HONDA

CBX750F

SHOP MANUAL
MANUEL D'ATELIER
WERKSTATT-HANDBUCH
MANUAL DE TALLER

E

HOW TO USE THIS MANUAL

This shop manual describes the technical features and servicing procedures for the CBX 750F.
Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.
Throughout the manual, the following abbreviations are used to identify individual models.

CODE	AREA (TYPE)
E	UK
F	France
G	Germany
ED	Europe
SA	South Africa
U	Australia
SW	Switzerland
ND	Northern Europe
IT	Italy
H	Netherland
AR	Austria

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break in period.
Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 19 describe parts of the motorcycle, grouped according to location.
Find the section you want on this page, then turn to the table of contents on page 1 of that section.
Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedures.
If you don't know the source of the trouble, go to section 21, TROUBLESHOOTING.

HONDA MOTOR CO., LTD
SERVICE PUBLICATION OFFICE

Contents

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 gas contains poisonous carbon monoxide gas.

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

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

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

SPECIFICATIONS

* E, F, U, SA, IT, H ** G, ED, AR *** SW, ND

ITEM				SPECIFICATIONS
DIMENSIONS	Overall Length			*2145mm (84.4") **2175mm (85.6") ***2180 (85.8")
	Overall width			740 mm (29.1")
	Overall height			1240 mm (48.8")
	Wheelbase			1465 mm (57.7")
	Seat Height			795 mm (31.3")
	Footpeg Height			365 mm (14.4")
	Ground Clearance			145 mm (5.7")
	Dry Weight			218 kg (481 lb)
	Curb Weight			238 kg (525 lb)
FRAME	Type			Double Cradle
	Front Suspension, travel			Telescopic fork, 150 mm (5.9")
	Rear Suspension, travel			Swingarm/shock absorber, 42.5 mm (1.67")
	Front suspension air pressure			0-40 kPa (0-0.4 kg/cm^2, 0-6 psi)
	Readr suspension air pressure			0-400 kPa (0-4.0 kg/cm^2, 0-57 psi)
	Front tyre size			110/90 V16 Tubeless
	Rear tyre size			130/80 V18 Tubeless
	Cold tyre pressures	Driver only	Front	250 kPa (2.50 kg/cm^2 36 psi)
			Rear	250 kPa (2.50 kg/cm^2 36 psi)
		Driver & one passenger	Front	250 kPa (2.50 kg/cm^2 36 psi)
			Rear	290 kPa (2.90 kg/cm^2 41 psi)
	Front brake, lining swept area			Double disk 904 cm^2 (140 sq in)
	Rear brake, lining swept area			Single disk 452 cm^2 (70 sq in)
	Fuel capacity			22 litres (5.8 US gal, 4.8 Imp gal)
	Fuel reserve capacity			4 litres (1.1 US gal, 0.9 Imp gal)
	Caster angle			63°00'
	Trail			93 mm (3.7 in)
	Front fork capacity			Right: 375 cc (132 oz), Left: 400 cc (14.1 oz)
ENGINE	Type			Air cooled 4 stroke, DOHC
	Cylinder arrangement			Vertical in line four
	Bore and stroke			67.0 x 53.0 mm (2.6 x 2.1 in)
	Displacement			747 cm^2 (45.6 cu. In)
	Compression ratio			9.3 : 1
	Valve train			Chain driven DOHC, 4 valves per cylinder
	Maximum horsepower			(DIN) 67 kW (91 ps)/9500 rpm
	Maximum torque			70 nm (7.1 kg.m)/8500 rpm
	Oil capacity			3.6 litres (3.8 US qt, 3.2 Imp qt) after disassembly
				2.5 litres (2.6 US qt, 2.2 Imp qt) after draining
	Lubrication system			Forced pressure and wet sump
	Air filtration			Paper filter
	Cylinder compression			1,200 ± 200 kPa (12.0 ± 2.0 kg/ cm^2 . 171 ± 28 psi)
	Intake valve	Opens		10° (BTDC) at 1 mm lift
		Closes		40° (ABDC) "
	Exhaust valve	Opens		45° (BBDC) "
		Closes		5° (ATDC) "
	Valve clearance	(Cold)		IN: 0 mm HYDRAULIC
				EX: "
	Engine weight (dry)			80 kg (176 lb)
	Idle speed			1,000 ± 100 rpm

ITEM		SPECIFICATIONS	
CARBURETION	Carburettor type/throttle bore	KEIHIN VE/34 mm (1.34 in)	
	Identification number	VE64B	
	Pilot screw initial setting	2 turns out	
	Float level (gauge level)	18.5 mm (0.73 in)	
DRIVE TRAIN	Clutch	Wet, multi plate	
	Transmission	6 speed	
	Primary reduction	1.780	
	Final reduction	2.812	
	Gear ratio I	3.000	
	Gear ratio II	2.235	
	Gear ratio III	1.750	
	Gear ratio IV	1.434	
	Gear ratio V	1.240	
	Gear ratio VI	1.115	
	Gear shift pattern	Left foot operated return system 1-N-2-3-4-5-6	
ELECTRICAL	Ignition	Full transistor ignition	
	Ignition timing "F" mark	10° BTDC at idle	
	Full advance	32° BTDC at 3,150 rpm	
	Starting system	Starting motor	
	Alternator	320 W/5,000 rpm (engine rpm)	
	Battery capacity	12V-14V AH	
	Spark plugs	< > : U	
		NGK	ND
	Standard	DPR8EA-9 <DP8EA-9>	X24EPR-U9 <X24EP-U9>
	For clod climate (below 5°C, 41°F)	DPR7EA-9 <DP7EA-9>	X22EPR-U9 <X22EP-U9>
	For extended high speed riding	DPR9EA-9 <DP9EA-9>	X27EPR-U9 <X27EP-U9>
	Spark plug gap	0.8-0.9 mm(0.031-0.035 in)	
	Firing order	1-3-4-2	
	Fuse/Main fuse	10A x 3, 15A x 3/30A	
LIGHTS	Headlight (high/low beam)	61/55W x 2 (E, U, SA, ED) 60W + 60/55W (G, AR, H) 60W + 55W (F) 60/55W (SW, IT, ND)	
	Tail/stoplight	5/21W	
	Front turn signal	21W	
	Rear turn signal	21W	
	Instrument lights	3.4W x 4	
	Neutral indicator	3.4W	
	Turn signal indicator	3.4W	
	High beam indicator	3.4W	
	Position light	4W (G, AR, F, SW, IT, ND) 4W x 2 (E, U, SA, ED)	
	Open circuit indicator	3.4W	

TORQUE VALUES

ENGINE

Item	Q'ty	Thread Dia. (mm)	Torque N-m (kg-m, ft-lb	Remarks
Main gallery plug	2	20	25-35 (2.5-3.5, 18-25)	Apply thread lock agent to the threads
Oil Filter	1	20	15-20 (1.5-2.0, 11-14)	Apply thread lock agent to the filter boss threads in the crank case
Engine oil drain plug	1	12	30-40 (3.0-4.0, 22-29)	
Cylinder head cover	8	6	8-12 (0.8-1.2, 6-9)	
Drive sprocket	1	10	50-55 (5.0-5.5, 36-40)	
Gear shift pedal	1	6	8-12 (0.8-1.2, 6-9)	
Camshaft holder	20	6	12-16 (1.2-1.6, 9-12)	
Cam sprocket	4	7	18-20 (1.8-2.0, 13-14)	
Centre shift fork	1	7	16-20 (1.6-2.0, 12-14)	
Oil bolt (7 mm)	4	7	10-14 (1.0-1.4, 7-10)	
Oil bolt (8 mm)	2	8	12-16 (1.2-1.6, 9-12)	
Oil bolt (10 mm)	4	10	23-27 (2.3-2.7, 17-20)	
Cylinder head	12	9	26-30 (2.6-3.0, 19-22)	Apply engine oil to the threads and flange
Spark plug	4	12	12-18 (1.2-1.8, 9-13)	
Oil pressure switch	1	-	16-20 (1.6-2.0, 12-14)	Apply thread lock agent to the threads
Clutch lock nut	1	22	75-85 (7.5-8.0, 54-61)	Apply thread lock agent to the threads
Shift drum stopper arm	1	6	10-14 (1.0-1.4, 7-10)	
Crank case (6 mm)	16	6	10-14 (1.0-1.4, 7-10)	
Crank case (7 mm)	2	7	15-19 (1.5-1.9, 11-14)	
Crank case (8 mm)	12	8	21-25 (2.1-2.5, 15-18)	Apply molybdenum disulfide grease to the threads & flange
Countershaft bearing cover	7	8	21-25 (2.1-2.5, 15-18)	Apply thread lock agent to the threads
Air separator cover	1	10	23-27 (2.3-2.7, 17-20)	
Alternator shaft	1	10	30-38 (3.0-3.8, 22-27)	
Connecting rod cap	8	8	30-34 (3.0-3.4, 22-25)	Apply molybdenum disulfide grease to the threads & flange
Pulse rotor	1	10	30-40 (3.0-4.0, 22-29)	
Alternator rotor	1	10	30-38 (3.0-3.8, 22-27)	
Slave cylinder bleed valve	1	8	4-7 (0.4-.07, 2.9-5.1)	

FRAME

Item	Q'ty	Thread Dia. (mm)	Torque N-m (kg-m, ft-lb	Remarks
Engine mount bolt (8 mm)	8	8	20-30 (2.0-3.0, 14-22)	
Engine mount bolt (10 mm)	4	10	45-60 (4.5-6.0, 33-43)	
Muffler to engine	2	10	45-60 (4.5-6.0, 33-43)	
Master cylinder reservoir cap	4	4	1-2 (0.1-0.2, 0.7-1.4)	
Master cylinder holder	4	6	10-14 (1.0-1.4, 7-10)	
Oil bolt	9	-	25-30 (2.5-3.0, 18-22)	
Oil hose bolt (engine to frame)	4	8	24-30 (2.4-3.0, 17-22)	Apply thread lock agent to the threads

FRAME continued

Item	Q'ty	Thread Dia. (mm)	Torque N-m (kg-m, ft-lb	Remarks
Handlebar pinch bolt	2	8	25-30 (2.5-3.5, 18-25)	Apply grease to the threads
Frame oil drain bolt	2	8	24-30 (2.4-3.0, 17-22)	
Front brake disk	12	8	35-40 (3.5-4.0, 25-29)	Apply grease to the threads
Front axle nut	1	14	55-65 (5.5-6.5, 40-47)	
Front caliper bracket	3	10	35-45 (3.5-4.5, 25-33)	
Anti dive pivot bolt	1	6	10-14 (1.0-1.4, 7-10)	
Axle holder	4	8	18-26 (1.8-2.6, 13-19)	
Fork piston	2	8	15-25 (1.5-2.5, 11-18)	
Fork top pinch bolt	2	7	9-15 (0.9-1.5, 7-11)	
Fork bottom pinch bolt	2	10	45-55 (4.5-5.5, 33-40)	
Fork brace	4	6	10-15 (1.0-1.5, 7-11)	
Steering bearing adjustment nut	1	26	23-27 (2.3-2.7, 17-20)	Apply engine oil to the threads
Steering stem nut	1	24	90-120 (9.0-12.0, 65-87)	
Steering stem pinch bolt	1	8	20-30 (2.0-3.0, 14-22)	
Fork cap	2	35	15-30 (1.5-3.0, 11-22)	
Anti dive case	4	6	6-9 (0.6-0.9, 4-7)	
Rear brake disk	6	8	35-40 (3.5-4.0, 25-29)	Apply grease to the threads
Final drive sprocket	5	12	80-100 (8.0-10.0, 58-72)	
Rear axle nut	1	18	85-105 (8.5-10.5, 61-76)	
Rear shock absorber	2	10	40-50 (4.0-5.0, 29-36)	
Shock link-to-arm	1	10	40-50 (4.0-5.0, 29-36)	
Shock arm-to-frame	1	10	40-50 (4.0-5.0, 29-36)	
Shock link-to-swingarm	1	10	40-50 (4.0-5.0, 29-36)	
Rear brake caliper-to torque link	1	10	30-40 (3.0-4.0, 22-29)	
Swingarm pivot bolt	1	14	60-70 (6.0-7.0, 43-51)	
Caliper mount bolt	3	8	20-25 (2.0-2.5, 14-18)	
Caliper pin	3	12	25-30 (2.5-3.0, 18-22)	
Pad pin retainer	3	6	8-13 (0.8-1.3, 6-9)	
Footpeg bracket	6	10	35-45 (3.5-4.5, 25-33)	

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

STANDARD TORQUE VALUES

Type	Torque N-m (kg-m, ft-lb	Type	Torque N-m (kg-m, ft-lb
5 mm bolt, nut	4.5-6 (0.45-0.6, 3.5-4.5)	5 mm screw	3.5-5.0 (0.35-5.0, 2.5-3.6)
6 mm bolt, nut	8-12 (0.8-1.2, 6-9)	6 mm screw	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	30-40 (3.0-4.0, 22-29)

TOOLS

SPECIAL

TOOL NAME	TOOL NUMBER	REFERENCE PAGE
Bearing remover set	07946-MJ00000	14-18
Driver shaft	07946-MJ00100	14-18
Driver head	07946-MJ00200	14-18
Pilot screw wrench	07908-4220201	3-8, 4-14
Oil filter wrench	07912-6110001	2-3
Steering stem socket	07916-3710100	13-33, 13-36
Hex wrench, 6 mm	07917-3230000	13-21
Rotor puller	07933-2160000	16-7
Bearing remover, 17 mm	07936-3710300	12-7
Bearing remover handle	07936-3710100	12-7
Bearing remover weight	07741-0010201	12-7
Bearing driver attachment, 28 x 30 mm	07946-1870100	9-2
Bearing race remover	07946-3710500	13-34
Ball race remover	07953-MJ10000	13-34
Fork seal driver	07946-4630100	13-28
Piston ring compressor	07954-2830000	7-7, 7.8
Piston base	07958-3000000	7-7
Oil seal driver attachment	07965-MA10200	14-10, 14-11
Oil seal driver attachment	07965-MB00100	14-12
Oil seal driver adapter	07965-ME70100	14-12
Oil seal driver	07965-MC70100	14-10, 14-12
Crank case assembly pin	07973-ME50000	10-4
Hydraulic tappet bleeder	07973-MJ00000	6-8, 6-18
Valve guide reamer	07984-MA60000	6-12, 6-13
Valve guide driver	07942-MA60000	6-13
Steering stem guide	07946-MB00000	13-35
Oil pressure gauge attachment	07510-MJ10100	2-4
Compression gauge attachment	07510-MB00101	3-9
Snap ring pliers	07914-3230001	8-4, 8-6, 13-22, 13-29, 15-9, 15-10, 15-16, 15-17

COMMON

TOOL NAME	TOOL NUMBER	REFERENCE PAGE
Float level gauge	07401-0010000	4-6
Lock nut wrench, 17 x 27 mm	07716-0020300	8-10, 8-17
Lock nut wrench, 30 x 32 mm	07716-0020400	13-32, 13-37
Extension bar	07716-0020500	8-10, 8-17, 13-32, 13-33, 13-36, 13-37
Universal holder	07725-0030000	8-10, 8-17, 12-2, 12-9

COMMON continued

TOOL NAME	TOOL NUMBER	REFERENCE PAGE
Attachment, 32 x 35 mm	07746-0010100	14-18, 14-19
Attachment, 37 x 40 mm	07746-0010200	12-17, 8-13
Attachment, 42 x 47 mm	07746-0010300	12-6, 13-16, 13-35
Attachment, 52 x 55 mm	07746-0010400	13-35, 14-6
Attachment, 62 x 68 mm	07746-0010500	14-6
Pilot, 15 mm	07746-0040300	13-16, 14-18
Pilot, 17 mm	07746-0040400	12-7
Pilot, 20 mm	07746-0040500	12-6, 14-6
Pilot, 22 mm	07746-0041000	14-19
Pilot, 25 mm	07746-0040600	14-6
Pilot, 35 mm	07746-0040800	8-13
Driver	07749-0010000	
Driver	07746-0020100	12-6
Attachment, I.D. 20 mm	07746-0020400	12-6
Driver	07746-0030100	11-5
Attachment, I.D. 25 mm	07746-0030200	11-5
Bearing remover shaft	07746-0050100	13-15, 14-5
Bearing remover head, 15 mm	07746-0050400	13-15
Valve spring compressor	07757-0010000	6-11, 6-15

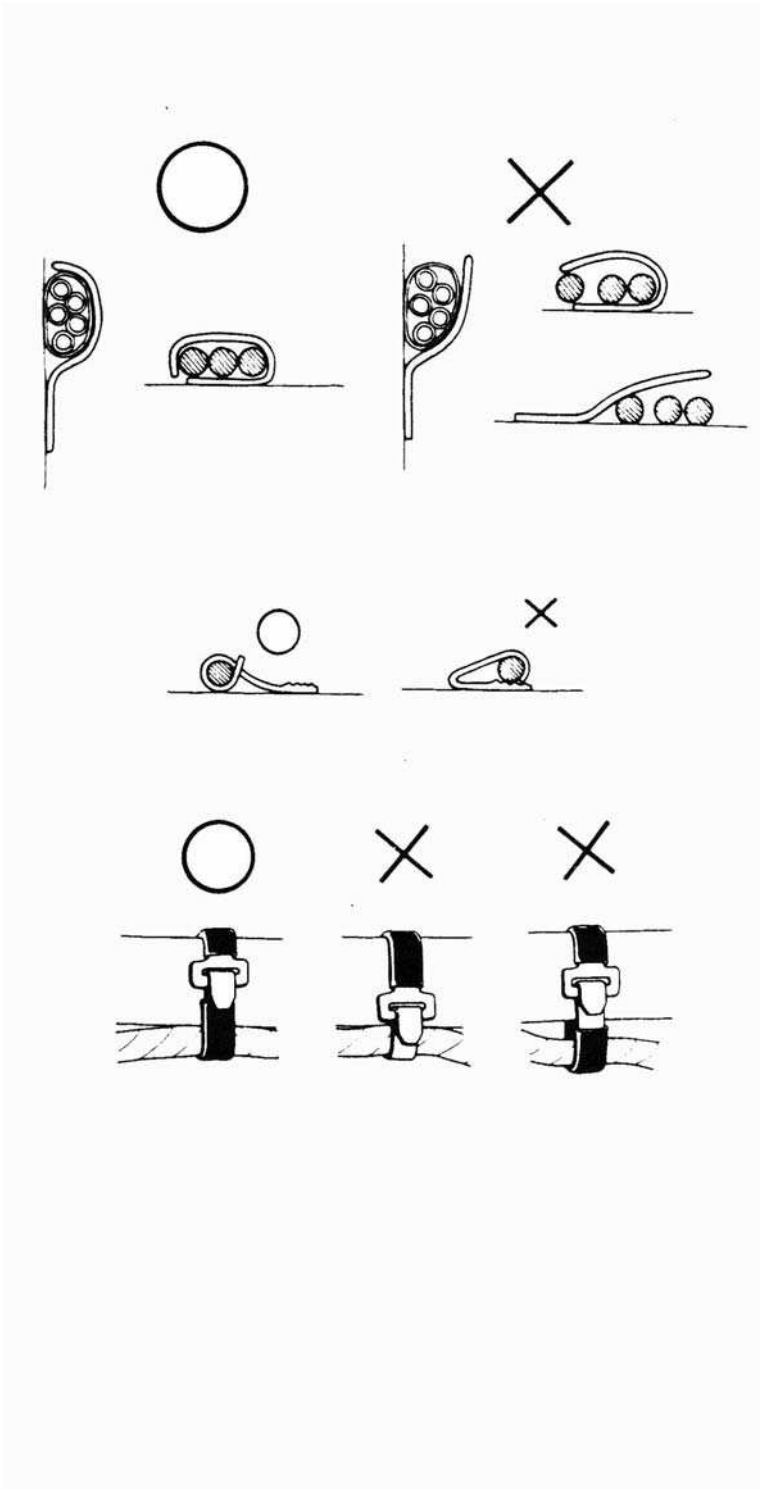
VALVE SET CUTTER

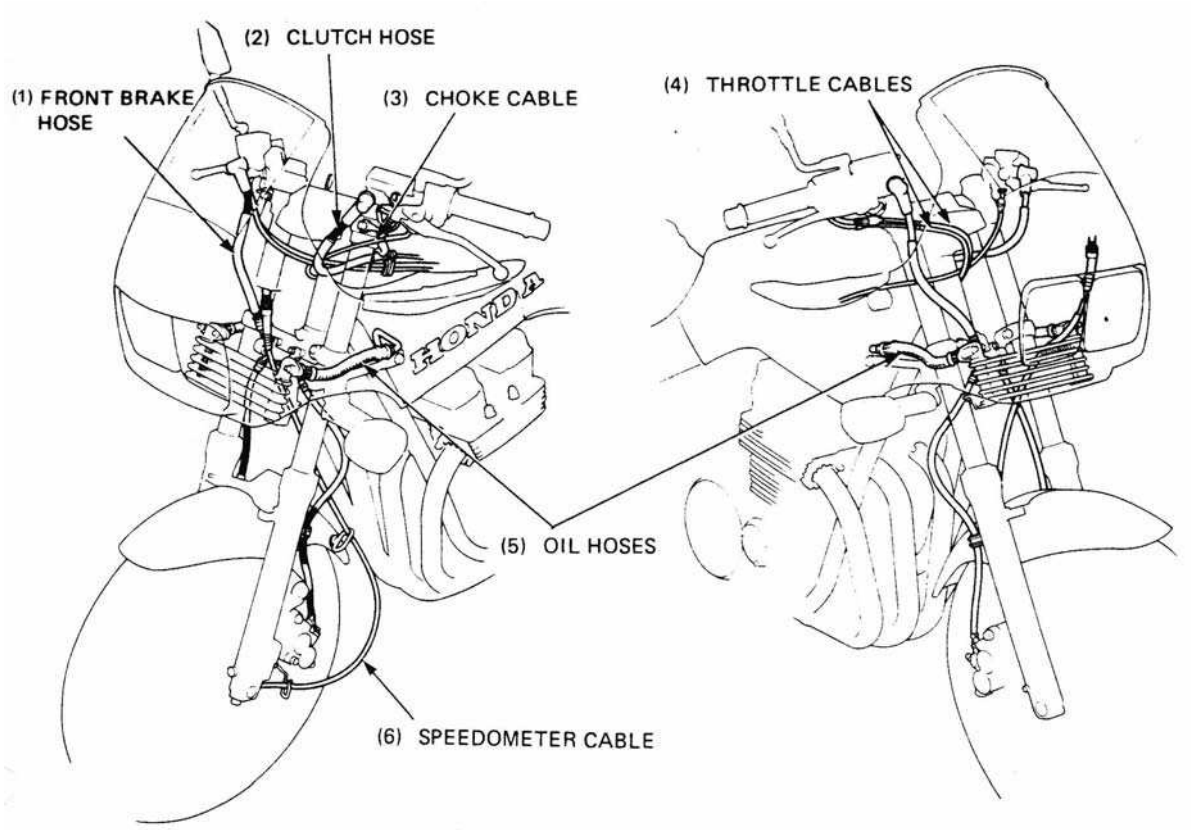
TOOL NAME	TOOL NUMBER	REFERENCE PAGE
Valve seat cutter, 24.5 mm (EX 45°)	07780-0010100	6-14
Valve seat cutter, 27.5 mm (IN 45°)	07780-0010200	6-14
Valve seat cutter, 25 mm (EX 32°)	07780-0012000	6-14
Valve seat cutter, 28 mm (IN 32°)	07780-0012100	6-14
Valve seat cutter, 22 mm (EX 60°)	07780-0014202	6-14
Valve seat cutter, 26 mm (IN 60°)	07780-0014500	6-14
Valve seat cutter holder	07781-0010400	6-14

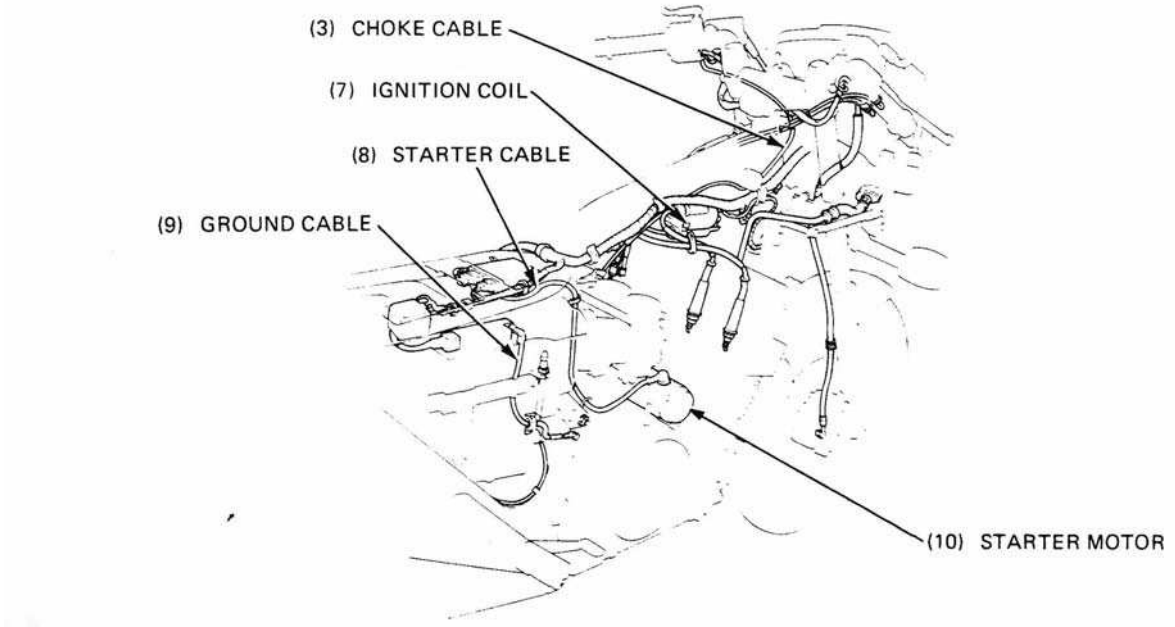
CABLE & HARNESS ROUTING

Note the following when routing cables and wire harnesses:

- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure
- Do not squeeze wires against the weld or end of its clamp when a weld on clamp is used
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so that they are not pulled or that have excessive slack
- Protect wires and harnesses with electrical tape or tube if they are in contact with a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use wires or harnesses with a broken insulator. Repair by wrapping them in 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 handle bars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in all steering positions.




(2) CLUTCH HOSE
(1) FRONT BRAKE HOSE
(3) CHOKE CABLE
(4) THROTTLE CABLES
HONDA
(5) OIL HOSES
(6) SPEEDOMETER CABLE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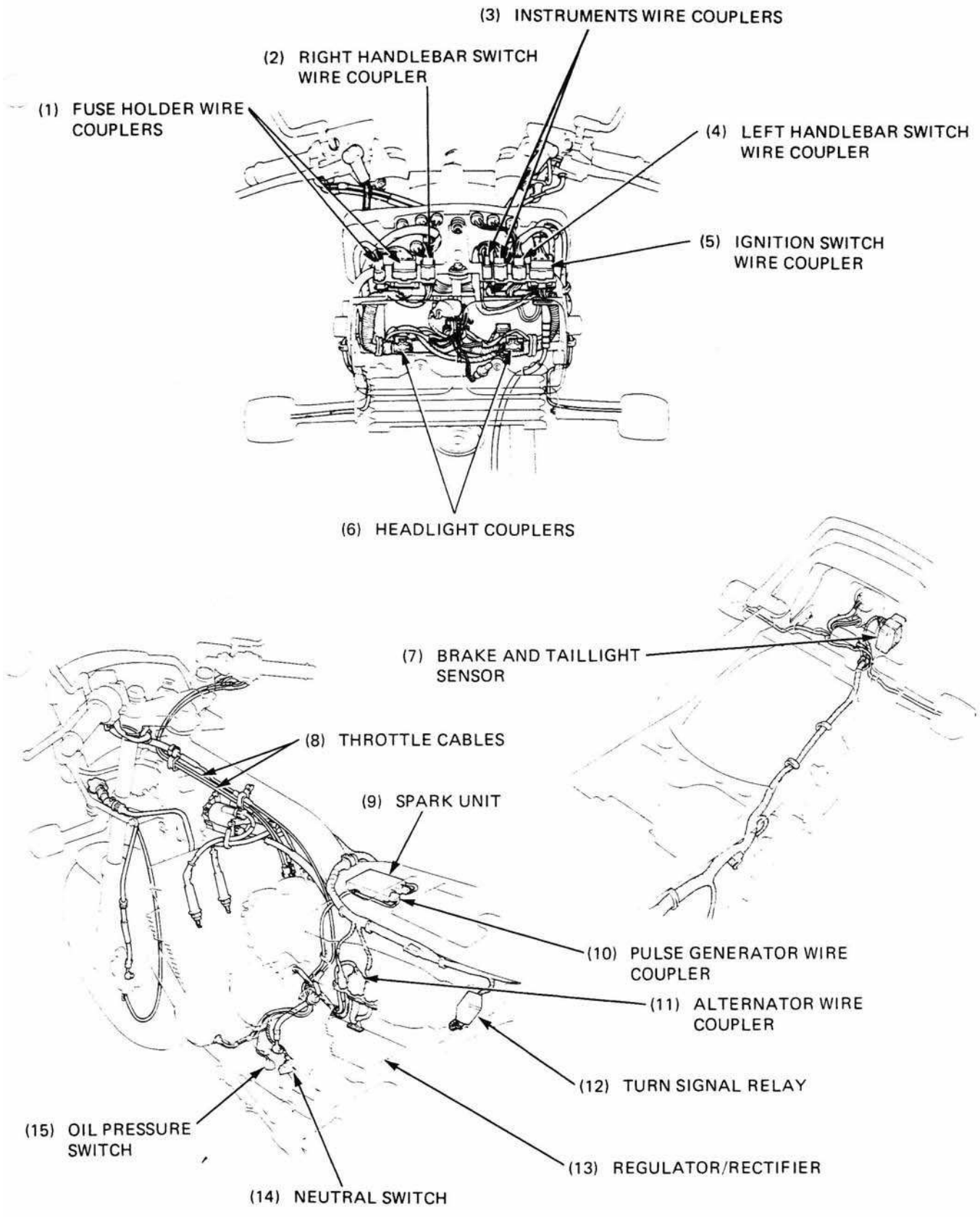
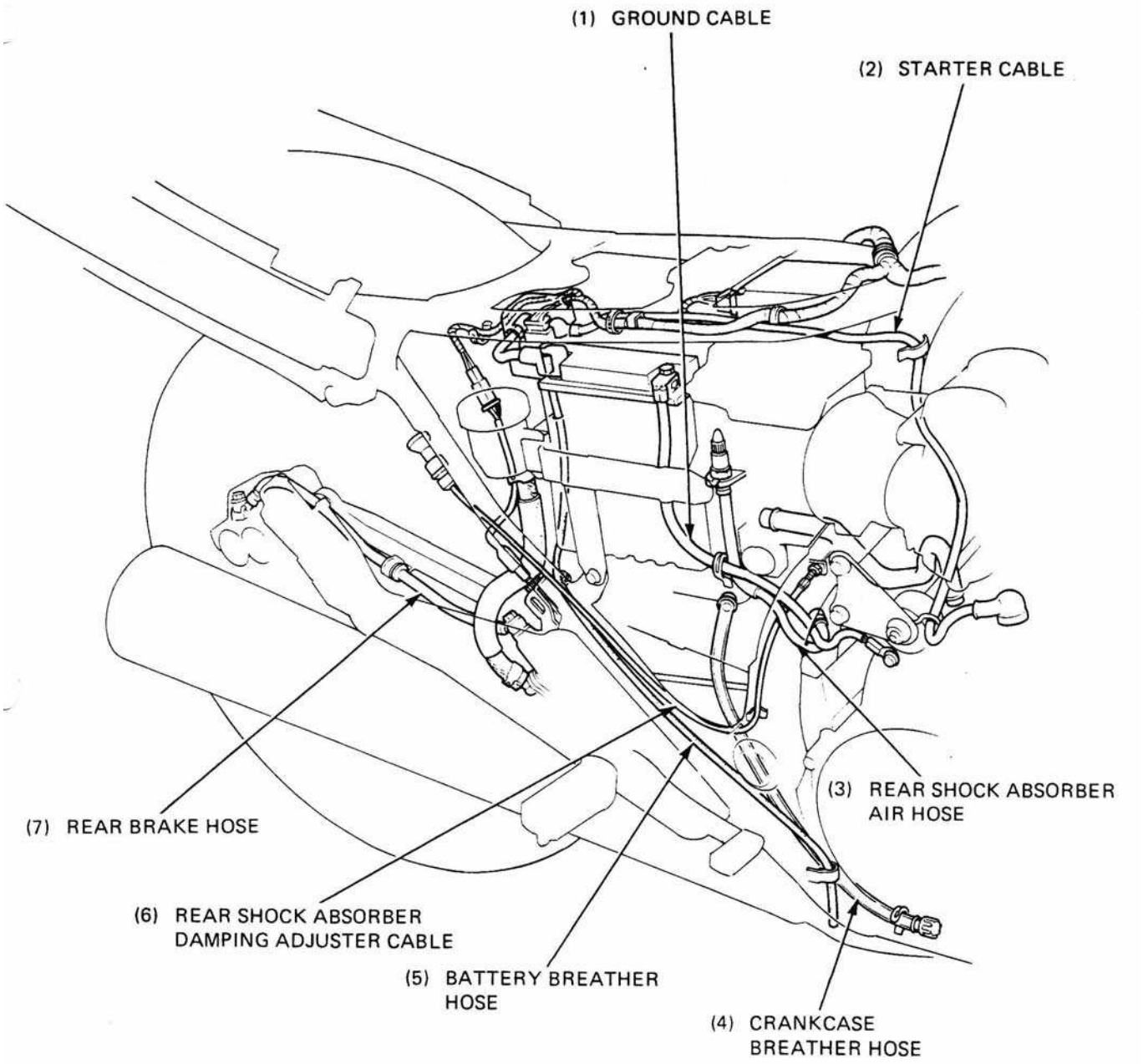
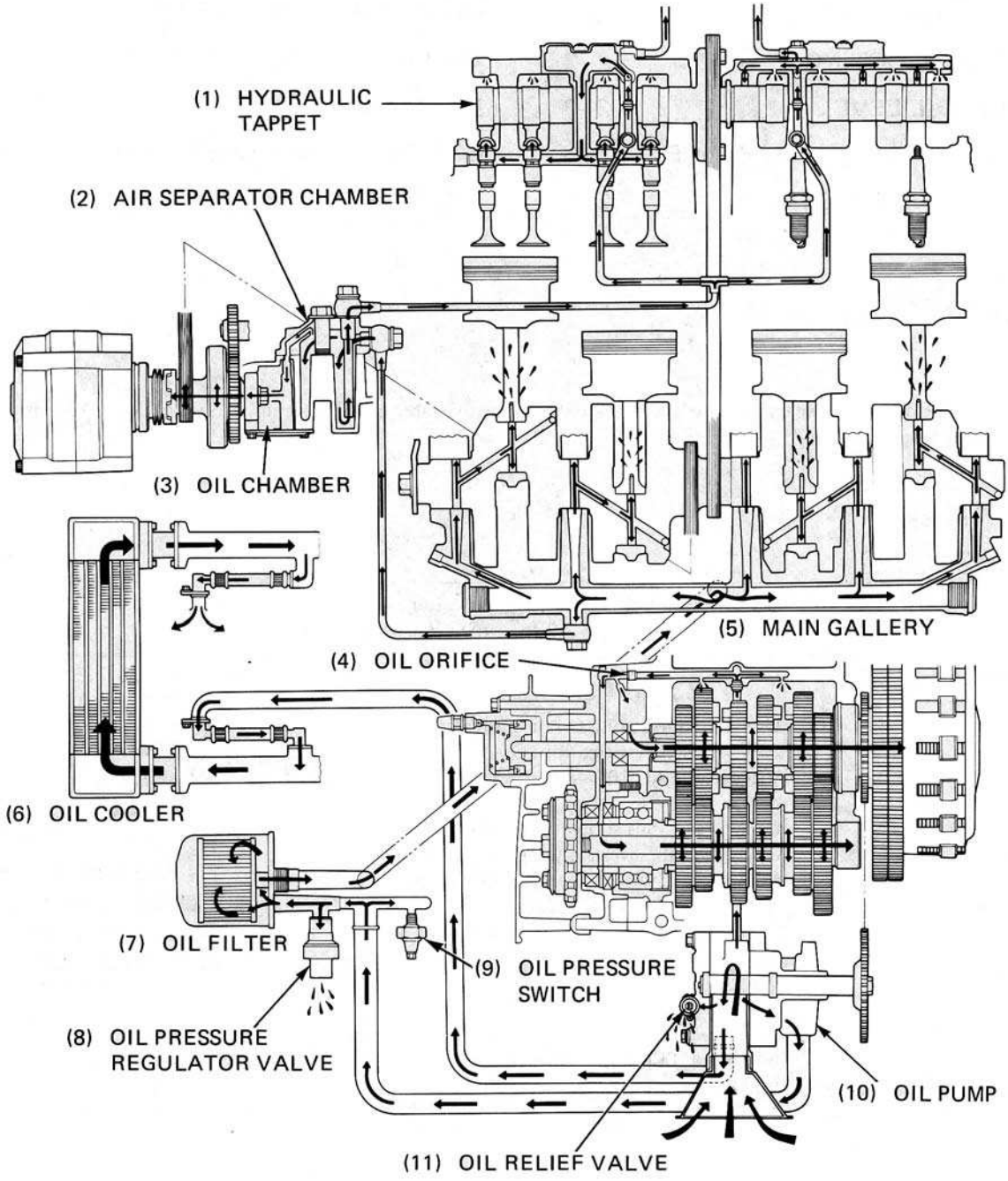
(7) IGNITION COIL
(8) STARTER CABLE
(9) GROUND CABLE
(10) STARTER MOTOR


(3) INSTRUMENTS WIRE COUPLERS
(2) RIGHT HANDLEBAR SWITCH WIRE COUPLER
(1) FUSE HOLDER WIRE COUPLERS
(4) LEFT HANDLEBAR SWITCH WIRE COUPLER
(5) IGNITION SWITCH WIRE COUPLER
(6) HEADLIGHT COUPLERS
(7) BRAKE AND TAILLIGHT SENSOR
(8) THROTTLE CABLES
(9) SPARK UNIT
(10) PULSE GENERATOR WIRE COUPLER
(11) ALTERNATOR WIRE COUPLER
(12) TURN SIGNAL RELAY
(13) REGULATOR/RECTIFIER
(14) NEUTRAL SWITCH
(15) OIL PRESSURE SWITCH


(1) GROUND CABLE
(2) STARTER CABLE
(3) REAR SHOCK ABSORBER AIR HOSE
(4) CRANKCASE BREATHER HOSE
(5) BATTERY BREATHER HOSE
(6) REAR SHOCK ABSORBER DAMPING ADJUSTER CABLE
(7) REAR BRAKE HOSE


(1) HYDRAULIC TAPPET
(2) AIR SEPARATOR CHAMBER
(3) OIL CHAMBER
(4) OIL ORIFICE
(5) MAIN GALLERY
(6) OIL COOLER
(7) OIL FILTER
(8) OIL PRESSURE REGULATOR VALVE
(9) OIL PRESSURE SWITCH
(10) OIL PUMP
(11) OIL RELIEF VALVE

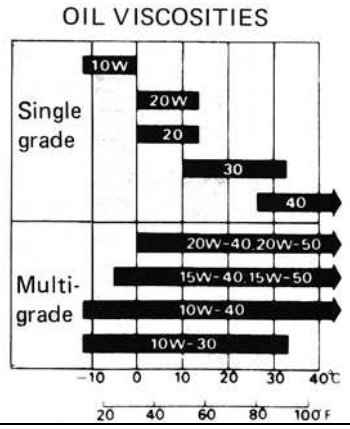
SERVICE INFORMATION

GENERAL

To service the oil pump, it is necessary to remove the exhaust system and clutch assembly. See section 8 for clutch removal and installation.

SPECIFICATIONS

Engine oil

Oil capacity	2.8 litre (3.0 U.S. qt, 2.5 Imp. qt) after oil filter and oil change 3.6 litre (3.8 U.S. qt, 3.2 Imp. qt) after disassembly
Oil recommendation	Use Honda 4-Stroke Oil or equivalent. API Service Classification: SE or SF. Viscosity: SAE 1OW-40 Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. 
Oil pressure (at oil pressure switch)	630 kPa/6,000 min' 80°C (176° F) (6.3 kg/cm^2 /6,000 rpm, 90 PSI/7,000 rpm)

Oil pump service data

	STANDARD	SERVICE LIMIT
Rotor tip clearance	0.10 mm (0.004 in)	0. 15 mm (0.006 in)
Pump body clearance	0.15-0.22 mm (0.006-0.009 in)	0.35 mm (0.014 in)
Pump end clearance	0.02-0.07 mm (0.00 1 -0.003 in)	0.10 mm (0.004 in)

TORQUE VALUES

Engine oil drain plug	Frame side	24-30 Nm (2.4-3.0 kg.m, 17-22 ft.lb)
	Engine side	30-40 N.m (3.0-4.0 kg.m, 22-29 ft.lb)
Oil filter		15-20 Nm (1.5-2.0 kg.m, 11-14 ft.lb)
Main gallery plug		25-35 Nm (2.5-3.5 kg.m, 18-25 ft.lb)
Oil hose (Engine-to-frame)		24-30 Nm (2.4-3.0 kg.m, 17-22 ft.lb)
0ii cooler hose		10-15 Nm (1.0-1.5 kg.m, 7-11 ft.lb)

TOOLS

Special

Oil pressure gauge attachment	07510-MJ10100
Oil filter wrench	07912-6110001

TROUBLESHOOTING

Oil level too low
1. External oil leaks
2. Worn piston rings
3. Worn valve guide or seal

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

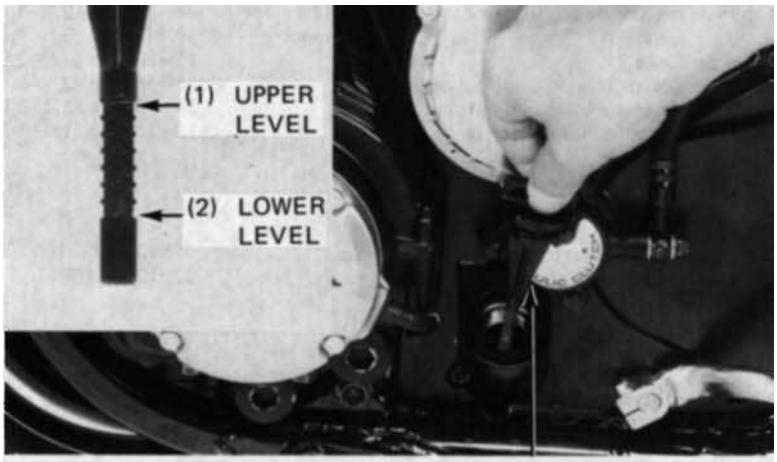
Low oil pressure
1.Oil level low
2. Pressure relief valve stuck open
3. Plugged oil pick-up screen
4. Oil pump worn
5. External oil leaks

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

No oil pressure
1. Oil level low
2. Oil pump faulty
3. Internal oil leakage

ENGINE OIL LEVEL

Put the motorcycle on its centre stand on level ground. Start the engine and let it idle for 2-3 minutes. Turn off the engine and wait for 2-3 minutes. Remove the filler cap/dipstick, wipe it clean and insert it without screwing it in. Remove the filler cap/dipstick and check the oil level.
If the oil level is below or near the lower level mark on the dipstick, fill to the upper level mark with recommended oil.



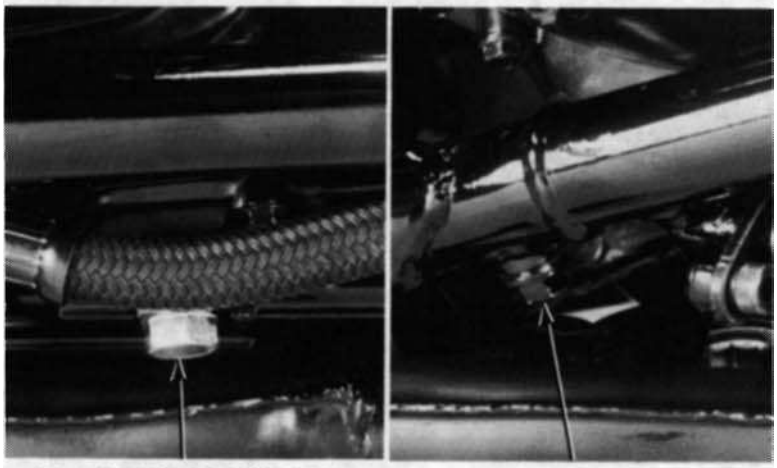
(3) OIL FILLER CAP/DIPSTICK

ENGINE OIL & FILTER CHANGE

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

WARNING
Do not touch the exhaust pipes and frame while they are hot.

Remove the oil filler cap.
Remove the under cowl.
Remove the engine and frame drain plugs, and drain the engine oil.


(1) ENGINE DRAIN PLUG (2) FRAME DRAIN PLUG

Loosen the oil filter with a filter wrench (07912-6110001) and remove the filter through the space between the No. 4 exhaust pipe and frame.
Discard the oil filter.
Apply thread lock agent to the filter boss threads in the crankcase.
Coat a new oil filter gasket with clean oil, and install a new oil filter.
Tighten the oil filter with the filter wrench (07912-6110001).

(1) OIL FILTER WRENCH 07912–6110001


(2) OIL FILTER

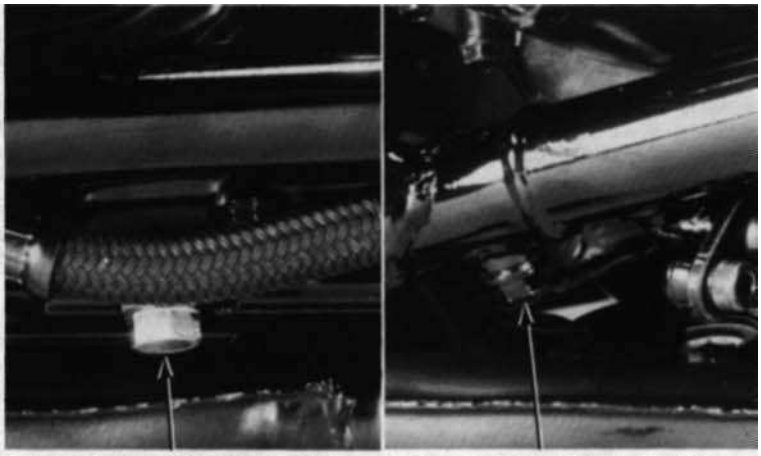
TORQUE: 15-20 Nm (1.5-2.0 kg.m, 11-14 ft.lb)

Wipe spilled oil off the exhaust pipes.

Check that the sealing washers on the drain plugs are in good condition and install the plugs.

TORQUE:
ENGINE DRAIN PLUG:
30-40 Nm (3.0-4.0 kg.m, 22-29 ft.lb)
FRAME DRAIN PLUG:
24-30 Nm (2.4-3.0 kg.m, 17-22 ft.lb)

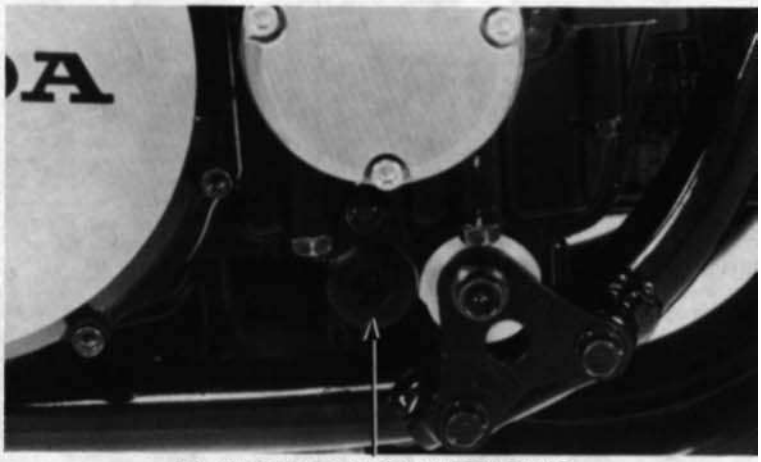
Fill the crankcase with 2.8 litres (3.0 U.S. qt, 2.5 Imp. qt) of the recommended oil (page 2-1). Reinstall the oil filler cap/dipstick.
Start the engine and let it idle for 2-3 minutes, stop the engine and wait for 2-3 minutes.
Make sure that the oil level is at the upper level mark on the dipstick.
Make sure that there are no oil leaks.



(1) ENGINE DRAIN PLUG (2) FRAME DRAIN PLUG

OIL PRESSURE CHECK

Warm the engine up to normal operating temperature (approximately 80° C/176° F).
Stop the engine.
Place the motorcycle on its side stand.
Remove the right main gallery plug and connect an oil pressure gauge to the plug hole with an attachment.
Place the motorcycle on its centre stand.
Check the oil level.
Start the engine and check the oil pressure at 6,000 rpm.



(1) RIGHT MAIN GALLERY PLUG

(2) OIL PRESSURE GAUGE ATTACHMENT 07510–MJ10100

OIL PRESSURE: 630kPa(6.3kg/cm^2, 90psi) at 6,000 rpm (80° C/176° F)

Stop the engine and place the motorcycle on its side stand. Remove the pressure gauge and attachment.
Apply **THREE BOND** sealant or equivalent to the right main gallery plug threads and install the plug with the sealing washer.

TORQUE: 25-35 Nm (2.5-3.5 kg.m, 18-25 ft.lb)

(3) OIL PRESSURE GAUGE

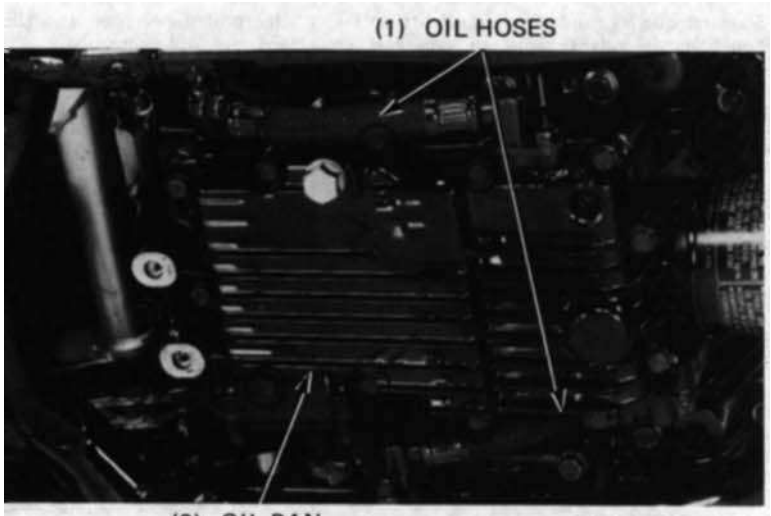
Start the engine.
Check that the oil pressure warning indicator goes out after one or two seconds.
If the oil pressure warning indicator stays on, stop the engine immediately and determine the cause.

OIL STRAINER/PRESSURE REGULATOR VALVE

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

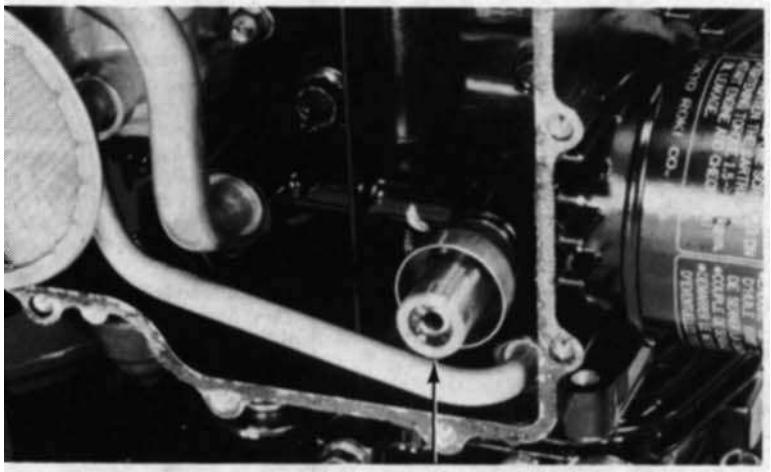
OIL PAN REMOVAL

Remove the under cowl.
Remove the exhaust system.
Remove the oil hoses.
Remove the oil pan and gasket.

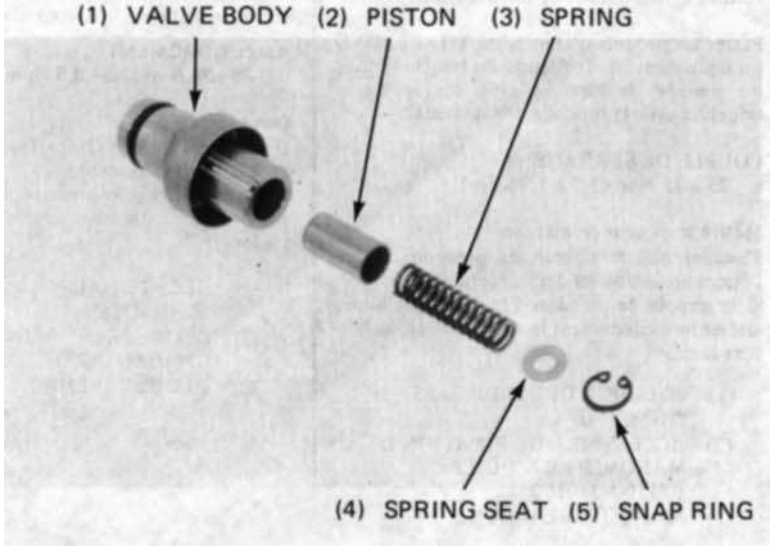


RELIEF VALVE INSPECTION

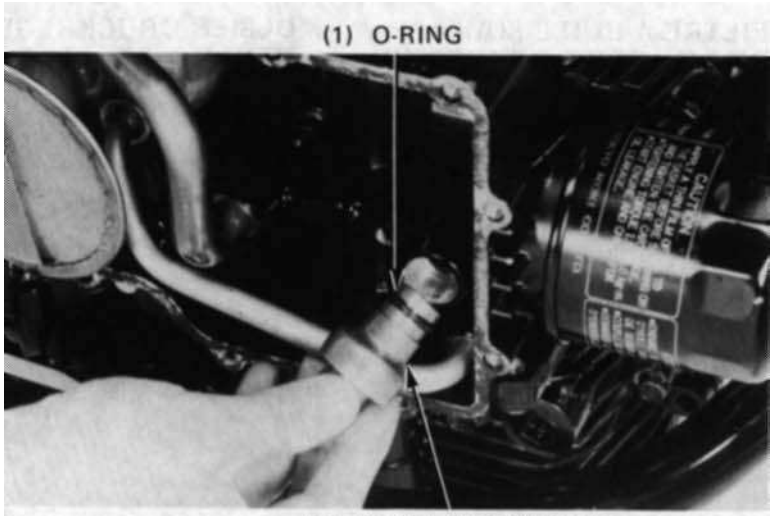
Remove the oil pressure regulator valve and check its operation.



Remove the snap ring, spring seat, spring and piston from the relief valve body.
Inspect the piston and inside of the valve body for wear, scratches or scoring.
Inspect the spring for wear of damage.
Assembly the regulator valve.

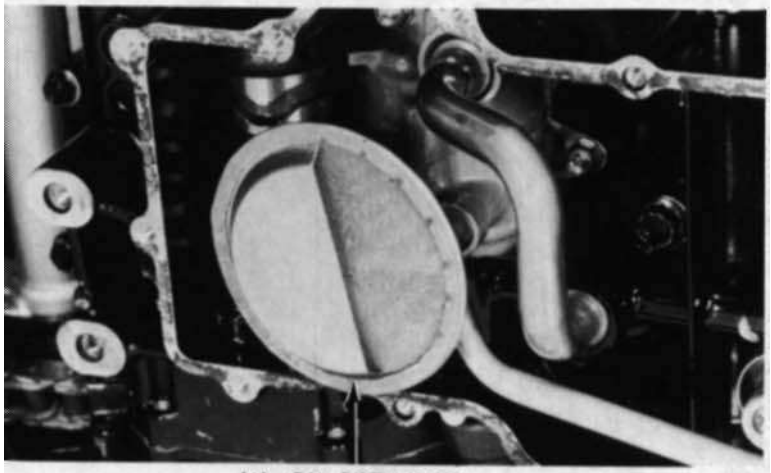


Make sure that the O-ring is good condition. Coat the O-ring with clean oil and install the regulator valve into the crankcase.

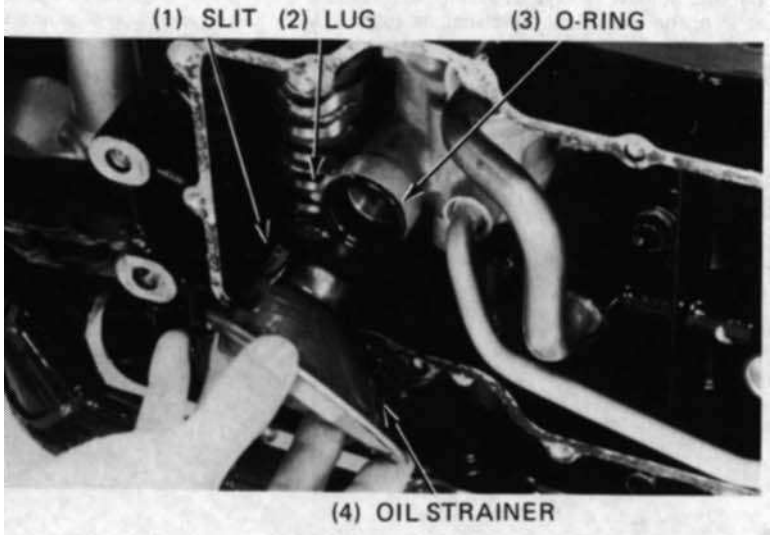


OIL STRAINER CLEANING

Remove and clean the oil strainer.



Make sure that the strainer 0-ring is in good condition.
Coat the O-ring with clean engine oil and install the oil strainer aligning the slit in the strainer with the lug on the oil pump.

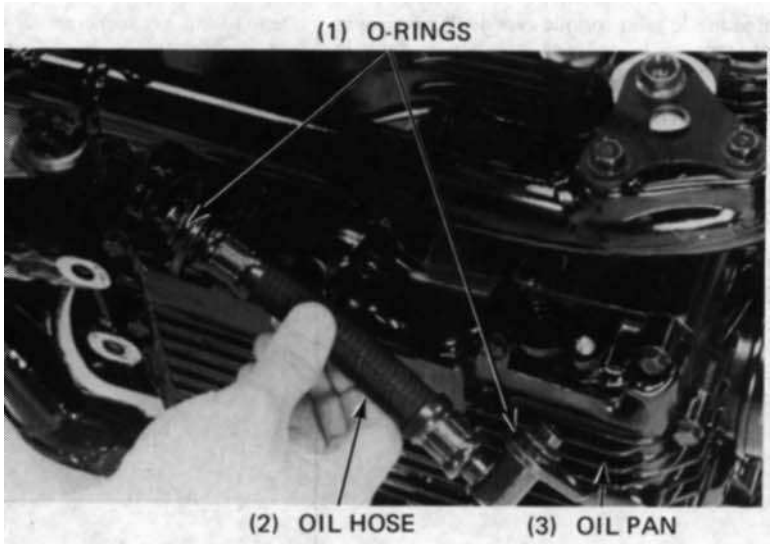


OIL PAN INSTALLATION

Install the oil pan with a new gasket.
Tighten the oil pan bolts in criss-cross pattern.
Make sure that the oil hose O-rings are in good condition and install the oil hoses.
Apply thread lock agent to the oil hose bolt threads.
Tighten the oil hose bolts.

TORQUE: 24-30 Nm
(2.4-3.0 kg.m, 17-22 ft.lb)

Install the exhaust system and under cowl.
Fill the crankcase with the recommended oil (page 2-1).



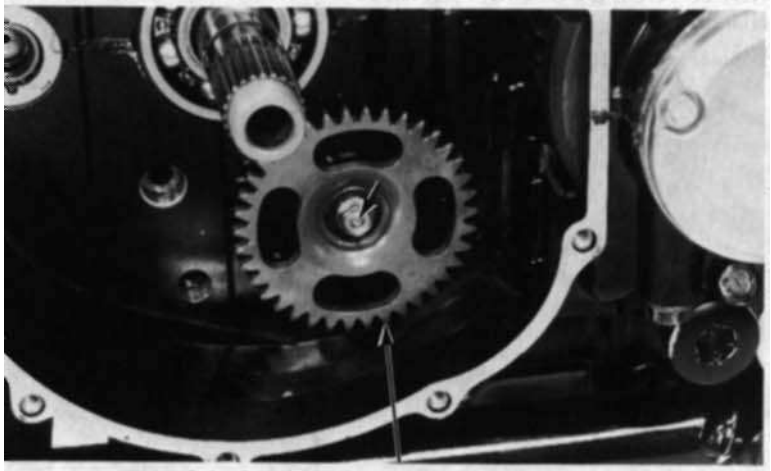
OIL PUMP

REMOVAL

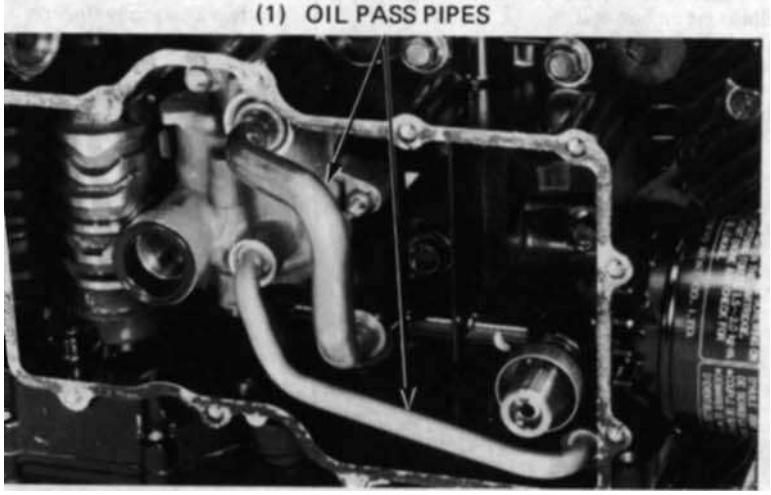
NOTE:
The oil pump can be removed with the engine mounted in the frame.

Remove the following parts:
- under cowl.
- exhaust system.
- clutch assembly.
- oil pan.
- oil strainer.

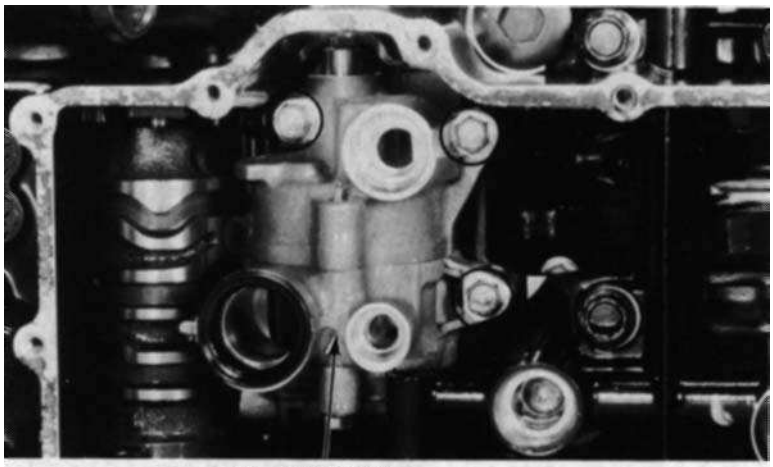
Remove the oil pump driven sprocket by removing the bolt and washer.



Remove the oil pass pipes.



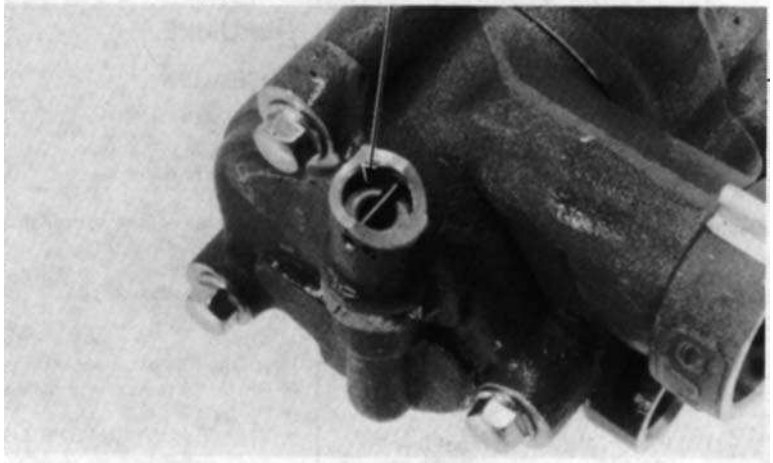
Remove the oil pump by removing the three mounting bolts.



(1) OIL PUMP

Check the operation of the oil pressure relief valve.

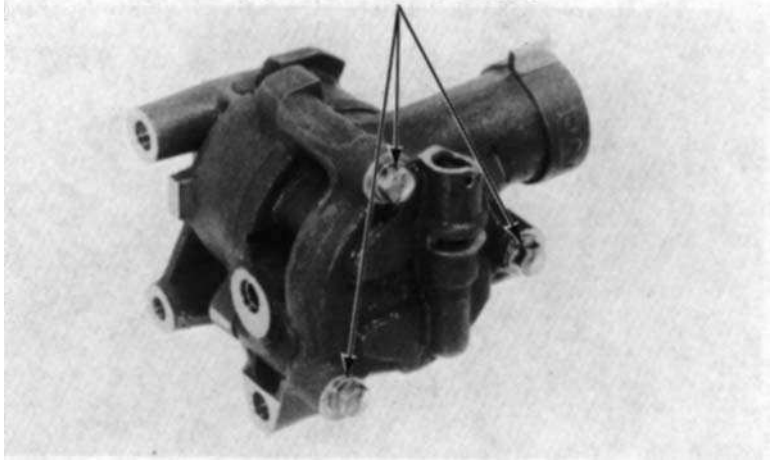
(1) OIL PRESSURE RELIEF VALVE



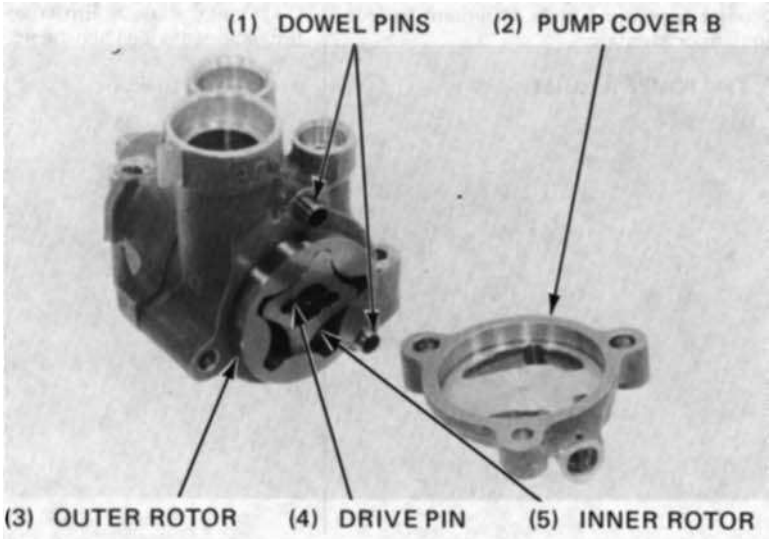
DISASSEMBLY

Remove the three bolts assembling the oil pump.

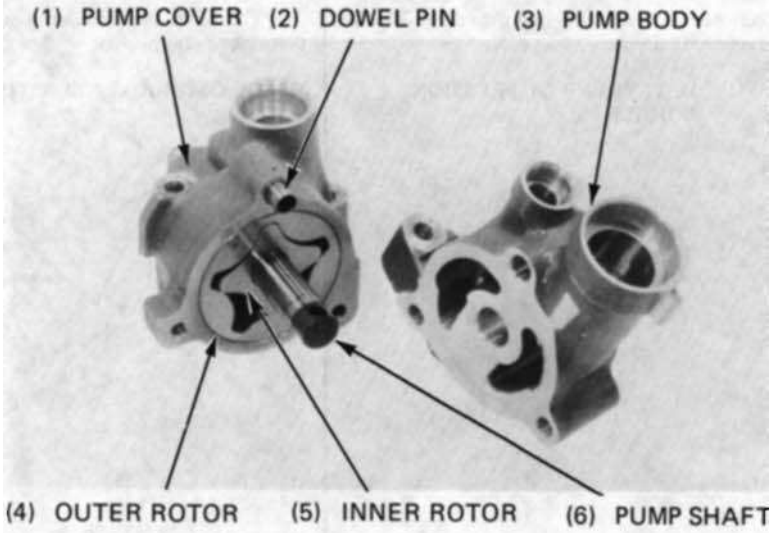
(1) ASSEMBLING BOLTS



Remove the oil pump cover B.
Remove the dowel pins.
Remove the inner and outer rotors of the cooler pump.
Remove the pump drive pin.



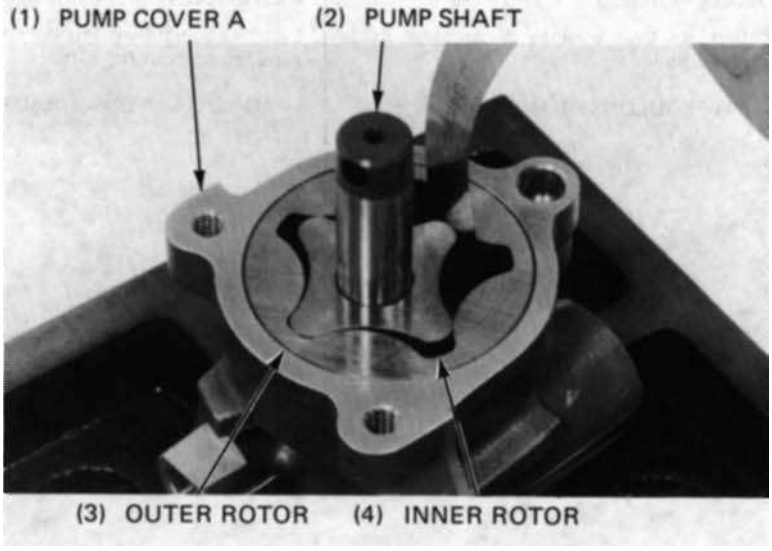
Remove the pump body from pump cover A.
Remove the dowel pin.
Remove the inner and outer rotors of the feed pump.
Remove the pump drive pin and thrust washer.
Remove the oil pump shaft from cover A.



INSPECTION

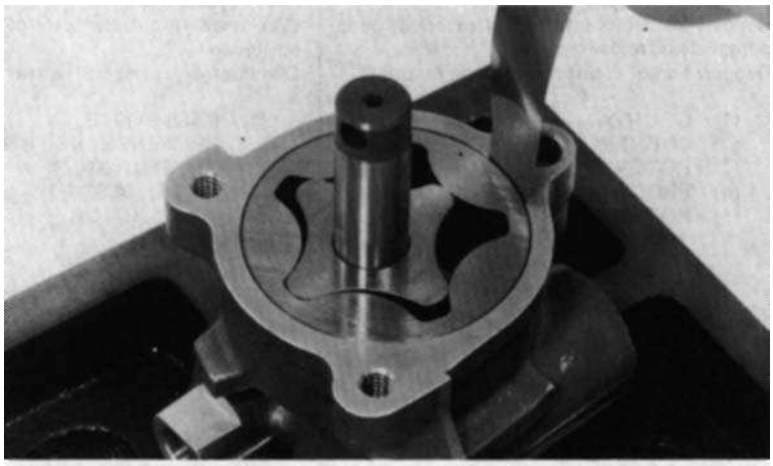
Install the feed pump inner and outer rotors, thrust washer and pump shaft into pump cover A.
Measure the pump tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



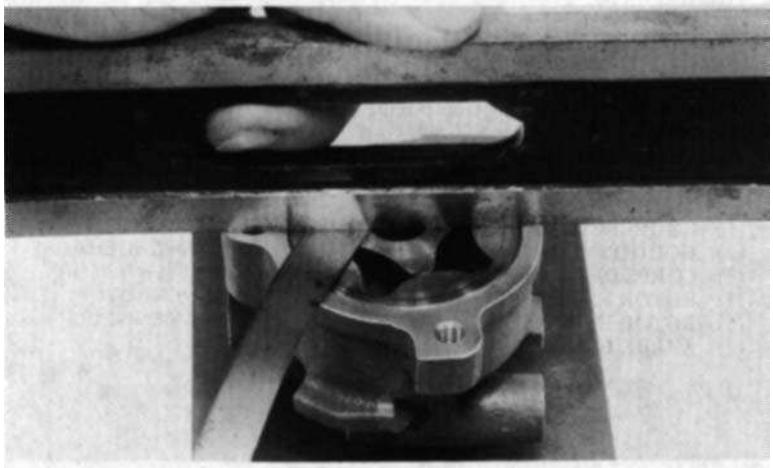
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



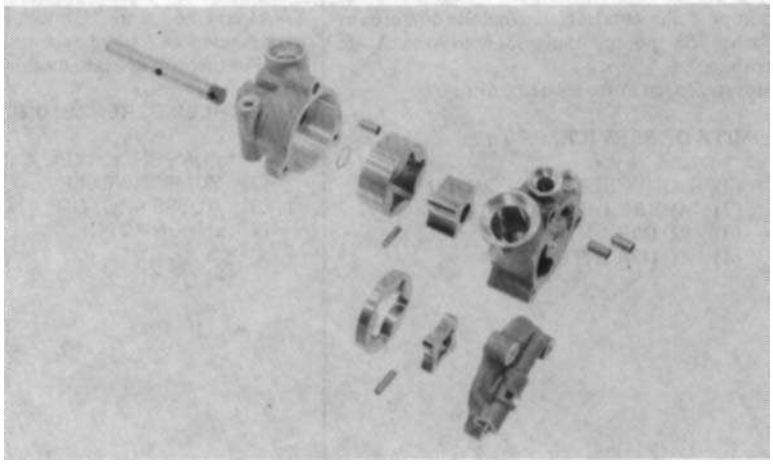
Remove the pump shaft and measure the pump end clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



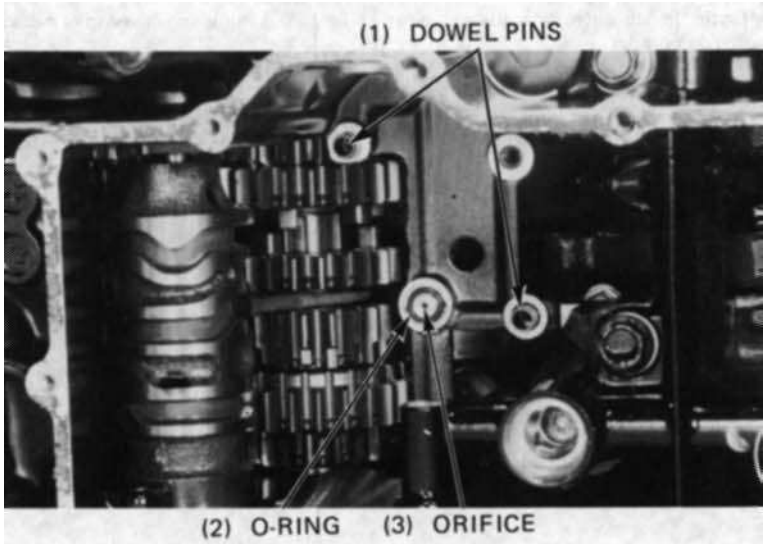
ASSEMBLY

Assemble the oil pump in the reverse order of disassembly.
Make sure the oil pump shaft rotates freely after assembling the oil pump.

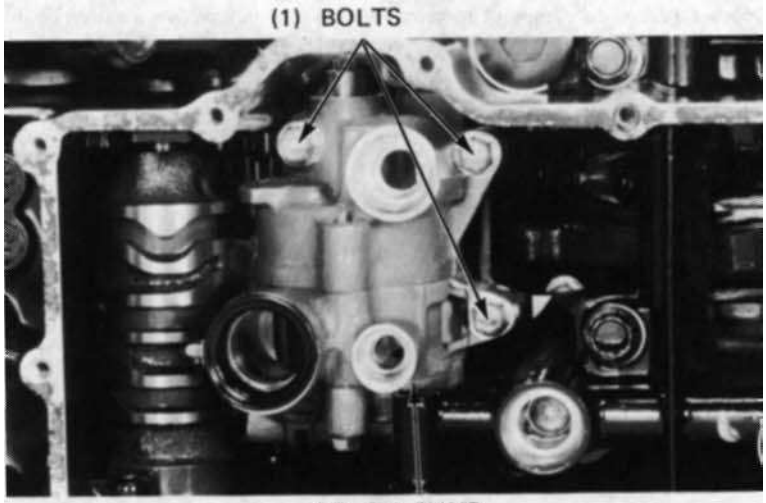


INSTALLATION

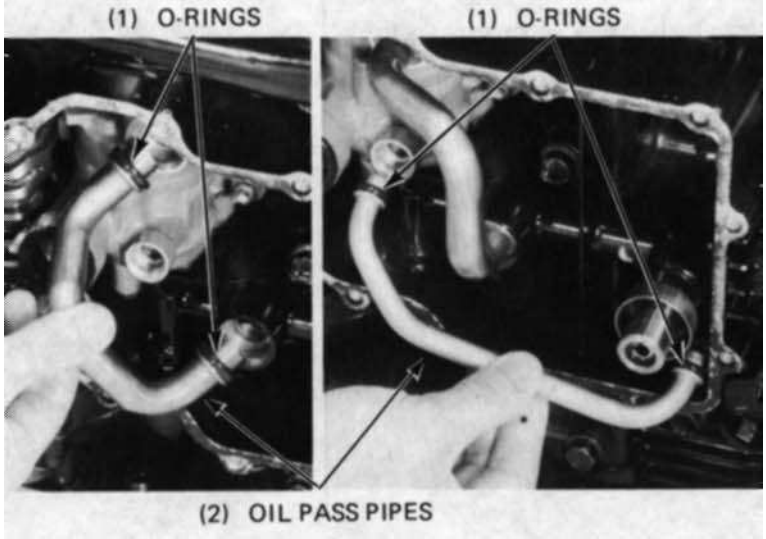
Install the two dowel pins onto the lower crankcase.
Make sure the orifice is not clogging and the O-ring is in good condition.
Install the orifice and O-ring.



Install the oil pump onto the lower crankcase and tighten the three mounting bolts.

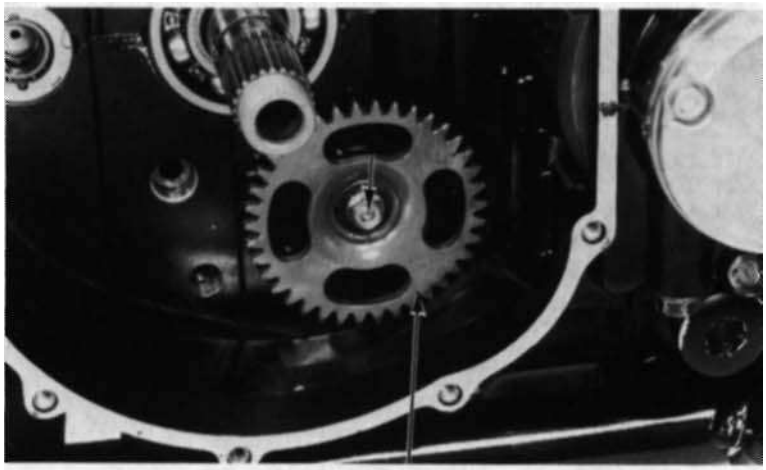


Make sure that the O-rings on the oil pass pipes are in good condition.
Coat O-rings with clean engine oil and install the oil pass pipes.



Install the oil pump driven sprocket with the washer and bolt.
Install the following parts:
- oil strainer.
- oil pan.
- clutch assembly.
- exhaust system.
- under cowl.

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



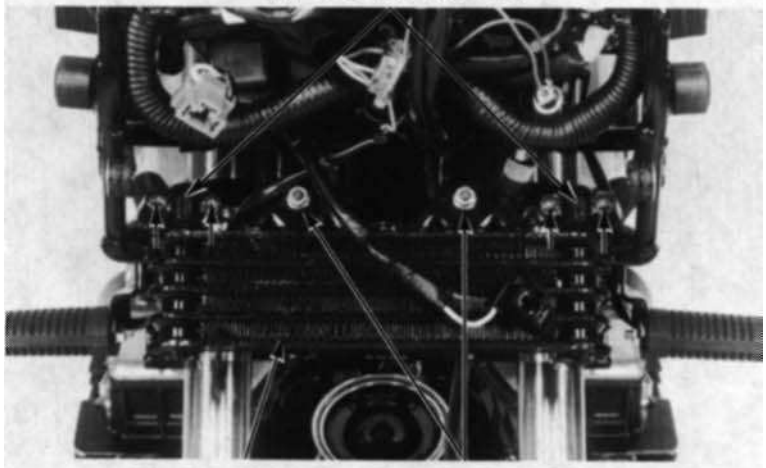
(1) OIL PUMP DRIVEN SPROCKET

OIL COOLER

REMOVAL

Remove the fairing and headlights with the bracket (section 13).
Drain the engine oil (page 2-3).
Disconnect the oil hoses from the cooler by removing the four bolts.
Remove the two mount nuts and the oil cooler.

(1) OIL HOSE JOINTS



(2) OIL COOLER (3) MOUNT NUTS

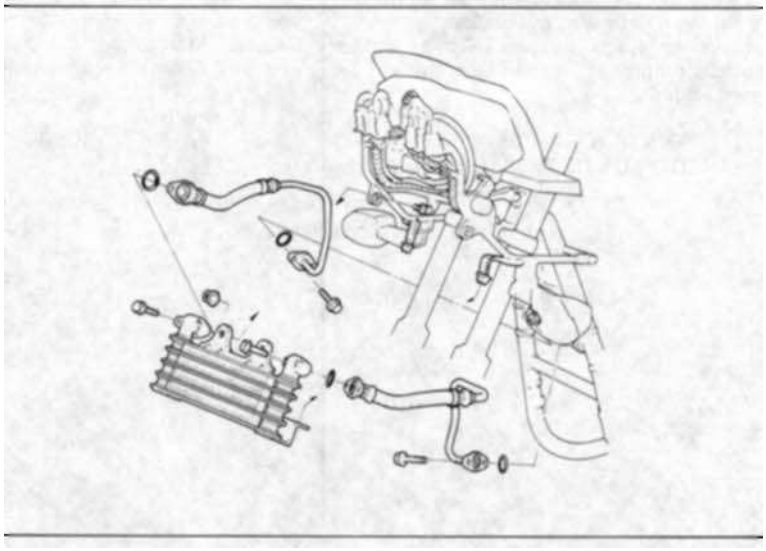
INSPECTION

Inspect the oil cooler soldered joints and seams for leaks.
Check the air passages for clogging or damage.
Straighten bent fins and collapsed core tubes.
Remove insects, mud or any obstruction with compressed air or low water pressure.

INSTALLATION

Install the oil cooler onto the lower mounts and mount studs properly and secure with the mount nuts.
Connect the oil hoses to the cooler and tighten the bolts.

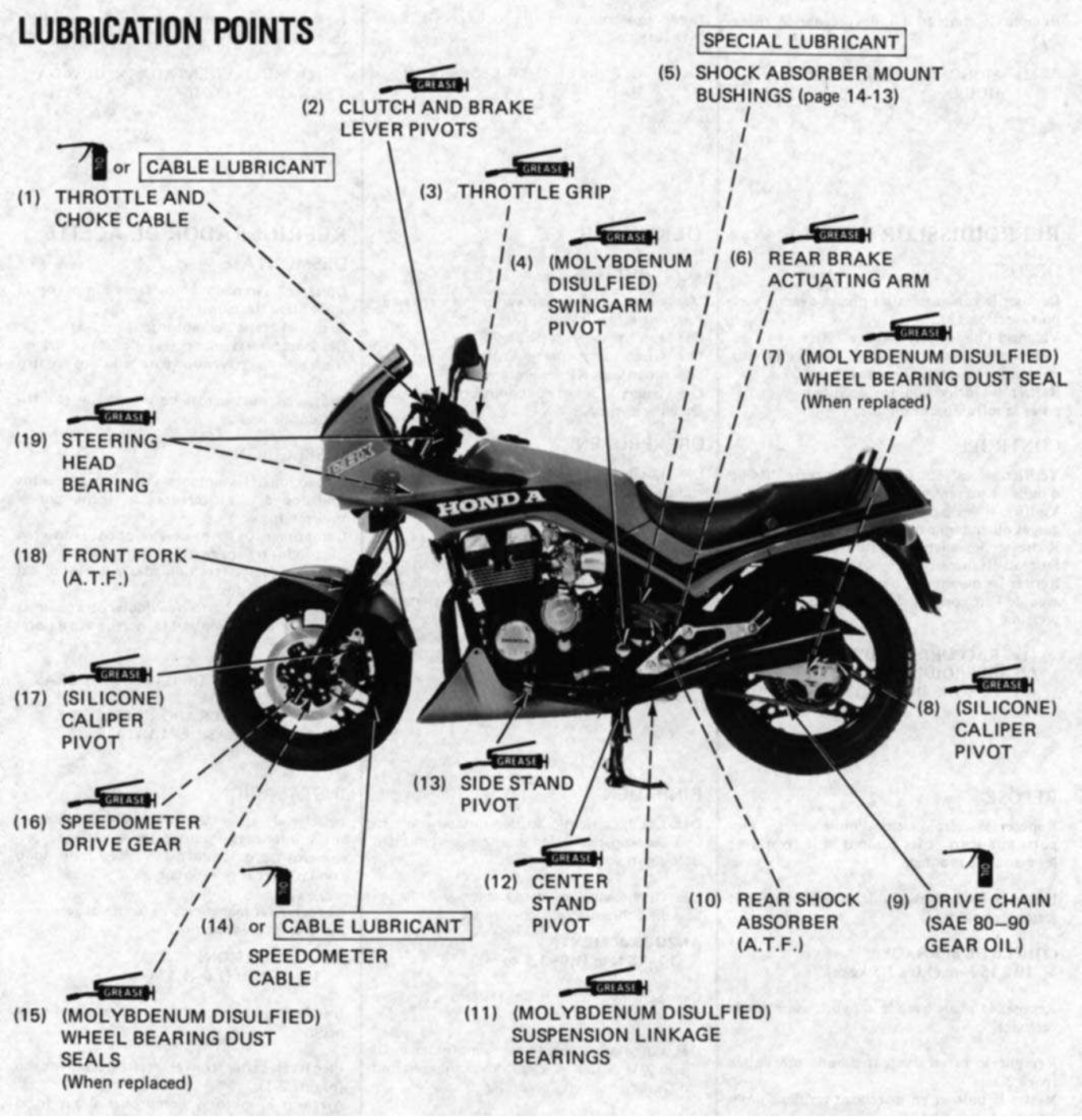
TORQUE: 10-15Nm (1.0-1.5 kg.m, 7-11 ft.lb)



Install the headlight with the bracket, and the fairing.
Fill the crankcase with the recommended oil (page 2-1),
Start the engine and check for oil leaks.

CONTROL CABLE LUBRICATION

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



SERVICE INFORMATION

GENERAL

- Engine Oil See page 2-3
- Engine oil filter See page 2-3

SPECIFICATIONS

<Engine>
Spark Plugs

Standard		For Cold climate (below 5°C, 41°F)		For extended high speed driving	
NKG	ND	NKG	ND	NKG	ND
DPR8EA-9 <DP8EA-9>	X24EPR-U9 <X24EP-U9>	DPR7EA-9 <DP7EA-9>	X22EPR-U9 <X22EP-U9>	DPR9EA-9 <DP9EA-9>	X27EPR-U9 <X27EP-U9>

Spark plug gap:	0.8-0.9 mm (0.031-0.035 in)
Idle speed:	1,000 ± 11 rpm
Carburettor synchronisation:	All carburetors within 60 mm (2.4 in) Hg
Cylinder compression:	1,200 ± 200 kPa (12.0 ± 2.0 kg/cm², 171 ± 28 psi)
Throttle grip free play:	2-6 mm (1/8-1/4 in)
Choke valve stroke:	5-7 mm (3/16-1/4 in)

<CHASSIS>
Drive chain slack: 15-25 mm (5/8-1 in)

Tyres

Tyre Size		Front	Rear
		110/90 V16	130/80 V18
Cold tyre pressure kPa (kg/cm^2, psi)	Driver only	250 (2.50, 36)	250 (2.50, 36)
	Driver and one passenger	250 (2.50, 36)	290 (2.90, 41)
Tyre brand	Bridgestone	G511	G510
	Dunlop	K527A	K527
Minimum tread depth		1.5 mm (1/16 in)	2.0 mm (3/32 in)

Suspension air pressure: Front, 0-40 kPa (0-0.4 kg/cm², 0-6 psi)
Rear, 0-100 kPa (0-4.0 kg/cm², 0-57 psi)

TOOLS

Special
Carburettor pilot screw wrench: 07908-4220201
Compression gauge attachment: 07510-MB00101

MAINTENANCE SCHEDULE

Perform the Pre Ride inspection at each scheduled period.

I : Inspect And Clean, Adjust, Lubricate Or Replace If Necessary
C : CLEAN R : REPLACE L : LUBRICATE

	Frequency / Item	Whichever comes first	Odometer Reading (Note 3)							Refer to page
			1,000 km 600 miles	6,400 km 4,000 miles	12,800 km 8,000 miles	19,200 km 12,000 miles	25,600 km 16,000 miles	32,000 km 20,000 miles	38,400 km 24,000 miles	
		Every								
*	Fuel Lines			I	I	I	I	I	I	3-4
*	Fuel Strainer		C	C	C	C	C	C	C	3-4
*	Throttle Operation		I	I	I	I	I	I	I	3-5
*	Carburettor – Choke			I	I	I	I	I	I	3-6
*	Air Cleaner	Note 1			R		R		R	3-6
	Crankcase Breather	Note 2		C	C	C	C	C	C	3-7
	Spark Plugs			I	R	I	R	I	R	3-7
	Engine Oil	Year	R	R	R	R	R	R	R	2-3
	Engine Oil Filter	Year	R	R	R	R	R	R	R	2-3
*	Carburettor Synchronisation		I	I	I	I	I	I	I	3-8
*	Carburettor - Idle Speed		I	I	I	I	I	I	I	13-9
	Drive Chain		I & L Every 1,000 km (600 miles)							3-9
	Battery	Month	I	I	I	I	I	I	I	3-11
	Brake Fluid	Month I 2 Years *R	I	I	I	*R	I	I	*R	3-11
	Brake Pad Wear			I	I	I	I	I	I	3-12
	Brake System		I	I	I	I	I	I	I	3-12
*	Brake Light Switch		I	I	I	I	I	I	I	3-12
*	Headlight Aim		I	I	I	I	I	I	I	3-12
	Clutch Fluid	Month I 2 Years *R	I	I	I	*R	I	I	*R	3-13
	Clutch System		I	I	I	I	I	I	I	3-13
	Side Stand			I	I	I	I	I	I	3-13
*	Suspension		I	I	I	I	I	I	I	3-13
	Nuts, Bolts, Fasteners		I	I	I	I	I	I	I	3-15
**	Wheels		I	I	I	I	I	I	I	3-15
**	Steering Head Bearing		I		I		I		I	3-16

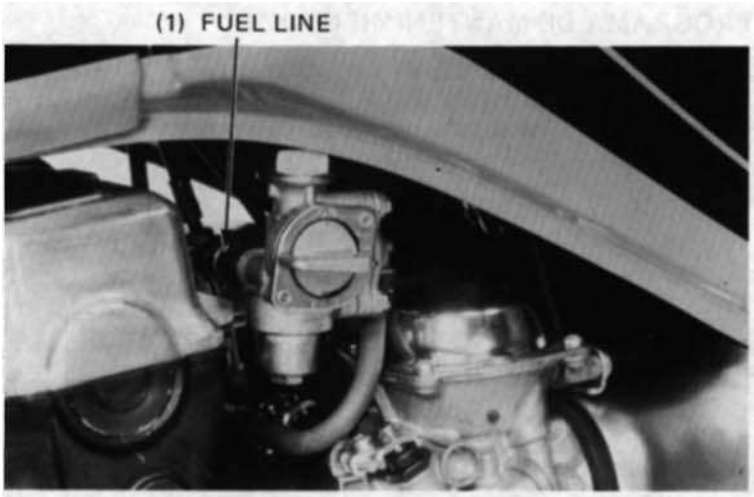
* Should be serviced by an authorised Honda Dealer unless the owner has proper tools and service data and is mechanically qualified. Refer to the official Honda Shop Manual.

** In the interest of safety, we recommend these items be serviced only by an authorised Honda Dealer

Notes:
(1) Service more frequently when riding in dusty areas
(2) Service more frequently when riding in rain, or at full throttle
(3) For higher odometer reading, repeat at the frequency interval established here

FUEL LINES

Check the fuel lines and replace any parts which show deterioration, damage or leakage.

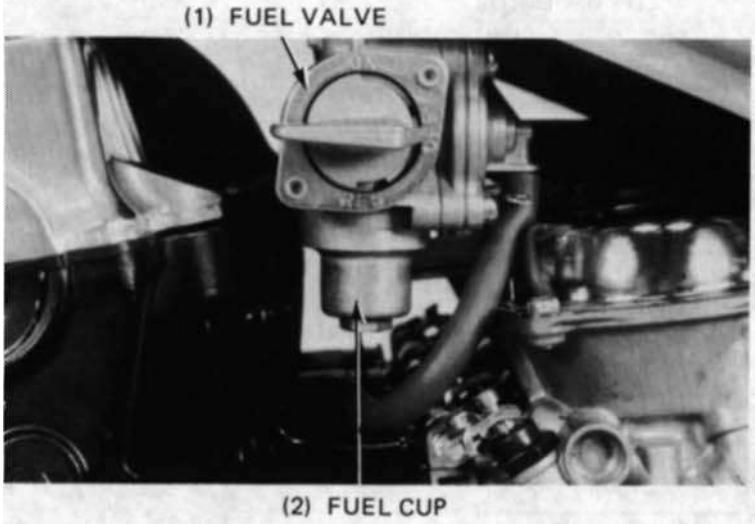


FUEL STRAINER

Turn the fuel valve OFF.
Remove the fuel cup, O-ring and strainer screen, draining 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.

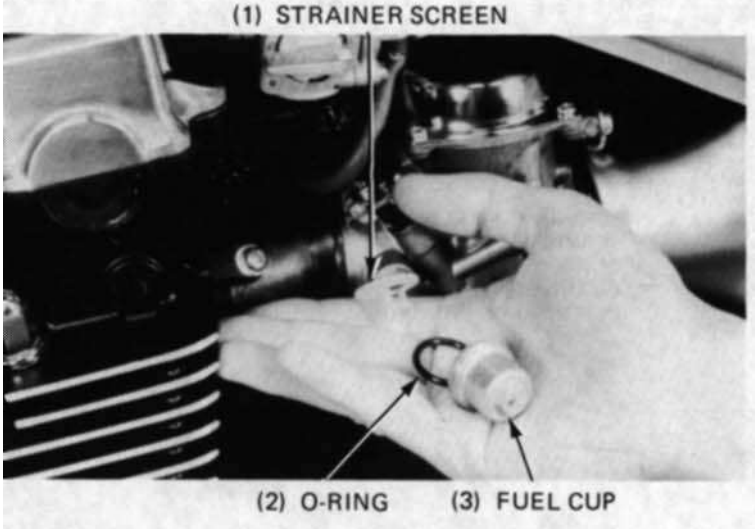
Wash the cup and strainer screen in clean non flammable or high flash point solvent.



Reinstall the screen, aligning the index marks on the fuel valve body and 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 torque to specification.

TORQUE: 3-5 Nm (0.3-0.5 kg.m, 2-4 ft.lb)

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



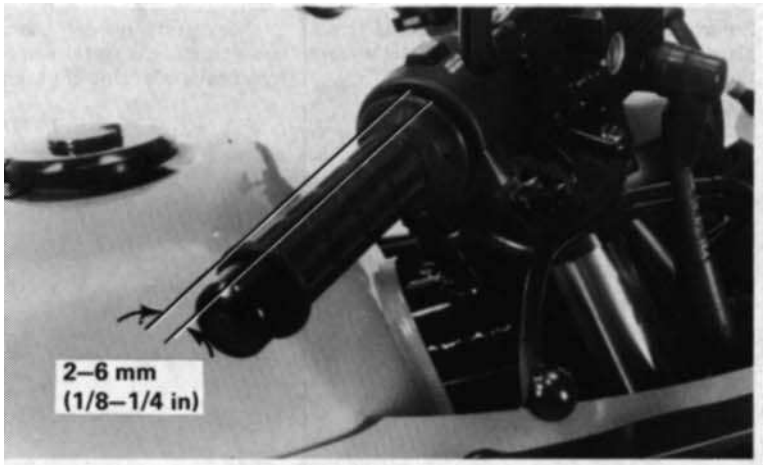
THROTTLE OPERATION

Check that the throttle grip opens smoothly to full throttle and fully closes automatically, in all steering positions. Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables (page 2-13), if throttle operation is not smooth.

Measure throttle grip free play at the throttle grip flange.

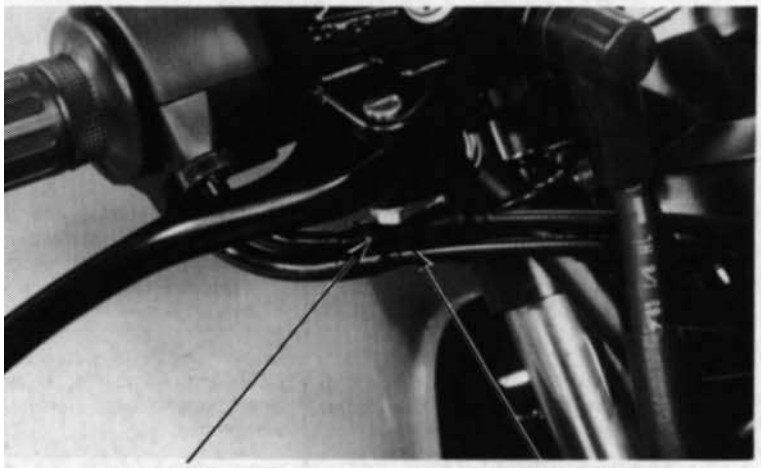
FREE PLAY: 2- 6 mm (1/8 - 1/4 in)



Adjustment can be made at either end of the throttle cable.

Minor adjustments are made with the upper adjuster and major adjustments are made with the lower adjuster. Adjust by loosening the lock nut and turning the adjuster.

Tighten the lock nut and recheck throttle operation

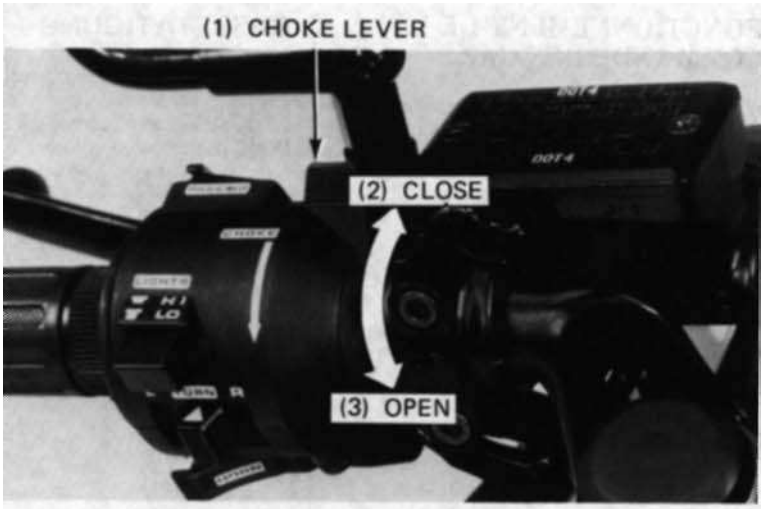


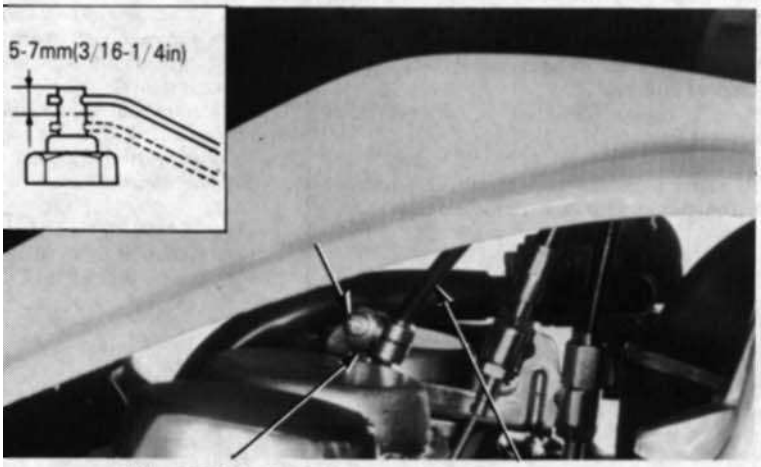
CARBERUTOR - CHOKE

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

Pull the choke lever on the handlebar all the way back to fully open position and measure the choke valve stroke valve at the No 3 carburettor between the fully closed and fully open positions.

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





(1) CABLE CLAMP (2) CHOKE CABLE

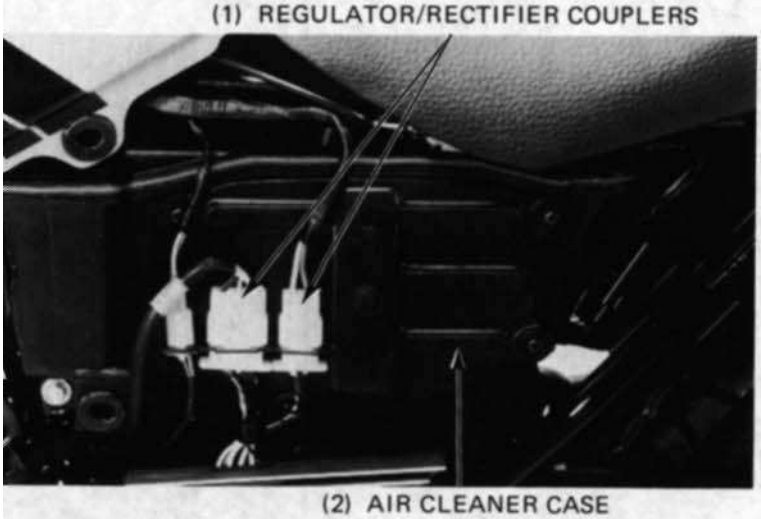
Adjust if necessary, by loosening the choke cable clamp on the carburettor and moving the choke cable casing so the choke is fully open.
Tighten the clamp.

Push the choke lever all the way to fully closed.
Make sure the choke valve is fully closed by checking for free play in the cable between the lever on the carburettor and cable casing.
Reinstall the removed parts in the reverse order of disassembly.

AIR CLEANER

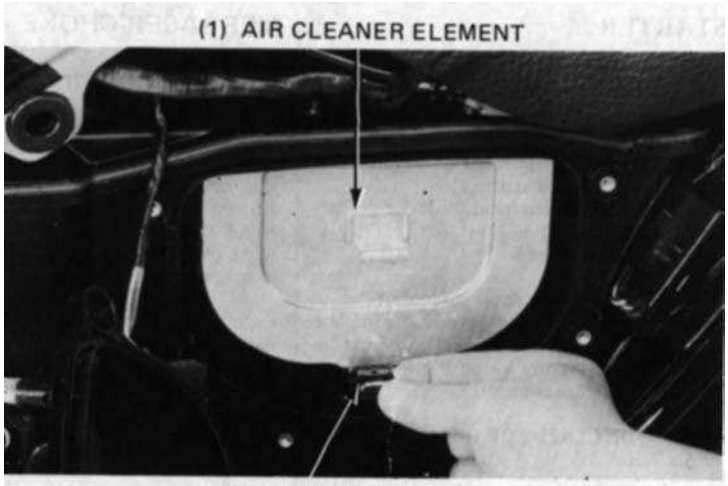
Remove the left from side cover.

Disconnect the regulator/rectifier couplers and remove the air cleaner case cover by removing the four screws.



Pull the air cleaner element set spring out and remove the element.
Discard the element in accordance with the maintenance schedule.

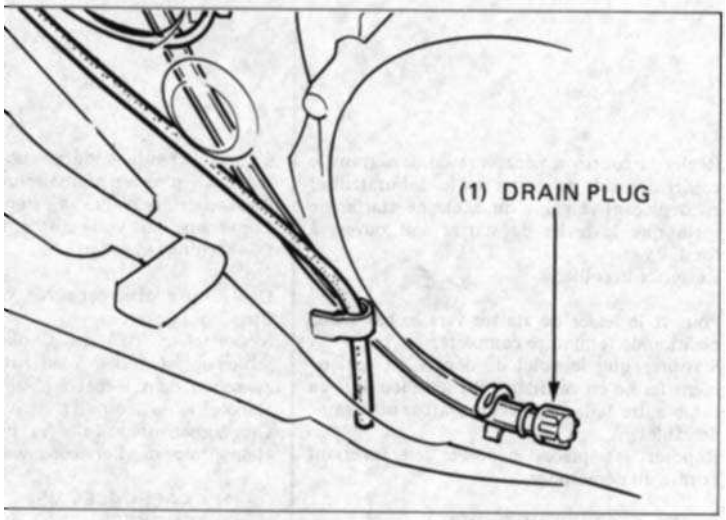
Also, replace the element any time it is excessively dirty
Install a new element and secure it with the set spring.
Install the air cleaner cover, connect the regulator/rectifier couplers and install the left frame cover.



CRANKCASE BREATHER

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

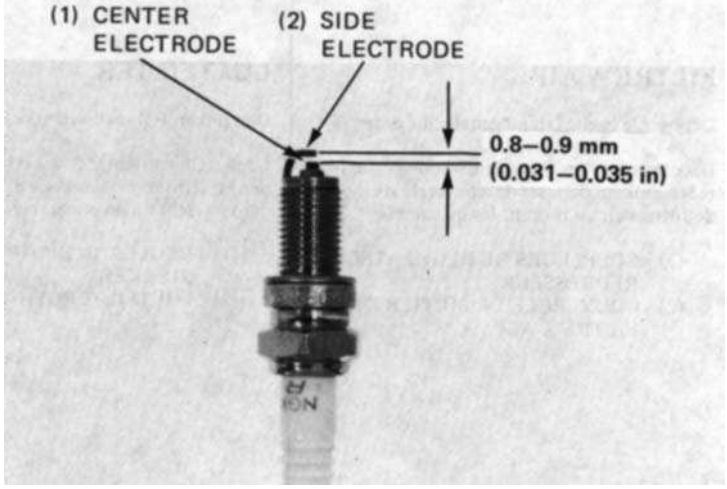
NOTE:
Service more frequently when riding in rain or at full throttle, or if the deposit can be seen in the transparent section of the drain tube.



SPARK PLUGS

RECOMMENDED SPARK PLUGS
< > : U

	NKG	ND
Standard	DPR8EA-9 <DP8EA-9>	X24EPR-U9 <X24EP-U9>
For Cold climate (below 5°C)	DPR7EA-9 <DP7EA-9>	X22EPR-U9 <X22EP-U9>
For extended high speed driving	DPR9EA-9 <DP9EA-9>	X27EPR-U9 <X27EP-U9>



Disconnect the spark plug caps.
Clean any dirt from around the spark plug bases.
Remove the spark plug.
Visually inspect the spark plug.
Discard the spark plug if the insulator is cracked or chipped.
Measure the spark plug gap with a wire type feeler gauge.

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

Adjust by bending the side electrode carefully.
With the plug washer attached, thread each spark plug in by hand to prevent cross threading. Continue tightening by hand until the spark plug bottoms. Then, tighten the spark plug another 1/2 turn with a spark plug wrench to compress the plug washer.
Connect the spark plug caps.

CARBURETTOR SYNCHRONIZATION

NOTE:
Synchronise the carburettors with the engine at normal operating temperatures, transmission in neutral and motorcycle on the centre stand.

Disconnect the fuel valve vacuum hose from the No. 2 intake pipe.
Remove the screw plug and vacuum hose connector from the intake pipes and install vacuum gauge adapters.
Connect vacuum gauge.

Apply vacuum to the fuel valve vacuum hose with a hand vacuum pump.

NOTE:
If the hand vacuum pump is not available, start the engine and pinch the vacuum hose with a tube clamp before disconnecting the fuel valve vacuum hose.

Start the engine and warm it up.
Adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,000 +/- 100 min^{-1} (rpm)

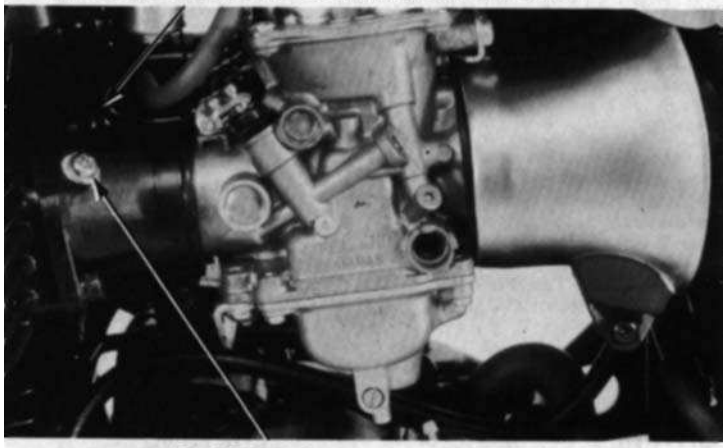
Check that the difference in vacuum readings is within 60mmHg (2.4 in.Hg)

NOTE:
The No.2 carburettor cannot be adjusted; it is base carburettor.

Synchronise to specification by turning the adjusting screws with carburettor pilot screw wrench (07908-4220201)

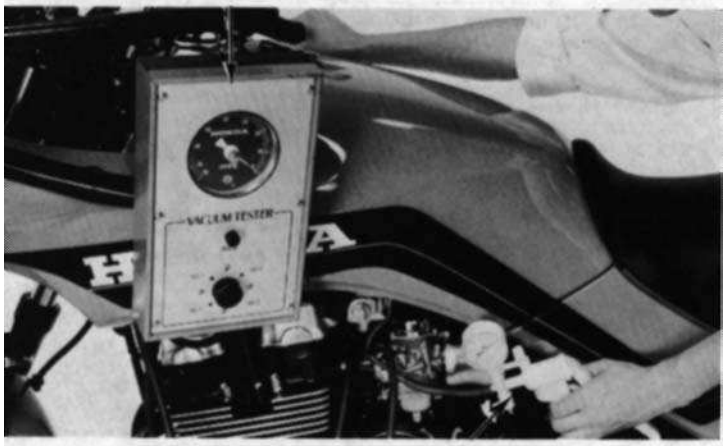
Recheck the idle speed and synchronisation.
Remove the gauge and adapters, install the plugs and vacuum tube connector.
Connect the fuel valve vacuum hose to the No.2 intake pipe.

(1) FUEL VALVE VACUUM TUBE CONNECTOR



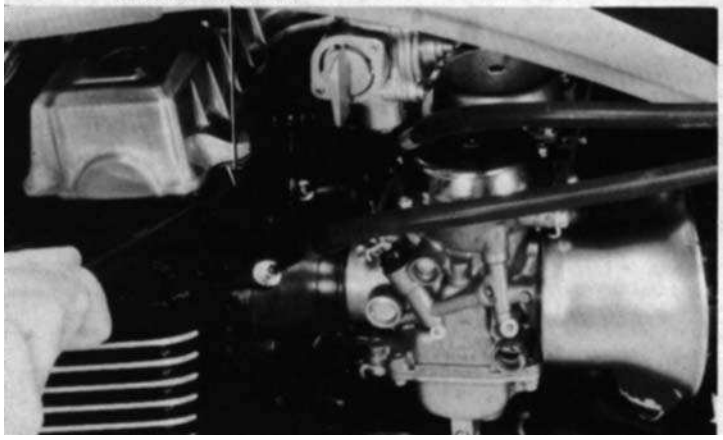
(2) SCREW PLUG

(1) VACUUM GAUGE



(2) VACUUM PUMP

(1) PILOT SCREW WRENCH
07908–4220201

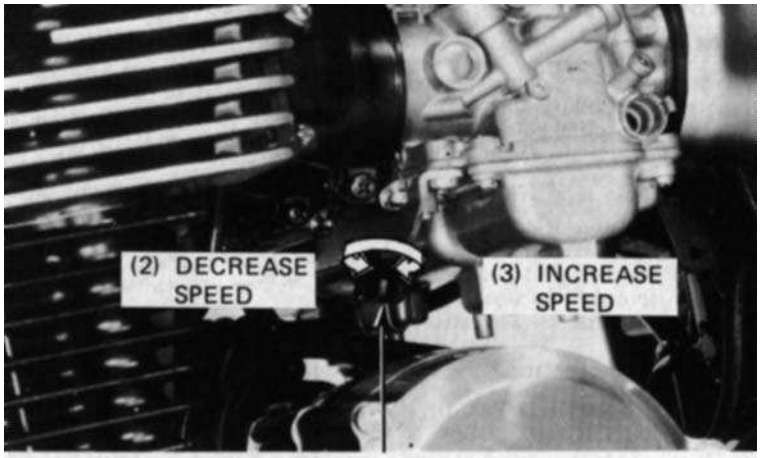


CARBURETTOR IDLE SPEED

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

Warm up the engine, shift to neutral, and place the motorcycle on its centre stand.
Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,000 +/- 100 min^{-1} (rpm)



(1) THROTTLE STOP SCREW

CYLINDER COMPRESSION.

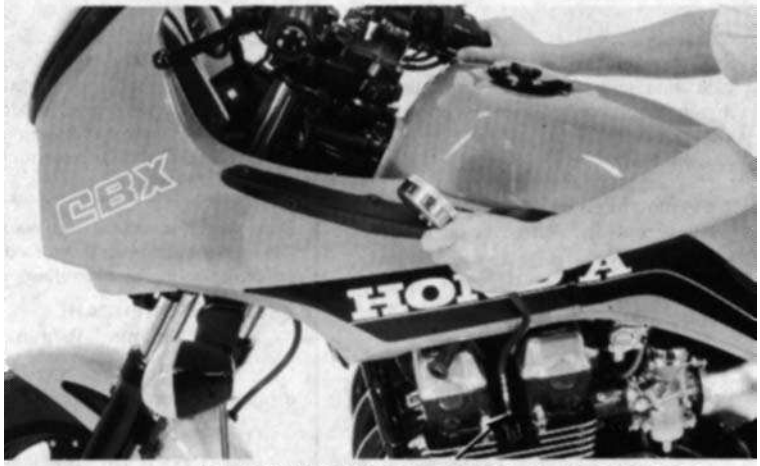
Warm up the engine.
Stop the engine, then disconnect the spark plug caps and remove the spark plugs.
Insert the compression gauge.
Open the throttle all the way and crank the engine with the starter motor.

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

COMPRESSION PRESSURE:
1,200 ± 200 kPa (12.0 ± 2.0 kg/cm^2, 171 ± 28 psi)

If compression is low, check for the following:
- Improper valve clearance
- Leaky valves
- Leaking cylinder head gasket
- Worn piston/ring/cylinder
- Faulty hydraulic tappet

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



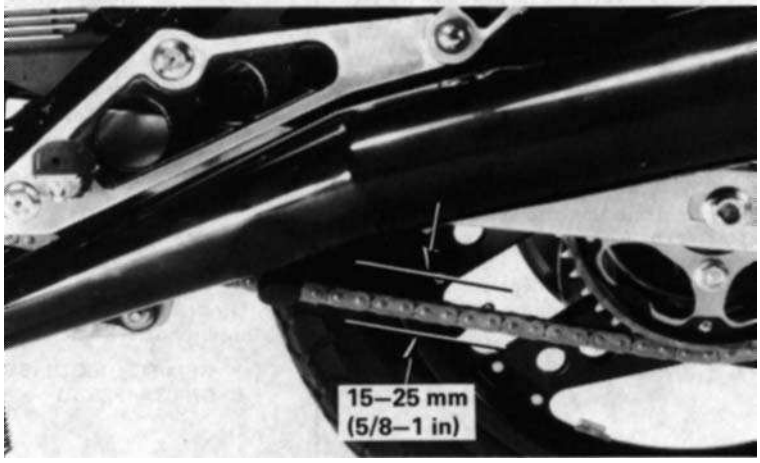
(1) COMPRESSION GAUGE ATTACHMENT
07510–MB00101

DRIVE CHAIN

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

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

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



Adjust as follows:

- Loosen the axle nut.
- Loosen the drive chain adjuster lock nuts.
- Turn both adjusting nuts an equal number of turns until the correct drive chain slack is obtained.

CAUTION
Make sure that the same graduation scale on both adjusters align with the rear ends of the axle hole in the swing arm.

Tighten the adjuster lock nuts.
Tighten the rear axle nut.

TORQUE:
85-105 N.m (8.5-10.5 kg.m, 61-76 ft-lb)

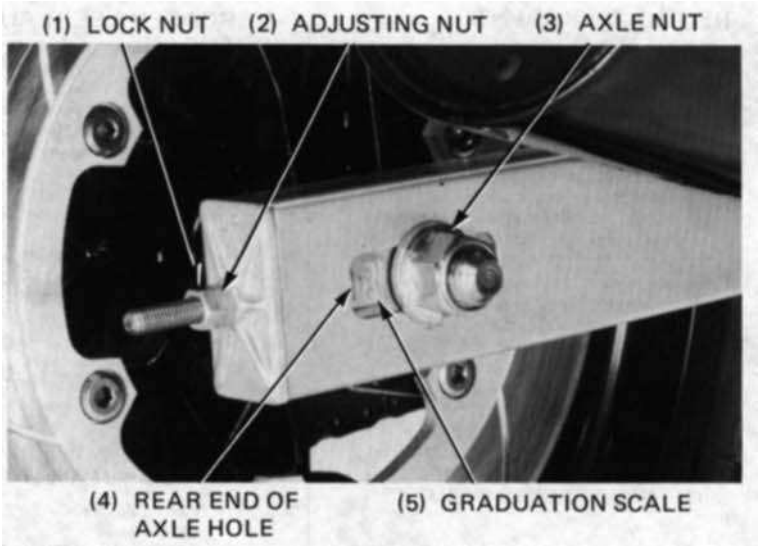
Recheck chain slack and free wheel rotation.
Lubricate the drive chain with SAE 80 or 90 gear oil.

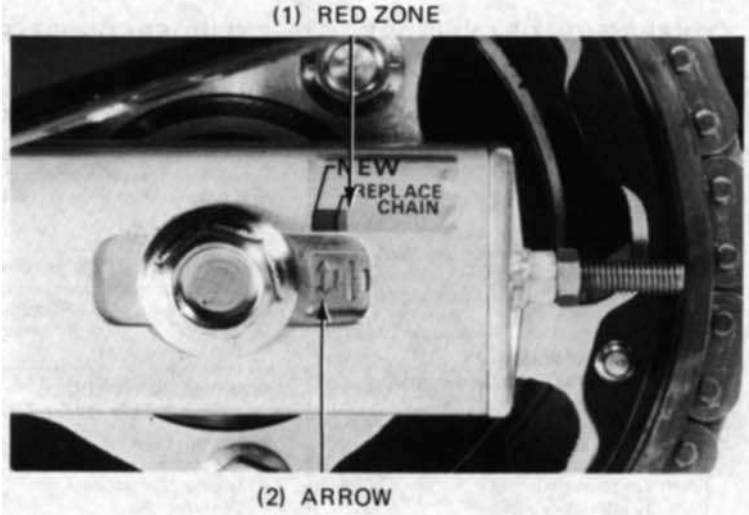
Check the chain wear label. If the red zone on the label aligns with, or is beyond, the arrow on the adjuster, the chain must be replaced.

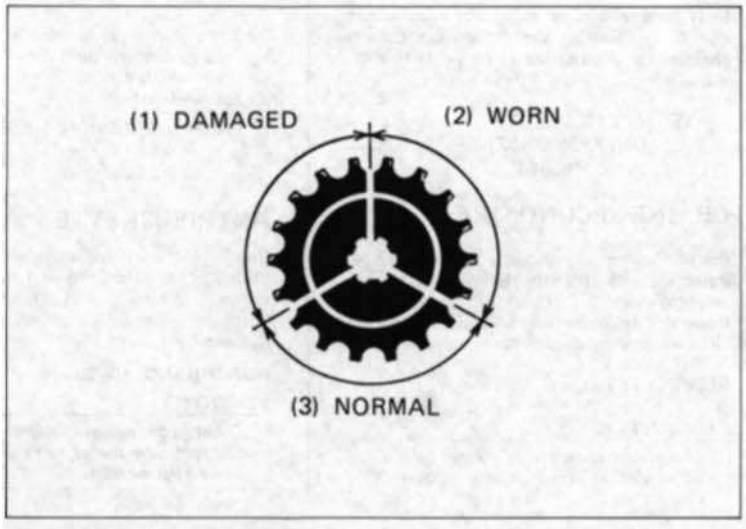
Inspect the drive chain and sprockets for damage or wear. A drive chain with damaged rollers, loose pins, or missing O rings must be replaced. Replace any sprocket which is damaged or excessively worn.

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

Lubrication and cleaning:
The drive chain on this motorcycle is equipped with small O-rings between the link plates. The O-rings can be damaged by steam cleaner, high pressure washers, and certain solvents.
Clean the chain with kerosene. Wipe dry and lubricate only with SAE 80 or 90 gear oil.
Commercial chain lubricants may contain solvents which could damage the rubber O-rings.







BATTERY

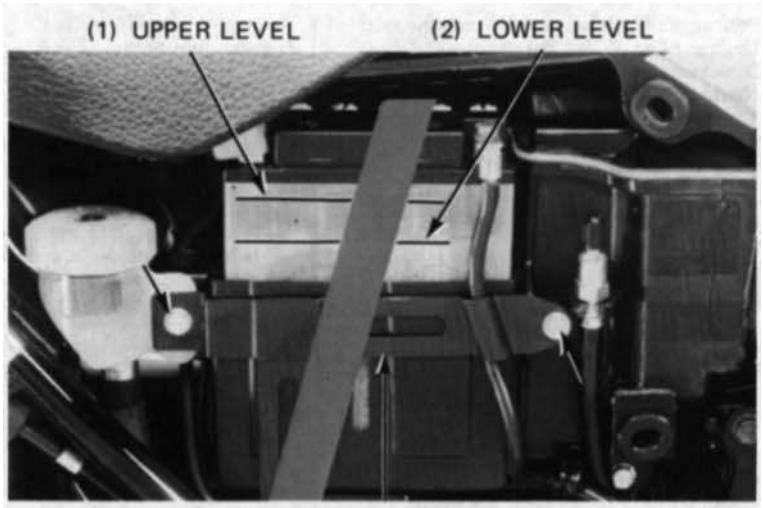
Remove the right hand side cover and inspect the battery fluid level.
When the battery level nears the lower level, remove the battery and add distilled water to the upper level line as follows:

Remove the three battery holder bolts and the battery holder.

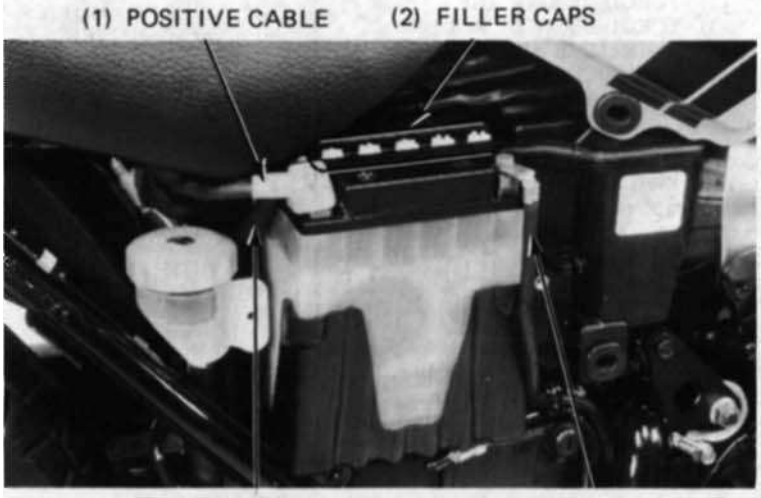
Disconnect the negative cable at the battery, then disconnect the positive cable.
Disconnect the battery breather hose from the battery.
Pull the battery out, remove the filler caps and add distilled water to the upper level line.
Reinstall the filler caps and battery.

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

WARNING
The battery electrolyte contains sulphuric acid. Protect your eyes, skin and clothing. If electrolyte gets in your eyes, flush them thoroughly with water and get prompt medical attention.



(3) BATTERY HOLDER



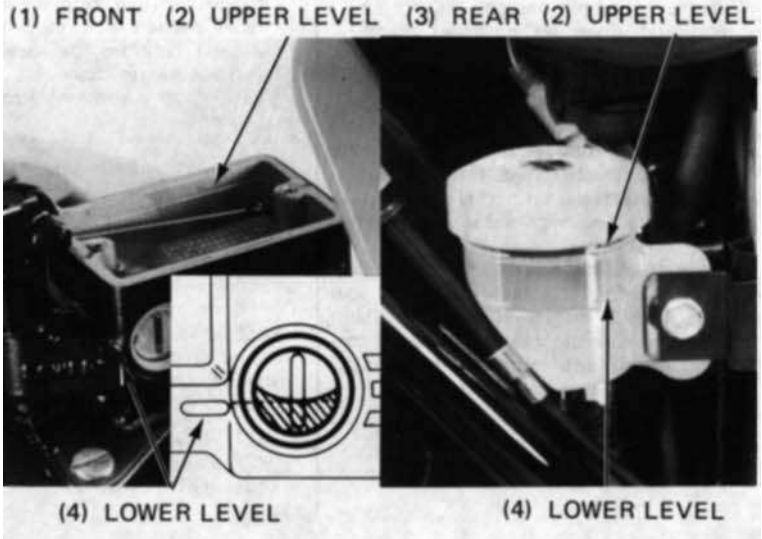
(3) BREATHER HOSE (4) NEGATIVE CABLE

BRAKE FLUID

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

CAUTION.
- ***Do not remove the cover until the handle bar has been turned so that the reservoir is level. Do not mix different types of fluids, as they are not compatible.***
- ***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 can result.***

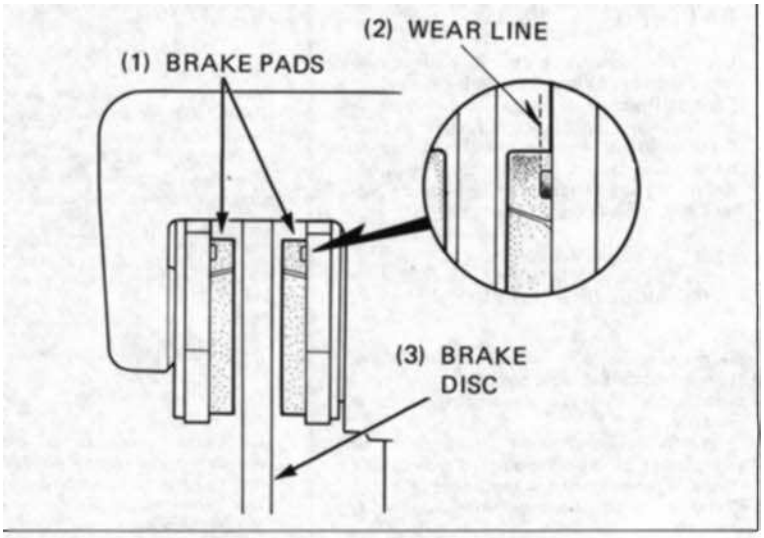
Refer to section 15 for brake bleeding procedures.



