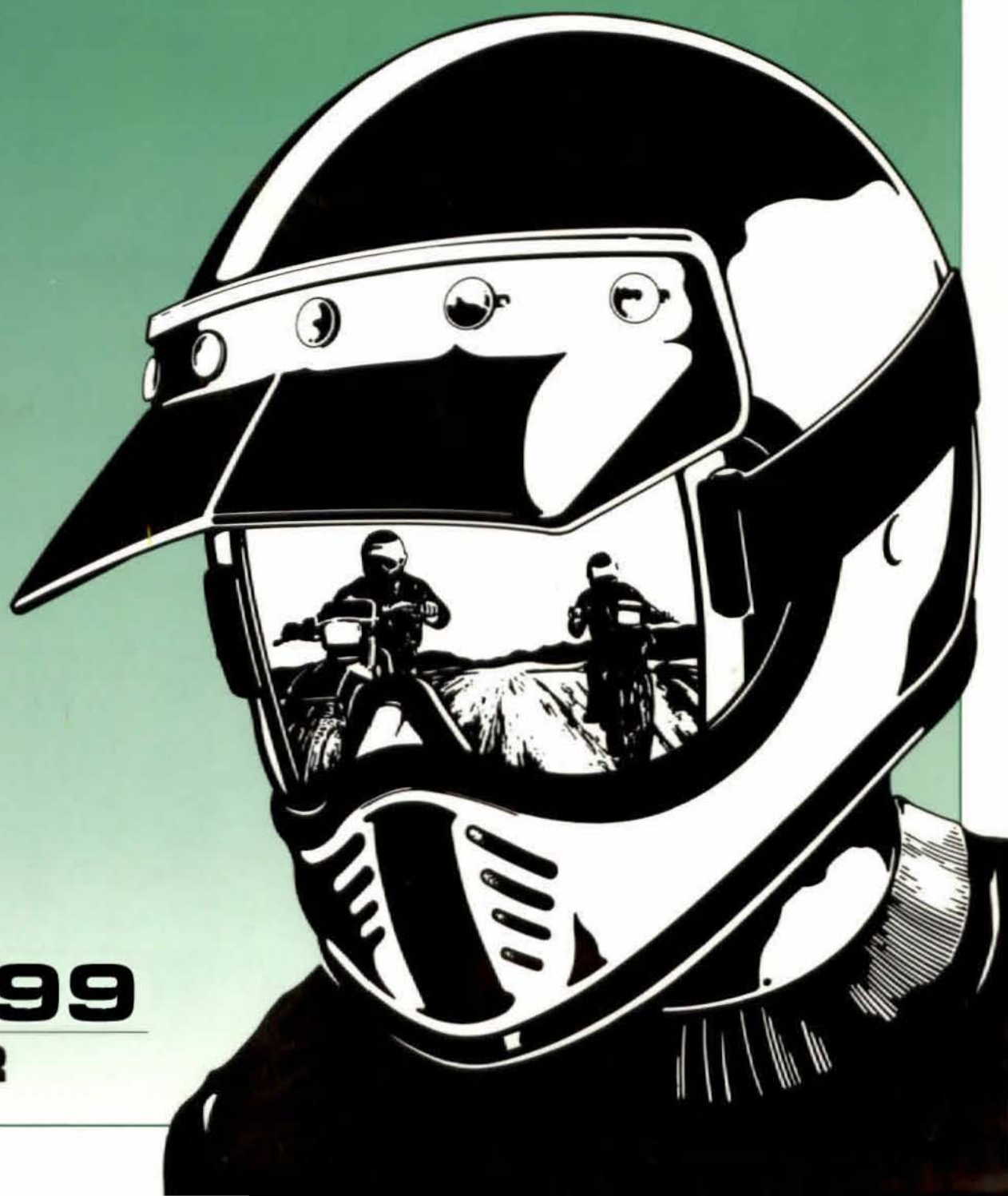


# **HONDA**

## **SERVICE MANUAL**



**88-99**  
**Z50R**

## IMPORTANT SAFETY NOTICE



### WARNING

*Indicates a strong possibility of severe personal injury or death if instructions are not followed.*

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

**NOTE:** Gives helpful information.

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

## HOW TO USE THIS MANUAL

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 15 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 and all the required specifications, torques, working practices, tools and troubleshooting for the section. The subsequent pages give detailed procedures for the section.

If you don't know what the source of the trouble is, refer to section 15 "TROUBLESHOOTING".

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# 1. GENERAL INFORMATION

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## GENERAL SAFETY

### WARNING

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

### WARNING

*Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your workarea or where gasoline is stored.*

### WARNING

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

### CAUTION:

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

## SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
4. When torquing bolts or nuts, begin with larger-diameter or inner bolts 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.



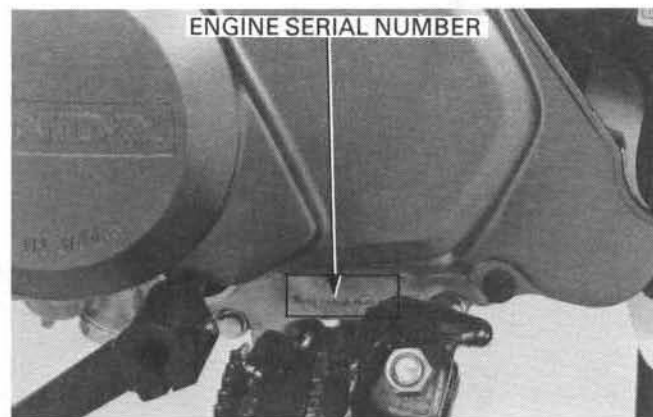
## MODEL IDENTIFICATION



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



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



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



The color label is attached on the left side of the frame above the front of the chain guard.

## SPECIFICATIONS

DIMENSIONS	Overall length Overall width Overall height Wheel base Seat height Ground clearance Dry weight	1,285 mm ( 50.6 in) 605 mm ( 23.8 in) 810 mm ( 31.9 in) 895 mm ( 35.2 in) 575 mm ( 22.6 in) 155 mm ( 6.1 in) 49.5 kg (109.1 lb)
FRAME	Type Front suspension, travel Rear suspension, travel Front tire size, pressure Rear tire size, pressure Front brake Rear brake Fuel capacity Fuel reserve capacity Caster Trail	Backbone Telescopic fork, 62 mm (2.4 in) Swingarm, 60.5 mm (2.4 in) 3.50—8—2PR, 100 kPa (1.0 kg/cm <sup>2</sup> , 15 psi) 3.50—8—2PR, 125 kPa (1.25 kg/cm <sup>2</sup> , 18 psi) Internal expanding shoe, 13 cm <sup>2</sup> (2.0 sq-in) Internal expanding shoe, 13 cm <sup>2</sup> (2.0 sq-in) 4.0lit (1.1 US gal, 0.9 Imp gal) 0.8lit (0.21 US gal, 0.18 Imp gal) 25° 42 mm (1.7 in)
ENGINE	Type Cylinder arrangement Bore × stroke Displacement Compression ratio Valve train Maximum torque Oil capacity Lubrication system Air filtration system Cylinder compression Intake valve Exhaust valve Valve clearance	Air cooled 4-cycle OHC Single cylinder 80° inclined from vertical 39.0 × 41.4 mm (1.54 × 1.63 in) 49 cm <sup>3</sup> (2.99 cu-in) 10.0:1 Chain driven overhead camshaft 2.94 N·m/3,500 rpm (0.30 kg-m/3,500 rpm) 0.8 lit (0.85 US qt, 0.70 Imp qt) Forced pressure and wet sump Oiled polyurethane foam 981—1,177 kPa (10—12 kg/cm <sup>2</sup> , 142.2—170.6 psi) Opens 7.5° (BTDC) Closes 12.5° (ABDC) Opens 2.5° (BBDC) Closes 22.5° (BTDC) In/Ex 0.05 mm (0.002 in)
CARBURETOR	Type Main jet Air screw initial opening Float level Idle speed	Piston valve type # 58 2 turnts out (see page 4-9) 1—1/4 turns out 12.7 mm (0.5 in) 1,700 ± 100 rpm

## GENERAL INFORMATION

DRIVE TRAIN	Clutch	Automatic centrifugal
	Transmission	3-speed constant mesh
	Primary reduction	4.058
	Gear ratio I	'88-'89, '91-'92: 3.181/After '92: 3.272
	II	1.823
	III	1.190
	Final reduction	2.642
	Gearshift pattern	Left foot operated return system
ELECTRICAL	Ignition	CDI
	Ignition timing	27° BTDC
	Alternator	AC generator
	Spark plug	'88: NGK: CR6HS
	'88 and After '88:	NIPPONDENSO: U20FSR-U
	After '88:	NGK: CR6HSA

## TORQUE VALUES

### ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N•m (kg-m, ft-lb)	REMARKS
Tappet hole cap	2	30	12 (1.2, 9)	
Valve adjusting lock nut	2	5	9 (0.9, 6.5)	
Cylinder head cover nut	4	8	11 (1.1, 8)	
Cam sprocket bolt	3	5	10 (1.0, 7.2)	
Cylinder bolt	1	6	10 (1.0, 7.2)	
R/L Crankcase cover bolt	11	6	9 (0.9, 6.5)	
Clutch lock nut	1	14	40 (4.0, 29)	
Shift drum stopper bolt	1	6	12 (1.2, 9)	
Drain bolt	1	12	25 (2.5, 18)	
Drive sprocket bolt	2	6	10 (1.0, 7.2)	
Flywheel nut	1	10	34 (3.4, 25)	

### FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N•m (kg-m, ft-lb)	REMARKS
Engine hanger bolt	2	8	28 (2.8, 20)	
Foot peg mounting bolt	4	8	22 (2.2, 16)	
Side stand pivot bolt	1	10	13 (1.3, 9)	
Side stand nut	1	10	35 (3.5, 25)	
Shift pedal bolt	1	6	10 (1.0, 7.2)	
Kickstarter bolt	1	6	10 (1.0, 7.2)	
Exhaust pipe joint nut	2	6	10 (1.0, 7.2)	
Exhaust pipe mounting nut	1	6	12 (1.2, 9)	
Exhaust pipe mounting bolt	1	8	27 (2.7, 20)	
Throttle cable housing screw	2	5	3 (0.3, 2.2)	
Steering stem nut	1	22	80 (8.0, 58)	
Handlebar mounting nut	2	10	40 (4.0, 29)	
Fork top bolt	2	10	33 (3.3, 24)	
Front axle nut	1	12	50 (5.0, 36)	
Front fender mounting nut	2	6	10 (1.0, 7.2)	
Brake arm nut (Front, Rear)	2	5	6 (0.6, 4.3)	
Swingarm pivot nut	1	10	45 (4.5, 33)	

## GENERAL INFORMATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N•m (kg-m, ft-lb)	REMARKS
Rear axle nut	1	12	50 (5.0, 36)	
Driven sprocket nut	3	8	33 (3.3, 24)	
Shock absorber lower joint	1	8	20 (2.0, 14)	
Rear shock absorber mounting nut (Upper)	1	10	33 (3.3, 24)	
(Lower)	1	10	33 (3.3, 24)	

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

## STANDARD TORQUE VALUES

ITEM	TORQUE N•m (kg-m, ft-lb)	ITEM	TORQUE N•m (kg-m, ft-lb)
5 mm bolt and nut	5.3 (0.53, 4.0)	5 mm screw	4.3 (0.43, 3.3)
6 mm bolt and nut	10 (1.0, 7.2)	6 mm screw and flange bolt (SH TYPE)	9 (0.9, 6.5)
8 mm bolt and nut	2.2 (0.22, 1.4)	6 mm flange bolt and nut	12 (1.2, 9.0)
10 mm bolt and nut	35 (3.5, 25)	8 mm flange bolt and nut	27 (2.7, 20)
12 mm bolt and nut	55 (5.5, 40)	10 mm flange bolt and nut	40 (4.0, 29)



## TOOLS

### SPECIAL

NOTE: Equivalent commercially available in U.S.A.

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER	REF. SECTION
Valve spring compressor attachment	07959-KM30101	NOTE	M9360-277-91774	6
Valve guide driver, 5.0mm	07942-MA60000			6
Valve guide reamer, 5.0mm	07984-MA6000C			6
Clutch outer holder	07923-0340000			8
Clutch dis/assembling tool	07960-0110000			8
Ball race driver	07944-1150001			11
Pin driver 4mm	07944-9350200			11
Snap ring pliers	07914-3230001			11
Steering stem driver	07946-GC40000			11
			07946-GC4000A 07946-MB000001	
Rear shock absorber compressor attachment	07967-1180100			12

### COMMON

NOTE: Equivalent commercially available in U.S.A.

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER	REF. SECTION
Tappet wrench 8 × 9 mm	07708-0030100	NOTE	07908-KE90200	3
Tappet adjusting wrench B	07708-0030400			3
Caburetor float level gauge	07401-0010000			4
Valve spring compressor	07757-0010000	NOTE	07933-0010000	6
Lock nut wrench 20 × 24 mm	07716-0020100			7
Extention bar	07716-0020500			7
Universal holder	07725-0030000			9
Flywheel puller	07733-0010000			9
Driver	07749-0010000	NOTE		10, 11, 12
Pin spanner	07702-0020001			11
Bearing remover shaft	07746-0050100			11, 12
Bearing remover head 12 mm	07746-0050300			11, 12
Attachment, 32 × 35 mm	07746-0010100			11, 12
Attachment, 37 × 40 mm	07746-0010200			10, 11
Pilot, 12 mm	07746-0040200			11, 12
Pilot, 17 mm	07746-0040400			10
Rear shock absorber compressor	07GME-0010000			12

### VALVE SEAT CUTTER

Valve seat cutters are commercially available in U.S.A. Therefore, in U.S.A., the following cutters are not required and not available.

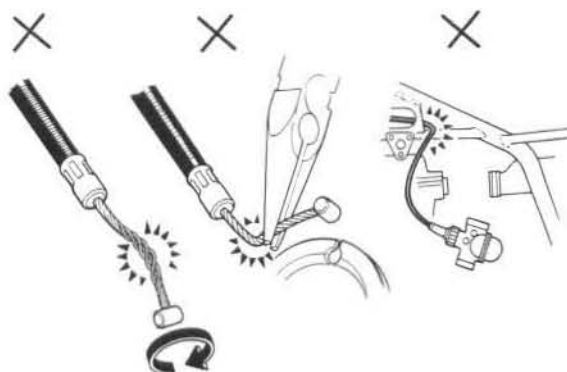
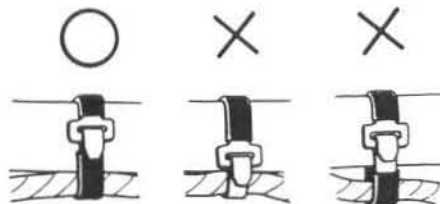
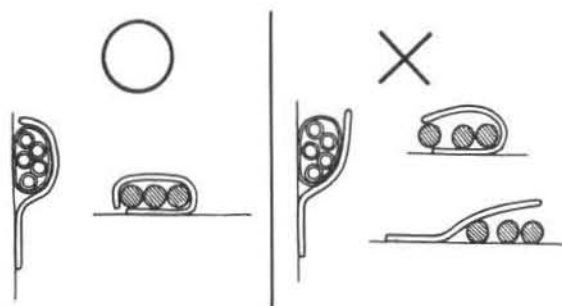
DESCRIPTION	TOOL NUMBER	REMARKS
Valve seat cutter 45°	07780-0010600	24 mm IN, EX
Valve seat cutter 32°	07780-0012700	19 mm EX
Valve seat cutter 32°	07780-0012800	21.5 mm IN
Valve seat cutter 60°	07780-0014202	22 mm IN, EX
Cutter holder 5 mm	07781-0010400	

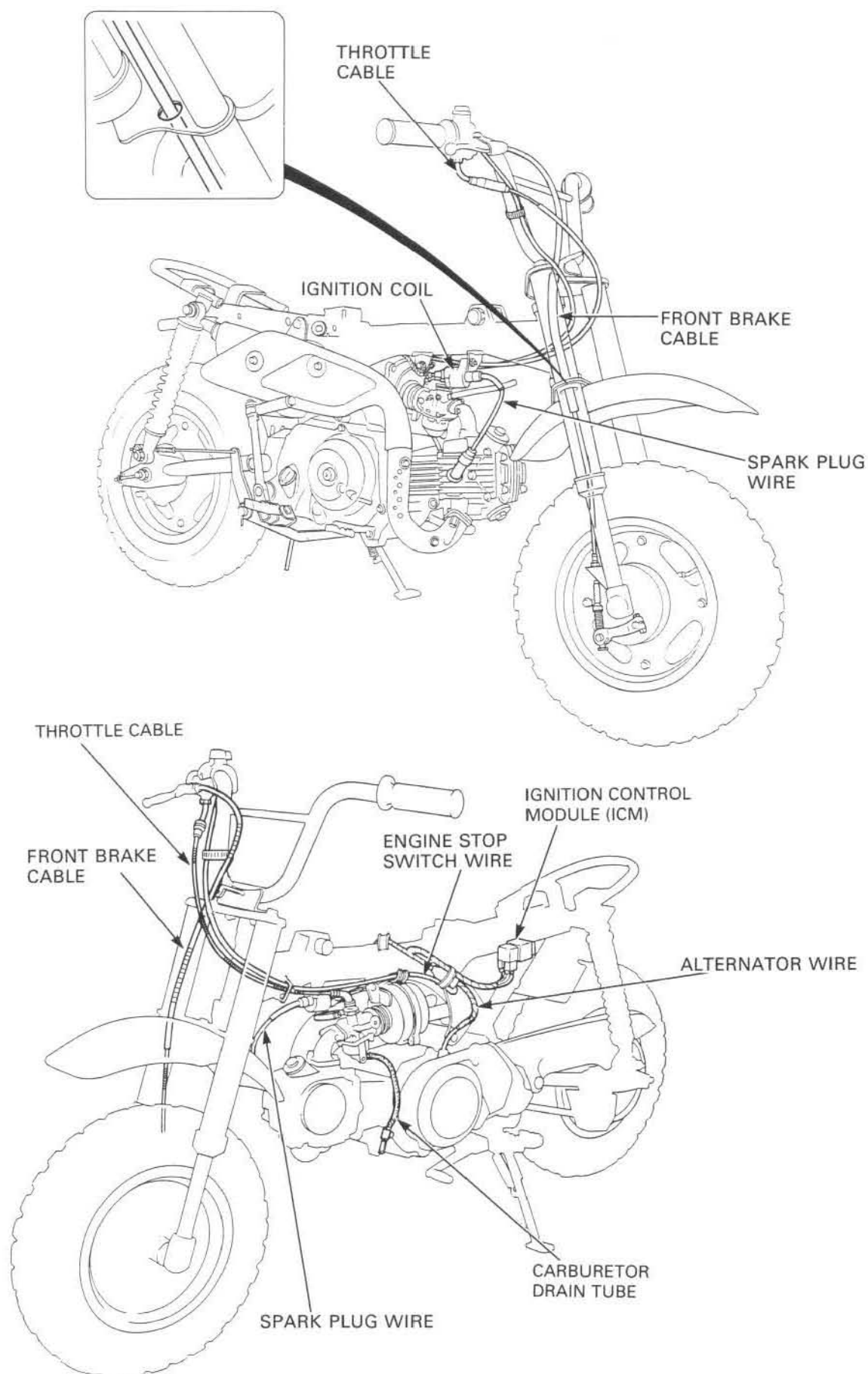
## CABLE & HARNESS ROUTING

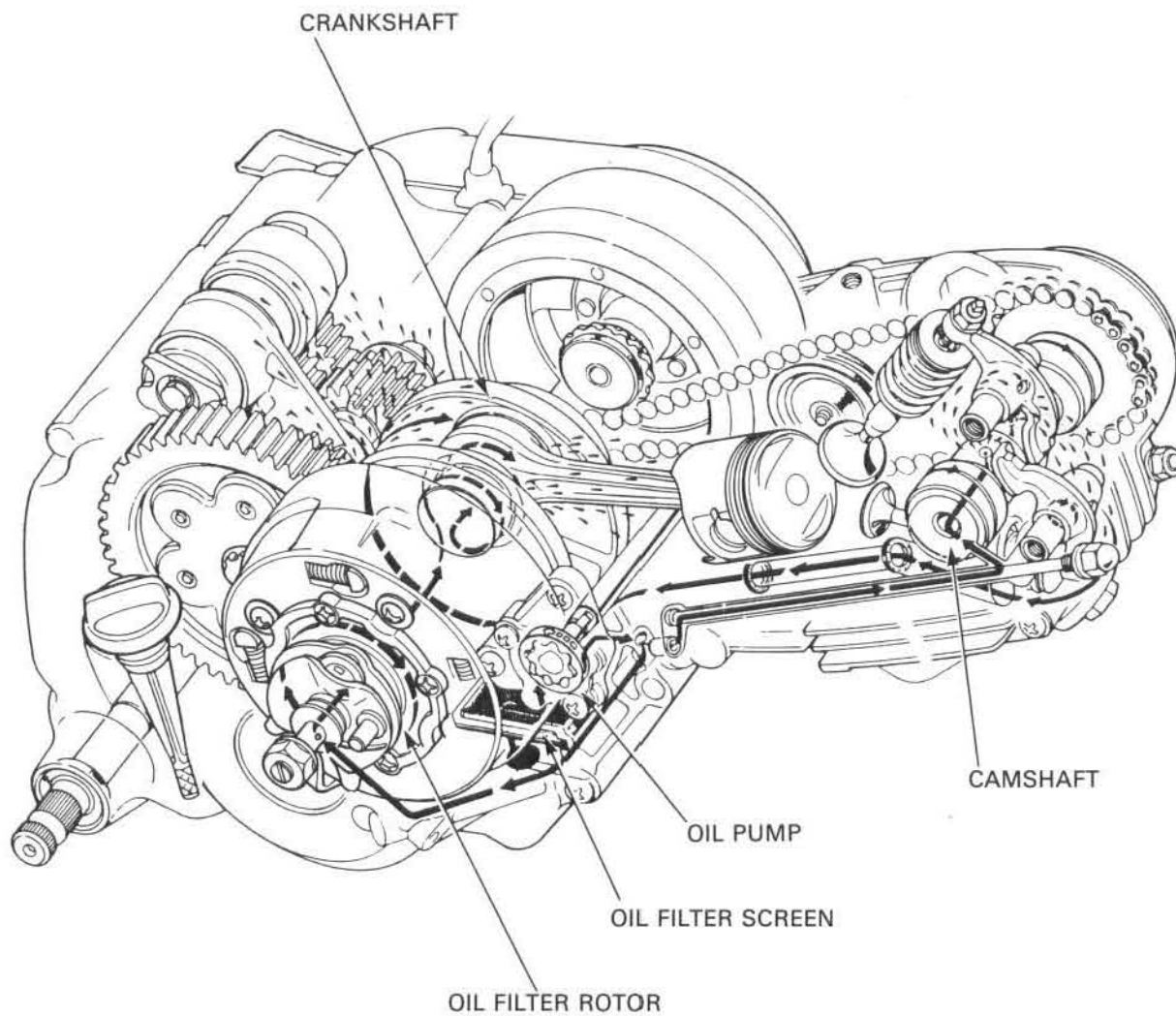
Note the following when routing cable and wire harness.

- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze a wire against the weld or end of its clamp when a weld-on clamp is used.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Leave a little slack when routing harnesses. Avoid pulling the harness too tight or leaving excessive slack.
- Protect wires and harnesses with electrical tape or tubes if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use wires or harnesses with a damaged insulator. Repair by wrapping them with protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners. Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipe and other parts that get hot.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in all steering positions.
- After routing, check that the wire harnesses are not twisted or kinked.
- Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

○ : CORRECT  
× : INCORRECT







<b>SERVICE INFORMATION</b>	<b>2-1</b>	<b>OIL PUMP REMOVAL/DISASSEMBLY</b>	<b>2-3</b>
<b>TROUBLESHOOTING</b>	<b>2-1</b>	<b>OIL PUMP INSPECTION</b>	<b>2-3</b>
<b>ENGINE OIL LEVEL CHECK</b>	<b>2-2</b>	<b>OIL PUMP ASSEMBLY</b>	<b>2-4</b>
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<b>OIL FILTER ROTOR AND SCREEN</b>	<b>2-2</b>	<b>LUBRICATION POINTS</b>	<b>2-5</b>

## SERVICE INFORMATION

### GENERAL

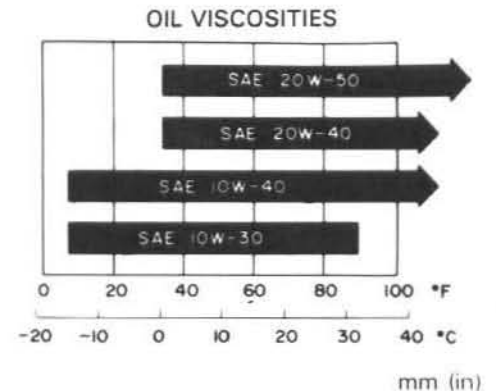
#### CAUTION

- *Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.*
- This section describes checking the engine oil level, changing engine oil, cleaning the oil filter rotor and screen, oil pump maintenance and service, and lubrication.
- The oil pump can be disassembled with the engine in the frame.

#### SPECIFICATIONS

Oil capacity	0.8 lit (0.85 US qt, 0.70 Imp qt) at disassembly 0.6 lit (0.63 US qt, 0.53 Imp qt) at after draining
Recommended engine oil	Use Honda GN4 4-Stroke Oil, SAE 10W-40 or equivalent. API service classification: SF or SG

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



ITEM		STANDARD	SERVICE LIMIT
Oil pump	Outer rotor-to-body clearance	0.02-0.07 (0.001-0.003)	0.12 (0.005)
	Tip clearance	0.15 (0.006)	0.2 (0.008)
	Rotor-to-cover clearance	0.10-0.15 (0.004-0.006)	0.2 (0.008)

#### TORQUE VALUE

Oil drain plug	25 N·m (2.5 kg-m, 18 ft-lb)
----------------	-----------------------------

## TROUBLESHOOTING

#### Oil level too low:

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

#### Oil contamination

- Oil not changed often enough
- Faulty head gasket
- Worn piston rings

#### Low oil pressure

- Faulty pump
- Oil not changed often enough
- Oil pump drive gear broken



## LUBRICATION

### ENGINE OIL LEVEL CHECK

Place the motorcycle on level ground.

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

Stop the engine.

Check the oil with the oil filter cap/dipstick.

Do not screw in the oil filter cap when making this check.

If the level is below the lower level mark on the dipstick, fill to the upper level mark with the recommended grade oil (page 2-1).



### ENGINE OIL CHANGE

#### NOTE

Drain the oil with the engine warm.

Place the motorcycle on level ground.

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

Operate the kickstarter several times with the engine stop switch "OFF" to drain any oil which may be left in the engine.

Install the drain plug.

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

#### NOTE

Check the condition of the sealing washer. If it is damaged, replace it with a new one.

Clean the oil filter rotor and screen.

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

#### ENGINE OIL CAPACITY:

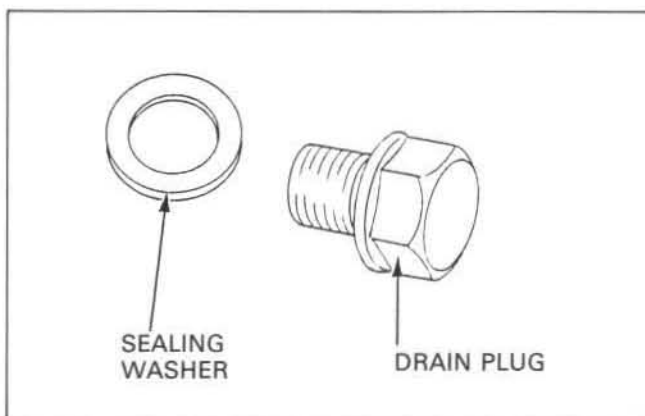
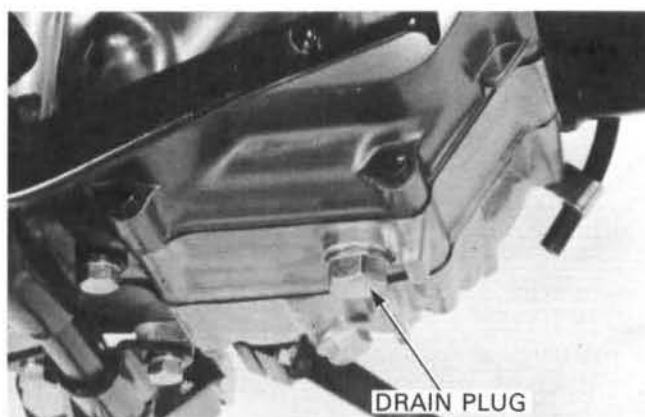
**0.6 lit (0.63 Us qt, 0.53 Imp qt) after draining**

Install the oil filler cap/dipstick.

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

Stop the engine.

Make sure that the oil level is at the upper level mark and that there are no oil leaks.



### OIL FILTER ROTOR AND SCREEN

#### NOTE

Clean the oil filter rotor and screen before adding oil.

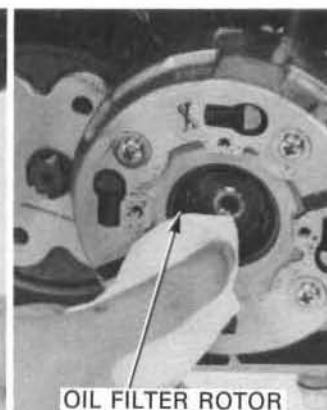
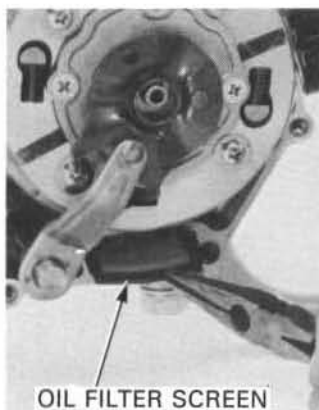
Remove the right crankcase cover (page 8-2).

Remove the oil filter screen from the right crankcase.

Clean the filter screen.

Remove the clutch outer cover and bearing (page 8-3).

Clean the oil filter rotor with the shop towel.

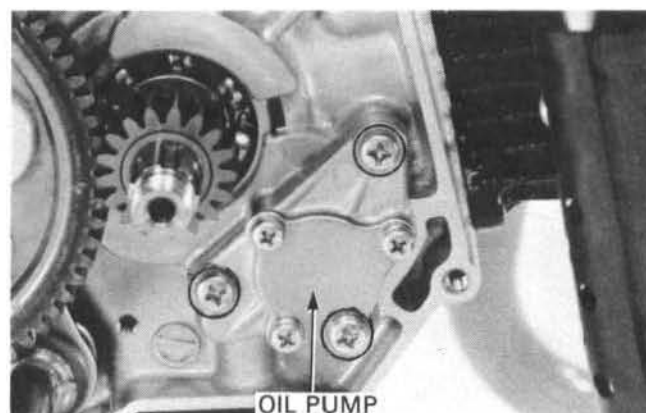


## OIL PUMP REMOVAL/DISASSEMBLY

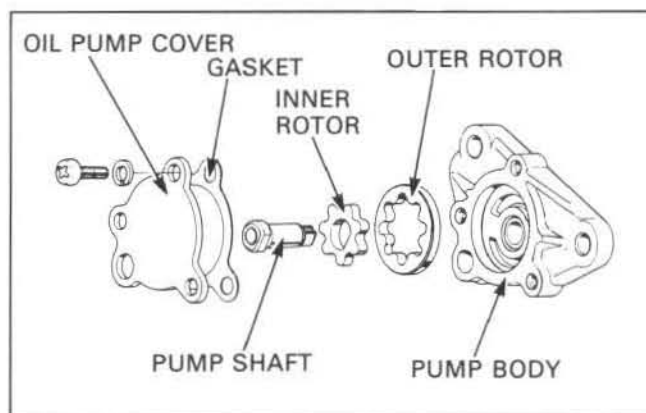
Drain the engine oil (page 2-2).  
Remove the R. crankcase cover.  
Remove the clutch (page 8-3).



Remove the oil pump mounting screws and oil pump.



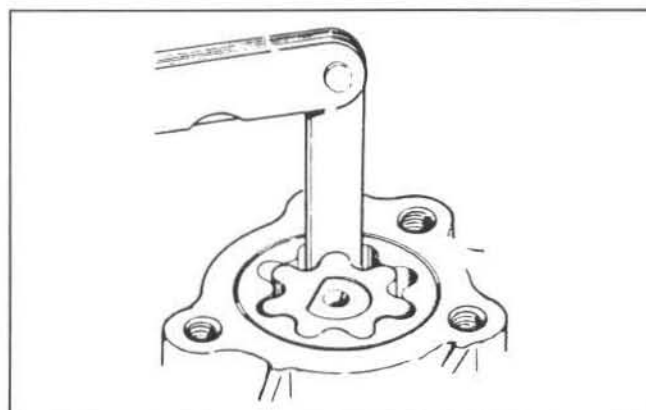
Remove the three cover screws and remove the oil pump cover.  
Pull out the pump shaft and remove the inner and outer rotors from the pump body.



## OIL PUMP INSPECTION

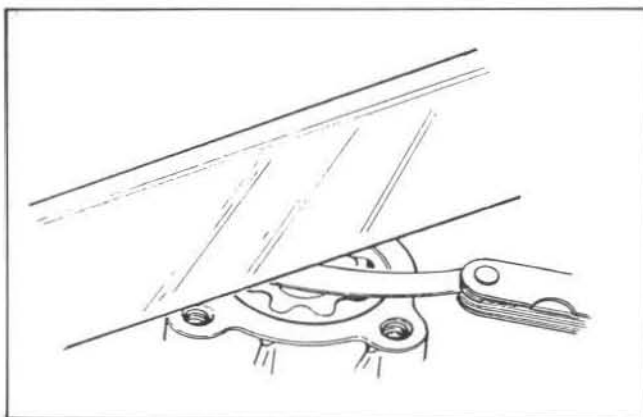
Check the inner and outer rotors.  
Replace them as a set if they are damaged or scratched.

Measure the pump tip clearance.  
**SERVICE LIMIT: 0.20 mm (0.008 in)**

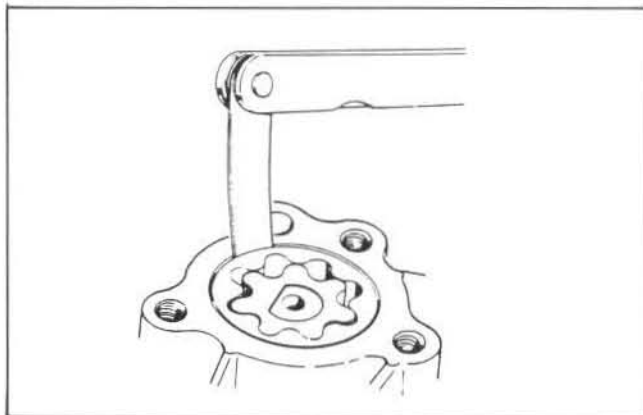


## LUBRICATION

Measure the rotor-to-cover clearance.  
**SERVICE LIMIT: 0.20 mm (0.008 in)**

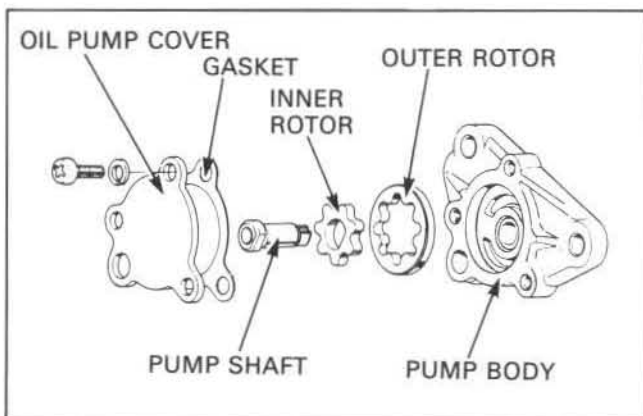


Measure the rotor-to-body clearance.  
**SERVICE LIMIT: 0.12 mm (0.005 in)**



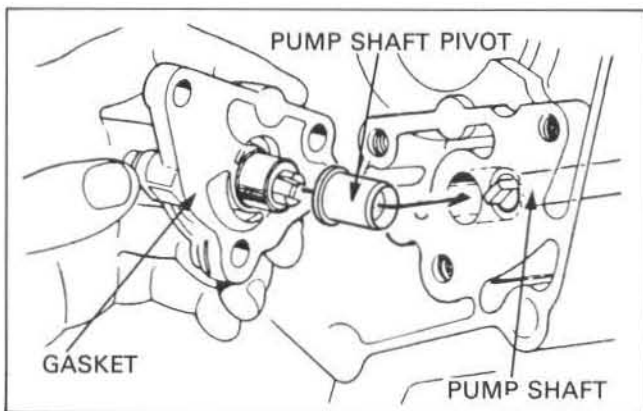
## OIL PUMP ASSEMBLY

Install the outer and inner rotors into the pump body.  
Install the shaft into the inner rotor aligning the flat on the shaft with that of the rotor.  
Install a new cover gasket and secure the cover with the three screws.



## OIL PUMP INSTALLATION

Install the pump shaft pivot in the crankcase.  
Install the oil pump with a new gasket, aligning the rotor shaft groove with the dowel of the pump drive shaft.  
Install the clutch and right crankcase cover (page 8-8, 12).

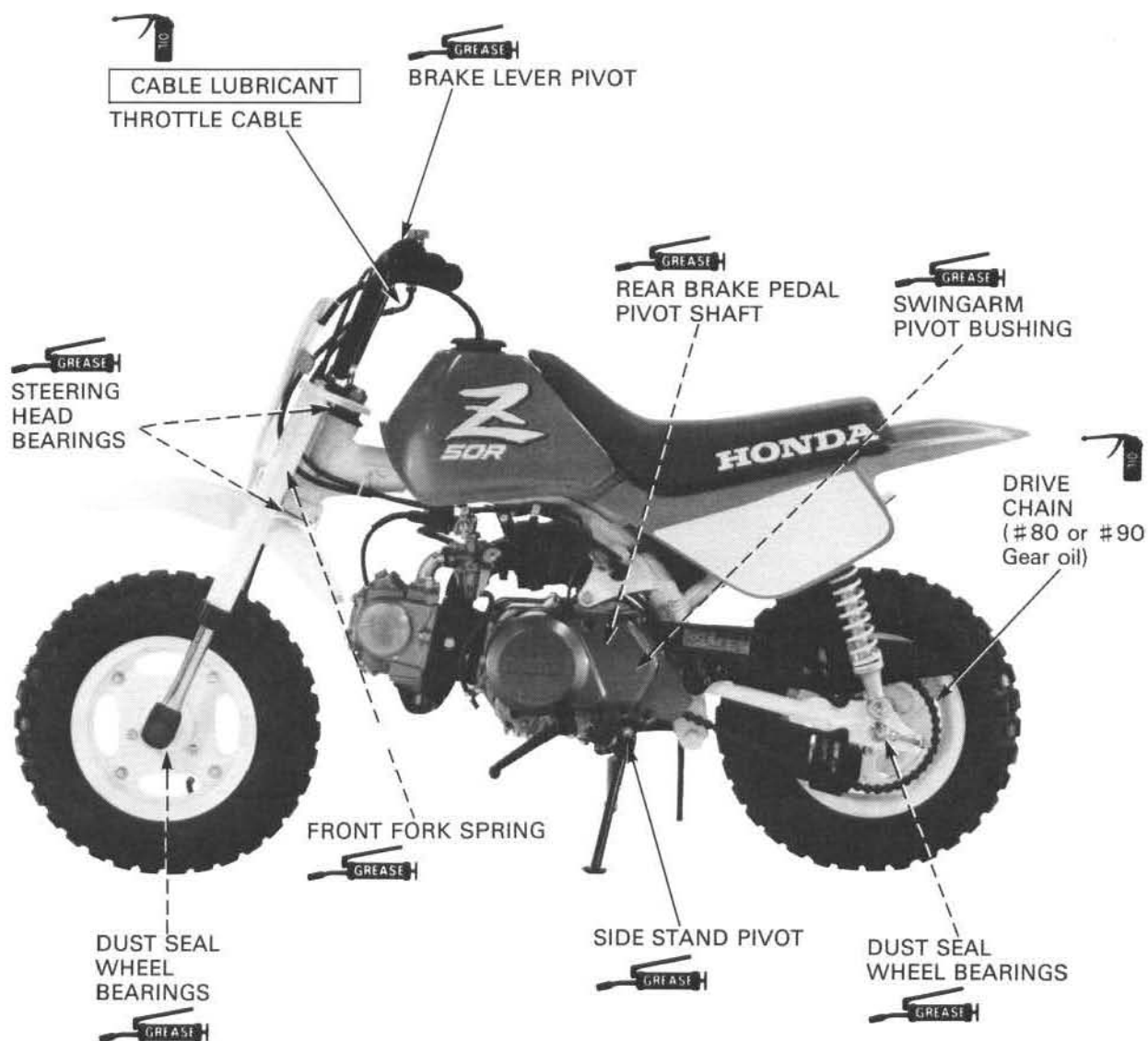


## LUBRICATION POINTS

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

### CONTROL CABLES

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



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## SERVICE INFORMATION

### GENERAL

- The following inspections and adjustments are included in the lubrication section.
  - Engine oil See page 2-2
  - Engine oil filter rotor and Screen See page 2-2

### SPECIFICATIONS

Throttle grip free play	2-6 mm (1/8-1/4 in)
Spark plug	'88 NGK: CR6HS After '88 NGK: CR6HSA
	'88 and After '88 NIPPONDENSO: U20FSR-U
Spark plug gap	0.6-0.7 mm (0.024-0.028 in)
Ignition timing	27° BTDC
Valve clearance: cold	0.05 mm (0.002 in)
Idle speed	1,700 ± 100 rpm
Cylinder compression	981-1,177 kPa (10-12 kg/cm <sup>2</sup> , 142.2-170.6 psi)
Drive chain slack	15-25 mm (5/8-1 in)
Front brake lever free play	10-20 mm (3/8-3/4 in)
Rear brake pedal free play	10-20 mm (3/8-3/4 in)

### Tires

Cold Tire Pressure: kPa (kg/cm <sup>2</sup> •psi)	Front: 100 (1.0, 15)	Rear: 125 (1.25, 18)
Tire size	Front: 3.50-8-2PR	Rear: 3.50-8-2PR



## MAINTENANCE

### TORQUE VALUES

Rear axle nut	50 N·m (5.0 kg-m, 36 ft-lb)
Side stand pivot bolt	13 N·m (1.3 kg-m (1.3 kg-m, 9ft-lb)
Side stand nut	35 N·m (3.5 kg-m, 25 ft-lb)
Tappet hole cap	12 N·m (1.2 kg-m, 9 ft-lb)

### TOOLS

#### Common

Tappet wrench, 8×9 mm	07708-0030100 or equivalent commercially available in U.S.A.
Tappet adjusting wrench B	07708-0030400 or 07908-KE90200

## MAINTENANCE SCHEDULE

'88-'97 **NEW**

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

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

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

ITEM		FREQUENCY	EVERY	BREAK-IN MAINTENANCE	REGULAR MAINTENANCE INTERVAL	REFER TO PAGE
				First week of operation-about 200mi (350 km)	Every 30 operating days-about 1,000 mi (1,600 km)	
*	FUEL LINE				I	3-4
*	FUEL STRAINER SCREEN				C	3-4
*	THROTTLE OPERATION				I	3-4
	AIR CLEANER	(NOTE 1)			C	3-5
	SPARK PLUG				I	3-6
*	VALVE CLEARANCE			I	I	3-6
	ENGINE OIL			R	R	2-2
**	ENGINE OIL STRAINER SCREEN				C	2-2
*	ENGINE IDLE SPEED			I	I	3-8
	DRIVE CHAIN	(NOTE 1)		I, L	Every 10 operating days-about 300 mi (500 km) I, L	3-8
	BRAKE SHOE WEAR				I	3-9
	BRAKE SYSTEM			I	I	3-10
	CLUTCH SYSTEM			I	I	3-11
	SIDE STAND				I	3-11
*	SUSPENSION				I	3-11
*	SPARK ARRESTER	(NOTE 2)			C	3-12
*	NUTS, BOLTS, FASTENERS			I	I	3-12
**	WHEELS/TIRES				I	3-13
**	STEERING HEAD BEARINGS			I	I	3-13

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

NOTES: (1) Service more frequently when riding in unusually wet or dusty conditions.


(2) U.S.A. only. ('88-'92)

# After '97:

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

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

ITEMS		FREQUENCY	WHICHEVER COMES FIRST	INITIAL MAINTENANCE	REGULAR MAINTENANCE INTERVAL				REFER TO PAGE	
				mi	100	600	1,200	1,800		2,400
				km	150	1,000	2,000	3,000		4,000
			NOTE	MONTH	1	6	12	18		24
*	FUEL LINE					I		I	3-4	
**	FUEL STRAINER SCREEN					C		C	3-4	
*	THROTTLE OPERATION					I		I	3-4	
	AIR CLEANER	NOTE 1			C	C	C	C	3-5	
	SPARK PLUG				I	I	I	I	3-6	
*	VALVE CLEARANCE			I	I	I	I	I	3-6	
	ENGINE OIL			R	R	R	R	R	2-2	
**	ENGINE OIL STRAINER SCREEN					C		C	2-2	
*	CAM CHAIN TENSION			A	A	A	A	A	—	
**	ENGINE IDLE SPEED			I	I	I	I	I	3-9	
	DRIVE CHAIN	NOTE 1		I, L	I, L: Every 300 mi (500 km) or 3 month				3-8	
	BRAKE SHOE WEAR				I	I	I	I	3-9	
	BRAKE SYSTEM			I	I	I	I	I	3-10	
	CLUTCH SYSTEM			I	I	I	I	I	3-11	
	SIDE STAND					I		I	3-11	
*	SPARK ARRESTER				C	C	C	C	3-12	
*	NUTS, BOLTS, FASTENERS			I		I		I	3-12	
**	WHEELS/TIRES			I	I	I	I	I	3-13	
**	STEERING HEAD BEARINGS			I		I		I	3-13	

\* 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.

NOTE: 1. Service more frequently when ridden in wet or dusty conditions.

### FUEL LINE

Check the fuel line for deterioration, damage or leakage. Replace if necessary.



### FUEL STRAINER SCREEN

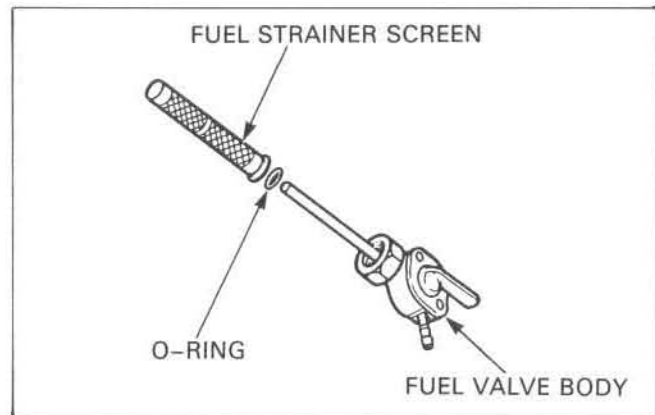
Drain the fuel.  
Remove the fuel valve body, O-ring and strainer screen.

#### WARNING

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

Wash the fuel valve body and strainer screen in clean non-flammable or high flash point solvent.  
Reinstall the strainer screen, a new O-ring and the fuel valve body into the fuel tank.

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



### THROTTLE OPERATION

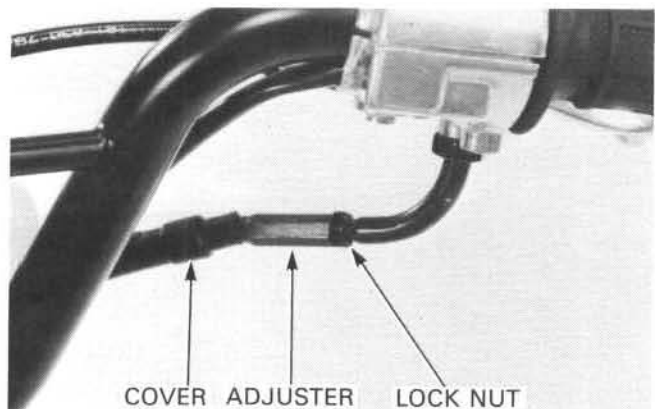
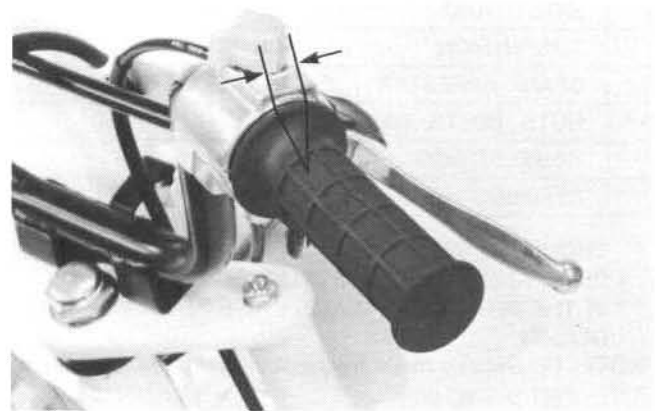
Check for smooth throttle grip full opening and automatic full closing in all steering positions. Check the throttle cable and replace it if it is deteriorated, kinked or damaged.

Lubricate the throttle cable (page 2-5) if throttle operation is not smooth.

Measure throttle grip free play at the throttle grip flange.

**FREE PLAY: 2-6 mm (1/8-1/4 in)**

Adjust as follows:  
Pull the cover off.  
Loosen the lock nut and turn the adjuster to obtain the specified free play.  
Tighten the lock nut and install the cover.

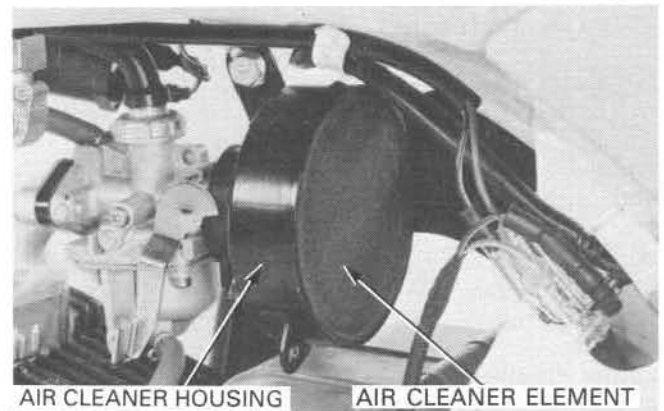


# AIR CLEANER

Remove the two screws and the air cleaner housing cover.



Remove the air cleaner element from the housing.



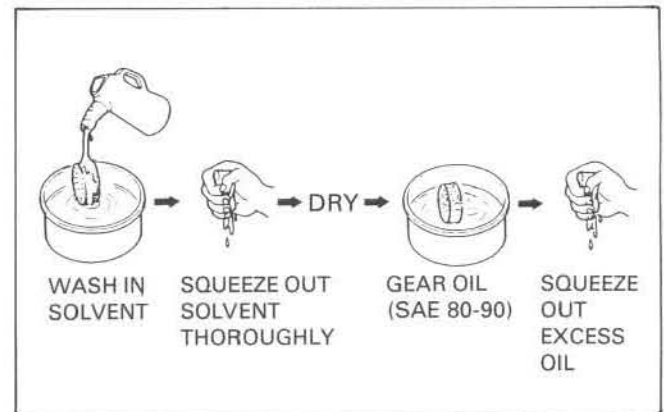
Wash the element in non-flammable or high flash point solvent and allow it to dry thoroughly.

## WARNING

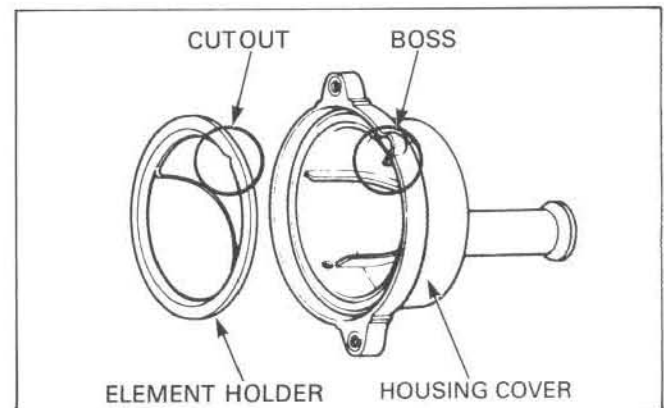
*Never use gasoline or low flash point solvents for cleaning the air cleaner element. A fire or explosion could result.*

Soak the element in clean gear oil (SAE 80-90).

Squeeze out the excess oil.



Install the air cleaner element in the housing.  
Install the element holder so that its cutout will align with the housing, cover boss.



## MAINTENANCE

Install the housing cover and tighten the screws.



## SPARK PLUG

Disconnect the spark plug cap and remove the spark plug.

Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should have a constant thickness.

Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped. Measure the gap with a feeler gauge and adjust by carefully bending the side electrode.

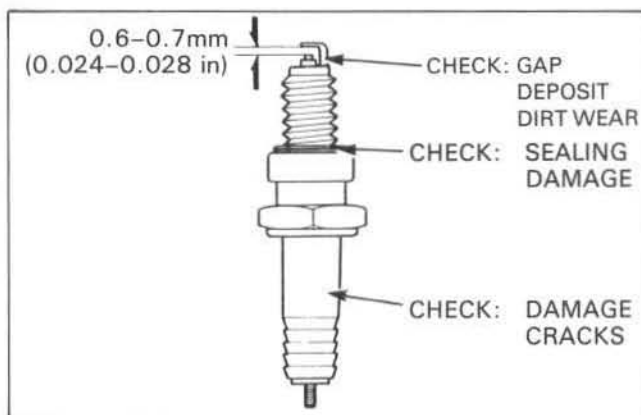
**SPARK PLUG GAP: 0.6–0.7 mm (0.024–0.028 in)**

**RECOMMENDED REPLACEMENT PLUG:**

'88: NGK: CR6HS

'88 and After '88: NIPPONDENSO: U20FSR-U

After '88: NGK: CR6HSA



Check the sealing washer and replace it if it is damaged. With the sealing washer attached, thread the spark plug in by hand to prevent crossthreading.

Tighten it with a spark plug wrench.

Connect the spark plug cap.

## VALVE CLEARANCE

### NOTE

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

Remove the left crankcase cover.

Rotate the crankshaft counterclockwise and align the "T" mark with the index mark.

Remove the tappet hole caps.

Make sure the piston is at T.D.C. on the compression stroke by feeling the tappets with your fingers. If the tappets are free, it is an indication that the piston is at top of the compression stroke. If the tappets are tight, rotate the crankshaft 360° and re-align the marks.





Check the valve clearances by inserting a feeler gauge between the adjusting screw and valve stem.

#### VALVE CLEARANCES:

INTAKE: 0.05 mm (0.002 in)

EXHAUST: 0.05 mm (0.002 in)

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

Hold the adjusting screw and tighten the lock nut.

#### TOOLS:

Tapped wrench 8×9 mm

Tappet adjusting wrench B

07708 – 0030100

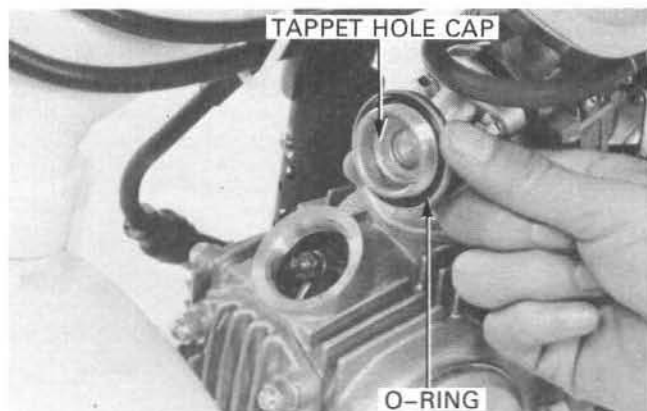
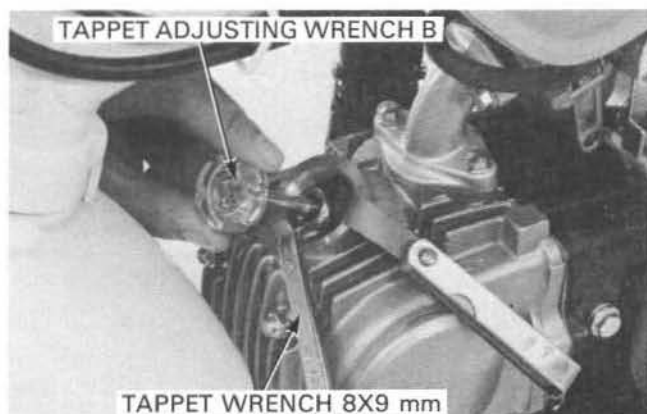
or equivalent commercially  
available in U.S.A.

07708 – 0030400

or 07908 – KE90200

Make sure the tappet hole cap O-rings are in good condition and install the caps.

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



## IGNITION TIMING

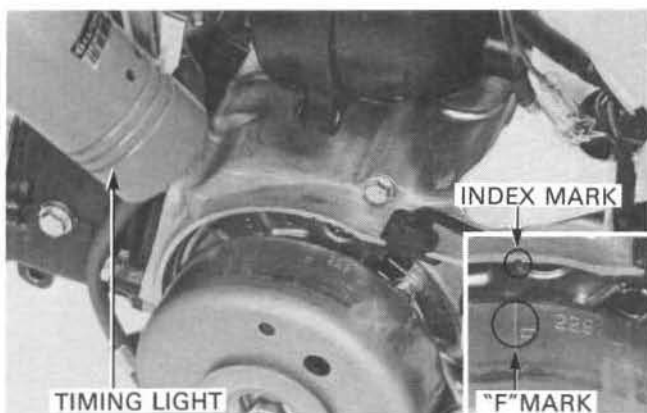
#### NOTE

This Capacitive Discharge Ignition system is factory pre-set and cannot be adjusted. Ignition timing inspection procedures are given to inspect the function of the CDI components.

Remove the left crankcase cover.

Connect the tachometer and timing light to the engine and start it. The timing is correct if the index mark aligns with the "F" mark.

**IGNITION TIMING:** 27° BTDC



## CYLINDER COMPRESSION

Warm up the engine.

Stop the engine and remove the spark plug.

Connect a compression gauge.

Open the choke valve and hold the throttle grip at the full open position.

Operate the kickstarter pedal several times and check the gauge reading.

#### NOTE

Check that there is no leakage at the gauge connection.



## MAINTENANCE

**CYLINDER COMPRESSION:** 981-1,177 kPa (10-12 kg/cm<sup>2</sup>,  
142.2-170.6 psi)

Low compression can be caused by:

- Improper valve adjustment
- Valve leakage
- Blown cylinder head gasket
- Worn piston ring or cylinder

High compression can be caused by:

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

## ENGINE IDLE SPEED

### NOTE

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

Connect a tachometer.

Warm up the engine and shift the transmission into neutral.  
Place the motorcycle on level ground.

Inspect the idle speed and adjust with the throttle stop screw, if necessary.

**IDLE SPEED:** 1,700 ± 100 rpm



## DRIVE CHAIN

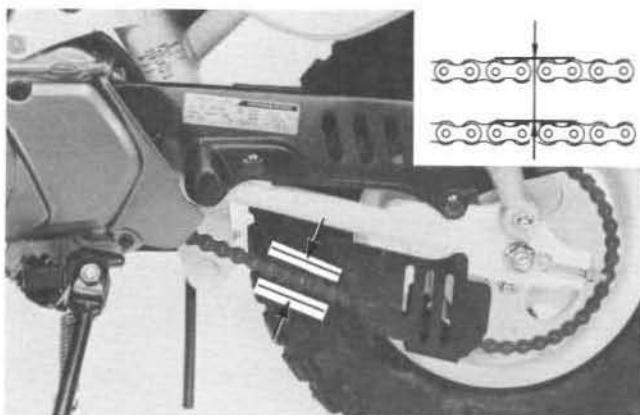
### INSPECTION

With the engine stop switch "OFF", shift the transmission into neutral.

