Mario's Manuals

XL350R
1984 to 1985

HOW TO USE THIS MANUAL

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

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 18 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, general instructions, specifications, torque values, tools and troubleshooting for the section. The subsequent pages give detailed procedures for the section.

If you don't know the source of the trouble, go to section 19.

CONTENTS

1. GENERAL INFORMATION

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

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

WARNING

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

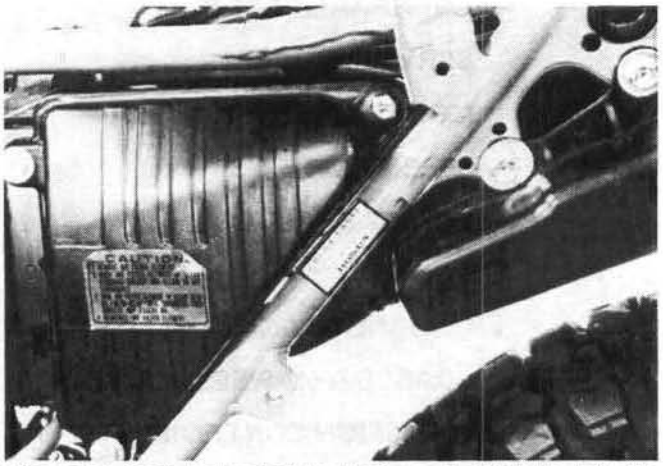
WARNING

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

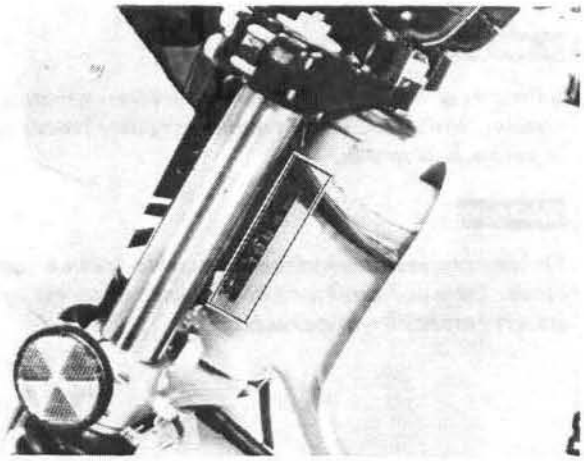
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
4. When tightening bolts or nuts, begin with the larger-diameter or inner bolts first, and tighten to the specified torque diagonally in 2-3 steps, unless a particular sequence is specified.
5. Clean parts in non-flammable or high flash point solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
6. After reassembly, check all parts for proper installation and operation.
7. 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.
8. Route all electrical wires as shown on page 1-11, Cable & Harness Routing, and always away from sharp edges and areas where they might be pinched between moving parts.

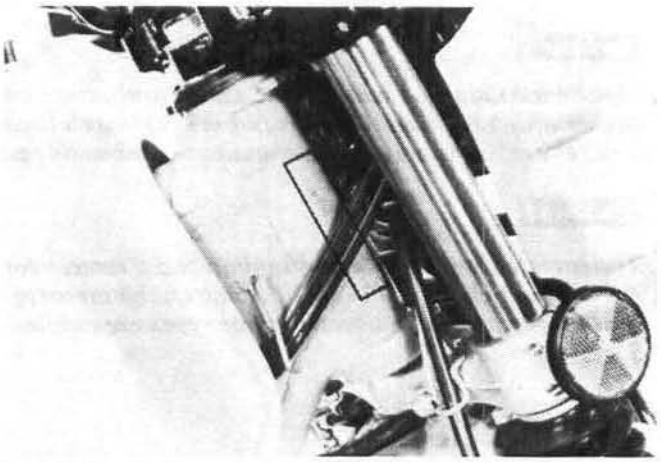
MODEL IDENTIFICATION



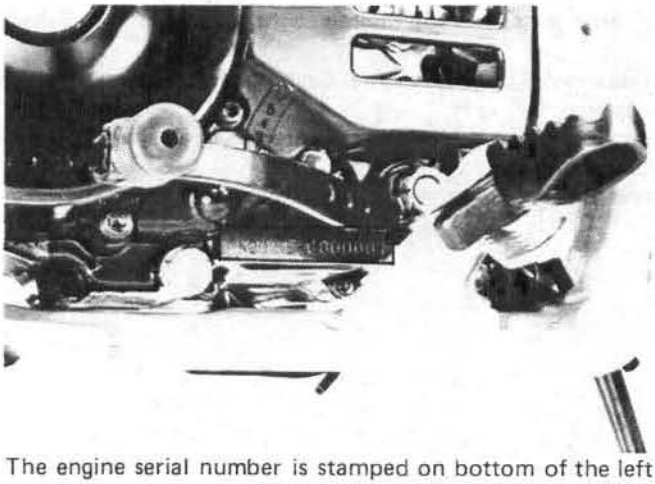
The color label is attached to the frame behind the left side cover.



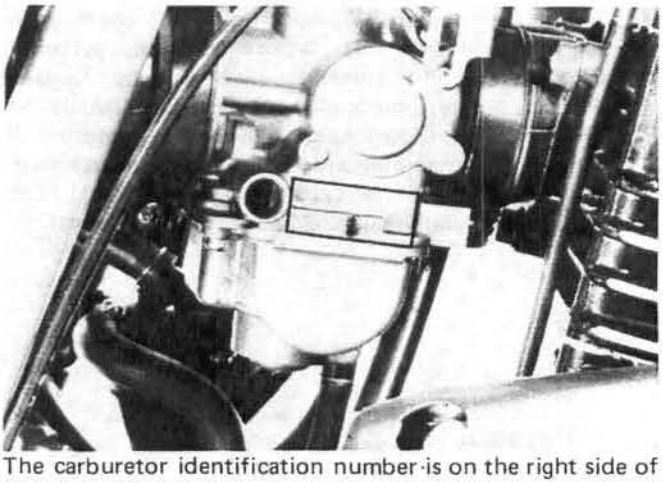
The vehicle identification number (VIN) is on the left side of the steering head.



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



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



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

SPECIFICATIONS

AC: California model

DIMENSIONS	Overall length		2,175 mm (85.6 in)
	Overall width		840 mm (33.1 in)
	Overall height		1,225 mm (48.2 in)
	Wheel base		1,415 mm (55.7 in)
	Seat height		840 mm (33.1 in)
	Footpeg height		360 mm (14.2 in)
	Ground clearance		260 mm (10.2 in)
	Dry weight		122 kg (269 lb)
FRAME	Type		Semi-double cradle
	Front suspension, travel		Telescopic fork 220 mm (8.66 in)
	Rear suspension, travel		Pro link 205 mm (8.07 in)
	Tire size	Front	3.00–21–4PR
		Rear	4.60–17–4PR
	Tire pressure		
	Up to 90 kg (200 lb) load	Front	150 kPa (1.5 kg/cm^2, 21 psi)
	90 kg (200 lb) load to vehicle capacity load	Rear	150 kPa (1.5 kg/cm^2, 21 psi)
		Front	150 kPa (1.5 kg/cm^2, 21 psi)
		Rear	150 kPa (1.5 kg/cm^2, 21 psi)
	Vehicle capacity load		150 kg (330 lb)
	Front brake, swept area		Dual piston caliper 342.8 cm^2 (53.1 sq-in)
	Rear brake, swept area		Internal expanding shoes 86.3 cm^2 (13.3 sq-in)
	Fuel capacity		11.0 lit. (2.9 U.S. gal., 2.4 Imp. gal.)
	Fuel reserve capacity		2.0 lit. (0.5 U.S. gal., 0.4 Imp. gal.)
	Caster		30°30′
	Trail		120 mm (4.7 in)
	Front fork oil capacity		411 cc (13.9 oz.)
ENGINE	Type		Gasoline, air-cooled 4-stroke
	Cylinder arrangement		Single cylinder inclined 15°
	Bore stroke		84 x 61.3 mm (3.31 x 2.41 in)
	Displacement		340 cc (20.7 cu-in)
	Compression ratio		9.5 : 1
	Valve train		OHC, chain driven, 4-valve
	Maximum horsepower		30 BHP/7,500 rpm
	Maximum torque		2.9 kg-m/6,500 rpm
	Oil capacity		1.9 lit. (2.0 U.S. qt. 1.7 Imp. qt.)
	Lubrication system		Forced pressure and wet sump
	Air filtration system		Oiled polyurethane foam
	Cylinder compression		1,400 kPa (14.0 kg/cm^2, 199 psi)
	Intake valve	Opens	7.5° (BTDC) at 1 mm lift / 81° (BTDC) at 0 lift
		Closes	27.5° (ABDC) at 1 mm lift / 122° (ABDC) at 0 lift
	Exhaust valve	Opens	37.5° (BBDC) at 1 mm lift / 112° (BBDC) at 0 lift
		Closes	2.5° (ATDC) at 1 mm lift / 98° (ATDC) at 0 lift
	Valve clearance	Intake	0.05 mm (0.002 in)
		Exhaust	0.08 mm (0.003 in)

CARBURETOR	Type	PISTON VALVE
	I.D. number	PH80A
	AC	PH81A
	Main jet	Pri #112, 2nd #110
	Air screw	See page 4-11
	Float level	18.0 mm (0.71 in)
	Idle speed	1,300 ± 100 rpm
DRIVE TRAIN	Clutch	Wet multi-plate type
	Transmission	6-speed constant mesh
	Primary reduction	2.708
	Gear ratio I	2.923
	Gear ratio II	2.000
	Gear ratio III	1.550
	Gear ratio IV	1.273
	Gear ratio V	1.080
	Gear ratio VI	0.926
	Final reduction	2.857
	Gear shift pattern	Left foot operated return system
ELECTRICAL	Ignition	C.D.I.
	Ignition timing Initial	8° BTDC at 1,300 rpm
	Full advance	28° BTDC at 4,000 rpm
	Alternator	337W/5,000 rpm
	Battery capacity	12V–3AH
	Spark plug [STANDARD]	DPR8EA-9 (NGK)
		X24EPR-U9 (ND)
	Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
	Headlight	55/60 watt
	Tail/stoplight	3/32 cp (8/27W) SAE 1157
	Turn signal light	32/32 cp (23/23W) SAE 1073
	Speedometer light	1 cp (1.7W)
	Neutral indicator	2 cp (3.4W) SAE 158
	Turn signal indicator	2 cp (3.4W) SAE 158
	High beam indicator	1 cp (1.7W)

TORQUE VALUES

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)
Kick starter ratchet guide bolt	2	6	10–14 (1.0–1.4, 7–10)
Cam chain tensioner bolt	1	6	10–14 (1.0–1.4, 7–10)
Clutch center lock nut	1	18	60–70 (6.0–7.0, 43–50)
Alternator flywheel bolt	1	12	100–120 (10.0–12.0, 72–87)
Cylinder head cover bolt	4	6	10–14 (1.0–1.4, 7–10)
(Small head bolt)	12	6	8–12 (0.8–1.2, 6–9)
	1	8	24–30 (2.4–3.0, 17–22)
Cylinder head bolt	4	10	47–53 (4.7–5.3, 34–38)
Cylinder bolt (10 mm)	4	10	47–53 (4.7–5.3, 34–38)
(6 mm)	2	6	10–14 (1.0–1.4, 7–10)
Rocker arm shaft	2	14	25–30 (2.5–3.0, 18–22)
Subrocker arm shaft IN	2	14	25–30 (2.5–3.0, 18–22)
EX	2	12	20–25 (2.0–2.5, 14–18)
Cam sprocket bolt	2	7	17–23 (1.7–2.3, 12–17)
Valve adjuster lock nut	4	6	15–18 (1.5–1.8, 11–13)
Shift drum stopper arm bolt	1	6	10–14 (1.0–1.4, 7–10)
Oil pass pipe bolt	3	7	8–12 (0.8–1.2, 6–9)
Shift drum stopper plate bolt	1	6	10–14 (1.0–1.4, 7–10)
Crankcase cover bolt	21	6	8–12 (0.8–1.2, 6–9)
Drain plug	1	12	20–30 (2.0–3.0, 14–22)
Drive sprocket bolt	2	6	8–12 (0.8–1.2, 6–9)
Primary drive gear lock nut	1	18	60–70 (6.0–7.0, 43–50)
Crankcase bolt	14	6	8–12 (0.8–1.2, 6–9)
Oil pump bolt	3	6	10–14 (1.0–1.4, 7–10)
Pulse generator bolt	2	3	8–12 (0.8–1.2, 6–9)
Alternator stator bolt	3	6	10–14 (1.0–1.4, 7–10)
Carburetor intake pipe bolt	3	6	8–12 (0.8–1.2, 6–9)
Neutral switch	1	10	35–45 (3.5–4.5, 25–33)
Spark plug	1	12	15–20 (1.5–2.0, 11–14)

FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)
Steering stem nut	1	24	80–120 (8.0–12.0, 58–87)
Handlebar holder bolt	4	8	18–30 (1.8–3.0, 13–22)
Front fork pinch bolt (upper)	4	8	18–30 (1.8–3.0, 13–22)
(lower)	4	8	30–35 (3.0–3.5, 22–25)
Front axle	1	12	50–80 (5.0–8.0, 36–58)
Front axle holder nut	4	6	10–14 (1.0–1.4, 7–10)
Engine hanger bolt	3	10	45–55 (4.5–5.5, 33–40)
Engine hanger bolt (front-upper)	1	10	35–45 (3.5–4.5, 25–33)
(top)	1	10	35–45 (3.5–4.5, 25–33)
Engine hanger plate bolt	6	8	23–30 (2.3–3.0, 17–22)
Rear axle nut	1	16	80–110 (8.0–11.0, 58–80)
Final driven sprocket bolt	6	8	24–28 (2.4–2.8, 17–20)
Front brake caliper bracket mount bolt	2	8	20–30 (2.0–3.0, 14–22 ft-lb)

FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA.(mm)	TORQUE N·m (kg-m, ft-lb)
Rear shock absorber mount bolt (upper)	1	10	40–50 (4.0–5.0, 29–36)
(lower)	1	10	40–50 (4.0–5.0, 29–36)
Shock rod pivot bolt	1	10	40–50 (4.0–5.0, 29–36)
Shock arm pivot bolt (swing arm side)	1	12	90–120 (9.0–12.0, 65–87)
(shock rod side)	1	10	40–50 (4.0–5.0, 29–36)
Swing arm pivot bolt	1	14	80–100 (8.0–10.0, 58–72)
Steering adjustment nut	1	26	1–2 (0.1–0.2, 0.7–1.4)
Right foot peg bolt	2	10	55–65 (5.5–6.5, 40–47)
Gearshift pedal pinch bolt	1	6	8–12 (0.8–1.2, 6–9)
Kick starter pedal pinch bolt	1	8	20–35 (2.0–3.5, 14–25)
Muffler band bolt	1	8	15–25 (1.5–2.5, 11–18)
Muffler bracket bolt	1	8	20–30 (2.0–3.0, 14–22)
Brake disc nut	4	6	14–16 (1.4–1.6, 10–12)
Brake pipe	1	10	30–40 (3.0–4.0, 22–29)
Brake hose joint	2	10	12–15 (1.2–1.5, 9–11)
Caliper oil pipe bolt	1	10	30–40 (3.0–4.0, 22–29)
Side stand pivot bolt	1	10	35–45 (3.5–4.5, 25–33)
Brake pedal pivot bolt	1	10	35–45 (3.5–4.5, 25–33)

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

STANDARD TORQUE VALUES

TYPE	TORQUE N·m (kg-m, ft-lb)	TYPE	TORQUE N·m (kg-m, ft-lb)
5 mm bolt, nut	4.5–6.0 (0.45–0.6, 3.3–4.3)	5 mm screw	3.5–5 (0.35–0.5, 2.5–3.6)
6 mm bolt, nut	8–12 (0.8–1.2, 6–9)	6 mm screw, bolt with 8 mm head	7–11 (0.7–1.1, 5–8)
8 mm bolt, nut	18–25 (1.8–2.5, 13–18)	6 mm flange bolt, nut	10–14 (1.0–1.4, 7–10)
10 mm bolt, nut	30–40 (3.0–4.0, 22–29)	8 mm flange bolt, nut	24–30 (2.4–3.0, 17–22)
12 mm bolt, nut	50–60 (5.0–6.0, 36–43)	10 mm flange bolt, nut	35–45 (3.5–4.5, 25–33)

TOOLS

- SPECIAL

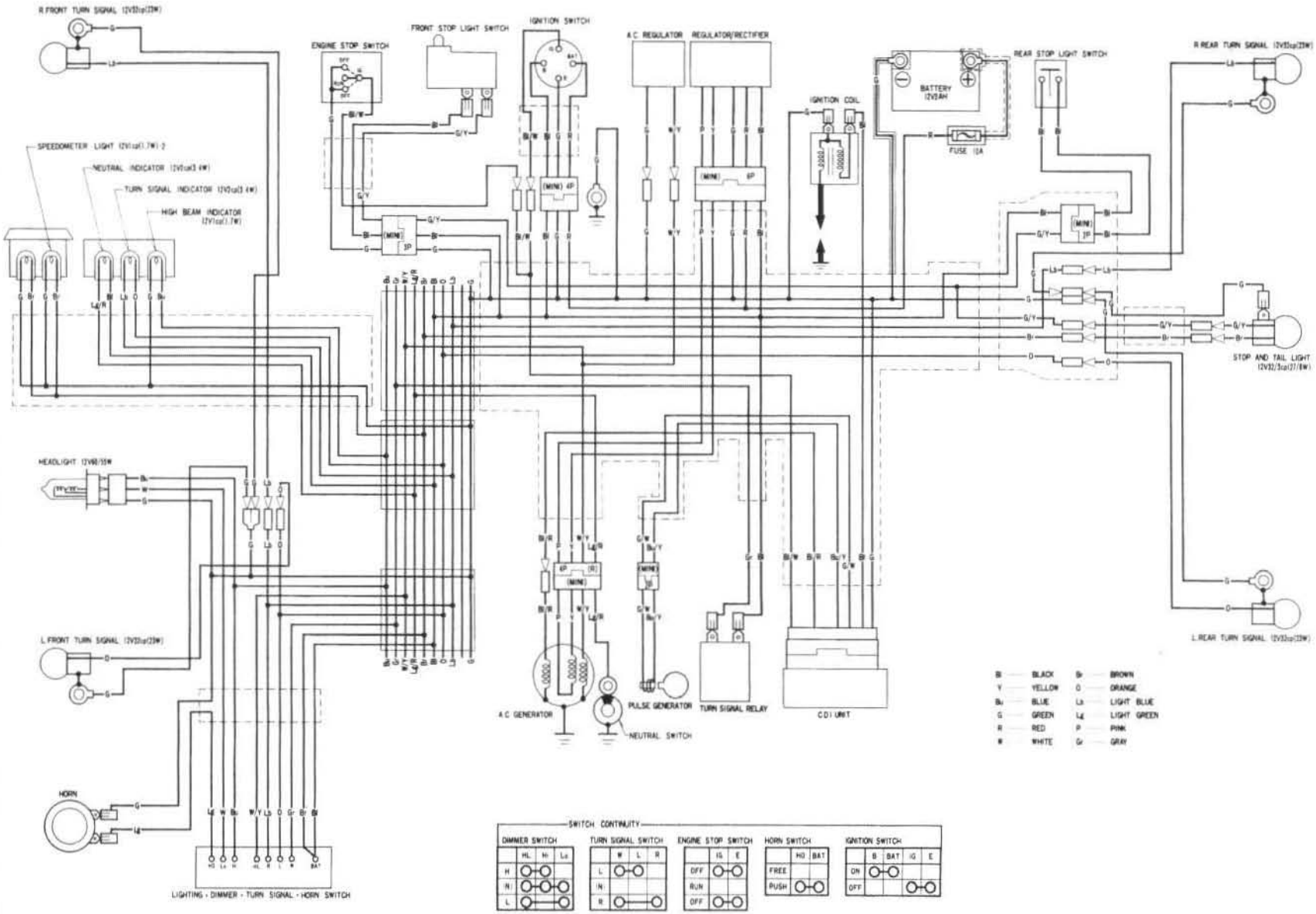
DESCRIPTION	NUMBER	ALTERNATIVE	NUMBER	REF. PAGE
Pressure pump	ST–AH–255–MC7 (U.S.A. only)			4-16
Vacuum pump	ST–AH–260–MC7 (U.S.A. only)			4-16
Cam chain tensioner holder	07973–MG30001			6-19
Valve guide reamer, 5.5 mm	07984–2000000			6-13
Clutch center holder*	07923–KE10001 (Not available in U.S.A.)			8-6
Bearing remover set, 15 mm	07936–KC10000	Weight	07741–0010201 or 07936–3710200	8-14
		Bearing remover, 15 mm	07936–KC10500	8-14
Bearing remover, 20 mm	07936–3710600			
Remover weight	07936–3710200	Remover set	07936–3710000	8-3, 11-7
Remover handle	07936–3710100			
Crankshaft assembly tool kit	07931–KF00000	Assembly collar	07931–KF00100	10-9
		Threaded adaptor	07931–KF00200	10-9
		Shaft puller	07931–KF40000	10-9
Bearing remover set, 12 mm	07936–1660001	Bearing remover	07936–1660100	11-7
		Remover weight	07741–0010201 or 07936–3710100	11-7
Bearing remover, 17 mm	07936–3710300			11-7
Steering stem driver	07946–MB00000			12-20
Fork seal driver	07947–4630100			12-16
Ball race remover	07953–KA50000	Race remover	07953–4250002	12-19
Steering stem socket	07916–3710100			12-18, 12-20
Snap-ring pliers	07914–3230001			12-13, 14-9
Digital multimeter	KS–AHM–32–003 (U.S.A. only)	Digital multimeter	07406–0050000	16-4, 17-3
		Multimeter (SANWA)	07308–0020000	16-4, 17-3

* Newly designed tool

- COMMON

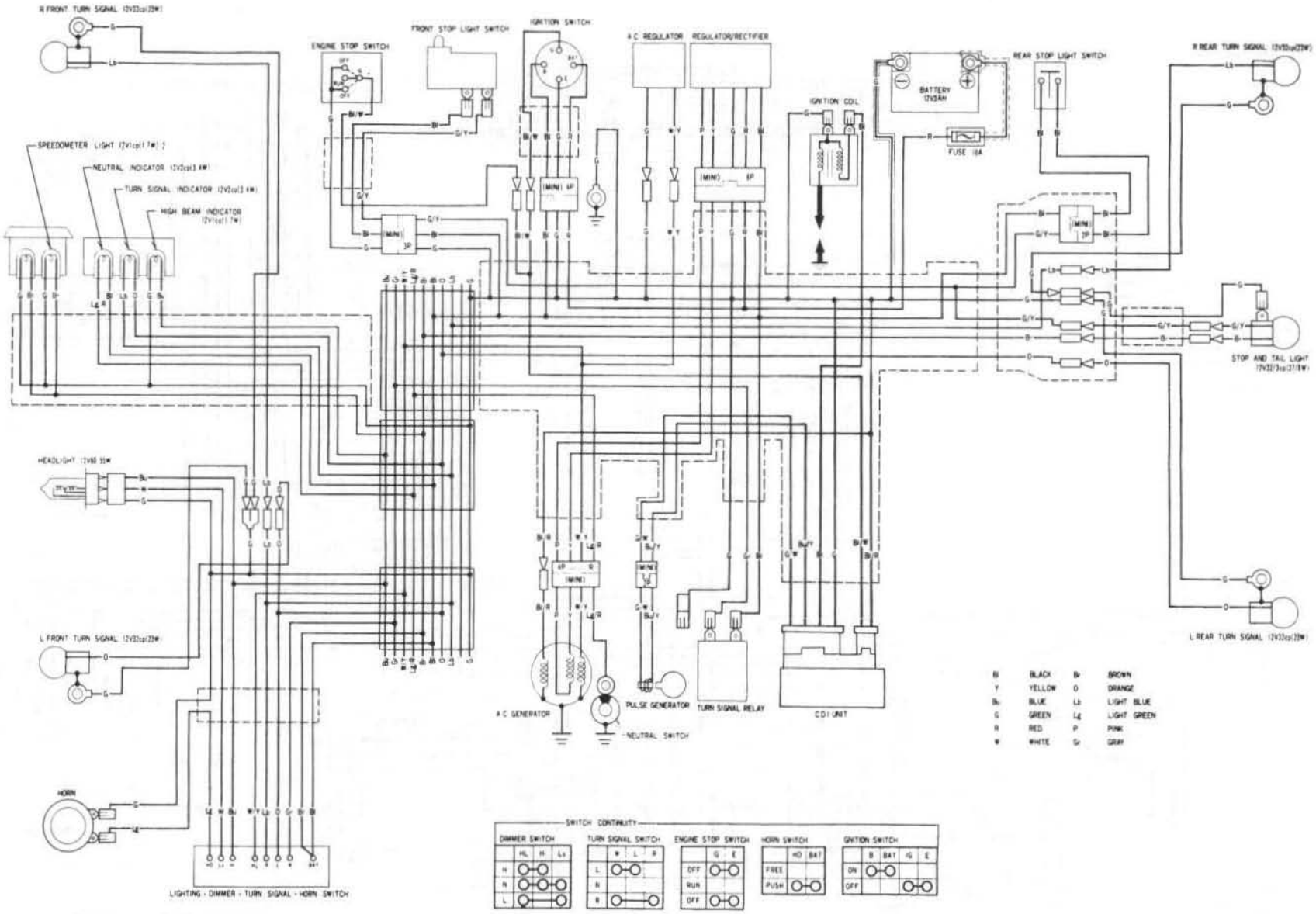
DESCRIPTION	NUMBER	ALTERNATIVE	NUMBER	REF. PAGE
Float level gauge	07401–0010000			4-5
Spoke wrench, 5.8 x 6.1 mm	07701–0020300	Commercially available in U.S.A.		3-19
Wrench, 10 x 12 mm	07708–0030200	Valve adjusting wrench	89201–200–000	3-8
Adjusting wrench B	07708–0030400			
Retainer wrench	07710–0010200			13-7
Wrench, 17 x 27 mm	07716–0020300	Commercially available in U.S.A.		8-6
Socket wrench, 30 x 32 mm	07716–0020400			12-18, 21
Flywheel holder	07725–0040000	Bandstrap wrench (Commercially available)		8-13, 9-3
Rotor puller	07733–0020001	Rotor puller	07933–3290001	9-3
Pin driver	07744–0010200			8-4
Attachment, 37 x 40 mm	07746–0010200			11-7, 8, 13-9
Pilot, 12 mm	07746–0040200			11-7
Attachment, 32 x 35 mm	07746–0010100			12-9, 13-7
Pilot, 17 mm	07746–0040400			11-7, 8, 12-19, 13-9
Attachment, 42 x 47 mm	07746–0010300			11-8, 13-9
Pilot, 15 mm	07746–0040300			11-8, 12-9
Attachment, 52 x 55 mm	07746–0010400			11-7, 8
Pilot, 20 mm	07746–0040500			8-3
Attachment, 24 x 26 mm	07746–0010700 (Not available in U.S.A.)			8-3
Attachment, 72 x 75 mm	07746–0010600	Attachment	07946–3570000	10-8
Pilot, 22 mm	07746–0041000			11-8
Pilot, 30 mm	07746–0040700			10-8
Bearing remover expander	07746–0050100			12-8, 13-7
Bearing remover collet, 15 mm	07746–0050400			12-8
Bearing remover collet, 17 mm	07746–0050500			13-7
Driver	07749–0010000			8-3, 10-8, 11-7, 8, 12-9, 13-9
Valve spring compressor	07757–0010000	Valve spring compressor	07957–3290001	6-10, 17
Valve guide driver	07742–0020200			6-13
Retainer wrench body	07710–0010401			13-9

WIRING DIAGRAM '84:



0030Z—KL3—6700

WIRING DIAGRAM After '84:

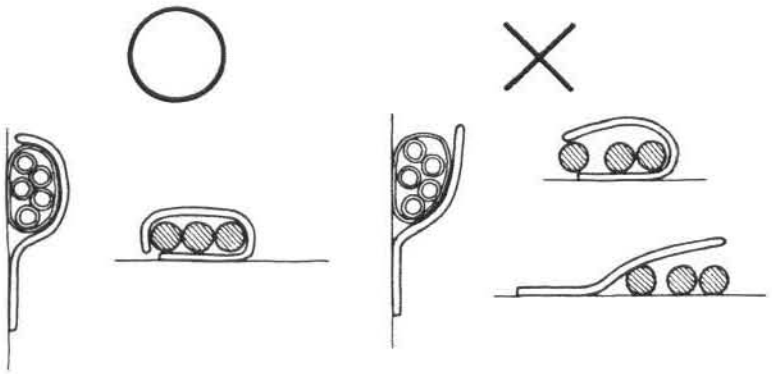


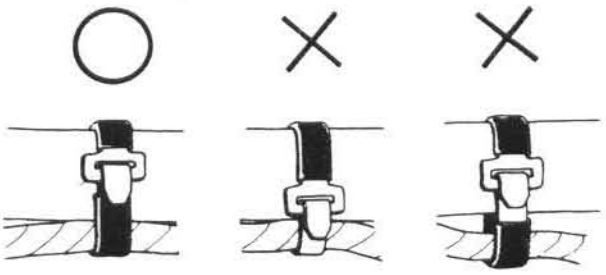
0030Z-KL3-7701

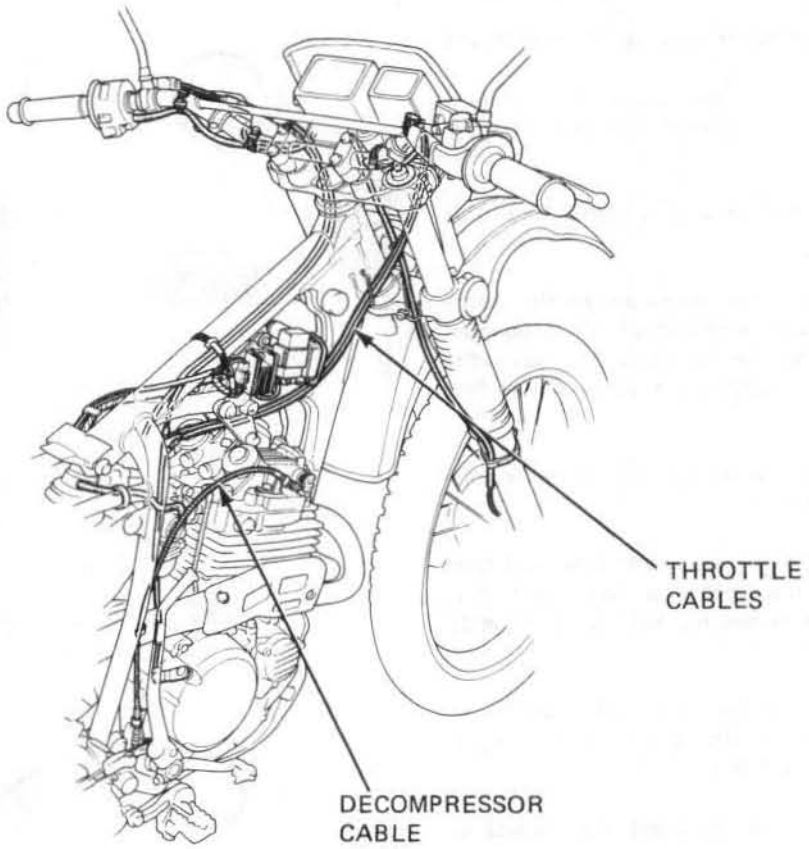
CABLE & HARNESS ROUTING

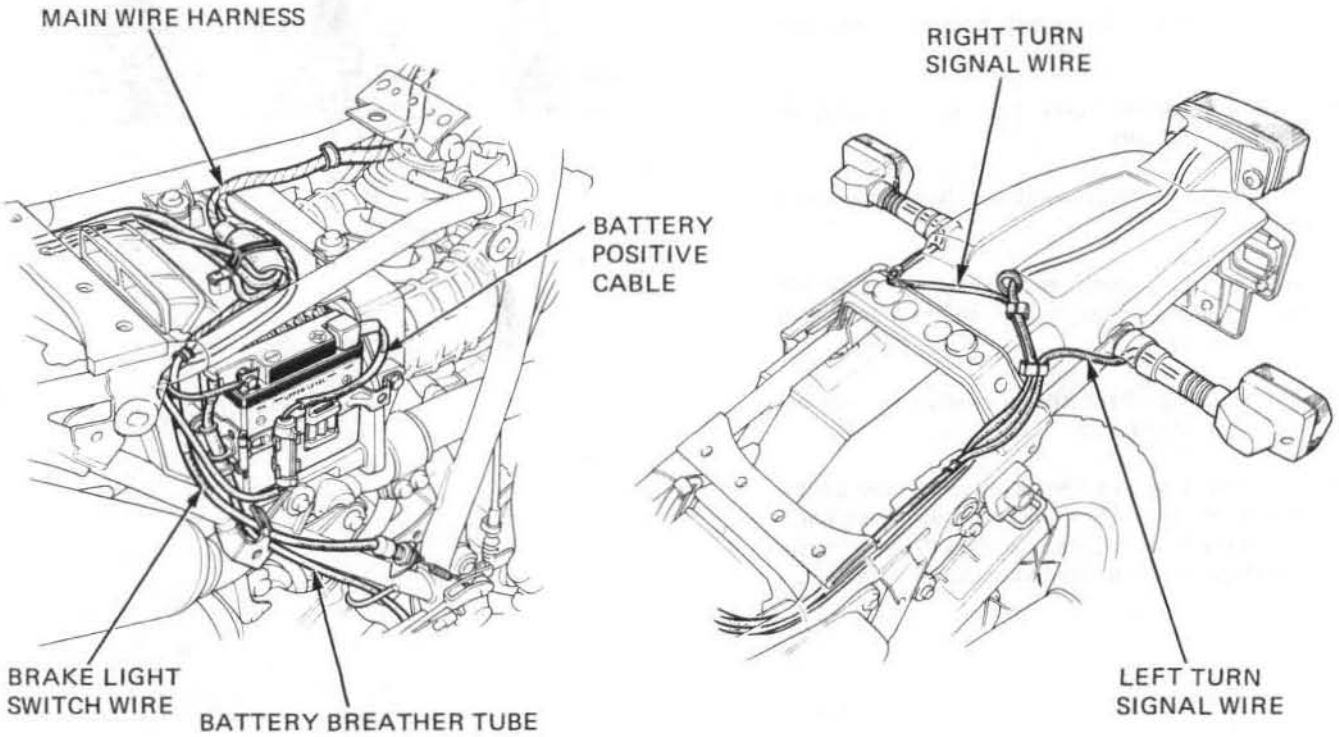
Note the following when routing cables and wire harnesses.
A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.

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









EMISSION CONTROL SYSTEM

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

Source Of Emissions

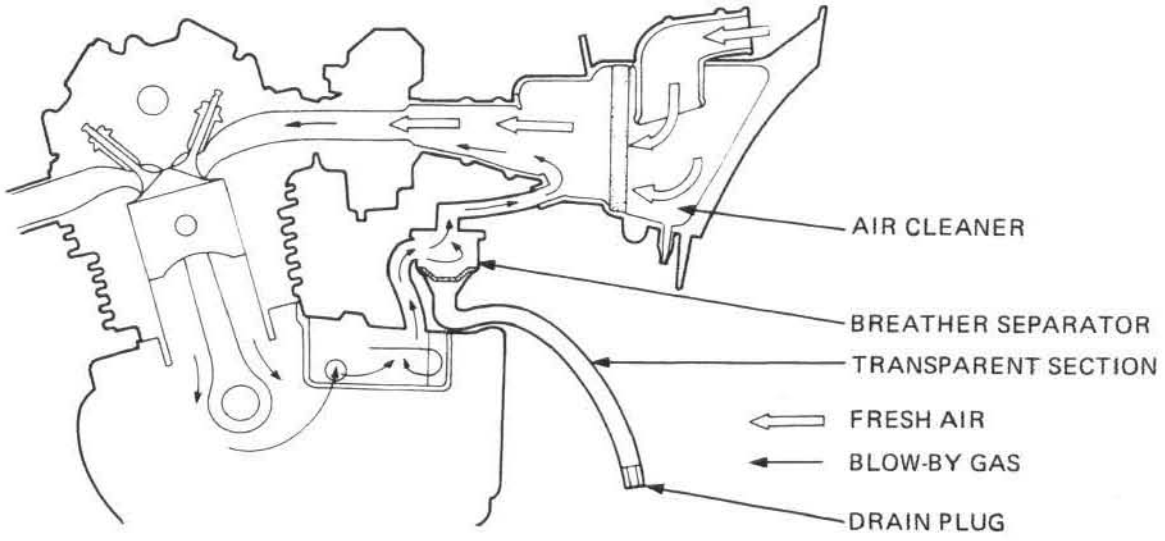
The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.
Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

EXHAUST EMISSION CONTROL SYSTEM

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

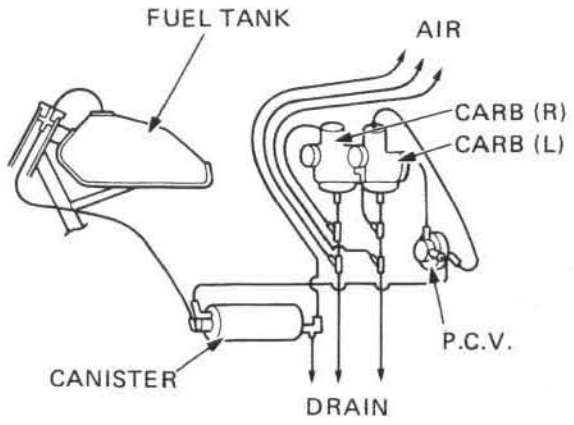
CRANKCASE EMISSION CONTROL SYSTEM

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



EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

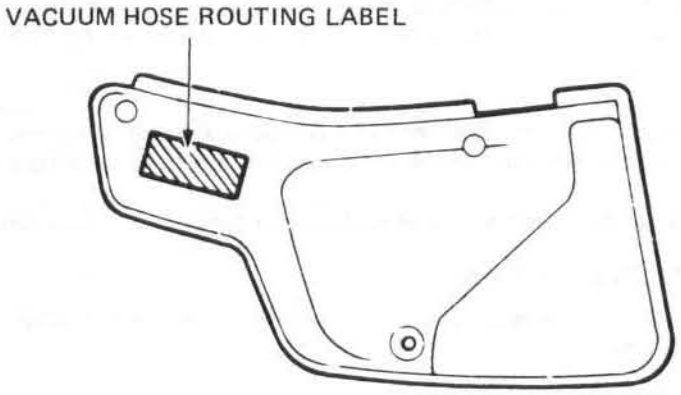
This model complies with California Air Resources Board requirements for evaporative emission regulations.
Fuel vapor from the fuel tank is routed into a charcoal canister where it is absorbed and stored while the engine is stopped. When the engine is running, and the purge control diaphragm valve is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



EMISSION CONTROL INFORMATION LABELS

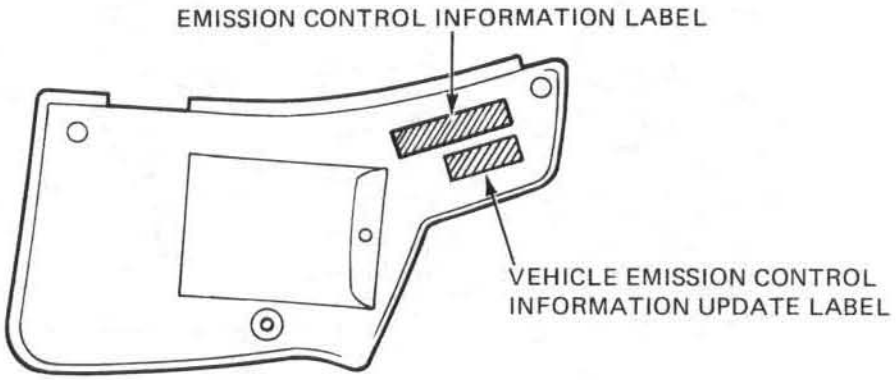
VACUUM HOSE ROUTING LABEL (California model only)

The Vacuum Hose Routing Label is attached to the right side cover.
Route the vacuum hoses as shown on this label.



EMISSION CONTROL INFORMATION LABEL

The Vehicle Emission Control Information Label is attached to the left side cover.
It contains basic tune-up specifications.



EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment (P. 4-12), attach an update label to the left side cover as shown. Instructions for obtaining the update label are given in Service Letter No. 132.

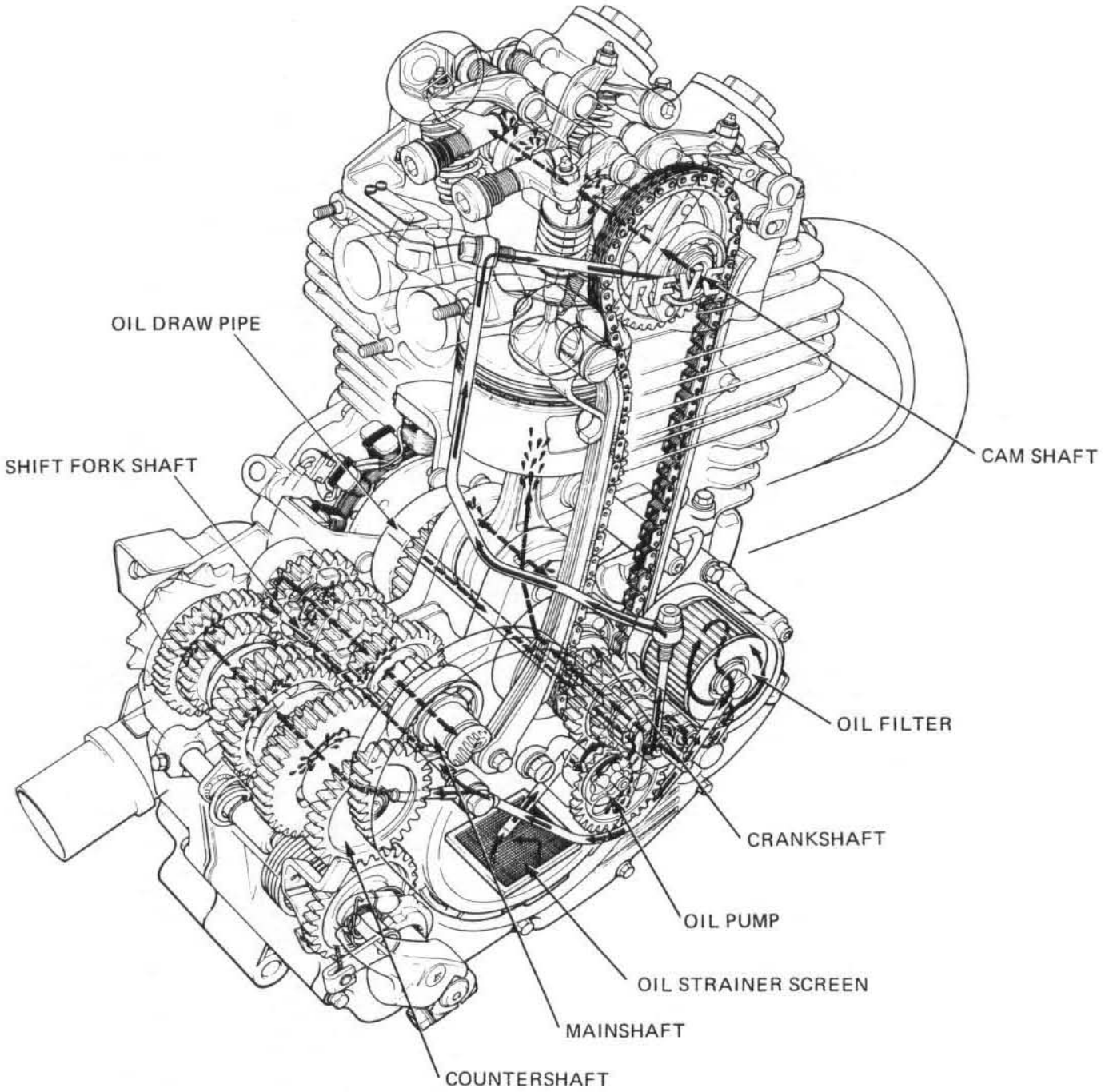
NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Federal law prohibits the following acts or the causing there of: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

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

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

MEMO



2. LUBRICATION

SERVICE INFORMATION

GENERAL

- This section describes inspection and replacement of engine oil, oil filter and cleaning of the oil strainer.
- Oil pump service is described in Section 8.

SPECIFICATIONS

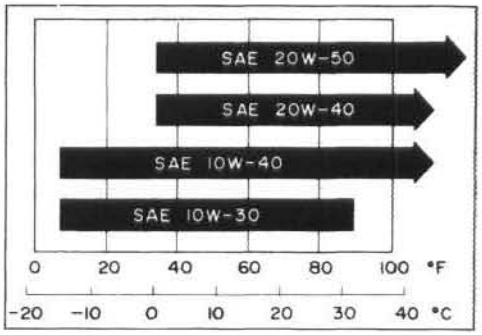
Oil capacity	1.9 liter (2.0 U.S. qt., 1.7 Imp. qt.) at engine assembly 1.65 liter (1.74 U.S. qt., 1.44 Imp. qt.) at oil change
Oil recommendation	Use HONDA 4 STROKE OIL or equivalent. API SERVICE CLASSIFICATION: SE or SF VISCOSITY: SAE 20W–50/10W–40

NOTE :

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

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

OIL VISCOSITIES



TORQUE VALUE

Oil drain plug	20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)

TROUBLESHOOTING

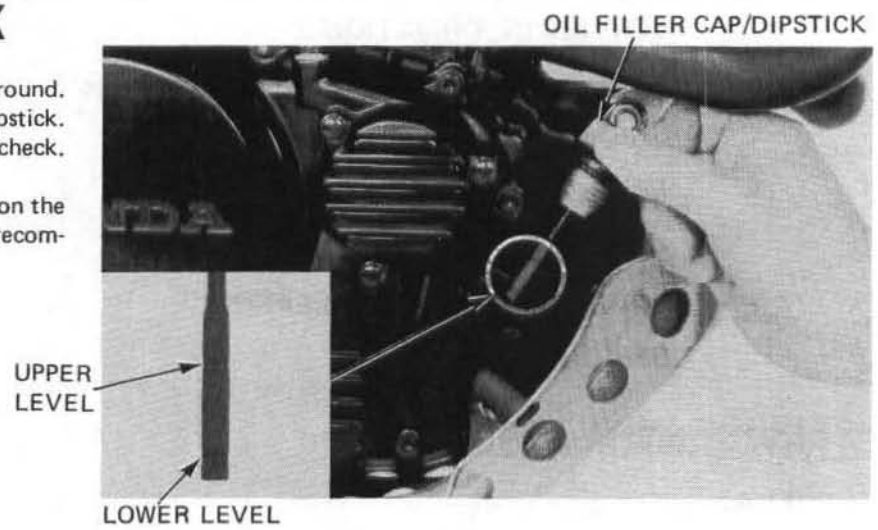
Oil Level Too Low
- Normal oil consumption
- External oil leaks
- Worn piston rings

Oil Contamination
- Oil not changed often enough
- Faulty head gasket

ENGINE OIL LEVEL CHECK

Support the motorcycle upright on level ground. Check the oil level with the oil filler cap/dipstick. Do not screw in the cap when making this check.

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



ENGINE OIL CHANGE

NOTE:

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

Remove the oil filler cap/dipstick and drain plug. After the oil has drained, check that the drain plug sealing washer is in good condition, and install the plug.

TORQUE: 20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)

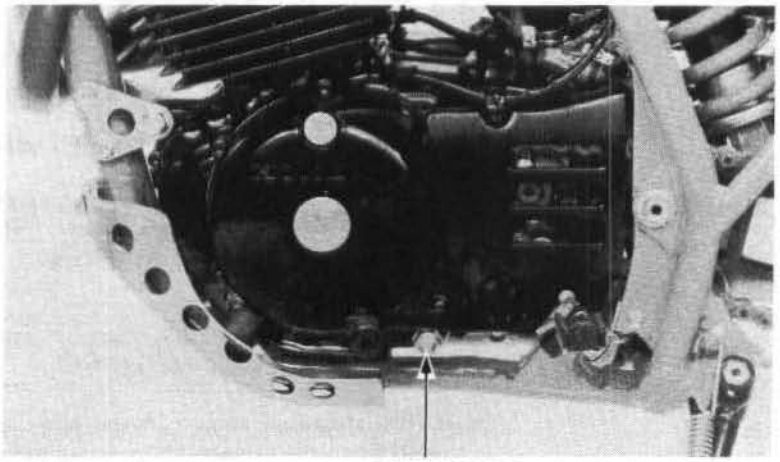
NOTE:

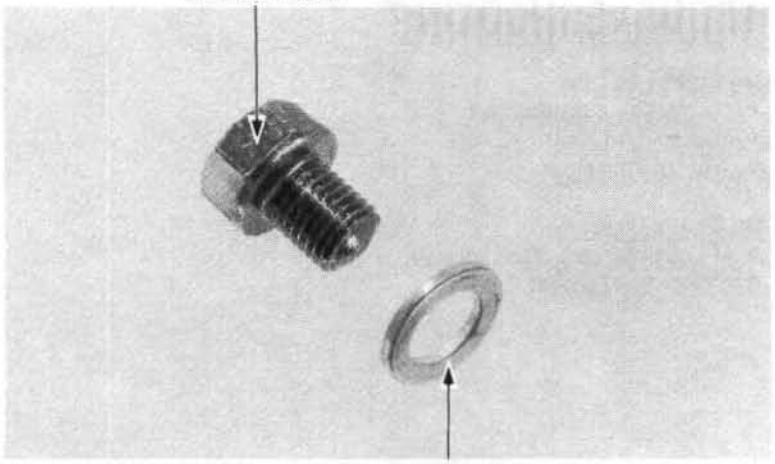
> Perform the oil filter maintenance, if required, before filling the crankcase.

Fill the crankcase with 1.6 liter (1.7 U.S. qt., 1.4 Imp. qt.) of the recommended oil.

Install the oil filler cap/dipstick.
Start the engine and let it idle for 2–3 minutes.

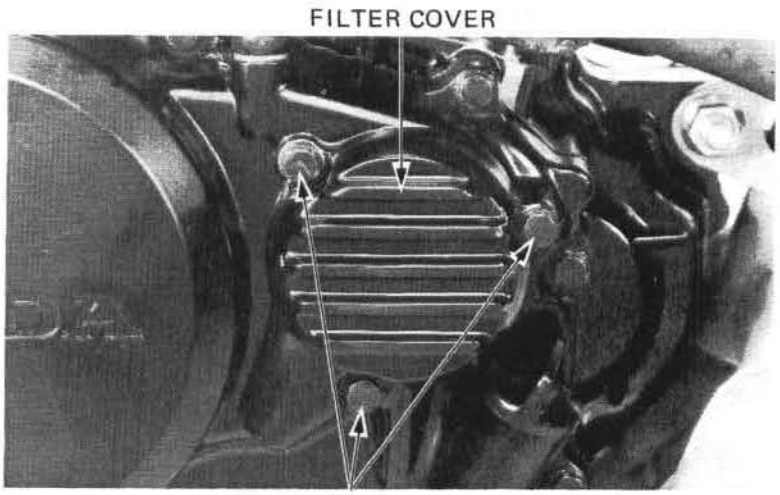
Stop the engine and wait a few minutes. Then check that the oil level is at the upper level mark with the motorcycle upright. Check that there are no oil leaks.





OIL FILTER CHANGE

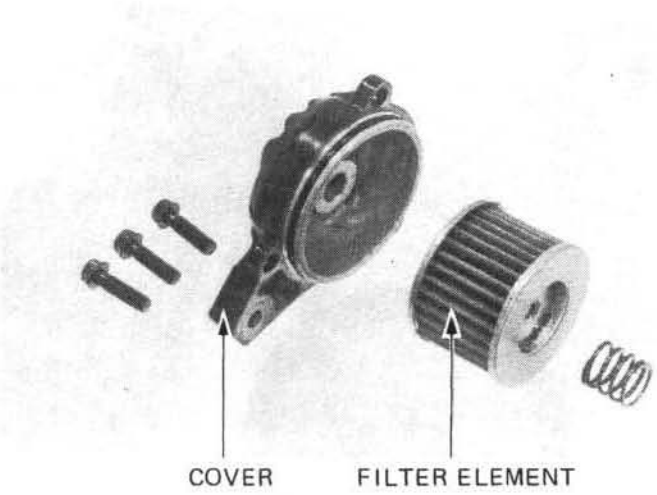
Drain the engine oil (Page 2-2). Remove the oil filter cover bolts and cover.



Install a new filter element, and install the oil filter cover, bolts and drain plug.

NOTE:

- Make sure that the O-ring on the oil filter cover and in the right crankcase cover are in good condition.
- Install the oil filter into the crankcase cover so that the side with the rubber seal is facing out, toward the oil filter cover.



ENGINE OIL STRAINER CLEANING

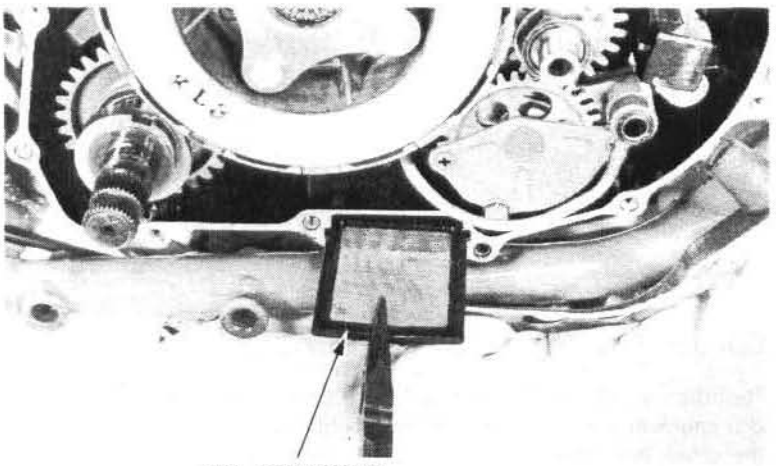
NOTE:

Clean the oil strainer whenever the right crankcase has been removed.

Remove the oil strainer and clean it.
Install the oil strainer.
Install a new right crankcase cover gasket.
Install the removed parts in the reverse order of disassembly.

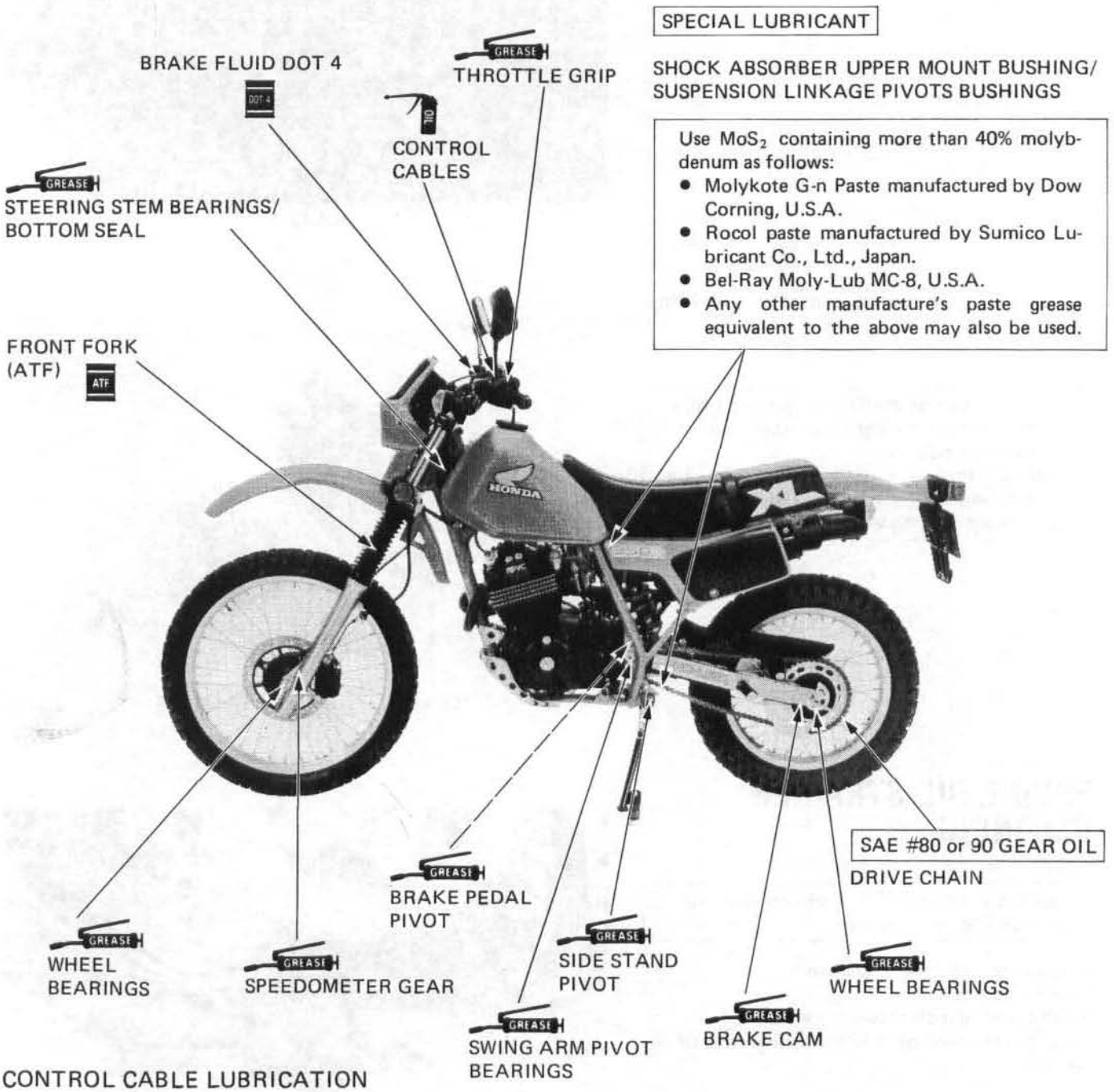
Adjust the brake pedal (Page 3-14), clutch lever (Page 3-15) and starter decompressor (Page 3-8).

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



LUBRICATION POINTS

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



CONTROL CABLE LUBRICATION

Periodically, disconnect the throttle and clutch control cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant.

3. MAINTENANCE

SERVICE INFORMATION

GENERAL

Engine oil level check . . . . . Page 2-2
Engine oil change . . . . . Page 2-2
Engine oil filter change . . . . . Page 2-3
Engine oil strainer cleaning . . . . . Page 2-3

SPECIFICATIONS

ENGINE

Ignition timing:	Initial:	8° BTDC at 1,300 rpm
	Full advance:	28° BTDC at 4,000 rpm
Spark plug:	Plug gap:	0.8–0.9 mm (0.031–0.035 in)

Plug type:

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

Valve clearance:	
INTAKE:	0.05 mm (0.002 in)
EXHAUST:	0.08 mm (0.003 in)
Throttle grip free play:	2–6 mm (1/8–1/4 in)
Idle speed:	1,300 ± 100 rpm
Kickstarter decompression valve lifter free play:	1–3 mm (1/32–1/8 in)

CHASSIS

Drive chain slack:	30–40 mm (1-1/4–1-5/8 in)
Rear brake pedal free play:	20–30 mm (3/4–1-1/4 in)
Clutch lever free play:	10–20 mm (3/8–3/4 in)
Side stand spring tension:	3–5 kg (6.6–11.0 lb)

Tire:

		Front	Rear
Tire size		3.00–21–4PR	4.60–17–4PR
Cold tire pressures psi (kPa, kg/cm²)	Up to 90 kg (200 lbs) load	21 (150, 1.5)	21 (150, 1.5)
	90 kg (200 lbs) load vehicle capacity load	21 (150, 1.5)	21 (150, 1.5)
Tire brand YOKOHAMA		Y-969	Y-969
Vehicle capacity load kg (lbs)		150 kg (330 lbs)	

TORQUE VALUES

Valve adjusting screw lock nut:	15–18 N·m (1.5–1.8 kg-m, 11–13 ft-lb)
Rear axle nut:	80–110 N·m (8.0–11.0 kg-m, 58–80 ft-lb)
Spoke nipple:	2.5–5.0 N·m (25–50 kg-cm, 29–57 in-lb)
Valve adjusting screw lock nut:	15–18 N·m (1.5–1.8 kg-m, 11–13 ft-lb)
Side stand pivot bolt:	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

TOOL

Wrench, 10 x 12 mm	07708–0030200 ┐
Adjusting wrench B	07708–0030400 ┘ 89201–200–000 and 07908–MB00100

MAINTENANCE SCHEDULE

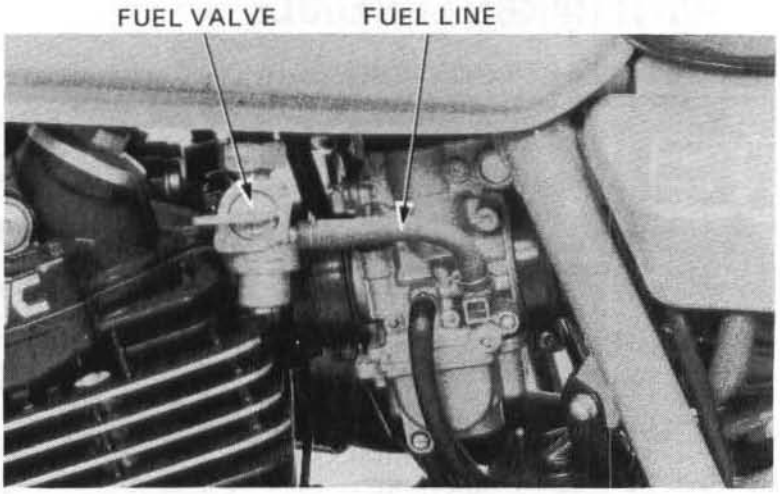
Perform the PRE-RIDE INSPECTION at each scheduled maintenance period.
I: Inspect and Clean, Adjust, Lubricate, or Replace if necessary.
C: Clean R: Replace L: Lubricate

		ITEM	FREQUENCY: WHICHEVER COMES FIRST / EVERY	ODOMETER READING (NOTE 4) 600 mi (1,000 km)	4,000 mi (6,400 km)	8,000 mi (12,800 km)	12,000 mi (19,200 km)	16,000 mi (25,600 km)	20,000 mi (32,000 km)	Refer to page
EMISSION RELATED ITEMS	*	FUEL LINE			I	I	I	I	I	3-4
	*	FUEL STRAINER		C	C	C	C	C	C	3-4
	*	THROTTLE OPERATION		I	I	I	I	I	I	3-4
	*	CARBURETOR-CHOKE			I	I	I	I	I	3-5
		AIR CLEANER	NOTE 1		C	C	C	C	C	3-6
		CRANKCASE BREATHER	NOTE 2		C	C	C	C	C	3-7
		SPARK PLUG			R	R	R	R	R	3-7
	*	VALVE CLEARANCE		I	I	I	I	I	I	3-7
		ENGINE OIL	YEAR R	R	REPLACE EVERY 2,000 mi (3,200 km)					2-2
		ENGINE OIL FILTER		R	R	R	R	R	R	2-3
	*	STARTER DECOMPRESSOR		I	I	I	I	I	I	3-8
	*	CARBURETOR-IDLE SPEED		I	I	I	I	I	I	3-9
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 5			I		I		3-9
NON-EMISSION RELATED ITEMS		DRIVE CHAIN	NOTE 3		I, L EVERY 300 mi (500 km)					3-10
		DRIVE CHAIN SLIPPER			I	I	I	I	I	3-12
		BATTERY	MONTH I	I	I	I	I	I	I	3-12
		BRAKE PAD/SHOE WEAR			I	I	I	I	I	3-12
		BRAKE FLUID (FRONT)	MONTH I 2 YEARS *R	I	I	I	*R	I	I	3-13
		BRAKE SYSTEM		I	I	I	I	I	I	3-13
	*	BRAKE LIGHT SWITCH		I	I	I	I	I	I	3-14
	*	HEADLIGHT AIM		I	I	I	I	I	I	3-15
		CLUTCH		I	I	I	I	I	I	3-15
		SIDE STAND			I	I	I	I	I	3-16
	*	SUSPENSION		I	I	I	I	I	I	3-16
	**	SPARK ARRESTER	NOTE 6		C	C	C	C	C	3-18
	*	NUTS, BOLTS, FASTENERS	NOTE 3	I	I	I	I	I	I	3-18
	**	WHEELS/SPOKES	NOTE 3	I	I	I	I	I	I	3-19
	**	STEERING HEAD BEARING		I		I		I		3-19

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

NOTE:
1. Service more frequently when riding in dusty areas.
2. Service more frequently when riding in rain or at full throttle.
3. Service more frequently when riding off-road.
4. For higher odometer readings, repeat at the frequency interval established here.
5. California model only.
6. U.S.A. only.

FUEL LINE/FUEL STRAINER



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

WARNING

Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks near the equipment while draining fuel.

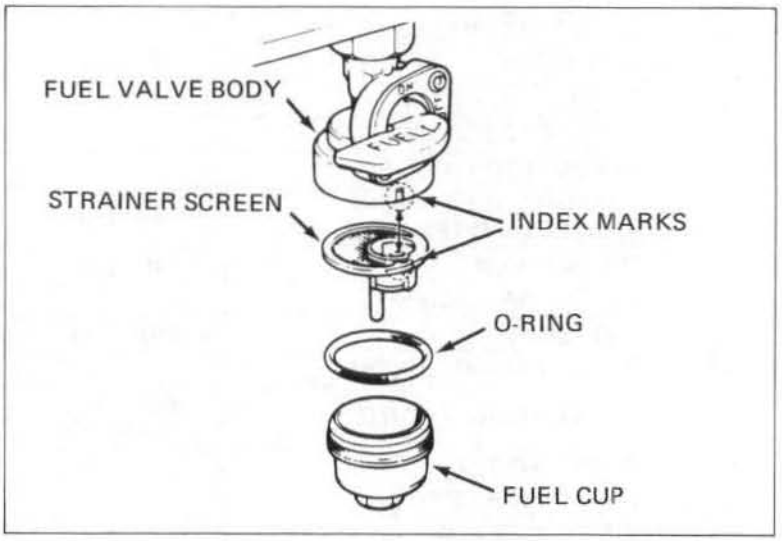
Wash the cup and strainer screen in clean non-flammable or high flash point solvent.
Reinstall the screen, aligning the index marks on the fuel valve body and strainer screen.
Install a new O-ring into the fuel valve body.
Reinstall the fuel cup, making sure the new O-ring is in place.
Hand tighten the fuel cup and then torque it to specification.

TORQUE: 3–5 N·m (0.3–0.5 kg-m, 2–4 ft-lb)

NOTE

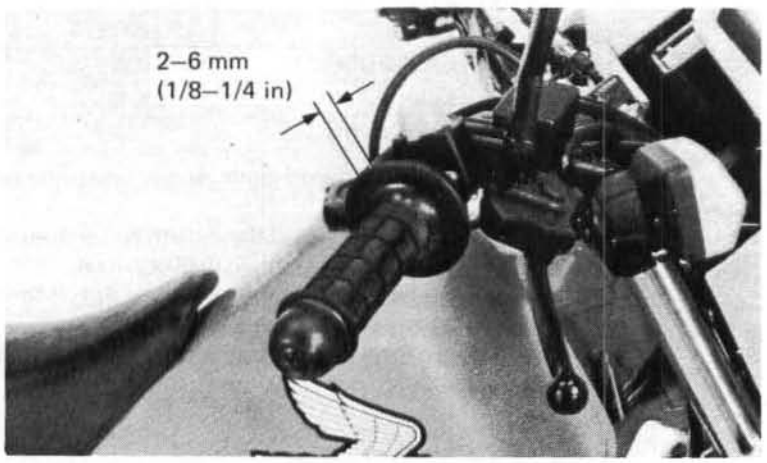
Do not overtighten the fuel cup.

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



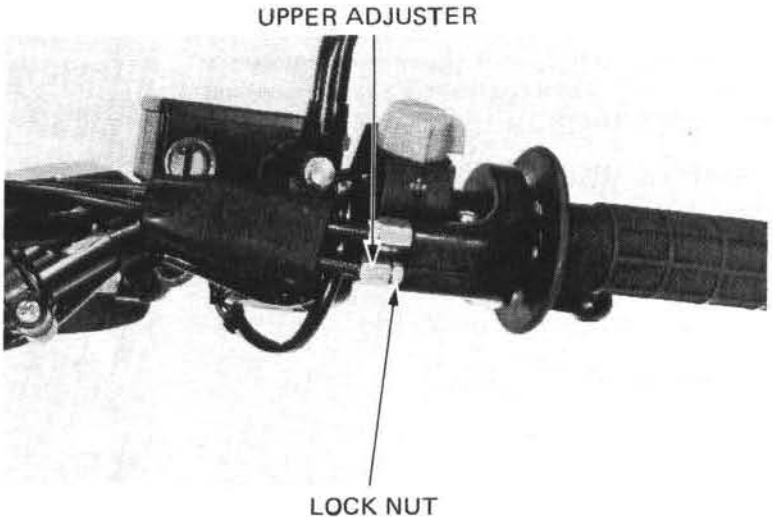
THROTTLE OPERATION

Check that the throttle grip opens smoothly to full throttle and fully closes automatically in all steering positions.
Make sure there is no deterioration, damage, or kinking in the throttle cables, and that the throttle grip free play is 2–6 mm (1/8–1/4 in) at the throttle grip flange.



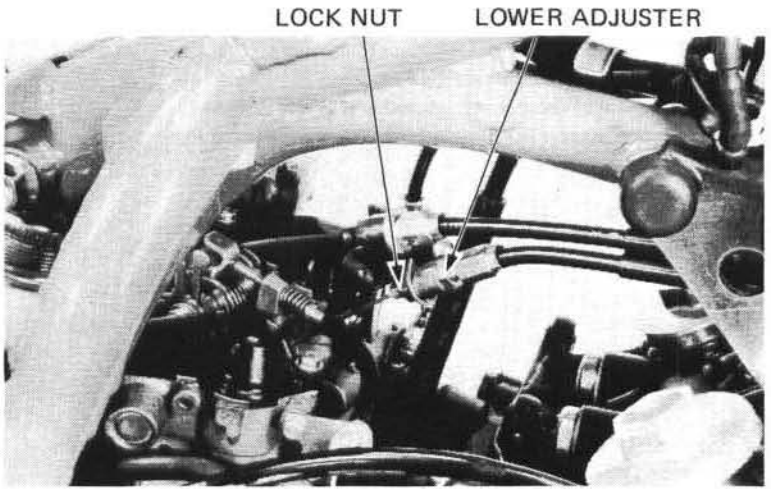
Throttle grip free play can be adjusted at either end of the throttle cable. Replace any damaged parts before beginning this adjustment.
Minor adjustments are made with the upper throttle cable adjuster.

Adjust free play by loosening the lock nut and turning the adjuster.
Tighten the lock nut.
Recheck throttle operation.



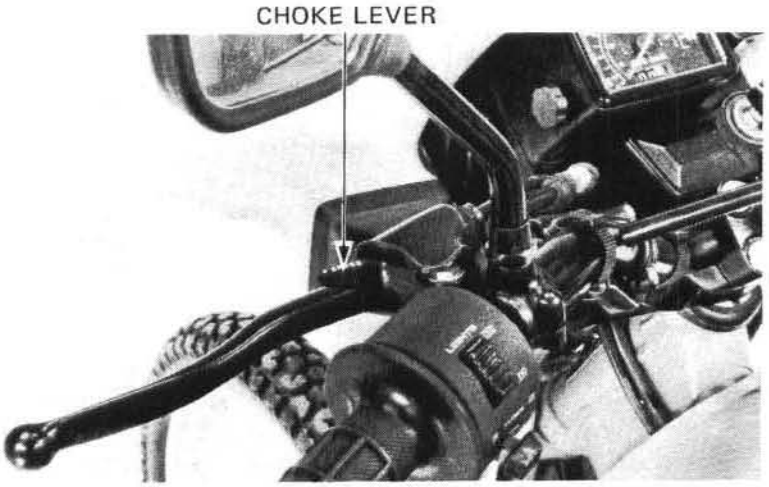
Major adjustments are made with the lower adjuster.
Remove seat and fuel tank.
Adjust free play by loosening the lock nut and turning the adjuster.
Tighten the lock nut.

Recheck throttle operation. Replace any damaged parts.
Reinstall fuel tank and seat.
Check for fuel leaks.



CARBURETOR-CHOKE

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

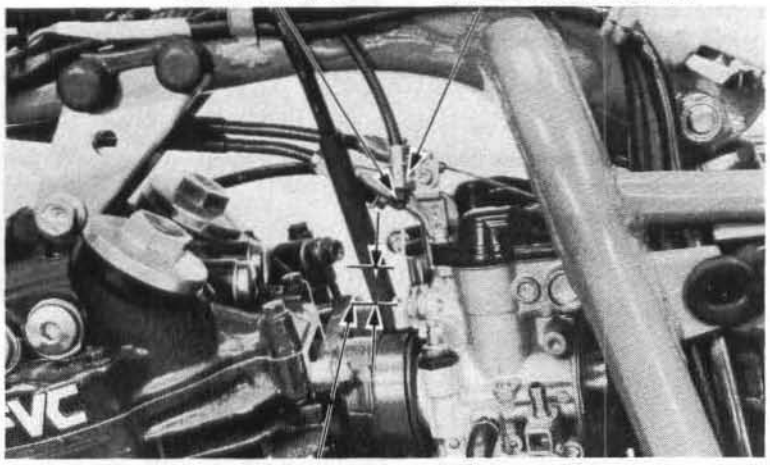


Remove the seat and fuel tank.
Pull the choke lever on the handlebar all the way back to the fully open position and measure the choke valve stroke between the fully closed and fully open positions.

CHOKE VALVE STROKE: 5–7 mm (3/16–1/4 in)

Adjust if necessary by loosening the choke cable clamp on the carburetor and moving the cable casing.
Recheck the choke valve stroke.

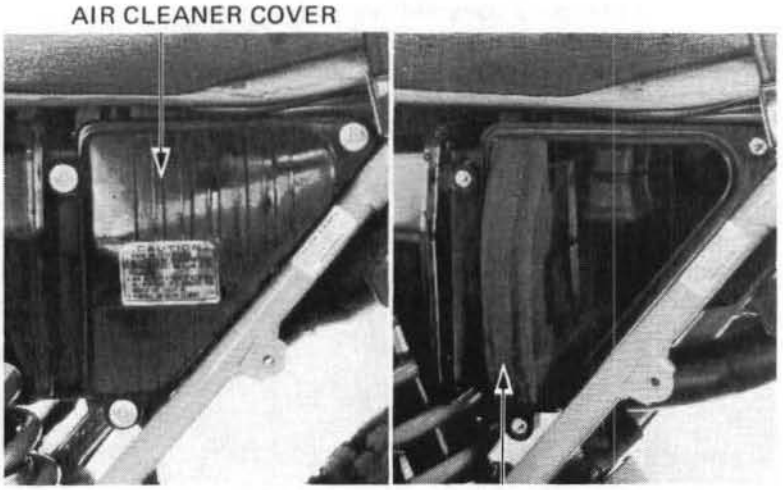
Install the fuel tank and seat.



CHOKE VALVE STROKE

AIR CLEANER

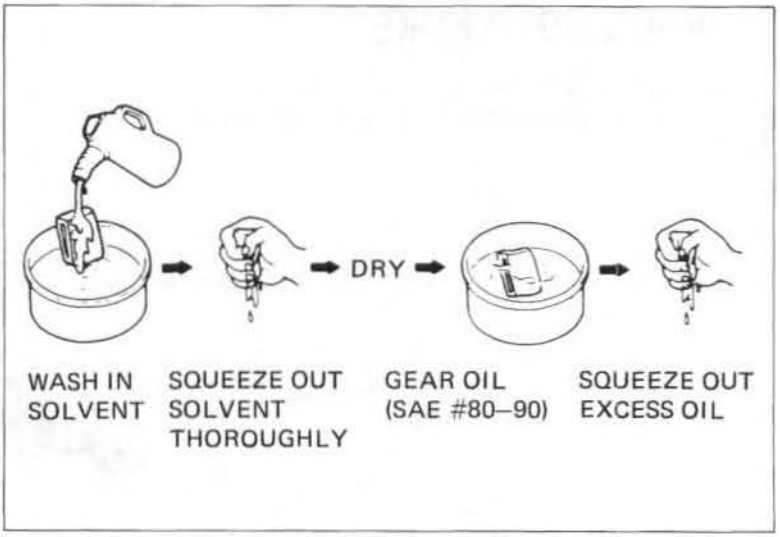
Remove the left-side cover.
Remove the air cleaner cover screws and the cover.
Remove the element holder and air cleaner element.



AIR CLEANER ELEMENT

Wash the element in non-flammable or high flash point solvent, and let it dry.
Soak the element in gear oil (SAE #80–90) and squeeze out the excess.

Installation is the reverse order of disassembly.



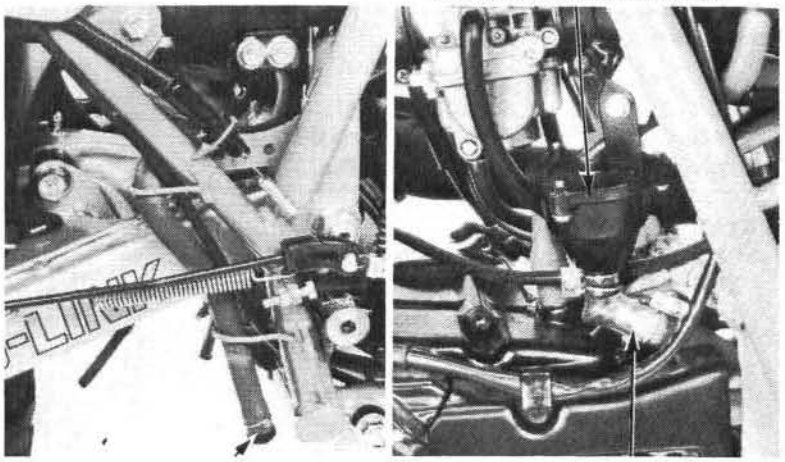
CRANKCASE BREATHER

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

NOTE

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

BREATHER SEPARATOR



DRAIN PLUG

TRANSPARENT SECTION

SPARK PLUG

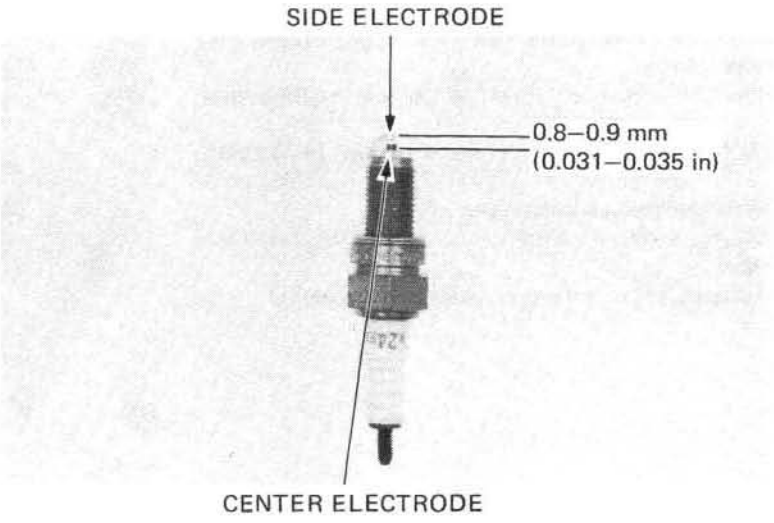
Disconnect the spark plug cap and clean any dirt from around the spark plug base.
Remove and discard the spark plug.
Measure the spark plug gap with a wire-type feeler gauge.
Adjust the gap by carefully bending the side electrode.

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

RECOMMENDED SPARK PLUG:

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

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



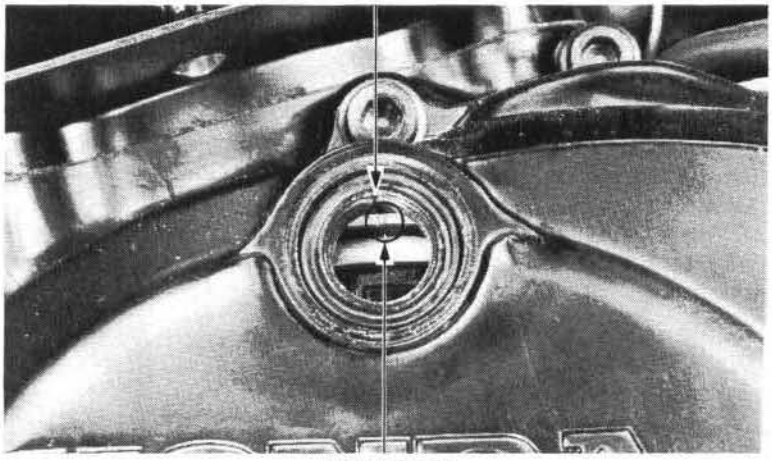
VALVE CLEARANCE

NOTE

> - Inspect and adjust valve clearance while the engine is cold (Below 35°C/95°F).
> - Make sure that the decompressor valves lifters have free play (page 3-8).

Remove the seat.
Turn the fuel valve "OFF", disconnect the fuel line and remove the tank.
Remove the crankshaft and timing mark hole caps.
Remove the valve adjusting covers.
Rotate the flywheel counterclockwise to align the "T" mark with the index mark on the left crankcase cover. Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

INDEX MARK



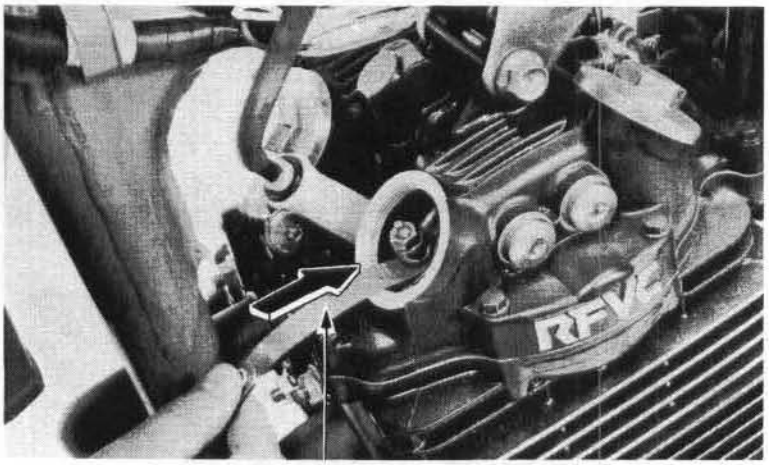
"T" MARK

Check the clearance of all four valves by inserting a feeler gauge between the rocker arm and sub rocker arm.

NOTE

When checking the clearance, slide the feeler gauge in the arrow direction as shown.

VALVE CLEARANCES:
INTAKE: 0.05 mm (0.002 in)
EXHAUST: 0.08 mm (0.003 in)



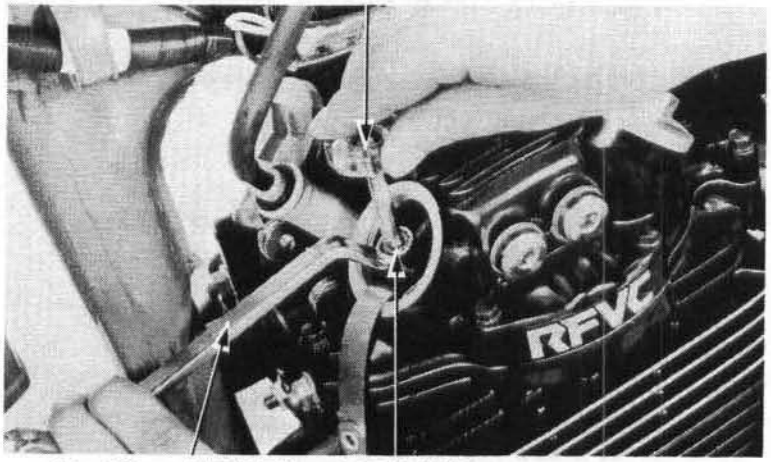
FEELER GAUGE

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

TORQUE: 15–18 N·m (1.5–18 kg-m, 11–13 ft-lb)

Recheck the valve clearance.
Adjust starter decompressor valve lifter lever free play.
Install parts in the reverse order of disassembly.

VALVE ADJUSTING WRENCH
07708–0030400 or 89201–200–000



10 x 12 mm WRENCH
07708–0030200 or
07908–MB00100

LOCK NUT

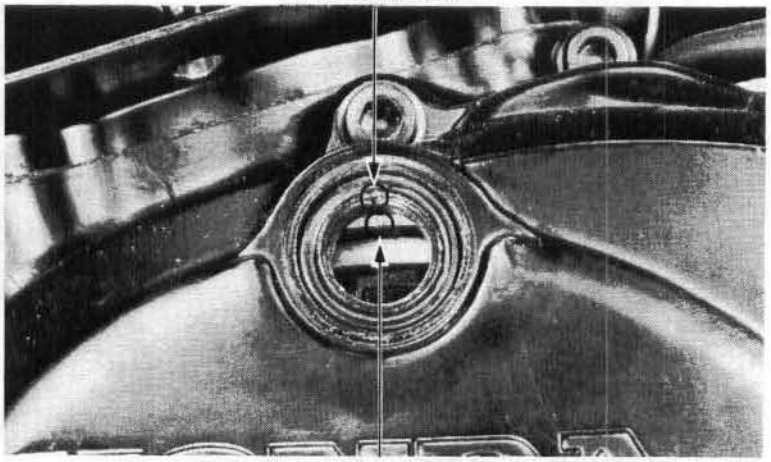
STARTER DECOMPRESSOR

NOTE

Always adjust the decompressor linkage after adjusting the valve clearance.

Remove the crankshaft and timing mark hole caps. Rotate the flywheel counterclockwise to align the "T" mark with the index mark. Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

INDEX MARK



"T" MARK

Measure the free play at the tip of the decompressor valve lifter.

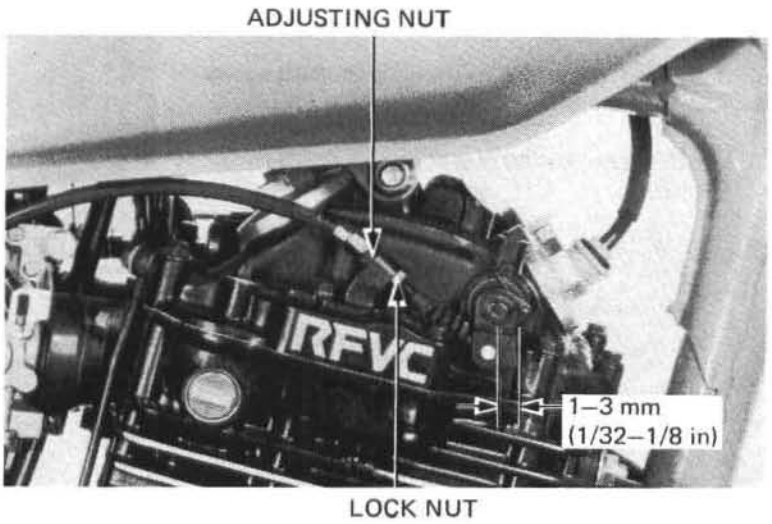
FREE PLAY: 1–3 mm (1/32–1/8 in)

Adjust by loosening the lock nut and turning the adjusting nut.

CAUTION

Excessive free play causes hard starting. Insufficient free play may cause erratic engine idling and valve damage.

Tighten the lock nut. Operate the kick starter and check the operation of the decompressor mechanism.
Recheck free play.



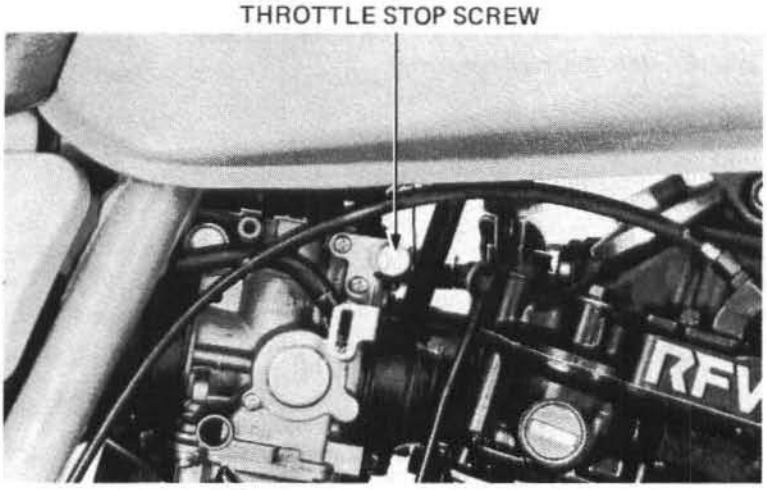
CARBURETOR IDLE SPEED

NOTE

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

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

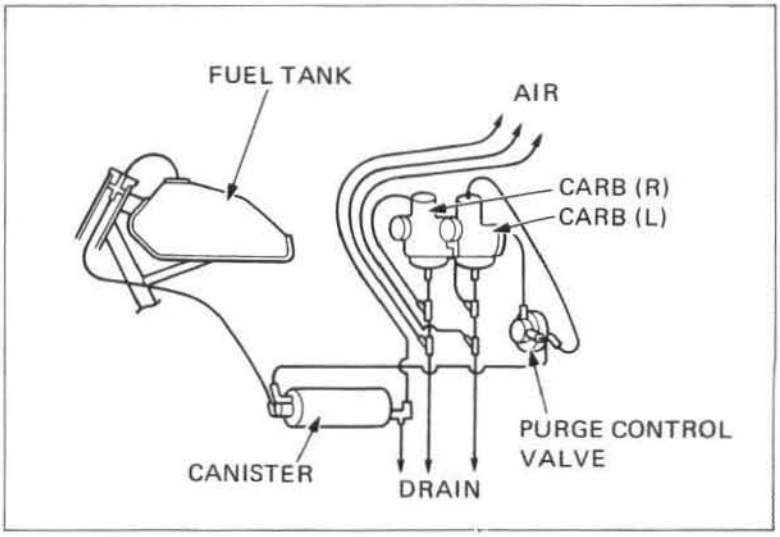
IDLE SPEED: 1,300 ± 100 rpm



EVAPORATIVE EMISSION CONTROL SYSTEM
(California model only)

Check all tubes to be sure they are securely connected and are not kinked or clogged.
Replace any damaged or deteriorated tubes.

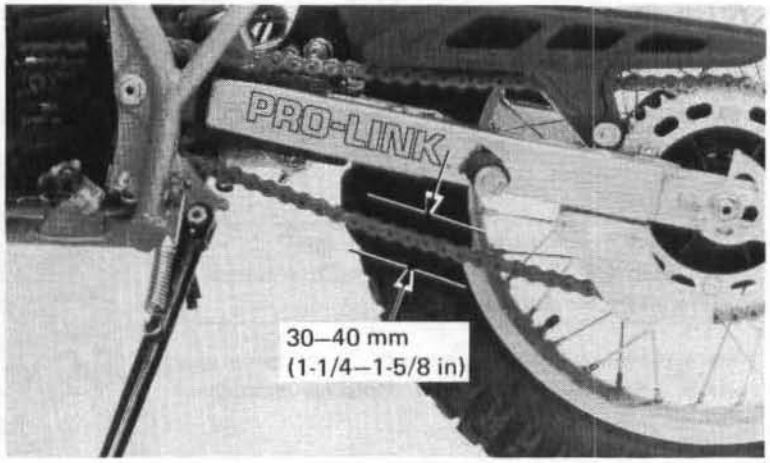
If a purge control valve problem is suspected, refer to test procedures on page 4-16.



DRIVE CHAIN

Measure the slack in the lower drive chain run midway between the sprockets.

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



Adjust as follows:
Loosen the rear axle nut, then turn both adjusters equally until chain slack is correct.

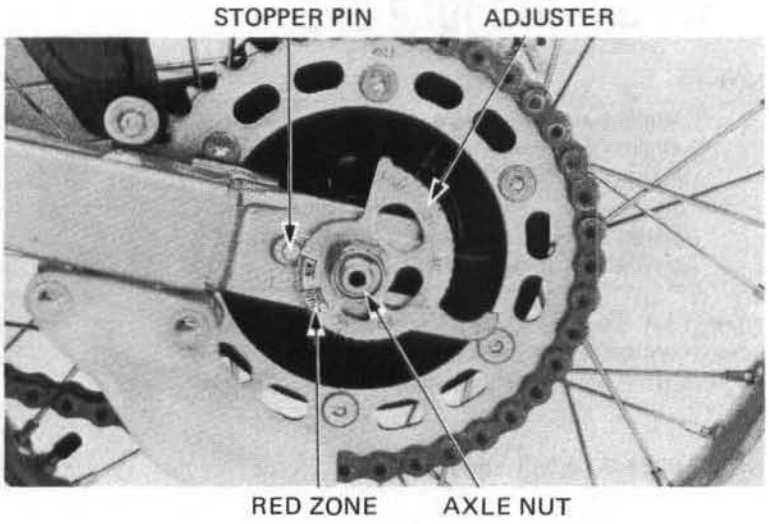
CAUTION

Be sure the same adjuster index marks align with the stopper pins on both sides of the swingarm.

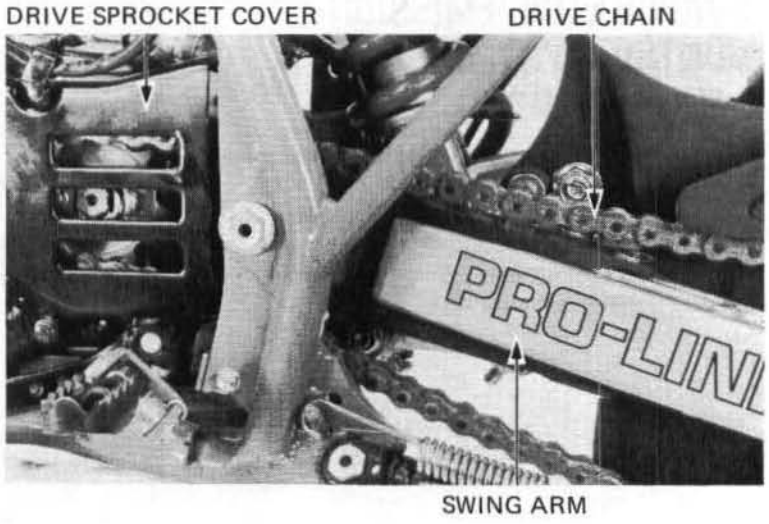
Tighten the axle nut.

TORQUE: 80–110 N·m (8.0–11.0 kg-m, 58–80 ft-lb)

Replace the drive chain when the red zone on the label aligns with the center of the stopper pin after the chain has been adjusted to 30–40 mm (1-1/4–1-5/8 in) slack.



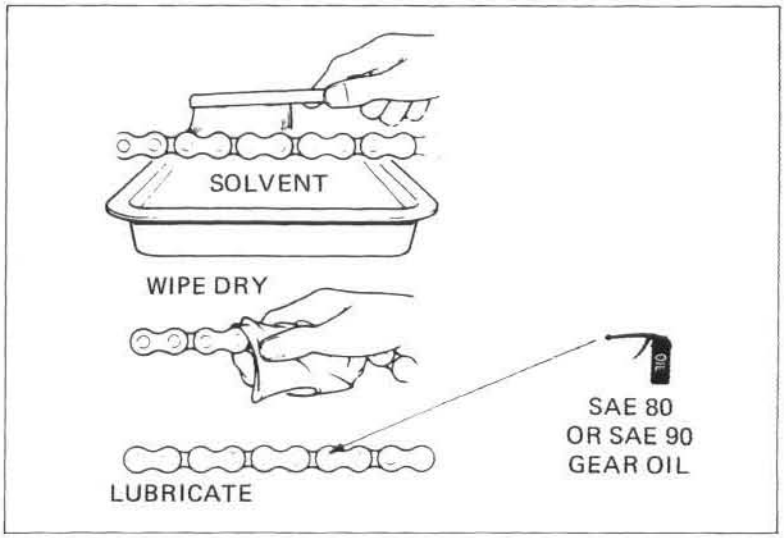
When the drive chain becomes extremely dirty, it should be removed and cleaned prior to lubrication.
Remove the drive sprocket cover.
Remove the rear shock absorber (Page 13-11) and swing arm (Page 13-15).
Remove the drive chain.



Clean the drive chain with a non-flammable or high flash point solvent that will not damage the O-rings and wipe dry.

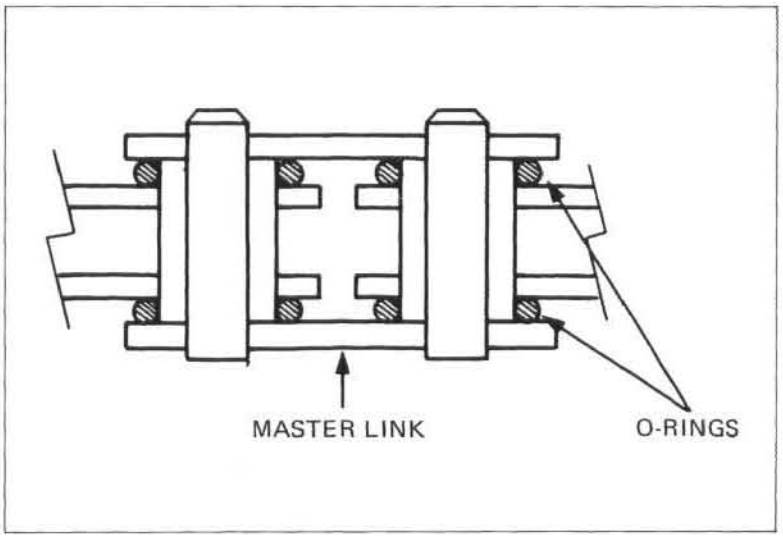
CAUTION

- *Do not use a steam cleaner, high pressure washers or aerosol chain lubricants as these will damage the O-rings.*
- *Do not use commercial aerosol chain lubricants. They contain solvents which could damage the O-rings.*



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

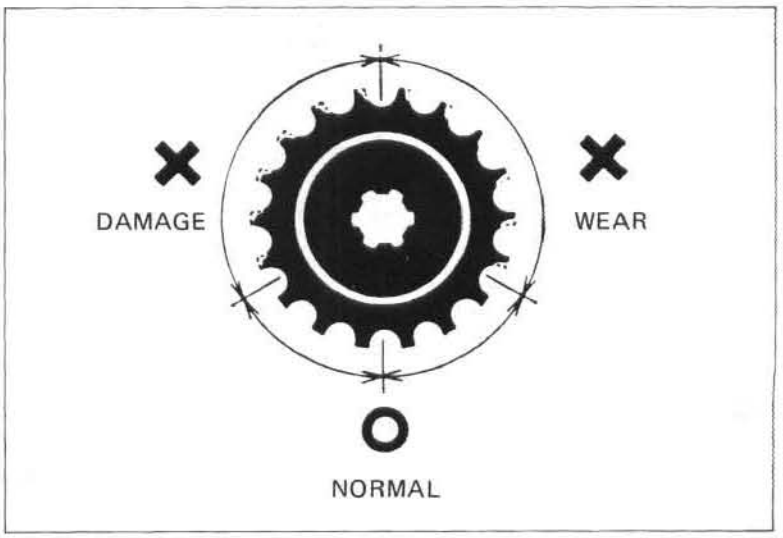
Lubricate the drive chain with SAE 80 or 90 gear oil.



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.