BRAKE PAD WEAR

Check the brake pads for wear.
Replace the brake pads if the wear line on the pads reaches the edge of the brake disc. (page 15-5)

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



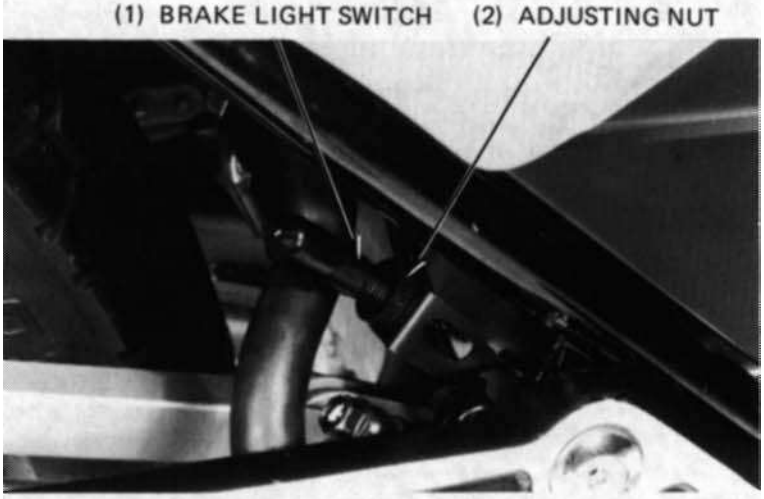
BRAKE SYSTEM

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

BRAKE LIGHT SWITCH

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

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



HEADLIGHT AIM

NOTE:
- **Adjust the headlight beam as specified by local laws and regulations.**
- **Adjust the right and left headlights individually.**

Adjust vertically by turning the vertical adjusting screw.
Adjust horizontally by turning the horizontal adjusting screw.

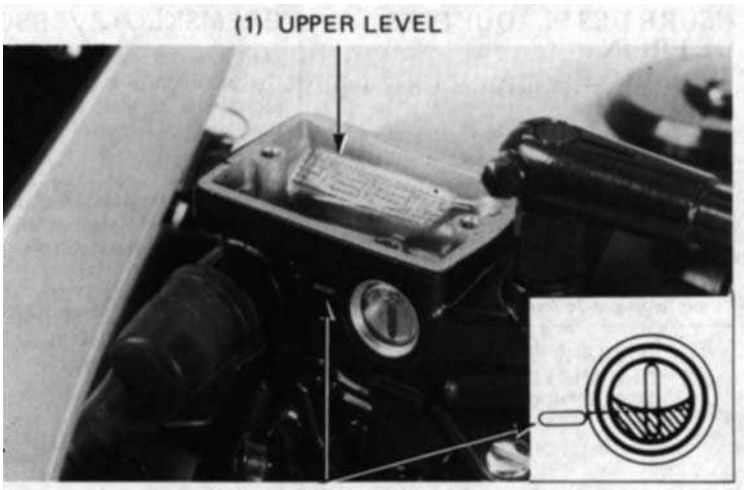
WARNING
An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.

CLUTCH

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

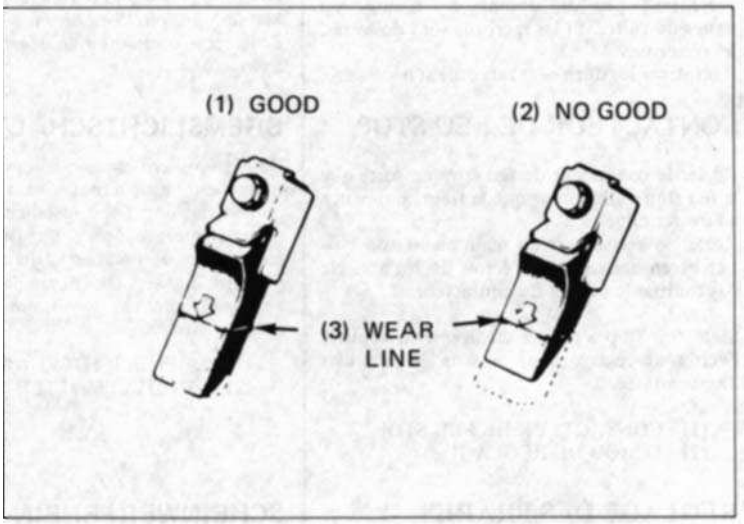
CAUTION

- ***Do not remove the cover until the handle bar has been turned so that the reservoir is level.***
- ***Do not mix different types of fluid, as they are not compatible.***
- ***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 can result.***



SIDE STAND

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



NOTE:

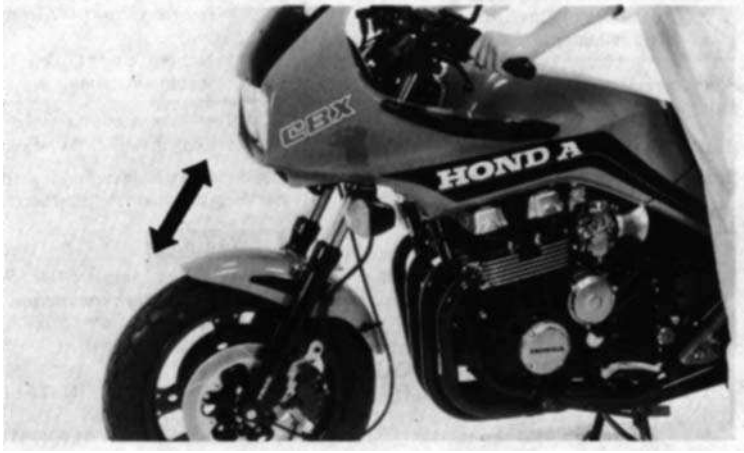
- **When replacing, use a rubber pad with the mark "Over 260 kg ONLY".**
- **Spring tension is correct if the measurement falls within 2-3 kg (4.4-6.6 lb) when pulling the side stand lower end with a spring scale.**

SUSPENSION

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

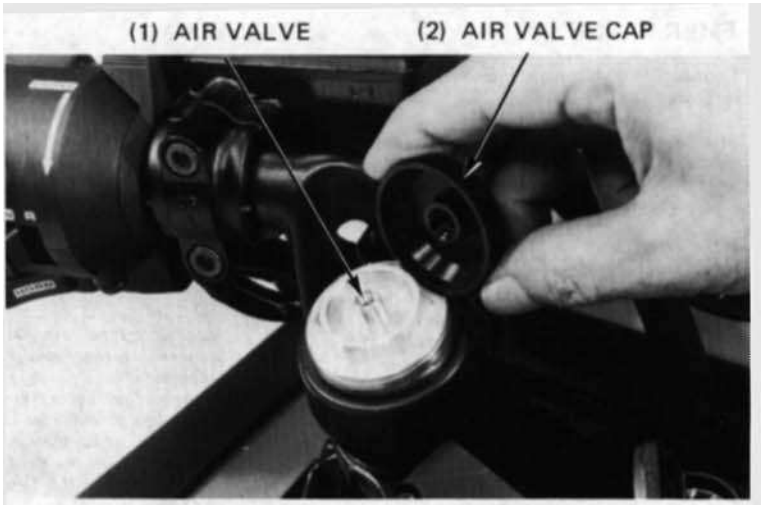
FRONT

Check the action of the front forks by compressing them several times.
Check the entire fork assembly for leaks or damage.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.



Check the front fork air pressure when the forks are cold.
Place the vehicle on its centre stand.
Remove the air valve cap and measure the air pressure.

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



ANTI DIVE SYSTEM INSPECTION

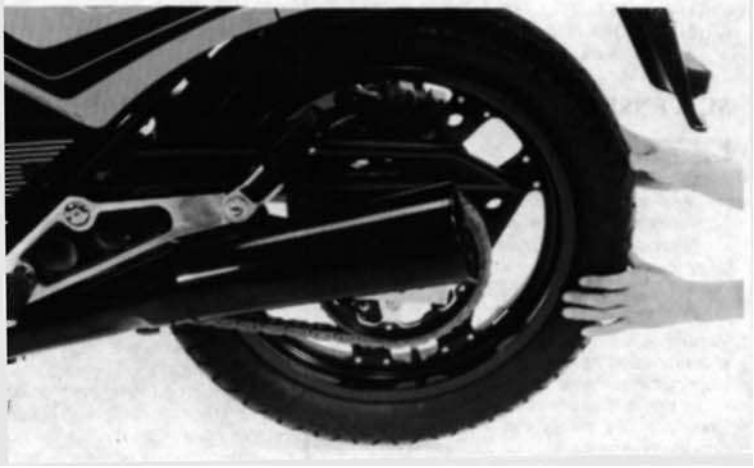
WARNING
Select a safe place away from traffic to perform this inspection.

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

Position	Anti dive damper force
1	LIGHT ANTI DIVE
2	MEDIUM
3	HARD
4	MAXIMUM ANTI DIVE

Inspect and if necessary, repair the system (Refer to section 13)

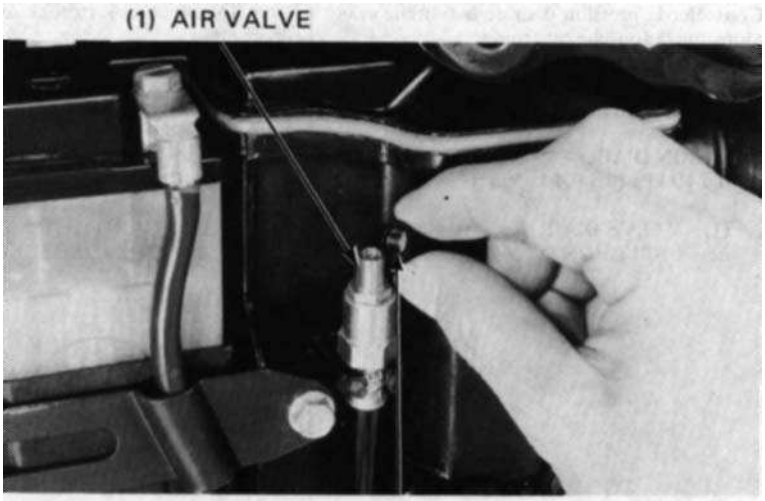
REAR
Place the motorcycle on its centre stand.
Move the wheel sideways with force to see if the swing arm bearings are worn.
Replace the bearings if there is any looseness (page 14-18)
Check the shock absorber for leaks or damage.
Tighten all rear suspension nuts and bolts.



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

REAR SHOCK ABSORBER AIR PRESSURE:
0-400 kPa (0-4.0 kg/cm^2, 0-57 psi)

NOTE:
Check the air pressure when the shock absorber is cold.



(2) AIR VALVE CAP

NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (Section 1) at the intervals shown in the Maintenance Schedule (page 3-3).
Check all cotter pins, safety clips, hose clamps and cable stays.

WHEELS

NOTE:
Tyre pressure should be checked when tires are COLD.

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

RECOMMENDED TYRES AND PRESSURES

		Front	Rear
Tyre size		110/90V16	130/80V18
Cold tyre pressure kPa (kg/cm^2, psi)	Driver only	250 (2.5, 36)	250 (2.5, 36)
	Driver and one passenger	250 (2.5,36)	290 (2.9, 41)
Tyre Brand	Bridgstone	G511	G510
	Dunlop	K527A	K527

Check the front and rear wheels for trueness (Section 13 and 14)
Measure the tread depth at the centre of the tyres following limits

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

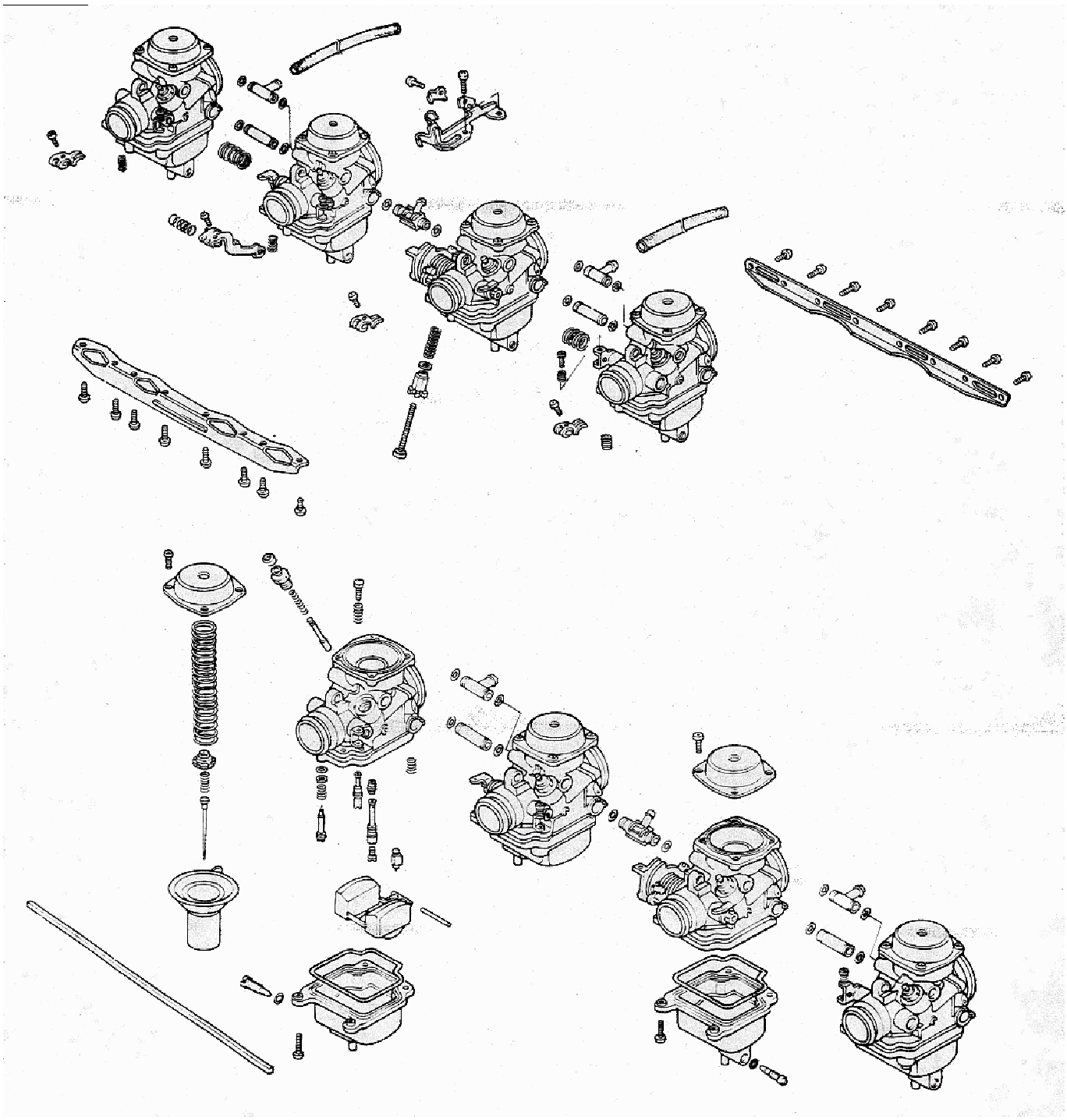
STEERING HEAD BEARINGS

NOTE:
Check that the control cables do not interfere with handle bar rotation.

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

CAUTION
When jacking up the engine, place a jack under the No. 2 and 3 exhaust pipes. Never support the oil hoses and oil filter.

If the handle bar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 13-36)



Service Information

General

WARNING

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

- When disassembling fuel system parts. Note the location of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain screws that can be loosened to drain residual gasoline.

SPECIFICATIONS

Item	Specifications
Carburettor Type	KEIHIN VE
Throttle Bore	34 mm (1.34 in)
Venturi Bore	30.8 mm (1.21 in)
Identification No.	VE64B
Float Level (Gauge Level)	18.5 mm (0.73 in)
Main Jet	#112
Idle Speed	1,000 +/- 100 rpm
Throttle grip free play	2-6 (0.008-0.24 in)
Pilot Screw Initial Opening	2 Turns Out

TOOLS

Special

Carburettor pilot screw wrench	07908 - 4220201

Common

Float gauge	07401 - 0010000

TROUBLESHOOTING

Engine cranks but wont start
1. No fuel in tank
2. No fuel in carburettor
3. Engine flooded with fuel
4. No spark at plug (ignition malfunction)
5. Air cleaner clogged
6. Intake air leaking
7. Improper choke operation
8. Improper throttle operation

Hard starting or stalling after starting
1. Improper choke operation
2. Ignition malfunction
3. Fast idle speed incorrect
4. Carburettor malfunction
5. Fuel contaminated
6. Intake air leak
7. Idle speed incorrect

Rough Idle
1. Ignition malfunction
2. Idle speed incorrect
3. Incorrect carburettor synchronisation
4. Carburettor malfunction
5. Fuel contaminated

Misfiring during acceleration
Ignition malfunction

Backfiring
1. Ignition malfunction
2. Carburettor malfunction

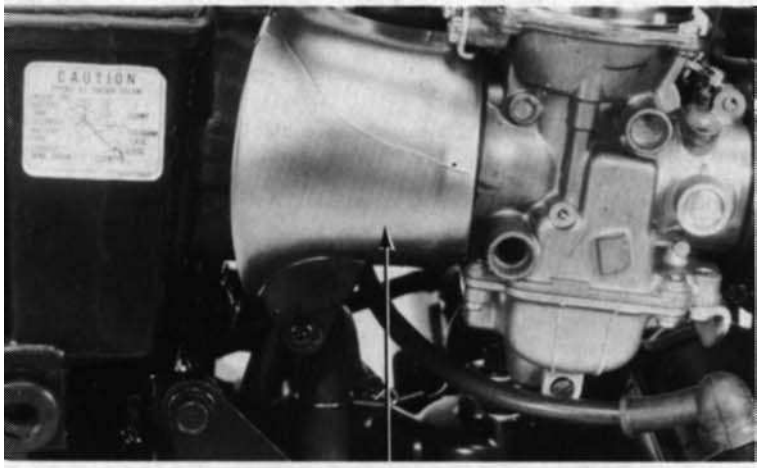
Poor performance (Driveability) and poor fuel economy
1. Fuel system clogged
2. Ignition malfunction

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

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

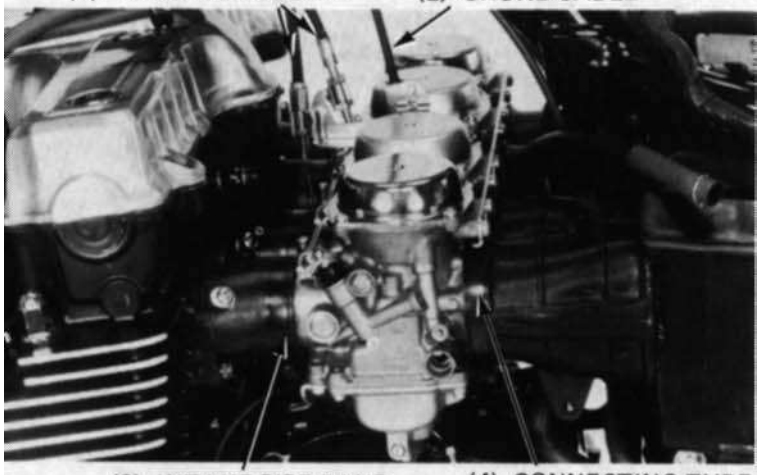
CARBURETOR REMOVAL

Remove fuel tank (page 4-15)
Remove the left and right connecting tube covers.

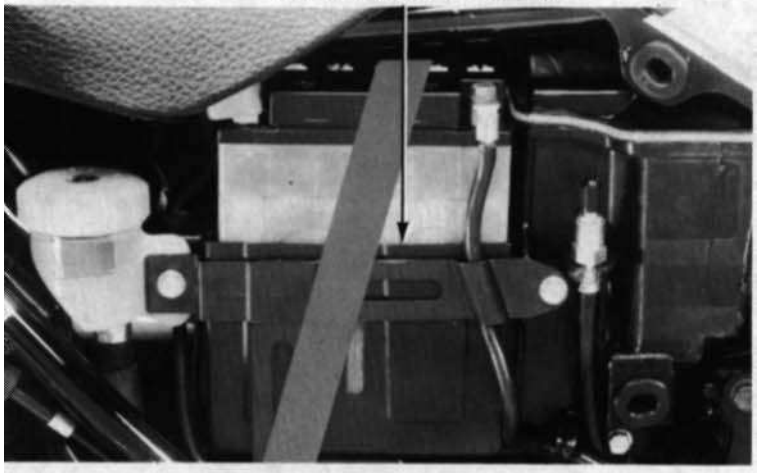


(1) CONNECTING TUBE COVER

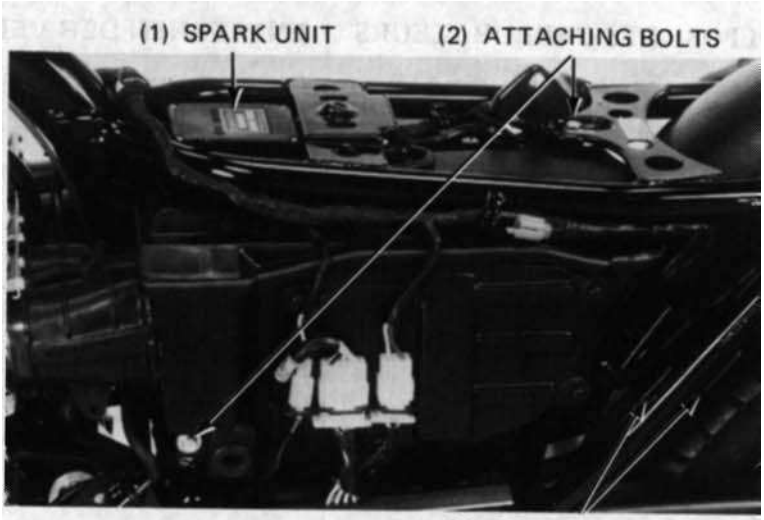
Loosen the air cleaners connecting tube bands and carburettor intake pipe bands.
Remove the choke and throttle cables from the bracket.


(1) THROTTLE CABLES (2) CHOKE CABLE
(3) INTAKE PIPE BAND (4) CONNECTING TUBE BAND

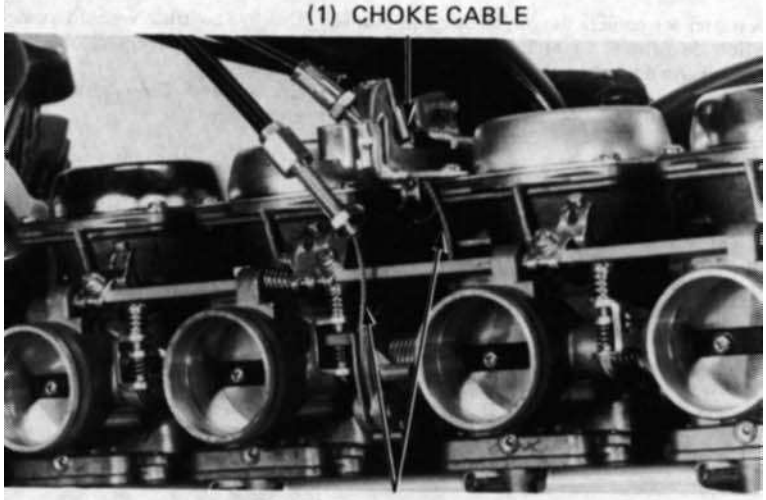
Remove the battery holder.


(1) BATTERY HOLDER

Remove the bolts attaching the air cleaner case to the frame.
Remove the spark unit from the air cleaner case.
Unhook the rear fender tabs from the frame.
Slide the air cleaner rearward.



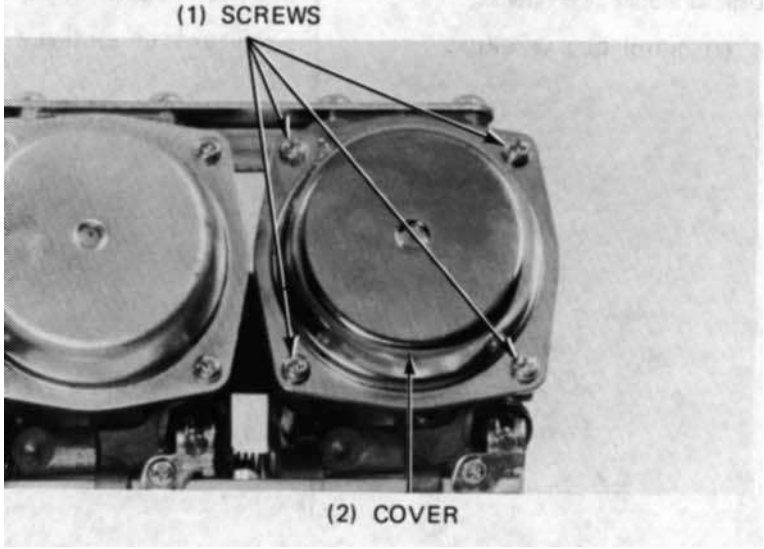
Remove the carburettor assembly from the left side and disconnect the choke and throttle cables from the carburettor.



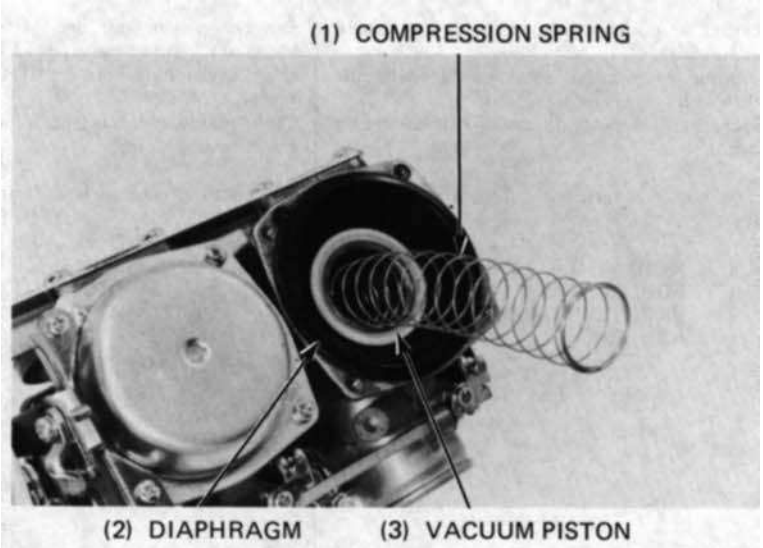
VACUUM CHAMBER

Removal

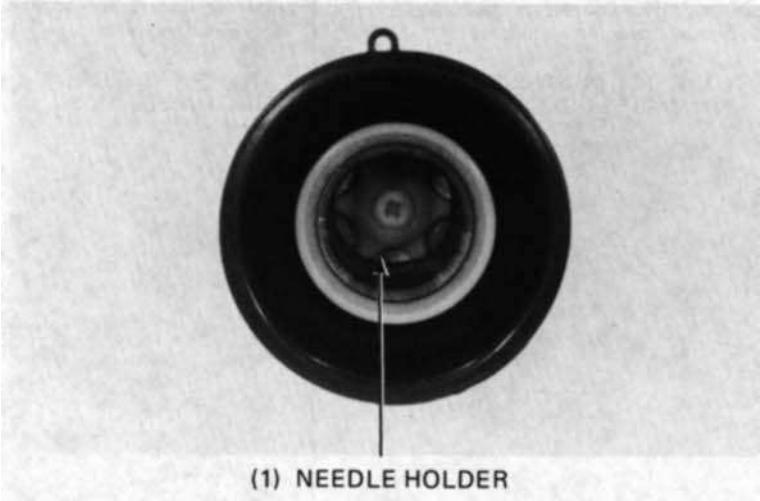
Remove the four vacuum chamber cover screws and cover.



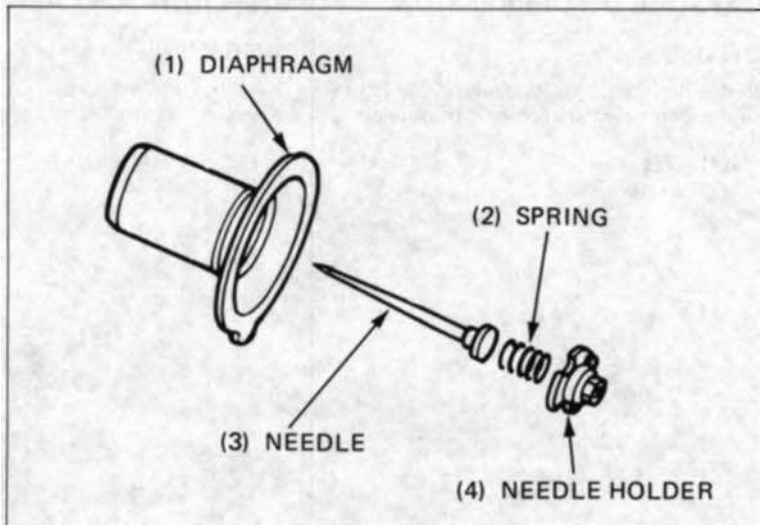
Remove the compression spring, diaphragm and vacuum piston. Inspect the vacuum piston for wear, nicks, scratches or other damage. Make sure the piston moves up and down freely in the chamber.



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

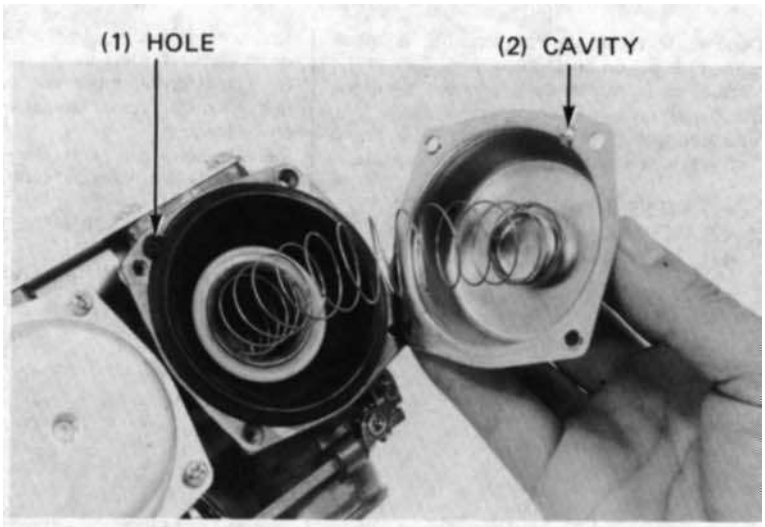


Inspect the needle for excessive ware at the tip and for bending, or other damage. Check for a torn diaphragm or other deterioration.



Installation

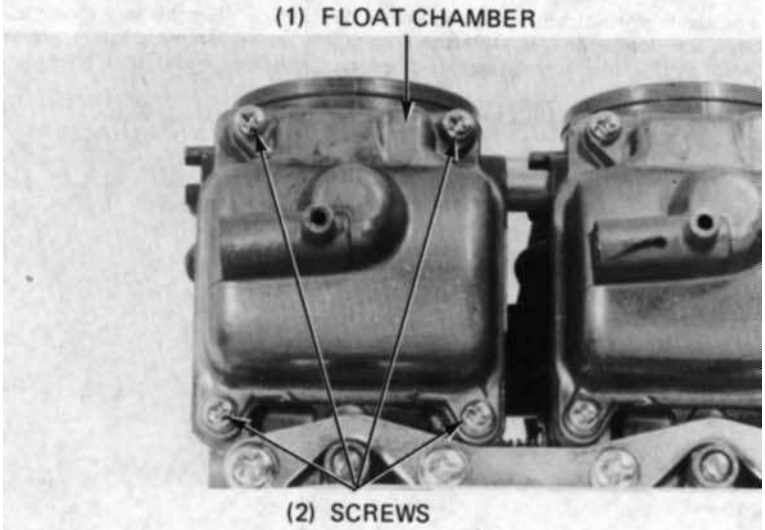
Installation is essentially the reverse of the removal but to keep from distorting the diaphragm, install the vacuum piston/diaphragm as follows:
Insert the vacuum piston into the carburettor. Stick your finger into the carburettor bore and hold the vacuum piston in the full throttle position, then turn down the diaphragm so its lip fits into the carburettor groove.
Install the chamber cover, aligning its cavity with the hole in the carburettor, and secure with at least two screws before releasing the vacuum piston.



FLOAT CHAMBER

Removal

Remove the four float chamber screws and the float chamber.

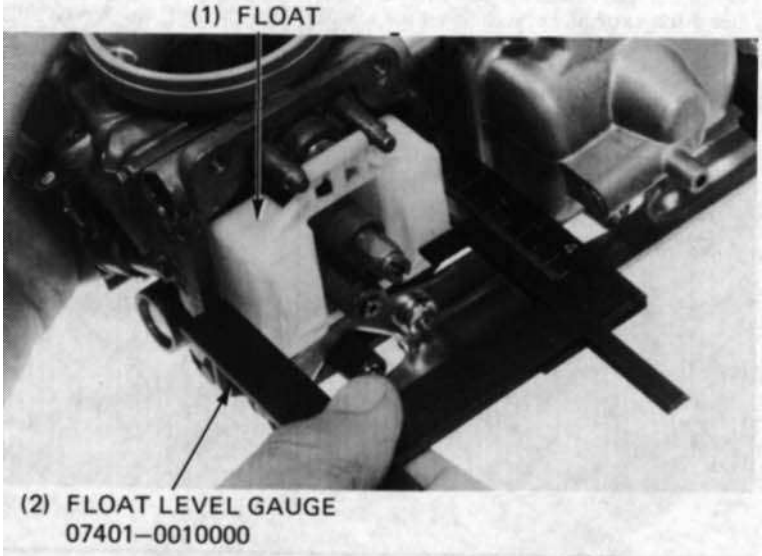


FLOAT LEVEL

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

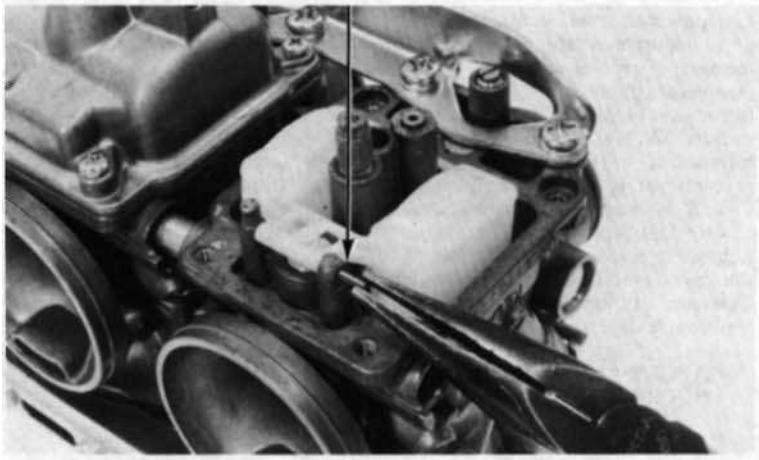
Float Level: 18.5 ± 1mm (0.61 ± 0.04 in)

Replace the float assembly, if it is not within specifications.

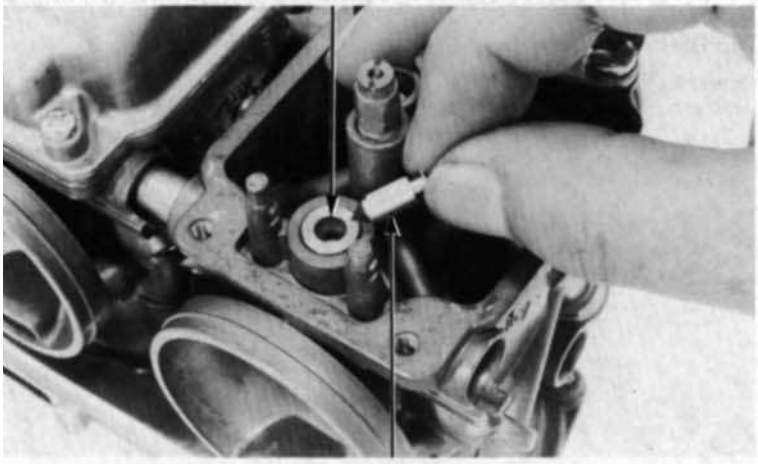


Float and Jets

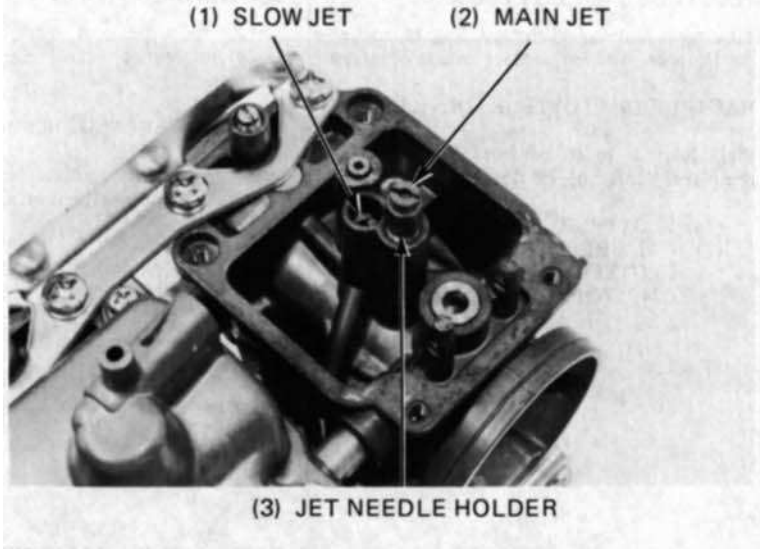
Remove the float pin, float and float valve.



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



Remove the main jet, slow jet and the jet needle holder.



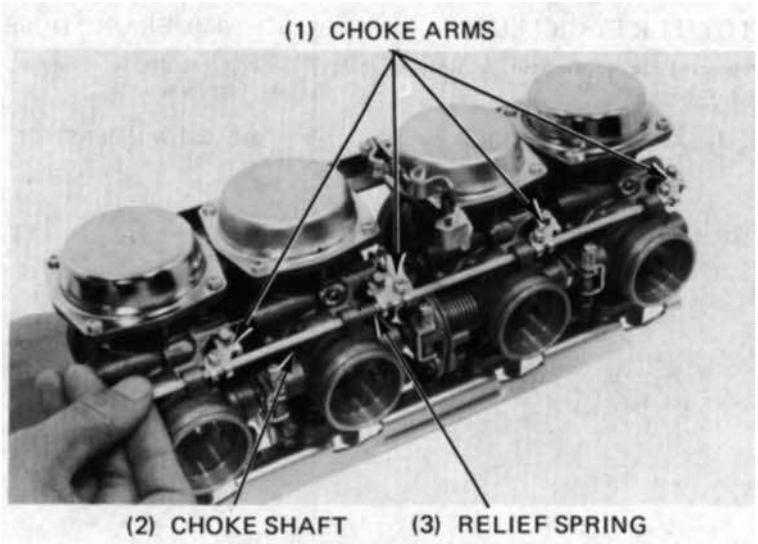
ASSEMBLY

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

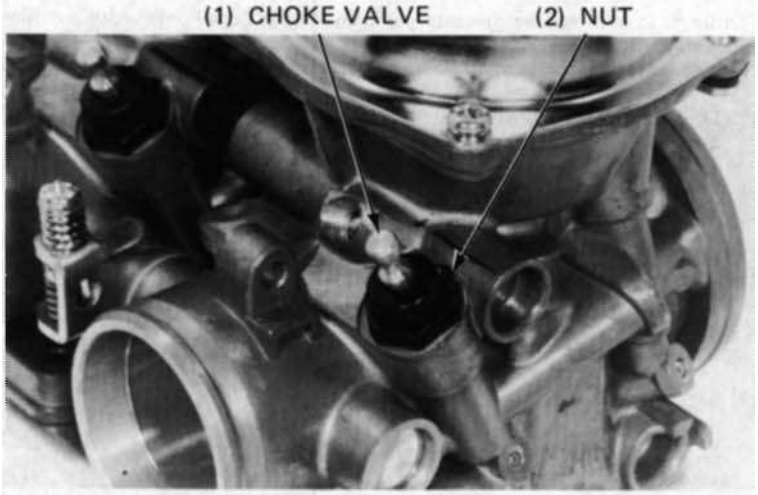
CHOKE (BYSTARTER) VALVE

Removal

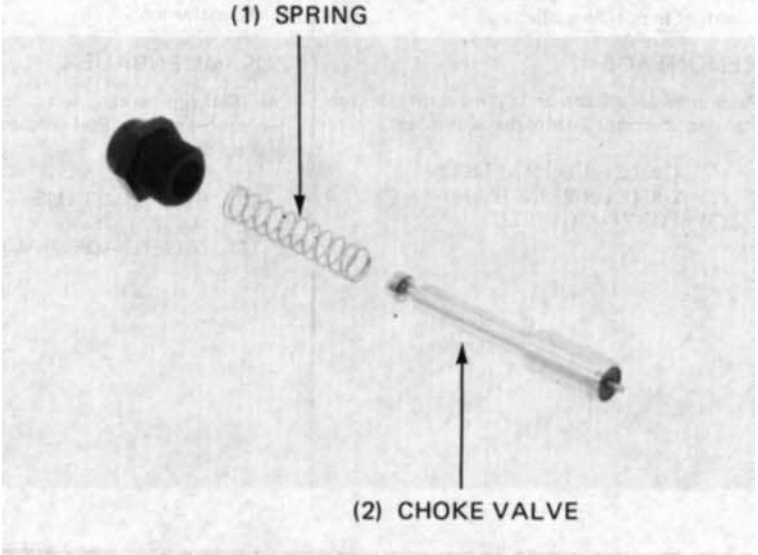
Unhook the choke (bystarter) valve relief spring from the No. 3 carburettor choke arm.
Loosen all choke (bystarter) arm clamp screws.
Pull the choke shaft out from the right side and remove the choke arms and relief spring.



Remove the choke valve nut, spring and valve.

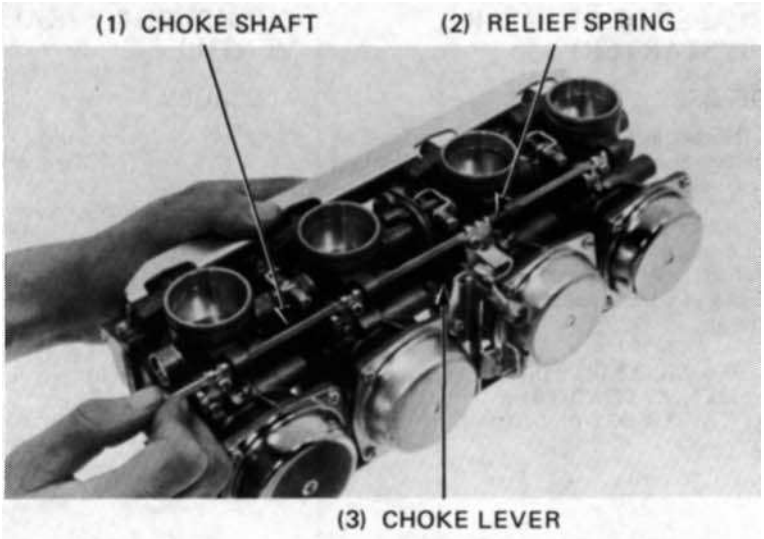


Check the choke valve and spring of nicks, grooves or other damage.



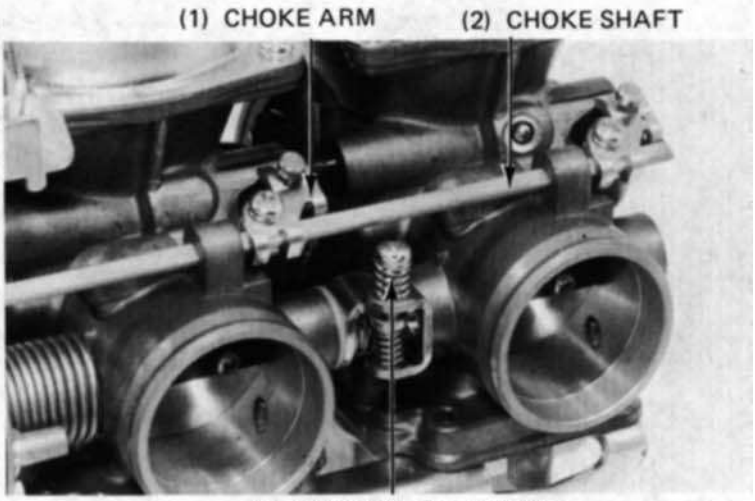
Installation

Install the choke valve, spring and nut.
Install the choke arm and relief spring, and insert the choke shaft from the left side.
Tighten the choke arm clamp screws.
Hook the choke relief spring correctly.
Make sure that the choke linkage operates smoothly by moving the choke lever.

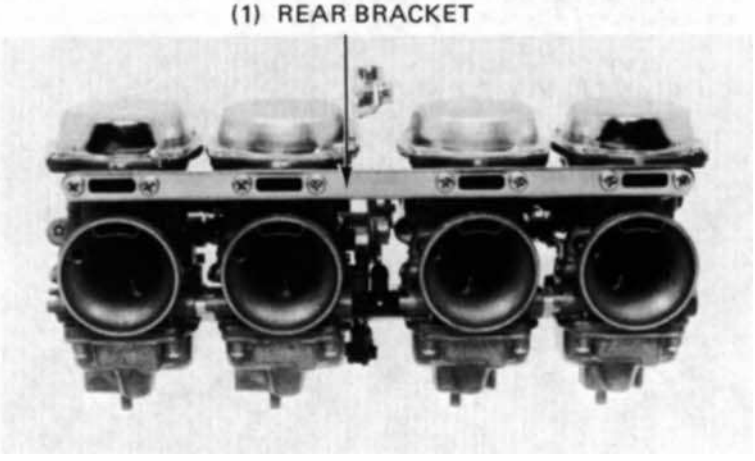


CARBURETOR SEPARATION

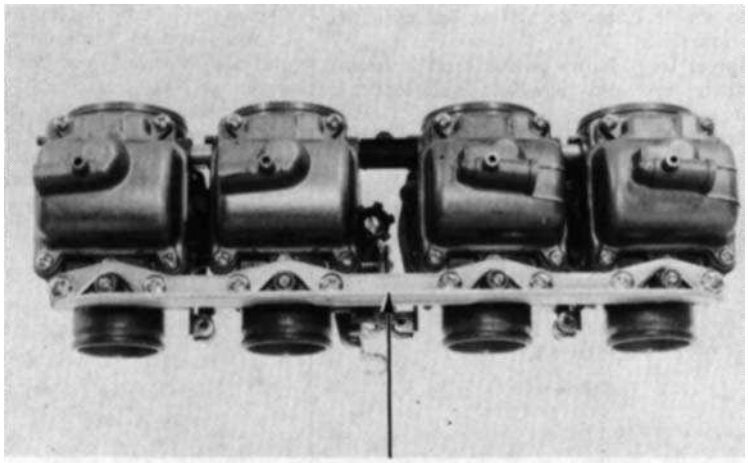
Remove the choke shaft, arms and relief spring (page 4-8).
Loosen each carburettor's synchronisation adjusting screw until there is no spring tension on it.



Remove the rear bracket.



Remove the front bracket.

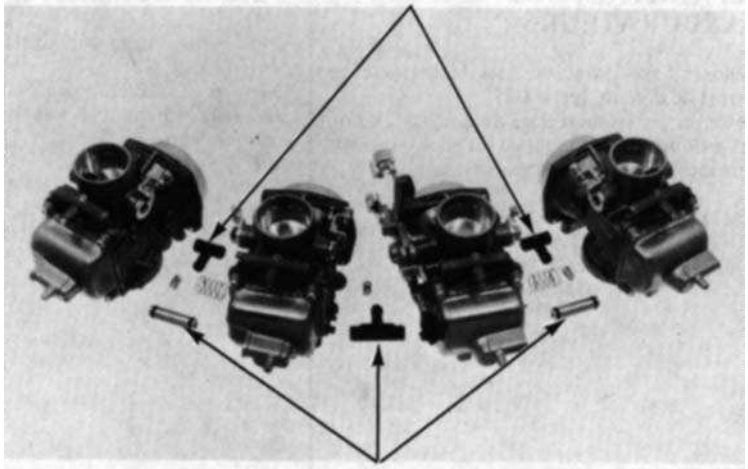


(1) FRONT BRACKET

Carefully separate the carburettors.

CAUTION
Separate the carburettors horizontally to prevent damage to the fuel and air joints pipes.

(1) AIR JOINT PIPES

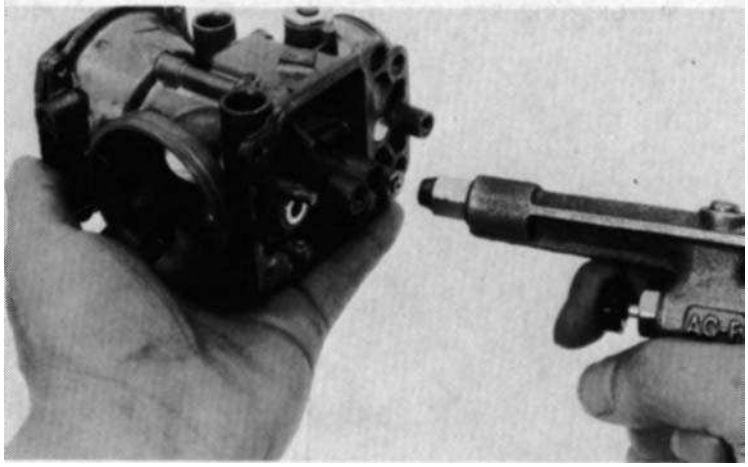


(2) FUEL JOINT PIPES

CARBURETTOR CLEANING

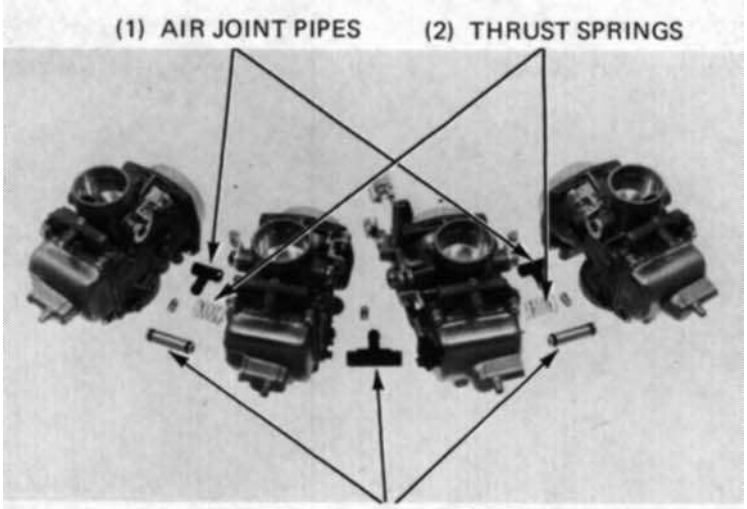
Remove the vacuum piston (page 4-4).
Remove the float, float valve and jets (page 4-7).
Remove the choke valve (page 4-8).
Remove the pilot screw (page 4-13).

Clean the carburettor passages with compressed air.
Install the removed parts.

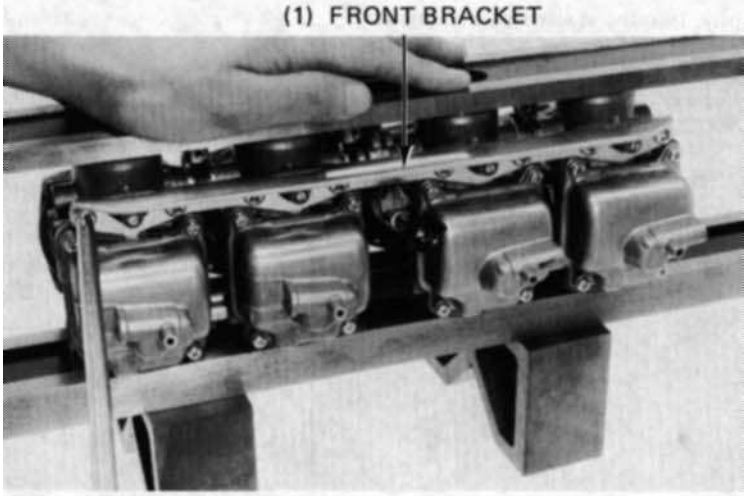


CARBURETTOR ASSEMBLY

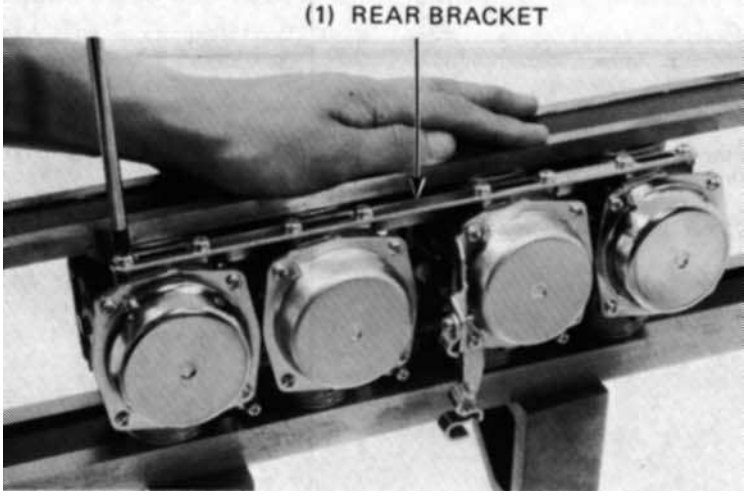
Coat new O-rings with oil and install them on the fuel and air joint pipes.
Connect the carburettors with the fuel and air joint pipes.
Install the thrust springs between the throttle valve shafts.



Install the front bracket loosely.
Place the carburettor on a flat surface with the front side facing up.
Press the carburetors together carefully and tighten the front bracket screws in the sequence shown in two or three steps to prevent carburettor misalignment.



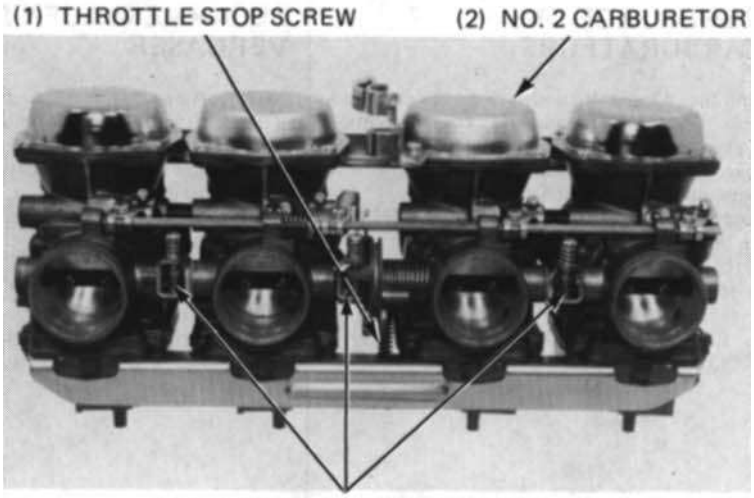
Install the rear bracket in the same procedure as for the front bracket.



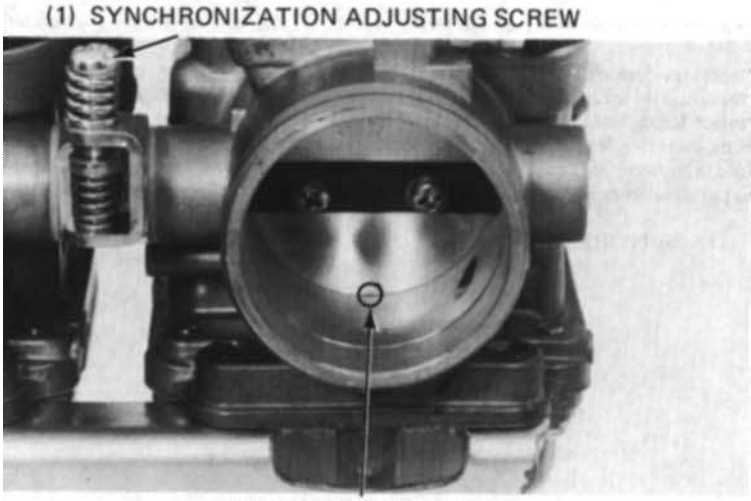
Install the choke arms and relief spring. Carefully insert the choke shaft through the choke arms and relief spring from the left-hand side.

Tighten the choke arm clamp screws and hook the relief spring correctly.

Install the synchronisation springs. Turn the throttle stop screw to align the No. 2 throttle valve with the edge of the by-pass hole.



Align each throttle valve with the edge of the bypass hole by turning the synchronisation adjusting screw.

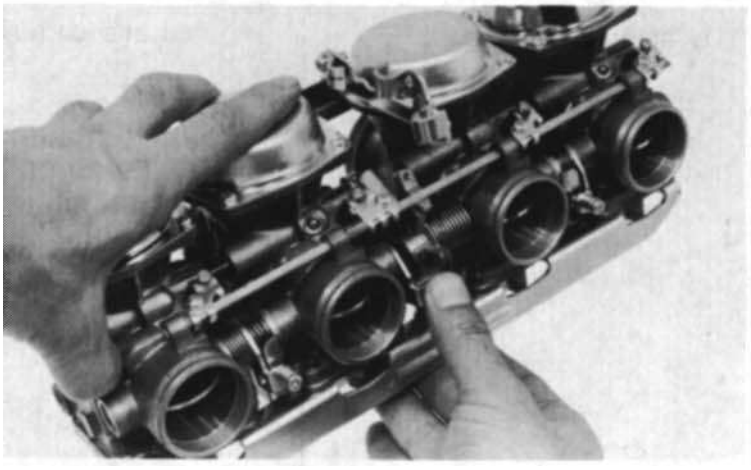


Inspect throttle operation as described below:

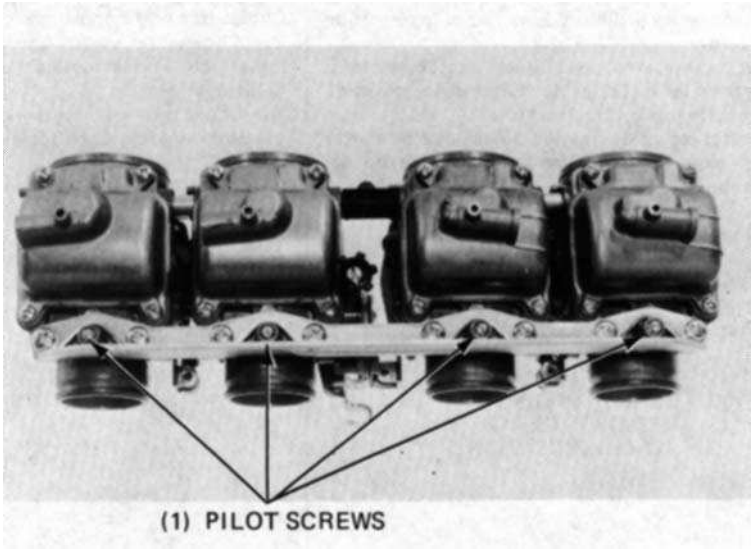
- Open the throttle slightly by pressing the throttle linkage. Then release the throttle.
- Make sure that it returns smoothly.
- Make sure that there is no drag when opening and closing the throttle.

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

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



PILOT SCREW


(1) PILOT SCREWS

Removal

NOTE:
The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.

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

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

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

Installation

Install the pilot screws and return them to their original position as noted during removal. Perform pilot screw adjustment if a new pilot screw is installed (page 4-14).

NOTE:
If you have replaced the pilot screw in one carburettor, you must replace the pilot screws in the other carburetors *for proper pilot screw adjustment.*

CARBURETOR INSTALLATION

Install is essentially the reverse of removal.

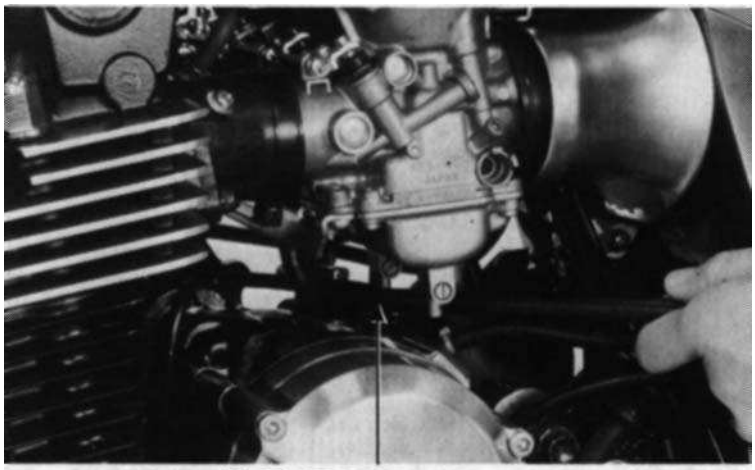
NOTE:
Route the throttle and choke cables properly (page 1-8).

Perform the following inspection and adjustment.
- Throttle operation (page 3-5).
- Carburetor choke (page 3-6)
- Carburetor idle speed (page 3-9)
- Carburetor synchronisation (page 3-8)

PILOT SCREW ADJUSTMENT

Idle Drop Procedure

NOTE:
- **The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced (page 4-13).**
- **Use a tachometer with graduation of 50 min^{-1} (rpm) change.**


(1) PILOT SCREW WRENCH
07908–4220201

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

   INITIAL OPENING: 2 Turns out

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

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

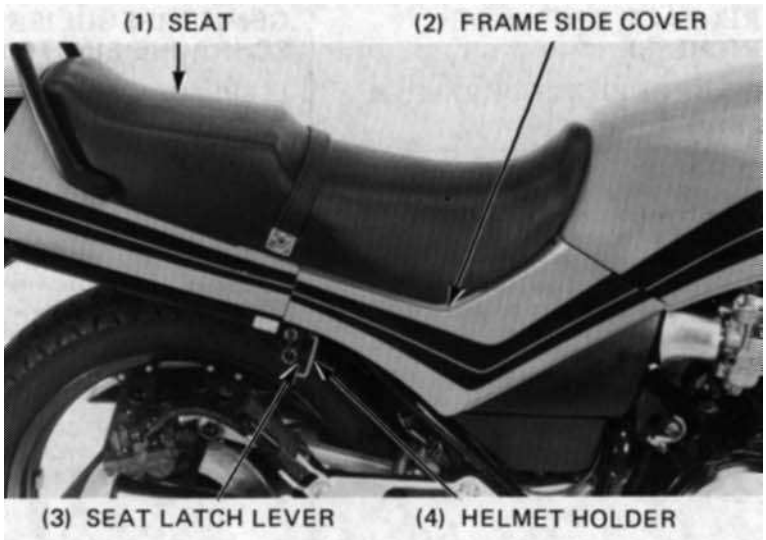
   IDLE SPEED: 1,000 ± 100 min^{-1} (rpm)
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If engine speed increases by 50 min-1 (rpm) or more, turn each pilot screw out by a continual 1/2 turn until the engine speed drops by 50 min-1 (rpm) or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburettor pilot screw in until the engine speed drops 50 min-1 (rpm).
9. Turn the No. 1 carburettor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2, 3 and 4 carburettor pilot screws.

FUEL TANK

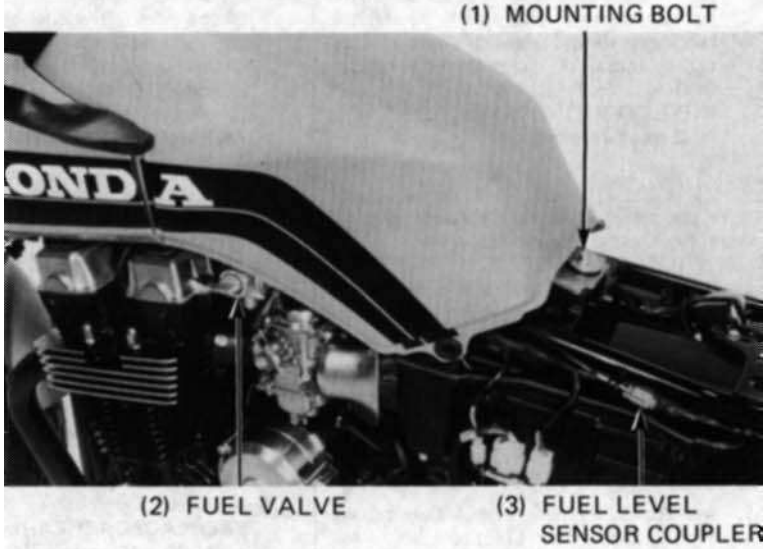
WARNING
Do not allow flames or sparks near gasoline.
Wipe up spilled gasoline at once.

REMOVAL

Unlock the helmet holder, release the seat by pushing the latch lever forward and remove the seat.
Remove the left and right frame side covers.



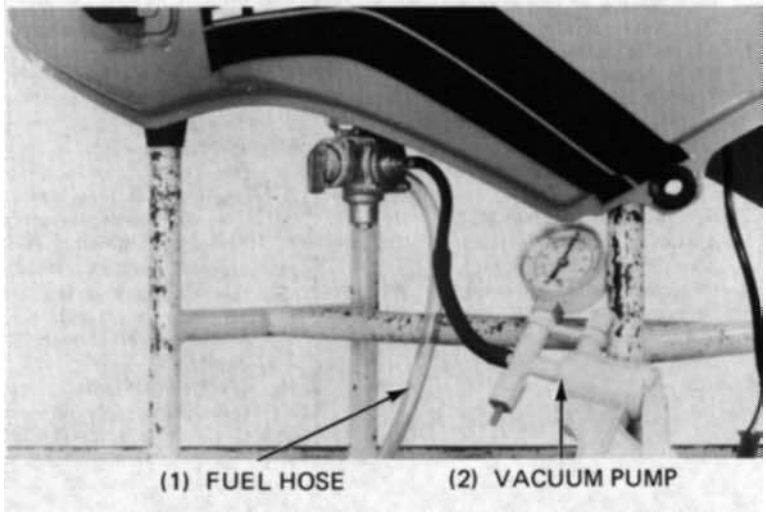
Turn the fuel valve off.
Disconnect the fuel level sensor coupler.
Remove the fuel tank mounting bolt.
Raise the fuel tank and disconnect the fuel valve vacuum hose and fuel hose.
Remove fuel tank from the frame.



FUEL VALVE DIAPHRAGM TEST

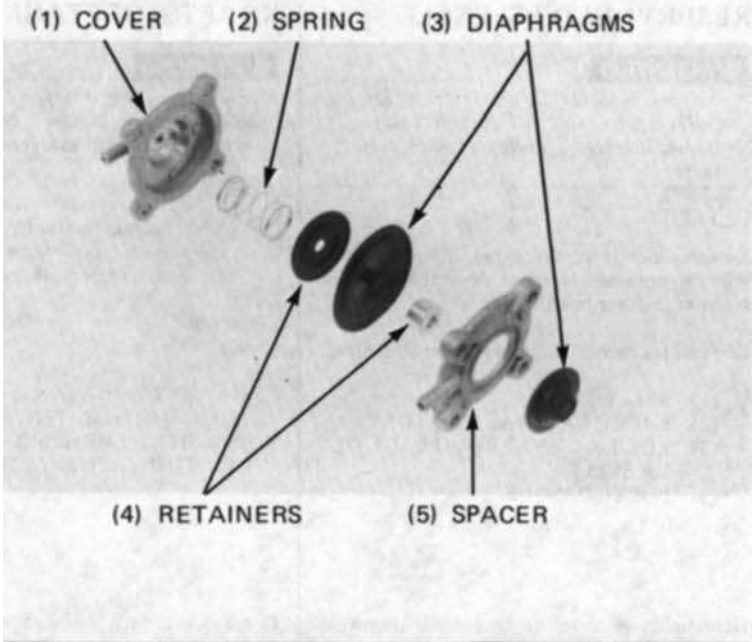
Connect the fuel hose to the fuel valve and place a container under the fuel hose.
Turn the fuel hose on. If fuel comes out of the fuel hose, replace the diaphragm.

Connect a hand vacuum pump to the diaphragm vacuum outlet. Fuel should flow from the fuel hose when vacuum is applied. If fuel flow is restricted, replace the diaphragm.

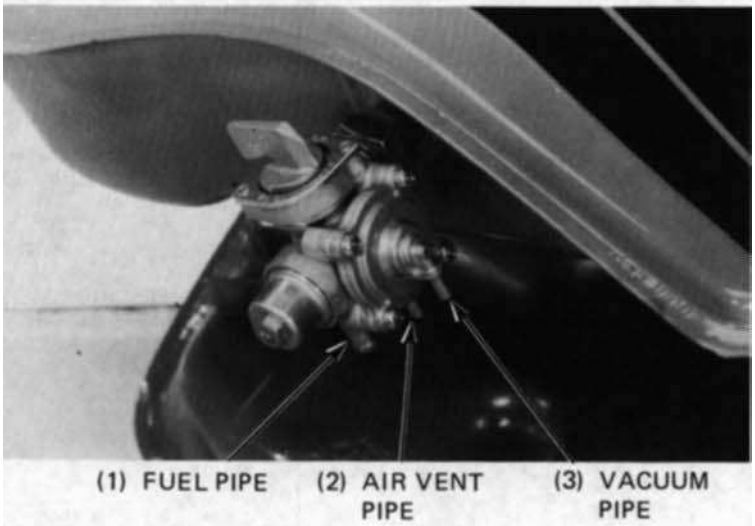


FUEL VALVE DIAPHRAGM REPLACEMENT

Drain the fuel from the fuel tank.
Remove the four attaching screws and the diaphragm assembly.
Replace the diaphragm cover, spring, diaphragms spacer and retainers as a set.

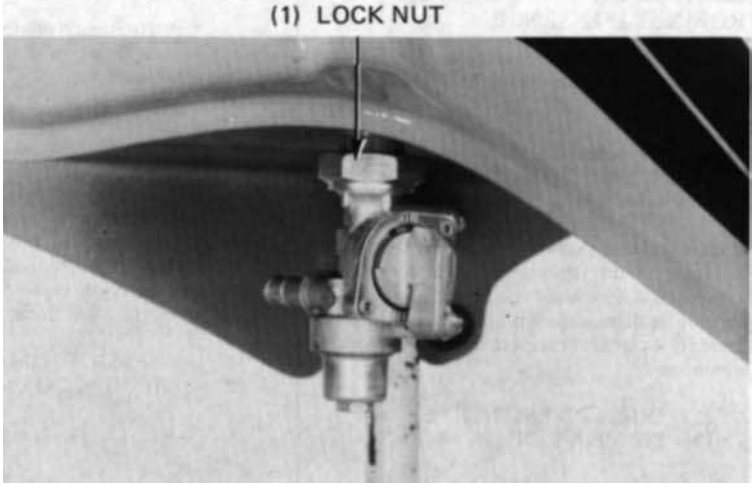


Install the diaphragm assembly so that the air vent pipe of the spacer and the vacuum pipe of the cover face to the same direction as the fuel pipe of the fuel valve body.



FUEL STRAINER CLEANING

Drain the fuel from the fuel tank.
Loosen the fuel valve lock nut and remove the fuel valve.



Remove the fuel strainer and O-ring.
Clean the fuel strainer.
Install the fuel strainer and O-ring onto the fuel valve.
Install the fuel valve and tighten the lock nut.

NOTE:
Do not over tighten lock nut

Fill the tank with gasoline and make sure there are no fuel leaks.

INSTALLATION

Install the fuel tank in the reverse order of removal.
Check the vent hole of the filler cap for blockage.
Make sure that there are no fuel leaks.

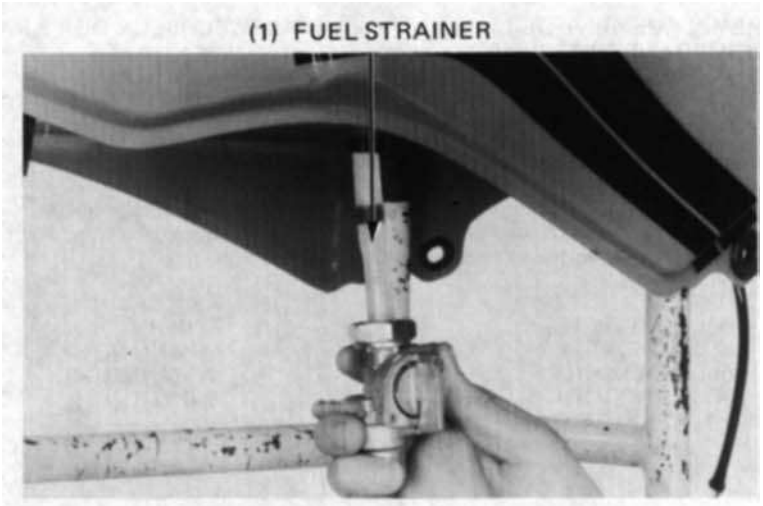
AIR CLEANER

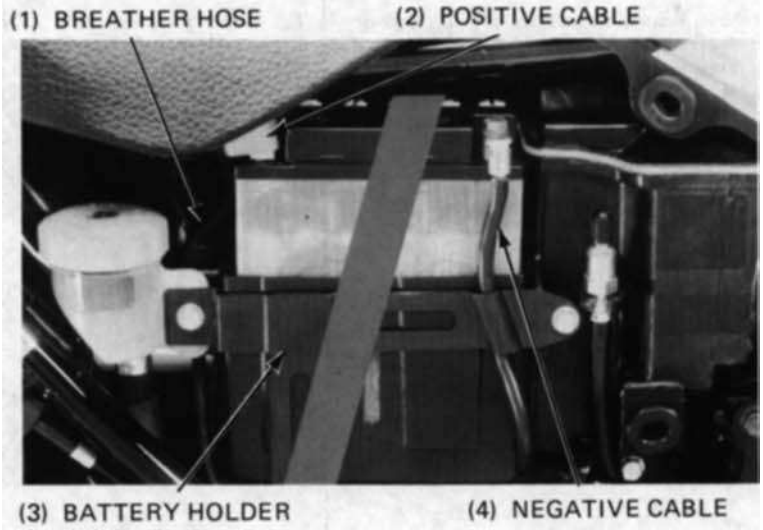
Air cleaner case removal

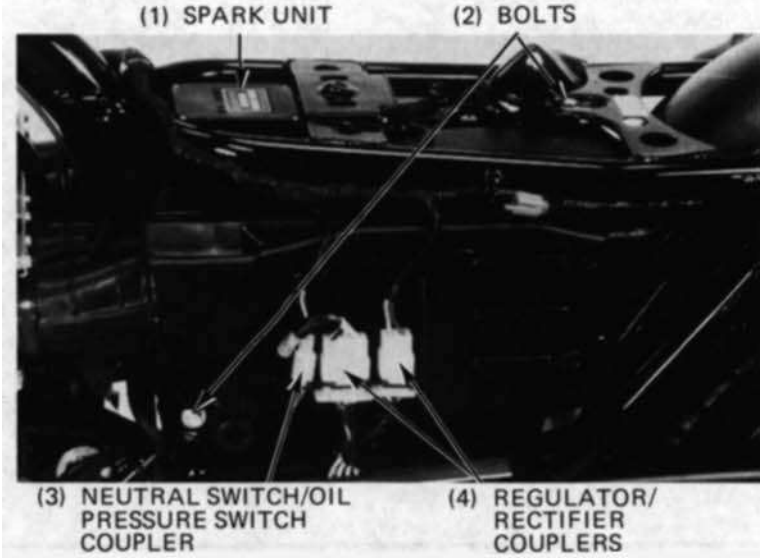
Remove fuel tank (page 4-14).

Remove the battery holder.
Pull out the battery and disconnect the negative cable, then disconnect the positive cable.
Disconnect the battery breather hose and remove the battery.

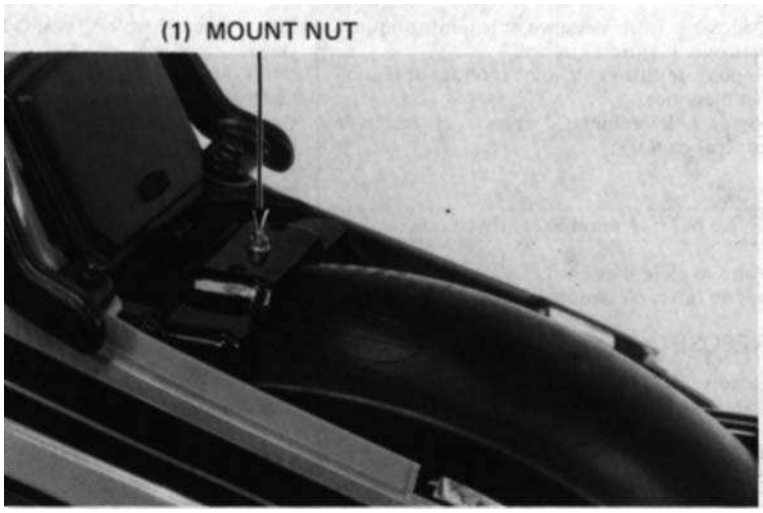
Disconnect the regulator/rectifier couplers and neutral switch/oil pressure switch coupler.
Remove the spark unit from the air cleaner case.
Remove the bolts attaching the air cleaner case to the frame.
Loosen the air cleaner connecting tube bands.







Remove the rear wheel (page 14-3).
Unhook the rear fender tabs from the frame pipes and remove the mount nut and rear fender.
Remove the air cleaner case from the rear.



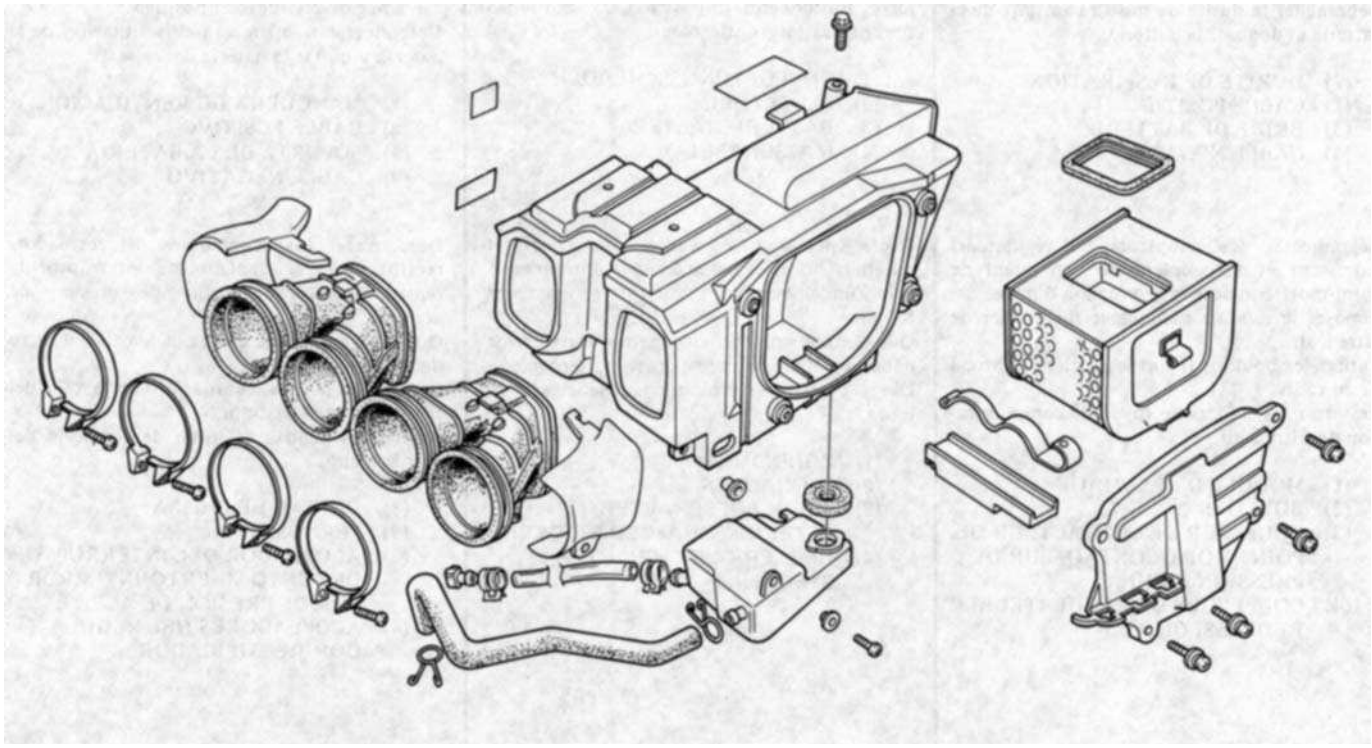
Check the air cleaner case seal rubbers for deterioration.

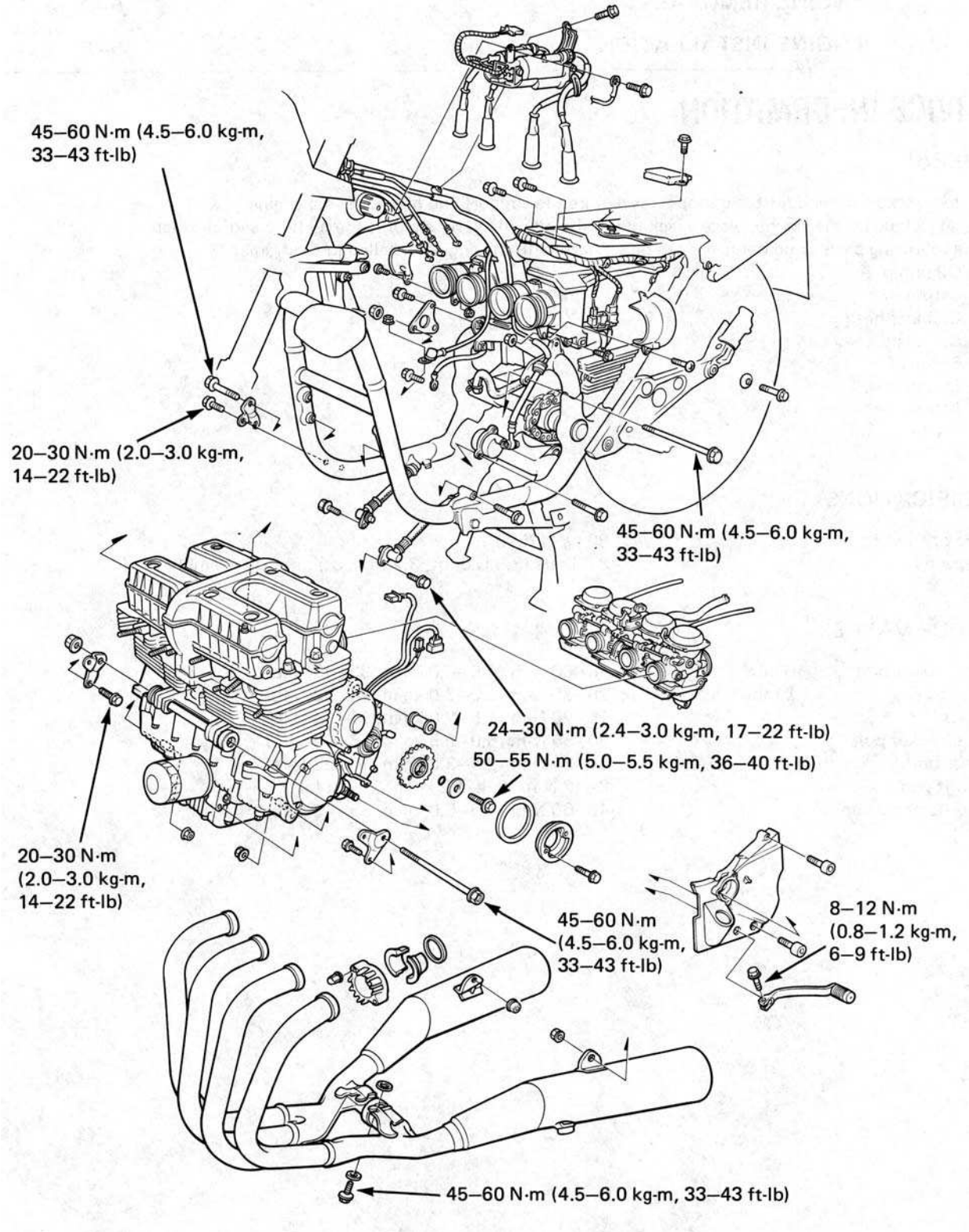
AIR CLEANER CASE INSTALLATION

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

CRANKCASE VENTILATION SYSTEM

Check that the breather tube is not restricted.




45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)
20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)
24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
50–55 N·m (5.0–5.5 kg-m, 36–40 ft-lb)
20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)
8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)

SERVICE INFORMATION

GENERAL

- A floor jack or other adjustable support is required to support and manoeuvre the engine.
- When jacking up the engine, place a jack under the oil pan. Never support the oil hose and oil filter.
- The following parts or components can be serviced with the engine installed in the frame.
  - Oil pump
  - Carburettor
  - Cylinder head
  - Cylinder
  - Piston
  - Clutch
  - Alternator
  - Starter motor

SPECIFICATIONS

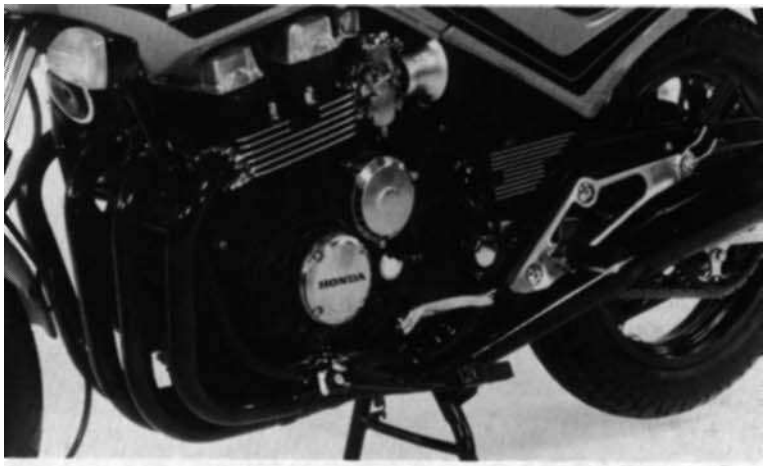
Engine dry weight	80 kg (176 lbs)
Oil capacity	3.6 litres (3.8 US qt, 3.2 Imp qt) after disassembly

TORQUE VALUES

Engine mount bolt	10 mm	45-60 Nm (4.5-6.0 kg.m, 33-43 ft-lb)
	8 mm	20-30 Nm (2.0-3.0 kg.m, 14-22 ft-lb)
Oil filter		15-20 Nm (1.5-2.0 kg.m, 11-14 ft-lb)
Drive sprocket bolt		50-55 Nm (5.0-5.5 kg.m, 36-40 ft-lb)
Oil hose bolt		24-30 Nm (2.4-3.0 kg.m, 17-22 ft-lb)
Gear shift pedal		8-12 Nm (0.8-1.2 kg.m, 6-9 ft-lb)
Muffler to engine bolts		45-60 Nm (4.5-6.0 kg.m, 33-43 ft-lb)

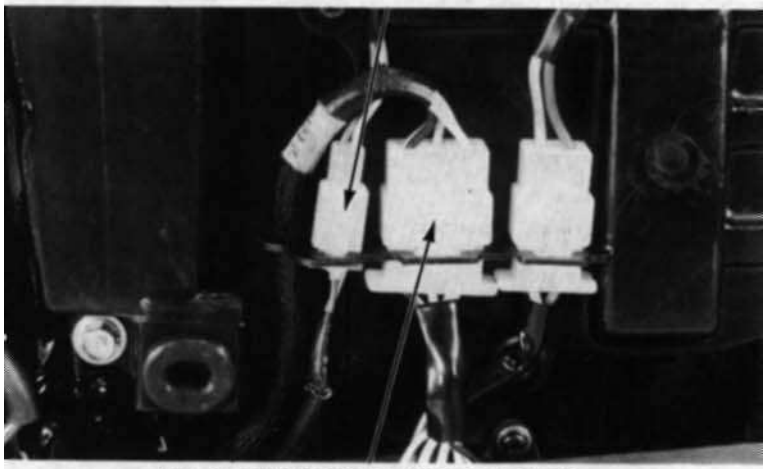
ENGINE REMOVAL

Place the motorbike on its centre stand.
Drain the engine oil (page 2-3).
Remove the following parts:
-fairing (page 13-3)
-fuel tank (4-15)
-exhaust system



(1) NEUTRAL/OIL PRESSURE SWITCH WIRE COUPLER

Disconnect the alternator wire coupler and neutral/oil pressure switch wire coupler.



(2) ALTERNATOR WIRE COUPLER

Remove the clutch slave cylinder

(1) CLUTCH SLAVE CYLINDER

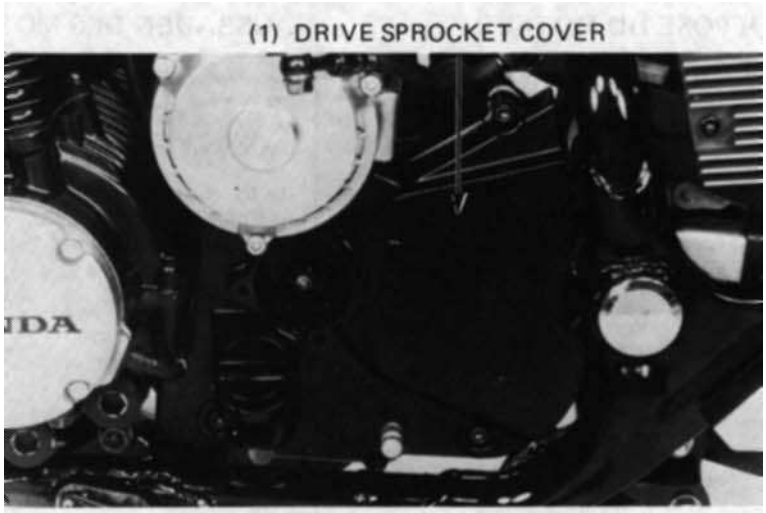
NOTE:

- **It is not necessary to disconnect the clutch oil line.**
- **To prevent the clutch system from air contamination, and the slave cylinder piston from falling, squeeze the clutch lever immediately after removing the slave cylinder, and tie the lever to the handle grip with a string.**

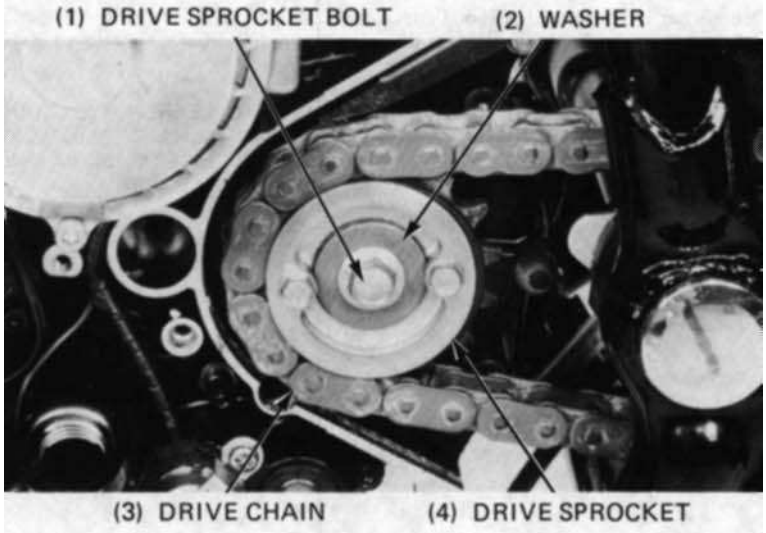
Remove the gear shift pedal

(2) GEARSHIFT PEDAL

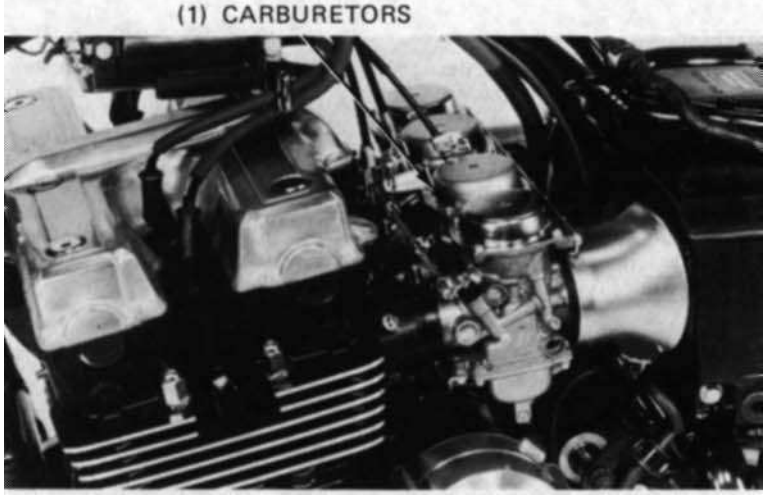
Remove the drive sprocket cover.



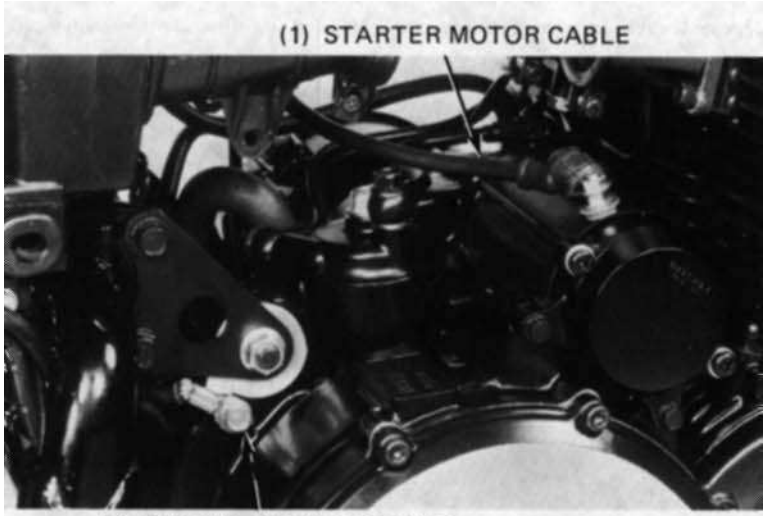
Loosen the axle nut, drive chain adjuster lock nut and adjusting nut.
Remove the drive sprocket bolt, O-ring and washer. Remove the drive sprocket with the drive chain.



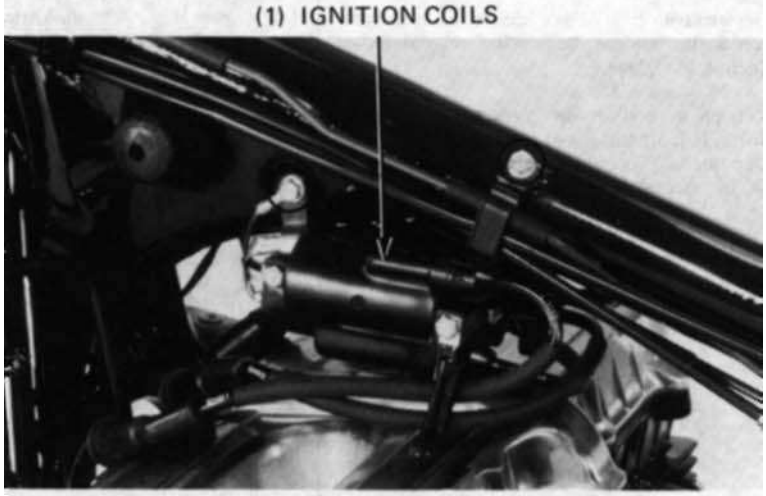
Remove the carburettors (page 4-3).



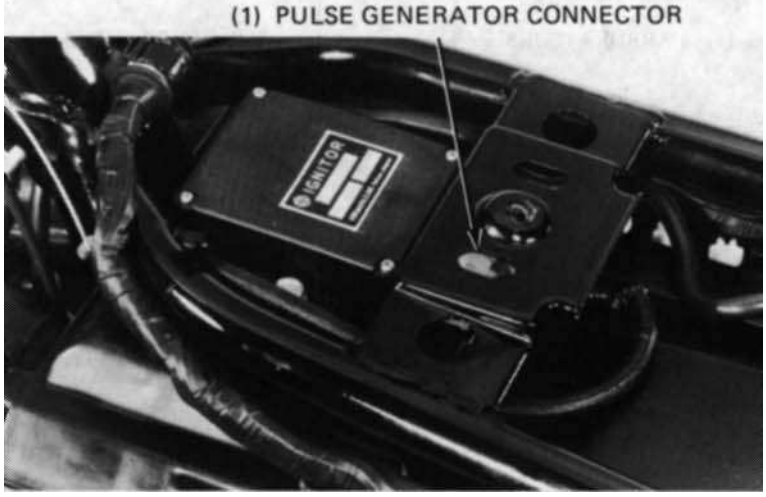
Disconnect the starter motor cable and engine ground cable.



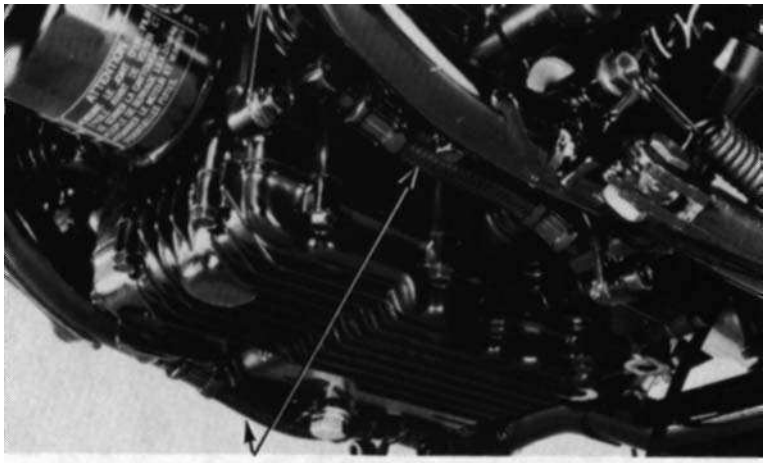
Remove the ignition coils with the spark plug wires.



Disconnect the pulse generator wire connector from the spark unit.



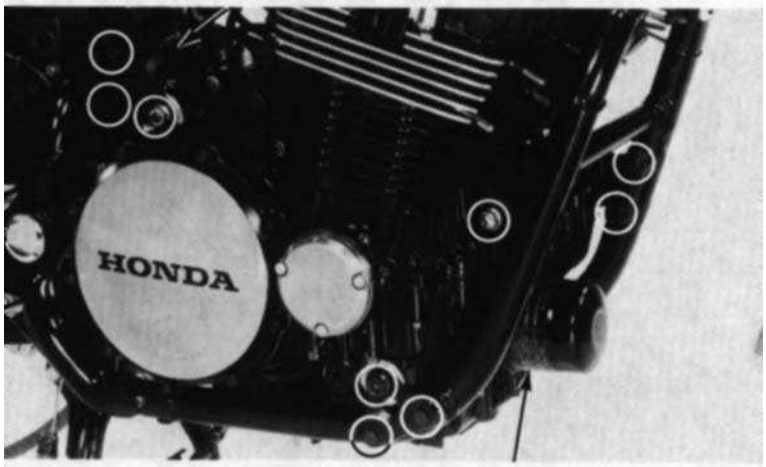
Remove the left and right oil hoses connecting the engine to the frame.



(1) OIL HOSES

(1) CRANKCASE BREATHER HOSE

Remove the oil filter.
Disconnect the crank case breather hose.
Place the floor jack or other adjustable support under the engine

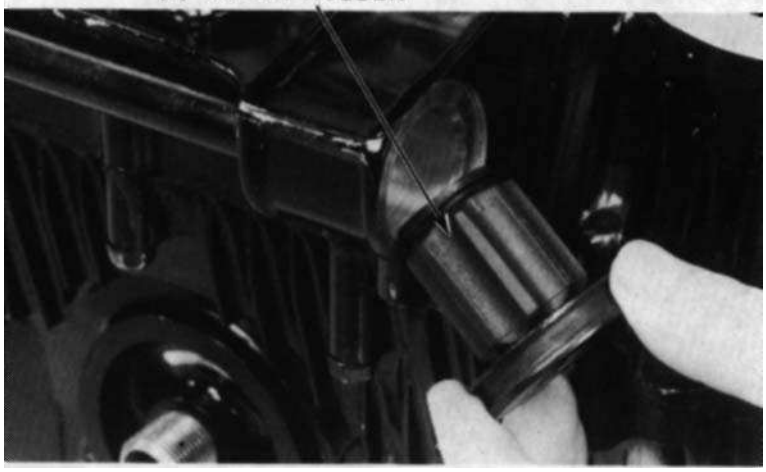


(2) OIL FILTER

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

Remove the engine mount bolts and brackets.
Remove the engine from the right side.

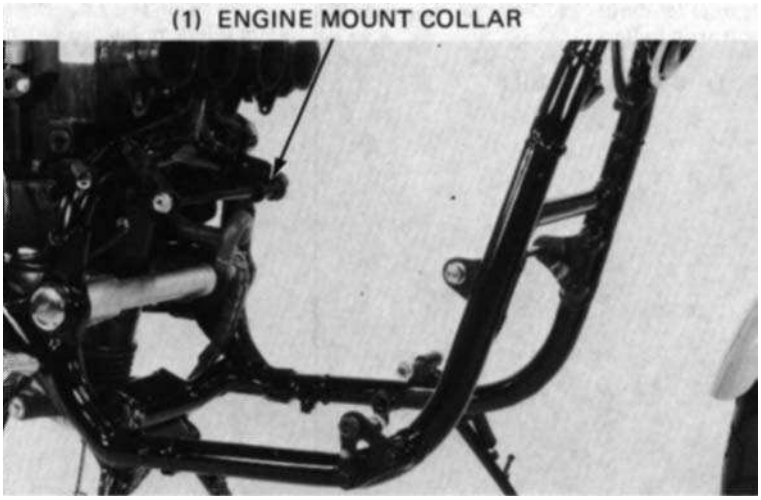
(1) MOUNT RUBBER



ENGINE INSTALLATION

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

Engine installation is essentially the reverse of removal.
Use a floor jack or other adjustable support to carefully manoeuvre the engine into place.



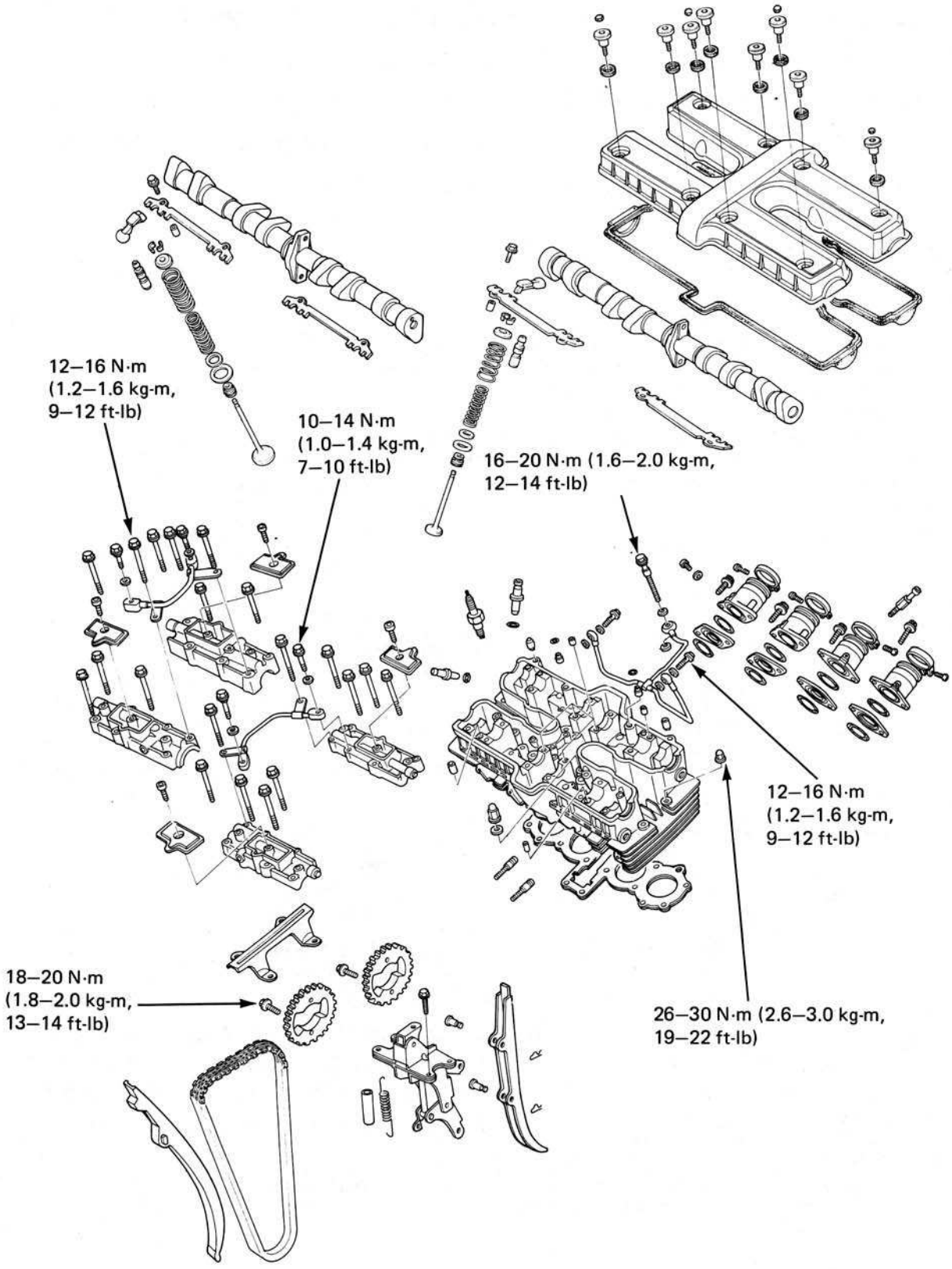
CAUTION

- ***When installing the clutch slave cylinder, temporarily install it to the drive sprocket cover, release the clutch lever from the handle grip by removing the string, and then tighten the slave cylinder bolts.***
- ***Do not forget to install the engine mount collar.***
- ***Carefully align mounting points with the jack to prevent damage to mounting bolt threads, wire harnesses and cables.***
- ***When installing the gear shift pedal, align the punch marks on the gearshift shaft and pedal.***

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

NOTE:

- **Route the wires and cables properly (pages 1-8 through 1-11).**
- **Fill the crankcase to the proper level with the recommended oil (page 2-1).**
- **Perform the following inspection and adjustments:**
  - **Throttle operation (page 3-5).**
  - **Clutch (page 3-13)**
  - **Drive chain (page 3-9).**


12–16 N·m
(1.2–1.6 kg-m,
9–12 ft-lb)
10–14 N·m
(1.0–1.4 kg-m,
7–10 ft-lb)
16–20 N·m (1.6–2.0 kg-m,
12–14 ft-lb)
12–16 N·m
(1.2–1.6 kg-m,
9–12 ft-lb)
18–20 N·m
(1.8–2.0 kg-m,
13–14 ft-lb)
26–30 N·m (2.6–3.0 kg-m,
19–22 ft-lb)

SERVICE INFORMATION

GENERAL

- The engine uses hydraulic valve tappets the eliminate manual valve adjustments
- The hydraulic tappets have de-foaming chamber. Before assembling, fill the chamber with clean engine oil
- Do not turn the camshaft before installing camshaft holders and filling the de-foaming chamber with engine oil, when you adjust the valve timing
- Whenever the camshaft is removed, bleed air from the tappets thoroughly (See page 6-18
- Lubricate the camshaft journals and cam loves with molybdenum disulfide grease for initial lubrication
- The camshaft holder are identified by the respective marking (IN R: Intake right, IN L: intake left, EX R: Exhaust right, EX L: exhaust left)

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Compression pressure			1,200+/- 200 kPa (12.0 +/- 2.0 kg/cm^2, 171+/- 28 psi)	-
Camshaft	Cam height	IN,EX	32.829-33.069 mm (1.2925-1.3019 in)	32.75 mm (1.289 in)
	Oil Clearance	IN1, IN4, EX1 ,EX4	0.020-0.062 mm(0.0008-0.0024 in)	0.09 mm (0.004 in)
		IN2, IN3, EX2, EX4	0.055-0.097 mm (0.0022-0.0038 in)	0.12 mm (0.005 in)
	Runout	IN, EX	-	0.10 mm (0.004 in)
Valve Spring	Free Length	IN, EX Outer	41.7 mm (1.64 in)	40.2 mm (1.58 in)
		IN, EX Inner	36.83 mm (1.45 in)	35.5 mm (1.40 in)
	Preload length	IN, EX Outer	29.5-33.5 kg/24.9 mm (65.0-73.9 lb/ 0.980 in)	-
		IN, EX Inner	12.5-14.5 kg /21.1 mm (27.6-32.0 lb/0.831 in)	-
Valve, Valve guide	Valve Stem OD	IN	4.975-4.990 mm (0.1959-0.1965 in)	4.97mm (0.195 in)
		EX	4.955-4.970 mm (0.1951-0.1957 in)	4.94mm (0.194 in)
	Valve Guide ID	IN, EX	5.0-5.012 mm (0.1969-0.1973 in)	5.04mm (0.198 in)
	Stem-to-guide clearance	IN	0.010-0.037 mm (0.0004-0.015 in)	0.07mm (0.003 in)
		EX	0.030-0.057mm (0.0012-0.0022 in)	0.09 mm (0.004 in)
Cylinder Head	Warpage			0.10 mm (0.004 in)
	Valve seat width	IN, EX	0.9-1.1mm (0.035-0.043 in)	1.5 mm (0.06 in)

TORQUE VALUES

Camshaft holder		12-16 Nm (1.2-1.6 kg-m, 9-12 ft lb)
Cam Sprocket		18-20 Nm (1.8-2.0 kg-m, 13-14 ft lb)
Cylinder Head		26-30 Nm (2.6-3.0 kg-m, 19-22 ft lb)
Spark Plug		12-18 Nm (1.2-1.8 kg-m, 9-13 ft lb)
Oil pipe bolt	7mm	10-14 Nm (1.0-1.4 kg-m, 7-10 ft lb)
	8mm	12-16 Nm (1.2-1.6 kg-m, 9-12 ft lb)
	10mm	23-27 Nm (2.3-2.7 kg-m, 17-20 ft lb)

TOOLS

Special

Valve guide reamer	07984-MA60000
Valve guide drive	07942-MA60000
Hydraulic tappet bleeder	07973-MJ00000

Common

Valve spring compressor	07757-0010000

Valve seat cutter

Valve seat cutter, 24.5 mm (EX 45°)	07780-0010100
Valve seat cutter 27.5 mm (IN 45°)	07780-0010200
Valve seat cutter 25 mm (EX 32°)	07780-0012000
Valve seat cutter 28 mm (IN 32°)	07780-0012100
Valve seat cutter 22 mm (EX 60°)	07780-0014202
Valve seat cutter 26 mm (IN 60°)	07780-0014500
Valve seat cutter holder, 5 mm	07781-0010400

TROUBLESHOOTING

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

Low compression or uneven compression

1. Valves
   - faulty hydraulic tappet
   - burned or bent valves
   - incorrect valve timing
   - broken valve spring
2. Cylinder head
   - Leaking or damaged head gasket
   - Warped or cracked cylinder head
3. Cylinder and Piston (refer to Section 7)

Compression too high

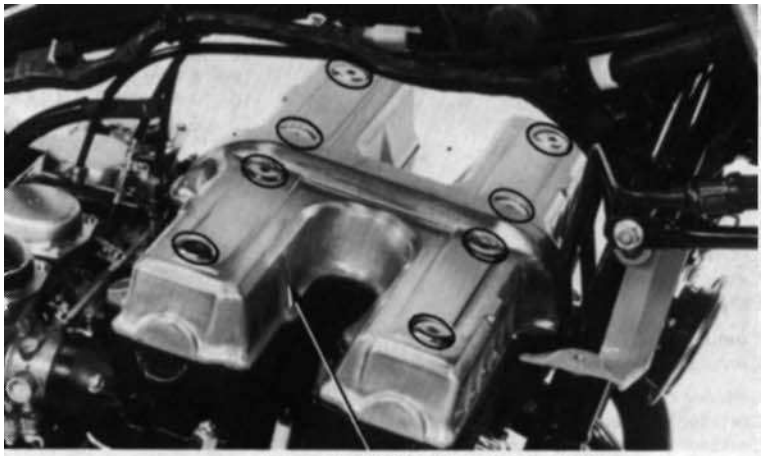
- Excessive carbon building up on piston head or combustions chamber

Excessive noises

1. Faulty hydraulic valve tappet system
   - Low engine oil level
   - Contaminated oil
   - Low oil pressure
   - Damaged hydraulic tappet
2. Sticking valve or broken valve spring
3. Damaged or worn camshaft
4. Loose or worn cam chain
5. Worn or damaged cam chain tensioner
6. Worn cam sprocket teeth

CAMSHAFT REMOVAL

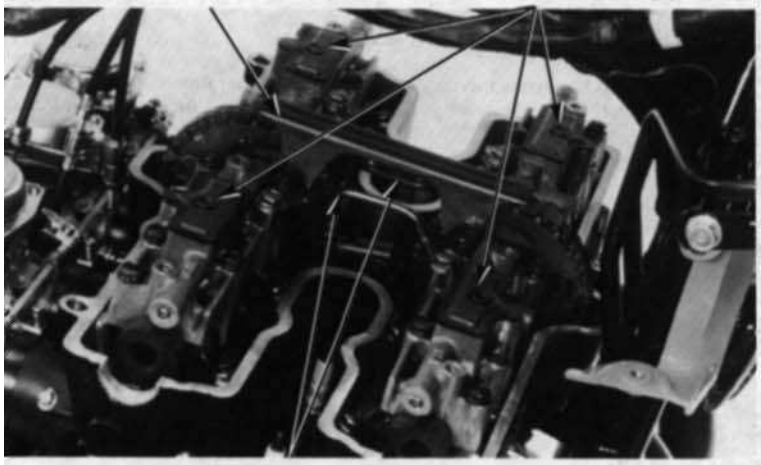
Remove the following parts
- faring (page 13-3)
- fuel tank (page 4-15)
- ignition coil



(1) CYLINDER HEAD COVER

Remove the cam chain guide and oil pipes.
Remove the de-foaming chamber covers.

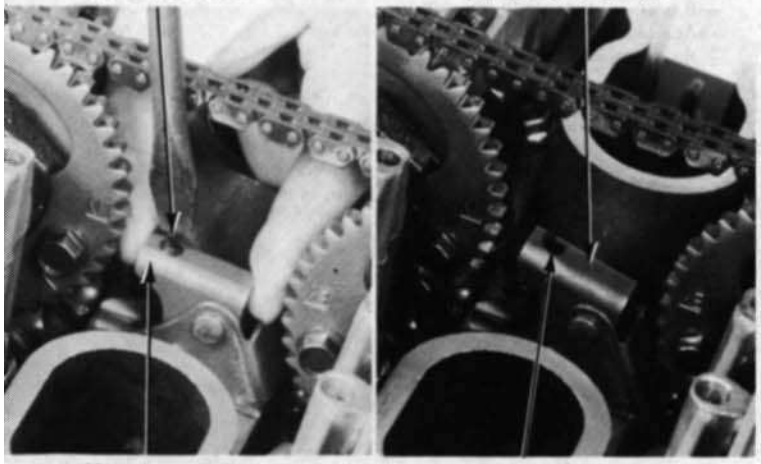
(1) CAM CHAIN GUIDE (2) DE-FOAMING CHAMBER COVERS



(3) OIL PIPES

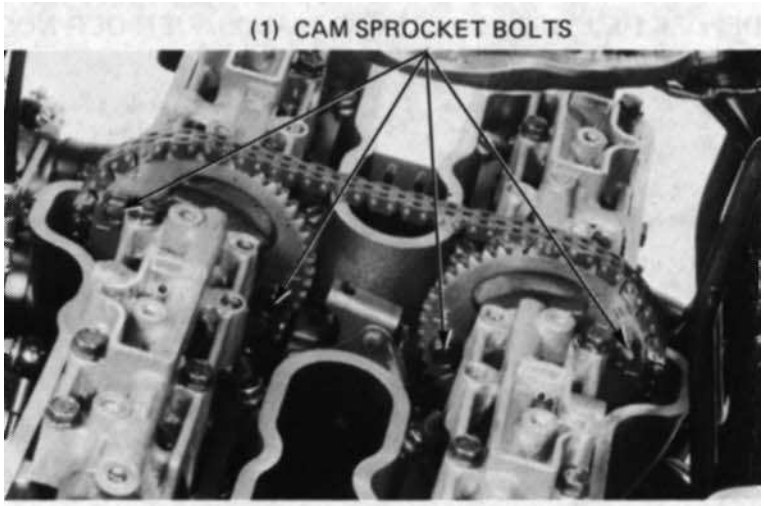
Loosen the cam chain by pushing the cam chain tensioner lock pins down, and pulling the lock plate up until the lock plate rests on the lock pin shoulder as shown.

(1) Push down (2) LOCK PLATE



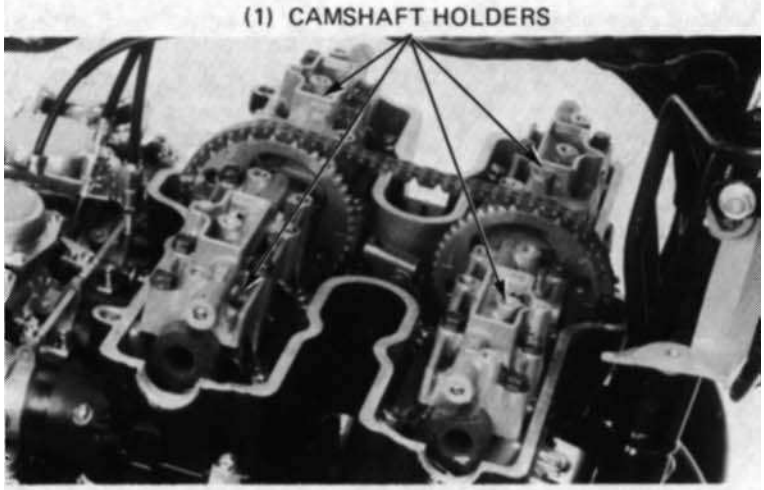
(3) Pull up (4) LOCK PIN

Remove the right crankshaft cover.
Remove the two cam sprocket bolt bolts first from both sprockets, turn the crankshaft clockwise, then remove the other two sprocket bolts.

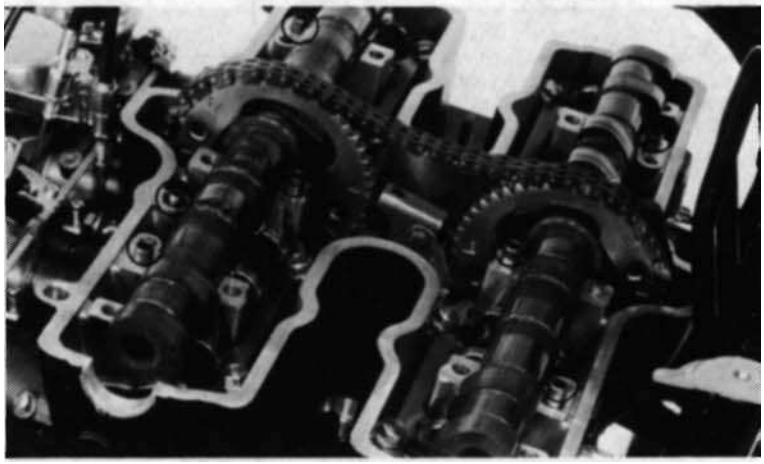


Slide the cam sprockets off the camshaft sprocket flanges.
Remove the camshaft holder bolts, and the holder.

NOTE:
Loosen the holder bolts in 2-3 steps in criss-cross pattern.



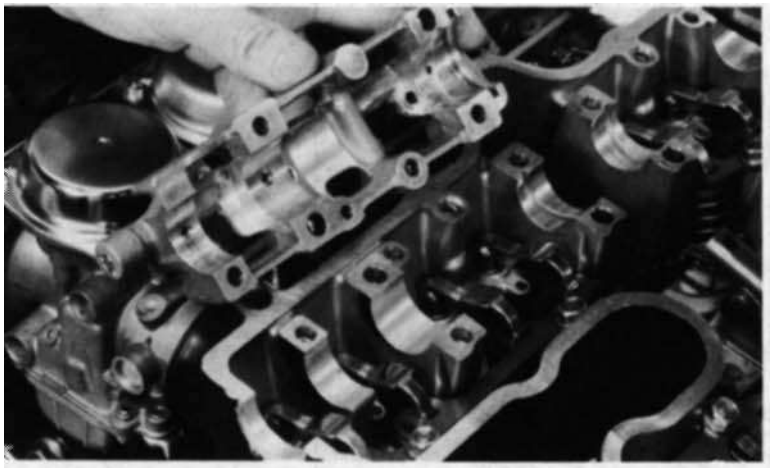
Remove the dowel pins and O-Rings.
Remove the camshafts and cam sprockets.



INSPECTION

CAMSHAFT BEARING SURFACE

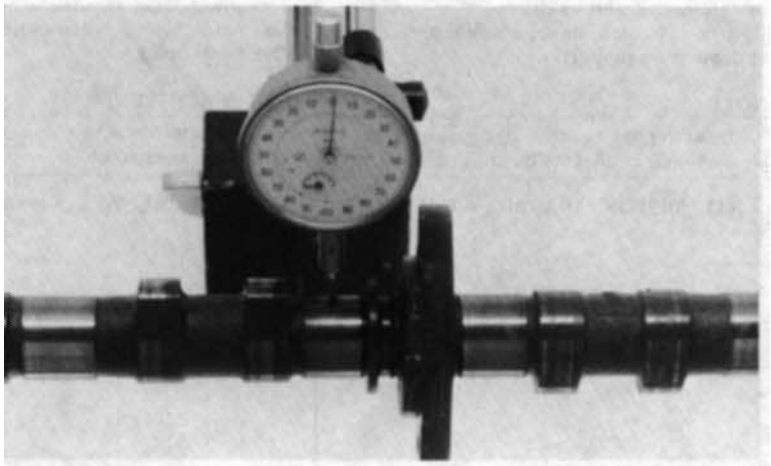
Inspect the cam bearing surfaces for scoring, scratches, or evidence of insufficient lubrication. Also inspect the bearing surfaces of the camshaft holders.



CAMSHAFT RUNOUT

Check the camshaft run-out with a dial indicator. Support both end of the camshaft with V blocks.

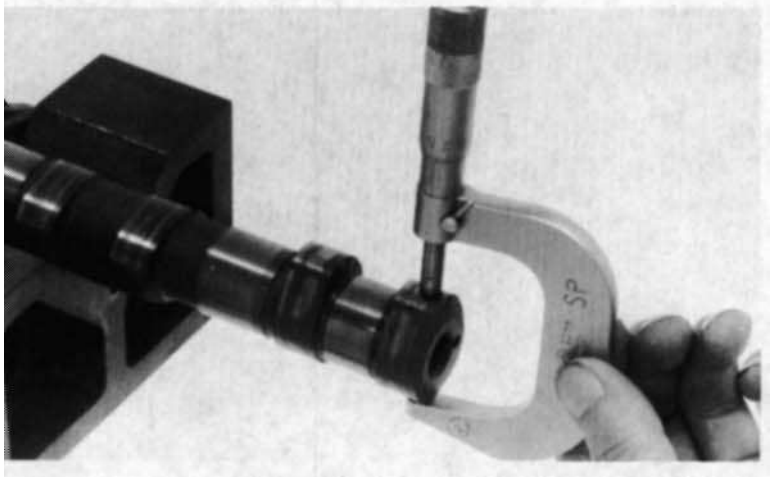
SERVICE LIMIT: 0.10 mm (0.004 in)



CAM LOBE HEIGHT

Check the camshaft lobes for wear or damage. If the lobes are scored, inspect the rocker arm surfaces also.
Measure the cam lobe height with a micrometer

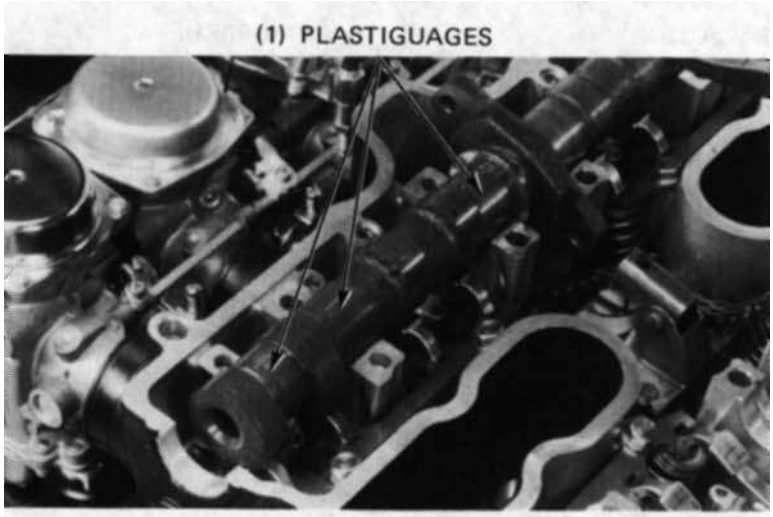
SERVICE LIMIT:
IN, EX: 32.75 mm (1.289 in)



CAMSHAFT OIL CLEARANCE

Wipe any oil from the camshaft journals.

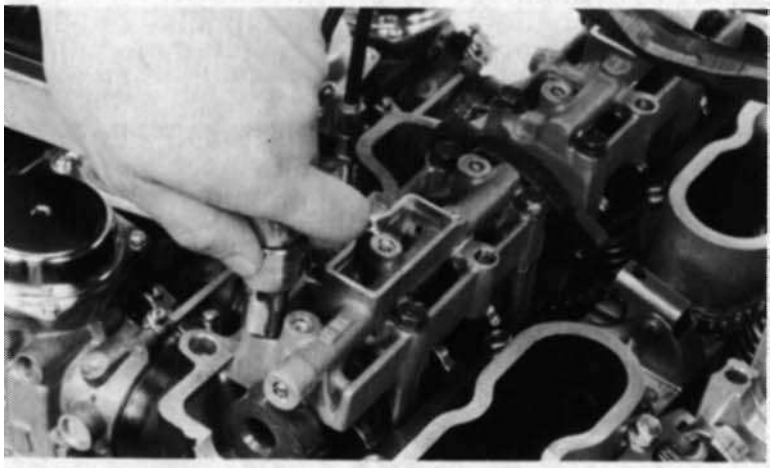
Lay a strip of plastigauge lengthwise on top of each camshaft journal.


(1) PLASTIGUAGES

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

NOTE:
Do not rotate the camshaft when using plastigauge.