Move the drive chain up and down by hand at a point midway between the sprockets.

**SLACK:** 15-25 mm (5/8-1 in)

Adjust if necessary.



### ADJUSTMENT

Loosen the rear axle nut.

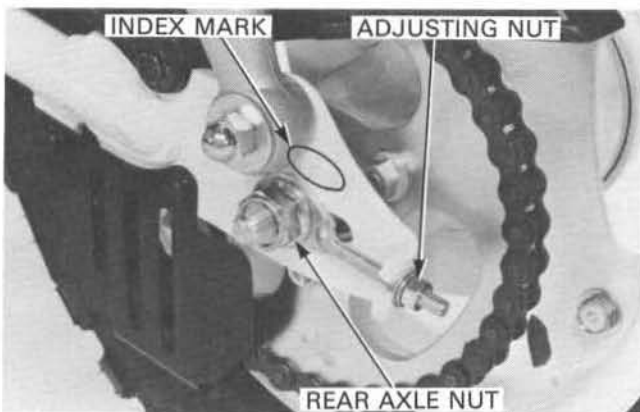
Turn the adjusting nuts on both sides of the swingarm an equal number of turns to obtain the specified chain slack.

### CAUTION

*Be sure that the index mark on the chain adjuster aligns with the same graduation mark on both sides of the swingarm.*

Tighten the axle nut.

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



Tighten the adjusting nuts and recheck the drive chain slack and free wheel rotation.

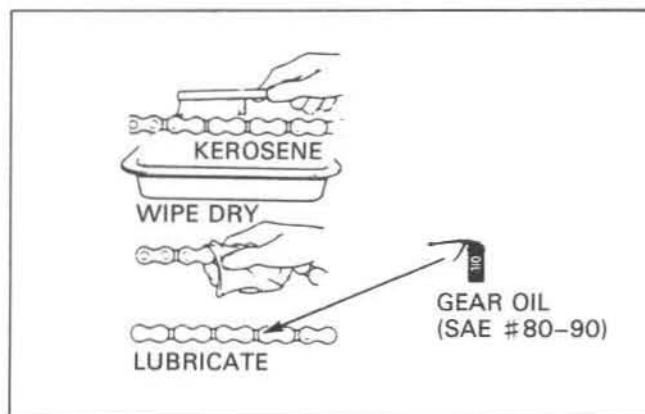
Adjust the rear brake pedal free play (page 3-10).

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

Remove the retaining clip, master link and drive chain.

Clean the drive chain with a non-flammable or high flash point solvent.

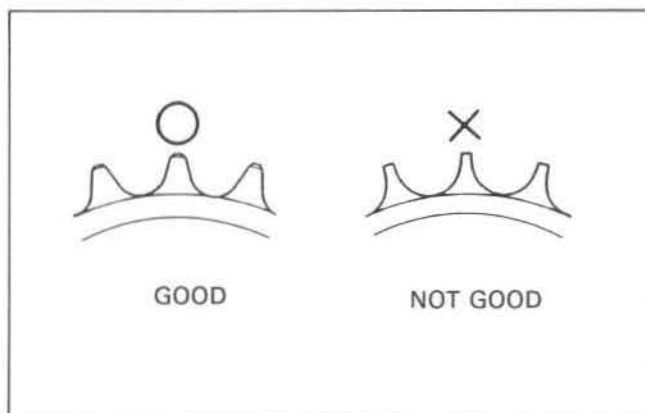
Lubricate the drive chain with gear oil (SAE #80-90).



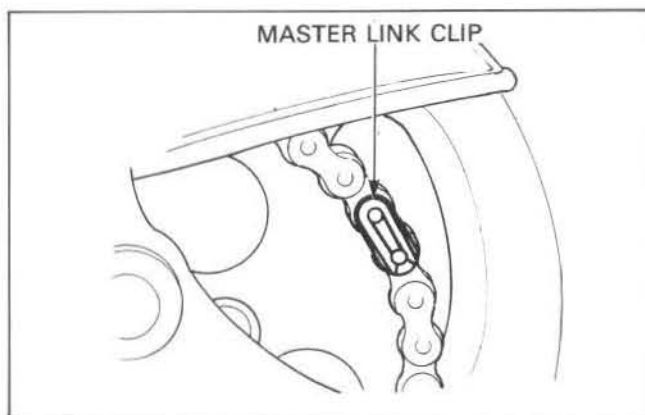
Inspect the sprocket teeth for excessive wear or damage. Replace if necessary.

#### NOTE

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

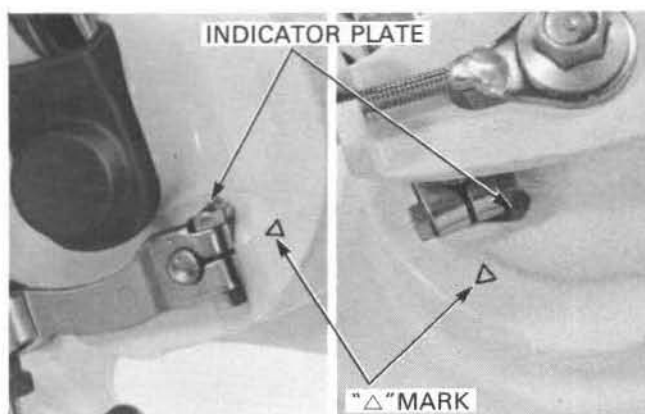


Reinstall the drive chain with the master link clip closed end facing the direction of the chains travel.



## BRAKE SHOE WEAR

Inspect the brake shoes and brake drum for wear if the arrow on the indicator plate aligns with the "△" mark on the brake panel when the brake is applied.

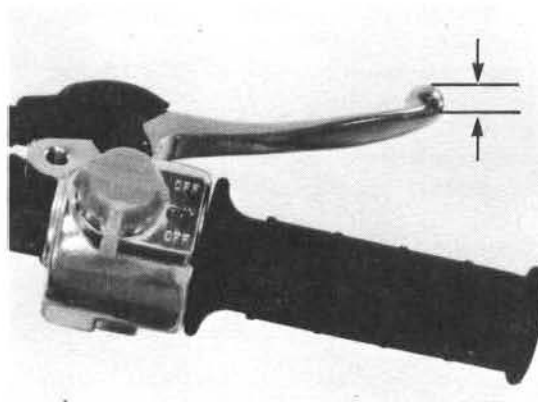


## BRAKE SYSTEM

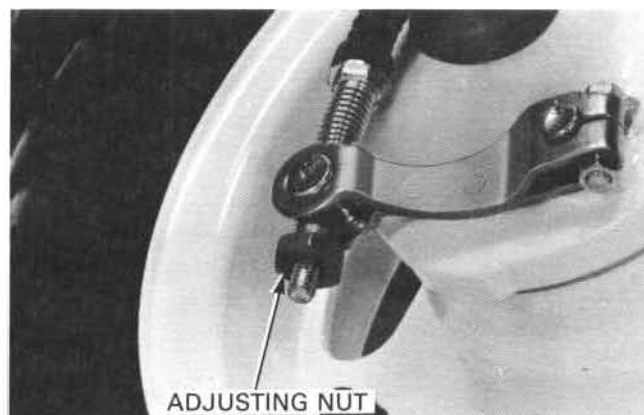
### FRONT BRAKE LEVER FREE PLAY

Measure the front brake lever free play at the tip of the brake lever.

**FREE PLAY: 10–20 mm (3/8–3/4 in)**



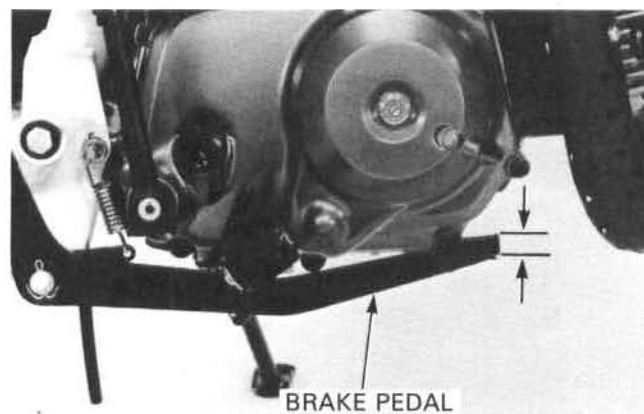
If necessary, turn the adjusting nut to obtain the specified free play.



### REAR BRAKE PEDAL FREE PLAY

Check the brake pedal free play

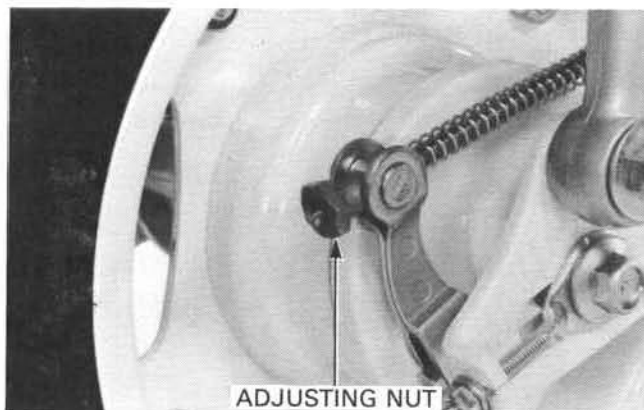
**FREE PLAY: 10–20 mm (3/8–3/4 in)**



If necessary, turn the adjusting nut to obtain the specified free play.

#### NOTE

Make sure the cutout on the adjusting nut is seated on the brake arm pin after making the final free play adjustment.



## CLUTCH SYSTEM

Loosen the lock nut and turn the adjusting screw one full turn clockwise.

Turn the screw counterclockwise until resistance is felt.

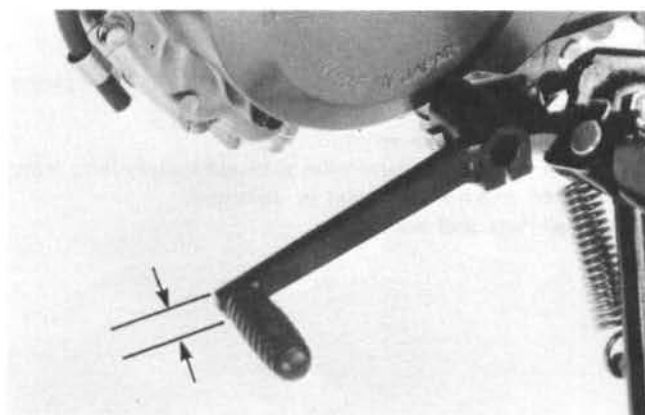
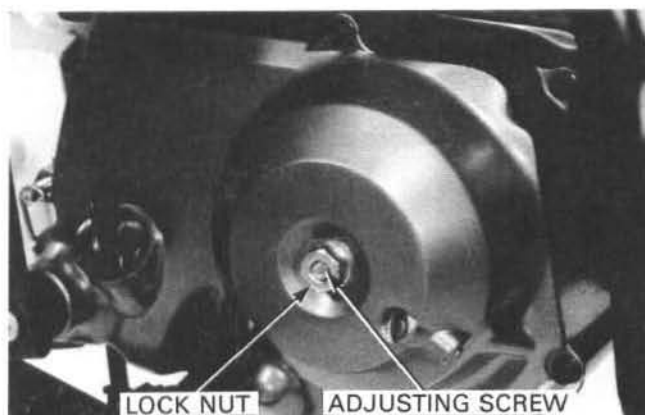
Then turn the adjusting screw 1/8 to 1/4 turns clockwise.

Tighten the lock nut.

### NOTE

- Hold the adjusting screw while tightening the lock nut.
- After adjusting the clutch, check its operation.

The clutch should be disengaged when the gearshift pedal is depressed 14–18 mm (1/2–3/4 in) measured at the pedal end.



## SIDE STAND

Support the motorcycle on a box or workstand.

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

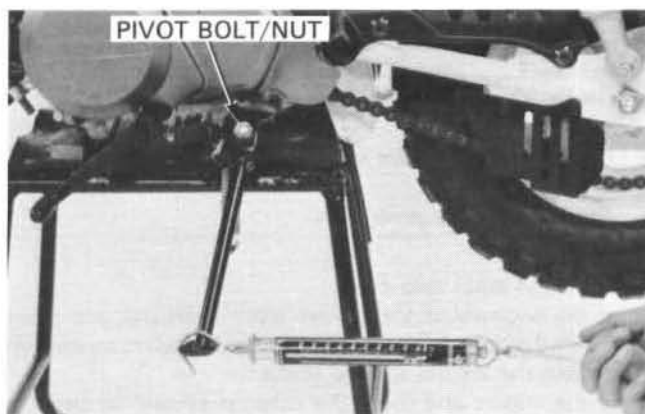
Make sure the side stand is not bent.

Measure the amount of force required to raise the side stand.

Tighten the side stand pivot bolt and nut if necessary.

### TORQUE:

Pivot bolt	13 N•m (1.3 kg-m, 9 ft-lb)
Nut	35 N•m (3.5 kg-m, 25 ft-lb)



## SUSPENSION

### WARNING

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

### FRONT

Check the fork action by compressing the suspension several times. Check the entire fork assembly for damaged.

Replace any components which are unrepairable.

Torque all nuts and bolts.



## MAINTENANCE

### REAR

Check the action of the rear shock absorbers by pressing down on the rear of the seat several times.

Check the entire shock absorber assembly for damage.

Replace damaged components which cannot be repaired.



### REAR

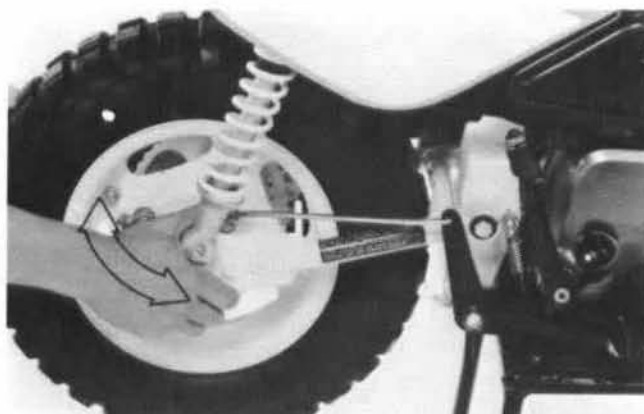
Support the motorcycle on a box or workstand.

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

Replace if excessively worn.

Check the entire rear suspension to be sure everything is securely mounted and not damaged or distorted.

Torque all nuts and bolts.



## SPARK ARRESTER CLEANING

### WARNING

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

Remove the drain hole cap.

Start the engine with the transmission in neutral, and purge accumulated carbon from the spark arrester system by momentarily revving the engine several times.

Stop the engine and allow the exhaust system to cool.

Install the drain hole cap.



## NUTS, BOLTS, FASTENERS

Tighten nuts, bolts and fasteners at regular intervals as shown in the Maintenance Schedule (page 3-2, 3).

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

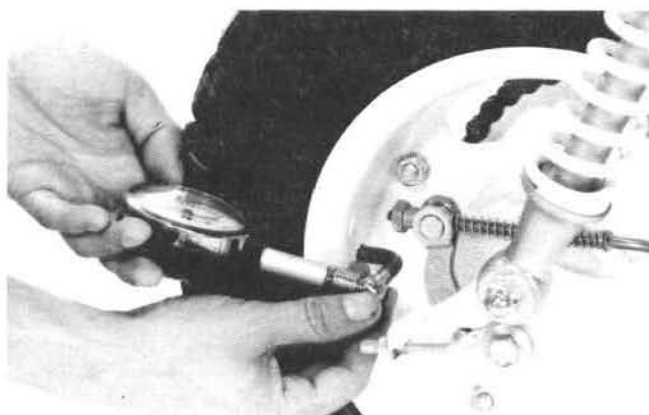


## WHEELS/TIRES

### NOTE

Tire pressure should be checked when tires are COLD.

	FRONT	REAR
TIRE PRESSURE kPa(kg/cm <sup>2</sup> , psi)	100 (1.0, 15)	125 (1.25, 18)
TIRE SIZE	3.50-8-2PR	3.50-8-2PR



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 limits:

**Minimum tread depth: 3mm (1/8 in)**

## STEERING HEAD BEARINGS

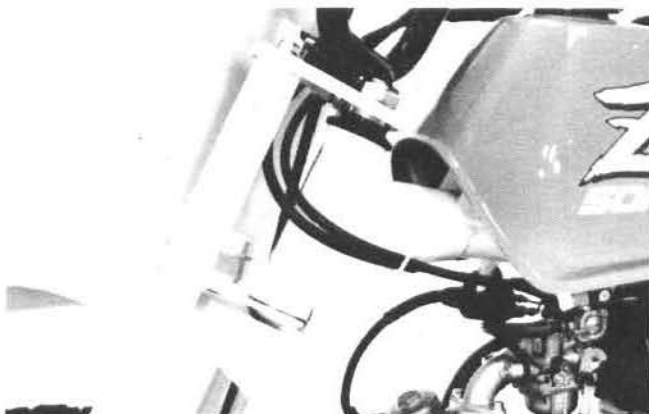
### NOTE

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

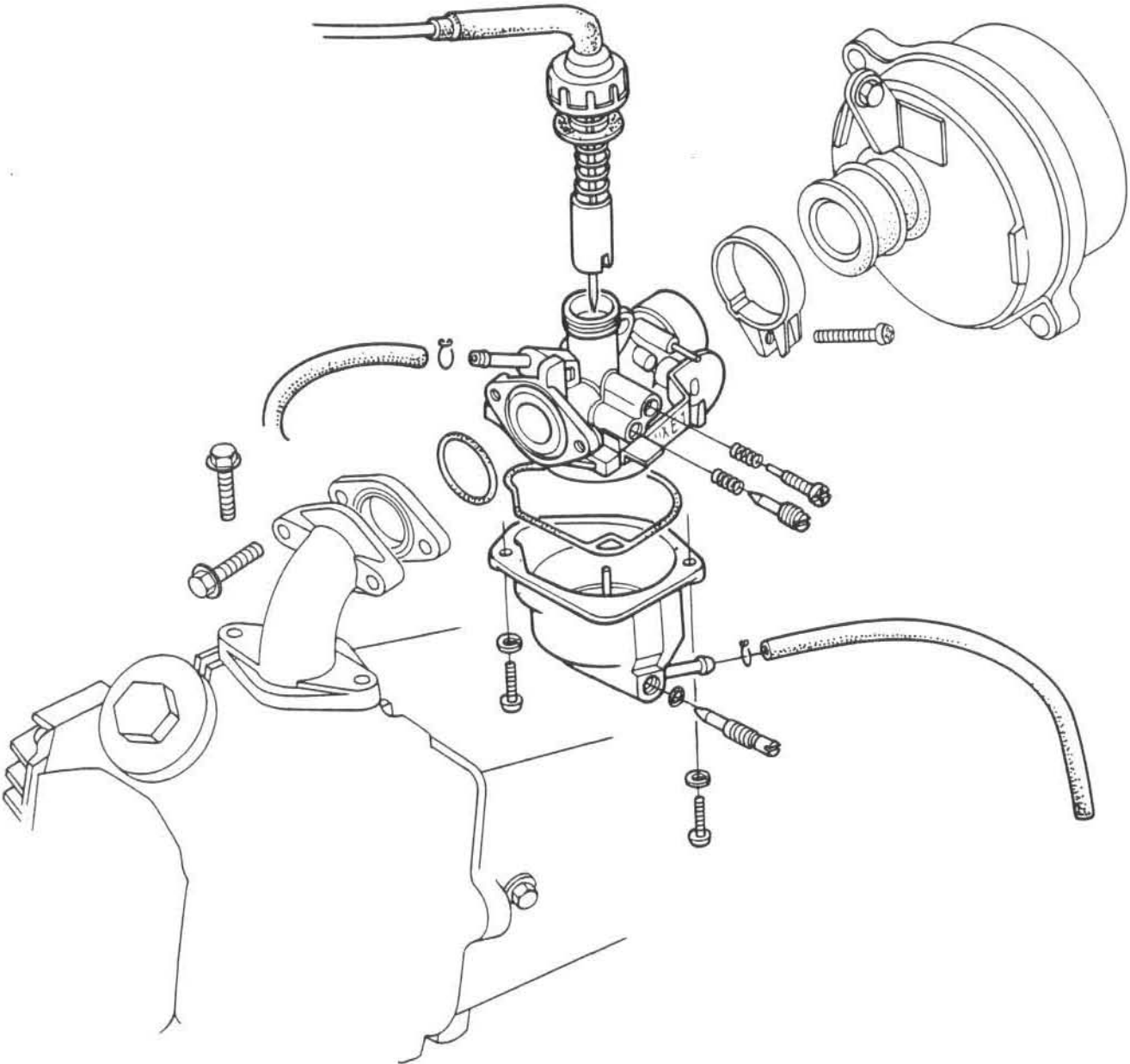
Rise the front wheel off the ground.

Check that the handlebar rotates freely.

If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearings by turning the steering head top thread nut (page 11-15).







SERVICE INFORMATION	4-1	CARBURETOR DISASSEMBLY	4-5
TROUBLESHOOTING	4-2	CARBURETOR ASSEMBLY	4-7
FUEL TANK	4-3	CARBURETOR INSTALLATION	4-9
AIR CLEANER CASE	4-4	AIR SCREW ADJUSTMENT	4-9
CARBURETOR REMOVAL	4-5		

## SERVICE INFORMATION

### GENERAL

#### WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped.  
Do not smoke or allow flames or sparks in the work area or where gasoline is stored.
- Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind resulting in loss of vehicle control.

- When disassembling fuel system parts, note the locations of the O-ring. Replace them during reassembly.

#### CAUTION

- The carburetor top is an integral part of the throttle cable assembly. The top cannot be separated from the assembly without causing damage to the cable.

#### NOTE

If the vehicle is to be stored for more than one month, drain the float bowl. Fuel left in the float bowl will cause clogged jets resulting in starting and driveability complaints.

## SPECIFICATIONS

### < Fuel tank >

Fuel tank capacity	4.0 lit (1.1 US gal, 0.9 Imp gal)
Fuel reserve capacity	0.8 lit (0.2 US gal, 0.2 Imp gal)

### < Carburetor >

Identification mark	'88	PA03F
	After '88	PA03H
	After '91	PA03M
Venturi bore	11 mm (0.4 in)	
Main jet	#58	
Slow jet	#35	
Jet needle clip standard position	2nd groove	
Air screw opening	'88	2 turns out
	After '88	1-1/4 turns out
Float level	12.7 mm (0.5 in)	
Idle speed	1,700 ± 100 rpm	

## TOOL

### Common

Carburetor float level gauge 07401 - 0010000

### TROUBLESHOOTING

#### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
- Too much fuel getting to cylinder
- No spark at plug (ignition malfunction)
- Air cleaner clogged

#### Engine idles roughly, stalls, or runs poorly

- Idle speed incorrect
- Ignition malfunction
- Rich mixture
- Lean mixture
- Air cleaner clogged
- Insulator leaks
- Fuel contaminated

#### Lean mixture

- Carburetor fuel jets clogged
- Fuel cap vent blocked
- Fuel strainer clogged
- Fuel line kinked or restricted
- Float valve faulty
- Float level too low

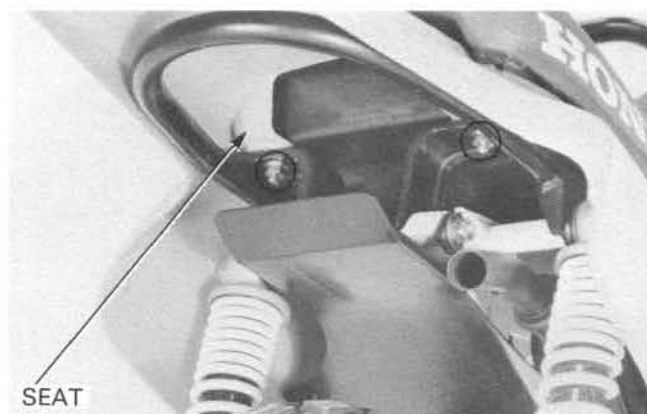
#### Rich mixture

- Carburetor choke stuck closed
- Float valve faulty
- Float level too high
- Carburetor air jet clogged
- Air cleaner dirty

## FUEL TANK

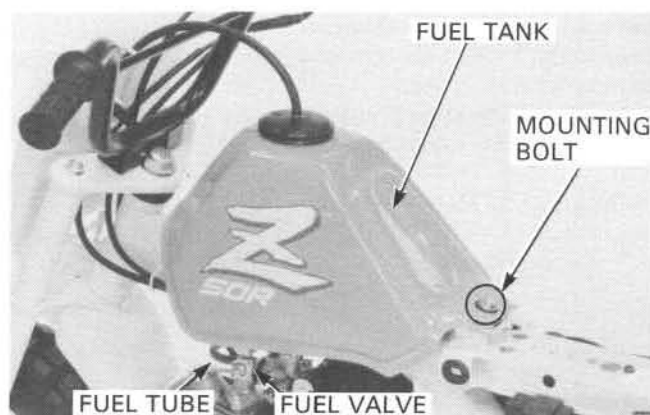
### REMOVAL

Remove the two screws and the seat.



Turn the fuel valve off and disconnect the fuel tube from the fuel tank.

Remove the fuel tank mounting bolt. Then remove the tank by pulling it rearward.

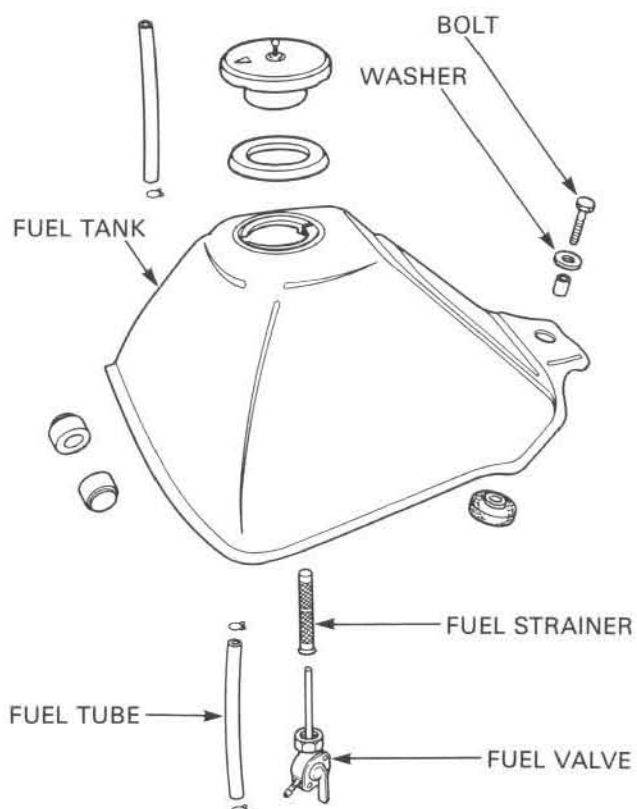


### INSTALLATION

Install the fuel tank in the reverse order of removal. Install the washer and tighten the fuel tank mounting bolt securely. Connect the fuel tube and install the seat.

#### NOTE

After assembling, make sure there are no fuel leaks.



## AIR CLEANER HOUSING

### REMOVAL

Remove two screws and the air cleaner housing cover.



Remove the air cleaner element.

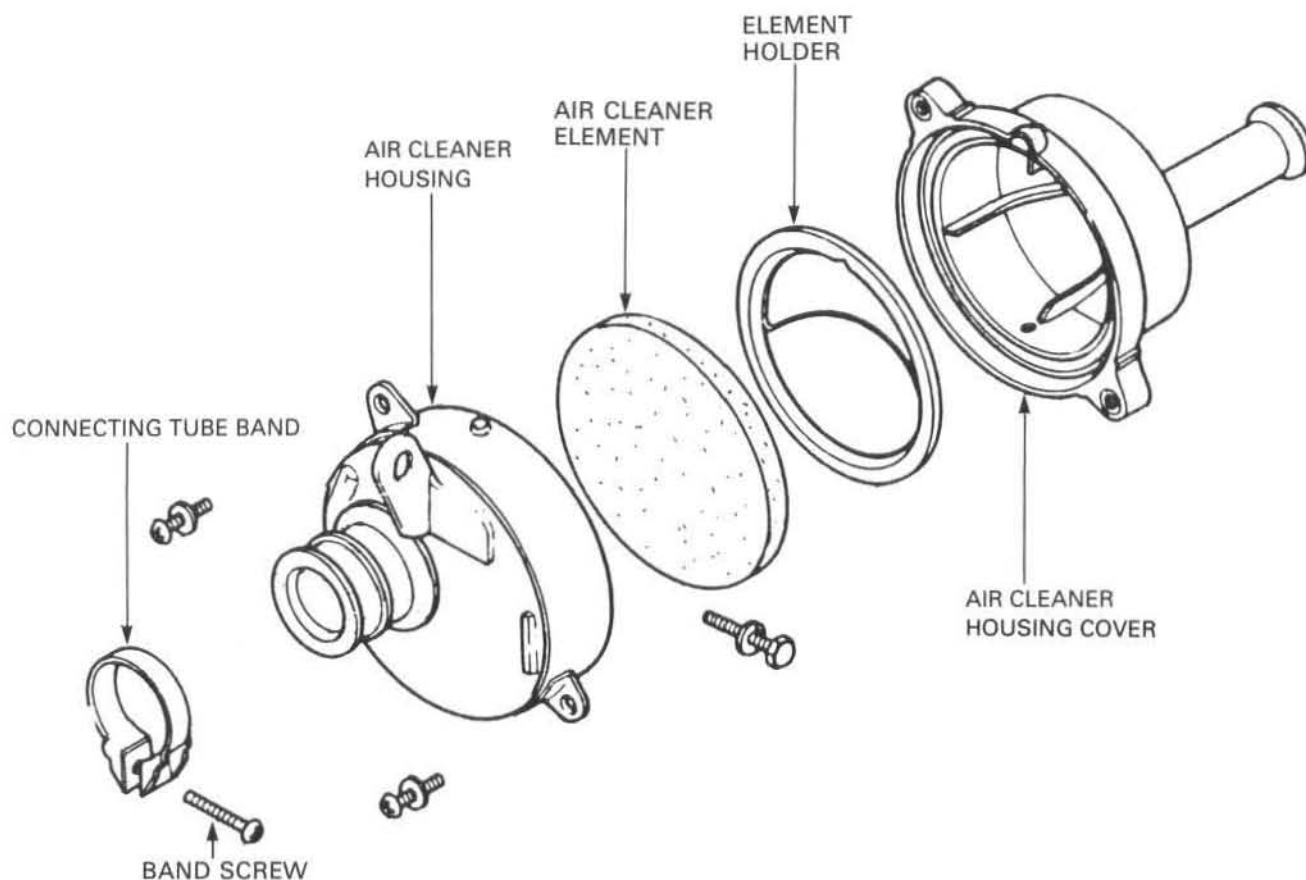
Loosen the air cleaner connecting tube band and remove the housing mounting bolt.

Remove the air cleaner housing.

Clean the element (page 3-5).

### INSTALLATION

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



## CARBURETOR REMOVAL

Turn the fuel valve "OFF" and loosen the drain screw to drain the fuel from the carburetor.

### WARNING

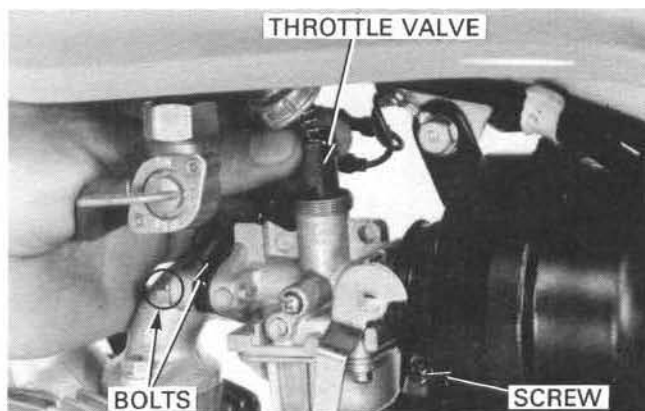
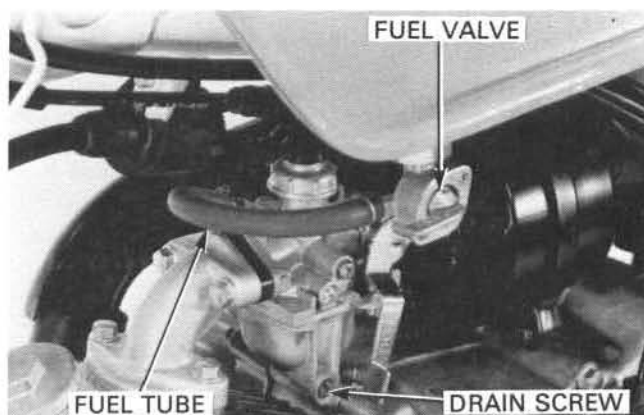
*Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where gasoline is stored.*

Disconnect the fuel tube from the carburetor.

Remove the carburetor top and pull out the throttle valve.

Loosen the connecting tube band screw.

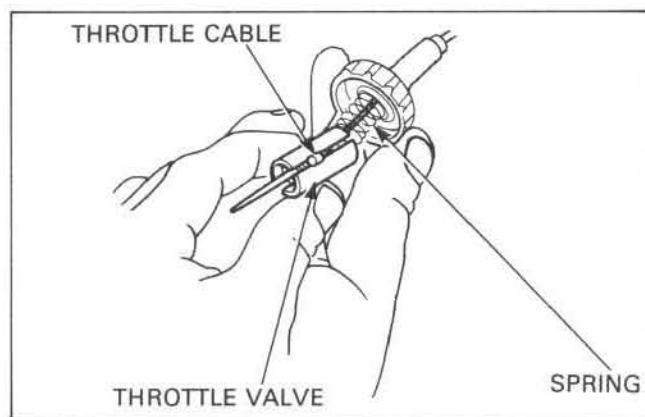
Remove the carburetor mounting bolts and the carburetor.



## CARBURETOR DISASSEMBLY

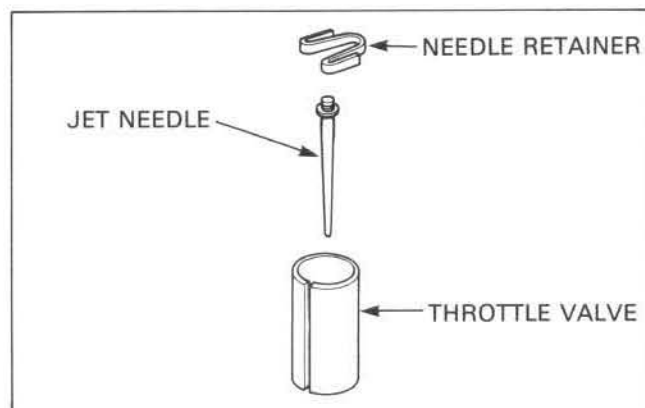
### THROTTLE VALVE DISASSEMBLY

Remove the throttle cable from the throttle valve by compressing the spring.



Remove the needle retainer and jet needle.

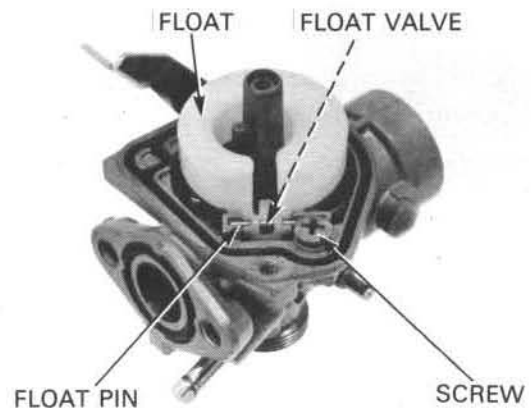
Inspect the throttle valve and jet needle for scratches, wear or damage.



## FUEL SYSTEM

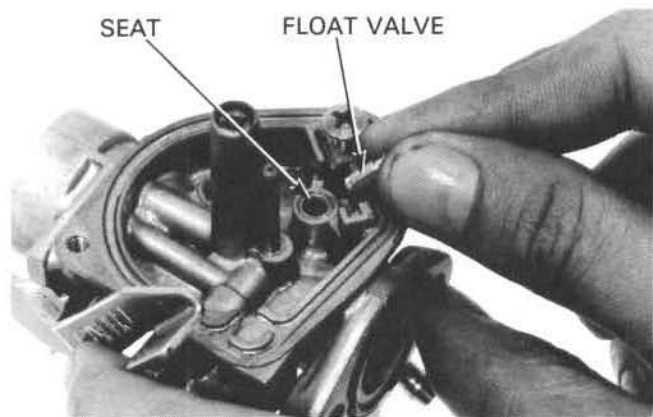
### FLOAT AND JETS DISASSEMBLY

Remove the float chamber from the carburetor body.  
Loosen the screw and remove the float pin, then remove the float and float valve.  
Check the float for deformation or the presence of fuel, and replace if necessary.



Inspect the float valve and seat for wear or damage.

Replace the float valve if it is damaged.  
If the seat is damaged, replace the carburetor body.



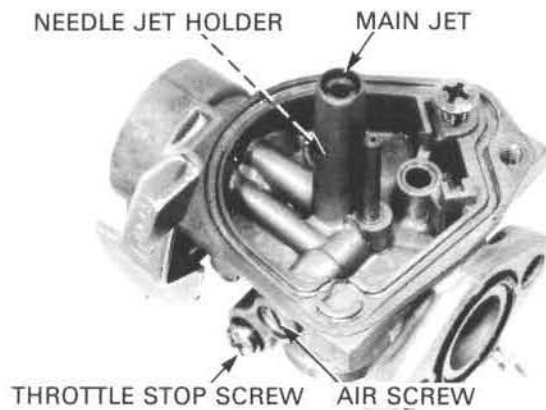
Remove the main jet, needle jet holder, and throttle stop screw.

#### NOTE

Before removing the air screw, record the number of turns until the screw seats lightly; then remove the air screw.

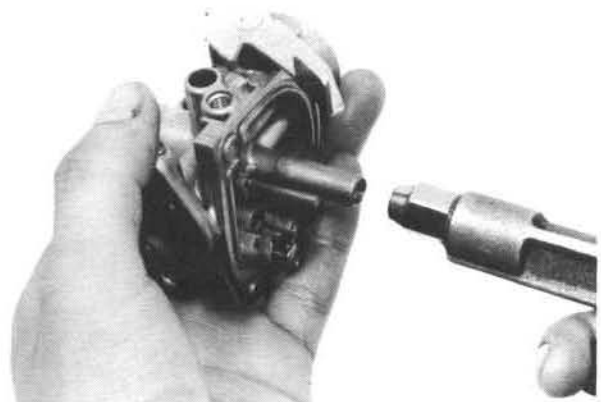
#### CAUTION

*The air screw seat will be damaged if the screw is tightened against the seat.*



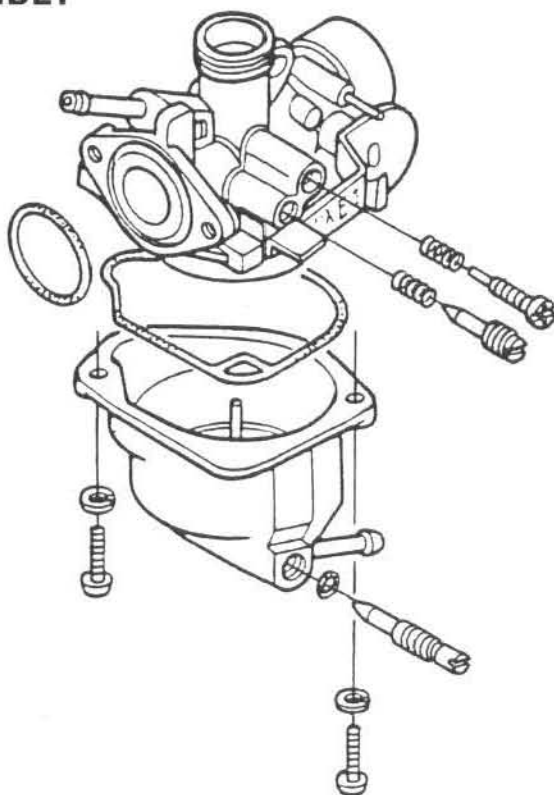
Clean the carburetor body passages with compressed air.

Check each part for wear or damage and replace them if necessary.





## CARBURETOR ASSEMBLY



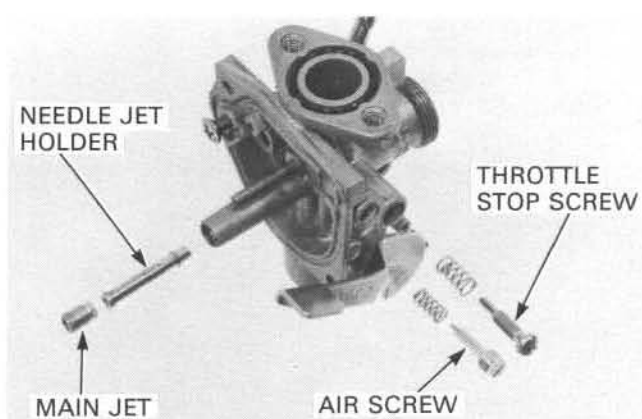
Clean all parts in high flash point solvent and blow dry with compressed air.

Install the needle jet holder and main jet.

Install the throttle stop screw and air screw.

### NOTE

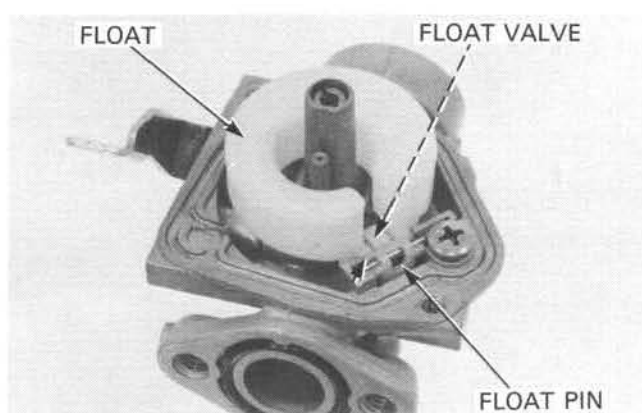
- Handle all jets and needles with care. They can easily be scored or scratched.
- Set the air screw at the position recorded during disassembly.



Install the float valve, float and float pin then secure the pin with the screw.

Check operation of the float.

After assembling the carburetor, measure the float level.



## FUEL SYSTEM

### FLOAT LEVEL INSPECTION

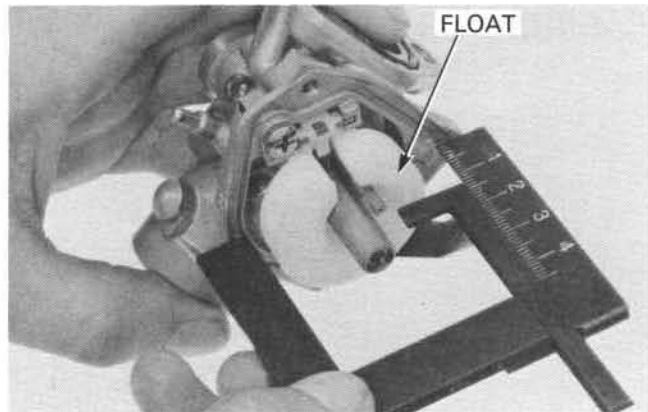
Measure the float level with the float tang just touching the float valve.

**FLOAT LEVEL: 12.7 mm (0.5 in)**

Replace the float if the level does not meet the specification.

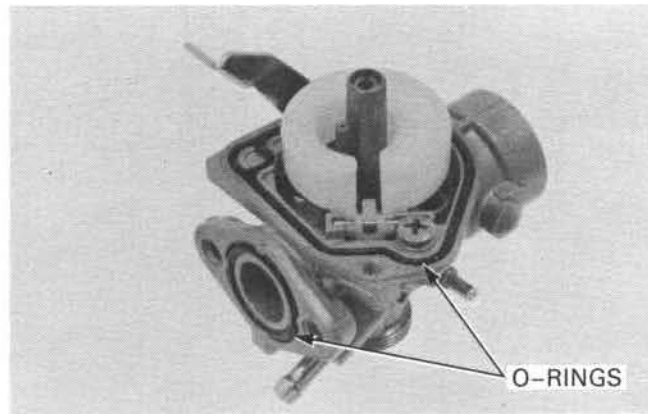
**TOOL: Carburetor float level gauge**

**07401-0010000**



Check the O-rings for wear or fatigue.

Install the float chamber and tighten the two screws.

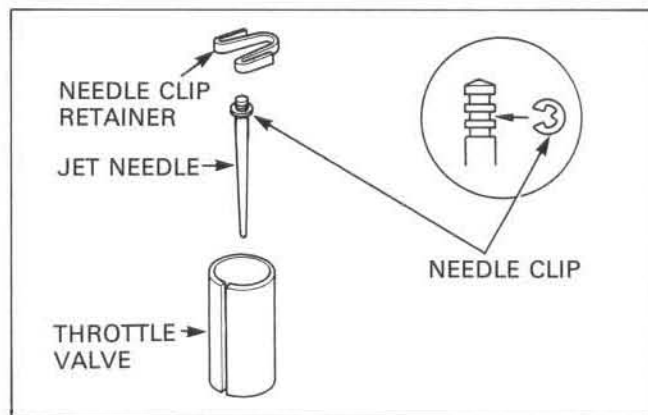


### THROTTLE VALVE ASSEMBLY

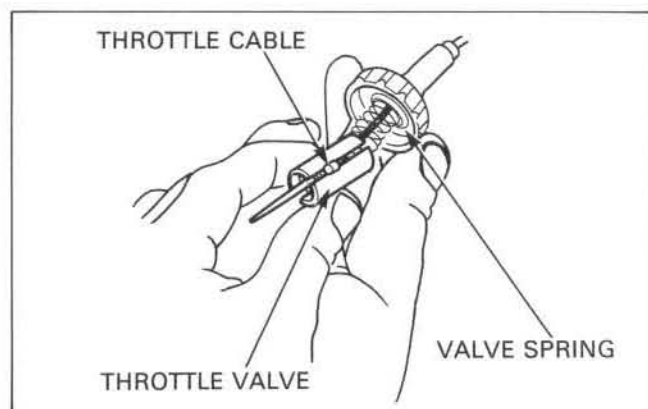
Install the needle clip on the jet needle.

**STANDARD GROOVE POSITION: 2nd**

Install the jet needle into the throttle valve and secure it with the needle clip retainer.



Connect the throttle cable to the throttle valve while depressing the valve spring.



## CARBURETOR INSTALLATION

Install the carburetor in the frame and tighten the carburetor mounting bolts securely.

Tighten the connecting tube band screw.

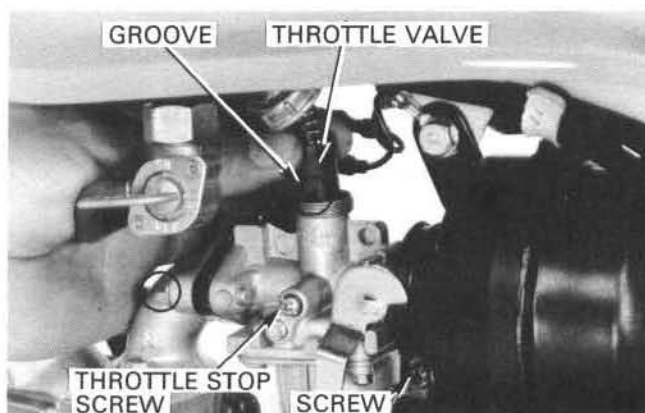
Insert the throttle valve into the carburetor, aligning the valve groove with the throttle stop screw.

Tighten the carburetor top.

### NOTE

After installing the carburetor and throttle valve, perform the following adjustment:

- Throttle grip free play (page 3-4).
- Carburetor idle speed (page 3-8).
- Carburetor air screw adjustment if the carburetor was overhauled or cleaned.

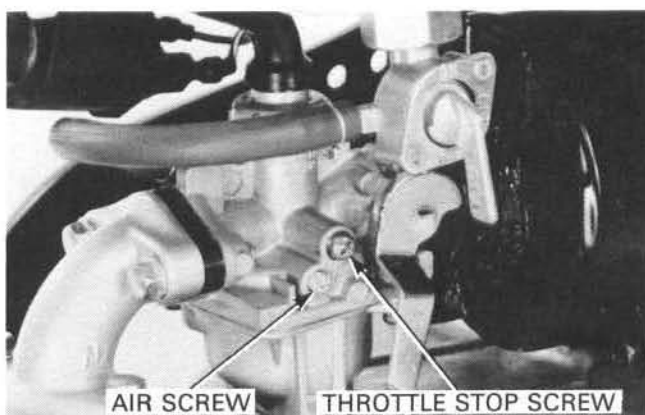


## AIR SCREW ADJUSTMENT

### NOTE

The air screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or cleaned.

1. Turn the air screw clockwise until it seats lightly and then back it out to standard setting.



### CAUTION

*The air screw seat will be damaged if the screw is tightened against the seat.*

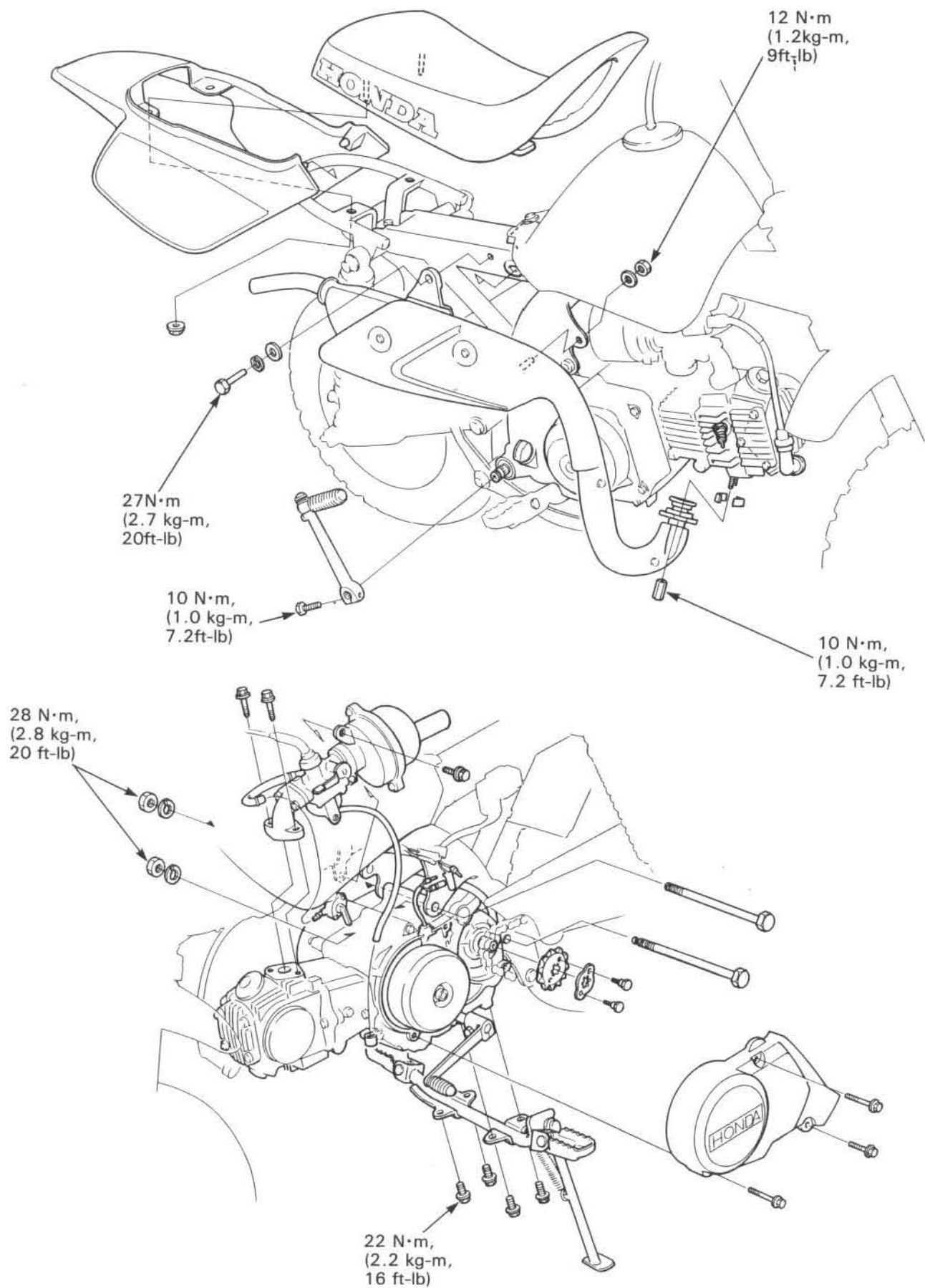
**INITIAL OPENING: '88 2 turns out**  
**After '88 1-1/4 turns out**

2. Warm the engine up to operating temperature.
3. Stop the engine, connect a tachometer to the engine according to the tachometer manufacturer's instructions. Start the engine.
4. Adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,700 ± 100 rpm.**

5. Turn the air screw in or out until the highest idle speed is obtained.
6. Repeat steps 4 and 5.
7. Readjust the idle speed with the throttle stop screw.
8. Check that the engine speed increases smoothly by turning the throttle grip; if not smoothly, repeat steps 4 through 7.

## ENGINE REMOVAL/INSTALLATION



# 5. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION  
ENGINE REMOVAL

5-1 ENGINE INSTALLATION  
5-2

5-3

## SERVICE INFORMATION

### GENERAL

- During removal and installation, support the frame with suitable blocks or a workstand.
- A jack or adjustable support is required to maneuver the engine.

### SPECIFICATIONS

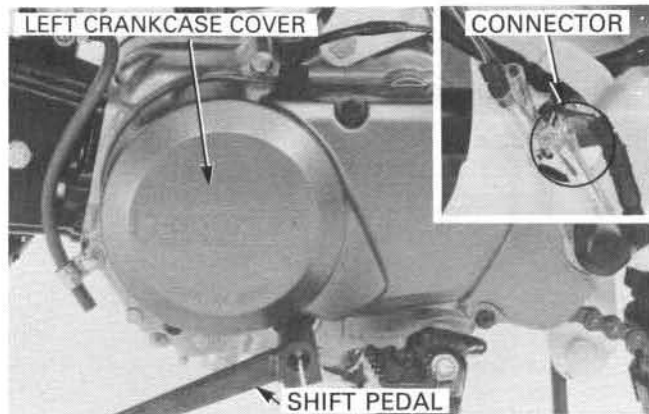
Engine dry weight	17.1 kg (37.70 lb)
Engine oil capacity	0.8 lit (0.85 US qt, 0.70 imp qt) at disassembly. 0.6 lit (0.63 US qt, 0.53 imp qt) at draining.

### TORQUE VALUES

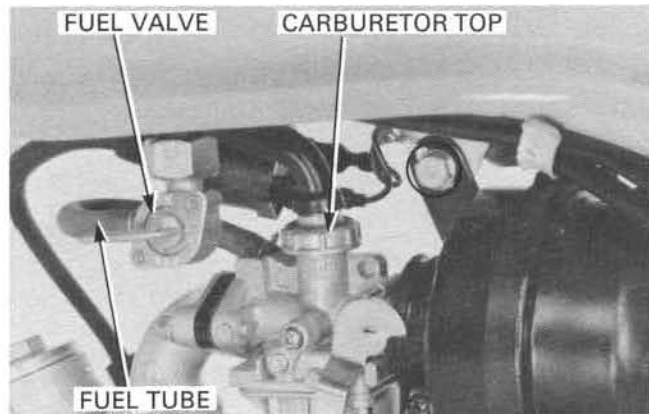
Engine hanger bolt	28 N•m (2.8 kg-m, 20 ft-lb)
Engine oil drain plug	25 N•m (2.5 kg-m, 18 ft-lb)
Swingarm pivot nut	45 N•m (4.5 kg-m, 33 ft-lb)
Exhaust pipe joint nut	10 N•m (1.0 kg-m, 7.2 ft-lb)
Air cleaner case mounting bolt	10 N•m (1.0 kg-m, 7.2 ft-lb)
Exhaust pipe mounting bolt	27 N•m (2.7 kg-m, 20 ft-lb)
Exhaust pipe mounting nut	12 N•m (1.2 kg-m, 9.0 ft-lb)
Foot peg assembly mounting bolt	22 N•m (2.2 kg-m, 16 ft-lb)

### ENGINE REMOVAL

Drain the engine oil (page 2-2).  
Remove the shift pedal and left crankcase cover.  
Disconnect the alternator wire connector.

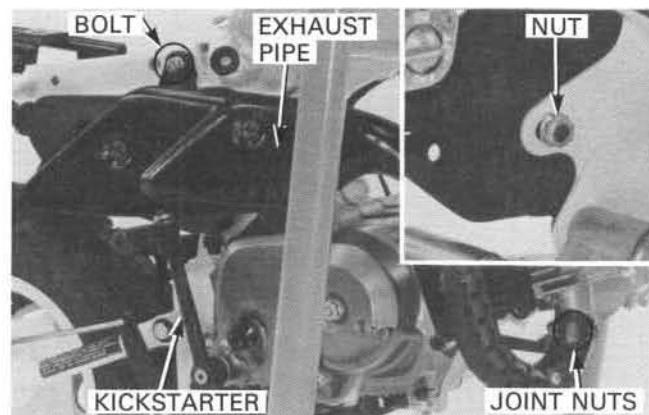


Turn the fuel valve OFF and disconnect the fuel tube from the carburetor.  
Remove the carburetor top and the air cleaner case mounting bolt.  
Remove the intake pipe bolts, then remove the intake pipe, carburetor and air cleaner housing together.

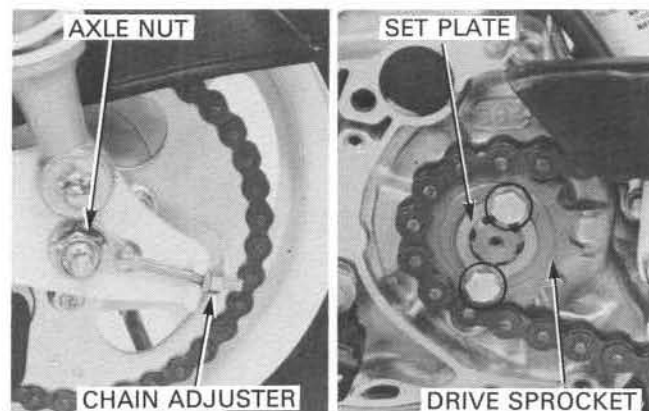


Remove the following:

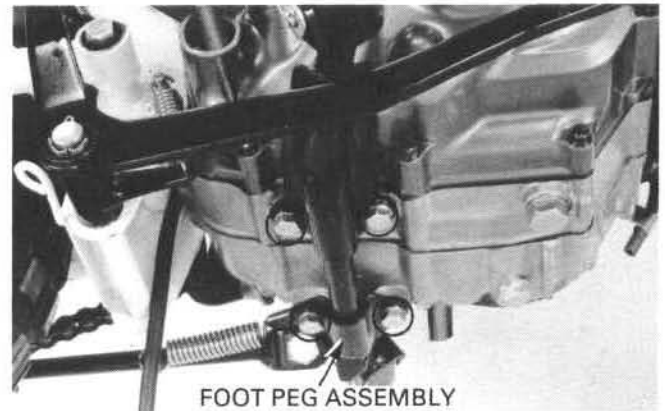
- seat and rear cover (page 4-3)
- exhaust pipe joint nuts, mounting bolt and nut, and exhaust pipe.
- kickstarter.



Loosen the rear axle nut and chain adjuster.  
Remove the brake adjusting nut.  
Remove the set plate bolts, set plate and drive sprocket.

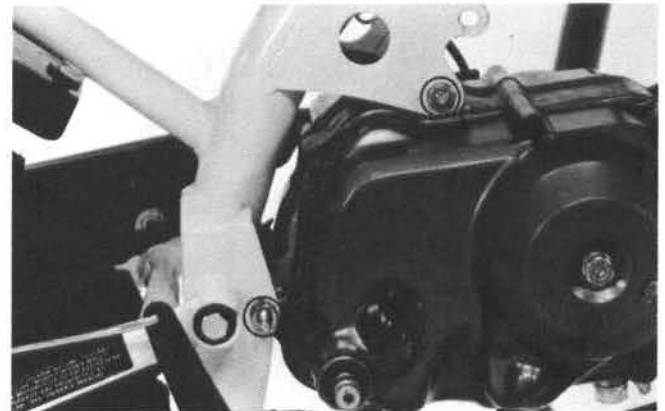


Support the frame with a quick stand or safety stand.  
Remove the four bolts and foot peg assembly.