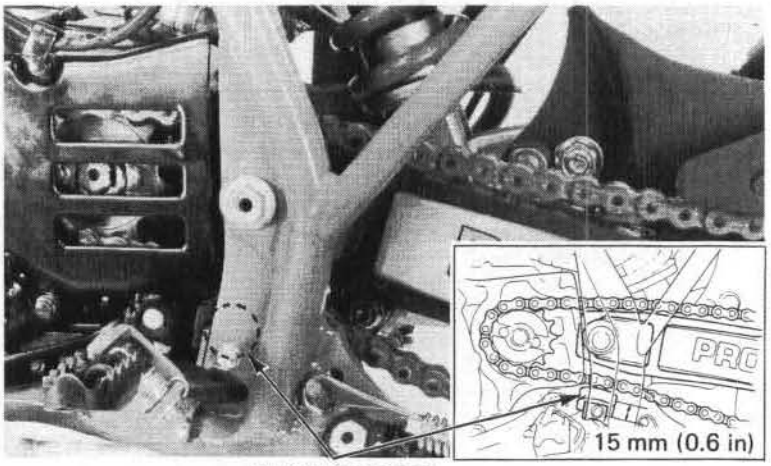


DRIVE CHAIN SLIPPER

Turn the ignition switch off. Raise the rear wheel off the ground by placing a support block under the engine.
Shift the transmission into neutral.
Inspect the chain slipper for wear or damage.

SERVICE LIMIT: 15 mm (0.6 in)

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



CHAIN SLIPPER

BATTERY

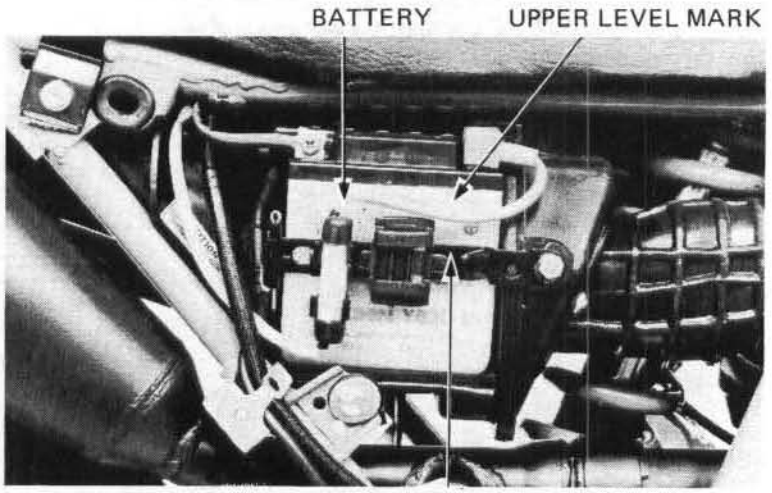
Remove the right side cover.
Inspect the battery electrolyte level.
When the electrolyte level nears the lower level mark, remove the battery and add distilled water to the upper level mark.

CAUTION

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

WARNING

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



LOWER LEVEL MARK

BRAKE SHOE/PAD WEAR

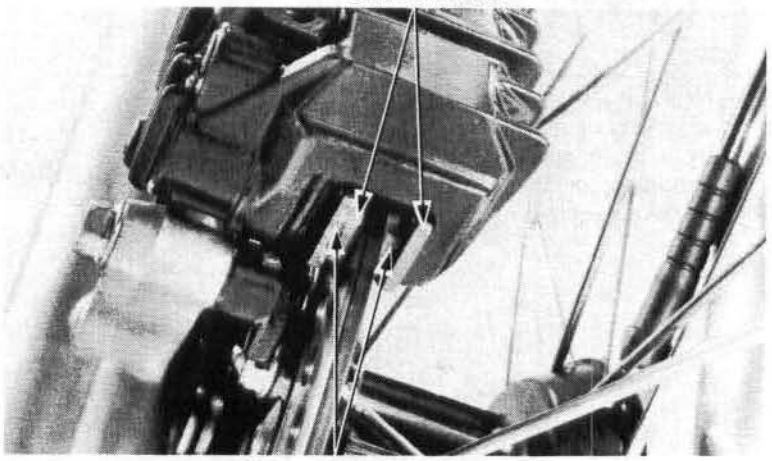
BRAKE PAD WEAR

Check the brake pads for wear by looking under the caliper.
Replace the brake pads if the brake pads are worn down to the groove (page 14-5).

CAUTION

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

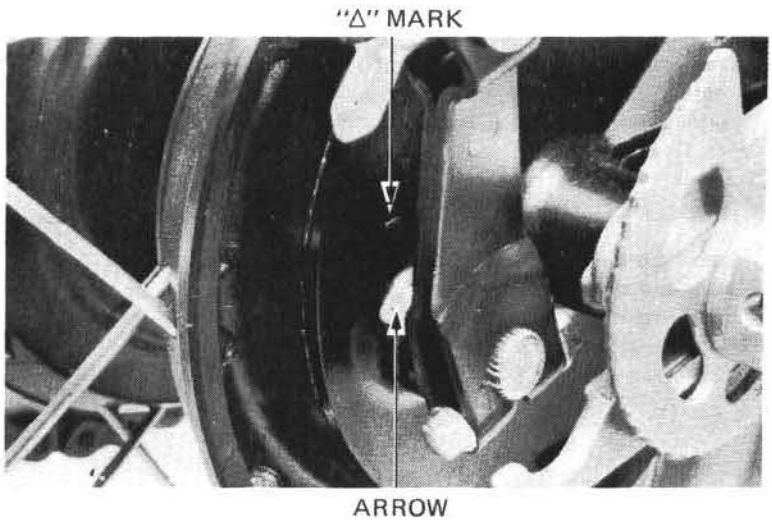
Refer to section 14 for brake bleeding procedures.



WEAR GROOVES

BRAKE SHOE WEAR

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

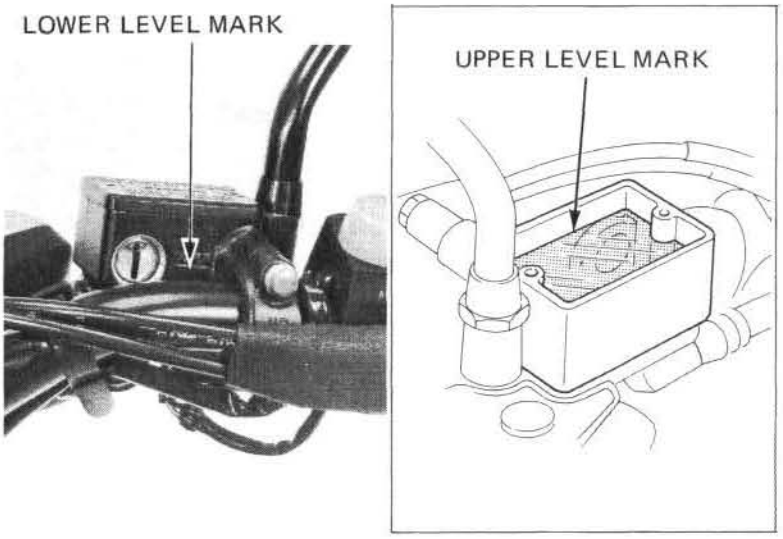


BRAKE FLUID

Check the front brake fluid reservoir level.
If the level is very low, check the entire system for leaks.
If the level is near the lower level mark, remove the cover and diaphragm.
Fill the reservoir with DOT 4 BRAKE FLUID from a sealed container to above the lower level mark.

CAUTION

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*



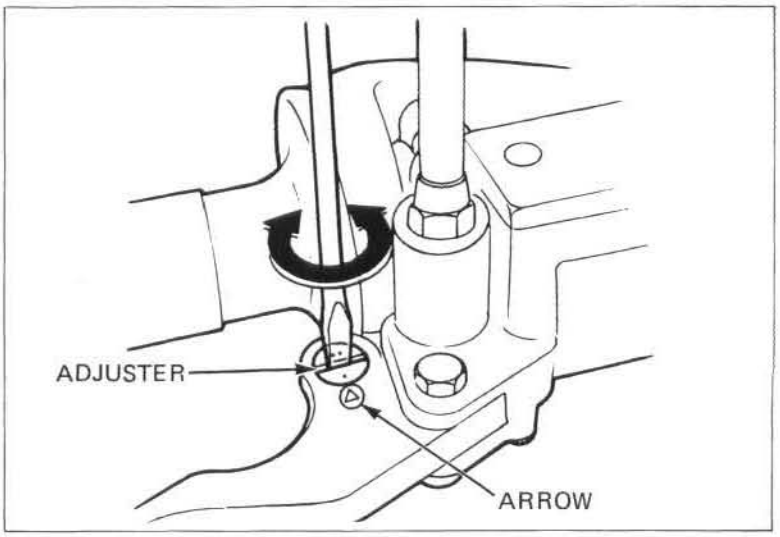
BRAKE SYSTEM

FRONT BRAKE LEVER FREE PLAY

Front brake lever adjuster:
The front brake lever adjuster has two positions. To increase free play, align the mark "●" with the arrow on the brake lever bracket. To decrease free play, align the mark "●●" with the arrow.
Do not leave the adjuster between the two positions.

BRAKE SYSTEM LINES

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

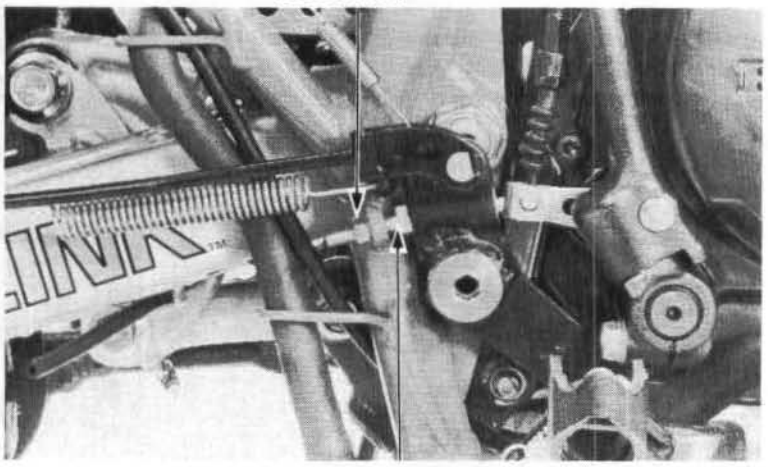


BRAKE LINKAGE

Check the brake rod, and brake pedal for loose connections, excessive play, or damage.
Replace or repair if necessary.

BRAKE PEDAL HEIGHT

Loosen the lock nut and adjust the pedal height by turning the stopper bolt.
Tighten the lock nut.
Adjust the brake pedal free play.



BRAKE PEDAL FREE PLAY

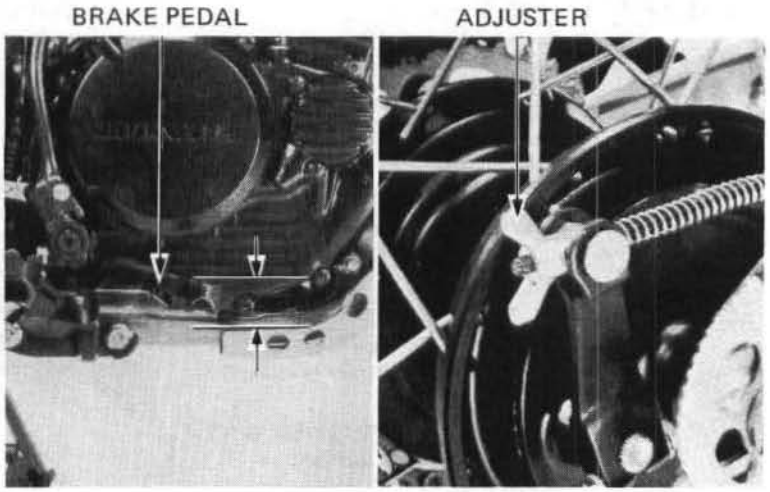
NOTE

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

Measure the rear brake pedal free play.

FREE PLAY: 20–30 mm (3/4–1-1/4 in)

Adjust the free play by turning the adjuster.



BRAKE LIGHT SWITCH

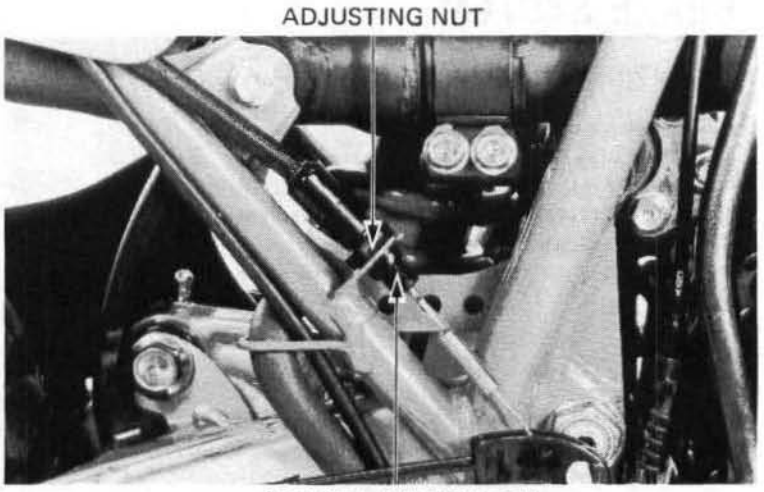
NOTE

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

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

CAUTION

> *Do not turn the switch body.*



HEADLIGHT AIM

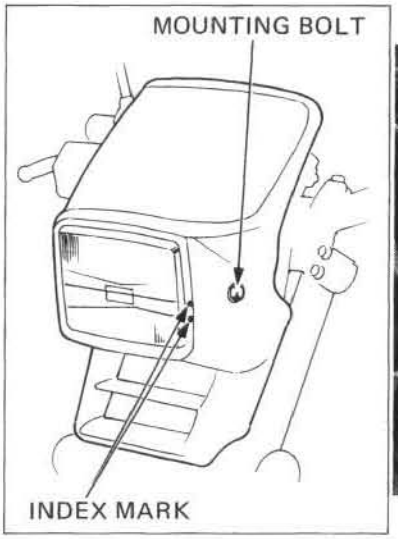
Adjust vertically by loosening both headlight case mounting bolts and tilting the headlight.
The lens lines should be aligned with the index marks on the headlight case.
Adjust horizontally by turning the adjusting screw on the headlight rim.

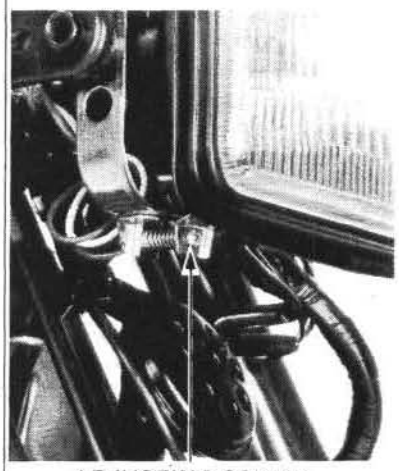
NOTE

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

WARNING

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



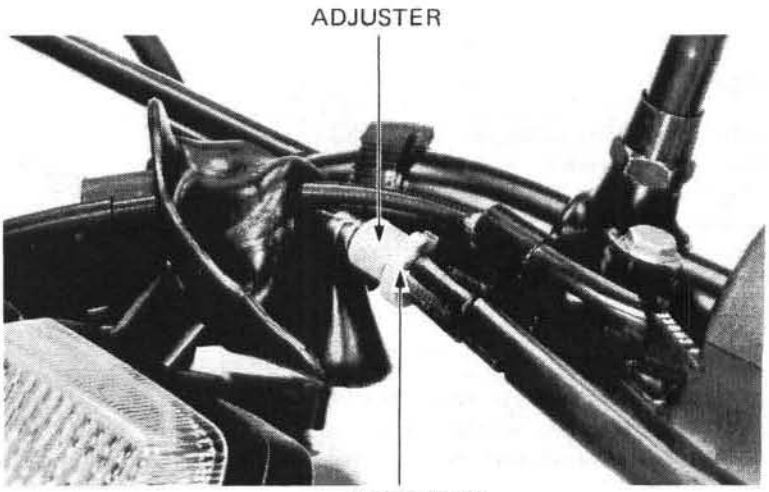

ADJUSTING SCREW

CLUTCH

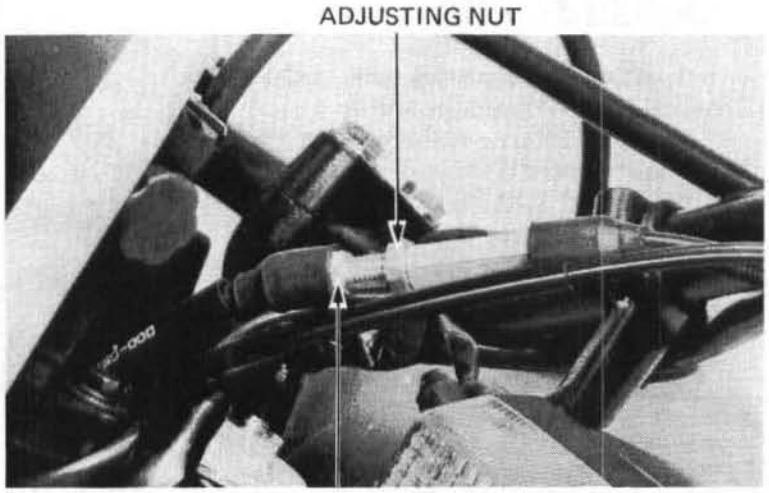
Measure the clutch free play at the lever end.

FREE PLAY: 10–20 mm (3/8–3/4 in)

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



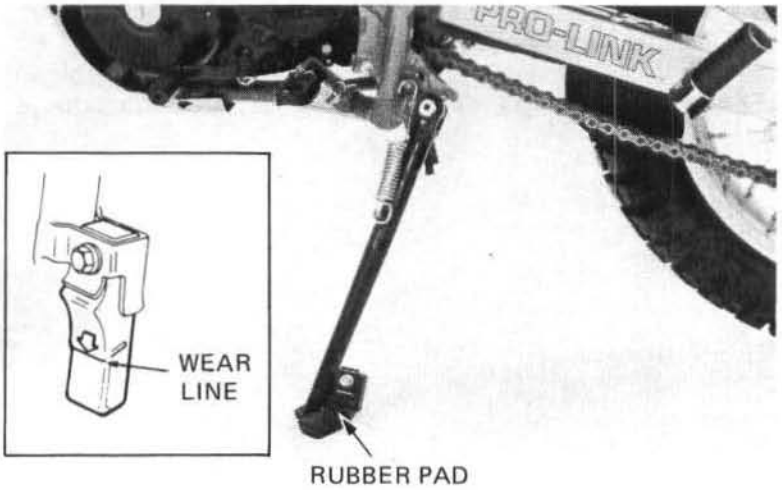
Major adjustments are made with the lower adjuster. If major adjustment is required, turn the upper adjuster in all the way and back out 1 turn.
Loosen the lock nut and turn the lower adjuster to obtain the specified free play.
Tighten the lock nut.
Check clutch operation.



SIDE STAND

Check the rubber pad for deterioration or wear. If wear extends to the wear line, replace with a pad marked "Over 260 lbs Only".
Check the side stand spring for damage and loss of tension.
Check the side stand for damage and freedom of movement.

Make sure the force required to fold up the side stand is within 3.0–5.0 kg (6.6–11.0 lb) when pulling with a spring scale.
Lubricate the side stand pivot.



SUSPENSION

FRONT

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

WARNING

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

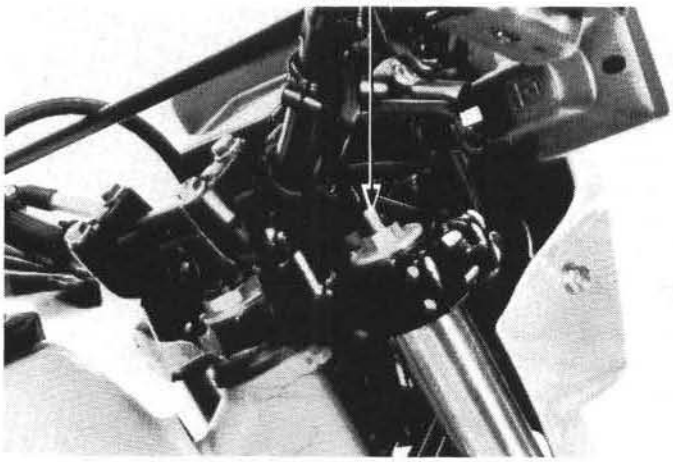
Raise the front wheel off the ground.
Adjust the air pressure to suit riding conditions.

RECOMMENDED PRESSURE:
0–6 psi (0–40 kPa, 0–0.4 kg/cm^2)

NOTE

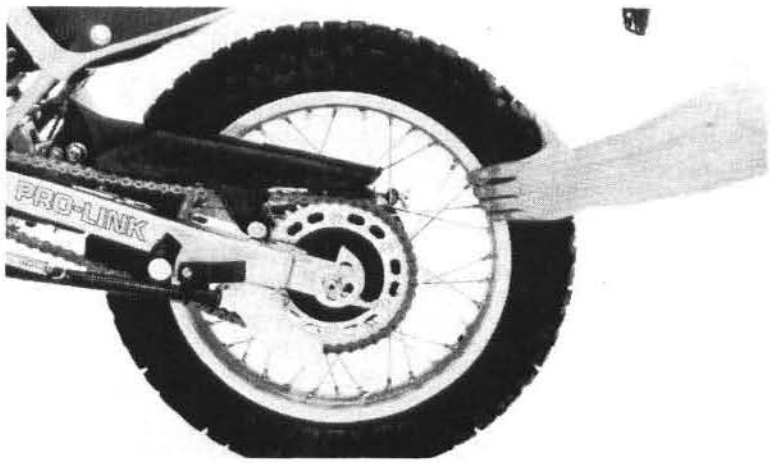
Do not exceed the recommended air pressure or the ride will be harsh and uncomfortable.

AIR VALVE



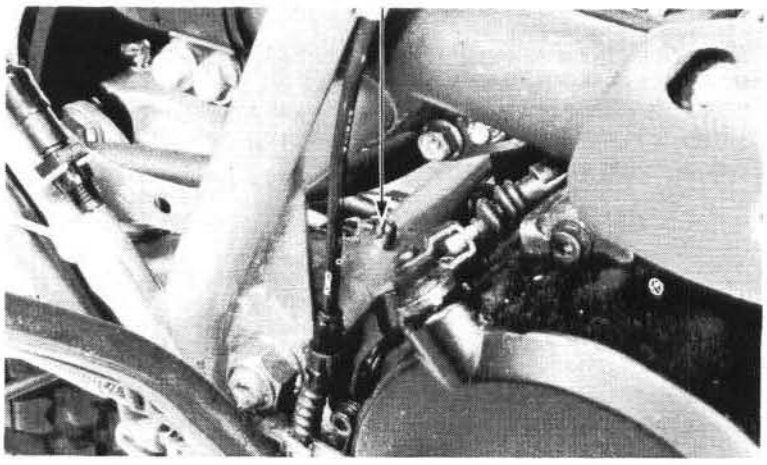
REAR

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



Grease the swing arm pivot bearings through the swing arm grease fitting.

GREASE FITTING



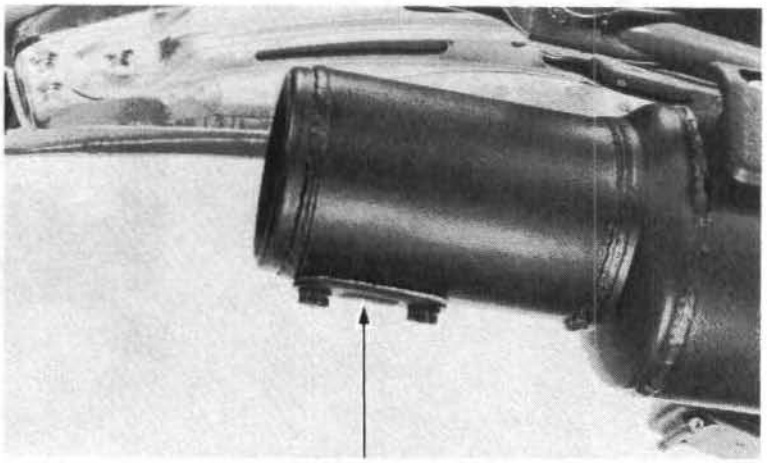
SPARK ARRESTER CLEANING

(U.S.A. only)

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

WARNING

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

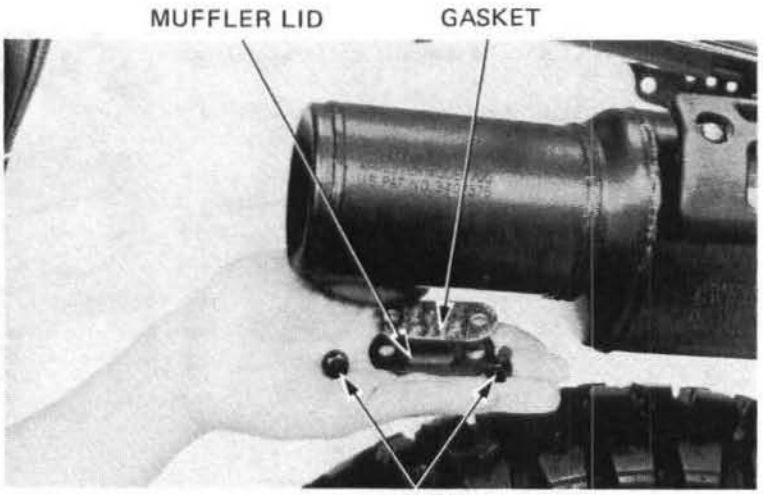


MUFFLER LID

After cleaning the spark arrester install the muffler lids and gasket.

NOTE

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



NUTS, BOLTS, FASTENERS

Tighten the bolts, nuts and fasteners at the intervals shown in the Maintenance Schedule (Page 3-3).
Check that all chassis nuts and bolts are tightened to their correct torque values (Page 1-5 and 6).
Check all cotter pins and safety clips.

WHEEL/SPOKES

TIRE PRESSURE

NOTE

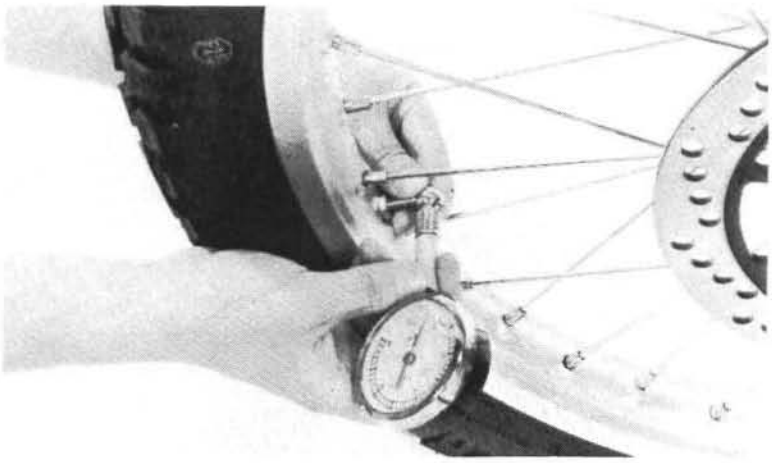
Tire pressure should be checked when the tires are COLD.

		Front	Rear
Tire size		3.00-21-4PR	4.60-17-4PR
Cold tire pressures psi (kPa, kg/cm^2)	Up to 90 kg (200 lbs) load	21 (150, 1.5)	21 (150, 1.5)
	90 kg (200 lbs) load to vehicle capacity load	21 (150, 1.5)	21 (150, 1.5)
Tire brand YOKOHAMA		Y-969	Y-969
Vehicle capacity load kg (lbs)		150 kg (330 lbs)	

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

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

TORQUE: 2.5–5.0 N·m
(25–50 kg-cm, 29–57 in-lb)



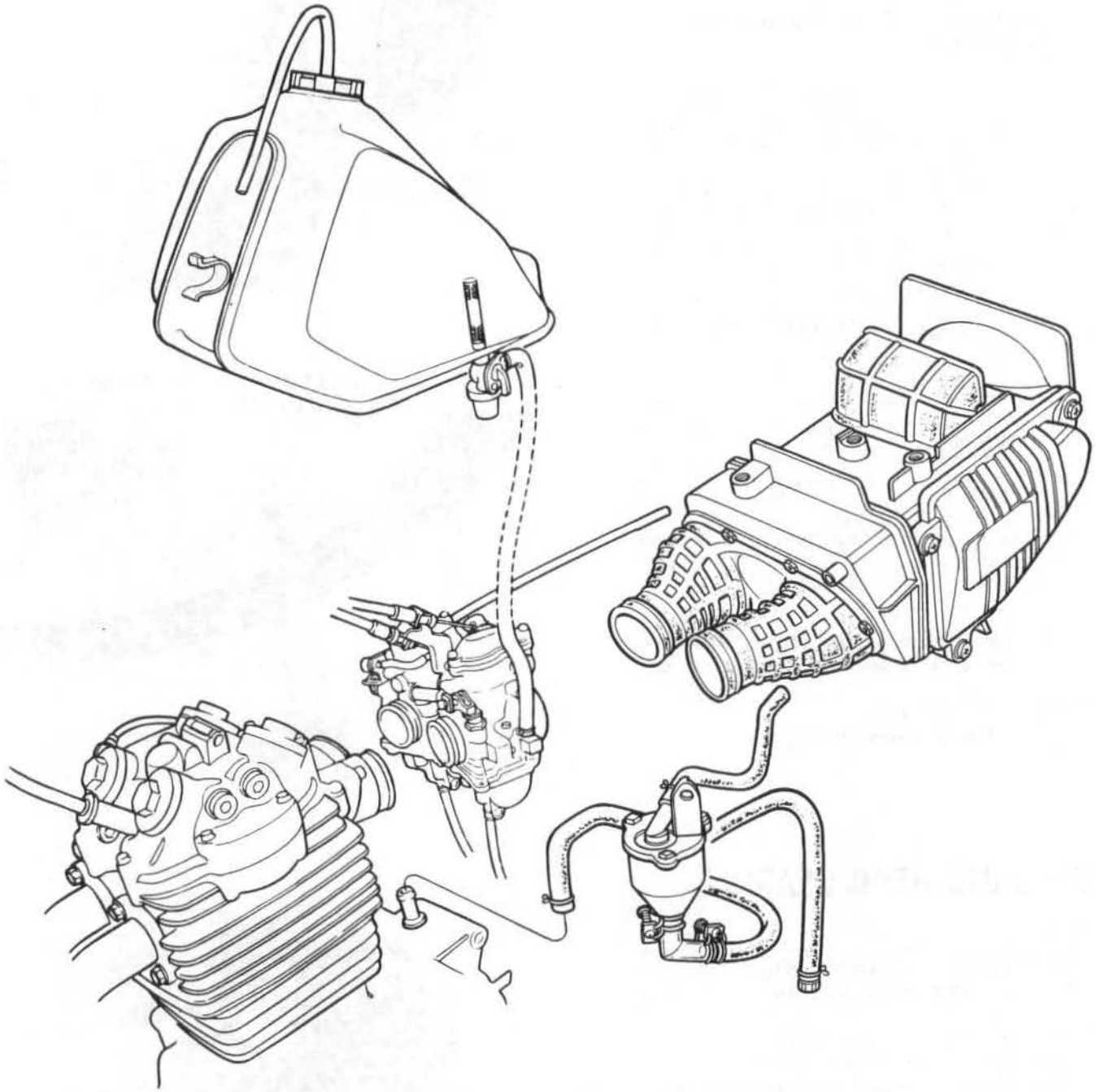
SPOKE WRENCH 5.8 x 6.1 mm 07701–0020300
OR COMMERCIALLY AVAILABLE IN U.S.A.

STEERING HEAD BEARING

NOTE

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

Raise the front wheel off the ground.
Check that the handlebar rotates freely.
If the handlebar moves unevenly, binds or has vertical movement, adjust the steering head bearings by turning the steering head adjusting nut with a pin spanner.



4. FUEL SYSTEM

SERVICE INFORMATION

GENERAL

WARNING

Keep gasoline away from flames or sparks. Wipe up spilled gasoline at once.

- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- When disassembling the primary and secondary carburetors at the same time, make sure to reassemble the parts correctly.
- The carburetor float bowls have drain plugs that can be loosened to drain residual gasoline.

SPECIFICATIONS [ ]: California model

Fuel tank capacity	11.0 ℓ (2.9 U.S. gal, 2.4 Imp. gal.)
Reserve capacity	2.0 ℓ (0.5 U.S. gal, 0.4 Imp. gal.)
Carburetor	
Type	Piston valve
Venturi dia.	Pri 24 mm (0.94 in), 2nd 24 mm (0.94 in)
Identification number	PH80A [PH81A]
Float level	18.0 mm (0.71 in)
Air screw opening	See page 4-11
Main jet	Pri #112 2nd #110
Slow jet (Pri)	#42
Idle speed	1,300 ± 100 rpm
Air cut-off valve operating pressure	430 mm Hg (16.9 in Hg)
Throttle grip free play	2–6 mm (1/8–1/4 in)

TOOL

Float level gauge	07401–0010000
Pressure pump	ST–AH–255–MC7 } U.S.A. only
Vacuum pump	ST–AH–260–MC7 }

TORQUE VALUE

Fuel tank mounting bolt	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

TROUBLESHOOTING

Engine Cranks But Won't Start
- No fuel in tank
- No fuel to cylinder
- Too much fuel getting to cylinder
- No spark at plug (ignition malfunction)
- Air cleaner clogged

Engine Idles Faster, Roughly, Stalls, or Runs Poorly
- Idle speed incorrect
- Ignition malfunction
- Cylinder compression too low
- Rich mixture
- Lean mixture
- Air cleaner clogged
- Air leaking into manifold
- Fuel contaminated
- Secondary carburetor touch-point too late
- Secondary carburetor not closed properly
- Fuel tank breather tube clogged

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

Rich Mixture
- Worn or damaged choke valve
- Float valve faulty
- Float level too high
- Carburetor air jets clogged
- Sticking float
- Dirty air cleaner

Idle Speed Too High
- Incorrect throttle stop screw adjustment
- Faulty choke valve
- Choke valve stuck open
- Faulty full close adjusting screw (Adjustment, Page 4-10)

Engine Does Not Slow Down Smoothly
- Faulty full close adjusting screw
- Incorrect air screw adjustment

Engine Lacks Power at Low and Idle Speeds
- Faulty secondary carburetor touch lever (Adjustment, Page 4-10)
- Incorrect air screw adjustment

CARBURETOR REMOVAL

Remove the seat and fuel tank.
Remove the left and right side covers.

Disconnect the throttle cables, and choke cable.
Loosen the drain screw and drain the fuel.

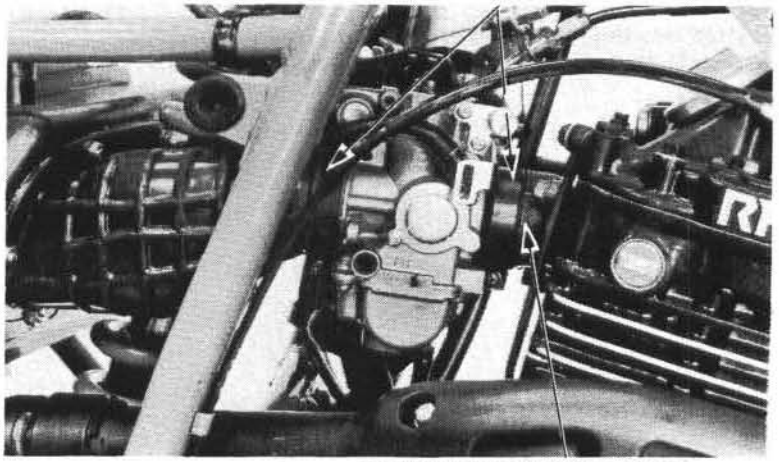
WARNING

Keep gasoline away from flames or sparks.
Wipe up spilled gasoline at once.

Loosen the screws securing the carburetor bands.
Remove the carburetor.

NOTE

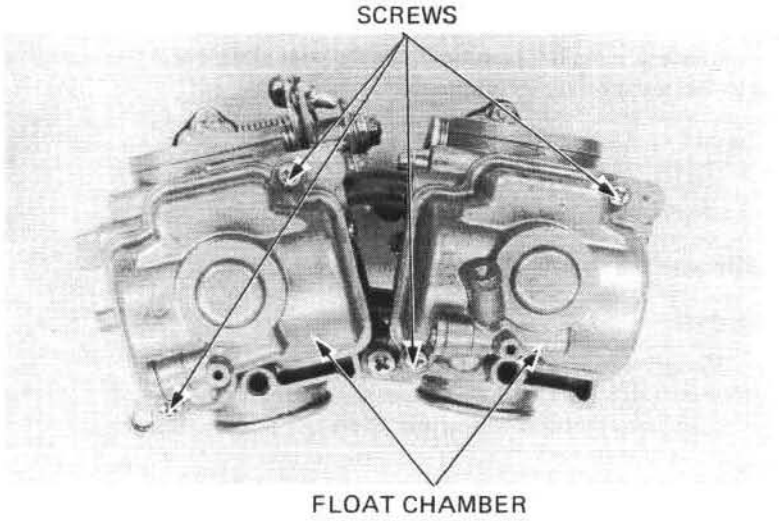
Do not pry between the insulator and engine. Carefully pull it back, away from the engine.



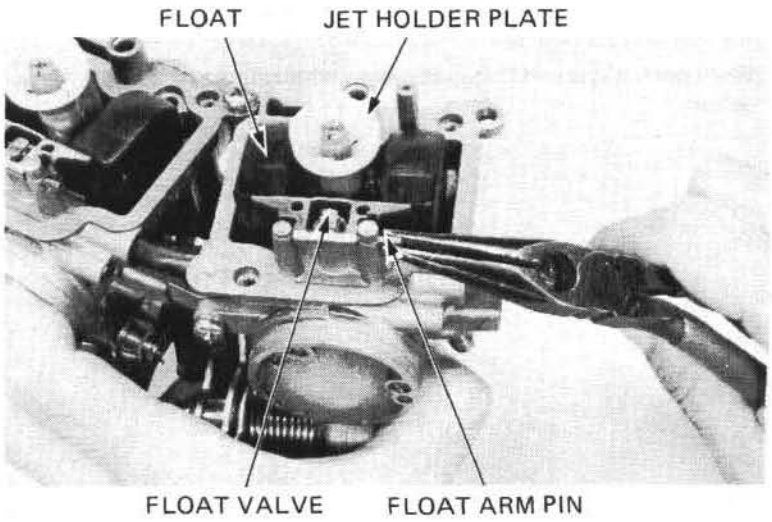
FLOAT CHAMBER/FLOAT/JETS

FLOAT REMOVAL

Remove the float chamber while removing the screws from the chamber.

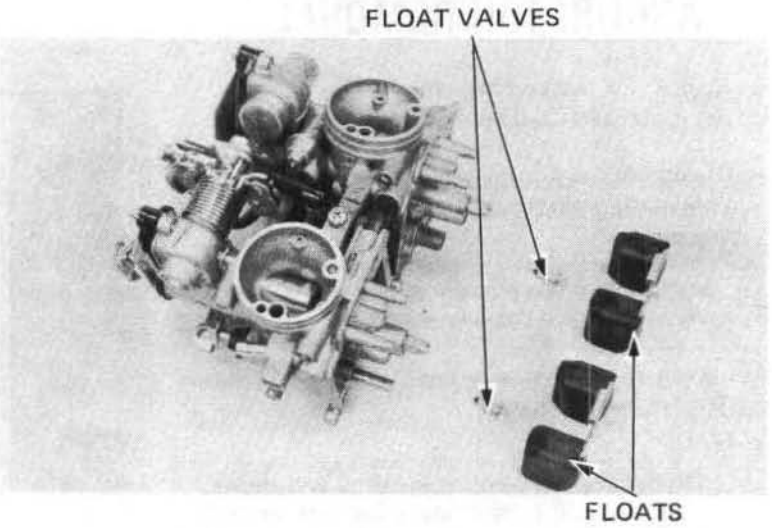


Pull out the float arm pin with a pair of pliers.
Remove the float and float valve.
Remove the jet holder plate.



FLOAT/FLOAT VALVE INSPECTION

Inspect each float for deformation.
Inspect each valve seat for wear or damage.



JET REMOVAL

Remove the main jet, jet holder, needle jet and slow jet from the primary carburetor.

NOTE

> If the needle jet is difficult to remove, carefully press it out from the piston valve side.

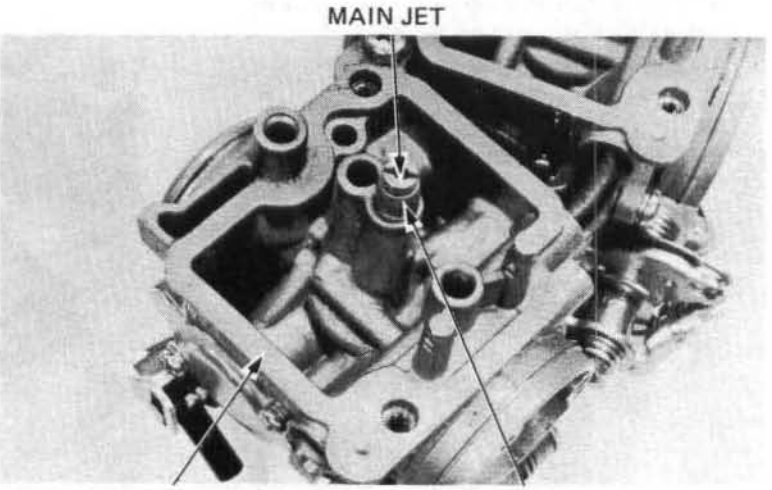
Remove the air screw if necessary (Page 4-11).

NOTE

> Count the number of turns required to remove the air screw, so it can be returned to its original setting during installation.

Remove the main jet, jet holder and needle jet from the secondary carburetor.

Blow open all jets and body openings with compressed air.

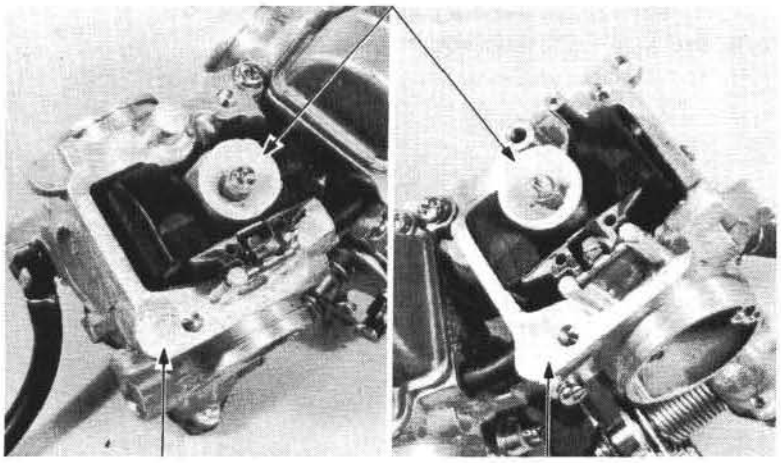


JETS/FLOAT/FLOAT VALVE ASSEMBLY

Installation is the reverse order of disassembly.

NOTE

- Check the float and float valve for operation after the reassembly.
- Turn the air screw in, the same number of turns required to remove it. Perform the idle drop procedure described on page 4-11.

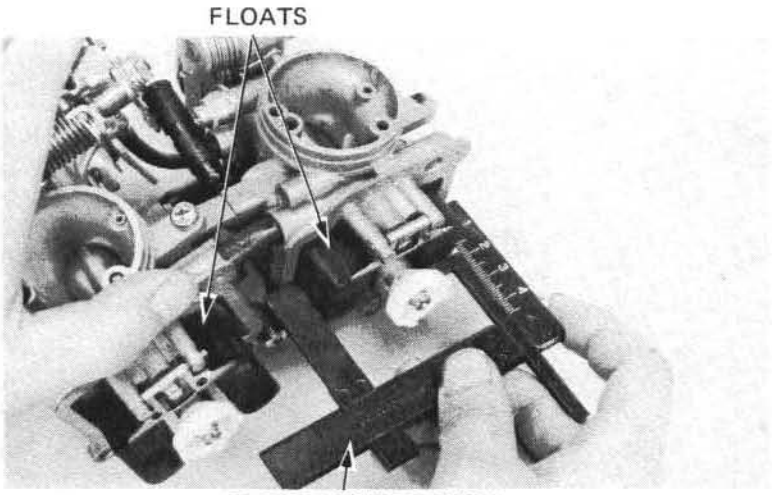


FLOAT LEVEL ADJUSTMENT

Measure the float levels with the float tip just contacting the float valve.

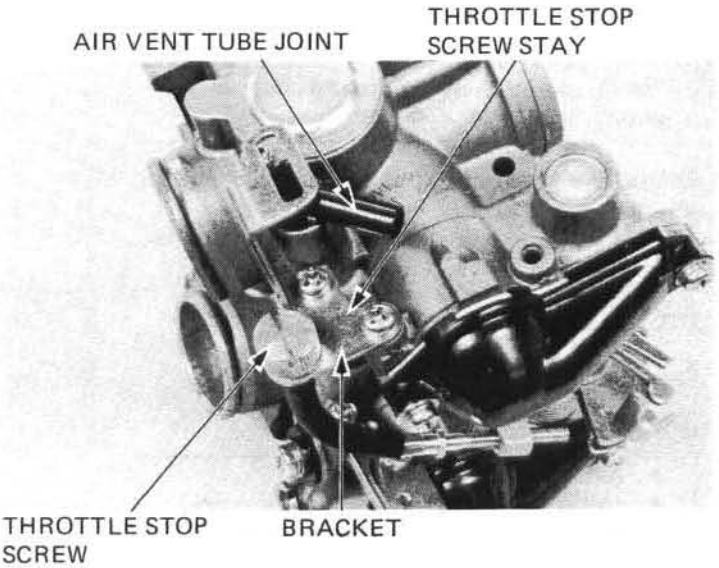
FLOAT LEVEL: 18.0 mm (0.71 in)

Adjust the float level by bending the float arm if not within the specification.



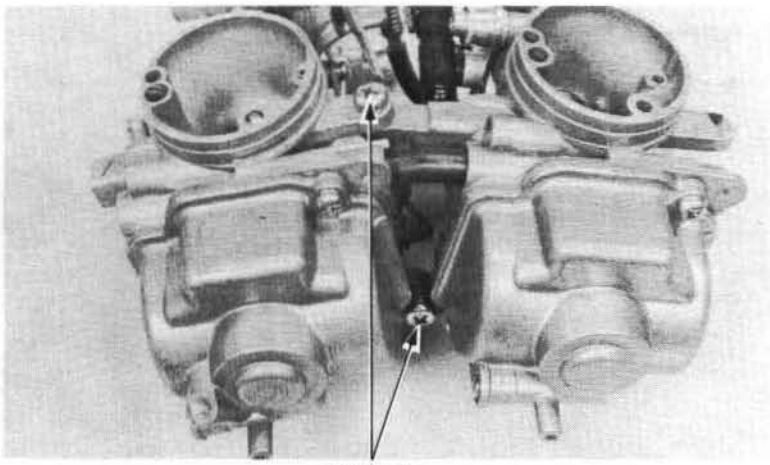
CARBURETOR SEPARATION

Remove the screw and the throttle stop screw stay.
Remove the air vent tube joint.
Remove the throttle stop screw from the primary carburetor.

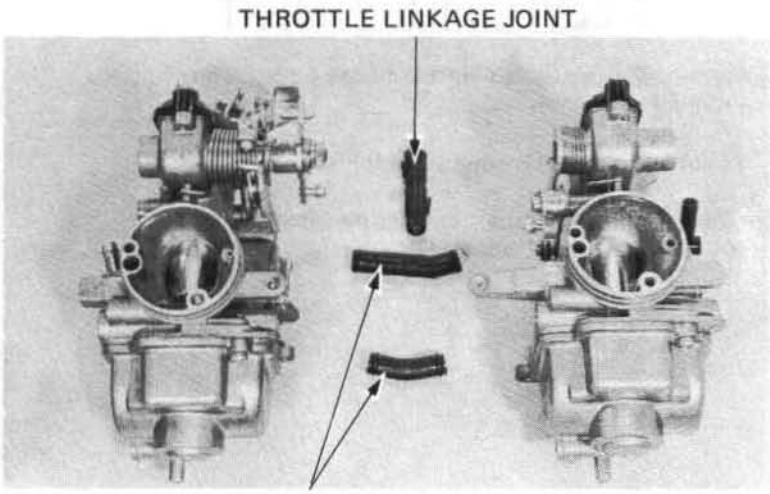


Remove the screws from the carburetor.

Separate the primary and secondary carburetors by removing the throttle linkage joint.



Remove the fuel joint pipes from the carburetor.



CARBURETOR DISASSEMBLY

AIR CUT-OFF VALVE DISASSEMBLY

NOTE

> The air cut-off valve is installed only in the primary carburetor.

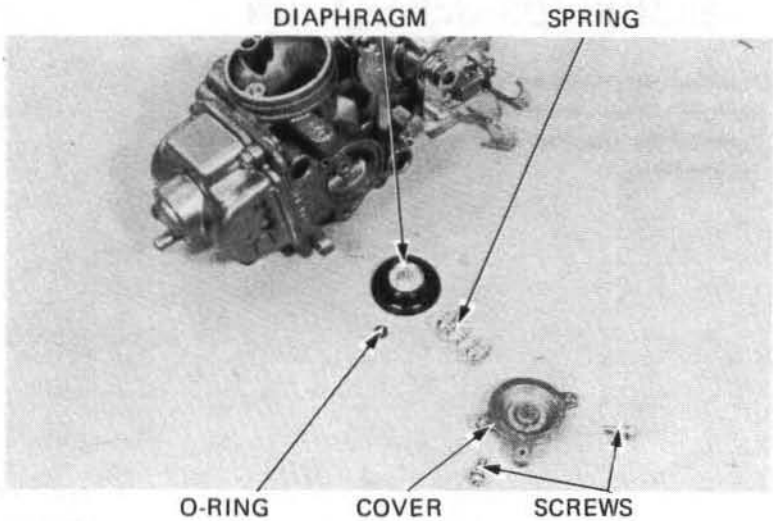
Remove the cover screws, then remove the air cut-off valve cover.
Remove the O-ring, spring and diaphragm.
Check the diaphragm for cracks or damage.

AIR CUT-OFF VALVE ASSEMBLY

Assembly is the reverse order of removal.

NOTE

> - Be sure to install the O-ring.
> - Install the diaphragm with its valve side (projection side) facing the carburetor.

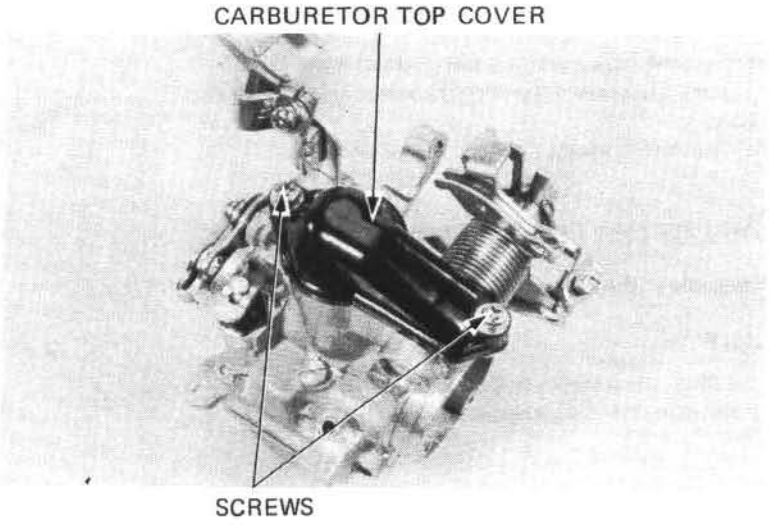


THROTTLE VALVE DISASSEMBLY

NOTE

> The following procedures are based on the primary carburetor. Secondary carburetor assembly/disassembly is the same unless otherwise noted.

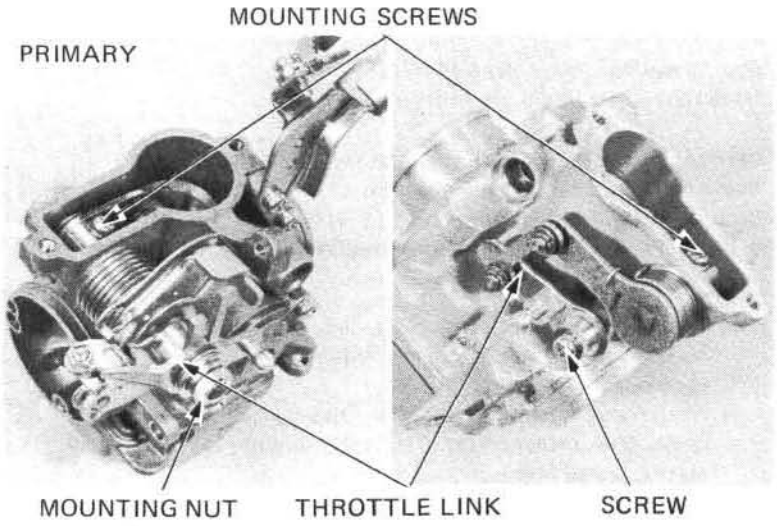
Remove the carburetor top cover screws, top cover, and gasket.



Remove the throttle valve mounting screw.
Remove the throttle link mount nut.
Remove the throttle link, then remove the throttle valve and thrust washer.

NOTE

> On secondary carburetor: Remove the throttle link mounting screw, then remove the throttle link.

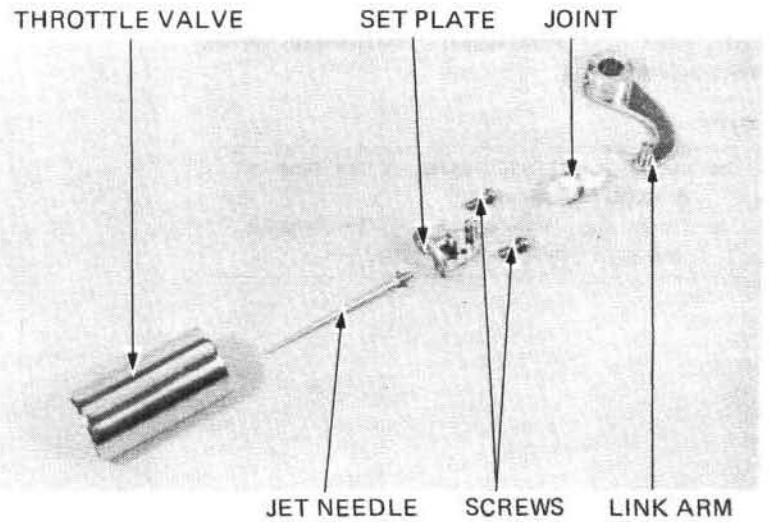


Remove the screws, link arm, joint and set plate.
Remove the jet needle from the throttle valve.

NOTE

> - Do not disassemble the throttle link more than necessary.
> - Mark the primary and secondary jet needles to ensure correct reassembly.

Inspect the tip of the jet needle for wear or damage.
Inspect the throttle valve for wear or damage.



THROTTLE LINK DISASSEMBLY

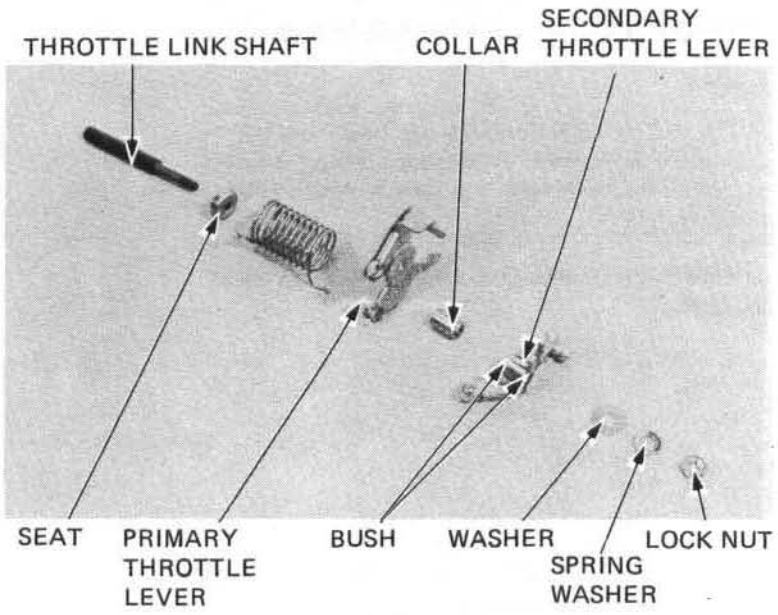
Remove the lock nut, spring washer and washer.
Remove the secondary throttle lever, bushings and collar.
Remove the primary throttle lever and seat.

THROTTLE LINK ASSEMBLY

Assembly is the reverse order of disassembly.

NOTE

> Adjust the secondary carburetor whenever the throttle link is disassembled or replaced.



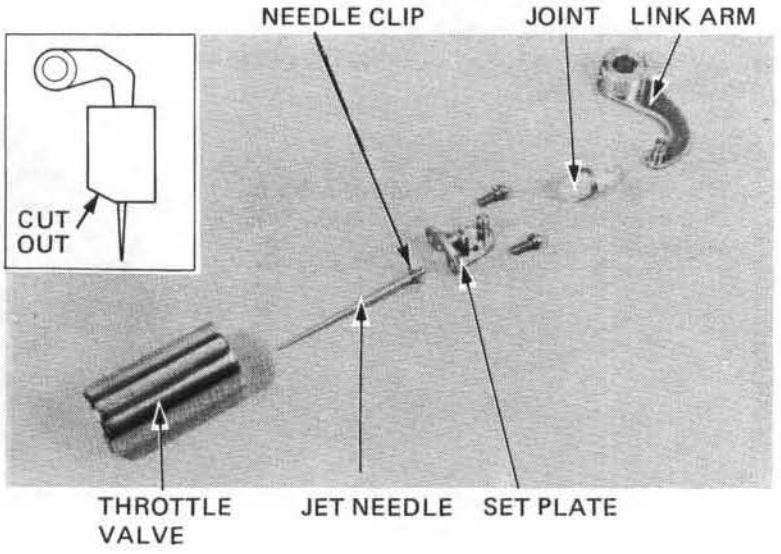
THROTTLE VALVE ASSEMBLY

Set the needle clip on the jet needle.
Install the jet needle on the throttle valve.

Connect the link arm to the set plate with the joint, then hook the spring on the joint pin.
Install the jet needle spring on the jet needle, set the link arm, and tighten the screw securely.

NOTE

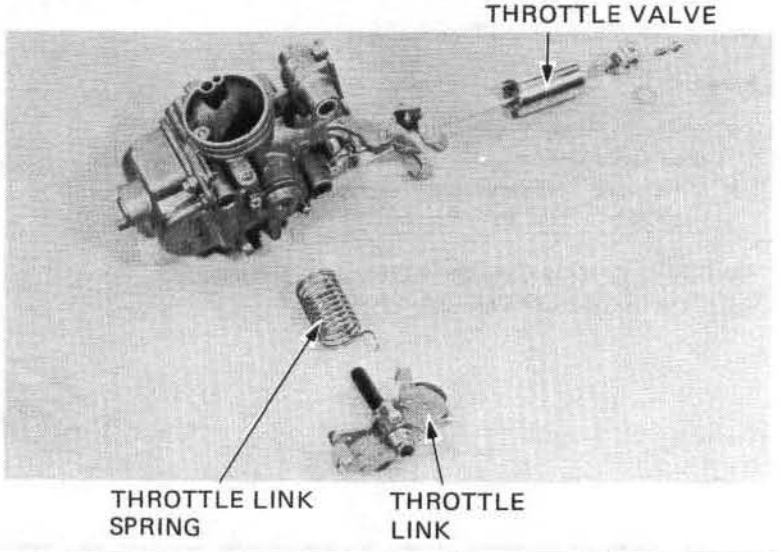
- To install the link arm, place the setting hole facing to the cut out of throttle valve as shown.
- When you install the throttle link, use a small screw driver so that the joint will not get out of the place.



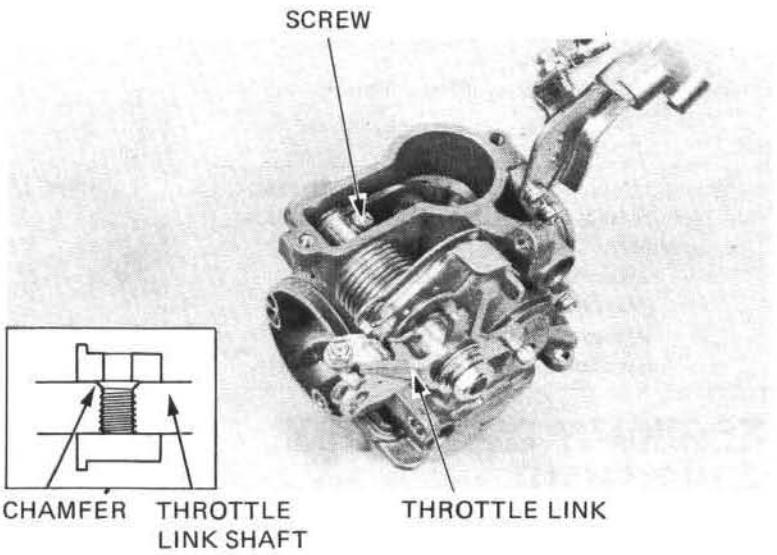
Install the throttle valve in the carburetor body, then install the thrust washer, throttle link spring, and throttle link.

NOTE

- Install the thrust washer at the side of throttle link spring.
- Hook the larger hook of the throttle link spring on the carburetor.



Align the chamfered hole in the throttle link shaft with the hole in the throttle valve link arm while holding the link spring on the carburetor body and throttle link and turning left.
Install the spring washer and screw, then secure with screw.
Install the gasket and carburetor top cover, then tighten the cover mounting screw securely.

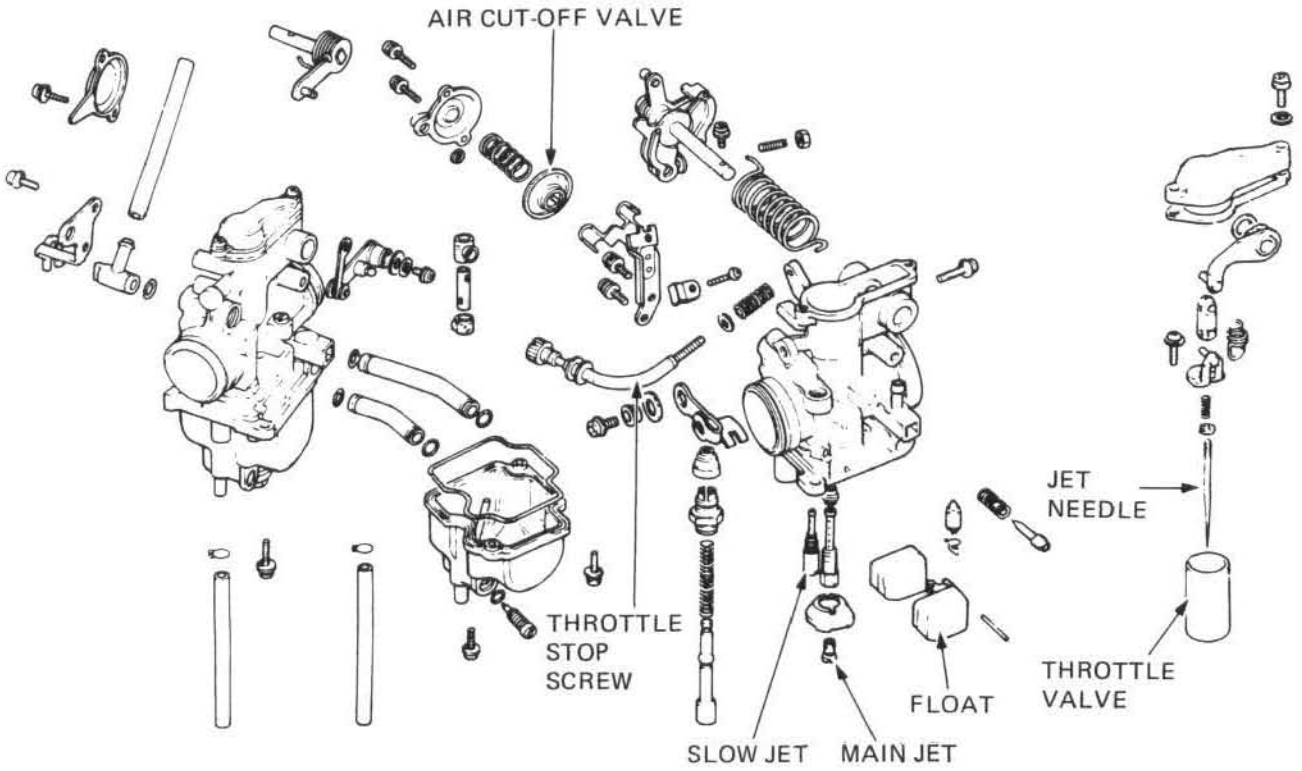


CARBURETOR ASSEMBLY

Assembly is the reverse order of separation.

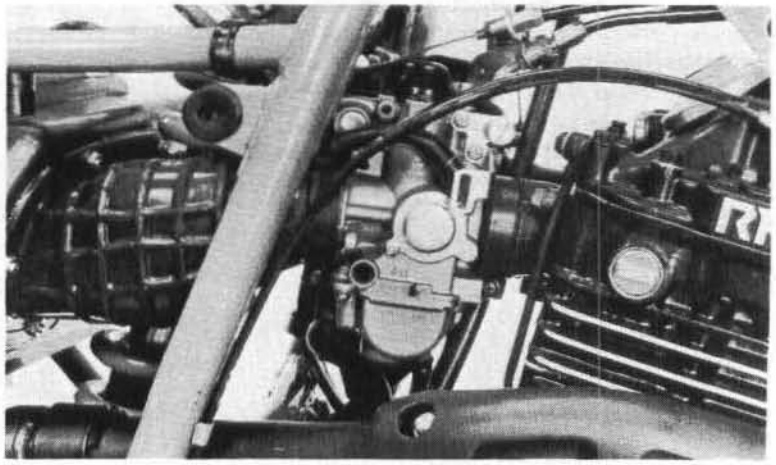
NOTE

Make sure that new O-rings are installed at both ends of the carburetor pipe.



CARBURETOR INSTALLATION

Installation is the reverse order of removal.



NOTE

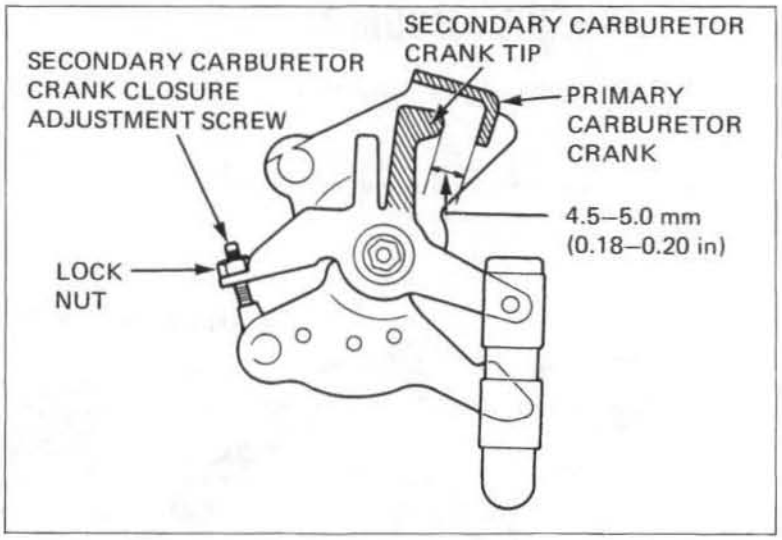
- Install the carburetors from the right side.
- Perform the following inspections and adjustments:
  - Throttle cable (page 3-4)
  - Choke cable (Page 3-5)
  - Idle speed (Page 3-9)
  - Secondary carburetor (Page 4-10).

SECONDARY CARBURETOR ADJUSTMENT

Remove the seat and fuel tank (Page 5-2).

POSITIVE CLOSURE ADJUSTMENT

1. Unscrew the idle stop screw until it no longer contacts the primary carburetor crank and the throttle is fully closed.
2. Loosen the lock nut on the closure adjustment screw, and turn the screw in until it just contacts the primary carburetor crank. Tighten the lock nut.



OPENING CLEARANCE ADJUSTMENT

1. With the idle stop screw unscrewed until it no longer contacts the primary carburetor crank, and the throttle fully closed, measure the clearance between the primary carburetor crank and the secondary carburetor crank tip.

Primary/secondary carburetor crank clearance	
Specified clearance	4.5–5.0 mm (0.18–0.20 in)

2. If clearance is not within the specified range, adjust by carefully bending the secondary carburetor crank tip.

NOTE

- Reduce clearance by inserting a screwdriver in the slot behind the crank tip and twisting the screwdriver against the crank tip.
- Increase clearance by using pliers to squeeze the crank tip against the post that is located behind the crank tip.

3. Reinstall the seat and fuel tank. Start the engine and adjust idle speed (Page 3-9).

AIR SCREW

REMOVAL/INSTALLATION

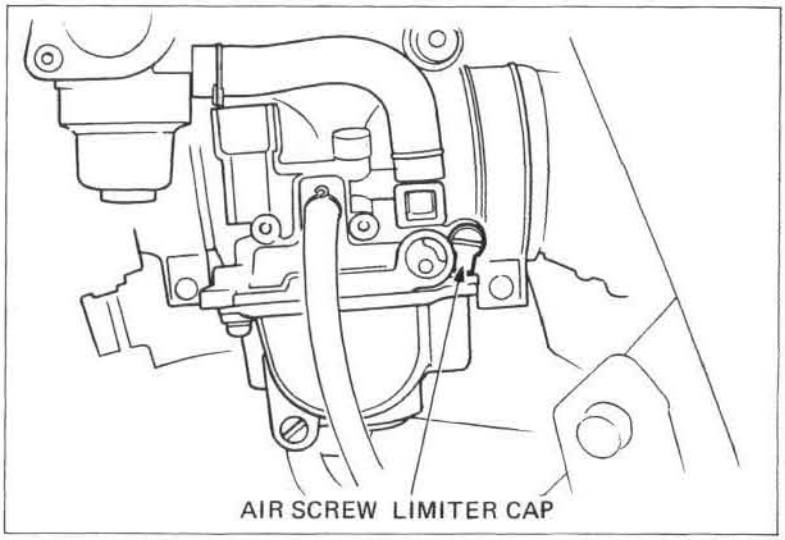
NOTE

- The air screw is factory preset and should not be removed unless the carburetor is overhauled.
- The air screw must be replaced with a new one whenever it is removed.

Using pliers, break off the air screw limiter cap and then remove the remainder of the air screw.
Install a new air screw and then adjust it as described below.

NOTE

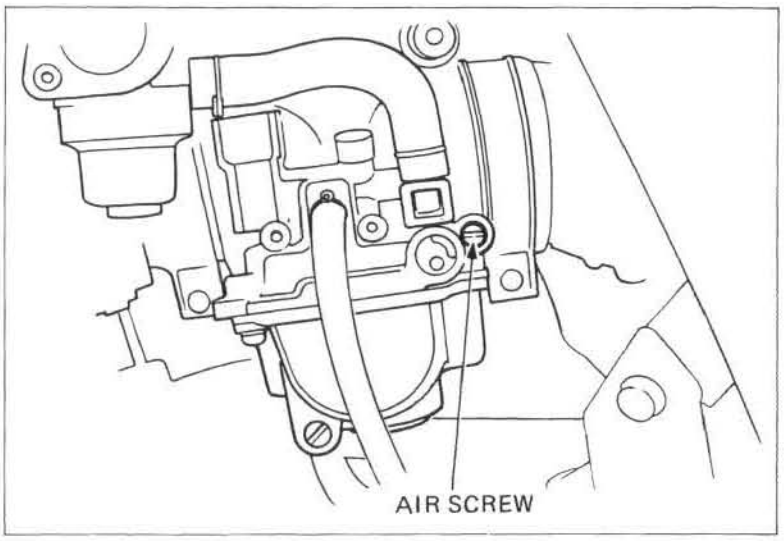
Do not install a limiter cap on a new air screw until after adjustment has been made (see below).



ADJUSTMENT

NOTE

- The air screw is factory preset and no adjustment is necessary unless the air screw is replaced (see removal above).
- Make sure that the secondary carburetor adjustment is complete (see Page 4-10).



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

   INITIAL OPENING: 2–1/8 turn out

CAUTION

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

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

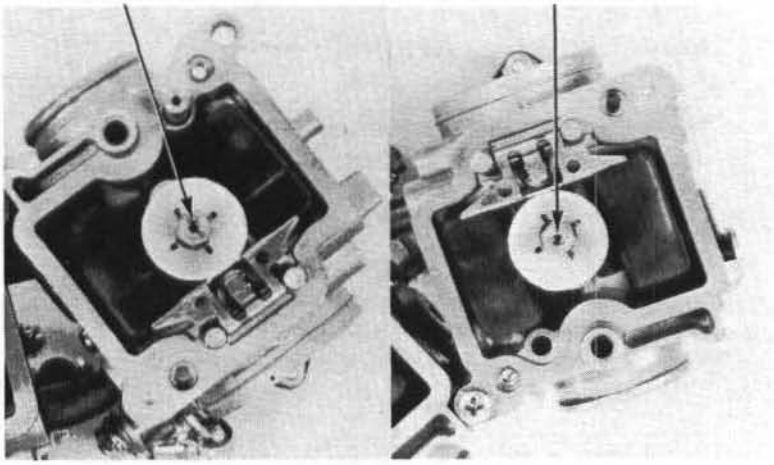
   IDLE SPEED: 1,300 ± 100 rpm

5. Turn the air screw in or out slowly to obtain the highest engine speed.
6. Readjust the idle speed with the throttle stop screw.
7. Make sure that the engine dose not miss on run erratically. Repeat steps 5 and 6 until engine speed increases smoothly.
8. Readjust the idle speed with the throttle stop screw.

9. Apply Loctite® 601 or equivalent to the inside of the limiter cap. Place the cap over the air screw so that its tab rests against the stop, preventing adjustment that would enrich the fuel mixture (limiter cap position permits counterclockwise rotation and prevents clockwise rotation).

NOTE

- An air screw limiter cap must be installed. It prevents misadjustment that could cause poor performance and increased emissions.
- Be careful not to turn the air screw when installing the limiter cap.



HIGH ALTITUDE ADJUSTMENT
(USA only)

When the vehicle is to be operated continuously above 2,000 m (6,500 feet) the carburetors must be readjusted as follows to improve dirveability and decrease exhaust emissions.

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

Remove the carburetor (page 4-3) and remove the carburetor float chamber.
Remove the primary and secondary main jets and install the new jet as shown.

Turn the air screw counterclockwise 1/2 turn.
Reassemble and install the carburetor.
Warm up the engine to operating temperature.
Stop and go driving for 10 minutes is sufficient.
Adjust the idle speed to 1,300 ± 100 rpm with the throttle stop screw.

NOTE

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

Attach a Vehicle Emission Control Information Update label to the left frame cover as shown. Refer to Service Bulletin SL #132 for information on obtaining the label.

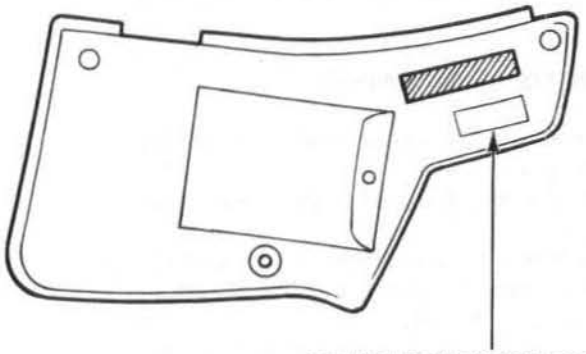
WARNING

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

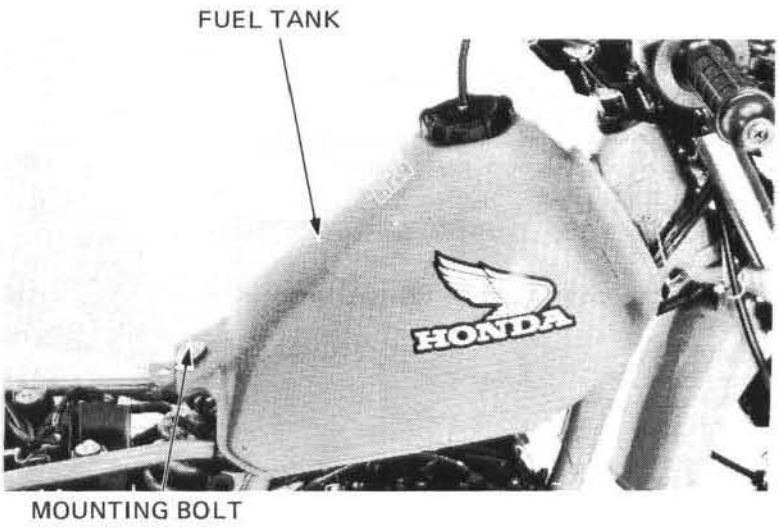
When the vehicle is to be operated continuously below 5,000 feet (1,500 m), turn air screw clockwise to its original position against its stop. Adjust the idle speed to 1,300 ± 100 rpm. Be sure to do these adjustments at low altitude.

MAIN JET SPECIFICATION

ALTITUDE	Main jets
Above 2,000 m (6,500 feet)	Pri: #105 2nd: #102
Below 1,500 m (5,000 feet)	Pri: #112 2nd: #110



FUEL TANK



FUEL TANK REMOVAL

Remove the seat (Page 5-2).
Turn the fuel valve OFF and disconnect the fuel tube.
Remove the mounting bolt and tank.

WARNING

Keep gasoline away from flames or sparks.
Wipe up spilled gasoline at once.

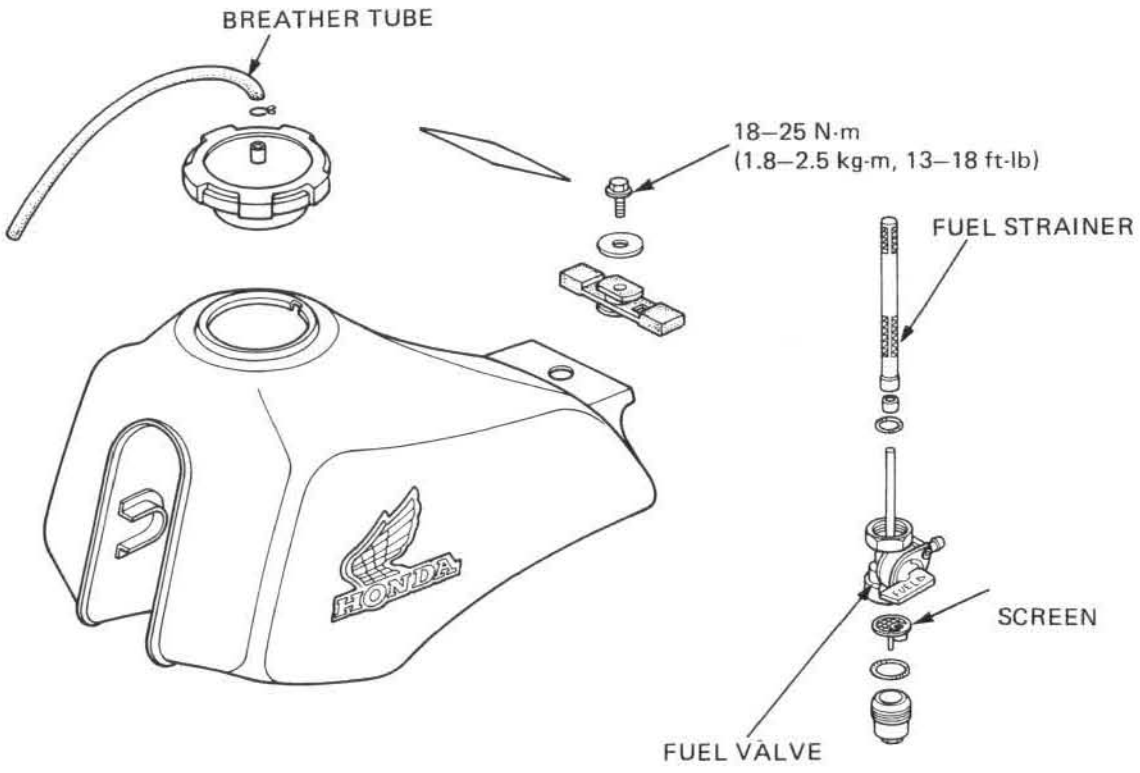
Check that fuel flows out of the fuel valve freely. If flow is restricted, clean the fuel strainer.

FUEL TANK INSTALLATION

Install the fuel tank with the two mounting bolts.
Connect the fuel tube.
Install the seat.

NOTE

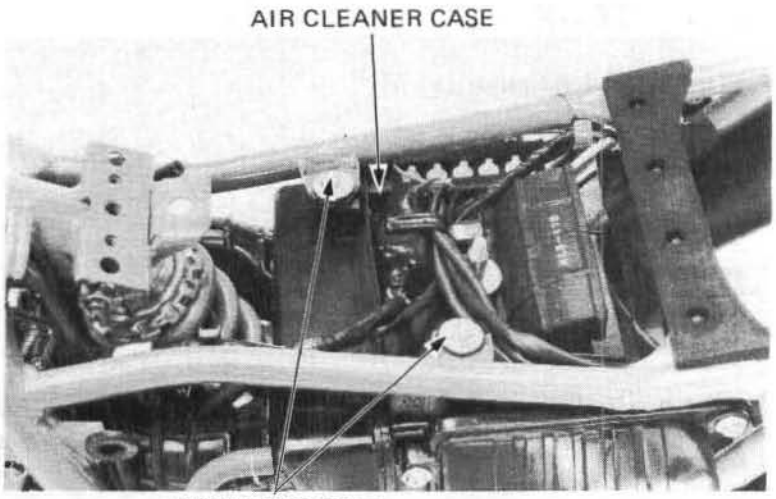
- After assembling, make sure there are no fuel leaks.
- Do not overtighten the fuel valve bolts.

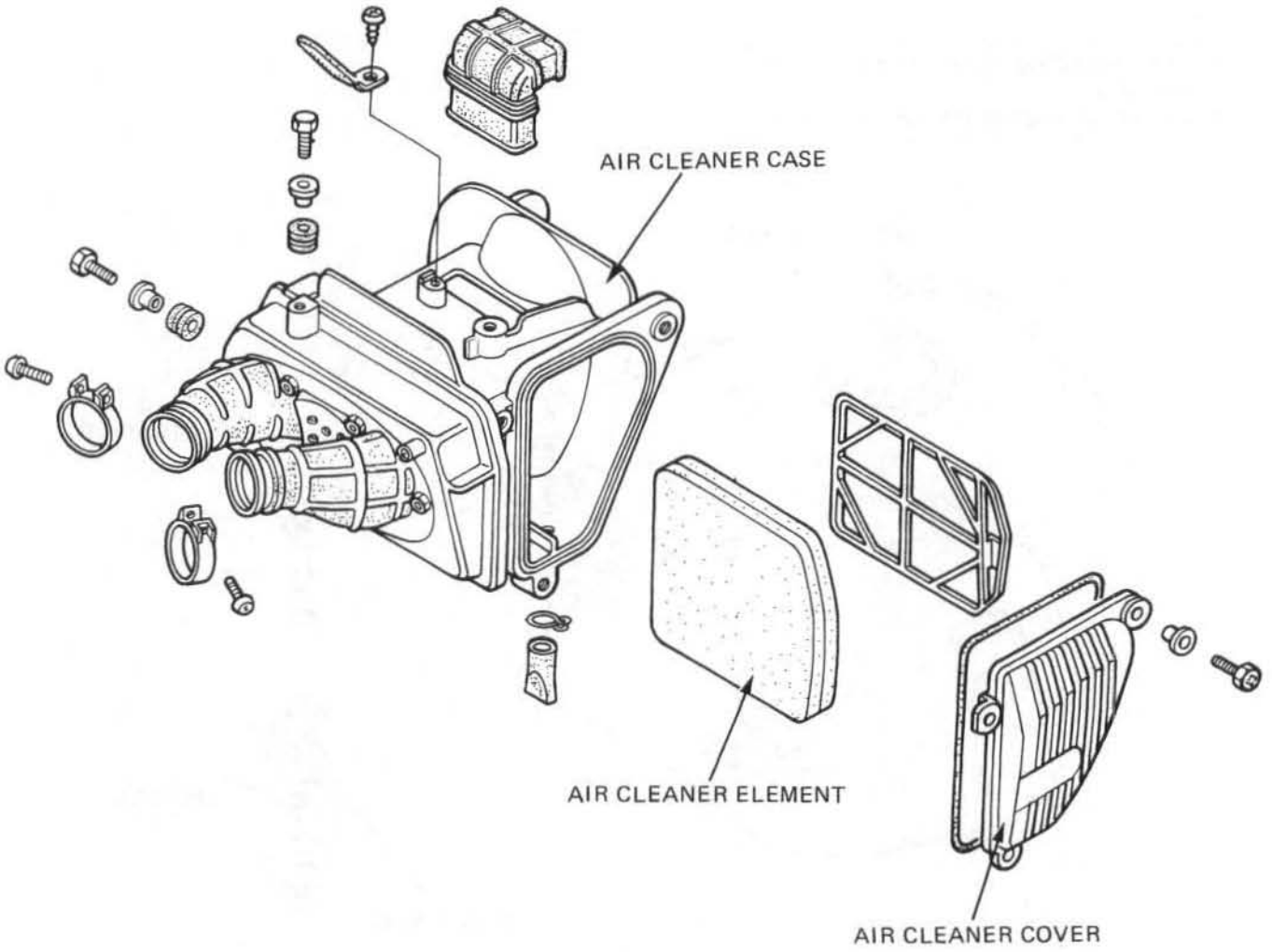


AIR CLEANER

Remove the seat and frame side covers.
Disconnect the battery wire.
Loosen the air cleaner connecting tube bands.
Remove the air cleaner mounting bolts.
Remove the air cleaner case.
Refer to page 3-6 for air cleaner service procedures.

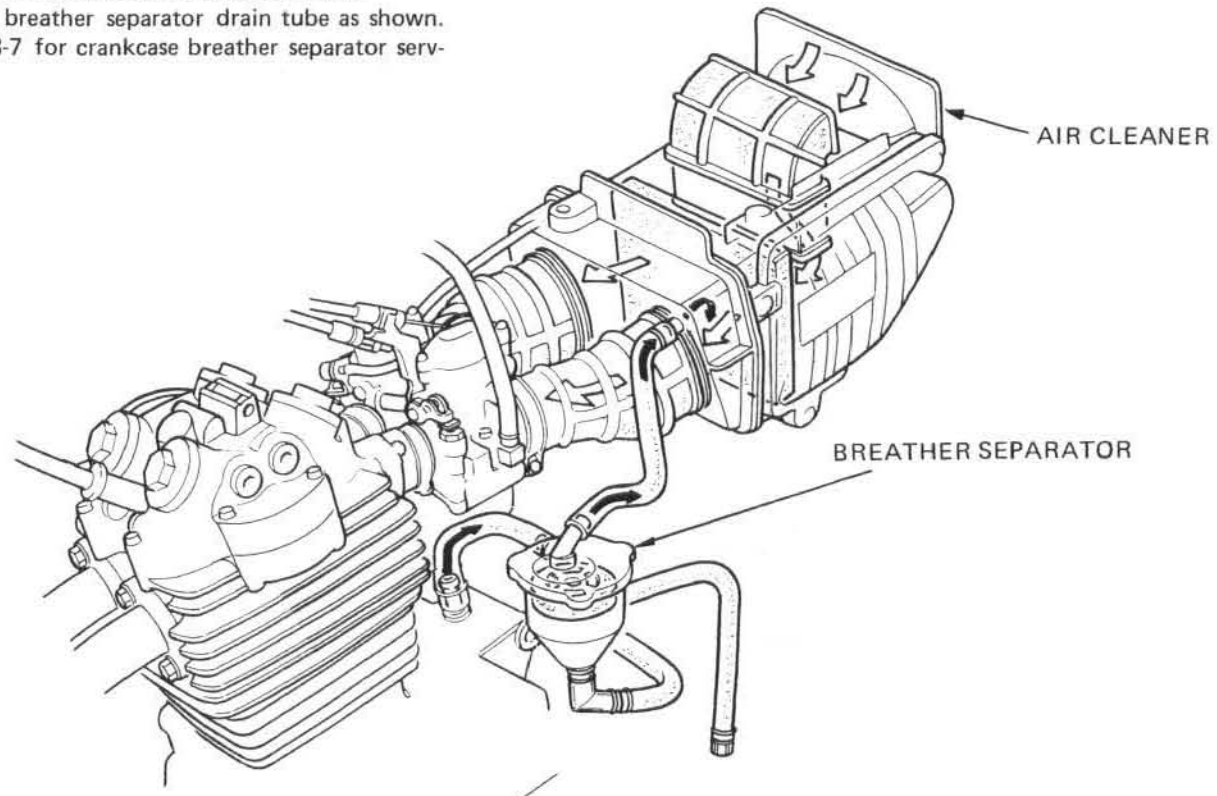
Install the air cleaner case in the reverse order of removal.

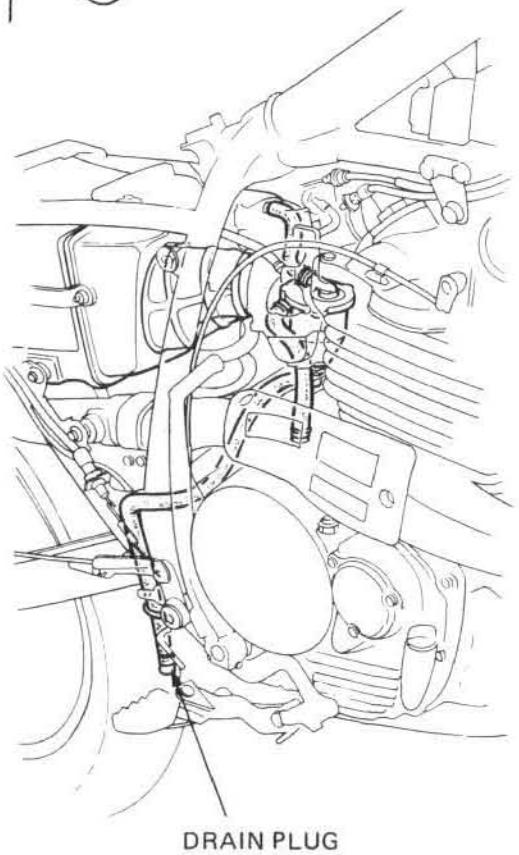




CRANKCASE BREATHER

Route the crankcase breather tube as shown.
Route the breather separator drain tube as shown.
See page 3-7 for crankcase breather separator service.





PURGE CONTROL VALVE INSPECTION

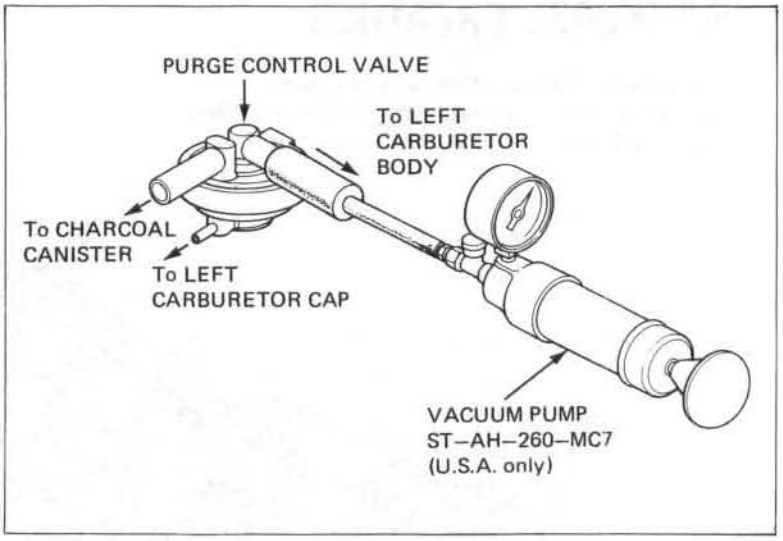
(CALIFORNIA MODEL)

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

NOTE

The PCV is located under the right carburetor.

Disconnect the PCV hoses from their connections and remove the PCV from its mount. Refer to the routing label on the inside of the frame right side cover for hose connections.



Connect a vacuum pump to the 8 mm I.D. hose that goes to the left carburetor body. Apply the specified vacuum to the PCV.

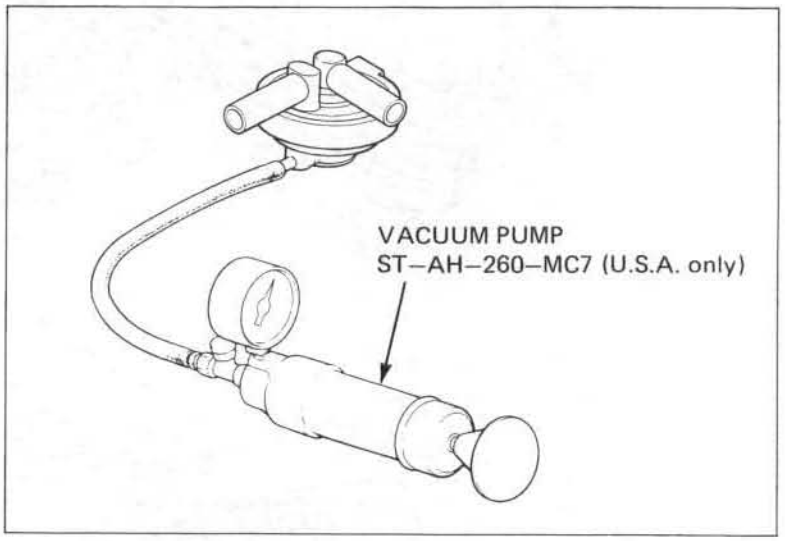
SPECIFIED VACUUM: 250 mm (9.8 in) Hg

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

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

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

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

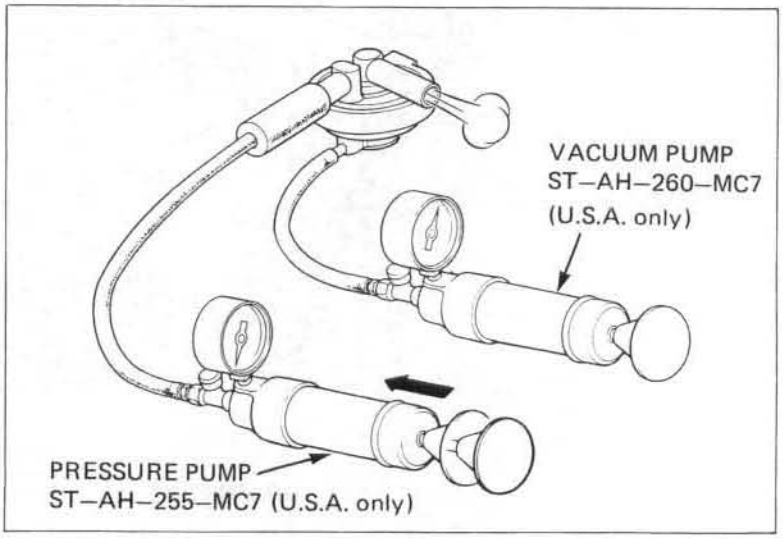


Connect a pressure pump to the 8 mm I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the PCV hose that goes to the carburetor cap, pump air through the canister hose. Air should flow through the PCV and out the hose that goes to the left carburetor body. Replace the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

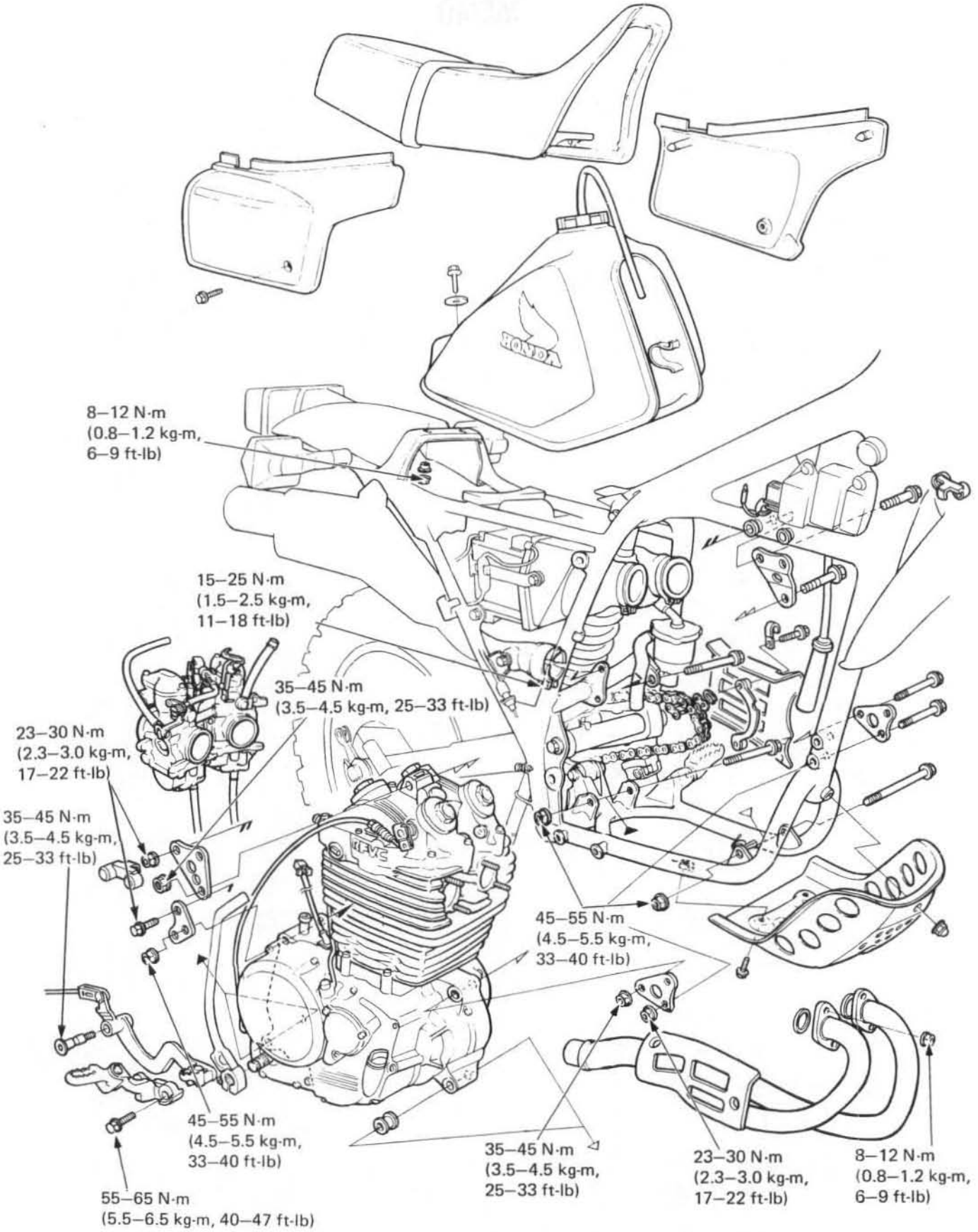
CAUTION

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

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



MEMO



5. ENGINE REMOVAL/ INSTALLATION

SERVICE INFORMATION

GENERAL

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

- Parts requiring engine removal for servicing:

Crankshaft	Section 10
Balancer	Section 10
Transmission	Section 11

SPECIFICATIONS

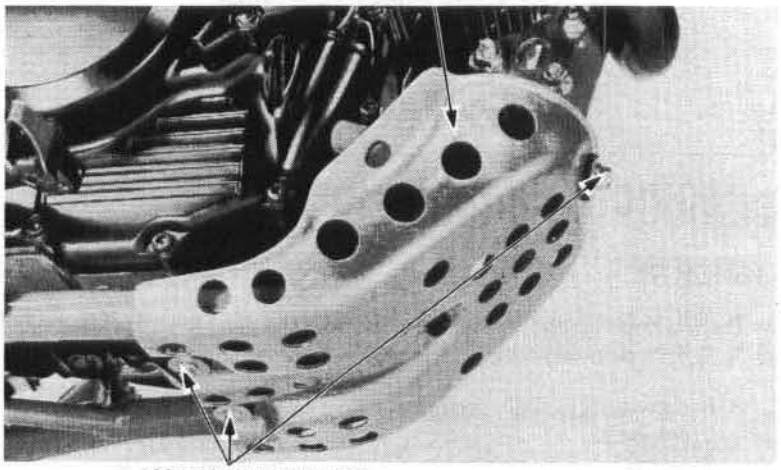
Engine weight	36.8 kg (77.2 lb)
Oil capacity	1.9 lit. (2.0 U.S. qt., 1.7 Imp. qt.) after assembly
	1.65 lit. (1.74 U.S. qt., 1.44 Imp. qt.) after draining

TORQUE VALUES

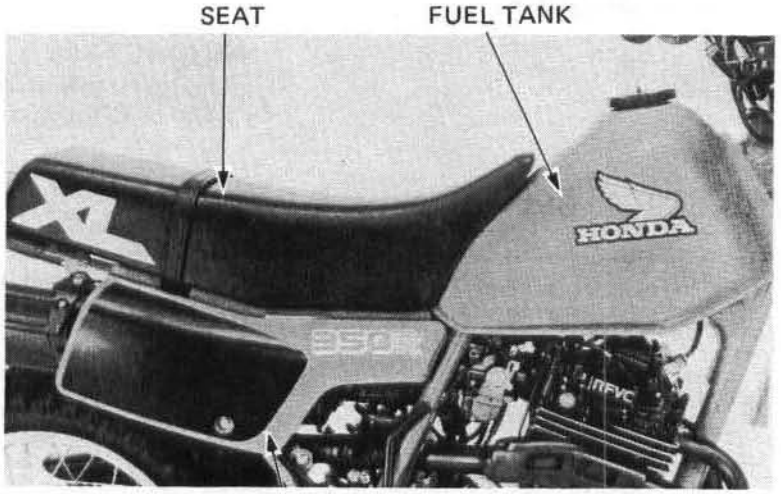
Engine hanger bolts:	
Engine hanger plate bolt	23–30 N·m (2.3–3.0 kg-m, 17–22 ft-lb)
Engine hanger bolt (Front-lower, Rear)	45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)
(Front-upper)	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
(Top)	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Right foot peg bolt	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Muffler band	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
Exhaust joint nut	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Brake pedal pivot bolt	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

ENGINE REMOVAL

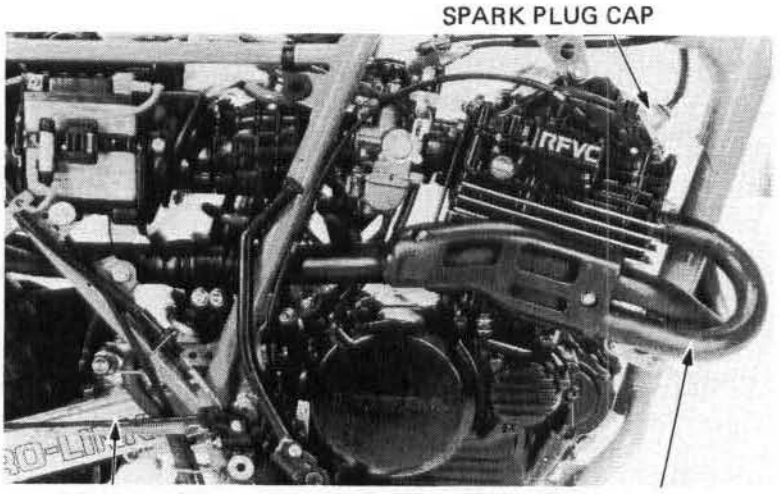
Drain the engine oil (Page 2-2).
Remove the skid plate mounting bolts and skid plate.



