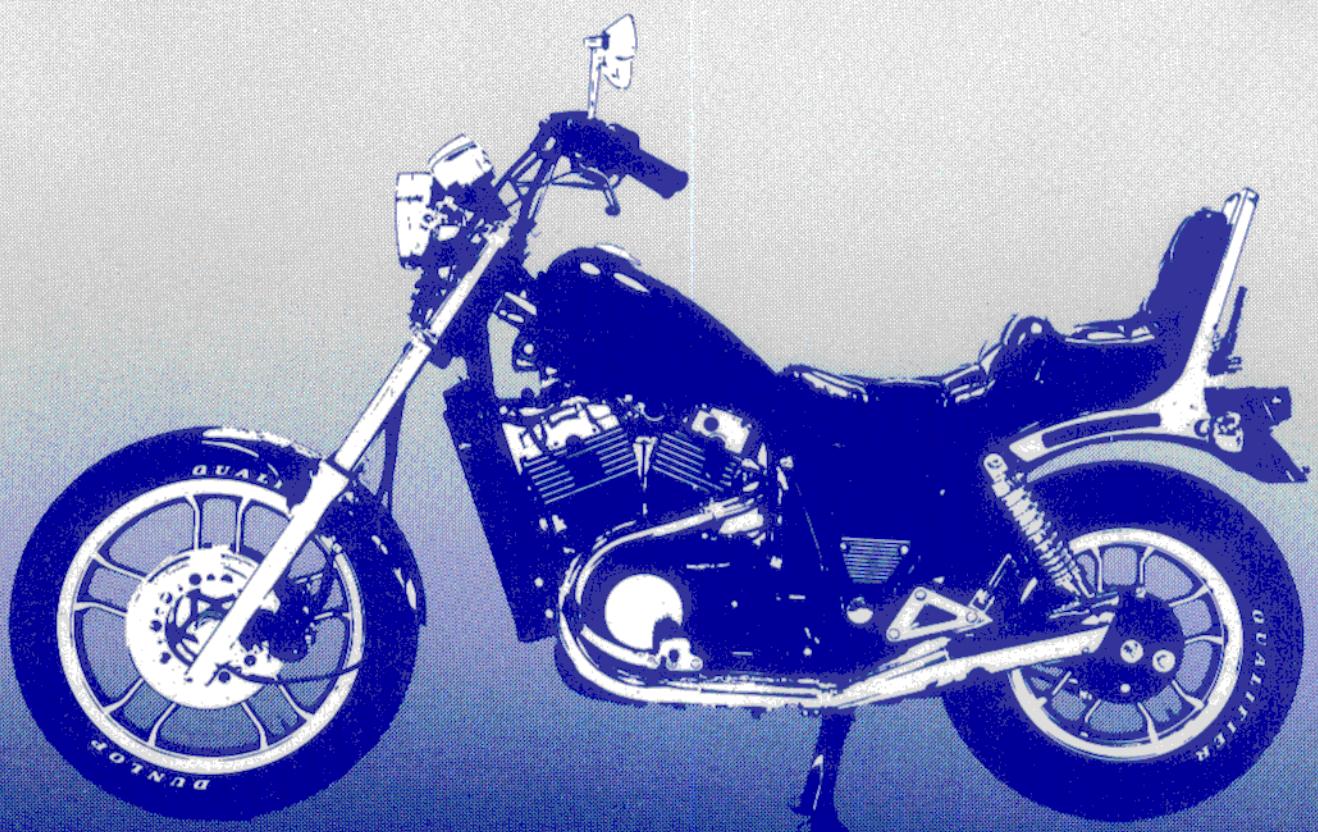
Official

HONDA

SHOP MANUAL

Shadow VT700C VT750C



VT700C : '84-'85
VT750C : '83

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IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

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

HOW TO USE THIS MANUAL

This manual is based on the '83 VT750C. Any information that differs between the after '83 models is called out in the text or in a note.

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

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 21 describe parts of the motorcycle, grouped according to location.

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

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

If you are not familiar with this motorcycle, read the Technical Features in section 23.

If you don't know the source of the trouble, go to section 24, Troubleshooting.

All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of approval for printing. HONDA MOTOR CO., LTD. reserves the right to make changes at any time without notice and without incurring any obligation whatever. No part of this publication may be reproduced without written permission.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

	GENERAL INFORMATION	1
	LUBRICATION	2
	MAINTENANCE	3
ENGINE	FUEL SYSTEM	4
ENGINE	ENGINE REMOVAL/INSTALLATION	5
ENGINE	COOLING SYSTEM	6
ENGINE	CLUTCH SYSTEM	7
ENGINE	ALTERNATOR/STARTER CLUTCH	8
ENGINE	GEARSHIFT LINKAGE	9
ENGINE	CYLINDER HEAD/VALVE	10
ENGINE	CYLINDER/PISTON	11
ENGINE	CRANKCASE	12
ENGINE	CRANKSHAFT/TRANSMISSION	13
ENGINE	FINAL DRIVE	14
CHASSIS	FRONT WHEEL/SUSPENSION	15
CHASSIS	REAR WHEEL/SUSPENSION/BRAKE	16
CHASSIS	HYDRAULIC BRAKES	17
ELECTRICAL	BATTERY/CHARGING SYSTEM	18
ELECTRICAL	IGNITION SYSTEM	19
ELECTRICAL	ELECTRIC STARTER	20
ELECTRICAL	SWITCHES	21
	WIRING DIAGRAM	22
	TECHNICAL FEATURES	23
	TROUBLESHOOTING	24

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1. GENERAL INFORMATION

GENERAL SAFETY	1–1
SERVICE RULES	1–1
MODEL IDENTIFICATION	1–2
SPECIFICATIONS	1–3
TORQUE VALUES	1–5
TOOLS	1–7
CABLE & HARNESS ROUTING	1–9
EMISSION CONTROL SYSTEMS	1–13

GENERAL SAFETY

WARNING

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

WARNING

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

WARNING

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

WARNING

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

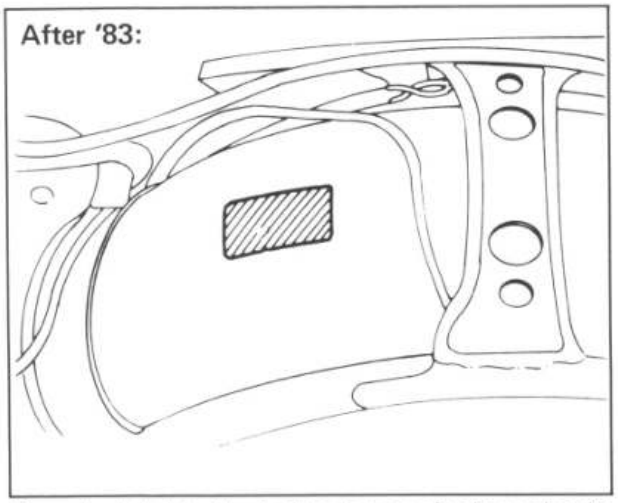
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with 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.

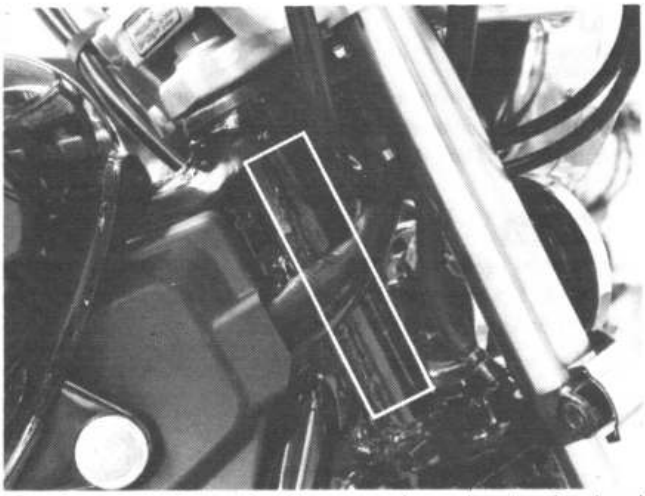
MODEL IDENTIFICATION



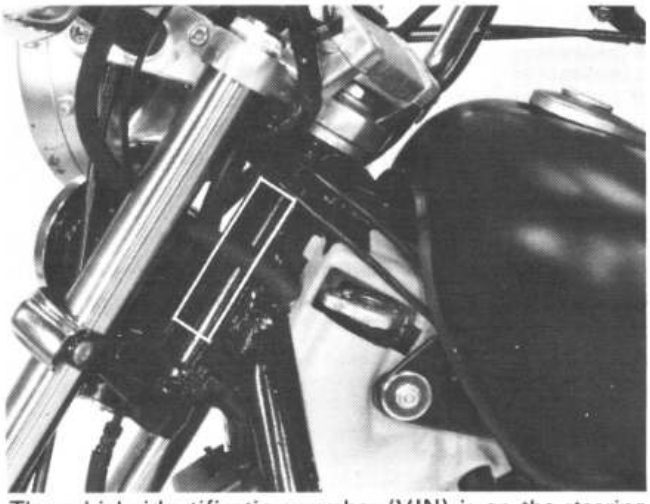
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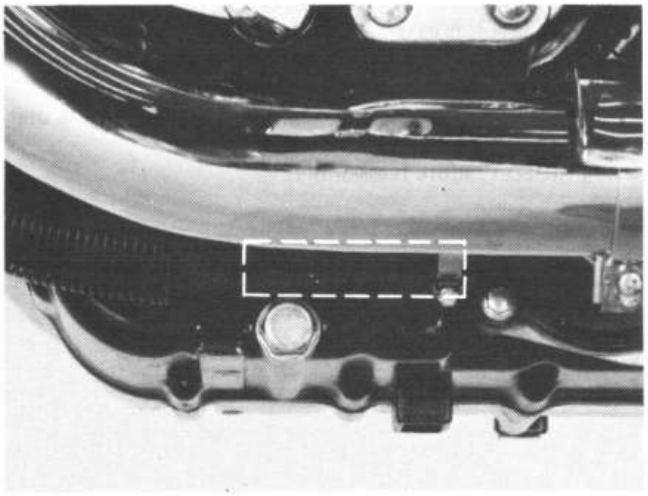
The color label is attached to the rear fender under the seat.



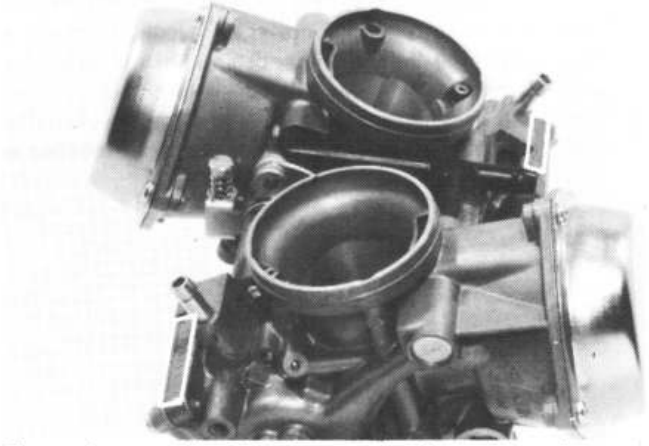
The frame serial number is stamped on the steering head right side.



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



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



The carburetor identification number is on the carburetor body intake side.

SPECIFICATIONS

ITEM			
DIMENSIONS	Overall length		2,190 mm (86.2 in)
	Overall width		860 mm (33.8 in)
	Overall height		1,200 mm (47.2 in)
	Wheelbase		1,525 mm (60.0 in)
	Seat height		760 mm (29.9 in)
	Foot peg height		330 mm (13.0 in)
	Ground clearance		150 mm (5.90 in)
	Dry weight		211 kg (465 lb)
	Curb weight		225 kg (496 lb)
FRAME	Type		Double cradle
	Front suspension, travel		Telescopic fork 145 mm (5.7 in)
	Rear suspension, travel		Swingarm/Shock absorber, 103 mm (4.1 in)
	Gross vehicle weight rating		395 kg (870 lb)
	Vehicle capacity load		168 kg (370 lb)
	Front tire size		110/90–19 62H
	Rear tire size		140/90–15 70H
	Cold tire pressures	Up to 90 kg (200 lbs) load Front	32 psi (225 kPa, 2.25 kg/cm²)
		Up to 90 kg (200 lbs) load Rear	32 psi (225 kPa, 2.25 kg/cm²)
		Up to vehicle capacity load Front	32 psi (225 kPa, 2.25 kg/cm²)
		Up to vehicle capacity load Rear	40 psi (280 kPa, 2.80 kg/cm²)
	Front brake, lining swept area		Double disc 868 cm² (134.5 sq in)
	Rear brake, lining swept area		Drum 201 cm² (31.2 sq in)
	Fuel capacity		12.5 liters (3.3 US gal, 2.75 Imp gal)
	Fuel reserve capacity		2.0 liters (0.53 US gal, 0.44 Imp gal)
	Caster angle		32°
	Trail		139 mm (5.5 in)
	Front fork oil capacity		470 cc (28.68 cu in)
	Front fork air pressure		0–6 psi (0–40 kPa, 0–0.4 kg/cm²)
ENGINE	Type		Water cooled twin 4-stroke SOHC engine
	Cylinder arrangement		2 cylinders 45° V
	Bore and stroke	'83:	79.5 x 75.5 mm (3.13 x 2.97 in)
		After '83:	76.5 x 75.5 mm (3.01 x 2.97 in)
	Displacement	'83:	749.5 cm³ (45.72 cu in)
		After '83:	694.5 cm³ (42.34 cu in)
	Compression ratio	'83:	9.8 : 1
		After '83:	9.6 : 1
	Valve train		Silent, multi-link chain drive and OHC with rocker arms
	Maximum horsepower	'83:	66 BHP/7,500 rpm
		After '83:	62 BHP/7,500 rpm
	Maximum torque	'83:	6.8 kg-m (49.4 ft-lb)/6,000 rpm
		After '83:	6.3 kg-m (45.8 ft-lb)/6,000 rpm
	Oil capacity		3.5 liters (3.7 US qt, 3.1 Imp qt) after disassembly
			3.0 liters (3.2 US qt, 2.6 Imp qt) after draining
	Coolant capacity		1.7 liters (1.8 US qt, 1.5 Imp qt)
	Lubrication system		Forced pressure and wet sump
	Air filtration		Urethane foam
	Cylinder compression		12 ± 2 kg/cm² (171 ± 28 psi)
	Intake valve Opens	'83, '84:	10° (BTDC) at 1 mm lift
	Intake valve Closes	'83, '84:	40° (ABDC) at 1 mm lift
	Intake valve Opens	After '84:	5° (BTDC) at 1 mm lift
	Intake valve Closes	After '84:	45° (ABDC) at 1 mm lift
	Exhaust valve Opens		40° (BBDC) at 1 mm lift
	Exhaust valve Closes		10° (ATDC) at 1 mm lift
	Valves		Hydraulic tappet
	Engine weight		78 kg (172 lb)
	Idle speed	'83:	900 ± 100 rpm
		After '83:	1000 ± 100 rpm

ITEM		
CARBURETION	Carburetor type	36 mm (1.42 in) Vertical
	Identification number '83:	VD7AA
	'84:	VD7CA [Calif: VD7BA]
	After '84:	VD7CB [Calif: VD7BB]
	Pilot screw initial setting	See page 4-12
	Float level	7.5 mm (0.30 in)
DRIVE TRAIN	Clutch	Wet, multi-plate
	Transmission	5-speed with over drive
	Primary reduction	1.737 : 1
	Secondary reduction	0.806 : 1
	Third reduction	1.188 : 1
	Final reduction	3.400 : 1
	Gear ratio I	2.294 : 1
	Gear ratio II	1.619 : 1
	Gear ratio III	1.292 : 1
	Gear ratio IV	1.074 : 1
	Gear ratio V	0.896 : 1
	Over drive	0.750 : 1
	Gear shift pattern	Left foot operated return system, 1–N–2–3–4–5–OD
	Final drive gear oil capacity '83:	170 cc (5.8 oz) after disassembly 130 cc (4.4 oz) after draining
	After '83:	150 cc (5.1 oz) after disassembly 130 cc (4.4 oz) after draining
ELECTRICAL	Ignition	Full transistor ignition
	Ignition timing "F" mark '83, '84:	5° BTDC at idle
	After '84:	10° BTDC at idle
	Full advance '83, '84:	26° BTDC at 3,500 rpm
	After '84:	26° BTDC at 4,000 rpm
	Pulse air gap	0.3–0.9 mm (0.012–0.035 in)
	Starting system	Starting motor
	Alternator	340 W/5,000 rpm
	Battery capacity	12V–16AH
	Spark plug	

Spark plug	NGK	ND
Standard	DPR8EA-9	X24EPR-U9
For cold climate (Below 5°C, 41°F)	DPR 7EA-9	X22EPR-U9
For extended high speed riding	DPR 9EA-9	X27EPR-U9

	Spark plug gap	0.8–0.9 mm (0.031–0.035 in)	
	Firing order	Front–225°–Rear–495°–Front	
	Fuse/Main fuse	10A, 15A/30A	
LIGHTS	Headlight (high/low beam)	60/55W	
	Tail/stoplight	8/27W	3/32 cp SAE NO. 1157
	Front turn signal/running light	23/8W x 2	32/3 cp x 2 SAE NO. 1034
	Rear turn signal	23W	32 cp SAE NO. 1073
	Instrument lights	3W x 3	
	Neutral indicator	3W	
	Turn signal indicator	3W x 2	
	High beam indicator	3W	
	Oil pilot lamp	3W	
	Tail light warning lamp	3W	
	Fuel warning lamp	3W	
	O.D. indicator lamp	3W	

TORQUE VALUES

- ENGINE

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Cylinder head cover cap nuts	8	10	35–45 (3.5–4.5, 25–33)	
cap nuts	4	8	20–25 (2.0–2.5, 14–18)	Include the cam chain cover.
bolts	12	8	20–25 (2.0–2.5, 14–18)	
Oil pipe	3	6	10–14 (1.0–1.4, 7–10)	
Spark plug sleeves	2	30	10–15 (1.0–1.5, 7–11)	Apply molybdenum disulfide grease to the threads.
Cam sprocket bolts	4	6	16–20 (1.6–2.0, 12–14)	
Connecting rod bearing cap nuts	4	9	41–45 (4.1–4.5, 30–33)	
Output drive shaft bolt	1	10	35–45 (3.5–4.5, 25–33)	Special
Countershaft bolt	1	10	35–45 (3.5–4.5, 25–33)	Special
Output gear case cap nuts	3	8	21–25 (2.1–2.5, 15–18)	
lock nuts	3	8	21–25 (2.1–2.5, 15–18)	
bolts	4	8	30–40 (3.0–4.0, 22–29)	Socket bolt
Output gear bearing lock nuts				
(Inner)	2	—	70–80 (7.0–8.0, 51–58)	
(Outer)	2	—	90–110 (9.0–11.0, 65–80)	
Center shift fork bolt	1	7	16–20 (1.6–2.0, 12–14)	
Engine oil drain plug	1	14	30–40 (3.0–4.0, 22–29)	
Engine oil filter	1	20	15–20 (1.5–2.0, 11–14)	Apply engine oil to the O-ring
Oil pressure switch	1	—	10–14 (1.0–1.4, 7–10)	Apply 3-BOND® (No. 1211) or its equivalent to the bolt threads.
Primary gear bolt	1	12	80–100 (8.0–10.0, 58–72)	
Clutch center lock nut	1	22	45–55 (4.5–5.5, 33–40)	
Clutch cover bolts	7	6	8–12 (0.8–1.2, 6–9)	Socket bolts
Crankcase	12	8	20–25 (2.0–2.5, 14–18)	
Right crankcase cover	14	6	8–12 (0.8–1.2, 6–9)	Socket bolts
Left crankcase cover	9	6	8–12 (0.8–1.2, 6–9)	Socket bolts
Flywheel bolt	1	12	80–100 (8.0–10.0, 58–72)	Left-hand threads
Starter clutch torx bolts	6	8	18–25 (1.8–2.5, 13–18)	Apply LOCTITE® #200 or its equivalent to the bolt threads.
Neutral switch	1	14	10–14 (1.0–1.4, 7–10)	
Timing cap	1	45	15–20 (1.5–2.0, 11–14)	Apply molybdenum disulfied grease to the threads.

- CHASSIS

Item	Q'ty	Tread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Handlebar upper holder	4	8	20–30 (2.0–3.0, 14–22)	
Caliper mounting bolts	4	10	30–40 (3.0–4.0, 22–29)	
Front axle	1	12	55–65 (5.5–6.5, 40–47)	
Axle pinch bolt	1	8	18–28 (1.8–2.8, 13–20)	
Front fork socket bolts	2	8	15–25 (1.5–2.5, 11–18)	
Fork tube caps	2	31	15–30 (1.5–3.0, 11–22)	
Steering bearing adjustment nuts	1	26	14–16 (1.4–1.6, 10–12)	
Steering stem nut	1	24	80–120 (8.0–12.0, 58–87)	
Front fork top pinch bolts	2	7	9–13 (0.9–1.3, 7–9)	
Front fork bottom pinch bolts	2	10	45–55 (4.5–5.5, 33–40)	

Item	Q'ty	Tread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Rear axle nut	1	16	60–80 (6.0–8.0, 43–58)	
Axle pinch bolt	1	8	20–30 (2.0–3.0, 14–22)	
Brake arm	1	8	24–30 (2.4–3.0, 17–22)	
Socket absorber mount nuts	4	10	30–40 (3.0–4.0, 22–29)	
Swingarm left pivot bolt	1	35	100–130 (10.0–13.0, 72–94)	
Swingarm right pivot bolt	1	23	10–14 (1.0–1.4, 7–10)	
Swingarm pivot lock nut	1	35	100–130 (10.0–13.0, 72–94)	
Front brake caliper bracket	2	10	30–40 (3.0–4.0, 22–29)	
Front brake caliper bolts	2	8	20–25 (2.0–2.5, 14–18)	
Front brake caliper pivot bolts	2	10	25–30 (2.5–3.0, 18–22)	
Front brake disc	5	8	35–40 (3.5–4.0, 25–29)	
Brake hose bolts	5	10	25–35 (2.5–3.5, 18–25)	
Brake panel stop bolt	1	8	18–25 (1.8–2.5, 13–18)	
Engine hanger bolts	1	8	20–30 (2.0–3.0, 14–22)	
	2	10	45–60 (4.5–6.0, 23–43)	
	1	12	60–80 (6.0–8.0, 43–58)	
Final drive flange	5	10	50–60 (5.0–6.0, 36–43)	
Final gear case nuts	3	10	60–70 (6.0–7.0, 43–51)	UBS
Gear case cover bolts	2	10	35–45 (3.5–4.5, 25–33)	
	6	8	23–28 (2.3–2.8, 17–20)	
Exhaust pipe joint nuts	4	6	8–14 (0.8–1.4, 6–10)	
Exhaust pipe clamp bolts	4	8	18–28 (1.8–2.8, 13–20)	
Sub-frame bolts Upper	2	10	70–80 (7.0–8.0, 51–58)	Socket bolt
Lower	2	10	35–45 (3.5–4.5, 25–33)	
Pinion nut	1	16	100–120 (10–12, 72–87)	
Pinion bearing retainer	1	—	100–120 (10–12, 72–87)	
Clutch fluid reservoir cover	2	4	1–2 (0.1–0.2, 0.7–0.9)	
Clutch lever pivot nut	1	6	5–7 (0.5–0.7, 4–5)	

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

• STANDARD TORQUE VALUES

Item	Torque Values N·m (kg-m, ft-lb)	Item	Torque Values N·m (kg-m, ft-lb)
5 mm bolt and nut	4–6 (0.4–0.6, 3–4)	5 mm screw	3–5 (0.3–0.5, 2–4)
6 mm bolt and nut	8–12 (0.8–1.2, 6–9)	6 mm screw	7–11 (0.7–1.1, 5–8)
8 mm bolt and nut	18–25 (1.8–2.5, 13–18)	6 mm flange bolt and nut	10–14 (1.0–1.4, 7–10)
10 mm bolt and nut	30–40 (3.0–4.0, 22–29)	8 mm flange bolt and nut	20–30 (2.0–3.0, 14–22)
12 mm bolt and nut	50–60 (5.0–6.0, 36–43)	10 mm flange bolt and nut	30–40 (3.0–4.0, 22–29)

TOOLS

- SPECIAL

Description	Part No.	Remarks/Alternative tool	Part No.	Ref. Sect.
Oil filter wrench	07912–MB00000	These tools are new and have not been used.		2
Hydraulic tappet bleeder	07973–ME90000			10
Main bearing remover attachment	07946–ME90100			13
Main bearing driver attachment	07946–ME90200			13
Pinion joint holer	07926–ME90000			14
S/A lock nut wrench	07908–ME90000			17
Oil pressure gauge	07506–3000000	Equivalant commercially available in U.S.A.		2
Oil pressure gauge attachment	07510–4220100			2
Vacuum gauge set	07404–0020000	Vacuum gauge set (U.S.A. only)	M937B–021–XXXX	3
Hand vacuum pump/gauge	ST–AH–260–MC7	Hand vacuum pump/ gauge (U.S.A. only)	A973X–041–XXXX	4
Valve guide driver, 7 mm	07942–8230000			4
Snap ring pliers	07914–3230001			7, 15, 16
Shaft holder	07923–6890101			7, 12, 13
Gear holder	07924–MC70001	Modify 07924–4150000 or 07924–MC70000		7, 10
Torx bit	————————	Equivalent commercially availble in U.S.A.		8
Fork tube holder attachment	07930–KA50100			10
Valve guide driver attachment				
(IN)	07943–6570100			10
(EX)	07943–6890100			10
Valve guide reamer	07984–6570100			10
Valve guide remover, 6.1 mm	07942–6570100			10
Lock nut wrench, 30/64 mm	07916–MB00000			13, 14
Remover handle	07936–3710100			13, 17
Bearing remover, 17 mm	07936–3710300			13
Bearing remover, 20 mm	07936–3710600			13
Attachment	07946–3710200			13
Driver	07949–3710000			13, 14
Damper compressor	07964–3710000			13
Ring gear Dis/Assembly tool	07965–3710100			13
Main bearing remover/driver	07973–MC70000			13
Driver	07947–4630300	Fork seal driver	07947–3710101	14
		Attachment, 37x40 mm	07746–0010200	14
Pinion puller	07935–MB00000	Pinion puller	07931–4630200	14
		Pinion puller attachment kit	07931–MB00000	14
Attachment	07945–3330300			14
Attachment	07947–6340201			14
O-ring guide	07973–4630200			14
Steering stem socket	07916–3710100			15

Description	Part No.	Remarks/Alternative tool	Part No.	Ref. Sect.
Hex wrench, 6 mm	07917–3230000	Equivalent commercially available in U.S.A.		15
Steering stem driver	07946–MB00000	Steering stem driver	07946–3710100	15
		Shock absorber compressor attachment (Collar)	07964–MB00200	15
Fork seal driver	07947–4630100			15
Swingarm bearing remover	07936–4150000	Swingarm pivot remover	07936–3710500	17
Shockabsorber compressor attachment	07959–MB10000			17
Socket bit, 10 mm	07917–3710000			17

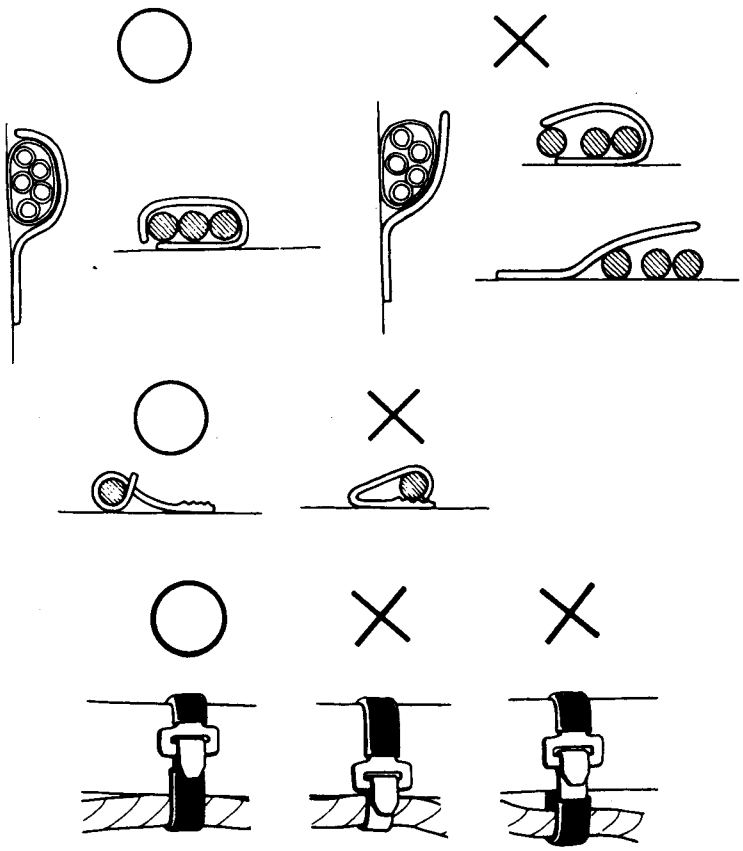
- COMMON

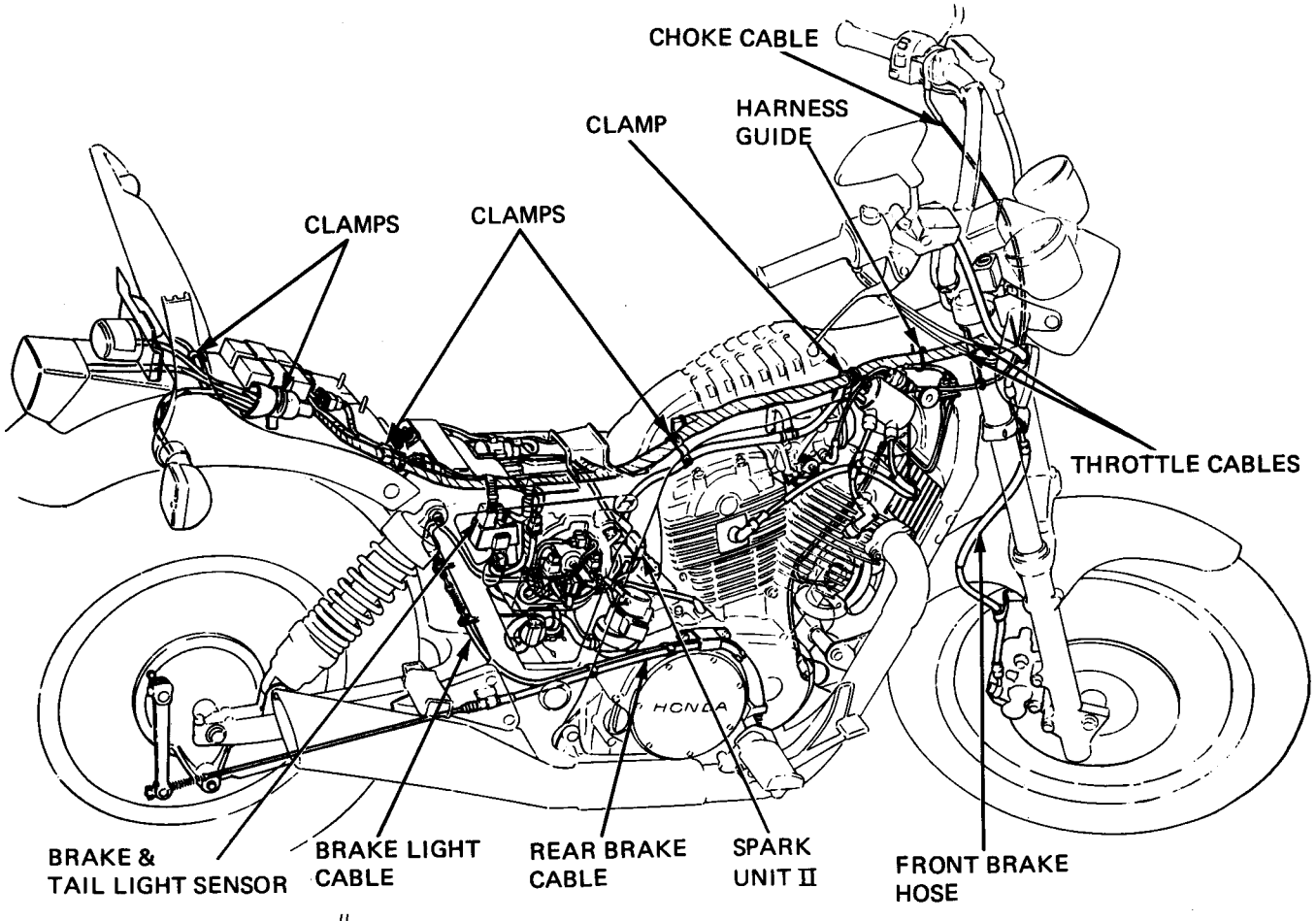
Description	Part No.	Remarks/Alternative tool	Part No.	Ref. Sect.
Float level gauge	07401–0010000			4
Lock nut wrench 17 x 27 mm	07716–0020300			7
Extension bar	07716–0020500			7, 15
Attachment, 37 x 40 mm	07746–0010200			7, 14
Pilot, 35 mm	07746–0040800			7
Driver	07749–0010000			7, 13, 14, 15, 17
Rotor puller	07733–0020001	Rotor puller	07933–3950000	8
Valve guide driver	07742–0010200	Valve guide driver	07942–6570100	10
Valve spring compressor	07757–0010000	Valve spring compressor	07957–3290001	10
Remover weight	07741–0010201	Remover weight	07936–3710200	13, 17
Attachment, 32 x 35 mm	07746–0010100			13, 14, 17
Attachment, 42 x 47 mm	07746–0010300			13, 14, 15 17
Attachment, 52 x 55 mm	07746–0010400			13, 14
Attachment, 62 x 68 mm	07746–0010500			13
Pilot, 17 mm	07746–0040400			13, 17
Pilot, 25 mm	07746–0040600			13
Pilot, 30 mm	07746–0040700			13, 14
Attachment, 30 mm I.D.	07746–0030300			13
Driver	07746–0030100			14
Attachment, 25 mm I.D.	07746–0030200			14
Lock nut wrench, 30 x 32 mm	07716–0020400	Equivalent commercially available in U.S.A.		15
Pilot, 15 mm	07746–0040300			15
Bearing remover expander	07746–0050100	Equivalent commercially available in U.S.A.		15, 17
Bearing remover collect, 15 mm	07746–0050400			15, 17
Shock absorber compressor	07959–3290001			17
Bearing remover collet, 17 mm	07746–0050500	Equivalent commercially available in U.S.A.		17
Socket bit, 17 mm	07703–0020500	Equivalent commercially available in U.S.A.		17

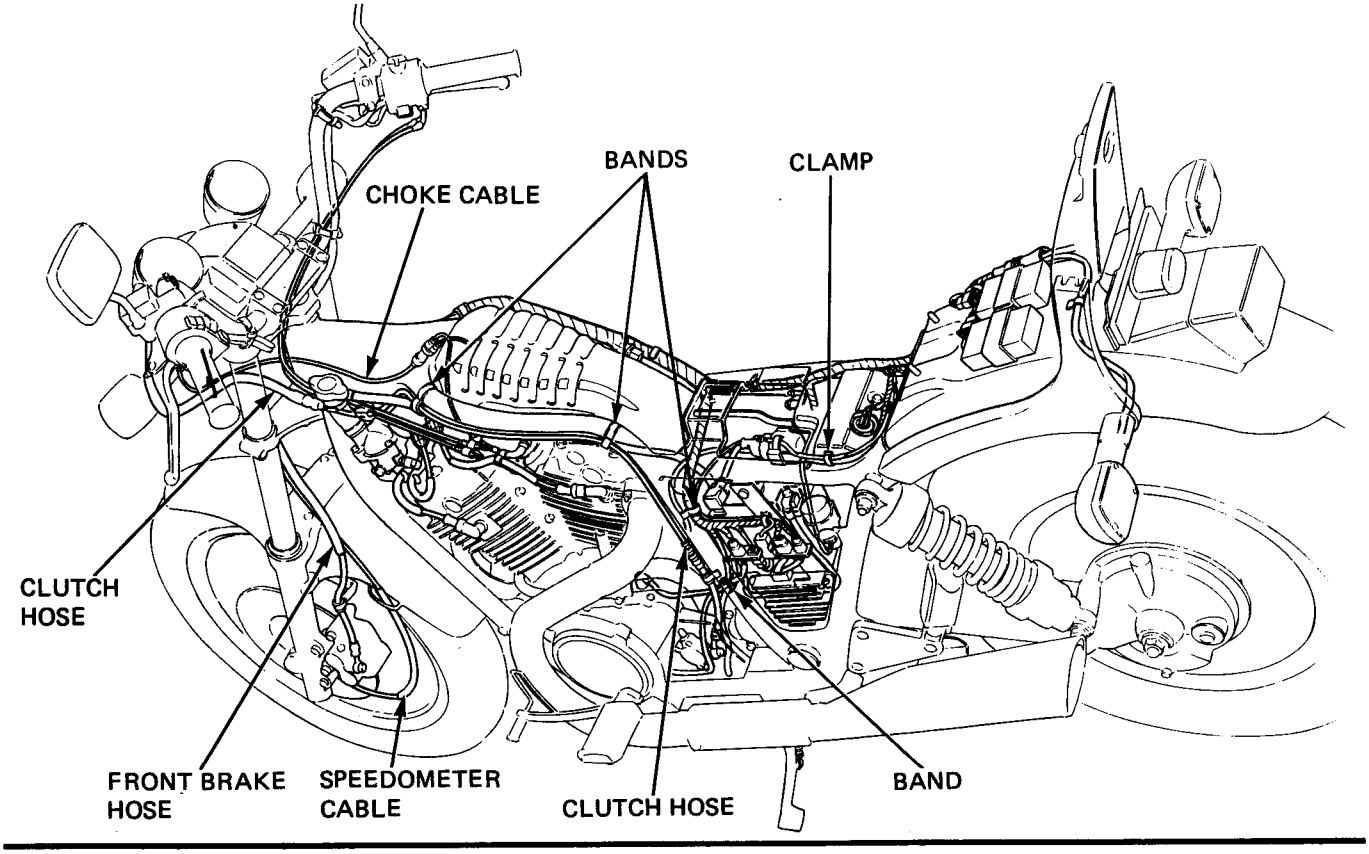
CABLE & HARNESS ROUTING

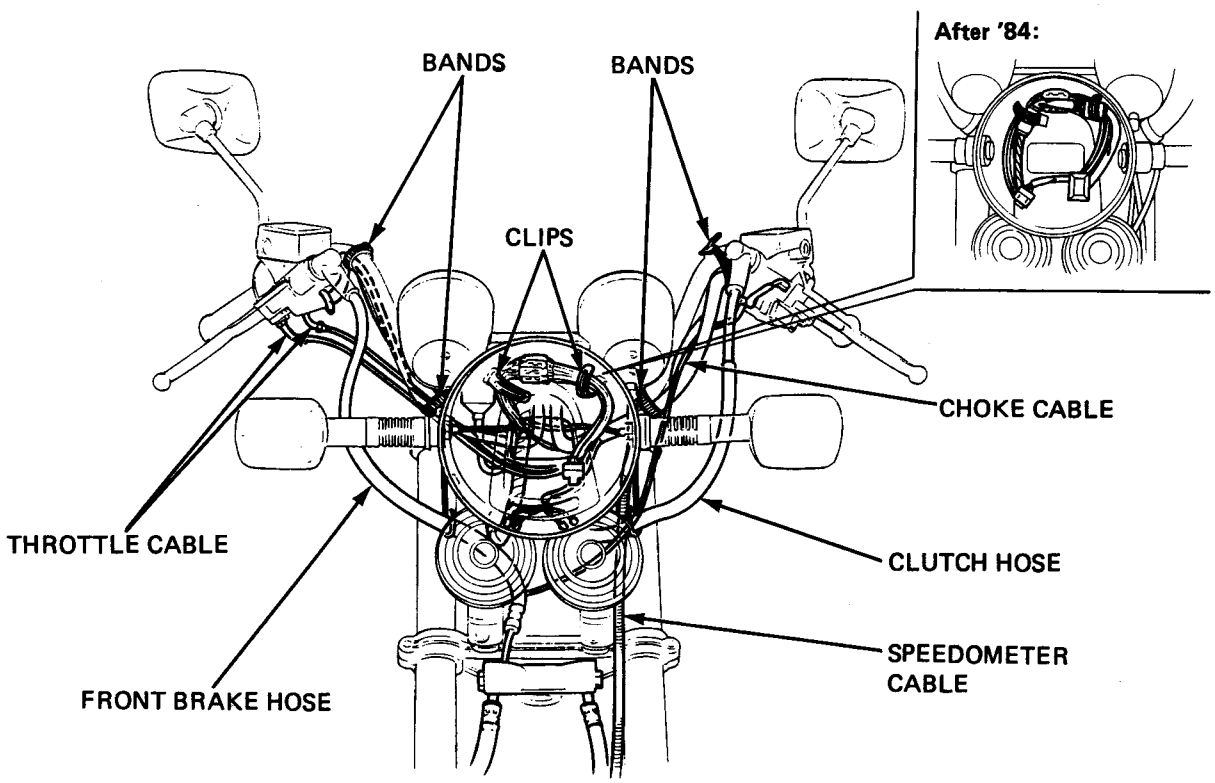
Note the following when routing cables and wire harnesses.
A loose wire, harness or cable can be safety hazard. After clamping, check each wire to be sure it is secure.

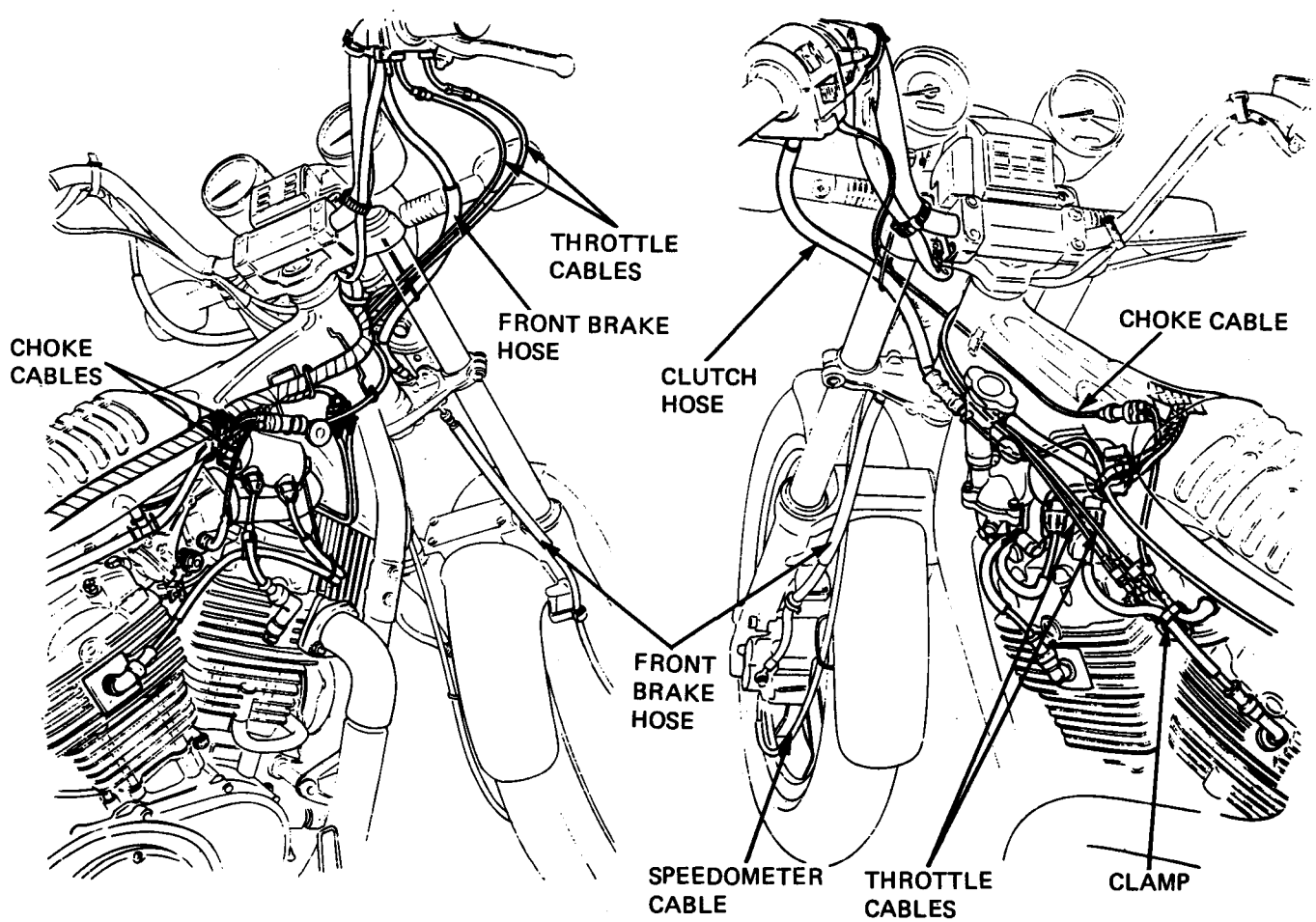
- Do not squeeze wires against the weld or end of its clamp when a weld-on clamp is used.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses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

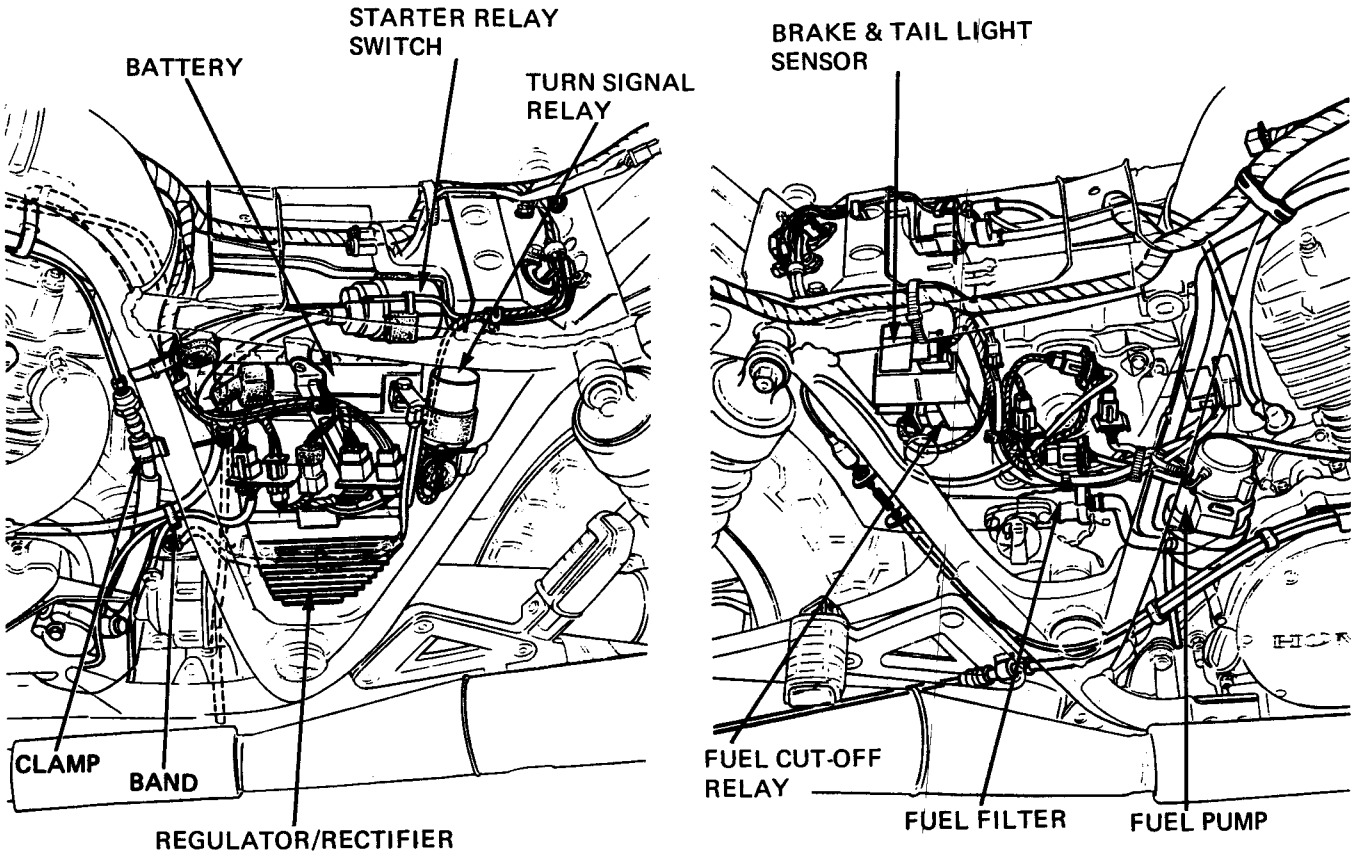


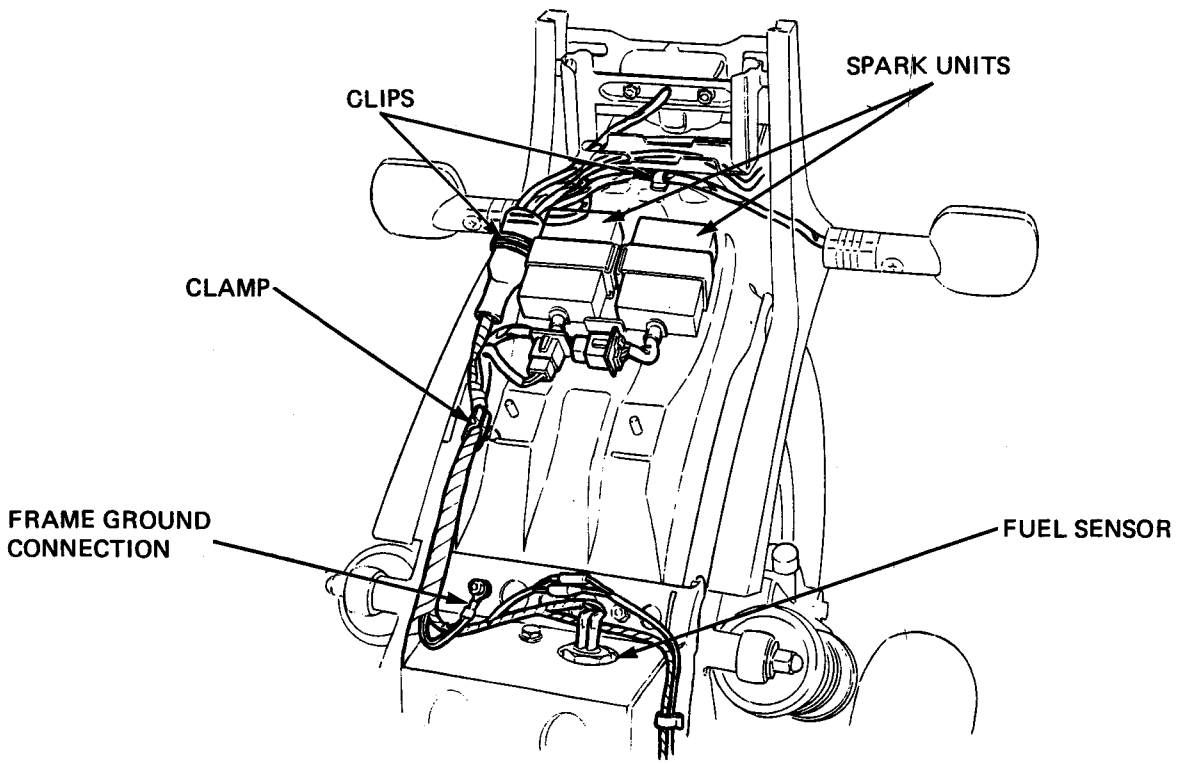

CHOKE CABLE
HARNESS GUIDE
CLAMP
CLAMPS
CLAMPS
THROTTLE CABLES
BRAKE & TAIL LIGHT SENSOR
BRAKE LIGHT CABLE
REAR BRAKE CABLE
SPARK UNIT II
FRONT BRAKE HOSE


BANDS
CLAMP
CHOKE CABLE
CLUTCH HOSE
FRONT BRAKE HOSE
SPEEDOMETER CABLE
CLUTCH HOSE
BAND


After '84:
BANDS
BANDS
CLIPS
CHOKE CABLE
THROTTLE CABLE
CLUTCH HOSE
SPEEDOMETER CABLE
FRONT BRAKE HOSE


THROTTLE CABLES
FRONT BRAKE HOSE
CHOKE CABLES
CLUTCH HOSE
CHOKE CABLE
FRONT BRAKE HOSE
SPEEDOMETER CABLE
THROTTLE CABLES
CLAMP


STARTER RELAY SWITCH
BATTERY
TURN SIGNAL RELAY
BRAKE & TAIL LIGHT SENSOR
CLAMP
BAND
REGULATOR/RECTIFIER
FUEL CUT-OFF RELAY
FUEL FILTER
FUEL PUMP


SPARK UNITS
CLIPS
CLAMP
FRAME GROUND CONNECTION
FUEL SENSOR

EMISSION CONTROL SYSTEMS

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

Source Of Emissions

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

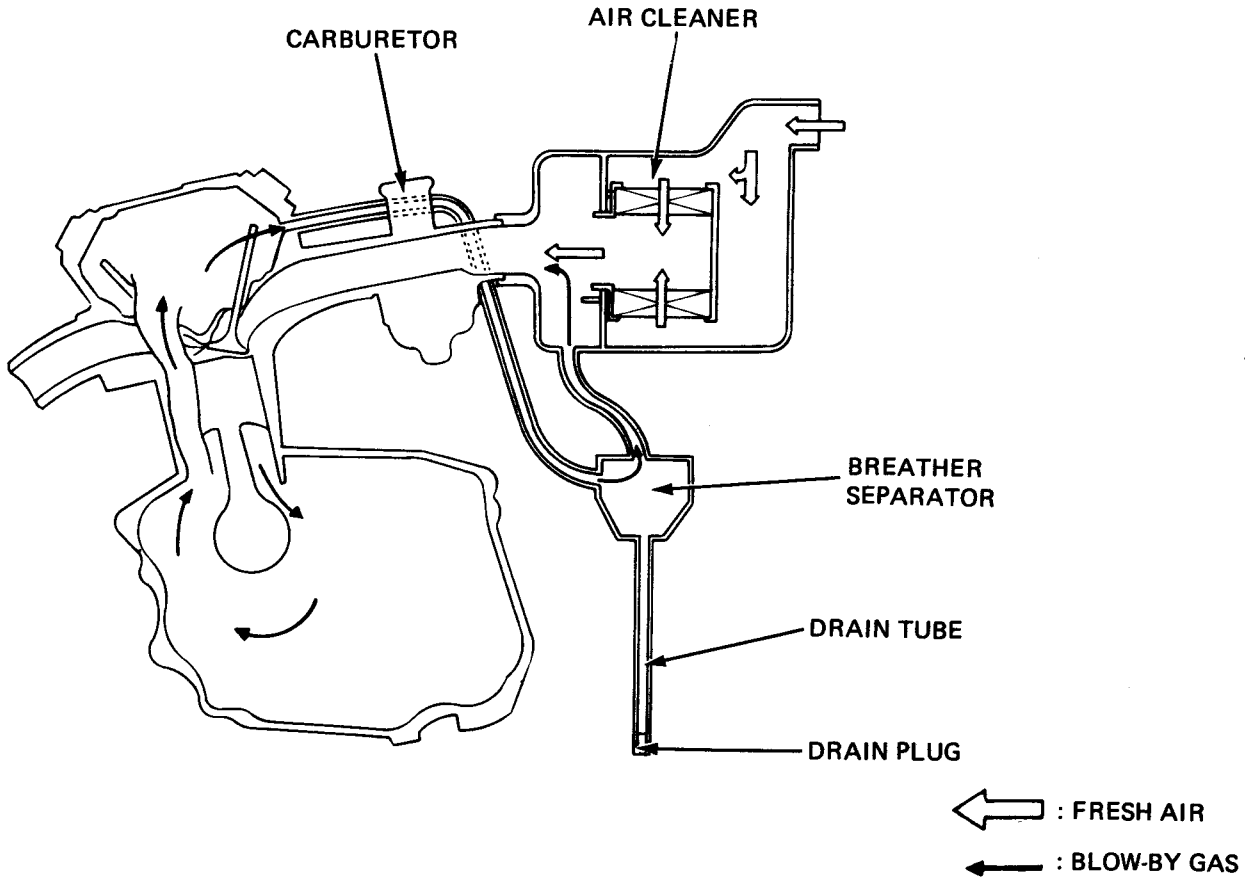
Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

EXHAUST EMISSION CONTROL SYSTEM

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

CRANKCASE EMISSION CONTROL SYSTEM

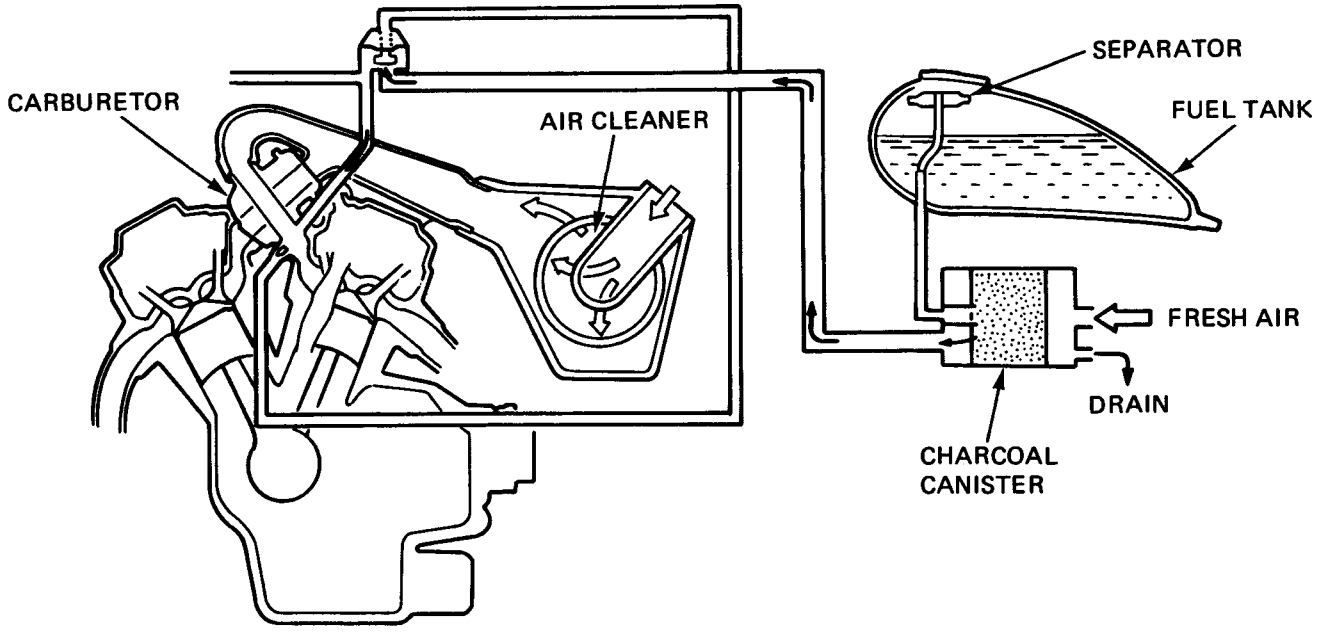
The engine is equipped with a closed crankcase system which routes crankcase emissions through the air cleaner and into the combustion chamber. Condensed crankcase vapors are accumulated in a storage tank which must be emptied periodically. See the Maintenance Schedule in section 3.



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

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

Fuel vapor from the fuel tank is routed into a charcoal canister where it is abosorbed and stored while the engine is stopped. When the engine is running and the purge control diaphragm valve is open, fuel vapor in the charcoal canister is drawn into the engine through the carburetor.



NOISE EMISSION CONTROL SYSTEM

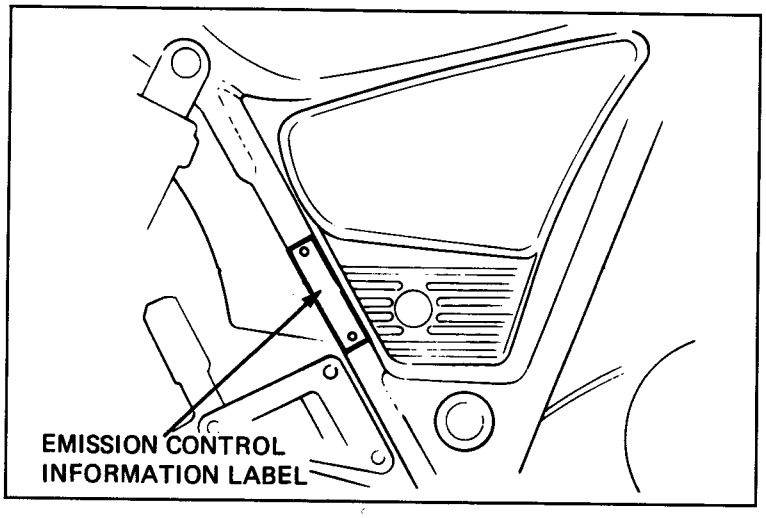
TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle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

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

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

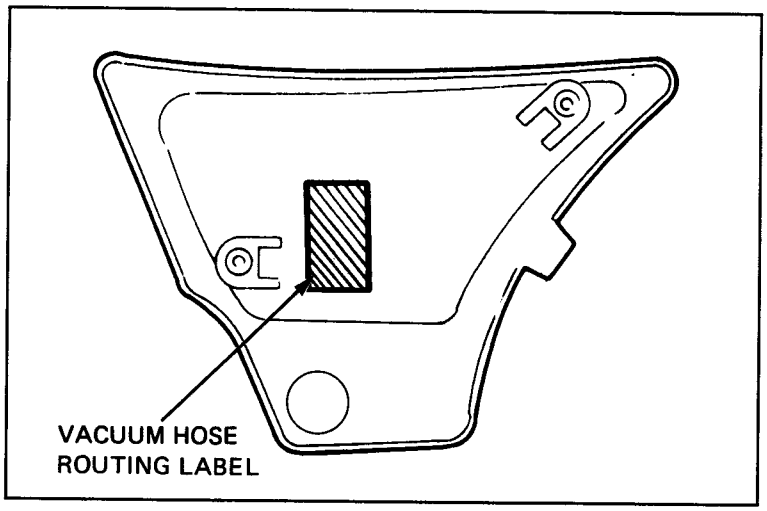
EMISSION CONTROL INFORMATION LABEL

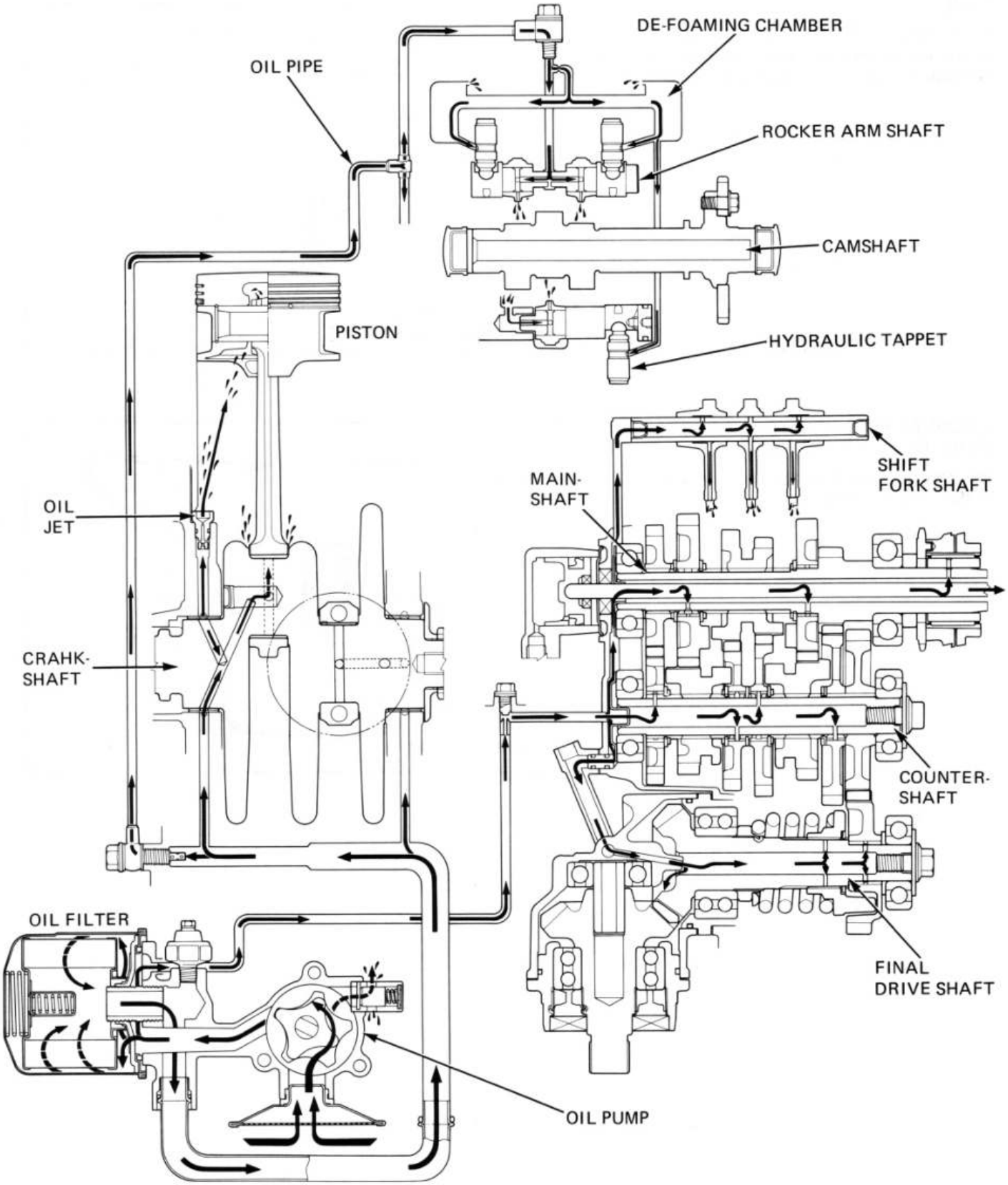
An Emission Control Information Label is located on the rear down tube behind the right side cover as shown. If gives basic tune-up specifications.



VACUUM HOSE ROUTING LABEL (After '83: California model)

The Vacuum Hose Routing Label is attached to the inside of the left side cover.




DE-FOAMING CHAMBER
OIL PIPE
ROCKER ARM SHAFT
CAMSHAFT
PISTON
HYDRAULIC TAPPET
SHIFT
FORK SHAFT
MAIN-
SHAFT
OIL
JET
CRAHK-
SHAFT
COUNTER-
SHAFT
OIL FILTER
FINAL
DRIVE SHAFT
OIL PUMP

2. LUBRICATION

SERVICE INFORMATION	2–1	OIL STRAINER & OIL PUMP	2– 4
TROUBLESHOOTING	2–2	FINAL DRIVE OIL	2–11
ENGINE OIL LEVEL	2–3	CONTROL CABLE LUBRICATION	2–11
ENGINE OIL & FILTER CHANGE	2–3	LUBRICATION POINTS	2–12
OIL PRESSURE CHECK	2–4		

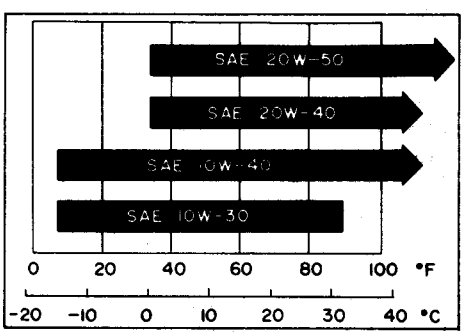
SERVICE INFORMATION

GENERAL

- To remove the oil pump, the following parts must be removed:
- Front cylinder exhaust pipe (Section 5).
- Right sub-frame (Section 5).
- Clutch assembly (Section 7).
- Gear shift linkage (Section 8).

SPECIFICATIONS

Engine oil

Oil capacity	3.0 liter (3.2 US qt, 2.6 Imp qt) after draining 3.5 liter (3.7 US qt, 3.1 Imp qt) after disassembly
Oil recommendation	Use Honda 4-Stroke Oil or equivalent. API Service Classification: SE or SF. Viscosity: SAE 10W–40 Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. **OIL VISCOSITIES** 
Oil pressure (at oil pressure switch)	5.4 ± 0.7 kg/cm² (62.6 ± 9.9 psi) at 6,000 rpm (80°C/176°F)
Oil pump delivery	36 liter (38.1 U.S. qt)/min. at 6,000 rpm

Oil pump service data

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

Final drive gear

	'83:	After '83:
Oil capacity	170 cc (5.7 oz.) after disassembly 130 cc (4.4 oz.) after draining	150 cc (5.1 oz.) after disassembly 130 cc (4.4 oz.) after draining
Recommended oil	Hypoid gear oil: Above 5°C/41°F SAE #90 Below 5°C/41°F SAE #80	Hypoid gear oil: SAE 80

TORQUE VALUES

Engine oil drain plug	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)	
Engine oil filter	15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)	
Oil pressure switch	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)	– Apply 3-BOND® No. 1211 or its equivalent to the bolt threads.
Oil pump	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)	
Oil pump driven sprocket	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)	

TOOLS

Special

Oil pressure gauge	07506–3000000	– or commercially available.
Oil pressure gauge attachment	07510–4220100	
Oil filter wrench	07912–MB00000	

TROUBLESHOOTING

Oil level too low – high oil consumption
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.

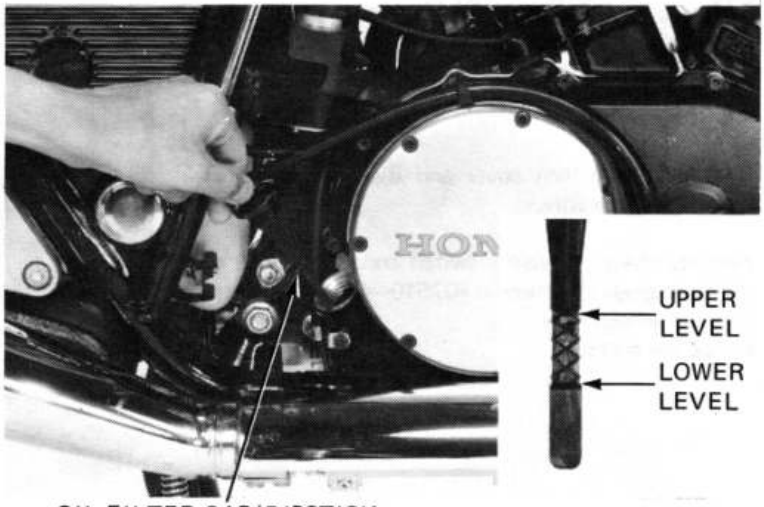
High oil pressure
1. Pressure relief valve stuck open.
2. Plugged oil filter, gallery, or metering orifice.
3. Incorrect oil being used.

No oil pressure
1. Oil level low.
2. Oil pump drive chain broken.
3. Oil pump faulty.
4. Internal oil leakage.

ENGINE OIL LEVEL

Place the motorcycle on its center stand.
Check the oil level with the filler cap/dipstick.
Do not screw it in when making this check.

If the oil level is below or near the lower level mark on the dipstick, add the recommended oil (page 2-1) up to the upper level line.



ENGINE OIL & FILTER CHANGE

NOTE:

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

Remove the oil filler cap, and drain plug and drain the oil. Remove the oil filter with a filter wrench. Discard the oil filter.
Check that the sealing washer on the drain plug is in good condition and install it.

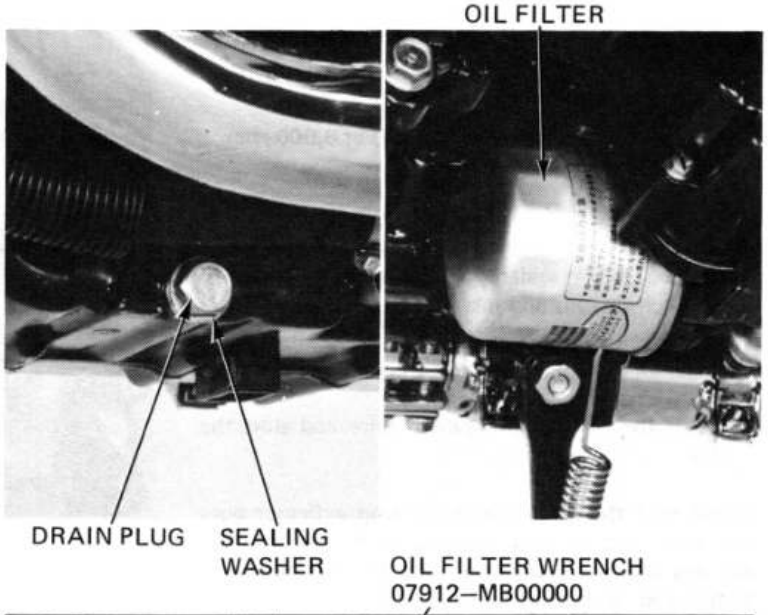
TORQUE: 30–40 N·m
(3.0–4.0 kg-m, 22–29 ft-lb)

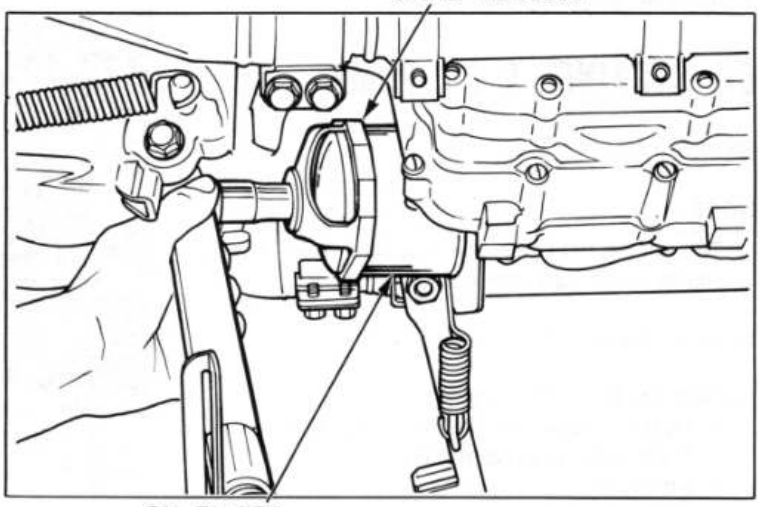
Apply oil to the new oil filter O-ring and install the new oil filter.

Torque the oil filter with a filter wrench after placing the motorcycle on its side stand.

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

After tightening the oil filter, place the motorcycle back on its center stand.
Fill the crankcase with 3.0 liters (3.2 US qt, 2.6 Imp. qt.) of the recommended oil (page 2-1).
Install the oil filler cap/dipstick.
Start the engine and let it idle for 2–3 minutes. Stop the engine and check that the oil level is at the upper level mark on the dipstick. Make sure there are no oil leaks.



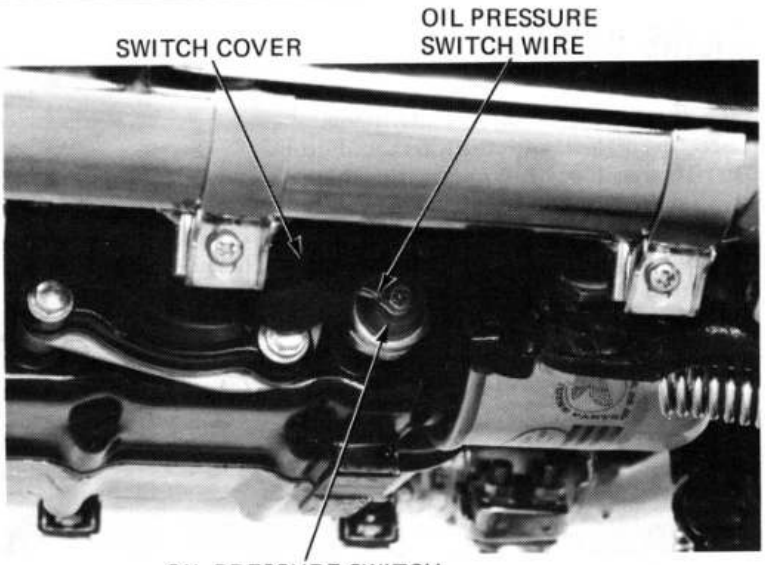


OIL PRESSURE CHECK

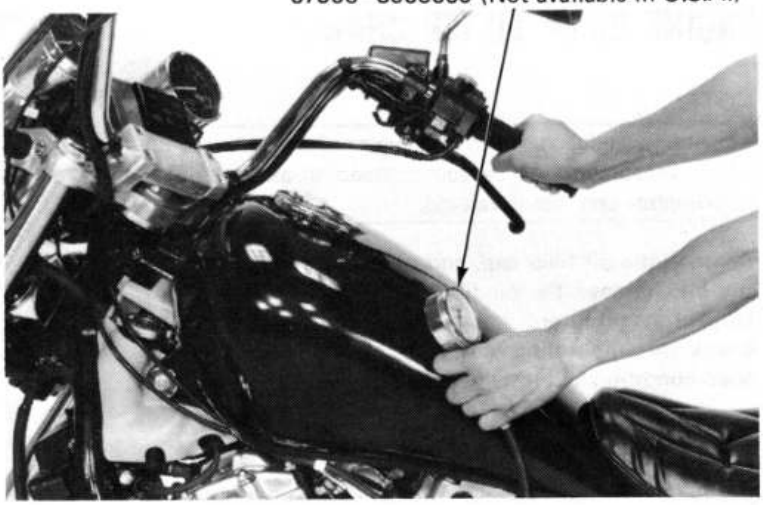
Warm the engine up to normal operating temperature (approximately 80°C/176°F).
Stop the engine.

Remove the switch cover and disconnect the oil pressure switch wire.

Remove the oil pressure switch and connect an oil pressure gauge attachment (07510–4220100) to the pressure switch hole.
Check the oil level.



OIL PRESSURE GAUGE
07506–3000000 (Not available in U.S.A.)



Start the engine and check the oil pressure at 6,000 rpm.

OIL PRESSURE:
5.4 ± 0.7 kg/cm² (62.6 ± 9.9 psi) at 6,000 rpm (80°C/176°F)

Stop the engine.

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

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

Connect the oil pressure switch wire and 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 & OIL PUMP

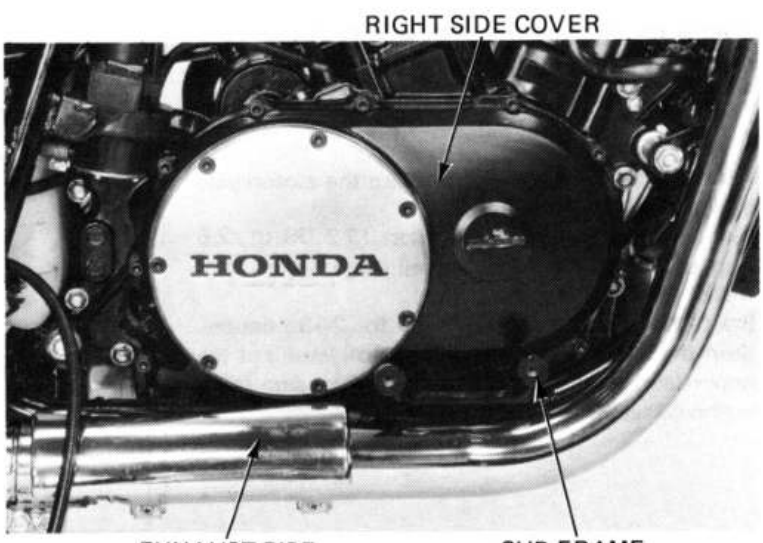
REMOVAL

NOTE:

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

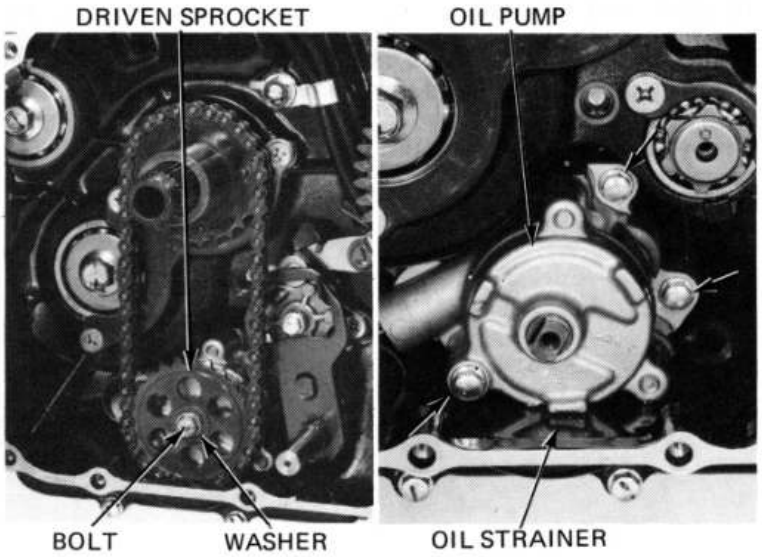
Drain the engine oil.

Remove the following parts:
- right foot peg with the rear brake pedal.
- front cylinder exhaust pipe.
- sub-frame.
- right side cover.

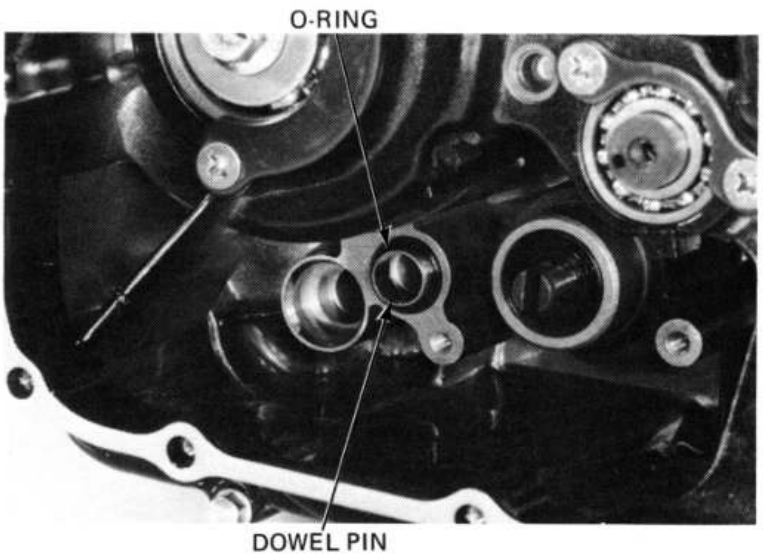


Remove the following parts:
- clutch assembly (page 7-11).
- oil pump driven sprocket by removing the bolt and washer.
- gear shift linkage (page 9-2).

Pull the oil strainer downward out of the oil pump. Remove the oil pump by removing the mounting bolts and remove the oil strainer.

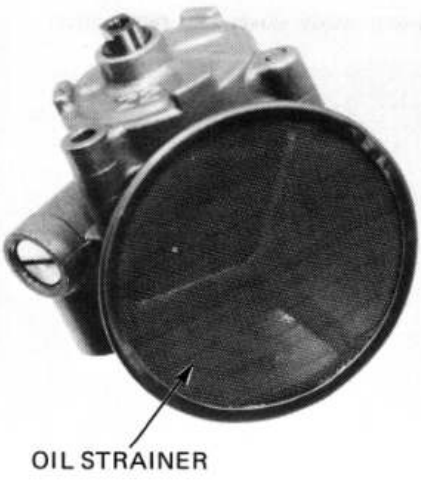


Remove the O-ring and dowel pin.



OIL STRAINER CLEANING

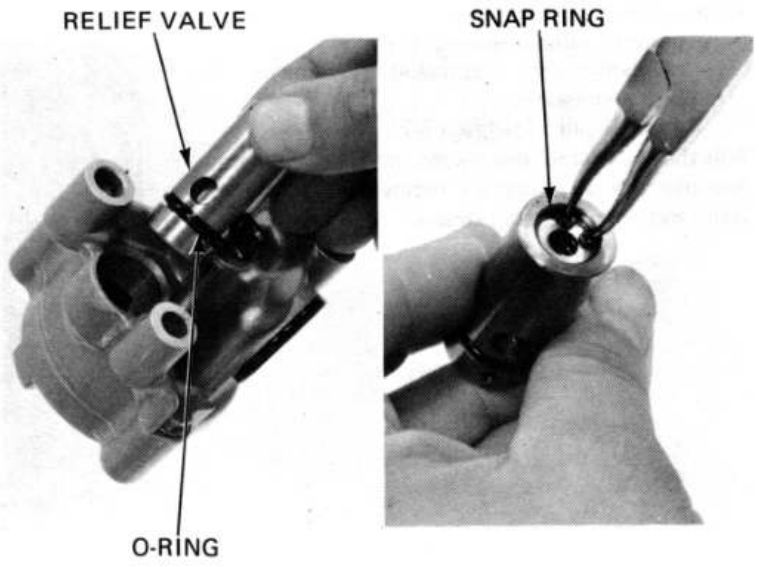
Clean the oil strainer with non-flammable solvent.



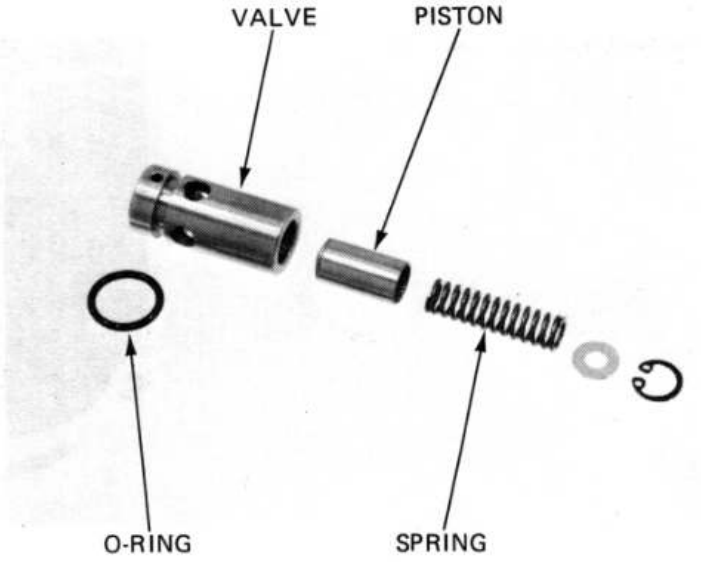
RELIEF VALVE CHECK

Remove the relief valve from the oil pump.
Make sure the O-ring is in good condition.

Remove the relief valve snap ring and disassemble the relief valve.

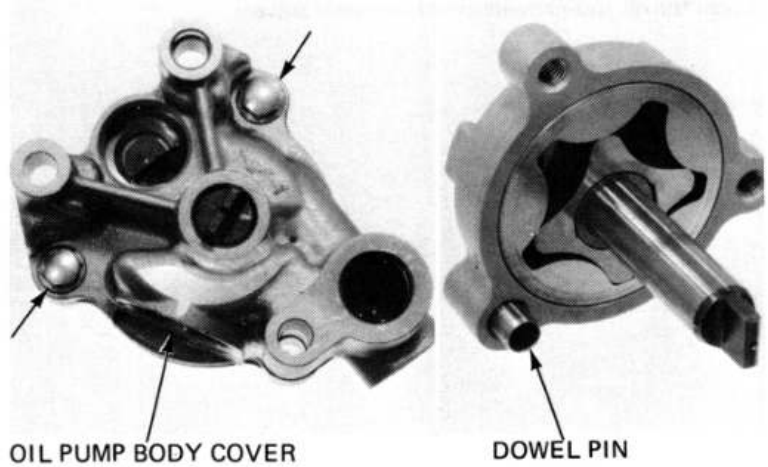


Check the spring and piston for wear or damage.
Check the valve for clogging or damage.
Assemble the parts in the reverse order of disassembly. Be sure to use new O-rings.



OIL PUMP DISASSEMBLY

Remove the oil pump body cover and remove the dowel pin.



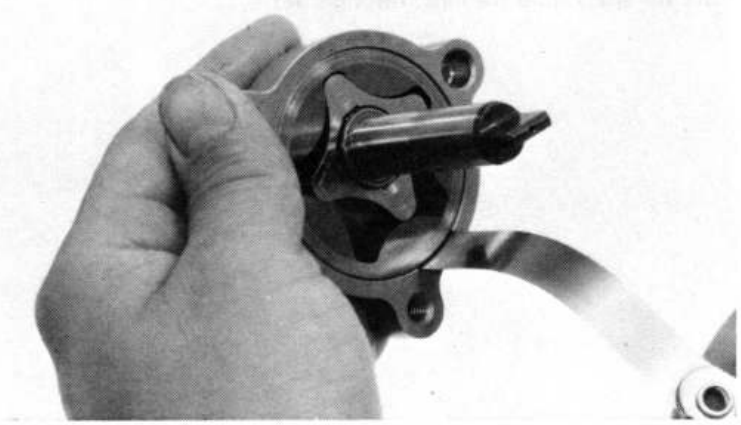
Measure the rotor tip clearance.

STANDARD: 0.15 mm (0.006 in)
SERVICE LIMIT: 0.20 mm (0.008 in)



Measure the pump body clearance.

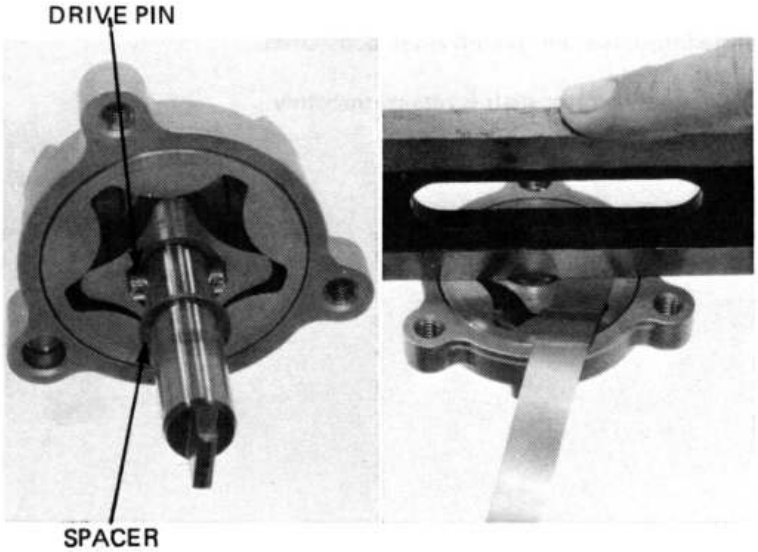
STANDARD: 0.15–0.22 mm (0.006–0.009 in)
SERVICE LIMIT: 0.35 mm (0.014 in)



Remove the spacer and drive pin from the rotor shaft.

Remove the rotor shaft and measure the pump end clearance.

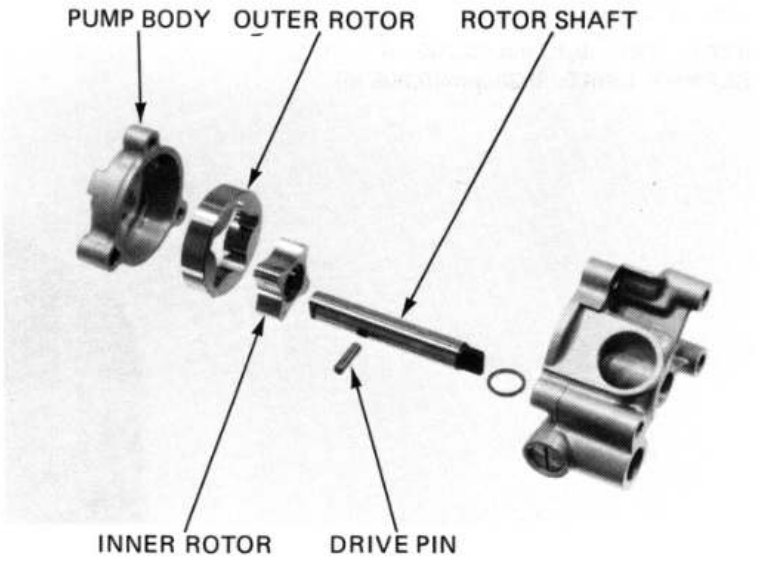
STANDARD: 0.02–0.07 mm (0.001–0.003 in)
SERVICE LIMIT: 0.10 mm (0.004 in)



ASSEMBLY

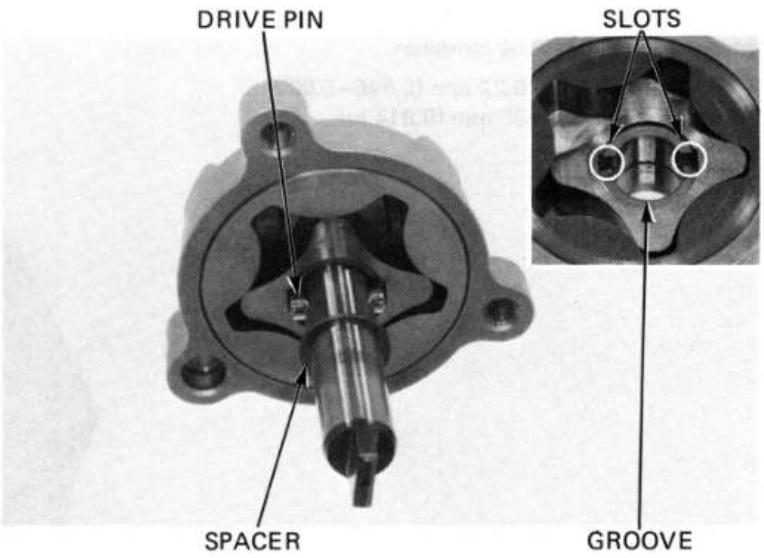
Install the outer rotor into the body and insert the rotor shaft.

Insert the drive pin into the rotor shaft.



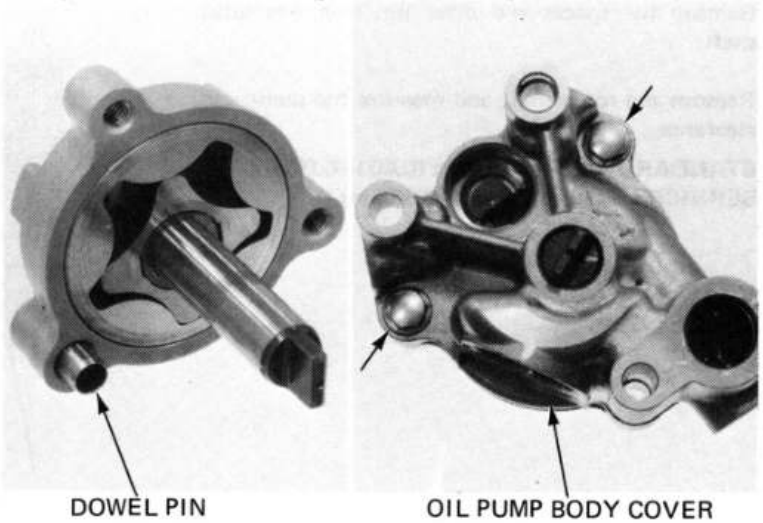
Align the slots in the inner rotor with the drive pin.

Placé the spacer into the inner rotor groove.