FOOT PEG ASSEMBLY

Remove the engine hanger bolts and the engine.

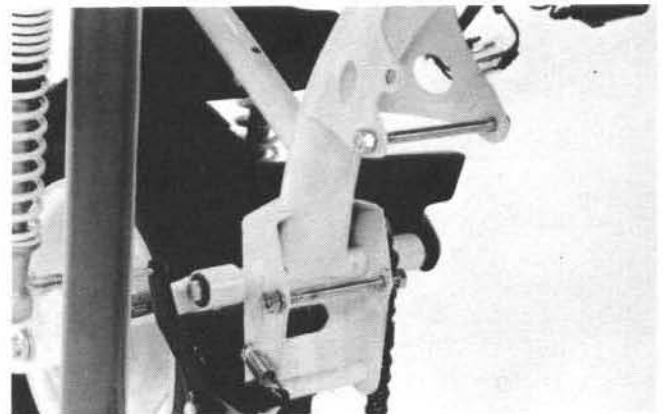


## ENGINE INSTALLATION

Installation is essentially the reverse order of removal.  
Tighten all fasteners to the specified torque.

### TORQUE:

Engine hanger bolt	28 N·m (2.8 kg-m, 20 ft-lb)
Exhaust pipe joint nut	10 N·m (1.0 kg-m, 7.2 ft-lb)
Exhaust pipe mounting bolt	27 N·m (2.7 kg-m, 20 ft-lb)
Exhaust pipe mounting nut	12 N·m (1.2 kg-m, 9 ft-lb)
Foot peg assembly mounting bolt	22 N·m (2.2 kg-m, 16 ft-lb)

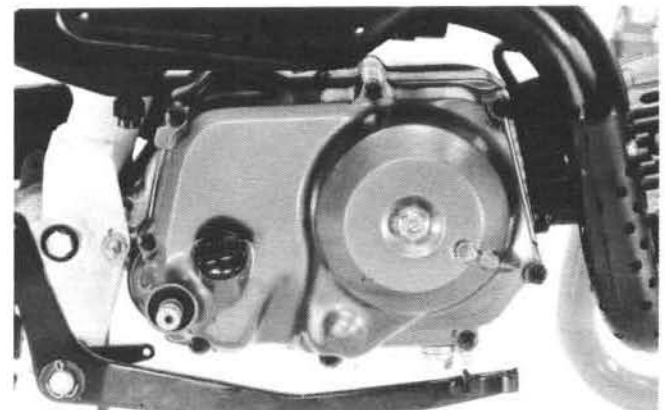


Fill the engine with the recommended oil (page 2-2).

### NOTE

Route all wire harness and cables properly (page 1-9).  
Use the correct bolts in their proper positions.

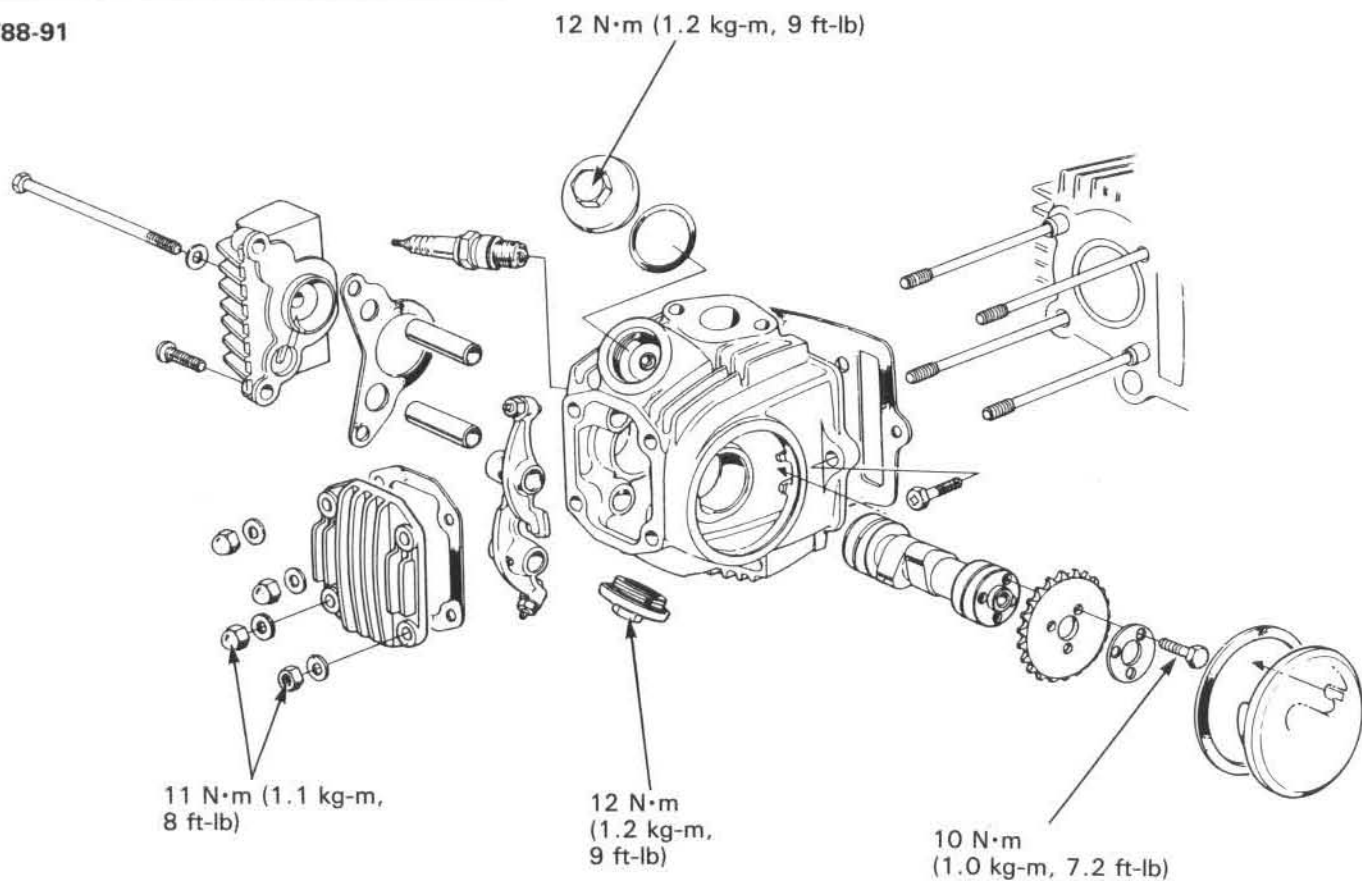
After installing the engine, adjust the drive chain slack (page 3-8)



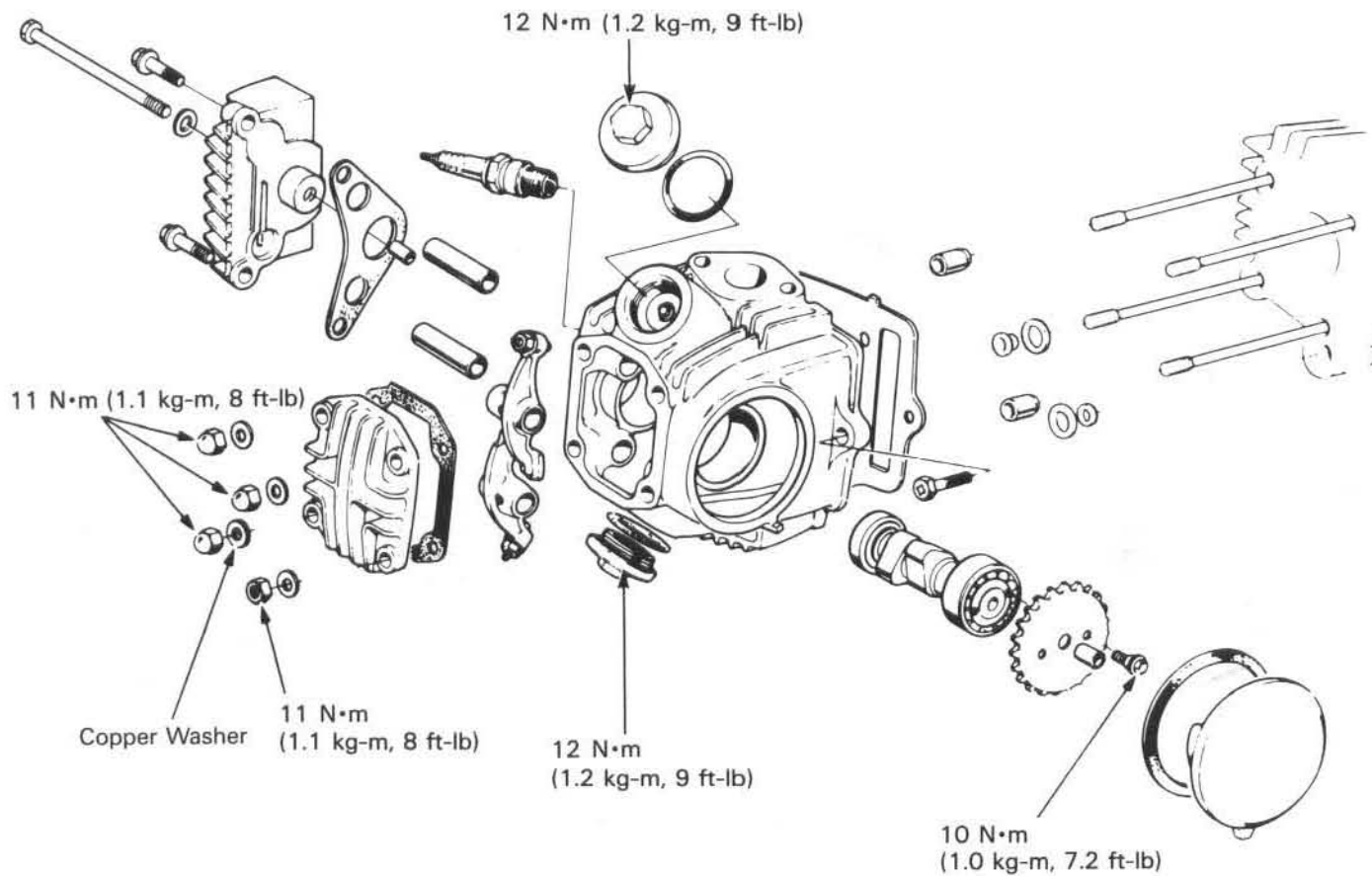


## CYLINDER HEAD/VALVES

'88-91



After '91



# 6. CYLINDER HEAD/VALVES

SERVICE INFORMATION	6-1	VALVE GUIDE REPLACEMENT	6-8
TROUBLESHOOTING	6-2	VALVE SEAT INSPECTION/REFACING	6-9
CAMSHAFT/ROCKER ARM REMOVAL	6-3	CYLINDER HEAD ASSEMBLY	6-11
CYLINDER HEAD REMOVAL	6-6	CYLINDER HEAD INSTALLATION	6-12
CYLINDER HEAD DISASSEMBLY	6-6	CAMSHAFT INSTALLATION	6-13

## SERVICE INFORMATION

### GENERAL

- This section covers cylinder head, valves, camshaft and rocker arm maintenance.
- Remove the front wheel (page 11-4) to allow clearance for cylinder head removal.
- Camshaft lubrication oil is fed to the cylinder head through an oil control orifice in the crankcase. Be sure that this orifice is not clogged and that new O-rings and dowel pins are in place before installing the cylinder head.

### SPECIFICATIONS

mm (in)

ITEM		STANDARD	SERVICE LIMIT
Camshaft journal O.D.	R	19.942–19.955 (0.7851–0.7856)	19.75 (0.778)
	L	28.942–28.955 (1.1394–1.1400)	28.75 (1.132)
Cam lobe height	IN	27.885–28.005 (1.0980–1.1026)	27.55 (1.085)
	EX	26.016–26.136 (1.0242–1.0290)	25.69 (1.011)
After '91 Cam lobe height	IN	20.055 (0.790)	19.67 (0.775)
	EX	20.063 (0.791)	19.66 (0.774)
End hole I.D.	R	20.010–20.031 (0.7878–0.7886)	20.20 (0.795)
	L	29.010–29.031 (1.1421–1.1430)	29.20 (1.150)
Camshaft-to-end hole clearance	R	0.0100–0.025 (0.0004–0.0010)	0.10 (0.004)
	L	0.010–0.025 (0.0004–0.0010)	0.10 (0.004)
Rocker arm I.D.		10.000–10.015 (0.3937–0.3943)	10.10 (0.398)
Rocker arm shaft O.D.		9.977–9.987 (0.3923–0.3932)	9.91 (0.390)
Cylinder head warpage		—	0.05 (0.002)
Valve spring free length	INNER	32.78 (1.291)	31.2 (1.23)
	OUTER	35.55 (1.400)	34.0 (1.34)
After '91 Valve spring free length		33.34 (1.314)	31.8 (1.25)
Valve stem O.D.	IN	4.970–4.985 (0.1957–0.1963)	4.92 (0.194)
	EX	4.955–4.970 (0.1951–0.1957)	4.92 (0.194)
Valve guide I.D.	IN/EX	5.000–5.012 (0.1969–0.1973)	5.03 (0.198)
Stem-to-guide clearance	IN	0.015–0.042 (0.0006–0.0017)	0.08 (0.003)
	EX	0.030–0.057 (0.0012–0.0022)	0.10 (0.004)
Valve seat width	IN/EX	1.0–1.3 (0.04–0.05)	2.0 (0.08)

### TORQUE VALUES

Tappet hole cap	12 N·m (1.2 kg-m, 9 ft-lb)
Cylinder head cover nut	11 N·m (1.1 kg-m, 8 ft-lb)
Cam sprocket bolt	10 N·m (1.0 kg-m, 7.2 ft-lb)
Valve adjusting lock nut	9 N·m (0.9 kg-m, 6.5 ft-lb)

## CYLINDER HEAD/VALVES

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### TOOLS

#### Special

Valve spring compressor attachment	07959-KM30101
Valve guide driver, 5.0mm	07942-MA60000
Valve guide reamer, 5.0mm	07984-MA6000C

#### Common

Valve spring compressor	07757-0010000
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## VALVE SEAT CUTTER

### VALVE SEAT CUTTER

Seat cutter 24 mm (45° IN, EX)	07780-0010600	— or equivalent commercially available in U.S.A.
Seat cutter 19 mm (32° EX)	07780-0012700	
Seat cutter 21.5 mm (32° IN)	07780-0012800	
Seat cutter 22 mm (60° IN, EX)	07780-0014202	
Cutter holder 5 mm	07781-0010400	

## TROUBLESHOOTING

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

### Low compression

- Valves
  - Incorrect valve adjustment
  - Burned or bent valve stem
  - Incorrect valve timing
  - Broken valve spring
  - Worn or damaged valve stem seal
  - Worn or damaged valve guide
- Cylinder head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Cylinder and piston (Refer to Section 7)

### High Compression

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

### Excessive Noise

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

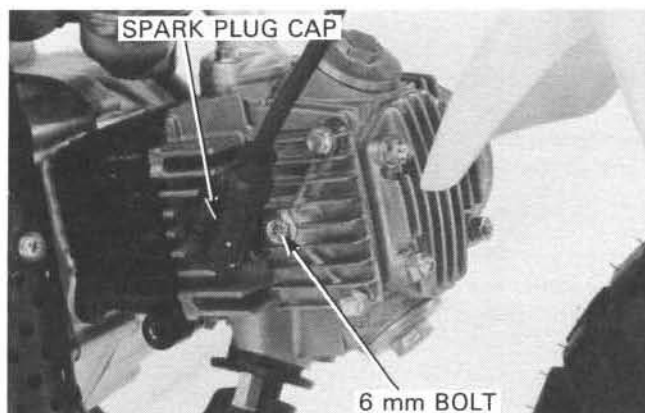
### Poor Idling

- Compression too low

## CAMSHAFT/ROCKER ARM REMOVAL

**'88-'91**

Remove the spark plug cap.  
Loosen the 6 mm bolt and tap the bolt head to loosen the cylinder head left side cover.  
Remove the 6 mm bolt.

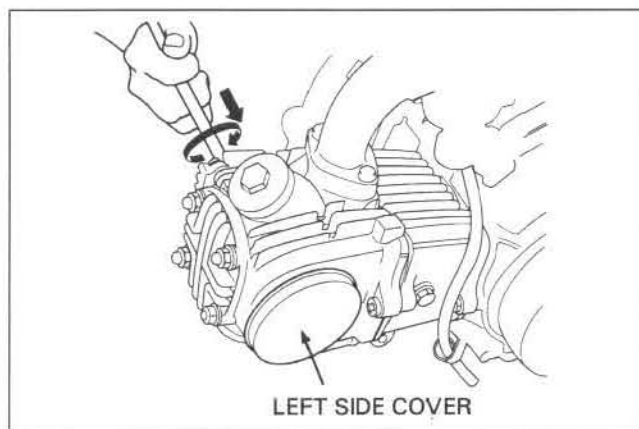


**After '91**

### Camshaft Removal

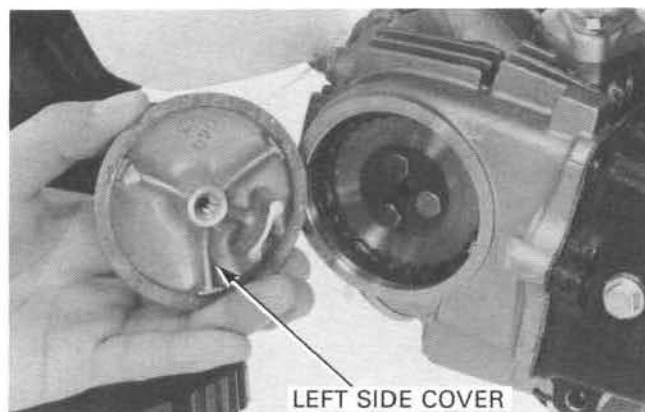
Remove the spark plug cap.  
Loosen the 6 mm bolt and tap it to loosen the cylinder head left side cover.

Remove the cylinder head left side cover and gasket.



**'88-'91**

Remove the left side cover.



Remove the sealing bolt, washer, cam chain tensioner spring and push rod (page 9-3).

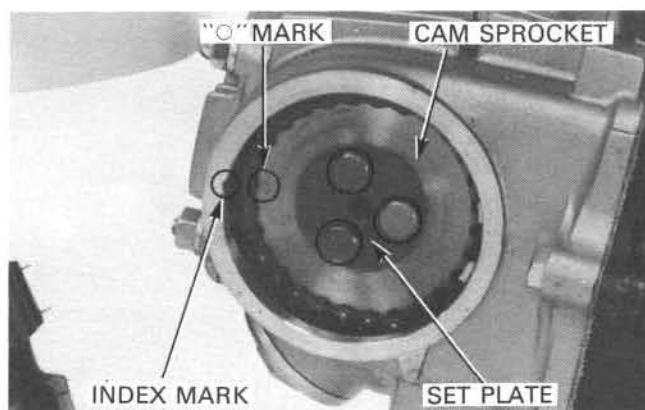
Remove the left crankcase cover (page 9-2).

Turn the crankshaft counterclockwise until the "O" mark on the cam sprocket aligns with the index mark on the cylinder head.

Remove the cam sprocket bolts, set plate and cam sprocket.

### NOTE

Suspend the cam chain with a piece of wire to prevent the chain falling into the cylinder.



## CYLINDER HEAD/VALVES

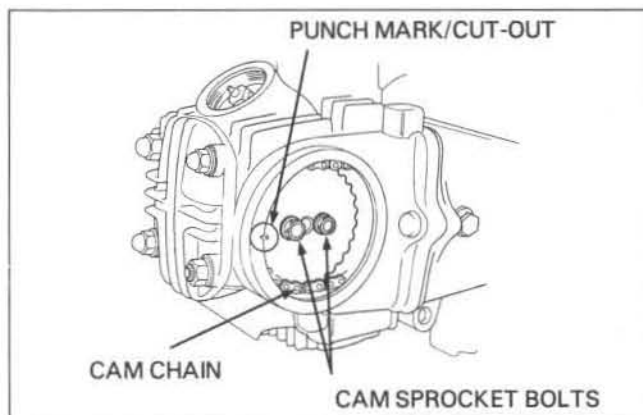
### After '91

Turn the crankshaft counterclockwise until the punch mark on the cam sprocket aligns with cut-out on the cylinder head.

Remove the cam sprocket bolts and dowel pin.  
Derail the cam chain and remove the cam sprocket.

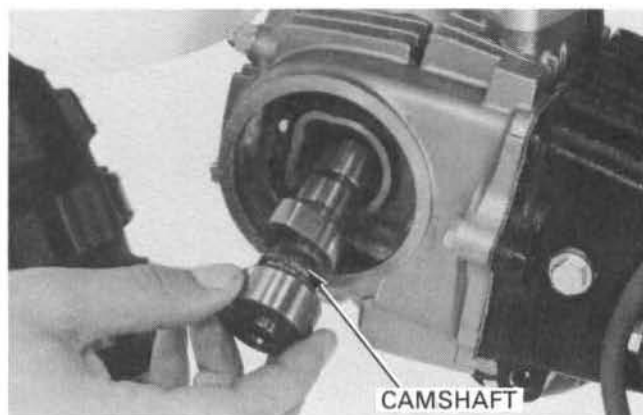
#### NOTE:

Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.



### '88-'91

Remove the camshaft.



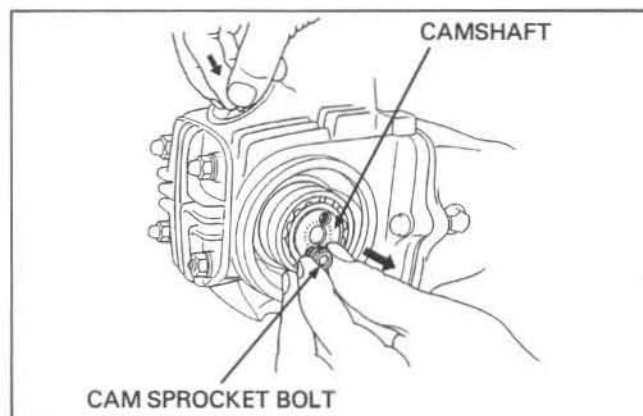
### After '91

Remove the valve adjuster covers and loosen the valve adjusters fully.

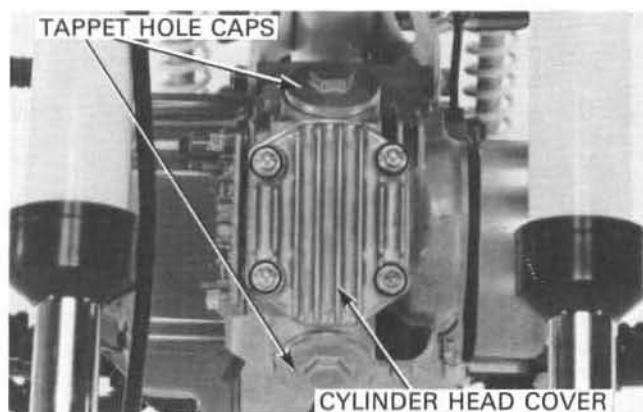
Temporarily screw the cam sprocket bolts into the camshaft and pull out the camshaft while holding the rocker arms.

#### NOTE:

Cylinder head can be removed with the camshaft installed on the cylinder head. Refer to the page 7-2 for removal.



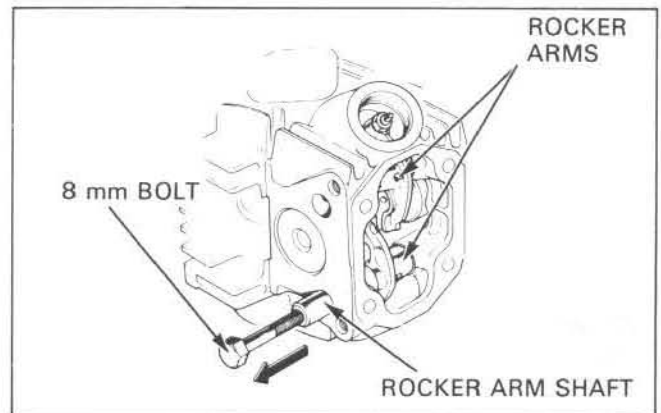
Remove the nuts, washers, and cylinder head cover.  
Remove the tappet hole caps.



Remove the right side cover and gasket.



Remove the rocker arm shafts by screwing in an 8 mm bolt and pulling outward on the bolt.  
Remove the rocker arms.

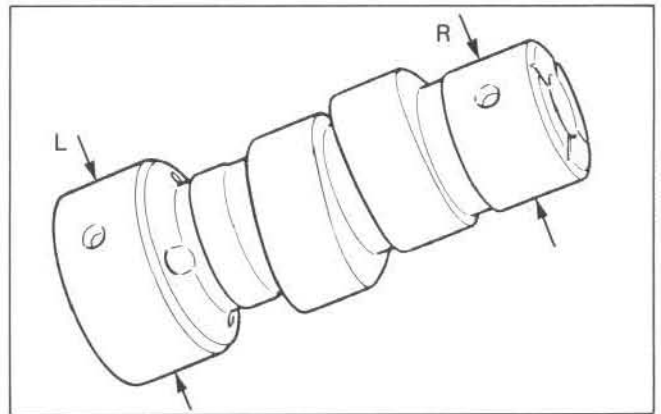


## CAMSHAFT INSPECTION

'88-'91

Measure and record the camshaft journal O.D. with a micrometer.

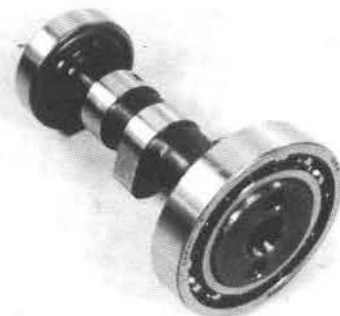
**SERVICE LIMITS:** R: 19.75 mm (0.778 in)  
L: 28.75 mm (1.132 in)



**After '91**

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

Replace the camshaft bearing if the outer race does not turn smoothly and quietly, or if it fits loosely on the camshaft.

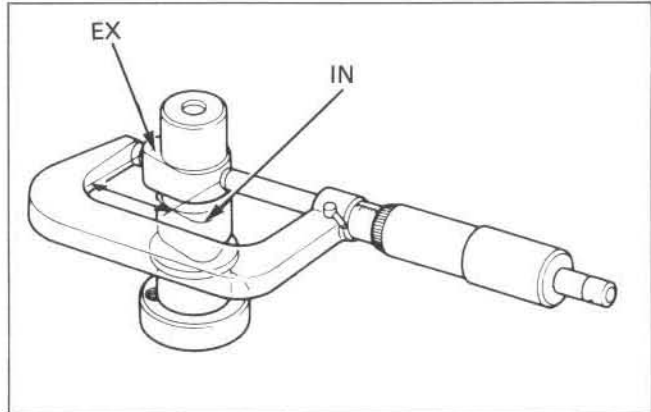


## CYLINDER HEAD/VALVES

'88-'91

Measure each cam lobe height and inspect it for wear or damage.

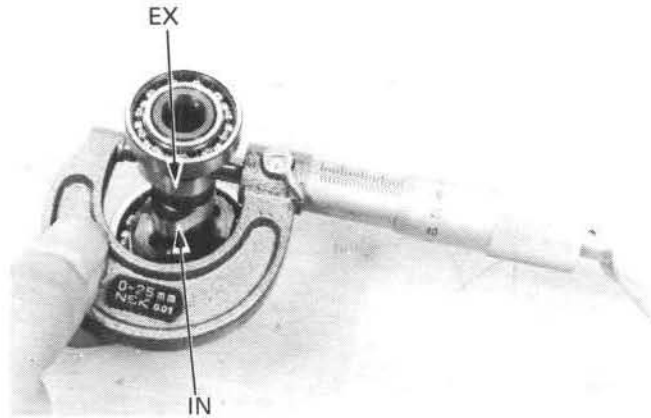
**SERVICE LIMITS:** IN: 27.55 mm (1.085 in)  
EX: 25.69 mm (1.011 in)



After '91

Measure each cam lobe heights and inspect it for wear or damage.

**SERVICE LIMITS:** IN: 19.67 mm (0.775 in)  
EX: 19.66 mm (0.774 in)



## CAMSHAFT-TO-END HOLE INSPECTION

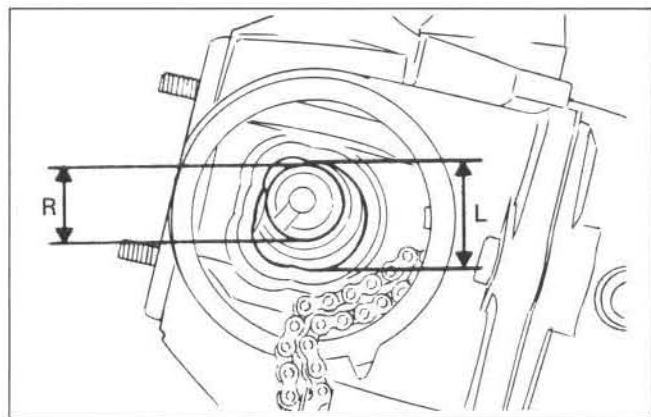
'88-'91

Measure and record the end hole I.D.

**SERVICE LIMITS:** R: 20.20 mm (0.795 in)  
L: 29.20 mm (1.150 in)

Calculate the camshaft-to-end hole clearance.

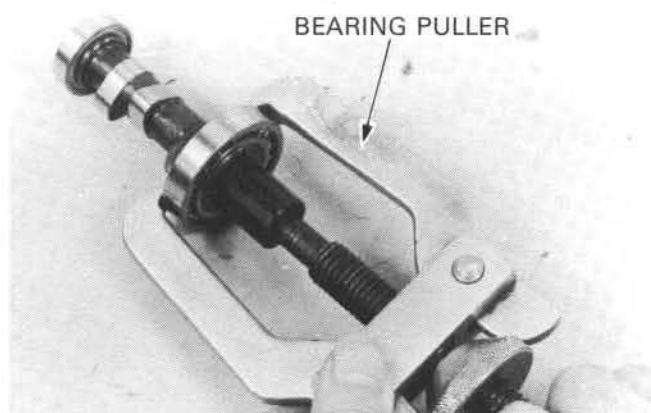
**SERVICE LIMITS:** R: 0.10 mm (0.004 in)  
L: 0.10 mm (0.004 in)



After '91

## CAMSHAFT BEARING REPLACEMENT

Remove a camshaft bearing using the bearing puller.

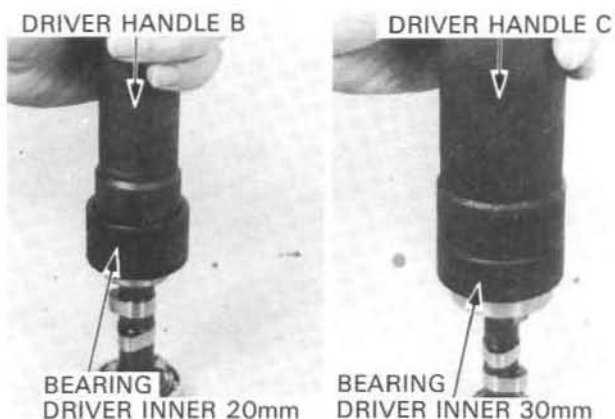




Drive a new camshaft bearing onto the camshaft using the following tools.

**TOOLS:**

Driver handle inner B	07746-0020100
Driver handle inner C	07746-0030100
Bearing driver inner 20 mm	07746-0020400
Bearing driver inner 30 mm	07746-0030300



## ROCKER ARM INSPECTION

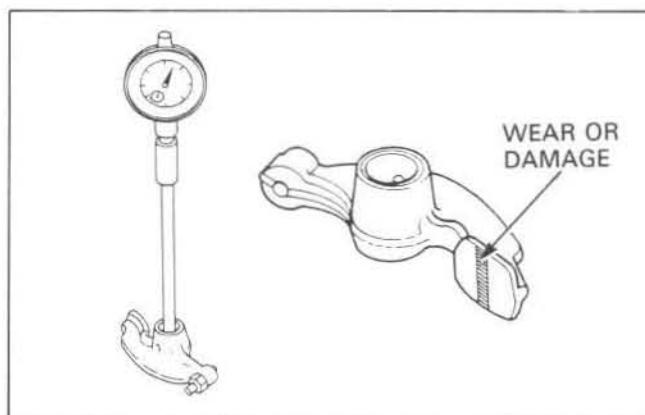
Inspect the rocker arms for damage, wear or clogged oil holes.

**NOTE**

If either rocker arm requires service or replacement, inspect the cam lobes for scoring, chipping or flat spots.

Measure the I.D. of each rocker arm.

**SERVICE LIMIT: 10.10 mm (0.398 in)**

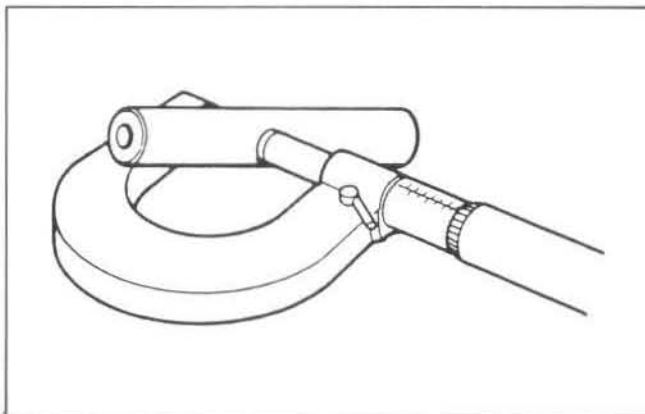


## ROCKER ARM SHAFT INSPECTION

Inspect the rocker arm shafts for wear or damage.

Measure the O.D. of each rocker arm shaft.

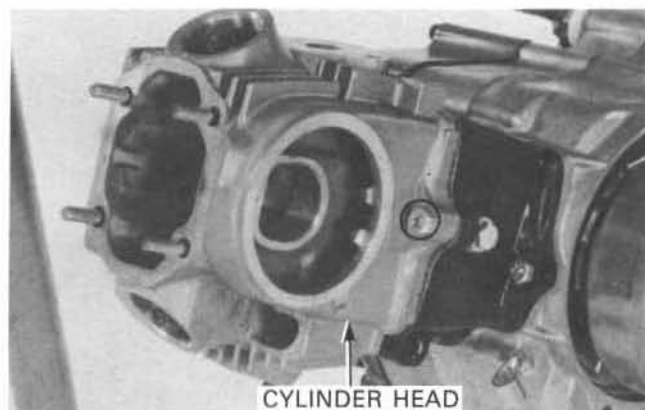
**SERVICE LIMIT: 9.91 mm (0.390 in)**



## CYLINDER HEAD REMOVAL

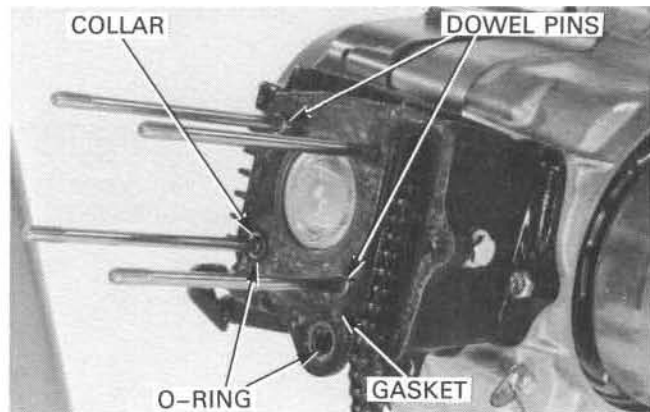
Remove the following:

- front wheel (page 11-4)
- intake pipe, carburetor and air cleaner housing together (page 5-2)
- exhaust pipe (page 5-2)
- camshaft and rocker arms
- cylinder head mounting bolt and cylinder head.



## CYLINDER HEAD/VALVES

Remove the cylinder head gasket, O-rings, collar and dowel pins.



## CYLINDER HEAD DISASSEMBLY

Remove the valve cotters using the valve spring compressor. Remove the spring retainers, springs, stem seals, spring seat and valves.

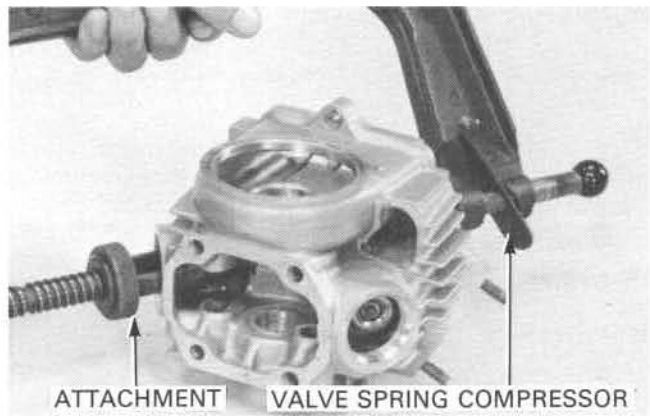
### CAUTION

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

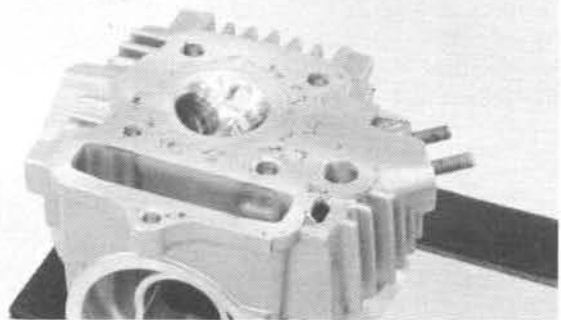
### TOOLS :

Valve spring compressor  
Attachment

07757-0010000  
07959-KM30101



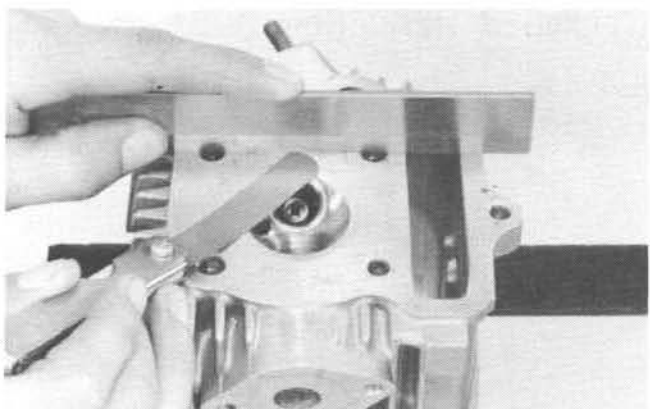
Remove the carbon deposits from the combustion chamber and exhaust port of the cylinder head.  
Clean off any gasket material from the cylinder head surface.



## CYLINDER HEAD INSPECTION

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

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

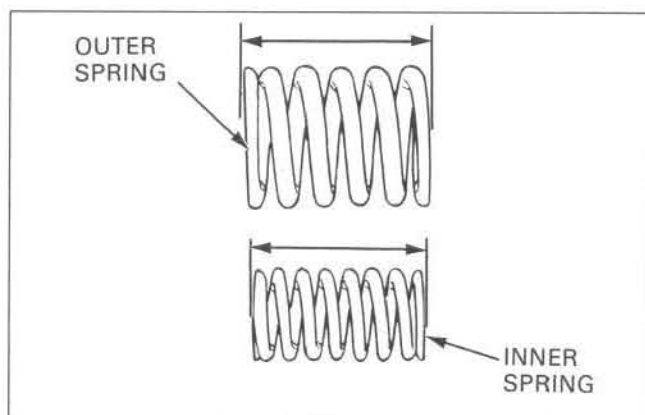


## VALVE SPRING INSPECTION

'88-'91

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

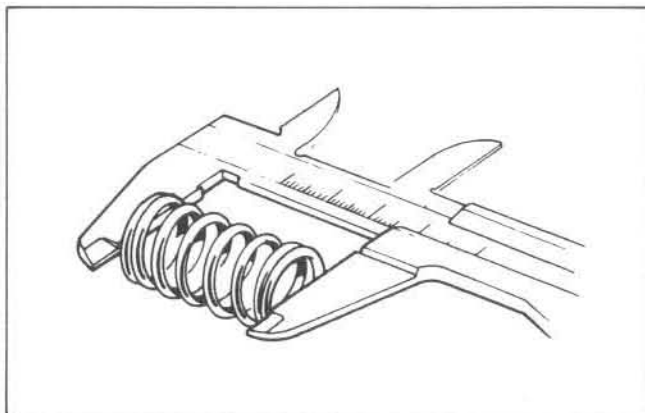
**SERVICE LIMITS:** INNER: 31.2mm (1.23 in)  
 OUTER: 34.0 mm (1.34 in)



After '91

Measure the free length of the valve springs.

**SERVICE LIMIT:** 31.8mm (1.25 in)



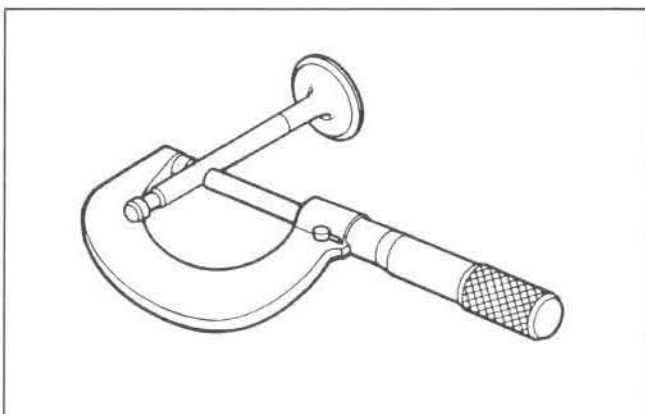
## VALVE/VALVE GUIDE INSPECTION

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

Check the valve movement in the guide.

Measure and record each valve stem O.D.

**SERVICE LIMITS:IN/EX:** 4.92 mm (0.194 in)



Ream the valve guides to remove any carbon deposits.

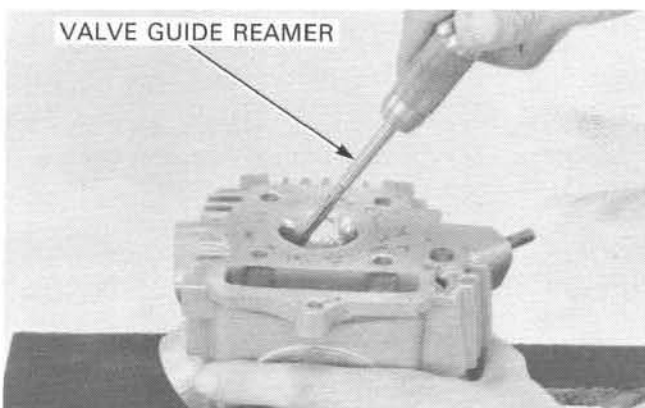
## NOTE

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

## TOOL:

Valve guide reamer, 5.0mm:

07984 – MA6000C



## CYLINDER HEAD/VALVES

Measure and record the valve guide I.D.

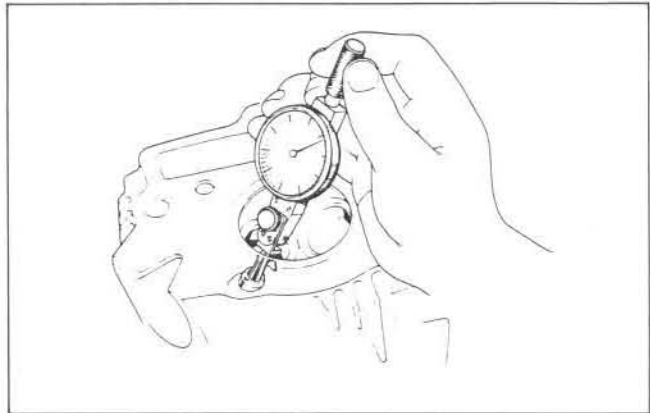
**SERVICE LIMITS:** IN/EX: 5.03 mm (0.198 in)

Calculate the stem-to-guide clearance.

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

### NOTE

- If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace guides as necessary and ream to fit.
- If the valve guide is replaced, the valve seat must be refaced.



## VALVE GUIDE REPLACEMENT

Heat the cylinder head to 100°–150°C (212°–300°F) with a hot plate or oven.

### WARNING

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

### CAUTION

*Do not use a torch to heat the cylinder head; it may cause warping.*

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

### TOOL:

**Valve guide driver, 5.0mm:** 07942-MA60000

Install a new oversize valve guide from the top of the cylinder head.

### NOTE

When driving in the valve guide, take care not to damage the cylinder head.

### TOOL:

**Valve guide driver, 5.0mm:** 07942-MA60000

Ream the new valve guide after installation.

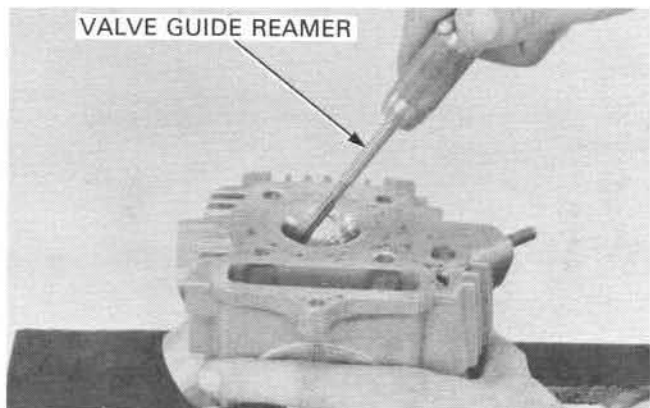
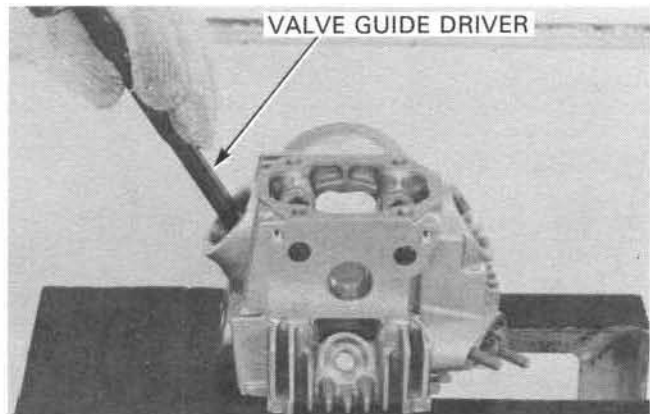
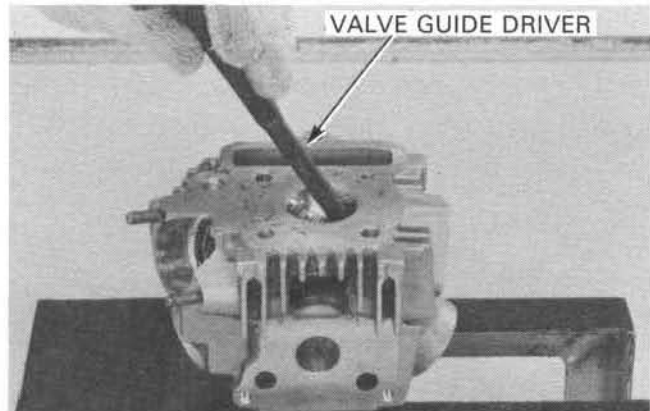
### NOTE

- Use cutting oil on the reamer during this operation.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

### TOOL:

**Valve guide reamer, 5.0mm:** 07984-MA6000C

Clean the cylinder head thoroughly to remove any metal particles. Reface the valve seat (page 6-9).



## VALVE SEAT INSPECTION/REFACING

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

Apply a light coating of Prussian Blue to each valve seat. Lap each valve and seat using a hand-lapping tool.

Remove and inspect each valve.

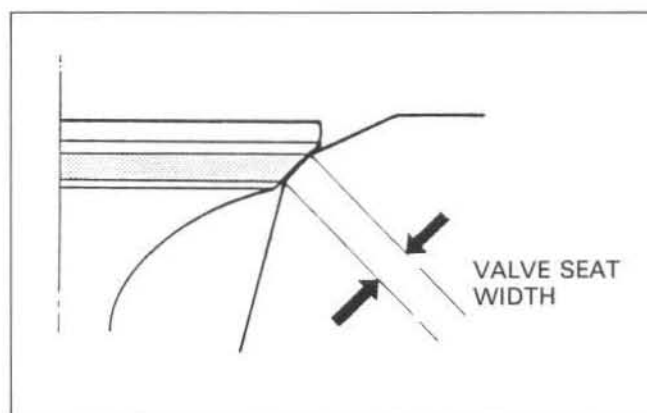
### NOTE

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

Measure the valve seat width.

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

If the seat is too wide, too narrow, or has low spots, it must be refinished for good sealing.



## VALVE SEAT REFACING

### NOTE

Follow the instructions are supplied with the valve seat refacing equipment.

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

### NOTE

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

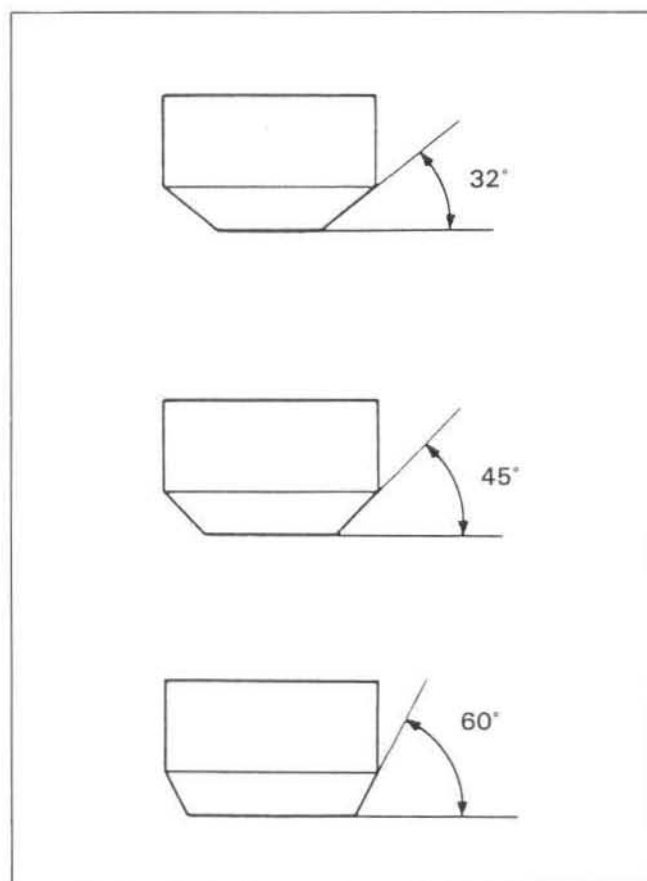
### TOOLS :

#### Valve seat cutter

Seat cutter 24 mm (45° IN, EX)	07780-0010600
Seat cutter 19 mm (32° EX)	07780-0012700
Seat cutter 21.5 mm (32° IN)	07780-0012800
Seat cutter 22 mm (60° IN,EX)	07780-0014202
Cutter holder 5 mm	07781-0010400

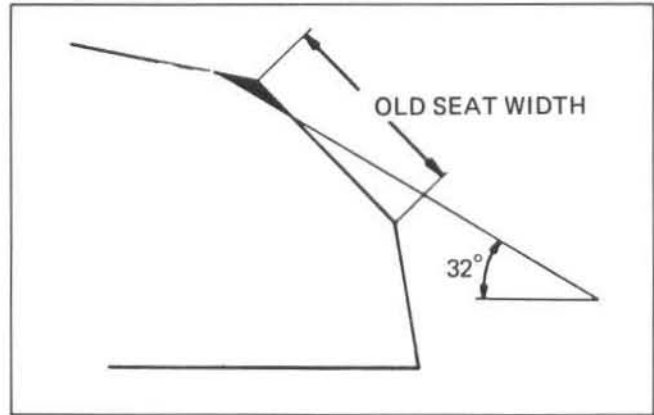
#### U.S.A.:

equivalents commercially available

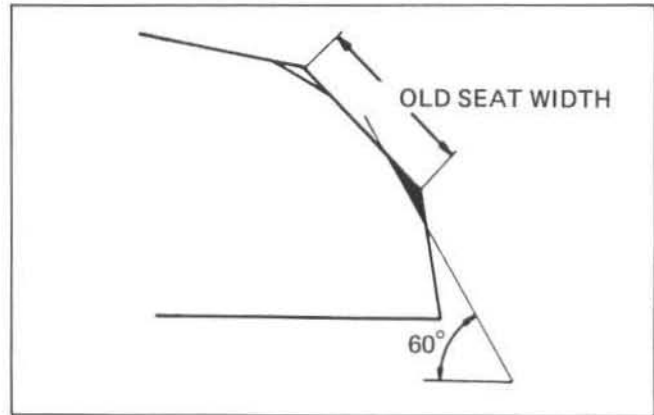


## CYLINDER HEAD/VALVES

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



Use the 60 degree cutter to remove the lower 1/4 of the old seat. Remove the cutter and inspect the area you have just cut.

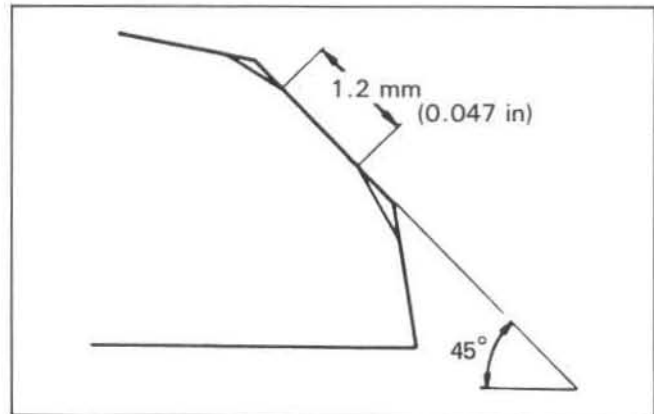


Install the 45 degree finish cutter and cut the seat to the proper width.

**STANDARD SEAT WIDTH: 1.2 mm (0.047 in)**

### NOTE

Make sure that all pitting and irregularities are removed. Refinish if necessary.



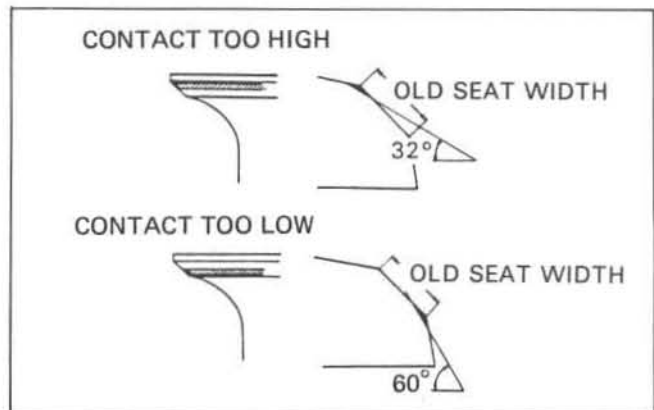
Apply a thin coating of Prussian Blue to the valve seat. Without rotating the valve, insert it through the valve guide and onto the seat to make a clear pattern.

If the contact surface is too high, cut the seat using the 32 degree cutter, then cut the seat to the proper width with the 45 degree finish cutter.

If the contact surface is too low, cut the seat using the 60 degree cutter, then cut the seat to the proper width with 45 degree finish cutter.

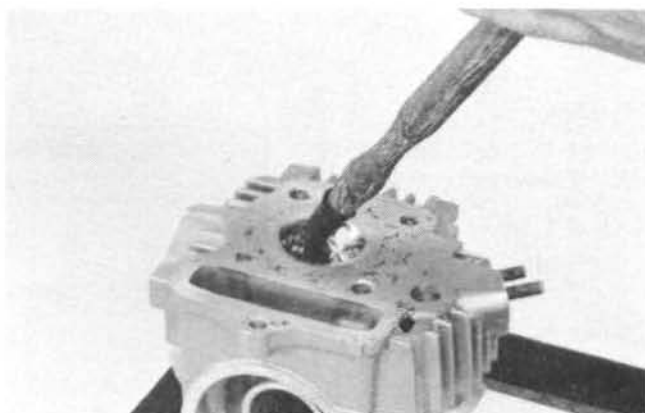
### NOTE

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



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

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



## CYLINDER HEAD ASSEMBLY

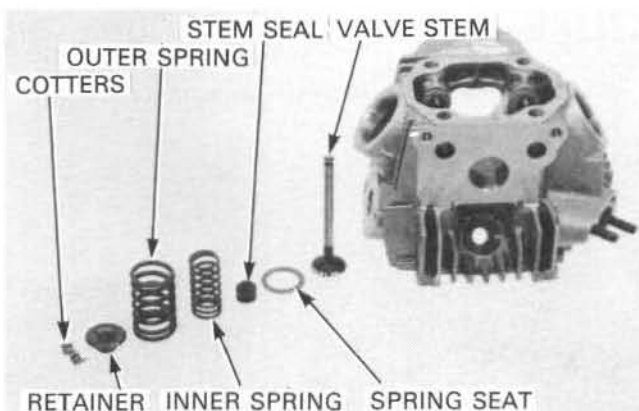
'88-'91

### NOTE

Install new valve stem seals after disassembling.

Lubricate each valve stem with oil and insert the valves into the guides.

Install the outer spring seats, stem seals and inner springs. Install the outer springs and retainers.



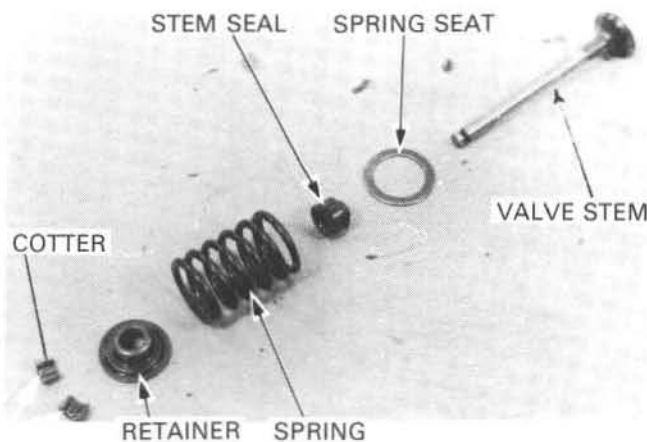
After '91

### NOTE

Install new valve stem seals after disassembling.

Lubricate each valve stem with oil and insert the valves into the guides.

Install the spring seats, stem seals, springs and retainers.



Install the valve cotters using the valve spring compressor.

### CAUTION

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

### TOOL:

Valve spring compressor  
Attachment

07757-0010000  
07959-KM30101



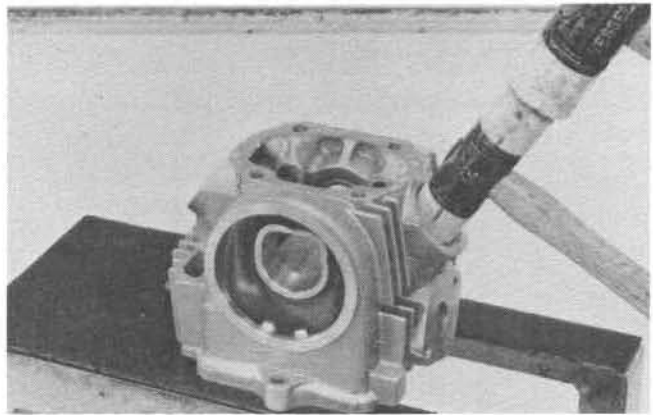


## CYLINDER HEAD/VALVES

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

### CAUTION

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



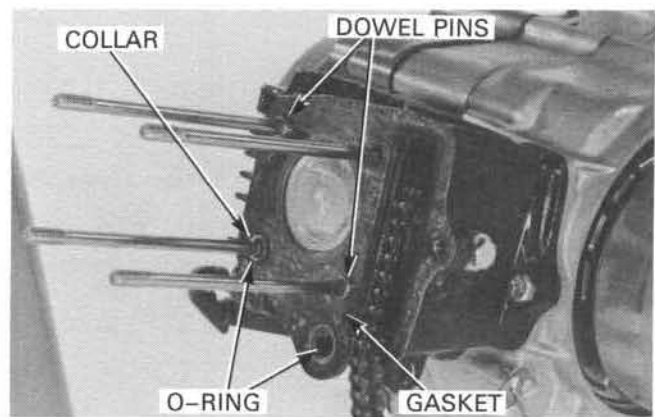
## CYLINDER HEAD INSTALLATION

Clean off and gasket material from the cylinder surface.