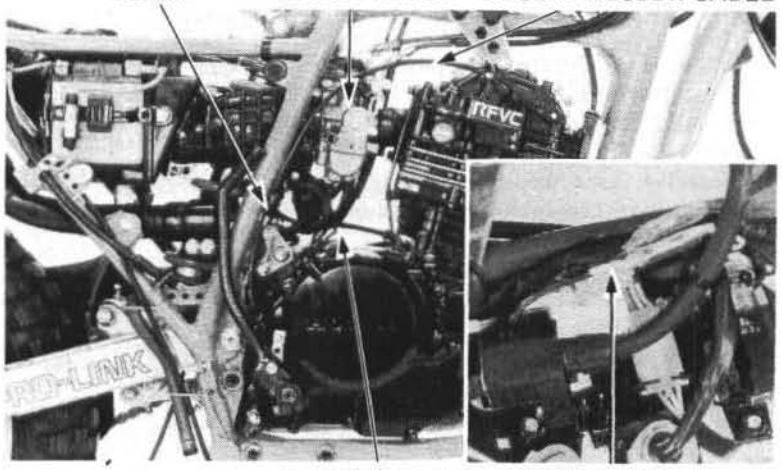
Remove the right and left side covers.
Remove the seat strap mounting bolt on either the left or right side and remove the mounting nuts located under the rear fender. Remove the seat. Turn the fuel valve OFF and disconnect the fuel tube from the carburetor, then remove the fuel tank.



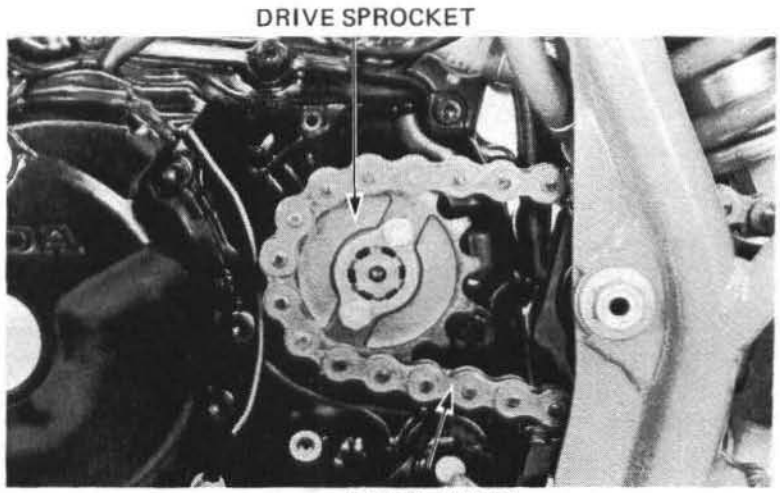
Remove the spark plug cap.
Loosen the muffler bands and remove the exhaust pipe joint nuts, then remove the exhaust pipe.
Remove the right footpeg.
Remove the rear brake pedal pivot bolt and adjuster, then remove the rear brake pedal and rod as a set.



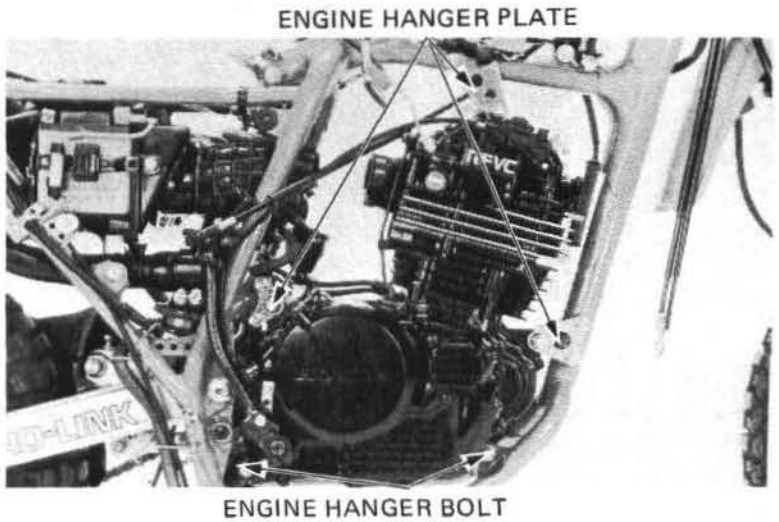
Disconnect the crankcase breather tube from the crankcase.
Disconnect the alternator wire connectors and free the wires by removing the wire bands.
Remove the carburetor (Page 4-3).
Disconnect the clutch cable.
Disconnect the decompressor cable from the frame clamp.



Remove the drive sprocket cover.
Loosen the rear axle nut and drive chain adjusters.
Push the rear wheel forward and disengage the drive chain from the drive sprocket.



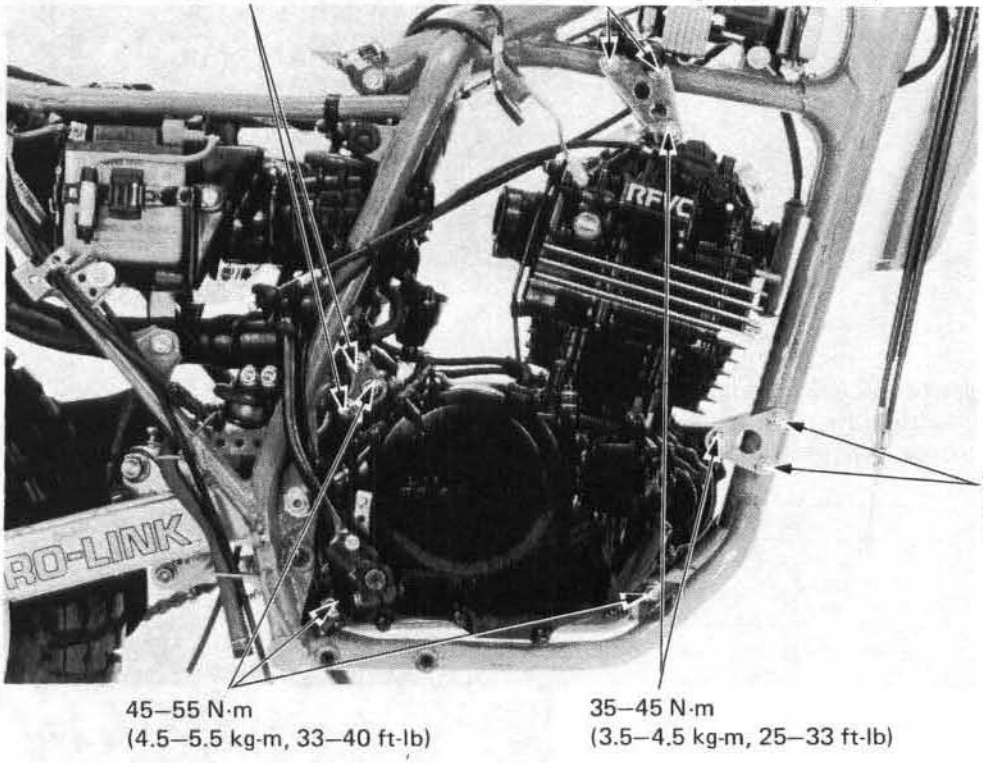
Remove the engine hanger bolts and hanger plates.
Remove the engine from the right side to prevent damage to wire harness, cables and the frame.



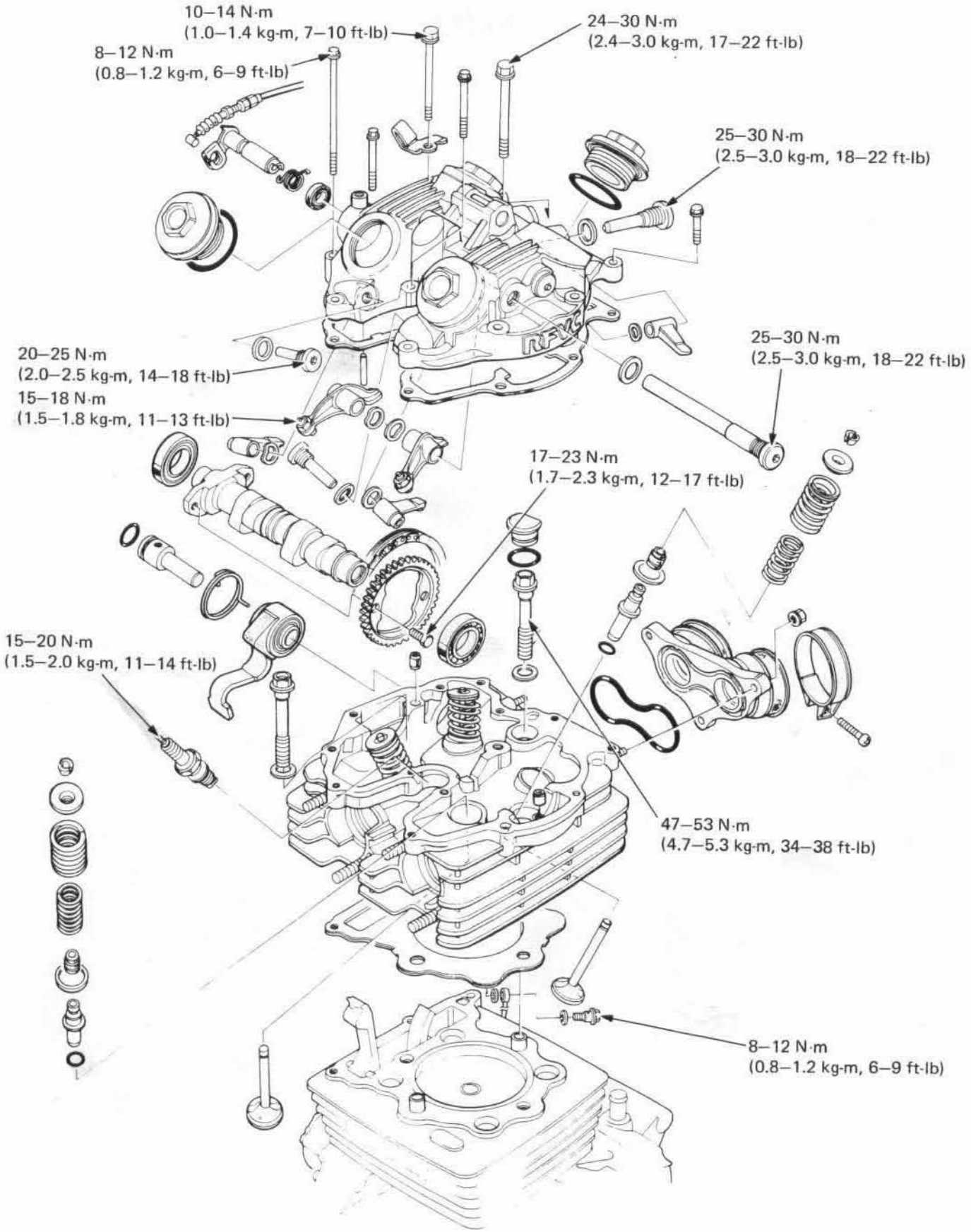
ENGINE INSTALLATION

Install the engine in the reverse order of removal, noting the following:
Replace any damaged or leaking exhaust pipe gaskets.
Tighten all bolts to the proper torque specifications.
Route all wire harnesses and cables properly (Page 1-11 and 1-12).

Perform the following inspections and adjustments:
- Engine oil (Page 2-2).
- Throttle grip free play (Page 3-4).
- Drive chain (Page 3-10).
- Rear brake pedal free play (Page 3-14)
- Clutch lever free play (Page 3-15)
- Decompressor lever free play (Page 3-8)
- Check all electrical equipment.



MEMO



6. CYLINDER HEAD/ VALVES

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,400 kPa (14.0 kg/cm^2, 199 psi)	———
Camshaft	Cam lobe height	IN	30.569 mm (1.2035 in)	30.37 mm (1.195 in)
		EX	30.575 mm (1.2037 in)	30.38 mm (1.196 in)
	Run out		———	0.04 mm (0.002 in)
Rocker arm I.D.			11.500–11.518 mm (0.4528–0.4535 in)	11.53 mm (0.454 in)
Sub rocker arm I.D.		IN	8.000–8.015 mm (0.3150–0.3155 in)	8.05 mm (0.317 in)
		EX	7.000–7.015 mm (0.2756–0.2761 in)	7.05 mm (0.277 in)
Rocker arm shaft O.D.			11.466–11.484 mm (0.4514–0.4521 in)	11.41 mm (0.449 in)
Sub rocker arm shaft O.D.		IN	7.969–7.972 mm (0.3137–0.3139 in)	7.92 mm (0.312 in)
		EX	6.969–6.972 mm (0.2744–0.2745 in)	6.92 mm (0.272 in)
Rocker arm shaft-to-arm clearance			0.016–0.052 mm (0.0006–0.0020 in)	0.10 mm (0.004 in)
Sub rocker arm shaft-to-arm clearance			0.028–0.046 mm (0.0011–0.0018 in)	0.10 mm (0.004 in)
Valve spring	Free length	Inner	35.7 mm (1.4055 in)	34.60 mm (1.362 in)
		Outer	41.1 mm (1.6181 in)	40.16 mm (1.575 in)
	Preload/length	Inner	4.7 ± 0.3 kg/31.5 mm (10.4 ± 0.7 lb/1.24 in)	———
		Outer	13.7 ± 0.7 kg/35 mm (30.2 ± 1.5 lb/1.38 in)	———

(Continued)

ITEM			STANDARD	SERVICE LIMIT
Valve	Stem O.D.	IN	5.475–5.490 mm (0.2155–0.2161 in)	5.46 mm (0.215 in)
		EX	5.467–5.477 mm (0.2152–0.2156 in)	5.45 mm (0.214 in)
	Guide I.D.	IN	5.500–5.512 mm (0.2165–0.217 in)	5.53 mm (0.218 in)
		EX	5.500–5.512 mm (0.2165–0.217 in)	5.53 mm (0.218 in)
	Stem-to-guide Clearance	IN	0.010–0.037 mm (0.0004–0.0015 in)	0.065 mm (0.0026 in)
		EX	0.023–0.045 mm (0.0009–0.0018 in)	0.080 mm (0.0031 in)
	Valve face width	IN/EX	1.2–1.4 mm (0.05–0.06 in)	2.0 mm (0.08 in)
Cylinder head	Warpage		———	0.10 mm (0.004 in)
	Valve seat width	IN/EX	1.2–1.4 mm (0.05–0.06 in)	2.0 mm (0.08 in)

TORQUE VALUES

Rocker arm shaft	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)	Apply liquid sealant to the threads.
Sub rocker arm shaft (IN)	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)	
Sub rocker arm shaft (EX)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)	
Cylinder head bolt	47–53 N·m (4.7–5.3 kg-m, 34–38 ft-lb)	
Cam sprocket bolt	17–23 N·m (1.7–2.3 kg-m, 12–17 ft-lb)	
Valve adjuster lock nut	15–18 N·m (1.5–1.8 kg-m, 11–13 ft-lb)	
Cylinder head cover 6 mm bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)	
8 mm bolt	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)	
6 mm small head bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)	
Oil pipe bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)	
Engine hanger plate bolt (8 mm)	23–30 N·m (2.3–3.0 kg-m, 17–22 ft-lb)	
Engine hanger bolt (10 mm)	45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)	
Exhaust pipe joint nut	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)	
Muffler clamp bolt	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)	

TOOLS

Special

Valve guide reamer, 5.5 mm	07984–2000000
Cam chain tensioner holder	07973–MG30001

Common

Valve spring compressor	07757–0010000 or 07957–3290001
Valve guide driver 5.5 mm	07742–0020200

TROUBLESHOOTING

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

Low Compression

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

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
- Faulty cam chain tensioner

Poor Idling

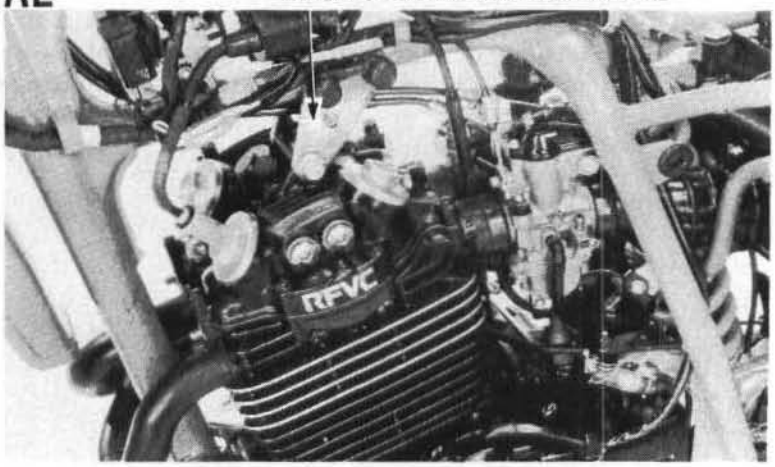
- Compression too low
- Decompressor out of adjustment

Hard Kick Starting

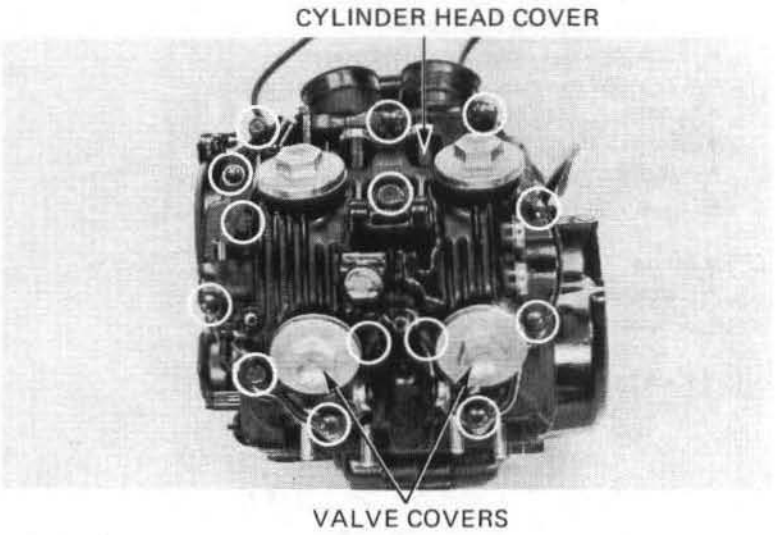
- Decompressor out of adjustment

CYLINDER HEAD COVER REMOVAL

Remove the right and left side covers.
Remove the seat and fuel tank.
Remove the engine upper hanger plates.
Remove the spark plug cap.
Disconnect the starter decompressor cable from the lifter lever.
Remove the oil pipe bolt and sealing washers at the cylinder head.

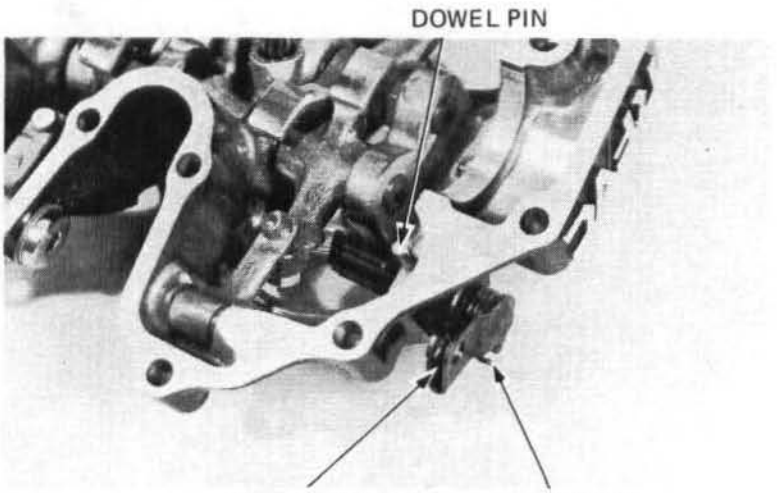


Remove the crankshaft hole and timing hole caps from the left crankcase cover.
Turn the crankshaft counterclockwise and align the "T" mark on the alter rotor with the index mark on the left crankcase cover. Verify the engine is at T.D.C. on the compression stroke by removing all valve covers and checking for free movement at both adjusters. If no movement is felt, rotate the crankshaft 360° and re-align the "T" mark.
Remove the cylinder head cover bolts and cylinder head cover.

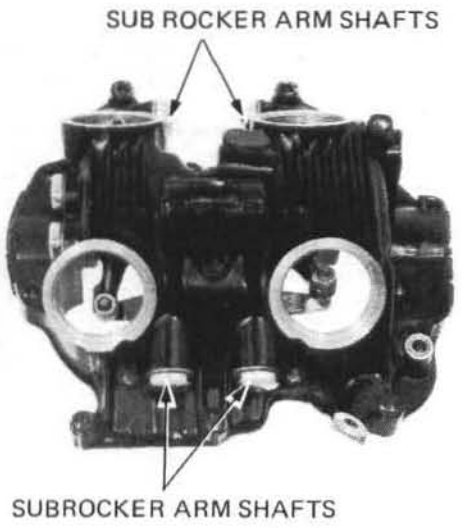


CYLINDER HEAD COVER DISASSEMBLY

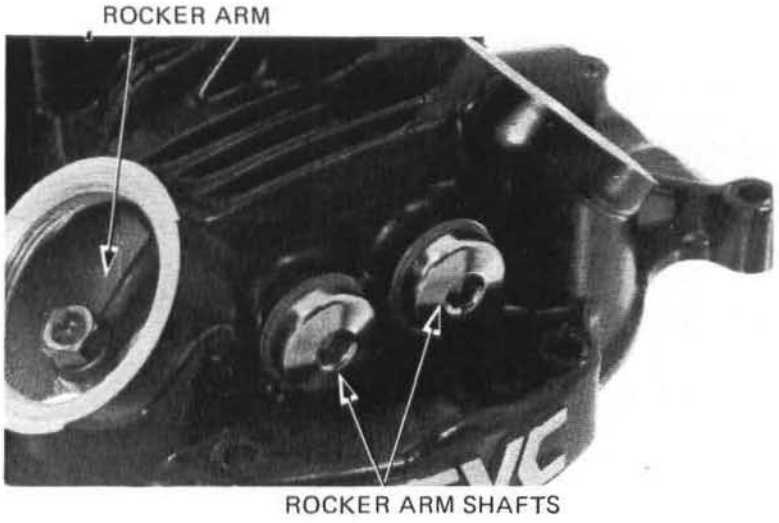
Remove the dowel pin, valve lifter lever and spring.



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



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



ROCKER ARM AND SUB ROCKER ARM INSPECTION

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

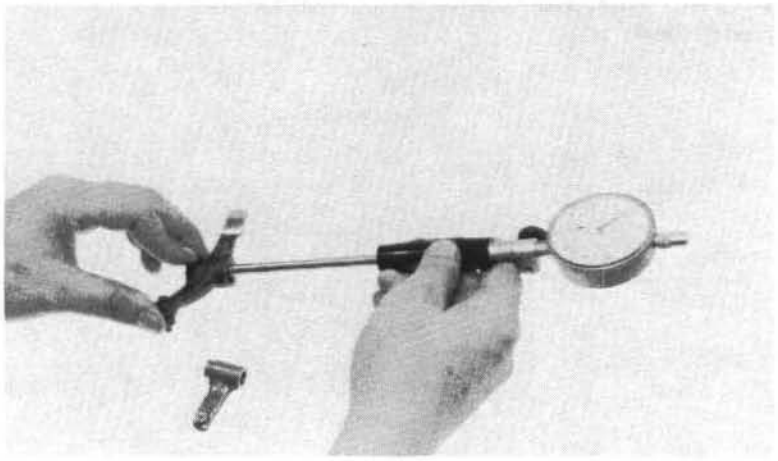
NOTE

> If any rocker arm or subrocker arm is worn or damaged, inspect the cam lobes for scoring, chipping or flat spots.

Measure the I.D. of each rocker arm and sub rocker arm.

SERVICE LIMITS:

ROCKER ARM:	**11.53 mm (0.454 in)**	
SUB-ROCKER ARM	**IN:**	**8.05 mm (0.317 in)**
	EX:	**7.05 mm (0.277 in)**

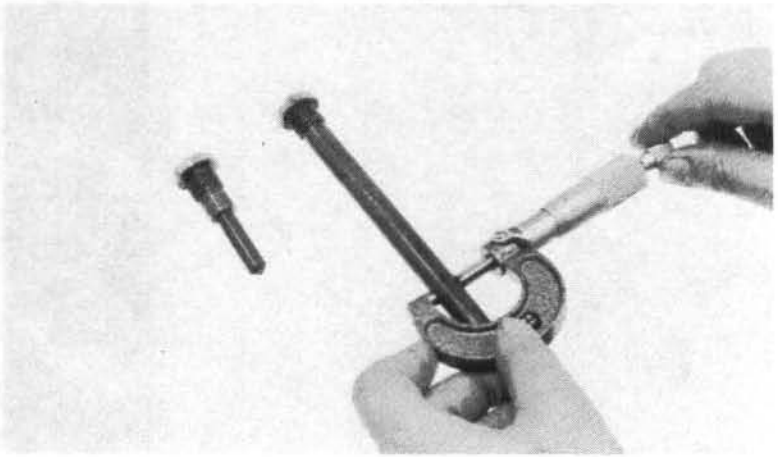


ROCKER ARM SHAFT AND SUB ROCKER ARM SHAFT INSPECTION

Inspect rocker arm shafts and sub rocker arm shafts for wear or damage.
Measure the O.D. of the shaft.

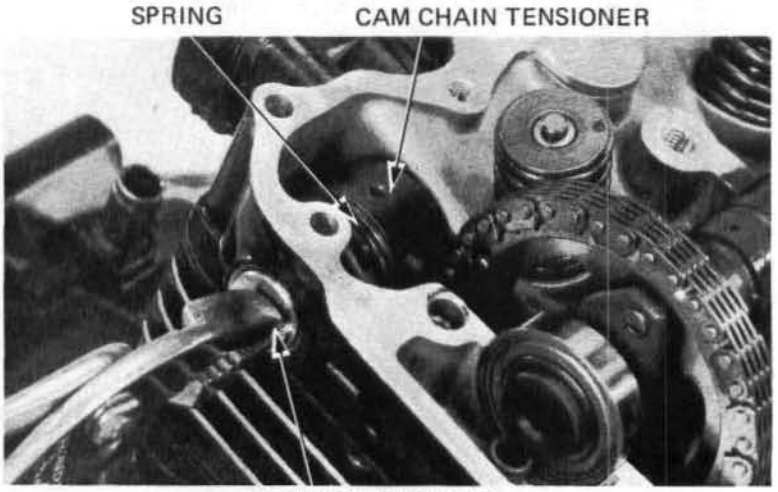
SERVICE LIMITS:

ROCKER ARM:	**11.41 mm (0.449 in)**	
SUB-ROCKER ARM	**IN:**	**7.92 mm (0.312 in)**
	EX:	**6.92 mm (0.272 in)**



CAMSHAFT REMOVAL

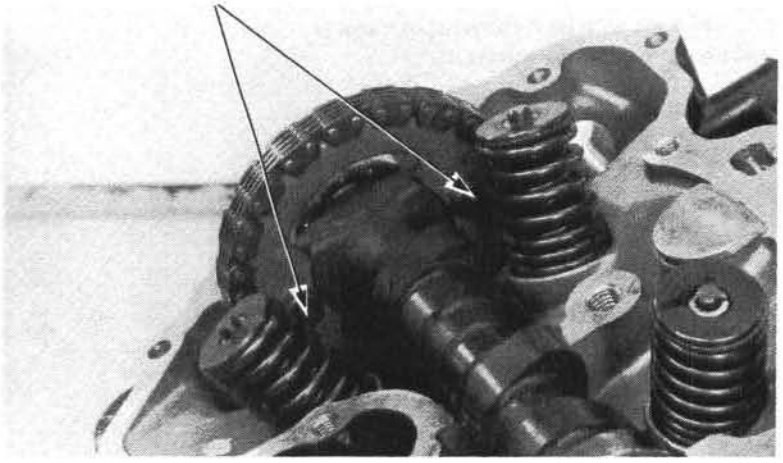
Using pliers, pull the cam chain tensioner shaft out of the cylinder head.
Remove the spring and cam chain tensioner.



Remove the crankshaft hole cap and timing hole cap.
Turn the crankshaft and remove the cam sprocket bolts.

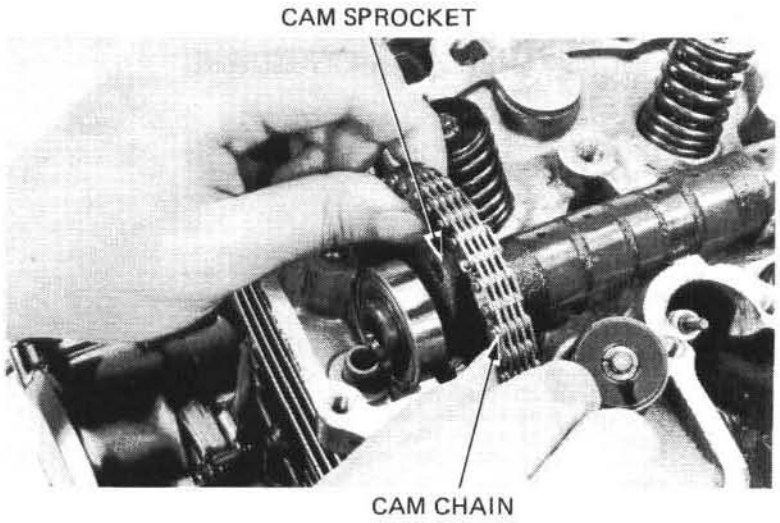
CAUTION

Be careful not to drop the bolts into the crankcase.



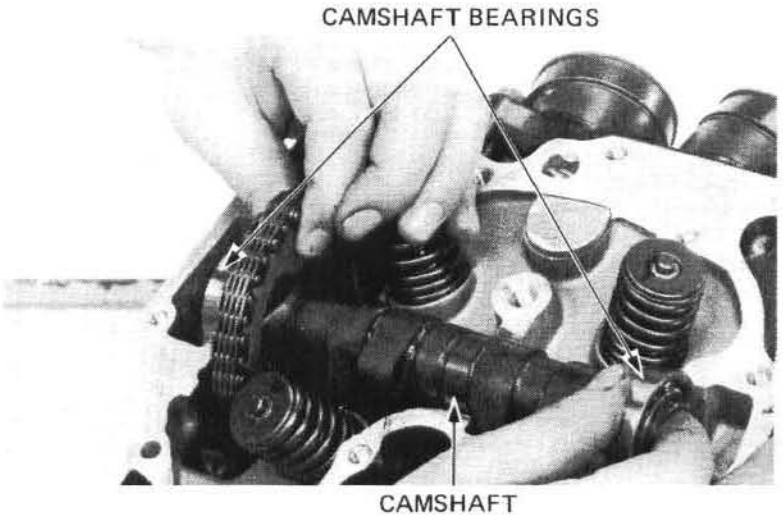
Pull the cam sprocket off the camshaft and remove the cam chain from the cam sprocket.

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



Pull the camshaft up as shown and remove the sprocket and camshaft.

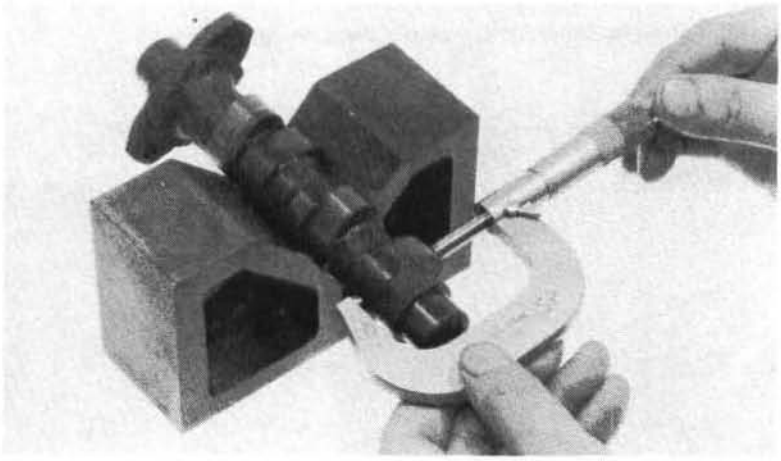
Remove the camshaft bearings.



CAMSHAFT INSPECTION

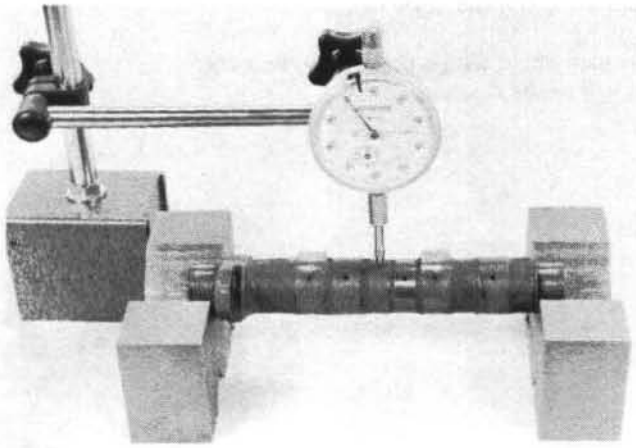
Check each cam lobe for wear or damage.
Measure the cam lobe height.

SERVICE LIMITS:
INTAKE: 30.37 mm (1.195 in)
EXHAUST: 30.38 mm (1.196 in)



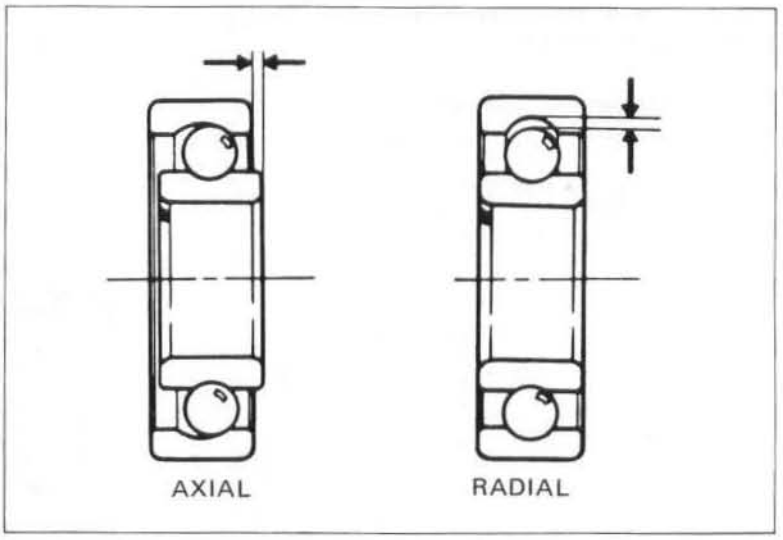
Check camshaft runout with a dial indicator.
Support both ends of the camshaft with V-blocks.
Use 1/2 of the total indicator reading to determine runout.

SERVICE LIMIT: 0.04 mm (0.002 in)



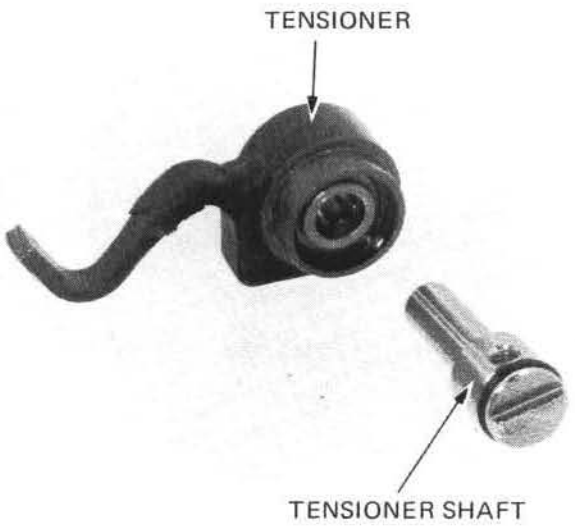
CAMSHAFT BEARING INSPECTION

Spin the camshaft bearings by hand check for play.
The bearings must be replaced if they are noisy or have excessive play.

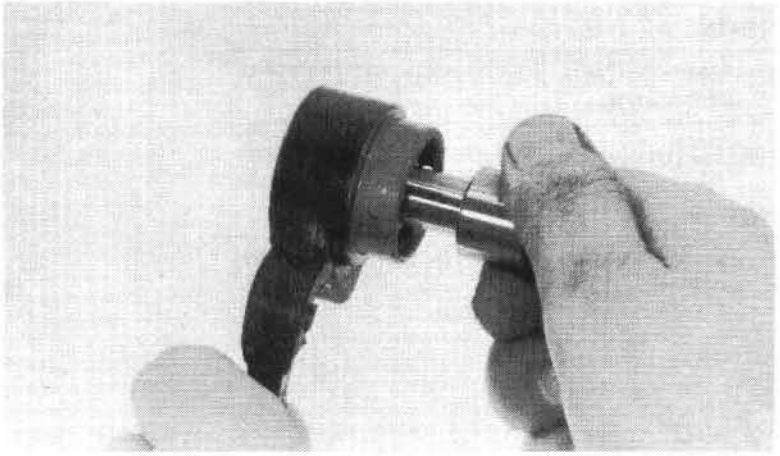


CAM CHAIN TENSIONER INSPECTION

Inspect the tensioner shaft for damage and wear.

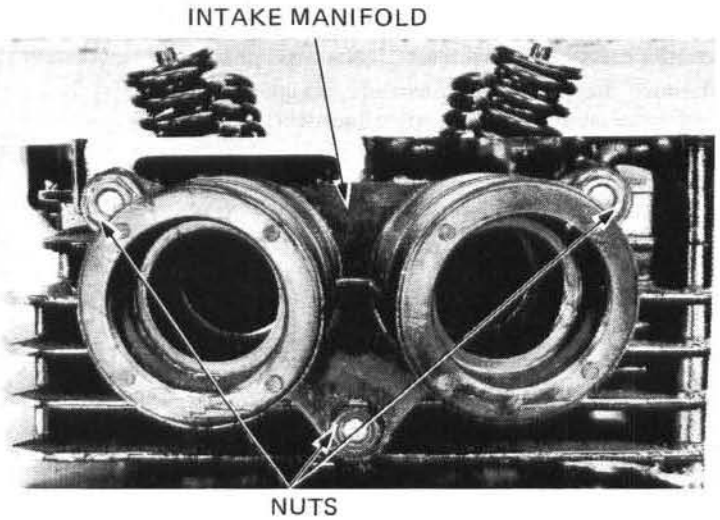


Insert the tensioner shaft into the tensioner and inspect the tensioner by turning the shaft.
The tensioner shaft should turn clockwise freely and should not turn counterclockwise.

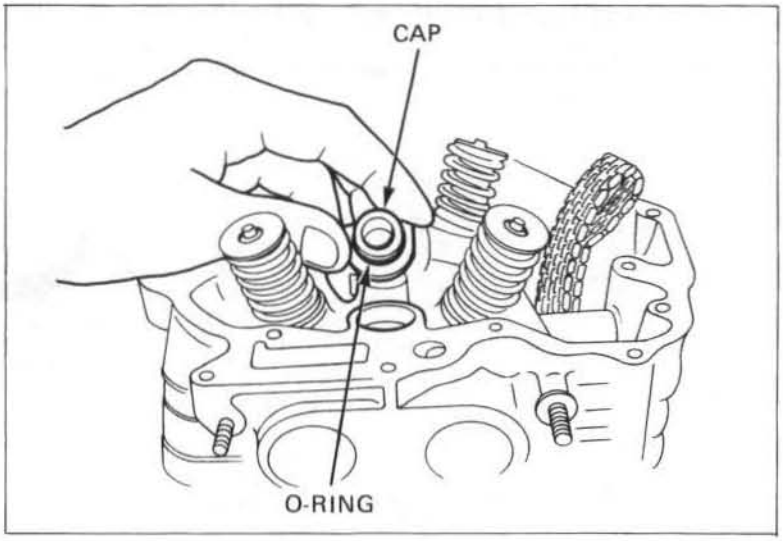


CYLINDER HEAD REMOVAL

Remove the cylinder head cover (Page 6-4).
Remove the camshaft (Page 6-6).
Remove the exhaust pipe (Page 5-2) and carburetor (Page 4-3).
Remove the intake manifold by removing the three nuts.

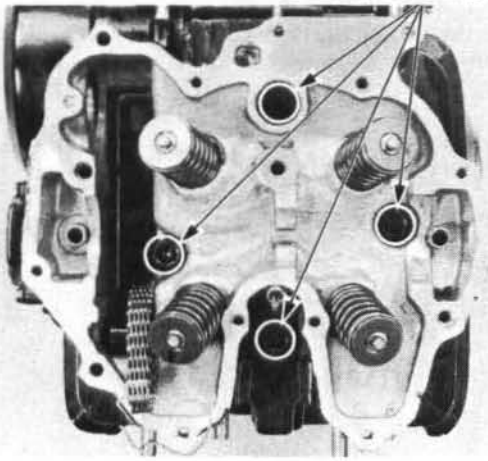


Remove the cap on the cylinder head.



Remove the four cylinder head bolts.

CYLINDER HEAD BOLTS



NOTE

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

Remove the cylinder head.

NOTE

Avoid damaging the cylinder head mating surfaces.

CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs, and valves with a valve spring compressor.

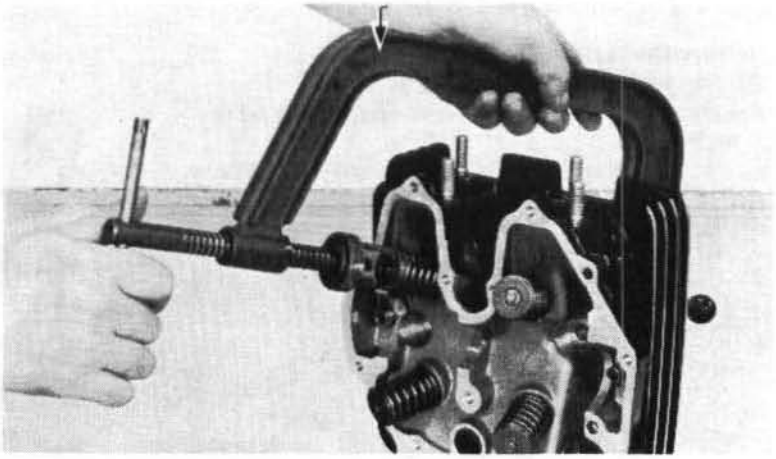
CAUTION

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

NOTE

Mark all parts to ensure correct assembly.

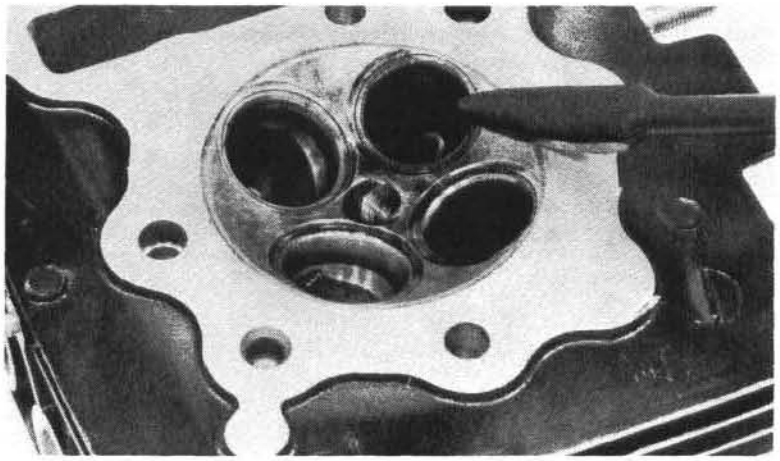
VALVE SPRING COMPRESSOR
07757–0010000 OR 07957–3290001



Remove the carbon deposits from the combustion chamber.
Clean any gasket material from the cylinder head mating surface.

CAUTION

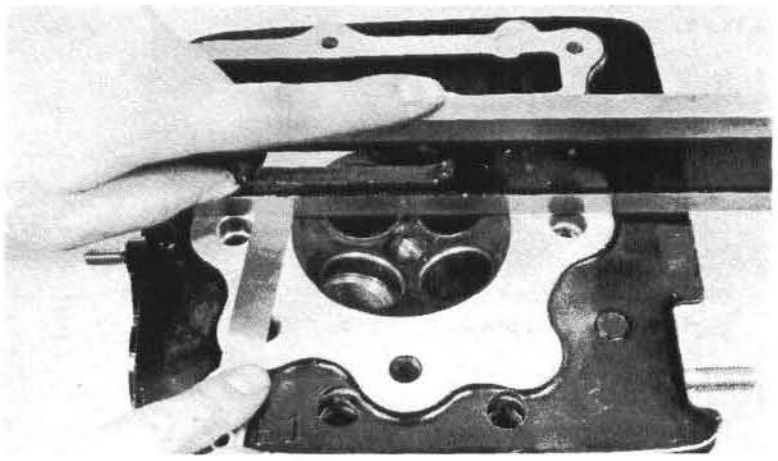
Be careful not to damage the valve seat.



CYLINDER HEAD INSPECTION

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

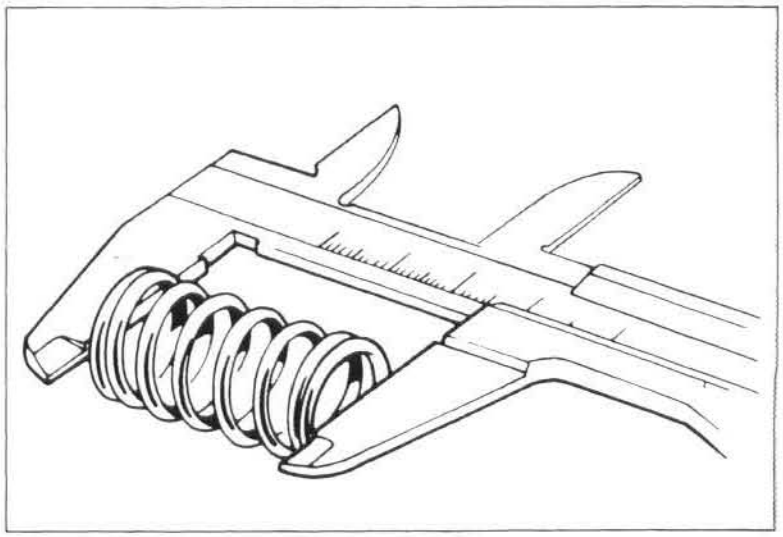
SERVICE LIMIT: 0.10 mm (0.004 in)



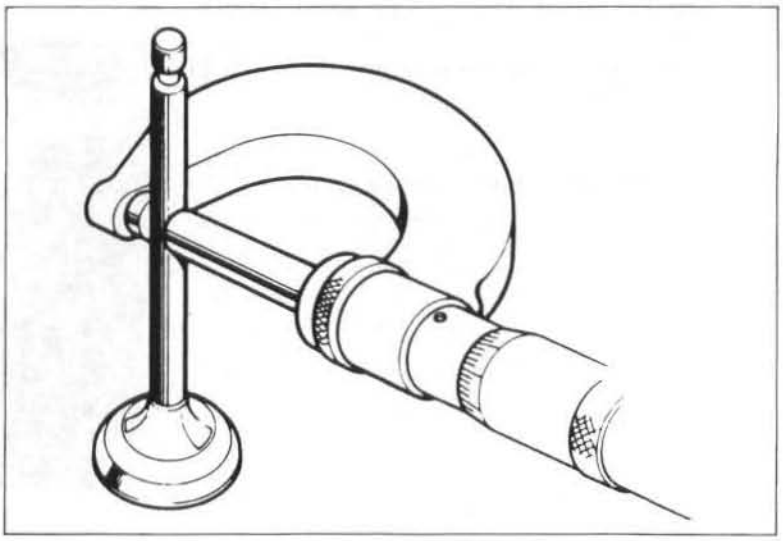
VALVE SPRING INSPECTION

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

SERVICE LIMITS:
INNER: 34.60 mm (1.362 in)
OUTER: 40.16 mm (1.575 in)



VALVE/VALVE GUIDE INSPECTION

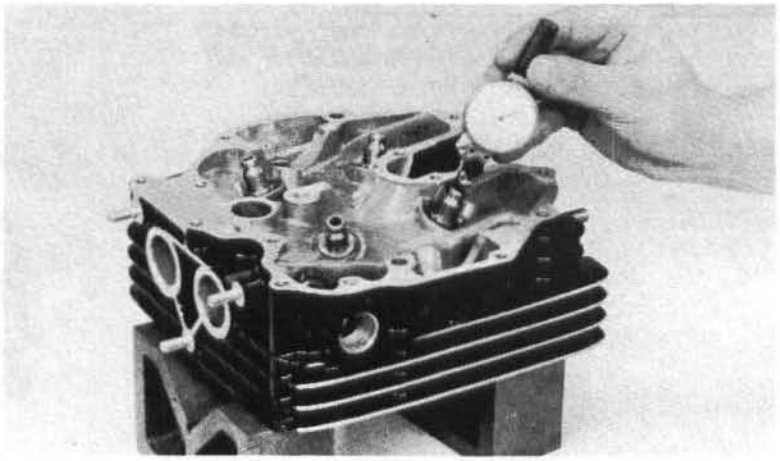


Inspect each valve for trueness, burning, scratches or abnormal stem wear.
Check valve movement in the guide. Measure and record each valve stem O.D.

SERVICE LIMITS:
INTAKE: 5.46 mm (0.215 in)
EXHAUST: 5.45 mm (0.214 in)

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

SERVICE LIMIT:
INTAKE/EXHAUST: 5.53 mm (0.218 in)



NOTE

> Ream the guides to remove carbon build-up before checking the valve guide I.D.

Calculate the stem-to-guide clearance.

SERVICE LIMITS:
INTAKE: 0.065 mm (0.0026 in)
EXHAUST: 0.080 mm (0.0031 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 stem-to-guide clearance still exceeds the service limit when new guides are installed, replace the valves.

NOTE

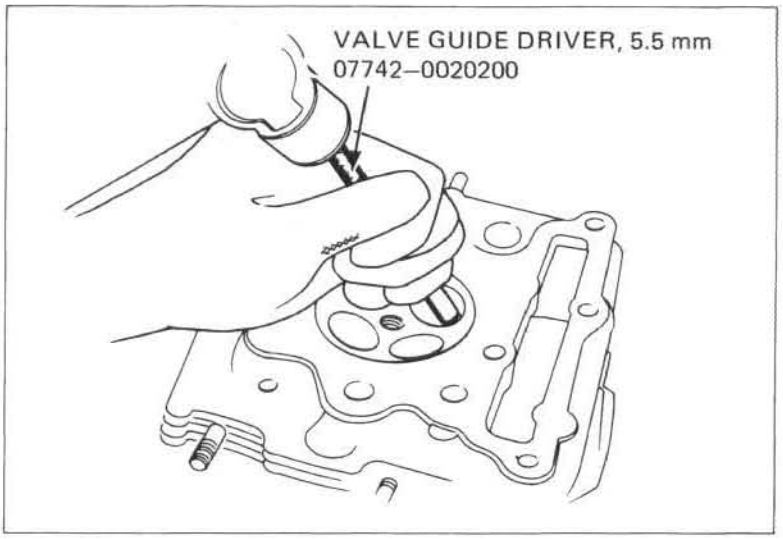
> Reface valve seats whenever new valve guides are installed.

VALVE GUIDE REPLACEMENT

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

NOTE

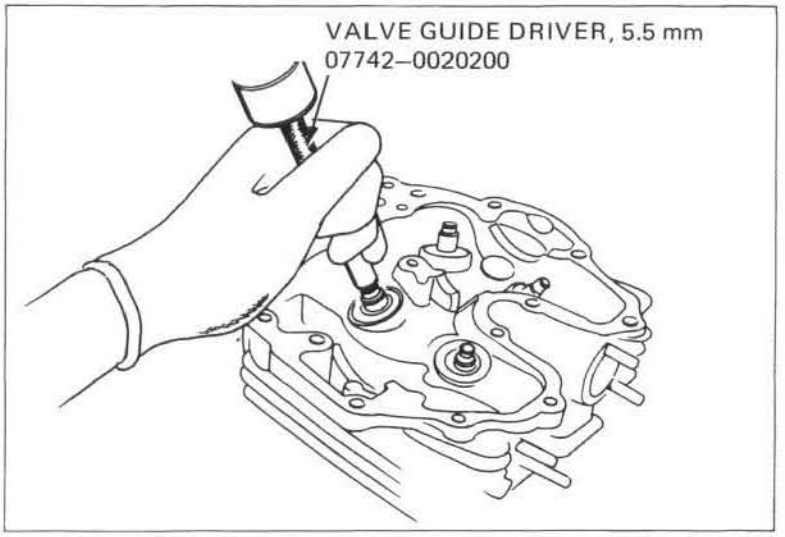
When driving out the valve guide, be careful not to damage the head.



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

NOTE

Inspect the valve guide for damage.

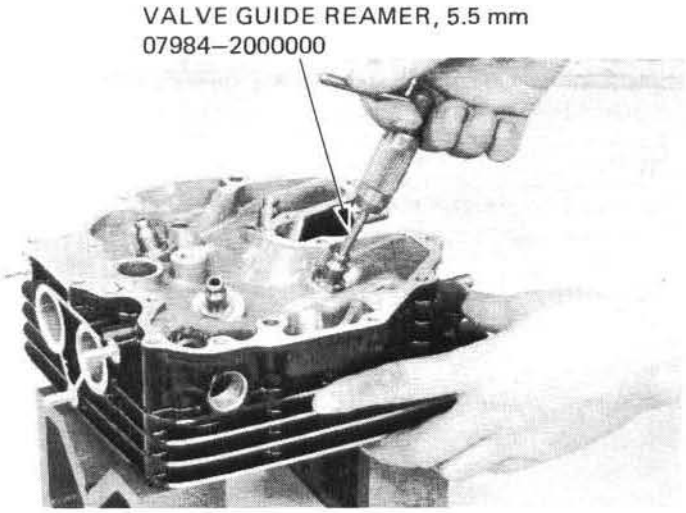


Ream the new valve guides after installation.

NOTE

Use cutting oil on the reamer during this operation.
Rotate the reamer in the cutting direction while inserting and removing it.

Reface the valve seat (Page 6-14).
Clean the cylinder head thoroughly to remove any metal particles.



VALVE SEAT INSPECTION AND REFACING

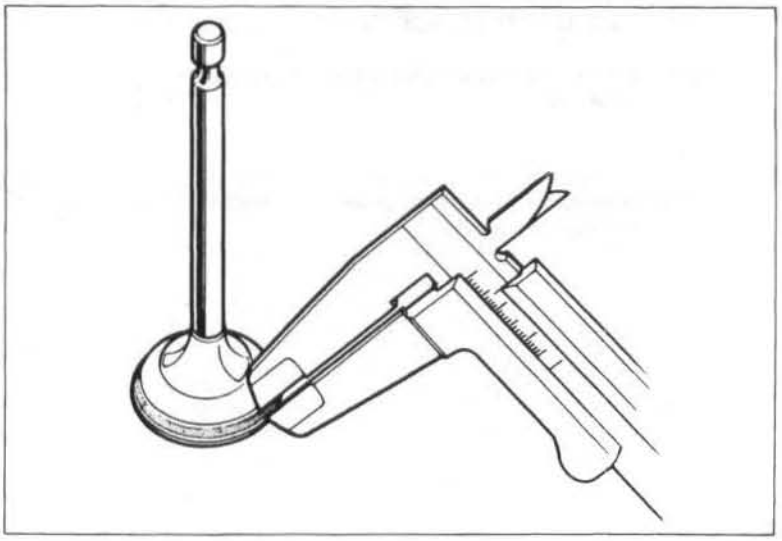
Clean all intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

Remove the valve and inspect the face.
Measure the valve face width.

SERVICE LIMIT: 2.0 mm (0.08 in)

CAUTION

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



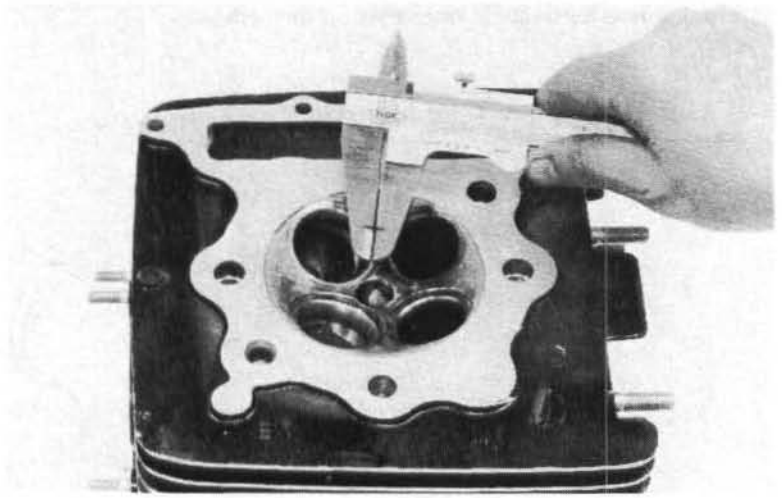
Measure the valve seat width.

SERVICE LIMIT: 2.0 mm (0.08 in)

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

NOTE

Follow the refacer manufacturer's operating instructions.

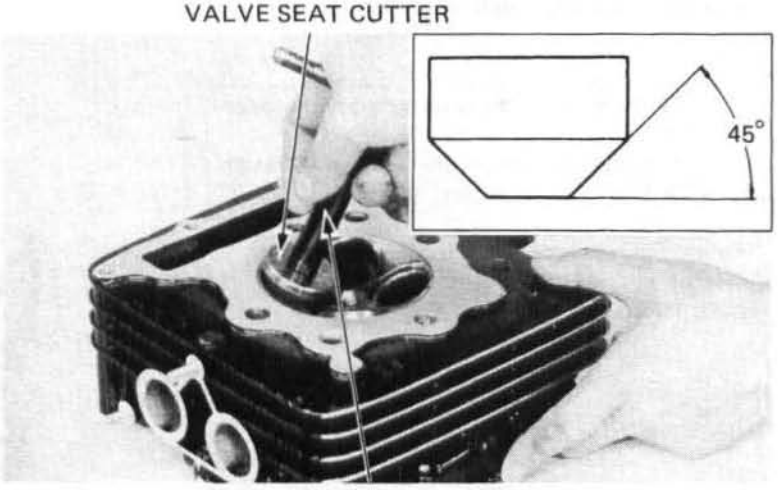


VALVE SEAT REFACING

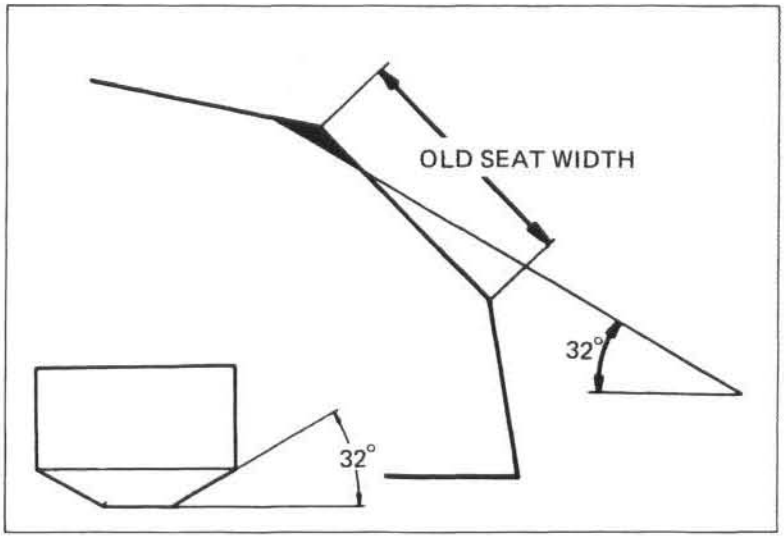
Using a 45 degree cutter, remove any roughness or irregularities from the seat.

NOTE

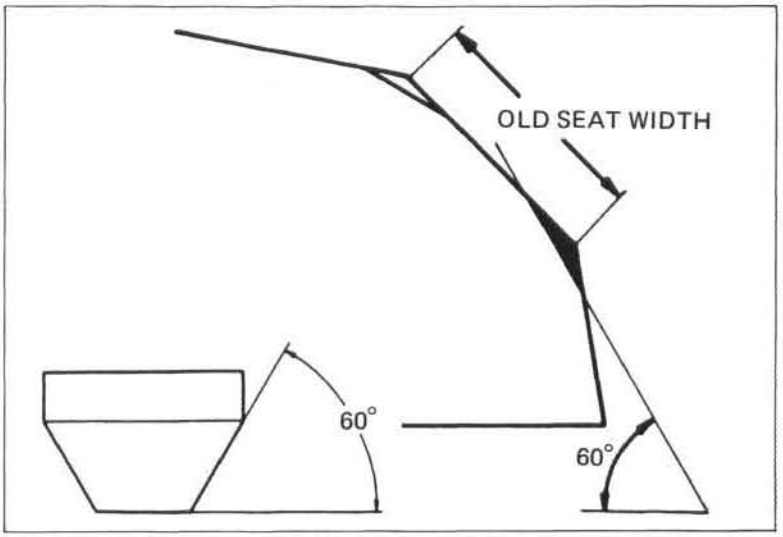
Reface the seat with a 45 degree cutter when the valve guide is replaced.



Using a 32 degree cutter, remove 1/4 of the existing valve seat material.



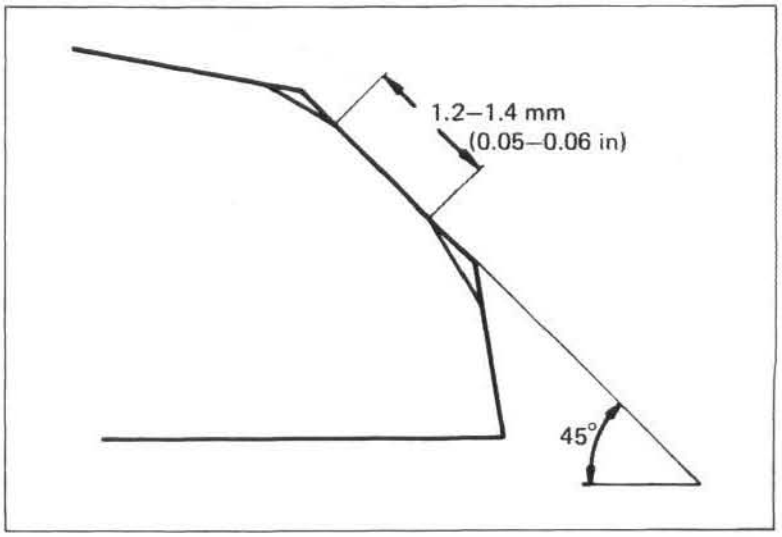
Using a 60 degree cutter, remove the bottom 1/4 of the old seat.



Using a 45 degree cutter, cut the seat to the proper width.

NOTE

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



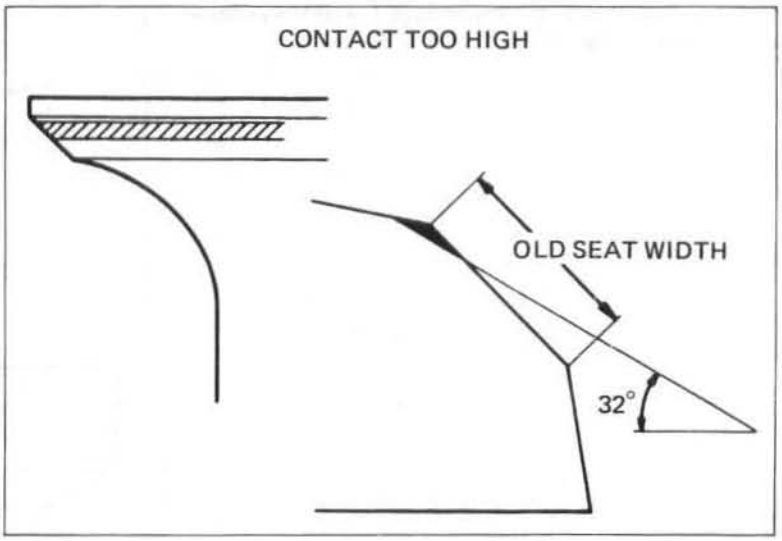
NOTE

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

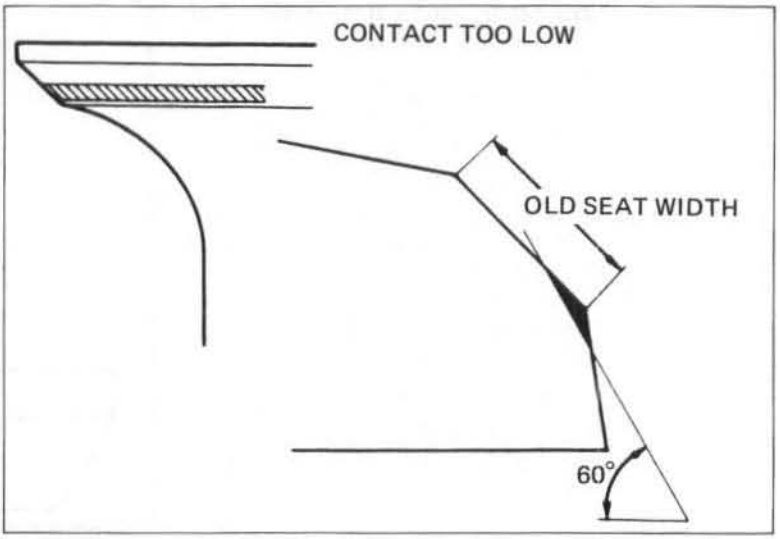
Apply a thin coating of Prussian Blue to the valve seat.

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

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



If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter. Refinish the seat to specifications, using a 45 degree finish cutter.

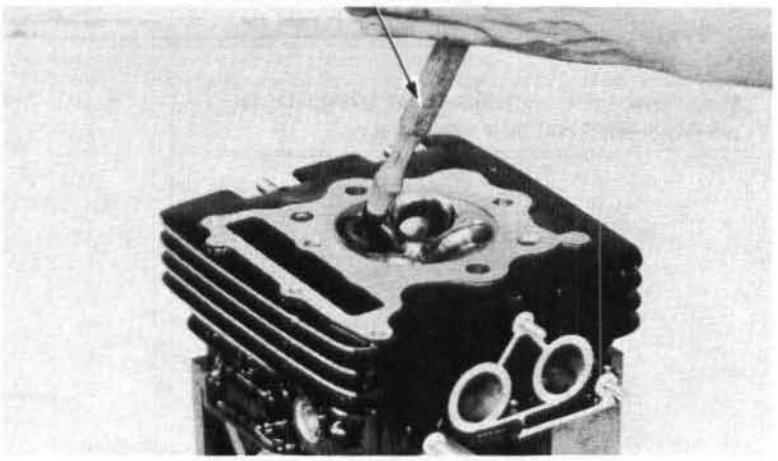


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure. After lapping, wash all residual compound off the cylinder head and valve.

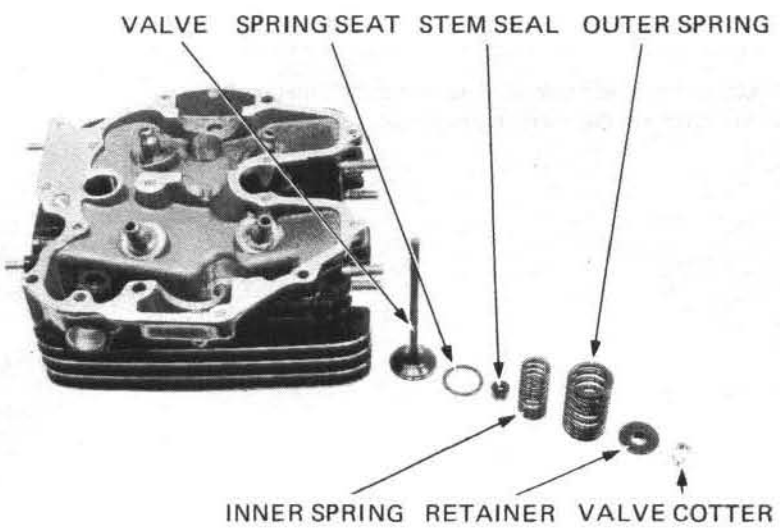
CAUTION

> *Take care not to allow the compound to enter between the valve stem and guide.*

VALVE LAPPING TOOL



CYLINDER HEAD ASSEMBLY



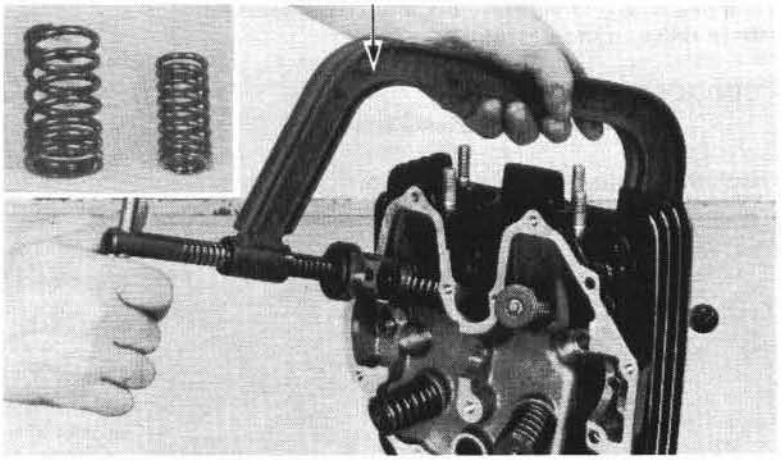
NOTE

> Install new valve stem seals when assembling.

Lubricate each valve stem with oil.
Insert the valves into the valve guides.

Install the spring seats, valve springs and retainers.

VALVE SPRING COMPRESSOR
07757–0010000 OR 07957–3290001



NOTE

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

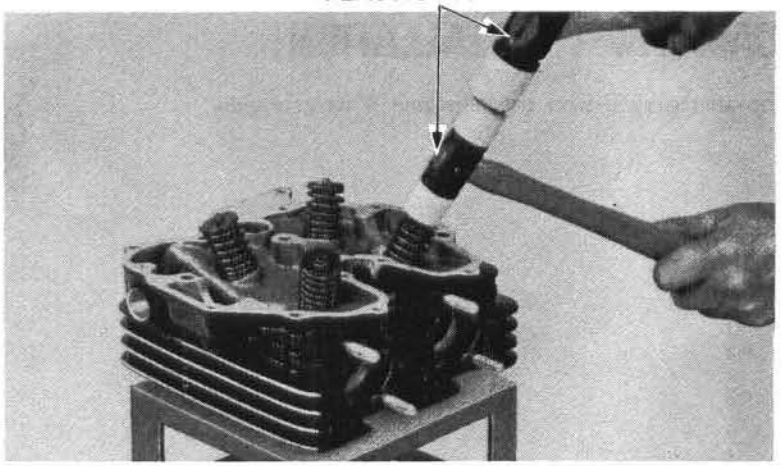
Install the valve cotters using the valve spring compressor.

CAUTION

> *To prevent loss of tension, do not compress the valve spring more than necessary.*

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

PLASTIC HAMMERS

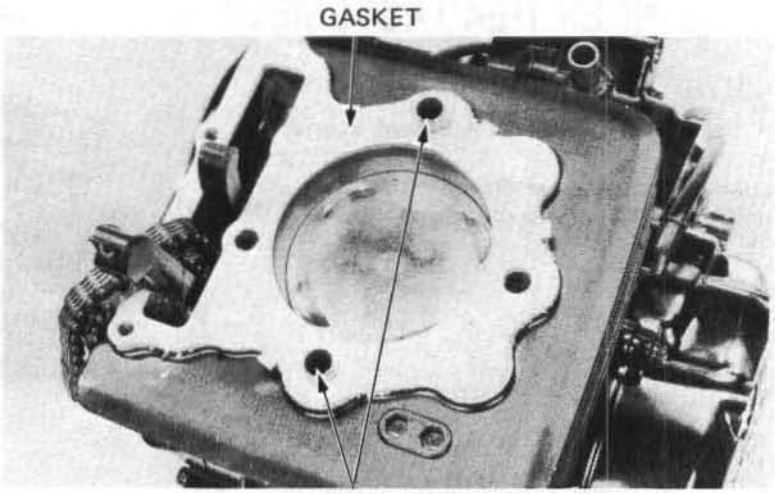


CAUTION

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

CYLINDER HEAD INSTALLATION

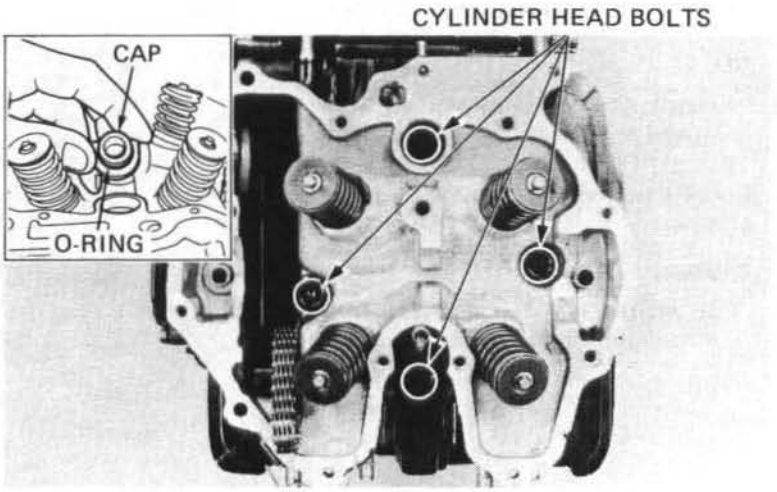
Clean any gasket material from the cylinder surface.
Install dowel pins and a new gasket.



Install the cylinder head.
Tighten the cylinder head bolts in a criss-cross pattern in two or more steps.

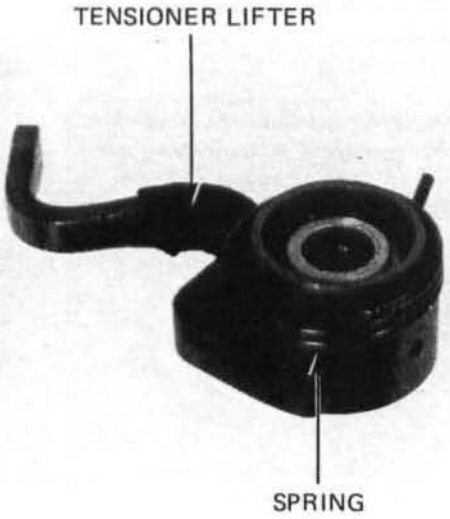
TORQUE: 47–53 N·m
(4.7–5.3 kg-m, 34–38 ft-lb)

Install the cylinder head bolt hole cap.
Install the intake manifold using a new O-ring.

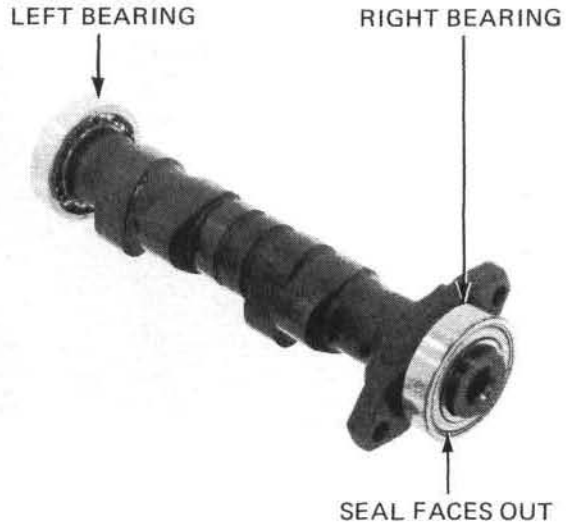


CAM CHAIN TENSIONER/ CAMSHAFT INSTALLATION

Install the spring on the tensioner lifter as shown.



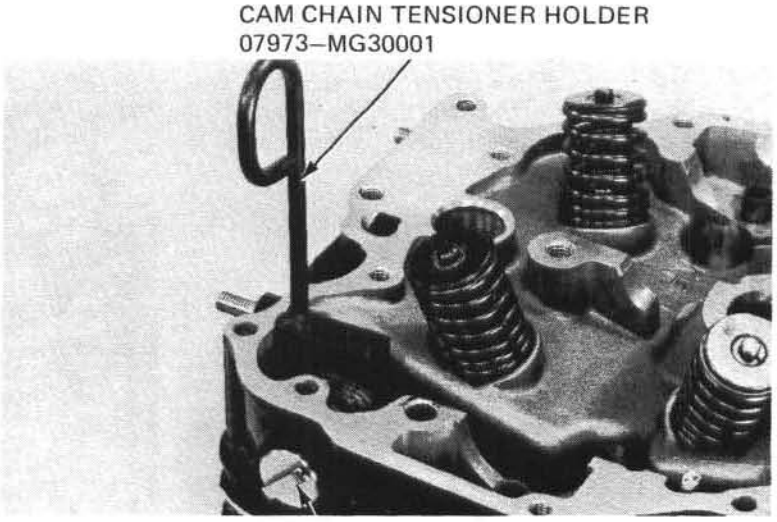
Apply engine oil to the camshaft bearings and install them onto the camshaft; the sealed bearing goes on the sprocket side with the seal facing out.



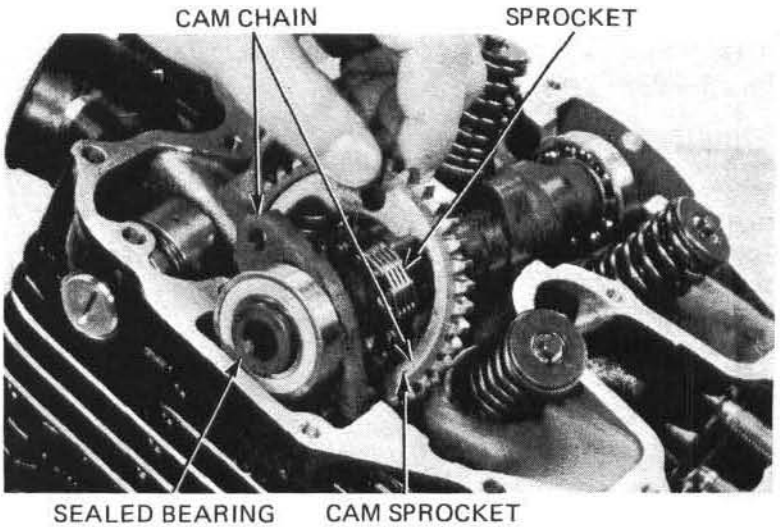
Install the tensioner lifter into the cylinder head. Apply engine oil to a new O-ring and install it in the groove of the cam chain tensioner shaft through the tensioner and into the cylinder head.
Hold the tensioner's lever straight down. Place the tensioner holder tool's pin into the hole in the tensioner which will be facing up.
Slowly release the tensioner lever until the tool rests against the cylinder head casting.

NOTE

Leave the tool in place until the camshaft, sprocket and chain are installed.

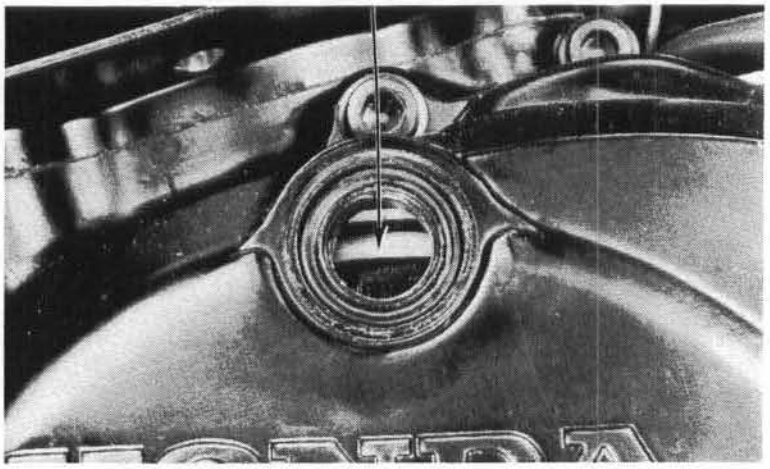


Place the cam sprocket inside the cam chain with its dished face facing the right side.
Install camshaft through the sprocket and cam chain.



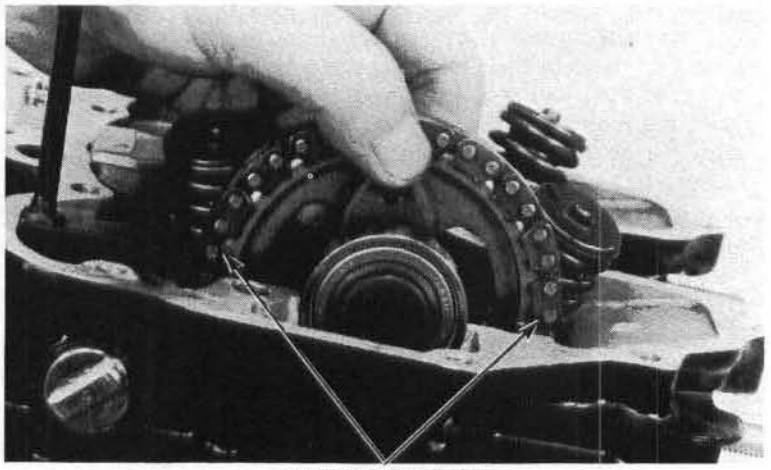
Turn the crankshaft and align the "T" mark on the flywheel with the index notch on the left crankcase cover.

"T" MARK AND INDEX MARK



Align the timing marks on the cam sprocket with the upper surface of the cylinder head and install the cam chain over the sprocket without rotating the sprocket.

Position the cam sprocket onto the shoulder of the camshaft.



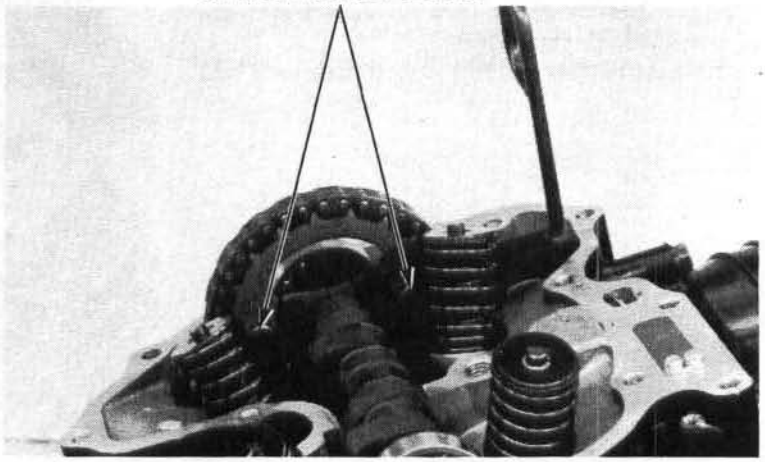
TIMING MARKS

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

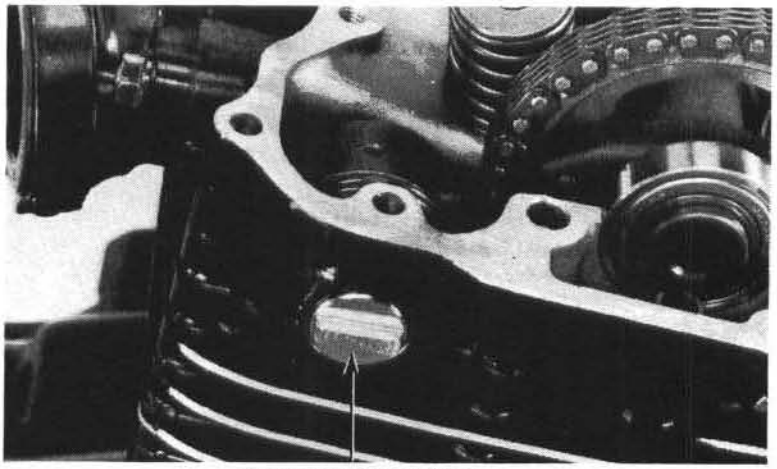
TORQUE: 17–23 N·m
(1.7–2.3 kg-m, 12–17 ft-lb)

Remove the cam chain tensioner holder tool.
Turn the crankshaft and align the "T" mark with the index notch and make sure that the timing marks on the sprocket align with the upper surface of the cylinder head.

CAM SPROCKET BOLTS



Turn the tensioner shaft, aligning it with the cylinder head edge as shown.



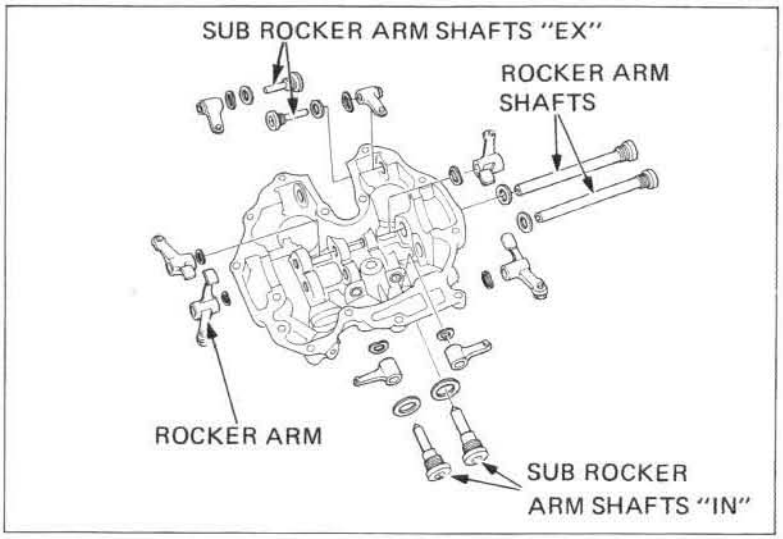
TENSIONER SHAFT

CYLINDER HEAD COVER ASSEMBLY

Install the rocker arms, sub rocker arms, rocker arm shafts, sub rocker arm shafts, thrust washer and wave washers.
Apply liquid sealant to the threads of the rocker arm and sub rocker arm shafts.

Tighten the rocker arm and sub rocker arm shafts.

TORQUE:
ROCKER ARM SHAFT:
25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
SUB ROCKER ARM SHAFT:
IN: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
EX: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

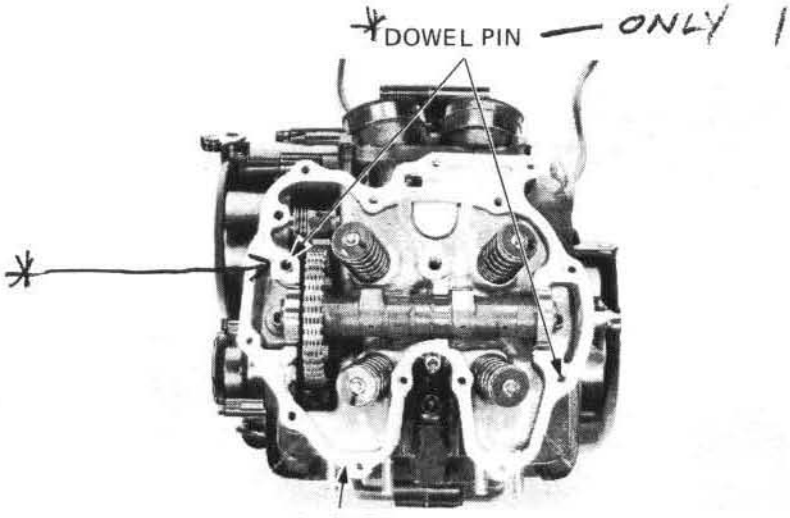


Apply clean engine oil to the rocker arms and shafts.

CYLINDER HEAD COVER INSTALLATION

Make sure the piston is at T.D.C. (Top Dead Center) on the compression stroke.

Install the dowel pins and a new gasket. Pour clean engine oil into the oil pockets in the head so that the cam lobes are completely submerged.

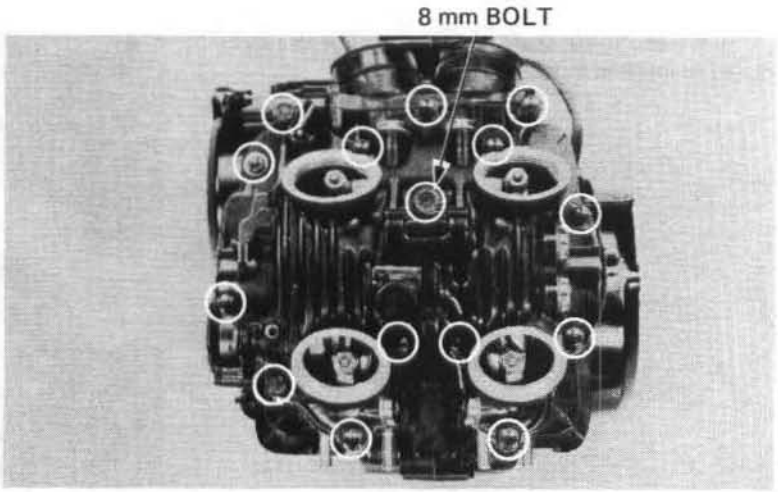


Install the cylinder head cover.
Tighten the cylinder head cover bolts to the specified torque.

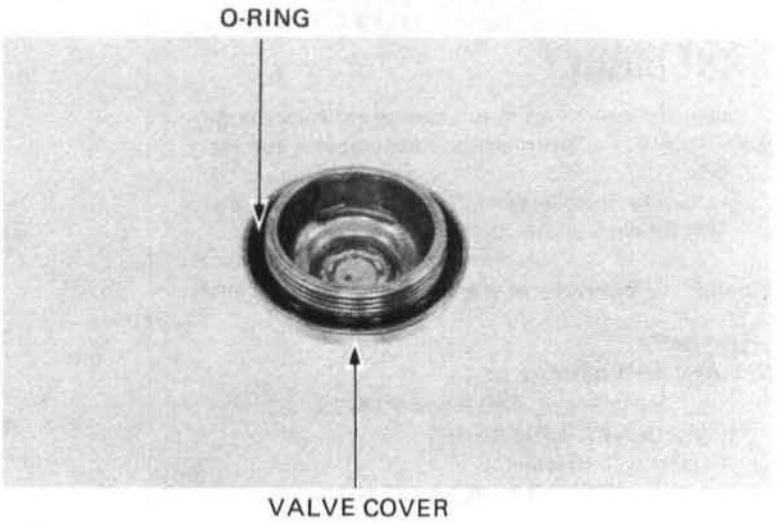
TORQUE: 6 mm bolt: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
8 mm bolt: 24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)
6 mm small head bolt: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

NOTE

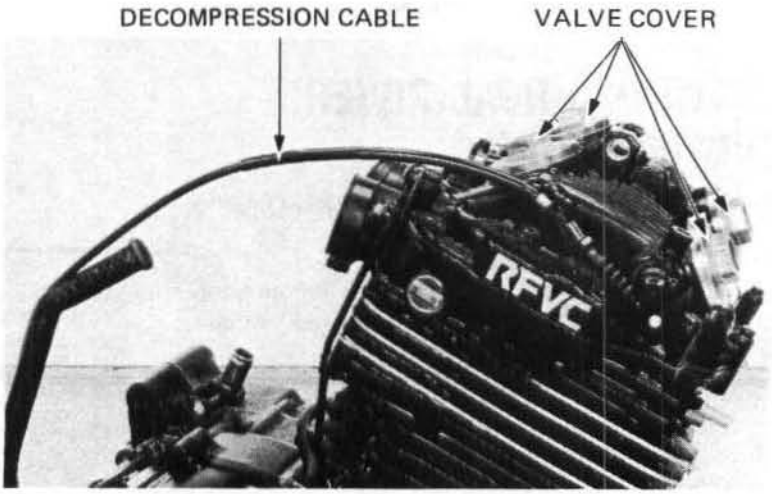
> Tighten the head cover bolts in a criss-cross pattern in two or more steps.



Adjust the valve clearance (Page 3-8).
Make sure the O-ring is properly seated in the groove of the valve cover.



Install the valve covers.
Connect the decompression cable and adjust if necessary (Page 3-9).
Reinstall the removed parts in the reverse order of removal.



CYLINDER COMPRESSION INSPECTION

Warm up the engine.
Stop the engine and remove the spark plug.
Disconnect the kick starter decompressor cable from the valve lifter lever at the cylinder head.
Connect a compression gauge.
Open the throttle grip fully.
Operate the kick starter pedal several times and check the gauge reading.

NOTE

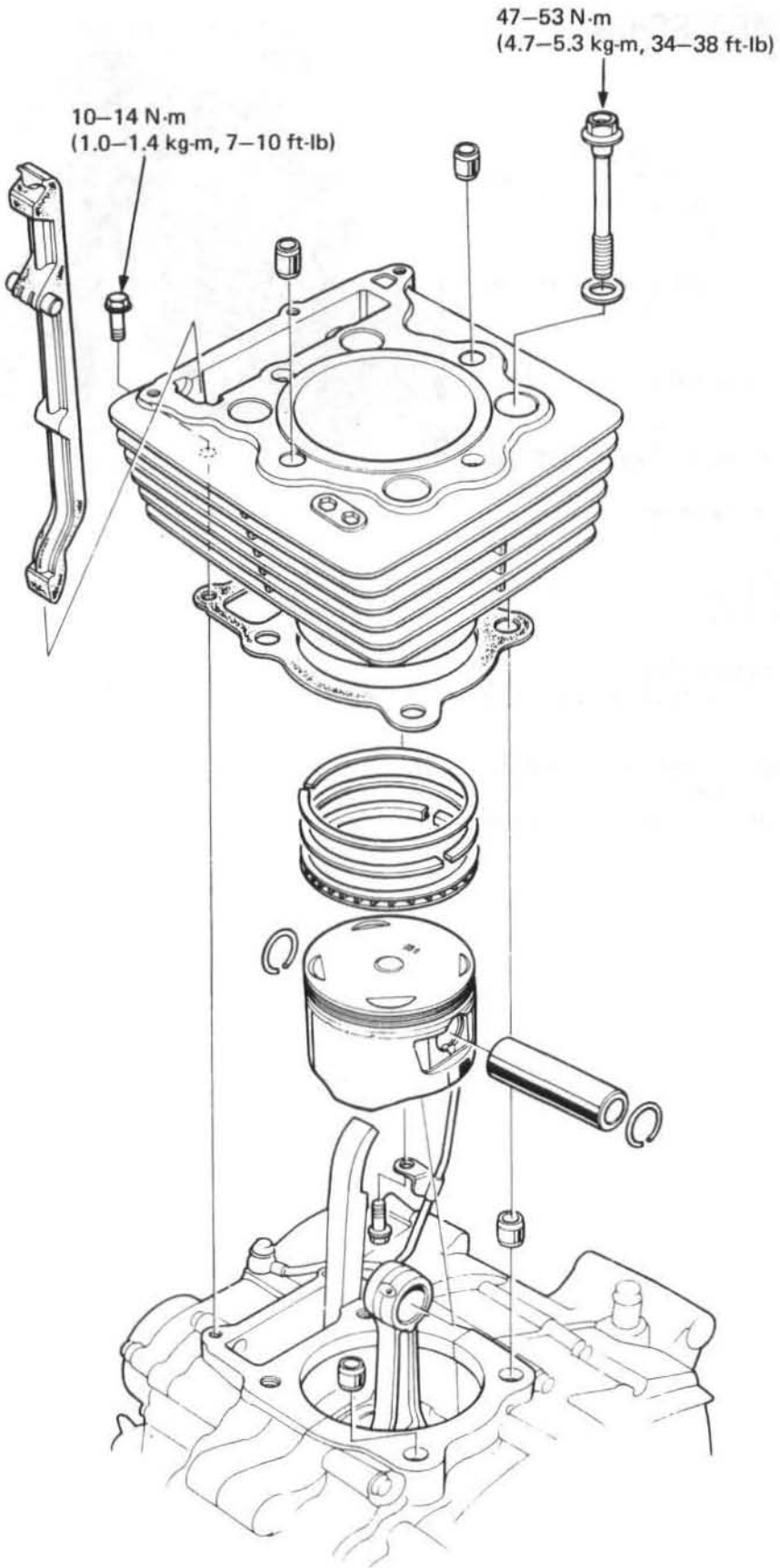
> Be sure compression is not leaking at the gauge connection.