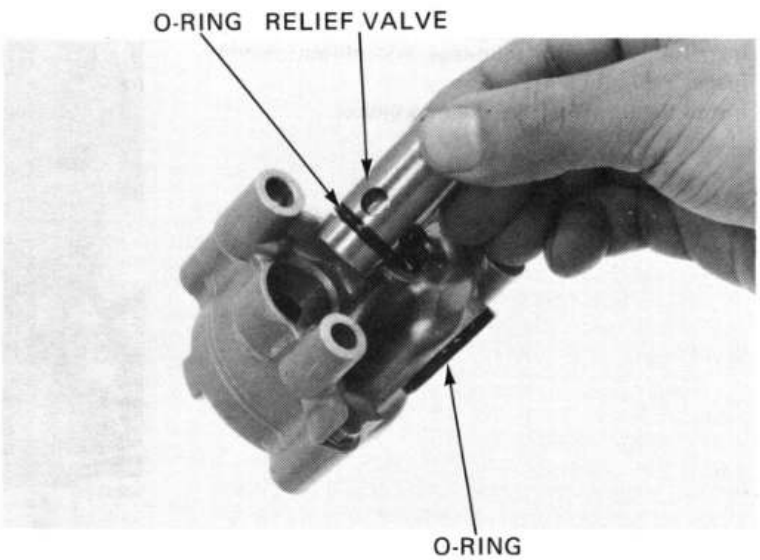
Install the dowel pin and oil pump body cover.

Make sure the rotor shaft is rotaing smoothly.



Install the relief valve with a new O-ring into the oil pump body.

Install a new O-ring into the oil strainer hole.



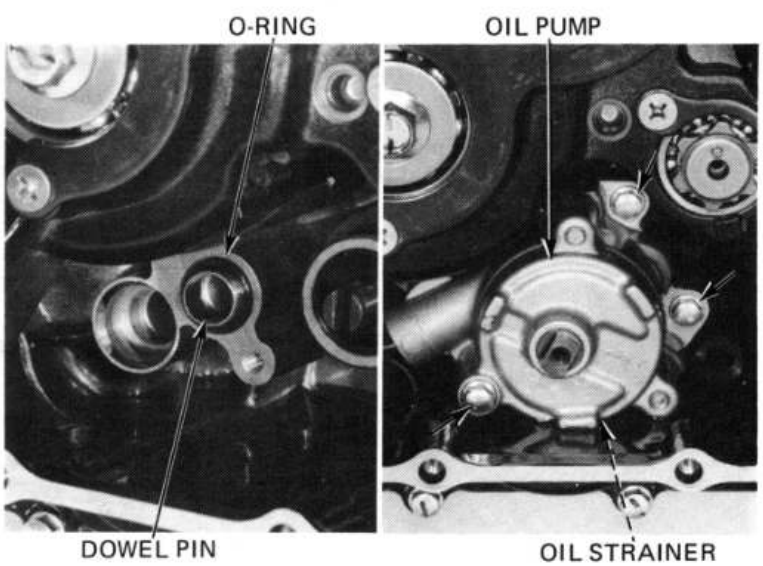
INSTALLATION

Install the dowel pin and a new O-ring.

Put the oil strainer into the crankcase, and then install the oil pump. Tighten the bolts.

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

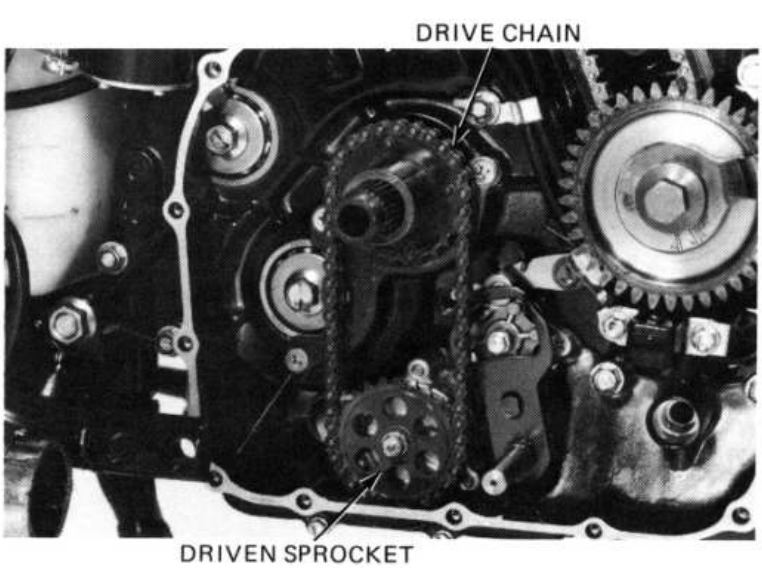
Install the oil strainer.



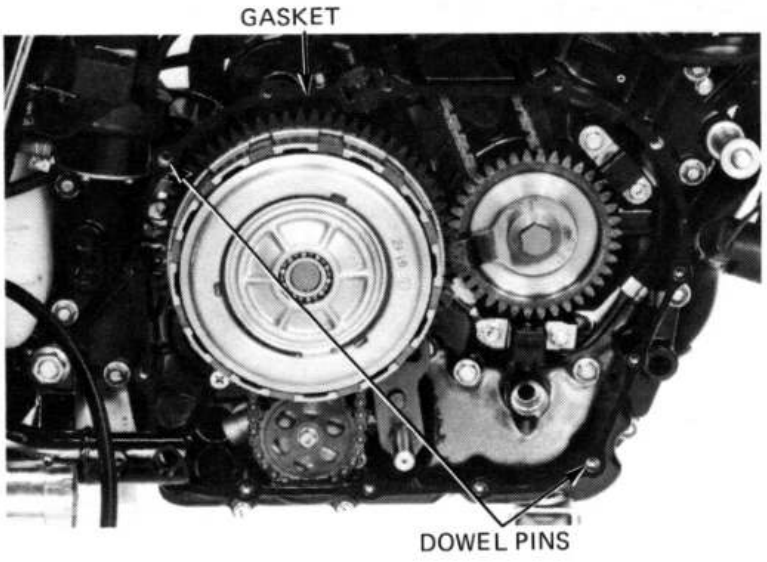
Place the oil pump driven sprocket into the drive chain. The "IN" mark on the driven sprocket should face the crankcase.

Install the washer and tighten the bolt.

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

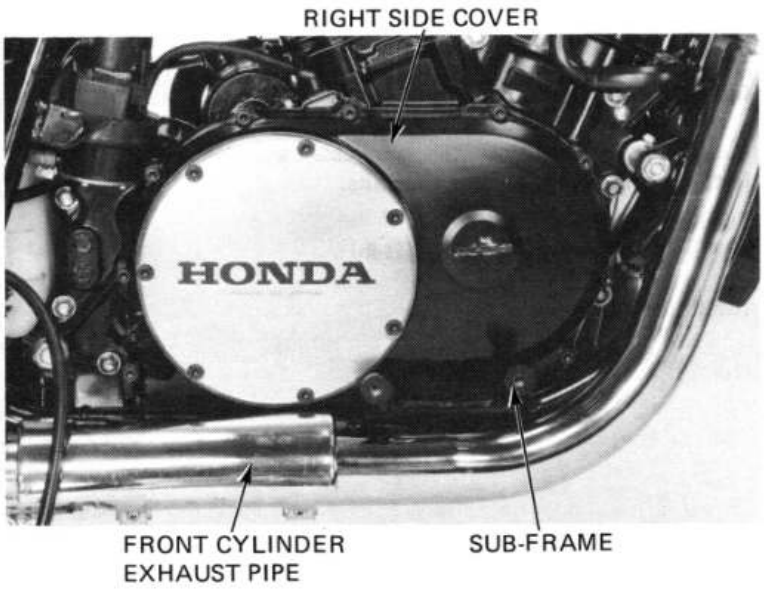


Install the gear shift linkage and clutch assembly (pages 7-17 and 9-4).
Install the dowel pins and a new gasket.



Install the following parts:
- right side cover.
- right sub-frame.
- front cylinder exhaust pipe.
- right foot peg with the rear brake pedal.

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



FINAL DRIVE OIL

CHECK

Place the motorcycle on its center stand on level ground.

Remove the oil filler cap.

Check that the oil level reaches the lower edge of the oil filler cap hole.

Check for leaks, if the level is low. Pour fresh oil through the oil filler hole until it reaches the lower edge.

CHANGE

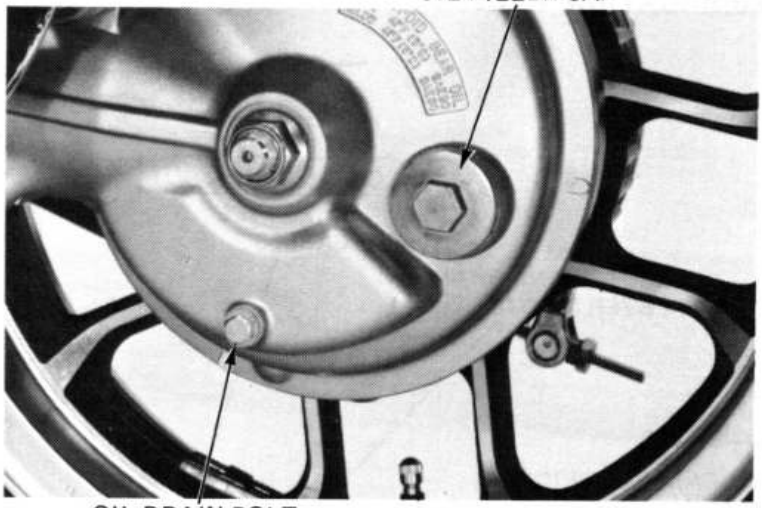
Remove the oil filler cap and drain bolt to drain all oil from the final gear case.

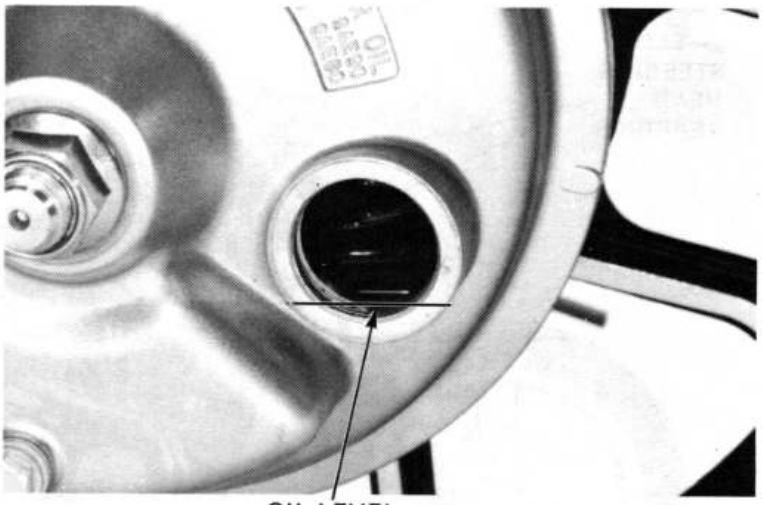
Install the drain bolt securely.

Fill the gear case with the recommended oil up to the correct level (above).

OIL CAPACITY: 130 cc (4.4 oz)
RECOMMENDED OIL:
'83:
HYPOID GEAR OIL API,
GL–5 SAE #90 (Above 5°C/41°F)
SAE #80 (Below 5°C/41°F)

After '83:
HYPOID GEAR OIL: SAE #80

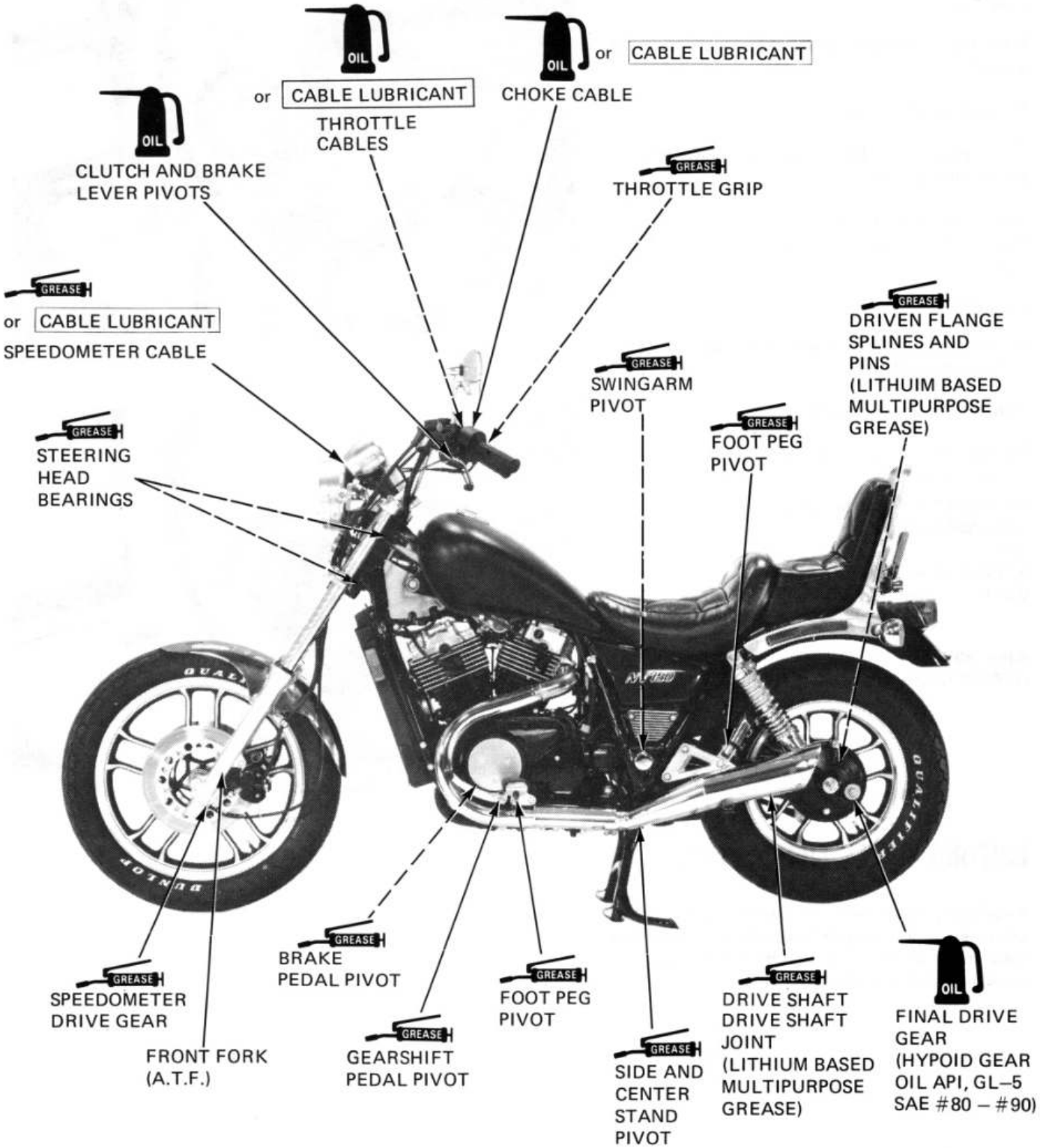




CONTROL CABLE LUBRICATION

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

LUBRICATION POINTS



3. MAINTENANCE

SERVICE INFORMATION	3–1	CYLINDER COMPRESSION	3–11
MAINTENANCE SCHEDULE	3–3	EVAPORATIVE EMISSION CONTROL SYSTEM	3–12
< ENGINE >		< CHASSIS >	
FUEL LINES	3–4	BATTERY	3–13
FUEL FILTER	3–4	BRAKE FLUID	3–13
THROTTLE OPERATION	3–5	BRAKE SHOE/PAD WEAR	3–14
CARBURETOR CHOKE	3–6	BRAKE SYSTEM	3–14
AIR CLEANER	3–7	BRAKE LIGHT SWITCH	3–16
CRANKCASE BREATHER	3–7	HEADLIGHT AIM	3–16
SPARK PLUGS	3–8	CLUTCH	3–16
IGNITION SYSTEM	3–8	SIDE STAND	3–17
CARBURETOR SYNCHRONIZATION	3–9	SUSPENSION	3–17
CARBURETOR IDLE SPEED	3–10	WHEELS	3–18
RADIATOR COOLANT	3–10	STEERING HEAD BEARINGS	3–19
RADIATOR CORE	3–11	NUTS, BOLTS, FASTENERS	3–19
COOLING SYSTEM HOSES & CONNECTIONS	3–11		

SERVICE INFORMATION

GENERAL

- Engine oil See page 2-3
- Engine oil filter See page 2-3
- Final drive gear oil See page 2-11

SPECIFICATIONS

< ENGINE >

Spark plugs:

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

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

Ignition timing		
At idle:	'83, '84:	5°BTDC
	After '84:	10°BTDC
Full advance:	'83, '84:	26°BTDC at 3,500 rpm
	After '84:	26°BTDC at 4,000 rpm
Idle speed:		900 ± 100 rpm
Carburetor synchronization:		Both carburetor within 40 mm (1.6 in) Hg of each other
Cylinder compression:		12 ± 2 kg/cm² (171 ± 28 psi)
Throttle grip free play:		2–6 mm (1/8–1/4 in)

< CHASSIS >

Rear brake pedal free play:	20–30 mm (3/4–1-1/4 in)
Front fork air pressure:	0–6 psi (0–40 kPa, 0–0.4 kg/cm²)

Tire:

Tire size		Front	Rear
		110/90–19 62H	140/90–15 70H
Cold tire pressure, psi (kPa, kg/cm²)	Up to 90 kg (200 lbs) load	32 (225, 2.25)	32 (225, 2.25)
	90 kg (200 lbs) load to vehicle capacity load	32 (225, 2.25)	40 (280, 2.80)
Tire brand	Bridgestone	L303	G508
	Dunlop	F11	K627C

TOOLS

Special:

Vacuum gauge set	07404–0020000 or M937B–021–XXXXX (U.S.A. only)

MAINTENANCE SCHEDULE

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

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

		ITEM	FREQUENCY: WHICHEVER COMES FIRST ➡ / EVERY ⬇	ODOMETER READING (NOTE 3) 600 mi (1,000 km)	4,000 mi (6,400 km)	8,000 mi (12,800 km)	12,000 mi (19,200 km)	16,000 mi (25,600 km)	20,000 mi (32,000 km)	24,000 mi (38,400 km)	Refer to page
EMISSION RELATED ITEMS	*	FUEL LINES				I		I		I	3-4
	*	FUEL FILTER								R	3-4
	*	THROTTLE OPERATION		I		I		I		I	3-5
	*	CARBURETOR-CHOKE				I		I		I	3-6
		AIR CLEANER	NOTE 1		C	C	C	C	C	C	3-7
		CRANKCASE BREATHER	NOTE 2		C	C	C	C	C	C	3-7
		SPARK PLUGS			R	R	R	R	R	R	3-8
		ENGINE OIL	YEAR	R		R		R		R	2-3
		ENGINE OIL FILTER	YEAR	R		R		R		R	2-3
	*	CARBURETOR-SYNCHRONIZATION		I		I		I		I	3-9
	*	CARBURETOR-IDLE SPEED		I	I	I	I	I	I	I	3-10
		RADIATOR COOLANT				I		I		*R	3-10
	*	RADIATOR CORE				I		I		I	3-11
	*	COOLING SYSTEM HOSES & CONNECTIONS		I		I		I		I	3-11
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 3			I		I		I	3-12
NON-EMISSION RELATED ITEMS		FINAL DRIVE OIL				I		I		R	2-11
		BATTERY	MONTH	I	I	I	I	I	I	I	3-13
		BRAKE FLUID (FRONT)	MONTH I 2 YEARS* R	I	I	I	*R	I	I	*R	3-13
		BRAKE SHOE/PAD WEAR			I	I	I	I	I	I	3-14
		BRAKE SYSTEM		I		I		I		I	3-14
	*	BRAKE LIGHT SWITCH		I		I		I		I	3-16
	*	HEADLIGHT AIM		I		I		I		I	3-16
		CLUTCH FLUID	MONTH I 2 YEARS* R	I	I	I	*R	I	I	*R	3-16
		CLUTCH SYSTEM		I		I		I		I	3-16
		SIDE STAND				I		I		I	3-17
	*	SUSPENSION		I		I		I		I	3-17
	*	NUTS, BOLTS, FASTENERS		I		I		I		I	3-19
	**	WHEELS		I		I		I		I	3-18
	**	STEERING HEAD BEARINGS		I		I		I		I	3-19

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

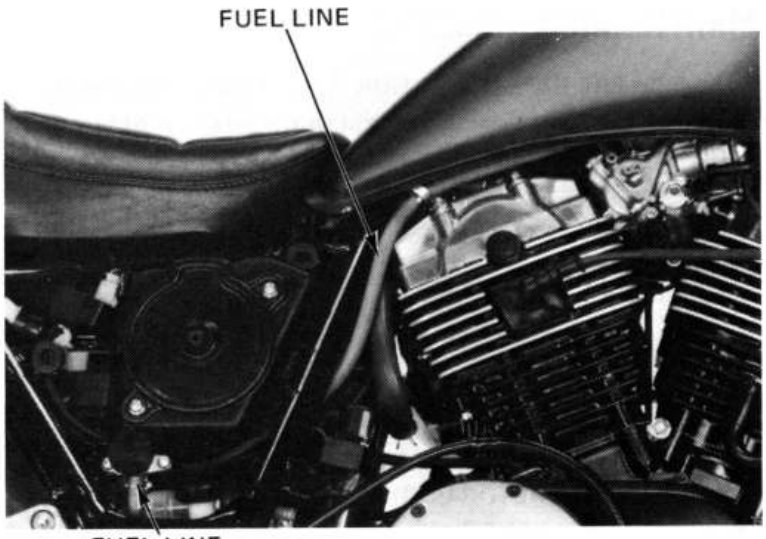
** IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTE: 1. SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.
2. SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE (U.S.A. ONLY).
3. '84 CALIFORNIA NODEL.
4. FOR HIGHER ODOMETER READING, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.

FUEL LINES

Check the fuel lines for deterioration, damage, or leakage.

Replace if necessary.



FUEL FILTER

Turn the fuel valve OFF.
Remove the right side cover, radiator reserve tank cap and pull out the fuel filter.
Clamp the fuel line between the fuel filter and fuel pump shut.

Disconnect the fuel lines from the filter.

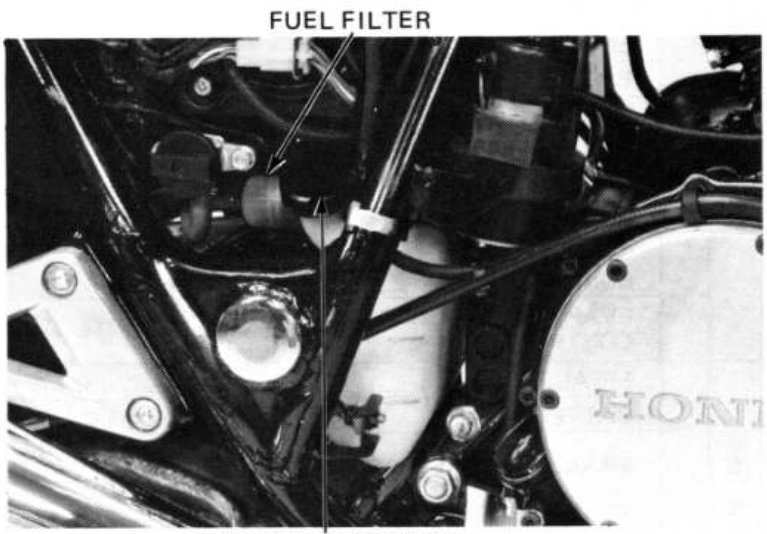
Replace the fuel filter with a new one when indicated by the maintenance schedule. (See page 3-3).

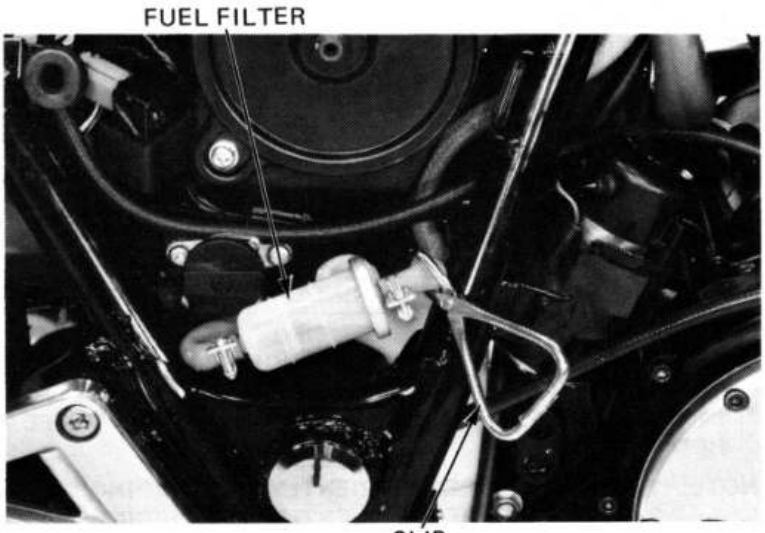
WARNING

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

Install the removed parts and remove the clip.

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





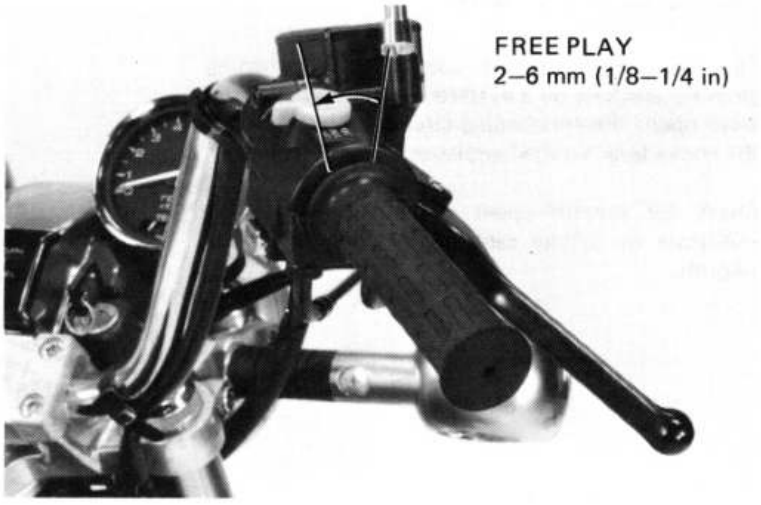
THROTTLE OPERATION

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

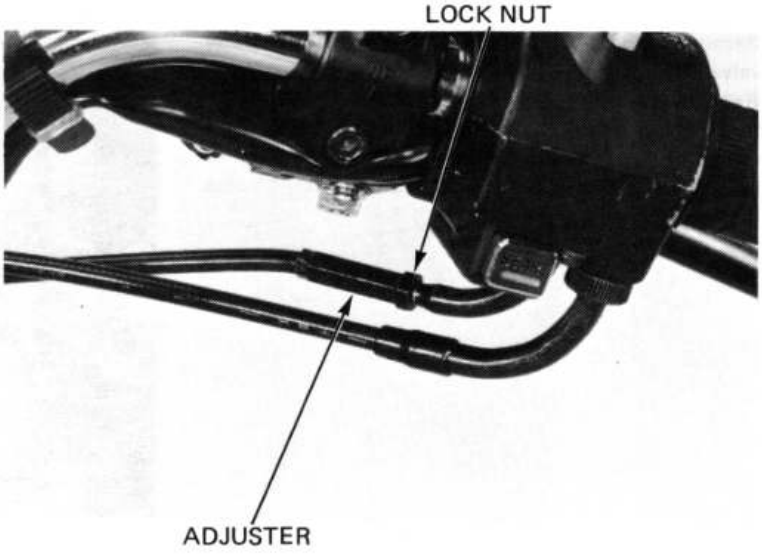
Make sure there is no deterioration, damage, or kinking in the throttle cables. Replace any damaged parts.
Lubricate the throttle cables (page 2-12), if throttle operation is not smooth.

Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2–6 mm (1/8–1/4 in)



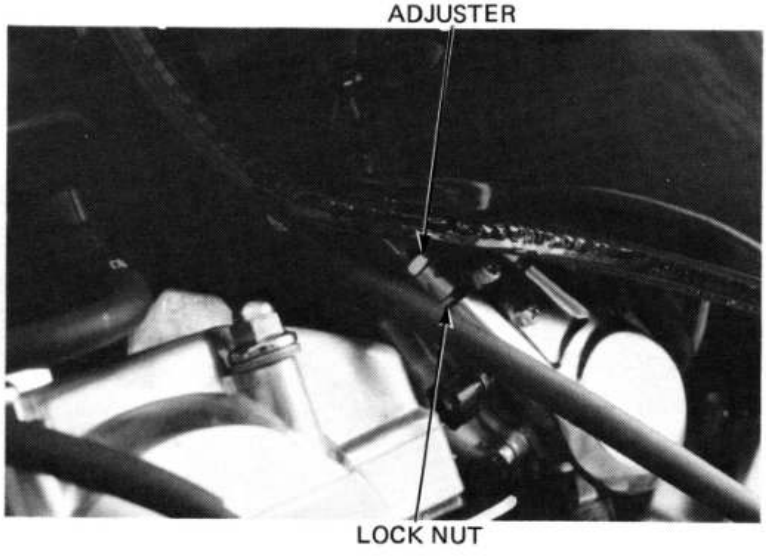
Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.



Major adjustments are made with the lower adjuster.

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

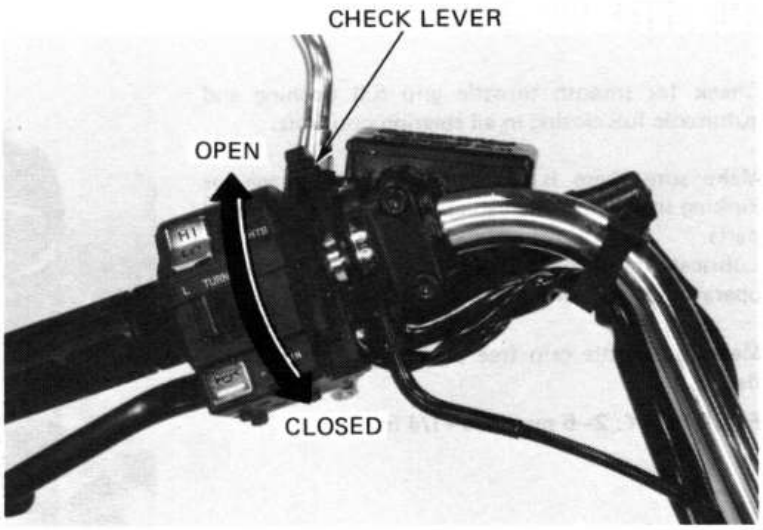
Recheck throttle operation.



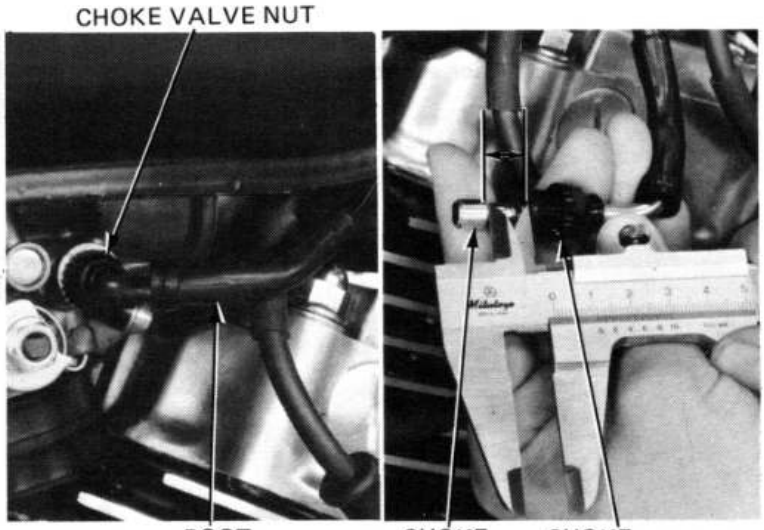
CARBURETOR CHOKE

This model choke system uses a fuel enrichening circuit controlled by a bystarter valve. The bystarter valve opens the enrichening circuit via a cable when the choke lever on the handlebar is pushed up.

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



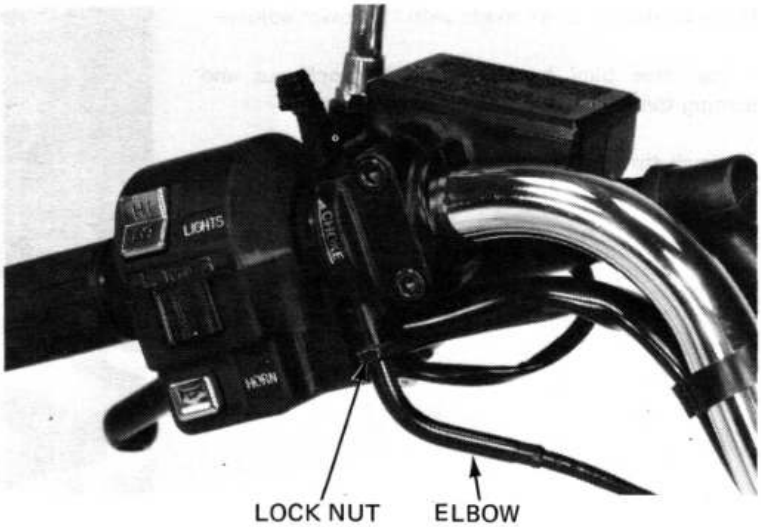
Remove the choke cable boots and loosen the choke valve nuts on the carburetors.
Remove the choke valve from the carburetor.
Push the choke lever on the handlebar all the way down to fully closed and make sure the distance between the nut's threads and valve is 10–11 mm (0.39–0.43 in).



Adjust within specifictions by loosening the lock nut and turning the cable's elbow at the clutch housing. Tighten the lock nut. Recheck the distance.

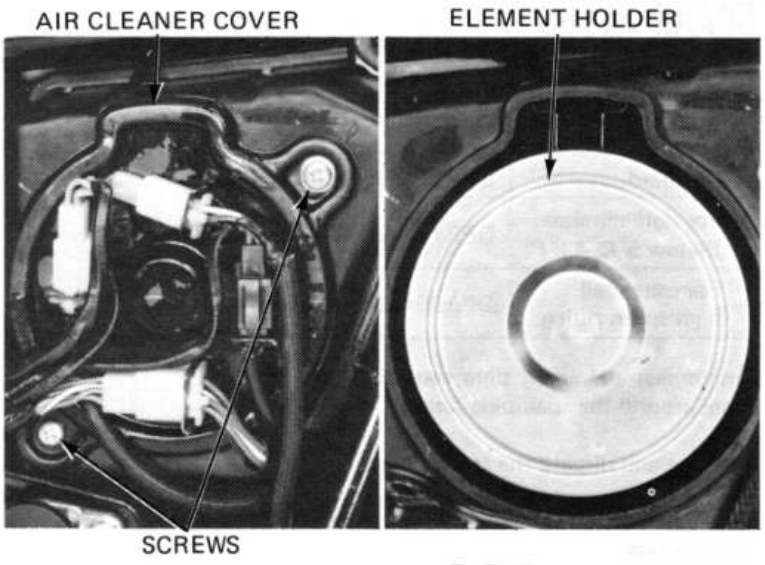
Thread the choke valve in by hand and then tighten the choke valve nut 1/4 turn with a 14 mm wrench. Install the choke cable boots.

Reinstall the removed parts in the reverse order of disassembly.



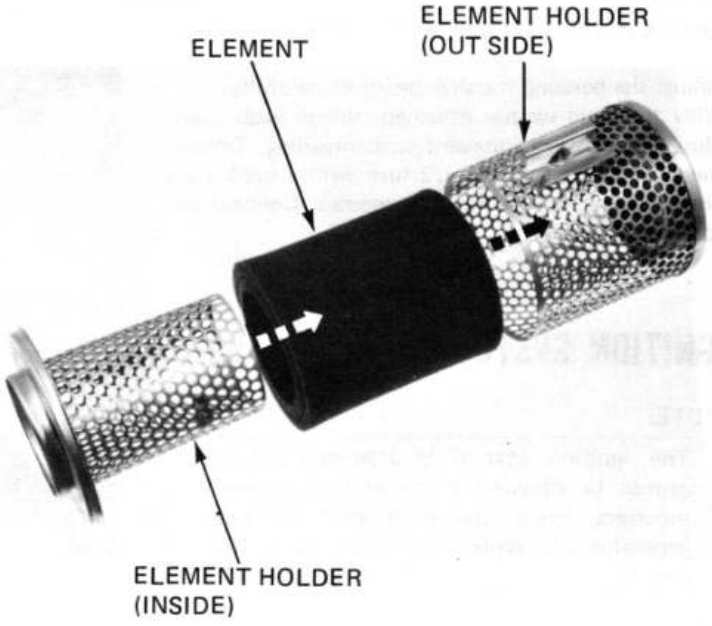
AIR CLEANER

Remove the right side cover.
Remove the air cleaner cover screws and cover.
Pull the air cleaner element holder out of the air cleaner case.



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

Install the removed parts in the reverse order of diassembly.



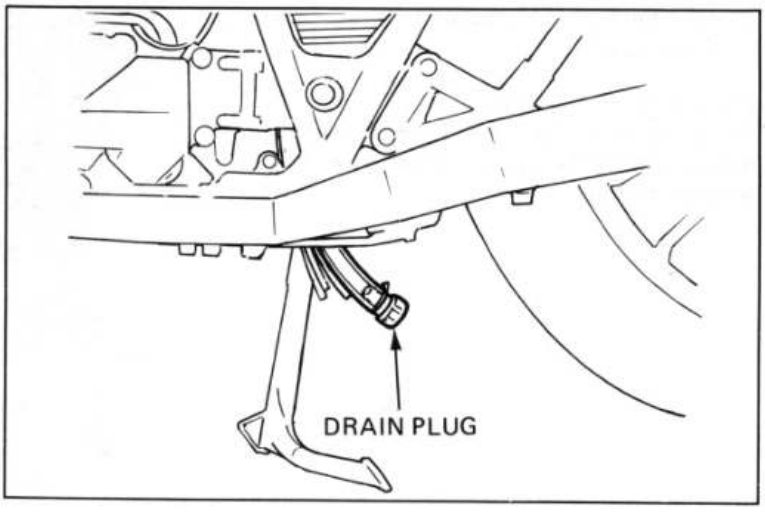
CRANKCASE BREATHER

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

Install the drain plug.

NOTE:

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



SPARK PLUGS

RECOMMENDED SPARK PLUGS

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

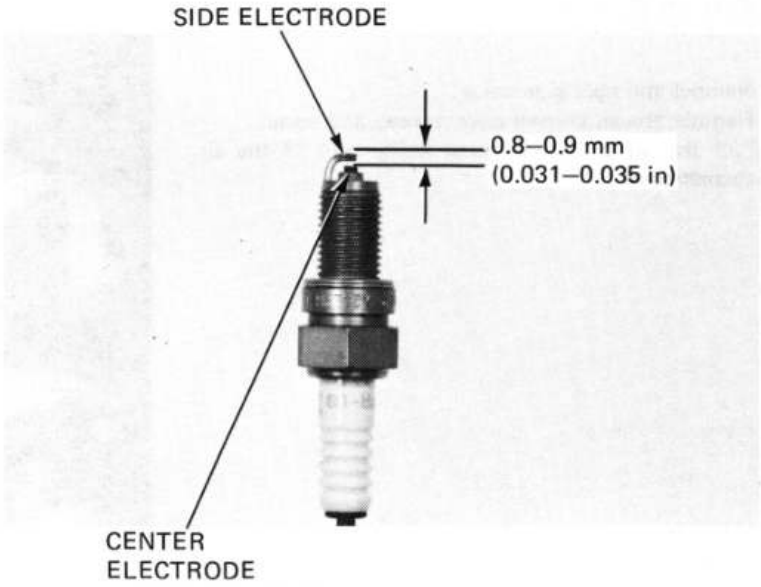
Disconnect the spark plug caps and clean any dirt from around the spak plug bases.

Remove and discard the spark plugs.

Measure the new spark plug gaps using a wire-type feeler gauge.

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

Adjust the bending the side electrode carefully.
With the plug washer attached, thread each spark plug in by hand to prevent crossthreading. Tighten the spark plugs another 1/2 turn with a spark plug wrench to compress the plug washer. Connect the spark plug caps.



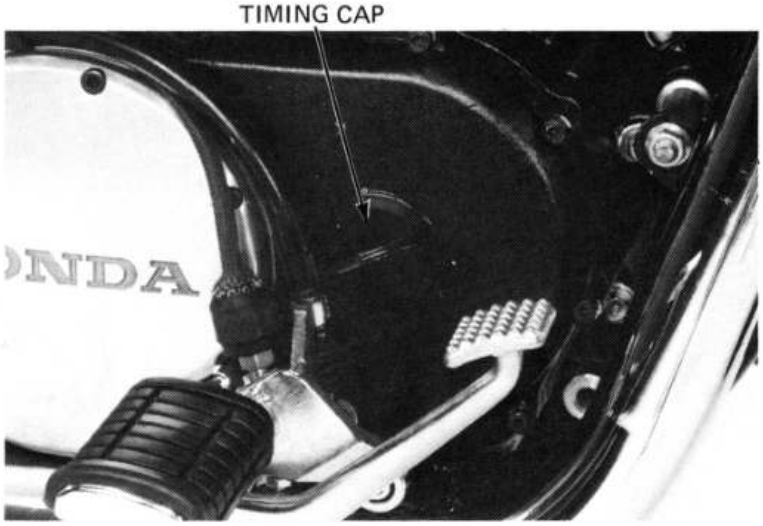
IGNITION SYSTEM

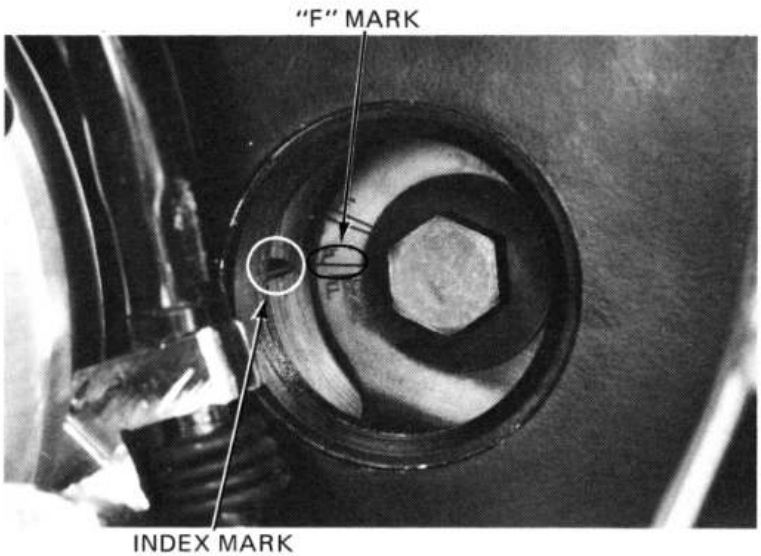
NOTE:

> 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 (Section 19).

Warm up the engine
Remove the timing inspection hole cap on the right crankcase cover.

Connect the timing light.
The timing is correct if the "F" mark aligns with the index mark on the right crankcase cover at 900 rpm for each cylinder.



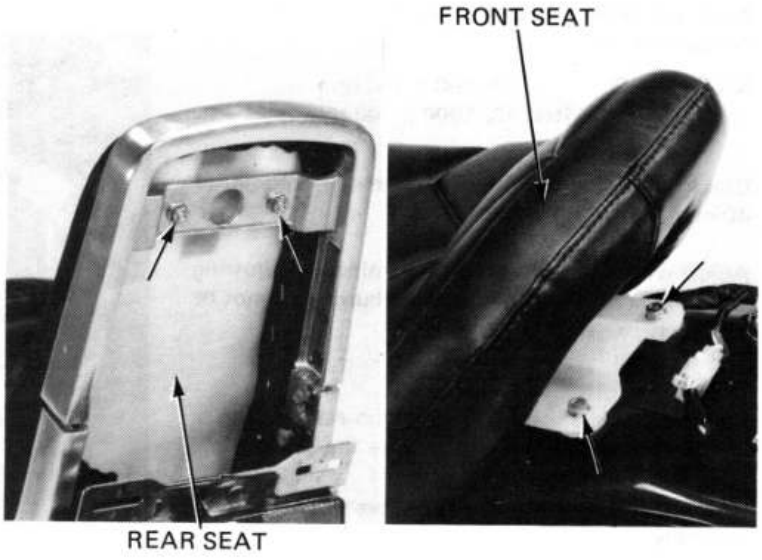


CARBURETOR SYNCHRONIZATION

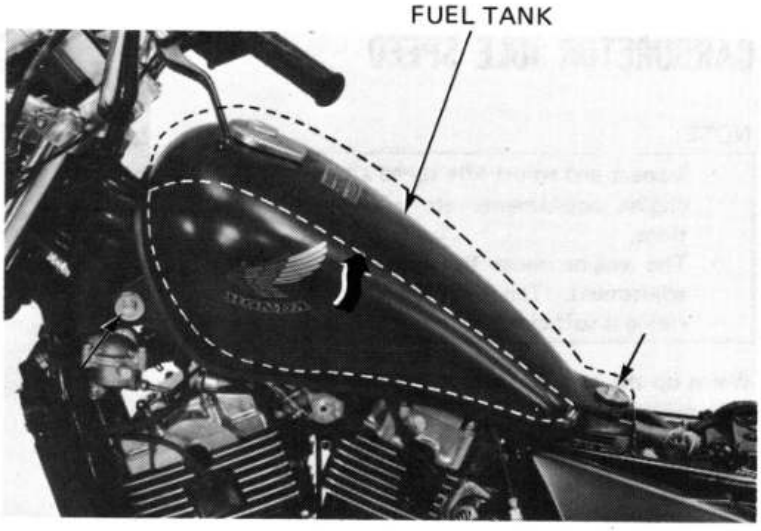
NOTE:

> Perform this maintenance with the engine at normal operating temperature, transmission in neutral, and motorcycle on its center stand.

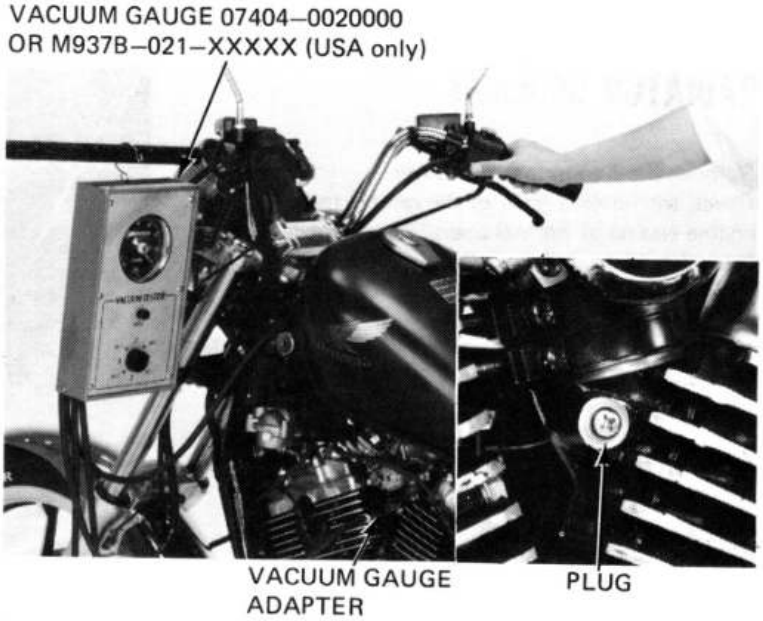
Unlock and remove the tool box at the back of the rear seat with the key.
Remove the rear and front seats.



Move the fuel tank back about 25–50 mm (1–2 in) removing the fuel tank mounting bolts.
Let it rest on the frame.



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



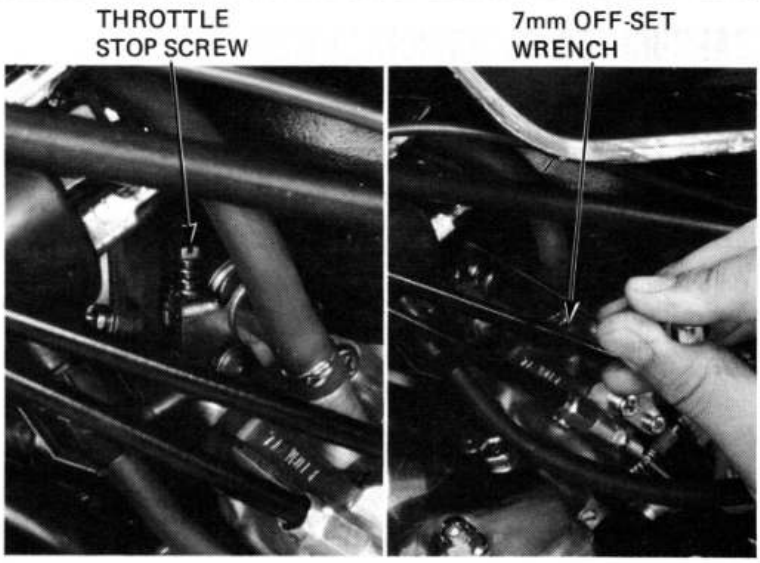
Warm up the engine and adjust the idle speed with the throttle stop screw.

IDLE SPEED: **'83: 900 ± 100 rpm**
After '83: 1000 ± 100 rpm

Check that the difference in vacuum readings is 40 mm (1.6 in) Hg or less.

Adjust within specifications by turning the adjusting screw, if necessary. The No. 1 carburetor cannot be adjusted.
It is the base.

Recheck the idle speed and synchronization.
Disconnect the gauges and remove the gauge adapters from the ports.
Install the removed parts in the reverse order of disassembly.

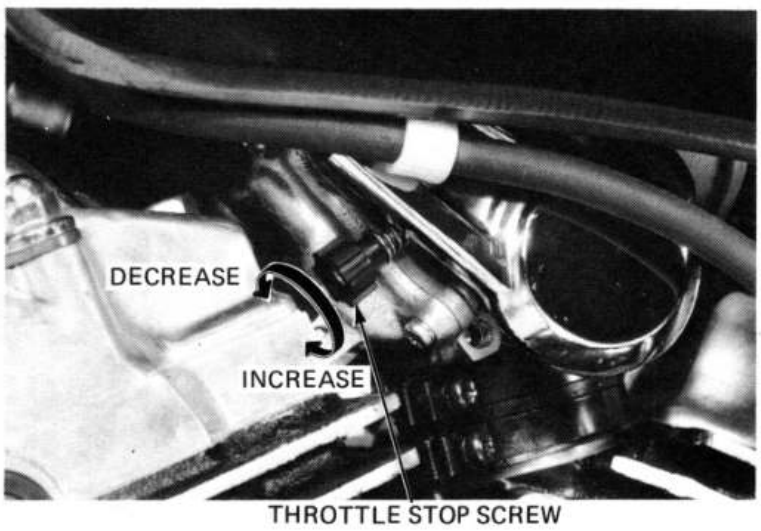


CARBURETOR IDLE SPEED

NOTE:

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

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



RADIATOR COOLANT

Remove the frame right side cover.
Check the coolant level of the reserve tank with the engine runing at normal operating temperature. The level should be between the "FULL" and "LOW" level lines.

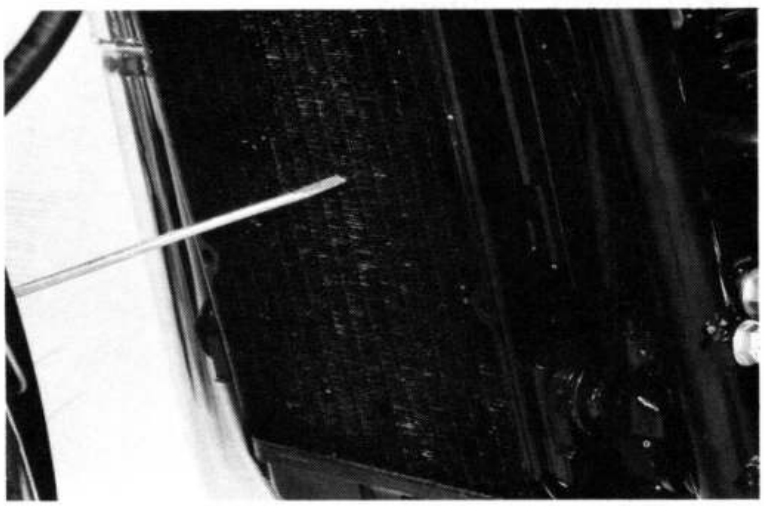
If necessary, remove the reserve tank cap and fill to the "FULL" level line with a 50/50 mixture of distilled water and anti-freeze.

Reinstall the cap and frame side cover.



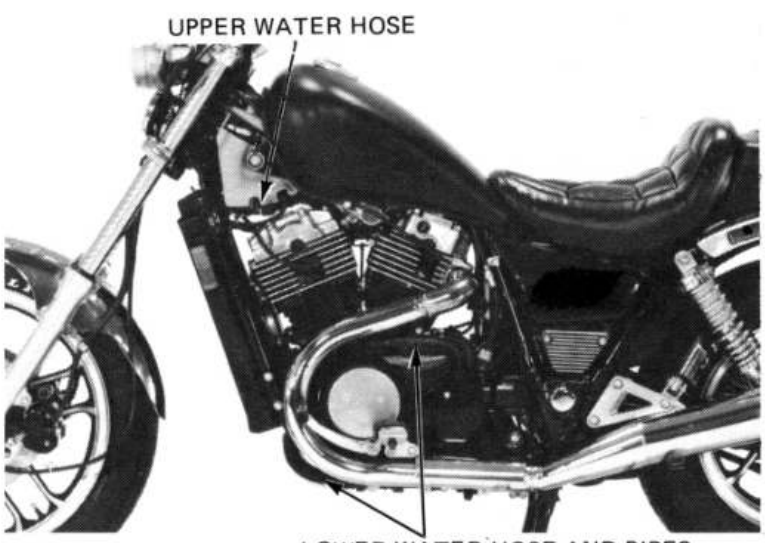
RADIATOR CORE

Check the air passages for clogging or damage.
Straighten bent fins or collapsed core tubes.
Remove insects, mud or any obstructions with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



COOLING SYSTEM HOSES & CONNECTIONS

Make sure the hoses are in good condition; they should not have any signs of deterioration.
Replace any hose that does.
Check that all hose clamps are tight.



CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine, disconnect both spark plug caps and remove one spark plug from each cylinder.

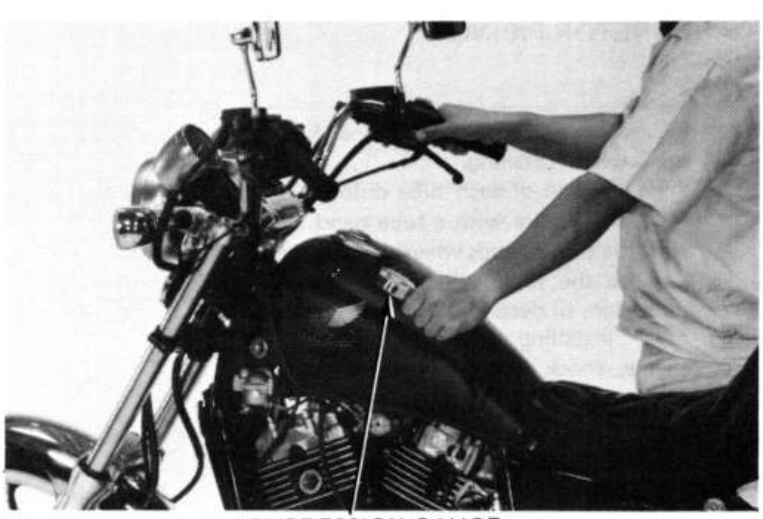
Insert the compression gauge. Open the throttle all the way and crank the engine with the starter motor. Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

COMPRESSION PRESSURE:
12 ± 2 kg/cm² (171 ± 28 psi)

If compression is low, check for the following:

- Leaky valves
- Leaking cylinder head gasket
- Worn piston/ring/cylinder.

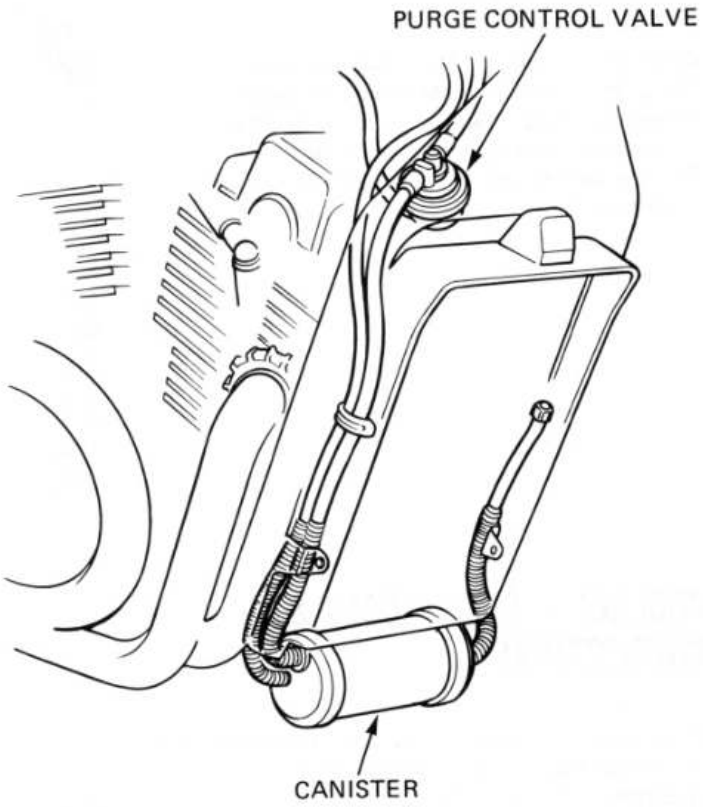
If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.



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

Check all hoses to be sure they are securely connected and not kinked. Repalce any hose that shows signs of deterioration.

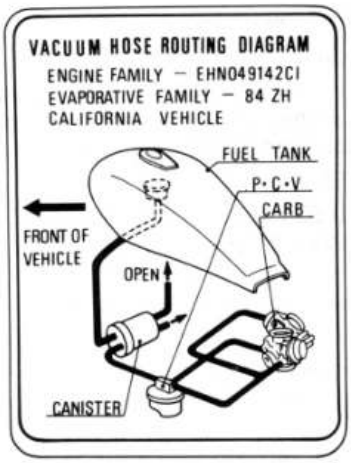
Check the canister for cracks or damage.



CARBURETOR PIPING

NOTE:

- Be careful not to bend, twist or kink the tubes when installing.
- Slide the end of each tube onto its fitting fully and secure with a tube band. Secure with the tube clamps whenever specified.
- Replace the tubes with new ones if they show signs of deterioration or damage.
- After installing the carburetor on the engine, check that the tubes are not contacting sharp edges or corners.



BATTERY

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

Remove the regulator/rectifier holder bolt and open the holder.

Disconnect the negative cable at the battery terminal. The remove the positive cable.

Pull out the battery and add distilled water to the upper level line.

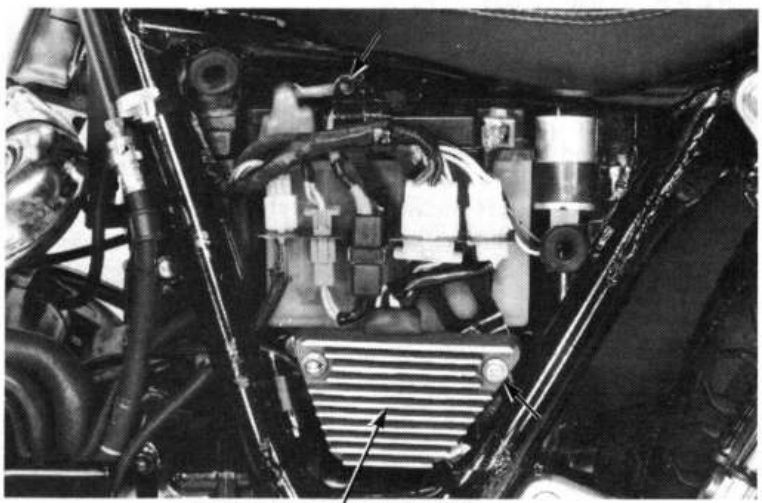
Reinstall the battery.

NOTE:

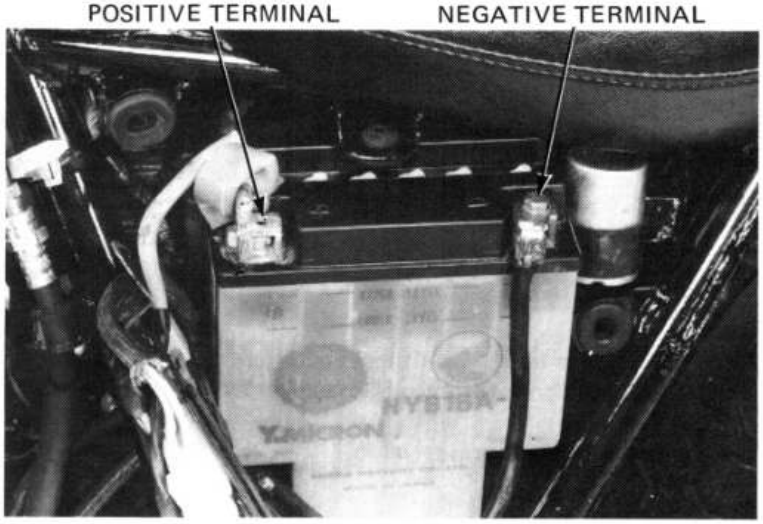
Add only distilled water. Tap water will shorten the service life of the battery.

WARNING

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



REGULATOR/RECTIFIER HOLDER



BRAKE FLUID

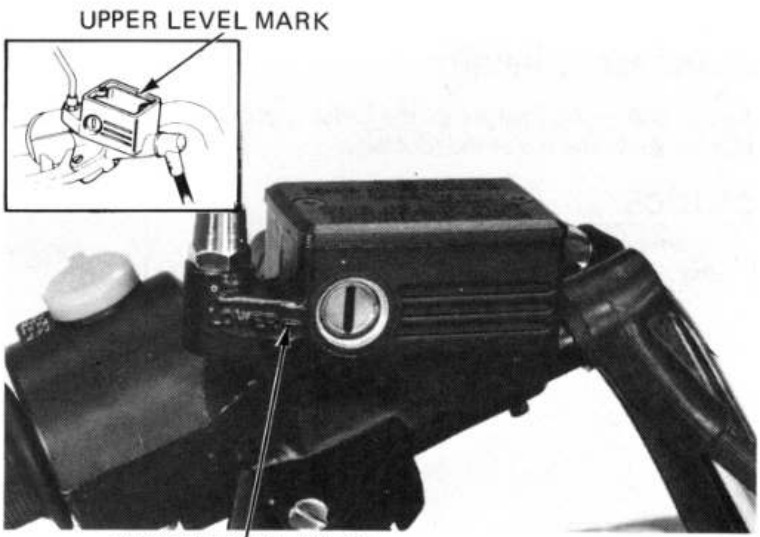
Check the front brake fluid reservoir level. If the level nears the lower level mark remove the cover and diaphram. Fill the reservoir with DOT-3 Brake Fluid to the upper level mark located inside the reservoir.

Check the entire system for leaks, if the level is low.

CAUTION:

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

Refer to section 17 for brake bleeding procedures.



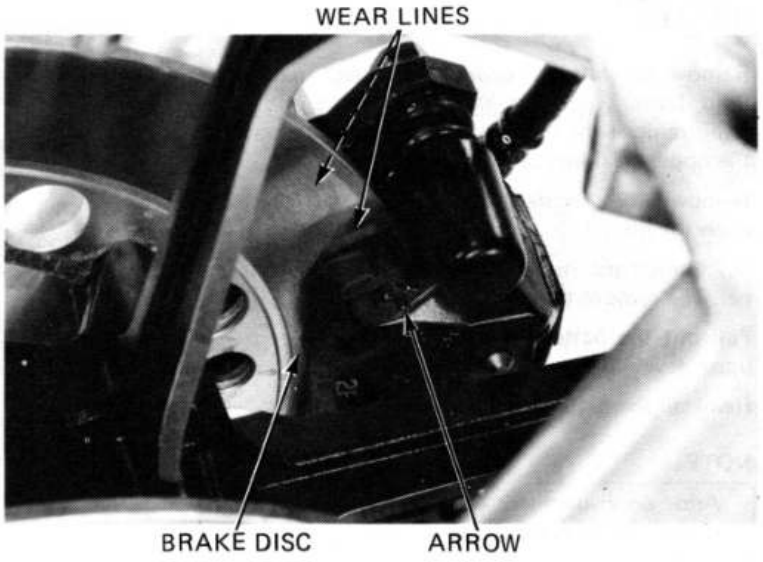
BRAKE SHOE/PAD WEAR

BRAKE PAD WEAR

Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly.
Replace the brake pads if the wear line on the pads reaches the edge of the brake disc (page 17-5).

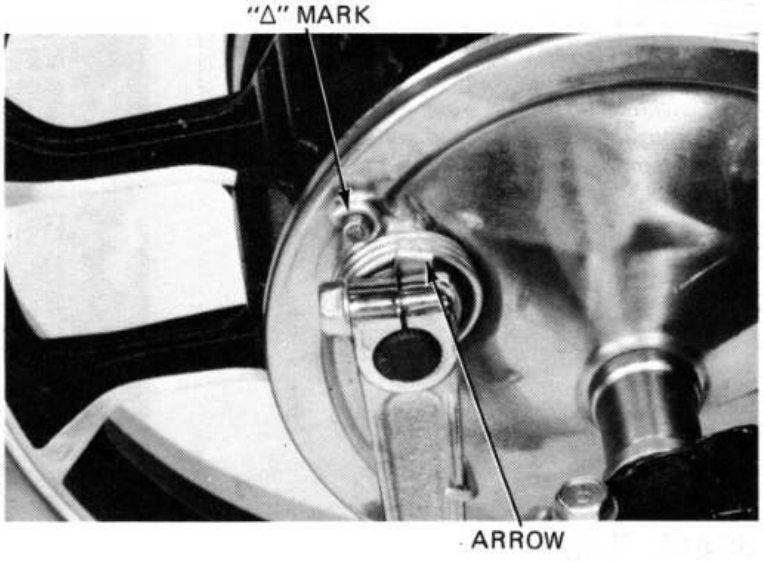
CAUTION:

Always replace the brake pads as a set to assure even disc pressure.



BRAKE SHOE INSPECTION

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



BRAKE SYSTEM

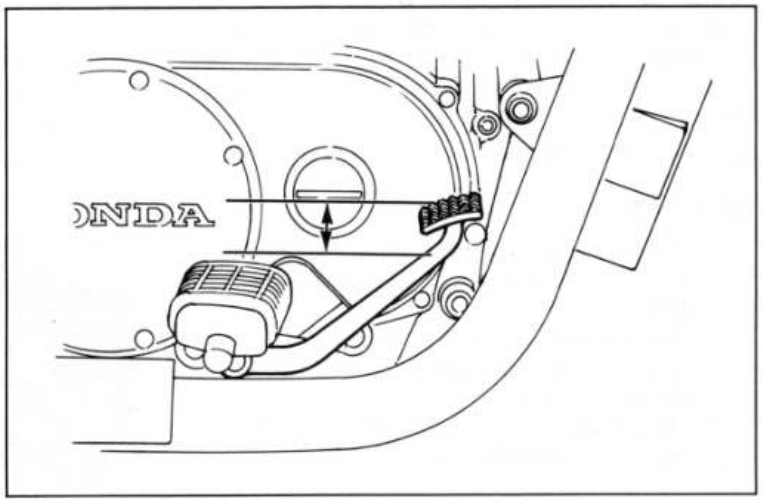
Inspect the brake hoses and fittings for deterioration, cracks and signs of leakage. Tighten any loose fittings.
Replace hoses and fittings as required.

BRAKE PEDAL HEIGHT

Adjust brake pedal height so the pedal is 20 mm (3/4 in) above the top of the foot peg.

CAUTION:

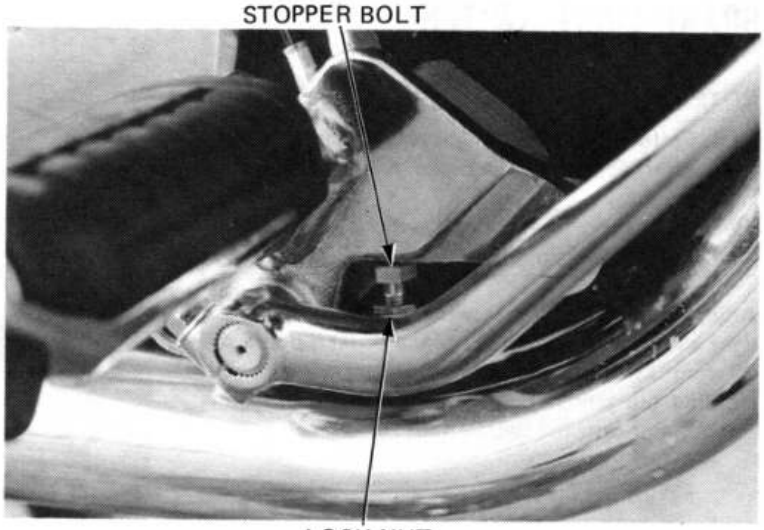
Incorrect brake pedal height can cause brake drag.



To Adjust:
Loosen the stopper bolt lock nut and turn the stopper bolt.
Retighten the lock nut.

NOTE:

> After adjusting the brake pedal height, check the rear brake light switch and brake pedal free play and adjust if necessary.



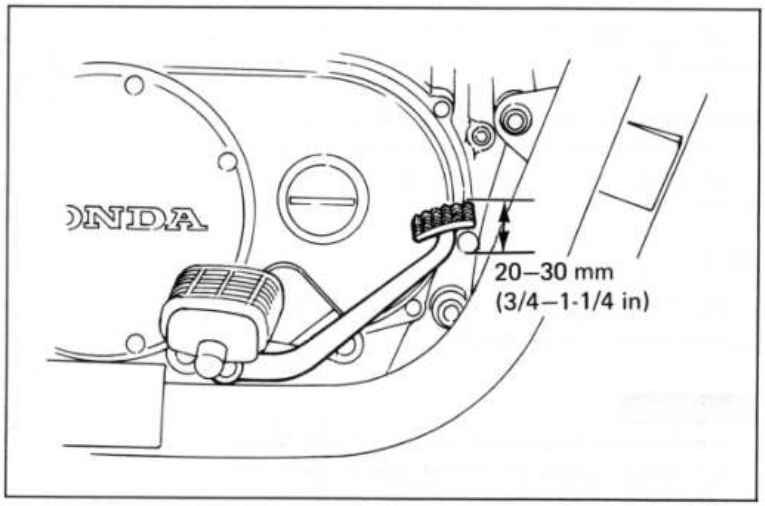
BRAKE PEDAL FREE PLAY

NOTE:

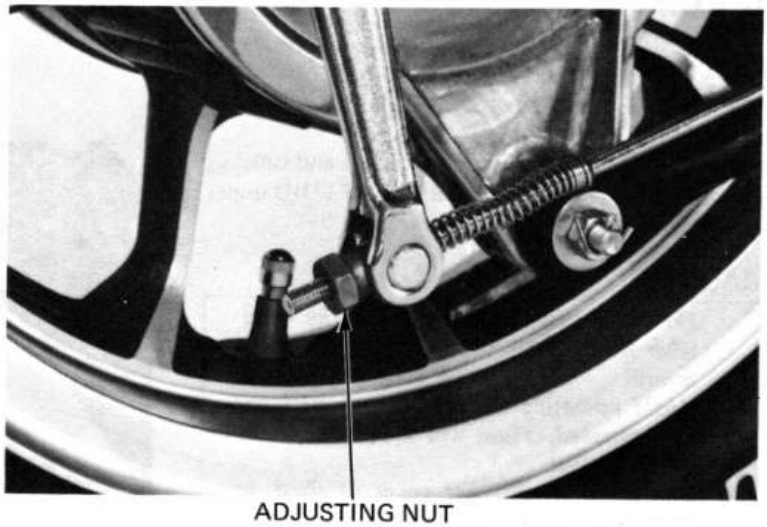
> Perform brake pedal free play adjustment after adjusting brake pedal height.

Check the brake pedal free play.

FREE PLAY: 20–30 mm (3/4–1-1/4 in)



If adjustment is necessary, turn the rear brake adjusting nut.

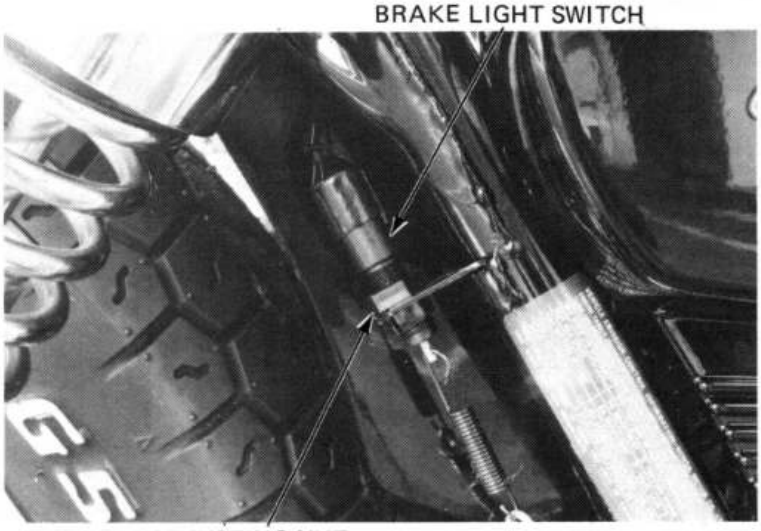


BRAKE LIGHT SWITCH

NOTE:

- Perform rear brake light switch adjustment after adjusting the brake pedal play and height.
- The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light will come on when the brake pedal is depressed 20 mm (3/4 in), and brake engagement begins. Holding the switch body and turning the adjusting nut. Do not turn the switch body.



HEADLIGHT AIM

Adjust vertically by loosening both headlight case mounting bolts.

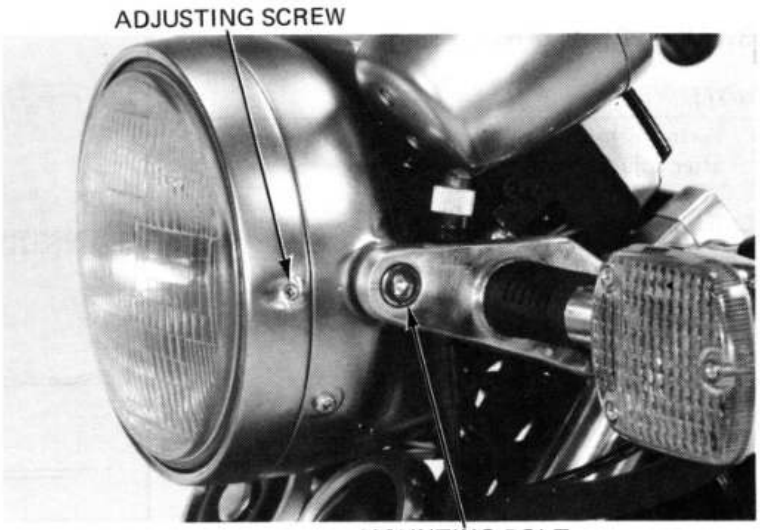
Adjust horizontally by turning the adjusting screw on the headlight rim. Turn the adjusting screw clockwise to direct the beam toward the right side of the rider.

NOTE:

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

WARNING

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

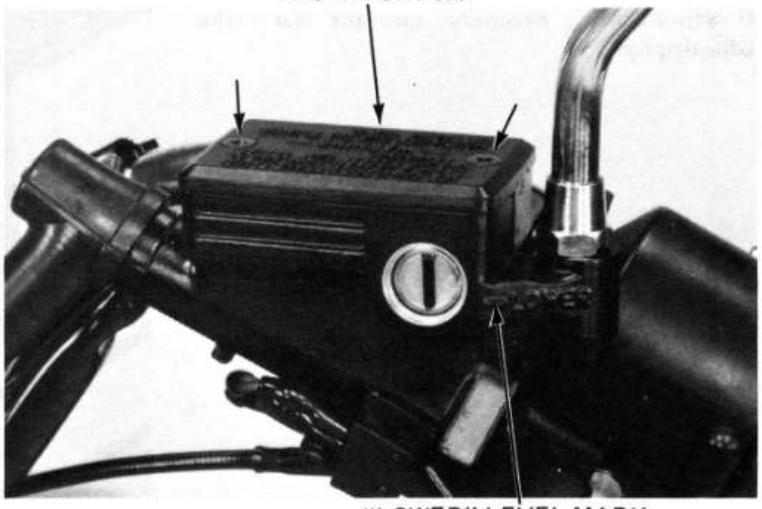


CLUTCH

Check the clutch fluid level.
If the level is under the lower level mark, check the clutch system for leak.
Remove the reservoir cap mount screws and cap.
Fill the reservoir with DOT-3 BRAKE FLUID upper the lower level mark.

CAUTION:

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



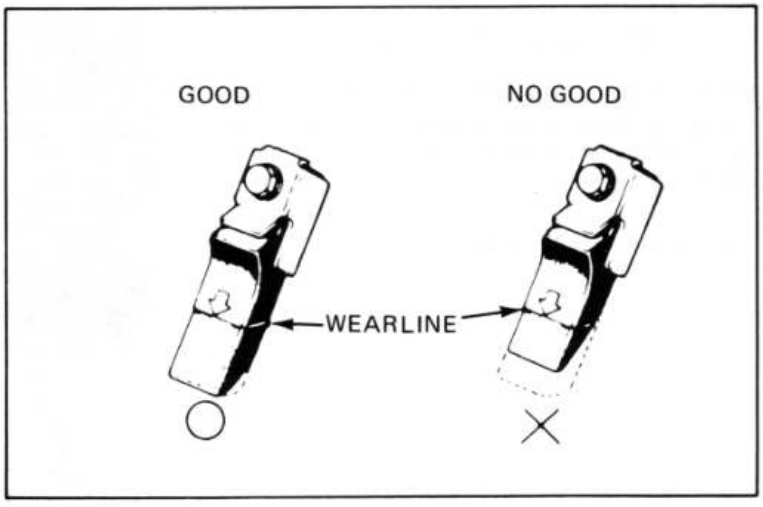
SIDE STAND

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

Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement. Make sure the side stand is not bent.

NOTE:

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



SUSPENSION

WARNING

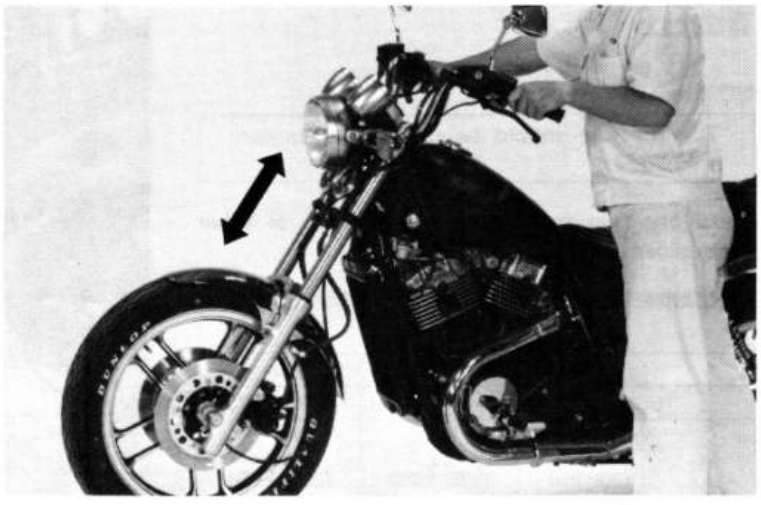
Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts impair vehicle stability and control.

FRONT

Check the action of the front forks by compressing them several times.

Check the entire fork assembly for leaks or damage. Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

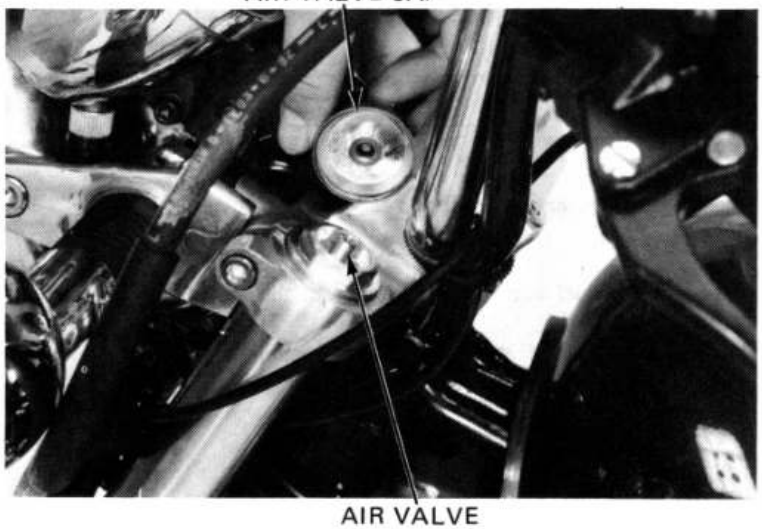


Check the front fork air pressure when the forks are cold.

Place the vehicle on its center stand.

Remove each air valve cap and measure the air pressure.

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

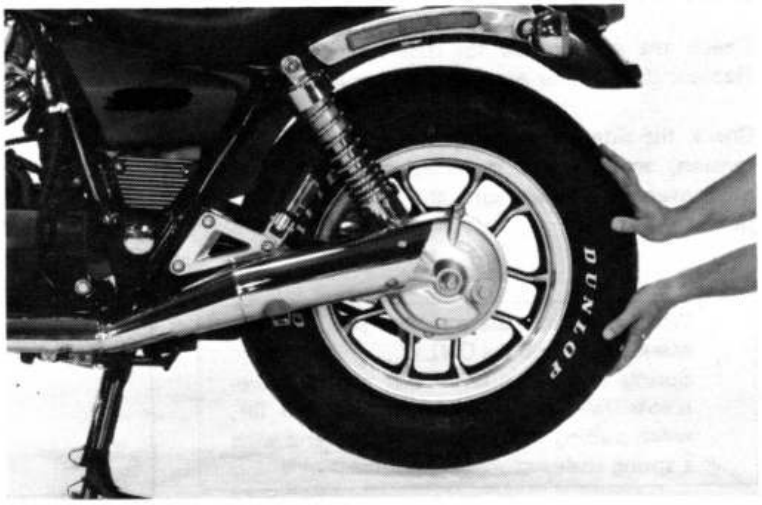


REAR

Place the motorcycle no its center stand.

Move the rear wheel sideways with force to see if the swingarm bearings are worn. Replace the bearings if there is any looseness (page 16-5).
Check the shock absorbers for leaks or damage.

Tighten all rear suspension nuts and bolts.



WHEELS

NOTE:

> Tire pressure should be checked when tires are COLD.

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

RECOMMENDED TIRES AND PRESSURES:

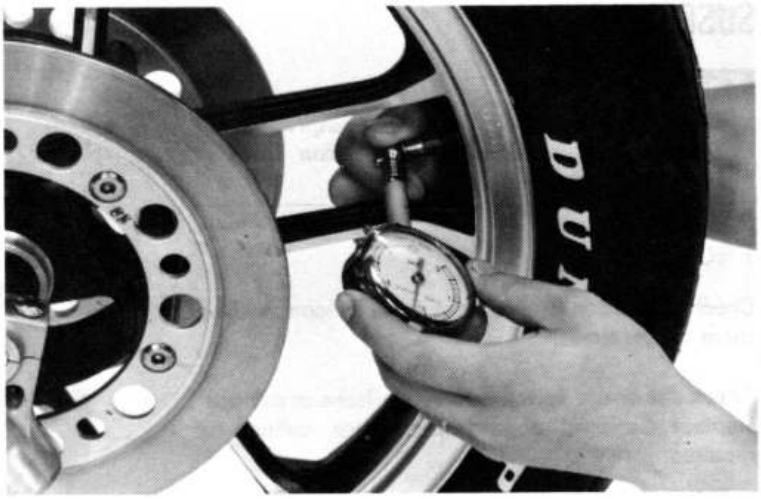
		Front	Rear
Tire size		110/90-19 62H	140/90-15 70H
Cold tire pressure psi (kPa, kg/cm²)	Up to 90 kg (200 lbs) load	32 (225, 2.25)	32 (225, 2.25)
	90 kg (200 lbs) load to vehicle capacity load	32 (225, 2.25)	40 (280, 2.8)
Tire brand	BRIDGE-STONE	L303	G508
	DUNLOP	F11	K627C

Check the front and rear wheels for trueness (page 15-15 and 16-5.

Measure the tread depth at the center of the tires.

Replace the tires if the tread depth reaches the following limits:

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



STEERING HEAD BEARINGS

NOTE:

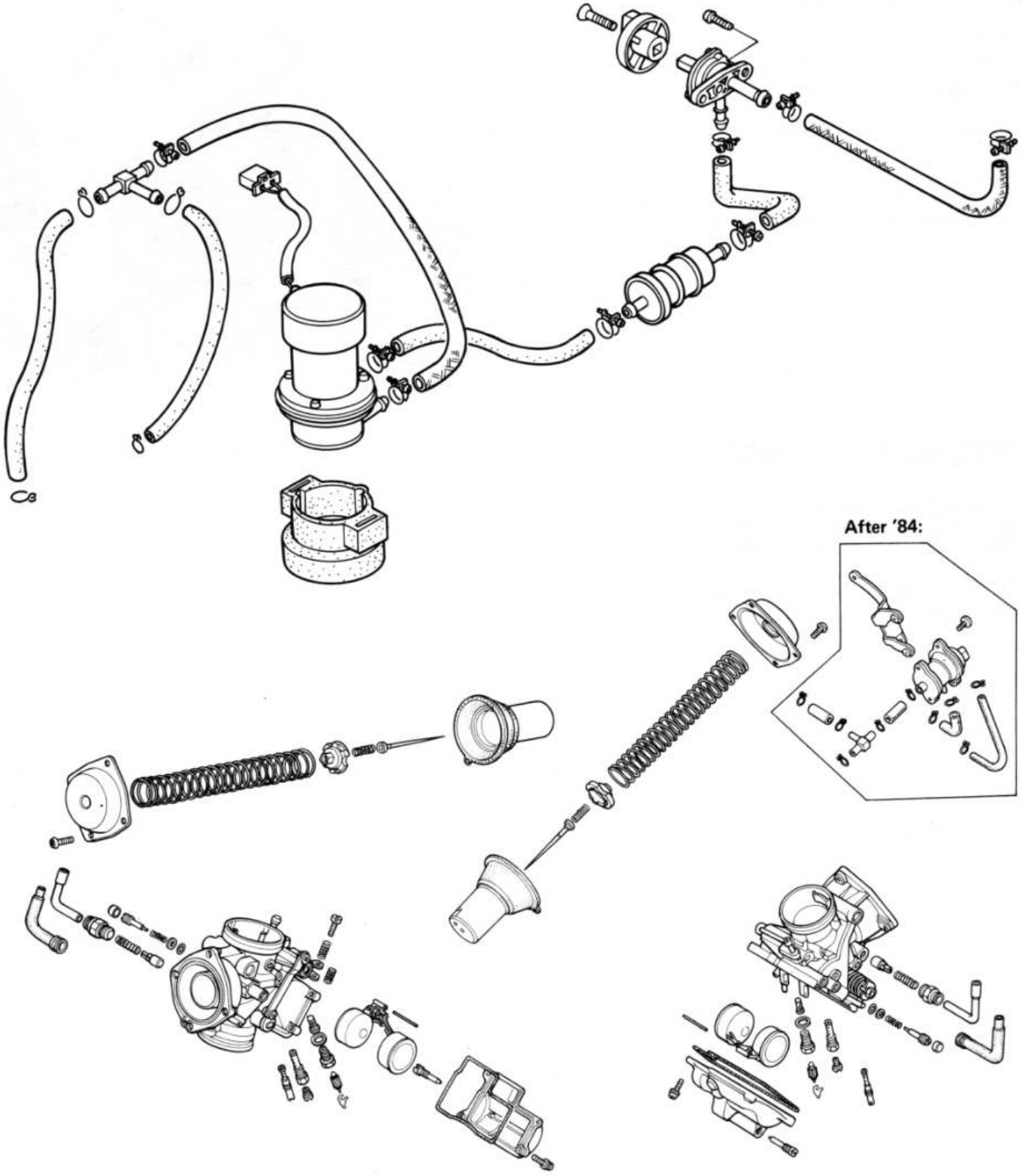
> Check that the control cables do not interfere with handlebar rotation.

Raise the front wheel off the ground and check that the handlebar rotates freely. If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 15-31).



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.


After '84:

4. FUEL SYSTEM

SERVICE INFORMATION	4–1	PILOT SCREW ADJUSTMENT	4–12
TROUBLESHOOTING	4–2	AIR CUT VALVE AFTER '84	4–13
CARBURETOR REMOVAL	4–3	FUEL TANK	4–13
VACUUM CHAMBER	4–4	AUXILIARY FUEL TANK	4–14
FLOAT CHAMBER	4–6	AIR CLEANER CASE	4–14
PILOT SCREW	4–8	FUEL PUMP	4–15
CARBURETOR SEPARATION	4–9	HIGH ALTITUDE ADJUSTMENT (USA only)	4–15
CARBURETOR ASSEMBLY	4–10		
CARBURETOR INSTALLATION	4–11	PURGE CONTROL VALVE INSPECTION (California model)	4–17

SERVICE INFORMATION

GENERAL

WARNING

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

- The engine uses down draft carburetors.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain screws that can be loosened to drain residual gasoline.
- Fuel pump inspection is in section 21.

TOOLS

Special

Pressure pump	ST–AH–255–MC7 (U.S.A. only)
Vacuum pump	ST–AH–260–MC7 (U.S.A. only)
Valve guide driver, 7 mm	07942–8230000 (U.S.A. only)

Common

Float gauge	07401–0010000

SPECIFICATIONS

[ ] ..... California model

	'83:	'84:	After '84:
Venturi dia.	Primary 14.2 mm (0.56 in) Secondary 34.2 mm (1.35 in)	← ←	14.8 mm (0.58 in) ←
Identification No.	VD7AA	VD7CA [VD7BA]	VD7CB [VD7BB]
Float level	7.5 mm (0.30 in)	←	←
Main jet	#115	#120	←
Idle speed	900 ± 100 rpm	1,000 ± 100 rpm	←
Throttle grip free play	2–6 mm (0.08–0.24 in)	←	←
Pilot screw initial opening	See page 4-12	←	←

TROUBLESHOOTING

Engine cranks but own't start
1. No fuel in tank.
2. No fuel to carburetor.
3. Engine flooded with fuel.
4. No spark at plug (ignition system faulty).
5. Air cleaner clogged.
6. Intake air leak.
7. Improper choke operation.
8. Improper throtle operation.

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

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

Misfiring during acceleration
1. Ignition system faulty.

Misfiring during acceleration
– Ignition system faulty.

Backfiring
1. Ignition system faulty.
2. Carubretor faulty.

Poor performance (driveability) and poor fuel economy
1. Fuel system clogged.
2. Ignition system faulty.

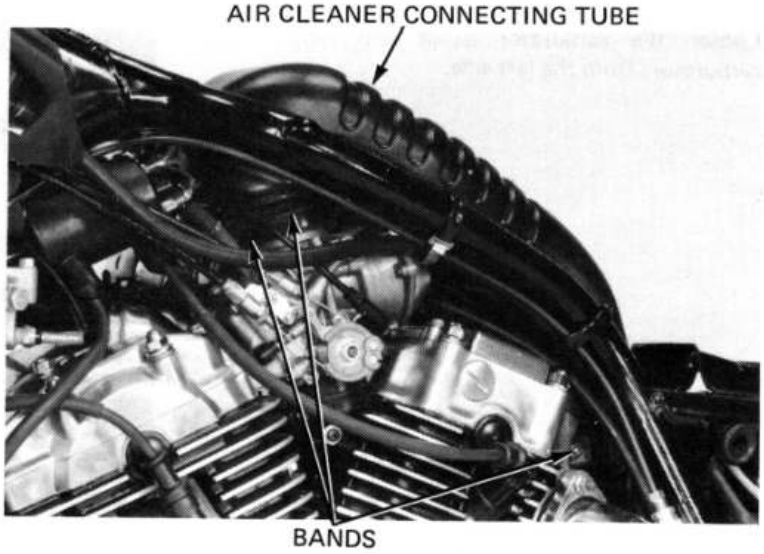
Lean mixture
1. Clogged fuel jets.
2. Piston stuck closed.
3. Faulty float valve.
4. Float level low.
5. Fuel cap vent blocked.
6. Fuel strainer screen clogged.
7. Restricted fuel line.
8. Intake air leak.
9. Restricted or faulty fuel pump

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

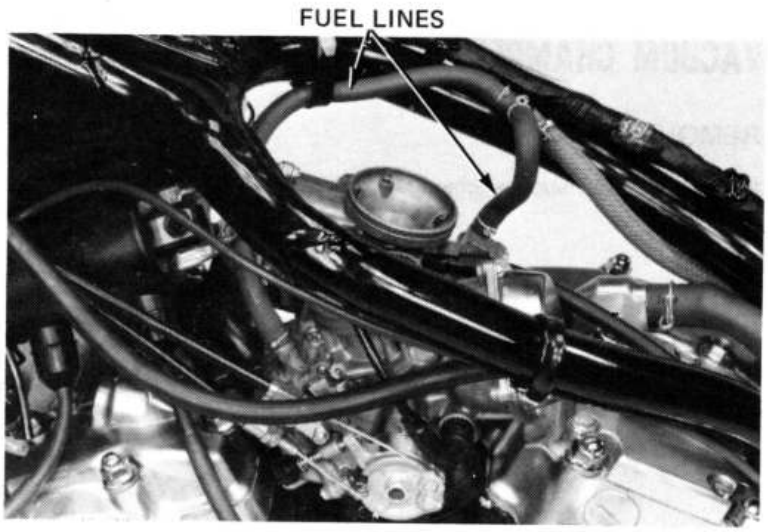
CARBURETOR REMOVAL

Remove the fuel tank (page 4-13).

Loosen the air cleaner connecting tube bands and remove the connecting tube.



Disconnect the fuel lines at the carburetors.



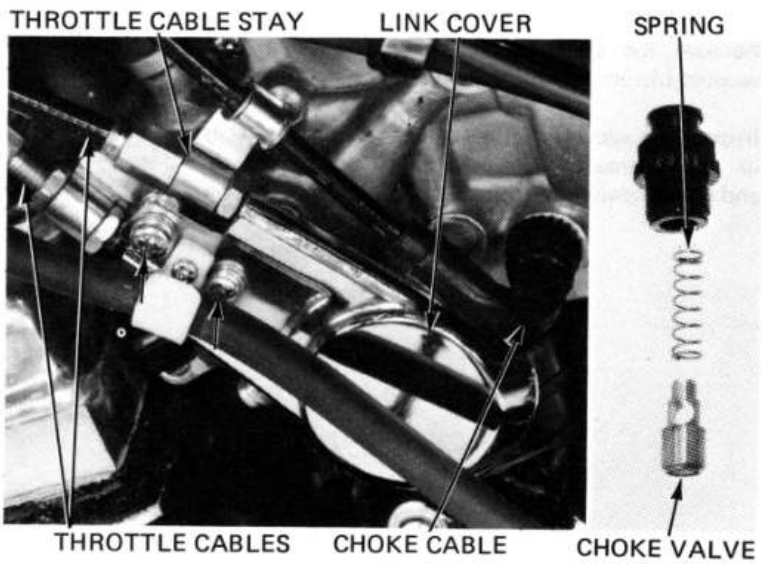
Remove the screws attaching the throttle cable stay and the throttle link cover and stay.