Install the O-ring, dowel pins, collar and a new gasket.

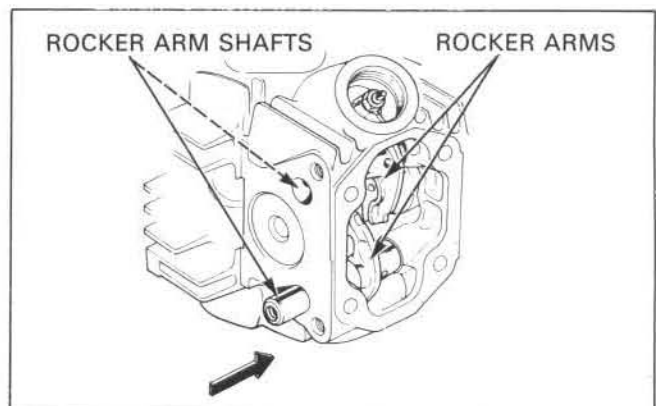
Check that the orifice is not clogged.



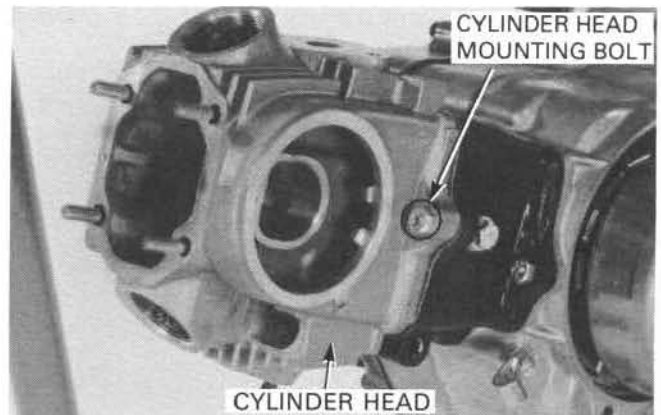
Install the rocker arms and rocker arm shafts into the cylinder head.

### NOTE

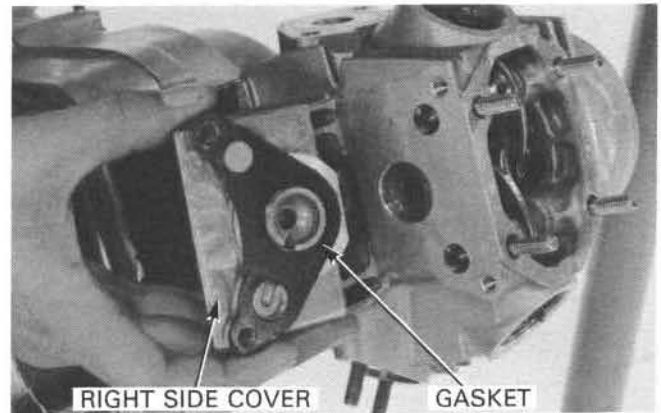
Install the shafts with the threaded end facing the right side.



Install the cylinder head and tighten the cylinder head mounting bolt loosely.



Install the gasket and the right side cover.



Install the cylinder head cover.

#### NOTE

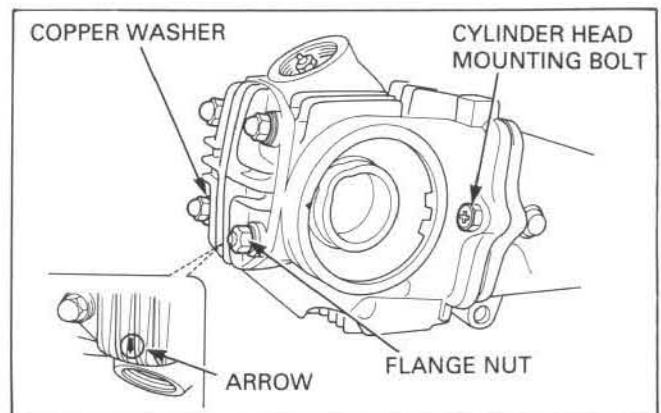
Install the cylinder head cover with the arrow facing the exhaust side as shown.

Note the positions of the copper washer and the flange nut in the picture at right. Tighten the nuts and washers in a criss cross pattern in 2 or 3 steps to the specified torque. Then tighten the cylinder head mounting bolt.

**TORQUE: 11 N·m (1.1 kg-m, 8 ft-lb)**

#### NOTE

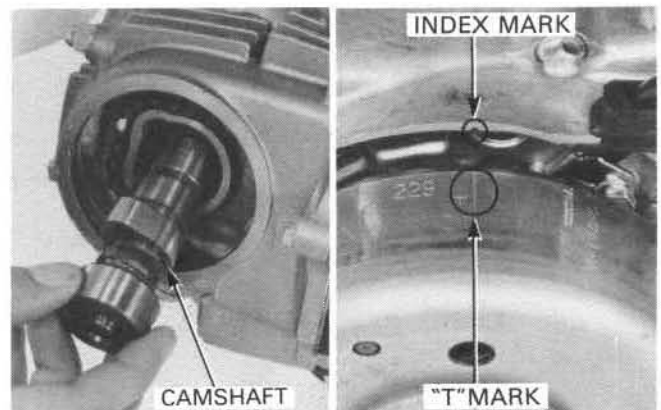
Be careful not to mistake the position of the copper washer and flange nut.



## CAMSHAFT INSTALLATION ('88-'91)

Align the "T" mark on the flywheel with the index mark on the left crankcase by turning the crankshaft counterclockwise.

Install the camshaft.



## CYLINDER HEAD/VALVES

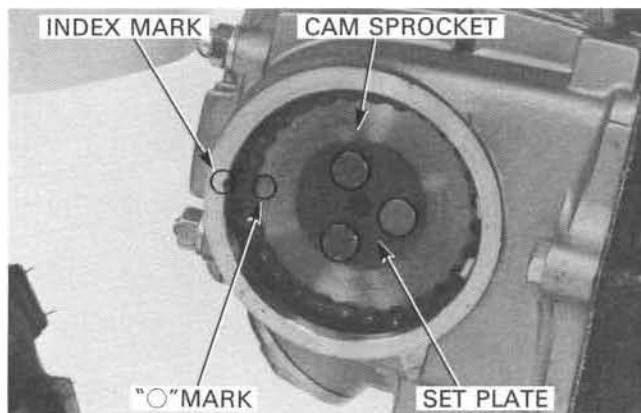
Install the cam sprocket, aligning the "O" mark on the cam sprocket with the index mark on the cylinder head.

Install the cam chain over the sprocket.

Install the set plate and tighten the cam sprocket bolts to the specified torque.

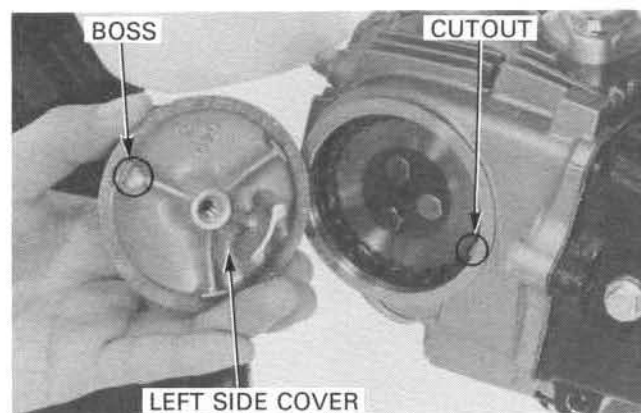
**TORQUE: 10 N•m (1.0 kg-m, 7.2 ft-lb)**

Recheck the valve timing.



Install the push rod, tensioner spring, washer and sealing bolt (page 9-4).

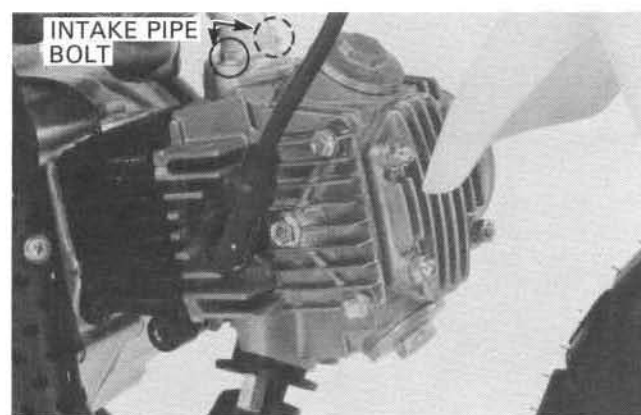
Install the cylinder head left side cover, aligning the boss of the left side cover with the cutout in the cylinder head.



Install the following:

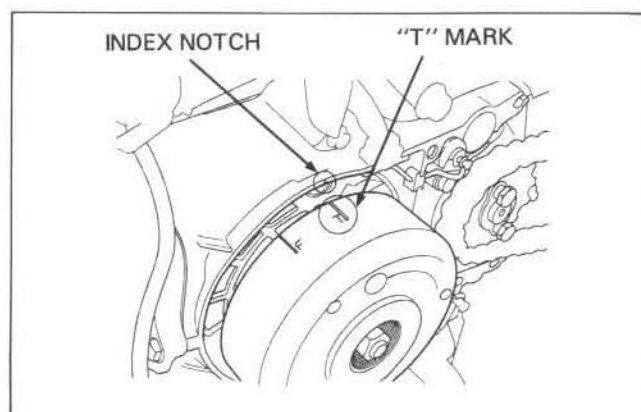
- intake pipe, carburetor and air cleaner housing
- exhaust pipe with the joint nuts and mounting bolts (page 5-3)
- front wheel (page 11-6)
- left crankcase cover

Adjust the tappet clearance (page 3-6).

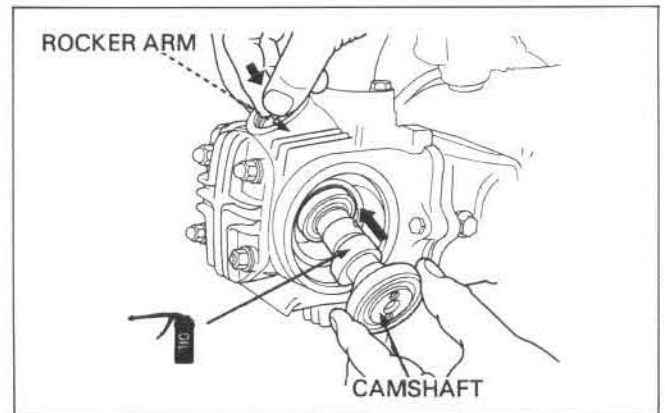


## CAMSHAFT INSTALLATION (After '91)

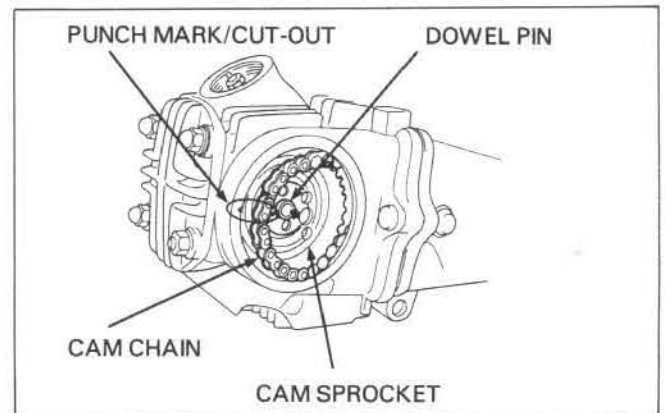
Turn the crankshaft counterclockwise and align the "T" mark on the flywheel with the index mark on the left crankcase.



Coat the camshaft and camshaft bearings with clean engine oil. While holding the rocker arms out of the way, install the camshaft into the cylinder head with the cam lobes facing the piston.



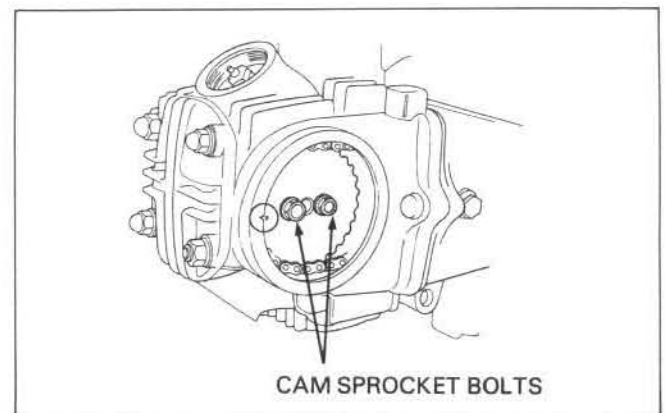
Install the dowel pin into the camshaft. Align the punch mark on the cam sprocket with cut-out on the cylinder head. Install the cam chain over the sprocket.



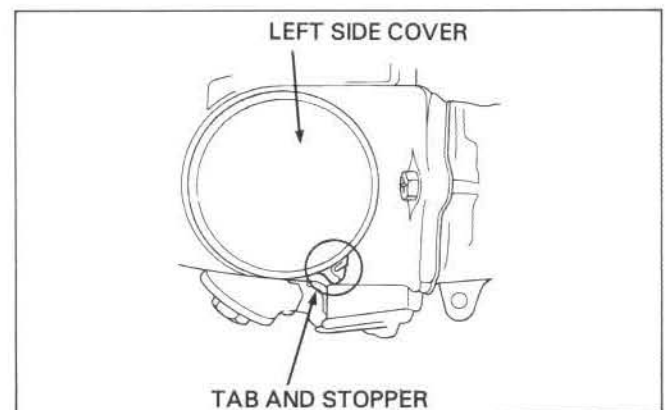
Install and tighten the cam sprocket bolts to the specified torque.

**Torque:** 9 N·m (0.9 kg-m , 6.5 lb-ft)

Recheck the valve timing.



Install the left side cover aligning the tab with the stopper on the cylinder head as shown.



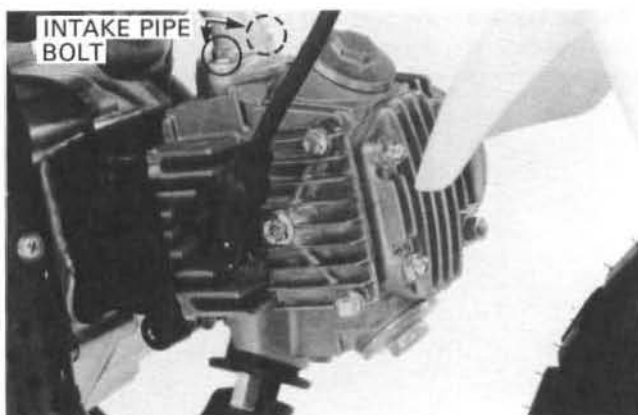
## CYLINDER HEAD/VALVES

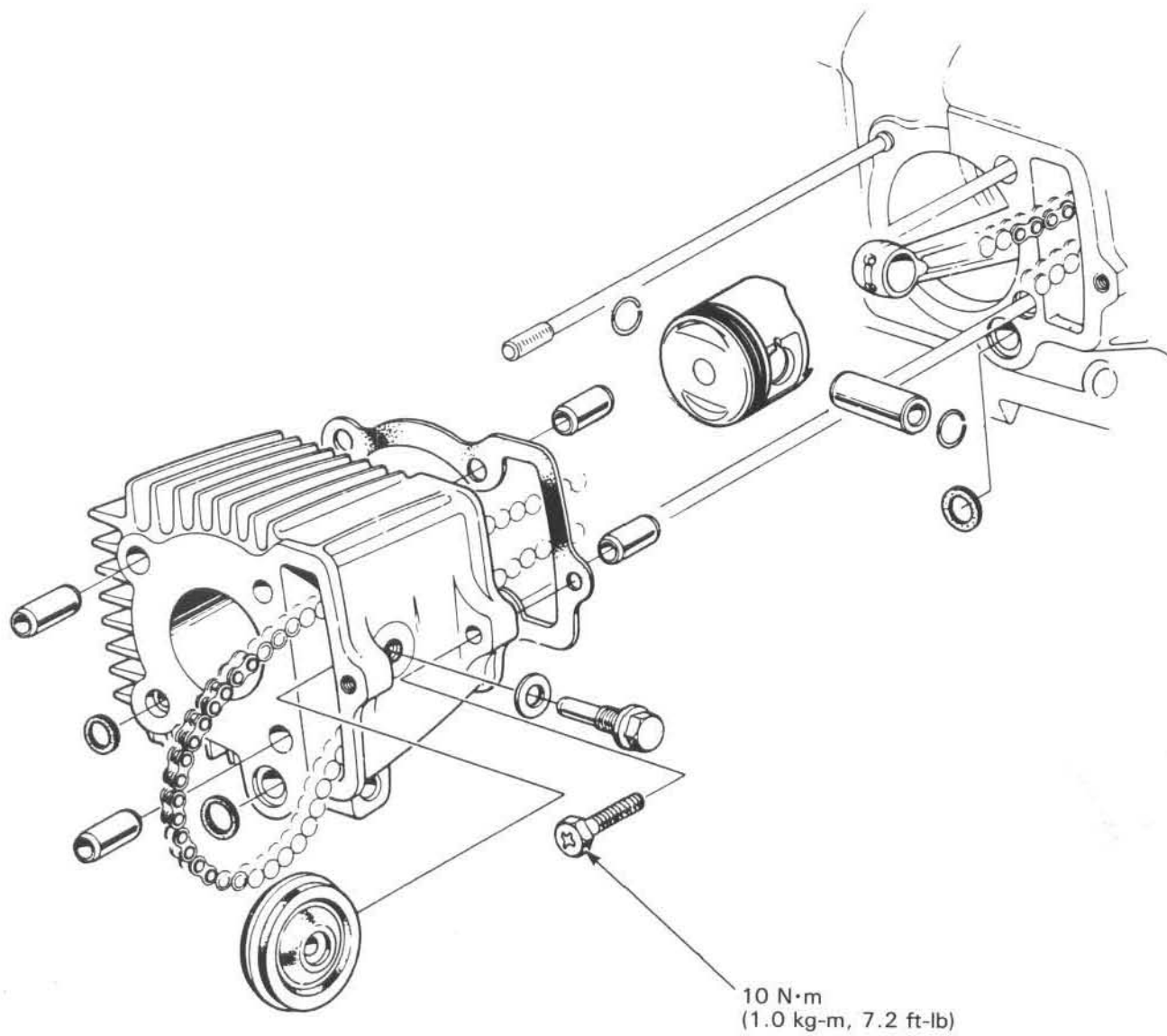
---

Install the following:

- intake pipe, carburetor and air cleaner housing
- exhaust pipe with the joint nuts and mounting bolts (page 5-3)
- front wheel (page 11-6)
- left crankcase cover

Adjust the tappet clearance (page 3-6).





# 7. CYLINDER/PISTON

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

## SERVICE INFORMATION

### GENERAL

- Camshaft lubrication oil is fed to the cylinder head through an orifice in the cylinder head, cylinder and crankcase. Be sure that this orifice is not clogged and that the O-rings and dowel pins are in place before installing the cylinder.

### SPECIFICATION

		mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.	39.005–39.015 (1.5356–1.5360)	39.05 (1.537)
	Taper	—	0.10 (0.004)
	Out-of-round	—	0.10 (0.004)
	Warpage across top	—	0.05 (0.002)
Piston, Piston Pin, piston rings	Piston O.D.	38.980–39.000 (1.5346–1.5354)	38.90 (1.532)
	Piston pin bore	13.002–13.008 (0.5119–0.512)	13.10 (0.516)
	Piston pin O.D.	12.994–13.000 (0.5116–0.5118)	12.98 (0.511)
	Piston-to-pin clearance	0.002–0.014 (0.0001–0.0006)	0.08 (0.003)
	Piston ring-to-ring groove clearance	TOP	0.015–0.050 (0.0006–0.0020)
		SECOND	0.015–0.050 (0.0006–0.0020)
	Piston ring end gap	0.10–0.30 (0.004–0.012)	0.50 (0.020)
Cylinder-to-piston clearance		0.010–0.040 (0.0004–0.0016)	0.15 (0.006)
Connecting rod small end I.D.		13.016–13.034 (0.5124–0.5131)	13.08 (0.515)

### TORQUE VALUE

Cylinder bolt 10 N·m (1.0 kg-m, 7.2 ft-lb)

## TROUBLESHOOTING

### Low or unstable compression

- Worn cylinder or piston rings

### Excessive smoke

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

### Overheating

- Excessive carbon built-up on piston or combustion chamber wall

### Knocking or abnormal noise

- Worn piston and cylinder
- Excessive carbon build-up



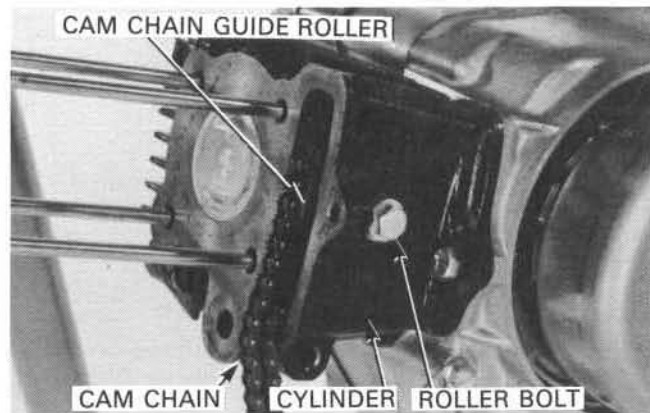
## CYLINDER REMOVAL

Remove the following:

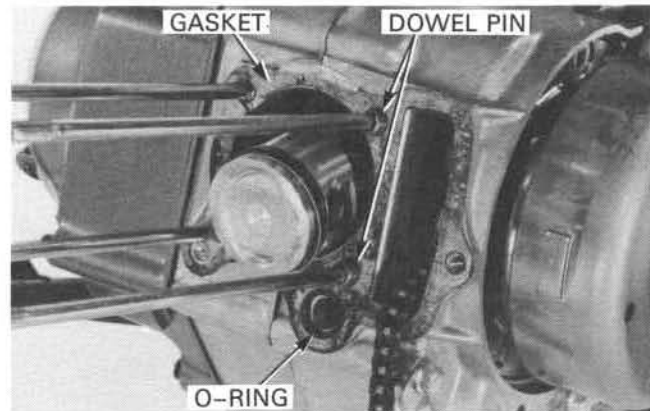
- cylinder head (section 6)
- cylinder mounting bolt.
- cam chain guide roller bolt, washer and guide roller.
- cylinder

### NOTE

Keep the cam chain from falling into the crankcase when removing the cylinder.



Remove the dowel pins, O-ring and gasket.



## PISTON REMOVAL

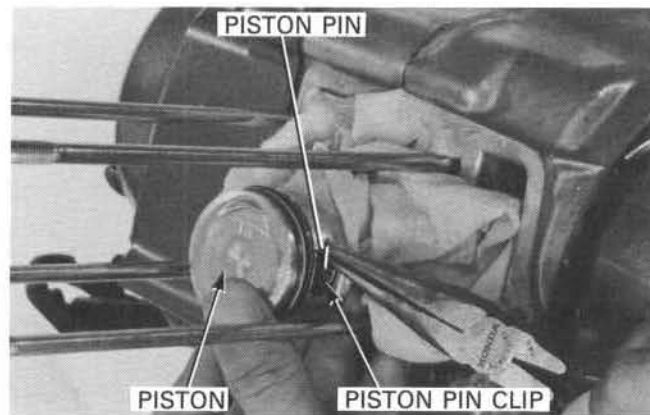
Stuff a shop towel into the crankcase.

Remove the piston pin clips with needle nose pliers.

### NOTE

Do not let the clips fall into the crankcase.

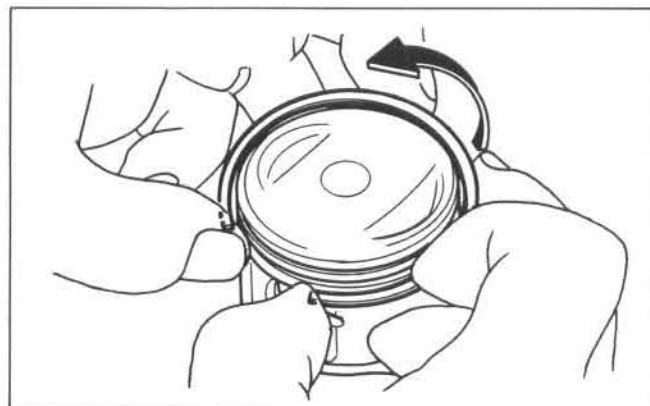
Press the piston pin out of the piston and remove the piston.



Remove the piston rings, being careful not damage them.

### NOTE

Spread each piston ring and remove it by lifting up at a point opposite the gap.



## INSPECTION

Inspect the cylinder walls for scratches and wear.

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

**SERVICE LIMIT: 39.05 mm (1.537 in)**

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

Refer to page 7-4 for measurement of the piston O.D.

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

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

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

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

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

The cylinder must be rebored and an oversize piston selected if the service limits are exceeded.

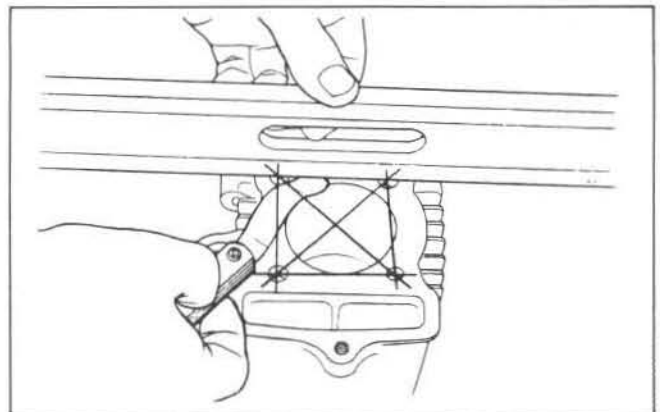
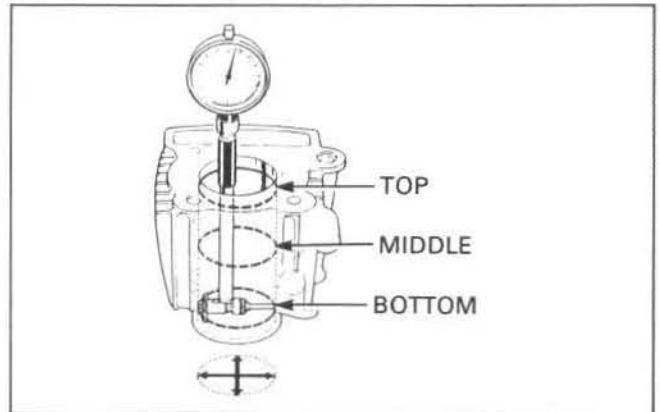
The following oversize piston are available.

0.25 mm (0.010 in), 0.50 mm (0.020 in), 0.75 mm (0.030 in) and 1.00 mm (0.040 in)

The cylinder must be rebored so that the clearance to an oversize piston is 0.010–0.040 mm (0.004–0.0016 in).

Inspect the top of the cylinder for warpage with a feeler gauge and a straight edge.

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



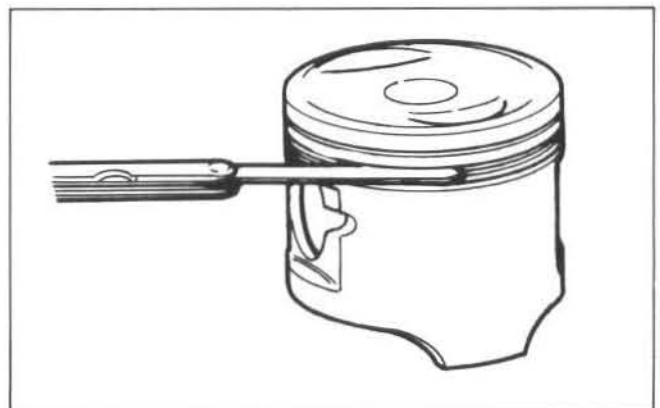
## PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

**SERVICE LIMITS:**

**TOP: 0.12 mm (0.005 in)**

**SECOND: 0.12 mm (0.005 in)**

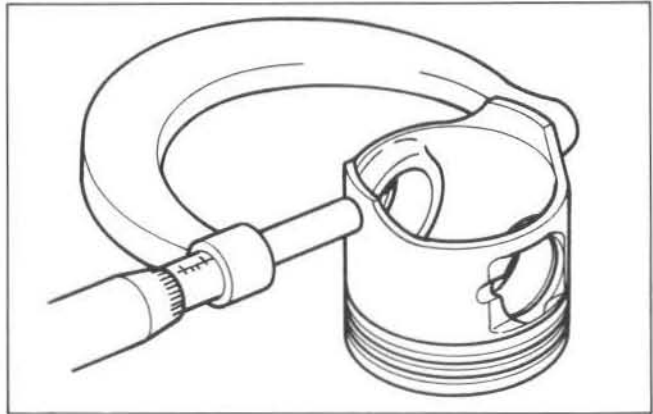


## CYLINDER/PISTON

Inspect the piston for wear or damage.  
Measure the piston skirt diameter at 10 mm (0.4 in) from the bottom and 90° to the piston pin bore.

**SERVICE LIMIT: 38.90 mm (1.532 in)**

Compare this measurement against the service limit and calculate the piston-to-cylinder clearance.  
Refer to page 7-3 for measuring the cylinder.



Measure the piston pin bore I.D.

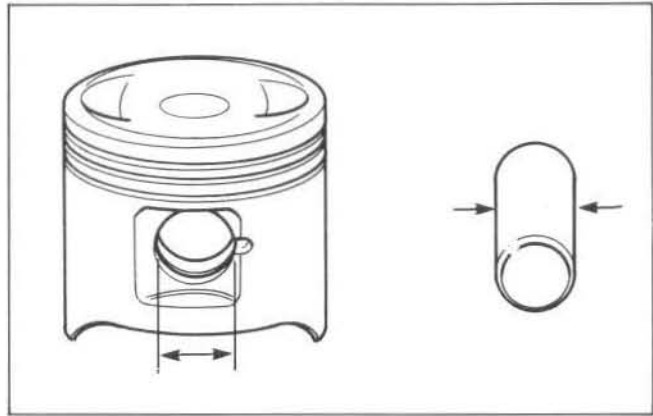
**SERVICE LIMIT: 13.10 mm (0.516 in)**

Measure the piston pin O.D.

**SERVICE LIMIT: 12.98 mm (0.511 in)**

Calculate the piston-to-piston pin clearance.

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



Measure the connecting rod small end I.D.

**SERVICE LIMIT: 13.08 mm (0.515 in)**



Install each piston ring squarely into the cylinder and measure the ring end gap.

### NOTE

Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

**SERVICE LIMIT:**

**Top/second: 0.12 mm (0.005 in)**

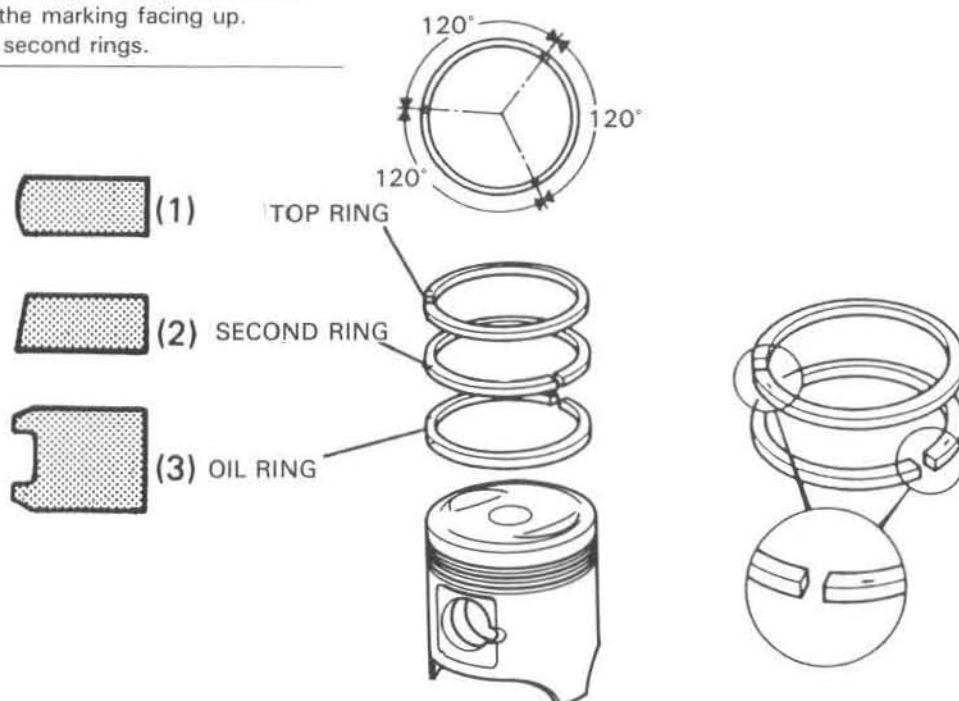


## PISTON RING INSTALLATION

Clean the ring grooves thoroughly and install the piston rings.

### NOTE

- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking facing up.
- Do not confuse the top and second rings.

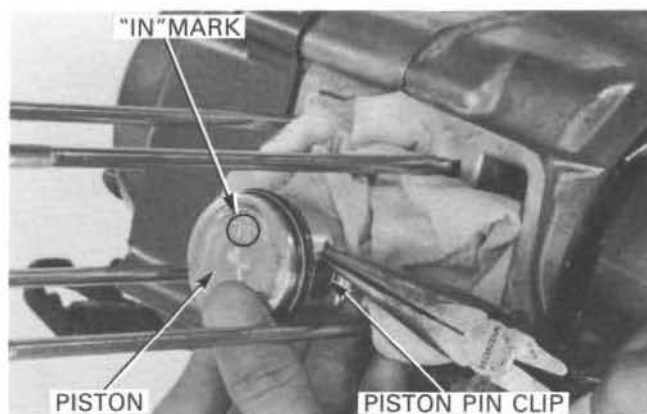


## PISTON INSTALLATION

Install the piston with its "IN" mark on the intake valve side. Install the piston pin with new piston pin clips.

### NOTE

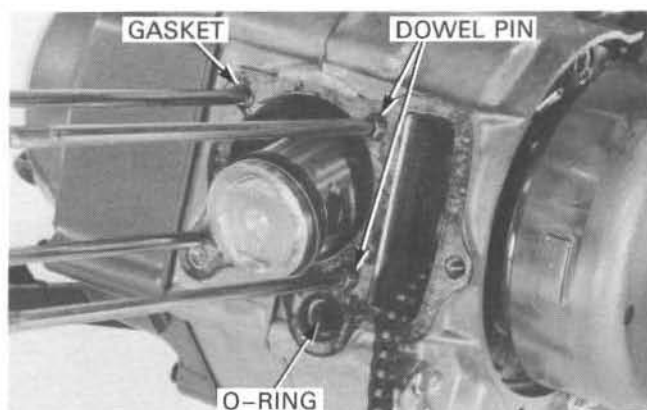
- Do not align the piston pin clip end gap with the piston cutout.
- Do not let the clips fall into the crankcase.



## CYLINDER INSTALLATION

Clean off any gasket material from the crankcase surface.

Install a new gasket, O-ring and the dowel pins.

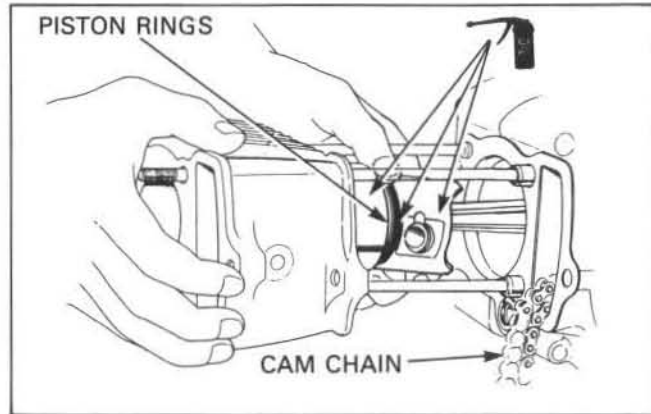


## CYLINDER/PISTON

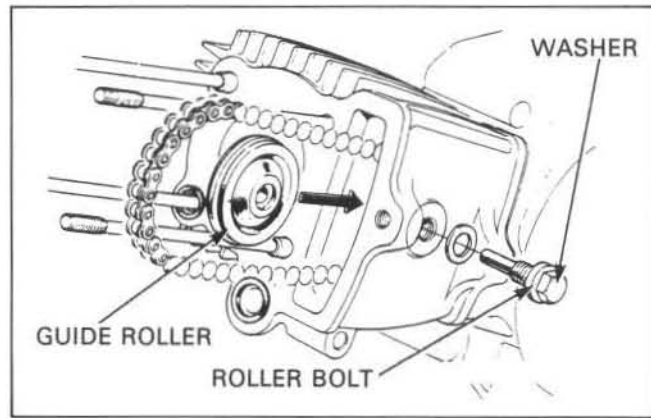
Coat the cylinder bore, piston and piston ring with engine oil and install the cylinder.

### NOTE

- Avoid piston ring damage during installation.
- Do not let the cam chain fall into the crankcase.

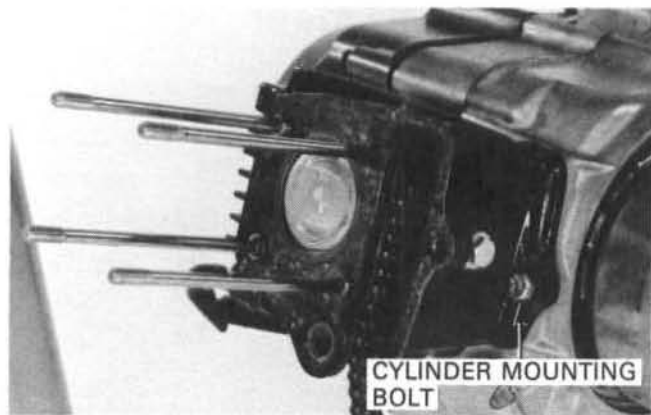


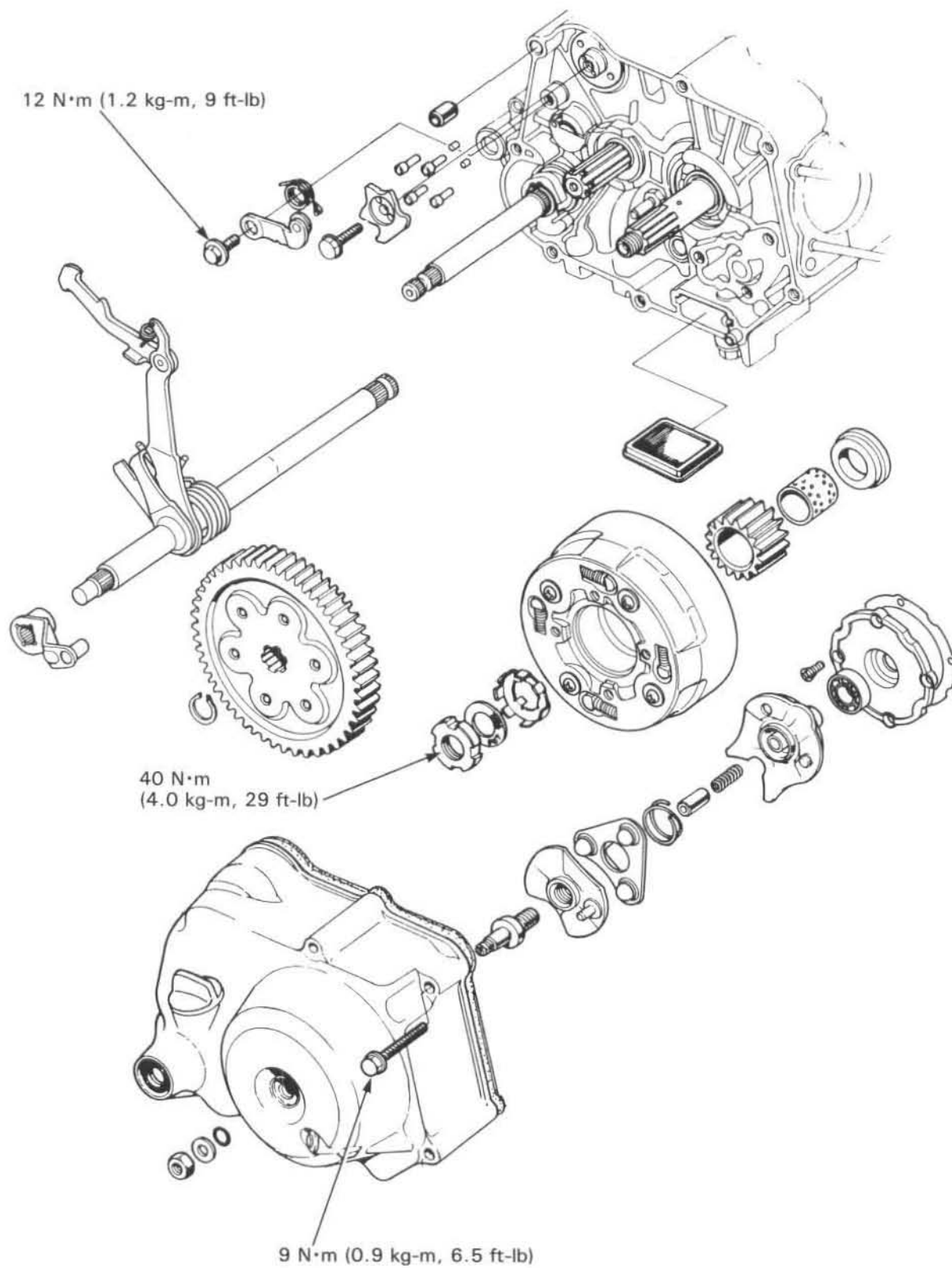
Install the cam chain guide roller, washer and guide roller bolt.



Install the cylinder mounting bolt, but do not tighten it yet.  
Install the cylinder head (Section 6).  
Then tighten the cylinder bolt.

**TORQUE: 10 N·m (1.0 kg-m, 7.2 ft-1b)**





# 8. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	8-1	CLUTCH	8-3
TROUBLESHOOTING	8-1	GEARSHIFT LINKAGE	8-9
RIGHT CRANKCASE COVER REMOVAL	8-2	RIGHT CRANKCASE COVER INSTALLATION	8-12

## SERVICE INFORMATION

### GENERAL

- This section covers clutch and gearshift removal and installation.
- Service can be accomplished with the engine in the frame.

### SPECIFICATION

mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch	Spring free length	21.1 (0.83)	19.4 (0.76)
	Disc thickness '88-'91	3.35–3.45 (0.132–0.136)	3.15 (0.124)
	After '91	A	2.3 (0.091)
	Disc thickness	B	3.0 (0.118)
	Plate warpage	—	0.2 (0.01)
	Drive gear I.D.	21.000–21.021 (0.8268–0.8276)	21.05 (0.829)
	Center guide O.D.	20.930–20.994 (0.8240–0.8265)	20.90 (0.823)
	Center guide I.D.	16.988–17.006 (0.6688–0.6695)	17.04 (0.671)
	Crankshaft O.D.	16.966–16.984 (0.6680–0.6689)	16.90 (0.665)

### TORQUE VALUE

Clutch lock nut	40 N•m (4.0 kg-m, 29 ft-lb)
Shift drum stopper bolt	12 N•m (1.2 kg-m, 9 ft-lb)
Right Crankcase cover bolt	9 N•m (0.9 kg-m, 6.5 ft-lb)

### TOOLS

#### Special

Clutch outer holder	07923–0340000
Dis/assembling tool	07960–0110000

#### Common

Lock nut wrench, 20×24 mm	07716–0020100
Extension bar	07716–0020500 or equivalent commercially available in U.S.A.

## TROUBLESHOOTING

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

### Clutch slips when accelerating

- Faulty clutch lifter
- Discs Worn
- Springs weak
- Oil additive in engine oil

### Clutch will not disengage

- Faulty clutch lifter
- Plates warped

### Motorcycle creeps with clutch disengaged

- Faulty clutch
- Plates warped

### Clutch operation feels rough

- Outer drum slots rough

### Hard to shift

- Stopper plate damaged
- Incorrect clutch adjustment
- Faulty clutch lifter

### Gearshift pedal will not return

- Weak or broken shift return spring
- Shift spindle binding with case

### Transmission jumps out of gear

- Weak or broken stopper arm spring



### RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 2-2).

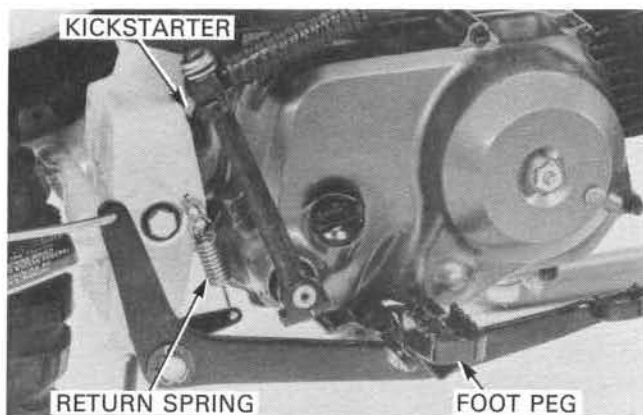
Remove the rear brake pedal return spring.

Loosen the rear brake adjusting nut.

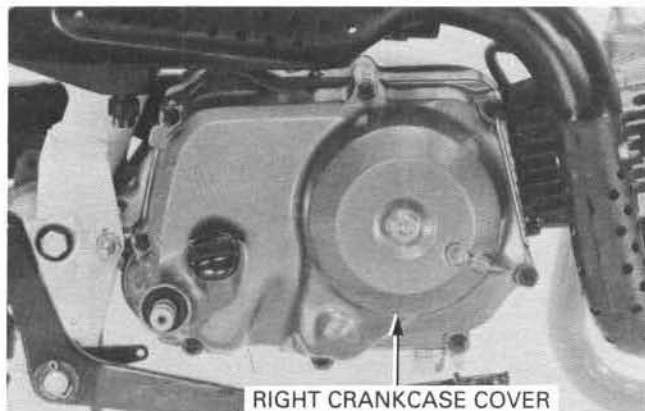
Raise the front wheel off the ground with the quick stand or safety stand.

Remove the foot peg (page 5-3).

Remove the kickstarter.

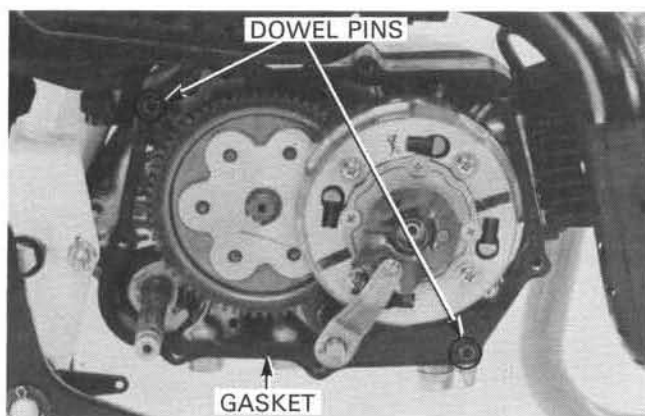


Remove the right crankcase cover.



Remove the ball retainer and spring.

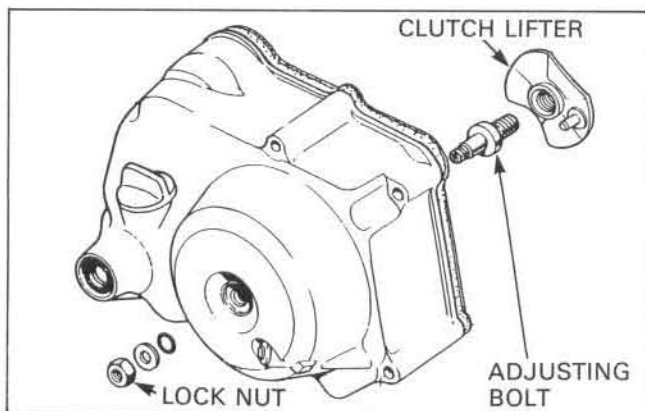
Remove the gasket and dowel pins.



### CLUTCH LIFTER REMOVAL

Remove the lock nut, washer and O-ring.

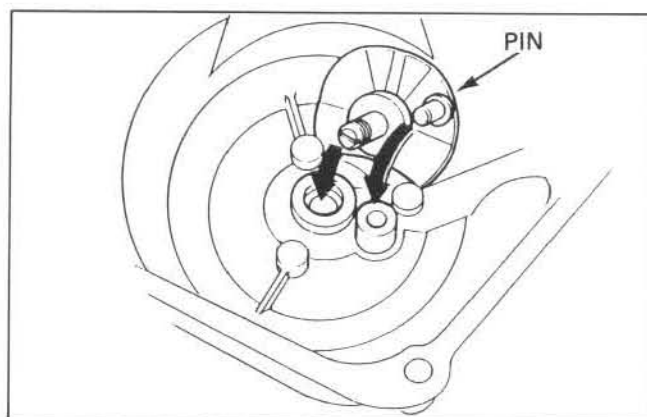
Remove the clutch adjusting bolt and the clutch lifter.



## CLUTCH LIFTER INSTALLATION

Installation is the reverse order of removal.

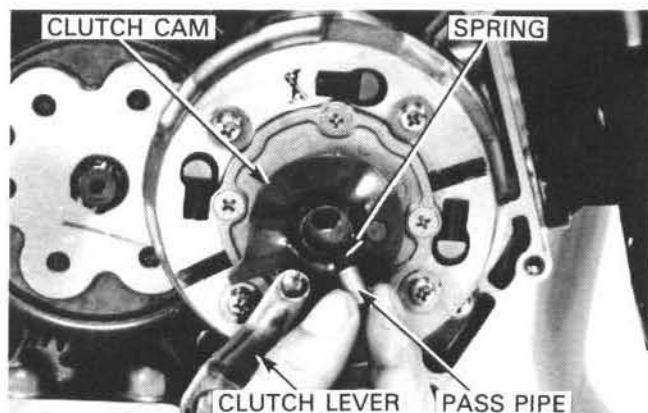
Install the clutch lifter, inserting its pin into the hole of the crankcase.



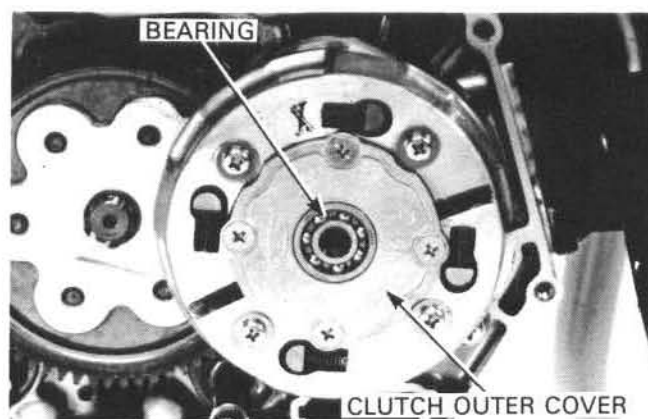
## CLUTCH

## REMOVAL

Remove the oil pass pipe, spring, clutch lever and clutch cam.



Remove the clutch outer cover and bearing.



Raise the tab of lock washer A.



## CLUTCH/GEARSHIFT LINKAGE

Hold the clutch outer with the holder tool and remove the lock nut.

### TOOLS

Lock nut wrench 20 × 24 mm

Extention bar

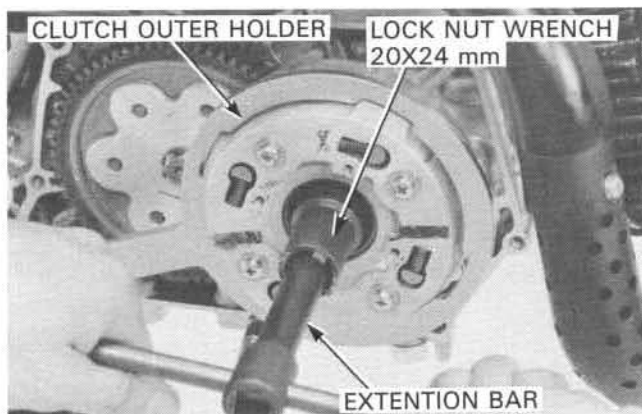
Clutch outer holder

07716 - 0020100

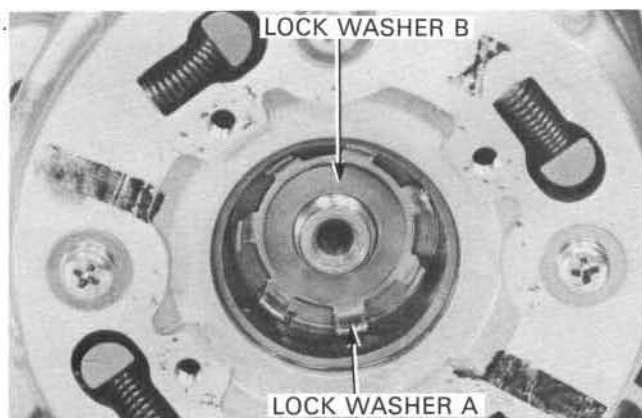
07716 - 0020500

or equivalent commercially  
available in U.S.A.

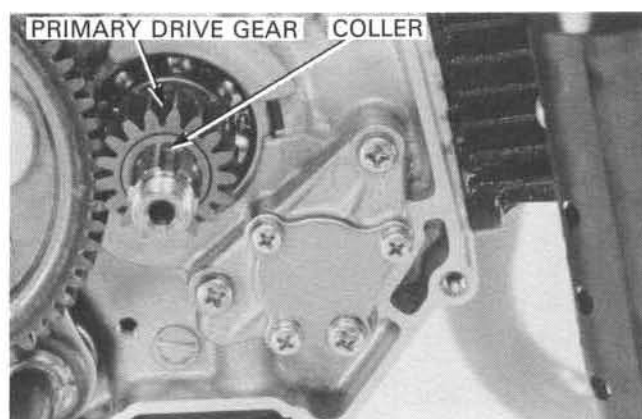
07923 - 0340000



Remove lock washer A, lock washer B, and the clutch assembly.

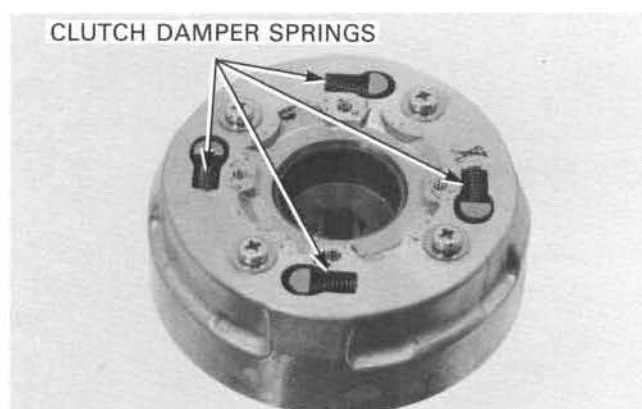


Remove the primary drive gear and collar.



### DISASSEMBLY

Remove the clutch damper spring.

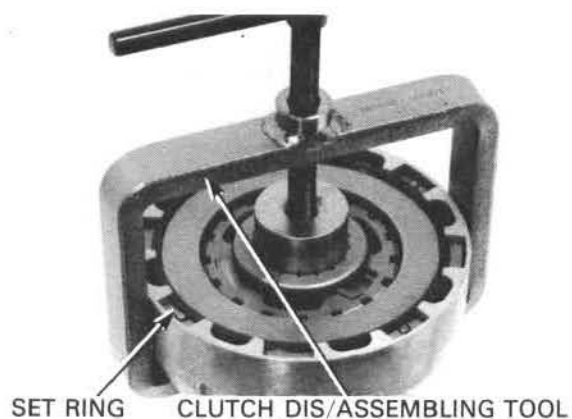


Remove the set ring by holding the clutch plate with the special tool.

### TOOL:

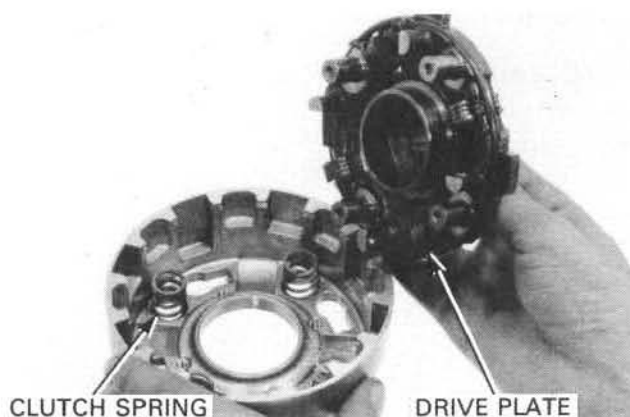
Clutch dis/assembling tool

07960-0110000



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

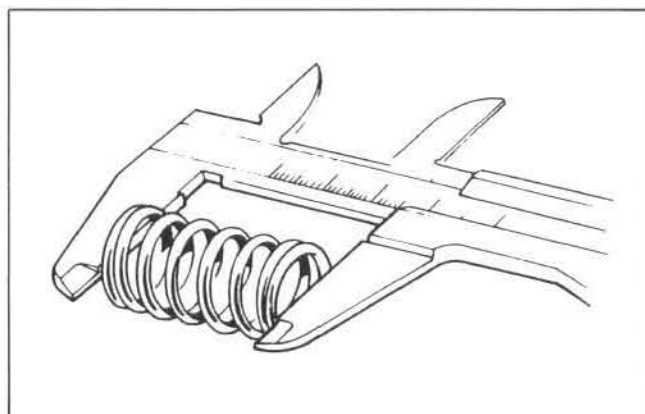
Remove the drive plate and clutch springs.



### INSPECTION

Measure the spring free length.

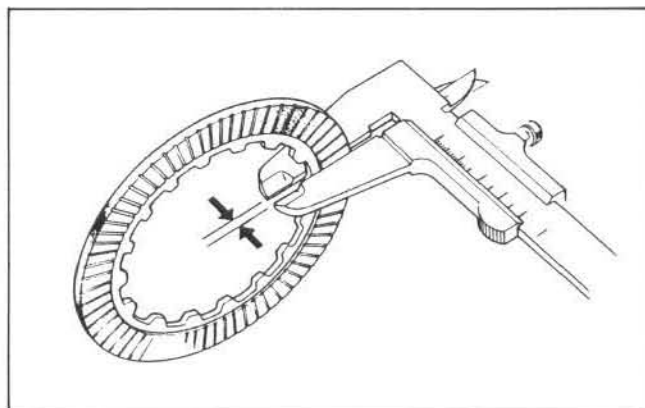
**SERVICE LIMIT: 19.4 mm (0.76 in)**



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

Measure the disc thickness.

**SERVICE LIMIT: 3.15 mm (0.124 in)**



## CLUTCH/GEARSHIFT LINKAGE

### After '91

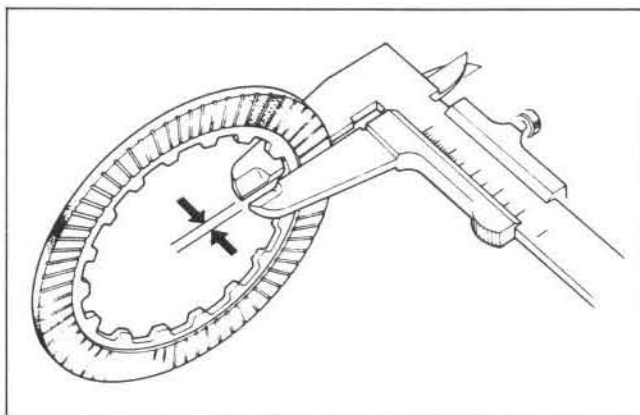
Measure the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness.

