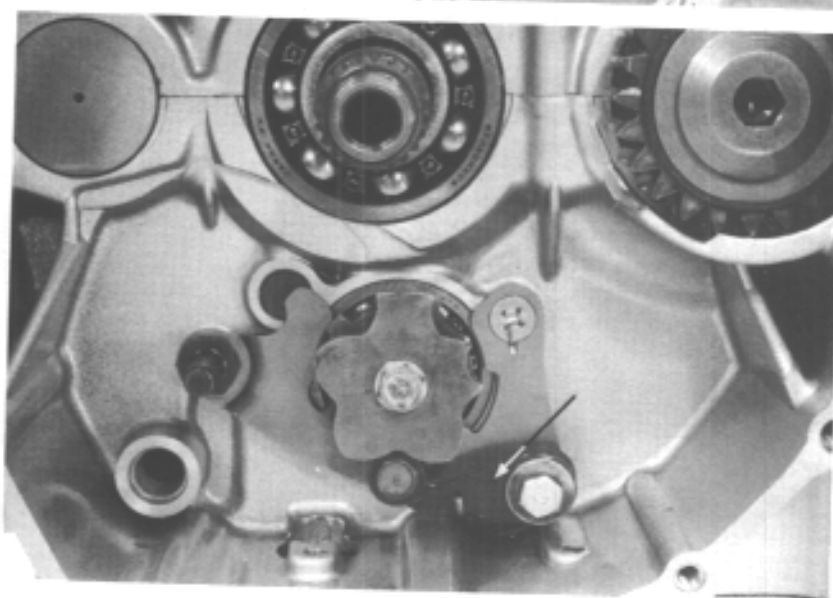
If bearing replacement is necessary, apply locking agent to the screw threads.



Install the roller stopper pins, plate and bolt.  
Tighten the bolt securely.



Install the drum stopper arm, bolt and return spring.  
Tighten the bolt securely.



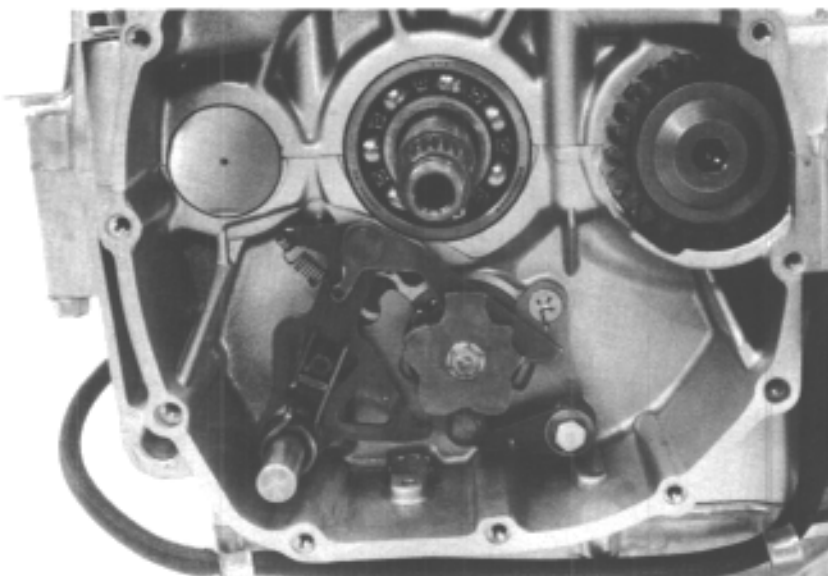


Assemble the gear shift spindle and return spring.

Install as shown.

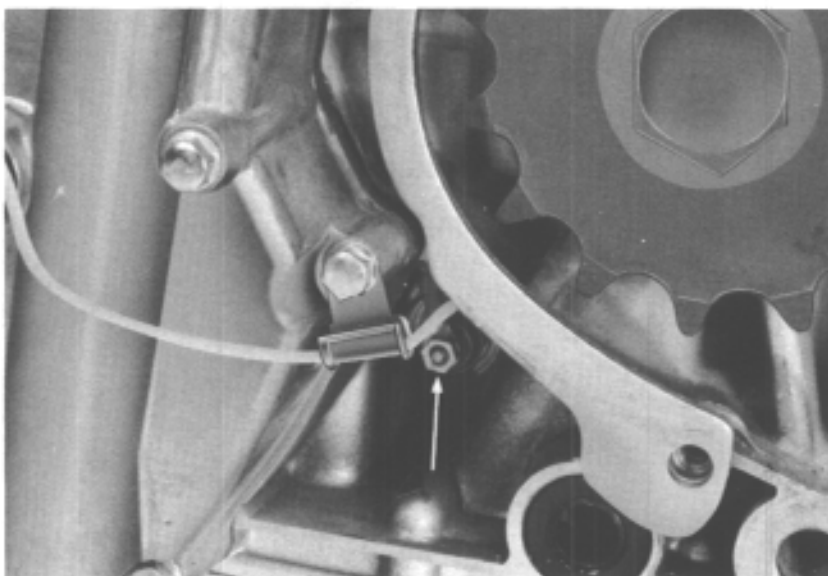
Rotate the gearshift spindle and check the linkage for smooth operation.

Install the clutch assembly and cover.



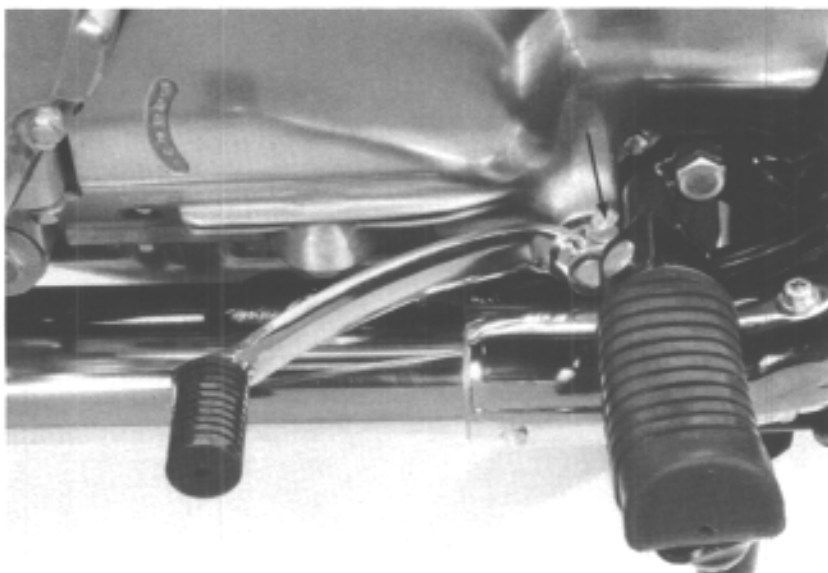
Install the neutral switch and connect the lead.

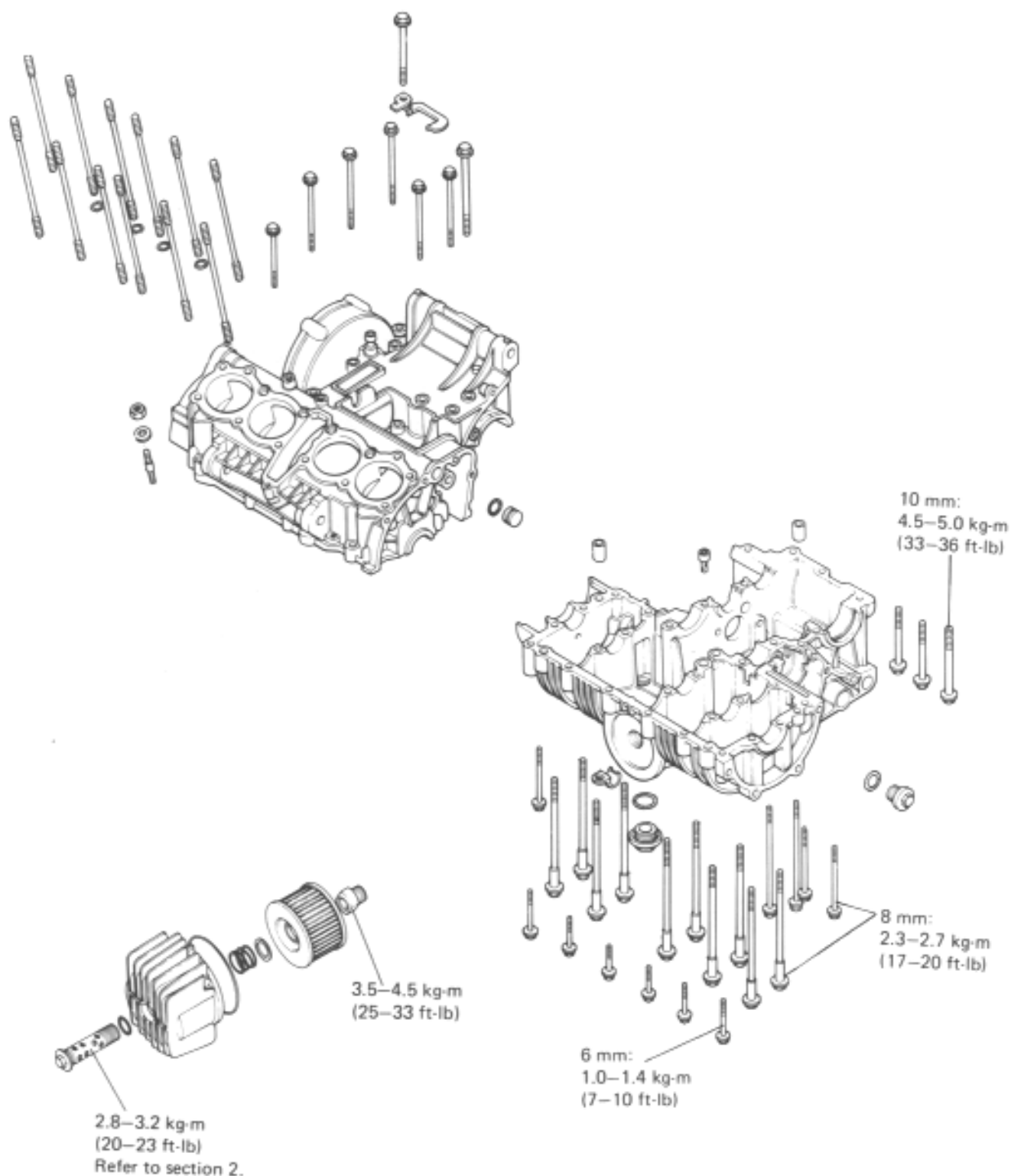
Install the left rear crankcase cover.



Install the gear shift pedal as shown.

Tighten the bolt securely.









SERVICE INFORMATION	10-1
CRANKCASE DISASSEMBLY	10-2
CRANKCASE ASSEMBLY	10-4

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

To repair the crankshaft, connecting rod, primary shaft and the transmission including the shift fork and drum, it is necessary to separate the crankcase halves.

The following parts must be removed before disassembling the crankcase.

To service	Remove
Crankshaft and connecting rod	Cylinder head, cylinder, pistons primary shaft assembly A.C.G. rotor and oil pump
Primary shaft	Oil pump
Transmission	Clutch and gearshift linkage

### TORQUE VALUES

8 mm bolt (Crankshaft)	2.1-2.5 kg-m (15-18 ft-lb)
8 mm bolt (Crankcase)	2.1-2.5 kg-m (15-18 ft-lb)
6 mm bolt	1.0-1.4 kg-m ( 7-10 ft-lb)
10 mm bolt	4.5-5.0 kg-m (33-36 ft-lb)
Oil filter bolt boss	3.5-4.5 kg-m (25-33 ft-lb)



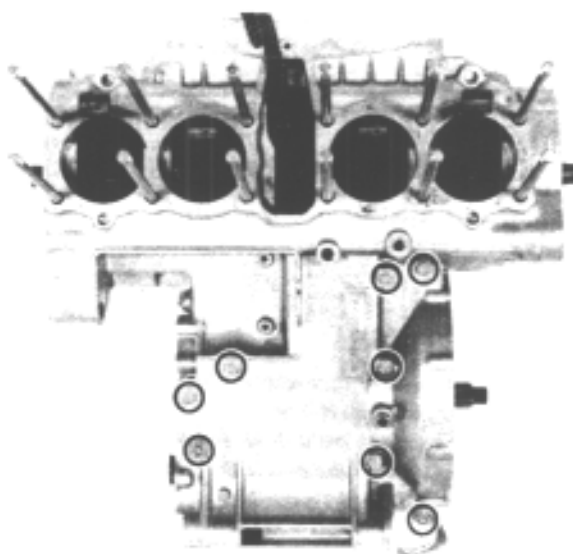
## CRANKCASE DISASSEMBLY

Remove the cylinder head, cylinder, pistons and oil filter (Section 6 and 7).

Remove the clutch, clutch related parts, oil pump, A. C. generator, gear shift linkage and starting motor (Section 8, 9, 16 and 18).

### NOTE:

The crankcase can be separated without removing the clutch, clutch related parts, gearshift mechanism and starting motor. However, we recommend removal of these parts, because the transmission gears may be dropped when separating the crankcases.

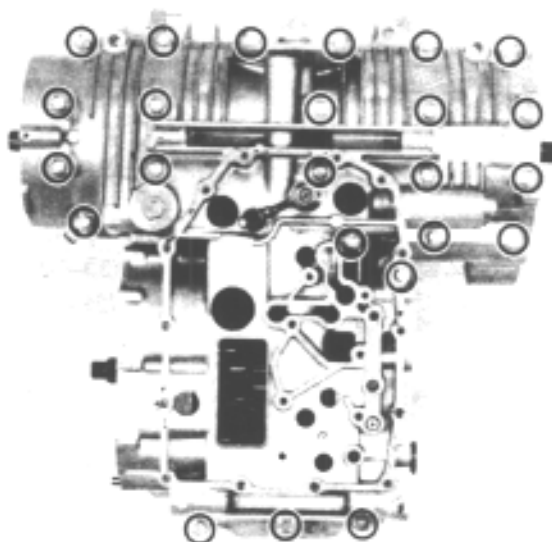


Remove the upper crankcase bolts.

Turn the engine upside down.

Remove the oil pan and oil strainer assembly.

Remove the lower crankcase bolts.



### NOTE

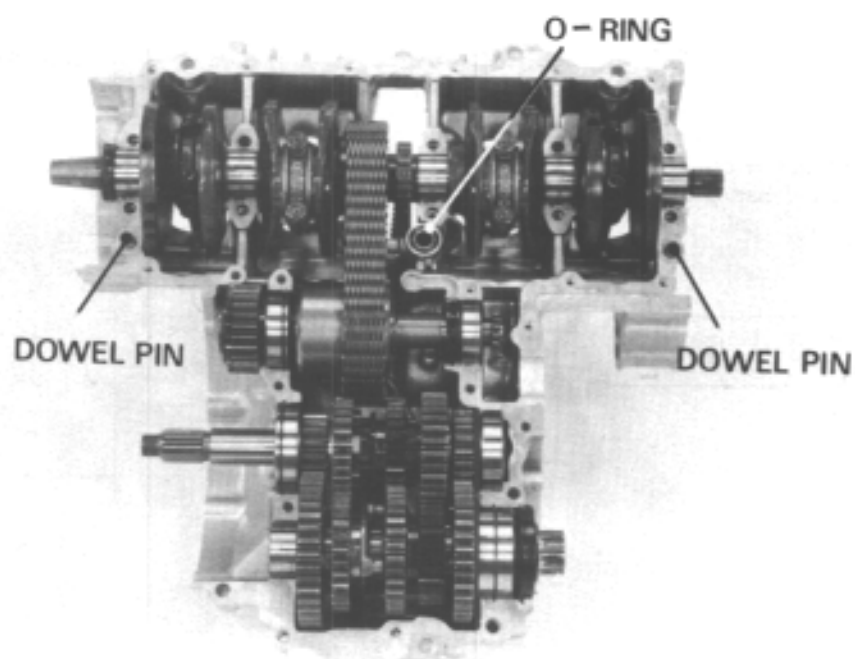
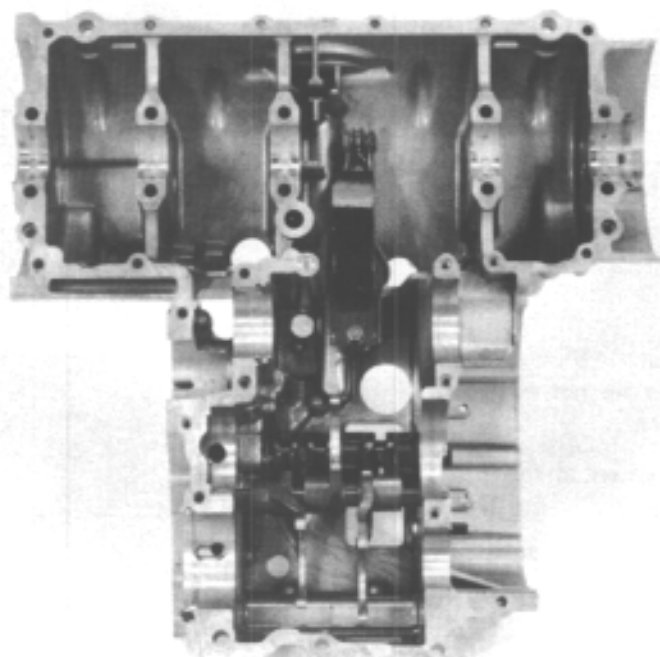
Remove the bolts in two or more steps and in a criss-cross pattern to prevent warpage.



Separate the crankcase.

**CAUTION**

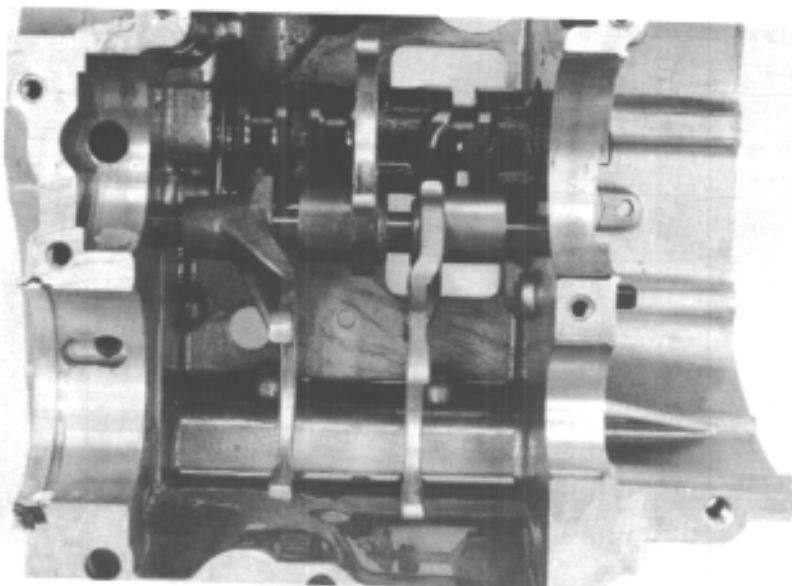
*Do not pry between the upper and lower cases.*





## CRANKCASE ASSEMBLY

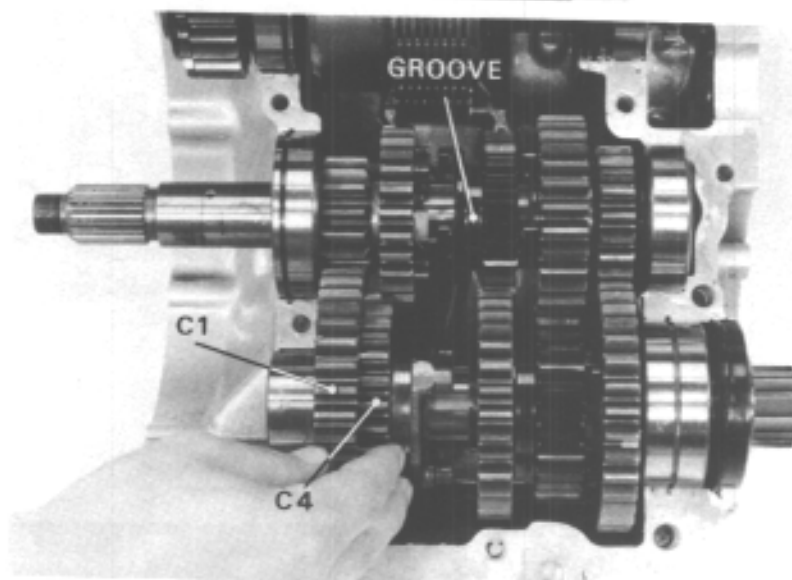
If the gearshift linkage, shift fork and shift drum are installed in the lower crankcase, shift the gearshift linkage into 1st gear for easier assembly.



Slide the C4 gear into the C1 gear.  
Make sure that the other gears are not engaged.

Apply molybdenum disulfide grease to the groove of the M3 gear.

Apply molybdenum disulfide grease to the crankshaft main bearings.

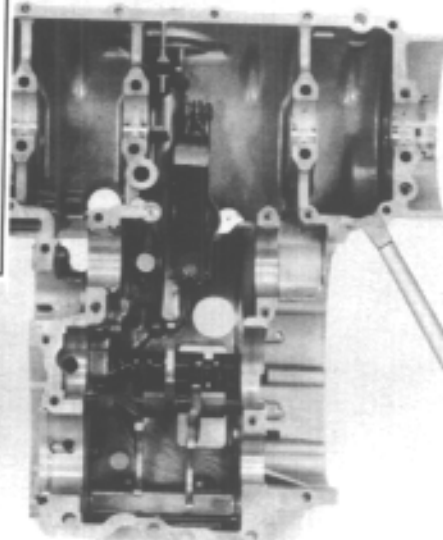


Clean the crankcase mating surfaces.  
Apply liquid sealant to the mating surface of the lower crankcase.

### CAUTION

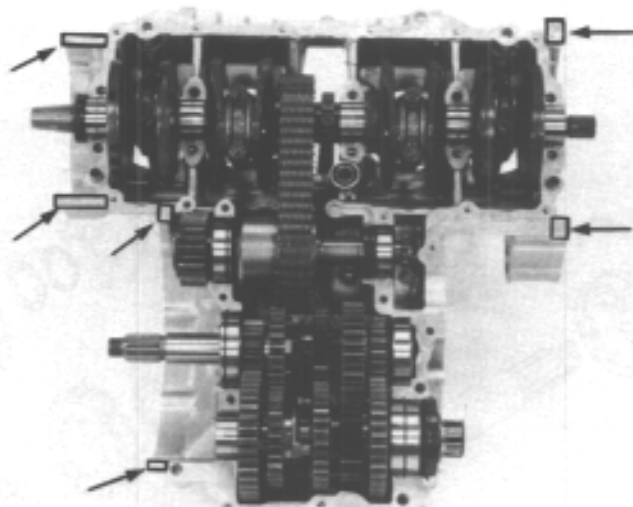
*Do not apply sealant to the area near the main bearings.*

Do not coat this area  
with sealant.





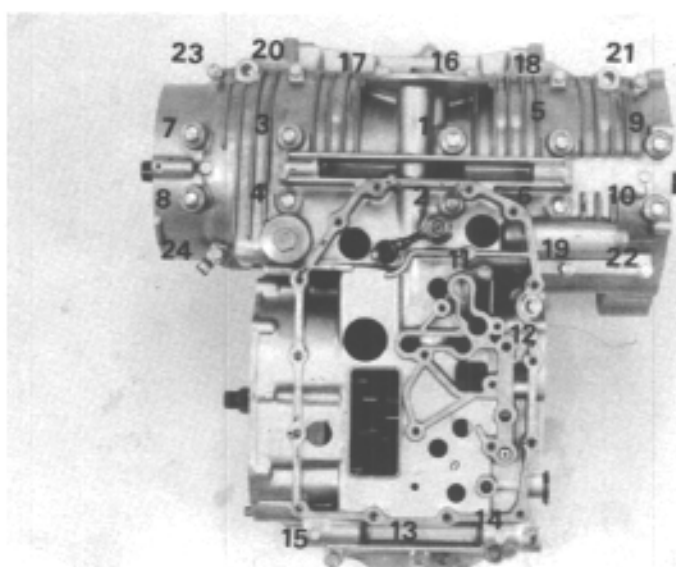
For the upper crankcase, apply sealant only where shown.



Assemble the crankcase halves, aligning the shift fork claws with the gears. Tighten the bolts to the specified torque values in the sequence shown.

### TORQUE VALUES:

8 mm bolt (Crankshaft)	2.1–2.5 kg-m (15–18 ft-lb)
8 mm bolt (Crankcase)	2.1–2.5 kg-m (15–18 ft-lb)
6 mm bolt	1.0–1.4 kg-m ( 7–10 ft-lb)
10 mm bolt	4.5–5.0 kg-m (33–36 ft-lb)



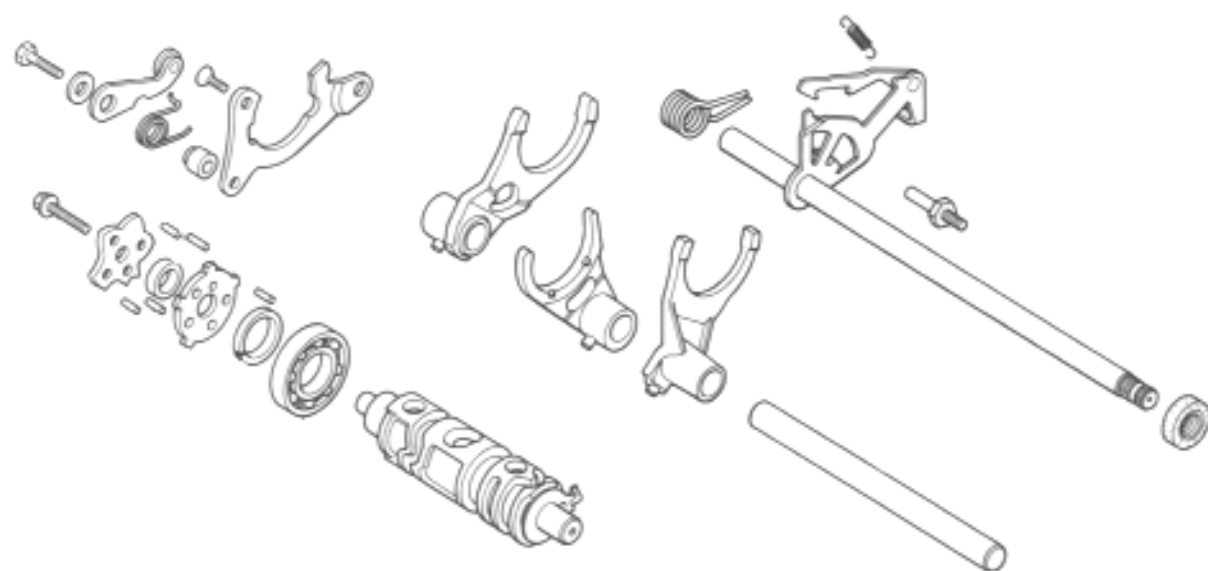
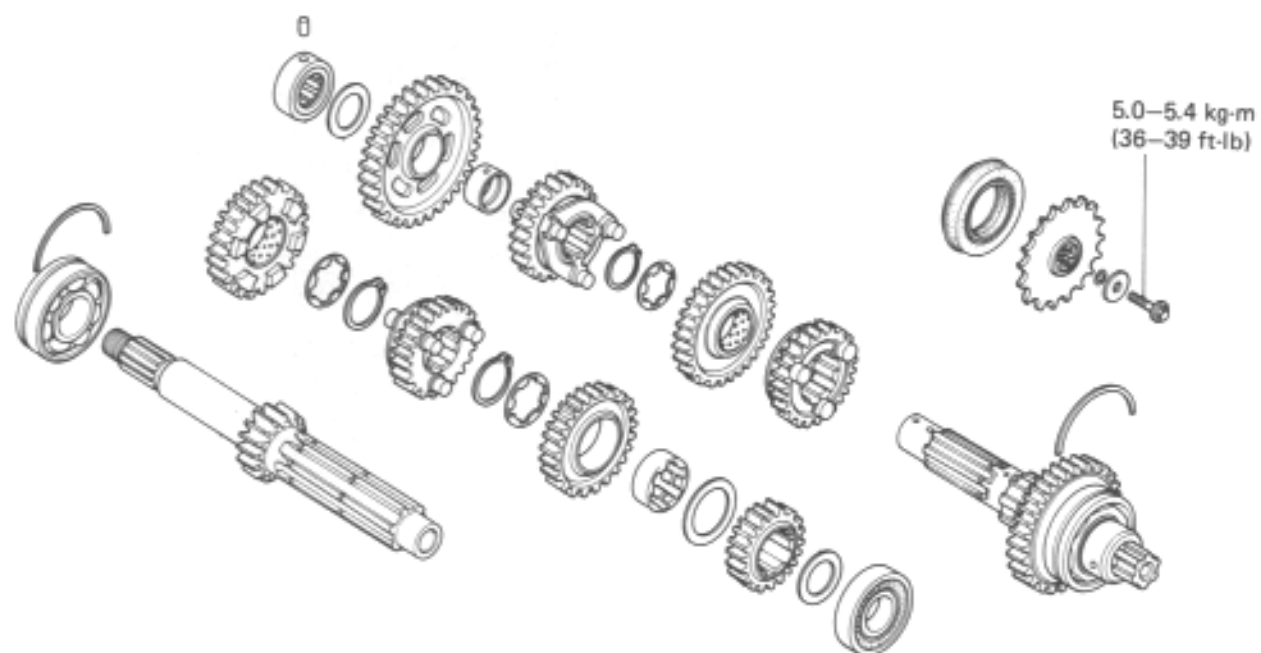
### NOTE

- Make sure that the plain washers are under the bolt head of the ten crankshaft bearing bolts.
- Apply molybdenum disulfide grease to the threads and head of the ten crankshaft holding bolts.

Tighten the upper crankcase bolts to the specified torque, proceeding front to rear.

### NOTE

- If the oil galley cap is removed, apply molybdenum disulfide grease to the thread when installing.





SERVICE INFORMATION	11-1
TROUBLESHOOTING	11-2
TRANSMISSION DISASSEMBLY	11-3
SHIFT FORK AND SHIFT DRUM REMOVAL	11-5
SHIFT DRUM AND SHIFT FORK INSTALLATION	11-7
TRANSMISSION ASSEMBLY	11-8

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

The gear shift linkage can be serviced with the engine in the frame. For internal transmission repairs, the crankcase must be separated (Refer to Section 10).

### SPECIAL TOOLS

#### Common Tools

Driver Handle (B)	07746-0020100
Driver Handle (C)	07746-0030100
30mm Inner Driver	07746-0030300

### TORQUE VALUES

Drive sprocket	5.0-5.4 kg-m (36-39 ft-lb)
Shift fork shaft	1.8-2.2 kg-m (13-16 ft-lb)

### SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Transmission	Backlash		0.024-0.074 mm (0.0009-0.0029 in)	0.12 mm (0.005 in)
	Gear I.D.	M4 gear	28.020-28.041 mm (1.1031-1.1040 in)	28.06 mm (1.105 in)
		M5 gear	31.025-31.050 mm (1.2215-1.2224 in)	31.07 mm (1.223 in)
		C1 gear	25.000-25.021 mm (0.9843-0.9851 in)	25.06 mm (0.987 in)
		C3 gear	28.020-28.041 mm (1.1031-1.1040 in)	28.07 mm (1.105 in)
	Gear bushing	M5 O.D.	30.950-30.975 mm (1.2185-1.2195 in)	30.93 mm (1.218 in)
		C1 O.D.	24.959-24.980 mm (0.9826-0.9835 in)	24.93 mm (0.981 in)
		C1 I.D.	22.000-22.021 mm (0.8661-0.8670 in)	22.06 mm (0.869 in)
	Mainshaft O.D.	at M4	27.959-27.980 mm (1.1007-1.1016 in)	27.93 mm (1.100 in)
	Countershaft O.D.	at C1 bushing	21.987-22.000 mm (0.8656-0.8661 in)	21.93 mm (0.863 in)
		at C3	27.959-27.980 mm (1.1007-1.1016 in)	27.93 mm (1.100 in)
	Gear to bushing or shaft clearance	M4 to shaft	—————	0.10 mm (0.004 in)
		M5 to M5 bushing	—————	0.12 mm (0.005 in)
		C1 to C1 bushing	—————	0.10 mm (0.004 in)
		C1 bushing to shaft	—————	0.10 mm (0.004 in)
		C3 to shaft	—————	0.10 mm (0.004 in)





			STANDARD	SERVICE LIMIT
Shift fork	Claw thickness		6.43–6.50 mm (0.253–0.256 in)	6.1 mm (0.24 in)
	I.D.	Center	13.000–13.018 mm (0.5118–0.5125 in)	13.04 mm (0.513 in)
		Left and right	13.000–13.018 mm (0.5118–0.5125 in)	13.04 mm (0.513 in)
Fork shaft	O.D.		12.966–12.984 mm (0.5104–0.5112 in)	12.90 mm (0.508 in)

## TROUBLESHOOTING

### Hard to shift

1. Improper clutch adjustment: too much free play
2. Shift fork bent
3. Shift shaft bent
4. Shift claw bent
5. 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



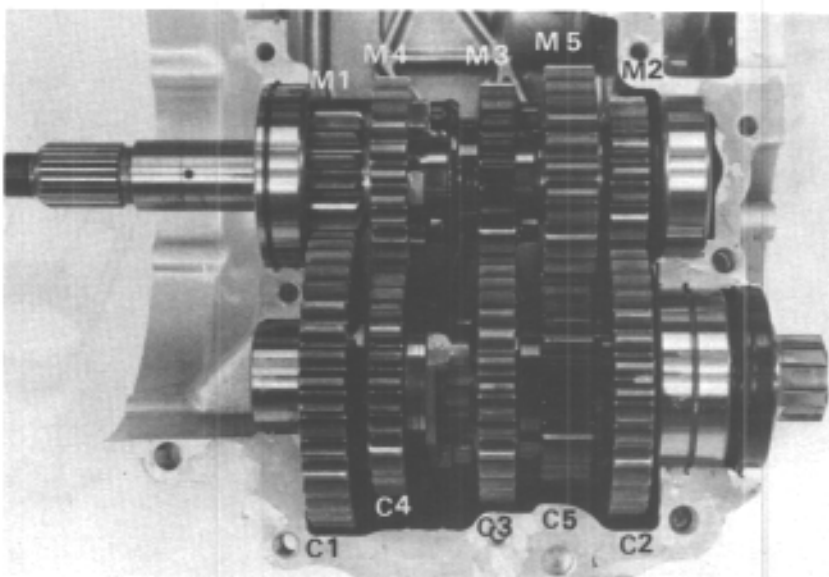
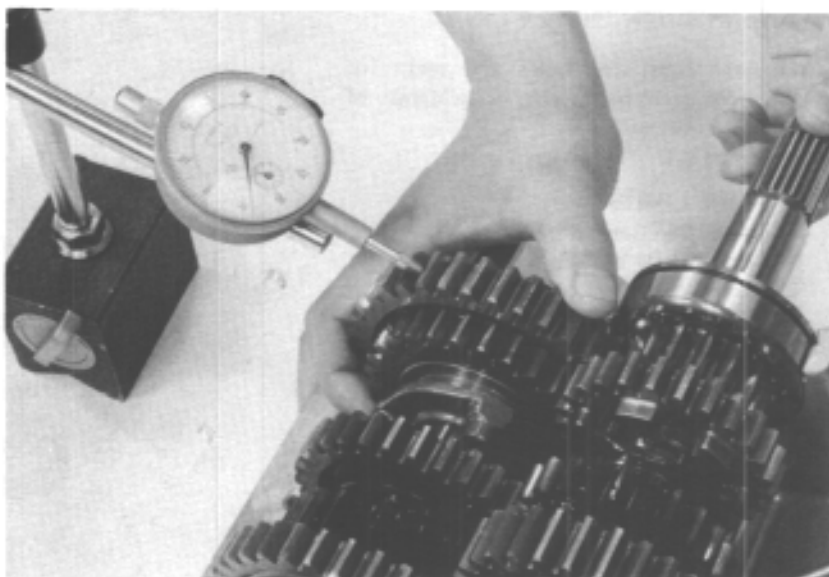
For servicing of the gearshift linkage, see Section 9.

## TRANSMISSION DISASSEMBLY

Separate the crankcase (Section 10).  
Inspect each gear for backlash.

**SERVICE LIMIT:** 0.13 mm (0.005 in)

Remove the mainshaft and countershaft.  
Remove the dowel pins from the crankcase.





## TRANSMISSION INSPECTION

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

Measure the I. D. of each gear.

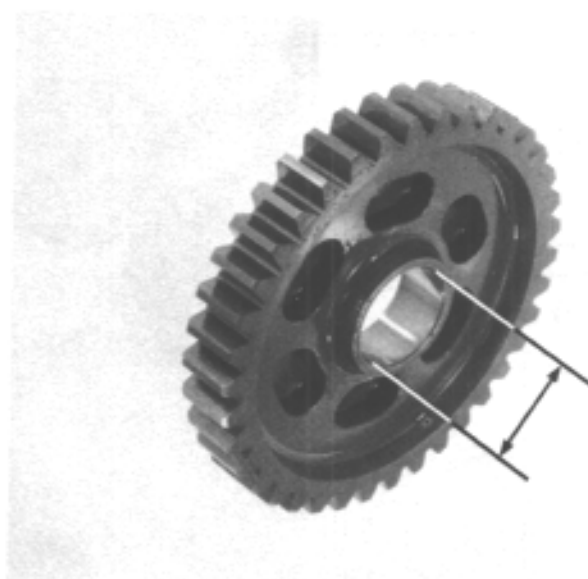
### SERVICE LIMITS:

M4 gear: 28.06 mm (1.105 in)

M5 gear: 31.07 mm (1.223 in)

C1 gear: 25.06 mm (0.987 in)

C3 gear: 28.07 mm (1.105 in)



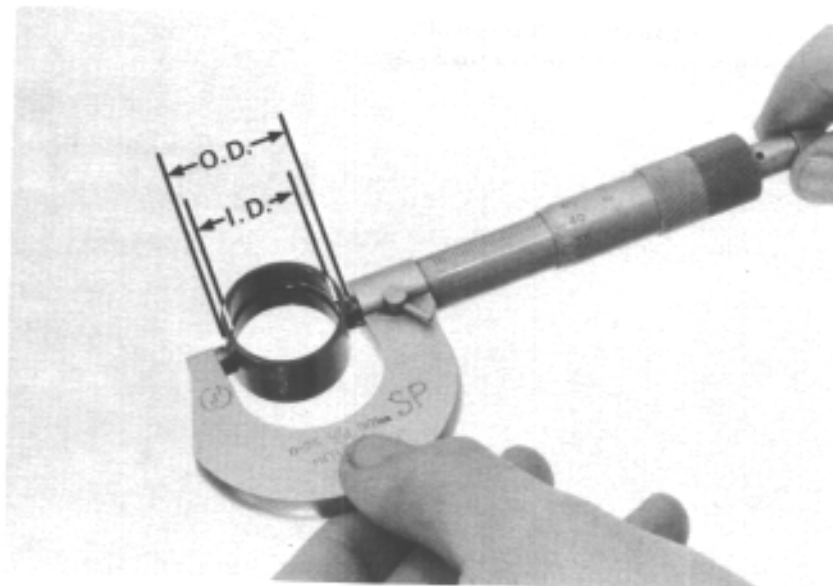
Measure the I.D. and O.D. of the gear bushings.

### SERVICE LIMITS:

M5 O.D.: 30.93 mm (1.218 in)

C1 O.D.: 24.93 mm (0.981 in)

C1 I.D.: 22.06 mm (0.869 in)



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

### SERVICE LIMITS:

A: 27.93 mm (1.100 in)

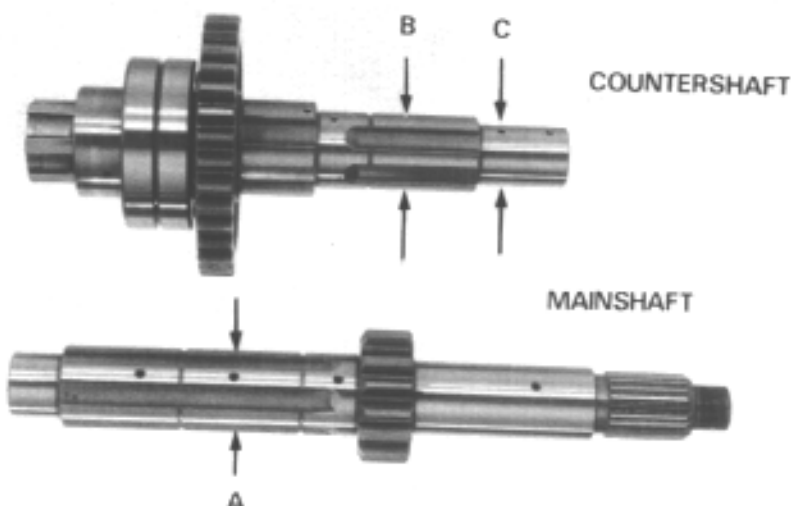
B: 27.93 mm (1.100 in)

C: 21.93 mm (0.863 in)

Calculate the clearance between the gear and gear shaft or bushing.

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

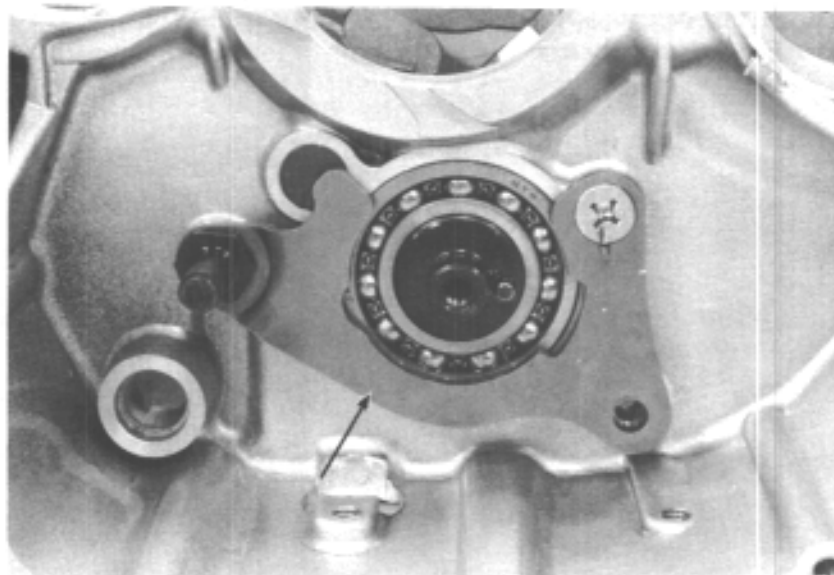
M5 to M5 bushing: 0.12 mm (0.005 in)



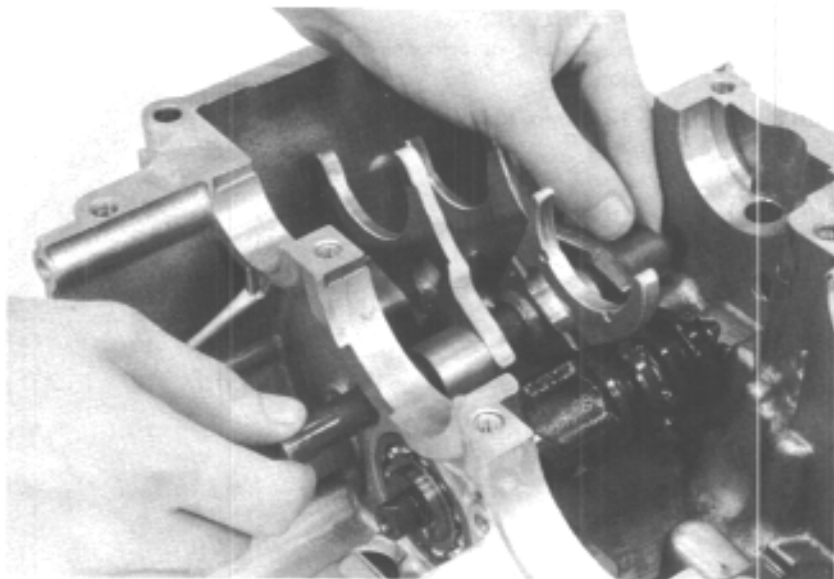


## SHIFT FORK AND SHIFT DRUM REMOVAL

Remove the bearing stopper plate.



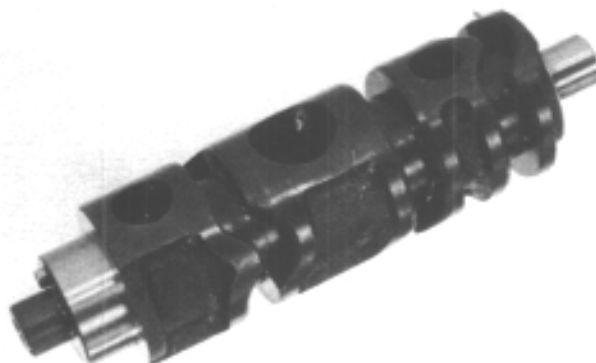
Remove the shift fork shaft and shift forks.  
Remove the shift drum.



## GEAR SHIFT DRUM AND SHIFT FORK INSPECTION

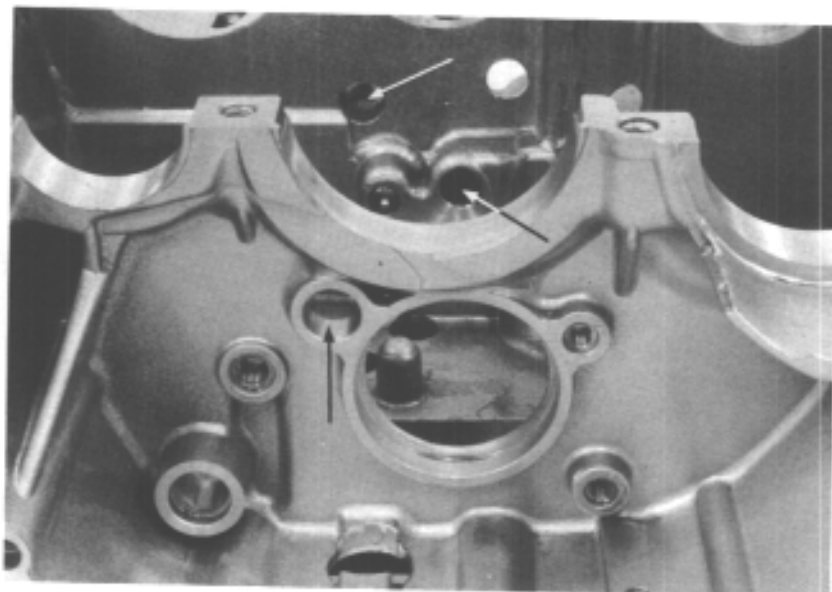
Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication.

Check the shift drum grooves for damage.



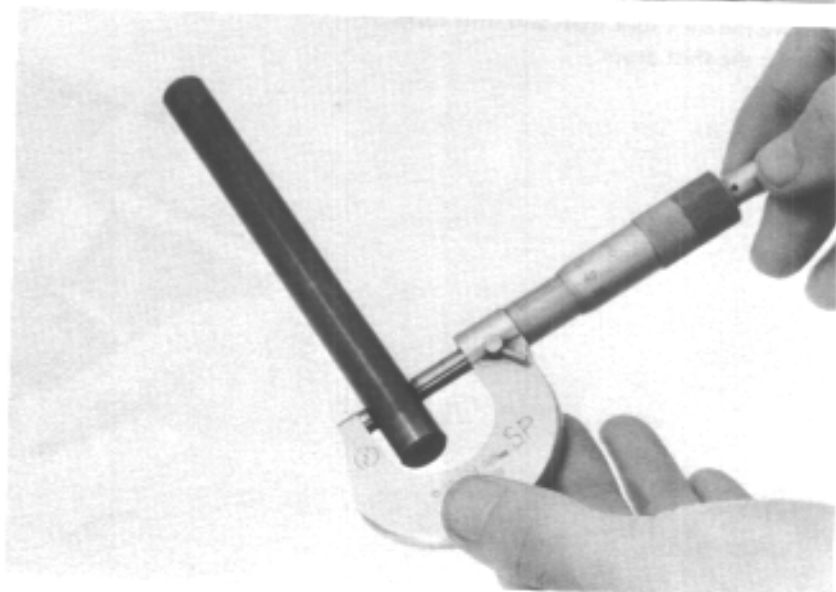


Inspect the shift drum hole and shift fork shaft hole for scoring or scratches.



Measure the shift fork shaft O.D.  
 Check for scratches, scoring, or evidence of insufficient lubrication.

**SERVICE LIMIT: 12.90 mm (0.508 in)**

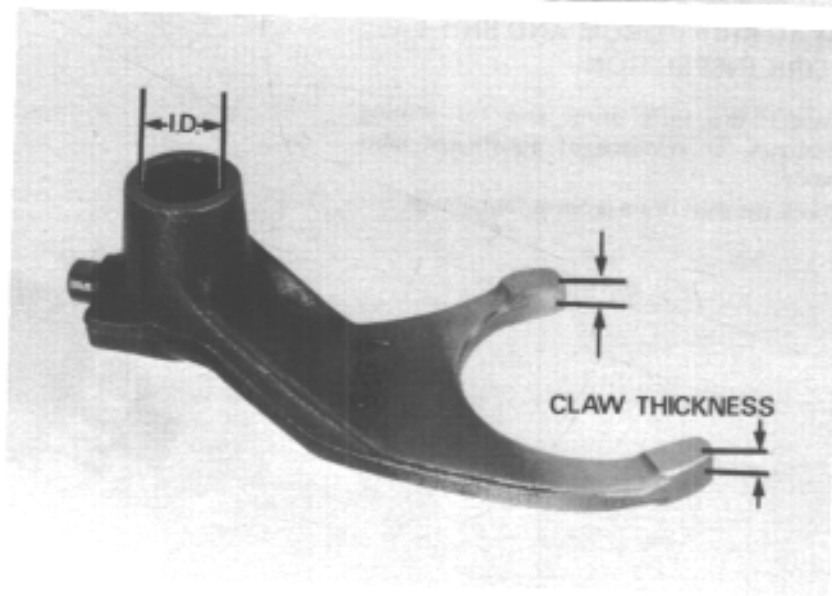


Measure the shift fork I.D. and claw thickness.

**SERVICE LIMITS:**

I.D. (L AND R): 13.04 mm (0.513 in)

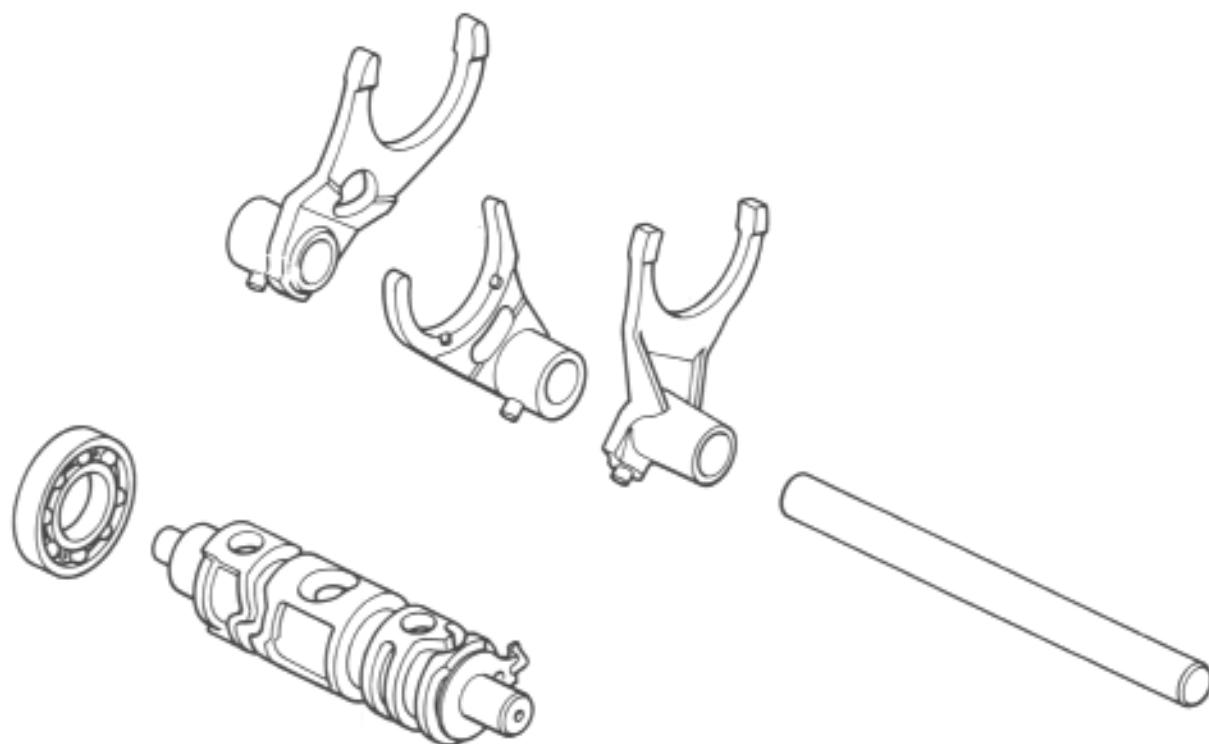
CLAW THICKNESS: 6.1 mm (0.24 in)





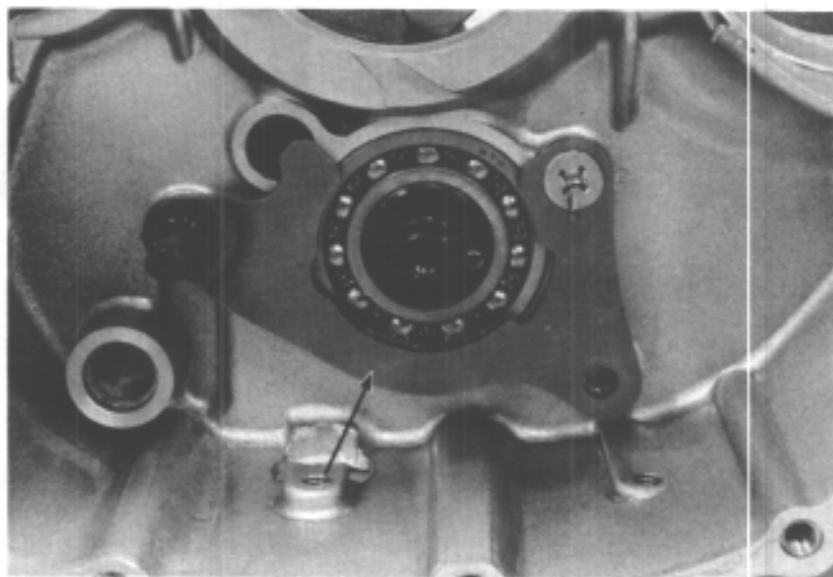
## SHIFT DRUM AND SHIFT FORK INSTALLATION

Install the shift drum and shift fork, by reversing the removal procedure. Key points are shown here.



### CAUTION

When installing the bearing stopper plate, apply a locking agent to the screw threads.