TORQUE: 12-16 Nm (1.2-1.6 kgm, 9-12 ft.lb)

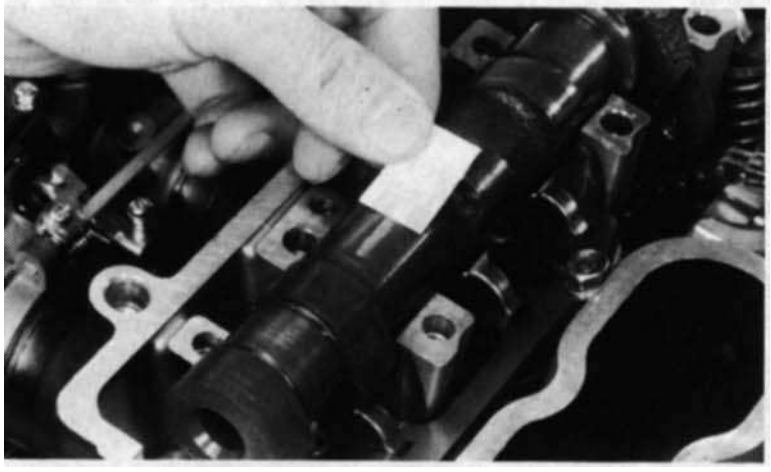


Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

SERVICE LIMITS:

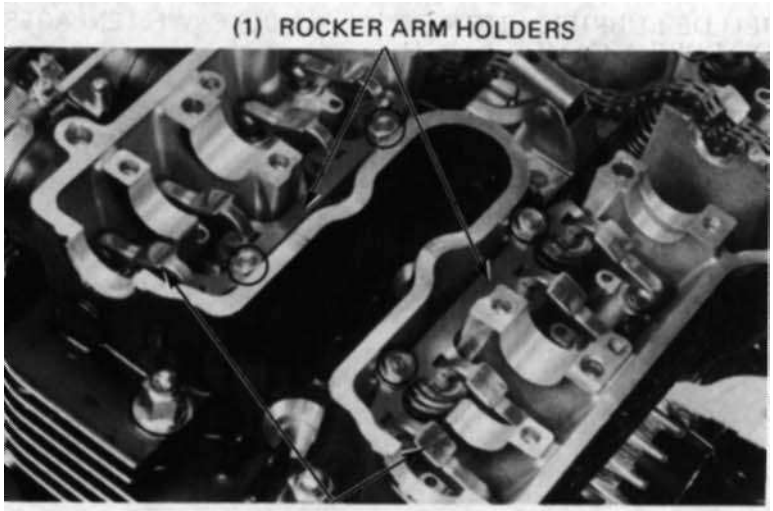
IN1, IN4, EX1, EX4L	**0.09 mm (0.004 in)**
IN2, IN3, EX2, EX3	**0.12 mm (0.005 in)**

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

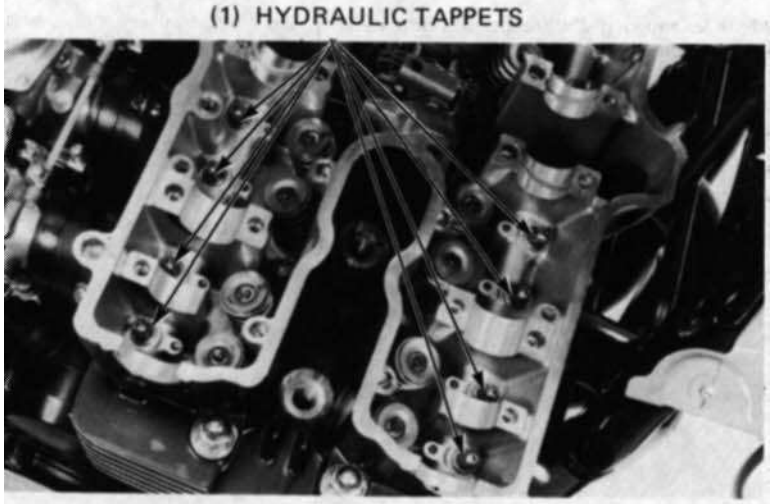


HYDRAULIC TAPPET REMOVAL

Remove the camshafts (page 6-3)
Remove the rocker arms.
Remove the rocker arm holder bolts and the holders.
Remove the dowel pins.

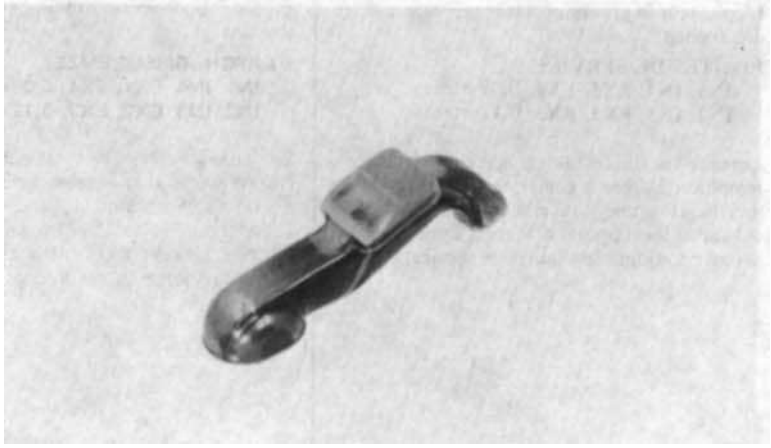


Remove the hydraulic tappets.



INSPECTION

ROCKER ARM
Inspect the rocker arm followers for damage or abnormal wear, and replace if necessary.

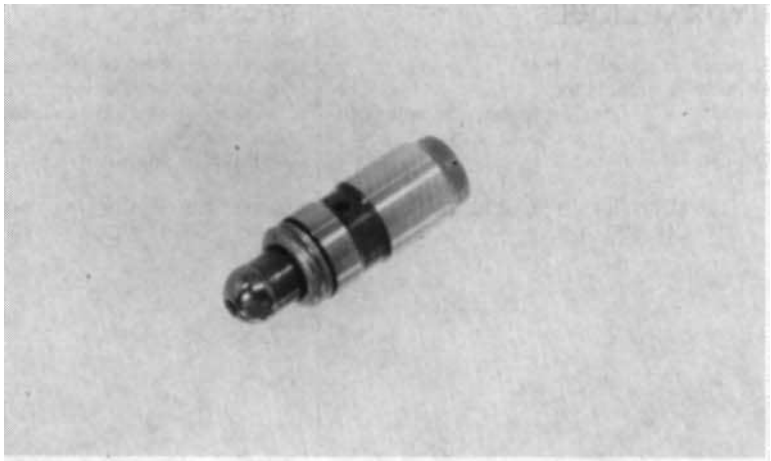


HYDRAULIC TAPPET

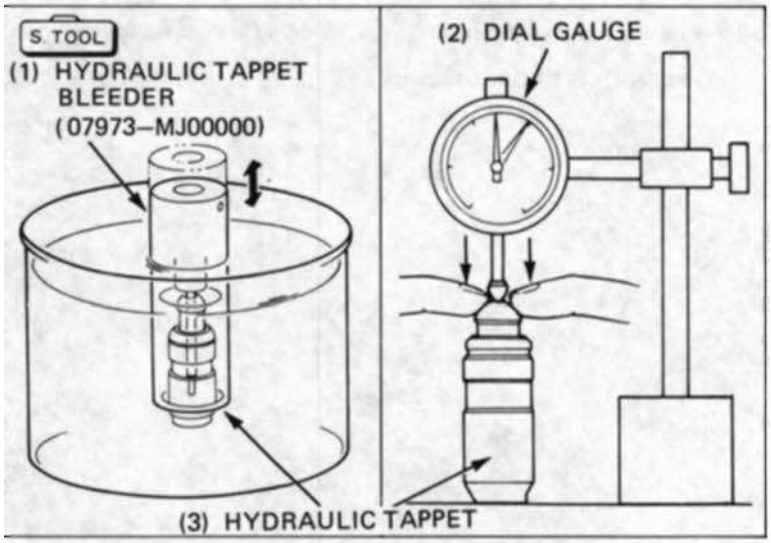
Inspect the hydraulic tappet for wear or damage or for clogged oil hole.

CAUTION:

- ***Never attempt to disassemble the tappets***
- ***Always use the special tool when bleeding the tappets. Use of wire can cause damage to them.***



Measure the free length of each hydraulic tappet as follows:
Attach the Hydraulic Tappet Bleeder to the hydraulic tappet and compress and extend the hydraulic tappet slowly in a jar filled with kerosene.



NOTE:
Hold the hydraulic tappet upright while compressing and extending the hydraulic tappet.

Continue operated the hydraulic tappet until there are no air bubbles from the hydraulic tappet and it does not make any further action. Remove the hydraulic tappet and try to compress quickly the tappet by hand. Measure the compression stroke with the dial gauge on the flat place.

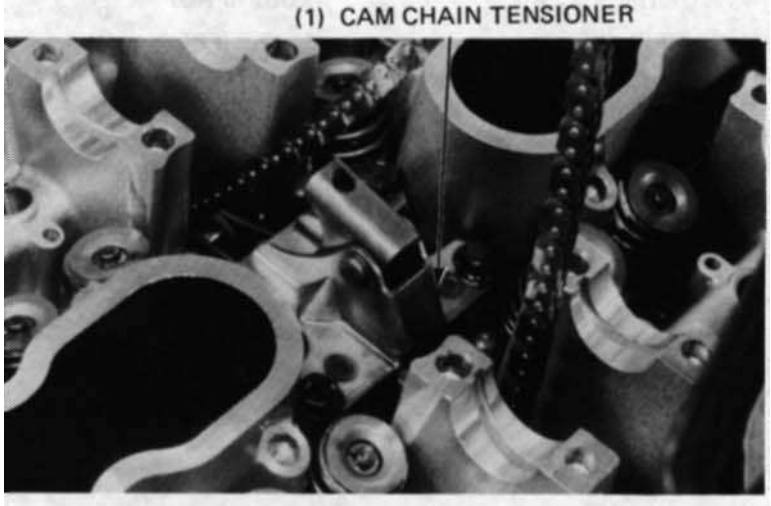
COMPRESSION STROKE: 0-0.2 mm

NOTE:
Keep the hydraulic tappet below the surface of kerosene while priming the hydraulic tappet.

CYLINDER HEAD REMOVAL

Remove the following parts:
- carburettor (section 4)
- exhaust system (section 5)
- hydraulic tappets (page 6-7)

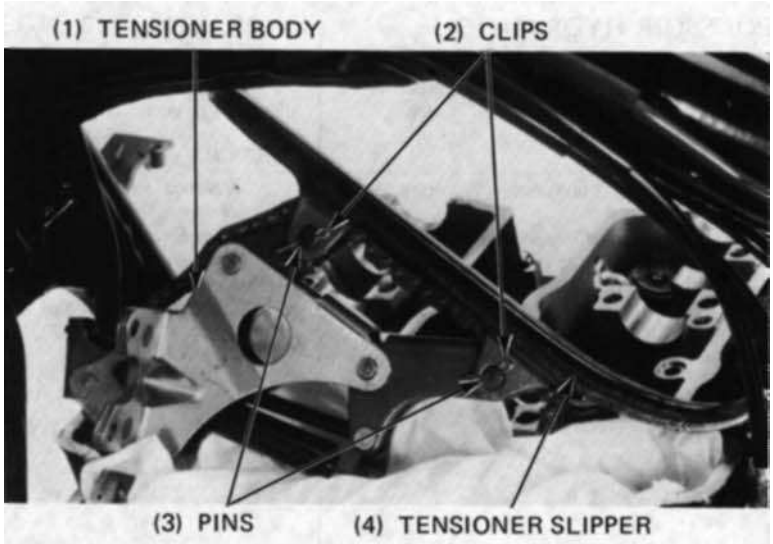
Remove the four cam chain tensioner mounting bolts.



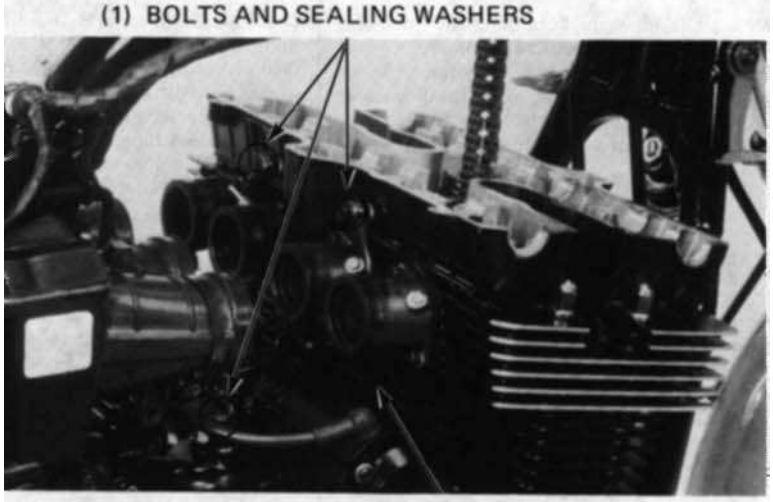
Remove the clips and pins from the tensioner.

NOTE:
Use care when removing the clips and pint to prevent them from falling into the crankcase.

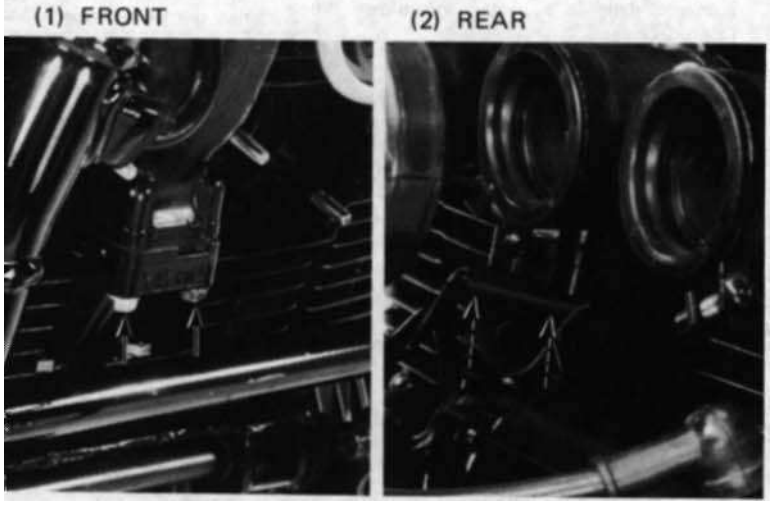
Place a piece of wire through the cam chain. Tie it so the chain does not fall into the crankcase.
Separate the tensioner body and slipper and remove them.



Remove the oil pipe bolts and sealing washers.

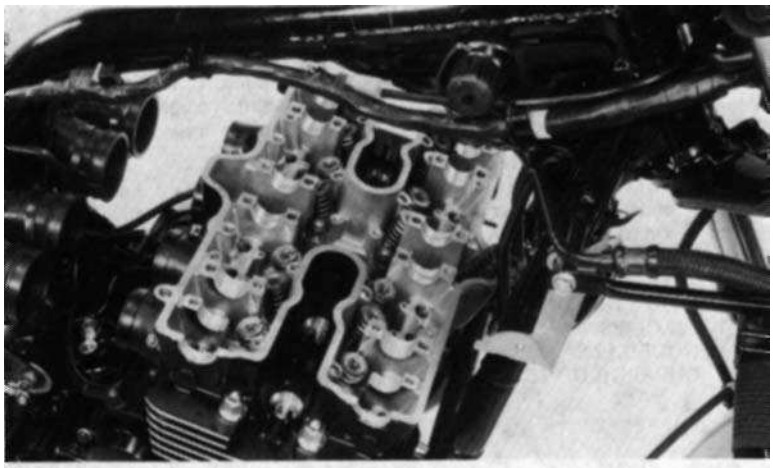


Remove the front and rear cylinder head mount bolts.
Remove the oil pipe.

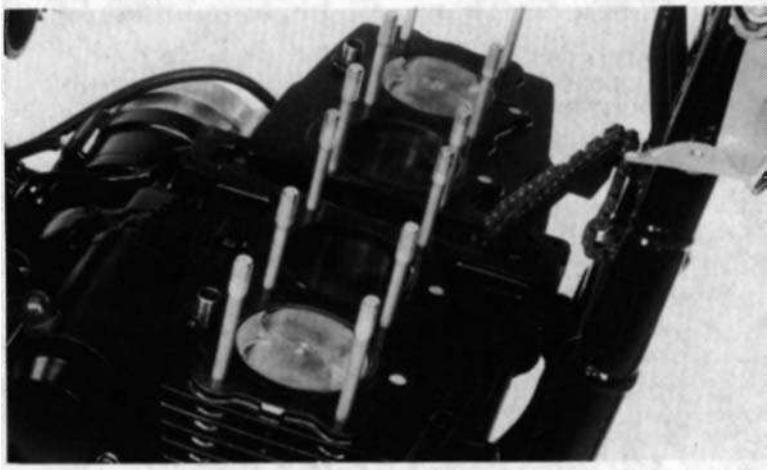


Remove the cylinder head cap nuts and washer.

NOTE:
Loosen the nut in 2-3 steps in a crisscross pattern to prevent cylinder head warpage.

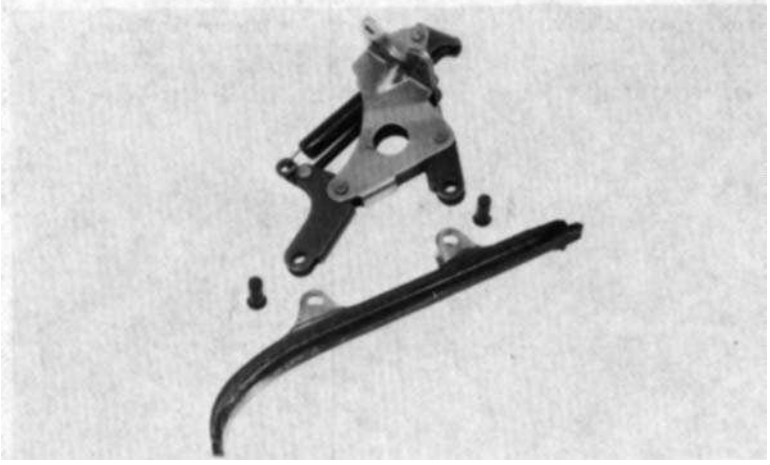


Remove the cylinder head
Remove the cylinder head gasket, dowel pins, and cam chain guide.



CAM CHAIN GUIDE AND TENSIONER INSPECTION

Inspect the cam chain guide and tensioner for damage or excessive wear.
Inspect the cam chain tensioner slipper for damage or excessive wear.
Replace the tensioner body if the spring is weak or has been damaged.

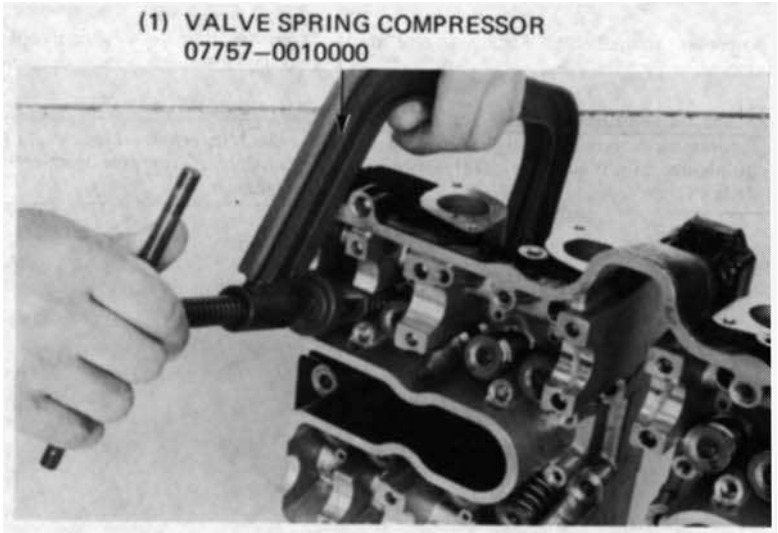


CYLINDER HEAD DISASSEMBLY

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

CAUTION;

- ***To prevent the loss of tension do not compress the valve springs more than necessary to remove the cotters.***
- ***Remove valve spring compressor large spring retainer before using to avoid damaging the cylinder head.***

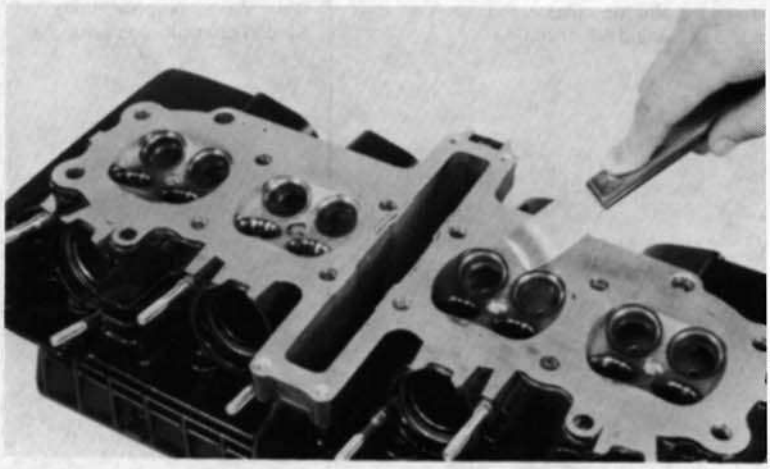


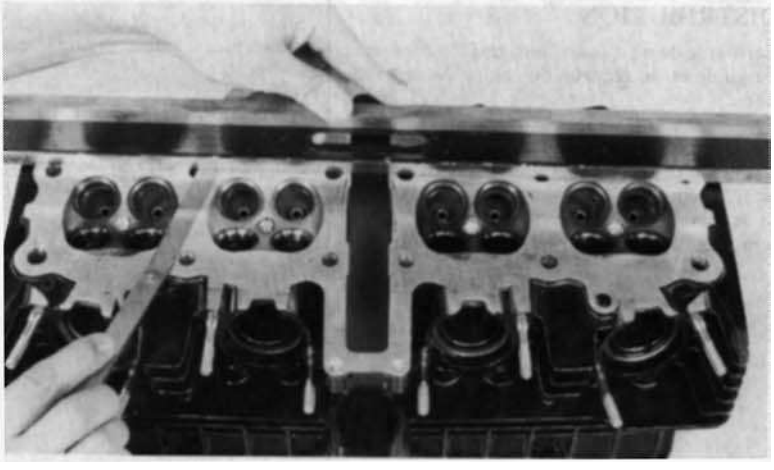
NOTE;
Mark all disassembled parts to ensure correct reassembly.

Remove the carbon deposits from the combustion chamber.

Clean the head gasket surfaces thoroughly

CAUTION:
Avoid damaging the gasket surfaces.





INSPECTION

CYLINDER HEAD

Check the spark plug holes and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and a feeler gauge in an X pattern.

SERVICE LIMIT: 0.10mm (0.004 in)

VALVE SPRING FREE LENGTH

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

SERVICE LIMITS
INNER SPRING:35.5 mm (1.40 in)
OUTER SPRING:40.2 mm (1.58 in)

Replace them if they are shorter than the service limit.

VALVE STEM TO GUIDE CLEARANCE

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

SERVICE LIMITS
IN: 4.97 mm (0.195 in)
EX: 4.94 mm (0.194 in)

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

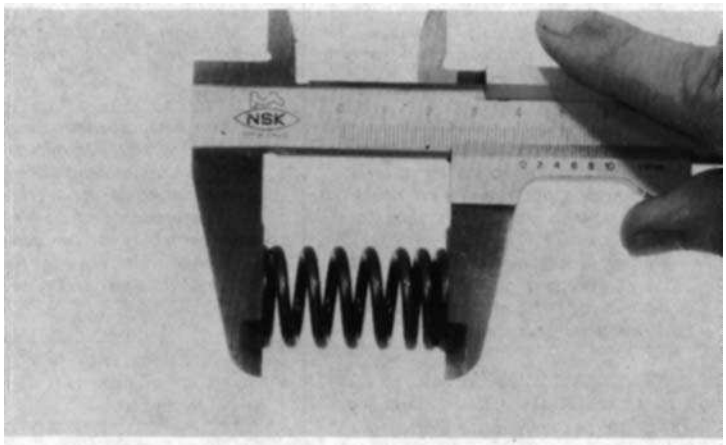
Measure and recorded each valve guide using a ball gauge or inside micrometer.

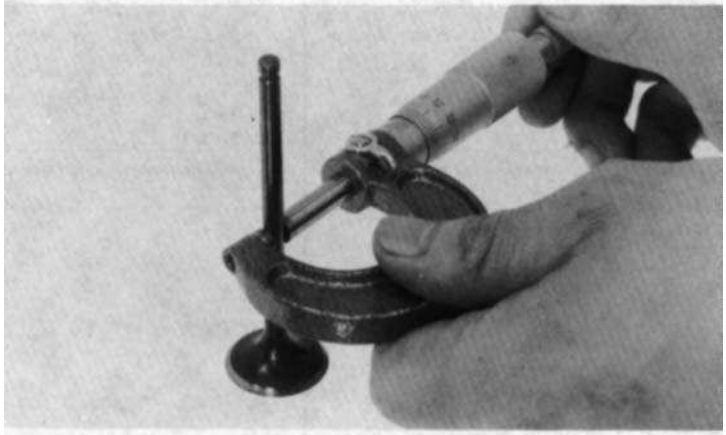
SERVICE LIMITS:
IN: 5.04 mm (0.198 in)
EX: .5.04 mm (0.198 in)

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

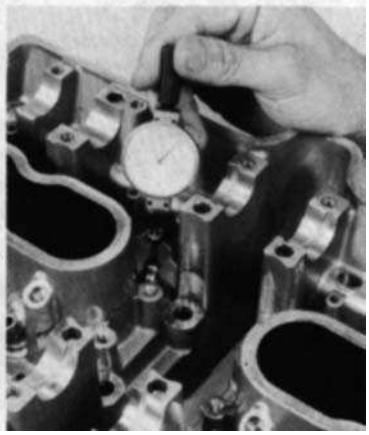
SERVICE LIMITS
IN: 0.07 mm (0.003 in)
EX: 0.09 mm (0.004 in)

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





(1) VALVE GUIDE REAMER
07984–MA60000



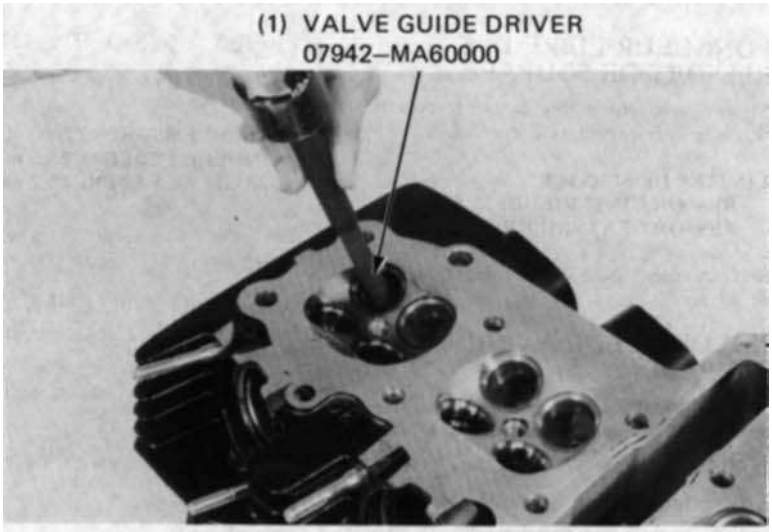
If the stem to guide clearance exceeds the service limits with new guides, replace the valves and the guides.

NOTE:
Reface the valve seat whenever the valves guides are replaced (page 6-14)

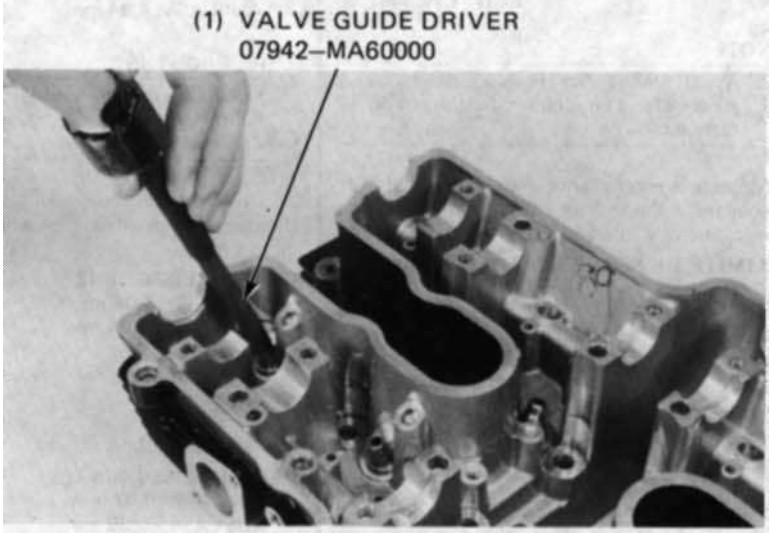
VALVE GUIDE REPLACEMENT

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

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

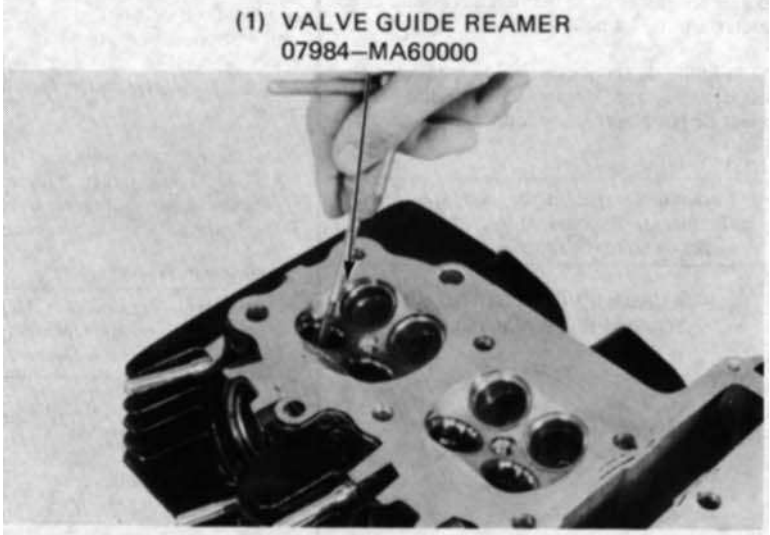


Install an oversize valve guide from the top of the head.



Ream the new valve guide after installation.

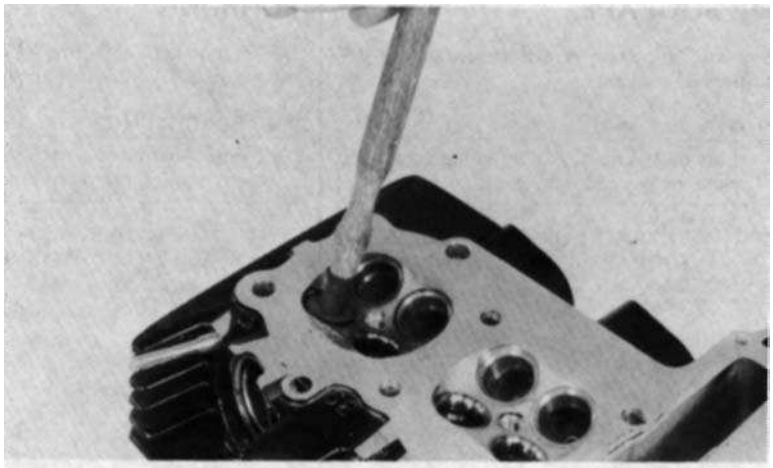
NOTE:
- **Use cutting oil on the reamer during this operation.**
- **Always rotate the reamer in the same direction when inserting and removing it.**



Reface the valve seat (page 6-14)

Clean the cylinder head thoroughly to remove any metal particles.

VALVE SEAT INSPECTION/ REFACING



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

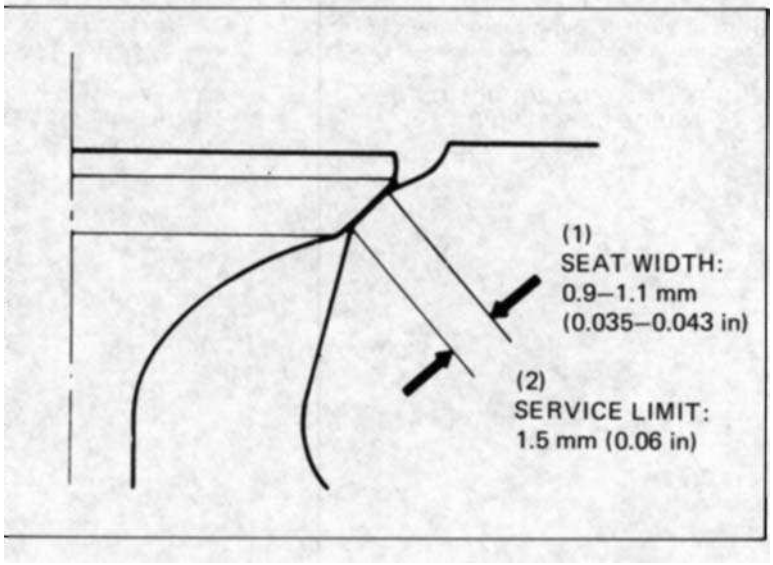
Apply a light coating of valve lapping compound to each valve face. Lap each valve and seat a few times with light pressure using a rubber hose or other hand lapping tool.

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

Remove the valve and inspect the face.

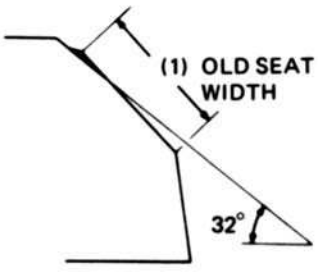
CAUTION:
The valves cannot be ground, if the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.

Inspect the valve seat. If the seat is too wide, too narrow, or has low spots, the seat must b e ground.

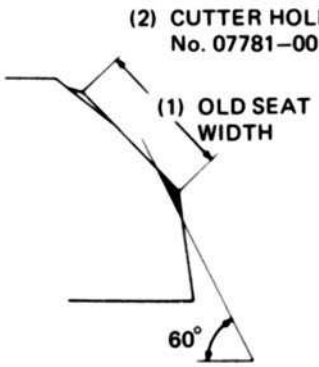


NOTE:
Follow the refacer manufacturers operating instructions.

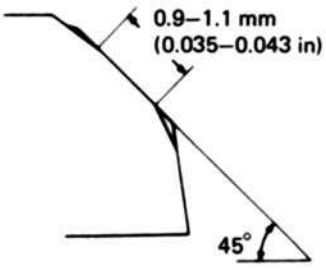
After cutting the seat, apply lapping compound to valve face, and lap the valve using light pressure. After lapping, wash any residual compound off the cylinder head and valve.



(3) FLAT CUTTER:
IN 07780–0012100
EX 07780–0012000



(4) INTERA CUTTER:
IN 07780–0014500
EX 07780–0014202



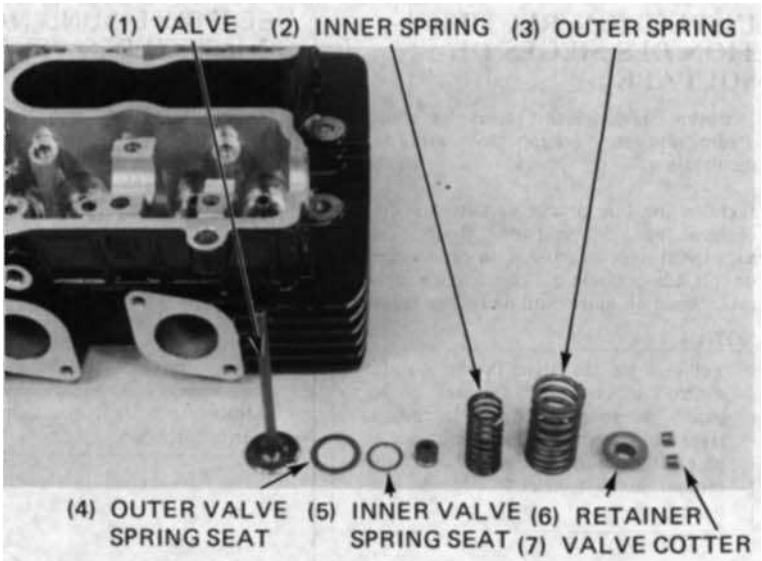
(5) SEAT CUTTER:
IN 07780–0010200
EX 07780–0010100

CYLINDER HEAD ASSEMBLY

Install new valve stem seals.

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

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

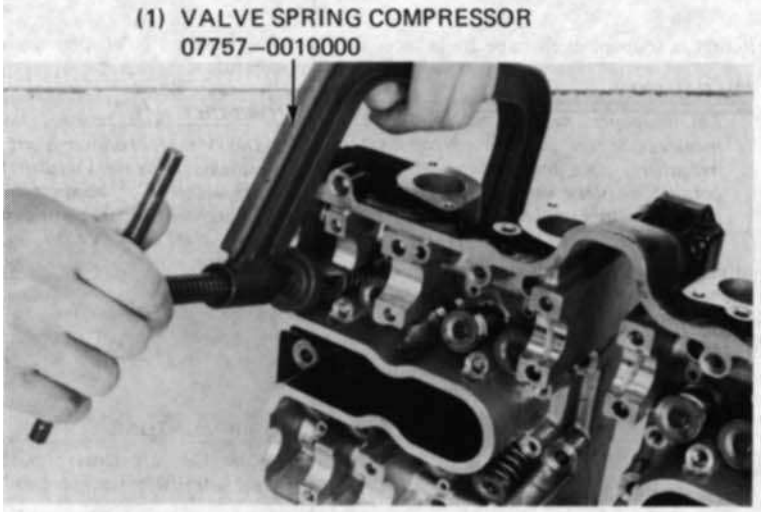


Install the valve springs and retainers.

NOTE:
Install the valve spring with the tightly wound coils facing the cylinder head.

Install the valve cotters.

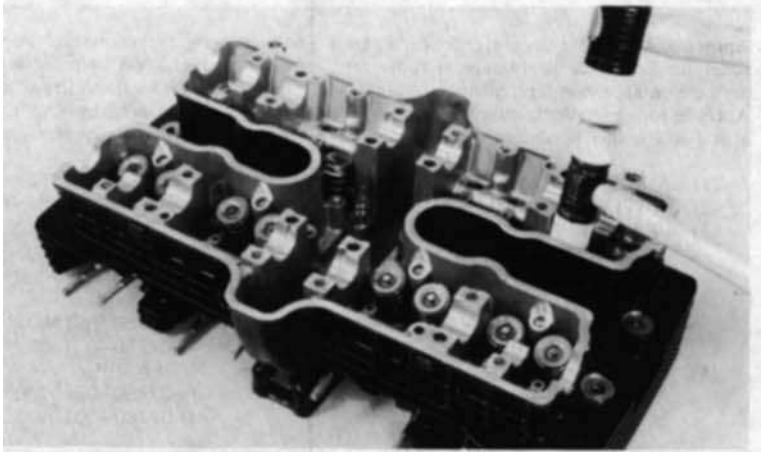
CAUTION:
To prevent loss of tension, do not compress the valve spring more than necessary to install the valve cotters.



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

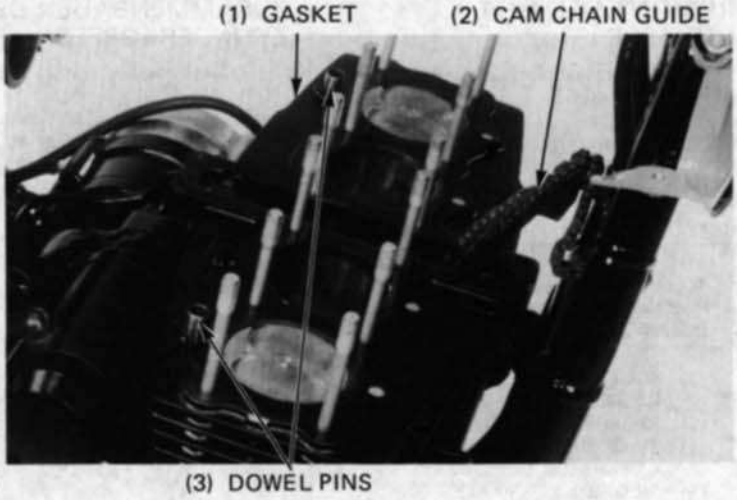
NOTE:
Support the cylinder head above the the work bench surface to prevent possible valve damage.

Clean the cylinder head assembly with solvent, after reassembling, then blow through all oil passages with compressed air.

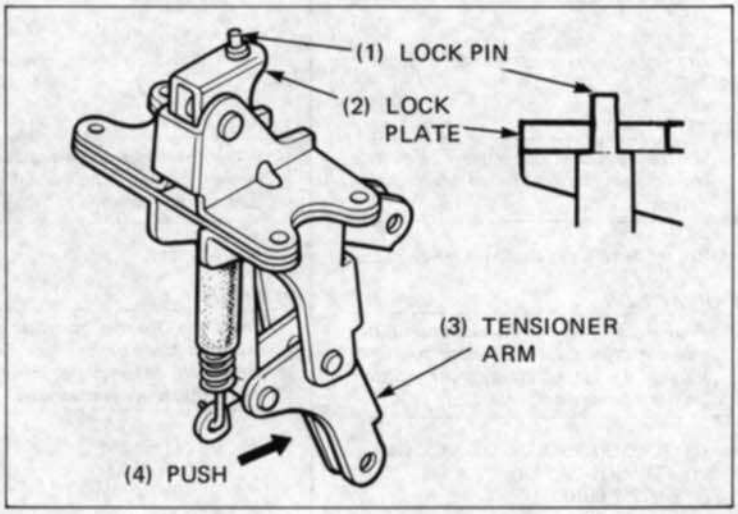


CYLINDER HEAD INSTALLATION

Clean the cylinder surfaces.
Install a new gasket and the dowel pins.
Install the cam chain guide.

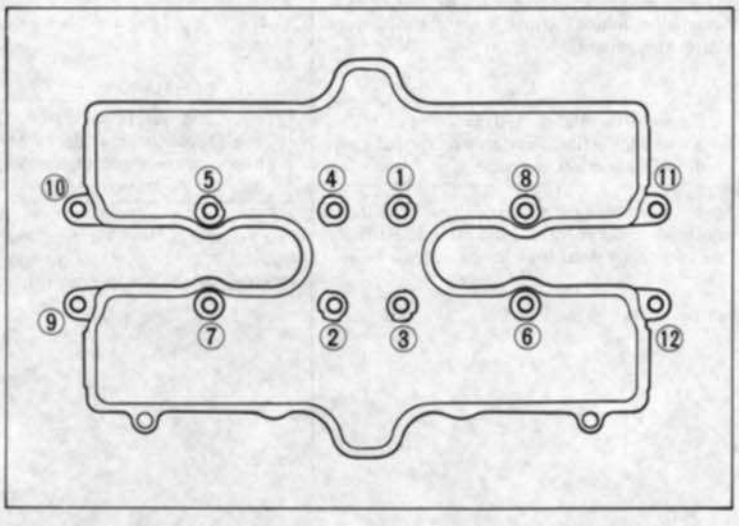


Push the tensioner arm and lock the arm by setting the lock pin to the lock plate as shown.

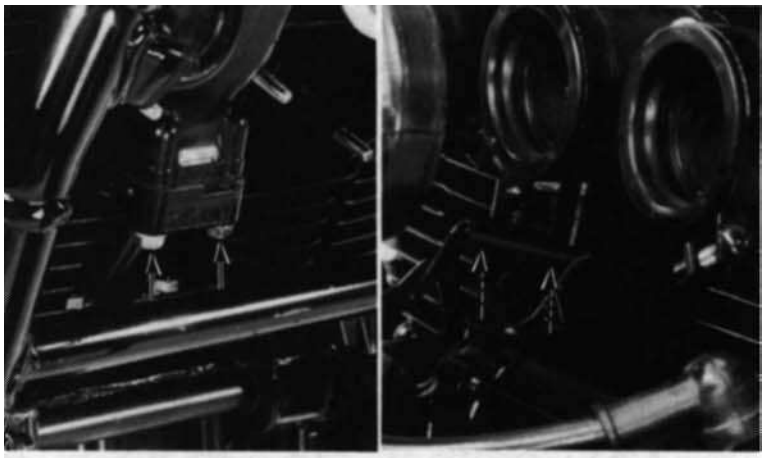


Pull the cam chain guide slightly and push it rearward, then lower the cylinder head.
Set the cam chain guide properly and set the cylinder head.
Apply engine oil to the threads and flanges of the cylinder head cap nuts.
Tighten the cylinder head cap nuts in the sequence shown.

TORQUES: 26-30Nm
(2.6-3.0 kg-m, 19-22 ft lb)



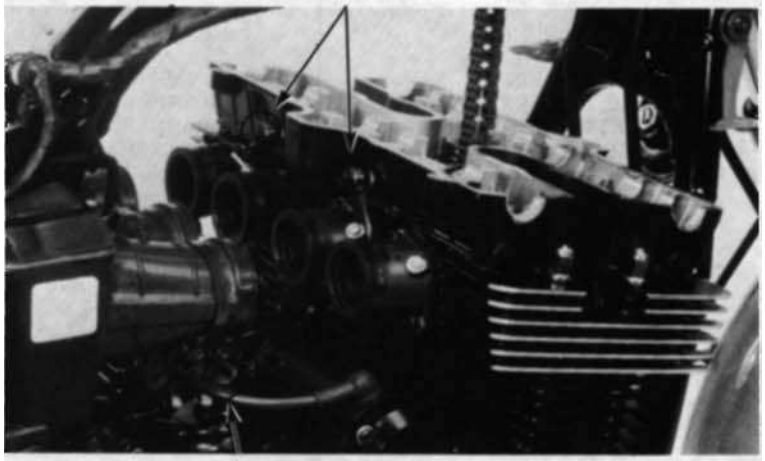
Blow the oil pipe with compressed air and install it in position.
Tighten the front and rear cylinder head mounting bolts.



(1) 8 mm BOLTS

Blow the oil bolts with compressed air.
Make sure the sealing washers are in good condition.
Connect the oil pipe with the oil bolts an sealing washers and tighten the bolts.

TORQUE;
8mm bolts: 12-16Nm
(1.2-1.6 kg-m, 9-12 ft lb)
10mm bolt: 23-27 Nm
(2.3-2.7 kg-m, 17-20 ft lb)



(2) 10 mm BOLT

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

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

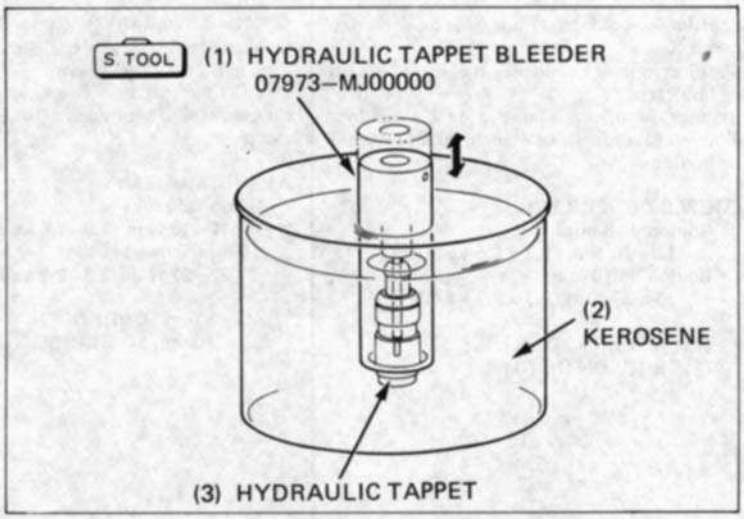
(1) PIN (2) CLIP

(3) TENSIONER SLIPPER (4) TENSIONER BODY (5) CAM CHAIN

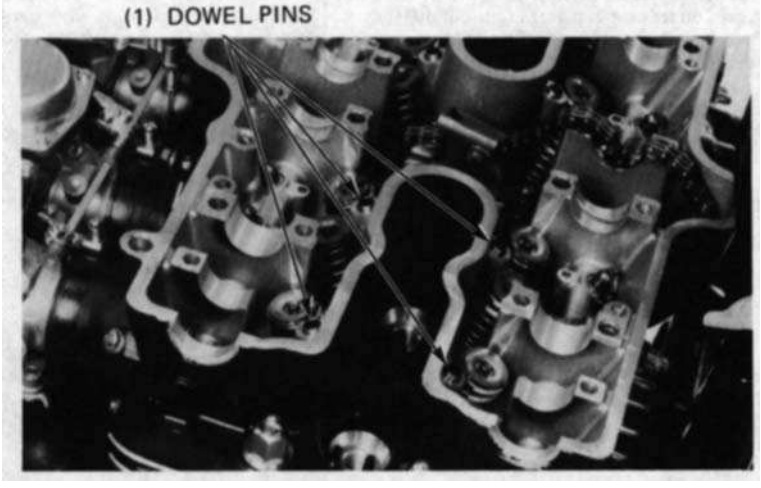
Install and tighten the cam chain tensioner mounting bolts.
Install the carburetors and exhaust system.

HYDRAULIC TAPPET INSTALLATION

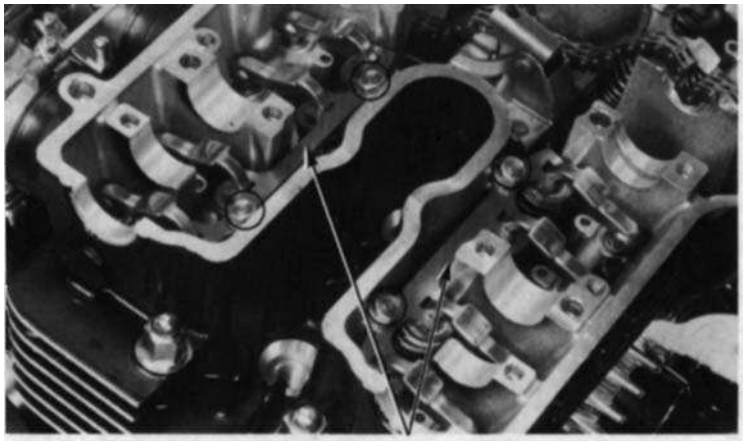
Place the tappet in a jar filled with kerosene.
Place the tapped bleed into the tappet.
Hold the tappet upright and pump the tappet until air bubbles stop coming out. Remove the tool and try to quickly the compress the tappet by hand You should not be able to compress it more than 0.2mm (0.008 in)
Remove the tappet from the fluid keeping it upright.



Fill the all tappet hole up with clean engine oil.
Install the bled hydraulic tappets as described above procedure.
Install the dowel pins into the cylinder head.



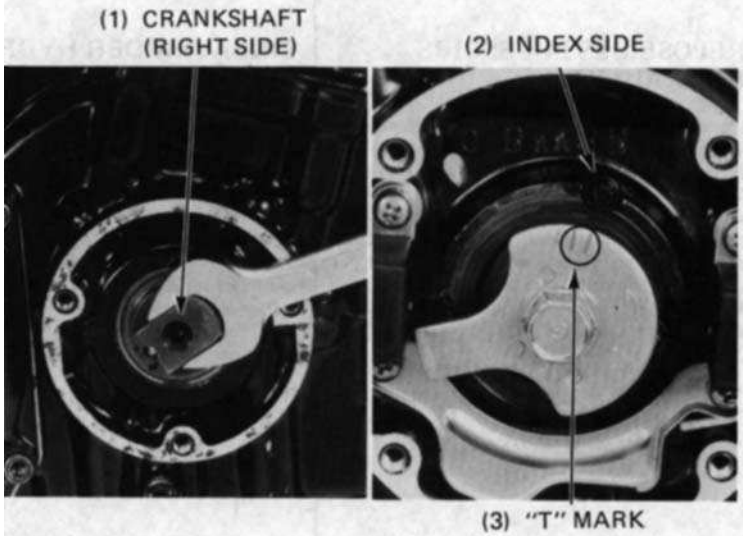
Install the rocker arm holders and tighten the bolts.
Install the rocker arms.



(1) ROCKER ARM HOLDERS

CAMSHAFT INSTALLATION

Remove the pulse generator cover.
Turn the crankshaft clockwise (viewed from the right side) and align the “T” mark on the pulse rotor with the index mark on the crankcase.

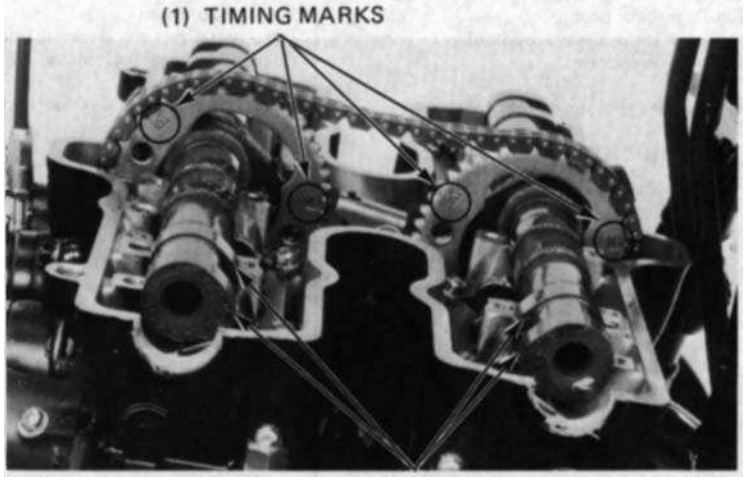


(1) CRANKSHAFT (RIGHT SIDE)
(2) INDEX SIDE
(3) “T” MARK

Lubricate the cylinder head camshaft bearing surfaces with molybdenum disulfide grease.
Install the intake and exhaust camshafts and sprockets through the cam chains, so that the timing marks on the sprockets face the right side as shown.

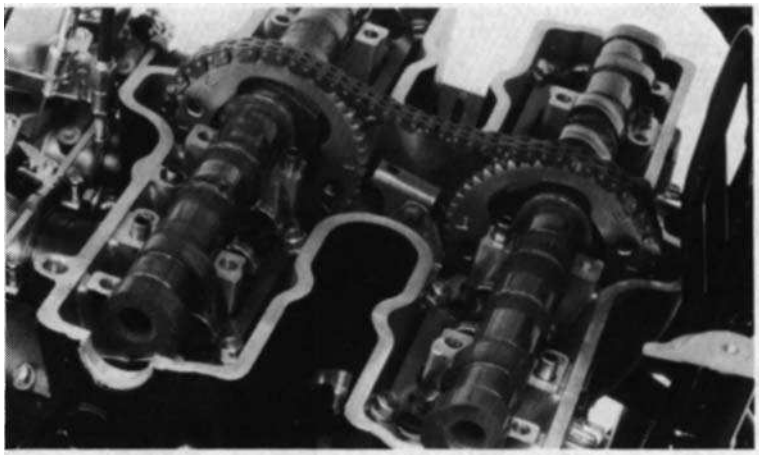
NOTE:
The intake camshaft and “IN” mark and the exhaust camshaft has “EX” mark.

Rotate the camshaft so the No. 4 cylinder cam lobes face each other.



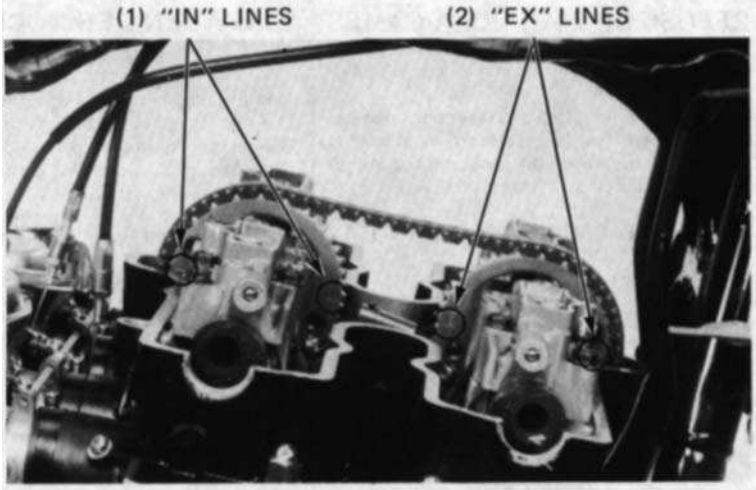
(1) TIMING MARKS
(2) NO. 4 CYLINDER CAM LOBES

Install the two O-rings and dowel pins into the oil passage holes.
Install the eight dowel pins into the camshaft holder bolt holes.



Install each camshaft holder on its original location.

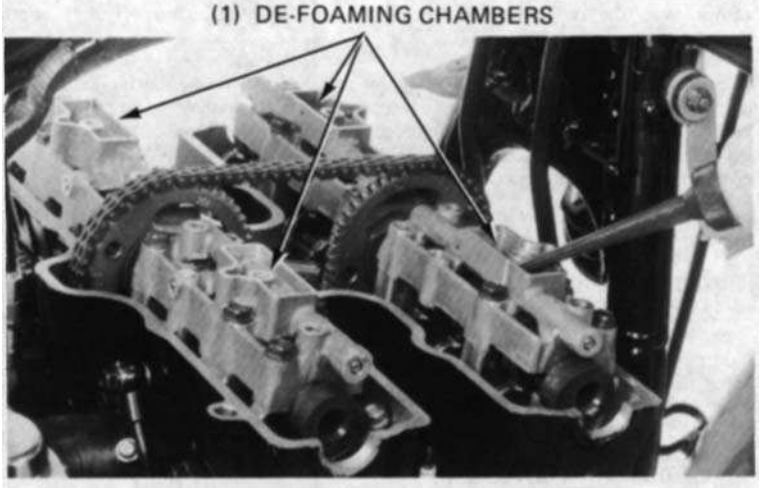
NOTE:
The marks on the camshaft holders mean:
IN R: Intake right
IN L: Intake left
EX R: Exhaust right
EX L: Exhaust left



Temporarily tighten the camshaft holder bolts.
Align the “IN” lines on the intake cam sprocket and the “EX” lines on the exhaust cam sprocket with the top of the cylinder head.
Place the cam chain on the sprockets.
Slide the cam sprockets onto the camshaft flanges.

Fill the de-foaming chambers with clean engine oil.

CAUTION;
Do not turn the camshaft before filling de-foaming chambers

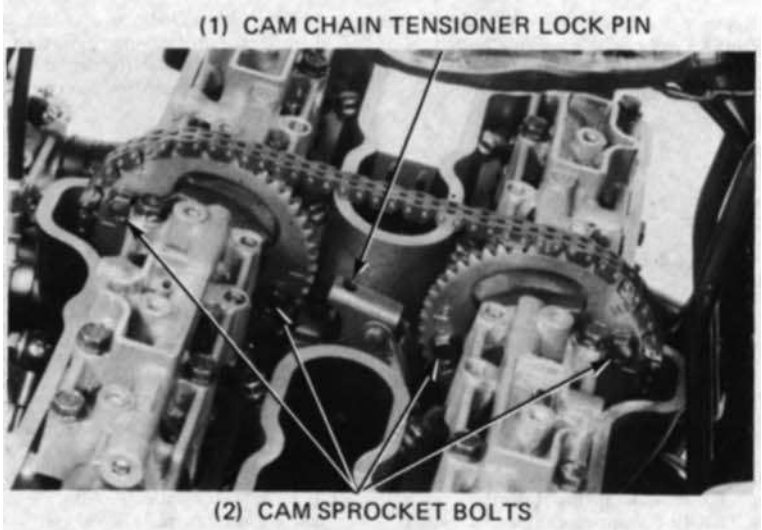


Align the cam sprocket bolt holes by turning the crankshaft slightly
Install and tighten the cam sprocket bolts

TORQUES: 18-20 Nm
(1.8-2.0 kg-m, 13-14 ft lb)

Turn the crankshaft clockwise (viewed from the right side of the engines) and re-align the "T" mark on the pulse rotor with the index mark on the crankcase.
Make sure that the "IN" lines on the intake cam sprocket and the "EX" lines on the exhaust cam sprocket align with the top of the cylinder head.

Push the cam chain tensioner lock pin forward to release it from the lock plate.



Install the cam chain guide.
Install the oil pipes with the oil bolts and sealing washers.
Tighten the camshaft holder bolts and the oil bolts to the specified torques in criss-cross pattern in 2-3 steps.

TORQUES:
CAMSHAFT HOLDER BOLTS:
12-16 Nm (1.2-1.6 kg-m, 9-12 ft.lb)
OIL BOLTS:
10-14 Nm (1.0-1.4 kg-m, 7-10 ft.lb)

Install the de-foaming chamber covers with the socket bolts.

Check the cylinder head cover gasket for damage or deterioration. Replace it if necessary.

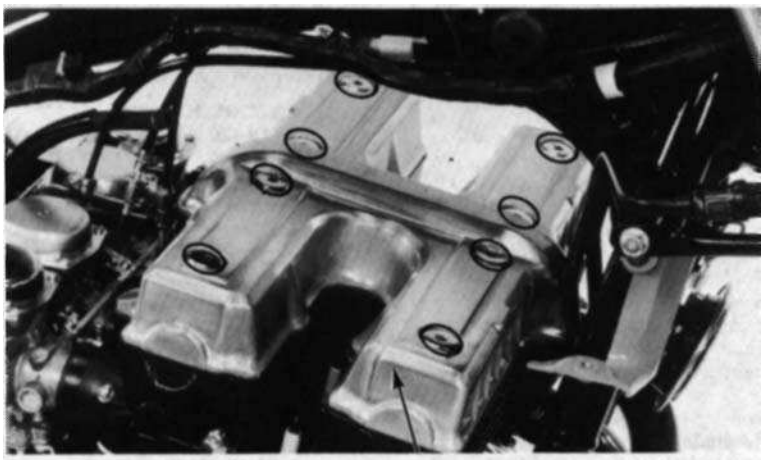
NOTE:
To hold the gasket on the cylinder head cover, slightly apply adhesive agent to the several points on the cover.

Apply liquid sealant to the semicircular portions of the cylinder head.

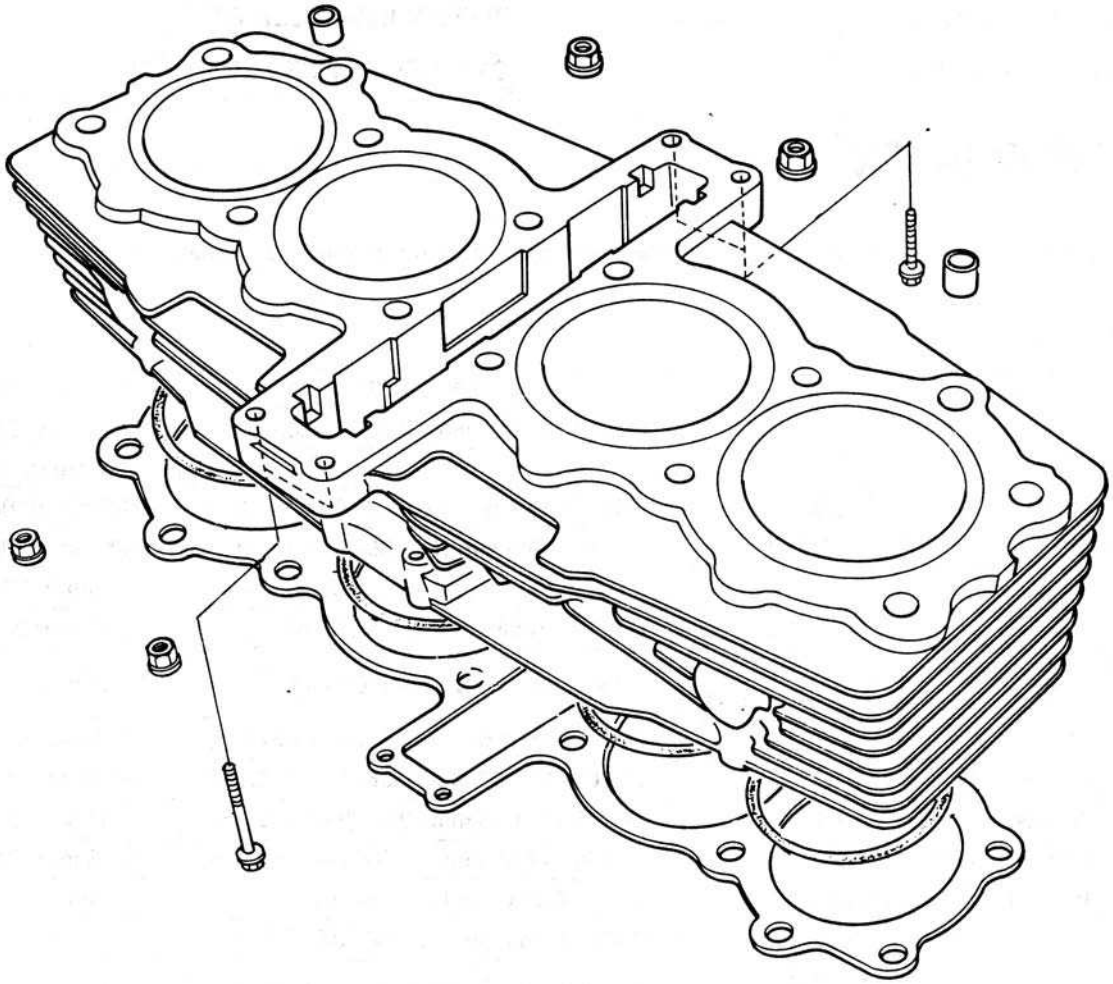
Install the cylinder head cover and tightens the cylinder head cover bolts.

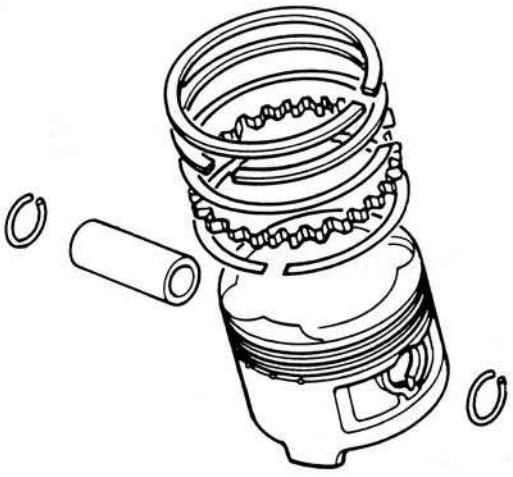
NOTE
The two front bolts are the locating bolts. Tighten those bolts first.

Install the ignition coil, fuel tank and fairing.



(1) CYLINDER HEAD COVER





SERVICE INFORMATION

GENERAL

All cylinder/piston maintenance and inspection can be accomplished without removing the engine from the frame.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		67.000-67.010 mm (2.6378-2.6382 in)	67.10 mm (2.642 in)
Piston, Piston rings and piston pin	Warpage			0.10 mm (0.004 in)
	Piston ring to ring groove clearance	TOP	0.015-0.045 mm (0.0006-0.0018 in)	0.06 mm (0.002 in)
		SECOND	0.015-0.045 mm (0.0006-0.0018 in)	0.06 mm (0.002 in)
	Ring end gap	TOP	0.15-0.30 mm (0.006-0.012 in)	0.5 mm (0.02 in)
		SECOND	0.15-0.30 mm (0.006-0.012 in)	0.5 mm (0.02 in)
		OIL (SIDE RAIL)	0.30-0.90 mm (0.012-0.035 in)	1.1 mm (0.04 in)
	Piston O.D.		66.960-66.990 mm (2.6362-2.6374 in)	66.90 mm (2.634 in)
	Piston pin bore		17.002-17.008 mm (0.6694-0.6696 in)	17.05 mm (0.671 in)
	Connecting rod small end I.D.		17.016-17.034 mm (0.6699-0.6706 in)	17.07 mm (0.672 in)
	Piston pin O.D.		16.994-17.000 mm (0.6691-0.6693 in)	16.98 mm (0.669 in)
	Piston to piston pin clearance		0.002-0.014 mm (0.0001-0.0006 in)	0.04 mm (0.002 in)
	Cylinder to piston clearance		0.010-0.050 mm (0.0004-0.0020 in)	0.10 mm (0.004 in)
	Piston pin to connecting rod clearance		0.016-0.040 mm (0.0006-0.0016 in)	0.06 mm (0.002 in)

TOOLS

Special

Piston base (2 required)	07958-3000000
Piston ring compressor	07954-2830000

TROUBLE SHOOTING

Compression low
1. Worn cylinder or piston rings
2. Leaking valve seats

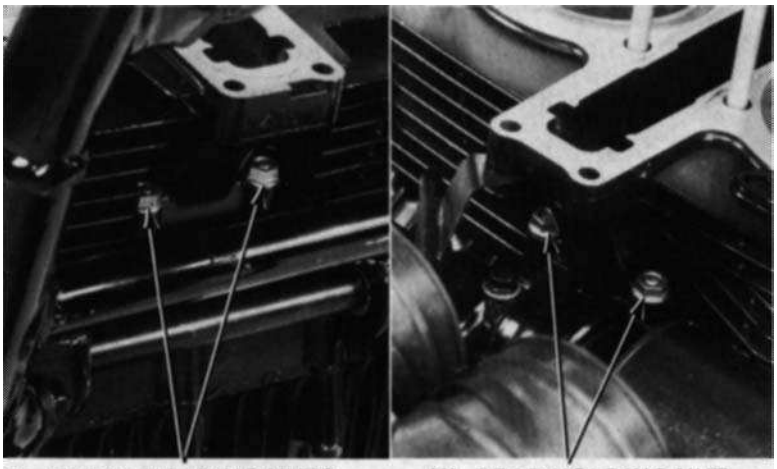
Excessive smoke
1. Worn cylinder or piston
2. Improper installation of piston rings
3. Scored or scratched piston or cylinder wall

Overheating
1. Excessive carbon build up on the piston or combustion chamber wall
2. Incorrect spark plug

Knocking or abnormal noise
1. Worn piston or cylinder
2. Excessive carbon build up
3. Low octane fuel

CYLINDER REMOVAL

Remove the cylinder head (Section 6).
Remove the cam chain tensioner guide.
Remove the front and rear cylinder holding nuts and remove the cylinder.


(1) FRONT HOLDING NUTS (2) REAR HOLDING NUT

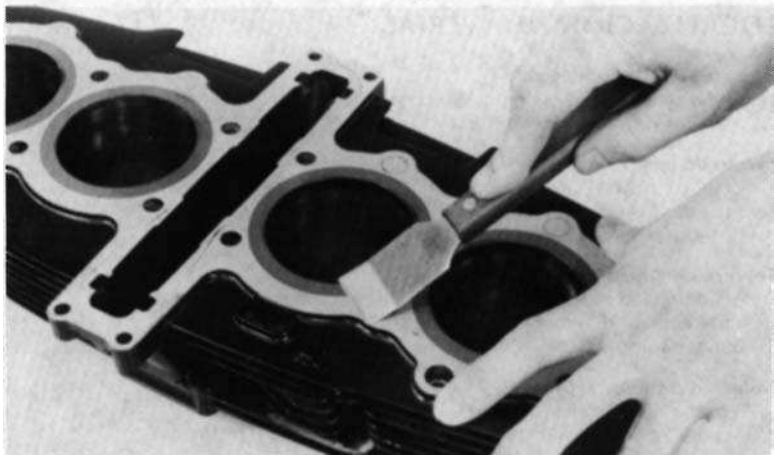
Remove the cylinder gasket and dowel pins.


(1) GASKET
(2) DOWEL PINS

Clean off the cylinder gasket surfaces.

NOTE:
Gasket will come of easier if soaked in solvent.

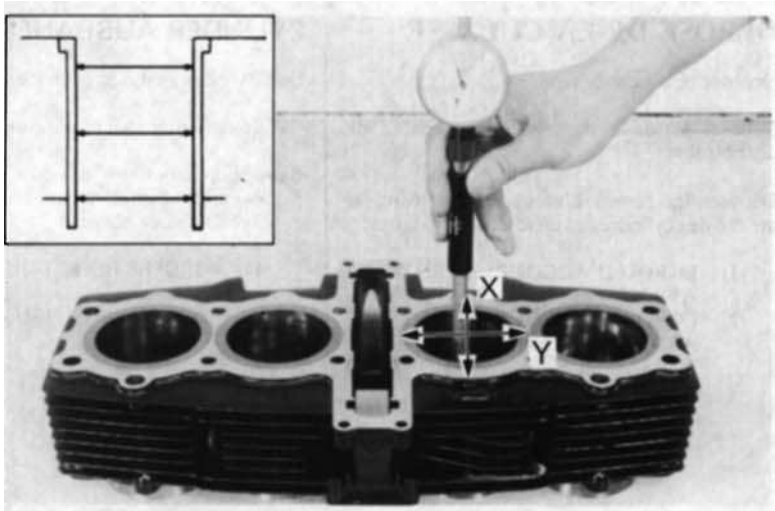
CAUTION
Do not damage the gasket surfaces.



CYLINDER INSPECTION

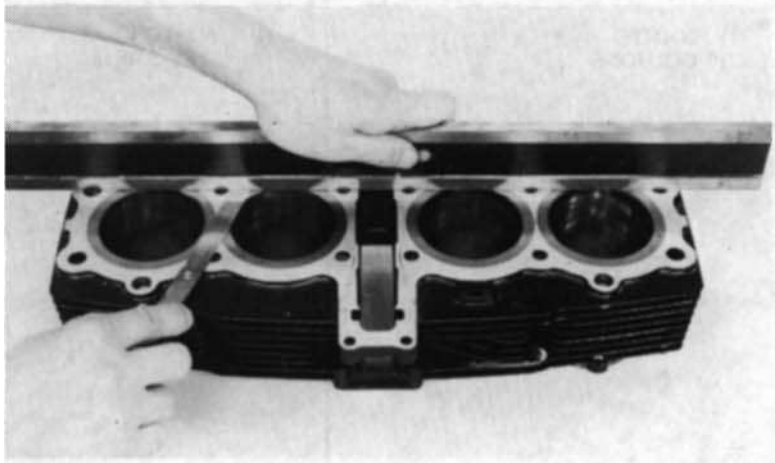
Inspect the cylinder bores for wear or damage.
Measure the cylinder I.D. at three levels in X and Y axis.

SERVICE LIMIT: 67.10 mm (2.642 in)



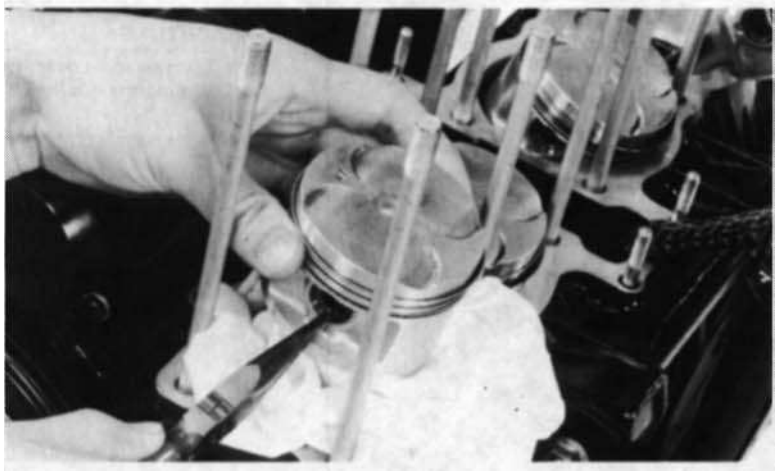
Inspect the top of the cylinder for warpage.
Check in an X pattern as shown.

SERVICE LIMIT: 0.10 mm (0.004 in)



PISTON REMOVAL

Place rags in the crankcase openings.
Remove each piston pin clip with needle nose pliers being careful not to allow clips to fall into the crankcase.
Press the piston pins out.
Mark each piston to indicate its cylinder position for reassembly.



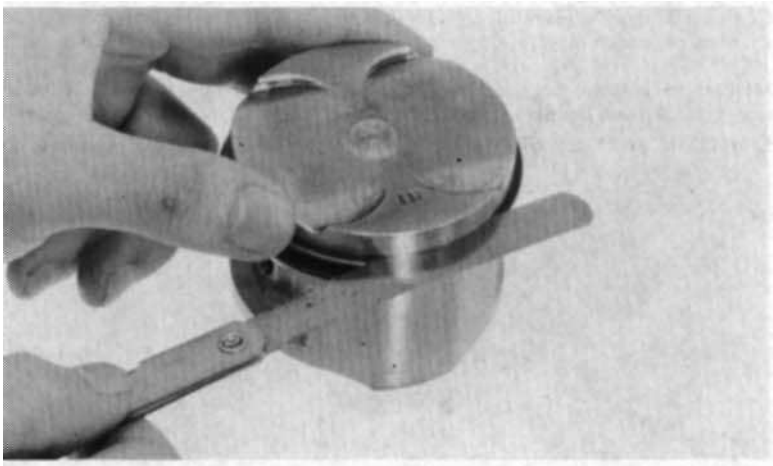
PISTON/PISTON RING INSPECTION

Inspect the piston ring-to-groove clearance.

SERVICE LIMIT:
TOP: 0.06 mm (0.002 in)
SECOND: 0.06 mm (0.002 in)

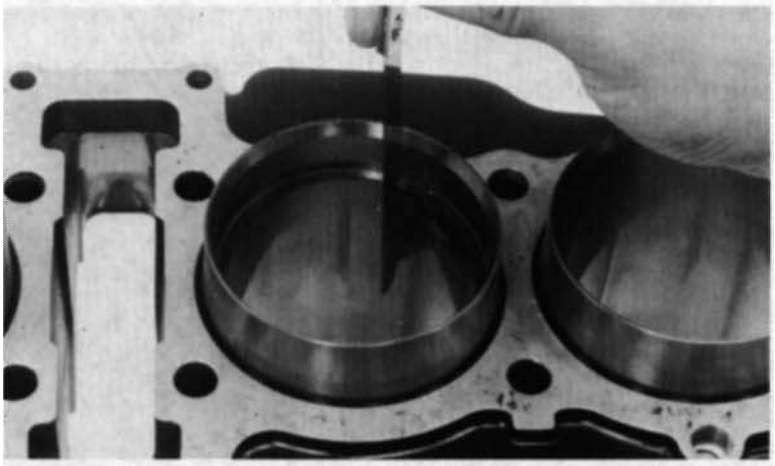
Mark the rings so that they can be returned to correct piston during reassembly.

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



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

SERVICE LIMITS:
TOP: 0.050 mm (0.020 in)
SECOND: 0.050 mm (0.020 in)
OIL (side rail) 1.10 mm (0.043 in)



Measure the piston O.D. 14 mm (0.6 in) from the bottom of the skirt and 90 deg to the piston pin hole.

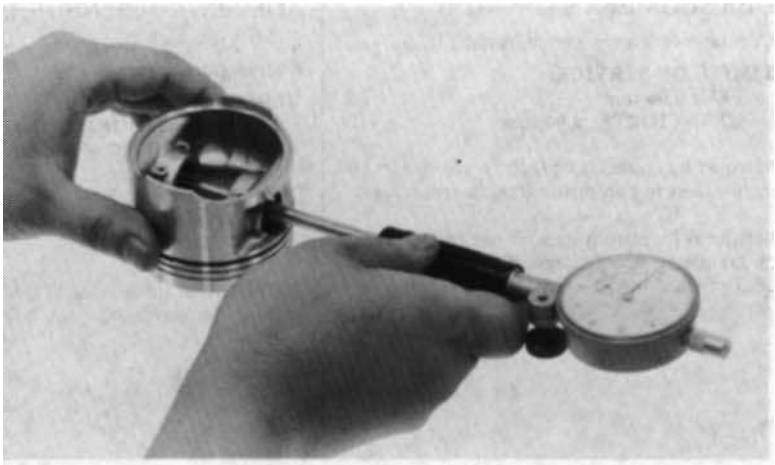
SERVICE LIMIT: 66.90 mm (2.634 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

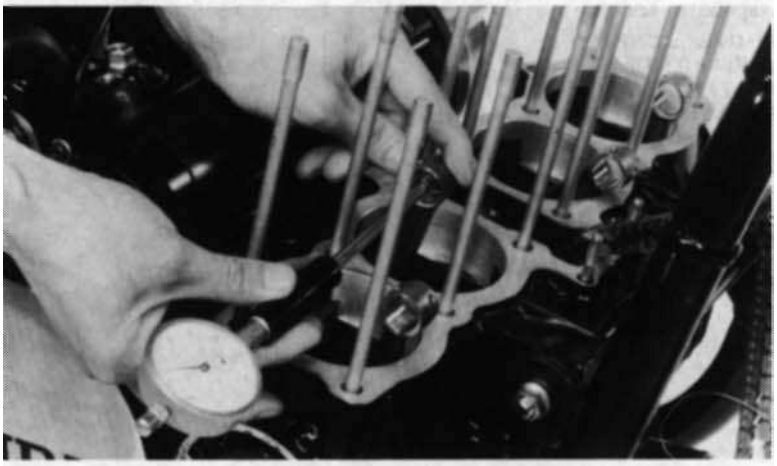
Measure the piston pin hole I.D.

SERVICE LIMIT: 17.05 mm (0.671 in)



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

SERVICE LIMIT: 17.07 mm (0.672 in)



Measure the piston pin O.D.

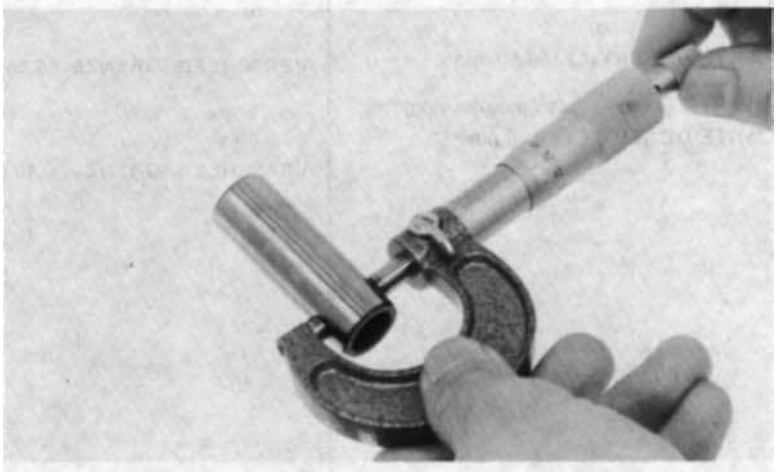
SERVICE LIMIT: 16.98 mm (0,669 in)

Calculate the piston pin-to-piston clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)

Calculate the piston pin-to-connecting rod clearance.

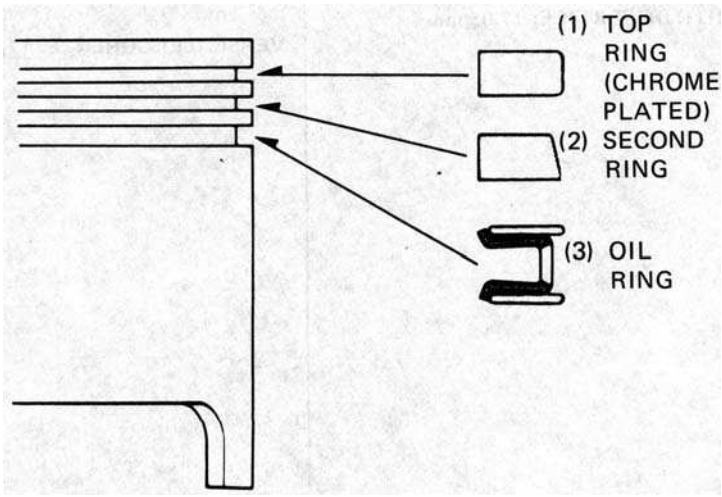
SERVICE LIMIT: 0.06 mm (0.002 in)



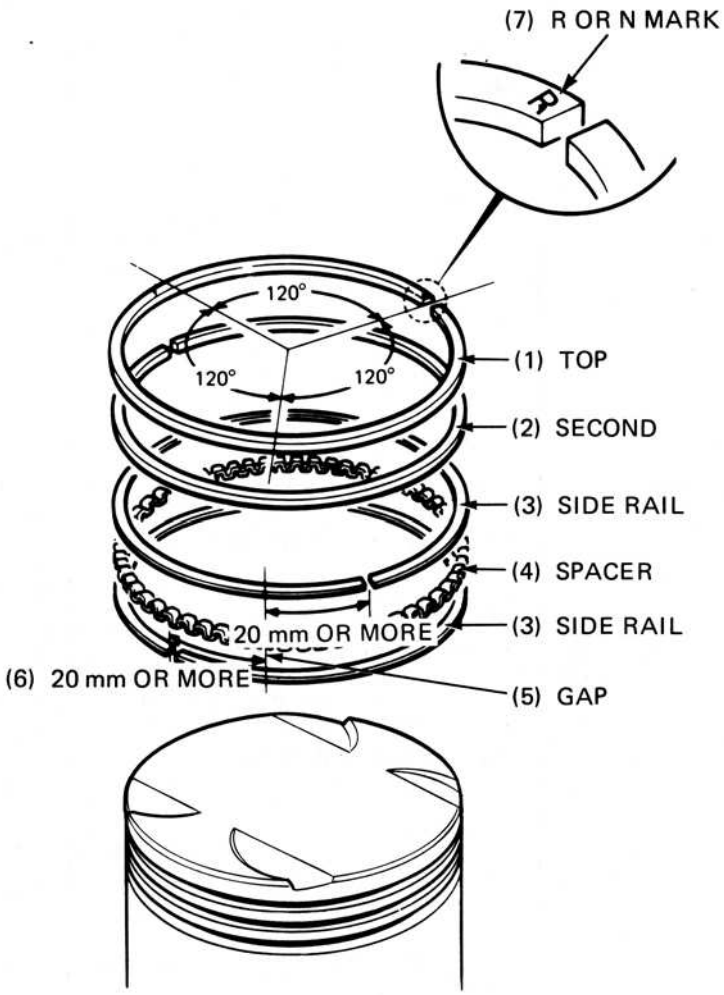
PISTON RING INSTALLATION

Install the piston rings with the markings face up

NOTE:
After installation, the rings should rotate freely in the grooves.



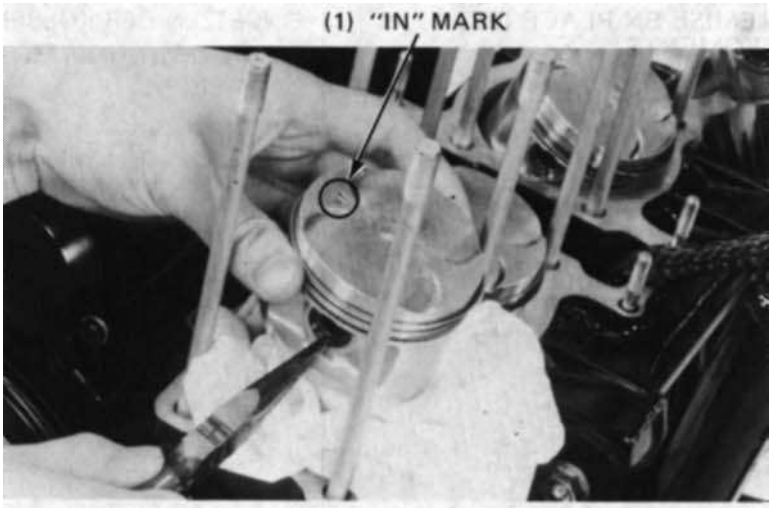
Space the piston ring end gaps 120 degrees apart.
Do not align the gaps in the oil rings.



PISTON INSTALLATION

Apply molybdenum disulphide grease to the connecting rod small ends.
Install the pistons, piston pins and clips. Be careful not to drop clips into the crank case,
NOTE:

- **Position the "IN" mark on the piston crown toward the intake side.**
- **Install the pistons in there original positions.**

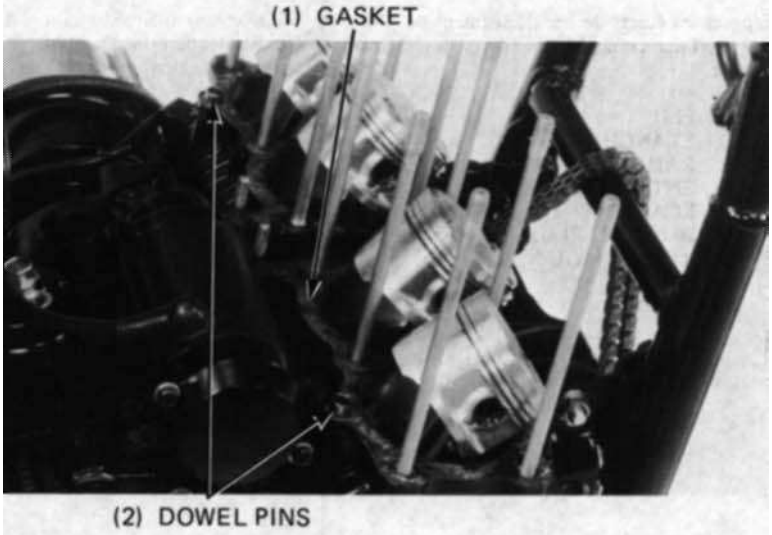


CYLINDER INSTALLATION

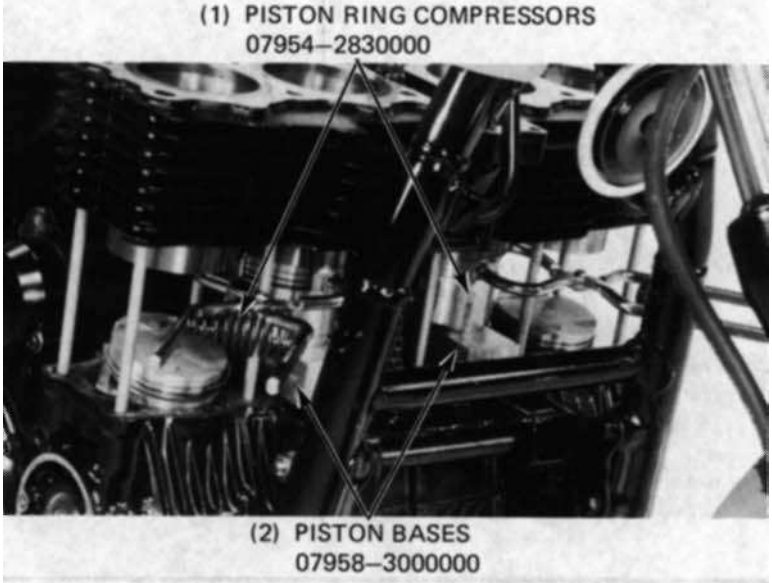
Clean the cylinder gasket surface of the crankcase.

CAUTION
Be careful not to damage the gasket surface.

Install the dowel pins and a new gasket.



Put the No. 2 and 3 pistons at TDC.
Place piston bases under the pistons, compress the piston rings with piston ring compressors and slide the cylinder over the No. 2 and 3 pistons.
Remove the piston ring compressors and piston bases.

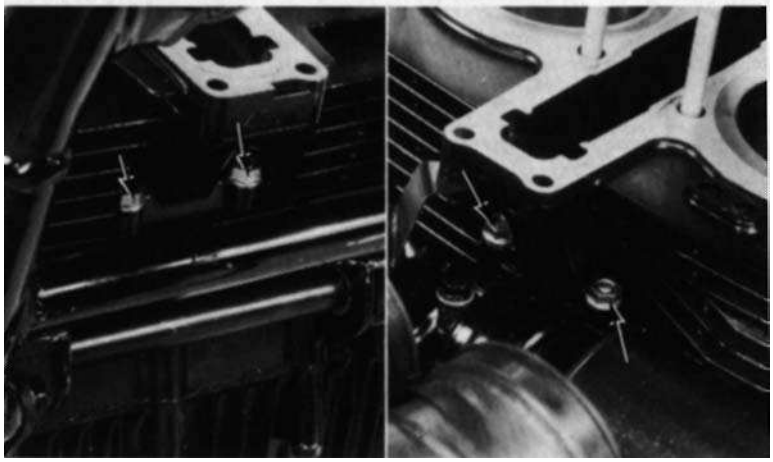


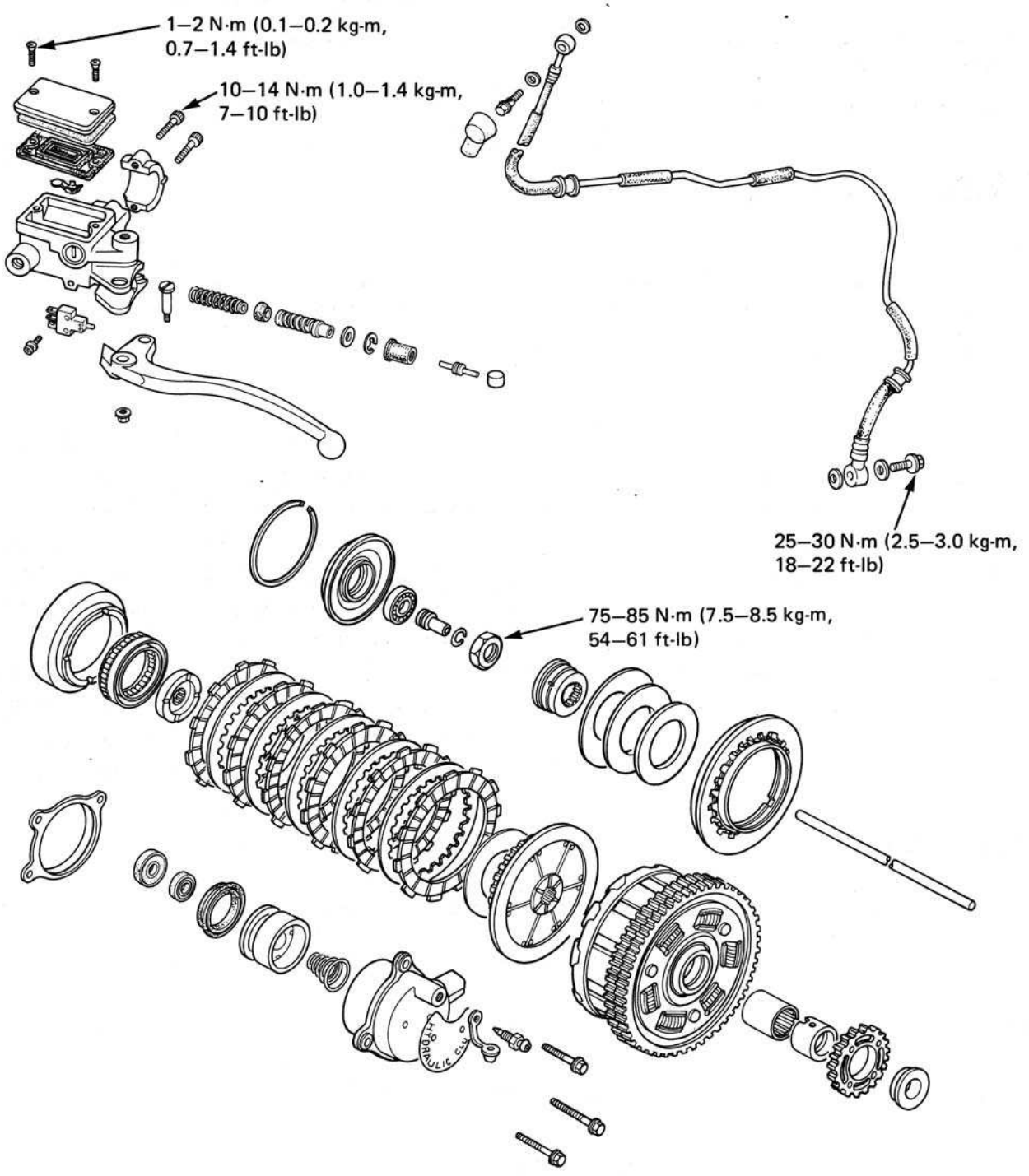
Compress the No. 1 and 4 pistons with the piston ring compressors and slide the cylinder over the pistons.
Remove the piston ring compressors.

(1) PISTON RING COMPRESSORS
07954–2830000

Install the cylinder holding nuts securely.

Install the cylinder head (Section 8).




1–2 N·m (0.1–0.2 kg-m,
0.7–1.4 ft-lb)
10–14 N·m (1.0–1.4 kg-m,
7–10 ft-lb)
25–30 N·m (2.5–3.0 kg-m,
18–22 ft-lb)
75–85 N·m (7.5–8.5 kg-m,
54–61 ft-lb)
HYDRAULIC CLU

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Clutch master cylinder	Cylinder I.D.	15.870-15.913 mm (0.6248-0.6265 in)	15.93 mm (0.627 in)
	Piston O.D.	15.827-15.854 mm (0.6231-0.6242 in)	15.80 mm (0.622 in)
Clutch slave cylinder	Cylinder I.D.	38.100 -38.162 mm (1.5000-1.5024 in)	38.18 mm (1.503 in)
	Piston O.D.	38.036-38.075 mm (1.4975-1.4990 in)	38.02 mm (1.497 in)
Clutch	Outside guide I.D.	24.995-25.012 mm (0.9841-0.9847 in)	25.08 mm (0.987 in)
	Spring free height	4.00 mm (0.16 in)	3.9 mm (0.15 in)
	Clutch centre B.I.D.	74.414-74.440 mm (2.9297-2.2743 in)	74.50 mm (2.933 in)
	One way clutch inner I.D.	57.755-57.768 mm (2.2738-2.2743 in)	57.74 mm (2.273 in)
	Disc thickness	3.72-3.88 mm (0.147-0.153 in)	3.1 mm (0.12 in)
	Plate warpage		0.30 mm (0.012 in)

TORQUE VALUES

Master cylinder reservoir cap	1-2 Nm (0.1-0.2 kg.m, 0.7-1.4 ft.lb)
Master cylinder holder	10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)
Oil bolt	25-30 Nm (2.5-3.0 kg.m, 18-22 ft.lb)
Clutch lock nut	75-85 Nm (7.5-8.5 kg.m, 54-61 ft.lb)

TOOLS

Special

Snap ring pliers	07914-3230001

Common

Extension bar	07716-0020500
Lock nut wrench, 17 x 27 mm	07716-0020300
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 35 mm	07746-0040800
Universal holder	07725-0030000

TROUBLESHOOTING

Clutch lever soft or spongy
1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking

Clutch lever too hard
1. Sticking piston(s)
2. Clogged hydraulic system

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

Clutch will not disengage
1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking
4. Hydraulic system sticking
5. Plates warped

Motorcycle creeps with clutch disengaged
1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking
4. Hydraulic system sticking
5. Plates warped

Excessive lever pressure
1. Hydraulic system sticking
2. Lifter mechanism damaged

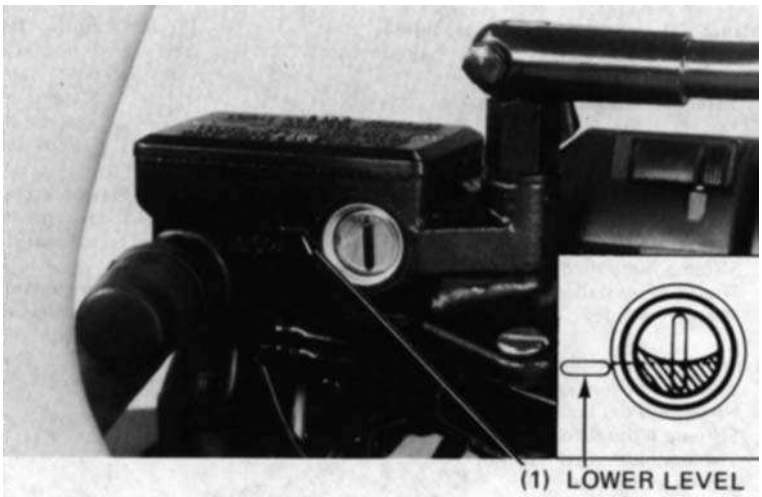
Clutch operation feels rough
1. Outer drum slots rough
2. Sticking piston(s)

CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

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

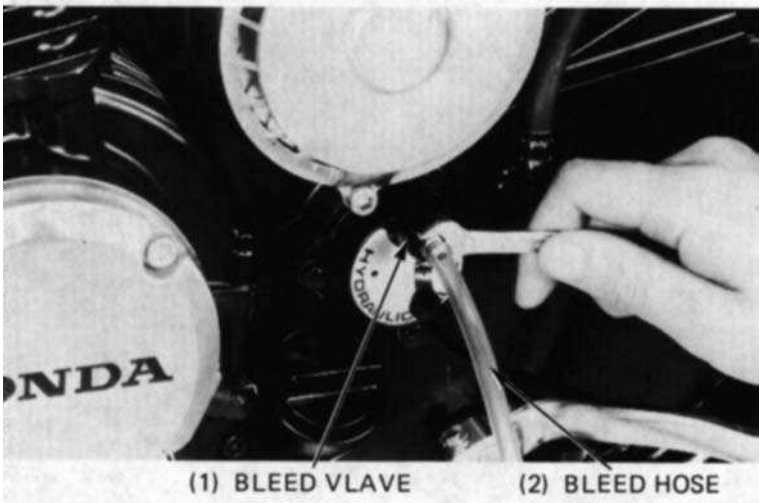
CAUTION

- ***Do not allow foreign material to enter the clutch system when filling the reservoir.***
- ***Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.***



CLUTCH FLUID DRAINING

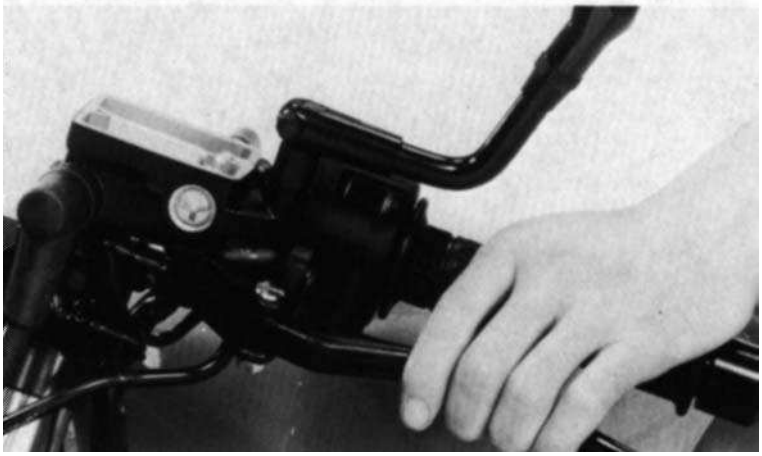
Remove the reservoir cap and diaphragm. Connect a bleed hose to the bleed valve. Loosen the slave cylinder bleed valve and pump the clutch lever. Stop operating the lever when no fluid flows out of the bleed valve.



CLUTCH FLUID FILLING

NOTE:
Do not mix different types of fluid since they are not compatible.

Close the bleed valve and fill the reservoir. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.
Then bleed the system (below).



AIR BLEEDING

NOTE:

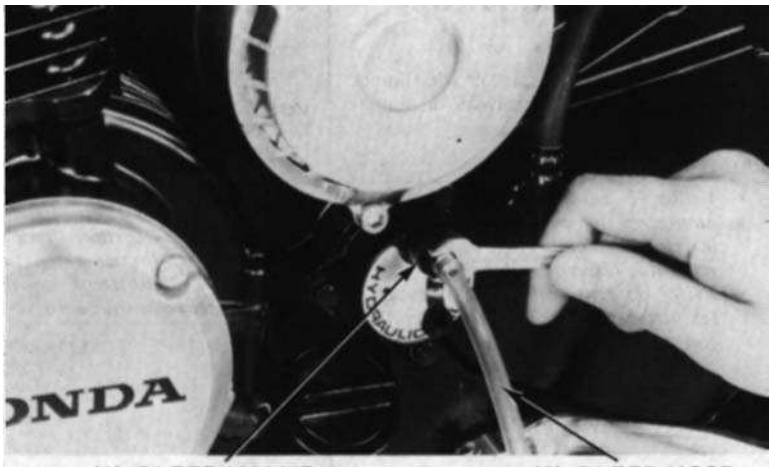
- **Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.**
- **Use only DOT 4 brake fluid from a sealed container.**
- **Do not mix brake fluid types and never reuse the fluid which has been pumped out during bleeding,**
- **or the efficiency of the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

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

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

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

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



CLUTCH MASTER CYLINDER

DISASSEMBLY

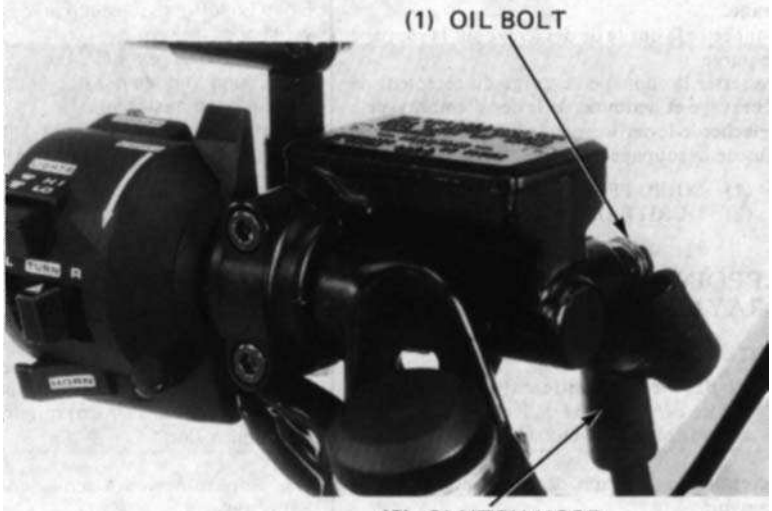
Drain clutch fluid from the hydraulic system.
Remove the rear view mirror and clutch lever.
Disconnect the clutch switch wires and remove the clutch hose.

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

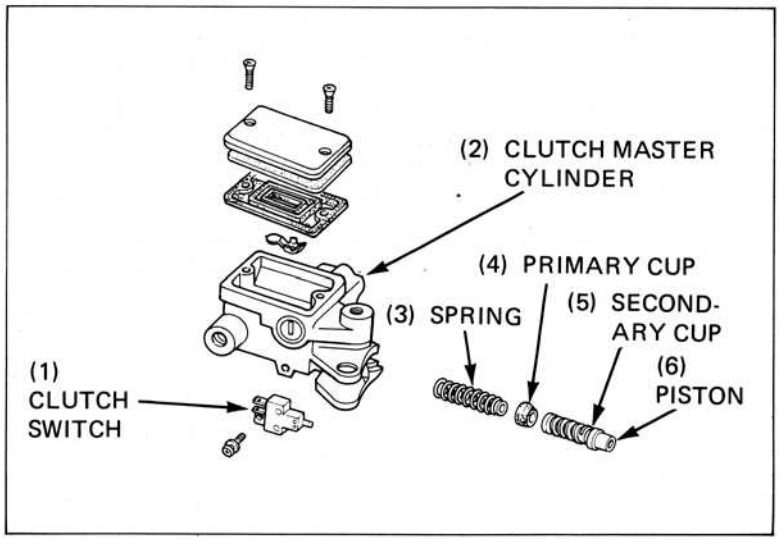
NOTE:
When removing the oil bolt, cover the end of the hose to prevent contamination and secure the hose.

Remove the master cylinder.

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



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

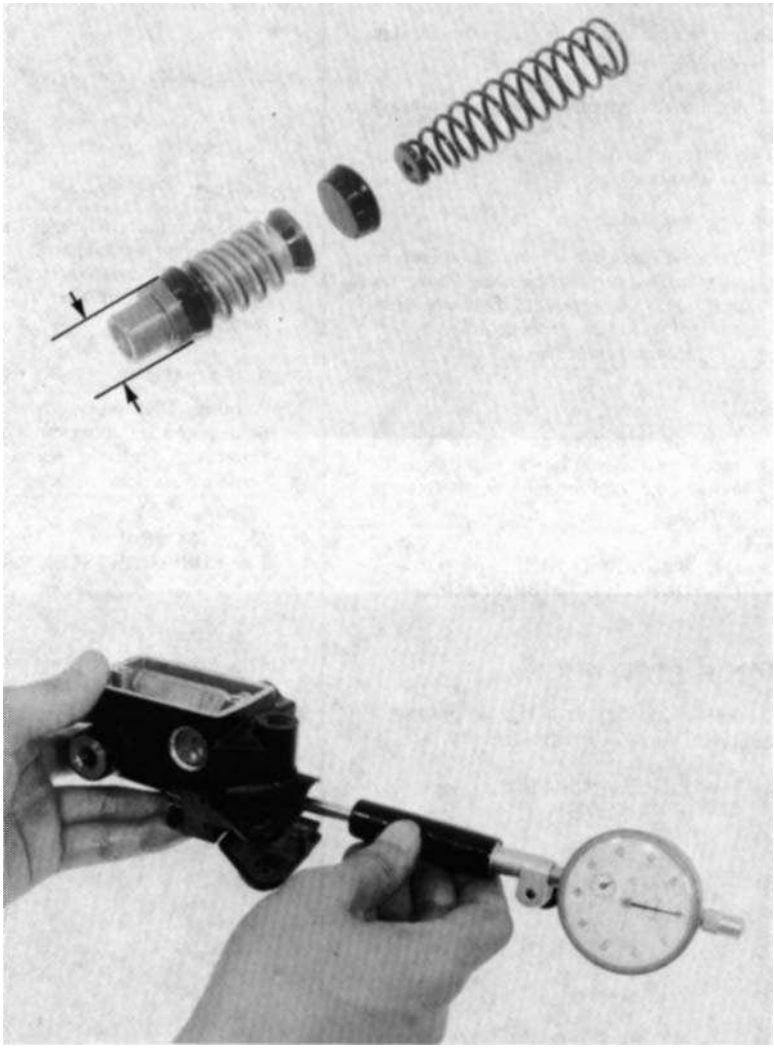


MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 15.80 mm (0.622 in)

Check the primary and secondary cups for damage before assembly.



MASTER CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 15.93 mm (0.627 in)

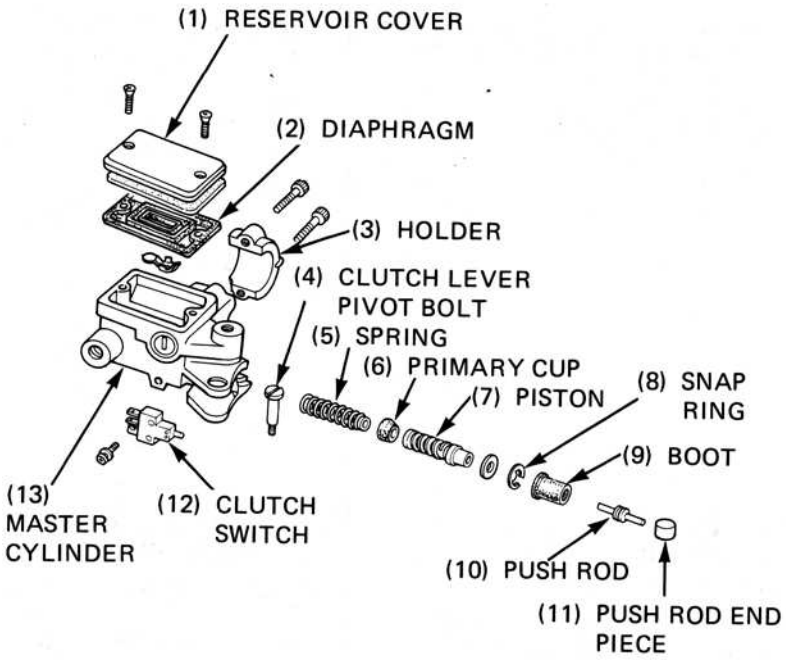
ASSEMBLY

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

Coat the primary cup and piston with clean brake fluid before assembly.
Install the spring, primary cup and piston.

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

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



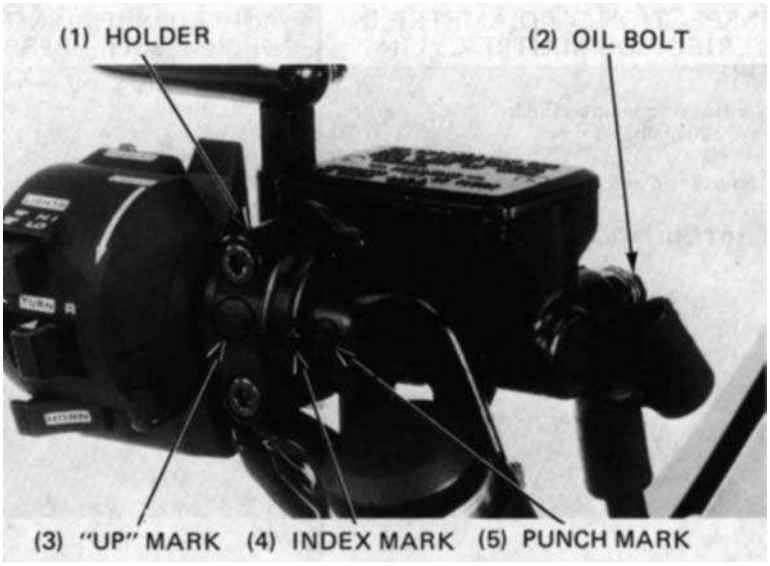
Place the master cylinder on the handlebar and install the holder with the "UP" mark facing up and the mounting bolts.
Align the index mark on the holder with the punch mark on the handlebar, and tighten the upper bolt first, then lower bolt.

TORQUE: 10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)

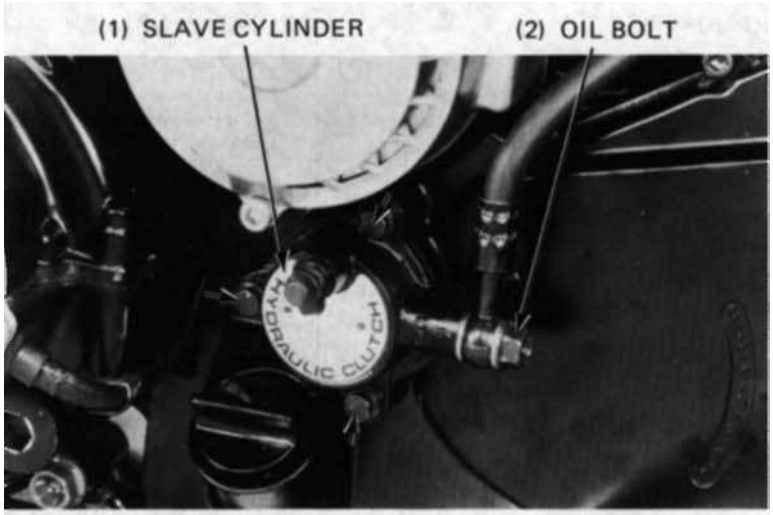
Install the clutch hose with the oil bolt and two sealing washers, and tighten the oil bolt.

TORQUE: 25-30 Nm (2.5-3.0 kg.m, 18-22 ft.lb)

Install the push rod end piece into the clutch lever hole and install the clutch lever.
Connect the clutch switch wires to the switch terminals.
Fill the reservoir and bleed the clutch system (page 7-3).



CLUTCH SLAVE CYLINDER

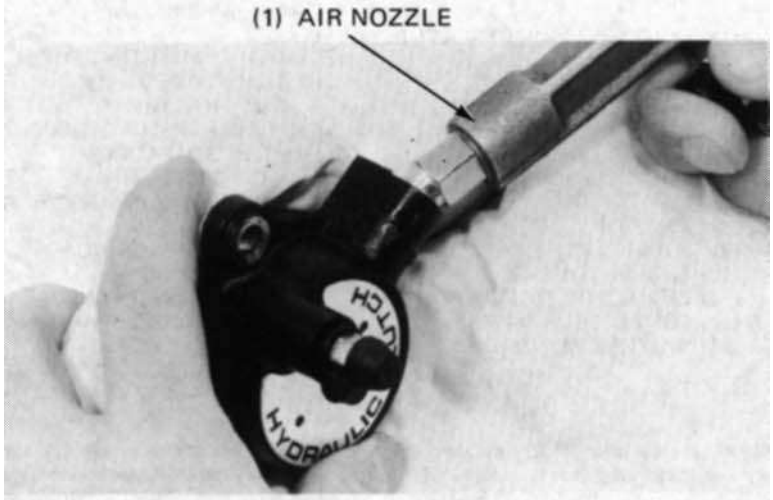


DISASSEMBLY

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

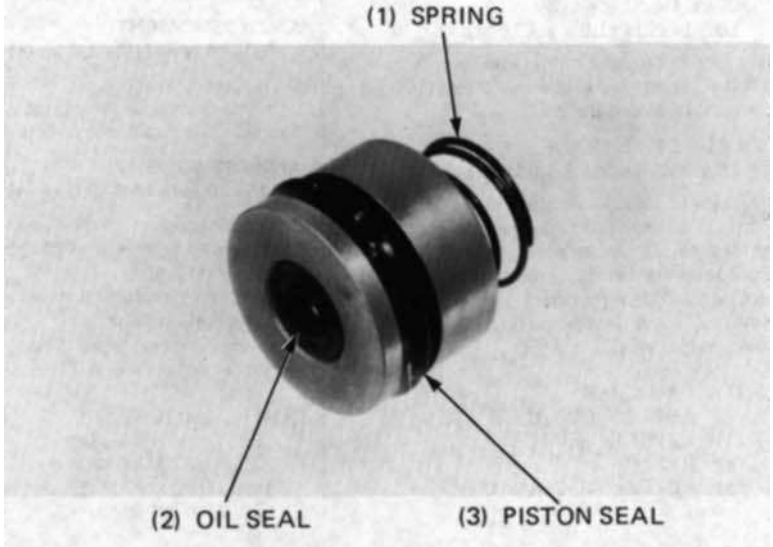
NOTE:
Avoid spilling clutch fluid on painted surfaces.

Remove the slave cylinder.



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

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



Remove the spring from the slave cylinder.

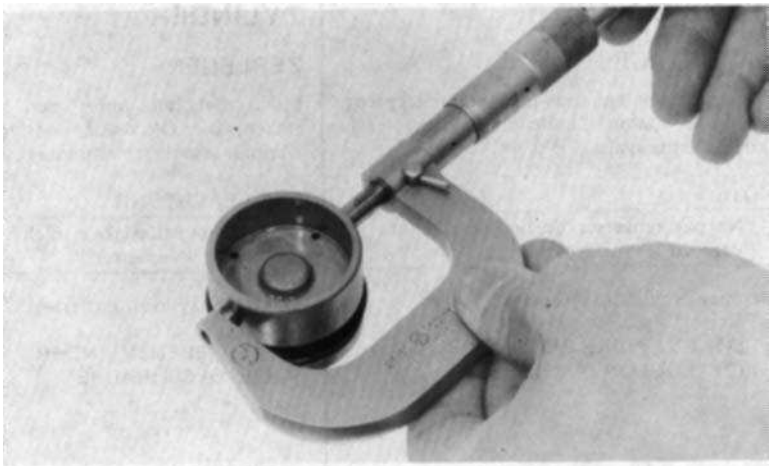
Remove the oil and piston seals.

Clean the piston groove with clutch fluid. Check the piston spring for weakness or damage.

PISTON O.D. INSPECTION

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

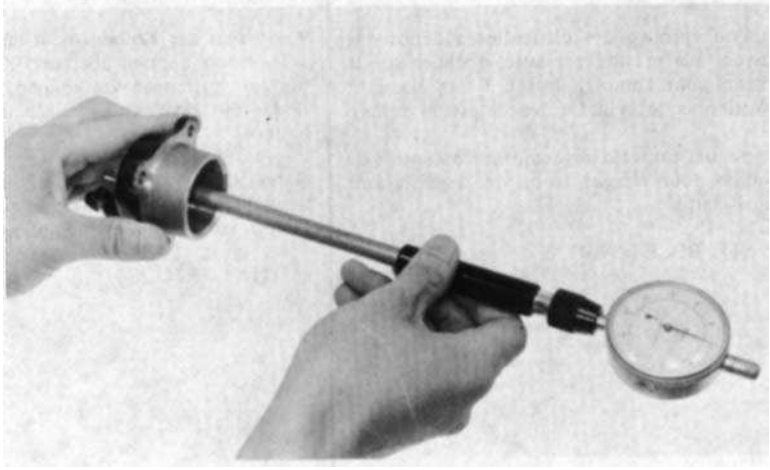
SERVICE LIMIT: 38.02 mm (1.497 in)



CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 38.18 mm (1.503 in)



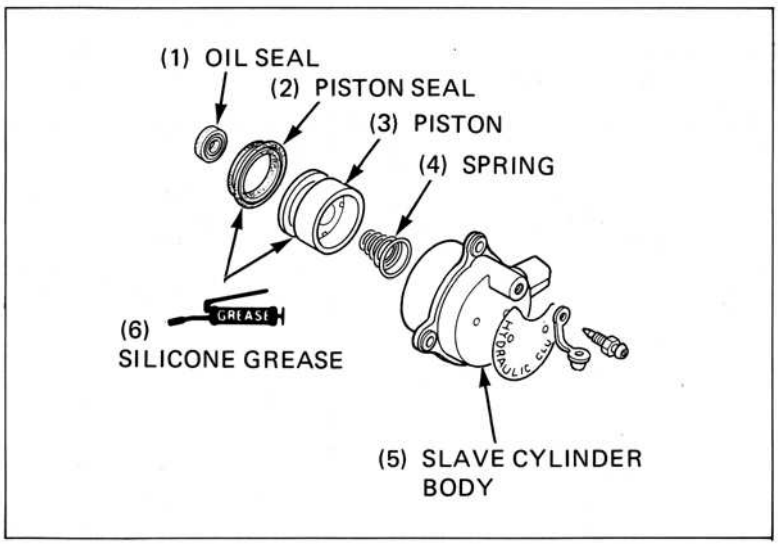
ASSEMBLY

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

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

Be certain the piston seal is seated in the piston groove.

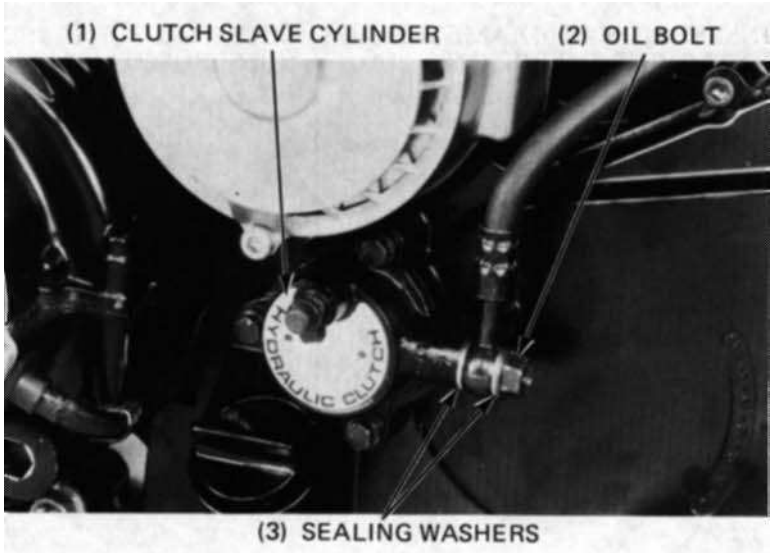
Place the piston in the cylinder with the oil seal end facing out.



Install the slave cylinder with a new gasket and tighten the slave cylinder bolts securely.
Connect the clutch hose with the oil bolt and two sealing washers, and tighten the oil bolt.

TORQUE. 25-30 Nm (2.5-3.0 kg.m, 18-22 ft.lb)

Fill the clutch fluid reservoir and bleed the clutch system (page 8-3).

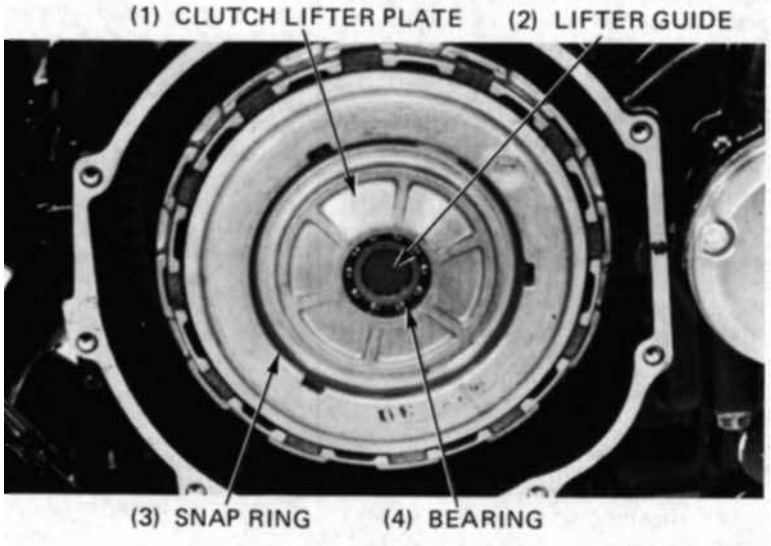


CLUTCH DISASSEMBLY

Drain the engine oil (page 2-3).
Remove the clutch cover and gasket.

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

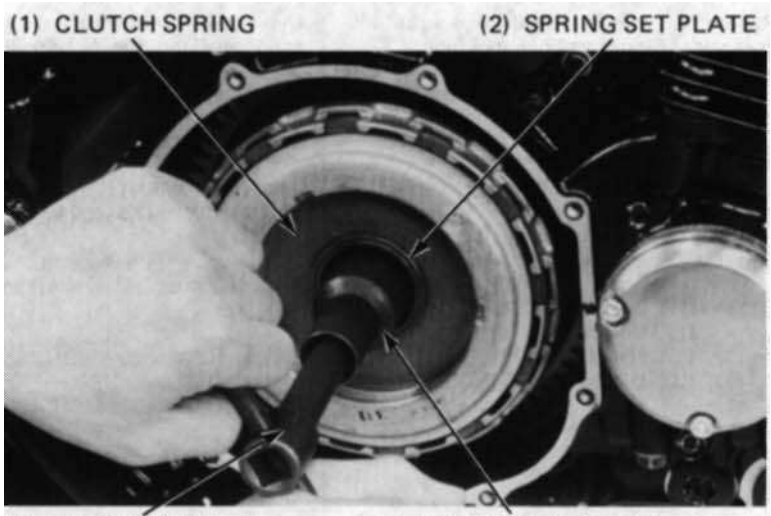
CAUTION
To prevent the clutch system from air contamination, squeeze the clutch lever immediately after removing the clutch lifter plate, and tie the lever to the handle grip with a string.



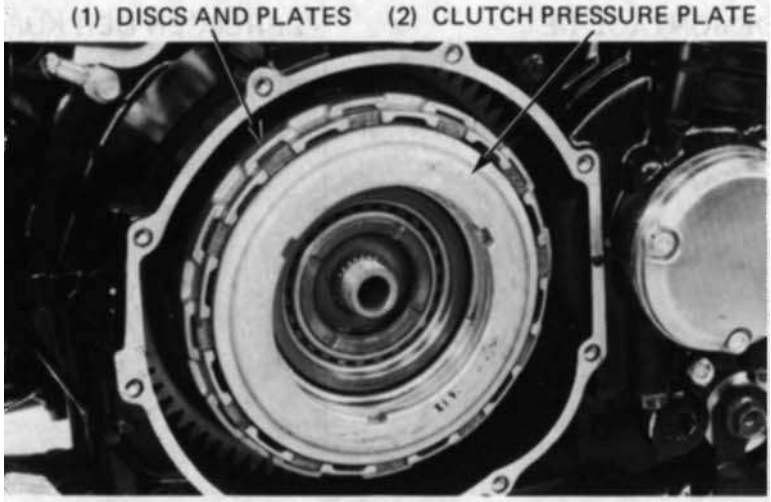
Shift the transmission into 6th gear and apply the rear brake.

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

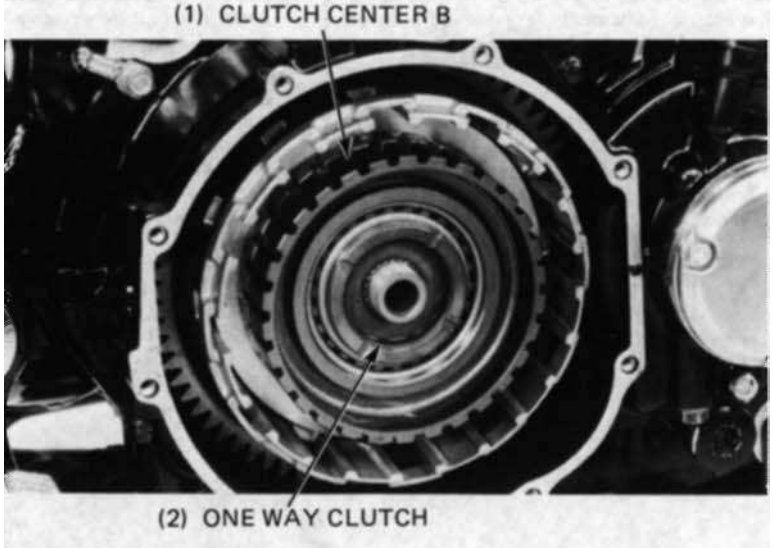
Remove the lock nut.
Remove the clutch spring set plate, clutch spring and two washers.