#### SERVICE LIMIT:

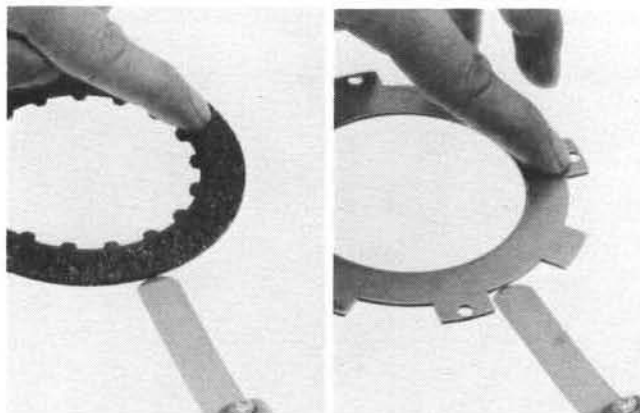
Disc A 2.3mm (0.091in)

Disc B 3.0mm (0.118in)



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

SERVICE LIMIT: 0.2 mm (0.01 in)



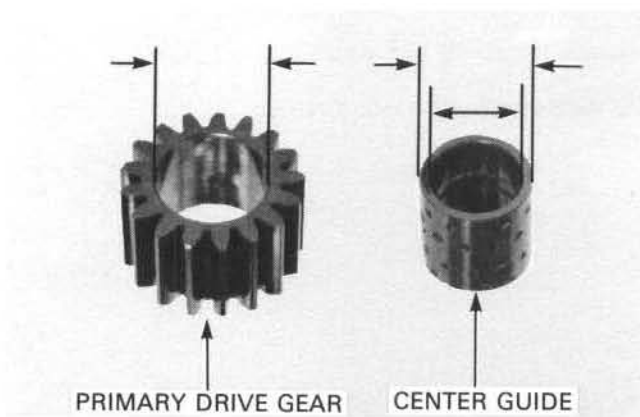
Inspect the primary drive gear and collar for wear or damage. Measure the primary drive gear I.D. and the center guide O.D. and I.D.

#### SERVICE LIMITS:

Gear I.D. 21.05 mm (0.829 in)

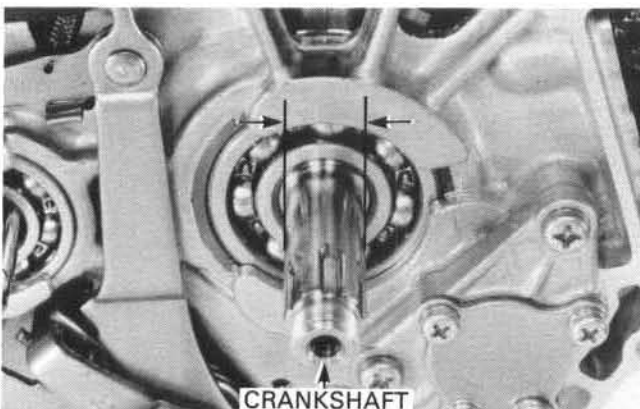
Center guide I.D. 17.04 mm (0.671 in)

O.D. 20.90 mm (0.823 in)

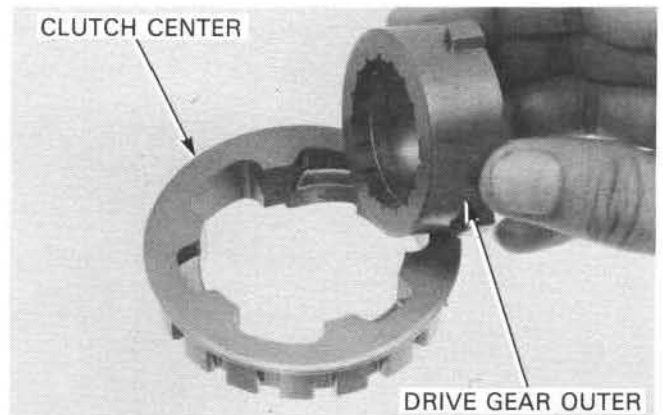


Measure the crankshaft O.D.

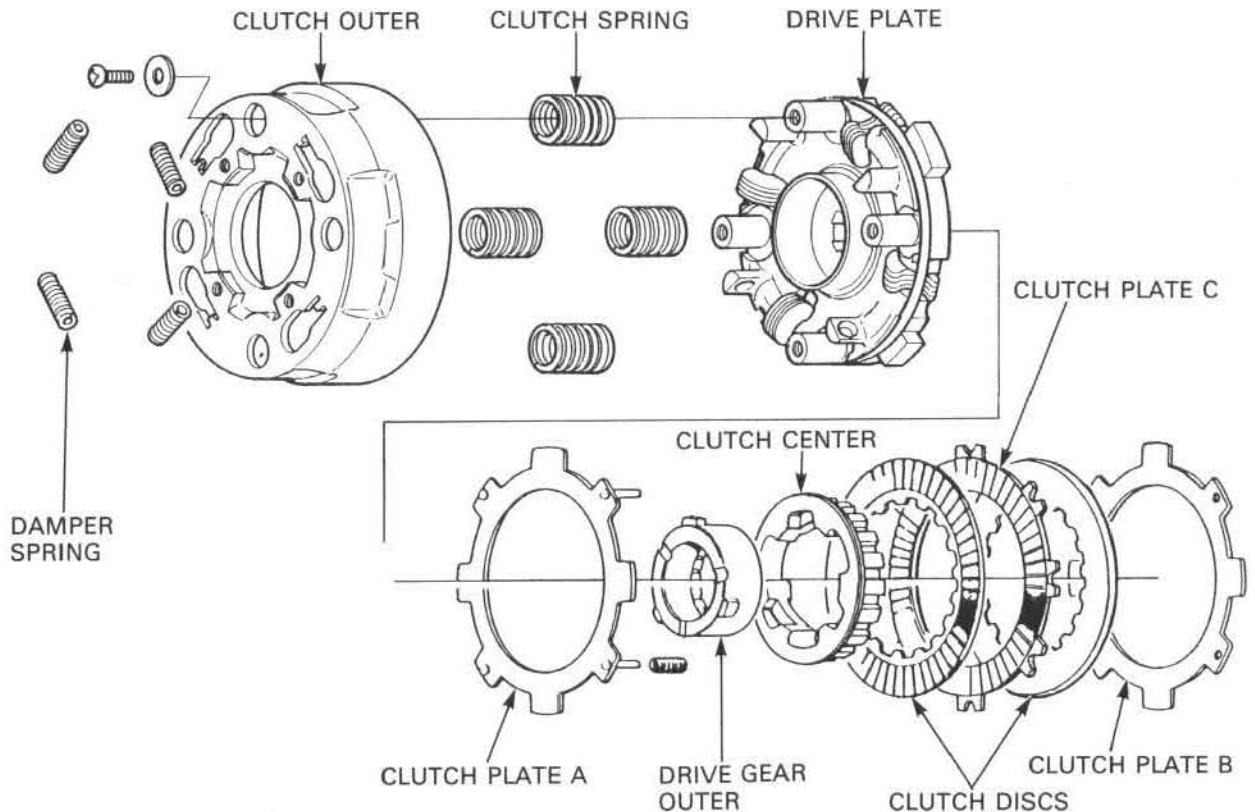
SERVICE LIMIT: 16.90 mm (0.665 in)



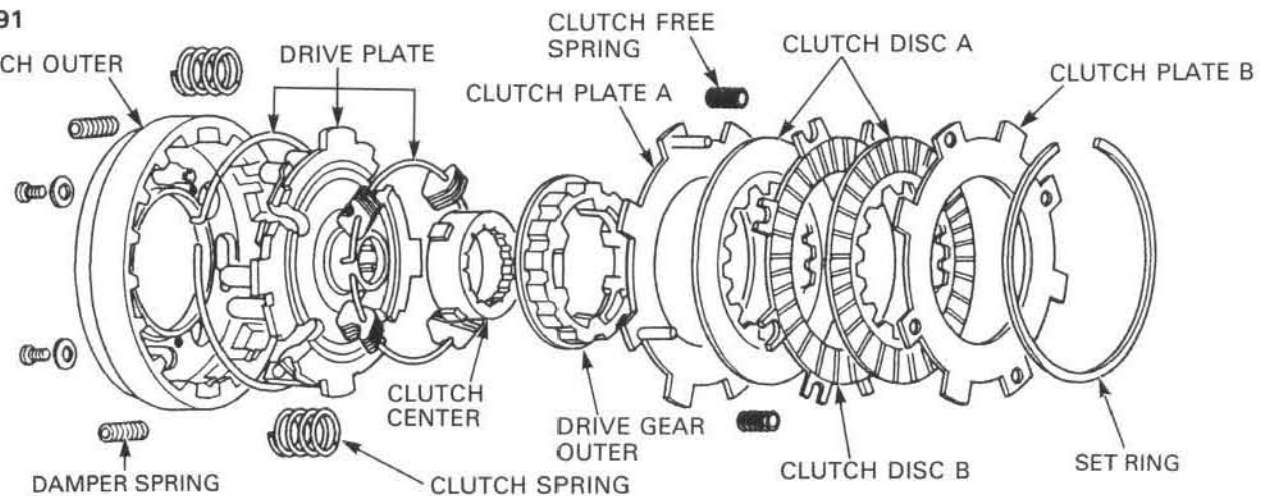
Check the drive gear outer and clutch center for excessive wear.



'88-'91



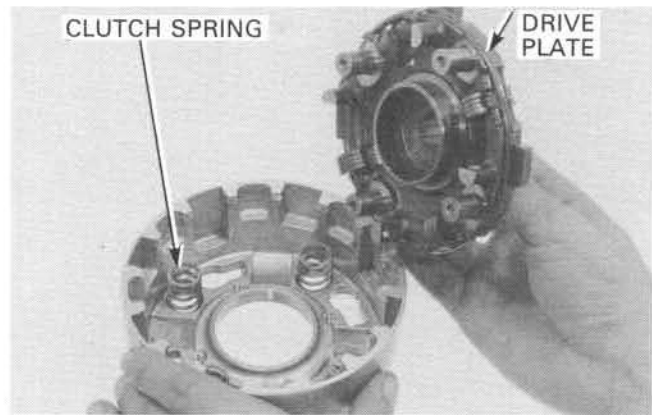
After '91





## CLUTCH/GEARSHIFT LINKAGE

Install the clutch springs and drive plate, and tighten the screws in a crisscross pattern in 2-3 steps.  
Install the damper springs.

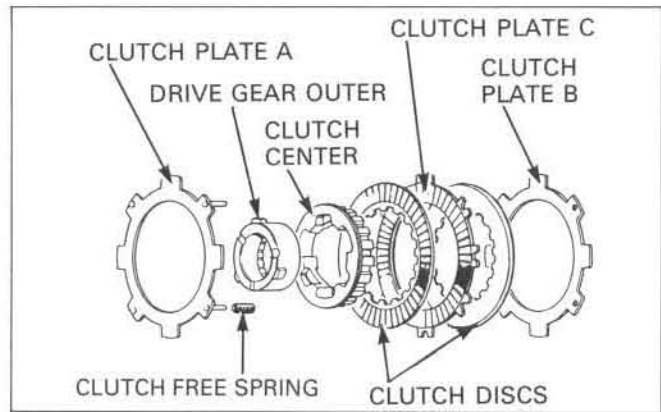


### 88-'91'

Install the drive gear outer and clutch center.  
Install clutch plates A, B, and C, the springs and clutch discs as shown.

#### NOTE

Make sure the clutch discs are installed correctly as shown.



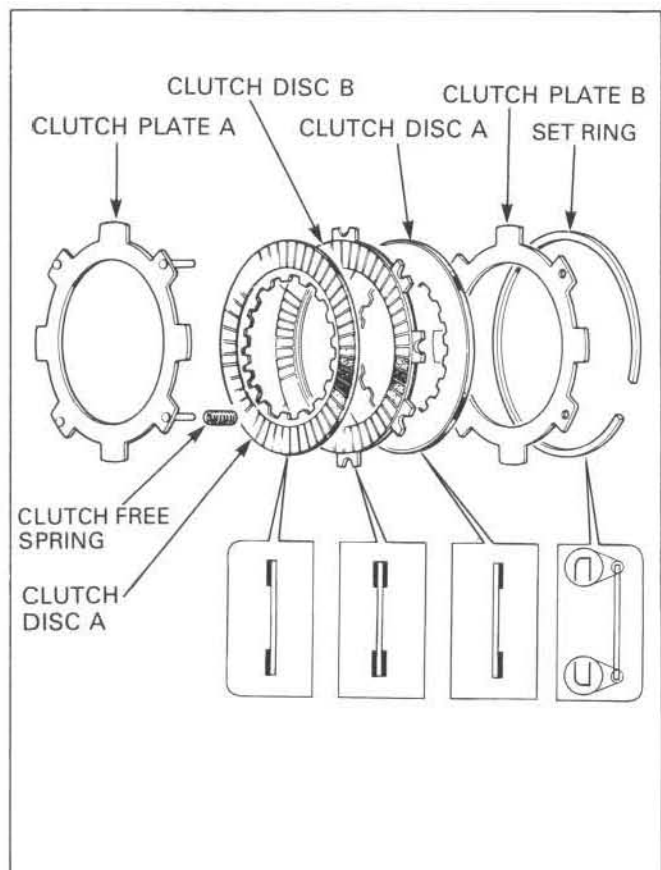
### After '91

Install clutch plates A and B, the clutch free springs and clutch discs A and B, install the set ring with chamfered side the clutch plate B.

At installation, install the clutch disc A with the flat surfaces facing the clutch disc B.

#### NOTE

Make sure the clutch discs are installed correctly as shown.

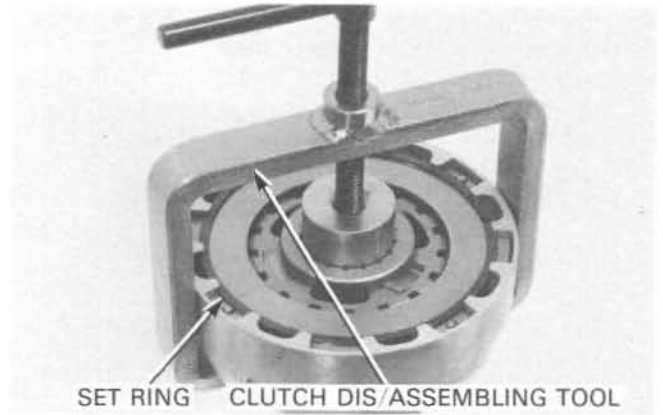




Install the set ring by holding the clutch plate with the special tool.

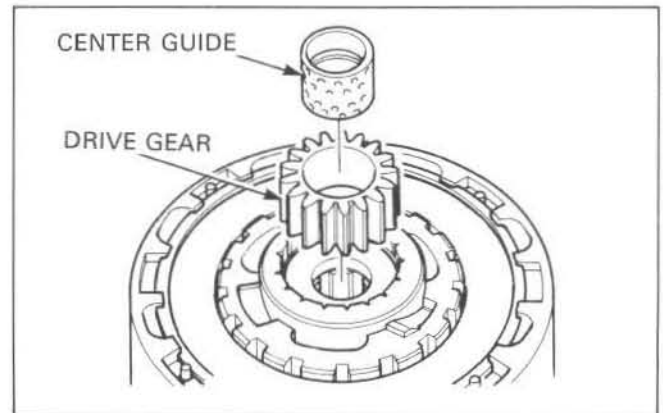
## TOOL:

Clutch dis/assembling tool 07960-0110000



## INSTALLATION

Install the primary drive gear and center guide in the clutch assembly.

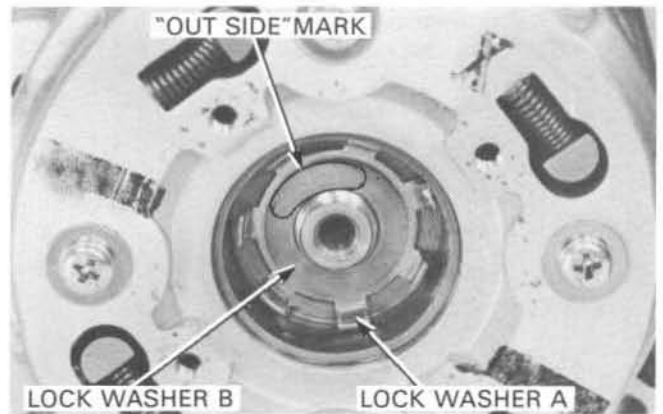


Install the clutch assembly on the crankshaft.

Install lock washers A and B.

## NOTE

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

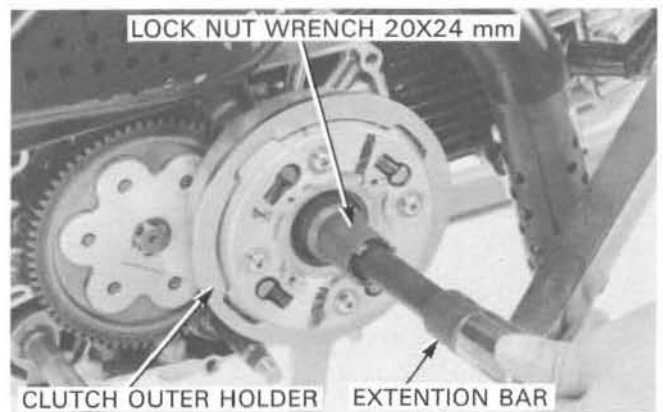


Hold the clutch and tighten the lock nut.

## TOOLS:

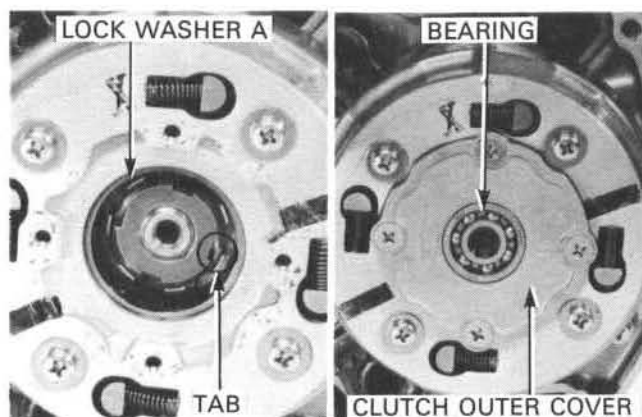
Lock nut wrench 20 × 24 mm 07716 - 0020100  
 Extention bar 07716 - 0020500  
 or equivalent commercially  
 available in U.S.A.  
 Clutch outer holder 07923 - 0340000

TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)

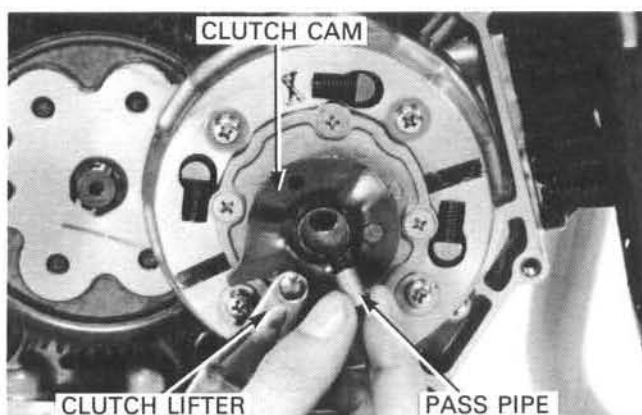


## CLUTCH/GEARSHIFT LINKAGE

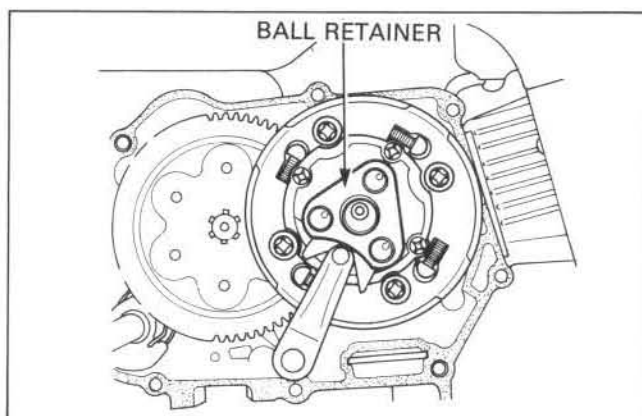
Bend the tab of lock washer A up into the lock nut groove.  
Install the gasket and clutch outer cover.  
Install the bearing.



Install the clutch cam, retainer spring and oil pass pipe.  
Install the clutch lever on the gearshift spindle.



Install the ball retainer as shown.  
Install the R. crankcase cover (page 8-12).

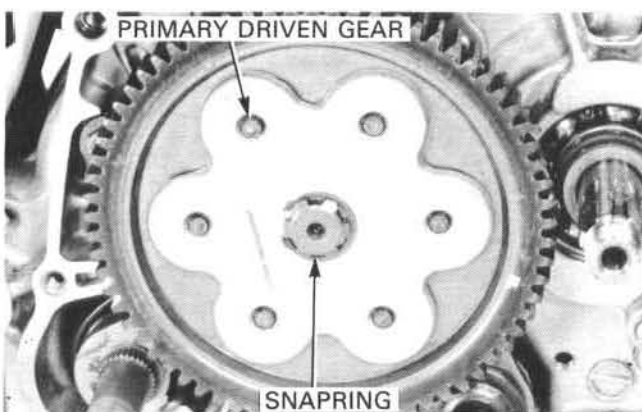


## GEARSHIFT LINKAGE

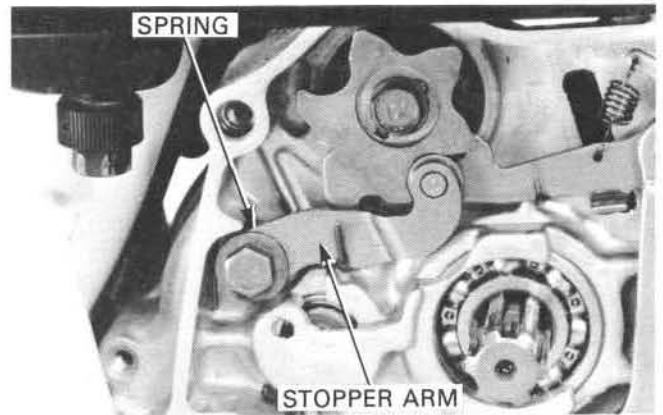
### REMOVAL

Remove the following:

- Right crankcase cover (page 8-2)
- clutch (page 8-3)
- snapping and primary driven gear.



Remove the stopper arm and spring by removing the bolt.

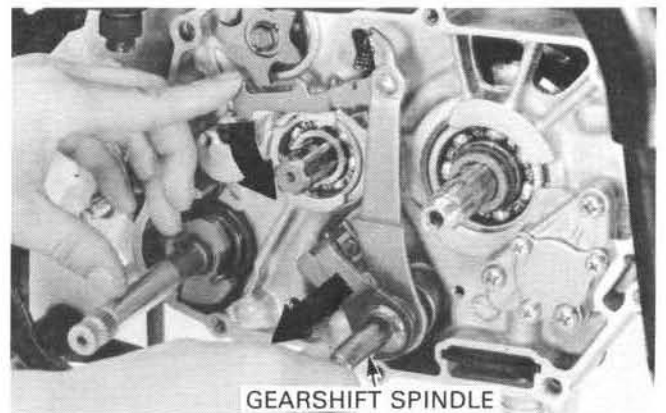


Remove the shift pedal.

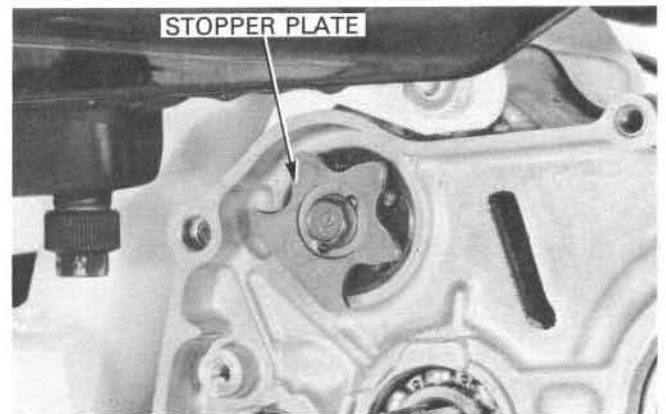
## NOTE

Clean the pedal end of the gearshift spindle to prevent dirt from entering the crankcase.

Pull the gearshift spindle out of the crankcase disengaging the claw as shown.

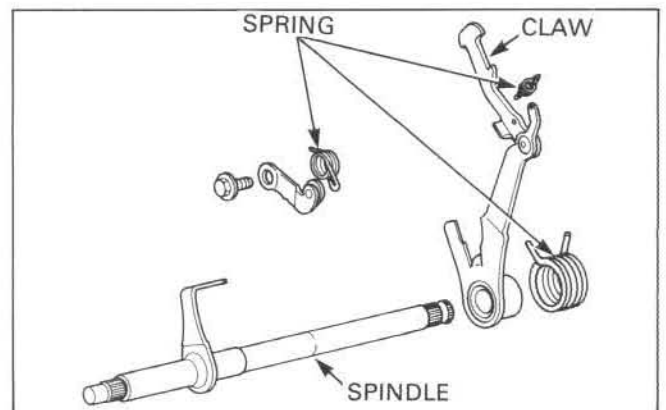


Remove the shift drum stopper plate, drum pins and dowel pins by removing the shift drum plate bolt.



## INSPECTION

Check the stopper arm and return spring for wear or damage.

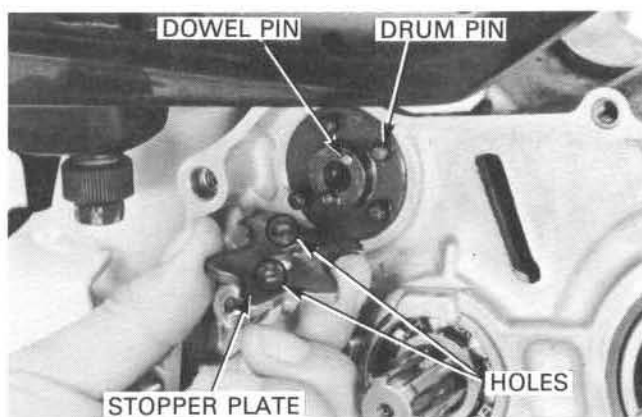


## CLUTCH/GEARSHIFT LINKAGE

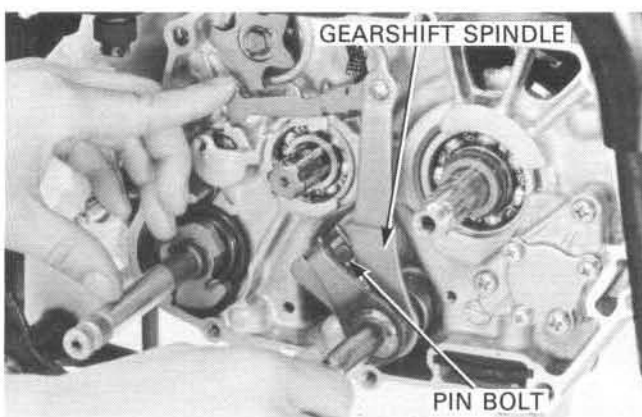
### INSTALLATION

Install the dowel pins and drum pins into the shift drum.  
Install the stopper plate, aligning the holes in the stopper plate with the drum pins.

Install the stopper plate bolt.



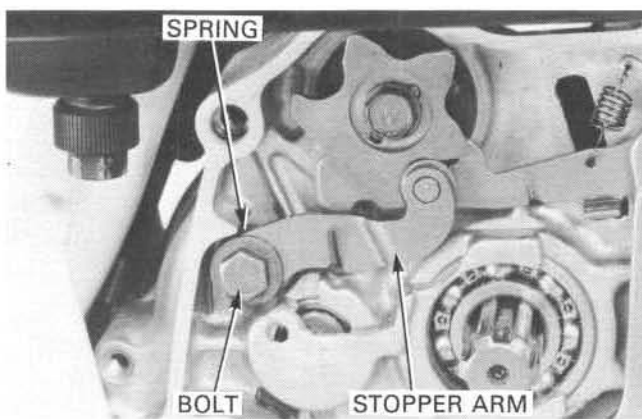
Install the gearshift spindle, aligning the return spring with the pin bolt as shown.  
Install the gearshift pedal.



Install the stopper arm bolt and spring with the bolt.

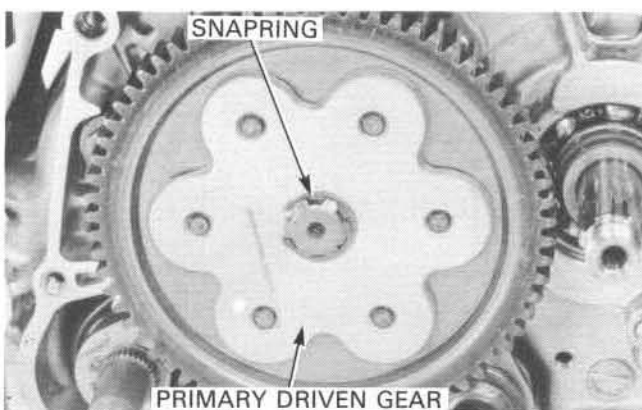
Tighten the bolt to the specified torque.

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



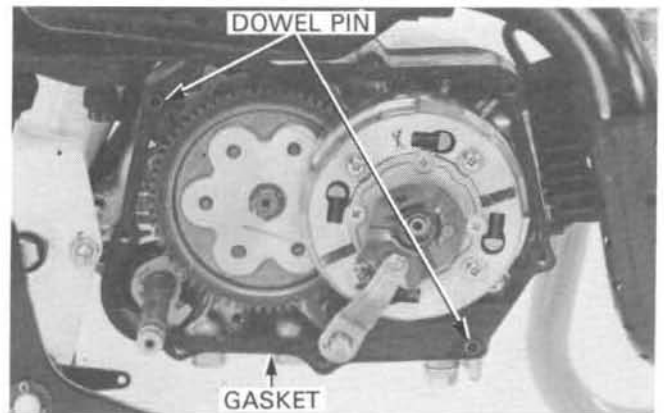
Install the primary driven gear with the snapring.

Install the clutch (page 8-8).

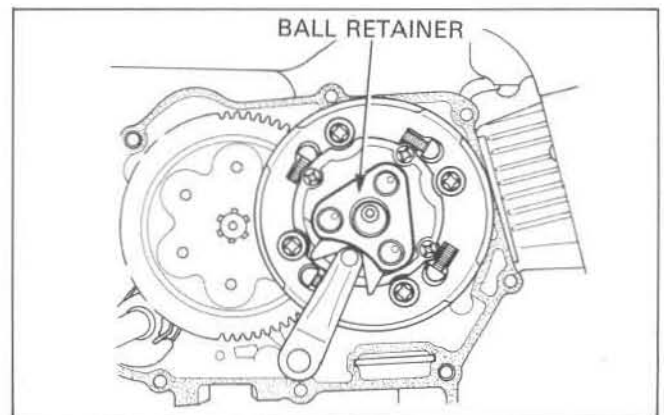


## RIGHT CRANKCASE COVER INSTALLATION

Install the new gasket and dowel pins.



Install the clutch ball retainer as shown.



Install the right crankcase cover.

### NOTE

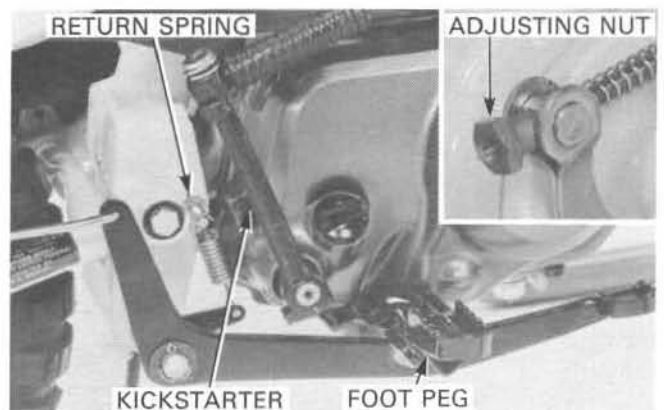
Be careful not to dislodge the clutch ball retainer or damage the kickstarter shaft oil seal.

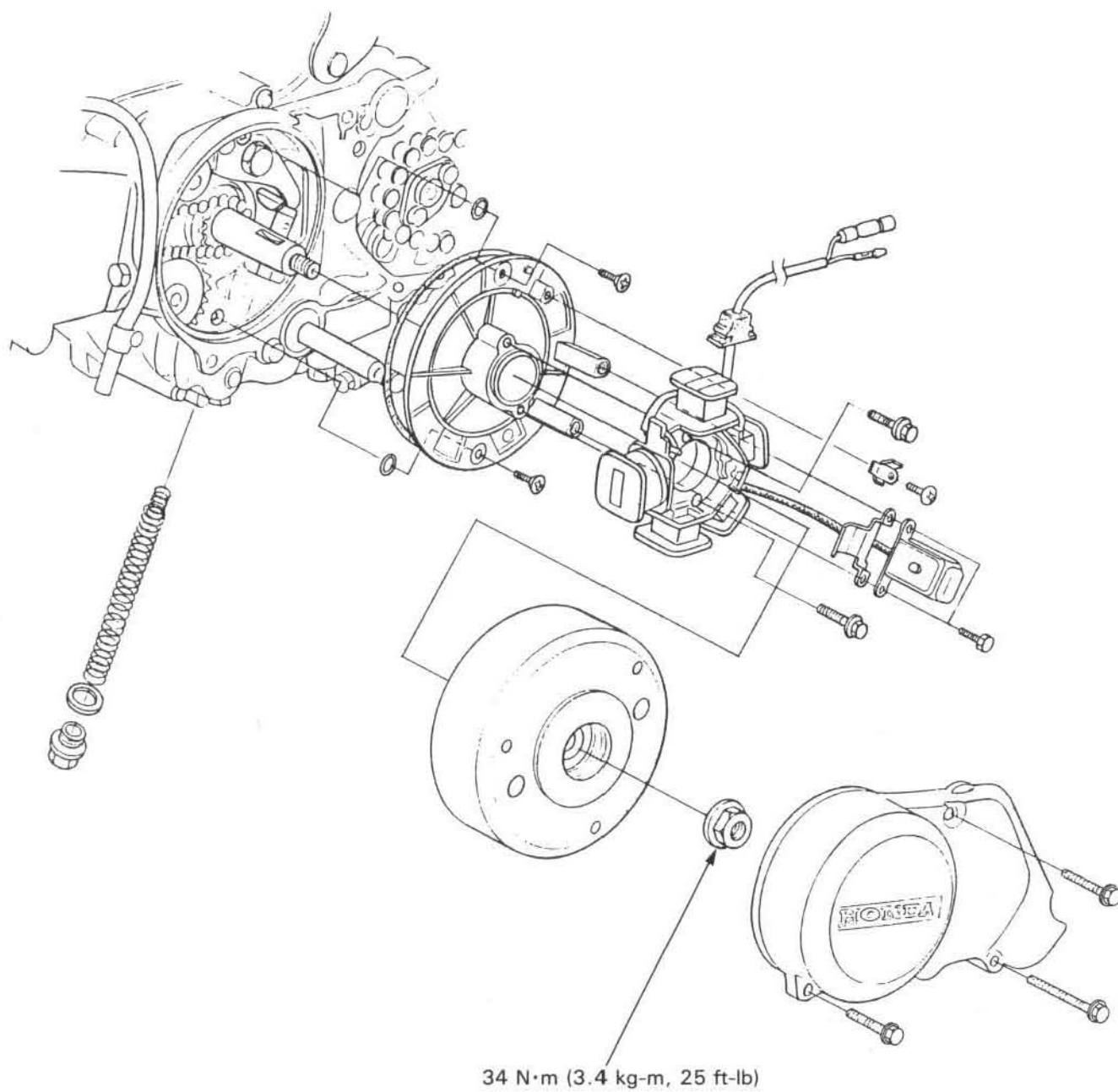
Tighten the cover bolts to the specified torque.

**TORQUE: 9 N·m (0.9 kg-m, 6.5 ft-lb)**



Install the kickstarter and foot peg.  
Install the brake pedal return spring and adjusting nut.  
Fill the crankcase with oil (page 2-2).





# 9. ALTERNATOR/CAM/CHAIN TENSIONER

SERVICE INFORMATION	9-1	CAM CHAIN TENSIONER REMOVAL	9-3
TROUBLESHOOTING	9-1	CAM CHAIN TENSIONER INSTALLATION	9-4
ALTERNATOR REMOVAL	9-2	ALTERNATOR INSTALLATION	9-4

## SERVICE INFORMATION

### GENERAL

- This section covers removal and installation of the alternator.
- Refer to Sections 13 for alternator inspection.

### SPECIFICATION

ITEM	STANDARD	mm (in)
		SERVICE LIMIT
Cam chain tensioner push rod O.D.	11.985–12.000 (0.4718–0.4724)	11.94 (0.470)
Cam chain tensioner spring free length	111.7 (4.40)	100 (3.9)

### TORQUE VALUES

Flywheel nut 34 N·m(3.4 kg-m, 25 ft-lb)

### TOOLS

#### Common

Universal holder

07725 – 0030000

Flywheel puller

07733 – 0010000 or 07933 – 0010000

## TROUBLESHOOTING

### Cam chain noise

- Worn or damaged spring
- Damaged tensioner

### Excessive chain slack

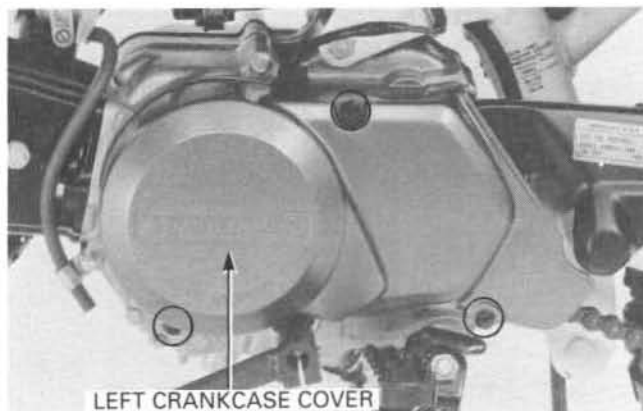
- Worn or damaged spring
- Faulty push rod



## ALTERNATOR REMOVAL

Drain the engine oil (page 2-2).

Remove the left crankcase cover bolts and the cover.



Hold the flywheel with the universal holder and remove the nut.

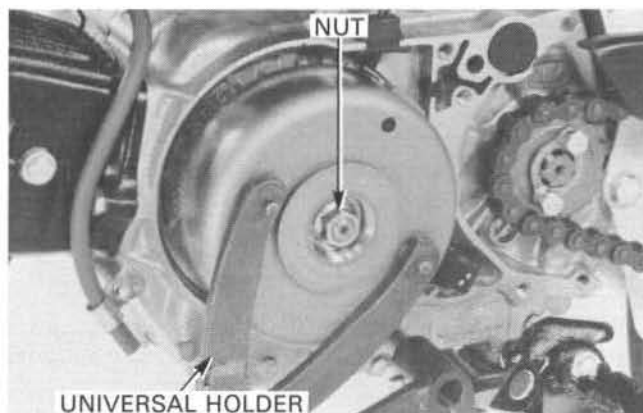
TOOL:

Universal holder

07725-0030000

or

07933-0010000

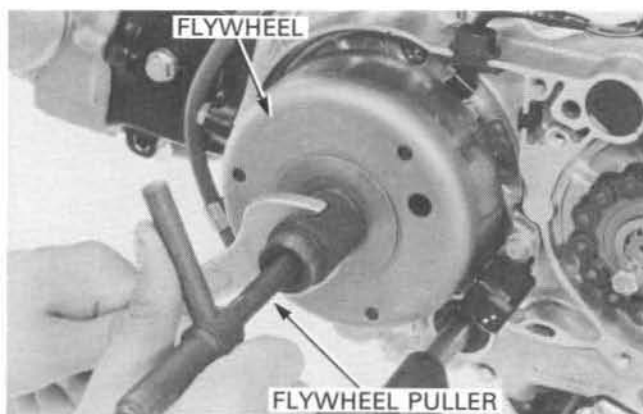


Remove the flywheel with the flywheel puller.

TOOL:

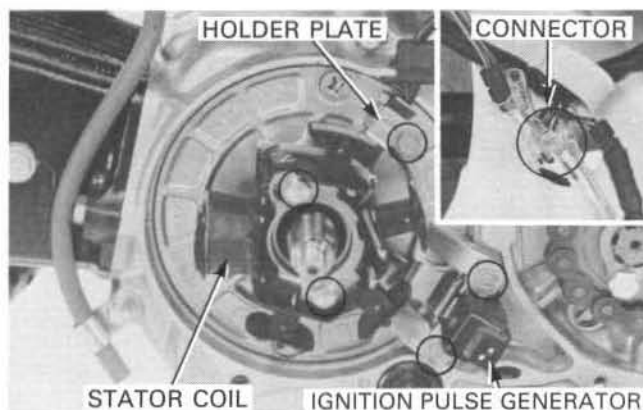
Flywheel puller

07733-0010000



Disconnect the alternator wire connector.

Remove the stator coil mounting bolts, ignition pulse generator mounting bolts and wire holder plate bolt.

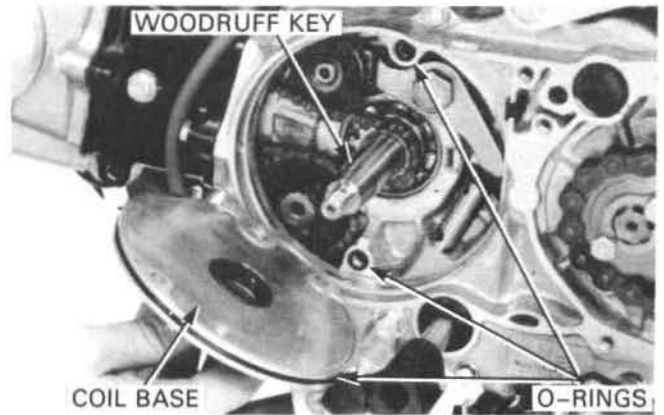


Remove the woodruff key.  
Remove the screws and pull out the stator coil base.

**NOTE**

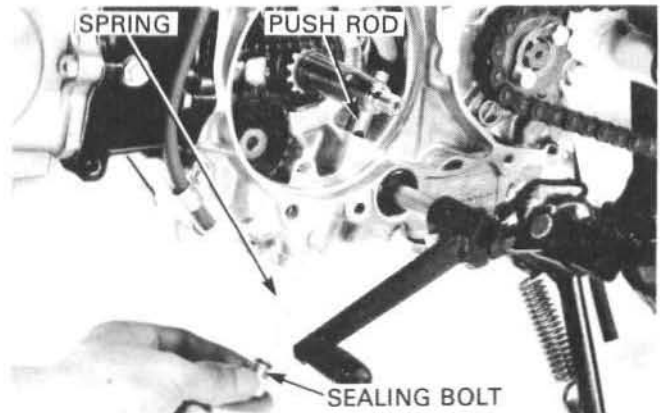
When removing the stator coil base, be careful not to damage the stator coil O-ring.

Remove the O-rings.

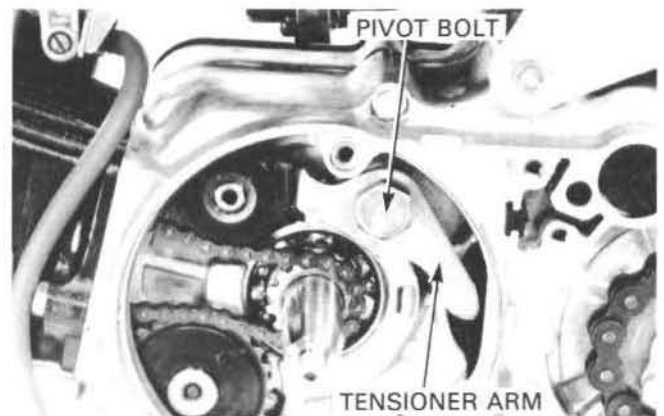


## CAM CHAIN TENSIONER REMOVAL

Remove the sealing bolt, tensioner spring and push rod.



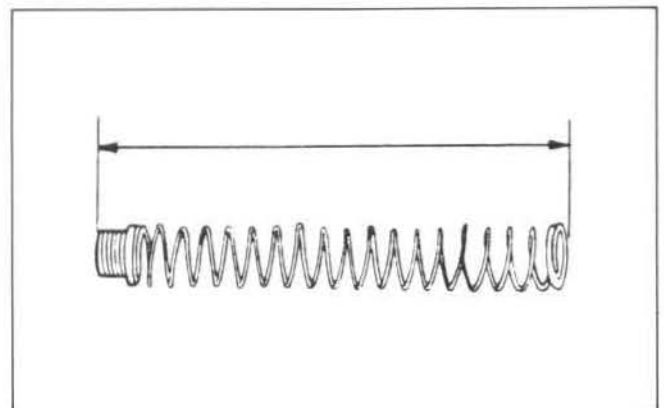
Remove the pivot bolt and tensioner arm.



## INSPECTION

Measure the tensioner spring free length.

**SERVICE LIMIT:** 100 mm (3.9 in)

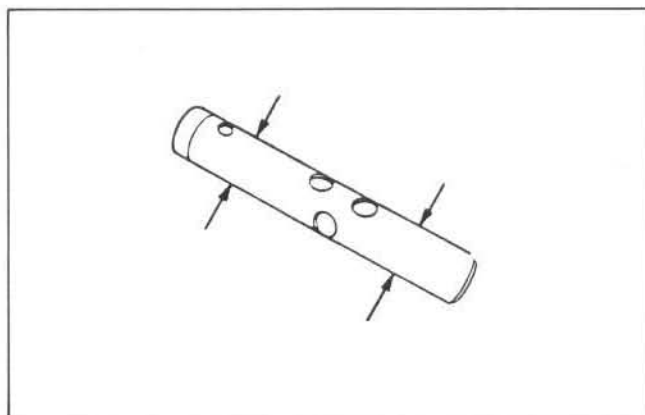


## ALTERNATOR/CAM/CHAIN TENSIONER

Check the push rod for wear or damage.  
Measure the push rod O.D.

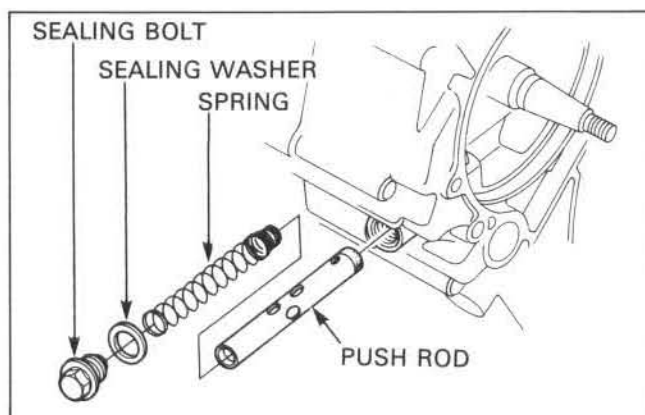
**SERVICE LIMIT: 11.94 mm (0.470 in)**

Check the sealing washer for damage.

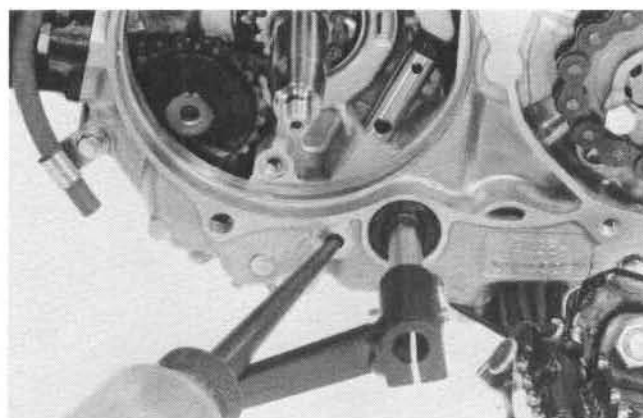


## CAM CHAIN TENSIONER INSTALLATION

Install the tensioner arm with the pivot bolt.  
Install the push rod and tensioner spring.



Remove the bolt and washer.  
Pour 1 cc of engine oil into the push rod then install the sealing washer and bolt.

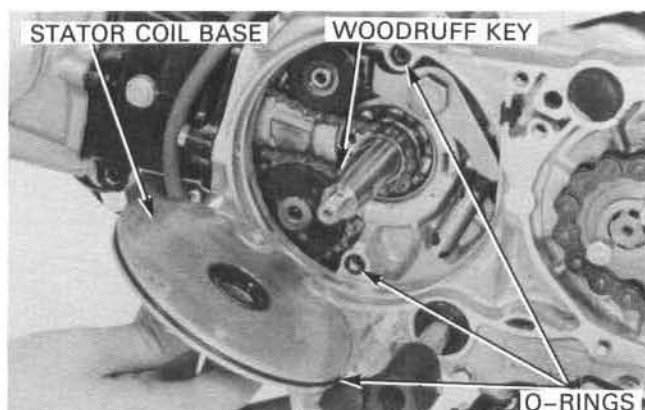


## ALTERNATOR INSTALLATION

Install the O-rings and the stator coil base.  
**NOTE**

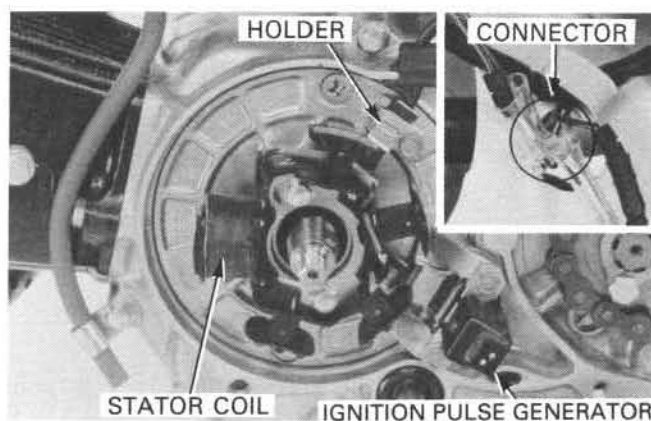
Be careful not to damage the O-rings.

Install the woodruff key.



Install the stator coil, ignition pulse generator and wire holder plate.

Connect the alternator wire connector.



Clean the inside of the flywheel, then install it by aligning its key-way with the woodruff key.

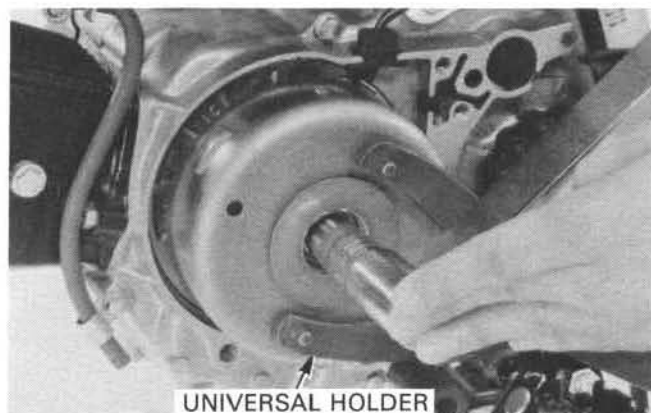
Tighten the flywheel nut.

#### **TOOL**

Universal holder

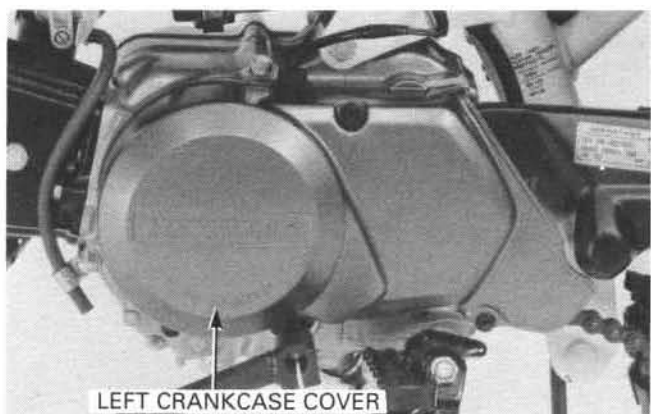
07725-0030000

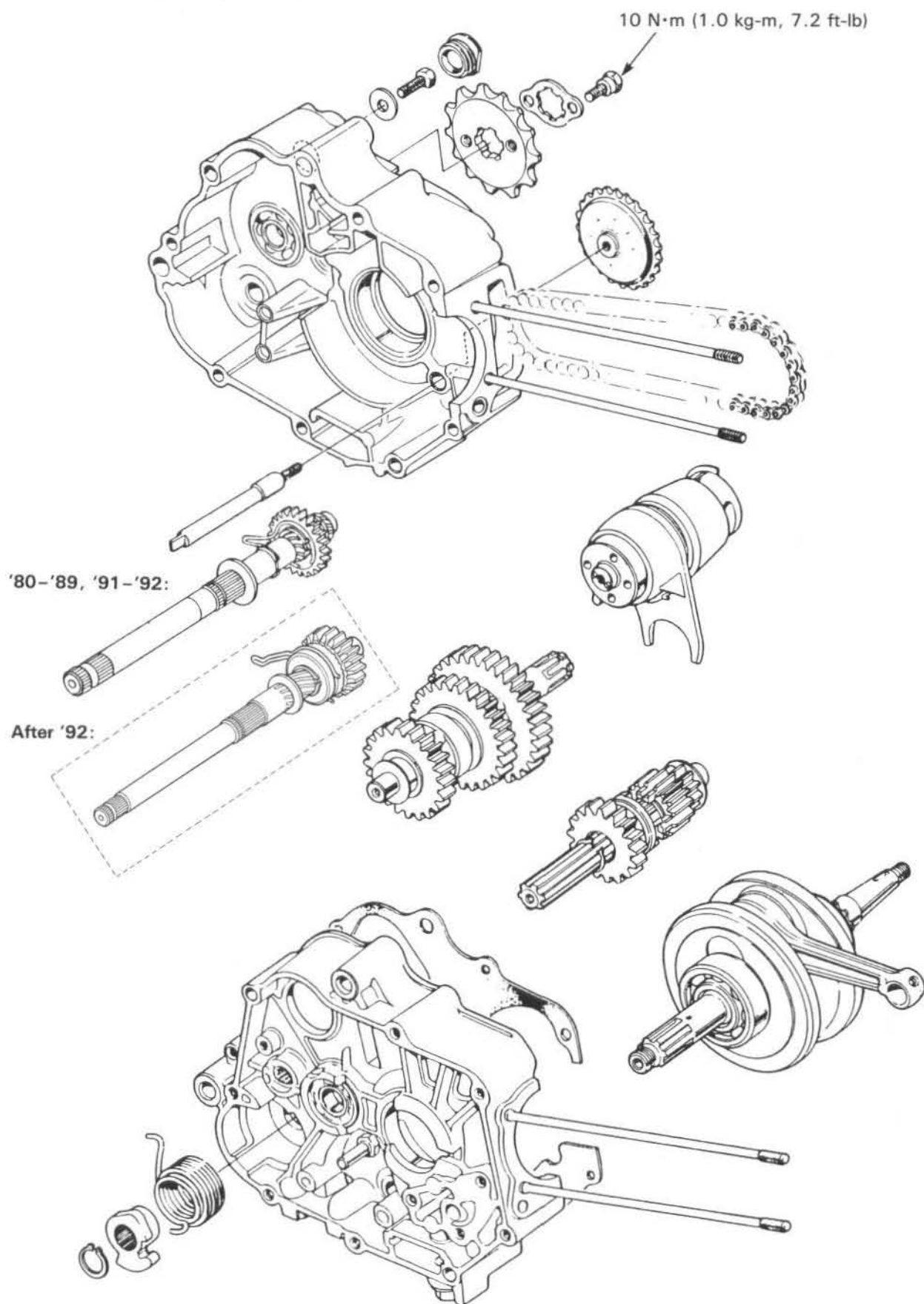
**TORQUE:** 34 N·m (3.4 kg-m 25 ft-lb)



Install the left crankcase cover.

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





# 10. TRANSMISSION/CRANKSHAFT/KICKSTARTER

SERVICE INFORMATION	10-1	KICKSTARTER	10-5
TROUBLESHOOTING	10-2	TRANSMISSION	10-7
CRANKCASE SEPARATION	10-3	CRANKCASE BEARING REPLACEMENT	10-10
CRANKSHAFT	10-4	CRANKCASE ASSEMBLY	10-11

## SERVICE INFORMATION

### GENERAL

- This section includes service of transmission, crankshaft and kickstarter which require crankcase separation. Refer to the following for service of engine removed and other parts which must be removed before separating the crankcase.
  - Engine removal/installation Section 5
  - Cylinder head/valves Section 6
  - Cylinder/piston Section 7
  - Clutch/gearshift linkage Section 8
  - Alternator/cam chain tensioner Section 9
  - Oil pump Section 2

### SPECIFICATIONS

mm (in)

10

ITEM			STANDARD	SERVICE LIMIT
Gearshift fork	I.D.		34.075—34.100 (1.3415—1.3425)	34.15 (1.345)
	Pawl thickness		4.86—4.94 (0.191—0.194)	4.60 (0.181)
Gearshift drum O.D.			33.950—33.975 (1.3366—1.3376)	33.93 (1.336)
Transmission	Mainshaft O.D.	M2	16.970—16.984 (0.6681—0.6687)	16.93 (0.667)
	Countershaft O.D.	C1, C3	16.966—16.984 (0.6680—0.6687)	16.94 (0.667)
	Gear I.D.	M2	17.016—17.043 (0.6699—0.6710)	17.10 (0.673)
		C1	20.020—20.053 (0.7882—0.7895)	20.10 (0.791)
		C3	17.016—17.043 (0.6699—0.6710)	17.10 (0.673)
	C1 bushing	I.D.	17.000—17.018 (0.6693—0.6700)	17.08 (0.672)
		O.D.	19.979—20.000 (0.7866—0.7874)	19.93 (0.785)
Crankshaft	Connecting rod big end radial clearance		0—0.012 (0—0.0005)	0.05 (0.002)
	Connecting rod big end side clearance		0.10—0.35 (0.004—0.014)	0.6 (0.02)
	Crankshaft runout		—	0.10 (0.004)

### TORQUE VALUE

Drive sprocket 10 N·m (1.0 kg-m, 7.2 ft-lb)

### TOOLS

#### Common

Driver 07749–0010000  
Attachment, 37×40 mm 07746–0010200  
Pilot, 17 mm 07746–0040400

## TROUBLESHOOTING

### Hard to shift

- Clutch adjustment incorrect
- Shift fork bent
- Guide pin damaged
- Gear dogs worn

### Transmission jumps out of gear

- Gear dogs worn
- Shift fork bent

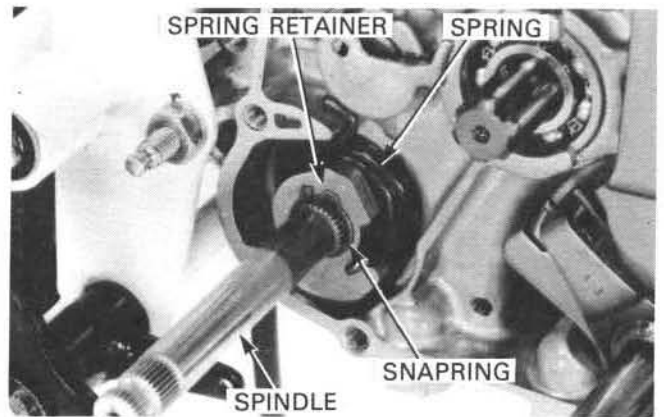
### Engine noise

- Main journal bearing worn
- Crankshaft bearing worn

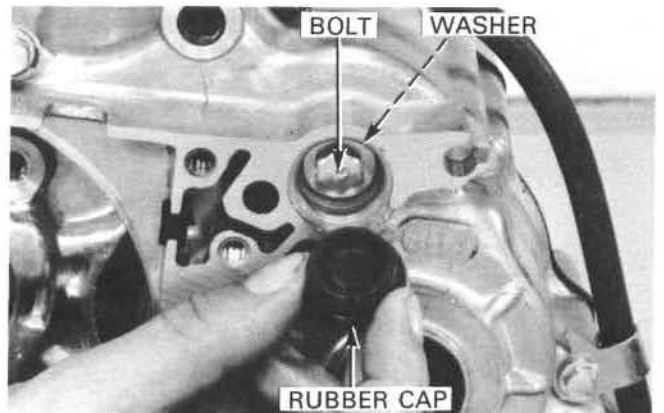


## CRANKCASE SEPARATION

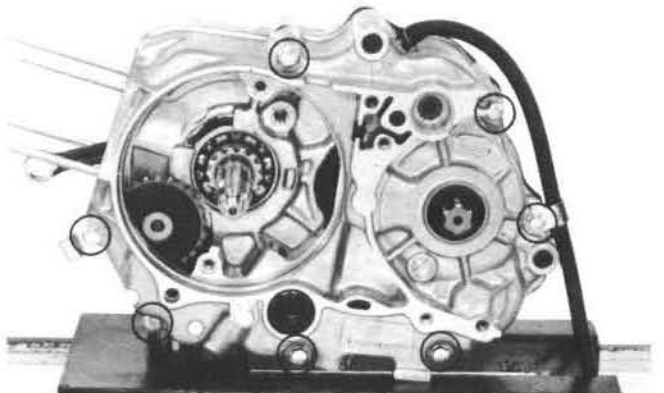
Refer to Service Information (page 10-1) for removal of necessary parts before separating the crankcase.  
Pry out the snapping on the kickstarter spindle.  
Remove the spring retainer and the spring.