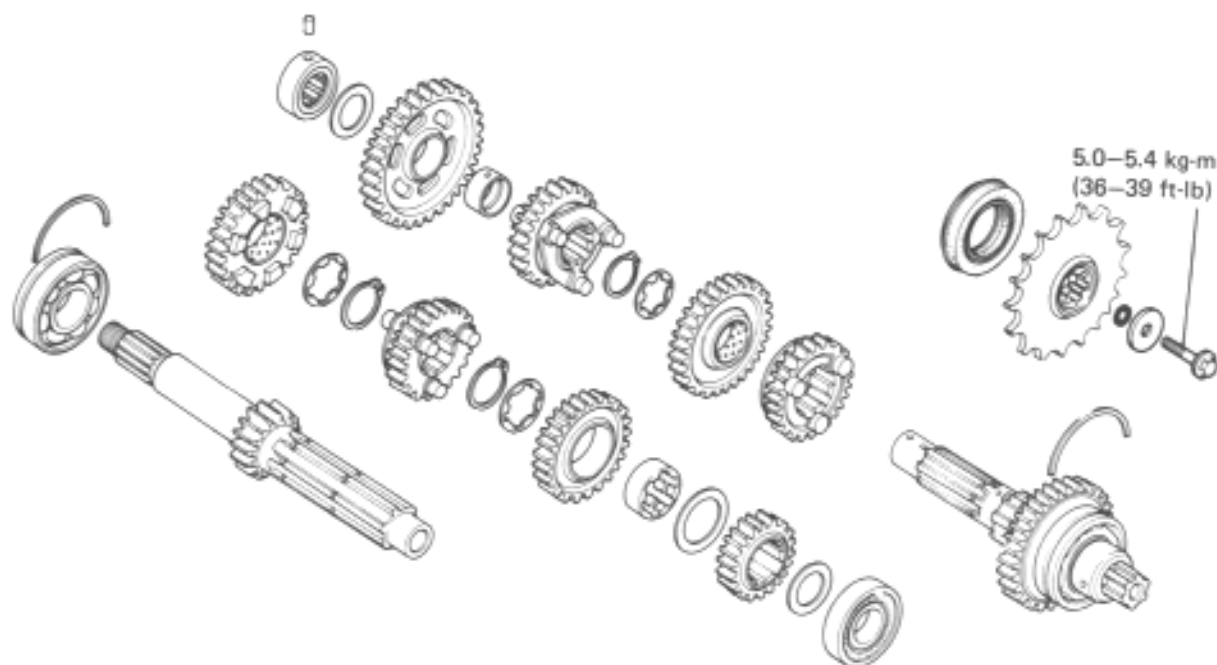


## TRANSMISSION ASSEMBLY

Assemble the mainshaft and countershaft.

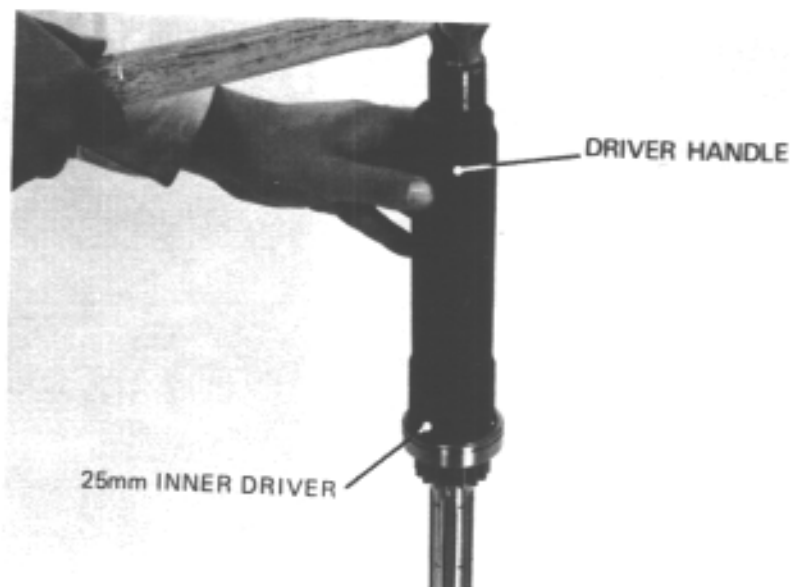
### NOTE

- Check the gears for freedom of movement or rotation on the shaft.
- Check that the snap rings are seated in the grooves.



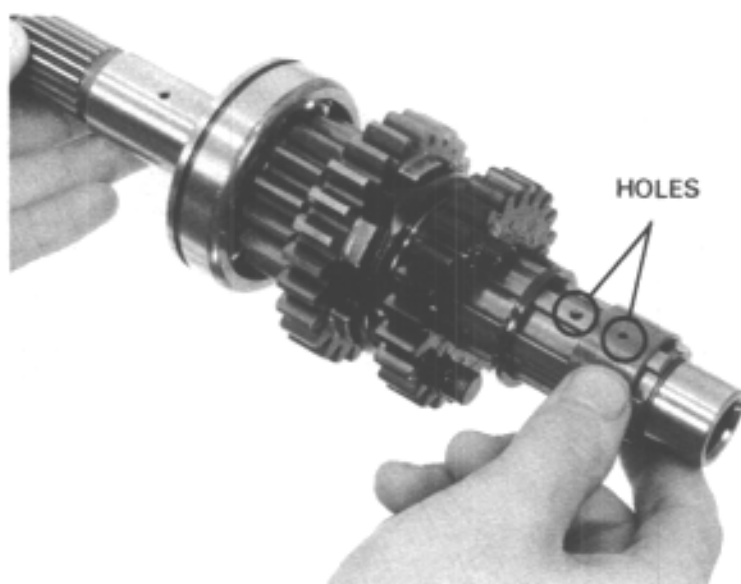
### NOTE

Install the mainshaft bearing with special tools.

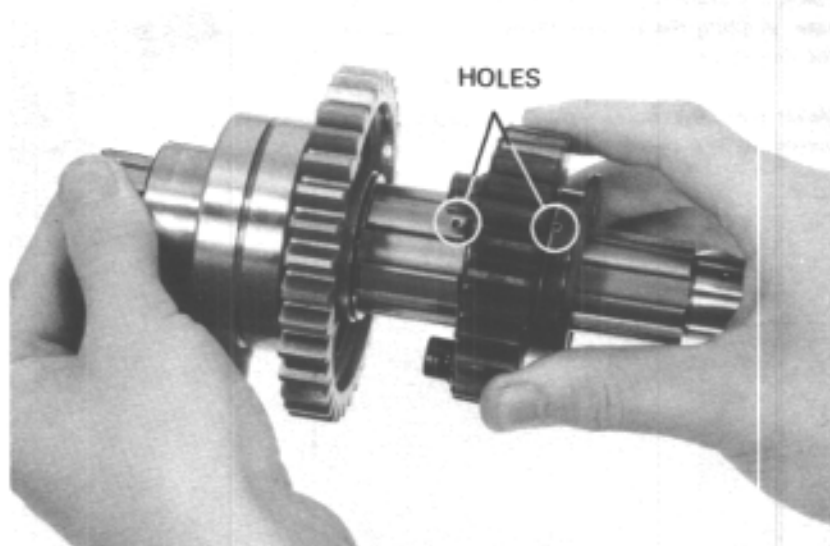




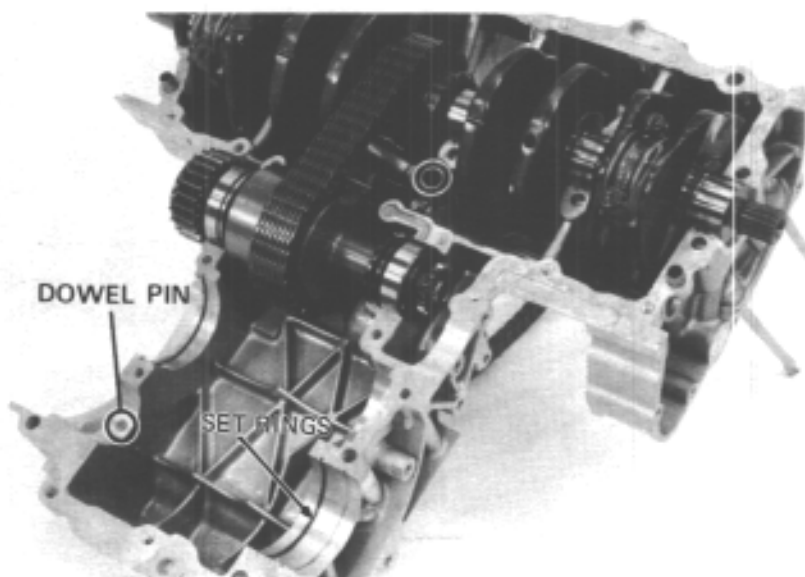
Align the hole in the M5 gear bushing with the hole in the mainshaft.



Align the hole in the C5 gear with the hole in the countershaft.



Insert the transmission bearing set rings and dowel pin into the upper crankcase.

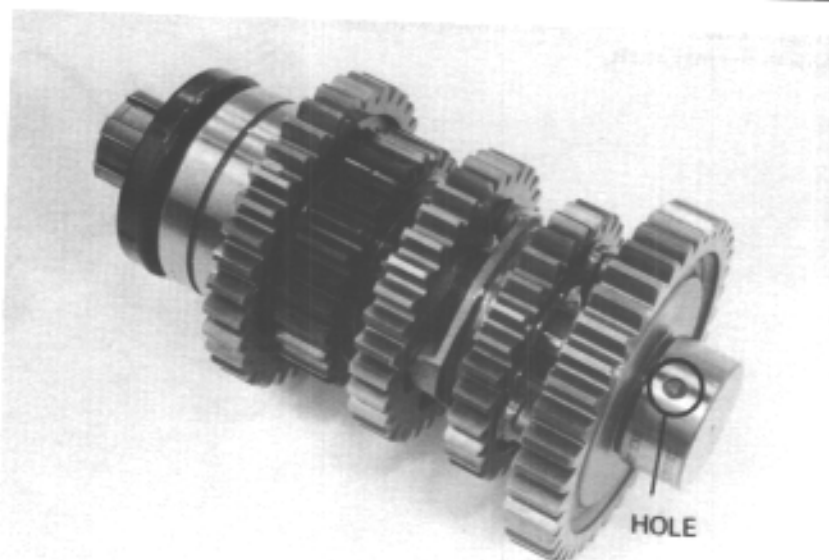






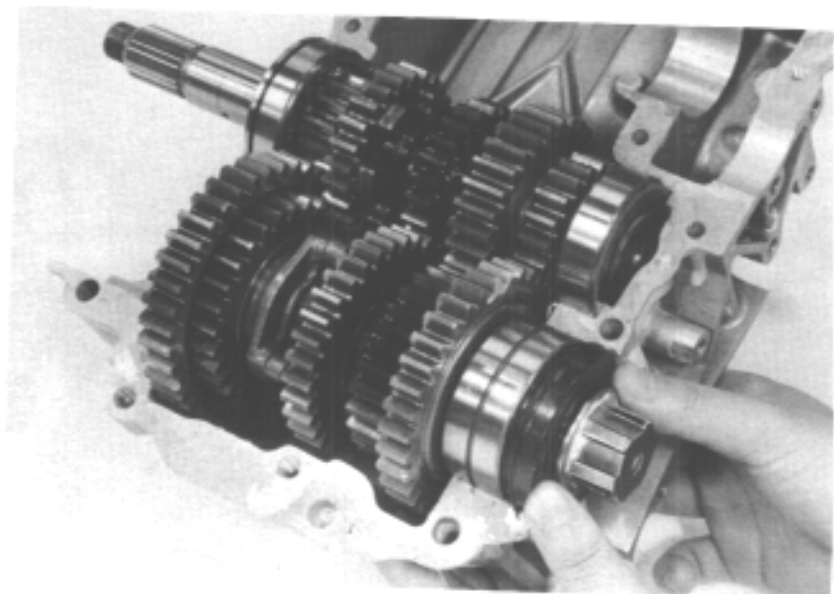
Seat the oil seal against the right countershaft bearing.

Note the location of the right countershaft bearing hole. Align it with the dowel pin.



Place the transmission shafts into the crankcase, aligning the bearing set rings and seating the dowel pin.

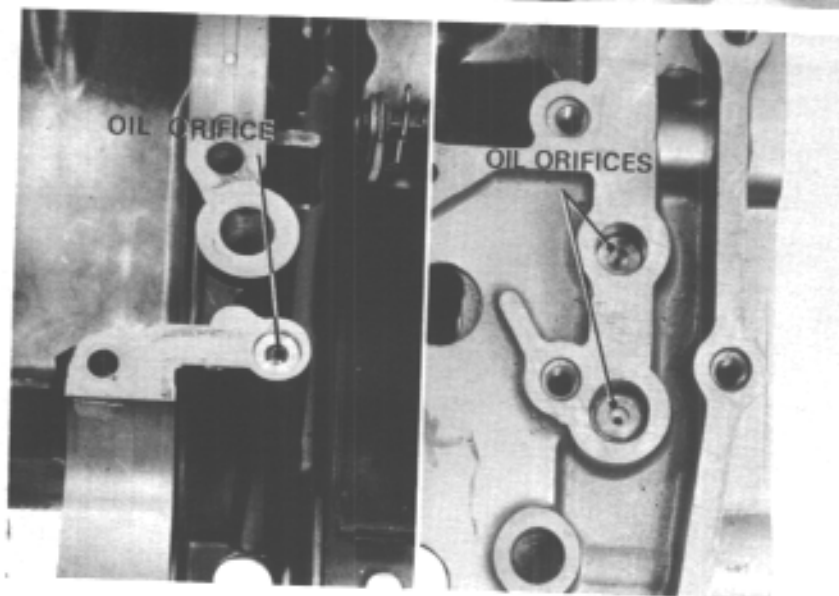
Make sure the countershaft oil seal's lip is seated in the crankcase groove.



Install the lower crankcase (Refer to Section 10).

#### NOTE

Check the oil orifice for clogging, before installing the lower crankcase.

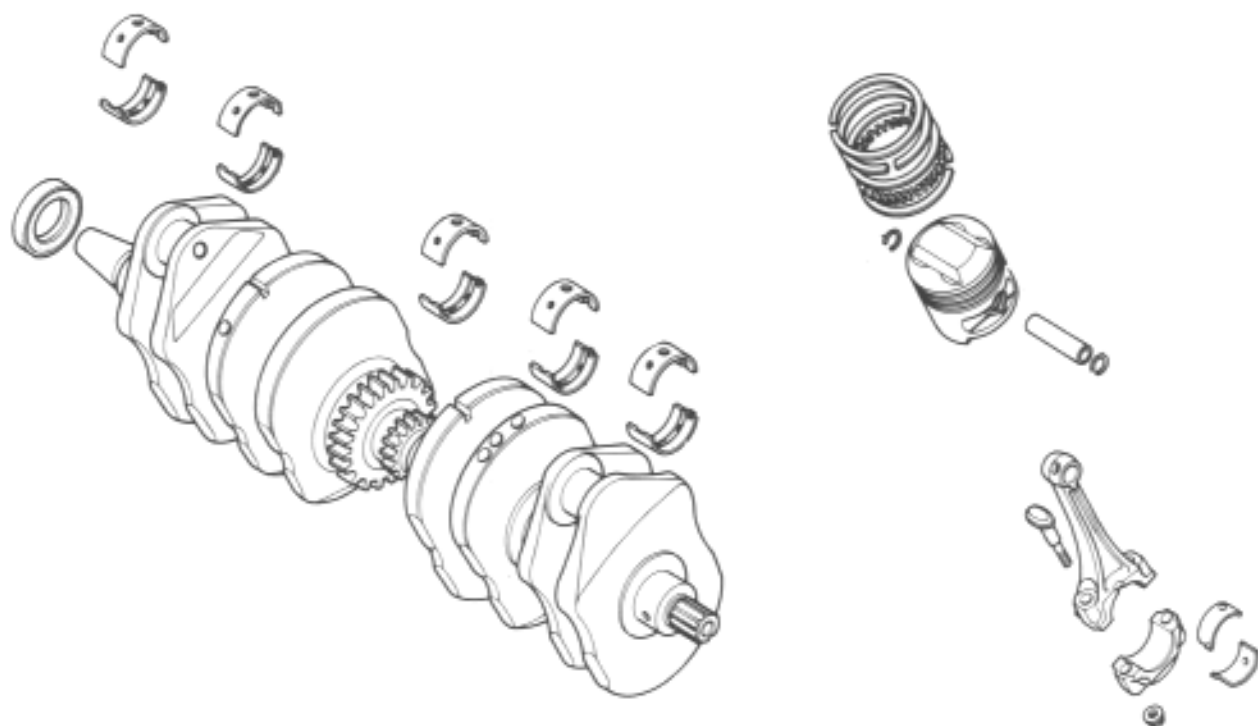
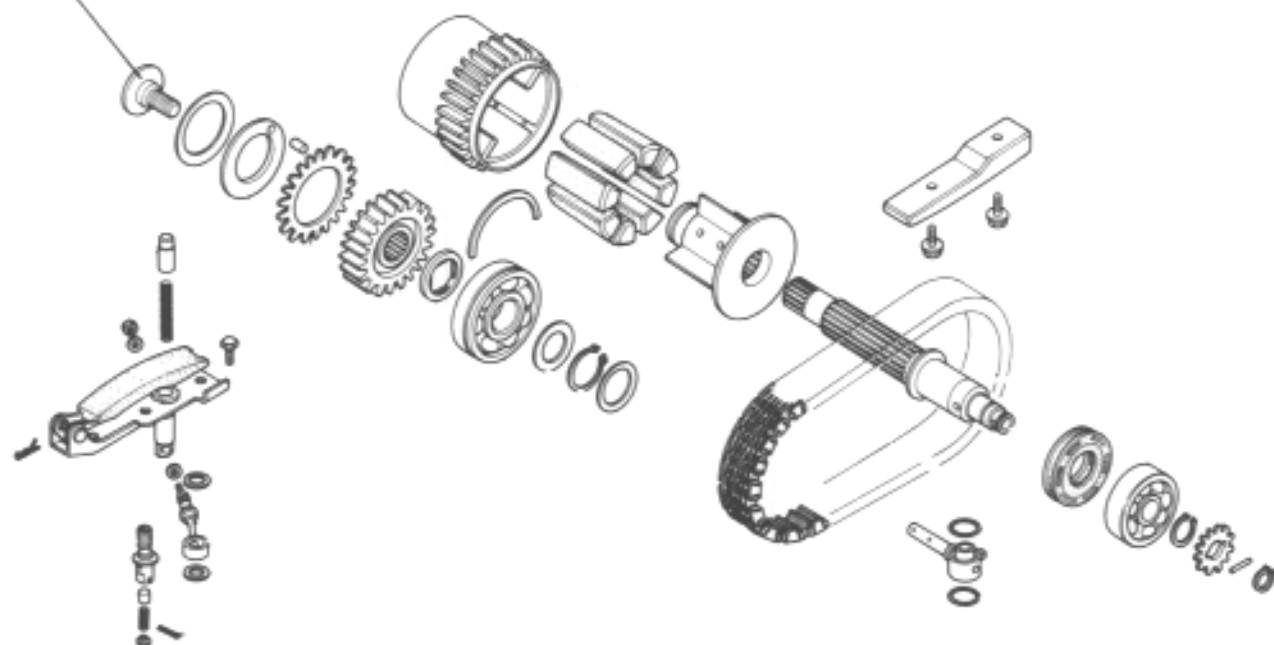




MEMO



8.0–10.0 kg-m  
 (60–72 ft-lb)





SERVICE INFORMATION	12-1
TROUBLESHOOTING	12-2
PRIMARY SHAFT REMOVAL	12-3
PRIMARY CHAIN TENSIONER DISASSEMBLY	12-4
CONNECTING ROD REMOVAL	12-4
BEARING INSPECTION	12-6
BEARING SELECTION	12-8
CONNECTING ROD INSTALLATION	12-10
PRIMARY SHAFT ASSEMBLY	12-12
PRIMARY CHAIN TENSIONER ASSEMBLY	12-13

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

All bearing inserts are select fit and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.

Apply molybdenum disulfide grease to the main journals and crankpins during assembly.

### SPECIAL TOOLS

#### Common Tools

Driver Handle	07746-0030100
20 mm Inner driver	07746-0020400
22 mm Inner driver	07746-0020100

### TORQUE VALUES

Crankpin	3.0-3.4 kg-m (22-25 ft-lb)
Crankshaft	2.1-2.5 kg-m (15-18 ft-lb)
Primary chain tensioner bolt	0.8-1.2 kg-m ( 6- 9 ft-lb)


**SPECIFICATIONS**

		STANDARD	SERVICE LIMIT
Electric Starter	Drive gear O.D.	47.175–47.200 mm (1.8573–1.8583 in)	47.155 mm (1.8565 in)
	Idle gear I.D.	10.000–10.015 mm (0.3937–0.3943 in)	10.04 mm (0.395 in)
	Idle gear shaft O.D.	11.966–11.984 mm (0.4711–0.4718 in)	11.95 mm (0.470 in)
	Idle gear-to-shaft clearance	—	0.1 mm (0.004 in)
Crankshaft	Connecting rod big end side clearance	0.05–0.20 mm (0.002–0.008 in)	0.3 mm (0.01 in)
	Runout	—	0.05 mm (0.002 in)
	Crankpin oil clearance	0.020–0.060 mm (0.0008–0.0024 in)	0.08 mm (0.003 in)
	Main journal oil clearance	0.020–0.060 mm (0.0008–0.0024 in)	0.08 mm (0.003 in)
Cam chain	Length	309.05–309.35 mm (12.167–12.179 in)	311.8 mm (12.28 in)
Primary chain	Length	129.78–129.98 mm (5.109–5.117 in)	131.1 mm (5.16 in)

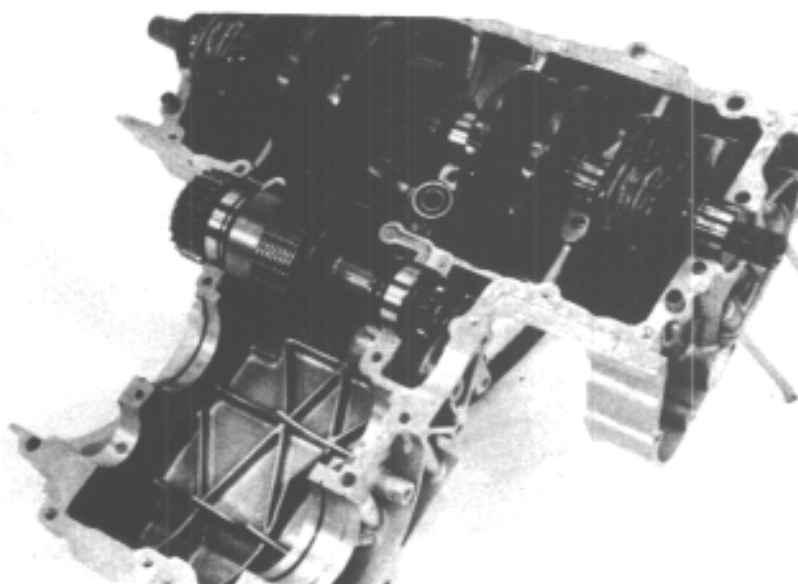
**TROUBLESHOOTING**
**Excessive noise**

- Worn main journal bearing
- Worn crank pin bearing

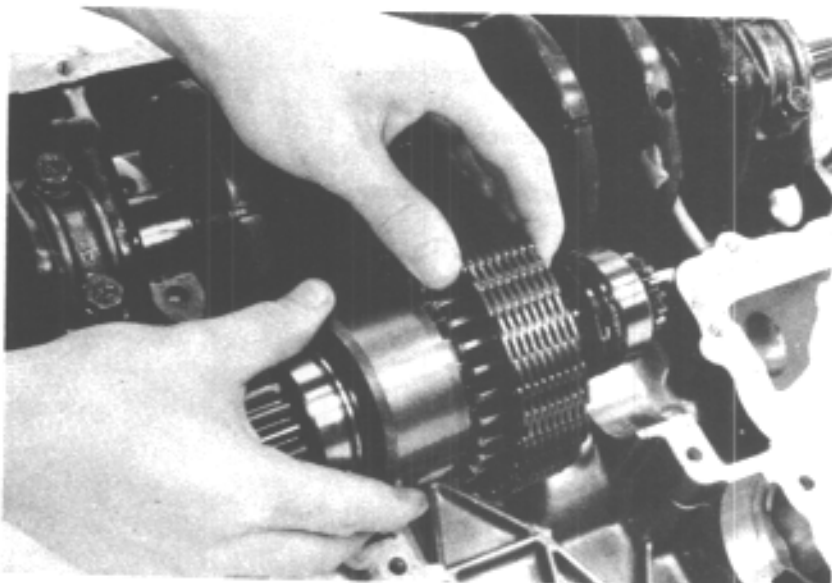


## PRIMARY SHAFT REMOVAL

Disassemble the crankcase (Section 10).  
Loosen the primary shaft drive gear lock bolt (Section 8).  
Remove the starting motor (Section 18).  
Remove the transmission assembly (Section 11).  
Remove the A.C. generator (Section 16).

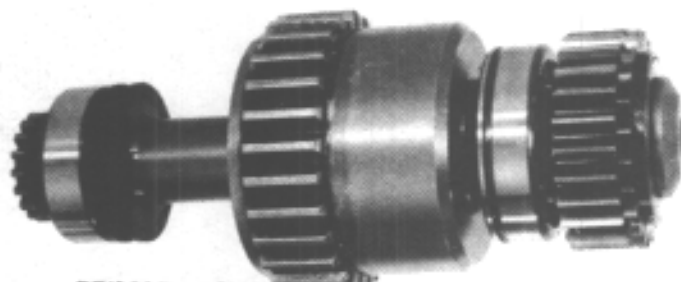


Raise the primary shaft assembly and remove the primary chain.



## PRIMARY SHAFT INSPECTION

Check for scoring, wear or other damage.  
Remove the bearings and damper by applying pressure lightly.



PRIMARY SHAFT ASSEMBLY

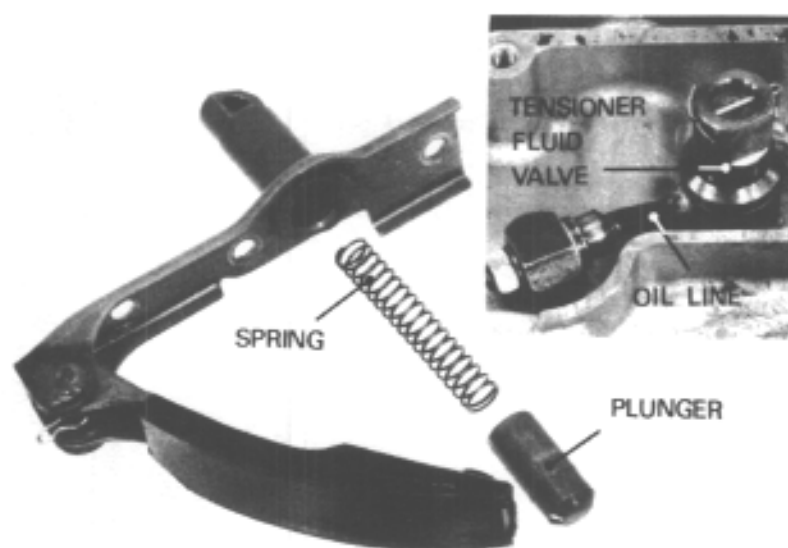


PRIMARY SHAFT



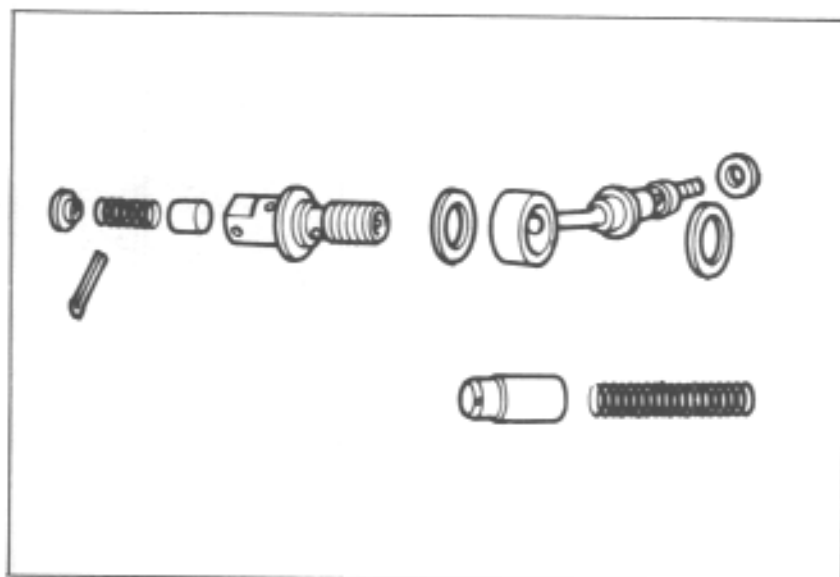
## PRIMARY CHAIN TENSIONER DISASSEMBLY

Remove the spring and plunger.  
 Remove the nut, oil line and tensioner fluid valve.  
 Remove the slipper assembly.



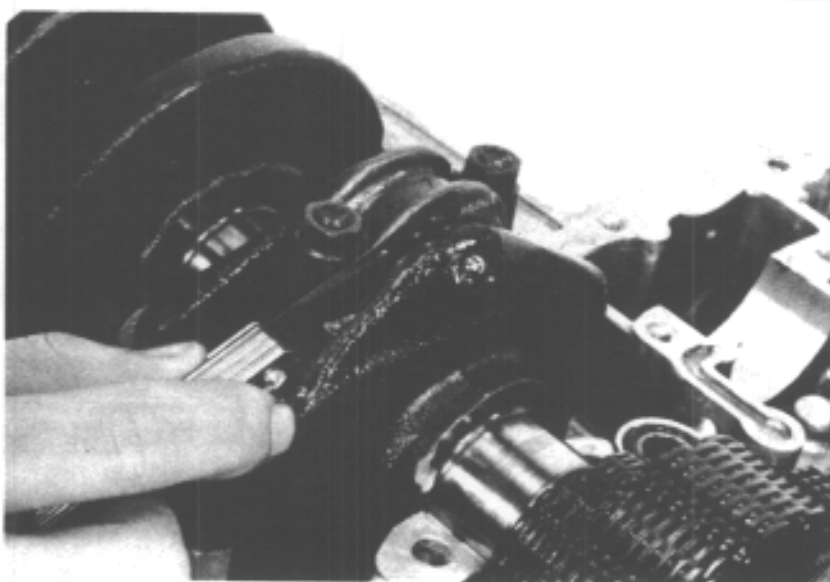
## INSPECTION

Check the holes in the oil lines and plunger for blockage.  
 Clean all parts with non-flammable or high flash point solvent.  
 Inspect the slipper for damage or excessive wear.



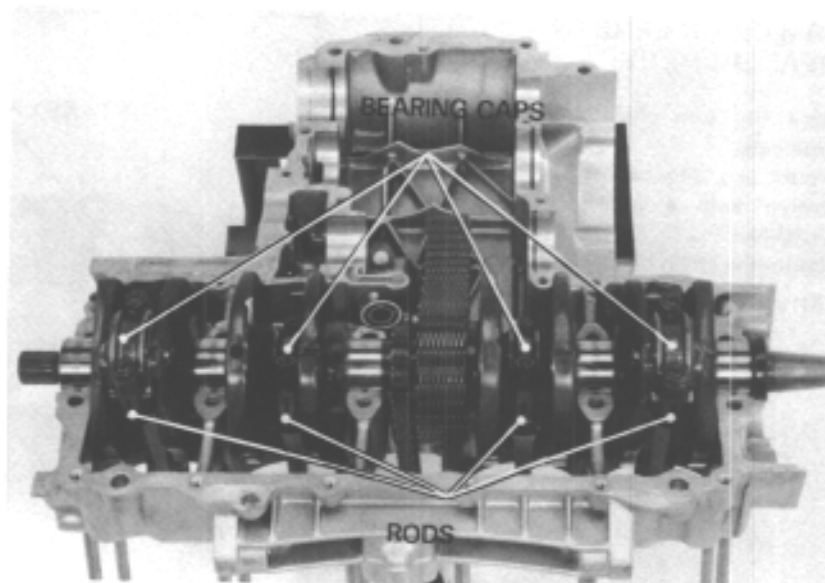
## CONNECTING ROD REMOVAL

Check the connecting rod side clearance.  
**SERVICE LIMIT: 0.3 mm (0.01 in)**



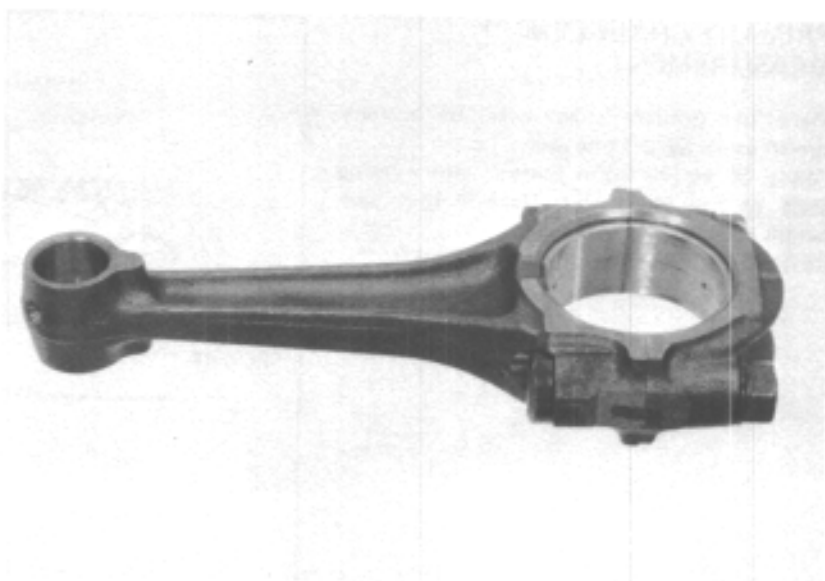


Remove the bearing caps and rods.



**NOTE**

Mark the rods, bearings and bearing caps to indicate cylinder position.

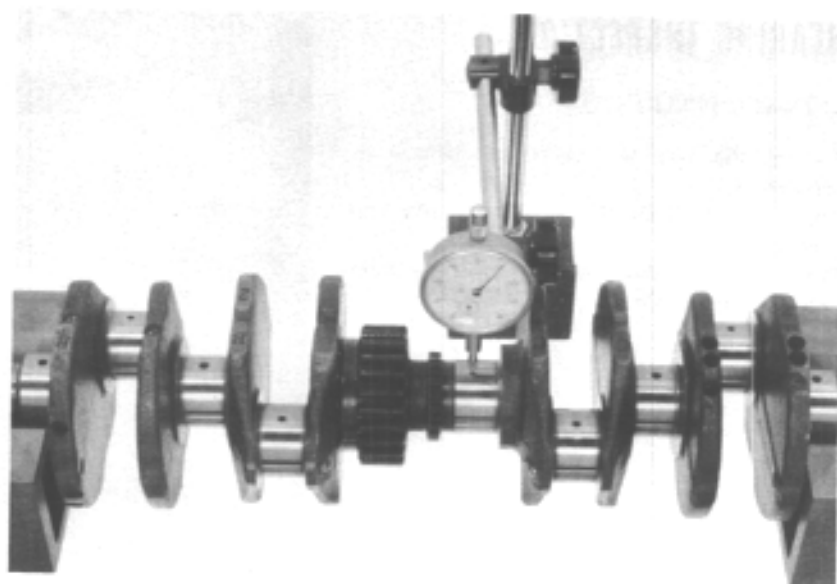


**CRANKSHAFT INSPECTION**

Remove the cam chain and primary chain.  
Actual runout is 1/2 of Total Indicator Reading.

Set the crankshaft on a stand or V blocks.  
Set a dial indicator to the center main journal.  
Rotate the crankshaft two revolutions and read runout at the center journal.

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







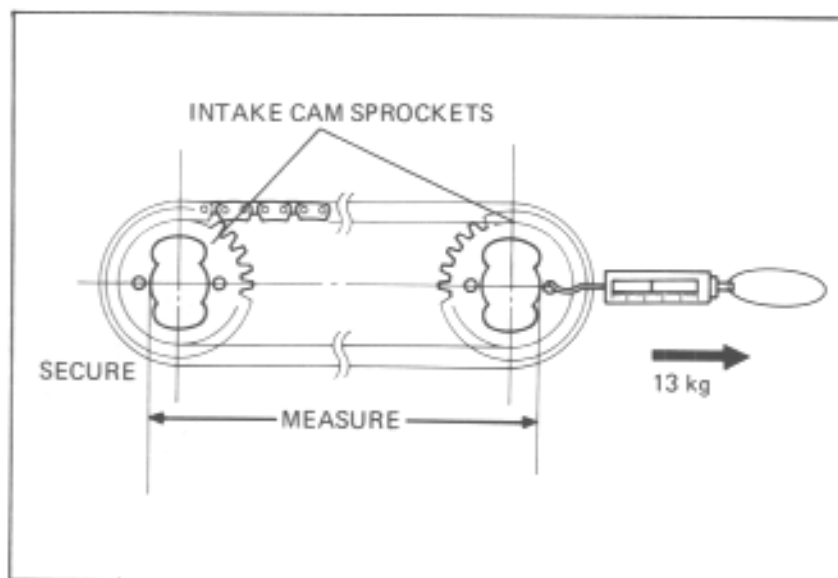
### CAM CHAIN LENGTH MEASUREMENT

Place the cam chain over the intake cam sprockets.

Secure one sprocket. Apply 13 kg (29 lb) of tension with a spring scale to the other sprocket.

Measure the chain length as shown.

**SERVICE LIMIT: 311.8 mm (12.28 in)**

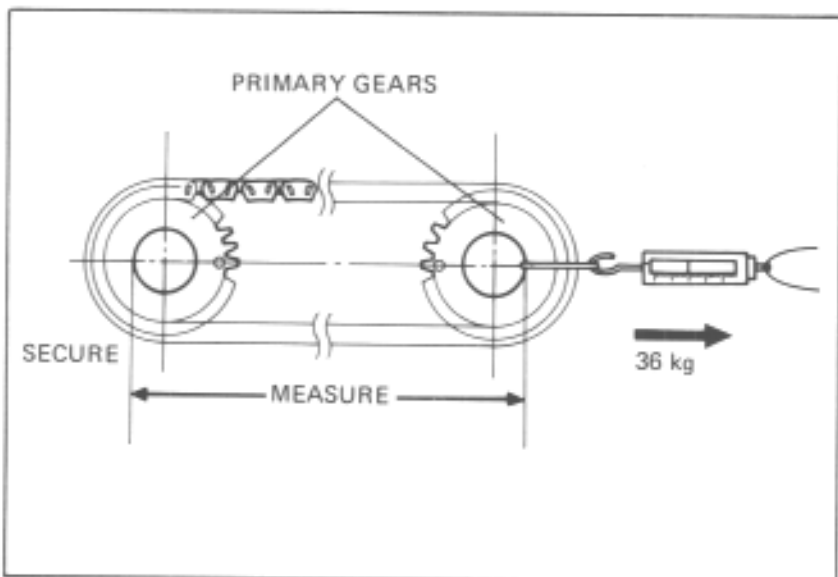


### PRIMARY CHAIN LENGTH MEASUREMENT

Place the primary chain over the primary driven gears. Secure one gear.

Apply 36 kg (79 lb) of tension with a spring scale to the other gear. Measure the chain length as shown.

**SERVICE LIMIT: 131.1 mm (5.16 in)**



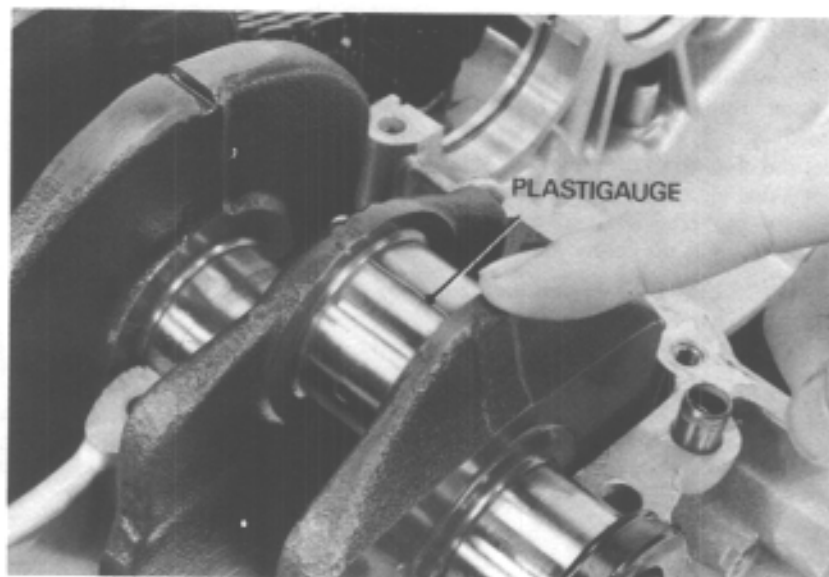
## BEARING INSPECTION

### CONNECTING RODS

Inspect the bearing inserts for damage or separation.

Clean all oil from the bearing inserts and crankpins.

Put a piece of plastigauge on each crankpin avoiding the oil hole.





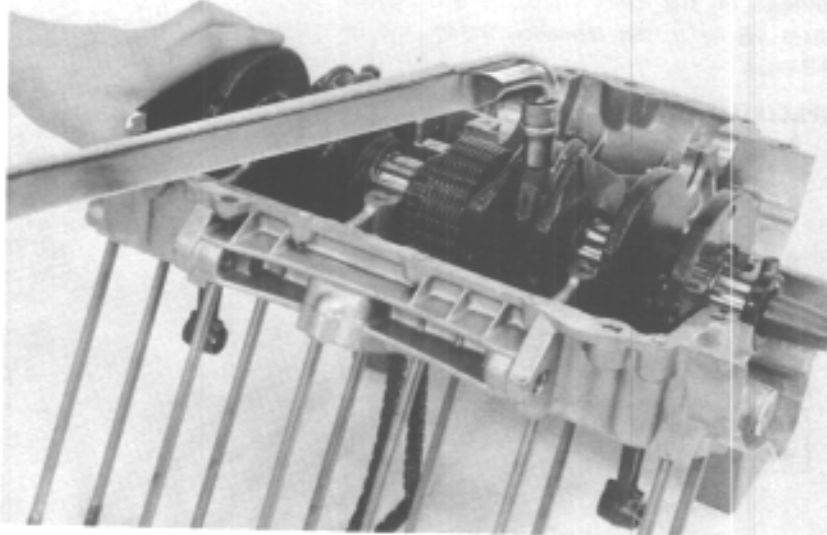
Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

**SPECIFIED TORQUE:**

3.0–3.4 kg-m (22–25 ft-lb)

**NOTE**

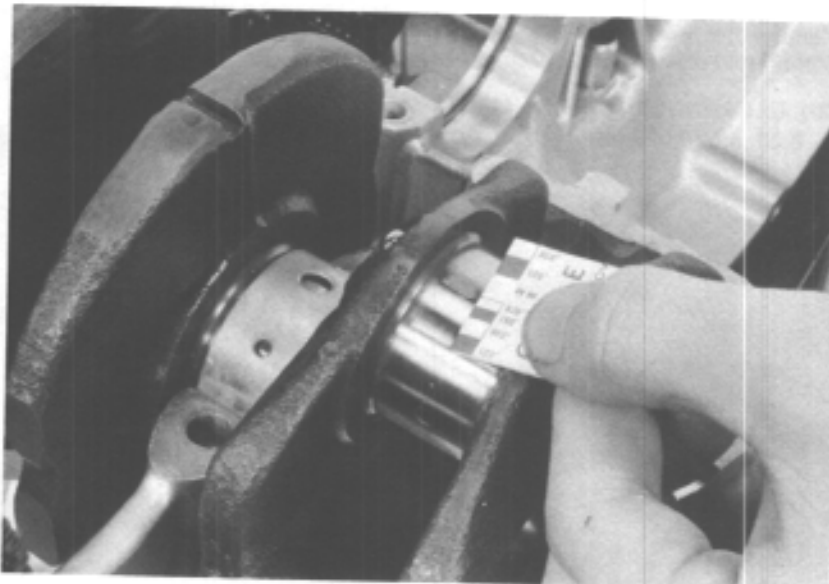
Do not rotate the crankshaft during inspection.



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

**OIL CLEARANCE SERVICE LIMIT:**

0.08 mm (0.003 in)

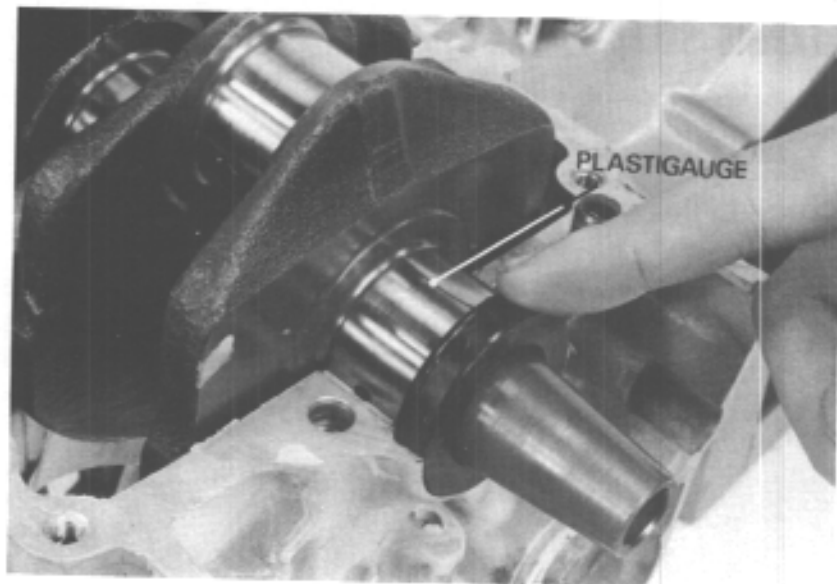


**MAIN BEARINGS**

Inspect the bearing inserts for damage or separation.

Clean all oil from the bearing inserts and journals.

Put a piece of plastigauge on each journal, avoiding the oil holes.





Install the main bearings on the correct journals on the lower crankcase and tighten them evenly in the sequence shown and in 2-3 steps.

**SPECIFIED TORQUES:**

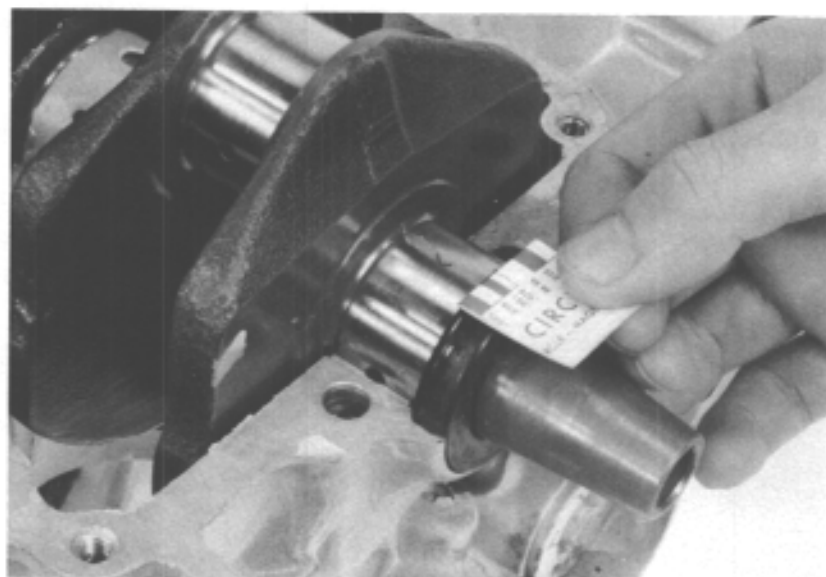
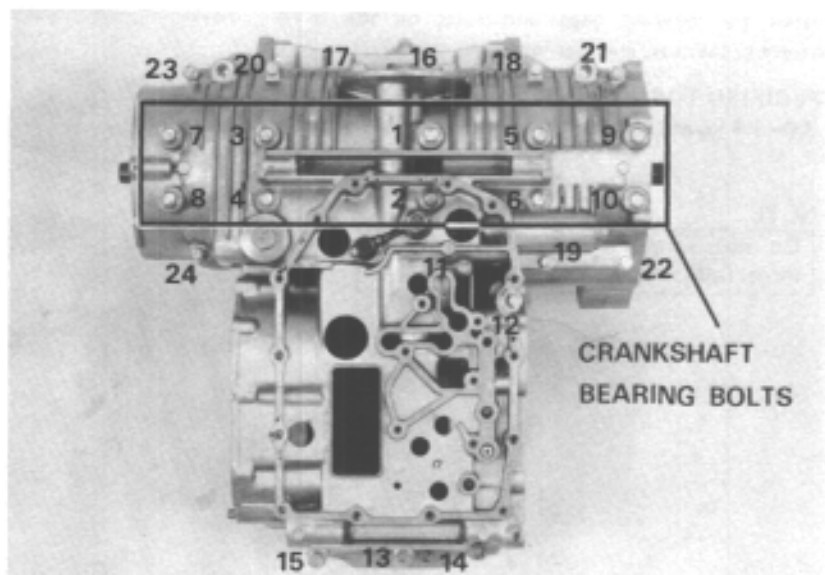
8 mm bolt (Crankshaft)	2.1–2.5 kg-m (15–18 ft-lb)
8 mm bolt (Crankcase)	2.1–2.5 kg-m (15–18 ft-lb)
6 mm bolt	1.0–1.4 kg-m ( 7–10 ft-lb)
10 mm bolt	4.5–5.0 kg-m (33–36 ft-lb)

**NOTE**

Do not rotate the crankshaft during inspection.

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

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

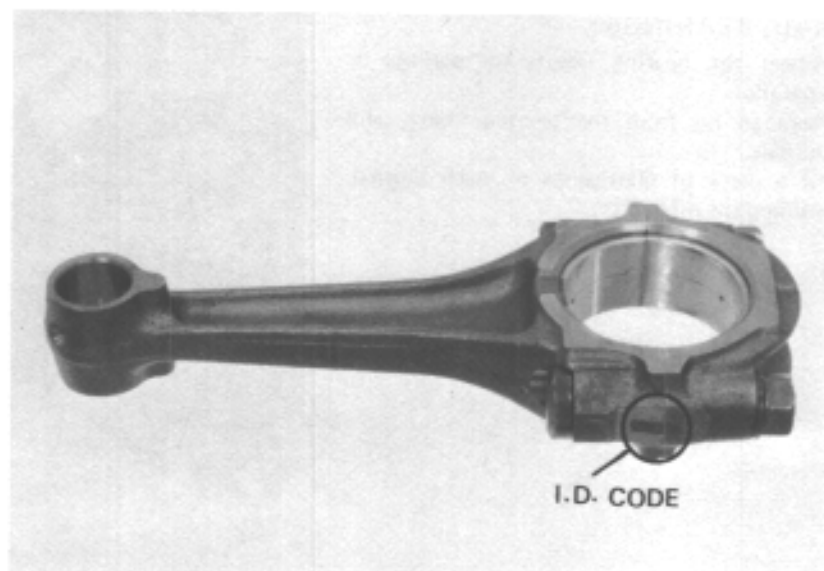


## BEARING SELECTION

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

### CONNECTING ROD BEARING INSERTS

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

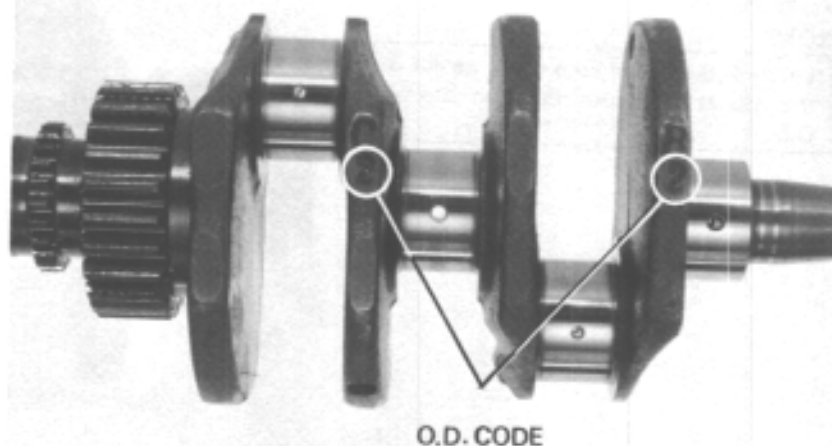




Determine and record the corresponding crankpin O. D. code number (or measure the crankpin O.D.).

### NOTE

Number 1,2 or 3 on each crank weight is the code for each crankpin O.D.



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

		CRANKPIN O.D. CODE NO.		
		1	2	3
CONNECTING ROD I.D. CODE NO.	1	39.000–39.008 mm	E (Yellow)	D (Green)
	2	39.008–39.016 mm	D (Green)	C (Brown)
	3	39.016–39.024 mm	C (Brown)	B (Black)

### BEARING INSERT THICKNESS:

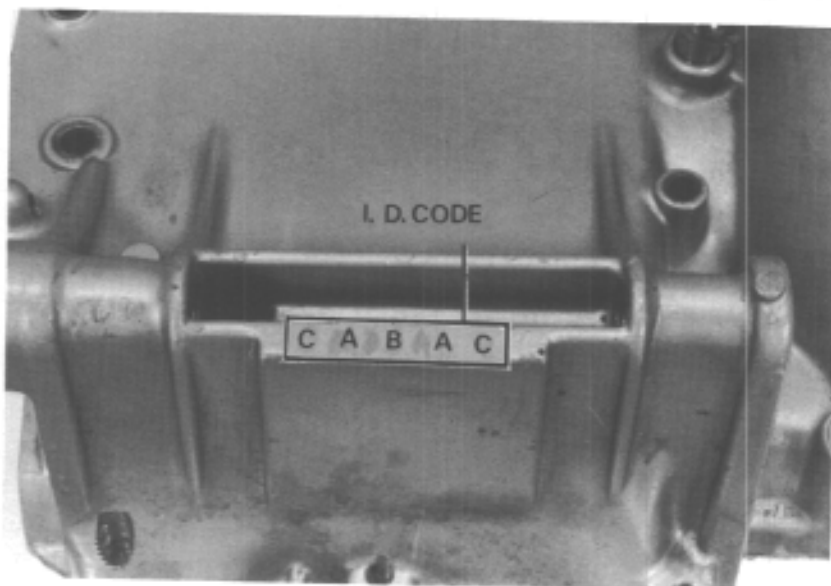
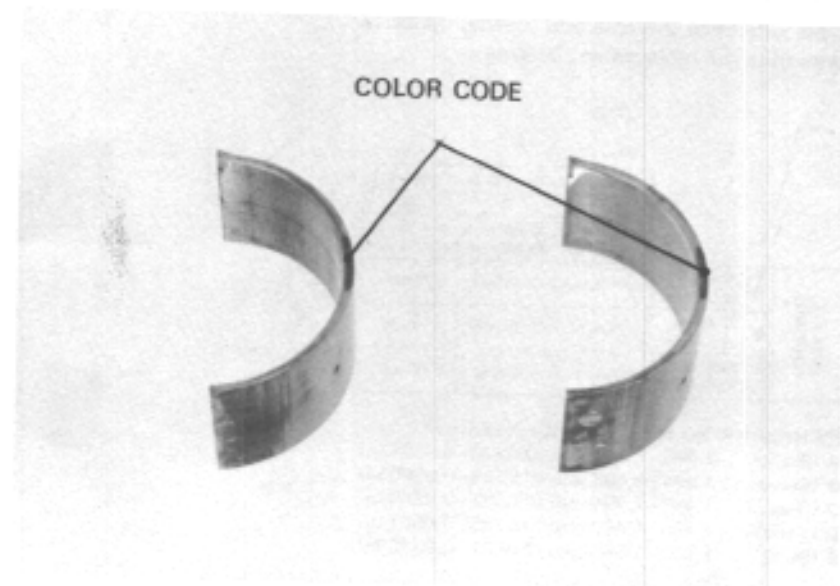
A (Blue) : 1.502–1.506 mm (0.0591–0.0593 in)  
 B (Black) : 1.498–1.502 mm (0.0590–0.0591 in)  
 C (Brown) : 1.494–1.498 mm (0.0588–0.0590 in)  
 D (Green) : 1.490–1.494 mm (0.0587–0.0588 in)  
 E (Yellow) : 1.486–1.490 mm (0.0585–0.0587 in)

### MAIN BEARING

Determine and record crankcase I. D. code numbers.