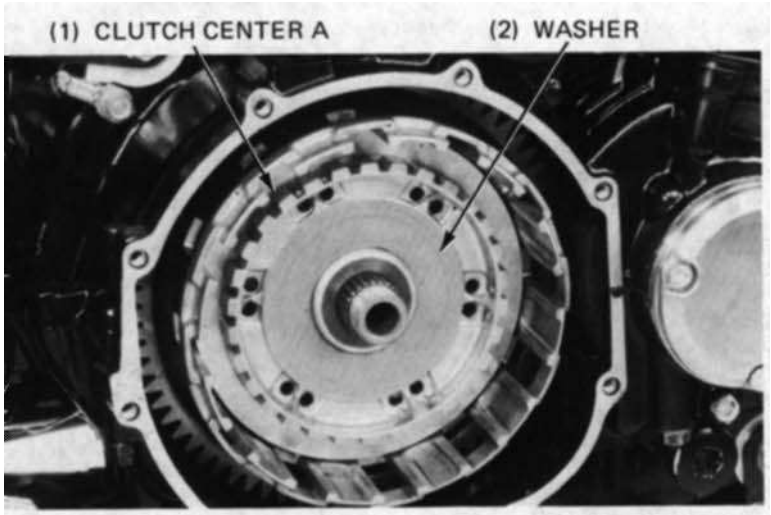
Remove the clutch pressure plate.
Remove the clutch plates and discs.



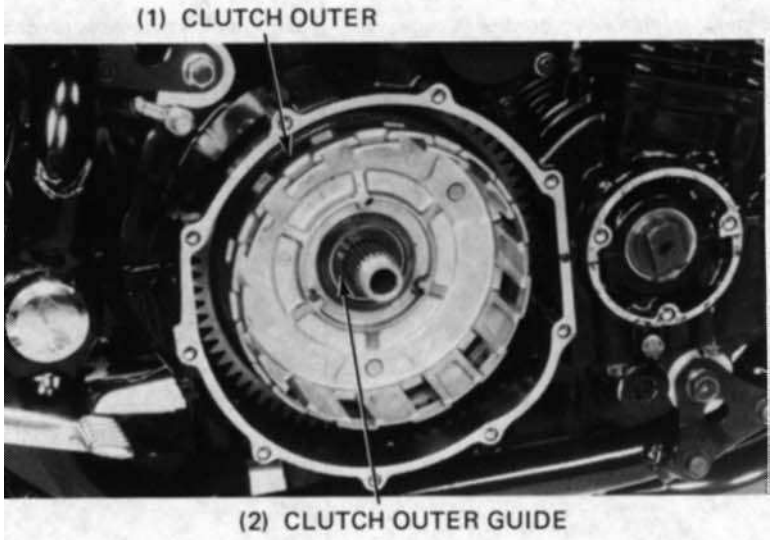
Remove clutch centre B and the one-way clutch as an assembly.



Remove clutch centre A and washer.



Remove the right crankshaft cover and turn the crankshaft clockwise until the No. 4 crank weight is positioned at BDC.
Pull out the clutch outer guide and remove the clutch outer.



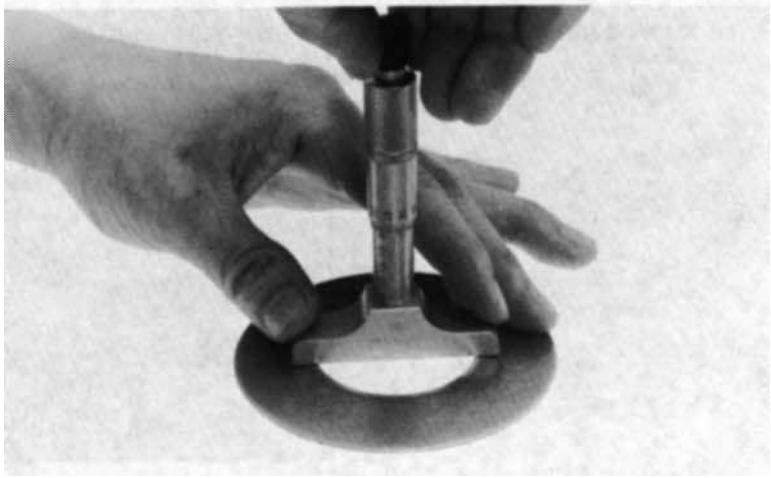
INSPECTION

CLUTCH SPRING

Measure the height of the clutch spring.

SERVICE LIMIT: 3.9 mm (0.15 in)

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

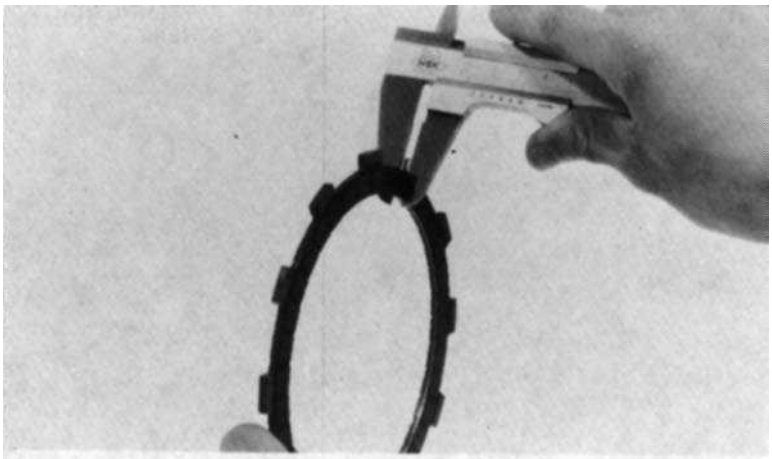


CLUTCH DISC

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

SERVICE LIMIT: 3.1 mm (0.12 in)

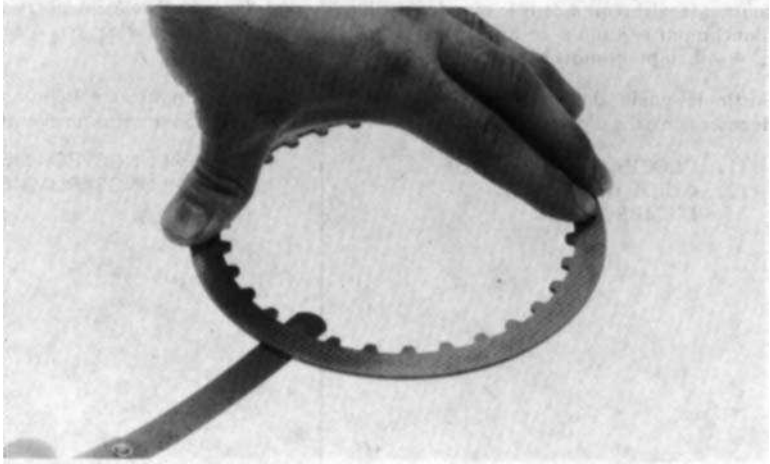
Replace any discs that are thinner than the service limit.



CLUTCH PLATE

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

SERVICE LIMIT: 0.30 mm (0.012 in)

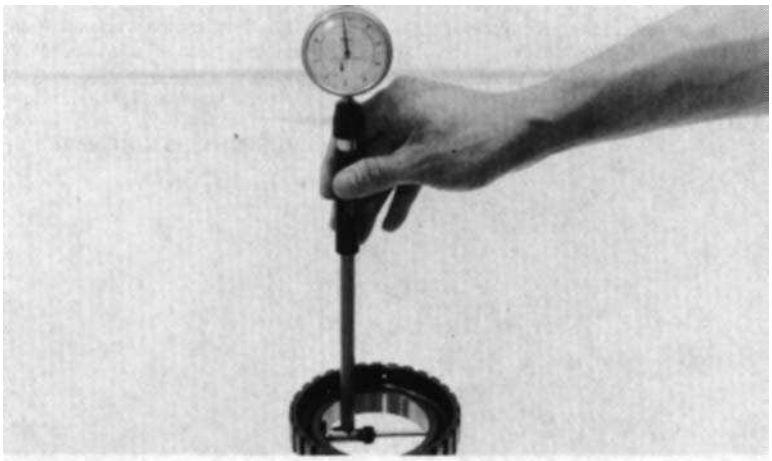


ONE WAY CLUTCH INSPECTION

Inspect the one way clutch for smooth operation. Check the rollers for excessive wear.

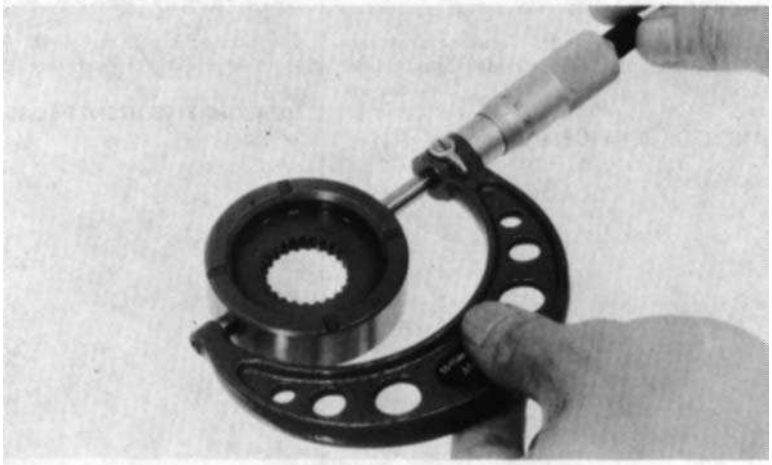
Measure the I.D. of clutch centre B.

SERVICE LIMIT: 74.50 mm (2.933 in)



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

SERVICE LIMIT: 57.74 mm (2.273 in)

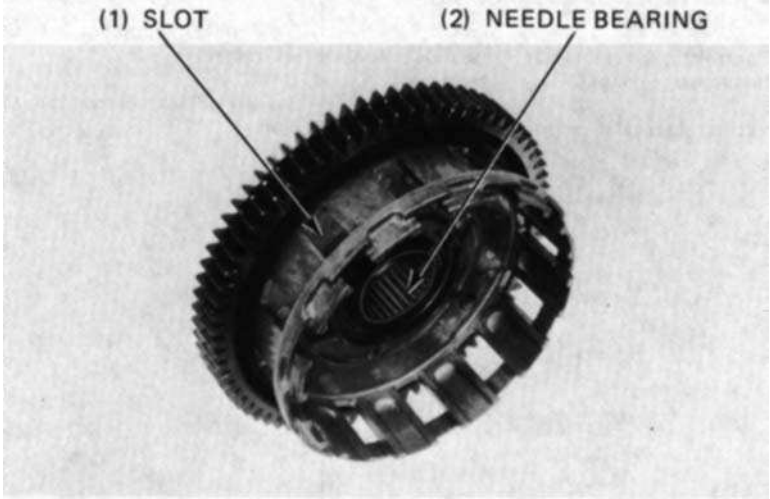


CLUTCH OUTER

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

If the needle bearing is difficult to remove from the clutch housing, use the following tools:

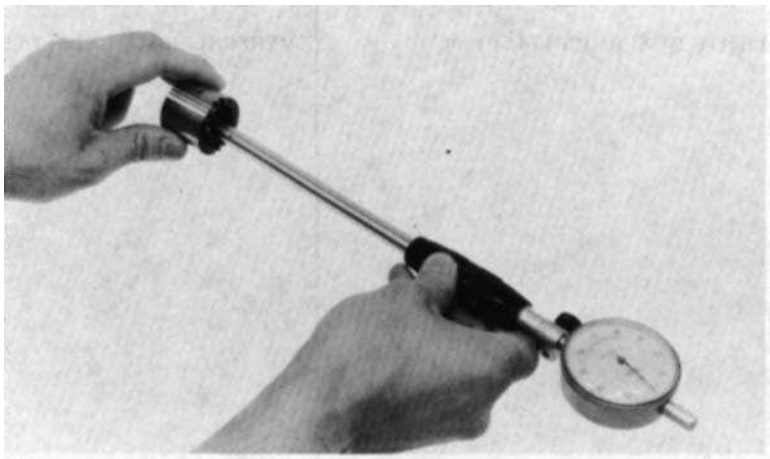
Driver: 07749-0010000
Attachment, 37 x 40 mm: 07746-0010200
Pilot, 35 mm: 07746-0040800



CLUTCH OUTER GUIDE

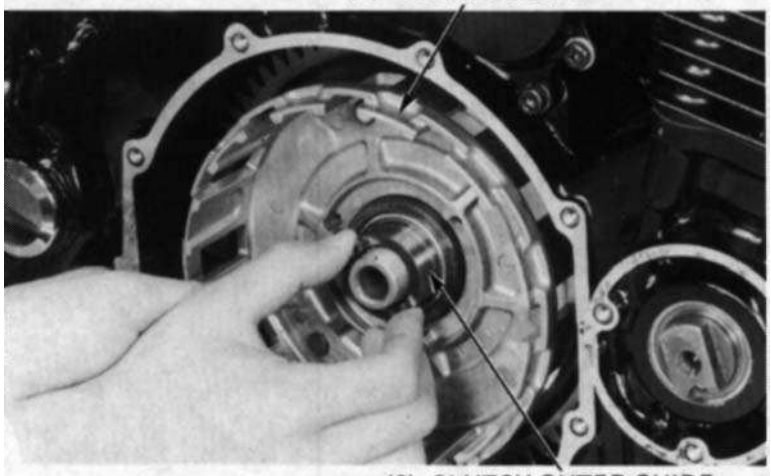
Measure the I.D. of the clutch outer guide.

SERVICE LIMIT: 25.08 mm (0.987 in)

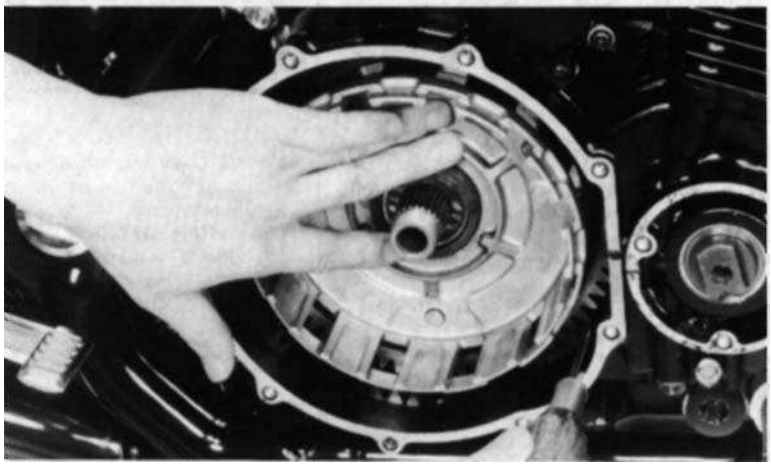


CLUTCH ASSEMBLY

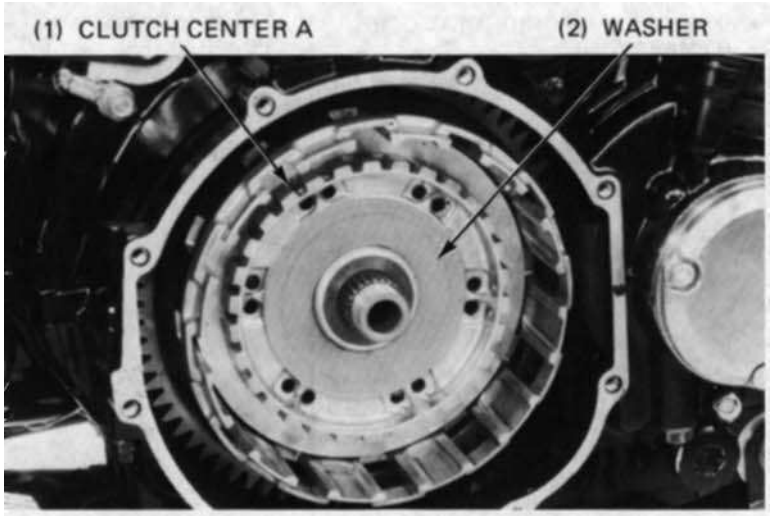
Install the needle bearing into the clutch outer. Install the clutch outer over the mainshaft.
Install the clutch outer guide between the mainshaft and clutch outer and push it in until it stops.



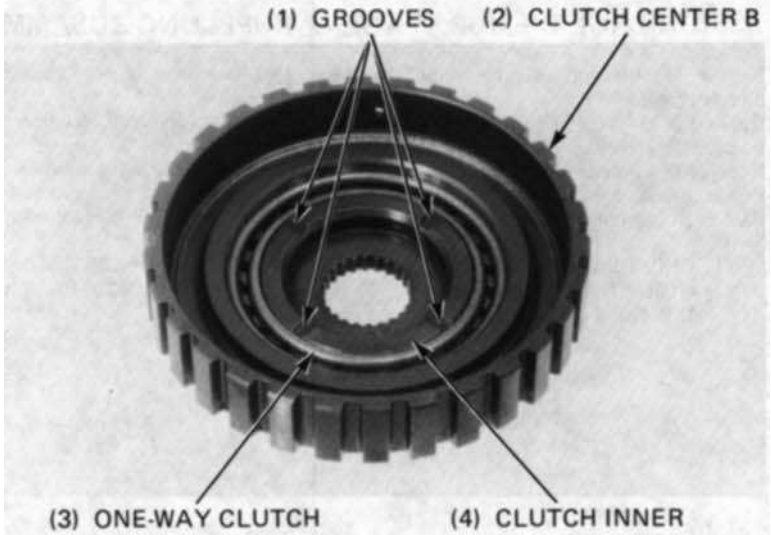
Push the clutch outer in while moving the primary driven gears with a screwdriver, then further push it in while moving the oil pump driven sprocket with the screwdriver to fit the pins on the drive sprocket into the holes in the clutch outer.



Install clutch centre A and the washer.

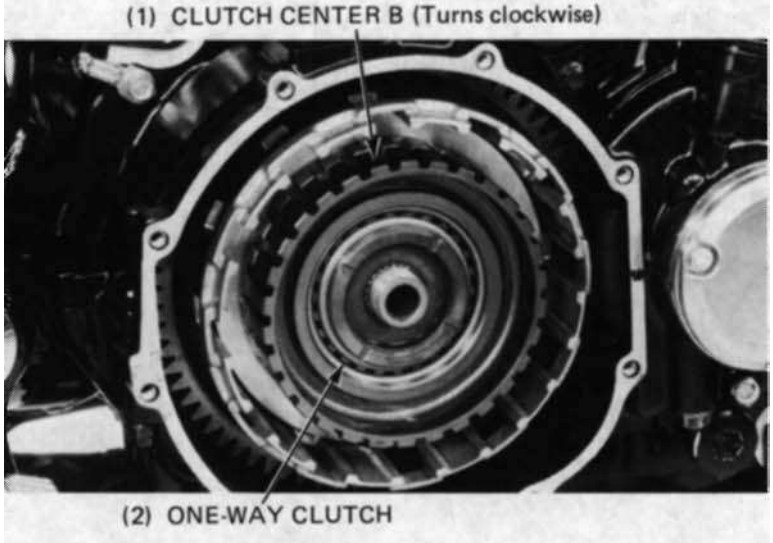


Place the clutch centre B with the grooved side facing down.
Install the one-way clutch into the clutch centre B with its flanged cage facing up.
Install the clutch inner into the one-way clutch with its grooves facing up. Turn it counter clockwise as you install it.

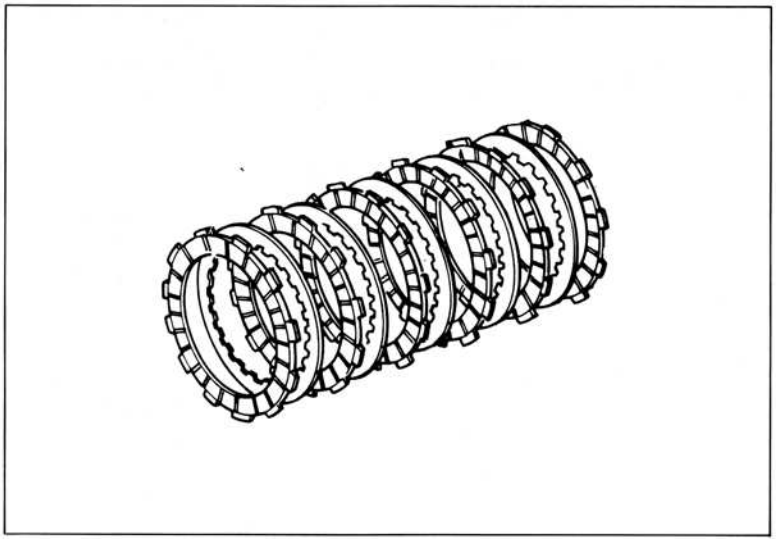


Install the one-way clutch/clutch centre B assembly over the mainshaft.

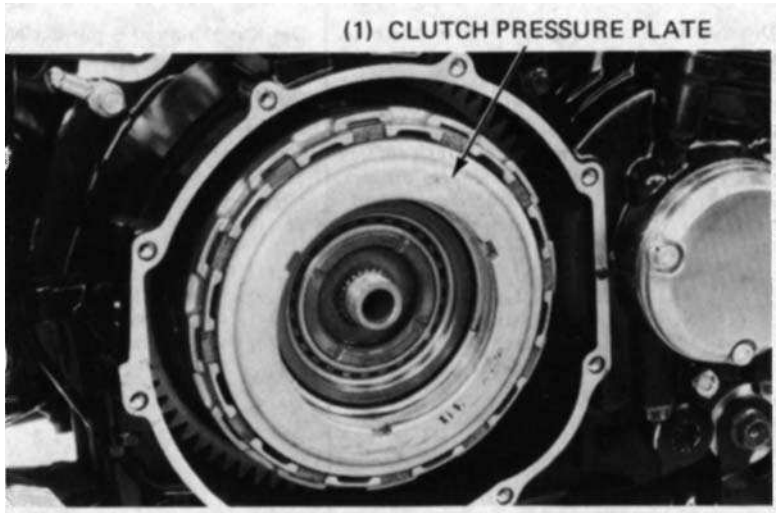
NOTE:
Make sure the one way clutch assembly is installed correctly by turning the clutch centre B. The clutch centre should turn clockwise freely and should not turn counter clockwise.



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

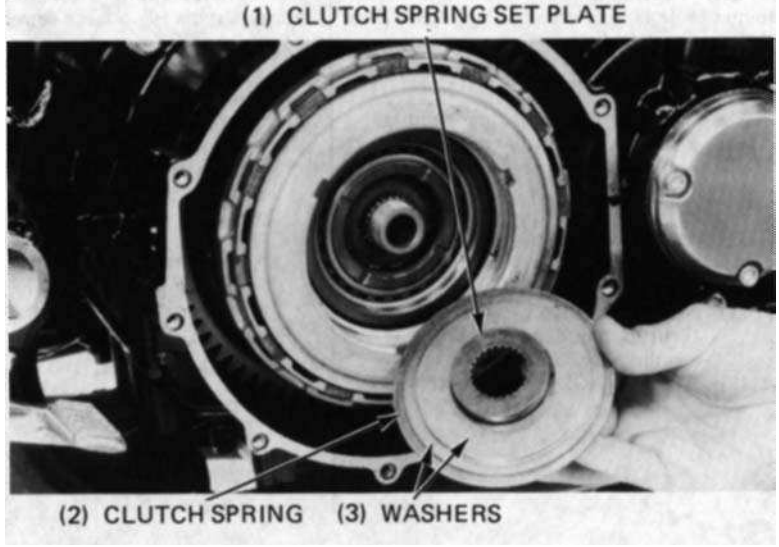


Install the clutch pressure plate.



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

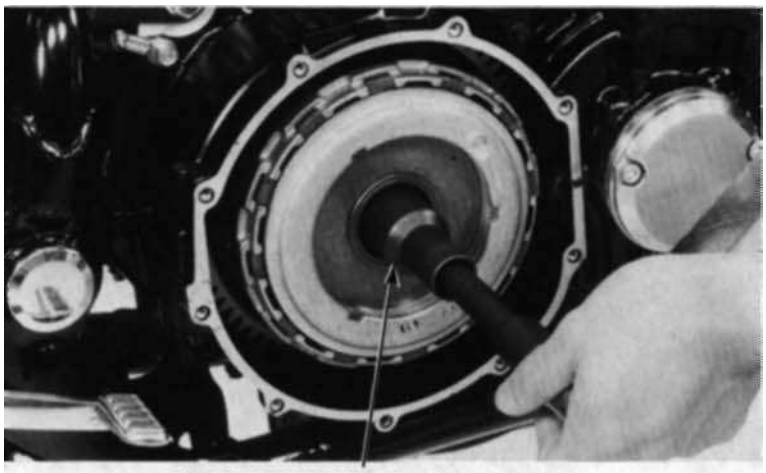
NOTE:
Install the clutch spring with the dished face towards the inside.



Place the transmission in 6th gear.
Apply thread lock agent to the threads of the lock nut and mainshaft.
Install and tighten the lock nut.

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

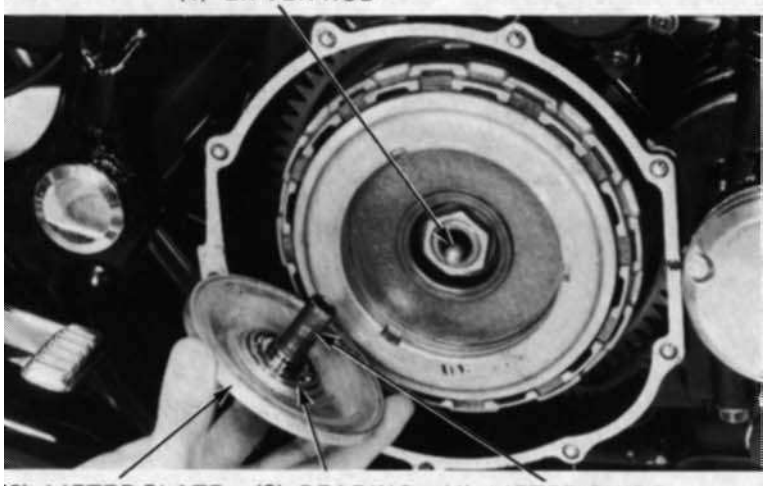
TORQUE: 75-85 Nm
(7.5-8.5 kg.m, 54-61 ft.lb)



(1) LOCK NUT WRENCH 17 x 27 mm
07716–0020300

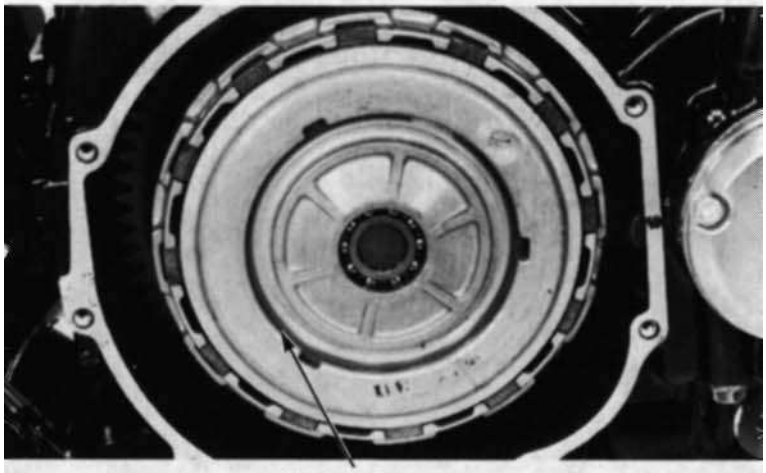
Install the clutch lifter rod. Install the clutch lifter plate, lifter guide and bearing.

NOTE:
Before installing the lifter plate, release the clutch lever by removing the string.



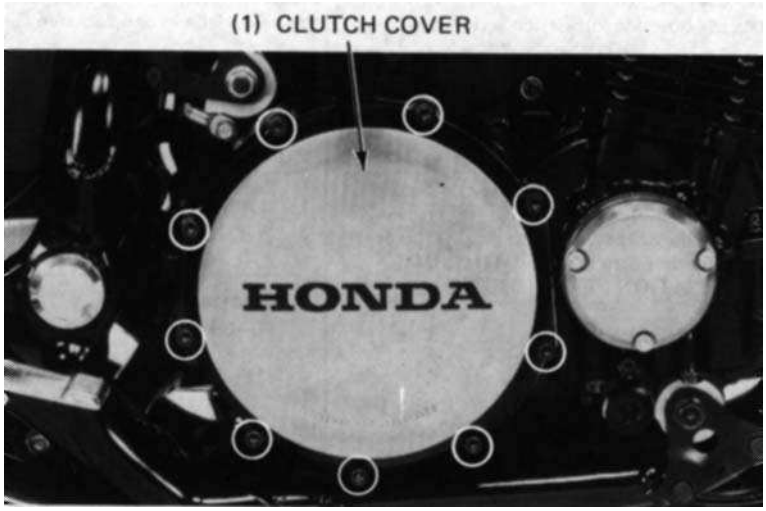
(2) LIFTER PLATE (3) BEARING (4) LIFTER GUIDE

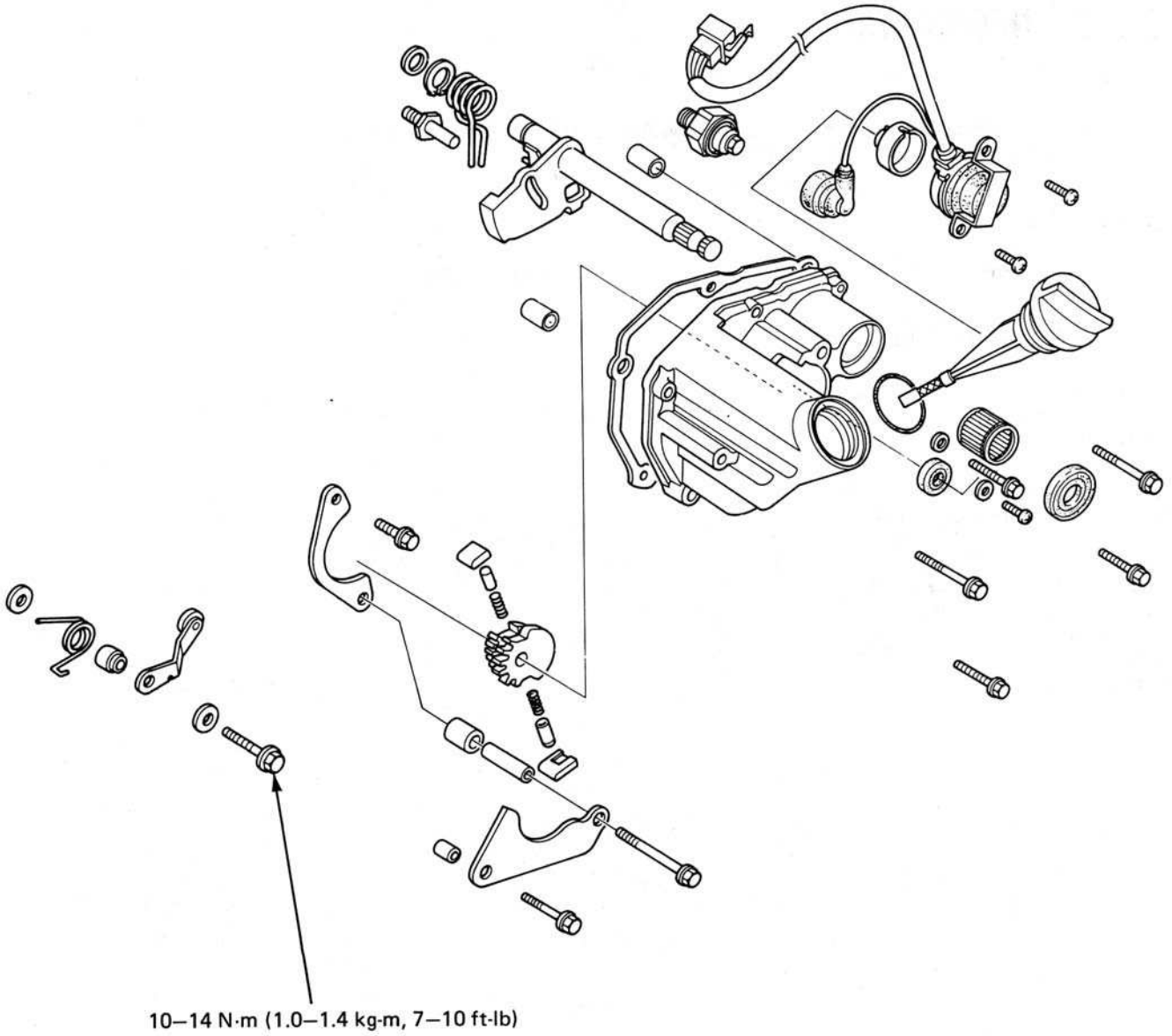
Install the snap ring.



(1) SNAP RING

Install the clutch cover with a new gasket. Fill the crankcase with the recommended oil (page 2-3).




10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

SERVICE INFORMATION

GENERAL

- If the shift forks, drum and transmission require servicing, remove the engine and separate the crankcase.
- For neutral switch inspection, see page 19-3

TORQUE VALUE

Stopper arm pivot bolt	10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)

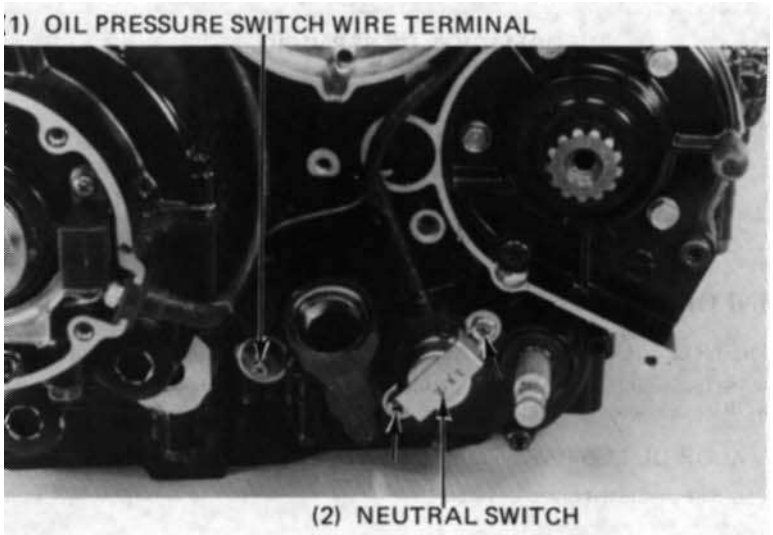
TROUBLE SHOOTING

Hard to shift
1. Improper clutch operation
2. Shift forks bent
3. Shift shaft bent
4. Shift claw bent
5. Shift drum cam grooves damaged

Transmission jumps out of gear
1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper broken
4. Shift forks bent

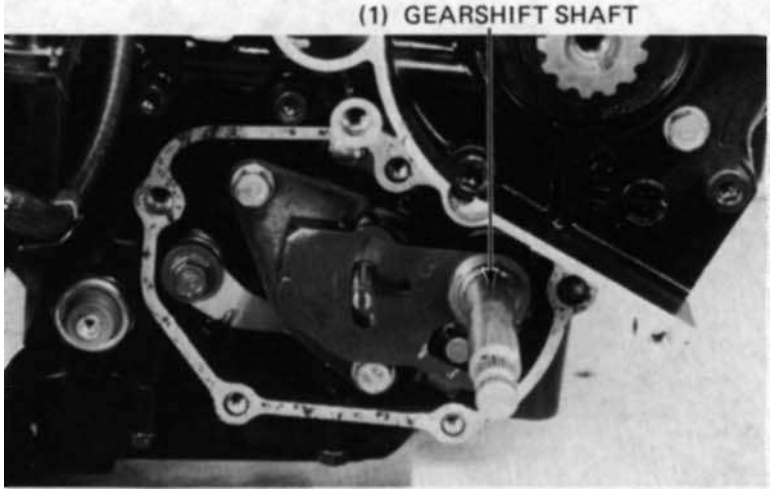
GEAR SHIFT LINKAGE REMOVAL

Slip the rubber cover off the oil pressure switch and disconnect the switch wire by removing the terminal screw.
Remove the neutral switch by removing the two mounting screws.
Remove the neutral switch joint.

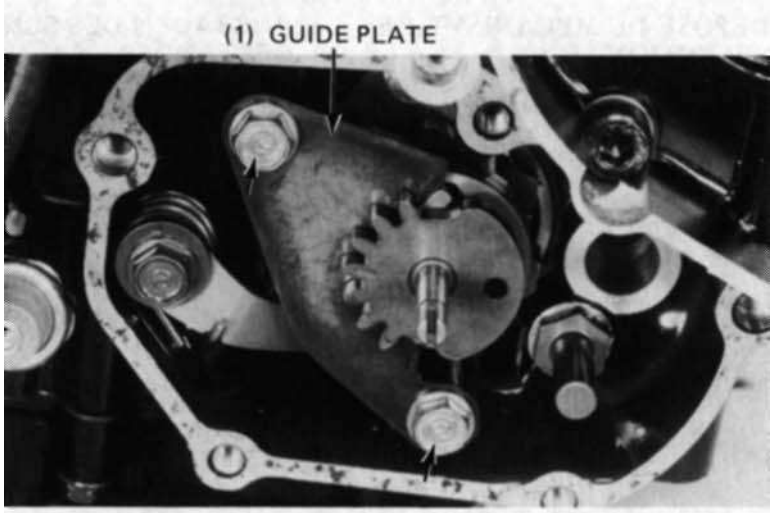


Remove the gear shift linkage cover by removing the five socket bolts.
Remove the dowel pins and gasket.

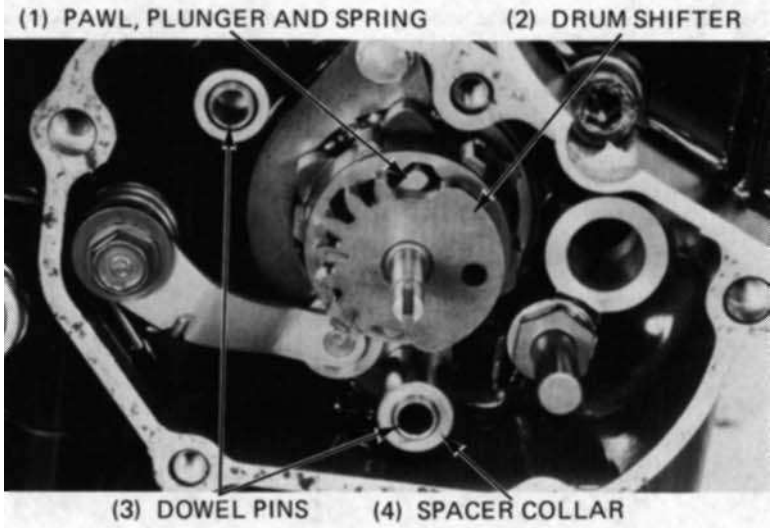
Remove the gear shift shaft.



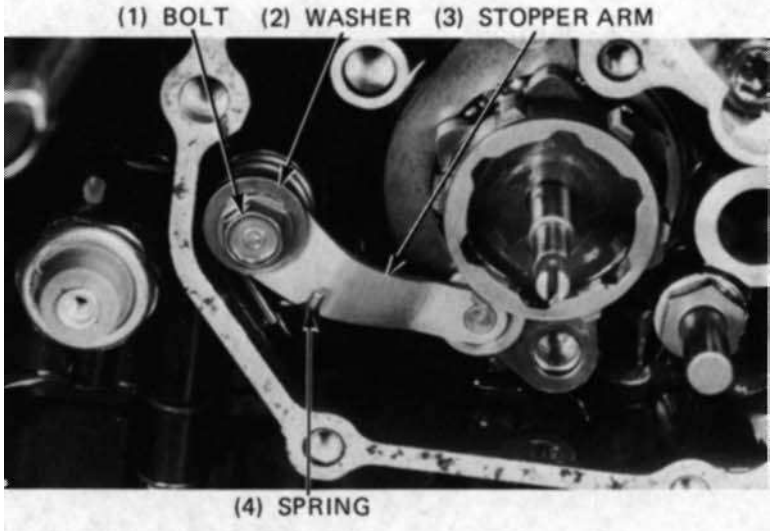
Remove the guide plate.



Remove the guide plate spacer collar and dowel pins.
Remove the drum shifter with the pawls, plungers and springs.

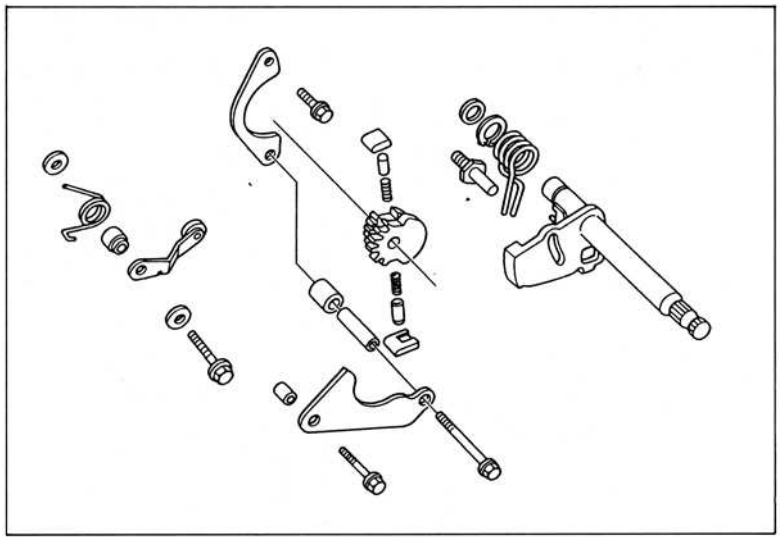


Remove the stopper arm bolt, washers, arm, collar and spring.



INSPECTION

Check the gear shift shaft, drum shifter, pawls, plungers and springs for wear and damage.

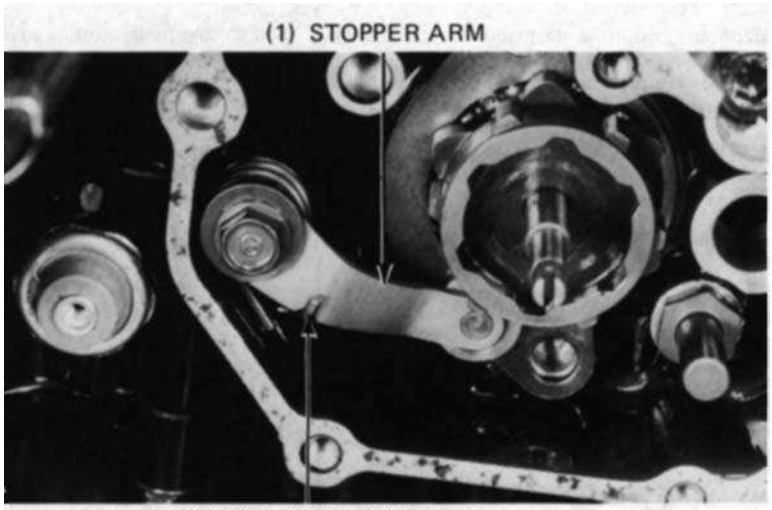


GEAR SHIFT LINKAGE INSTALLATION

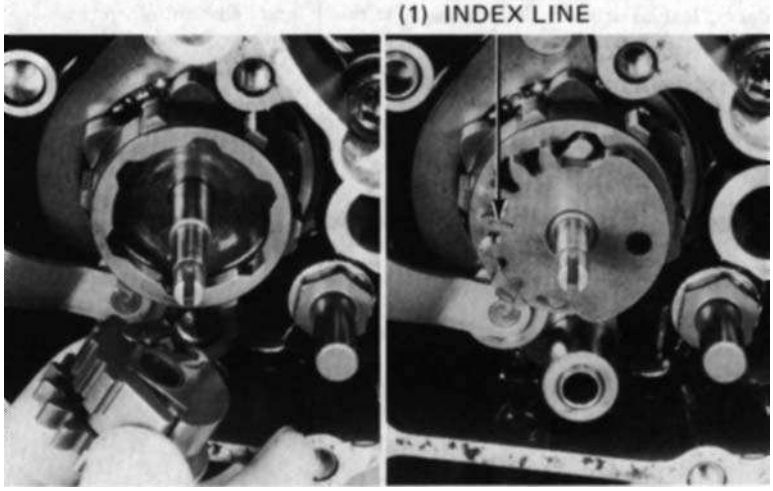
Install the washers, stopper arm, collar and return spring onto the bolt.

Temporarily install the stopper arm bolt and hook the spring to the stopper arm, then tighten the bolt.

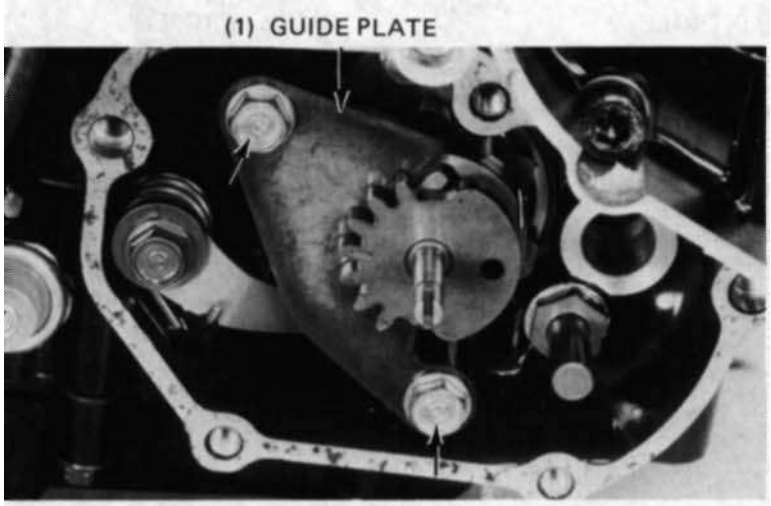
TORQUE: 10-14 Nm
(1.0-1.4 kg.m, 7-10 ft.lb)



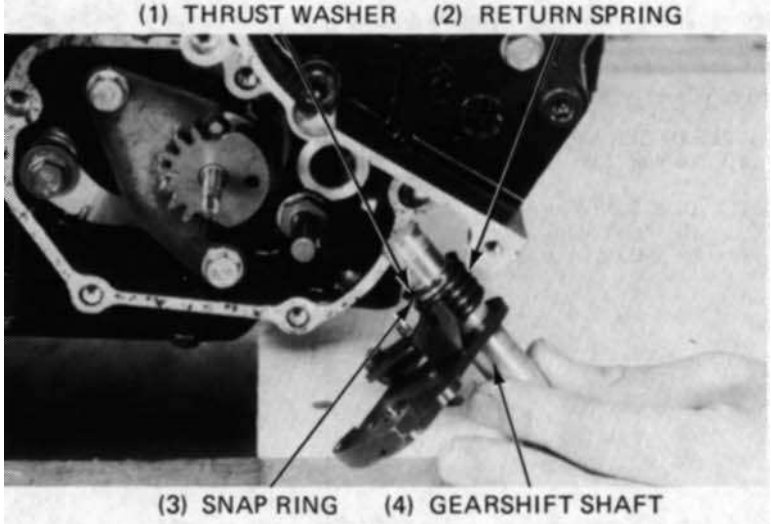
Install the springs, plungers and pawls to the drum shifter.
While holding the pawls, install the drum shifter assembly into the gear shift drum so that the index line on the shifter tooth faces forward as shown.
Install the guide plate dowel pins and spacer collar.



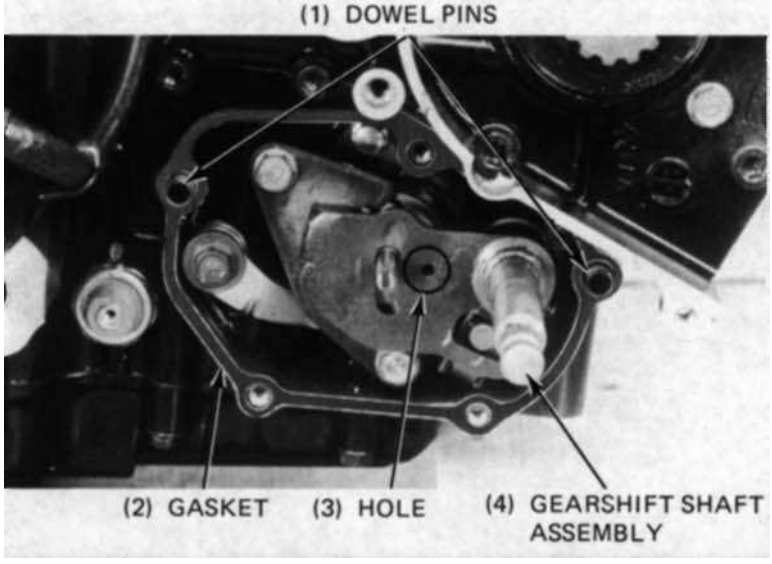
Install the guide plate.



Install the return spring, snap ring and thrust washer onto the gear shift shaft.

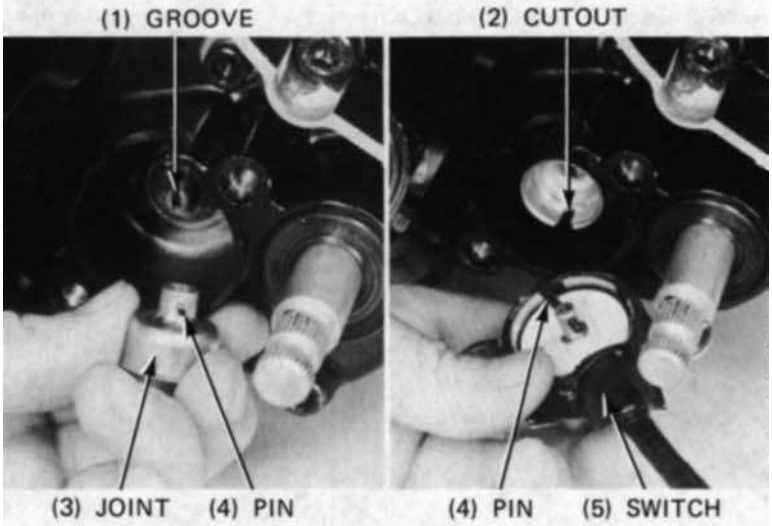


Aligning the holes in the gear shift shaft and drum shifter with a pin, install the gear shift shaft assembly as shown.
Install the dowel pins and a new gasket.

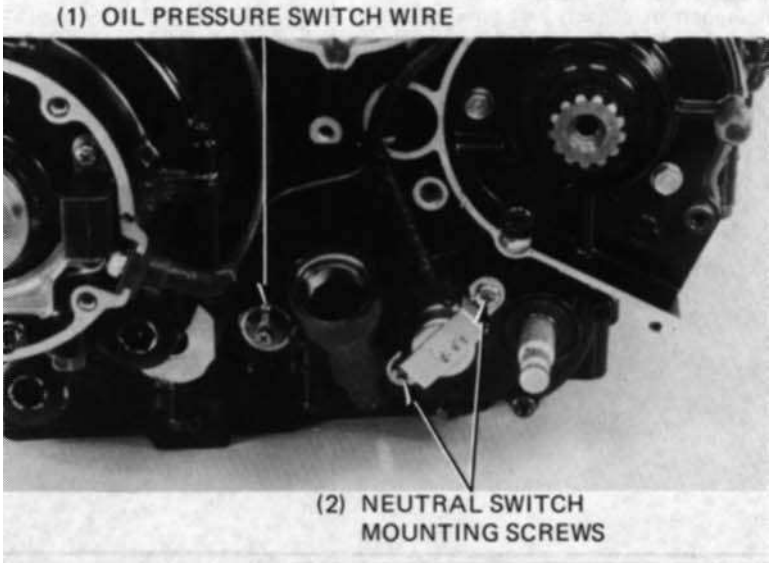


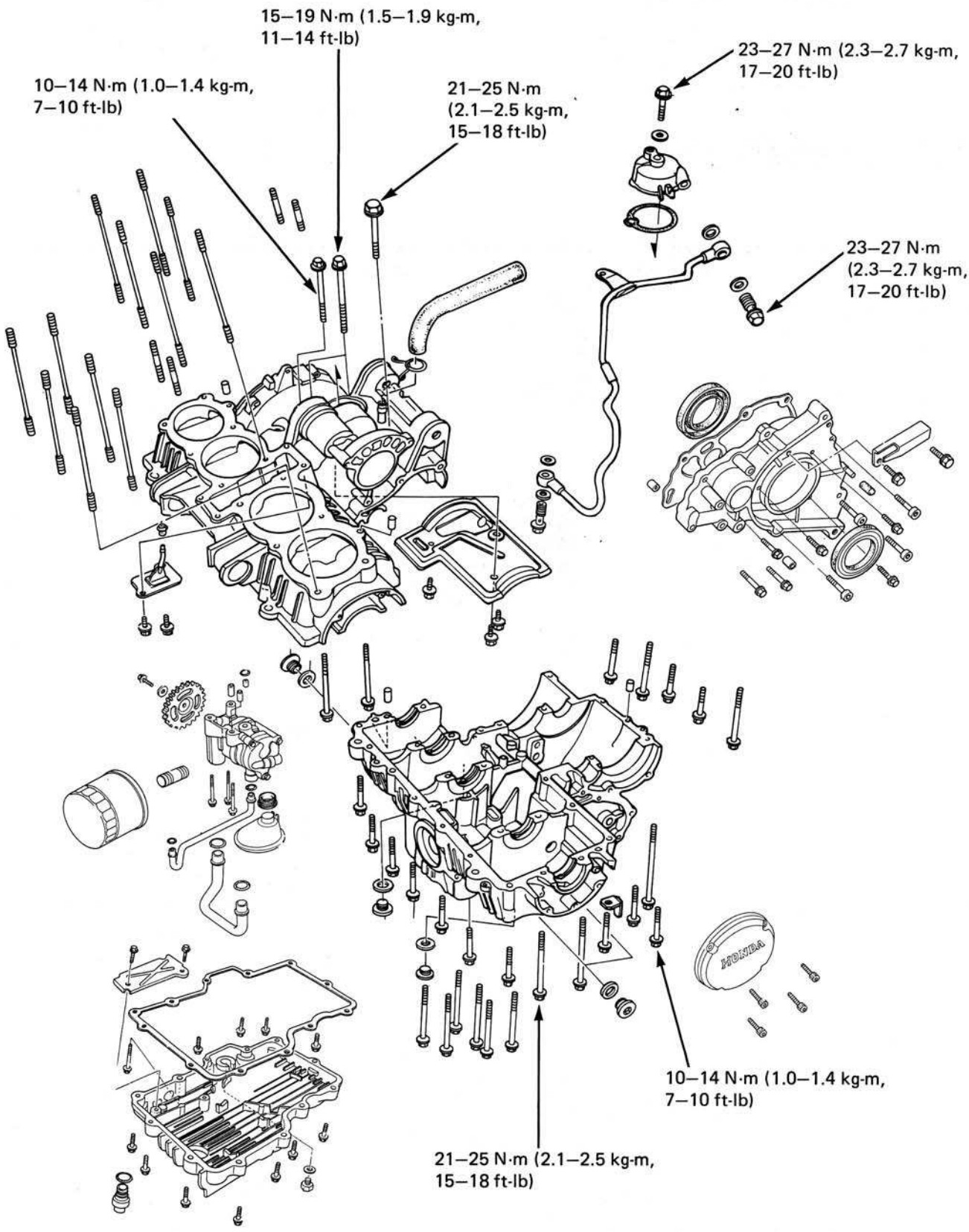
Install the gear shift linkage cover and tighten it with the five socket bolts.

Install the neutral switch joint, aligning the pin of the joint with the groove in the gear shift drum.
Install the neutral switch, aligning the pin of the switch with the cut out in the switch joint.



Secure the neutral switch with the two mounting screws.
Connect the oil pressure switch wire with the terminal screw.
Install the rubber cover over the oil pressure switch.




15–19 N·m (1.5–1.9 kg-m, 11–14 ft-lb)
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)
23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)
HONDA
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)

SERVICE INFORMATION

GENERAL

- To service the crankshaft, connecting rods, starter clutch and transmission, the crankcase halves must be separated.
- The following parts must be removed before disassembling the crankcase.

- Oil pump	Section 2
- Cylinder head	Section 6
- Cylinder/Pistons	Section 7
- Clutch	Section 8
- Alternator	Section 16
- Starter motor	Section 18

TORQUE VALUES

Crankcase	6 mm	10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)
	7 mm	15-19 Nm (1.5-1.9 kg.m, 11-14 ft.lb)
	8 mm	21-25 Nm (2.1-2.5 kg.m, 15-18 ft.lb)
Counter shaft bearing cover		21-25 Nm (2.1-2.5 kg.m, 15-18 ft.lb)
Pulse rotor		30-40 Nm (3.0-4.0 kg.m, 22-29 ft.lb)
Air separator cover		23-27 Nm (2.3-2.7 kg.m, 17-20 ft.lb)
Oil bolt	10 mm	23-27 Nm (2.3-2.7 kg.m, 17-20 ft.lb)

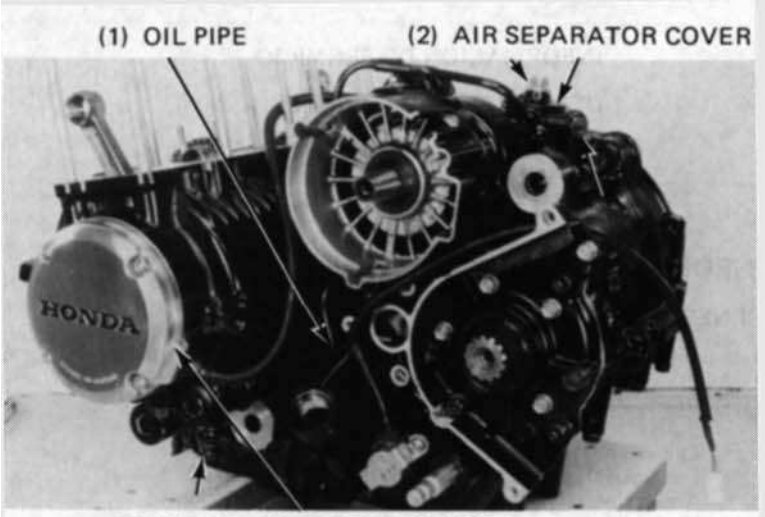
TOOL

Special

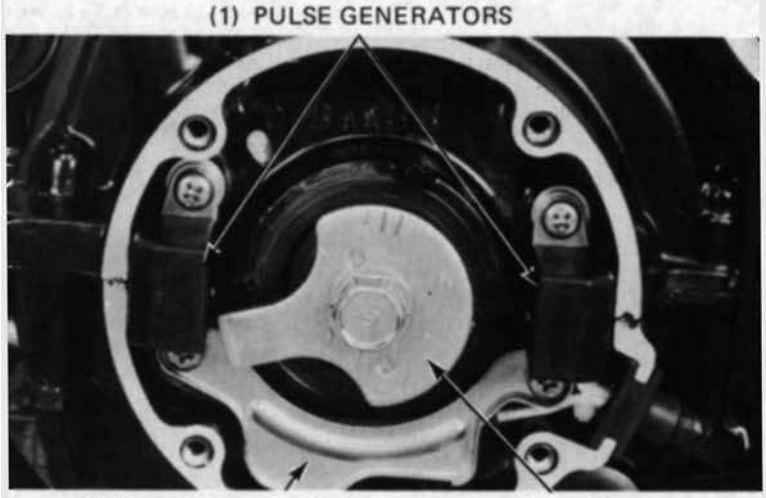
Crankcase assembly pin (2 required)	07973-ME50000

CRANKCASE DISASSEMBLY

Remove the engine (section 5)
Refer to Service Information (page 10-1) for removal of necessary parts before disassembling the crankcase.
Remove the oil bolts and the oil pipe from the crankcase.
Remove the special bolt and the air separator cover.
Remove the pulse generator cover.

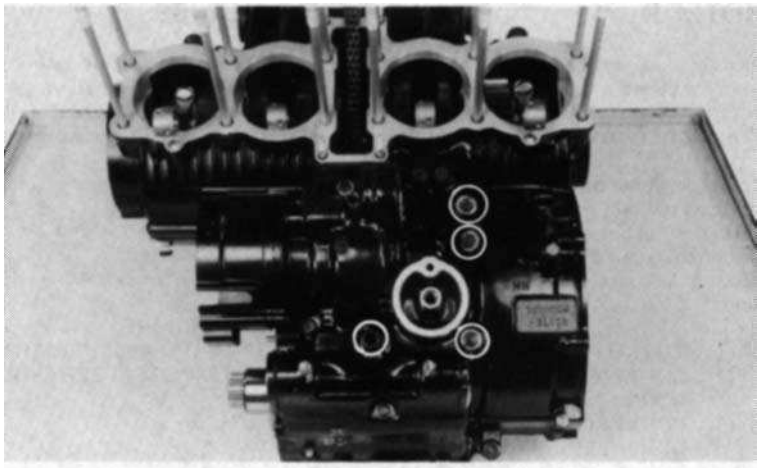


Remove the pulse generator rotor, pulse generators and wire protector cover.



Remove the countershaft bearing cover.

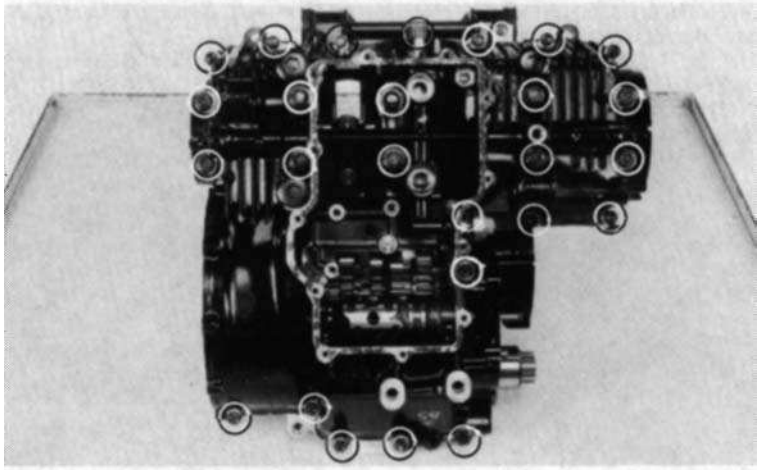
Remove the four upper crankcase bolts.



Turn the engine over.
Remove the fifteen 6 mm and eleven 8 mm lower crankcase bolts.

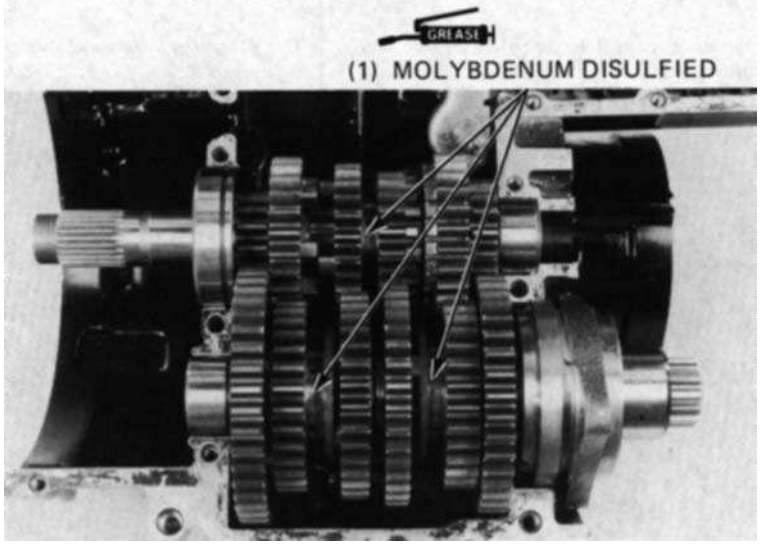
CAUTION
Loosen the bolts in 2-3 steps in a criss-cross pattern to prevent distorting the crankcase.

Separate the crankcase.



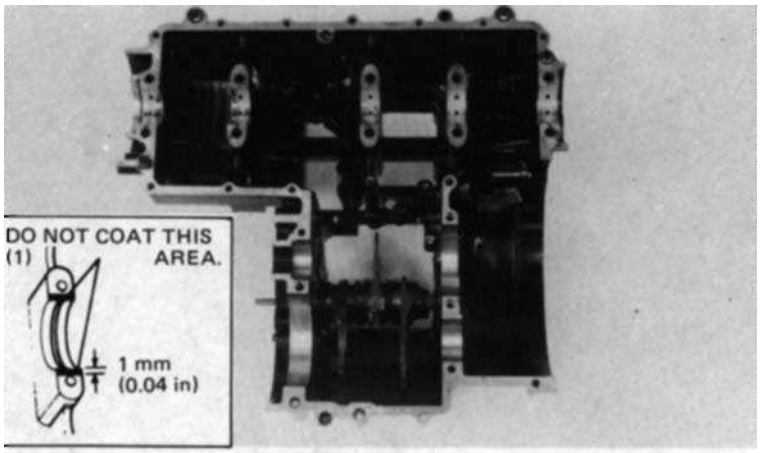
CRANKCASE ASSEMBLY

Apply molybdenum disulphide grease to the shift fork grooves and the crankshaft main bearings.



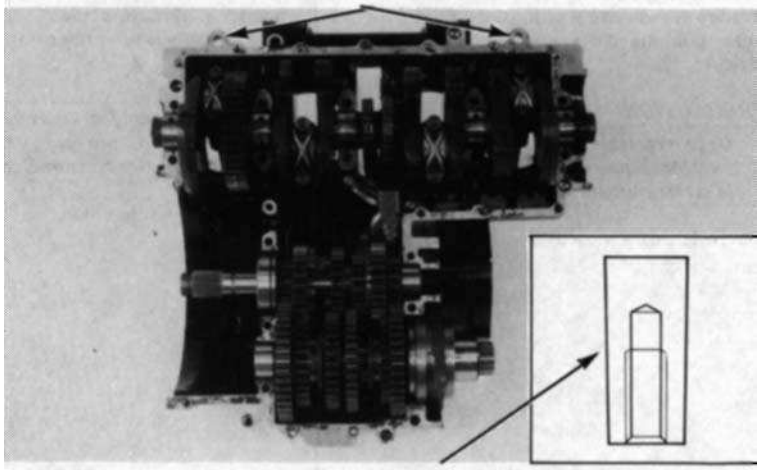
Clean the crankcase mating surfaces and apply liquid sealant to the mating surface of the lower crankcase

CAUTION
Do not apply sealant to the areas near the main bearings and tapered holes.



(1) TAPER HOLES

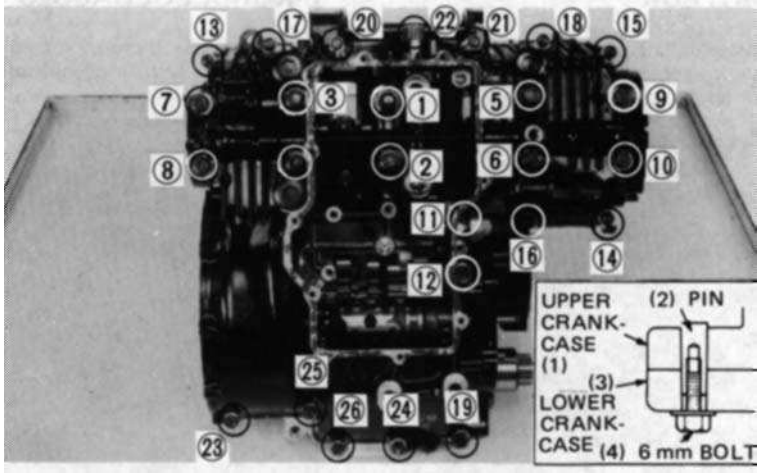
Install two crankcase assembly pins (09793-ME50000) into the upper crankcase taper holes.
Shift the gear shift linkage into neutral for easier assembly, if the gear shift linkage is installed in the lower crankcase.
Install the lower crankcase over the upper crankcase, aligning the shift fork cawls with the shift fork grooves.



(2) CRANKCASE ASSEMBLY PIN
07973–ME50000

NOTE:
Clean the thread and seating surface of the bolts and the thread in te crankcase with a degreasing agent before installing the 8 mm crankcase bolts.

Tighten the crankcase assembly pins with 6 x 15 mm bolts.
Tighten the lower crankcase bolts shown in 2-3 steps.



TORQUE:
8 mm BOLTS:
21-25 Nm (2.1-2.5 kg.m, 15-18 ft.lb)

6 mm BOLTS:
10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)

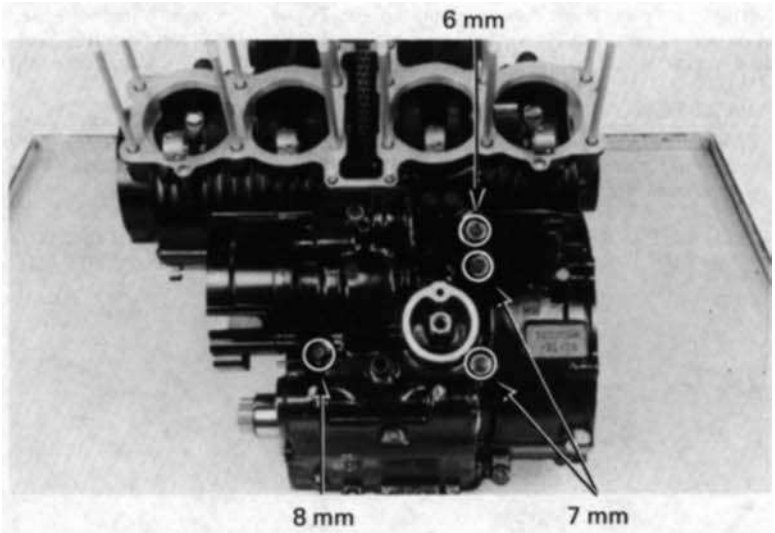
Loosen the 6 x 15 mm bolts several turns and tap the bolt heads with a hammer.
Remove the bolts and pins.

Turn the engine over and tighten the upper crankcase bolts.

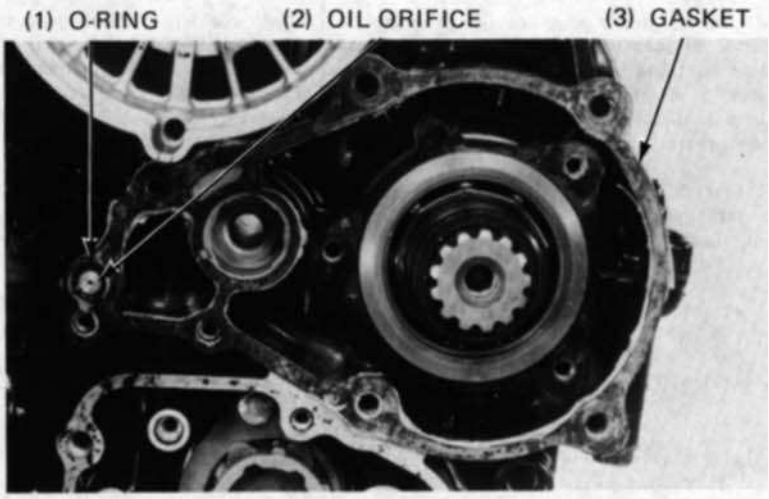
TORQUE:
6 mm BOLT:
10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)

7 mm Bolt:
15-19 Nm (1.5-1.9 kg.m, 11-14 ft.lb)

8 mm BOLT:
21-25 NNm (2.1-2.5 kg.m, 15-18 ft.lb)



Apply sealant to 10-15 mm (0.4-0.6 in) width on the crankcase mating surface area of the counter-shaft bearing cover gasket surface and install a new cover gasket.
Install the oil orifice and O-ring.



Apply thread lock agent to the threads of the 8 mm countershaft bearing cover bolts and install the cover and bolts.
Tighten the 6 mm special bolt first, then tighten the 8 mm and 6 mm bolts.

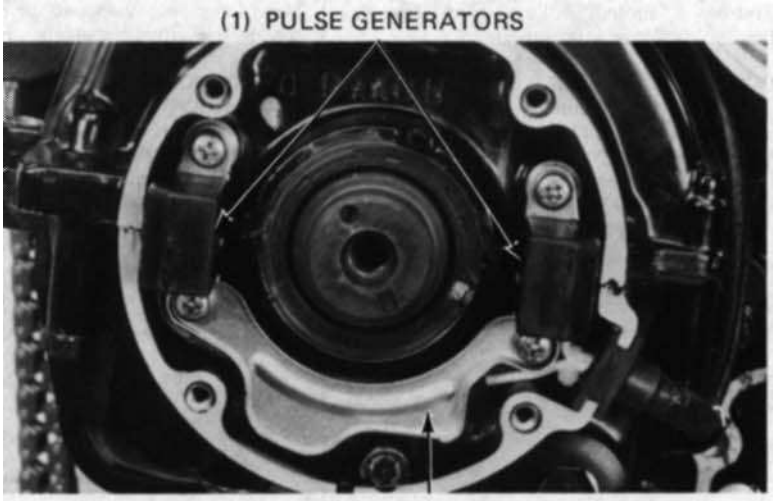
TORQUE:

8 mm BOLTS:
21-25 Nm (2.1-2.5 kg.m, 15-18 ft.lb)

6 mm BOLTS:
10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)

CAUTION
If the crankcase is serviced with the neutral switch installed, be careful not to bind the switch harness.

Install the pulse generators and wire protector cover.

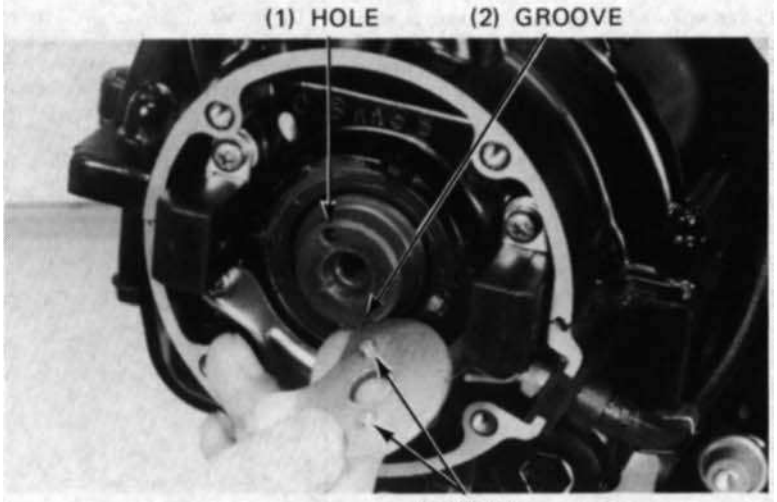


Install the pulse generator rotor, aligning the pins with the hole and groove in the crankshaft.

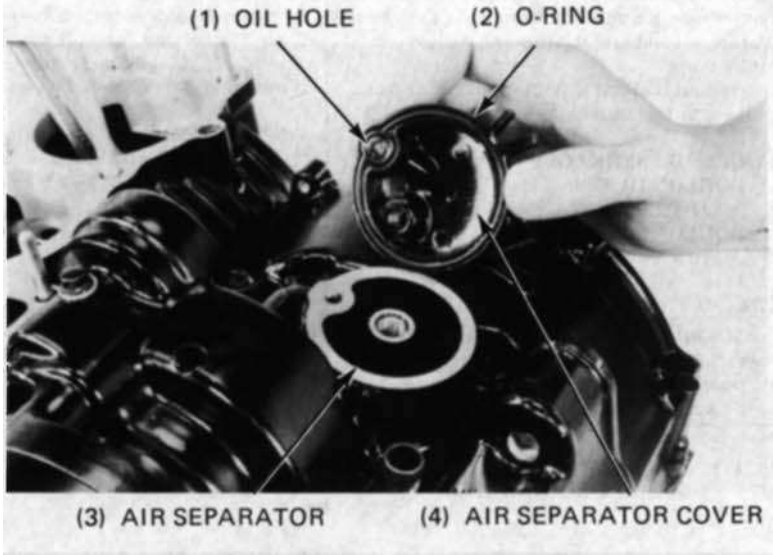
TORQUE:
30-40 Nm (3.0-4.0 kg.m, 22-29 ft.lb)

NOTE:
The rotor bolt cannot be installed if the rotor is installed in the opposite direction.

Install the pulse generator cover.



Blow the oil hole in the air separator cover with compressed air.
Make sure that the O-ring on the air separator cover is in good condition and install the cover on the upper crankcase.



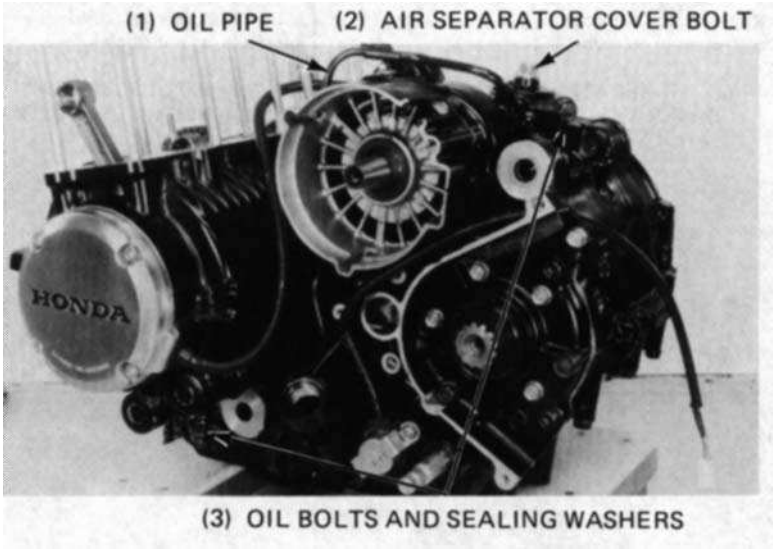
Tighten the air separator cover bolts.

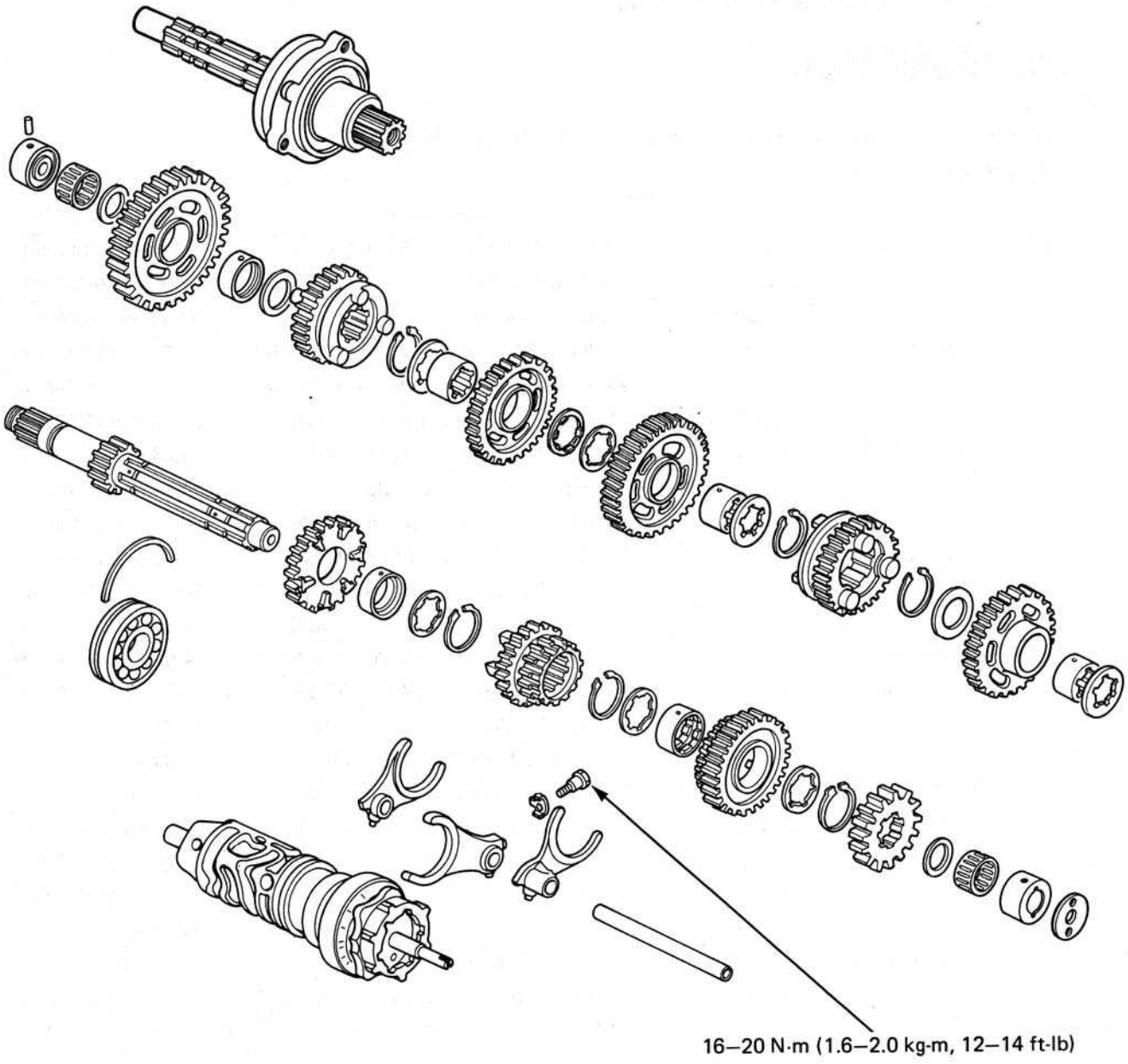
TORQUE:
23-27 Nm (2.3-2.7 kg.m, 17-20 ft.lb)

Blow the oil pipe and the oil bolts with compressed air.
Install the oil pipe with the oil bolts and sealing washers and tighten the oil bolts.

TORQUE:
23-27 Nm (2.3-2.7 kg.m, 17-20 ft.lb)

Install the removed parts.
Install the engine (section 5).




16–20 N·m (1.6–2.0 kg·m, 12–14 ft·lb)

SERVICE INFORMATION

GENERAL

For internal transmission repairs, the crankcase must be separated (Section 10)

SPECIFICATIONS

			STANDARD	SERVICE LIMITS
Transmission	Backlash	1st, 2nd	0.095-0.190 mm (0.0037-0.0075 in)	0.20 mm (0.008 in)
		3rd	0.094-0.188 mm (0.0037-0.0074 in)	0.19 mm (0.007 in)
		4th, 5th, 6th	0.068-0.136 mm (0.0027-0.0054 in)	0.14 mm (0.006 in)
	Gear I.D.	M5, M6	28.000-28.021 mm (1.1024-1.1032 in)	28.04 mm (1.104 in)
		C1	24.000-24.021 mm (0.9449-0.9457 in)	24.04 mm (0.946 in)
		C2, C3, C4	31.000-31.025 mm (1.2205-1,2215 in)	31.04mm (1.222 in)
	Gear Bushing O.D.	M5, M6	27.959-27.980 mm (1.1007-1.1016 in)	27.94 mm (1.100 in)
		C1	23.959-23.980 mm (0.9433-0.9441 in)	23.94 mm (0.943 in)
		C2, C3, C4	30.950-30.975 mm (1.2185-1.2195 in)	30.93 mm (1.218 in)
	Gear Bushing I.D.	M5	24.985-25.006 mm (0.9837-0.9845 in)	25.03 mm (0.985 in)
		C1	20.016-20.037 mm (0.7880-0.7889 in)	20.06 mm (0.790 in)
		C2	27.985-28.006 mm (1.1018-1.1026 in)	28.03 mm (1.104 in)
	Mainshaft O.D.	at M5	24.959-24.980 mm (0.9826-0.9835 in)	24.94 mm (0.982 in)
	Countershaft O.D.	at C1	19.987-20.000 mm (0.7869-0.7874 in)	19.97 mm (0.786 in)
		at C2	27.967-27.980 mm (1.1011-1.1016 in)	27.94 mm (1.100 in)
	Gear-to-bushing clearance	M5, M6	0.020-0.062 mm (0.0008-0.0024 in)	0.10 mm (0.004 in)
		C1	0.020-0.062 mm (0.0008-0.0024 in)	0.10 mm (0.004 in)
		C2, C3, C4	0.025-0.075 mm (0.0010-0.0030 in)	0.11 mm (0.004 in)
	Bushing-to-shaft clearance	M5	0.005-0.047 mm (0.002-0.0019 in)	0.08 mm (0.003 in)
		C1	0.016-0.050 mm (0.0006-0.0020 in)	0.09 mm (0.004 in)
		C2	0.005-0.039 mm (0.0002-0.0015 in)	0.08 mm (0.003 in)
Shift Fork	Claw thickness		6.43-6.50 mm (0,253-0.256 in)	6.1 mm (0.24 in)
	I.D.	Left and right	14.000-14.021 mm (0.5512-0.5505 in)	14.04 mm (0.553 in)
Fork shaft	O.D.		13.966-13.984 mm (0.5498-0.5505 in)	13.90 mm (0.547 in)

TORQUE VALUE

Centre shift fork	16-20 Nm (1.6-2.0 kg.m, 12-14 ft.lb)

TOOLS

Common

Driver	07746-0030100
Attachment, I.D. 25 mm	07746-0030200

TROUBLESHOOTING

Hard to shift
1. Clutch slave cylinder sticking
2. Shift fork bent
3. Shift shaft bent
4. Shift claw bent
5. Shift drum cam grooves damaged

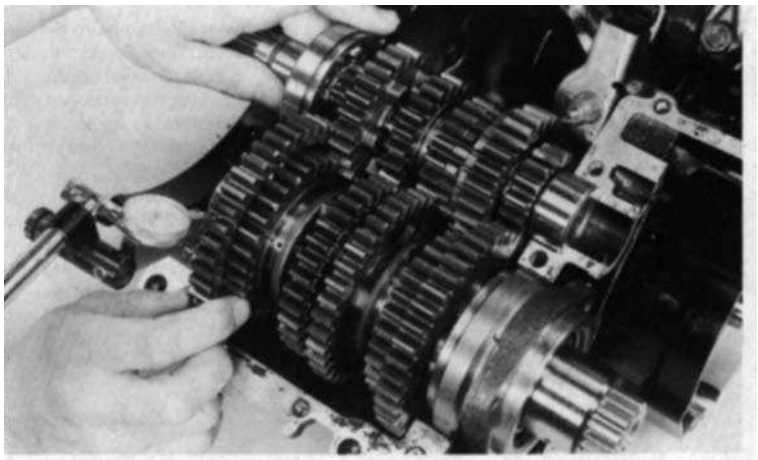
Transmission jumps out of gear
1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper bent
4. Shift forks bent

TRANSMISSION DISASSEMBLY

Separate the crankcase (Section 10)
Inspect the backlash of each gear

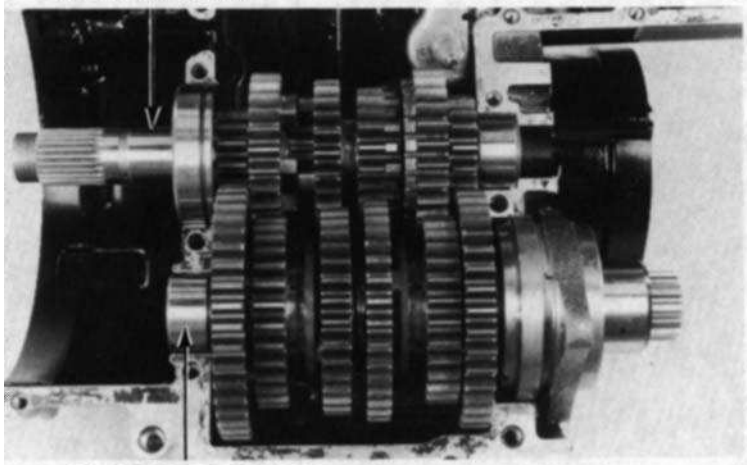
SERVICE LIMIT

1st, 2nd	**0.20 mm (0.008 in)**
3rd	**0.19 mm (0.007 in)**
4th, 5th, 6th	**0.14 mm (0.006 in)**



(1) MAINSHAFT

Remove and dissemble the mainshaft and countershaft

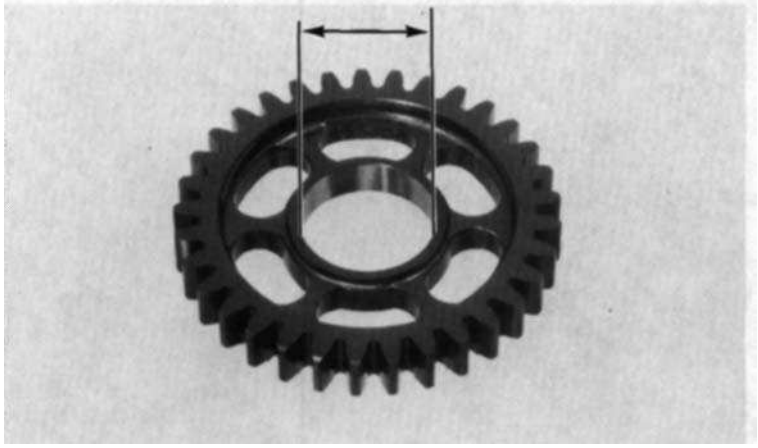


(2) COUNTERSHAFT

INSPECTION
Check the gear dogs, dog holes and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.
Measure the I.D. of each gear.

SERVICE LIMITS:

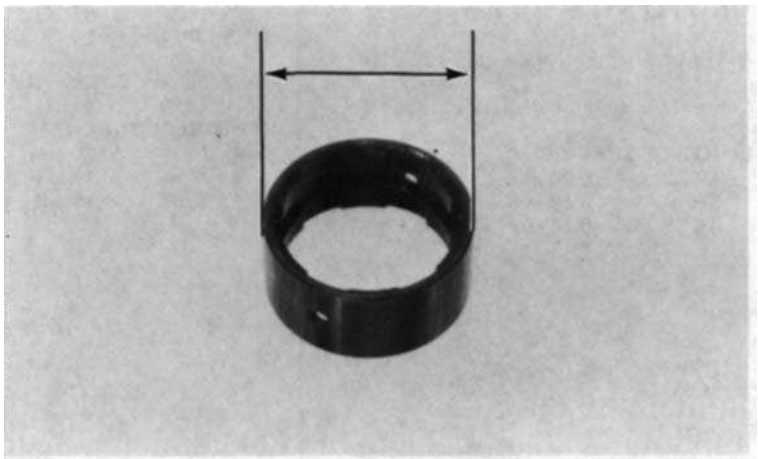
M5, M6	**28.04 mm (1.104 in)**
C1	**24.04 mm (0.946 in)**
C2, C3, C4	**31.04mm (1.222 in)**



Measure the O.D. of each gear bushing

SERVICE LIMITS:

M5, M6:	**27.94 mm (1.100 in)**
C1:	**23.94 mm (0.943 in)**
C2, C3, C4:	**30.93 mm (1.218 in)**



Calculate the clearance between the gear and bushing.

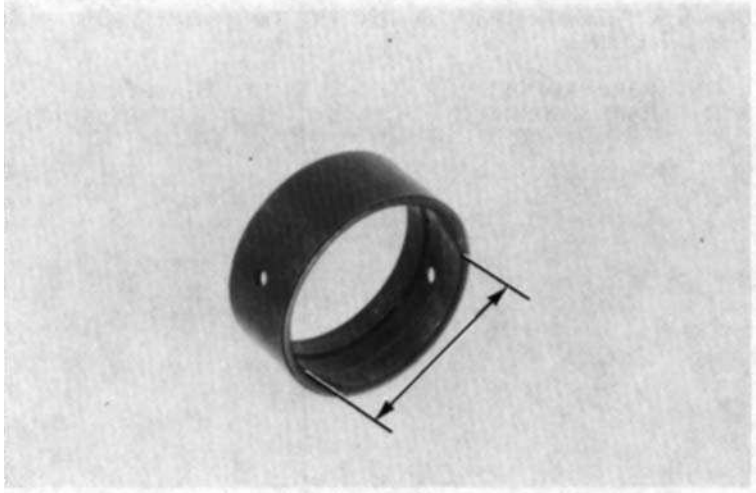
SERVICE LIMITS:

M5, M6:	**0.10 mm (0.004 in)**
C1:	**0.10 mm (0.004 in)**
C2, C3, C4:	**0.11 mm (0.004 in)**

Measure the I.D. of gear bushings.

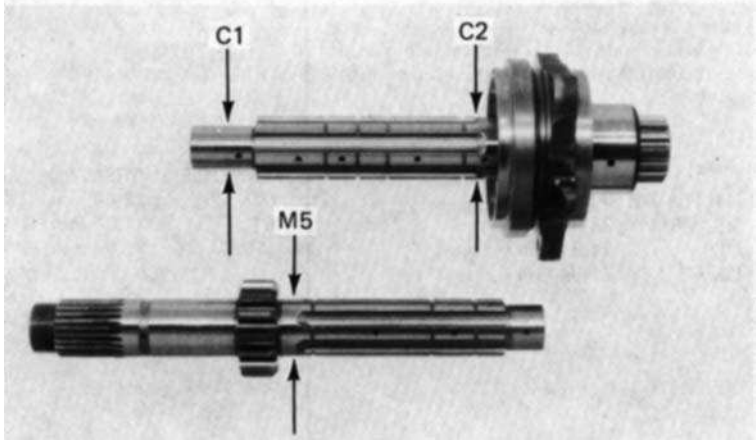
SERVICE LIMITS:

M5:	**25.03 mm (0.985 in)**
C1:	**20.06 mm (0.790 in)**
C2:	**28.03 mm (1.104 in)**



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

SERVICE LIMITS:
MAINSHAFT (at M5 bushing)
24.94 mm (0.982 in)
COUNTERSHAFT⊗at C1 bushing)
19.97 mm (0.786 in)
COUNTERSHAFT (at C2 bushing)
27.94 mm (1.100 in)

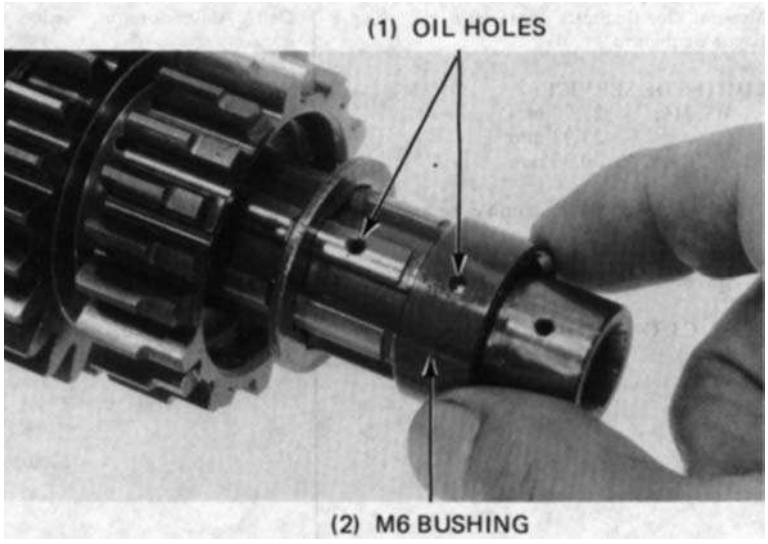


Calculate the clearance between the bushing and the shaft.

SERVICE LIMITS:

M5:	**0.08 mm (0.003 in)**
C1:	**0.09 mm (0.004 in)**
C2:	**0.08 mm (0.003 in)**

TRANSMISSION ASSEMBLY

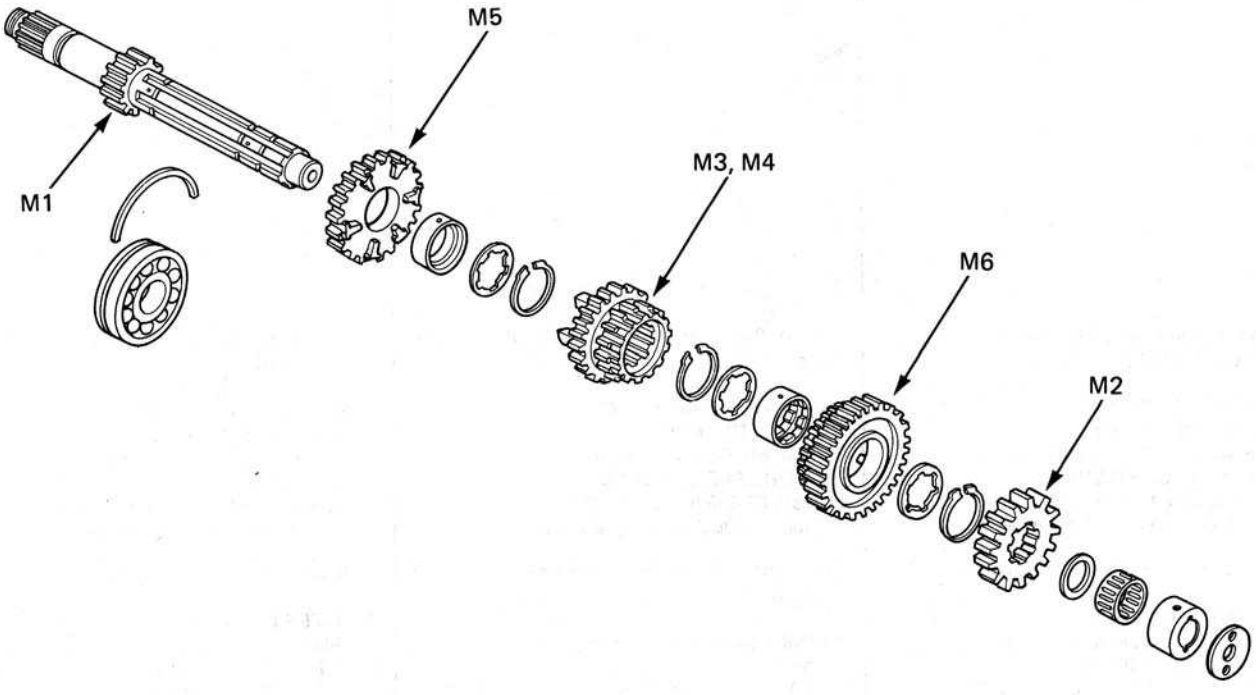


MAINSHAFT

When the mainshaft ball bearing was removed, drive a new bearing using driver (07746-0030100) and I.D. 25 mm attachment (07746-0030200).

Check the gears for freedom of movement or rotation on the shaft.
Check that the snap rings are seated on the grooves and align their end gaps with the lands on the splines.

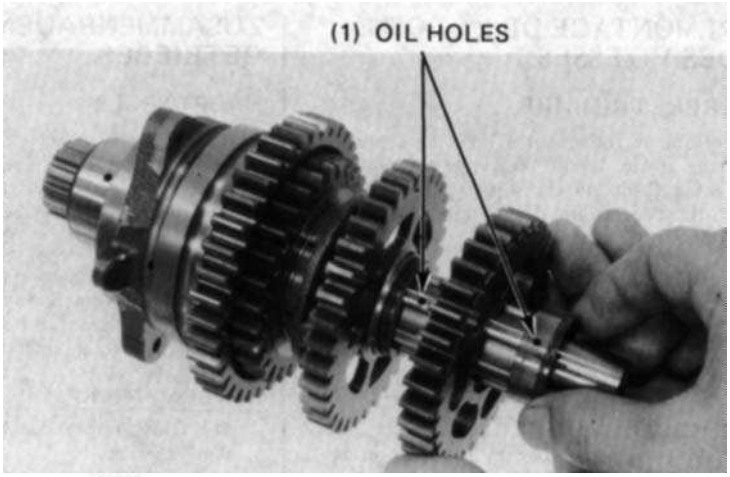
NOTE
Align the oil holes in the M6 bushing and the shaft.

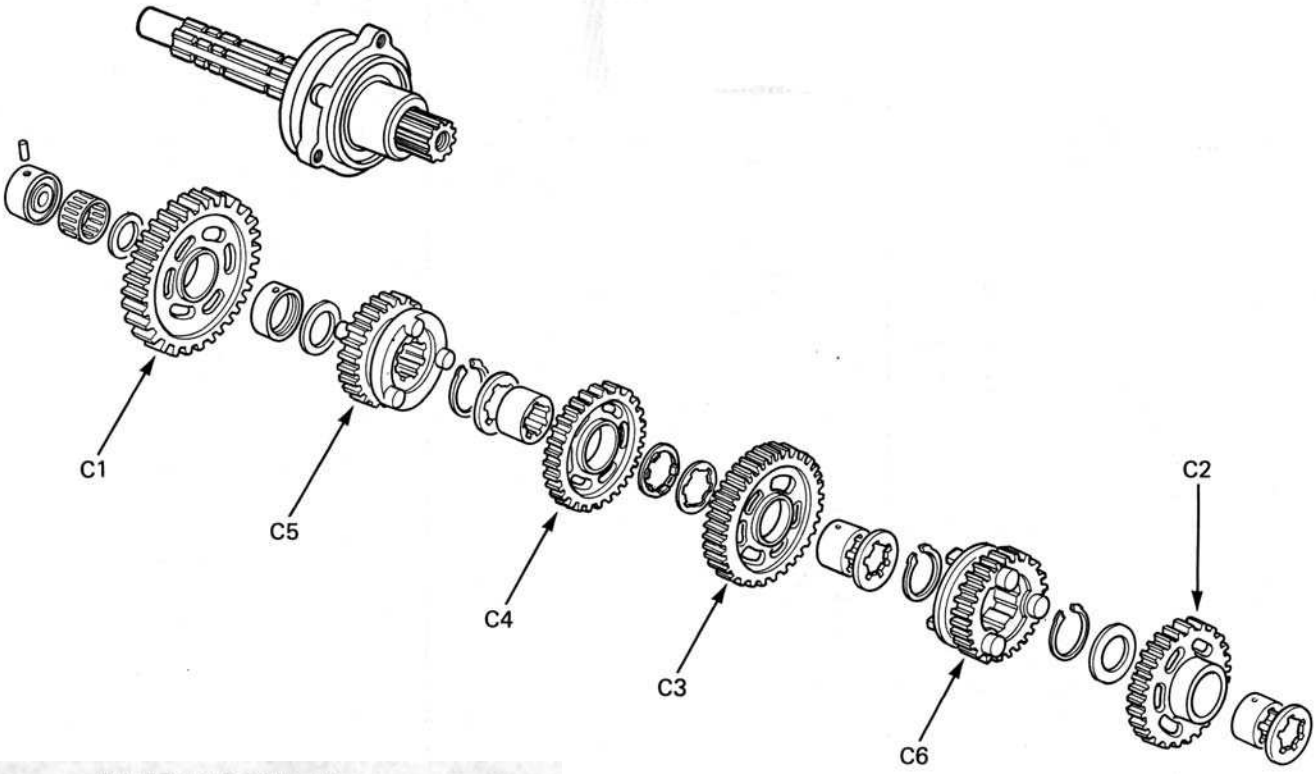


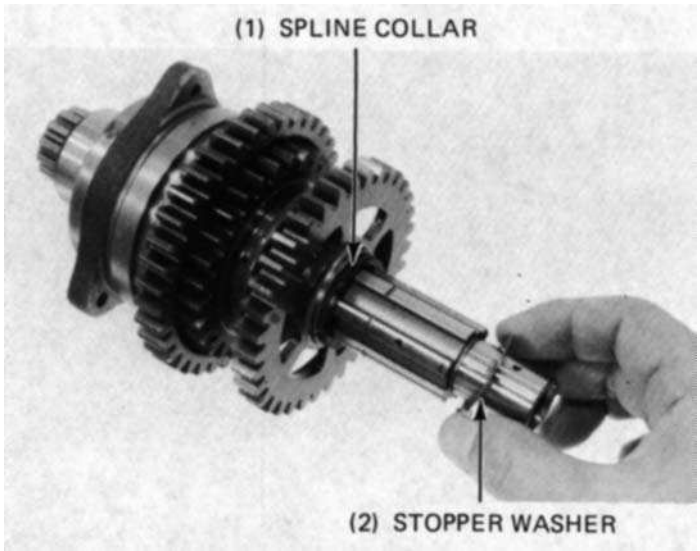
COUNTERSHAFT

Check the gear for freedom of movement or rotation on the shaft.
Check that the snap rings are seated in the grooves and align their ends with the lands of the splines.

NOTE
Align the oil holes in the C3 and C4 bushings, and the shaft.

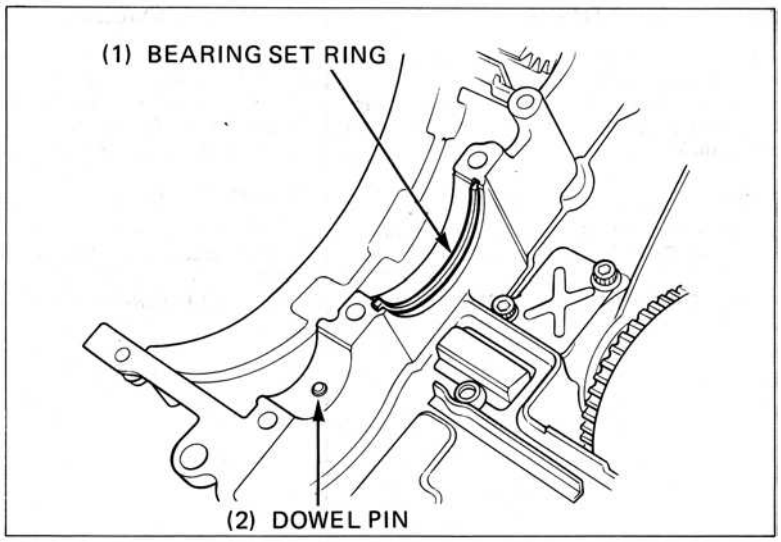




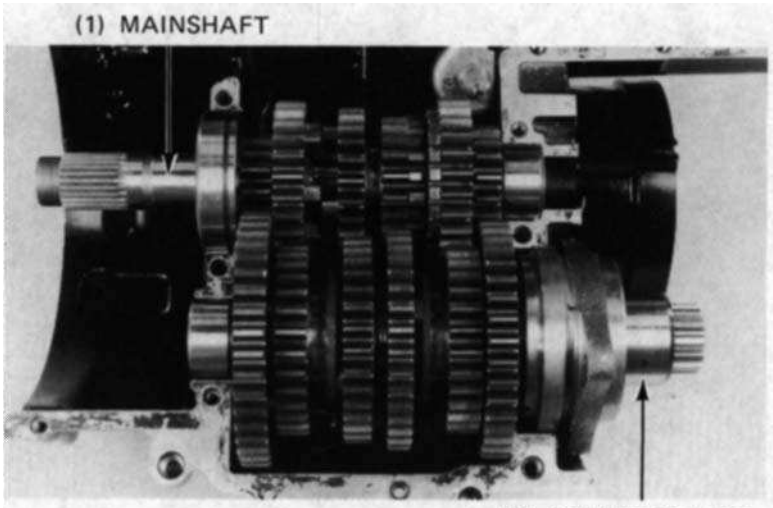


NOTE:
Install the stopper washer while aligning the tabs of the washer with the grooves in the spline collar.

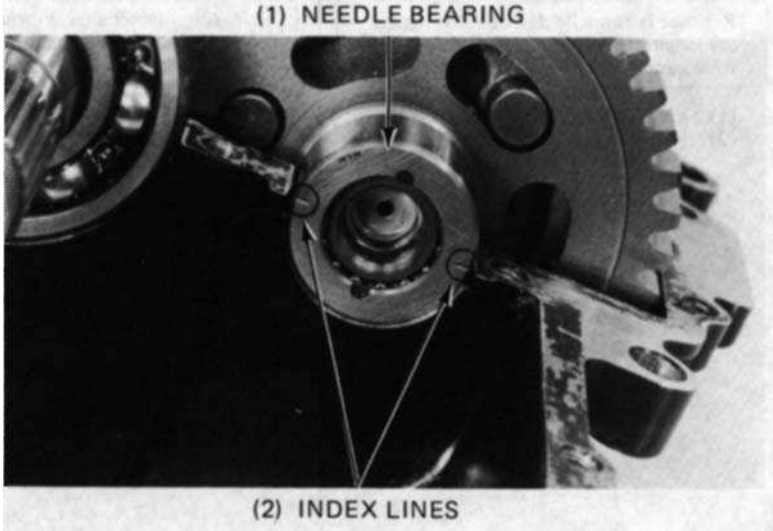
Install the mainshaft bearing set ring and countershaft bearing dowel pin into the upper crankcase.



Install the mainshaft, aligning the bearing grooves with the bearing set ring.
Install the countershaft.



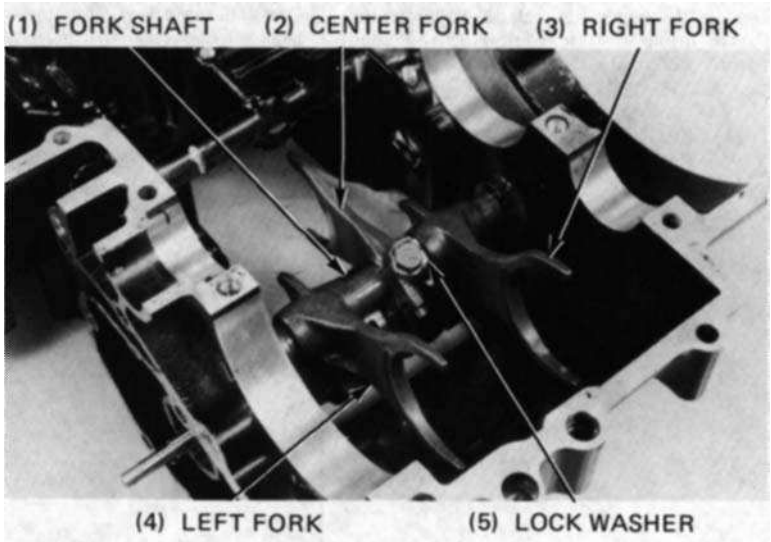
Align the index lines on the countershaft needle bearing with the crankcase mating surfaces to insert the dowel pin into the needle bearing hole.



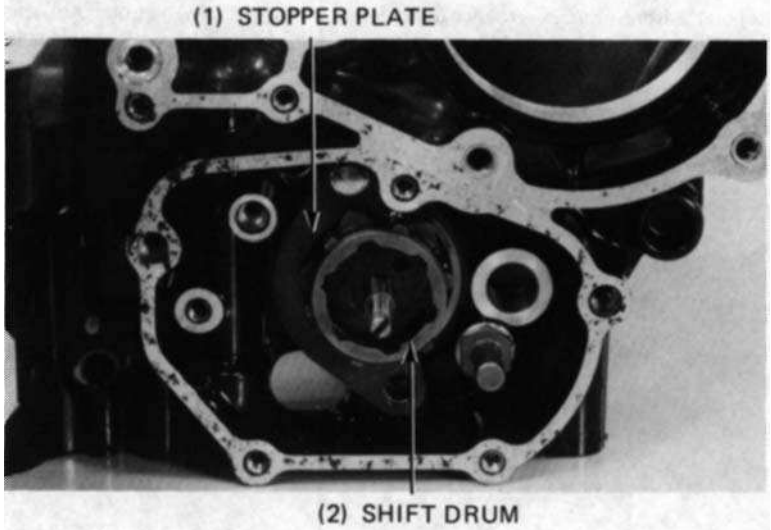
SHIFT FORK AND SHIFT DRUM

REMOVAL

Bend the lock washer tab down and remove the centre fork mounting bolt.
Remove the shift fork shafts and shift forks.

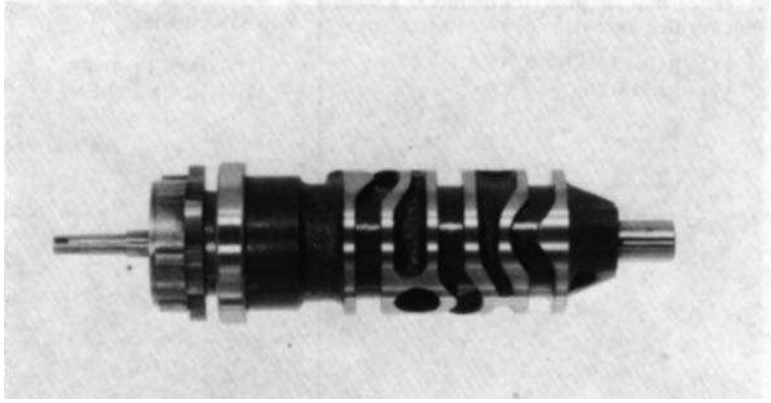


Remove the shift drum bearing stopper plate.
Remove the shift drum.

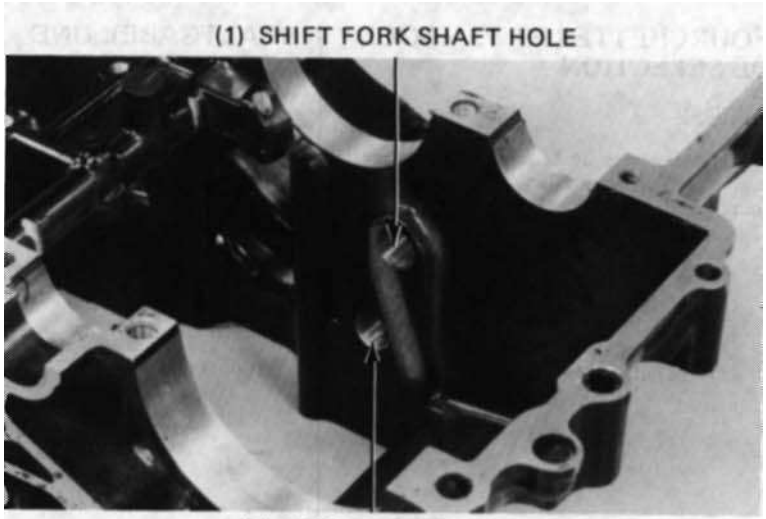


GEAR SHIFT DRUM AND SHIFT FORK INSPECTION

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

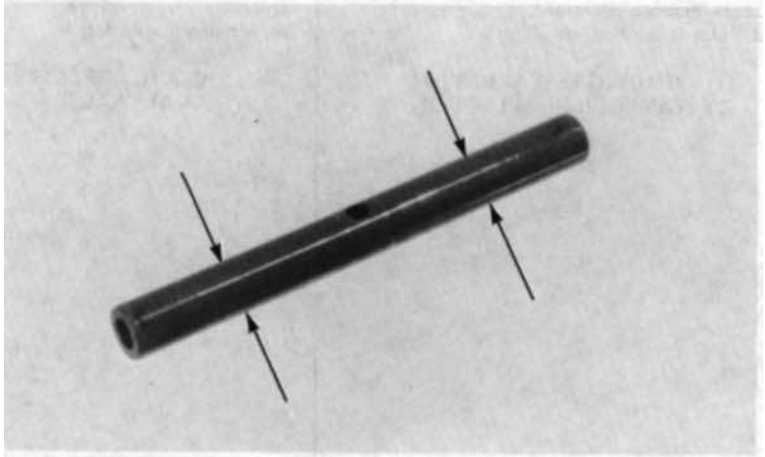


Inspect the shift drum and shift fork shaft holes for scoring or scratches.



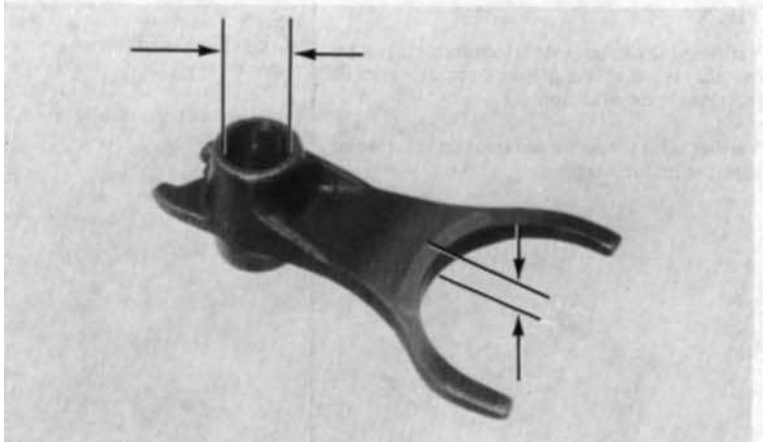
Measure the shift fork shaft O.D. where the shift forks move on the shaft.
Check for scratches, scoring or evidence of insufficient lubrication.

SERVICE LIMIT: 13.90 mm (0.547 in)



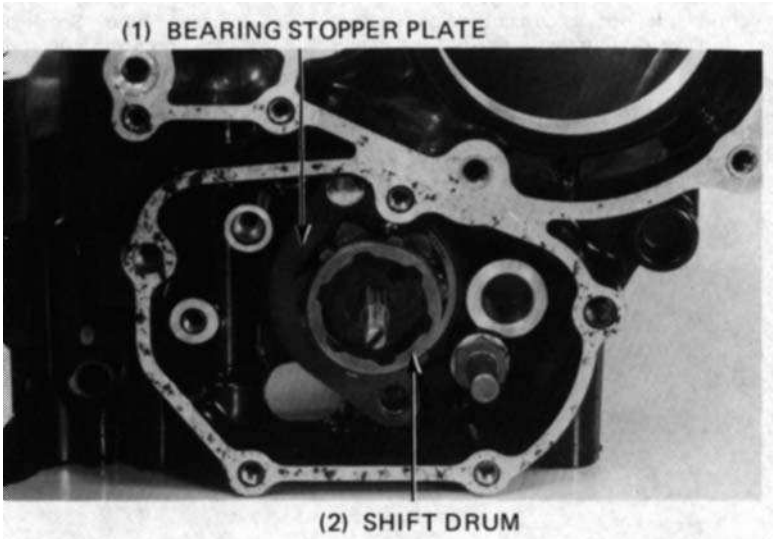
Measure the right and left shift fork I.D.
Measure the shift fork claw thickness.

SERVICE LIMITS:
I.D. (left and right fork): 14.04 mm (0.553 in)
CLAW THICKNESS: 6.1 mm (0.24 in)



INSTALLATION.

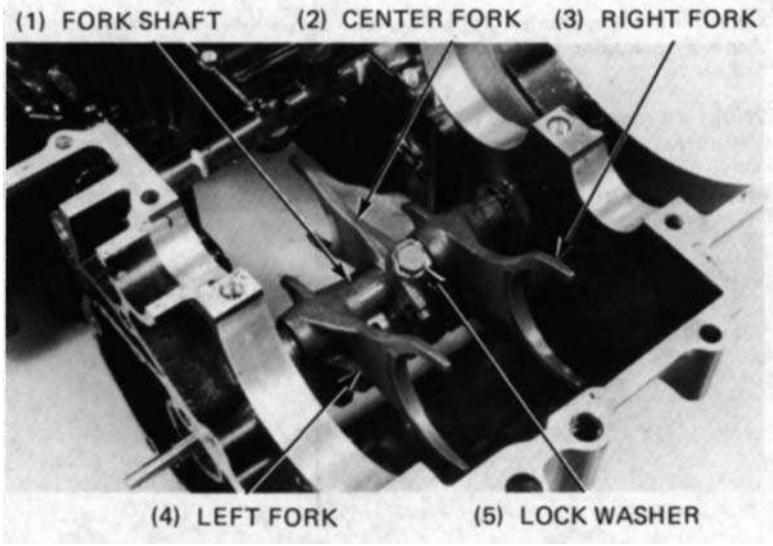
Install the shift drum.
Install the dowel pin into the lower bolt hole of the bearing stopper plate.
Apply locking agent to the stopper plate bolt threads and install the stopper plate.
Remove the dowel pin.

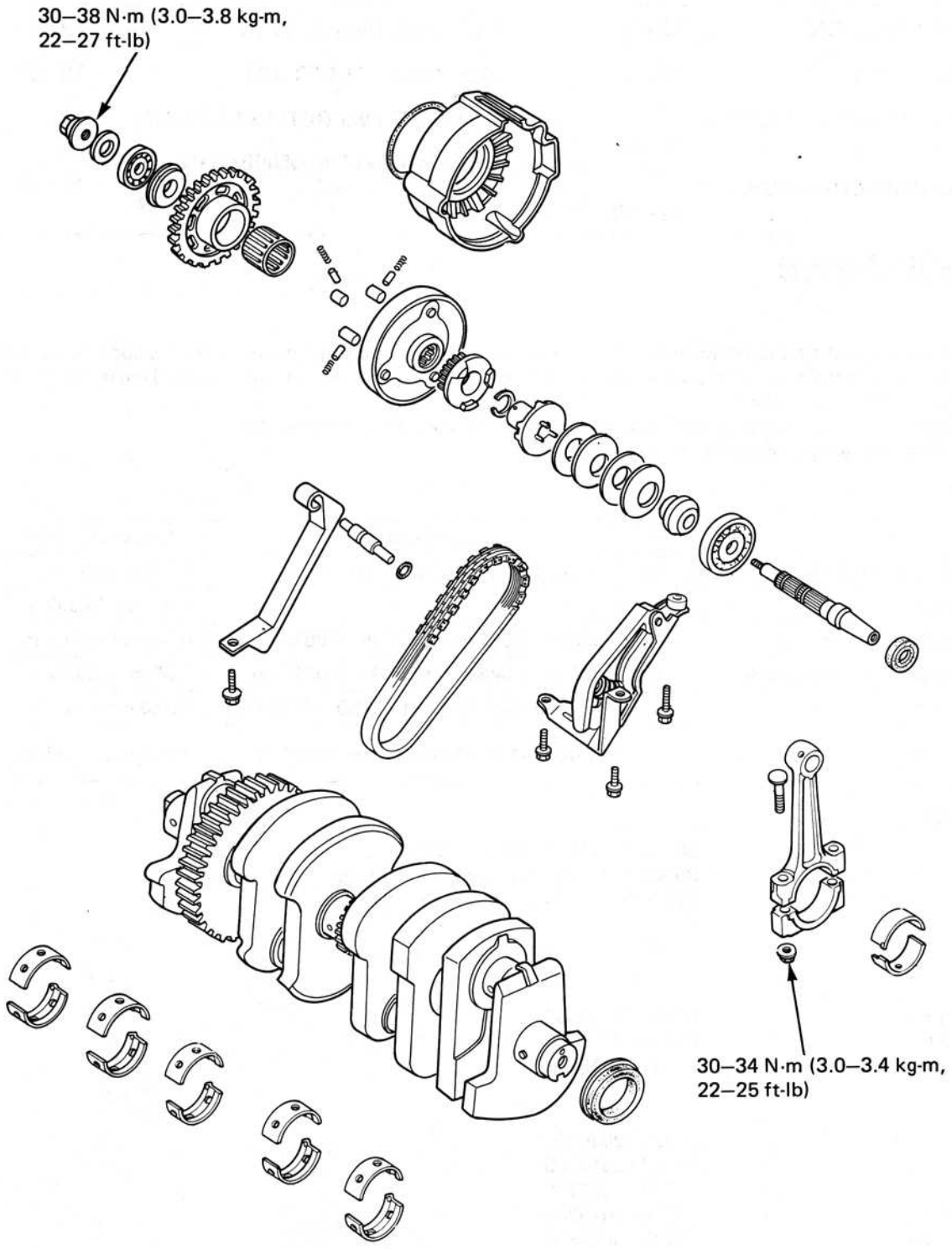


Install the shift fork shaft and shift forks.
Install a new lock washer and the bolt to the centre shift fork and tighten the bolt.

TORQUE:
16-20 Nm (1.6-2.0 kg.m, 12-14 ft.lb)

Bend up the lock washer's tab.




30–38 N·m (3.0–3.8 kg-m,
22–27 ft-lb)
30–34 N·m (3.0–3.4 kg-m,
22–25 ft-lb)

SERVICE INFORMATION

GENERAL

- All bearing inserts are a select fit and are identified by colour codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance. Apply molybdenum disulfied grease the main journals and crankpins during assembly.
- The crankcase assembly must be separated (section 10) to service the crankshaft and starter clutch.
- Refer to section 18 for starter system troubleshooting.

SPECIFICATONS

		STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance	0.05-0.20 mm (0.002-0.008 in)	0.3 mm (0.01 in)
	Runout		0.05 mm (0.002 in)
	Crankpin oil clearance	0.024-0.057 mm (0.0009-0.0022 in)	0.06 mm (0.002 in)
	Main journal oil clearance	0.019-0.043 mm (0.0007-0.0017 in)	0.05 mm (0.002 in)
Cam chain	Length	336.55-337.00 mm (13.250-13.268 in)	320.0 mm (12.60 in)
Alternator chain	Length	149.00-149.20 mm (5.866-5.874 in)	150.5 mm (5.93 in)

TORQUE VALUES

Alternator shaft	30-38 N.m (3.0-3.8 kg.m, 22-27 ft.lb)
Connecting rod cap	30-34 N.m (3.0-3.4 kg.m, 22-25 ft.lb)
Main bearing	21-25 N.m (2.1-2.5 kg.m, 15-18 ft.lb)

TOOLS

Special

Bearing remover, 17 mm	07936-3710300
Bearing remover handle	07936-3710100
Bearing remover weight	07741-0010201

Common

Universal holder	07725-0030000
Driver	07749-0010000
Driver	07746-0020100
Attachment, 37 x 40	07746-0010200
Attachment, 42 x 47	07746-0010300
Pilot, 17 mm	07746-0040400
Pilot, 20 mm	07746-0040500
Attachment, I.D. 20 mm	07746-0020400

TROUBLESHOOTING

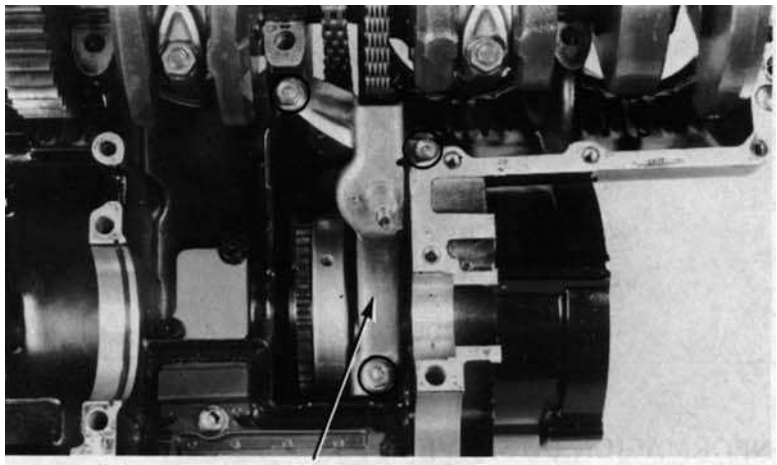
Excessive noise

1 Worn main journal bearing
2 Worn crank pin bearing

STARTER CLUTCH / ALTERNATOR SHAFT

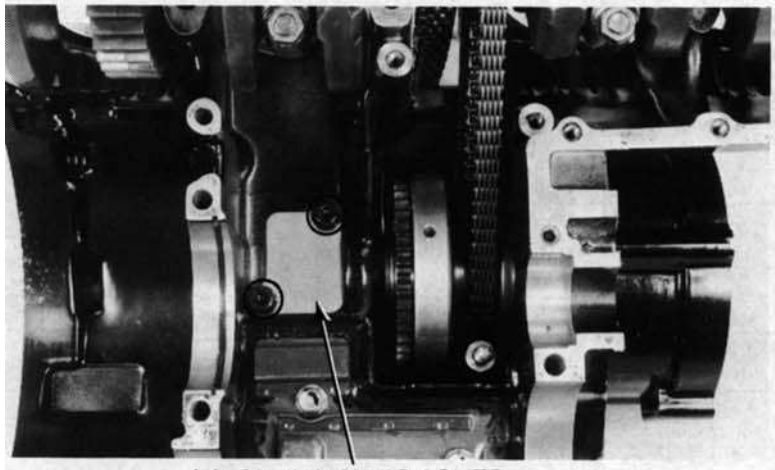
STARTER CLUTCH/ALTERNATOR SHAFT REMOVAL

Separate the crankcase (page 10-2)
Remove the transmission.
Remove the alternator drive chain tensioner by removing the two bolts and nut.
Remove the spacer collar from the tensioner mounting stud.