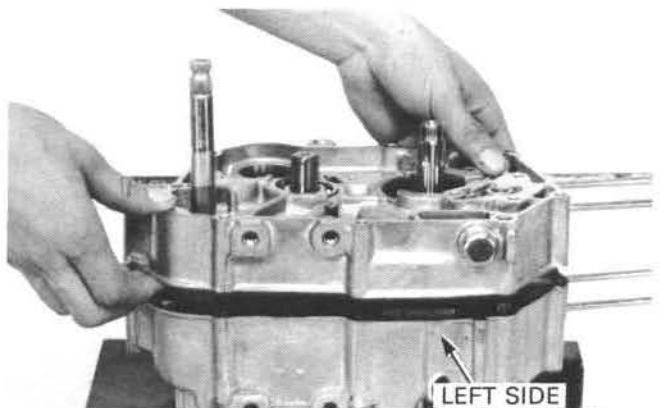
Remove the rubber cap.  
Remove the bolt and washer holding the gear shift drum.



Loosen the crankcase bolts in a criss-cross pattern in 2 or 3 steps and remove them.

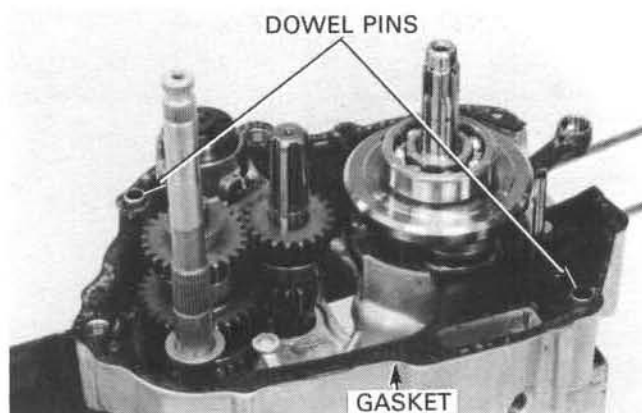


Lay the crankcase on the left side.  
Separate the right and the left crankcase halves.



## TRANSMISSION/CRANKSHAFT/KICKSTARTER

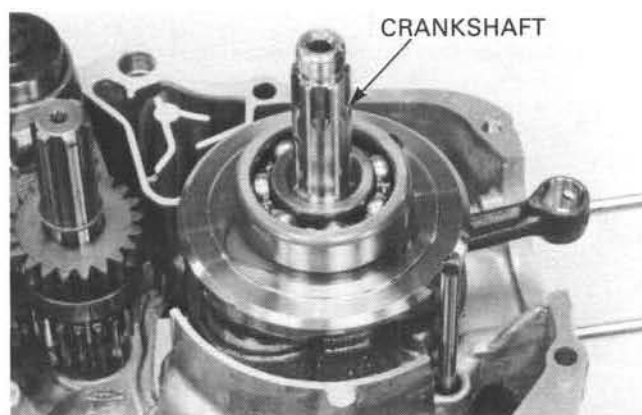
Remove the gasket and dowel pins.



## CRANKSHAFT

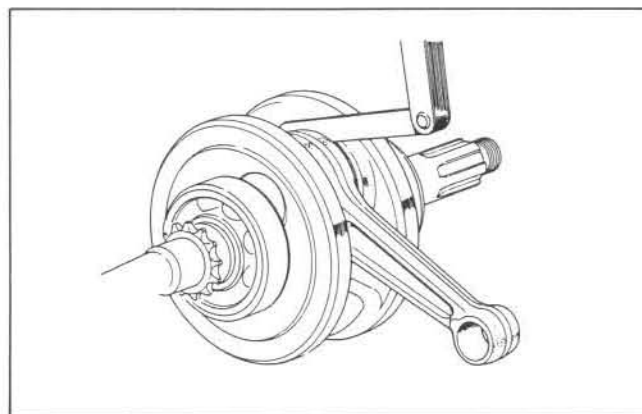
### INSPECTION

Remove the crankshaft.



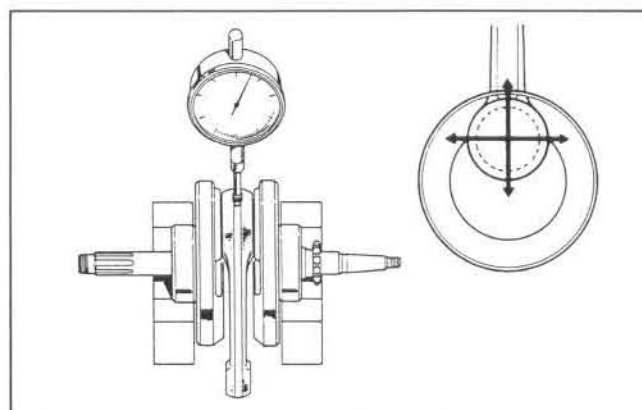
Measure the connecting rod big end side clearance with a feeler gauge.

**SERVICE LIMIT: 0.6 mm (0.02 in)**



Measure the connecting rod big end radial clearance at symmetrical points as shown.

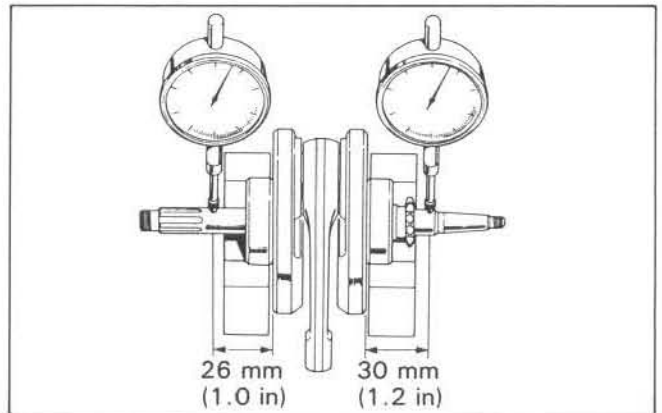
**SERVICE LIMIT: 0.05 mm (0.002 in)**



Place the crankshaft on a stand or V-blocks and measure the runout using a dial gauge.

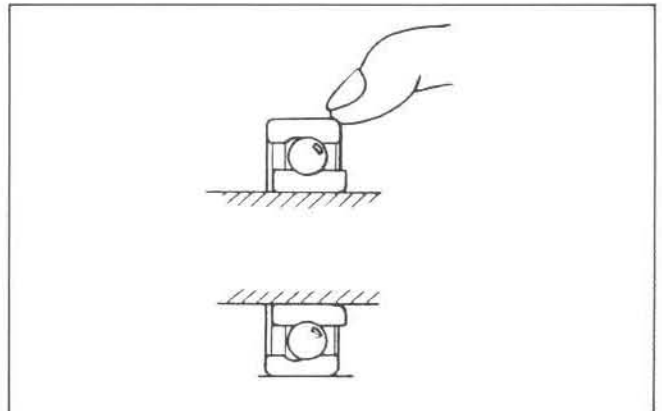
The measuring locations are as shown.

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

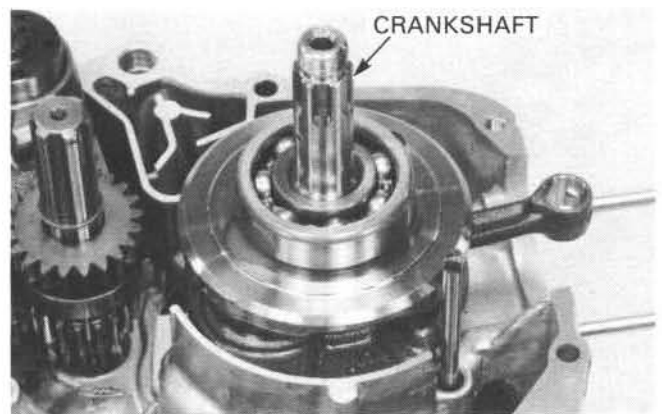


Turn the outer races of the crankshaft bearings with your fingers. The bearings should turn smoothly and quietly. Also check that the inner races of the bearings fit tightly on the crankshaft.

Check the timing sprocket for wear or damage.



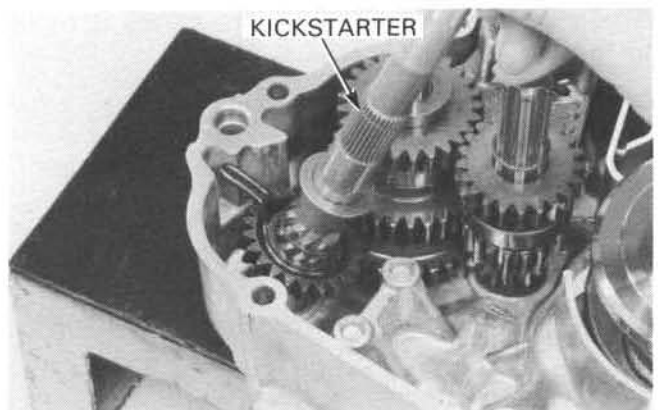
Install the crankshaft into the left crankcase.



## KICKSTARTER

### DISASSEMBLY

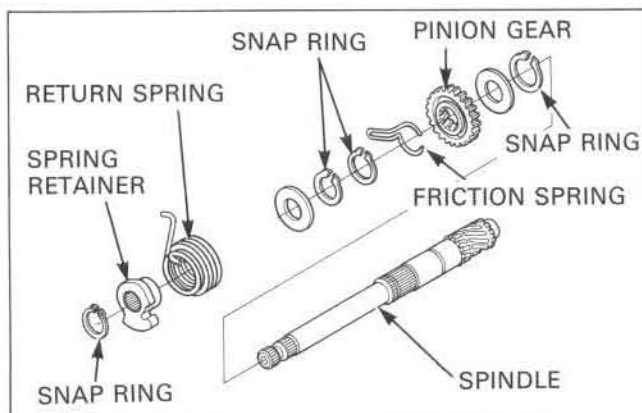
Remove the kickstarter.



## TRANSMISSION/CRANKSHAFT/KICKSTARTER

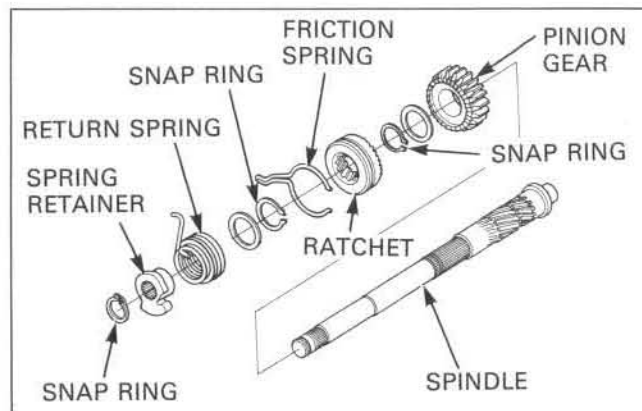
### '88-'89, '91-'92:

Remove the snapring and disassemble the kickstarter. Check the pinion gear, kickstarter spindle, friction spring and return spring for wear or damage.

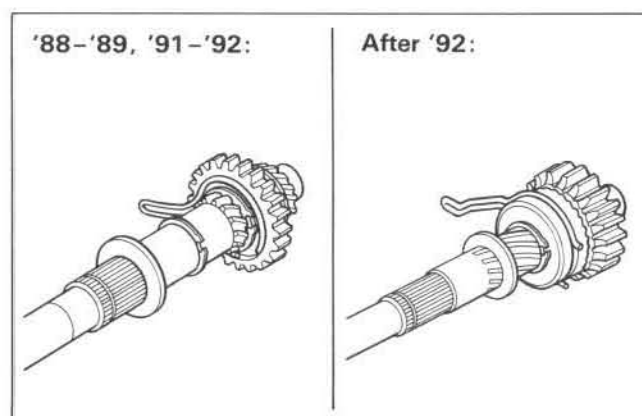


### After '92:

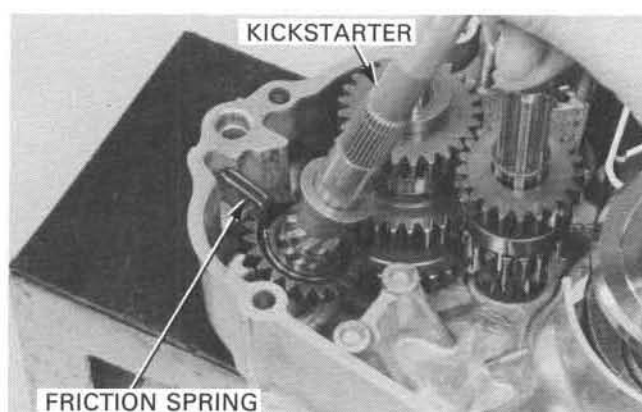
Remove the snap ring and disassemble the kickstarter. Check the pinion gear, kickstarter spindle, starter drive ratchet, friction spring, and return spring for wear or damage.



Assemble the kickstarter spindle in the reverse order of disassembly.



Install the kickstarter spindle by inserting the end of the friction spring in the crankcase cutout.

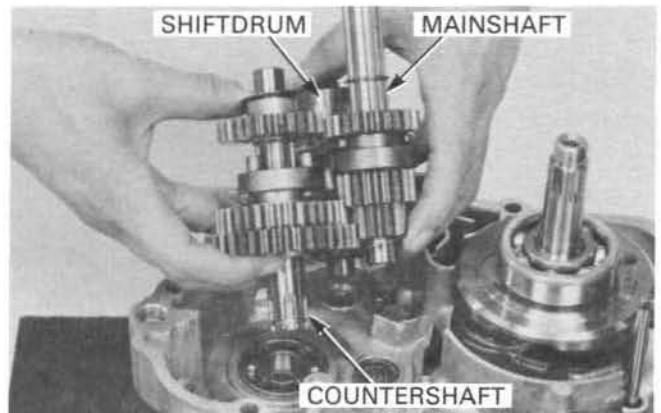


## TRANSMISSION

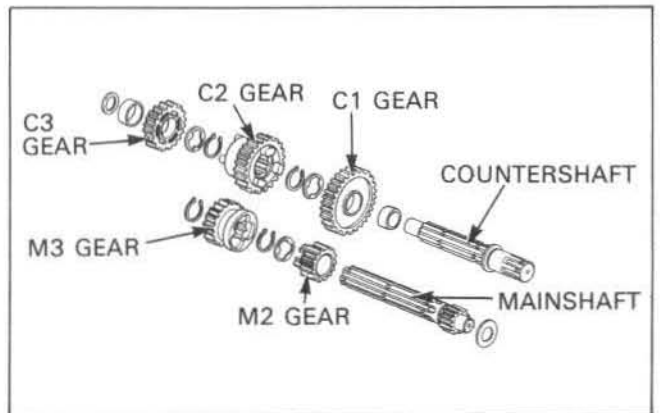
### DISASSEMBLY

Remove the kickstarter.

Remove the mainshaft, countershaft and shift drum as an assembly.



Disassemble the mainshaft and countershaft.

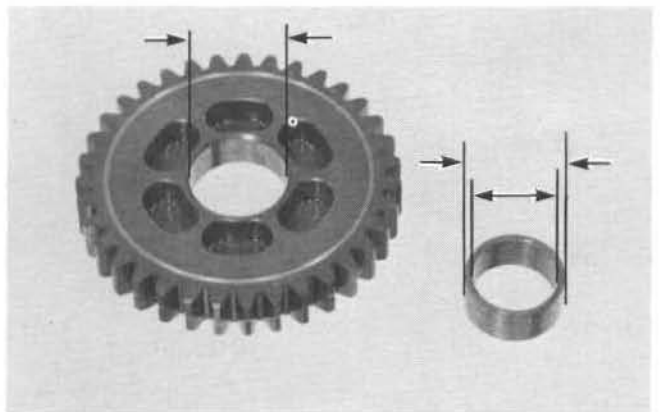


### INSPECTION

Inspect each gear for wear or damage and replace if necessary. Check the gear teeth and engagement dogs for wear or damage. Measure the I.D. of each spinning gear.

Measure the I.D. and O.D. of the bushing.

<b>SERVICE LIMITS:</b>	<b>M2:</b>	<b>17.10 mm (0.673 in)</b>
	<b>C1:</b>	<b>20.10 mm (0.791 in)</b>
	<b>C3:</b>	<b>17.10 mm (0.673 in)</b>
	<b>C1 bushing I.D.:</b>	<b>17.08 mm (0.672 in)</b>
	<b>C1 bushing O.D.:</b>	<b>19.93 mm (0.785 in)</b>

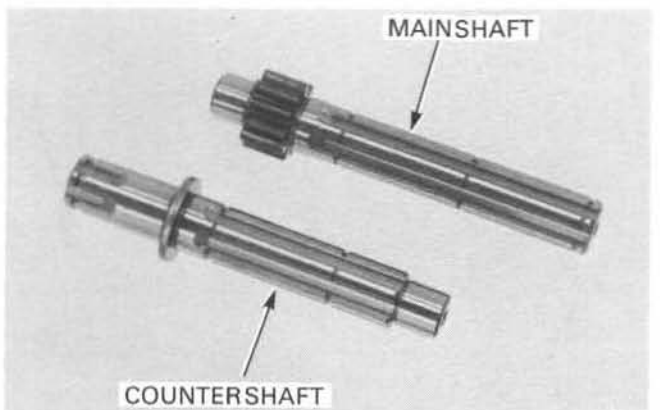


Check the mainshaft and countershaft splines and sliding surfaces for wear or damage.

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

### SERVICE LIMITS:

<b>Mainshaft O.D.:</b>	<b>16.93 mm (0.667 in)</b>
<b>Countershaft O.D.:</b>	<b>16.94 mm (0.667 in)</b>

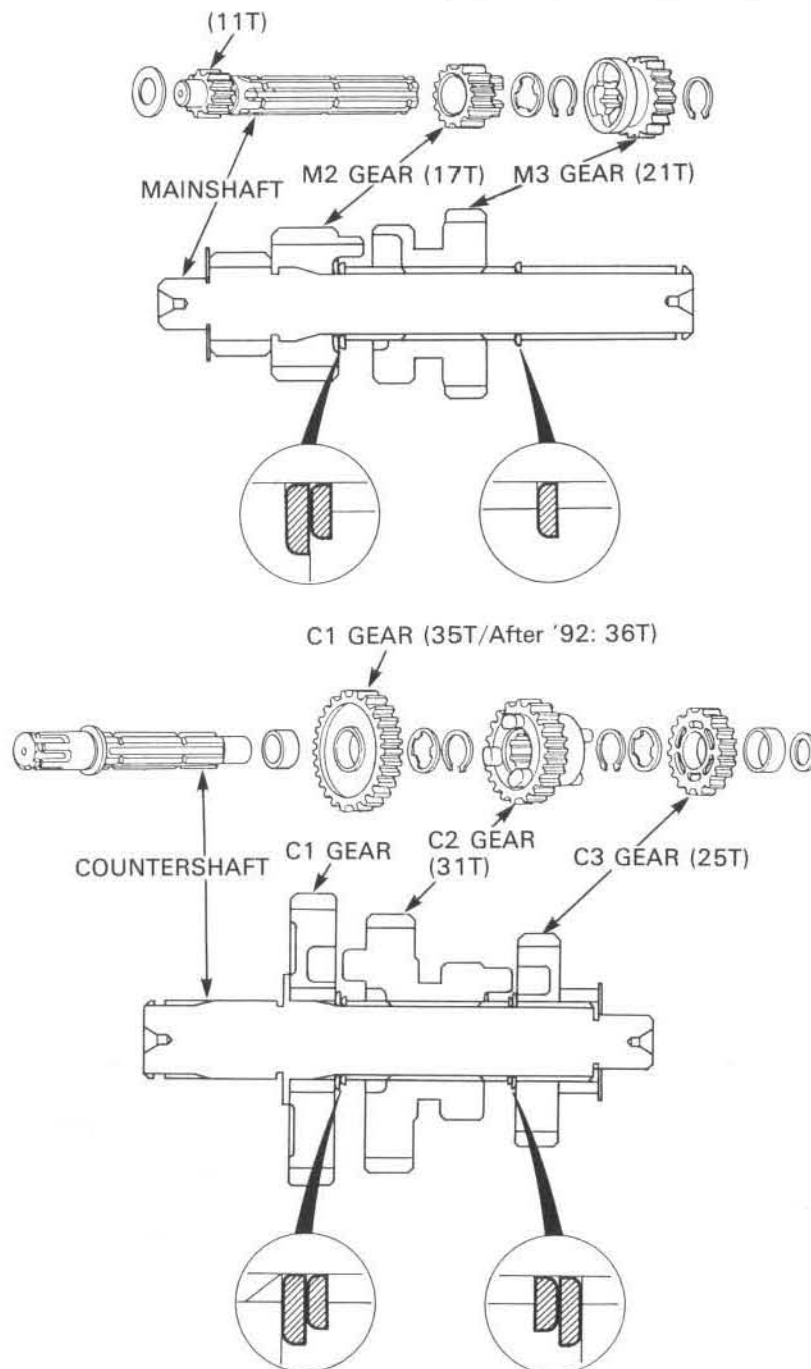
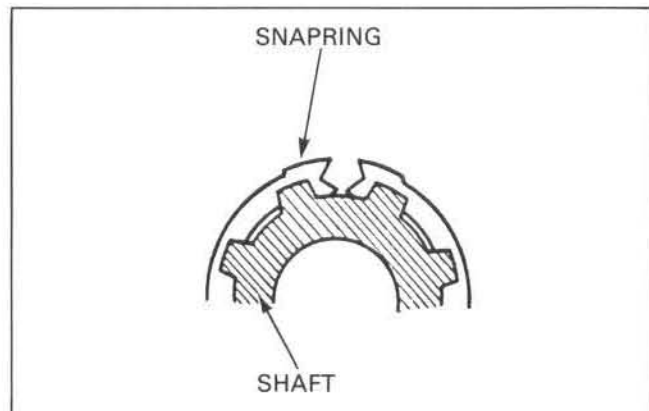


## TRANSMISSION/CRANKSHAFT/KICKSTARTER

Assemble the transmission in the reverse order of disassembly.

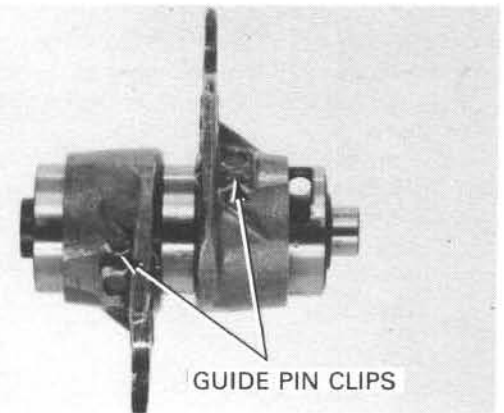
### NOTE

Align the snapping end with the center of the spline as shown.



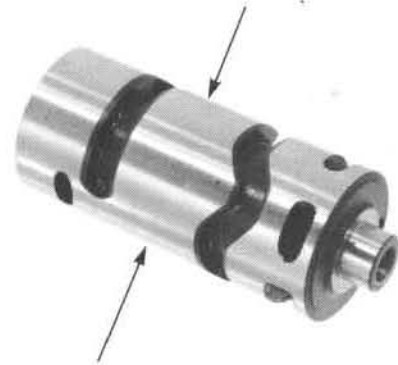
**SHIFT DRUM DISASSEMBLY**

Remove the guide pin clips.  
Remove the guide pins and shift forks.

**SHIFT DRUM INSPECTION**

Check the shift drum and guide pins for wear or damage.  
Measure the shift drum O.D.

**SERVICE LIMIT: 33.93 mm (1.336 in)**

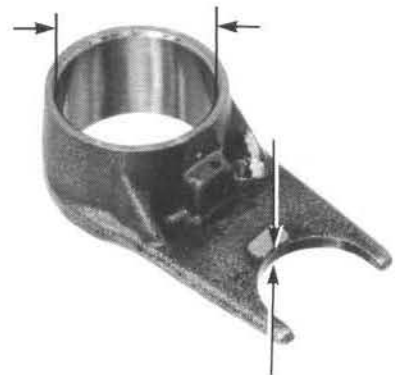


Measure the shift fork I.D.

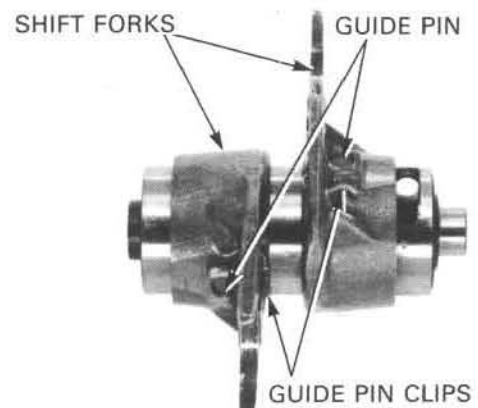
**SERVICE LIMIT: 34.15 mm (1.345 in)**

Measure the shift fork pawl thickness.

**SERVICE LIMIT: 4.60 mm (0.181 in)**

**SHIFT DRUM ASSEMBLY**

Install the shift forks on the gearshift drum.  
Install the guide pins and guide pin clips.





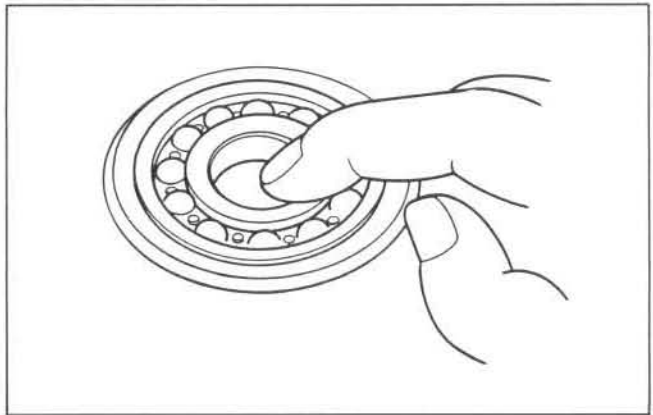
### TRANSMISSION BEARING INSPECTION

Turn the inner races of the bearings with your finger.

The bearings should turn smoothly and quietly.

Also check that the outer races of the bearings fit tightly in the crankcase.

Replace the bearings if they do not turn smoothly and quietly, or if they have been spinning in the crankcase.



### CRANKCASE BEARING REPLACEMENT

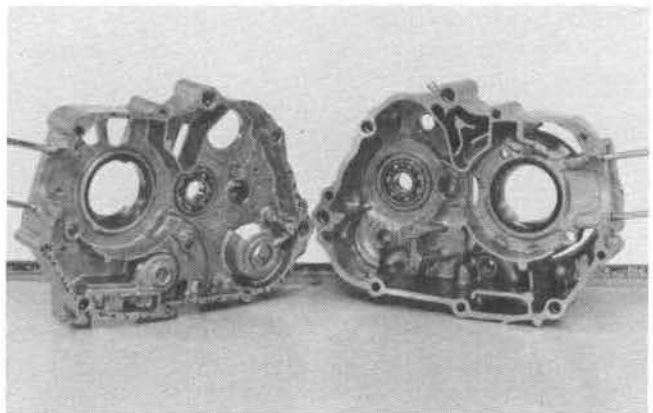
Remove the oil pump drive shaft and drive sprocket.

Remove the crankshaft.

Remove the countershaft oil seal.

Drive the countershaft and mainshaft bearings out of the left crankcase.

Drive the mainshaft and countershaft bearings out of the right crankcase.

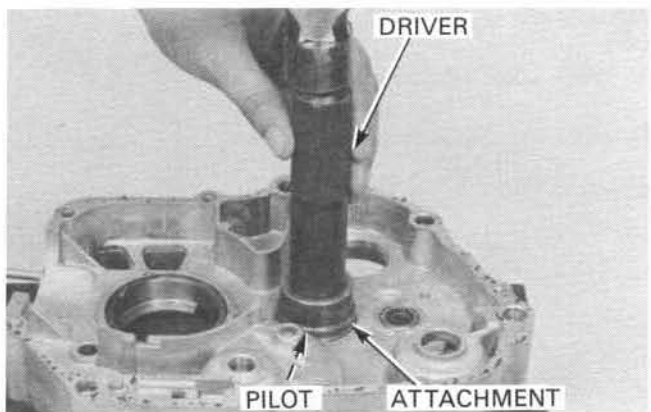


Drive new bearings into the crankcase.

#### TOOLS

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 37 × 40 mm</b>	<b>07746-0010200</b>
<b>Pilot, 17 mm</b>	<b>07746-0040400</b>

Install a new left countershaft oil seal in the left crankcase and grease the oil seal lip.



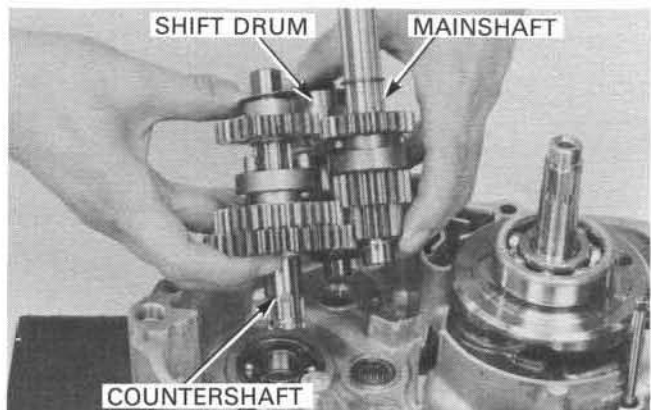
Install the oil pump drive shaft and drive sprocket and the crankshaft.

Apply clean engine oil to the transmission gears and shift drum.

Install the transmission and shift drum in the left crankcase as an assembly.

Rotate the shift drum to check the transmission operation.

Install the kickstarter.



## CRANKCASE ASSEMBLY

Clean the crankcase mating surfaces before assembling.

### NOTE

- Dress the surfaces with an oil stone if necessary to correct any minor roughness or irregularities.
- After cleaning, lubricate the crankshaft bearings and other contacting surfaces with clean engine oil.

Install the dowel pins and a new gasket onto the left crankcase.

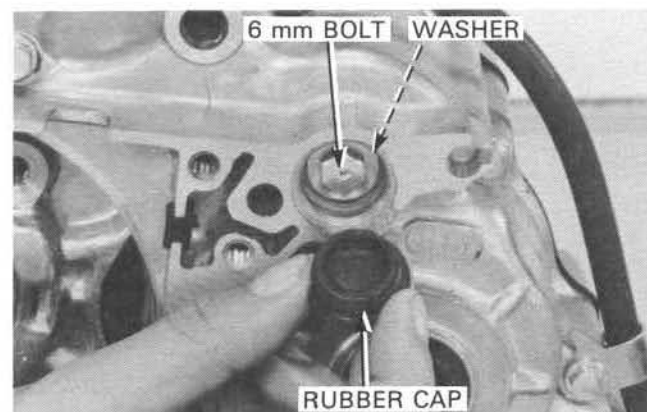
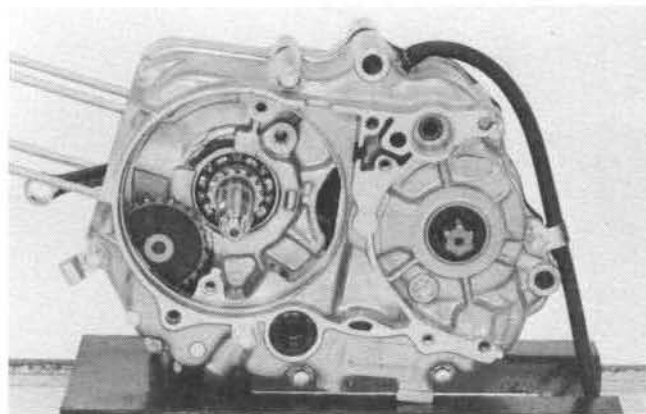
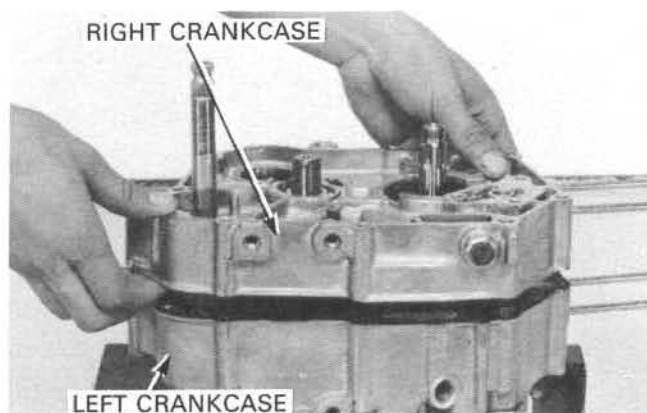
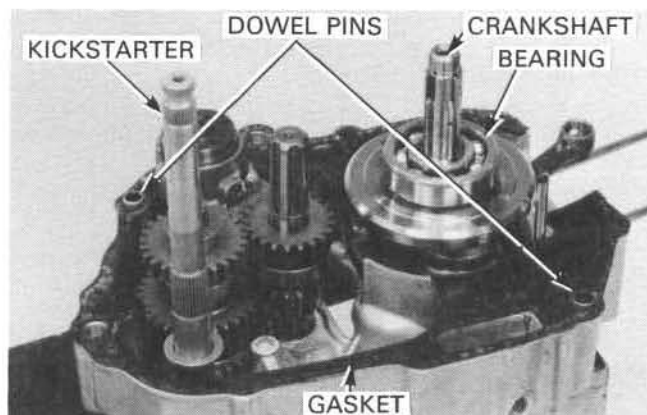
Install the right crankcase over the left crankcase.

### NOTE

Make sure that the gasket stays in place.

Install and tighten the crankcase bolts securely in a criss-cross pattern in 2 or 3 steps.

Install the gearshift drum bolt and washer.  
Tighten the 6 mm bolt securely.  
Install the rubber cap.



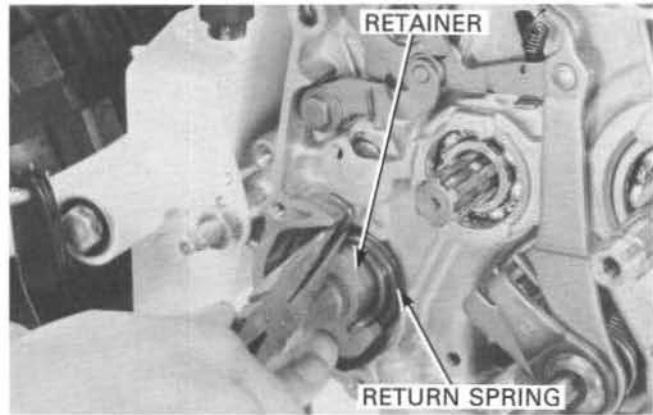
## TRANSMISSION/CRANKSHAFT/KICKSTARTER

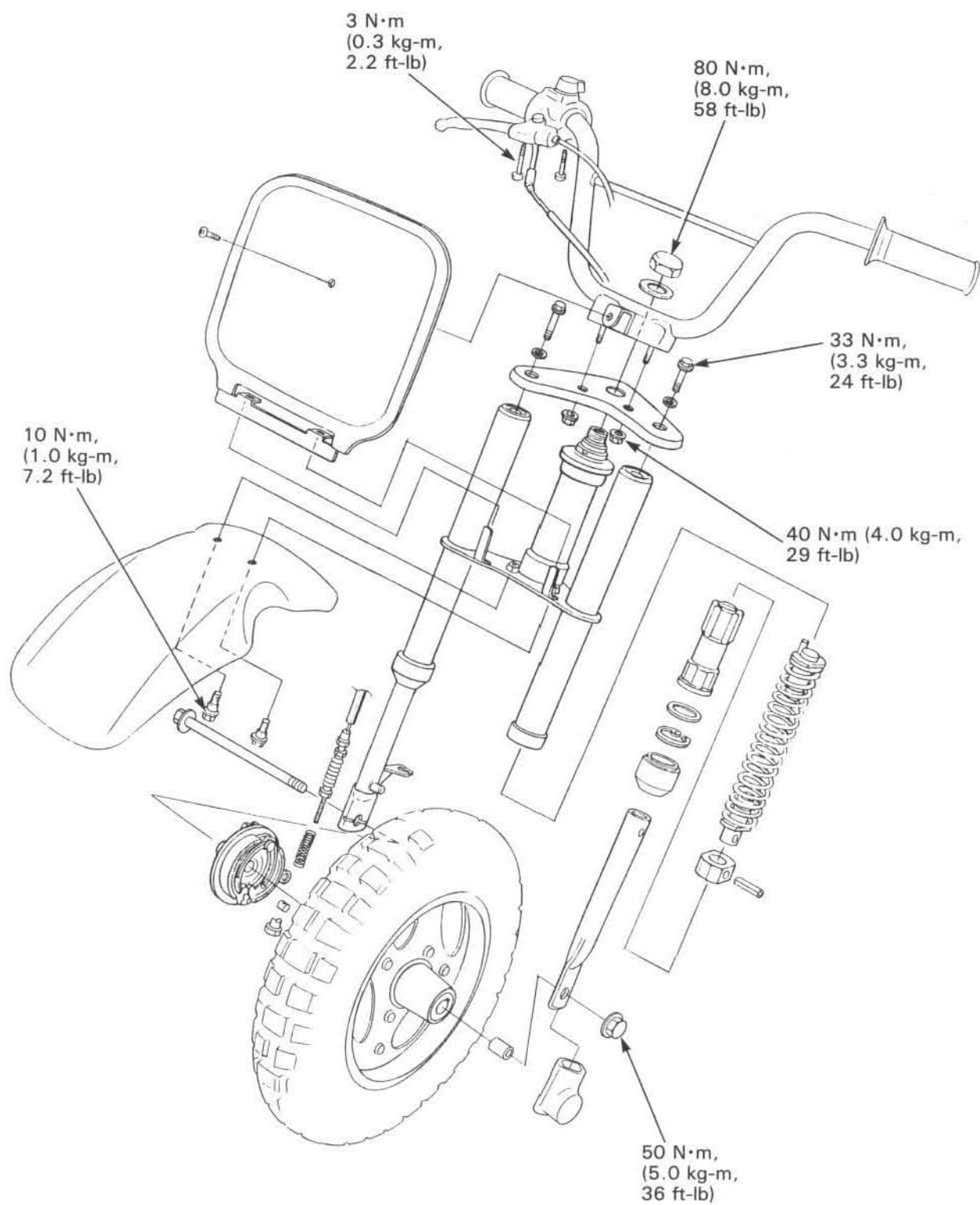
Install the return spring and spring retainer onto the kickstarter spindle.

Install the snap ring.

Refer to the appropriate section for installation of the removed parts.

- alternator/cam chain tensioner (section 9)
- oil pump (section 2)
- clutch/gearshift linkage (section 8)
- cylinder/piston (section 7)
- cylinder head/valves (section 6)
- engine installation (section 5)





# 11. FRONT WHEEL/BRAKE/SUSPENSION/STEERING

SERVICE INFORMATION	11-1	FRONT BRAKE	11- 7
TROUBLESHOOTING	11-2	FRONT SUSPENSION	11-10
HANDLEBAR	11-3	STEERING STEM	11-13
FRONT WHEEL	11-4		

## SERVICE INFORMATION

### GENERAL

#### WARNING

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

- This section describes removal, installation and servicing of the front wheel, brake, fork assembly and steering stem.
- Support the engine with a jack or a jack or a block to raise the front wheel off the ground before servicing them.

### SPECIFICATIONS

mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front axle runout		—	0.2 (0.01)
Front wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Front brake drum I.D.		80 (3.15)	80.5 (3.17)
Front brake lining thickness		3.5 (0.14)	2.0 (0.08)
Fork spring free length		170 (6.89)	166.6 (6.56)

### TORQUE VALUES

Front axle nut	50N•m(5.0kg-m, 36ft-lb)
Fork top bolt	33N•m(3.3kg-m, 24ft-lb)
Steering stem nut	80N•m(8.0kg-m, 58ft-lb)
Throttle cable housing mounting screw	3N•m(0.3kg-m, 2.2ft-lb)
Handlebar mounting nut	40N•m(4.0kg-m, 29ft-lb)
Front fender mounting bolt	10N•m(1.0kg-m, 7.2ft-lb)
Brake arm nut	6N•m(0.6kg-m, 4.3ft-lb)

## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

---

### TOOLS

#### Special

Ball race driver	07944—1150001 or M9360—277—91774
Steering stem driver	07946—GC40000 or 07946—GC400A (U.S.A. only) and 07946-MB00000
Snapping pliers	07914—3230001
Pin driver, 4 mm	07944—9350200 or equivalent commercially available in U.S.A.

#### Common

Bearing remover shaft	07746—0050100 or equivalent commercially available in U.S.A.
Bearing remover head, 12mm	07746—0050300 or equivalent commercially available in U.S.A.
Driver	07749—0010000
Attachment, 37 × 40 mm	07746—0010200
Attachment, 32 × 35 mm	07746—0010100
Pilot, 12 mm	07746—0040200
Pin spanner	07702—0020001

## TROUBLESHOOTING

#### Hard steering

- Steering top thread nut too tight
- Damaged steering head ball race and/or cone race
- Insufficient tire pressure

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

- Bent fork legs
- Bent front axle
- Wheel installed incorrectly

#### Front wheel wobbling

- Distorted rim
- Worn front wheel bearing
- Faulty tire
- Axle not tightened properly

#### Soft suspension

- Weak fork spring

#### Hard suspension

- Bent fork legs

#### Hard suspension noise

- Loose suspension fasteners
- Damaged fork legs
- Bent fork legs

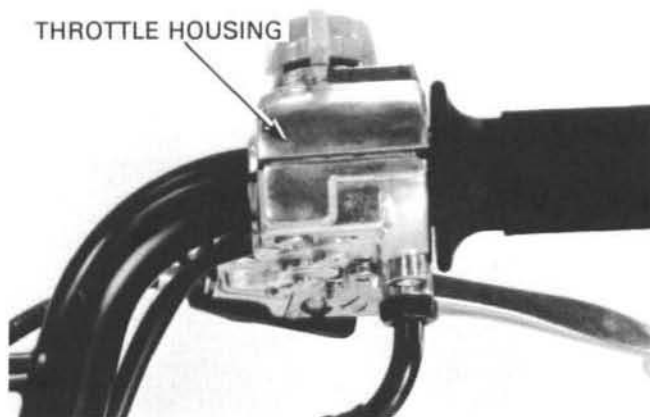
#### Improper brake performance

- Incorrect adjustment of lever
- Contaminated brake shoes
- Worn brake shoes
- Worn brake cam
- Worn brake drum
- Improperly engaged brake arm serrations

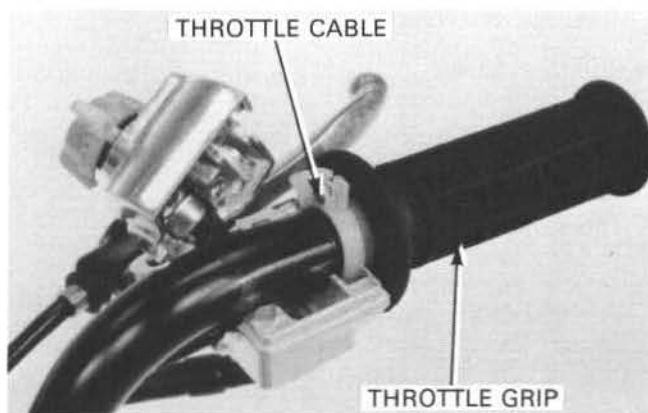
## HANDLEBAR

### REMOVAL

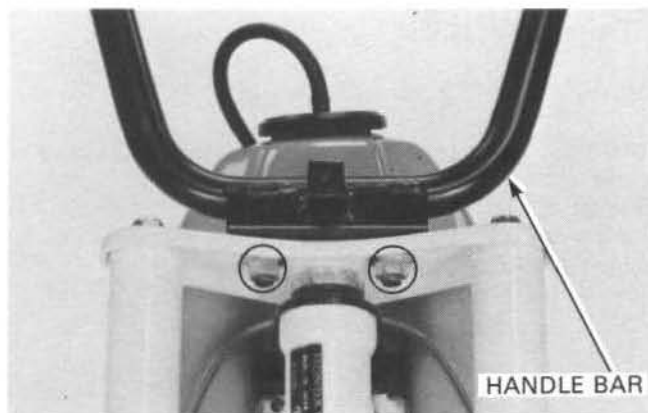
Remove the front number plate.  
Remove the two mounting screws and separate the throttle housing.



Disconnect the throttle cable end from the throttle grip.  
Remove the throttle housing and, if necessary, the throttle grip.



Remove the two handlebar mounting nuts and handlebar.



### INSTALLATION

Install the handlebar with two nuts and tighten them.

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



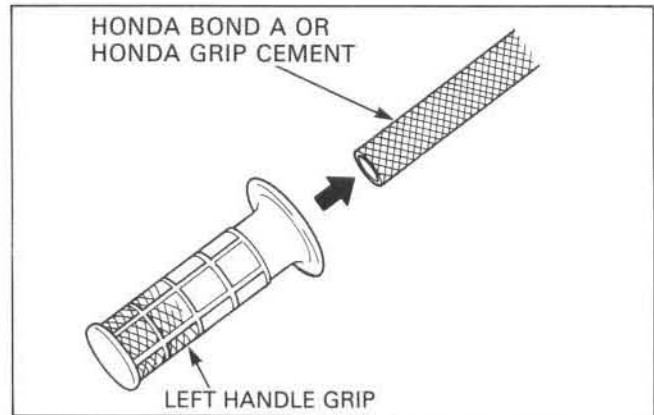


## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the left grip as follows, if it was removed.  
Apply Honda Bond A or Honda Grip Cement (U.S.A. only) to the inside surface of the grip and to the clean surface of the left handlebar.  
Wait 3–5 minutes and install the grip.  
Rotate the grip for even application of the adhesive.

### NOTE:

Allow the adhesive to dry for an hour before using.

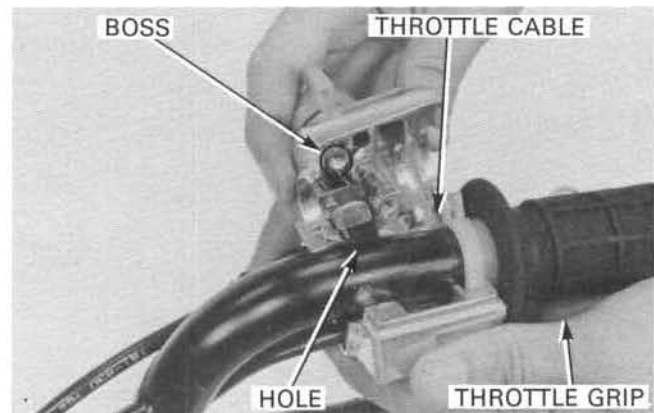


Connect the throttle cable to the throttle grip.

Position the throttle housing's boss so it aligns with the hole in the handlebar.  
Tighten the forward screw first, then tighten the rear screw.

**TORQUE: 3 N·m(0.3 kg-m, 2.2 ft-lb)**

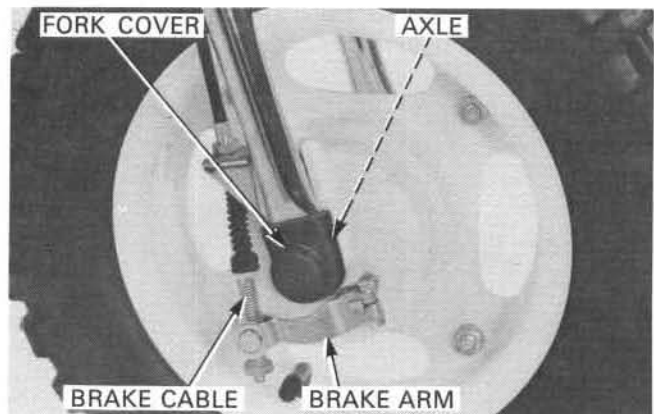
Install the front number plate with the screw.  
Check the throttle operation.



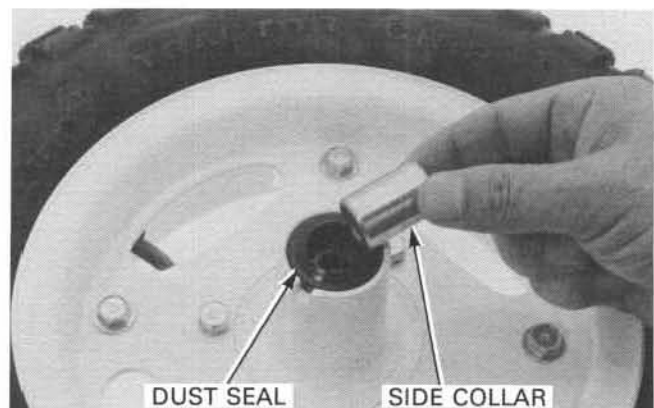
## FRONT WHEEL

### REMOVAL/DISASSEMBLY

Raise the front wheel off the ground by placing a block or work-stand under the engine.  
Take off the front fork covers.  
Remove the front brake adjusting nut and disconnect the brake cable from the brake arm.  
Remove the axle nut.  
Holding the front wheel, remove the axle.



Remove the brake panel from the wheel.  
Remove the side collar and dust seal.

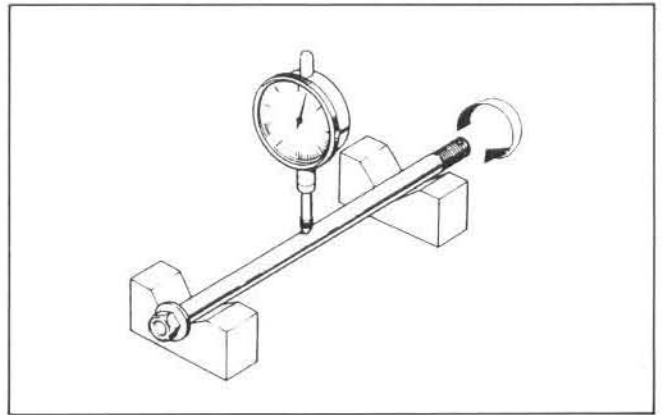


Set the axle in V blocks and measure the runout.

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

**NOTE**

Actual runout is half of the total indicator reading.



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

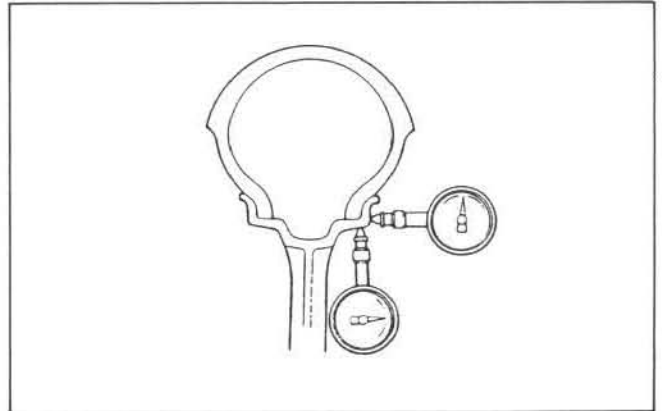
**SERVICE LIMITS:**

**Radial: 2.0 mm (0.08 in)**

**Axial: 2.0 mm (0.08 in)**

**NOTE**

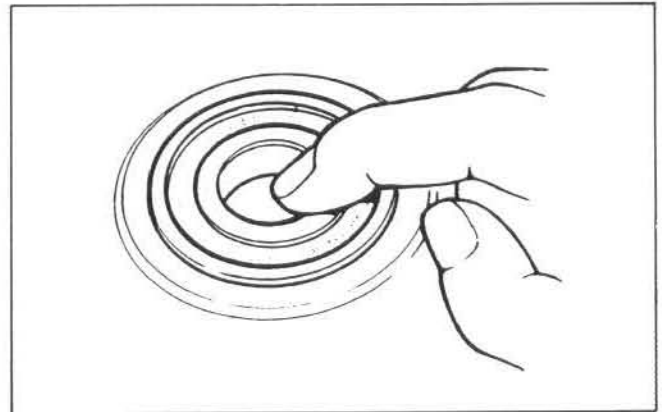
Actual runout is half of the total indicator reading.



Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub. Remove and discard the bearings if the races do not turn smoothly, quietly or if they fit loosely in the hub.

**NOTE**

Replace hub bearings in pairs.



**BEARING REPLACEMENT**

Insert the bearing remover head into the bearing. From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel. Remove the distance collar and drive out the other bearing.

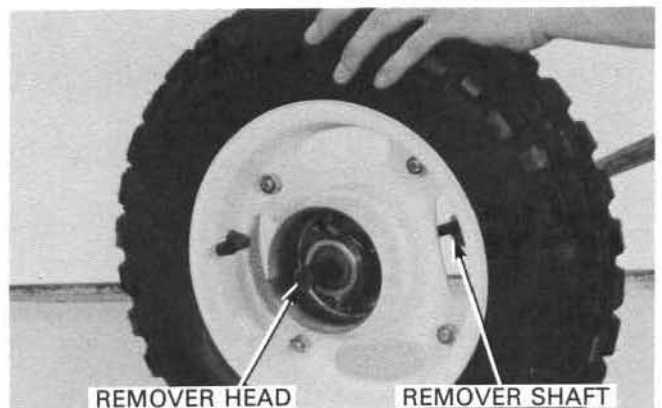
**TOOLS**

**Bearing remover shaft**

07746 - 0050100  
or  
equivalent commercially  
available in U.S.A.

**Bearing remover head 12mm**

07746 - 0050300  
or  
equivalent commercially  
available in U.S.A.

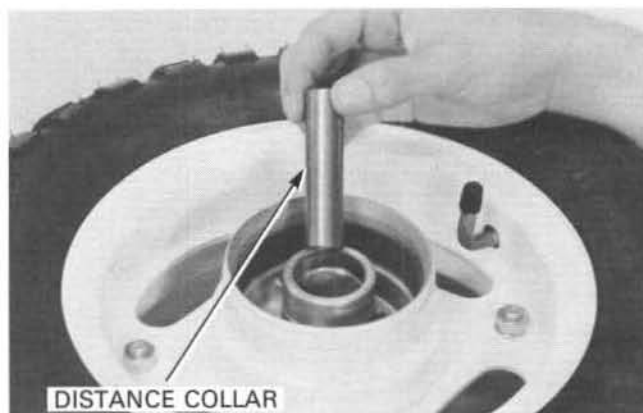


## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Pack the new bearing cavities with grease.  
Drive a new left bearing in squarely with the sealed side facing out.  
Install the distance collar into place.

### NOTE

Be certain the distance collar is in position before installing the right bearing.



Drive a new right bearing in squarely with the sealed side facing out.

### TOOLS:

**Driver**

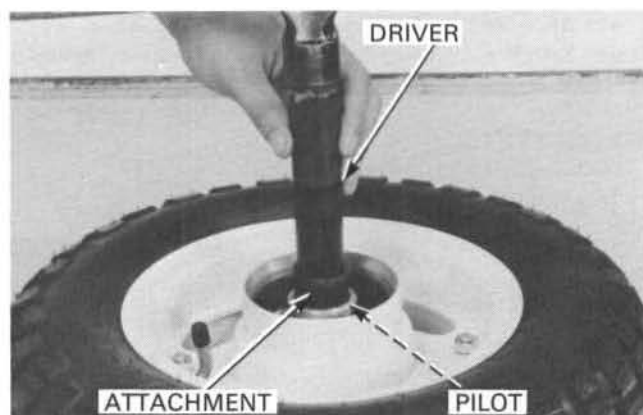
**Attachment 32 × 35 mm**

**Pilot, 12 mm**

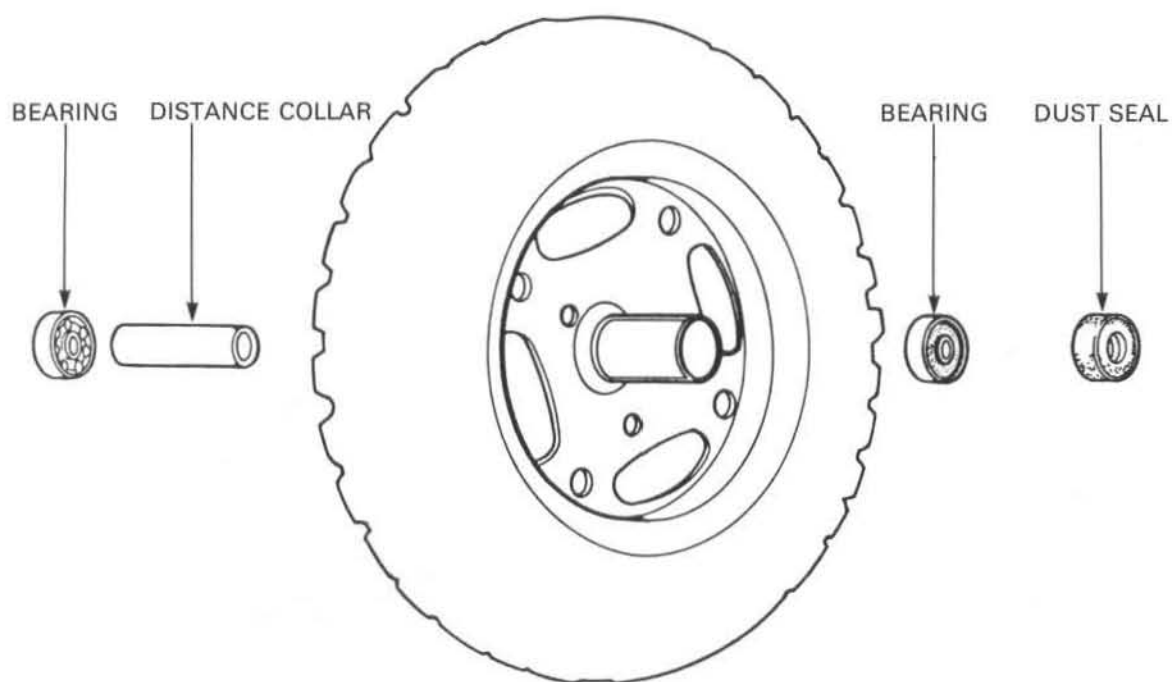
07749-0010000

07746-0010100

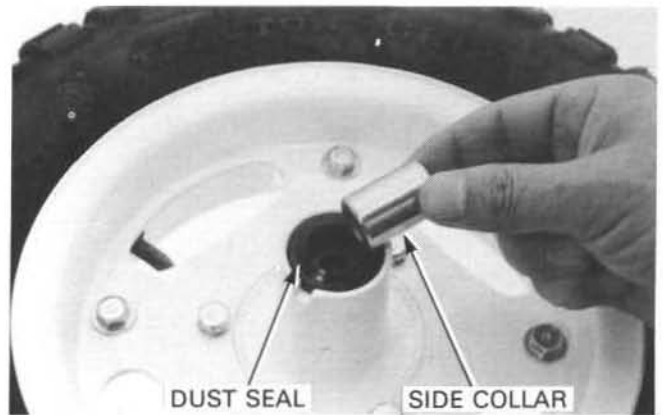
07746-0040200



## ASSEMBLY/INSTALLATION



Install the dust seal and side collar.  
Install the brake panel.



Position the wheel inside the fork legs.