COMPRESSION: 1,400 kPa (14.0 kg/cm^2, 199 psi)

Low compression can be caused by:
- Improper valve adjustment
- Valve leakage
- Leaking cylinder head gasket
- Worn piston rings or cylinder

High compression can be caused by:
- Carbon deposits in the combustion chamber or on the piston head

Disconnect the compression gauge, then reinstall the kickstarter decompressor cable.
Adjust the kickstarter decompressor lifter lever free play.
Reinstall the spark plug.



7. CYLINDER/PISTON

SERVICE INFORMATION

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.	84.00–84.01 mm (3.3071–3.3074 in)	84.11 mm (3.311 in)
	Taper	———	0.05 mm (0.002 in)
	Out of round	———	0.05 mm (0.002 in)
	Warpage across top	———	0.10 mm (0.004 in)
Piston	O.D. at skirt	83.965–83.985 mm (3.3057–3.3065 in)	83.87 mm (3.302 in)
	Piston pin bore	19.002–19.008 mm (0.7481–0.7483 in)	19.08 mm (0.751 in)
	Piston pin-to-piston clearance	0.002–0.014 mm (0.0001–0.0006 in)	0.12 mm (0.005 in)
Piston ring end gap	Top/second	0.20–0.40 mm (0.0079–0.0157 in)	0.55 mm (0.022 in)
	Oil (Side Rail)	0.2–0.9 mm (0.007–0.035 in)	———
Piston ring-to-groove clearance	Top	0.030–0.065 mm (0.0012–0.0026 in)	0.12 mm (0.005 in)
	Second	0.015–0.045 mm (0.0006–0.0018 in)	0.12 mm (0.005 in)
Cylinder-to-piston clearance		0.015–0.045 mm (0.0006–0.0018 in)	0.10 mm (0.004 in)
Piston pin O.D.		18.994–19.000 mm (0.7478–0.7480 in)	18.96 mm (0.746 in)
Connecting rod small end I.D.		19.020–19.041 mm (0.7488–0.7496 in)	19.07 mm (0.751 in)

TORQUE VALUES

Cylinder bolt (10 mm): 47–53 N·m (4.7–5.3 kg-m, 34–38 ft-lb)
(6 mm): 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TROUBLESHOOTING

Low or Unstable Compression
- Worn cylinder or piston rings

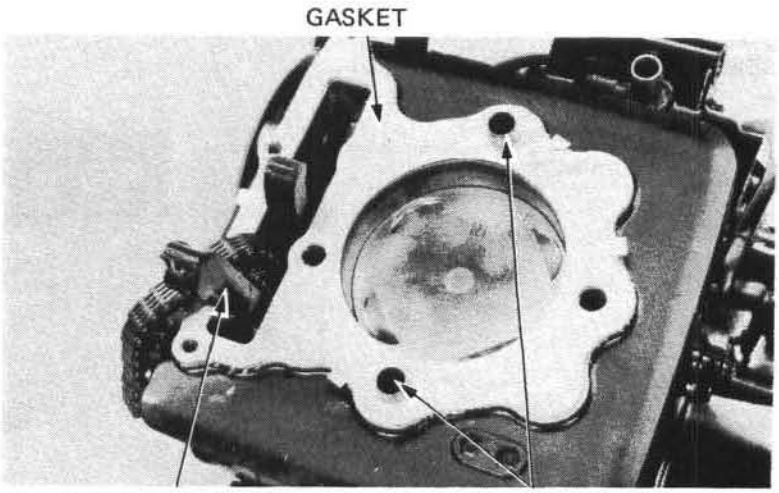
Excessive Smoke
- Worn cylinder, piston, or piston rings
- Improper installation of piston rings
- Scored or scratched piston of cylinder wall

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

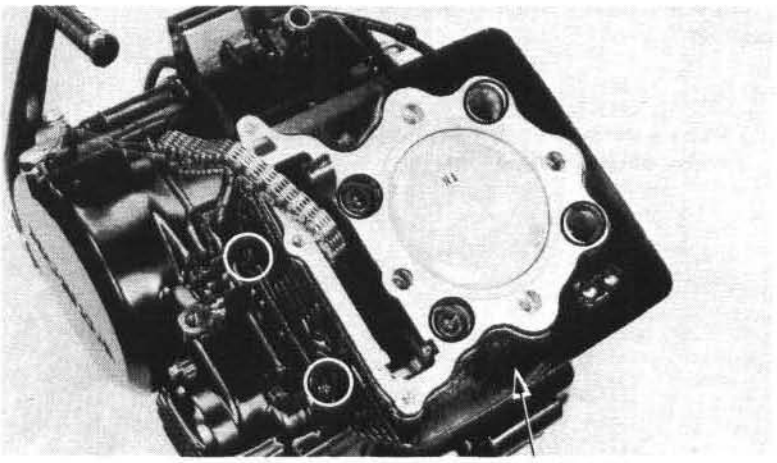
Knocking or Abnormal Noise
- Worn piston and cylinder
- Excessive carbon build-up on piston crown or combustion chamber

CYLINDER REMOVAL

Remove the cylinder head (Section 6).
Remove the cylinder head gasket and dowel pins.
Remove the cam chain guide.



Remove the cylinder bolts.
Remove the cylinder.



CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D.

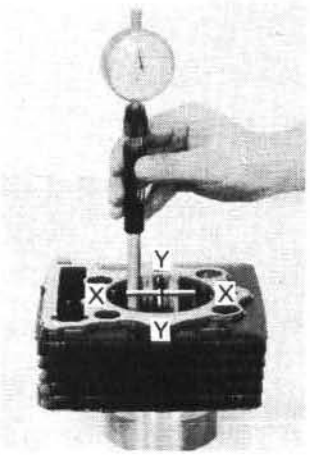
SERVICE LIMIT: 84.11 mm (3.311 in)

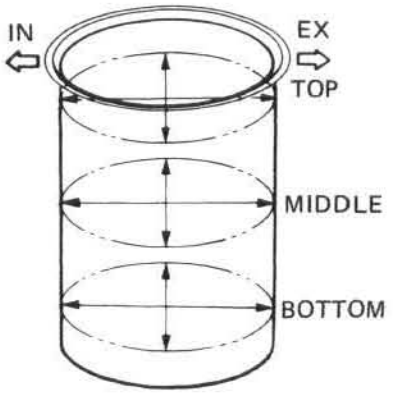
NOTE

> Check for out of round on the X and Y axis at three locations.

Calculate the taper and out of round.

SERVICE LIMITS:
OUT OF ROUND: 0.05 mm (0.002 in)
TAPER: 0.05 mm (0.002 in)



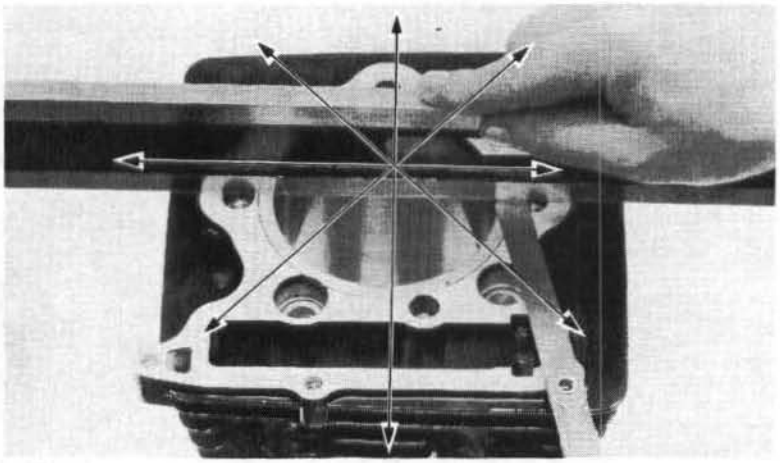


Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)

NOTE

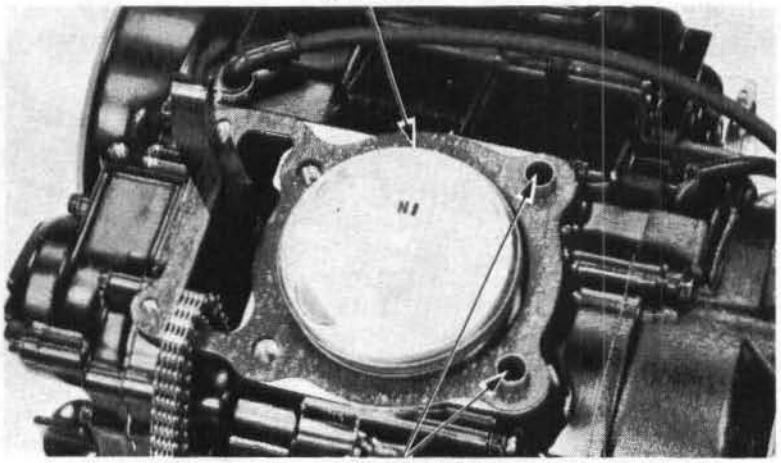
Check in an X pattern.



Remove the base gasket and dowel pins.
Clean any gasket material from the crankcase and cylinder.

NOTE

Place a shop towel in the crankcase to prevent gasket materials from falling in.



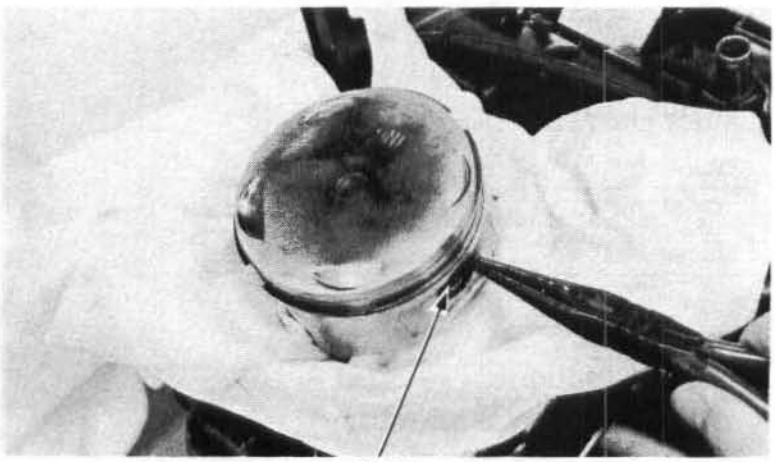
PISTON REMOVAL

Remove the piston pin clip with pliers.

NOTE

Place a shop towel in the crankcase to prevent clips and other objects from falling in.

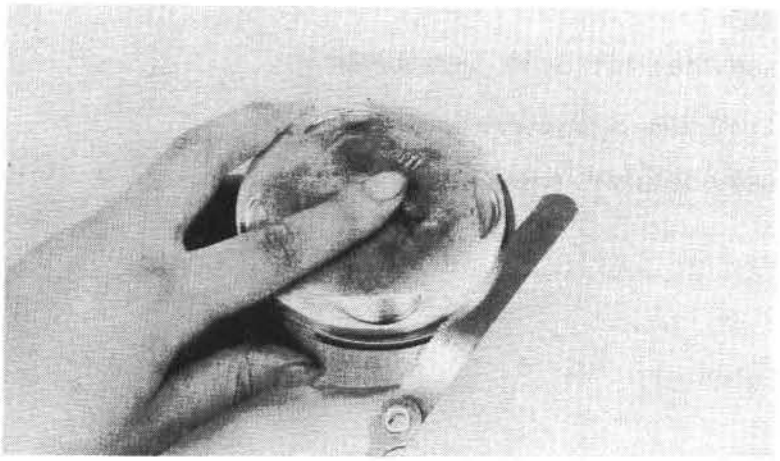
Press the piston pin out of the piston.
Remove the piston.



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT:
TOP/SECOND: 0.12 mm (0.005 in)

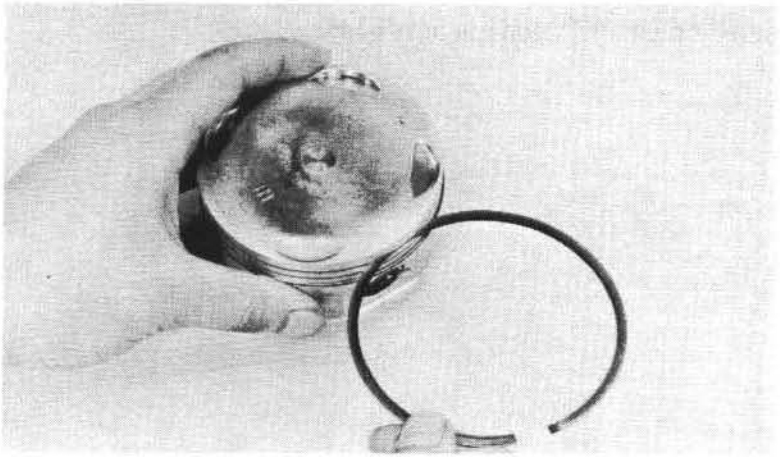


Remove the piston rings.
Inspect the pistons for damage and the ring grooves for wear.

NOTE

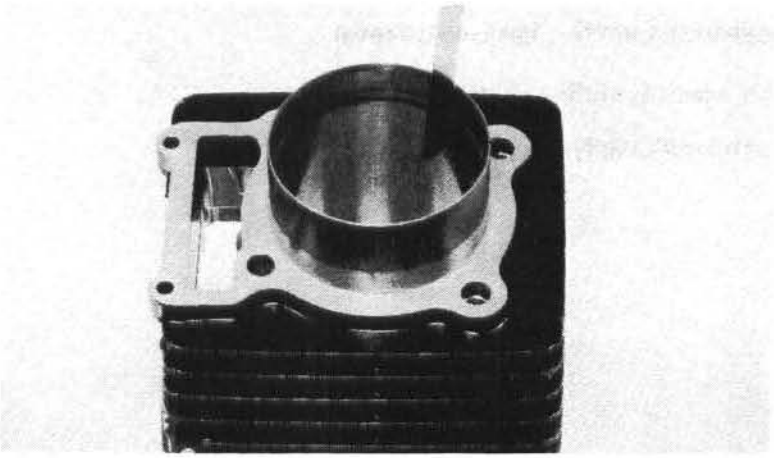
> Do not damage the piston rings during removal.

Clean the piston ring grooves thoroughly.
Check for cleanliness by holding a ring in the grooves while turning the piston.



Insert each piston ring into the cylinder and measure the ring end gap.

SERVICE LIMIT:
TOP/SECOND: 0.55 mm (0.022 in)

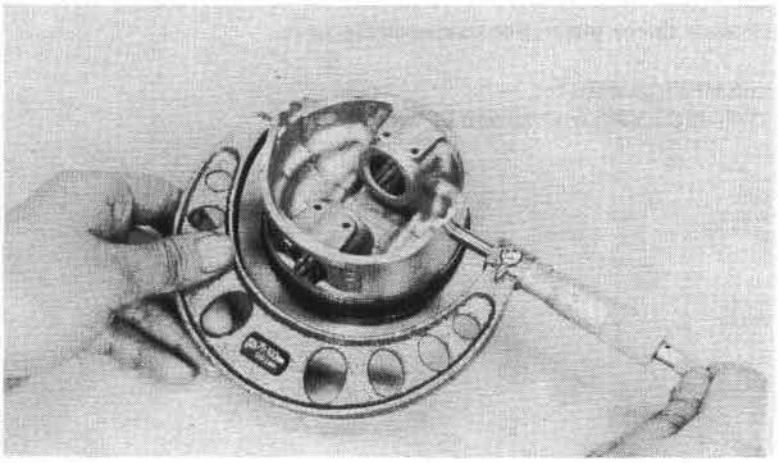


Measure the piston diameter 10 mm from the bottom.

SERVICE LIMIT: 83.87 mm (3.302 in)

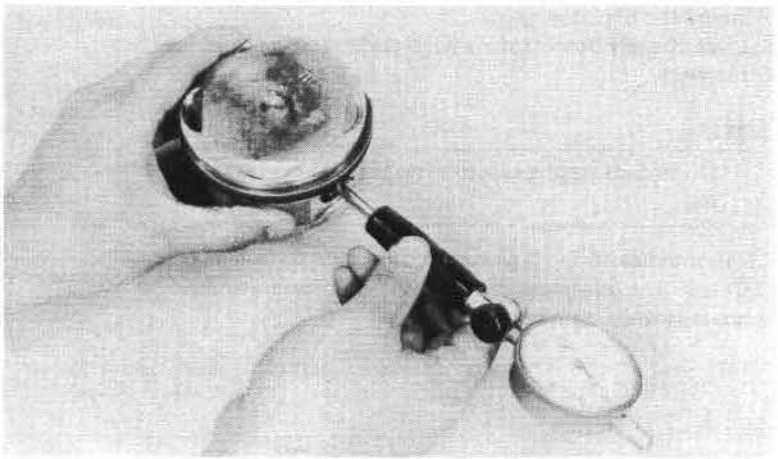
Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



Measure the piston pin hole I.D.

SERVICE LIMIT: 19.08 mm (0.751 in)

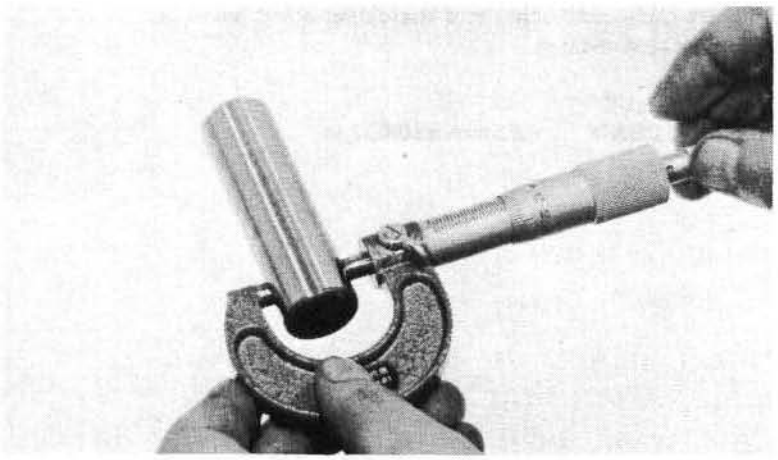


Measure the piston pin O.D.

SERVICE LIMIT: 18.96 mm (0.746 in)

Calculate the piston-to-piston pin clearance.

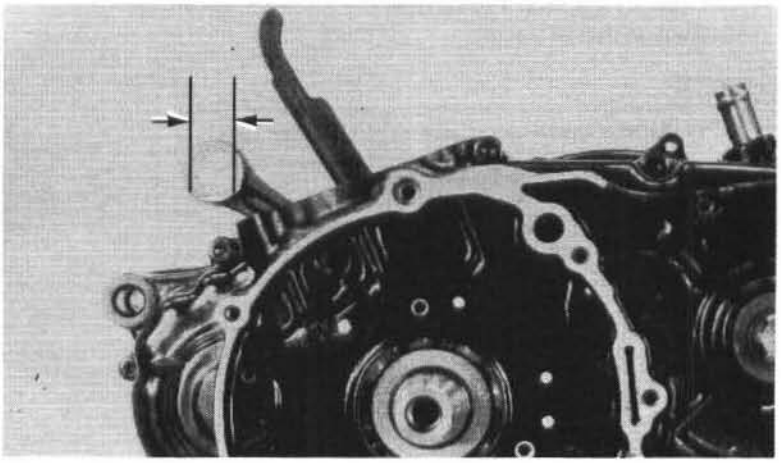
SERVICE LIMIT: 0.12 mm (0.005 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 19.07 mm (0.751 in)

See section 10 for crankshaft removal.



PISTON INSTALLATION

PISTON RING INSTALLATION

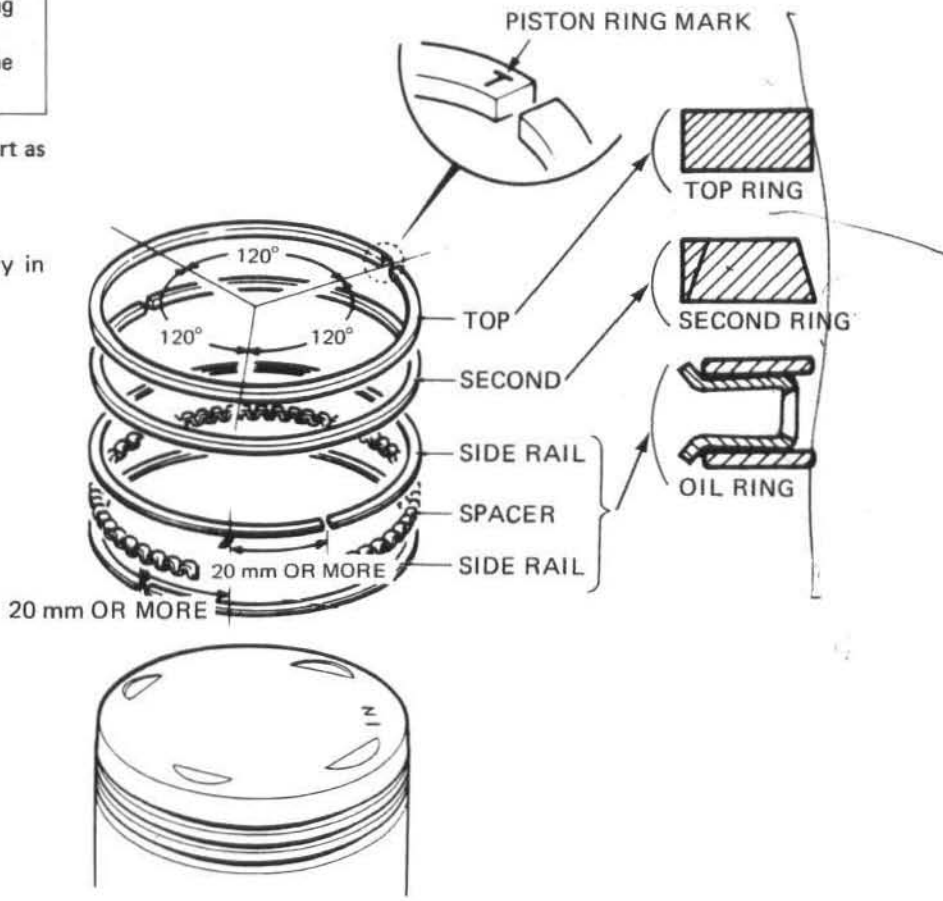
Install the piston rings with the marks facing up.

NOTE

> Avoid piston and piston ring damage during installation.
> Install the oil ring spacer first, then install the side rails.

Space the piston ring end gaps 120 degrees apart as shown.
Do not align the oil ring (side rail) gaps.

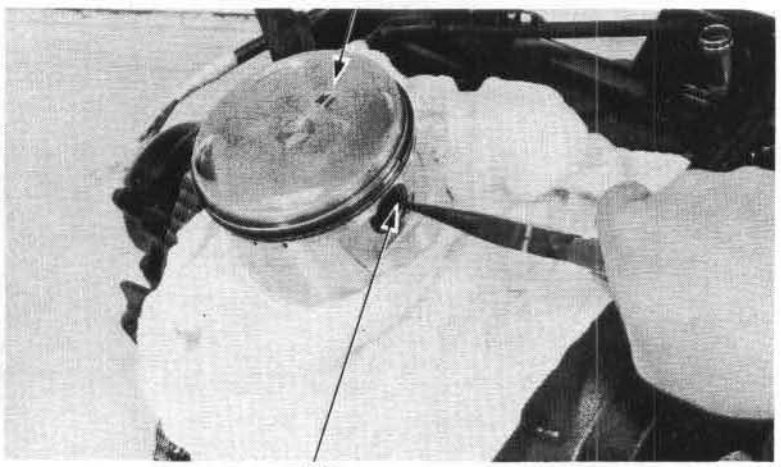
After installation, the rings should rotate freely in the ring lands.



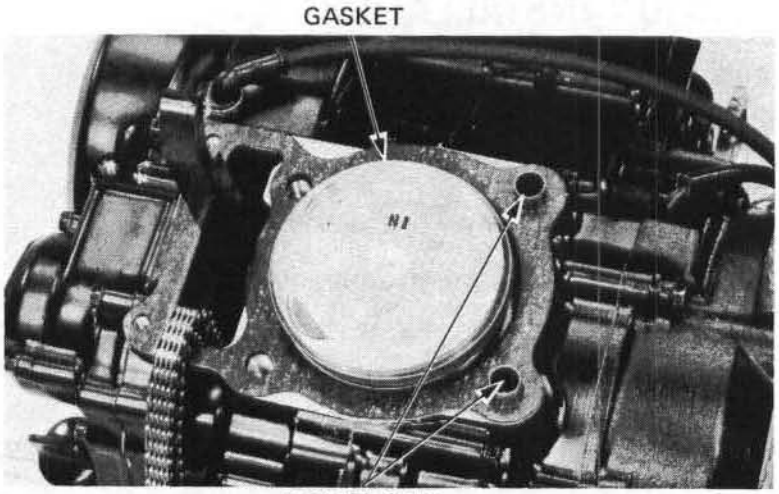
Install the piston and piston pin. Position the piston "IN" mark on the intake valve side.
Install new piston pin clips.

NOTE

- Place a clean shop towel in the crankcase to prevent clips and other objects from falling in.
- Position the piston pin clip end gaps in the 12 o'clock position.



Remove the shop towel from the crankcase.
Install the cylinder base gasket and dowel pins.
Coat the cylinder bore, piston and piston rings with clean engine oil.



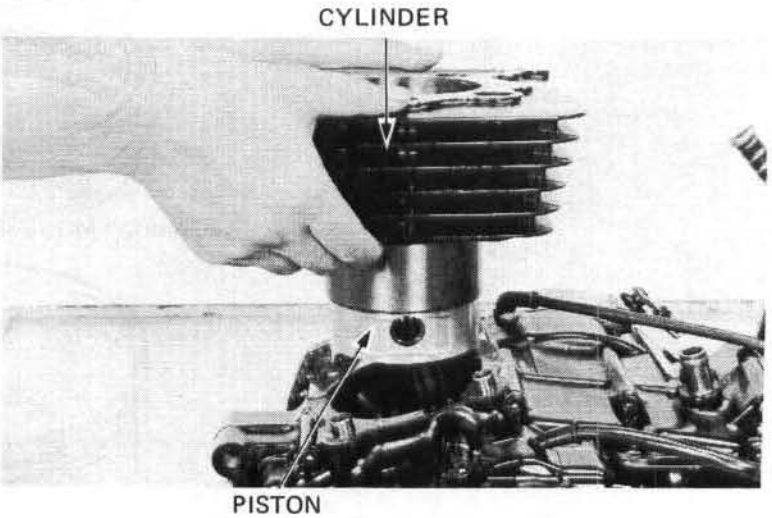
CYLINDER INSTALLATION

CYLINDER INSTALLATION

Carefully lower the cylinder over the piston by compressing the piston rings by hand as shown.

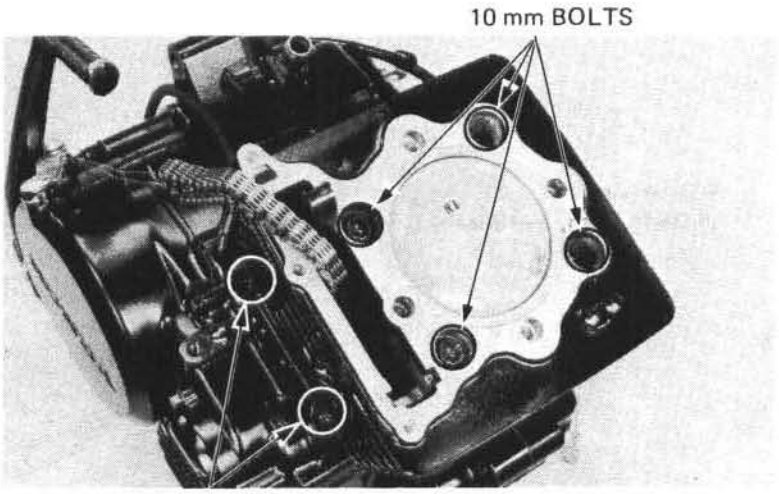
NOTE

Avoid piston ring damage during installation.



Tighten the cylinder bolts.

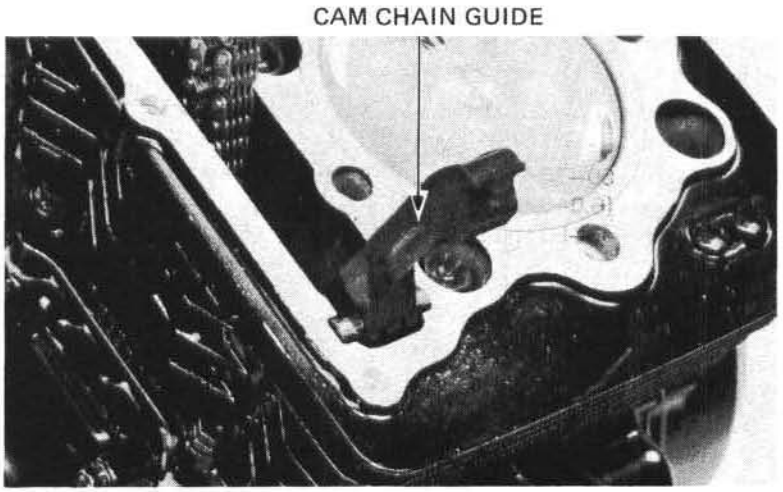
TORQUE:
Cylinder bolts
10 mm: 47–53 N·m (4.7–5.3 kg-m, 34–38 ft-lb)
6 mm: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)



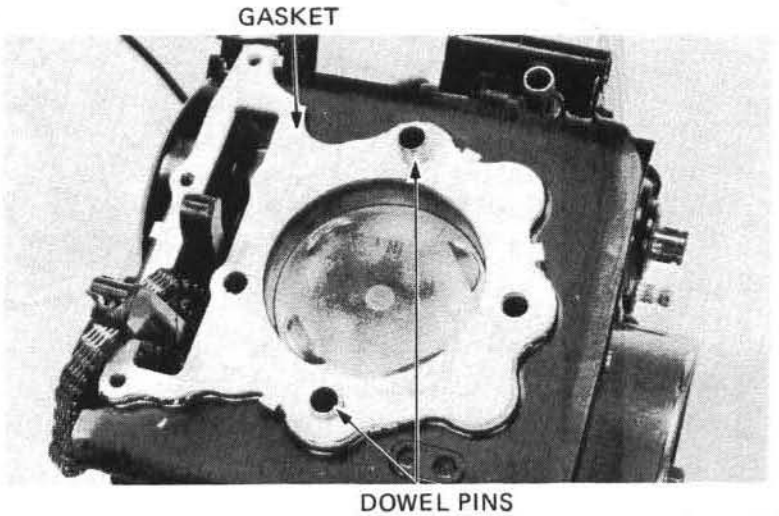
Install the cam chain guide.

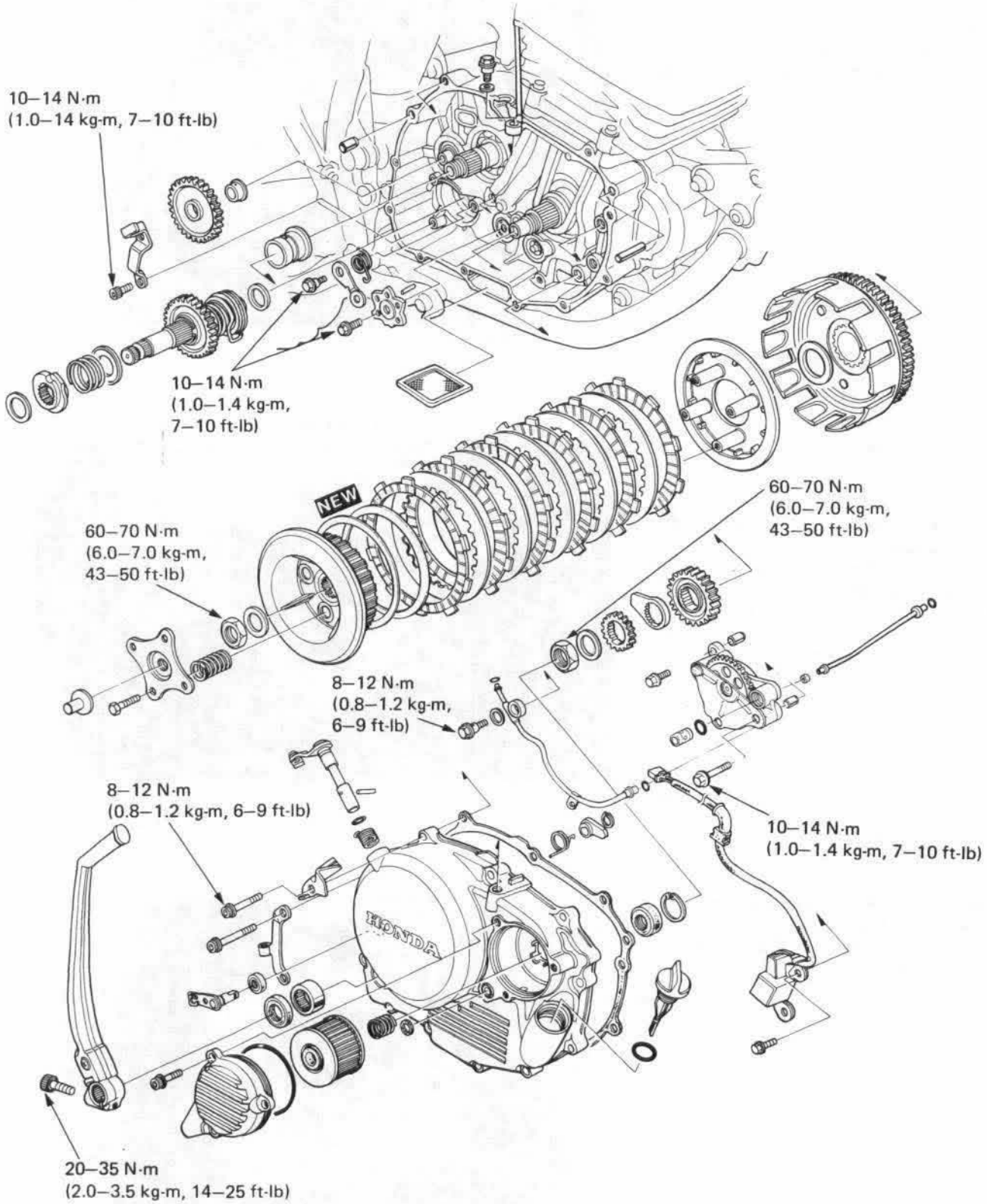
NOTE

- Fit the cam chain guide tab in the cylinder cutout as shown.
- Push the guide in until it bottoms in the crankcase guide hole.



Install the dowel pins in the top of the cylinder.
Install a new cylinder head gasket.
Clean carbon deposits from the cylinder head.
Install the cylinder head (Page 6-18).





8. CLUTCH/OIL PUMP/ KICK STARTER

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch, oil pump, and kick starter, starting with the right crankcase cover. All these operations can be accomplished with the engine installed.
- When the existing clutch discs are replaced, coat new discs with engine oil prior to assembly.
- Clean the oil strainer whenever the right crankcase cover is removed.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Clutch	Lever free play (at lever end)		10–20 mm (3/8–3/4 in)	———
	Spring free length		35.4 mm (1.39 in)	33.7 mm (1.33 in)
	Spring preload/length		23.4–28.6 kg/23 mm (51.59–63.05 lb/0.9 in)	———
	Disc thickness		2.92–3.08 mm (0.115–0.121 in)	2.69 mm (0.106 in)
	Plate warpage		———	0.3 mm (0.01 in)
	Clutch outer I.D.		28.000–28.021 mm (1.1024–1.1032 in)	28.04 mm (1.104 in)
	Clutch outer guide	O.D.	27.959–27.998 mm (1.1007–1.1023 in)	27.05 mm (1.065 in)
		I.D.	22.010–22.035 mm (0.8665–0.8675 in)	22.05 mm (0.868 in)
	Mainshaft O.D.		21.959–21.980 mm (0.8645–0.8654 in)	21.91 mm (0.863 in)
Oil pump	Inner rotor-to-outer rotor clearance		0.15 mm (0.006 in) max.	0.20 mm (0.008 in)
	Outer rotor-to-body clearance		0.15–0.21 mm (0.006–0.008 in)	0.25 mm (0.010 in)
	Rotor-to-cover clearance		0.02–0.08 mm (0.001–0.003 in)	0.12 mm (0.005 in)
Starter idle gear I.D.			17.010–17.034 mm (0.6697–0.6706 in)	17.12 mm (0.674 in)
Starter idle gear bushing		O.D.	16.966–16.984 mm (0.6684–0.6687 in)	16.93 mm (0.667 in)
		I.D.	14.000–14.018 mm (0.5512–0.5519 in)	14.04 mm (0.553 in)
Kick starter pinion I.D.			22.020–22.041 mm (0.8669–0.8679 in)	22.12 mm (0.871 in)
Kick starter spindle O.D.			21.959–21.980 mm (0.8645–0.8654 in)	21.91 mm (0.863 in)
Mainshaft-to-clutch outer guide clearance			0.051–0.055 mm (0.0020–0.0022 in)	0.14 mm (0.006 in)
Countershaft (starter idle gear) O.D.			13.982–14.000 mm (0.5505–0.5512 in)	13.96 mm (0.550 in)

TORQUE VALUES

Clutch lock nut:	60–70 N·m (6.0–7.0 kg-m, 43–50 ft-lb)
Primary drive gear lock nut:	60–70 N·m (6.0–7.0 kg-m, 43–50 ft-lb)
Right crankcase cover bolt:	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Oil pump bolt:	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Oil pass pipe bolt:	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Kick starter ratchet guide bolt:	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Shift drum stopper arm bolt:	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Shift drum stopper plate bolt:	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Kick starter pedal bolt:	20–35 N·m (2.0–3.5 kg-m, 14–25 ft-lb)
Right footpeg bolt:	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Muffler band bolt:	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)

TOOLS

Special

Clutch center holder	07923–KE10001
Bearing remover, 15 mm	07936–KC10500
Bearing remover, 20 mm	07936–3710600
Remover weight	07936–3710200
Remover handle	07936–3710100

Common

Lock nut wrench, 17 x 27 mm	07716–0020300 or equivalent commercially available in U.S.A.
Pin driver, 3 mm	07744–0010200
Driver	07749–0010000
Attachment, 24 x 26 mm	07746–0010700 not available in U.S.A.
Pilot, 20 mm	07746–0040500
Pilot, 30 mm	07746–0040700 U.S.A. only
Flywheel holder	07725–0040000 or Band strap wrench commercially available in U.S.A.

TROUBLESHOOTING

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

Clutch Slips When Accelerating
- No free play
- Discs worn
- Spring weak

Clutch Will Not Disengage
- Too much free play
- Plates warped

Motorcycle Creeps With Clutch Disengaged
- Too much free play
- Plates warped

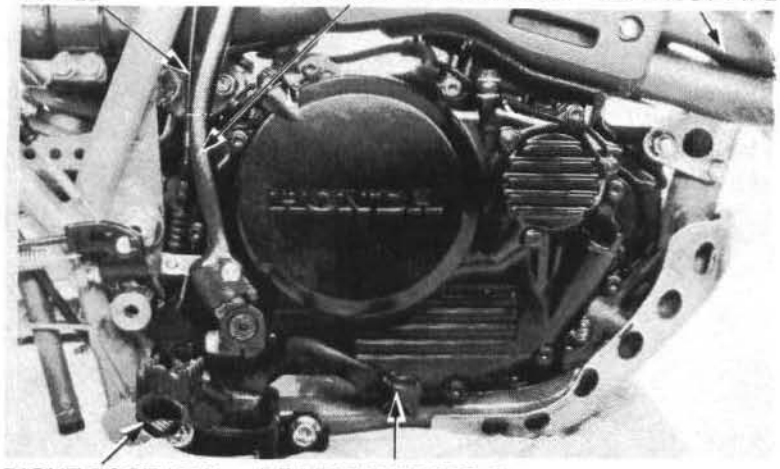
Excessive Lever Pressure
- Clutch cable kinked, damaged or dirty
- Lifter mechanism damaged

Clutch Operation Feels Rough
- Outer drum slots rough

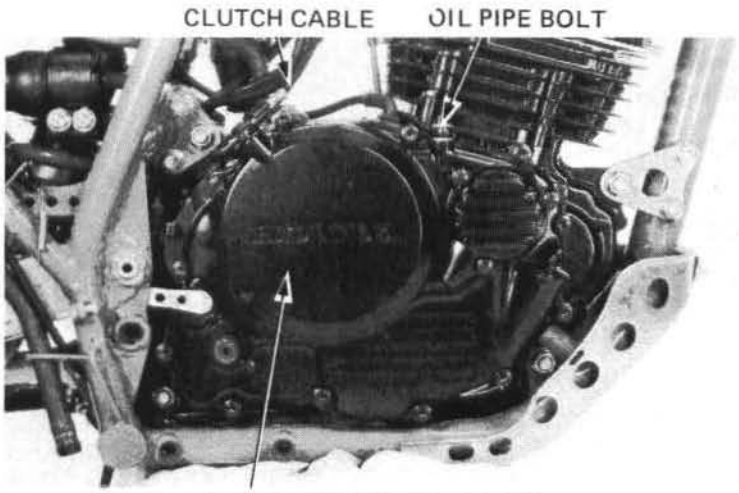
Low Oil Pressure
- Faulty oil pump
- Oil pump drive gear broken

RIGHT CRANKCASE COVER REMOVAL

Drain oil from the engine.
Remove the right side cover.
Remove the exhaust pipe.
Remove the kick starter pedal.
Remove the right foot peg.
Remove the rear brake pedal.
Disconnect the decompressor cable.



Remove the oil pipe bolt.
Disconnect the clutch cable.
Remove the bolts holding the right crankcase cover, and remove the cover.

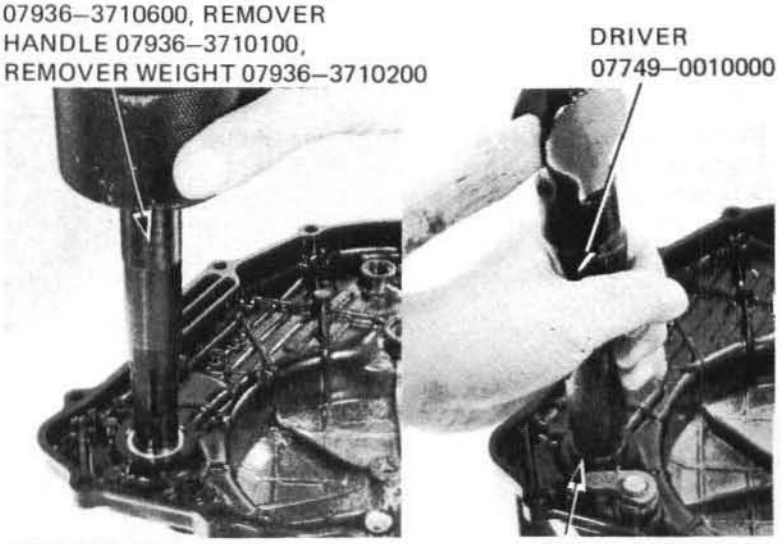


KICK STARTER NEEDLE BEARING REPLACEMENT

Remove the circlip, and remove the decompressor lifter cam, spring and lifter arm.

Remove the kick starter needle bearing with the bearing remover.

Coat a new bearing with grease and drive it into the right crankcase cover with the mark facing out.

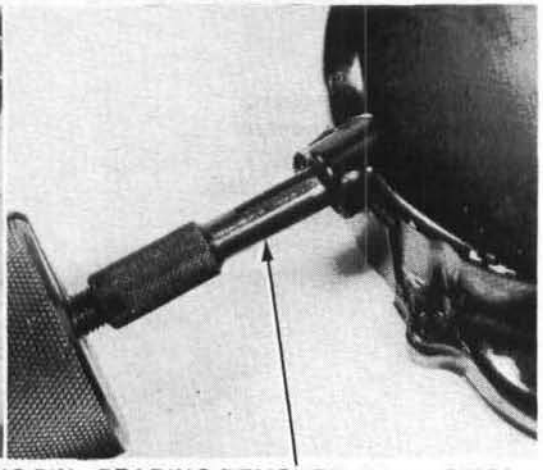


CLUTCH LIFTER ARM BEARING REPLACEMENT

Pull the lifter arm out, then remove the spring.
Drive the spring pin out with the pin driver, then remove the lifter arm.
Remove the dust seal, then remove the bearing with the bearing remover.

PIN DRIVER 3mm 07744–0010200 OR EQUIVALENT (U.S.A. ONLY)

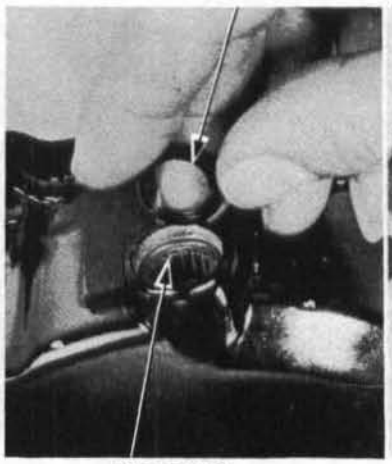
LIFTER ARM SPRING PIN



BEARING REMOVER, 15 mm 07936–KC10500, HANDLE 07936–3710100, WEIGHT 07936–3710200

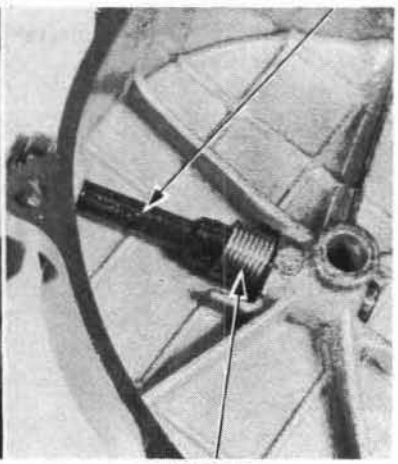
Install the new bearing with the mark facing out.
Apply grease to the bearing.
Install the dust seal and lifter arm.
Install the spring and spring pin.

DUST SEAL



BEARING

LIFTER ARM

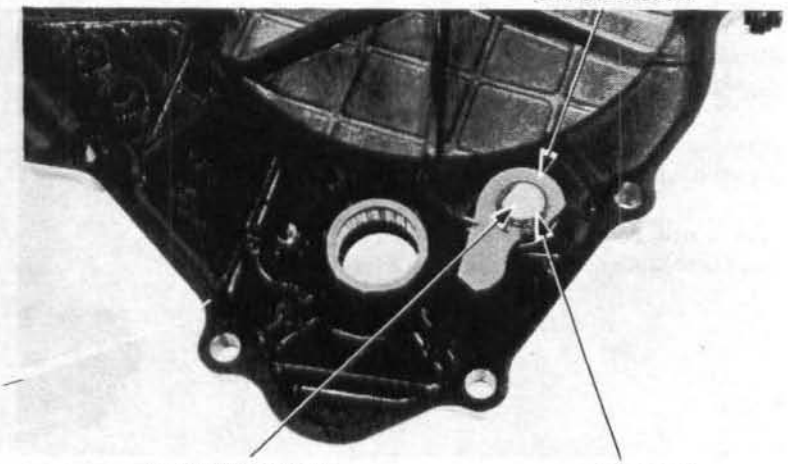


SPRING

DECOMPRESSOR LIFTER ARM REPLACEMENT

Install the decompressor lifter arm, spring and the lifter lever.
Set the circlip onto the lifter lever.

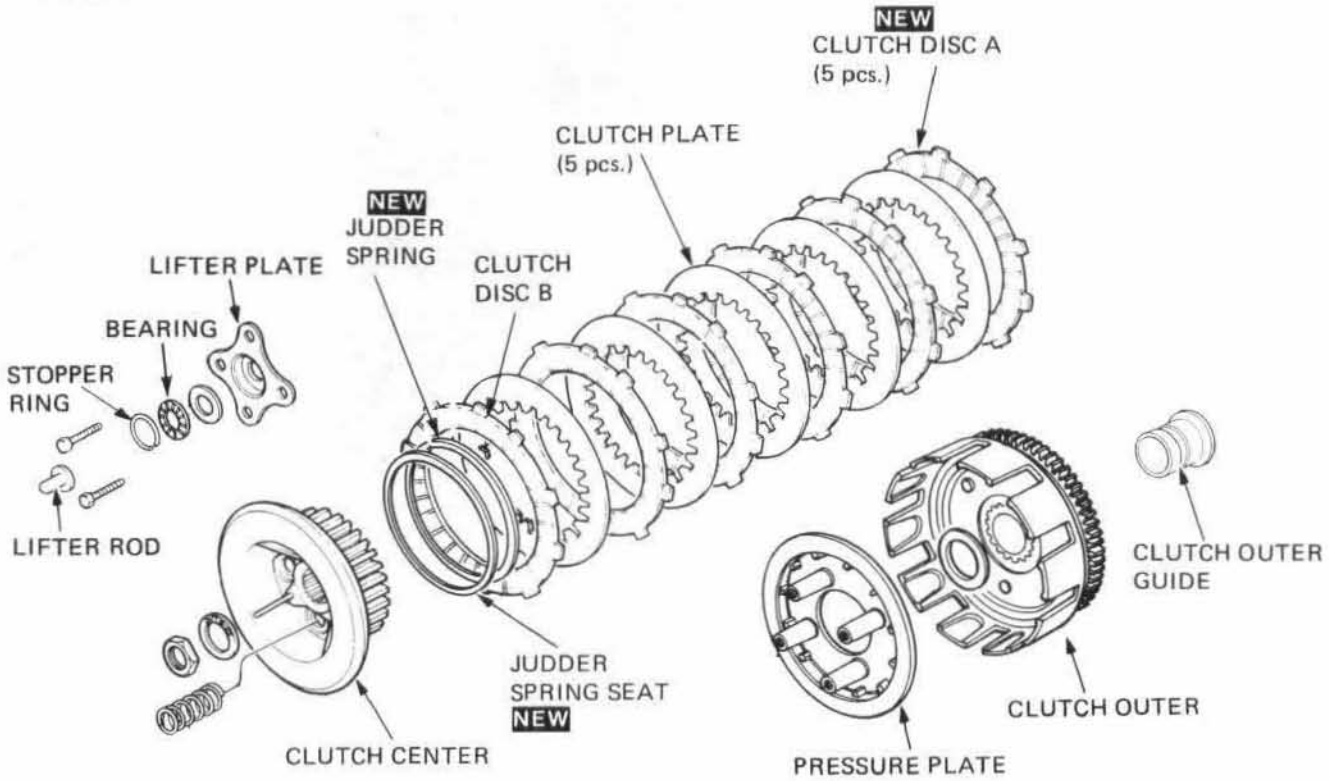
LIFTER CAM



LIFTER LEVER

CIRCLIP

CLUTCH



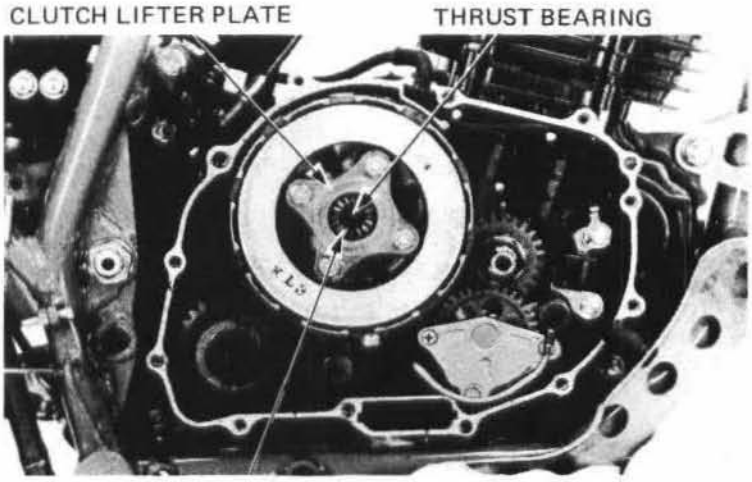
REMOVAL

Remove the clutch lifter plate and springs by removing the four bolts.

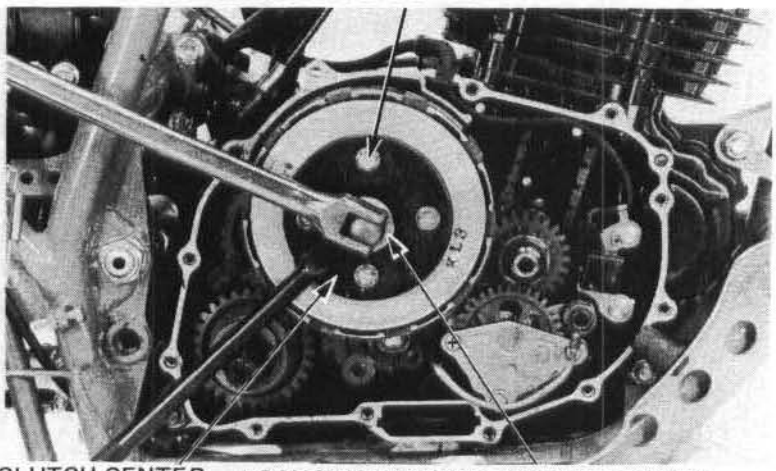
NOTE

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

Remove the stopper ring, bearing and washer, if necessary.



Attach the clutch center holder to the pressure plate with four clutch bolts.
Remove the clutch nut and lock washer.
Remove the clutch center holder, clutch center, discs, plates, pressure plate, clutch outer, guide, and thrust washer.



CLUTCH CENTER HOLDER 07923–KE10001

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

INSPECTION

- SPRING

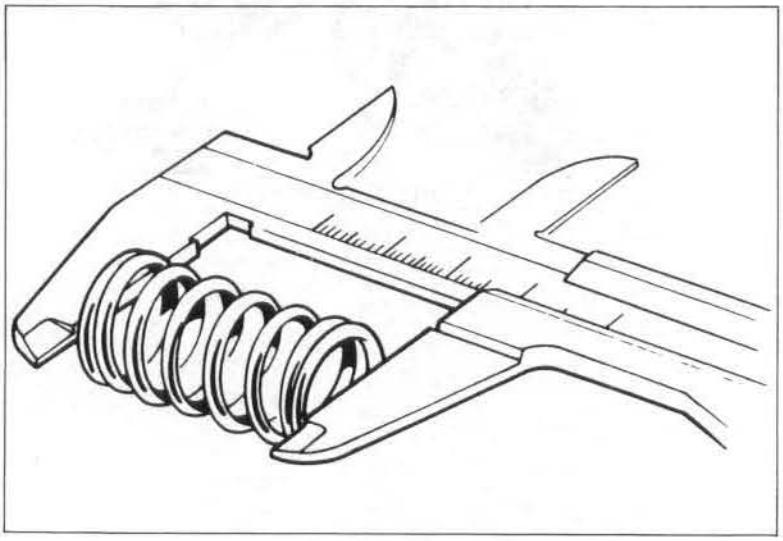
Measure the free length of each spring.

SERVICE LIMIT: 33.7 mm (1.33 in)

Replace if shorter than the service limit.

NOTE

> Clutch spring should be replaced as a set if one or more is beyond the service limit.



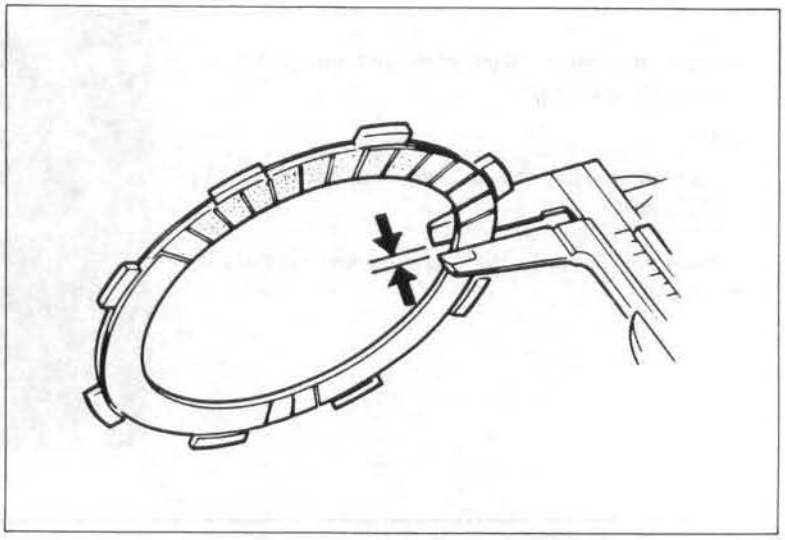
- CLUTCH DISC

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

SERVICE LIMIT: 2.69 mm (0.106 in)

NOTE

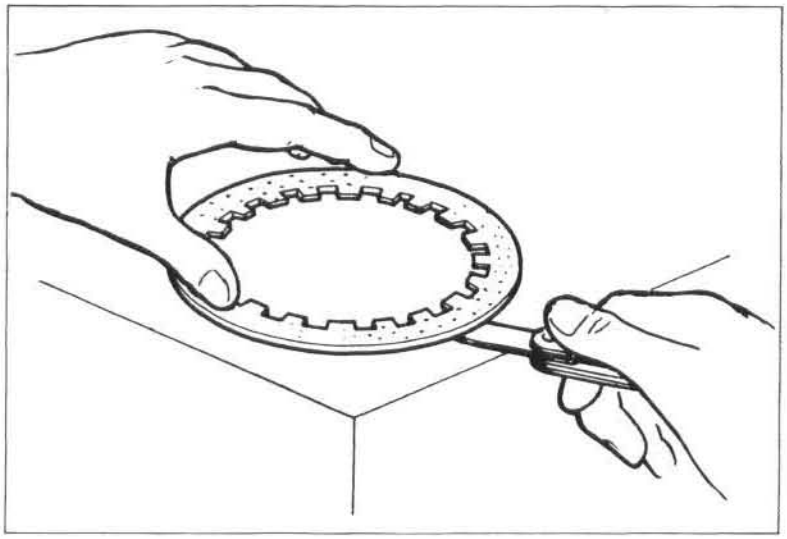
> Clutch discs and plates should be replaced as a set if any one is beyond the service limit.



• CLUTCH PLATE

Check the clutch center slots for indentations from the clutch plates.
Replace if necessary.
Check for plate warpage on a surface plate, using a feeler gauge.

SERVICE LIMIT: 0.3 mm (0.01 in)



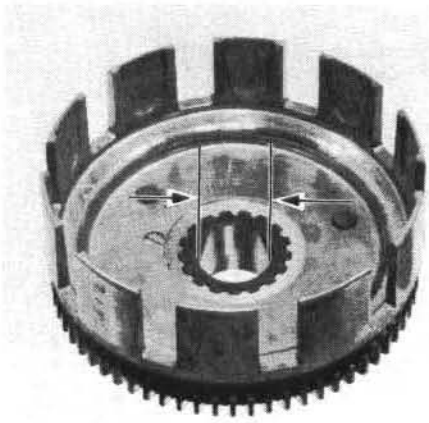
• CLUTCH OUTER AND OUTER GUIDE

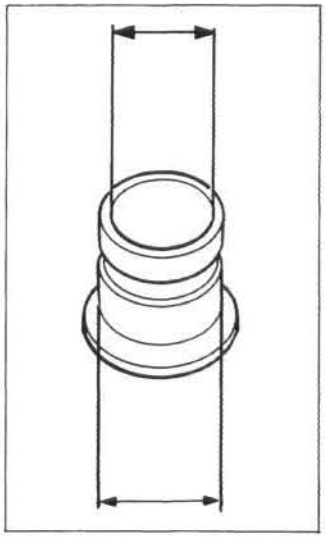
Check the clutch outer slots for nicks, cuts and indentations made by the clutch discs.
Replace if necessary.
Measure the I.D. of the clutch outer.

SERVICE LIMIT: 28.04 mm (1.104 in)

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

SERVICE LIMITS:
I.D.: 22.05 mm (0.868 in)
O.D.: 27.05 mm (1.065 in)



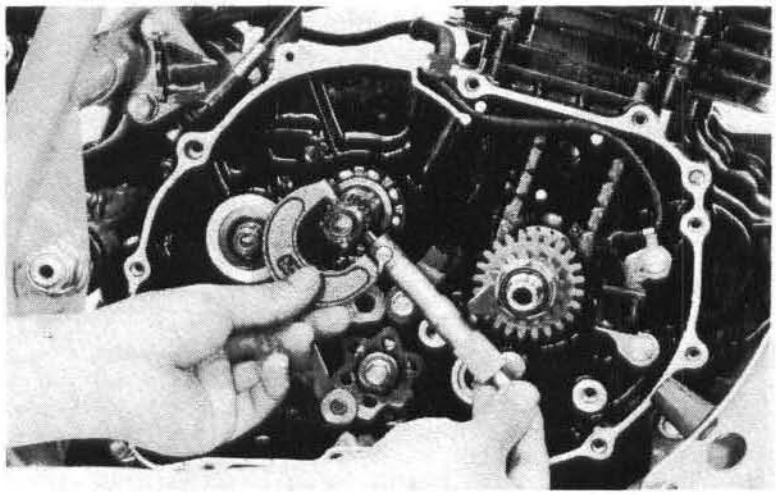


Measure the mainshaft O.D. at the clutch outer guide area.

SERVICE LIMIT: 21.91 mm (0.863 in)

Calculate the mainshaft-to-clutch center guide clearance.

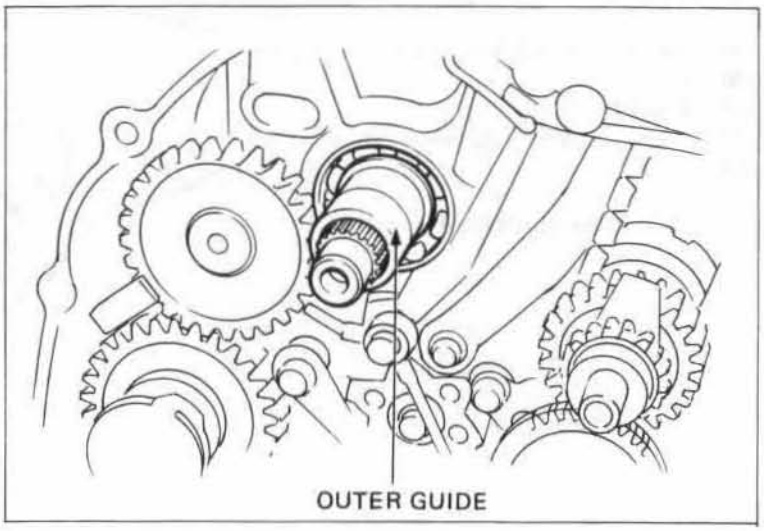
SERVICE LIMIT: 0.14 mm (0.006 in)



INSTALLATION

Install the clutch outer guide.

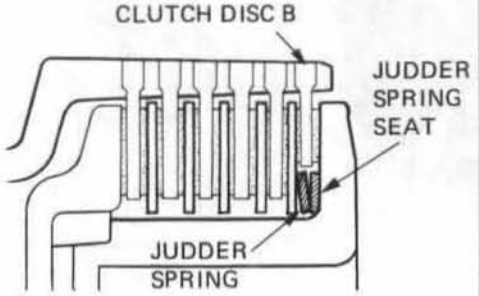
Install the clutch outer and thrust washer on the mainshaft.

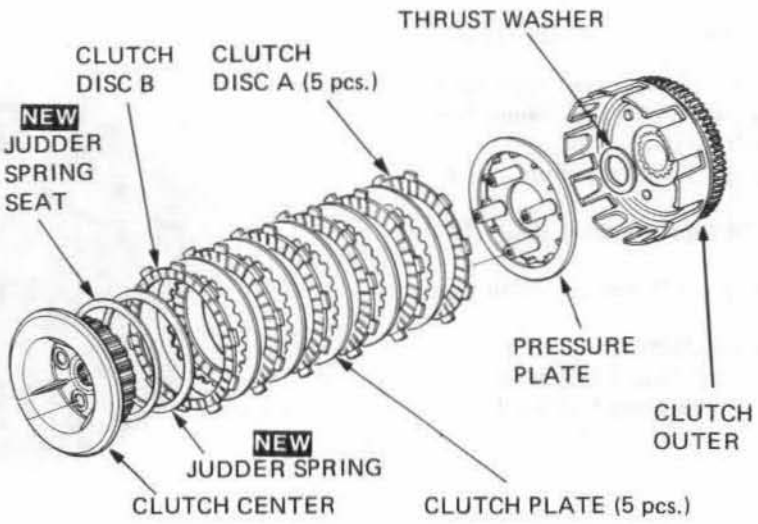


Install the clutch discs, plates, judder spring, seat and pressure plate on the clutch center.

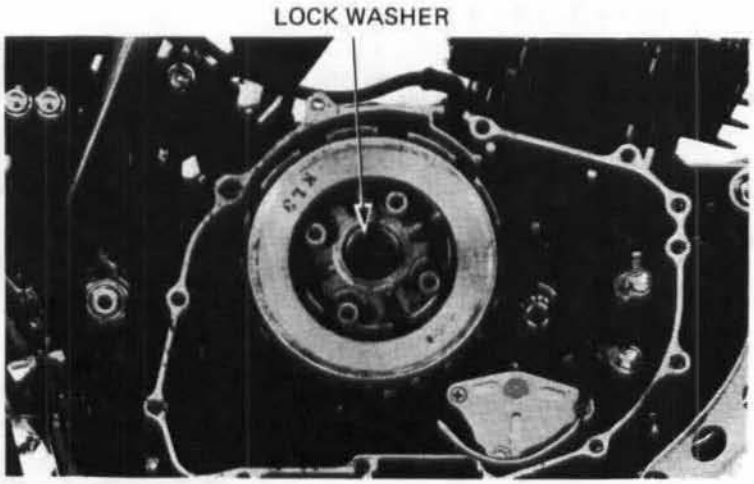
NOTE

- Stack the discs and plates alternately as shown.
- Coat new clutch discs with engine oil.
- Install the judder spring with the dished face towards the inside as shown.



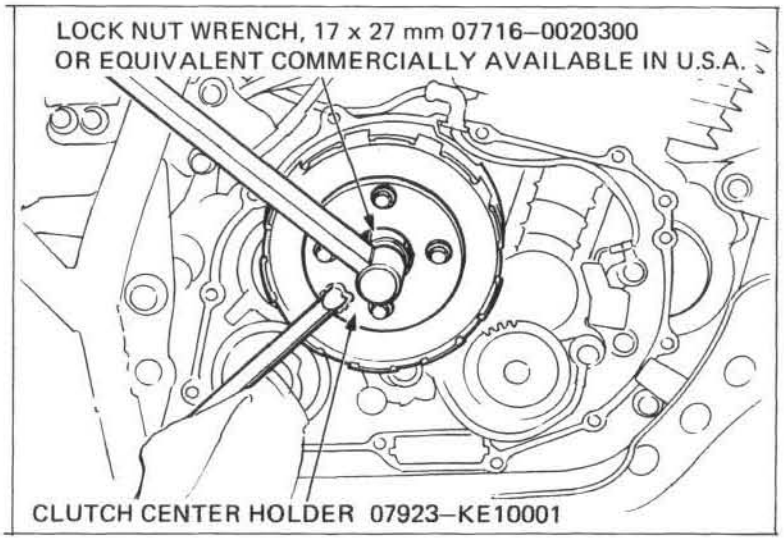


Install the lock washer with the mark "outside" facing out.



Install the clutch center holder with four clutch bolts.
Install a new lock nut and tighten the lock nut to the specified torque.

TORQUE: 60–70 N·m
(6.0–7.0 kg-m, 43–50 ft-lb)

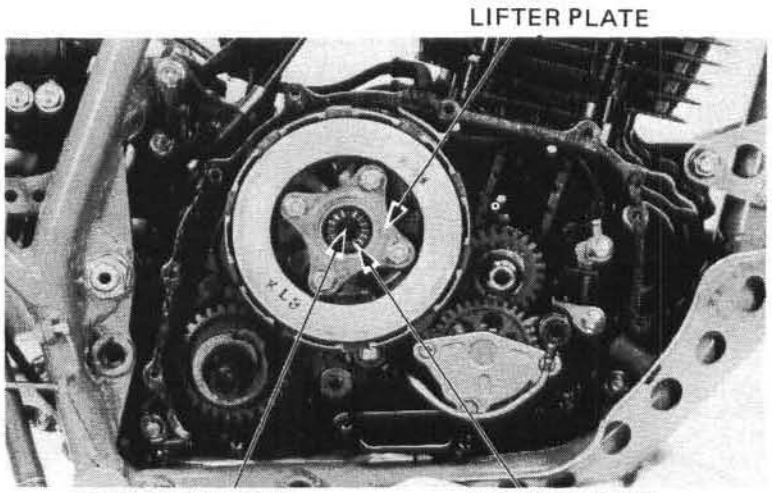


Install the clutch springs, lifter plate and lifter plate bolt.

NOTE

> Tighten the bolts in a criss-cross pattern in two or more steps.

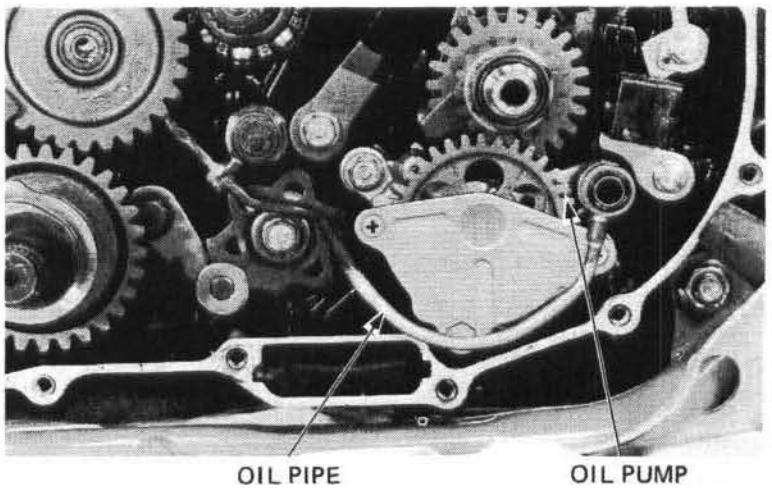
Install the washer, bearing and stopper ring on the lifter plate, if removed.
Install the right crankcase cover (Page 8-18).



OIL PUMP

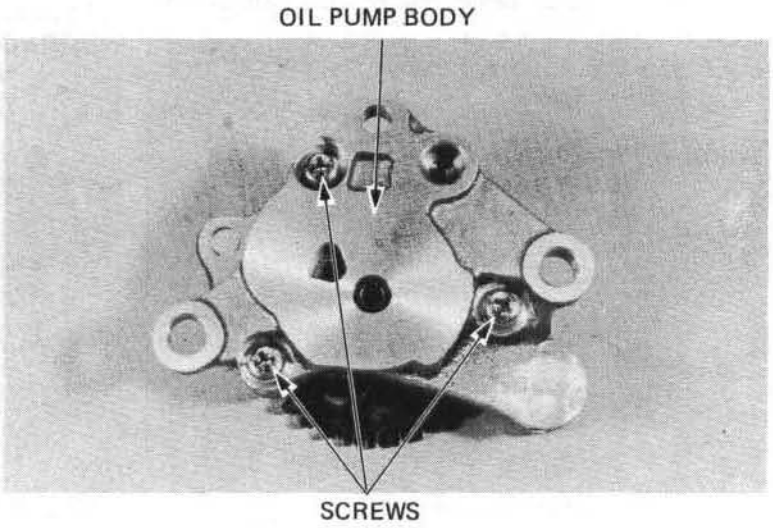
OIL PUMP REMOVAL

Remove the clutch assembly (Page 8-5).
Remove the oil pipe.
Remove the dowel pin and oil pump.

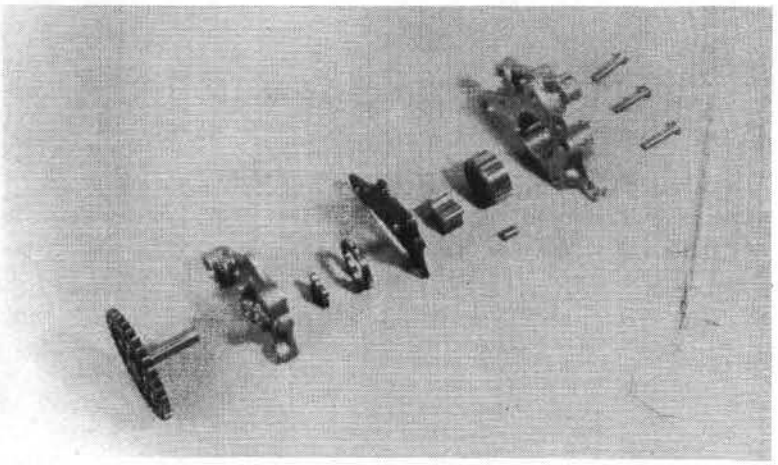


OIL PUMP DISASSEMBLY

Remove the screw and oil pump cover.
Remove the oil pump body screws.



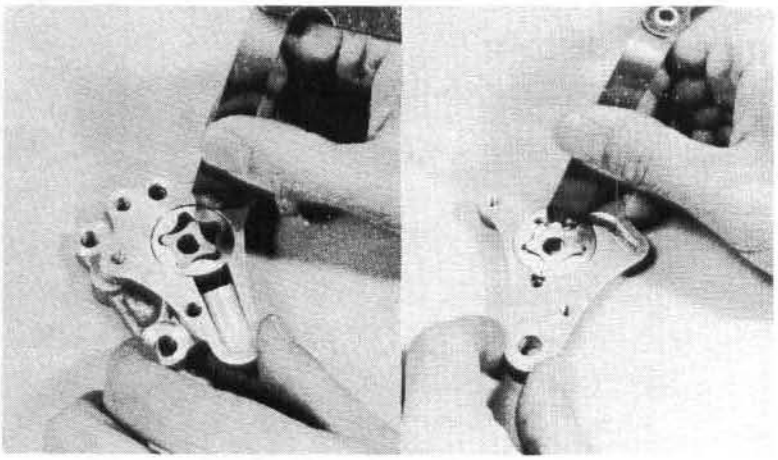
Separate the main and sub-oil pumps, and disassemble the oil pumps.



OIL PUMP INSPECTION

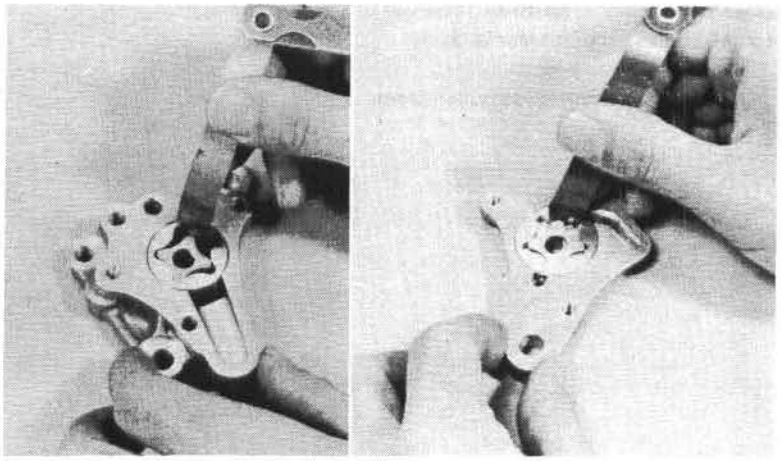
Measure the outer rotor-to-body clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)



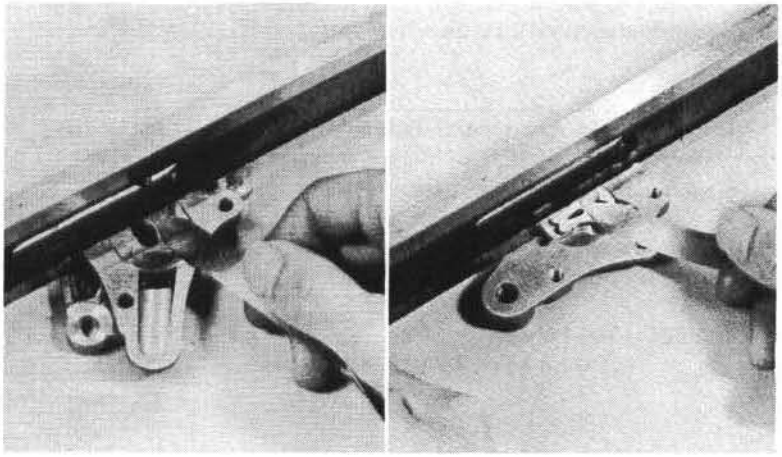
Measure the inner rotor-to-outer rotor clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



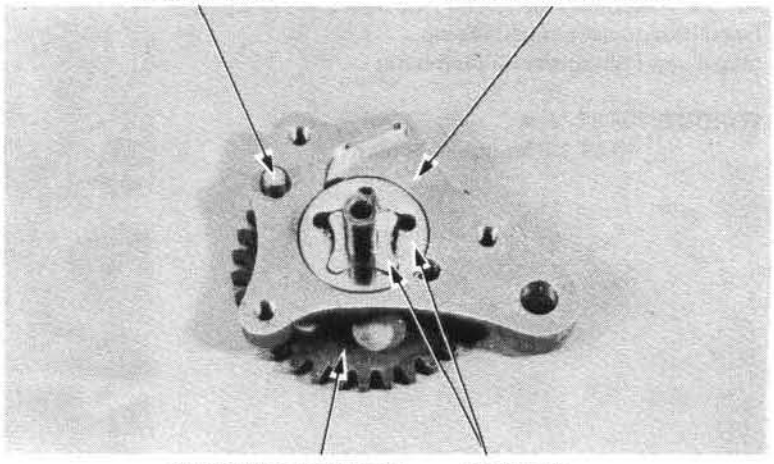
Measure the rotor-to-cover clearance.

SERVICE LIMIT: 0.12 mm (0.005 in)

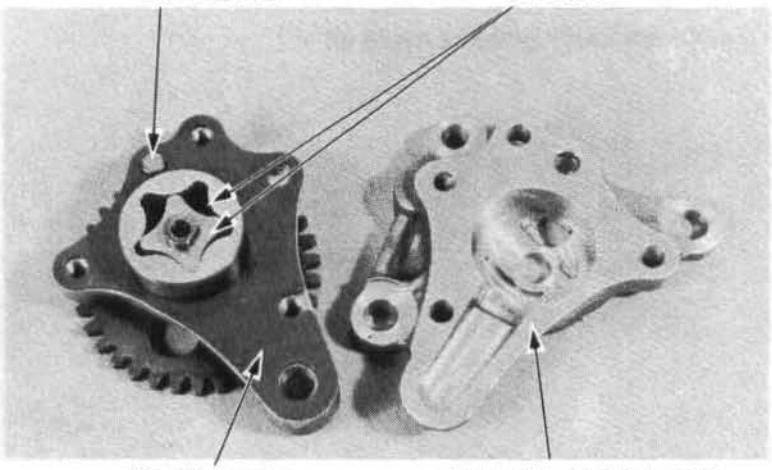


OIL PUMP ASSEMBLY

Install the pump shaft/gear in the sub oil pump body, then install the inner and outer rotors.
Install the dowel pin in the pump body.



Place the pump plate on the sub oil pump.
Install the inner and outer rotor in the pump shaft.
Install the main oil pump body.
Tighten the screws securely.
Install the oil pump cover with screw.



OIL PUMP INSTALLATION

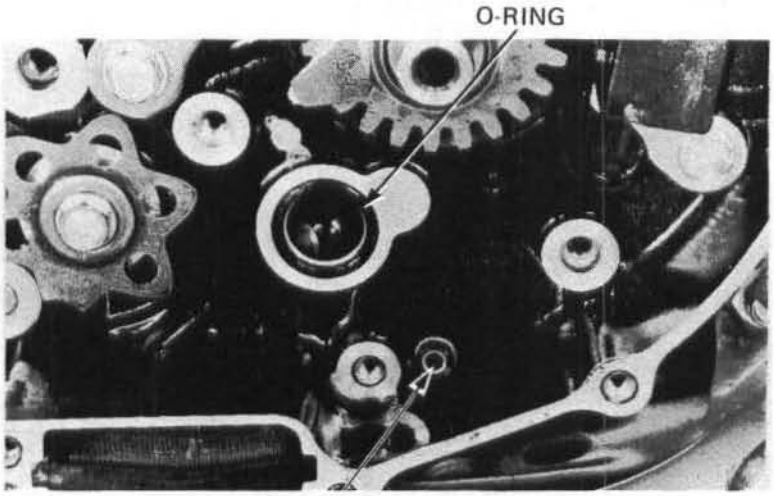
Make sure the oil pick up pipe is in place.

NOTE

> If the oil pick up pipe is removed, set the washer on the left side of the oil pipe, apply grease to the O-ring, and install the pipe.

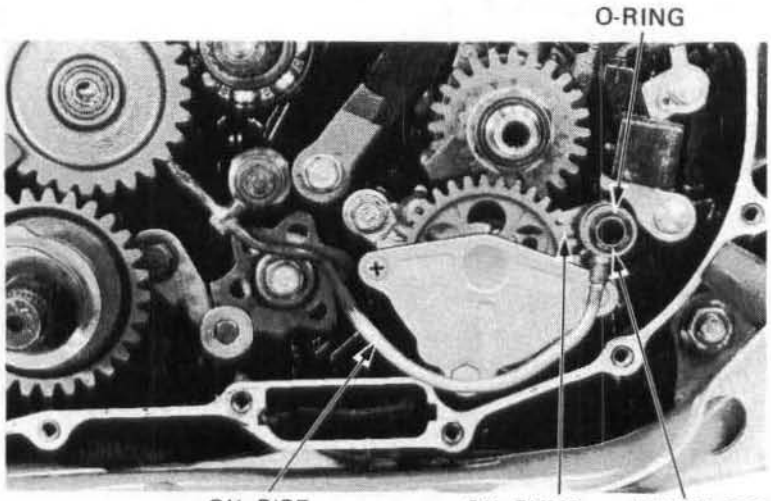
Install the O-ring.
Install the oil pump.

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



Make sure that the inner oil pipe O-ring is in place on the oil pump body, and position the oil pipe.
Install the dowel pin and O-ring.
Install and tighten the oil pipe bolt.

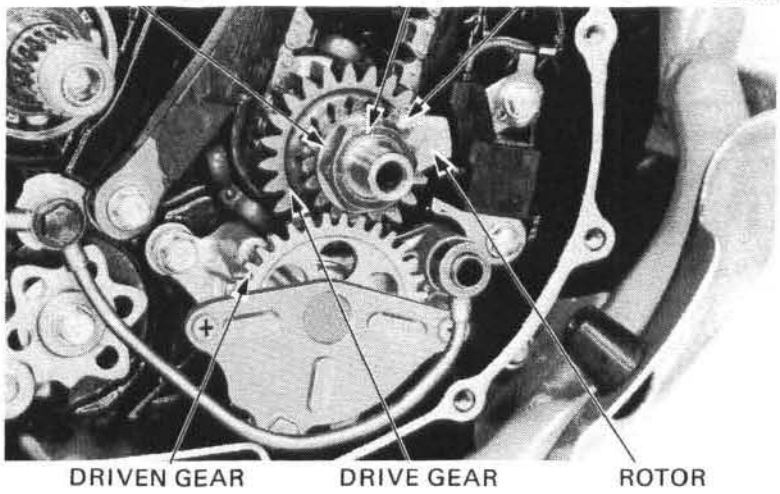
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)



DRIVE GEAR

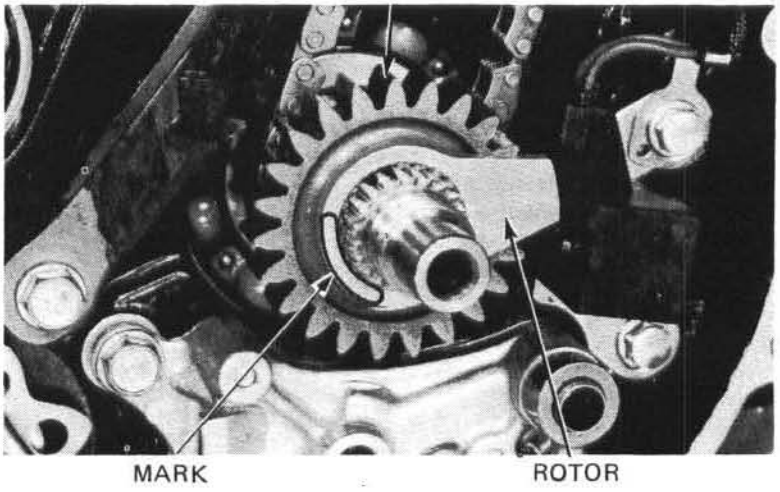
REMOVAL

Remove the clutch (Page 8-5) and oil pump (Page 8-9).
Remove the nut and lock washer.
Remove the oil pump drive gear.
Remove the pulse rotor.
Remove the drive gear.
Remove the alternator cover and hold the flywheel with a flywheel holder (07725–0040000).



INSTALLATION

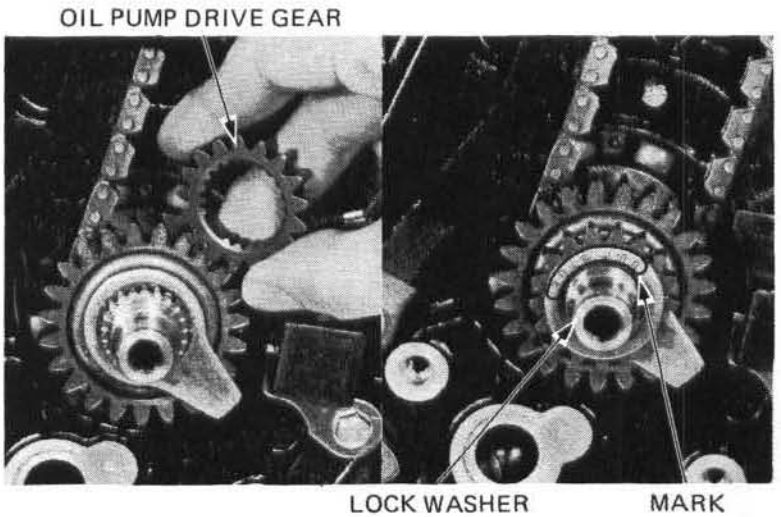
Install the drive gear aligning the cut out with the shaft.
Install the pulse rotor with the "OUTSIDE" mark facing outward and the cutout aligned with the shaft.



Install the oil pump drive gear on the crankshaft.
Install the lock washer with the mark "OUTSIDE" facing out.
Hold the flywheel with the flywheel holder (07725–0040000) or equivalent commercially available in U.S.A.

TORQUE: 60–70 N·m
(6.0–7.0 kg-m, 43–50 ft-lb)

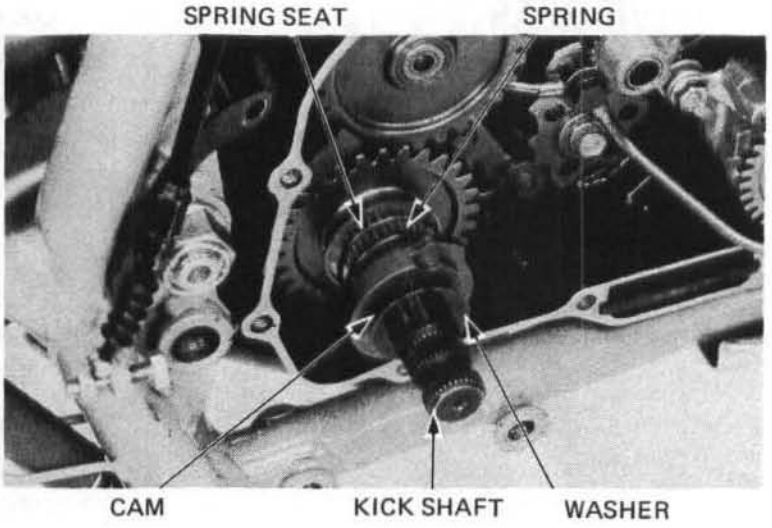
Install the alternator cover.
Install the oil pump (Page 8-12) and clutch (Page 8-8).



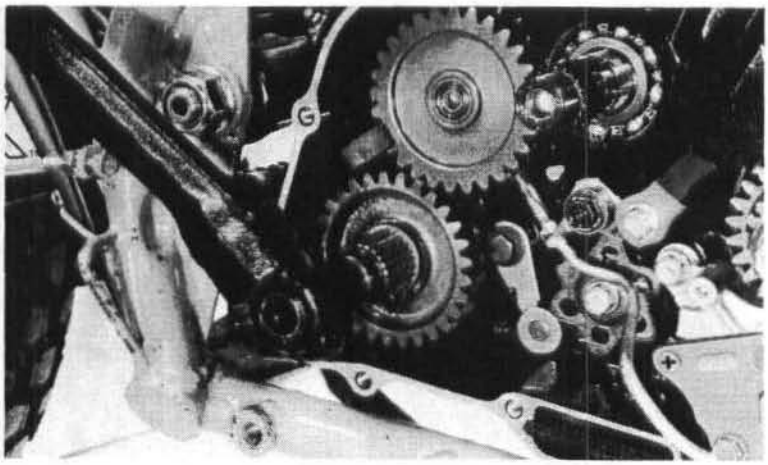
KICK STARTER

REMOVAL

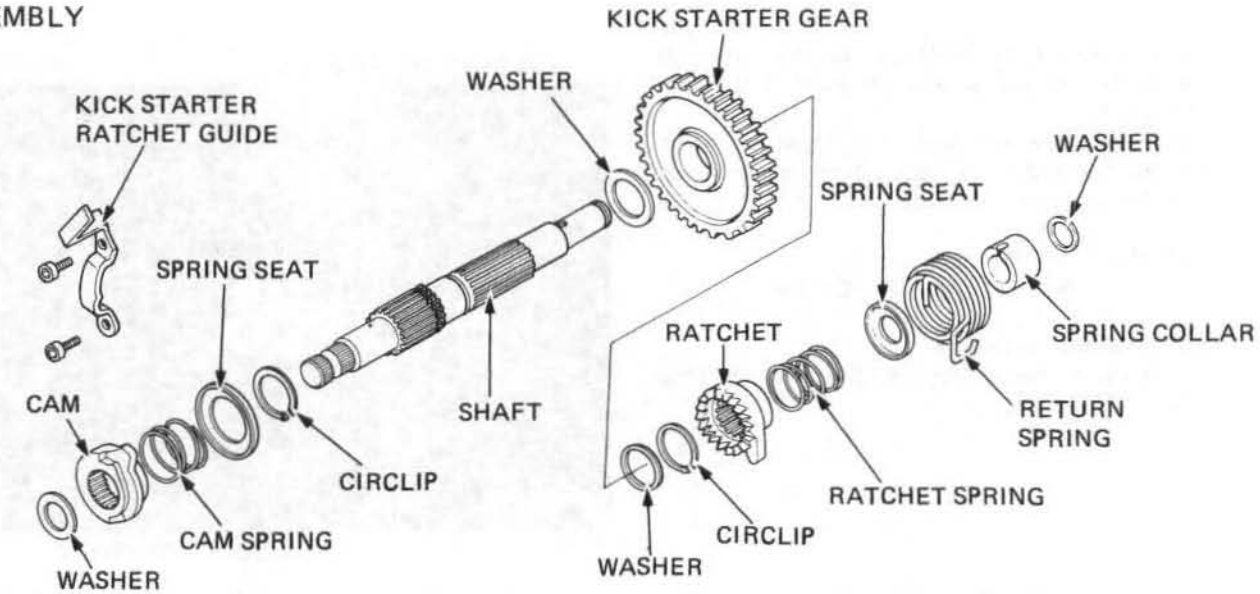
Remove the clutch (Page 8-5).
Remove the kick shaft, washer, cam, spring and spring seat.



Temporarily install the kick starter pedal on the kick shaft and rotate the shaft counterclockwise until the ratchet stub is clear of the kick starter ratchet guide.
At this position, pull the kick starter assembly out so that the ratchet clears the ratchet guide, then return the kick shaft and unhook the kick starter spring from the crankcase.
Remove the kick starter assembly.
Check the kick starter ratchet guide for wear or damage, and replace if necessary.



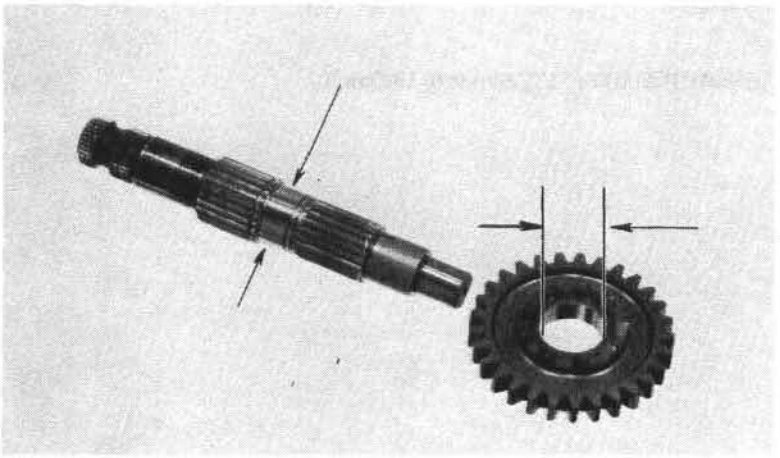
DISASSEMBLY



KICK STARTER INSPECTION

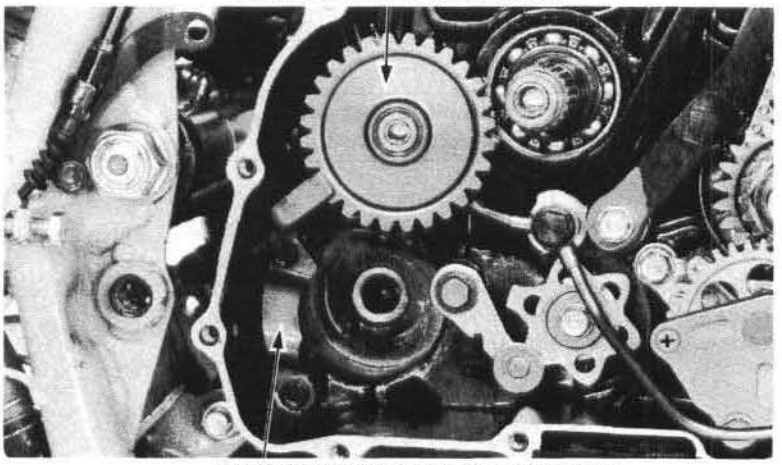
Measure the kick starter pinion I.D. and spindle O.D.

SERVICE LIMITS:
PINION I.D.: 22.12 mm (0.871 in)
SPINDLE O.D.: 21.91 mm (0.863 in)



KICK STARTER IDLE GEAR REMOVAL

Remove the kick starter ratchet guide, starter idle gear and bushing.
Inspect the ratchet guide for abnormal wear or damage.

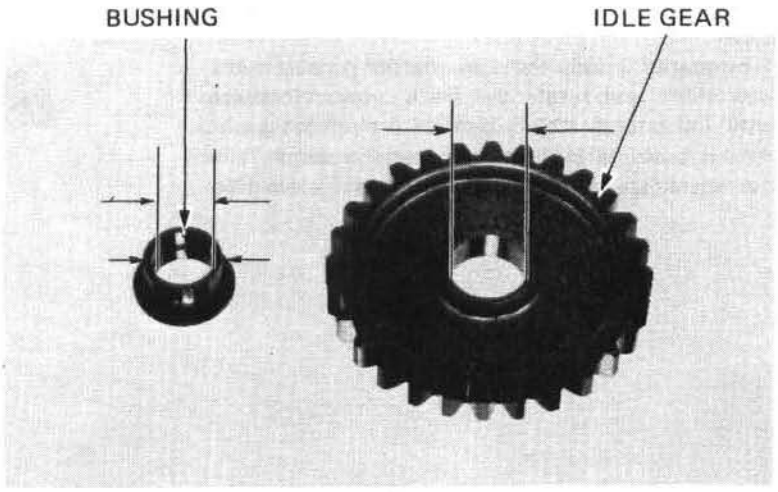


IDLE GEAR INSPECTION

Measure the idle gear I.D. and bushing O.D. and I.D.

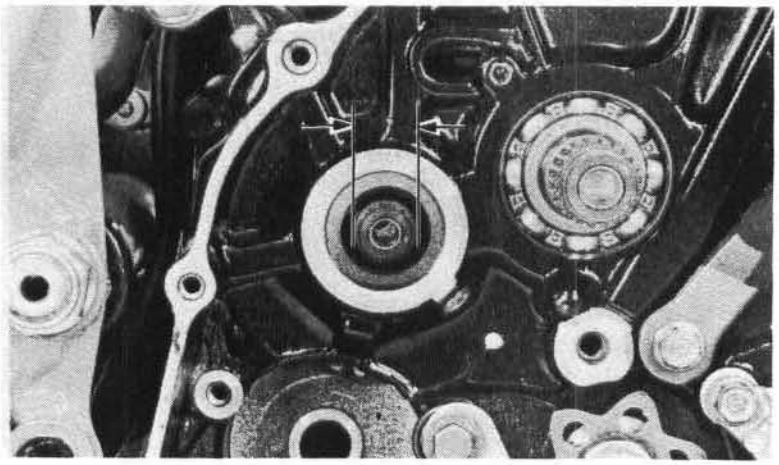
SERVICE LIMITS:
GEAR
I.D.: 17.12 mm (0.674 in)
BUSHING
O.D.: 16.93 mm (0.667 in)
I.D.: 14.04 mm (0.553 in)

Install the idle gear and ratchet guide in the reverse order of removal.



Measure the countershaft O.D. at the idle gear sliding area.

SERVICE LIMIT: 13.96 mm (0.550 in)



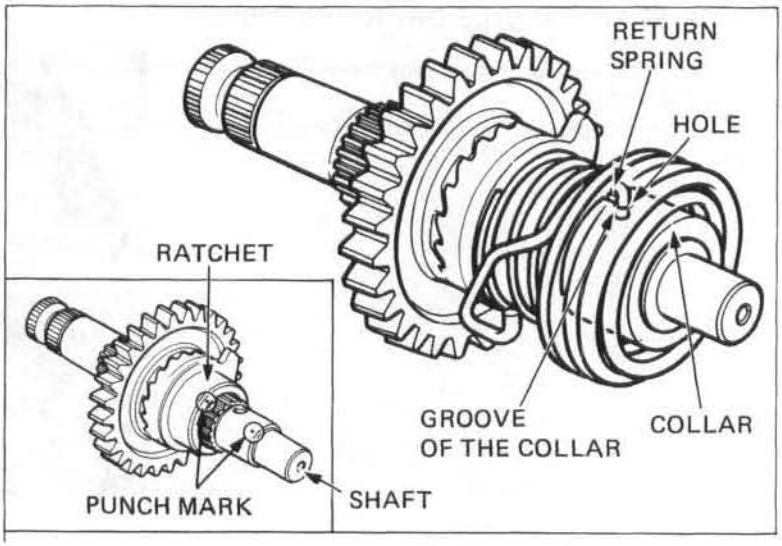
KICK STARTER ASSEMBLY

Install the kick starter gear, thrust washers and circlips on the starter shaft.
Install the ratchet on the starter shaft.