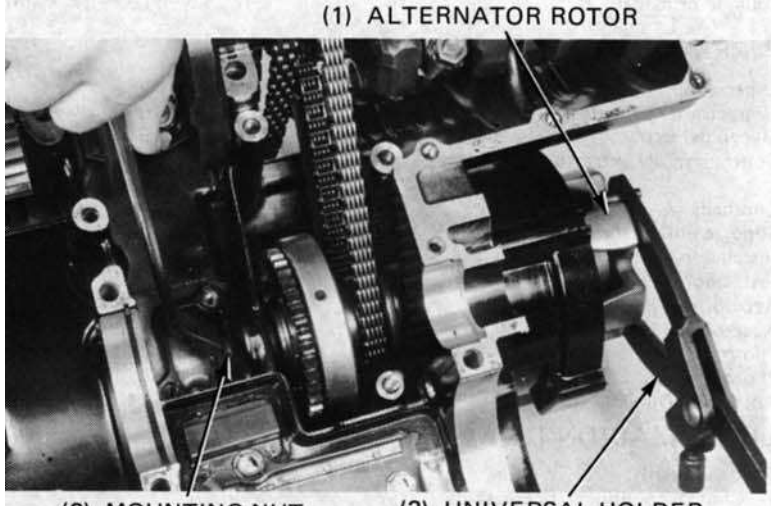
(1) ALTERNATOR DRIVE CHAIN TENSIONER

Remove the two socket bolts and the oil chamber cover.



(1) OIL CHAMBER COVER

Temporarily install the alternator rotors and hold the rotor with universal holder.
Remove the alternator shaft mounting nut.

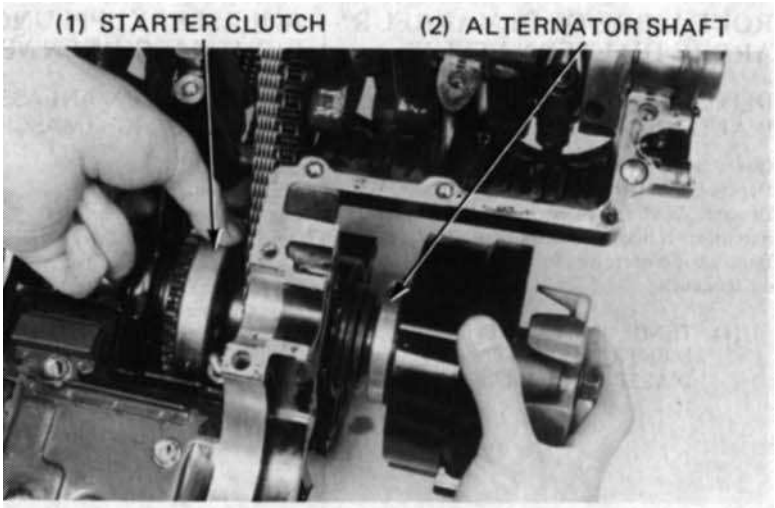


(1) ALTERNATOR ROTOR

(2) MOUNTING NUT

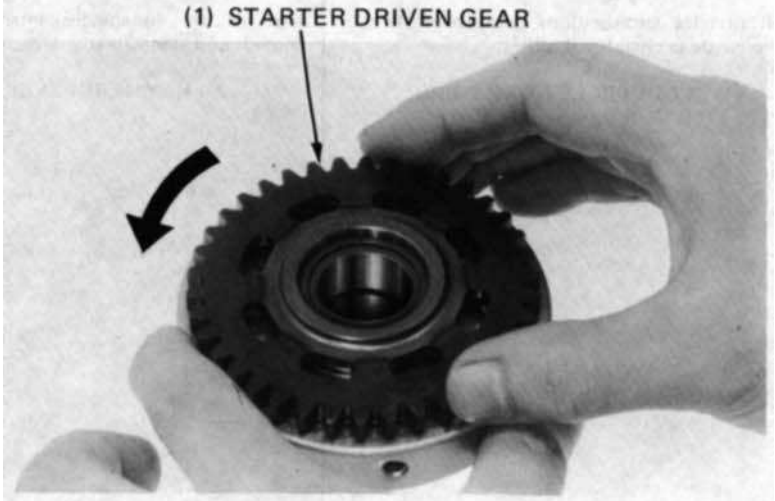
(3) UNIVERSAL HOLDER
07725–0030000

Pull the alternator shaft out of the upper crankcase and remove the starter clutch, spacer and alternator driven sprocket.

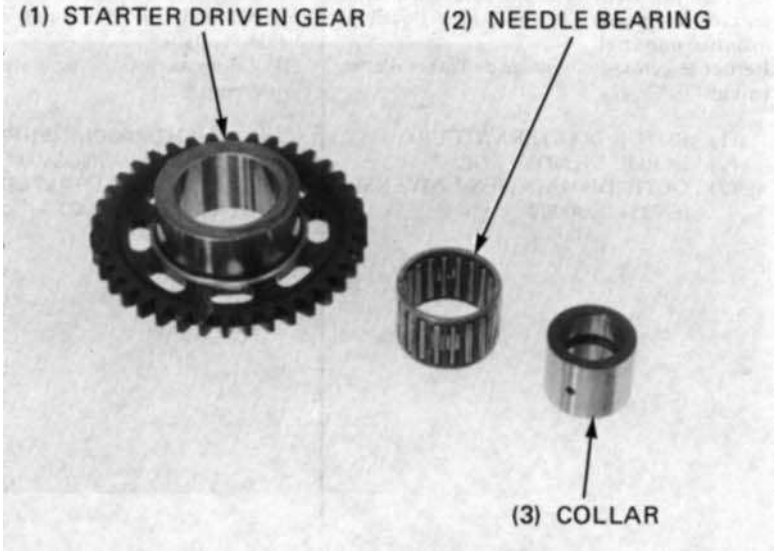


STARTER CLUTCH INSPECTION

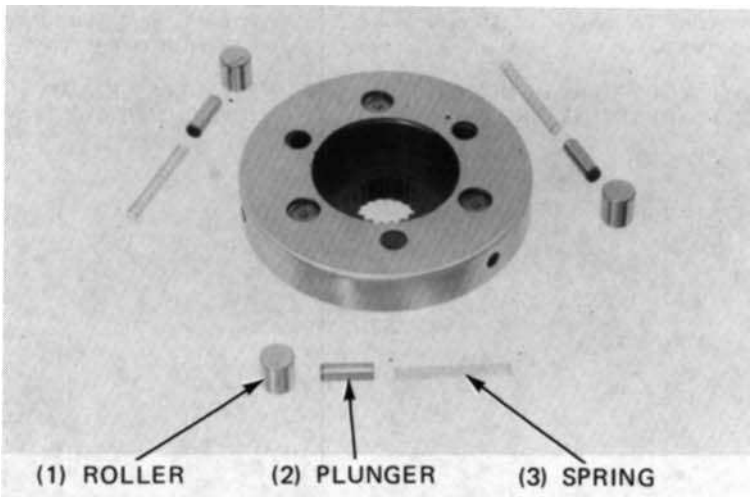
Check the starter clutch for smooth operation by turning the starter driven gear. The starter driven gear should turn counterclockwise freely and should not turn clockwise.



Remove the starter driven gear, needle bearing and collar from the starter clutch. Check the driven gear, needle bearing and collar for wear or damage.



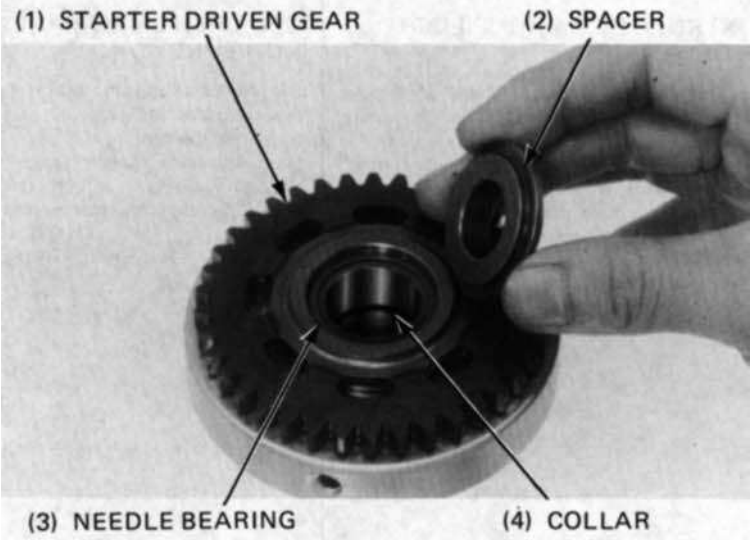
Remove the rollers, plungers and springs from the starter clutch and check them for wear or damage.



STARTER CLUTCH ASEMBLY

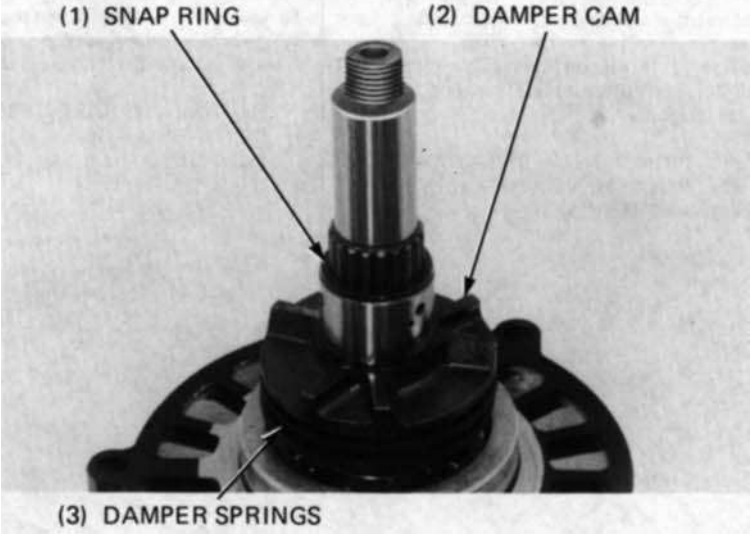
Install the springs, plungers and rollers into the starter clutch.

Install the needle bearing and collar into the starter driven gear and install them into the starter clutch.
Install the spacer onto the starter driven gear.



ALTERNATOR SHAFT DISASSEMBLY

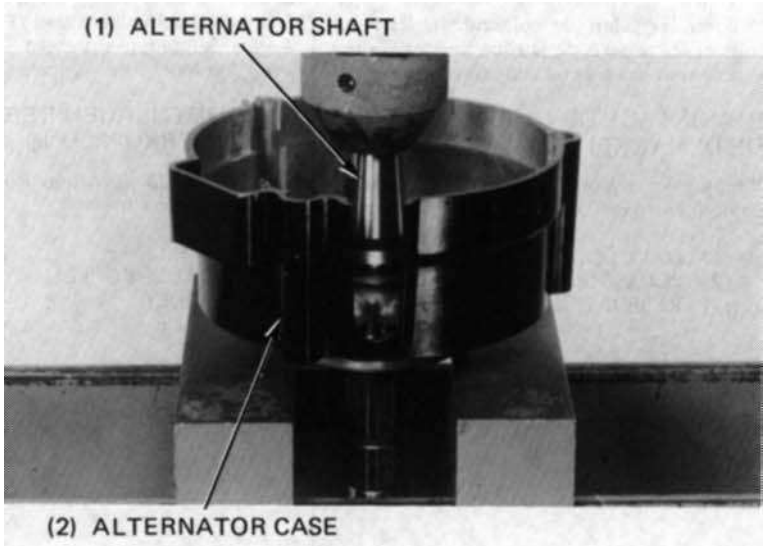
Remove the snap ring, damper cam and damper springs from the alternator shaft.



Place the alternator shaft/case in the hydraulic press with the case supported.

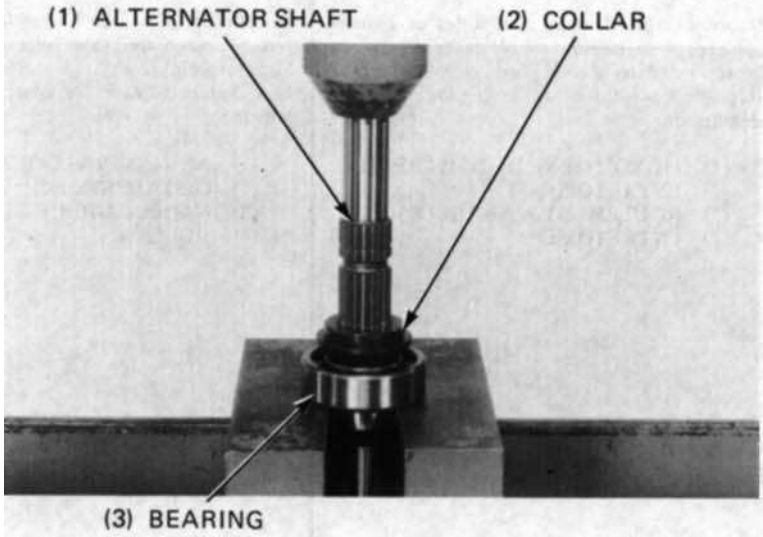
NOTE:
Do not support the bearing as the bearing is pressed out together with the shaft.

Press the alternator shaft out of the alternator case.

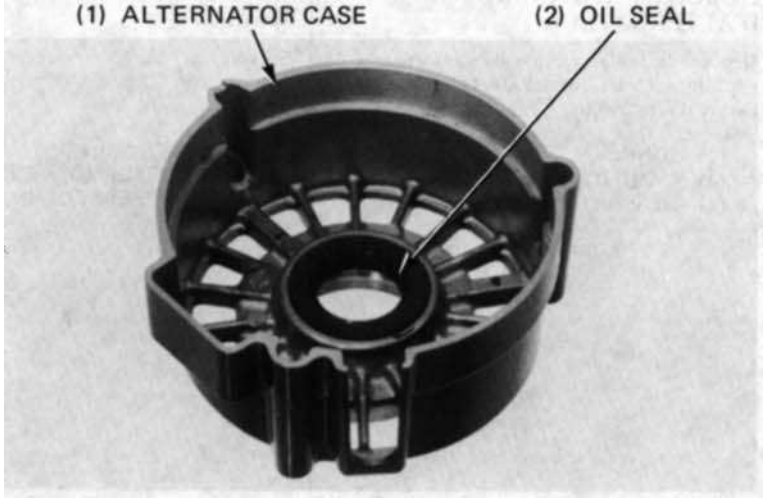


Place the alternator shaft in the press and press the shaft out of the bearing and collar.

NOTE:
Never reinstall old bearing; once the bearing is removed, it must be replaced with a new one.

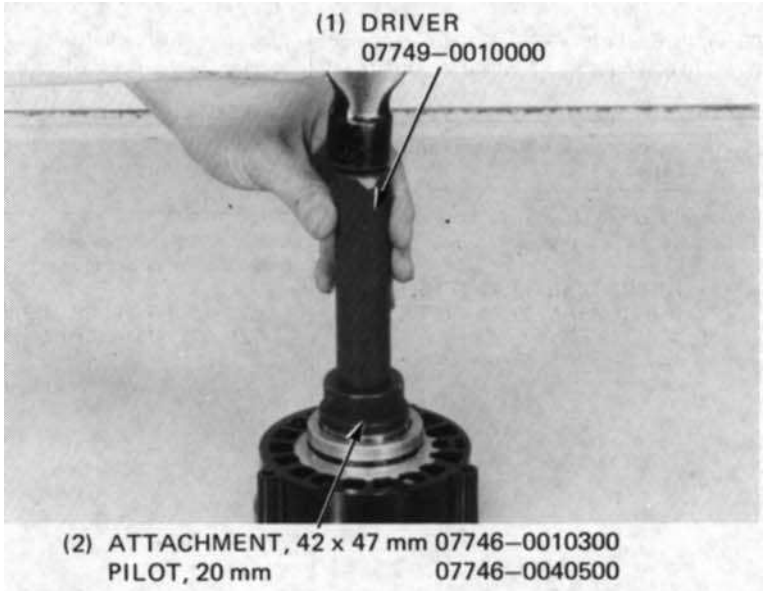


Remove the oil seal from the alternator case.

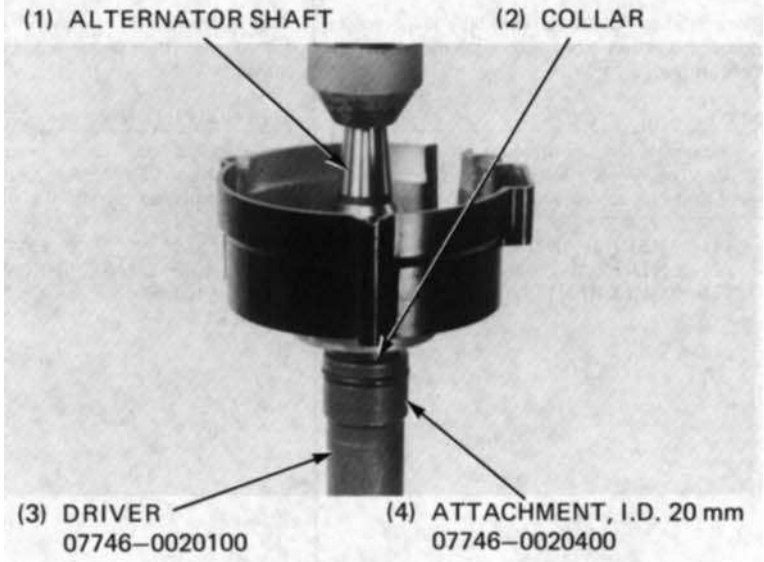


ALTERNATOR SHAFT ASSEMBLY

Drive a new bearing in the alternator case. Install a new oil seal into the case.

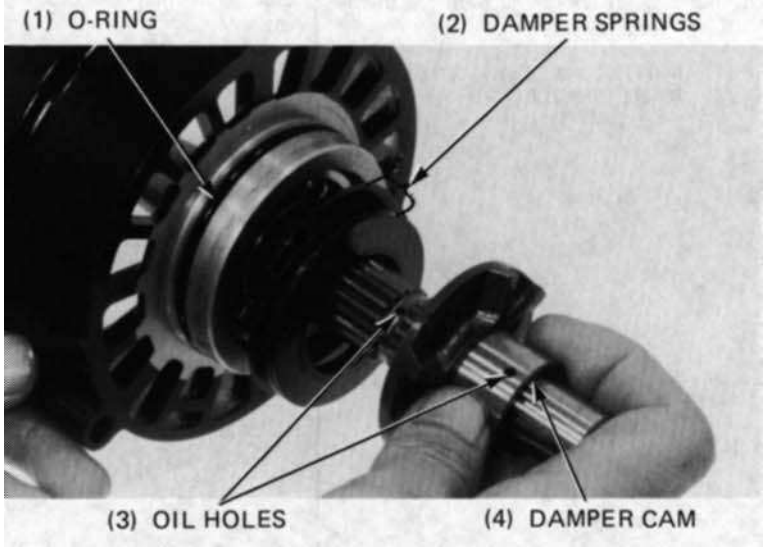


Support the collar and case bearing with special tools and press the alternator shaft into them.



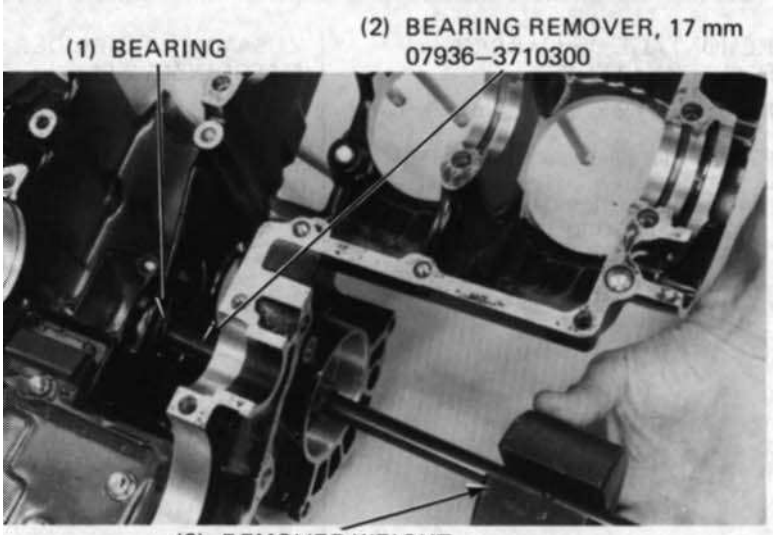
Install the four damper springs with the dished faces facing each other as shown. Install the damper cam onto the alternator shaft, aligning the oil holes in the damper cam and shaft.

Secure the damper cam with the snap ring. Install a new O-ring into the groove in the alternator case.

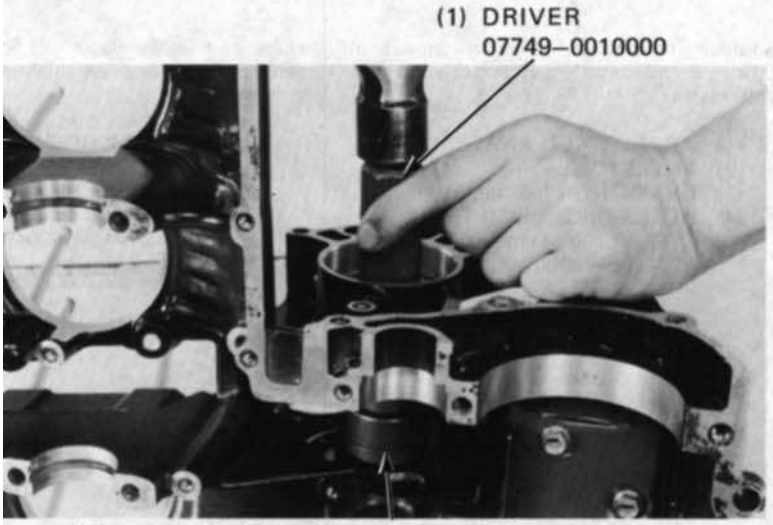


ALTERNATOR SHAFT BEARING REPLACEMENT (CRANKCASE SIDE)

Remove the crankshaft (page 12-10)
Remove the alternator shaft bearing with special tools.

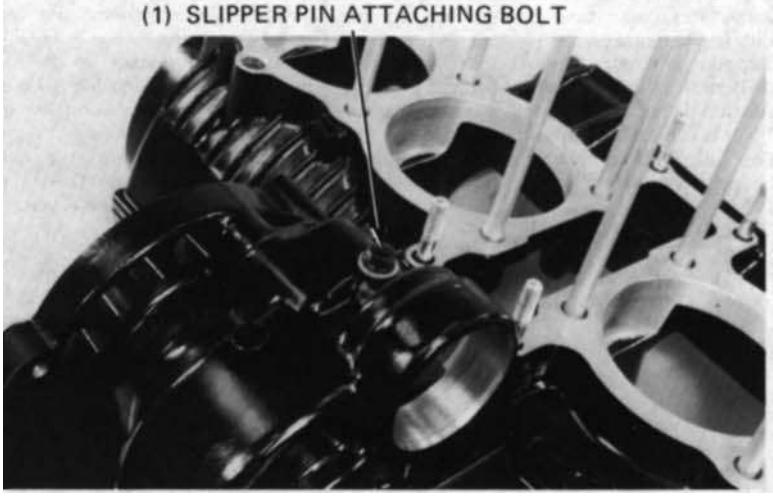


Drive a new bearing in the crankcase.
Install the crankshaft (page 12-17)

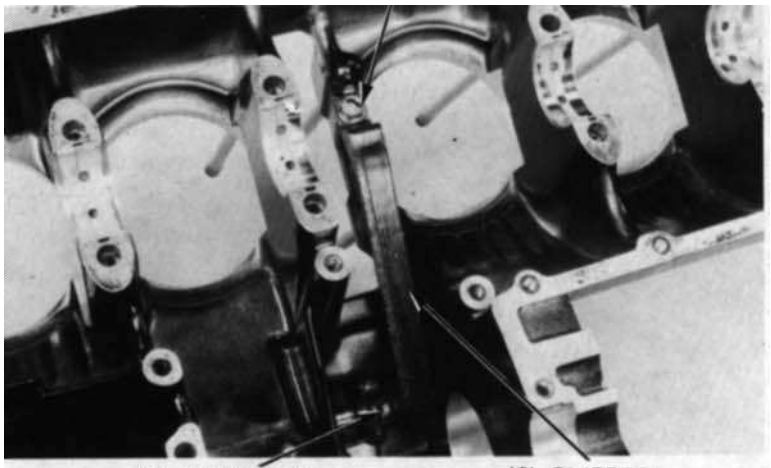


ALTERNATOR DRIVE CHAIN SLIPPER REPLACEMENT

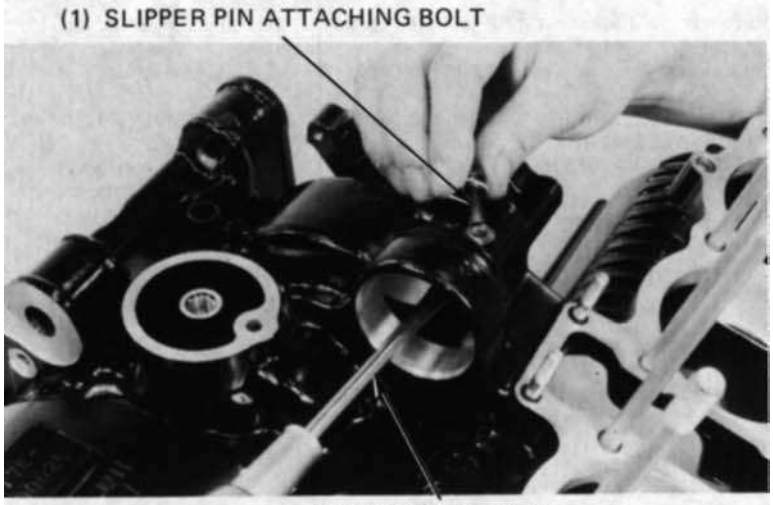
Remove the crankshaft (12-10)
Remove the slipper pin attaching bolt.



Remove the slipper attaching bolt, pull the slipper pin out and remove the slipper.
Replace the slipper if it is damaged.
Install the slipper on the upper crankcase and install the slipper pin.
Apply thread lock agent to the attaching bolt threads and install it.

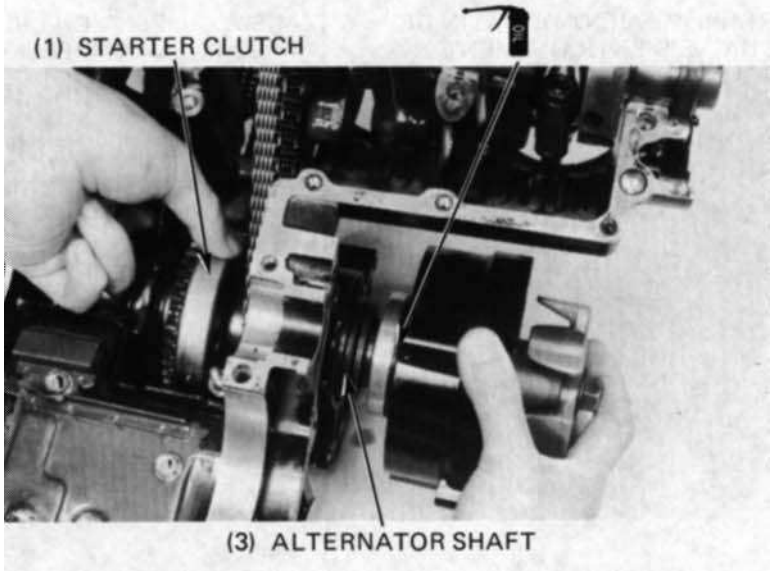


Align the bolt holes in the upper crankcase and slipper pin by turning the pin with a screwdriver.
Apply thread lock agent to the threads of the slipper pin attaching bolt and install it.
Install the crankshaft (page 12-17)



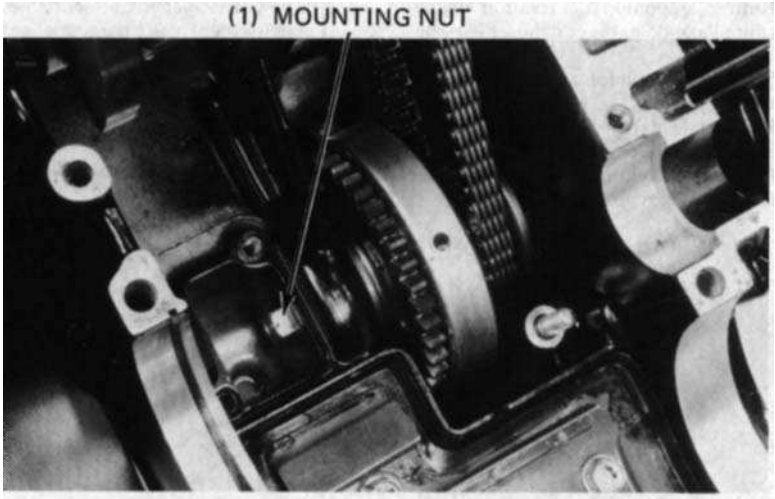
STARTER CLUTCH - ALTERNATOR SHAFT INSTALLATION

Place the alternator drive chain over the alternator driven sprocket.
Coat the alternator case O-ring with clean engine oil and insert the alternator shaft into the upper crankcase through the alternator driven sprocket and starter clutch.



Temporarily install the alternator rotors and hold the rotor with universal holder (07725-0030000). Install and tighten the alternator shaft mounting nut.

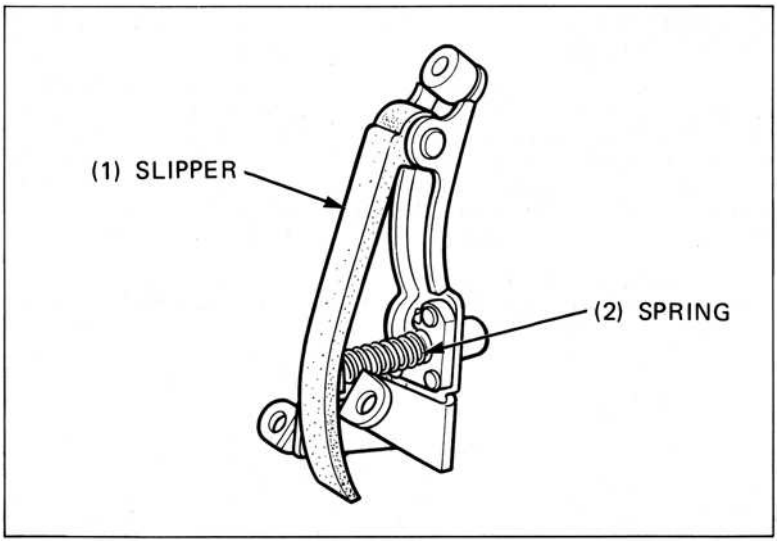
TORQUE: 30-38 Nm
(3.0-3.8 kg.m, 22-27 ft.lb)



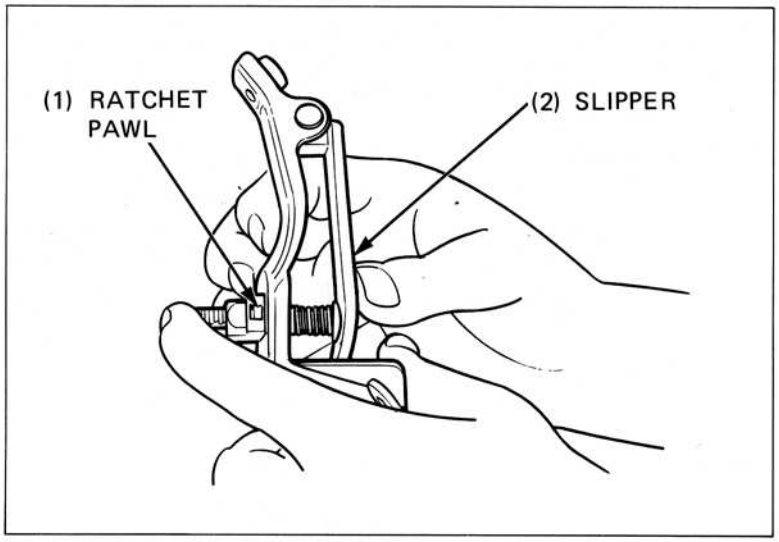
Apply thread lock agent to the socket bolt threads and install the oil chamber cover with the socket bolts.

Check the alternator drive chain tensioner spring and slipper for wear or damage.

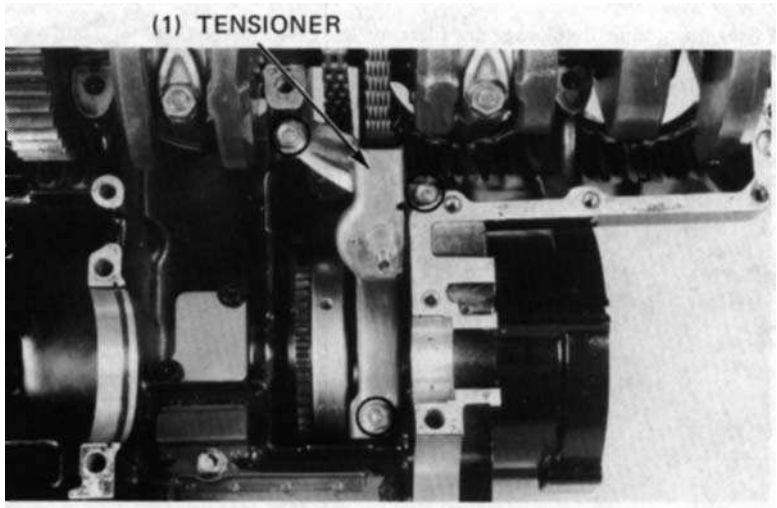
Replace the tensioner if necessary.



Release the ratchet paw] by pushing it and push the tensioner slipper on for minimum tension and hold it until the tensioner is installed in position.



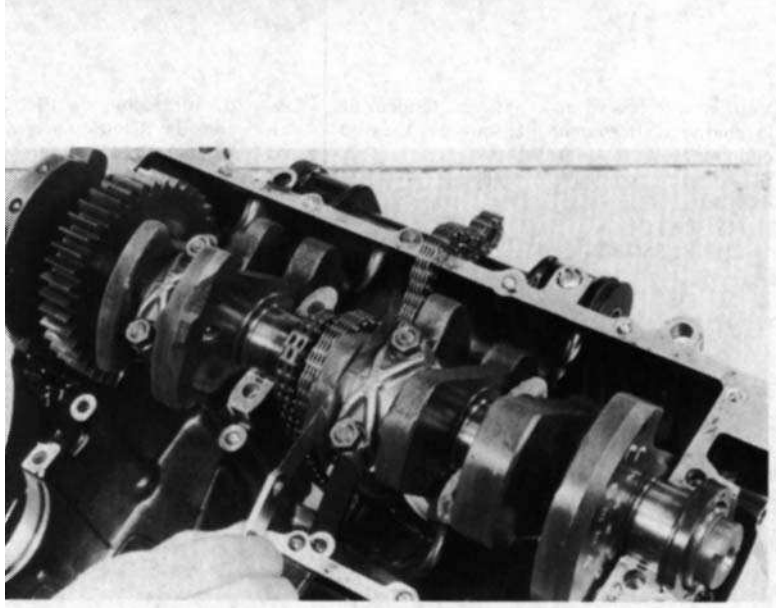
Apply thread lock agent to the threads of the attaching bolts and nut, and install the tensioner over the drive chain and on the crankcase with the bolts and nut.



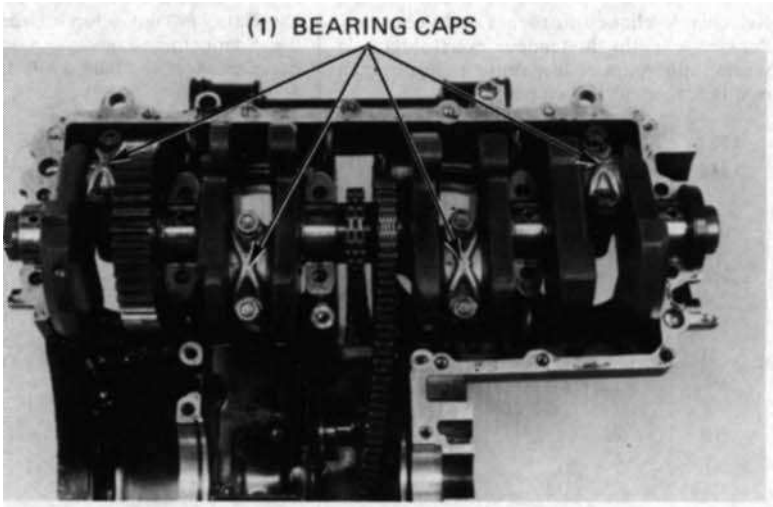
CONNECTING ROD/ CRANKSHAFT REMOVAL

Separate the crankcase (page 10-2).
Remove the alternator shaft (page 12-2).
Check the connecting rod side clearance with a feeler gauge.

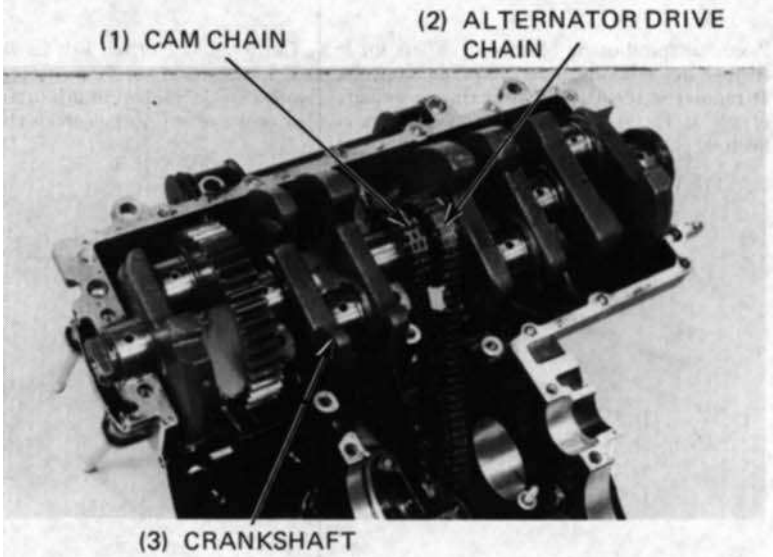
SERVICE LIMIT: 0.3 mm (0.01 in)



Remove the bearing cap nuts, bearing caps and connecting rods.
Mark the rods, bearings and bearing caps to indicate their cylinder position for correct reassembly.



Remove the crankshaft, cam chain and alternator drive chain.

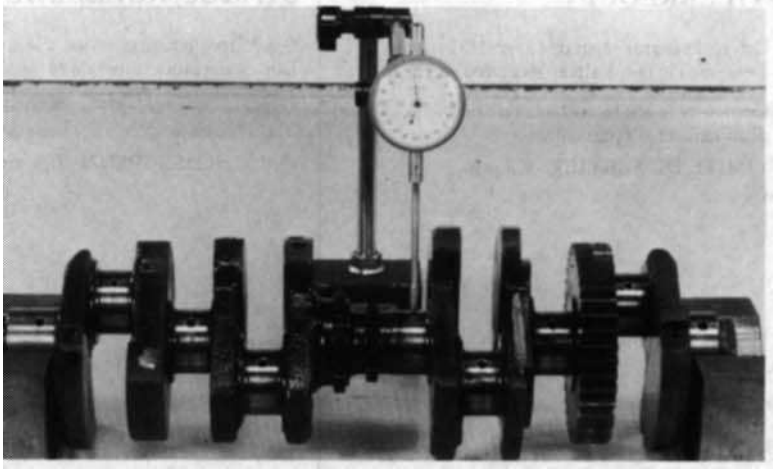


INSPECTION

CRANKSHAFT RUNOUT

Remove the cam and alternator chains.
Place the crankshaft on a stand or V-blocks

Set a dial indicator on the centre main journal of the crankshaft.
Rotate the crankshaft two revolutions and read runout at the centre journal.

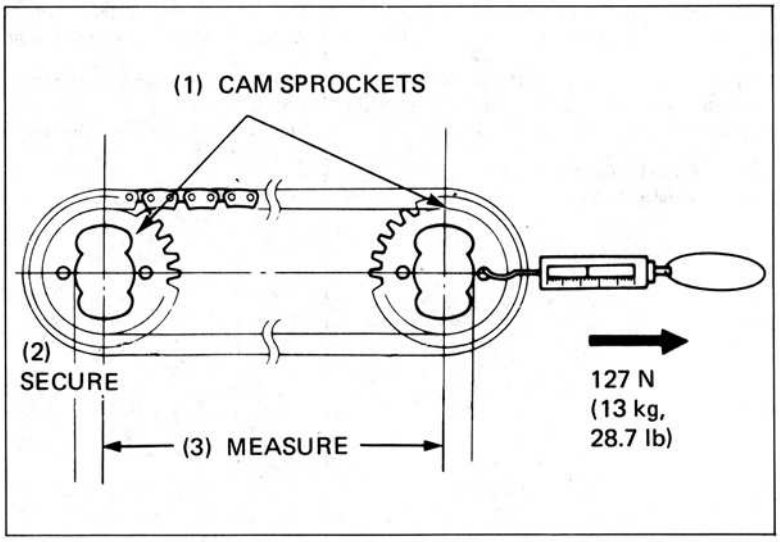


SERVICE LIMIT: 0.05 mm (0.002 in)

CAM CHAIN LENGTH MEASUREMENT

Place the cam chain over the intake and exhaust cam shaft sprockets with the bolt holes positioned as shown. Secure one sprocket.
Apply 127 N (13 kg, 29 lb) of tension with a spring scale to the other sprocket.
Measure the chain length between the sprocket centres.

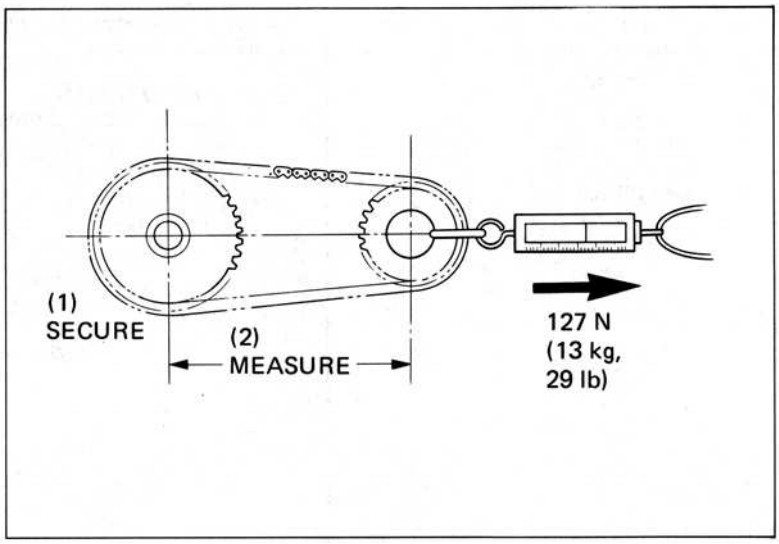
SERVICE LIMIT: 320.0 mm (12.60 in)



ALTERNATOR DRIVE CHAIN LENGTH

Place the alternator drive chain over the alternator drive and driven sprockets.
Secure the crankshaft.
Apply 127 M (13 kg, 29 lbs) of tension with a spring scale to the driven sprocket.
Measure the chain length between the sprocket centres.

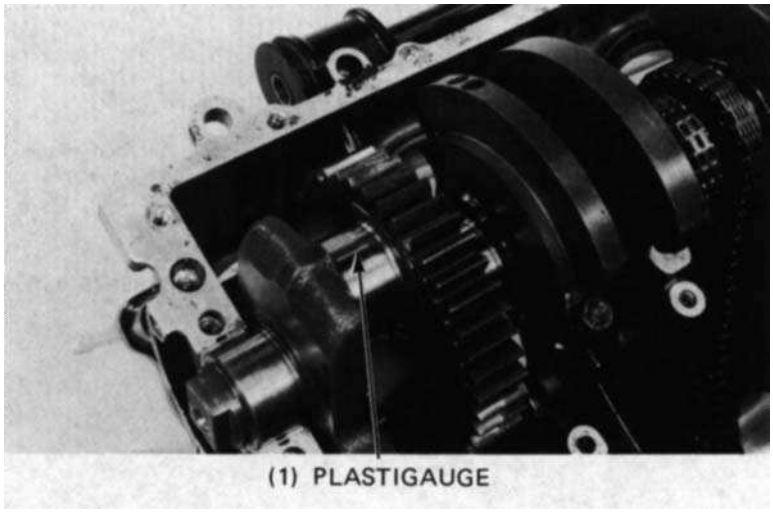
SERVICE LIMIT: 150.5 mm (5.93 in)



BEARING INSPECTION

CONNECTING RODS

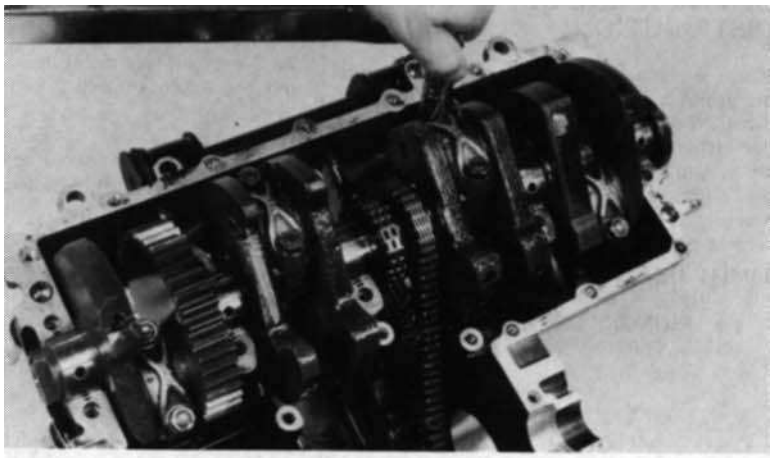
Inspect the bearing inserts for damage or separation.
Clean all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin avoiding the oil hole.



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

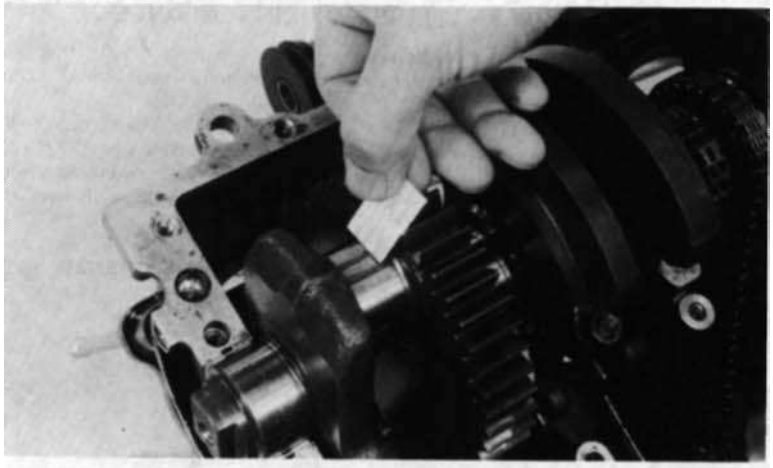
TORQUE: 30-34 Nm (3.0-3.4 kg.m, 22-25 ft.lb)

NOTE:
Do not rotate the crankshaft during inspection.



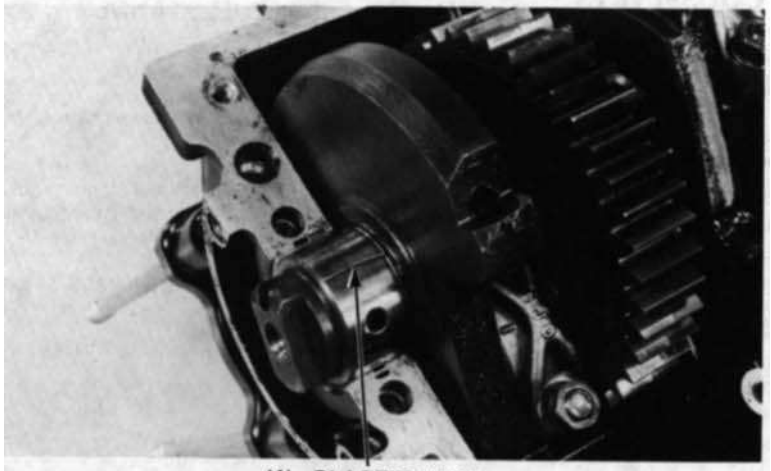
Remove the caps and measure the compressed plastigauge on each crankpin.

OIL CLEARANCE SERVICE LIMIT:
0.06 mm (0.002 in)



MAIN BEARINGS

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

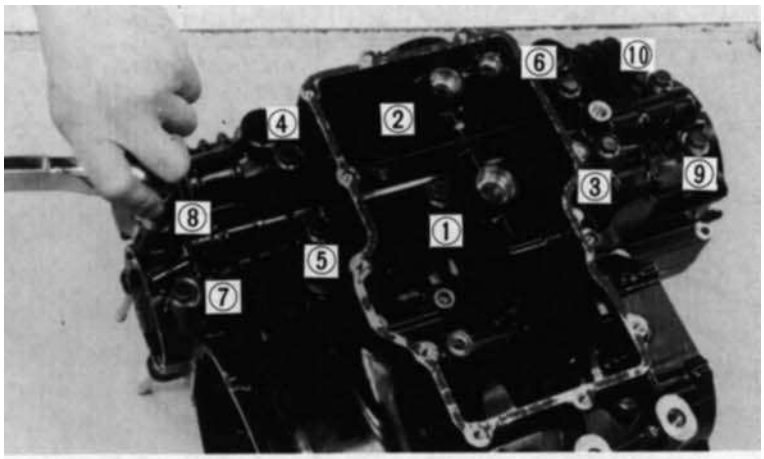


(1) PLASTIGAUGE

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

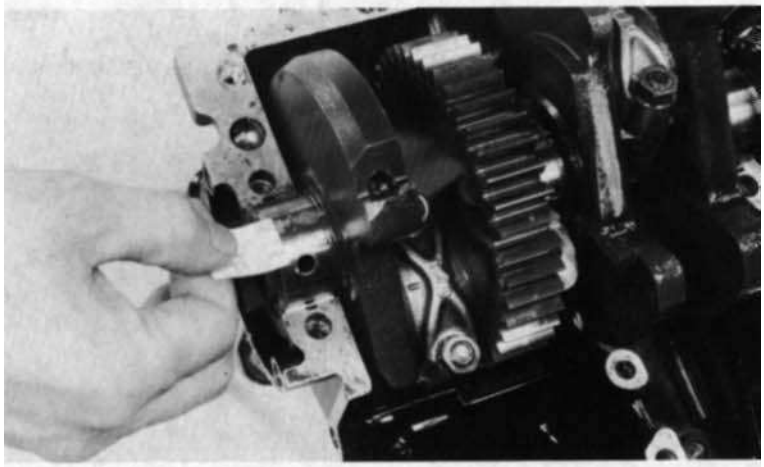
TORQUE: 21-25 Nm
(2.1-2.5 kg.m, 15-18 ft.lb)

NOTE:
Do not rotate the crankshaft during inspection.



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

OIL CLEARANCE SERVICE LIMIT:
0.05 mm (0.002 in)

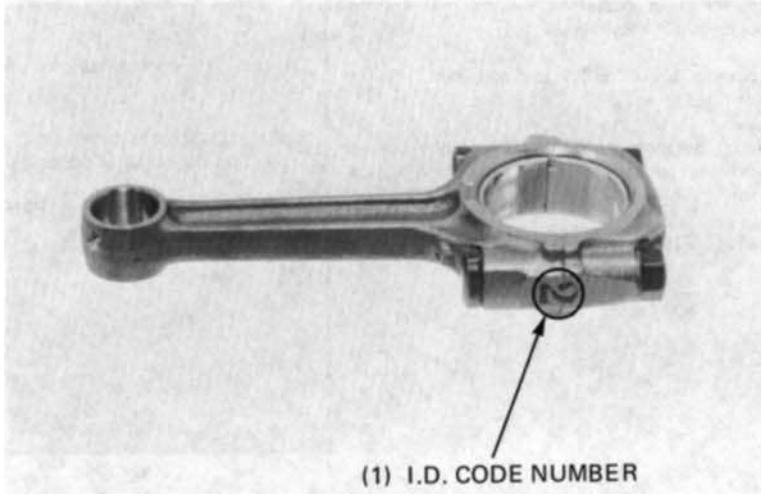


BEARING SELECTION

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

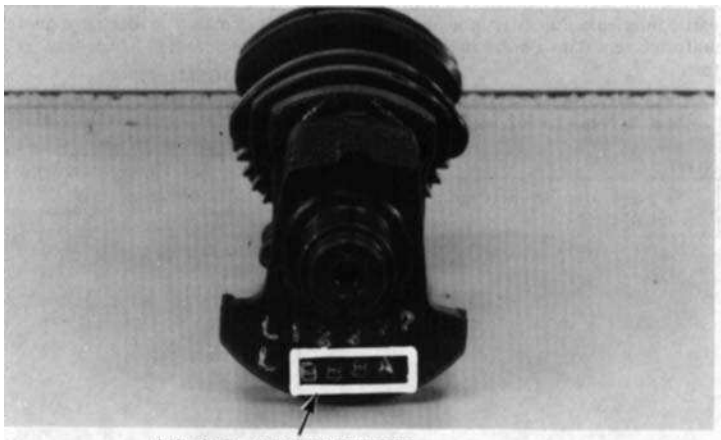
CONNECTING ROD BEARING INSERTS

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



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

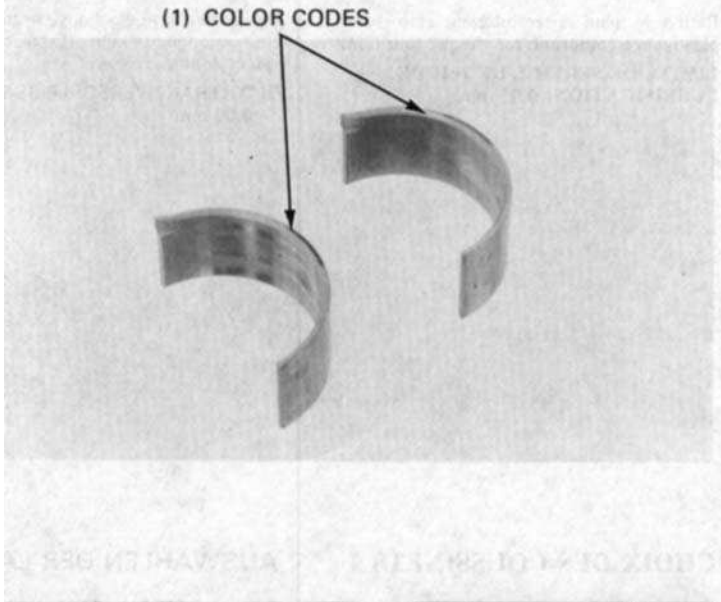
NOTE:
The letter A or B on the outside crankshaft weight is the code for each crankpin O.D. from left-to-right.



(1) O.D. CODE LETTER

Cross reference the crankpin and connecting rod codes to determine the replacement bearing colour

			CRANKPIN O.D. CODE LETTER	
			A	B
			35.992-36.000 mm (1.4170-1.4173 in)	35.984-35.992 mm (1.4167-1.4170 in)
CONNECTING ROD I.D. CODE NUMBER	1	39.000-39.008 mm (1.5354-1.5357 in)	Yellow	Green
	2	39.008-39.016 mm (1.5357-1.5361 in)	Green	Brown



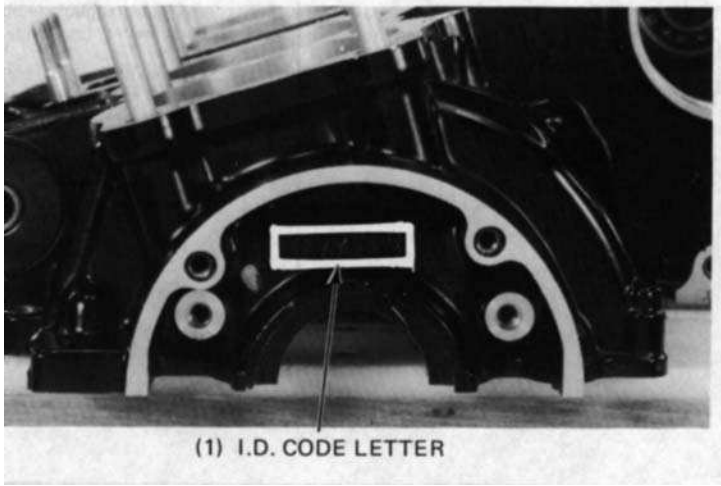
(1) COLOR CODES

BEARING INSERT THICKNESS:
Brown: 1.494-1.498 mm (0.0588-0.0590 in)
Green: 1.490-1.494 mm (0.0587-0.0588 in)
Yellow: 1.486-1.490 mm (0.0585-0.0587 in)

MAIN BEARING

Determine and record crankcase I.D. code number on the upper crankcase.

NOTE:
The letters A or B on the upper crankcase are the codes for the main journal I.D.'s from left-to-right.



(1) I.D. CODE LETTER

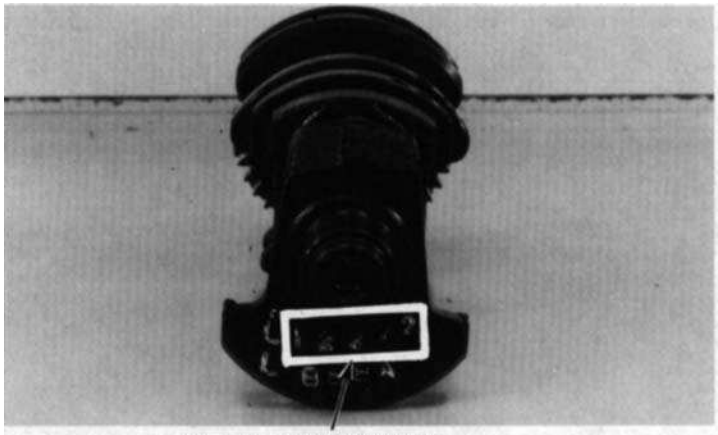
Determine and record the corresponding main journal I.D. code letters (or measure the main journal O.D.).

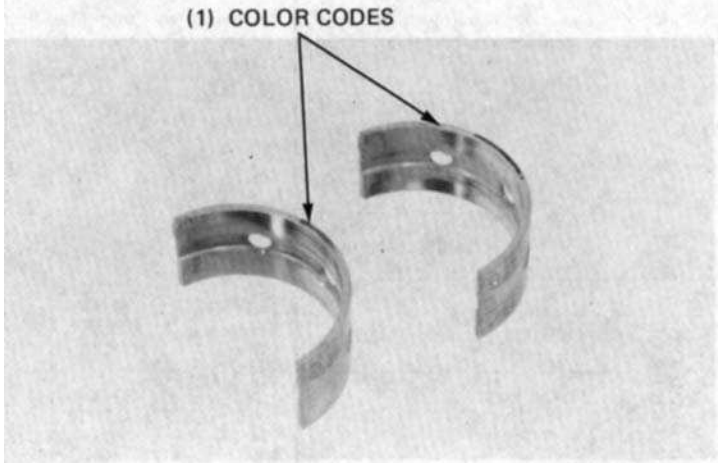
NOTE:
The letters 1 or 2 on the crank weight is the code for the main journal O.D.'s from left-to-right.

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

			MAIN JOURNAL O.D. CODE NUMBER	
			A	B
			35.992-36.000 mm (1.4170-1.4173 in)	35.984-35.992 mm (1.4167-1.4170 in)
CRANKCASE I.D. CODE LETTER	1	39.000-39.008 mm (1.5354-1.5357 in)	Pink	Yellow
	2	39.008-39.016 mm (1.5357-1.5361 in)	Yellow	Green

BEARING INSERT THICKNESS:
Green:1.504-1.508 mm (0.0592-0.0594 in)
Yellow:1.500-1.504 mm (0.0591-0.0592 in)
Pink: 1.496-1.500 mm (0.0589-0.0591 in)

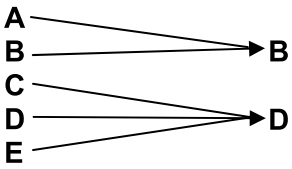


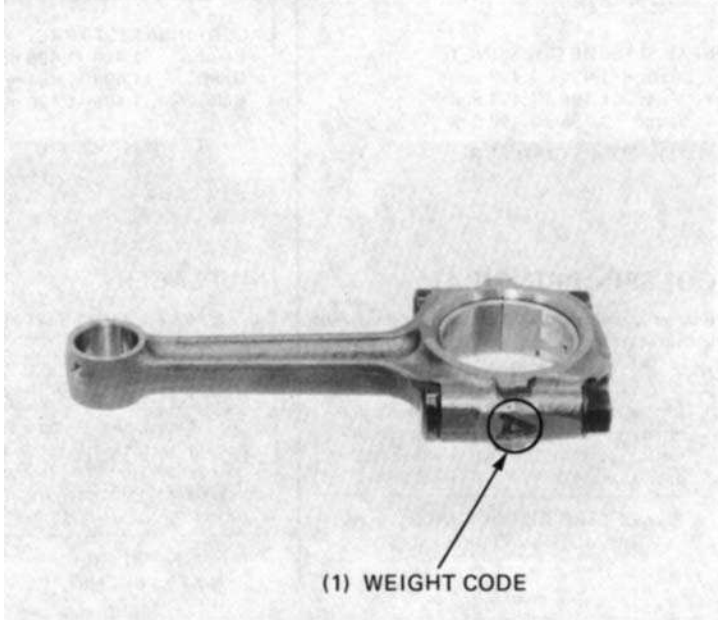


CONNECTING ROD SELECTION

When replacing the connecting rods, select the rods accordance with the weight code as shown below.

Factory set code Available code

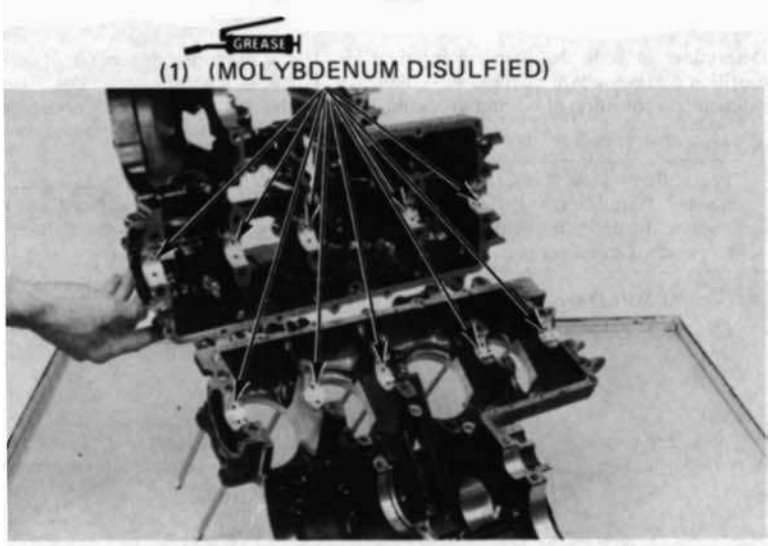




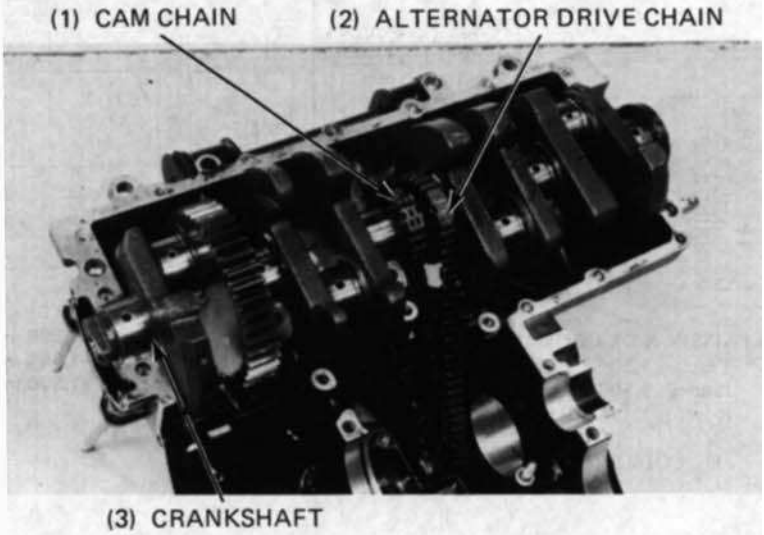
NOTE:
Do not select the connecting rod with the different weight code of 2 rank.

CRANKSHAFT/CONNECTING ROD INSTALLATION

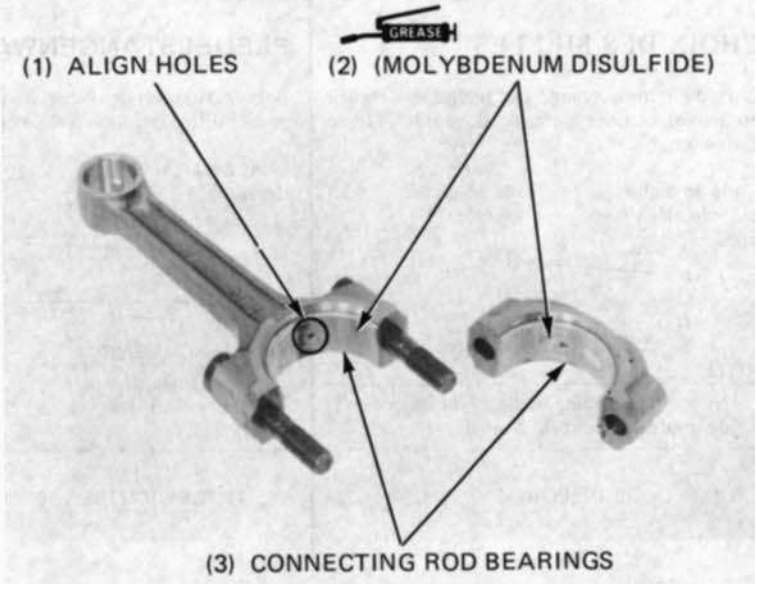
Install the main bearings into the upper and lower crankcases.
Apply molybdenum disulfide grease to the upper and lower main bearings.



Install the cam chain and alternator drive chain over the crankshaft. Install the crankshaft onto the upper crankcase.



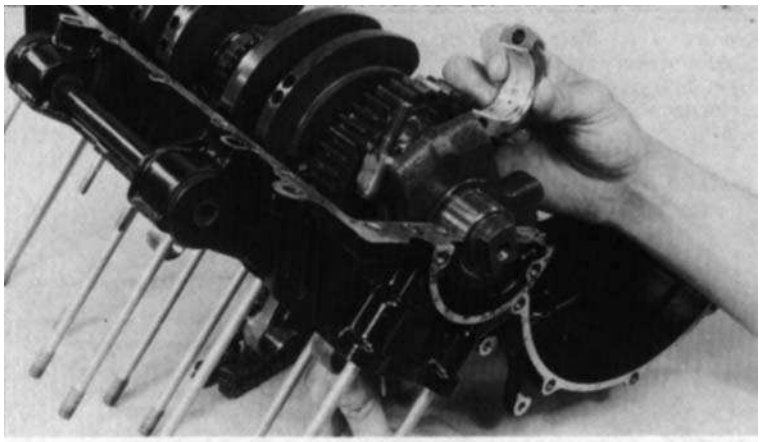
Align the hole in the connecting rod bearing insert with the hole in the connecting rod and install the insert. Install the connecting rod cap bearing insert.
Apply molybdenum disulfide grease to the connecting rod bearings.



Apply molybdenum disulfide grease to the threads and flanges of the connecting rod cap nuts, and install them.

NOTE:

- **Be sure the connecting rods are installed in their correct positions and the oil holes point to the rear (intake side).**
- **Cross reference the connecting rod and cap I.D. codes to insure correct assembly.**

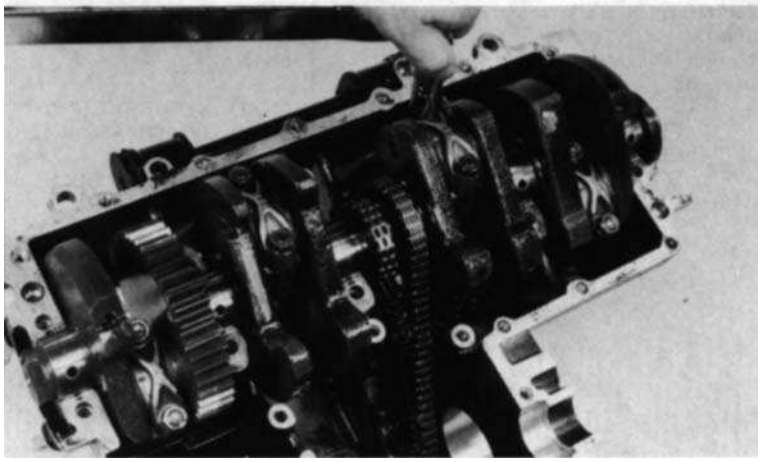


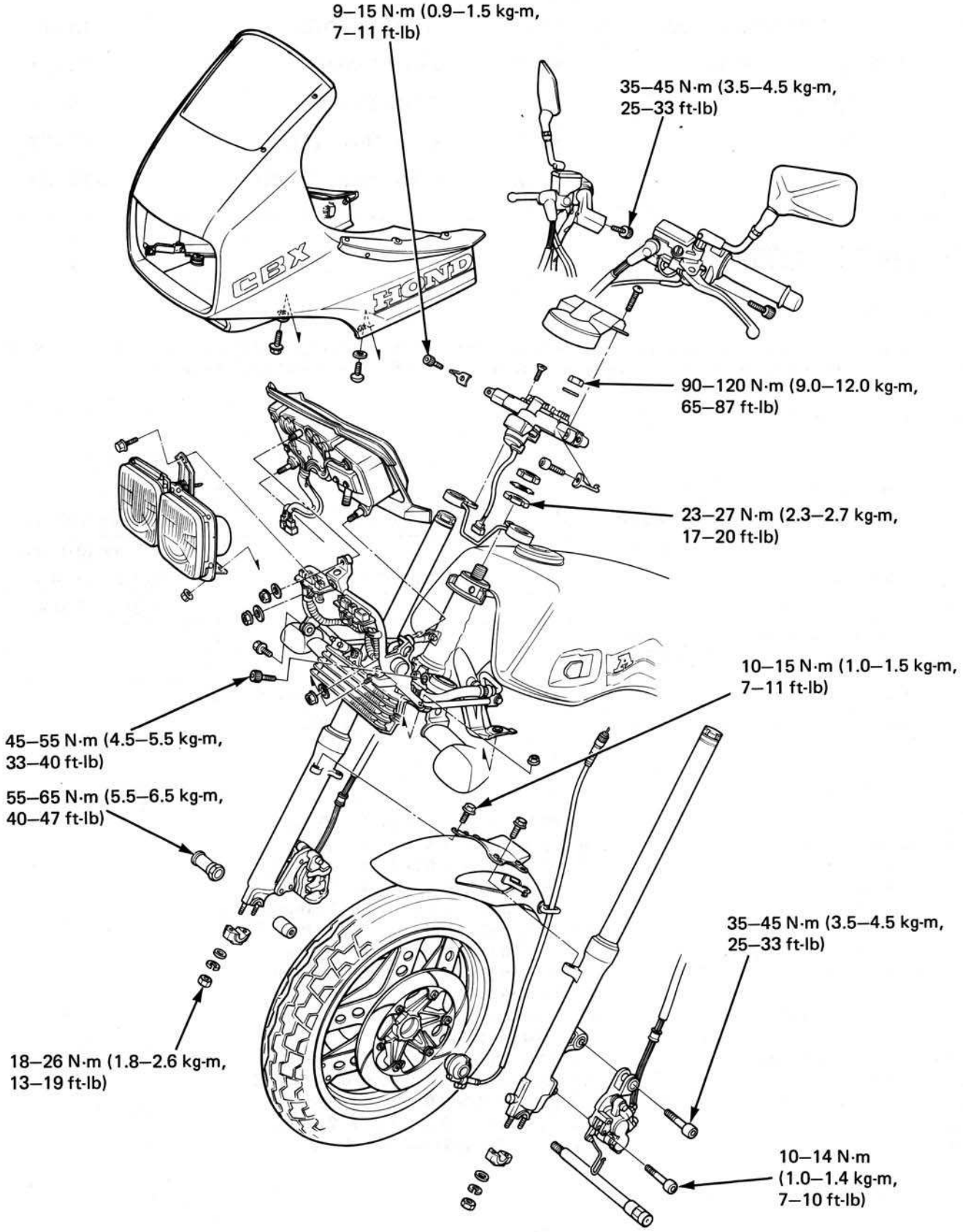
Tighten the connecting rod cap nuts in 2-3 steps.

TORQUE. 30-34 Nm
(3.0-3.4 kg.m, 22-25 ft.lb)

NOTE:
After tightening the nuts, check that the connecting rod moves freely without binding.

Install the alternator shaft (page 12-8).
Assemble the crankcase (section 10).




9–15 N·m (0.9–1.5 kg-m,
7–11 ft-lb)
35–45 N·m (3.5–4.5 kg-m,
25–33 ft-lb)
90–120 N·m (9.0–12.0 kg-m,
65–87 ft-lb)
23–27 N·m (2.3–2.7 kg-m,
17–20 ft-lb)
10–15 N·m (1.0–1.5 kg-m,
7–11 ft-lb)
45–55 N·m (4.5–5.5 kg-m,
33–40 ft-lb)
55–65 N·m (5.5–6.5 kg-m,
40–47 ft-lb)
35–45 N·m (3.5–4.5 kg-m,
25–33 ft-lb)
18–26 N·m (1.8–2.6 kg-m,
13–19 ft-lb)
10–14 N·m
(1.0–1.4 kg-m,
7–10 ft-lb)

SERVICE INFORMATION

GENERAL

- A jack or other support is required to support the front of the motorcycle when you are working on the front wheel or forks
- The front wheel uses a tubeless tyre. For tubeless tyre repairs, refer to the TUBELESS TYRE MANUAL.
-

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle shaft runout		-	0.2 mm (0.01 in)
Front wheel rim runout	Radial	-	2.0 mm (0.08 in)
	Axial	-	2.0 mm (0.08 in)
Fork spring length		553.7 mm (21.80 in)	543 mm (21.4 in)
Fork tube runout		-	0.2 mm (0.01 in)
Fork fluid capacity	Right	375 cc (13.2 oz)	-
	Left	400 cc (14.1 oz)	-
Fork air pressure		0-40 kPa (0-0.4 kg/cm2, 0-6 psi)	-
Steering head bearing preload		1.1-1.7 kg (2.4-3.7 lbs)	-

TORQUE VALUES

Handlebar pinch bolt	35-45 Nm (3.5-4.5 kg.m, 25-33 ft.lb)
Master cylinder holder	10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)
Front brake disk	35-40 Nm (3.5-4.0 kg.m, 25-29 ft.lb)
Front axle nut	55-65 Nm (5.5-6.5 kg.m, 40-47 ft.lb)
Front calliper bracket	35-45 Nm (3.5-4.5 kgm, 25-33 ft.lb)
Axle holder	18-26 Nm (1.8-2.6 kg.m, 13-19 ft.lb)
Anti dive pivot bolt	10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)
Fork piston socket bolt	15-25 Nm. (1.5-2.5 kg.m, 11-18 ft.lb)
Fork top pinch bolt	9-15 Nm (0.9-1.5 kg.m, 7-11 ft.lb)
Fork bottom pinch bolt	45-55 Nm (4.5-5.5 kg.m, 33-40 ft.lb)
Fork brace	10-15 Nm (1.0-1.5 kg.m, 7-11 ft.lb)
Steering bearing adjustment nut	23-27 Nm (2.3-2.7 kg.m, 17-20 ft.lb)
Steering stem nut	90-120 Nm (9.0-12.0 kg.m, 65-87 ft.lb)
Steering stem pinch nut	20-30 Nm (2.0-3.0 kg.m, 14-22 ft.lb)
Fork cap	15-30 Nm 91.5-3.0 kg.m, 11-22 ft.lb)
Anti dive case	6-9 Nm (0.6-0.9 kg.m, 4-7 ft.lb)

TOOLS

Special

Hex, wrench, 6 mm	07917-3230000
Snap ring pliers	07914-3230001
Fork seal driver	07947-4630100
Steering stem socket	07916-3710100
Bearing race remover	07946-3710500
Ball race remover	07953-MJ10000
Steering stem driver	07946-MB00000

Common

Driver	07749-0010000
Attachment, 42 x 47	07746-0010300
Pilot, 15 mm	07746-0040300
Lock nut wrench, 30 x 32 mm	07716-0020400
Extension	07716-0020500
Attachment, 52 x 55 mm	07746-0020400
Bearing remover shaft	07746-0050100
Bearing remover head, 15 mm	07746-0050400

TROUBLESHOOTING

Hard Steering
1 Steering bearing adjustment nut too tight
2 Faulty steering stem bearings
3 Damaged steering stem bearings
4 Insufficient tyre pressure

Steers to one side or does not track straight
1 Bent forks
2 Bent front axle
3 Wheel installed incorrectly

Front wheel wobbling
1 Bent rim
2 Bent front axle
3 Faulty tyre
4 Axle nut tightened incorrectly

Soft suspension
1 Weak fork springs
2 Insufficient fluid in forks
3 Fork air pressure incorrect

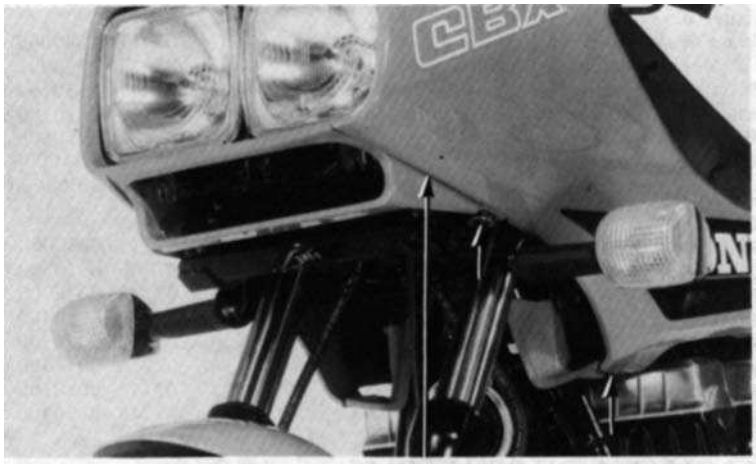
Hard suspension
1 Incorrect fluid weights in forks
2 Fork air pressure incorrect
3 Bent fork tubes
4 Clogged fluid passage
5 Clogged anti dive orifice

Front suspension noise
1 worn slide or guide bushings
2 Insufficient fluid in forks
3 loose front fork fasteners
4 Lack of grease in speedometer gearbox

HEADLIGHT

REMOVAL/INSTALLATION

Remove the fairing by removing the two bolts and two screw.



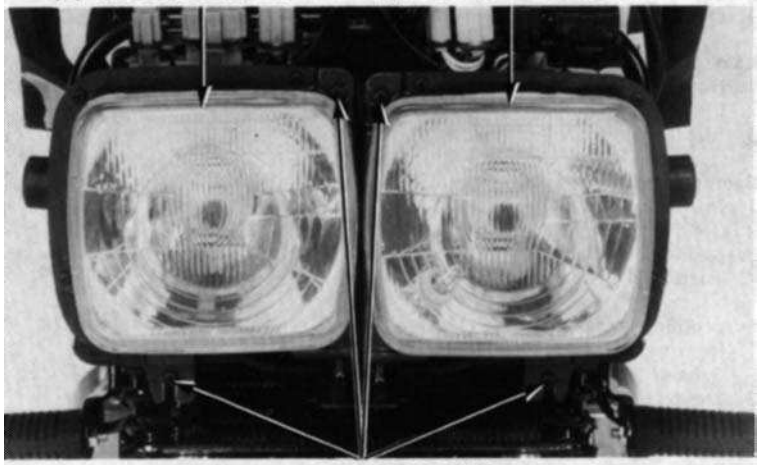
(1) FAIRING

Remove the headlight from the bracket by removing the headlight adjusting screws.

NOTE:
Never remove the headlight from the bracket unless the headlight must be replaced.

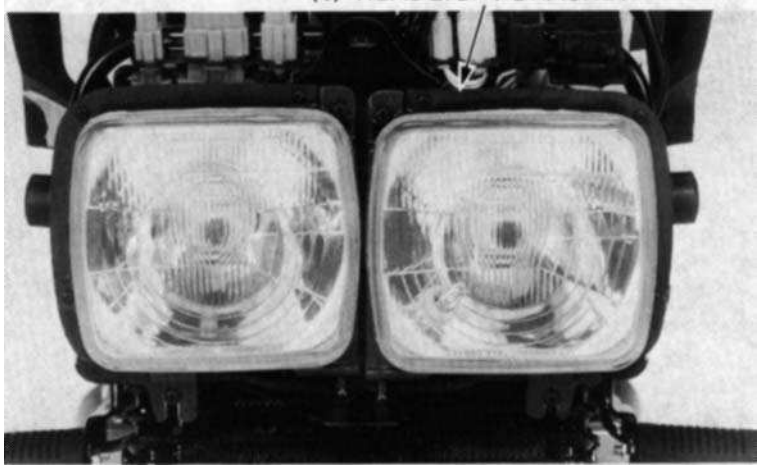
Disconnect the headlight coupler.
Install the headlight in the reverse order of removal.
Adjust the headlight aim after installation.

(1) RIGHT HEADLIGHT (2) LEFT HEADLIGHT



(3) ADJUSTING SCREWS

(1) HEADLIGHT BRACKET

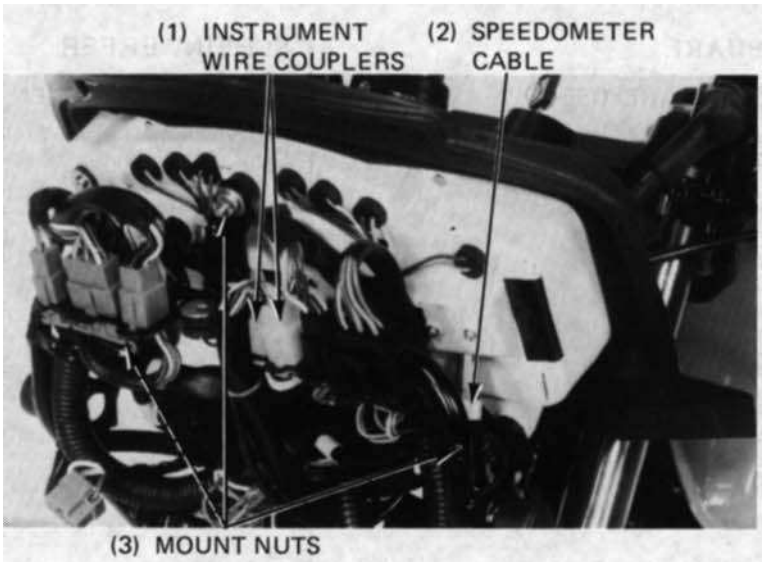


INSTRUMENTS

REMOVAL

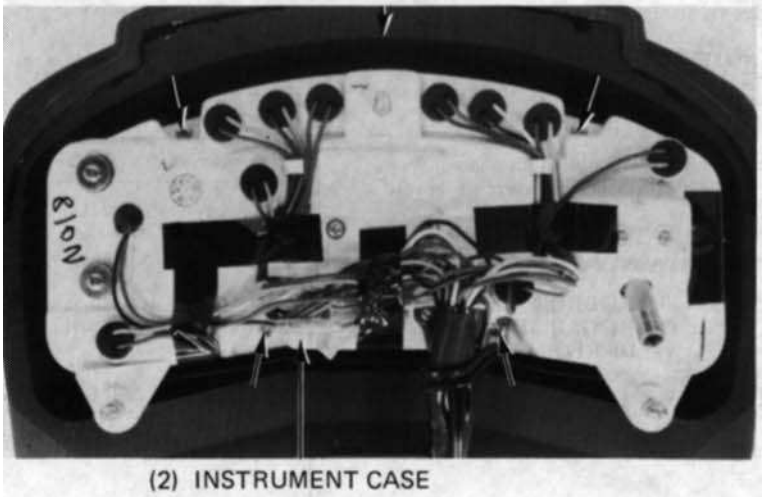
Remove the fairing.
Remove the headlights with their brackets by removing the mount nut and bolt.
Disconnect the headlight couplers.

Disconnect the instrument wire couplers and the speedometer cable.
Remove the three mount nuts and remove the instrument assembly from the bracket.

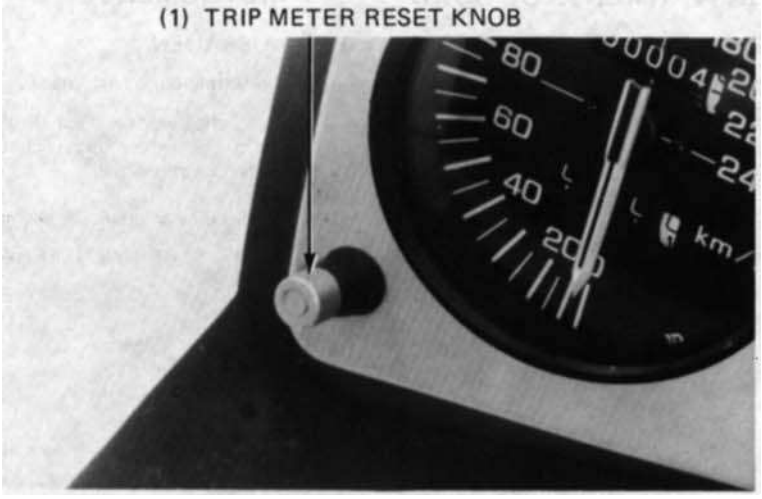


DISSAMBLEY

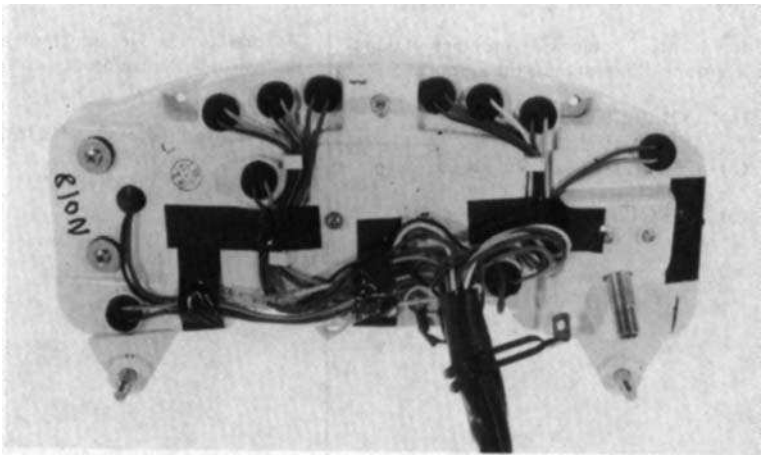
Remove the four screws attaching the instrument case to the instrument panel.



Pull the instrument case to remove the trip meter reset shaft from the knob and grommet and separate the case and panel.

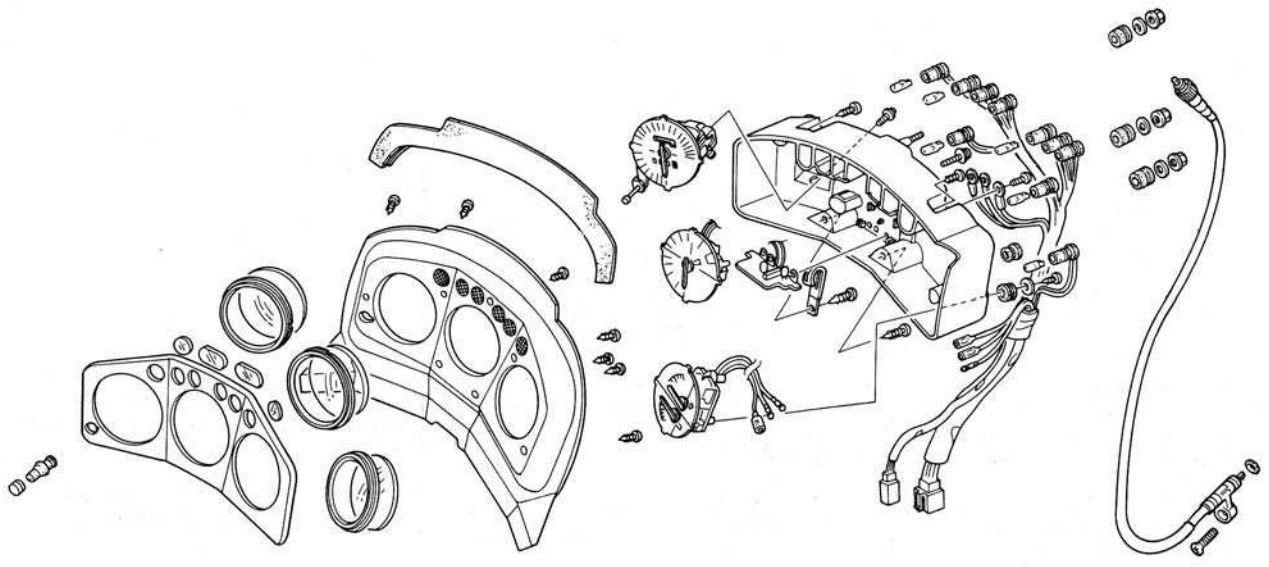


Remove the bulb sockets and meter terminals, and disconnect the meter wire connectors.
Remove the attaching screws and disassemble the instruments.



INSTRUMENTS ASSEMBLEY/INSTALLATION

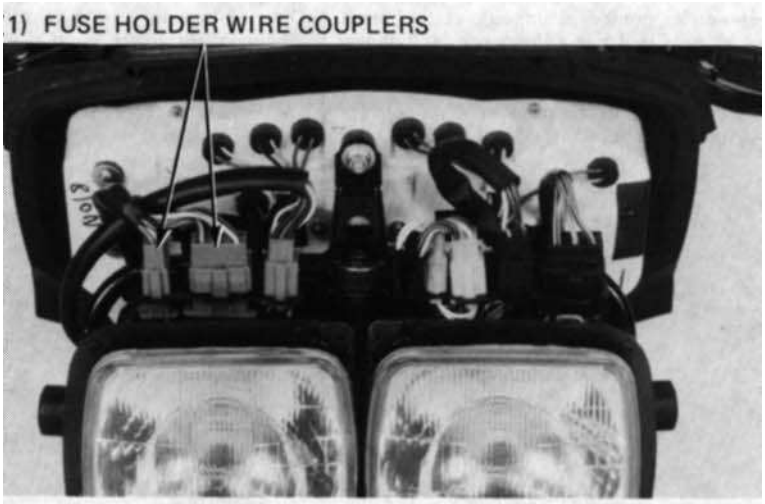
Assemble and install the instruments in the reverse order of disassembly and removal.



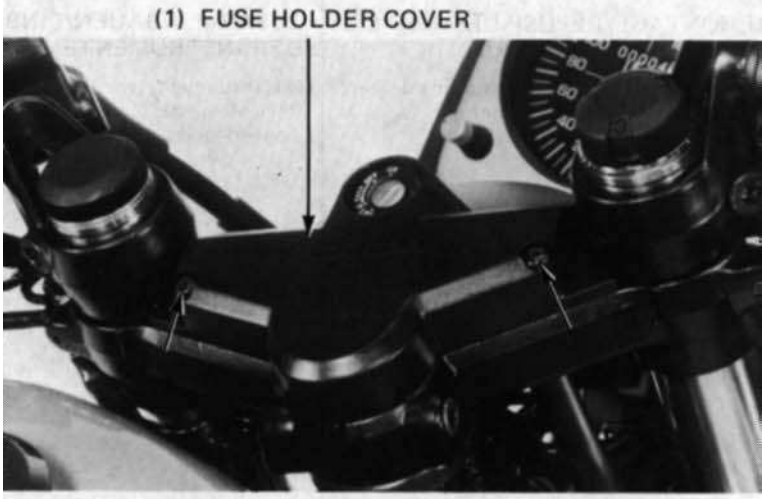
FUSE HOLDER

REPLACEMENT

Remove the fairing (page 13-3)
Disconnect the fuse holder wire couplers.

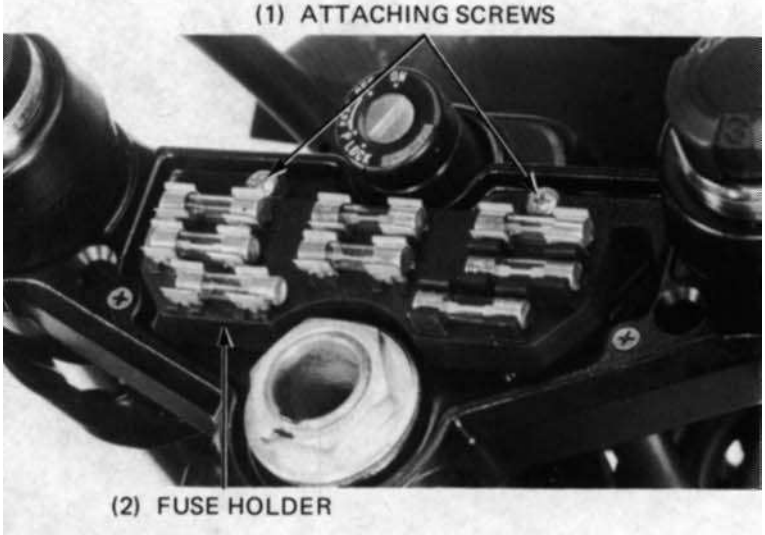


Remove the fuse holder cover.



Remove the two attaching screws and remove the fuse holder from the fork bridge,
Install the fuse holder in the reverse order of removal.

NOTE:
Be sure to route the fuse holder wire harness properly (pages 1-9 thru 1-10)

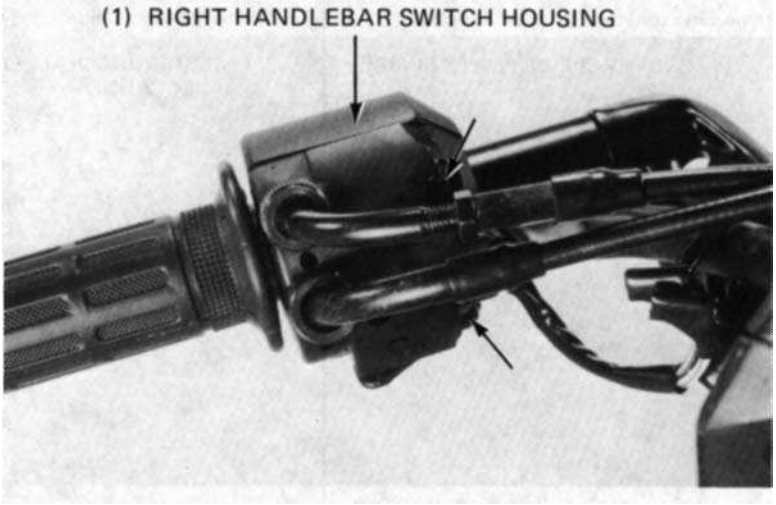


HANDLEBARS

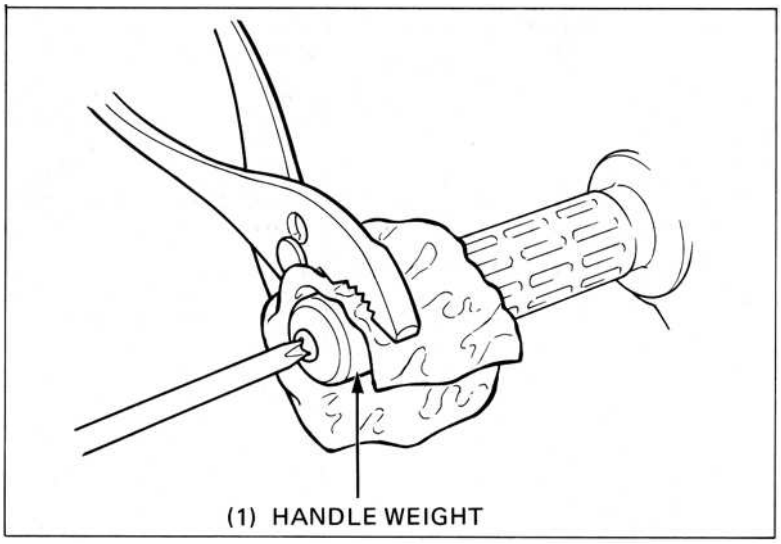
RIGHT HANDLEBAR REMOVAL

Disconnect the front brake switch wires from the switch.
Remove the front brake master cylinder.

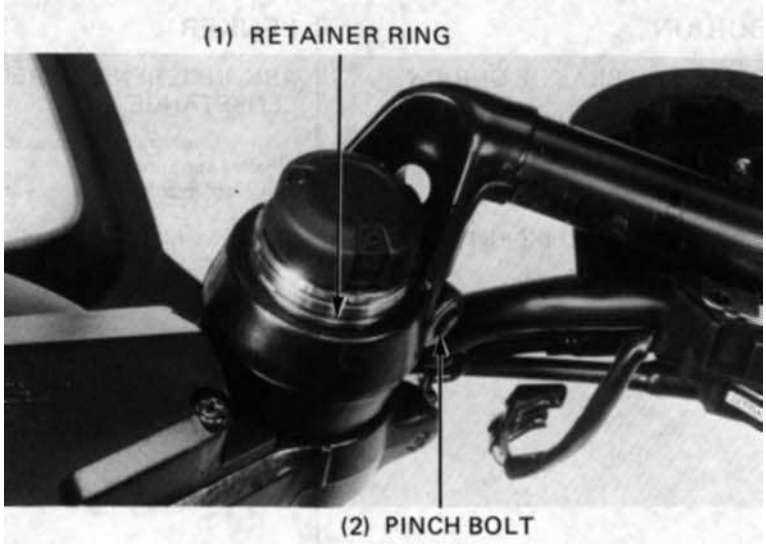
Remove the right handlebar switch housing.



Hold the handle weight with pliers and shop towel, and remove the handle weight attaching screw and weight.

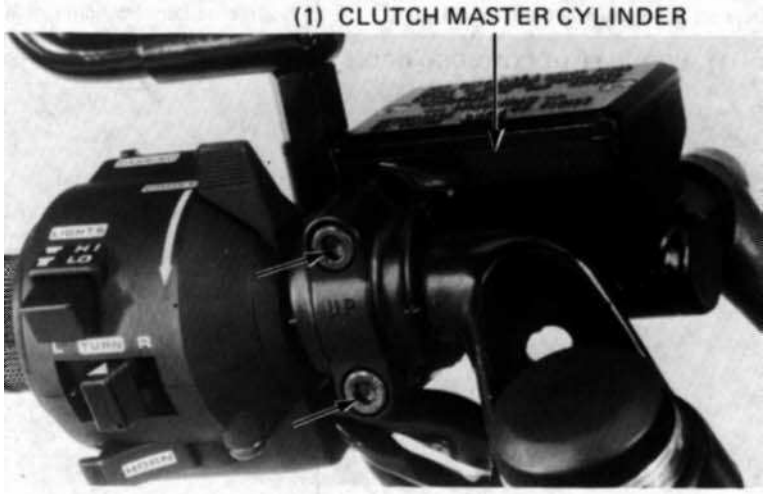


Remove the handlebar retainer ring.
Loosen the handle bar pinch bolt and remove the right handle bar from the fork tube.
Remove the throttle grip from the right handlebar.

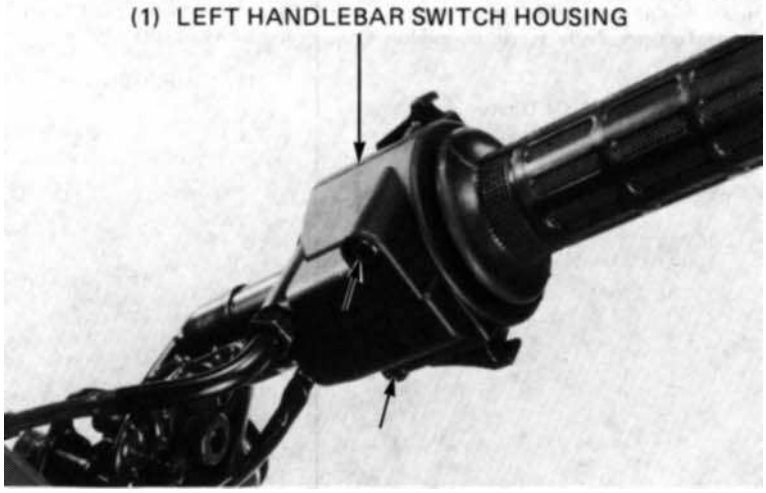


LEFT HANDLEBAR REMOVAL

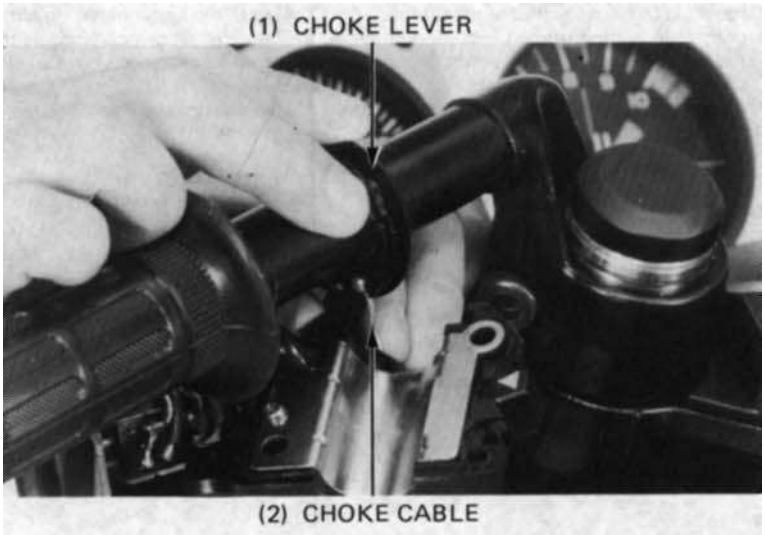
Disconnect the clutch switch wires from the switch.
Remove the clutch master cylinder.



Remove the left handlebar switch housing.

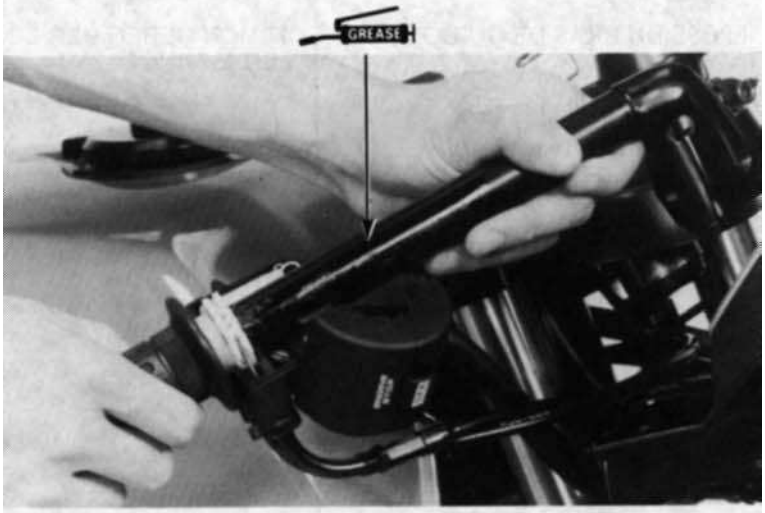


Disconnect the choke cable from the choke lever.
remove the retainer ring, loosen the pinch bolt and remove the left handlebar from the fork tube.



RIGHT HANDLEBAR INSTALLATION

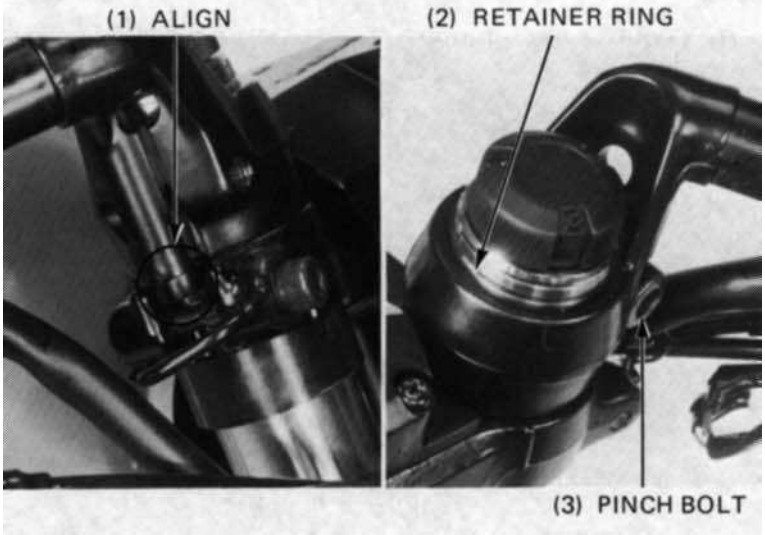
Apply grease to the throttle grip sliding surface and slide the throttle grip over the right handlebar.



Install the right handlebar onto the fork tube and on the top bridge, aligning the pin on the bottom of the handlebar with the slit of the top bridge. Put the pin of the handlebar to the rear surface of the slit and tighten the handlebar pinch bolt.

TORQUE: 35-45 Nm
(3.5-4-5 kgm, 25-33 ft.lb)

Install the handlebar retainer ring.
Install the handle weight and attaching screw to the handlebar.
Hold the weight with pliers and shop towel, and tighten the attaching screw.



Install the right handlebar switch housing, aligning the locating tab of the housing with the hole in the handlebar.
Tighten the forward screw first, then tighten the rear screw.

(1) LOCATING TAB

Place the front brake master cylinder on the handlebar and install the master cylinder holder with the "UP" mark facing up.
Align the index mark on the holder with the punch mark on the handlebar, and tighten the upper bolt first then tighten the lower bolt.

TORQUE: 10-14 Nm
(1.0-1.4 kg.m, 7-10 ft.lb)

Connect the front brake switch wires.

(1) FRONT BRAKE MASTER CYLINDER (2) "UP" MARK

(3) PUNCH MARK (4) INDEX MARK (5) HOLDER

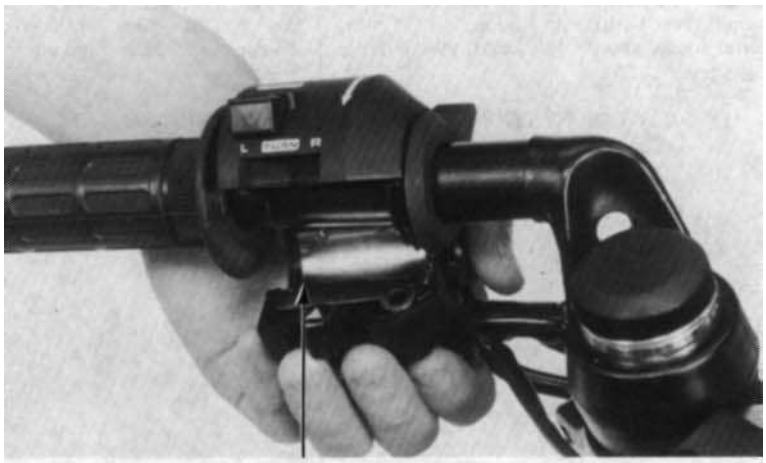
LEFT HANDLEBAR INSTALLATION

Install the left handlebar onto the fork tube in the same manner as the right handlebar (page 13-9).
Connect the choke cable to the choke lever.

(1) CHOKE LEVER

(2) CHOKE CABLE

Install the left handlebar switch housing, aligning the locating tab of the housing with the hole in the handlebar.
Tighten the forward screw first, then tighten the rear screw.



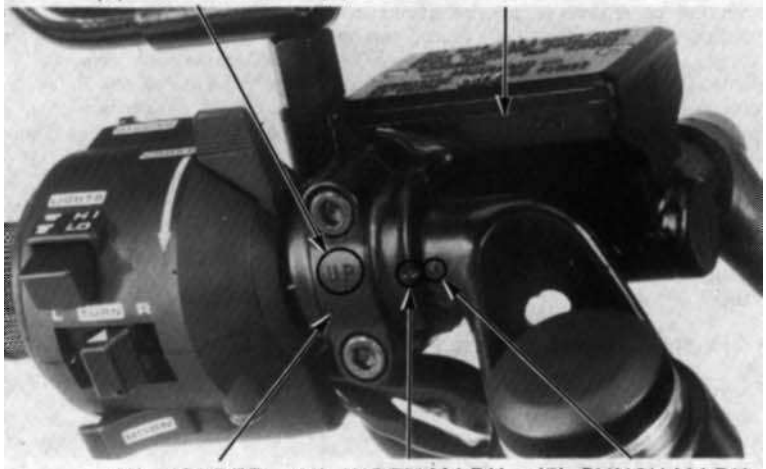
(1) LOCATING TAB

Place the clutch master cylinder on the handlebar and install the master cylinder with the "UP" mark facing up.
Align the index mark on the holder with the punch mark on the handlebar, and tighten the upper bolt first then tighten the lower bolt.

TORQUE: 10-14 Nm (1.0-1.4 kg.m, 7-10 ft.lb)

Connect the clutch switch wires.

(1) "UP" MARK (2) CLUTCH MASTER CYLINDER



(3) HOLDER (4) INDEX MARK (5) PUNCH MARK

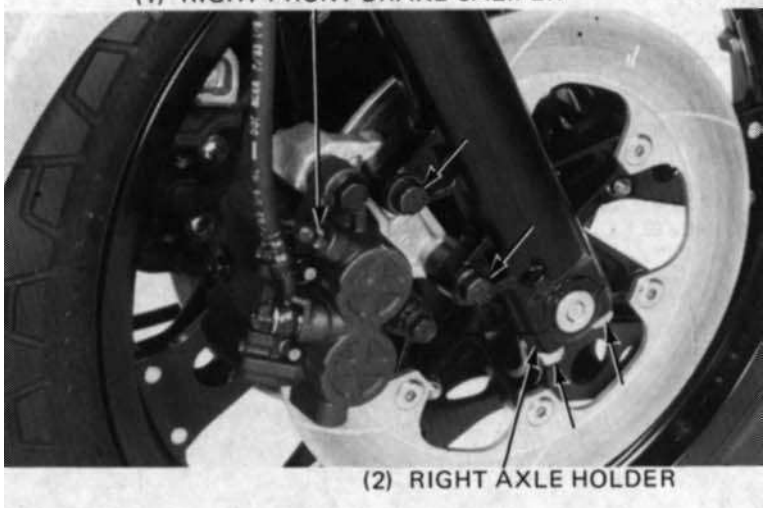
FRONT WHEEL

REMOVAL

Remove the right front brake calliper with its bracket from the fork leg.
Remove the right axle holder.

NOTE:
If you squeeze the front brake lever after the calliper is removed, the calliper piston will move out and make reassembly difficult.

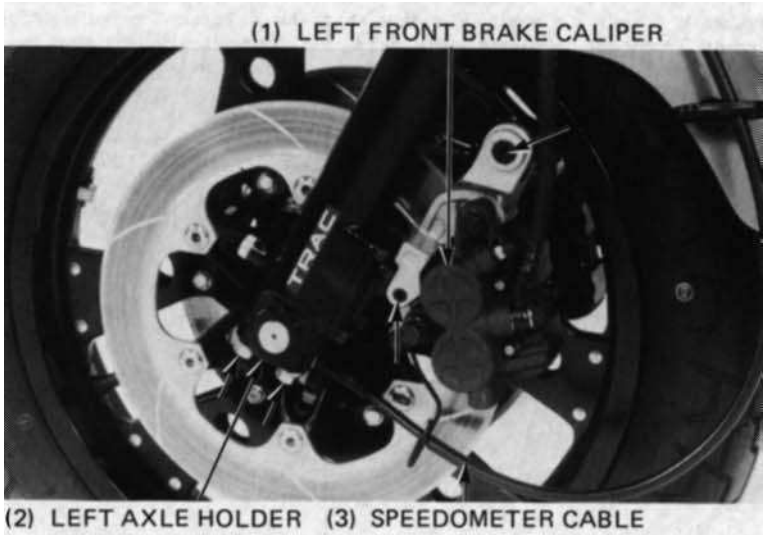
(1) RIGHT FRONT BRAKE CALIPER



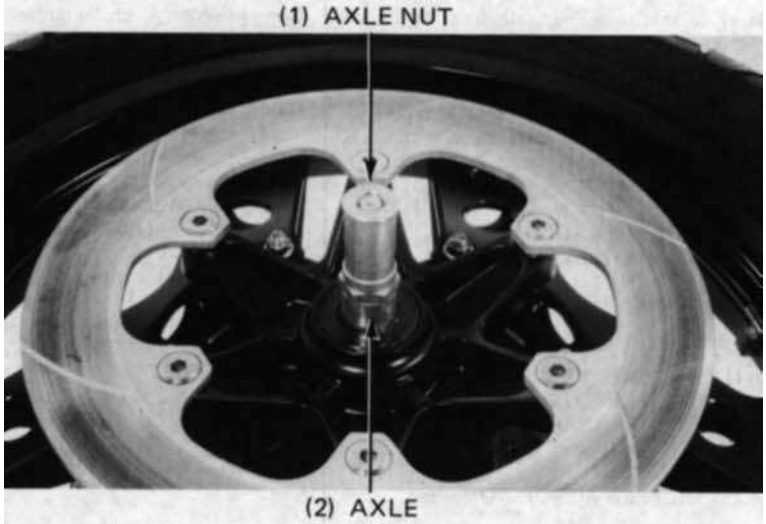
(2) RIGHT AXLE HOLDER

Remove the speedometer cable set screw and disconnect the speedometer cable. Remove the left front calliper with its bracket from the front fork and anti dive piston. Remove the left axle holder.

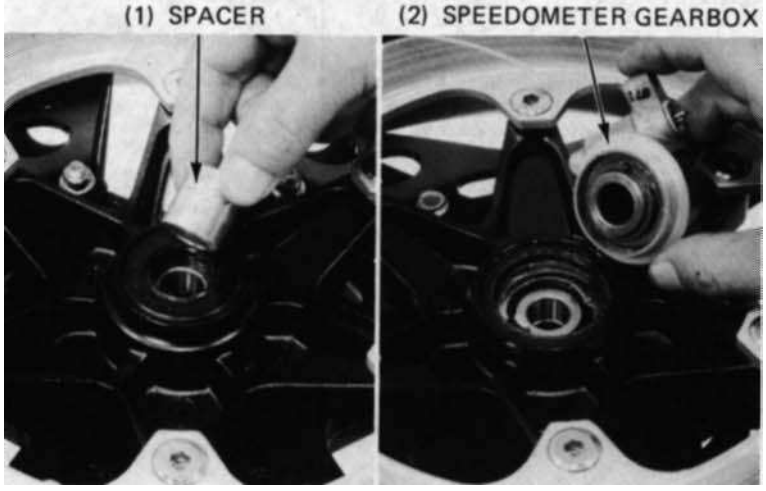
Jack up the engine until the forks clear the axle and remove the front wheel.



Remove the front axle nut and axle.



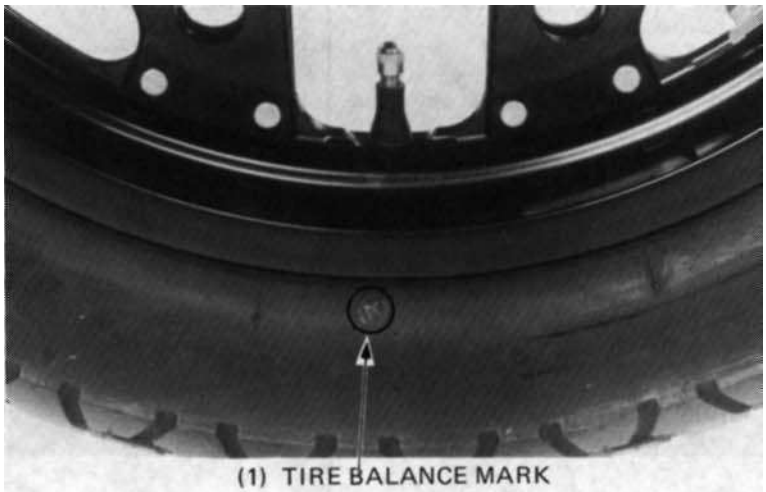
Remove the spacer from the right side. Remove the speedometer gearbox from the left side.



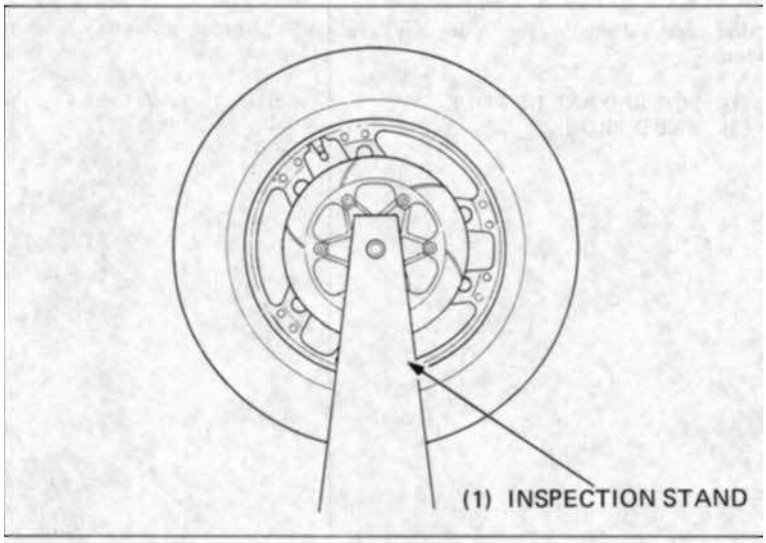
WHEEL BALANCE

CAUTION
Wheel balance directly affects the stability, handling and overall safety of the motorcycle.
Always check balance when the tyre has been removed from the rim.

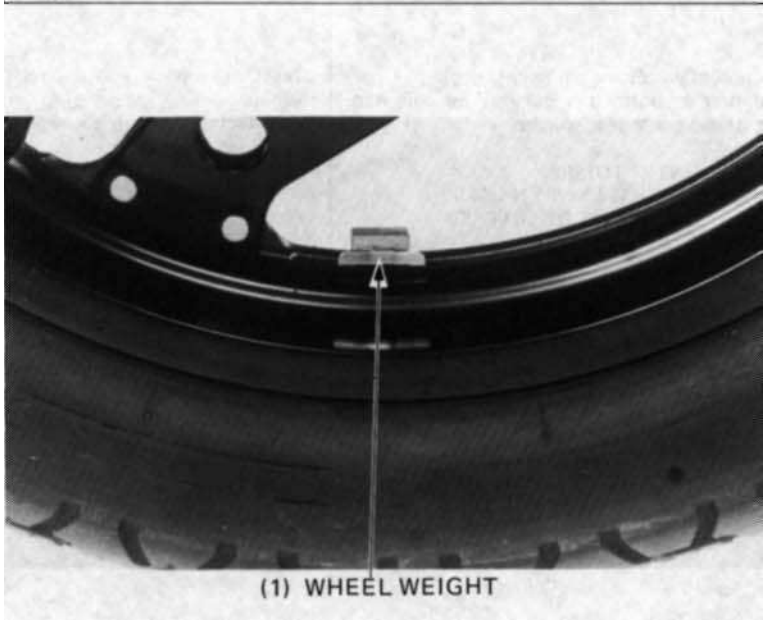
NOTE:
For optimum balance, the tyre balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tyre if necessary.


(1) TIRE BALANCE MARK

Mount the wheel, tyre and brake assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

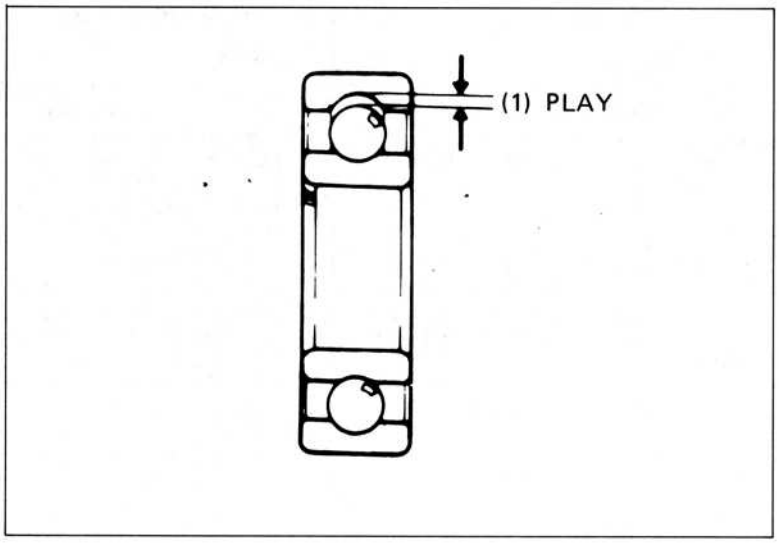

(1) INSPECTION STAND

To balance the wheel, install wheel weight on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when its spun.
Do not add more than 60 grams (rear wheel 70 grams)


(1) WHEEL WEIGHT

WHEEL BEARING INSPECTION

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

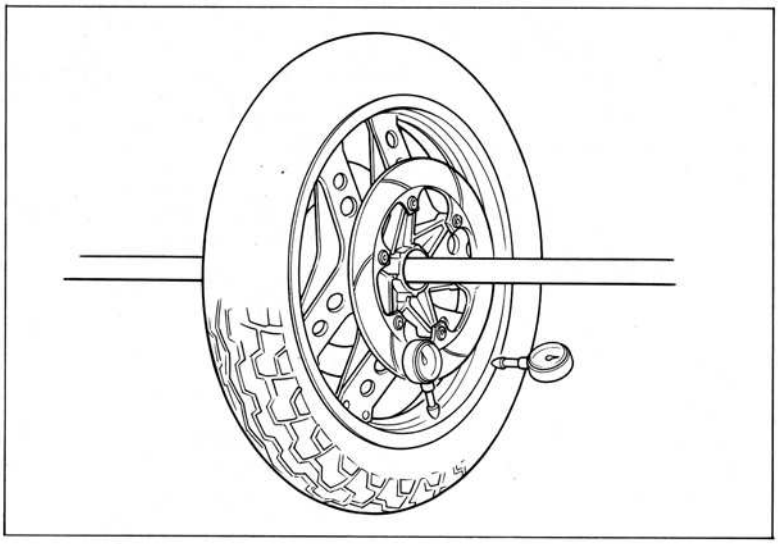


WHEEL INSPECTION

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

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

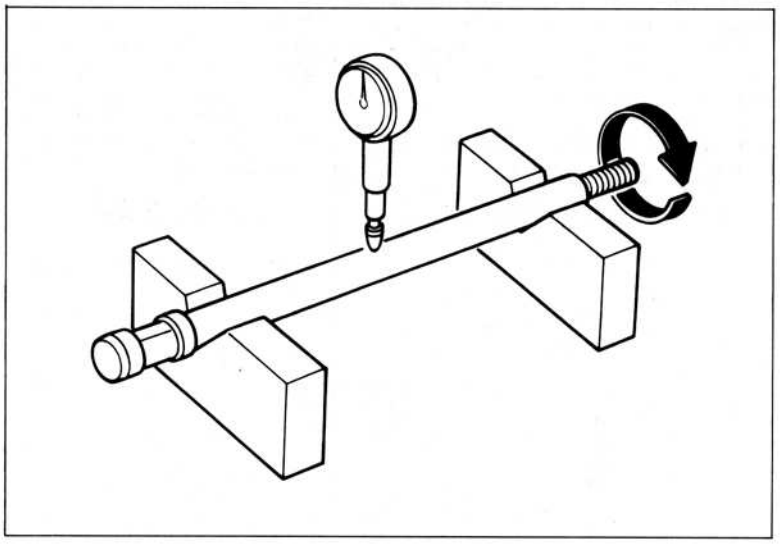
The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



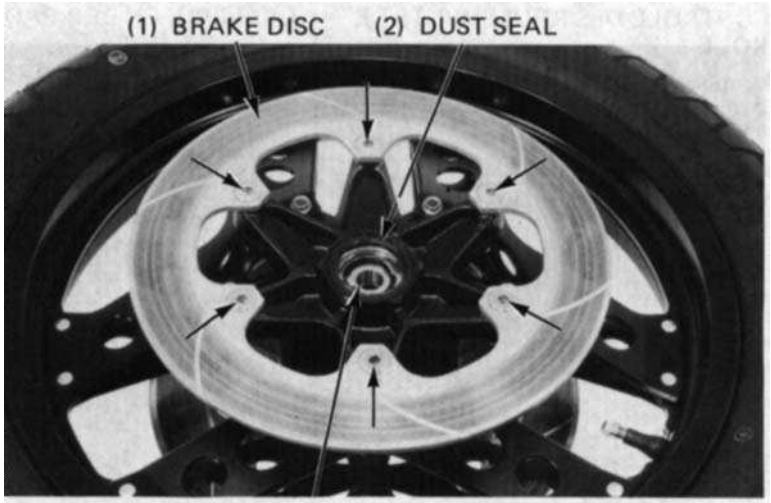
AXLE INSPECTION.

Set the axle in V blocks and measure the runout.

SERVICE LIMIT: 0.2 mm (0.01 in)



Remove the left and right brake disc mounting bolts and discs.
Remove the dust seals from both sides.
Remove the speedometer gear retainer from the left side.



WHEEL BEARING REMOVAL

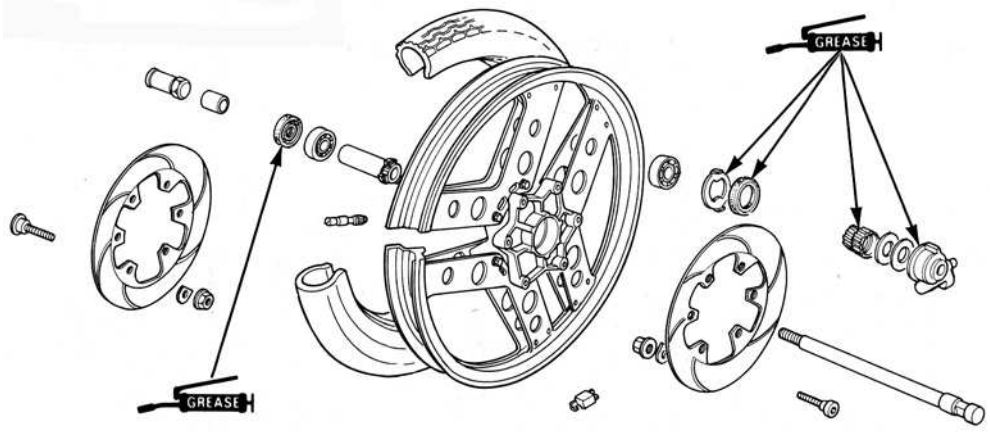
If the bearings need replacement, remove the bearing with special tool.
Remove the distance collar.