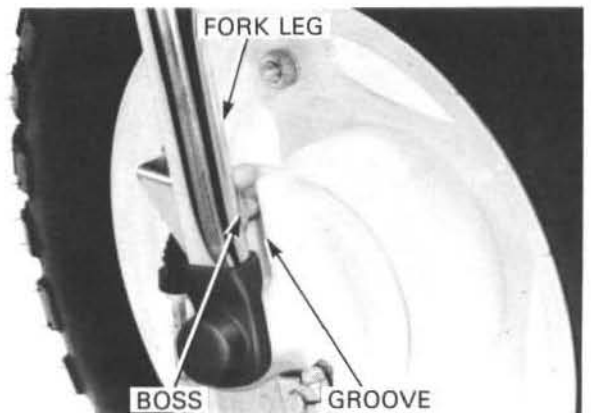
#### NOTE

Position the groove on the brake panel to align with the boss on the fork leg.

Insert the axle shaft from right side.  
Tighten the axle nut.

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

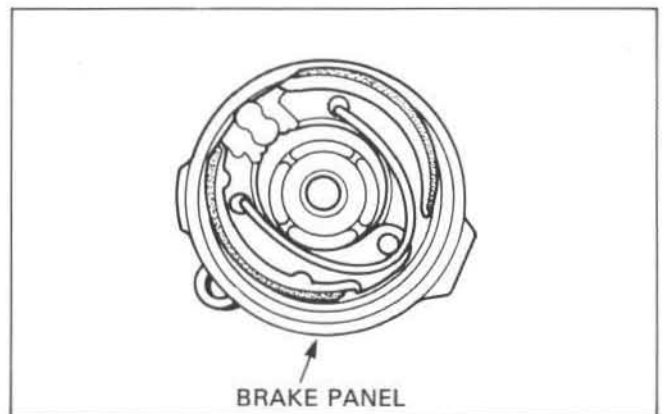
Connect the brake cable to the brake arm.  
Install the brake adjusting nut and adjust the front brake (page 3—10).



## FRONT BRAKE

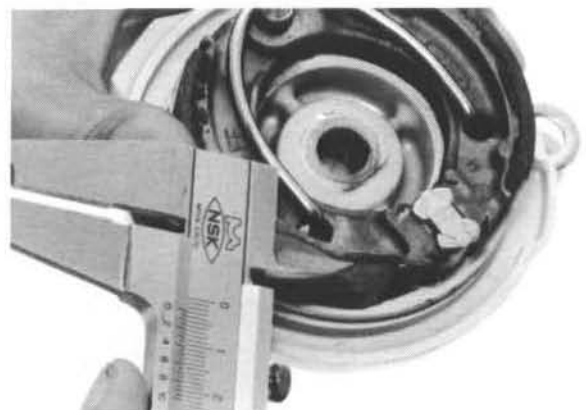
### INSPECTION

Remove the front wheel, then remove the front brake panel from the wheel hub.



Measure the brake shoe lining thickness.

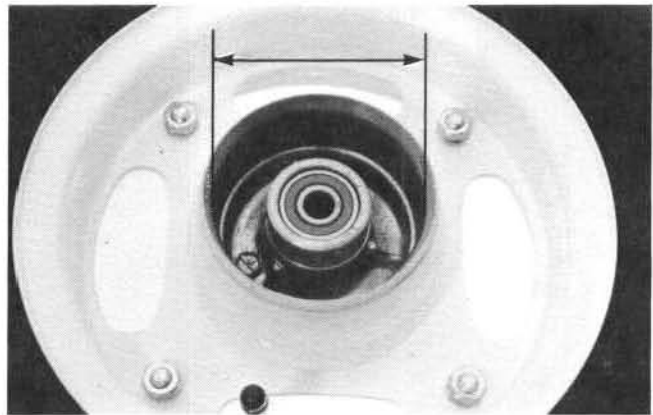
**SERVICE LIMIT: 2.0 mm (0.08 in)**



## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

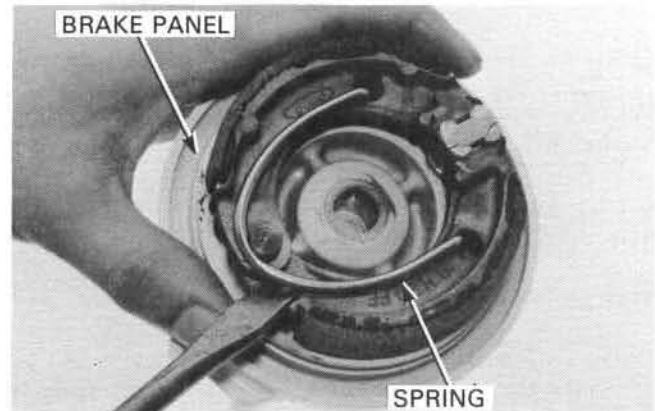
Measure the front brake drum I.D.

**SERVICE LIMIT: 80.5 mm (3.17 in)**

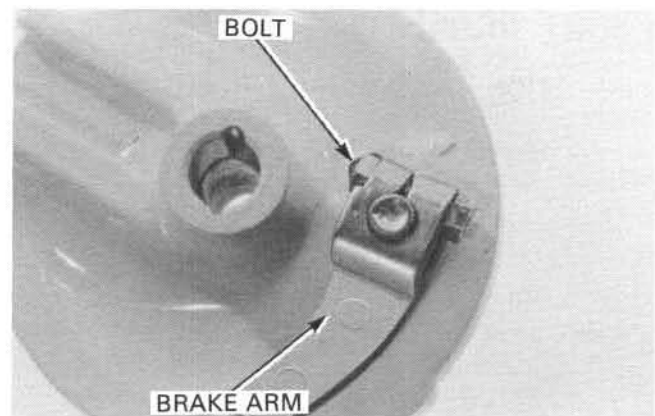


### DISASSEMBLY

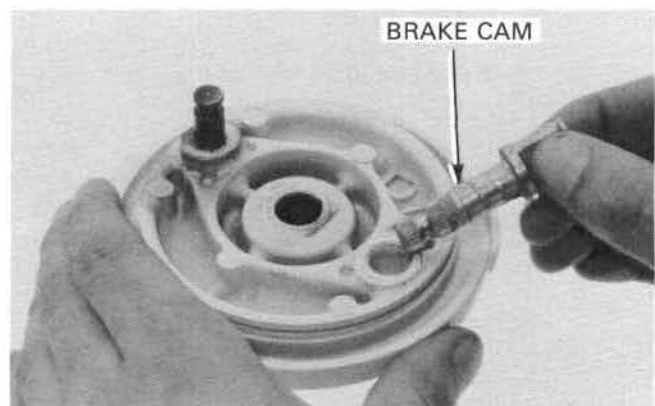
Remove the brake shoe spring from the brake panel using a screwdriver.



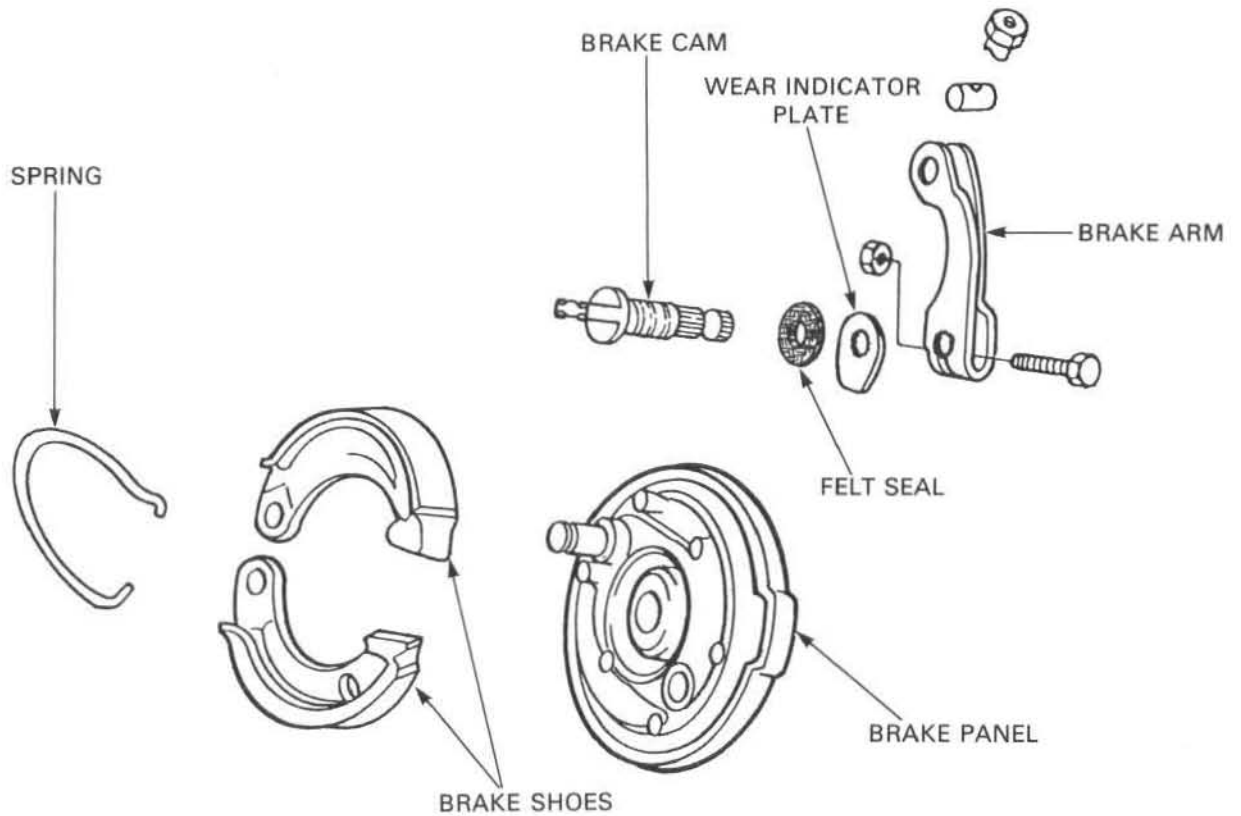
Remove the brake arm bolt and brake arm.  
Remove the wear indicator plate and felt seal.



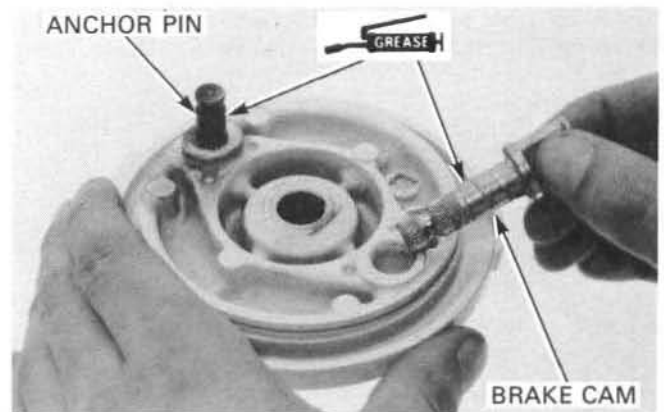
Remove the brake cam.



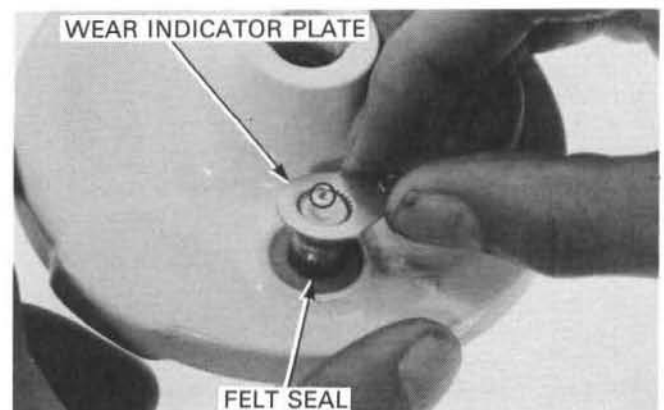
ASSEMBLY/INSTALLATION



Apply grease to the anchor pin and brake cam.  
Install the brake cam.



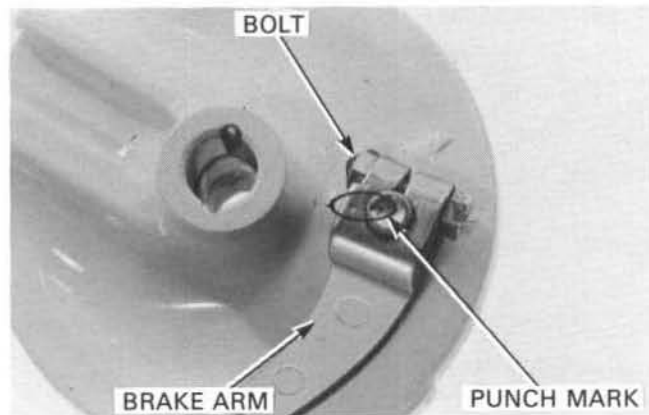
Install the felt seal on the brake panel and apply oil to it.  
Install the wear indicator plate on the cam aligning its wide tooth with the cam's wide groove.



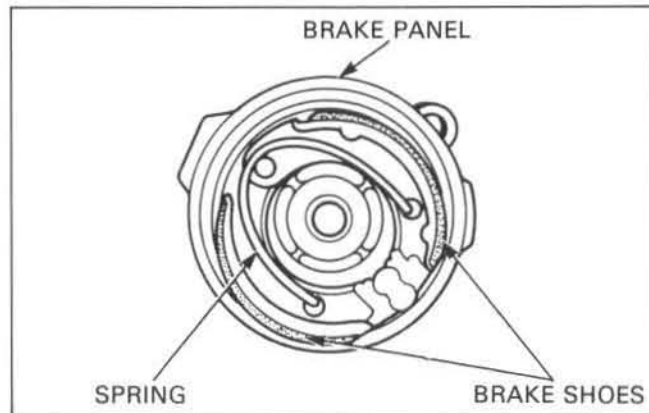
## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the brake arm aligning the punch marks on the arm and cam, and tighten the brake arm bolt.

**TOURQUE:** 6N•m (0.6 kg-m, 4.3 ft-lb)



Install the brake shoe and spring.



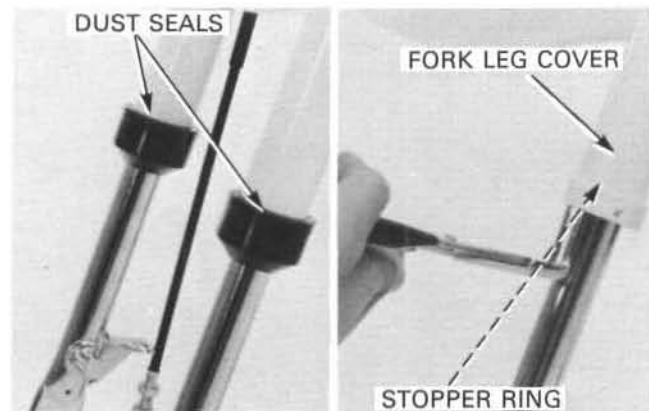
Install the brake panel onto the wheel hub.  
Install the front wheel (page 11-6) and check the brake operation.



## FRONT SUSPENSION

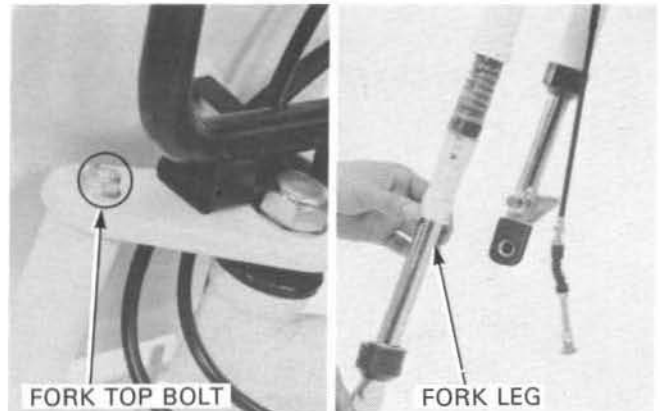
### REMOVAL

Remove the front wheel (Page 11-4)  
Slide the dust seal down and pry the stopper ring out of the fork leg cover.





Remove the fork top bolt and pull the fork leg down.



## DISASSEMBLY/INSPECTION

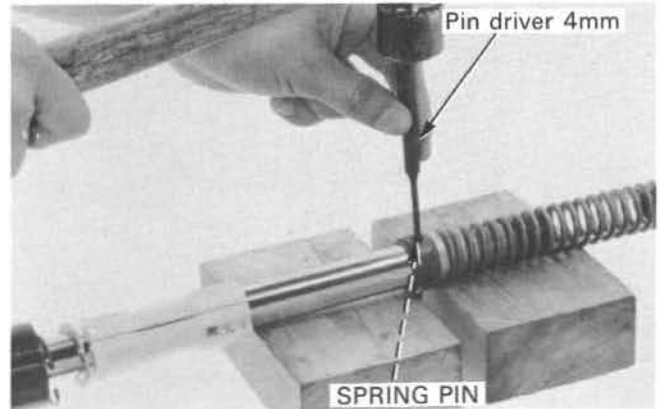
Remove the spring pin and disassemble the fork leg.

**TOOL:**

**Pin driver 4 mm**

**07944 - 9350200**

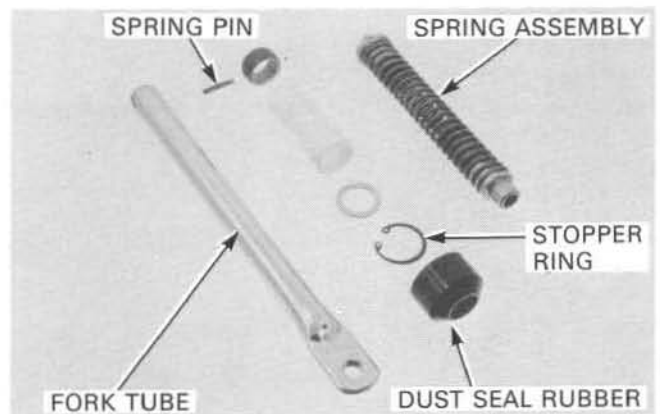
or  
equivalent commercially  
available in U.S.A.



Check each part for wear or damage.  
Check the fork tubes and covers for bends.

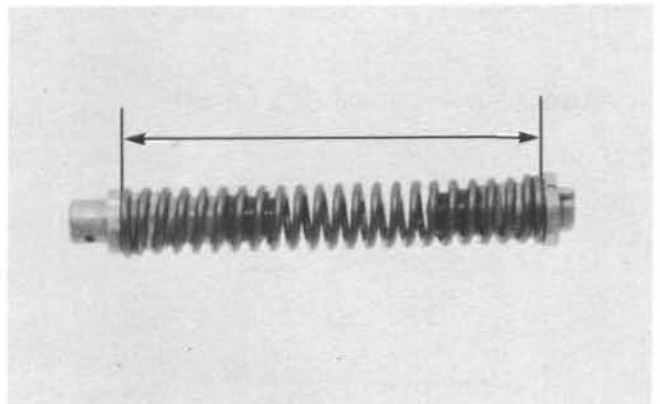
## NOTE

Repair or replace the fork tube if it is bent.



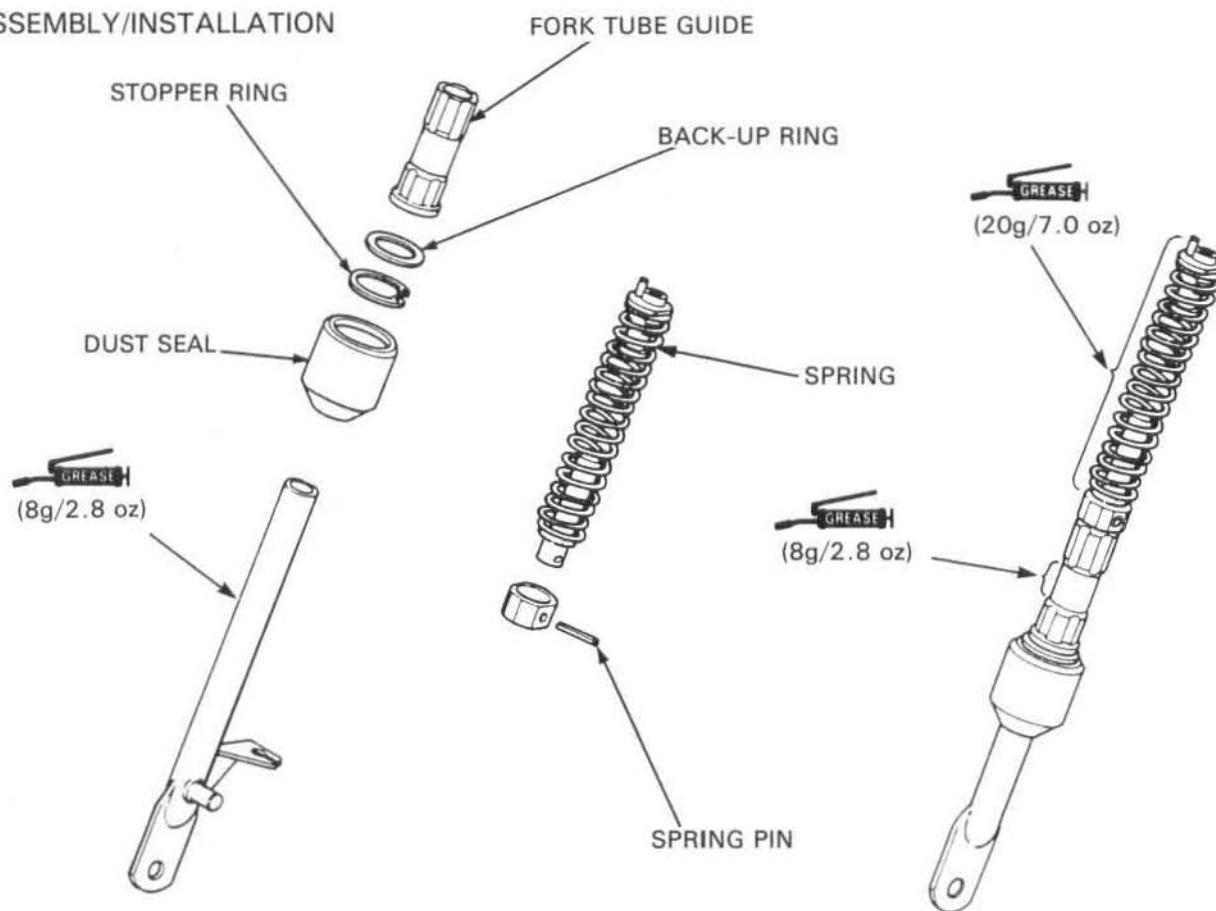
Measure the fork spring free length.

**SERVICE LIMIT: 166.6 mm (6.56 in)**

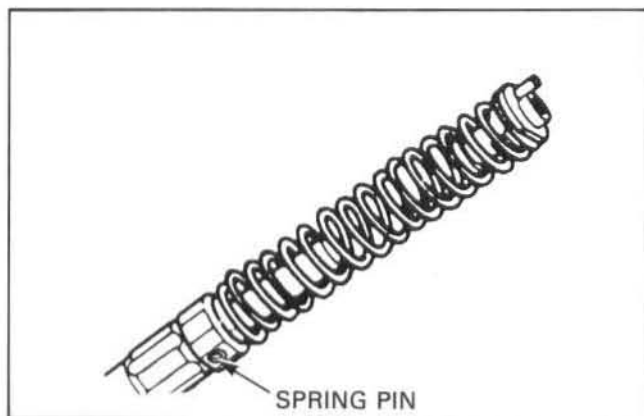


## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

### ASSEMBLY/INSTALLATION

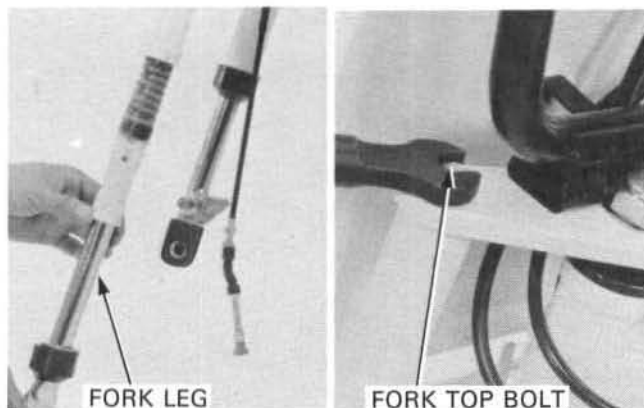


Install the spring assembly on the fork tube and secure it with the spring pin.  
Squirt grease inside the spring.  
Apply grease to the outer surface of the fork tube and fork tube guide.

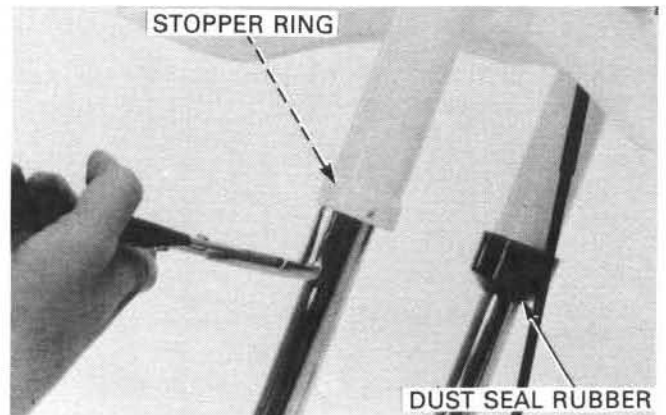


Install the fork leg in the fork tube and secure with the fork top bolt.

**TORQUE: 33 N·m (3.3 kg-m, 24 ft-lb)**



Install the stopper ring and the dust seal.  
Install the front wheel (page 11-6).



## STEERING STEM

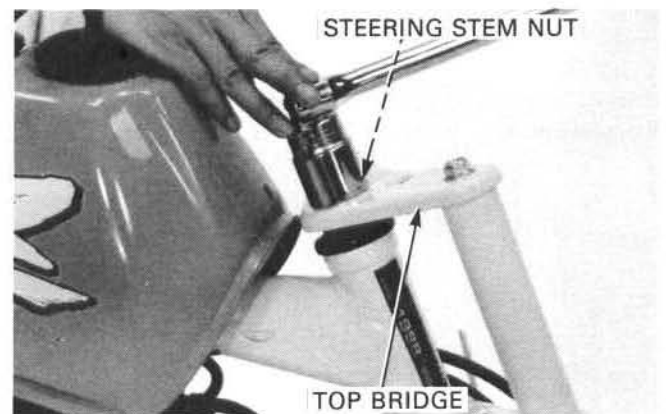
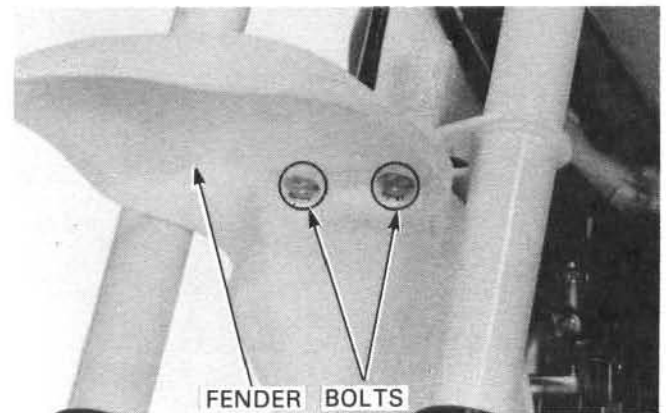
### REMOVAL

Remove the following:

- number plate.
- handlebar (page 11-3)
- front wheel (page 11-4)
- fender mounting bolts and fender.
- steering stem nut, washer and fork top bolts.
- top bridge.

### NOTE

It is not necessary to remove the fork legs.

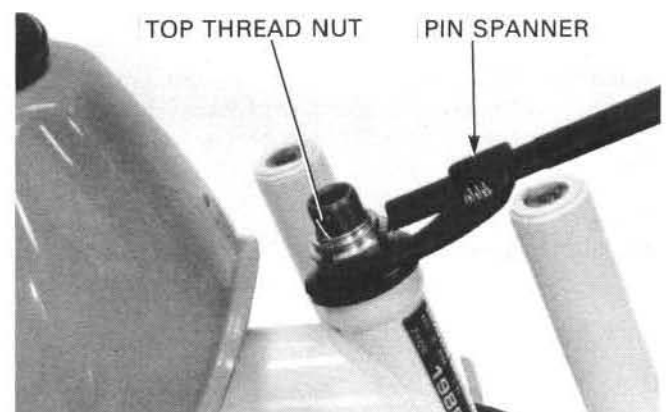


Loosen the top thread nut.

### TOOL:

Pin spanner

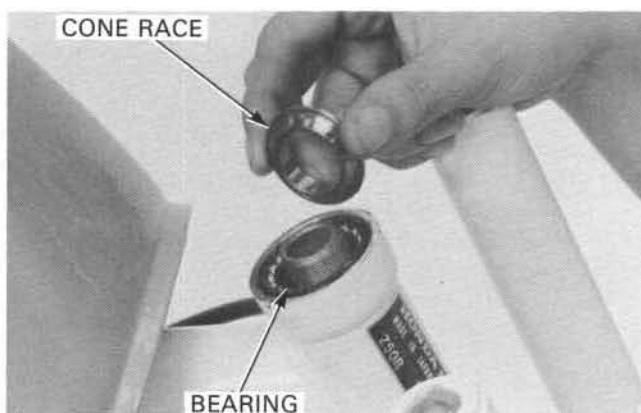
07702-0020001



## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

### INSPECTION

Inspect the steel balls, cone races and ball races for wear or damage and replace if necessary.



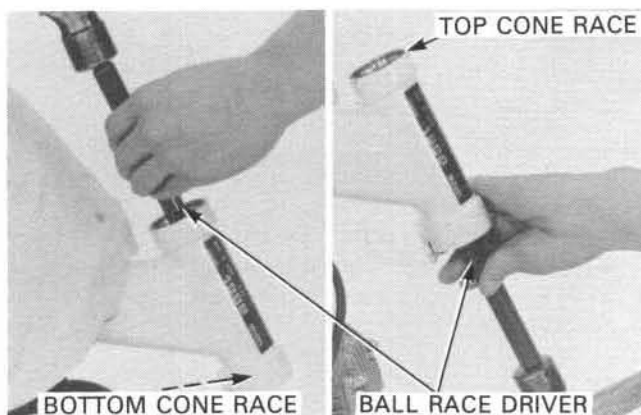
### BALL RACE REPLACEMENT

Remove the top and bottom ball races.

#### TOOL:

Ball race driver

07944 - 1150001  
or  
M9360 - 277 - 91774



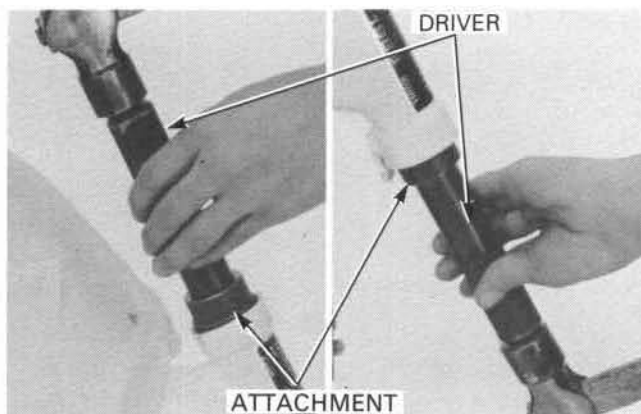
Drive new top and bottom ball races into the steering head.

#### TOOLS:

Driver

Attachment 37 × 40 mm

07749-0010000  
07746-0010200



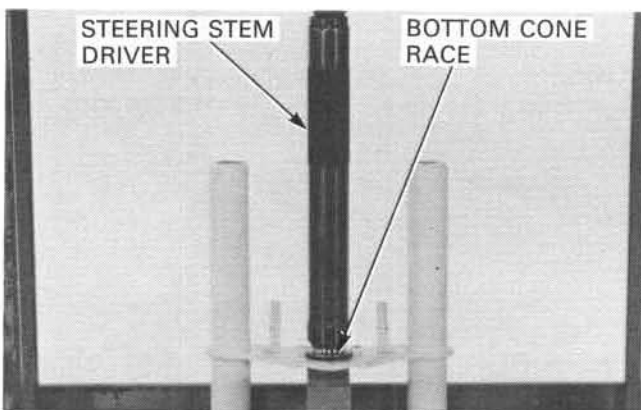
### BOTTOM CONE RACE REPLACEMENT

Remove the bottom cone race and dust seal.  
Apply grease to the dust seal and install it onto the steering stem.  
Press the bottom cone race onto the steering stem using the steering stem driver.

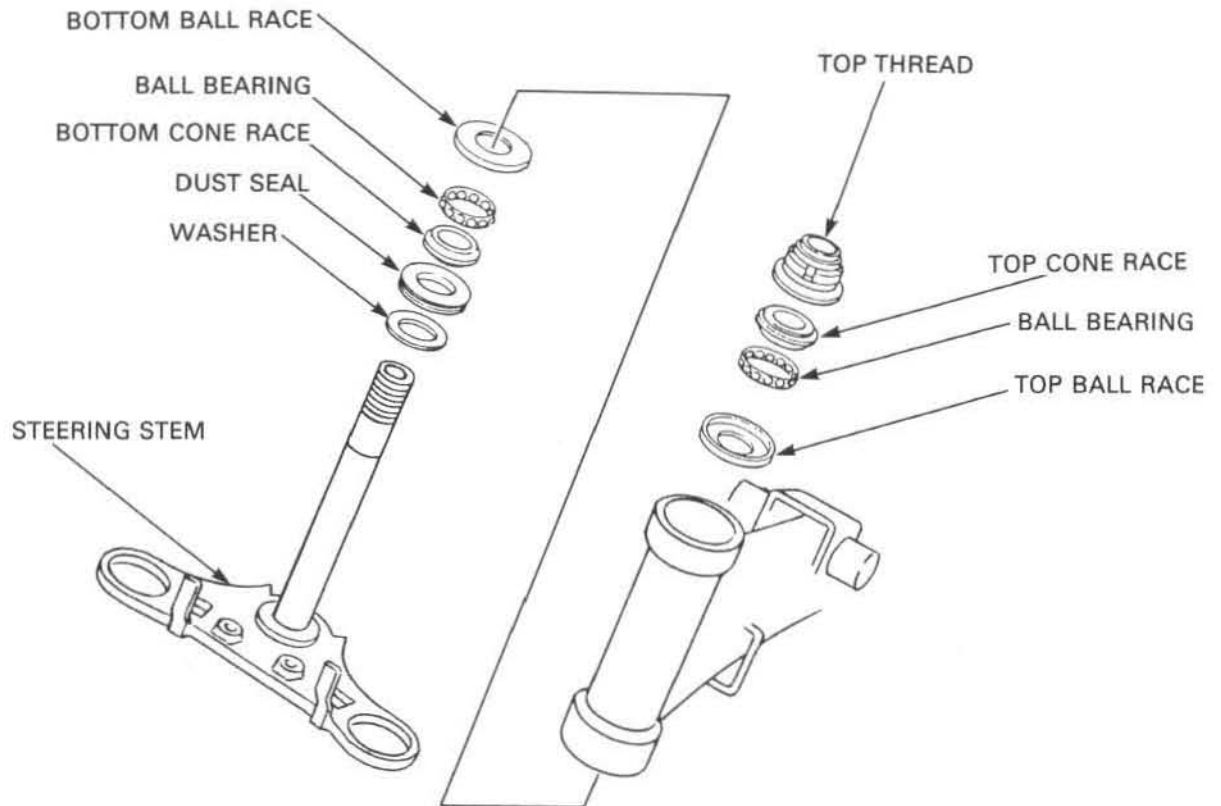
#### TOOL:

Steering stem driver

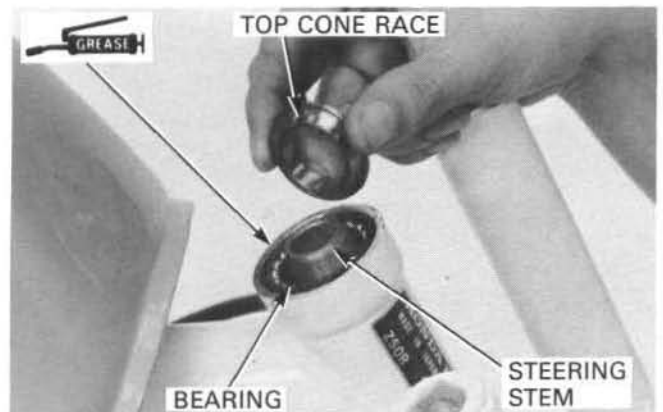
07946-GC40000  
or  
07946 - MB00000  
07946 - GC4000A



INSTALLATION



Apply grease to the top ball race and bottom cone race.  
Install the steel balls.  
Install the steering stem, top cone race and top thread.

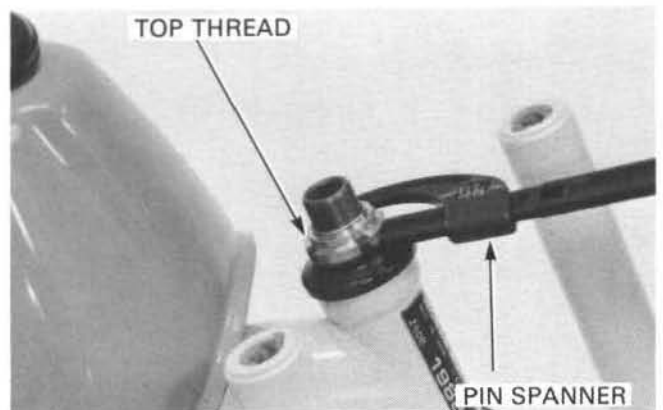


Tighten the top thread and then back it out 1/8 turn.  
Make sure that there is no vertical movement and the stem rotates smoothly.

TOOL:

Pin spanner

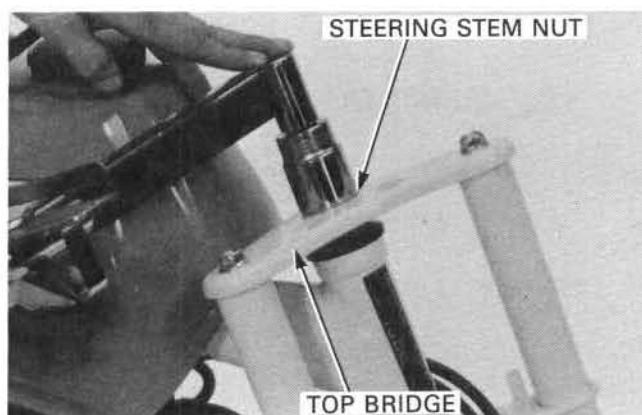
07702-0020001



## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the top bridge, washer, and steering stem nut.

**TORQUE:** 80N·m (8.0 kg-m, 58 ft-lb)

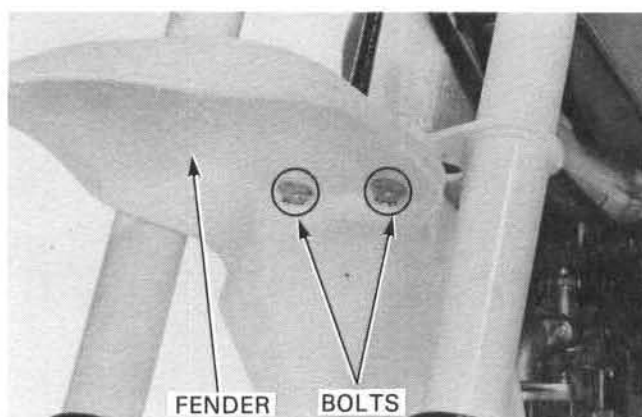


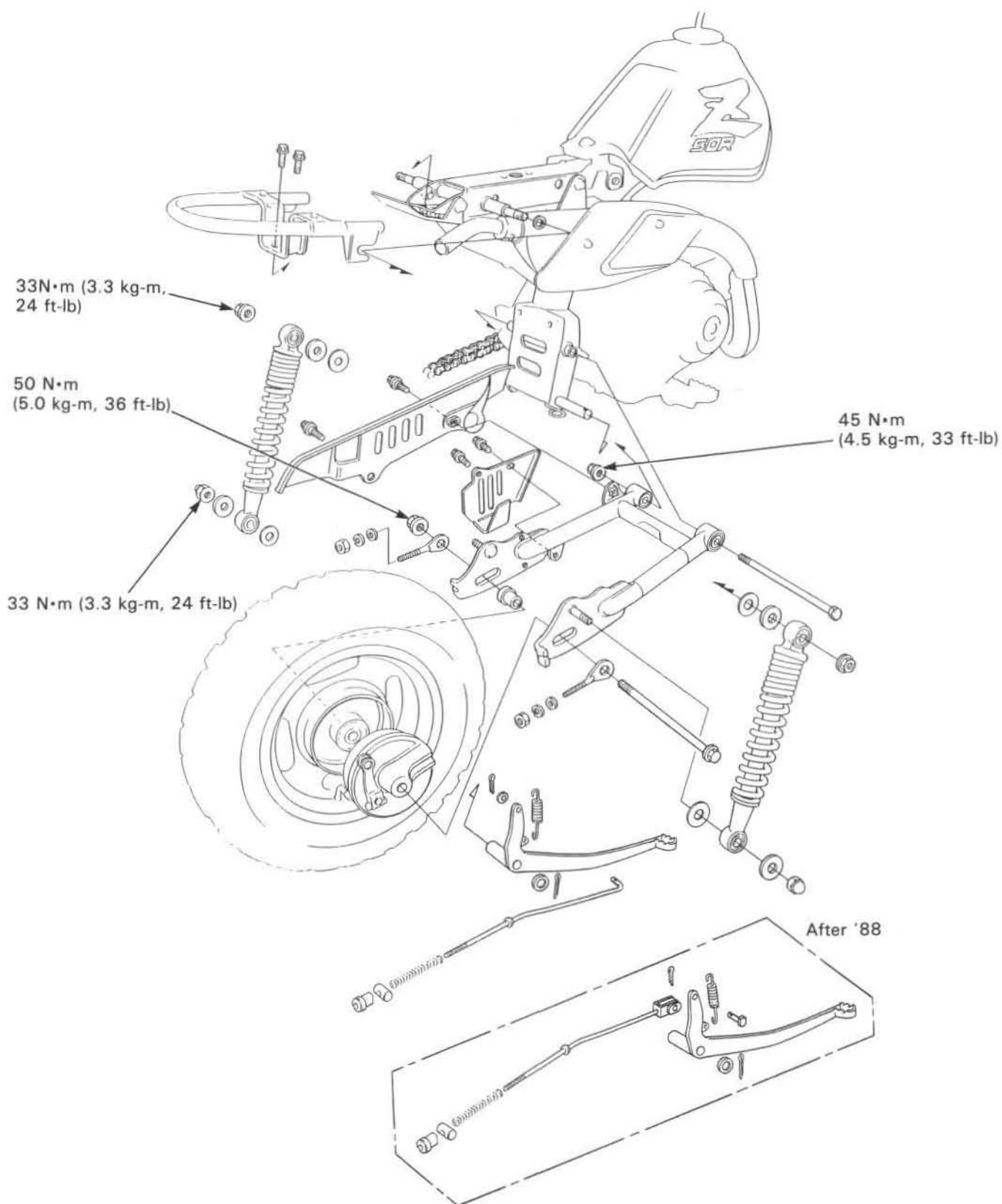
Install the front fender and tighten the two bolts.

**TORQUE:** 10 N·m (1.0 kg-m, 7.2 ft-lb)

Install the following:

- handlebar (page 11-3)
- front wheel (page 11-6)
- front number plate, with the screw.







# 12. REAR WHEEL / BRAKE / SUSPENSION

SERVICE INFORMATION	12-1	SHOCK ABSORBERS	12-8
TROUBLESHOOTING	12-2	SWINGARM	12-11
REAR WHEEL	12-3	BRAKE PEDAL	12-12
REAR BRAKE	12-6		

## SERVICE INFORMATION

### GENERAL

#### WARNING

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

- This section describes the removal, installation and servicing of the rear wheel, brake, shock absorbers and swing arm.

### SPECIFICATIONS

		mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Rear axle runout		—	0.2 (0.01)
Rear wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Rear brake drum I.D.		80 (3.15)	80.5 (3.17)
Rear brake lining thickness		3.5 (0.14)	2.0 (0.08)
Rear shock absorber spring free length		190.7 (7.51)	186.9 (7.36)

### TORQUE VALUES

Rear axle nut	50N•m (5.0 kg-m, 36 ft-lb)
Driven sprocket nut	33N•m (3.3 kg-m, 24 ft-lb)
Rear shock absorber lower joint lock nut	20N•m (2.0 kg-m, 14 ft-lb) Apply locking agent.
Rear shock absorber mounting nut	Upper: 33N•m (3.3 kg-m, 24 ft-lb)
	Lower: 33N•m (3.3 kg-m, 24 ft-lb)
Swingarm pivot nut	45N•m (4.5 kg-m, 33 ft-lb)
Brake arm nut	6N•m (0.6 kg-m, 4.3 ft-lb)

### TOOLS

#### Special

Shock absorber compressor attachment 07967—1180100

#### Common

Bearing remover shaft	07746—0050100	— or equivalent commercially available in U.S.A.
Bearing remover head, 12 mm	07746—0050300	
Driver	07749—0010000	
Attachment 32×35 mm	07746—0010100	
Pilot, 12 mm	07746—0040200	
Shock absorber compressor	07GME—0010000	

### TROUBLESHOOTING

#### Wobble or vibration in motorcycle

- Loose Wheel bearing
- Distorted rim
- Tire pressure incorrect
- Loose axle nut

#### Soft suspension

- Weak spring
- Rear damper weakened
- Loose swingarm pivot

#### Hard suspension

- Loose fasteners
- Faulty shock absorber stopper rubber
- Bent damper shaft

#### Suspension noise

- Loose fasteners
- Faulty shock absorber stopper rubber
- Damper leaking
- Damper and spring binding

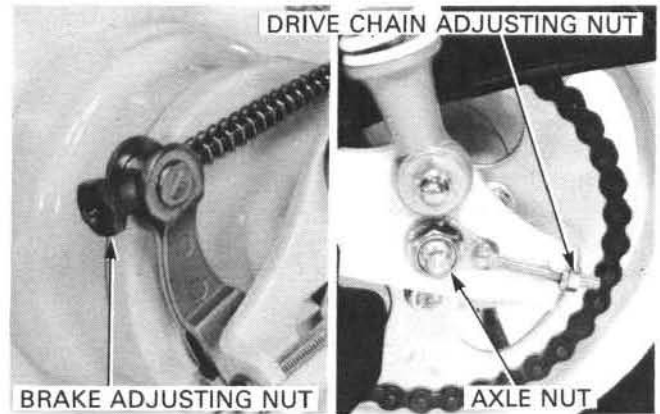
#### Poor brake performance

- Improper brake adjustment
- Worn brake linings
- Dirty brake linings
- Worn brake drum
- Brake arm serrations improperly engaged

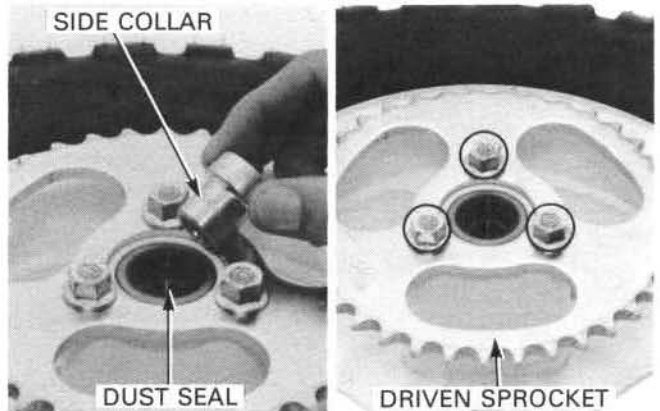
## REAR WHEEL

### REMOVAL/DISASSEMBLY

Raise the rear wheel off the ground by placing a box or work-stand under the engine.  
Remove the brake adjusting nut.  
Loosen the drive chain adjusting nuts, push the wheel forward and derail the drive chain.  
Loosen the axle nut, withdraw the axle and remove the rear wheel.



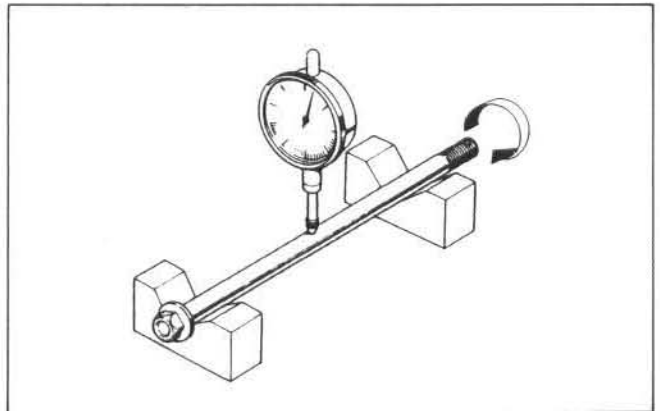
Remove the side collar.  
Remove the nuts and the sprocket.



### INSPECTION

Place the rear axle in V-blocks and measure the runout.

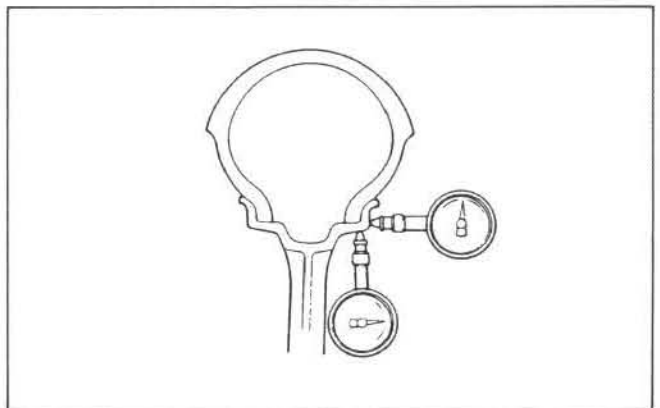
**SERVICE LIMITE: 0.20 mm (0.008 in)**



Check the rim runout by placing the wheel on a truing stand. Turn the wheel by hand and measure the runout using a dial indicator.

### SERVICE LIMITS:

**Radial: 2.0 mm (0.08 in)**  
**Axial: 2.0 mm (0.08 in)**

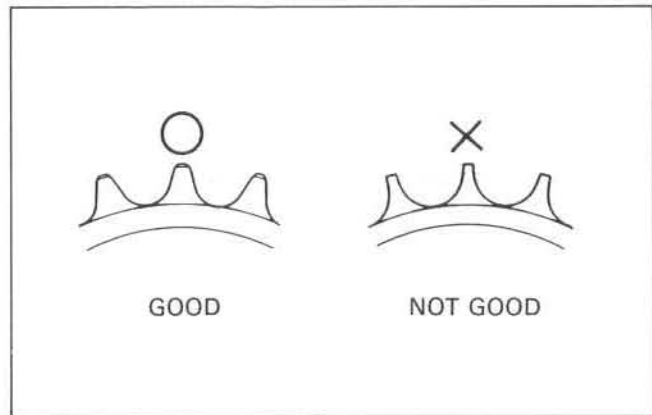


## REAR WHEEL/BRAKE/SUSPENSION

Inspect the sprocket teeth for excessive wear or damage.  
Replace if necessary.

### NOTE

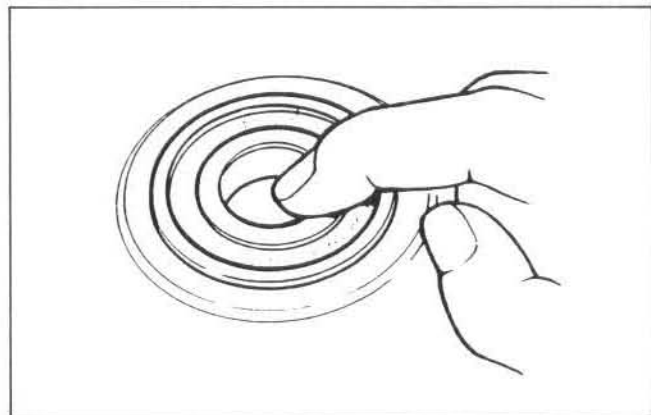
Never install a new drive chain on worn sprockets or a worn chain on new sprockets. Both chain and sprockets must be in good condition, or the new replacement chain or sprockets will wear rapidly.



Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.  
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

### NOTE

Replace hub bearings in pairs.



## BEARING REPLACEMENT

Insert the bearing remover head into the bearing.  
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel.  
Remove the distance collar and drive out the other bearing and dust seal.

### TOOLS:

**Bearing remover shaft**

07746 - 00500100  
or  
equivalent commercially  
available in U.S.A.  
07746 - 00500300  
or  
equivalent commercially  
available in U.S.A.

**Bearing remover head 12 mm**

Pack the new bearing cavities with grease.  
Drive a new left bearing in squarely with the sealed side facing out.  
Install the distance collar into place.

### NOTE

Be certain the distance collar is in position before installing the right bearing.

Drive a new right bearing in squarely with the sealed side facing out.  
Drive in a new dust seal.

### TOOLS:

**Driver**

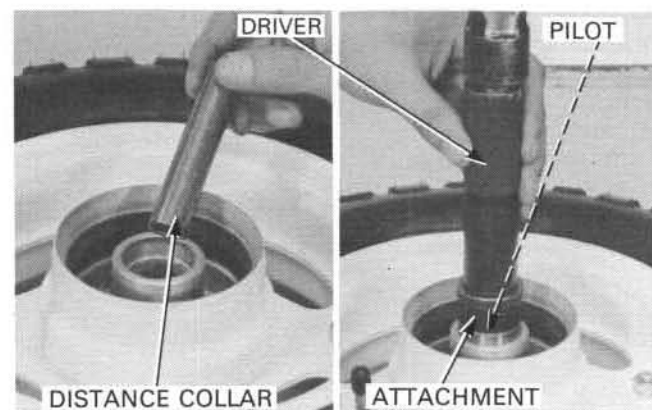
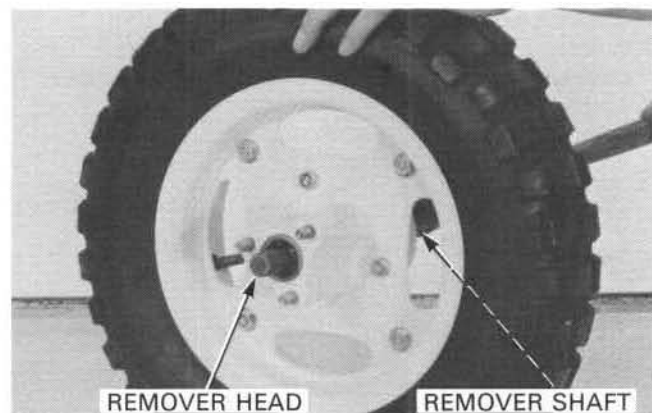
07749-0010000

**Attachmet, 32 × 35 mm**

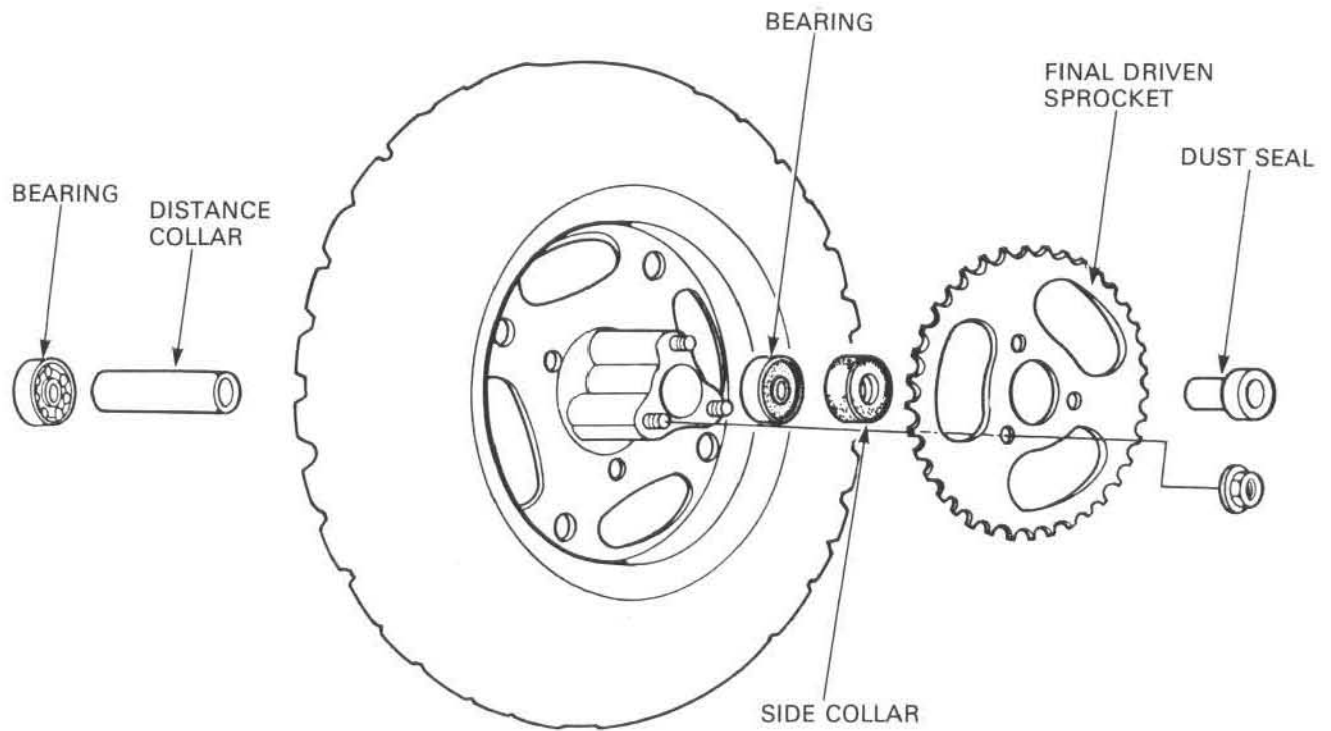
07746-0010100

**Pilot 12 mm**

07746-0040200



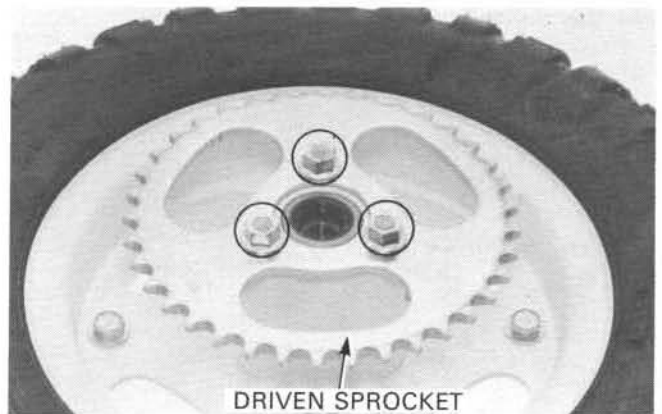
ASSEMBLY/INSTALLATION



Install the sprocket and tighten the nuts.

**TORQUE: 33N•m (3.3 kg-m, 24 ft-lb)**

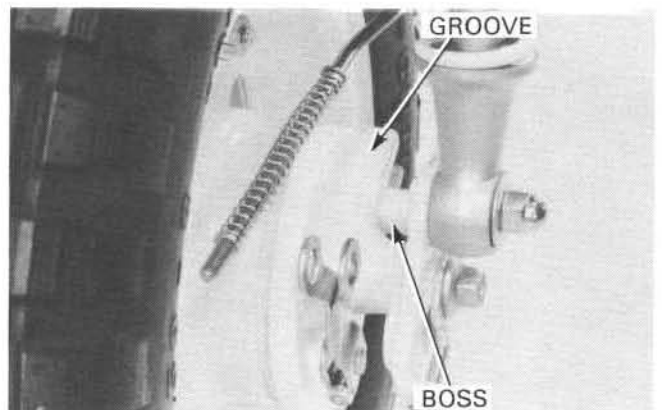
Install the brake panel in the wheel hub.



Position the wheel inside the swingarm.

**NOTE**

Align the groove on the brake panel with the boss on the swingarm.