### NOTE

Letters A,B or C on the upper rear crankcase are the codes for the main journal I.D. from left to right; I.D. code for the third main journal from left to right is B.

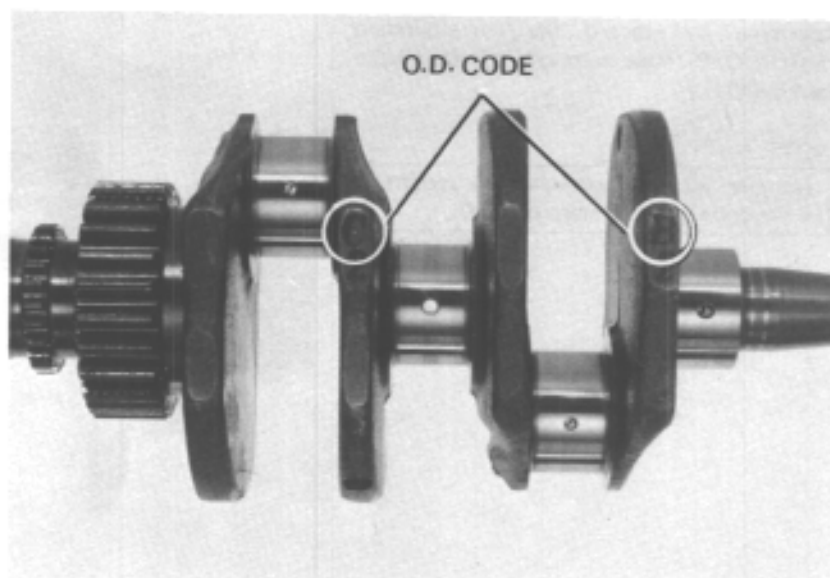




Determine and record the corresponding main journal O.D. code letters (or measure the main journal O.D.).

**NOTE**

Letter A, B or C on each crank weight is the adjacent the code for main journal O.D.

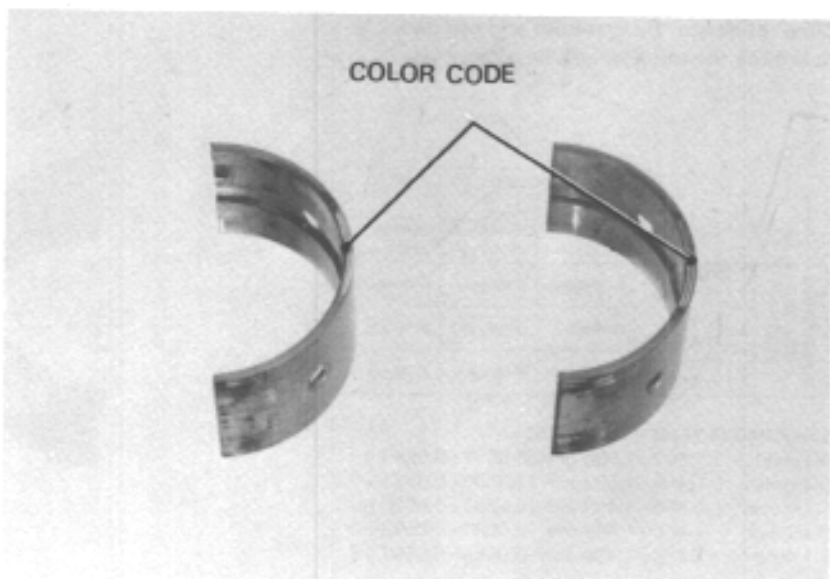


Cross reference the case and journal codes to determine the replacement bearing.

		MAIN JOURNAL O.D. CODE NO.		
		A	B	C
		35.992– 36.000 mm	35.984– 35.992 mm	35.975– 35.984 mm
CASE I.D. CODE NO.	A	39.000– 39.008 mm	D (Yellow)	C (Green)
	B	39.008– 39.016 mm	C (Green)	B (Brown)
	C	39.016– 39.024 mm	B (Brown)	A (Black)
			A (Black)	E (Blue)

**MAIN BEARING INSERT THICKNESS:**

A (Black) : 1.498–1.502 mm (0.0590–0.0591 in)  
 B (Brown) : 1.494–1.498 mm (0.0588–0.0590 in)  
 C (Green) : 1.490–1.494 mm (0.0587–0.0588 in)  
 D (Yellow) : 1.486–1.490 mm (0.0585–0.0587 in)  
 E (Blue) : 1.502–1.506 mm (0.0591–0.0593 in)

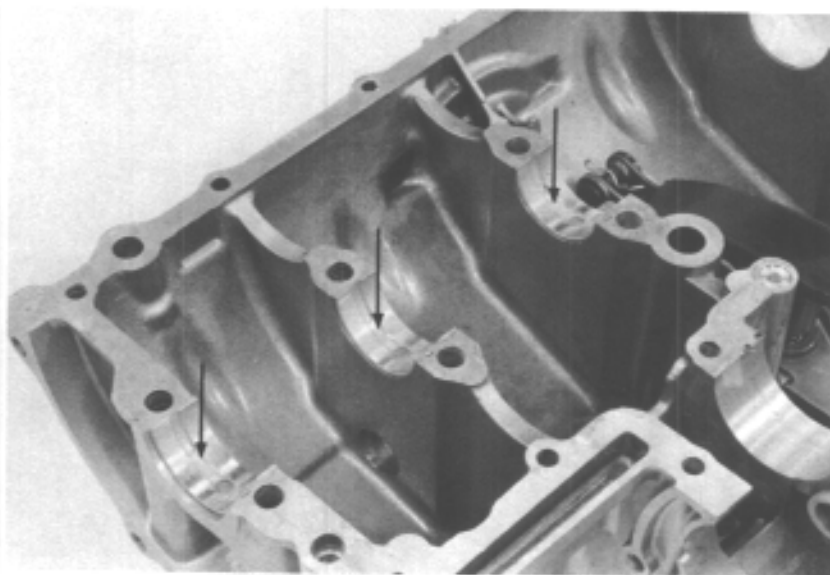


## CONNECTING ROD INSTALLATION

Install the main bearings into the upper crankcase.

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

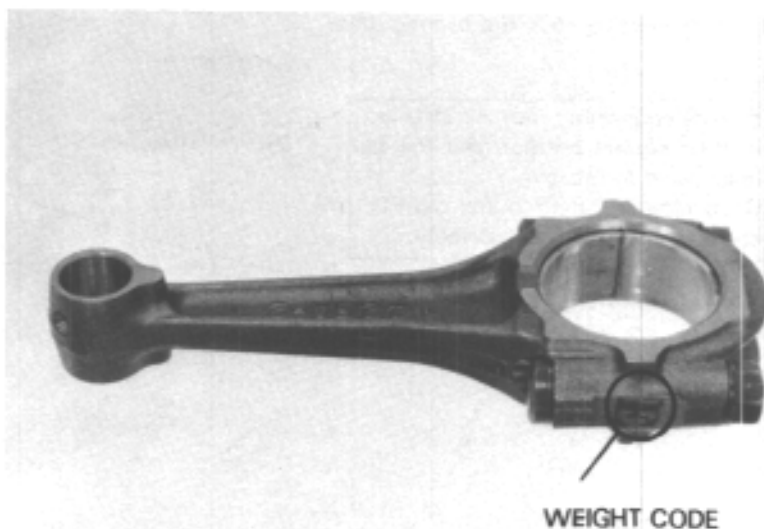
Install the crankshaft with the cam chain and primary chain.



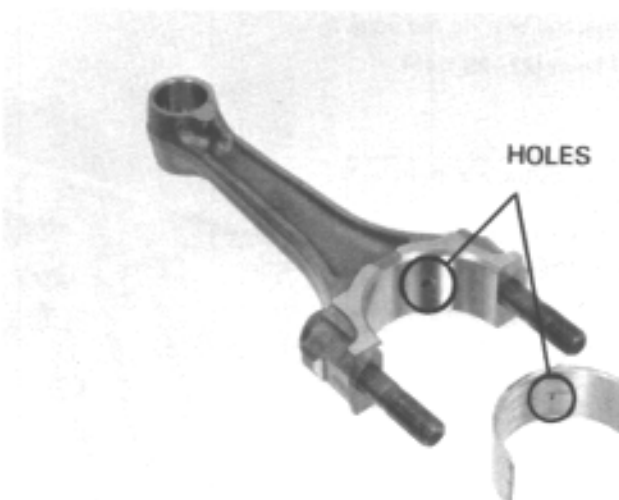


Before installing the connecting rods, make sure that the weight code combination is properly made:

Factory set code	Available code
A	→ B
B	→ B
C	→ D
D	→ D
E	→ D
F	→ F
G	→ F

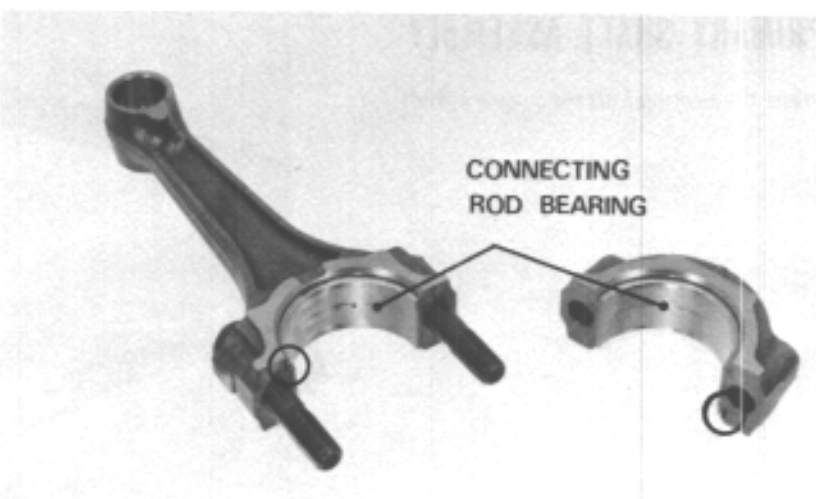


Align the hole in the bearing insert with the hole in the connecting rod.



Install the connecting rod and cap bearing inserts.

Apply molybdenum disulfide grease to the connecting rod bearings.



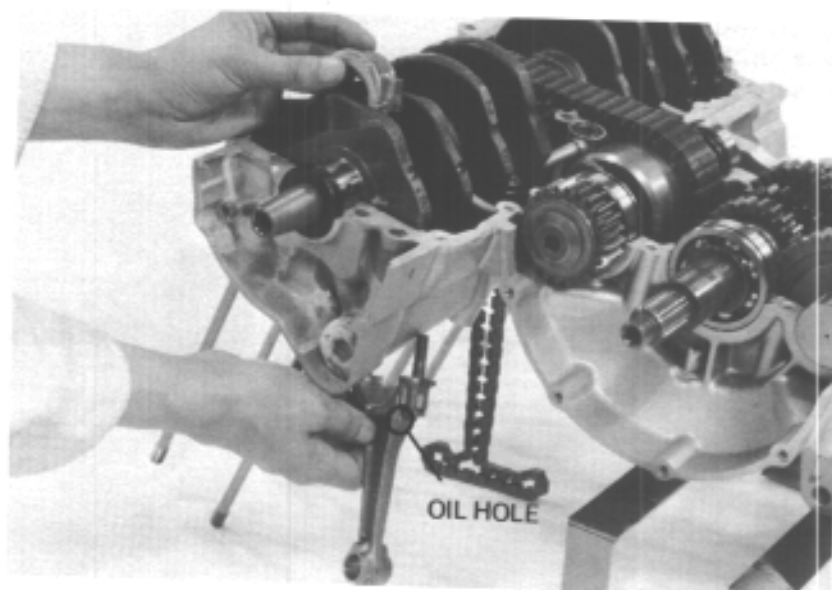




Install the connecting rods and bearing caps.

**NOTE**

- Be sure connecting rods are installed in their correct position and the oil holes point to the rear.
- Cross reference the rod and cap I.D. codes to insure original assembly.

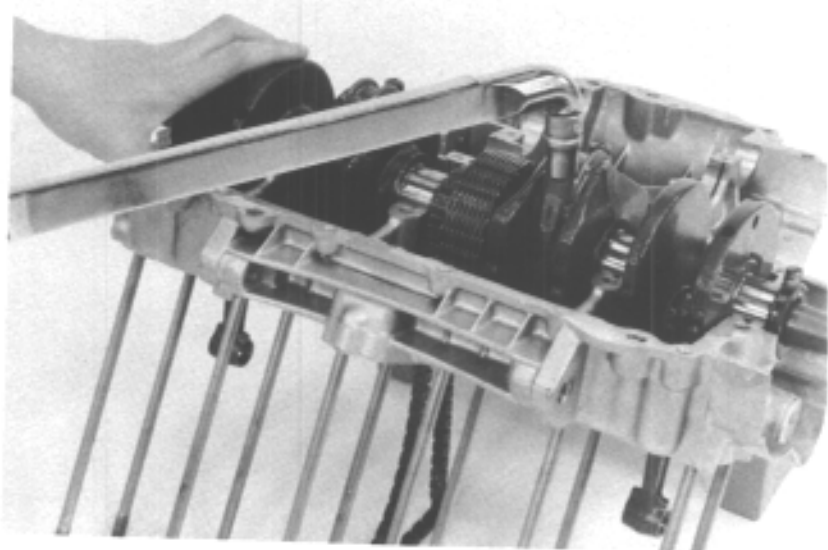


Tighten the connecting rod bearing cap bolts.

**TORQUE:** 3.0–3.4 kg-m (22–25 ft-lb)

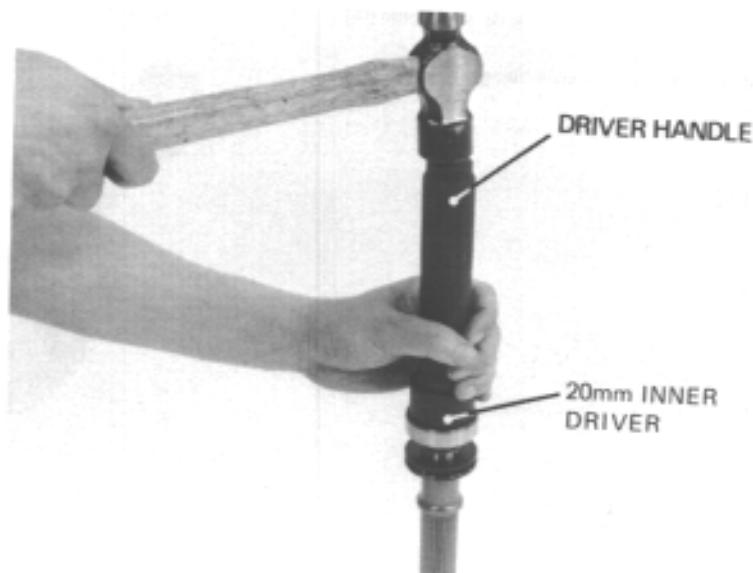
**NOTE**

- Tighten the rod bearing cap bolts in two or more steps.
- After tightening the bolts, check that the rod moves freely without binding.



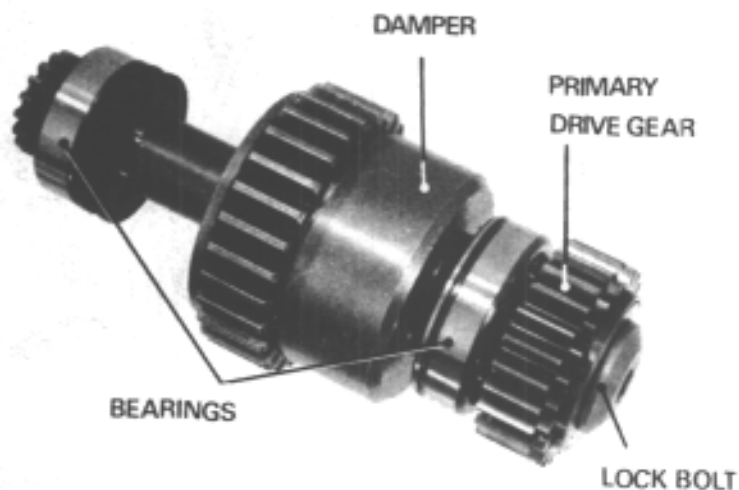
## PRIMARY SHAFT ASSEMBLY

Insert the bearing into the primary shaft.



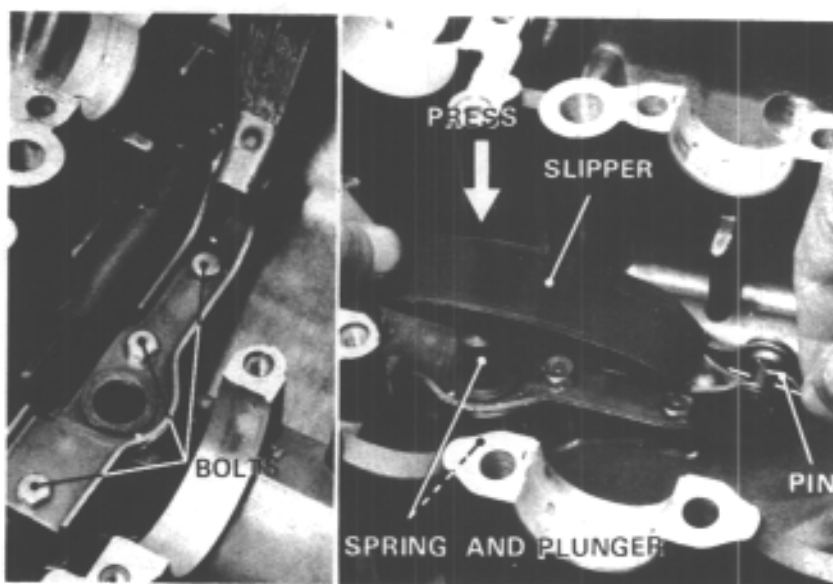


Install the damper and bearings.  
Tighten the lock bolt (Section 8).

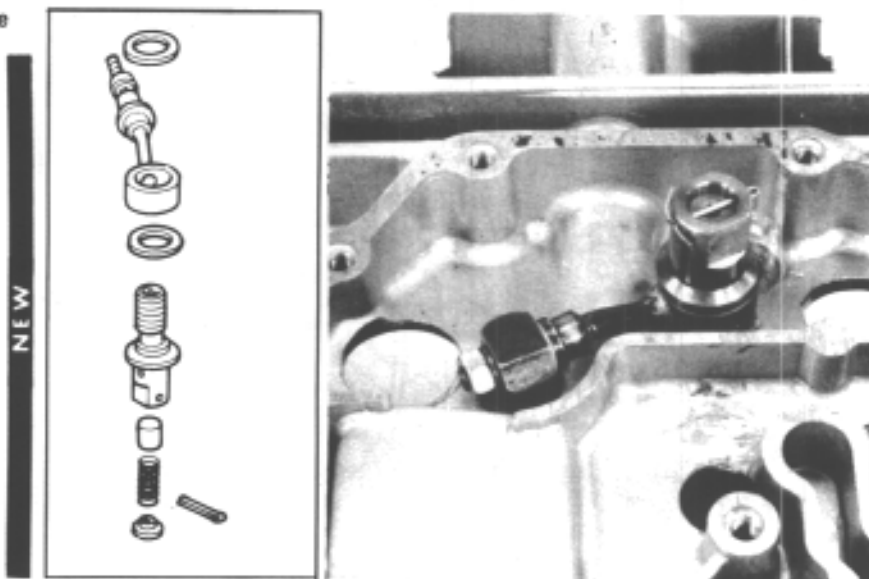


### PRIMARY CHAIN TENSIONER ASSEMBLY

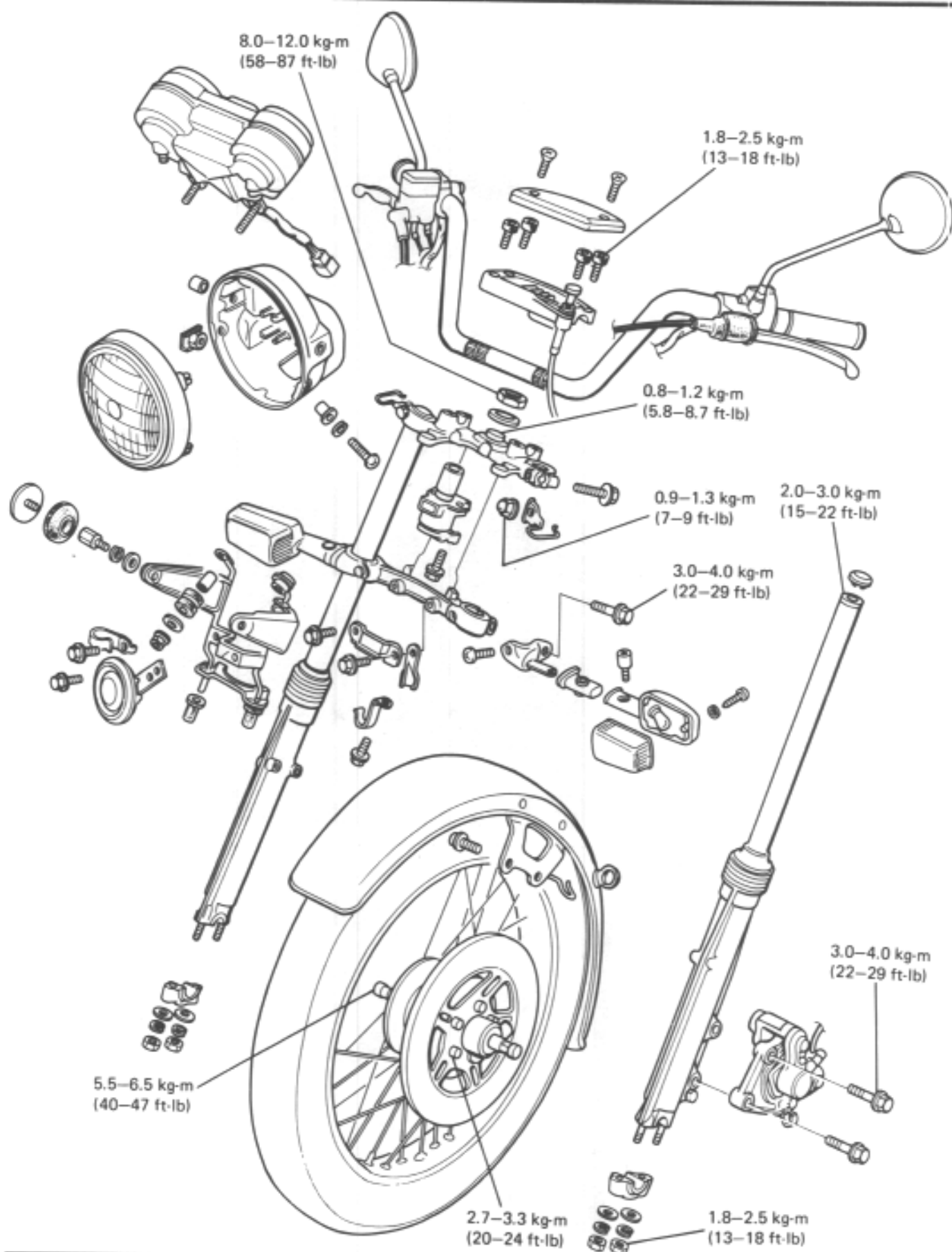
Install the slipper base.  
Tighten the bolts securely.  
Insert the spring and plunger.  
Press the slipper down and install the pin.



Install the fluid valve and oil line. Tighten the nut.  
Insert the spring and plunger.









SERVICE INFORMATION	13-1
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FRONT WHEEL	13-14
FRONT FORK	13-19
STEERING STEM	13-25

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

A jack or other support is required to support the motorcycle.  
 Never ride on the rim or try to bend the wheel.

### SPECIAL TOOLS

#### Special Tools

Steering Stem Socket	07916-3710100
Hollow Set Wrench (6 mm)	07917-3230000
Bearing Race Remover	07946-3710500
Steering Stem Driver	07946-3710600
Bearing Driver Attachment	07946-3710700
Bearing driver	07947-6340000
Steering Stem Driver	07953-4250000

#### Common Tools

Retainer Wrench (B)	07710-0010200
Retainer Wrench Body	07710-0010400
Bearing Driver Outer (42 x 47 mm)	07746-0010300
Bearing Driver Pilot (15 mm)	07746-0040300
Front Fork Oil Seal Driver Body	07747-0010100
Front Fork Oil Seal Attachment (E)	07747-0010600
Lock Nut Wrench Socket (30 x 32)	07716-0020400
Bearing Driver Handle (A)	07749-0010000
Extension Bar	07716-0020500

### TORQUE VALUES

Front brake disc	2.7- 3.3 kg-m (20-24 ft-lb)
Front axle nut	5.5- 6.5 kg-m (40-47 ft-lb)
Front caliper carrier	3.0- 4.0 kg-m (22-29 ft-lb)
Front axle holder nut	1.8- 2.5 kg-m (13-18 ft-lb)
Front fork cap bolt	2.0- 3.0 kg-m (15-22 ft-lb)
Handlebar mounting bolt	1.8- 2.5 kg-m (13-18 ft-lb)
Fork bottom bridge	3.0- 4.0 kg-m (22-29 ft-lb)
Fork top bridge	0.9- 1.3 kg-m ( 7- 9 ft-lb)
Steering bearing adjustment nut	10.0-12.0 kg-cm (0.7-1.4 ft-lb./ 9-17 in-lb)
Steering stem nut	8.0-12.0 kg-m (58-87 ft-lb)

### SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle shaft runout		—	0.2 mm ( 0.01 in)
Front wheel rim runout	Radial	—	2.0 mm ( 0.08 in)
	Axial	—	2.0 mm ( 0.08 in)
Fork spring free length		507.8 mm (20.0 in)	492.6 mm (19.4 in)
Tube bend		—	0.2 mm ( 0.01 in)
Front fork slider I.D.		35.042-35.104 mm (1.3796-1.3820 in)	35.15 mm ( 1.384 in)
Front fork tube O.D.		34.93 mm-34.95 mm (1.3752-1.3760 in)	34.90 mm ( 1.374 in)
Front fork oil capacity		172.5-177.5 cc (5.8-6.0 ozs) after assembly 155 cc (5.2 ozs) at oil change	—



## **TROUBLE SHOOTING**

### **Hard steering**

1. Steering stem nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem bearings
4. Insufficient tire pressure

### **Steers to one side or does not track straight**

1. Unevenly adjusted right and left shock absorbers
2. Bent front forks
3. Bent front axle; wheel installed incorrectly

### **Front wheel wobbling**

1. Distorted rim
2. Worn front wheel bearing
3. Faulty tire
4. Axle not tightened properly

### **Soft suspension**

1. Weak fork spring
2. Insufficient fluid in front forks

### **Hard suspension**

1. Incorrect fluid weight in front forks

### **Front suspension noise**

1. Slider binding
2. Insufficient fluid in forks
3. Loose front fork fasteners
4. Lack of grease in speedometer gear box



## HEADLIGHT

### HEADLIGHT CASE REMOVAL

Remove the headlight and disconnect all wires at their couplers and connectors.

To remove the headlight case, unscrew the headlight case mounts.

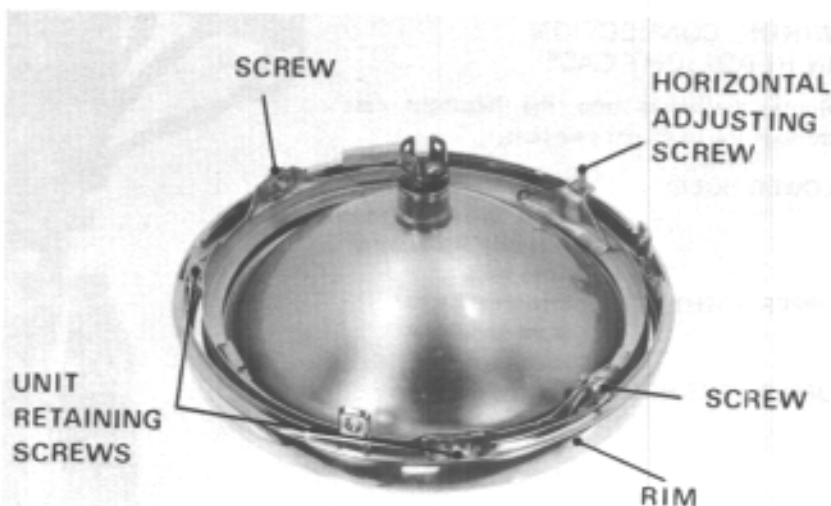


### HEADLIGHT DISASSEMBLY/ASSEMBLY

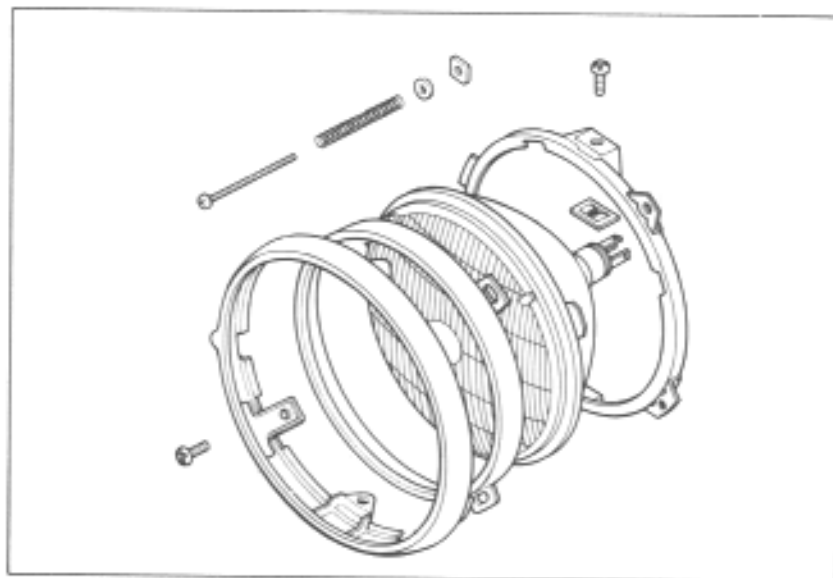
Remove the retaining screws and horizontal adjusting screw from the rim.

Remove the two sealed beam unit retaining screws, and sealed beam unit.

Assembly is essentially the reverse of disassembly.



After assembly, adjust the headlight beam (Page 3-19).



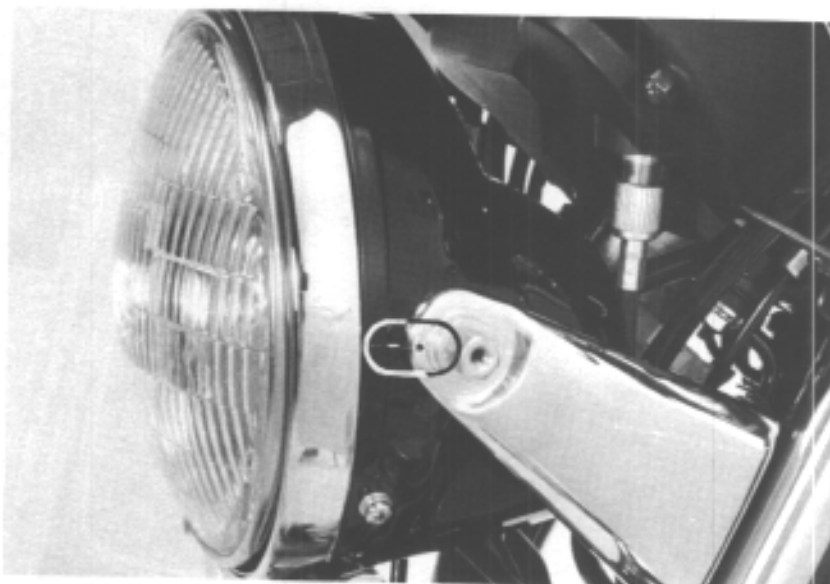


## HEADLIGHT CASE INSTALLATION

Align the index marks on the headlight case with the punch marks on the brackets.

### NOTE

Check each component for operation after assembling



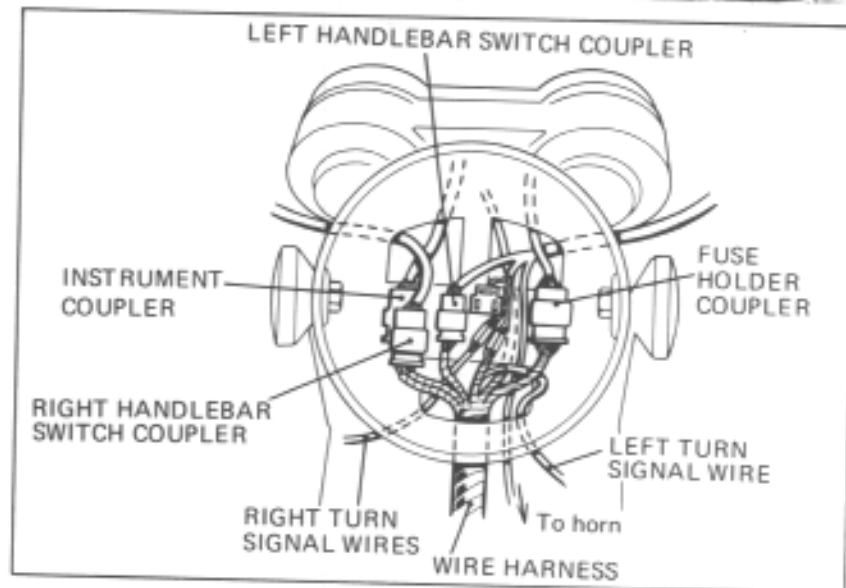
## WIRING CONNECTION IN HEADLIGHT CASE

Route the wires into the headlight case through the headlight case hole.

- |                   |  |
|-------------------|--|
| LOWER HOLE:       | Main wire harness<br>Right turn signal wires<br>Left turn signal wires<br>Horn wires |
| UPPER RIGHT HOLE: | Instrument wires<br>Right handlebar switch wires                                     |
| UPPER LEFT HOLE:  | Fuse holder wires<br>Left handlebar switch wires                                     |

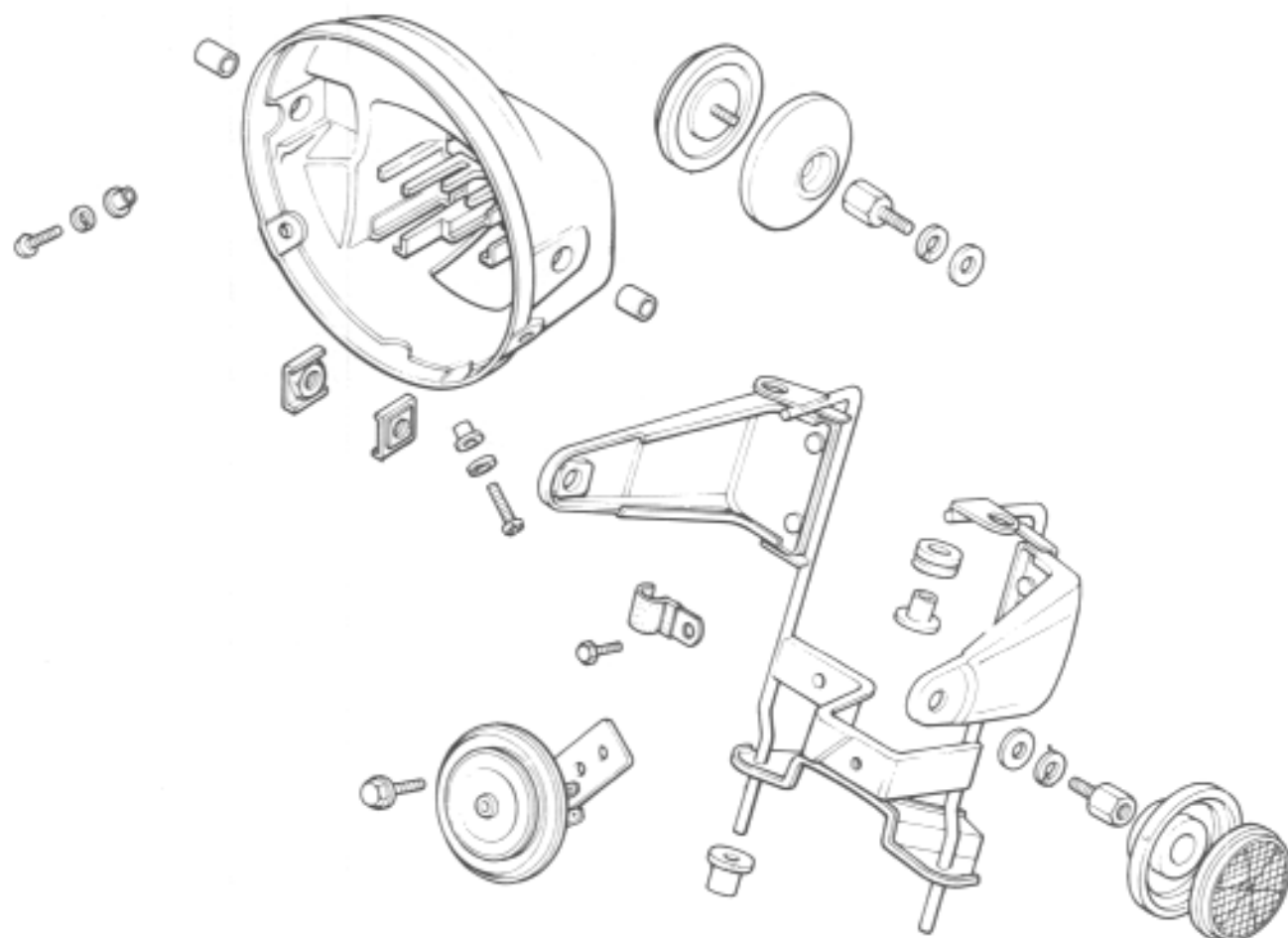


Connect the color-coded wires and couplers.





### HEADLIGHT CASE BRACKET DISASSEMBLY/ASSEMBLY



Remove the headlight and disconnect all wires and wire couplers inside the case.  
Disconnect the brake hose from the front brake master cylinder.

#### NOTE

Avoid spilling fluid on painted surfaces.  
Place a rag over the fuel tank whenever the brake hose is disconnected.

Remove the instruments.  
Disconnect the throttle, clutch and choke cables at the handlebar.  
Remove the main harness clamp.  
Remove the headlight case bracket.





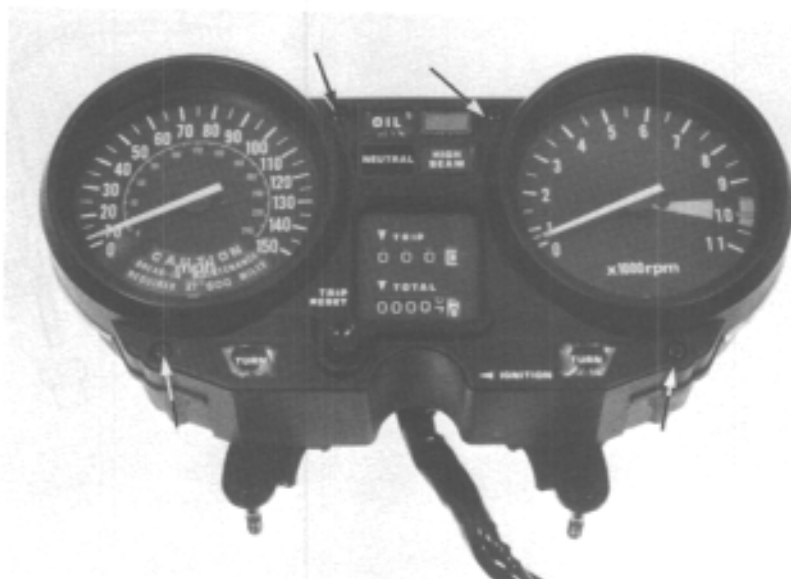
## INSTRUMENTS

### DISASSEMBLY

Remove the headlight.  
 Disconnect the instrument wire connectors in the headlight case.  
 Remove the speedometer and tachometer cables from the instruments.  
 Remove the instrument mounting nuts and instruments.



Remove the four screws and instrument cover.



Remove the instrument lamp bulbs.

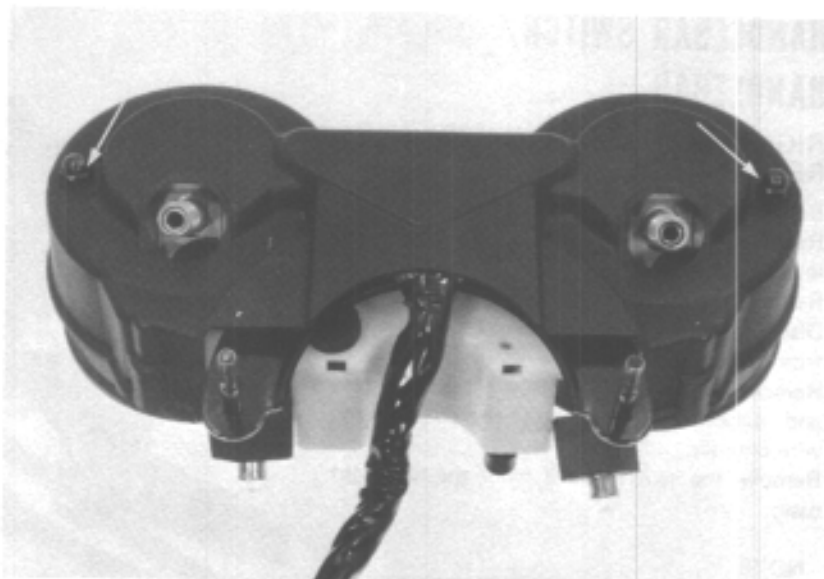




Remove the lower instrument case by removing two cap nuts.

### CAUTION

*Do not leave the instrument upside down or damping fluid leakage may occur.*

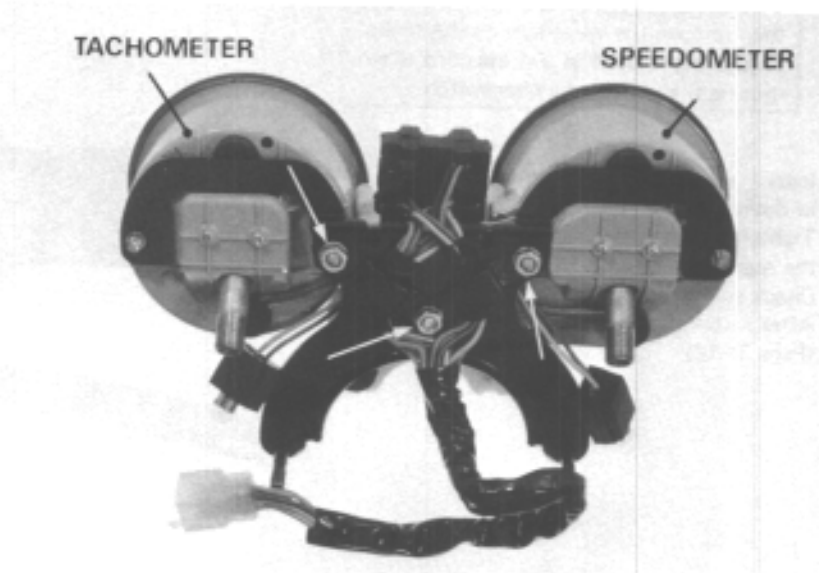


Separate the speedometer and tachometer from the mounting bracket by removing the three nuts.

Check the meter cable if the needle swings abnormally.

TACHOMETER

SPEEDOMETER



### ASSEMBLY

After installing a new bulb, check for continuity. If the bulb does not light, inspect the wiring for open or short circuits.

Lubricate the speedometer and tachometer cables before reconnecting.





## HANDLEBAR SWITCH/ HANDLEBAR

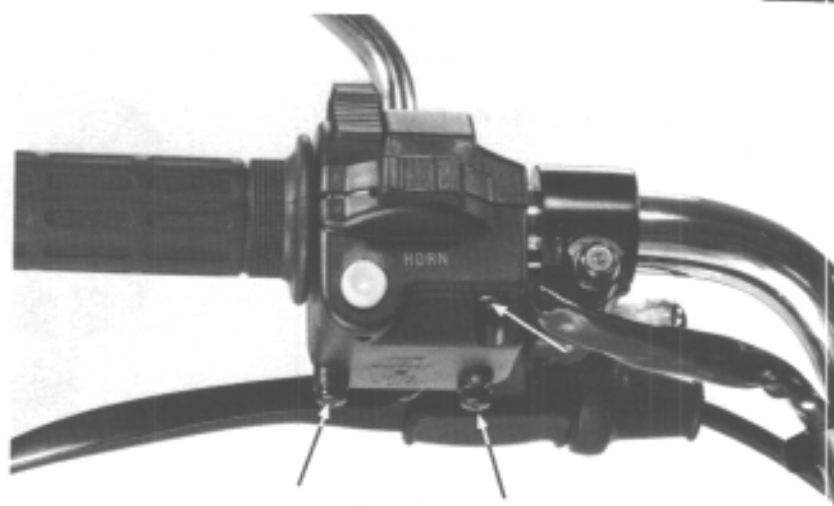
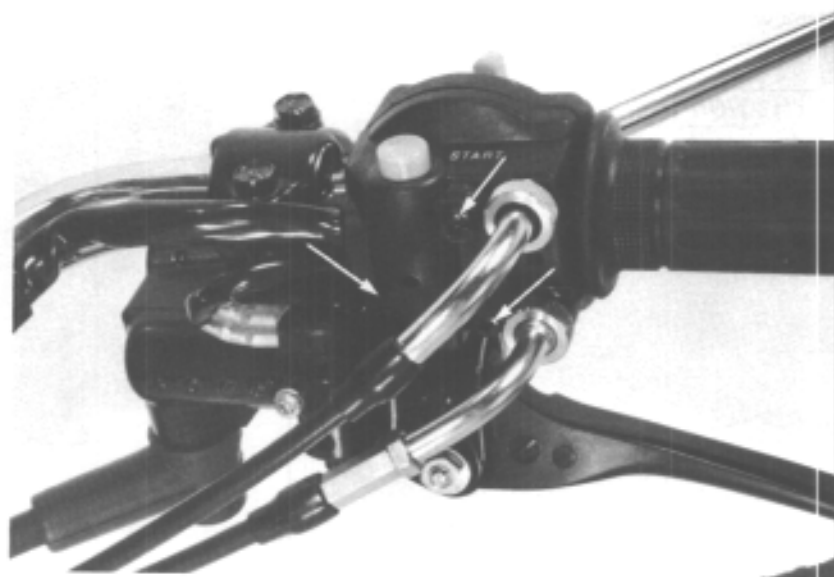
### RIGHT HANDLEBAR SWITCH REPLACEMENT

Remove the fuel tank.  
 Remove the screws holding the upper and lower switch housings.  
 Remove the throttle cables.  
 Disconnect the front brakelight switch wires from the switch.  
 Remove the headlight from the headlight case and disconnect the right handlebar switch wire coupler.  
 Remove the switch wires from the headlight case.

#### NOTE

Connect a string to the switch wires and then remove the wires leaving the string. This string is used as a draw cord when routing the wiring of a new switch.

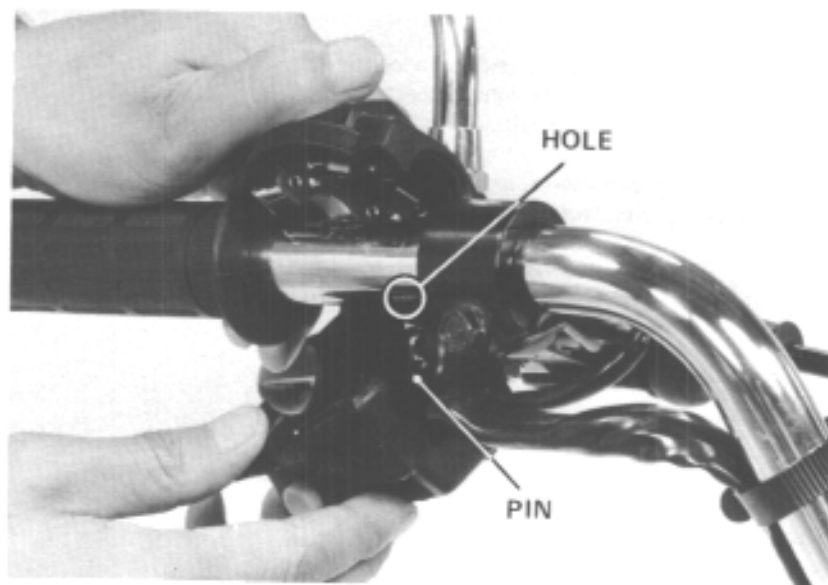
Install a new switch aligning with the hole in the handlebar.  
 Tighten the forward screw first, then tighten the rear screw.  
 Check switch operation.  
 After installing, adjust throttle cable free play. (Page 3-12)



### LEFT HANDLEBAR SWITCH REPLACEMENT

Refer to RIGHT HANDLEBAR SWITCH REPLACEMENT.

Loosen the clutch lever bracket bolt.  
 Disconnect the left handlebar switch wires.





### HANDLEBAR REMOVAL

Loosen the three screws attaching the throttle grip/switch housing.  
Remove the right handlebar switch wires from the handlebar.



Remove the brake master cylinder.

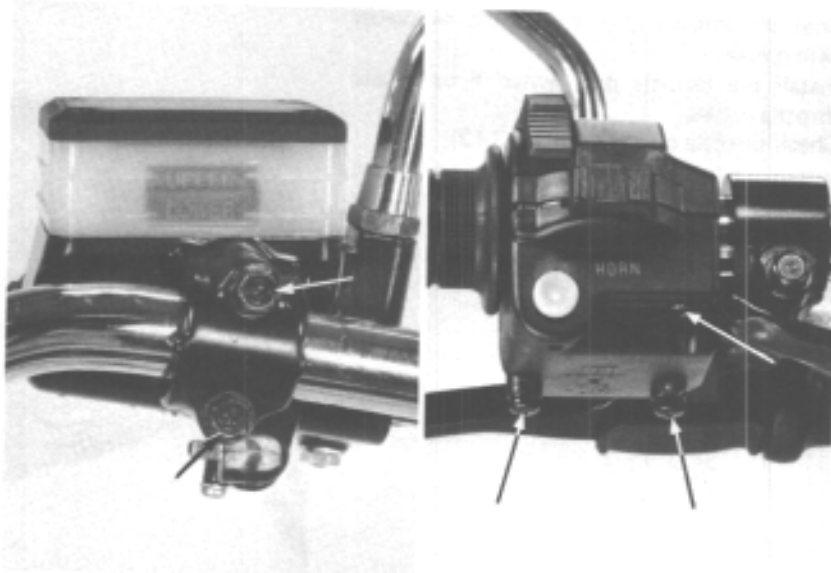
#### CAUTION

*Secure the brake cylinder in an upright position to prevent the fluid from leaking and damaging the paint and to prevent air from entering the brake system*

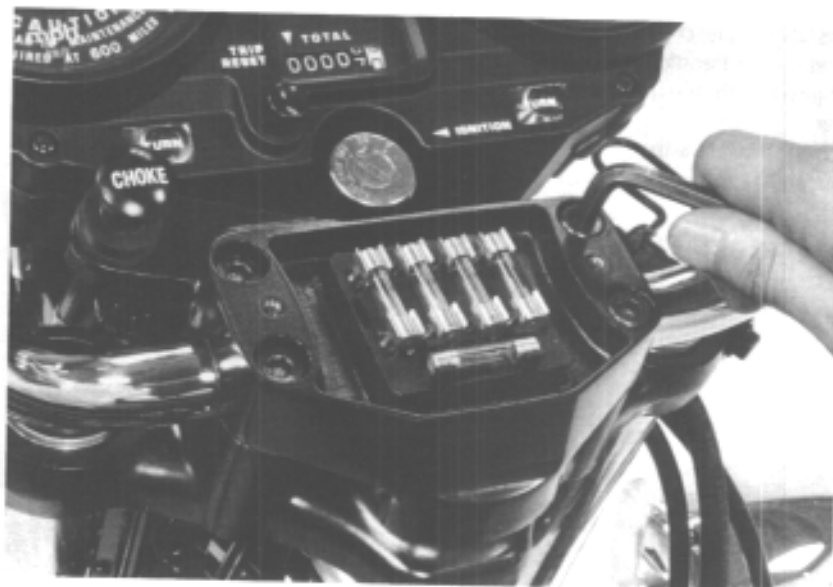
#### NOTE

*Do not loosen the brake hose unless necessary.*

Remove the left grip.  
Remove the left handlebar switch assembly.  
Loosen the clutch lever bracket bolt.  
Remove the clutch lever assembly.



Remove the handlebar upper holder.  
Remove the handlebar.  
Remove the throttle grip and switch assembly.





## HANDLEBAR INSTALLATION

### NOTE

Apply grease to the throttle grip area of the handlebar.

Position the handlebar on the fork bridge with the punch marks on the handlebar in line with the top.

Place the upper holder on the handlebar.

Tighten the forward bolts first, then the rear bolts.



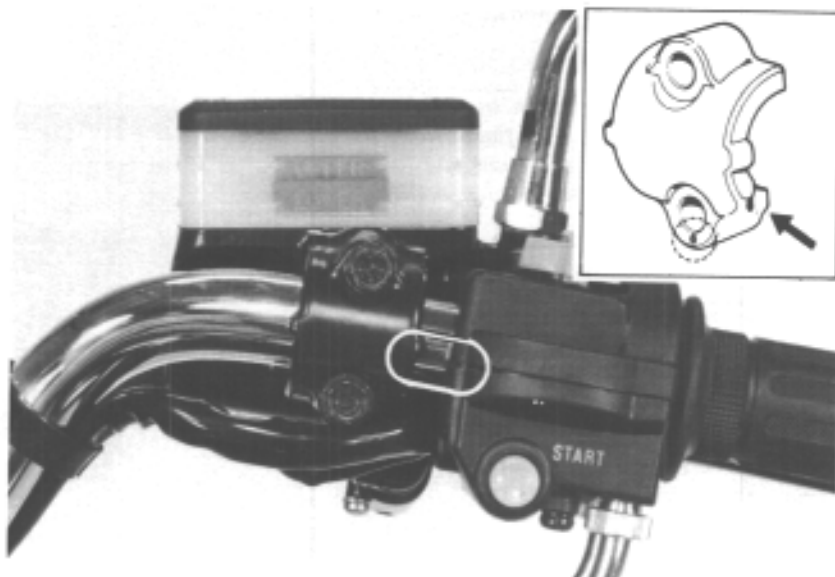
Coat the throttle grip area of the handlebar with grease.

Install the throttle grip switch housing and throttle cables.

Check throttle operation (Page 3-12).

Install the master cylinder on the handlebar. The lug of the holder with the switch case mating surface and wire relief facing down.

Tighten the upper bolt first, then tighten the lower bolt.