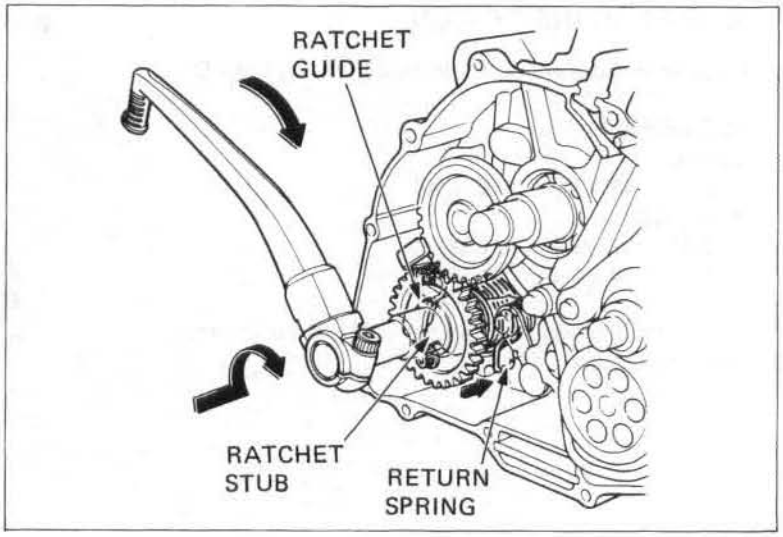
NOTE

> Align the punch mark on the ratchet with the punch mark on the kick starter shaft.

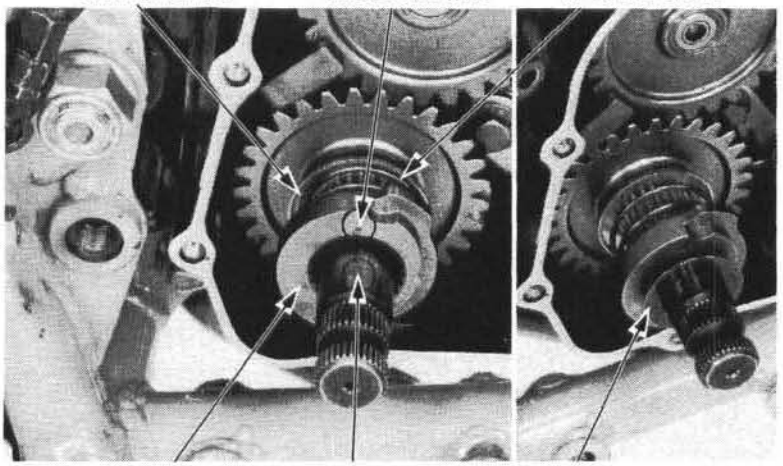
Install the ratchet spring and spring seat.
Insert the tip of the return spring into the hole in the shaft. Then slip the collar over the shaft and under the spring, aligning the collar groove with the spring end. Press firmly on the collar to snap the collar groove over the spring end.



Hook the kick starter return spring on the crankcase.
Temporarily install the kick starter pedal on the kick shaft and rotate the shaft counterclockwise until the ratchet stub is clear of the ratchet guide. At this position, push the kick starter assembly into the crankcase then return the pedal clockwise.



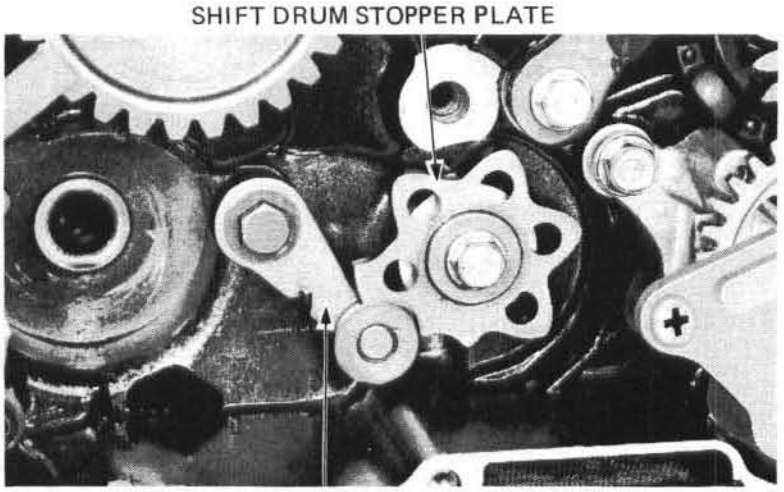
Install the thrust washer, circlip, cam spring and kick shaft cam. Align the cam and shaft index marks.
Install the thrust washer.
Install the clutch (Page 8-8).



GEAR SHIFT DRUM STOPPER

REMOVAL

Remove the clutch and kick starter.
Remove the oil pipe.
Remove the stopper arm and return spring.
Remove the stopper plate and dowel pin.
Inspect the parts for wear or damage.



ASSEMBLY

Install the dowel pin and gearshift stopper plate on the shift drum.
Tighten the stopper plate bolt.

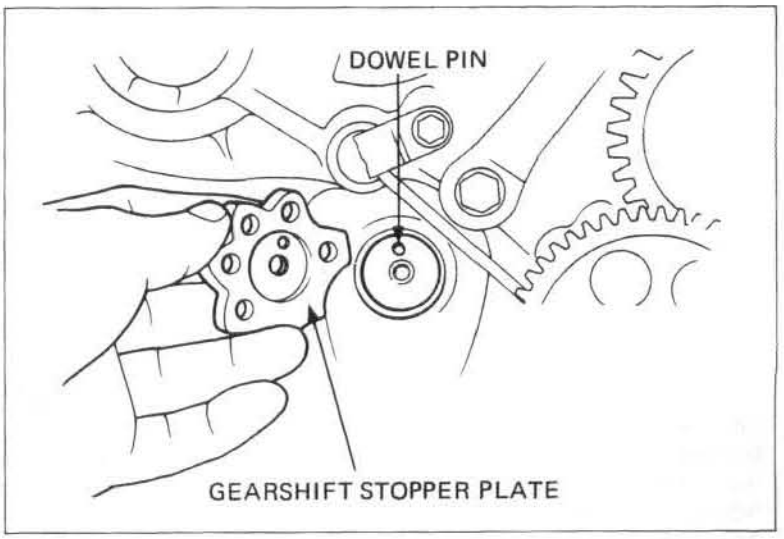
TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

Install the stopper arm on the crankcase.
Tighten the stopper arm bolt.

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

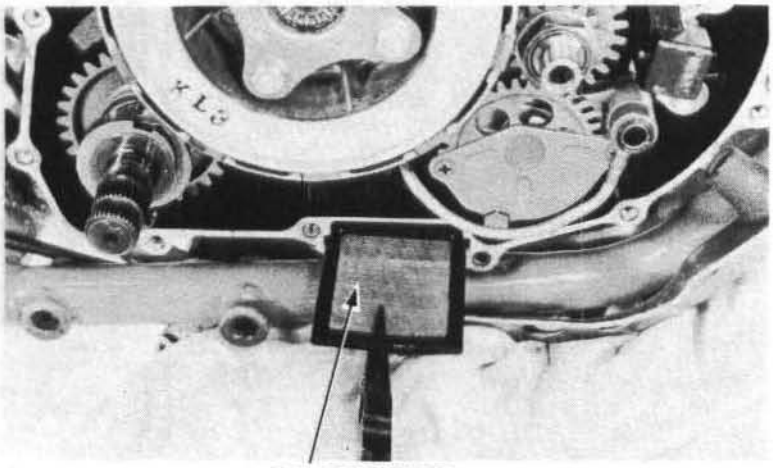
NOTE

> Check that the shift drum operates smoothly. Set the gearshift stopper plate aligning the hole on the gearshift stopper arm with dowel pin on the shift drum as shown.

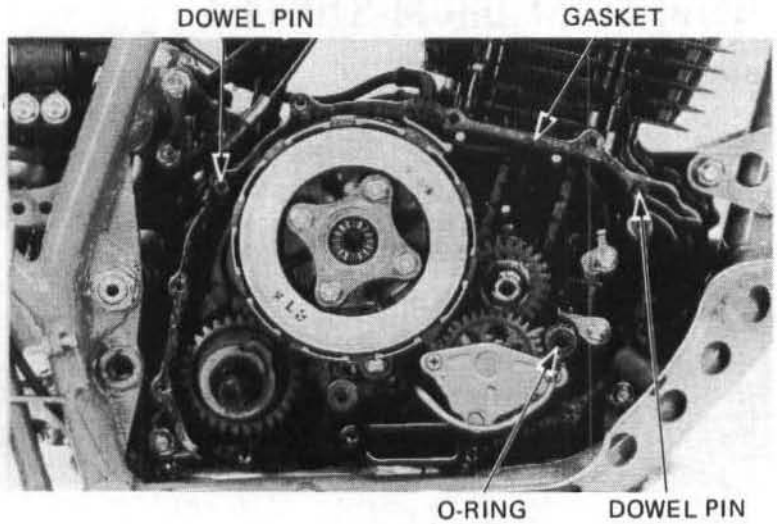


RIGHT CRANKCASE COVER INSTALLATION

Clean the oil strainer and install it.



install the dowel pins and a new gasket.
Make sure that the O-ring is on the oil pipe joint.



Install the right crankcase cover while holding the cam follower lever up.
Tighten the right crankcase cover bolts.

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

Install the kick starter and tighten the bolt.

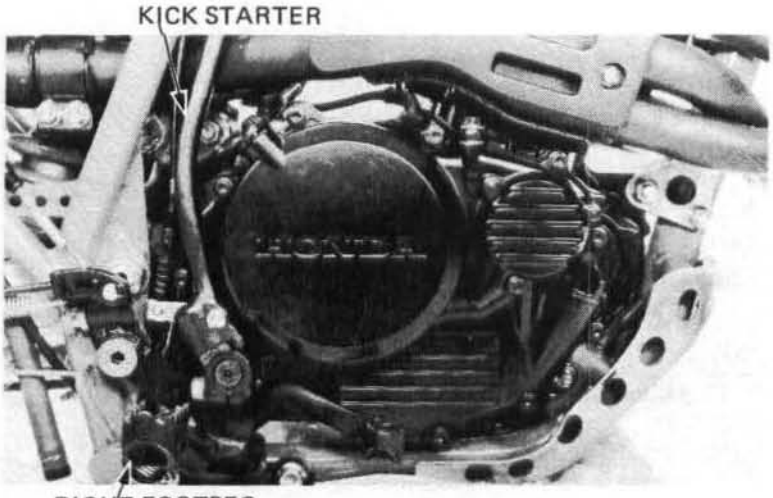
TORQUE: 20–35 N·m (2.0–3.5 kg-m, 14–25 ft-lb)

Install the right footpeg.

TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)

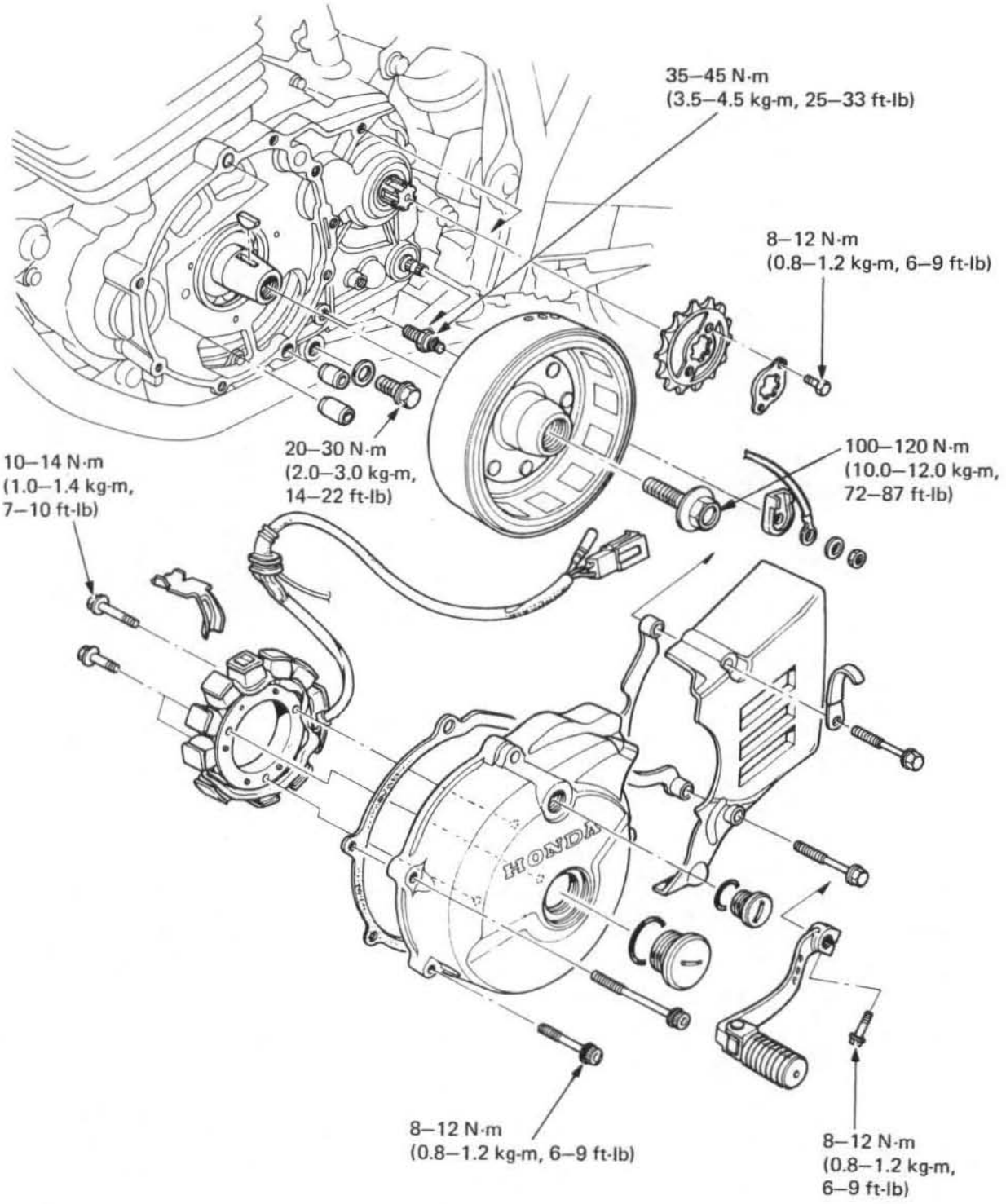
NOTE

> Check operation of the decompressor and clutch levers after installing the cover.



Fill the crankcase with recommended oil up to the proper level (Page 2-2).
Adjust the starter decompressor (Page 3-8).
Adjust the clutch free play (Page 3-15).
Adjust the rear brake pedal free play (Page 3-14).

MEMO



9. ALTERNATOR

SERVICE INFORMATION

GENERAL

- This section pertains to removal and installation of the alternator. These operations can be accomplished with the engine in the frame after removing the left crankcase cover.
- For alternator inspection, refer to section 16.

TORQUE VALUES

Alternator rotor bolt	100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
Left crankcase cover bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Gearshift pedal pinch bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Drain plug	20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Drive sprocket bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Neutral switch	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Stator bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) Apply Loctite® or equivalent.

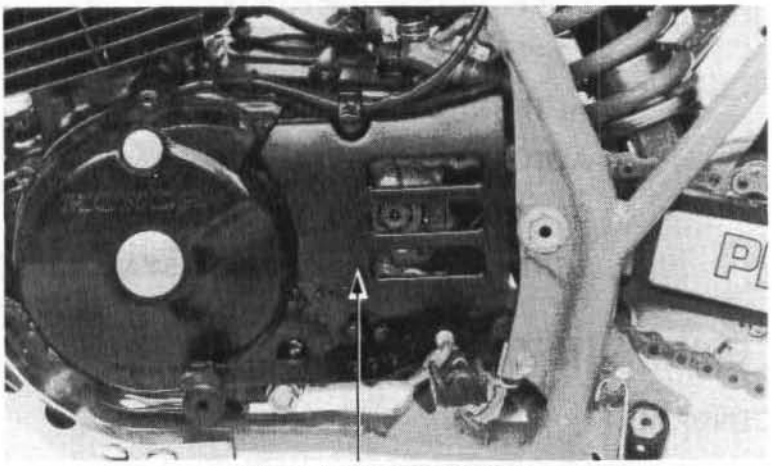
TOOLS

Common

Flywheel holder	07725–0040000 or Band strap wrench commercially available in U.S.A.
Rotor puller	07733–0020001 or 07933–3290001

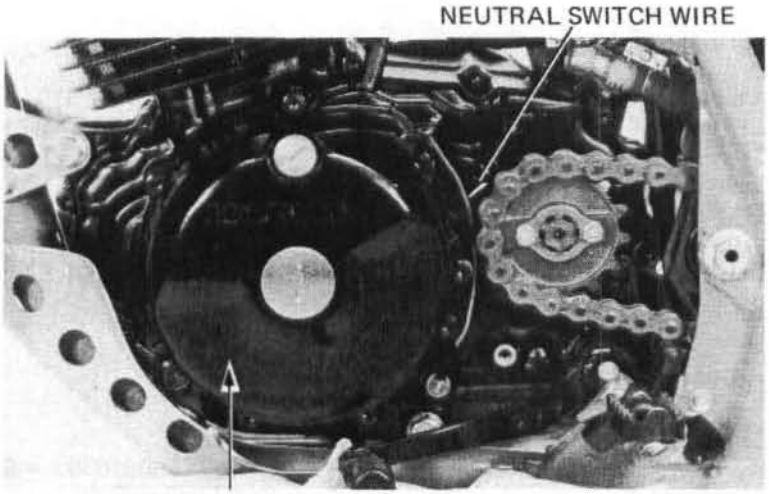
LEFT CRANKCASE COVER REMOVAL

Remove the seat and fuel tank.
Disconnect the alternator coupler.
Remove the sprocket cover.



DRIVE SPROCKET COVER

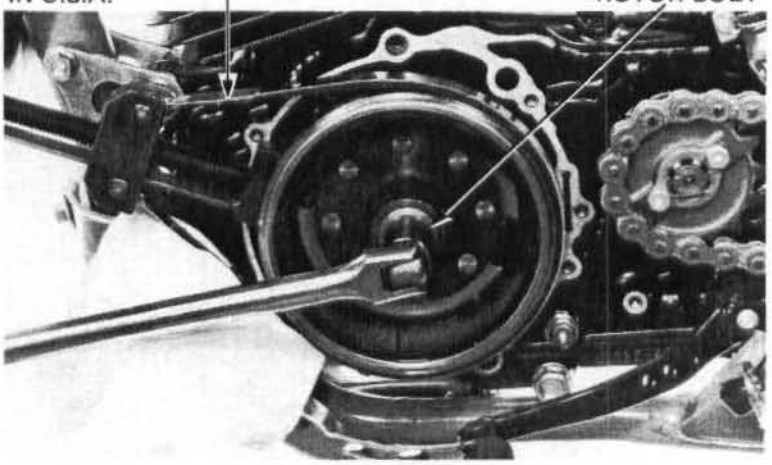
Disconnect the neutral switch wire.
Loosen the left crankcase cover bolts and lift the cover to drain the residual oil.
Remove the left crankcase cover.



LEFT CRANKCASE COVER

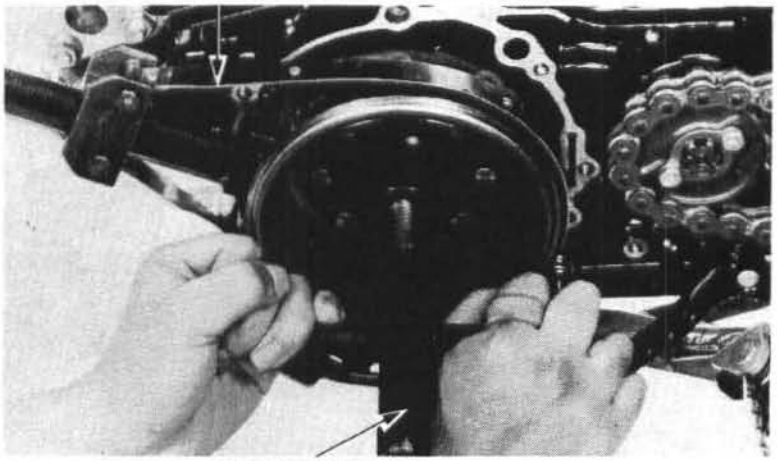
ALTERNATOR REMOVAL

Hold the flywheel with a flywheel holder, and remove the rotor bolt.



Remove the rotor using the puller.

FLYWHEEL HOLDER 07725–0040000 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.



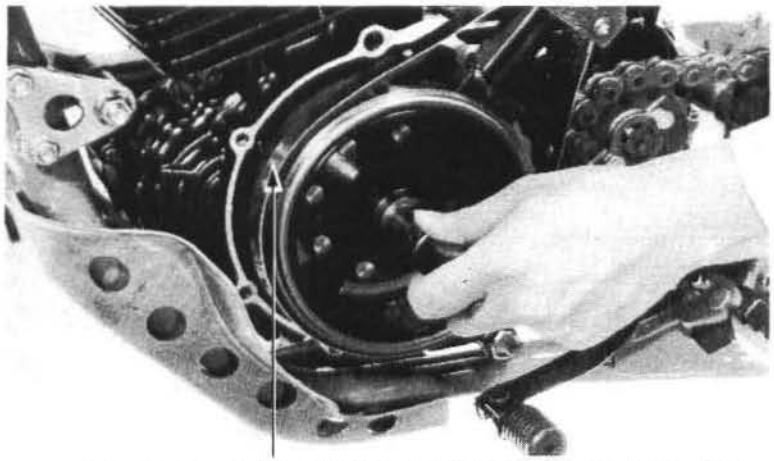
ROTOR PULLER
07733–0020001 OR 07933–3290001

ALTERNATOR INSTALLATION

Install the rotor by aligning the woodruff key with the rotor keyway.

Hold the flywheel with a flywheel holder or band strap wrench and tighten the rotor bolt.

TORQUE: 100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)



FLYWHEEL HOLDER 07725–0040000 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

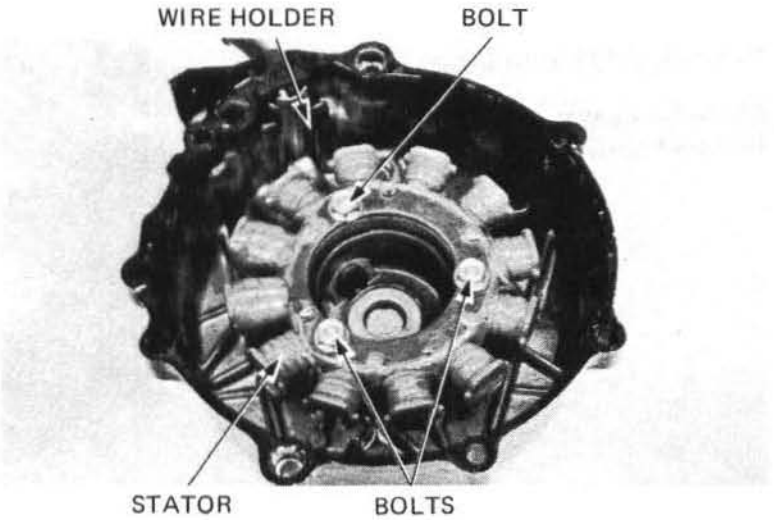
STATOR REMOVAL / INSTALLATION

Remove the stator attaching bolts and wire holder.
Remove the stator.
Installation is the reverse order of removal.

NOTE

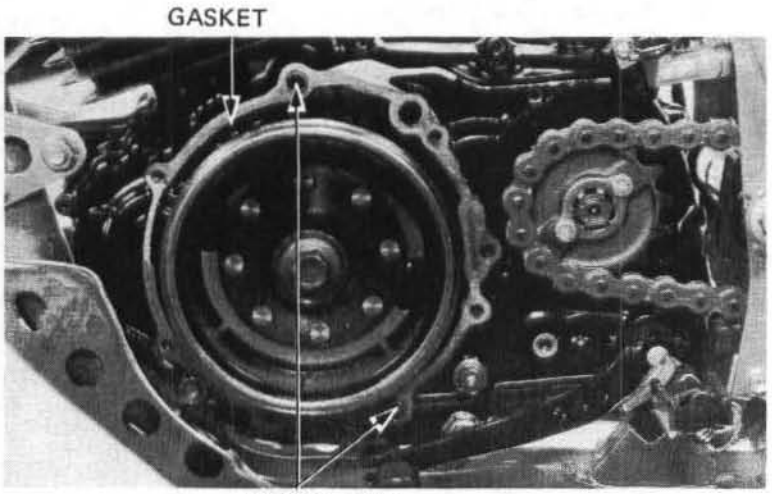
Apply Loctite® or equivalent to the stator attaching bolts and tighten them to specified torque.

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



LEFT CRANKCASE COVER INSTALLATION

Place the alternator wire and grommet in the groove.
Install the dowel pins and gasket.



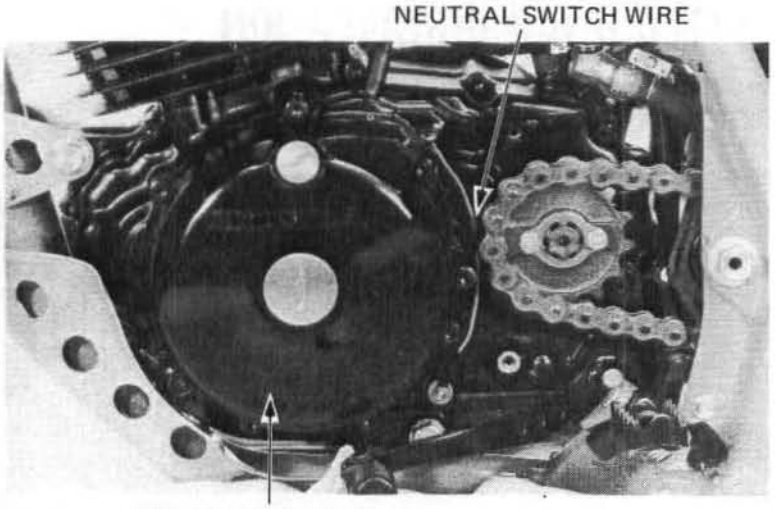
Install the left crankcase cover.

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

NOTE

> Be careful not to pinch the alternator or neutral switch wire during installation.

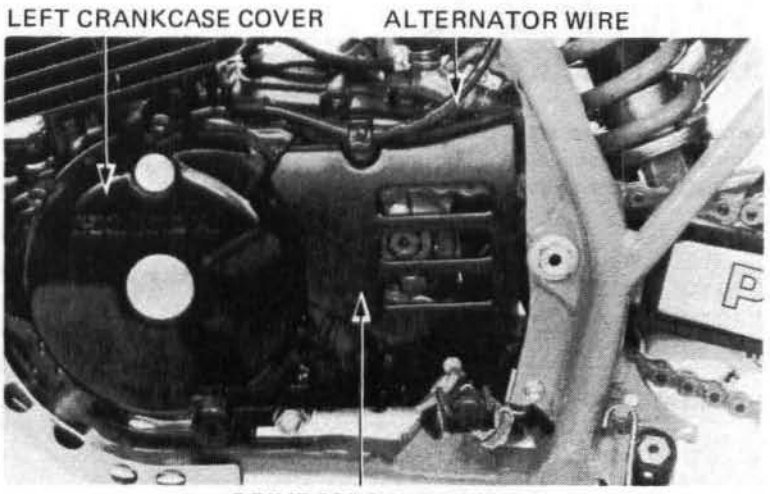
Connect the neutral switch wire to the neutral switch terminal.



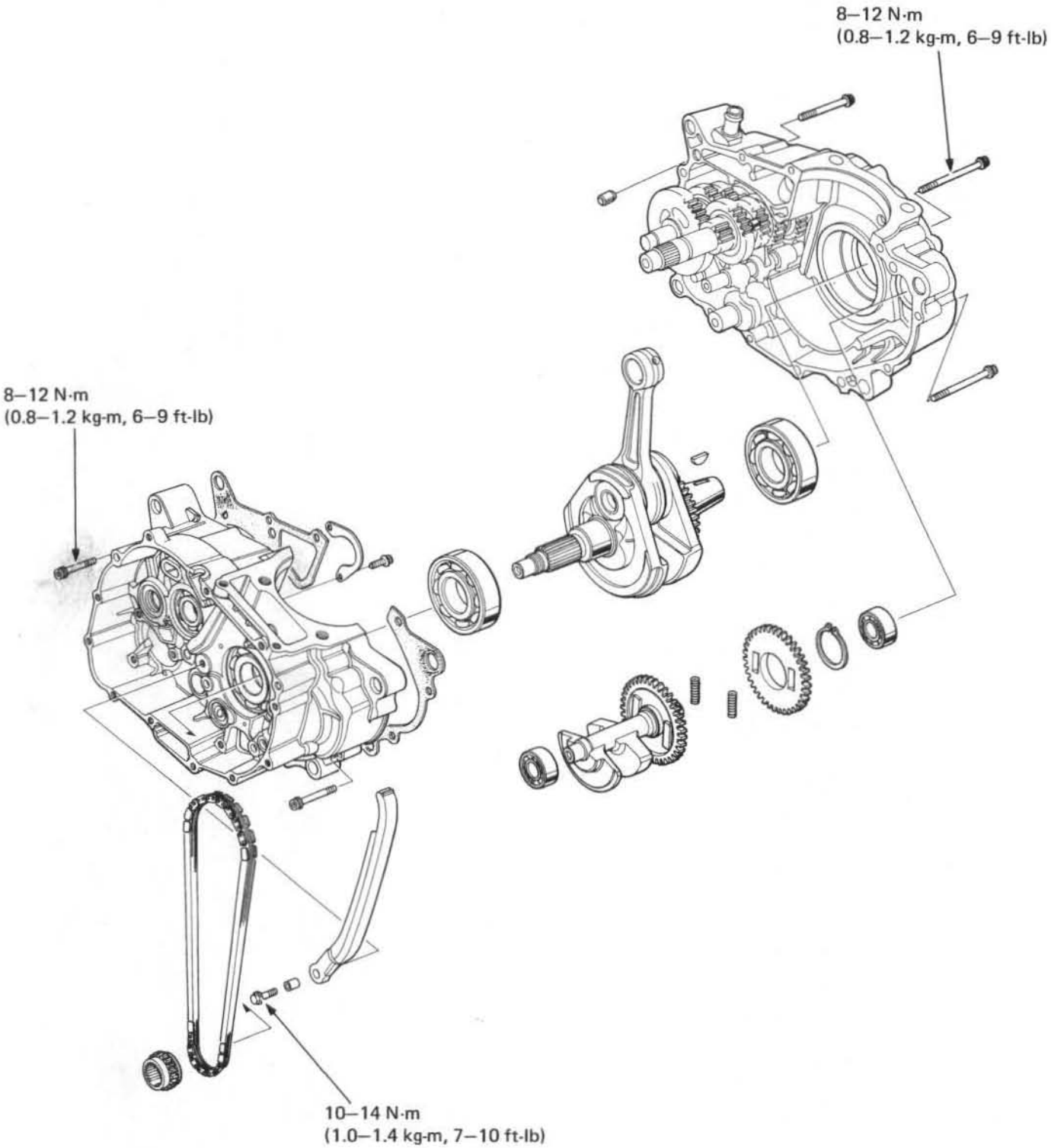
Install the drive sprocket cover.

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

Connect and route the alternator wire.
Install the fuel tank and seat.



MEMO



10. CRANKSHAFT/ BALANCER

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to repair the crankshaft, connecting rod, kick starter, shift spindle, transmission and balancer.
- Remove the following parts before separating the crankcase.
  - ENGINE REMOVAL . . . . . Section 5
  - CYLINDER HEAD . . . . . Section 6
  - CYLINDER/PISTON . . . . . Section 7
  - CLUTCH/OIL PUMP/KICK STARTER . . . . . Section 8
  - ALTERNATOR . . . . . Section 9
- To service the crankshaft and balancer, it is necessary to separate the crankcase.
- After installing the balancer, check balancer timing.
- Replace the left crankshaft bearing when removing the crankshaft.

10

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance	0.050–0.65 mm (0.0020–0.026 in)	0.80 mm (0.031 in)
	Connecting rod big end radial clearance	0.006–0.018 mm (0.0002–0.0007 in)	0.05 mm (0.002 in)
	Connecting rod small end I.D.	19.020–19.041 mm (0.7488–0.7496 in)	19.07 mm (0.751 in)
	Crankshaft runout	———	0.10 mm (0.004 in)
Crankshaft bearing play	Radial	———	0.10 mm (0.004 in)
	Axial	———	0.05 mm (0.002 in)
Balancer shaft journal O.D.	Right	14.972–14.990 mm (0.5894–0.5902 in)	14.95 mm (0.589 in)
	Left	11.983–11.994 mm (0.4718–0.4722 in)	11.95 mm (0.471 in)

TORQUE VALUES

Right crankcase bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Left crankcase bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Cam chain tensioner bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Drive sprocket bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TOOLS

Special

Crankcase assembly tool kit — 07931–KF00000
- Assembly collar 07931–KF00100
- Threaded adaptor 07931–KF00200
- Shaft puller 07931–ME40000

Common

Attachment, 72 x 75 mm	07746–0010600 or Attachment 07946–3570000
Pilot, 30 mm	07746–0040700
Driver	07749–0010000

TROUBLESHOOTING

Excessive Noise

- Crankshaft
  - Worn connecting rod big end bearing
  - Bent connecting rod
  - Worn crankshaft bearing
  - Worn connecting rod small end

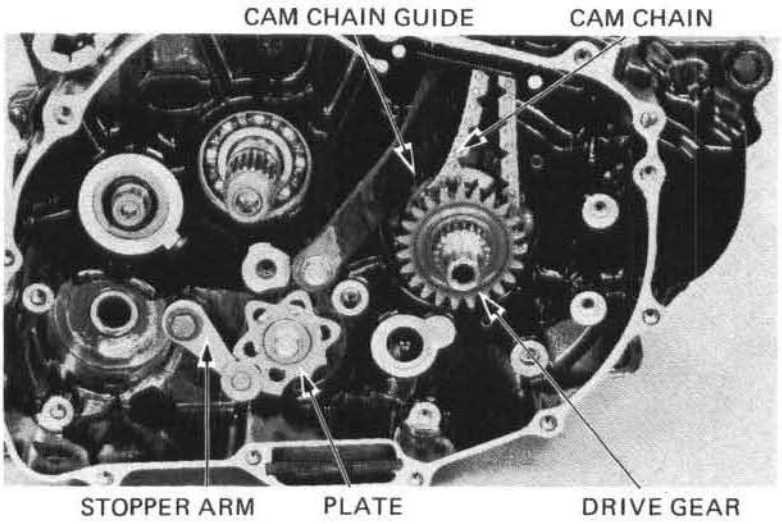
- Balancer
  - Improper timing adjustment

Abnormal vibration

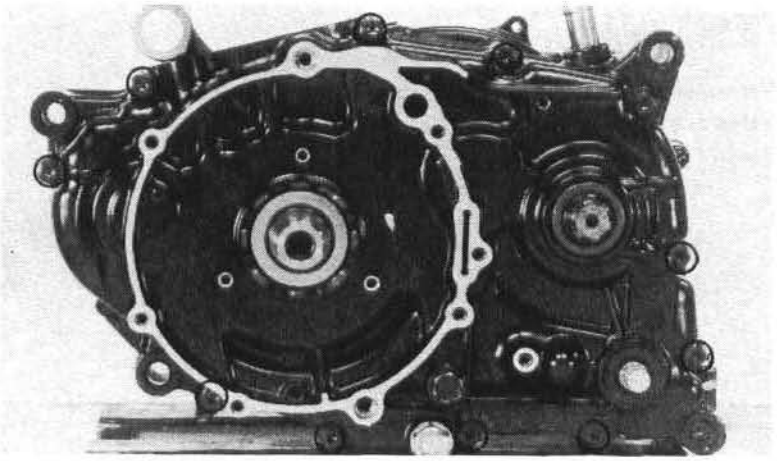
- Improper balancer timing adjustment

CRANKCASE SEPARATION

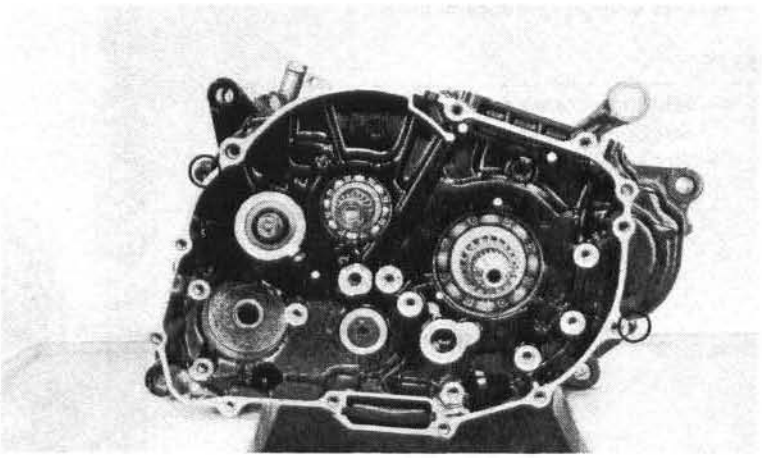
Remove the following:
- cylinder head and cylinder
- clutch
- kick starter shaft
- stopper arm and shift plate
- drive gear and chain
- cam chain guide
- oil pump
- alternator
- drive sprocket



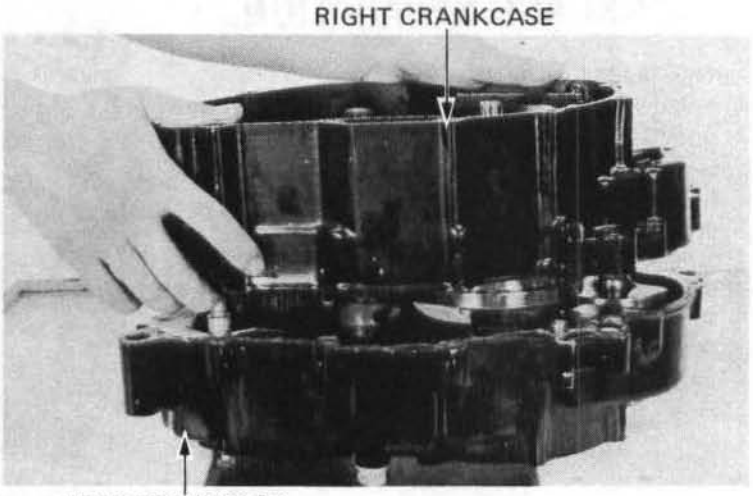
Remove the left crankcase bolts.



Remove the right crankcase bolts.

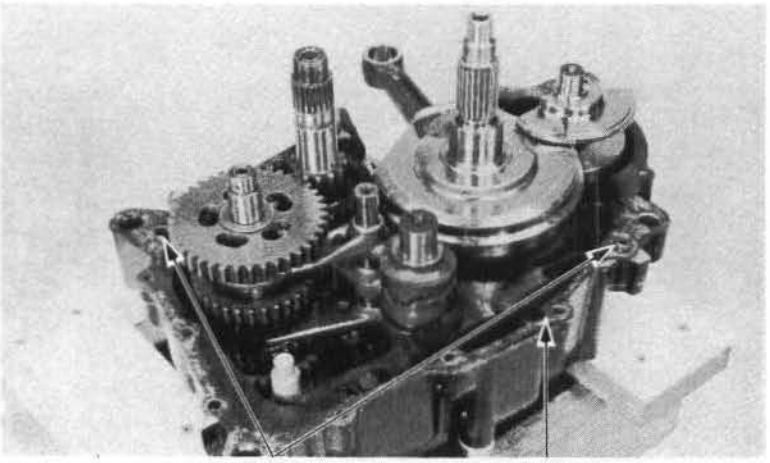


Remove the right crankcase from the left crankcase.



CRANKSHAFT/BALANCER REMOVAL

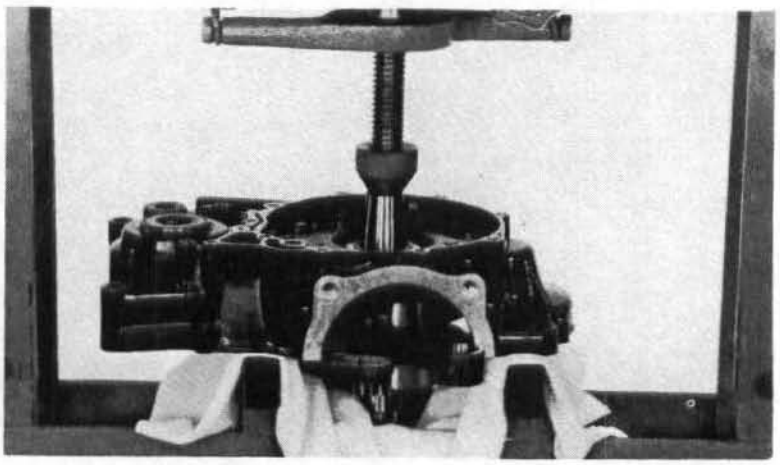
Remove the dowel pins and gasket.
Remove the transmission.



Remove the crankshaft and balancer from the left crankcase by using a hydraulic press.

NOTE

- Hold the crankshaft and balancer to prevent them from falling.
- Be careful not to damage the crankcase mating surface.

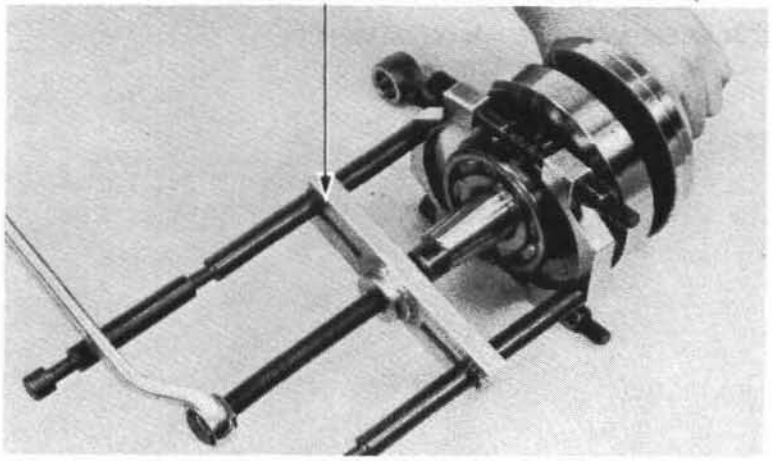


Remove right crankcase bearing by using the bearing puller.

NOTE

> Always replace the bearing with a new one if it is removed from the crankshaft.

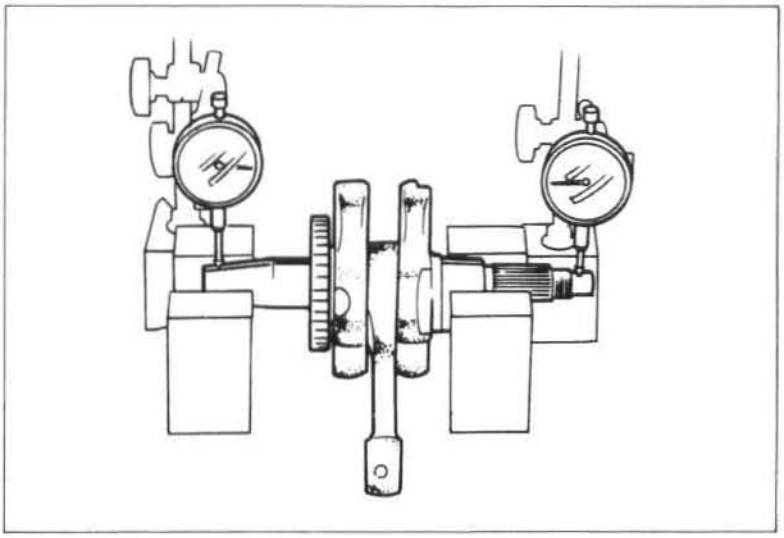
BEARING PULLER
(COMMERCIALLY AVAILABLE IN U.S.A.)



CRANKSHAFT INSPECTION

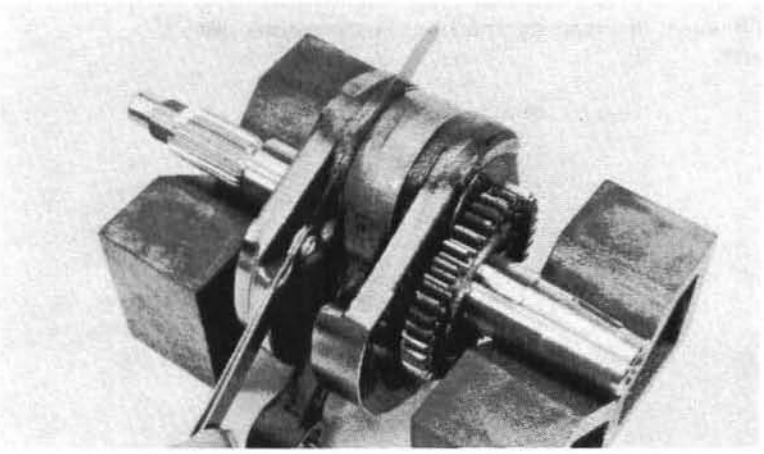
Set the crankshaft on a truing stand or V blocks and measure the runout using a dial indicator.

SERVICE LIMIT: 0.10 mm (0.004 in)



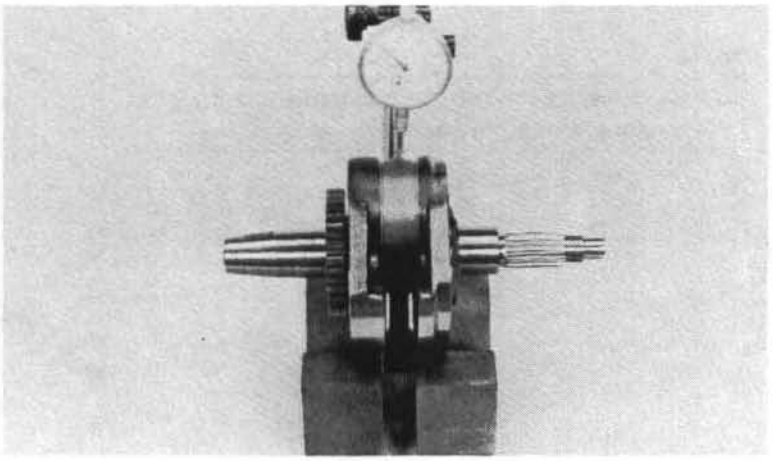
Measure the connecting rod big end side clearance with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)

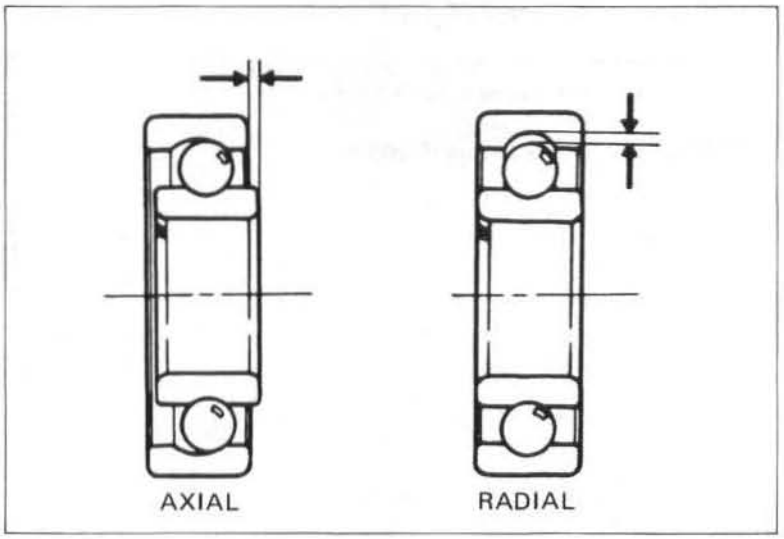


Measure the connecting rod big end radial clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)

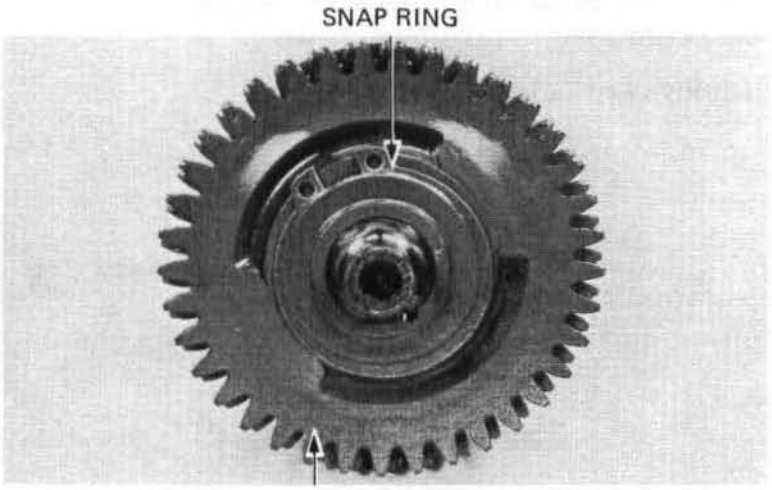


Spin the crankshaft bearing by hand and check for play. The bearing must be replaced if it is noisy or has excessive play.



BALANCER DRIVE GEAR REMOVAL

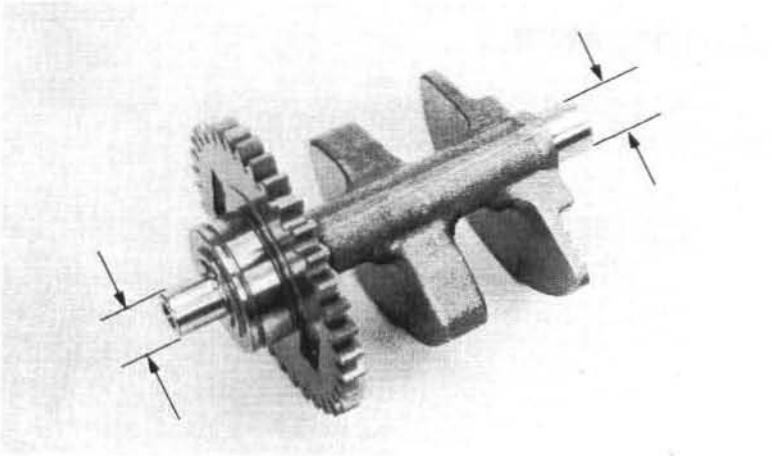
Remove the snap ring and remove the outer drive gear.



BALANCER SHAFT INSPECTION

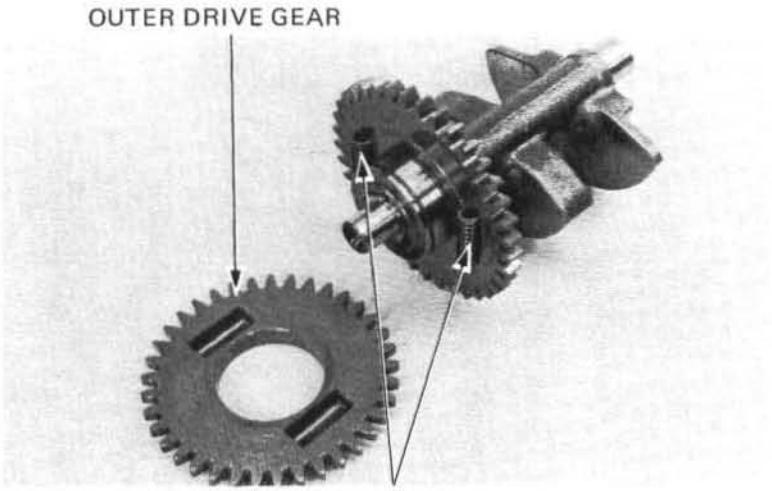
Measure the balancer shaft journal O.D. on each side.

SERVICE LIMITS:
Right: 14.95 mm (0.589 in)
Left: 11.95 mm (0.471 in)



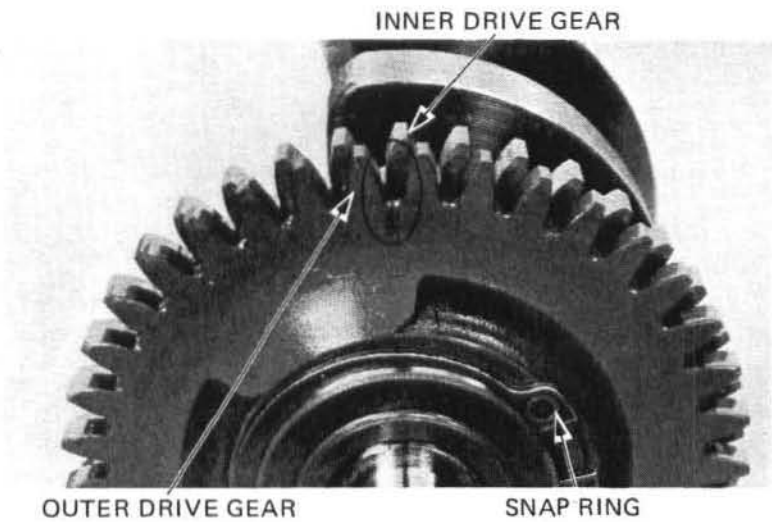
BALANCER SHAFT INSTALLATION

Install the springs in the outer drive gear.



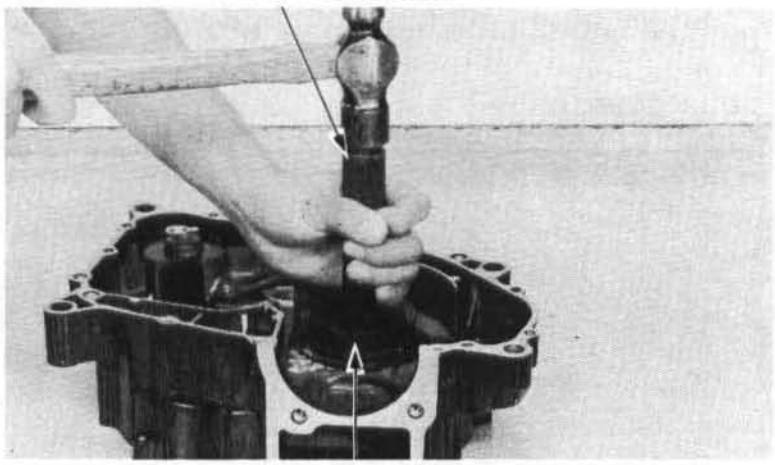
Install the outer drive gear, aligning the line on the inner gear with the line on the outer gear, as shown.

Install the snap ring.



CRANKSHAFT/BALANCER INSTALLATION

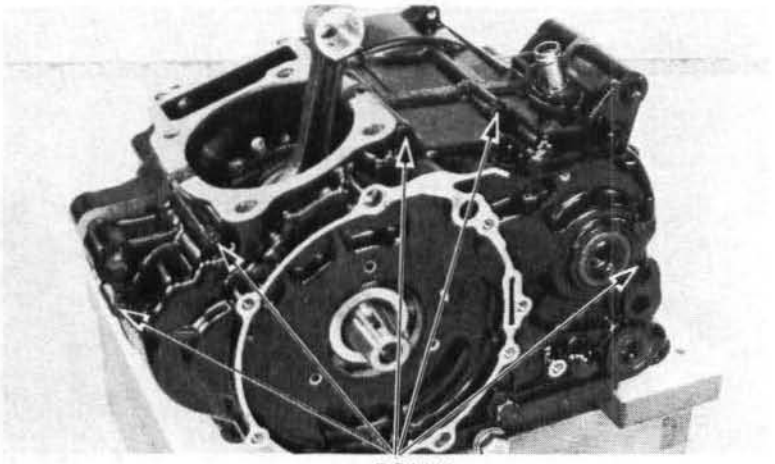
Install the new crankshaft bearings in the left and right crankcases, if the old ones have been removed.



ATTACHMENT, 72 x 75 mm 07746–0010600 AND
PILOT, 30 mm 07746–0040700
OR ATTACHMENT 07946–3570000

Install the crankshaft in the right crankcase.
Install the balancer in the right crankcase, aligning the marks on the crankshaft gear and balancer gear.

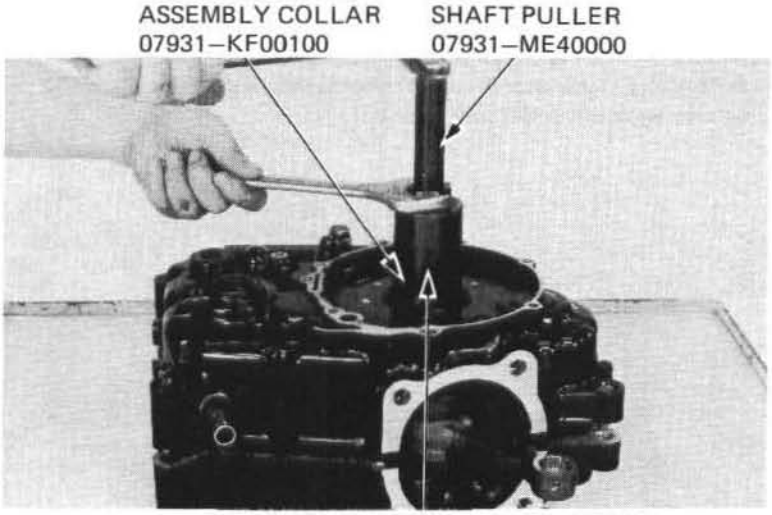
Assemble the right and left crankcases and loosely install the case bolts at five locations to hold the cases.



Screw the 12 mm end of the threaded adapter tool into the end of the left crankshaft, and push the crankshaft into the crank bearing.
Place the small end of the assembly collar tool over the end of the crankshaft and align it with the inner race of the crank bearing.
Attach the shaft puller tool onto the threaded adapter and turn the nut down until it fits into the races in the assembly collar.
Hold the puller with a 17 mm box-end wrench, and turn the nut on the puller shaft with a 27 mm wrench counterclockwise to pull the crankshaft completely into the bearing.

TOOL

CRANK ASSEMBLY KIT	07931–KF00000
– ASSEMBLY COLLAR	07931–KF00100
– THREADED ADAPTER	07931–KF00200
– SHAFT PULLER	07931–ME40000



THREADED ADAPTER 07931–KF00200

Rotate the crankshaft to make sure that the balancer does not interfere with the crankshaft.

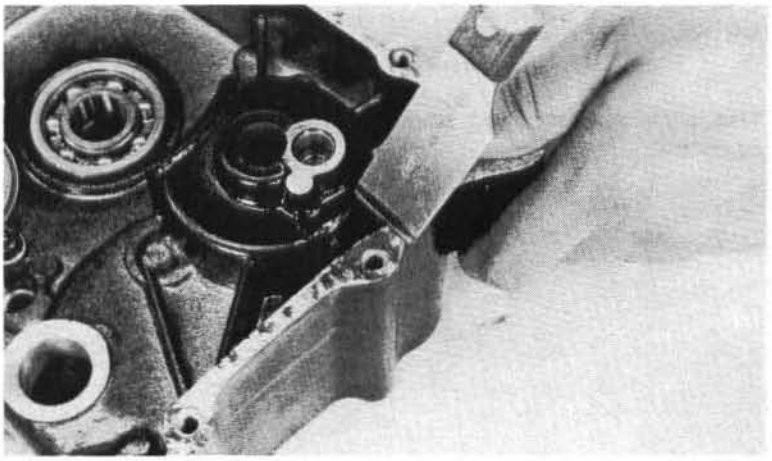
BALANCER

CRANKCASE ASSEMBLY

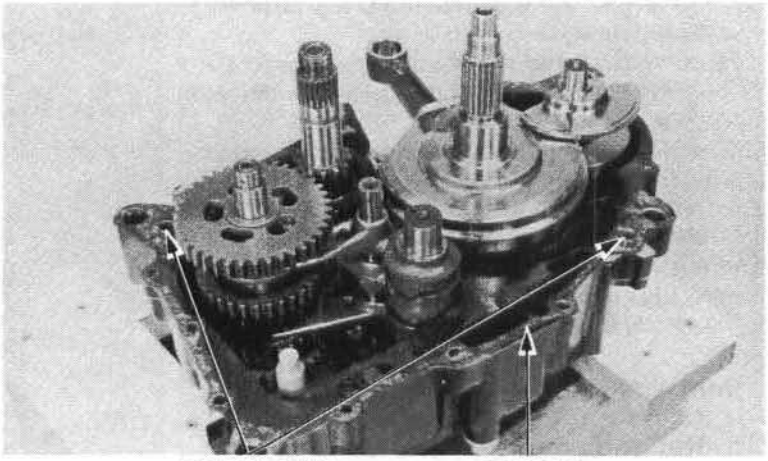
Clean the crankcase mating surfaces before assembling and check for wear or damage.

NOTE

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

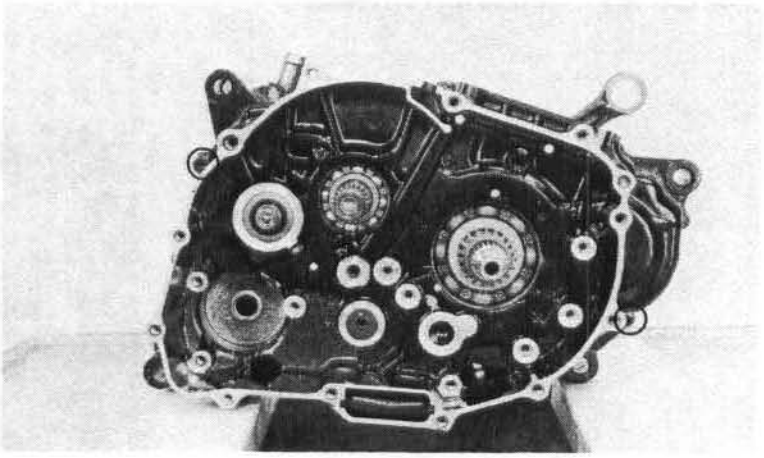


Install the transmission (Section 11).
Install the two dowel pins and a new gasket.
Assemble the right and left crankcase halves being careful to align the dowel pins and shafts.



Tighten the right crankcase bolt.

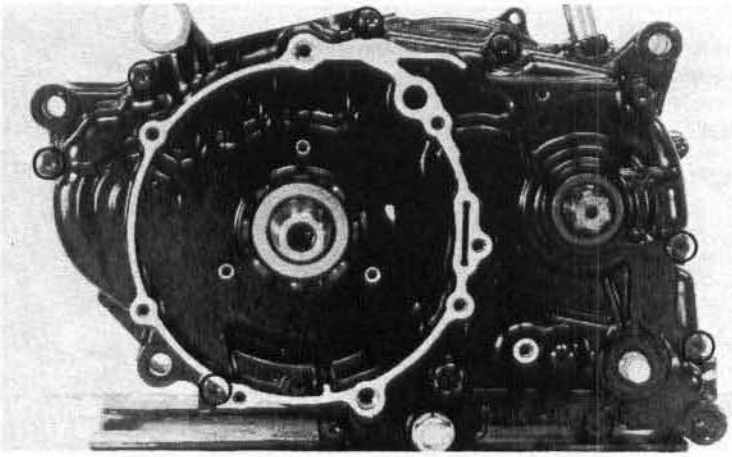
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)



Tighten the left crankcase bolts.

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

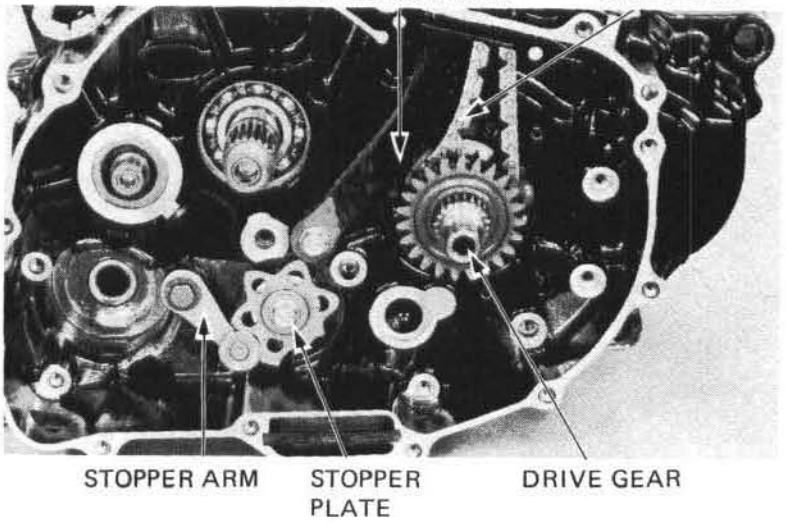
Check the crankshaft and transmission for smooth operation.

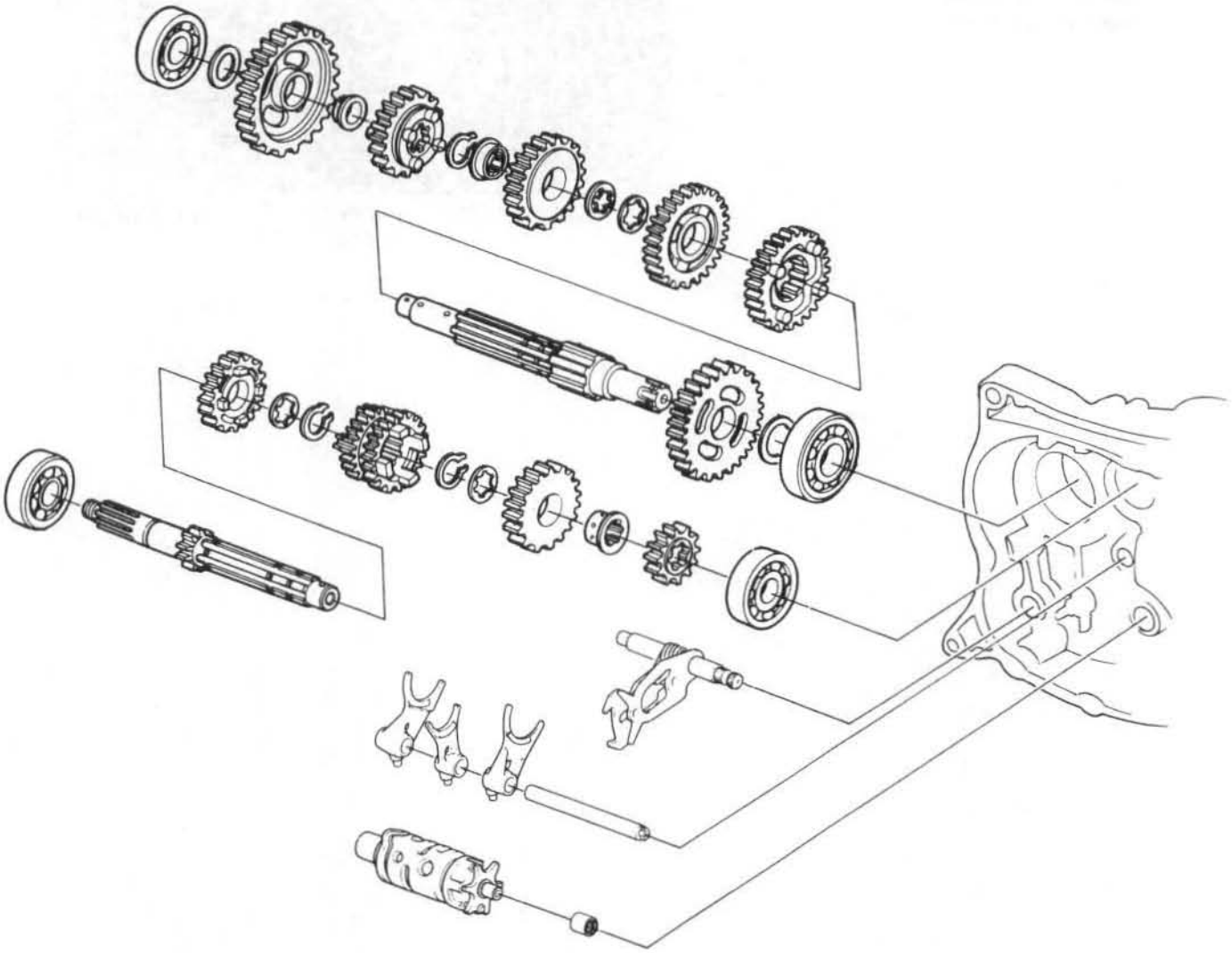


Install the cam chain guide.

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

Install the removed parts in the reverse order of removal.
- clutch/oil pump/kick starter (Section 8)
- alternator (Section 9)
- cylinder/piston (Section 7)
- cylinder head (Section 6)





11. TRANSMISSION

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the transmission.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Gear I.D.	M6, C1, C4	22.020–22.041 mm (0.8669–0.8678 in)	22.10 mm (0.870 in)
	M5, C2, C3	24.020–24.041 mm (0.9457–0.9465 in)	24.10 mm (0.949 in)
Bushing I.D.	(C1)	17.014–17.020 mm (0.6698–0.6701 in)	17.08 mm (0.672 in)
Bushing O.D.	M5, C3	23.984–24.005 mm (0.9443–0.9451 in)	23.93 mm (0.942 in)
	C1	21.984–22.005 mm (0.8655–0.8663 in)	21.93 mm (0.863 in)
Mainshaft O.D.	(M6)	21.959–21.980 mm (0.8645–0.8654 in)	21.91 mm (0.863 in)
Countershaft O.D.	C2	23.959–23.980 mm (0.9433–0.9441 in)	23.91 mm (0.941 in)
	C4	21.959–21.980 mm (0.8645–0.8654 in)	21.91 mm (0.863 in)
	C1	16.966–16.984 mm (0.6680–0.6687 in)	16.93 mm (0.667 in)
Shaft-to-gear clearance	(M6, C2)	0.040–0.082 mm (0.0016–0.0032 in)	0.15 mm (0.006 in)
Gear-to-bushing clearance	(M5, C1, C3)	0.015–0.057 mm (0.0006–0.0022 in)	0.10 mm (0.004 in)
Bushing-to-shaft clearance	(C1)	0.020–0.054 mm (0.0008–0.0021 in)	0.10 mm (0.004 in)
Shift fork I.D.		13.000–13.021 mm (0.5118–0.5126 in)	13.05 mm (0.514 in)
Shift fork shaft O.D.		12.966–12.983 mm (0.5105–0.5111 in)	12.90 mm (0.508 in)
Fork claw thickness		4.930–5.000 mm (0.1941–0.1969 in)	4.50 mm (0.177 in)
Shift drum O.D.	Left	11.966–11.984 mm (0.4711–0.4718 in)	11.91 mm (0.469 in)
	Right	19.959–19.980 mm (0.7858–0.7866 in)	19.90 mm (0.783 in)

TOOLS

Special

Bearing remover set, 12 mm 07936–1660001
- Bearing remover, 12 mm 07936–1660100
- Remover weight 07741–0010201 or 07936–3710200

Remover set 07936–3710000
- Bearing remover, 20 mm 07936–3710600
- Remover weight 07936–3710200
- Remover handle 07936–3710100

Bearing remover, 17 mm 07936–3710300

Bearing remover set, 15 mm 07936–KC10000
- Remover weight 07936–3710200
- Bearing remover, 15 mm 07936–KC10500
- Remover handle 07936–3710100

Common

Attachment, 37 x 40 mm	07746–0010200	Pilot, 12 mm	07746–0040200
Attachment, 42 x 47 mm	07746–0010300	Pilot, 17 mm	07746–0040400
Attachment, 52 x 55 mm	07746–0010400	Pilot, 15 mm	07746–0040300
Driver	07749–0010000	Pilot, 20 mm	07746–0040500
		Pilot, 22 mm	07746–0041000

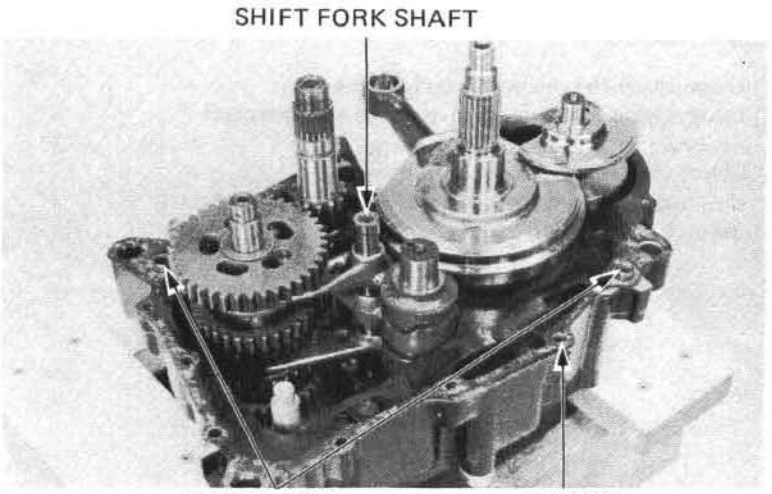
TROUBLESHOOTING

Hard to Shift
- Improper clutch adjustment; too much free play
- Shift forks bent
- Shift shaft bent
- Shift fork claw bent
- Shift drum cam groove damaged

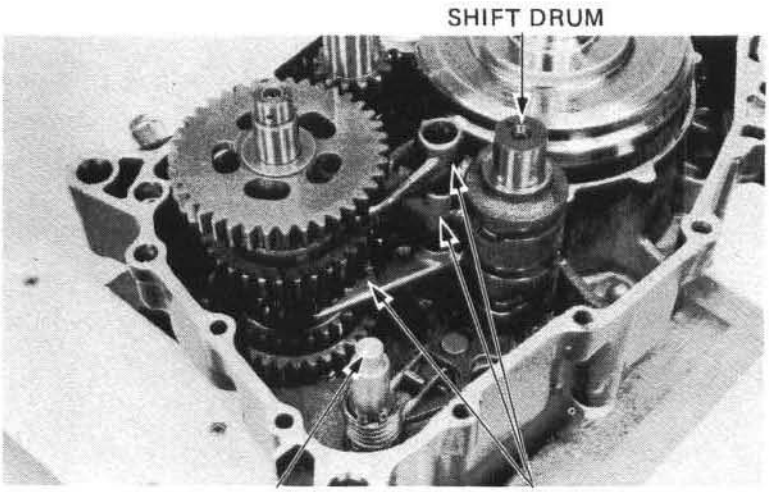
Transmission Jumps Out of Gear
- Gear dogs worn
- Shift shaft bent
- Shift drum stopper broken
- Shift forks bent

TRANSMISSION DISASSEMBLY

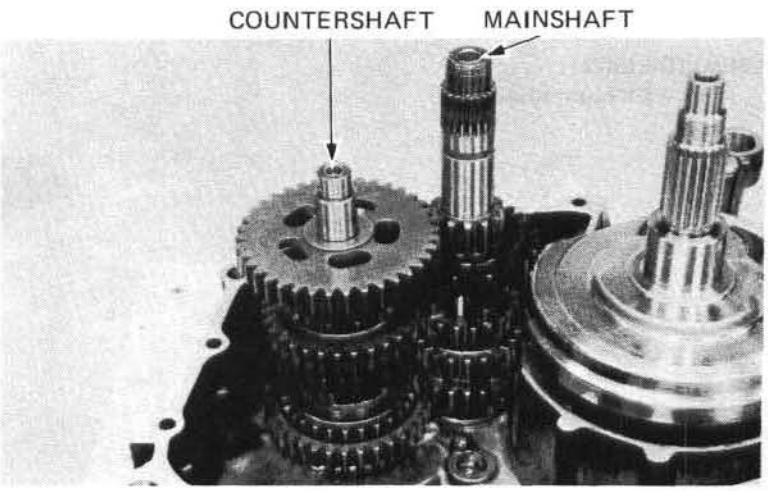
Separate the crankcase (Section 10).
Remove the gasket and dowel pins.
Remove the shift fork shaft.



Remove the shift forks and gearshift drum.
Remove the shift spindle.

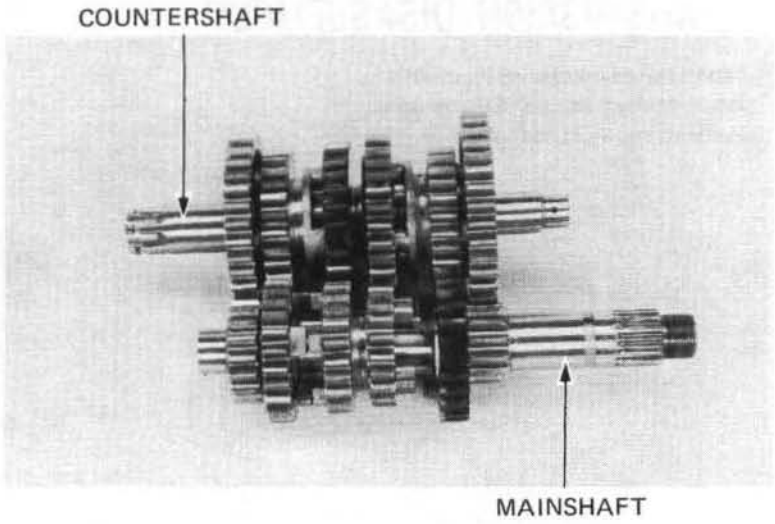


Remove the mainshaft and countershaft.



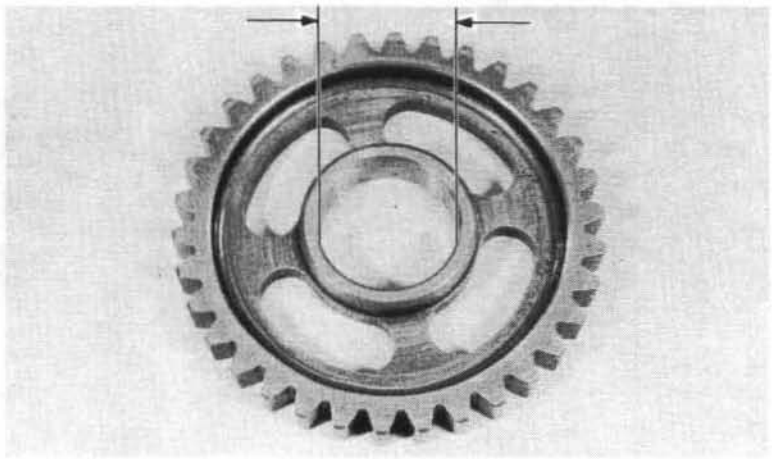
TRANSMISSION GEAR/SHAFT INSPECTION

Disassemble the mainshaft and countershaft.
Inspect each gear for wear or damage and replace if necessary.
Check the gear teeth for wear or damage.
Check the engagement dogs of gears for wear or damage.



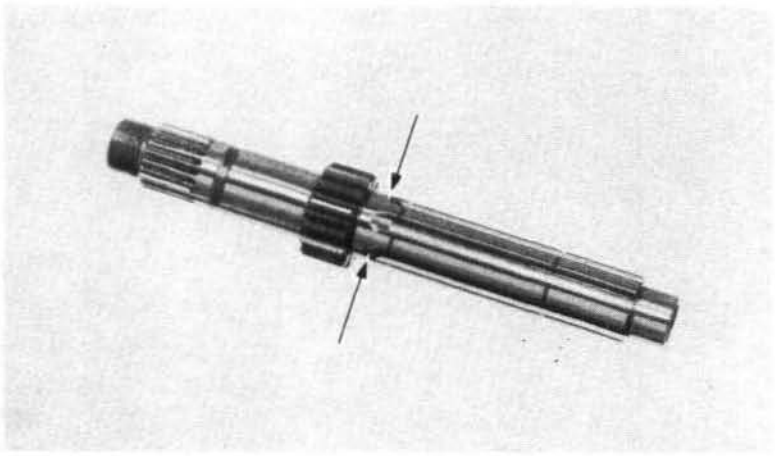
Measure the I.D. of each spinning gear.

SERVICE LIMITS:
M5, C3, C2: 24.10 mm (0.949 in)
M6, C1, C4: 22.10 mm (0.870 in)



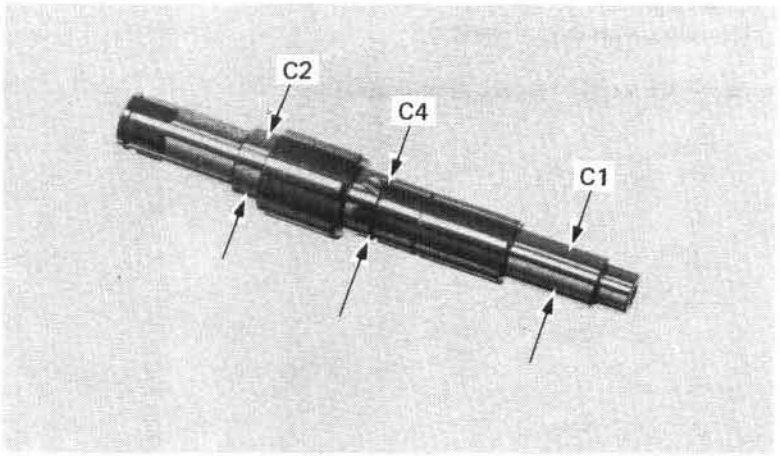
Measure the O.D. of the mainshaft.

SERVICE LIMIT:
M6: 21.91 mm (0.863 in)



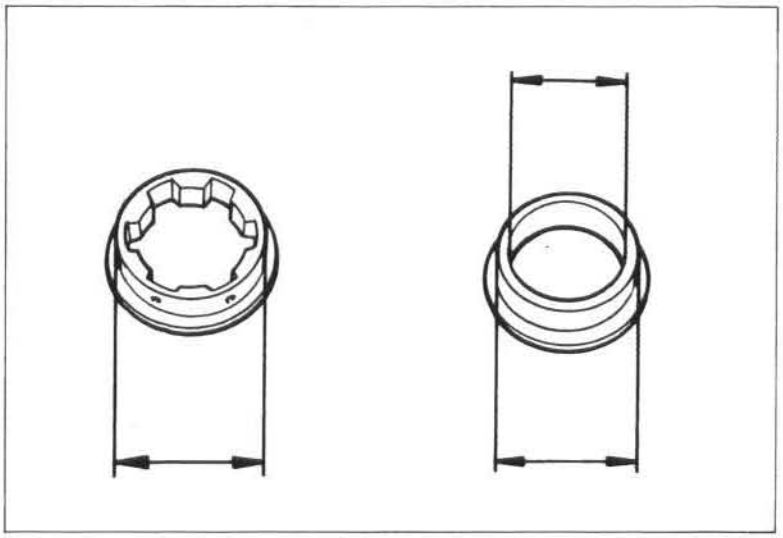
Measure the countershaft O.D.

SERVICE LIMITS:
C1: 16.93 mm (0.667 in)
C2: 23.91 mm (0.941 in)
C4: 21.91 mm (0.863 in)



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

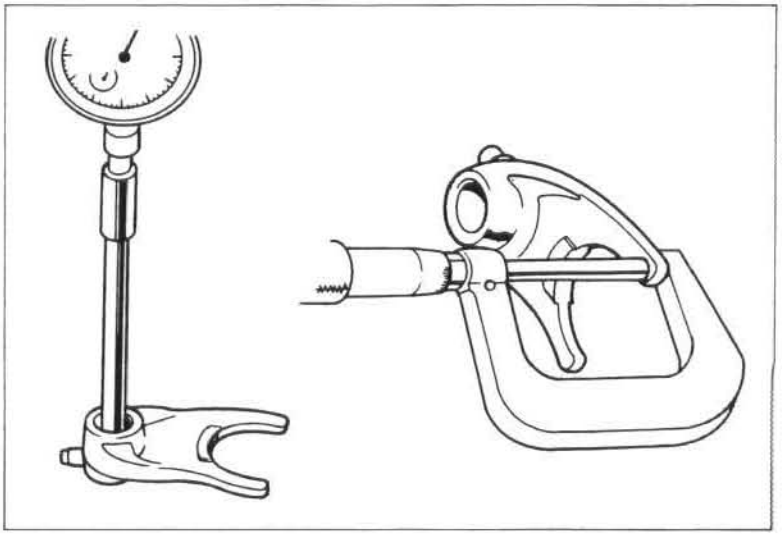
SERVICE LIMITS:
I.D. (C1): 17.08 mm (0.672 in)
O.D. (M5, C3): 23.93 mm (0.942 in)
(C1): 21.93 mm (0.863 in)



SHIFT FORK/SHIFT FORK INSPECTION

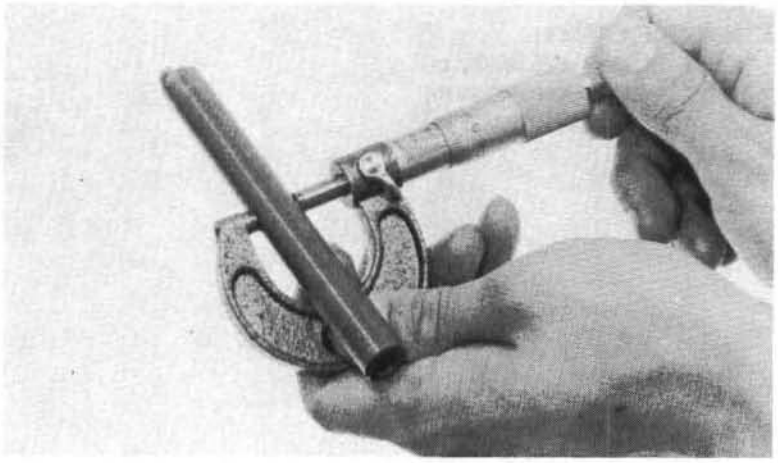
Check that the shift forks are not bent, worn or damaged. Measure the I.D. and shift claw thickness.

SERVICE LIMITS:
Claw thickness: 4.50 mm (0.177 in)
Shift fork I.D.: 13.05 mm (0.514 in)



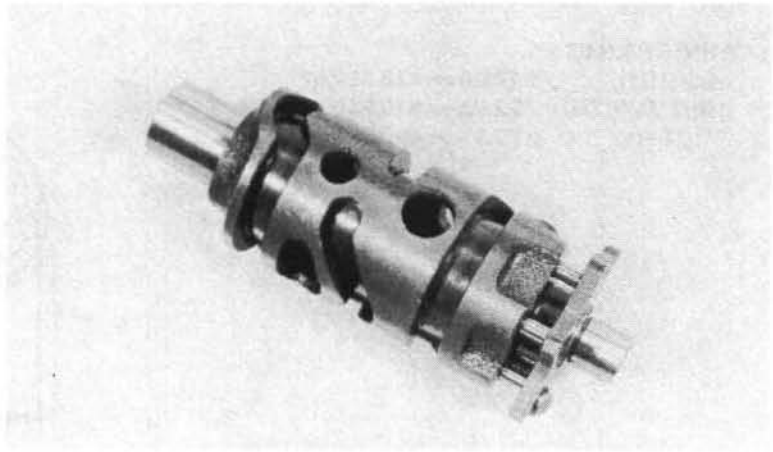
Check that the shift fork shafts are not bent, worn, or damaged.
Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.90 mm (0.508 in)



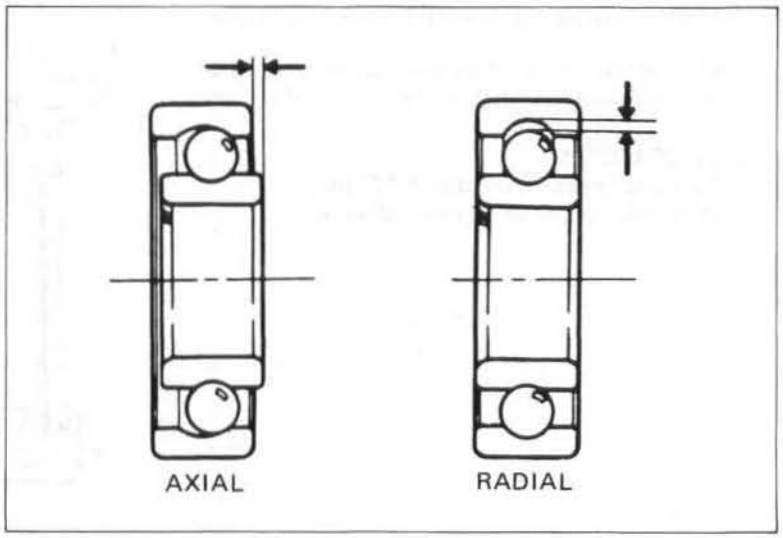
GEARSHIFT DRUM INSPECTION

Inspect the drum grooves and replace the drum if it is damaged or shows excessive wear.
Refer to page 8-17 for gearshift drum plate and stopper arm inspection.



TRANSMISSION BEARING INSPECTION

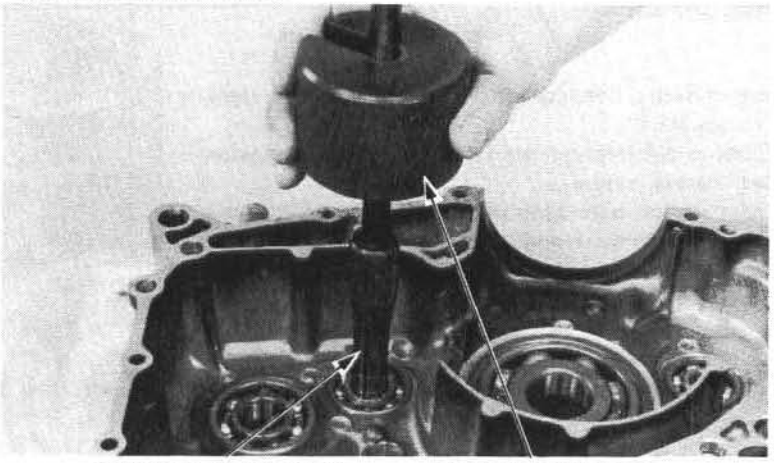
A bearing must be replaced if it is noisy or has excessive play.



LEFT CRANKCASE BEARING REPLACEMENT

Remove the bearing from the left crankcase with the bearing remover.
Install a new bearing in the left crankcase with the driver, attachment, and pilot.
Use the following tools to install and remove the bearings.

<BEARING REMOVAL>



Main Shaft Bearing

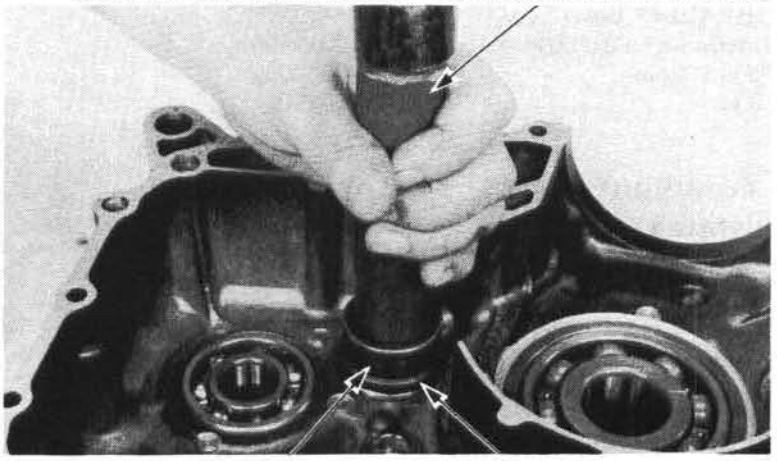
REMOVAL

Bearing remover, 17 mm	07936–3710300
Remover handle	07936–3710100
Remover weight	07936–3710200

INSTALLATION

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

<BEARING INSTALLATION> BEARING DRIVER HANDLE



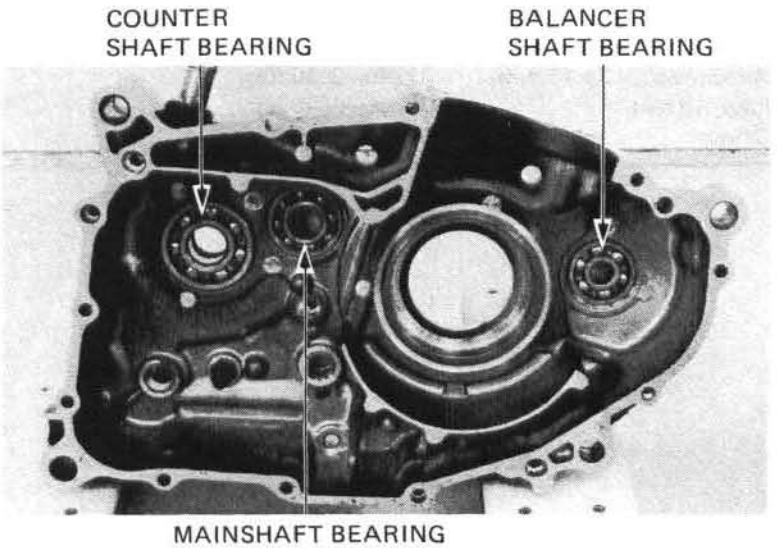
Countershaft Bearing

REMOVAL

Bearing remover, 20 mm	07936–3710600
Remover handle	07936–3710100
Remover weight	07936–3710200

INSTALLATION

Attachment, 52 x 55 mm	07746–0010400
Pilot, 20 mm	07746–0040500
Driver	07749–0010000



Left Balancer Shaft Bearing

REMOVAL

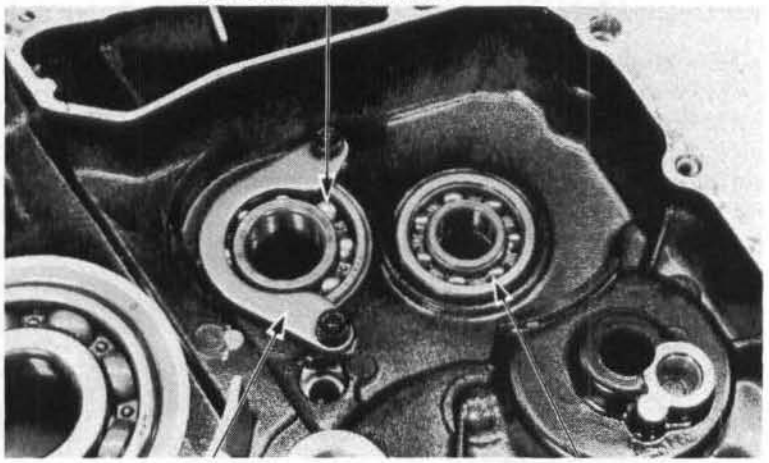
Bearing remover, 12 mm	07936–1660100
Remover weight	07936–3710200 or 07741–0010201

INSTALLATION

Attachment, 37 x 40 mm	07746–0010200
Pilot, 12 mm	07746–0040200
Driver	07749–0010000

RIGHT CRANKCASE BEARING REPLACEMENT

Remove the bearing setting plate from the right crankcase.
Remove the bearing from the right crankcase with the bearing remover.
Install a new bearing in the right crankcase with the driver, attachment, and pilot.
Use the following tools to install and remove the bearing.



Mainshaft Bearing

INSTALLATION

Attachment, 52 x 55 mm	07746–0010400
Pilot, 22 mm	07746–0041000
Driver	07749–0010000

Countershaft Bearing

INSTALLATION

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

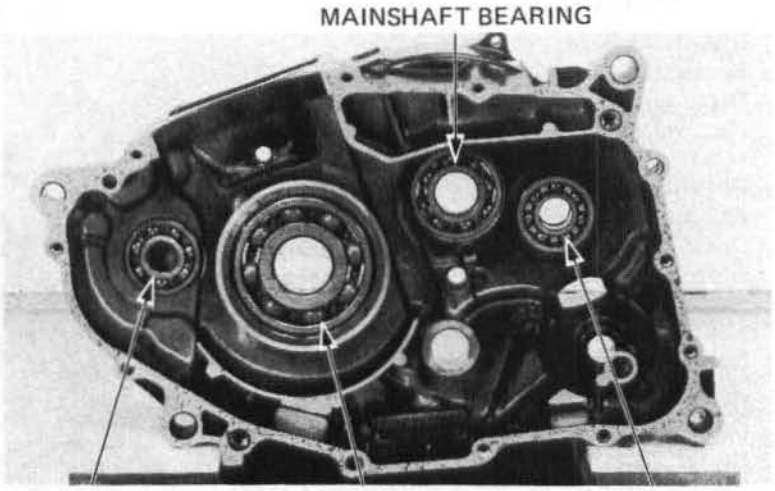
Right Balancer Shaft Bearing

REMOVAL

Bearing remover set, 15 mm	07936–KC10000
or Bearing remover, 15 mm	07936–KC10500
– Remover weight	07936–3710200

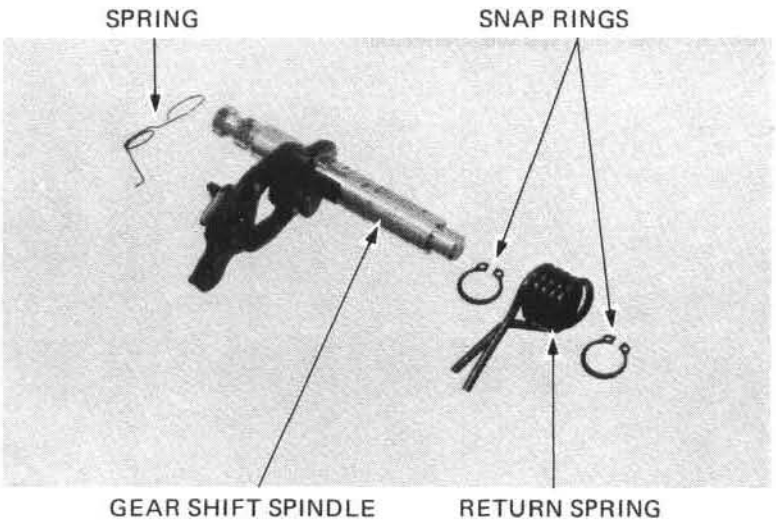
INSTALLATION

Attachment, 42 x 47 mm	07746–0010300
Pilot, 15 mm	07746–0040300
Driver	07749–0010000



GEAR SHIFT SPINDLE

Inspect the gear shift spindle for wear or damage.
Disassemble and replace parts as necessary.
Install the spindle return spring, snap-rings and spring on the gear shift spindle.

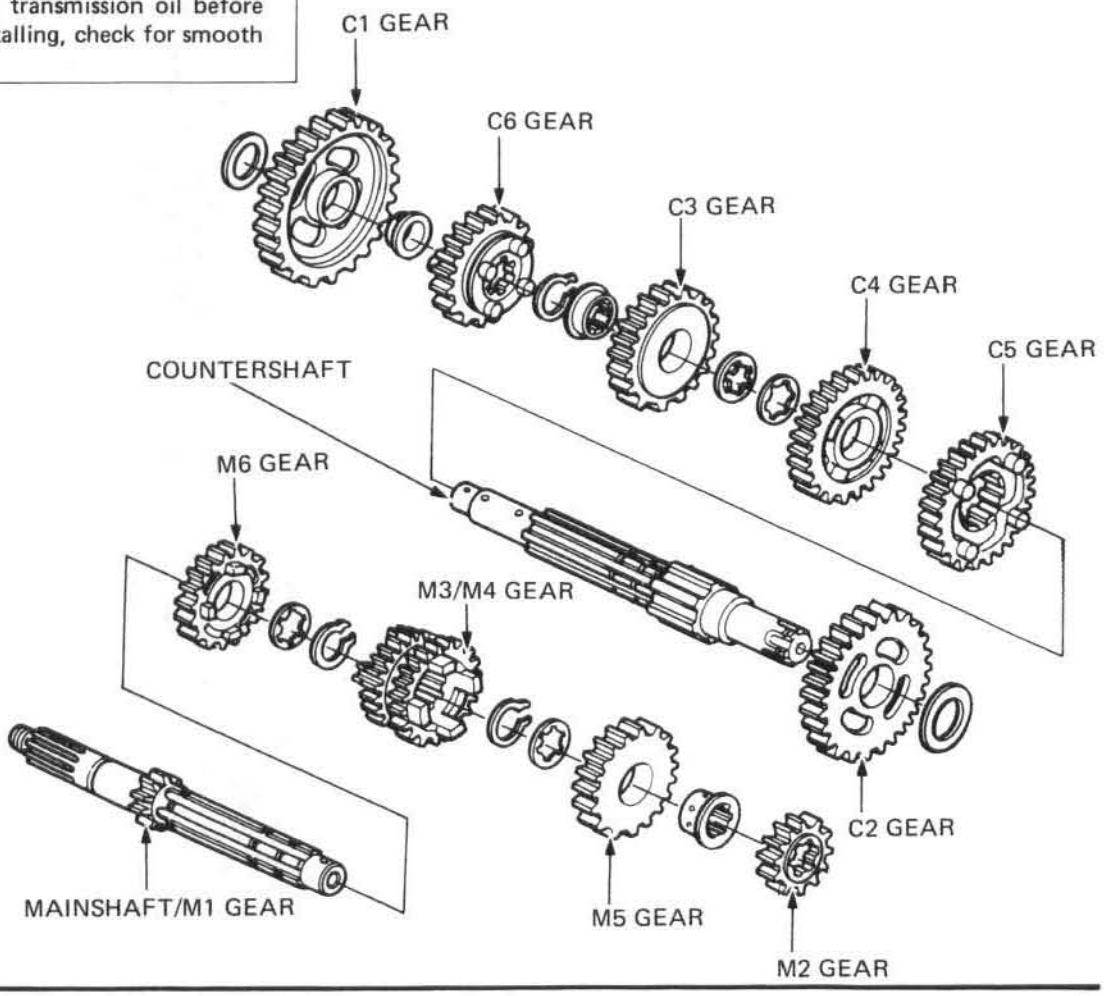


TRANSMISSION ASSEMBLY

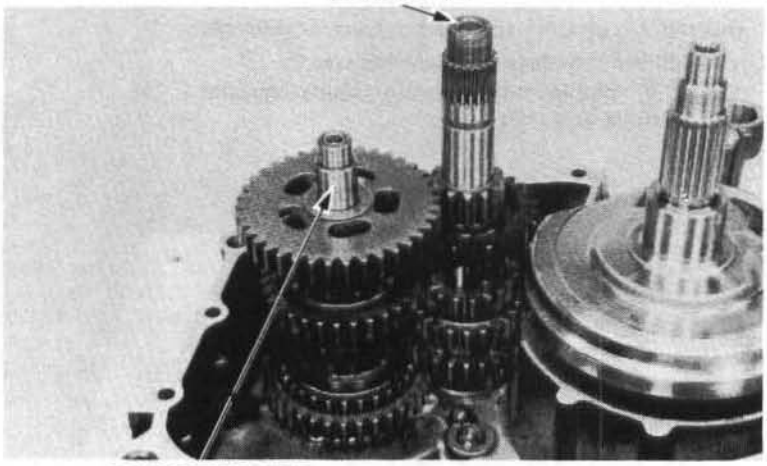
Assemble the transmission gears and shafts.