Disconnect the throttle cables from the throttle drum.

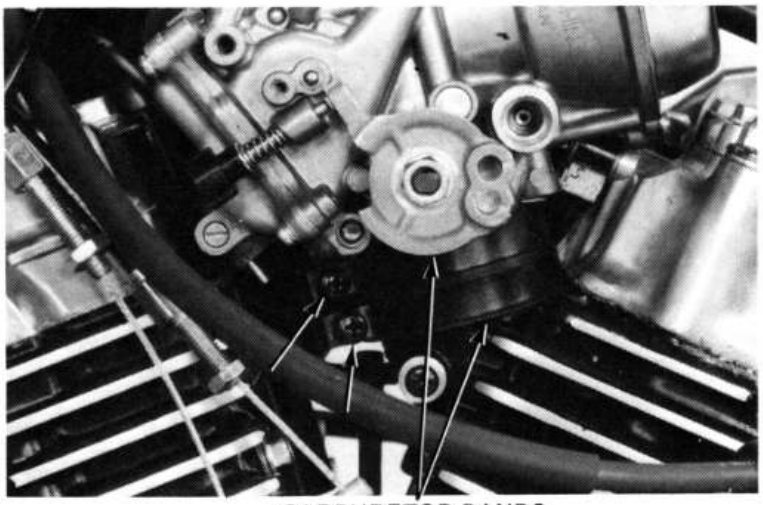
Remove the choke cables from the carburetors.

Remove the choke valve and spring from the choke cable.

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



Loosen the carburetor bands and remove the carburetors from the left side.

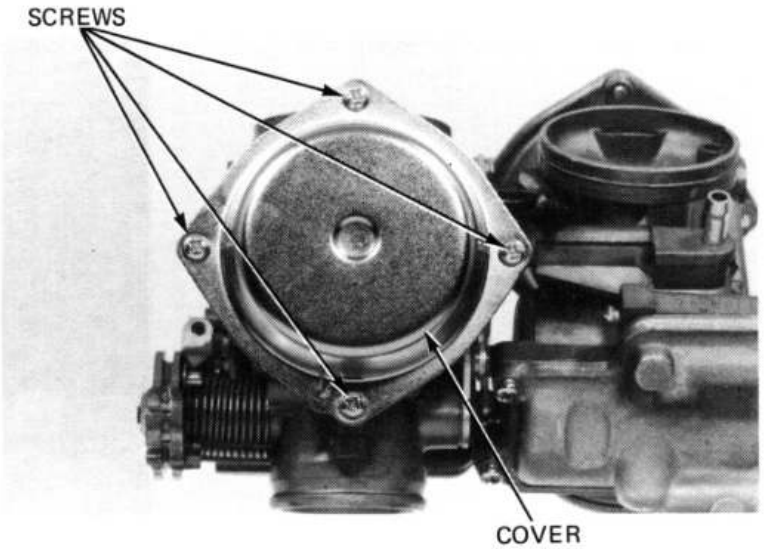


CARBURETOR BANDS

VACUUM CHAMBER

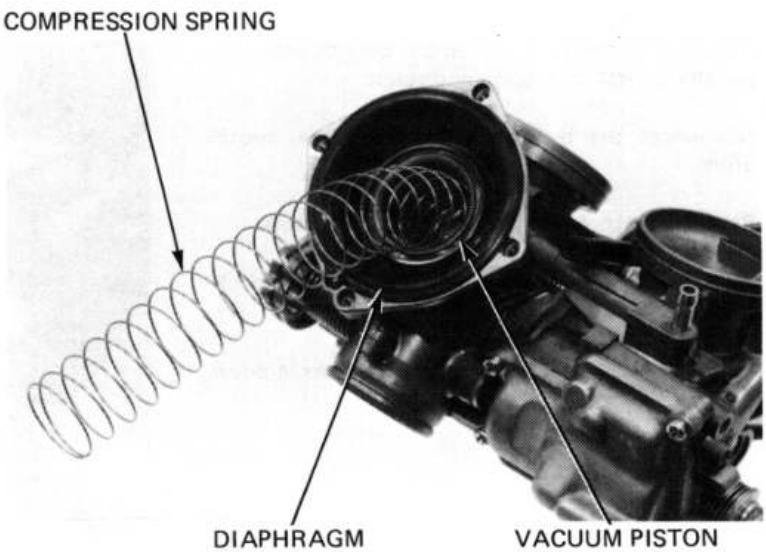
REMOVAL

Remove the four vacuum chamber cover screws and cover.



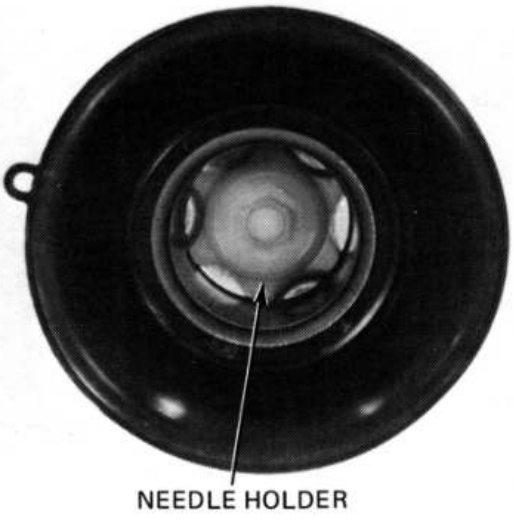
Remove the compression spring, diaphragm and vacuum piston.

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



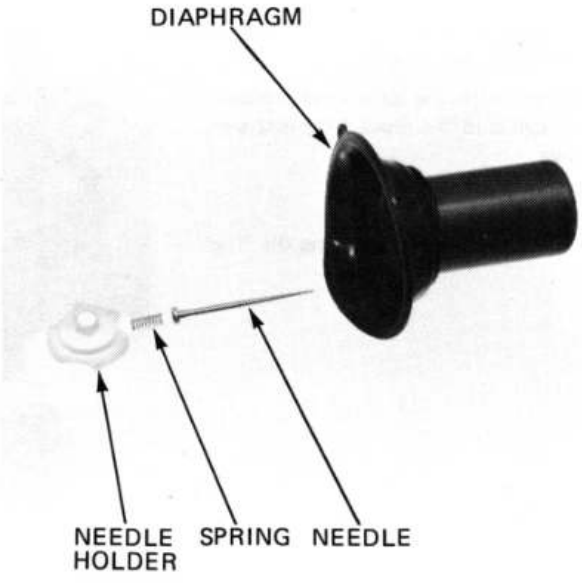
Push the needle holder in and turn it 60 degrees with an 8 mm socket. Then remove the needle holder, spring and needle from the piston.

Remove the plastic washer from the piston.



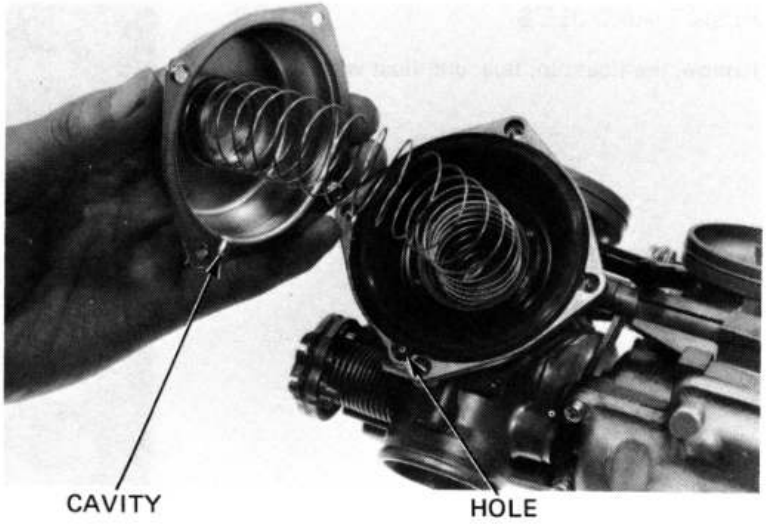
Inspect the needle for excessive wear at the tip and for bending, or other damage.

Check the diaphragm for deterioration and tears.



INSTALLATION

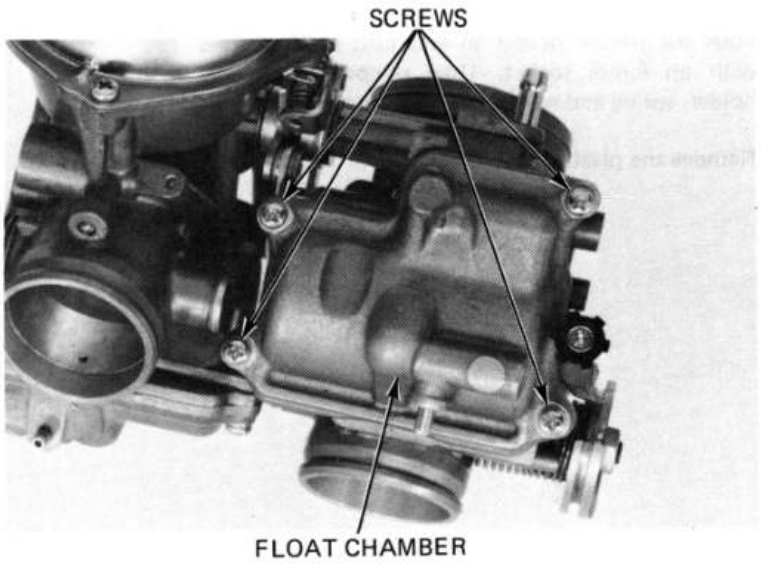
Installation is essentially the reverse of removal. Install the chamber cover so that its cavity aligns with the hole in the diaphragm.



FLOAT CHAMBER

REMOVAL

Remove the four float chamber screws and the float chamber.

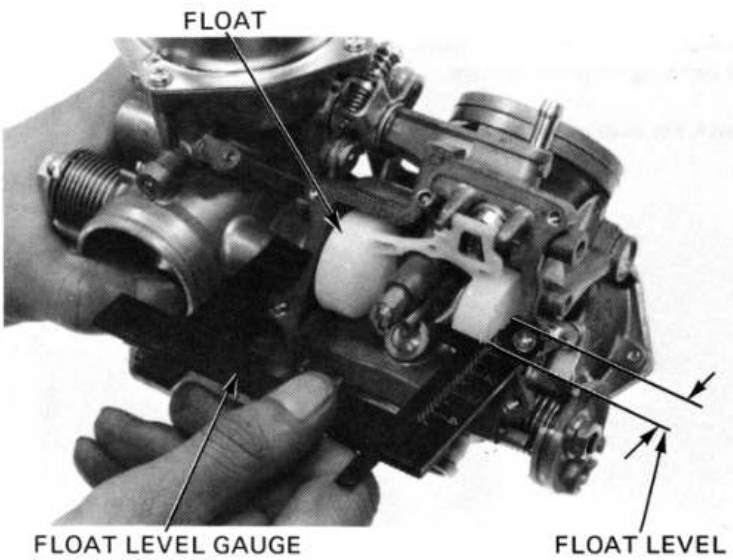


FLOAT LEVEL

Measure the float level with the carburetor inclined 15°–45° from vertical and the float tang just contacing the float valve.

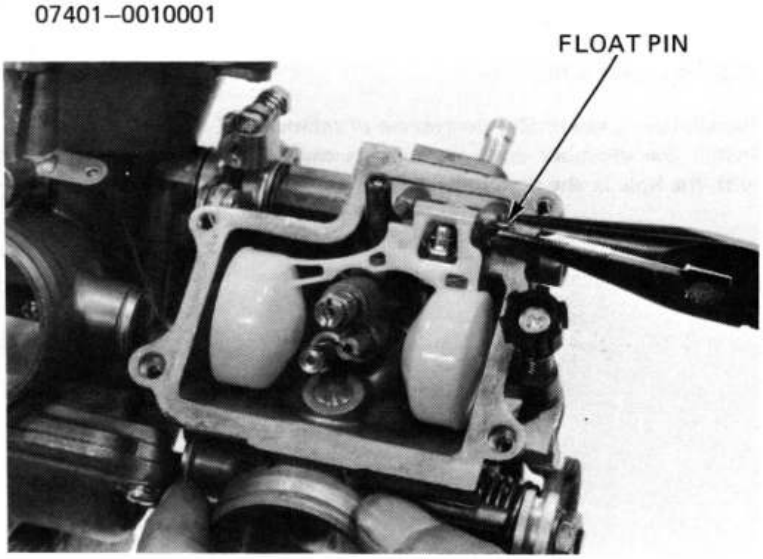
SPECIFICATIONS: 7.5 mm (0.30 in)

Adjust the float level by carefully bending the float tang.



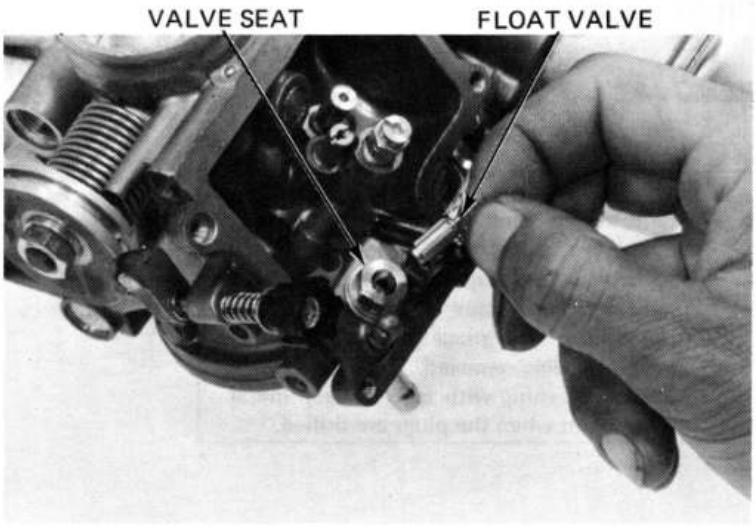
FLOAT AND JETS

Remove the float pin, float and float valve.



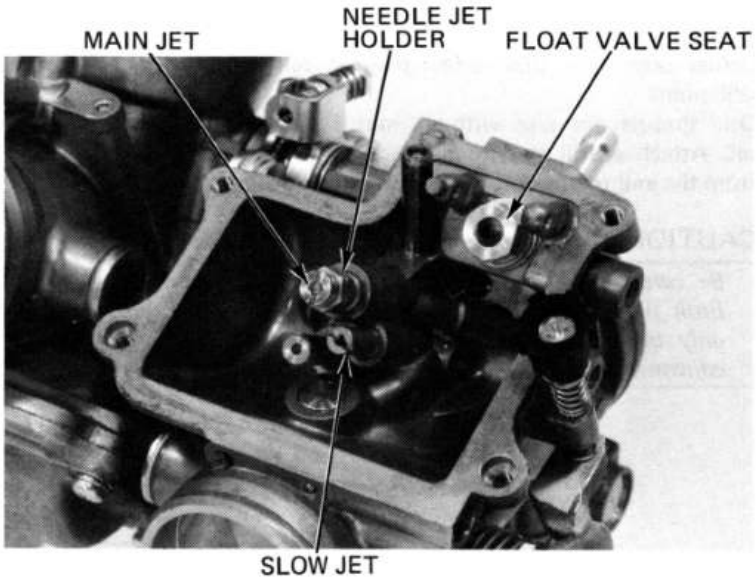
Inspect the float valve for grooves and nicks.

Inspect the operation of the float valve.



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

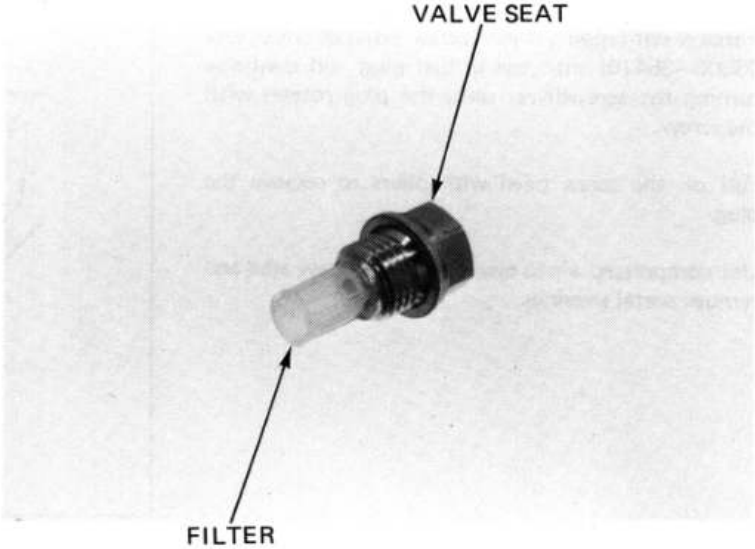
Remove the float valve seat and filter.



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

ASSEMBLY

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



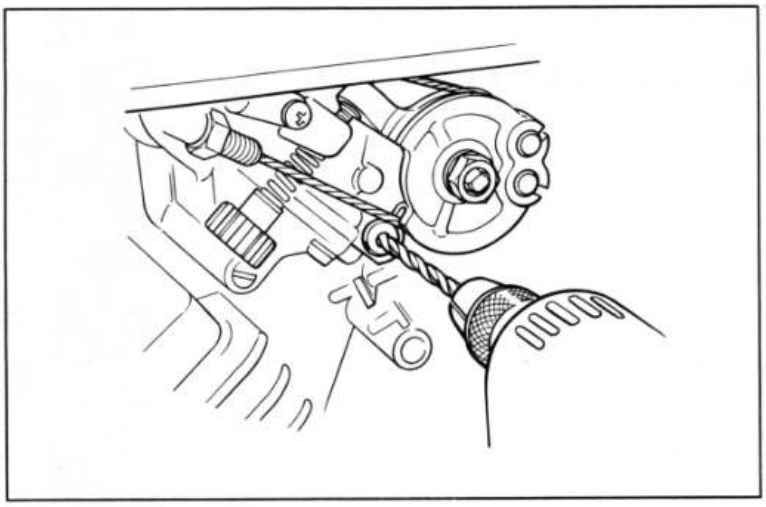
PILOT SCREW

REMOVAL

NOTE:

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

Center punch the pilot screw plug to center the drill point.
Drill through the plug with a 4 mm (5/32 in) drill bit. Attach a drill stop to the bit, 3 mm (1/8 in) from the end to prevent drilling into the pilot screw.



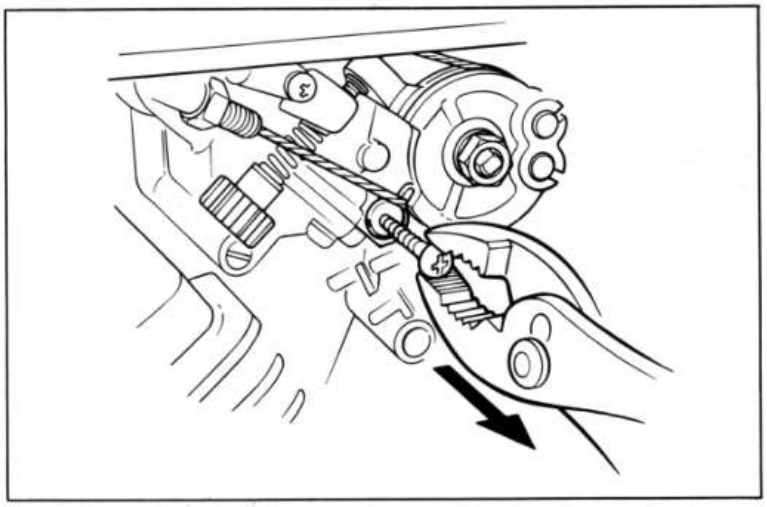
CAUTION:

Be careful not to drill into the pilot screw. Both pilot screws must be replaced even if only one requires it, for proper pilot screw adjustment (page 4-12).

Force a self-tapping 4 mm screw (H/C 069399, P/N 93903–35410) into the drilled plug and continue turning the screwdriver until the plug rotates with the screw.

Pull on the screw head with pliers to remove the plug.

Use compressed air to clean the pilot screw area and remove metal shavings.



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

CAUTION:

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

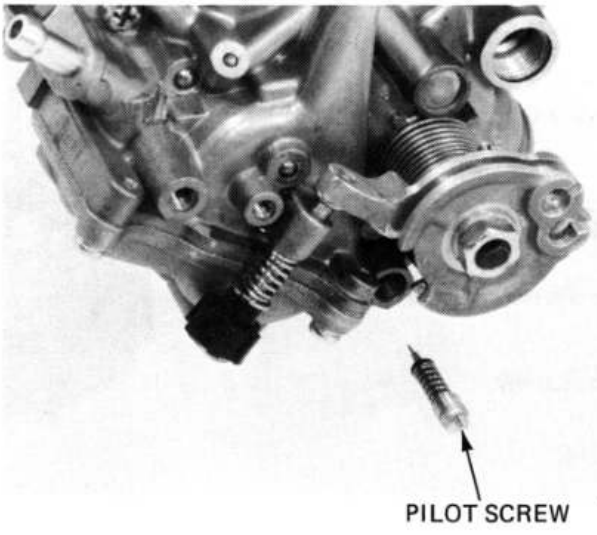
Remove the pilot screws and inspect them. Replace them if they are worn or damaged.

INSTALLATION

Install the pilot screws and return them to their original position as noted during removal.
Perform pilot screw adjustment if new pilot screws are installed (page 4-12).

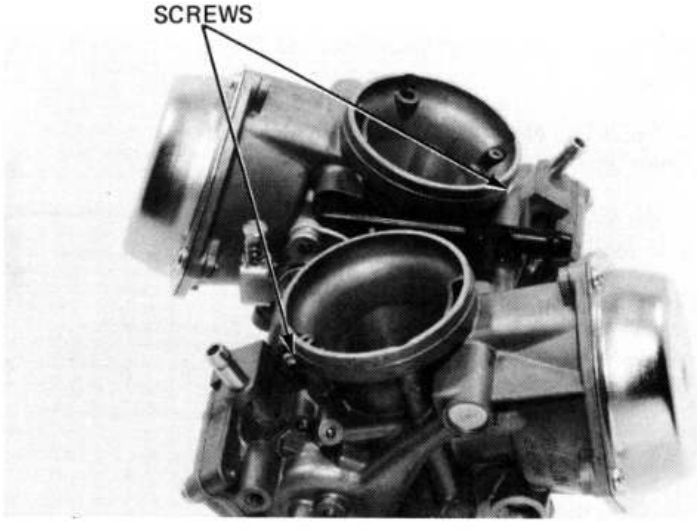
NOTE:

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

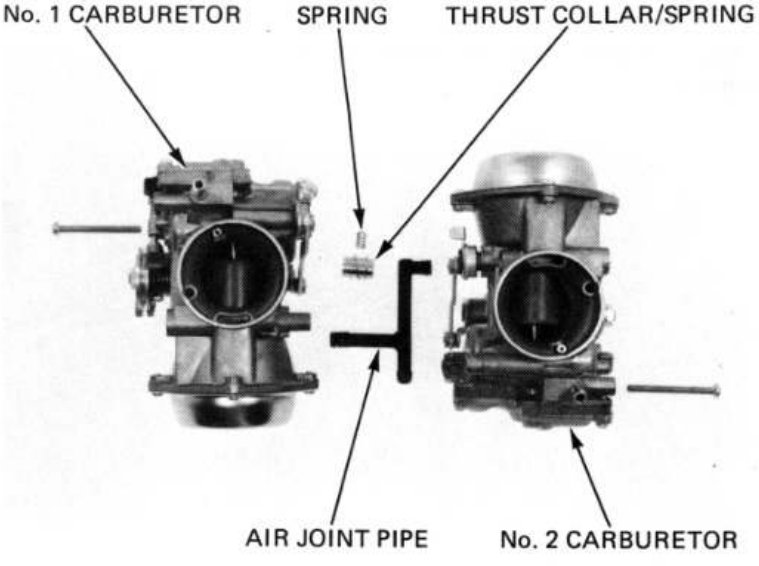


CARBURETOR SEPARATION

Remove the two screws assembling the carburetors.

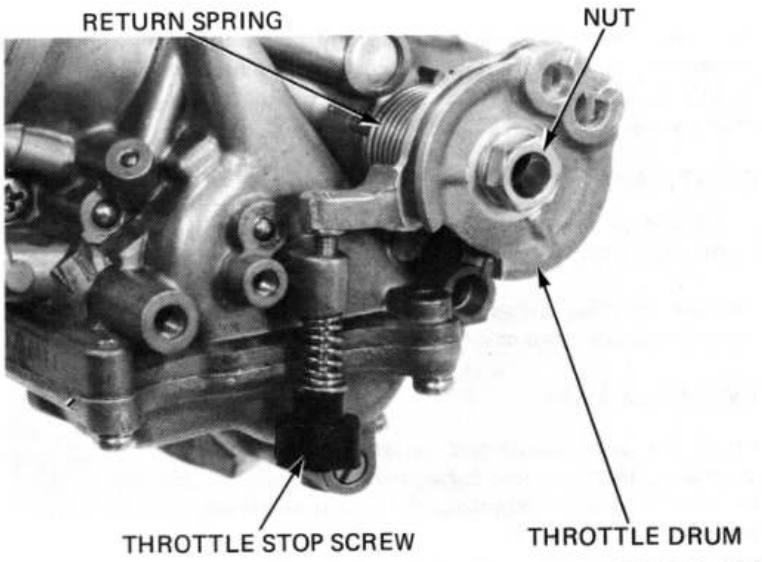


Carefully separate the No. 1 and No. 2 carburetors.



Loosen the throttle stop screw.

Remove the nut attaching the throttle drum and remove the throttle drum and return spring.



CARBURETOR ASSEMBLY

Install the throttle return spring, throttle drum and nut.

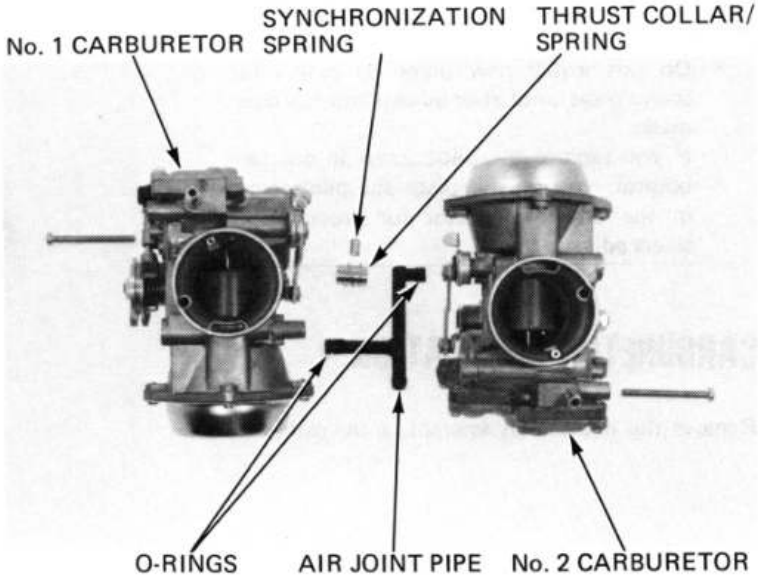
Tighten the nut securely.

Coat new O-rings with oil and install them on the air joint pipe.

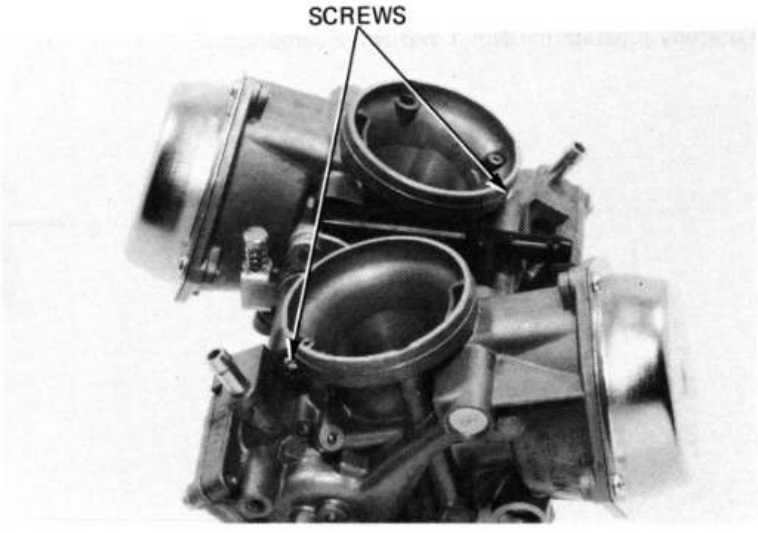
Put the No. 1 and No. 2 carburetors together with the air joint pipe, thrust collar and spring.

Loosen the synchronization adjusting screw until there is no tension.

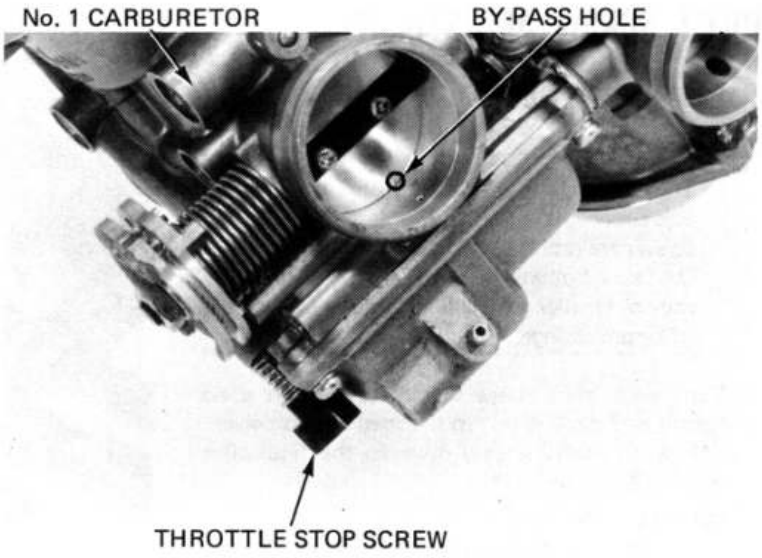
Install the synchronization spring.



Secure the carburetors together with the two attaching screws.



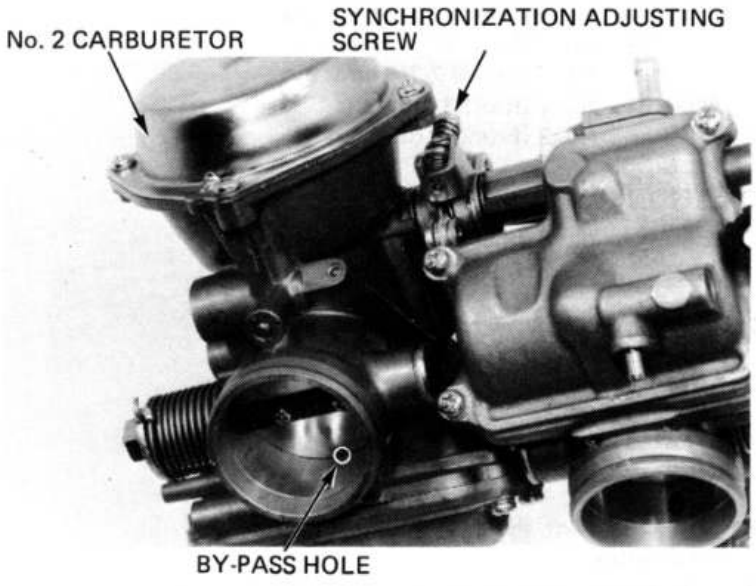
Turn the throttle stop screw to align the No. 1 throttle valve with the edge of the by-pass hole.



Align the No. 2 throttle valve with the by-pass hole edge by turning the synchronization adjusting screw.

Inspect throttle operation as described below:

- Open the throttle slightly by pressing on 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.



CARBURETOR INSTALLATION

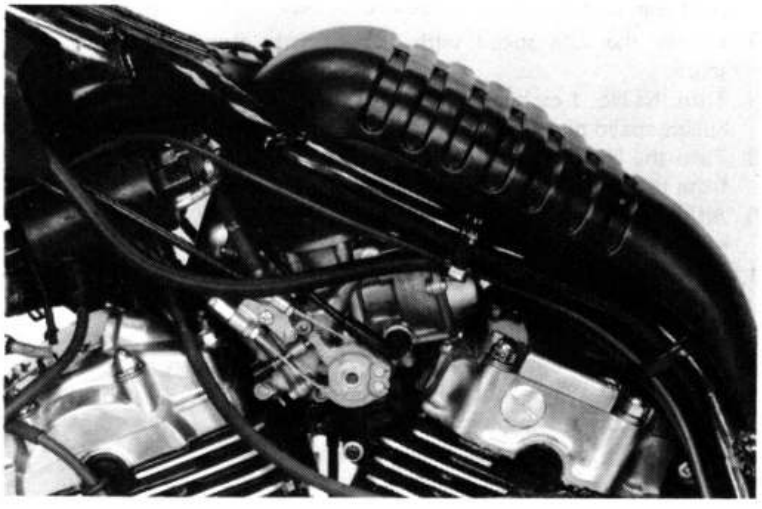
Installation is essentially the reverse of removal.

NOTE:

> Routh the throttle and choke cables properly (page 1–9 to 1–11).

Perform the following inspections and adjustments.

- Throttle operation (page 3-5).
- Carburetor choke (page 3-6).
- Carburetor idle speed (page 3-10).
- Carburetor synchronization (page 3-9).



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE (U.S.A. ONLY)

NOTE:

- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced (page 4-8).
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

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

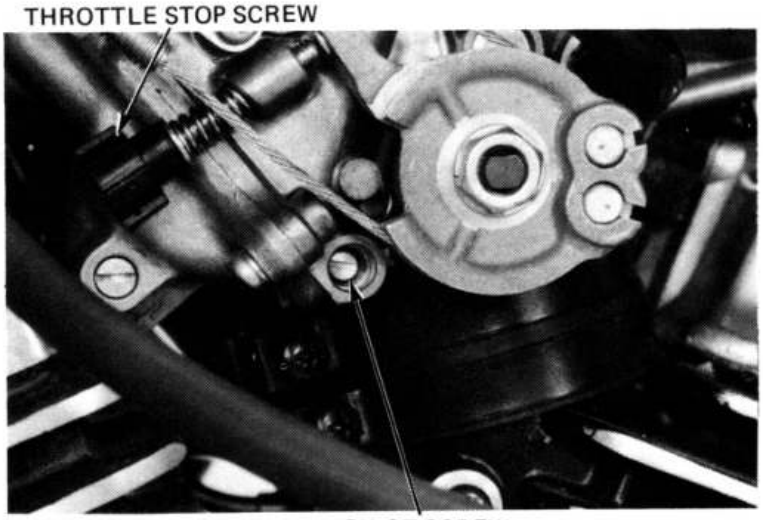
INITIAL OPENING:

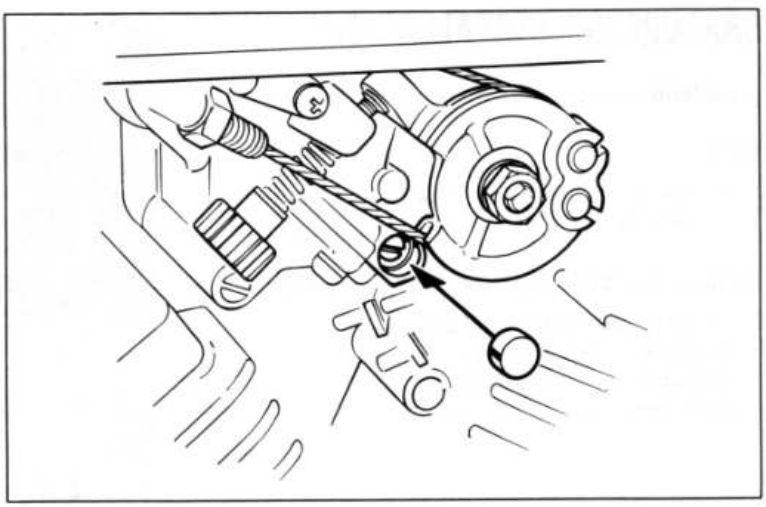
'83: No. 1 (Rear) 2-1/2 turns out
No. 2 (Front) 2-1/2 turns out
'84: No. 1 (Rear) 2-3/4 turns out
No. 2 (Front) 2-3/4 turns out
After '84: No. 1 (Rear) 3 turns out
No. 2 (Front) 3 turns out

CAUTION:

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

2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to the manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2 carburetor pilot screw.
12. Drive new pilot screw plugs into the pilot screw bores with a 7 mm valve guide drive (P/N 07942 −8230000). When fully seated the plug surfaces will be recessed 1 mm.





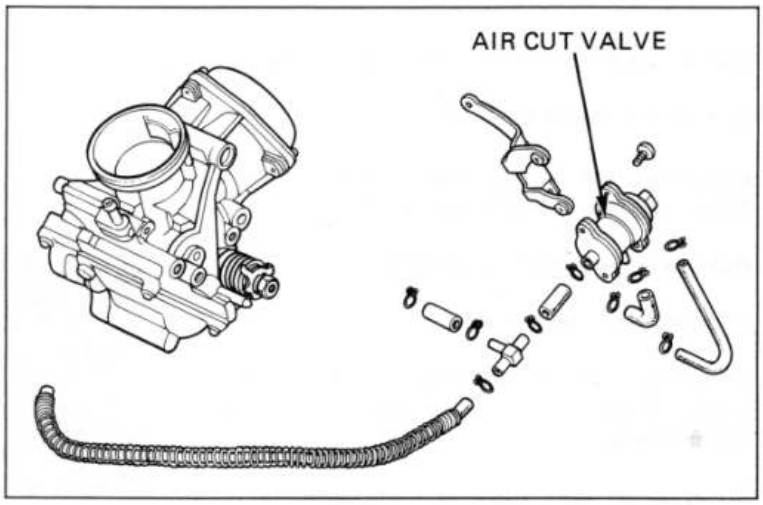
AIR CUT VALVE (After '84)

Remove the air cut valve bracket from the carburetor.

CAUTION:

Do not disassemble the air cut valve.

Install the air cut valve in the reverse order of removal.



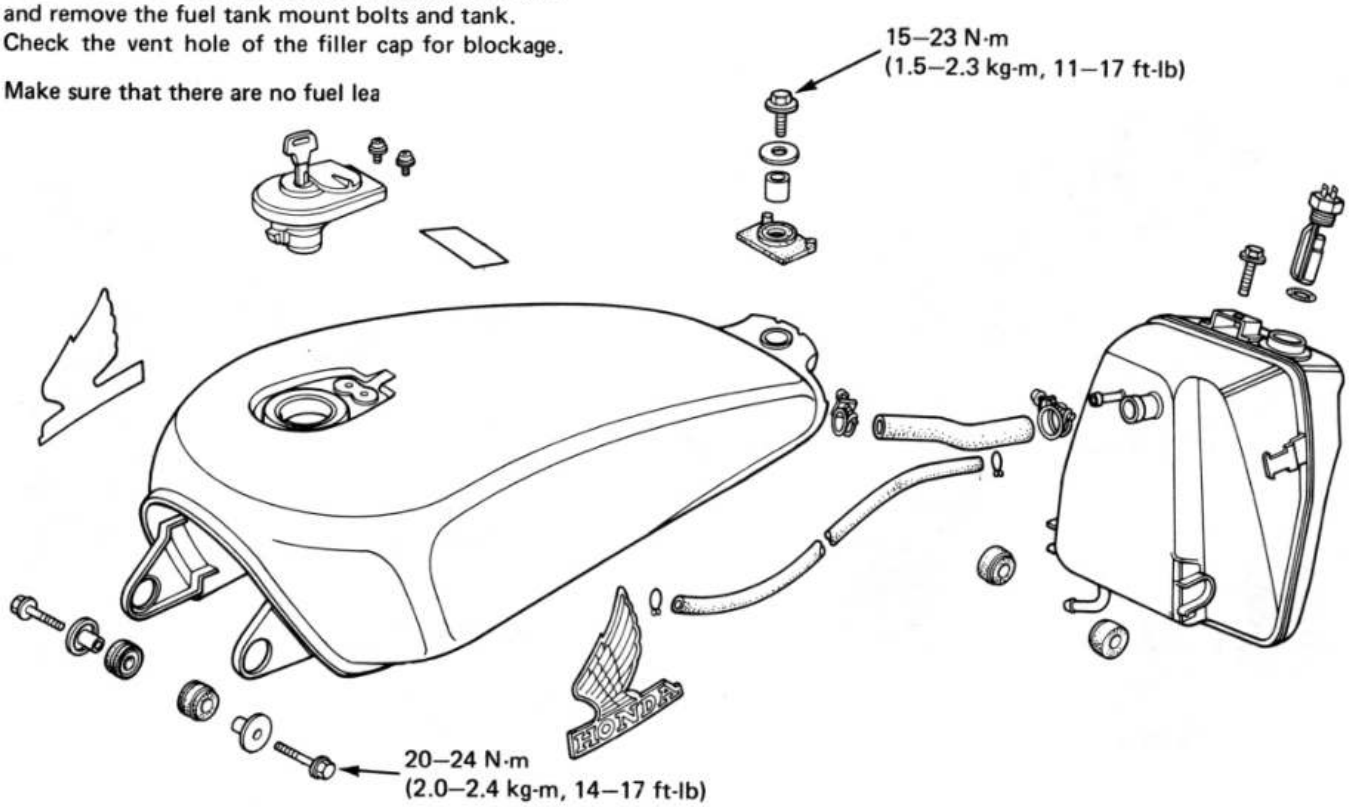
FUEL TANK

WARNING

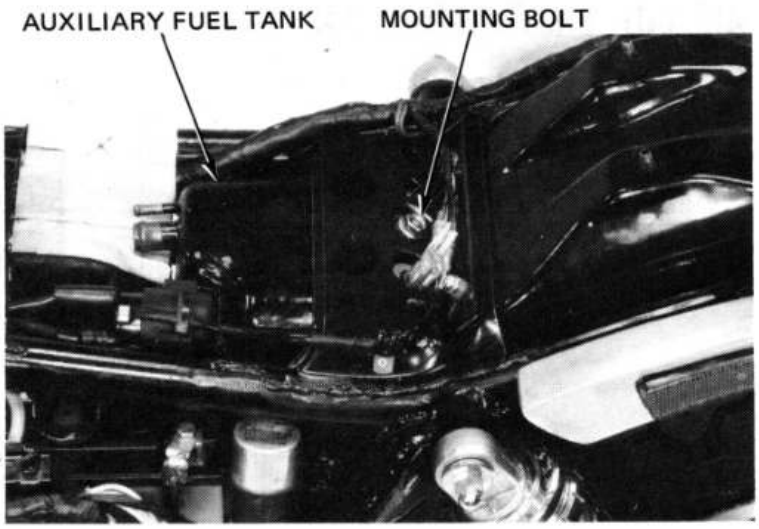
Do not allow flames or sparks near gasoline. Wipe up spilled gasoline at once.

Turn the fuel valve OFF and disconnect the fuel line at the fuel filter.
Turn the fuel valve ON and drain the fuel into a clean container.
Disconnect the fuel lines at the auxiliary fuel tank and remove the fuel tank mount bolts and tank.
Check the vent hole of the filler cap for blockage.

Make sure that there are no fuel lea



AUXILIARY FUEL TANK



Remove the seat, main fuel tank and side covers.

Remove the regulator/rectifier.

Disconnect the battery negative cable, then the positive cable and remove the battery.

Remove the rear wheel (page 16-3).

Remove rear fenders A and B.

Detach the auxiliary fuel tank hose from the fuel pump. Remove the auxiliary fuel tank mounting bolt and tank.

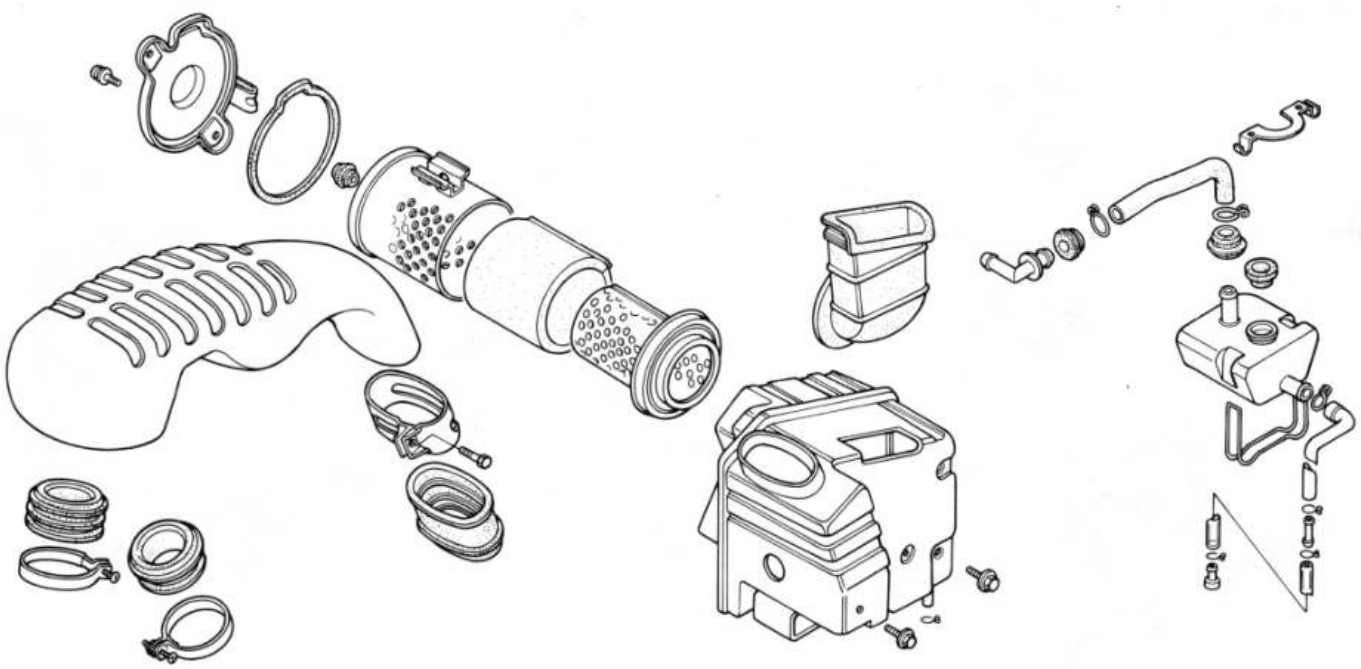
Install the auxiliary fuel tank in the reverse order of removal.

AIR CLEANER CASE

Check the air cleaner case for deterioration. Replace it if it has any signs of deterioration.

CRANKCASE VENTILATION SYSTEM

Check that the breather tube is not restricted.



FUEL PUMP

Remove the frame right side cover.

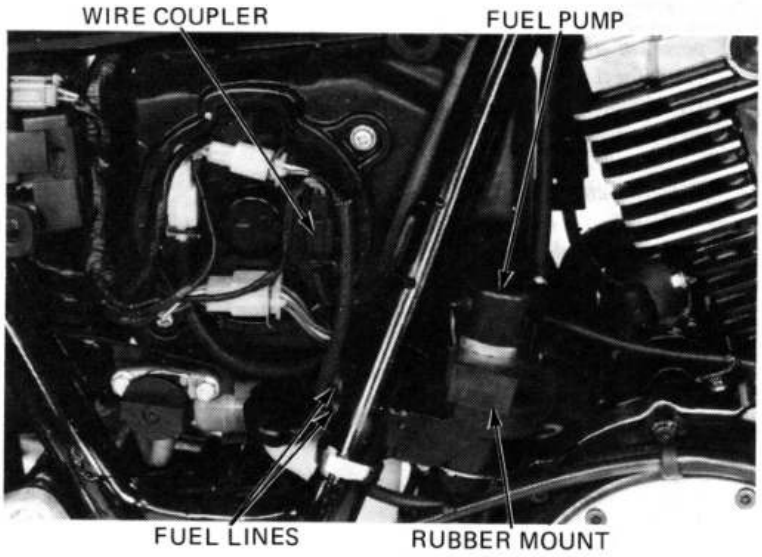
Disconnect the fuel pump wire coupler.

Turn the fuel valve OFF.

Detach the fuel inlet and outlet lines from the fuel pump.

Remove the fuel pump from its rubber mount.

Install the fuel pump in the reverse order of removal.



HIGH ALTITUDE ADJUSTMENT (USA only)

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

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

Remove each pilot screw plug (page 4-8).

Turn each pilot screw clockwise 1 turn.

Adjust the idle speed to specification (page 4-1), with the throttle stop screw.

Drive new pilot screw plugs into the pilot screw bores (page 4-12).

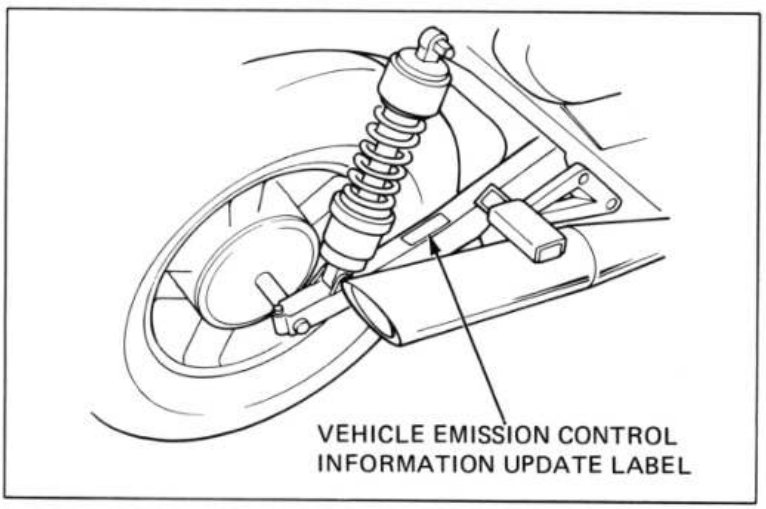
NOTE:

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

Attach a Vehicle Emission Control Information Update label onto the swingarm as shown. See SL #132 for information on obtaining the label.

NOTE:

> Do not attach the label to any part that can be easily removed from the vehicle.



VEHICLE EMISSION CONTROL INFORMATION UPDATE
-HONDA MOTOR CO., LTD.
THIS VEHICLE HAS BEEN ADJUSTED TO IMPROVE EMISSION CONTROL PERFORMANCE WHEN OPERATED AT HIGH ALTITUDE.
ALTITUDE PERFORMANCE ADJUSTMENT INSTRUCTIONS ARE AVAILABLE AT YOUR AUTHORIZED HONDA DEALER.

WARNING

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

When the vehicle is to be operated continuously below 1,500 m (5,000 feet), turn each pilot screw counterclockwise 1 turn to its original position after removing each pilot screw plug and adjust the idle speed to specification (page 4-1). Drive new pilot screw plugs into the pilot screw bores (page 4-12). Be sure to do these adjustments at low altitude.

PURGE CONTROL VALVE INSPECTION (CALIFORNIA MODEL)

NOTE:

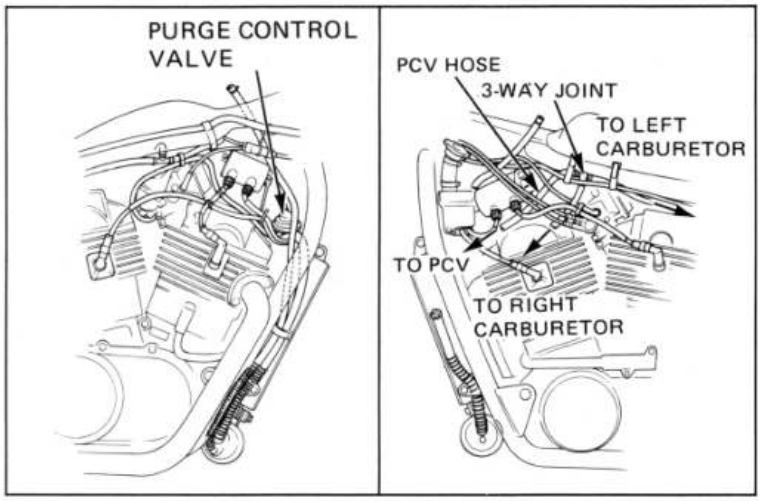
> The purge control valve should be inspected if hot restart is difficult.

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

NOTE:

> The PCV is located on the frame above the front cylinder.

Disconnect the PCV hose at the 3-way joint and remove the PCV from its mount. Refer to the routing label on the inside of the left side cover for hose connections.



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

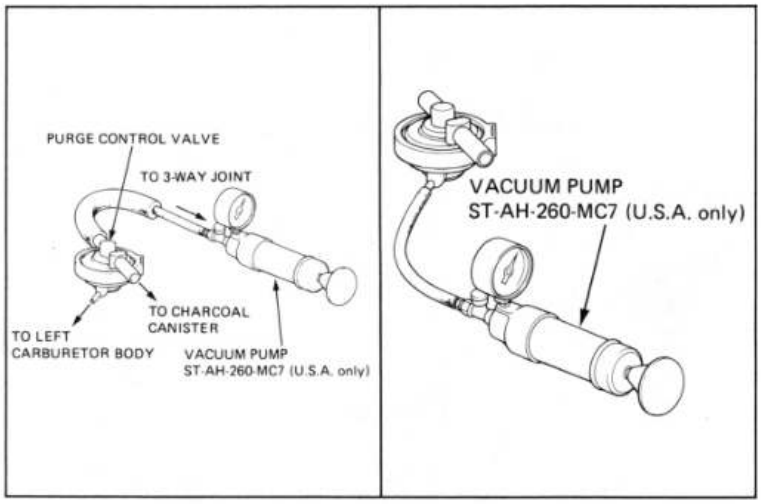
SPECIFIED VACUUM: 250 mm (9.8 in) Hg

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

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

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

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

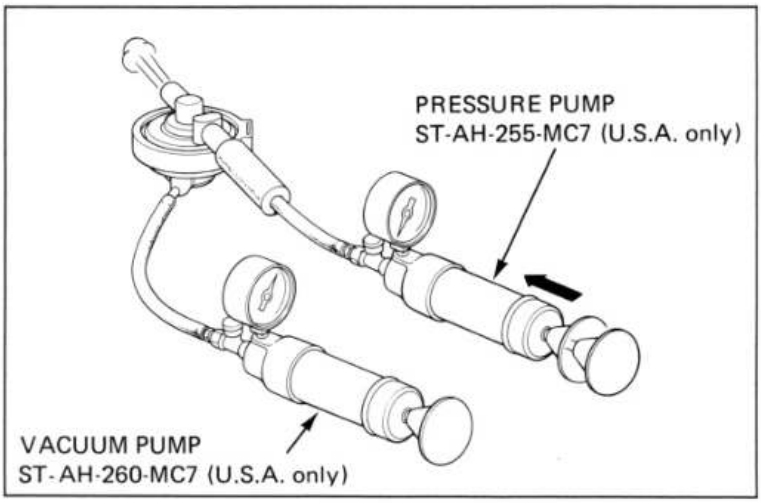


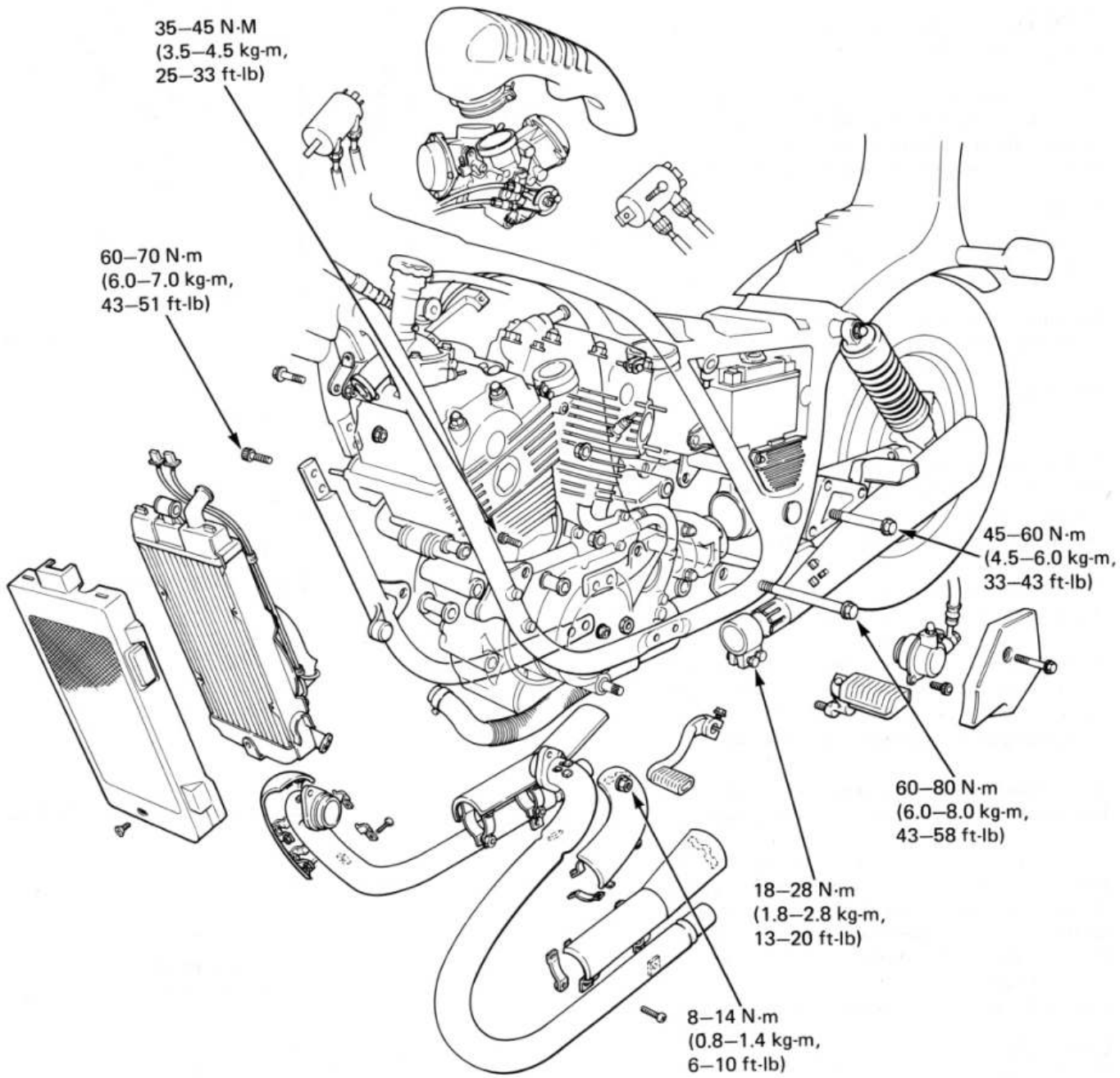
Connect a pressure pump to the 8 mm I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the PCV hose that goes to the 3-way joint pump air through the canister hose. Air should flow through the PCV and out the hose that goes to the 3-way joint.
Replace the PCV if air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

CAUTION:

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

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




35–45 N·M
(3.5–4.5 kg-m,
25–33 ft-lb)
60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)
45–60 N·m
(4.5–6.0 kg-m,
33–43 ft-lb)
60–80 N·m
(6.0–8.0 kg-m,
43–58 ft-lb)
18–28 N·m
(1.8–2.8 kg-m,
13–20 ft-lb)
8–14 N·m
(0.8–1.4 kg-m,
6–10 ft-lb)

5. ENGINE REMOVAL/INSTALLATION

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

SERVICE INFORMATION

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following parts or components can be serviced with the engine installed in the frame:
  - Clutch
  - Gearshift linkage
  - Oil pump and oil filter
  - Alternator
  - Starter motor
  - Carburetors

SPECIFICATIONS

Engine dry weight	78 kg (172 lb)
Oil capacity	3.5 liters (3.7 U.S. qt)

TORQUE VALUES

Engine hanger bolts		
– 8 mm bolt		20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
– 10 mm bolt		45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)
– 12 mm bolt		60–80 N·m (6.0–8.0 kg-m, 43–58 ft-lb)
Sub-frame bolts	(Upper)	70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
	(Lower)	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Exhaust pipe joint nut		8–14 N·m (0.8–1.4 kg-m, 6–10 ft-lb)
Exhaust pipe clamp bolt		18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

ENGINE REMOVAL

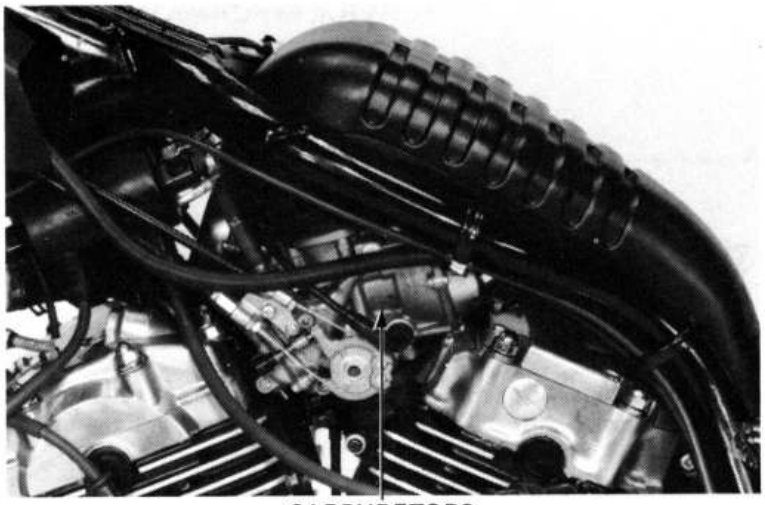
Place the motorcycle on its center stand.

Remove the seat and fuel tank.

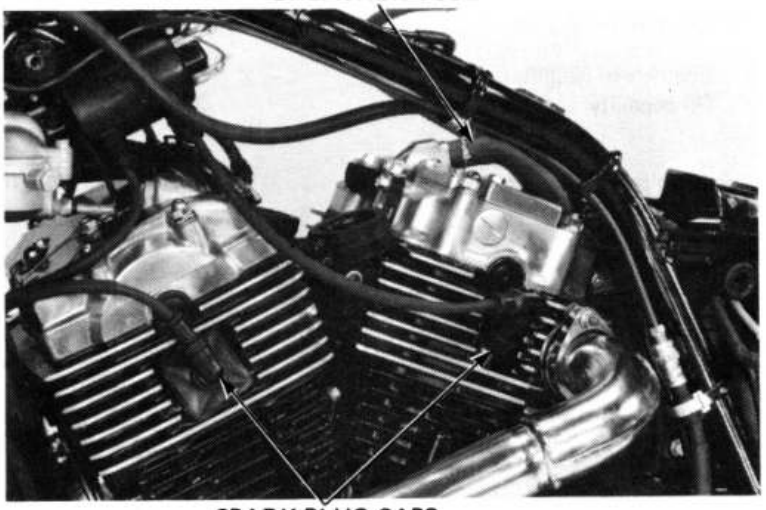
Remove the left and right frame side covers.

Drain the engine oil (page 2-3) and the coolant (page 6-3).

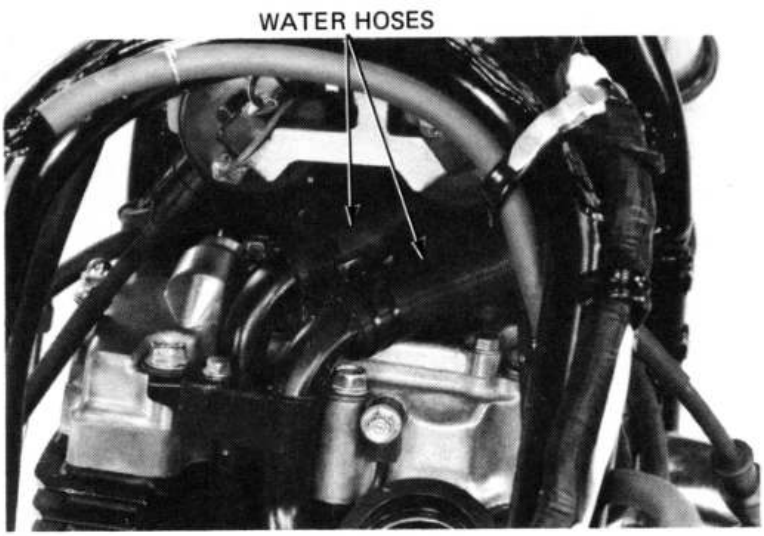
Remove the carburetors (page 4-3).



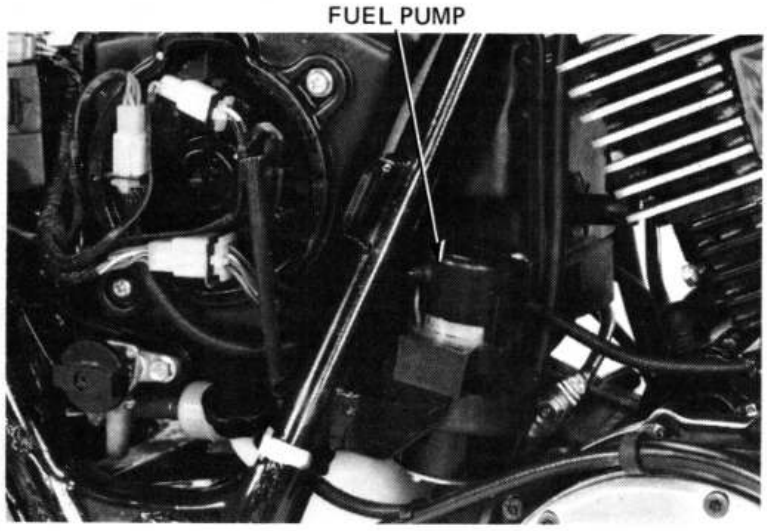
Disconnect the spark plug caps and the crankcase breather tube at the cylinder head cover.



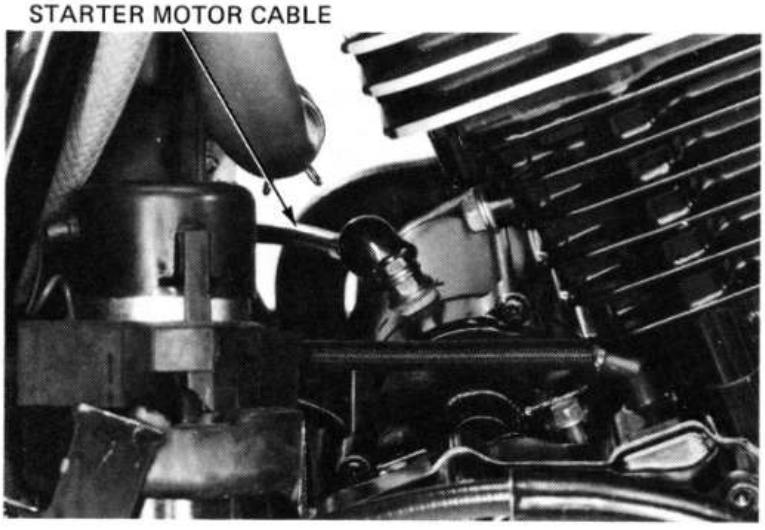
Disconnect the water hoses at the cylinder head.



Remove the fuel pump from the bracket with the fuel lines connected.

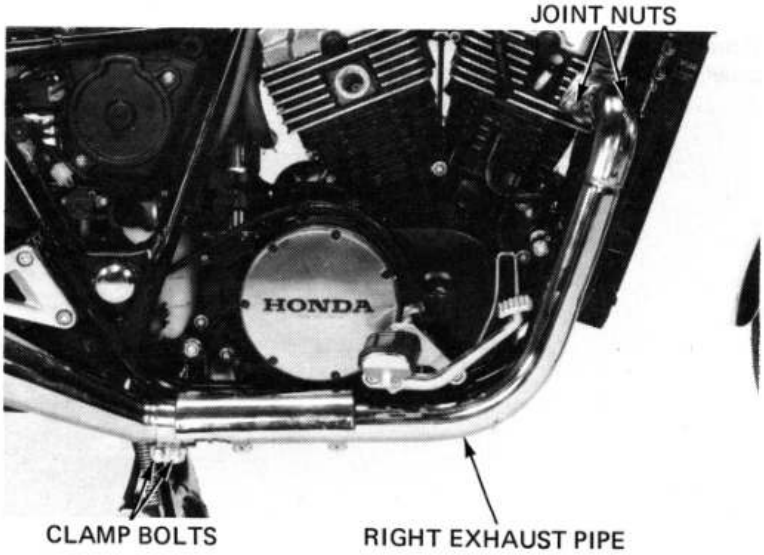


Disconnect the starter motor cable at the starter motor.



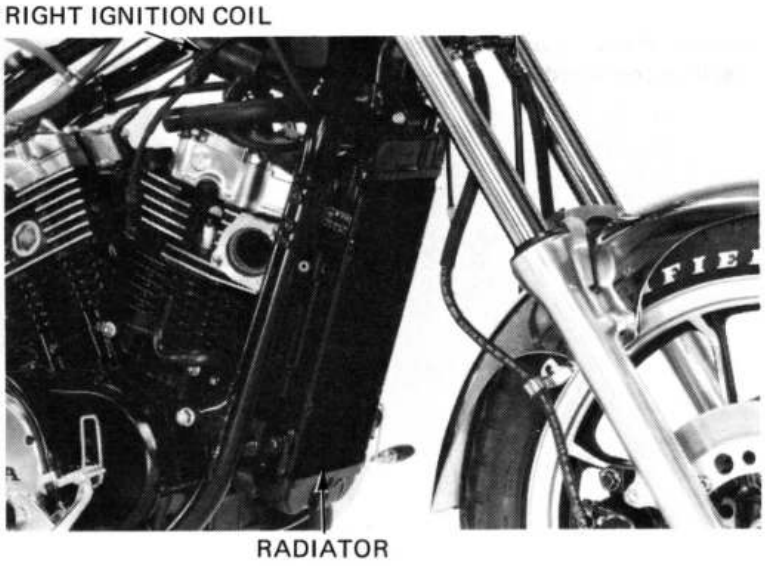
Loosen the right exhaust pipe clamp bolts.

Remove the right exhaust pipe joint nuts and remove the right exhaust pipe.



Remove the radiator (page 6-6).

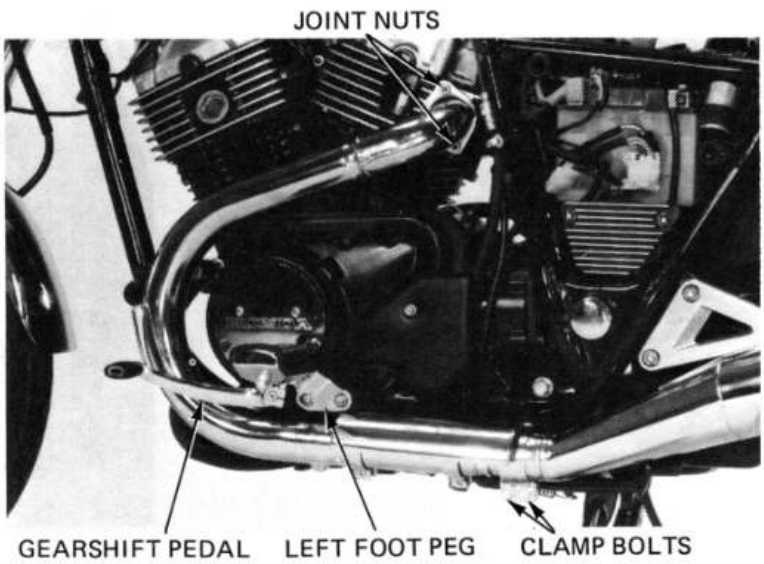
Remove the right ignition coil.



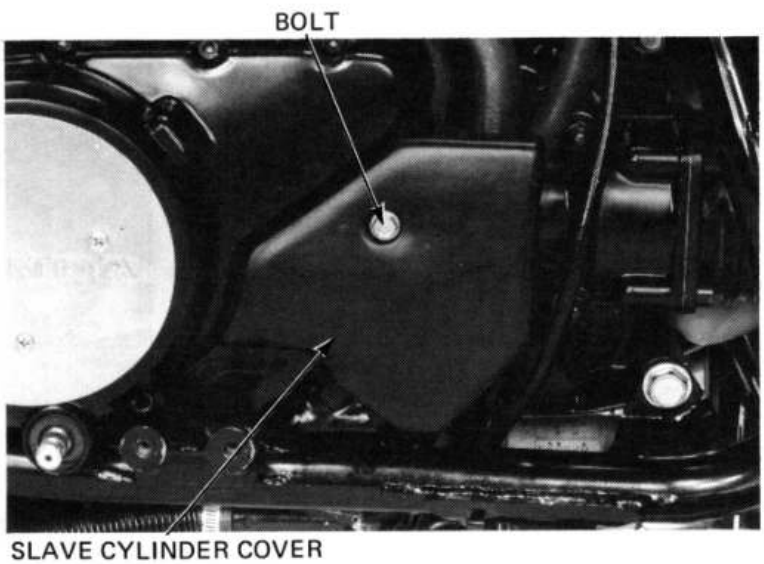
Remove the left foot peg and gearshift pedal.

Loosen the left exhaust pipe clamp bolts.

Remove the exhaust pipe joint nuts and remove the left exhaust pipe.



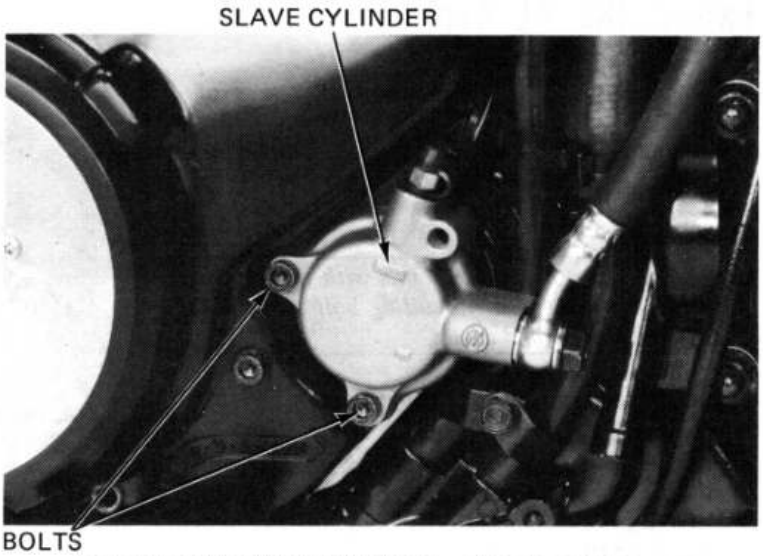
Remove the bolt attaching the clutch slave cylinder cover and cover.



Remove the slave cylinder mounting bolts and slave cylinder with the clutch hose connected.

NOTE:

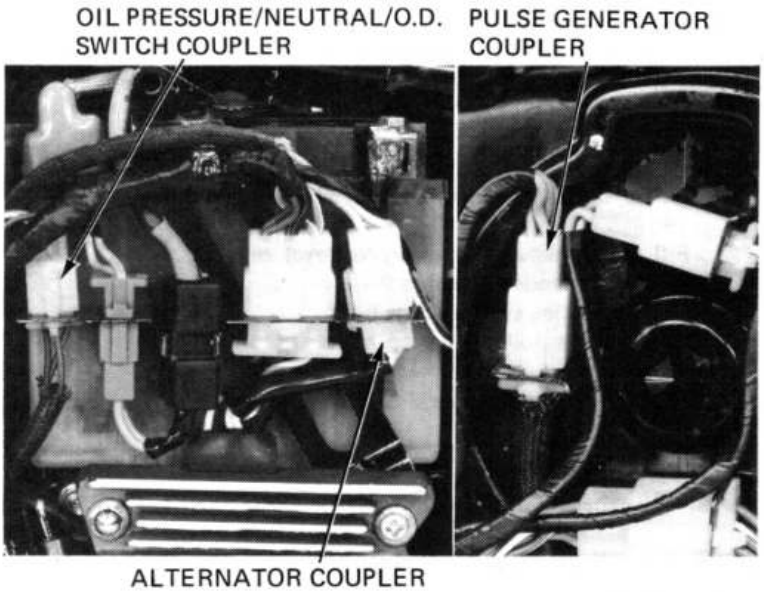
> Do not operate the clutch lever after removing the clutch slave cylinder. To do so will cause difficulty in installing the slave cylinder.



Disconnect the oil pressure, neutral and O.D. switch wire coupler.

Disconnect the alternator wire coupler.

Disconnect the pulse generator wire coupler.



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

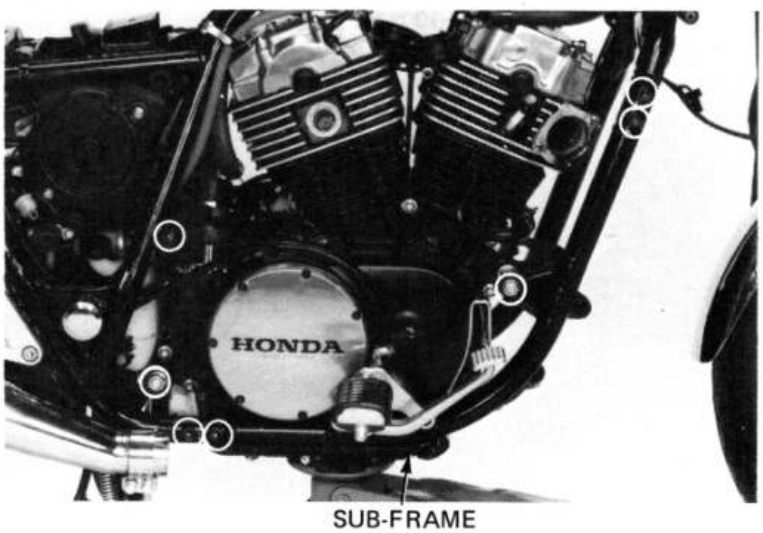
NOTE:

> The jack height must be continuously adjusted so that the mounting bolts can be removed, and so stress is relieved from other bolts until they are removed.

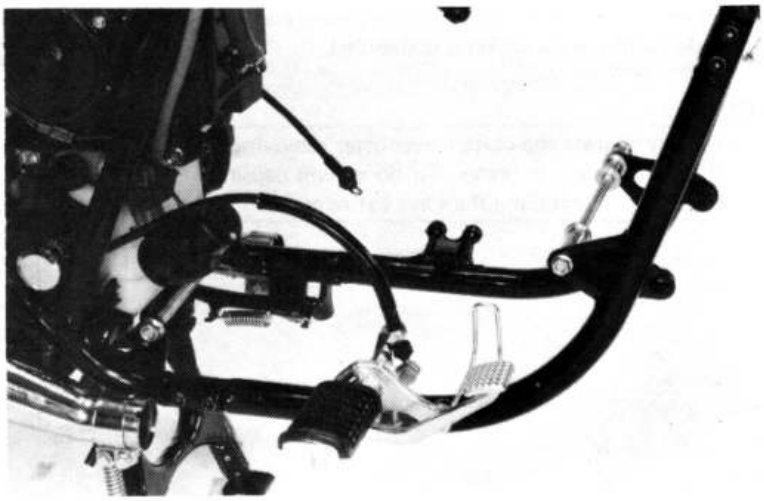
Remove the right subframe.

Remove the engine mounting bolts.

Remove the engine from the right side while disconnecting the drive shaft universal joint from the engine.



ENGINE INSTALLATION



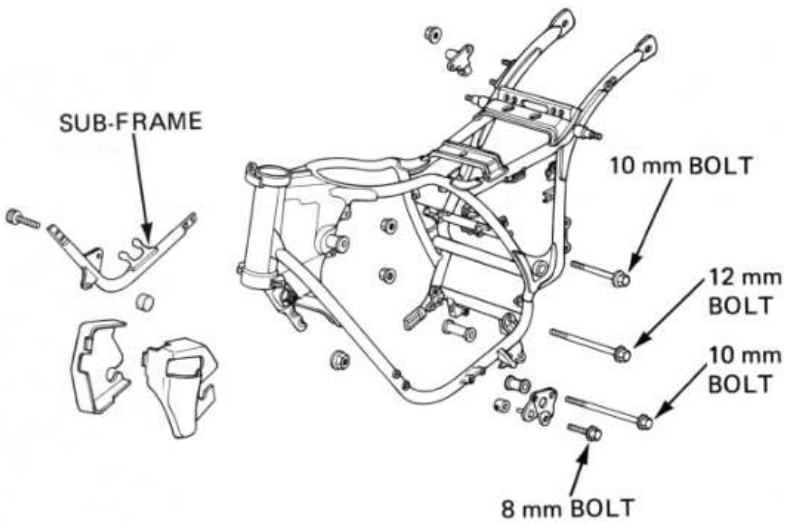
Engine installation is essentially the reverse of removal.
Use a floor jack or other adjustable support to carefully manuever the engine into place.

CAUTION:

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

Tighten the all fasteners to the specified torque:

ENGINE MOUNT BOLTS:
12 mm 60–80 N·m (6.0–8.0 kg-m, 43–58 ft-lb)
10 mm 45–60 N·m (4.5–6.0 kg-m, 33–42 ft-lb)
8 mm 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
SUB-FRANE BOLTS:
Upper 70–80 N·m
(7.0–8.0 kg-m, 51–58 ft-lb)
Lower 35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)



NOTE:

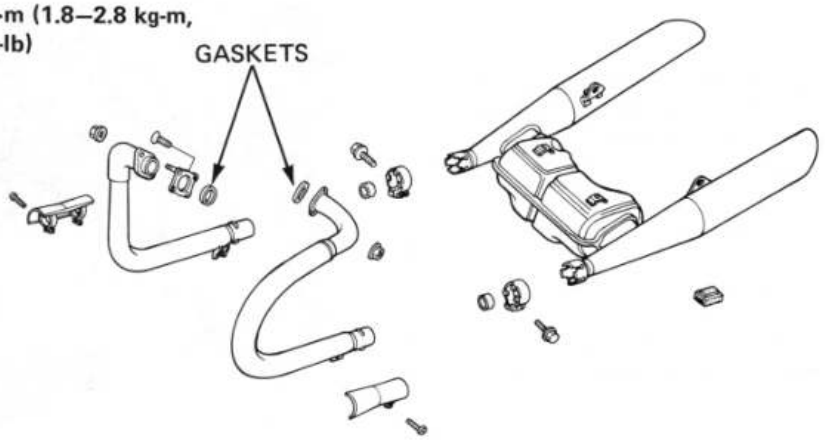
- Route the wires and cables properly (page 1-9).
- Fill the crankcase to the proper level with the recommended oil (page 2-1).
- Fill the cooling system (page 6-3).
- Perform the following inspection and adjustments:
  Throttle operation (page 3-5).
  Clutch (page 3-5).

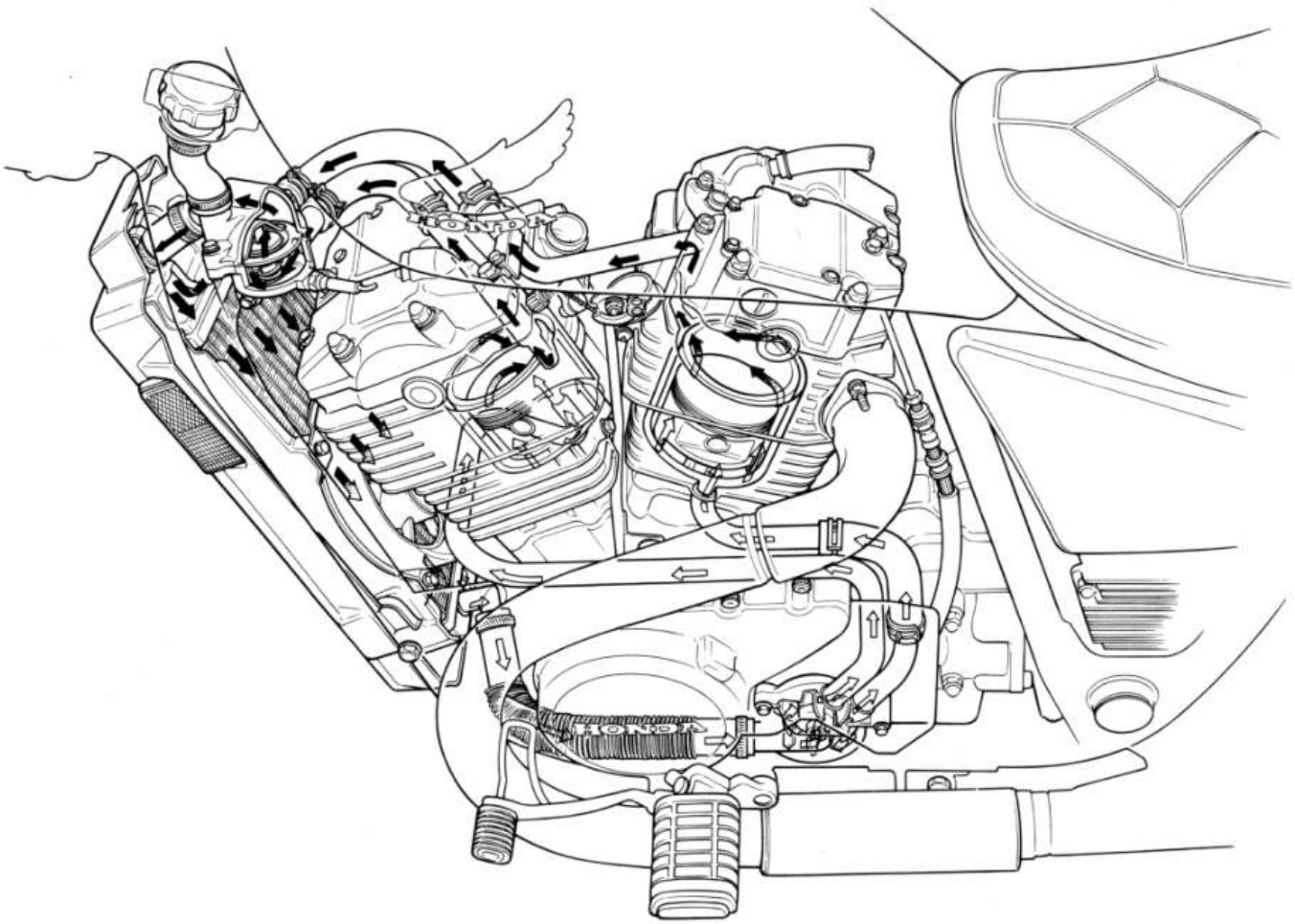
Install the exhaust system:
Install new exhaust pipe joint gaskets.

Install the exhaust pipes and tighten the joint nuts and clamp bolts.

TORQUE: JOINT NUTS: 8–14 N·m (0.8–1.4 kg-m, 6–10 ft-lb)

CLAMP BOLTS: 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)





6. COOLING SYSTEM

SERVICE INFORMATION	6–1	THERMOSTAT	6–4
TROBULESHOOTING	6–1	RADIATOR/COOLING FAN	6–6
SYSTEM TESTING	6–2	WATER PUMP	6–10
COOLANT REPLACEMENT	6–3		

SERVICE INFORMATION

GENERAL

WARNING

Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.

- Use only distilled water and ethylene glycol in the cooling system. A 50–50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze or an antifreeze with self sealing properties.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- Radiator, cooling fan and thermostet services can be made with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 21 for fan motor thermostatic switch and temperature sensor inspections.

SPECIFICATIONS

Radiator cap relief pressure	0.75–1.05 kg/cm^2(10.7–14.9 psi)
Freezing point (Hydrometer test):	55% Distilled water + 45% ethylene glycol: −32°C (−25°F) 50% Distilled water + 50% ethylene glycol: −37°C (−34°F) 45% Distilled water + 55% ethylene glycol: −44.5°C (−48°F)
Coolant capacity: Radiator and engine Reserve tank Total system	 1.7 liters (1.80 US qt) 0.4 liters (0.42 US qt) 2.1 liters (2.22 US qt)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 8 mm at 95°C (0.315 in at 203°F)
Boiling point (with 50–50 mixture):	Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F)

TOOLS

Special

Cooling system tester — Commercially available

TROUBLESHOOTING

Engine temperature too high

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

Engine temperature too low

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

Coolant leaks

1. Faulty pump mechanical seal
2. Deteriorated O-rings
3. Loose or too tight hose clamps

SYSTEM TESTING

COOLANT

Test the coolant mixture with an antifreeze tester. For maximum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.



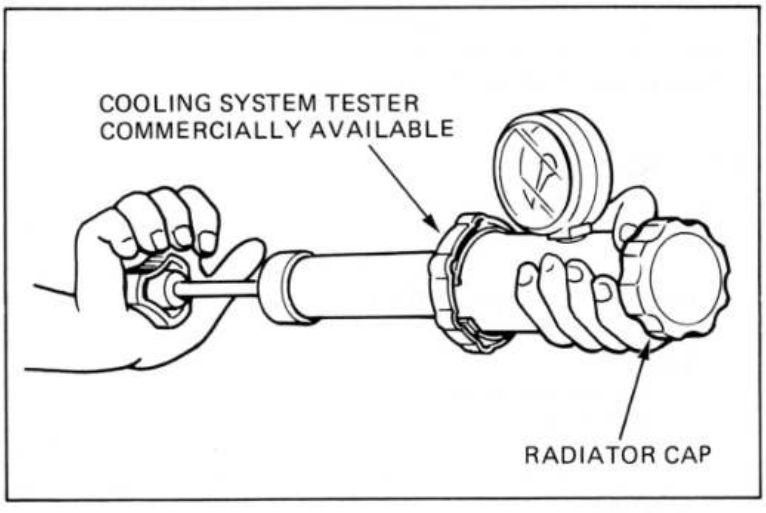
RADIATOR CAP INSPECTION

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

NOTE:

Before installing the cap on the tester, apply water to sealing surfaces.

RADIATOR CAP RELIEF PRESSURE:
0.9 ± 0.15 kg/cm² (12.8 ± 2.1 psi)

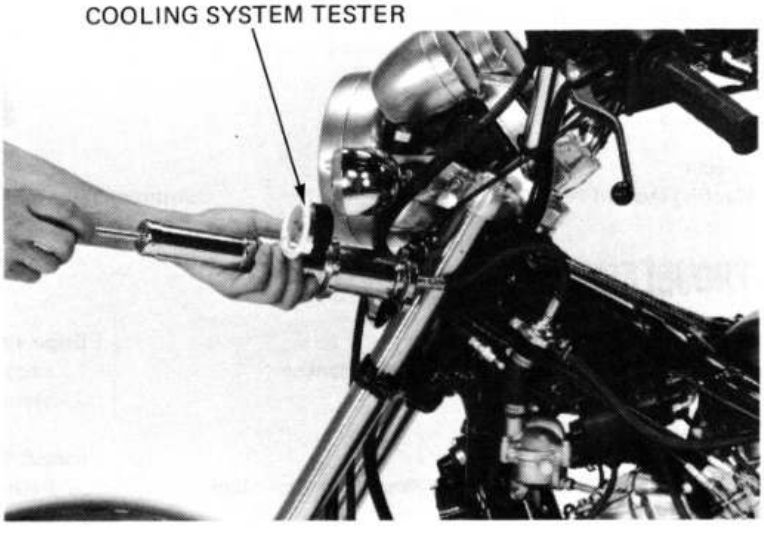


Pressurize the radiator, engine and hoses, and check for leaks.

CAUTION:

Excessive pressure can damage the radiator. Do not exceed 1.05 kg/cm² (14.9 psi)

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



COOLANT REPLACEMENT

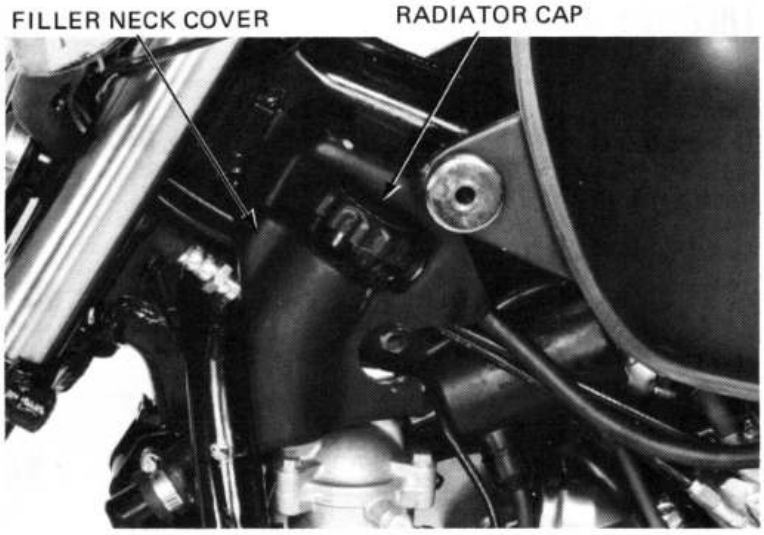
CAUTION:

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

Remove the fuel tank front mounting bolts and raise the front of the fuel tank.

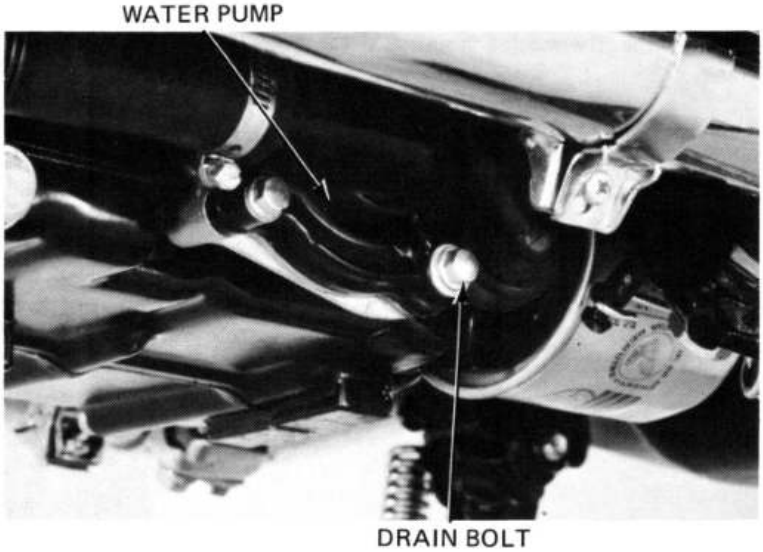
Remove the radiator filler neck cover.

Remove the radiator cap.



Remove the drain bolt located at the water pump and drain the system coolant.

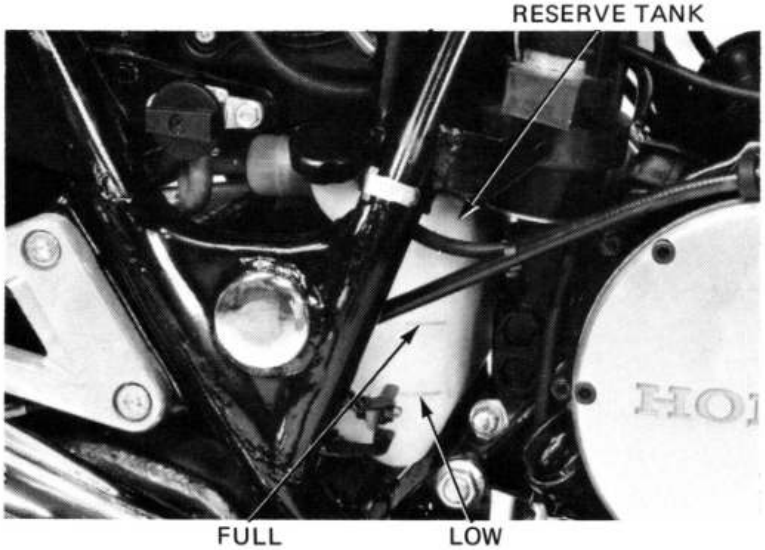
Replace the drain bolt.



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

Bleed air from the radiator.