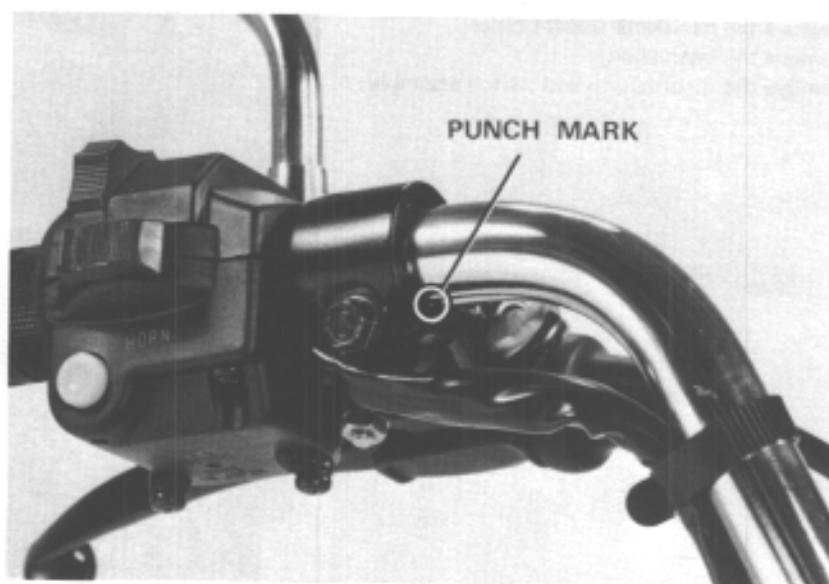


Install the clutch lever assembly.

Install the handle lever bracket with the split aligned with the punch mark on the handlebar.

Install the left grip.

Install the left switch housing.

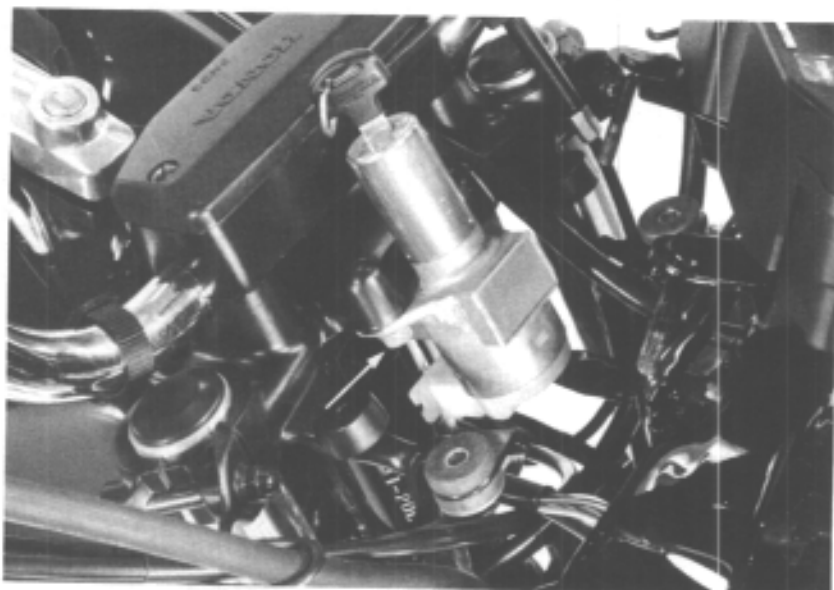




### IGNITION SWITCH REPLACEMENT

Remove the two bolts holding the instrument cluster.

Remove the bolts holding the ignition switch and disconnect the wire harness coupler.



### FUSE HOLDER REPLACEMENT

Remove the fuse cover.

Remove the handlebar upper holder.

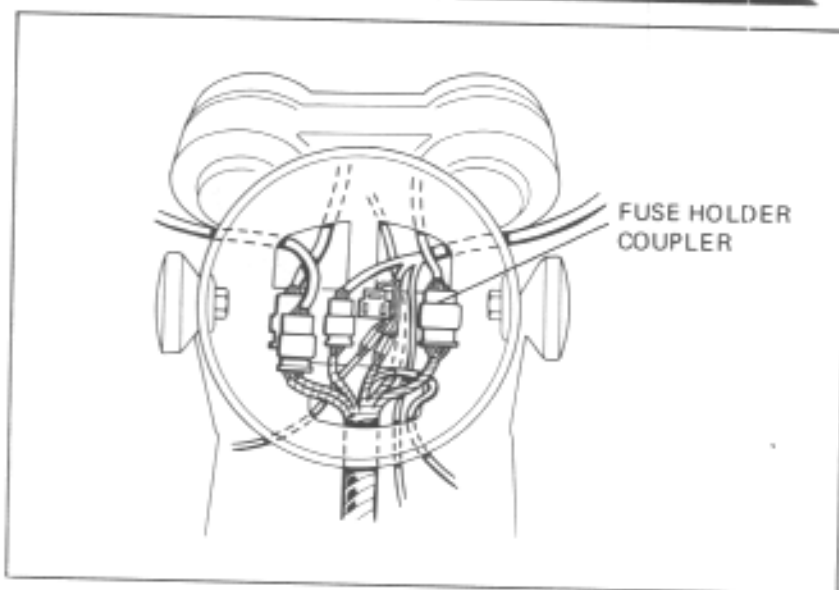
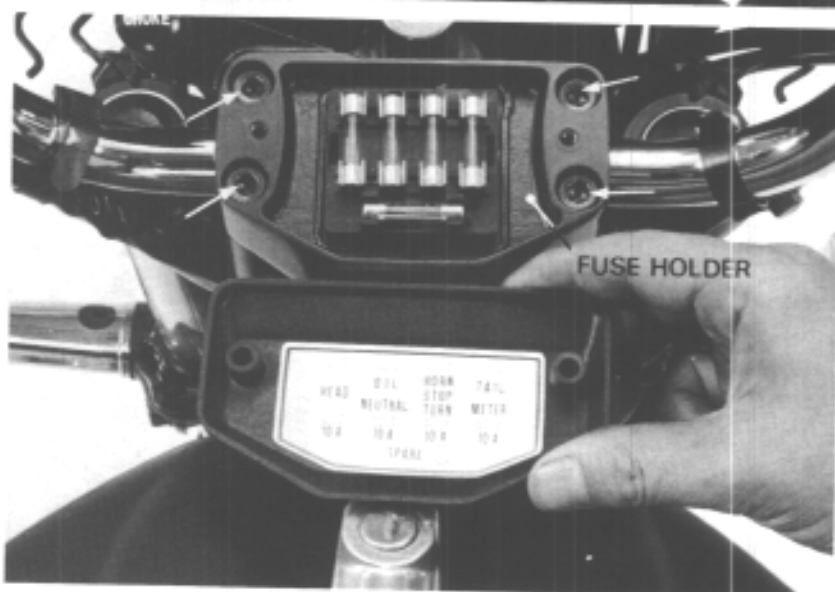
Remove the headlight.

Disconnect the wire coupler.

Remove the fuse holder.

#### NOTE

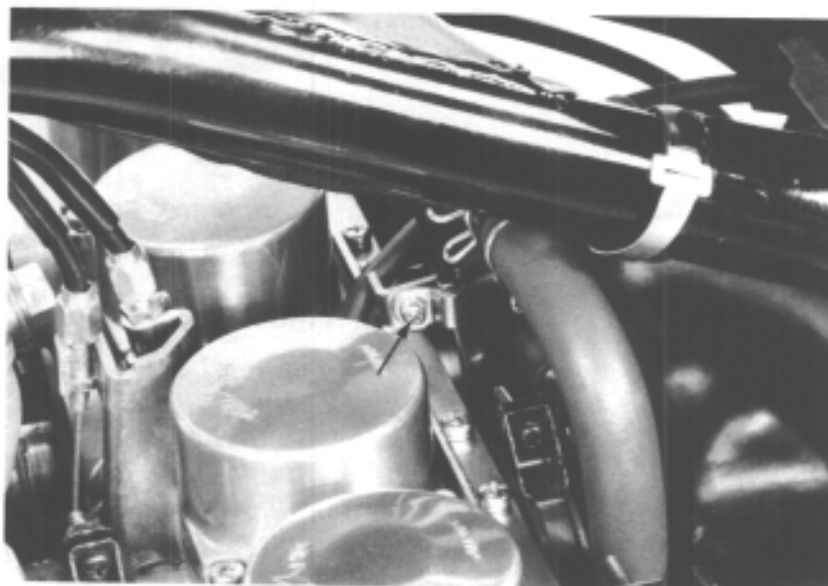
Before disconnecting the holder wires, tie a string to them. This string can be used as a draw cord when installing a new holder.





### CHOKE CABLE REPLACEMENT

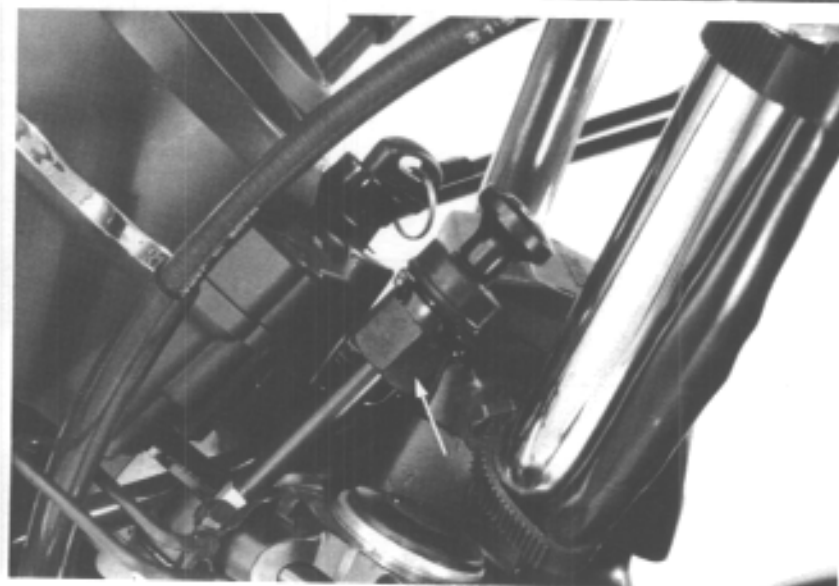
Remove the fuel tank.  
Disconnect the choke cable from the lower  
choke cable bracket.  
Remove the cable end from the choke lever.



Remove the choke cable from the choke cable  
bracket on the handlebar.

#### NOTE

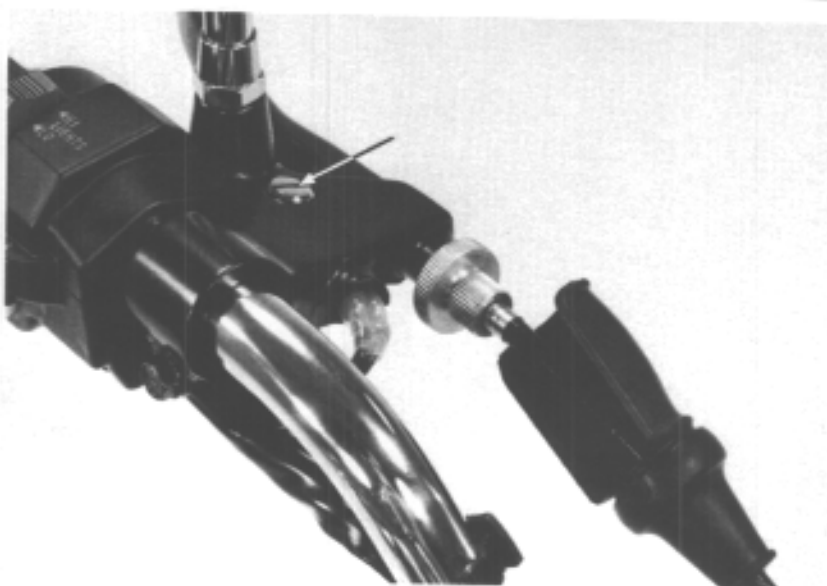
Before removing the cable, tie a string  
to the cable end. This string can be  
used as a draw cord when installing a  
new choke cable.



Lubricate choke cable.

### CLUTCH CABLE REPLACEMENT

Remove the fuel tank.  
Remove the clutch cable from the lever.





Loosen the clutch adjuster lock nuts and remove the clutch cable from the clutch lever.

**NOTE**

Before removing the clutch cable, connect a string to the end of the cable so that a new cable can be installed easily by using this string as a draw cord.

Lubricate clutch cable.

Adjust the clutch cable after replacement (Page 3-20).

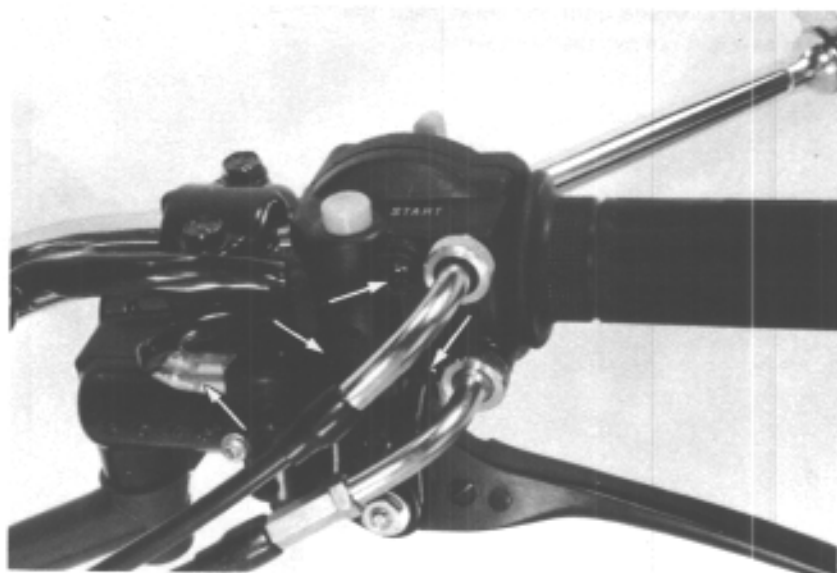


**THROTTLE CABLE REPLACEMENT**

Remove the fuel tank.

Remove the right handlebar switch/throttle housing.

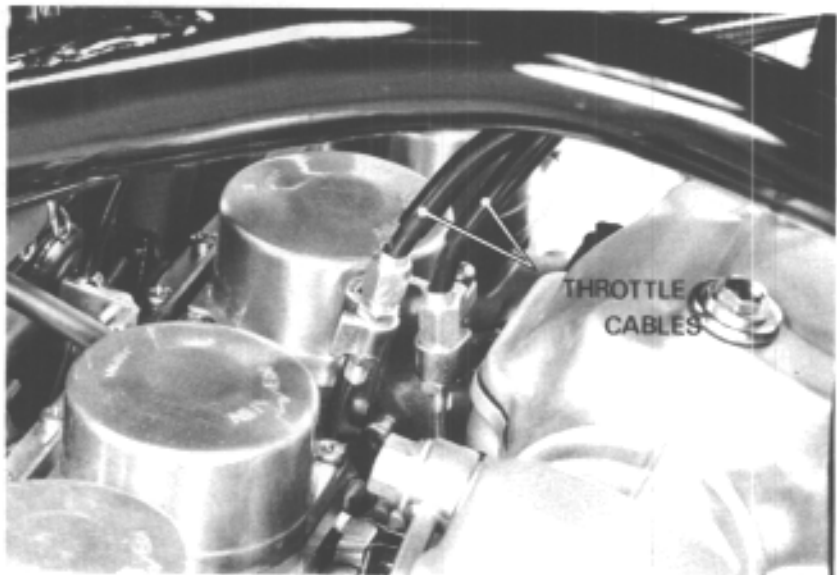
Remove the throttle cables from the throttle housing.



Remove the throttle cables from the carburetors.

Lubricate throttle cables.

Adjust throttle cable free play (Page 3-12).







## FRONT WHEEL

### FRONT WHEEL REMOVAL

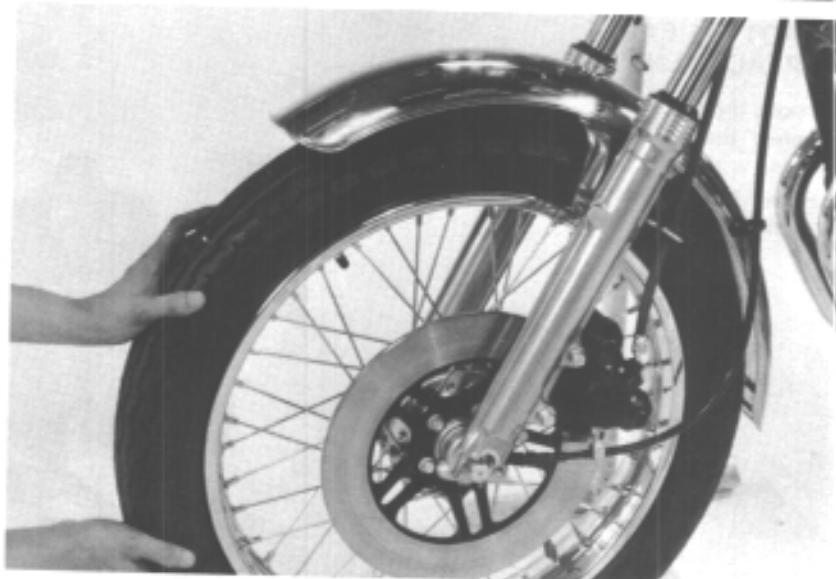
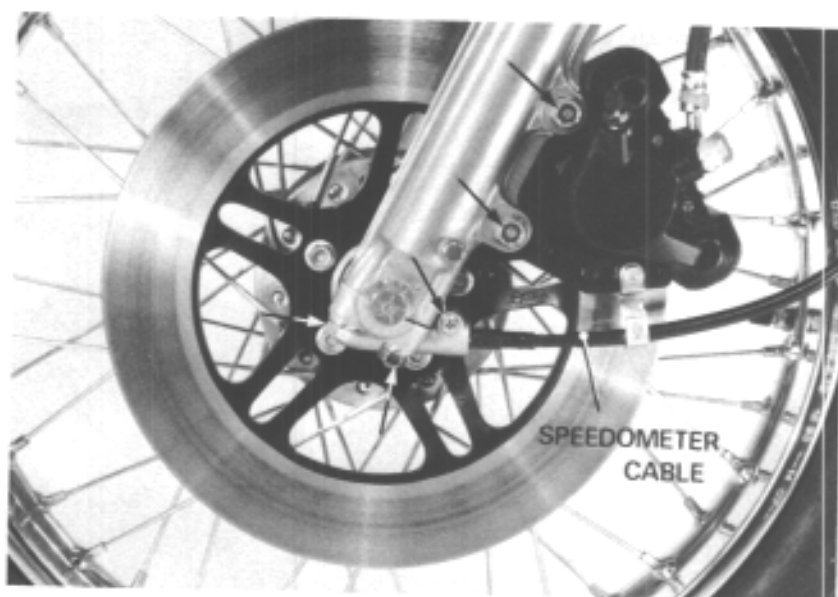
Remove the speedometer cable set screw and the speedometer cable.

#### NOTE

Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

Remove the right and left axle holders.

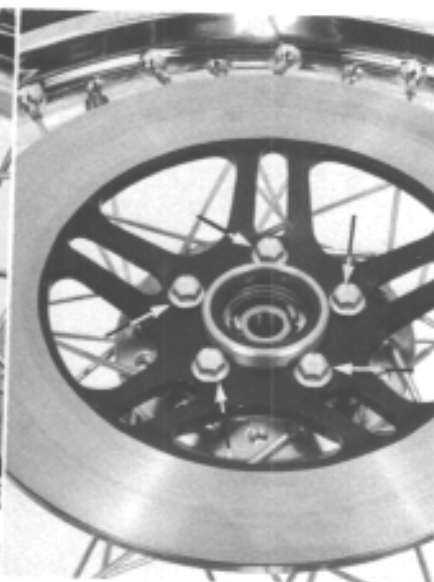
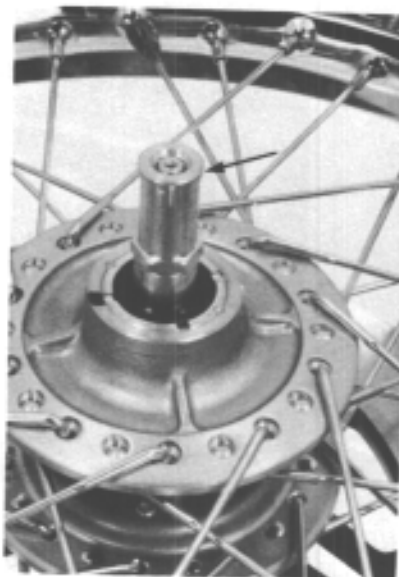
Jack up the engine until the forks clear the front axle and remove the front wheel.



### FRONT WHEEL DISASSEMBLY

Remove the axle nut, speedometer gear box, axle and collar.

Remove five bolts and disc.





Remove the retainer.  
Remove the bearings and the distance collar  
from the hub.

**NOTE**

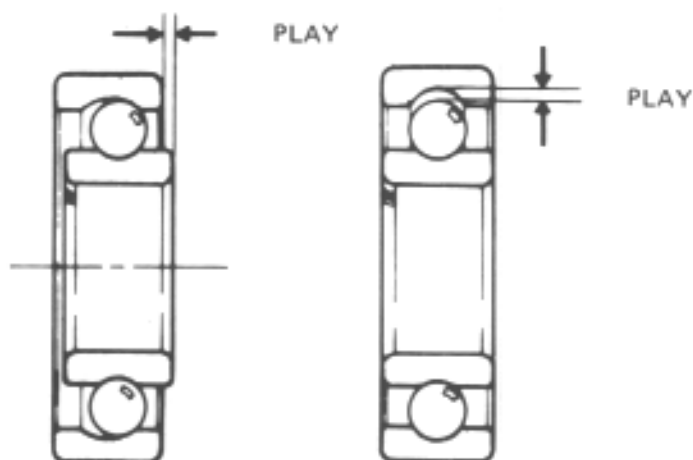
If the bearings are removed, they should  
be replaced with new ones.



**FRONT WHEEL INSPECTION**

**WHEEL BEARING:**

Check wheel bearing play by placing the  
wheel in a truing stand and spinning the wheel  
by hand. Replace the bearings with new ones  
if they are noisy or have excessive play.



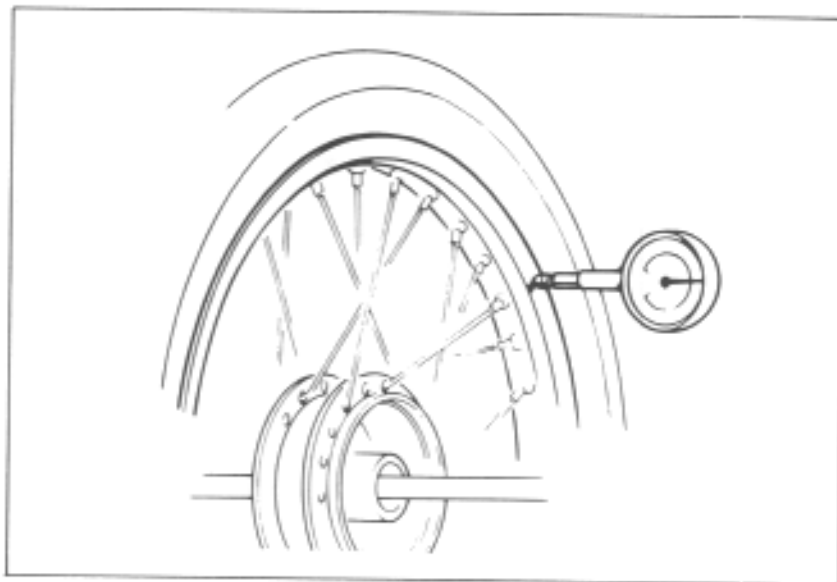
**WHEEL INSPECTION**

Check rim runout by placing the wheel in a  
truing stand. Spin the wheel slowly and read  
the runout using a dial indicator gauge.

**SERVICE LIMITS:**

**RADIAL RUNOUT:** 2.0 mm (0.08 in)

**AXIAL RUNOUT:** 2.0 mm (0.08 in)



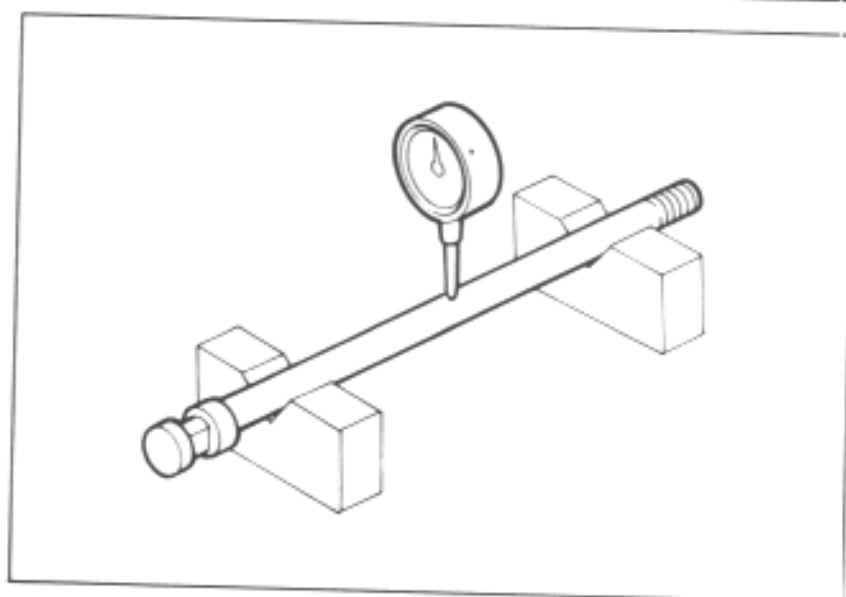




### AXLE INSPECTION

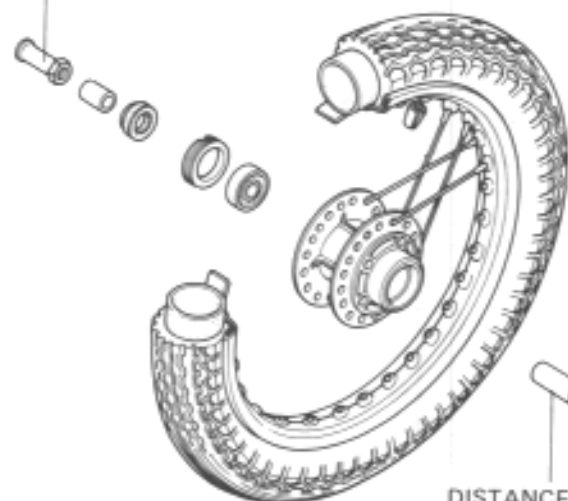
Set the axle in V blocks and measure the runout. The actual runout is 1/2 of TIR (Total Indicator Reading).

**SERVICE LIMIT: 0.2 mm (0.01 in)**



### FRONT WHEEL ASSEMBLY

5.5–6.5 kg-m (40–47 ft-lb)



BEARING

DISTANCE  
COLLAR

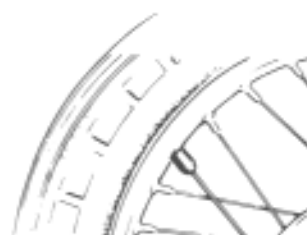
BEARING  
RETAINER



SPEEDOMETER

2.7–3.3 kg-m (20–24 ft-lb)

Balance weight installation



Align the balance mark with the tire valve.



Pack all bearing cavities with grease.  
Drive in the right bearing first.  
Press the distance collar into place.

### NOTE

Be certain the distance collar is in position before installing the bearings.

Drive in the left bearing.

### NOTE

- Drive the bearing squarely.
- Drive the bearing into position, making sure that it is fully seated and that the sealed side is facing out.

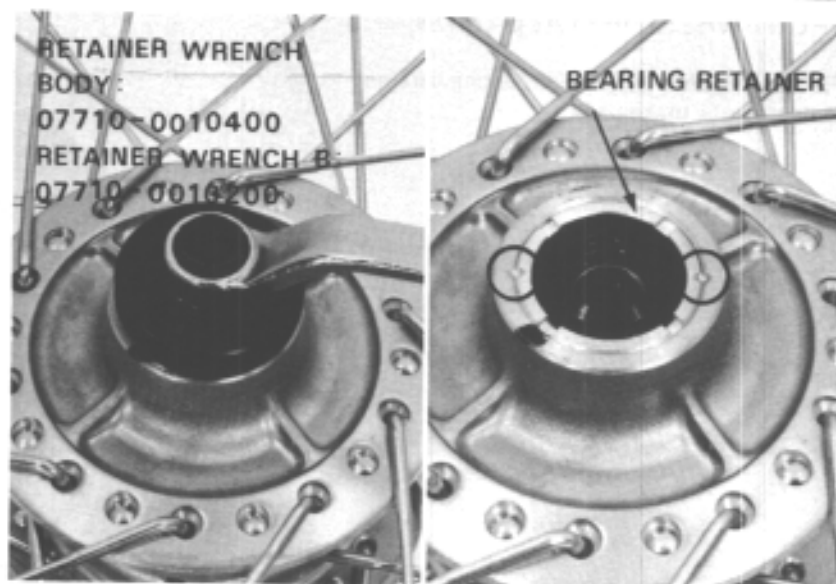
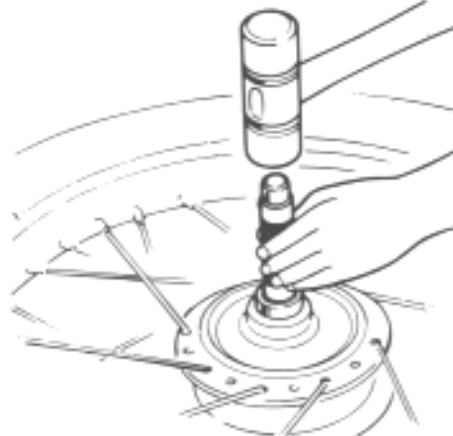
Install the bearing retainer with the tool used to remove it.

### NOTE

Inspect the retainer. If the threads are damaged, it should be replaced.

Install the seal and the bearing retainer and peen the edge of the retainer.

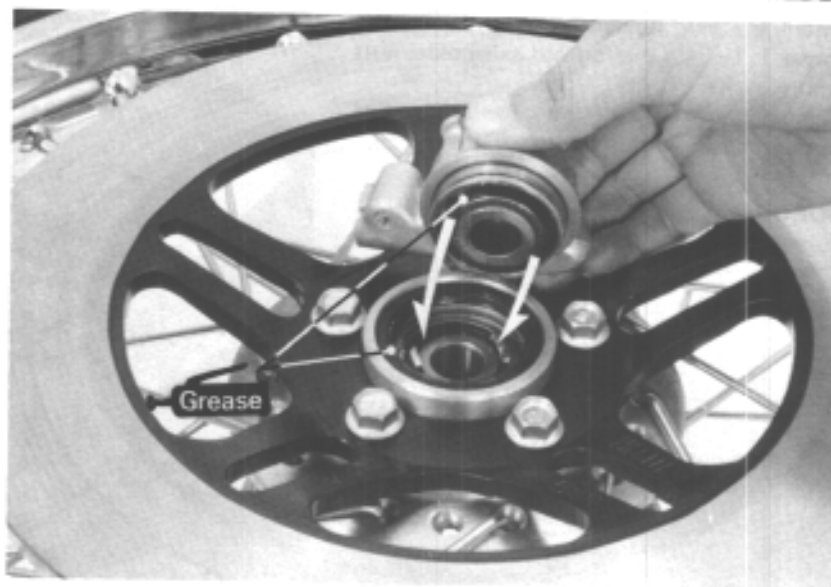
BEARING DRIVER HANDLE (A): 07749-0010000  
BEARING DRIVER OUTER (42 x 47 mm): 07746-0010300  
BEARING DRIVER PILOT (15 mm): 07746-0040300



Install the speedometer gear retainer.  
Lubricate the inside of the oil seal and install it.

Remove the speedometer drive gear from the gear box. Wipe old grease off, check the sliding surfaces for wear or damage. Replace the drive gear and/or gear box if necessary. Fill the gear box with grease and install the drive gear.

Install the speedometer gear in the wheel hub, aligning the tangs with the slots.





Install the disc and disc bolts.

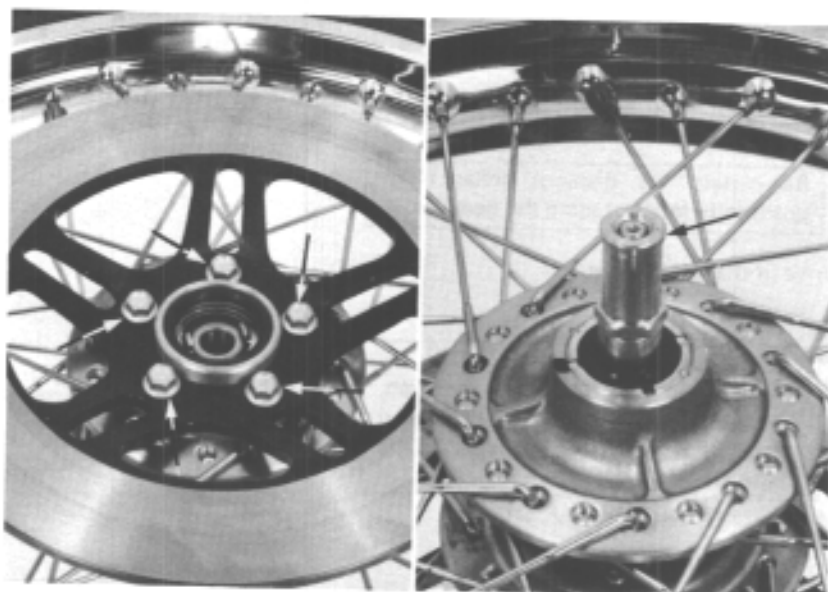
**TORQUE: 2.7–3.3 kg-m (20–24 ft-lb)**

Install the left side collar and axle.

Install the axle nut.

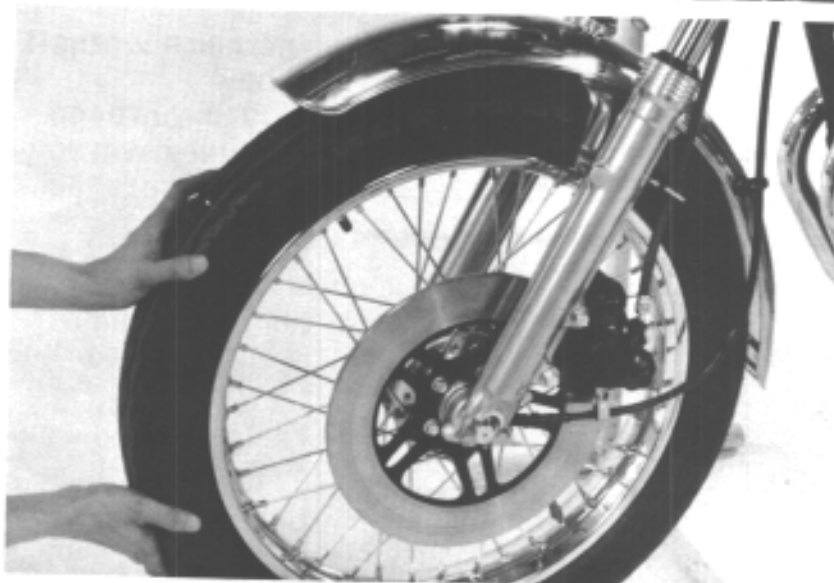
**TORQUE: 5.5–6.5 kg-m (40–47 ft-lb)**

Clean the brake disc with a high quality degreasing agent.



### FRONT WHEEL INSTALLATION

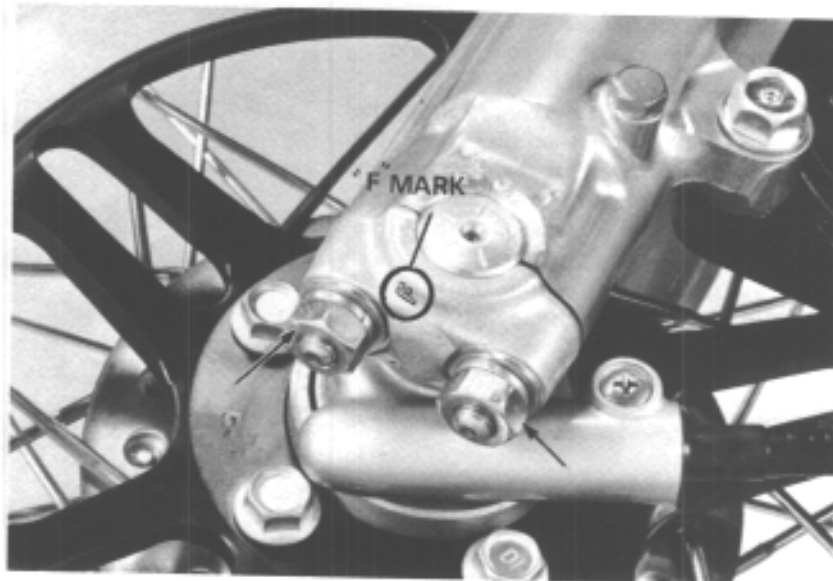
Fit the calipers over the disc, taking care not to damage the brake pads.



Install the axle holders with the "F" arrow forward. Tighten the forward axle holder nuts lightly.

Tighten the axle holder nuts to the specified torque, starting with the forward nuts.

**TORQUE: 1.8–2.5 kg-m (13–18 ft-lb)**





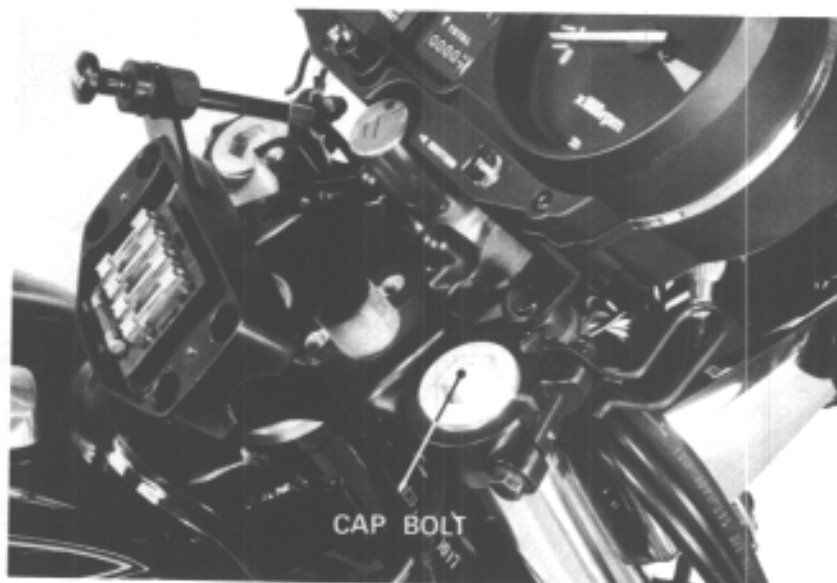
## FRONT FORK

### FRONT FORK OIL CHANGE

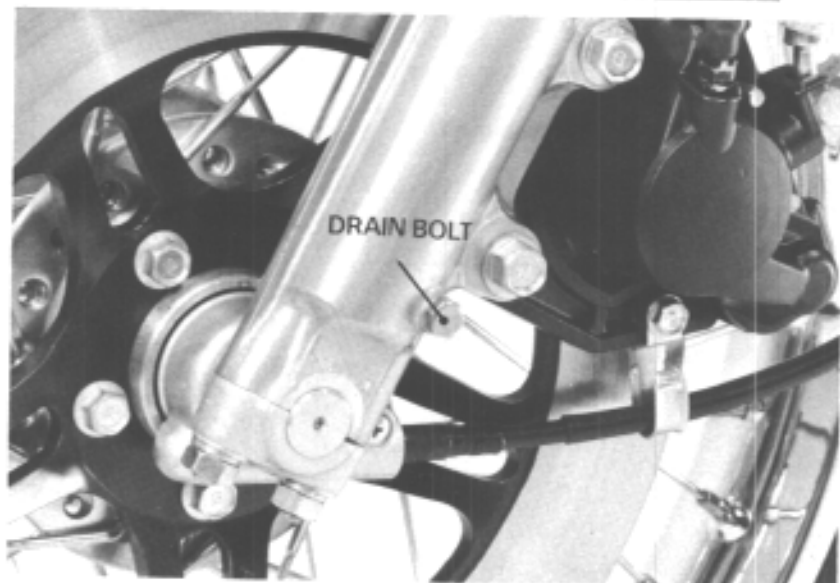
Remove the handlebar and cap bolt.  
Place a pan below the fork, remove the drain plug and allow the fork oil to drain.  
Compress the suspension to completely drain the fork.

Refill the fork, page 13-23.

REFILL CAPACITY: 155 cc (5.2 ozs)



Repeat this operation for the remaining fork leg.



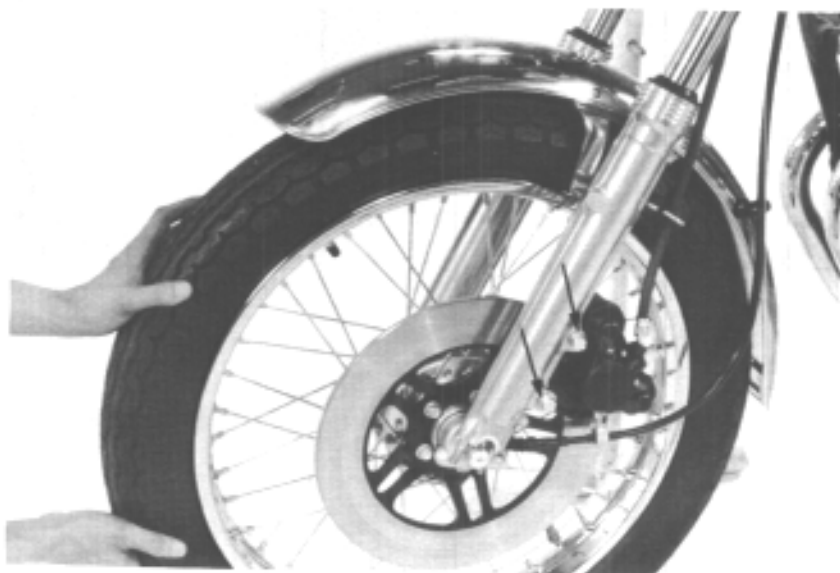
### FORK REMOVAL

Remove the front wheel.  
Remove the brake caliper.

#### NOTE

Do not loosen the brake hose unless necessary.

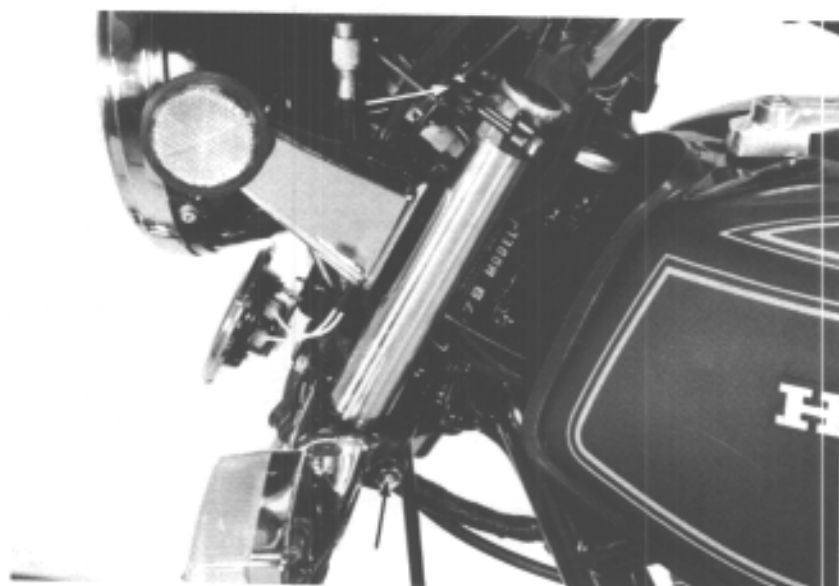
Remove the front fender.




**NOTE**

Loosen the fork cap bolt to facilitate disassembly later.

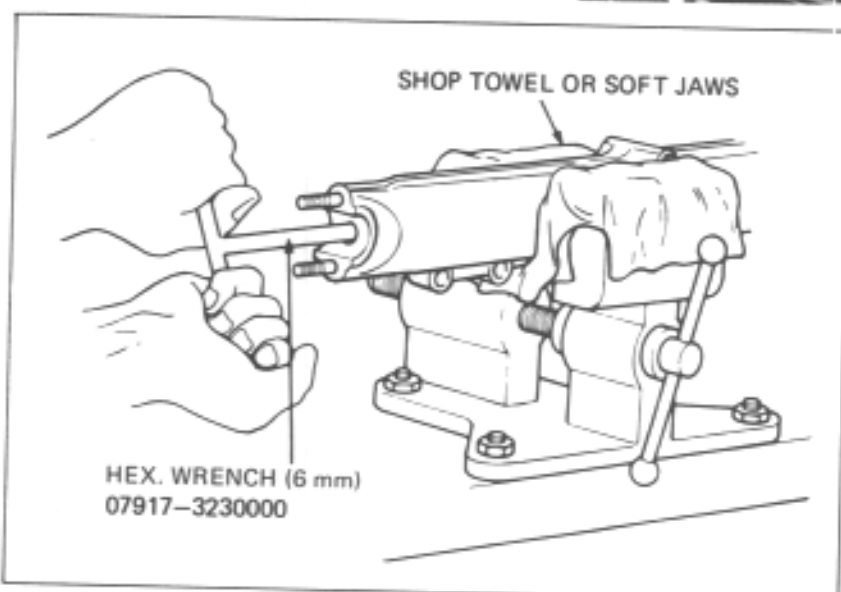
Loosen the clamp bolts on the fork upper and lower bridges.  
 Pull the assembly down and out while turning the fork tube.


**FORK DISASSEMBLY**

Remove the bolt from the bottom of the fork leg.  
 Remove the fork tube and components.

**NOTE**

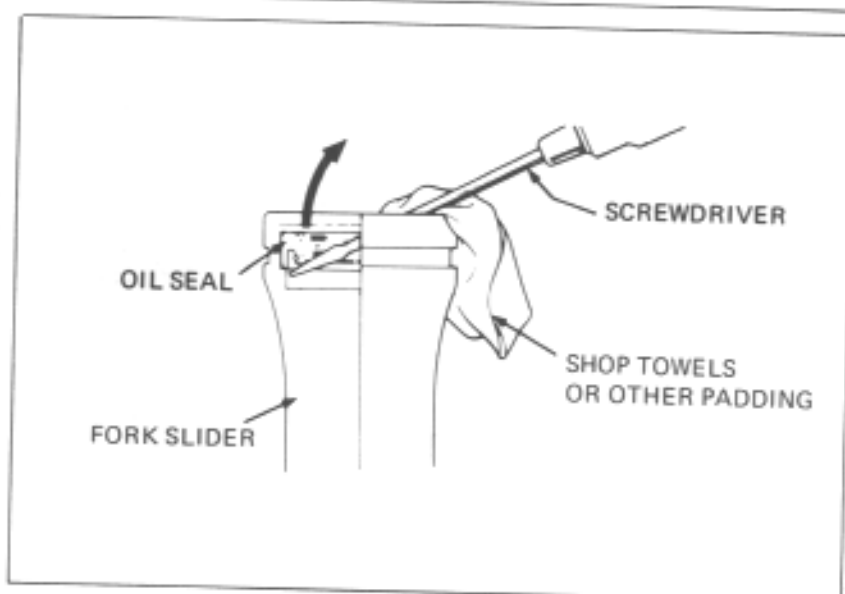
Hold the fork slider in a vise, being careful not to overtighten it.


**OIL SEAL REMOVAL**

Carefully remove the oil seal with a screwdriver.

**CAUTION**

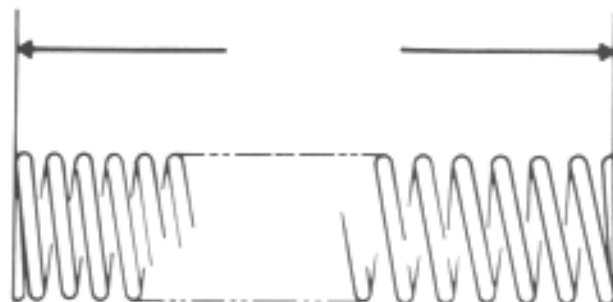
Avoid damaging the inner and outer surfaces of the slider when removing the seal.



**SPRING FREE LENGTH INSPECTION**

Check the free length of the fork spring. Replace it if it does not meet the specification.

**SERVICE LIMIT: 492.6 mm (19.4 in)**

**FORK TUBE/FORK SLIDER/PISTON INSPECTION**

Check the fork tubes, fork sliders and pistons for score marks, scratches, or excessive or abnormal wear, replacing those which cannot be reused.

Remove the fork seal. Measure the inside diameter of the slider.

Measure the outside diameter of the fork tube and check the condition of the tube piston and rings.

Front fork slider I.D.

**SERVICE LIMIT: 35.15 mm (1.384 in)**

Front fork tube O.D.

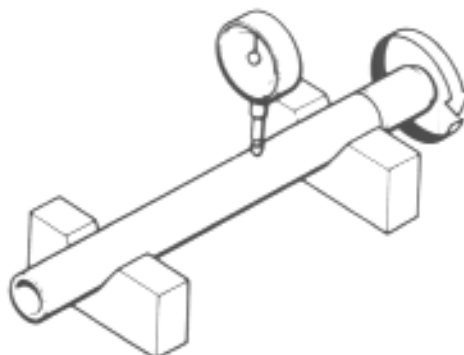
**SERVICE LIMIT: 34.90 mm (1.374 in)**

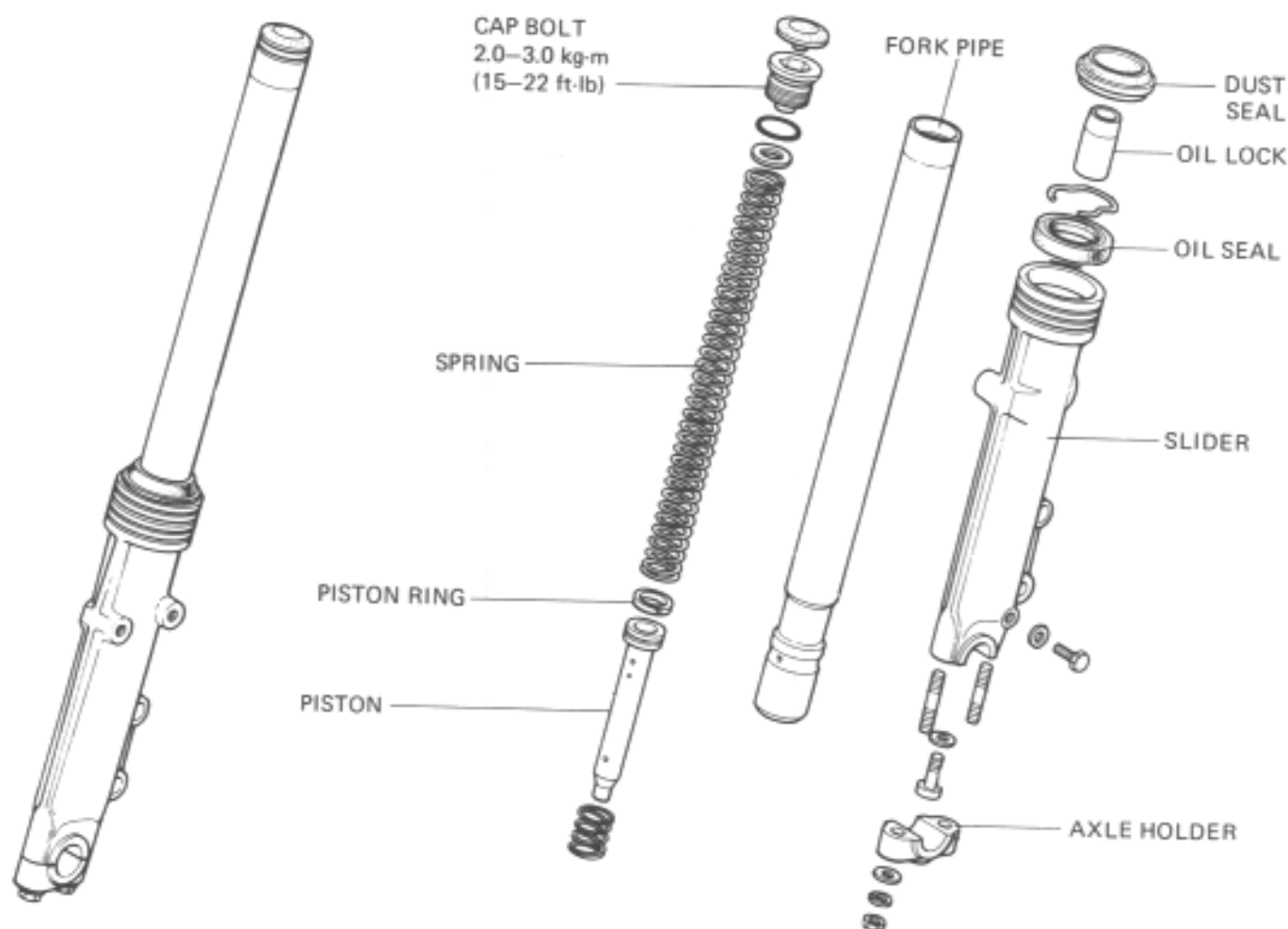
**FORK SLIDER****FORK TUBE INSPECTION**

Set the fork tube in V blocks and read the runout. Take 1/2 TIR to determine the actual runout.

**RUNOUT**

**SERVICE LIMIT: 0.2 mm (0.01 in)**

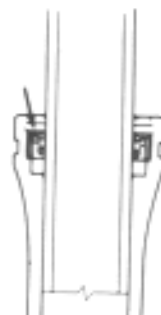
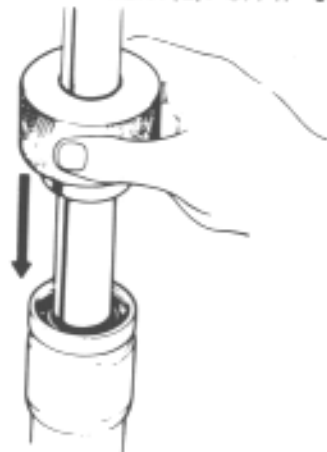



**FORK ASSEMBLY**

**OIL SEAL INSTALLATION**

Dip the new fork seal in ATF and install it in the slider using the fork leg as a guide for the seal driver.

Drive the oil seal into position until the snap ring groove appears.  
 Install the snap ring and dust cover.

FORK OIL SEAL DRIVER BODY: 07747-0010100  
 FORK OIL SEAL ATTACHMENT(E): 07747-0010600



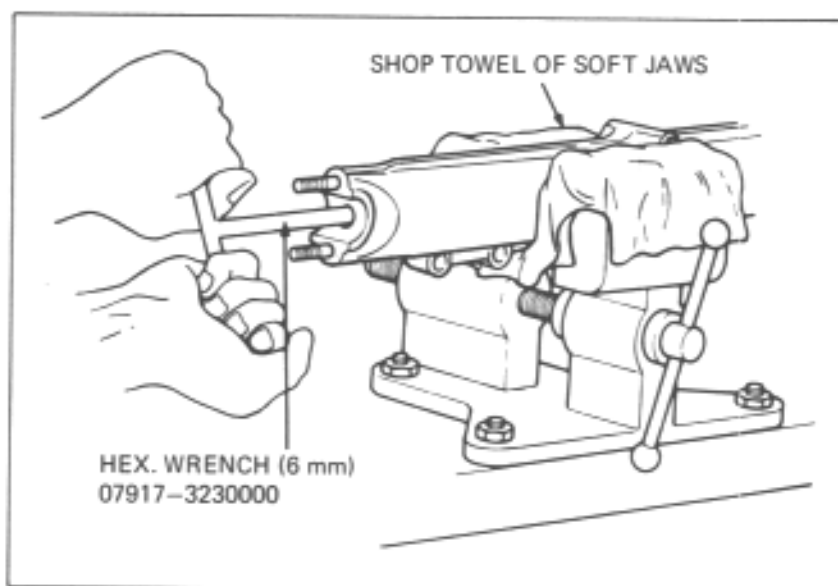


Install the piston and fork tube.  
Apply a locking agent to the bolt threads  
and underside of the bolt and tighten.