NOTE

> Coat each gear with transmission oil before assembling. After installing, check for smooth movement.



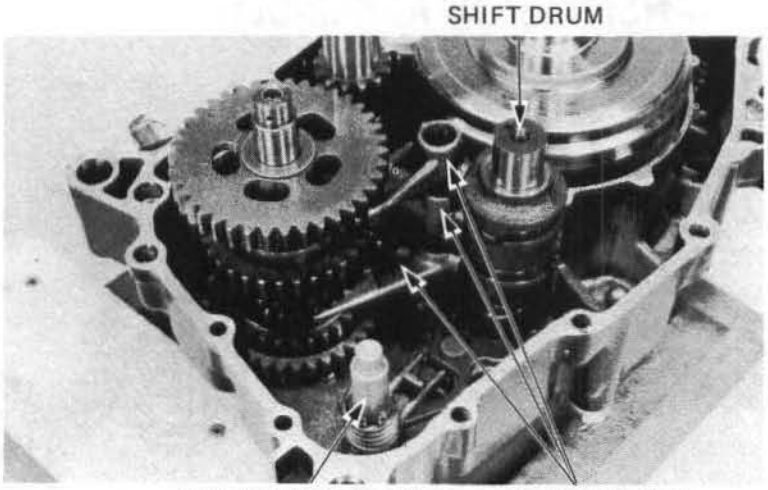
Engage the mainshaft and countershaft gears, and place the gears into the left crankcase.



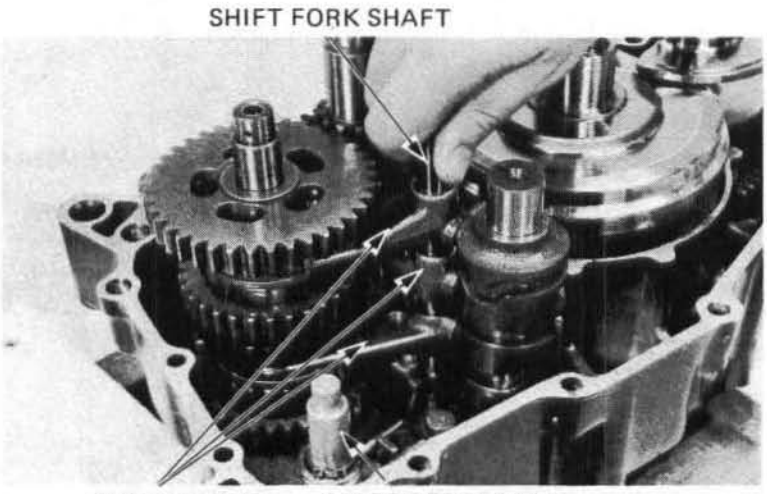
Install the gear shift spindle, drum and shift forks.

CAUTION

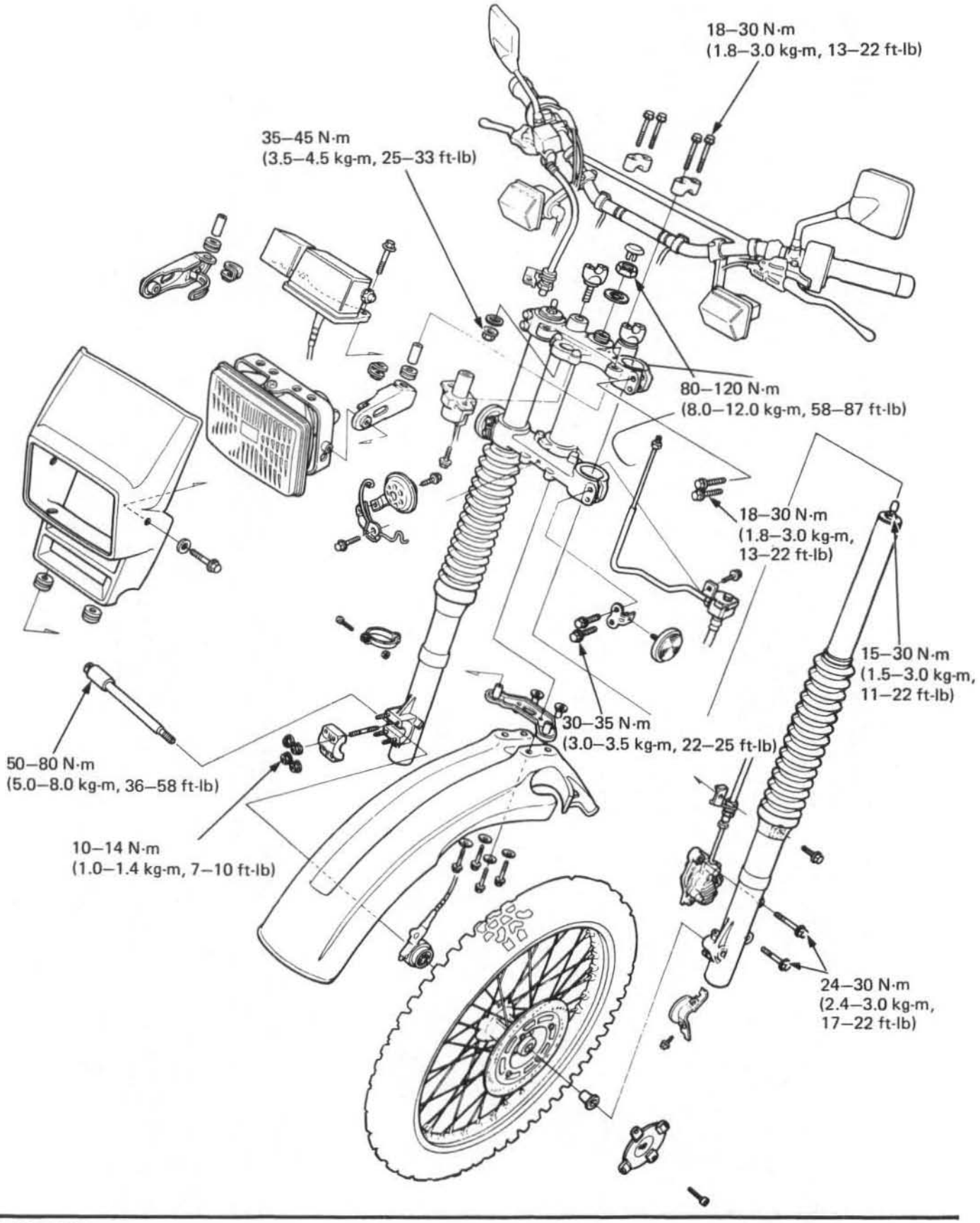
Install the shift forks with their marks facing toward the left crankcase.



Slide the shift fork shaft through the shift forks, and into the left crankcase.
Assemble the left and right crankcases (Page 10-9).
After installing, check for smooth operation.



MEMO



12. FRONT WHEEL/ SUSPENSION/STEERING

SERVICE INFORMATION

GENERAL

- A jack or other support is required to support the motorcycle.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Axle shaft runout		———	0.2 mm (0.01 in)
Front wheel rim runout	Radial	———	2.0 mm (0.08 in)
	Axial	———	2.0 mm (0.08 in)
Front fork spring free length		571.4 mm (22.50 in)	565.7 mm (22.27 in)
Front fork tube runout		———	0.2 mm (0.01 in)

TOOLS

Special

Fork seal driver	07947–4630100	
Steering stem socket	07916–3710100	
Steering stem driver	07946–MB00000	
Ball race remover	07953–KA50000 or 07953–4250002	
Snap-ring pliers	07914–3230002	
Steering bearing attachment	GN–HT–54 (U.S.A. only)	

Common

Socket wrench, 30 x 32 mm	07716–0020400	Equivalent tool commercially available in U.S.A.
Attachment, 42 x 47 mm	07746–0010300	
Attachment, 32 x 35 mm	07746–0010100	
Pilot, 15 mm	07746–0040300	
Bearing remover collet, 15 mm	07746–0050400	Equivalent tools commercially available in U.S.A.
Bearing remover expander	07746–0050100	
Driver	07749–0010000	

TORQUE VALUES

Handlebar upper holder	18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb)
Front spoke	2.5–5.0 N·m (25–50 kg-cm, 1.8–3.6 ft-lb)
Front axle	50–80 N·m (5.0–8.0 kg-m, 36–58 ft-lb)
Front axle holder	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Fork cap bolt	15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb)
Fork upper pinch bolt	18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb)
Steering stem nut	80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
Fork bottom socket bolt	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
Fork lower pinch bolt	30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)
Front brake caliper bracket bolt	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
Steering adjustment nut	1–2 N·m (0.1–0.2 kg-m, 0.7–1.4 ft-lb)
Master cylinder holder bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Brake disc nut	14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)

TROUBLESHOOTING

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

Steers to One Side or Does Not Track Straight
- Bent front forks
- Bent front axle, wheel installed incorrectly

Front Wheel Wobbling
- Distorted rim
- Worn front wheel bearings
- Loose or broken spokes
- Faulty tire
- Axle not tightened properly

Soft Suspension
- Weak fork springs
- Insufficient fluid in front forks
- Incorrect fork air pressure

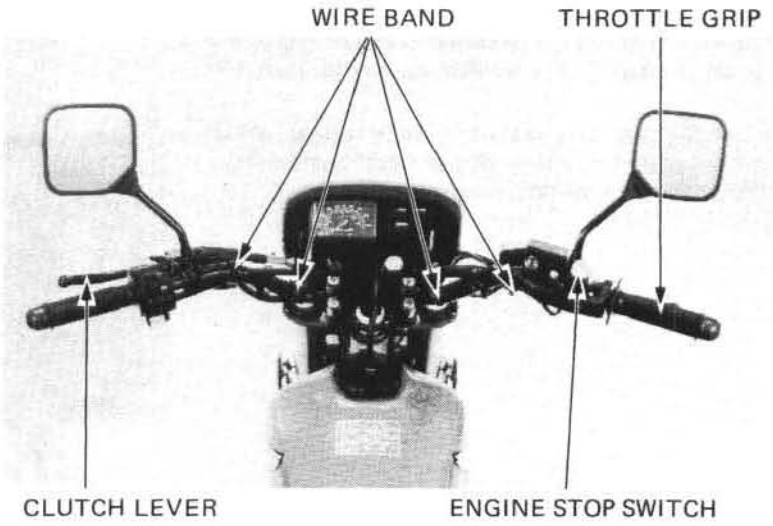
Hard Suspension
- Incorrect fluid weight in front forks
- Incorrect fork air pressure
- Fork tube bent

Front Suspension Noise
- Slider binding
- Insufficient fluid in forks
- Loose front fork fasteners

HANDLEBAR

REMOVAL

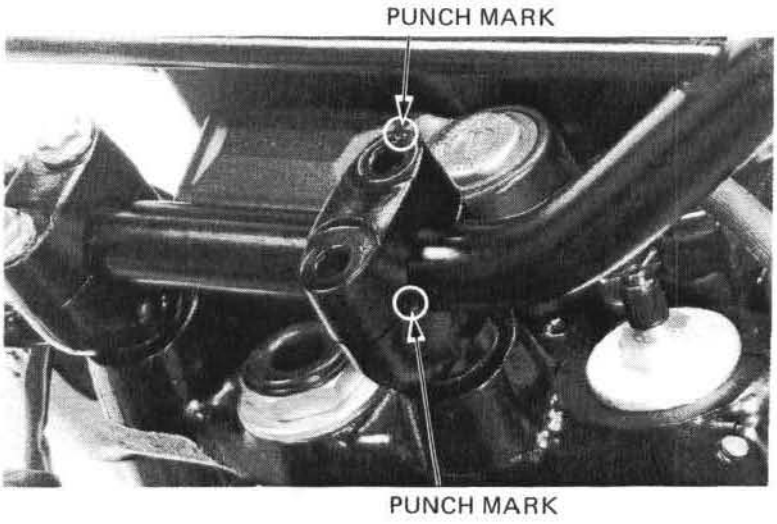
Remove the wire harness bands.
Remove the throttle grip.
Remove the engine stop switch and front brake master cylinder.
Remove the left handlebar switch.
Remove the turn signals.
Remove the left handlebar grip and clutch lever holder.
Remove the handlebar holder bolts and the handlebar.



INSTALLATION

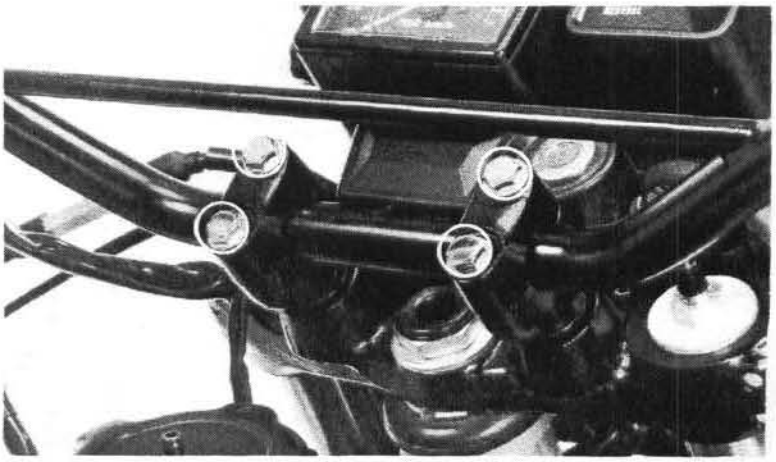
Install the handlebar on the lower handlebar holders.
Align the punch mark on the handlebar with the top of the lower holders.

Place the upper holders on the handlebar with the punch marks facing forward.



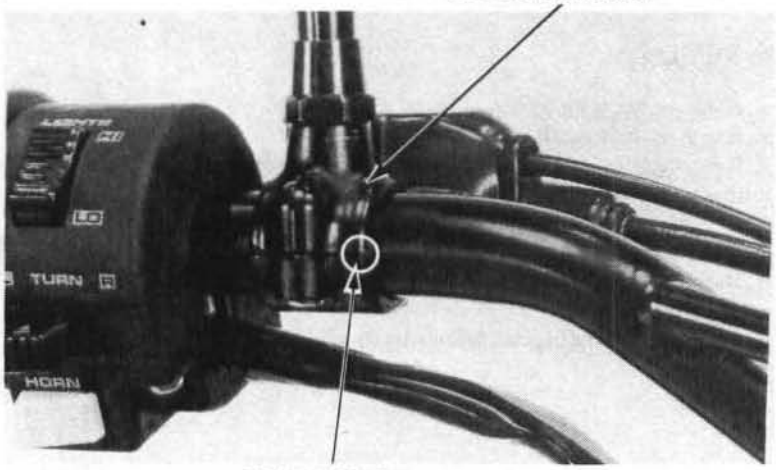
Tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 18–30 N·m
(1.8–3.0 kg-m, 13–22 ft-lb)



Install the clutch lever bracket and left switch case. Align the split lines of the bracket and case with the punch mark on the handlebar, and tighten the screw.

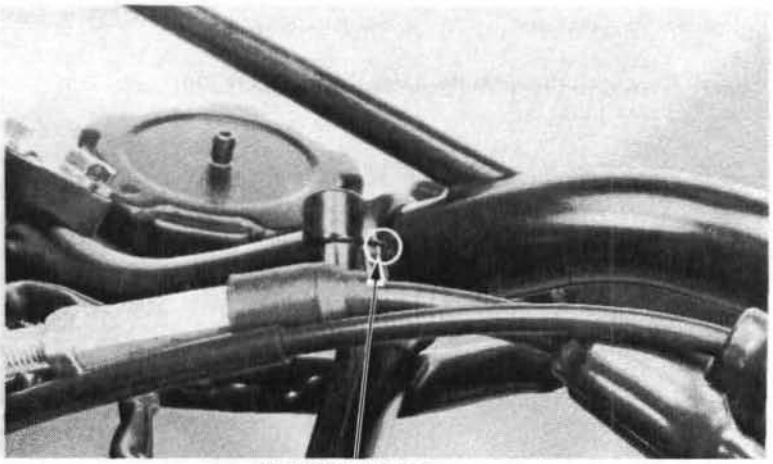
Align the dowel pin of the left handlebar switch bracket with the hole of the handlebar, and tighten the forward screw first then rearward screw.



Install the left turn signal.

Align the split in the bracket with the punch mark on the handlebar.

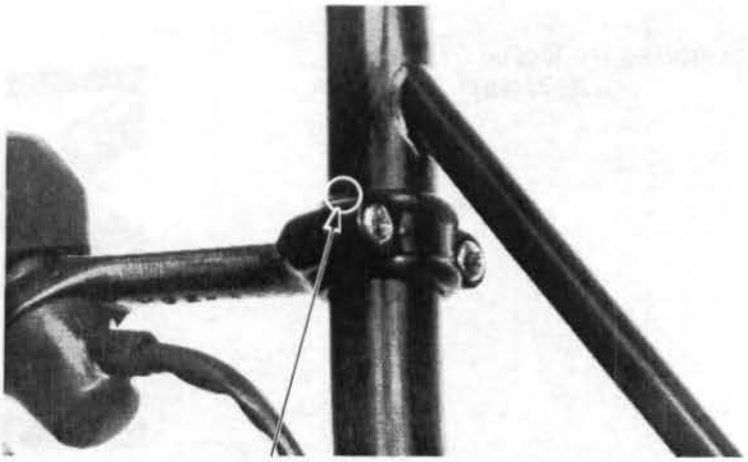
Tighten the screws securely.



Install the right turn signal.

Align the split line of the bracket with the punch mark on the handlebar.

Tighten the screws.



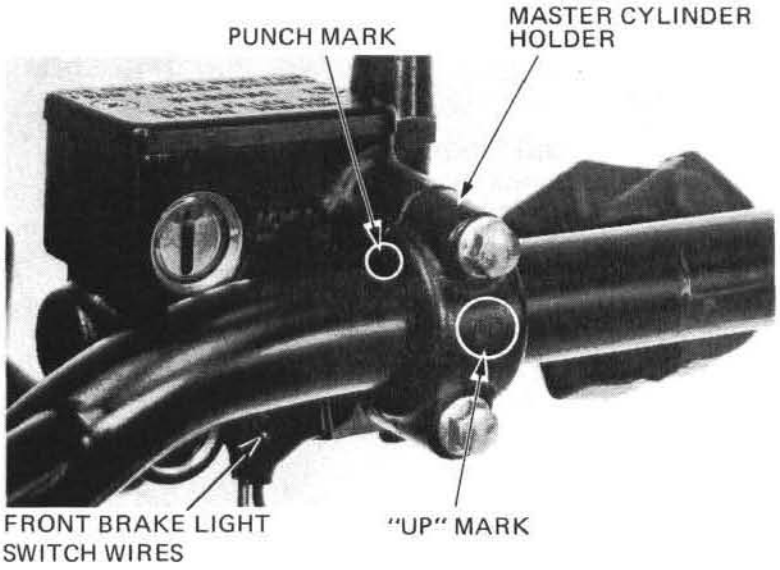
Set the front brake master cylinder on the handlebar.
Install the master cylinder holder with the "UP" mark up and align the end of the holder with the punch mark on the handlebar.
Tighten the master cylinder holder bolts.

NOTE

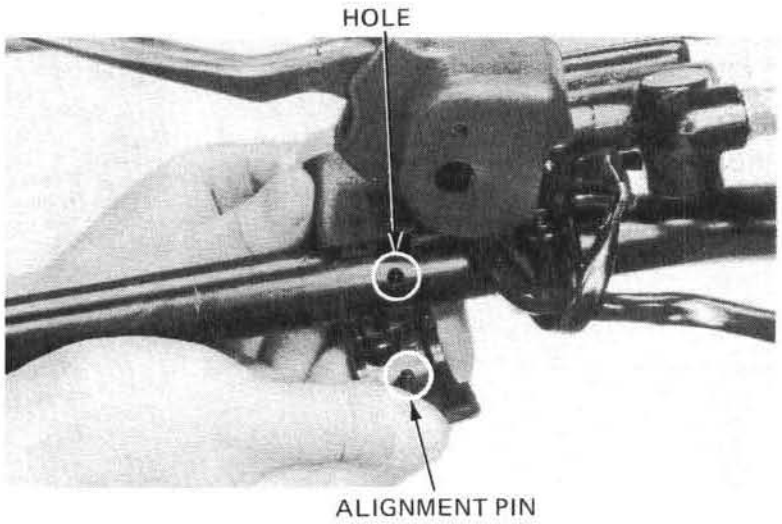
Tighten the upper bolt first then the lower bolt.

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

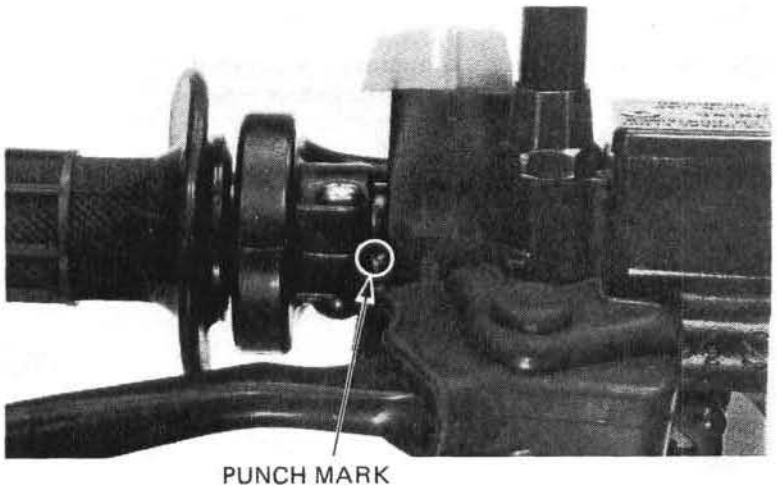
Connect the front brake light switch wires.



Install the engine stop switch.
Position the lower half of the switch so the alignment pin fits into the hole in the handlebar.
Tighten the forward screw first, then tighten the rear screw.



Apply grease to the inside of the grip pipe and the throttle housing.
Install the throttle grip.
Align the split line of the throttle housing with the punch mark on the handlebar.
Tighten the forward screw first, then tighten the rear screw.

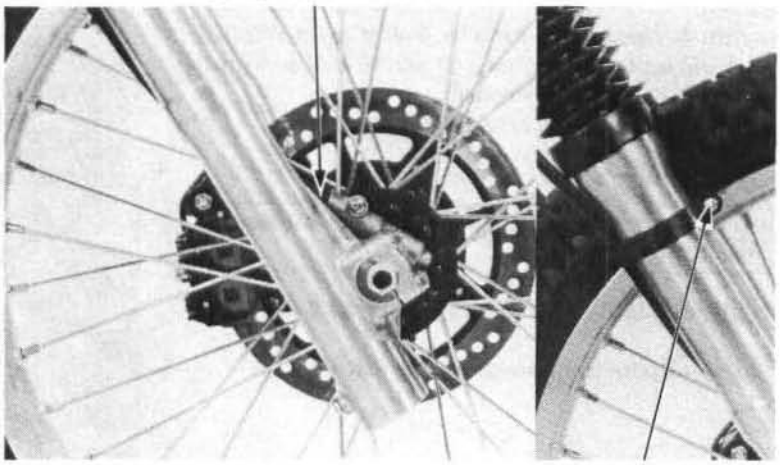


FRONT WHEEL

REMOVAL

Raise the front wheel off the ground by placing a box or work stand under the engine.
Loosen the speedometer cable clamp screw.

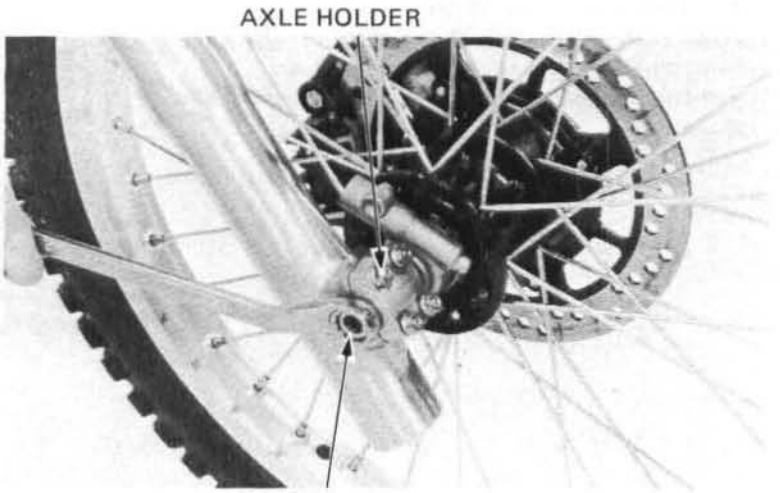
Disconnect the speedometer cable from the speedometer gearbox at the front wheel.
Remove the front fork guard from the left fork leg.



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

NOTE

> Do not depress the brake lever when the wheel is off the motorcycle. The caliper pistons will be forced out of the cylinder.

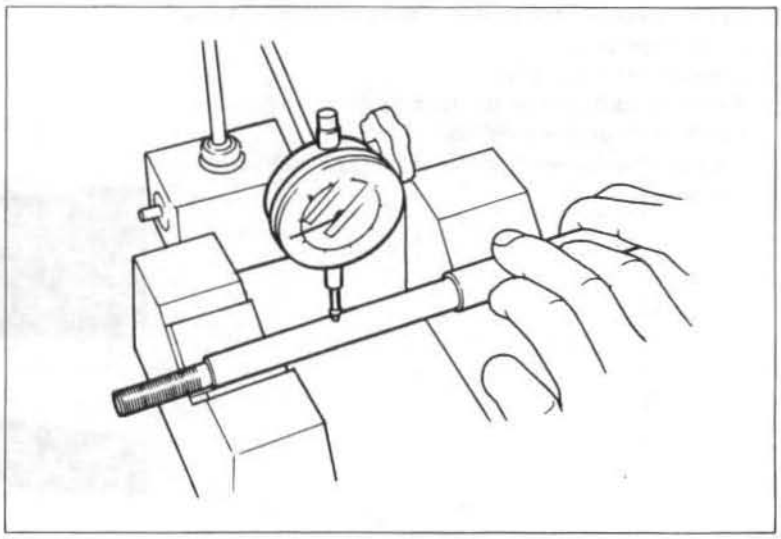


INSPECTION

AXLE

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

SERVICE LIMIT: 0.2 mm (0.01 in)



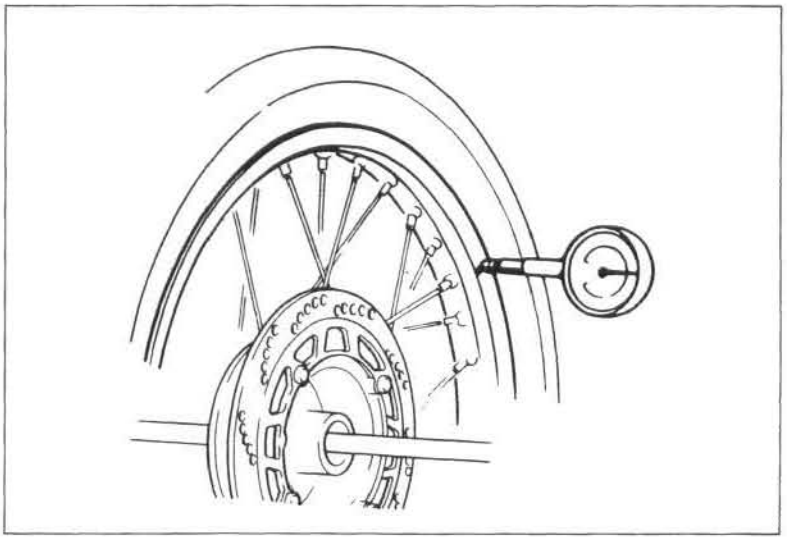
WHEEL

Check the rim runout by placing the wheel on a truing stand. Then spin the wheel by hand, and read the runout using a dial indicator.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)

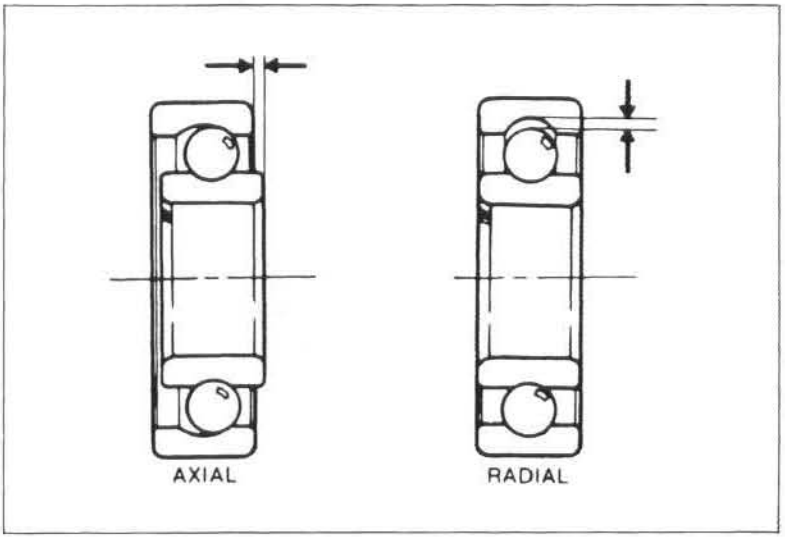
Check the spokes and tighten any that are loose.

TORQUE: 2.5–5.0 N·m
(25–50 kg-cm, 1.8–3.6 ft-lb)



WHEEL BEARINGS

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

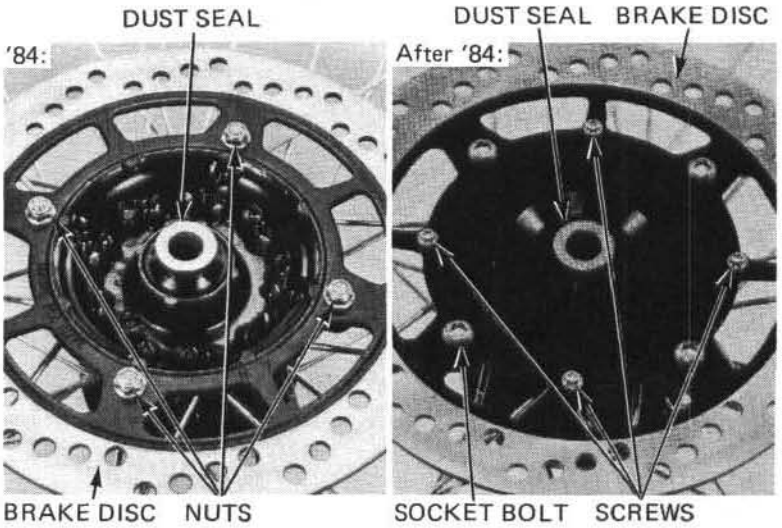


FRONT WHEEL DISASSEMBLY

Remove the speedometer gearbox.
Remove the axle collar and dust seal from the wheel hub.

'84:
Remove the disc by removing the four nuts.

After '84:
Remove the front wheel hub cover by removing the four screws.
Remove the disc by removing the four socket bolts.

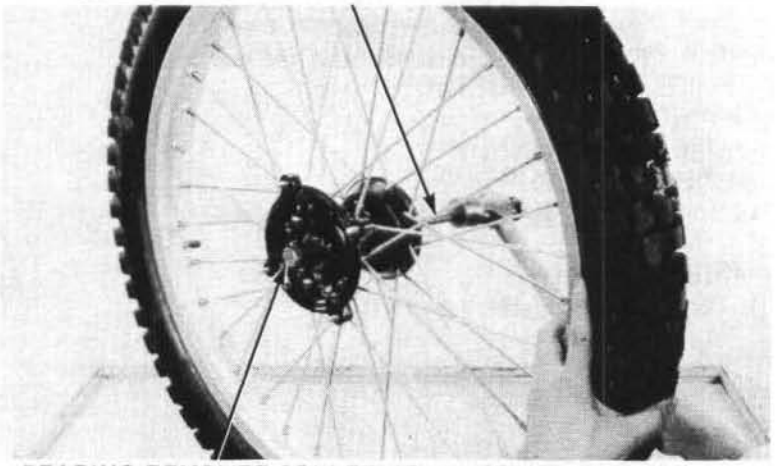


Remove the wheel bearings and the distance collar from the hub.

NOTE

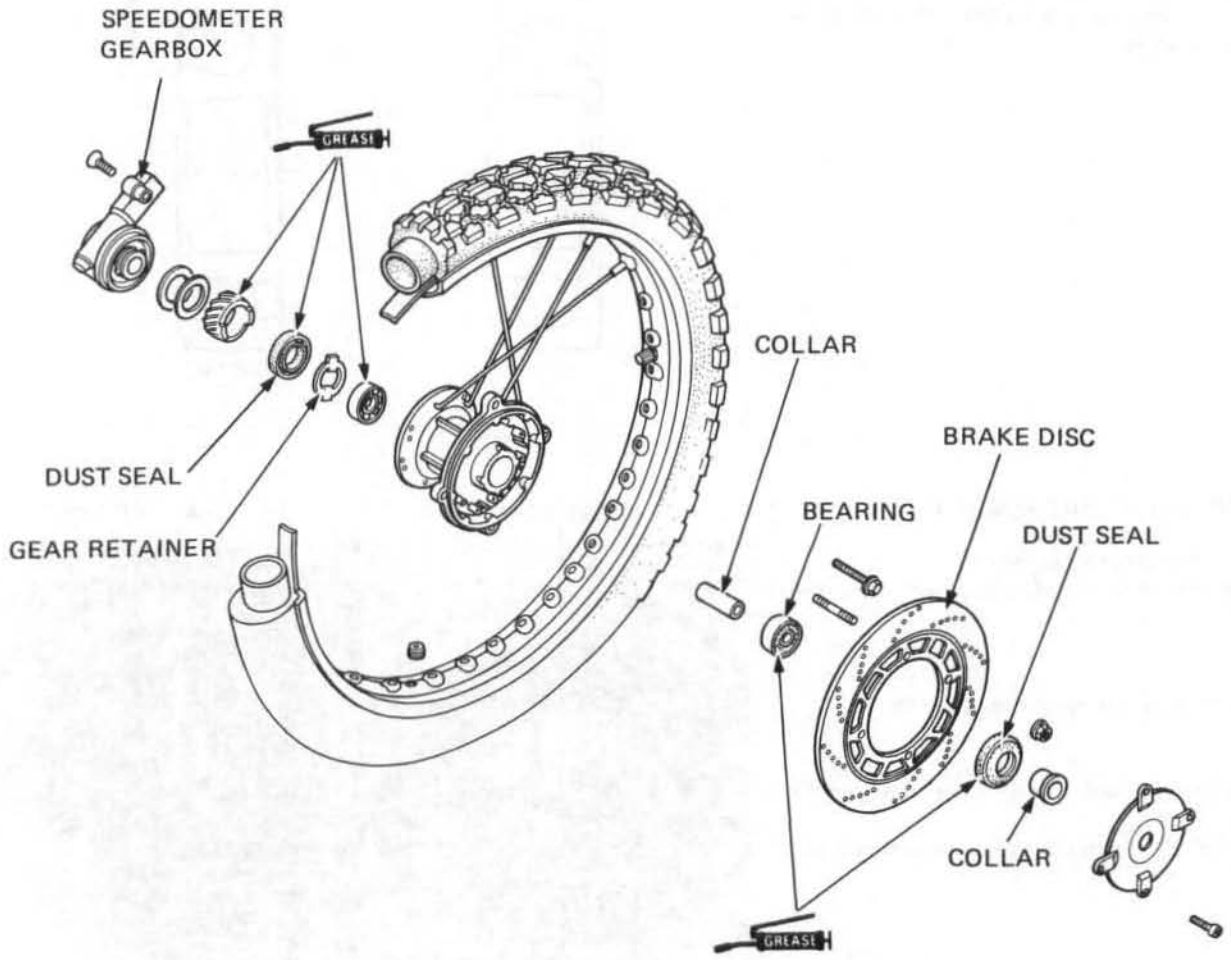
> Never reinstall old bearings, once the bearings are removed, they must be replaced with new ones.

BEARING REMOVER EXPANDER 07746–0050100
OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.



BEARING REMOVER COLLET, 15 mm 07746–0050400
OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

ASSEMBLY



Pack the bearing cavities with grease.
Drive in the right bearing and install the distance collar.
Drive in the left bearing.

NOTE

- Install the bearings with the sealed end toward the outside.
- Be sure to drive the bearing in squarely.

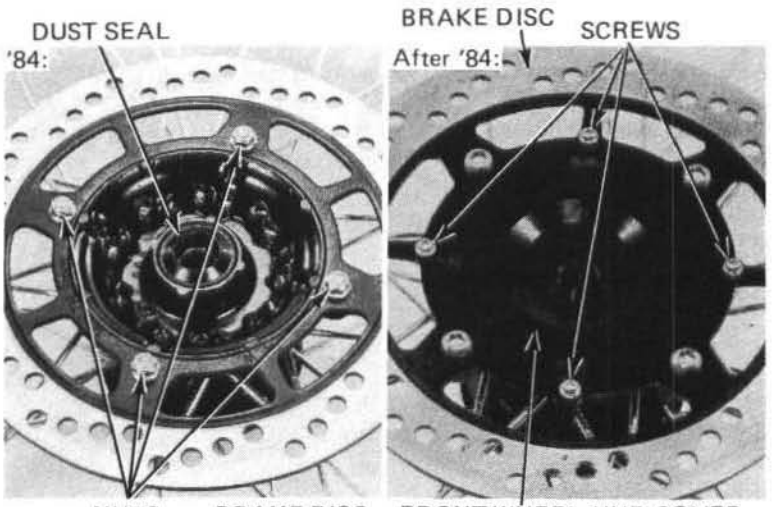
ATTACHMENT, 32 x 35 mm 07746–0010100 AND
PILOT, 15 mm 07746–0040300

Install the brake disc and tighten its nuts.

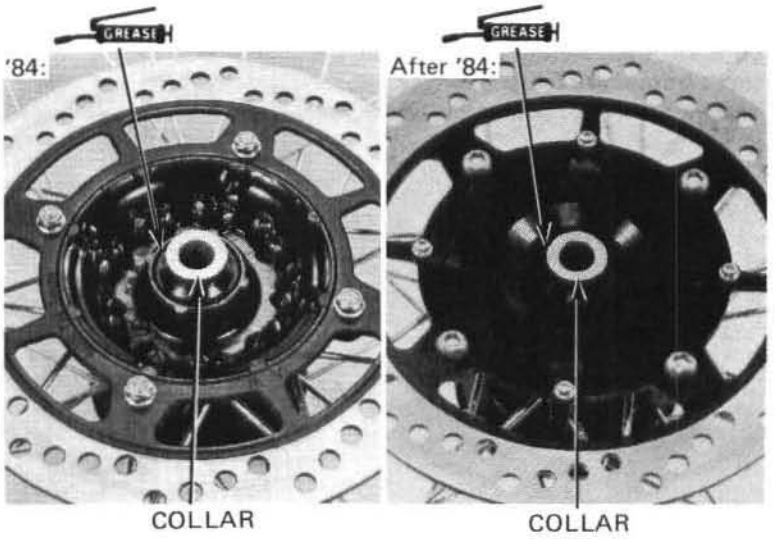
TORQUE: 14–16 N·m
(1.4–1.6 kg-m, 10–12 ft-lb)

Install the dust seal in the wheel hub.

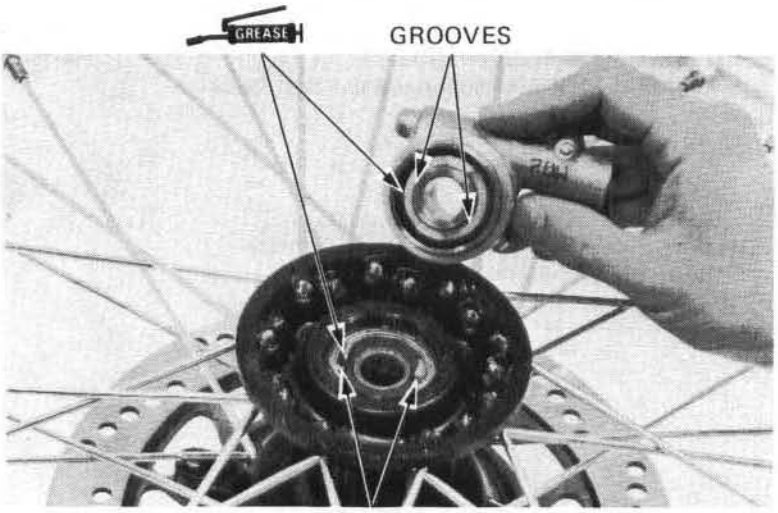
After '84:
Install the front wheel hub cover and tighten its screws.
Install the dust seal in the wheel hub.



Lubricate the dust seal lip with grease.
Install the axle collar in the dust seal.



Install the speedometer gear retainer in the left wheel hub.
Lubricate the inside of the dust seal and install it.
Disassemble the speedometer gearbox and lubricate the sliding surfaces with grease.
Install the speedometer gearbox in the wheel hub, aligning the groove in the speedometer gearbox with the slots.



FRONT WHEEL INSTALLATION

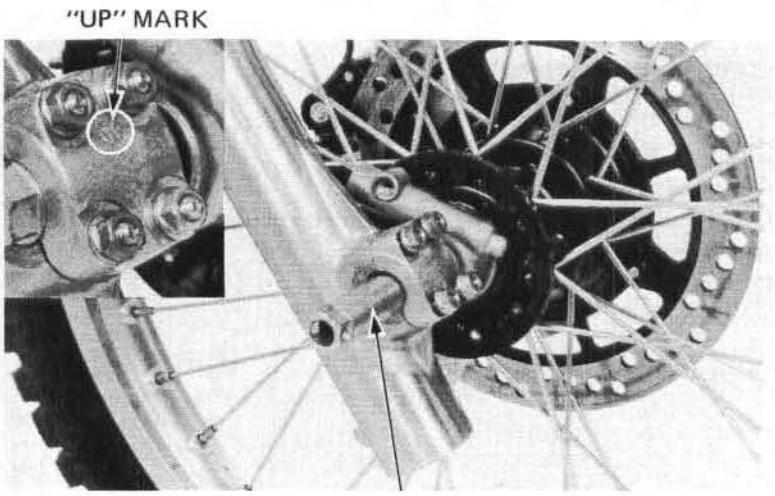
Fit the caliper over the disc, taking care not to damage the brake pads.
Clean the axle and holder.
Install the holder with the "UP" mark facing upwards.
Install the axle holder nuts but do not tighten at this time.

NOTE

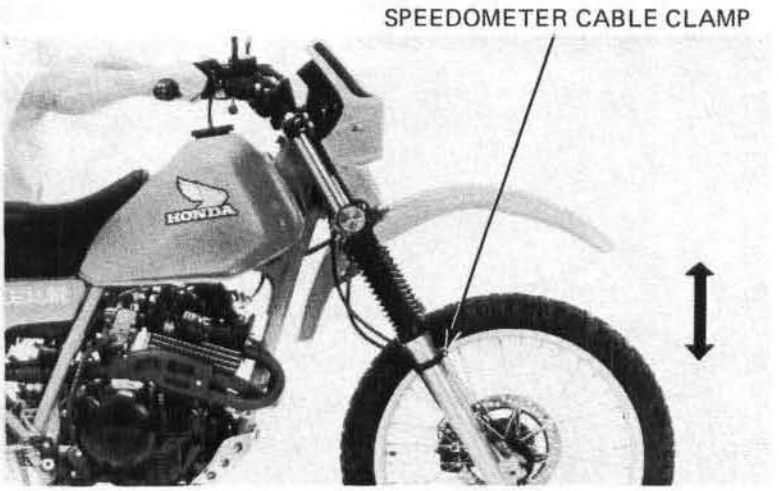
> Set the tang on the gearbox under the boss on the left front fork.

Tighten the axle to the specified torque.

TORQUE: 50–80 N·m
(5.0–8.0 kg-m, 36–58 ft-lb)



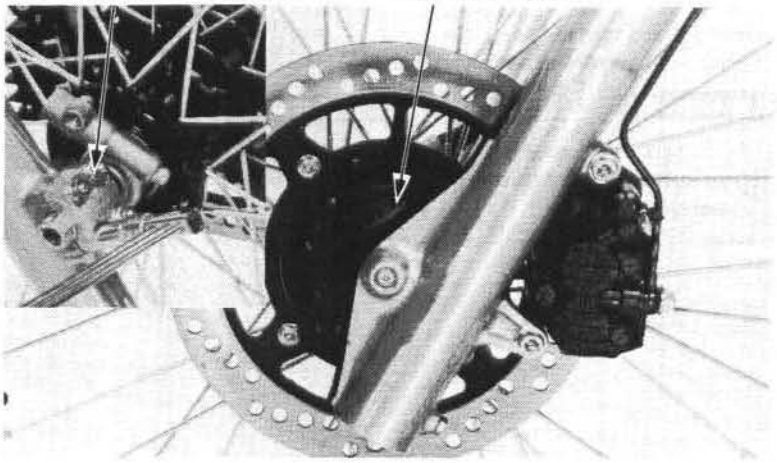
With the front brake applied, pump the front forks up and down several times to seat the axle and check front brake operation.
Tighten the speedometer cable clamp screw.



Tighten the axle holder nut; the upper nuts first, then the lower nuts.

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

Install the front fork guard.
Connect the speedometer cable.

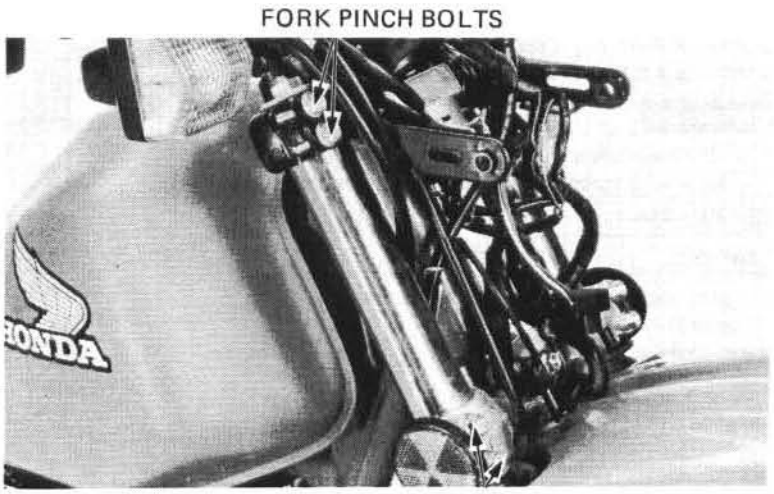


FRONT FORK

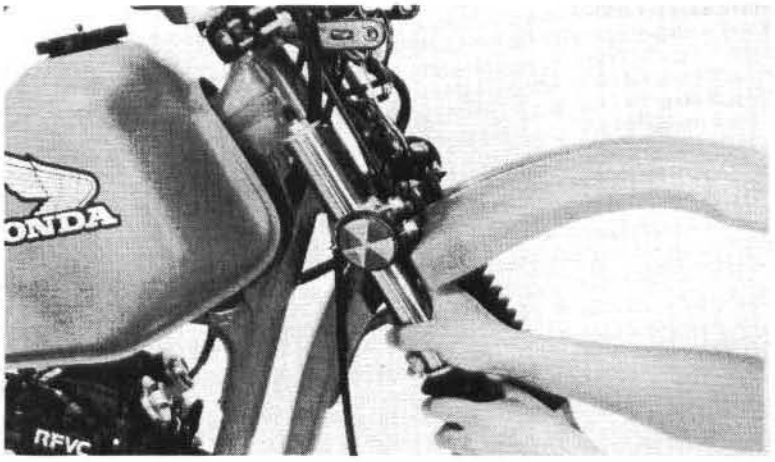
REMOVAL

Remove the front wheel (Page 12-6).
Remove the headlight (Page 18-5).
Loosen the fork boot clamp screw.

Remove the speedometer cable from the clamp on the right fork.
Remove the brake caliper bracket bolts and hose clamp bolt from the left fork (Page 14-5).
Remove the brake hose from the brake hose clamp.
Loosen the upper and lower fork pinch bolts.



Remove the front forks.
Remove the fork boot.

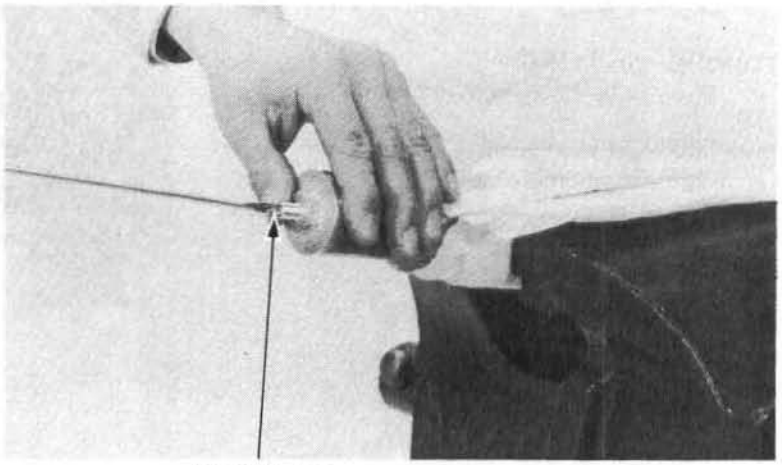


DISASSEMBLY

Remove the air valve cap.
Release the air from each fork tube.

WARNING

Be sure to release front fork air pressure before disassembling to prevent parts from becoming projectiles.



AIR VALVE

Hold the tube in a vise with soft jaws or a shop towel, avoiding the sliding surface.
Remove the fork cap bolt.

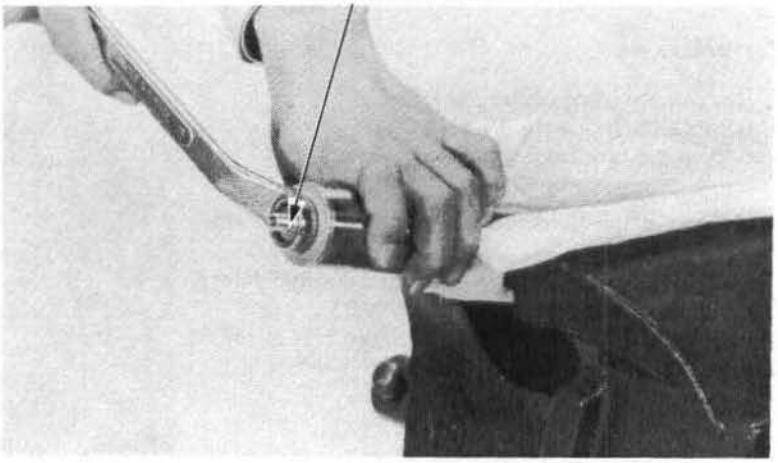
WARNING

The cap bolts are under spring pressure. Use care when removing and wear eye and face protection.

CAUTION

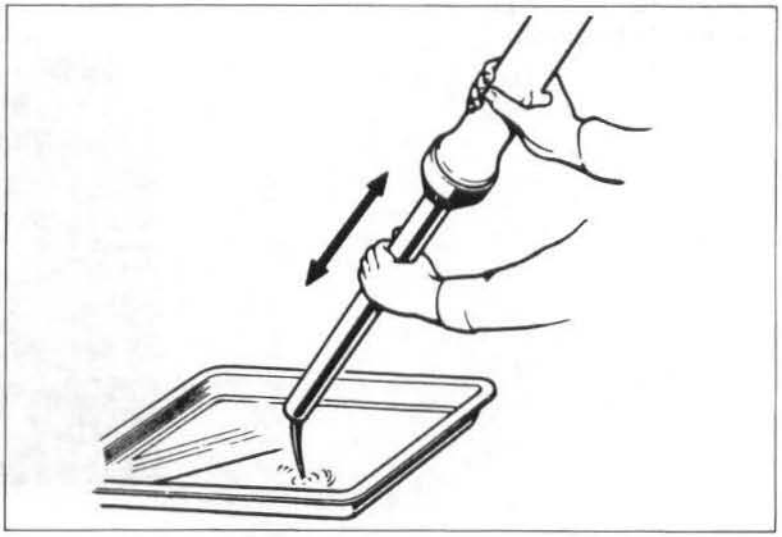
Do not damage or bend the fork tube sliding surface.

FORK CAP BOLT



Remove the fork spring, seat washer and spacer.

Pour out any remaining fork fluid by pumping the fork several times.

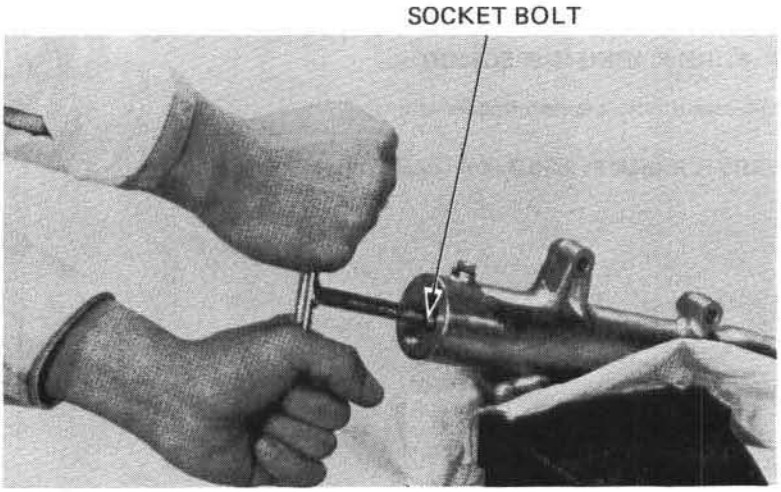


Hold the fork slider in a vise with soft jaws or a shop towel.
Remove the bottom socket bolt.

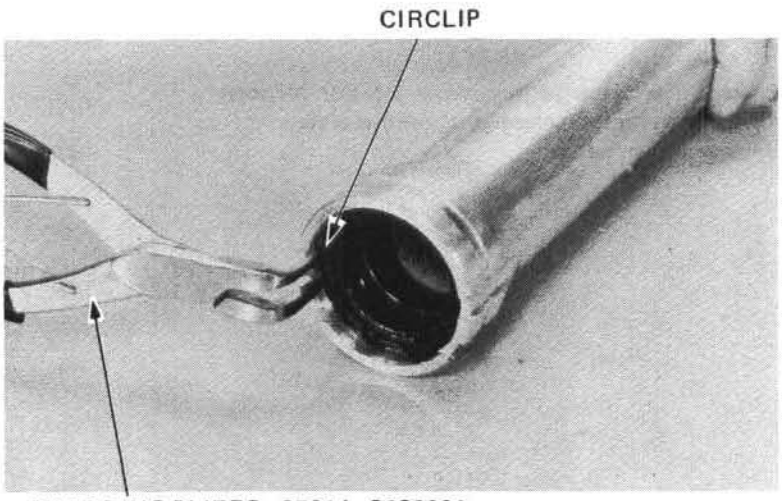
CAUTION

Do not distort the fork slider in a vise.

Remove the piston and rebound spring, then separate the slider and fork tube.



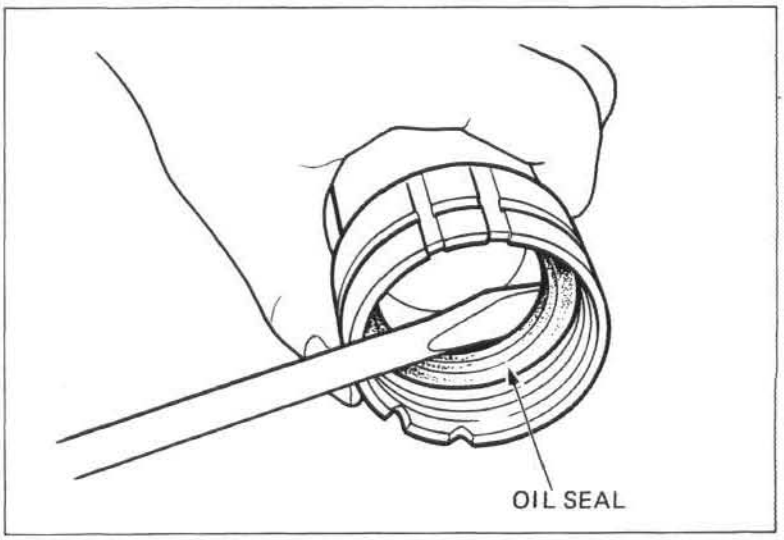
'84:
Remove the dust seal, foam washer, plastic washer and circlip.
After '84:
Remove the dust seal and circlip.



Remove the oil seal and back-up ring.

NOTE

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

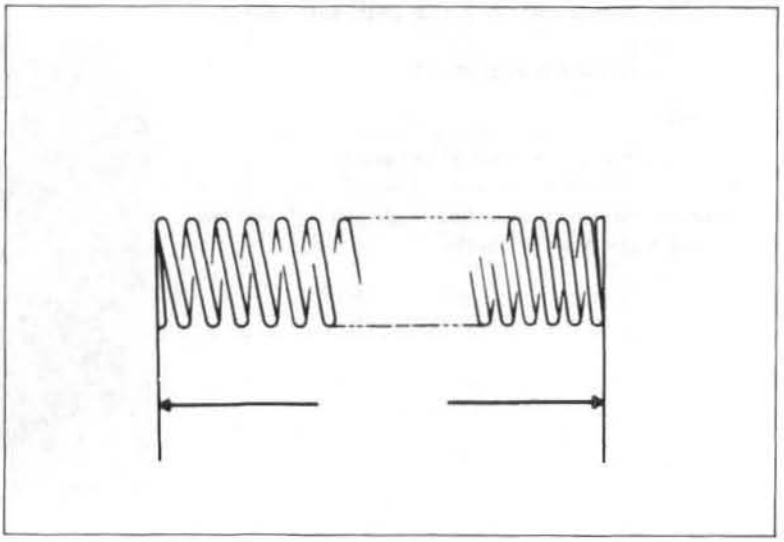


INSPECTION

- **FORK SPRING INSPECTION**

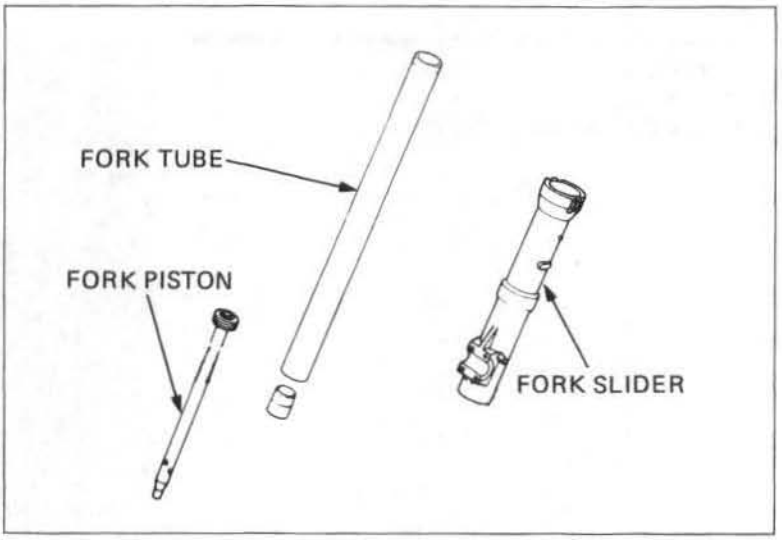
Measure the fork spring free length.

SERVICE LIMIT: 565.7 mm (22.27 in)



- **FORK TUBE/FORK PISTON/SLIDER**

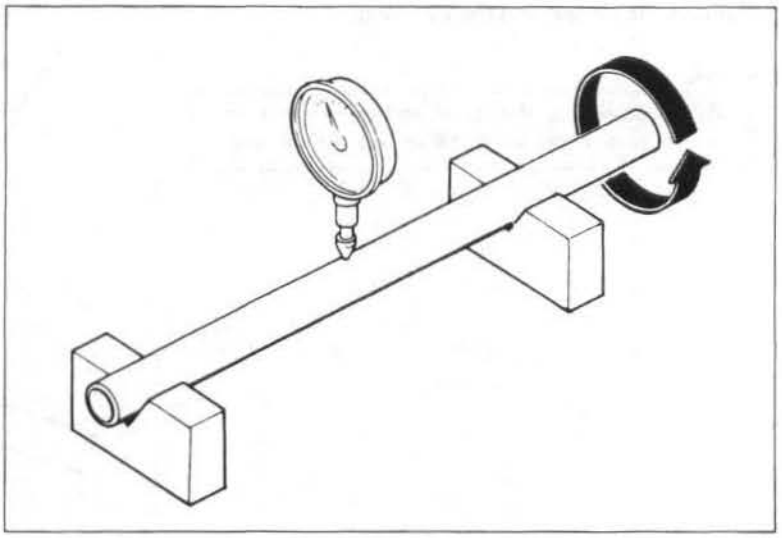
Check the fork tube, fork slider and piston for score marks, scratches, excessive or abnormal wear. Replace if necessary.



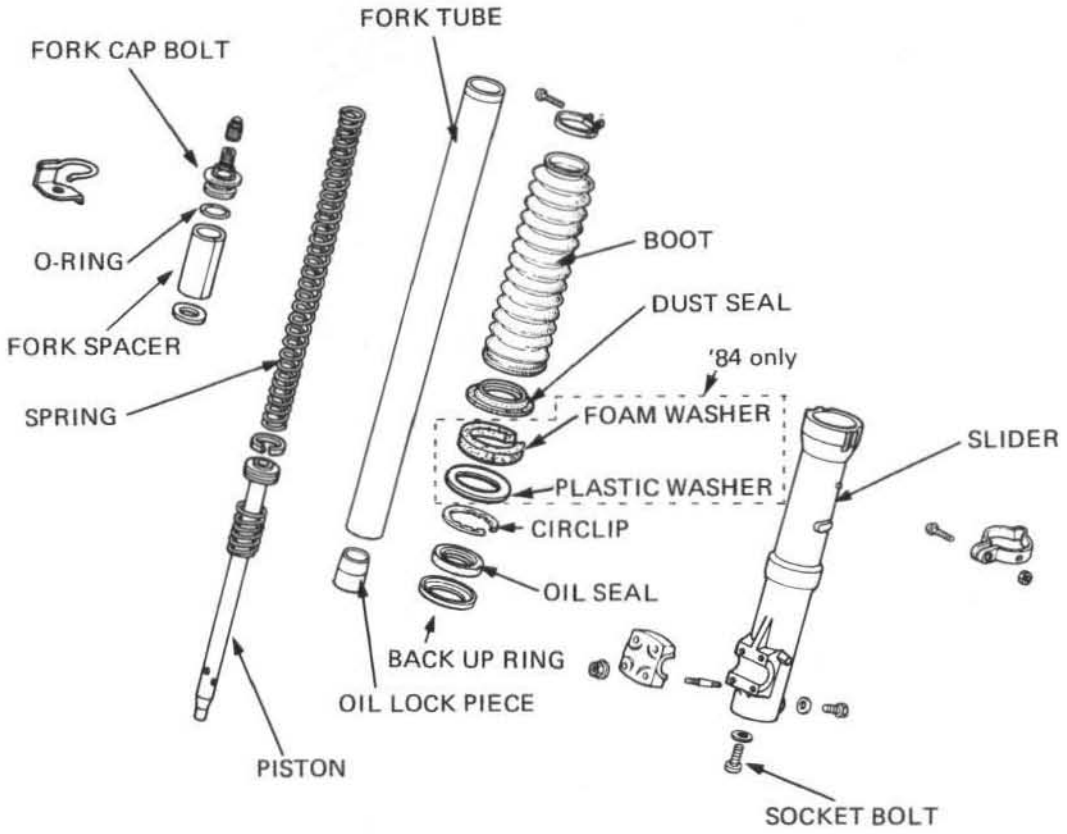
Set the fork tube on V blocks and measure the runout.

The actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



ASSEMBLY

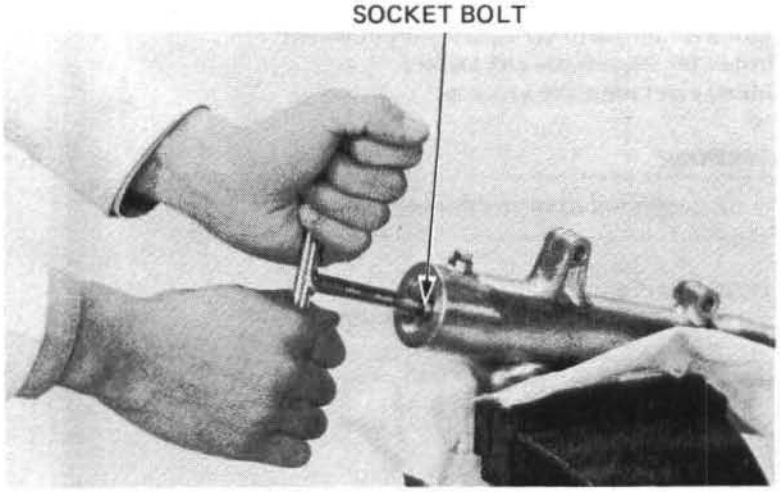


Install the rebound spring on the fork piston, then insert it in the fork tube.
Install the oil lock piece and fork tube in the fork slider.
Place the fork slider in a vise with soft jaws or a shop towel.
Apply a locking agent to the socket bolt threads and torque the bottom socket bolt.

NOTE

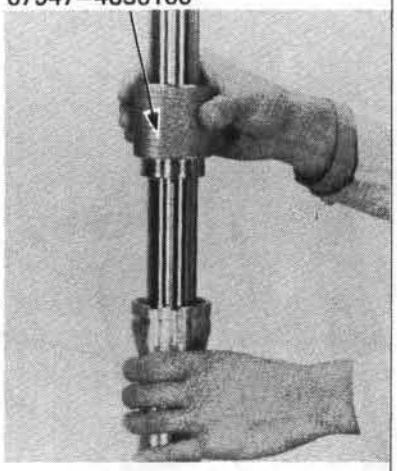
> Temporarily install the fork springs, seat washer, spacer and fork tube cap to tighten the socket bolt.

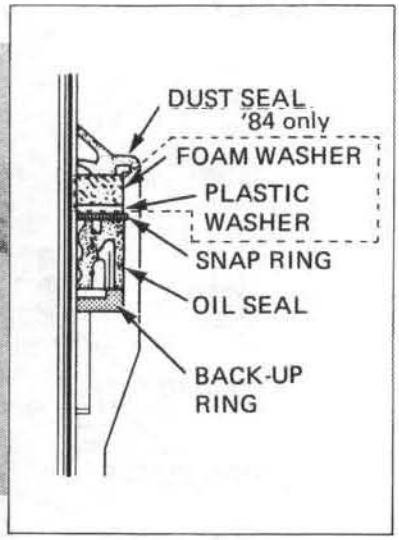
TORQUE: 15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)



Install the back-up ring.
Coat a new oil seal with ATF.
Wrap the fork tube groove or top edge with vinyl tape to prevent damage to the oil seal lip during installation.
Install the oil seal with the seal marking facing up.
Drive the seal in with the seal driver.

FORK SEAL DRIVER
07947–4630100





Install the circlip into groove of the slider with sharp edge facing upward.
Install the plastic washer, foam washer and dust seal.

Install the dust seal.
Pour in the specified amount of ATF.

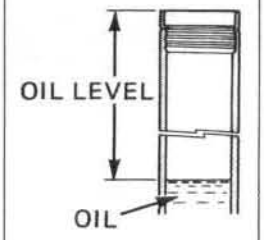
SPECIFIED FLUID: ATF
CAPACITY: 411 cc (14.0 oz)

Compress the front fork and measure the oil level from the top of the tube.

NOTE

> Be sure the oil level is the same in both fork tubes.

STANDARD OIL LEVEL: 184 mm (7.2 in)

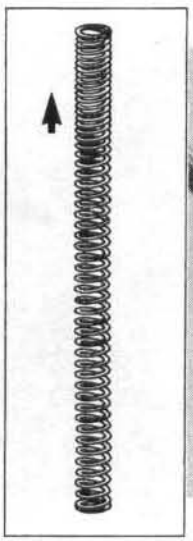


Wipe the fork spring clean, and install it in the fork tube with the narrowly spaced coils upward.
Install the seat washer and spacer.
Install and torque the fork cap.

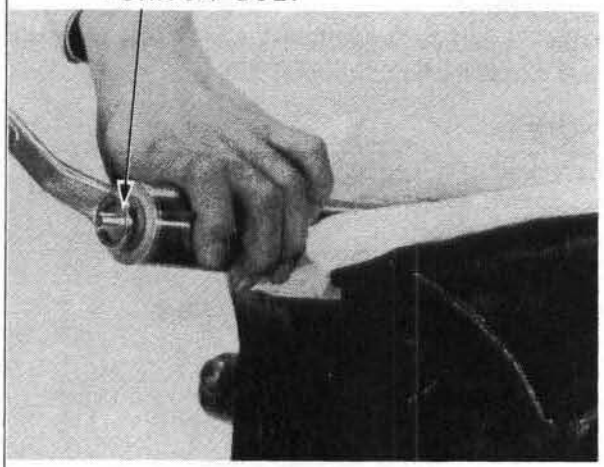
CAUTION

> *Be careful not to cross-thread the fork cap.*

TORQUE: 15–30 N·m
(1.5–3.0 kg-m, 11–22 ft-lb)

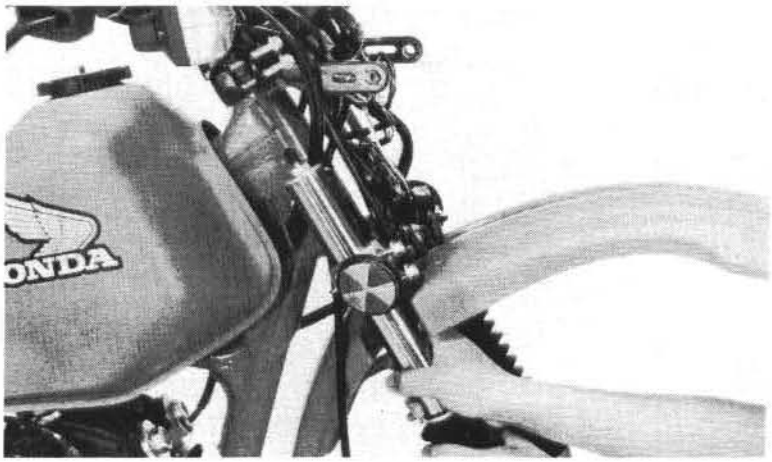


FORK CAP BOLT



INSTALLATION

Install the fork tubes through the top bridge and steering stem while rotating them by hand.
The bottom edge of the fork cap should be flush with the top of the fork bridge.



Tighten the upper and lower fork pinch bolts.

TORQUE:

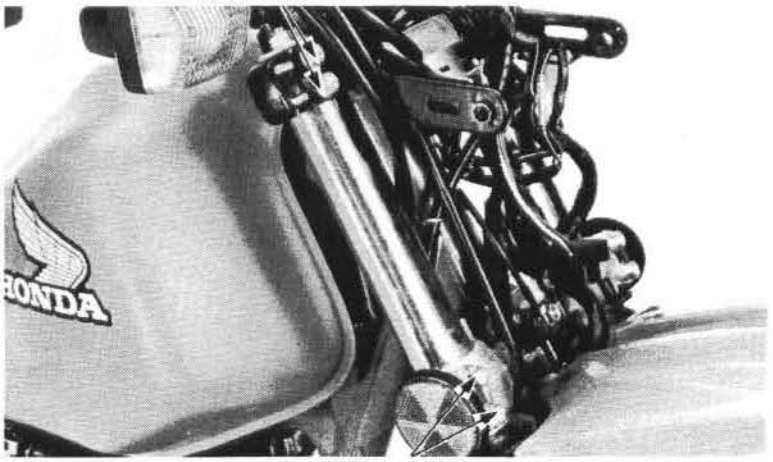
Upper pinch bolt:	**18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb)**
Lower pinch bolt:	**30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)**

Push the fork boots up until they just touch the steering stem and tighten the clamps.
Install the front wheel (Page 12-10).
Raise the front wheel off the ground by placing a box or work stand under the engine.
Add air pressure to each fork, as necessary, and re-install the air valve caps.

NOTE

Check the cable routing after installation.

UPPER FORK PINCH BOLTS



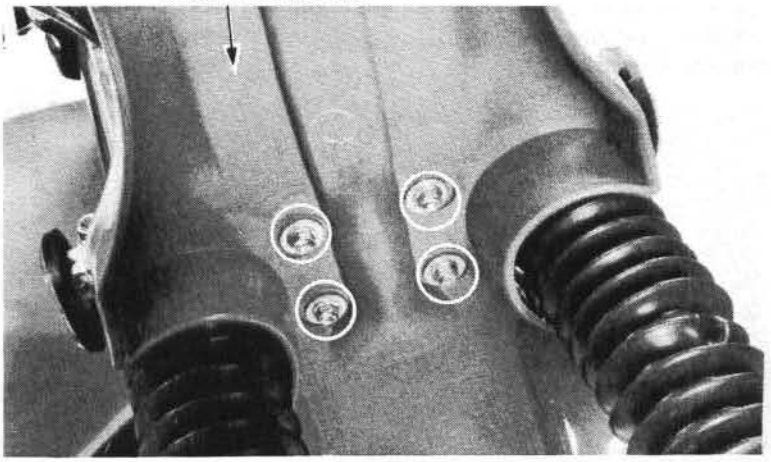
LOWER FORK PINCH BOLTS

STEERING STEM

REMOVAL

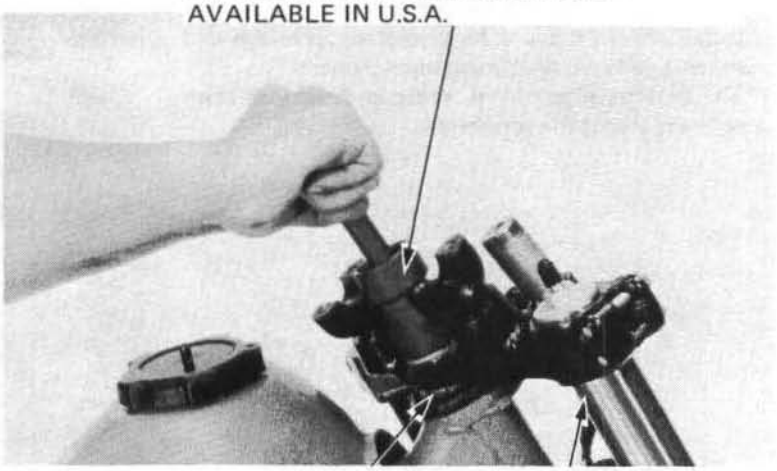
Remove the headlight (Page 18-5).
Disconnect the wires at the connectors.
Remove the following parts:
- Speedometer (Page 18-6)
- Horn
- Speedometer cable guide
- Brake hose joint bolt
- Instrument bracket
- Handlebar (Page 12-3)
- Front wheel (Page 12-6)
- Front fender

FRONT FENDER



Remove the steering stem nut.
Loosen the upper fork pinch bolts and the top bridge.
Remove the front forks by loosening the lower fork pinch bolts.

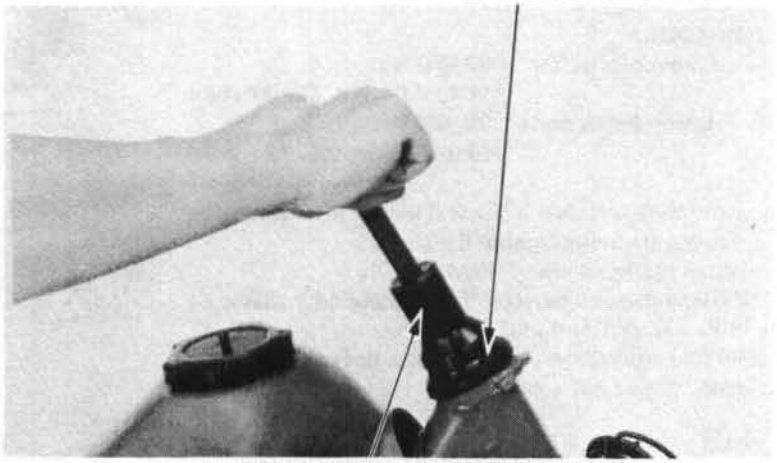
SOCKET WRENCH, 30 x 32 mm 07716–0020400
OR EQUIVALENT COMMERCIALLY
AVAILABLE IN U.S.A.



FORK BRIDGE FRONT FORK

Hold the steering stem to prevent it from falling.
Remove the steering adjustment nut.

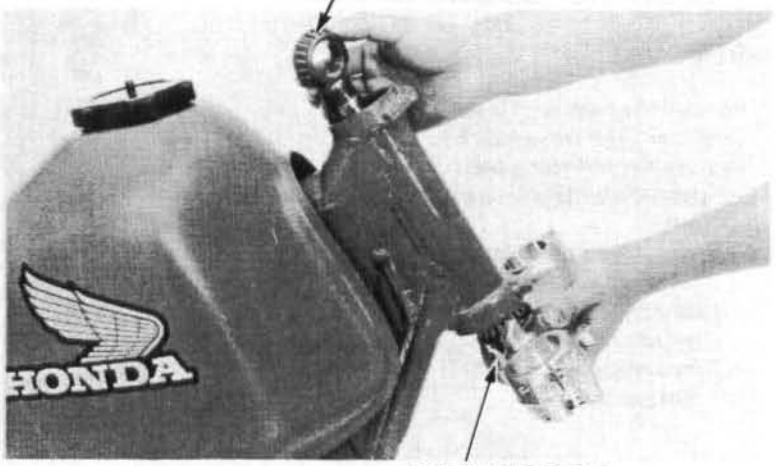
STEERING ADJUSTMENT NUT



STEERING STEM SOCKET
07916–3710100

Remove the steering stem and upper bearing.
Check the upper and lower bearings and outer race for wear or damage.
Replace if necessary.

UPPER BEARING



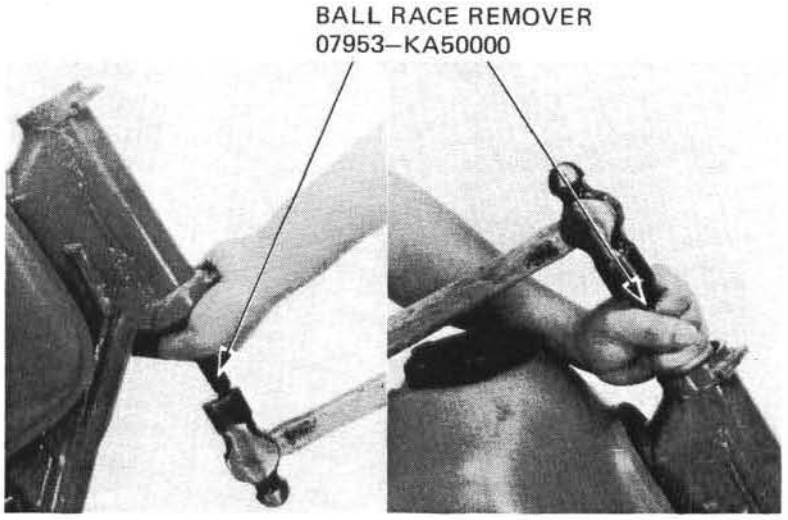
STEERING STEM

BEARING REPLACEMENT

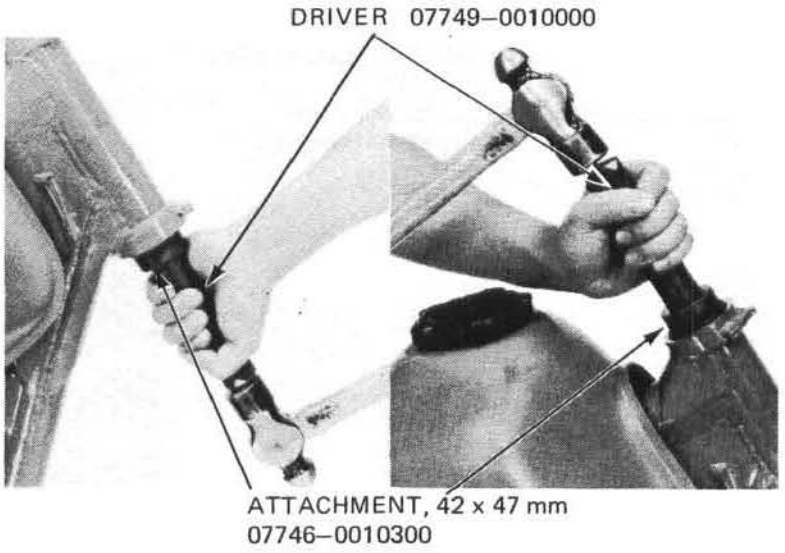
NOTE

Always replace the bearing and race as a set.

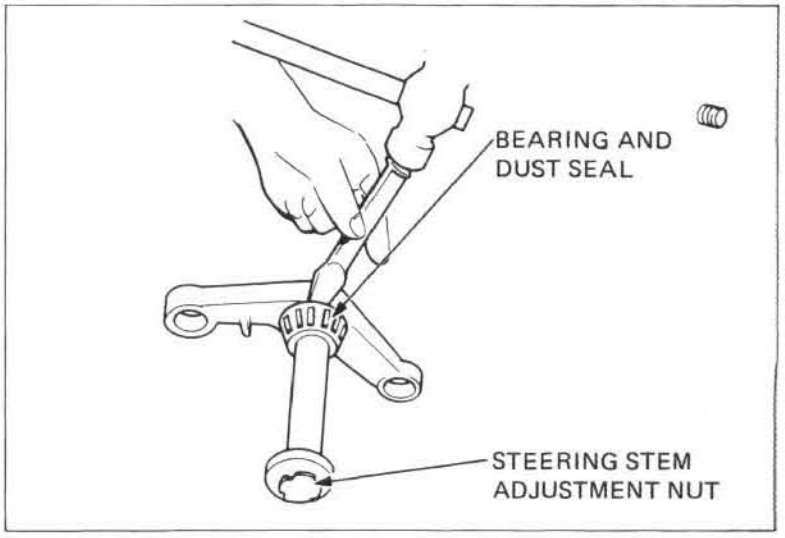
Remove the upper and lower races, using a ball race remover.



Drive in the upper and lower races, using the special tools.

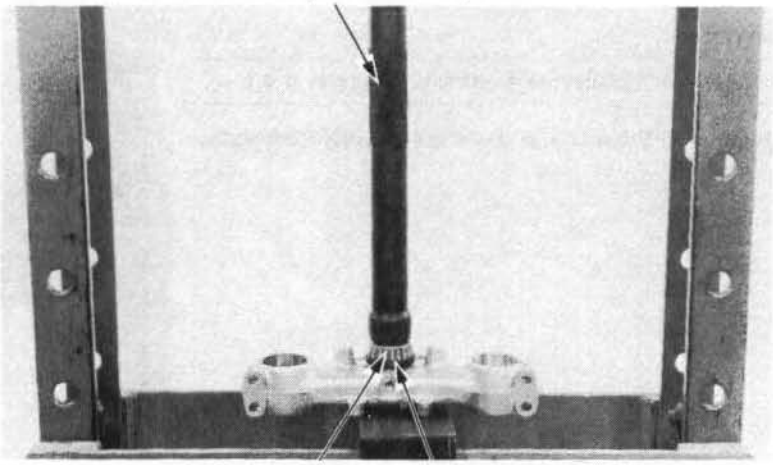


Install the bearing adjustment nut on the top end of the steering stem to prevent damage to the thread.
Remove the lower bearing and dust seal using a punch or driver.
Replace the dust seal with new one whenever it is removed.



Install the dust seal and lower tapered roller bearing using a hydraulic press and steering stem driver.

STEERING STEM DRIVER 07946–MB00000
AND GN–HT–54 (U.S.A. ONLY)



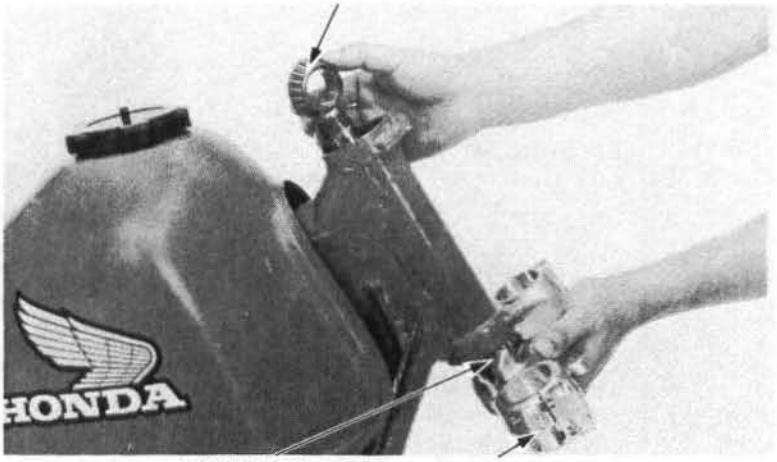
BEARING DUST SEAL

STEERING STEM INSTALLATION

Coat the upper and lower taper bearings with grease.

Install the upper bearing in the steering head.
Slide the steering stem through the steering head from the bottom.

UPPER BEARING



LOWER BEARING STEERING STEM

STEERING STEM ADJUSTMENT

Install the bearing adjustment nut and torque with the steering stem socket.

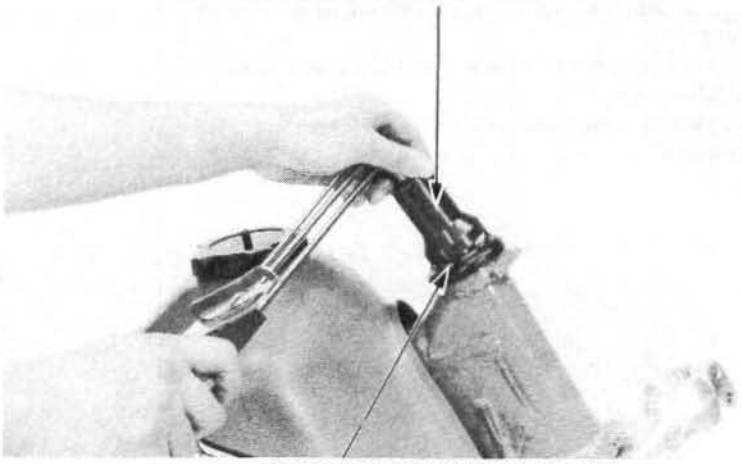
TORQUE: 1–2 N·m
(0.1–0.2 kg-m, 0.7–1.4 ft-lb)

Turn the steering stem lock-to-lock five times to seat the bearings. Repeat the bearing tightening and steering stem turning sequence twice more.

NOTE

> After each tightening and turning sequence, you should be able to turn nut slightly before reaching the specified torque.

STEERING STEM SOCKET 07916–3710100

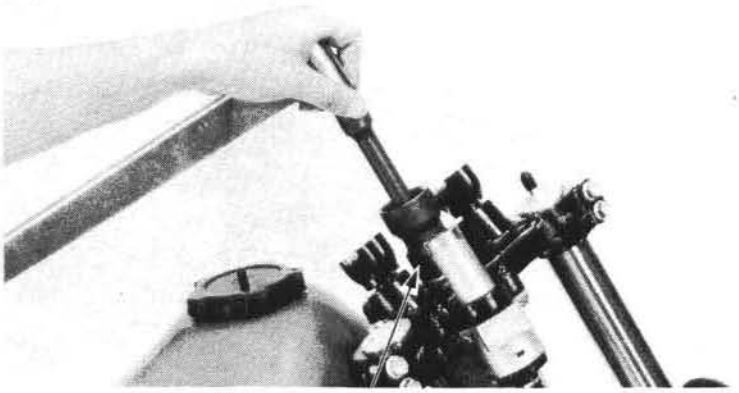


BEARING ADJUSTMENT NUT

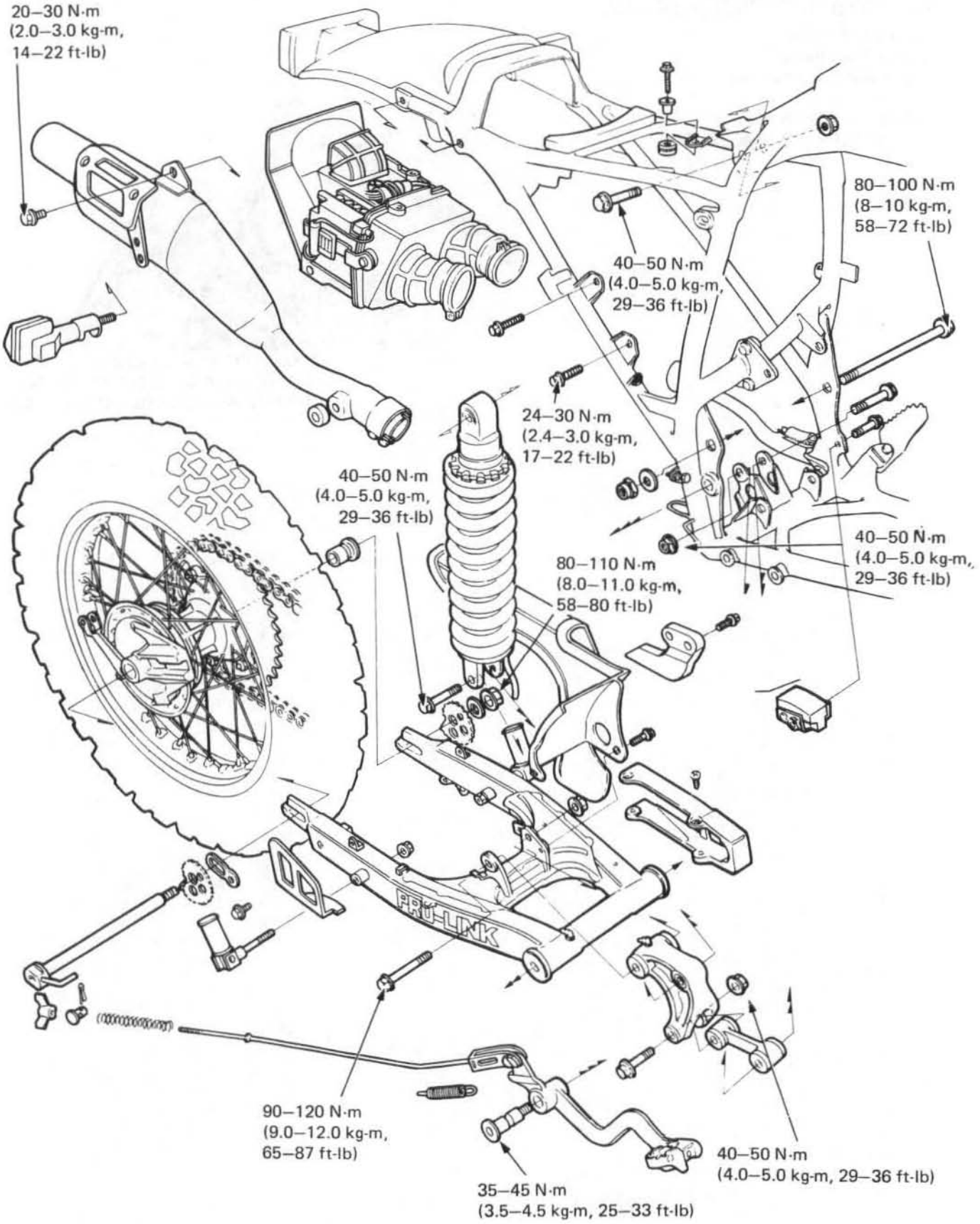
FORK TOP BRIDGE INSTALLATION

Install the fork bridge.
Install the front forks.
Tighten the steering stem nut.

TORQUE: 80–120 N·m
(8.0–12.0 kg-m, 58–87 ft-lb)



SOCKET WRENCH, 30 x 32 mm
07716–0020400 OR EQUIVALENT TOOL
COMMERCIALLY AVAILABLE IN U.S.A.



13. REAR WHEEL/BRAKE SUSPENSION

SERVICE INFORMATION

GENERAL

- A jack block is required to support the motorcycle.
- Use genuine rear suspension linkage and shock absorber pivot/mount bolts.
- Note installation direction of the bolts.

WARNING

- *The rear shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.*
- *Brake dust may contain asbestos which can be harmful to your health. Do not use compressed air to clean brake drums or brake panels. Use a vacuum with a sealed dust collector. Wear a protective face mask and thoroughly wash your hands when finished.*

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Rear shock absorber spring free length		283 mm (11.14 in)	280.2 mm (11.03 in)
Rear wheel runout	Radial	———	2.0 mm (0.08 in)
	Axial	———	2.0 mm (0.08 in)
Rear axle runout		———	0.2 mm (0.01 in)
Rear brake drum I.D.		110 mm (4.33 in)	111 mm (4.37 in)
Rear brake shoe thickness		4.0 mm (0.16 in)	2.0 mm (0.08 in)
Rear suspension damper compression		28–29 kg (62–64 lb)	28 kg (46.3 lb)

TOOLS

Special

Bearing remover set	07936–3710000	or	Bearing remover, 20mm	07936–3710600 and
			Weight	07936–3710200 and
			Handle	07936–3710100

Common

Retainer wrench body	07710–0010401	Attachment, 37 x 40 mm	07746–0010200
Retainer wrench attachment	07710–0010200	Pilot, 17 mm	07746–0040400
Bearing remover expander	07746–0050100 or equivalent commercially available in U.S.A.	Attachment, 42 x 47 mm	07746–0010300
		Pilot, 20 mm	07746–0040500
		Attachment, 32 x 35 mm	07746–0010100 or 07946–3710300
Driver	07749–0010000		
Bearing remover collet, 17 mm	07746–0050500 or equivalent commercially available in U.S.A.		

TORQUE VALUES

Rear shock absorber (upper)	40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
(lower)	40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Shock arm (swingarm)	90–120 N·m (9.0–12.0 kg-m, 65–87 ft-lb)
(shock link)	40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Shock link	40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Spokes	2.5–5.0 N·m (0.25–0.5 kg-m, 1.8–3.6 ft-lb)
Final driven sprocket	24–28 N·m (2.4–2.8 kg-m, 17–20 ft-lb)
Rear axle nut	80–110 N·m (8.0–11.0 kg-m, 58–80 ft-lb)
Swing arm pivot bolt	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Right footpeg bolt	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Brake pedal pivot bolt	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Brake arm bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TROUBLESHOOTING

Wobbler or Vibration in Motorcycle

- Bent rim
- Loose wheel bearings
- Loose or bent spokes
- Damaged tire
- Axle not tightened properly
- Swing arm pivot bearing worn
- Chain adjusters not adjusted equally

Soft Suspension

- Weak spring
- Improper rear suspension spring preload
- Faulty rear damper

Hard Suspension

- Improper rear suspension spring preload
- Spring thrust sleeve binding
- Bent shock absorber rod
- Swing arm pivot bearings damaged

Suspension Noise

- Faulty rear damper
- Loose fasteners
- Worn suspension linkage pivot bushings

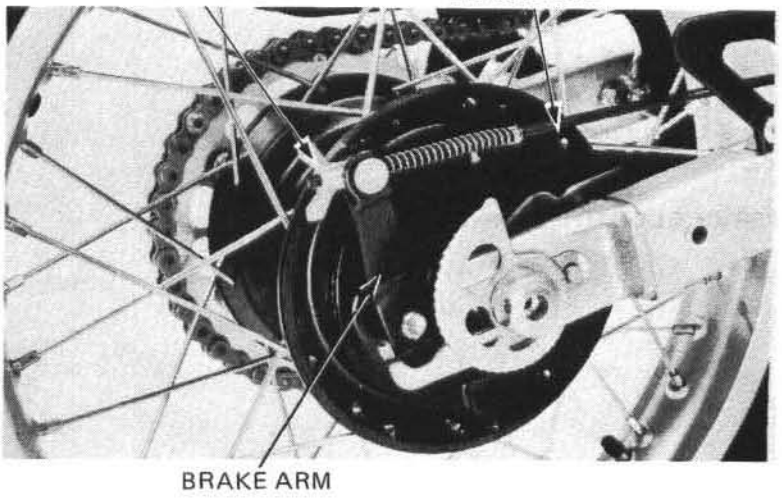
Poor Brake Performance

- Improper brake adjustment
- Worn brake shoes
- Brake linings oily, greasy or dirty
- Worn brake cam
- Worn brake drum
- Brake arm serrations improperly engaged
- Brake shoes worn at cam contact area

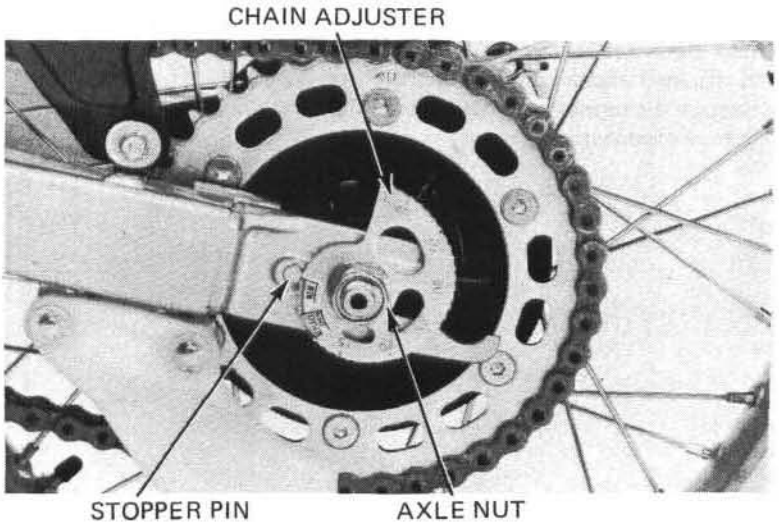
REAR WHEEL

REAR WHEEL REMOVAL

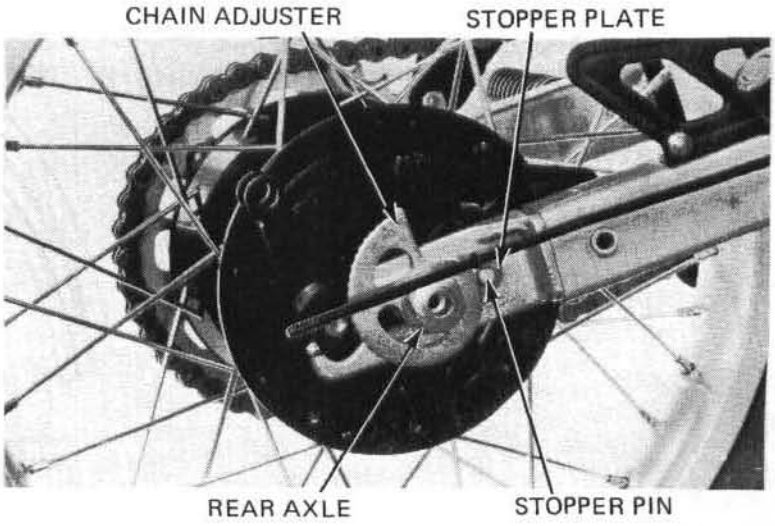
Raise the rear wheel off the ground by placing a box or workstand under the engine.
Remove the adjusting nut from the brake rod.