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



THERMOSTAT

REMOVAL

Turn the fuel valve OFF.

Remove the seat and fuel tank.

Remove the coolant drain bolt, and drain the coolant (page 6-3).

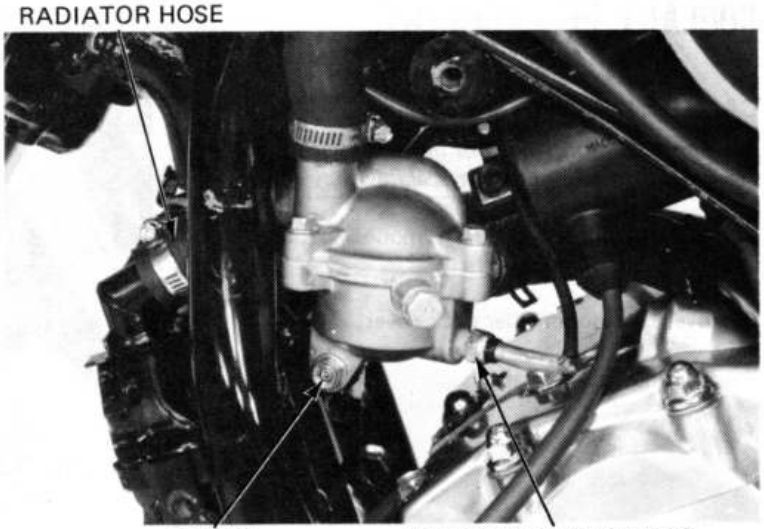
Remove the radiator cover.

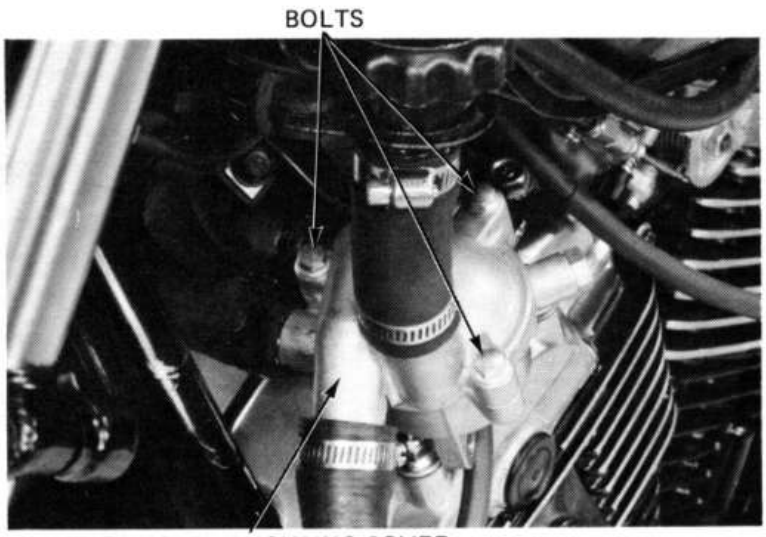
Disconnect the radiator upper hose at the radiator.

Disconnect the wire connector from the temperature sensor.

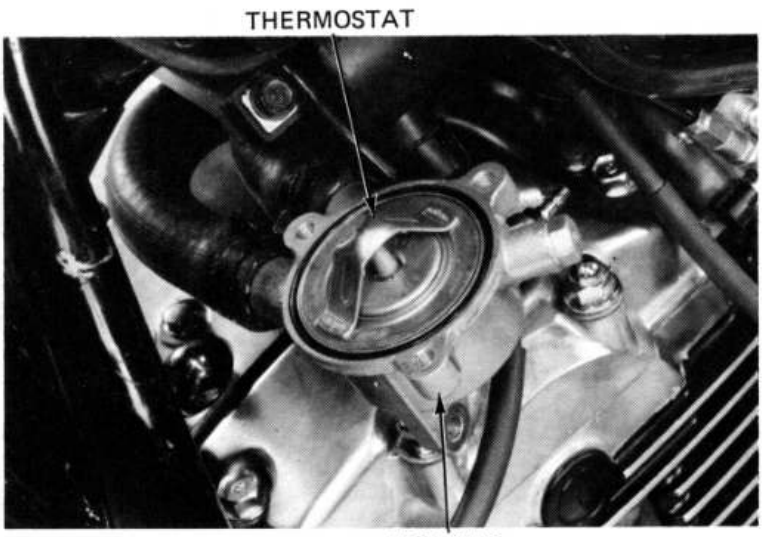
Remove the bolt attaching the thermostat housing to the frame.

Remove the thermostat housing cover bolts and cover.





Remove the thermostat from the housing.



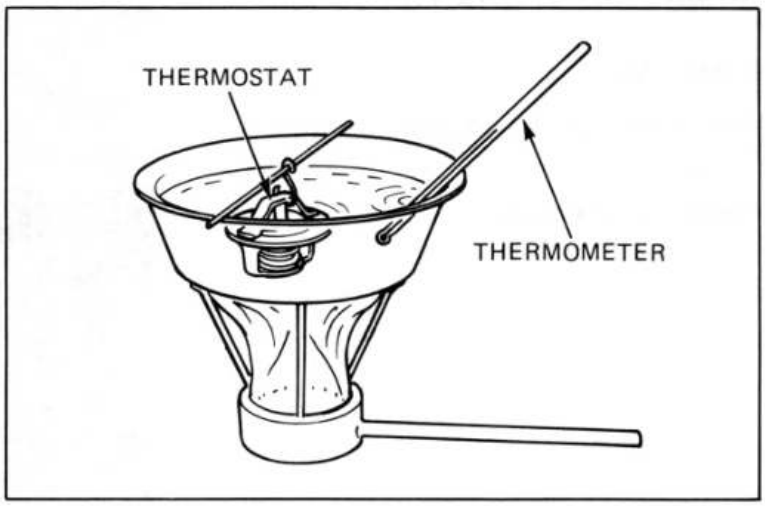
INSPECTION

Visually inspect the thermostat for damage.
Suspend the thermostat in heated water to check its operation. Do not let the thermostat or thermometer touch the pan or false readings will result.

Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

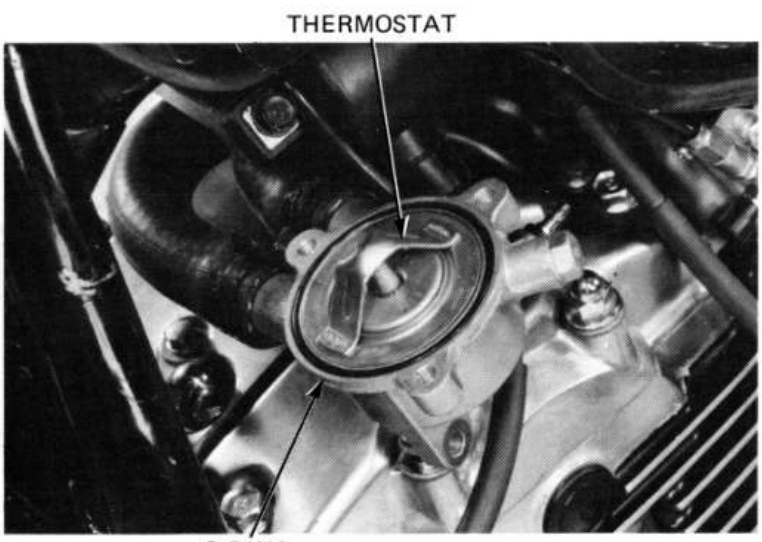
Technical Data

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



INSTALLATION

Install a new O-ring on the thermostat housing and insert the thermostat into the housing.



Install the thermostat housing cover and tighten the bolts.

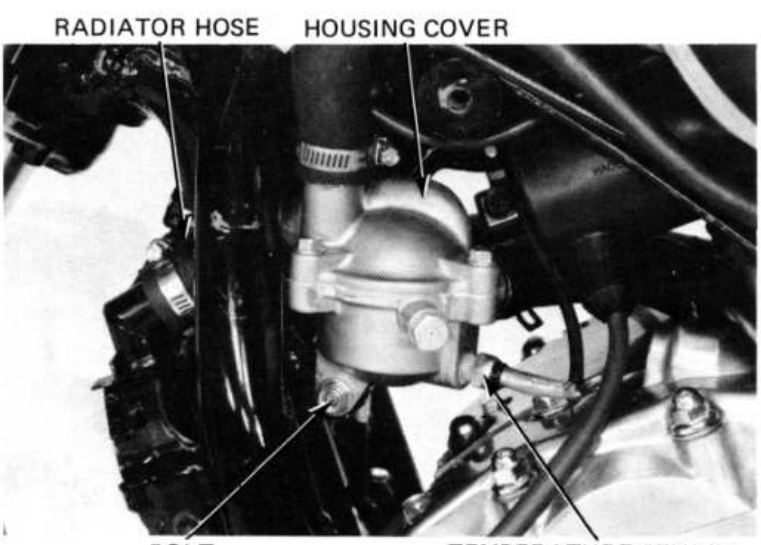
Connect the radiator upper hose to the radiator and tighten the hose band.

Secure the thermostat housing to the frame with the bolt.

Connect the wire lead to the temperature sensor.

Fill the cooling system (page 6-3).

Install the radiator filler neck cover, fuel tank, seat and radiator cover.

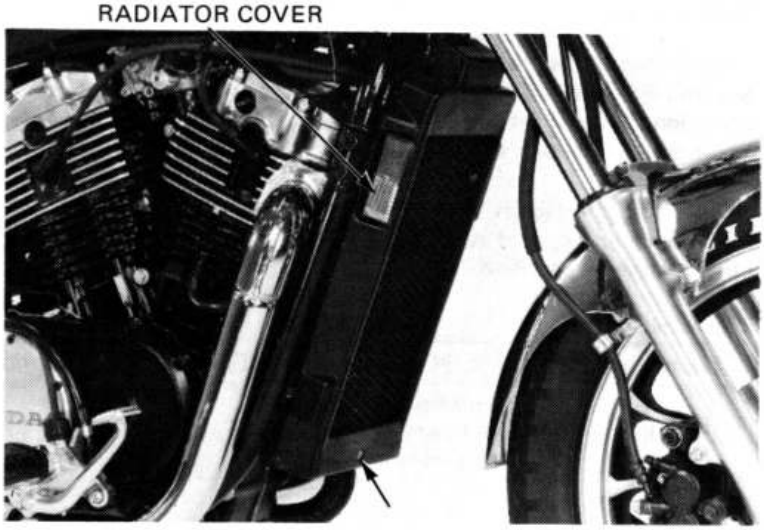


RADIATOR/COOLING FAN

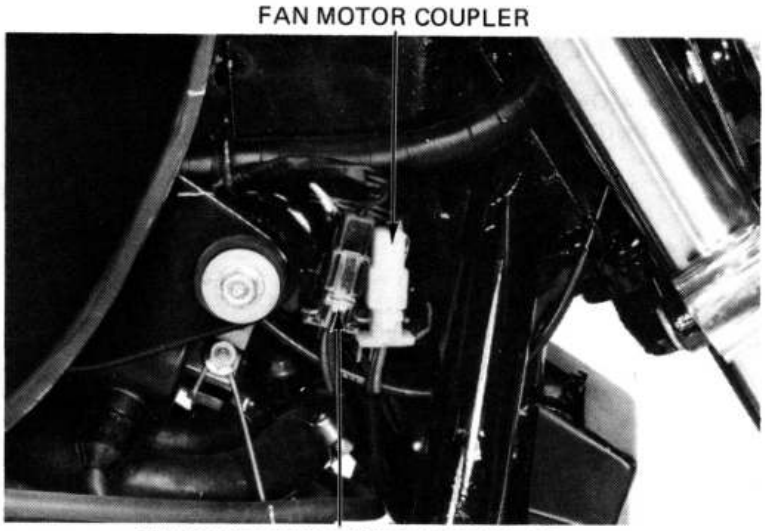
REMOVAL

Remove the drain bolt and drain the coolant (page 6-3).

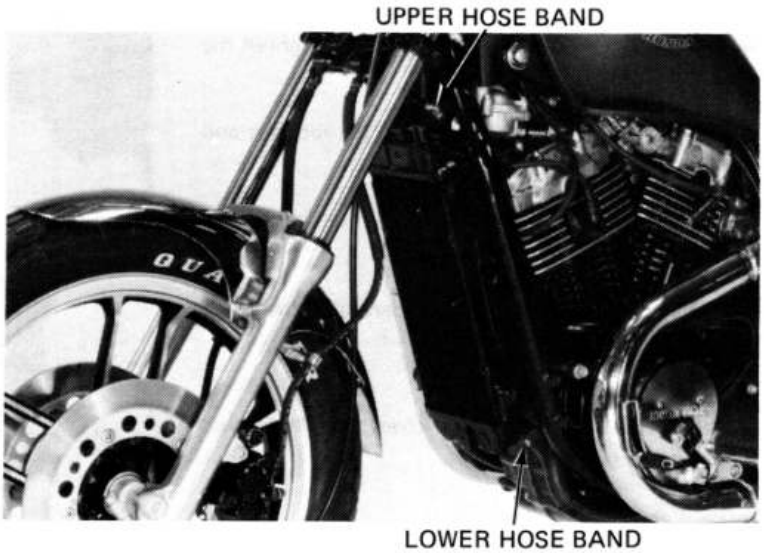
Remove the radiator cover.



Disconnect the fan motor and thermostatic switch couplers from the wire harness.

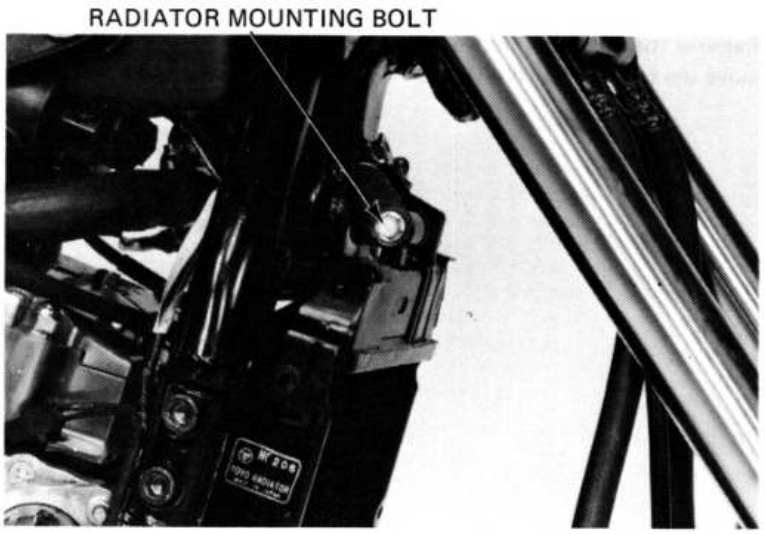


Loosen the upper and lower hose bands.



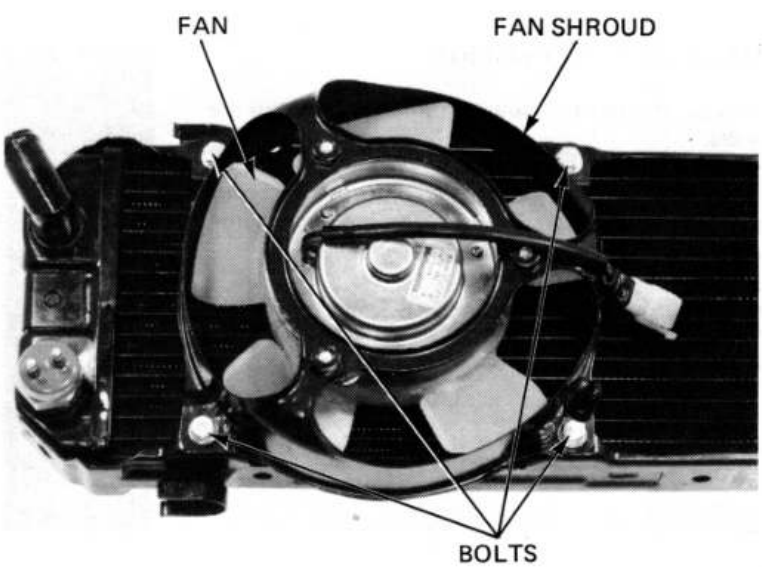
Remove the radiator mounting bolt.

Remove the radiator while pulling the upper and lower hoses off.

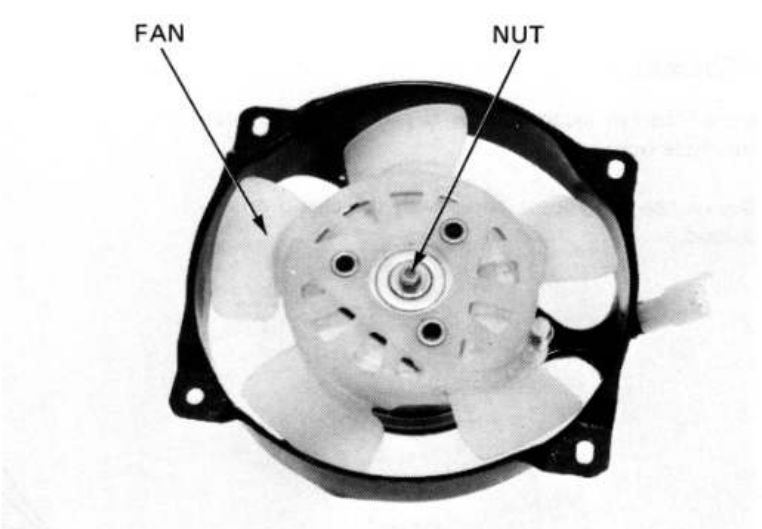


DISASSEMBLY

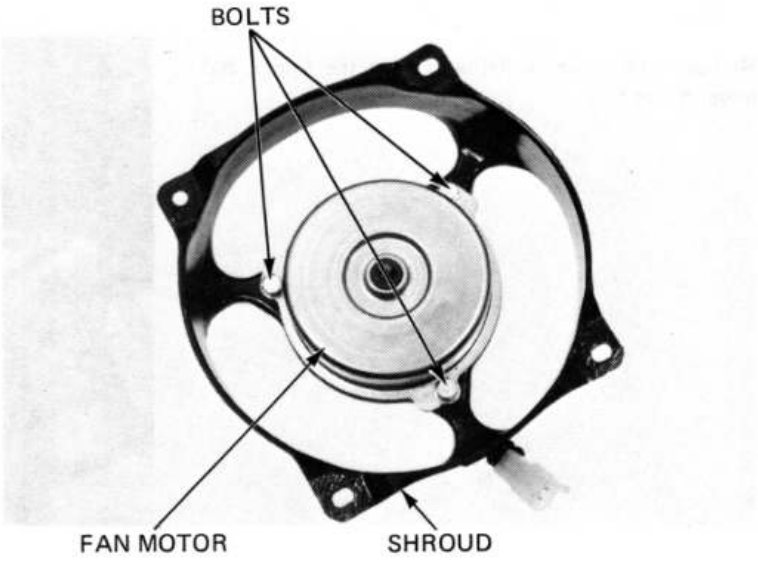
Remove the fan shroud with the fan by removing the four bolts.



Remove the fan attaching nut and pull the fan off the fan motor.



Remove the three fan motor attaching bolts and remove the fan motor from the shroud.

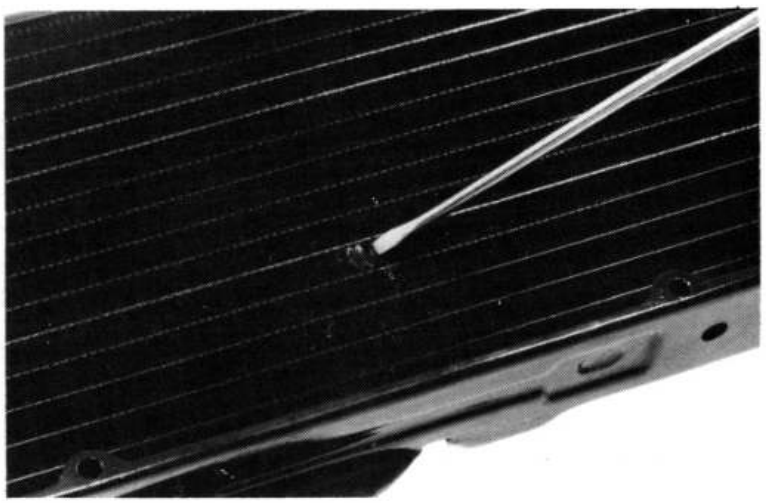


RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.

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

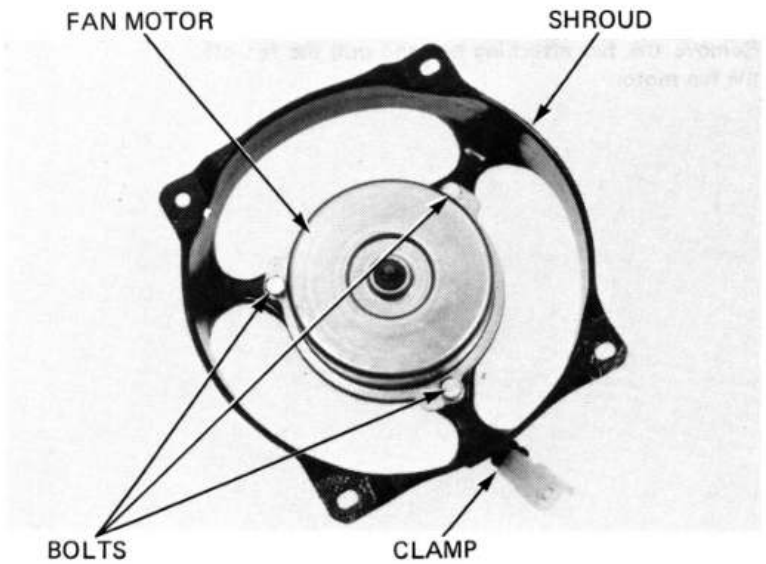
Carefully straighten any bent fins.



ASSEMBLY

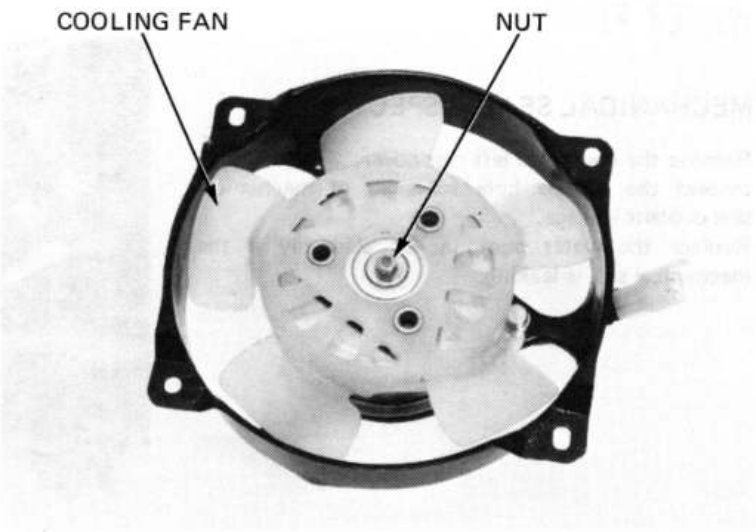
Install the fan motor on the fan shroud and tighten the three bolts.

Secure the fan motor wires with the clamp on the shroud.

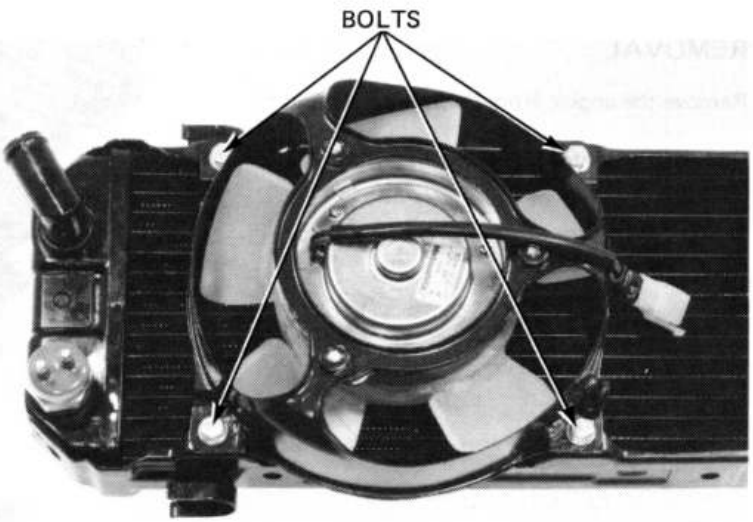


Place the fan over the motor shaft.

Apply a locking agent to the fan motor shaft threads, install and torque the plain washer, lock washer and nut.



Attach the fan shroud to the radiator with the four bolts.



INSTALLATION

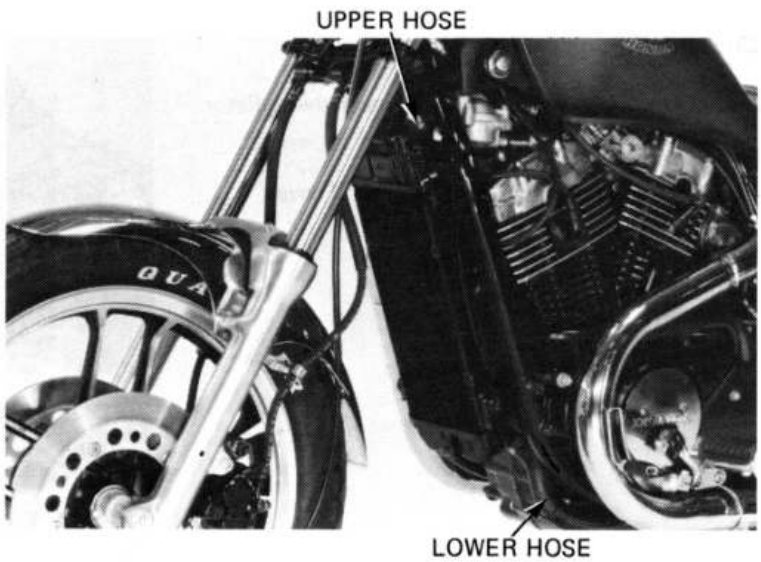
Install the radiator onto the frame and tighten the mounting bolts.

Connect the upper and lower hoses to the radiator and tighten the hose bands.

Connect the thermostatic switch and fan motor wire couplers to the wire harness.

Install the radiator cover.

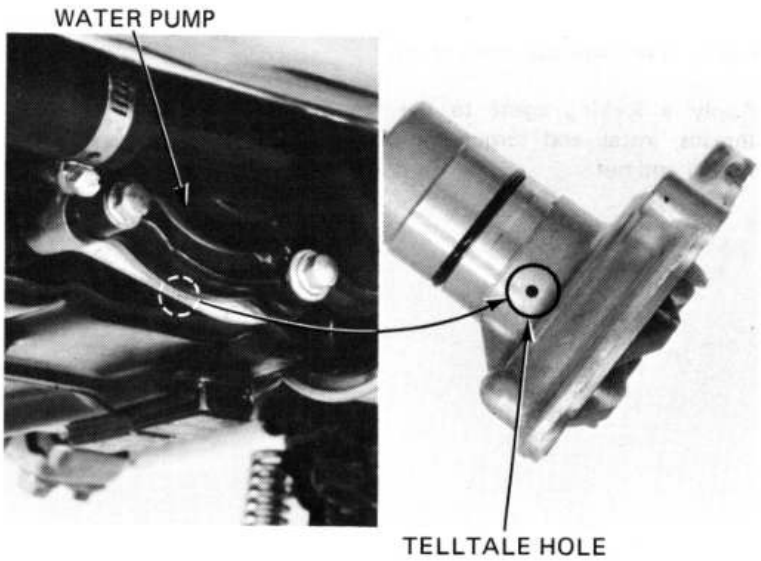
Fill the cooling system (page 6-3).



WATER PUMP

MECHANICAL SEAL INSPECTION

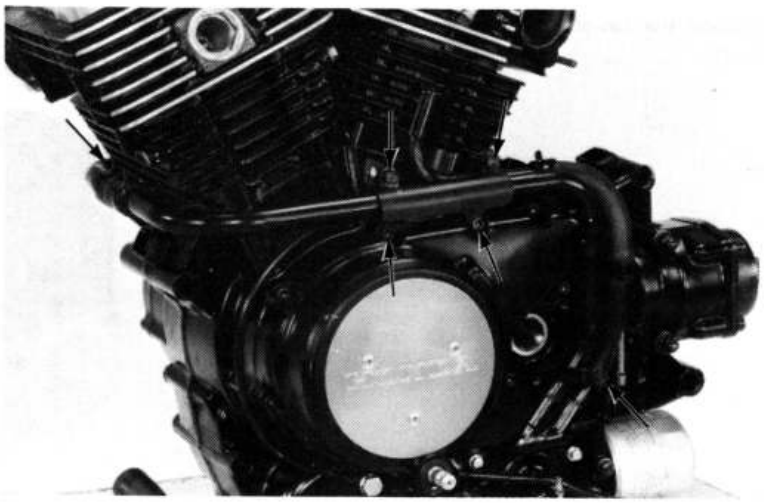
Remove the crankcase left rear cover.
Inspect the telltale hole for signs of mechanical seal coolant leakage.
Replace the water pump as an assembly if the mechanical seal is leaking.



REMOVAL

Remove the engine from the frame (Section 5).

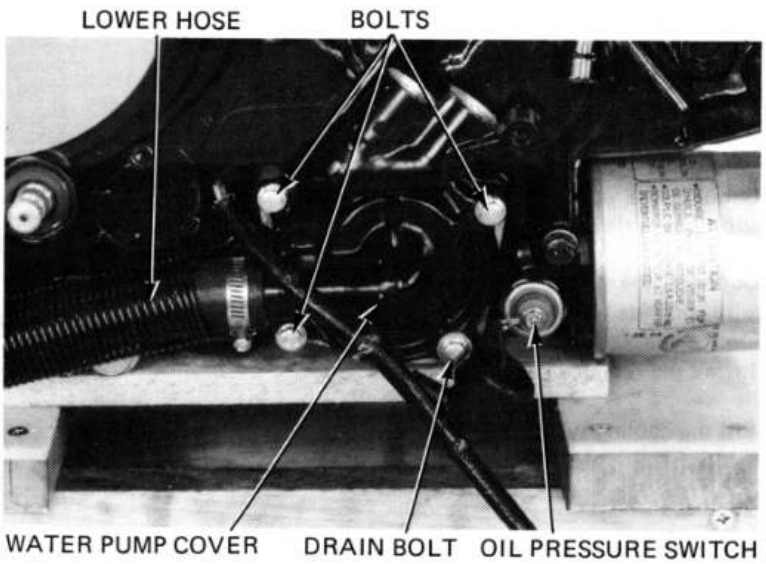
Remove the water pipes and hoses from the engine.



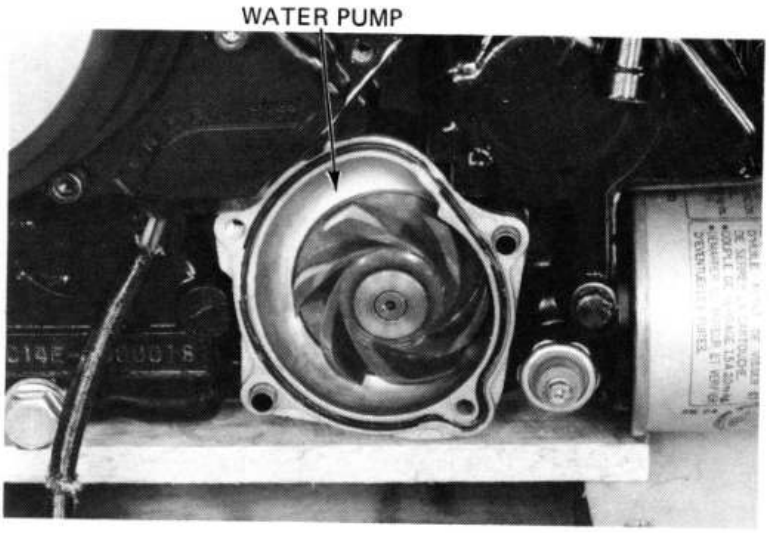
Disconnect the oil pressure switch wire.

Loosen the hose band and disconnect the radiator lower hose from the water pump.

Remove the water pump cover bolts and cover.

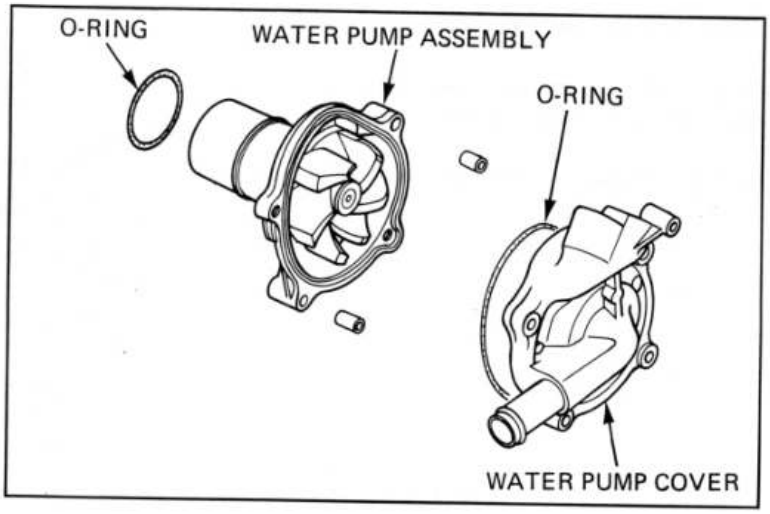


Pull the water pump off the crankcase.



INSPECTION

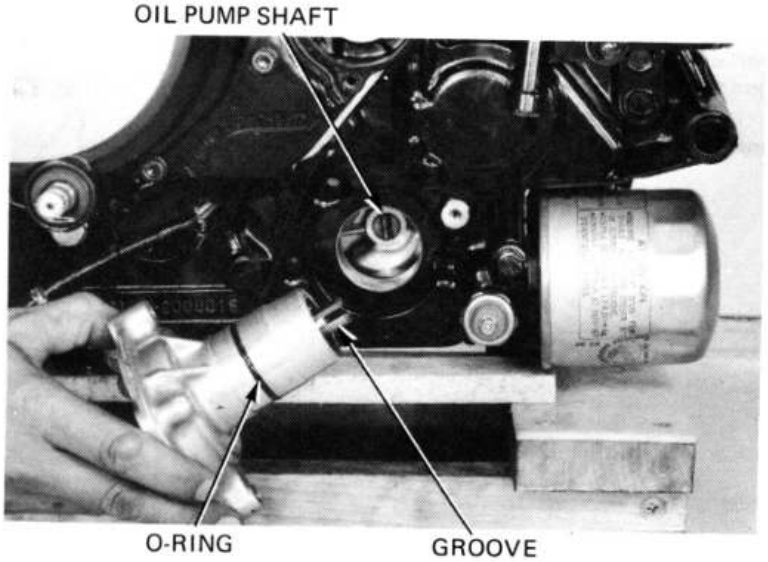
Check the water pump for mechanical seal leakage and bearing deterioration. Replace the water pump as an assembly if necessary.



INSTALLATION

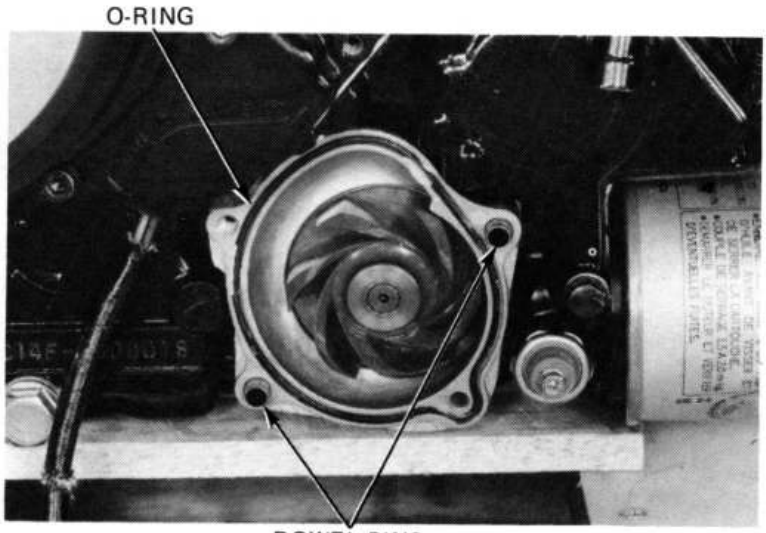
Apply a coat of clean engine oil to a new O-ring and install it in the water pump shaft housing groove.

Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.



Apply a coat of engine oil to a new O-ring and install it around the impeller.

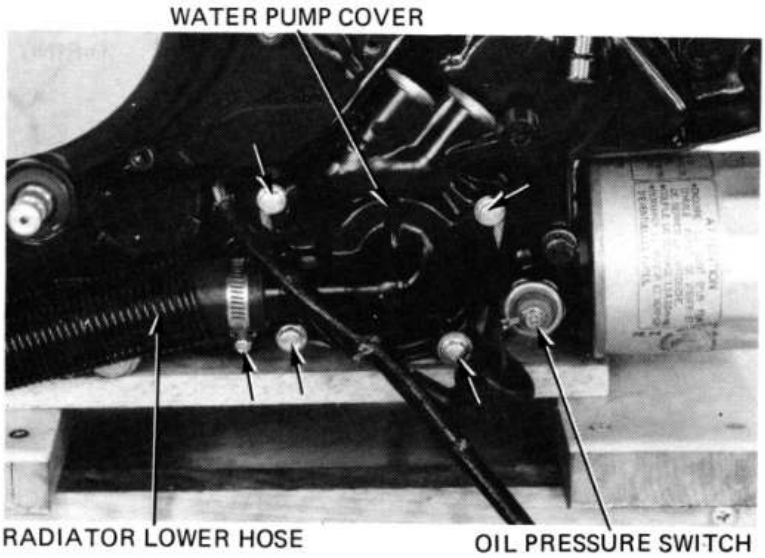
Install the two dowel pins.



Install the water pump cover.

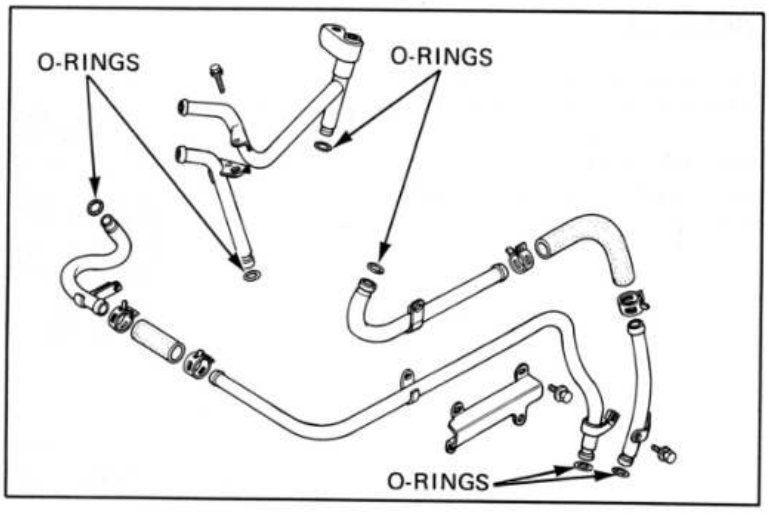
Connect the radiator lower hose to the water pump cover and tighten the hose band.

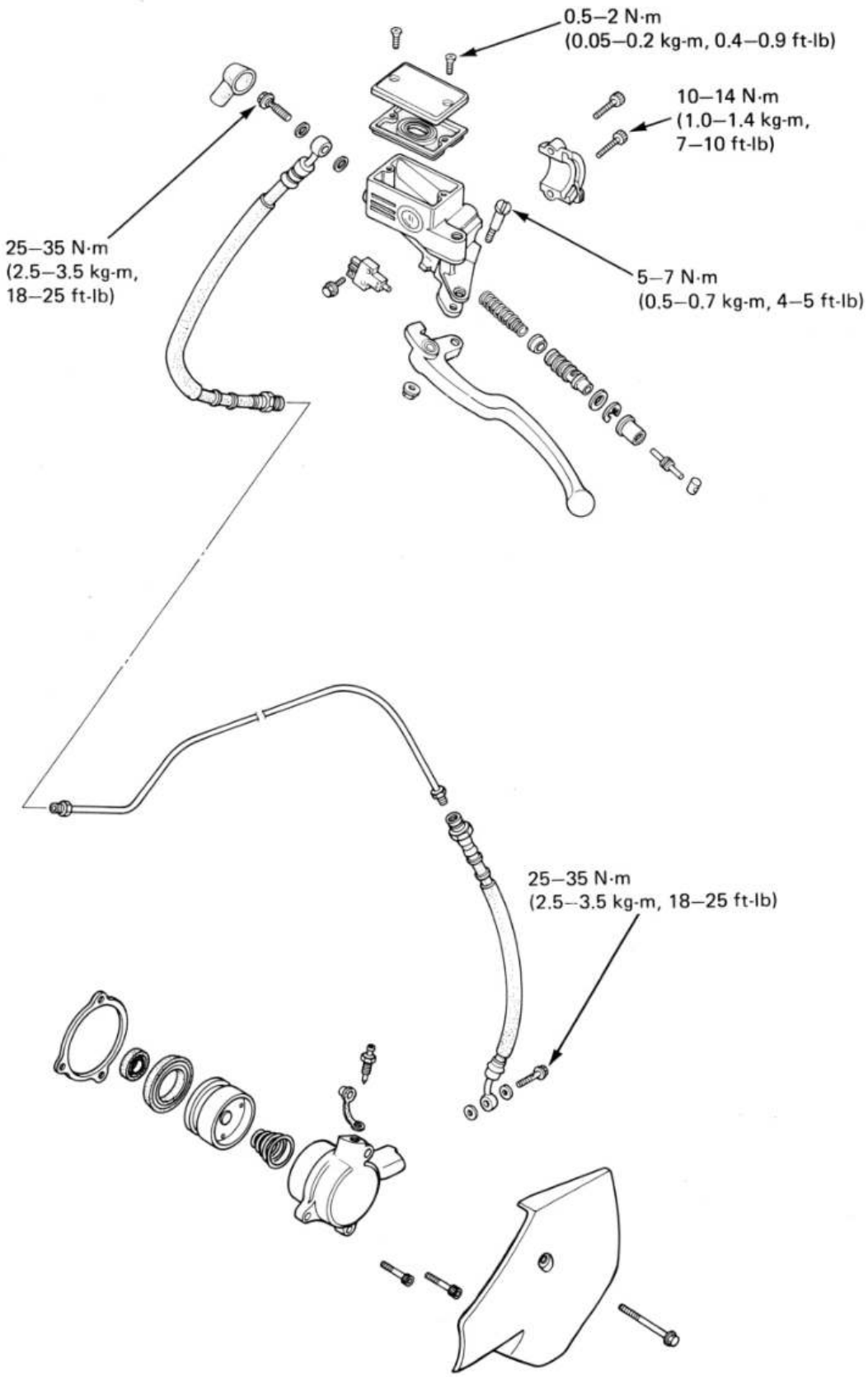
Connect the oil pressure switch wire to the switch.



Install the water pipes and hoses with new O-rings and tighten the hose bands.

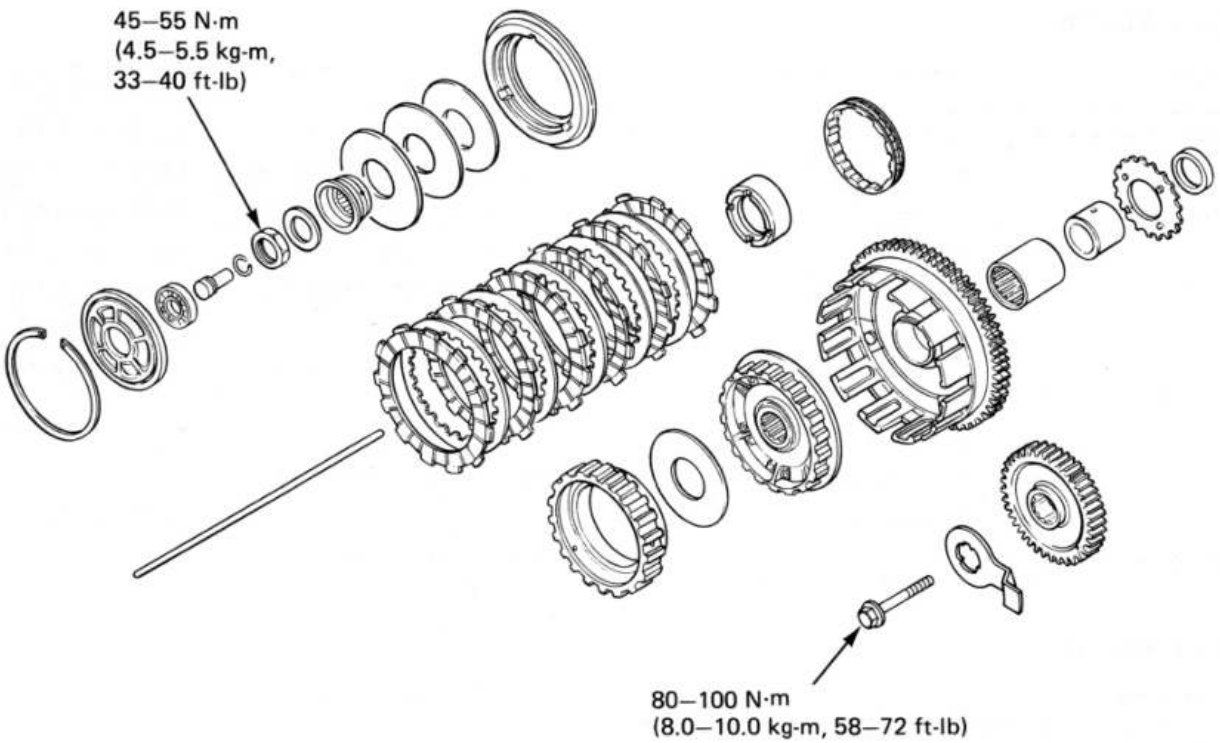
Install the engine into the frame (page 5-6).

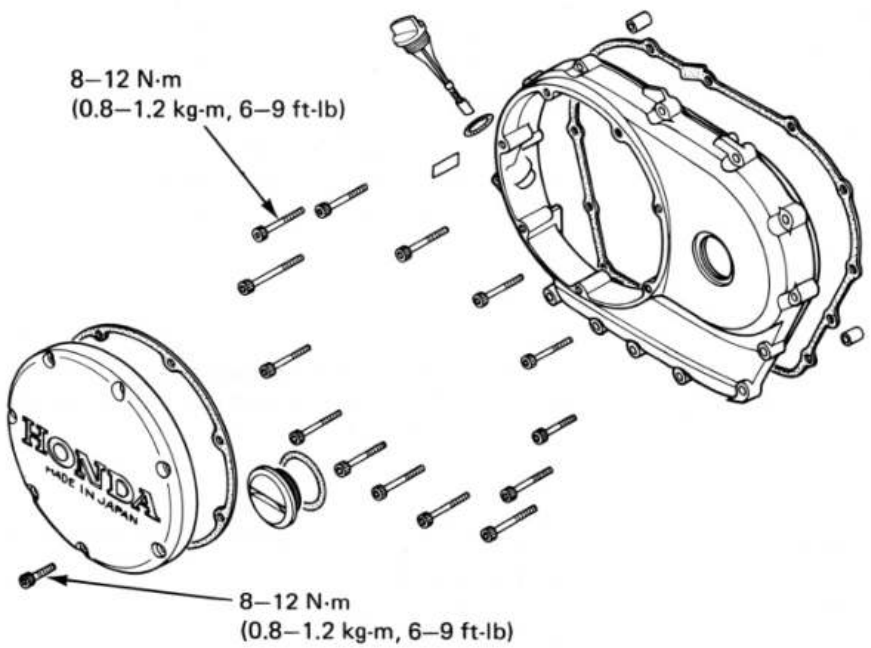



0.5–2 N·m
(0.05–0.2 kg-m, 0.4–0.9 ft-lb)
10–14 N·m
(1.0–1.4 kg-m,
7–10 ft-lb)
25–35 N·m
(2.5–3.5 kg-m,
18–25 ft-lb)
5–7 N·m
(0.5–0.7 kg-m, 4–5 ft-lb)
25–35 N·m
(2.5–3.5 kg-m, 18–25 ft-lb)

7. CLUTCH

SERVICE INFORMATION	7–2	CLUTCH SLAVE CYLINDER	7–8
TROUBLESHOOTING	7–3	CLUTCH DISASSEMBLY	7–12
CLUTCH FLUID REPLACEMENT/ AIR BLEEDING	7–4	CLUTCH ASSEMBLY	7–17
CLUTCH MASTER CYLINDER	7–5	PRIMARY GEAR	7–23





SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch hydraulic system, clutch and primary driver gear.
- DOT-3 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.	14.000–14.043 mm (0.5512–0.5524 in)	14.06 mm (0.553 in)
	Piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.94 mm (0.549 in)
Clutch slave cylinder	Cylinder I.D.	38.100–38.162 mm (1.5000–1.5024 in)	38.18 mm (1.503 in)
	Piston O.D.	38.036–38.075 mm (1.4975–1.4990 in)	38.02 mm (1.497 in)
Clutch	Outer guide I.D.	24.995–25.012 mm (0.9841–0.9847 in)	25.08 mm (0.987 in)
	Spring free height	3.9 mm (0.15 in)	3.6 mm (0.14 in)
	Clutch center B I.D.	74.414–74.440 mm (2.9297–2.9307 in)	74.50 mm (2.933 in)
	One way clutch inner O.D.	57.710–57.840 mm (2.2720–2.2772 in)	57.60 mm (2.268 in)
	Disc thickness	3.72–3.88 mm (0.147–0.153 in)	3.1 mm (0.12 in)
	Plate warpage	–	0.30 mm (0.012 in)
Pulse coil air gap		0.3–0.9 mm (0.01–0.04 in)	–

TORQUE VALUES

Clutch hose oil bolts		25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Clutch fluid reservoir cover		1–2 N·m (0.1–0.2 kg-m, 0.7–0.9 ft-lb)
Clutch lever pivot nut		5–7 N·m (0.5–0.7 kg-m, 4–5 ft-lb)
Clutch center lock nut		45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)
Clutch cover bolts		8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Right crankcase cover bolts		8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Primary gear bolt		80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Sub-frame bolts	Upper	70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
	Lower	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Exhaust pipe joint nuts		8–14 N·m (0.8–1.4 kg-m, 6–10 ft-lb)
Exhaust pipe clamp bolts		18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

TOOLS

Special

Snap ring pliers	07914–3230001 or commercially available in U.S.A.
Gear holder	07924–MC70001 or modified 07924–MC70000 or 07924–4150000
Shaft holder	07923–6890101

Common

Extension bar	07716–0020500 ┐
Lock nut wrench, 17 x 27 mm	07716–0020300 ┘ or commercially available in U.S.A.
Driver	07749–0010000
Attachment, 37 x 40 mm	07746–0010200
Pilot, 35 mm	07746–0040800

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. Spring 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.

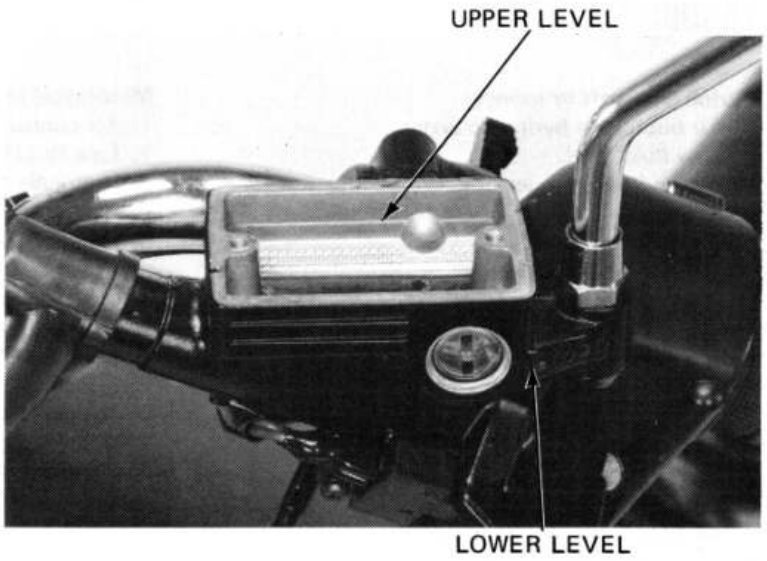
Clutch operation feels rough
1. Outer drum slots rough.
2. Sticking piston(s).

CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

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

CAUTION:

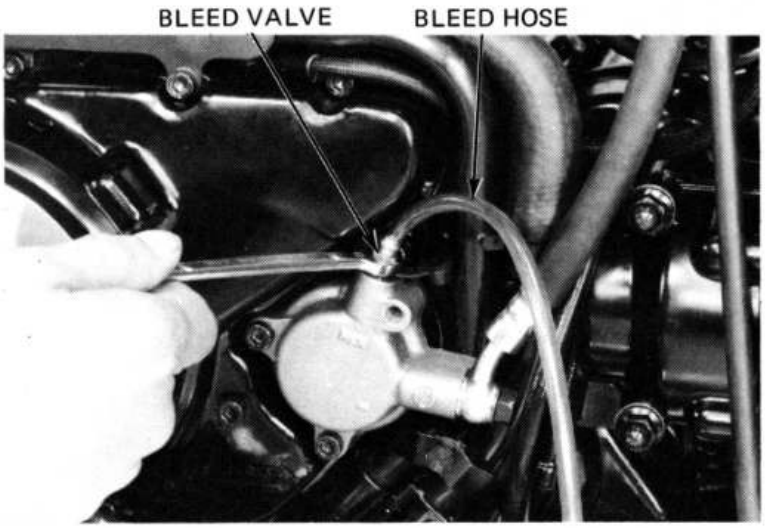
- *Install the diaphragm on the reservoir when operating the clutch lever. Failure to do so will allow clutch fluid to squirt out of the reservoir during clutch operation.*
- *Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.*



CLUTCH FLUID DRAINING

Connect a bleed hose to the bleed valve.

Loosen the slave cylinder bleed valve and pump the clutch lever. Stop operating the lever when no more fluid flows out of the bleed valve.



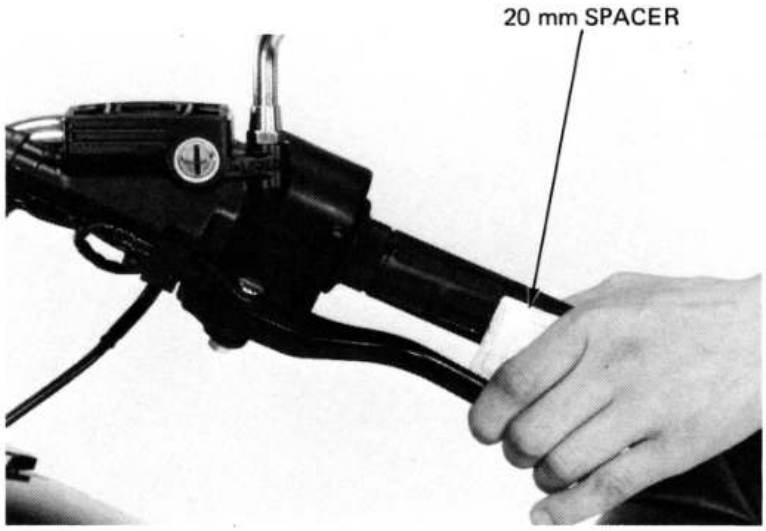
CLUTCH FLUID FILLING

NOTE:

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

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

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



AIR BLEEDING

NOTE:

- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- Use only DOT 3 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

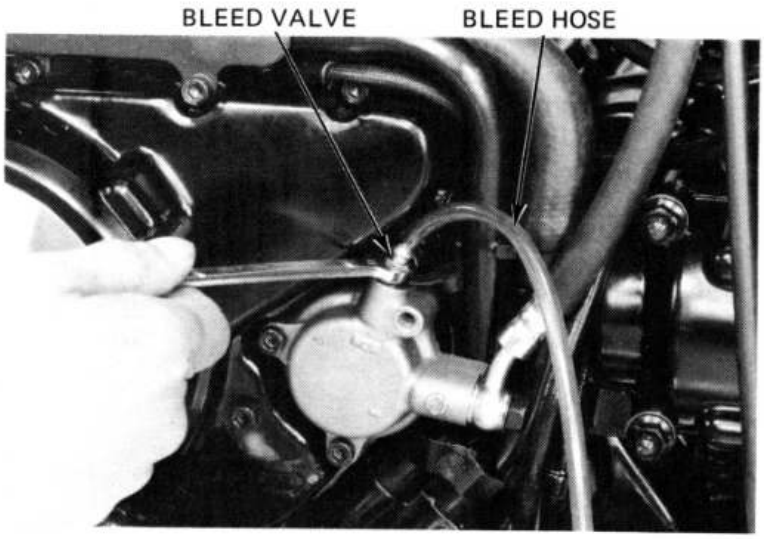
NOTE:

> 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 up to between the upper and the lower levels.



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:

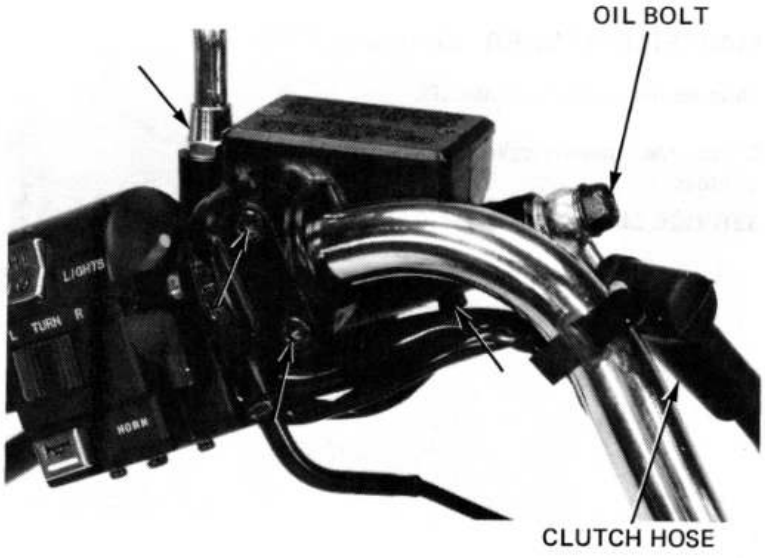
> *Avoid spilling clutch fluid on painted surfaces. Place a rag over the fuel tank whenever the clutch system is serviced.*

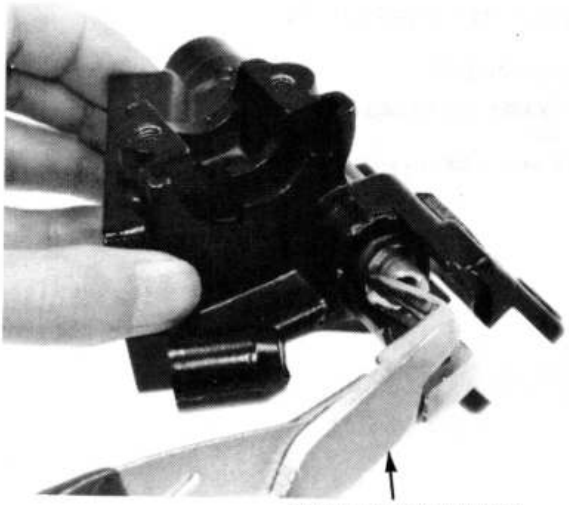
NOTE:

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

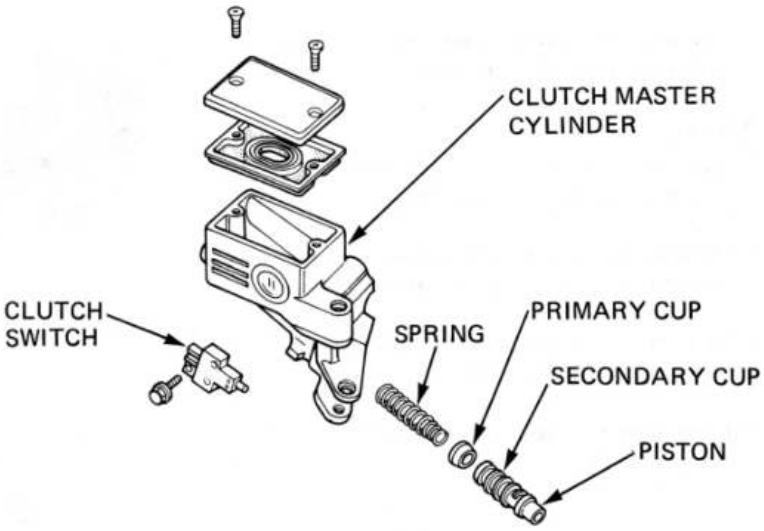
Remove the master cylinder.

Remove the push rod boot and circlip from the master cylinder body.





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

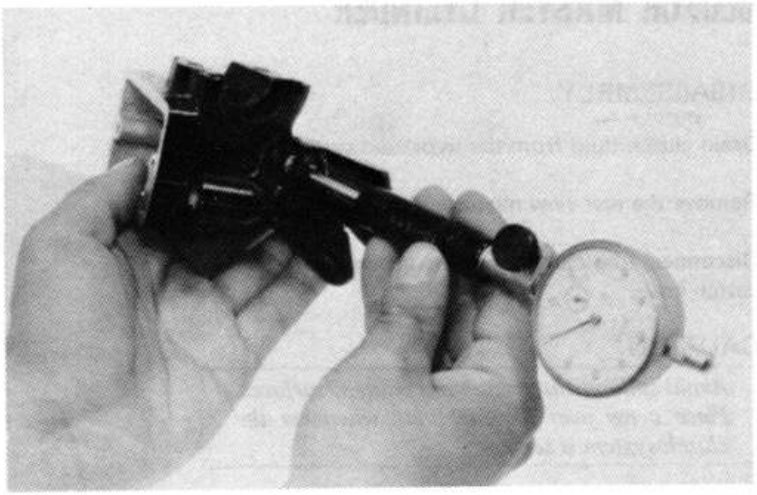


MASTER CYLINDER I.D. INSPECTION

Measure the master cylinder I.D.

Check the master cylinder for scores, scratches or nicks.

SERVICE LIMIT: 14.06 mm (0.553 in)

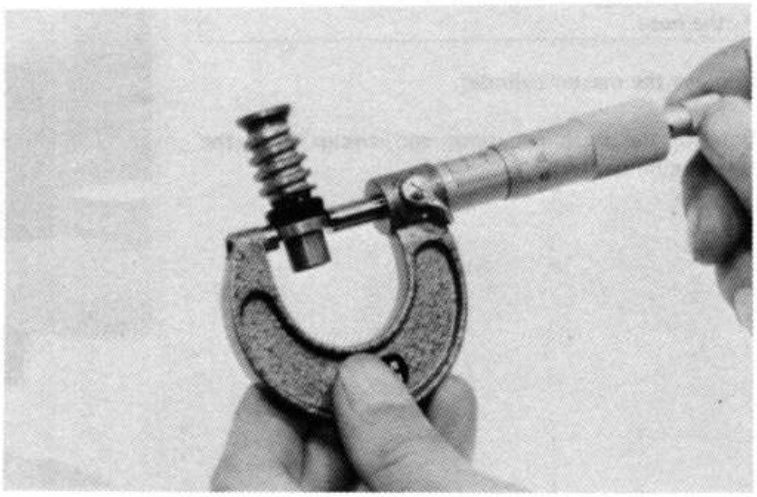


MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.94 mm (0.549 in)

Check the primary and secondary cups for damage before assembly.



ASSEMBLY

CAUTION:

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

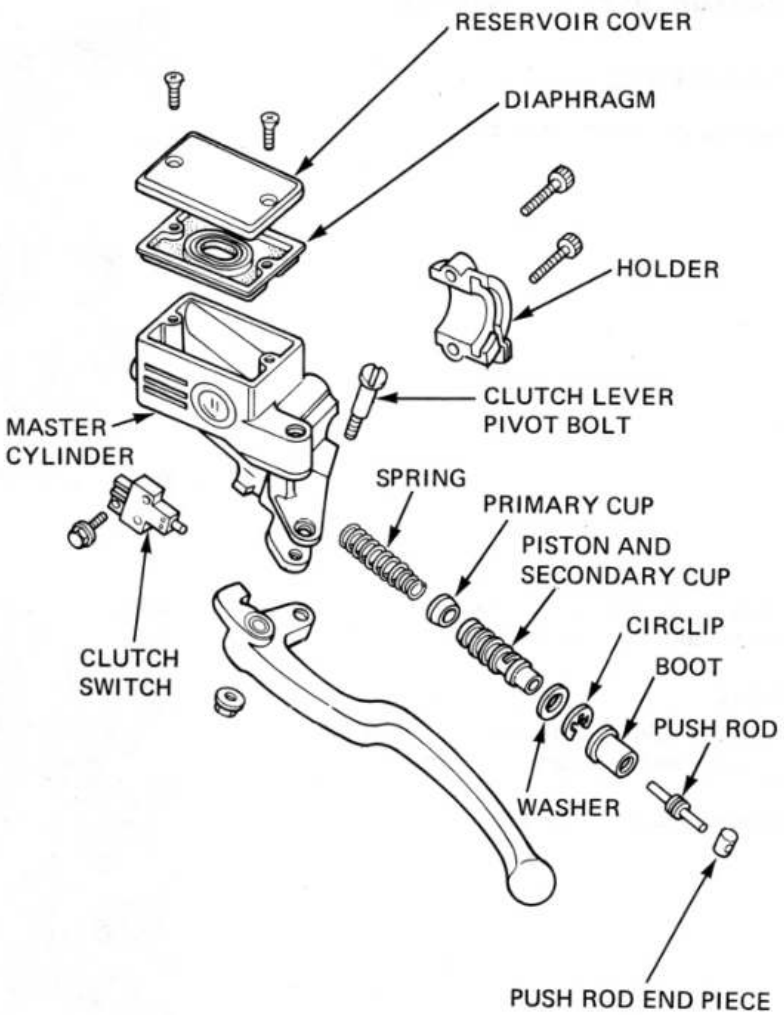
Coat all parts with clean brake fluid before assembly.

Install the spring, primary cup and piston.

CAUTION:

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

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

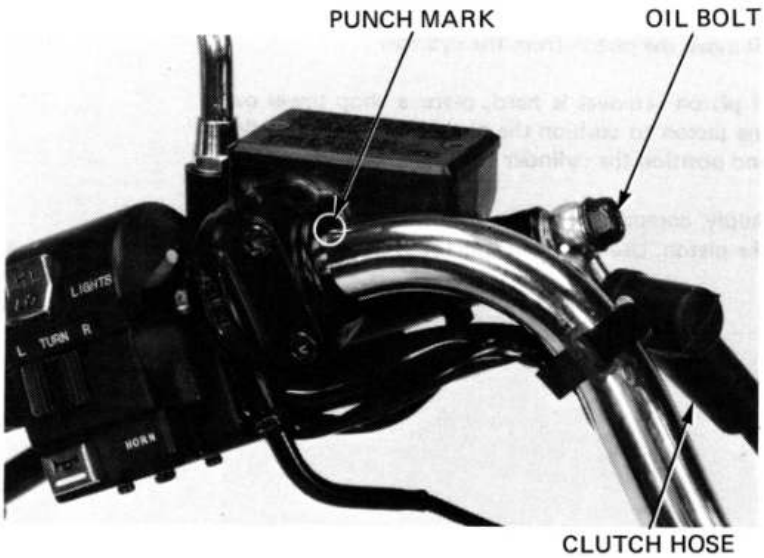


Place the master cylinder on the handlebar and install the holder and the two mounting bolts.
Align the end of the holder with the handlebar punch mark.
Tighten the top bolt first, then the bottom bolt.

Install the oil hose with the bolt and its two sealing washers.

Install the push rod end piece into the clutch lever hole and install the clutch lever.

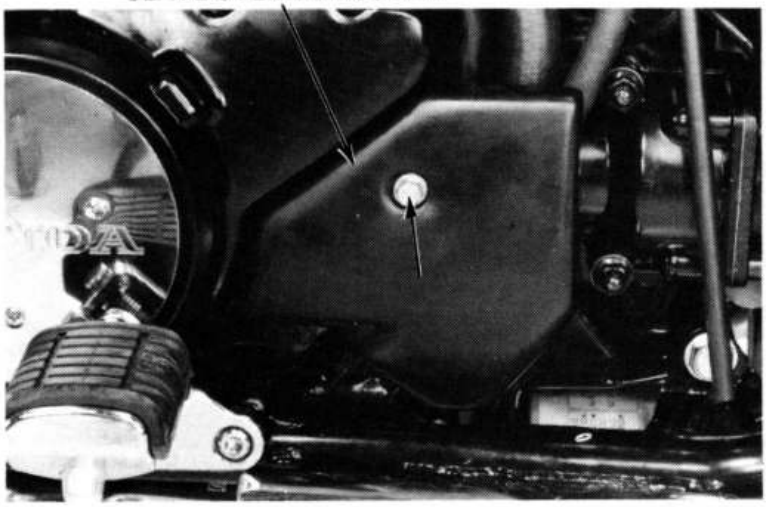
Connect the clutch switch wires to the switch terminals. Fill the reservoir and bleed the clutch system (page 7-4).



CLUTCH SLAVE CYLINDER

DISASSEMBLY

Remove the slave cylinder cover.

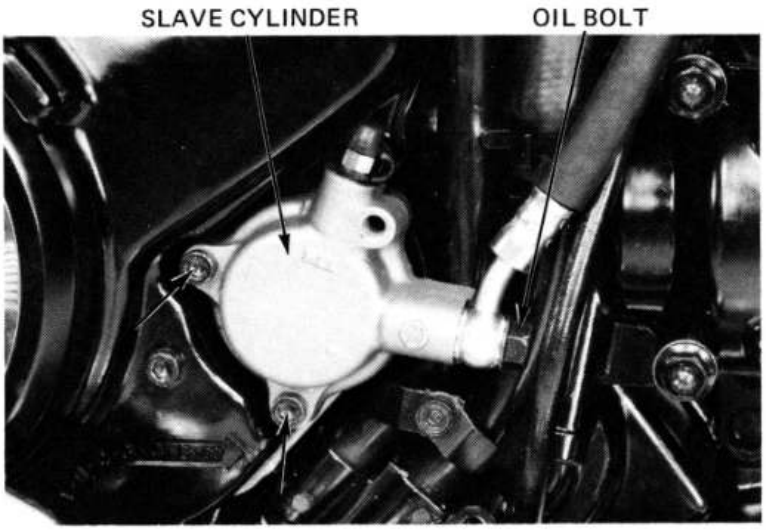


Place a container under the slave cylinder, remove the oil bolt and disconnect the clutch hose.

NOTE:

> Avoid spilling clutch fluid on painted surfaces to prevent damage to the paint.

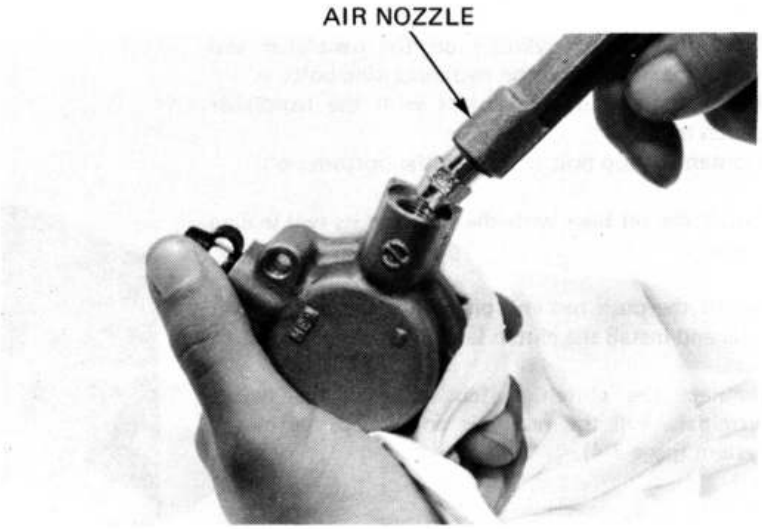
Remove the slave cylinder.



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.

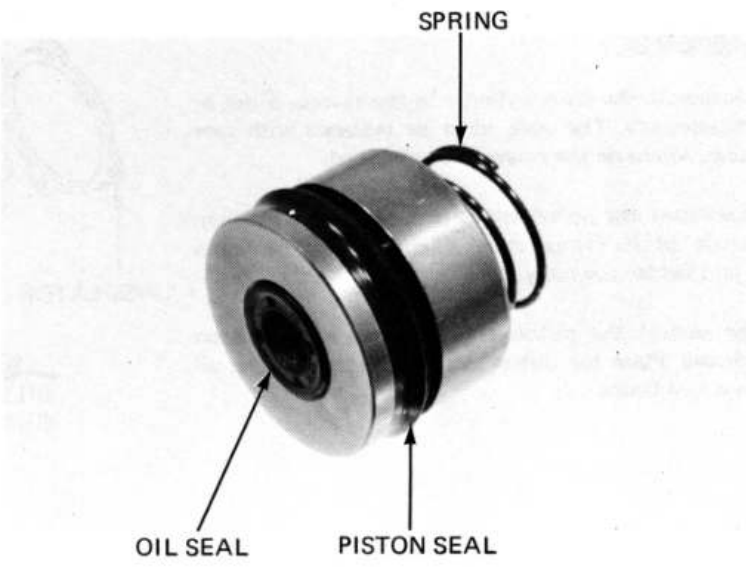


Remove the spring from the slave cylinder.

Remove the oil and piston seals.

Clean the piston groove with clutch fluid.

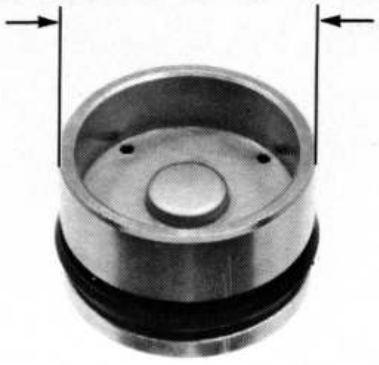
Check the piston spring for weakness or damage.



PISTON O.D. INSPECTION

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

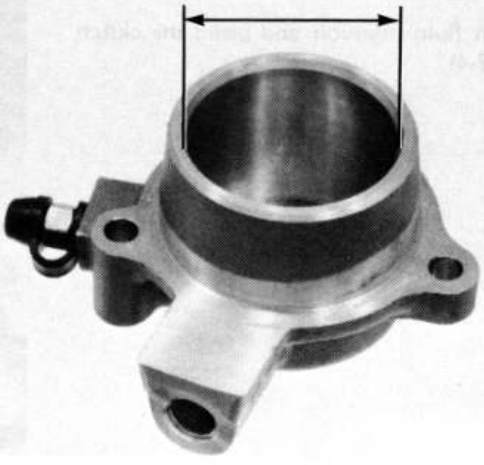
SERVICE LIMIT: 38.02 mm (1.497 in)



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)

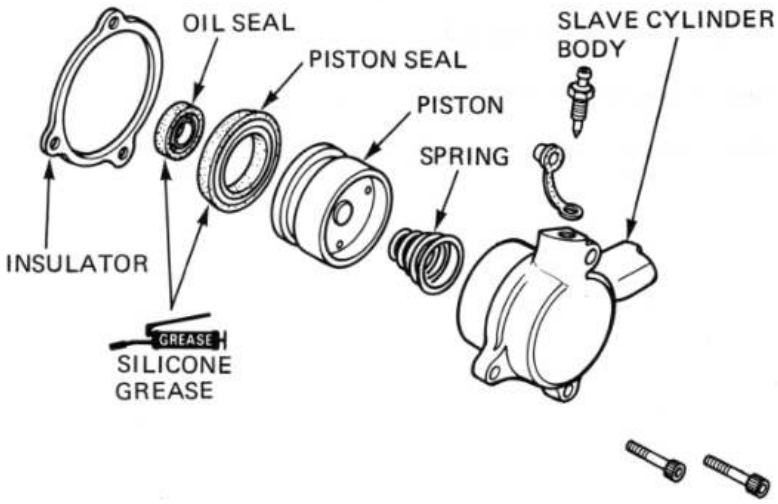


ASSEMBLY

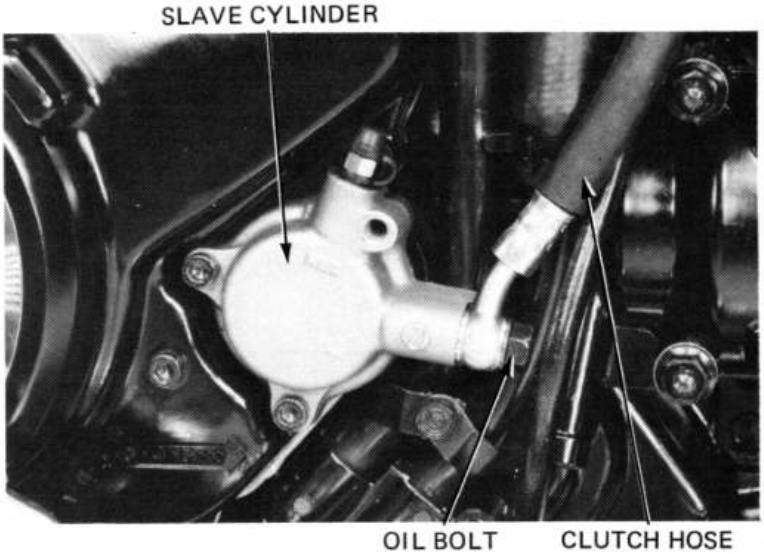
Assemble the slave cylinder in the reverse order of disassembly. The seals must be replaced with new ones whenever they have been removed.

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

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

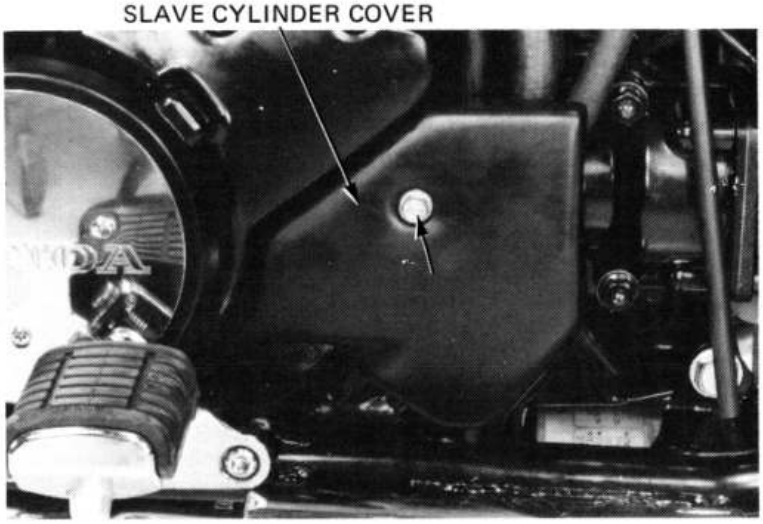


Install the insulator and slave cylinder.
Connect the clutch hose with the oil bolt and the two sealing washers.



Install the slave cylinder cover.

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

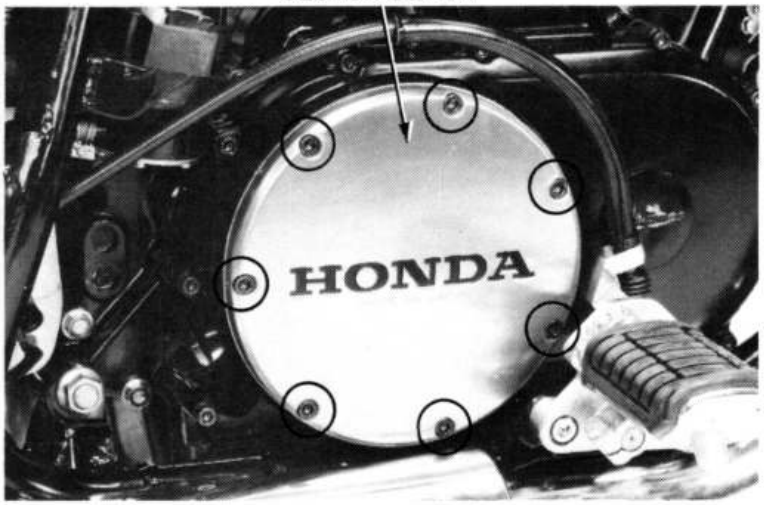


CLUTCH DISASSEMBLY

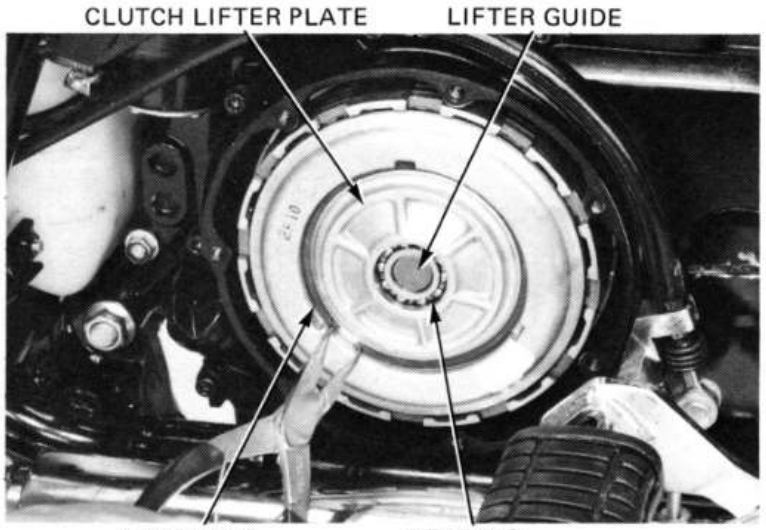
NOTE:

> All clutch components, except for the clutch outer, can be serviced by removing the clutch cover. The right crankcase cover does not need to be removed.

Drain the engine oil and remove the clutch cover and gasket.



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



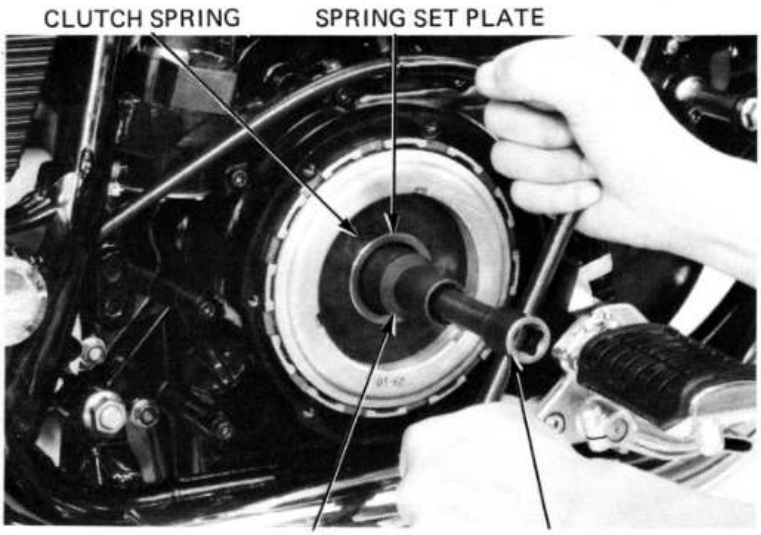
Shift the transmission into high gear and apply the rear brake.

NOTE:

> When the engine is not in the frame, shift the transmission into gear and use the MAINSHAFT HOLDER, P/N 07923–6890100, to hold the final shaft.

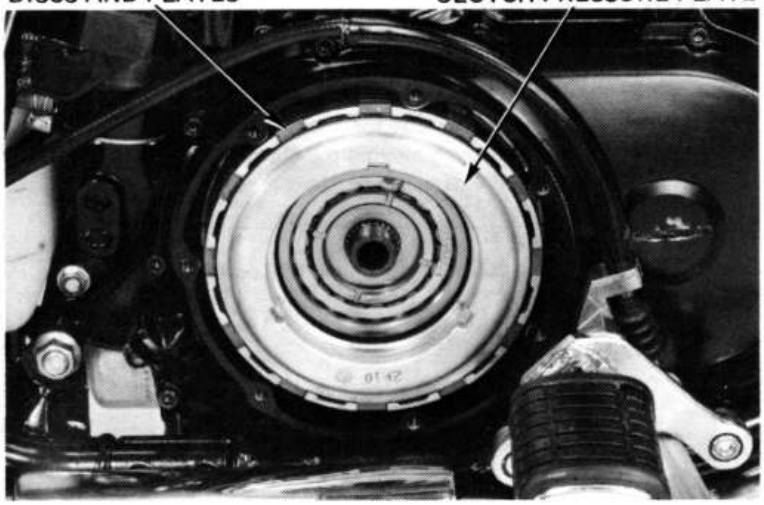
Remove the lock nut and lock washer.

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

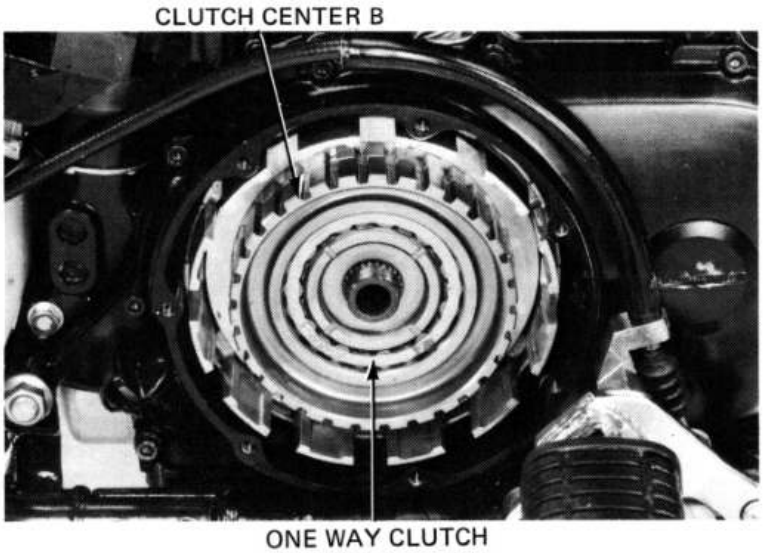


Remove the clutch pressure plate.

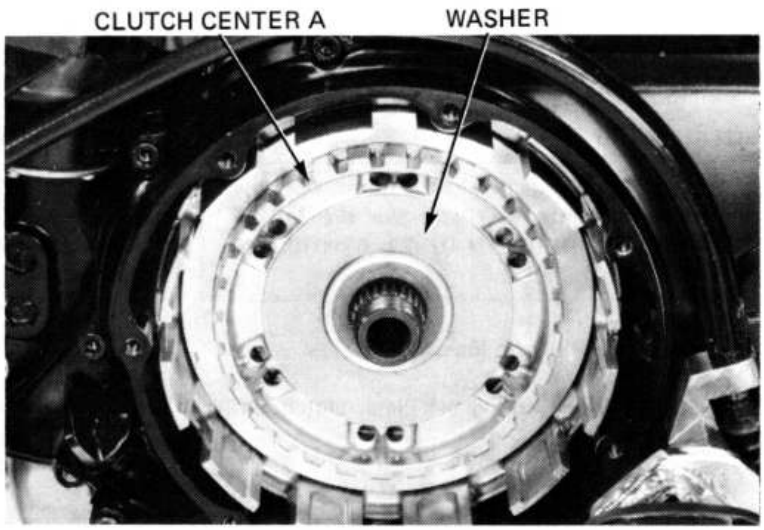
Remove the clutch plates and discs.



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



Remove clutch center A and washer.



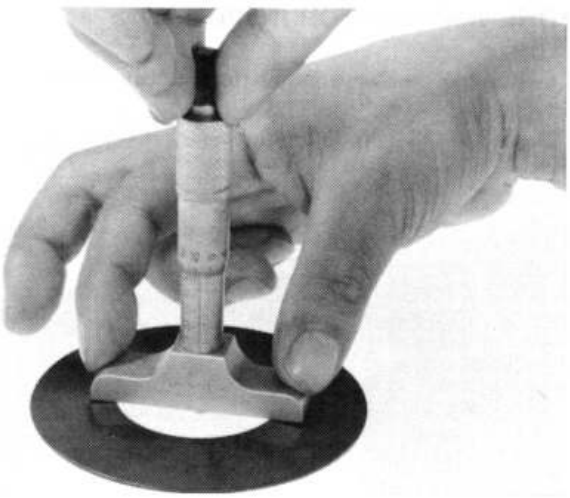
INSPECTION

CLUTCH SPRING

Measure the height of the clutch spring.

SERVICE LIMIT: 3.6 mm (0.14 in)

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

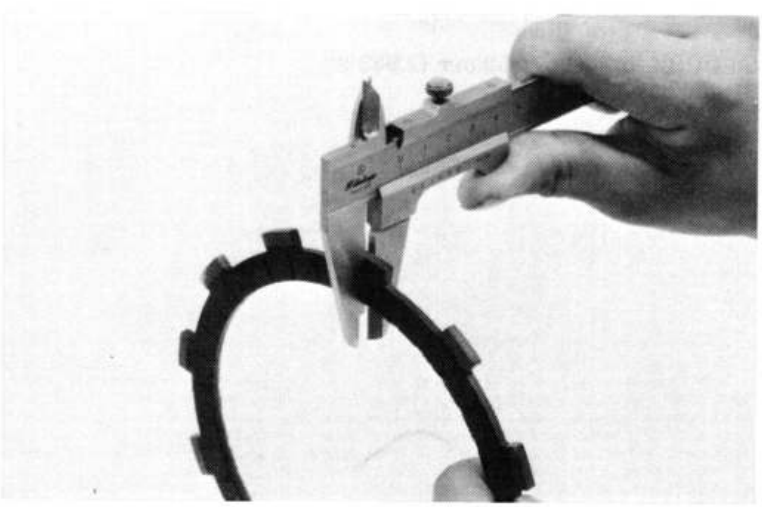


CLUTCH DISC

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

SERVICE LIMIT: 3.1 mm (0.12 in)

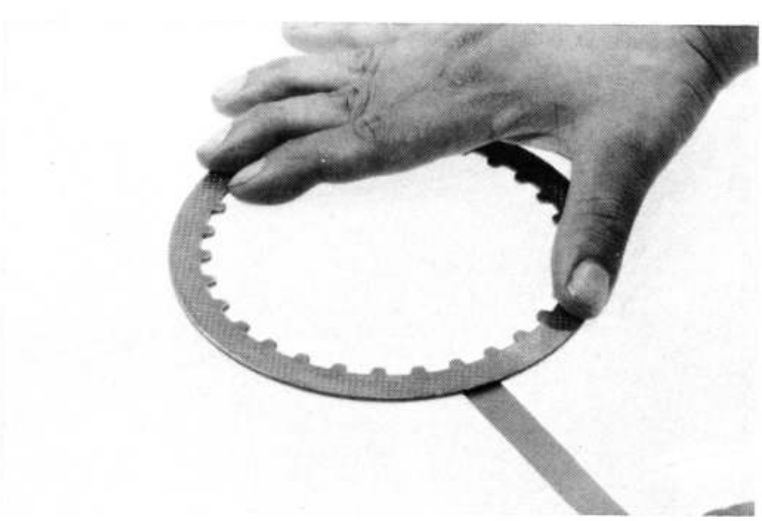
Replace any discs that are thinner than the service limit.



CLUTCH PLATE

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

SERVICE LIMIT: 0.30 mm (0.012 in)



ONE WAY CLUTCH INSPECTION

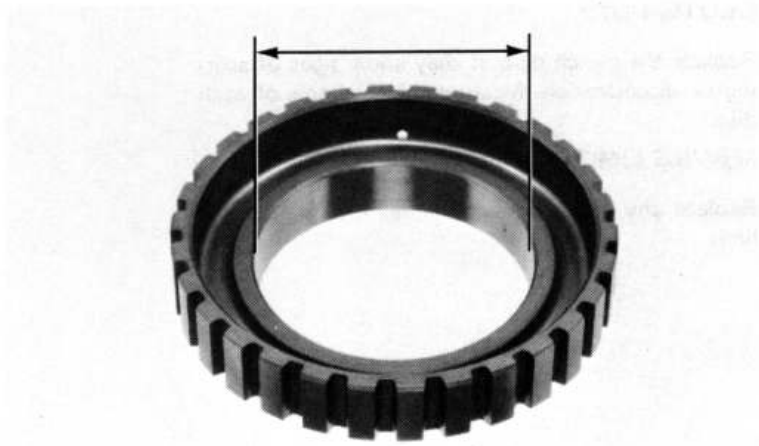
Inspect the one way clutch for smooth operation.

Check the rollers for excessive wear.



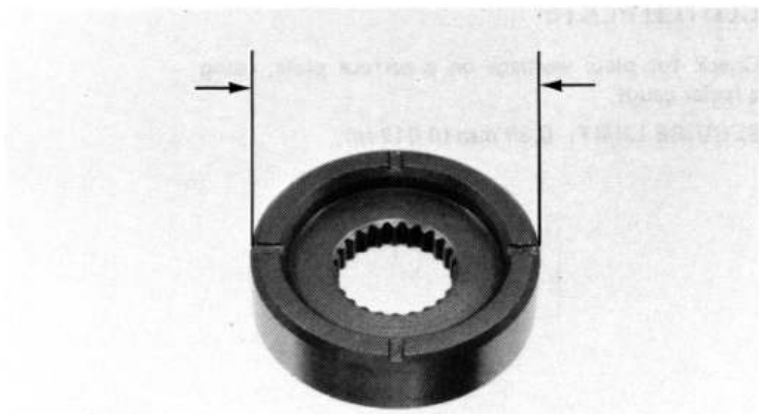
Measure the I.D. of clutch center B.

SERVICE LIMIT: 74.50 mm (2.933 in)



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

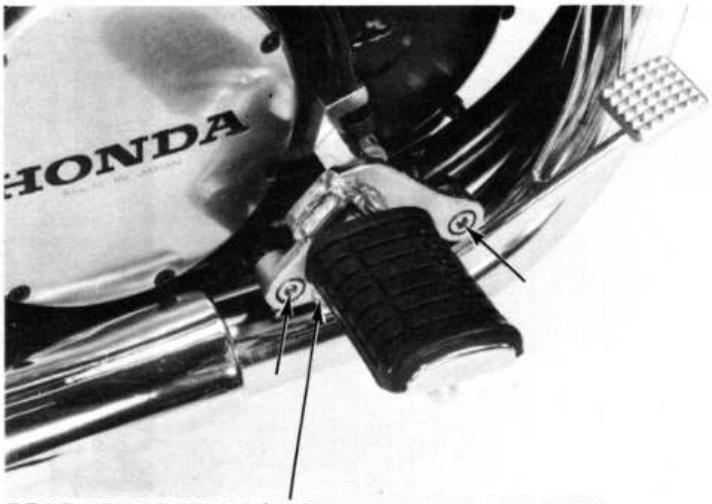
SERVICE LIMIT: 57.60 mm (2.268 in)



CLUTCH OUTER REMOVAL

Drain the engine oil.