**TORQUE:** 0.8–1.2 kg-m (6–9 ft-lb)

**CAUTION**

*Do not overtighten the fork slider in a vise.*



### FILLING WITH OIL

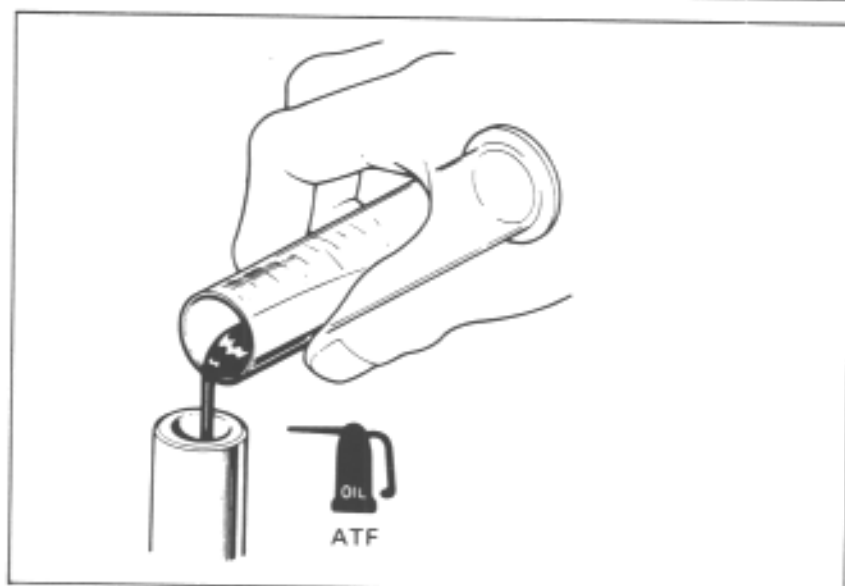
Use ATF (Automatic Transmission Fluid) to  
fill the front fork.

**OIL CAPACITY:**

172.5–177.5 cc (5.8–6.0 ozs) at assembly

**NOTE**

Pour the specified amount of ATF. Do  
not overfill.

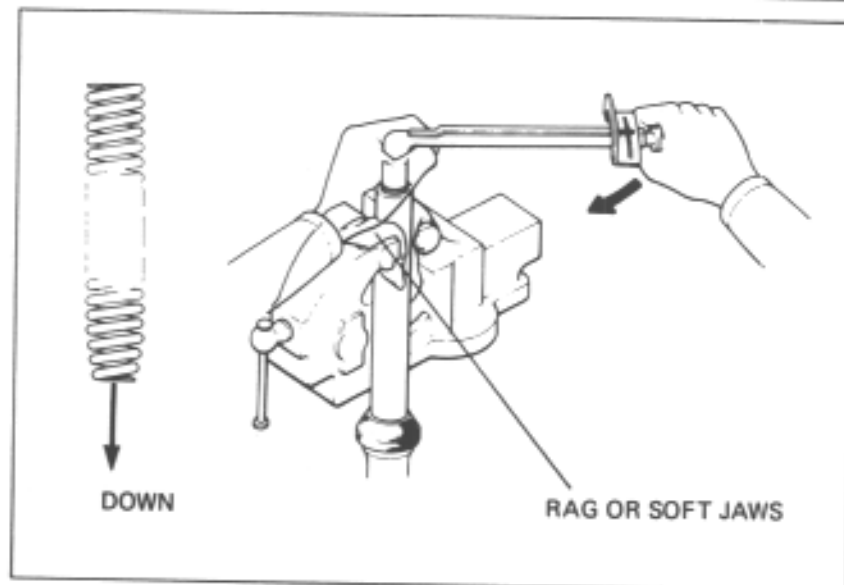


Slide the fork spring and spring seat into  
position and tighten with the cap bolt.

**TORQUE:** 2.0–3.0 kg-m (15–22 ft-lb)

**NOTE**

- Place the fork tube in a vise with  
shop towel, avoiding the sliding  
surface.
- Note the spring direction.



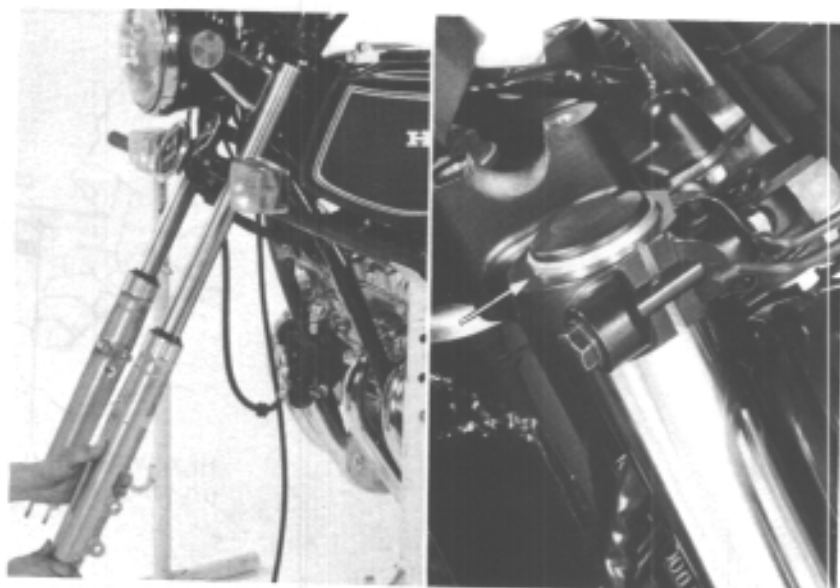




## FORK INSTALLATION

Install the fork tubes in the fork top bridge and steering stem, while rotating them by hand.

Position the fork tubes so that the fork tube upper end lines are even with the fork top bridge as shown.

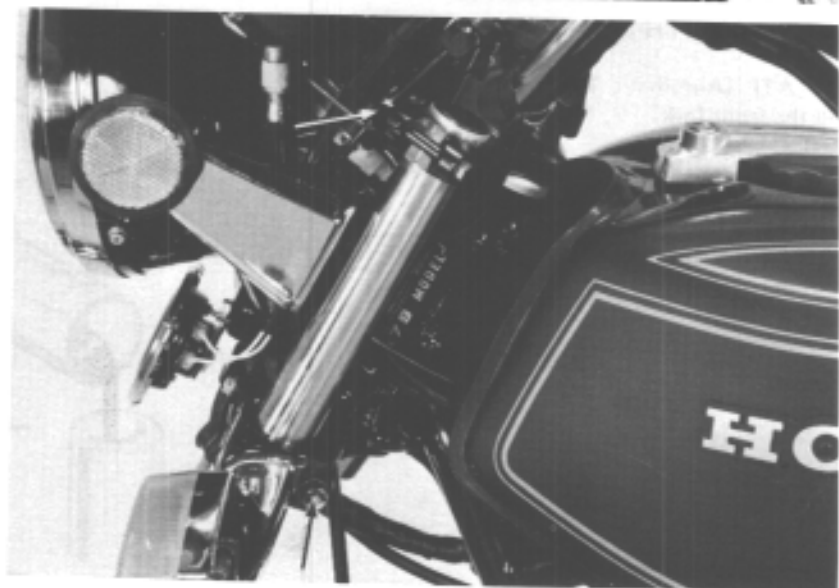


Tighten the fork tube pinch bolts at the steering stem.

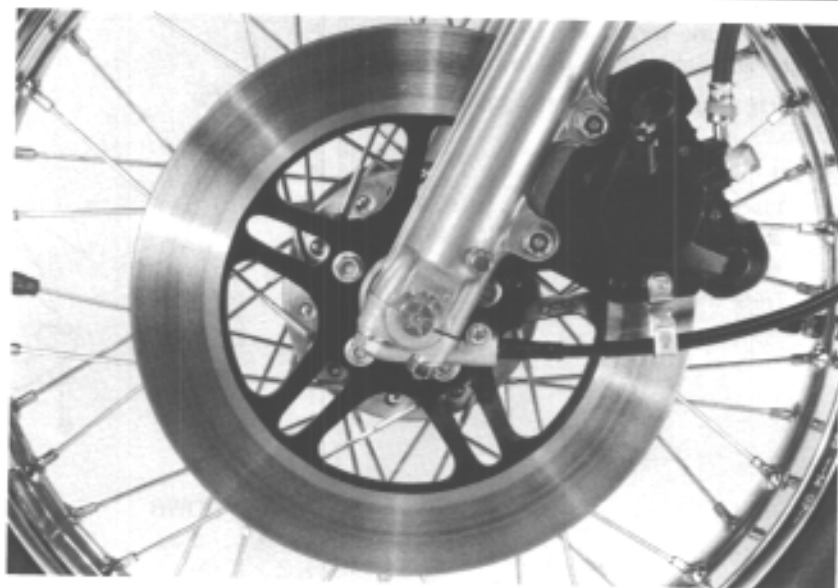
**TORQUE: 3.0–4.0 kg-m (22–29 ft-lb)**

Tighten the fork tube pinch bolts at the top bridge.

**TORQUE: 0.9–1.3 kg-m (7–9 ft-lb)**



Install the fender.  
Install the brake caliper.  
Secure the brake hose.  
Install the front wheel.





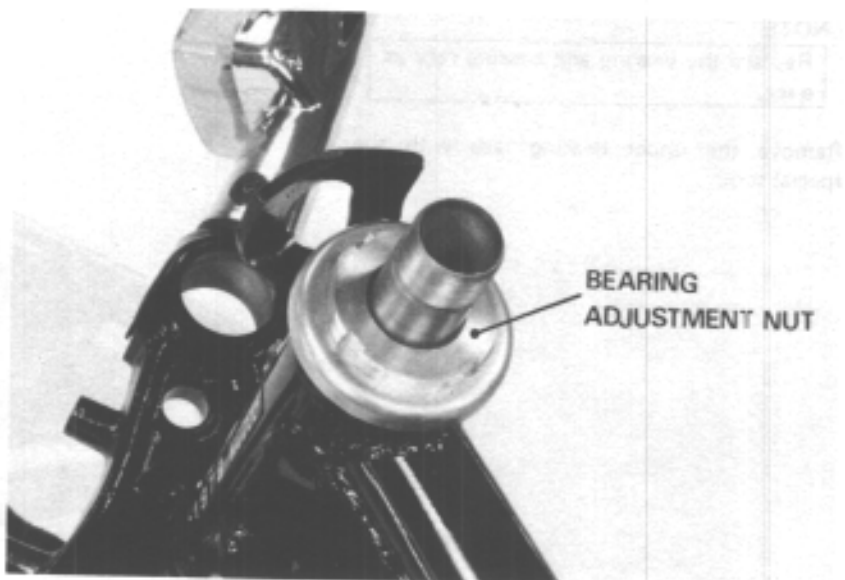
## STEERING STEM

### STEM REMOVAL

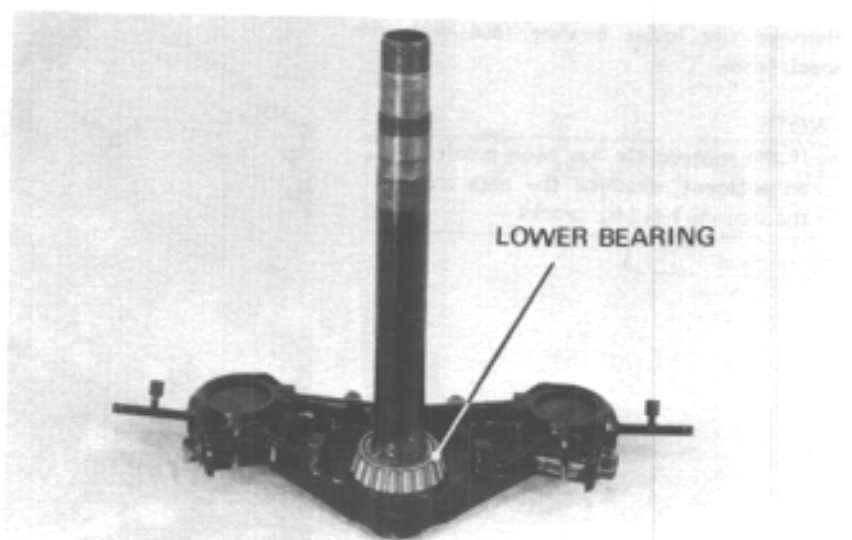
Remove the handlebar.  
Remove the instruments (Page 13-6).  
Remove the headlight assembly and disconnect the wiring (Page 13-4).  
Remove the steering stem nut.  
Remove the headlight case bracket.  
Remove the wheel and forks.  
Remove the fork top bridge.



Remove the bearing adjustment nut.  
Remove the steering stem.

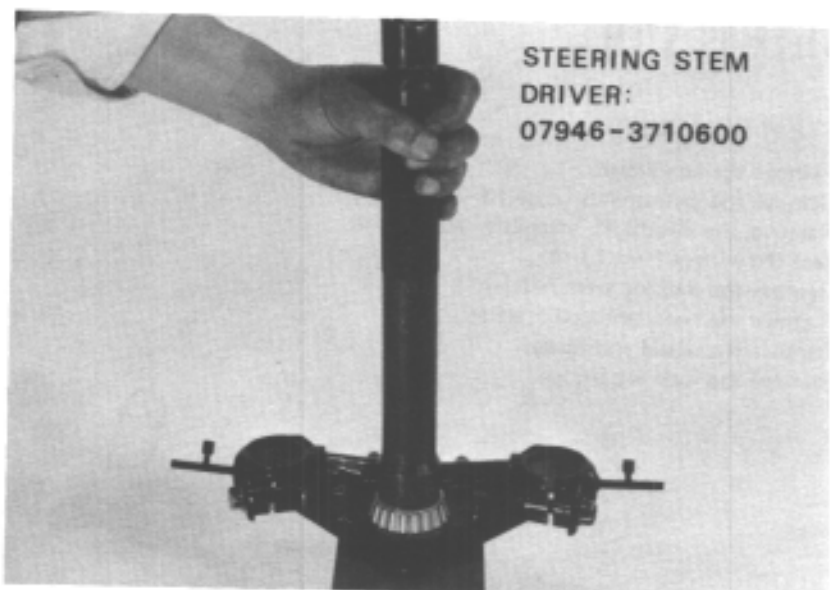


Remove the lower steering stem bearing.





Install a dust seal on the steering stem and drive the lower bearing inner race over the stem with the special tool.


**NOTE**

Replace the bearing and bearing race as a set.

Remove the upper bearing race with the special tool.



Remove the lower bearing race with the special tool.

**NOTE**

If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.





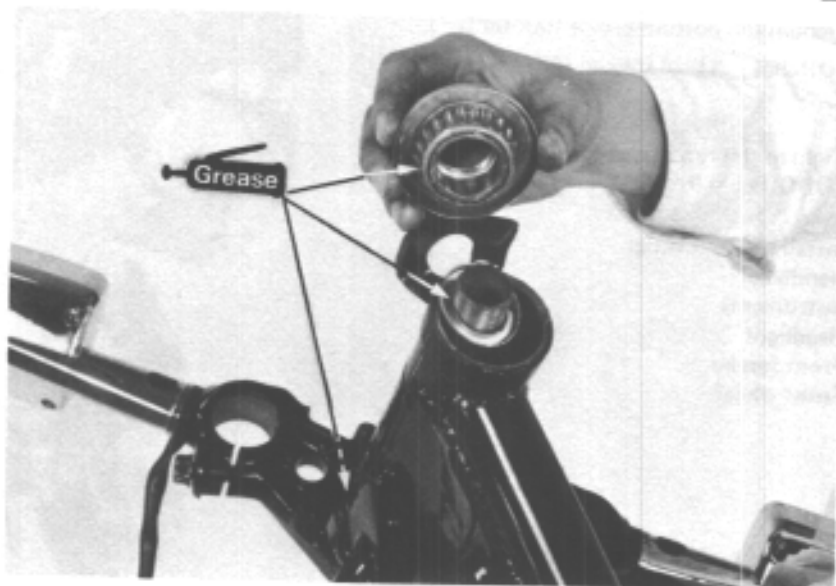
Drive the upper bearing outer race into the steering head with the special tools.

Drive the lower bearing outer race into the steering head with the special tool.

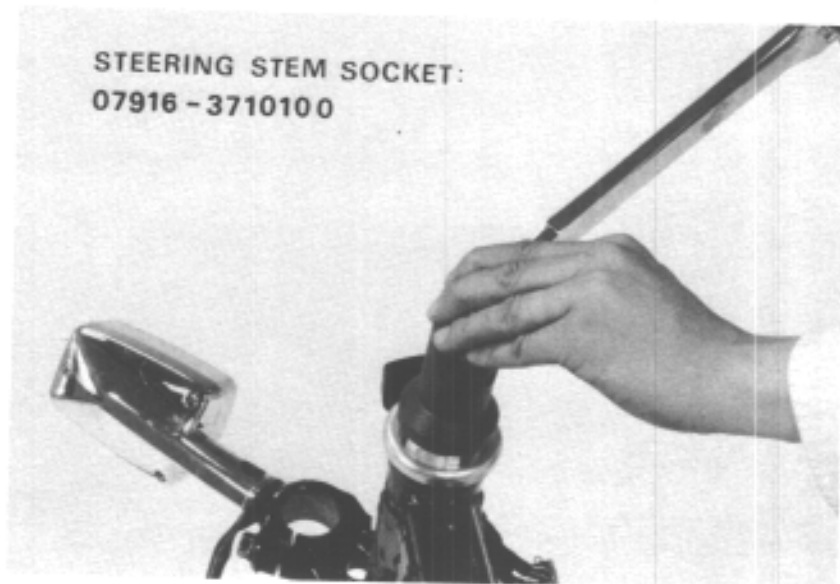


### STEERING STEM INSTALLATION

Pack the bearing cavities with bearing grease. Insert the steering stem into the steering head and install the upper bearing inner race.



Install the bearing adjustment nut and tighten it to 3.0–4.0 kg-m (22–29 ft-lb). Loosen the nut and retighten it to 10–20 kg-cm (0.7–1.4 ft-lb/9–17 in-lb).

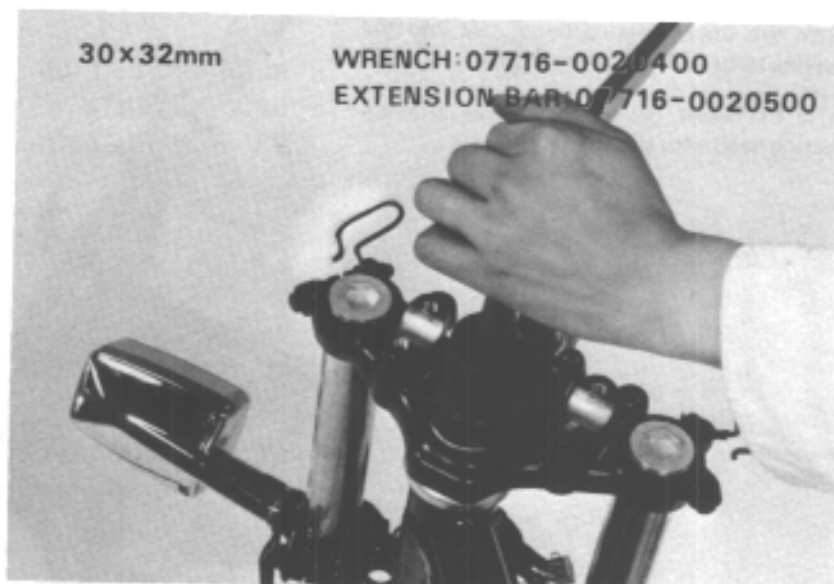


**TOP BRIDGE INSTALLATION**

Install the front fork legs.

Temporarily hold the front fork legs by tightening the steering stem fork pinch bolts. Tighten the steering stem nut.

**TORQUE: 8.0–12.0 kg-m (58–87 ft-lb)**



Tighten the bottom bridge fork bolts.

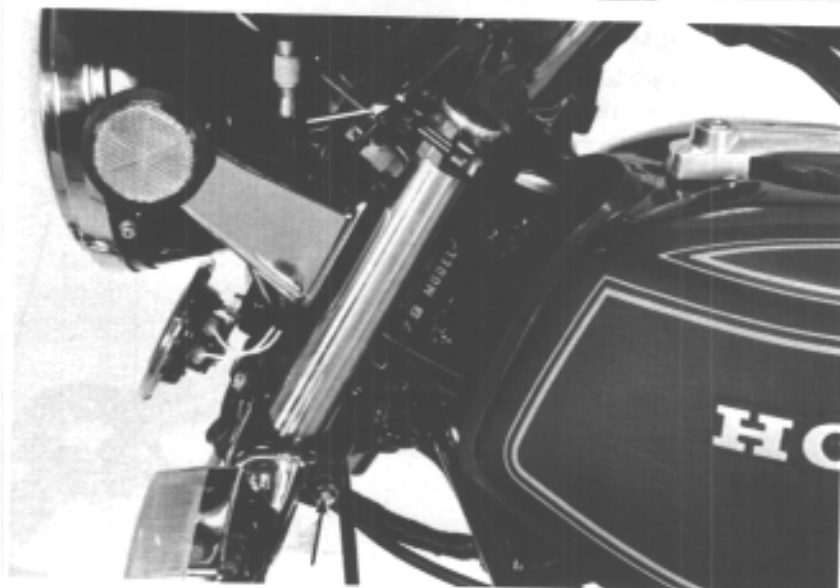
**TORQUE: 3.0–4.0 kg-m (22–29 ft-lb)**

Tighten the top bridge fork bolts.

**TORQUE: 0.9–1.3 kg-m (7–9 ft-lb)**

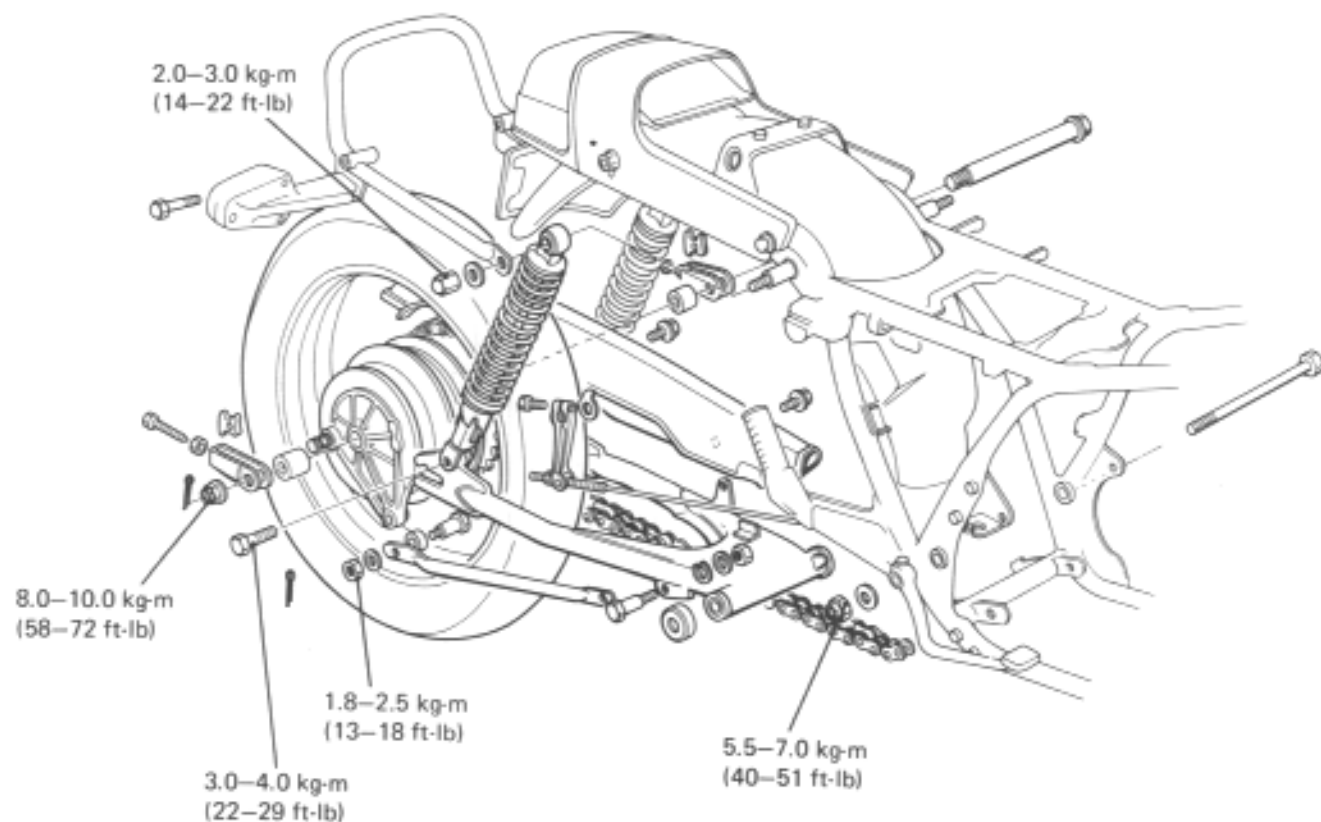
Install the following:

Handlebar  
Instruments  
Headlight  
Front fender  
Front wheel





MEMO





SERVICE INFORMATION	14-1
TROUBLESHOOTING	14-2
REAR WHEEL	14-3
SHOCK ABSORBER	14-9
SWING ARM	14-12

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

The shock absorbers are mounted with the gas-filled damper on bottom. This reduces unsprung weight.  
 Do not try to disassemble the gas-filled damper.  
 Never ride on the rim or try to bend the wheel.

### SPECIAL TOOLS

#### Common Tools

Bearing Driver Handle (A)	07749-0010000
Bearing Driver Outer (62 x 68 mm)	07746-0010500
Bearing Driver Outer (52 x 55 mm)	07746-0010400
Bearing Driver Pilot (20 mm)	07746-0040500
Bearing Driver Pilot (25 mm)	07746-0040600
Rear Shock Absorber Compressor	07959-3290001
Retainer Wrench Body	07710-0010400
Retainer Wrench (A)	07710-0010100
Retainer Wrench (C)	07710-0010300

### TORQUE VALUES

Rear shock absorber	
Upper	2.0- 3.0 kg-m (14-22 ft-lb)
Lower	3.0- 4.0 kg-m (22-29 ft-lb)
Driven sprocket	8.0-10.0 kg-m (58-72 ft-lb)
Rear axle	8.0-10.0 kg-m (58-72 ft-lb)
Swing arm pivot bolt	5.5- 7.0 kg-m (40-51 ft-lb)
Rear brake torque link nut	1.8- 2.5 kg-m (13-18 ft-lb)

### SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle runout		—	0.2 mm (0.01 in)
Rear wheel rim runout	Radial	—	2.0 mm (0.08 in)
	Axial	—	2.0 mm (0.08 in)
Shock absorber spring free length		244.5 mm (9.6 in)	237.2 mm (9.5 in)
Swing arm bushing	I.D.	21.500-21.552 mm (0.8465-0.8485 in)	21.7 mm (0.854 in)
Swing arm collar	O.D.	21.427-21.460 mm (0.8436-0.8449 in)	21.4 mm (0.843 in)





## TROUBLESHOOTING

### Wobble or vibration

1. Distorted rim
2. Loose wheel bearing
3. Loose or distorted spokes
4. Faulty tire
5. Loose axle
6. Tire pressure incorrect
7. Swing arm bushing worn

### Soft suspension

1. Weak spring
2. Shock absorbers improperly adjusted

### Hard suspension

1. Shock absorbers improperly adjusted
2. Bent shock absorber

### Suspension noise

1. Shock case binding
2. Loose fasteners



## REAR WHEEL

### REAR WHEEL REMOVAL

Place the motorcycle on its center stand.  
Loosen the drive chain adjuster lock nuts and bolts.

Disconnect the rear brake torque link by removing the cotter pin and nut.

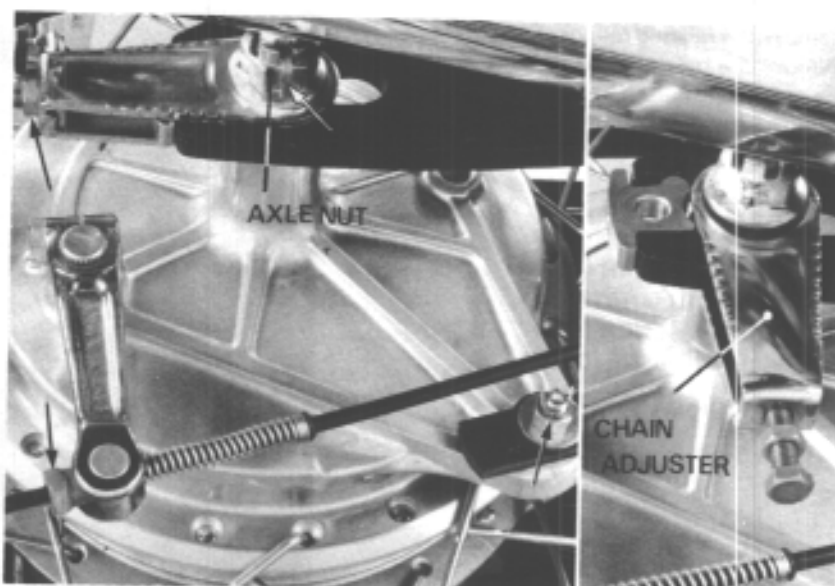
Remove the rear brake adjusting nut and disconnect the brake rod.

Remove the cotter pin from the rear axle and loosen the nut.

Pull the adjusters down, push the wheel forward and remove the drive chain from the drive sprocket.

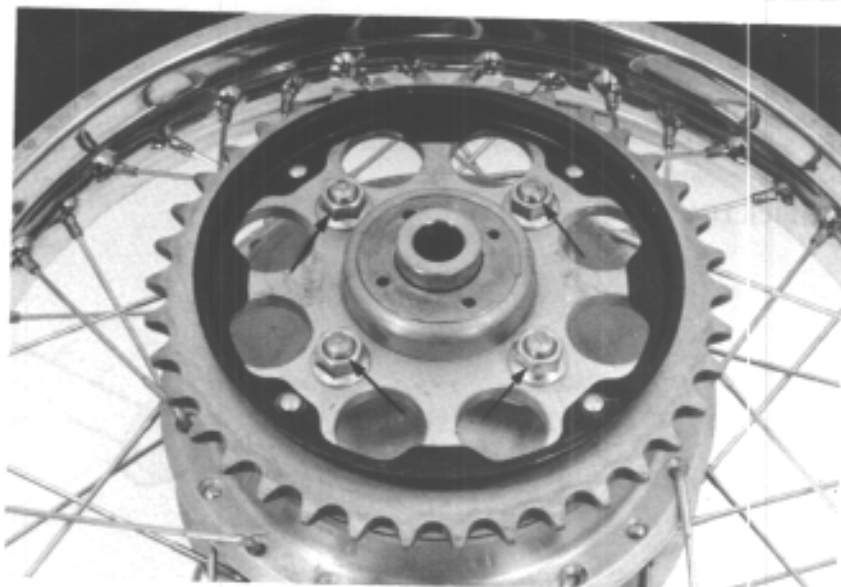
Remove the rear wheel.

Remove the rear axle.

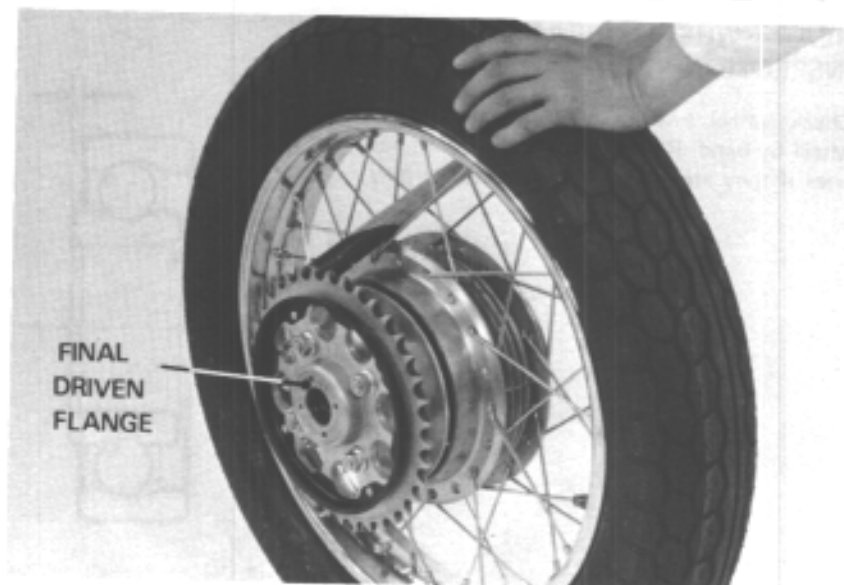


### REAR WHEEL DISASSEMBLY

Loosen the driven sprocket nuts.



Remove the driven flange from the wheel hub.  
Remove the driven sprocket.





Remove the bearing retainer.  
 Remove the bearings and distance collar from the rear wheel hub.  
 Remove the bearing from the final driven flange.

**RETAINER WRENCH BODY**

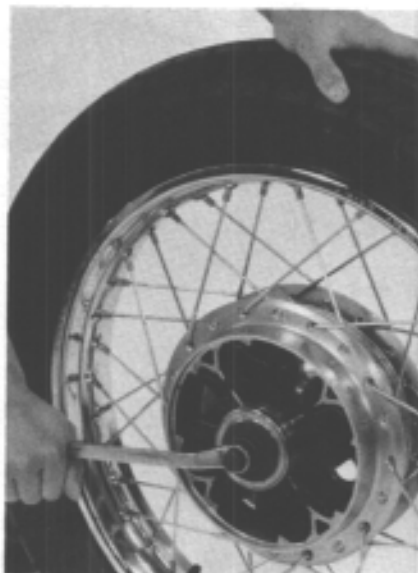
07710-0010400

**RETAINER WRENCH (A)**

07710-0010100

**RETAINER WRENCH (C)**

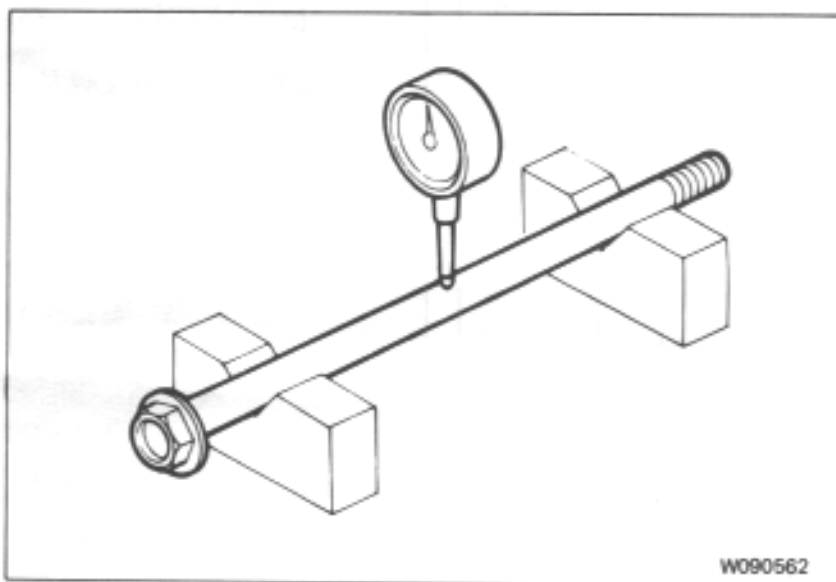
07710-0010300


**AXLE INSPECTION**

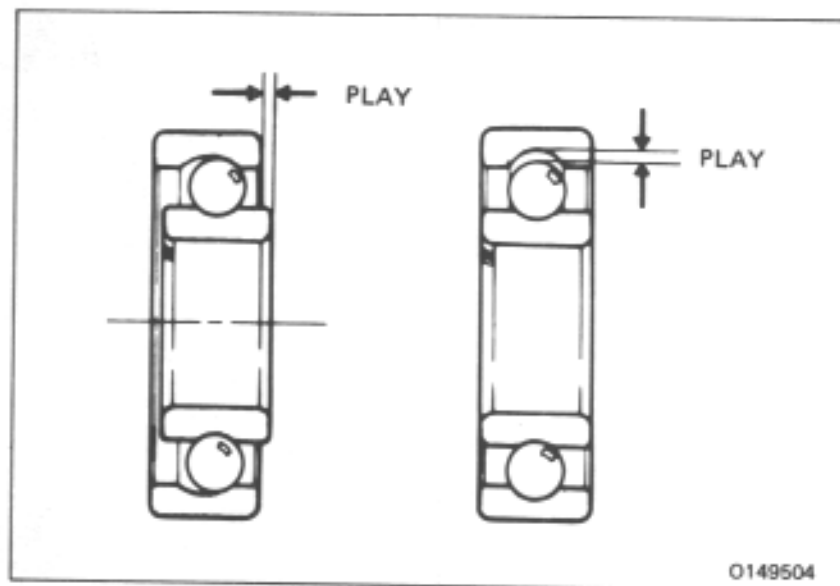
Set the axle in V blocks and read the axle runout.

The actual axle runout is 1/2 of TIR (total indicator reading).

**SERVICE LIMIT: 0.2 mm (0.01 in)**


**REAR WHEEL BEARING PLAY INSPECTION**

Check wheel bearing play by rotating the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.





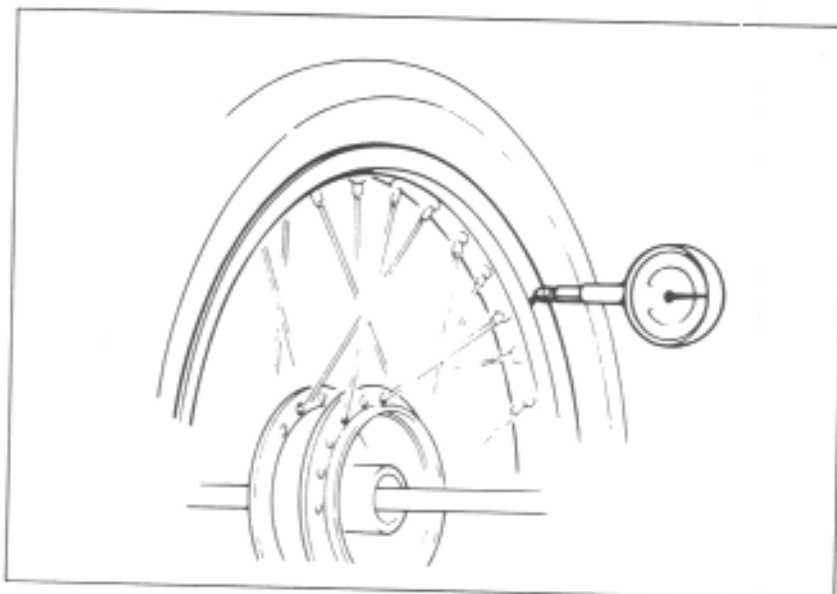
### REAR WHEEL RIM RUNOUT INSPECTION

Check the rim for runout by placing the wheel in a truing stand. Spin the wheel slowly, and read the runout using a dial indicator.

#### SERVICE LIMITS:

RADIAL RUNOUT: 2.0 mm (0.08 in.)

AXIAL RUNOUT: 2.0 mm (0.08 in.)



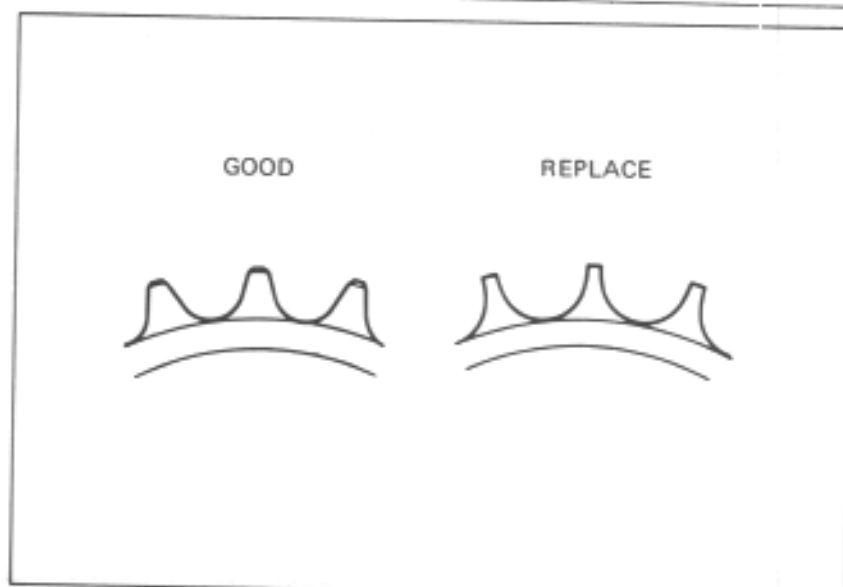
### FINAL DRIVEN SPROCKET INSPECTION

Check the condition of the final driven sprocket teeth.

Replace the sprocket if worn or distorted.

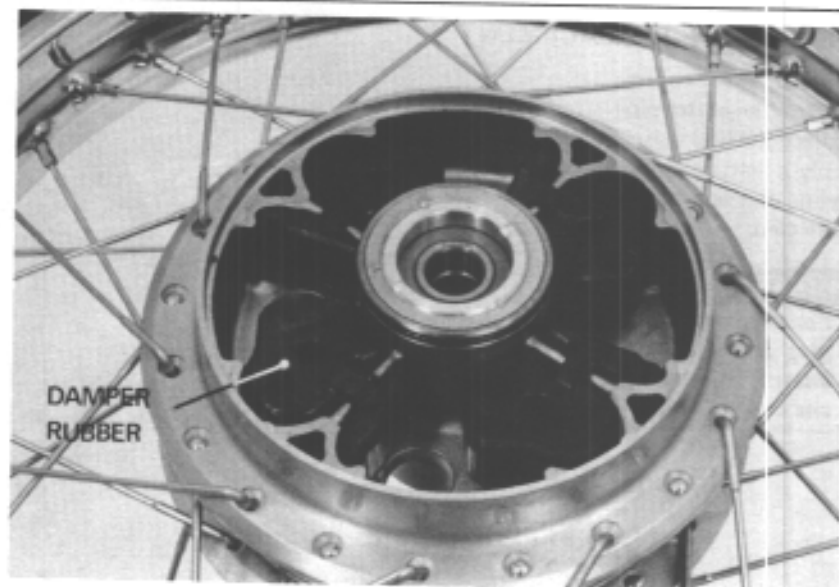
#### NOTE

If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket. (See 3-16)



### DAMPER RUBBER INSPECTION

Replace the damper rubbers if they are damaged or deteriorated.

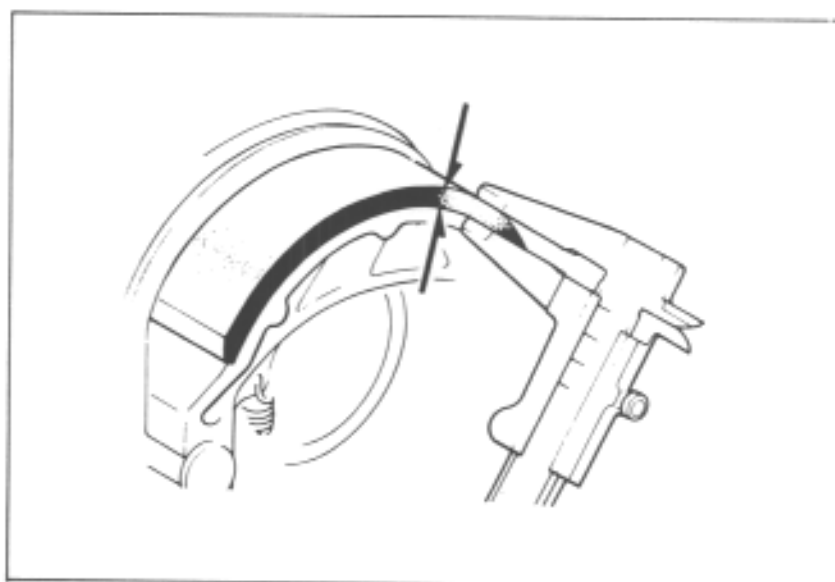




### BRAKE LINING THICKNESS INSPECTION

Measure the brake lining thickness.

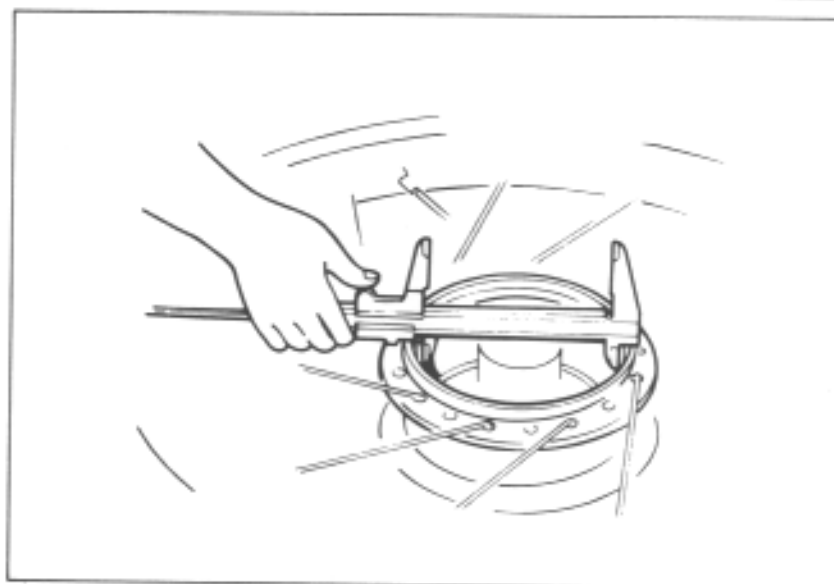
**SERVICE LIMIT: 2.0 mm (0.08 in)**



### BRAKE DRUM I.D. INSPECTION

Measure the brake drum inside diameter.

**SERVICE LIMIT: 181 mm (7.1 in)**



### BRAKE SHOE REPLACEMENT

Remove the brake arm.

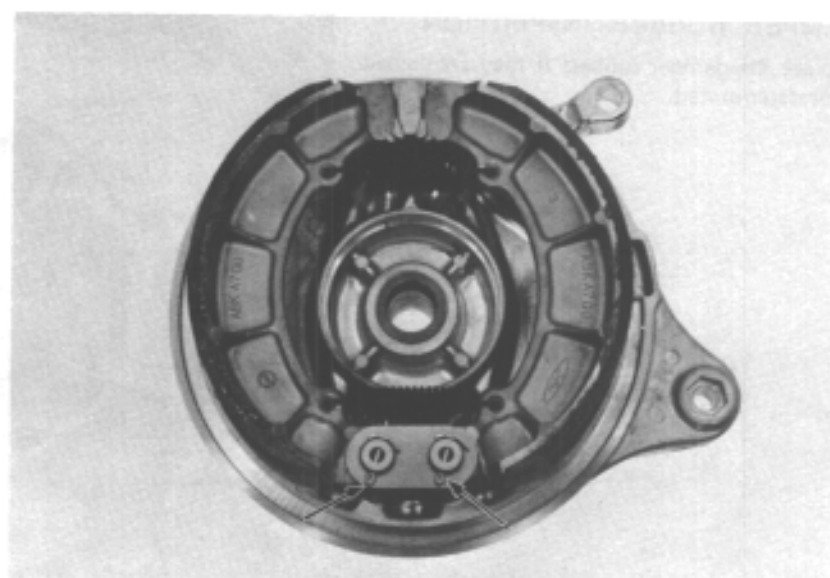
Remove the cotter pins.

Replace the brake shoes with new ones.

Apply a light coat of grease to the faces of the anchor pins and brake cam and groove in the brake cam.

#### **WARNING**

*Contaminated brake linings reduce stopping power. Keep grease off the brake linings. Wipe excess grease off the cam and anchor pins.*







Pack all bearing cavities with grease.  
 Press the distance collar into place from the left side.  
 Drive the right bearing first, then the left bearing.

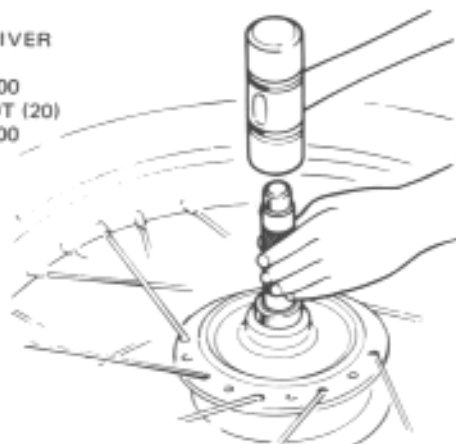
**CAUTION**

*Drive the bearings squarely.  
 Install the bearings with the sealed end facing out, making sure they are fully seated.*

**DRIVER HANDLE (A) 07949-0010000**

WHEEL HUB:  
 BEARING DRIVER  
 (52 x 55)  
 07746-0010400  
 DRIVER PILOT (20)  
 07746-0040500

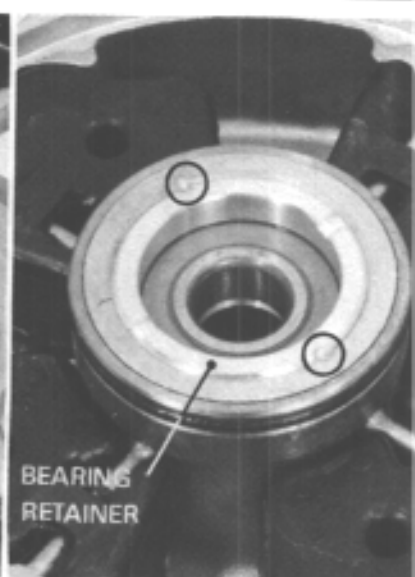
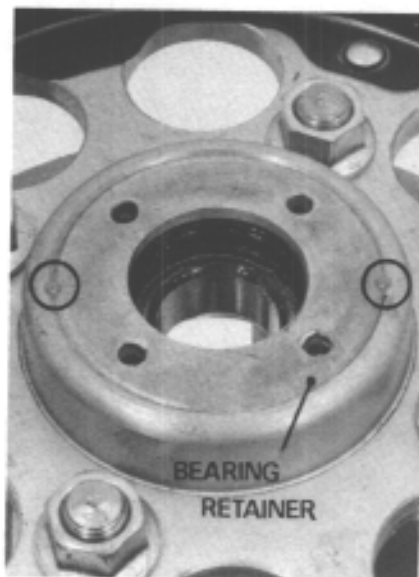
FINAL DRIVE  
 FLANGE:  
 BEARING DRIVER  
 (62 x 68)  
 07746-0010500  
 DRIVER PILOT (25)  
 07746-0040600



Install the bearing retainer with the same tool that was used to remove it. Peen it to the hub.

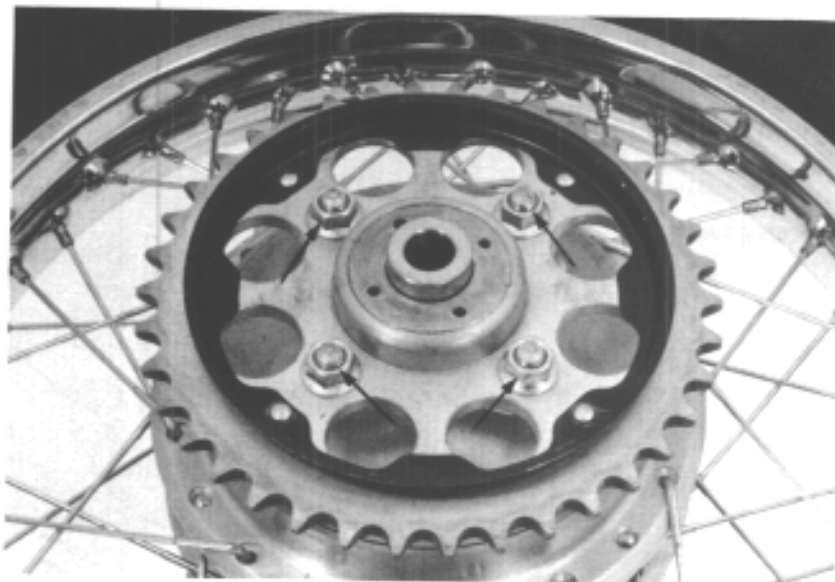
**NOTE**

Check the condition of the bearing retainer.  
 Replace the retainer if the threads are damaged.



Install the final driven sprocket.

**TORQUE: 8.0-10.0 kg-m (58-72 ft-lb)**





### REAR WHEEL INSTALLATION

Install the rear wheel in the reverse order of removal.

#### NOTE

After installing the wheel, apply the brakes several times, and then check to be sure that the wheel rotates freely. Recheck the installation if the brake drags or wheel does not rotate freely.

Use a new cotter pin for securing the axle nut.

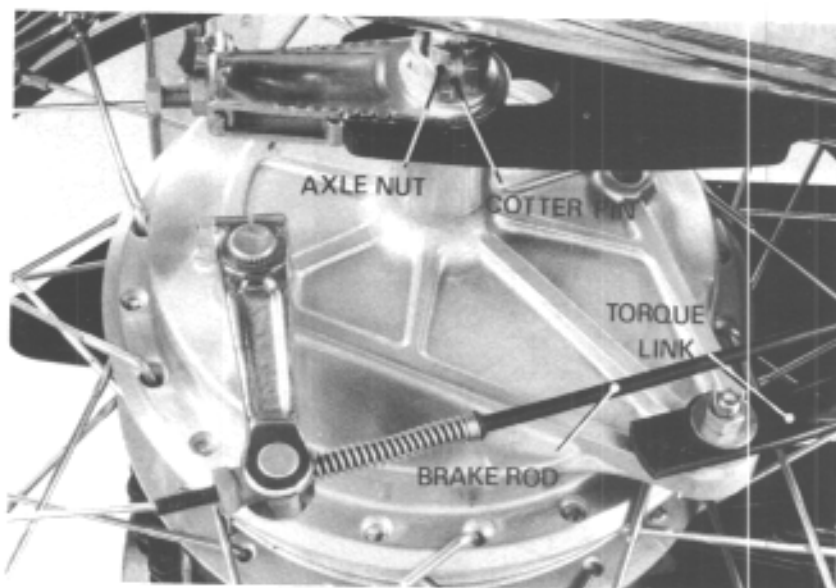
**TORQUE: 8.0–10.0 kg-m (58–72 ft-lb)**

Use a new cotter pin for securing the rear brake torque link.