Loosen the rear axle nut.
Rotate the chain adjusters and move the wheel forward.



Detail the drive chain from the driven sprocket.
Lift the stopper plate clear of the pin on the swing arm's right side.
Remove the rear wheel with the rear axle.
Remove the rear axle, adjusters, stopper plate and brake panel from the wheel.

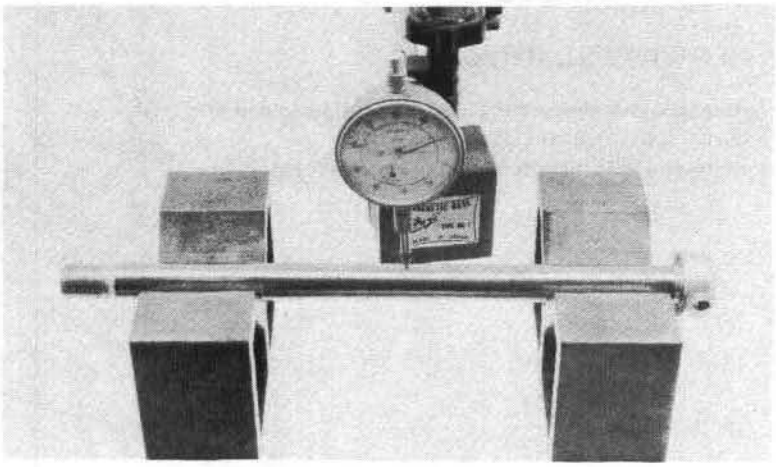


INSPECTION

AXLE

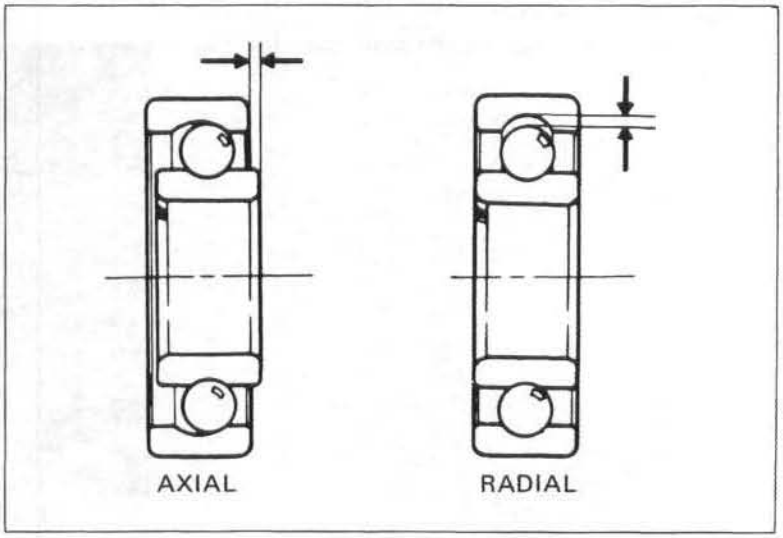
Remove the axle from the rear wheel.
Set the axle on V blocks and measure the runout. The actual runout if 1/2 of the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



REAR WHEEL BEARING

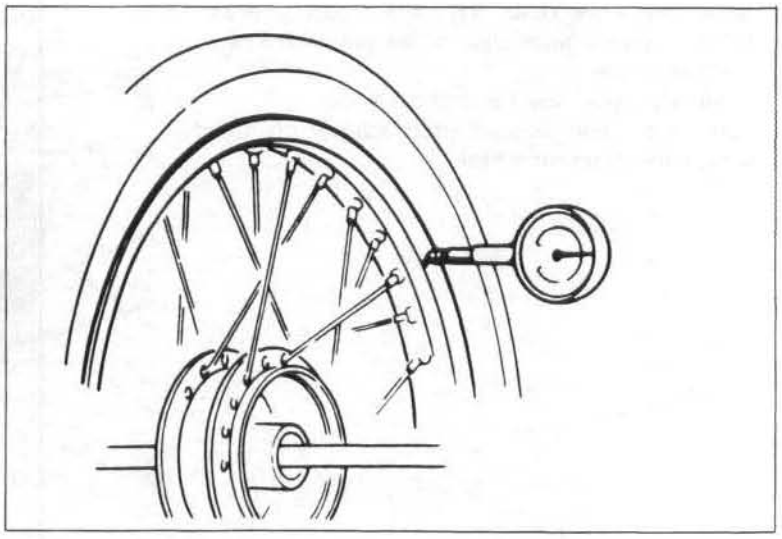
Check the wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.



REAR WHEEL RIM RUNOUT

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)

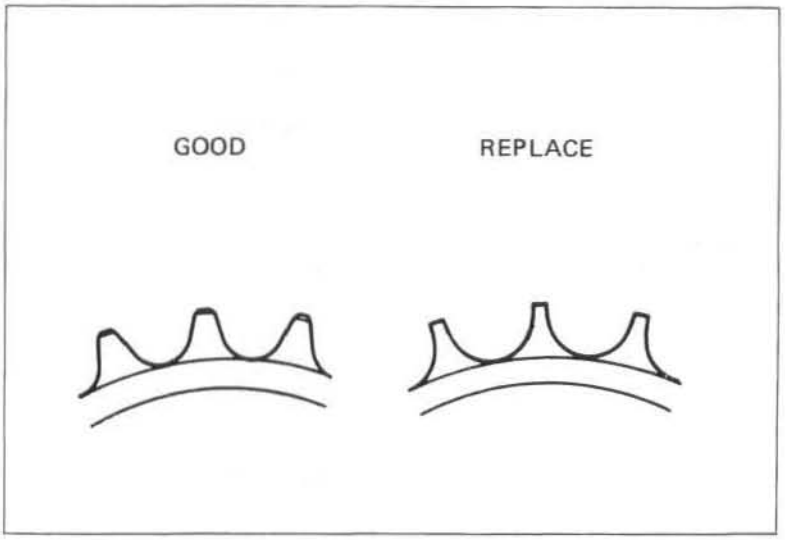


FINAL DRIVEN SPROCKET

Check the condition of the final driven sprocket teeth.
Replace the sprocket if worn or damaged.

NOTE

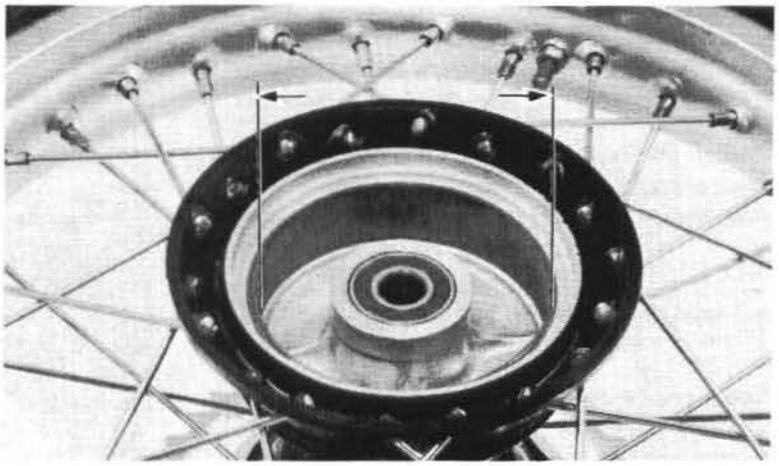
> The drive chain and drive sprocket must also be inspected if the driven sprocket is worn or damaged. Never install a new drive chain on worn sprockets or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the new replacement chain or sprockets will wear rapidly.



REAR BRAKE DRUM I.D.

Measure the rear brake drum I.D.

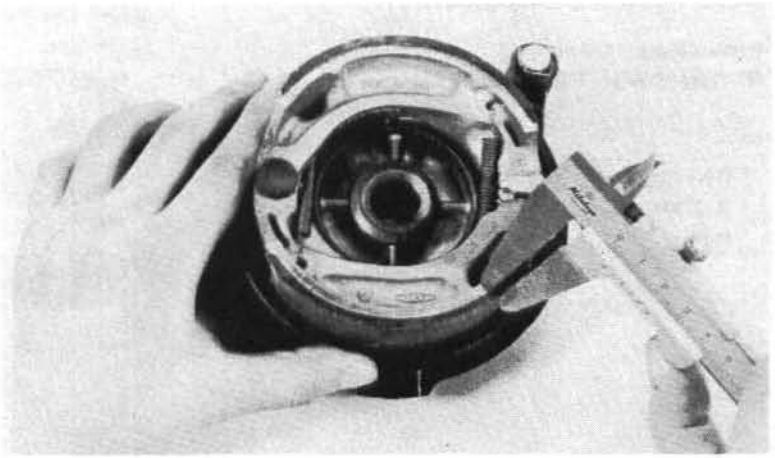
SERVICE LIMIT: 111 mm (4.37 in)



BRAKE LINING

Measure the rear brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)



REAR BRAKE SHOE REPLACEMENT

Remove the brake shoes and springs from the brake panel.
Remove the brake arm and then slide the brake cam out of the brake panel.
Clean all parts thoroughly.

WARNING

Brake dust contains asbestos which can be harmful to your health. Do not use compressed air to clean the brake panel. Use a vacuum with a sealed dust collector while wearing a protective face mask. Be sure to thoroughly wash your hands when finished.

Apply grease to the shaft of the brake cam and install it into the brake panel.
Apply a thin coat of grease to the face of the brake cam and to the anchor pin.

WARNING

Grease on the brake linings will reduce stopping power.
Keep grease off of the brake linings. Wipe excess grease off of the cam and anchor pin.

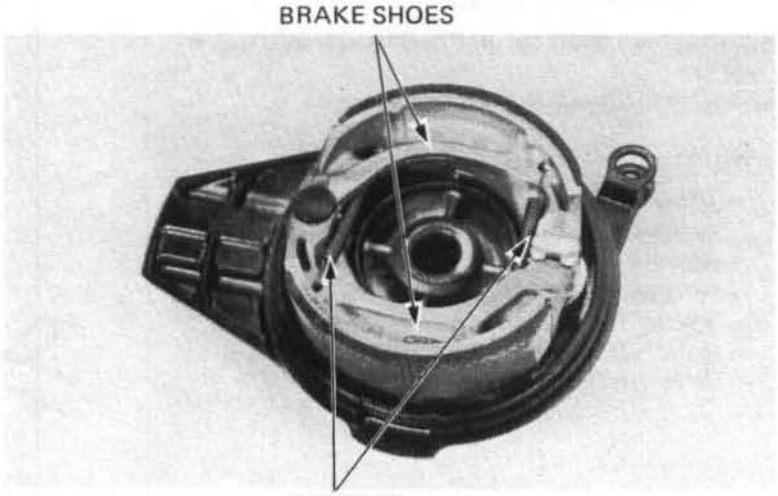
Install the new brake shoes along with the brake shoe springs.
Install the wear indicator plate onto the brake cam.

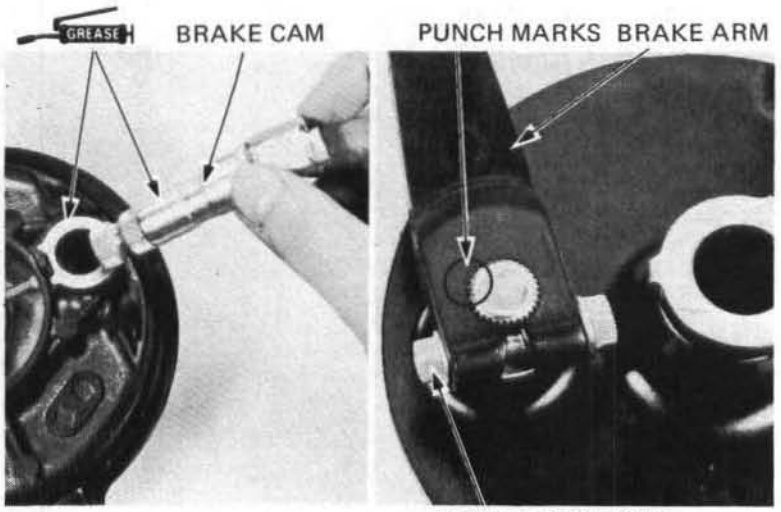
NOTE

Align the indicator tab with the cut-out in the brake camshaft.

Install the brake arm aligning the punch mark with the punch mark on the brake cam.
Torque the brake arm bolt.

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



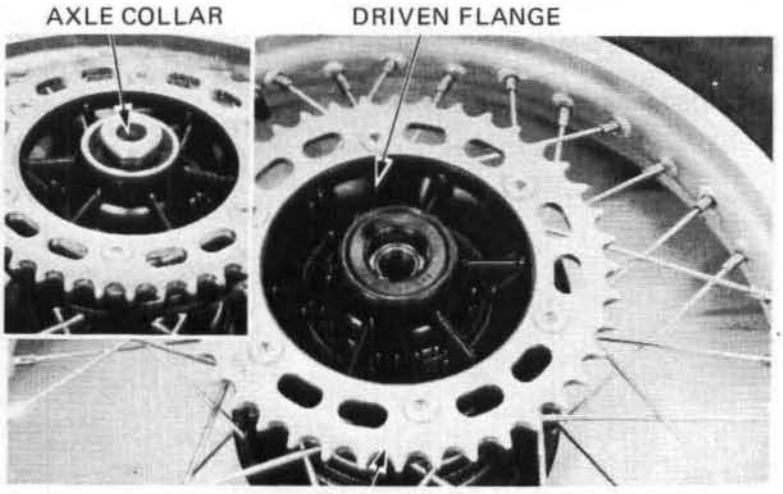


REAR WHEEL DISASSEMBLY

Remove the axle collar.
Remove the final driven flange.

NOTE

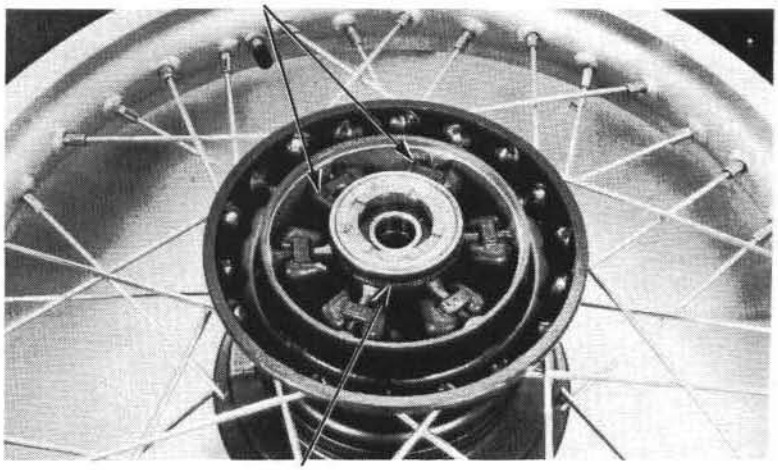
When removing the driven sprocket, loosen the sprocket bolt with the driven flange installed.



Replace the damper rubbers if they are damaged or deteriorated.

Remove the O-ring.

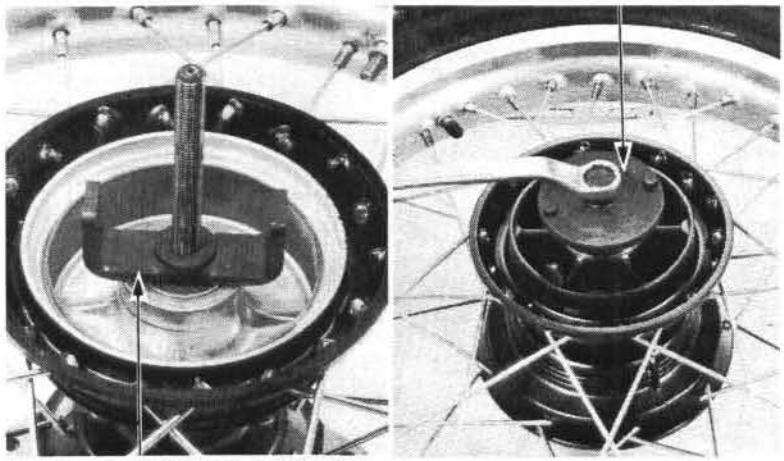
DAMPER RUBBERS



O-RING

Install the retainer wrench and remove the retainer.

RETAINER WRENCH ATTACHMENT
07710–0010200



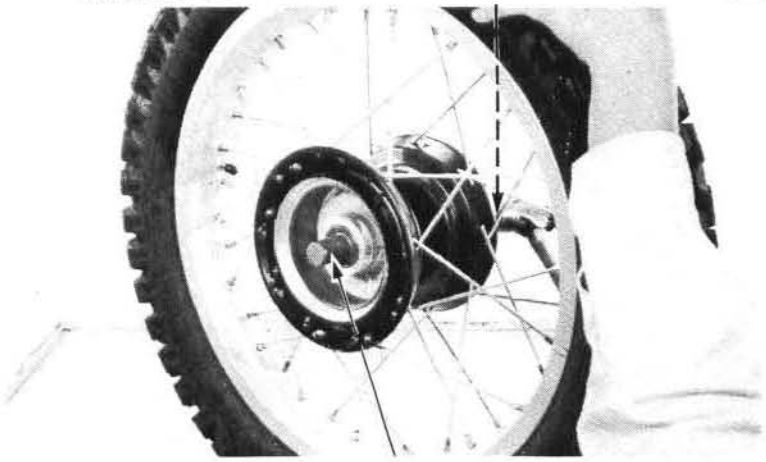
RETAINER WRENCH BODY
07710–0010401

Drive out the wheel bearings and the collar.

NOTE

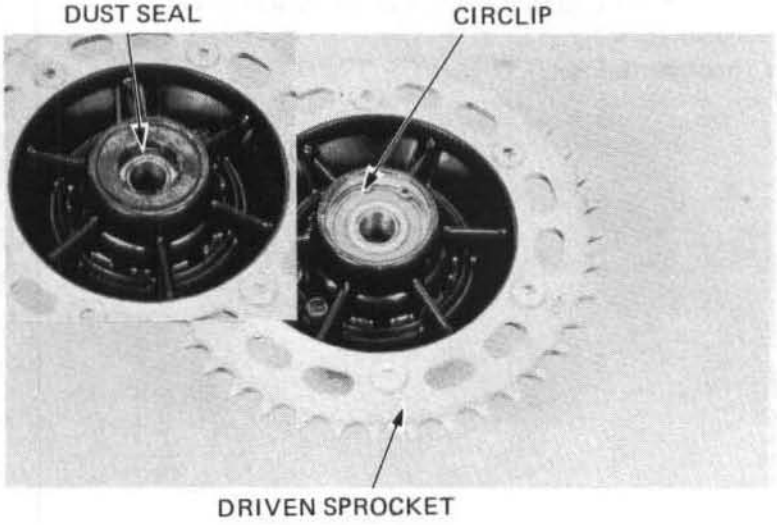
> If the bearings are removed, they should be replaced with new ones.

WHEEL BEARING REMOVER EXPANDER 07746–0050100
OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

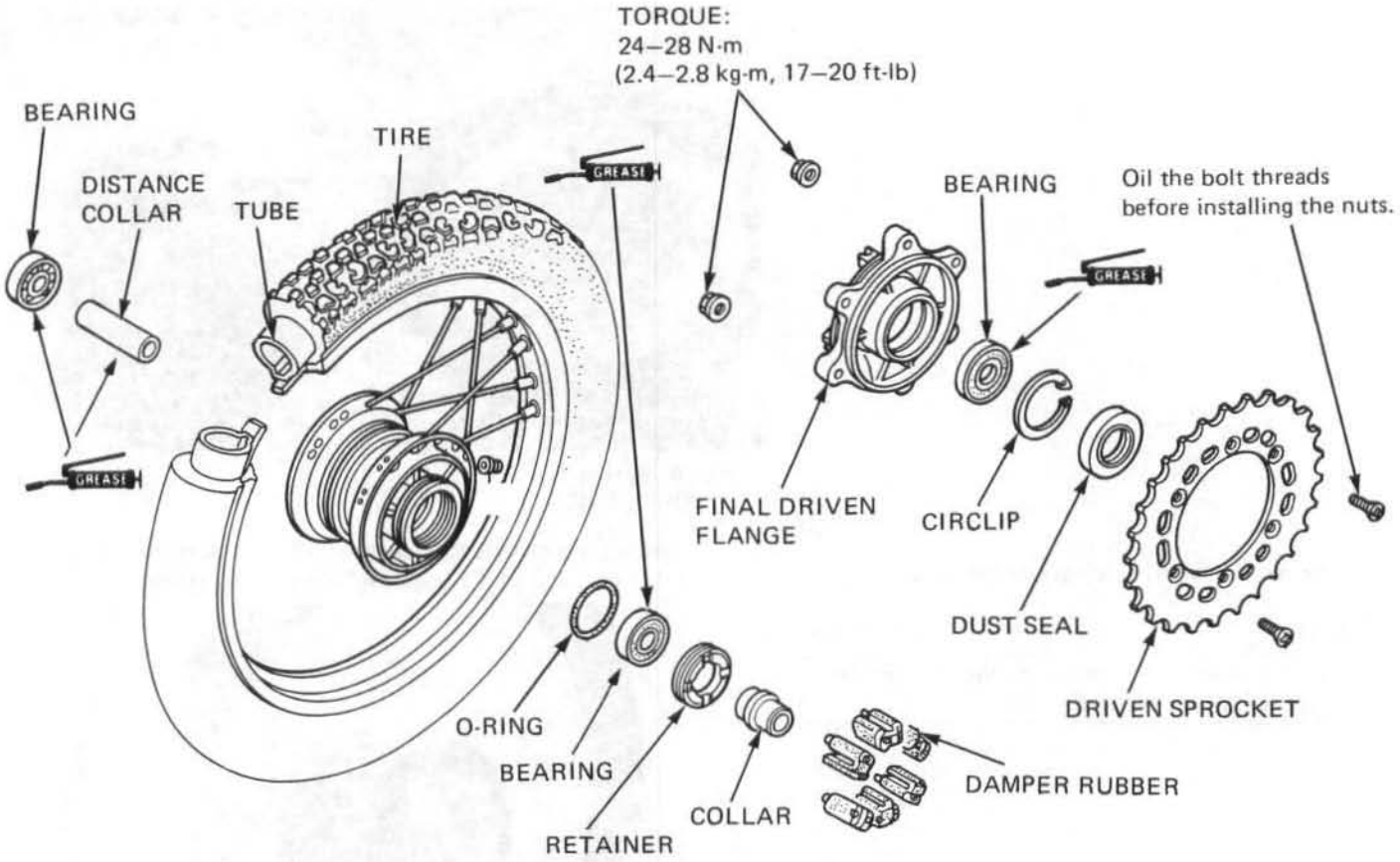


BEARING REMOVER COLLET 17 mm 07746–0050500
OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

Remove the dust seal.
Remove the circlip.
Remove the collar and bearing.
Remove the driven sprocket.



REAR WHEEL ASSEMBLY



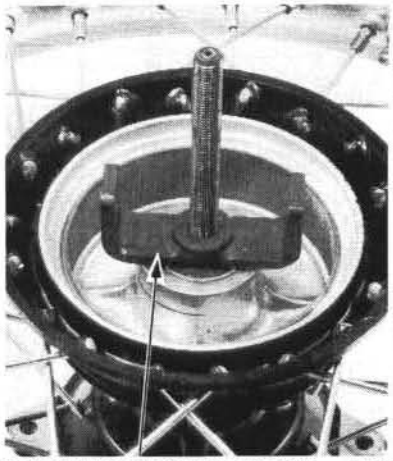
Pack the bearing cavities with grease.
Drive in the left bearing with the sealed side of the bearing facing out, away from the center of the hub. Be careful not to tilt the bearing while driving it into the hub and to make sure that it is fully seated. Install the distance collar in the hub then drive in the right bearing with it's sealed side facing out.

WARNING

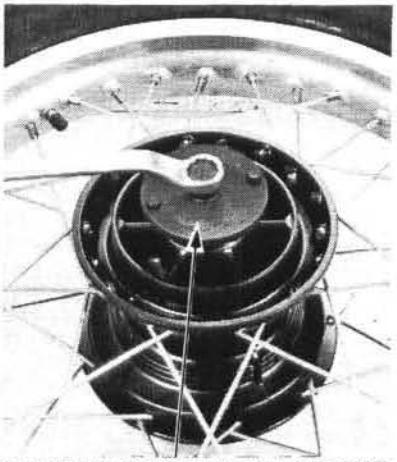
Grease on the brake drum reduces stopping power. Keep grease off the brake drum.

ATTACHMENT, 37 x 40 mm 07746–0010200
AND PILOT, 17 mm 07746–0040400

Grease and install the bearing retainer with the retainer wrench and body.



RETAINER WRENCH BODY
07710–0010401



RETAINER WRENCH ATTACHMENT
07710–0010200

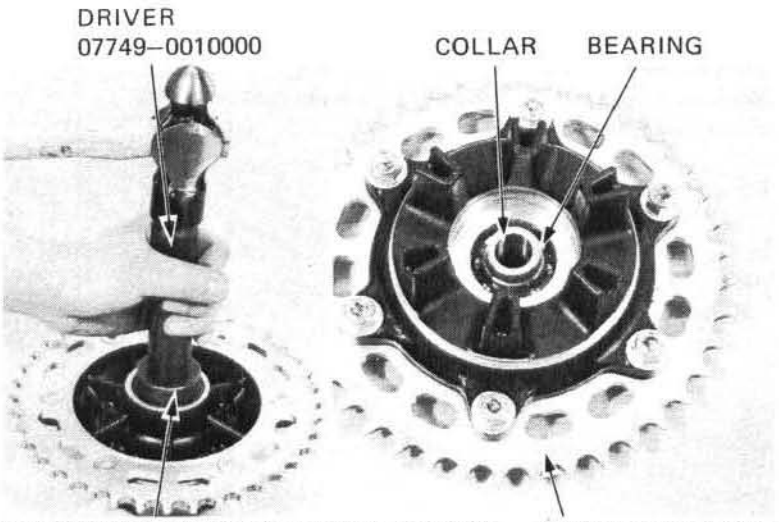
Install the driven sprocket on the driven flange.

TORQUE: 24–28 N·m
(2.4–2.8 kg-m, 17–20 ft-lb)

NOTE

Oil the threads of the sprocket bolts before installing the nuts.

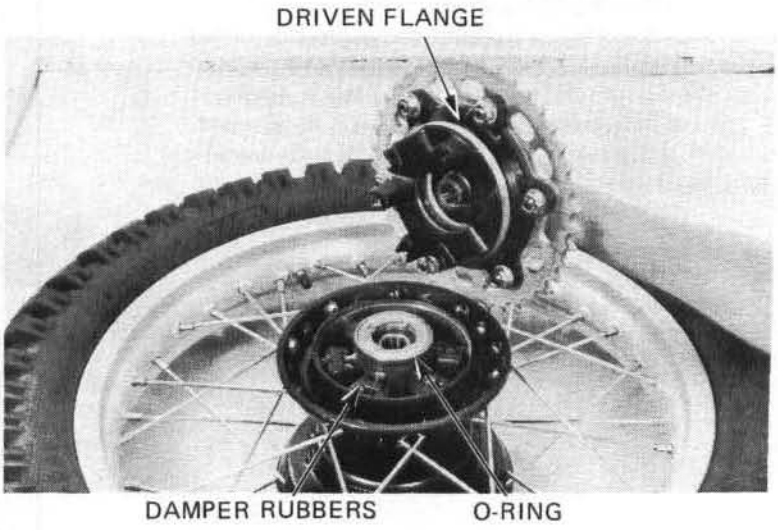
Install the bearing, circlip, and dust seal.
Install the axle collar.



ATTACHMENT, 42 x 47 mm 07746–0010300
AND PILOT, 20 mm 07746–0040500

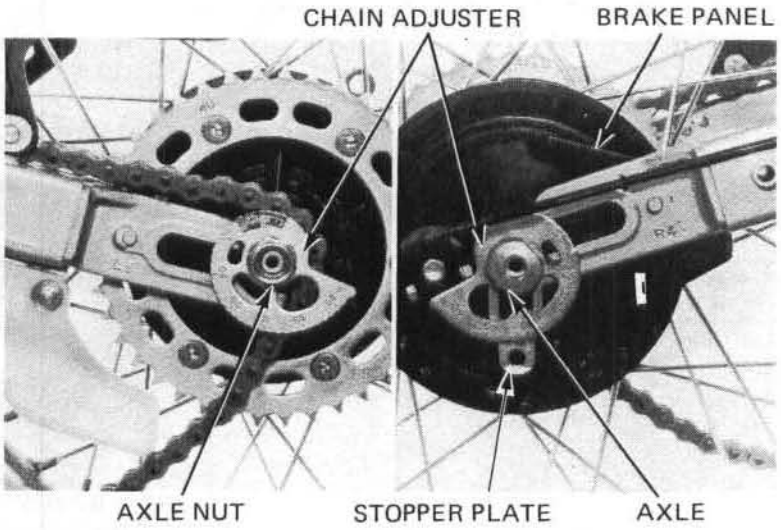
DRIVEN SPROCKET

Install the damper rubbers.
Apply grease to a new O-ring and install it onto the groove of the wheel hub.
Install the driven flange.

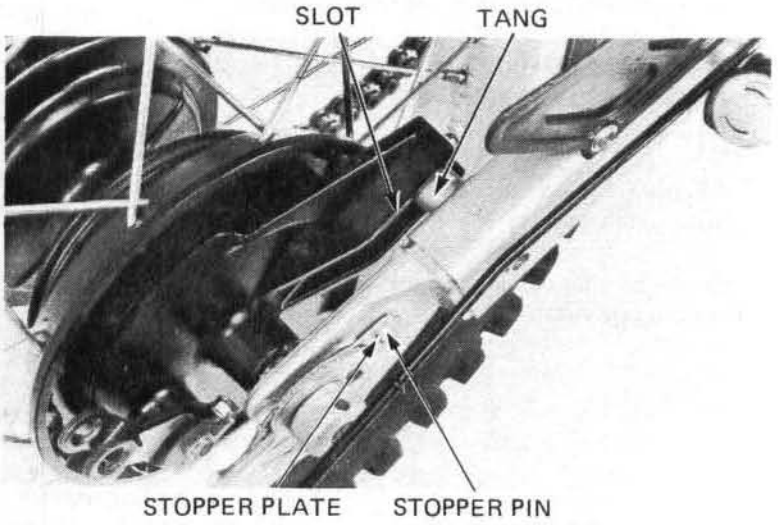


REAR WHEEL INSTALLATION

Install the brake panel, chain adjusters, stopper plate and rear axle to the rear wheel.
Place the rear wheel into the swing arm locating the tang on the swing arm.



Place the slot of the brake panel over the tang of the swing arm.
Set the stopper plate in place by aligning the hole of the stopper plate with the stopper pin.

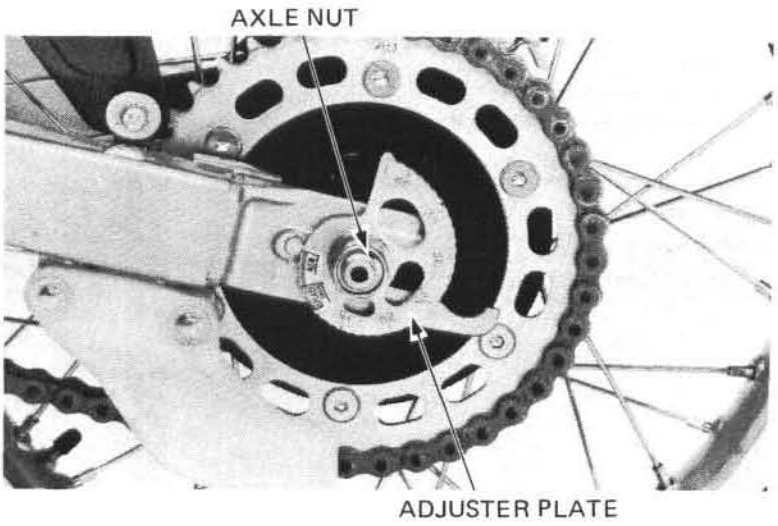


Run the chain over the final driven sprocket.

Adjust the drive chain by turning the adjuster plates (left and right) to the same index mark on both sides (Page 3-10).

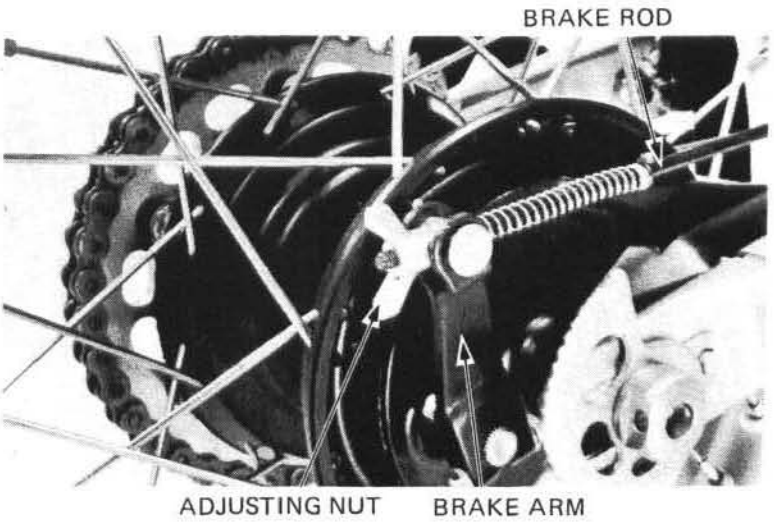
Tighten the axle nut.

TORQUE: 80–110 N·m
(8.0–11.0 kg-m, 58–80 ft-lb)



Connect the brake rod to the brake arm.

Adjust the brake pedal free play (Page 3-14).



SHOCK ABSORBER

REMOVAL

Raise the rear wheel off the ground by placing a jack or block under the engine.
Remove the seat and fuel tank.

Remove the side covers.
Remove the air cleaner case (Page 4-14).

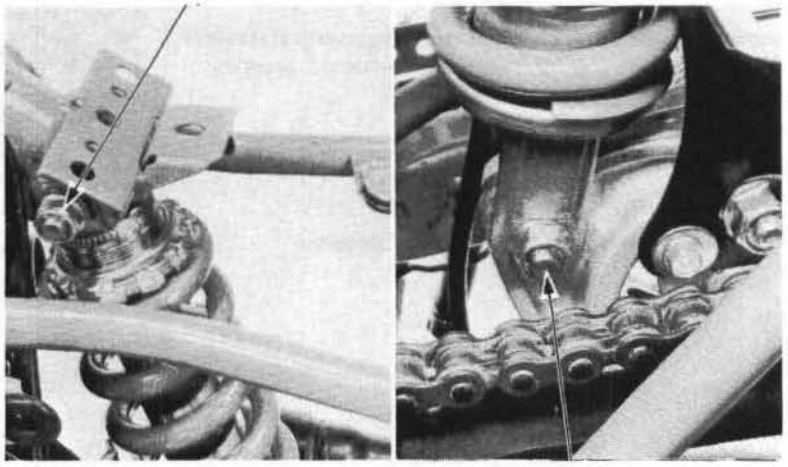
NOTE

> Seat the carburetor inlet with tape or clean cloth to keep dirt and debris from entering the intake tract.

Remove the shock absorber upper mouting bolt. Lift the shock absorber from the upper frame mount.
Raise the rear wheel until the lower mounting bolt can be removed, and hold the rear wheel in this position.
Remove the lower mounting bolt and remove the shock absorber.

CAUTION

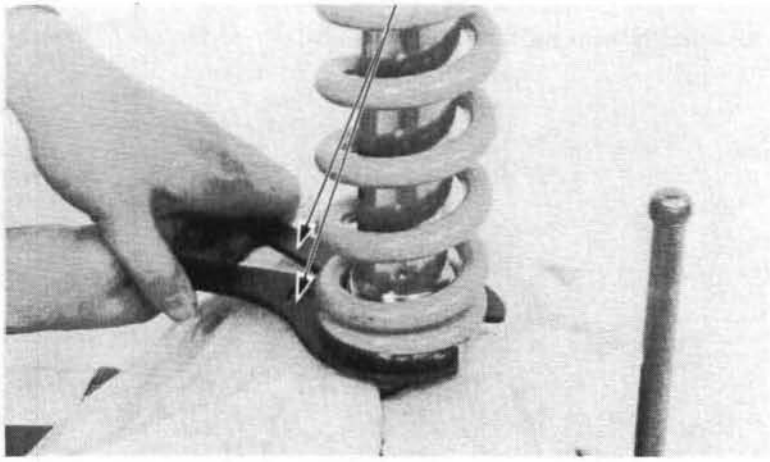
Do not let the rear wheel fall.



DISASSEMBLY

Hold the upper mount of the shock in a vise with soft jaws or a shop towel.
Loosen the lock nut and remove the lock nut, adjusting nut and spring from the damper.

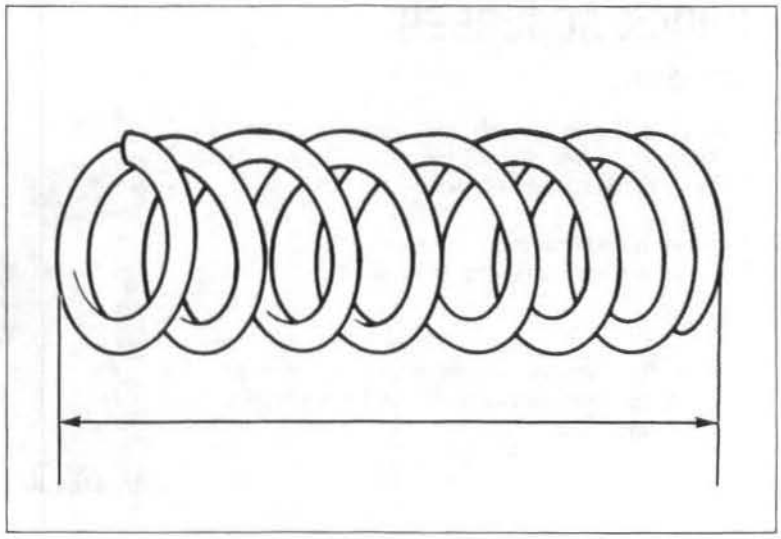
PIN SPANNERS 89201–KA4–810
89202–KA4–810



SHOCK ABSORBER SPRING INSPECTION

Measure the spring free length.

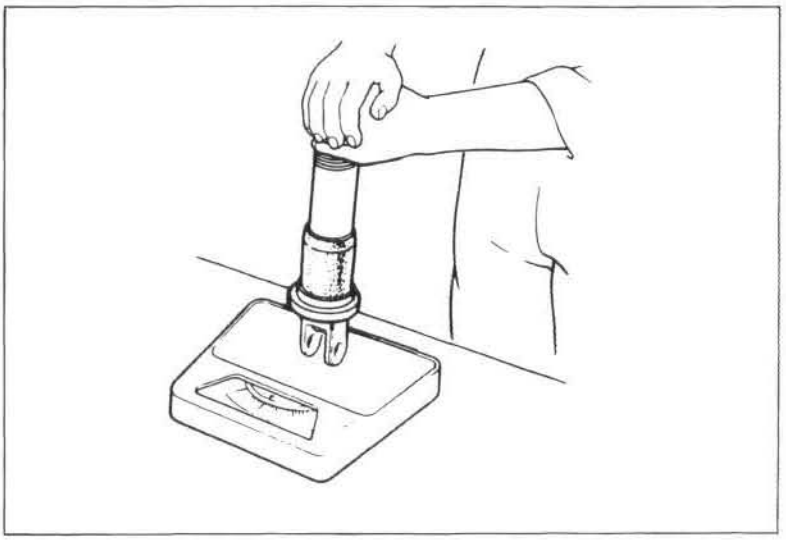
SERVICE LIMIT: 280.2 mm (11.03 in)



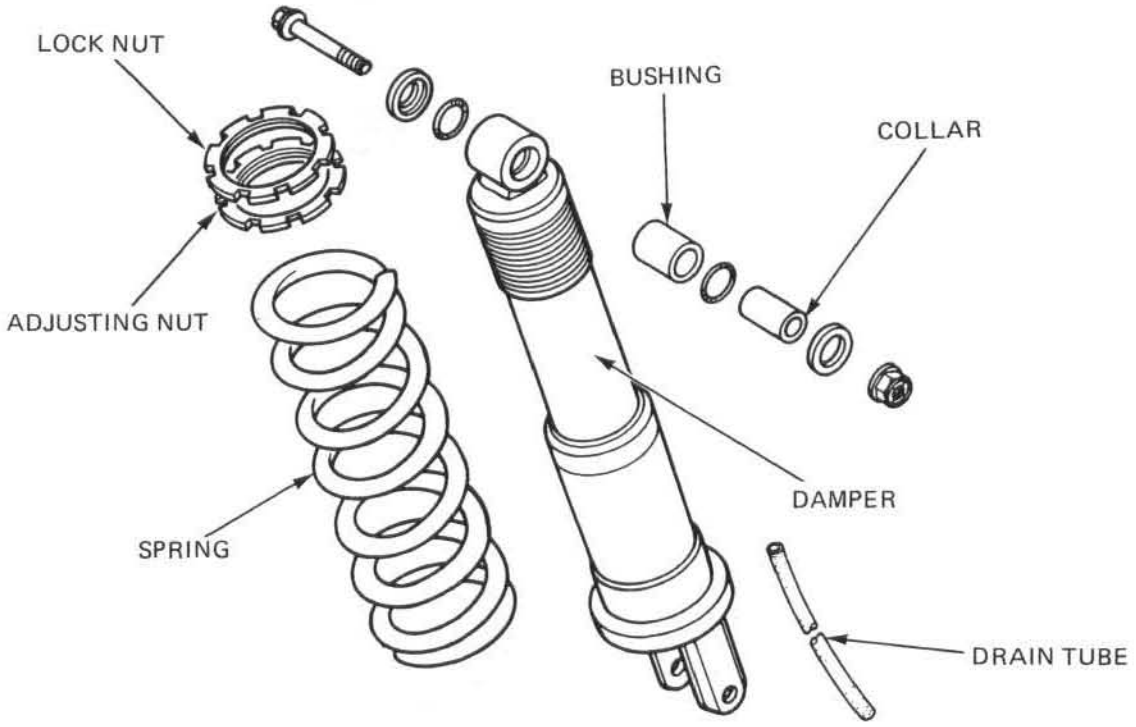
Visually inspect the damper unit for dents, oil leaks or other faults. Replace the damper unit if necessary.
Place the damper rod on a scale and measure the force required to compress the damper 10 mm (0.4 in).

COMPRESSION FORCE: 28–29 kg (62–64 lb)

If the force required is less than 28 kg (62 lb), gas is leaking. Examine the damper rod and replace the damper until if it is bent or scored.



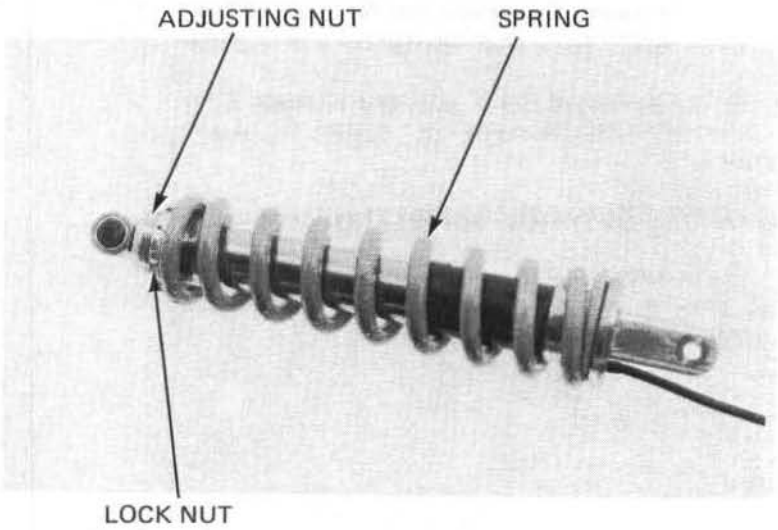
ASSEMBLY



Install the spring, adjusting nut and lock nut.
Align the upper and lower shock absorber mounts.

NOTE

Install the rear shock absorber with the index mark for the damping adjuster facing the rear.



Measure the spring's length.
Turn the adjusting nut to obtain the standard spring length.

STANDARD SPRING LENGTH: 272.6 mm (10.73 in)

NOTE

One turn equals 1.5 mm (0.06 in) of spring length.

To increase spring preload; tighten the adjusting nut to shorten the spring length up to 5 mm (1/4 in) and tighten the lock nut.

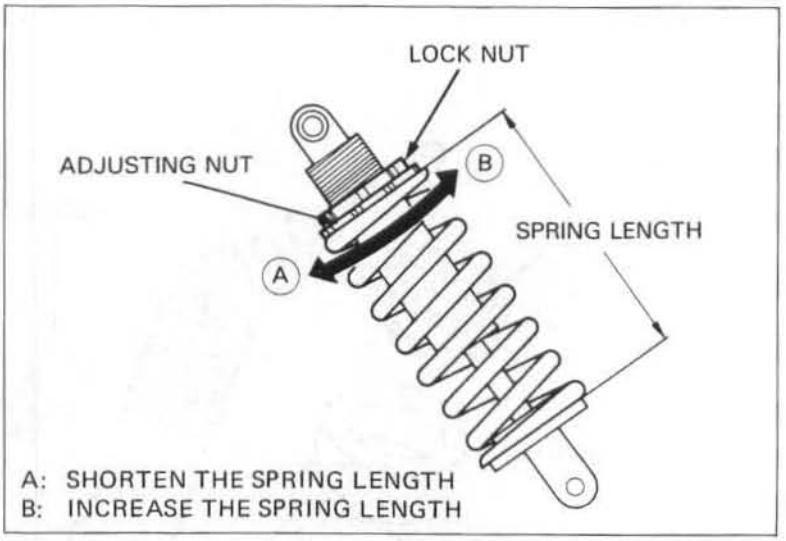
CAUTION

Do not shorten the spring more than 5 mm (1/4 in) from standard spring length, or damage to the spring could result.

To reduce spring preload; loosen the adjusting nut to increase spring length 5 mm (1/4 in) and tighten the lock nut.

CAUTION

Do not ride the motorcycle without the spring having preload. Loss of rider control could result.

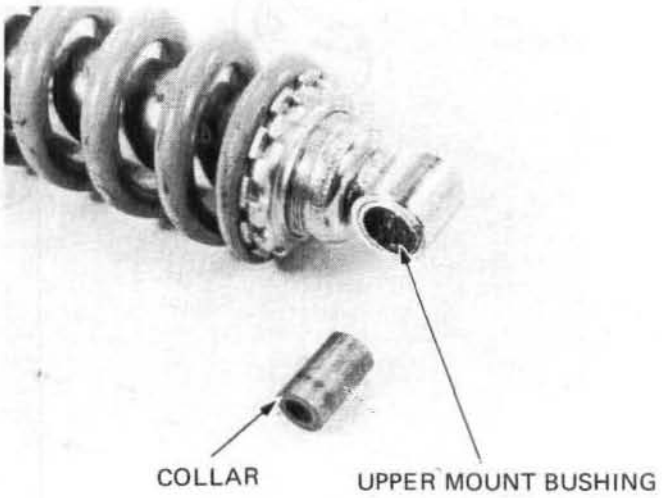


Apply MoS_2 paste grease to the upper mount bushing before installation.

NOTE

Some sources of paste grease with 40% or more molybdenum are:
- Molykote G-n Paste manufactured by Dow Corning, U.S.A.
- Locol Paste manufactured by Sumico Lubricant, Japan.
- Bel-Ray Moly-Lube NIC-8, U.S.A.

Any other manufacturer's paste grease equivalent to the above may also be used.

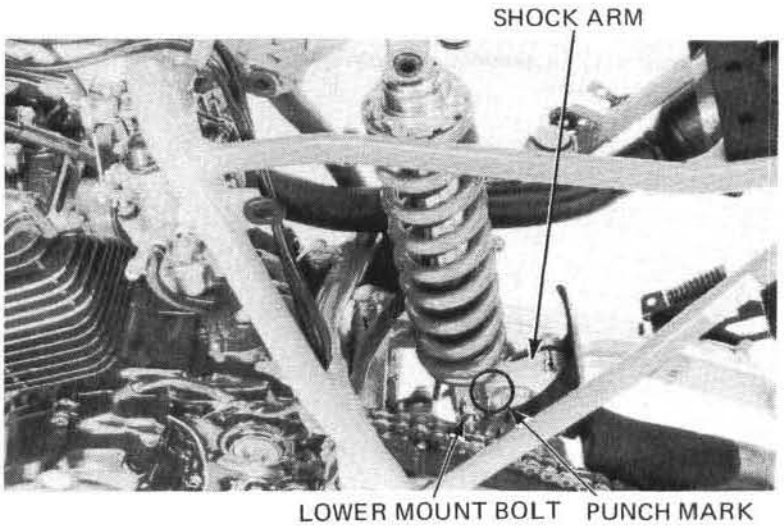


INSTALLATION

Set the shock absorber onto the shock arm.
Raise the rear wheel up until the lower mounting bolt can be installed.
Align the edge of the shock end with the punch mark on the shock arm at the left side.

Tighten the lower mount bolt to the specified torque.

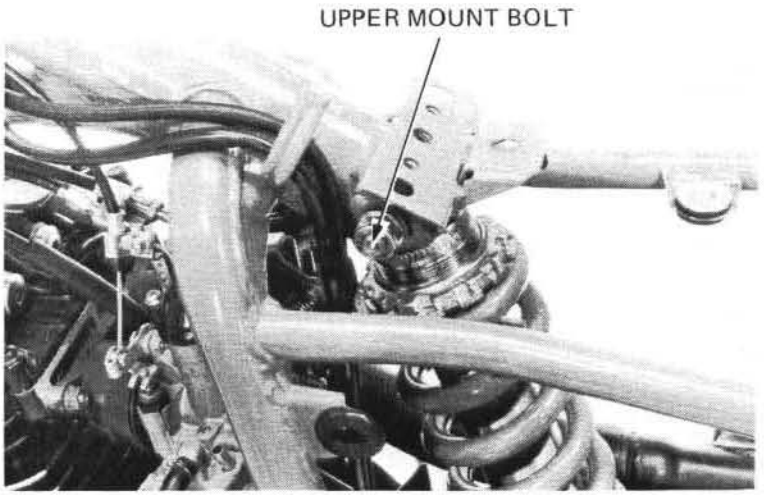
TORQUE: 40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)



Install and torque the rear shock absorber upper mount bolt.

TORQUE: 40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)

Install the removed parts in the reverse order of removal.

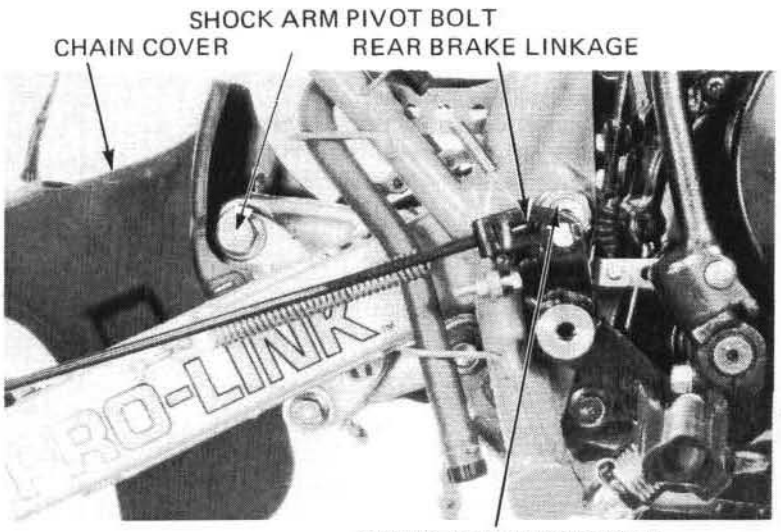


SWING ARM

REMOVAL

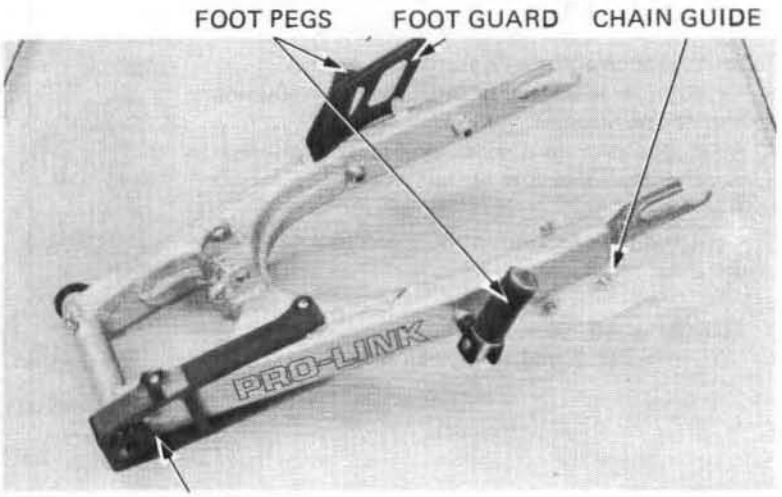
Raise the rear wheel off the ground with a box or workstand under the engine.
Remove the following:
- rear wheel (Page 13-3)
- rear shock absorber (Page 13-11)
- rear brake linkage

Remove the shock arm pivot bolt and swing arm pivot bolt.
Remove the swing arm.



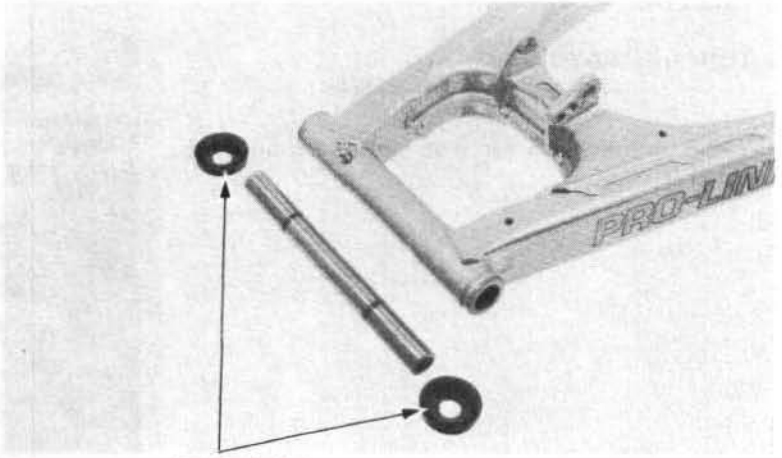
DISASSEMBLY

Remove the chain guide slider, chain guide, foot pegs and foot guard.



INSPECTION

Inspect the pivot collar and bearing for wear or damage.
Replace them if they have score marks, scratches, or excessive or abnormal wear.

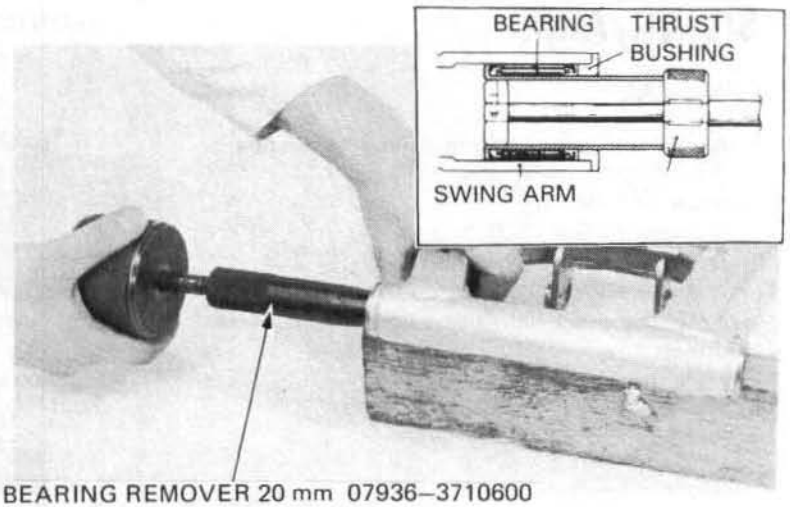


PIVOT BEARING REPLACEMENT

Remove the dust seal and pivot collar.
Install the bearing remover in the swing arm pivot bearing and expand the tool behind the bearing. Drive the bearing and thrust bushing out with a slide hammer.

NOTE

> Never install old bearings, once the bearings are removed; they must be replaced with new ones.



BEARING REMOVER 20 mm 07936–3710600
REMOVER HANDLE 07936–3710100
REMOVER WEIGHT 07936–3710200

Carefully drive the needle bearings and thrust bushings into the swing arm with the special tool below the edge of the hole.

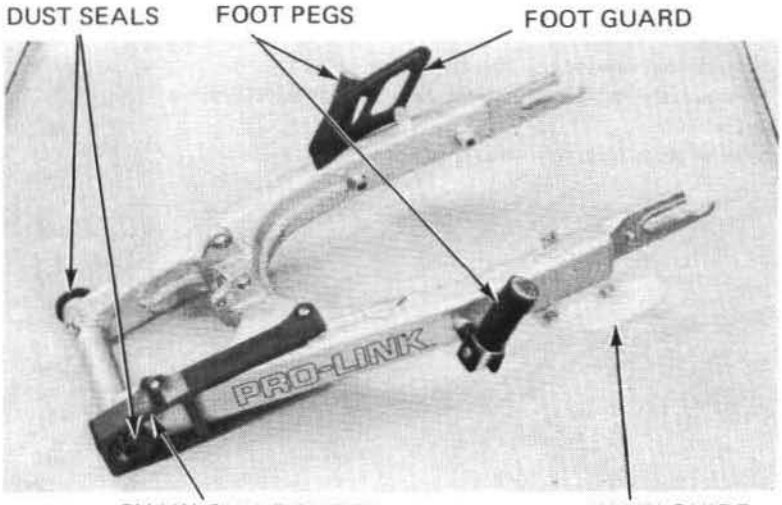
NOTE

Install the bearings with the marks facing out.

Lubricate the bearings with grease after installation. Apply grease to the pivot collar and install the pivot collar in the swing arm.

ASSEMBLY

Install the foot guard, chain guide, foot peg and chain guide slider.
Apply grease to the lip of the dust seal, and install the dust seals.



INSTALLATION

Install the swing arm and torque the pivot bolt.

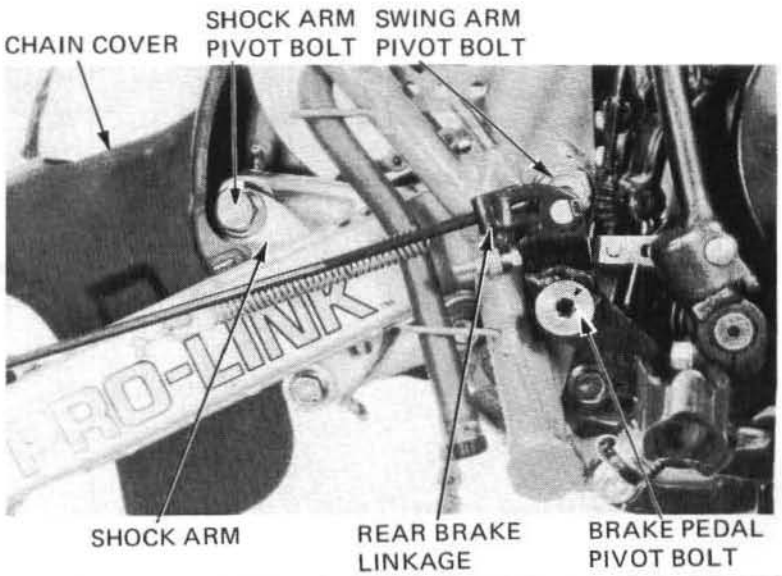
TORQUE: 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

Install the shock arm onto the swing arm.
Tighten the shock arm pivot bolt.

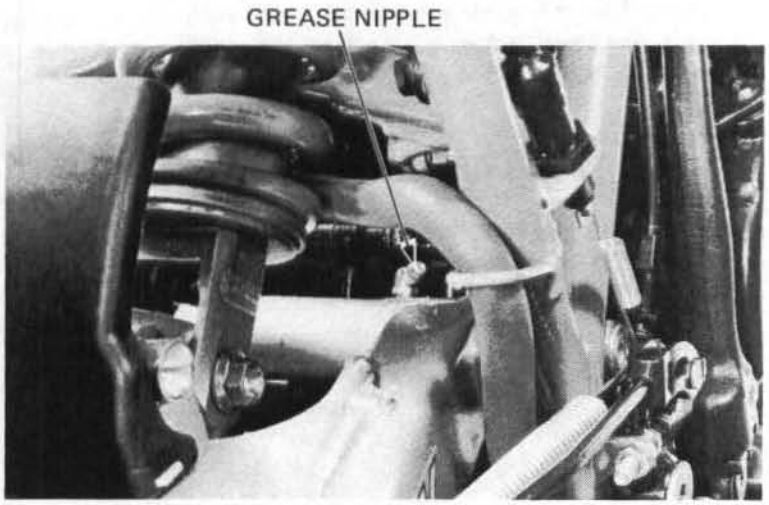
TORQUE: 90–120 N·m (9.0–12.0 kg-m, 65–87 ft-lb)

Install the chain cover.
Install the rear brake linkage.
Tighten the brake pedal pivot bolt.

TORQUE: 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)



Fill grease to the swing arm pivot through the grease fitting.
Apply molybdenum disulfied (MoS_2) paste to the linkage bushings through the grease fittings on the linkage pivots.
Install the removed parts in the reverse order of removal.



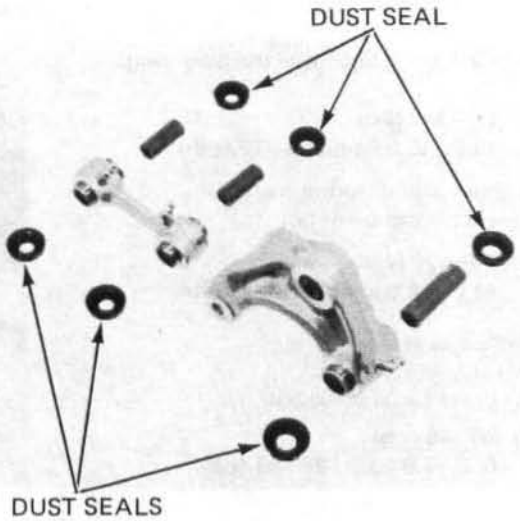
SUSPENSION LINKAGE

REMOVAL

Remove the rear shock absorber (Page 13-11).
Remove the shock arm pivot bolt and shock link bolts.
Remove the shock arm and shock link.

INSPECTION

Remove the dust seals and collars.
Check the suspension linkage collars for wear or damage.
Replace them if they have score marks, scratches, excessive or abnormal wear.



INSTALLATION

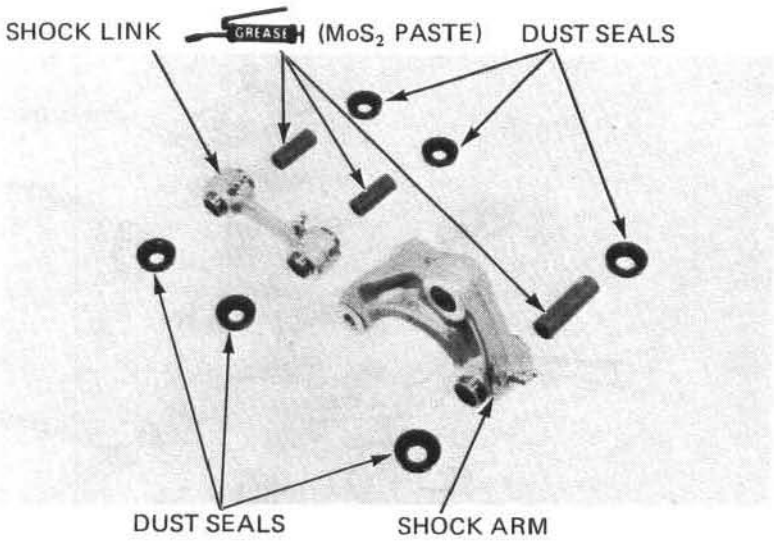
Apply molybdenum disulfied (MoS_2) paste (containing more than 40% MoS_2) to the pivot collars and lip of the dust seals.

NOTE

Some sources of paste grease with 40% or more molybdenum are:
- Molykote G-n Paste manufactured by Dow Corning, U.S.A.
- Locol Paste manufactured by Sumico Lubricant, Japan.
- Bel-Ray Moly-Lube NIC-8, U.S.A.

Any other manufacturer's paste grease equivalent to the above may also be used.

Install the collars and dust seals.



Install the shock link on the frame with the shock link pivot bolt. Tighten the pivot bolt.

TORQUE: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)

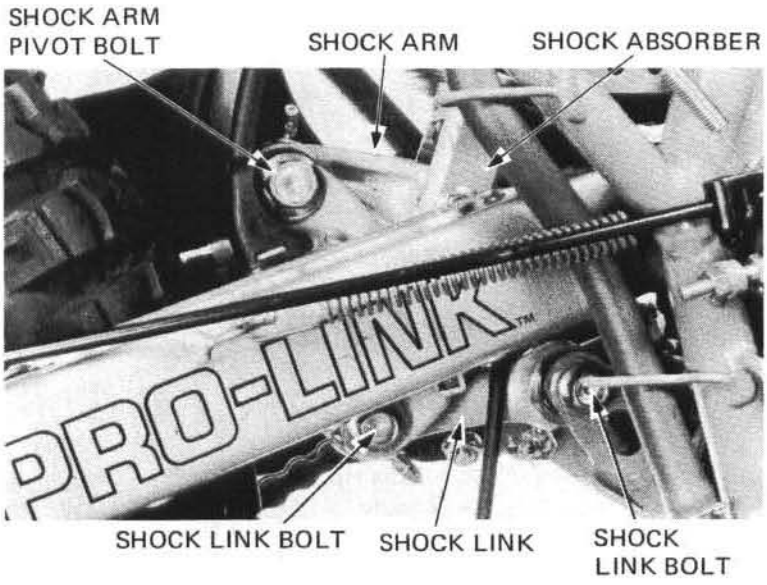
Install the shock arm on the swing arm and tighten the shock arm pivot bolt.

TORQUE: 90–120 N·m (9.0–12.0 kg-m, 65–87 ft-lb)

Connect the shock link to the shock arm with the pivot bolt and torque it.

TORQUE: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)

Install the shock absorber (Page 13-15).
Install the rear wheel (Page 13-10).



BRAKE PEDAL

REMOVAL

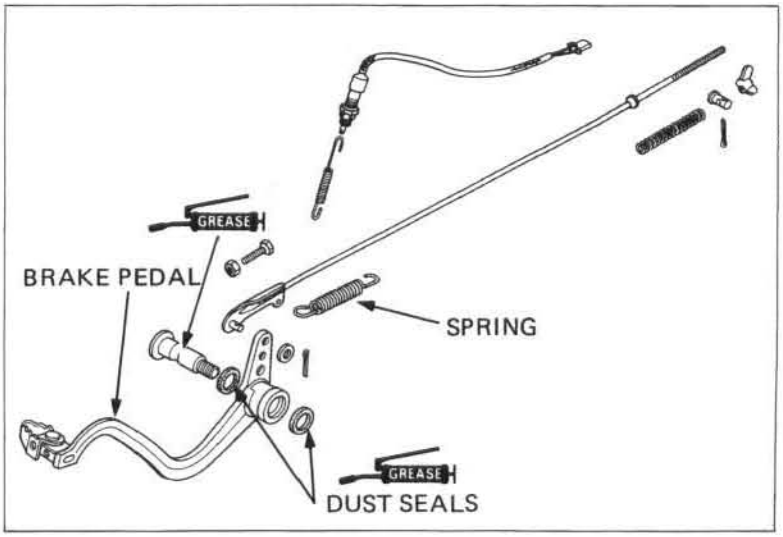
Disconnect the brake pedal spring.
Disconnect the brake rod and remove brake pedal.

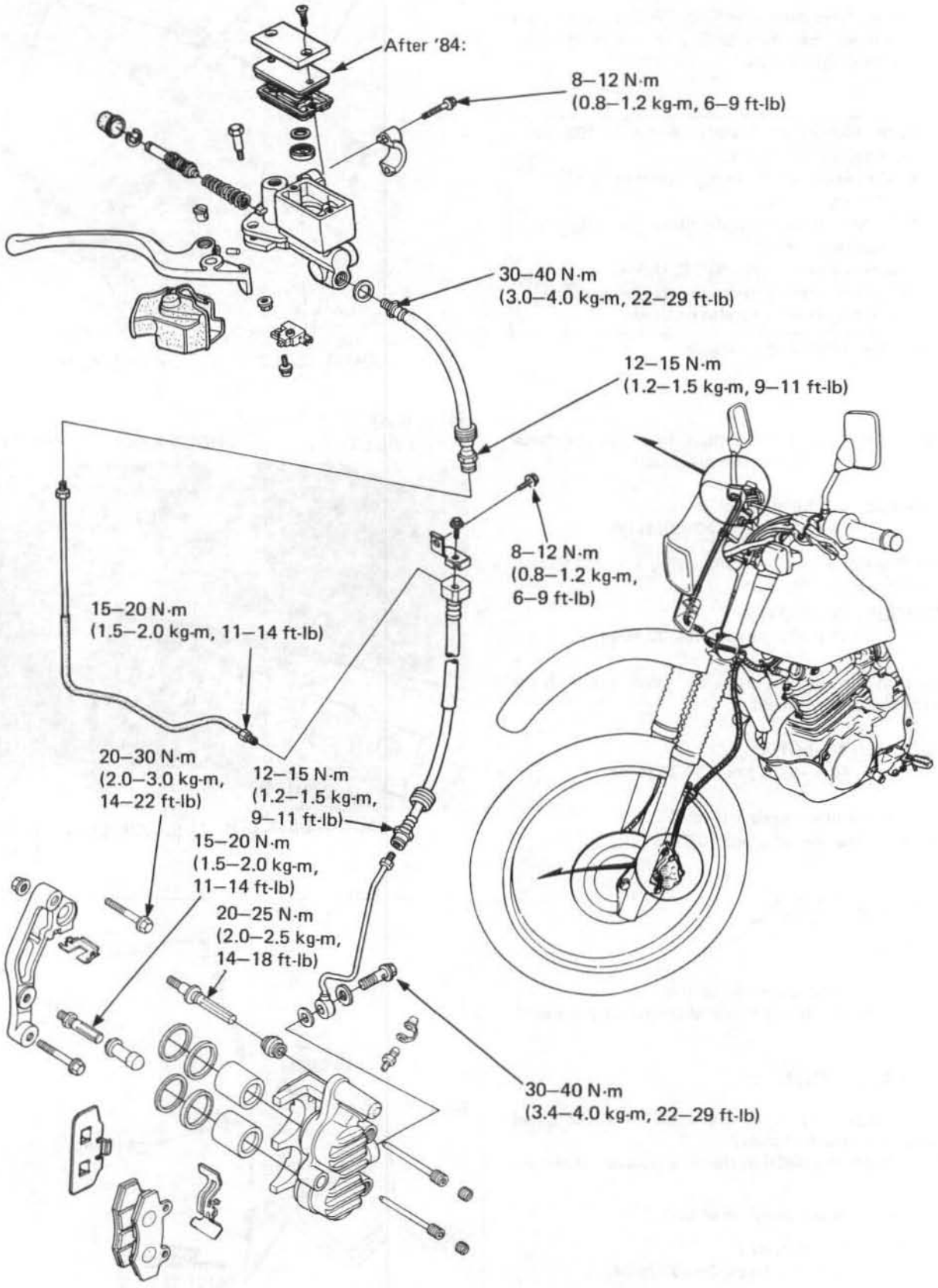
INSTALLATION

When assembling, apply grease to the brake pedal pivot bolt, and dust seals.
Install the brake pedal in the reverse order of removal.

Tighten the brake pedal pivot bolt.

TORQUE: 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)





14. HYDRAULIC BRAKES

SERVICE INFORMATION

GENERAL

- The front brake can be removed without disconnecting the hydraulic system.
- Once the hydraulic systems has been opened, or if the brakes feel spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage will result.
- Always check brake operation before riding the motorcycle.
- Use only DOT 4 Brake fluid.
- Replace the sealing washers whenever the brake hose bolt is removed.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Front disc thickness	3.5 mm (0.14 in)	3.0 mm (0.12 in)
Front disc runout	———————	0.30 mm (0.012 in)
Front master cylinder I.D.	12.700–12.743 mm (0.5000–0.5017 in)	12.755 mm (0.5022 in)
Front master piston O.D.	12.657–12.684 mm (0.4983–0.4994 in)	12.640 mm (0.4976 in)
Front caliper piston O.D.	25.318–25.368 mm (0.9968–0.9987 in)	25.30 mm (0.996 in)
Front caliper cylinder I.D.	25.400–25.405 mm (1.0000–1.0002 in)	25.45 mm (1.002 in)

TORQUE VALUES

Brake pipe bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Front brake caliper bracket	20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Brake caliper pin bolt (Upper)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
(Lower)	15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)
Brake disc nut	14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)
Brake hose	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Brake hose joint nut	12–15 N·m (1.2–1.5 kg-m, 9–11 ft-lb)
Metal line joint nut	15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)

TOOL

Special

Snap ring pliers	07914–3230001 or Commercially available in U.S.A.

TROUBLESHOOTING

Brake Lever/Pedal Soft or Spongy
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

Brake Lever/Pedal Too Hard
- Sticking piston(s)
- Clogged hydraulic system
- Pads glazed or worn excessively

Brakes Drag
- Hydraulic system sticking
- Sticking piston(s)

Brakes Grab or Pull to One Side
- Disc or wheel misaligned

Brakes Chatter or Squeal
- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly
- Disc or wheel misaligned

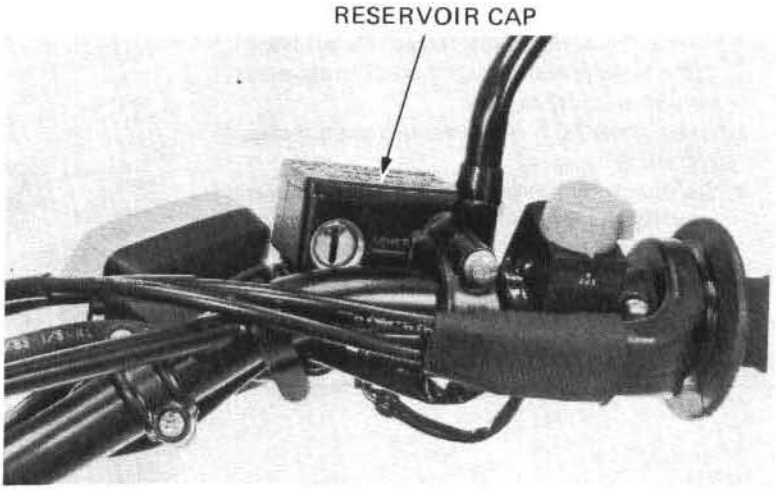
BRAKE FLUID REPLACEMENT/ AIR BLEEDING

BRAKE FLUID DRAINING

Remove the reservoir cap and diaphragm.

CAUTION

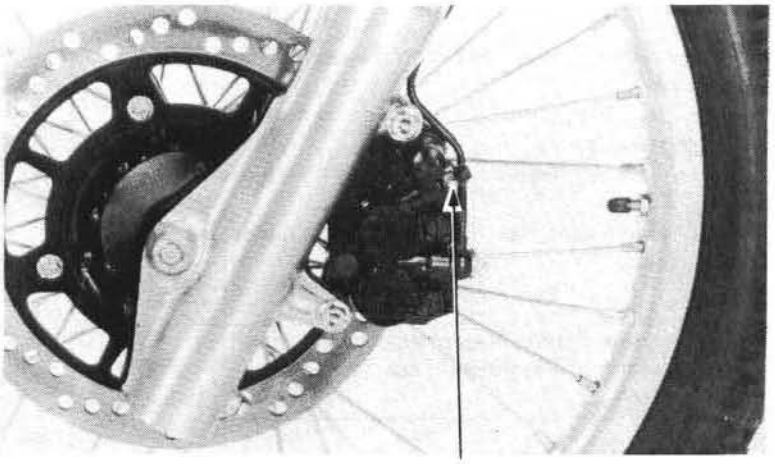
Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.



Connect a bleed hose to the bleed valve.
Loosen the caliper bleeder valve and pump the brake lever.
Stop operating the lever when no fluid flows out of the bleeder valve.

WARNING

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

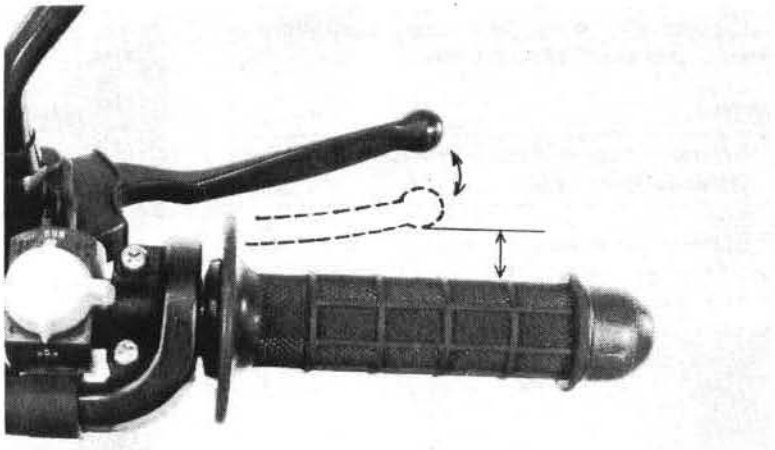


BRAKE FLUID FILLING

NOTE

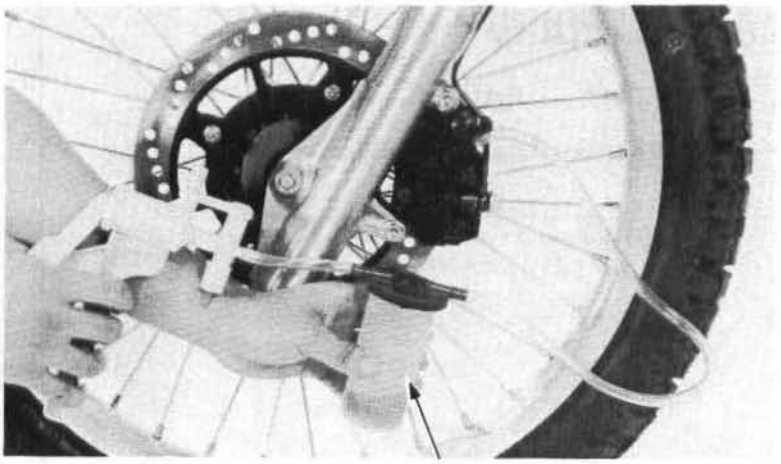
Do not mix different types of fluid. They are not compatible.

If a brake bleeder is not available, perform the following procedure.
Close the bleeder valve, fill the reservoir, and install the diaphragm.
Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.
Bleed the system as described on the next page.



NOTE

- Check the fluid level often while bleeding the system to prevent air from being pumped into the system.
- Use only DOT 4 brake fluid from a sealed container.
- Do not mix brake fluid types and never reuse the contaminated fluid which has been pumped out during brake bleeding, because that would impair the efficiency of the brake system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



MITYVAC BRAKE BLEEDER or EQUIVALENT

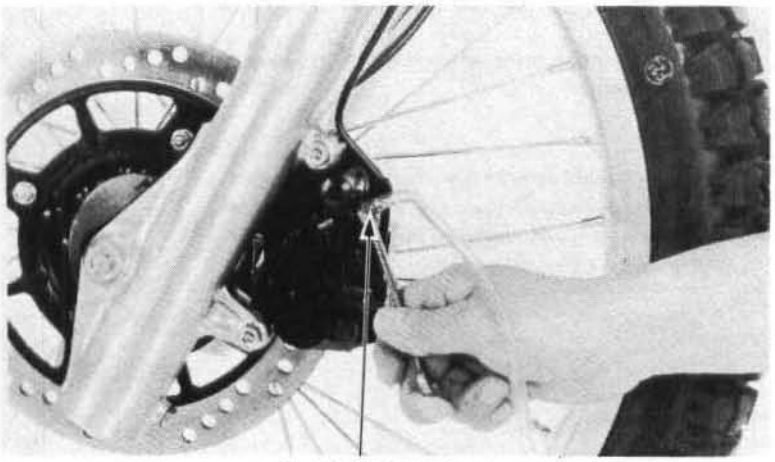
BRAKE FLUID FILLING WITH BRAKE BLEEDER

Fill the reservoir to near full with the recommended brake fluid.
Connect the Mityvac Brake Bleeder or equivalent to the bleed valve.
Pump the brake bleeder and loosen the bleeder valve.
Add fluid when the level in the master cylinder reservoir is low.

NOTE

If air is entering the bleeder hose from around the bleeder valve threads, seal the threads with teflon tape.

Check brake lever operation.
If the brake feels spongy, bleed the air from the system.



BLEED VALVE

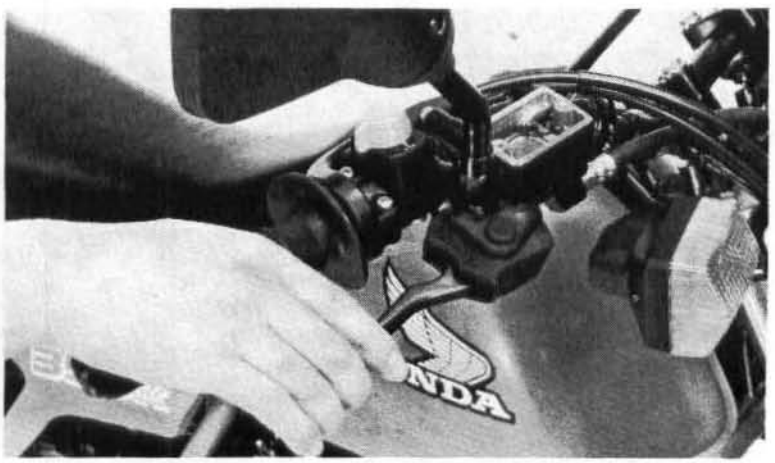
AIR BLEEDING

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

NOTE

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

2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.
Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.



BRAKE PAD/DISC

PAD REPLACEMENT

NOTE

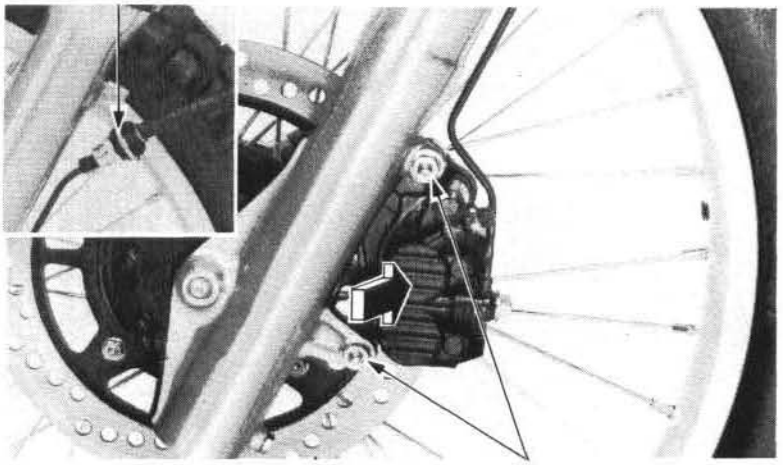
> Always replace the brake pads in pairs to assure even disc pressure.

Remove the brake hose clamp.
Remove the caliper bracket mounting bolts.
Remove the caliper from the fork slider.

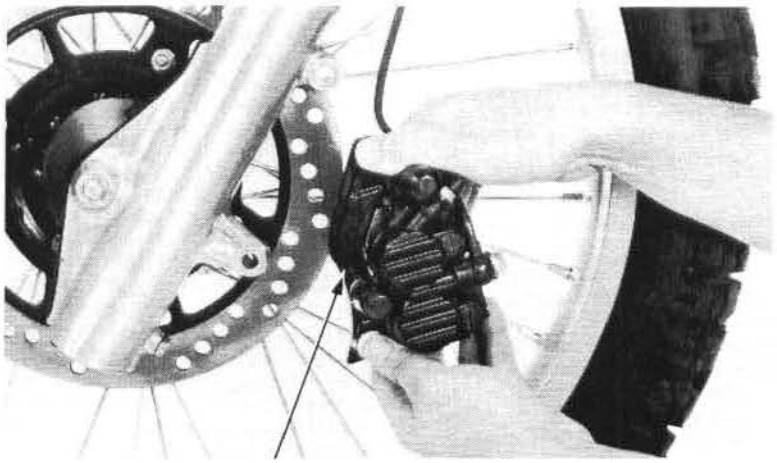
CAUTION

> *Support the caliper assembly so that it does not hang from the brake line.*

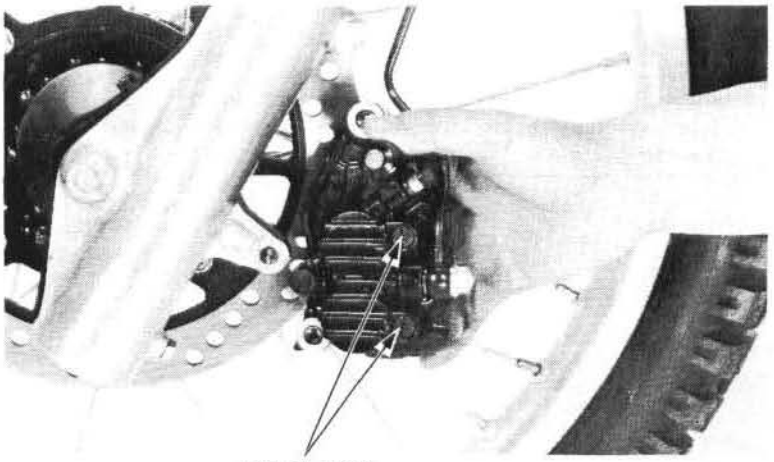
BRAKE HOSE CLAMP



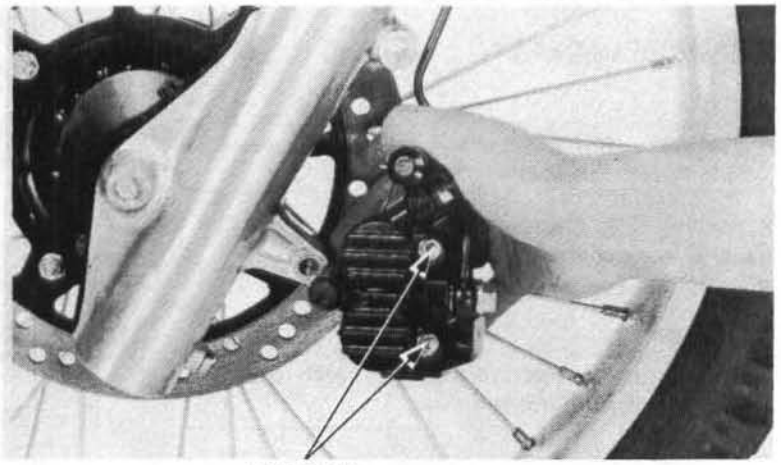
Remove the caliper bracket from the caliper.



Remove the two pad pin plugs.

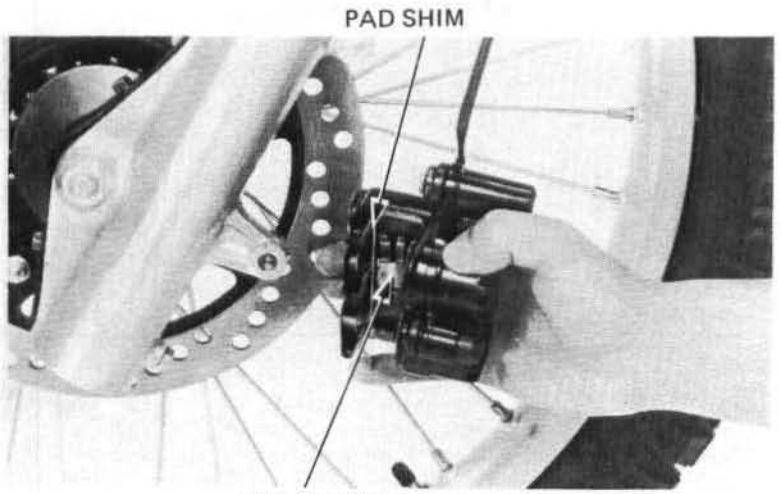


Remove the pad pins from the caliper.
Remove the pads from the caliper.



PAD PINS

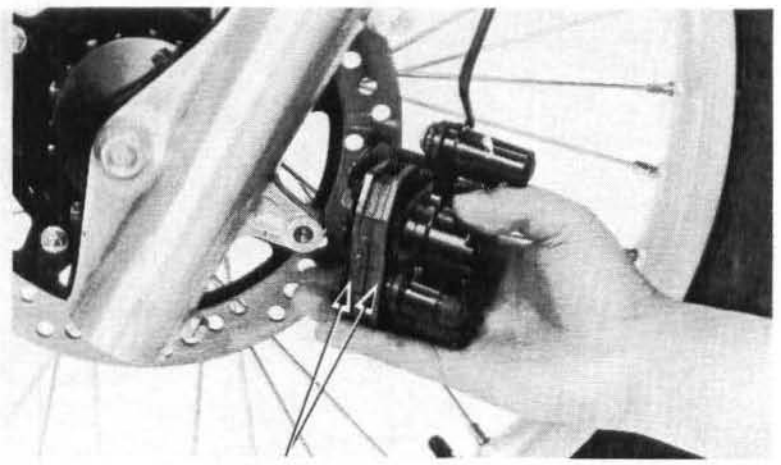
Position the pad spring and pad shim in the caliper as shown.



Install new pads in the caliper.
Push the piston all the way into the caliper.

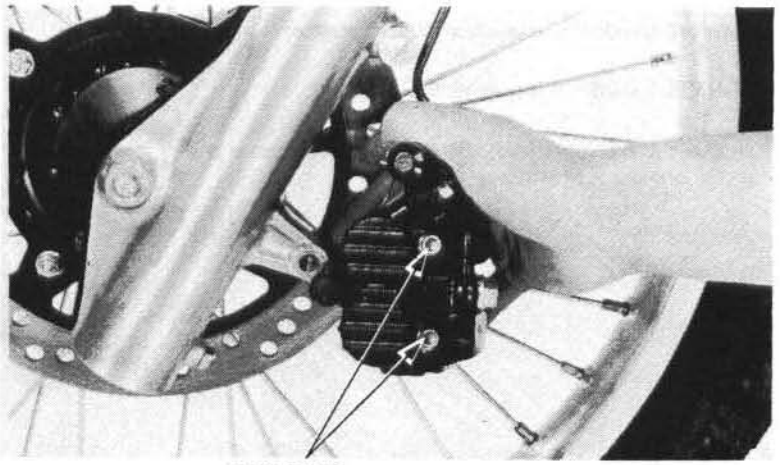
NOTE

> Check the brake fluid level in the master cylinder reservoir as this operation causes the level to rise.



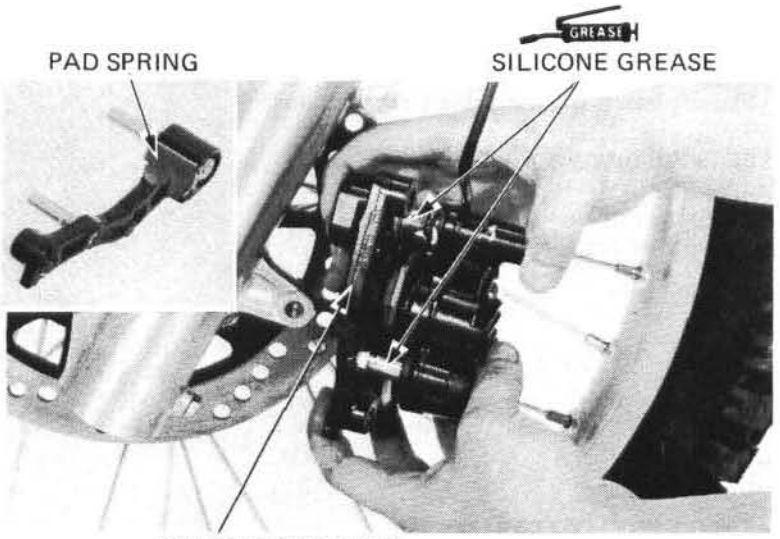
PADS

Install the pad pins.
Tighten the pad pins securely.
Install the pad pin plugs.



PAD PINS

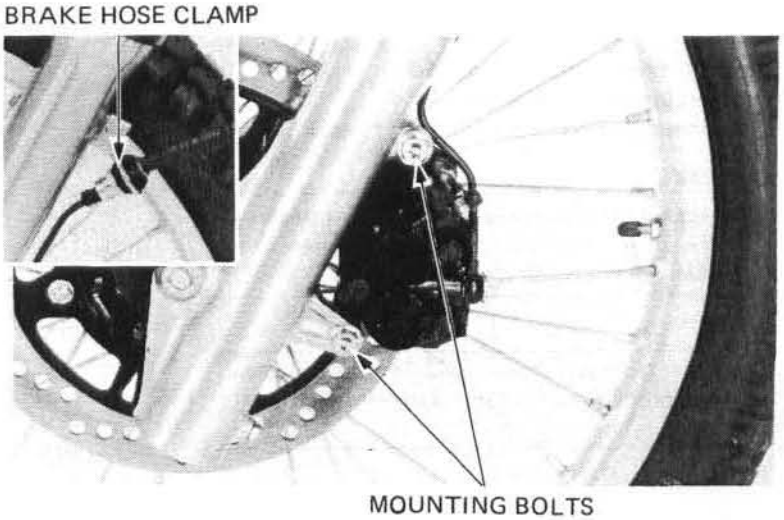
Make sure the pad spring on the caliper bracket is in place.
Apply medium grade Hi-Temperature silicone grease to the caliper bracket pins.
Assemble the caliper and bracket as shown.



Install the caliper so that the brake disc is positioned between the pads, making sure not to damage the pads. Tighten the caliper bracket bolts.

TORQUE: 20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)

Install the brake hose clamp.

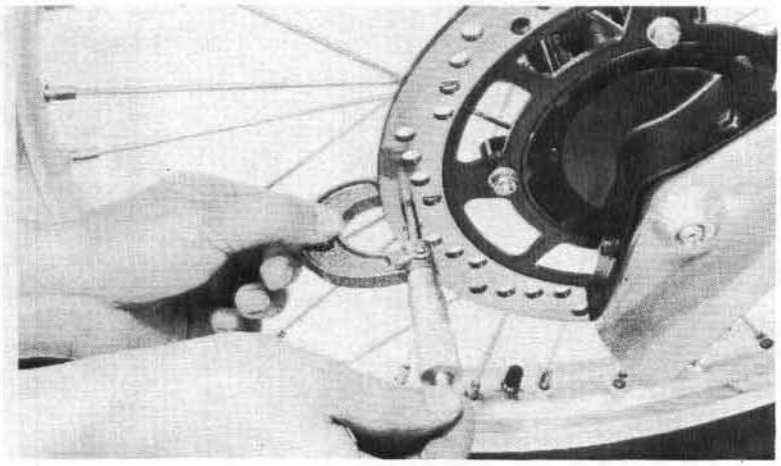


DISK THICKNESS

Measure the disc thickness with a micrometer.

SERVICE LIMIT: 3.0 mm (0.12 in)

Remove the front wheel (Page 12-6) and remove the disc from the wheel (Page 12-7).

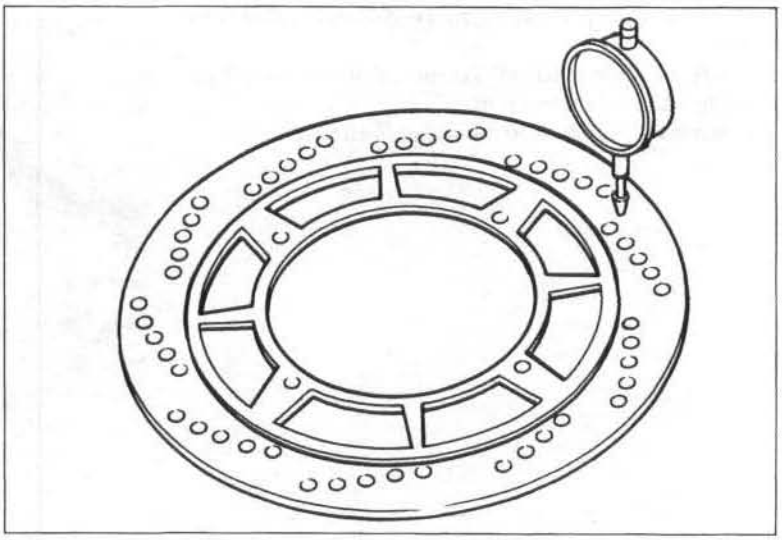


BRAKE DISC WARPAGE

Measure brake disc warpage on a surface plate.

SERVICE LIMIT: 0.30 mm (0.012 in)

Install the disc on the wheel.
Install the front wheel (Page 12-10).



MASTER CYLINDER

DISASSEMBLY

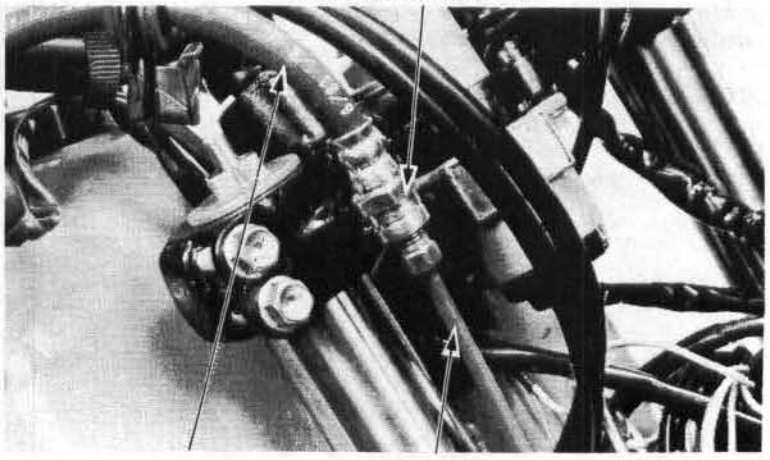
Remove the headlight (Page 18-5) and meter bracket.
Drain the brake system (Page 14-3).
Loosen the brake hose joint.
Disconnect the brake hose from the metal line.

CAUTION

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

NOTE

When the brake hose is disconnected, cover the end of the metal line to prevent contamination.