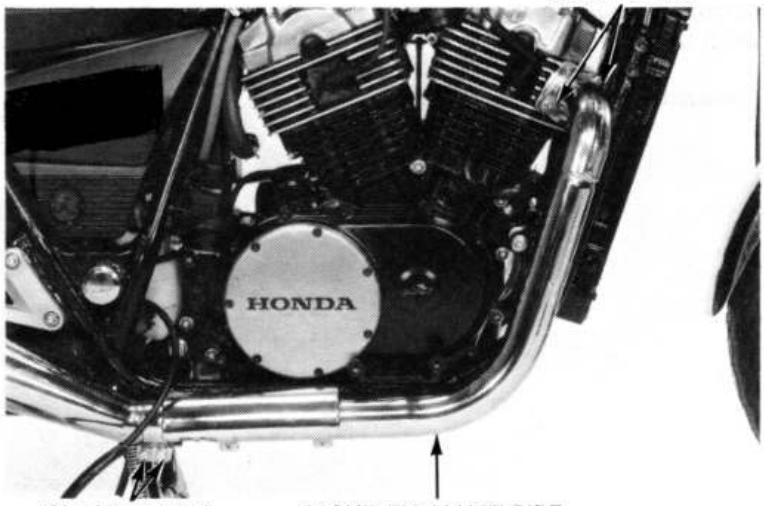
Remove the rear brake pedal/right foot peg bracket.



REAR BRAKE PEDAL/RIGHT FOOT PEG BRACKET

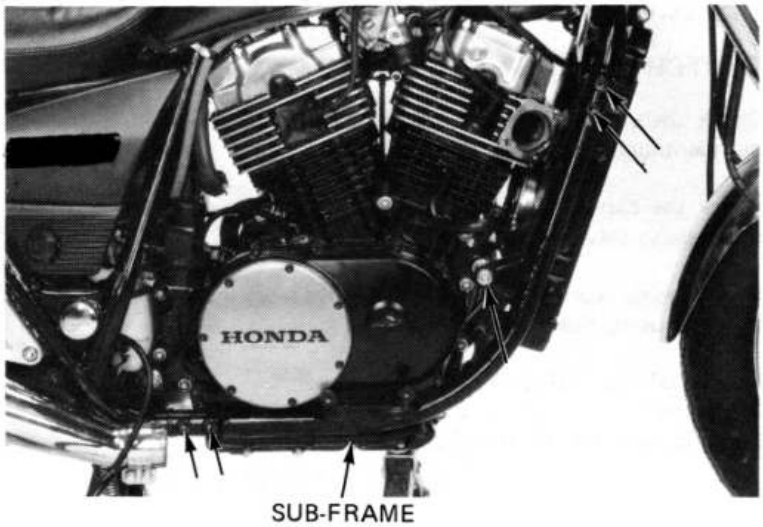
Loosen the two right exhaust pipe clamp bolts.

Remove the exhaust pipe joint nuts and remove the right exhaust pipe.



Place a jack or other adjustable support under the engine to support the engine.

Remove the four sub-frame bolts, engine mount nut and sub-frame.

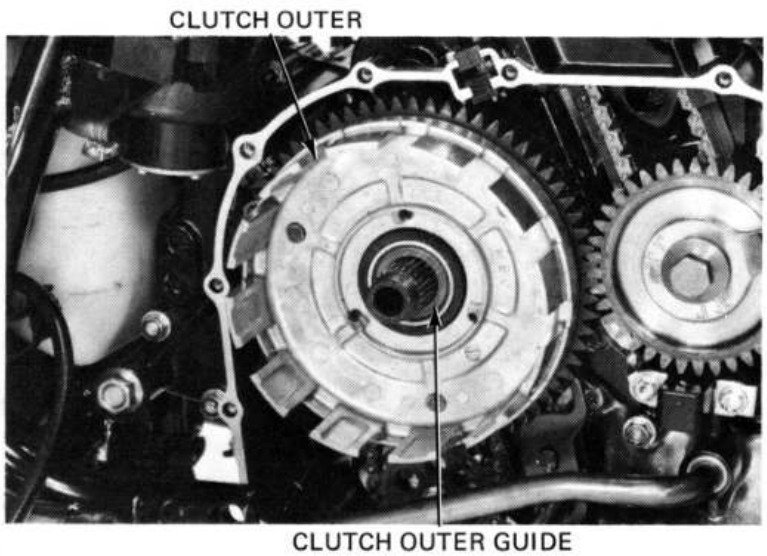


Remove the right crankcase cover, gasket and dowel pins.



Remove the clutch plates, discs and clutch centers A and B (page 7-11).

Remove the clutch outer and outer gauide.



INSPECTION

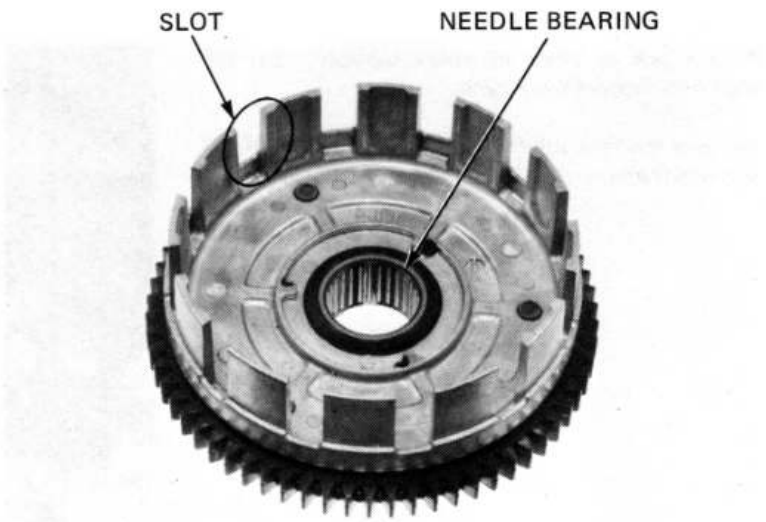
CLUTCH OUTER

Check the slots in the clutch outer for nicks, cuts or indentations made by the friction discs.

Check the clutch outer needle bearing for damage or excessive play.

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

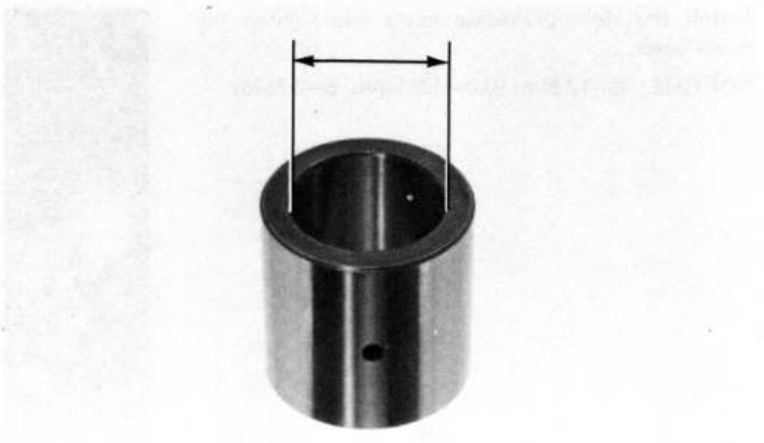
Driver: 07749–0010000
Attachment, 37 x 40 mm: 07746–0010200
Pilot, 35 mm: 07746–0040800



CLUTCH OUTER GUIDE

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

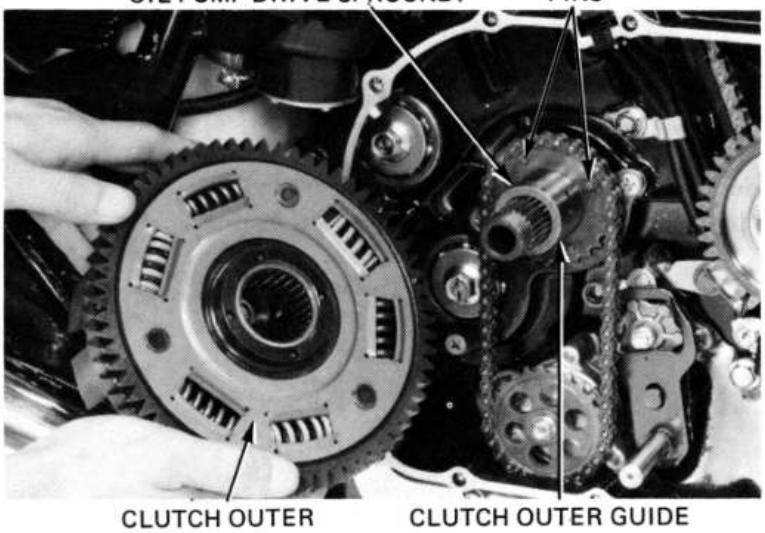
SERVICE LIMIT: 25.08 mm (0.987 in)



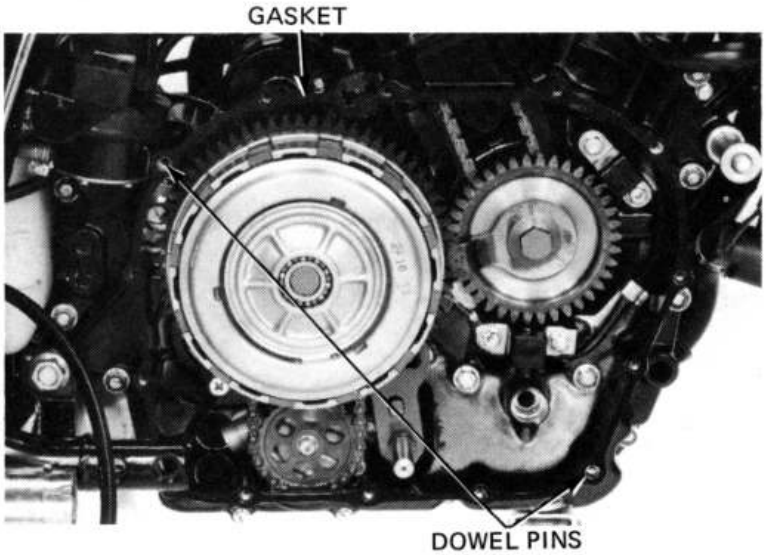
CLUTCH ASSEMBLY

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

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

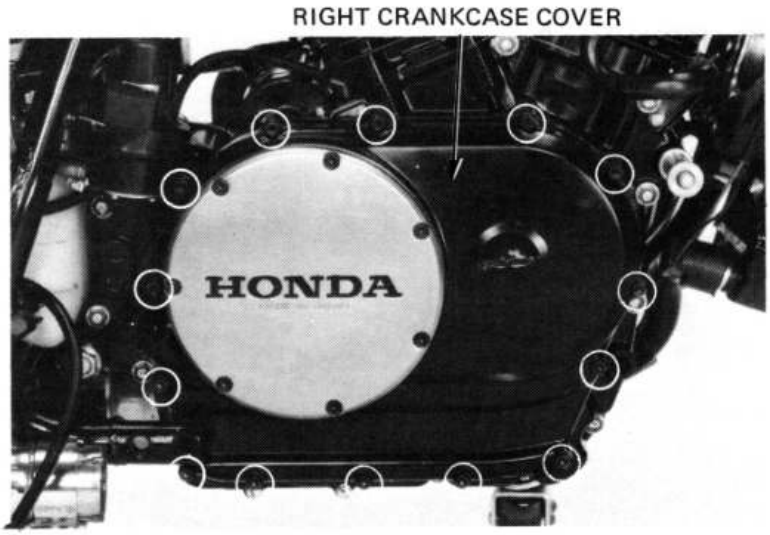


Install the dowel pins and a new gasket.



Install the right crankcase cover and tighten the cover bolts.

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

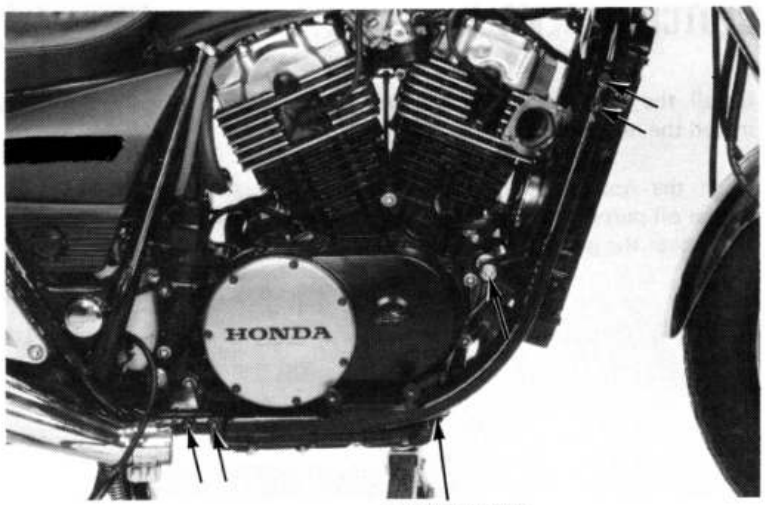


Install the sub-frame and tighten the bolts.

TORQUE:
Upper 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Lower 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

Install and torque the engine mount 10 mm nut.

TORQUE: 45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)



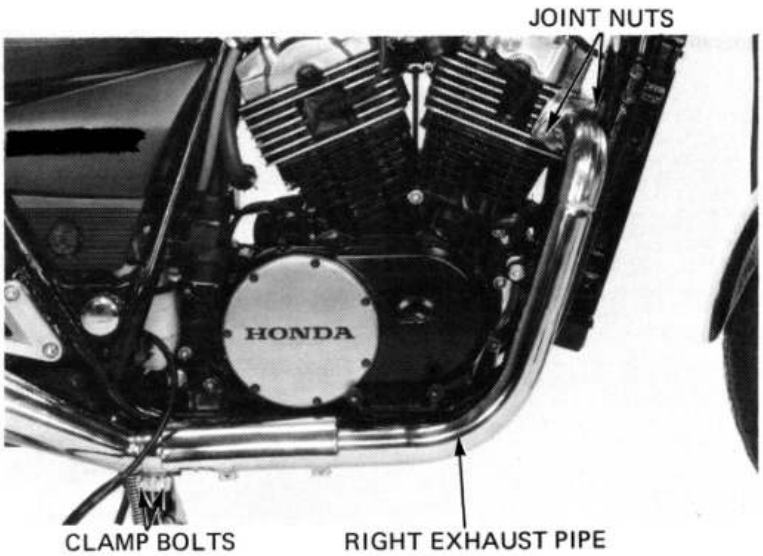
Install the right exhaust pipe and tighten the exhaust pipe joint nuts.

TORQUE: 8–14 N·m (0.8–1.4 kg-m, 6–10 ft-lb)

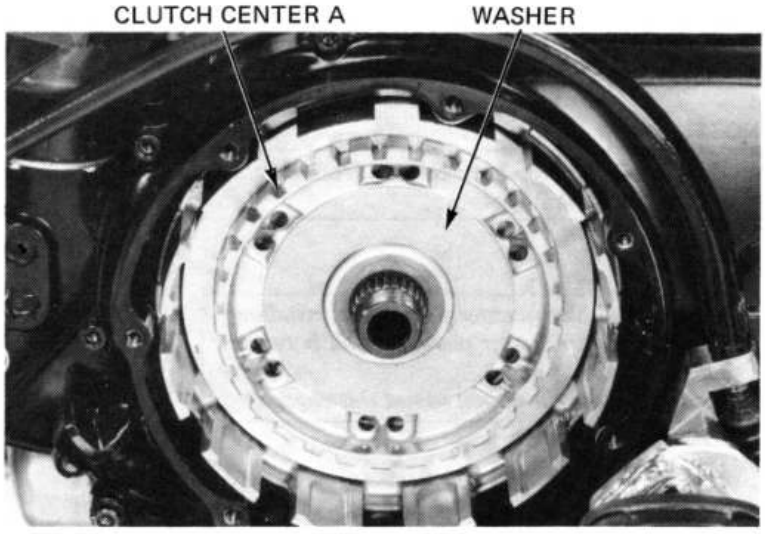
Tighten the exhaust pipe clamp bolts.

TORQUE: 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

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



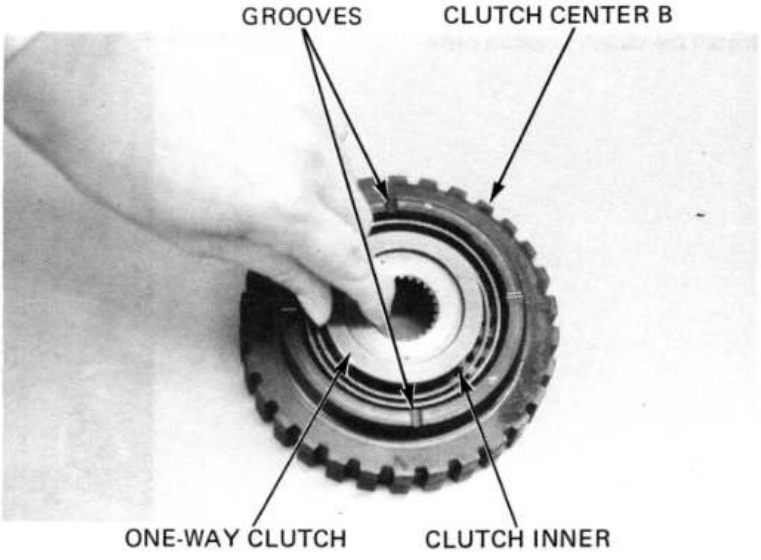
Install clutch center A and the washer.



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

Place clutch center B with the grooved side facing up.

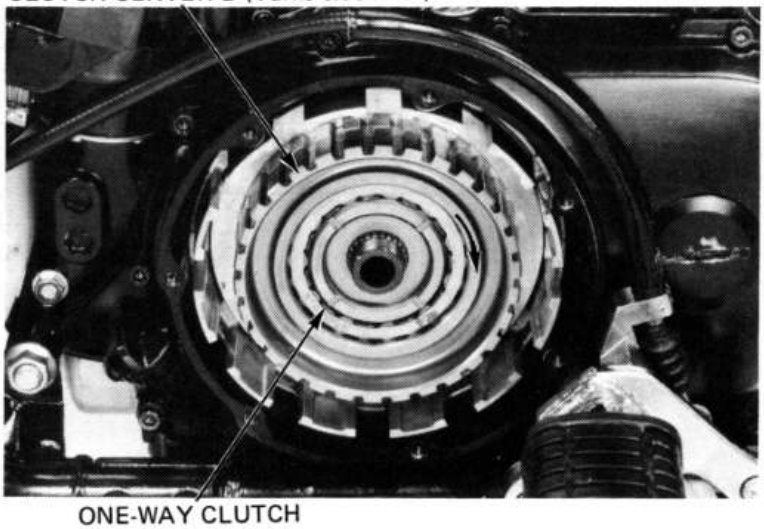
Install the clutch inner into the one-way clutch with its grooves facing down. Turn it clockwise as you install it.



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

NOTE:

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



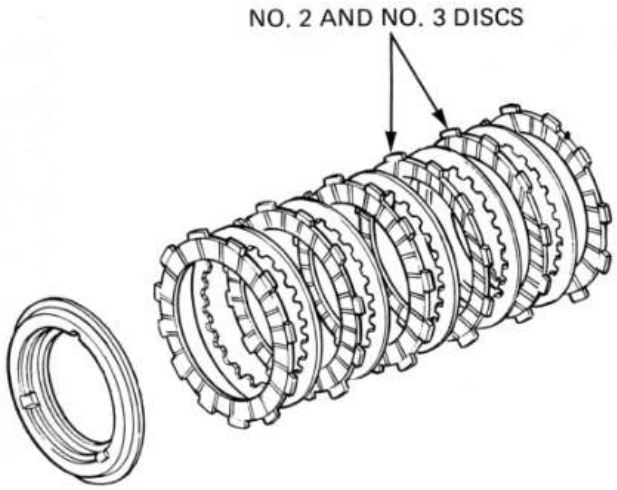
Coat the discs and plates with clean engine oil. Install the clutch discs and plates as shown.

NOTE:

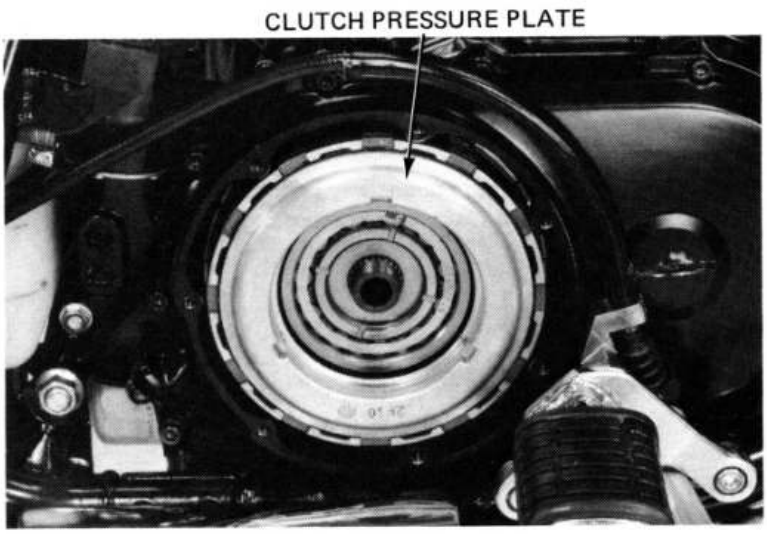
> The No. 2 and No. 3 clutch discs from the inside have different grooves.

CAUTION:

> *Do not pull cluth center B out after installing the discs and plates or plate will fall between clutch centers A and B.*
> *This will cause the clutch to not this engage.*



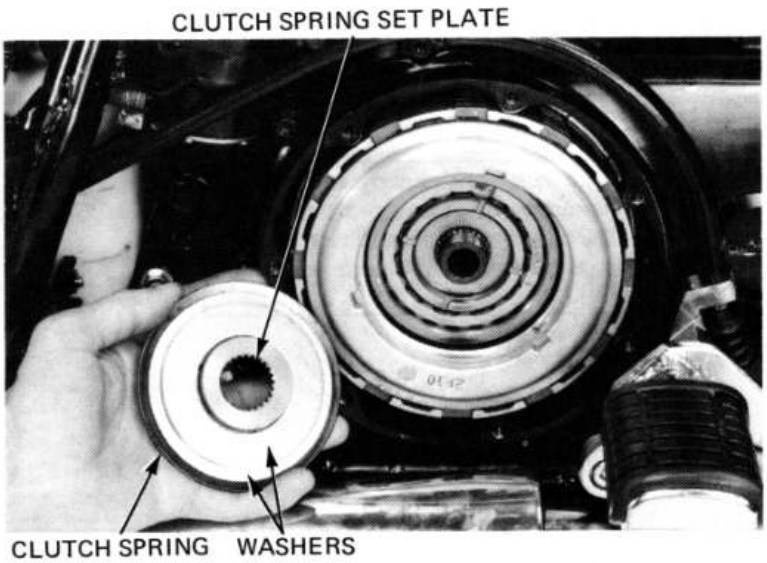
Install the clutch pressure plate.



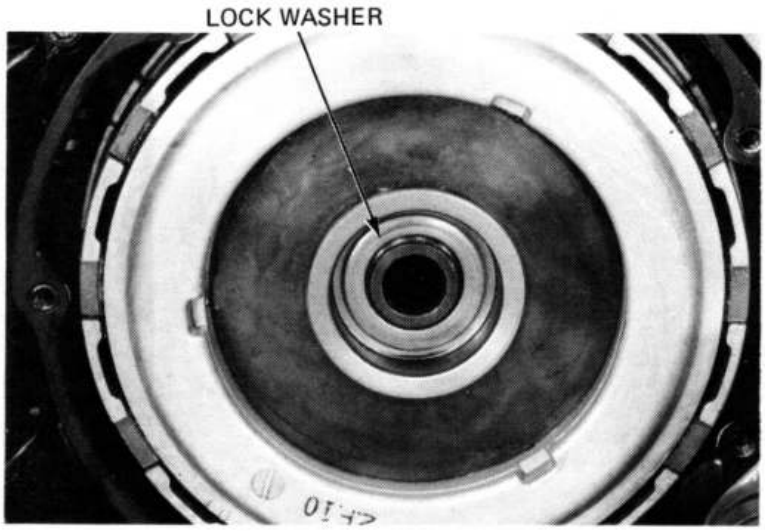
Install the clutch spring set plate, clutch spring, and washers.

NOTE:

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



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



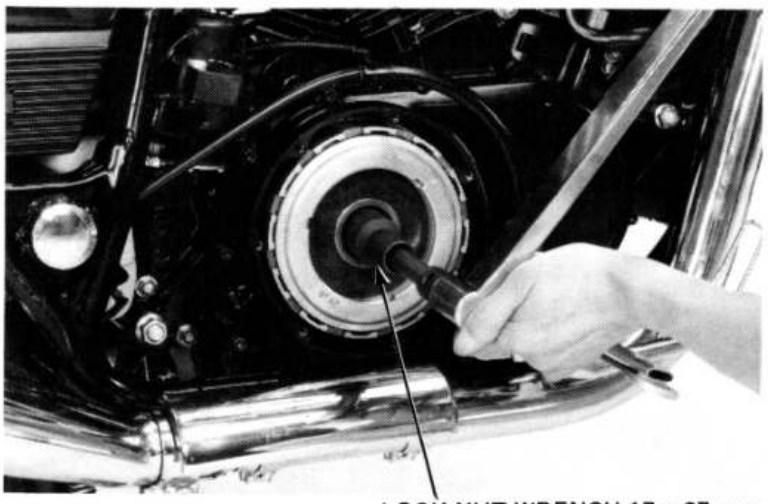
Place the transmission in 6th gear.

Apply the rear brake and tighten the lock nut.

NOTE:

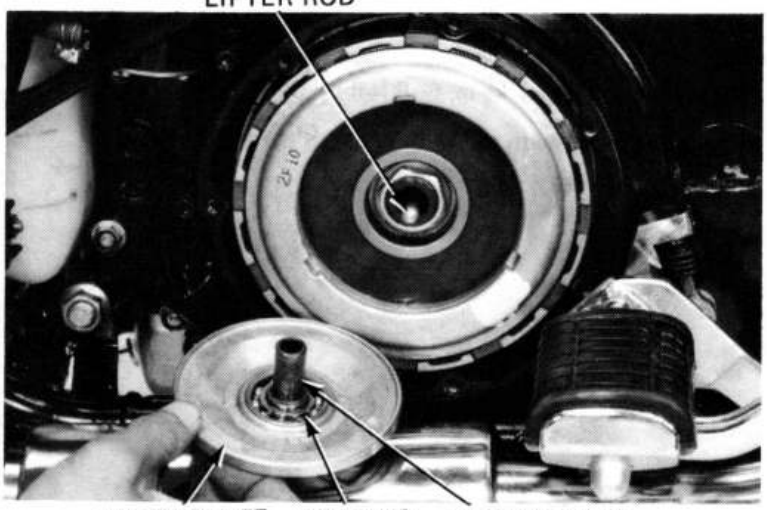
> When servicing the clutch with the engine out of the frame, shift the transmission into gear and hold the output shaft with the HOLDER 07923–6890101.

TORQUE:
45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)

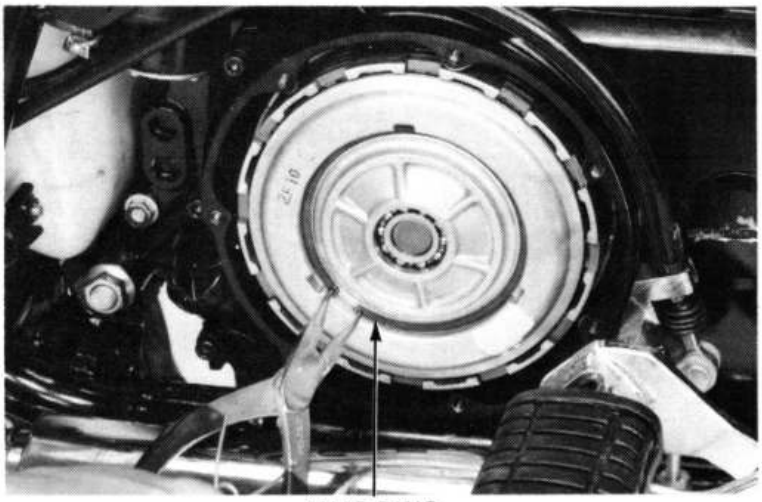


Install the clutch lifter rod.

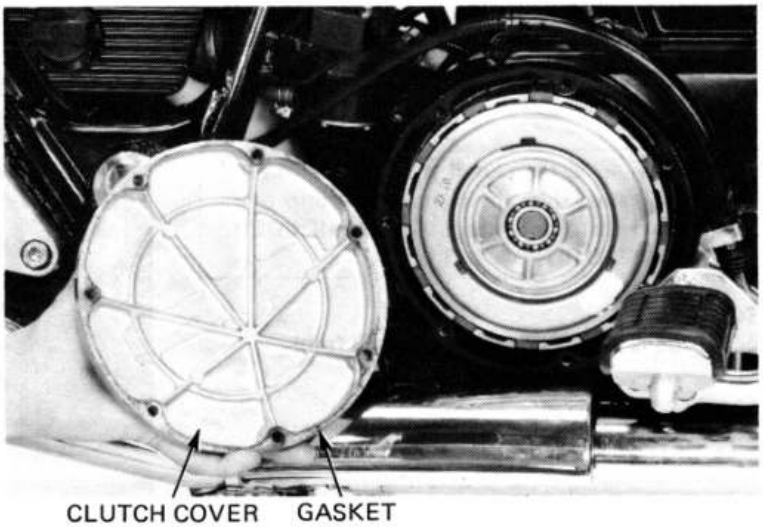
Install the clutch lifter plate, lifter guide and bearing.



Install the snap ring.


SNAP RING

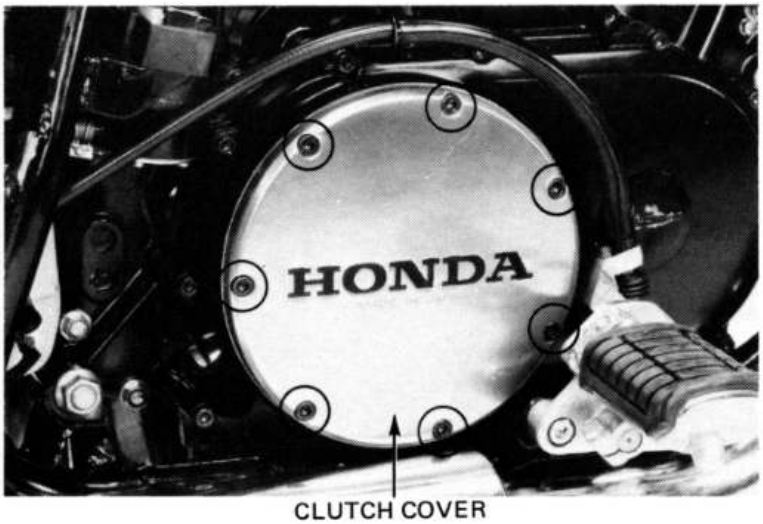
Install a new gasket onto the clutch cover.


CLUTCH COVER GASKET

Install the clutch cover and tighten the cover bolts.

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

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



CLUTCH COVER

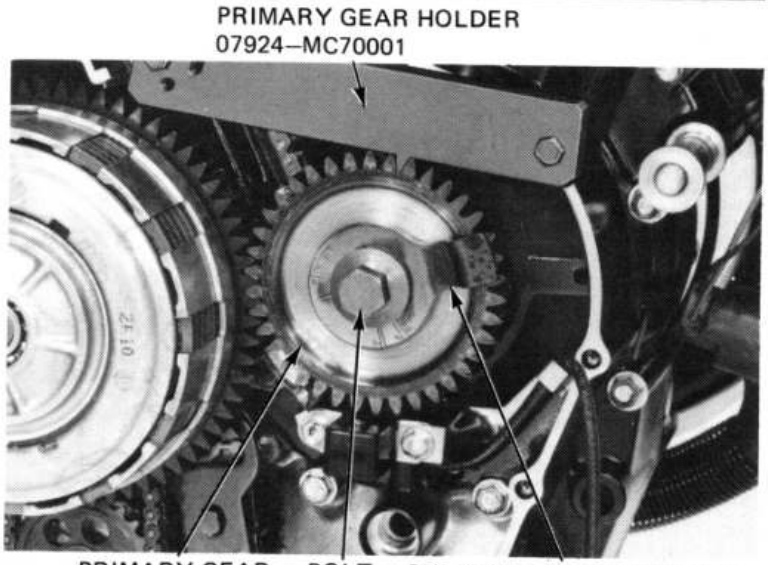
PRIMARY GEAR

REMOVAL

Remove the right crankcase cover (page 7-15).

Hold the primary gear with the gear holder and remove the bolt.

Remove the pulse generator plate and primary gear from the crankshaft.



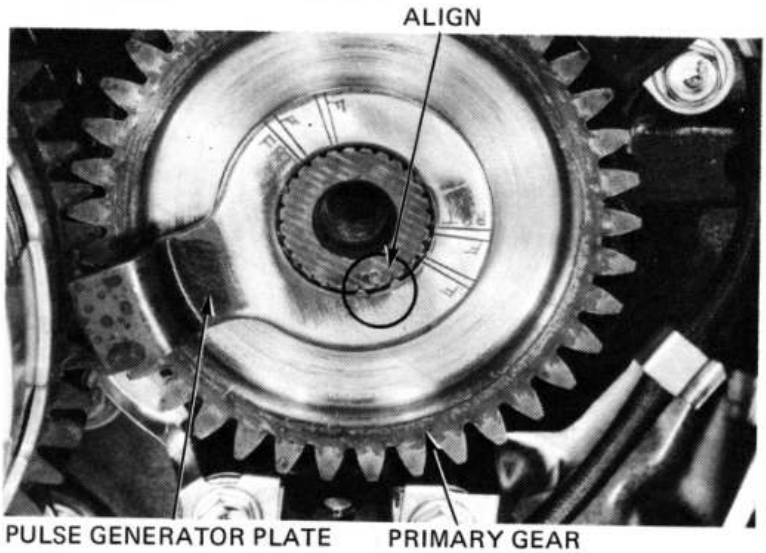
INSTALLATION

Install the primary gear.

Align the center of two pulse generator plate teeth with the flat of the crankshaft serrations and install the plate.

Measure the pulse coil air gap and adjust if necessary.

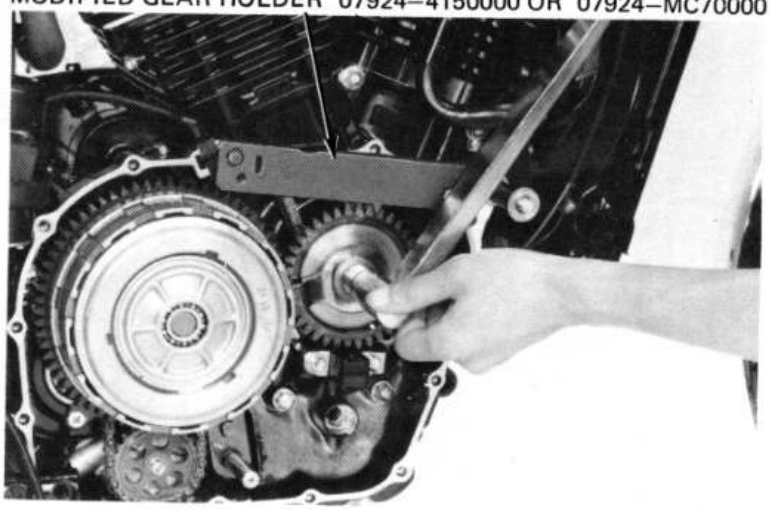
COIL AIR GAP: 0.3–0.9 mm (0.01–0.04 in)

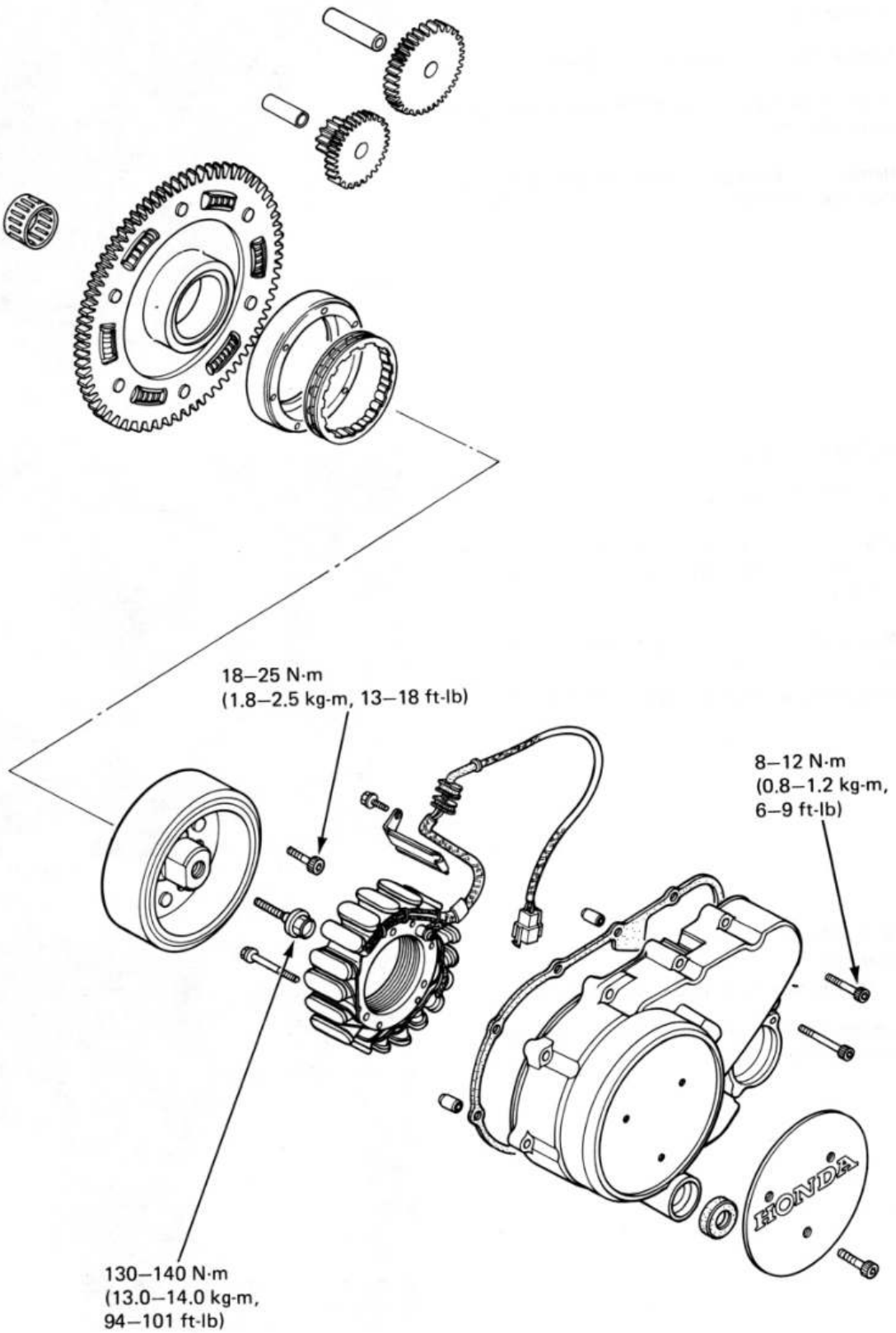


Tighten the primary gear bolt.

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

Remove the gear holder tool and install the right crankcase cover.




18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)
8–12 N·m
(0.8–1.2 kg-m,
6–9 ft-lb)
130–140 N·m
(13.0–14.0 kg-m,
94–101 ft-lb)
HONDA

8. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	8–1
STATOR REMOVAL	8–2
FLYWHEEL REMOVAL	8–3
STARTER CLUTCH DISASSEMBLY	8–4
STARTER CLUTCH ASSEMBLY	8–5
FLYWHEEL INSTALLATION	8–6
STATOR INSTALLATION	8–6

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the alternator and starter clutch.
- Refer to section 18 for troubleshooting and inspection of the alternator.

SPECIFICATIONS

	STANDARD	SERVICE LIMIT
Starter driven gear O.D.	57.710–57.840 mm (2.2720–2.2772 in)	57.60 mm (2.268 in)
Starter clutch outer I.D.	74.414–74.440 mm (2.9297–2.9307 in)	74.50 mm (2.933 in)

TORQUE VALUE

Alternator rotor/Flywheel bolt	130–140 N·m (13.0–14.0 kg-m, 94–101 ft-lb)
Starter clutch Torx bolts	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Alternator cover bolts	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TOOLS

Special

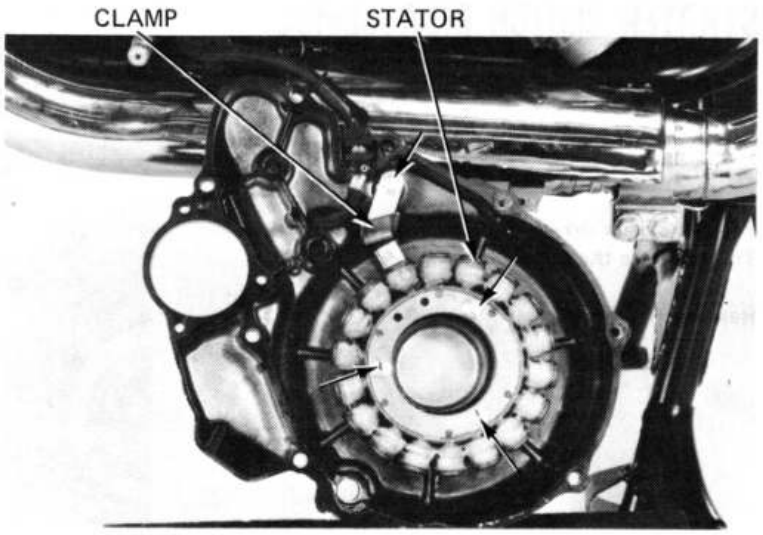
Torx bit		– Commercially available in U.S.A.
Flywheel holder	07925–ME90000	– or band strap wrench (commercially available in U.S.A.)

Common

Rotor puller	07733–0020001 or 07933–3250000

Remove the bolt attaching the alternator wire clamp and clamp.

Remove the stator mounting bolts and stator from the alternator cover.

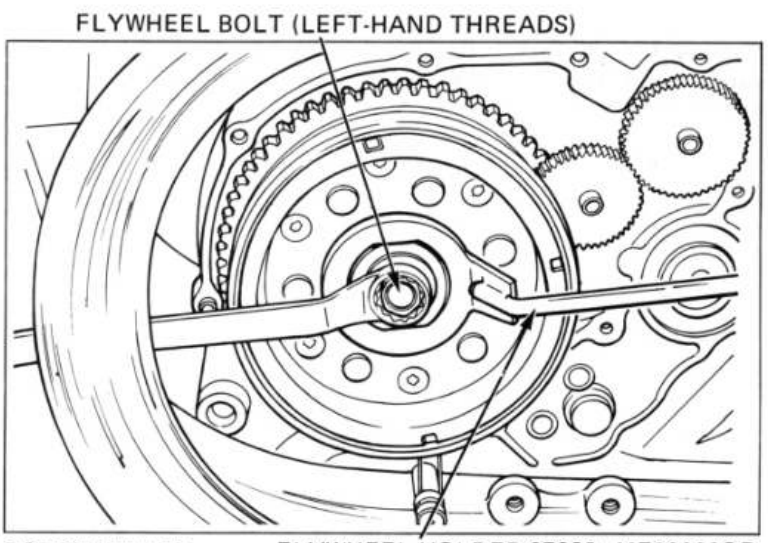


FLYWHEEL REMOVAL

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

NOTE:

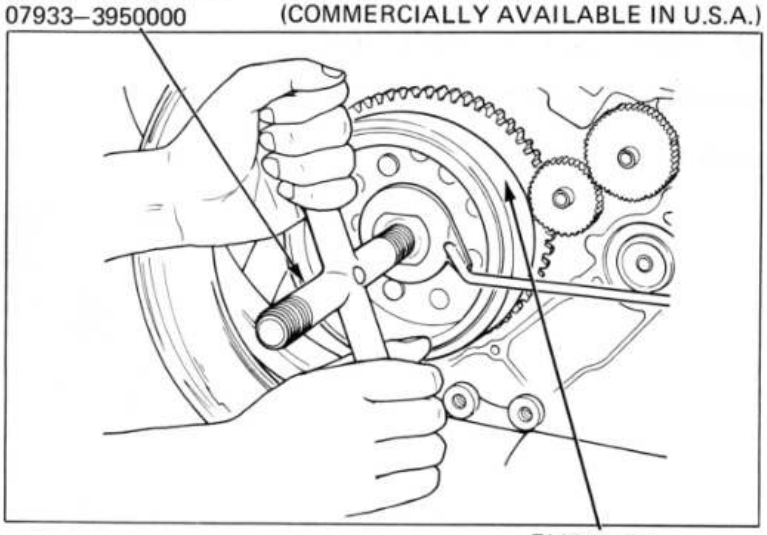
The flywheel bolt has left-hand threads.



Remove the flywheel with the rotor puller.

ROTOR PULLER
07733–0020001 OR
07933–3950000

FLYWHEEL HOLDER 07923–ME900000R
BAND STRAP WRENCH
(COMMERCIALLY AVAILABLE IN U.S.A.)



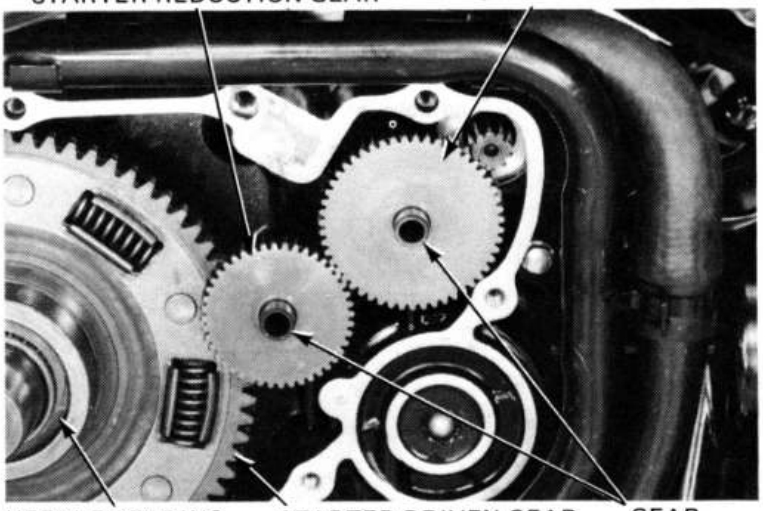
STARTER CLUTCH DISASSEMBLY

Remove the flywheel (page 8-3).

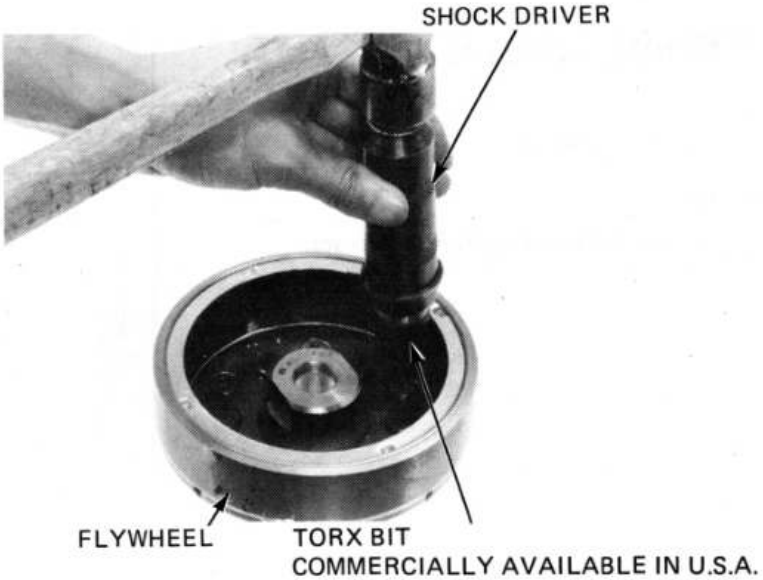
Remove the starter drive and reduction gears, and gear shafts.

Pull the starter driven gear toward you until it stops. Then remove the needle bearing from the gear.

Remove the driven gear.



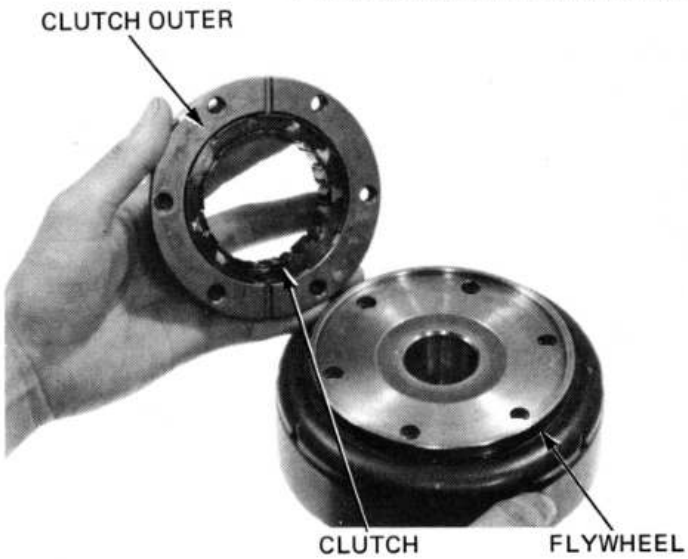
Remove the six torx bolts attaching the starter clutch to the flywheel and remove the starter clutch and clutch outer.



STARTER CLUTCH INSPECTION

Inspect the starter clutch for smooth operation.

Check the rollers for excessive wear.



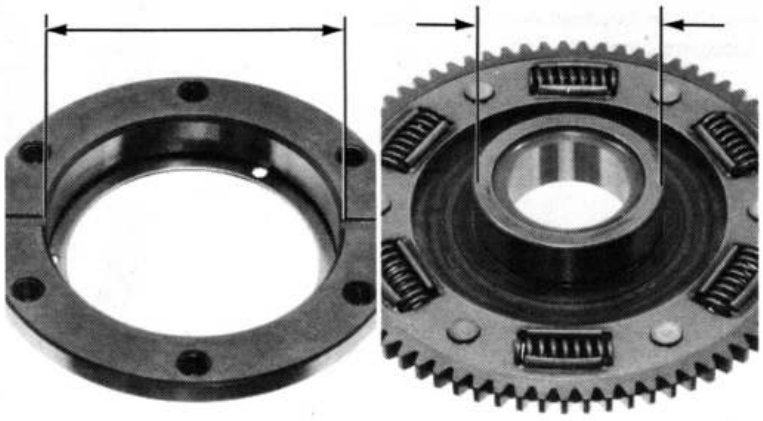
Inspect the driven gear for damage or excessive wear.

Measure the starter clutch outer I.D.

SERVICE LIMIT: 74.50 mm (2.933 in)

Measure the driven gear O.D.

SERVICE LIMIT: 57.60 mm (2.268 in)

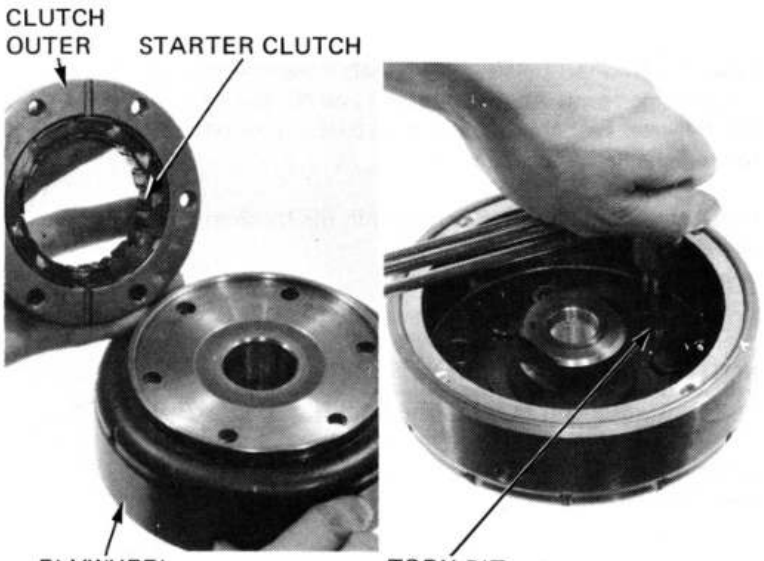


STARTER CLUTCH ASSEMBLY

Install the starter clutch and clutch outer onto the flywheel.

Apply Loctite® Lock N'Seal to the threads of the six torx bolts and tighten the bolts with a torx bit.

TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

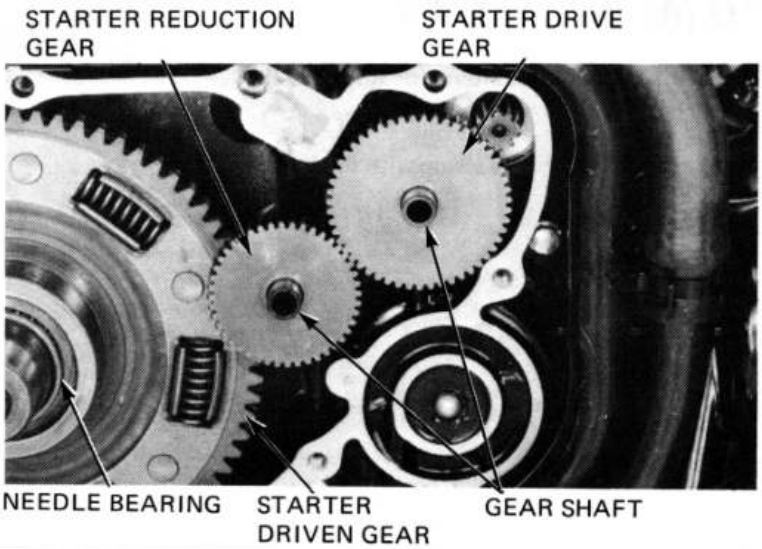


Install the starter driven gear and needle bearing over the crankshaft.

Install the starter reduction gear, drive gear and shafts.

NOTE:

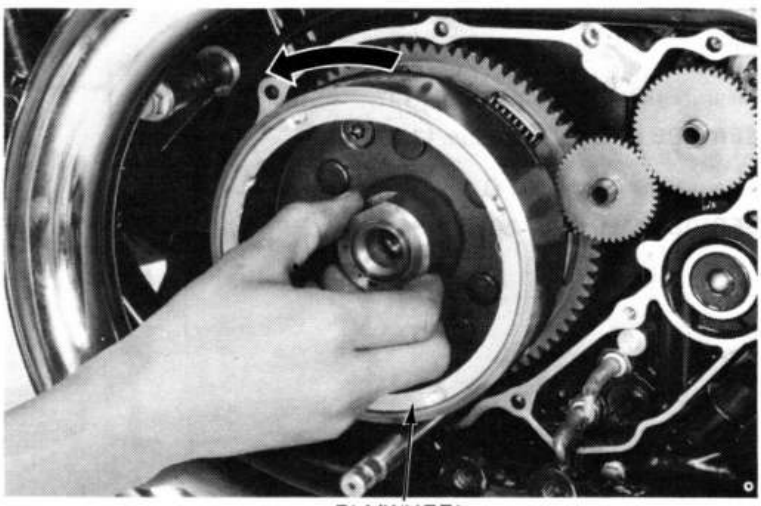
> The starter drive gear and reduction gear must be replaced as a set; if either the starter drive gear or reduction gear needs replacement, replace the other gear also.



FLYWHEEL INSTALLATION

Install the flywheel on the crankshaft while turning it counterclockwise.

Clean the outside of the flywheel so a band strap wrench will not slip when the flywheel bolt is tightened.



FLYWHEEL

Clean the flywheel bolt and crankshaft threads with a degreasing agent. Apply Loctite® Lock N' Seal to the flywheel bolt threads and molybdenum grease to the bolts flange seating surface.

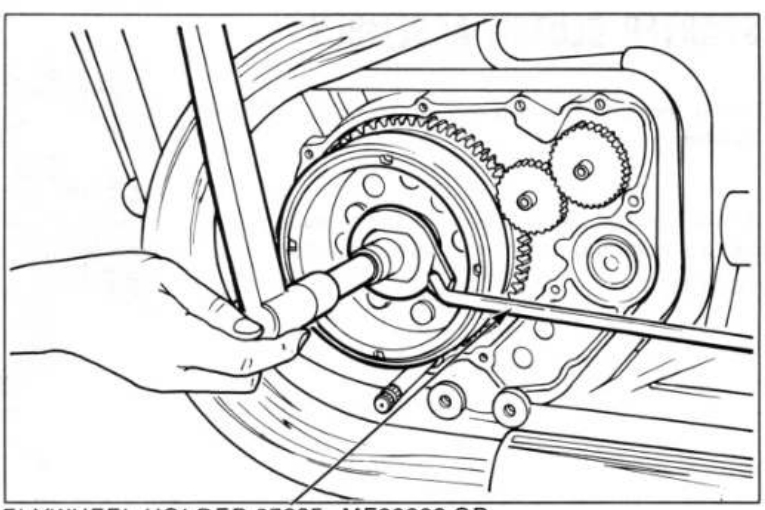
Install the bolt hold the flywheel with the flywheel holder and torque the bolt.

TORQUE:
130–140 N·m (13.0–14.0 kg-m, 94–101 ft-lb)

NOTE:

The flywheel bolt has left-hand threads.

Allow the Loctite® to dry for one hour before operating the engine.

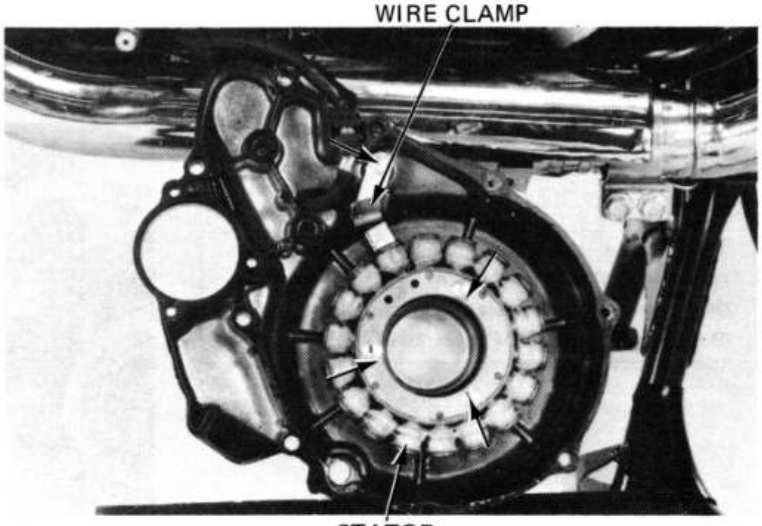


FLYWHEEL HOLDER 07925–ME90000 OR
BAND STRAP WRENCH (COMMERCIALLY AVAILABLE IN U.S.A.)

STATOR INSTALLATION

Install the stator on the alternator cover and tighten the three bolts.

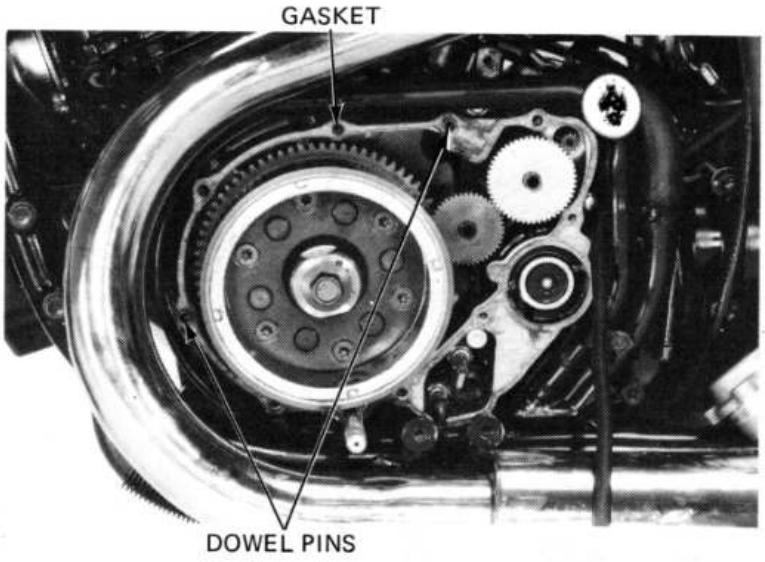
Install the alternator wire clamp with the bolt.



WIRE CLAMP

STATOR

Install the dowel pins and a new gasket.



Install the alternator cover.

Install the water pipe protector and tighten the two bolts.

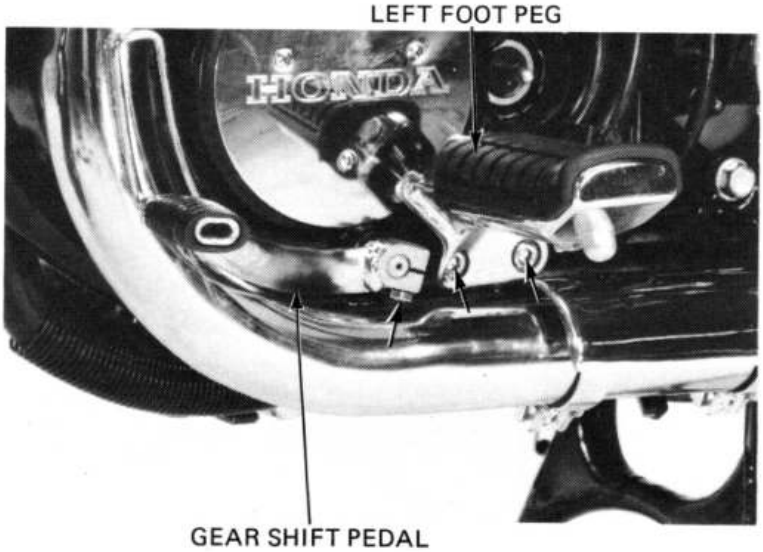
TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

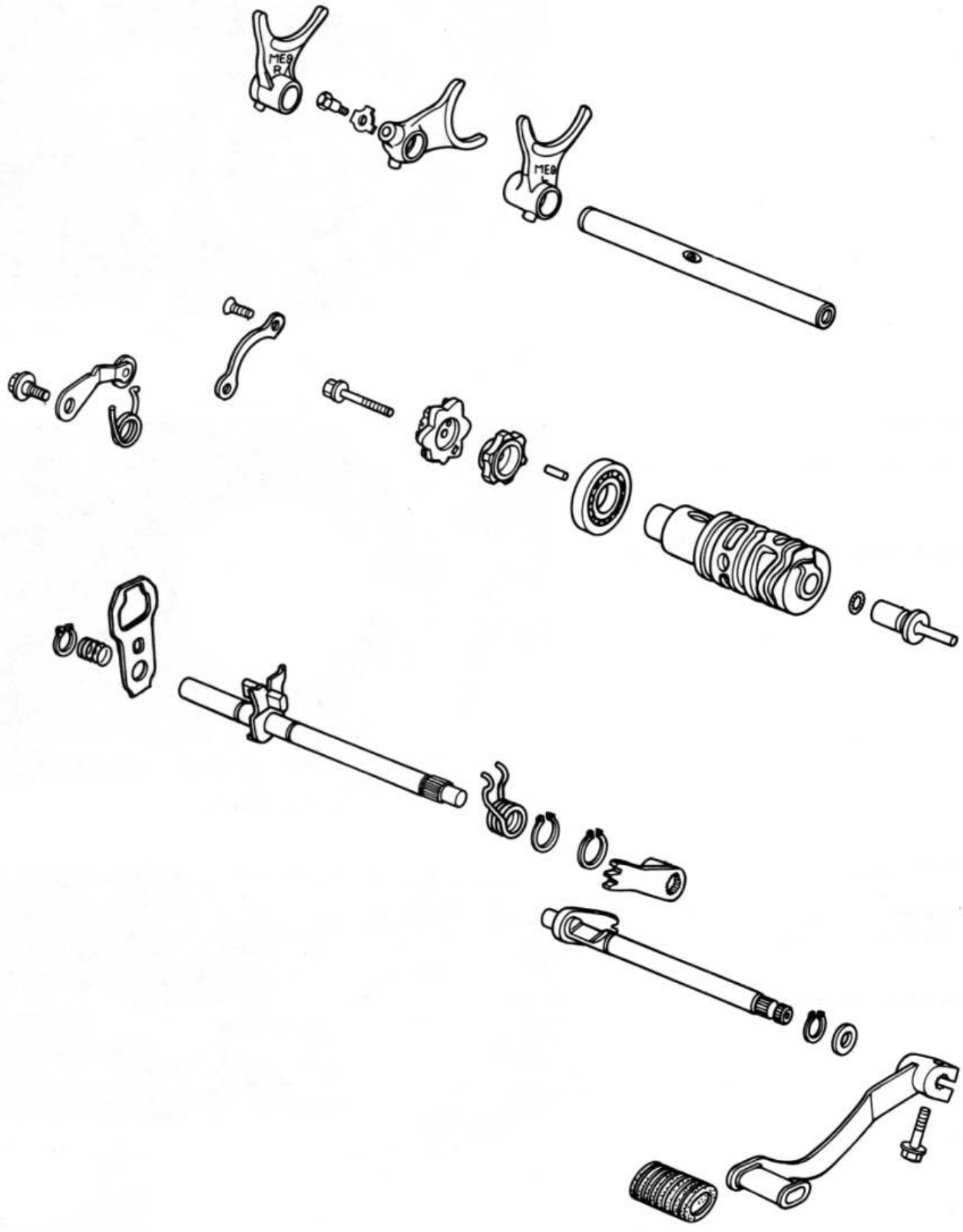


Install the left foot peg and gear shift pedal.

Install the clutch slave cylinder (page 7-10). Connect the alternator coupler.

Install the seat and frame left side cover.





9. GEARSHIFT LINKAGE

SERVICE INFORMATION	9–1
TROUBLESHOOTING	9–2
GEARSHIFT LINKAGE REMOVAL	9–3
GEARSHIFT LINKAGE INSTALLATION	9–4

SERVICE INFORMATION

GENERAL

- The gearshift spindle and stopper arms can be serviced with the engine in the frame.
- If the shift forks, drum and transmission require servicing, remove the engine and separate the crankcase (section 13).

TROUBLESHOOTING

Hard to shift

1. Improper clutch hydraulic system; air in system.
2. Shift forks bent.
3. Shift claw bent.
4. Shift drum cam grooves damaged.

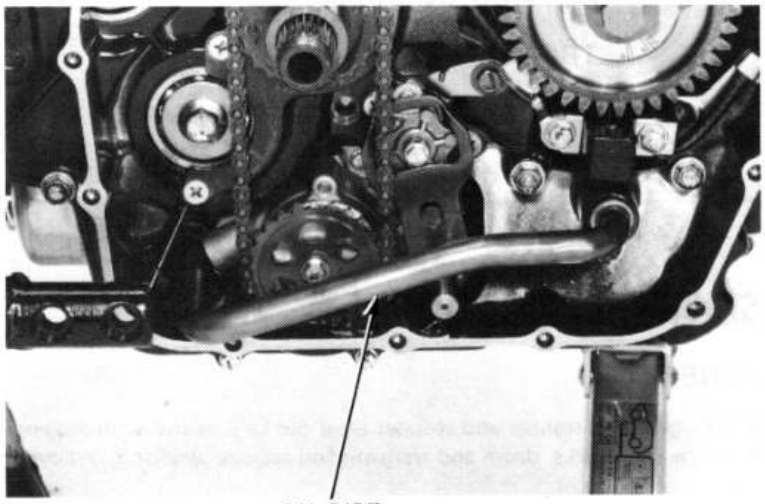
Transmission jumps out of gear

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

GEARSHIFT LINKAGE REMOVAL

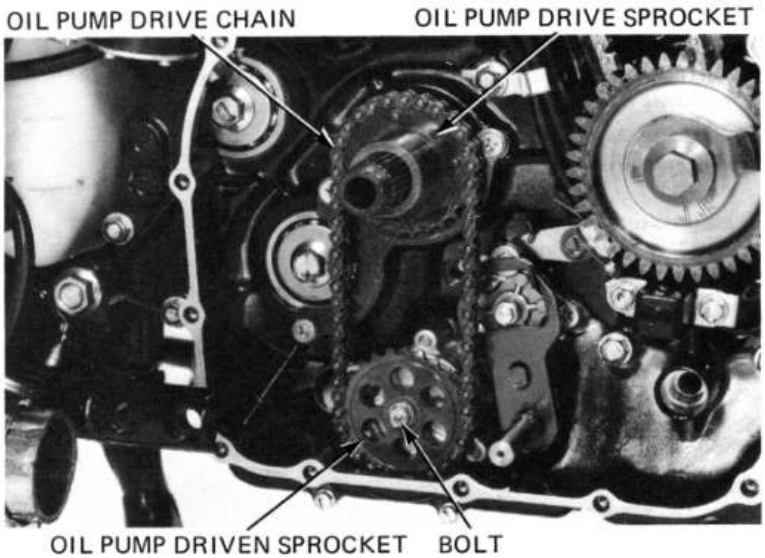
Remove the right crankcase cover and clutch assembly (section 7).

Remove the oil pipe.

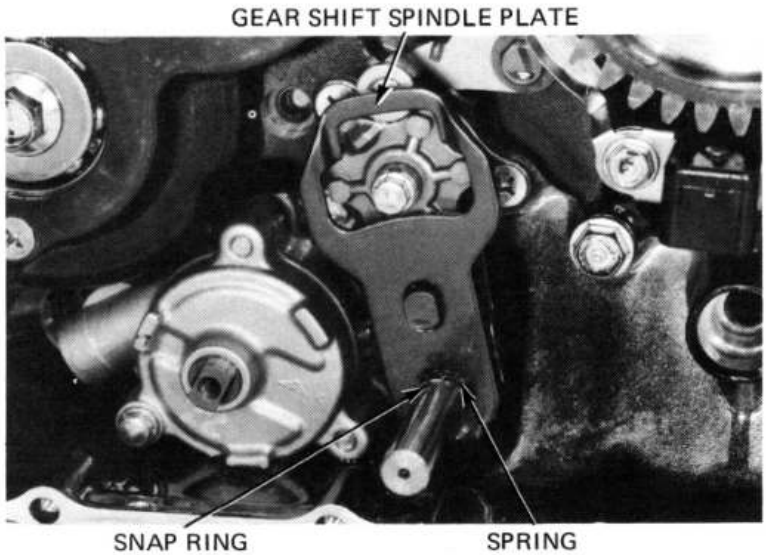


Remove the oil pump driven sprocket bolt.

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

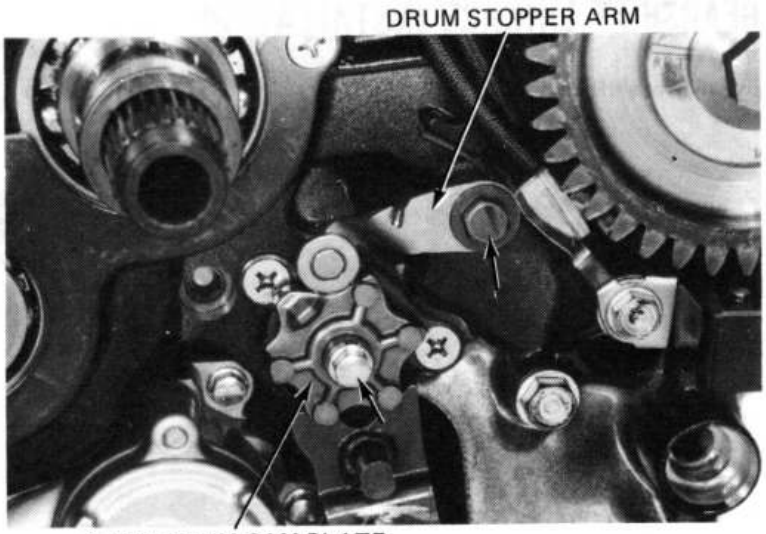


Remove the snap ring, spring and gearshift spindle plate.



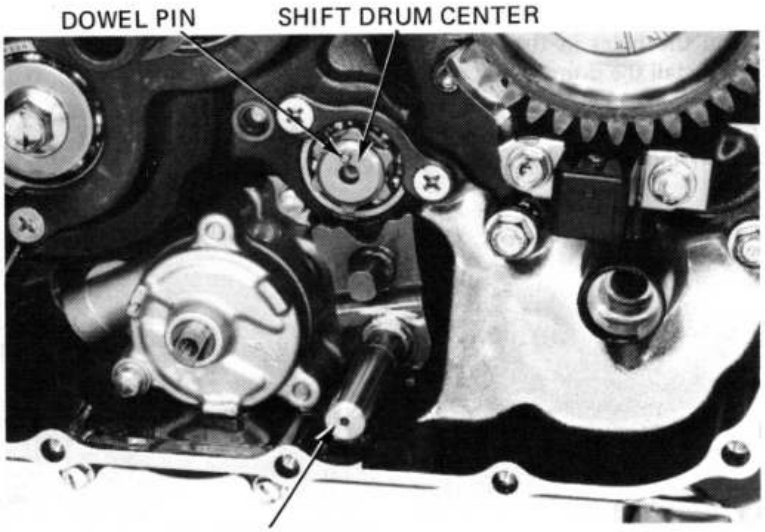
Remove the drum stopper arm bolt, arm and spring.

Remove the shift drum cam plate bolt and cam plate.



Remove the dowel pin and the shift drum center.

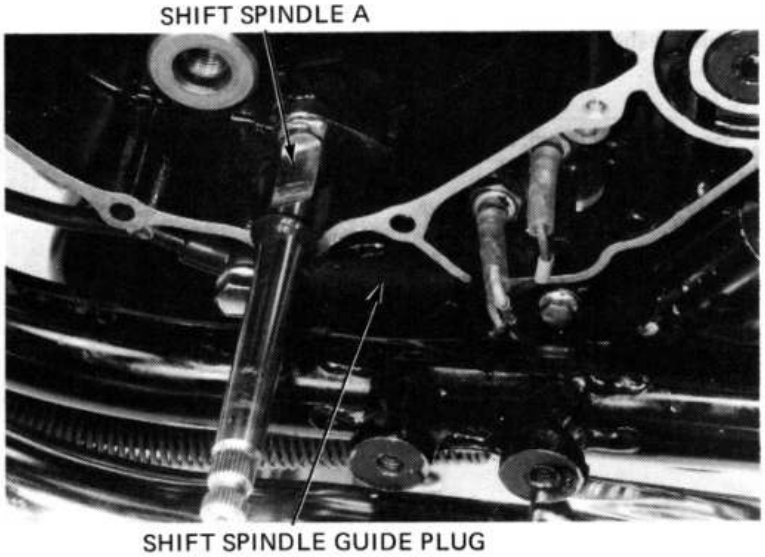
Remove gear shift spindle B.



Remove the flywheel and starter clutch assembly (section 8).

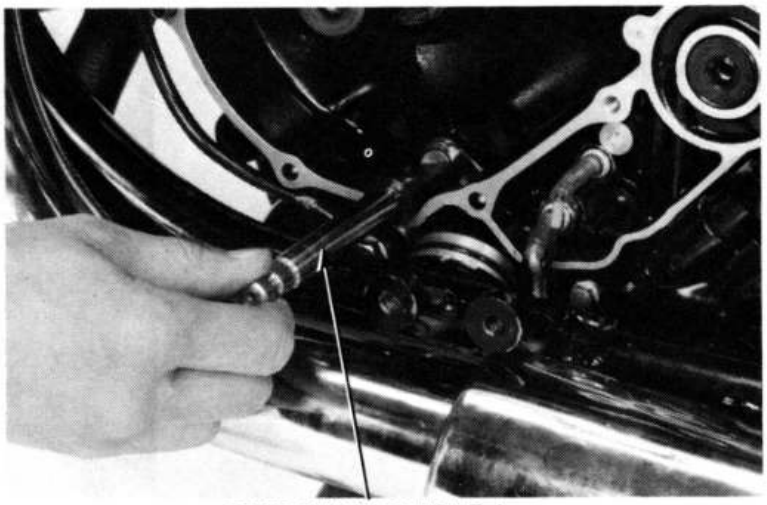
Remove the shift spindle guide plug from the left crankcase.

Remove gear shift spindle A.



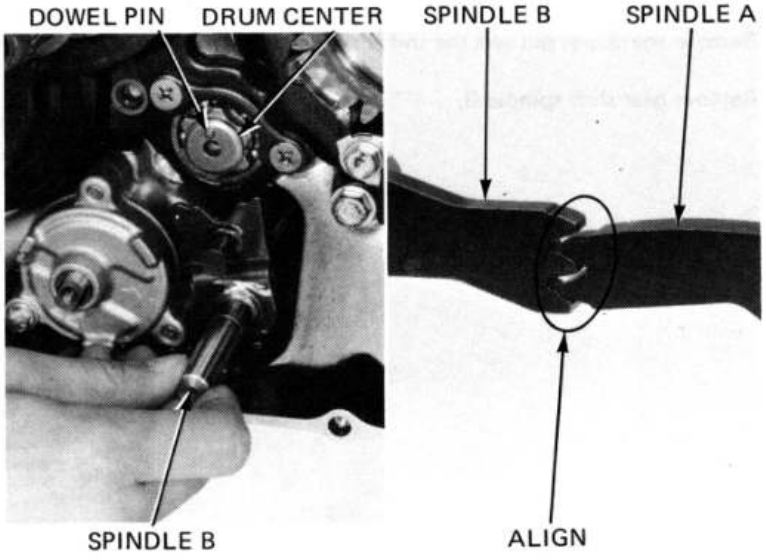
GEARSHIFT LINKAGE INSTALLATION

Install gear shift spindle A.



Align the holes in the shift drum and drum center and install the drum center and dowel pin.

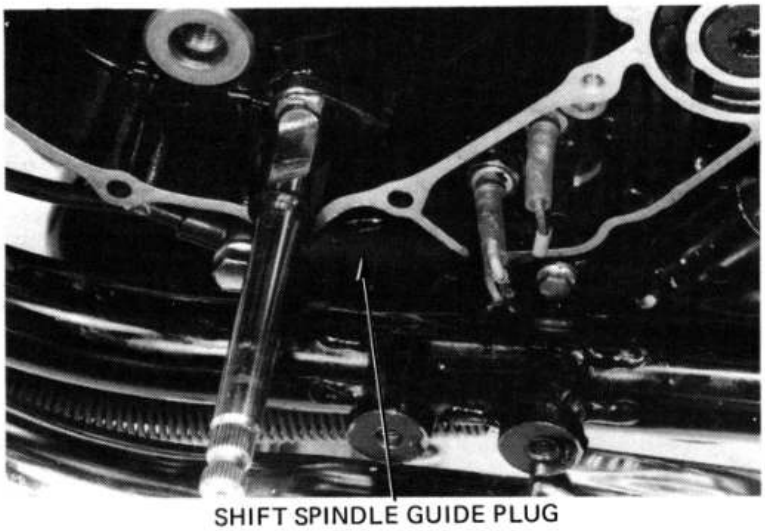
Align the teeth of gear shift spindle A and B as shown and install shift spindle B.



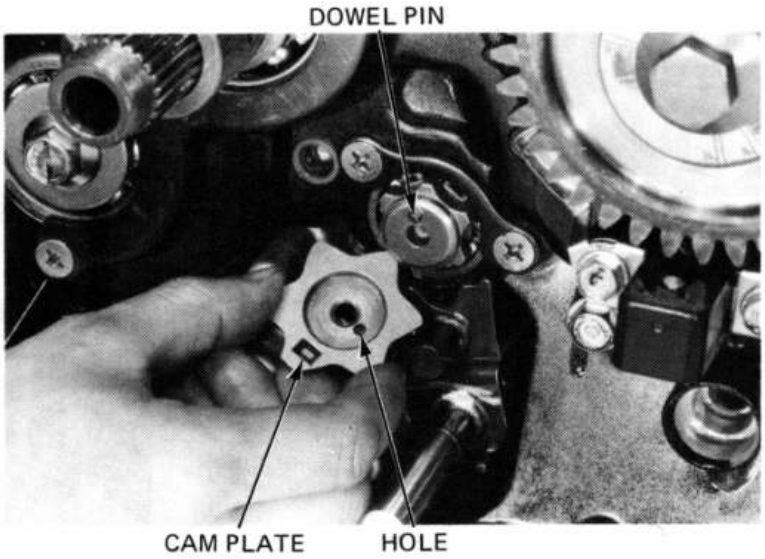
Install the shift spindle guide plug.

NOTE:

Be careful not to damage the O-ring.

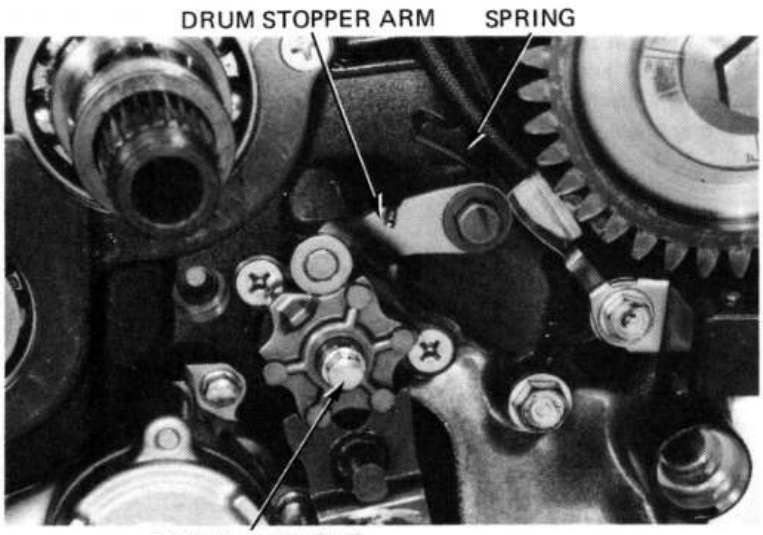


Align the cam plate hole with the dowel pin on the drum center and install the cam plate.



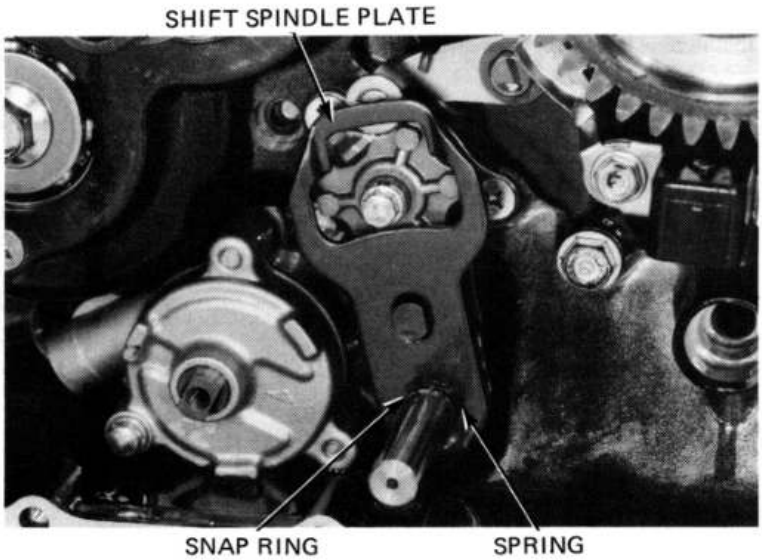
Tighten the cam plate bolt securely.

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

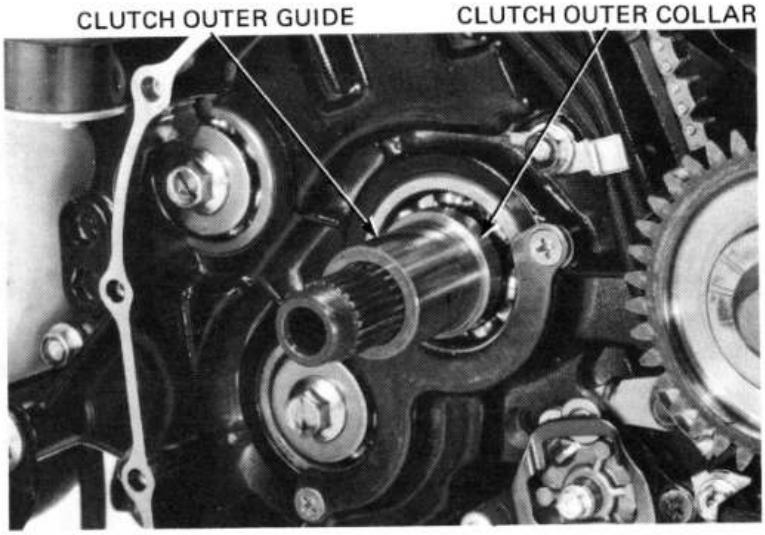


Install the shift spindle plate, spring and snap ring over shift spindle B.

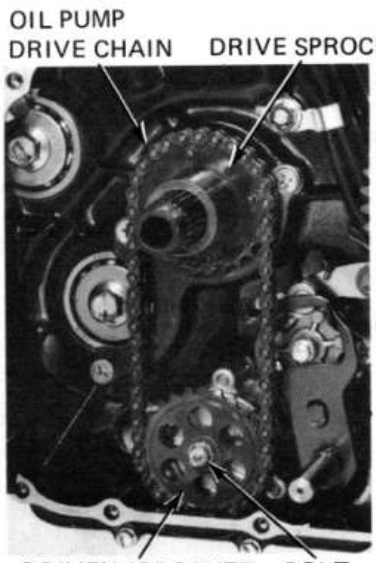
Rotate the gearshift spindle and check the shift mechanism for smooth operation.

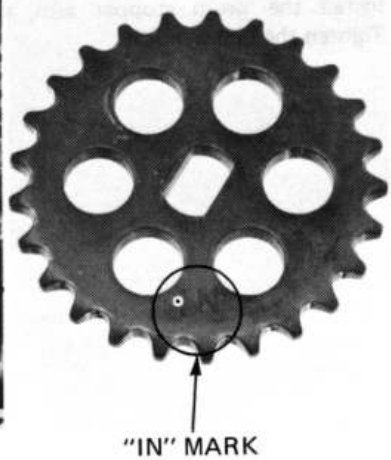


Install the clutch outer collar and guide over the mainshaft.



Install the oil pump drive and driven sprockets with drive chain and tighten the driven sprocket bolt securely. The driven sprocket "IN" mark must face the crankcase.

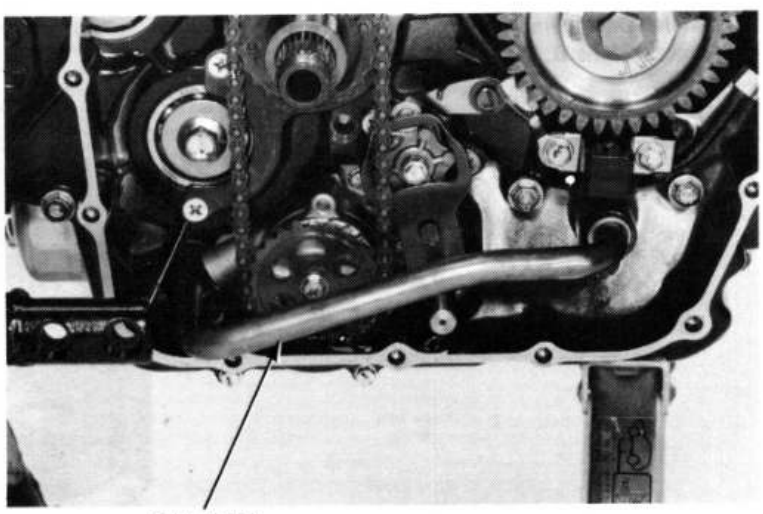


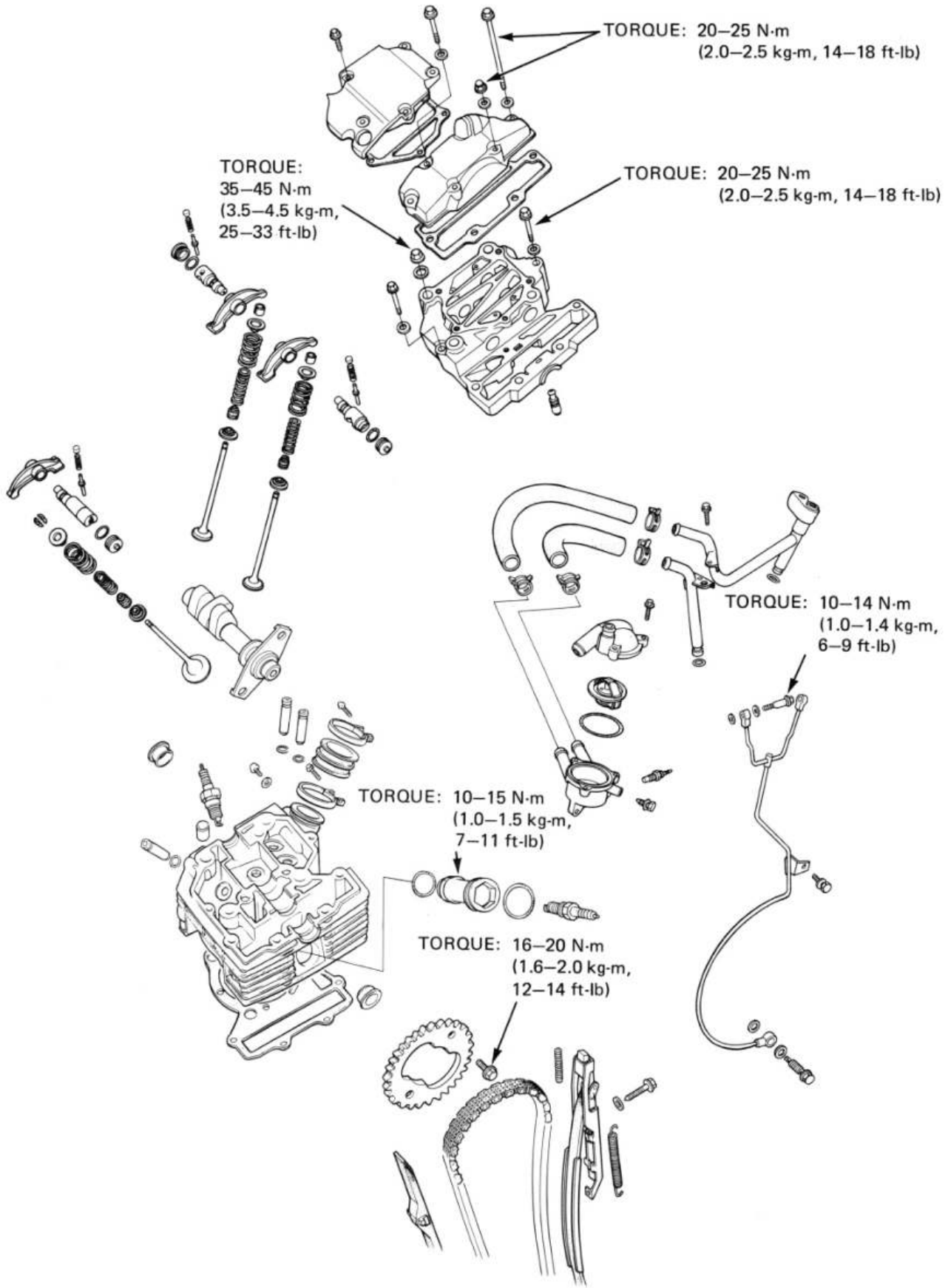


Install new O-rings on the ends of the oil pipe.

Install the oil pipe.
Install the clutch assembly and right crankcase cover (section 7).

Install the starter clutch, flywheel and alternator cover (section 8).




TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
TORQUE:
35–45 N·m
(3.5–4.5 kg-m,
25–33 ft-lb)
TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
TORQUE: 10–14 N·m
(1.0–1.4 kg-m,
6–9 ft-lb)
TORQUE: 10–15 N·m
(1.0–1.5 kg-m,
7–11 ft-lb)
TORQUE: 16–20 N·m
(1.6–2.0 kg-m,
12–14 ft-lb)

10. CYLINDER HEAD/VALVE

SERVICE INFORMATION	10–1	VALVE GUIDE REPLACEMENT	10–13
TROUBLESHOOTING	10–2	VALVE SEAT INSPECTION/ REFACING	10–14
CYLINDER HEAD COVER REMOVAL	10–3	CYLINDER HEAD ASSEMBLY	10–17
CAMSHAFT REMOVAL	10–4	CYLINDER HEAD INSTALLATION	10–18
CYLINDER HEAD COVER DISASSEMBLY	10–7	CAMSHAFT INSTALLATION	10–19
CYLINDER HEAD REMOVAL	10–10	CYLINDER HEAD COVER ASSEMBLY	10–21
CYLINDER HEAD DISASSEMBLY	10–10	CYLINDER HEAD COVER INSTALLATION	10–23

SERVICE INFORMATION

GENERAL

- The engine uses hydraulic tappets. After installing the cylinder head covers, fill the de-foaming chambers in the head covers with fresh engine oil as described in this section.
- To service the cylinder heads, the engine must be removed from the frame. See Section 5 for removal and installation of the engine.
- Camshaft lubricating oil is fed through an oil line. Be sure the hole in the oil line is not clogged.
- During assembly, apply molybdenum disulfide grease to the camshaft holders and rocker arm shafts to provide initial lubrication.
- The hydraulic tappets must be adjusted with shims whenever the following parts are replaced:
  - Cylinder head cover.
  - Cylinder head.
  - Valve, valve guide and valve seat refacing.
  - Camshaft.
  - Rocker arm and rocker arm shaft.

10

SPECIFICATIONS

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Compression pressure				12 ± 2 kg/cm² (171 ± 28 psi)	—
Camshaft	Cam lobe height	IN		36.497 (1.4369)	36.28 (1.4283)
		EX		36.497 (1.4369)	36.28 (1.4283)
	Runout			0.03 (0.0010)	0.05 (0.0020)
	Oil clearance	Both ends		0.020–0.062 (0.0008–0.0024)	0.07 (0.0027)
		Center		0.020–0.062 (0.0008–0.0024)	0.07 (0.0027)
Rocker arm	Rocker arm I.D.			13.750–13.768 (0.5413–0.5420)	13.80 (0.5433)
	Rocker arm shaft O.D.	IN		13.716–13.734 (0.5400–0.5406)	13.58 (0.5346)
		EX		13.716–13.737 (0.5400–0.5408)	13.58 (0.5346)
	Camshaft holder I.D.			20.000–20.021 (0.7874–0.7882)	20.07 (0.7902)
	Tappet assist spring free length			19.46 (0.7661)	18.68 (0.7354)
	Tappet compression stroke with kerosene			—	0.20 (0.0079)
Valves and valve guides	Valve stem O.D.	IN		6.570–6.595 (0.2587–0.2596)	6.55 (0.2579)
		EX		6.550–6.575 (0.2579–0.2589)	6.54 (0.2575)
	Valve guide I.D.			6.600–6.620 (0.2598–0.2606)	6.66 (0.2622)
	Stem-to-guide clearance	IN		0.005–0.050 (0.0002–0.0020)	0.11 (0.0043)
		EX		0.025–0.070 (0.0010–0.0028)	0.12 (0.0047)
	Valve seat width			0.9–1.1 (0.0354–0.0433)	1.50 (0.0591)
Valve springs	Free length	OUTER	IN	45.70 (1.7992)	43.90 (1.7283)
			EX	43.50 (1.7126)	41.80 (1.6457)
		INNER	IN	37.9 (1.4921)	36.40 (1.4331)
			EX	37.9 (1.4921)	36.40 (1.4331)
Cylinder head warpage				—	0.10 (0.0040)

TORQUE VALUES

Cylinder head cover	
10 mm cap nut	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
8 mm bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Cam chain cover	
8 mm bolt/cap nut	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Oil pass pipe	10–14 N·m (1.0–1.4 kg-m, 6–9 ft-lb)
Spark plug sleeve	10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb) – Apply molybdenum disulfide grease to the threads.
Cam sprocket bolt	16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

TOOLS

Special	
Valve Guide Reamer	07984–6570100
Valve Guide Driver	07942–6110000
Valve Guide Driver Attachment (IN)	07943–6570100
(EX)	07943–6890100
Hydraulic Tappet Bleeder	07973–ME90000
Spark Plug Sleeve Socket	07930–KA50100
Common	
Valve Spring Compressor	07757–0010000 or 07957–3290001

TROUBLESHOOTING

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

Low Compression

1. Valves
   - hydraulic tappet locked. (Engine will not start)
   - Depress hydraulic tappet. (Chatter noise)
     - insufficient air bleeding, noise will stop after about 10 minutes.
   - Burned or bent valves.
   - Broken or damaged valve springs.
   - Incorrect valve timing.
   - Valve stuck open.
2. Cylinder head
   - Leaking or damaged head gasket.
   - Warped or cracked cylinder head.
3. Cylinder and piston (Refer to Section 13)

Compression too high

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

Excessive Noise

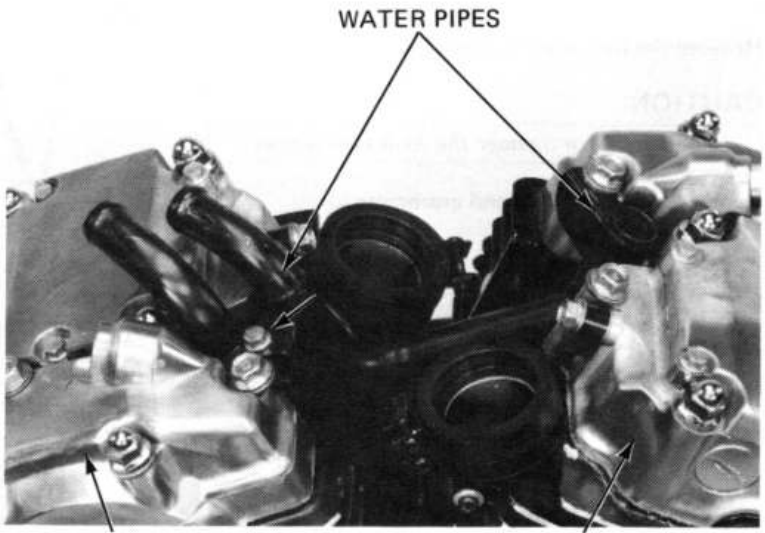
1. Hydraulic tappet.
   - Worn or damaged tappet.
   - Clogged oil hole or oil passage to cylinder head.
   - Weak or damaged assist spring.
   - Worn or damaged assist shaft.
   - Worn or damaged rocker arm or shaft.
   - Worn or damaged rocker arm shaft mount hole in head cover.
   - Air in oil passage caused by low oil level.
   - Excessively worn valve seat.
   - Worn rocker arm follower or valve stem end.
2. Sticking valve or broken valve spring.
3. Weak valve spring.
4. Worn or damaged camshaft.
5. Worn or damaged cam chain.
6. Worn or damaged cam chain tensioner.
7. Worn cam sprocket.