**TORQUE: 1.8–2.5 kg-m (13–18 ft-lb)**

Adjust drive chain free play. (See 3-16)

Adjust the rear brake. (See 3-18)

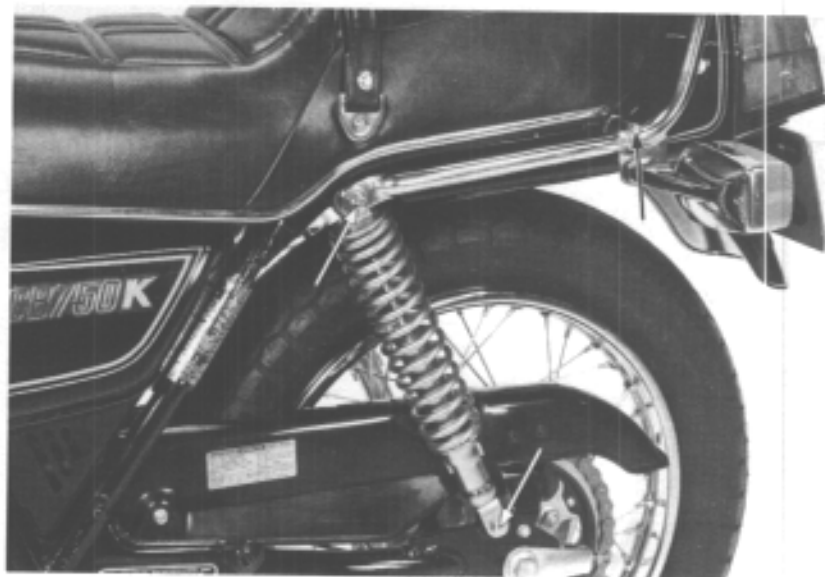


### SHOCK ABSORBER

#### SHOCK ABSORBER REMOVAL

Remove the mufflers.

Remove the rear carrier pipe attaching bolts. Remove the upper and lower shock absorber mounting bolts and nuts, and remove the shock absorbers.



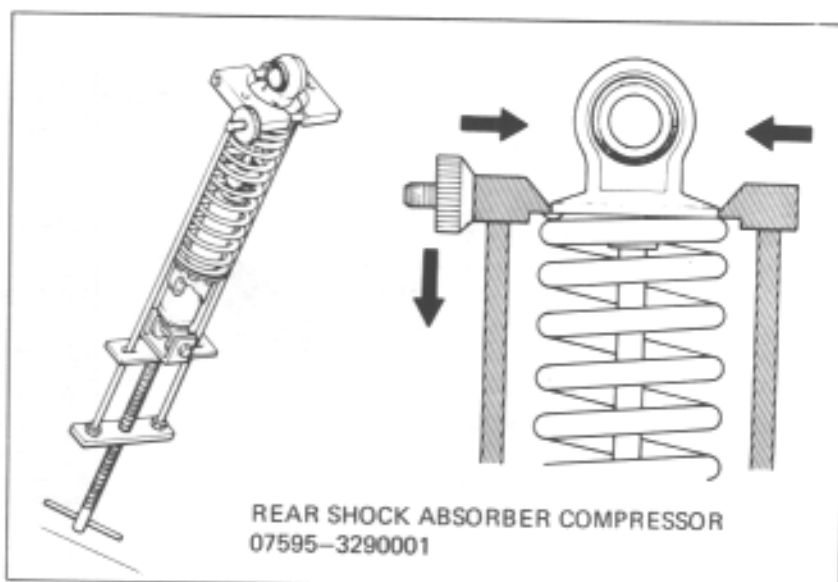
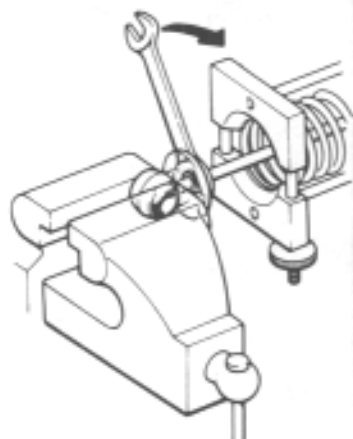




### SHOCK ABSORBER DISASSEMBLY

Compress the spring just enough to remove the lock nut.

Loosen the lock nut and remove the upper mount.

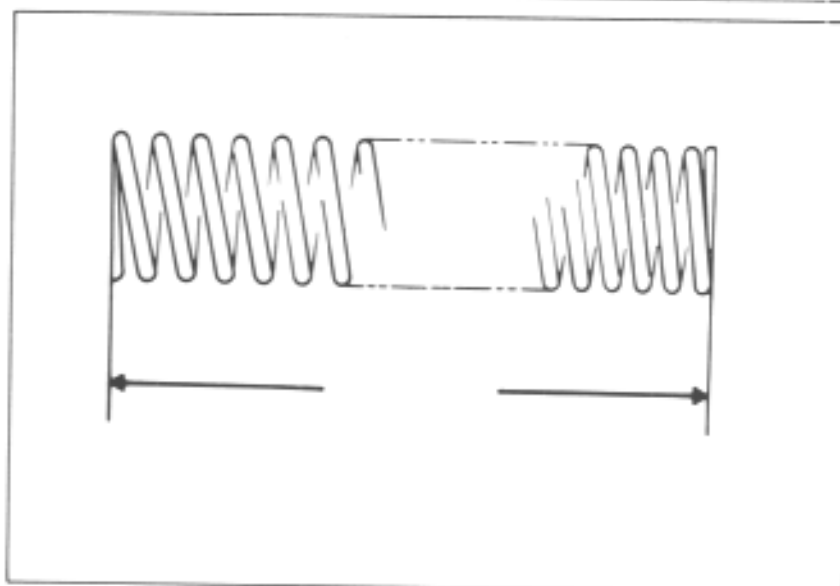


### SHOCK ABSORBER SPRING FREE LENGTH

Disassemble the unit.

Measure the free length of the spring. Inspect the shock body for oil leaks.

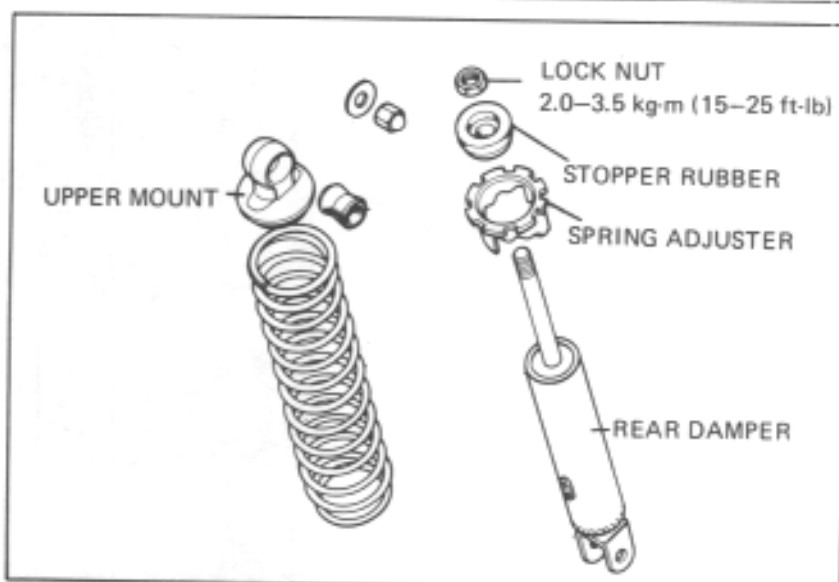
SERVICE LIMIT: 237.2 mm (9.5 in)



### SHOCK ABSORBER ASSEMBLY

#### NOTE

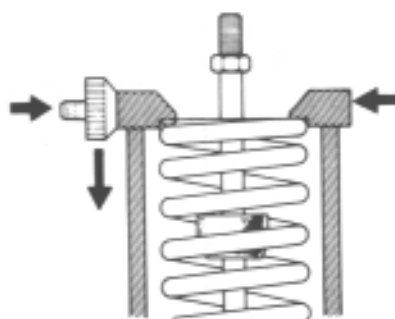
Install the spring with the tight coils at the bottom.



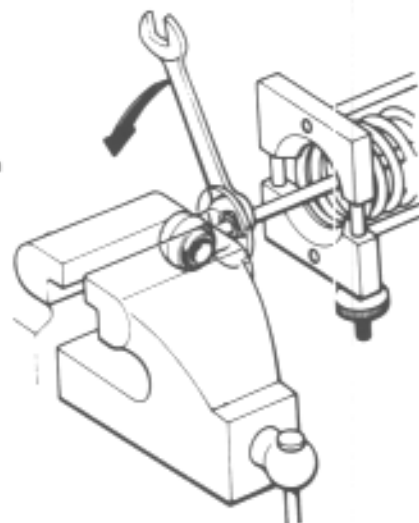


### NOTE

Apply a locking agent to the lock nut at time of assembly.



REAR SHOCK ABSORBER  
COMPRESSOR  
07595-3290001



### SHOCK ABSORBER INSTALLATION

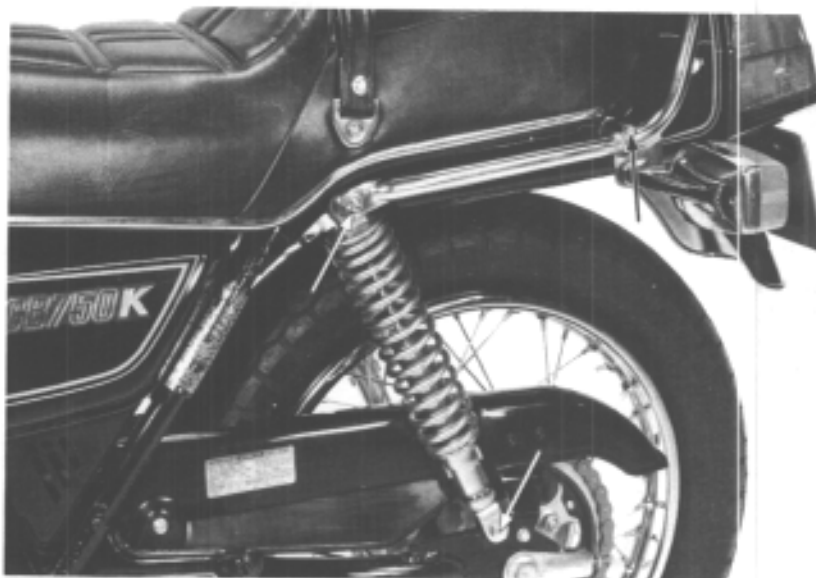
Tighten the shock absorber bolts and nuts.

#### TORQUE:

UPPER: 2.0-3.0 kg-m (14-22 ft-lb)

LOWER: 3.0-4.0 kg-m (22-29 ft-lb)

Install the muffler.



Adjust the right and left absorbers equally with the spring adjuster.

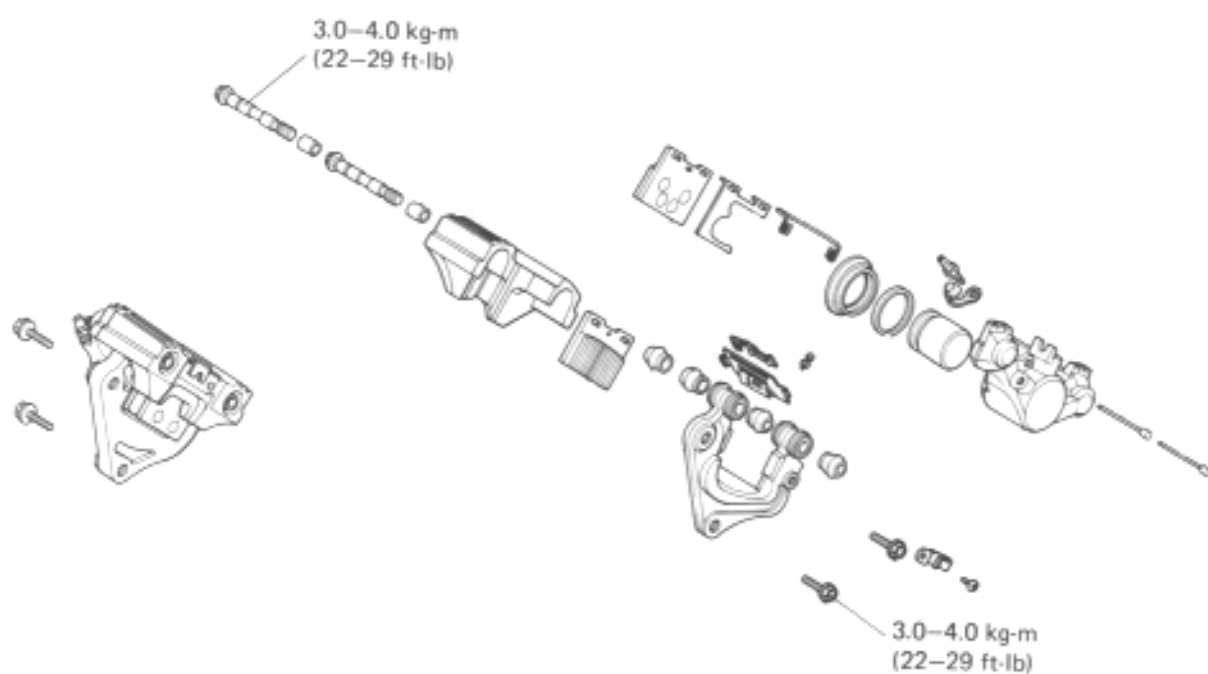
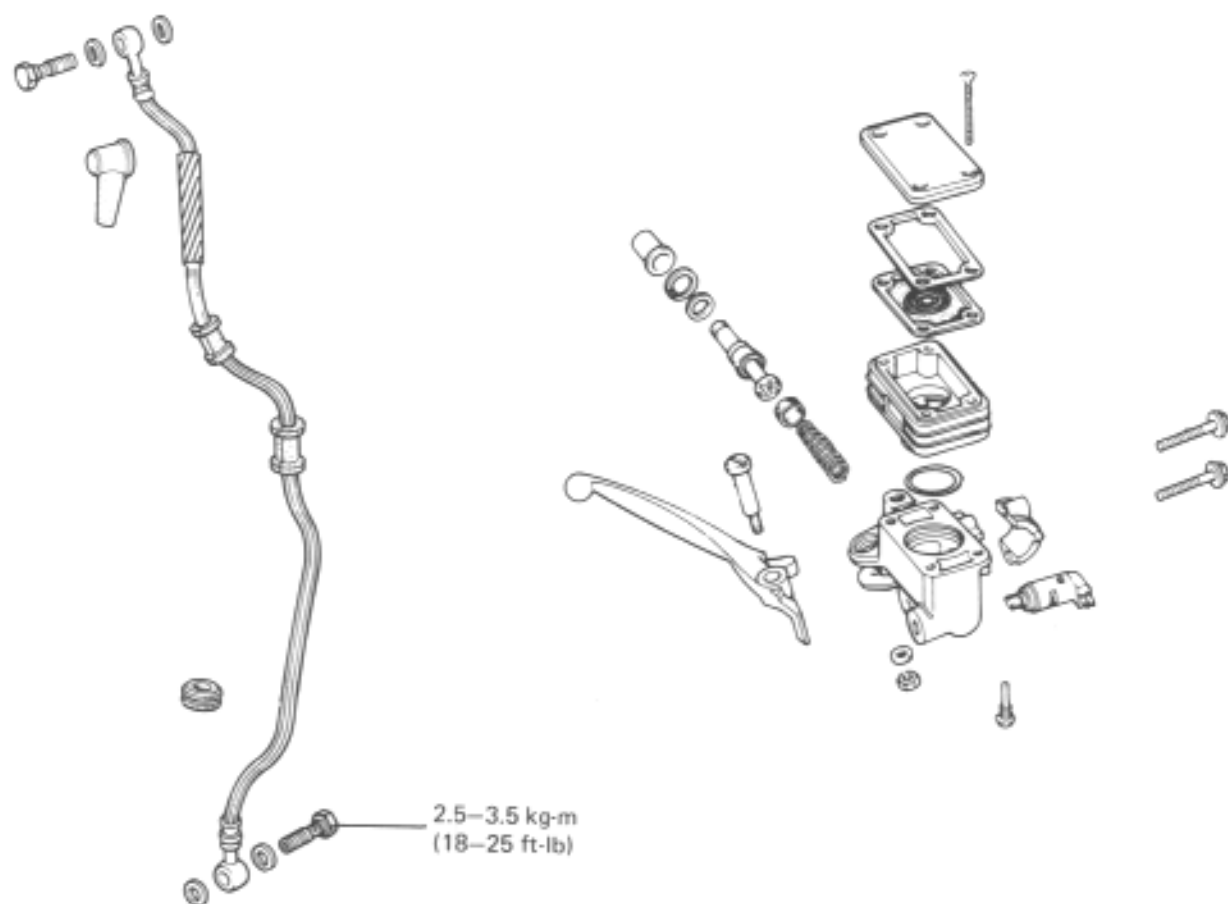
Check shock absorber operation after installation.



STANDARD : I



MEMO





SERVICE INFORMATION	15-1
TROUBLESHOOTING	15-2
BRAKE FLUID REPLACEMENT/AIR BLEEDING	15-3
BRAKE PAD/DISC	15-4
BRAKE MASTER CYLINDER	15-6
BRAKE CALIPER	15-8

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- The front brake can be removed without disconnecting the hydraulic system. Once the hydraulic systems have been opened, or if the brakes feel spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage will result.
- Always check brake operation before riding the motorcycle.

### SPECIAL TOOL

Snap Ring Pliers 07914-3230001

### TORQUE VALUES

Brake hose bolt	2.5-3.5 kg-m (18-25 ft-lb)
Front brake caliper carrier	3.0-4.0 kg-m (22-29 ft-lb)
Front brake caliper A	3.0-4.0 kg-m (22-29 ft-lb)

### SPECIFICATIONS

	STANDARD	SERVICE LIMIT
Disc thickness	6.9 - 7.1 mm (0.27 - 0.28 in)	6.0 mm (0.24 in)
Disc runout	—	0.3 mm (0.01 in)
Front master cylinder I.D.	14.000-14.043 mm (0.5512-0.5529 in)	14.055 mm (0.5533 in)
Front master piston O.D.	13.957-13.984 mm (0.5495-0.5506 in)	13.945 mm (0.5490 in)
Front caliper piston O.D.	42.815-42.820 mm (1.6856-1.6858 in)	42.800 mm (1.6850 in)
Front caliper cylinder I.D.	42.850-42.926 mm (1.6870-1.6900 in)	42.940 mm (1.6905 in)



## TROUBLESHOOTING

### Brake lever soft or spongy

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

### Brake lever too hard

1. Sticking piston(s)
2. Clogged hydraulic system
3. Pads glazed or worn excessively

### Brakes drag

1. Hydraulic system sticking
2. Incorrect adjustment of lever
3. Sticking piston(s)

### Brakes grab or pull to one side

1. Pads contaminated
2. Disc or wheel misaligned

### Brakes chatter or squeal

1. Pads contaminated
2. Excessive disc runout
3. Caliper installed incorrectly
4. Disc or wheel misaligned



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

## BRAKE FLUID DRAINING

Connect a bleed hose to the bleeder valve. Loosen the caliper bleeder valve and pump the brake lever.

Stop operating the lever when no fluid flows out of the bleeder valve.

### WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

## BRAKE FLUID FILLING

### NOTE

Use only DOT 3 brake fluid from a sealed container.

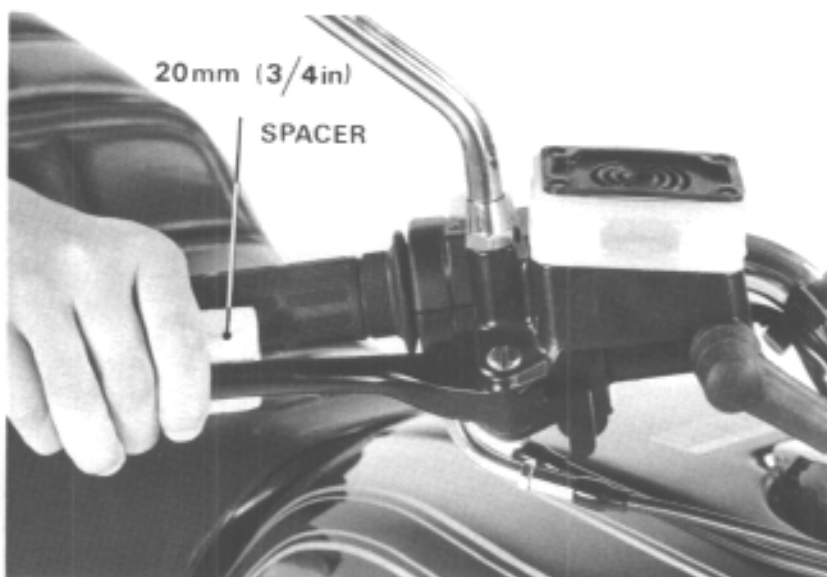
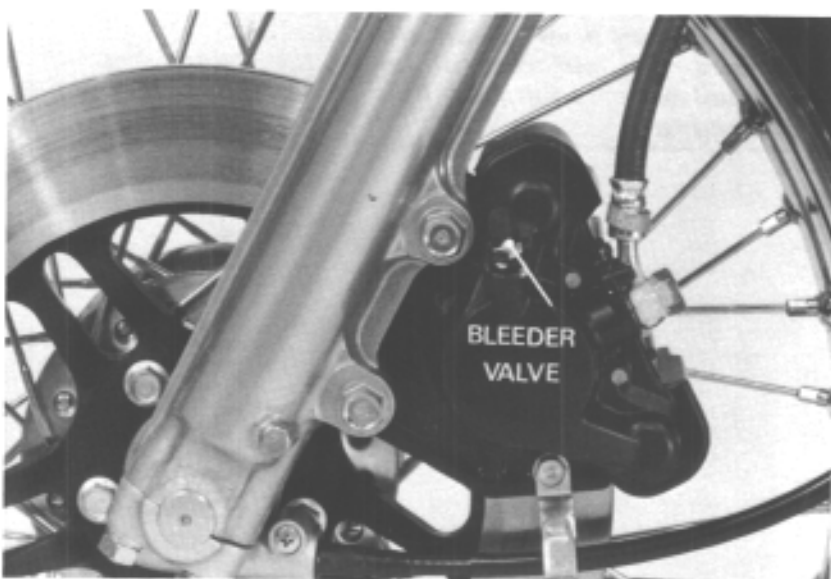
Close the bleeder valve, fill the reservoir, and install the diaphragm.

## AIR BLEEDING

To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in) space to the handlebar grip when bleeding the front brake 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.

### NOTE

Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.



**NOTE**

Never re-use the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.

Squeeze the brake lever, open bleeder valve 1/2 turn and close the bleeder valve.

Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

**NOTE**

Do not release the brake lever until the bleeder valve has been closed again.

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

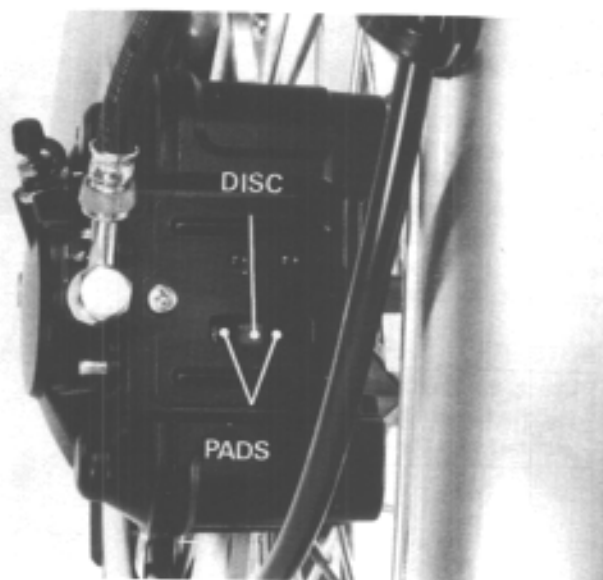
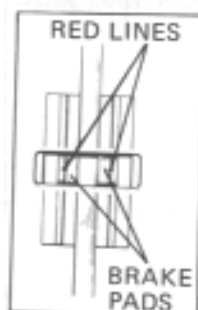
Fill the fluid reservoir to the upper level mark.

**WARNING**

*A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

**BRAKE PAD/DISC****BRAKE PAD WEAR CHECK**

Replace the front brake pads if the red line on the top of the pads reaches the edge of the brake disc.







### BRAKE PAD REPLACEMENT

Remove the caliper cover.

Remove the clip.

Push the caliper toward the right and push the piston all the way in to allow installation of new brake pads.

Remove the pins, brake pads and shim.

Apply a coat of silicon grease to the both side of the shim.



Install new brake pads with the shim on the piston side of the pad.

Install the pins and clip.

Install the caliper cover.

#### NOTE

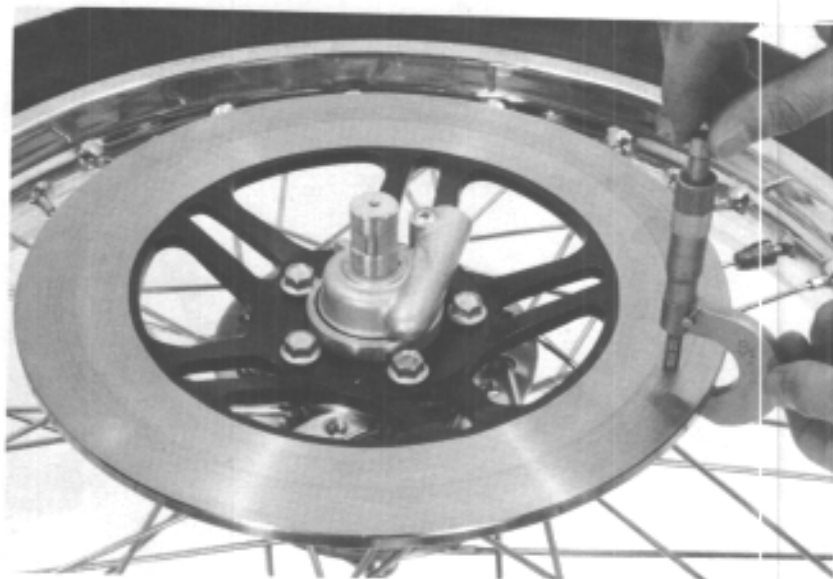
- Always replace the brake pads in pairs to assure even disc pressure.
- Push the piston all the way in.
- Check the brake fluid level in the brake master cylinder reservoir as this causes the level to raise.



### DISC THICKNESS

Measure the disc thickness.

**SERVICE LIMIT: 6.0 mm (0.24 in)**





## BRAKE DISC WARPAGE

Measure brake disc warpage.

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



## BRAKE MASTER CYLINDER

### BRAKE MASTER CYLINDER DISASSEMBLY

Drain brake fluid from the hydraulic system. Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

#### CAUTION

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

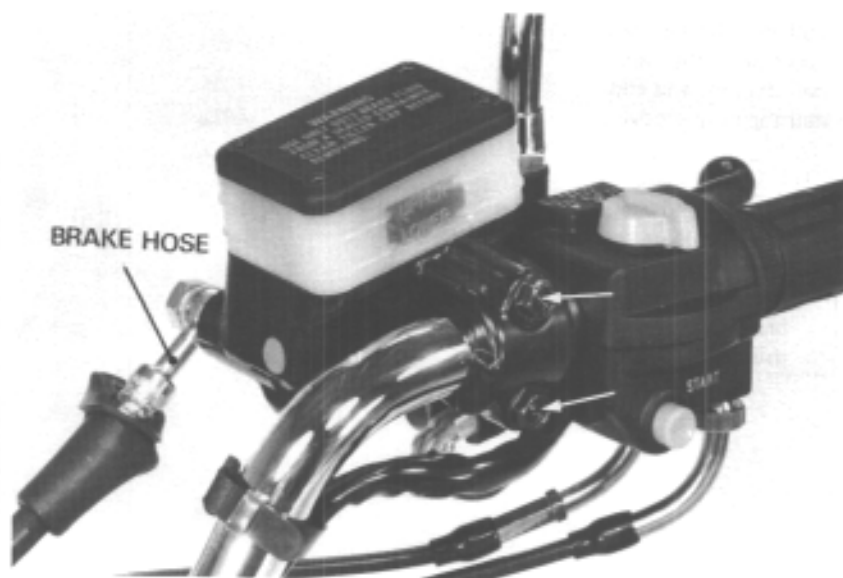
#### NOTE

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

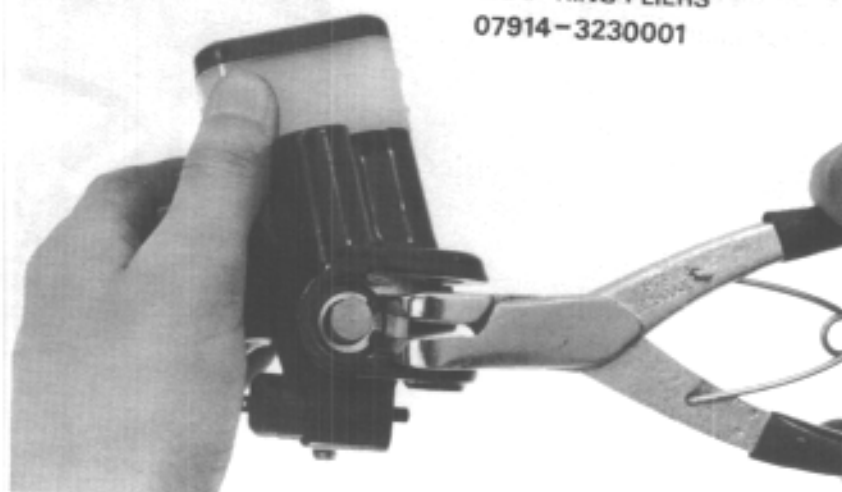
Remove the two master cylinder attaching bolts.

Remove the boot.

Remove the circlip from the master cylinder body.



**SNAP RING PLIERS**  
**07914-3230001**

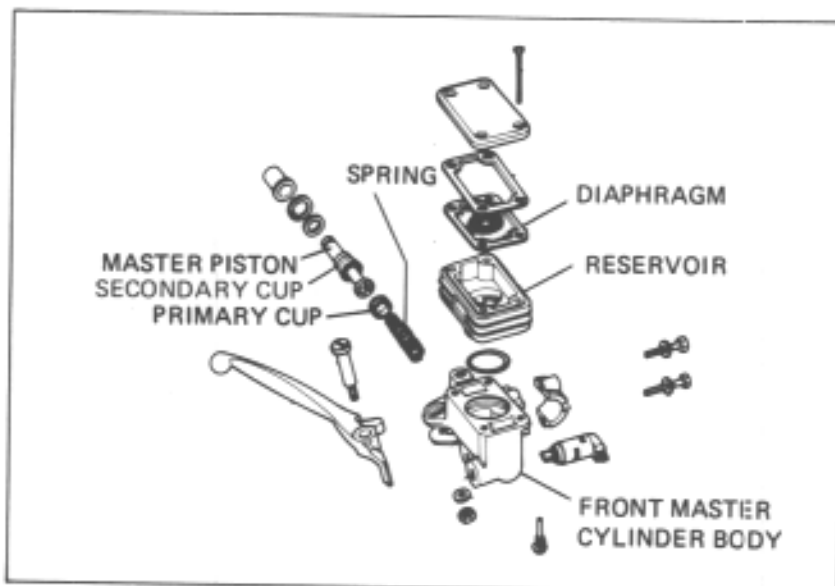




Remove the stop plate, secondary cup and master piston.  
Then remove the primary cup and spring.

Remove the brake fluid reservoir from the master cylinder body.

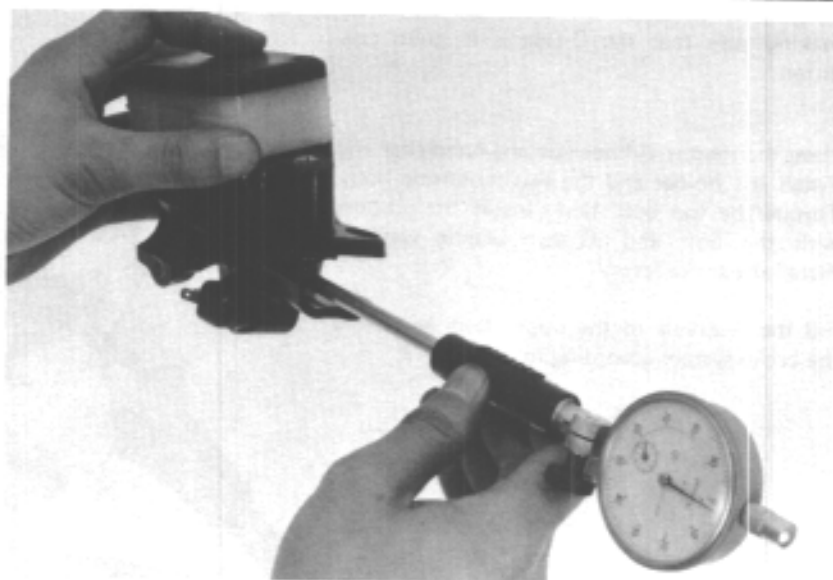
Clean the inside of the master cylinder and reservoir with brake fluid.



### MASTER CYLINDER I.D. INSPECTION

Measure the master cylinder I.D.  
Check the master cylinder for scores, scratches or nicks.

**SERVICE LIMIT: 14.055 mm (0.5533 in)**

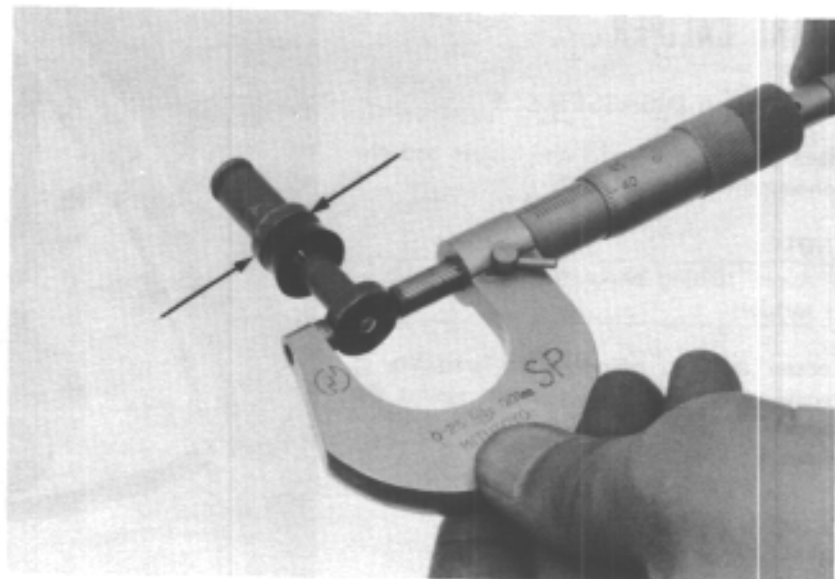


### MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

**SERVICE LIMIT: 13.945 mm (0.5490 in)**

Check the primary cup and secondary cup for damage before assembly.





## MASTER CYLINDER ASSEMBLY

### CAUTION

- Handle the master cylinder piston, cylinder and spring as a set.
- When installing the cups, do not allow the lips to turn inside out.
- Be certain the circlip is seated firmly in the groove.

Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Place the spring on the check valve. Install the spring and valve together.

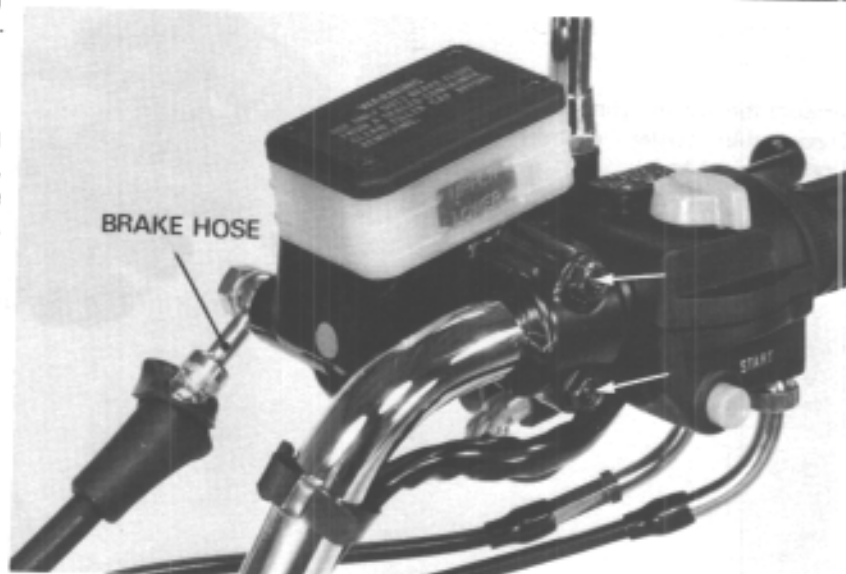
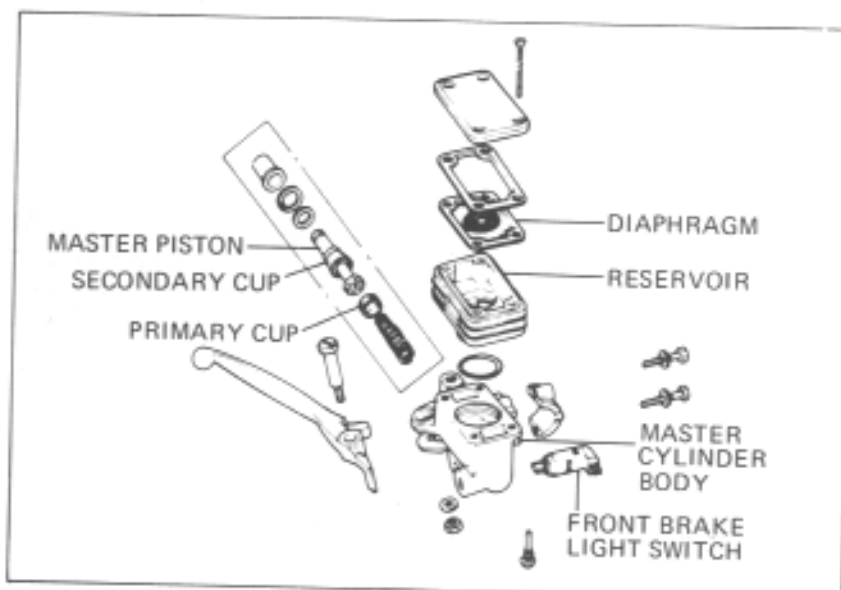
Dip the piston cup in brake fluid before assembly.

Install the boot, washer and clip.

Install the reservoir on the master cylinder making sure that the O-ring is in good condition.

Place the master cylinder on the handlebar and install the holder and the two mounting bolts. Torque the top bolt first. Install the oil hose with the bolt and its two sealing washers. Install the brake lever.

Fill the reservoir to the upper level and bleed the brake system according to page 15-3.



## BRAKE CALIPER

### CALIPER A DISASSEMBLY

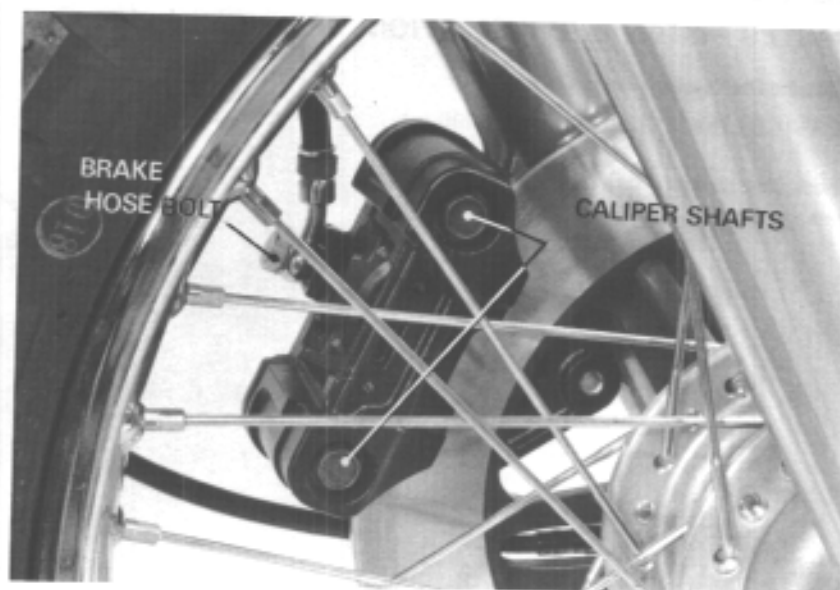
Place a container under the caliper and disconnect the brake hose bolt.

### NOTE

Avoid spilling brake fluid on painted surfaces.

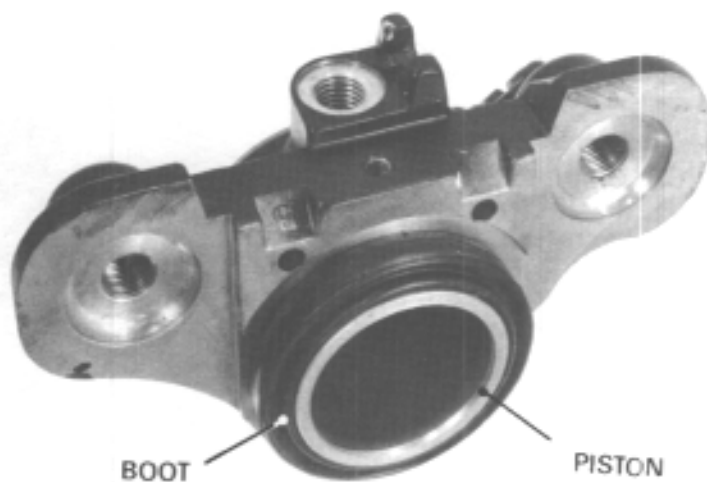
Loosen the two caliper shafts gradually in several steps while pressing them against the caliper.

Remove caliper A.





Remove the piston boot.  
Inspect the piston boot for damage or deterioration.



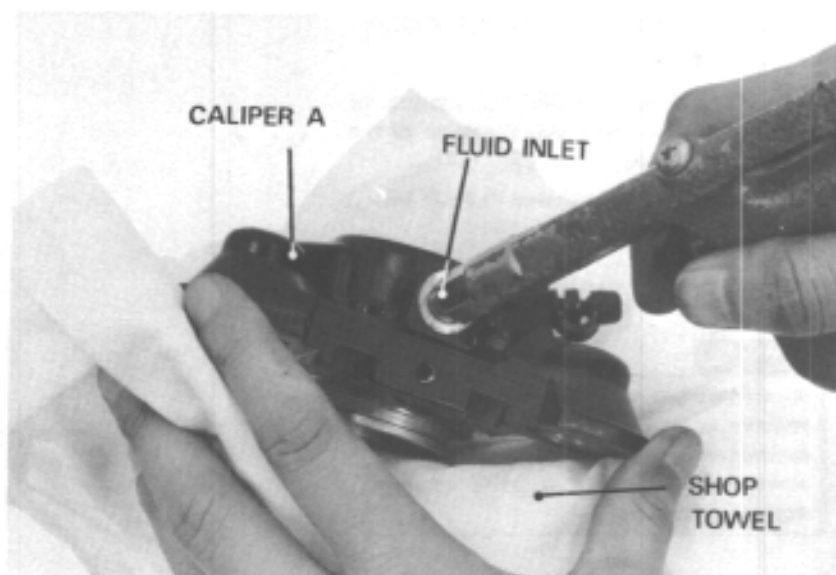
Place a shop towel over the piston to control piston removal, and position the caliper with the piston down.

Remove the piston by applying a small amount of air pressure to the fluid inlet.

**WARNING**

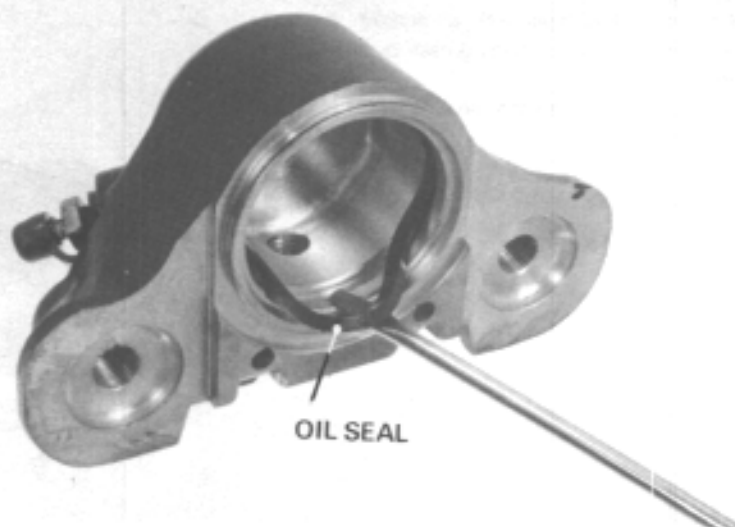
*Do not use high pressure air or bring the nozzle too close to the inlet.*

Examine the piston and cylinder for scoring or scratches and replace if necessary.



Remove the oil seal by first pushing it into the cylinder as shown.

Clean the caliper grooves with brake fluid.

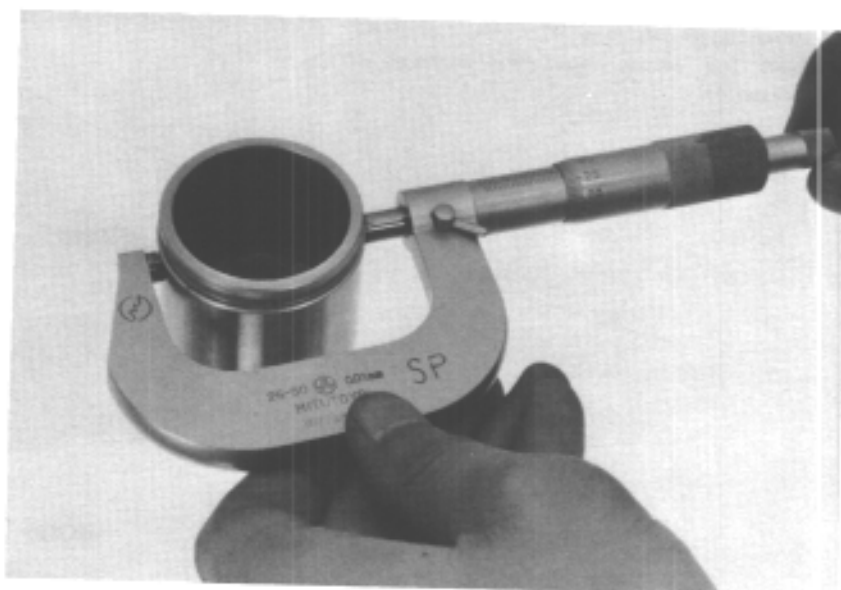




### FRONT CALIPER PISTON O.D. INSPECTION

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

**SERVICE LIMIT: 42.800 mm (1.6850 in)**



### FRONT CALIPER CYLINDER I.D. INSPECTION

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

**SERVICE LIMIT: 42.940 mm (1.6905 in)**

### FRONT BRAKE CALIPER ASSEMBLY

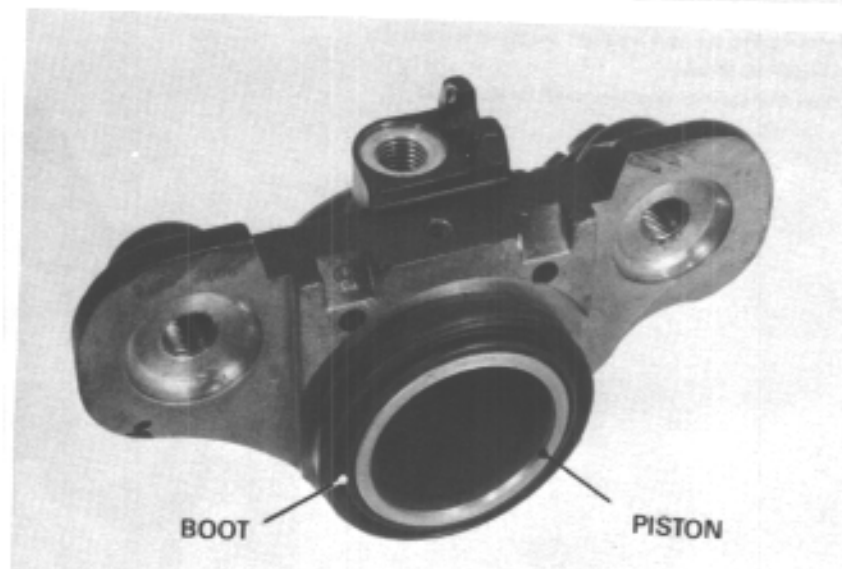
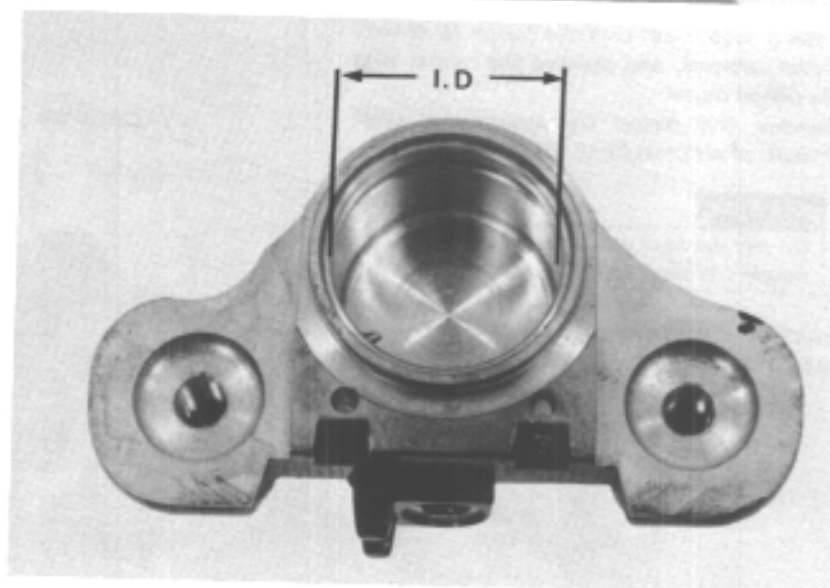
#### **WARNING**

*A contaminated brake disc or pad  
reduces stopping power. Replace con-  
taminated pads, and clean a con-  
taminated disc with a good quality  
degreasing agent.*

Assemble the caliper in the reverse order of  
disassembly. The oil seal must be replaced  
with a new one whenever removed. Lubricate  
the piston and seal with a medium grade of  
Hi-Temperature Silicone grease or brake fluid  
before assembly.

Be certain the piston seal is seated in the  
caliper groove.

Place the piston in the caliper with the boot  
lip facing out. Install the boot on the piston.

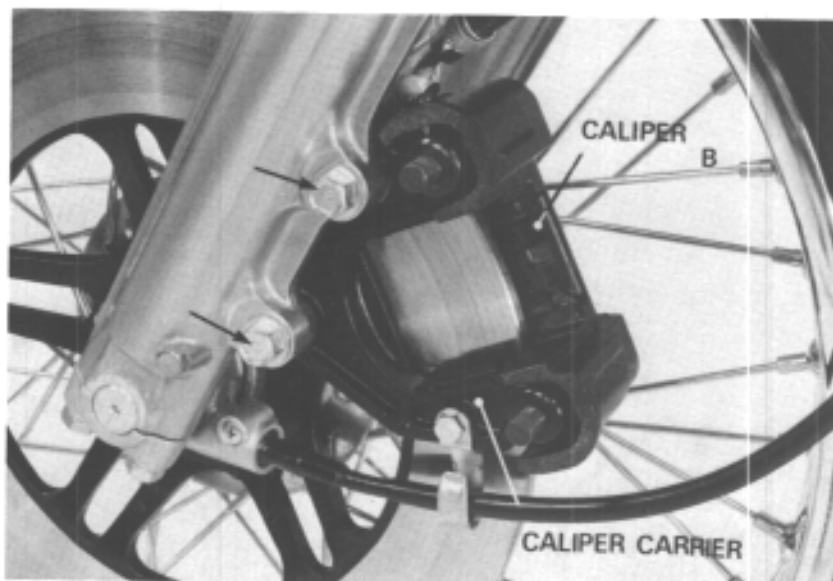






### CALIPER CARRIER/CALIPER B DISASSEMBLY

Remove the speedometer cable clamp.  
Remove the carrier with caliper B by  
removing the two bolts.



Remove the carrier shafts from the carrier and  
caliper B while rotating them by hand. Avoid  
damaging the boots.

### CALIPER CARRIER/CALIPER B ASSEMBLY

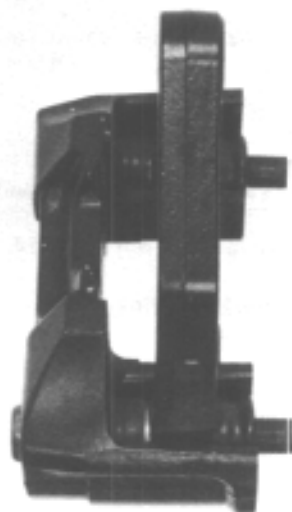
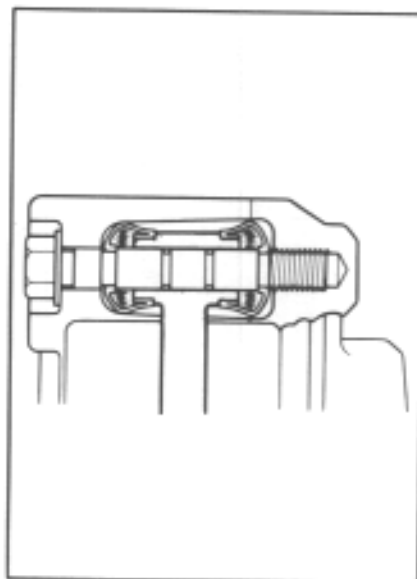
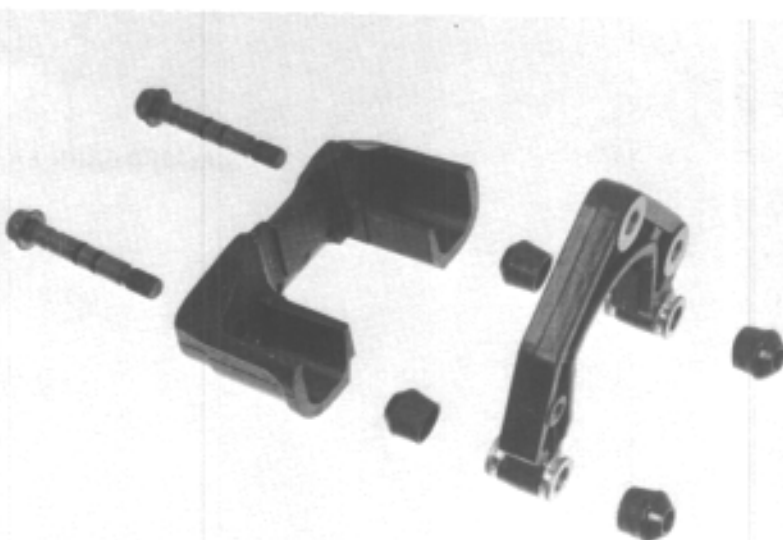
Wash all removed parts. Coat the O-rings with  
silicon grease or brake fluid and install in the  
shaft grooves.