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

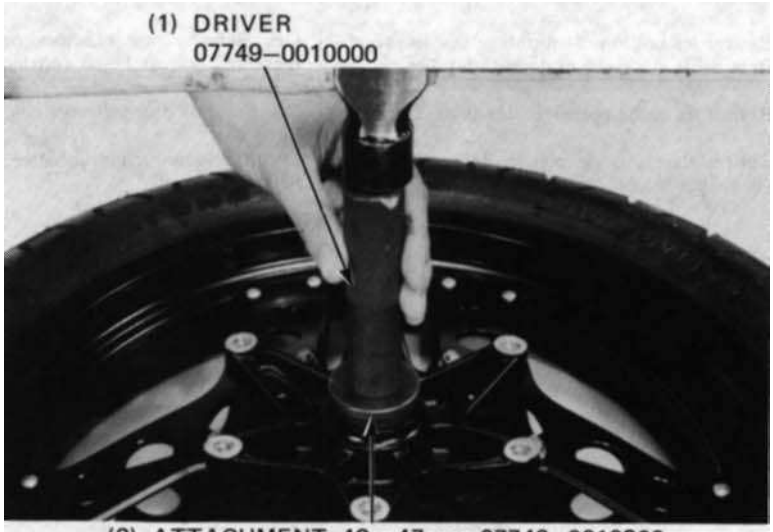
ASSEMBLY

WARNING
Do not get grease on the brake disc or stopping power will be reduced.

NOTE:
- **the cast wheel has no rim band**
- **the front wheel uses a tubeless tyre. For tubeless tyre repair, refer to the Honda Tubeless Tyre manual.**

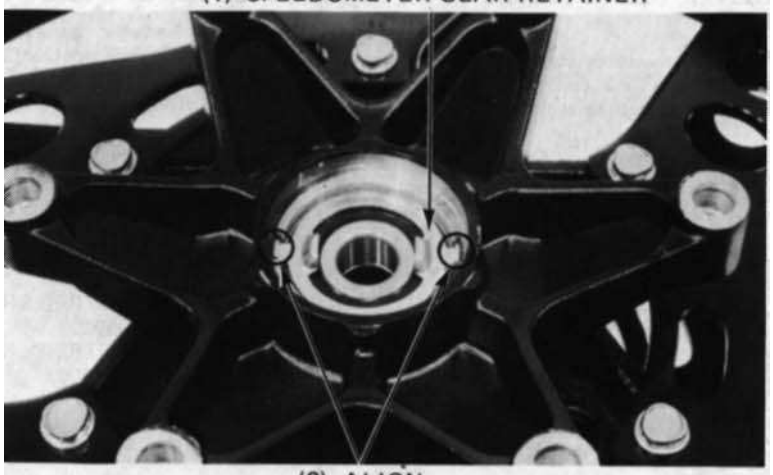


First drive a new right wheel bearing in squarely until it is fully seated, install the distance collar, then drive a new left bearing in squarely.



(2) ATTACHMENT, 42 x 47 mm 07746–0010300
PILOT, 15 mm 07746–0040300

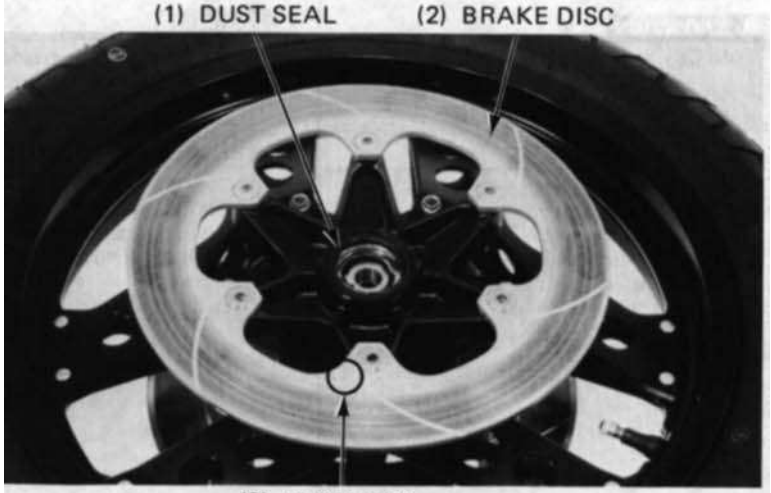
Install the speedometer gear retainer in the left side of the wheel hub, aligning its tangs with the slots in the hub.



(2) ALIGN

Apply molybdenum disulfied grease to the dust seal lips and install the dust seal. Place new gaskets on the disc mounting flange, then install the left disc with its "L" mark facing out. Tighten the disc mounting bolts.

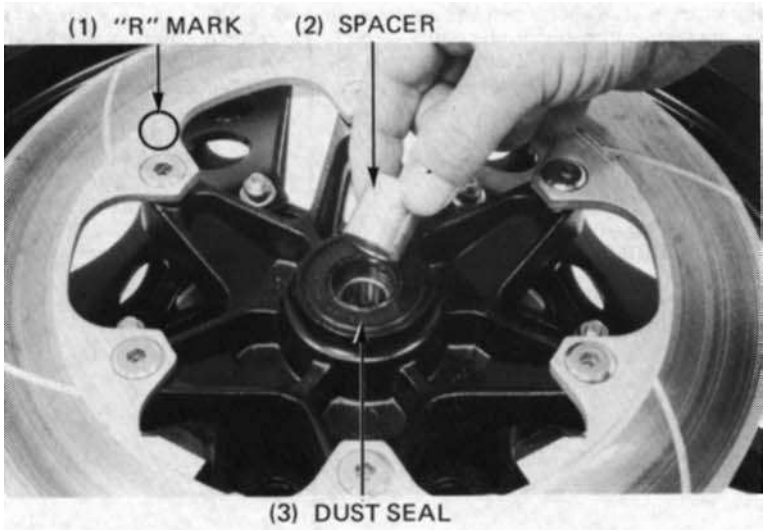
TORQUE: 35-40 Nm (3.5-4.0 kg.m, 25-29 ft.lb)



(3) "L" MARK

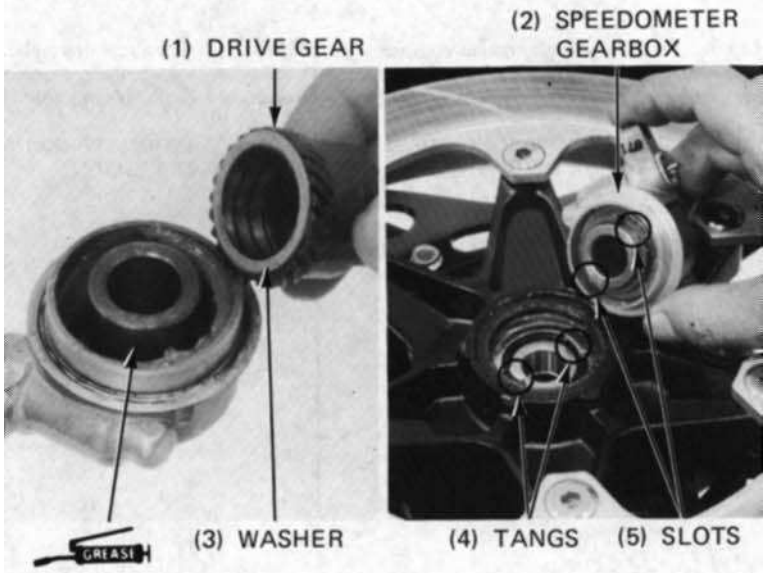
Apply molybdenum disulfied grease to the dust seal lips and install the dust seal.
Place new gaskets on the disc mounting flange, then install the right disc with its "R" mark facing out.
Tighten the mounting bolt to the same torque as the left side.

Install the spacer.



Fill the speedometer gearbox with grease and install the plain washer and drive gear.

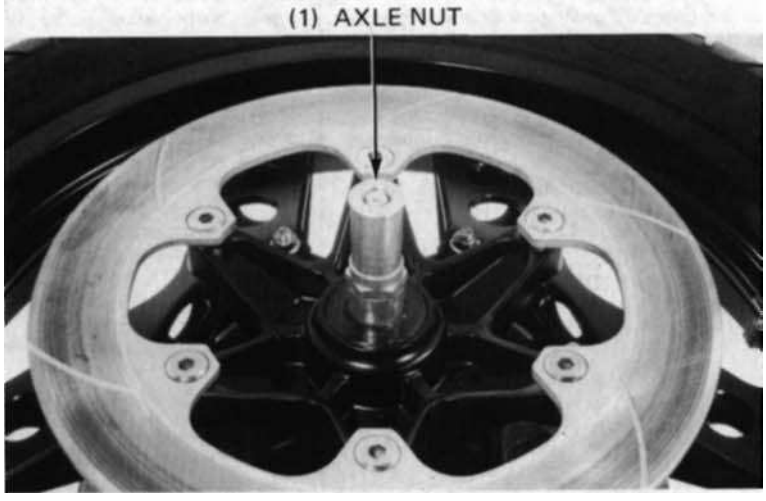
Install the speedometer gearbox in the wheel hub, aligning the tangs in the slots.



Install the front axle and axle nut. Tighten the axle nut.

TORQUE: 55-65 Nm
(5.5-6.5 kg.m, 40-47 ft.lb)

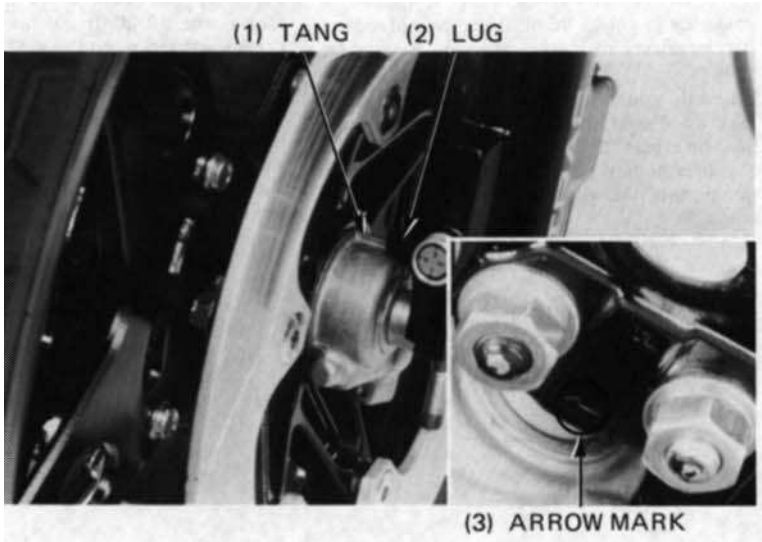
NOTE:
There are flats on the opposite end of the axle, so you can hold the axle while torquing the axle nut.



Clean the brake discs with a high quality degreasing agent.

INSTALLATION

Position the wheel between the fork legs. Lower the engine so the fork legs rest on the top of the axle.
Position the tang on the speedometer gear box against the lug on the left fork leg.
Install the axle holders with the arrow pointing forward.

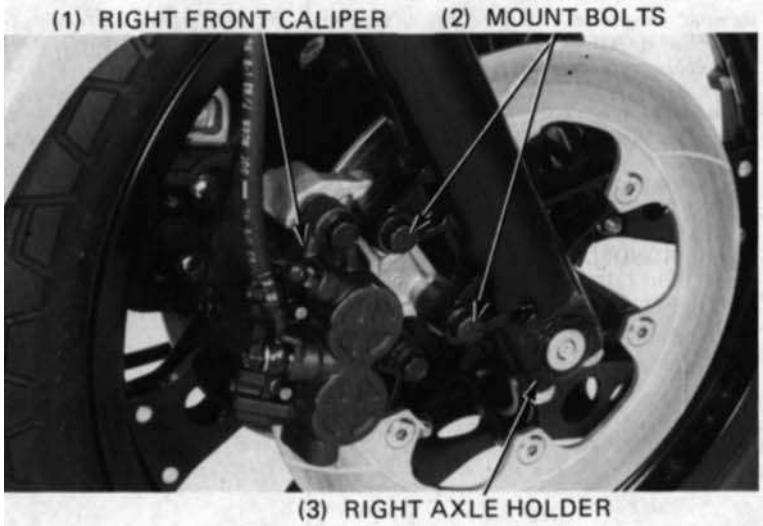


Install the right front calliper so that the disc is positioned between the pads, being careful not to damage the pads.
Tighten the calliper bracket mount bolts.

TORQUE: 35-45 Nm (3.5-4.5 kg.m, 25-33 ft.lb)

Tighten the right axle holder nuts, starting with the forward nut.

TORQUE: 18-26 Nm (1.8-2.6 kg.m, 13-19 ft.lb)



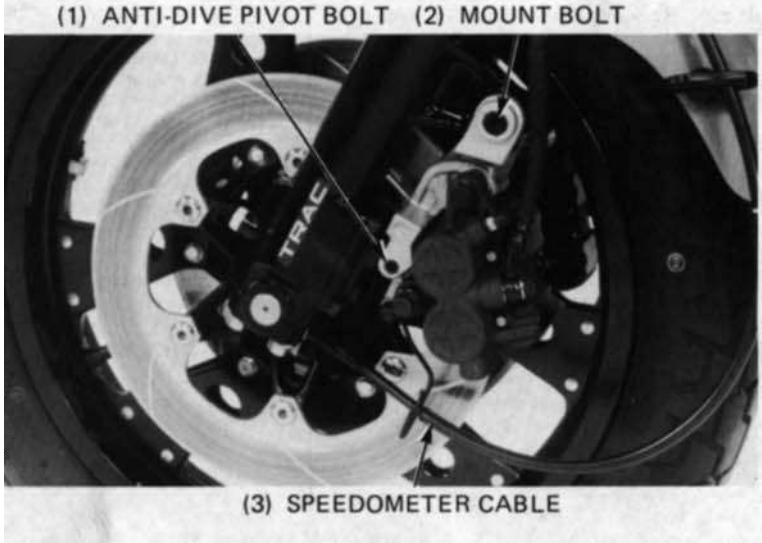
Install the left front calliper so that the disc is positioned between the pads, being careful not to damage the pads.
Tighten the anti dive pivot bolt.

TORQUE: 10-14 Nm (1.0-1-4 kg.m, 7-10 ft.lb)

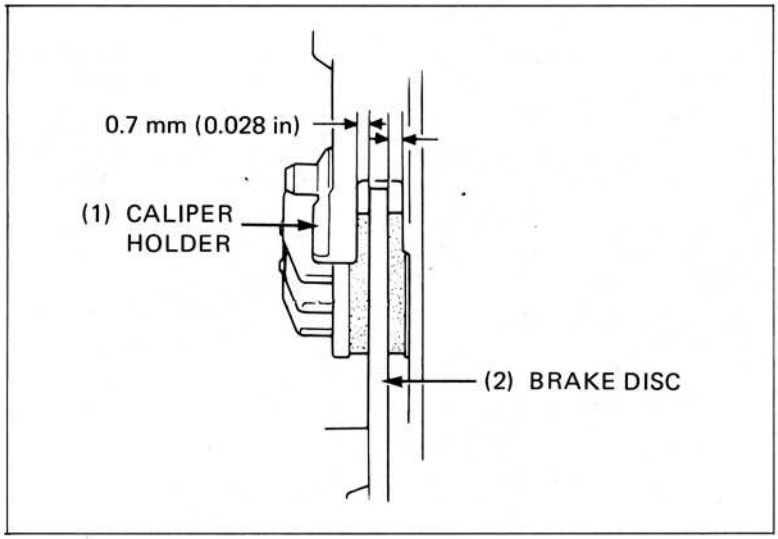
Tighten the calliper bracket mount.

TORQUE: 35-45 Nm (3.5-4.5 kg.m, 25-33 ft.lb)

Connect the speedometer cable and secure it with the set screw.



Measure the clearance between each surface of the left brake disc and the left calliper bracket with a 0.7 mm (0.028 in) feeler gauge. If the gauge inserts easily, tighten the forward left axle holder nut to the specified torque, then tighten the rear nut.
If the feeler gauge cannot be inserted easily, pull the left fork out or push it in until the gauge can be inserted.
After inserting the wheel, apply the brake several times, then recheck both discs for calliper bracket to disc clearance.



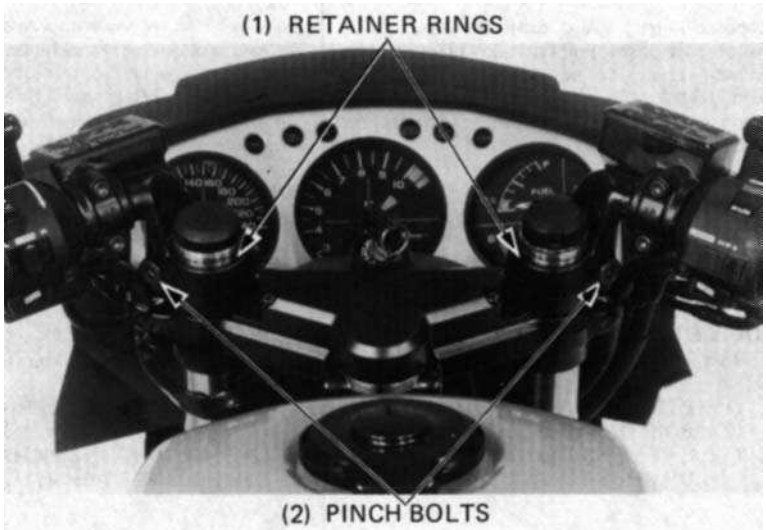
WARNING
Failure to provide adequate disc to calliper bracket clearance may damage the brake disc and impair brake efficiency.

FRONT FORKS

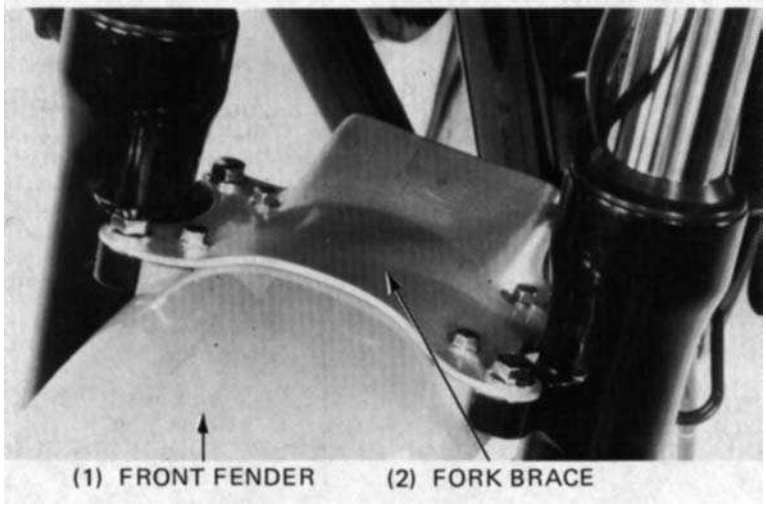
REMOVAL

Remove the following parts:
- fairing (page 13-3)
- front wheel (page 13-11)

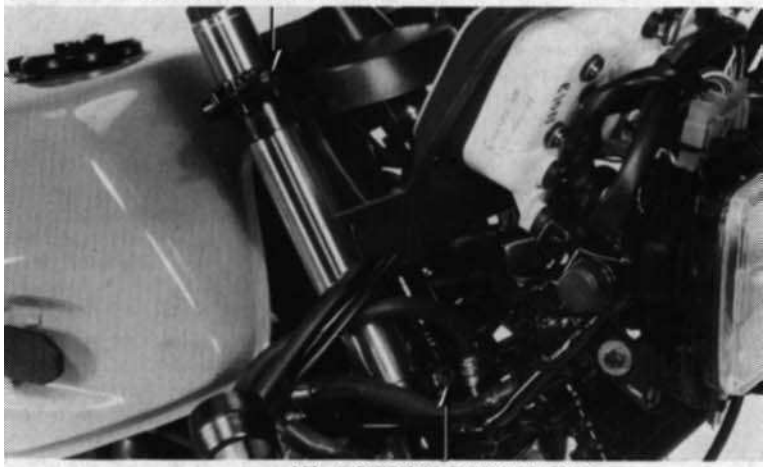
Remove the left and right handlebars by removing the retainer rings and loosening the pinch bolts.



Remove the front fender, then remove the fork brace.



Loosen the fork top and bottom pinch bolt.

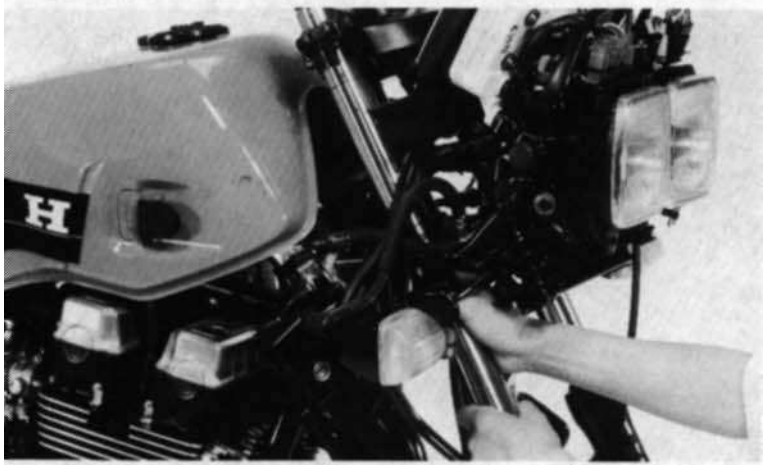


Pull the fork tube down.

NOTE
Because of the friction caused by the air joint O-ring, you'll have to turn the tube while pulling down

Remove the fork stop ring.

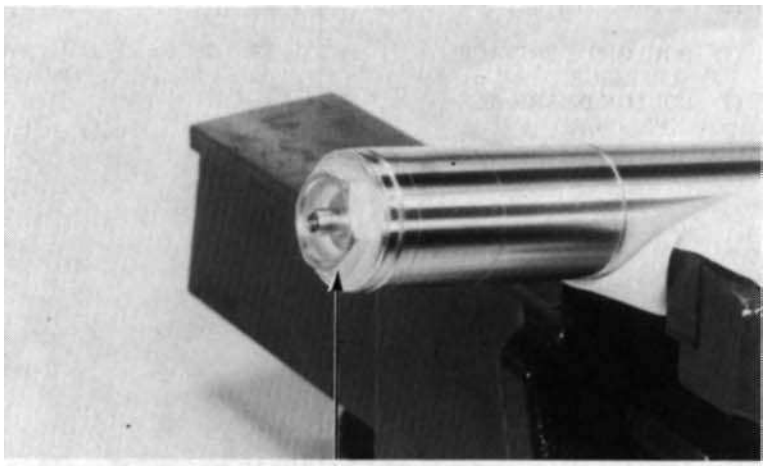
Pull the fork tube out of the top and bottom bridges.



DISASSEMBLY

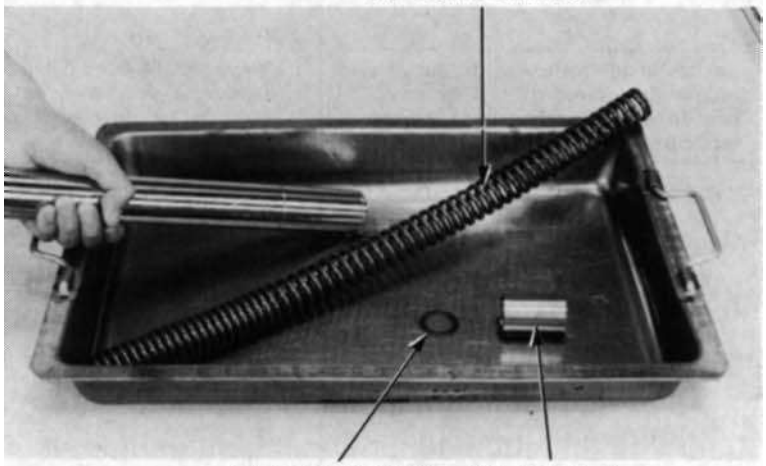
Hold the fork tube in a vise, with soft jaws or a shop towel and remove the fork tube cap.

CAUTION
Do not damage the sliding surface.



(1) FORK TUBE CAP

Remove the space, spring seat and fork spring.
Drain the fork oil by pumping the fork up and down several times.



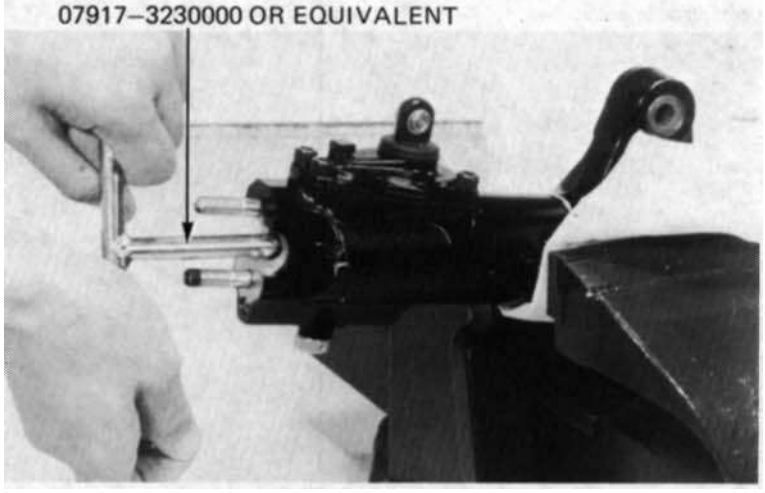
(1) FORK SPRING

(2) SPRING SEAT (3) SPACER

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

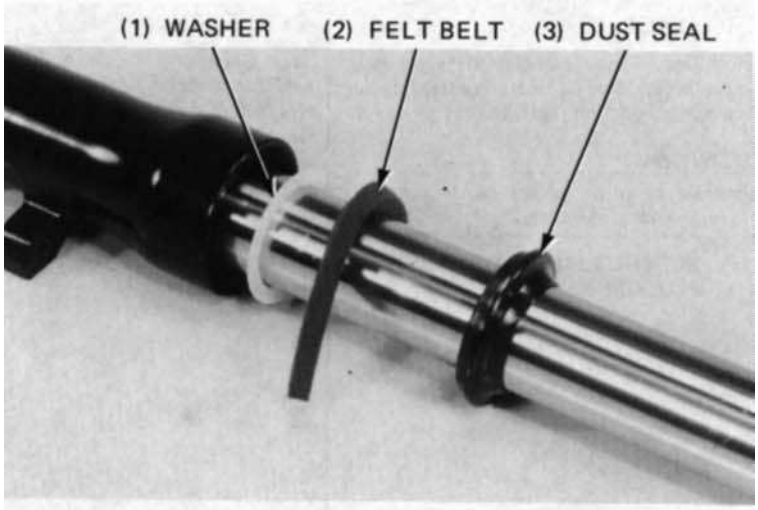
NOTE:
Temporarily install the spring and fork cap if difficulty is encountered in removing the socket bolt.

The piston and rebound spring can be removed from the right fork.

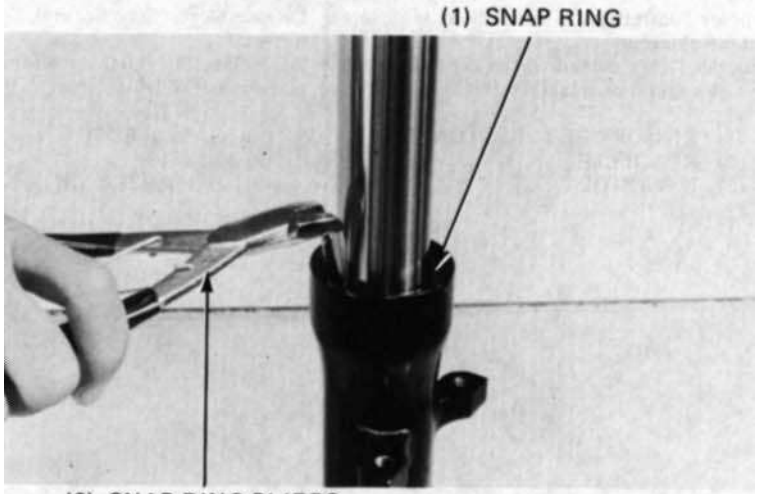


(1) 6 mm HEX WRENCH
07917–3230000 OR EQUIVALENT

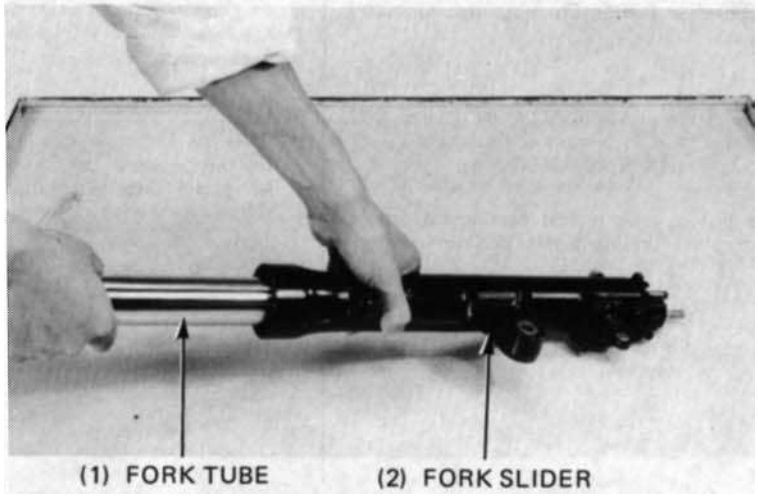
Remove the dust seal.



Remove the snap seal.

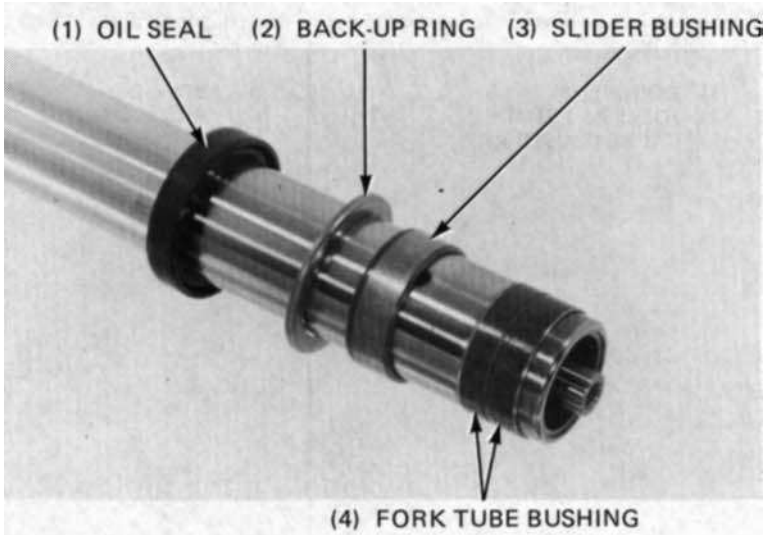


Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.
Remove the oil lock piece from the right fork slider.

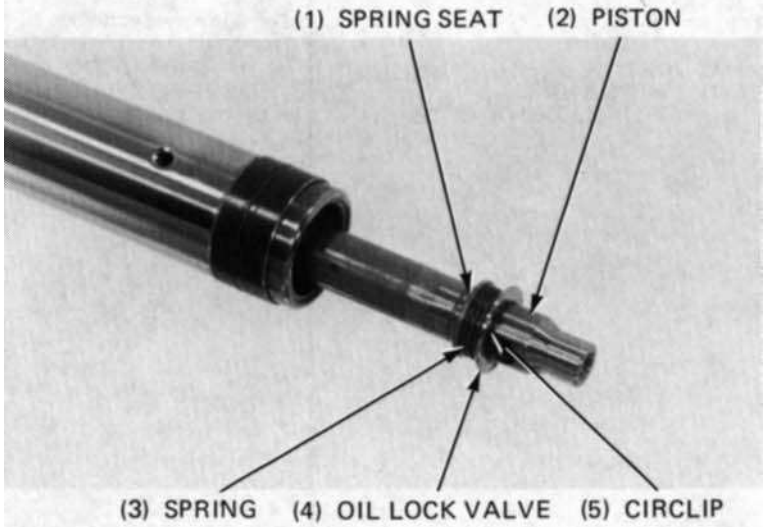


Remove the oil seal, back up ring and slider bushing from the fork tube.

NOTE:
Do not remove the fork tube bushing unless it is necessary to replace it with a new one.



On the left fork, remove the circlip, oil lock valve, spring and spring seat from the piston.
Remove the piston and rebound spring from the fork tube.

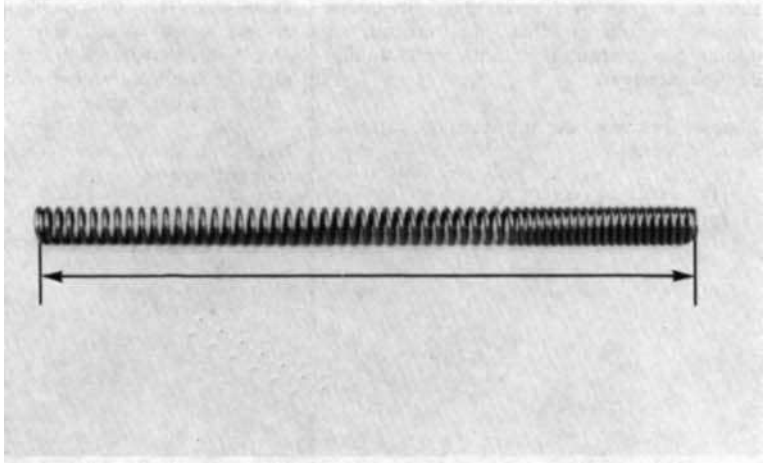


INSPECTION

FORK FREE LENGTH

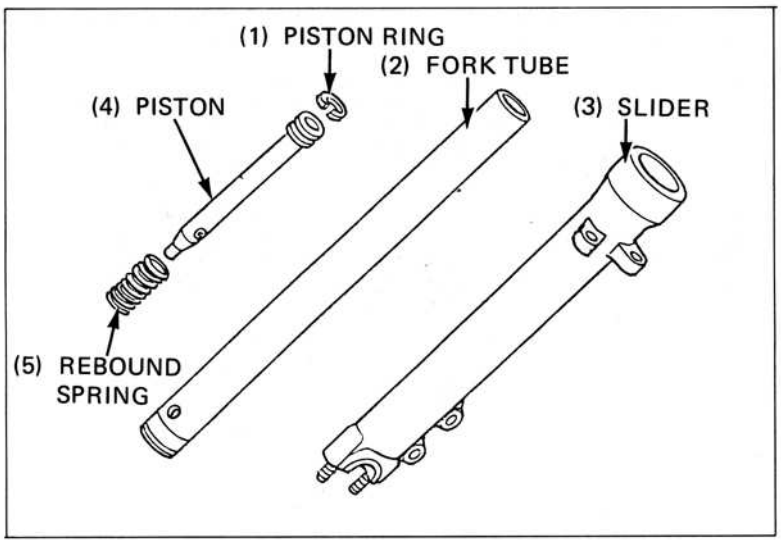
Measure the fork spring free length.

SERVICE LIMIT: 543 MM (21.4 IN)



FORK TUBE/FORK SLIDER/PISTON

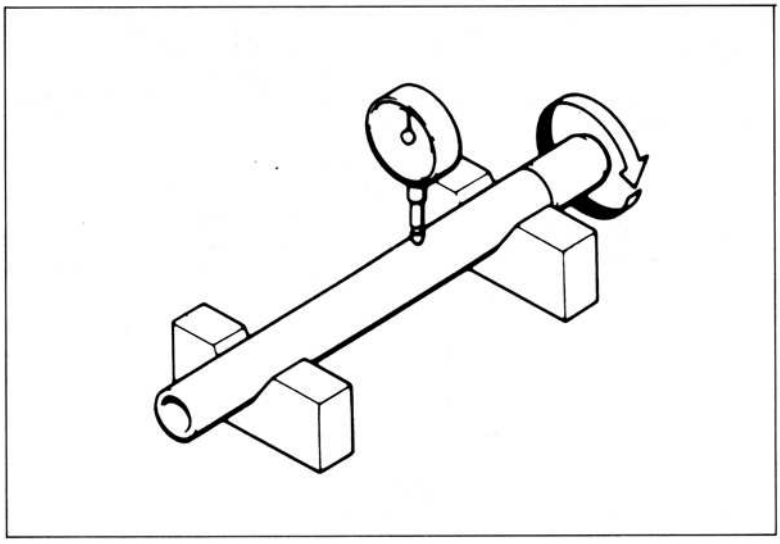
Check the fork tube, fork slider and piston for score marks, scratches, or excessively or abnormal wear.
Replace any components which are worn or damaged.
Check the fork piston for wear or damage.
Check the rebound spring for fatigue or damage.



FORK TUBE

Set the fork tube in V blocks and check its run out.

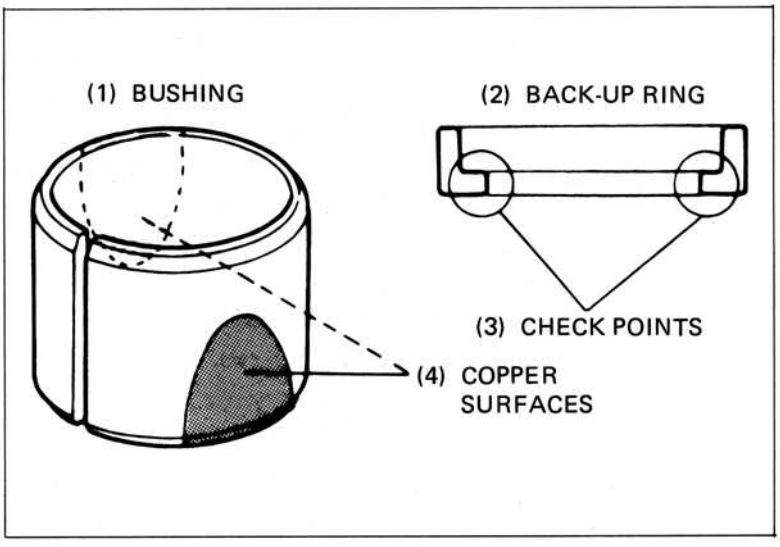
SERVICE LIMIT: 0.20 mm (0.008 in)



BUSHING/BACK UP RING

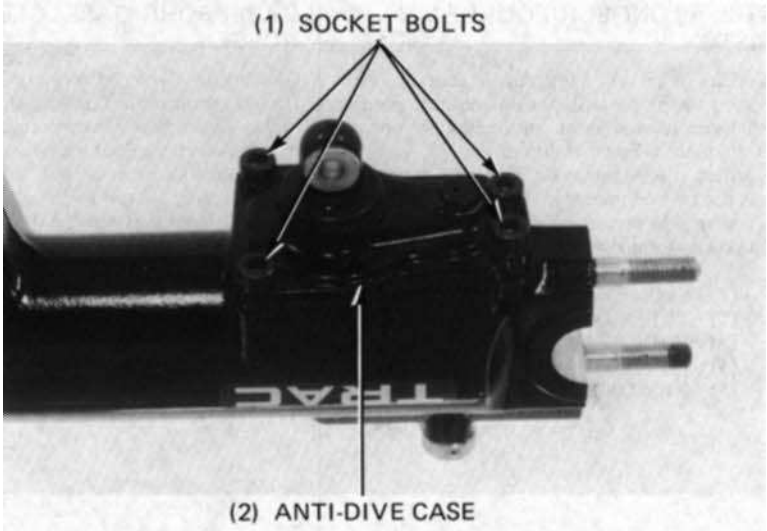
Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back up ring: replace it if there is any distortion at the points shown.

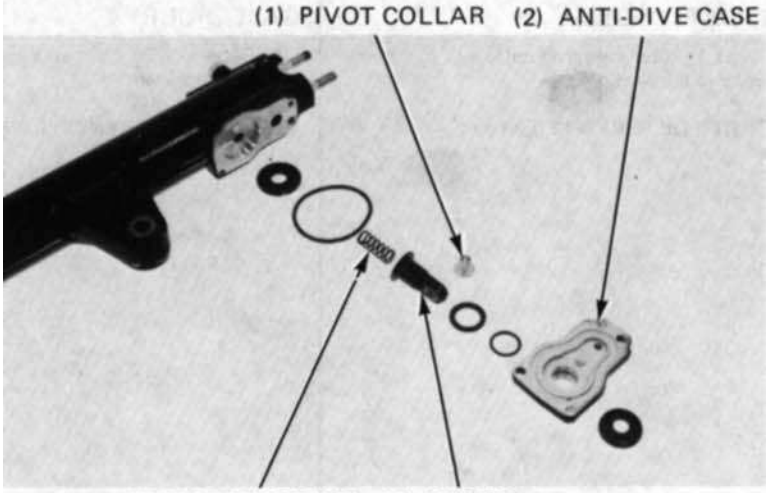


ANTI DIVE CASE

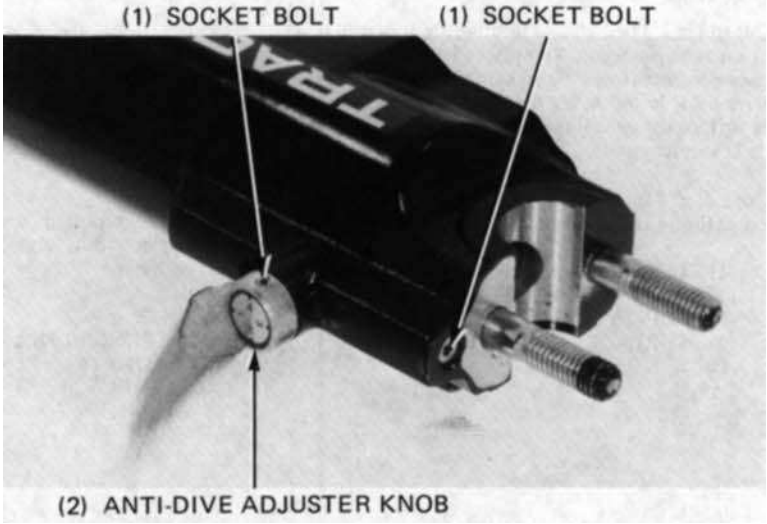
Remove the four socket bolts and remove the anti dive case from the left fork slider.



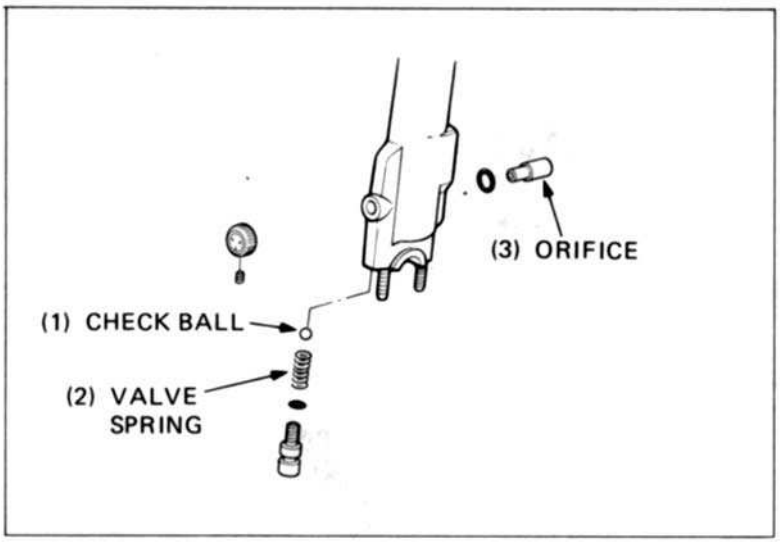
Remove the pivot collar from the piston and disassemble the anti dive case as shown.
Check each part for wear or damage.



Remove the socket bolt and remove the anti dive adjuster knob.
Remove the socket bolt and remove the valve spring and check ball.
Remove the orifice from the fork slider.

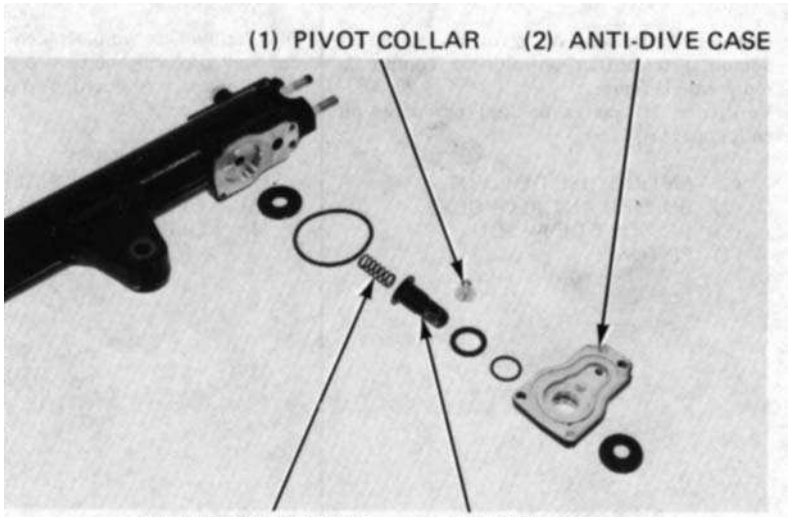


Check the orifice for clogging by applying compressed air. Also check the orifice for damage.
Check the valve spring and check ball for wear or damage.



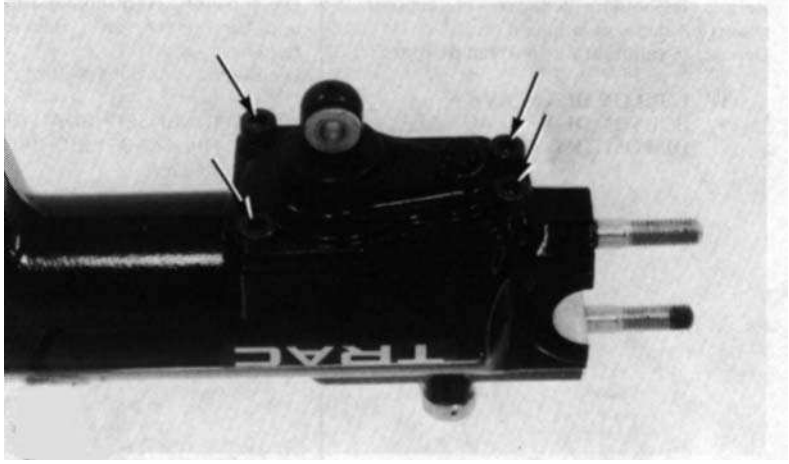
Install the orifice into the left fork slider.
Install the check ball and valve spring, and tighten the socket bolt.
Install the adjuster knob and secure it with the socket bolt.
Assemble the anti dive case.

NOTE:
- **Apply a locking agent to the socket bolt threads before assembly.**
- **Apply ATF to the piston and O-rings.**

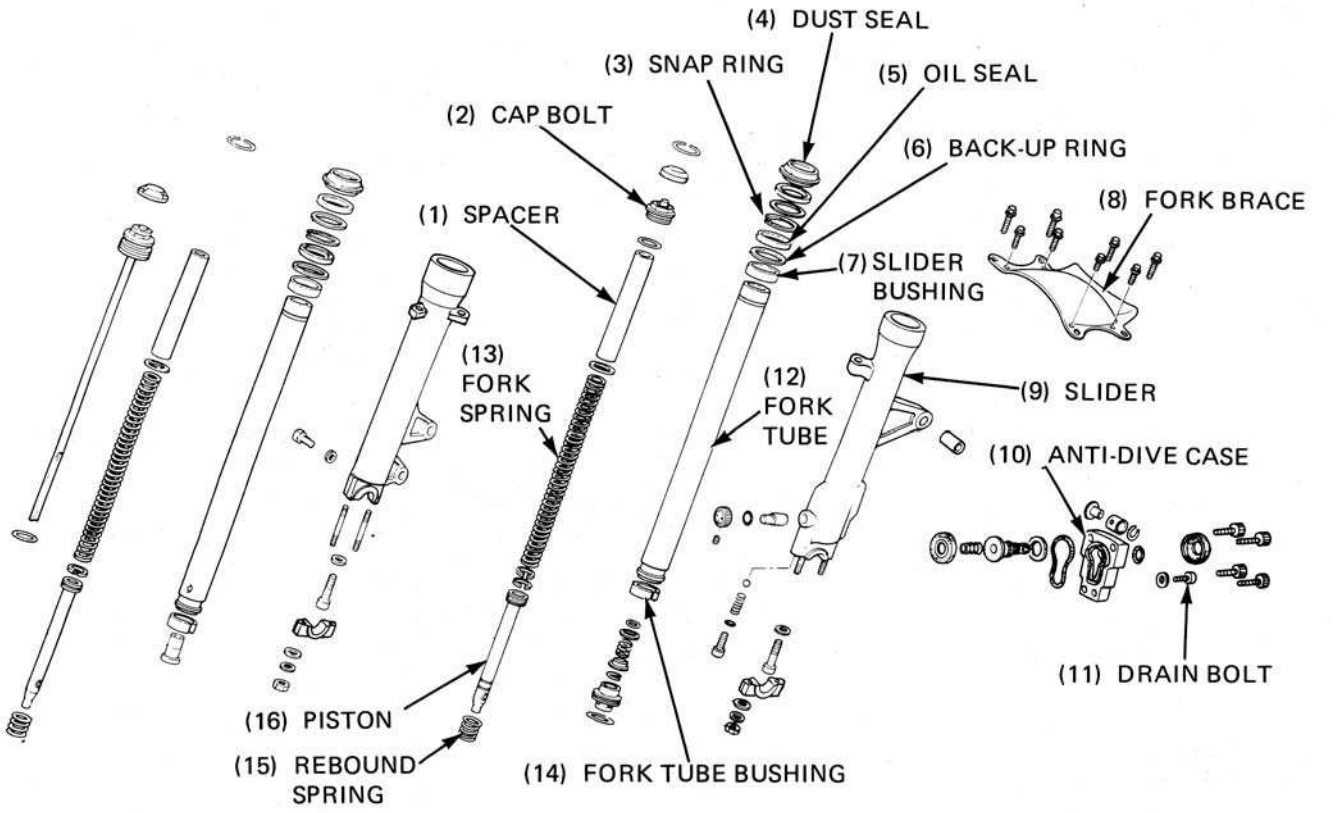


Install the anti dive case onto the left fork slider and tighten the socket bolts.

TORQUE: 6-9 Nm
(0.6-0.9 kg.m, 4-7 ft.lb)



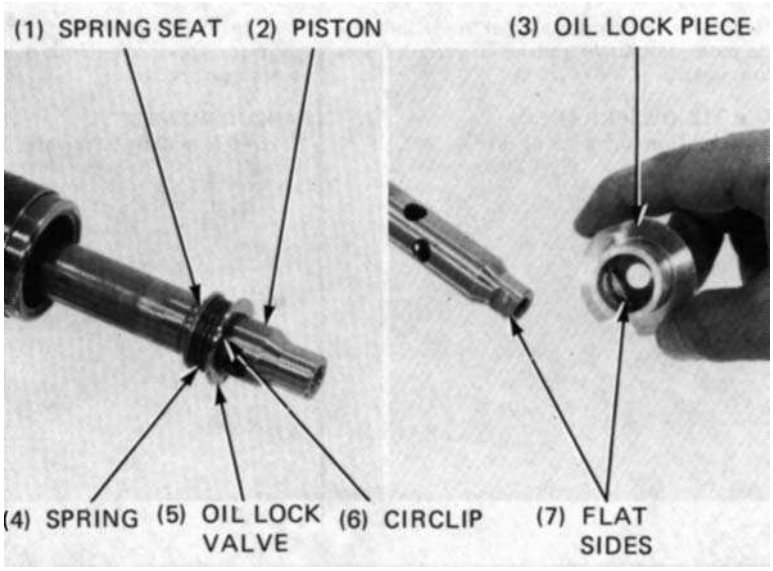
Before assembly, wash all parts with a high flash point or non flammable solvent and wipe them off completely.



Insert the rebound spring and piston into the fork tube.

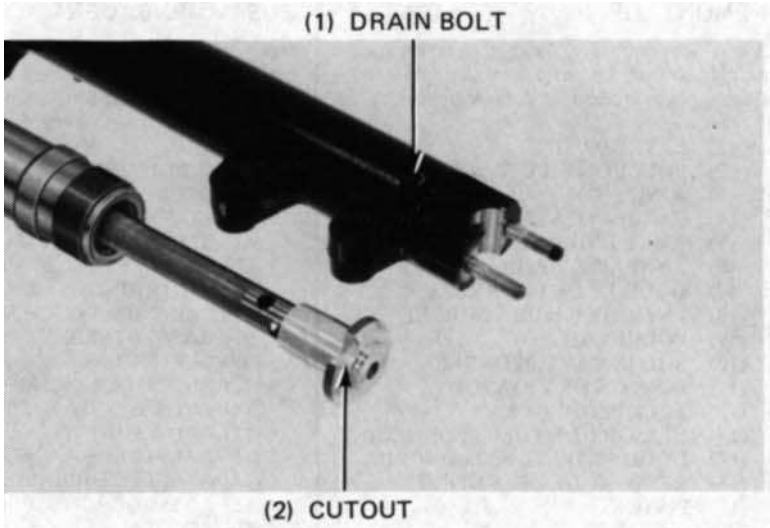
Left fork: Install the spring seat, valve piston, oil lock valve and circlip on the piston.

Right fork: Place the oil lock piece on the end of the piston, aligning the flat sides of the oil lock piece and piston end.



Insert the fork tube into the slider.

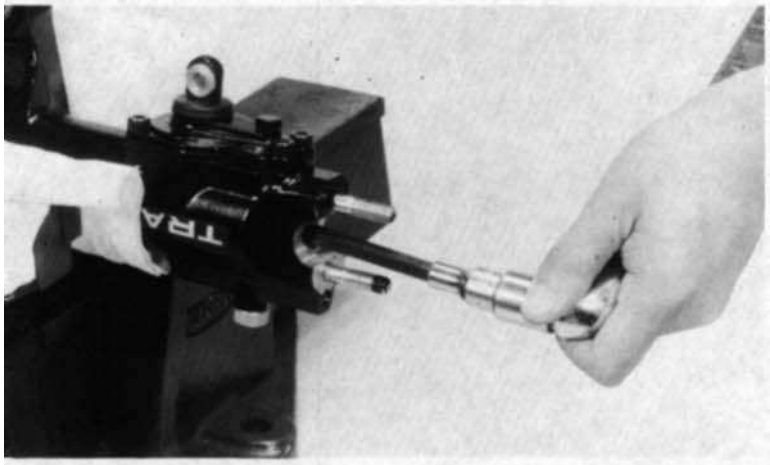
NOTE:
On the right fork, align the cutout of he oil lock piece with the drain bolt in the slider.



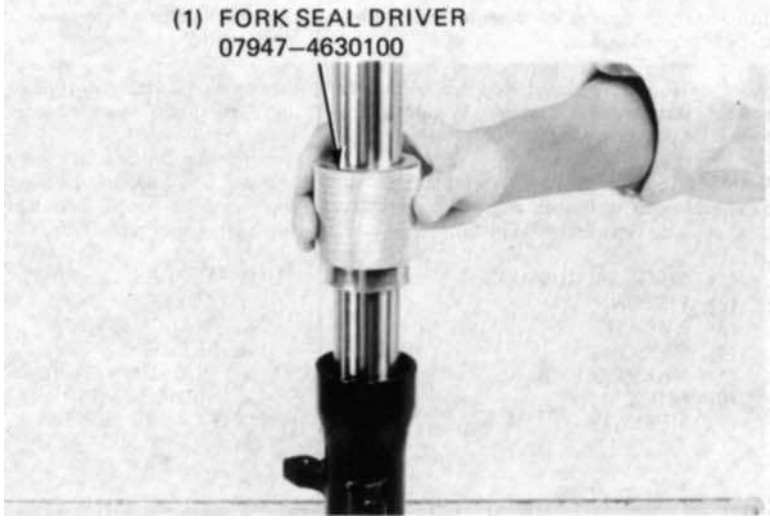
Place the fork slider in a vise with soft jaws or a shop towel.
Apply a locking agent to the socket bolt and thread it into position. Tighten with a 6 mm hex wrench.

NOTE:
Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

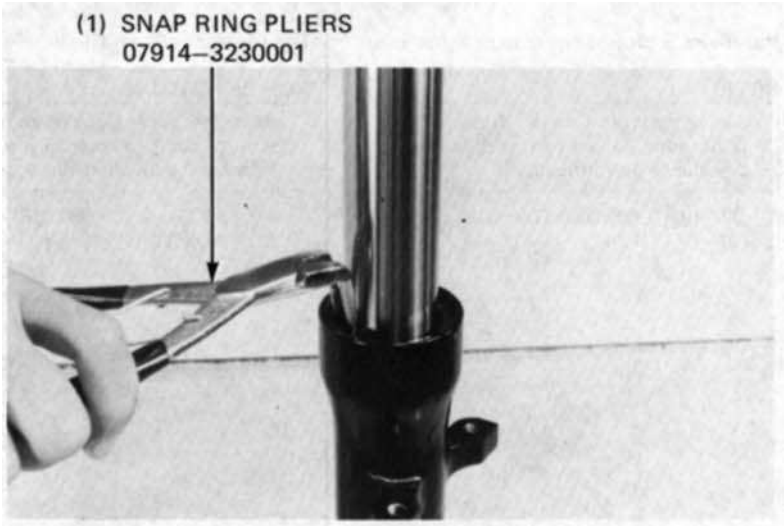
TORQUE: 15-25 Nm
(1.5-2.5 kg.m, 11-18 ft.lb)



Place the slider bushing over the fork tube and rest it on the slider. Put the back up ring and an old bushing or equivalent tool on top.
Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool.
Coat a new oil seal with ATF and install it with the seal markings face up. Drive the seal in with the seal driver.

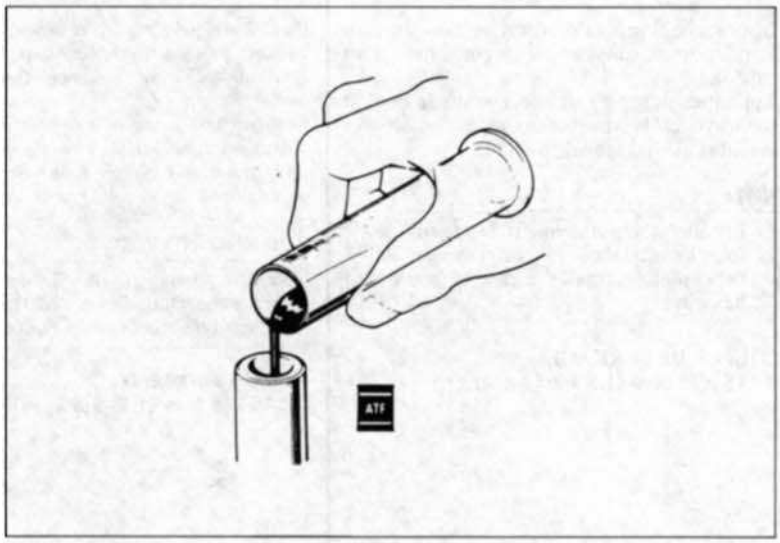


Install he snap ring with its radiused edge facing down and install the washer, oil felt and dust cover.



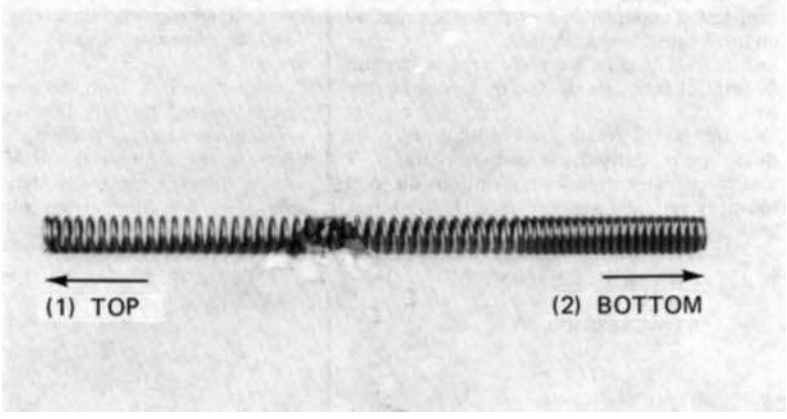
Pour the specified amount of ATF into the fork tube.

CAPACITY:
Right fork: 375 cc (13.2 oz)
Left fork: 400 cc (14.1 oz)



Install the fork spring, spring seat and spacer in the fork tube.

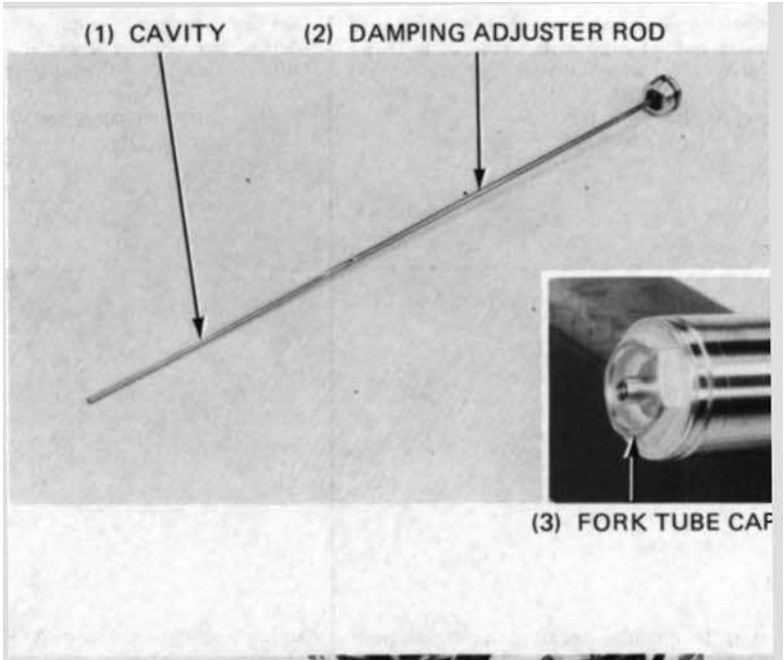
NOTE:
Note the spring direction: the closely wound coils must face toward the bottom.



Hold the fork tube in a vise with soft jaws or a shop towel, and install and tighten the fork tube cap.

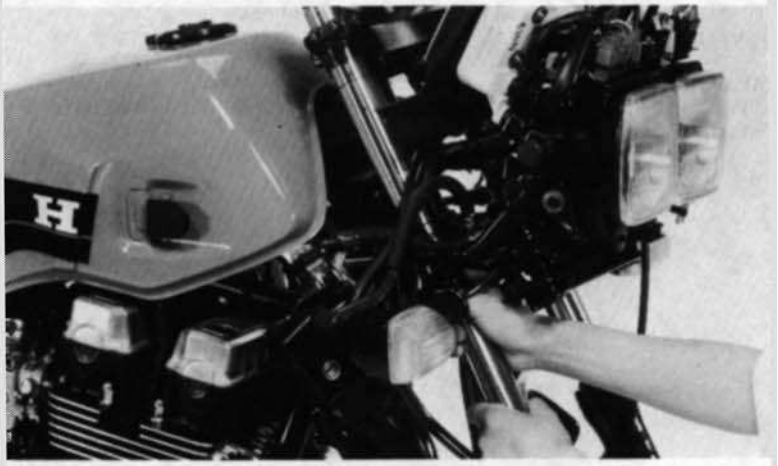
TORQUE: 15-30 Nm (1.5-3.0 kg.m, 11-22 ft.lb)

NOTE:
On the right fork, align the cavity on the damping adjuster rod with the flat side of the piston.

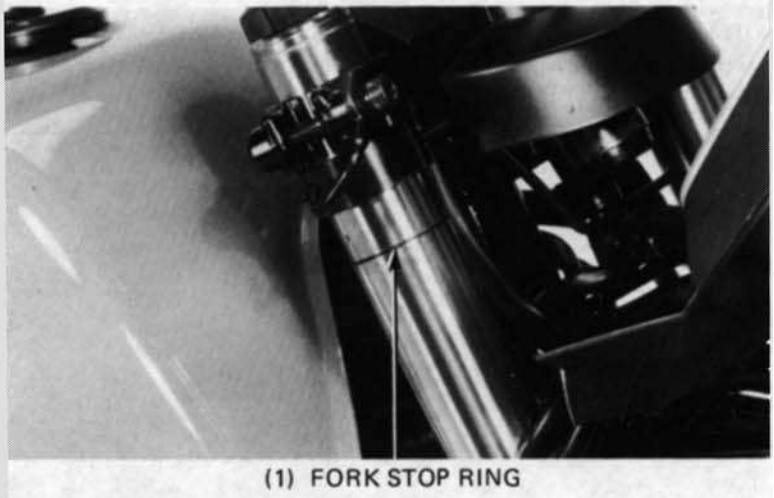


INSTALLATION

Install the fork and temporarily tighten the bottom pinch bolt.



Install the fork stop ring in the groove in the fork tube.
Push the fork tube up until the stop ring contacts the air joint.

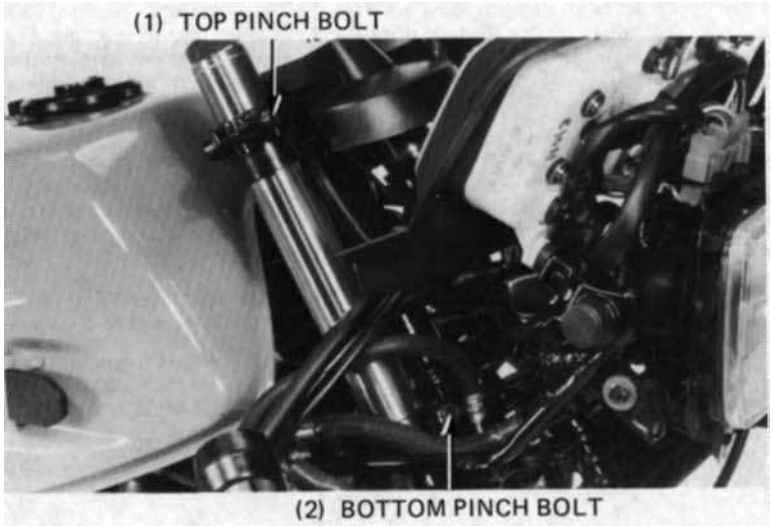


Tighten the bottom pinch bolt.

TORQUE: 45-55 Nm
4.5-5.5 kg.m, 33-40 ft.lb)

Tighten the top pinch bolt.

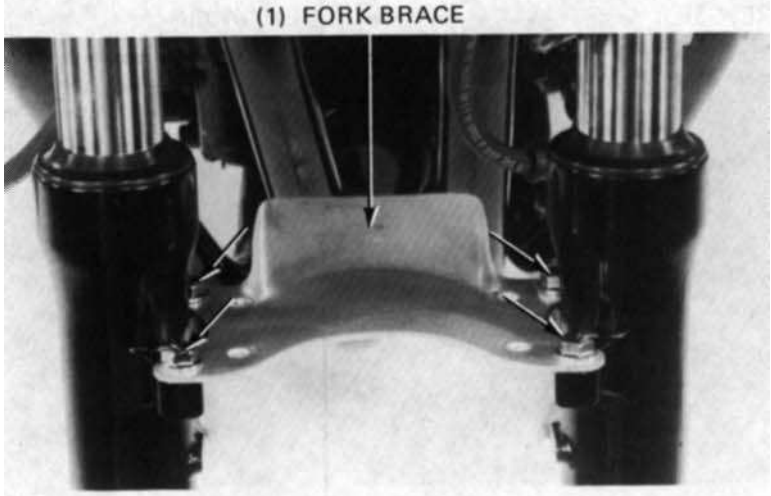
TORQUE: 9-15 Nm
(0.9-1.5 kg.m, 7-11 ft.lb)



Loosely install the fork brace.
Install the removed parts in the reverse order of removal.
- front fender.
- Handlebars.
- front wheel.
- fairing.

With the front brake applied, pump the forks up and down several times.
Tighten the front fork brace mounting bolts.

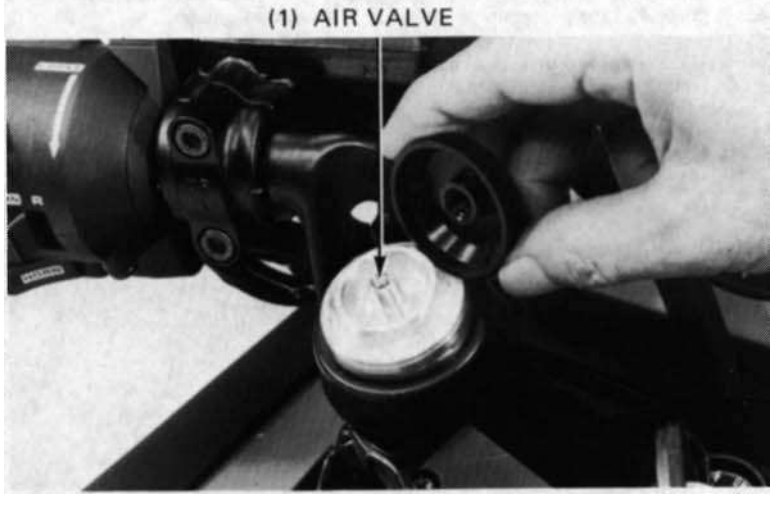
TORQUE: 10-15 Nm
1.0-1.5 kg.n, 7-11 ft.lb)



Fill the fork tubes with air.

RECOMMENDED PRESSURE
0-40 kPa (0-0.4 kg/cm^3, 0-6 psi)

CAUTION
- ***Use only a hand-operated air pump to fill the fork tubes. Do not use compressed air.***
- ***Maximum pressure is 300 kPa (3 kg/cm^3, 43 psi). Do not exceed this or fork tube component damage may occur.***



With the front brake applied, pump the forks up and down several times. Place the motorcycle on its centre stand.
Check the air pressure and adjust if necessary.

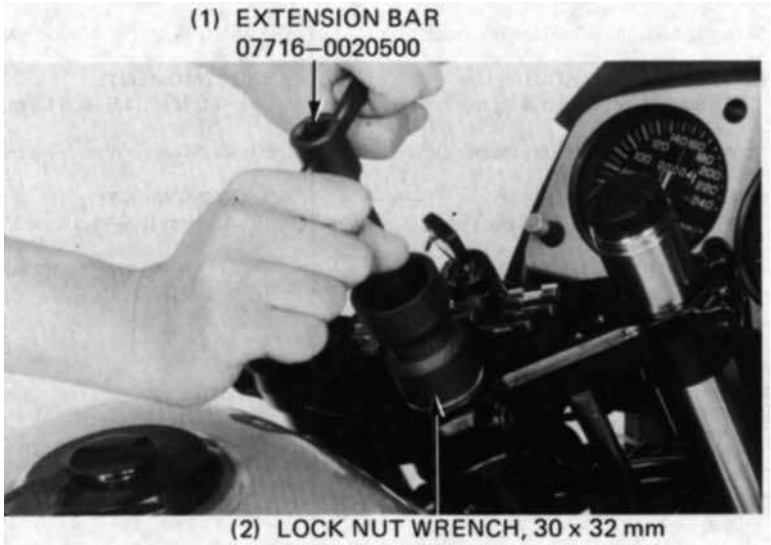
STEERING STEM

REMOVAL

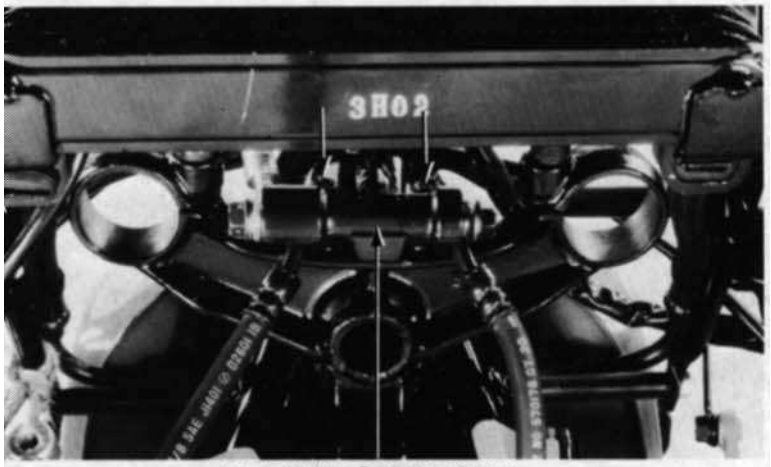
Remove the following parts:
- fairing (page 13-3).
- handlebars.
- fuse holder cover.

Loosen and remove the steering stem nut.

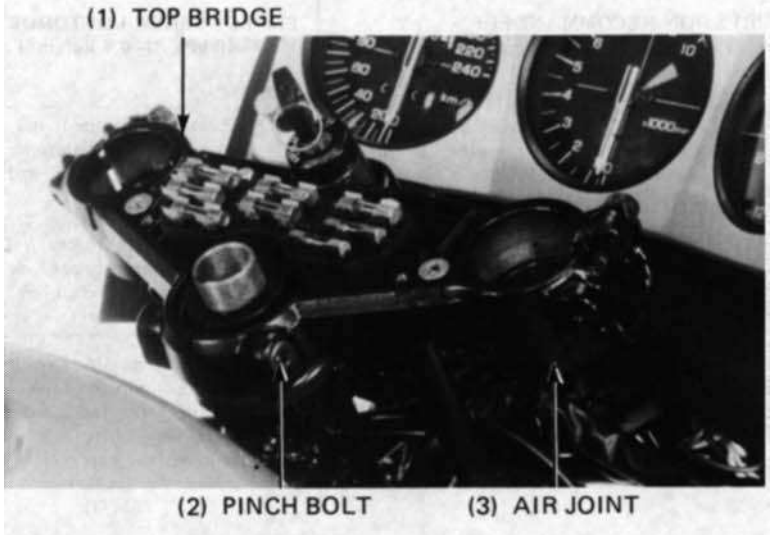
Remove the front forks (13-19).



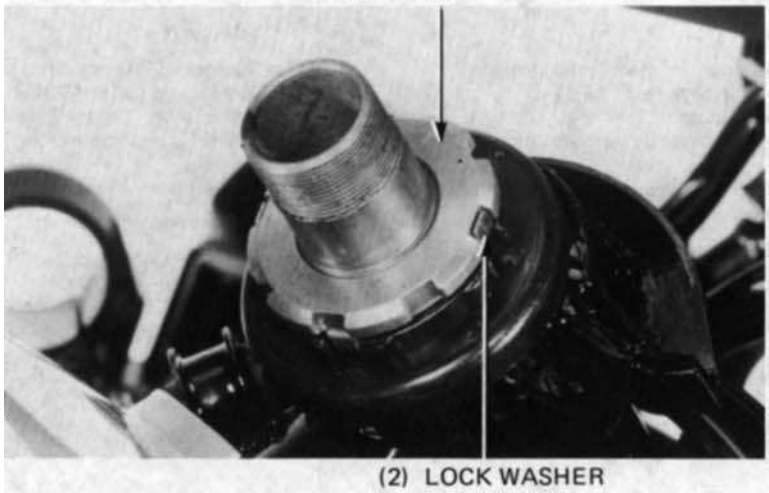
Remove the brake 3 way joint.



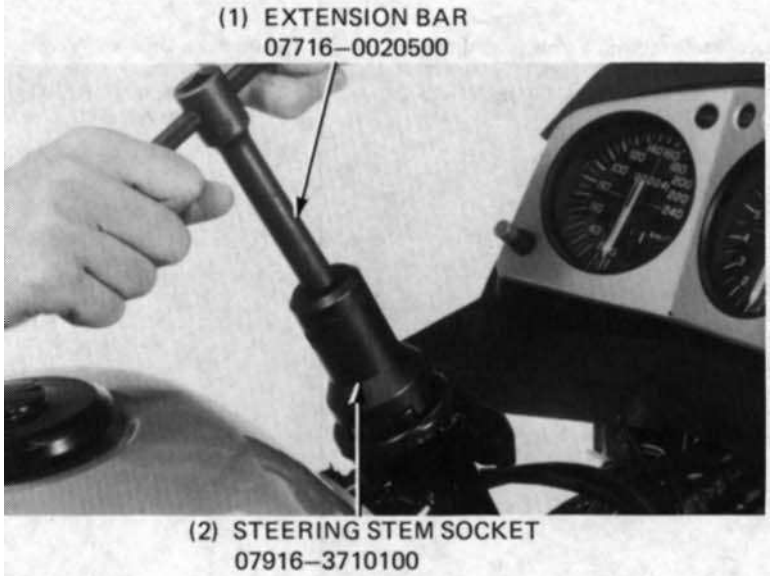
Disconnect the ignition switch and fuse holder wire couplers.
Loosen the top bridge pinch bolt and remove the top bridge with the air joint from the stem.



Straighten the lock washer tabs and remove the lock nut and lock washer.



Loosen the bearing adjustment nut and remove the nut, dust seal and upper bearing inner race. Then remove the steering stem.
Remove the grease retainer from the stem.

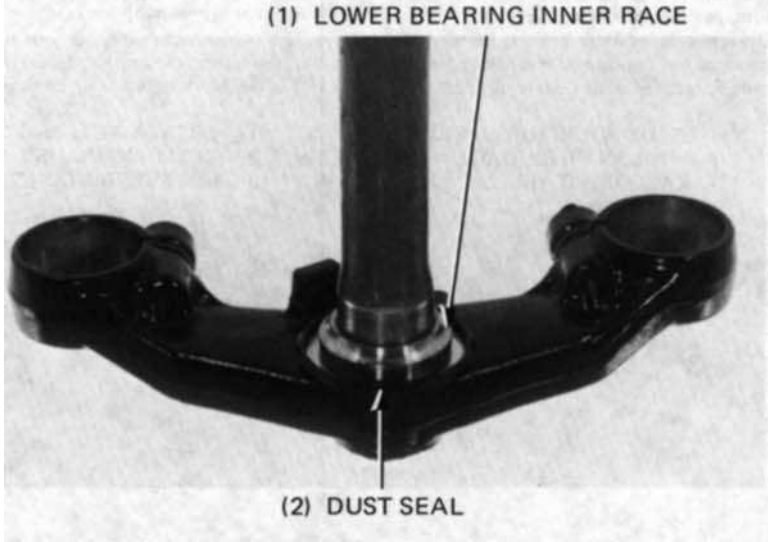


Check the steering stem bearing for wear or damage.

BEARING REPLACEMENT

NOTE:
Replace the bearing and bearing races as a set.

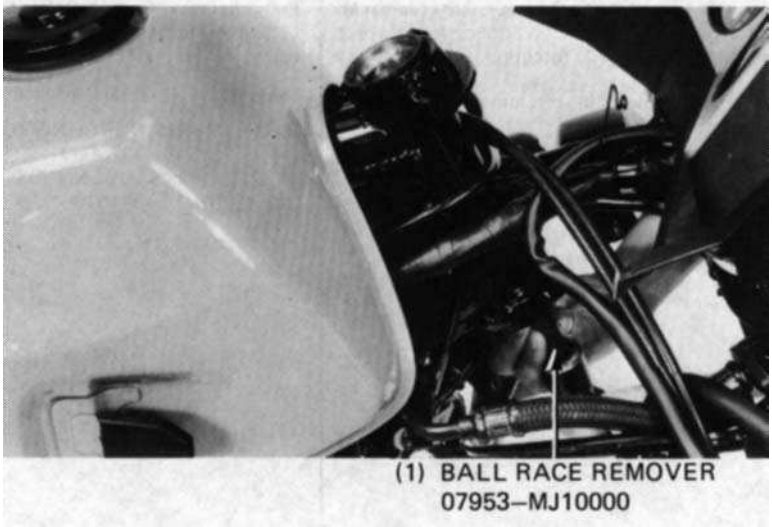
Remove the lower bearing inner race and dust seal.

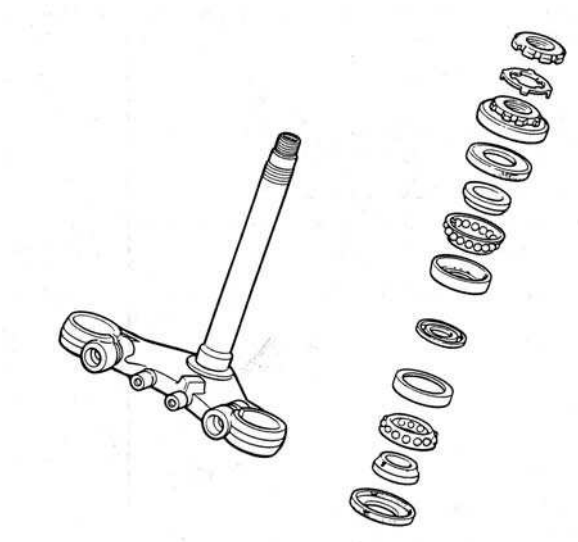


Remove the lower bearing outer race with special tools.

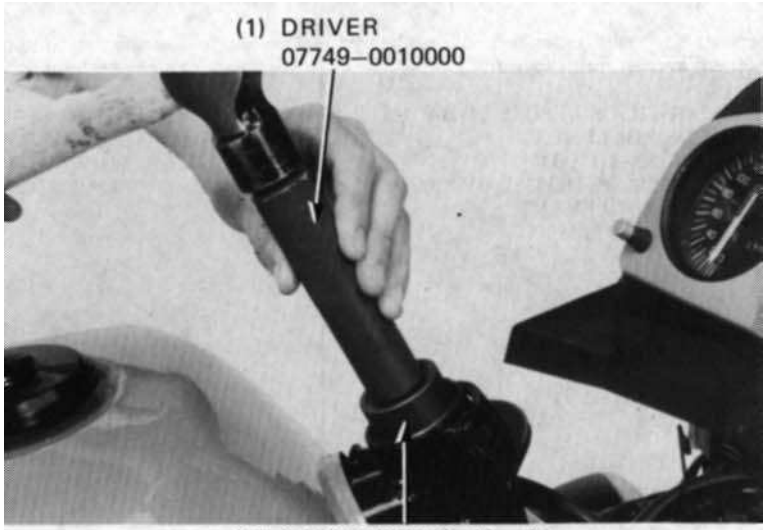
Remove the upper bearing outer race with a special tool.

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



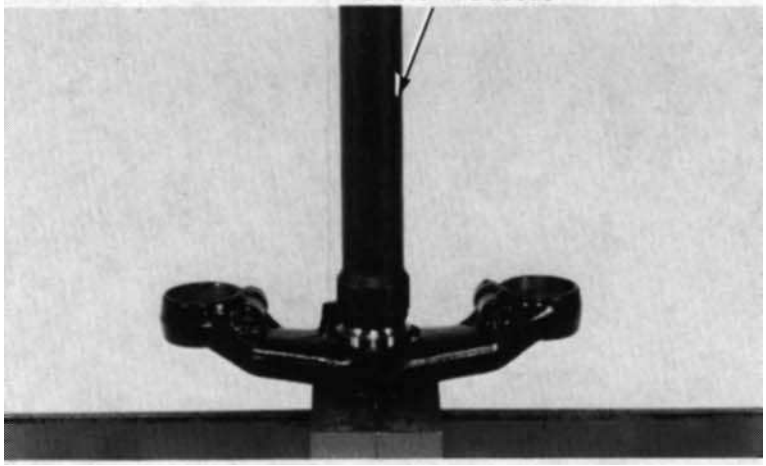


Drive a new upper bearing outer race into the steering head.



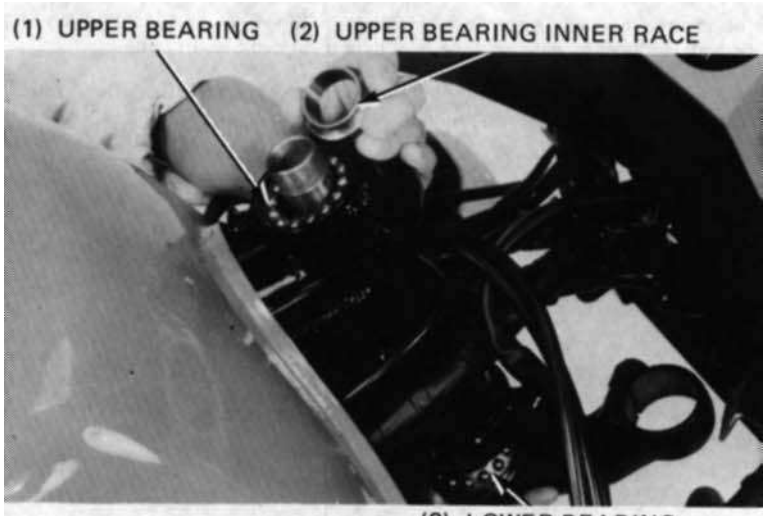
Drive a new lower bearing outer race into the steering head.

Install a dust seal onto the steering stem and press a new lower bearing inner race over the stem with a special tool.



INSTALLATION

Pack the bearing cavities with bearing grease.
Install the lower bearing onto the steering stem.
Install the grease retainer on the steering stem, then insert the steering stem into the steering head.
Install the upper bearing in the steering head.
Install the upper bearing inner race and dust seal.



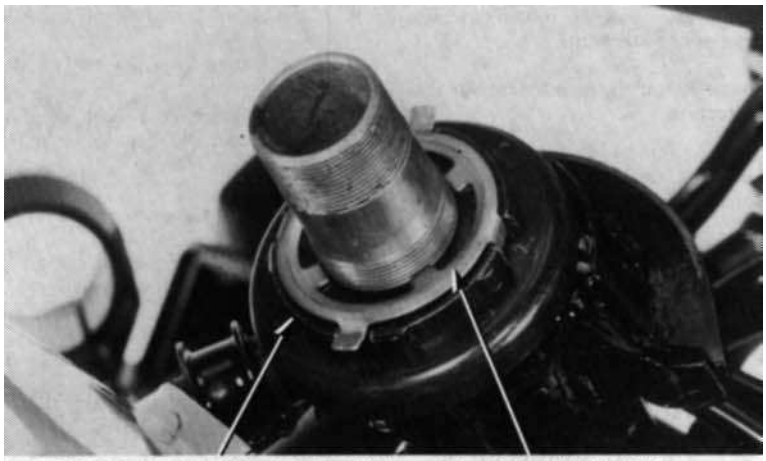
Install the bearing adjustment nut and tighten it to the specified torque.

TORQUE: 23-27 Nm (2.3-2.7 kg.m, 17-20 ft.lb)

Turn the steering stem all the way to right and left five times to seat the bearings.
Retighten the adjustment nut to the same torque.
Turn the steering stem to seat the bearings.

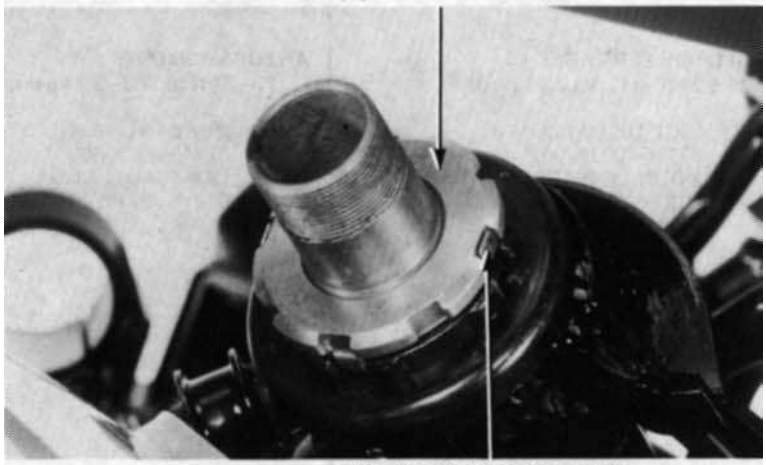
Install a new bearing adjustment nut lock washer aligning the tabs with the grooves in the lock nut. Bend two opposite tabs down into the grooves.

NOTE:
DO NOT install a used bearing adjustment nut lock washer.



(1) BEARING ADJUSTMENT NUT (2) LOCK WASHER

Finger tighten the lock nut all the way. Hold the adjustment nut and further tighten the lock nut within 90 degrees enough to align its grooves with the lock washer tabs.
Bend the lock washer tabs up into the lock nut grooves.



(1) LOCK NUT

(2) LOCK WASHER TAB

Install the fork top bridge with the fork air joint and install the steering stem nut. Temporarily install the front forks. Tighten the steering stem nut.

TORQUE: 90-120 Nm (9.0-12.0 kg.m, 65-87 ft.lb)

Tighten the steering stem pinch bolt.

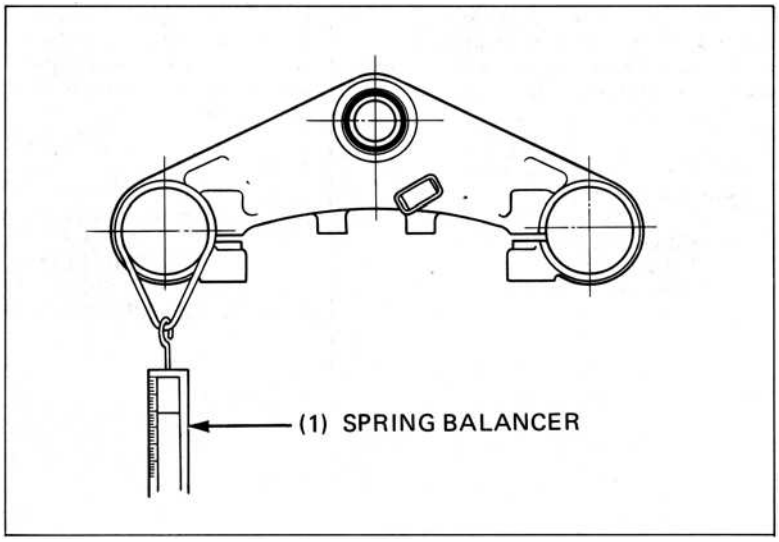
TORQUE: 20-30 Nm (2.0-3.0 kg.m, 14-22 ft.lb)

(1) EXTENSION BAR 07716–0020500

(2) LOCK NUT WRENCH, 30 x 32 mm 07716–0020400

STEERING HEAD BEARING PRELOAD

Install the front forks (page 13-30)
Install the front wheel (page 13-18)
Raise the front wheel off the ground and place a stand under the engine.
Position the steering stem straight ahead position.
Hook a spring balancer to the fork tube and measure the steering head bearing preload.



NOTE:
Make sure there is no cable and wire harness interference

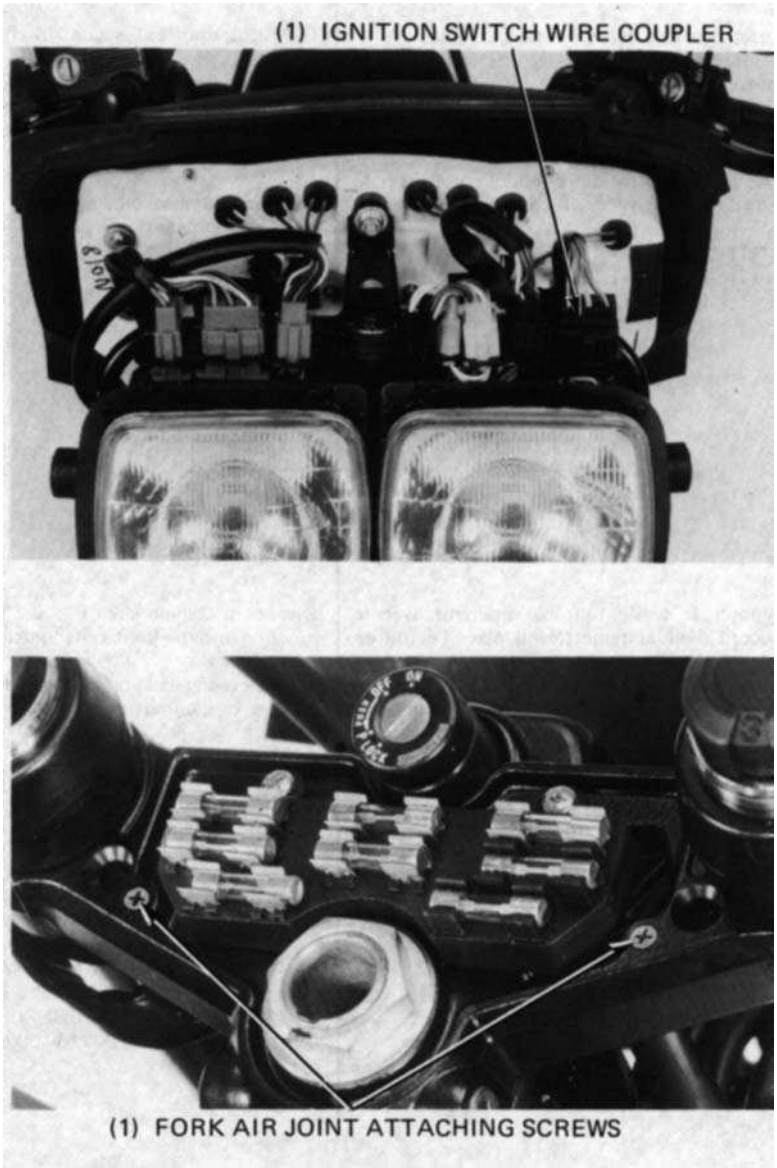
The preload should be within 1.1-1.7 kg (2.4-3.7 lbs) for right and left turns.
If the readings do not fall within the limits, lower the front wheel on to the ground and adjust the bearing adjustment nut.
After making sure the bearing preload, install the removed parts in the reverse order of removal.

IGNITION SWITCH

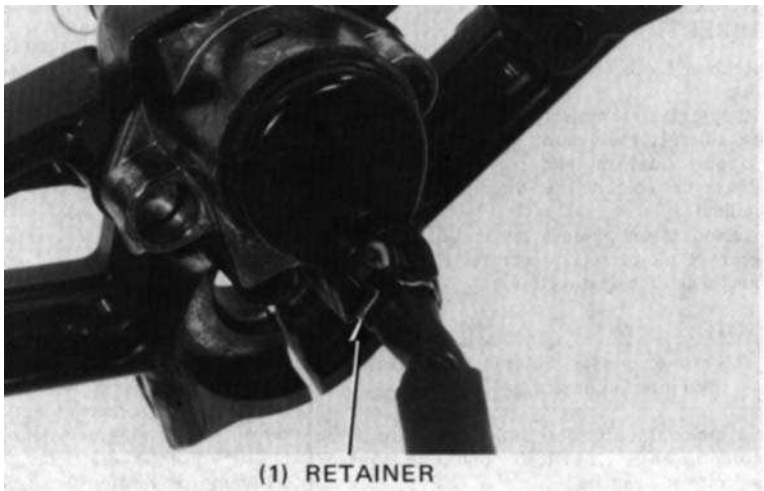
CONTACT BASE REPLACEMENT

Remove the fairing (page 13-3)
Disconnect the ignition wire coupler.

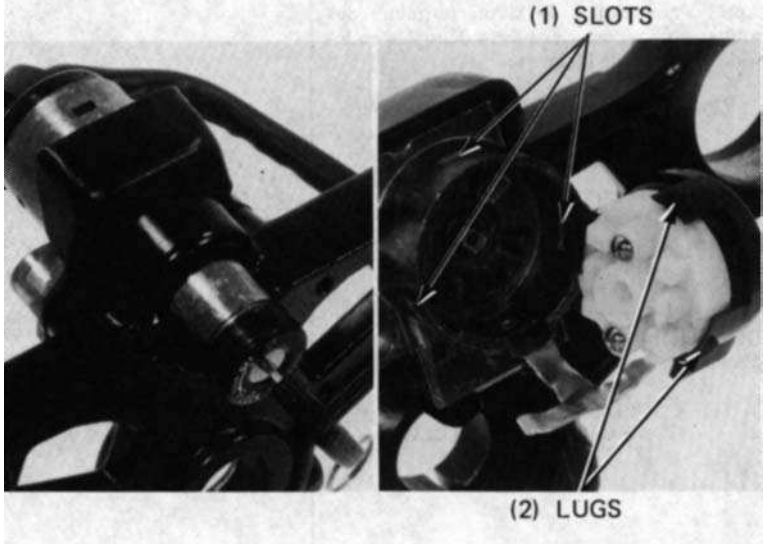
Remove the fuse holder cover and fuse holder from the fork top bridge.
Remove the handlebars by removing the retainer rings and loosening the pinch bolts.
Remove the fork air joint attaching screws.
Remove the steering stem nut and washer.
Loosen the fork top pinch bolts and bridge pinch bolt.
Remove the top bridge from the forks and steering stem.



Pry open the retainer.


(1) RETAINER

Turn the ignition key so that it is partway between the ON and OFF detent positions.
Push the lugs that are locked in the slots, then pull the contact base from the switch.


(1) SLOTS
(2) LUGS

NOTE:
On G and ND models, if the ignition switch lock cylinder must be replaced, remove the shear bolts that are attaching the cylinder to the top bridge, using a drill. Install a new cylinder and tighten the shear bolts until the bolt head twists off.

Install the contact base and top bridge in the reverse order of removal.

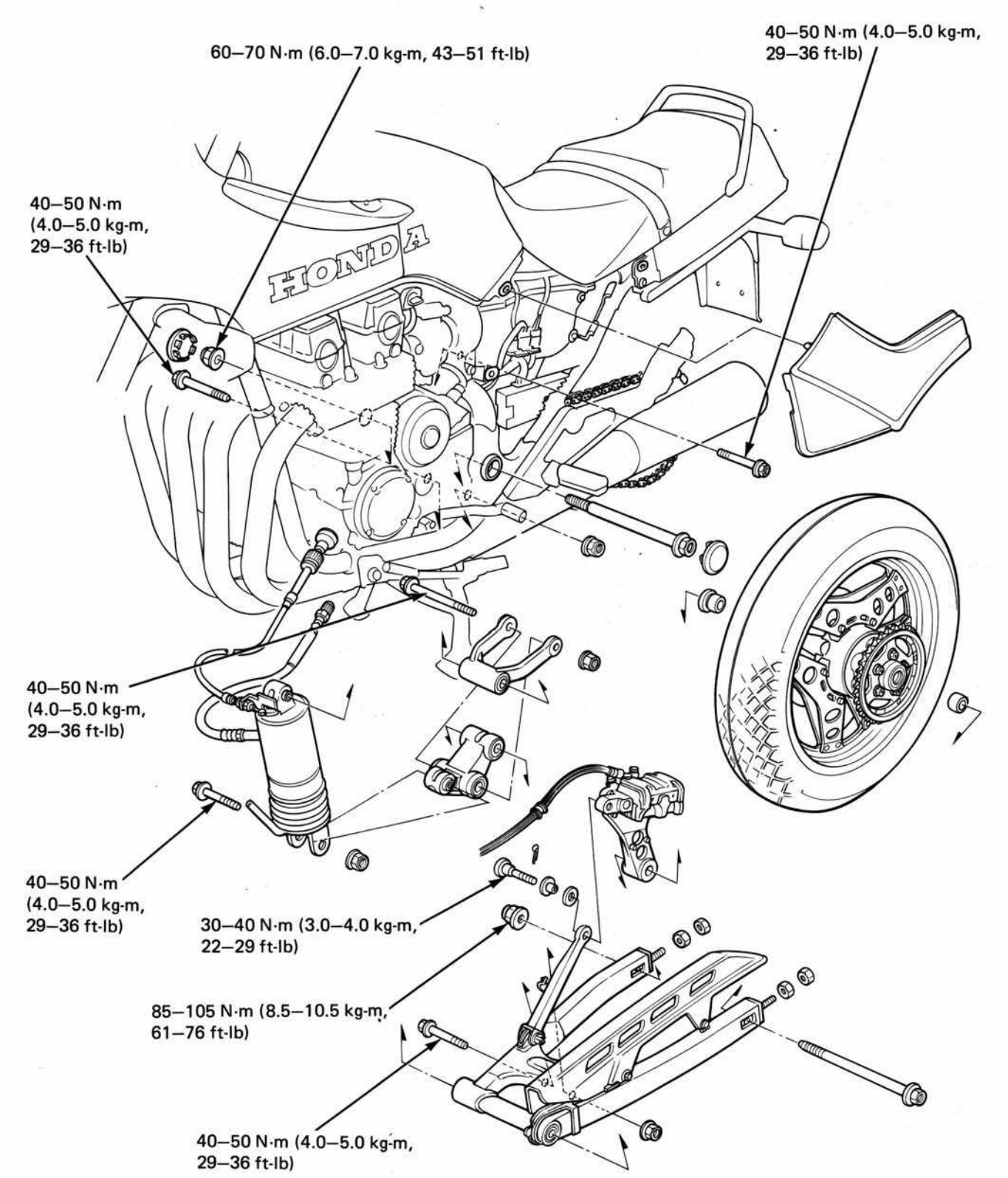
TORQUE:

STEERING STEM NUT:
90-12 Nm (9.0-12.0 kg.m, 65-87 ft.lb)

STEERING STEM PINCH BOLT:
20-30 Nm (2.0-3.0 kg.m, 17-20 ft.lb)

FORK TOP PINCH BOLT:
9-15 Nm (0.9-1.5 kg.m, 7-11 ft.lb)

HANDLEBAR PINCH BOLTS:
35-45 Nm (3.5-4.5 kg.m, 25-33 ft.lb)


60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
HONDA

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubeless tyre. For tubeless tyre repairs, refer to the TUBELESS TYRE MANUAL.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle runout		-	0.2 mm (0.01 in)
Rear wheel rim runout	Radial	-	2.0 mm (0.08 in)
	Axial	-	2.0 mm (0.08in)
Shock absorber air pressure		0-400 kPa (0-4.0 kg/cm^2, 0-57 psi)	-

TORQUE VALUES

Rear brake disc	35-40 Nm (3.5-4.0 kg.m, 25-29 ft.lb)
Final driven sprocket	80-100 Nm (8.0-10.0 kg.m, 58-72 ft.lb)
Rear axle nut	85-105 Nm (8.0-10.5 kg.m, 61-76 ft.lb)
Shock absorber mounting bolts	40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)
Shock link-to-arm bolt	40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)
Shock arm-to-frame bolt	40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)
Shock link-to-swingarm bolt	40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)
Exhaust chamber-to-engine bolts	45-60 Nm (4.5-6.0 kg.m, 33-43 ft.lb)
Rear brake caliper-to-torque link bolt	30-40 Nm (3.0-4.0 kg.m, 22-29 ft.lb)
Swingarm pivot bolt	60-70 Nm (6.0-7.0 kg.m, 43-51 ft.lb)

TOOLS

Special

Bearing remover set	07946-MJ00000
(Driver shaft)	07946-MJ00100
(Driver head)	07946-MJ00200
Oil seal driver attachment	07965-MA10201
Oil seal driver attachment	07965-MB00100
Oil seal driver adapter	07965-ME70100
Oil seal driver	07965-MC70100

Common

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Attachment, 52 x 55 mm	07746-0010400
Attachment, 62 x 68 mm	07746-0010500
Pilot, 15 mm	07746-0040300
Pilot, 20 mm	07746-0040500

Pilot, 22 mm	07746-0041000
Pilot, 25 mm	07746-0040600
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600

TROUBLE SHOOTING

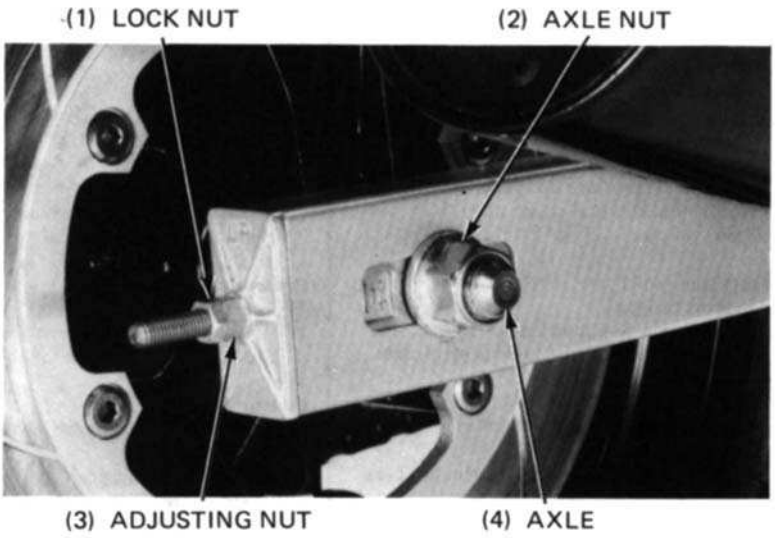
Oscillation
1. Bent rim
2. Loose wheel bearings
3. Faulty tyre
4, Loose axle
5. Tyre pressure incorrect
6. Swingarm bearings worn
7. Worn tires

Soft suspension
1. Weak spring
2. Insufficient fluid in shock absorber
3. Shock absorber air pressure incorrect

Hard suspension
1. Incorrect fluid weight in shock absorber
2. Bent shock absorber
3. Shock absorber air pressure incorrect

Suspension noise
1. Shock case binding
2. Loose fasteners

REAR WHEEL



REMOVAL

Place the motorcycle on its centre stand.
Loosen the drive chain adjuster lock nuts and adjusting nuts.
Remove the axle nut and axle.
Push the wheel forward, remove the drive chain from the driven sprocket and remove the rear wheel.

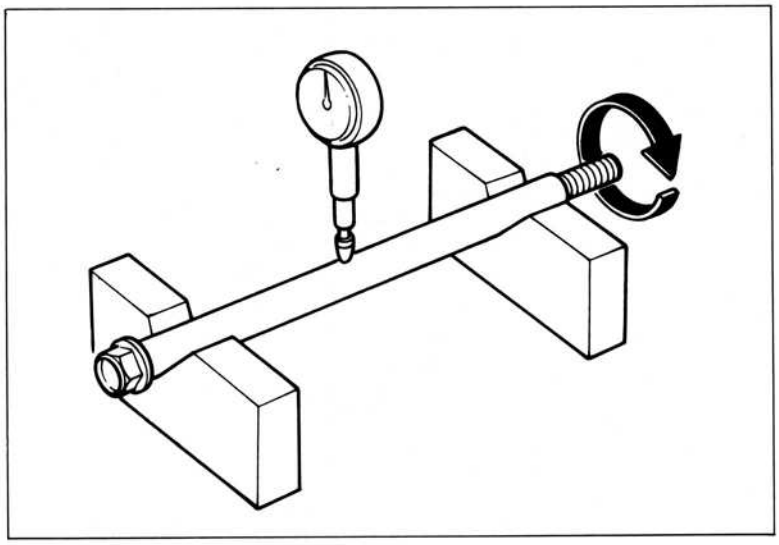
NOTE:
If you depress the brake pedal after the rear wheel is removed, the caliper piston will move out and make reassembly difficult.

INSPECTION

AXLE

Set the axle in V blocks and read the axle runout with a dial indicator.

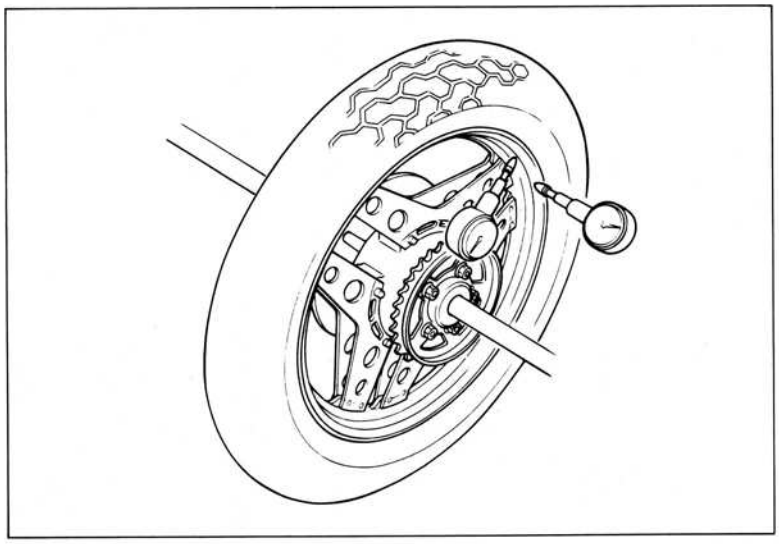
SERVICE LIMIT: 0.2 mm (0.01 in)



REAR WHEEL RIM RUNOUT

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

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

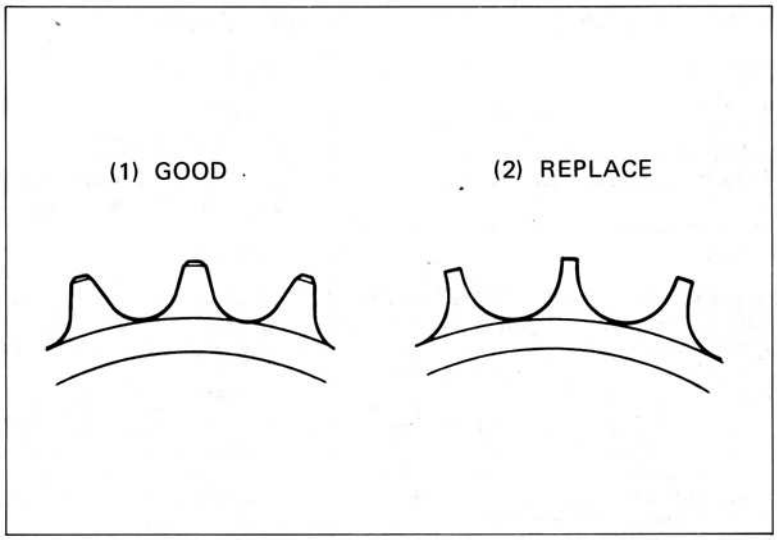


NOTE:
The wheel cannot be serviced and must be replaced if the above limits are exceeded.

FINAL DRIVEN SPROCKET

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

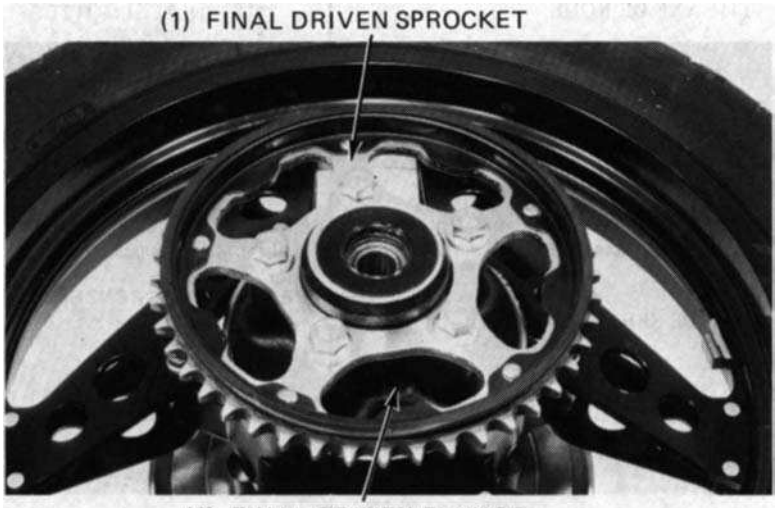
NOTE:
If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.



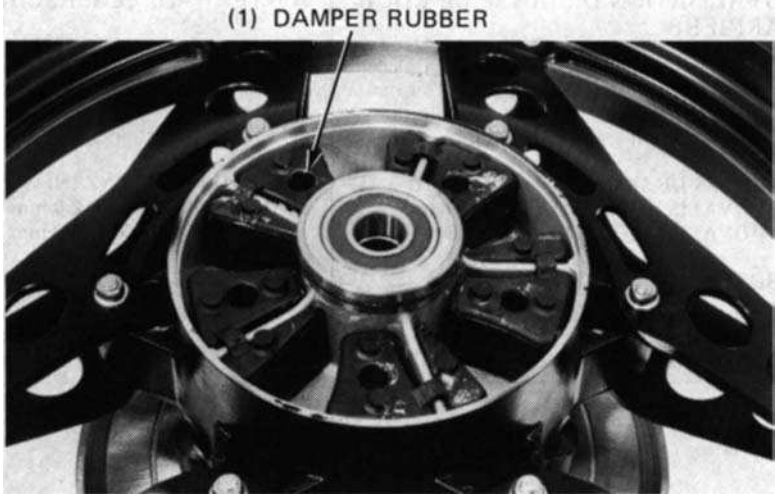
DAMPER RUBBERS

Remove the final driven sprocket and driven flange together.

NOTE:
Do not separate the driven sprocket and flange, unless replacement of the driven sprocket or flange is necessary.

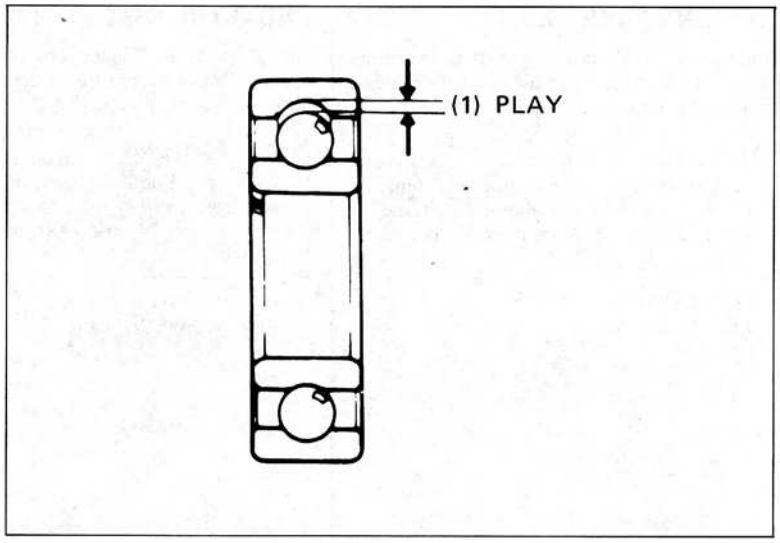


Replace the damper rubbers if they are damaged or deteriorated.



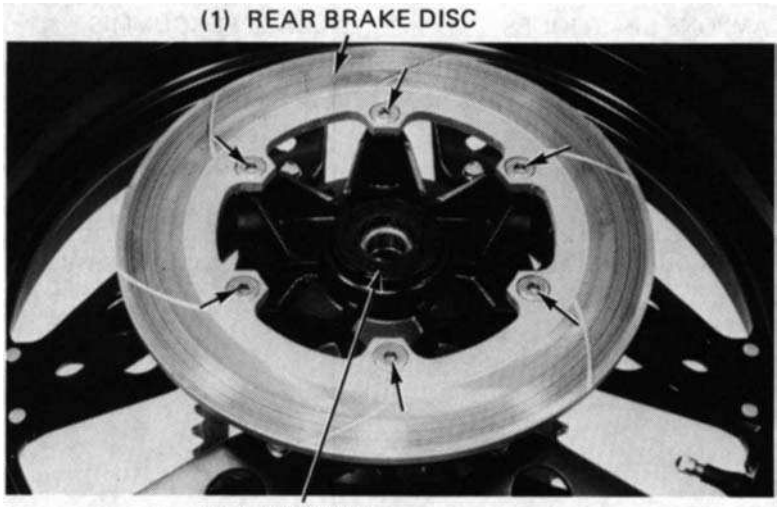
WHEEL BEARING

Place the wheel in a truing stand and check the wheel bearing play by rotating the wheel by hand. Replace the bearings if they are noisy or have excessive play.



BEARING REPLACEMENT

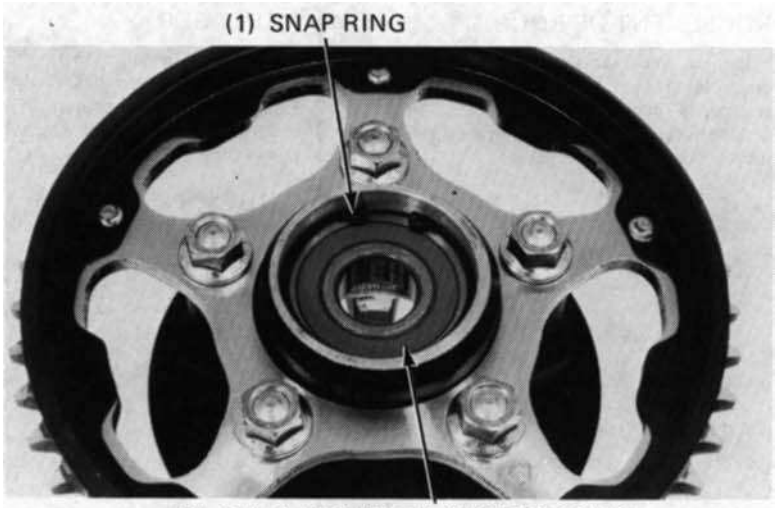
Remove the rear brake disc.
Remove the dust seal.



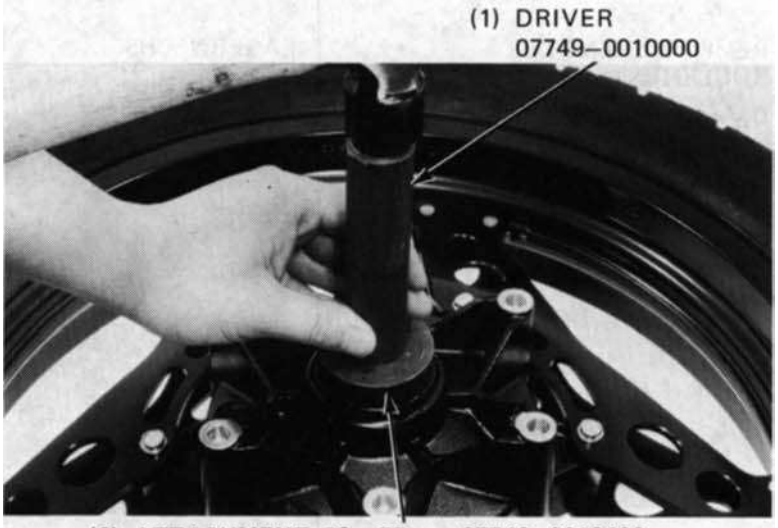
Remove the wheel bearing with bearing remover.

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

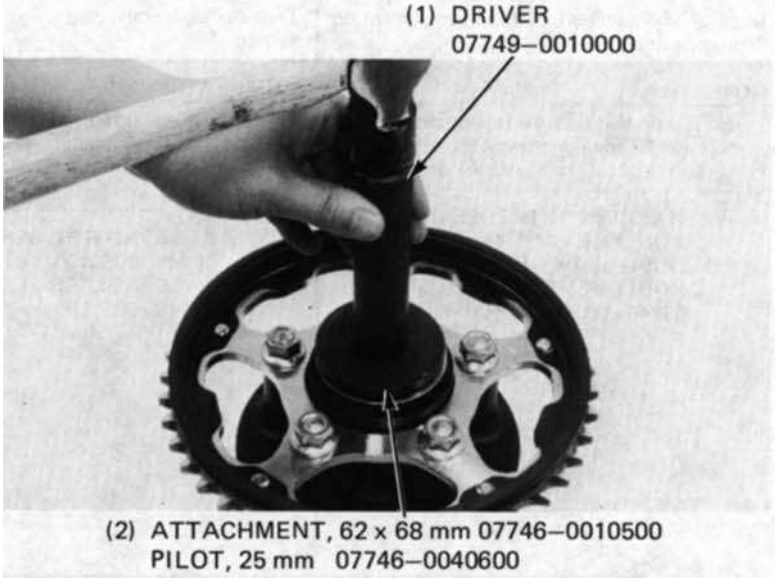
Remove the dust seal from the final driven flange.
Remove the snap ring and drive the final driven flange bearing out of the flange.



First, drive a new right wheel bearing in squarely until it is fully seated, install the distance collar, then drive a new left wheel bearing in squarely.

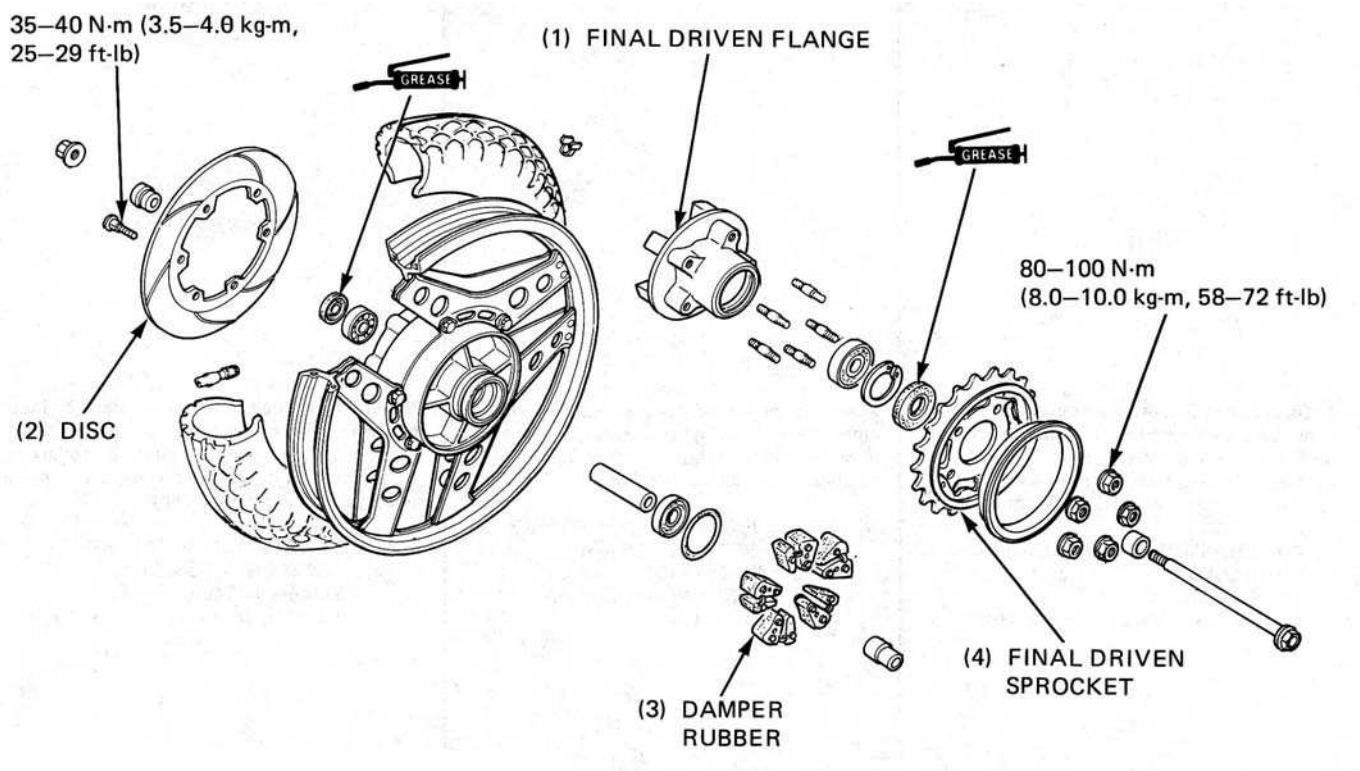


Drive a new driven flange bearing in the flange squarely.
Install the snap ring.

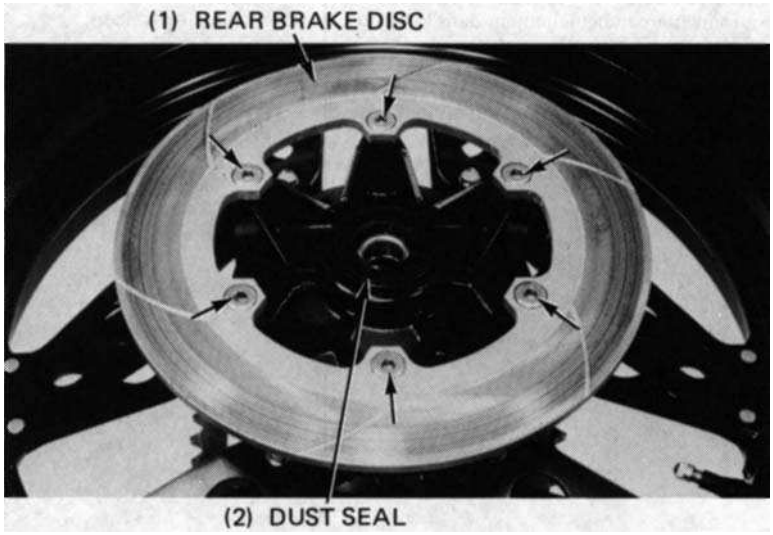


ASSEMBLY

NOTE:
The rear wheel uses a tubeless tyre. For tubeless tyre repairs, refer to the Tubeless Tyre Manual.



WARNING
Do not get grease on the brake disc or stopping power will be reduced.



Install the brake disc and tighten the bolts.

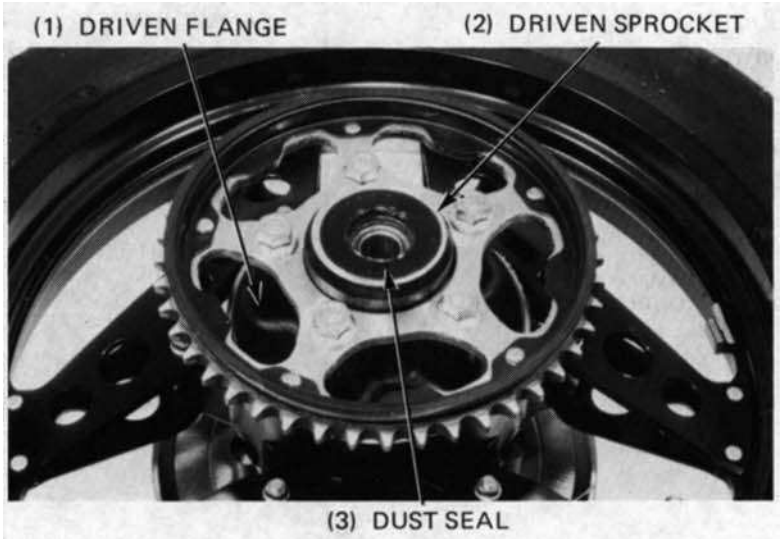
TORQUE: **35-40 Nm**
(3.5-4.0 kg.m, 25-29 ft.lb)

Apply molybdenum disulfied grease to the dust seal lips and install the dust seal.

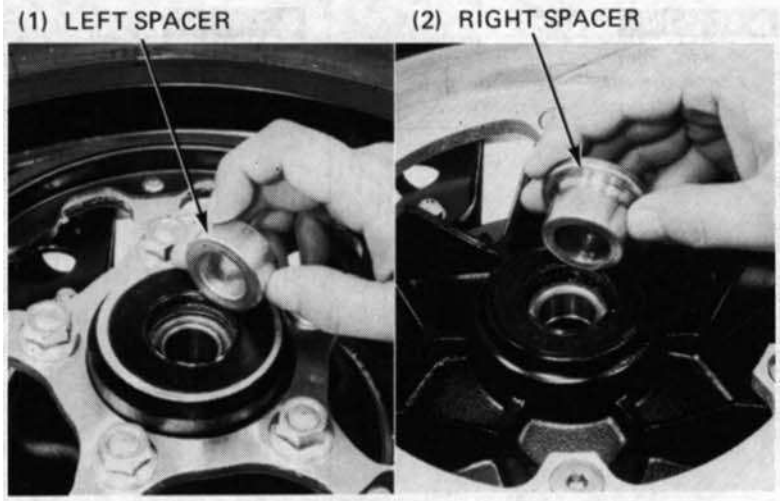
Install the rear axle sleeve, final driven flange and driven sprocket.
If the driven sprocket was removed from the flange, tighten the driven sprocket nuts to the specified torque.

TORQUE: 80-100 Nm (8.0-10.0 kg.m, 58-72 ft.lb)

Apply molybdenum disulfied grease to the dust seal lips and install the dust seal.