CYLINDER HEAD COVER REMOVAL

Remove the engine from the frame (page 5-2).

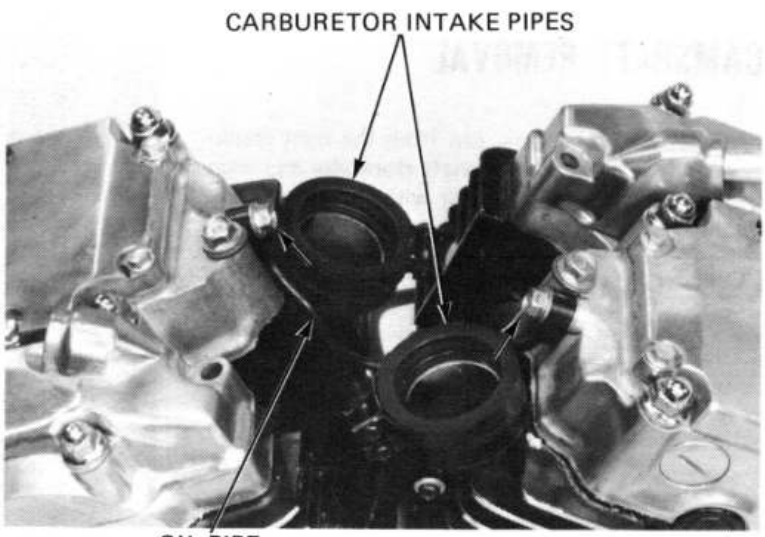
Remove the water pipes from the front and rear cylinder heads.

Remove the O-ring from the water pipes.



Remove the oil pipe from the front and rear cylinder heads.

Remove the carburetor intake pipes.



Loosen the rocker arm cover 6 mm mount bolts.

NOTE:

> Carefully remove the rocker arm covers to keep the hydraulic tappet assist springs from falling into the cylinder head.

Remove the cylinder head covers and cam sprocket covers.

NOTE:

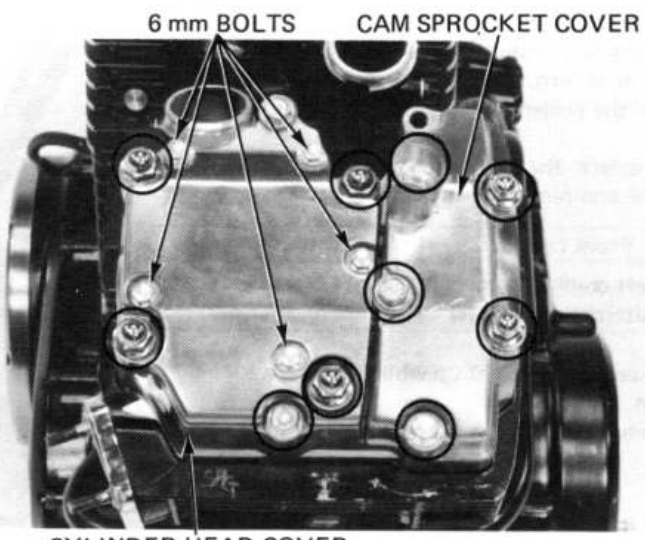
> The hydraulic tappets may come out with the cylinder head cover. Be careful they do not fall out.

Loosen the 6 mm bolts in the criss-cross pattern in 2–3 steps, starting with the center bolt.

NOTE:

> Tilt the engine about 40° to the right (left) when removing the front (rear) cylinder head cover.

Remove the cover gaskets.

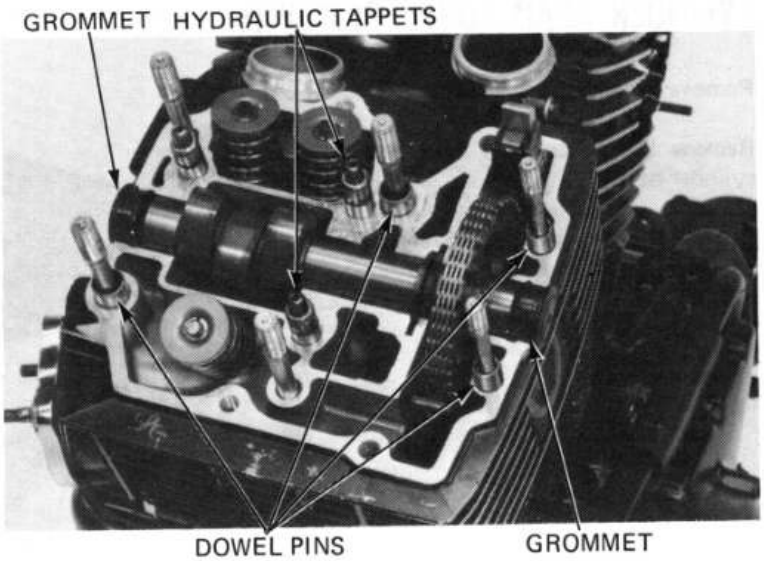


Remove the hydraulic tappets.

CAUTION:

Do not strike or damage the hydraulic tappets.

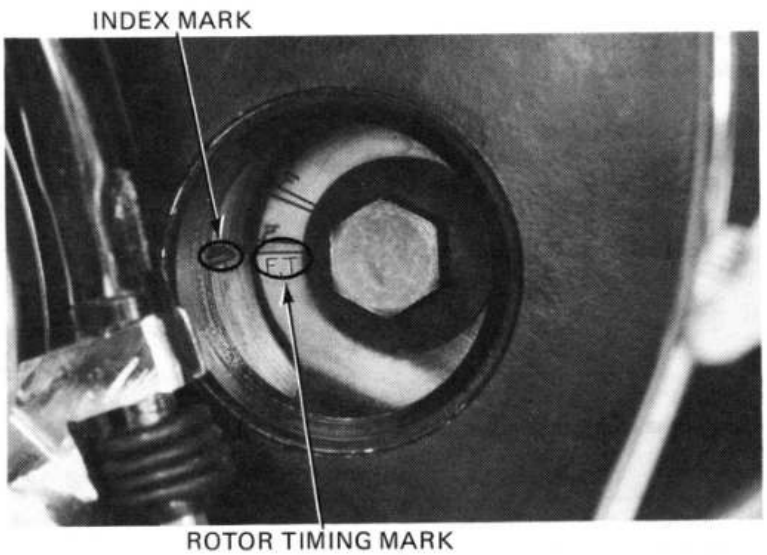
Remove the dowel pins and grommets.



CAMSHAFT REMOVAL

Remove the timing hole cap from the right crankcase cover. Turn the crankshaft clockwise and align the timing mark on the rotor with the index mark on the crankcase cover.

Cylinder	Rotor timing mark
Front	F.T.
Rear	R.T.

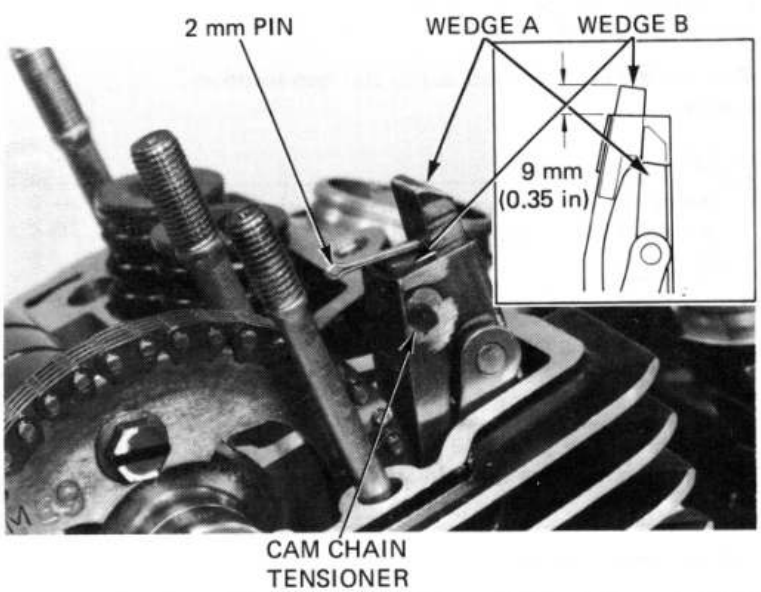


Measure the amount of the cam chain tensioner projects as shown. Replace the cam chain with a new one if the projection exceeds 9.0 mm (0.35 in.).

To replace the cam chain, drain the oil from the engine and remove the following parts:

Front cylinder	Rear cylinder
· Left crankcase cover · Alternator flywheel	· Right crankcase cover · Primary drive gear

Pull wedge A straight up while holding wedge B down.
Secure wedge A with a 2 mm pin as shown.

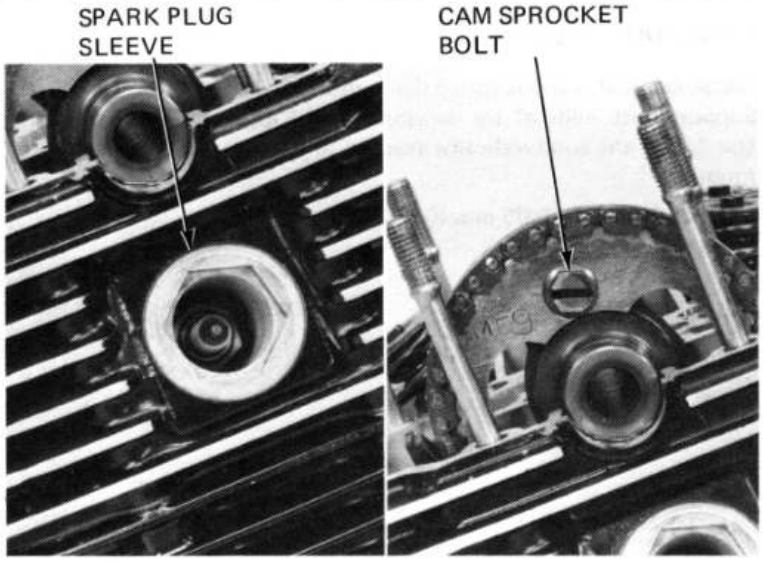


Remove the sleeve with fork tube holder attachment (07930–KA50100) from the spark plug hole on the cam chain side.
Remove the cam sprocket bolts.
Rotate the crankshaft clockwise one turn (360°) and remove the other cam sprocket bolts.

NOTE:

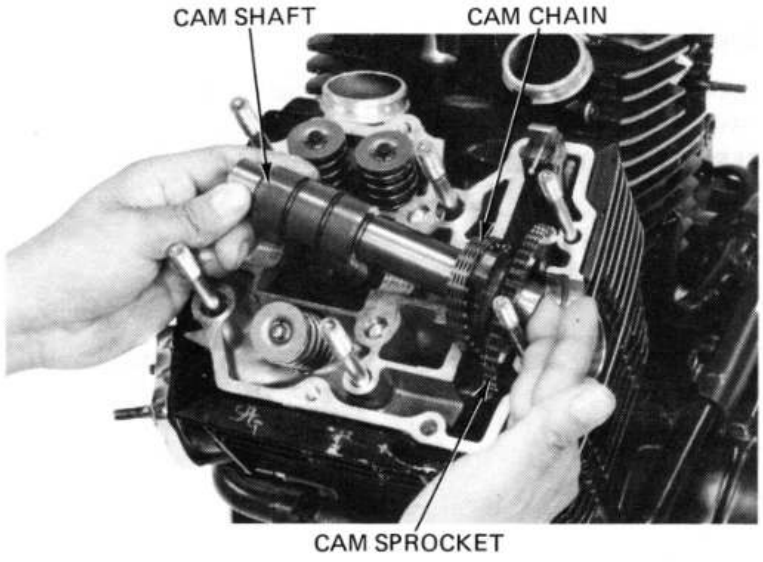
> Be careful not to let the cam sprocket bolts fall into the crankcase.

Remove the cam sprocket from the camshaft flange with the cam chain. Rotate the crankshaft clockwise half a turn (180°) and remove the cam chain from the sprocket.



Hang the cam chain on the camshaft behind the camshaft flange and remove the cam sprocket while lifting the camshaft out.

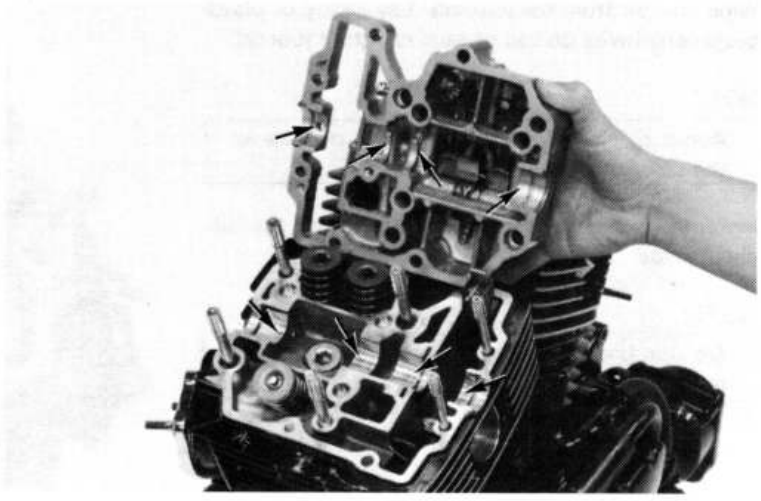
Attach a piece of wire to the cam chain to prevent it from being dropped into the crankcase.



INSPECTION

CAMSHAFT HOLDER/CYLINDER HEAD

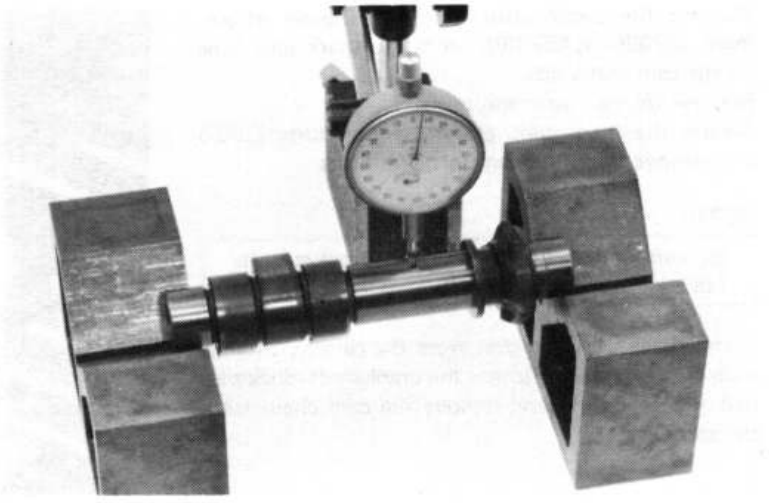
Inspect the camshaft holder and cylinder head journal surfaces for scoring, scratches, or evidence of insufficient lubrication.



CAMSHAFT RUNOUT

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

SERVICE LIMIT: 0.05 mm (0.002 in)



CAM LOBE HEIGHT

Using a micrometer, measure the height of each cam lobe.

SERVICE LIMITS: IN/EX: 36.38 mm (1.4282 in)



Wipe any oil from the journals. Lay a strip of plastigauge lengthwise on top of each camshaft journal.

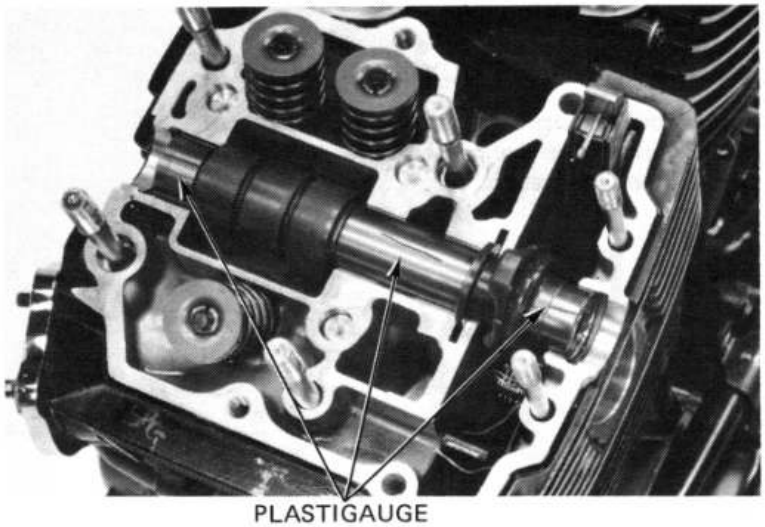
NOTE:

> Avoid placing plastigauge over the oil hole in the cam holder.

Hook the cam chain suspension wire against the cam chain guide.

NOTE:

> Do not hook the wire against the head cover mating surface.



PLASTIGAUGE

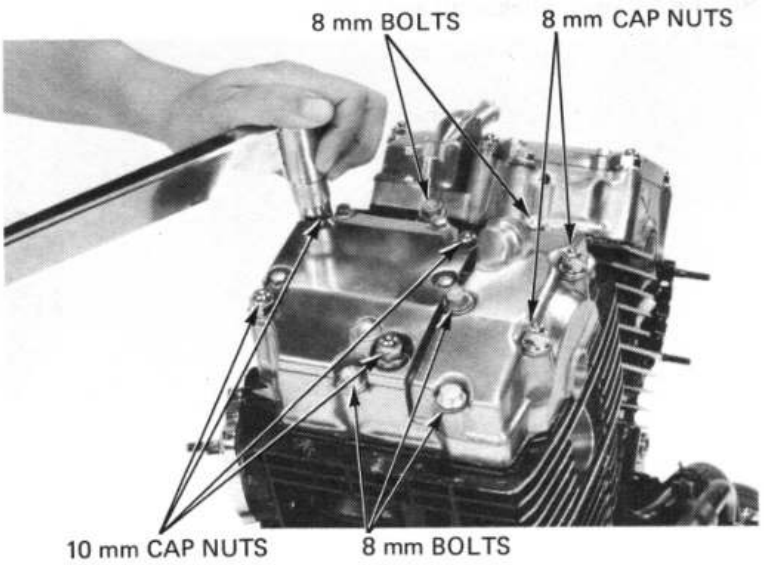
Install the cylinder head cover and tighten in a crisscross pattern in 2–3 steps. Also, install the cam chain cover.

NOTE:

> Do not rotate the camshaft when using plastigauge.

TORQUES:

8 mm bolt/nut: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
10 mm cap/nut: 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)



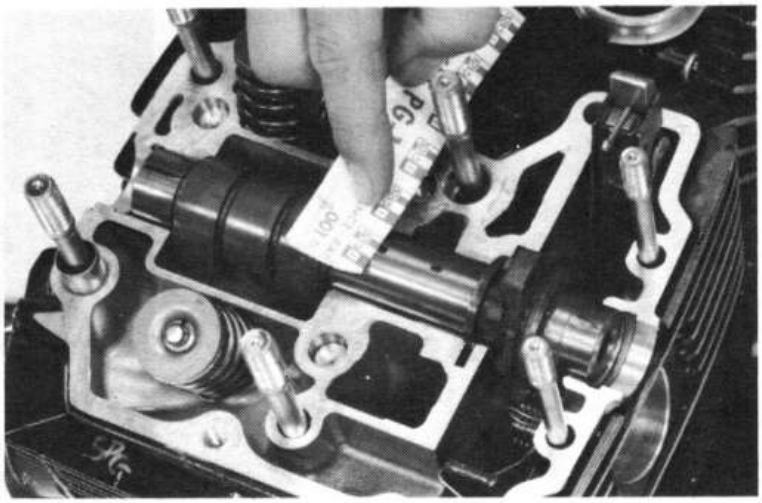
Remove the cylinder head cover and measure the width of each plastigauge. The widest thickness determines the oil clearance.

SERVICE LIMITS:

CENTER: 0.07 mm (0.0027 in)
BOTH ENDS: 0.07 mm (0.0027 in)

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

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

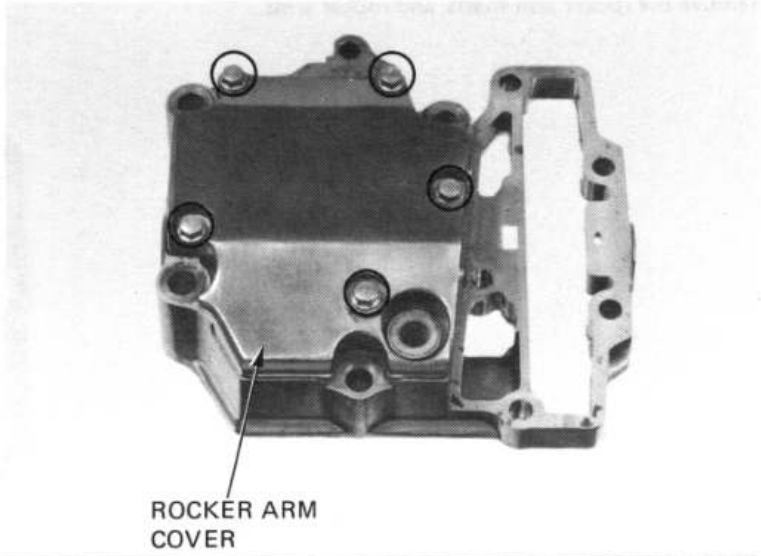


CYLINDER HEAD COVER DISASSEMBLY

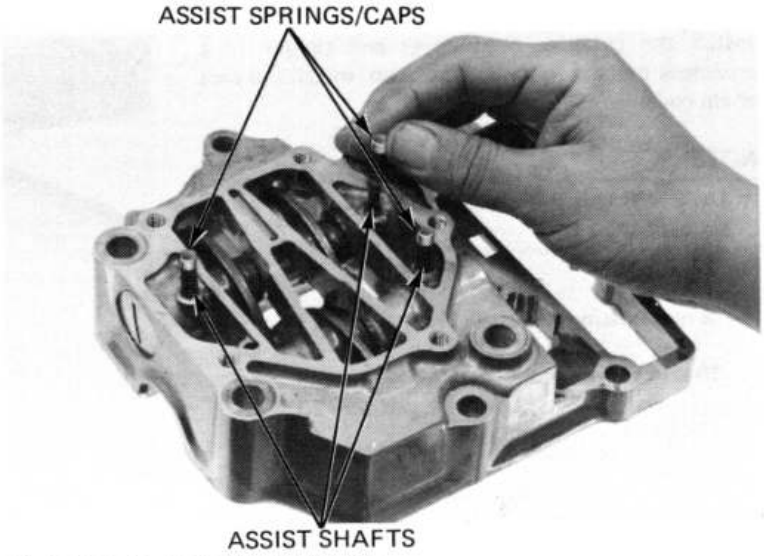
Remove the rocker arm cover and cover gasket.

NOTE:

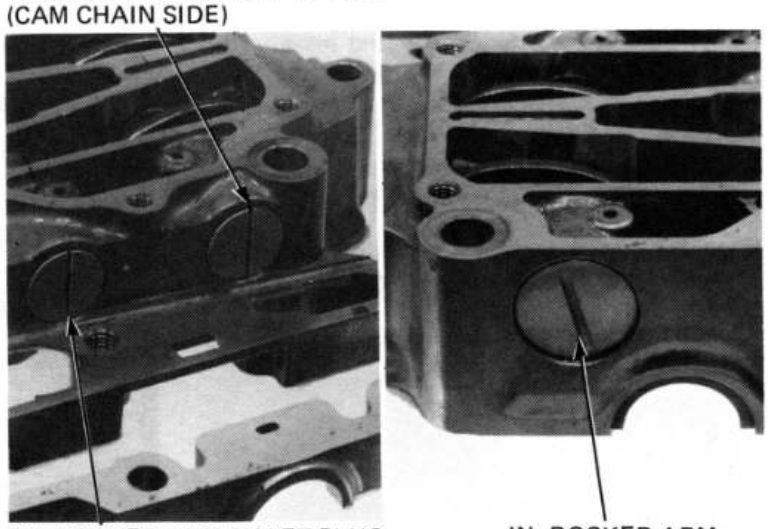
> Remove the rocker arm covers carefully as the assist springs and caps will pop out.



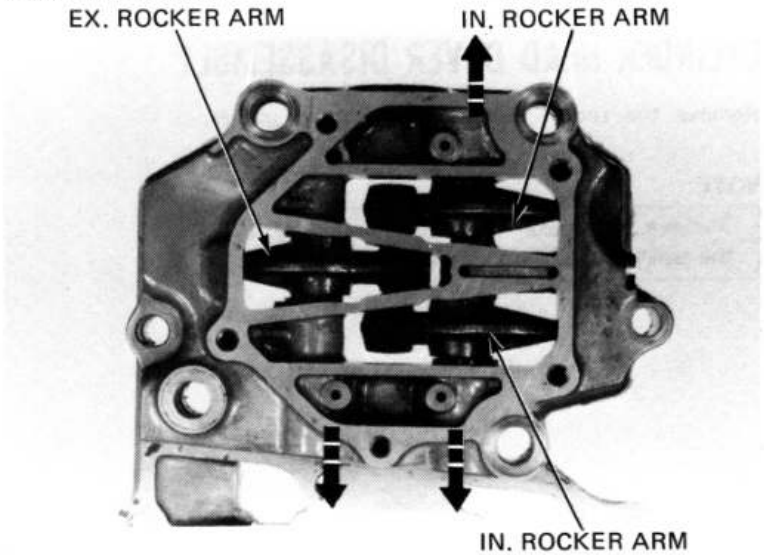
Remove the assist springs/caps and shafts.



With a flat screwdriver, remove the plugs from the rocker arm shaft hole;
Thread 6 mm bolts into the plugs on the cam chain side. Then pull on the bolts with pliers to remove the plugs.



Remove the rocker arm shafts and rocker arms.



INSPECTION

ROCKER ARM SHAFT/ ROCKER ARM

Inspect the rocker arm shafts and rocker arms for wear or damage.

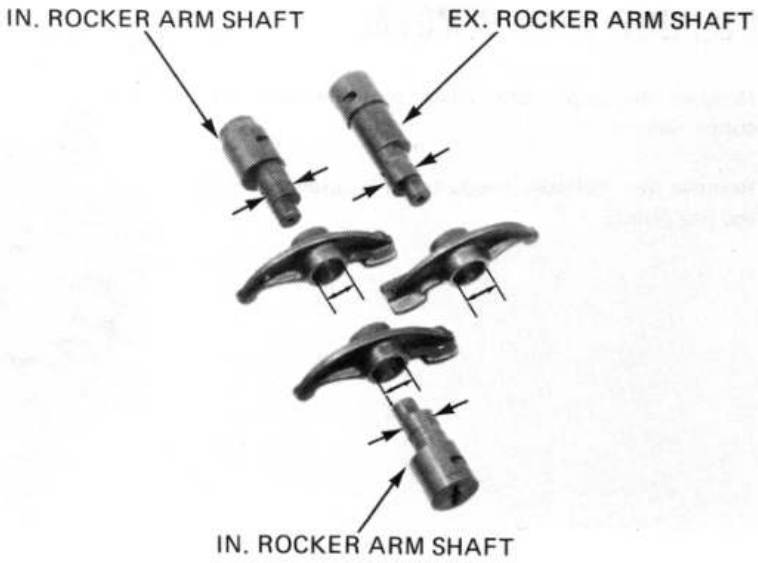
Check the rocker arms for clogged oil holes.

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

SERVICE LIMITS:
IN: 13.58 mm (0.5346 in)
EX: 13.58 mm (0.5346 in)

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 13.80 mm (0.5433 in)



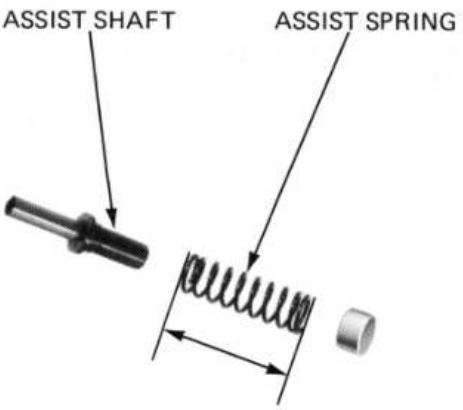
INSPECTION

ASSIST SPRING/SHAFT

Inspect the assist springs and shafts for wear or damage.

Measure the free length of each assist spring.

SERVICE LIMIT: 18.68 mm (0.7354 in)



HYDRAULIC TAPPET

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

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:

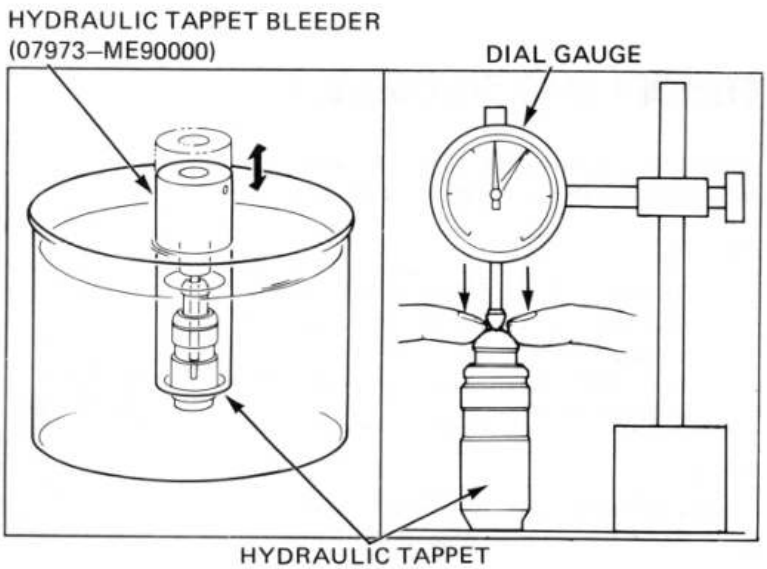
> Hold the hydraulic tappet upright while compressing and extending the hydraulic tappet.

Continue operating the hydraulic tappet until there are no air bubbles from the hydraulic tappet and it does not make no 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:

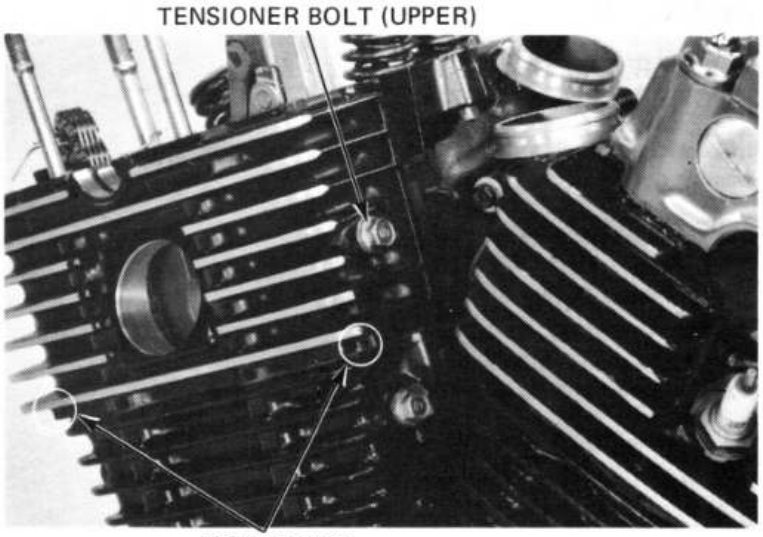
> Keep the hydraulic tappet below the surface of kerosene while priming the hydraulic tappet.



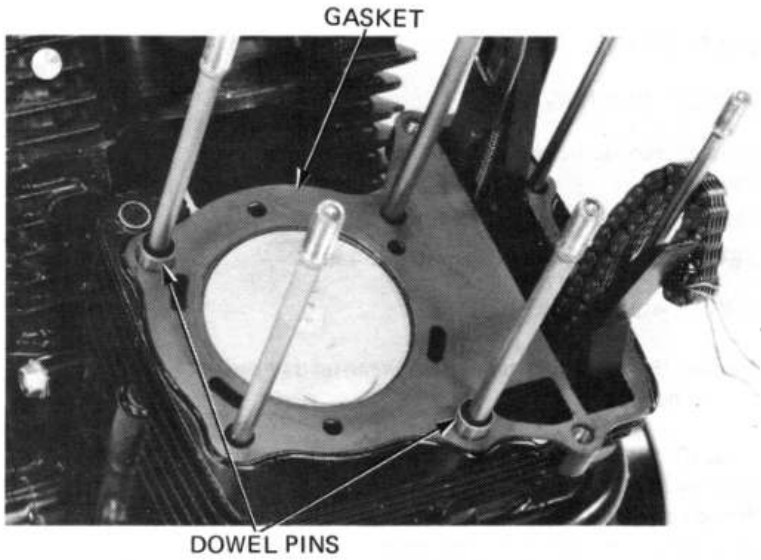
CYLINDER HEAD REMOVAL

Remove the upper cam chain tensioner bolt and copper washer.

Remove the cylinder heads using a screwdriver at the pry points.



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



CYLINDER HEAD DISASSEMBLY

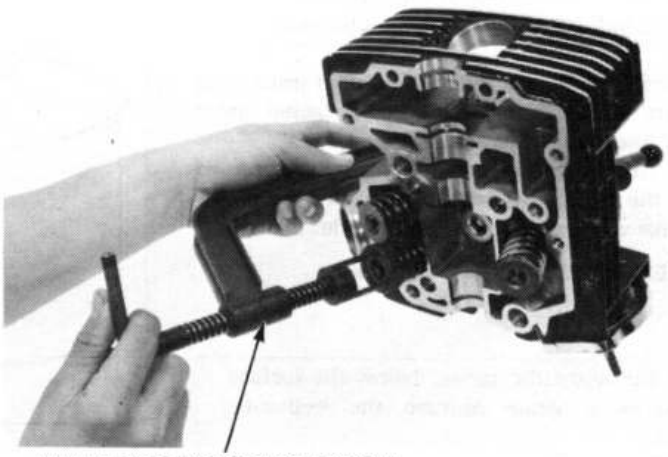
Remove the valve spring cotters, retainers, springs and valves with the Valve Spring Compressor.

CAUTION:

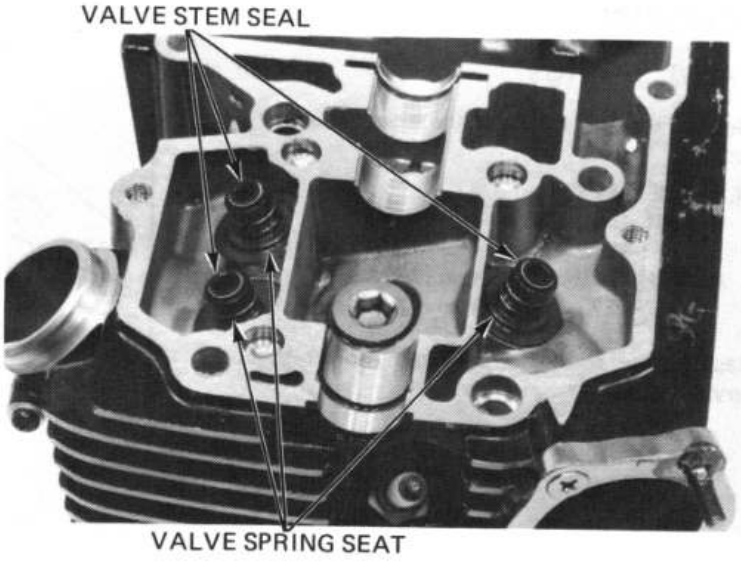
- *To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.*
- *Avoid damaging the sliding surfaces of the hydraulic tappets.*

NOTE:

Mark all parts during disassembly so they can be placed back in their original locations.



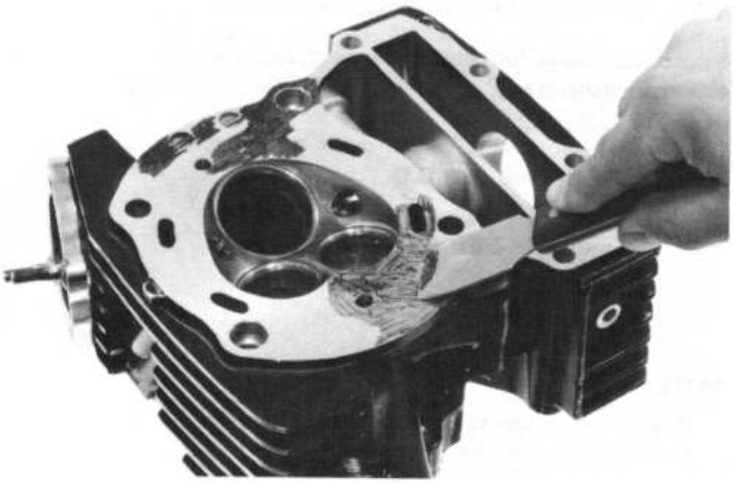
Remove the valve stem seals and valve spring seats.



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

NOTE:

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



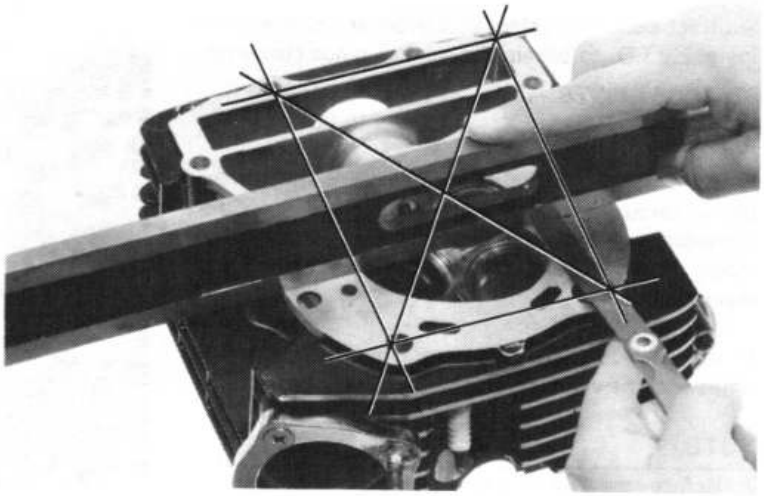
INSPECTION

CYLINDER HEAD

Check the spark plug hole and valve areas for cracks.

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

SERVICE LIMIT: 0.10 mm (0.004 in)



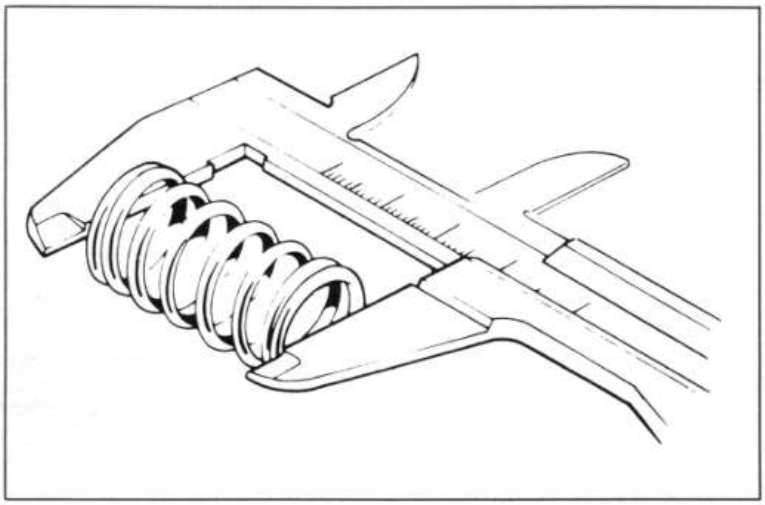
INSPECTION

VALVE SPRINGS

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

SERVICE LIMITS:
INNER (IN): 36.40 mm (1.4331 in)
(EX): 36.40 mm (1.4331 in)
OUTER (IN): 43.90 mm (1.7283 in)
(EX): 41.80 mm (1.6457 in)

Replace the springs if they are shorter than the service limits.



VALVE STEM-TO-GUIDE CLEARANCE

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

Check valve movement in the guide and measure and record each valve stem O.D.

SERVICE LIMITS: IN: 6.55 mm (0.2579 in)
EX: 6.54 mm (0.2575 in)



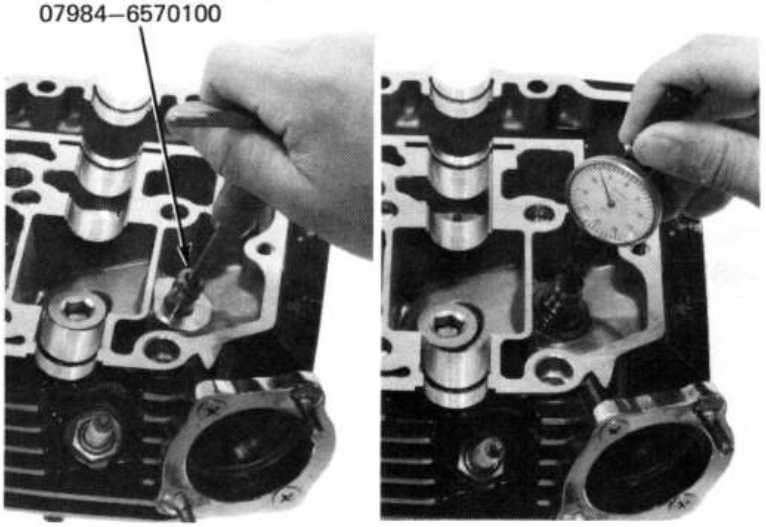
NOTE:

Ream the guides to remove any carbon deposits before checking clearances.

Measure and record each valve guide I.D.

SERVICE LIMIT: 6.66 mm (0.2622 in)

VALVE GUIDE REAMER
07984–6570100



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

SERVICE LIMITS: IN: 0.11 mm (0.0043 in)
EX: 0.12 mm (0.0047 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.

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

NOTE:

Reface the valve seats whenever the valve guides are replaced.

VALVE GUIDE REPLACEMENT

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

WARNING

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

CAUTION:

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

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

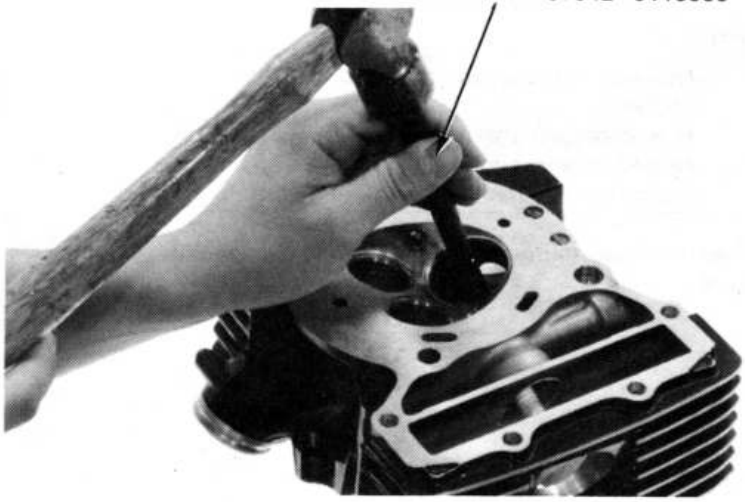
NOTE:

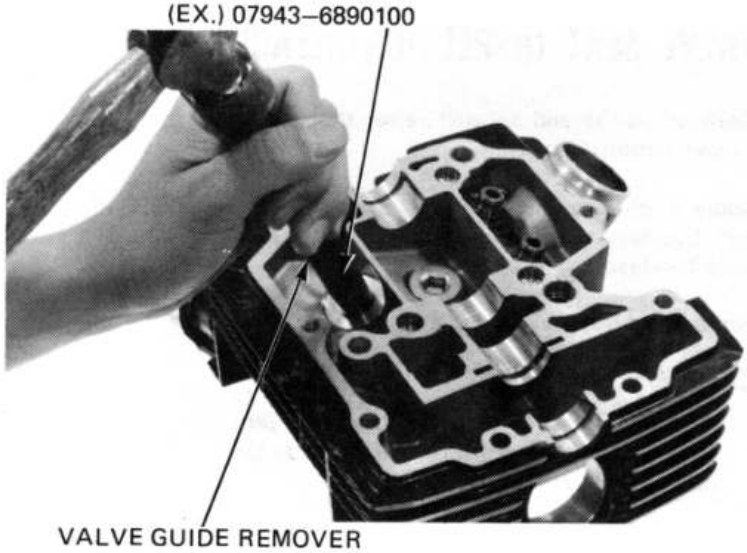
Avoid damaging the cylinder head.

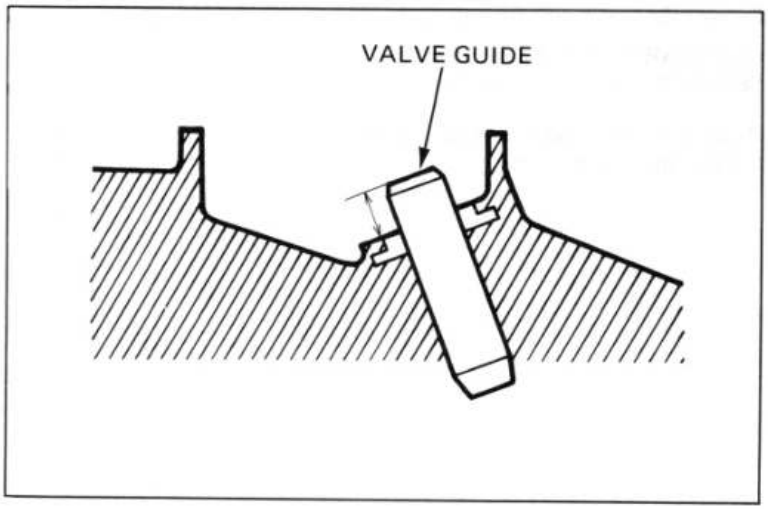
Drive new guides in from the rocker arm side of the cylinder head.

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:

IN: 14.5 ± 0.1 mm (0.5709 ± 0.004 in)
EX: 15.5 ± 0.1 mm (0.6102 ± 0.004 in)







Ream the new valve guides after installation.

NOTE:

- Use cutting oil on the reamer during this operation.
- It is important that the reamer always be rotated in the same direction when it is inserted or removed.

Clean the head thoroughly after reaming the valve guides.



VALVE SEAT INSPECTION/REFACING

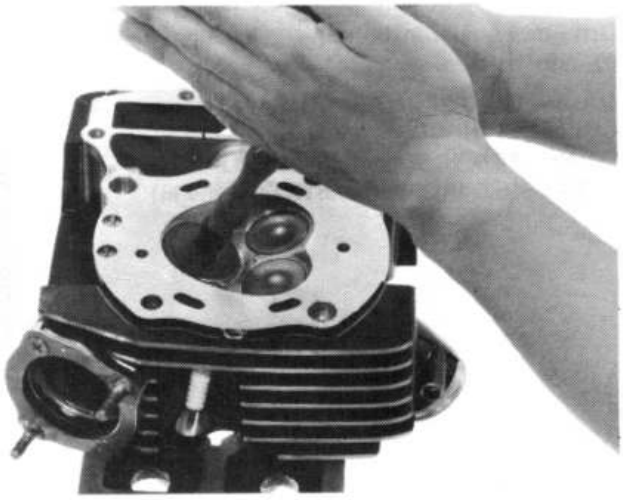
Clean all intake and exhaust valves thoroughly to remove carbon deposits.

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

Remove and inspect each valve.

CAUTION:

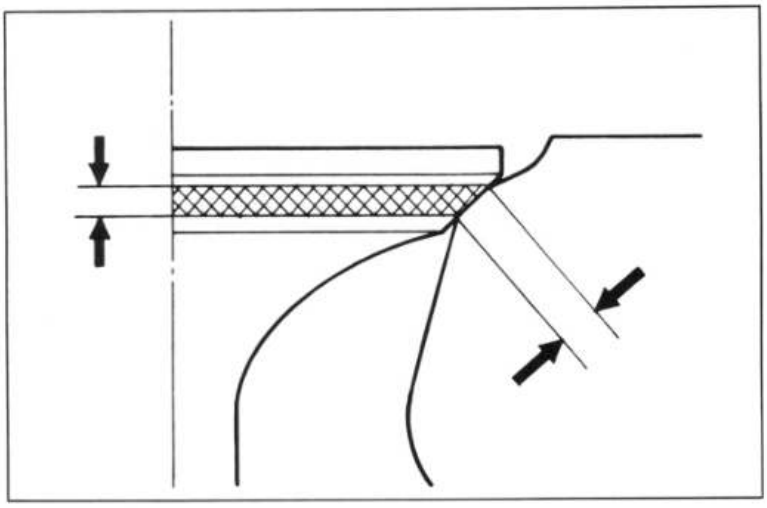
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



Inspect the width of each valve seat.

STANDARD: 1.1–1.3 mm (0.04–0.05 in)
SERVICE LIMIT: 2.0 mm (0.08 in)

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

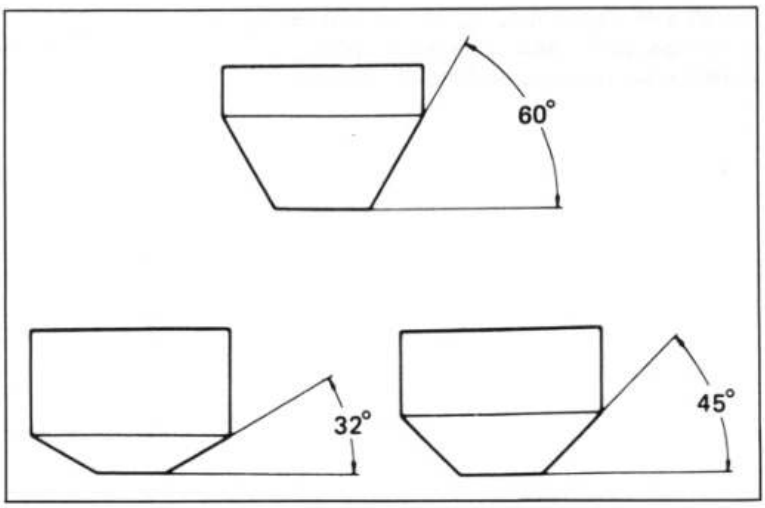


VALVE SEAT CUTTERS

Honda Valve Seat Cutters, grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

NOTE:

- Follow the refacer manufacturer's operating instructions.



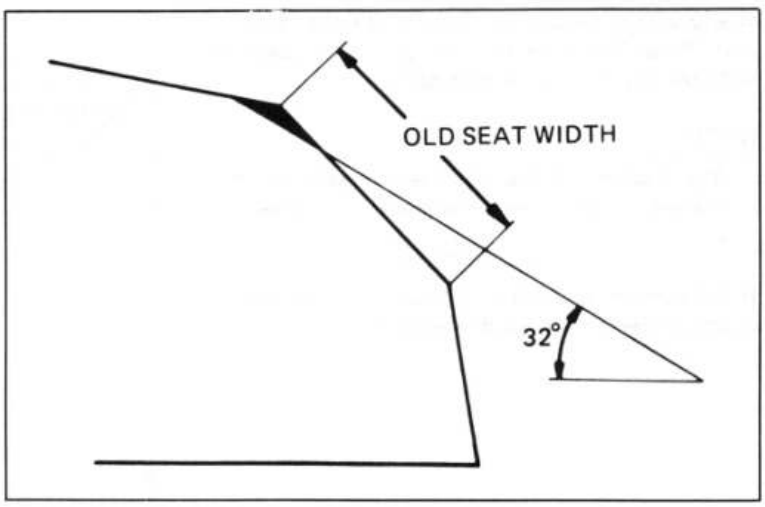
VALVE SEAT REFACING

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

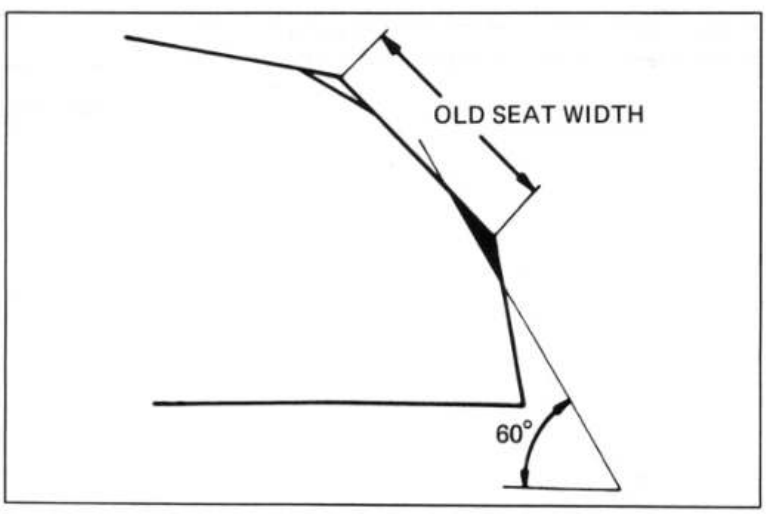
NOTE:

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

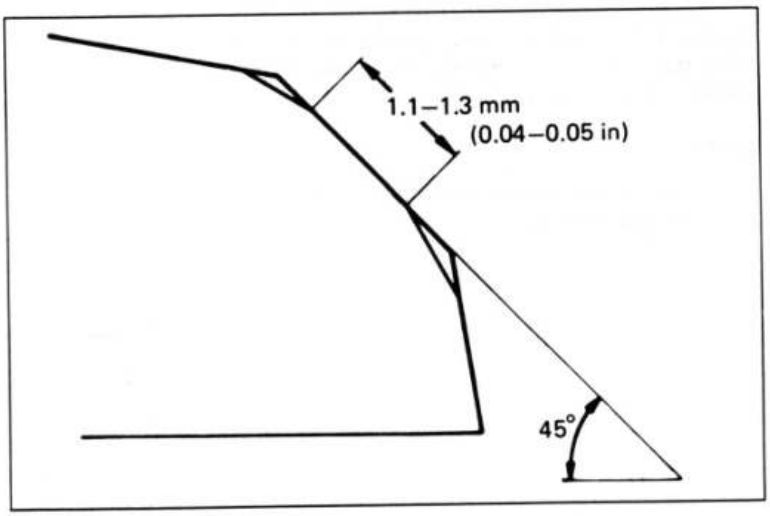
Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.



Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have refaced.



Install a 45 degree finish cutter and cut the seat to the proper width. Make sure that all pitting and irregularities are removed. Refinish if necessary.

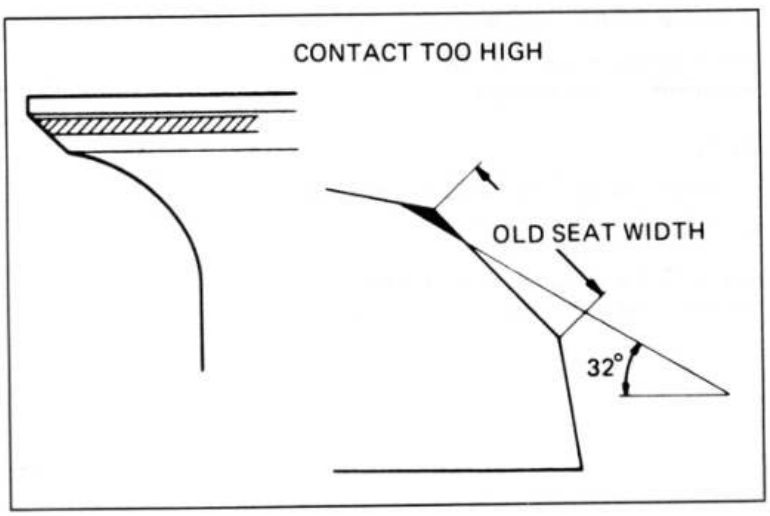


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

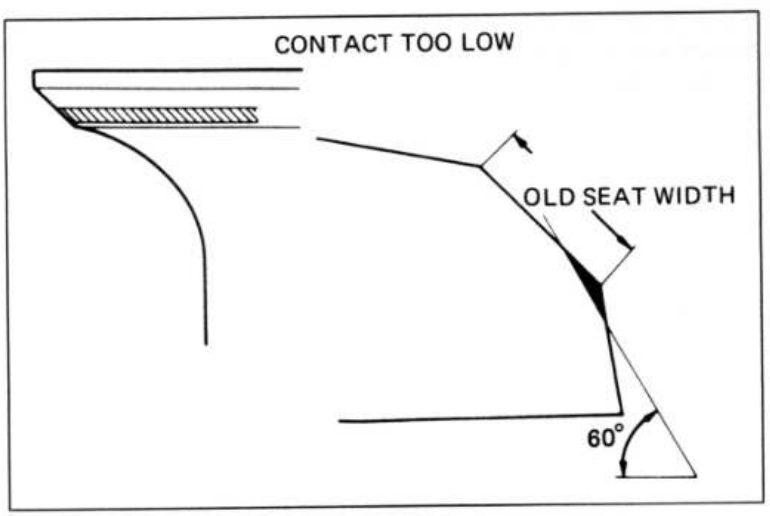
NOTE:

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

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



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

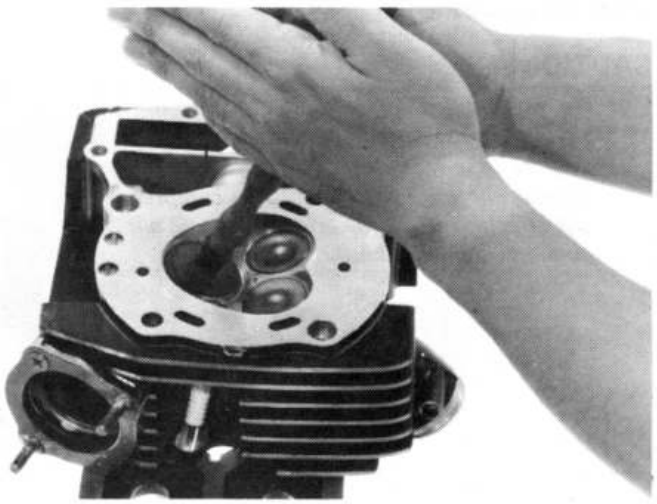


Refinish the seat to specifications, using a 45 degree finish cutter.

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

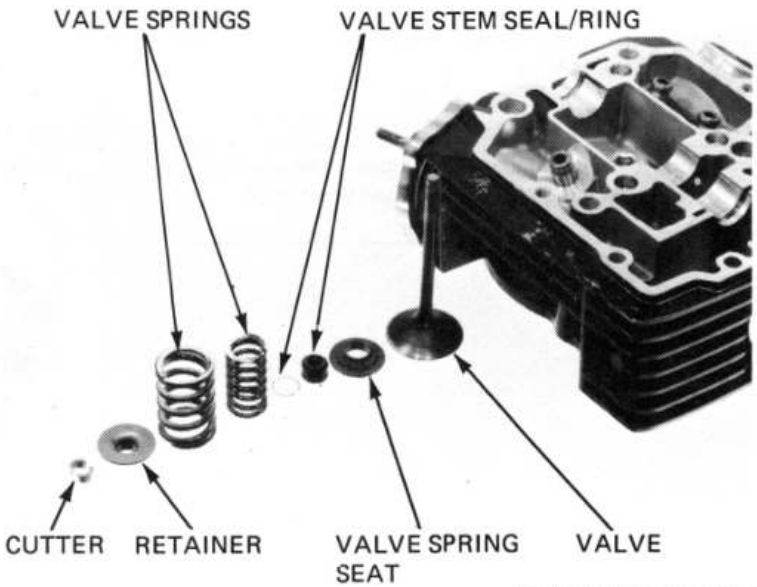
NOTE:

> Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

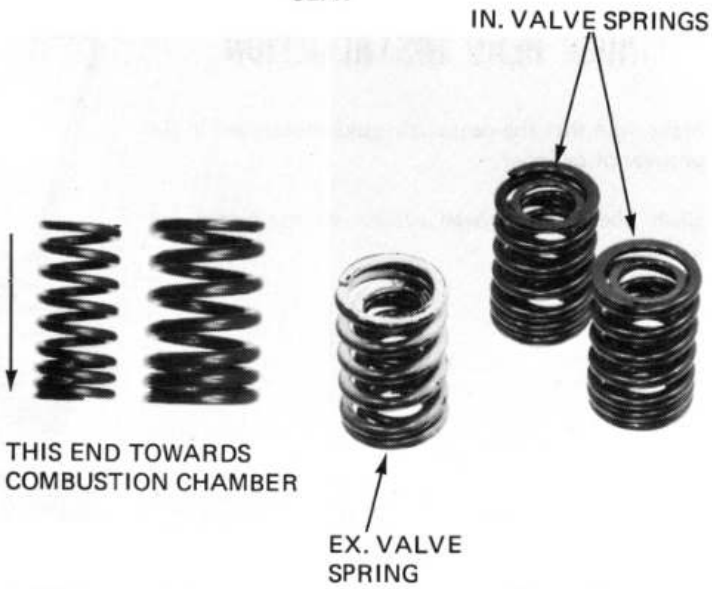
Install the valve spring seat and a new stem seal. Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide. To avoid damage to the stem seal, turn the valve slowly when inserting.



Install the valve springs and retainers. The springs tightly wound coils should face in toward the combustion chamber.

NOTE:

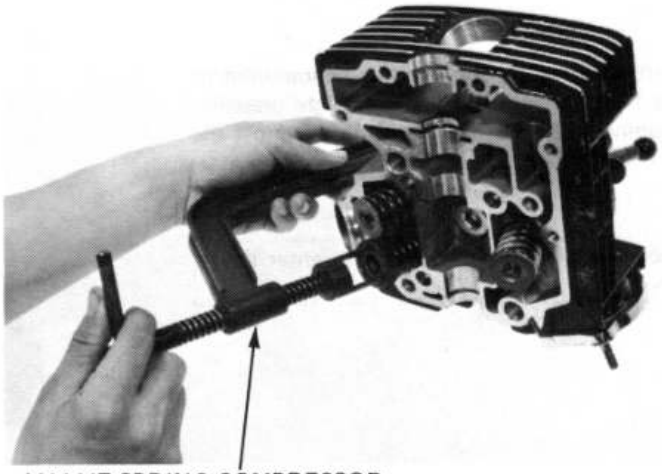
> Springs with green paint are exhaust valve springs.



Install the valve cotters.

CAUTION:

- *To prevent loss of tension, do not compress the valve springs more than necessary to install the valve keepers.*
- *Thread the large retainer on the compressor attachment, so the compressor will not touch the cylinder head.*



VALVE SPRING COMPRESSOR
07757–0010000 OR 07959–3290001

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

NOTE:

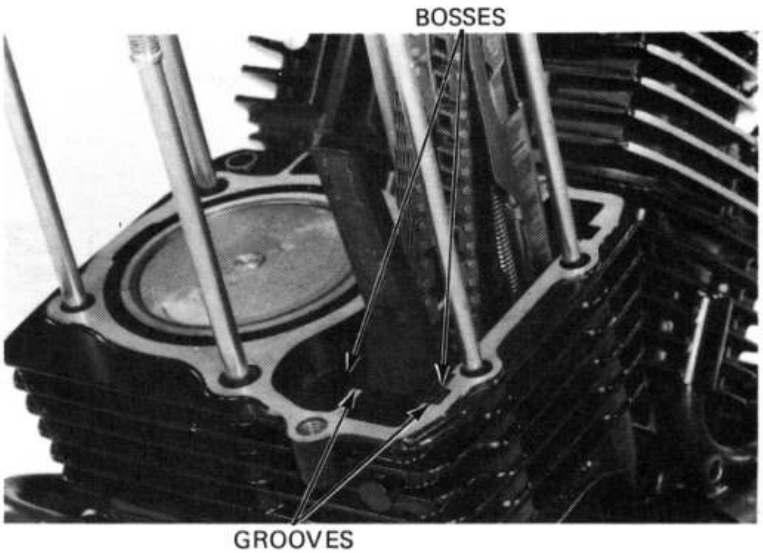
Support the cylinder head above the work bench surface to prevent possible valve damage.



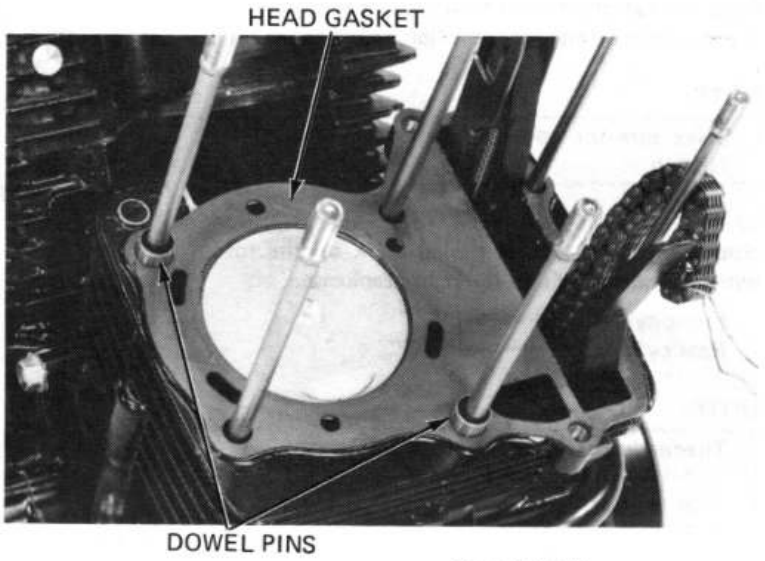
CYLINDER HEAD INSTALLATION

Make sure that the cam chain guide bosses are in the grooves of cylinder.

Clean the cylinder head surface of any gasket material.

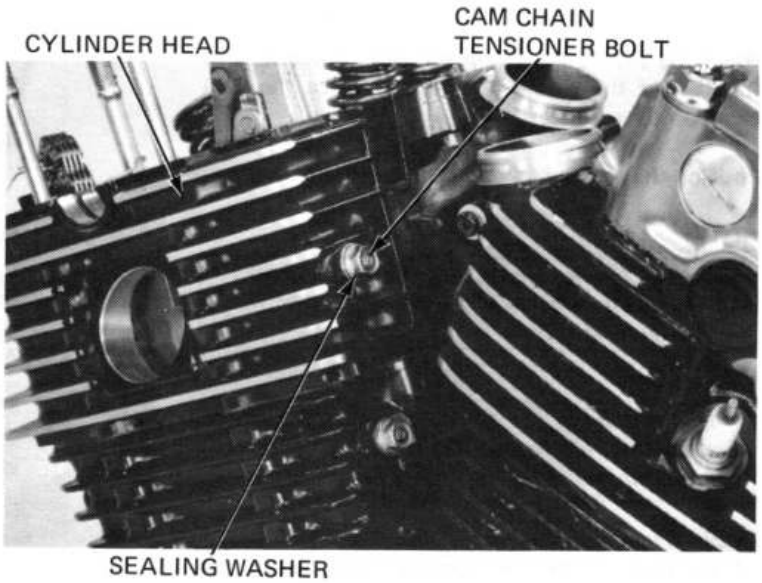


Install the dowel pins and a new head gasket.



Install the cylinder head.

Install the cam chain tensioner bolt and sealing washer.



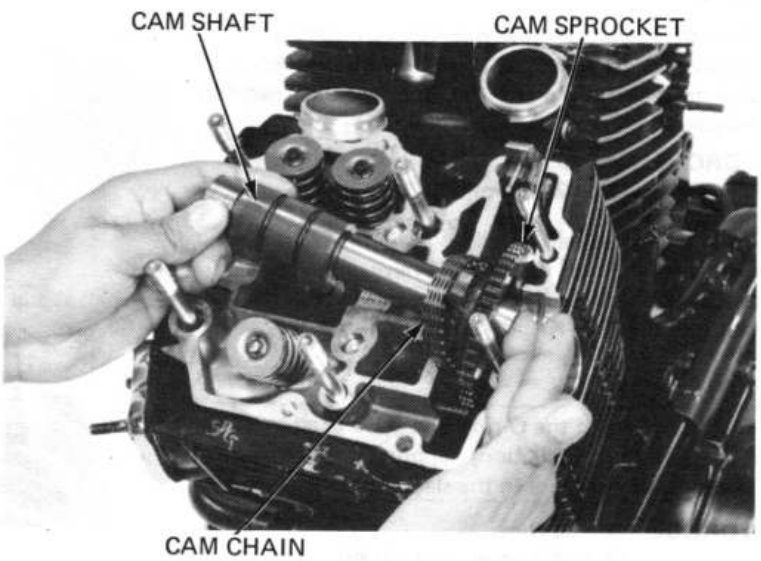
CAMSHAFT INSTALLATION

Lubricate the camshaft journal surface of the cylinder head with molybdenum disulfide grease.

Run the camshaft through the cam chain and install the cam sprocket on the shaft flange.

NOTE:

> Install the cam sprocket with the timing mark (punch mark) facing the outside.



Place the camshafts into their correct positions with the markings on the sprocket flanges facing up.

NOTE:

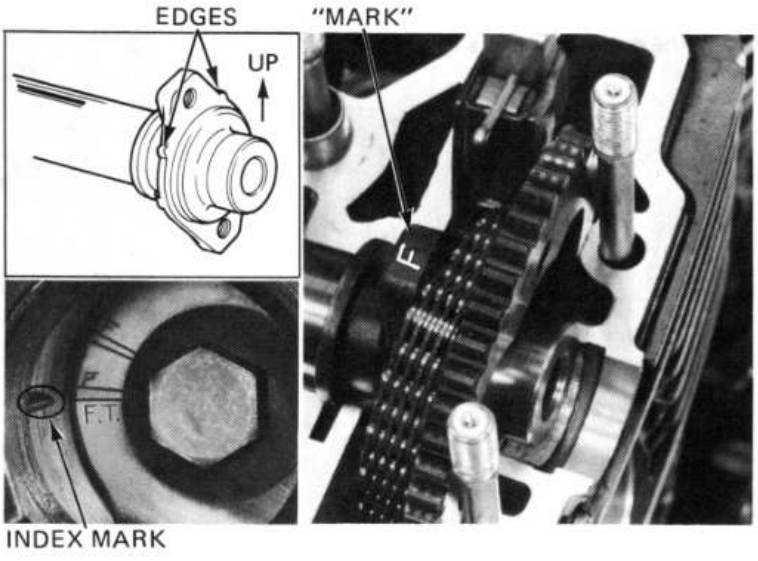
> Make sure the edges on the sprocket flanges face up.

While lifting the cam chain, rotate the crankshaft clockwise and align the timing mark on the rotor with the index mark on the right crankcase.

Front cylinder ⟶ "F.T"
Rear cylinder ⟶ "R.T"

NOTE:

> The marks on the camshaft flanges mean:
> "F" → Front cylinder camshaft
> "R" → Rear cylinder camshaft



Align the timing marks on the cam sprocket with the top of the cylinder head and place the cam chain on the sprocket.

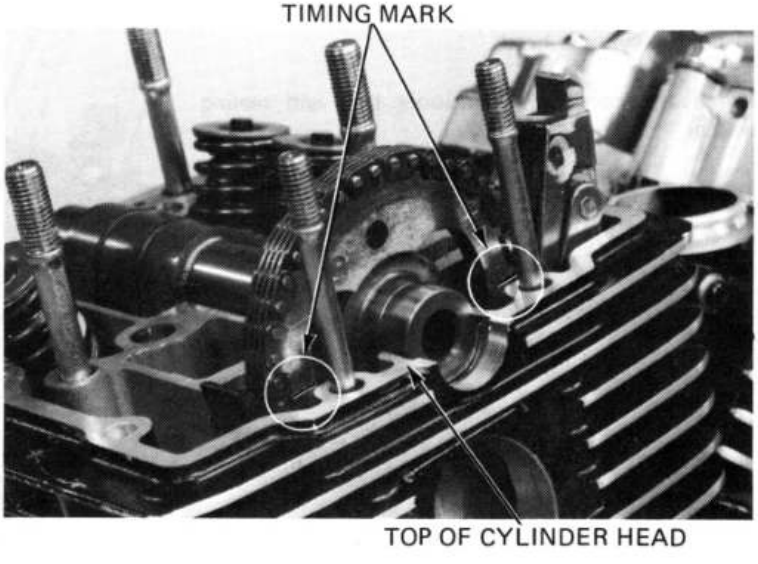
Position the cam sprocket on the camshaft flange.

NOTE:

> After installing, check that the timing marks on the cam sprocket align with the top of the cylinder head.

CAUTION:

> *After installing the front cylinder, turn the crankshaft clockwise 225° turn and then install the rear cylinder.*



Apply a locking agent to the threads and underside of the head of the cam sprocket bolt, but do not tighten at this time.

Turn the crankshaft lockwise one turn (360°).
Apply locking agent to the other cam sprocket bolt and install it. Tighten the bolt to the specified torque.

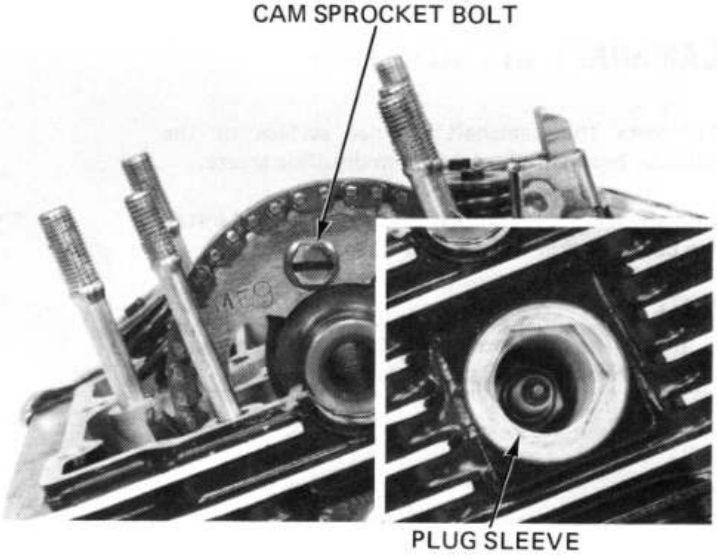
TORQUE: 16–20 N·m
(1.6–2.0 kg-m, 12–14 ft-lb)

Turn the crankshaft clockwise one turn and torque the remaining bolt to the same valve.
Install and torque the spark plug sleeve with the special tool (07930–KA50100).

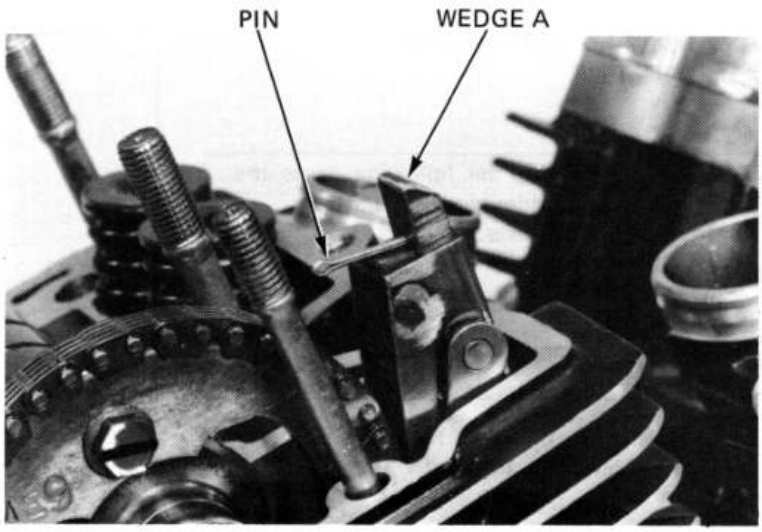
NOTE:

> - Check that the O-ring is in good condition.
> - Before installation, apply molybdenum disulfide grease to the sleeve threads.

TORQUE: 10–15 N·m
(1.0–1.5 kg-m, 7–11 ft-lb)



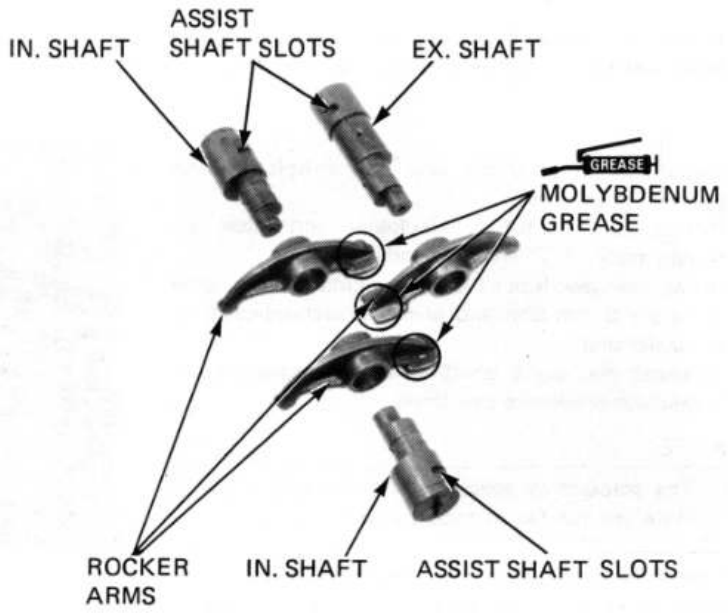
Remove the 2 mm pin holding wedge A.



CYLINDER HEAD COVER ASSEMBLY

Brush Molybdenum Disulfide grease on the slipper surfaces of the rocker arms and coat the contact surfaces of the rocker shafts with clean engine oil.

Install the rocker arms and shafts into the cylinder head cover, making sure that the assist shaft slots are facing up.



Rotate each rocker shaft so that the arms are moved in toward the center of the cover.

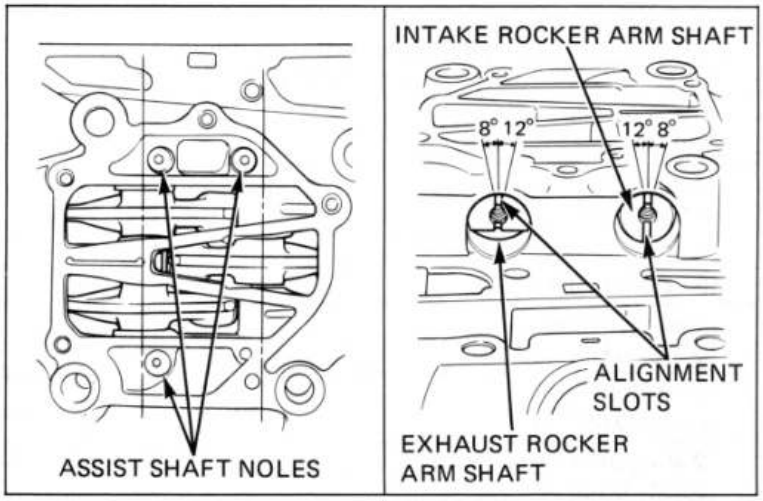
NOTE:

> Put your finger on the rocker arms as you rotate the shaft to be sure which way the are moving.

Check that the alignment slots in the rocker shafts are within the limits shown.

NOTE:

> Both intake rocker arm shafts should fall within the same limits.

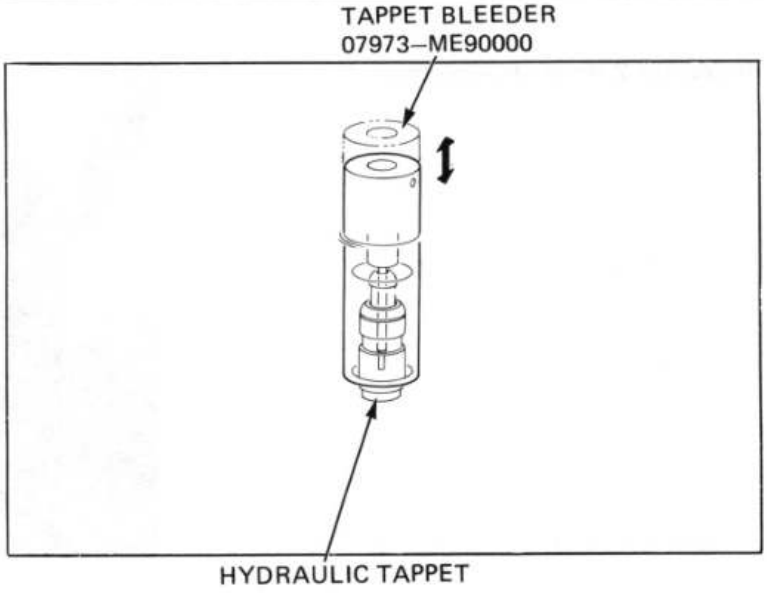


HYDRAULIC TAPPET SHIM ADJUSTMENT

NOTE:

Whenever replacing the following parts, the hydraulic tappet shim must be adjusted.
- Cylinder head cover.
- Cylinder head.
- Valve stem, valve guide and valve seat refacing.
- Rocker arm and rocker arm shaft.
- Camshaft.

After bleeding the oil in the hydraulic tappets with the tappet bleeder, install the tappets into the cylinder head.



Install the cylinder head cover and tighten the 8 mm bolts and 10 mm cap nuts to the specified torque.

Install the assist shafts are in the holes of the cylinder head cover.
Rotate the crankshaft clockwise and align the timing mark "F.T" with the index mark.
Install the gear holder on the cylinder head cover using the 6 mm bolt and place the dial indicator on the assist shaft.
Measure the assist shaft stroke by rotating the crankshaft clockwise two times.

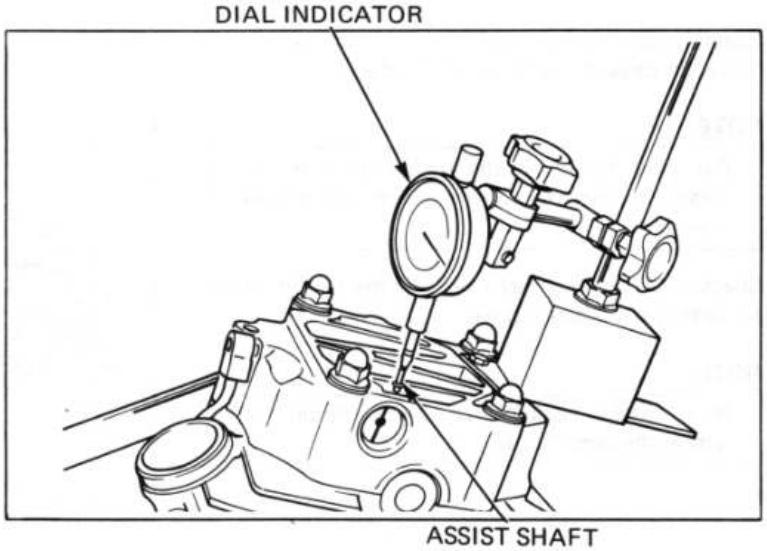


NOTE:

The amount of assist shaft stroke will determine the number of tappet shims needed.

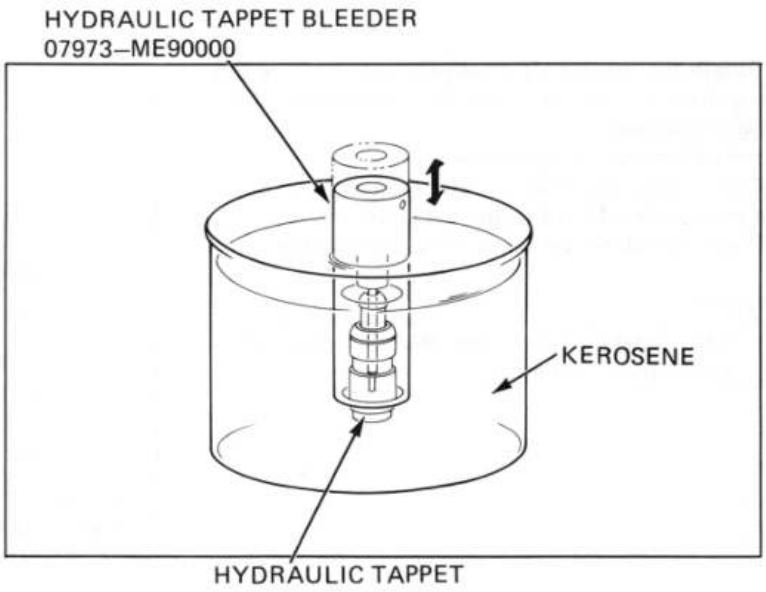
Determine and record the number of shims to be used to each tappet according to the following chart.

Assistant shaft stroke	Number of shims needed 0.5 mm (0.02 in)
0–1.20 mm (0–0.047 in)	0
1.20–1.50 mm (0.047–0.059 in)	1
1.50–1.80 mm (0.059–0.070 in)	2
1.80–2.10 mm (0.070–0.083 in)	3
2.10–2.40 mm (0.083–0.094 in)	4
2.40–2.70 mm (0.094–0.106 in)	5



CYLINDER HEAD COVER INSTALLATION

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



Install the shims into each hydraulic tappet hole of the cylinder head.
Install the hydraulic tappets into the cylinder head.

CAUTION:

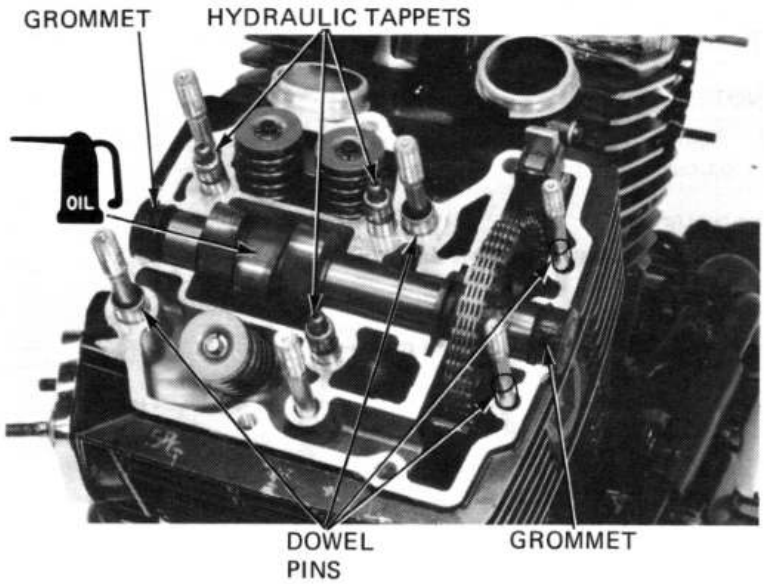
Do not tilt the hydraulic tappets, keep them as upright as possible.

Install the dowel pins and grommets.

NOTE:

Apply a liquid sealant to the oil seals where they contact the cylinder head.

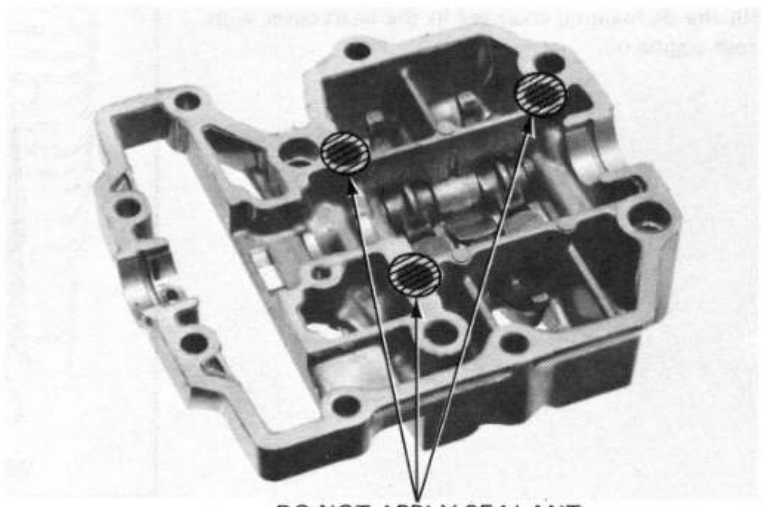
Pour fresh oil into the oil pockets in the cylinder head until the cams are submerged.



Apply a liquid sealant to the mating surfaces of the cylinder head cover.

NOTE:

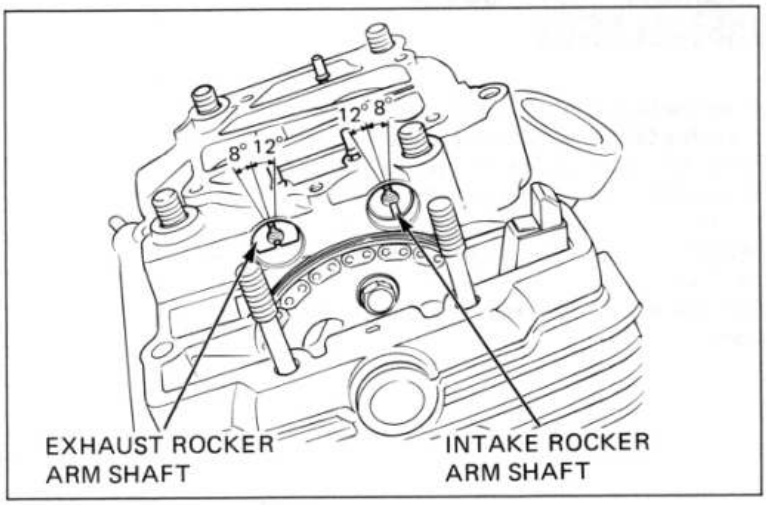
Do not apply liquid sealant to the shadowed area. Failure to do so could cause a faulty hydraulic tappet.



Rotate the crankshaft clockwise and align the timing mark on the rotor with the index mark on the right crankcase.
Install the cylinder head cover.
Check that the slots in the exhaust and intake rocker arm shafts are within the limits shown.
If not, repeat the preceeding step and recheck.

NOTE:

> Both intake rocker arm shafts should fall within the same limits.



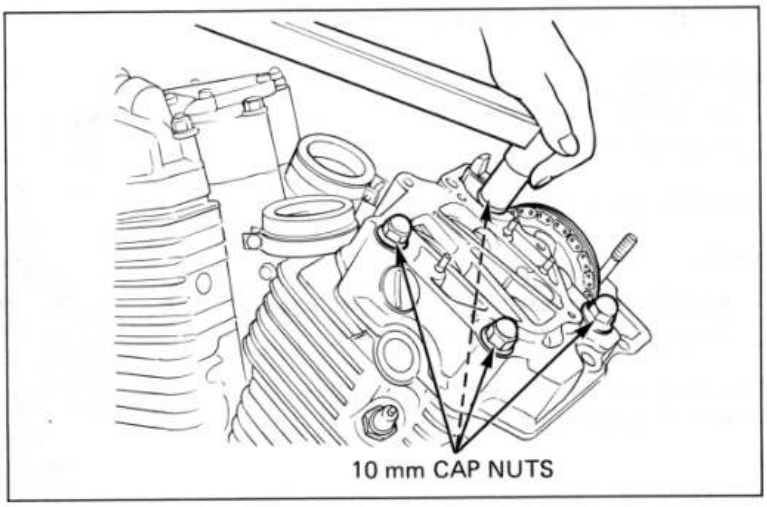
Torque the cylinder head cover bolts and cap nuts.

NOTE:

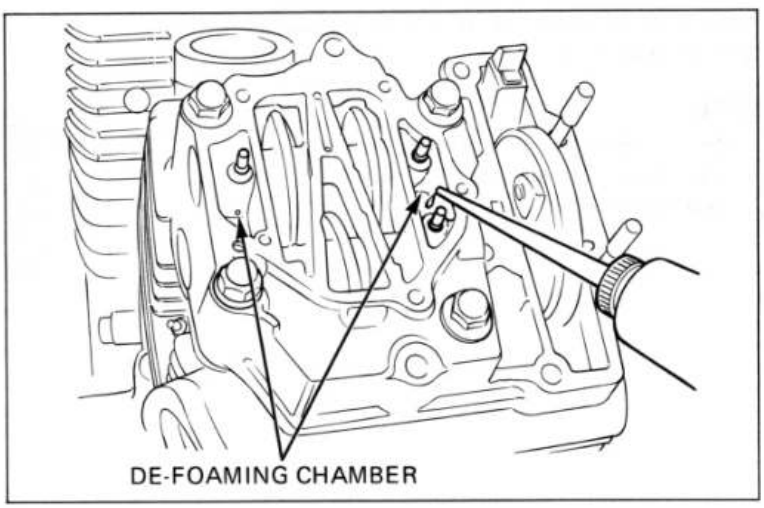
> Tighten the bolts and cap nuts in a criss-cross pattern in 2–3 steps.