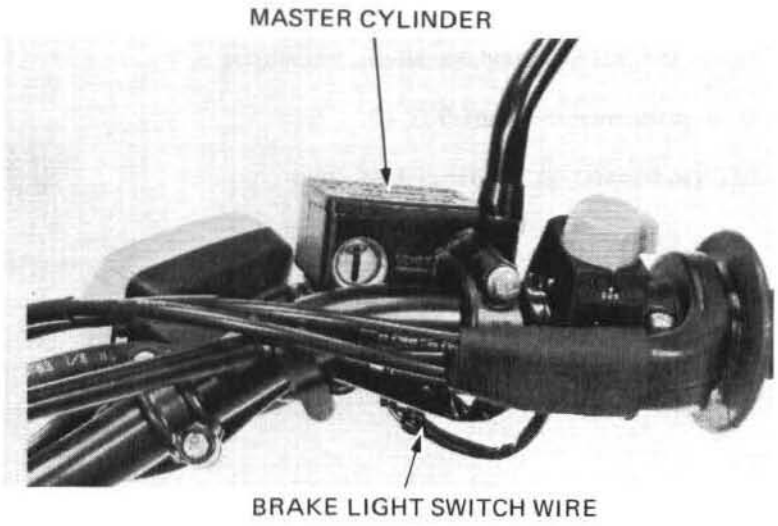


Disconnect the brake light switch wires.
Disconnect the brake hose from the master cylinder.
Remove the brake lever and rear view mirror from the master cylinder.

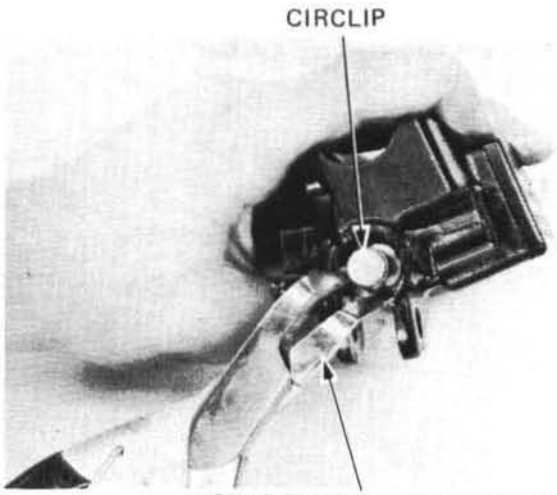
NOTE

> When removing the brake lever, do not lose the lever adjuster and push rod.

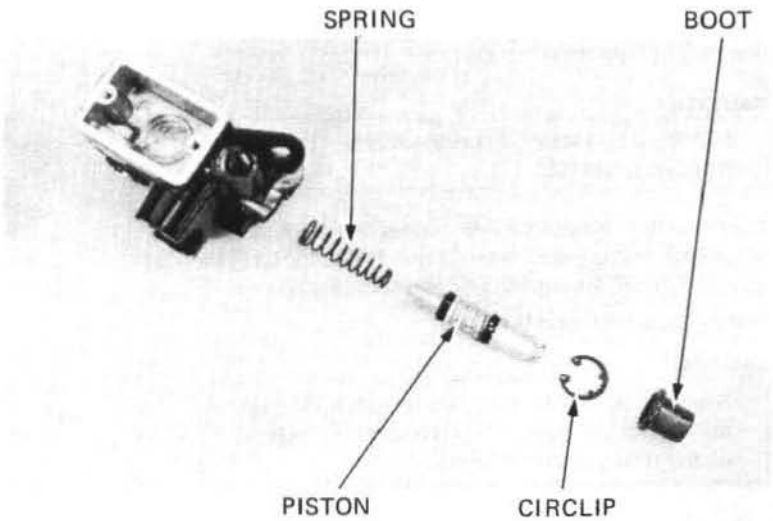
Remove the master cylinder.



Remove the boot and circlip from the master cylinder body.



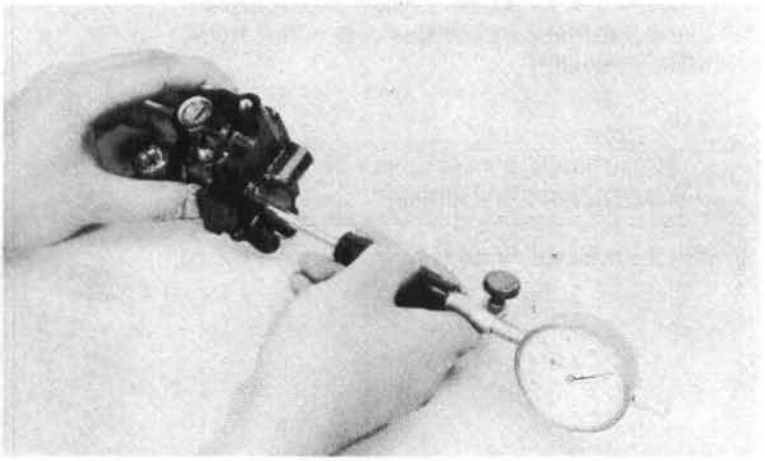
Remove the master cylinder piston and spring.
Clean the inside of the master cylinder and reservoir with brake fluid.



MASTER CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 12.755 mm (0.5022 in)

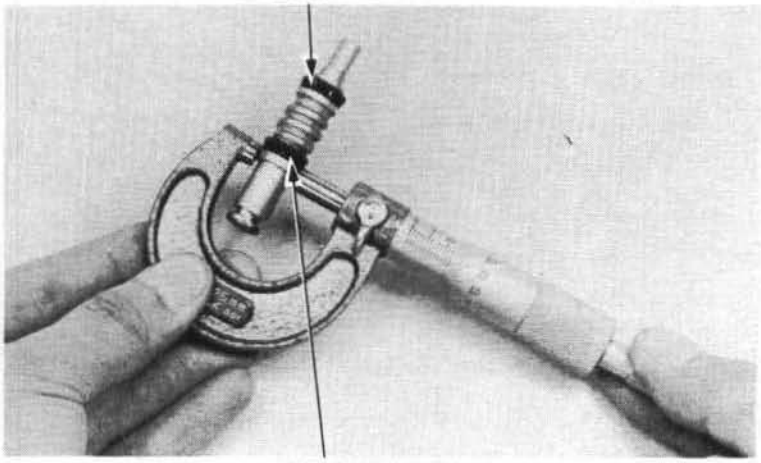


MASTER PISTON O.D. INSPECTION

Check the primary cup and secondary cup for damage or deterioration.

Measure the piston O.D.

SERVICE LIMIT: 12.640 mm (0.4976 in)



ASSEMBLY

Blow out the inside of the master cylinder and reservoir with compressed air.

CAUTION

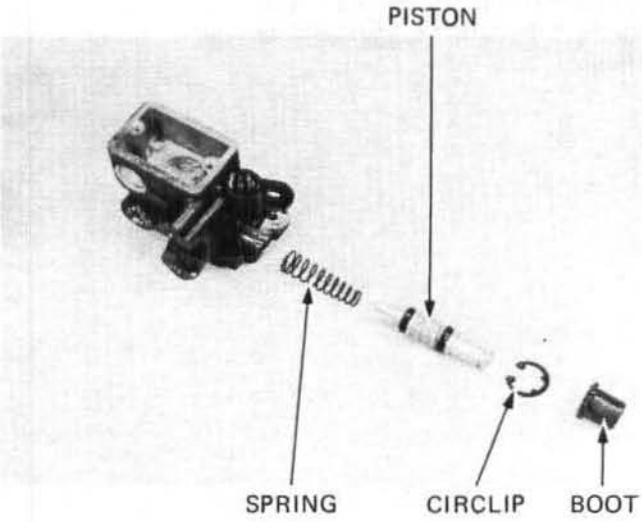
Handle the master cylinder piston, cylinder and spring as a set.

Assemble the master cylinder. Coat the primary and secondary cups with clean brake fluid before assembly. Install the spring and piston together.

Install the circlip and boot.

CAUTION

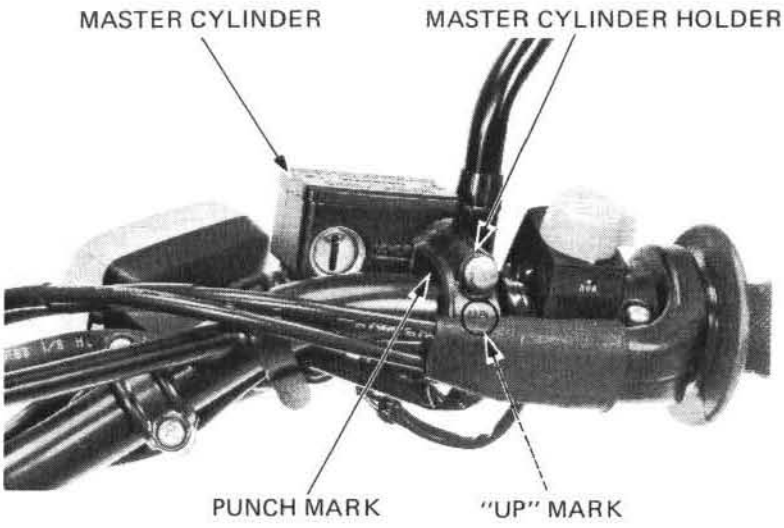
When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.



Connect the hose to the master cylinder and tighten the hose finger tight.
Place the master cylinder on the handlebar.
Install the holder with "UP" mark facing upward.
Install the two mounting bolts.
Align the end of the holder with the punch mark on the handlebar.
Tighten the top bolt first, then tighten the lower bolt.
Tighten the brake hose to the specified torque.

TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

Install the mirror and brake lever.

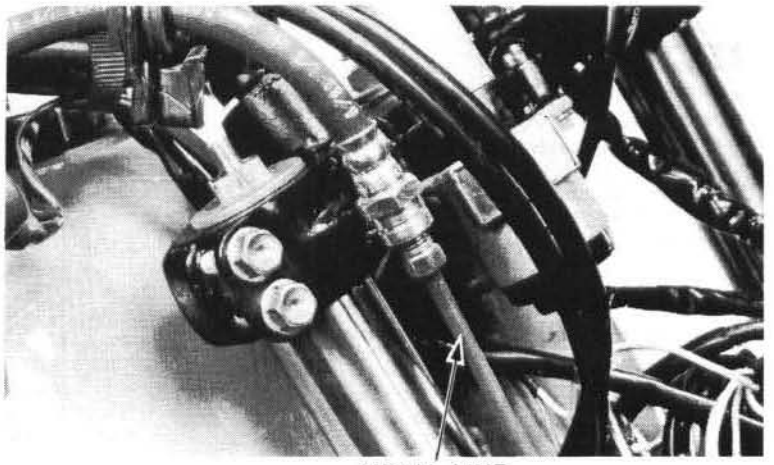


Connect the brake hose to the metal line.
Tighten the joint nut.

TORQUE: 12–15 N·m
(1.2–1.5 kg-m, 9–11 ft-lb)

Install the headlight and meter.

Fill the reservoir to the upper level and bleed the brake system according to page 14-4.



BRAKE CALIPER

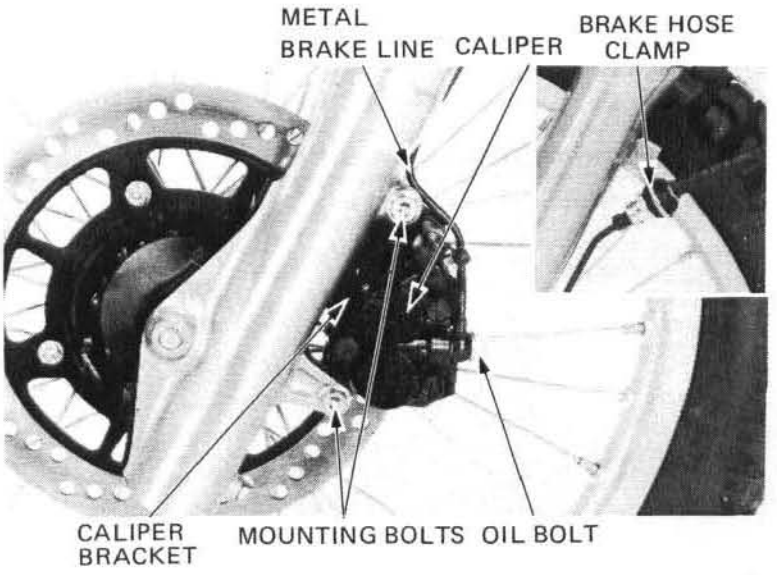
REMOVAL

Remove the brake hose clamp.
Place a clean container under the caliper and disconnect the metal brake line from the caliper.

CAUTION

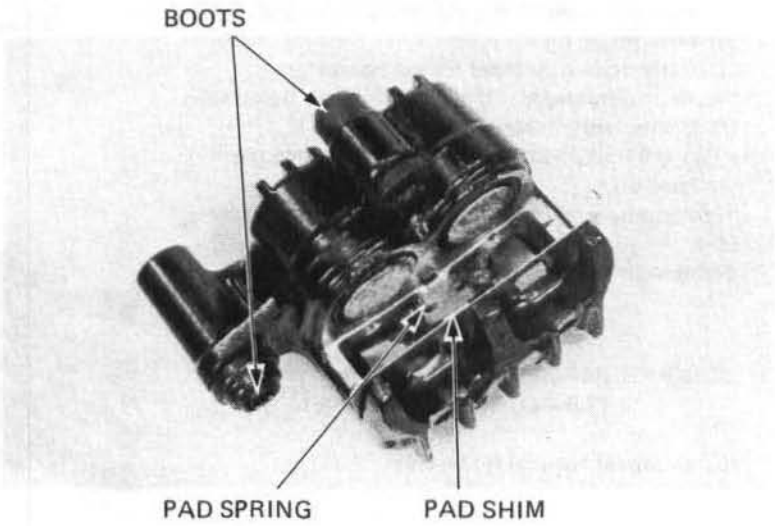
Avoid spilling brake fluid on painted surfaces to prevent paint damage.

Remove the caliper assembly by removing the two mounting bolts.
Remove the caliper bracket from the caliper.



DISASSEMBLY

Remove the pads, pad spring and pad shim.
Remove the boots from the caliper.



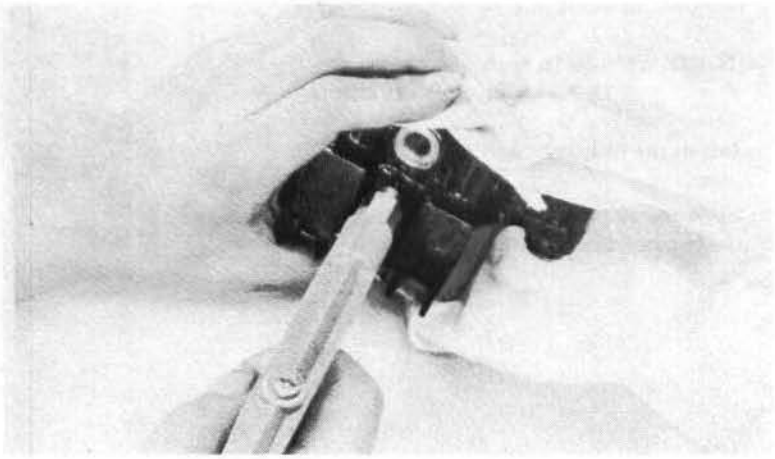
Position the caliper with the pistons down and apply short bursts of air pressure to the fluid inlet.

WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

NOTE

Place a shop towel over the pistons to prevent them from flying out.

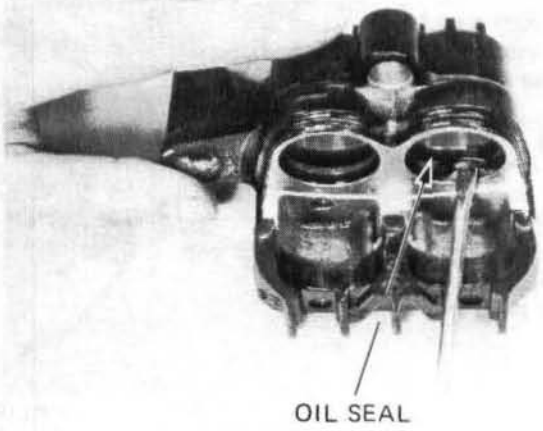


Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.

Push the oil seals in and then lift them out. Clean the oil seal grooves with clean brake fluid.

CAUTION

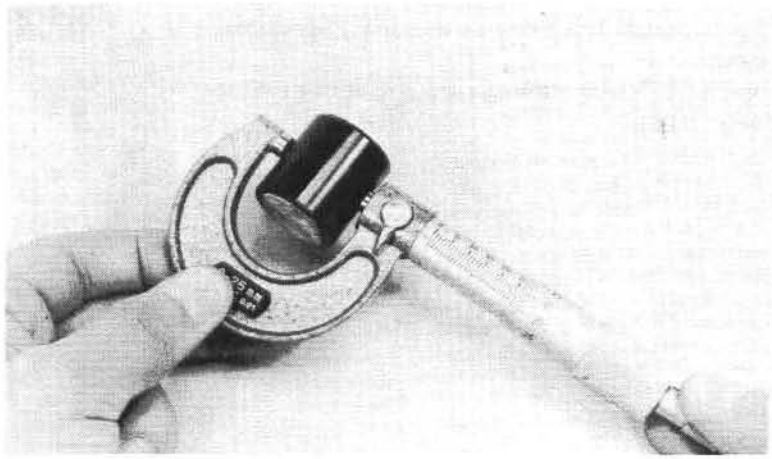
Do not damage the piston sliding surfaces.



CALIPER PISTON O.D. INSPECTION

Check the piston for scoring, scratches or other faults. Measure the piston diameter with a micrometer.

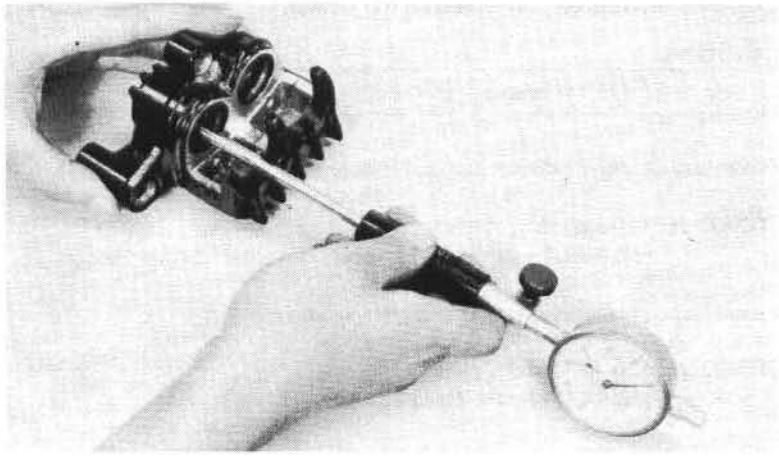
SERVICE LIMIT: 25.30 mm (0.966 in)



CALIPER CYLINDER I.D. INSPECTION

Check the caliper cylinder for scoring, scratches or other faults. Measure the caliper cylinder bore.

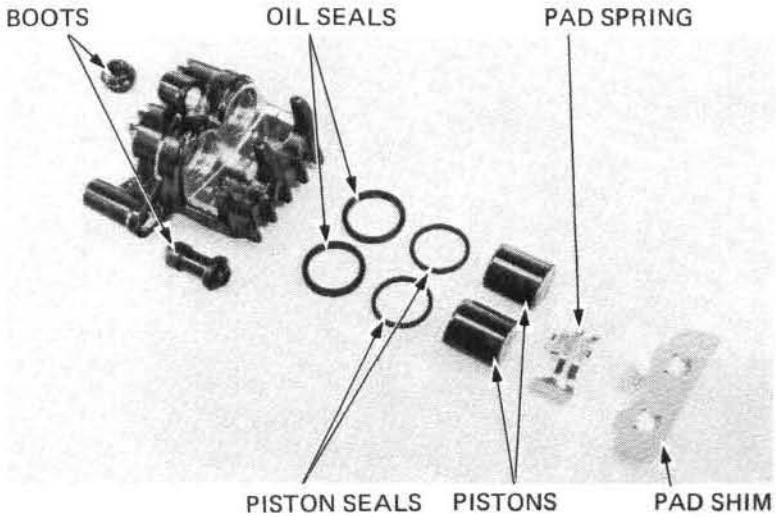
SERVICE LIMIT: 25.45 mm (1.002 in)



ASSEMBLY

The seals must be replaced with new ones whenever they are removed.
Coat the seals with brake fluid before assembly.

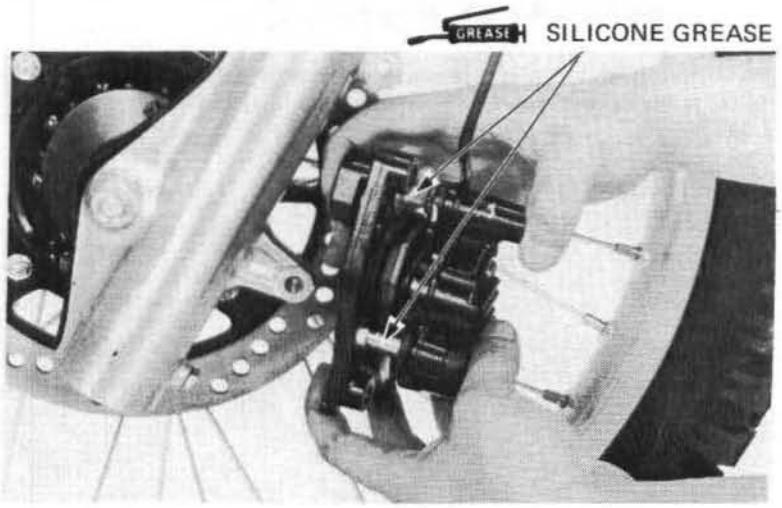
Install the pistons with the dished ends toward the pads.
Inspect the condition of the caliper pin bolt boot.
Install the boots.
Install the pad spring, pad shim and pads.



INSTALLATION

Loosely install the brake line using new sealing washers.

Apply Hi-Temperature silicone grease to the caliper bracket pins.



Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

CAUTION

Be careful not to damage the pads.

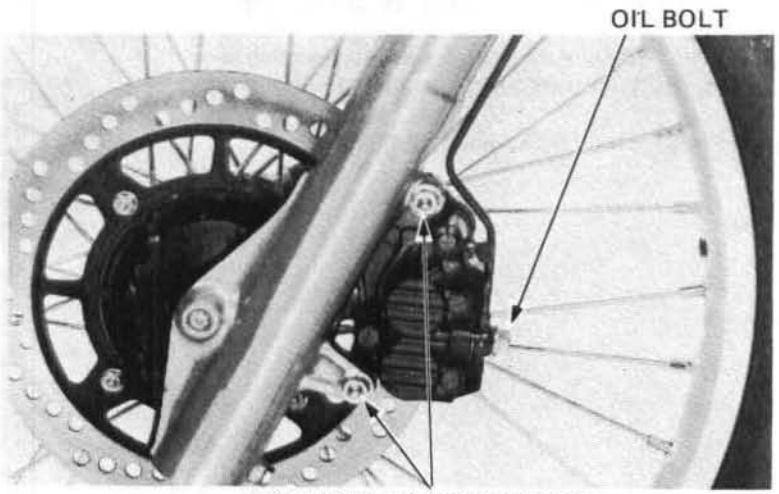
Install the caliper bracket bolts and tighten.

TORQUE: 20–30 N·m
(2.0–3.0 kg-m, 14–22 ft-lb)

Install the brake hose clamp and tighten the oil bolt.

TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

Fill the brake fluid reservoir and bleed the front brake system (Page 14-4).



15. REAR FENDER/ EXHAUST PIPE

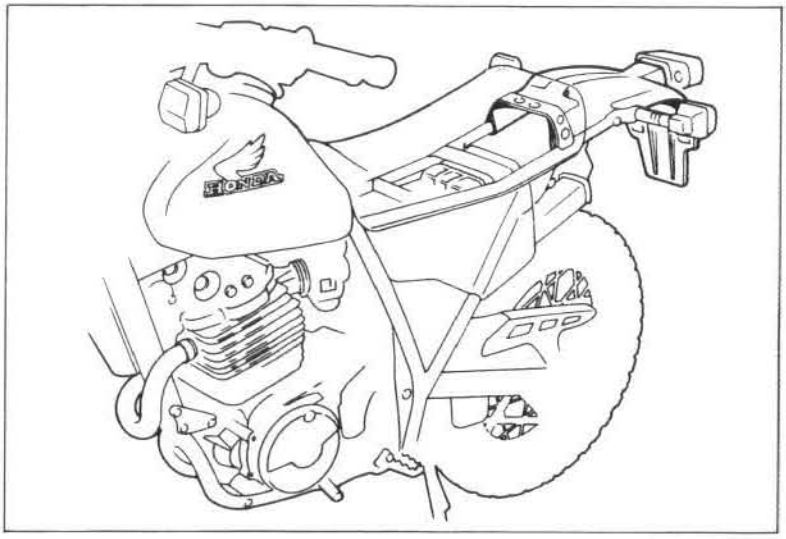
REAR FENDER

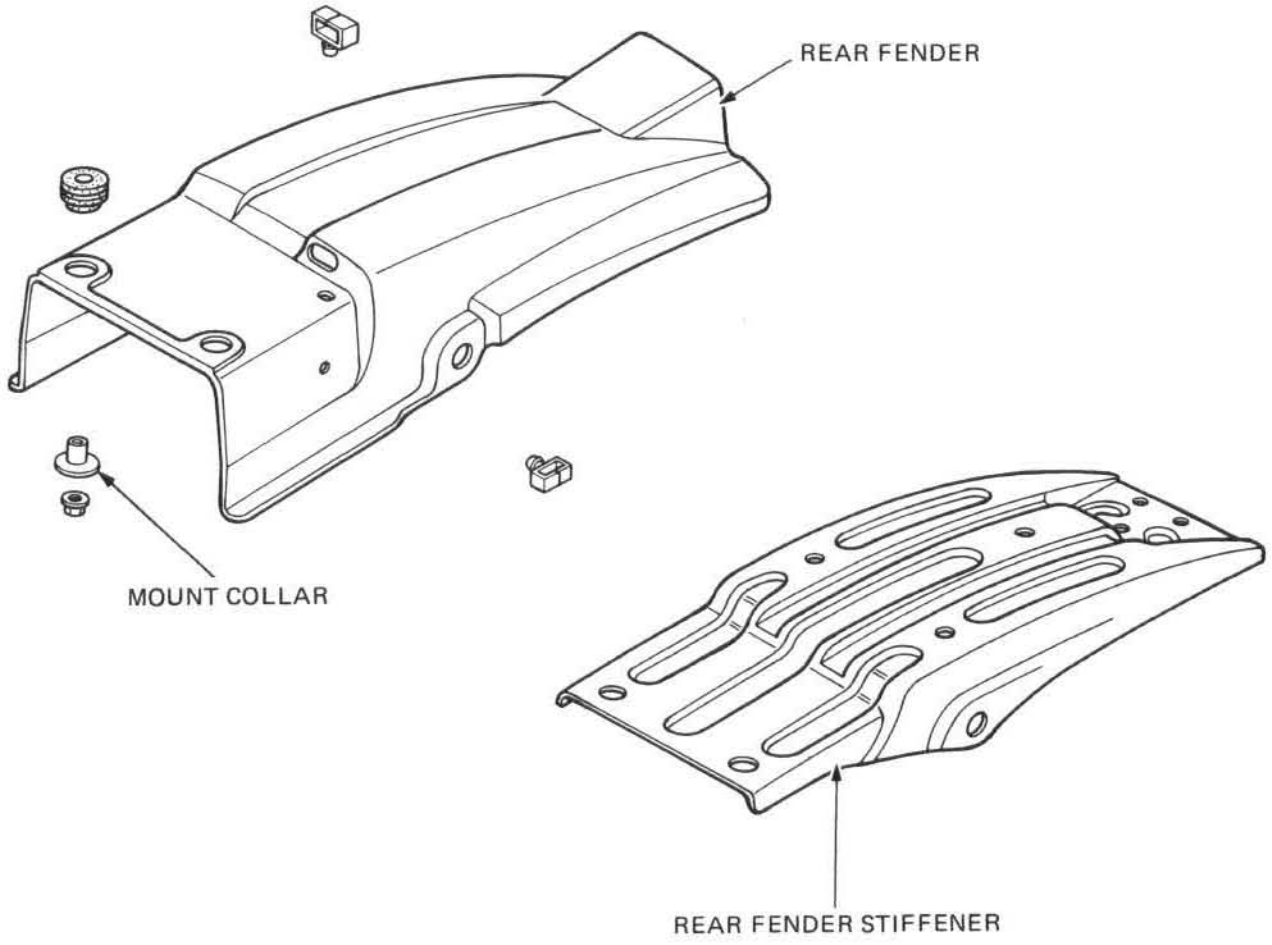
Remove the left and right side covers and remove the seat strap.
Remove the seat mounting nuts. Slide the seat back and lift it off.
Disconnect the taillight and rear turn signal wires. Remove rear fender.

Installation is the reverse order of disassembly.

NOTE

- Before installing the seat, check that the rear fender is set on the frame cross member properly.
- Install the collar with the long ends facing up.





EXHAUST PIPE

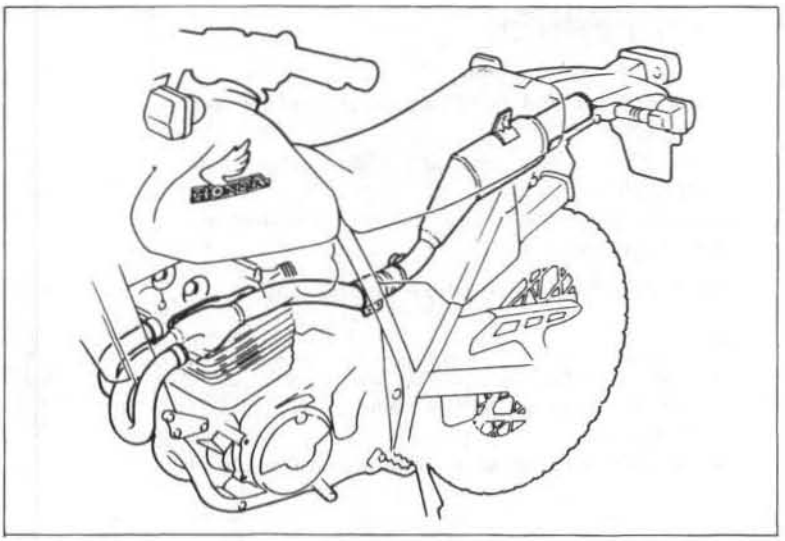
WARNING

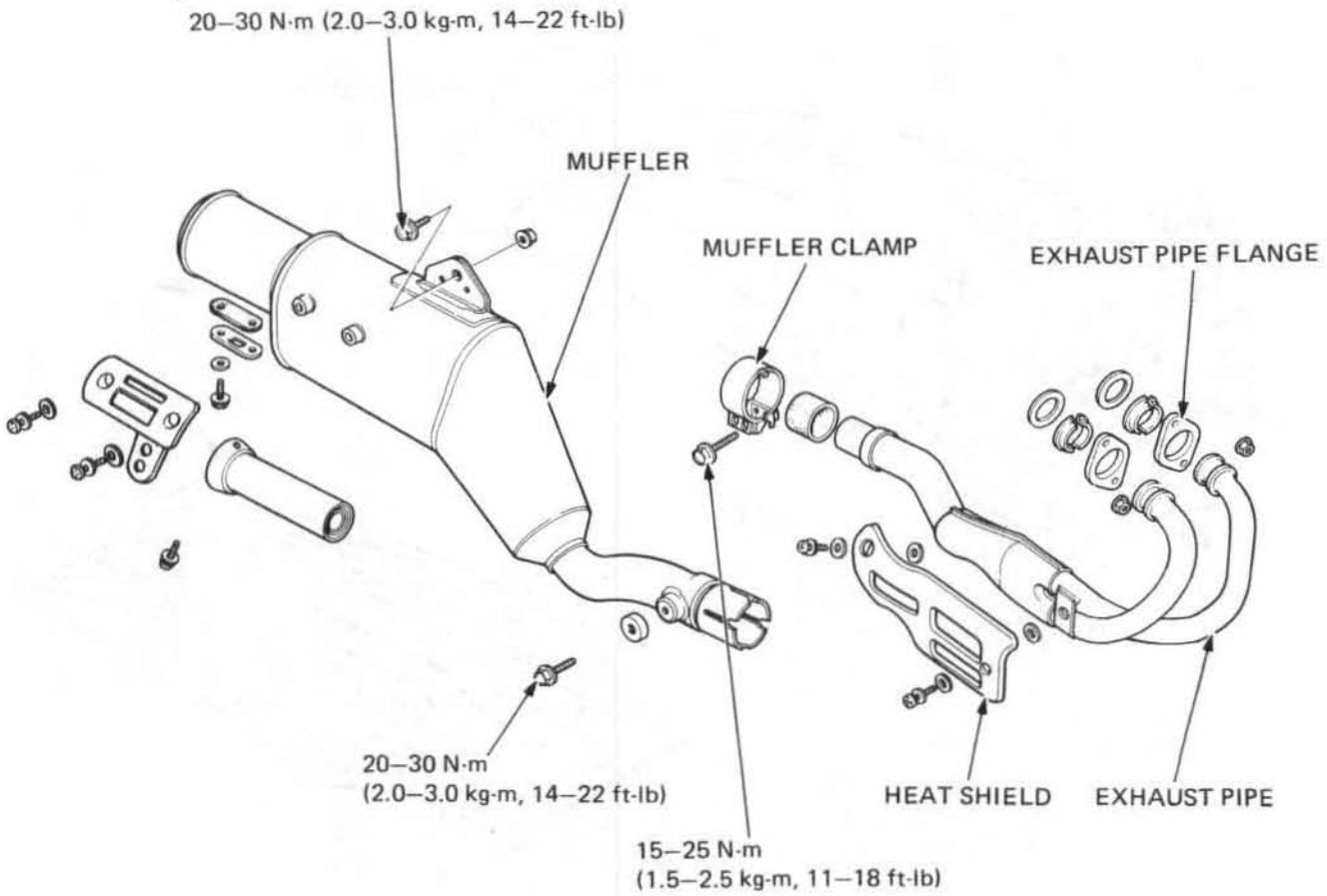
Do not service the exhaust pipe or muffler while they are hot.

Remove the exhaust pipe flange nuts.
Loosen the muffler band.
Remove the exhaust pipe.
Remove the muffler clamp bolts and remove the exhaust pipe.
Install in the reverse order of disassembly.

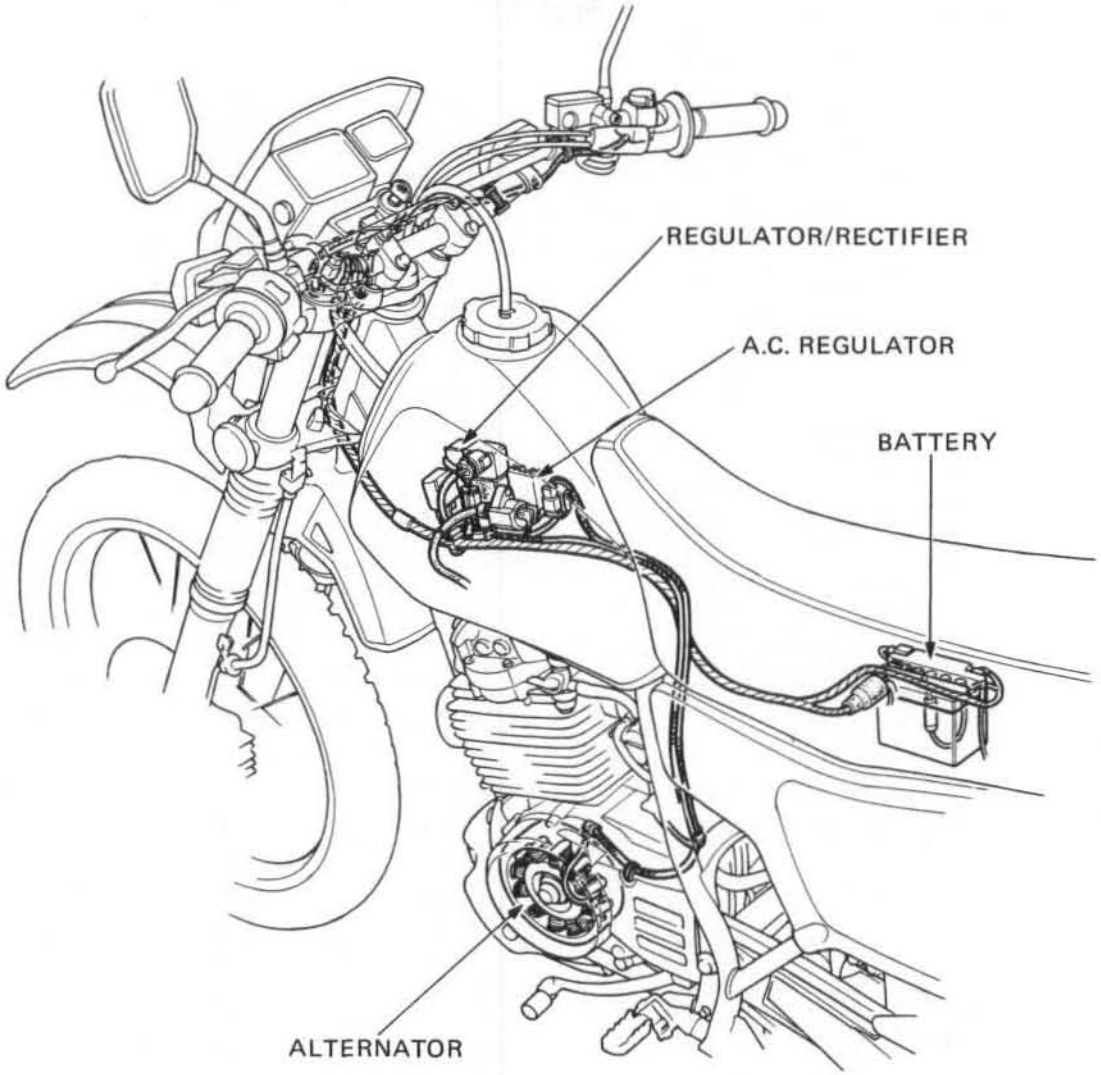
NOTE

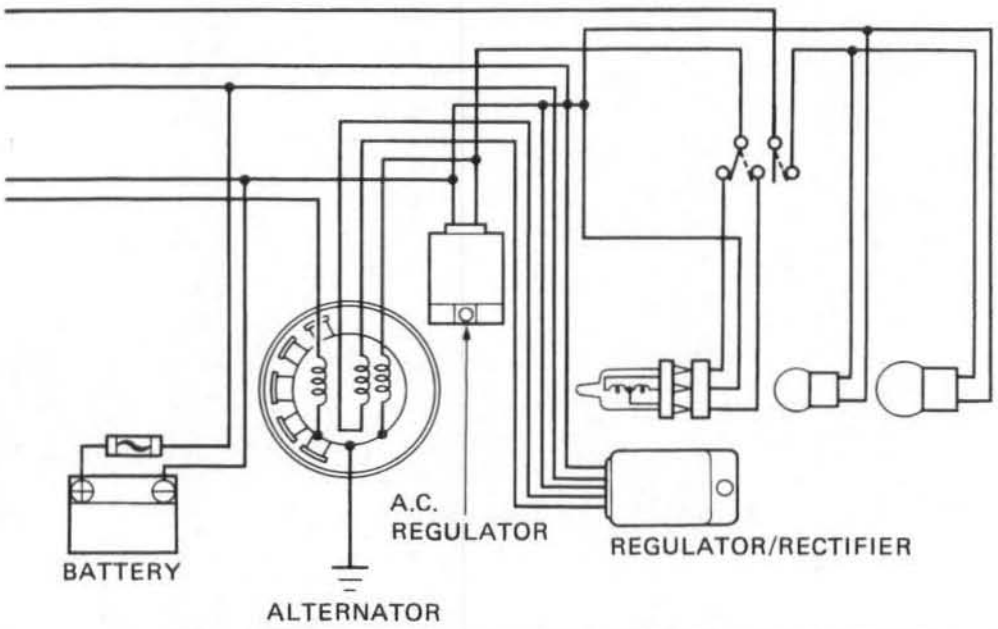
After installing, make sure that there are no gas leaks.





MEMO





16. BATTERY/ CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- Battery acid level should be checked regularly and distilled water added when necessary.
- Remove the battery from the motorcycle for charging whenever possible. If the battery must be charged on the motorcycle, keep flames and sparks away from a charging battery because it produces hydrogen gas which is explosive.
- All charging system components can be tested on the motorcycle.
- For alternator removal, see page 9-2.
- Quick-charging should only be done in an emergency; slow-charging is preferred.

SPECIFICATIONS

Alternator	
Charging rpm	1,300 rpm maximum
Charging output	5.5 amperes maximum at 8,000 rpm 2.7 amperes minimum at 2,500 rpm
Battery	
Capacity	12V 3AH
Fuse	
Rating	Main 10A
Voltage regulator	Transistorized non-adjustable regulator

TOOL

Special	
Multimeter	07308–0020000 or KOWA TH-5H-1
Digital meter	07406–0050000 or KS-AHM-32-003 (U.S.A. only)

TROUBLESHOOTING

No Power – Key Turned On

- Dead battery
  - Battery not charged
  - Battery electrolyte evaporated
  - Charging system failure
- Disconnected battery cable
- Main fuse burned out
- Faulty ignition switch

Low Power – Key Turned On

- Weak battery
  - Low battery electrolyte level
  - Battery run down
  - Charging system failure
- Loose battery connection

Intermittent Power

- Loose battery connection
- Loose charging system connection
- Loose connection or short circuit in ignition system
- Loose connection or short circuit in lighting system

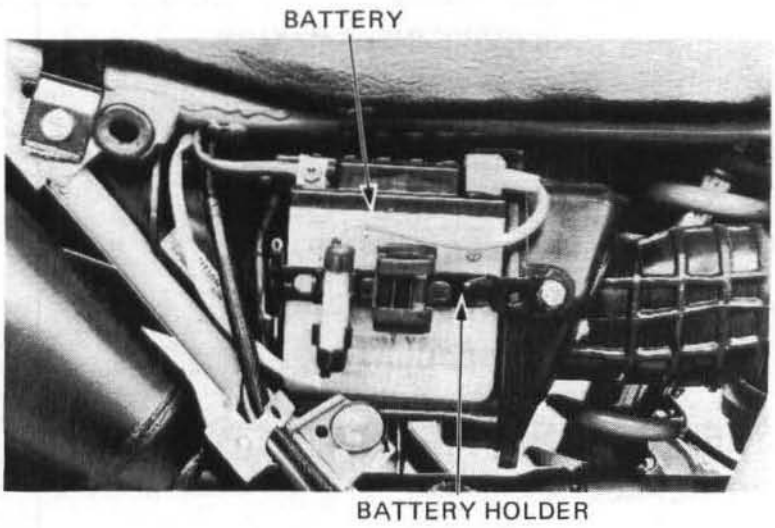
Charging System Failure

- Loose, broken, or shorted wire or connection
- Faulty voltage regulator
- Faulty rectifier
- Faulty alternator

Low Power – Engine Running

- Battery undercharged
  - Low battery electrolyte level
  - One or more dead cells
- Charging system failure

BATTERY



REMOVAL

Remove the right side frame cover.
Disconnect the negative terminal, then positive terminal at the battery.
Remove the bolt and open the battery holder.
Remove the battery.

SPECIFIC GRAVITY TEST

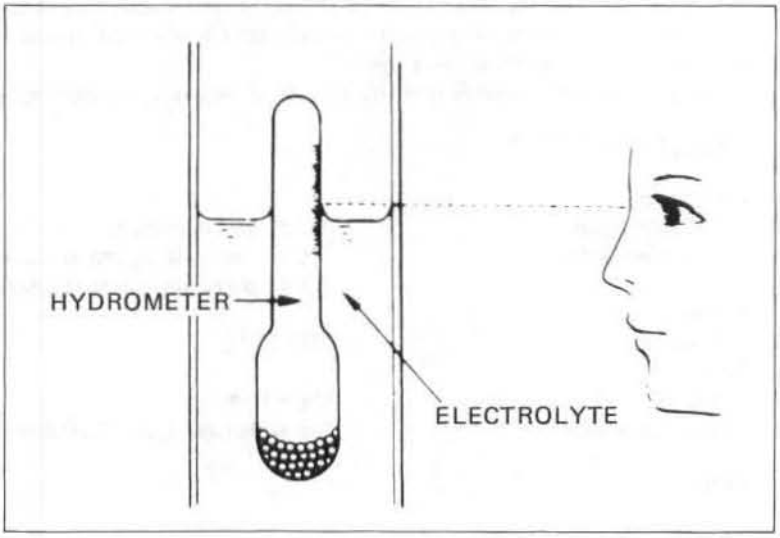
Test each cell by drawing electrolyte into a hydrometer.

SPECIFIC GRAVITY (20°C/68°F)

1.27–1.29	**Fully charged**
1.26 or below	**Undercharged**

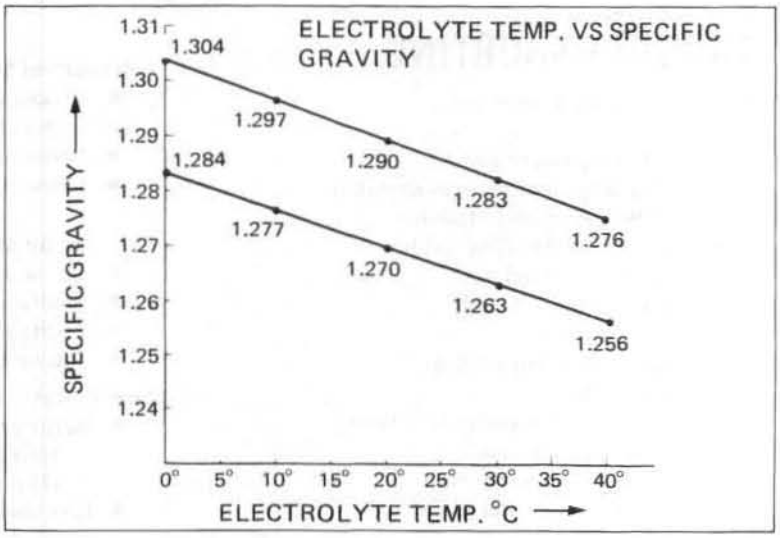
NOTE:

- The battery must be recharged if the specific gravity is below 1.23.
- The specific gravity varies with the temperature as shown.
- Replace the battery if sulfation is evident.
- The battery must be replaced if there is sediment on the bottom of the cell.



WARNING

The battery contains sulfuric acid. Avoid contact with skin, eyes, or clothing.
Antidote: Flush with water and get prompt medical attention.



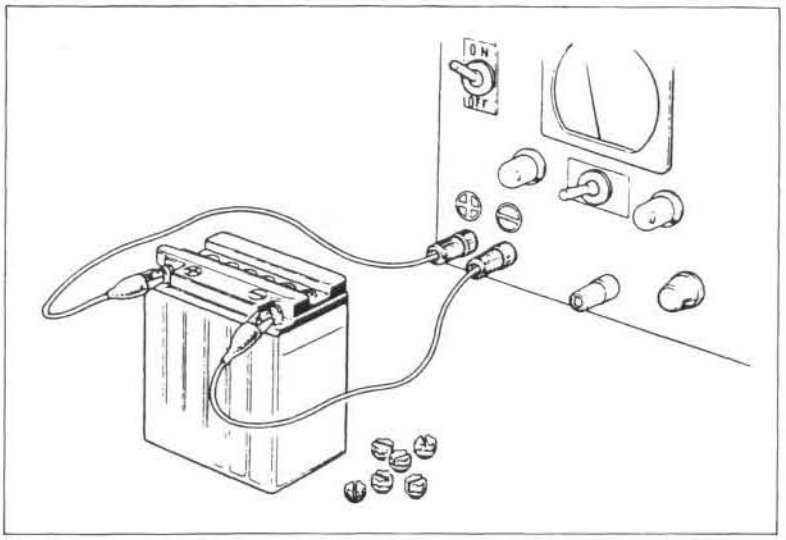
BATTERY CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.

Charging current:
0.3 amperes maximum
Charging:
Charge the battery until specific gravity is 1.27–1.29 at 20°C (68°F).

WARNING

- *Before charging a battery, remove the cap from each cell.*
- *Keep fire and sparks away from a charging battery.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*
- *Discontinue charging if the electrolyte temperature exceeds 45°C (117°F).*



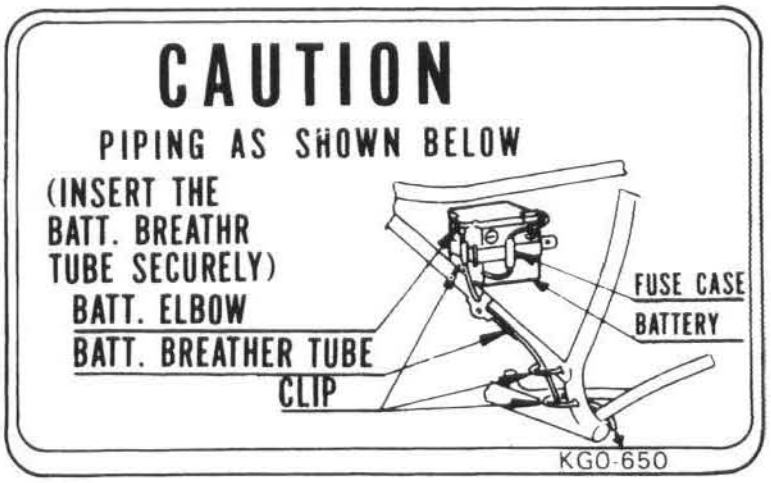
CAUTION

Quick-charging should only be done in an emergency; slow-charging is preferred.

After installing the battery, coat the terminals with clean grease.

CAUTION

Route the breather tube as shown on the battery caution label.



CHARGING SYSTEM

CURRENT TEST

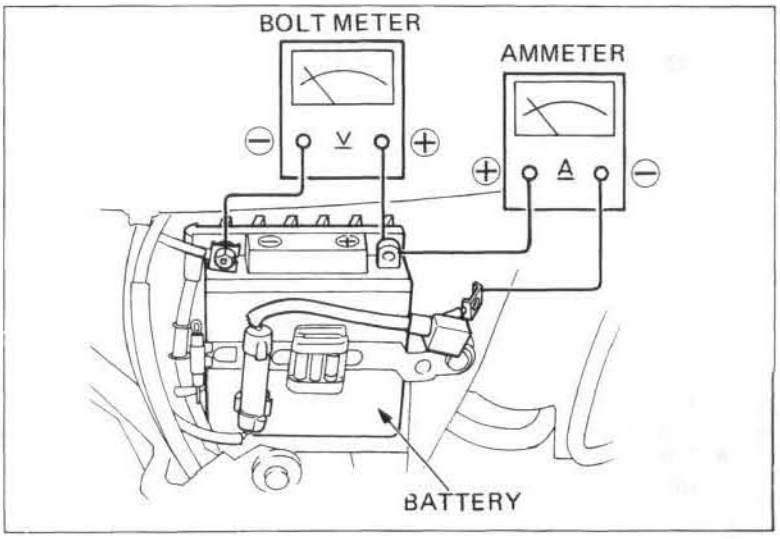
NOTE

Be sure the battery is in good condition before performing this test.

Warm up the engine.
Remove the right side cover and seat.
Disconnect the battery positive terminal and connect the ammeter positive wire to battery cable and the ammeter negative wire to battery positive terminal as shown.

CAUTION

Avoid the battery cable from touching to the frame body.

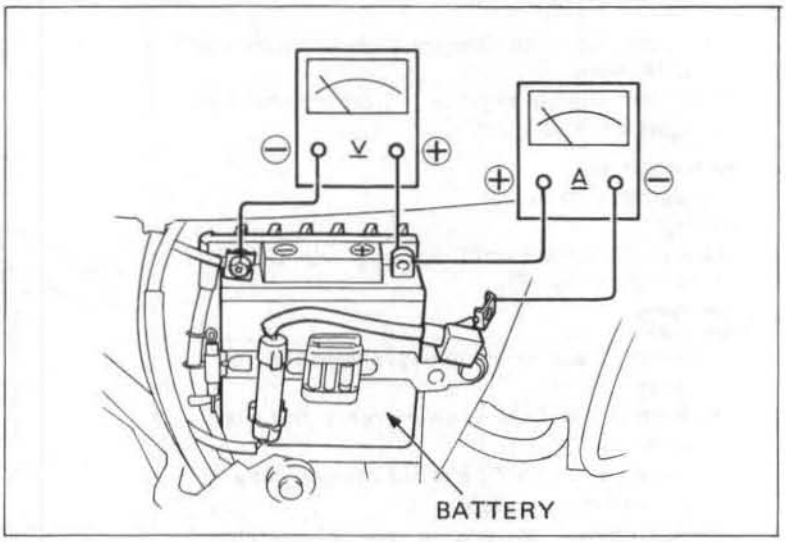


Connect the voltmeter across the battery terminals.
Start the engine, gradually increase engine speed and read the ammeter and voltmeter.
The ampere and voltage should be control to 0A and 13.5–15.5V.
If the readings do not meet the specifications, check the wires for loose connection and repair if necessary. If the wires are in good condition, replace the regulator/rectifier with a new one and retest.
If the readings still do not meet the specifications, perform the alternator output test (Page 16-4).

ALTERNATOR OUTPUT TEST

Disconnect the regulator/rectifier coupler.
Disconnect the black wire from the coupler and reconnect the coupler.
Connect the ammeter and voltmeter as the same as the current test.
Start the engine and gradually increase the engine speed.

Engine speed	2,500 rpm	8,000 rpm
Output	16.8V/2.7A min.	18.4V/5.5A max.



ALTERNATOR

INSPECTION

NOTE

> It is not necessary to remove the stator to make this test.

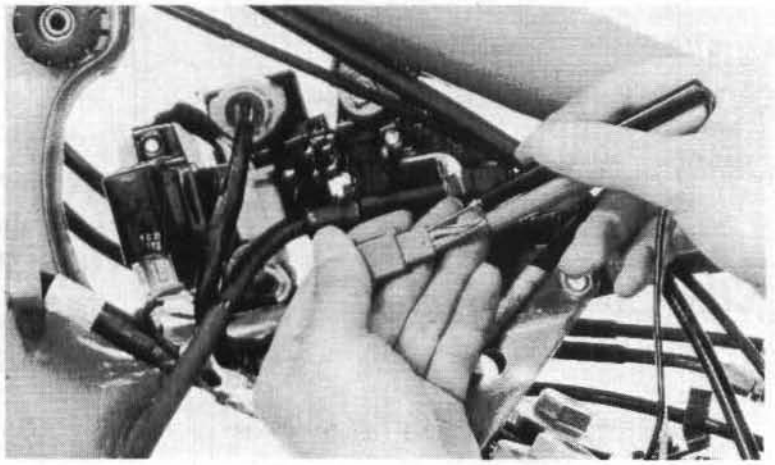
CHARGING COIL:
The charging coil is good if there is continuity between the pink wire and the yellow wire.

RESISTANCE IN NORMAL DIRECTION:
0.2–2.0 Ω

LAMP COIL:
The lamp coil is good if there is continuity between the white/yellow wire and ground.

RESISTANCE IN NORMAL DIRECTION:
0.1–1.0 Ω

If there is no continuity, there is an open circuit; replace the stator coil (Page 9-3).



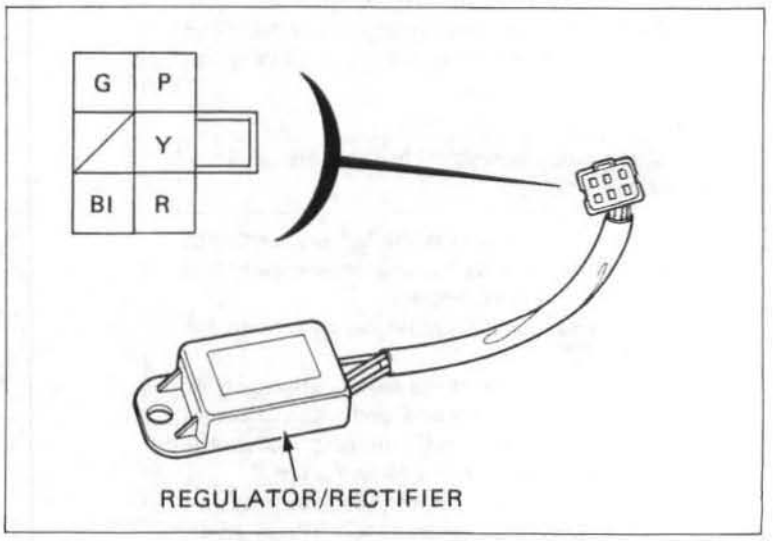
REGULATOR/RECTIFIER

INSPECTION

Disconnect the regulator/rectifier couplers.
Check the resistances between the leads with an ohmmeter. If the resistances are outside the specifications (see next page), replace the regulator rectifier.

NOTE

- Use a Sanwa SP-100, Kowa TH-5H-1, or Kowa KS-AHM-32-003 (U.S.A. only) multimeter.
- The regulator/rectifier has a semiconductor, so if using a different tester, the test results will be out of specification.



Tester range: KOWA X100Ω, SANWA XKΩ

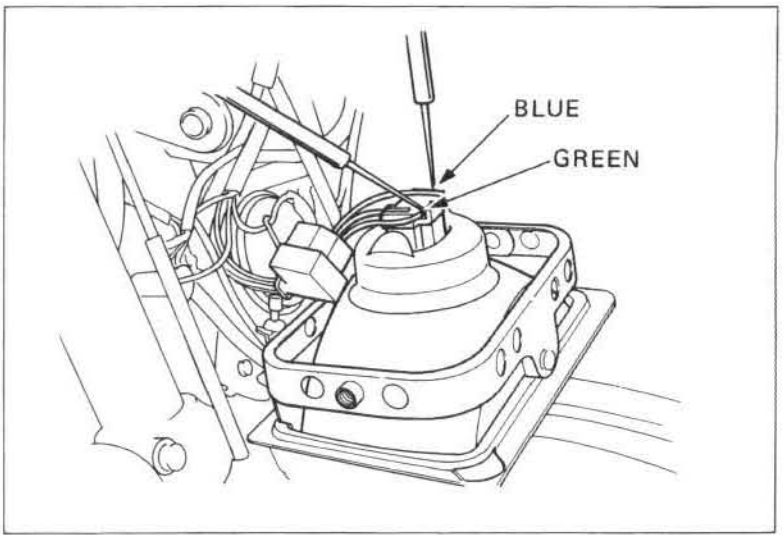
+ Probe / – Probe	Y	P	G	R	BI
Y		∞	∞	1–20	∞
P	∞		∞	1–20	∞
G	1–20	1–20		3–100	0.2–20
R	∞	∞	∞		∞
BI	1–50	1–50	0.2–10	3–100	

A.C. REGULATOR

VOLTAGE TEST

Remove the headlight and connect a voltmeter.
Switch the dimmer to "HI" position.
Start the engine and check the meter readings while increasing engine speed slowly.

SPECIFIC VOLTAGE:
13.5–14.5V at 5,000 rpm

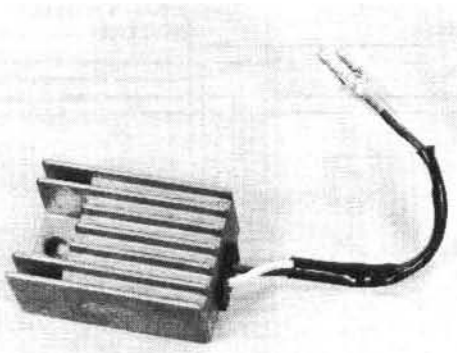


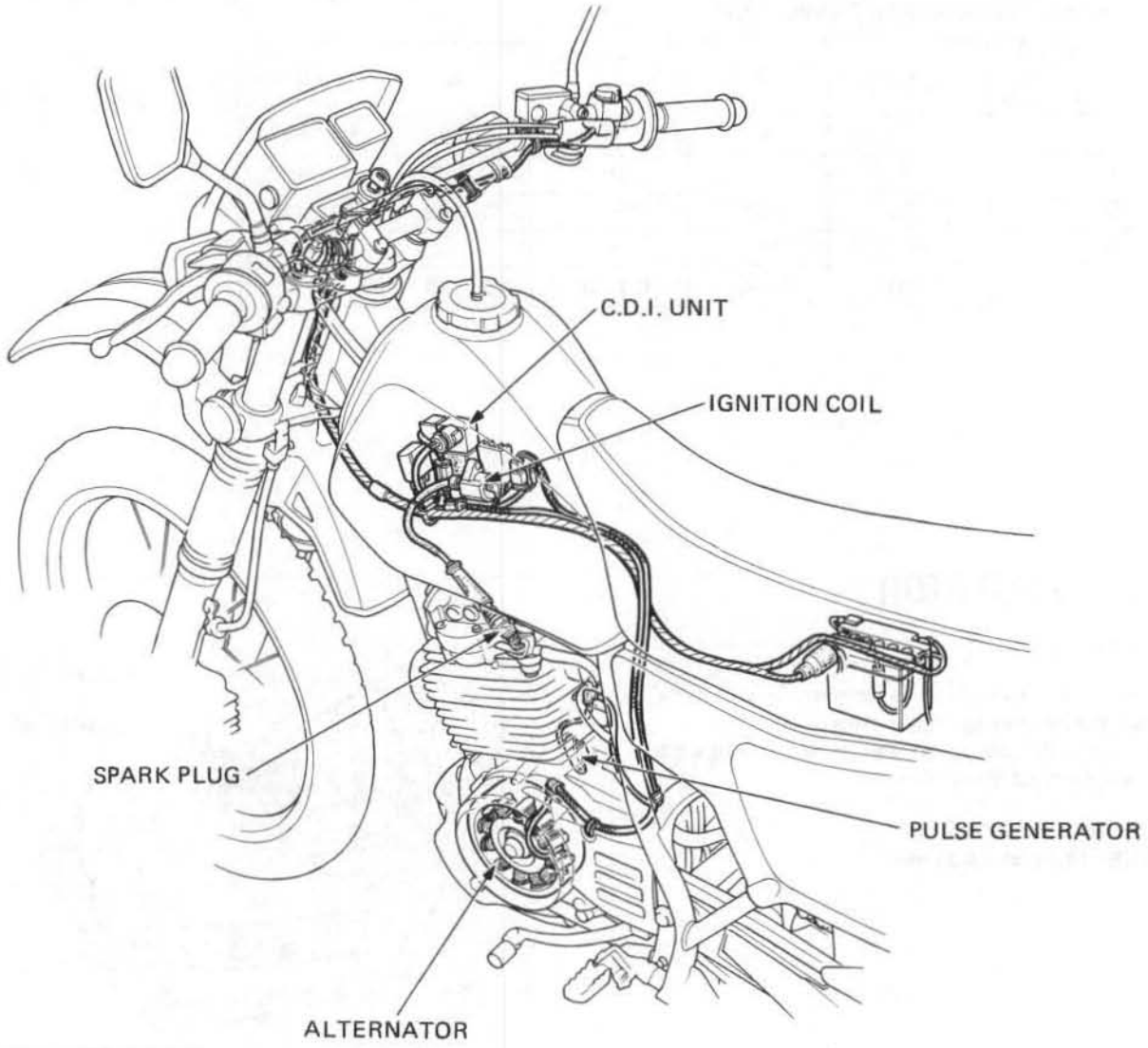
INSPECTION

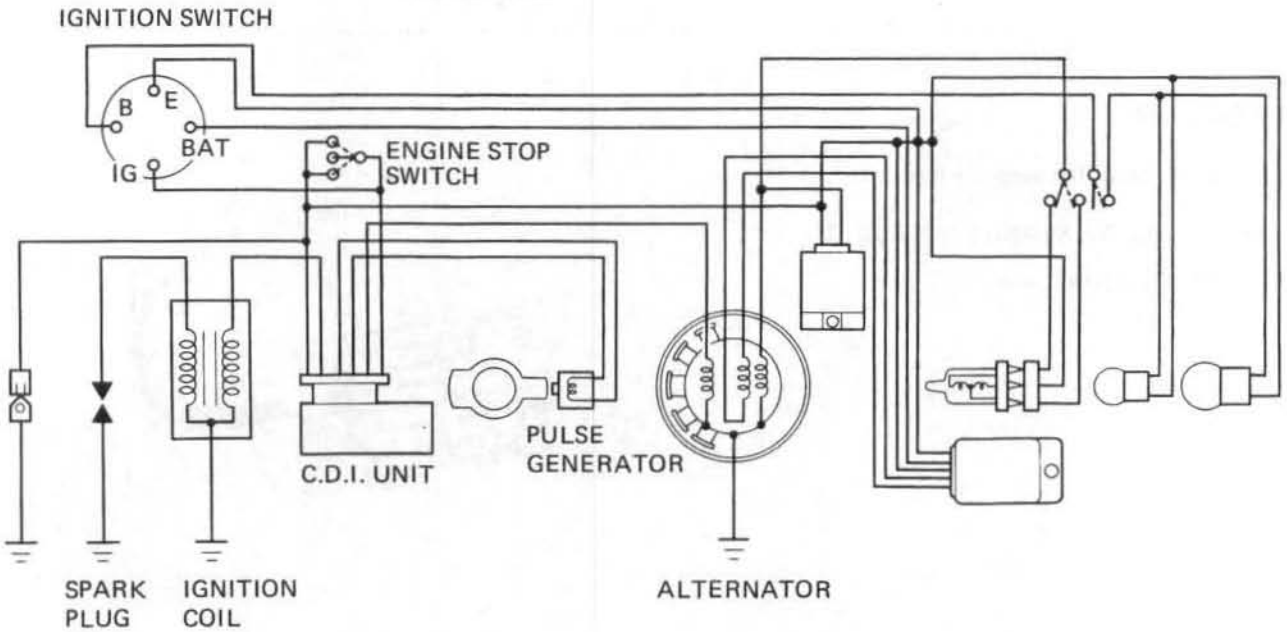
Check the resistance between the leads.

Tester range: KOWA X100Ω, SANWA XKΩ

RESISTANCE: 100 kΩ – ∞







17. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

- Ignition timing cannot be adjusted since the CDI (Capacitive Discharge Ignition) unit is non-adjustable.
- If ignition timing is incorrect, check the CDI unit, pulse generator and alternator and replace any faulty parts.

SPECIFICATIONS

Spark plug

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

Plug gap:	0.8–0.9 mm (0.031–0.035 in)
Ignition timing:	
Initial:	8° ± 2° at 1,300 rpm
Full advance:	28° ± 2° at 4,000 rpm

TOOL

Special

Multimeter	07308–0020000 or Kowa TH-5H-1
Digital multimeter	07406–0050000 or KS-AHM-32-003; U.S.A. only

TROUBLESHOOTING

No Spark Plug

- Engine stop switch "OFF"
- Poorly connected, broken or shorted wires
  - Between alternator and ignition coil
  - Between CDI unit and engine stop switch
  - Between CDI unit and ignition coil
  - Between CDI unit and ignition switch
  - Between ignition coil and plug
  - Between pulse generator and CDI unit
- Faulty ignition switch
- Faulty ignition coil
- Faulty CDI unit
- Alternator faulty
- Faulty pulse generator

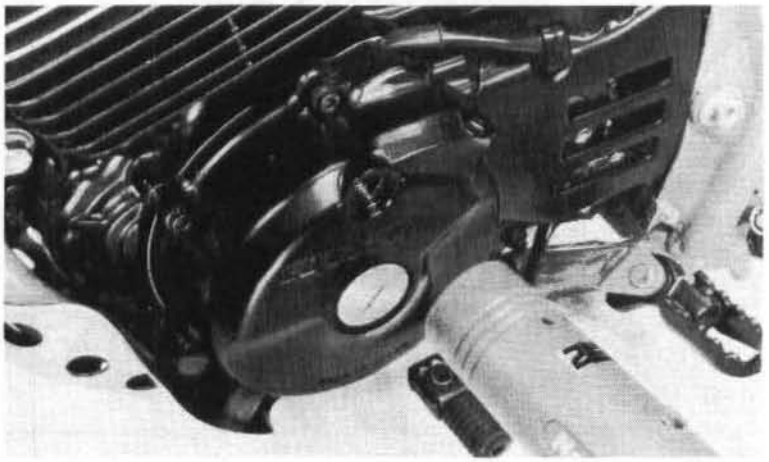
Engine Starts but Runs Poorly

- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Faulty pulse generator
- Secondary circuit
  - Alternator faulty
  - CDI unit faulty
  - Faulty pulse generator

IGNITION TIMING

NOTE

> The 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 timing hole cap.
Connect a tachometer and timing light.
Start the engine.
The timing at idle is correct if the index notch aligns with the "F" mark at (1,300 rpm).
To check the advance, raise the engine speed to 4,000 rpm. The index notch should be between the advance marks.
If the ignition timing is incorrect, check the CDI unit, pulse rotor and pulse generator, and replace any faulty parts.

SPARK PLUG

For spark plug gap inspection and adjustment procedures, see page 3-7.

IGNITION COIL

IGNITION COIL

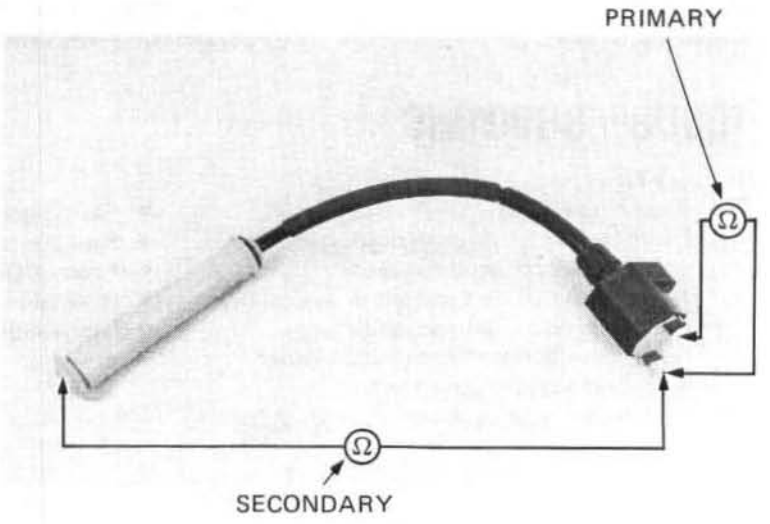
REMOVAL

Remove the fuel tank and disconnect the ignition coil wire leads.
Remove the attaching bolt and remove the coil.

INSPECTION

Measure the resistances of the primary and secondary coils.

PRIMARY: 0.1–0.3 Ω
SECONDARY: 3.5–4.7 kΩ

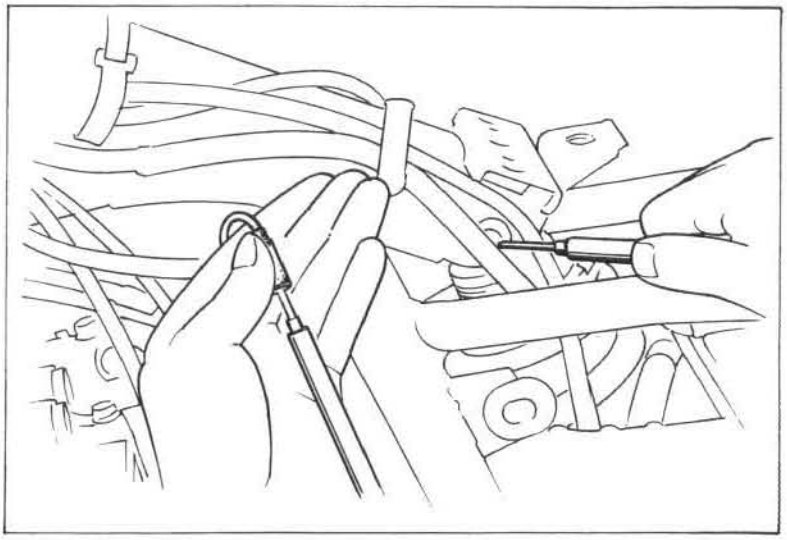


ALTERNATOR

EXCITER COIL INSPECTION

Disconnect the alternator wire coupler.
Measure the resistances between the black/red wire and ground.

RESISTANCE IN NORMAL DIRECTION:
50–200 Ω



CDI UNIT

REMOVAL

Remove the fuel tank and disconnect the coupler from the CDI unit and remove the CDI unit.

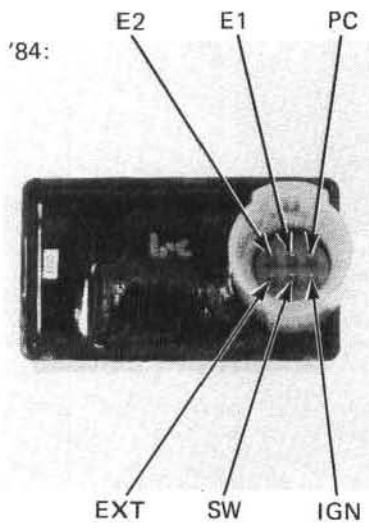
INSPECTION

Check continuity of the CDI terminals. Replace the CDI unit if the readings do not fall within the limits shown in the table.

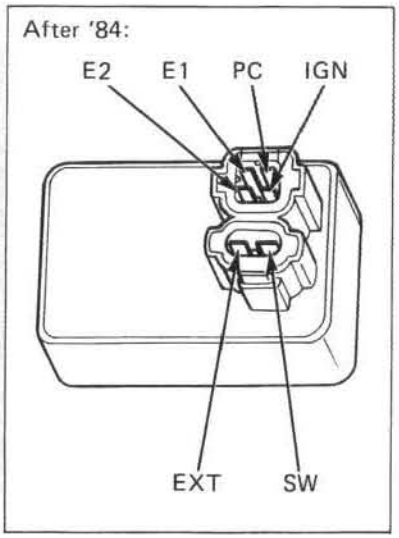
NOTE

- The CDI unit is fully transistorized.
- For accurate testing, it is necessary to use a specified electric tester. Use of an improper tester, or measurements in an improper range may give false readings.
- Use a 07308–0020000, Kowa TH-5H-1, 07406–0050000 or Kowa KS-AHM-32-003 (U.S.A. only) multimeter.

'84:



After '84:



Tester range: KOWA X100Ω, SANWA XKΩ

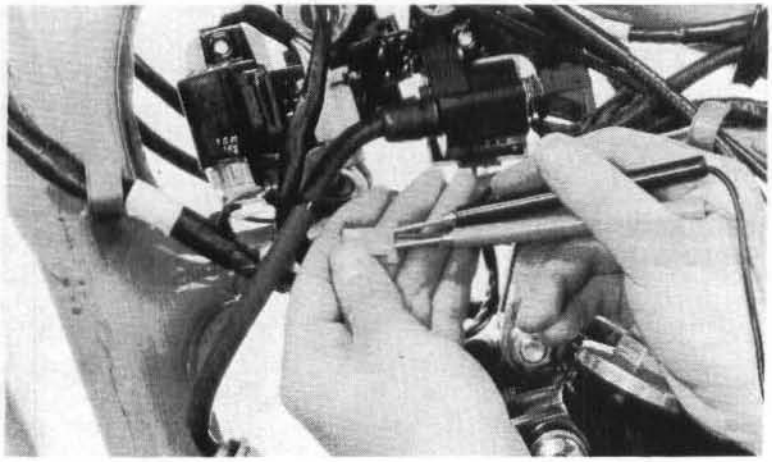
+ Probe / – Probe	SW	EXT	P-C	E1-E2	IGN
SW		∞	∞	∞	∞
EXT	0.1–50		50–∞	50–∞	∞
P-C	10–1.000	5–500		3–300	∞
E1-E2	0.2–250	0.1–100	0.5–100		∞
IGN	∞	∞	∞	∞	

PULSE GENERATOR

INSPECTION

Disconnect the pulse generator wire coupler. Measure the resistance between the Blue/Yellow and Green white wires.

SPECIFICATION: 460–580 Ω



18. SWITCHES/HORN/LIGHTS

SERVICE INFORMATION

GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other with corresponding band colors.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- Isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle – by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals or connections.

SPECIFICATIONS

Headlight	12V-60/55W	
Tail/stoplight	12V-32/3 cp	SAE No. 1157
Turn signal light	12V-32 cp	SAE No. 1073
Instrument light	12V-1 cp	
Neutral indicator	12V-2 cp	SAE No. 158
Turn signal indicator	12V-2 cp	SAE No. 158
High beam indicator	12V-1 cp	

TROUBLESHOOTING

No Lights Come On When Ignition Switch Is Turned ON

- Bulb at fault or burned out
- Faulty switch
- Wiring to that component has open circuit
- Fuse blown
- Wiring loose, broken, or at fault
- Battery dead or disconnected

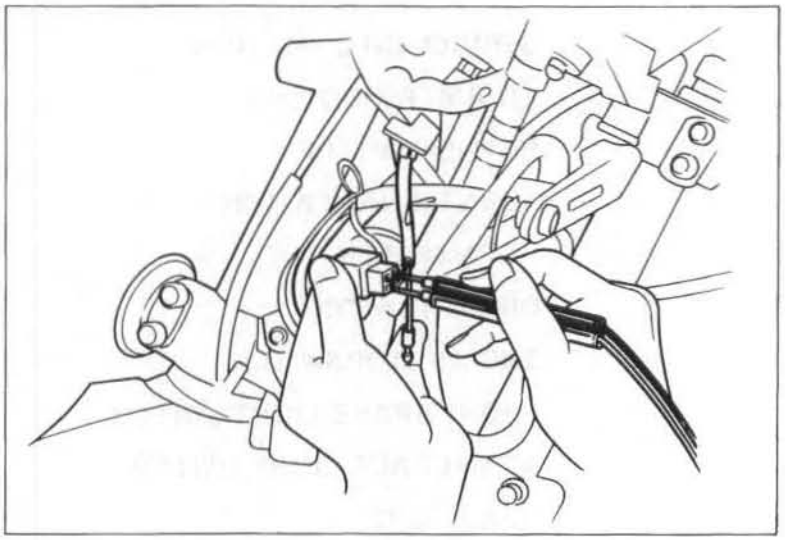
All Lights Come On, but Dimply, When Ignition Switch Is Turned ON

- Battery voltage low
- Wiring or switch has excessive resistance

Headlight Beam Does Not Shift When HI-LO Switch Is Operated

- Beam filament burned out
- Faulty dimmer switch

IGNITION SWITCH



TEST

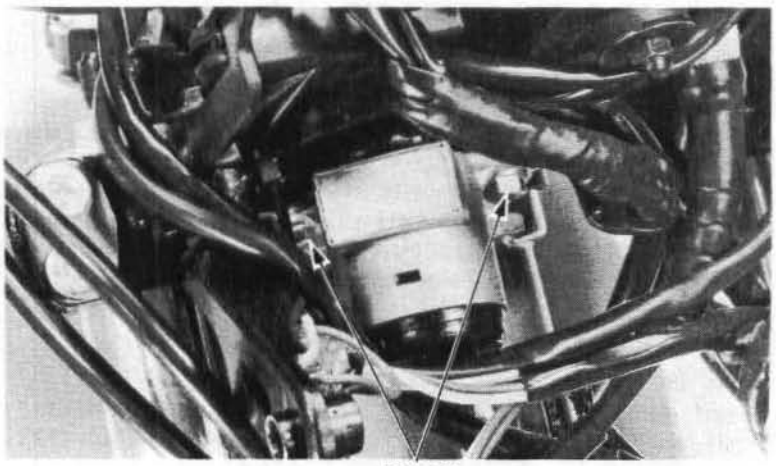
Remove the headlight and disconnect the ignition switch wires at the 4-P coupler. Check for continuity between terminals.

	B	BAT	IG	E
ON	○——	——○		
OFF			○——	——○
Color	Bl	R	Bl/W	G

Continuity should exist between color coded wires indicated by interconnected circles.

REMOVAL/INSTALLATION

Remove the headlight (Page 18-5).
Disconnect the ignition switch wire coupler.
Remove the ignition switch mounting bolts, and ignition switch.
Install the ignition switch in the reverse order of removal.

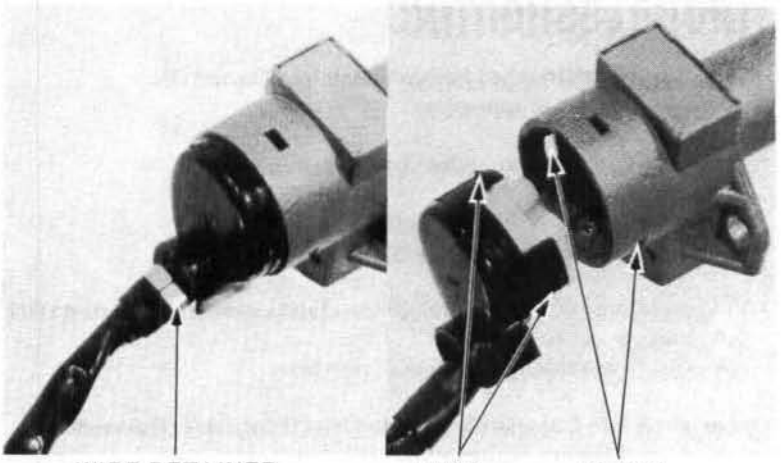


BOLTS

CONTACT BASE REPLACEMENT

Pry open the wire retainer.
Insert the ignition key and turn it partway between the ON and OFF detent positions.

Push in the lugs, that are locked in the slots then pull the contact base from the switch.
Assemble the ignition switch in the reverse order of disassembly.

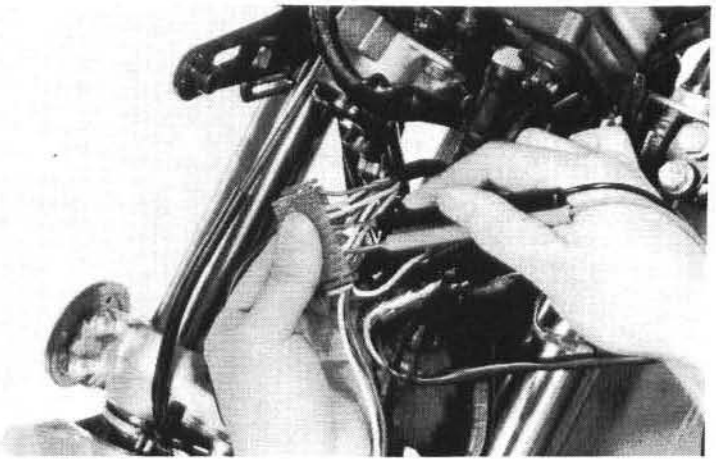


WIRE RETAINER LUGS SLOTS

TURN SIGNAL SWITCH

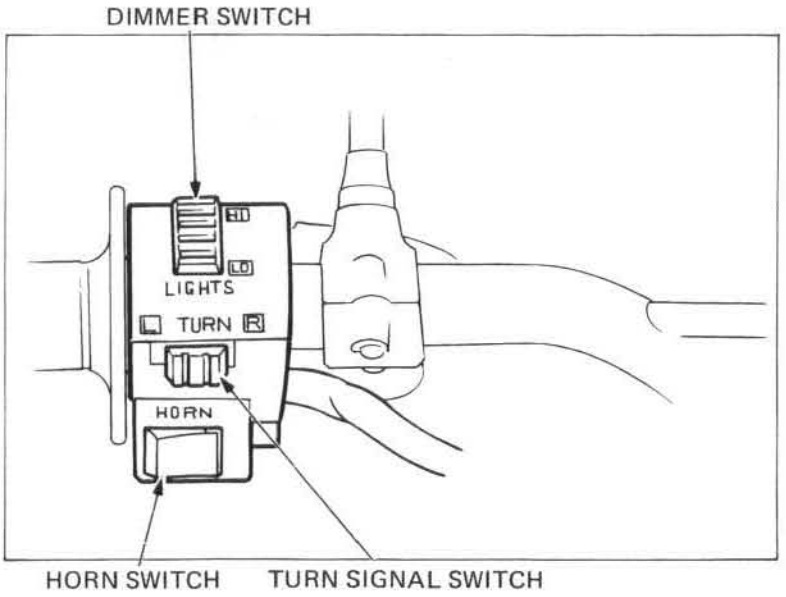
	W	L	R
R	○		○
(N)			
L	○	○	
Color	Gr	○	Lb

The switch is normal if there is continuity between the interconnected circles.



HORN SWITCH

	HO	BAT
FREE		
PUSH	○	○
Color	Lg	Bl



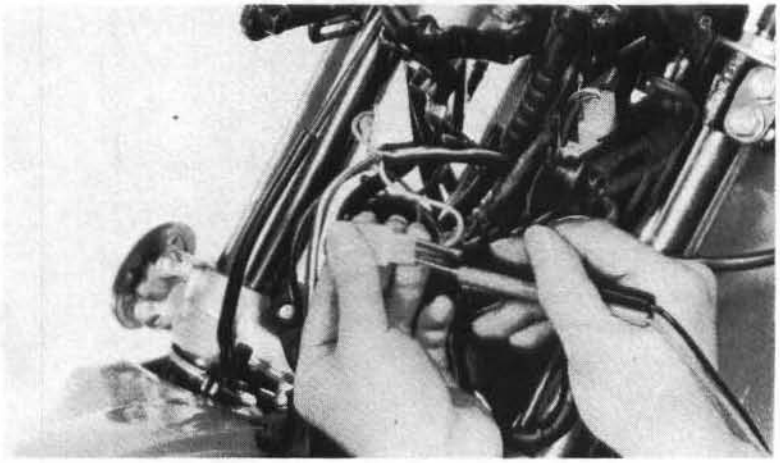
DIMMER SWITCH

	HL	HI	LO
Lo	○		○
(N)	○	○	○
Hi	○	○	
Color	W/Y	Bu	W

Continuity should exist between color coded wires indicated by interconnected circles.

ENGINE STOP SWITCH

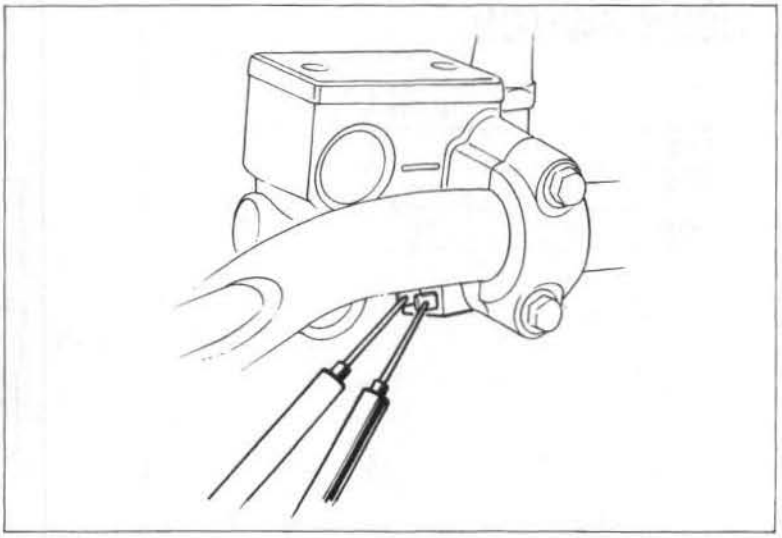
	IG	E
OFF	O——	——O
RUN		
OFF	O——	——O
Color	Bl/W	G



FRONT BRAKE LIGHT SWITCH

Check the front brake light switch for continuity with the front brake applied.

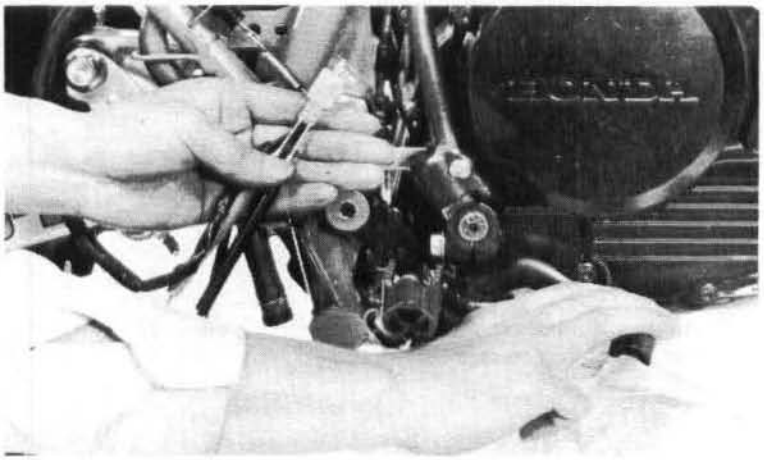
The switch is normal if there is continuity with the brake applied.



REAR BRAKE LIGHT SWITCH

Check the rear brake light switch for continuity with the rear brake applied.

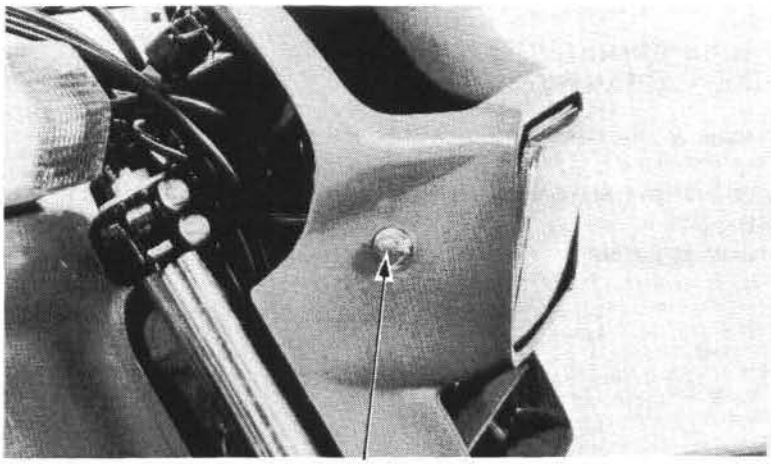
The switch is normal if there is continuity with the rear brake applied.



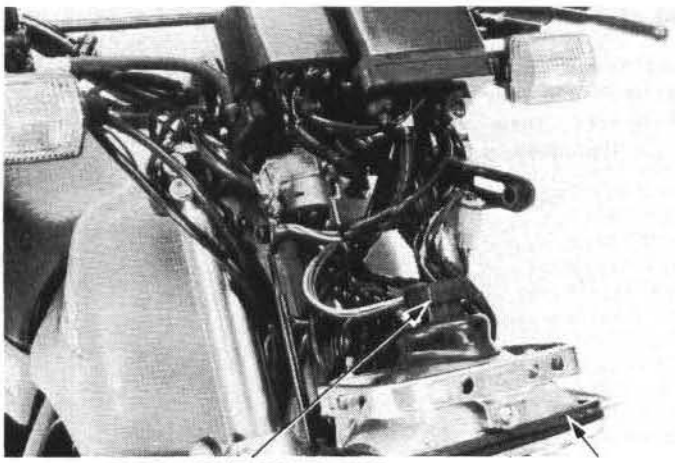
HEADLIGHT

HEADLIGHT REMOVAL

Remove two headlight case mounting bolts.
Remove the headlight shell/number plate.

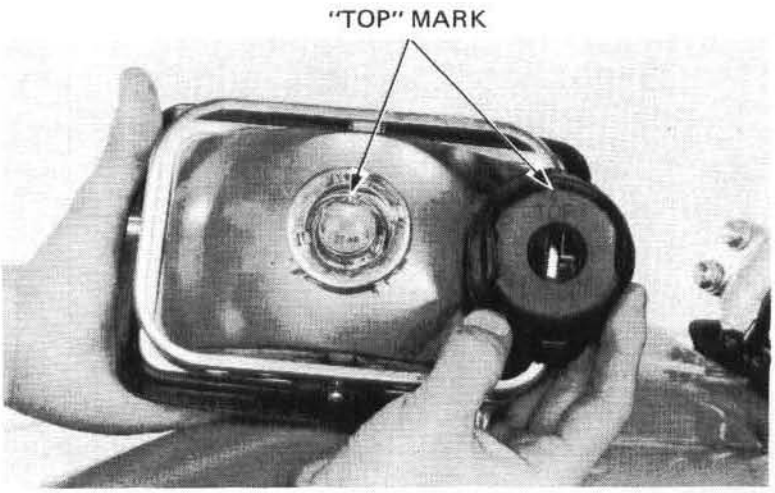


Remove the headlight.
Disconnect the all wires at their couplers and connectors.



HEADLIGHT REPLACEMENT

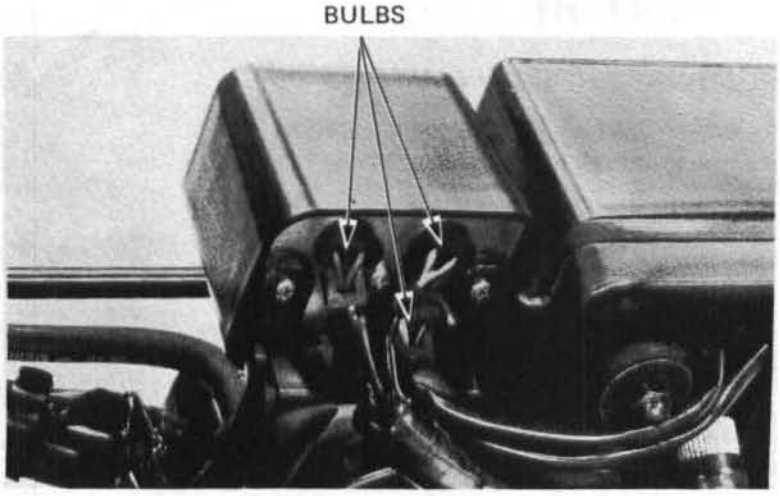
When installing the headlight bulb, make sure the top mark is up.



INSTRUMENTS

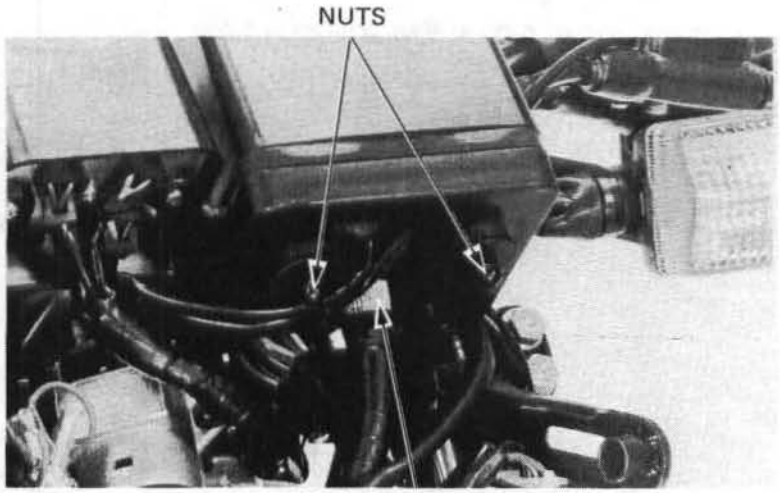
INDICATOR LIGHT BULB REPLACEMENT

Remove the headlight case and headlight (Page 18-5).
Gently remove the bulb socket from the back of the instrument.
Replace the bulb.



SPEEDOMETER REMOVAL/ INSTALLATION

Disconnect the speedometer cable.
Remove the speedometer attaching nuts.
Remove the speedometer.
Installation is the reverse of removal.



19. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		Probable Cause
1. Check if fuel is getting to the carburetor GETTING TO CARBURETOR ↓	NOT GETTING TO CARBURETOR →	(1) No fuel in fuel tank (2) Clogged fuel tube or fuel filter (3) Clogged float valve (4) Clogged fuel tank cap breather tube
2. Try spark test GOOD SPARK ↓	WEAK OR NO SPARK →	(1) Faulty spark plug (2) Fouled spark plug (3) Faulty CDI unit (4) Broken or shorted high spark plug wire (5) Faulty alternator (6) Broken or shorted ignition coil (7) Faulty engine stop switch (8) Faulty pulse generator (9) Poorly connected, broken or shorted wires
3. TEST CYLINDER COMPRESSION COMPRESSION NORMAL ↓	LOW COMPRESSION →	(1) Valve clearance too small (2) Valve stuck open (3) Worn cylinder and piston rings (4) Damaged cylinder head gasket (5) Improper valve timing (6) Improperly adjusted decompression mechanism (7) Seized valve
4. Start by following normal starting procedure ENGINE DOES NOT FIRE ↓	ENGINE STARTS BUT SOON STALLS →	(1) Choke excessively open (2) Carburetor air screw excessively closed (3) Air leaking past intake pipe (4) Improper ignition timing (CDI unit or pulse generator faulty)
5. Remove spark plug DRY ↓	WET PLUG →	(1) Carburetor flooded (2) Carburetor choke excessively closed (3) Throttle valve excessively open
6. START WITH CHOKE APPLIED		

ENGINE LACKS POWER

		Probable Cause
1. Raise wheels off ground and spin by hand WHEEL SPINS FREELY	WHEEL DOES NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearing (3) Drive chain too tight (4) Rear axle nut excessively tightened
2. Check tire pressure with tire gauge PRESSURE NORMAL	PRESSURE TOO LOW →	(1) Punctured tire and tube (2) Faulty tire valve
3. Try rapid acceleration from low to second ENGINE SPEED LOWRED WHEN CLUTCH IS RELEASED	ENGINE SPEED DOES NOT CHANGE WHEN CLUTCH IS RELEASED →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate
4. Lightly accelerate engine ENGINE SPEED INCREASE	ENGINE SPEED DOES NOT INCREASE SUFFICIENTLY →	(1) Carburetor choke closed (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged fuel tank breather tube (5) Clogged muffler
5. Check ignition timing CORRECT	INCORRECT →	(1) Faulty CDI unit (2) Faulty pulse generator (3) Faulty alternator
6. Check valve clearance CORRECT	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
7. Test cylinder compression using compression gauge NORMAL	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing (5) Improperly adjusted decompression mechanism
8. Check carburetor for clogging NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough
9. Remove spark plug NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plug not serviced frequently enough (2) Use of plug with improper heat range

10. Remove oil level gauge and check oil level and for dirty oil	OIL LEVEL INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
CORRECT ↓		
11. Remove cylinder head cover and inspect lubrication	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil control orifice
VALVE TRAIN LUBRICATED PROPERLY ↓		
12. Check if engine overheats	OVERHEATED →	(1) Excessive carbon build-up in combustion chamber (2) Use of improper quality of fuel (3) Clutch slipping (4) Fuel air mixture too lean
13. Accelerate or run at high speed	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Fuel air mixture too lean (3) Use of improper grade of fuel (4) Excessive carbon build-up in combustion chamber (5) Ignition timing too advanced (Faulty CDI unit)
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		Probable Cause
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty CDI unit)
CORRECT ↓		
2. Check carburetor air screw adjustment	INCORRECT →	(1) Fuel-air mixture too lean (To correct, screw in) (2) Fuel-air mixture too rich (To correct, screw out)
CORRECT ↓		
3. Check if air is leaking past intake pipe	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor
NOT LEAKING ↓		
4. Try spark test	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty CDI unit (3) Alternator faulty (4) Faulty ignition coil (5) Faulty pulse generator
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

		Probable Cause
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Faulty CDI unit (3) Faulty pulse generator (4) Faulty alternator
CORRECT ↓		
2. Disconnect fuel tube at carburetor	FUEL FLOW RESTRICTED →	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank breather tube
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet	CLOGGED →	(1) Clean
NOT CLOGGED ↓		
4. Check valve timing	INCORRECT →	(1) Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	(1) Faulty spring
NOT WEAKENED		

POOR HANDLING — Check tire pressure

	Probable Cause
1. If steering is heavy →	(1) Steering head adjuster too tight (2) Damaged steering cones or steel balls
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Distorted rim (3) Improperly installed wheel hub (4) Swing arm pivot bushing excessively worn (5) Distorted frame (6) Improper drive chain tension or adjustment (7) Loose swing arm pivot bolt (8) Loose engine hanger bolt
3. If the motorcycle pulls to one side →	(1) Bent frame (2) Front and rear wheels not aligned (3) Bent front fork (4) Bent swing arm