Install the left and right side spacers,

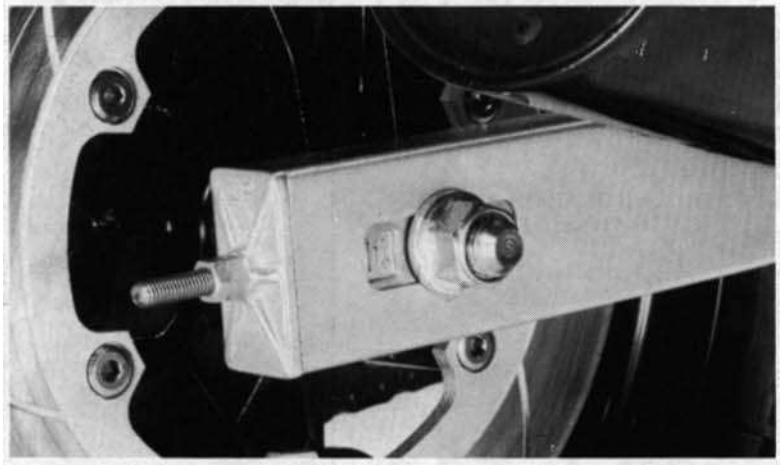


INSTALLATION

Install the rear wheel in the reverse order of removal.

NOTE:

- **When installing the wheel, carefully fit the brake disc between the brake pads.**
- **After installing the wheel, apply the brake several times. Then check that the wheel rotates freely. Recheck wheel installation if the brake drags or if the wheel does not rotate freely.**



Tighten the rear axle not.

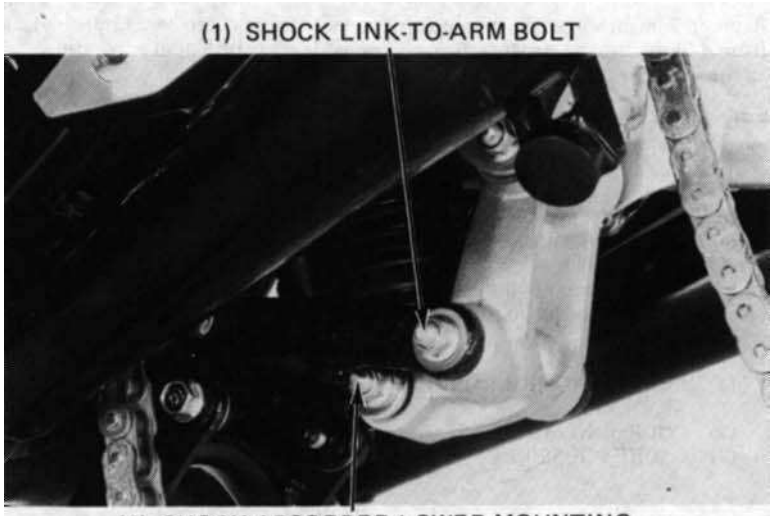
TORQUE: 85-105 Nm (8.5-10.5 kg.m, 61-76 ft.lb)

Adjust the drive chain slack (page 3-10).

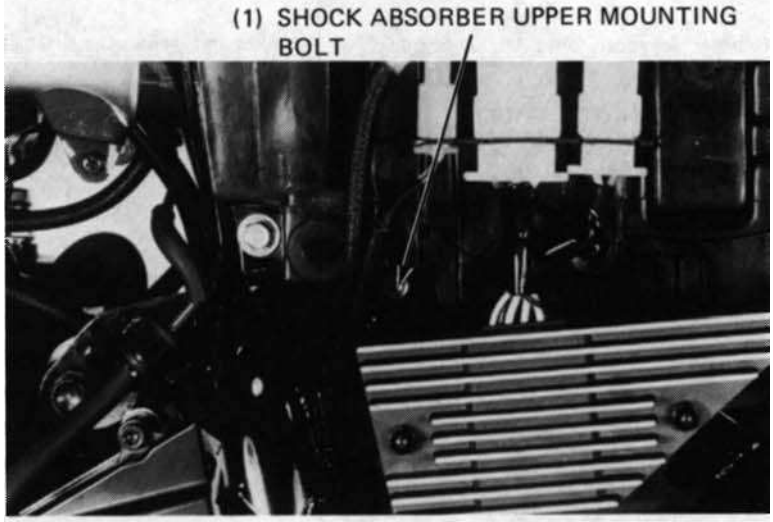
SHOCK ABSORBER

REMOVAL

Place the motorcycle on its centre stand.
Remove the rear wheel (page 14-3).
Remove the left and right frame side covers.
Free the rear shock damping adjuster cable from its clamps.
Remove the shock link-to-arm bolt.
Remove the shock absorber lower mounting bolt.

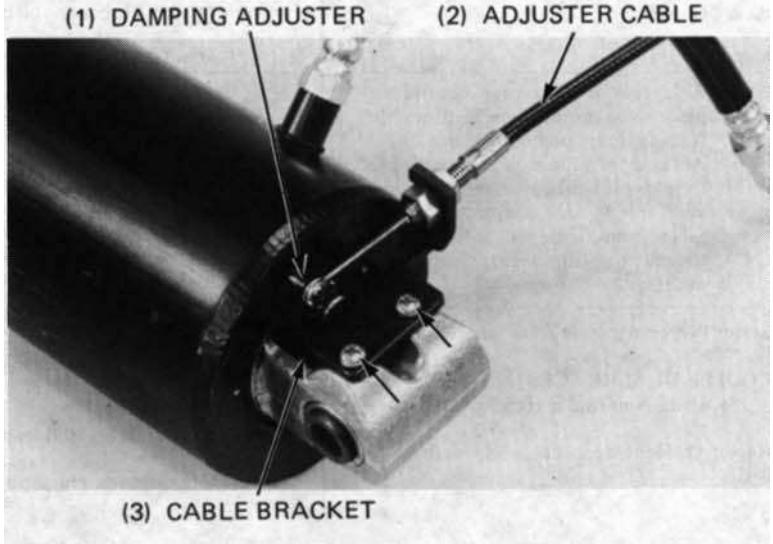


Remove the shock absorber upper mounting bolt and remove the shock absorber from the frame being careful not to damage the damping adjuster cable and air hose.

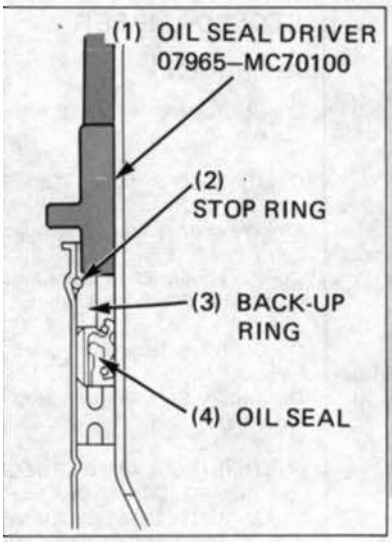


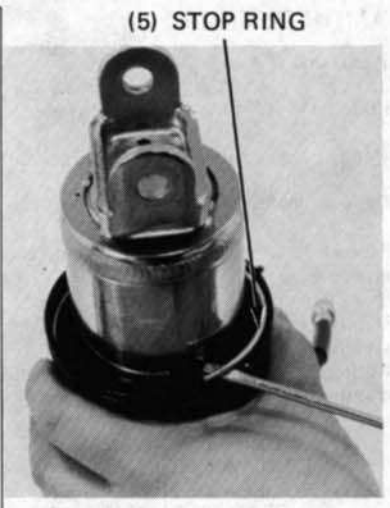
OIL SEAL REPLACEMENT

Remove the cotter pin and washer, and disconnect the damping adjuster cable from the adjuster.
Remove the cable bracket from the absorber.

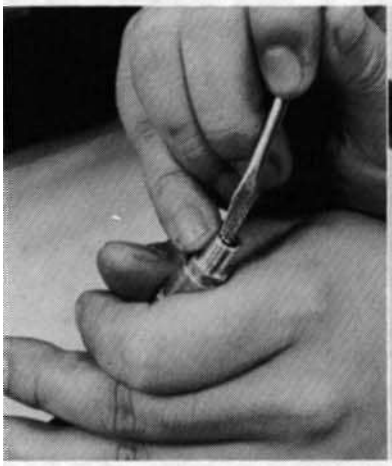


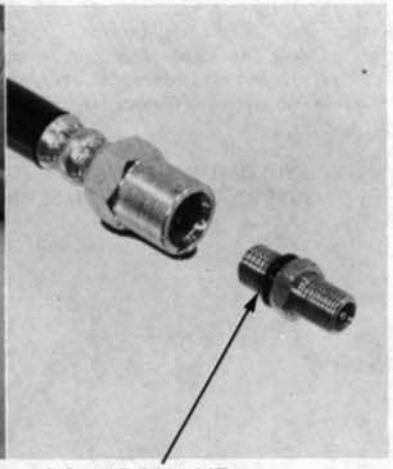
Remove the boot clip and boot.
To remove the stopper ring, press down on the back-up ring and oil seal.
Remove the stopper ring and back-up plate.





Release air pressure and remove the air valve from the hose.

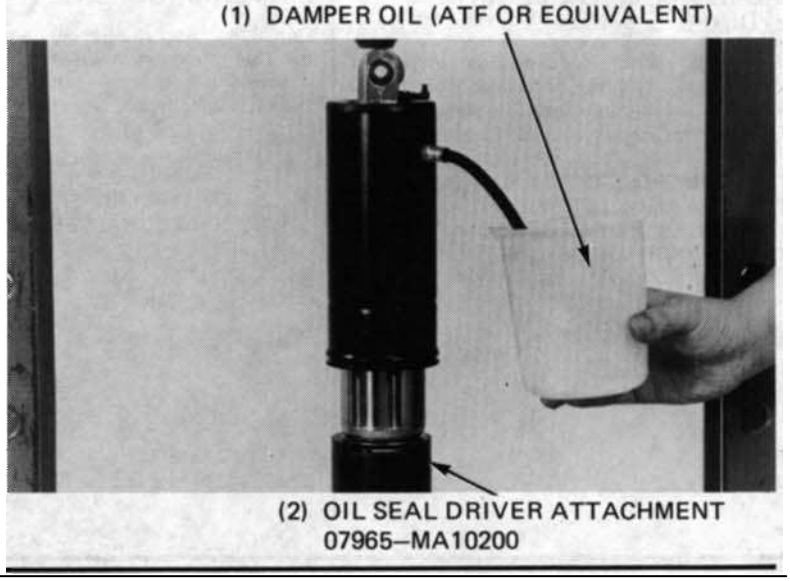




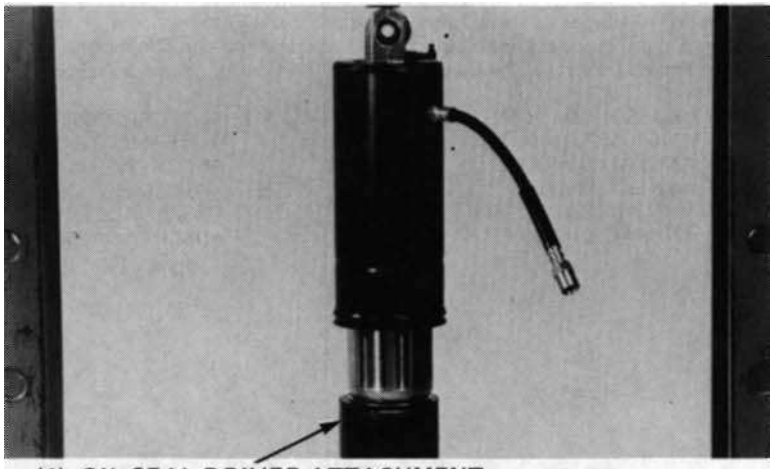
Place about 300 cm^3 (10. 1 oz) of damper oil (ATF or equivalent) in a clean container.
Place the shock absorber in a hydraulic press with an OIL SEAL DRIVER ATTACHMENT positioned as shown.
Place the air hose in the oil and press the shock absorber several times until the damper is filled with the oil.

NOTE:

- **Do not over-press the shock.**
- **This shock absorber's stroke is 42.5 mm (1.67 in).**

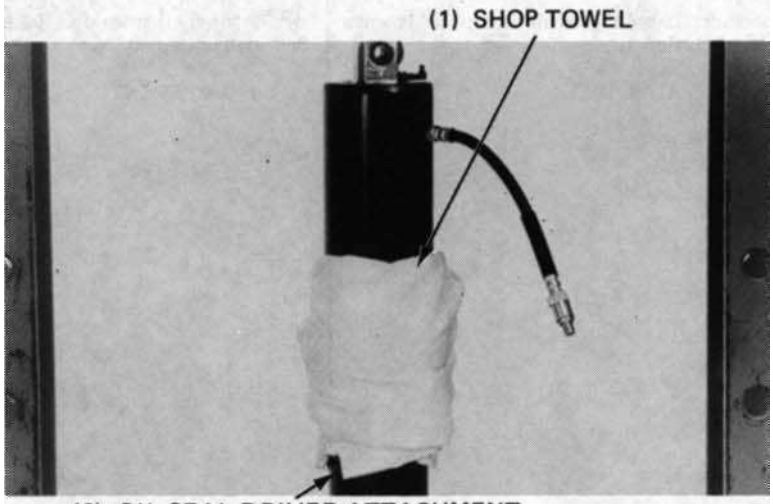


Place the shock absorber up right in an oil drain pan. Let the shock stand for 5 minutes to allow air to escape.



(1) OIL SEAL DRIVER ATTACHMENT
07965–MA10200

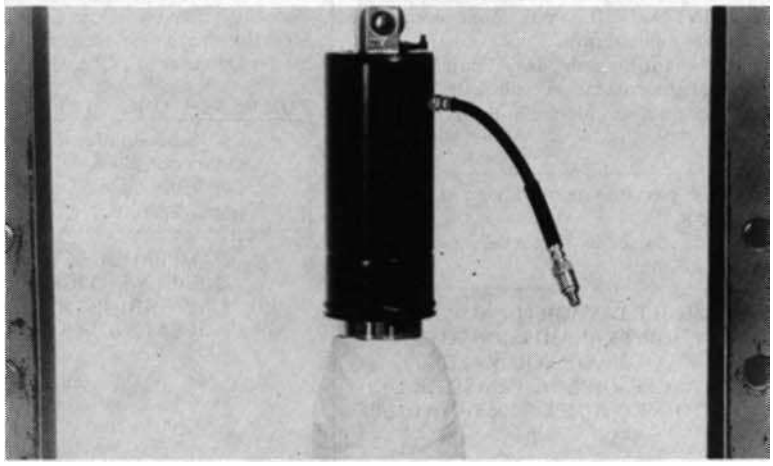
Reinstall the air valve in the air hose.
Place the shock absorber in the hydraulic press using the oil seal driver attachment.
Wrap a shop towel around the shock absorber.
Press the oil seal out by compressing the shock absorber.



(2) OIL SEAL DRIVER ATTACHMENT
07965–MA10200

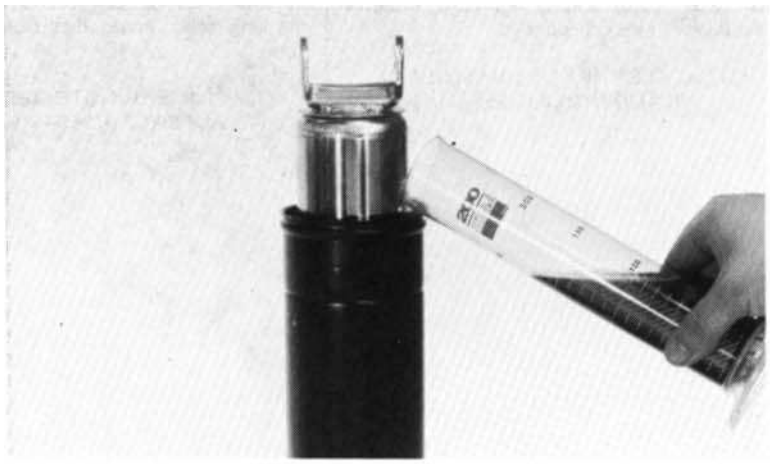
Leave the shock absorber for another 5 minutes to let any remaining ATF drain out.

NOTE:
Do not tilt the shock absorber or ATF will flow out of the damper case.



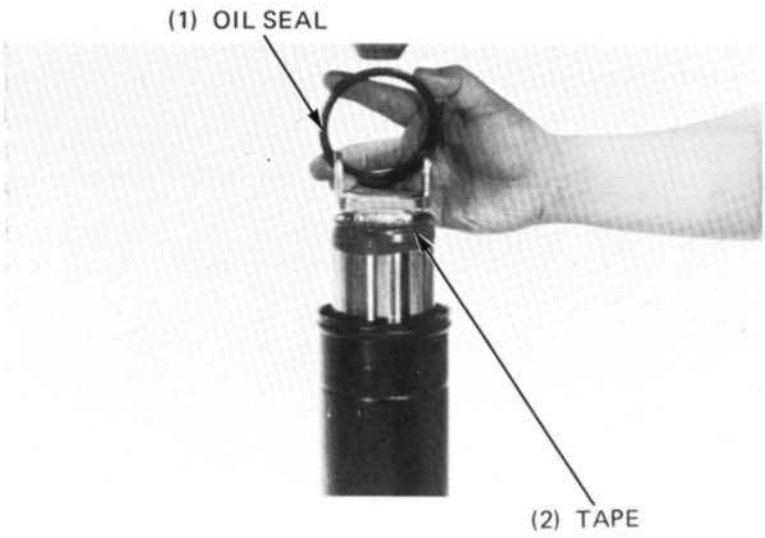
Turn the shock absorber upside down as soon as all the ATF has drained from the outer case.
Fill the damper case with the specified amount of ATF.

SPECIFIED AMOUNT:
142 cc (4.80 U.S. oz., 5.00 Imp. oz.)

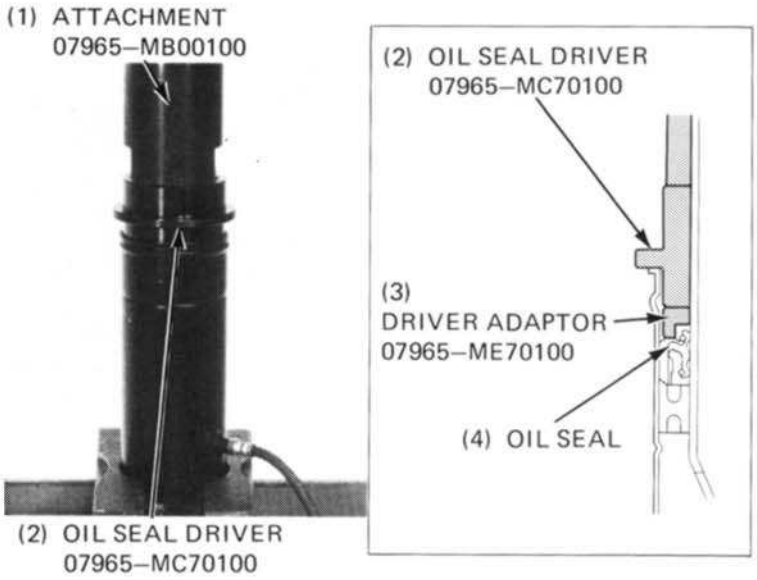


Install the guide bushing into the damper case.
Wrap a piece of tape around the groove at the end of the shock absorber.
Dip the oil seal in damper oil and install it on the damper.

CAUTION
Be careful not to damage the oil seal during installation.



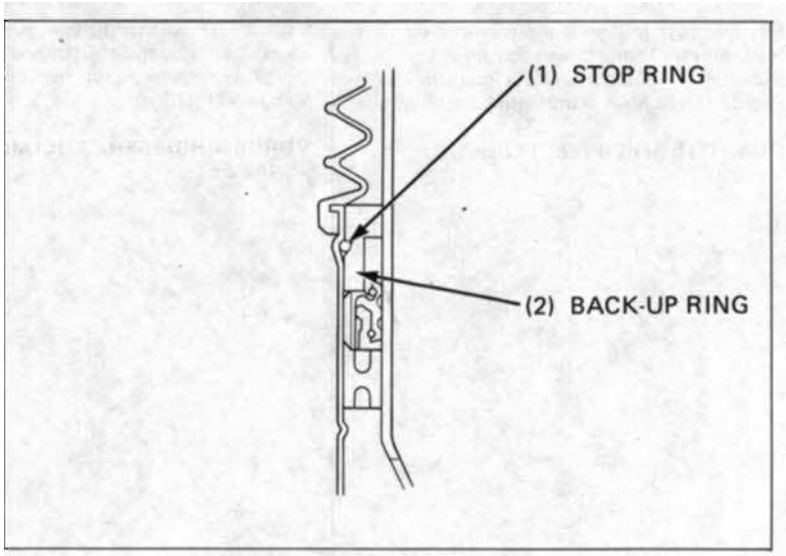
Press the oil seal into the shock absorber with a hydraulic press until the oil seal driver and oil seal driver ring stops at the edge of the outer case.



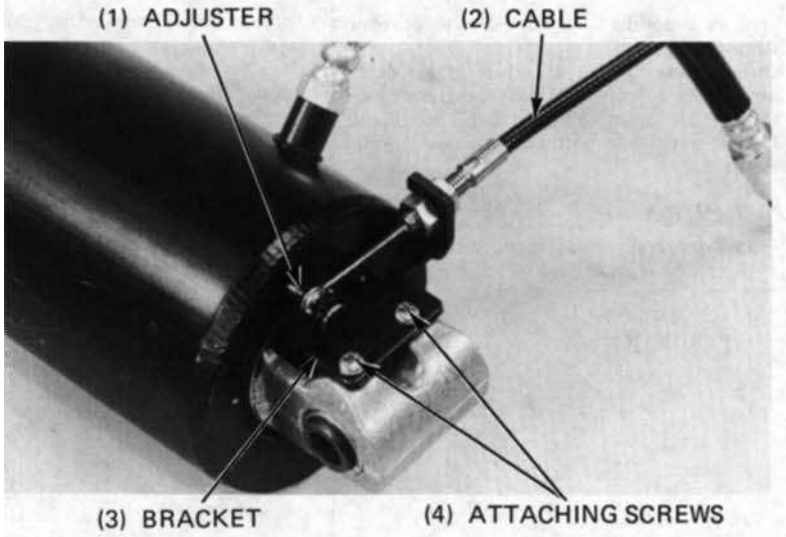
Install the back-up ring.
Install the stop ring, being certain that it is seated in the ring groove in the outer case.

NOTE:
Be sure stop ring is seated in the ring groove all the way around.

Install the boot.
Install the boot clip with the edge facing down.



Install the damping adjuster cable bracket onto the absorber.
Apply locking agent to the threads of the attaching screws and secure the bracket with the screws.
Connect the adjuster cable to the adjuster and secure it with the washer and new cotter pin.



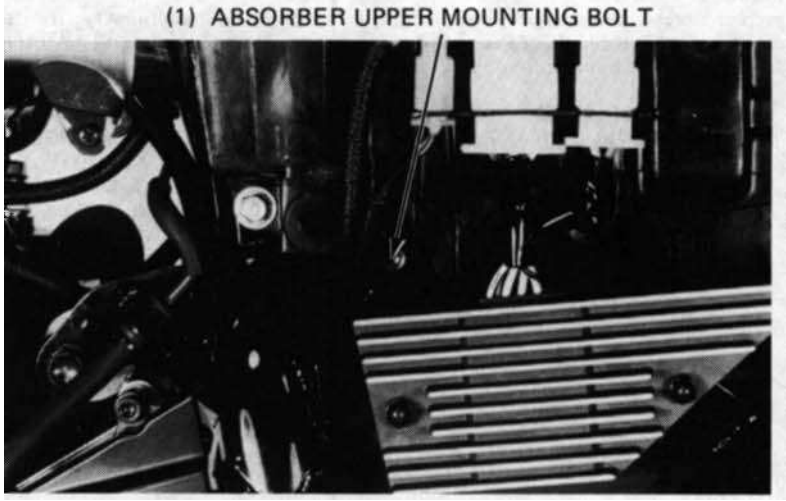
INSTALLATION

Apply paste grease (containing more than 45% of molybdenum) to the upper and lower mounting bushings.

NOTE:
Use paste grease (containing more than 45% of molybdenum) as follows:

- **MOLYKOTE G-n PASTE manufactured by Dow Corning, U.S.A.**
- **Locol Paste manufactured by Sumico Lubricant, Japan.**
- **Other lubricants of equivalent quality.**

Install the shock absorber in the frame and tighten the upper and lower mounting bolts.

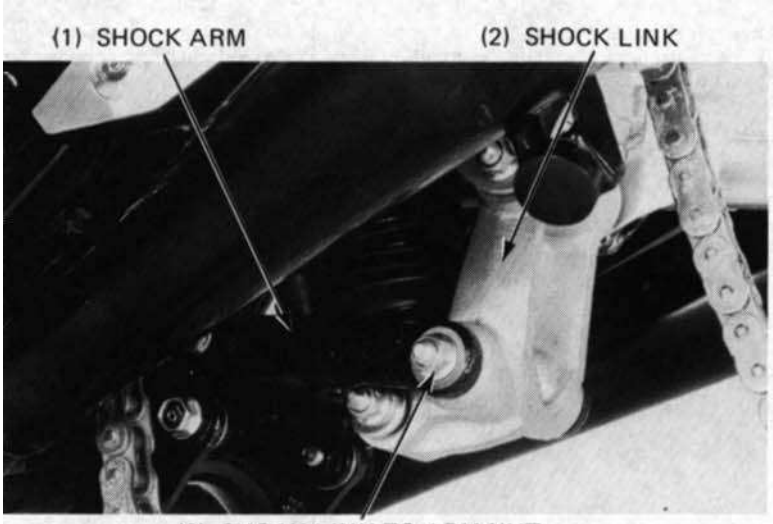


TORQUE: 40-50 Nm
(4.0-5.0 kg.m, 29-36 ft.lb)

Connect the shock arm and link, and tighten the nut.

TORQUE: 40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)

Clamp the damping adjuster cable properly (page 1-8).
Install the left and right side covers.
Install the rear wheel (page 14-8).
Adjust the shock absorber air pressure (page 3-15).

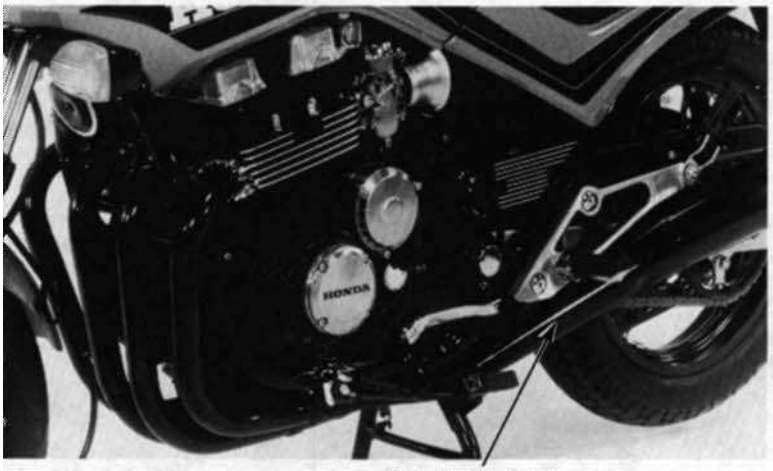


(3) SHOCK LINK-TO-ARM NUT

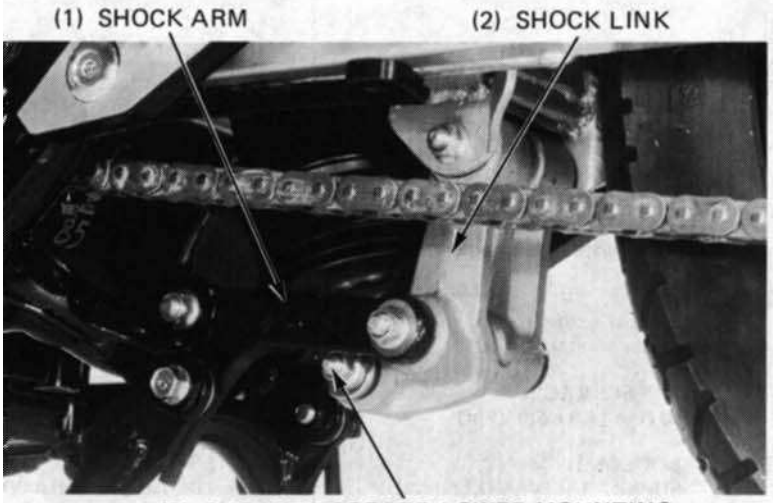
SHOCK ABSORBER LINKAGE

REMOVAL

Remove the muffler by removing the exhaust pipe attaching nuts, muffler-to-footpeg bracket bolts and exhaust chamber-to-engine bolts.


(1) MUFFLER

Remove the shock link by removing the shock link-to-arm bolt, shock absorber lower mounting bolt and shock link-to-swingarm bolt.
Remove the shock arm from the frame,



(3) SHOCK ABSORBER LOWER MOUNTING BOLT

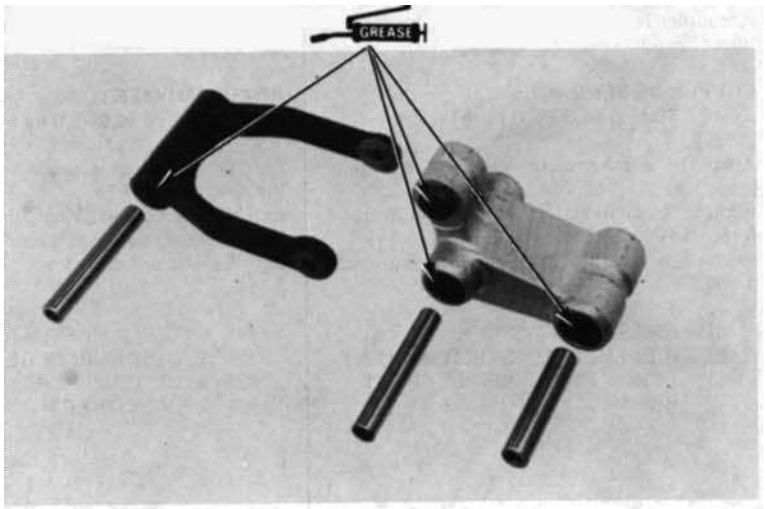
INSPECTION

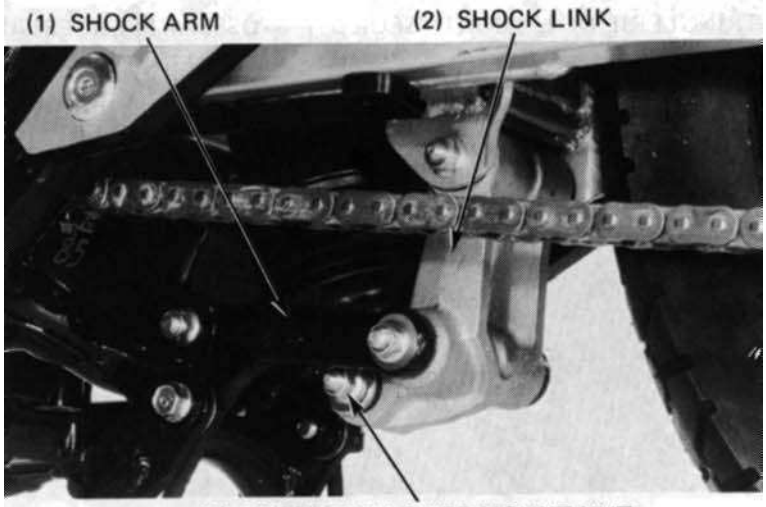
Remove the collars.
Check the bushing and needle bearings for wear or damage.
Check the dust seals for damage.
Replace the dust seal if necessary.

NOTE:
The bushing and needle bearings cannot be replaced. If they are damaged or worn, replace the shock link and/or shock arm.

INSTALLATION

Apply molybdenum disulfied grease to the needle bearings and dust seal lips.





Install the shock arm to the frame and tighten the mounting nut.

TORQUE: 40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)

Install the shock link to the swingarm and tighten the mount nut.

TORQUE: 40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)

Connect the shock link to the shock absorber and tighten the lower mounting nut.

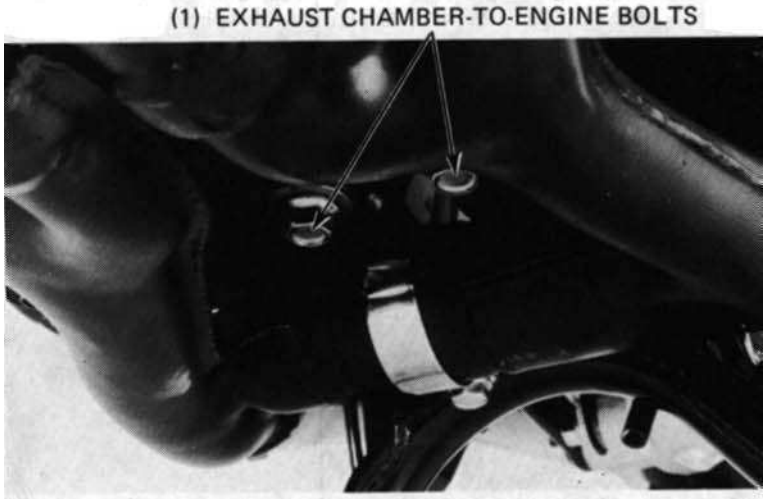
TORQUE: 40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)

Connect the shock arm to the shock link and tighten the nut.

TORQUE: 40-50 Nm (4.0-5.0 kg.m, 29-36 ft.lb)

Install the muffler.
Tighten the exhaust chamber-to-engine bolts.

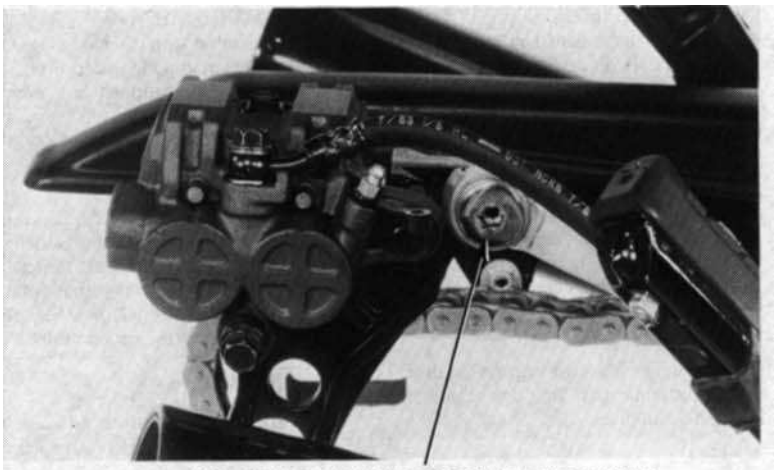
TORQUE: 45-60 Nm (4.5-6.0 kg.m, 33-43 ft.lb)



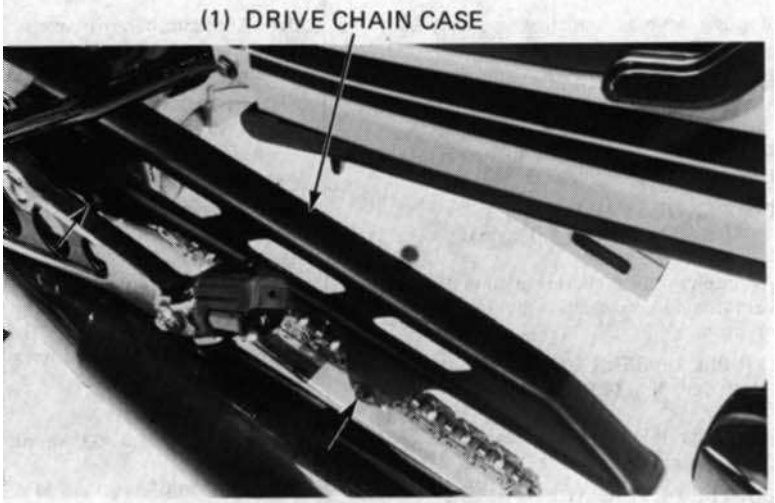
SWINGARM

REMOVAL

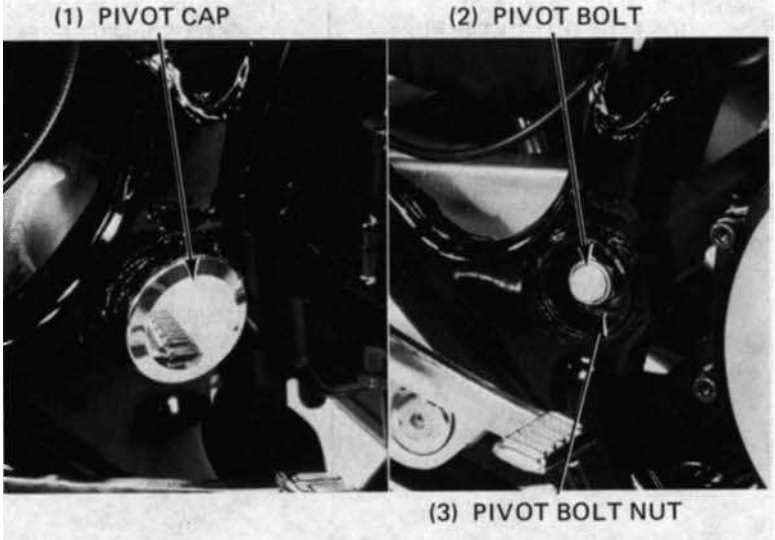
Remove the rear shock absorber (page 14-9).
Remove the cotter pin from the rear brake torque link bolt and remove the bolt.
Remove the rear brake hose from the clamp on the swingarm.


(1) REAR BRAKE TORQUE LINK BOLT

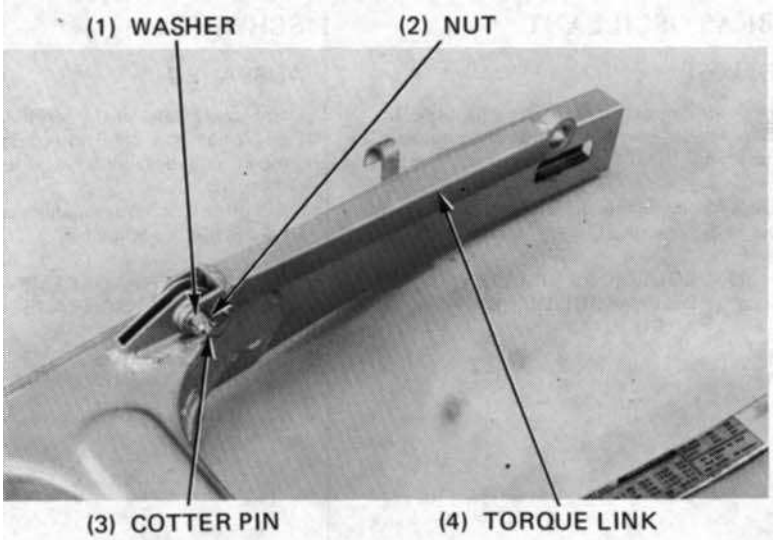
Remove the drive chain case.


(1) DRIVE CHAIN CASE

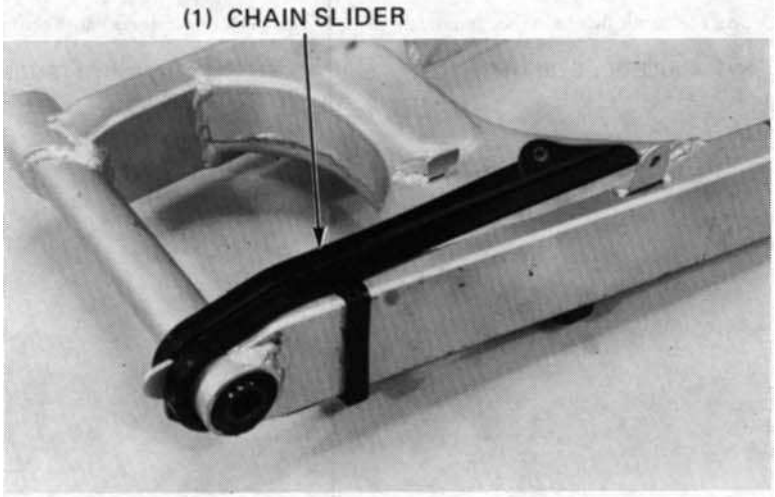
Remove the swingarm pivot caps.
Loosen the swingarm pivot bolt nut and remove the nut and bolt.
Remove the swingarm from the frame.


(1) PIVOT CAP
(2) PIVOT BOLT
(3) PIVOT BOLT NUT

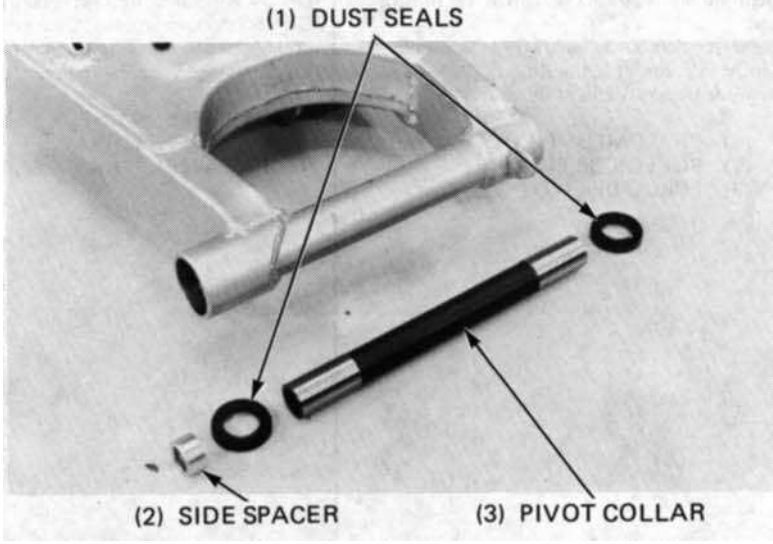
Remove the cotter pin, nut, washer and bolt, and, remove the torque link from the swingarm.



Remove the chain slider from the swingarm.

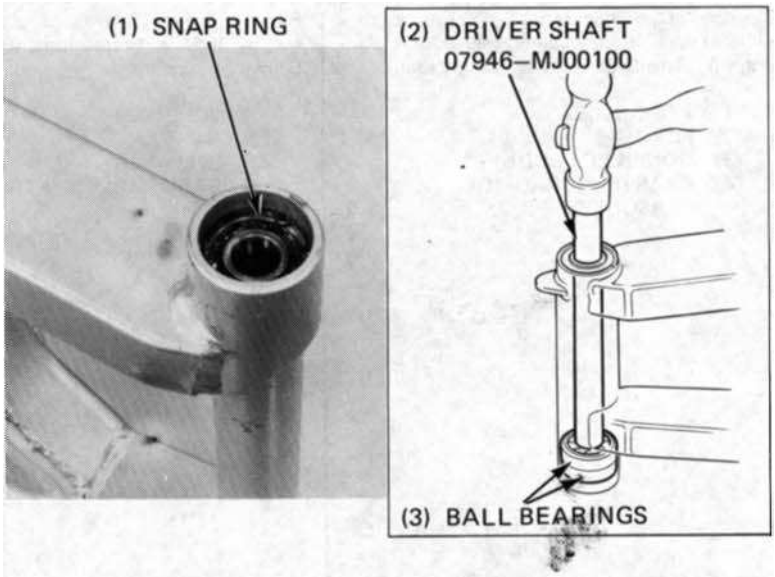


Remove the side spacer, dust seals and pivot collar from the swingarm pivot.

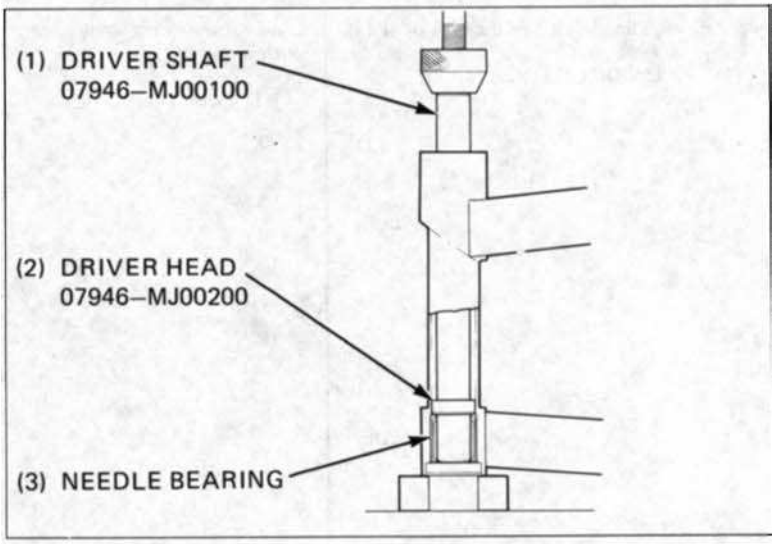


PIVOT BEARING REPLACEMENT

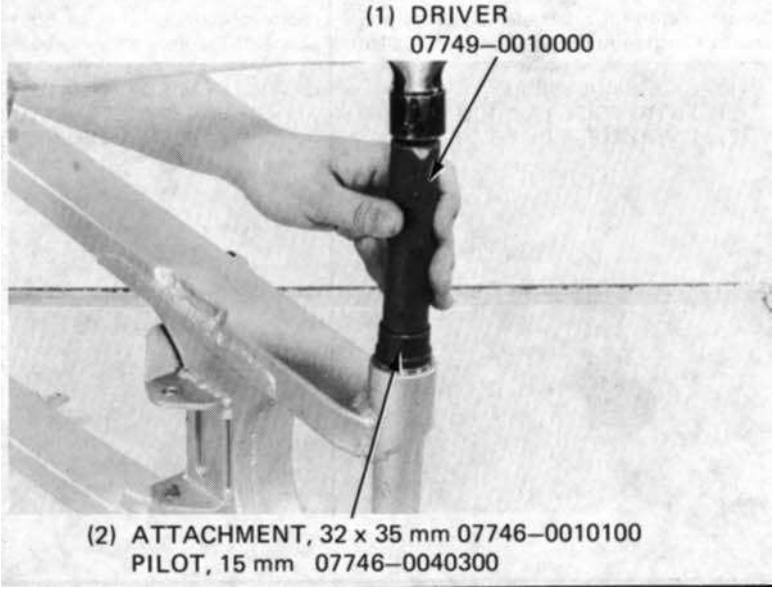
Remove the snap ring from the swingarm right pivot.
Drive the ball bearings out of the swingarm with driver shaft.



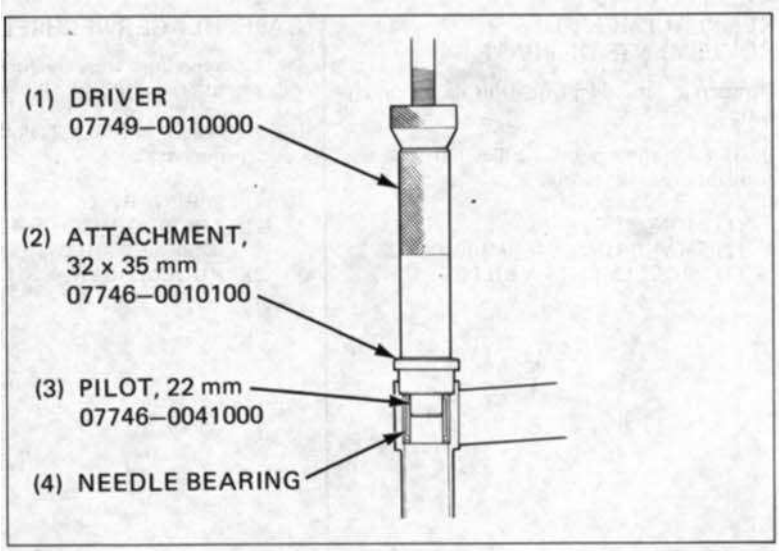
Using a hydraulic press, press the needle bearing out of the swingarm with driver shaft and driver head.



Apply molybdenum disulfied grease to the ball bearing cavities and inside of the needle bearing.
Drive new ball bearings in the swingarm right pivot squarely with the maker mark facing out until they are fully seated.
Install the snap ring,

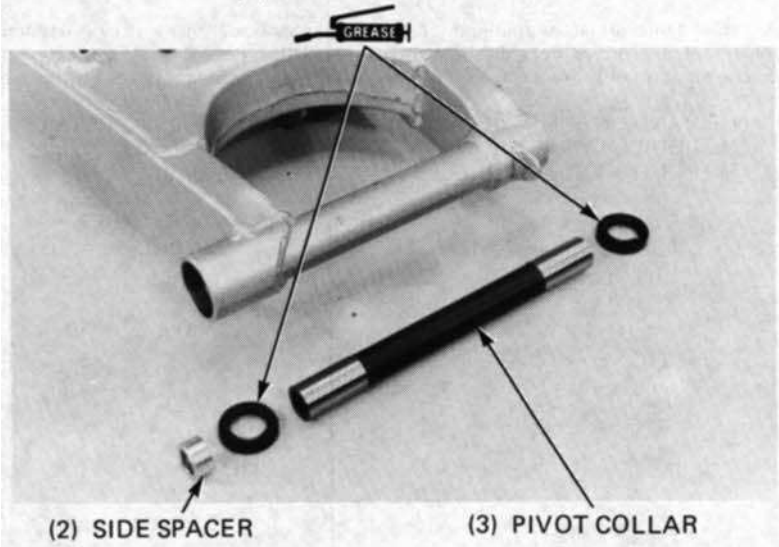


Press a new needle bearing in the left pivot of the swingarm, using a hydraulic press.



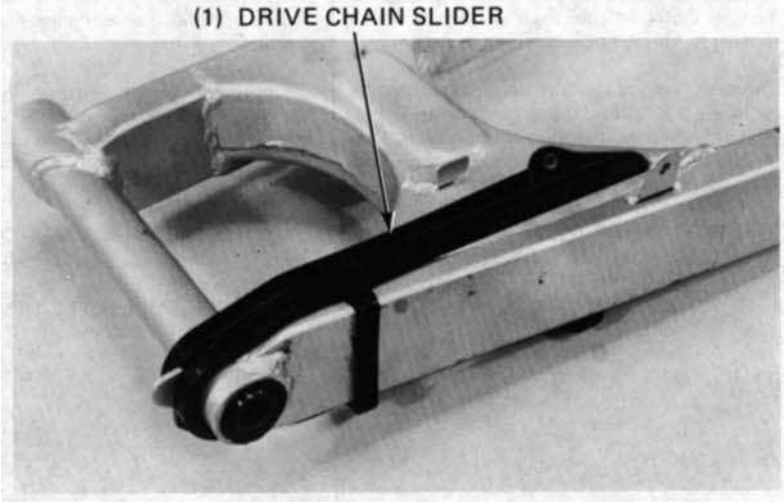
INSTALLATION

Apply molybdenum disulfied grease to the dust seal lips.
Install the dust seals, pivot collar and side spacer into the swingarm pivot.

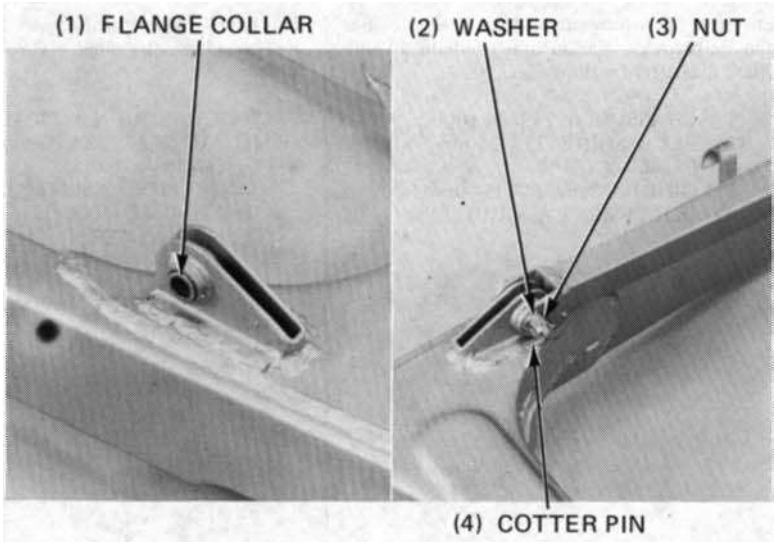


Install the drive chain slider.

NOTE:
Check the slider for wear or damage and re place it if necessary.



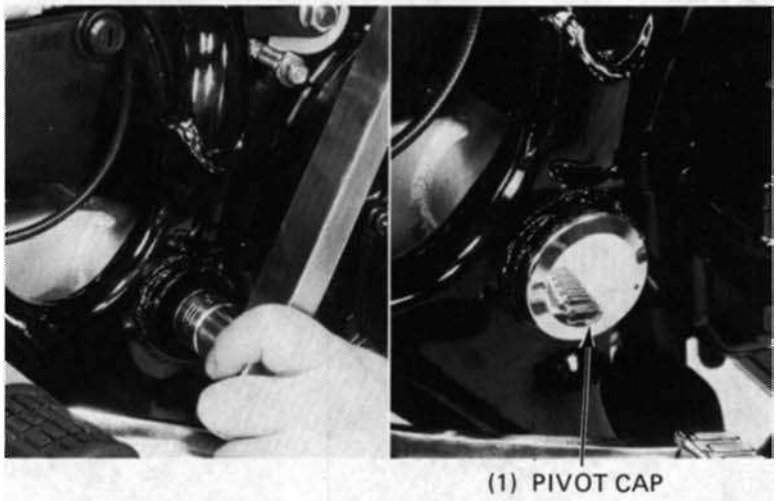
Make sure that the flange collar is installed in the torque link pivot of the swingarm and install the torque link with the bolt, washer and nut.
Tighten the nut and secure it with a new cotter pin.



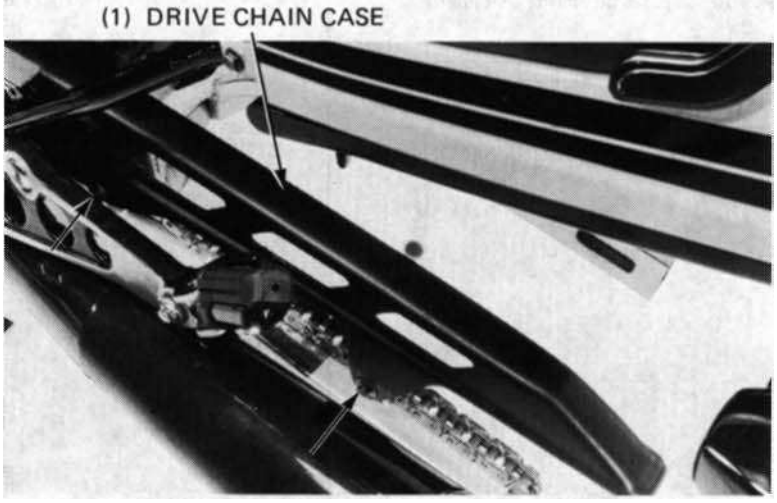
Install the swingarm in the frame.
Install the pivot bolt and nut, and tighten the nut.

TORQUE: 60-70 Nm
(6.0-7.0 kg.m, 43-51 ft-lb)

Install the swingarm pivot caps.



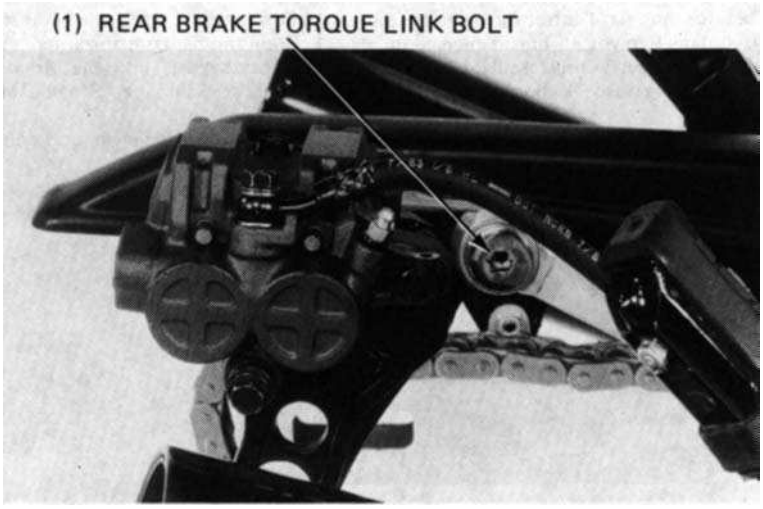
Install the drive chain case.

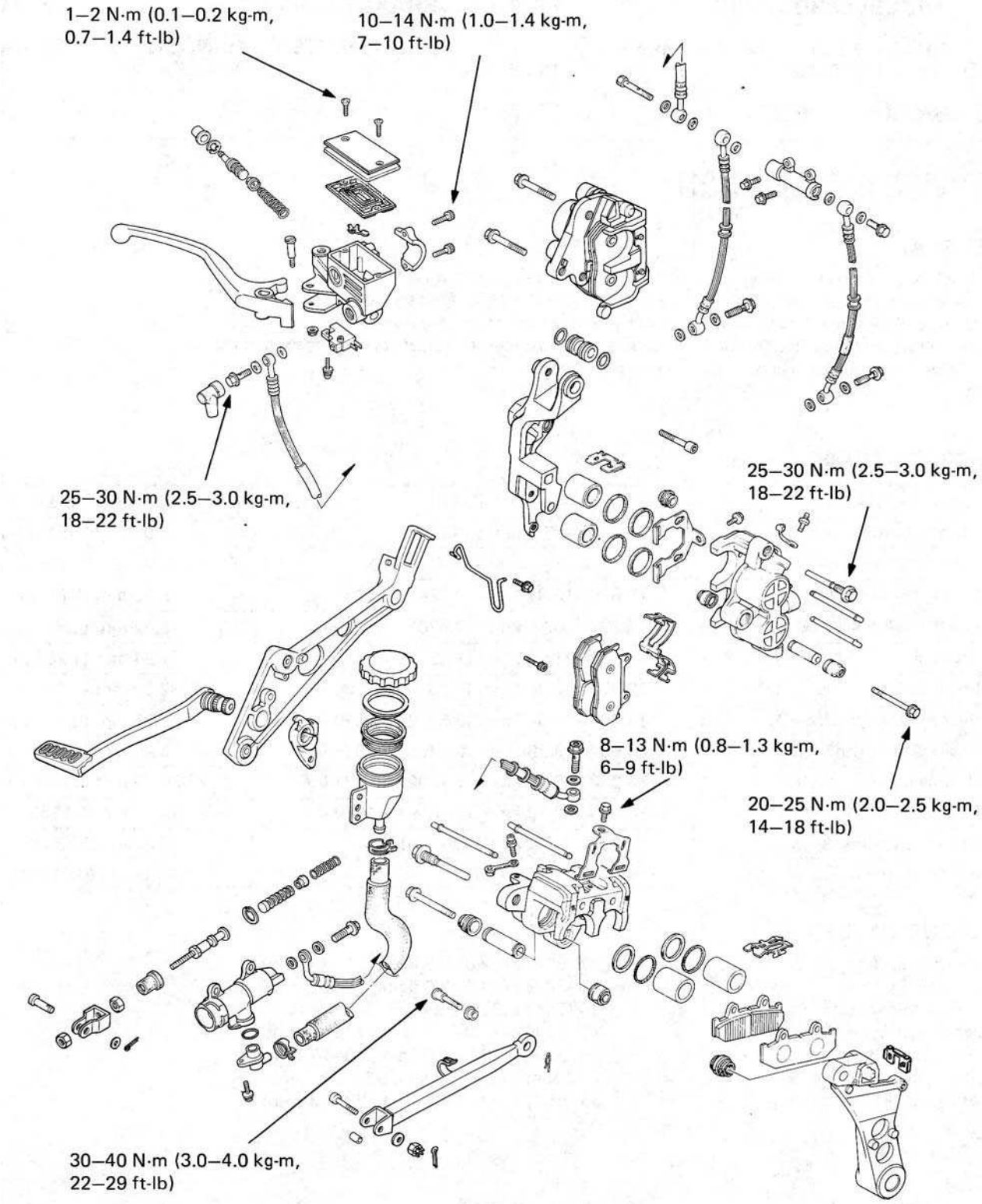


Connect the torque link and rear brake caliper, and temporarily tighten the torque link bolt.
Install the rear shock absorber (page 14-13).
Install the rear wheel (page 14-8).

Tighten the rear brake torque link bolt and secure it with a new cotter pin.

TORQUE: 30-40 Nm (3.0-4.0 kg.m, 22-29 ft.lb)




1–2 N·m (0.1–0.2 kg-m, 0.7–1.4 ft-lb)
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)
20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

SERVICE INFORMATION

GENERAL

- The brake calipers can be removed without disconnecting the hydraulic system.
- Bleed the hydraulic system if it is disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage can result.
- Always check brake operation before riding the motorcycle.

SPECIFICATIGNS

ITEM	STANDARD	SERVICE LIMIT
Front disc thickness	5.0 mm (0 197 in)	4.0 mm (0.157 in)
Front disc runout	-	0.30 mm (0.012 in)
Front master cylinder I.D.	15.870-15.913 mm (0.6248-0.6265 in)	15.93 mm (0.627 in)
Front master piston O.D.	15.827-15.854 mm (0.6231-0.6242 in)	15.82 mm (0.623 in)
Front caliper piston O.D.	31.948-31.998 mm (1.2578-1.2598 in)	31.94 mm (1.257 in)
Front caliper cylinder I.D.	32.030-32.080 mm (1.2610-1.2630 in)	32.09 mm (1.263 in)
Rear master cylinder I.D.	14.000-14.043 mm (0.5512-0.5529 in)	14.06 mm (0.554 in)
Rear master piston O.D.	13.957-13.984 mm (0.5495-0.5506 in)	13.95 mm (0.549 in)
Rear caliper cylinder I.D.	30.230-30.280 mm (1.1902-1.1921 in)	30.29 mm (1.193 in)
Rear caliper piston O.D.	30.148-30.198 mm (1.1869-1.1889 in)	30.14 mm (1.1866 in)
Rear disc thickness	7.0 mm (0.276 in)	6.0 mm (0.236 in)
Rear disc runout	-	0.30 mm (0.012 in)

TORQUE VALUES

Caliper mount bolt	20-25 N.m (2.0-2.5 kg.m, 14-18 ft.lb)
Caliper pin bolt	25-30 N.m (2.5-3.0 kg.m, 18-22 ft.lb)
Pad pin retainer bolt	8-13 N.m (0.8-1.3 kg.m, 6-9 ft.lb)
Front master cylinder holder	10-14 N.m (1.0-1.4 kg.m, 7-10 ft.lb)
Brake hose oil bolt	25-30 N.m (2.5-3.0 kg.m, 18-22 ft.lb)
Master cylinder reservoir cap	1-2 N.m (0.1 -0.2 kg.m, 0.7-1.4 ft.lb)
Footpeg bracket mount bolt	35-45 N.m (3.5-4.5 kg.m, 25-33 ft.lb)

TOOL

Special

Snap ring pliers	07914-3230001

TROUBLESHOOTING

Brake lever/pedal soft or spongy
1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking

Brake lever/pedal too hard
1. Sticking piston(s)
2. Clogged hydraulic system
3. Pads glazed or worn excessively

Brake drag
1. Hydraulic system sticking
2. Sticking piston(s)

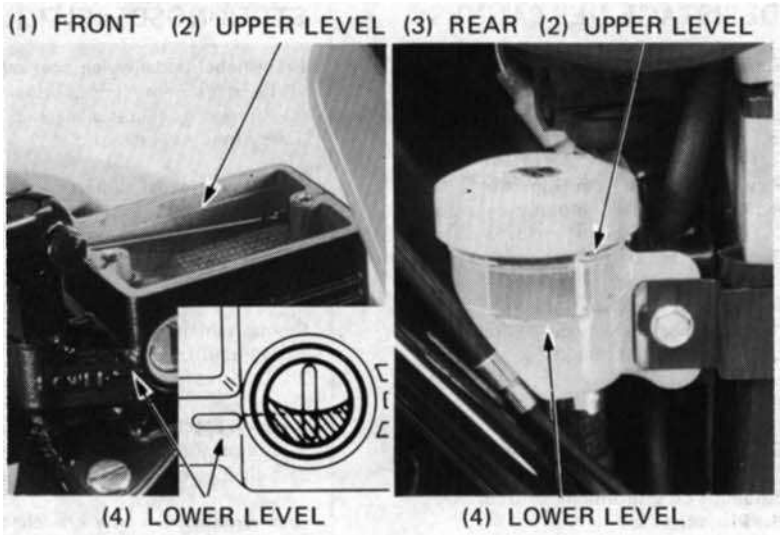
Brakes grab
1. Pads contaminated
2. Disc or wheel misaligned

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

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

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

CAUTION
Avoid spilling fluid on painted surfaces. Place clean shop towels over the fuel tank whenever the system is being serviced.

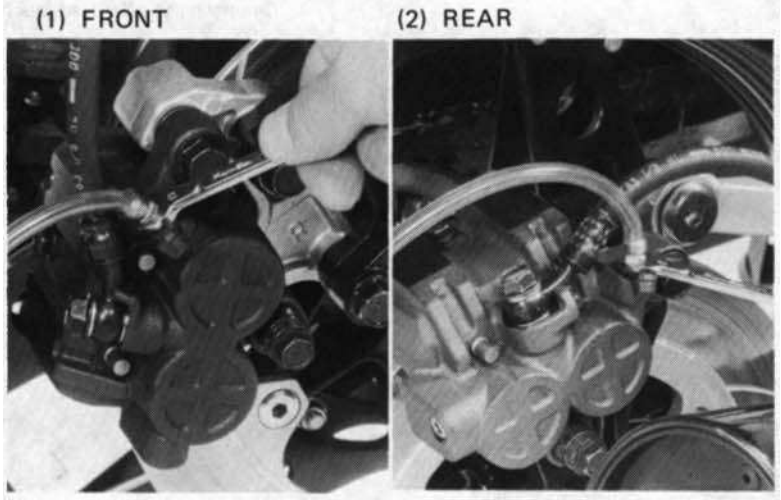


BRAKE FLUID DRAINING

Remove the reservoir cap and diaphragm. Connect a bleed hose to the bleed valve to avoid spilling fluid.

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

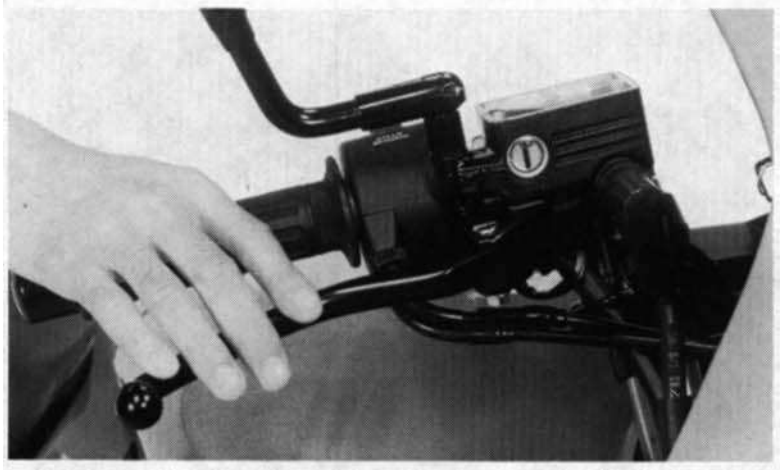
Loosen the caliper bleed valve and pump the brake lever.
Stop operating the lever when fluid stops flowing out of the bleed valve.



BRAKE FLUID FILLING

NOTE:
Do not mix different types of fluid since they are not be compatible.

Close the bleed valve and fill the reservoir. Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever or pedal resistance is felt.



NOTE:

- **Check the fluid level often while bleeding the brakes 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 reused the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.**

1. Squeeze the brake lever (or depress the brake pedal), open the bleed valve 1/2 turn and then close the valve.

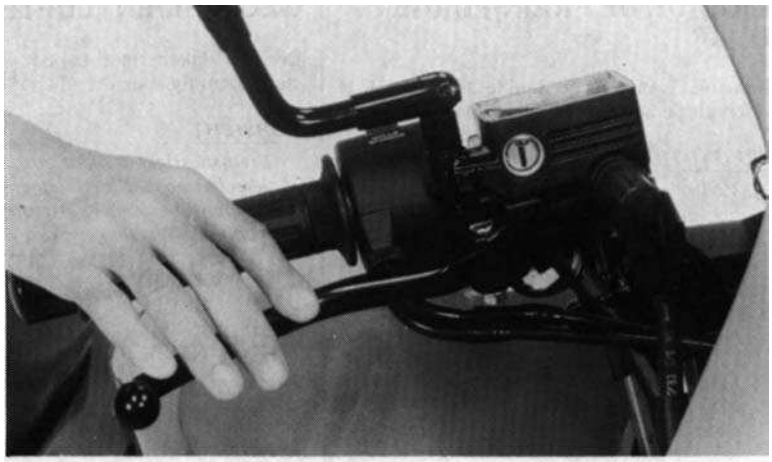
NOTE:
Do not release the brake lever (or pedal) until the bleed valve has been closed.

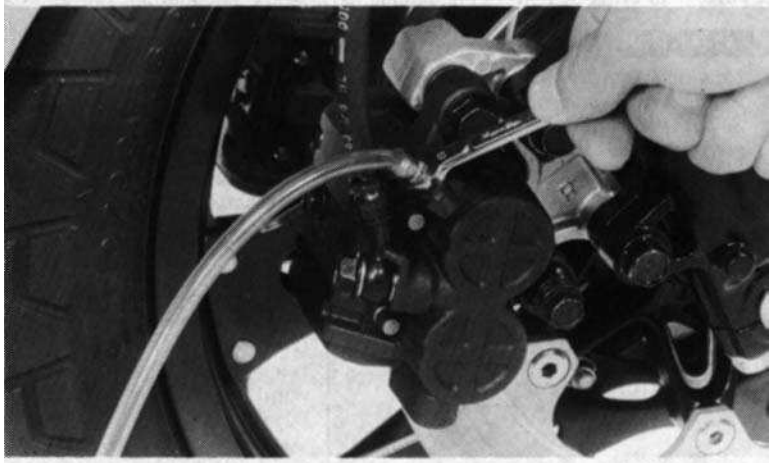
2. Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.

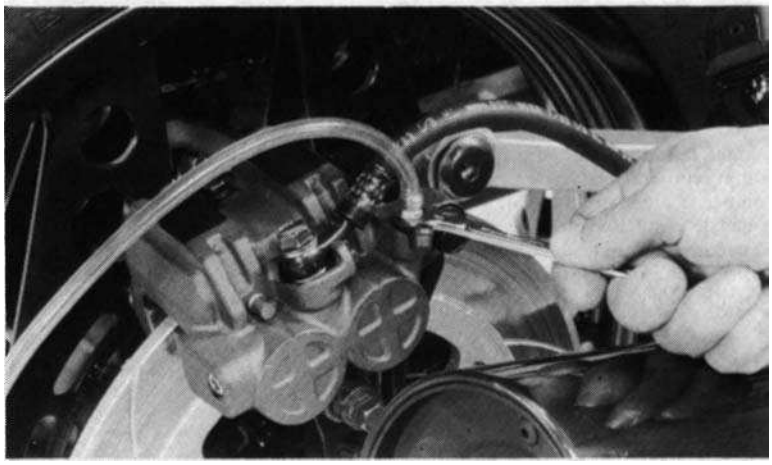
Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleeder valve.

Fill the fluid reservoir to the upper level mark.

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





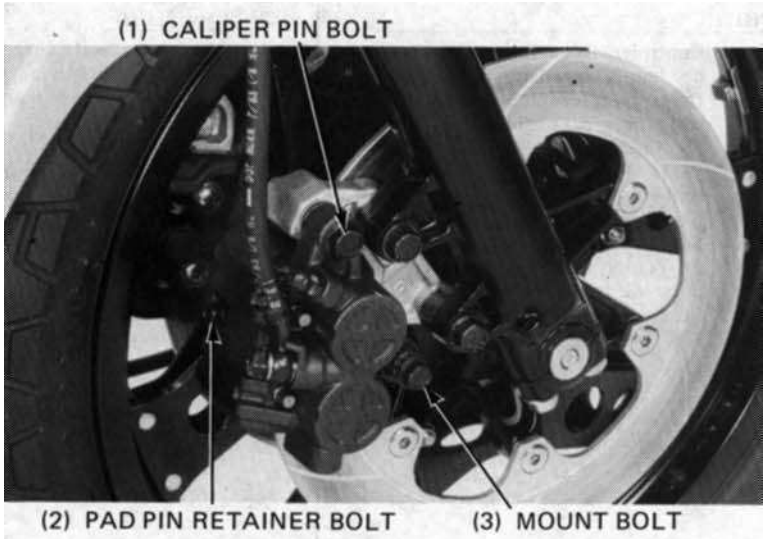


BRAKE PAD/DISC

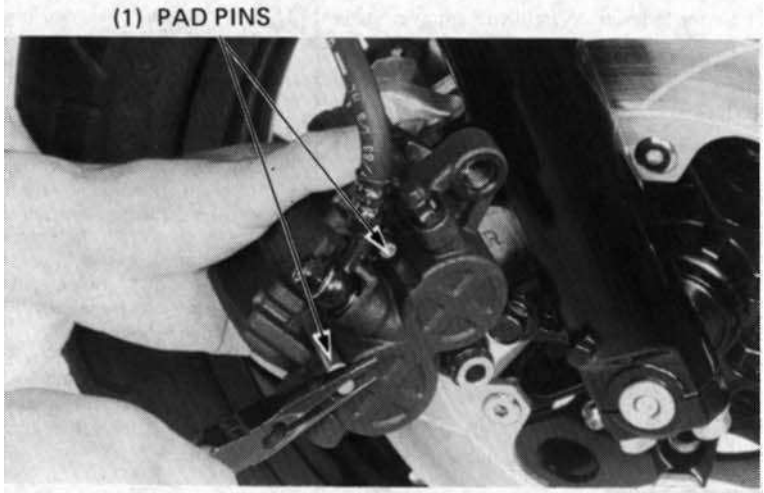
FRONT BRAKE PAD REPLACEMENT

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

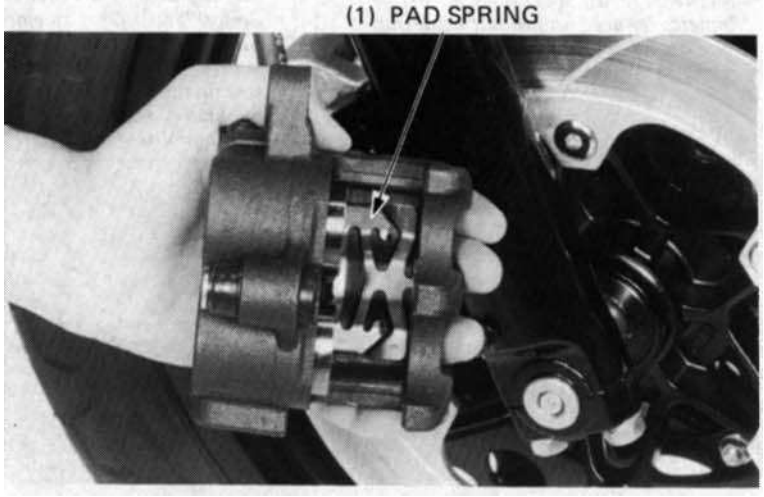
Loosen the pad pin retainer bolt.
Remove the caliper pin bolt and mount bolt.
Remove the caliper from the bracket.



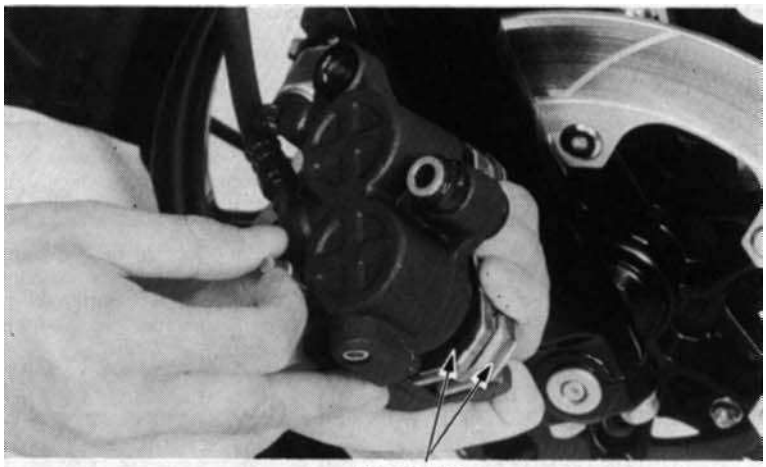
Remove the pad pin retainer and pull the pad pins out of the caliper.
Remove the brake pads.



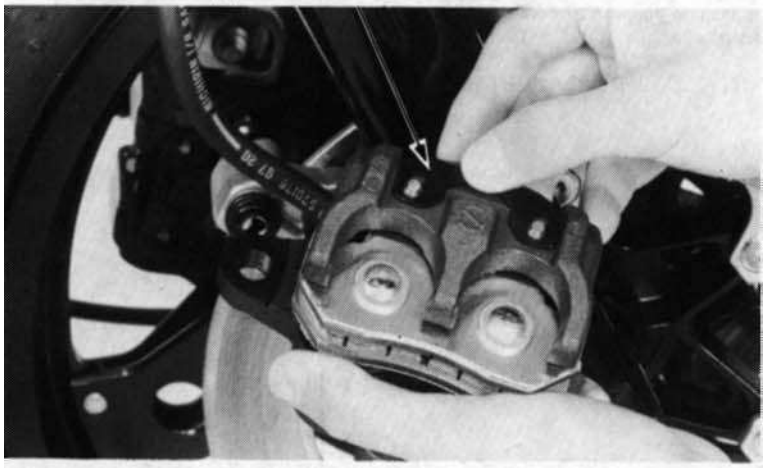
Position the pad spring in the caliper as shown.
Push the caliper pistons in all the way.



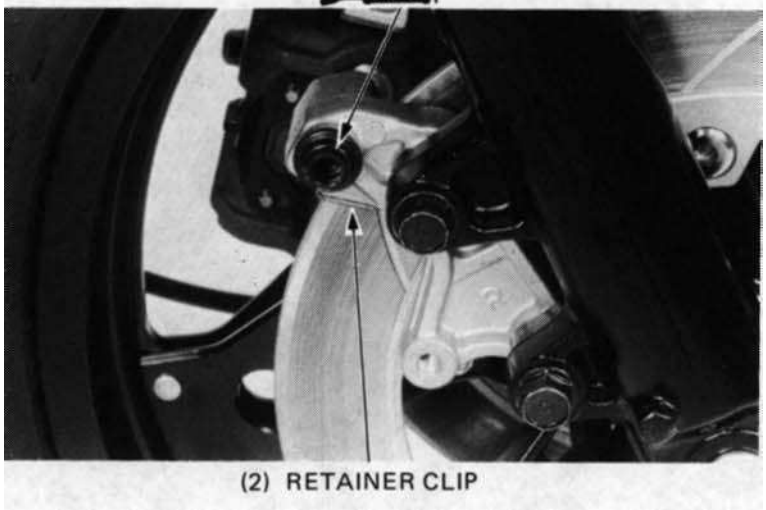
Install the new pads in the caliper.
Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



Place the pad pin retainer over the pad pins.
Push the retainer down to secure the pins.



Apply silicone grease to the caliper pin bolt boot and caliper pin bolt.
Make sure that the retainer clip is in position on the caliper bracket.

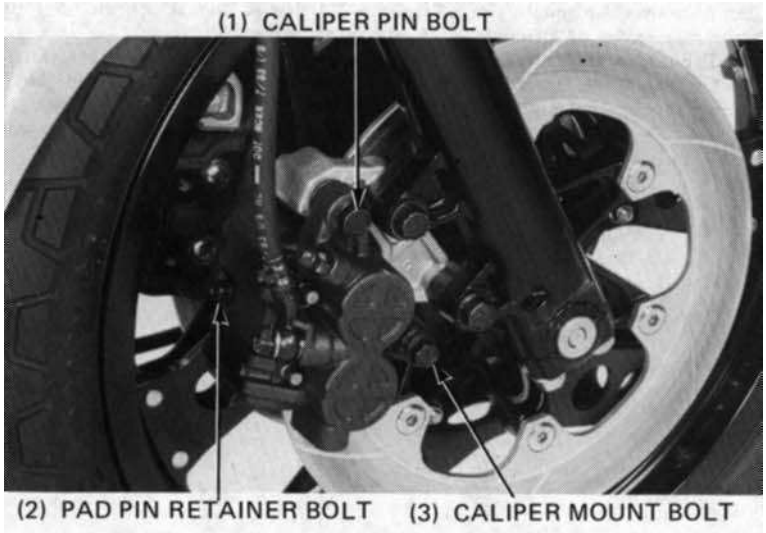


Install the caliper to the bracket so the disc is positioned between the pads, being careful not to damage the pads.
Tighten the caliper mount bolt and pin bolt.

TORQUE:
CALIPER MOUNT BOLT:
20-25 Nm (2.0-2.5 kg.m, 14-18 ft.lb)
CALIPER PIN BOLT
25-30 Nm (2.5-3.0 kg.m, 18-22 ft.lb)

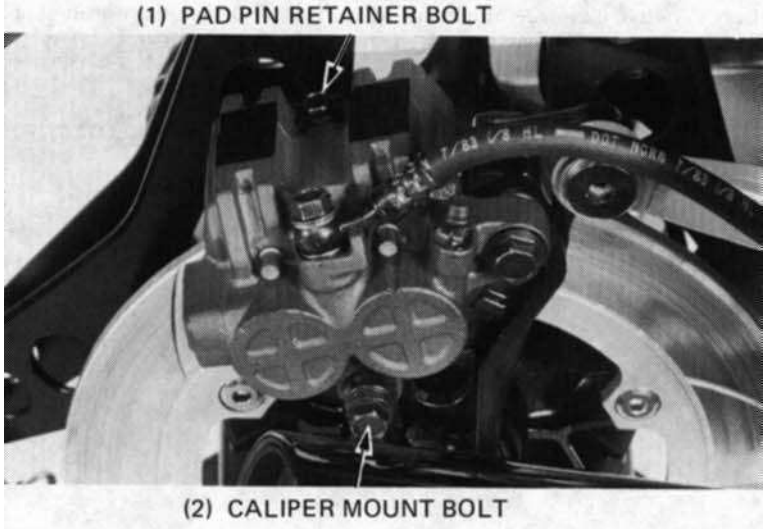
Tighten the pad pin retainer bolt.

TORQUE: 8-13 Nm (0.8-1.3 kg.m, 6-9 ft.lb)



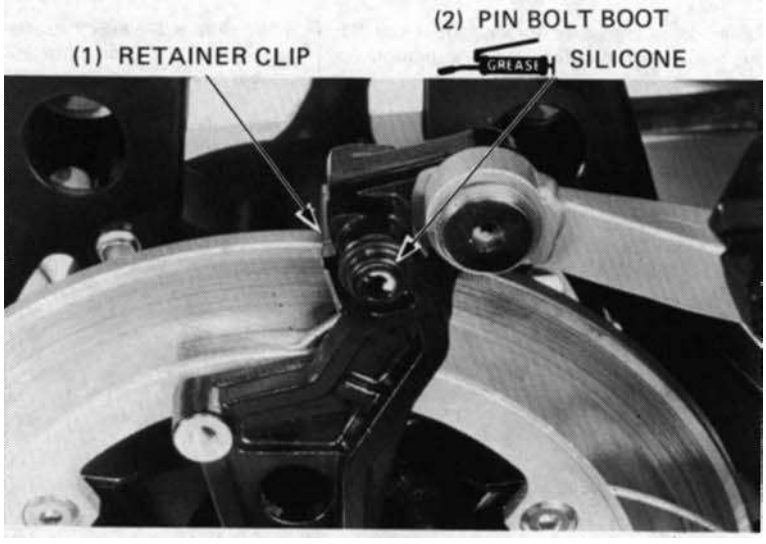
REAR BRAKE PAD REPLACEMENT

Loosen the pad pin retainer bolt.
Loosen the caliper mount bolt and remove it from the caliper bracket.
Pivot the caliper up out of the way and remove the caliper from the bracket.
Replace the rear brake pads using the same method as used for front brake pad replacement.



Before installing the caliper to the bracket, apply silicone grease to the caliper pin bolt boot and caliper pin bolt, and make sure that the retainer clip is in position on the bracket.

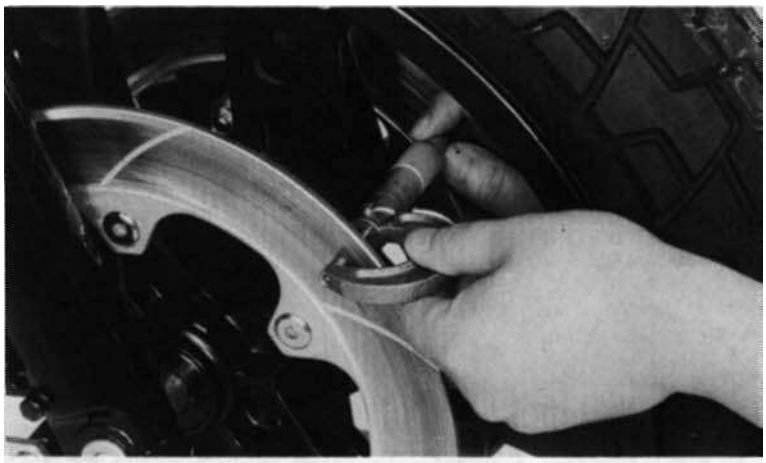
TORQUE:
CALIPER MOUNT BOLT:
20-25 Nm (2.0-2.5 kg.m, 14-18 ft.lb)
PAD PIN RETAINER BOLT:
8-13 Nm (0.8-1.3 kg.m, 6-9 ft-lb)



DISC THICKNESS

Measure the thickness of each disc.

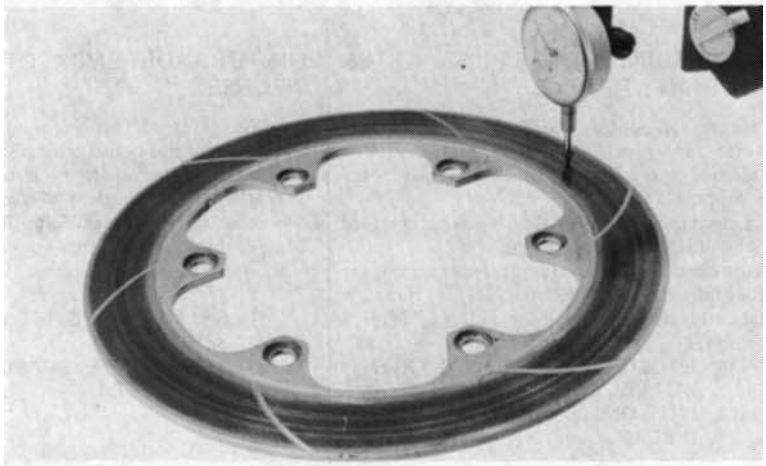
SERVICE LIMIT:
FRONT: 4.0 mm (0.16 in)
REAR: 6.0 mm (0.24 in)



BRAKE DISC WARPAGE

Measure brake disc for warpage.

SERVICE LIMIT: 0.30 mm (0.012 in)



FRONT MASTER CYLINDER

DISASSEMBLY

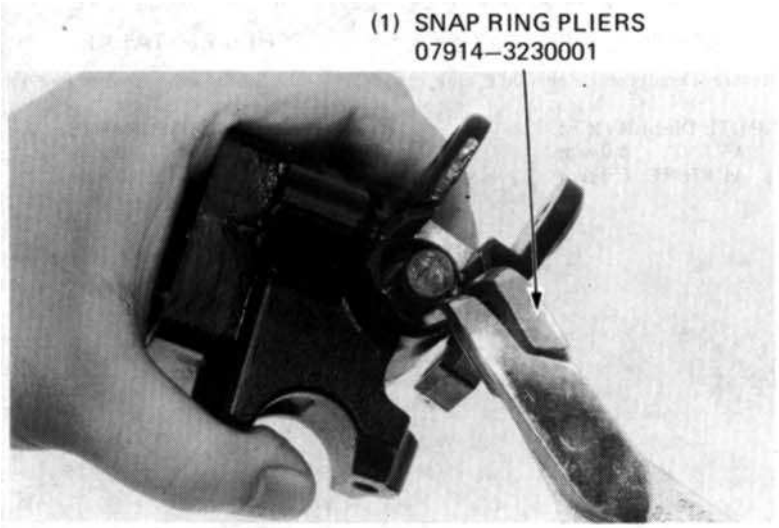
Drain brake fluid from the hydraulic system.
Remove the brake lever and rear view mirror from the master cylinder.
Disconnect the brake hose.

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

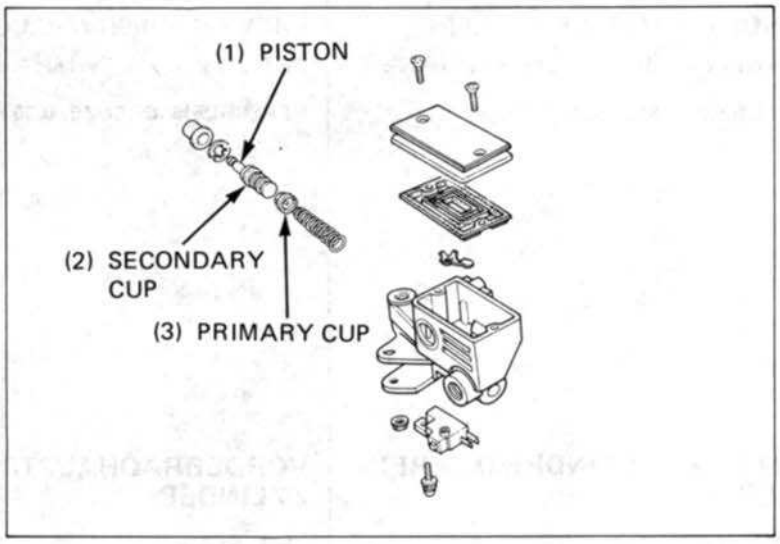
NOTE:
When removing the fluid hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Disconnect the front brake switch wires.
Remove the front brake master cylinder.

Remove the piston boot and the snap ring from the master cylinder body.



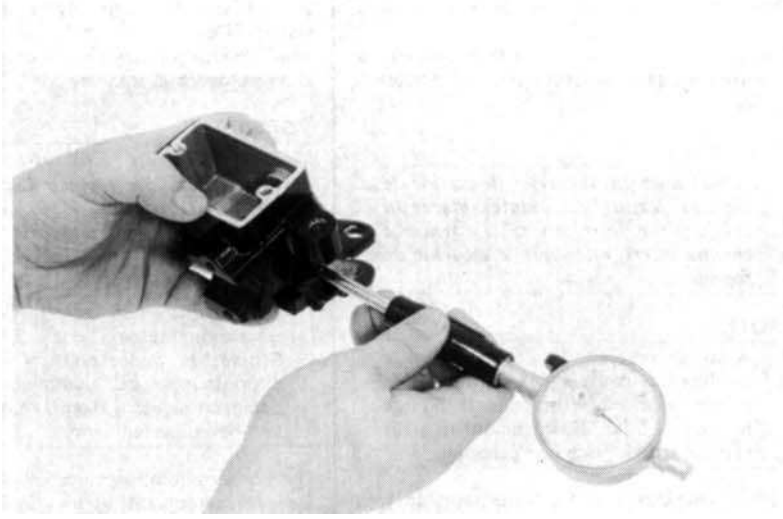
Remove the secondary cup and piston. Then remove the primary cup and spring. Remove the brake light switch from the master cylinder body, if necessary. Clean the inside of the master cylinder and reservoir with brake fluid.



INSPECTION

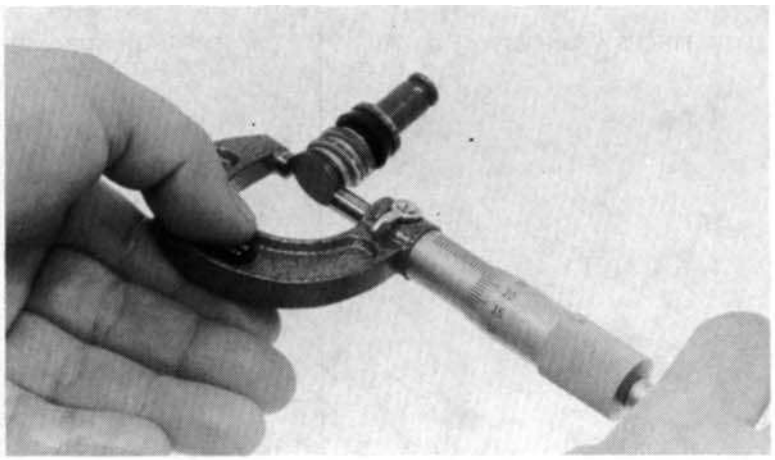
Measure the master cylinder I.D. Check the master cylinder for scores, scratches or nicks.

SERVICE LIMIT: 15.93 mm (0.627 in)



Measure the master piston O.D.

SERVICE LIMIT: 15.82 mm (0.623 in)

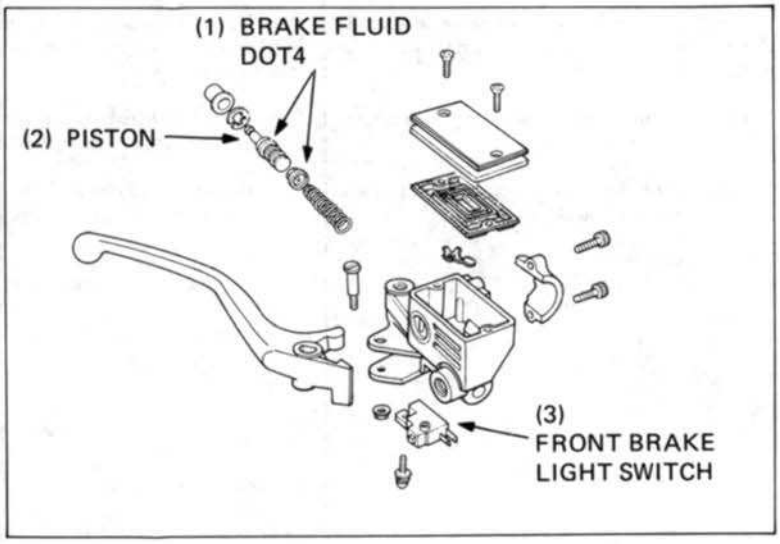


Check the primary and secondary cups for damage before assembly.

ASSEMBLY

CAUTION
Keep the master cylinder piston, cylinder and spring as a set; don't substitute individual parts.

Assemble the master cylinder. Coat the master piston, primary and secondary cups with clean brake fluid before assembly. Install the spring and primary cup together.
Install the piston and snap ring.



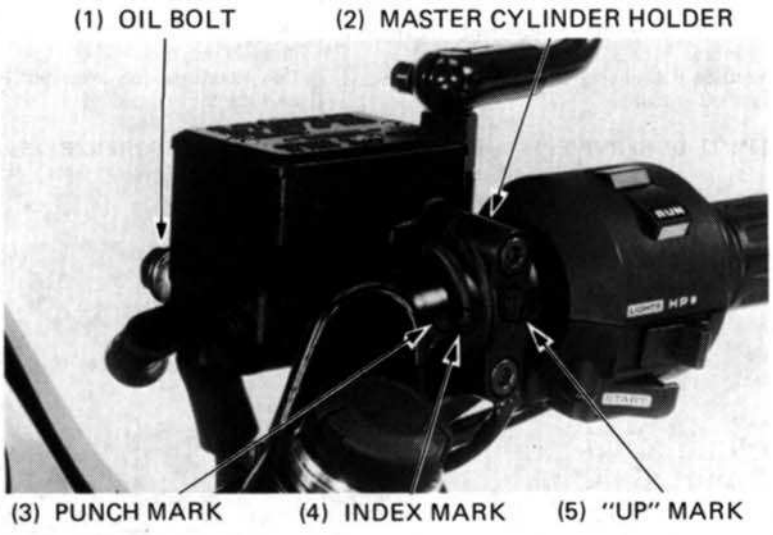
CAUTION
Do not allow the lips of the cups to turn inside out and be certain the snap ring is firmly seated in the groove.

Install the boot.

INSTALLATION

Place the front brake master cylinder on the handlebar and install its holder with the "UP" mark facing up. Align the index mark on the holder with the punch mark on the handlebar. Tighten the upper bolt first, then tighten the lower bolt.

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



Install the brake hose with the oil bolt and two sealing washers, and tighten the oil bolt.

TORQUE: 25-30 N.m
(2.5-3.0 kg.m, 18-22 ft.lb)

Install the brake lever and rear view mirror.
Connect the front brake switch wires.
Fill the reservoir to the upper level and bleed the front brake system according to page 15-4.

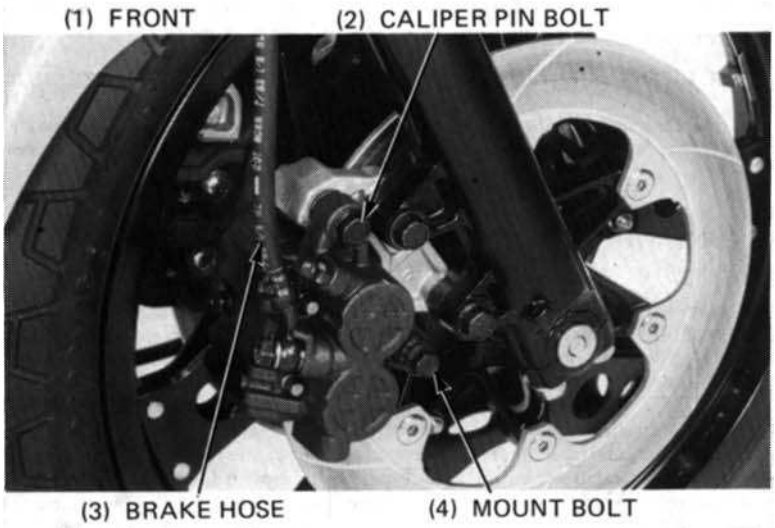
BRAKE CALIPERS

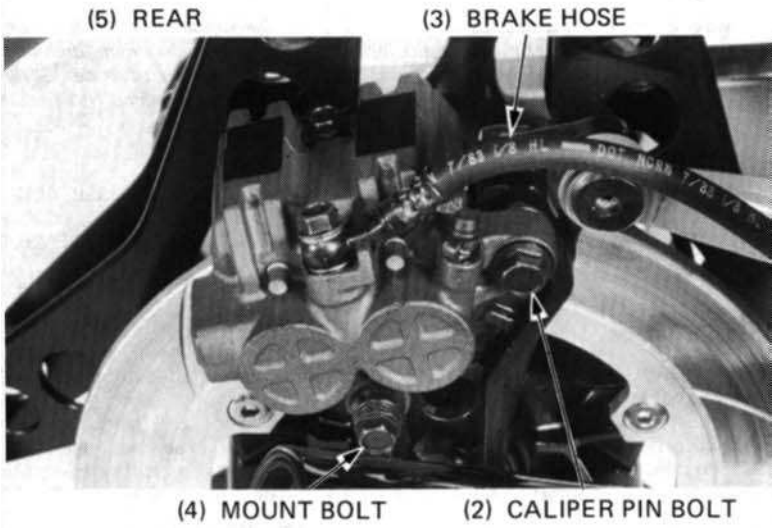
REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION
Avoid spilling brake fluid on painted surfaces.

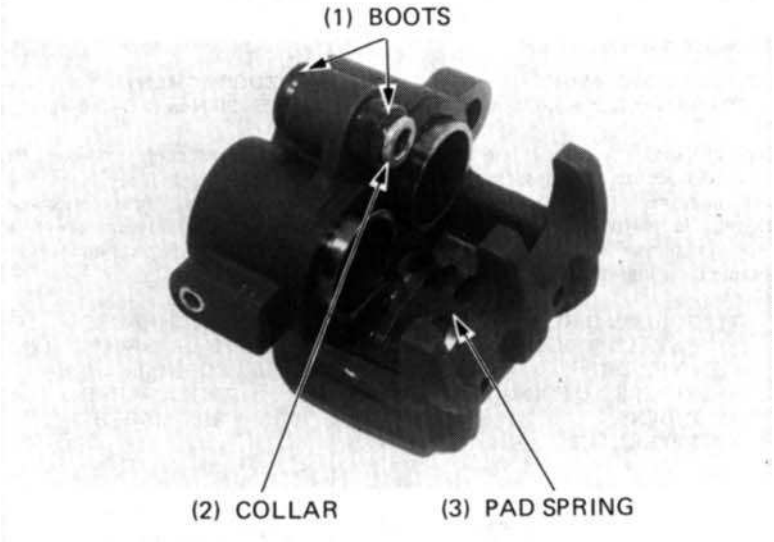
Remove the caliper pin bolt and mount bolt, and remove the caliper.





DISASSEMBLY

Remove the brake pads (page 15-5).
Remove the pad spring.
Remove the caliper pivot collar and boots.
Remove the pistons from the caliper.

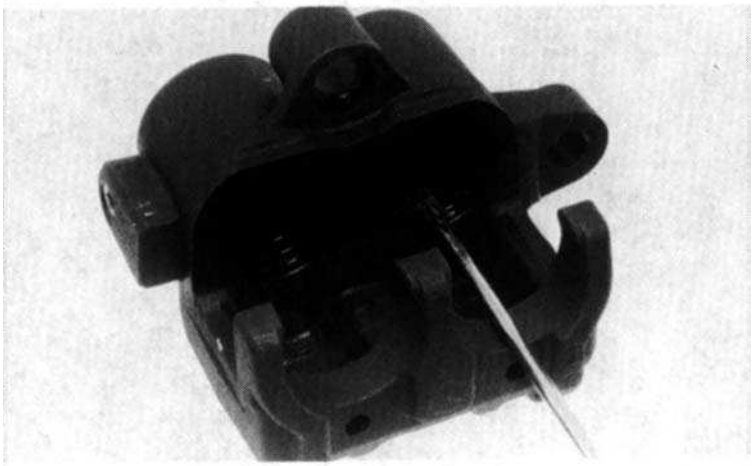


If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is forced out. Use the air in short spurts.

WARNING
Do not bring the nozzle too close to the inlet.

Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.

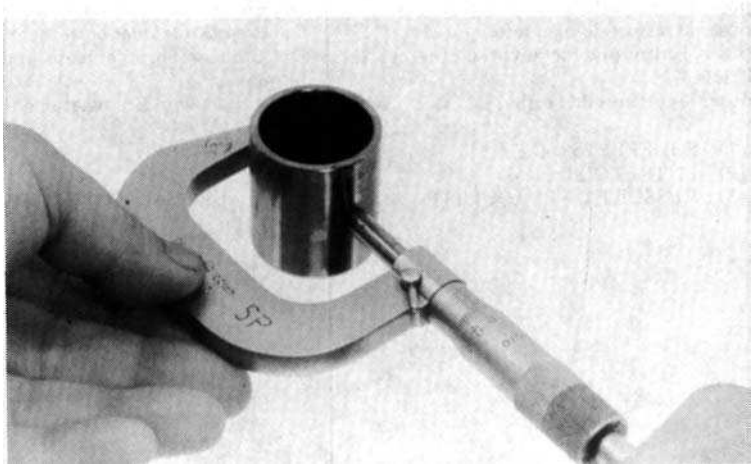
Push the dust and piston seals in and lift them out, then discard them.
Clean the piston seal grooves with brake fluid.



CAUTION
Be careful not to damage the piston sliding surfaces.

PISTON INSPECTION

Check the pistons for scoring, scratches or other damage. Measure the piston diameter with a micrometer.

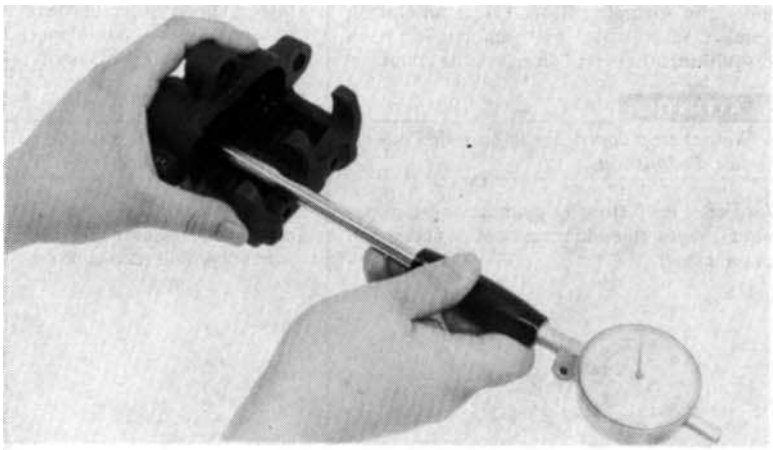


SERVICE LIMIT:
FRONT: 31.94 mm (1.257 in)
REAR: 30.14 mm (1.1866 in)

CYLINDER INSPECTION

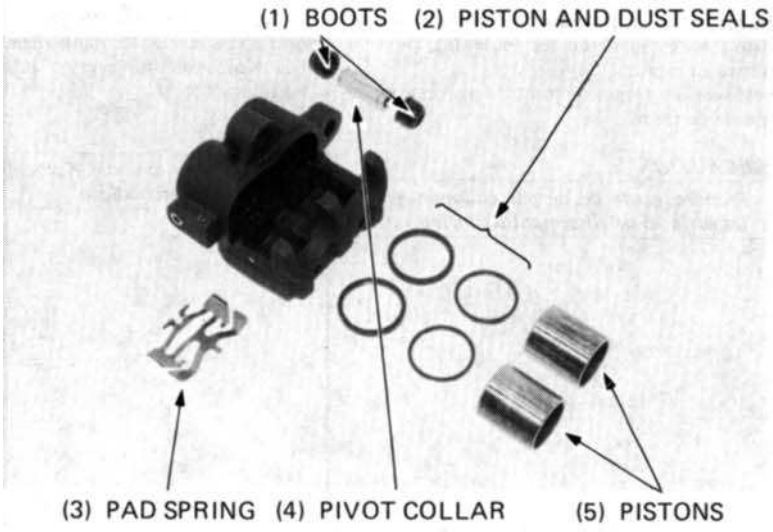
Check the caliper cylinder for scoring, scratches or other damage. Measure the caliper cylinder bore.

SERVICE LIMIT:
FRONT: 32.09 mm (1.263 in)
REAR: 30.29 mm (1.193 in)



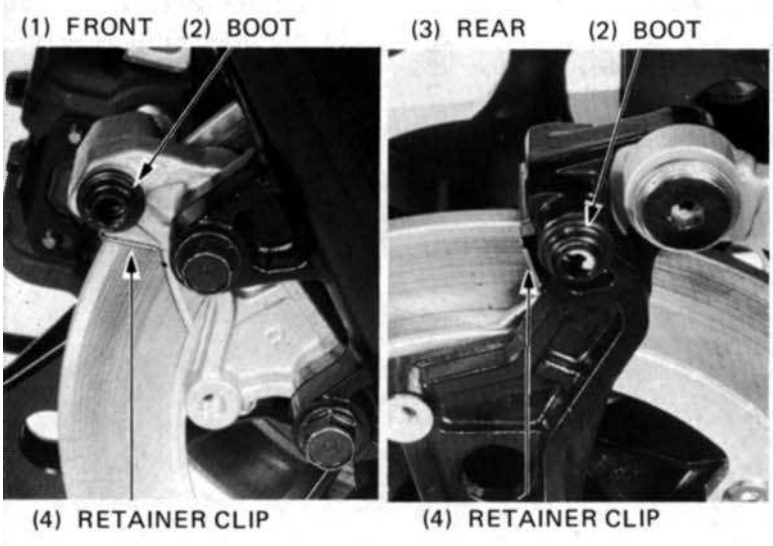
ASSEMBLY

If the pivot collar boots are hardened or deteriorated, replace them with new ones.
The piston and dust seals must be replaced with new ones whenever they are removed. Coat the seals with silicone grease or brake fluid before assembly. Install the pistons with the dished ends toward the pads.
Apply silicone grease to the pivot collar and boots and install the collar and boots making sure that the boots are seated in the collar and caliper grooves properly.
Install the pad spring.
Install the pads (page 15-5).



INSTALLATION

Make sure that the retainer clip is in position on the caliper bracket.
Inspect the condition of the caliper pin bolt boot.
Apply silicone grease to the caliper pin bolt boot and bolt.



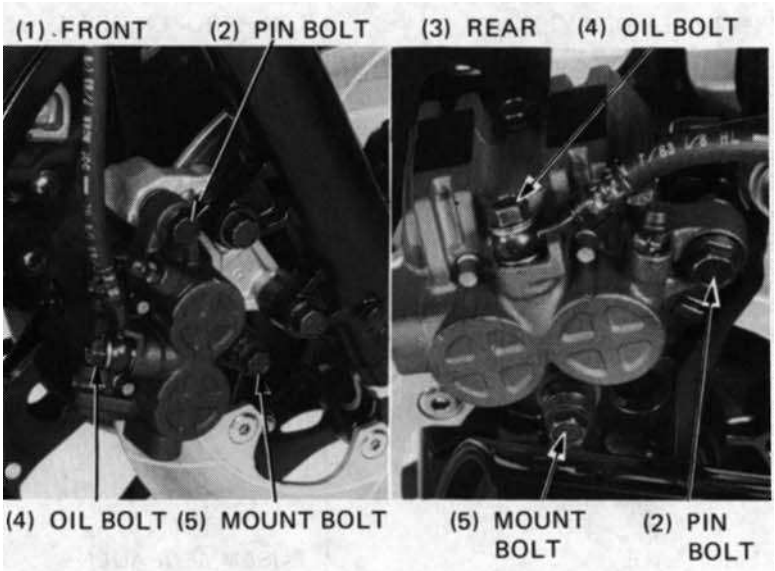
Install the caliper assembly to the bracket so that the disc is positioned between the pads, being careful not to damage the pads.
Tighten the caliper mount bolt and pin bolt.

TORQUE:
CALIPER MOUNT BOLT:
20-25 N.m (2.0-2.5 kg.m, 14-18 ft.lb)
CALIPER PIN BOLT:
25-30 N.m (2.5-3.5 kg.m, 18-22 ft.lb)

Connect the brake hose to the caliper with the oil bolt and two sealing washers, and tighten the oil bolt.

TORQUE: 25-30 N.m
(2.5-3.0 kg.m, 18-22 ft.lb)

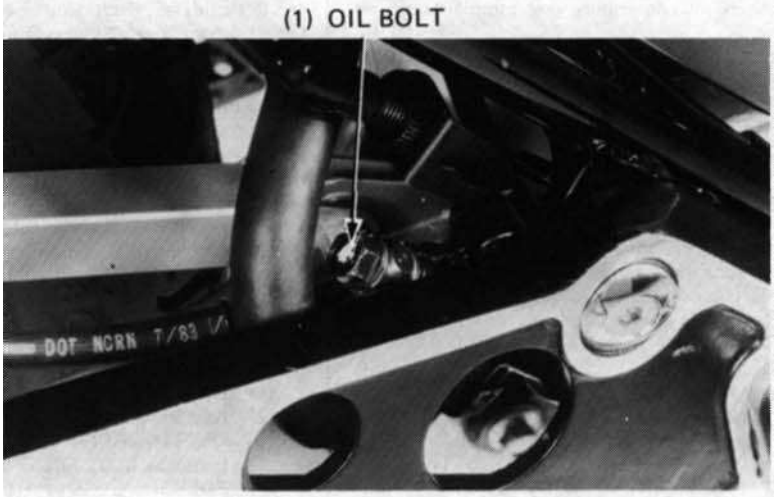
Fill the brake fluid reservoir and bleed the brake system (page 15-4).



REAR MASTER CYLINDER

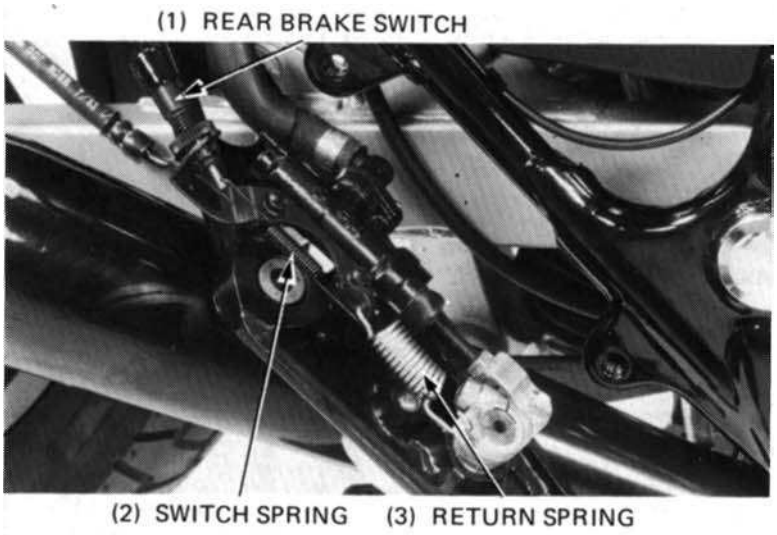
REMOVAL

Drain the brake fluid from the rear brake system (page 15-3).
Remove the oil bolt and disconnect the brake hose from the master cylinder.

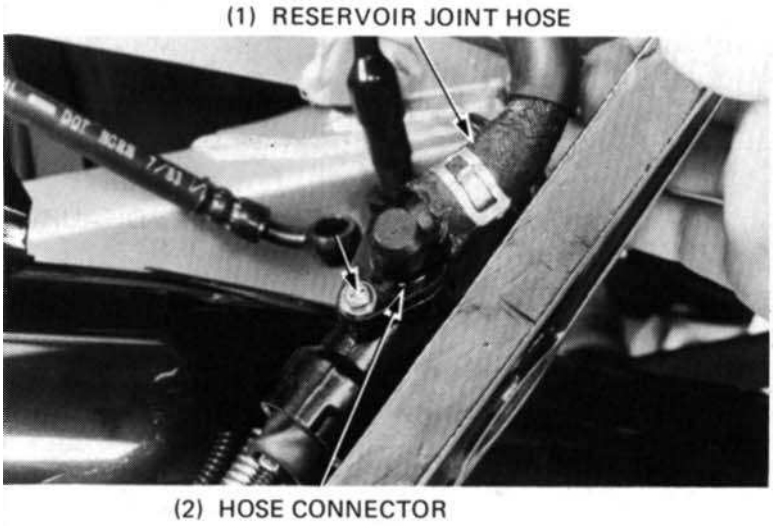


Remove the right footpeg bracket.

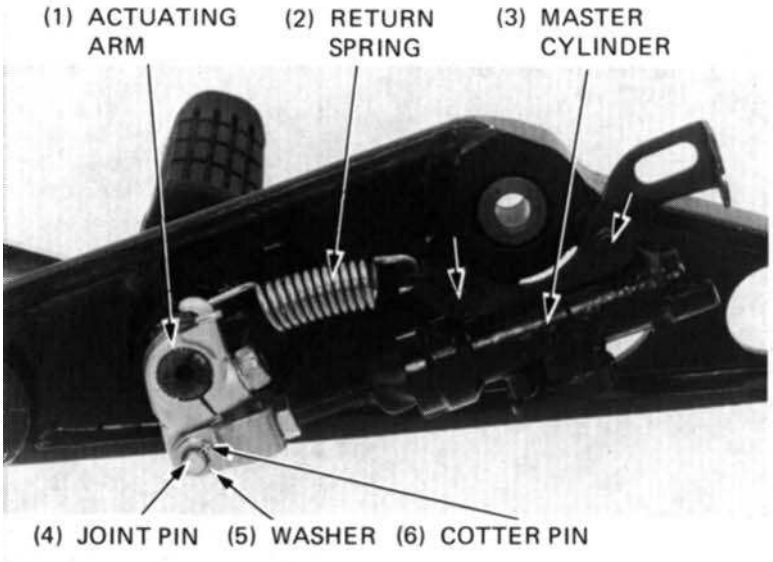
Remove the rear brake switch from the right footpeg bracket and unhook the switch spring from the rear brake return spring.



Remove the hose connector screw and disconnect the reservoir joint hose from the master cylinder.

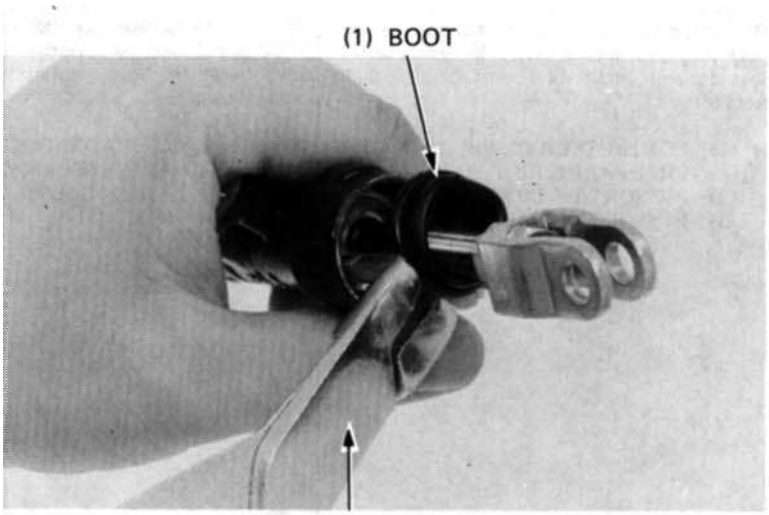


Unhook the rear brake return spring from the actuating arm.
Remove the actuating arm from the pedal shaft.
Remove the cotter pin, washer and joint pin, and disconnect the actuating arm from the master cylinder push rod.
Remove the master cylinder from the footpeg bracket.



DISASSEMBLY

Remove the rubber boot. Remove the snap ring and push rod from the master cylinder body. Remove the master piston, primary cup and spring. It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup. Clean the piston and inside of the master cylinder with brake fluid.

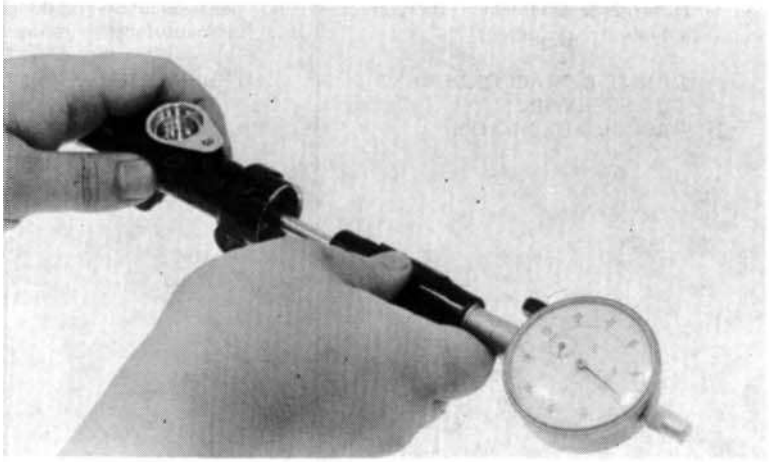


CYLINDER I.D. INSPECTION

Measure the inside diameter of the master cylinder bore.

SERVICE LIMIT: 14.06 mm (0.554 in)

Check for scores, scratches or nicks.

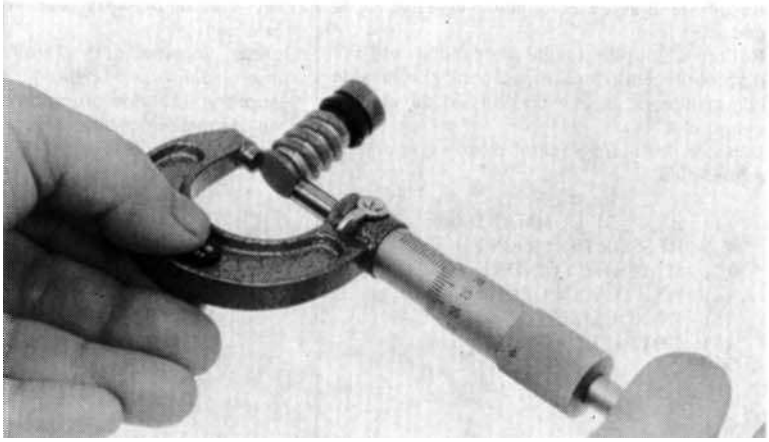


PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.95 mm (0.549 in)

Check the primary cup and piston cup for damage.



ASSEMBLY

CAUTION
Keep the master cylinder piston, cylinder and spring as a set; do not substitute individual parts.

Assemble the master cylinder. Coat the master piston, primary and secondary cups with clean brake fluid before assembly.
Install the spring and primary cup together.
Install the piston.
Install the push rod and snap ring.

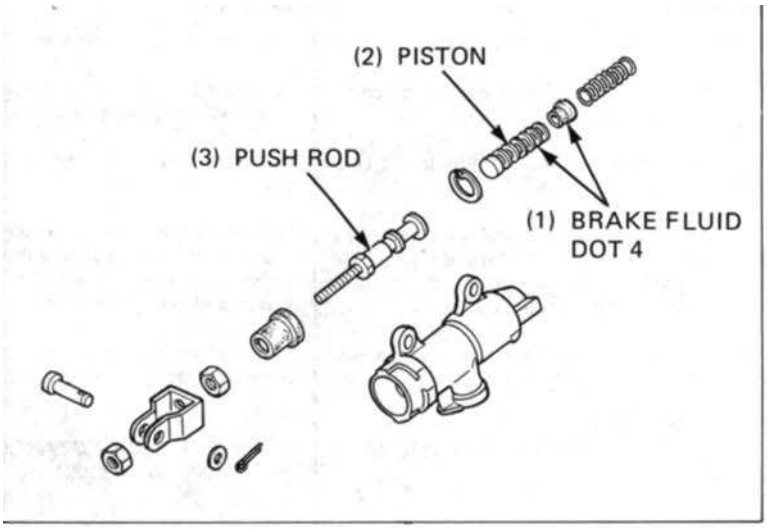
CAUTION
Do not allow the lips of the cups to turn inside out and be certain the snap ring is firmly seated in the groove.

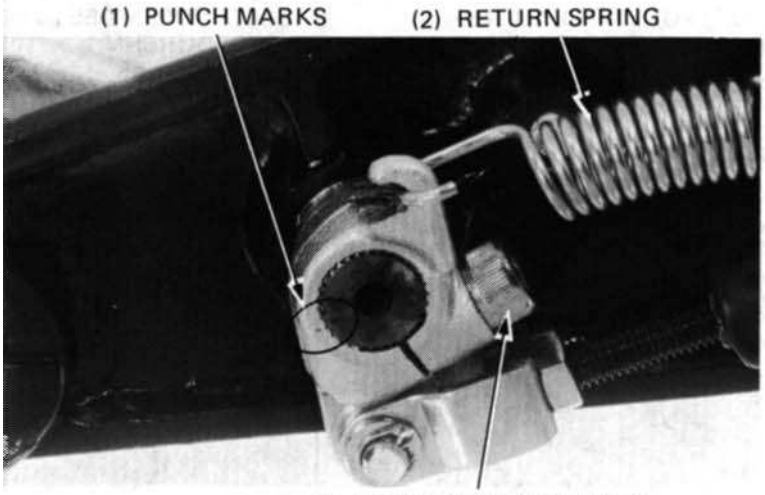
Install the rubber boot.

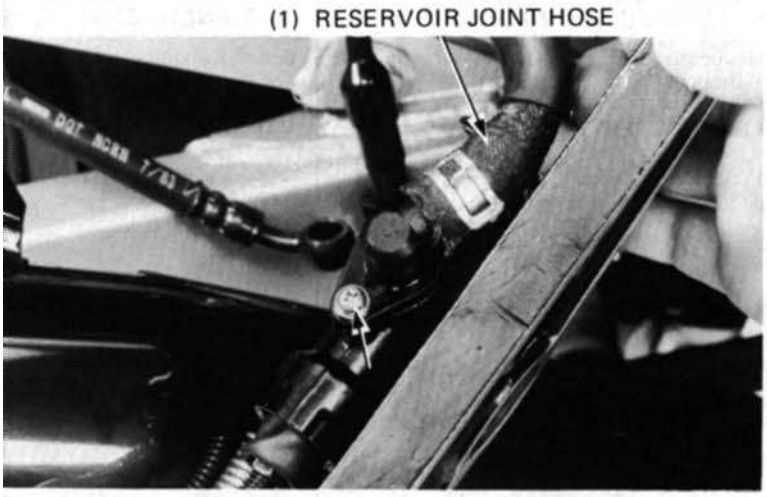
INSTALLATION

Install the master cylinder onto the footpeg bracket.
Connect the actuating arm to the master cylinder push rod with the joint pin, washer and a new cotter pin.
Install the actuating arm onto the pedal shaft, aligning the punch marks on the arm and shaft.
Tighten the actuating arm bolt.
Hook the rear brake return spring to the actuating arm.

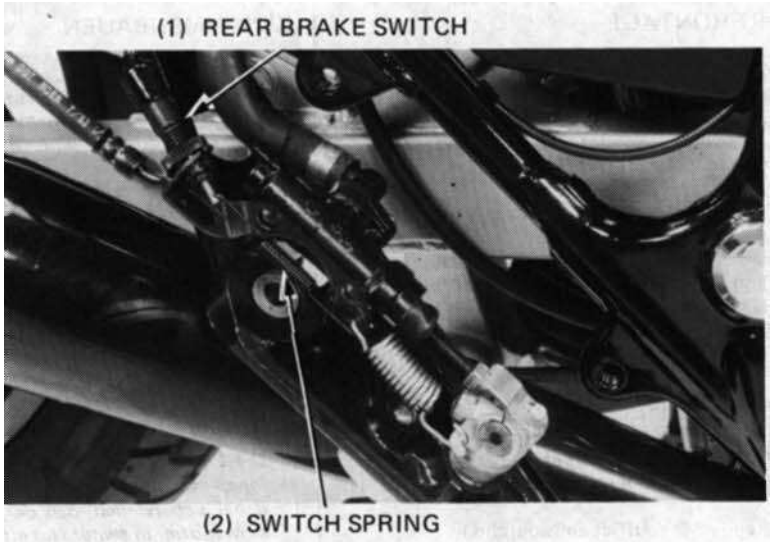
Connect the reservoir joint hose to the master cylinder with a new O-ring and the screw.







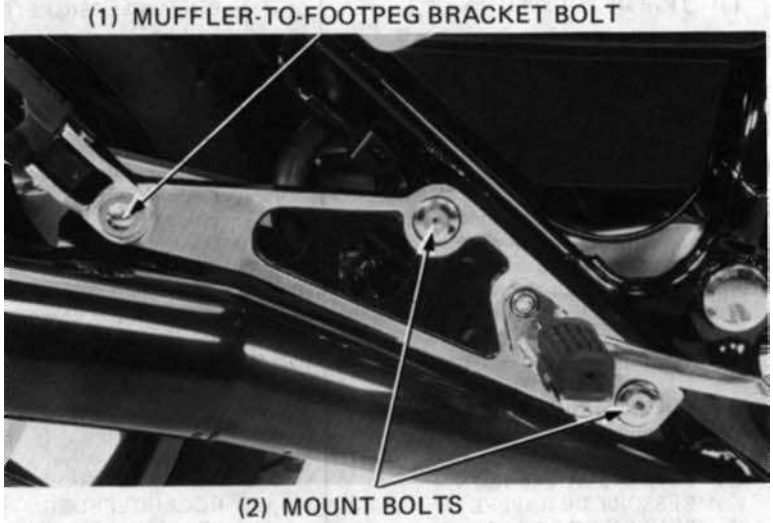
Hook the rear brake switch spring to the return spring and install the switch to the footpeg bracket.



Install the footpeg bracket to the frame and tighten the mount bolts.