TORQUES:

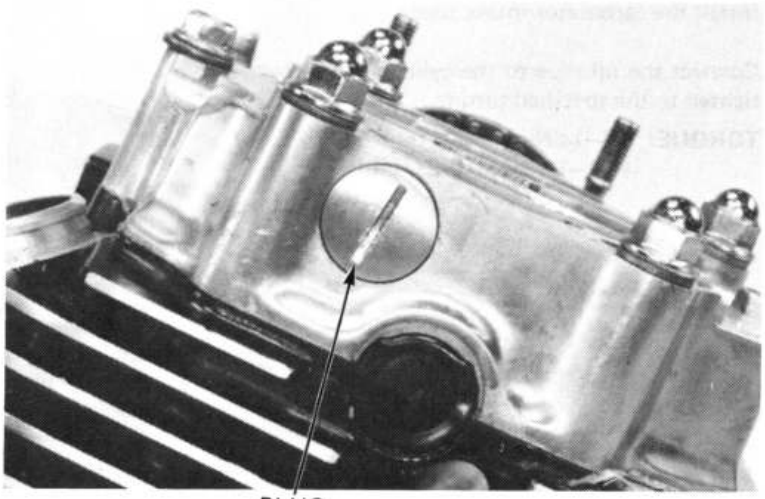
10 mm cap nut:	**35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)**
8 mm bolt:	**20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)**



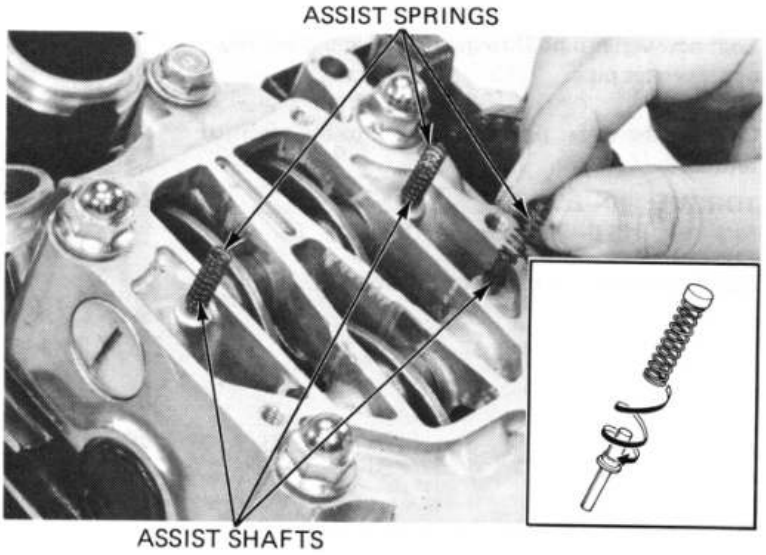
Fill the de-foaming chamber in the head cover with fresh engine oil.



Place a new O-ring on each rocker arm shaft plug and install the plugs.



Install assist spring onto assist shaft while twisting it so that assist spring end seats flange face tightly.
Install the assist shafts and springs in the holes of the cylinder head cover as shown.
Rotate the crankshaft clockwise and align the timing mark (T.D.C.) on the rotor with the index mark on the right crankcase.
Make sure the rocker arm can be slided side way.



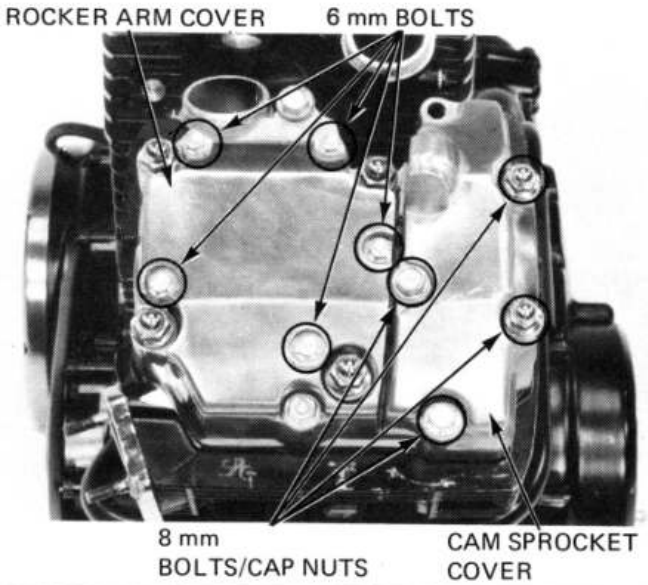
Install the cam sprocket cover with a new gasket. Torque the 8 mm bolts and cap nuts.

NOTE:

> Tighten the bolts and cap nuts in a criss-cross pattern in 2–3 steps.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

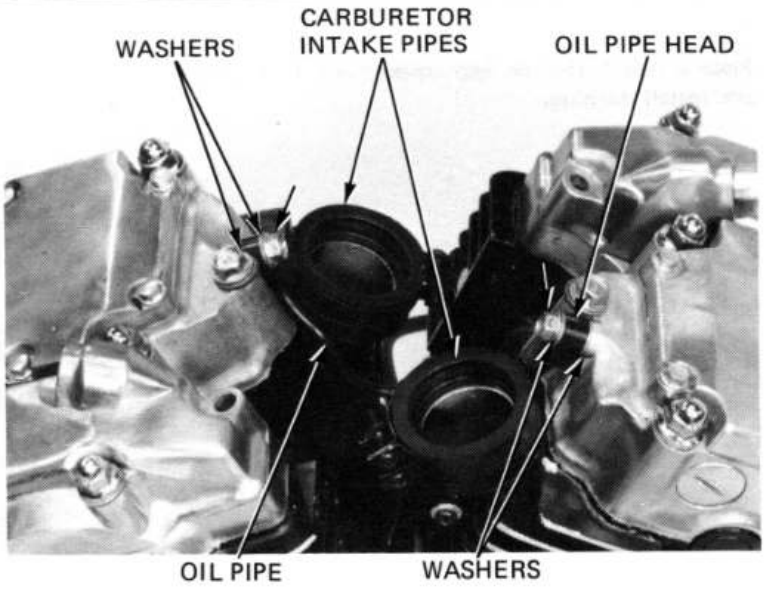
Place a new gasket on the cylinder head cover.
Install the rocker arm cover and torque the 6 mm bolts in a crisscross pattern in 2–3 steps.



Install the carburetor intake pipes.

Connect the oil pipe to the cylinder head cover and tighten to the specified torque.

TORQUE: 10–14 N·m
(1.0–1.4 kg-m, 6–9 ft-lb)

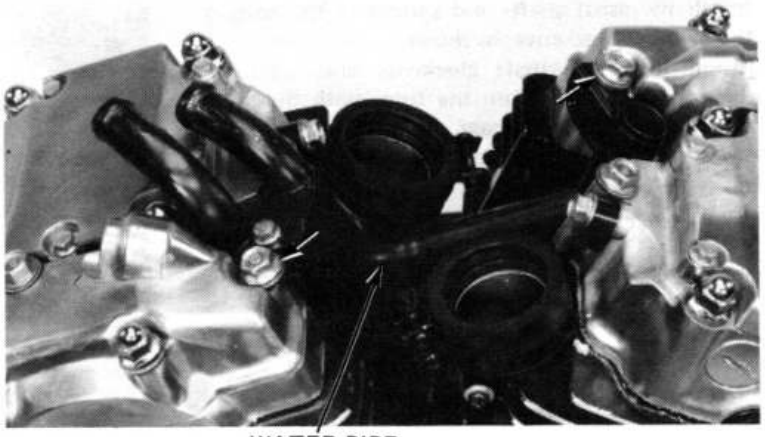


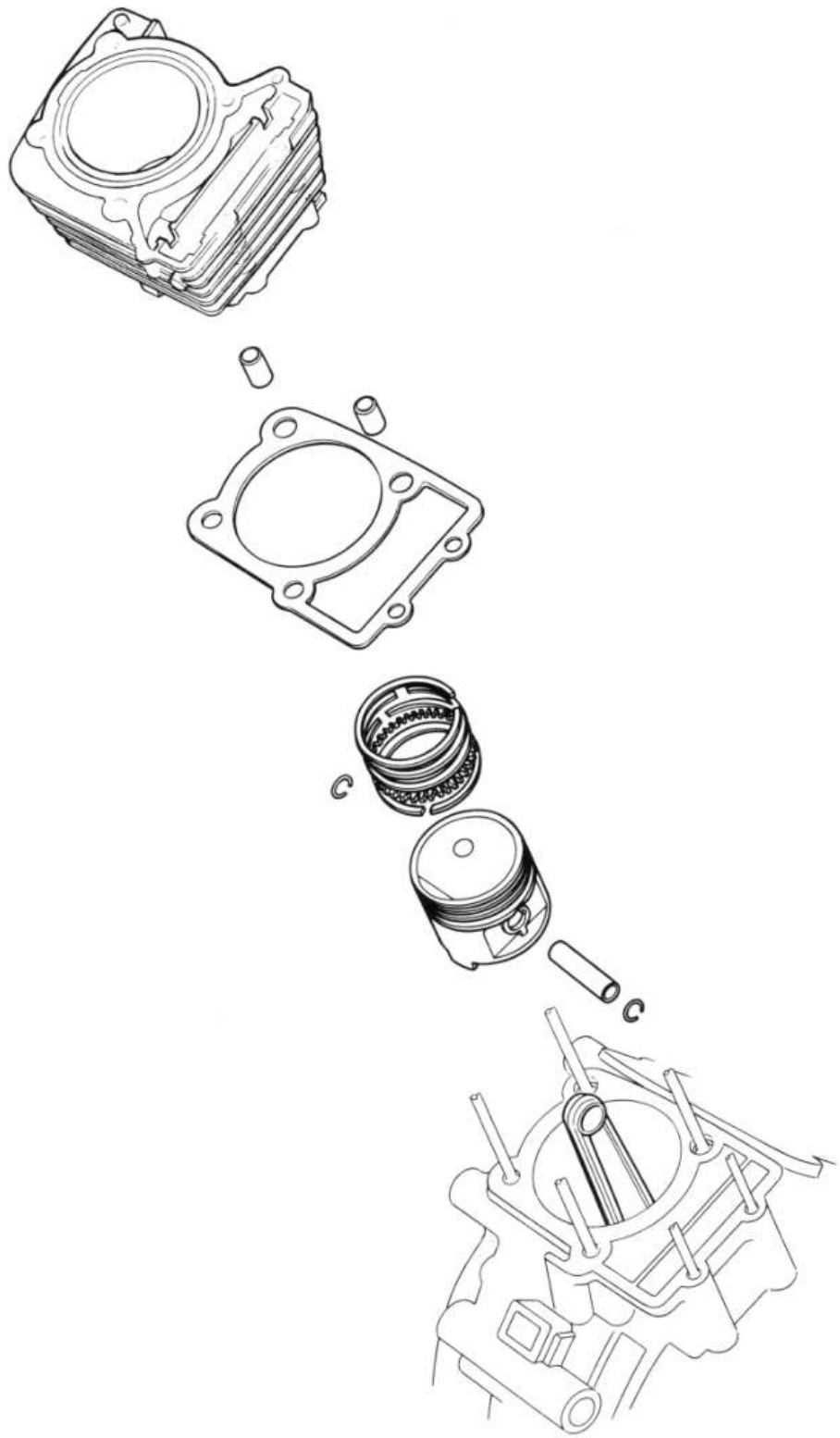
Coat new water pipe O-rings with oil and place them on the water pipe.

Connect the water pipe and tighten to the specified torque.

TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

Install the engine in the frame (Section 5).





11. CYLINDER/PISTON

SERVICE INFORMATION	11–1
TROUBLESHOOTING	11–2
CYLINDER REMOVAL	11–3
PISTON REMOVAL	11–5
PISTON RING INSTALLATION	11–7
PISTON INSTALLATION	11–9
CYLINDER INSTALLATION	11–9

SERVICE INFORMATION

GENERAL

- Cylinder head coolant is fed through water jackets in the cylinder.
- Be sure that the wathe pipe O-ring, gasket and dowel pins are in place before installing the cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.	'83:	79.500–79.515 (3.1299–3.1305)	79.67 (3.137)
	I.D.	After '83:	76.500–76.515 (3.0118–3.0124)	76.66 (3.018)
	Out-of-round		—	0.05 (0.002)
	Taper		—	0.05 (0.002)
	Warpage		—	0.10 (0.004)
Pistons, piston rings, and piston pins	Piston skirt O.D.	'83:	79.470–79.490 (3.1287–3.1295)	79.35 (3.124)
	Piston skirt O.D.	After '83:	76.210–76.230 (3.0004–3.0012)	76.09 (2.996)
	Piston pin hole		20.002–20.008 (0.7875–0.7877)	20.05 (0.789)
	Piston pin O.D.		19.994–20.000 (0.7872–0.7874)	19.80 (0.780)
	Piston pin-to-piston clearance		0.002–0.014 (0.0001–0.0005)	0.10 (0.004)
	Piston ring-to groove clearance	Top/second	0.03–0.035 (0.0012–0.0014)	0.25 (0.010)
		Oil	0.03–0.035 (0.0012–0.0014)	0.10 (0.004)
	Piston ring end gap	Top/second	0.20–0.35 (0.0079–0.0138)	0.50 (0.002)
		Oil (side rail)	0.30–0.90 (0.0118–0.035)	1.1 (0.04)
Piston-to-cylinder clearance			0.010–0.045 (0.0004–0.0018)	0.32 (0.013)

TROUBLESHOOTING

Low or uneven compression
1. Worn cylinder or piston rings.
2. Leaking head gasket.
3. Incorrect valve timing.

Excessive smoke
1. Worn cylinder and piston rings.
2. Improperly installed piston rings.
3. Damaged piston or cylinder.

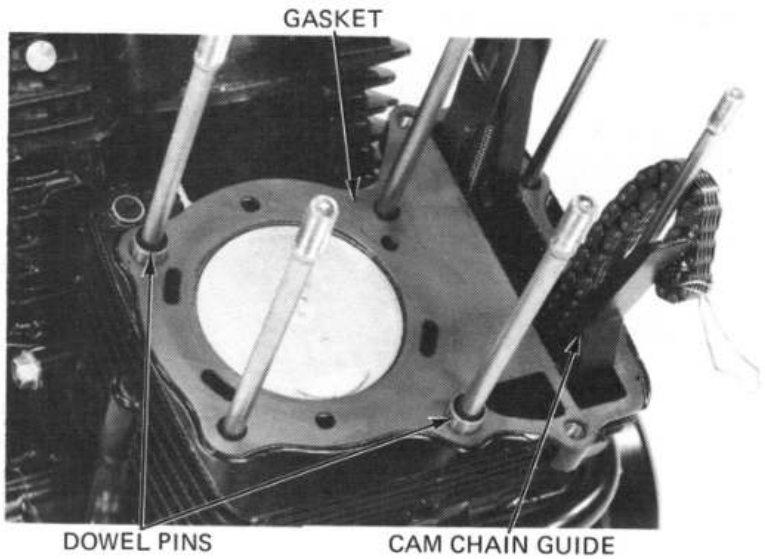
Overheating
1. Excessive carbon deposits on piston or combustion chamber.
2. Faulty water pump

Piston noise
1. Worn cylinder and piston.
2. Excessive carbon deposits.

CYLINDER REMOVAL

Remove the cylinder heads (Refer to Section 10).

Remove the gaskets and dowel pins and the cam chain guides.

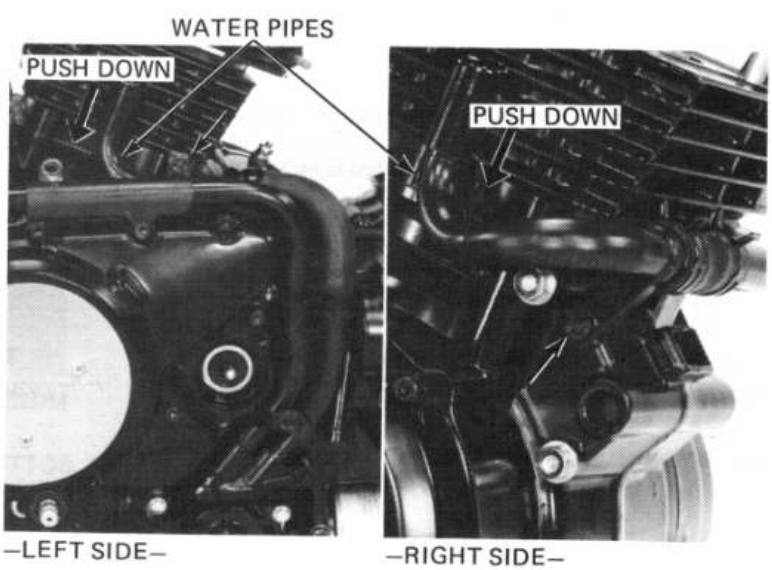


Remove the cam chain tensioner bolt and sealing washer.

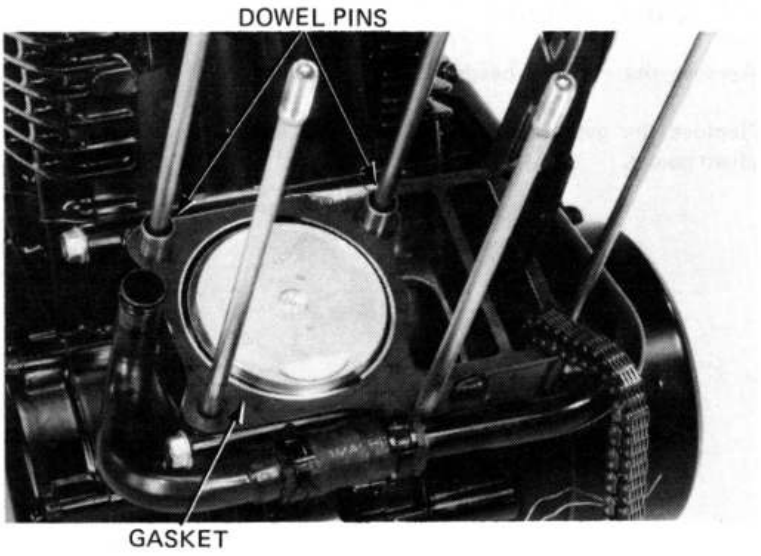


Remove the union bolts and remove the right and left water pipes from the cylinders by pulling them out by hand.
Remove the O-rings from the water pipes.

Remove the cylinders.



Remove the gaskets and dowel pins.



Clean the top of each cylinder thoroughly with a scraper.

NOTE:

- Avoid damaging the gasket surface.
- The gasket will come off easier if it is soaked in solvent.



CYLINDER INSPECTION

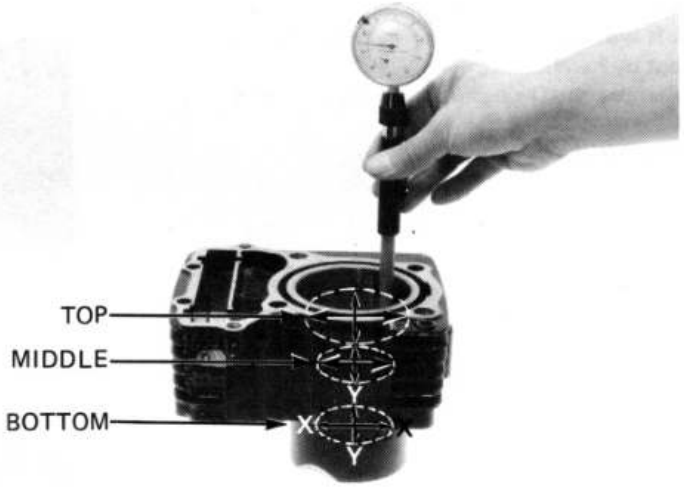
Inspect the cylinder bores for wear or damage.

Measure the cylinder I.D. at three levels in X and Y axis.

SERVICE LIMIT:
'83: 79.67 mm (3.137 in)
After '83: 76.66 mm (3.018 in)

Calculate the taper and out of round.

SERVICE LIMIT:
Taper: 0.05 mm (0.002 in)
Out of round: 0.05 mm (0.002 in)

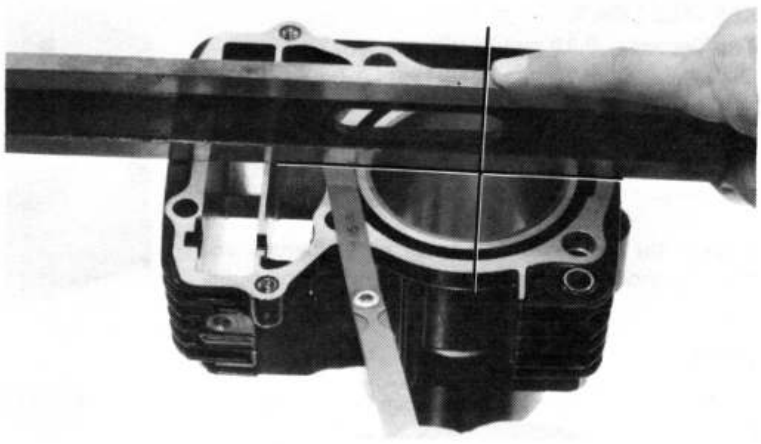


Inspect the cylinders for transverse warpage across the top.

NOTE:

> Measure warpage using a straight edge and feeler gauge in the directions shown.

SERVICE LIMIT: 0.10 mm (0.004 in)



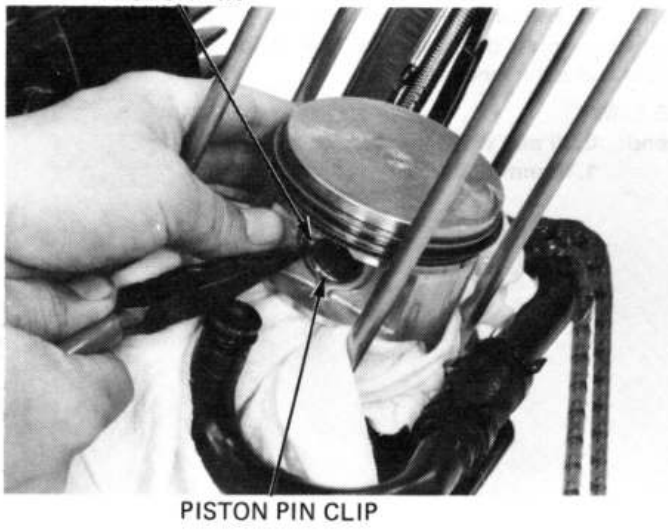
PISTON REMOVAL

Place a shop towel into the crankcase and remove the piston pin clips.

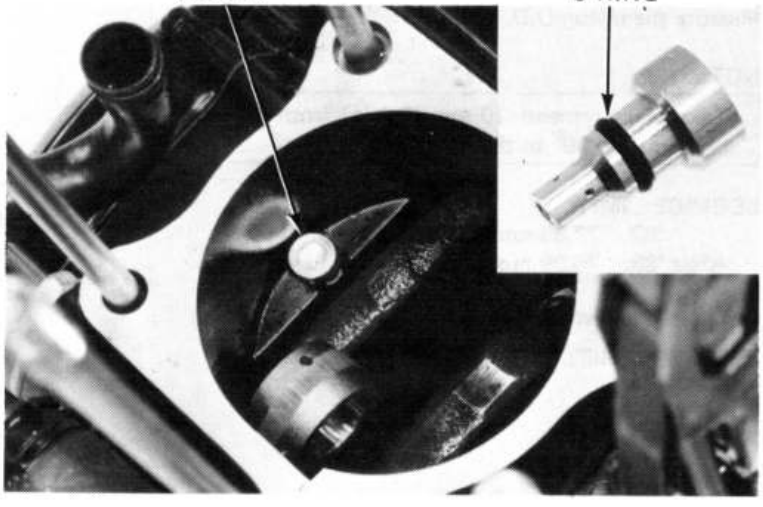
NOTE:

> Do not let the clips fall into the crankcase.

Push the piston pin out and remove the piston.



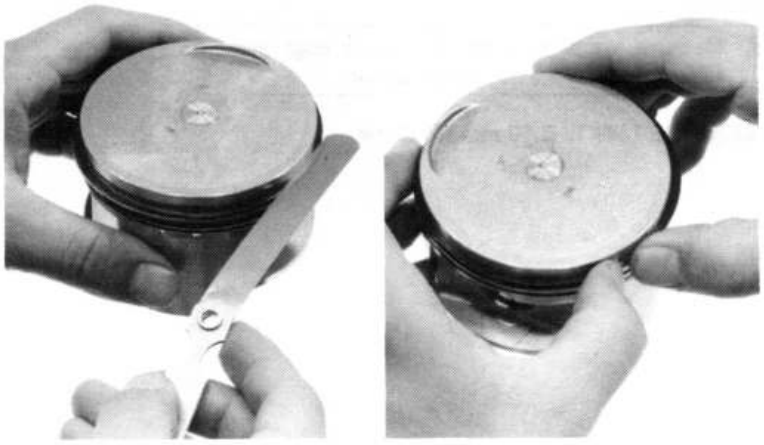
Remove the oil jet and check for clogging.
Check the O-ring for damage or deterioration.



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT:
Top/Second: 0.10 mm (0.004 in)
Oil: 0.10 mm (0.004 in)



Remove the piston rings and mark them to indicate the correct cylinder and piston position for re-assembly.

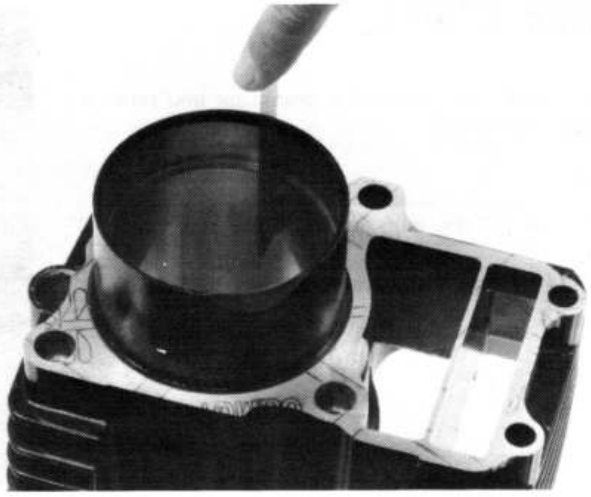
Inspect the piston for cracks or other damage and the ring grooves for excessive wear or carbon build-up.

NOTE:

> Do not damage the piston rings when removing them.

Measure the top and second piston ring end gaps; using a piston, push the ring into the cylinder squarely and make the measurement.

SERVICE LIMIT:
Top/Second: 0.50 mm (0.02 in)
Oil: 1.10 mm (0.04 in)



Measure the piston O.D.

NOTE:

> Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT:
'83: 79.35 mm (3.124 in)
After '83: 76.09 mm (2.996 in)



Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.32 mm (0.013 in)

Measure each piston pin hole I.D.

SERVICE LIMIT: 20.05 mm (0.789 in)

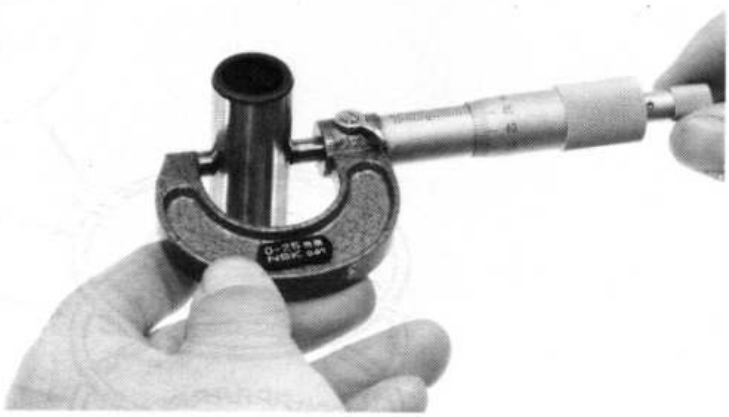


Measure each piston pin O.D.

SERVICE LIMIT: 19.80 mm (0.780 in)

Calculate the piston pin to piston clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)



PISTON RING INSTALLATION

Clean the piston domes, ring lands, and skirts.

NOTE:

> Insert the outside surface of the ring into the proper ring groove and roll around in the groove to make sure that the ring has a free fit around the piston's circumference.



Carefully install the piston rings onto the piston with the markings facing up.

NOTE:

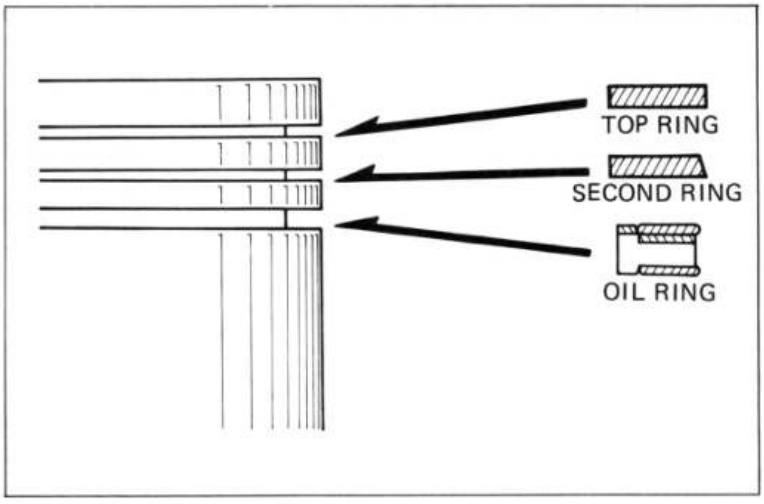
> Be careful not to damage the piston and piston rings during assembly.

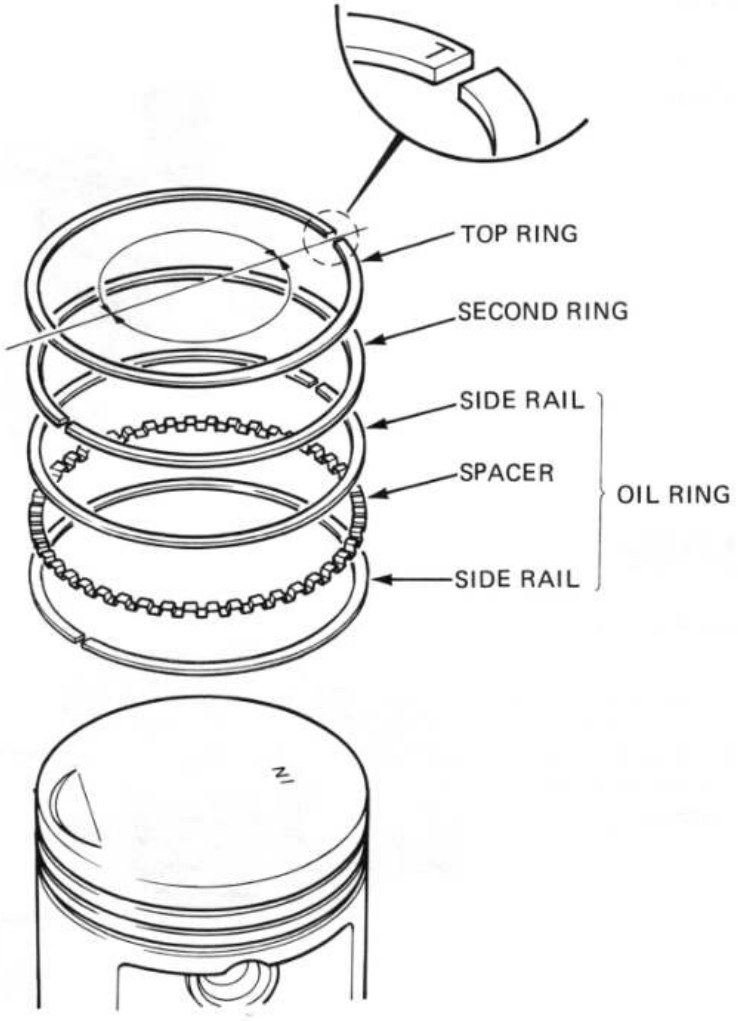
Stagger the ring end gaps 180° apart from each other as shown.

NOTE:

> To install the oil ring, install the spacer first, then install the side rails.

After installing the rings, check that they rotate freely without sticking.



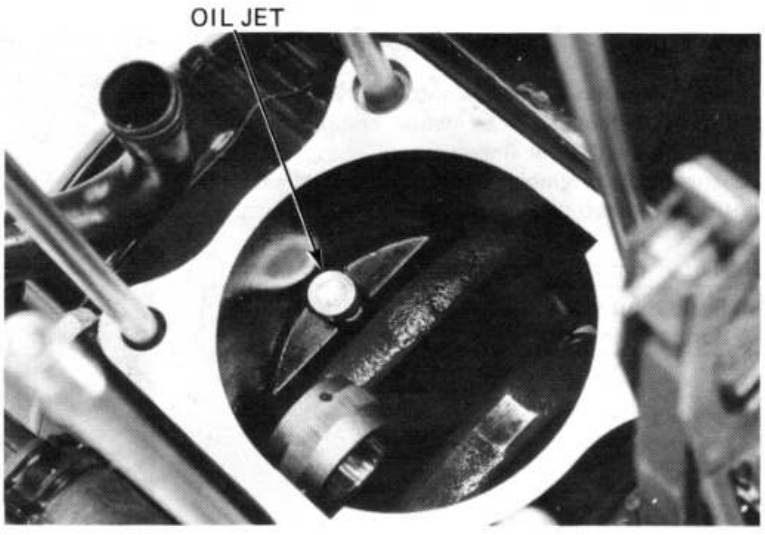


PISTON INSTALLATION

Install the oil jets.

NOTE:

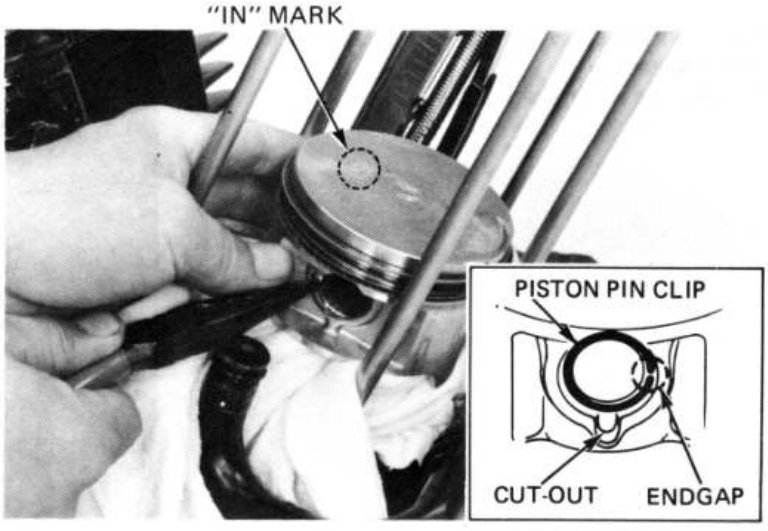
> Before installing the oil jets, make sure that the O-Rings are installed on the oil jets.



Coat the rod small end with molybdenum disulfide grease. Assemble the piston and connecting rod with the piston and piston pin clips as shown.

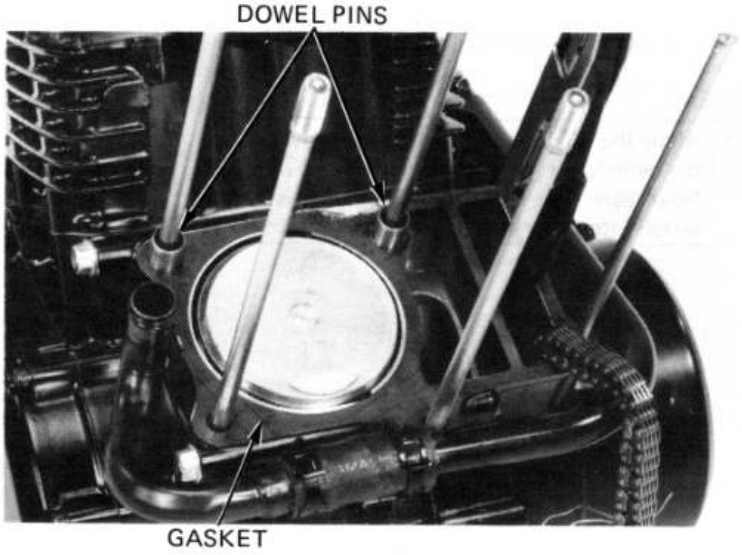
NOTE:

- Install the pistons with the marking "IN" facing towards the inlet side.
- After installing the piston pin clips, make sure that they are seated properly and not aligned with the cutout in the piston.
- Do not let the piston pin clips fall into the crankcase.



CYLINDER INSTALLATION

Install the gasket and dowel pins.

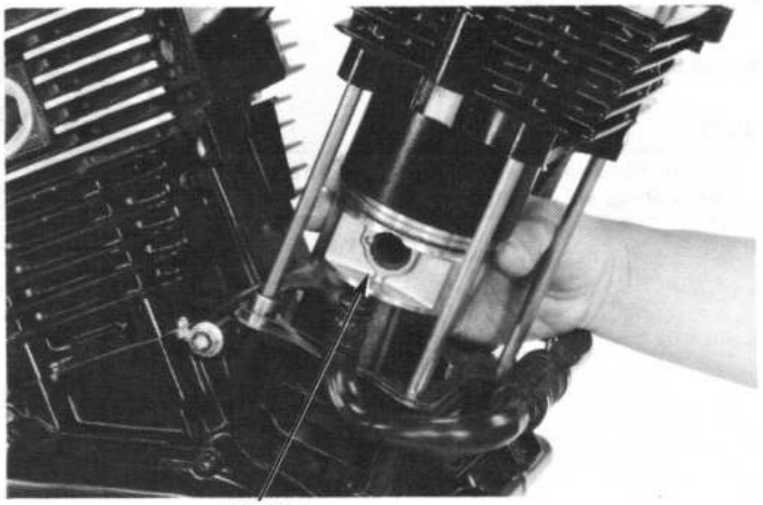


Coat the cylinders, piston rings/grooves and pistons with oil.

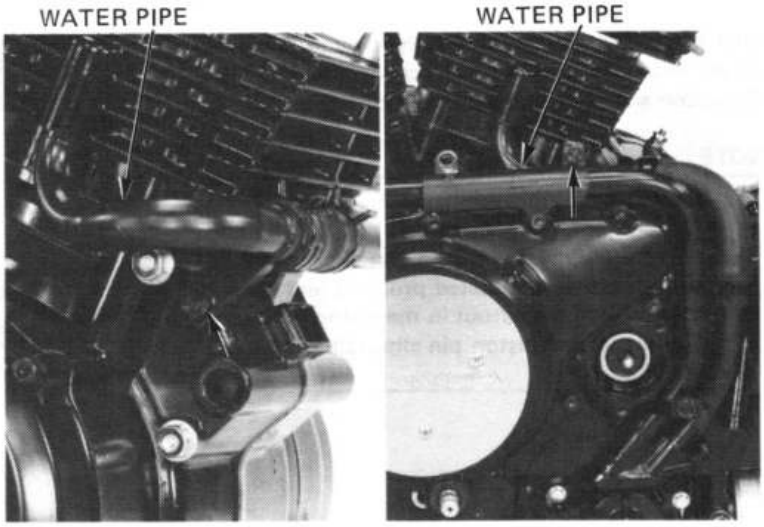
Install the piston assemblies into the cylinders from the top of the crankcase while compressing the piston rings with your fingers.
Be sure each assembly is returned to its original position as noted during removal.

NOTE:

> Be careful not to damage the piston rings during assembly.



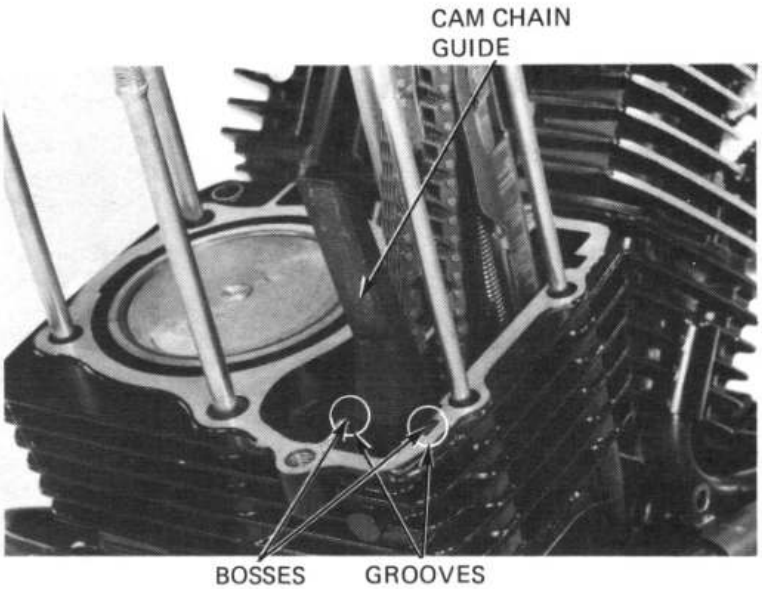
Apply oil to new water pipe O-rings and place them on the water pipes.
Connect the water pipes to the cylinders.



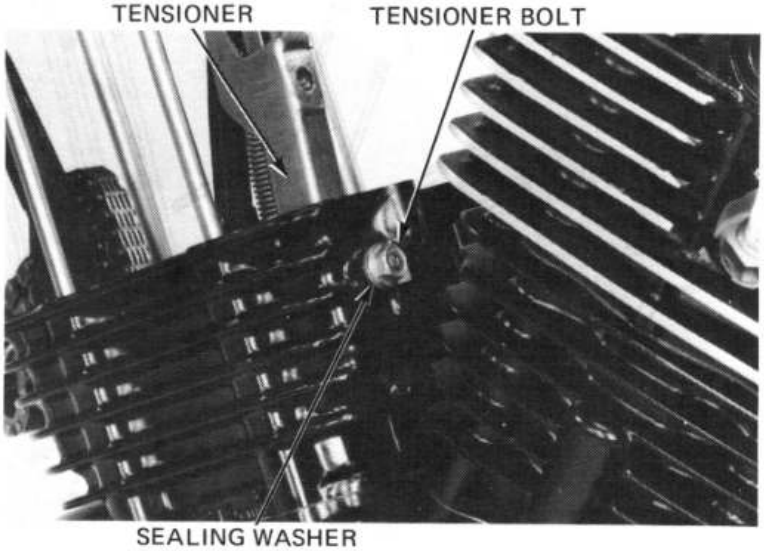
Install the cam chain guides.

NOTE:

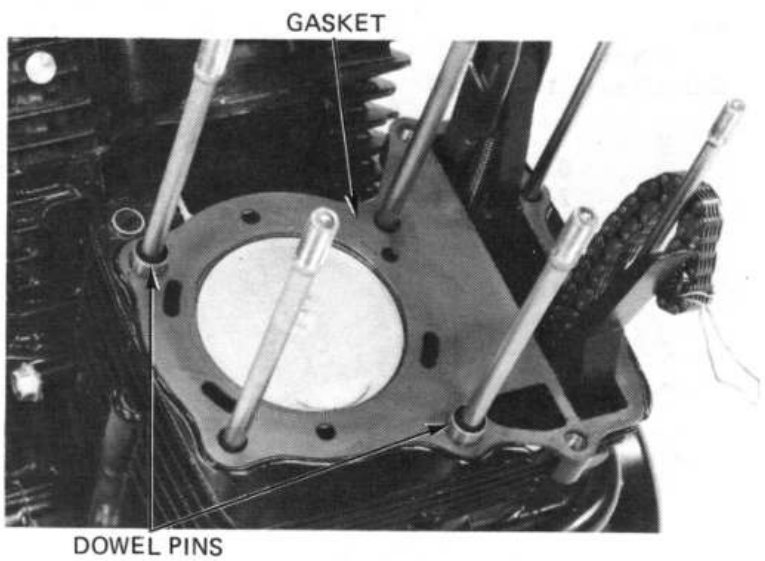
- Align the guide bosses with the grooves in the cylinders.
- Make sure that the end of the guide is inserted into place in the crankcase.

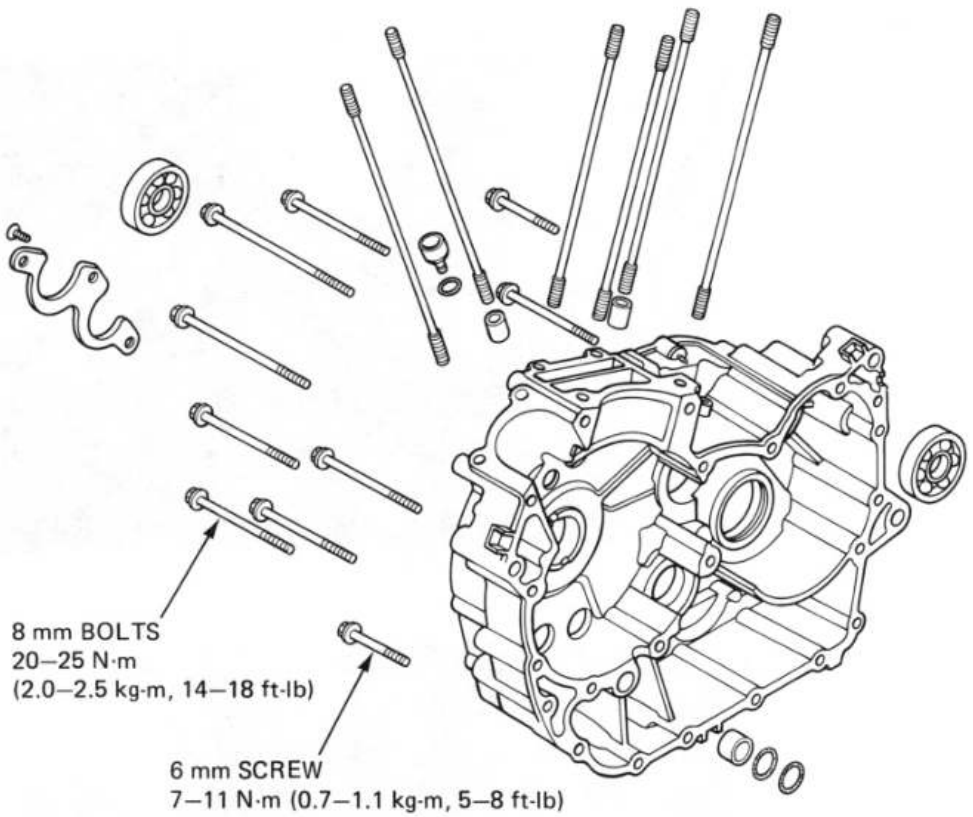


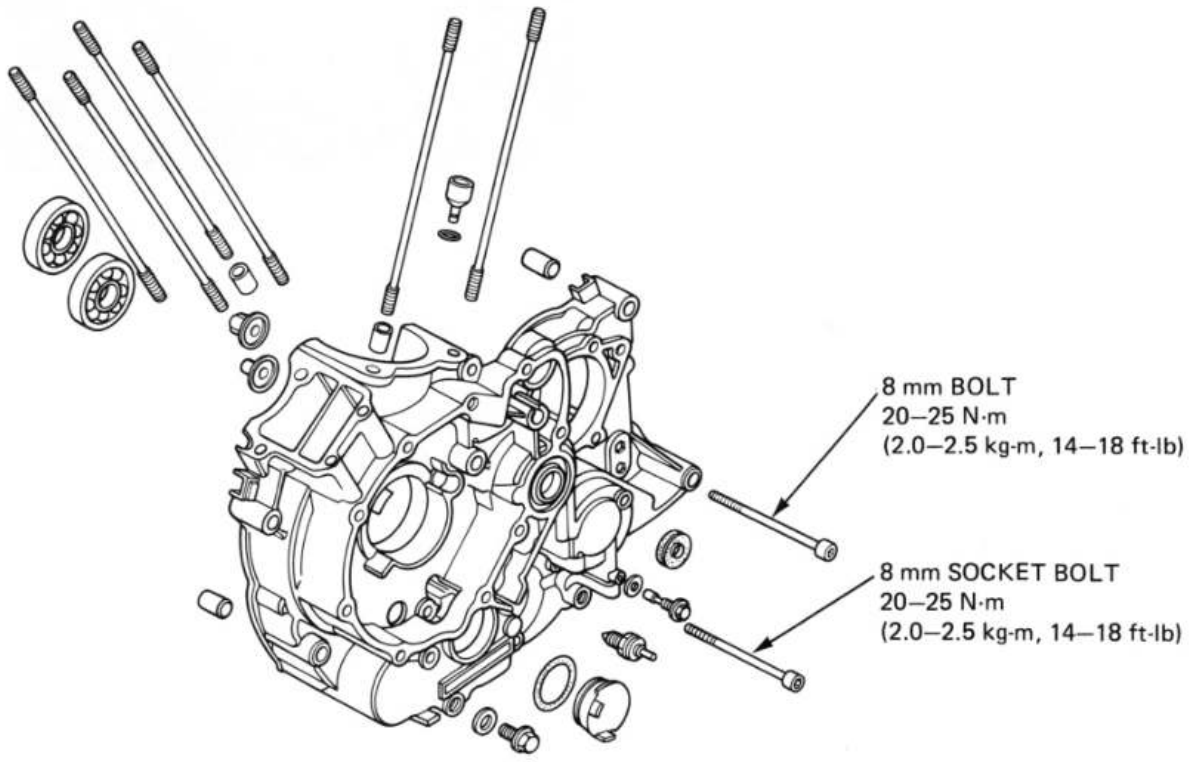
Install the tensioner bolts and sealing washers while pulling up on the tensioners.



Install the dowel pins.
Install new gaskets.
Clean the cylinder contacting faces of the cylinder heads of gasket material and carbon deposits.
Install the cylinder heads (Page 10-18).




8 mm BOLTS
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
6 mm SCREW
7–11 N·m (0.7–1.1 kg-m, 5–8 ft-lb)


8 mm BOLT
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
8 mm SOCKET BOLT
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

12. CRANKCASE

SERVICE INFORMATION	12–1
CRANKCASE SEPARATION	12–2
CRANKCASE ASSEMBLY	12–4

SERVICE INFORMATION

- To service the connecting rods, crankshafts and transmission, the crankcase must be separated.

TORQUE VALUES

8 mm bolt:	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
8 mm socket head bolt:	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
6 mm bearing set plate screw:	7–11 N·m (0.7–1.1 kg-m, 5–8 ft-lb) (Apply LOCTITE® to the threads)
10 mm special bolt:	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

TOOL

Special

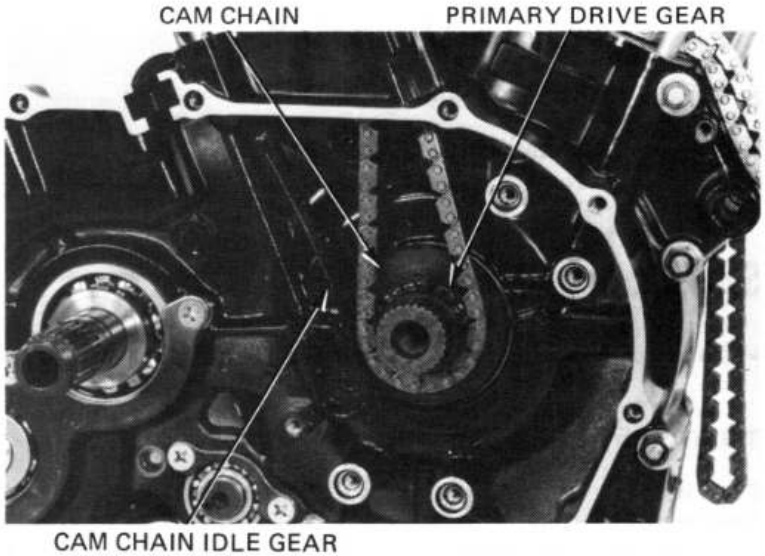
Shaft holder	07923–6890101

CRANKCASE SEPARATION

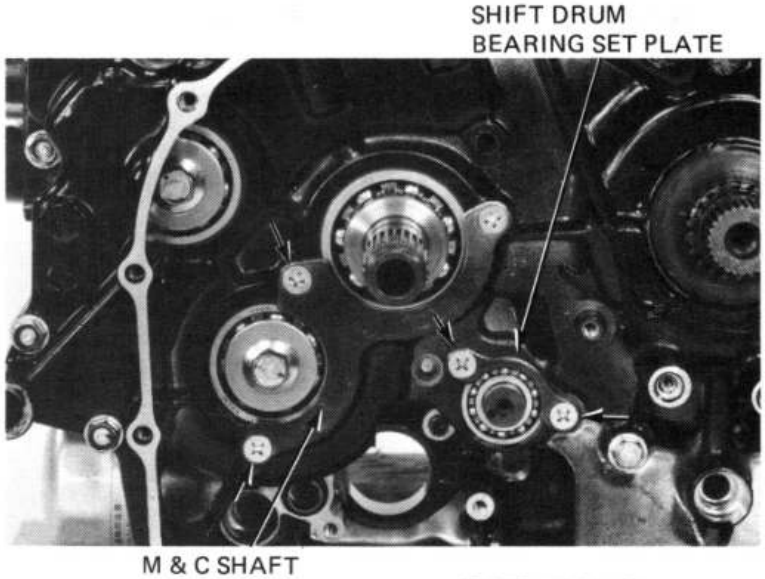
The following parts must be removed before disassembling the crankcase.

- Oil pump (Refer to section 2)
- Water pump and water pipes (Refer to section 6)
- Clutch (Refer to section 7)
- Gearshift linkage (Refer to section 8)
- Alternator rotor/starter clutch (Refer to section 9)
- Cylinder heads (Refer to section 10)
- Cylinders/pistons (Refer to section 11)
- Starter motor (Refer to section 20)

Remove the cam chain tensioners, cam chains and primary drive gear.

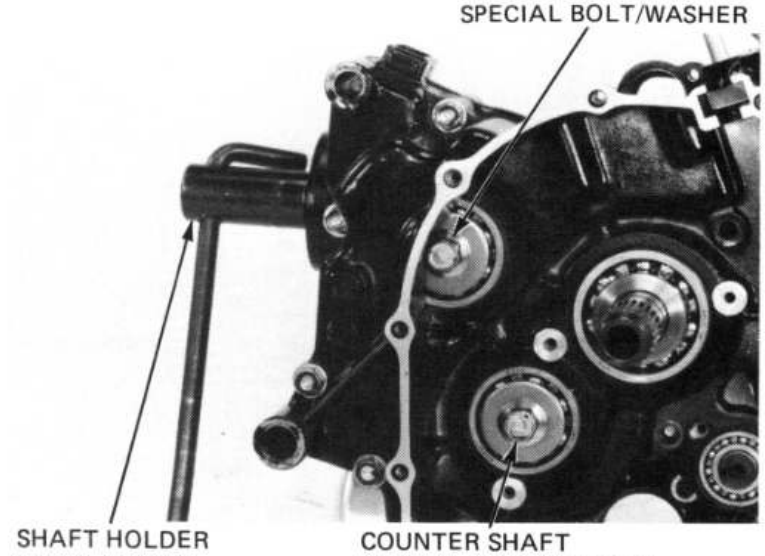


Remove the mainshaft, countershaft and shift drum bearing holders by removing the respective screws.



Install the Shaft Holder on the output gear shaft.

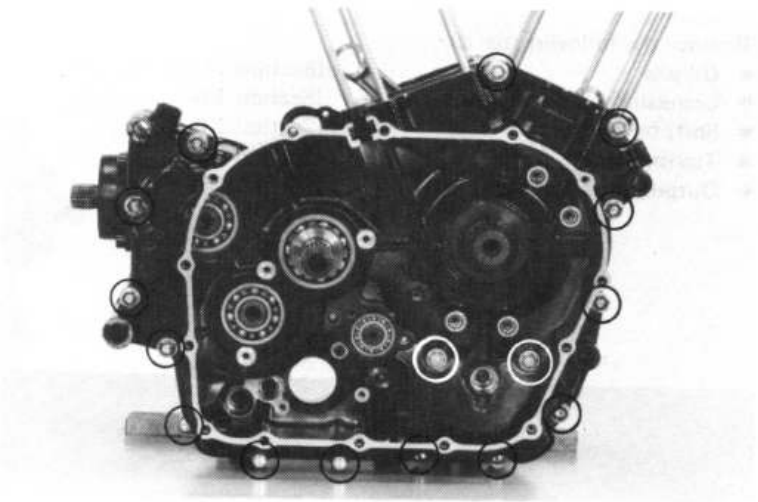
Remove the special bolts and washers holding the countershaft and final drive shaft.



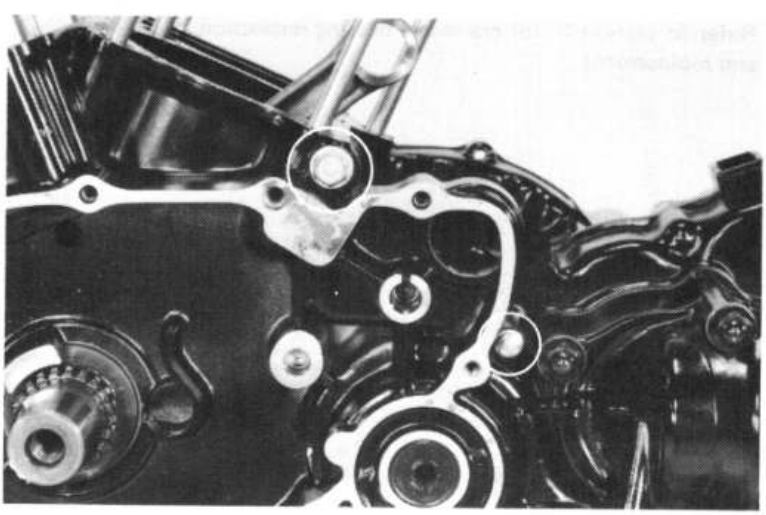
Remove the right crankcase 8 mm and 6 mm bolts.

NOTE:

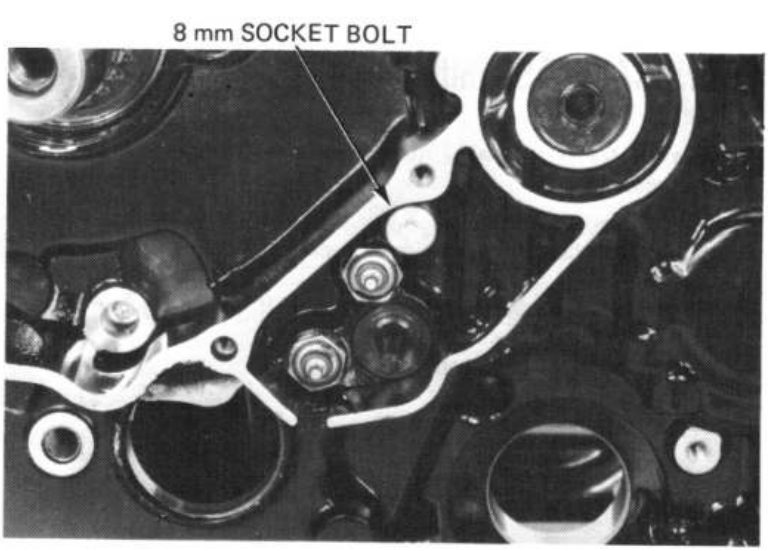
> To prevent a distorted crankcase, loosen the bolts in a crisscross pattern in 2-3 steps.



Remove the left crankcase 8 mm and 6 mn bolts.



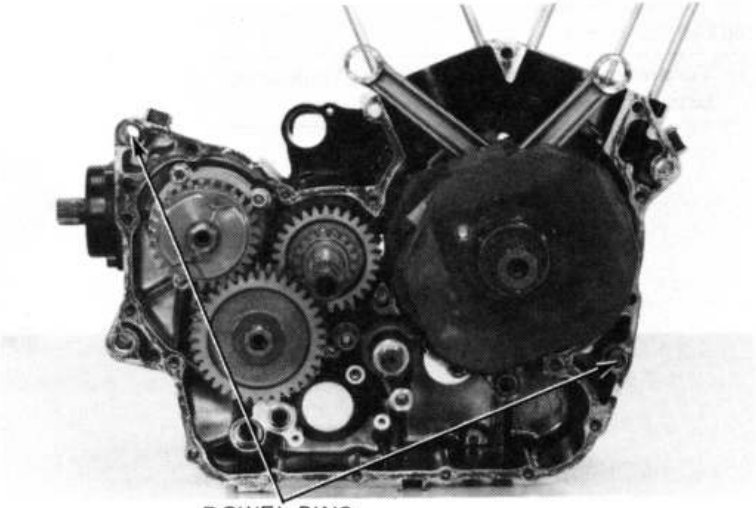
Remove the 8 mm socket head bolt.



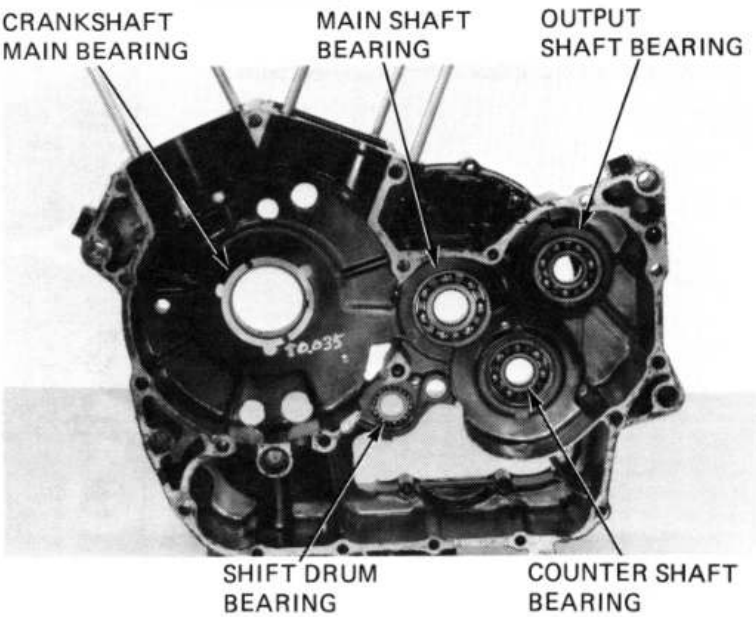
Separate the crankcase. Remove the dowel pins.

Remove the following parts:

- Oil jets (Section 11)
- Crankshaft/connecting rods (Section 13)
- Shift forks/drum (Section 13)
- Transmission (Section 13)
- Output gear assembly (Section 13)



Refer to section 13 for crankcase bearing inspection and replacement.



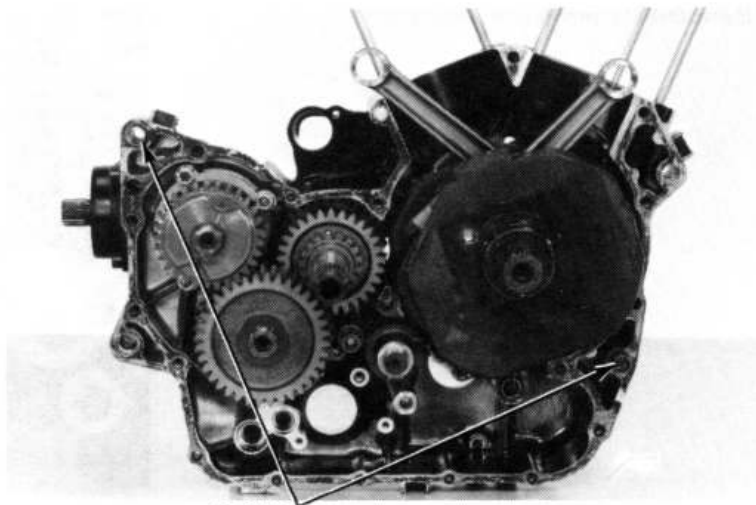
CRANKCASE ASSEMBLY

Remove all traces of gasket mating surfaces from the crankcase halves.

Apply liquid sealant to the mating surfaces.

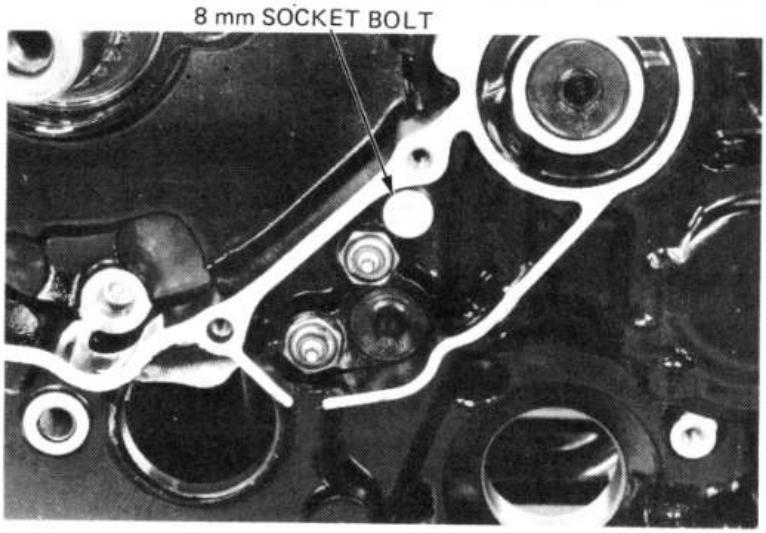
Install the dowel pins in the left crankcase half.

Assemble the crankcase halves.



Tighten the left crankcase 8 mm socket head bolt to the specified torque.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

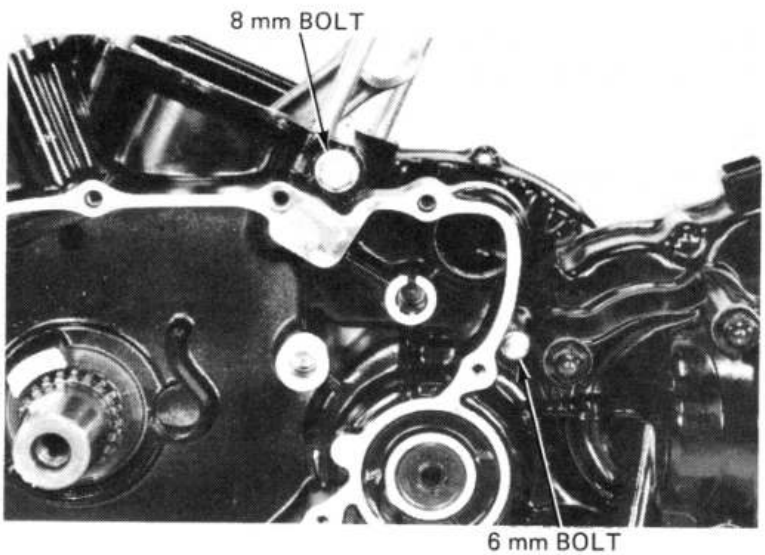


NEW

Tighten the left crankcase 8 mm hex head bolt to the specificated torque.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Tighten the 6 mm bolt to the standard torque.



Tighten the right crankcase 8 mm bolts in the sequence shown in 2-3 steps, to the specified torque.

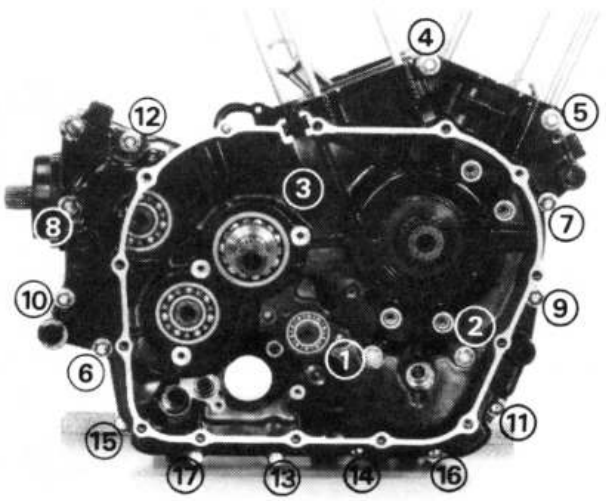
TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

NOTE:

The bolts 1 through 12 are 8 mm.

Tighten the 6 mm bolts in 2-3 steps to the standard torque.

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



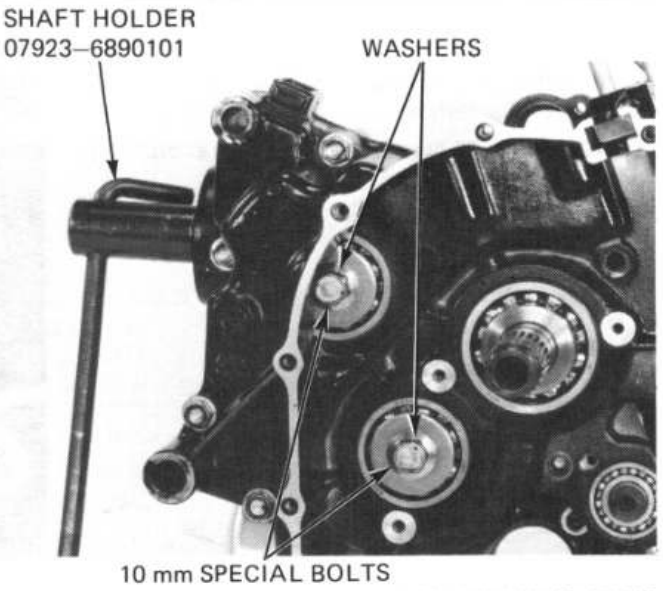
NEW

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Install the Shaft Holder on the side gear output shaft.

Install the washers and 10 mm special bolts on the countershaft and output shaft. Tighten the bolts.

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

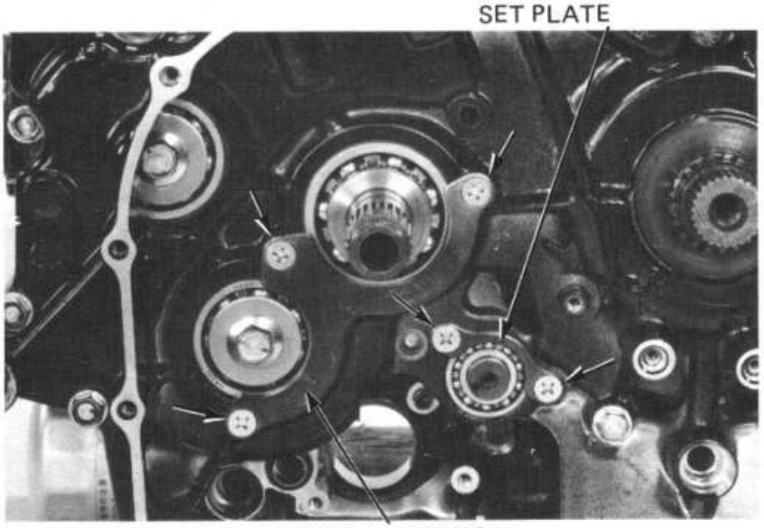


Install the bearing holders with the 6 mm screws.

TORQUE: 7–11 N·m (0.7–1.1 kg-m, 5–8 ft-lb)

NOTE:

> Apply Loctite® to the threads of the 6 mm screws.



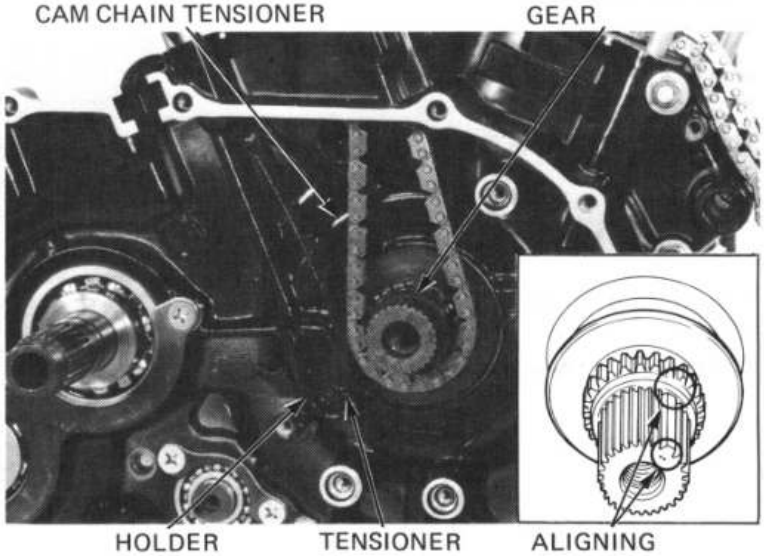
Install the primary drive gear on the crankshaft with the flat on the drive gear aligned with the flat on the crankshaft splines.

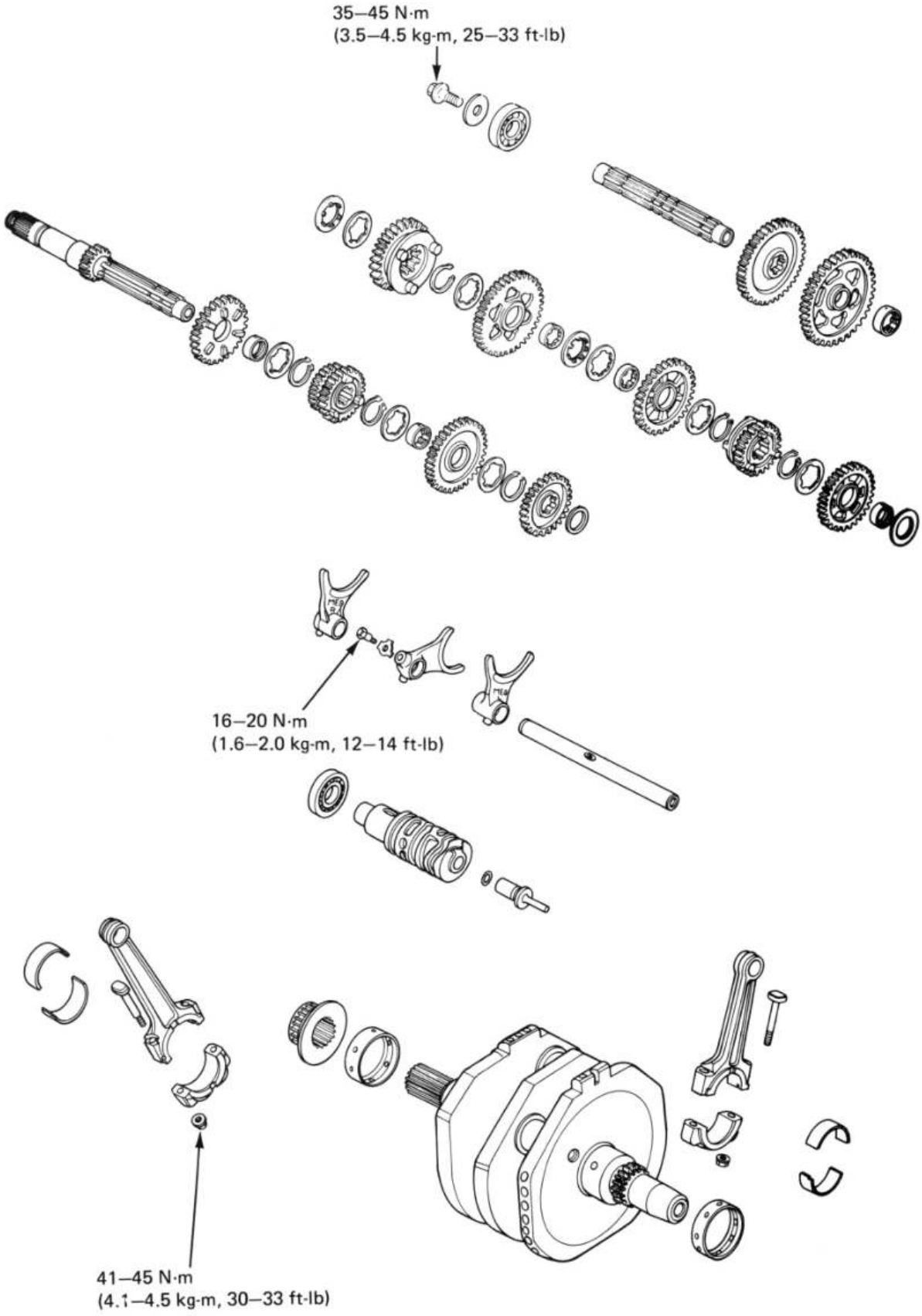
Install the cam chain over the drive gear.

Install the lower end of the cam chain tensioner slipper in the holder securely.

Install the following parts:

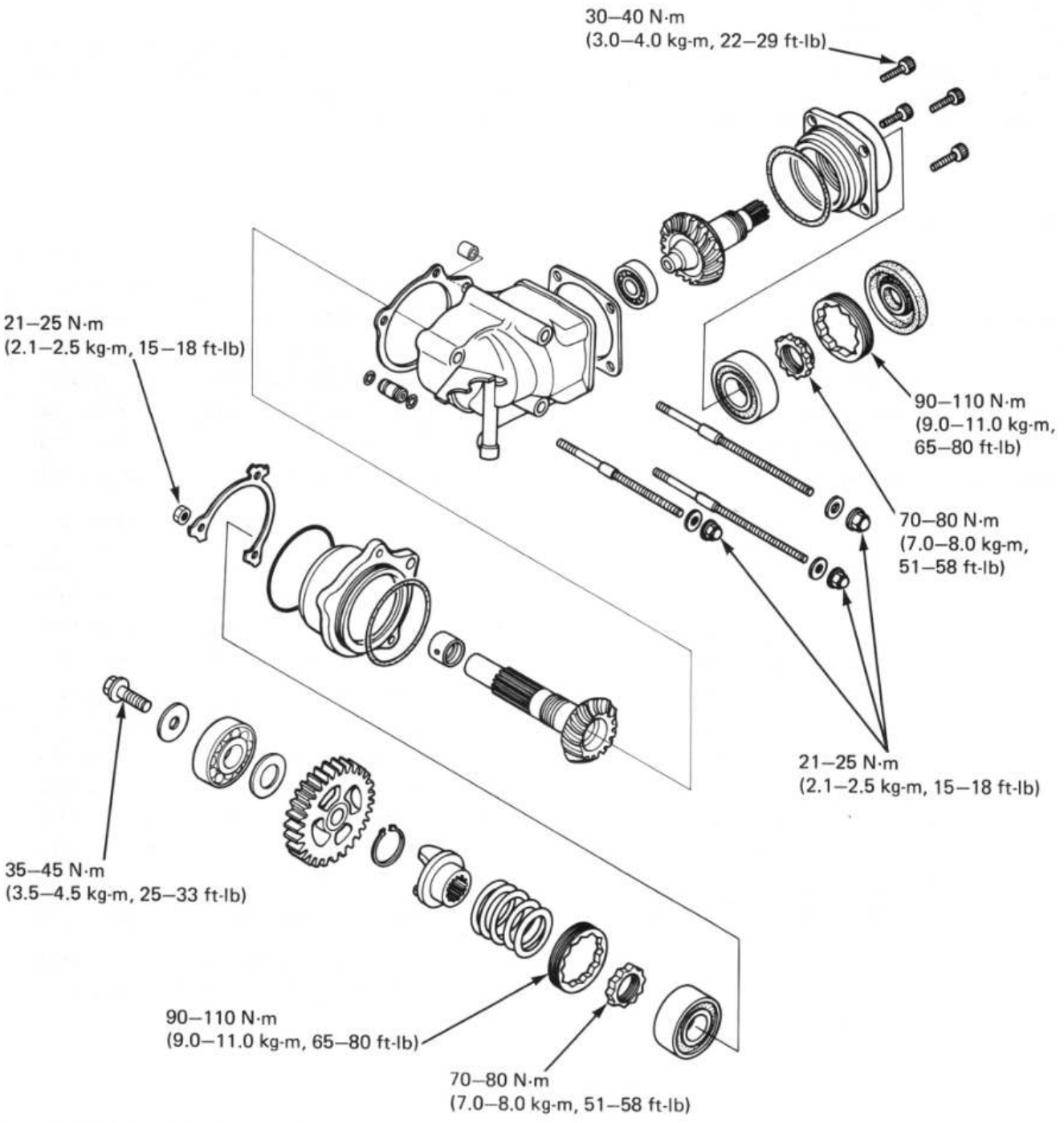
- Starter motor (Section 20)
- Cylinders/pistons (Section 11)
- Cylinder heads (Section 10)
- Oil pump (Section 2)
- Gearshift linkage (Section 8)
- Water pump/water pipes (Section 6)
- Clutch (Section 7)
- Starter clutch/alternator (Section 9)




35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)
16–20 N·m
(1.6–2.0 kg-m, 12–14 ft-lb)
41–45 N·m
(4.1–4.5 kg-m, 30–33 ft-lb)

13. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	13–2	TRANSMISSION REMOVAL	13–12
TROUBLESHOOTING	13–3	OUTPUT GEAR	13–17
OUTPUT GEAR CASE REMOVAL	13–4	SHIFT FORK/SHIFT DRUM	13–32
OUTPUT GEAR CASE INSTALLATION	13–4	CRANKCASE BEARINGS REPLACEMENT	13–34
CRANKSHAFT/CONNECTING ROD	13–5	TRANSMISSION INSTALLATION	13–35



SERVICE INFORMATION

GENERAL

- For crankshaft and transmission repair, the crankcase must be separated (Section 12).
- All bearing inserts are select fitted and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfied grease to the main journals and crankpins during assembly.
- When replacing the following output gear components, a new adjustment shim must be selected.
  - Output gear case.
  - Output gear assembly.
  - Output gear bearing.
  - Output gear bearing holder.
- Replace the final drive and output drive shafts as a set.
- When using the lock nut wrench, use a deflecting beam type torque wrench 14-20 inches long. The lock nut wrench increases, the torque wrenche's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The torque scale reading is given with the actual torque specifications.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD		SERVICE LIMIT
Crankshaft/ connecting rod	Connecting rod big end side clearance		0.10–0.25	(0.0039–0.010)	0.40 (0.0157)
	Connecting rod small end I.D.		20.020–20.041	(0.7882–0.7890)	20.09 (0.7909)
	Crankpin oil clearance		0.028–0.052	(0.0011–0.0020)	0.07 (0.0028)
	Main journal oil clearance		0.025–0.041	(0.0010–0.0016)	0.06 (0.0024)
	Crankshaft runout		—		0.05 (0.0020)
Countershaft	Backlash	Low	0.089–0.170	(0.0035–0.0067)	0.24 (0.0094)
		2nd, 3rd, 4th, 5th and 6th gears	0.068–0.136	(0.0027–0.0054)	0.18 (0.0071)
	Gear I.D.	M5, M6	28.000–28.021	(1.1023–1.1034)	28.04 (1.1039)
		C1, C2, C3	28.000–28.021	(1.1023–1.1034)	28.04 (1.1039)
		C4	29.000–29.021	(1.1417–1.1426)	29.04 (1.1433)
	Gear bushing O.D.	M5, M6	27.959–27.980	(1.1007–1.1016)	27.94 (1.1000)
		C1, C2, C3	23.959–23.980	(0.9433–0.9441)	23.94 (0.9425)
		C4	28.959–28.980	(1.1401–1.1410)	28.94 (1.1394)
	Gear bushing I.D.	M5	24.985–25.006	(0.9837–0.9845)	25.04 (0.9858)
		C4	24.985–25.006	(0.9837–0.9845)	25.04 (0.9858)
	Mainshaft O.D.	M5	24.959–24.980	(0.9826–0.9835)	24.90 (0.9803)
	Countershaft O.D.	C4	24.959–24.980	(0.9824–0.9835)	24.90 (0.9803)
	Gear-to-bushing or shaft clearance	M5, 6 gear to bushing	0.020–0.060	(0.0008–0.0024)	0.10 (0.0039)
		M5 bushing to shaft	0.005–0.047	(0.0002–0.0019)	0.06 (0.0024)
		C1, 2, 3, 4 gear to bushing	0.020–0.062	(0.0008–0.0025)	0.10 (0.0039)
		C4 gear to bushing	0.005–0.047	(0.0002–0.0019)	0.06 (0.0024)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Output gear	Backlash	Final drive gear	0.08–0.023 (0.0031–0.0091)	0.40 (0.0157)
	Damper shaft gear	Gear I.D.	24.000–24.021 (0.9449–0.9457)	24.10 (0.9488)
		Bushing O.D.	23.959–23.980 (0.9433–0.9441)	23.70 (0.9331)
		Bushing I.D.	20.020–20.041 (0.7882–0.7890)	20.10 (0.7913)
	Final drive shaft O.D.		19.979–20.000 (0.7866–0.7874)	20.05 (0.7894)
	Damper spring free length		65.1 (2.5630)	63.8 (2.5118)
Shift fork/fork shaft	Claw thickness		6.50–6.57 (0.2559–0.2587)	6.20 (0.2441)
	Right and left shift fork I.D.		14.000–14.021 (0.5512–0.5520)	14.04 (0.5528)
	Shaft O.D.		13.966–13.984 (0.5498–0.5506)	13.90 (0.5472)
Shift drum	Shift drum I.D.		12.500–12.518 (0.4921–0.4928)	12.54 (0.4937)
	Shift drum holder O.D.		12.457–12.484 (0.4904–0.4915)	12.33 (0.4854)

TORQUE

Connecting rod		41–45 N·m (4.1–4.5 kg-m, 30–33 ft-lb)
Final drive shaft		35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Countershaft		35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Output gear case	8 mm cap nut	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
	8 mm lock nut	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
	8 mm socket bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Output gear bearing lock nut	(Inner)	70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
	(Outer)	90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Shift fork		16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

TOOLS

Special

Lock Nut Wrench, 30 x 64 mm	07916–MB00000
Shaft Holder	07923–6890101
Main Bearing Remover Attachment	07946–ME90100
Main Bearing Drive Attachment	07946–ME90200
Remover Handle	07936–3710100
Remover Weight	07936–3710200
Bearing Remover, 17 mm	07936–3710300
Main Journal Bearing Remover/Driver	07973–MC70000
Ring gear Dis/Assembly Tool	07965–3710100
Damper Compressor	07964–3710000
Bearing remover, 20 mm	07936–3710600
Driver	07949–3710000
Attachment	07946–3710200

Common

Remover weight	07741–0010201
Attachment, 32 x 35 mm	07746–0010100
Attachment, 42 x 47 mm	07746–0010300
Attachment, 52 x 55 mm	07746–0010400
Attachment, 62 x 68 mm	07746–0010500
Pilot, 17 mm	07746–0040400
Pilot, 25 mm	07746–0040600
Pilot, 30 mm	07746–0040700
Driver	07749–0010000
Attachment, 30 mm I.D.	07746–0030300

TROUBLESHOOTING

Excessive noise

1. Crankshaft
   - Worn main bearing
   - Worn rod bearing
2. Connecting rod
   - Worn rod small end

Hard to shift

1. Air in clutch system
2. Shift fork bent
3. Shift fork shaft bent
4. Shift spindle claw bent
5. Shift drum cam grooves damaged
6. Shift fork guide pin damaged

Transmission jumps out of gear

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

Excessive output gear noise

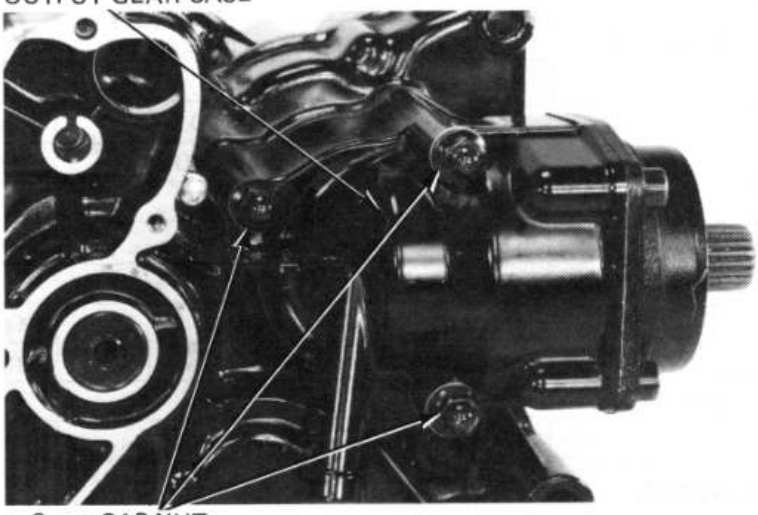
1. Output drive and driven gears worn or damaged
2. Bearings worn or damaged
3. Excessive backlash between output drive and driven gears
4. Improper shim thickness

OUTPUT GEAR CASE REMOVAL

NOTE:

> The following output gear service can be performed with engine removed from the frame and without separating the crankcase.
> - Final drive shaft side bearing holder O-ring replacement (page 13-4).
> - Drive gear seal replacement (page 13-25).
> - Driven gear shaft bearing replacement (page 13-26).
> - Driven gear bearing holder O-ring replacement (page 13-26).
> - Tooth contact adjustment (page 13-30).
> - Oilorifice and O-ring inspection and replacement.

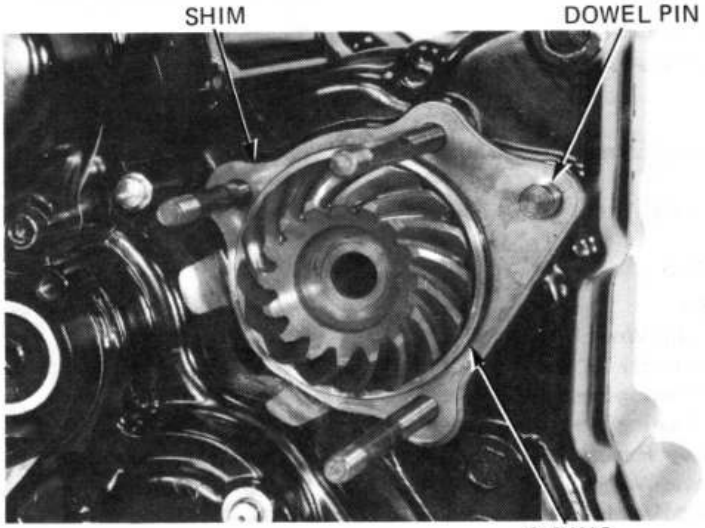
Remove the 8 mm cap nuts and sealing washers.
Remove the output gear case.



Remove the O-ring, dowel pin and shim from the bearing holder.

NOTE:

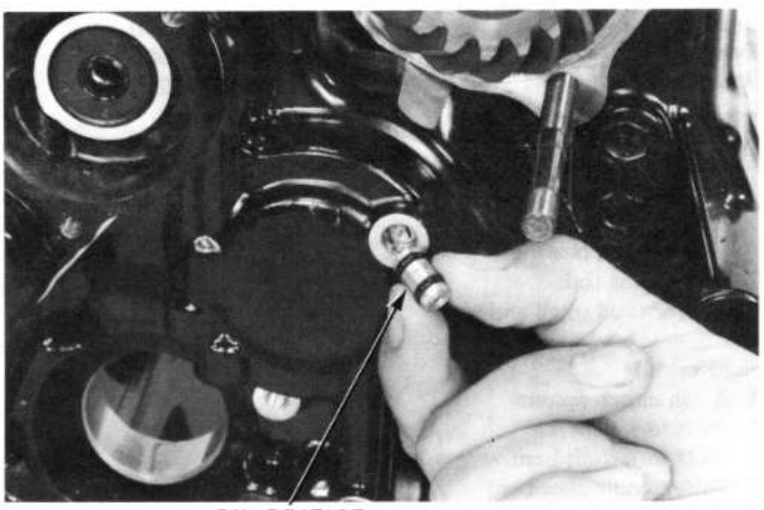
> Take care not to damage the shim.



Remove the oil orifice and clean it with the compressed air.

OUTPUT GEAR CASE INSTALLATION

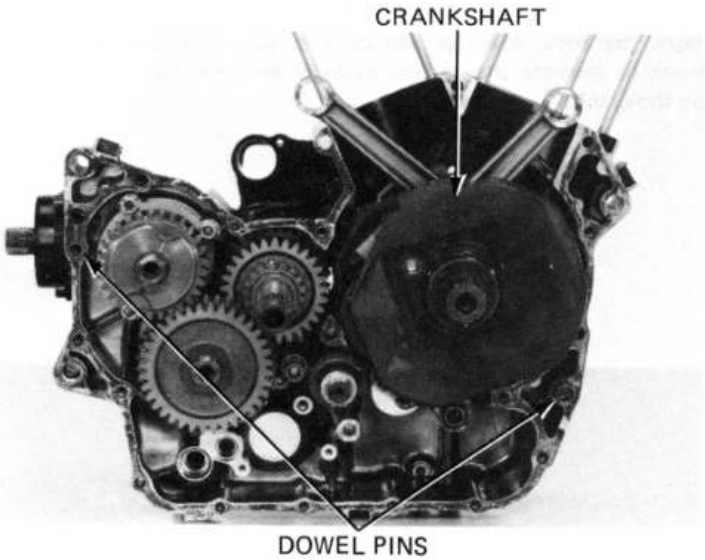
Replace the O-rings with new ones and install the output gear case in the reverse order of removal.



CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase (page 12-2) and remove the dowel pins.
Remove the crankshaft.



CONNECTING ROD REMOVAL

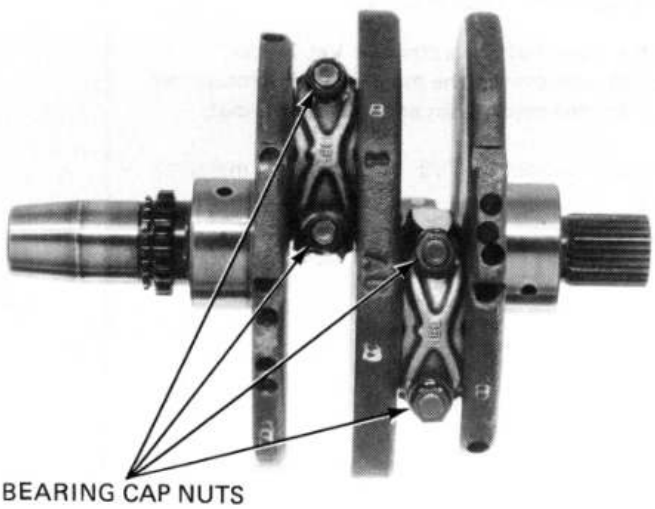
Check the connecting rod side clearance.
SERVICE LIMIT: 0.40 mm (0.0157 in)



Remove the connecting rod bearing caps and note their locations.

NOTE:

> Tap the side of the cap lightly if it is hard to remove.

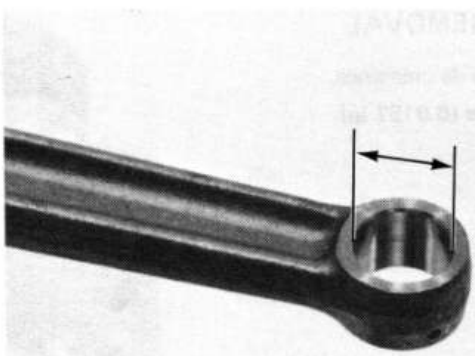


Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.



Measure the connecting rod small end I.D.

SERVICE LIMIT: 20.09 mm (0.7909 in)

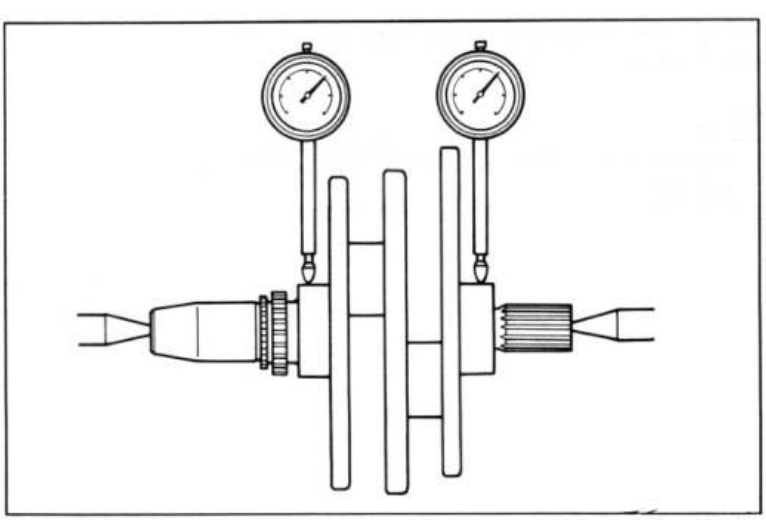


CRANKSHAFT INSPECTION

Place the crankshaft on a stand or Vee blocks.
Set a dial indicator on the main journals. Rotate the crankshaft two revolutions and read the runout.