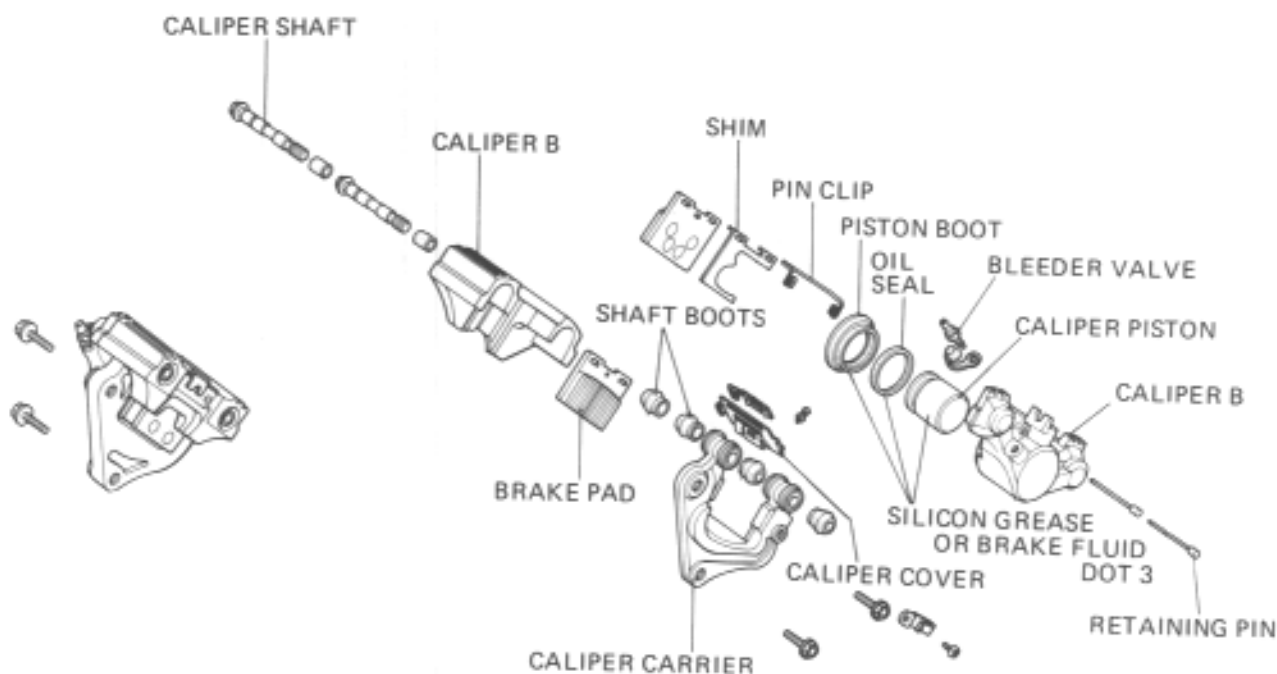
#### NOTE

Replace the O-rings with new ones  
whenever disassembled. Replace the  
boots with new ones if damaged.

Install the boots on the carrier.  
Assemble the caliper B and caliper carrier  
together, making sure that the boots are  
seated in the caliper shaft grooves properly.  
Install the carrier on the front fork.

**TORQUE: 3.0–4.0 kg-m (22–29 ft-lb)**





### CALIPER A INSTALLATION

Tighten the caliper shafts evenly while pushing them against caliper B.

#### NOTE

Tighten the shafts carefully, noting the mating surfaces of caliper A and B.

**TORQUE: 3.0–4.0 kg-m (22–29 ft-lb)**

Connect the brake hose.

Install the caliper cover.

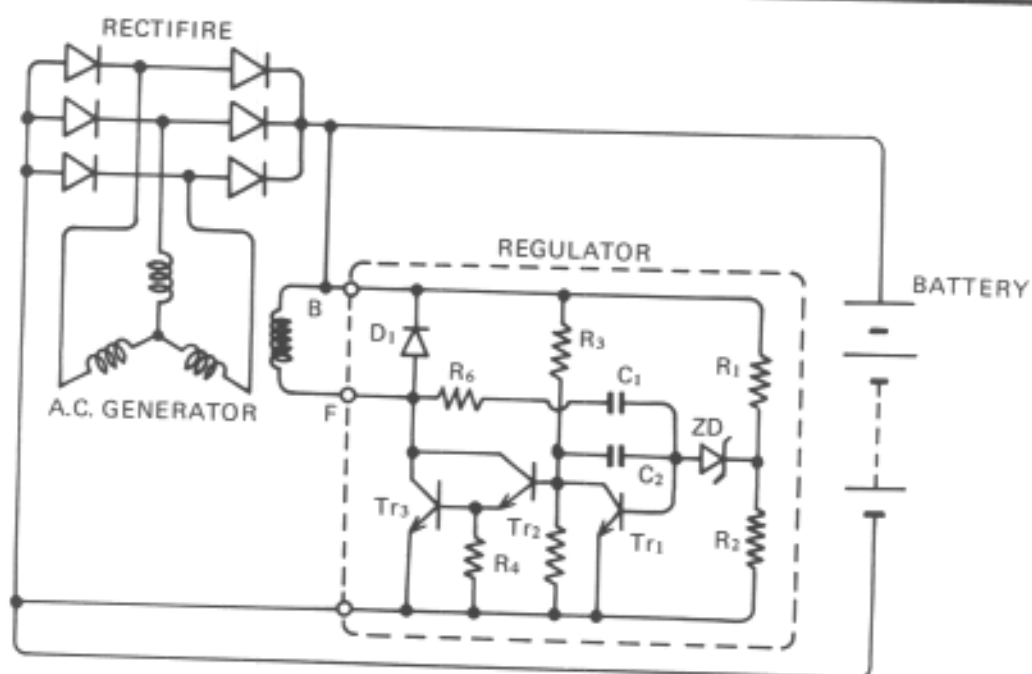
Fill the brake fluid reservoir and bleed the front brake system. (See page 15-3).



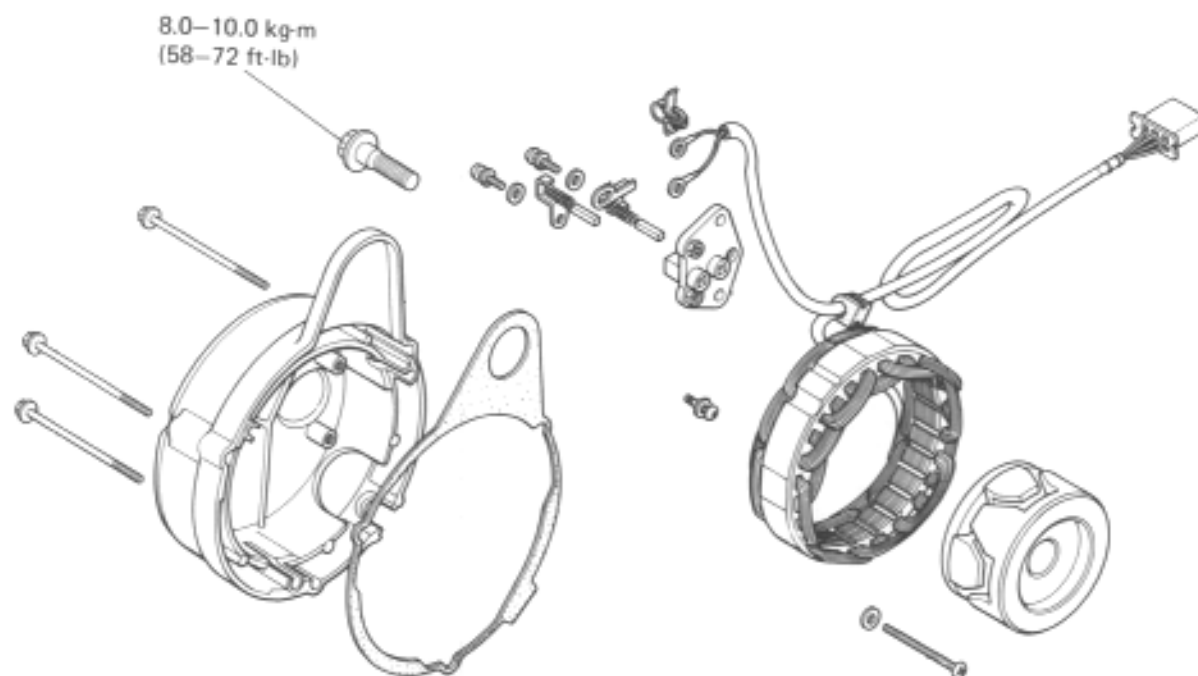




MEMO



BATTERY/CHARGING SYSTEM





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BATTERY	16-3
CHARGING SYSTEM	16-4
A. C. GENERATOR REMOVAL/ INSTALLATION	16-5
VOLTAGE REGULATOR	16-8

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery, only in an emergency. Slow-charging is preferred.  
Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

#### **WARNING**

*Do not smoke, and keep flames away from a charging battery. The gas produced by a battery will explode if a flame or spark is brought near.*

- All charging system components can be tested on the motorcycle.

### SPECIAL TOOLS

Common tools

Rotor puller 07933-4250000

### SPECIFICATIONS

Battery	Capacity	12 V 14 AH	
	Specific gravity	1.28/20°C (68°F)	
	Charging rate	1.4 amperes maximum	
A.C. generator	Capacity	1500 rpm	5000 rpm
		6.5A min	18A min
Voltage regulator		Transistorized non-adjustable regulator	



## TROUBLESHOOTING

### No power — key turned on:

1. Dead battery
  - Low fluid level
  - Low specific gravity
  - Charging system failure
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

### Low power — key turned on:

1. Weak battery
  - Low fluid level
  - Low specific gravity
  - Charging system failure
2. Loose battery connection

### Low power — engine running:

1. Battery undercharged
  - Low fluid level
  - One or more dead cells
2. Charging system failure

### Intermittent power:

1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection
4. Loose connection or short circuit in ignition system
5. Loose connection or short circuit in lighting system

### Charging system failure:

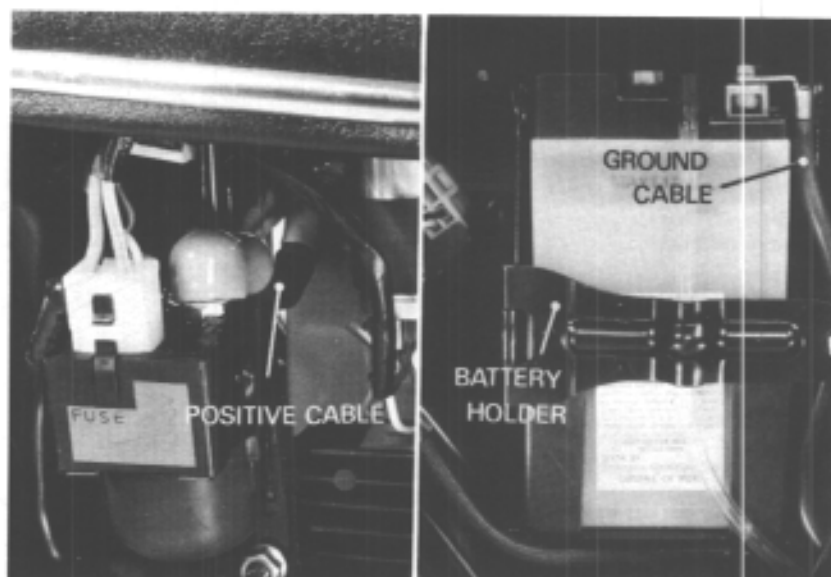
1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty silicon rectifier
4. Faulty A.C. generator



### BATTERY

#### REMOVAL

Remove the right and left side covers.  
Disconnect the ground cable at the battery terminal.  
Disconnect the positive cable at the starter relay switch terminal.  
Remove the battery holder.



#### TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

**SPECIFIC GRAVITY:**  
(20°C, 68°F)

1.26—1.28	Fully charged
Below 1.25	Undercharged

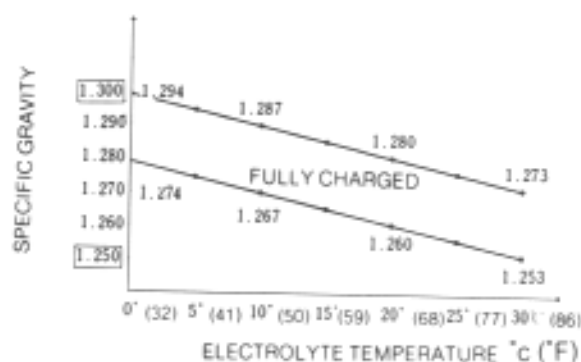
#### NOTE

- The battery must be recharged if the specific gravity is below 1.22.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.

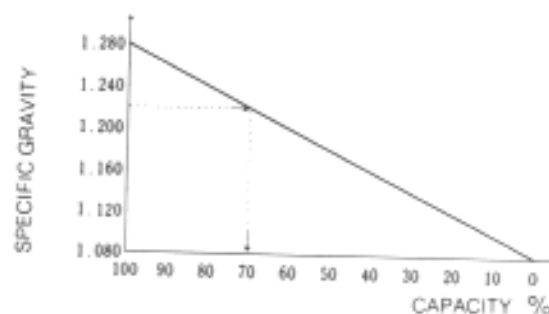
#### WARNING

*The battery contains sulfuric acid.  
Avoid contact with skin, eyes, or clothing.  
Antidote: Flush with water and get prompt medical attention.*

#### ELECTROLYTE TEMPERATURE VS SPECIFIC GRAVITY



#### SPECIFIC GRAVITY AND CAPACITY





## BATTERY CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (-) cable to the battery negative (-) terminal.

## Charging current:

1.4 amperes max.

## Charging:

Charge the battery until specific gravity is 1.26–1.28 at 20°C (68°F).

## WARNING

- Before charging a battery, remove the cap from each cell.
- Keep flames and sparks away from a charging battery.
- Turn power ON/OFF at the charger, not at the battery terminals.
- Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).

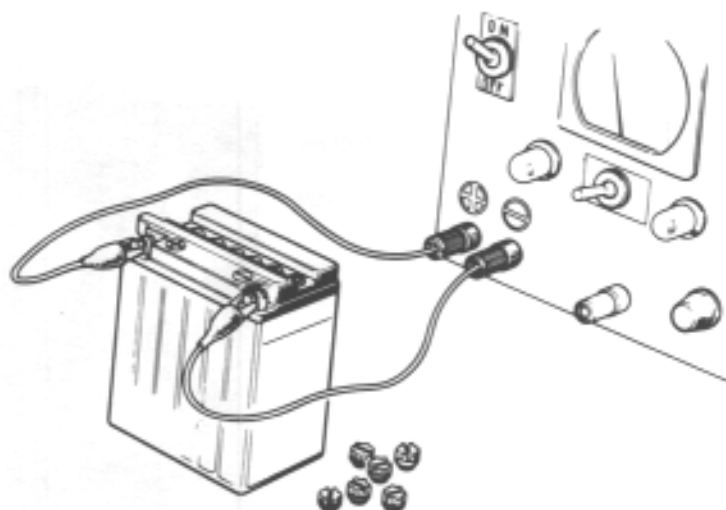
## CAUTION

Quick-charging should only be done in an emergency; slow-charging is preferred.

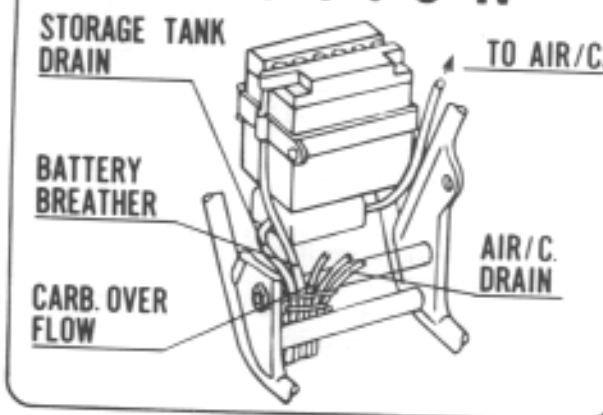
After installing the battery, coat the terminals with clean grease.

## CAUTION

Route the breather tube as shown on the battery caution label.



## CAUTION



## CHARGING SYSTEM

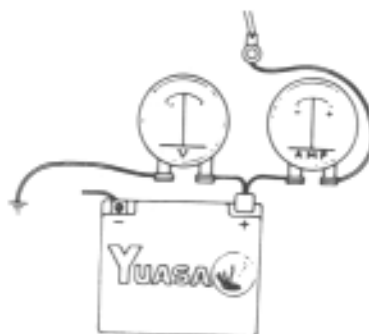
## CHARGING OUTPUT TEST

Warm up the engine before taking readings.

Connect a voltmeter and an ammeter to check charging system output.

## NOTE

Use a fully charged battery to check the charging system output.



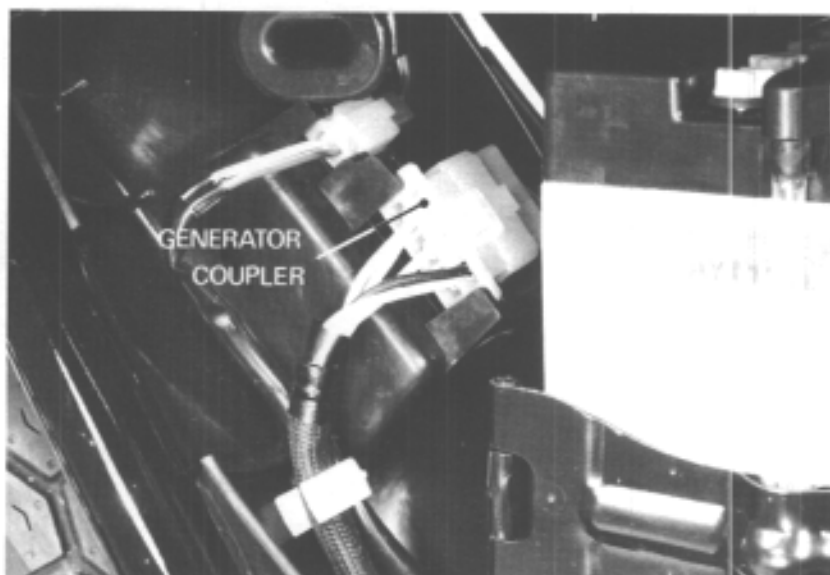
## TECHNICAL DATA

MAIN SWITCH	LIGHTING SWITCH	INITIAL CHARGING	AT 5,000 RPM
ON	ON (High beam)	1,700 rpm	0 amperes minimum/14 volts



## A.C. GENERATOR REMOVAL/ INSTALLATION

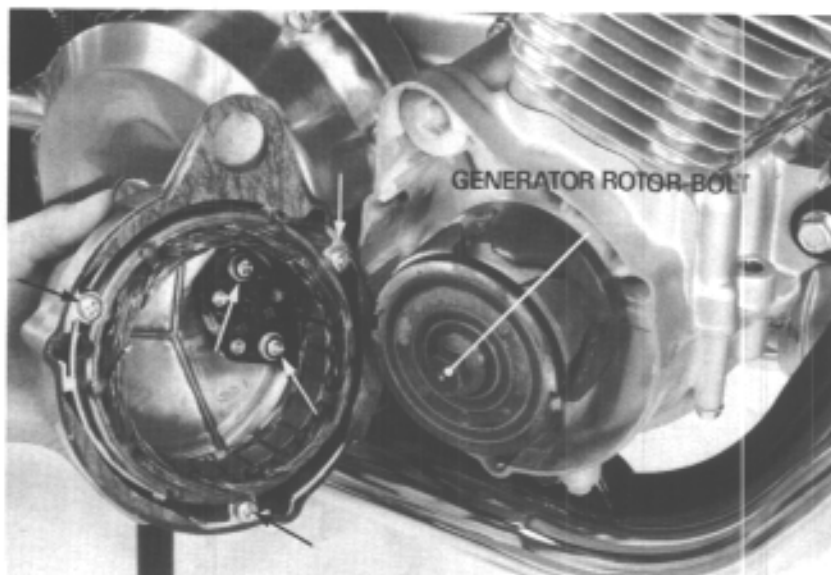
Remove the right side cover and disconnect the A. C. generator coupler.



Remove the A. C. generator cover by loosening three bolts.

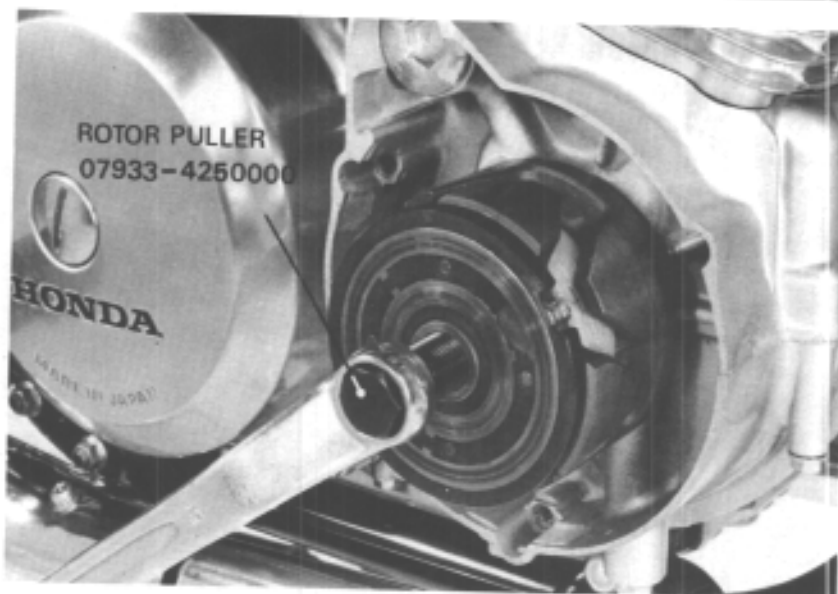


Remove the generator stator with the brush holder by loosening five screws.  
Shift the transmission into gear and apply the rear brake.  
Remove the generator rotor bolt.





Remove the generator rotor while applying the rear brake.



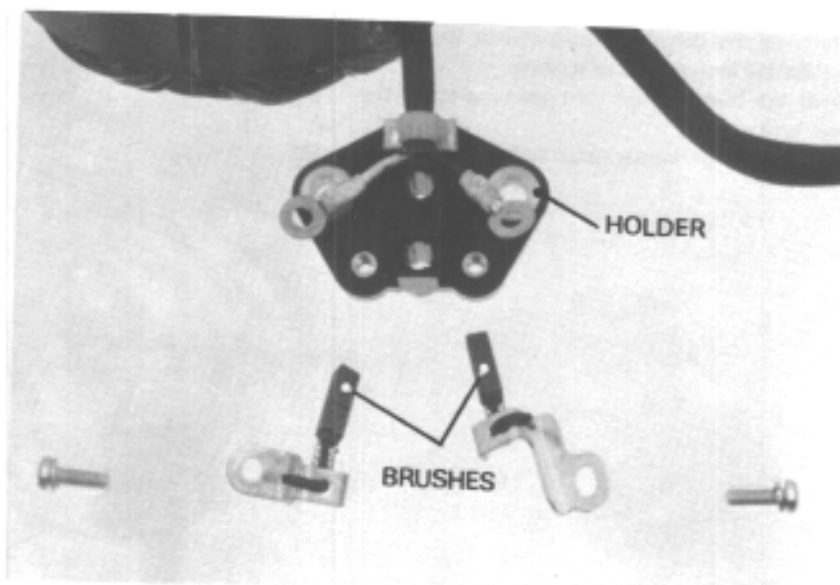
### INSPECTION

Inspect the length of each brush as shown. If it shows wear to the scribed service limit line, replace the brush.

**SERVICE LIMIT:** Scribed line



Remove and replace the brush by removing the mounting screws.







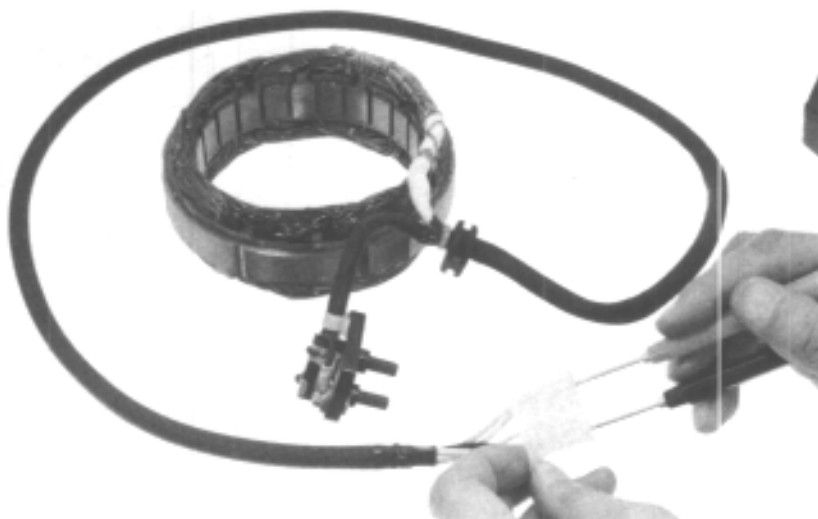
## STATOR COIL CONTINUITY TEST

### NOTE

It is not necessary to remove the stator to make this test.

Check the yellow leads to the A. C. generator stator for continuity with each other. Replace the stator if any yellow lead is not continuous with the others, or if any lead has continuity to ground.

**SPECIFIED RESISTANCE:** 0.41–0.51 $\Omega$

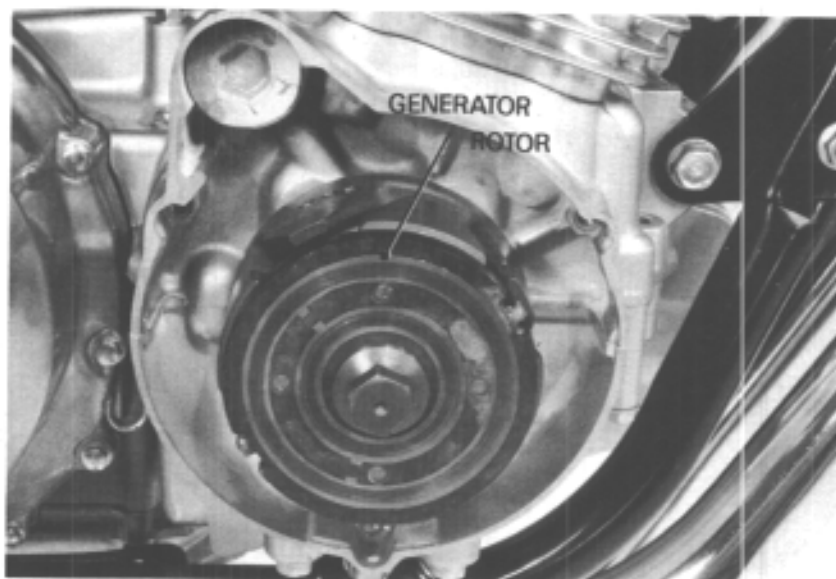


## INSTALLATION

Install the generator rotor.

**TORQUE:** 8.0–10.0 kg-m (58–72 ft-lb)

Route the generator leads properly.





## VOLTAGE REGULATOR

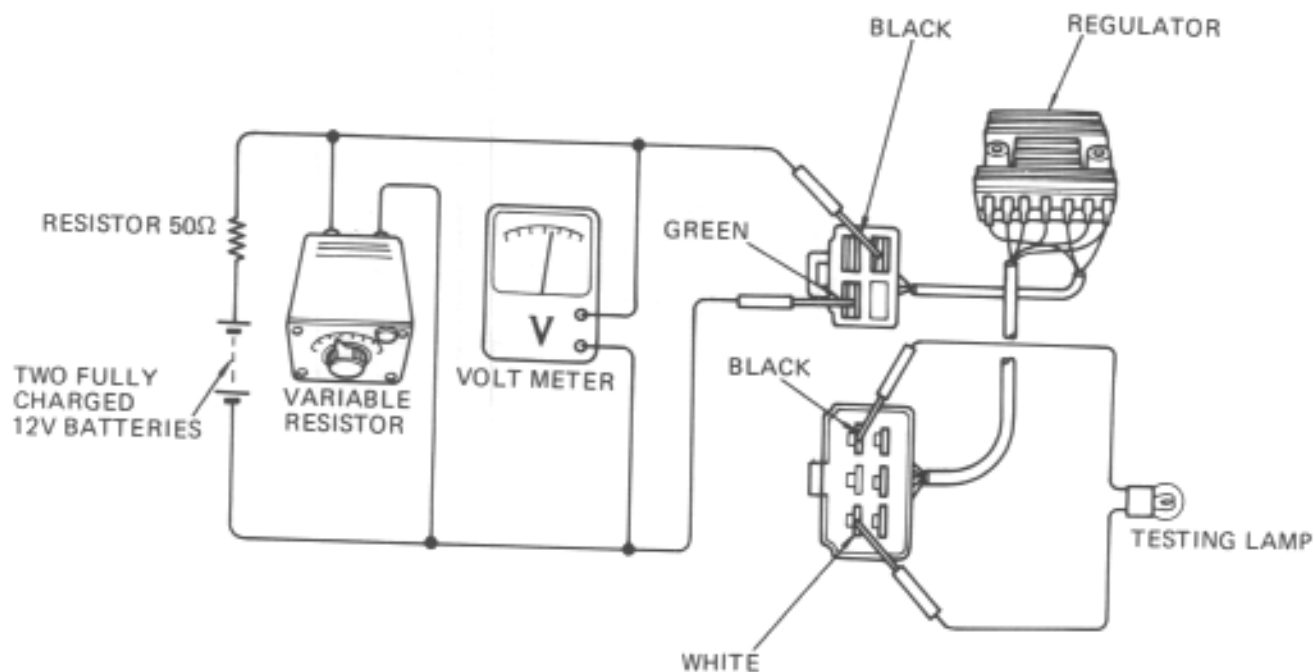
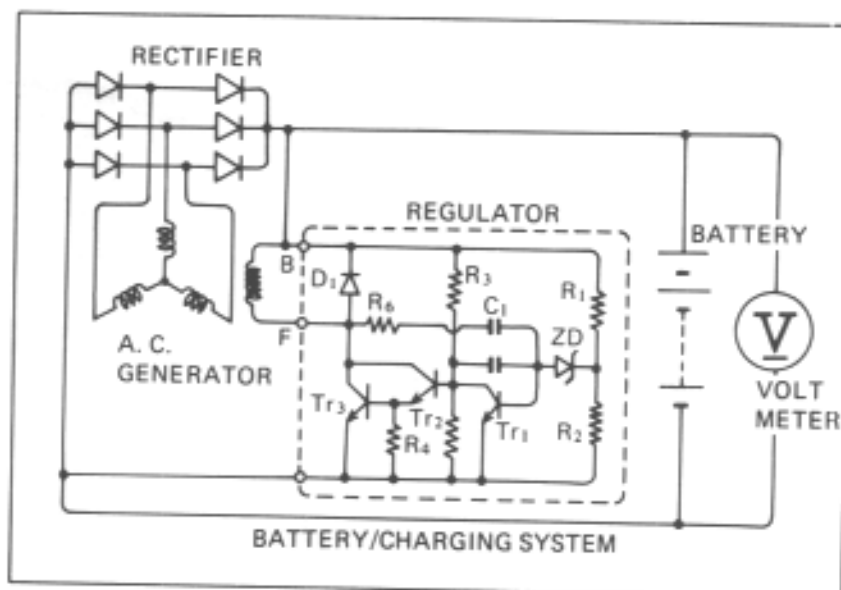
### VOLTAGE REGULATOR PERFORMANCE TEST

#### a. Testing with a voltmeter

Connect a voltmeter across the battery.  
 Check regulator performance with the engine running.  
 Regulator must cut off the field coil current when battery voltage reaches 14–15V.

#### b. Testing with a variable resistor

Connect two 12V batteries in series.  
 Connect a variable resistor (0–100Ω) across the battery with a 50Ω resistor in between.  
 Test lamp must go out when voltage reaches 14–15V on the voltmeter by adjusting the variable resistor.





### VOLTAGE REGULATOR/ RECTIFIER TEST

Check the resistance between the leads with an ohmmeter.

#### RESISTANCE IN NORMAL DIRECTION:

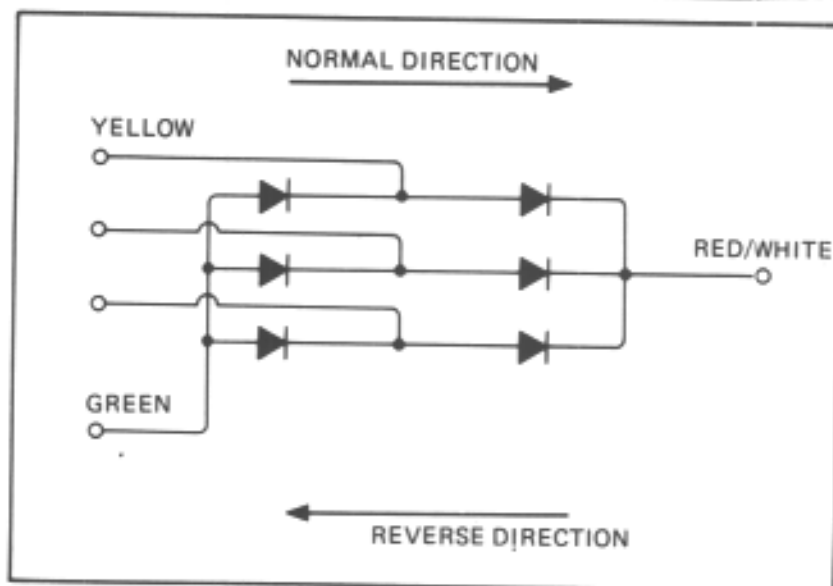
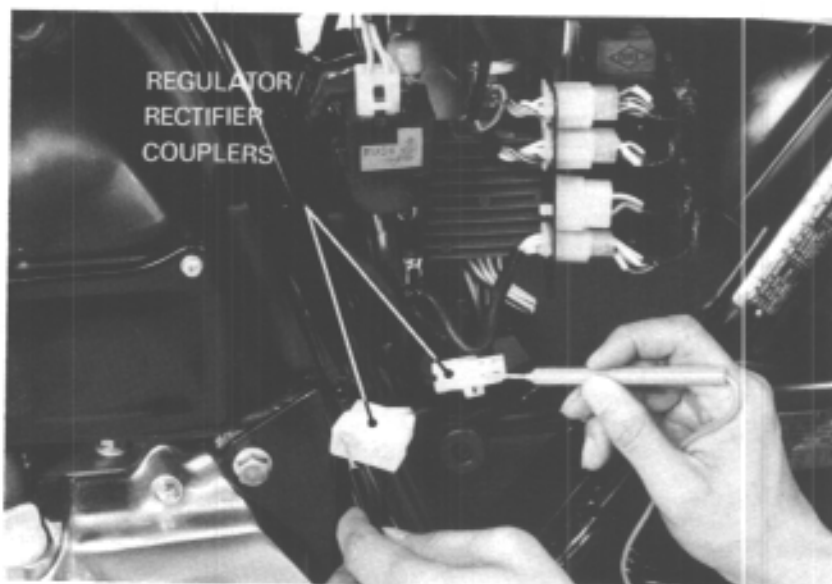
Green and any yellow: 5–40 $\Omega$

Red/white and any yellow 5–40 $\Omega$

#### RESISTANCE IN REVERSE DIRECTION:

Red/white and any yellow 2000 $\Omega$  min.

Green and any yellow 2000 $\Omega$  min.





## MEMO



SERVICE INFORMATION	17-1
TROUBLESHOOTING	17-2
IGNITION COIL	17-3
TRANSISTORIZED IGNITION SYSTEM (Pulser Generator, Spark Unit)	17-4
SPARK ADVANCER	17-6

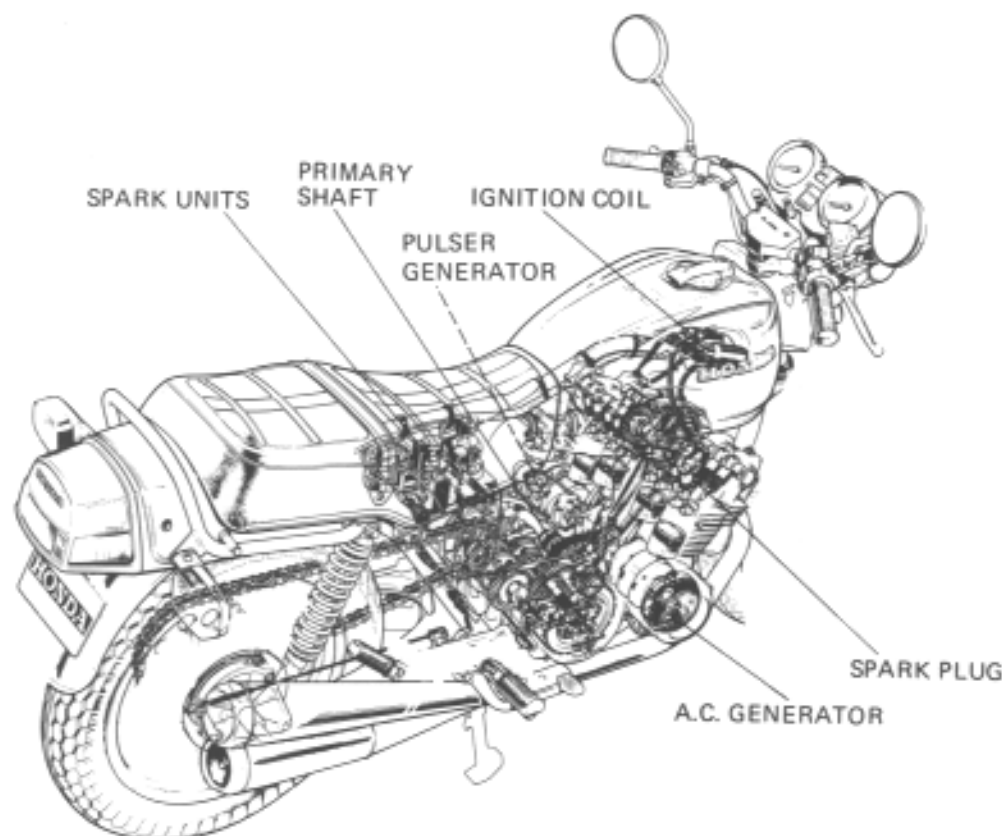
## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments are to be made unless the pulser generator screws are loosened. If these screws are loosened, ignition timing for either the No. 1 or No. 4 cylinder must be adjusted. For spark plug information, see page 3-5.

### SPECIFICATIONS

		For cold climate (below 5°C, 41°F)	Standard	For extended high speed riding
Spark plug U.S.A. only	ND	X22ES-U	X24ES-U	X27ES-U
	NGK	D7EA	D8EA	D9EA
Spark plug (Canada model)		ND X24ESR-U, NGK DR8ES-L		
Spark plug gap		0.6-0.7 mm (0.024-0.028 in)		
Ignition timing	At idle rpm	10° (BTDC)		
	Full advance/rpm	40° BTDC/6,000 rpm-36° BTDC/7,400 rpm		
Ignition coil		3-point spark test	6 mm (1/4 in) minimum	



## TROUBLESHOOTING

### NOTE

The ignition system has two sub-systems; one for the No. 1 and No. 4 cylinders and one for No. 2 and No. 3 cylinders. Determine which sub-system is faulty, then proceed to the detailed tests below.

#### Engine cranks but will not start

- Engine stop switch OFF.
- No spark at plugs
- Faulty transistorized spark unit
- Faulty pulser generator

#### No spark at plug

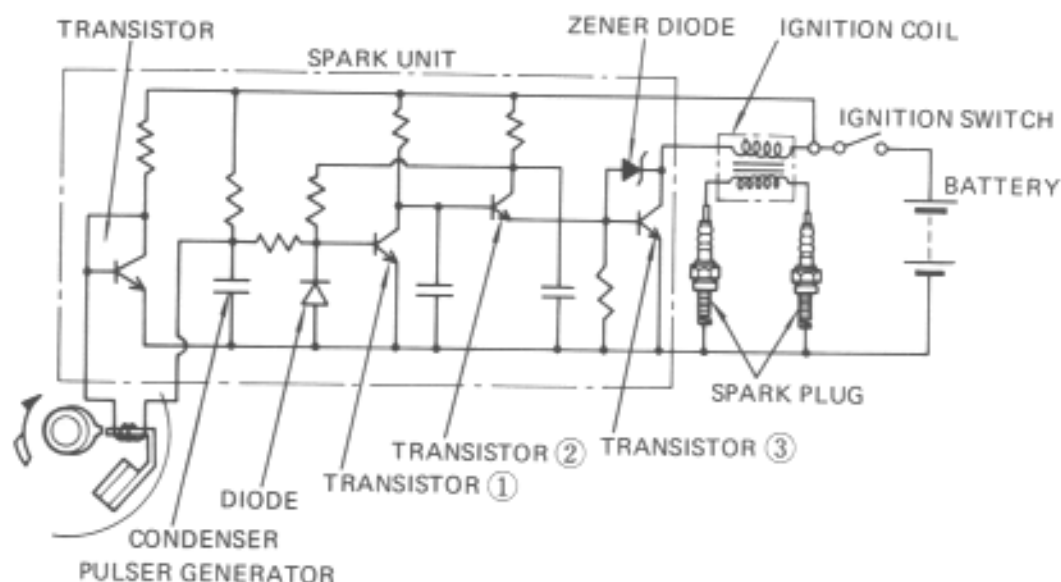
- Engine stop switch OFF
- Poorly connected, broken or shorted wires
  - Between ignition switch and engine stop switch
  - Between spark unit and engine stop switch
  - Between spark unit and ignition coil
  - Between ignition coil and plug
  - Between spark unit and pulser generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty spark unit
- Faulty pulser generator

#### Engine starts but runs poorly

- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Intermittent short circuit
- Secondary circuit
  - Faulty plug
  - Faulty high tension cord

#### Timing advance incorrect

- Centrifugal advancer faulty



## IGNITION COIL

### REMOVAL

Remove the fuel tank.  
Disconnect the wire leads.  
Remove the coils by removing the attaching bolts.



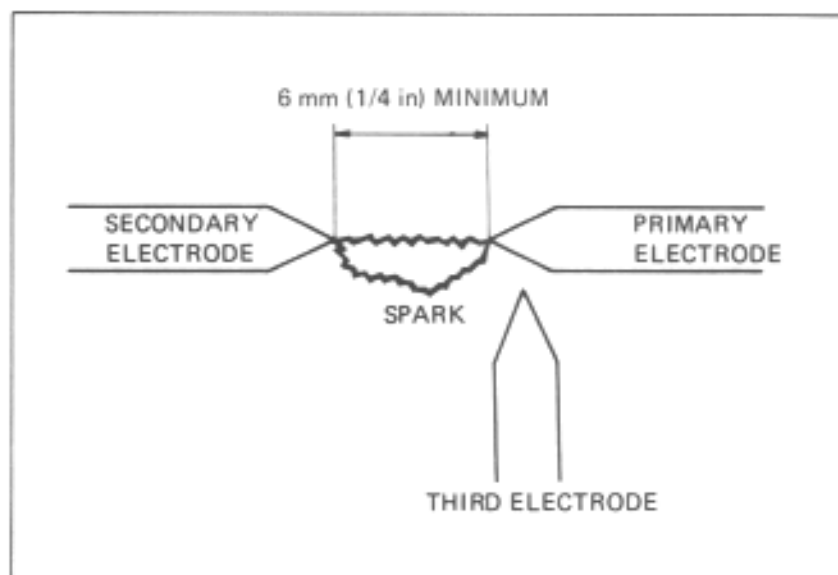
### PERFORMANCE TEST

Perform the 3-point spark test with a coil tester.

**SERVICE LIMIT:** 6 mm (1/4 in) min.

#### NOTE

Follow the coil tester manufacturers instructions.



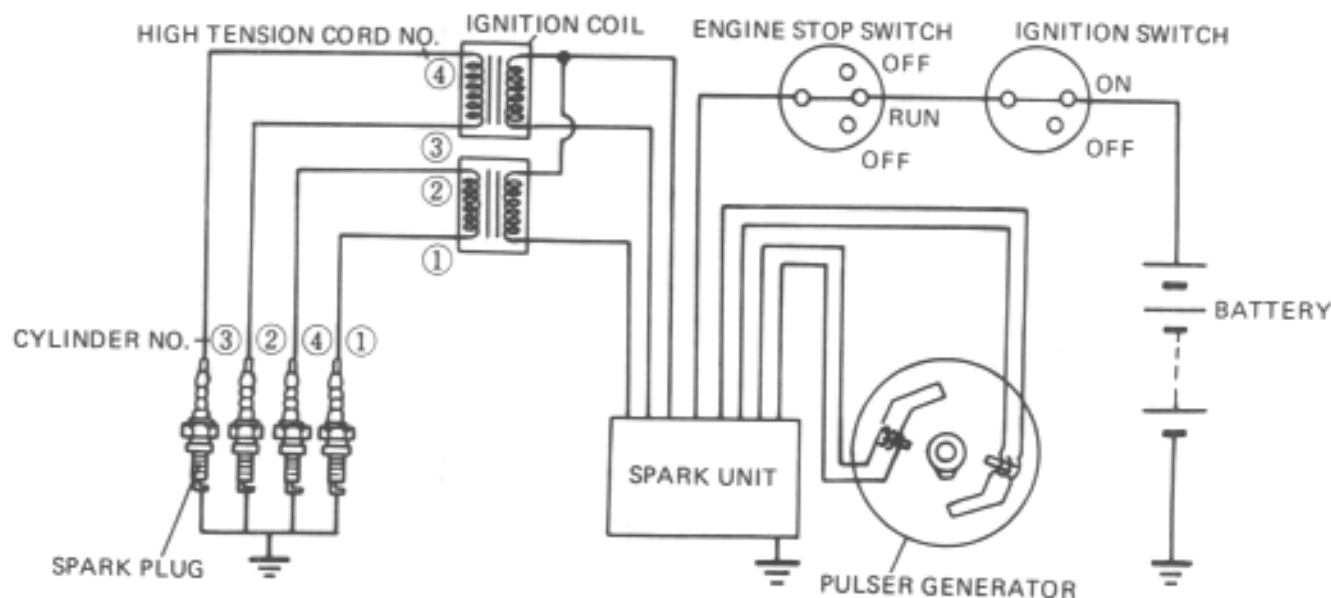
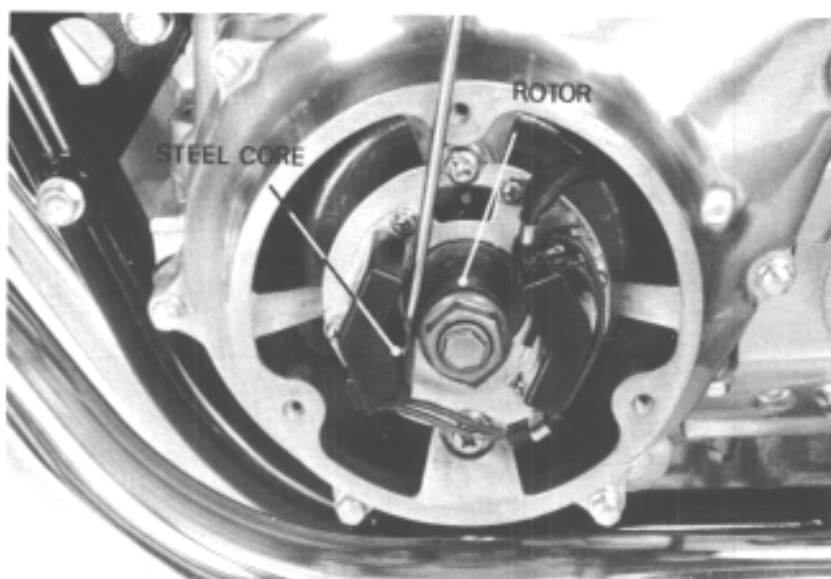


## TRANSISTORIZED IGNITION SYSTEM

### INSPECTION

#### System

Disconnect the 1 and 2 plugs.  
Hold each plug against any convenient engine ground.  
Turn the ignition switch on.  
Remove the pulser generator cover.  
Touch the end of a screwdriver to the rotor and one pulser generator steel core.  
Repeat this operation several times.  
A good spark to the plug means that the ignition system for that cylinder is in good shape.  
Repeat the above for the other pulser.



#### Pulser generator

Measure the coil resistance.

**COIL RESISTANCE:**  $530 \pm 50 \Omega$  ( $20^{\circ}\text{C}$ ,  $68^{\circ}\text{F}$ )

Between yellow leads (2, 3 cylinders)

Between blue leads (1, 4 cylinders)

Measure the clearance between the pulser generator steel core and the rotor tooth.  
Adjust the clearance by moving the pulser generator coil.

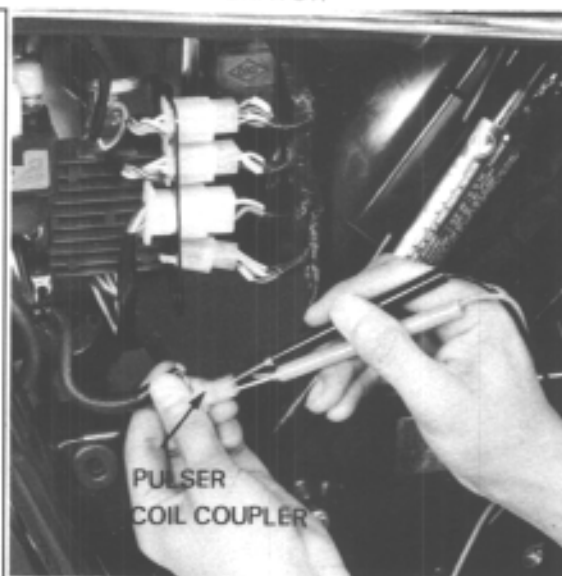
Replace the pulser generator assembly if necessary.

**CLEARANCE:** 0.4–0.7 mm  
(0.016–0.027 in)

PULSER  
GENERATOR COIL

ROTOR

**CLEARANCE:**  
0.4–0.7 mm  
(0.016–0.027 in)

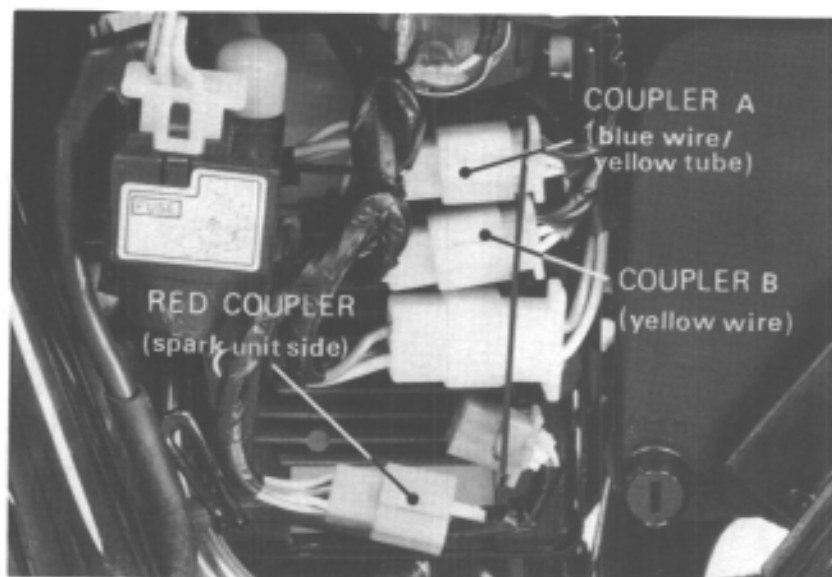




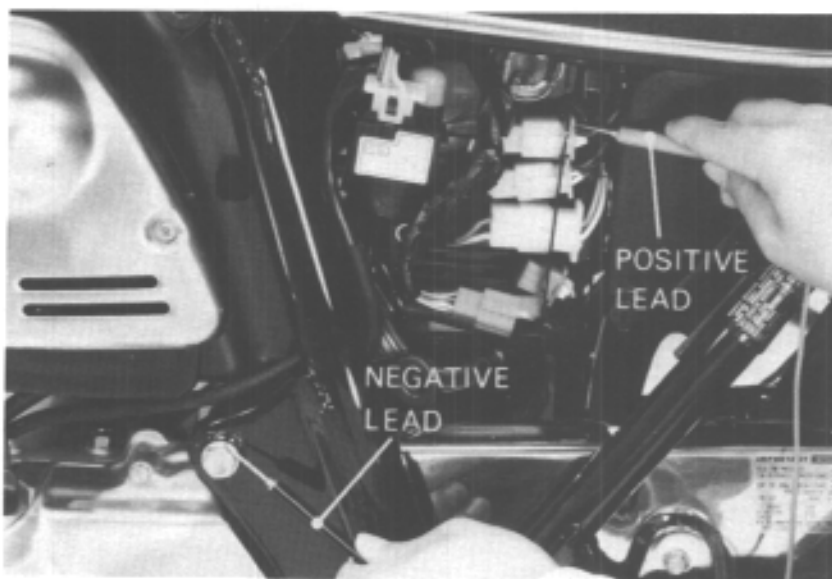


### Spark unit

Disconnect the red coupler. Turn the ignition switch on. Set voltmeter to the 0–25V DC scale.



Touch the positive meter lead to the blue wire (with yellow tube) of coupler A; ground the negative lead. The meter should read 12V (battery voltage.)



With the voltmeter leads in place, use a jumper wire to ground the blue wire (with white tube) terminal on the male (spark unit) side of the red coupler. Voltage should drop to 0–2V DC.

Move the positive voltmeter lead to the yellow wire of coupler B. Voltage should be 12V DC.

Move the jumper lead from the blue wire (with white tube) to the yellow wire (with white tube) terminal of the red coupler. Voltage should drop to 0–2V DC.

Replace the spark units if they are faulty.





### PULSER REPLACEMENT

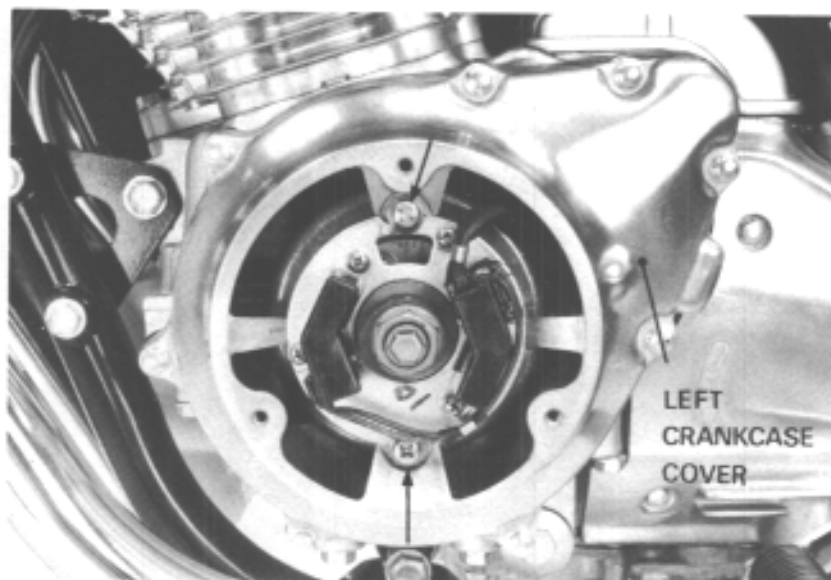
If pulser replacement is necessary, loosen the two pulser base plate screws.

Remove the left crankcase cover.

Remove the left rear crankcase cover.

Replace the pulser generator assembly.

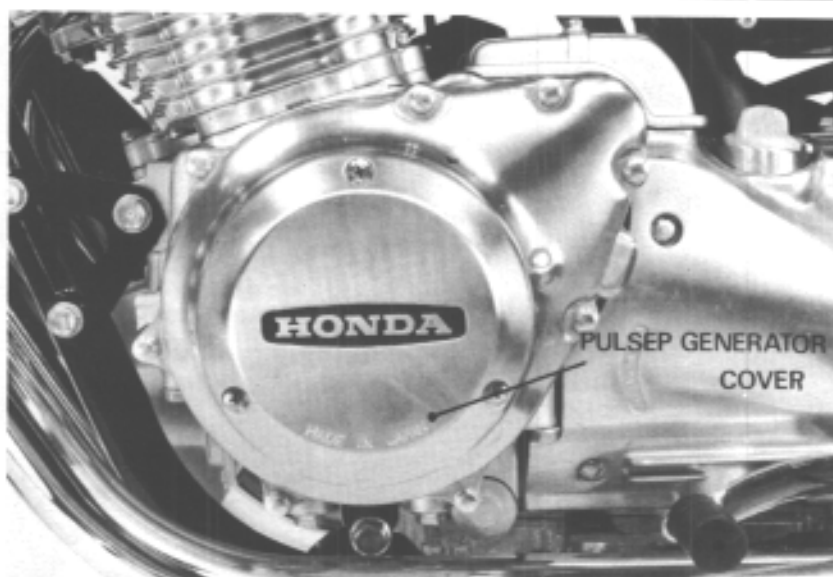
Adjust the ignition timing (Page 3-5).