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

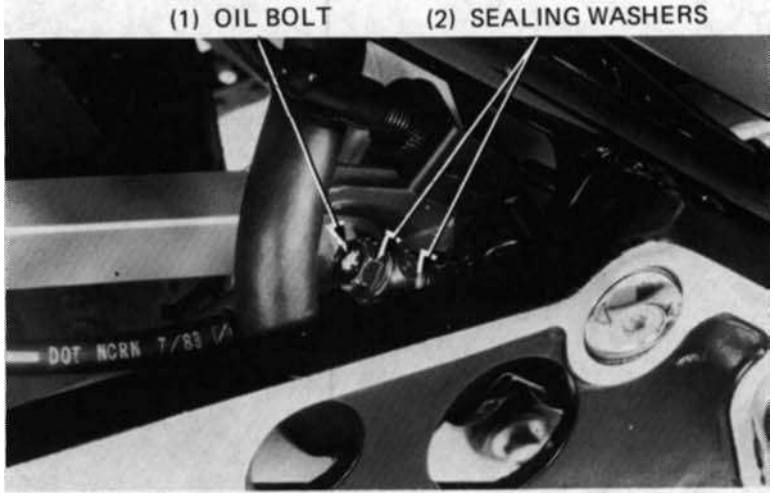
Install the muffler-to-footpeg bracket bolt and nut.

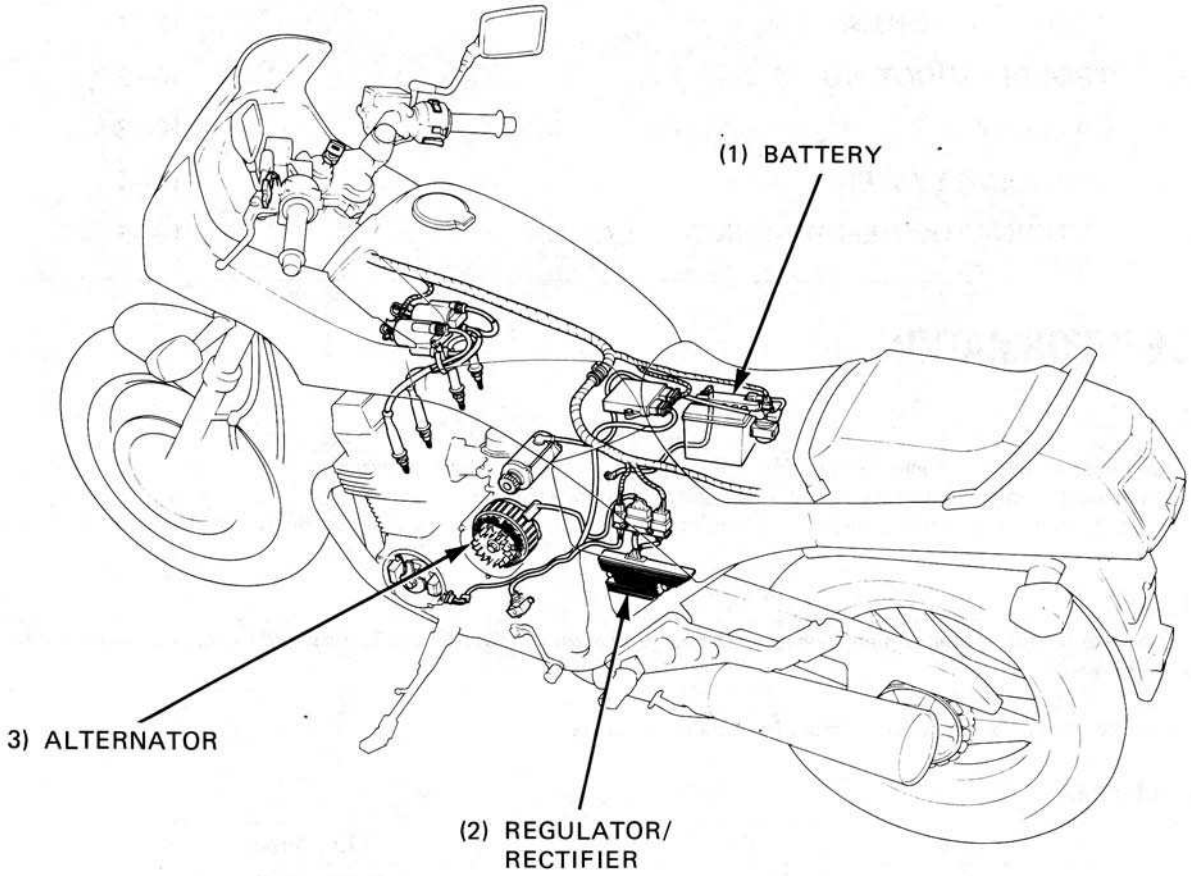


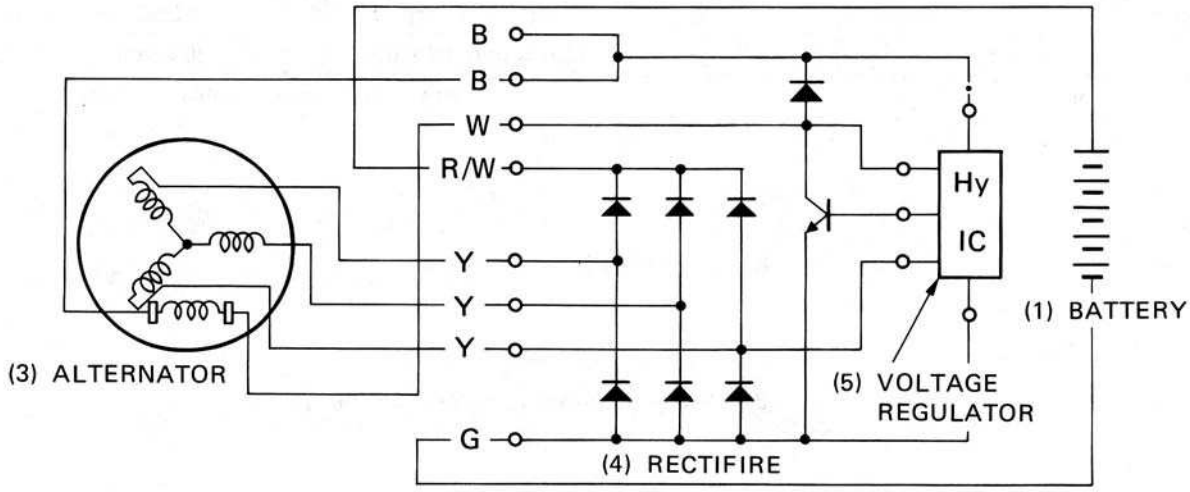
Connect the brake hose to the master cylinder with the oil bolt and two sealing washers, and tighten the oil bolt.

TORQUE: 25-30 N.m
(2.5-3.0 kg.m, 18-22 ft.lb)

Fill and bleed the rear brake system (page 15-4).
Adjust the rear brake switch (page 3-12).




(1) BATTERY
3) ALTERNATOR
(2) REGULATOR/
RECTIFIER


B
B
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IC
(1) BATTERY
(3) ALTERNATOR
(5) VOLTAGE
REGULATOR
(4) RECTIFIRE

SERVICE INFORMATION

GENERAL

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery only in an emergency; slow-charging is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

WARNING
Do not smoke or allow flames near a charging battery. The gas produced by a battery will explode if flames or sparks are brought near.

- All charging system components can be tested on the motorcycle.

SPECIFICATIONS

Battery	Capacity	12V 14AH	
	Specific gravity	1.280/20° C (68° F)	
	Charging rate	1.4 amperes maximum	
Alternator	Engine speed	1,750 min^{-1} (rpm)	4,350 min^{-1} (rpm)
	Capacity	12.5 A min. (No load)	20 A min. (No load)
Voltage regulator		Transistorized non-adjustable regulator	

TOOL

Special

Rotor puller	07933-2160000

TORQUE VALUE

Alternator rotor bolt	30-38 Nm (3.0-3.8 kg.m, 22-27 ft.lb)

TROUBLESHOOTING

No power - key turned on:

1 Dead battery
- Low fluid level
- Low specific gravity
- Charging system failure

2. Disconnected battery cable
3, Main fuse burned out
4. Faulty ignition switch

Low power - key turned on:

1. Weak battery
- Low fluid level
- Low specific gravity
- Charging system failure

2. Loose battery connection

Low power - engine running:

1. Battery undercharged
- Low fluid level
- One or more dead cells

2. Charging system failure

Intermittent power:

1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection
4. Loose connection or short circuit in ignition system

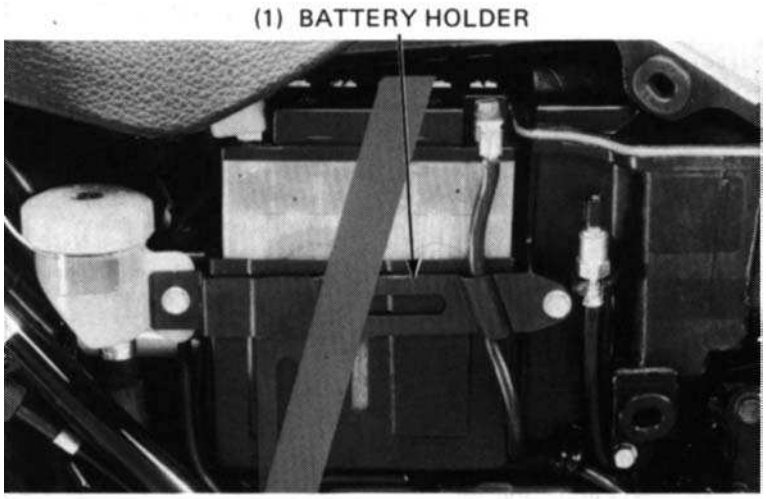
Charging system failure:

1. Loose, broken or shorted wire or connection
2. Faulty voltage regulator/rectifier
3, Faulty alternator

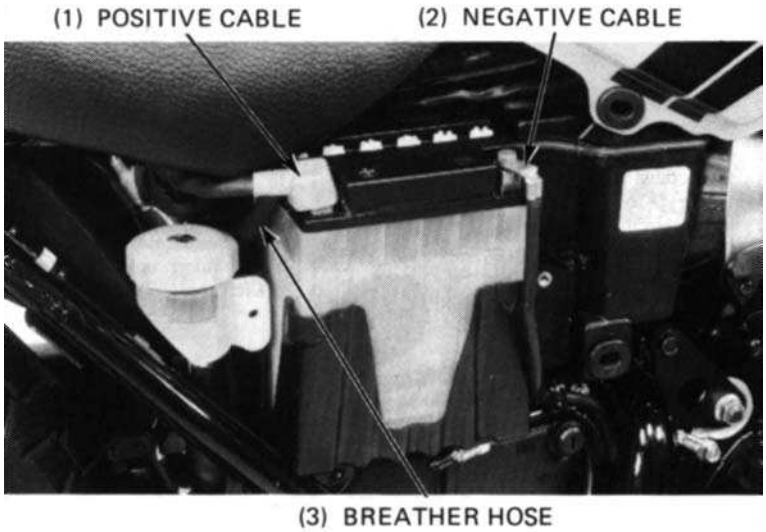
BATTERY

REMOVAL

Remove the right frame side cover.
Remove the battery holder bolts and the holder.



Pull the battery out.
Disconnect the negative cable from the battery, then positive cable.
Disconnect the battery breather hose from the battery and remove the battery.



TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

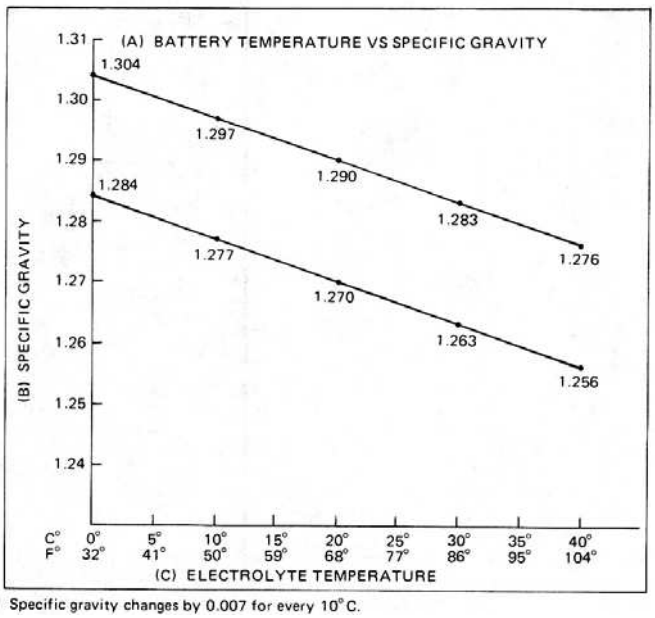
SPECIFIC GRAVITY: 1.270-1.290 (20° C, 68° F)

1.270-1.290	Fully charged
Below 1.260	Undercharged

NOTE:

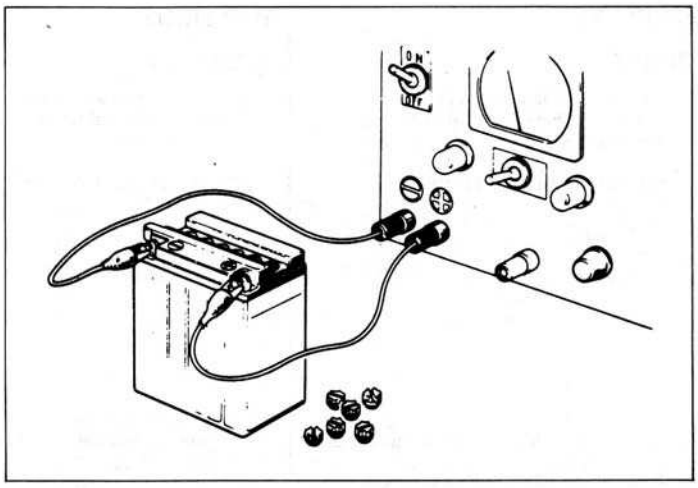
- **The battery must be recharged if the specific gravity is below 1.230.**
- **The specific gravity varies with the temperature as shown in the accompanying table.**
- **Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.**

WARNING
The battery contains sulphuric acid. Avoid contact with skin, eyes, or clothing. Antidote: Flush with water and get prompt medical attention.



(D) Specific gravity changes by 0.007 for every 10°C.

CHARGING



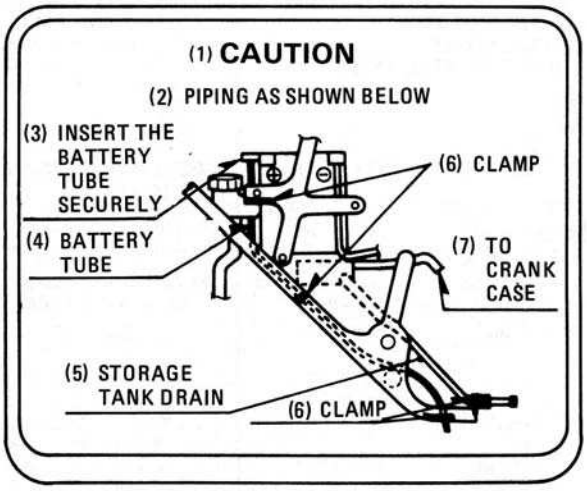
Remove the battery cell caps.
Fill the battery cells with distilled water to the upper level line, if necessary.
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.

Charging current: 1.4 amperes max.

Charge the battery until specific gravity is 1.270-1.290 at 20° C (68° F).

WARNING

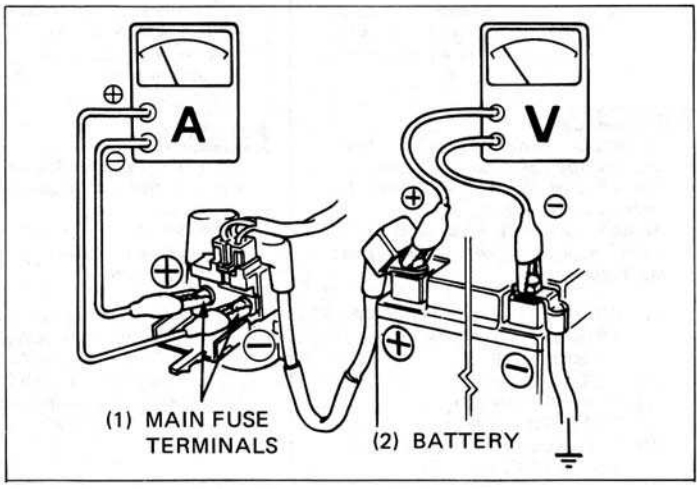
- ***Before charging a battery, remove the cap from each cell.***
- ***Keep flames and sparks a way from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks.***
- ***Discontinue charging if the electrolyte temperature exceeds 45° C (113 °F).***



CAUTION

- ***Quick-charging should only, be done in an emergency; slow charging is preferred.***
- ***Route the breather tube as shown on the battery caution label.***

After installing the battery, coat the terminals with clean grease.



CHARGING SYSTEM

CURRENT TEST

NOTE:
Be sure the battery is in good condition before performing this test.

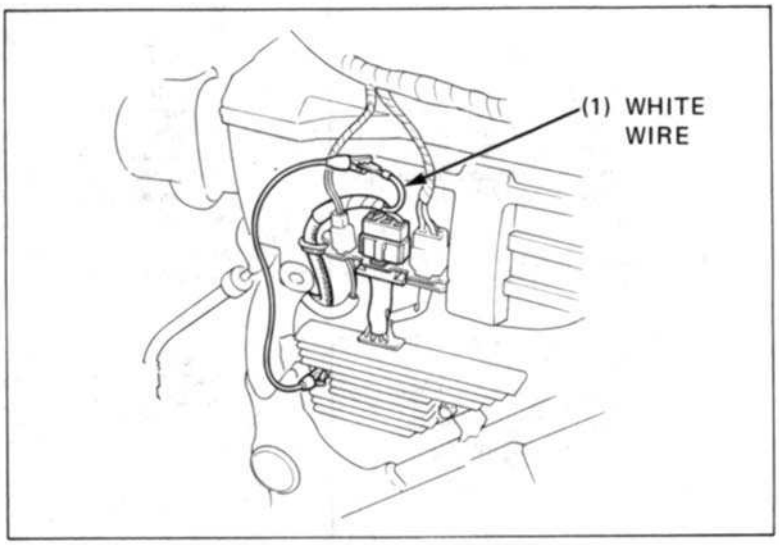
Warm up the engine.

Remove the right frame side cover.
Remove the main fuse and connect the ammeter positive wire to the fuse holder negative terminal and ammeter negative wire to the fuse holder positive terminal.
Connect a voltmeter across the battery negative and starter relay positive terminals.
Start the engine, gradually increase the engine speed and read the ammeter and voltmeter.

Ampere and voltage should be controlled to 0 A and 14-15 V.
If the readings do not meet the specifications, check the wires for loose connections and repair as necessary.
If the wires are in good condition, replace the regulator/rectifier with a new one and re-test.
If the readings still do not meet the specifications, perform the alternator output test.

ALTERNATOR OUTPUT TEST

Disconnect the white wire from the alternator wire coupler and ground it.
Connect an ammeter and voltmeter as same as the current test (page 16-4).
Charging amperage should be a minimum of 12.5 A at 1,750 min^{-1} (rpm) and should be a minimum of 20 A at 4,350 min^{-1} (rpm).



STATOR CONTINUITY TEST

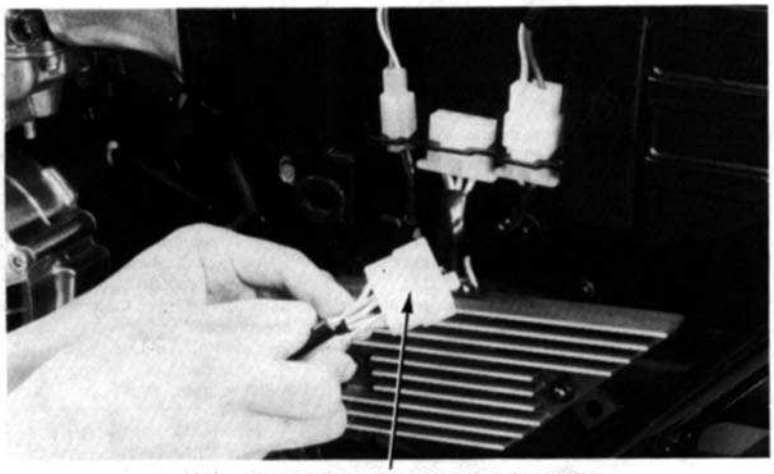
Remove the left frame side cover.
Disconnect the alternator wire coupler from the regulator/rectifier.

Charging coil

Check for continuity between the yellow wire terminals, and between the yellow wire terminals and ground.
Replace the stator if there is no continuity between the yellow wire terminals, or if there is continuity between the yellow wire terminals and ground.

Field coil

Check for continuity between the black and white wire terminals. Replace the stator if there is no continuity.

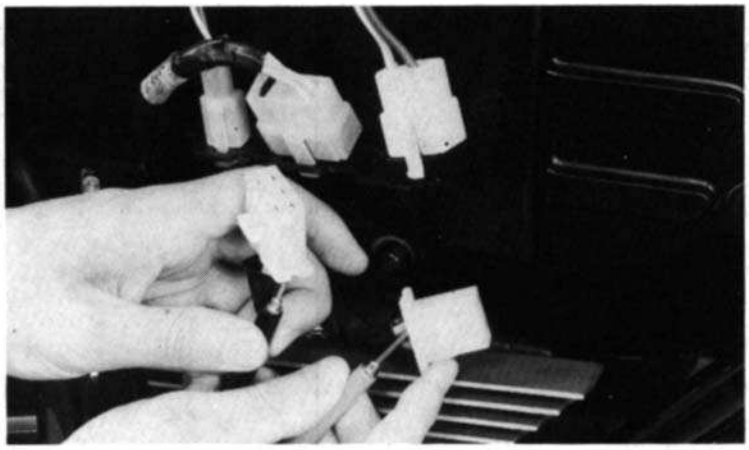


(1) ALTERNATOR WIRE COUPLER

VOLTAGE REGULATOR/RECTIFIER TEST

Remove the left side cover.
Disconnect the regulator/rectifier couplers.
Check for continuity between the leads with an ohmmeter.

NOTE:
The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

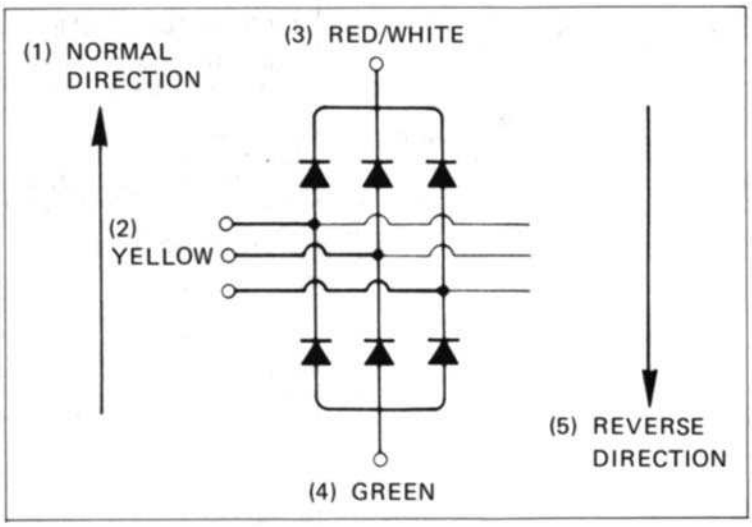


NORMAL DIRECTION: CONTINUITY

	+ probe	- probe
1	YELLOW	GREEN
11	RED/WHITE	YELLOW

REVERSE DIRECTION: NO CONTINUITY

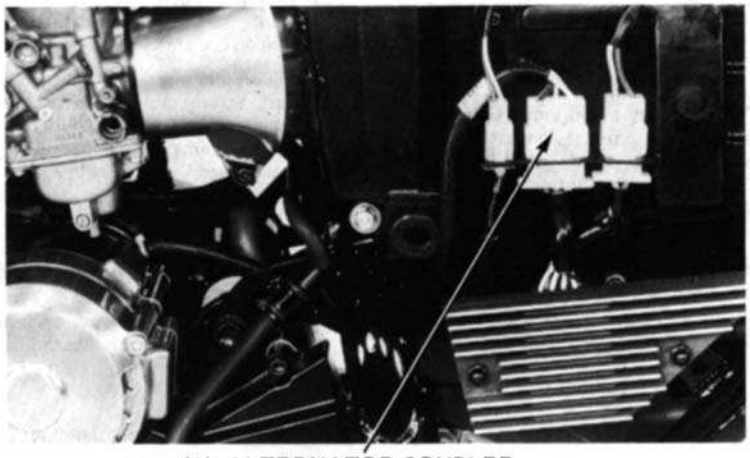
	+ probe	- probe
1	GREEN	YELLOW
11	YELLOW	RED/WHITE



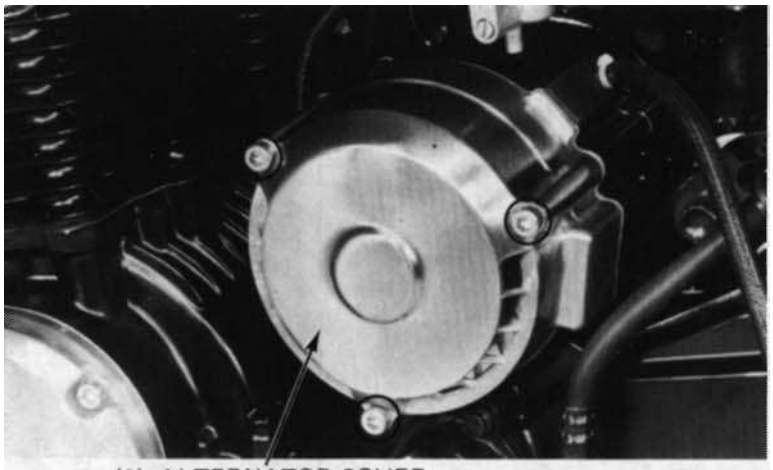
ALTERNATOR REMOVAL / INSTALLATION

REMOVAL

Remove the frame left side cover.
Disconnect the alternator coupler.

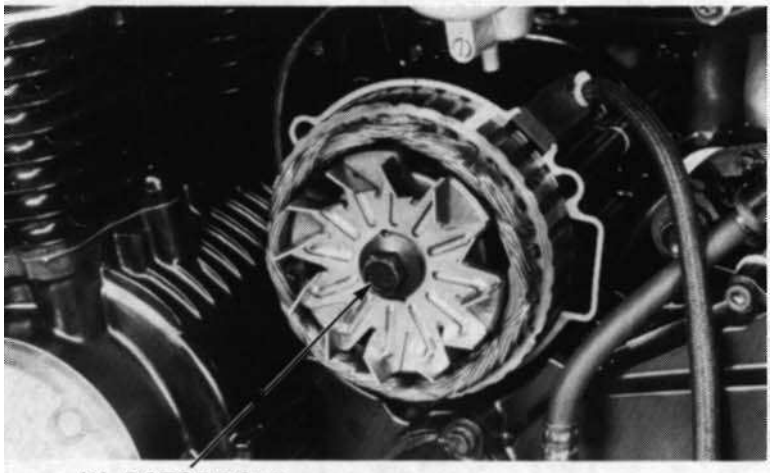

(1) ALTERNATOR COUPLER

Remove the alternator cover by loosening three bolts.



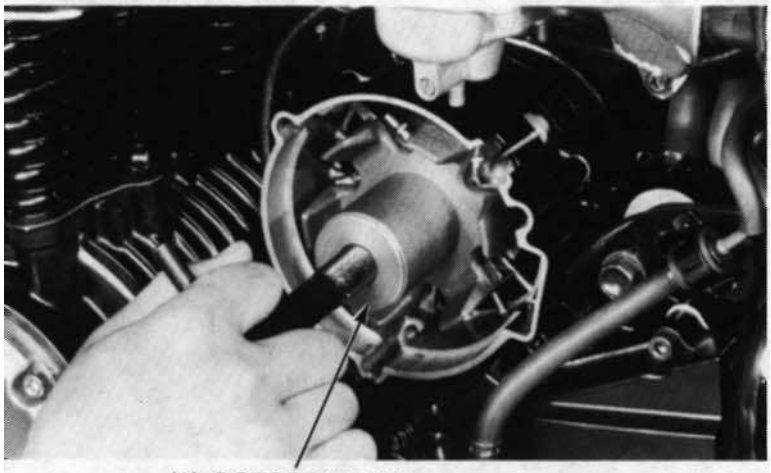
(1) ALTERNATOR COVER

Shift the transmission into gear and apply the rear brake.
Remove the alternator rotor bolt, fan, rotor B and stator.

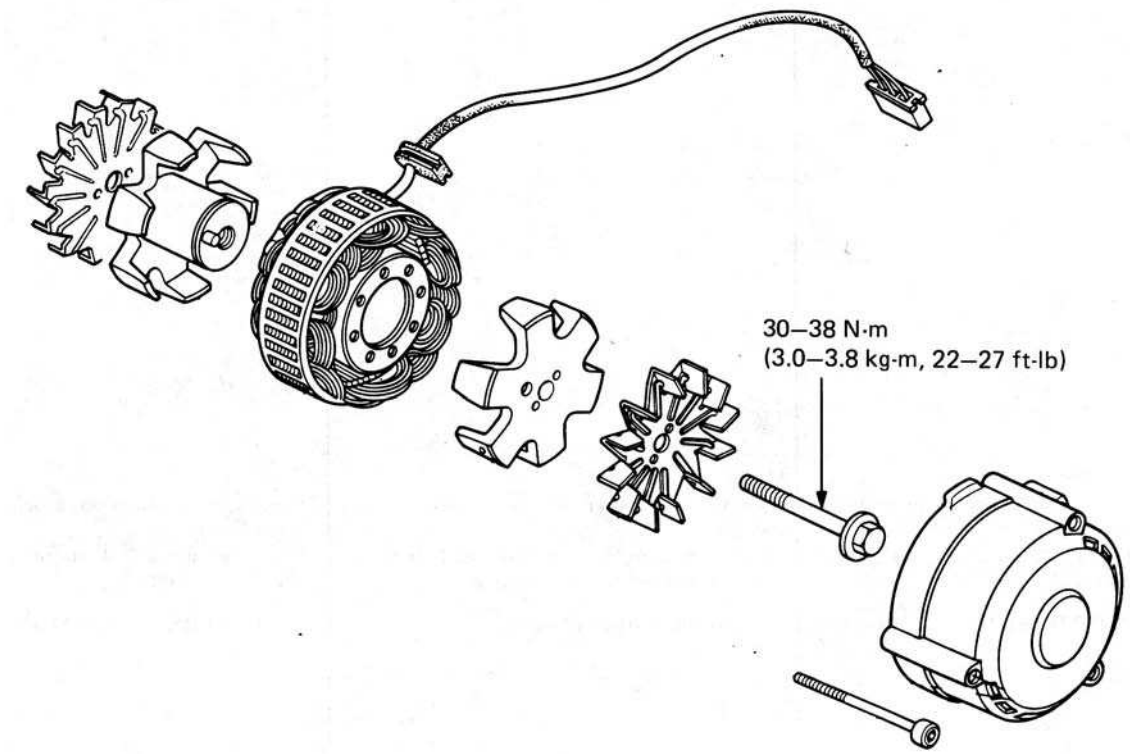


(1) ROTOR BOLT

Remove alternator rotor A while applying the rear brake.

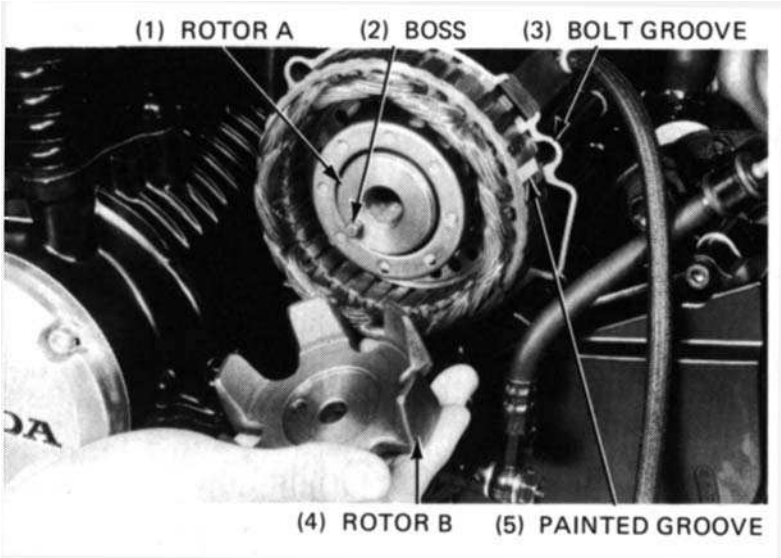


(1) ROTOR PULLER
07933–2160000

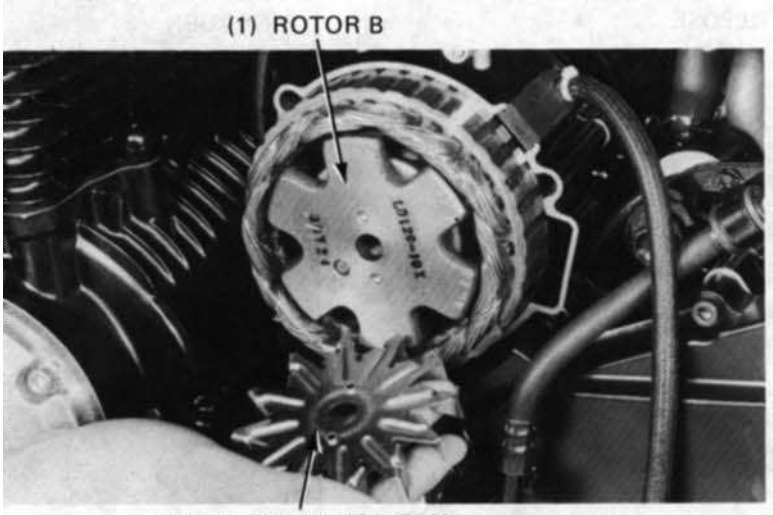


Install alternator rotor A.
Install the alternator stator with the painted groove on the stator coil aligned with upper right groove for the alternator cover mounting bolts.

Install rotor B with its hole aligned with the boss on rotor A.



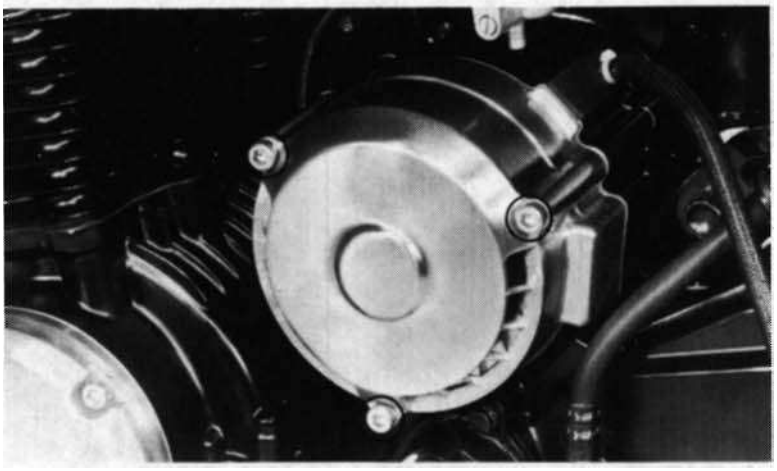
Install the alternator fan with its holes aligned with the holes in rotor B.

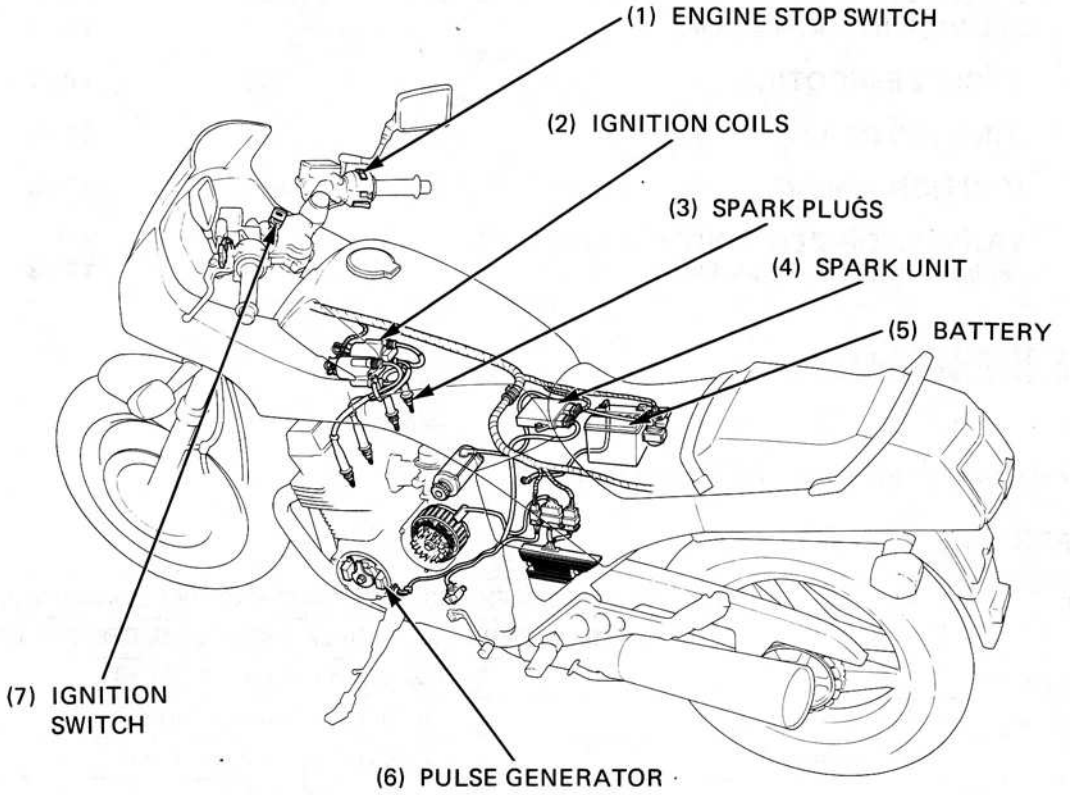


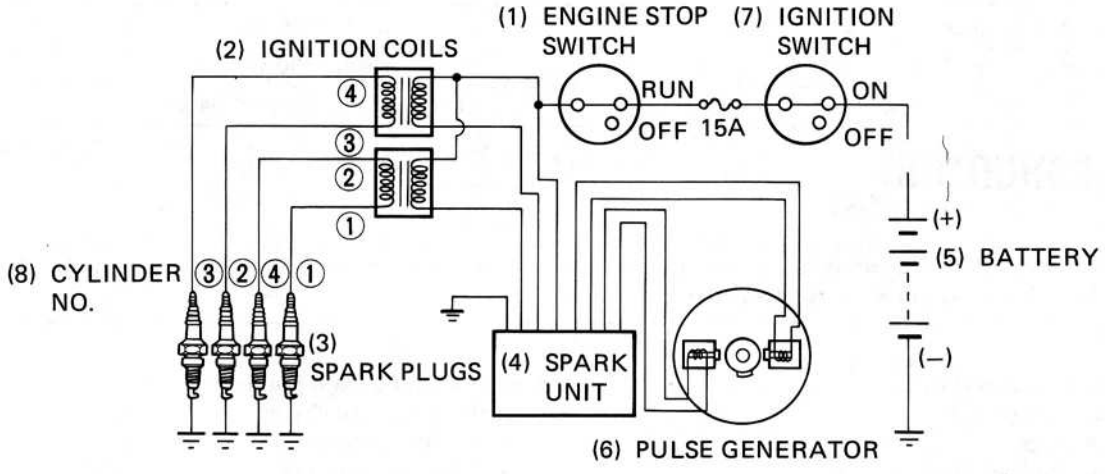
Install and tighten the alternator bolt to the specified torque.

TORQUE: 30-38 N.m
(3.0-3.8 kg.m, 22-27 ft.lb)

Install the alternator cover.




(1) ENGINE STOP SWITCH
(2) IGNITION COILS
(3) SPARK PLUGS
(4) SPARK UNIT
(5) BATTERY
(7) IGNITION SWITCH
(6) PULSE GENERATOR


(1) ENGINE STOP SWITCH
(7) IGNITION SWITCH
(2) IGNITION COILS
RUN
OFF
15A
ON
OFF
(+)
(5) BATTERY
(–)
(8) CYLINDER NO.
3 2 4 1
(3) SPARK PLUGS
(4) SPARK UNIT
(6) PULSE GENERATOR

SERVICE INFORMATION

GENERAL

A transistorized ignition system is used and it cannot be adjusted.

SPECIFICATIONS < > : U

Spark plug	ND	X22EPR-U9, X24EPR-U9, X27EPR-U9 <X22EP-U9, X24EP-U9, X27EP-U9>
	NGK	DPR7EA-9, DPR8EA-9, DPR9EA-9 <DP7EA-9, DP13EA-9, DP9EA-9 >
Spark plug gap		0.8-0.9 mm (0.031-0.035 in)
Ignition timing	At idle	10 BTDC/1,000min^{-1} (rpm)
	Full advance	32 BTDC/3,150 min^{-1} (rpm)
Ignition coil resistance	Primary	2.4-3.0Ω
	Secondary	13.6-15.5 kΩ
Spark plug cap resistance		3.75-6.25 kΩ
Pulse generator	Resistance	300-360Ω
	Air gap	0.5-0.9 mm (0.02-0.04 in)

TROUBLESHOOTING

NOTE:
The ignition system has two sub-systems; one for the No. 1 and No. 4 cylinders and one for No. 2 and No. 3 cylinders.
Determine which sub-system is faulty, then refer to the charts below.

Engine cranks but will not start	**Engine starts but runs poorly**
- Engine stop switch OFF	- Ignition primary circuit
- No spark at plugs	• Faulty ignition coil
- Faulty transistorized spark unit	• Loose or bare wire
- Faulty pulse generator	• Intermittent short circuit
	- Secondary circuit
No spark at plug	• Faulty plug
- Engine stop switch OFF	• Faulty spark plug wire
- Poorly connected, broken or shorted wires	
• Between ignition switch and engine stop switch	**Timing advance incorrect**
• Between spark unit and engine stop switch	- Centrifugal advancer faulty
• Between spark unit and ignition coil	- Faulty spark unit
• Between ignition coil and plug	
• Between spark unit and pulse generator	
- Faulty ignition coil	
- Faulty ignition switch	
- Faulty spark unit	
- Faulty pulse generator	

IGNITION COIL

CONTINUITY TEST

Remove the fuel tank and disconnect the ignition coil wire leads. Measure the primary coil resistance between the terminals.

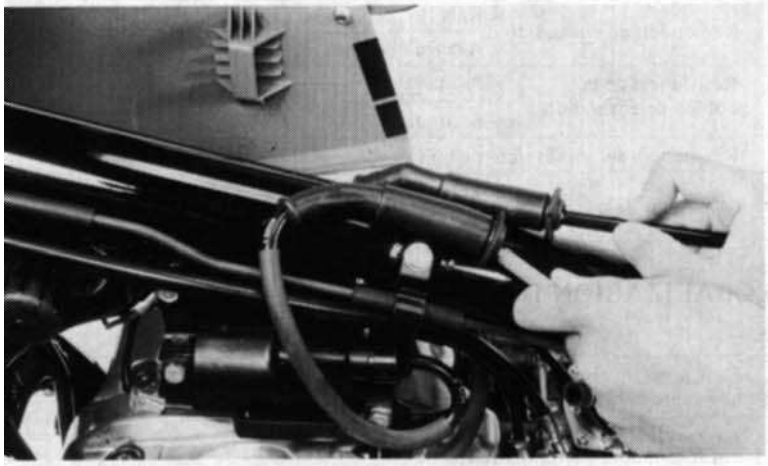
RESISTANCE: 2.4-3.0 Ω

If the reading does not meet the specification, check for continuity between the primary terminal and ground. Replace the coil if there is continuity between them.

Measure the secondary coil resistance with the spark plug caps in place.

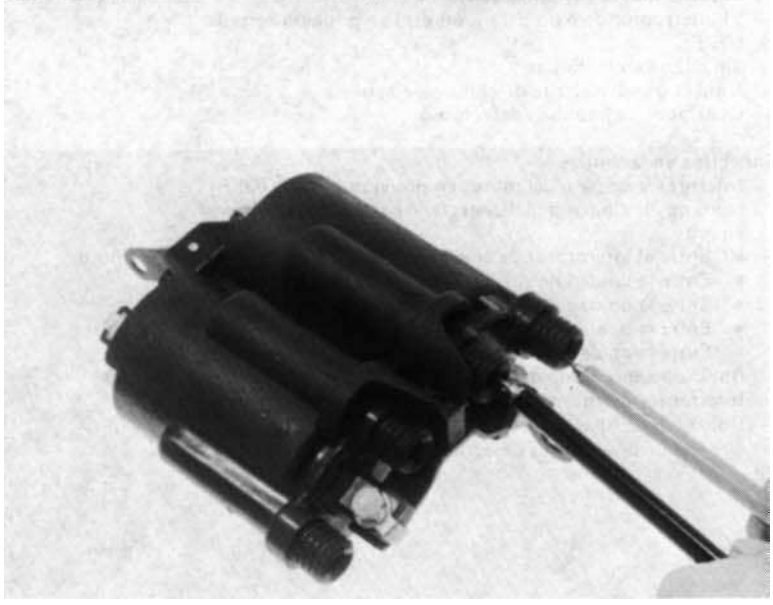
RESISTANCE: 21-28 kΩ

If the reading does not fall with in the limit, remove the ignition coils by removing the bolts.



Remove the spark plug wires by loosening the wire retaining nuts. Measure the secondary coil resistance.

RESISTANCE: 13.6-15.5 kΩ

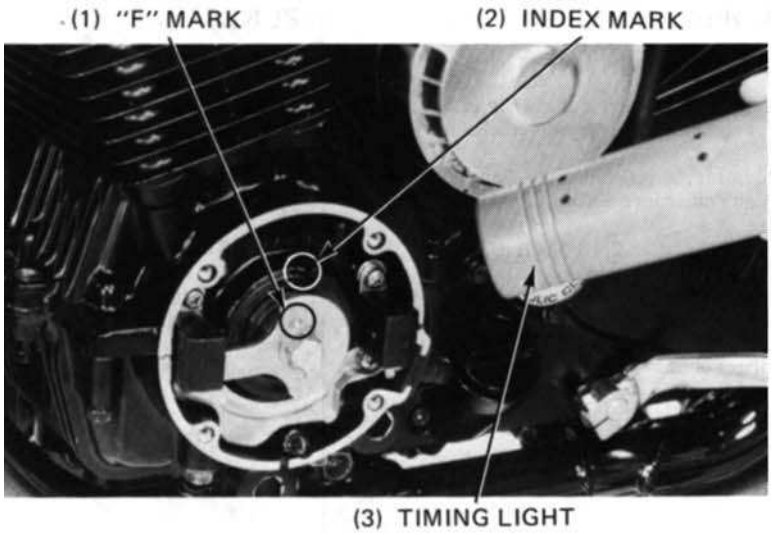


IGNITION TIMING

NOTE:
The ignition system is transistorized and cannot be adjusted. If the ignition timing is incorrect, check the spark unit and pulse generator and replace any faulty parts.

Warm up the engine.

Remove the pulse generator cover.
Connect the timing light to the No. 1 or No. 4 cylinder's spark plug wire.
The timing is correct if the "F" mark aligns with the index mark on the crankcase at 1,000 ± 100 rpm.

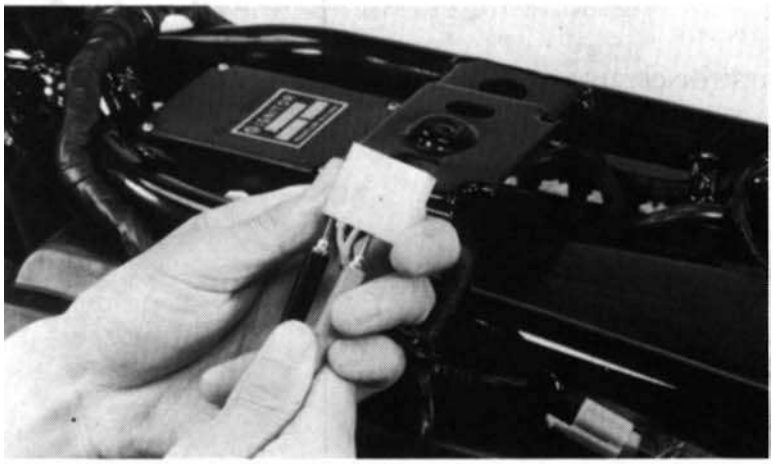


TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR TEST

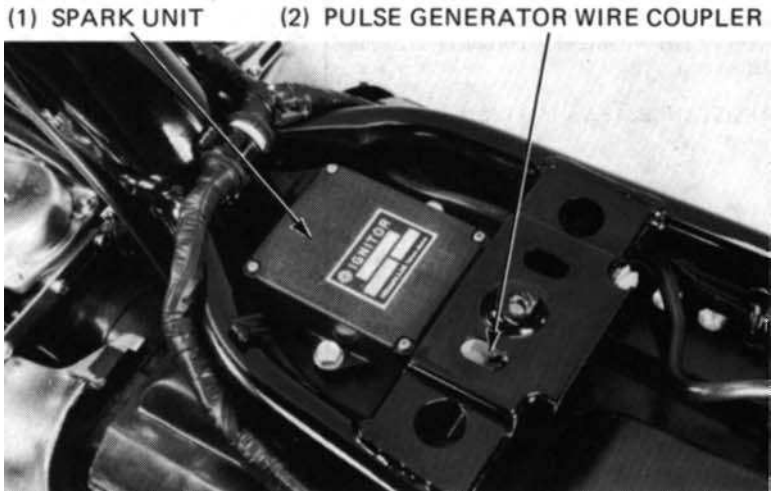
Remove the seat and fuel tank. Disconnect the pulse generator coupler and measure the coil resistance between the white and yellow wires (2 and 3 cylinders), and between the white, and blue wires (1 and 4 cylinders).

RESISTANCE: 300-360Ω



PULSE GENERATOR REPLACEMENT

Remove the seat and fuel tank.
Disconnect the pulse generator wire coupler from the spark unit.

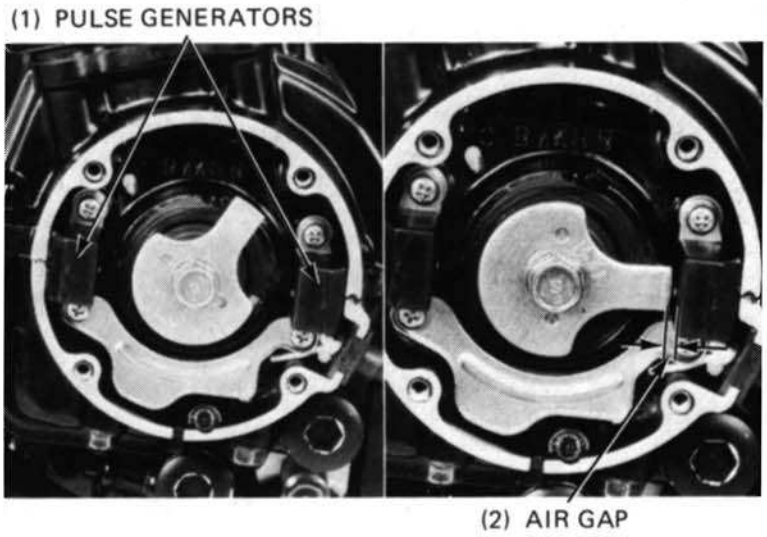


Remove the pulse generator cover and drive sprocket cover.

Remove the pulse generator mounting screws, pulse generators and wire guide.
Install new pulse generators and wire guide.
Align the pulse rotor tip with the pulse generator magnet and measure the air gap with a feeler gauge.

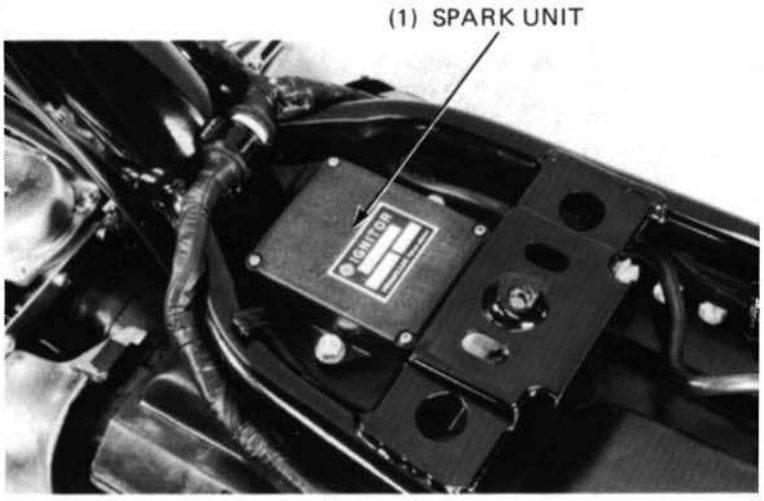
AIR GAP: 0.5-0.9 mm (0.02-0.04 in)

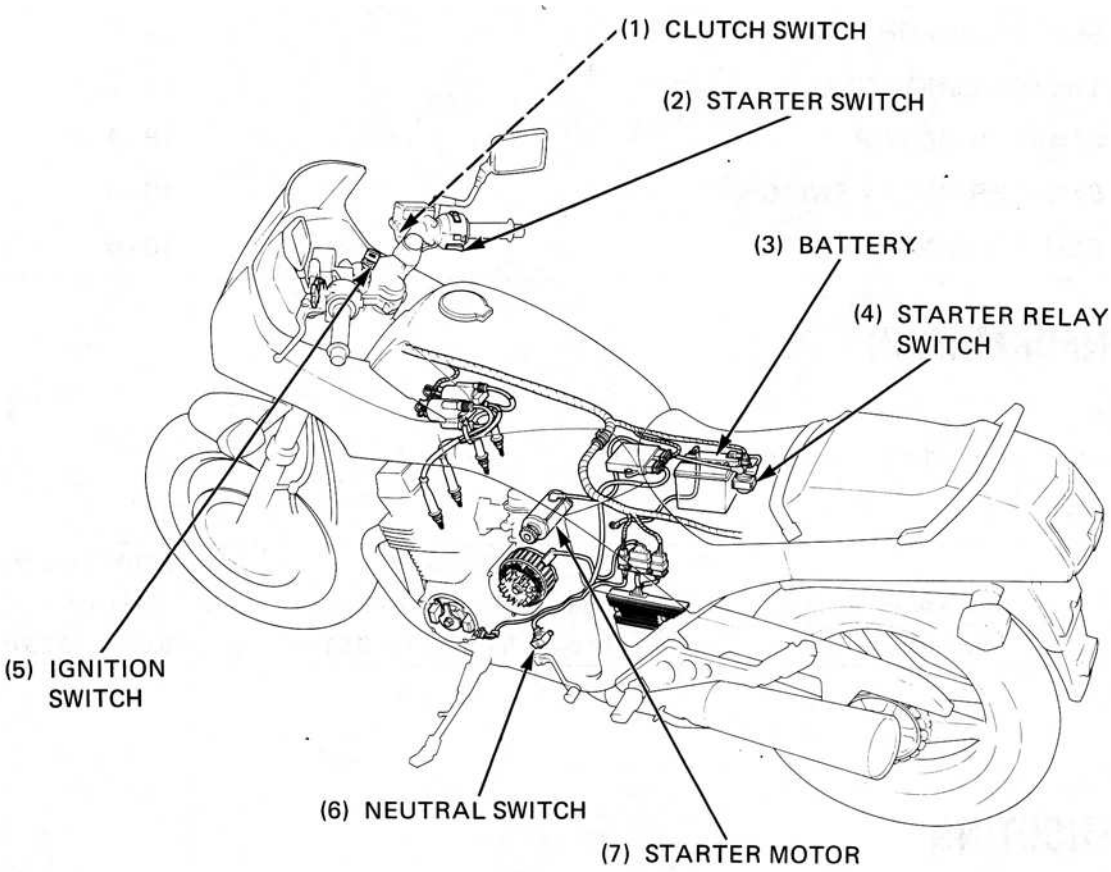
Check the ignition timing.
Install the drive sprocket cover and pulse generator cover.

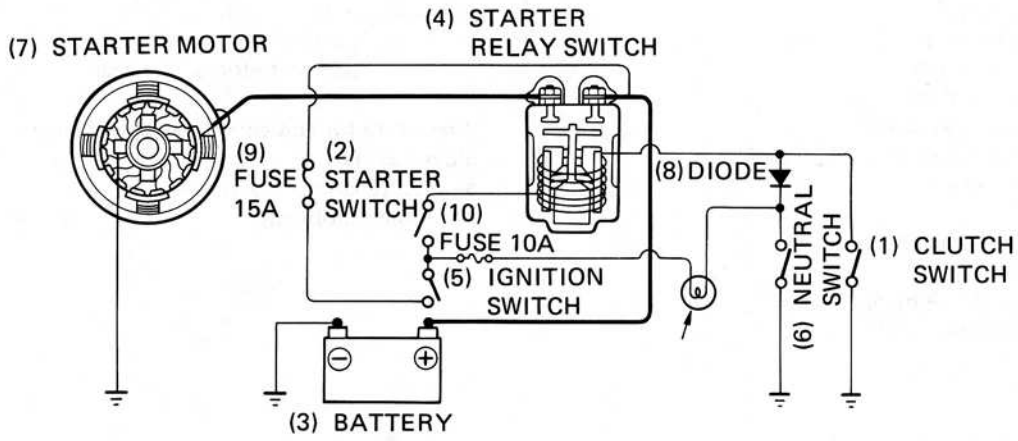


SPARK UNIT

If the pulse generators, ignition coils and wiring are good, and the ignition timing is not within specification; replace the spark units with new ones and recheck the ignition timing.




(1) CLUTCH SWITCH
(2) STARTER SWITCH
(3) BATTERY
(4) STARTER RELAY SWITCH
(5) IGNITION SWITCH
(6) NEUTRAL SWITCH
(7) STARTER MOTOR


(7) STARTER MOTOR
(4) STARTER RELAY SWITCH
(9) FUSE 15A
(2) STARTER SWITCH
(10) FUSE 10A
(5) IGNITION SWITCH
(8) DIODE
(6) NEUTRAL SWITCH
(1) CLUTCH SWITCH
(3) BATTERY

SERVICE INFORMATION

GENERAL

The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	680-920 g (24.0-32.5 oz)	545 g (19.2 oz)
	Brush length	12.0-13.0 mm (0.47-0.51 in)	6.5 mm (0.26 in)

TROUBLESHOOTING

Starter motor will not turn
- Battery discharged
- Faulty ignition switch
- Faulty starter switch
- Faulty neutral switch
- Faulty starter relay switch
- Loose or disconnected wire or cable
- Neutral diode open

Starter motor turns engine slowly
- Low specific gravity
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns, but engine does not turn
- Faulty starter clutch
- Faulty starter motor gears
- Faulty starter motor or idle gear

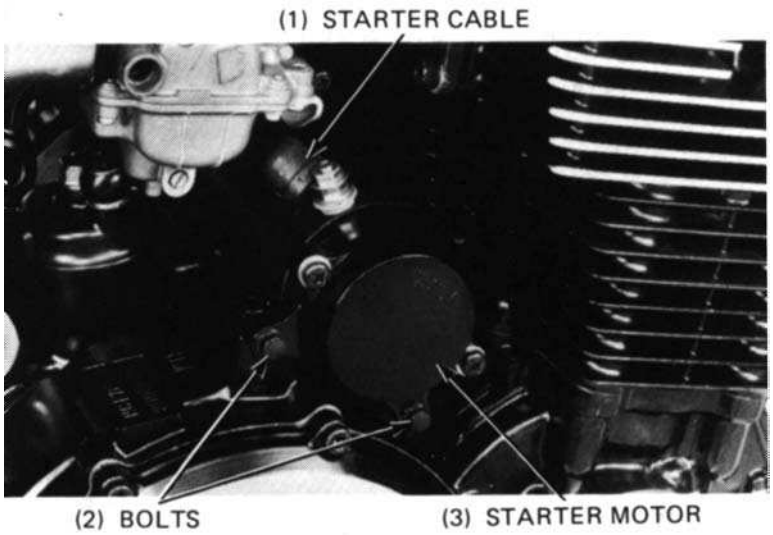
Starter motor and engine turns, but engine does not start
- Faulty ignition system
- Engine problems

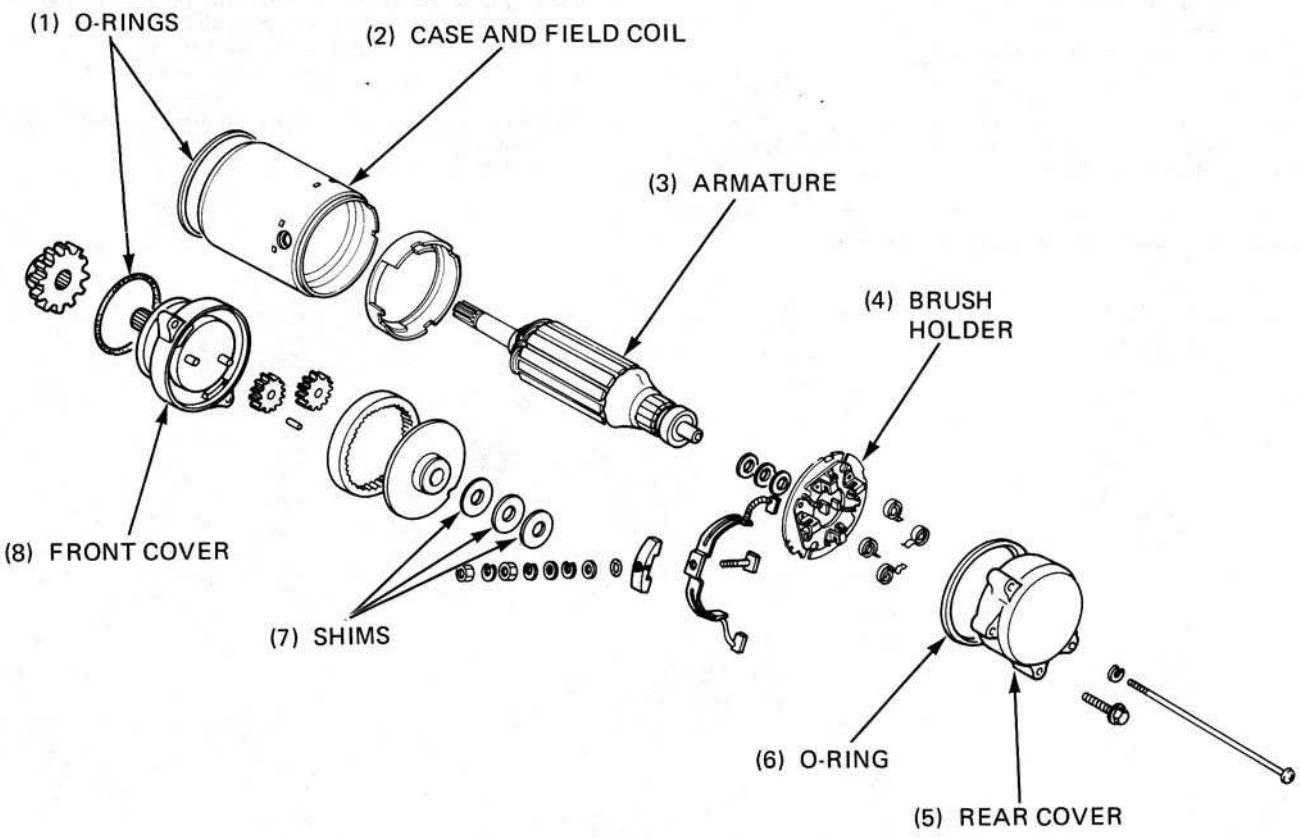
STARTER MOTOR

REMOVAL

WARNING
With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the starter cable from the starter motor.
Remove the bolts and starter motor.



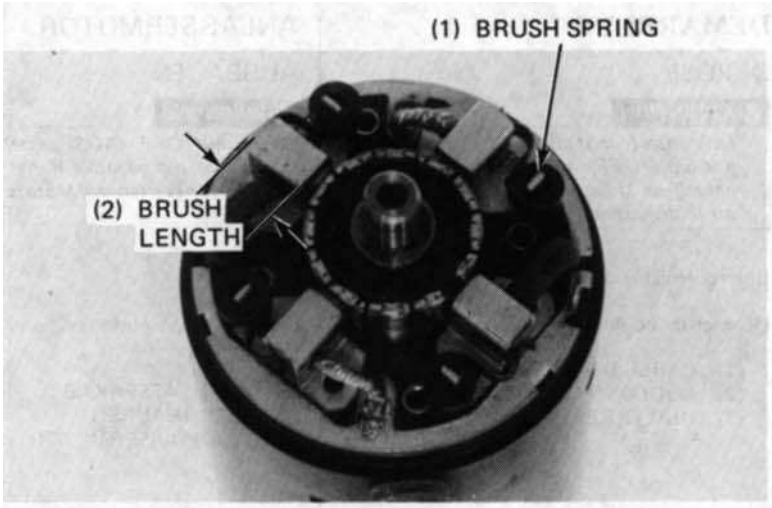


BRUSH INSPECTION

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length:	**6.5 mm (0.26 in)**
Brush spring tension:	**680 g (24.0 oz)**



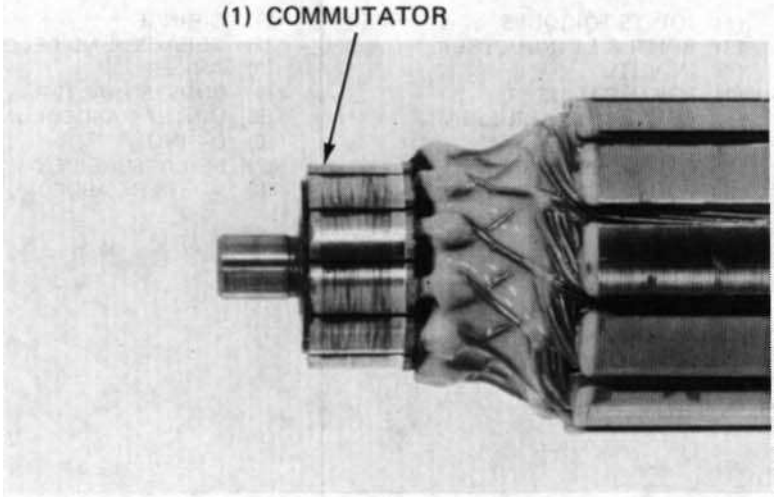
COMMUTATOR INSPECTION

Remove the starter motor case.

NOTE:
Record the location and number of thrust washers for correct reassembly.

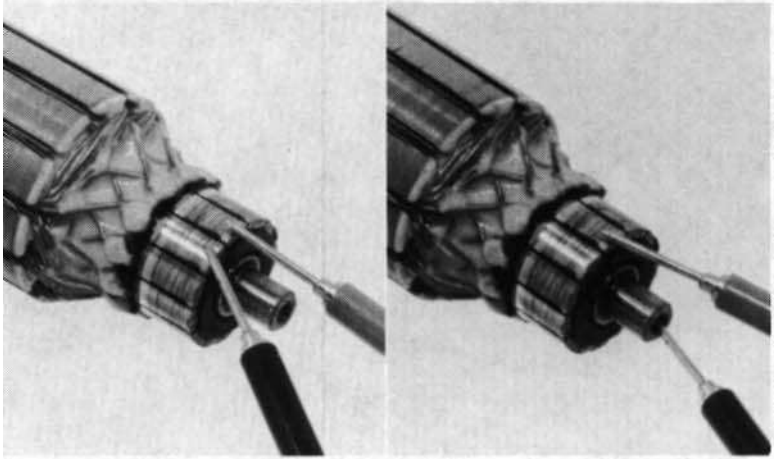
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.

NOTE:
Do not use emery or sand paper on the commutator.



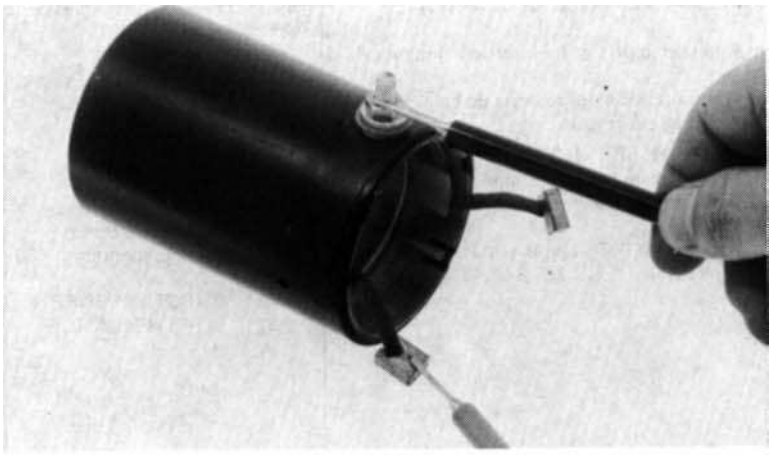
(1) CONTINUITY BETWEEN COMMUTATOR BAR PAIRS: NORMAL
(2) NO CONTINUITY BETWEEN COMMUTATOR BAR AND ARMATURE SHAFT: NORMAL

Check for continuity between pairs of commutator bars, and also between individual commutator bars and armature shaft.



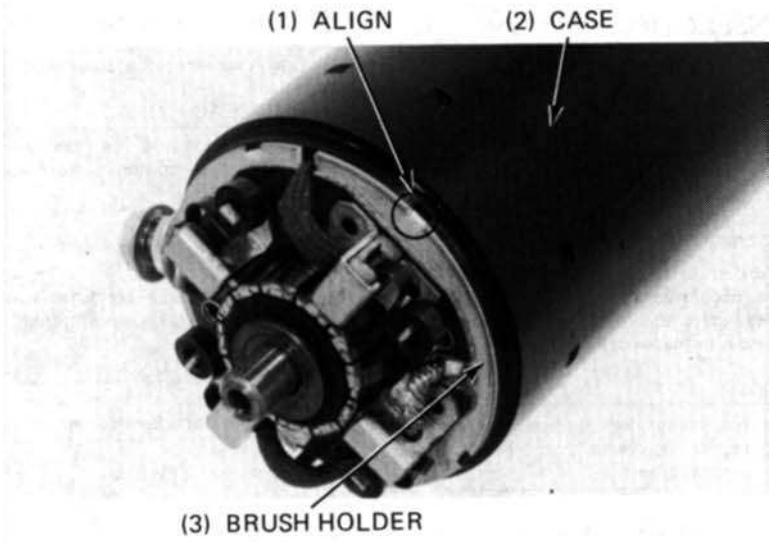
FIELD COIL INSPECTION

check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire. Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.

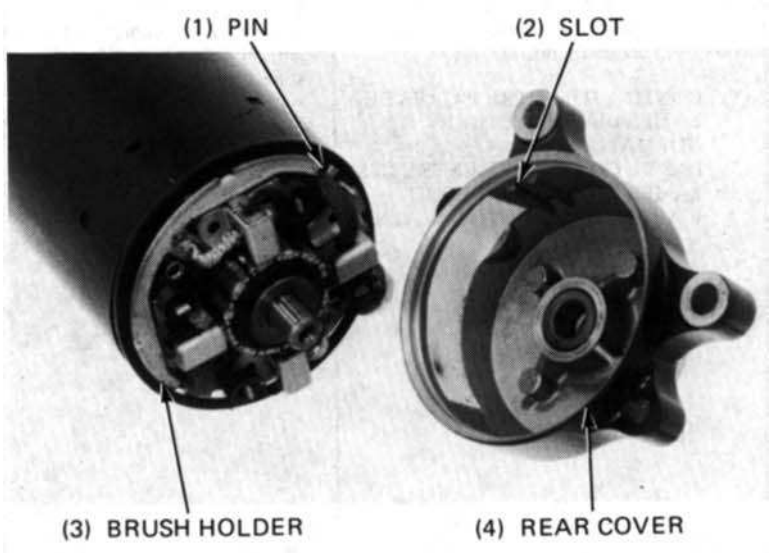


ASSEMBLYLY / INSTALLATION

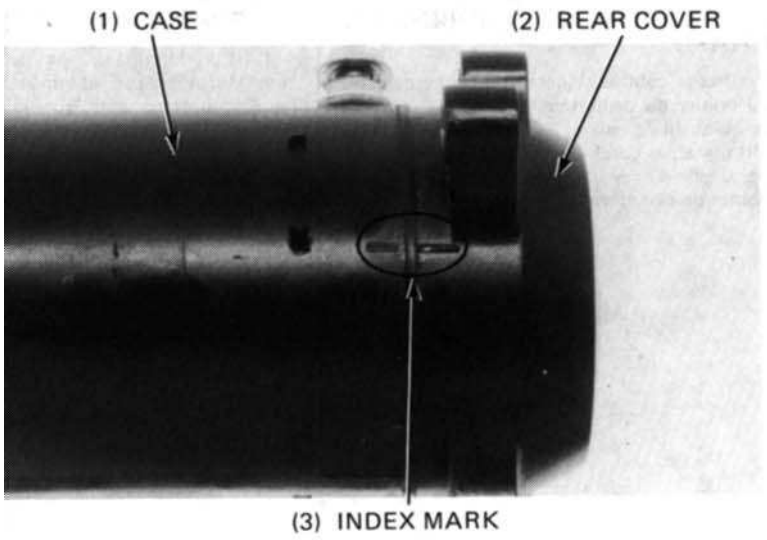
Assemble the starter motor.
Align the case notch with the brush holder pin.



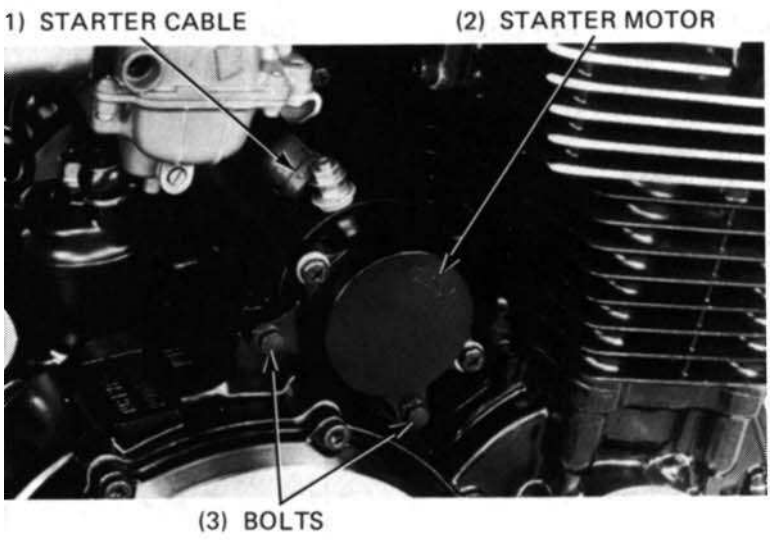
Install the rear cover aligning its slot with the brush holder pin.



Install the rear cover with its index mark aligned with the index mark on the case.



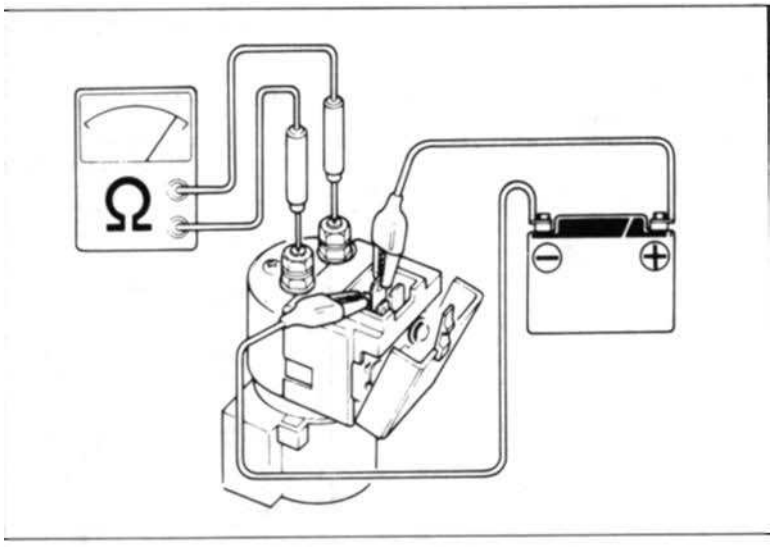
Install the starter motor.
Connect the starter cable and battery ground cable.



STARTER RELAY SWITCH

INSPECTION

Depress the starter switch button with the ignition ON.
The coil is normal if the starter relay switch clicks.
Connect an ohmmeter to the starter relay switch terminals.
Connect a 12V battery to the switch cable terminals.
The switch normal if there is continuity.



CLUTCH DIODE

REMOVAL

Remove the fuel tank.
Remove the clutch diode from the wire harness.

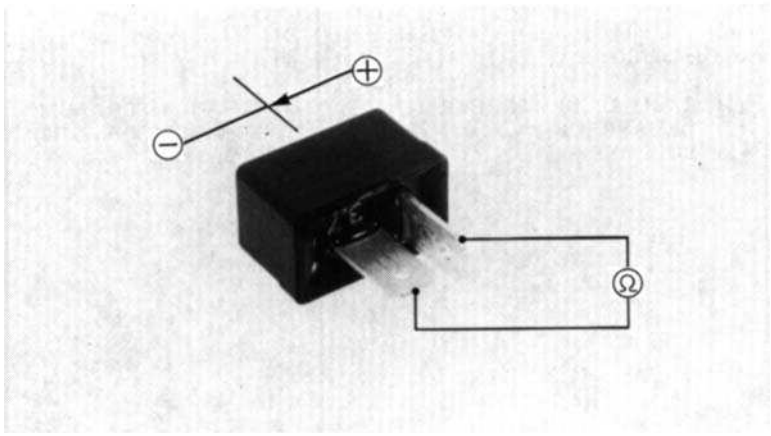
(1) CLUTCH DIODE

INSPECTION

Check for continuity with an ohmmeter.

NORMAL DIRECTION: CONTINUITY
REVERSE DIRECTION: NO CONTINUITY

Replace the diode if it does not meet specifications.



SERVICE INFORMATION

GENERAL

- Some wires have different coloured bands around them near the connector. These are connected to other wires which correspond with the band colour.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following colours codes used are indicated throughout this section and on the wiring diagram.

Bu =Blue	**G = Green**	**LG = Light Green**	**R = Red**
Bl = Black	**Gr =Gray**	**0 = Orange**	**W = White**
Br =Brown	**LB = Light Blue**	**P = Pink**	**Y = Yellow**

- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester of volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

OIL PRESSURE SWITCH

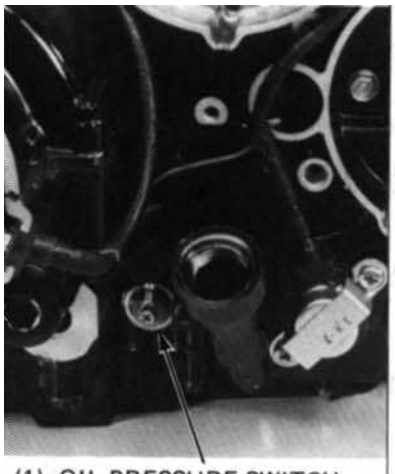
Remove the engine (Section 5).
Pull the rubber cover off the oil pressure switch.
Disconnect the oil pressure switch lead and remove the switch.
Check for continuity while applying pressure to the switch.

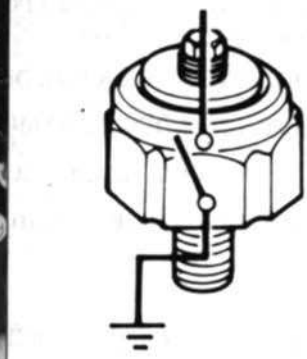
No continuity: Above 20-40 kPa (0.2-0.4 kg/cm^2, 2.8-5.7 psi)

Replace the switch if necessary.
Apply a liquid sealant to the switch threads before installing the switch.
Screw the switch into the crankcase but stop two threads from the bottom. Then tighten it to the specified torque.

TORQUE: 15-20 N.m (1.5-2.0 kg.m, 11-14 ft.lb)

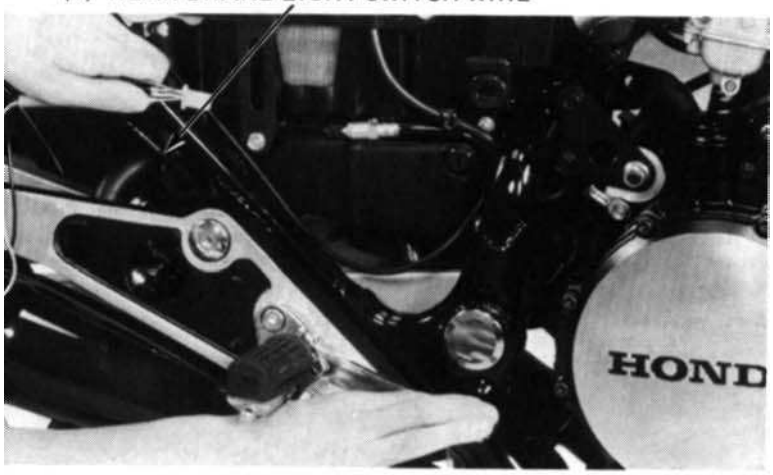
NOTE:
To prevent crankcase damage, do not over tighten the switch.


(1) OIL PRESSURE SWITCH

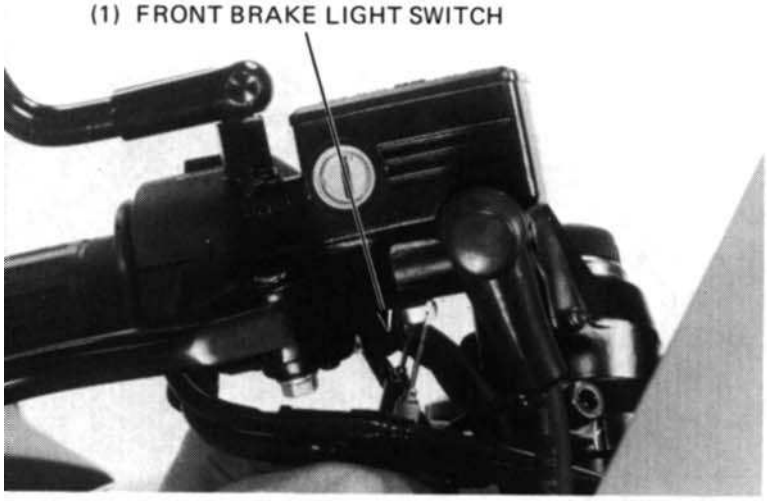


BRAKE LIGHT SWITCH

Remove the right frame side cover and disconnect the rear brake switch wire coupler.
Check the rear brake light switch for continuity with the rear brake applied.

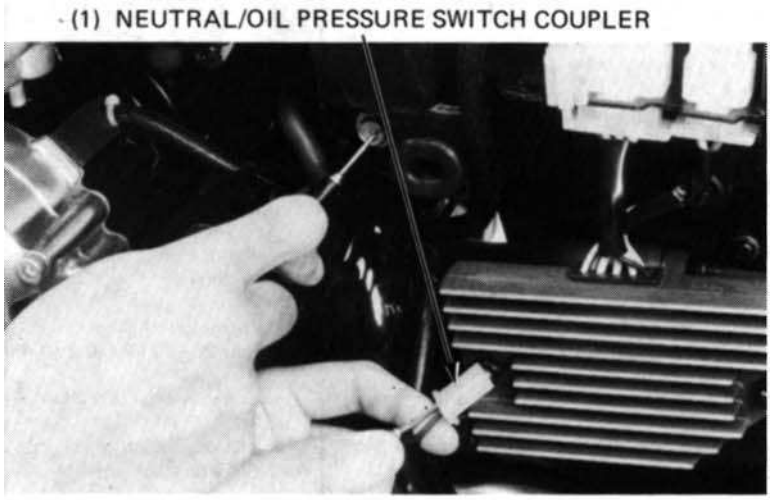

(1) REAR BRAKE LIGHT SWITCH WIRE

Check the front brake light switch for continuity with the front brake applied.
Replace the switches if necessary.


(1) FRONT BRAKE LIGHT SWITCH

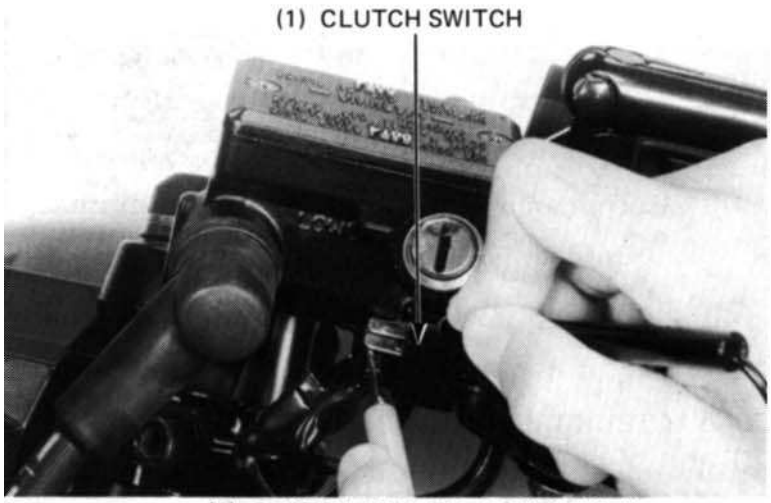
NEUTRAL SWITCH

Remove the left side cover and disconnect the neutral oil pressure switch coupler.
Check the switch for continuity between the light green/red wire terminal and ground with the transmission in neutral and with the transmission in any gear.
For neutral switch replacement, refer to Section 9.



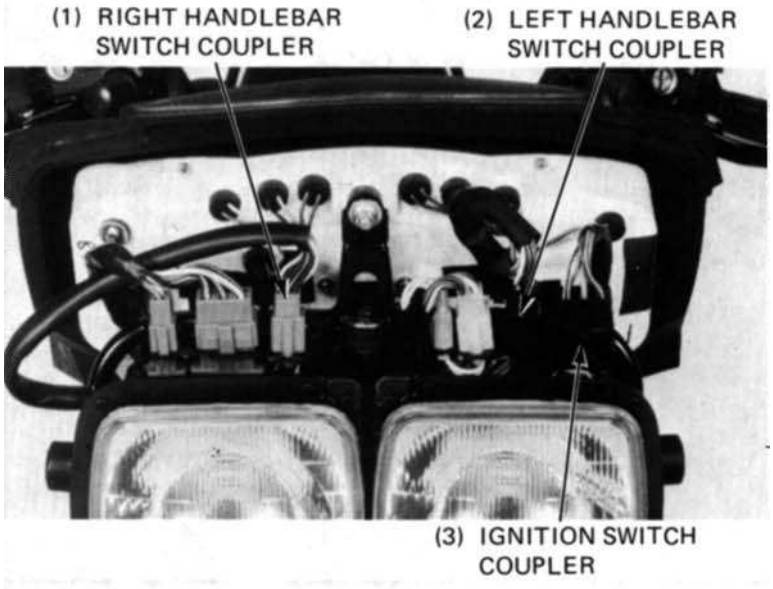
CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and applied.
Replace if necessary.



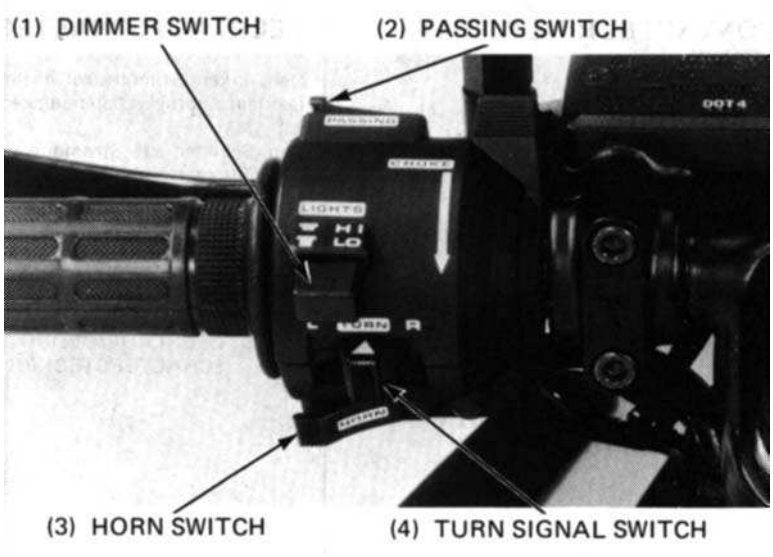
HANDLEBAR SWITCHES

The handlebar switch must be replaced as an assembly.
Remove the fairing and disconnect the handlebar switch couplers.
Continuity should exist between the colour coded wires in each chart.



DIMMER SWITCH

COLOR	Bu/W	W	Bu
Lo	●	●	
N (PUSH)	●	●	●
Hi	●		●
TERMINAL	HL	Lo	Hi



TURN SIGNAL SWITCH

COLOR	Gr	LB	O
R	●	●	
N			
L	●		●
TERMINAL	W	R_1	L_1

HORN SWITCH

COLOR	W/G	LG
FREE		
PUSH	●	●
TERMINAL	BAT_3	Ho

PASSING SWITCH

COLOR	W/G	Bu
FREE		
PUSH	●	●
TERMINAL	BAT_3	Hi

LIGHTING SWITCH

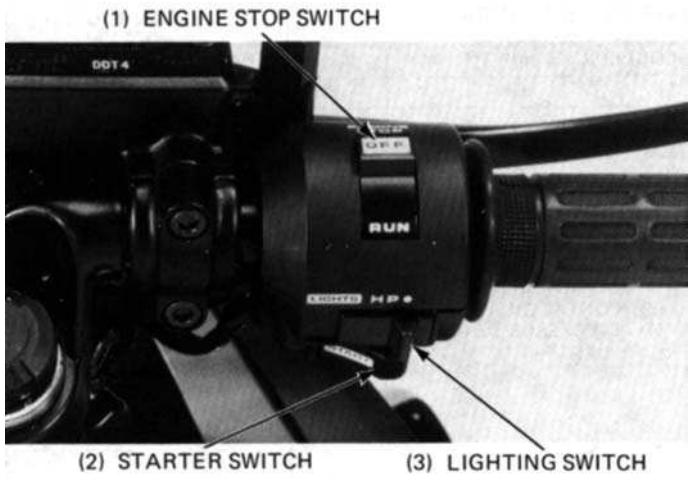
COLOR	Br/Bu	Br/W	Bl/R	Bu/W
(OFF)				
P	●	●		
HL	●	●	●	●
TERMINAL	BAT_4	TL	BAT_5	HL

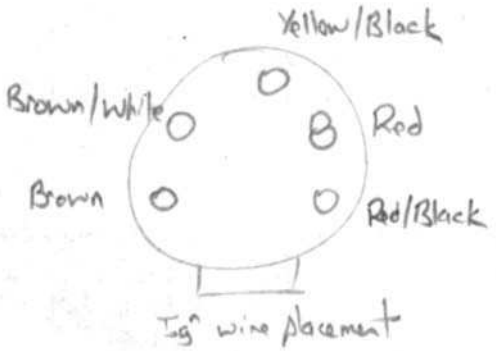
STARTER SWITCH

COLOR	Bl	Y/R
FREE		
PUSH	●	●
TERMINAL	BAT_2	ST

ENGINE STOP SWITCH

COLOR	Bl	Bl/W
OFF		
RUN	●	●
TERMINAL	BAT_2	IG



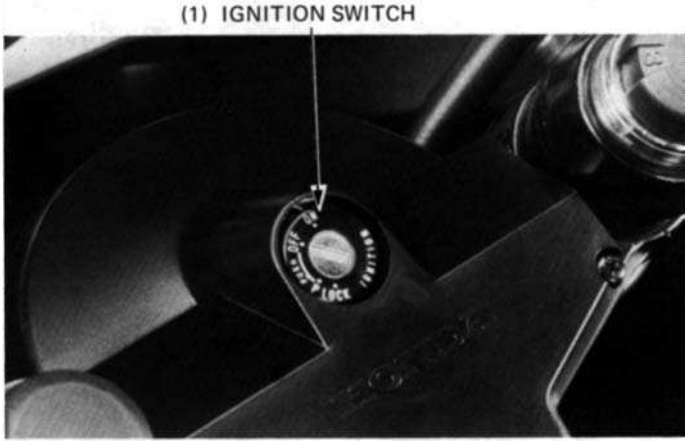


IGNITION SWITCH

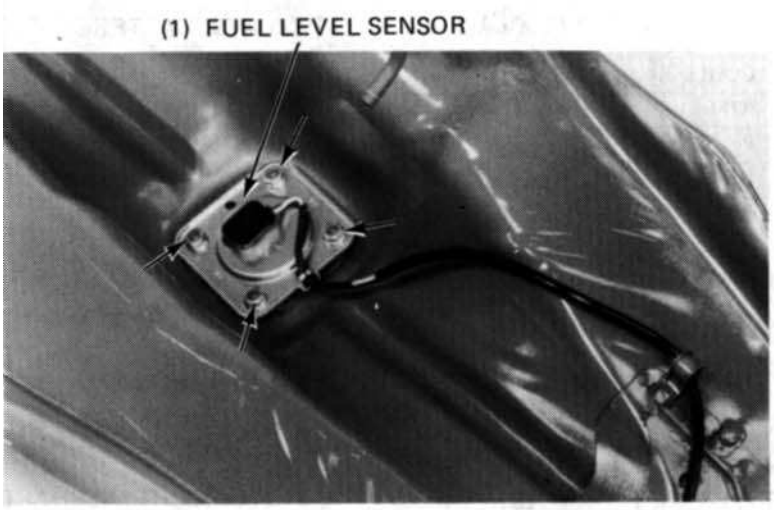
Remove the fairing and disconnect the ignition switch coupler (page 19-3).
Continuity should exist between the colour coded wires in the chart.

COLOR	R	R/Bl	Br/W	Bl	Y/Bl
ON	●	●	●	●	
OFF					
P LOCK	●				●
LOCK					
TERMINAL	BAT_1	IG	TL_1	TL_2	P

For ignition switch replacement, refer to Section 3.



FUEL LEVEL SENSOR



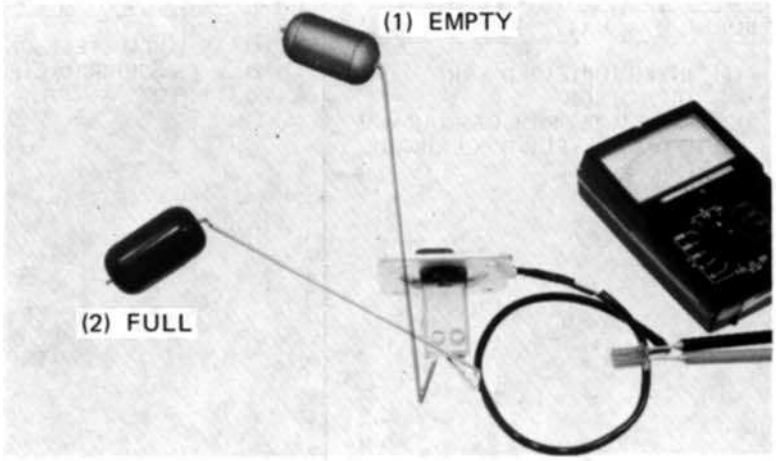
REMOVAL

Remove the fuel tank and drain the fuel. Remove the fuel level sensor attaching nuts and fuel level sensor.

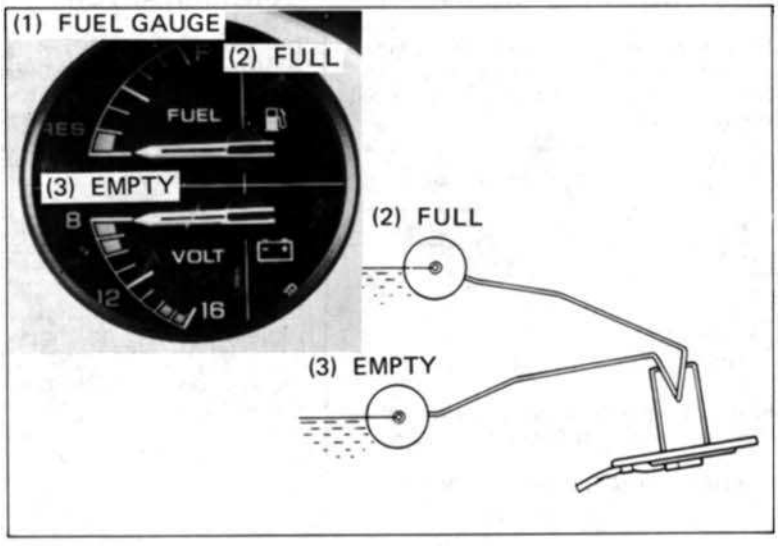
INSPECTION

Measure the resistance of the fuel level sensor in the full and empty float positions.

RESISTANCE: FULL 1-5 Ω
EMPTY 103-117 Ω

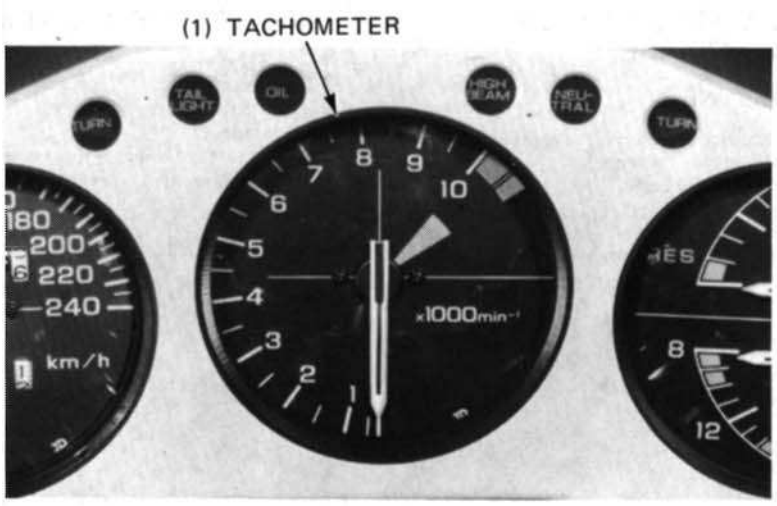


Turn the ignition switch ON.
Connect the fuel level sensor coupler to the wire harness. Move the float to full and empty and check the fuel gauge needle in both positions. If the fuel gauge does not indicate the proper level, replace it with a new one.



TACHOMETER

If the tachometer does not work properly, replace the spark unit with a new one and recheck the operation.
If the problem still appears, replace the spark unit with the original one and tachometer with a new one.

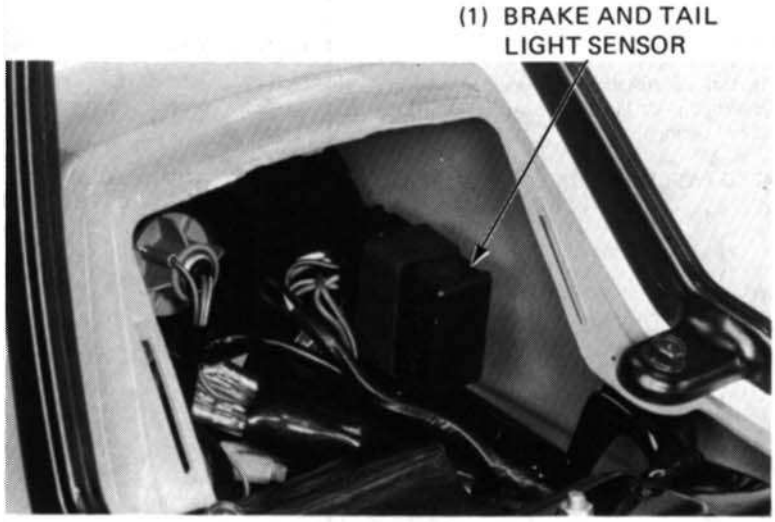


BRAKE AND TAILLIGHT SENSOR

Turn the ignition switch on.
Check the source voltage at the black/brown lead.
If there is no voltage, check and repair the source circuit.
If there is voltage, measure the voltage at the white/ yellow (positive) and green/yellow (negative) wires.

VOLTAGE: 5V

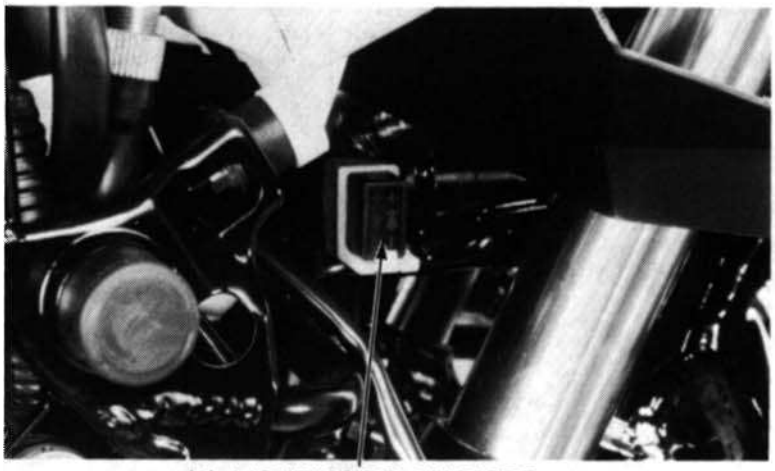
If there is no voltage, replace the sensor unit.



HEADLIGHT RELAY/DIODE (DUAL HEADLIGHT MODEL)

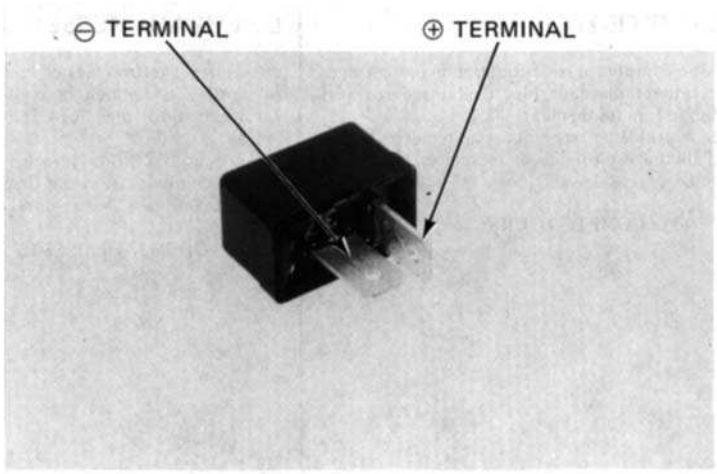
LIGHTING RELAY DIODE

Remove the fairing.
Remove the lighting relay diode from the wire harness.



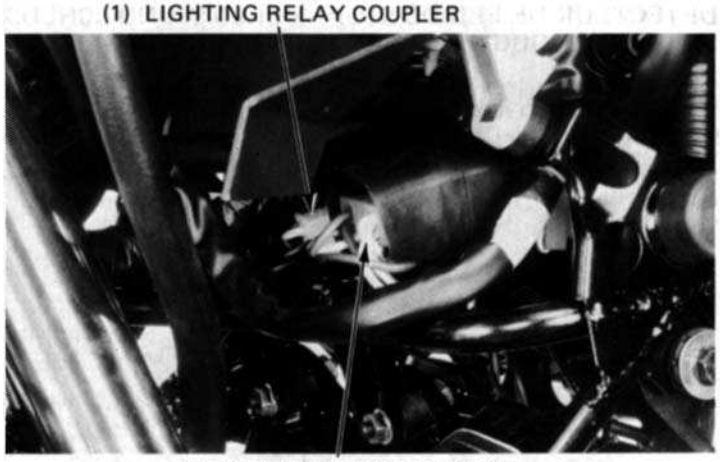
Check for continuity with an ohmmeter.

(+) PROBE / (-) PROBE	(+) TERMINAL	(-) TERMINAL
(+) TERMINAL		NO CONTINUITY
(-) TERMINAL	CONTINUITY	



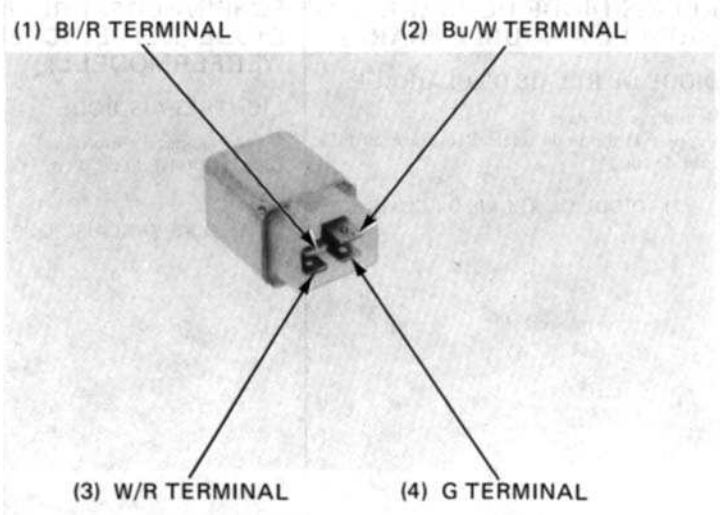
LIGHTING RELAY/DIMMER RELAY

Remove the fairing.
Remove the lighting relay and dimmer relay from the bracket and disconnect the couplers.



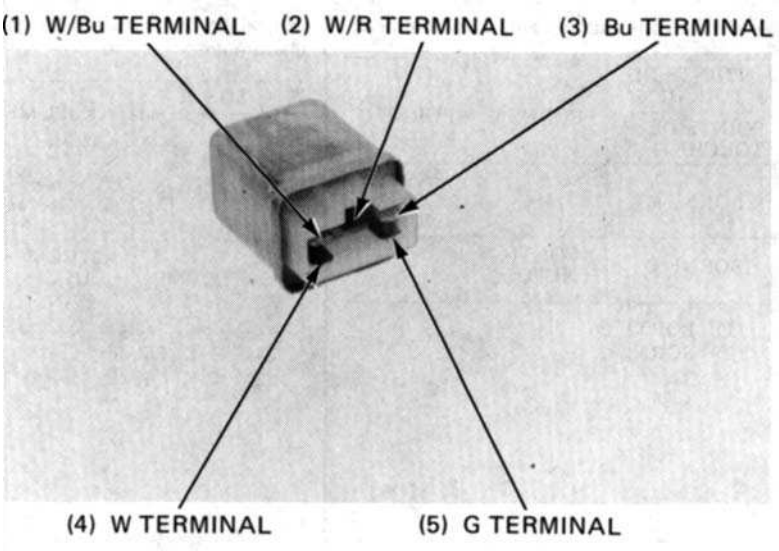
Lighting Relay Inspection

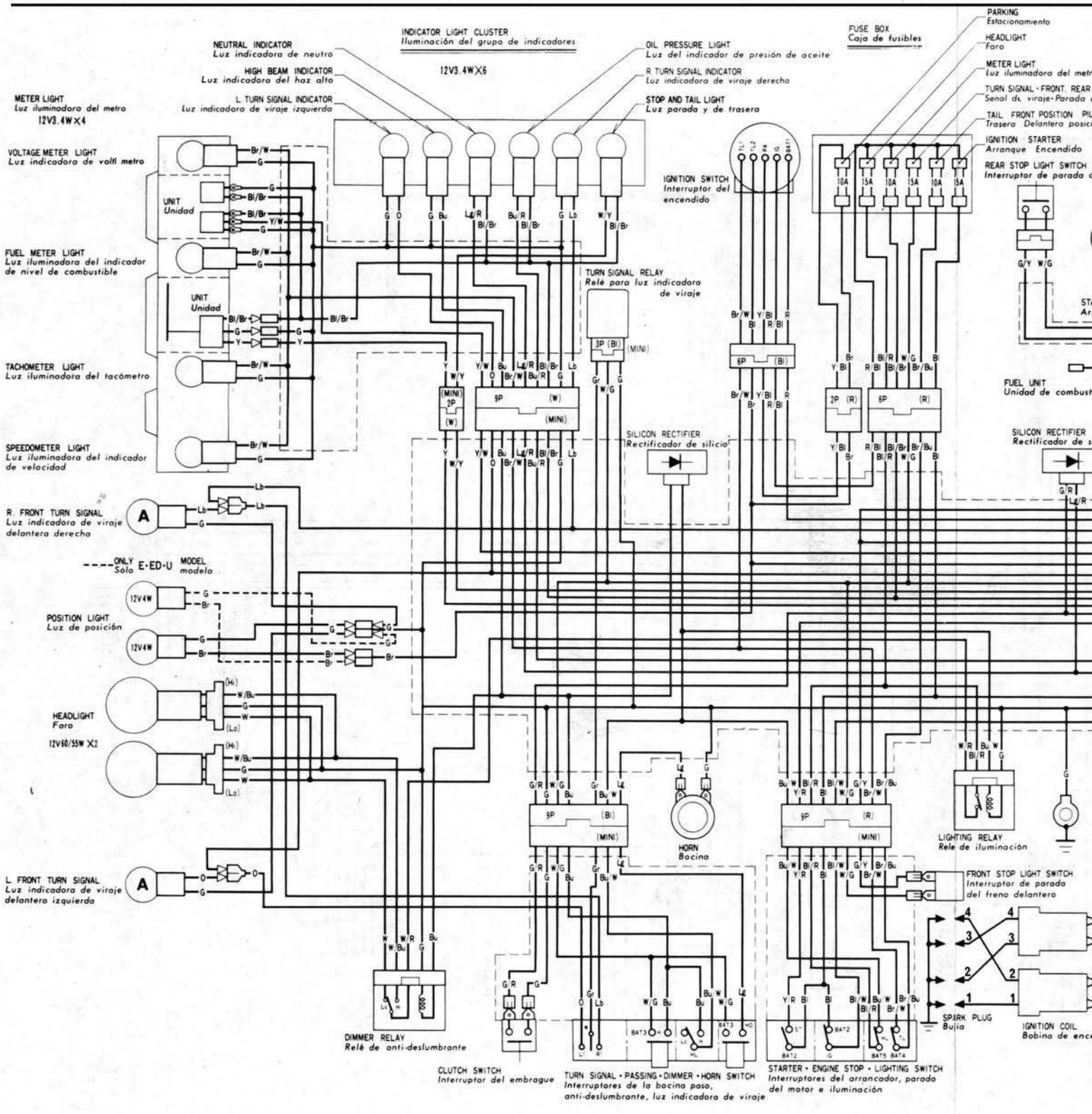
Check for continuity between the W/R and BI/R terminals.
There should not be continuity.
Apply battery voltage between the Bu/W and G terminals.
There should be continuity between the W/R and BI/R terminals.



Dimmer Relay Inspection

Check for continuity between the W/R and W terminals and W/R and W/Bu terminals.
There should continuity between the W/R and W terminals, and no continuity between the W/R and W/Bu terminals.
Apply battery voltage between the Bu and G terminals.
There should be continuity between the W/R and W/Bu terminals, and no continuity between the W/R and W terminals.





SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT1	IG	TL1	TL2	P
OFF					
ON	○	○	○		
P	○				○

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
●				
P				
HL	○		○	

ENGINE STOP SWITCH
Interruptor de parada delmotor

	IG	BAT2
OFF		
RUN	○	○
OFF		

STARTER SWITCH
Interruptor de arranque

	ST	BAT2
FREE		
PUSH	○	○

TURN SIGNAL SWITCH
Interruptor de senal de viraje

	W	RI	LI
R	○		
N			
L			○

DIMMER SWITCH
Interruptor anti-deslumbrante

	HL	Lo	H
Lo	○		
N		○	○
H	○		○

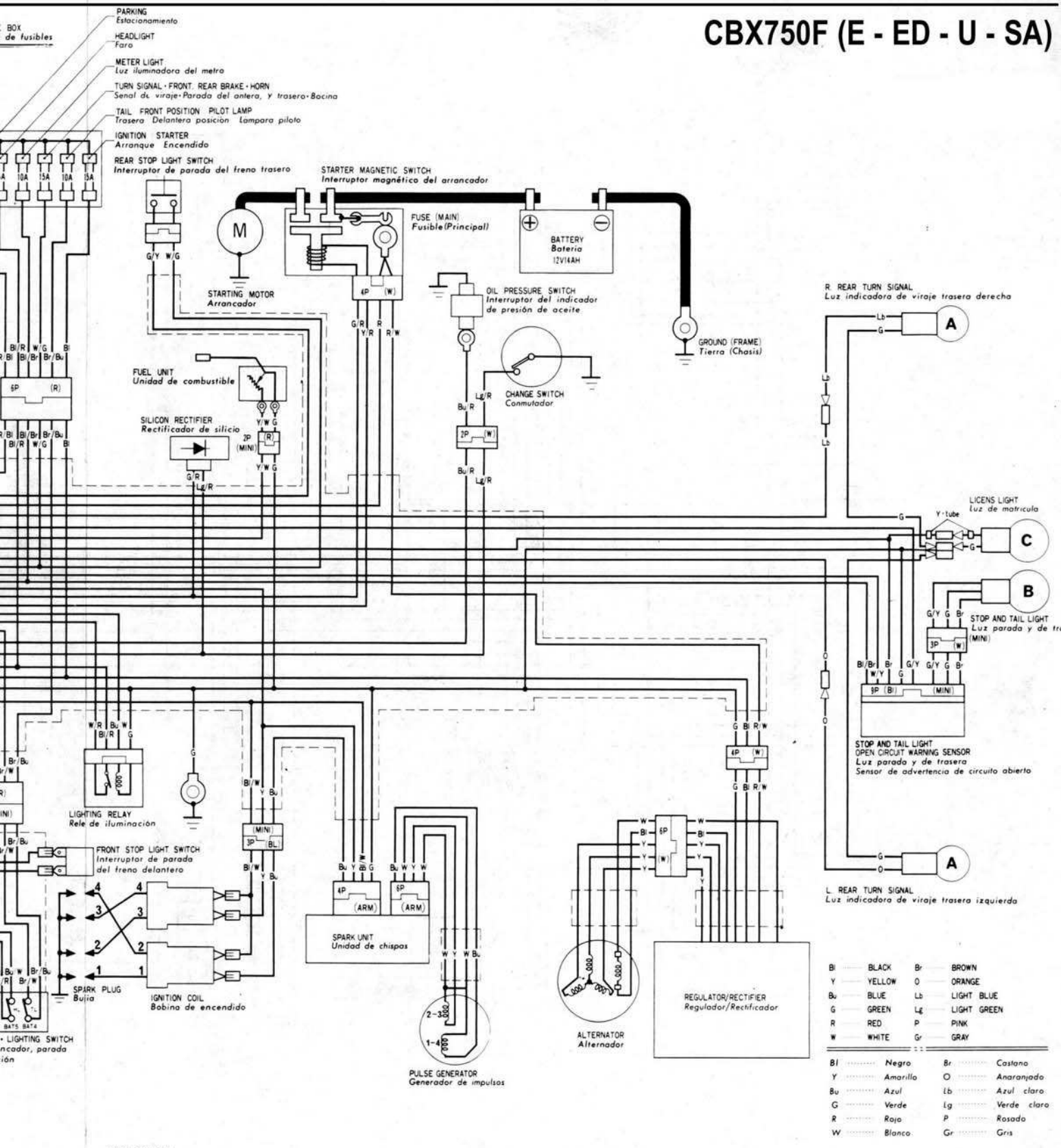
HORN SWITCH
Interruptor de bocina

	HO	BAT3
FREE		
PUSH	○	○

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	H
FREE		
PUSH	○	○

CBX750F (E - ED - U - SA)

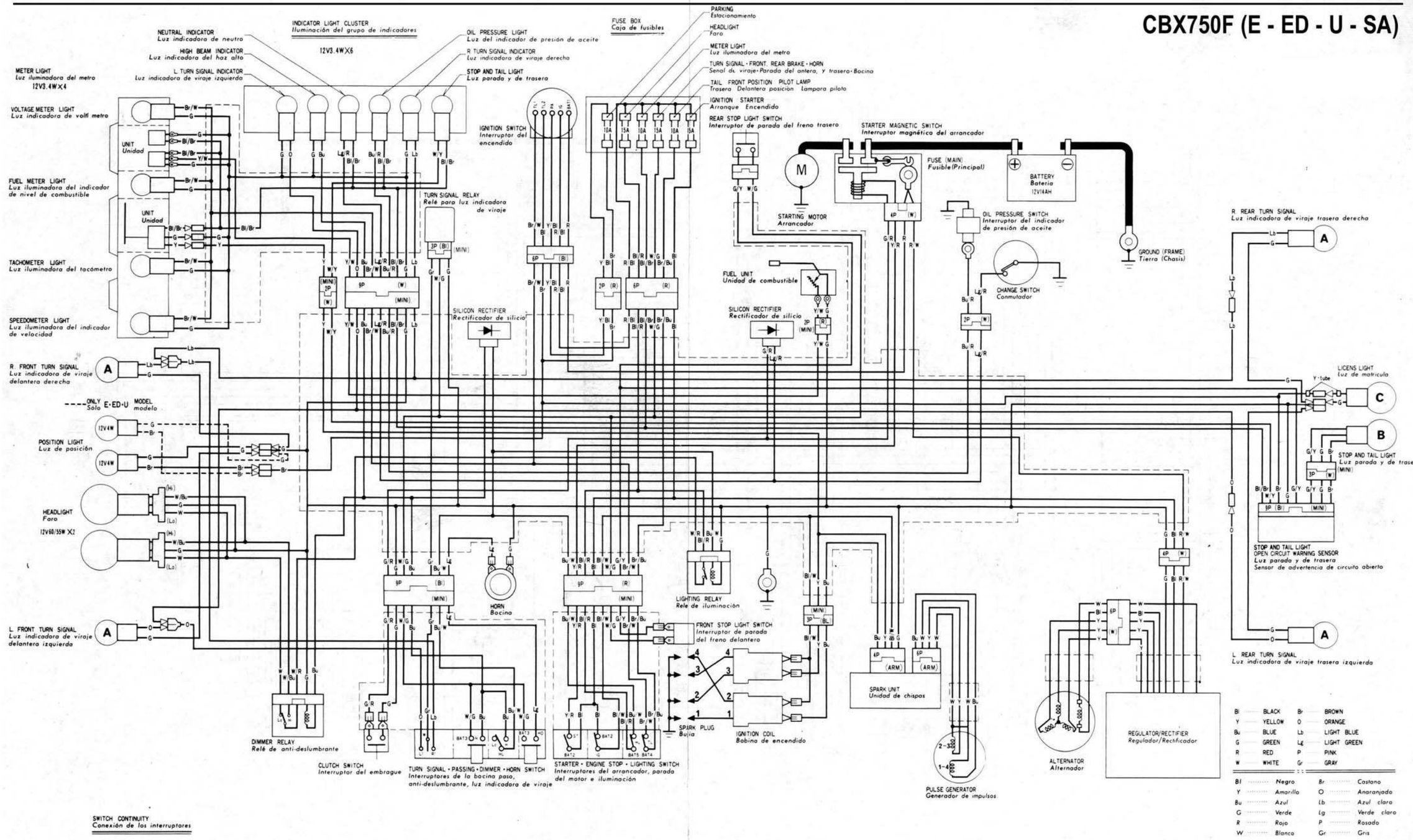


Bl	BLACK	Br BROWN
Y	YELLOW	O ORANGE
Bu	BLUE	Lb LIGHT BLUE
G	GREEN	Lg LIGHT GREEN
R	RED	P PINK
W	WHITE	Gr GRAY

Bl	Negro	Br Castano
Y	Amarillo	O Anaranjado
Bu	Azul	Lb Azul claro
G	Verde	Lg Verde claro
R	Rojo	P Rosado
W	Blanco	Gr Gris

DWG NO	AREA(TYPE) AREA(TIPO)	A TURN SIGNAL LIGHT Luz indicadora de viraje	B STOP AND TAIL Luz parada y de trasera	C LICENS LIGHT Luz de matricula
0030Z-MJO-6000	E. ED	12V21W	12V21/5W	12V5W
0030Z-MJO-6500	U. SA	12V23W	12V23/8W	12V8W

0030Z—MJ0—6000 6500



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT1	IG	TL1	TL2	P
OFF					
ON	○	○	○		
P	○				○

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
●				
P	○			
HL	○		○	

ENGINE STOP SWITCH
Interruptor de parada delmotor

	IG	BAT2
OFF		
RUN	○	
OFF		

STARTER SWITCH
Interruptor de arranque

	ST	BAT2
FREE		
PUSH	○	

TURN SIGNAL SWITCH
Interruptor de senal de viraje

	W	RI	LI
R	○		
N			
L		○	

DIMMER SWITCH
Interruptor anti-deslumbrante

	HL	Lo	H
Lo	○		
N			
H		○	

HORN SWITCH
Interruptor de bocina

	HO	BAT3
FREE		
PUSH	○	

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	H
FREE		
PUSH	○	

DWG NO	AREA(TYPE) AREA(TIPO)	A TURN SIGNAL LIGHT Luz indicadora de viraje	B STOP AND TAIL Luz parada y de trasera	C LICENS LIGHT Luz de matricula
0030Z-MJ0-6000	E. ED	12V21W	12V21/5W	12V5W
0030Z-MJ0-6500	U. SA	12V23W	12V23/8W	12V8W

0030Z—MJ0—6000 6500

ENGINE DOES NOT START OR IS HARD TO START

		POSSIBLE CAUSE
1. Check fuel flow to carburetor REACHING CARBURETOR ↓	NOT REACHING CARBURETOR →	1. Fuel tank empty 2. Clogged fuel tube or fuel filter 3. Sticking float valve 4. Clogged fuel tank cap breather hole 5. Faulty fuel valve
2. Perform spark test GOOD SPARK ↓	WEAK OR NO SPARK →	1. Faulty spark plugs 2. Fouled spark plugs 3. Faulty spark unit 4. Broken or shorted ignition coil 5. Faulty ignition switch 6. Faulty pulse generator
3. Test cylinder compression COMPRESSION NORMAL ↓	LOW COMPRESSION →	1. Low battery charge 2. Valve stuck open 3. Worn cylinder and piston rings 4. Damaged cylinder head gasket 5. Seized valve 6. Faulty hydraulic tappet 7. Excessive camshaft runout
4. Start by following normal procedure ENGINE DOES NOT FIRE ↓	ENGINE FIRES BUT STOPS →	1. Improper choke operation 2. Carburetor incorrectly adjusted 3. Manifold leaking 4. Improper ignition timing (Spark unit or pulse generator) 5. Fuel contaminated
5. Remove and inspect spark plug	WET PLUG →	1. Carburetor flooded 2. Choke closed 3. Throttle valve open 4. Air cleaner dirty

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand WHEEL SPINS FREELY ↓	WHEELS DO NOT SPIN FREELY →	1. Brake dragging 2. Worn or damaged wheel bearing 3. Wheel bearing needs lubrication 4. Drive chain too tight 5. Rear axle nut excessively tight
2. Check tire pressure PRESSURE NORMAL ↓	PRESSURE LOW →	1. Punctured tire 2. Faulty tire valve
3. Accelerate rapidly from low to second ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED ↓	ENGINE SPEED CHANGED → WHEN CLUTCH IS RELEASED	1. Clutch slipping 2. Worn clutch disc/plate 3. Warped clutch disc/plate
4. Accelerate lightly ENGINE SPEED INCREASES ↓	ENGINE SPEED DOES NOT → INCREASED	1. Carburetor choke closed 2. Clogged air cleaner 3. Restricted fuel flow 4. Clogged fuel tank vent hole 5. Clogged muffler
5. Check ignition timing CORRECT ↓	INCORRECT →	1. Faulty spark unit 2. Faulty pulse generator
6. Test cylinder compression NORMAL ↓	TOO LOW →	1. Valve stuck open 2. Worn cylinder and piston rings 3. Leaking head gasket 4. Improper valve timing 5. Excessive camshaft runout
6. Check carburetor for clogging NOT CLOGGED ↓	CLOGGED →	1. Carburetor not serviced frequently enough
7. Remove spark plug NOT FOULED OR DISCOLORED ↓	FOULED OR DISCOLORED →	1. Plugs not serviced frequently enough 2. Spark plug with incorrect heat range
3. Check oil level and condition CORRECT ↓	INCORRECT →	1. Oil level too high 2. Oil level too low 3. Contaminated oil
4. Remove cylinder head cover and inspect lubrication VALVE TRAIN LUBRICATED PROPERLY ↓	VALVE TRAIN NOT → LUBRICATED PROPERLY	1. Clogged oil passage 2. Clogged oil control orifice
5. Check for engine overheating NOT OVERHEATING ↓	OVERHEATING →	1. Excessive carbon build-up in combustion chamber 2. Use of poor quality fuel 3. Clutch slipping
6. Accelerate or run at high speed ENGINE DOES NOT KNOCK ↓	ENGINE KNOCKS →	1. Worn piston and cylinder 2. Wrong type of fuel 3. Excessive carbon build-up in combustion chamber 4. Ignition timing too advanced (Faulty spark unit or pulse generator

POOR PERFORMANCE AT LOW AND IDLE SPEED

		POSSIBLE CAUSE
1. Check ignition timing and camshaft CORRECT ↓	INCORRECT →	1. Improper ignition timing (Faulty spark unit or pulse generator) 2. Faulty camshaft journal
2. Check carburetor pilot screw adjustment CORRECT ↓	INCORRECT →	See Fuel System Section
3. Check for leaking intake pipe NO LEAKS ↓	LEAKING →	1. Deteriorated insulator O-ring 2. Loose carburetor
4. Perform spark test GOOD SPARK ↓	WEAK OR INTERMITTENT → SPARK	1. Faulty, carbon or wet fouled spark plug 2. Faulty spark unit 3. Faulty ignition coil 4. Faulty pulse generator

POOR PERFORMANCE AT HIGH SPEED

		POSSIBLE CAUSE
1. Check ignition timing CORRECT ↓	INCORRECT →	1. Faulty spark unit 2. Faulty pulse generator
2. Disconnect fuel tube at carburetor FUEL FLOWS FREELY ↓	FUEL FLOW RESTRICTED →	1. Lack of fuel in tank 2. Clogged fuel line 3. Clogged fuel tank breather hole 4. Clogged fuel valve
3. Remove carburetor and check for clogged jet NOT CLOGGED ↓	CLOGGED →	1. Clean
4. Check valve timing CORRECT ↓	INCORRECT →	1. Cam sprocket not installed properly
5. Check valve spring tension NOT WEAKENED ↓	WEAK →	1. Faulty spring

HYDRAULIC TAPPET

TAPPET NOISE

Snap ten times or ride for five minutes with the engine speed 3,000 rpm

		POSSIBLE CAUSE
1. Check oil level and condition CORRECT ↓	INCORRECT →	1. Oil level too low 2. Contaminated oil 3. Contaminated oil filter
2. Check oil pressure NOT CLOGGED ↓	TOO LOW →	1. Clogged oil passage 2. Clogged oil control orifice
3. Remove cylinder head cover and oil hole caps and check lubrication CORRECT ↓	NOT LUBRICATE PROPERLY →	1. Clogged oil pipe 2. Defected O-ring 3. Defected oil hole cap
4. Remove hydraulic tappet and check CORRECT	INCORRECT →	1. Plunger stick 2. Defected tappet 3. Defected one way valve

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Turn the engine for a few minute with starter ENGINE DOES NOT START ↓	ENGINE START →	1. Bubbly engine oil with over rev up.
2. Check oil pressure CORRECT ↓	TOO LOW →	1. Oil level too low 2. Clogged oil passage 3. Contaminated oil 4. Contaminated oil filter
3. Remove tappet and check	INCORRECT →	1. Defect tappet

POOR HANDLING

		POSSIBLE CAUSE
1. If steering is heavy	➔	1. Steering stem adjustment too tight 2. Damaged steering head bearings
2. If either wheel is wobbling	➔	1. Excessive wheel bearing play 2. Bent rim 3. Improperly installed wheel hub 4. Swingarm pivot bearing excessively worn 5. Bent frame
3. If the motorcycle pulls to one side	➔	1. Bent frame 2. Front and rear wheels not aligned 3. Bent front fork 4. Improperly installed front fork brace