## REAR WHEEL/BRAKE/SUSPENSION

Install the left side collar in the hub then insert the axle from the right side through the right chain adjuster, wheel assembly, left side collar, and left chain adjuster.

Loosely install the axle nut.

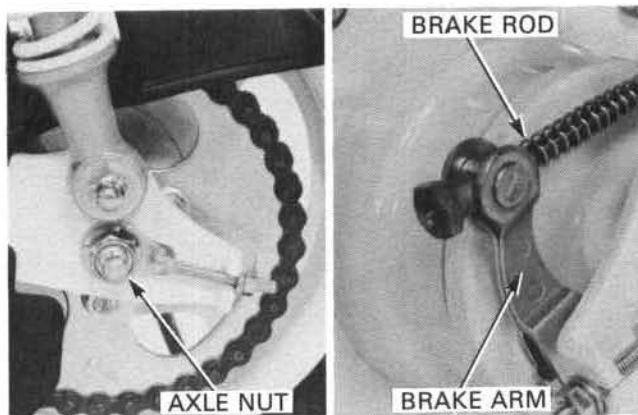
Push the wheel forward and install the drive chain on the sprocket.

Adjust the chain adjusters (page 3–8).

Tighten the axle nut.

**TORQUE: 50N•m (5.0 kg-m, 37 ft-lb)**

Connect the brake rod to the brake arm with the nut, then check the pedal free play.



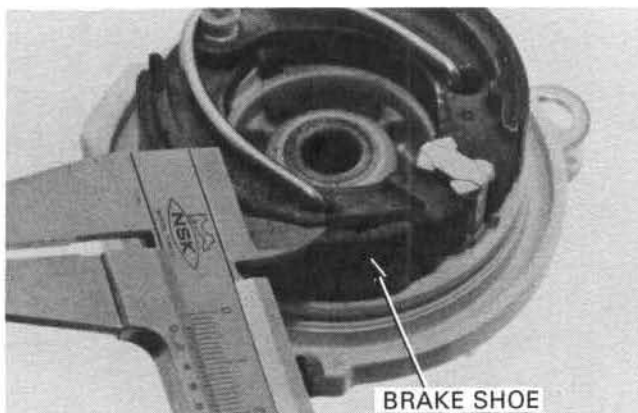
## REAR BRAKE

### INSPECTION

Remove the rear wheel (page 12-3), then remove the brake panel from the wheel hub.

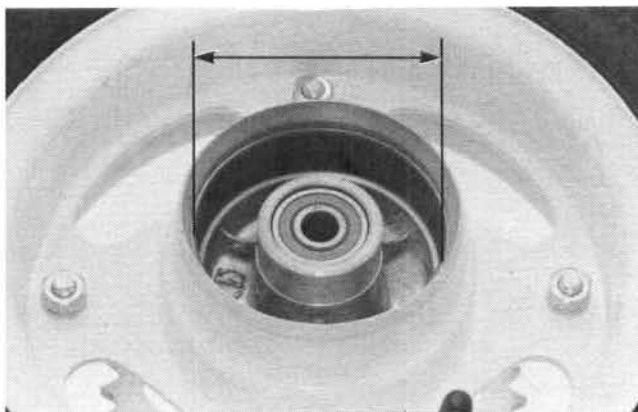
Measure the brake shoe lining thickness.

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



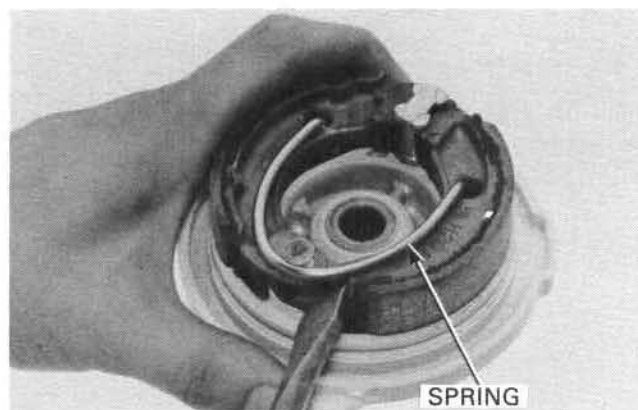
Measure the rear brake drum I.D.

**SERVICE LIMIT: 80.5 mm (3.17 in)**

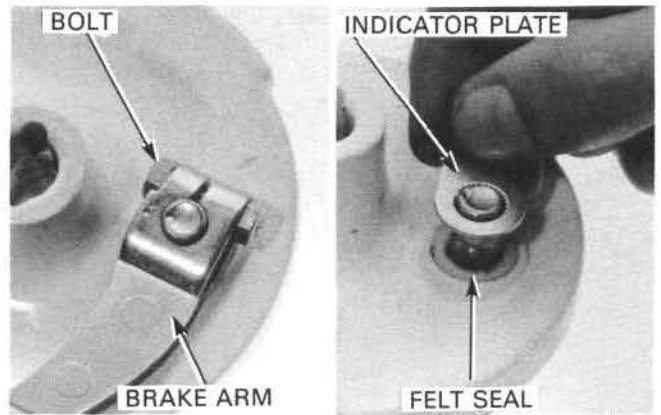


### DISASSEMBLY

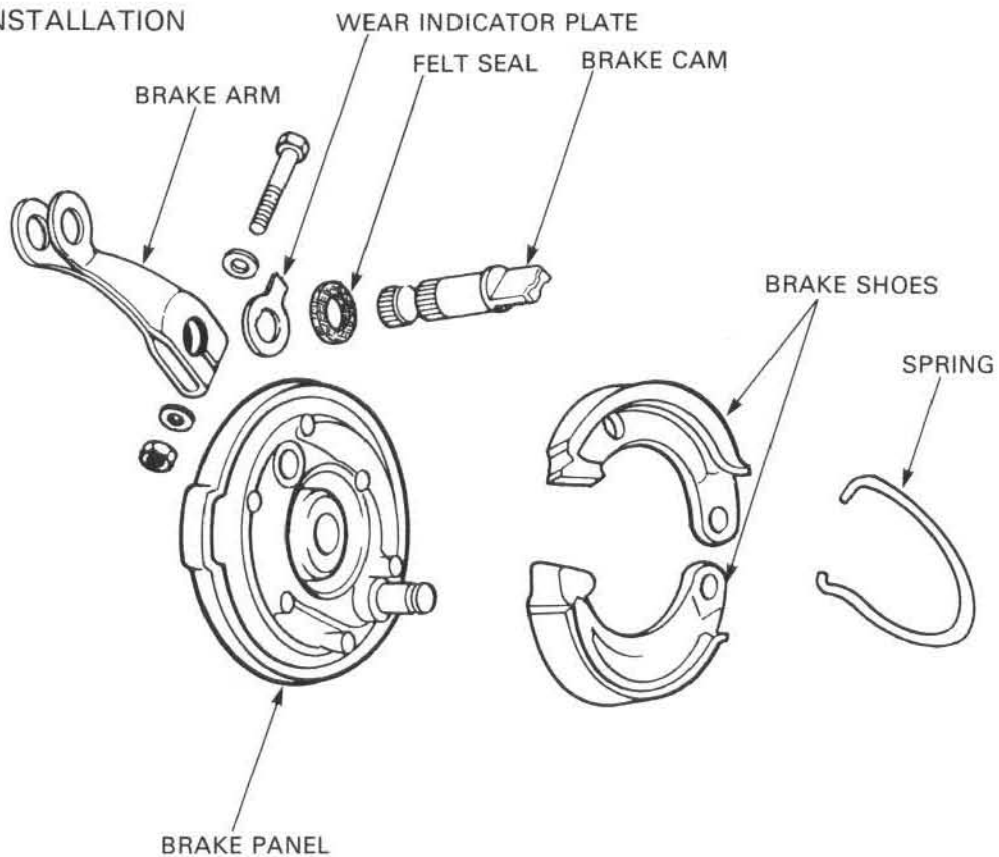
Remove the brake shoe spring from the brake panel using a screwdriver.



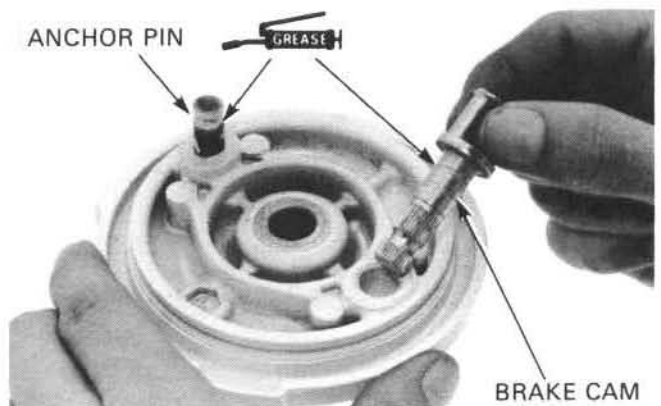
Remove the brake arm bolt and brake arm.  
Remove the wear indicator plate, felt seal and brake cam.



## ASSEMBLY/INSTALLATION



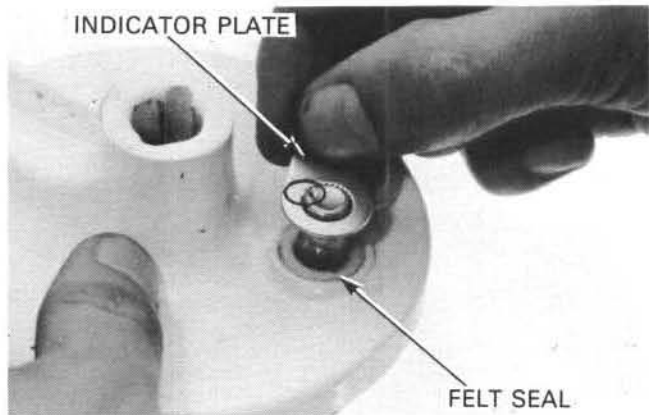
Apply grease to the anchor pin and brake cam.  
Install the brake cam.





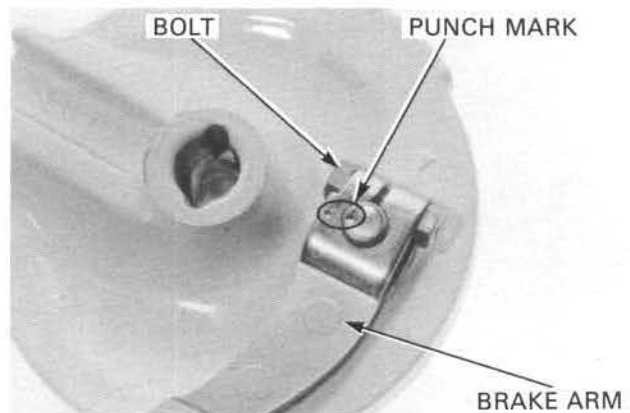
## REAR WHEEL/BRAKE/SUSPENSION

Install the felt seal on the brake panel and apply oil to it.  
Install the wear indicator plate on the cam, aligning its wide tooth with the cam's wide groove.

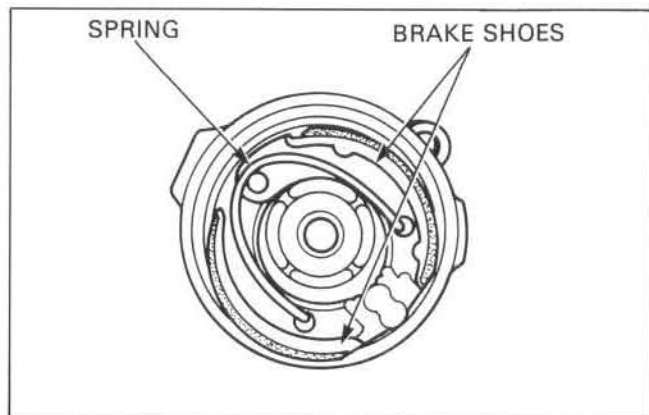


Install the brake arm, aligning the punch marks on the arm and cam, and tighten the brake arm bolt.

**TORQUE: 6N•m (0.6 kg-m, 4.3 ft-lb)**



Install the brake shoes and spring.  
Install the rear wheel (page 12-5) and check the brake operation.



## SHOCK ABSORBERS

### REMOVAL/DISASSEMBLY

Remove the seat and rear cover (page 4-3).  
Remove the upper and lower nuts and remove the shock absorber.

#### NOTE

If you remove both shock absorbers, loosen the swingarm pivot bolt to prevent swingarm bushing damage.



Compress the spring enough to loosen the lock nut.

## NOTE

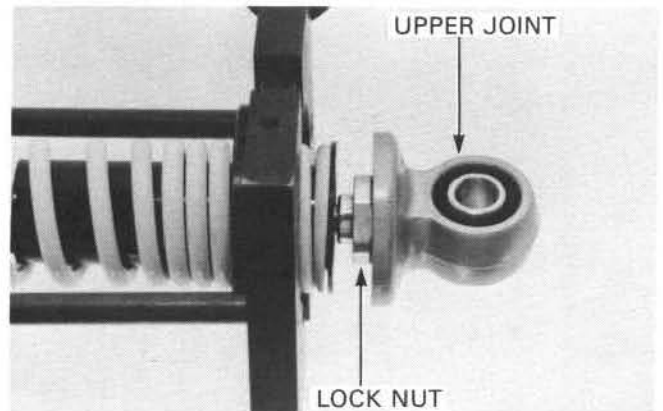
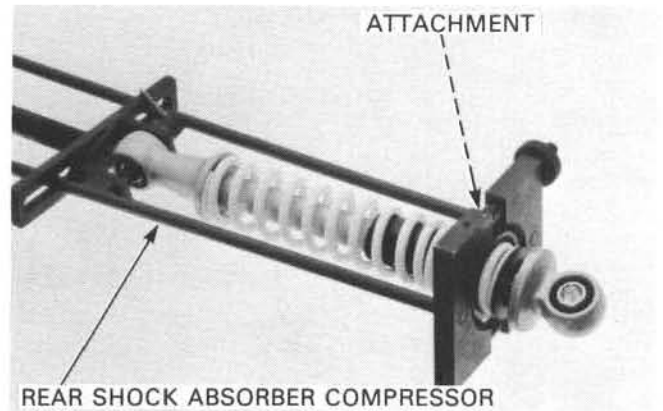
Be careful not to overtighten the spring.

## TOOLS:

Rear shock absorber compressor 07GME-0010000

Rear shock absorber compressor attachment 07967-1180100

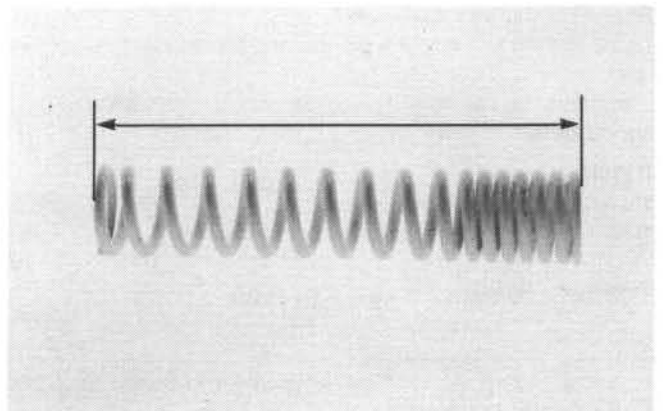
Loosen the lock nut and remove the upper joint.



## INSPECTION

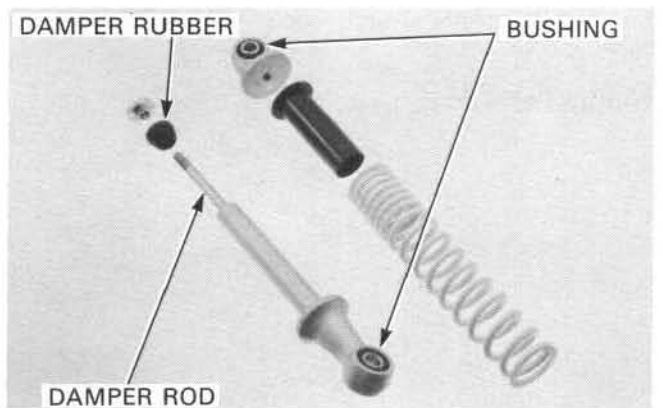
Measure the spring free length.

**SERVICE LIMIT: 186.9 mm (7.36 in)**



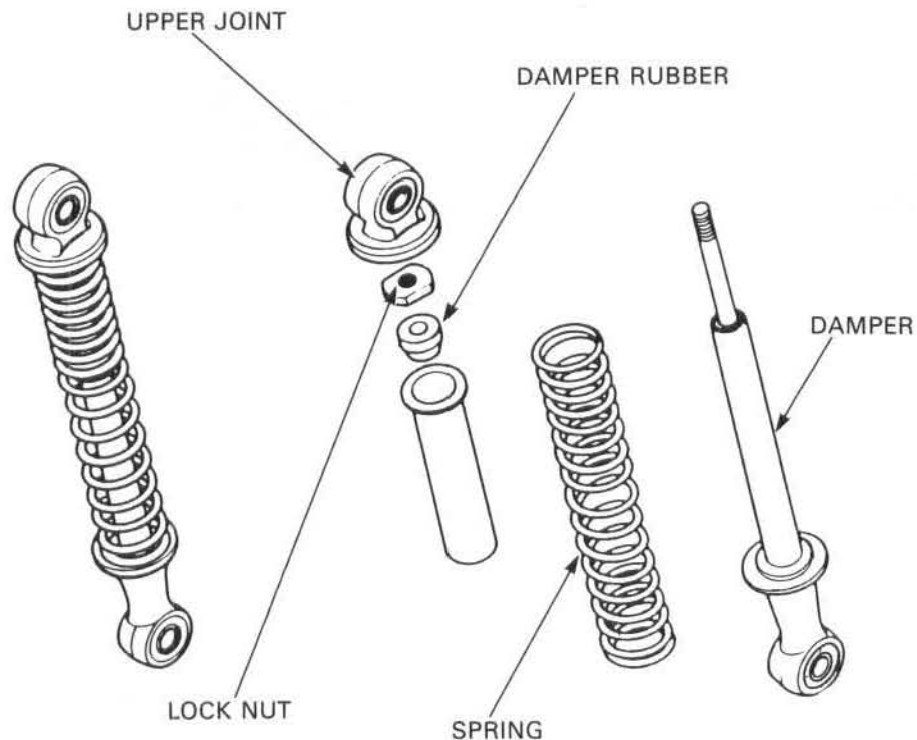
Inspect the parts follows:

- upper and lower bushings for wear or damage.
- damper rod for bends or scratches.
- damper unit for oil leaks.
- damper rubber for damage.



## REAR WHEEL/BRAKE/SUSPENSION

### ASSEMBLY/INSTALLATION



Assemble the shock absorber.

Apply locking agent to the damper rod threads and install the lock nut.

Compress the spring with the compressor, install the upper joint and tighten the lock nut.

#### TOOLS:

Rear shock absorber compressor

07GME-0010000

Rear shock absorber compressor attachment

07967-1180100

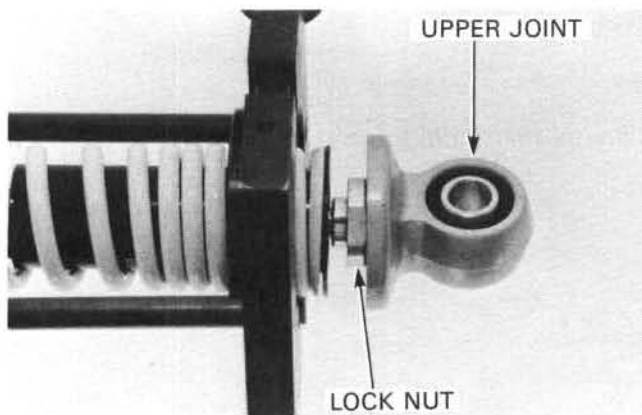
**TORQUE:** 20N•m (2.0 kg-m, 14 ft-lb)

#### NOTE

- Install the spring with its small coil end facing up.
- Be careful not to overtighten the spring.

Install the rear shock absorbers on to the frame and tighten the upper and lower nuts.

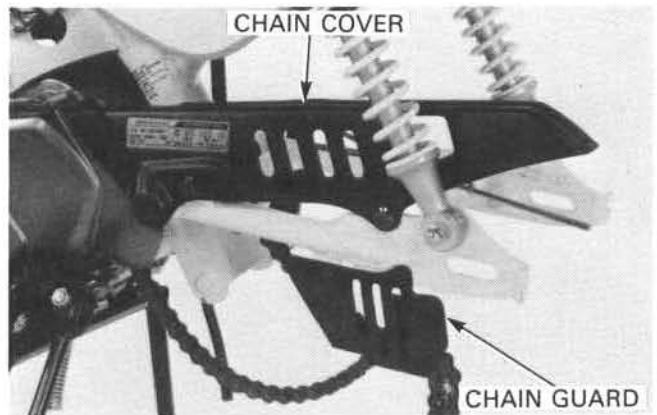
**TORQUE:** 33N•m (3.3 kg-m, 24 ft-lb)



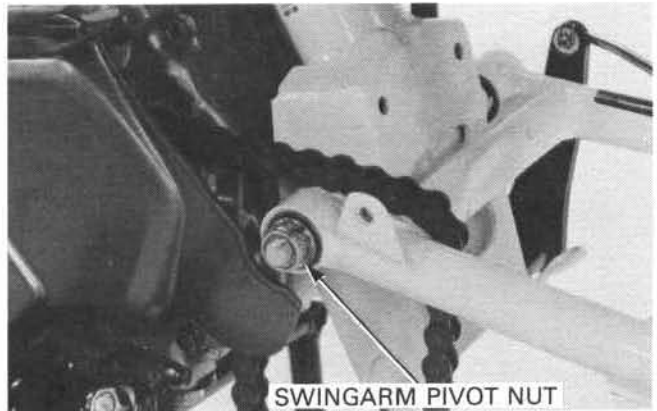
## SWINGARM

Remove the following:

- rear wheel (page 4-3)
- rear shock absorber (page 12-8)
- chain cover mounting bolts and chain cover
- chain guard mounting bolts and chain guard.

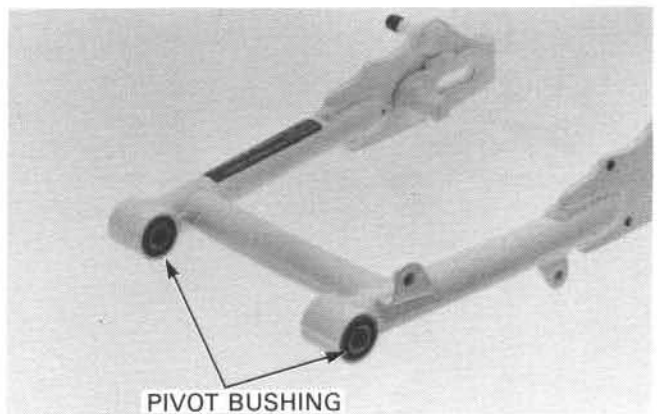


Remove the swingarm pivot bolt and swingarm.



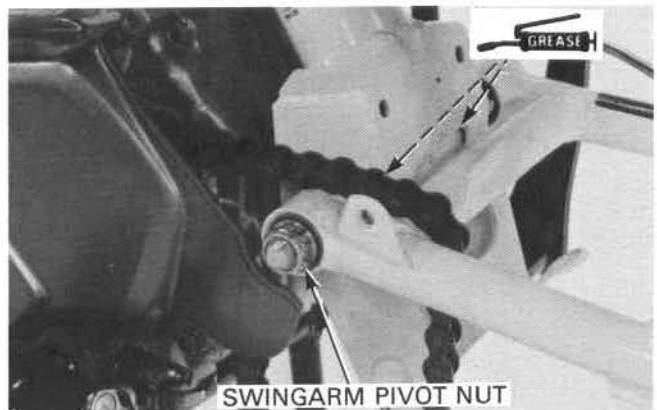
## INSPECTION

Check the swingarm for cracks or damage.  
Check the pivot bushings and pivot bolt for excessive wear.



## INSTALLATION

Apply grease to the swingarm bushings and pivot bolt.  
Install the swingarm, pivot bolt and nut, but do not tighten the nut yet.



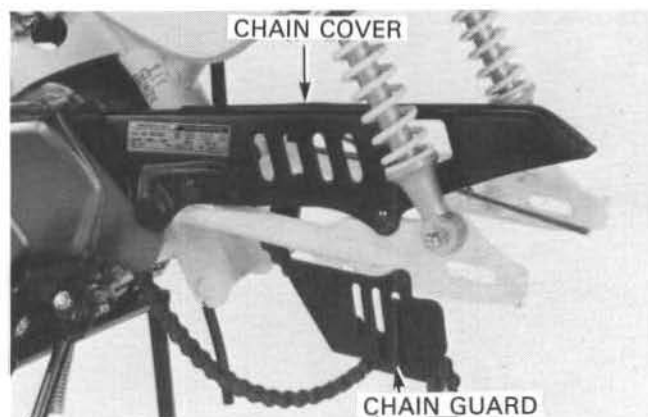
## REAR WHEEL/BRAKE/SUSPENSION

Install the rear shock absorbers (page 12-10).  
Tighten the pivot nut.

**TORQUE:** 45N•m (4.5 kg-m, 33 ft6-lb)



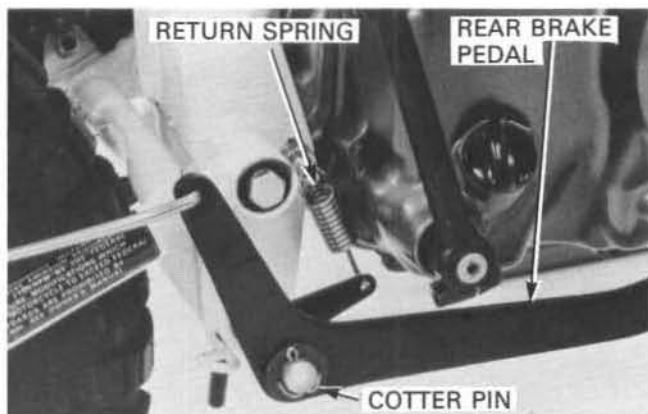
Install the rear wheel (page 12-5).  
Install the chain cover and chain guard.



## BRAKE PEDAL

### REMOVAL/INSTALLATION

Remove the rear brake adjusting nut, return spring and cotter pin.  
Remove the rear brake pedal.

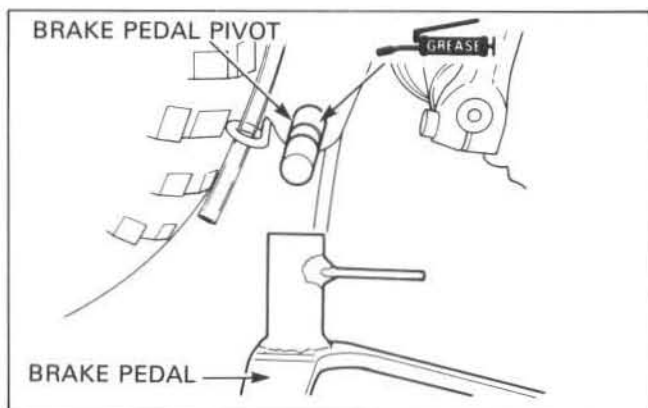


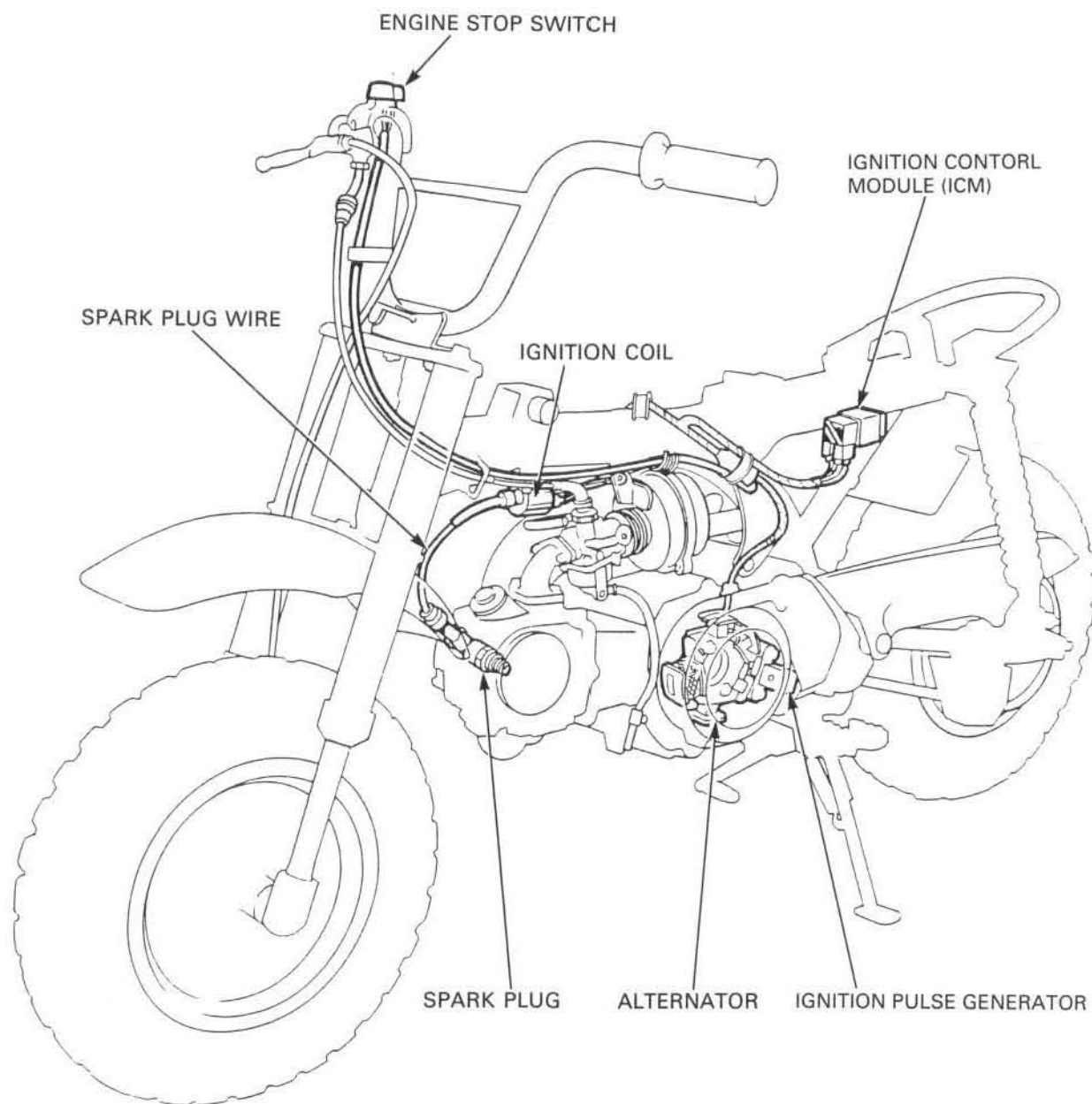
Installation is the reverse of removal.

#### NOTE

- Apply grease to the brake pedal pivot.
- Use a new cotter pin.

Adjust the brake pedal free play (page 3-10).





# 13. IGNITION SYSTEM

SERVICE INFORMATION	13-1	ALTERNATOR	13-3
TROUBLESHOOTING	13-1	IGNITION PULSE GENERATOR	13-3
IGNITION CONTROL MODULE (ICM)	13-2	ENGINE STOP SWITCH	13-4
IGNITION COIL	13-2		

## SERVICE INFORMATION

### GENERAL

- Ignition timing cannot be adjusted since the ignition control module (ICM) is non-adjustable. If ignition timing is incorrect, check the system and replace the faulty parts.
- For spark plug inspection, refer to page 3-6.
- For alternator and ignition pulse generator removal, refer to section 9.
- A continuity check can usually be made without removing the parts from motorcycle by simply disconnecting the wires and using a continuity tester or ohmmeter at the terminals.

### SPECIFICATIONS

Spark plug	'88	NGK	CR6HS
	'88 After '88	NIPPONDENSO	U20FSR-U
	After '88	NGK	CR6HSA
Spark plug gap			0.6–0.7mm (0.024–0.028 in)
Ignition coil resistance at 20°C (68°F)	Primary coil		0.1–0.3 Ω
	Secondary coil (with spark plug cap)		6.5–10.0 kΩ
	Secondary coil (without spark plug cap)		2.5–3.5 kΩ
Stator coil resistance at 20°C (68°F)			500–900 Ω
Ignition pulse generator resistance at 20°C (68°F)			50–200 Ω
Ignition timing			27° BTDC

## TROUBLESHOOTING

### Engine cranks but will not start

- Engine stop switch OFF
- No spark at plug
- Faulty spark plug
- Faulty ignition control module (ICM)
- Faulty pulse generator

### No spark at plug

- Engine stop switch OFF
- Poorly connected, broken or shorted wires
  - Between ignition coil and spark plug
  - Between engine stop switch and ignition control module (ICM)
  - Between ignition control module (ICM) and ignition coil
  - Between ignition control module (ICM) and alternator
  - Between and ignition pulse generator
- Faulty ignition coil
- Faulty engine stop switch
- Faulty ignition control module (ICM)
- Faulty ignition pulse generator
- Faulty stator coil
- Faulty spark plug

### Engine starts but runs poorly

- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Intermittent short circuit
- Secondary circuit
  - Faulty plug
  - Faulty spark plug wire



## IGNITION SYSTEM

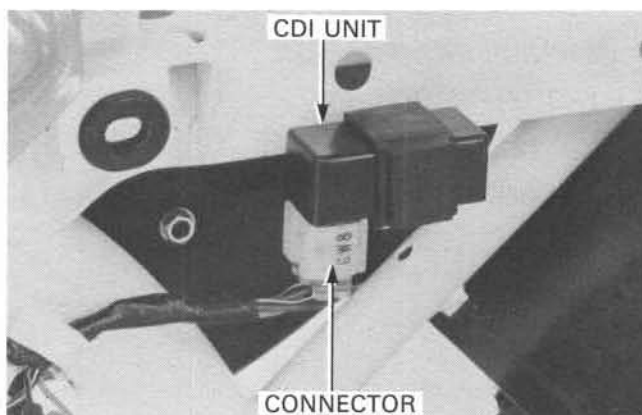
### IGNITION CONTROL MODULE (ICM)

#### SYSTEM INSPECTION

If the problem is a weak spark, or no spark, inspect as follows:  
Remove the seat (page 4-3) and side cover.

Disconnect the wire connector from the ignition control module (ICM).

Inspect the items listed in the chart below by measuring the resistance at each of the wired harness connector terminals specified.



At 20°C (68°F)

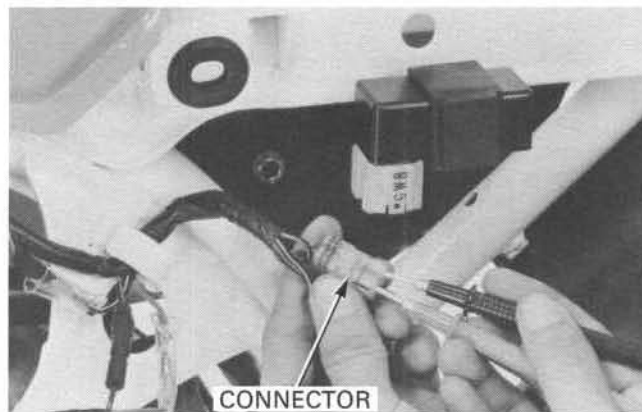
ITEM		Measure at:	Standard
Engine stop switch	RUN	Black/White-Green	NO CONTINUITY
	OFF		CONTINUITY
Ignition coil (Primary coil)		Black/Yellow-Green	0.1–0.3 $\Omega$
Ignition coil with spark plug cap (Secondary coil)		Black/Yellow-plug cap	6.5–10.0 k $\Omega$
Alternator (Stator)		Black/Red-Green	500–900 $\Omega$
Ignition pulse generator		Blue/Yellow-Green	50–200 $\Omega$

If there is no problem, check the ignition control module (ICM) connector for loose terminals.

If all wire connectors are OK, replace the ignition control module (ICM).

If the resistance of any individual part does not meet its specification, test the component as described following and replace as required.

- Ignition coil primary coil
- Ignition coil secondary coil (page 13-3)
- Alternator (page 13-3)
- Ignition pulse generator (page 13-3)
- Engine stop switch (page 13-4)



### IGNITION COIL

#### INSPECTION

Disconnect the ignition coil wire connectors.

Measure the primary coil resistance by checking for continuity between the primary terminal and green terminal.

**RESISTANCE:** 0.1–0.3  $\Omega$  at 20°C (68°F)

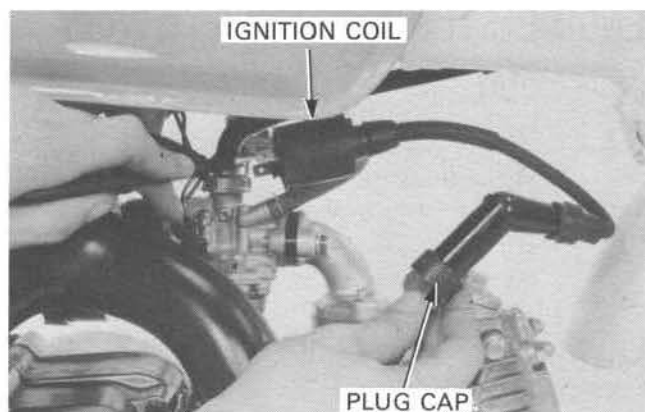


Measure the secondary coil resistance with the spark plug cap in place by checking for continuity between the plug cap and black/yellow terminal

**RESISTANCE:** 6.5–10.0 k $\Omega$  at 20°C (68°F)

If the resistance is out of range, remove the spark plug cap and measure the resistance between the wire and black/yellow terminal.

**RESISTANCE:** 2.5–3.5 k $\Omega$  at 20°C (68°F)



## ALTERNATOR

### INSPECTION

#### NOTE

This test can be performed with the alternator installed in the engine.

Disconnect the stator coil wire connector (Black /Red) and measure the resistance between the wire terminal and ground.

**RESISTANCE:** 500–900  $\Omega$  at 20°C (68°F)

Refer to section 9 for stator coil replacement.



## IGNITION PULSE GENERATOR

### INSPECTION

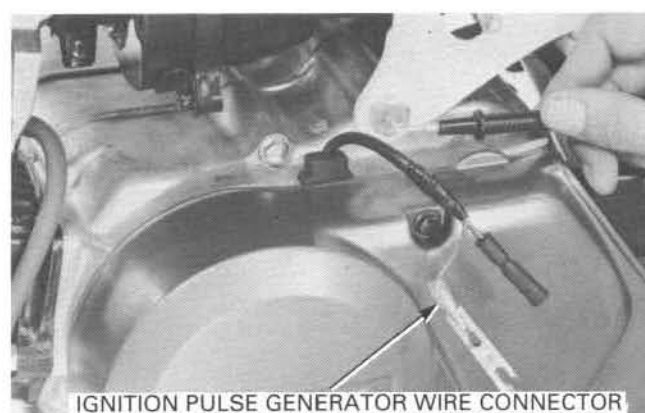
#### NOTE

This test can be performed with the ignition pulse generator installed in the engine.

Disconnect the ignition pulse generator wire connector (Blue/ Yellow) and measure the resistance between the terminal and ground.

**RESISTANCE:** 50–200  $\Omega$  at 20°C (68°F)

Refer to section 9 for ignition pulse generator replacement.

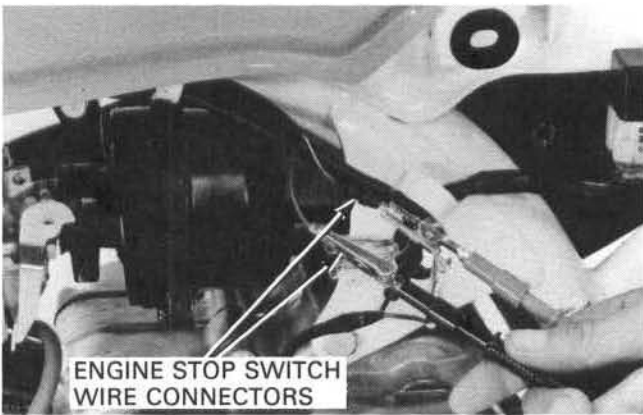


ENGINE STOP SWITCH

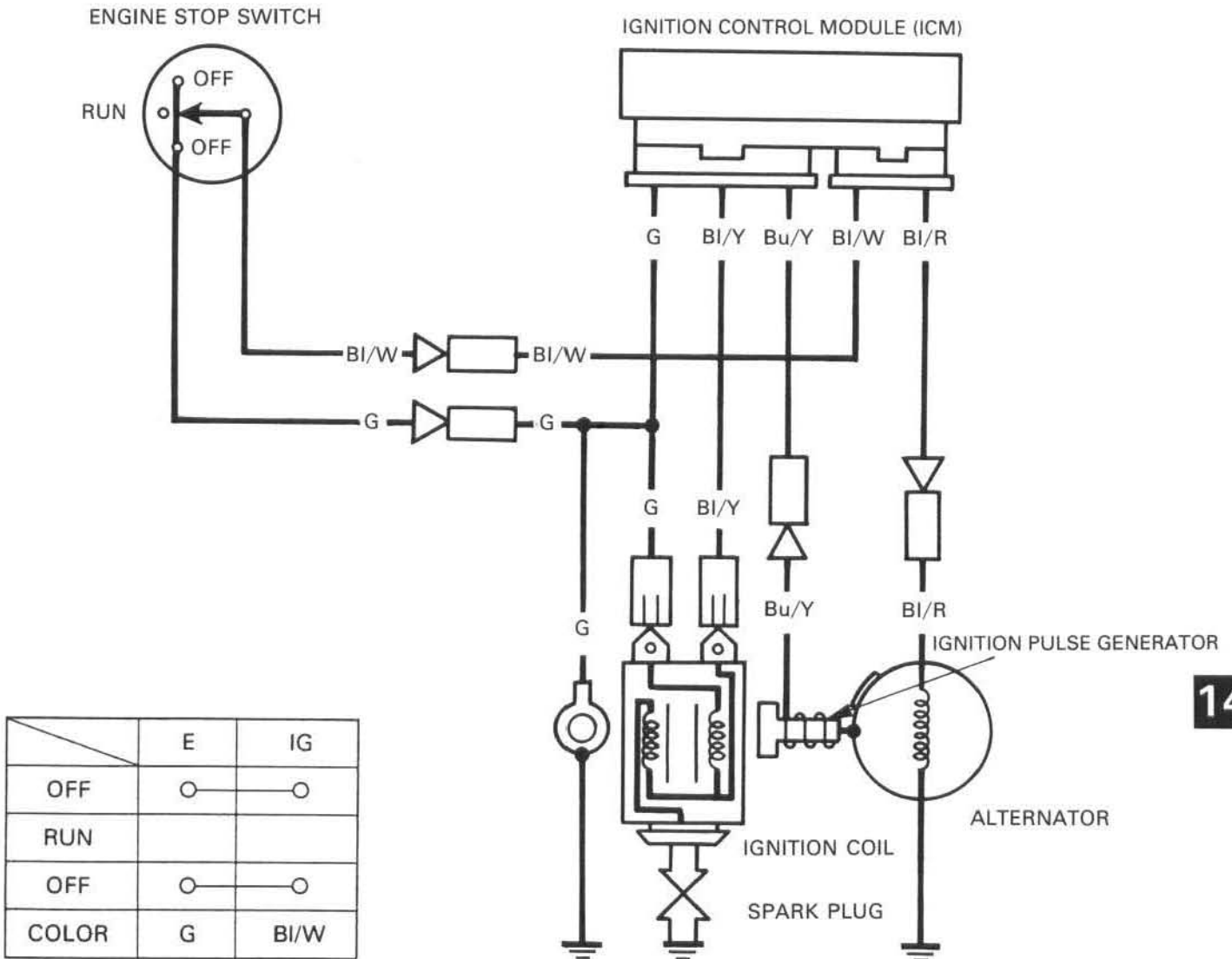
INSPECTION

Disconnect the engine stop switch wire connectors (green and black/white) and check the continuity between the connectors. There should be continuity as shown by the interconnected circles (○—○) below.

SWITCH \ COLOR	COLOR	
	GREEN	BLACK/WHITE
"OFF"	○ — ○	○ — ○
"RUN"		
"OFF"	○ — ○	○ — ○



# 14. WIRING DIAGRAM



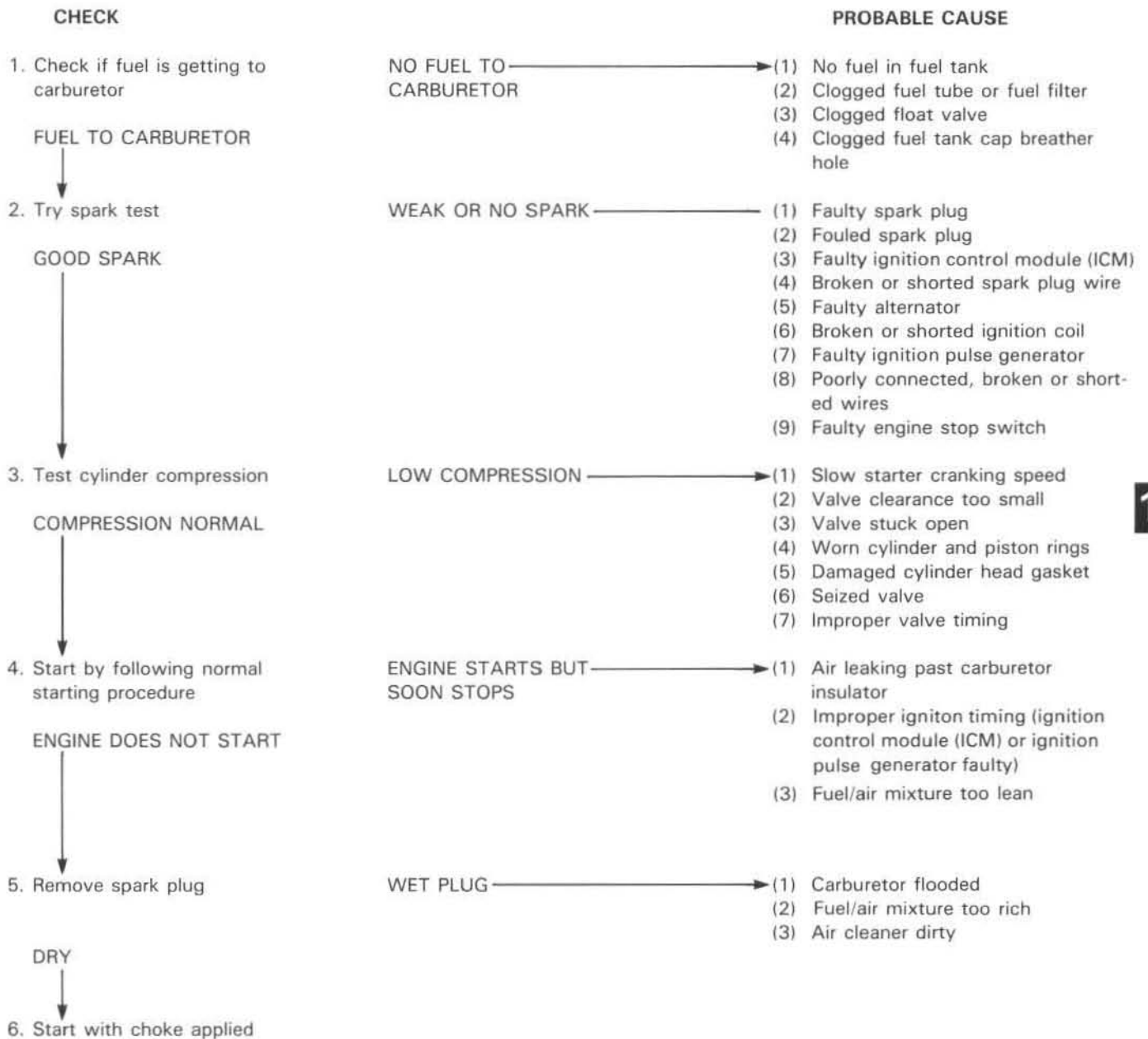
14

BI	BLACK
Y	YELLOW
Bu	BLUE
G	GREEN
R	RED
W	WHITE

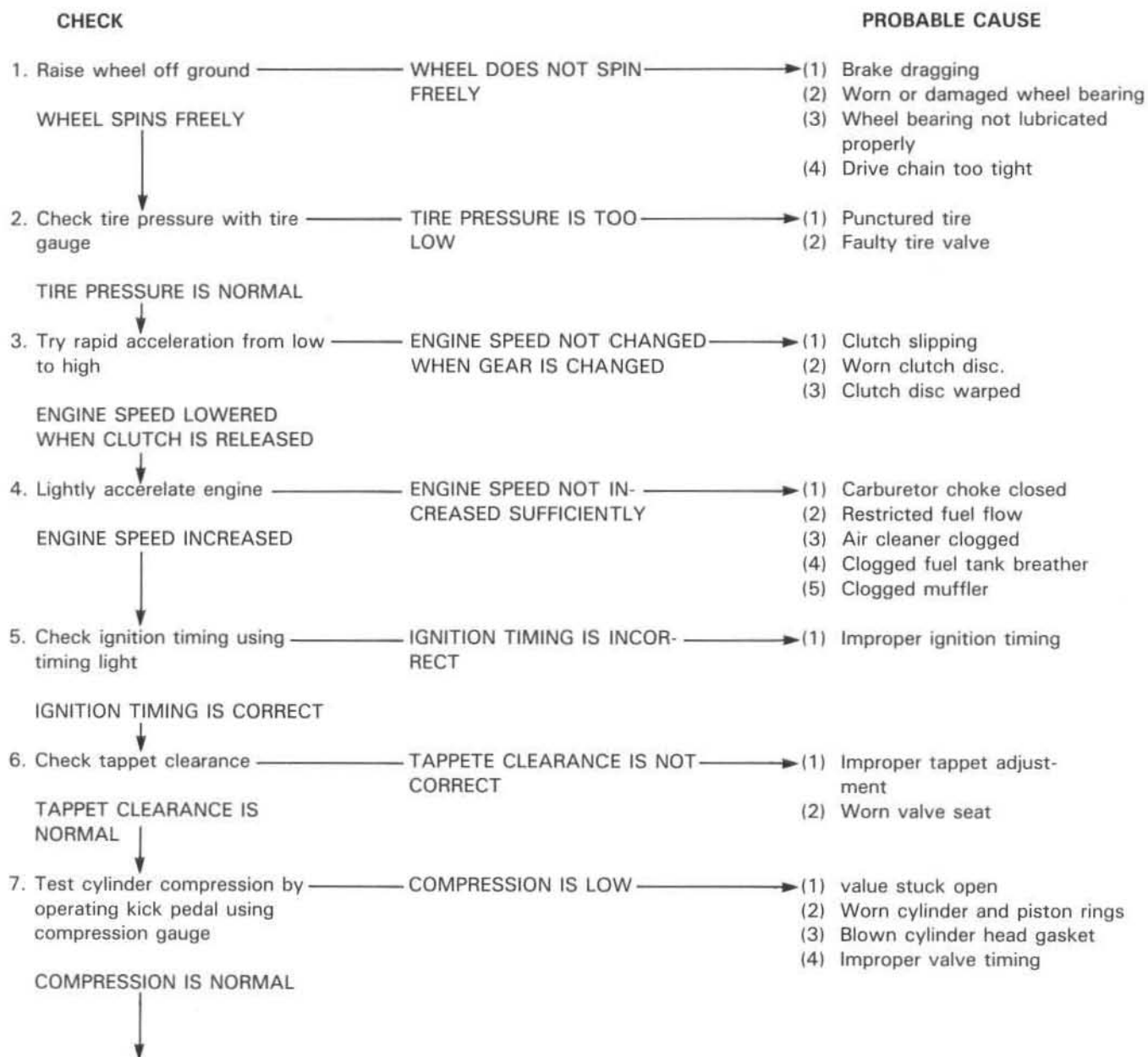
# 15. TROUBLESHOOTING

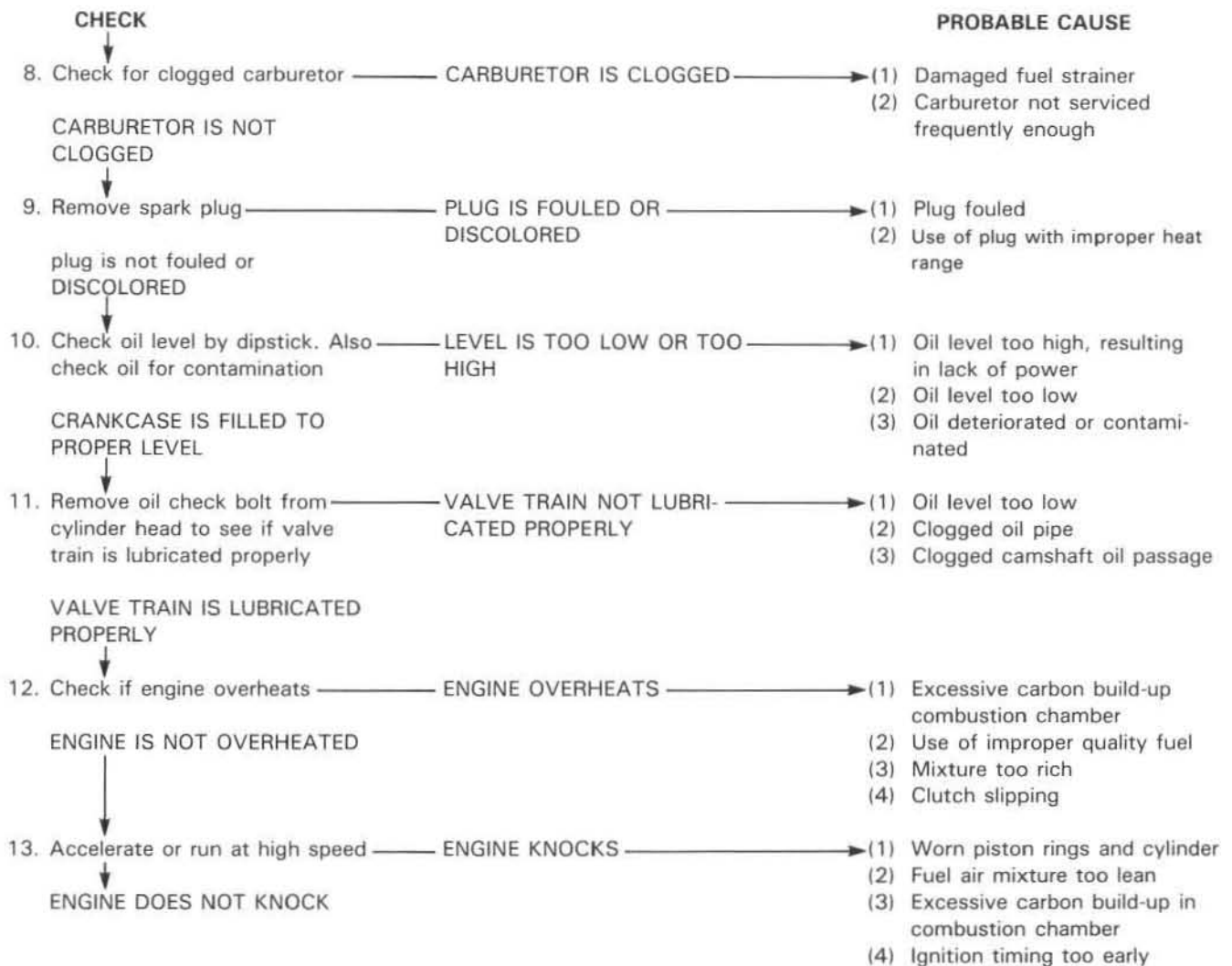
ENGINE DOES NOT START OR IS HARD TO START	15-1
ENGINE LACKS POWER	15-2
POOR PERFORMANCE AT LOW AND IDLE SPEEDS	15-3
POOR PERFORMANCE AT HIGH SPEED	15-4
POOR HANDLING	15-4
WEAK OR NO SPARK	15-5

## ENGINE DOES NOT START OR IS HARD TO START

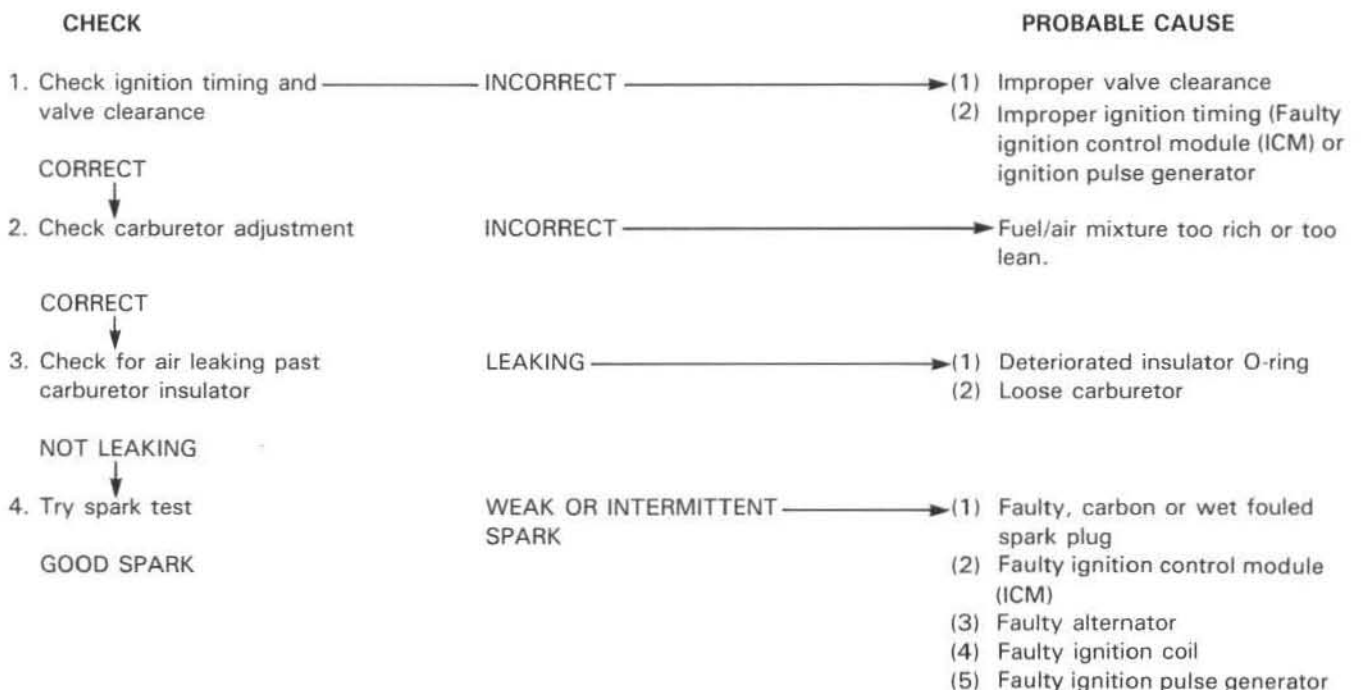


## ENGINE LACKS POWER





## POOR PERFORMANCE AT LOW AND IDLE SPEEDS





## POOR PERFORMANCE AT HIGH SPEED

CHECK		PROBABLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT	(1) Improper valve clearance (2) Faulty ignition control module (3) Faulty ignition pulse generator (4) Improper flywheel installation
CORRECT ↓		
2. Disconnect fuel tube at carburetor	FUEL FLOW RESTRICTED	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank cap breather hole (4) Clogged fuel valve
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet	CLOGGED	Clean
NOT CLOGGED ↓		
4. Check valve timing	INCORRECT	Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK	Faulty spring
NOT WEAKENED		

## POOR HANDLING

CHECK		PROBABLE CAUSE
1. Check tire pressure		
2. If steering is heavy		(1) Top thread too tight (2) Damaged steering head bearing
3. If either wheel is wobbling		(1) Excessive wheel bearing play (2) Bent rim (3) Improperly installed wheel hub (4) Swingarm bushings excessively worn (5) Bent frame (6) Loose swingarm pivot bolt
4. If the motorcycle pulls to one side		(1) Front and rear wheels not aligned (2) Bent front fork (3) Bent swingarm or frame

## WEAK OR NO SPARK