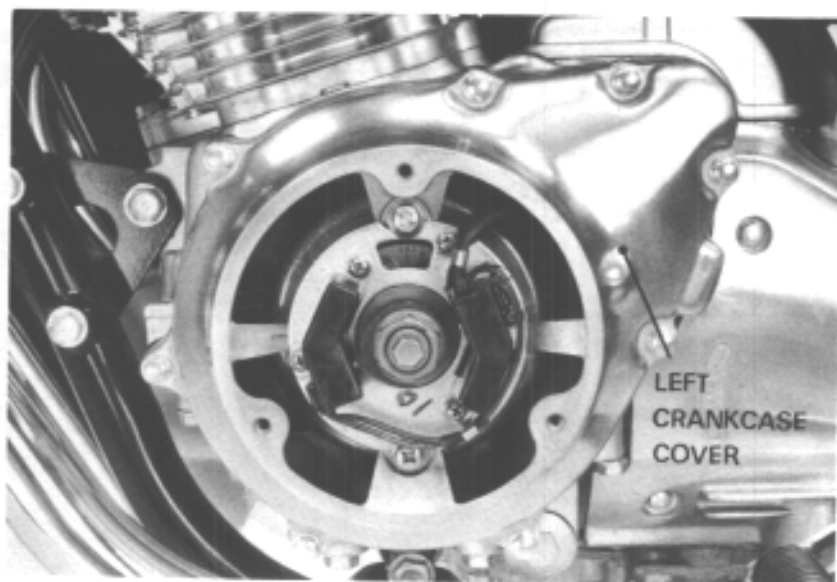
### SPARK ADVANCER

For advancer function test, see Page 3-6.

Remove the pulser generator cover screws and cover.



Remove the left crankcase cover screws and cover.

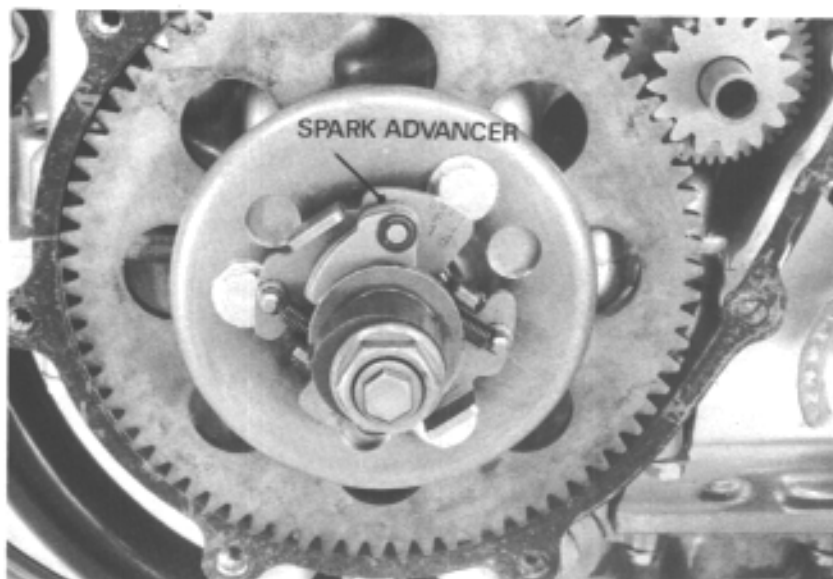




### ADVANCER VISUAL INSPECTION

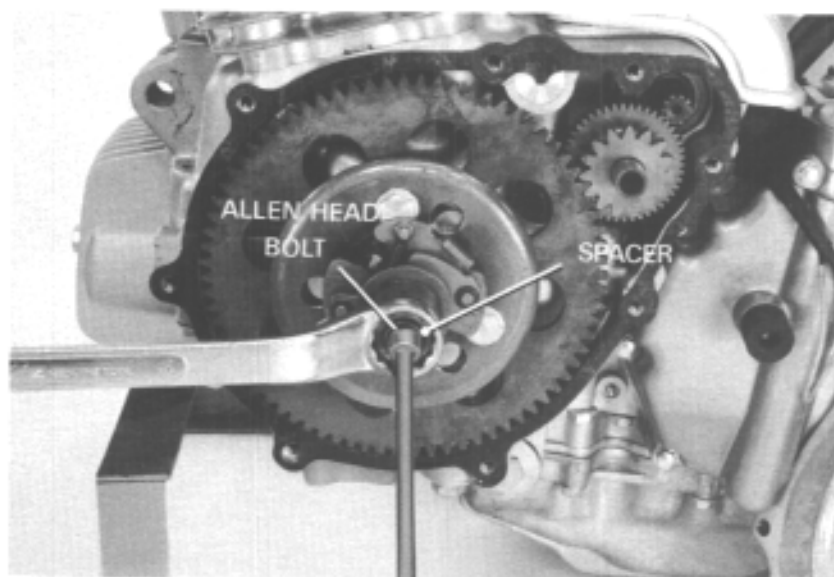
Check the mechanical advancer cam for sticking.

Lubricate the sliding surfaces, and check the spring for loss of tension and advancer pin for excessive wear if the advancer fails to return.



### ADVANCER REPLACEMENT

Remove the bolt by holding the spacer.  
Remove the advancer.



Install the advancer.

Align the pin on the advancer with the slot in the crankshaft.

Tighten the hex. head bolt.

**TORQUE: 2.1–2.5 kg-m (15–18 ft-lb)**





## MEMO



SERVICE INFORMATION	18-1
TROUBLESHOOTING	18-1
STARTER MOTOR	18-2
STARTER RELAY SWITCH	18-5

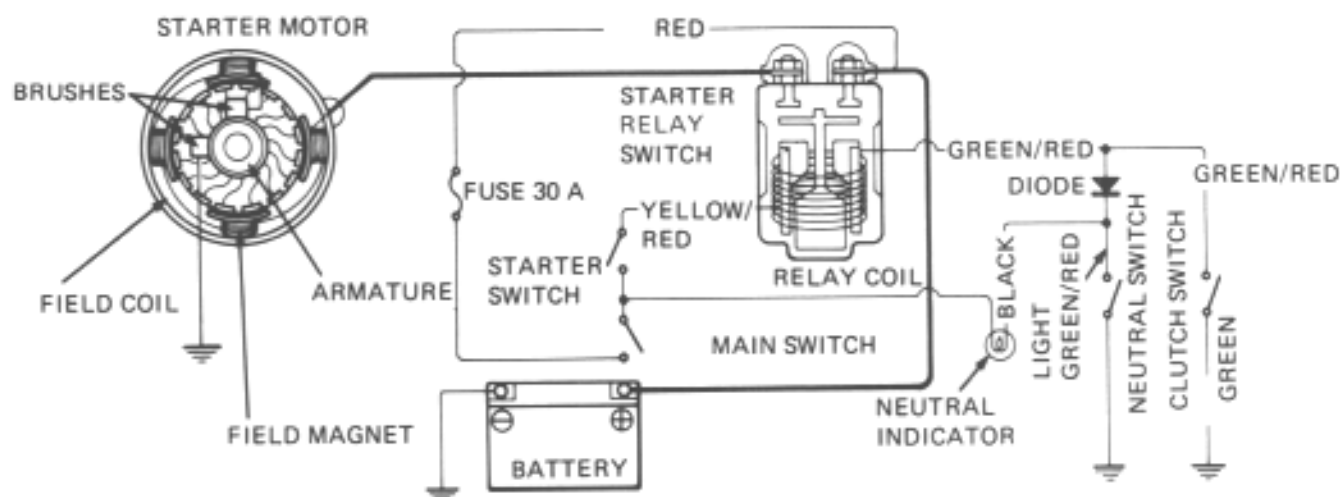
## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

The starter motor can be removed with the engine in the frame.

### SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	560 g—680 g (19.75—23.89 oz)	560 g (19.75 oz)
	Brush length	12.0—13.0 mm (0.47—0.51 in)	7.5 mm (0.30 in)



## TROUBLESHOOTING

### Starter motor will not turn:

- Battery discharged
- Faulty ignition switch
- Faulty starter switch
- Faulty neutral switch
- Faulty starter relay switch
- Loosen or disconnected wire or cable
- Neutral diode open

### Starter motor turns engine slowly

- Low specific gravity
- Excessive resistance in circuit
- Binding in starter motor

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

- Faulty starter clutch
- Faulty starter motor gears
- Faulty starter motor or idle gear

### Starter motor and engine turns, but engine does not start

- Faulty ignition system
- Engine problems



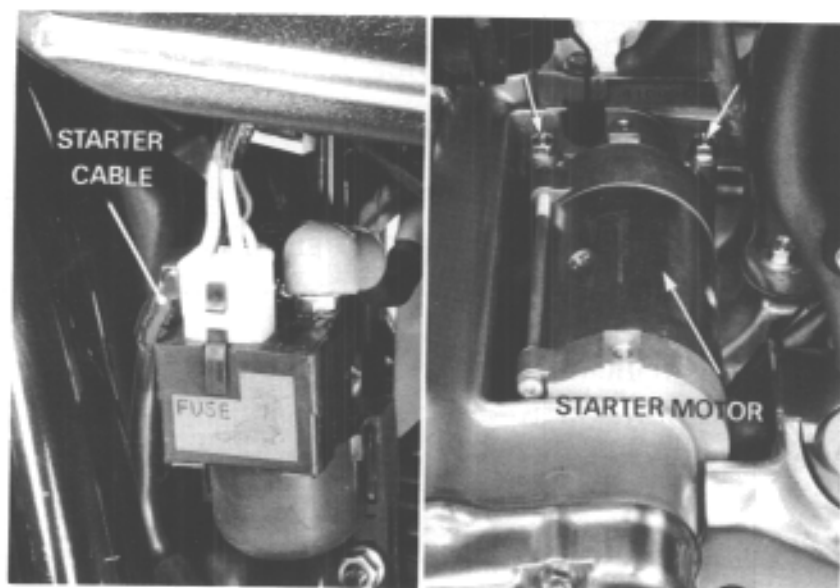
## STARTER MOTOR

### REMOVAL

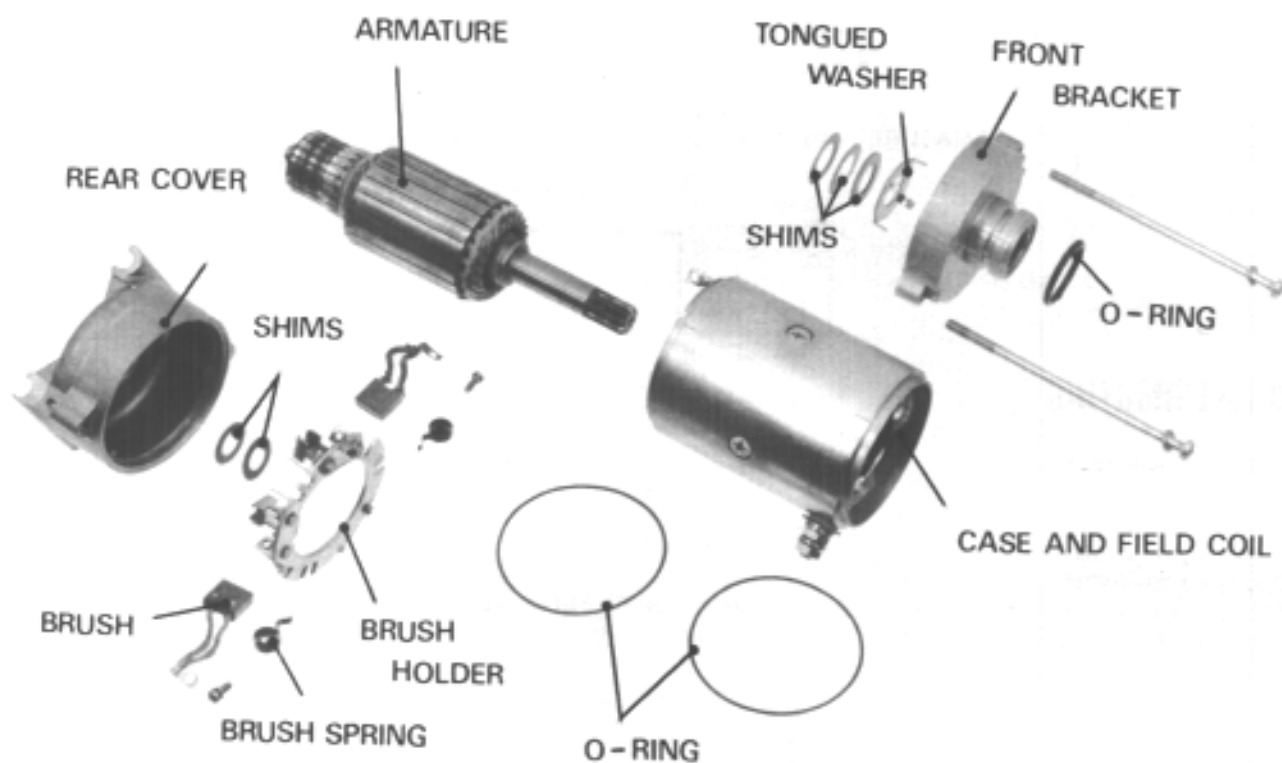
#### WARNING

*With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.*

Remove the right side cover and disconnect the starter cable at the starter relay switch.



Remove the starter motor cover and starter motor.



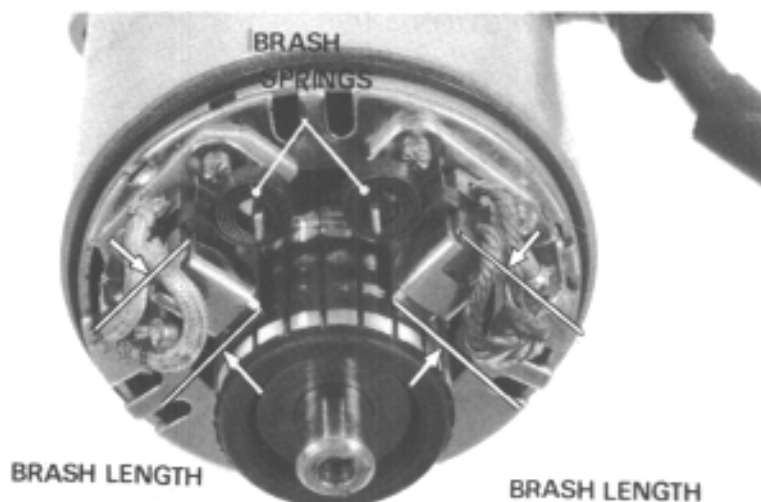


### BRUSH INSPECTION

Remove the starter motor case screws.  
Inspect the brushes and measure the brush length.  
Measure brush spring tension with a spring scale.

#### SERVICE LIMITS:

Brush length: 7.5 mm (0.30 in)  
Brush spring tension: 560 g (19.75 oz)



### COMMUTATOR INSPECTION

Remove the starter motor case.

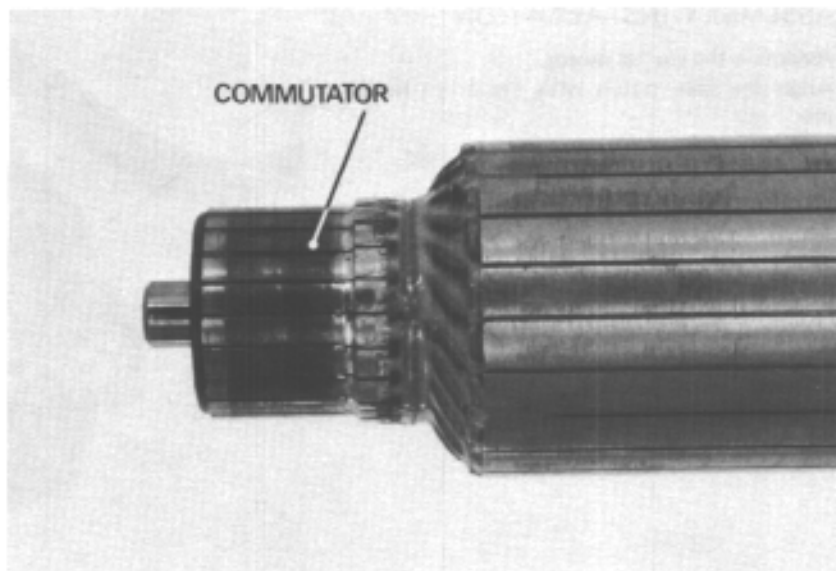
#### NOTE

Record the location and number of thrust washers.

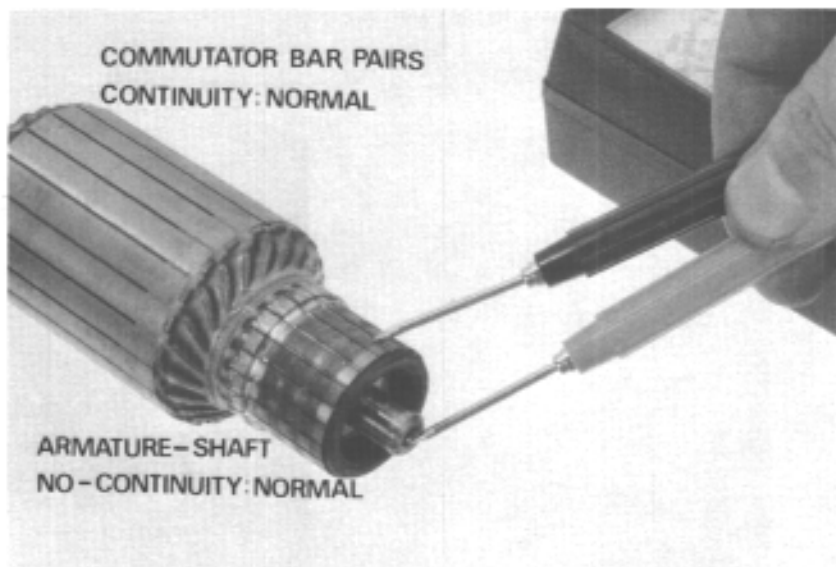
Inspect the commutator bars for discoloration.  
Bars discolored in pairs indicate grounded armature coils.

#### NOTE

Do not use emery or sand paper on the commutator.



Check for continuity between pairs of commutator bars, and also between commutator bars and armature shaft.







### FIELD COIL INSPECTION

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire.

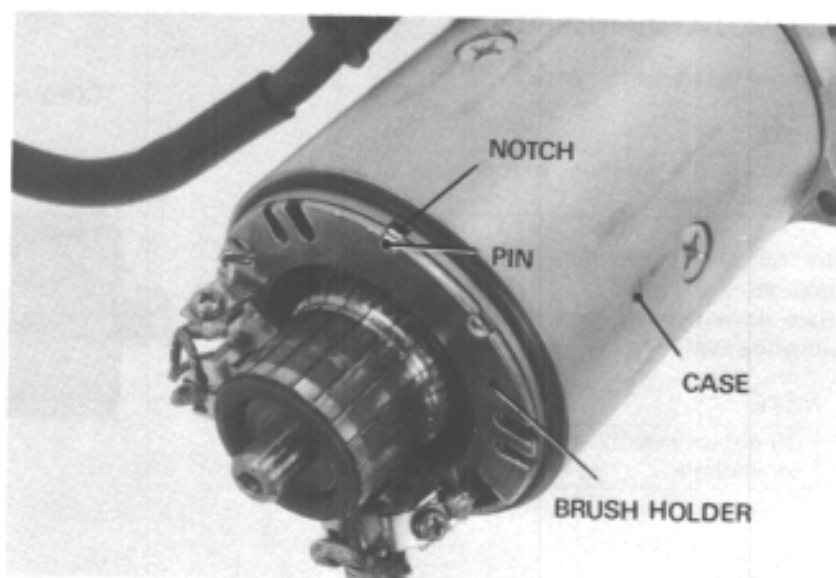
Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.



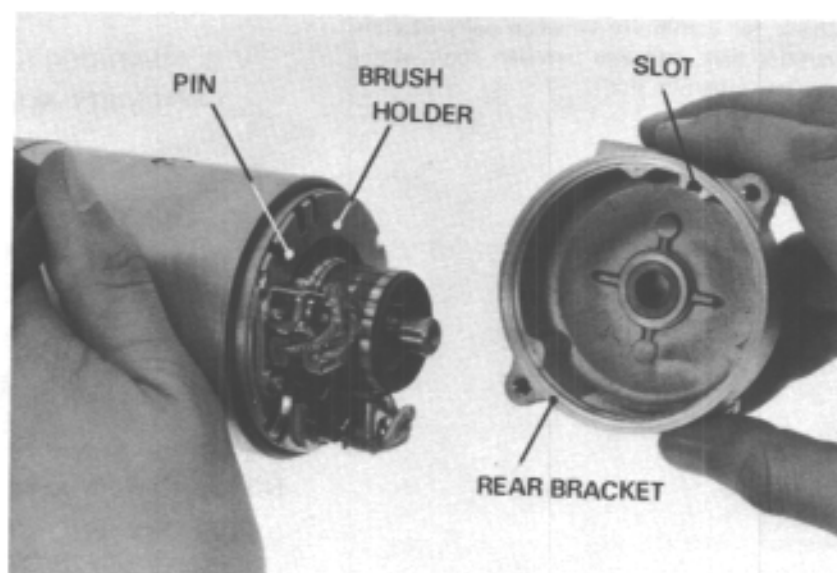
### ASSEMBLY/INSTALLATION

Assemble the starter motor.

Align the case notch with the brush holder pin.



Install the rear cover aligning its slot with the brush holder pin.







## STARTER RELAY SWITCH

### INSPECTION

Depress the starter switch button with the ignition ON.

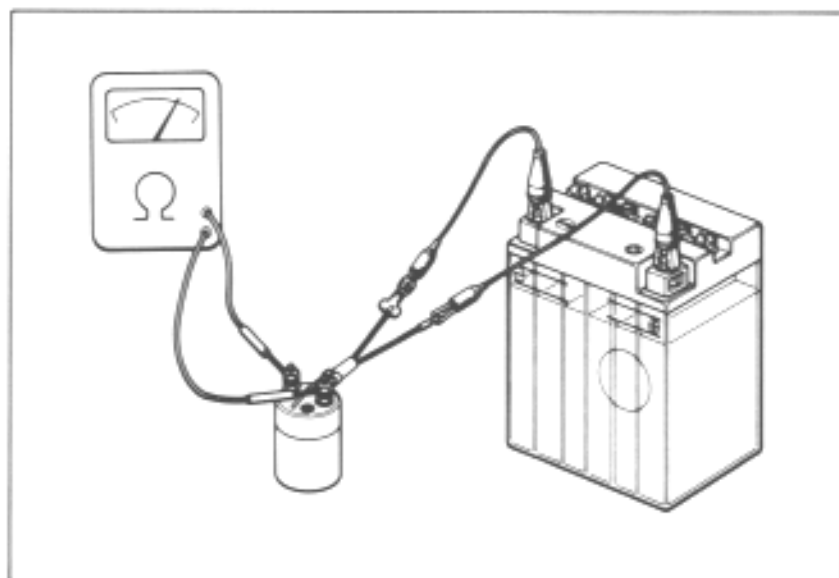
The coil is normal if the starter relay switch clicks.



Connect an ohmmeter to the starter relay switch terminals.

Connect a 12 V battery to the switch cable terminals.

The switch is normal if there is continuity.





MEMO



SERVICE INFORMATION	19-1	HANDLEBAR SWITCHES	19-3
OIL PRESSURE WARNING SWITCH	19-2	IGNITION SWITCH	19-4
BRAKE SWITCHES	19-2	CLUTCH SWITCH	19-4
NEUTRAL SWITCH	19-2		

## SERVICE INFORMATION

### GENERAL INFORMATION

- Some wires have different colored bands around them near the connector. These are connected to other wires which correspond with the band color.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following color codes used are indicated throughout this section and on the wiring diagram.

B = Blue	LG = Light Green
Bk = Black	O = Orange
Br = Brown	P = Pink
G = Green	R = Red
Gr = Grey	W = White
LB = Light Blue	Y = Yellow

- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.



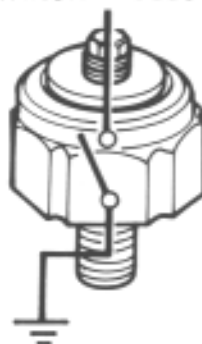
## OIL PRESSURE WARNING SWITCH

Check for continuity while applying pressure to the switch.

Replace the switch if necessary.

Apply a liquid sealant to the switch threads.

CONTINUITY: BELOW 2.8 psi



NO CONTINUITY: ABOVE 2.8–5.6 psi

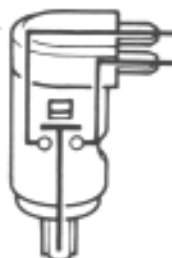
## BRAKE SWITCHES

Check the rear brakelight switch for continuity with the rear brake applied.

Check the front brakelight switch for continuity with the front brake applied.

Replace the switches if necessary.

FRONT



BRAKE APPLIED: CONTINUITY  
 BRAKE NOT APPLIED: NO CONTINUITY

REAR

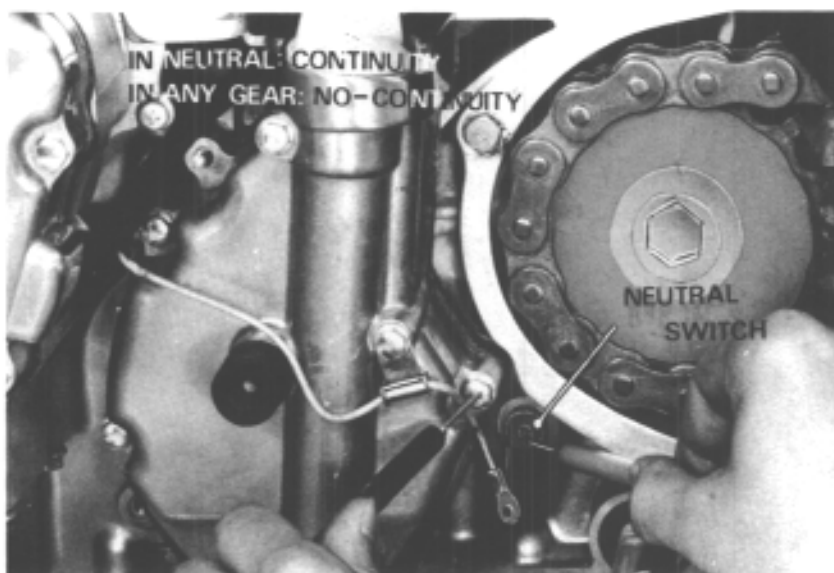


## NEUTRAL SWITCH

Remove the foot pegs, gearshift pedal and left rear crankcase cover.

Check the switch for continuity between the switch terminal (wire removed) and ground with the transmission in neutral and with the transmission in any gear.

Replace the neutral switch if necessary.



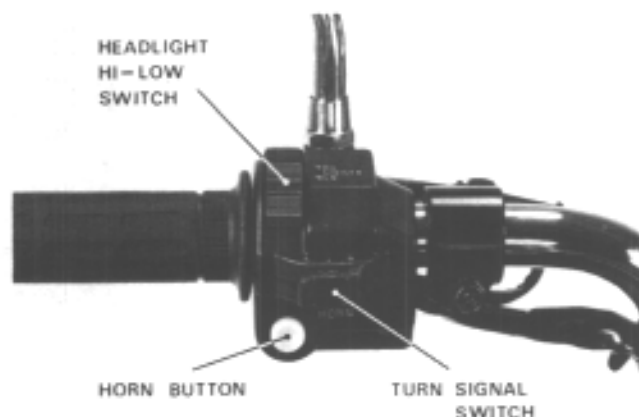


### HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, start and stop) must be replaced as assemblies.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires on each chart.



#### HEADLIGHT HI-LOW SWITCH

HI: B/W to B  
MIDDLE (N): B/W to W to B  
LO: B/W to W

Headlight Hi-Low Switch

	HL	Hi	Lo
Hi	○	○	
(N)	○	○	○
Lo	○		○
Code color	B/W	B	W

#### TURN SIGNAL SWITCH

LEFT: Gr to O, Br/W to LB/W  
OFF: Br/W to O/W to LB/W  
RIGHT: Gr to LB, Br/W to O/W

Turn Signal Switch

	W	L	R	P	PL	PR
LEFT	○	○		○		○
OFF				○	○	○
RIGHT	○		○	○	○	
Code color	Gr	O	LB	Br/W	O/W	LB/W

#### HORN BUTTON

LG to G with button depressed  
No continuity with button released

Horn Button

	Ho	E
	○	○
Code color	LG	G

#### STARTER BUTTON

Bk/R to B/W with button released  
Bk to Y/R with button depressed

Starter Button

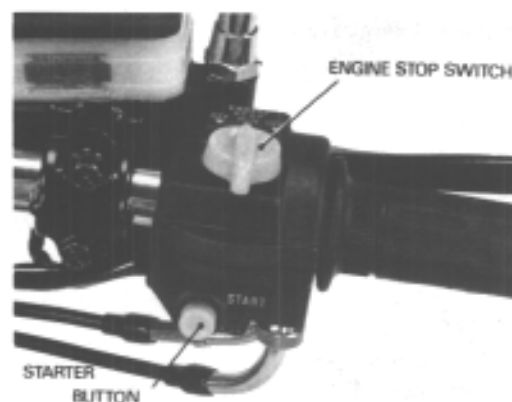
	BAT5	HL	BAT2	ST
FREE	○	○		
START			○	○
Code color	Bk/R	B/W	Bk	Y/R

#### ENGINE STOP SWITCH

RUN: Bk to Bk/W  
OFF: No continuity

Engine Stop Switch

	BAT2	IG
OFF		
RUN	○	○
OFF		
Code color	Bk	Bk/W





## IGNITION SWITCH

Remove the instrument cluster and disconnect the plug.  
 Remove the ignition switch.

### NOTE

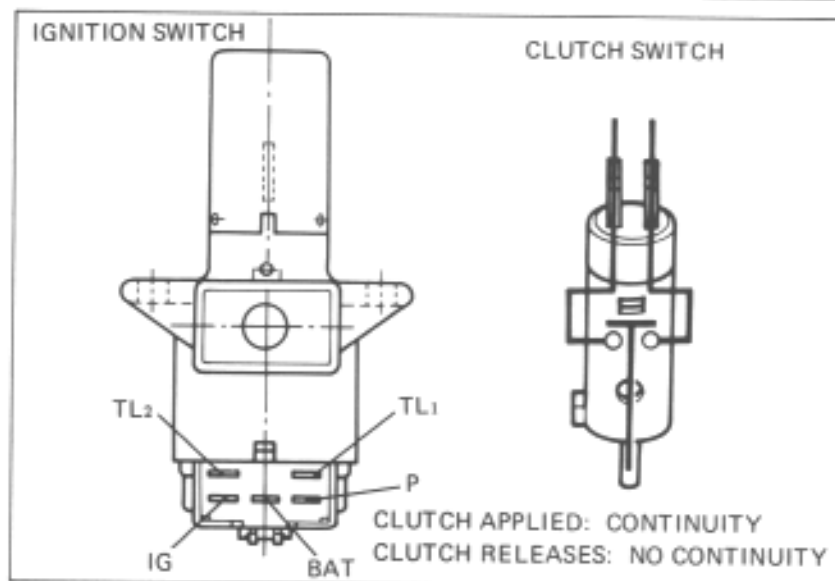
Identify the wire colors at the connector. There are no colors on the switch.

Check continuity of terminals on the ignition switch in each switch position.

### SWITCH POSITION

**LOCK:** No continuity  
**OFF:** No continuity  
**ON:** BAT1 to IG, TL1 to TL2  
**PARK:** P to BAT1

Terminal Position	P	BAT <sub>1</sub>	IG	TL <sub>1</sub>	TL <sub>2</sub>
P	○—○				
ON		○—○		○—○	
OFF					
LOCK					



## CLUTCH SWITCH

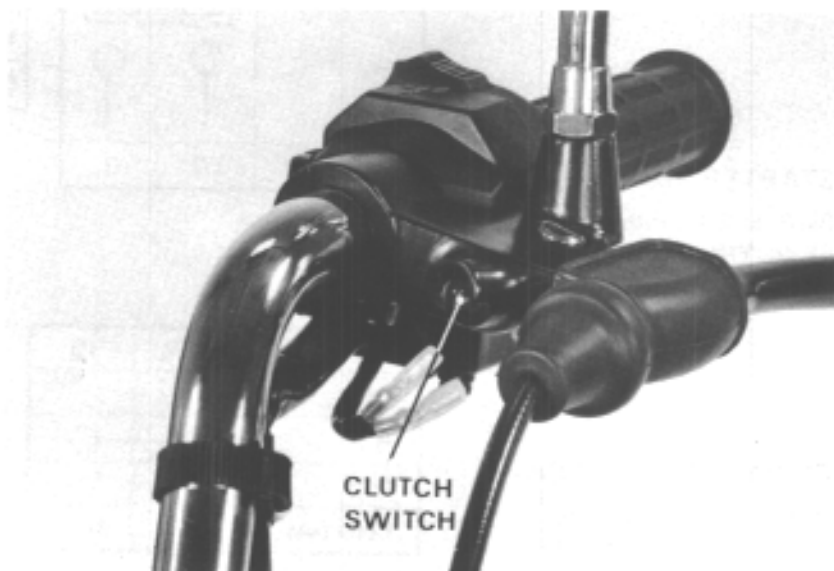
Check continuity of the clutch lever (safety) switch with the clutch released and applied.  
 Replace if necessary.

### REMOVAL

Unplug the wires.  
 Remove the clutch lever and cable.  
 Remove the switch.

### NOTE

The switch case has a small protrusion that must point toward the handlebar when installed.

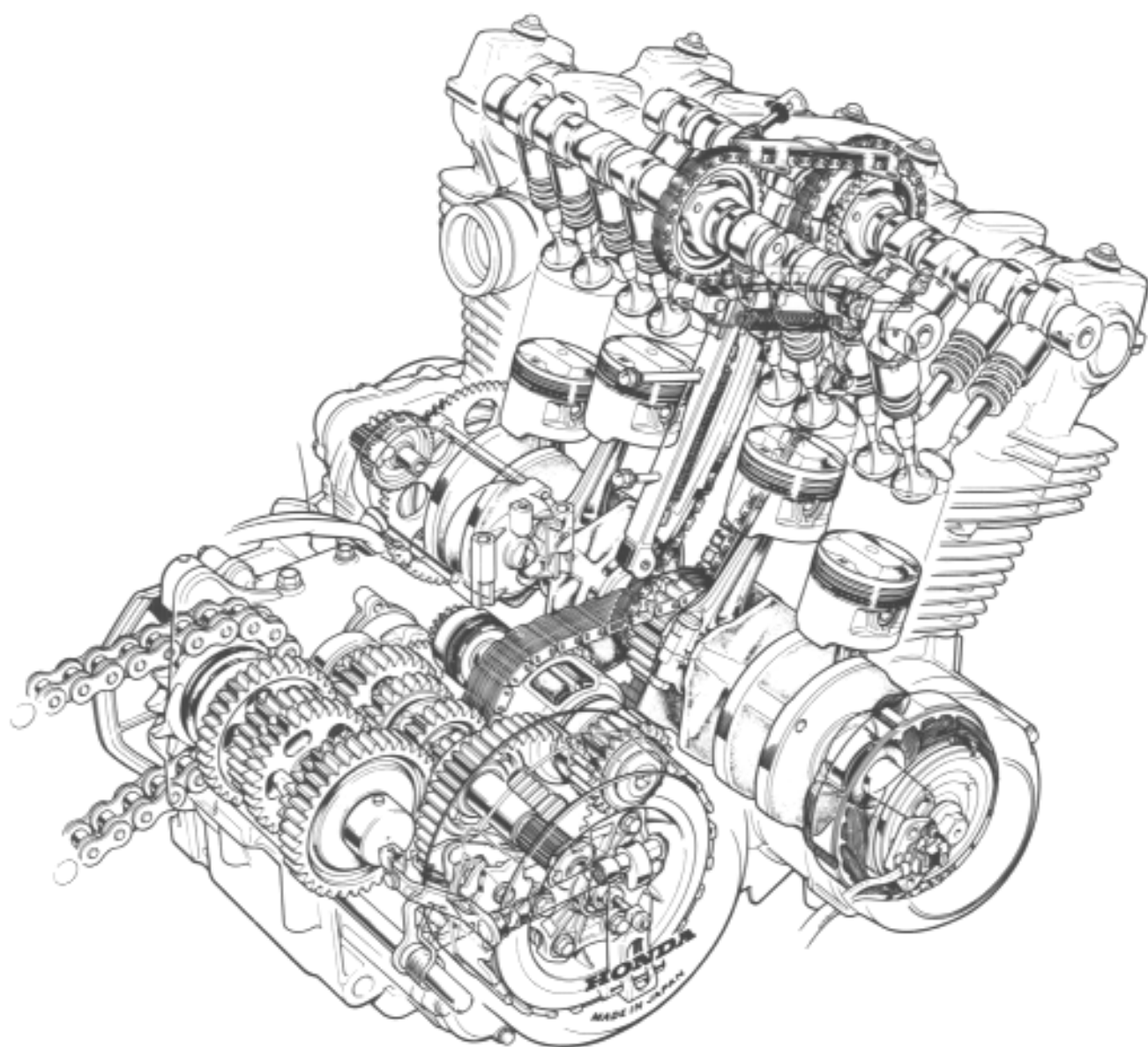




MEMO



## ENGINE CONSTRUCTION







## DUAL CAM CHAINS

Dual cam chains drive the camshafts. Drive is transmitted from the crankshaft to the exhaust camshafts and from there to the intake camshafts. This eliminates a diagonal chain path through the rear of the engine, reducing the distance between the carburetors and cylinders.

The cam chains are the silent inverted tooth type.

Each chain has a guide. Chain tensioners are the slipper type.

## 16 VALVES

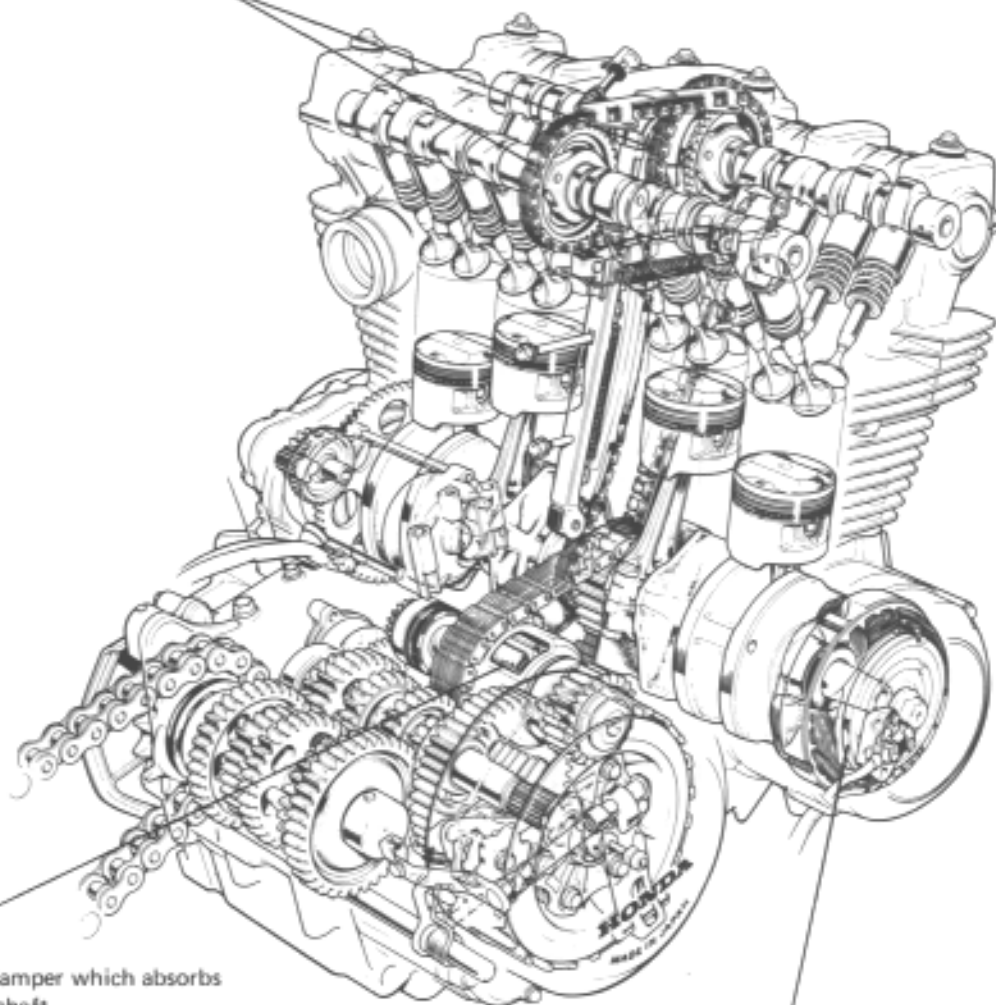
Each cylinder has two intake and two exhaust valves. The arrangement ensures effective breathing at high speed without valve float. Four valves instead of two allow a large overall port areas with a low reciprocating weight for each valve spring.

## PRIMARY SHAFT

The primary shaft has a damper which absorbs the shock from the crankshaft.

## A.C. GENERATOR

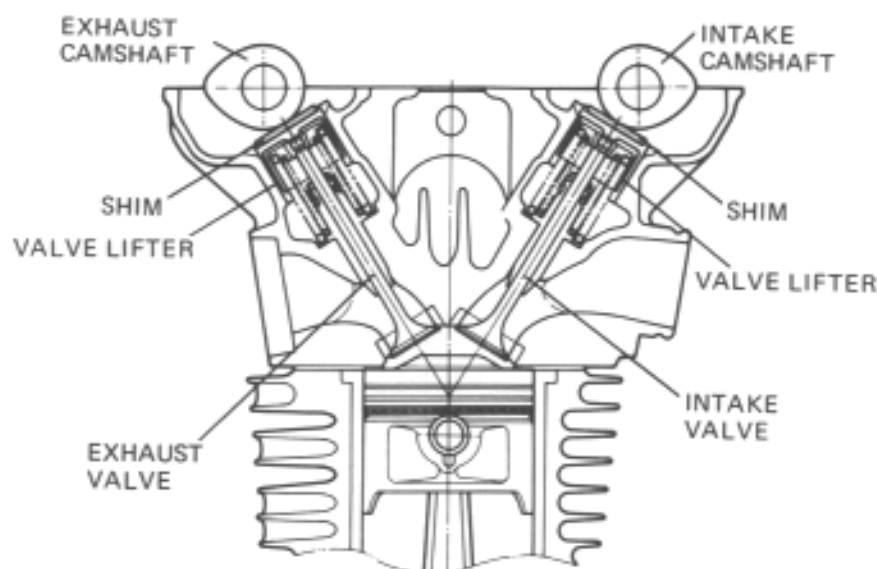
The A. C. generator and ignition pulser assembly are mounted on the crankshaft. This makes the ignition system maintenance-free.





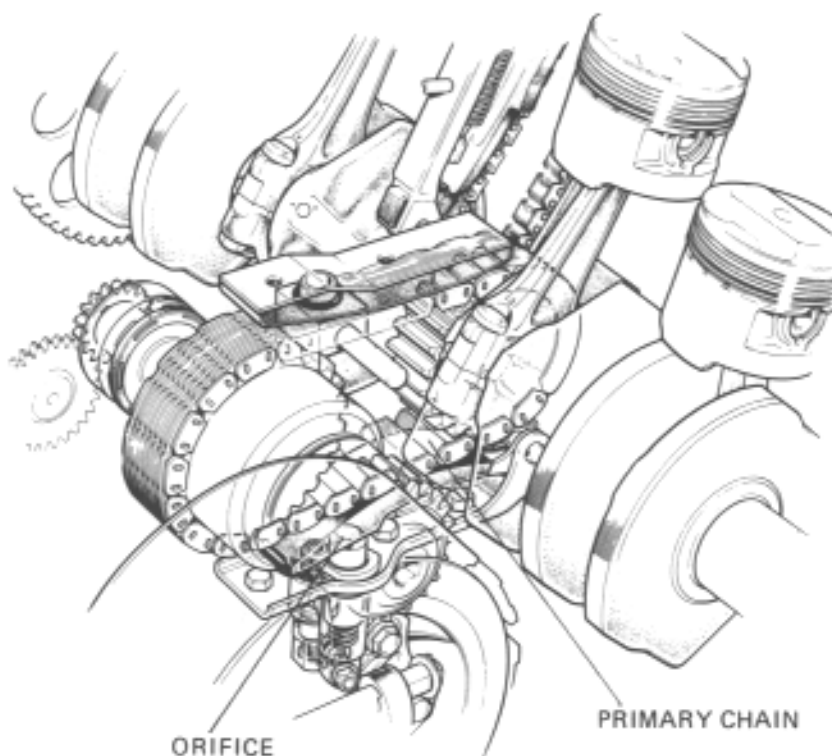
## VALVE MECHANISM

The valves are operated by the cams through the valve lifters. The shims can be removed and installed easily without removing the camshafts by pushing down on the lifters with a special tool.



## OIL DAMPER TYPE PRIMARY CHAIN TENSIONER

Primary chain tension is controlled by an oil dampened chain tensioner. It consists of a fluid valve using oil control orifice, a spring and a tension bar. Oil in the fluid valve compensates for cavitation, assuring positive damper action at all times.

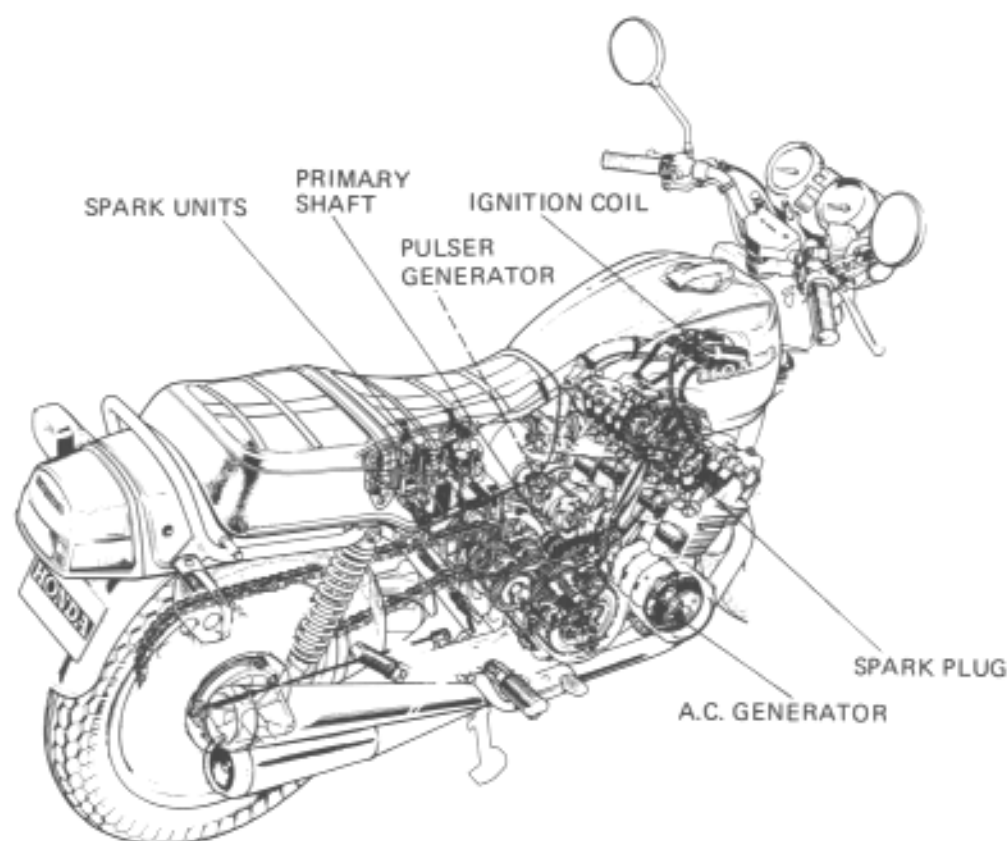




## TRANSISTORIZED IGNITION

The engine uses a transistorized ignition. A pulser generator and transistorized spark unit supply current to the crank circuit. The system is free from problems that occur in mechanical breaker systems. It produces stable secondary energy and eliminates periodic adjustments and maintenance services. There are two independent systems; one for 1 & 3 and one for 2 & 4 cylinders. The generator rotor is connected to the crankshaft so they turn as a unit as the shaft rotates. Two generating coils are spaced evenly on the base plate, 180 degrees apart.

When the rotor turns, pulses are generated as it passes over the coils. Adjusting timing for 1 & 3 cylinders automatically adjust the other cylinders.





## MEMO



## ENGINE DOES NOT START OR IS HARD TO START

1. Check fuel flow to carburetor

REACHING CARBURETOR



2. Perform spark test

GOOD SPARK



3. TEST CYLINDER COMPRESSION

COMPRESSION NORMAL



4. Start by following normal procedure

ENGINE DOES NOT FIRE



5. Remove and inspect spark plug

NOT REACHING CARBURETOR



### POSSIBLE CAUSE

- (1) Fuel tank empty
- (2) Clogged fuel tube or fuel filter
- (3) Sticking float valve
- (4) Clogged fuel tank cap breather hole

WEAK OR NO SPARK



- (1) Faulty spark plugs
- (2) Fouled spark plugs
- (3) Faulty spark unit
- (4) Broken or shorted high tension wires
- (5) Faulty A.C. generator
- (6) Broken or shorted ignition coil
- (7) Faulty ignition switch
- (8) Faulty pulser generator

LOW COMPRESSION



- (1) Low battery charge
- (2) Improper valve clearance
- (3) Valve stuck open
- (4) Worn cylinder and piston rings
- (5) Damaged cylinder head gasket
- (6) Seized valve
- (7) Improper valve timing

ENGINE FIRES BUT STOPS



- (1) Improper choke operation
- (2) Carburetor incorrectly adjusted
- (3) Manifold leaking
- (4) Improper ignition timing (Spark unit or pulser generator)
- (5) Incorrect fast idle
- (6) Fuel contaminated

WET PLUG



- (1) Carburetor flooded
- (2) Choke closed
- (3) Throttle valve open
- (4) Air cleaner dirty


**ENGINE LACKS POWER**

1. Raise wheels off ground and spin by hand  
 WHEEL SPINS FREELY  
 ↓
2. Check tire pressure  
 PRESSURE NORMAL  
 ↓
3. Accelerate rapidly from low to second  
 ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED  
 ↓
4. Accelerate lightly  
 ENGINE SPEED INCREASES  
 ↓
5. Check ignition timing  
 CORRECT  
 ↓
6. Check valve clearance  
 CORRECT  
 ↓
7. Test cylinder compression  
 NORMAL  
 ↓
8. Check carburetor for clogging  
 NOT CLOGGED  
 ↓
9. Remove spark plug  
 NOT FOULED OR DISCOLORED  
 ↓
10. Check oil level and condition  
 CORRECT  
 ↓
11. Remove cylinder head cover and inspect lubrication  
 VALVE TRAIN LUBRICATED PROPERLY  
 ↓
12. Check for engine overheating  
 NOT OVERHEATING  
 ↓
13. Accelerate or run at high speed  
 ENGINE DOES NOT KNOCK

**POSSIBLE CAUSE**

- WHEELS DO NOT SPIN FREELY → (1) Brake dragging  
 (2) Worn or damaged wheel bearing  
 (3) Wheel bearing needs lubrication  
 (4) Drive chain too tight
- PRESSURE LOW → (1) Punctured tire  
 (2) Faulty tire valve
- ENGINE SPEED CHANGED WHEN CLUTCH IS RELEASED → (1) Clutch slipping  
 (2) Worn clutch disc/plate  
 (3) Warped clutch disc/plate
- ENGINE SPEED NOT INCREASED → (1) Carburetor choke closed  
 (2) Clogged air cleaner  
 (3) Restricted fuel flow  
 (4) Clogged fuel tank breather tube  
 (5) Clogged muffler
- INCORRECT → (1) Faulty spark unit  
 (2) Faulty pulser generator  
 (3) Faulty ignition advancer
- INCORRECT → (1) Improper valve adjustment  
 (2) Worn valve seat
- TOO LOW → (1) Valve stuck open  
 (2) Worn cylinder and piston rings  
 (3) Leaking head gasket  
 (4) Improper valve timing
- CLOGGED → (1) Carburetor not serviced frequently enough
- FOULED OR DISCOLORED → (1) Plugs not serviced frequently enough  
 (2) Spark plug with incorrect heat range
- INCORRECT → (1) Oil level too high  
 (2) Oil level too low  
 (3) Contaminated oil
- VALVE TRAIN NOT LUBRICATED PROPERLY → (1) Clogged oil passage  
 (2) Clogged oil control orifice
- OVERHEATING → (1) Excessive carbon build-up in combustion chamber  
 (2) Use of poor quality fuel  
 (3) Clutch slipping
- ENGINE KNOCKS → (1) Worn piston and cylinder  
 (2) Wrong type of fuel  
 (3) Excessive carbon build-up in combustion chamber  
 (4) Ignition timing too advanced (Faulty spark unit or advancer)



### POOR PERFORMANCE AT LOW AND IDLE SPEEDS

1. Check ignition timing and valve clearance	INCORRECT	POSSIBLE CAUSE (1) Improper valve clearance (2) Improper ignition timing (Faulty spark unit or spark advancer)
CORRECT ↓		
2. Check carburetor pilot screw adjustment	INCORRECT	See Fuel System Section
CORRECT ↓		
3. Check for leaking manifold	LEAKING	(1) Deteriorated insulator O-ring (2) Loose carburetor
NO LEAK ↓		
4. Perform spark test	WEAK OR INTERMITTENT SPARK	(1) Faulty, carbon or wet fouled spark plug (2) Faulty spark unit (3) A.C. generator faulty (4) Faulty ignition coil (5) Faulty spark advancer
GOOD SPARK		

### POOR PERFORMANCE AT HIGH SPEED

1. Check ignition timing and valve clearance	INCORRECT	(1) Improper valve clearance (2) Faulty spark unit (3) Faulty pulser generator (4) Faulty spark advancer
CORRECT ↓		
2. Disconnect fuel tube at carburetor	FUEL FLOW RESTRICTED	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel cock
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet	CLOGGED	(1) Clean
NO CLOG ↓		
4. Check valve timing	INCORRECT	(1) Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK	(1) Faulty spring
NOT WEAKENED		

### POOR HANDLING ————— Check tire pressure

1. If steering is heavy	(1) Steering top thread nut too tight (2) Damaged steering head bearings
2. If either wheel is wobbling	(2) Excessive wheel bearing play (2) Distorted rim (3) Improperly installed wheel hub (4) Swing arm pivot bushing excessively worn (5) Distorted frame (6) Improper drive chain tension or adjustment
3. If the motorcycle pulls to one side	(1) Improperly adjusted shock absorber (2) Front and rear wheels not aligned (3) Bent front fork (4) Bent swing arm



## MEMO