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

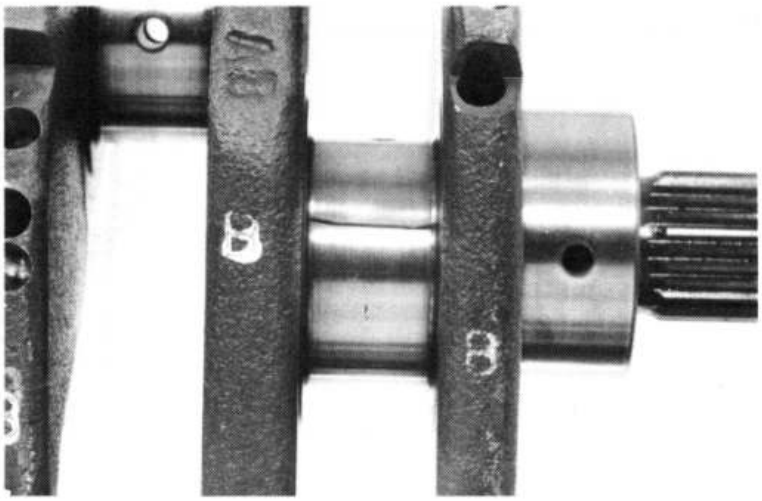
SERVICE LIMIT: 0.05 mm (0.002 in)



BEARING INSPECTION

CONNECTION ROD

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.

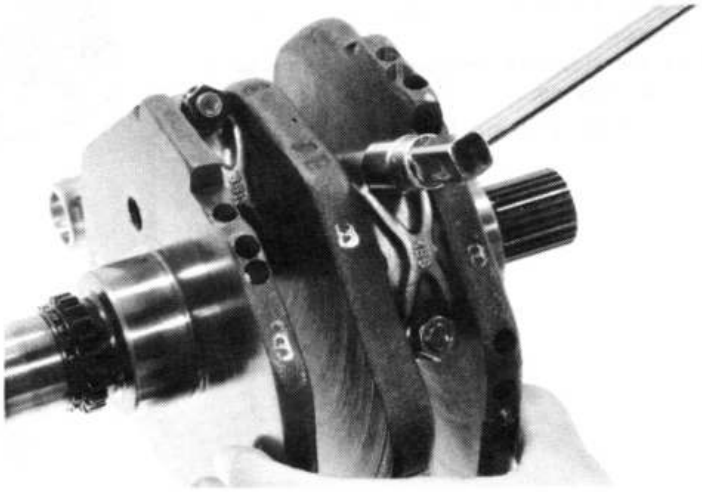


Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 41–45 N·m (4.1–4.5 kg-m, 30–33 ft-lb)

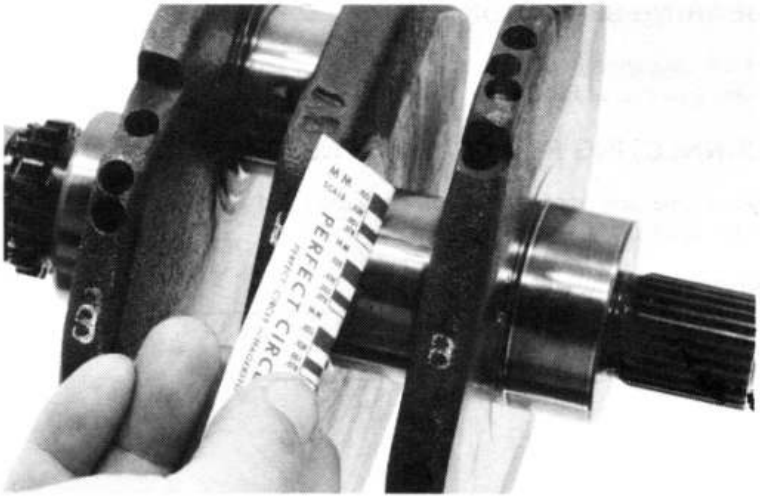
NOTE:

> Do not rotate the crankshaft during inspection.



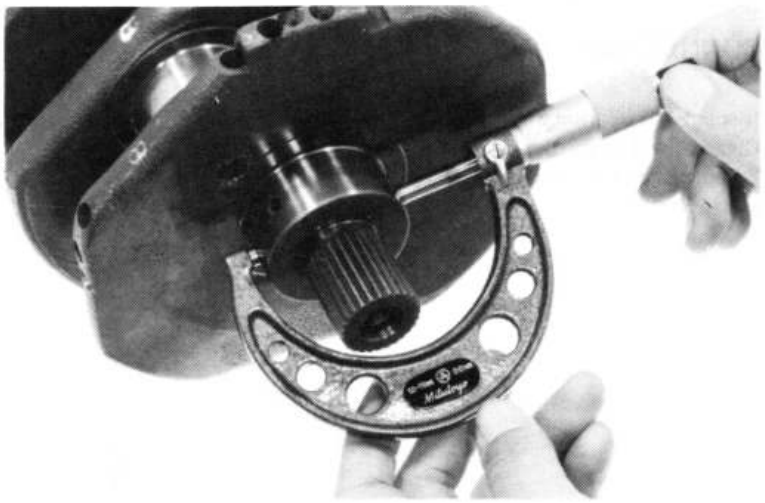
Remove the caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)



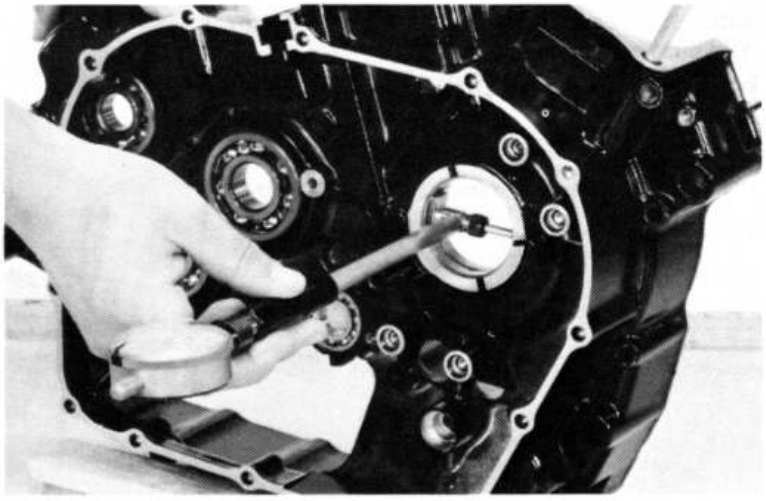
MAIN BEARINGS

Measure the main journal O.D. and record it.



Measure the main journal bearing I.D. in the crankcase and record it.
Calculate the clearance between the main journal and the main bearing.

SERVICE LIMIT: 0.06 mm (0.0024 in)



BEARING SELECTION

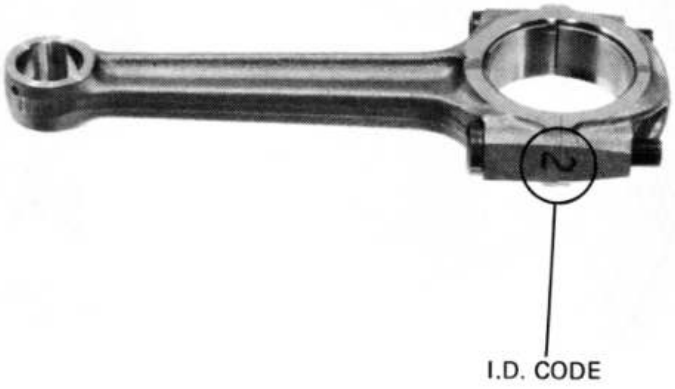
If oil clearance is beyond tolerance, select repalcement bearings as follows:

CONNECTING ROD BEARING INSERTS

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

NOTE:

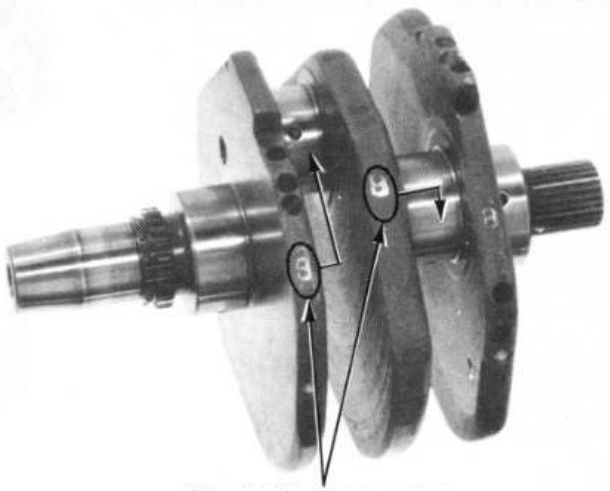
> Numbers 1 or 2 on the connecting rods are the codes for the connecting rod I.D.



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

NOTE:

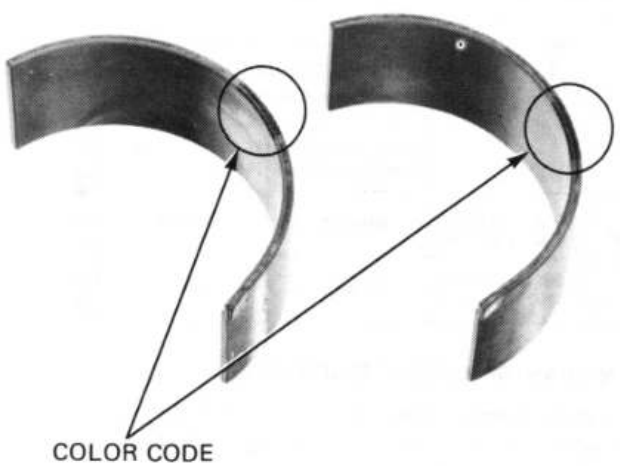
Letters A or B on each crank weight are the codes used for each crankpin O.D.



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

			CONNECTING ROD I.D. CODE NO.	
			1	2
			46.000–46.008mm	46.008–46.016mm
CRANK PIN O.D. CODE	A	42.982–42.990mm	F (Pink)	E (Yellow)
	B	42.974–42.982mm	E (Yellow)	D (Green)

BEARING INSERT THICKNESS:
D (Green): 1.495–1.499 mm (0.0589–0.0590 in)
E (Yellow): 1.491–1.495 mm (0.0578–0.0589 in)
F (Pink): 1.487–1.491 mm (0.0585–0.0587 in)

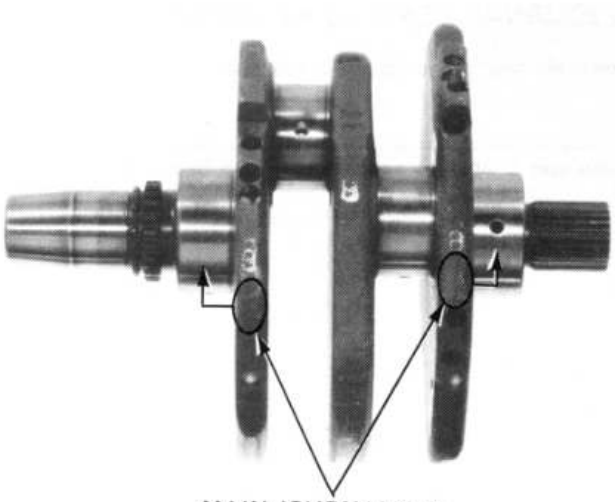


MAIN BEARING INSERTS

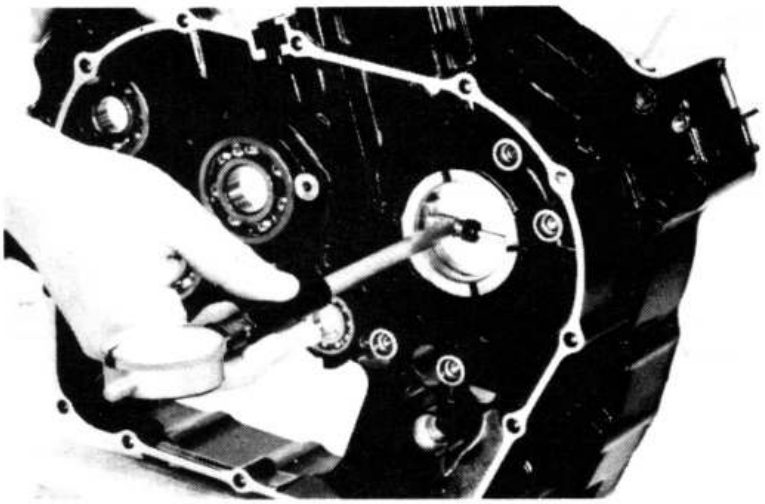
Determine and record the corresponding main journal O.D. codes, (or measure the main journal O.D.).

NOTE:

Letters 1 or 2 on each crank weight are the codes used for each main journal O. D.



Measure the crankcase main journal I. D. and record it.



Cross reference the case I. D. and journal code to determine the replacement bearing.

		MAIN JOURNAL O.D. CODE		
		1	2	
		49.992–50.000 mm (1.9682–1.9685 in)	49.984–49.992 mm (1.9679–1.9682 in)	NEW
CRANK-CASE I. D.	53.970–53.980 mm (2.1248–2.1252 in)	BROWN	BLACK	
	53.980–53.990 mm (2.1252–2.1256 in)	BLACK	BLUE	

MAIN BEARING INSERT THICKNESS:

BROWN: 1.989–1.999 mm (0.0783–0.0787 in)
BLACK: 1.994–2.004 mm (0.0785–0.7798 in)
BLUE: 1.999–2.009 mm (0.0787–0.0791 in)

MAIN JOURNAL BEARING REMOVAL

Press the main bearing out of the crankcase.

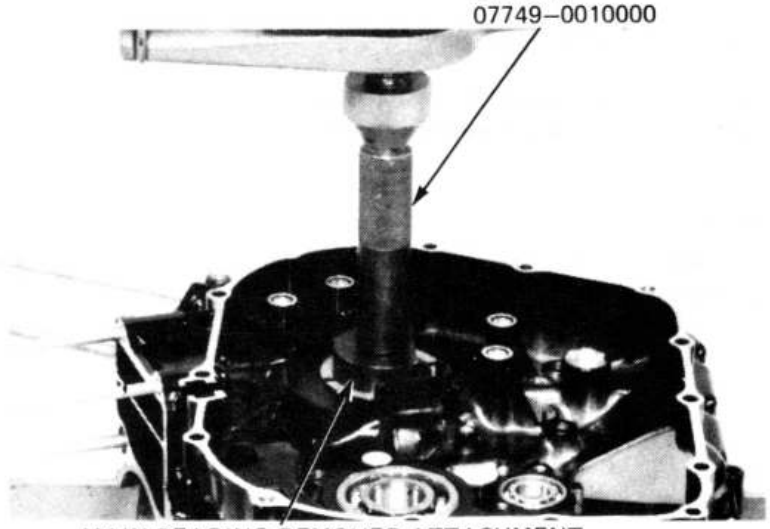
NOTE:

> Always use a press to remove the main bearings.



COLOR CODE

DRIVER
07749–0010000



MAIN BEARING REMOVER ATTACHMENT
07946–ME90100

Revised: August 1987
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MAIN BEARING INSTALLATION

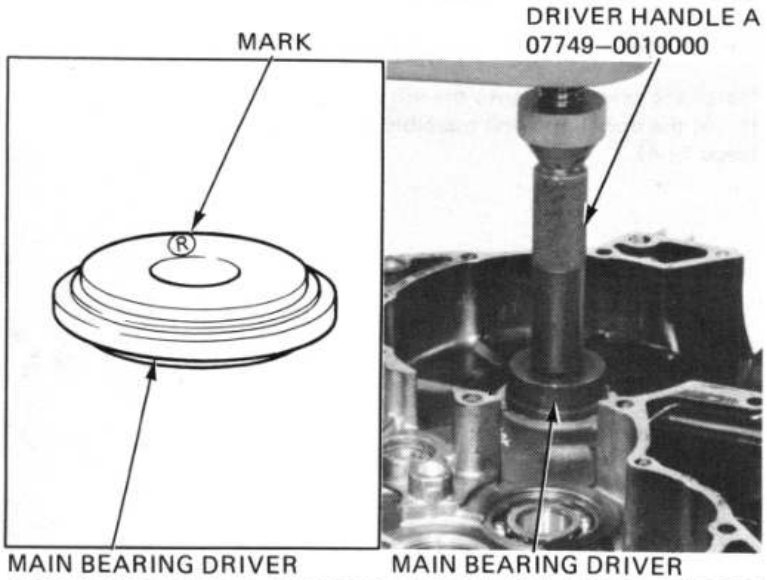
Apply molybdenum disulfide grease to the outer surface of the main bearings.
Align the tab on the bearing with the groove in the crankcase and press the bearing into the crankcase.

CAUTION:

Be careful not to damage the bearings.

NOTE:

The marks on both side of Main Bearing Driver Attachment means:
"R" → Use for right side bearing.
"L" → Use for left side bearing.

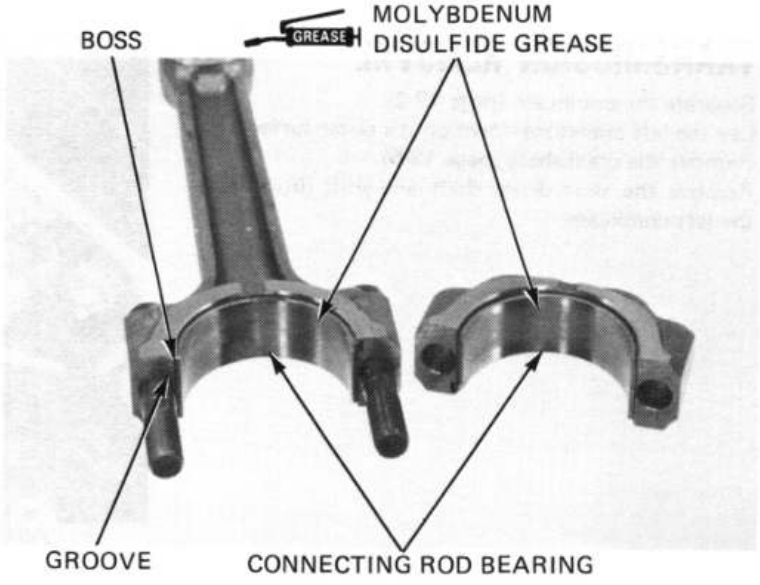


CONNECTING ROD INSTALLATION

Install the bearing inserts on the rods and caps.

NOTE:

- Align the boss on the bearing with the groove in the rod or cap.
- Apply molybdenum disulfide grease to the bearings.

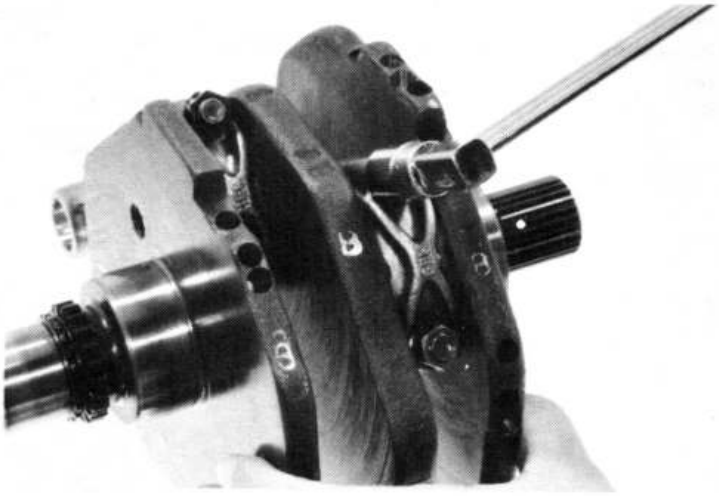


Install the rods and caps on the crankshaft. Be sure each part is installed in its original position, as noted during removal.
Tighten the cap nuts.

TORQUE: 41–45 N·m (4.1–4.5 kg-m, 30–33 ft-lb)

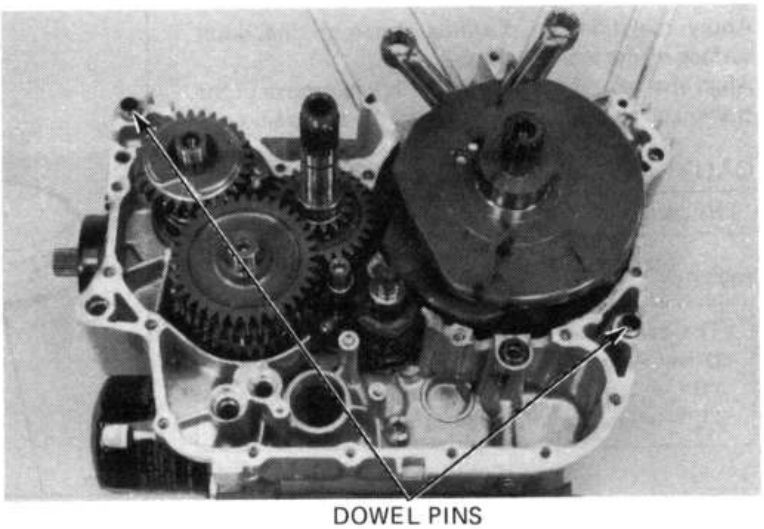
NOTE:

- Align the I.D. code on the cap and rod.
- Tighten the nuts in two or more steps.
- After tightening the nuts, check that the rods move freely without binding.



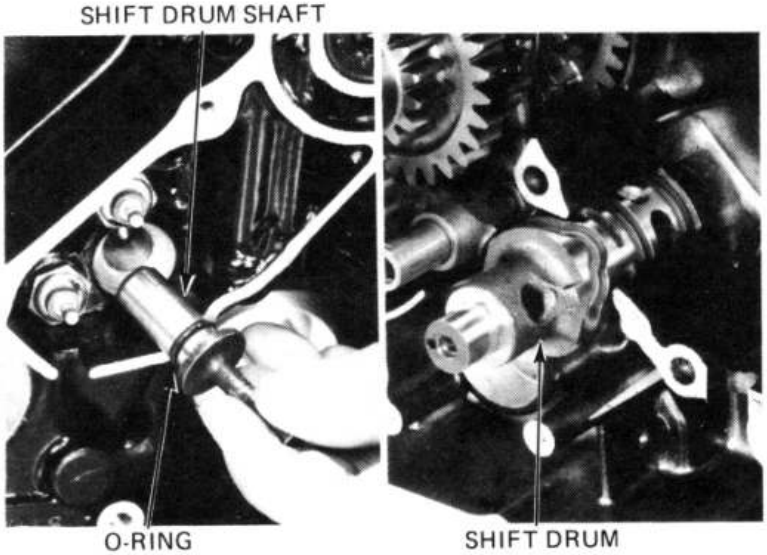
CRANKSHAFT INSTALLATION

Install the crankshaft onto the left crankcase.
Install the dowel pins and assemble the crankcase (page 12-4).

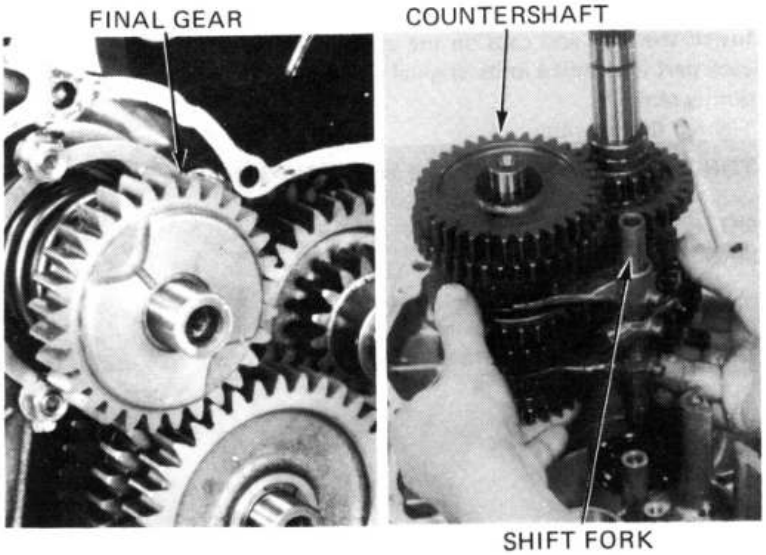


TRANSMISSION REMOVAL

Separate the crankcase (page 12-2).
Lay the left crankcase down on it's outer surface.
Remove the crankshaft (page 13-5).
Remove the shift drum shaft and shift drum from the left crankcase.



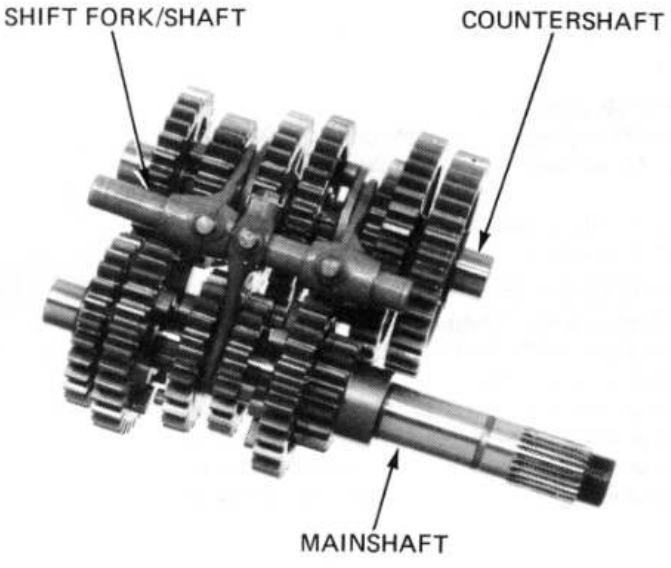
Remove the final gear.
Remove the mainshaft, countershaft, and shift fork together.



Revised: February, 1986
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TRANSMISSION DISASSEMBLY

Separate the shift forks, shaft, mainshaft and countershaft assemblies from each other.



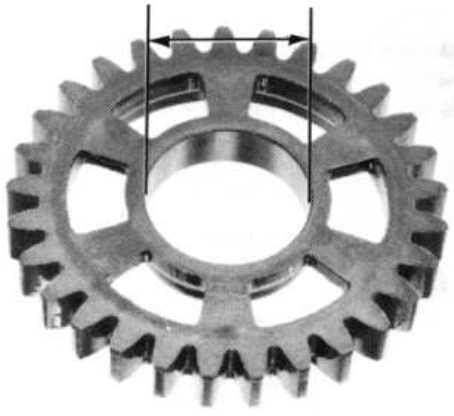
TRANSMISSION INSPECTION

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

Measure the I.D. of each gear.

SERVICE LIMIT:

M5, M6 gears:	**28.04 mm (1.104 in)**
C1, C2, C3 gears:	**28.04 mm (1.104 in)**
C4 gear:	**29.04 mm (1.143 in)**



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

SERVICE LIMIT:

M5, M6 bushing O.D.:	**27.94 mm (1.100 in)**
C1, C2, C3 bushing O.D.:	**27.94 mm (1.100 in)**
C4 bushing O.D.:	**28.94 mm (1.139 in)**
M5 bushing I.D.:	**25.04 mm (0.986 in)**
C4 bushing I.D.:	**25.04 mm (0.986 in)**



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

SERVICE LIMITS:

A (at M5 bushing):	**24.90 mm (0.980 in)**
B (at C5 bushing):	**24.90 mm (0.980 in)**



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

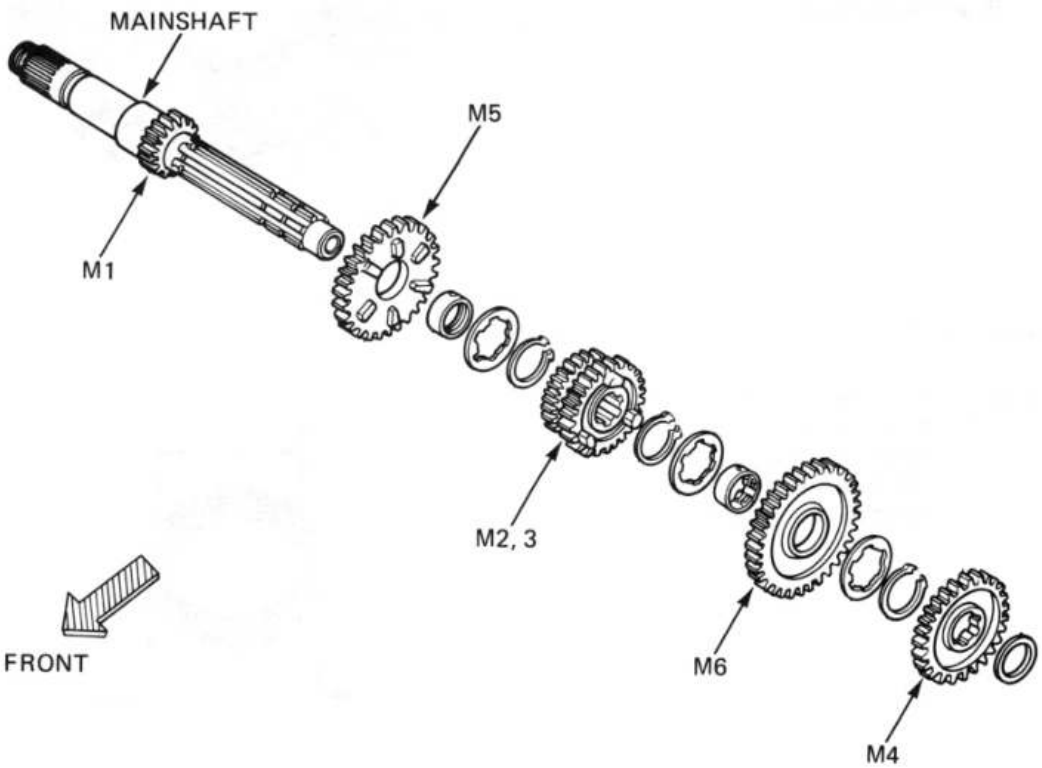
SERVICE LIMITS:

M5, 6 gear to M5, 6 bushing:	**0.10 mm (0.004 in)**
M5 bushing to M5 shaft:	**0.06 mm (0.002 in)**
C1 gear to C1 bushing:	**0.10 mm (0.004 in)**
C1 bushing to C1 shaft:	**0.10 mm (0.004 in)**
C2 gear to C2 bushing:	**0.10 mm (0.004 in)**
C3 gear to C3 bushing:	**0.10 mm (0.004 in)**
C4 gear to C4 bushing:	**0.10 mm (0.004 in)**

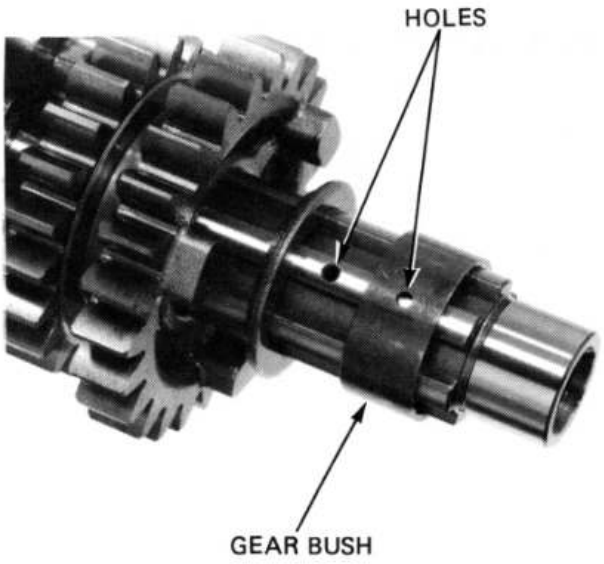
TRANSMISSION ASSEMBLY

Mainshaft

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



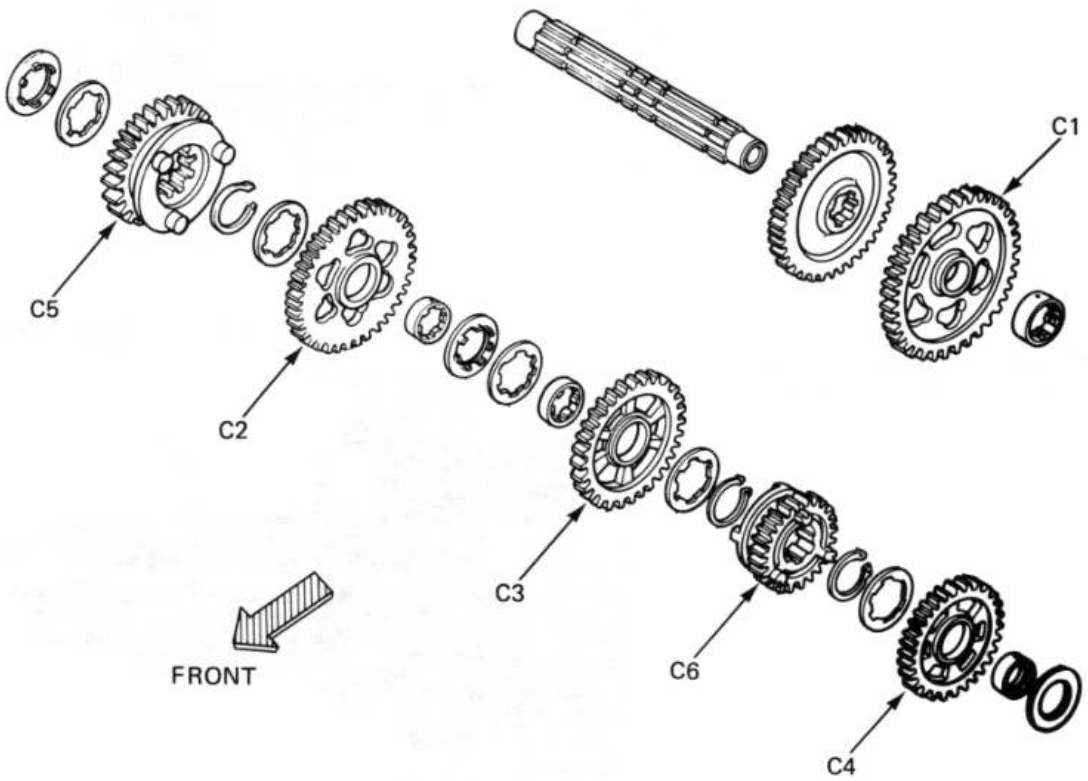
Align the hole in the M5, M6 gear bushing with the hole in the mainshaft when installing.



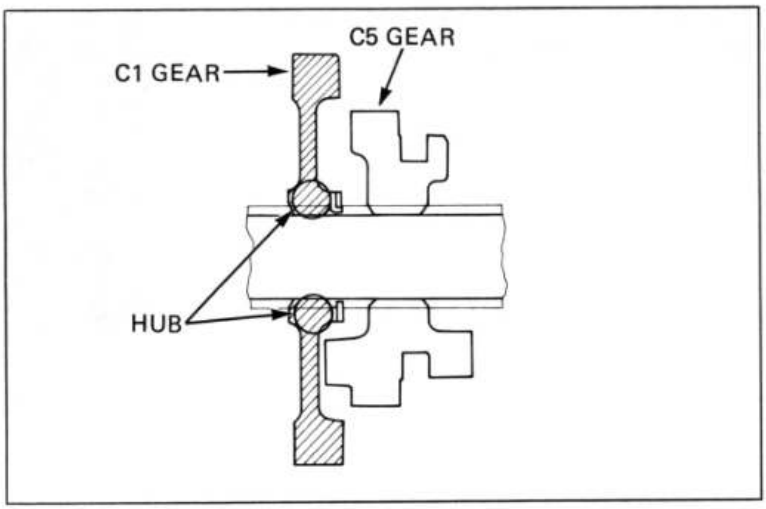
Countershaft

Check the gears for freedom of movement or rotation on the shaft.

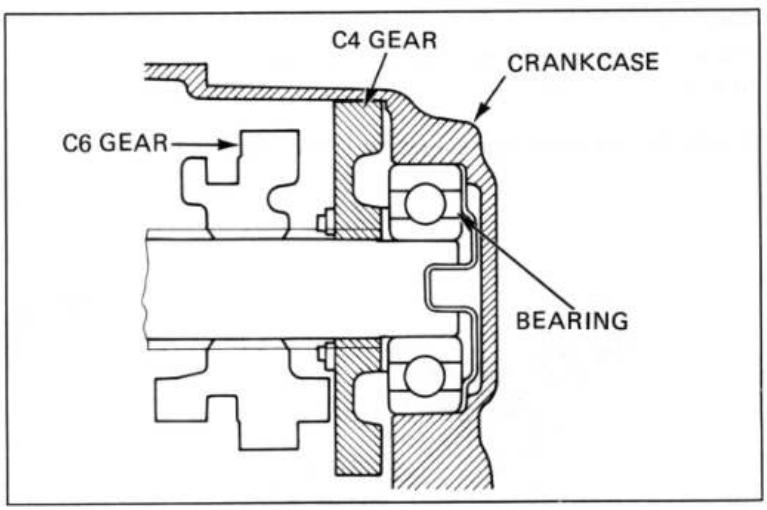
Check that the snap rings are seated in the grooves.



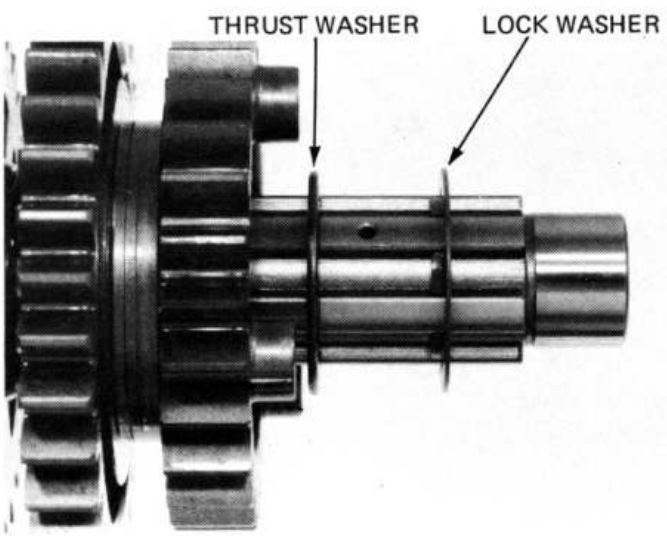
Install the C1 gear hub facing the C5 gear.



Install the C4 gear recess facing the crankcase bearing, not the C6 gear.



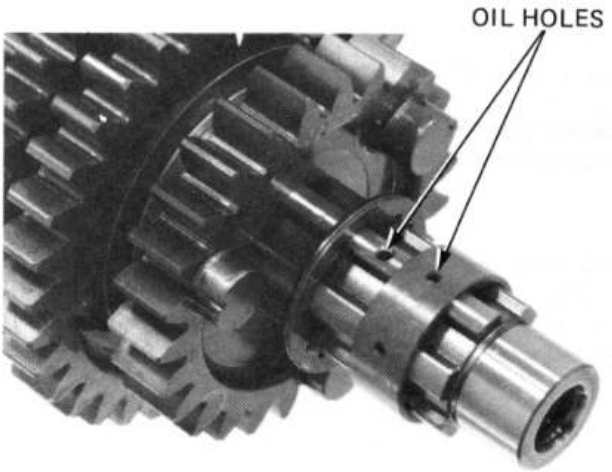
Align the lock washer tab into the thrust washer groove between the C5 and C1 gears, and the C2 and C3 gears.



Align the oil hole in the C1, 2, 3, 4 gear bushing with the hole in the countershaft.

NOTE:

> Do not install the C1 bushing (6 holes) to the C4 bushing place. It is different width from the C4 bushing.

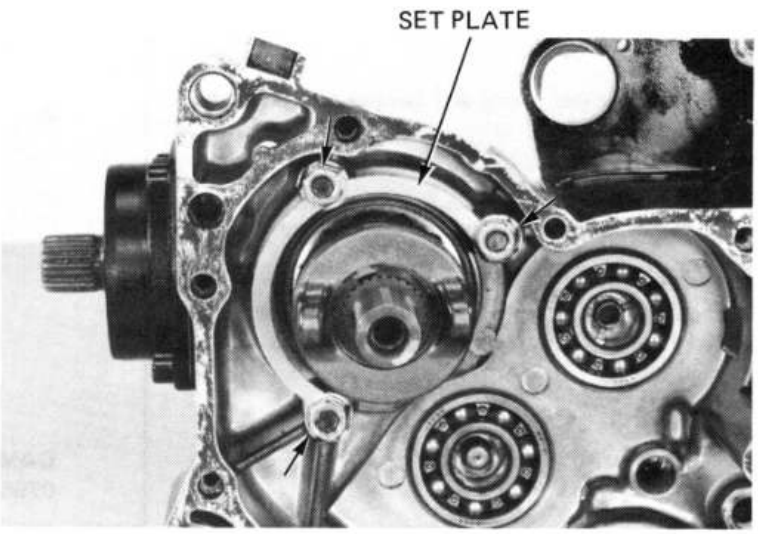


OUTPUT GEAR

OUTPUT GEAR ASSEMBLY REMOVAL

Bend the lock washer tab down, remove the nuts and the set plate.
Pull the output gear assembly off the crankcase.

Remove the gasket and dowel pin.

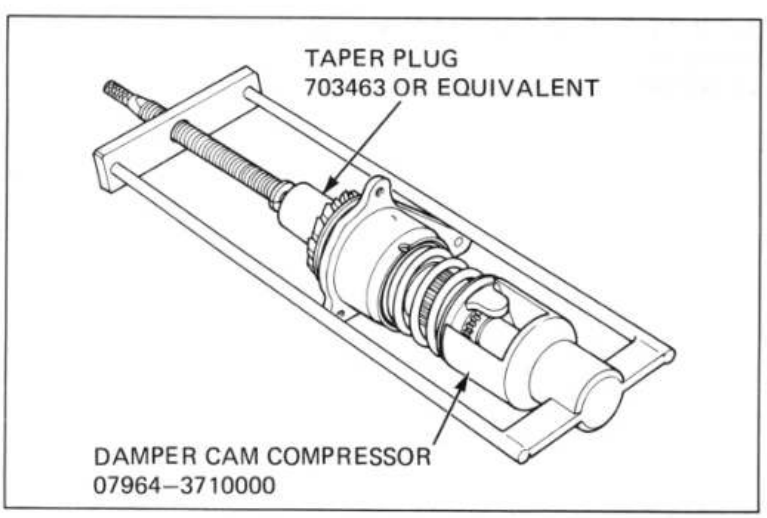


OUTPUT DRIVE GEAR DAMPER ASS'Y REMOVAL

Separate the output drive shaft and bearing holder from the output gear case.
Set the shaft and holder into the special tool and compress the damper cam.

NOTE:

> Use taper plug 703463 with damper cam compressor 07964–3710000.



Remove the circlip.
Loosen the special tool slowly to remove it.

Remove the damper cam and spring.
Check the damper cam for wear or damage.

NOTE:

> Reinstall the drive shaft and bearing holder into the output gear case for removal and torquing of the output drive shaft inner bearing race lock nut.



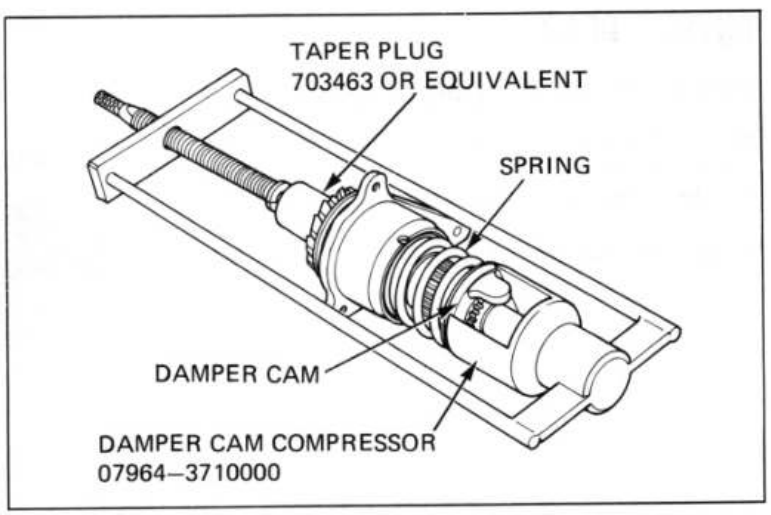
INSTALLATION

Install the damper spring and damper cam on to the output drive shaft.

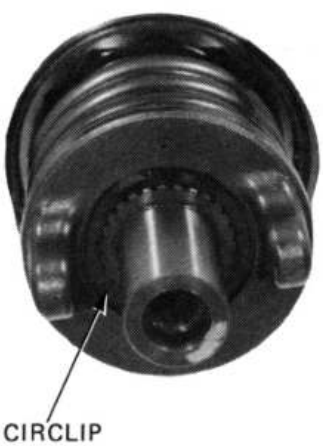
NOTE:

> Seat the damper spring on the bearing lock nut.

Attach the spring compressor in the output drive shaft threads. Compress the damper cam with the special tool.



Install the circlip onto the shaft, being sure it seats in its groove.
Loosen and remove the special tool from the shaft.

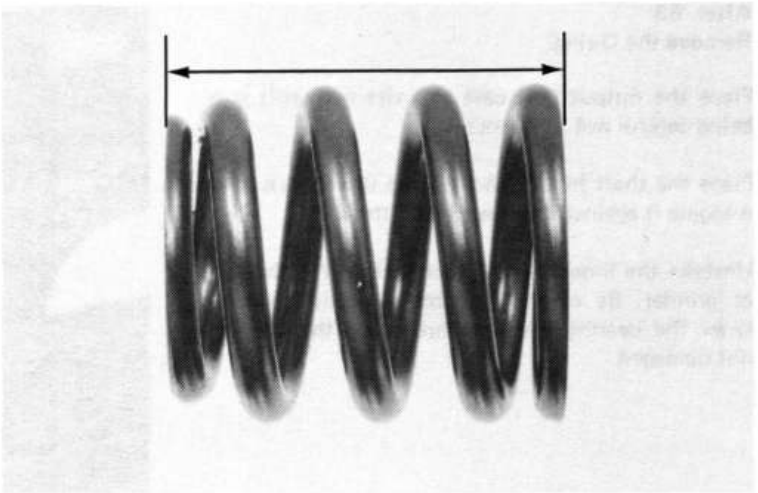


SPRING FREE LENGTH

Measure the damper spring free length.

SERVICE LIMIT: 63.8 mm (2.512 in)

Replace it if it is shorter than the service limit.



BACKLASH INSPECTION

Place the output gear case in a vise with soft jaws or a shop towel.

Set a horizontal type dial indicator on the final drive shaft as shown.
Hold the driven gear with the shaft holder and rotate the drive shaft until gear slack is taken up.

Turn the drive shaft back and forth to read backlash.

STANDARD: 0.08–0.23 mm (0.003–0.009 in)
SERVICE LIMIT: 0.40 mm (0.016 in)

Remove the dial indicator. Turn the output drive shaft 120° and measure backlash. Repeat this procedure once more.
Compare the difference of the three measurements.

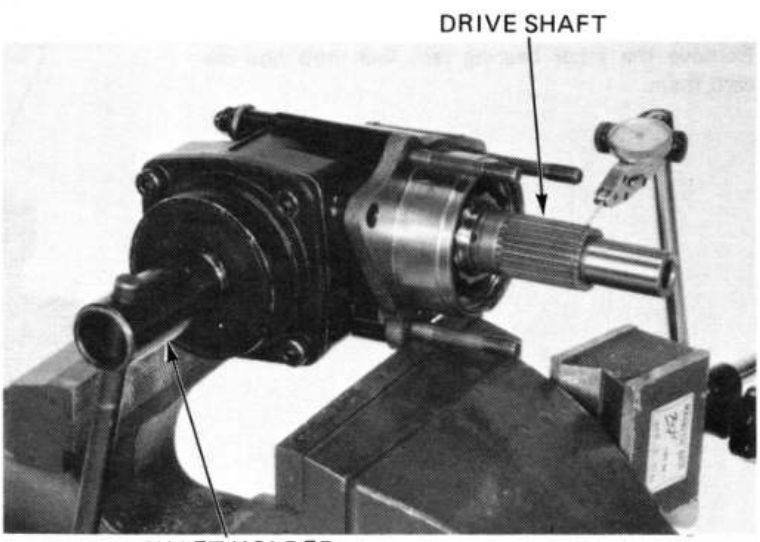
DIFFERENCE OF MEASUREMENTS
SERVICE LIMIT: 0.10 mm (0.004 in)

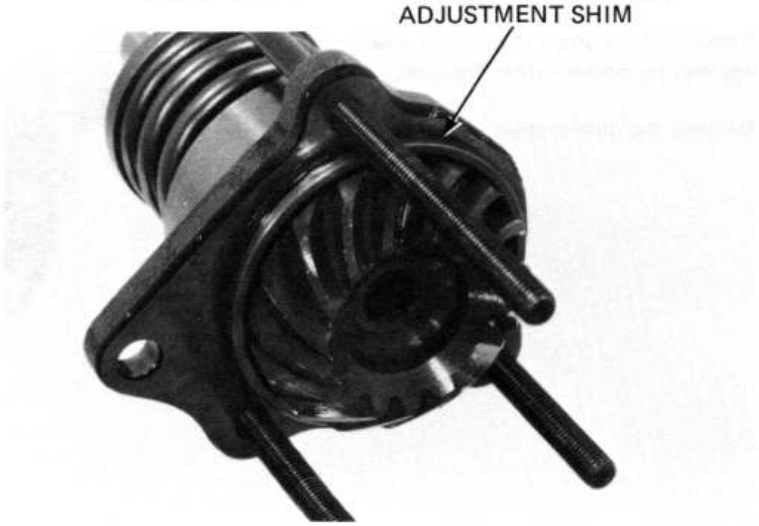
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is excessive, replace the drive shaft adjustment shim with a thinner one.
If the backlash is too small, replace the drive shaft adjustment shim with a thicker one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the shim is changed by 0.10 mm (0.004 in).

COUNTERSHAFT/OUTPUT DRIVE GEAR ADJUSTMENT SHIMS:
A: 0.40 mm (0.016 in)
B: 0.45 mm (0.018 in)
C: 0.50 mm (0.020 in) Standard
D: 0.55 mm (0.022 in)
E: 0.60 mm (0.024 in)



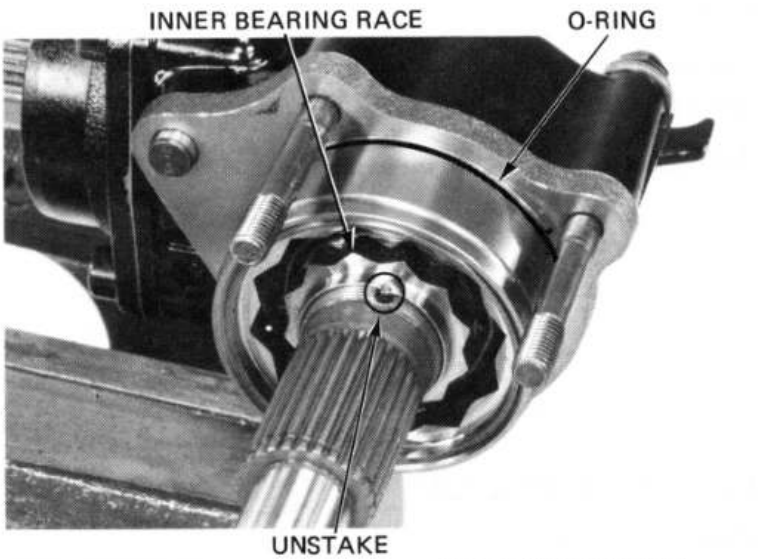


After '83:
Remove the O-ring.

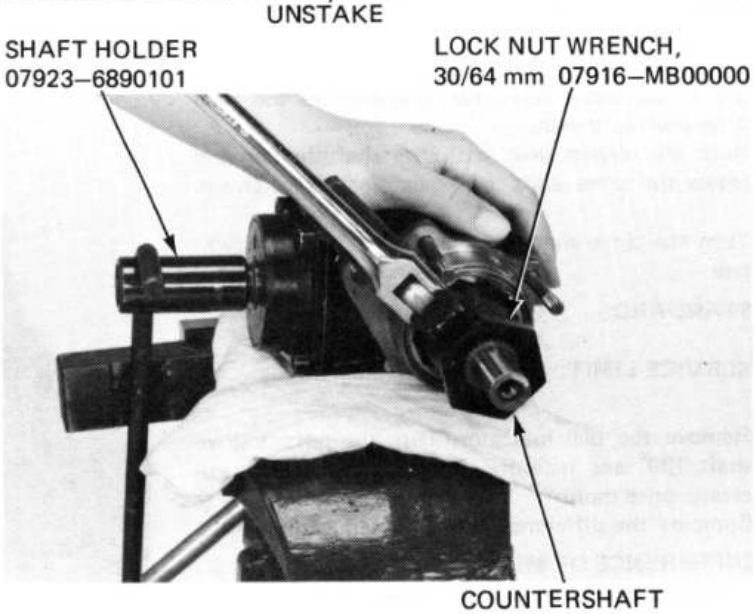
Place the output gear case in a vise with soft jaws, being careful not to distort it.

Place the shaft holder tool on the driven gear shaft wedging it against the vise to lock the shaft.

Unstake the inner bearing race lock nut with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.



Remove the inner bearing race lock nuts and discard them.



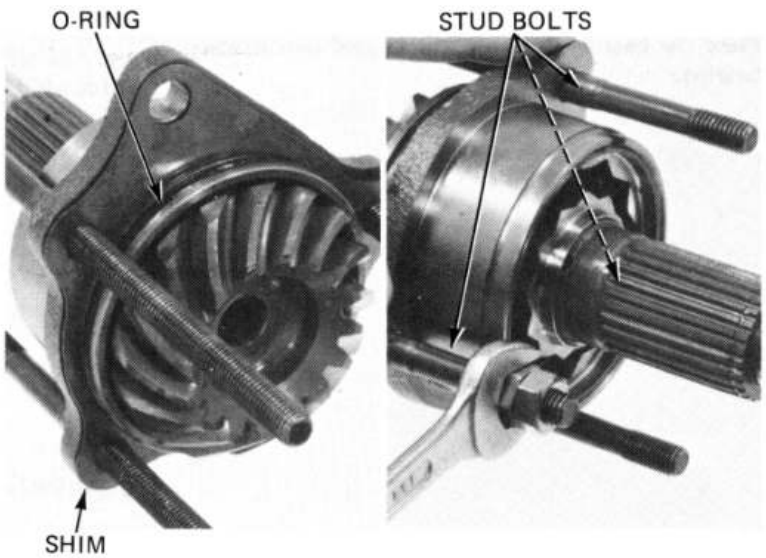
Remove the output drive shaft bearing holder nuts and sealing washers from the case.

Remove the output drive shaft.



Remove the O-ring and shim.

Lock two unts together on the gear case stud bolts. Remove the studs from the bearing holder.

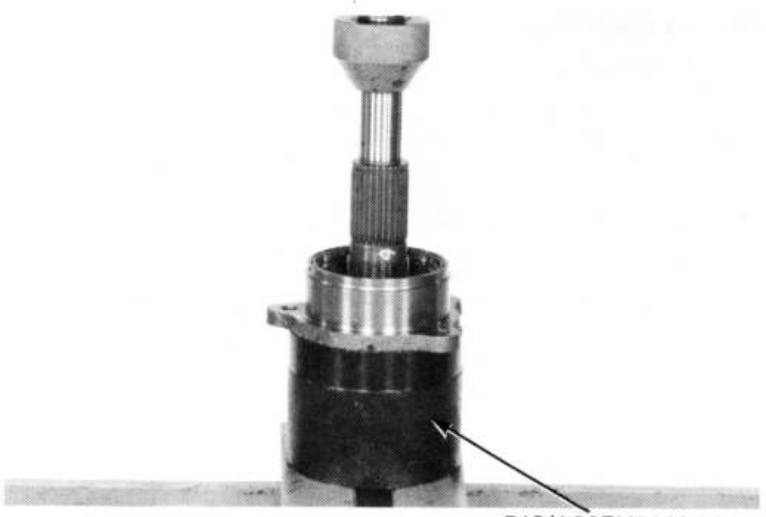


Place the output drive shaft and a disassembly tool in a press.

NOTE:

> Remove the center guide from the dis/ assembly tool before using it.

Press the output drive shaft out of the bearing holder.



OUTPUT DRIVE SHAFT BEARING REPLACEMENT

NOTE:

> The drive shaft must be removed before replacing the bearing.

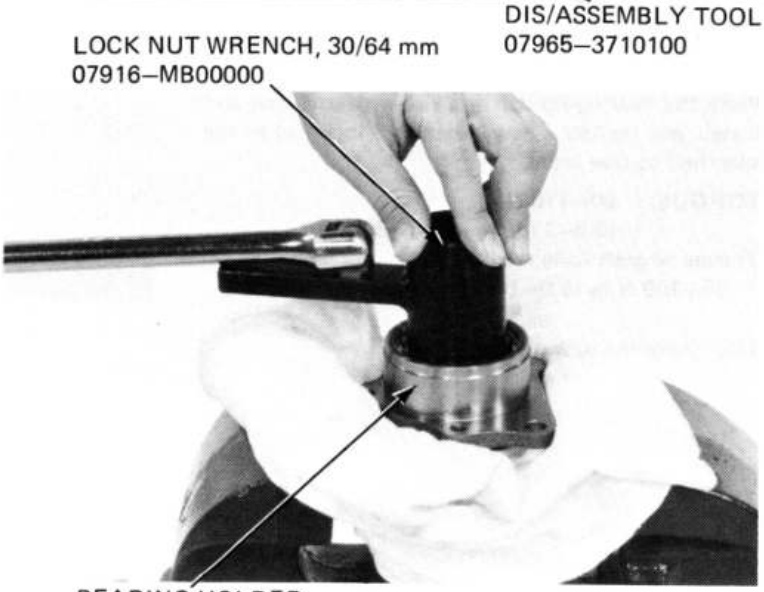
Place the bearing holder in a vise with soft jaws or a shop towel.

NOTE:

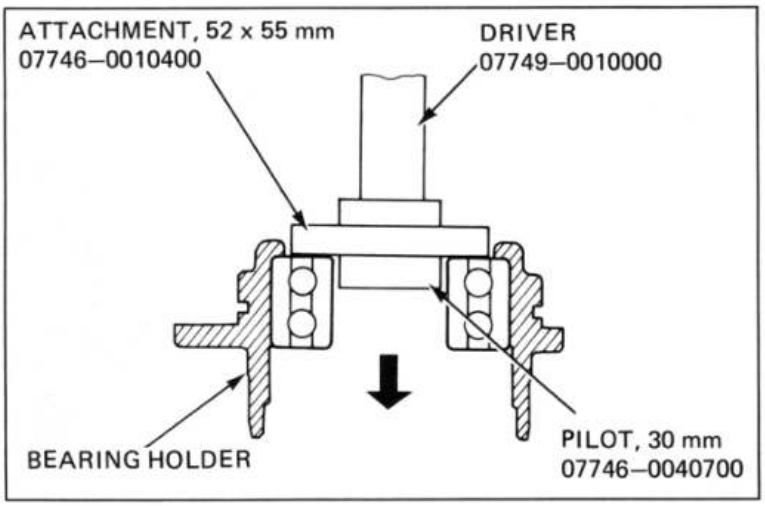
> Do not damage the bearing holder, especially the crankcase mating surface.

Unstake the outer race lock nut with a punch.

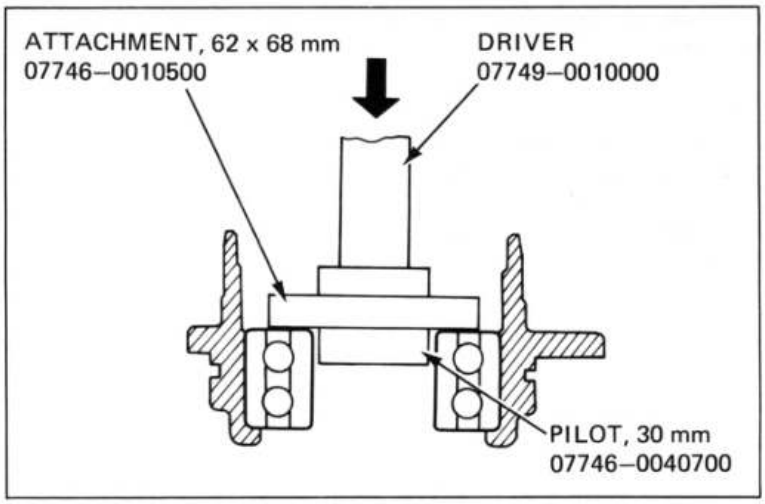
Remove the bearing outer rase lock nut with a special tool and discard the lock nut.



Place the bearing holder in a press and remove the bearing.



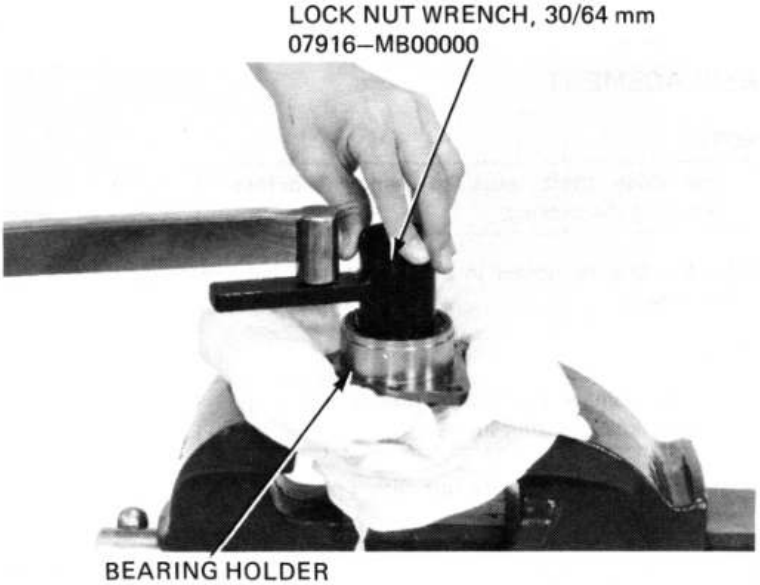
Press in a new bearing.



Place the bearing holder in a vise with soft jaws and install and tighten a new outer race lock nut to the specified torque value.

TORQUE: 90–110 N·m
(9.0–11.0 kg-m, 65–80 ft-lb)
Torque wrench scale reading:
80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

Then stake the new nut.



OUTPUT DRIVE GEAR INSTALLATION

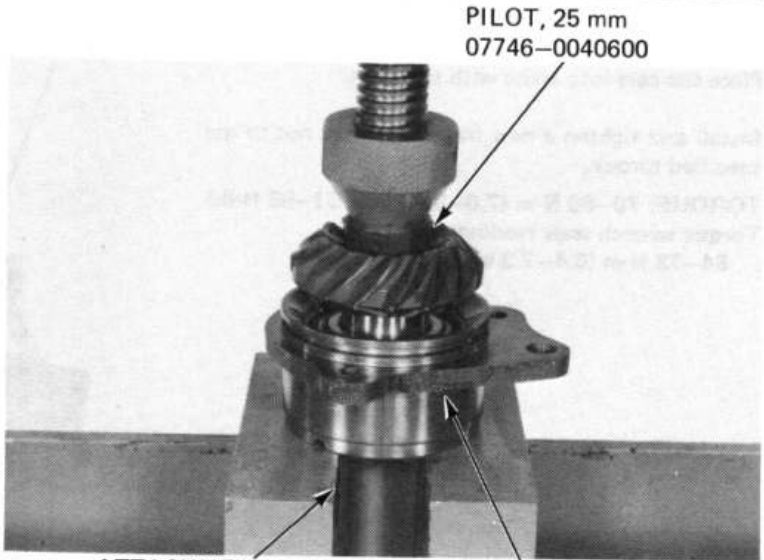
NOTE:

> The output drive and driven gears must be replaced as a set if they or the gear case or bearing require replacement.

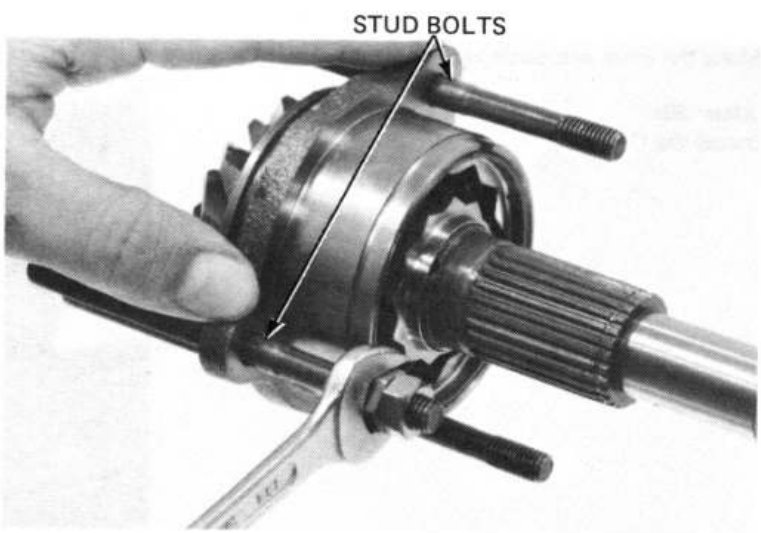
Place the output gear shaft and bearing holder into a press. Press the output drive shaft into the bearing. Support the inner bearing race using the special tools.

NOTE:

> Place the pilot's threaded end into the final drive shaft.



Install the stud bolts into the bearing holder.

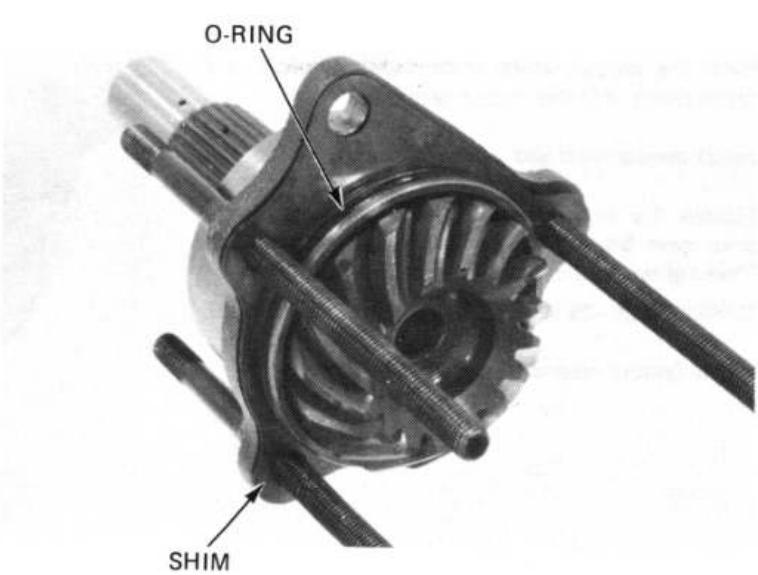


Place the adjustment shim over the bearing holder.

NOTE:

> If the output gear case is replaced a new adjustment shim must be selected (page 13-19, Backlash Inspection).

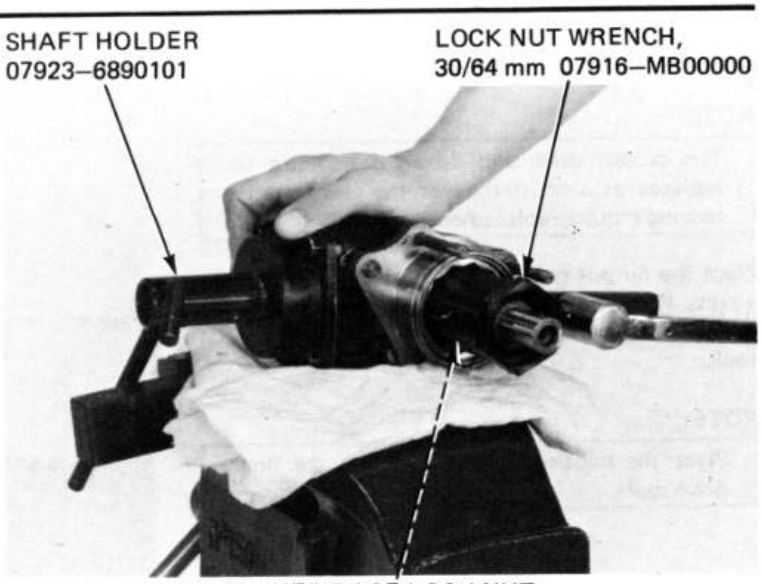
Install the O-ring.



Place the case into a vise with soft jaws.

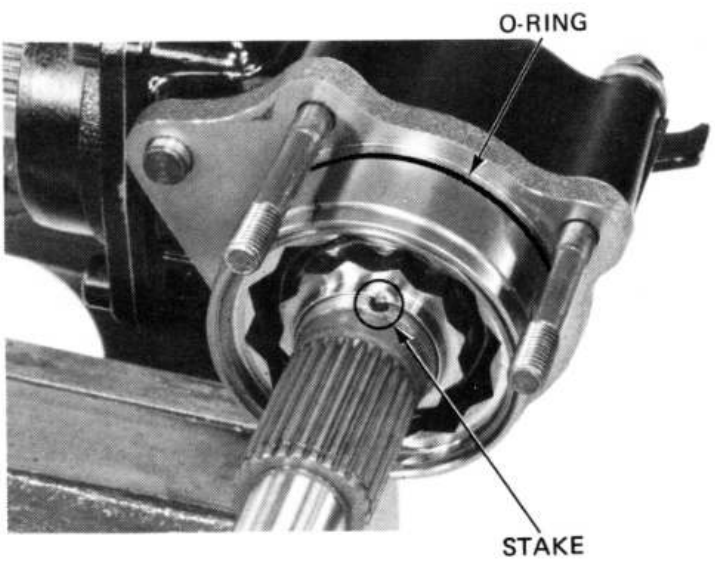
Install and tighten a new inner race lock nut to the specified torque.

TORQUE: 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Torque wrench scale reading:
64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)



Stake the inner and outer lock nuts.

After '83:
Install the O-ring.



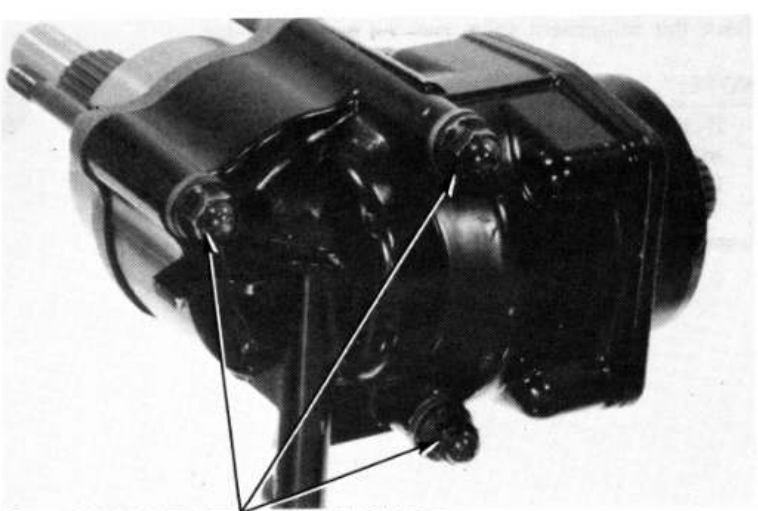
Place the output drive shaft bearing holder and correct shim into the output gear case.

Install the cap nuts and sealing washers.

Tighten the nuts in a crisscross pattern until the drive gear bearing holder seats against the case. Then tighten to the specified torque.

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

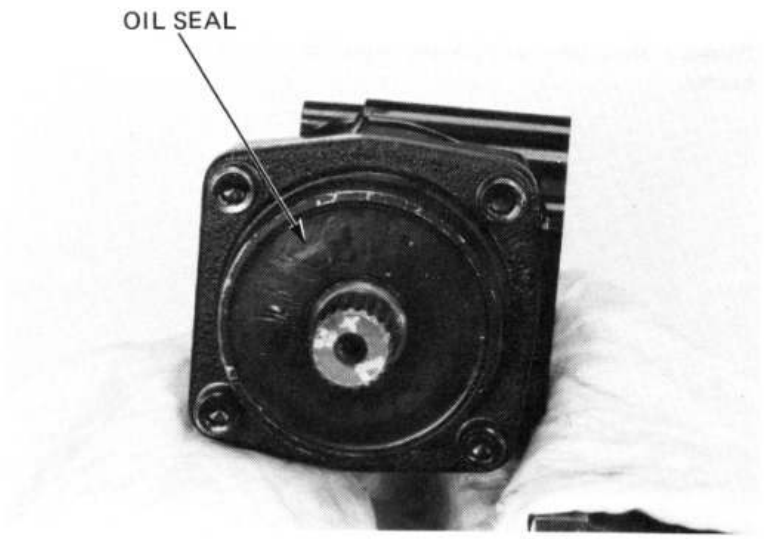
Install damper assembly, (page 13-18).



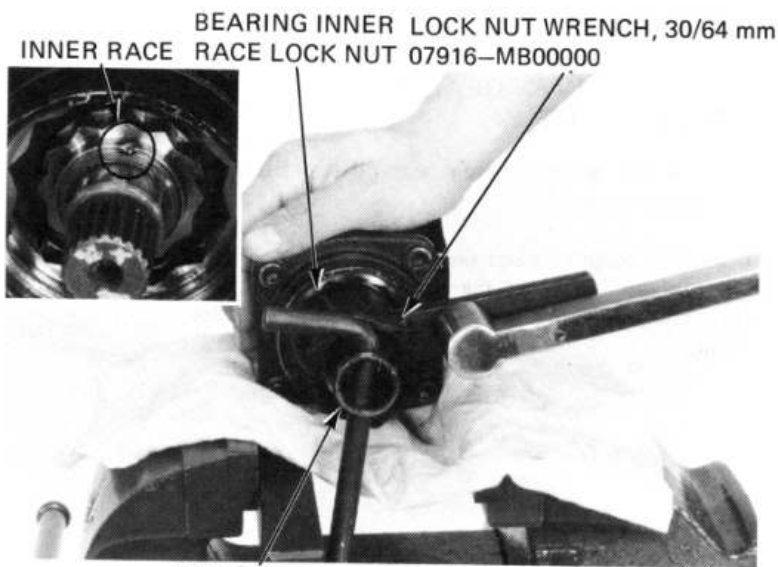
OUTPUT DRIVEN GEAR REMOVAL

Remove the driven gear oil seal from the output driven gear case.

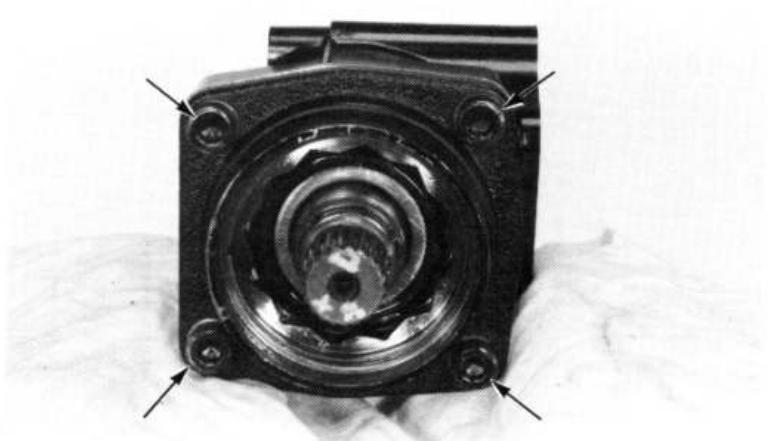
Place the output driven gear case into a vise.



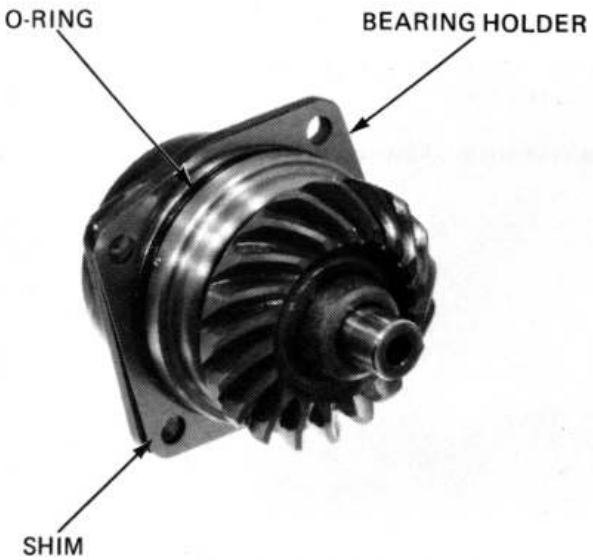
Unstake and remove the output driven gear bearing inner race lock nut.



Remove the driven gear bearing holder mounting bolts and remove the shim, gear and holder from the case.



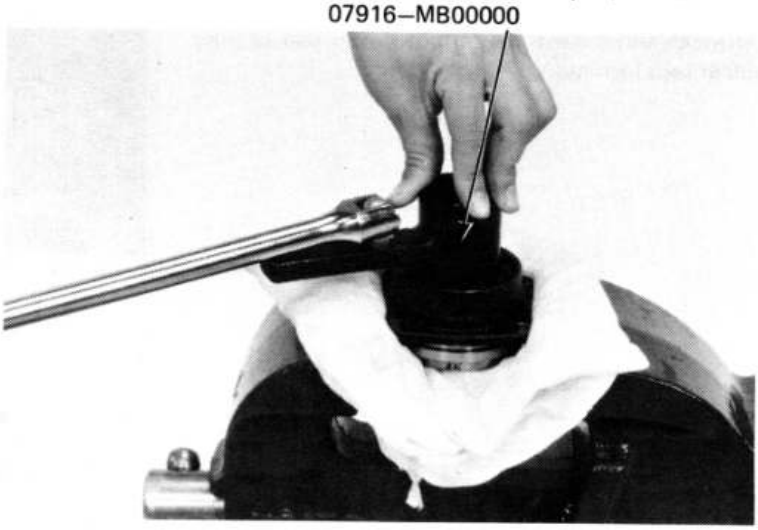
Remove the shim and O-ring from the bearing holder.



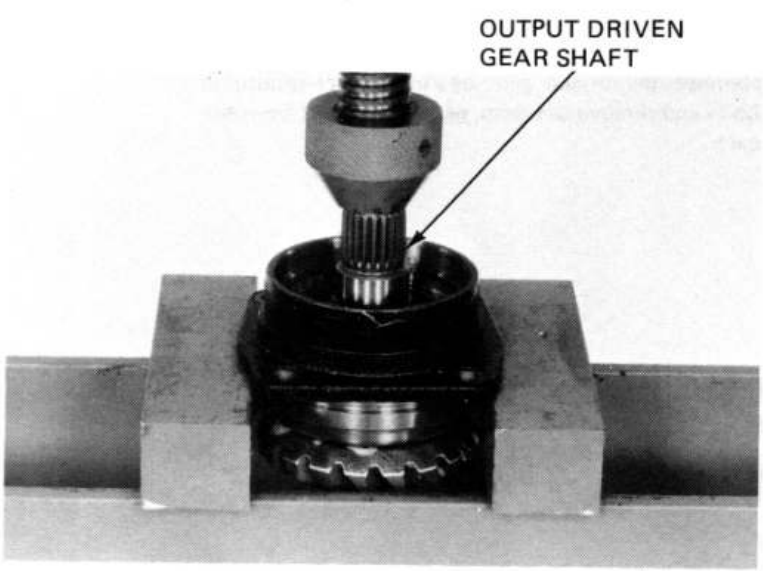
OUTPUT DRIVEN GEAR BEARING REPLACEMENT

Remove the output driven gear oil seal from the output gear case.

Place the output driven gear bearing holder into a vise with soft jaws. Unstake and remove the output driven gear bearing outer race lock nut from the holder.



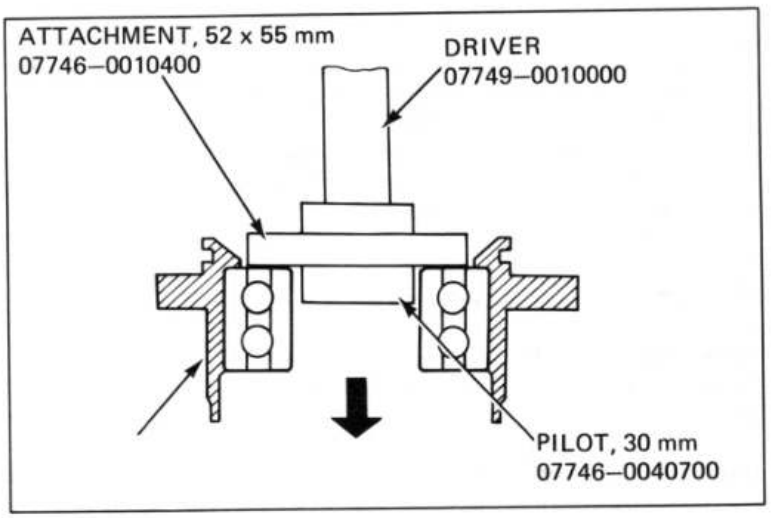
Press the output driven gear shaft from the holder.



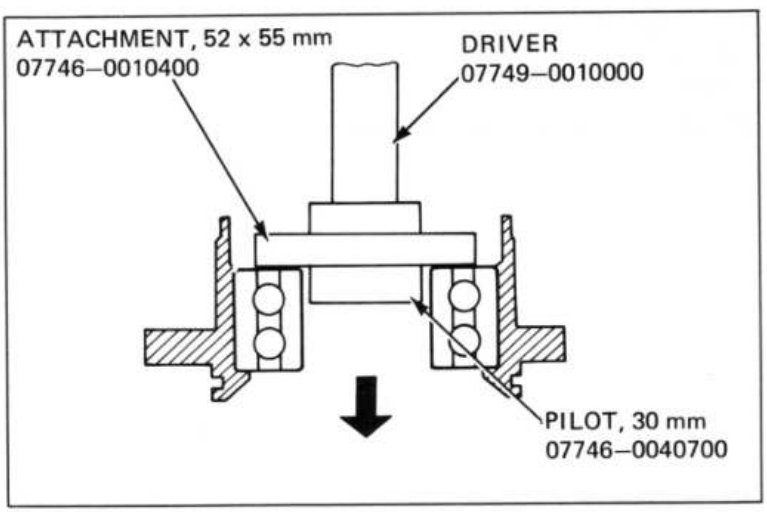
Place the bearing holder in a press and press the bearing out.

NOTE:

> Be careful not to damage the bearing holder gear case mating surface.



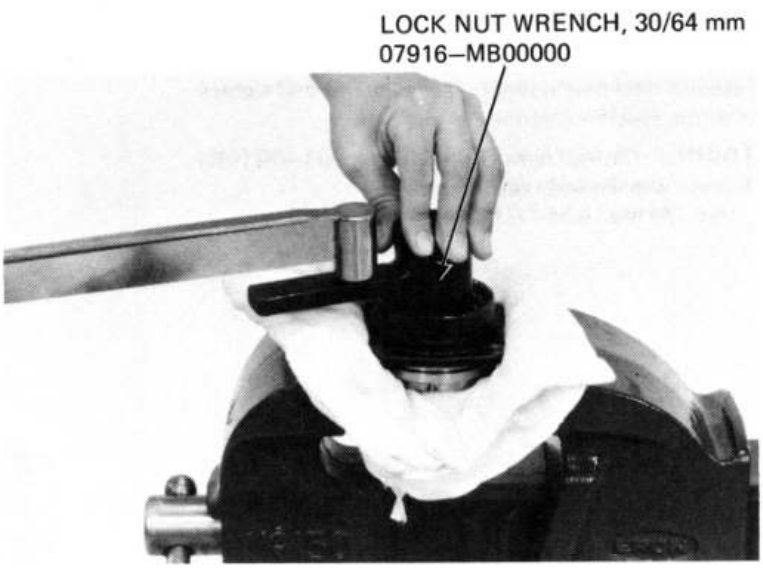
Press in a new bearing and make sure it rotates freely after installation.



Place the bearing holder into a vise with soft jaws. Install and tighten a new bearing outer race lock nut to the specified torque value.

TORQUE: 90–110 N·m
(9.0–11.0 kg-m, 65–80 ft-lb)

Torque wrench scale reading:
80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)



OUTPUT DRIVEN GEAR INSTALLATION

NOTE:

- Remove the center guide from the dis/assembly tool before using.
- When the gear set, driven gear bearing and/or gear case has been replaced, use a shim 0.30 mm (0.012 in) thick for initial reference.

Place the output driven gear bearing holder into a press.
Then press in the output driven gear.
Support the inner bearing race using the special tools.

Install the O-ring and correct shim.



DIS/ASSEMBLY TOOL
07965–3710100

Attach the bearing holder onto the gear case with the four hex bolts. Tighten the bolts in a crisscross pattern in two or more steps.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

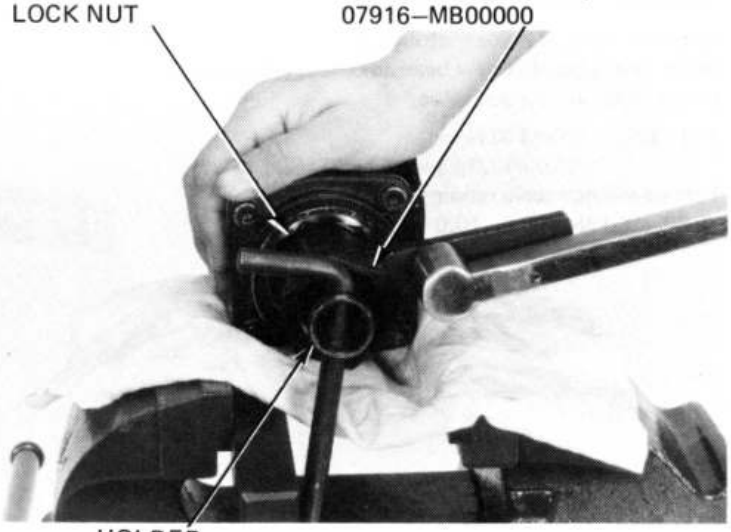


BEARING INNER RACE LOCK NUT

LOCK NUT WRENCH, 30/64 mm
07916–MB00000

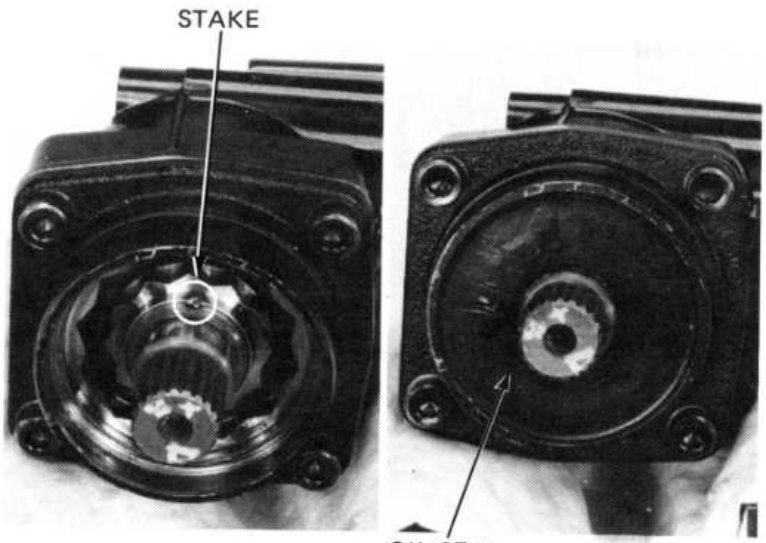
Install a new bearing inner race lock nut and tighten it to the specified torque.

TORQUE: 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Torque wrench scale reading:
64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)



HOLDER
07923–6890101

Stake both new lock nuts and install a new oil seal.

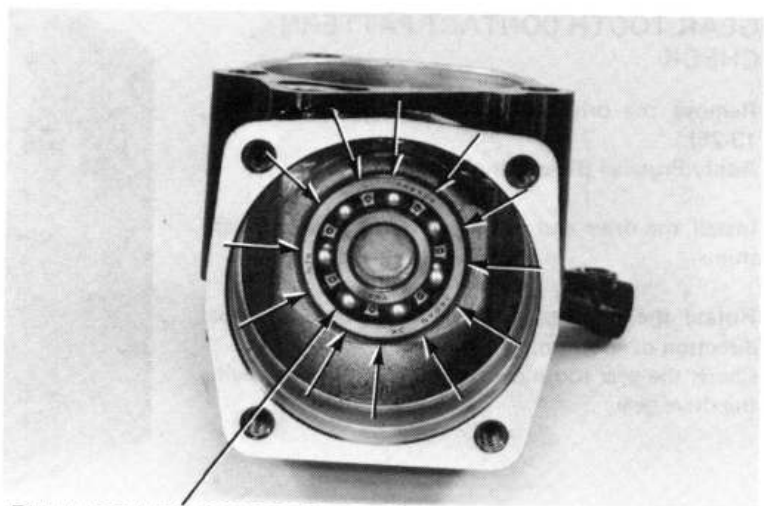


OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

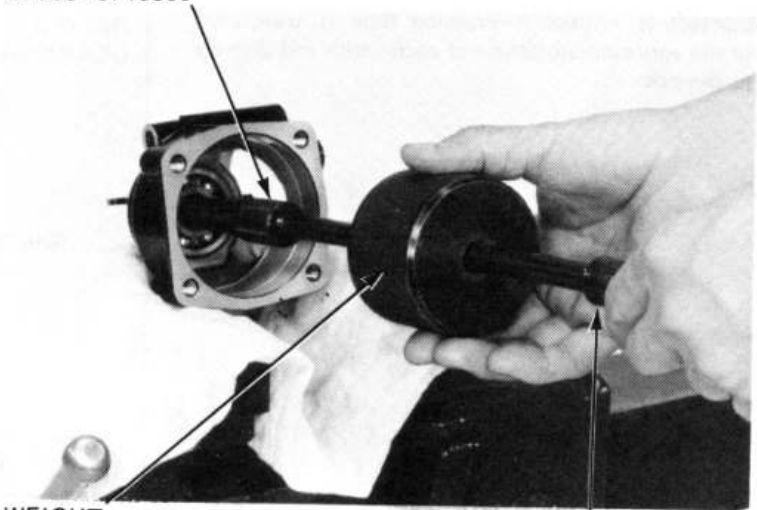
Head the output gear case around the driven shaft bearing to 80°C (176°F).

CAUTION:

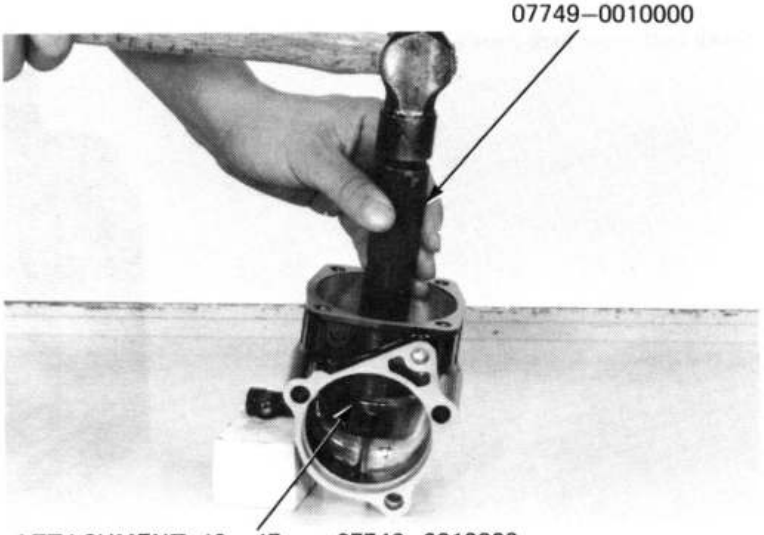
Always wear gloves when handling a heated gear case.



Remove the bearing with the bearing remover.



Drive a new bearing into the output gear case.

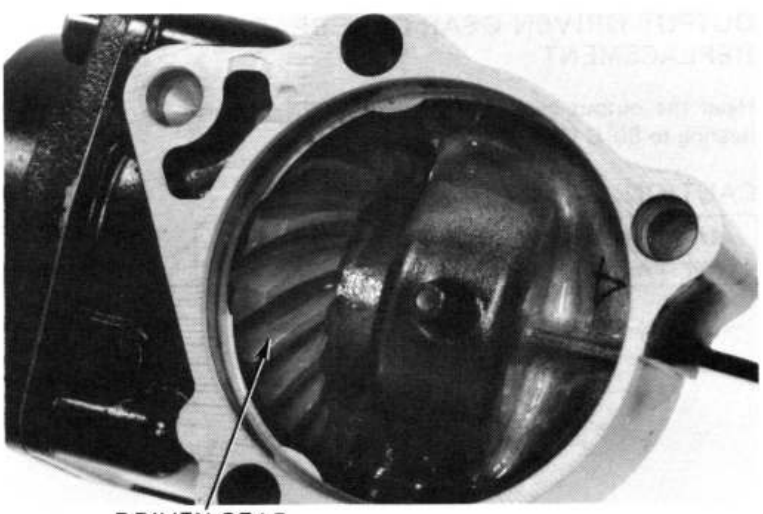


GEAR TOOTH CONTACT PATTERN CHECK

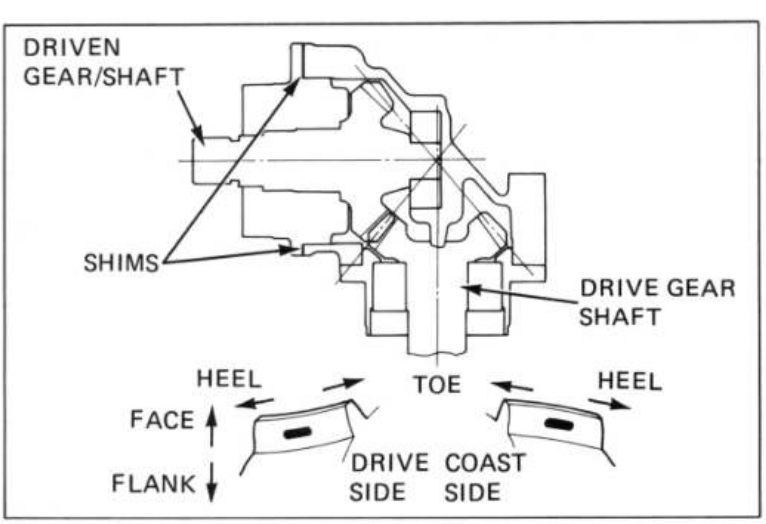
Remove the drive and driven gears (pages 13-17, 13-25).
Apply Prussian Blue to the driven gear teeth.

Install the drive and driven gears with the standard shims.

Rotate the drive gear several times in the normal direction of rotation.
Check the gear tooth contact pattern after removing the drive gear.

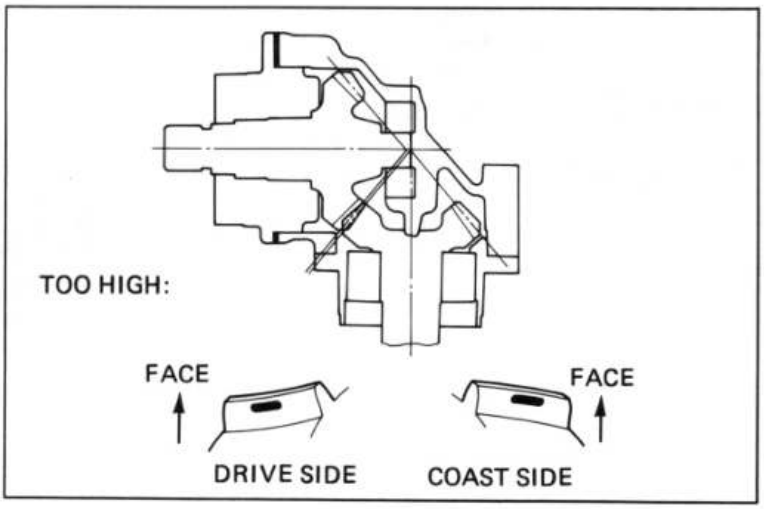


Contact is normal if Prussian Blue is transfered to the approximate center of each tooth and slightly to the side.



If the pattern is not correct, remove and replace the driven gear adjustment shim.

Replace the shim with a thinner one if the contact pattern is too high.



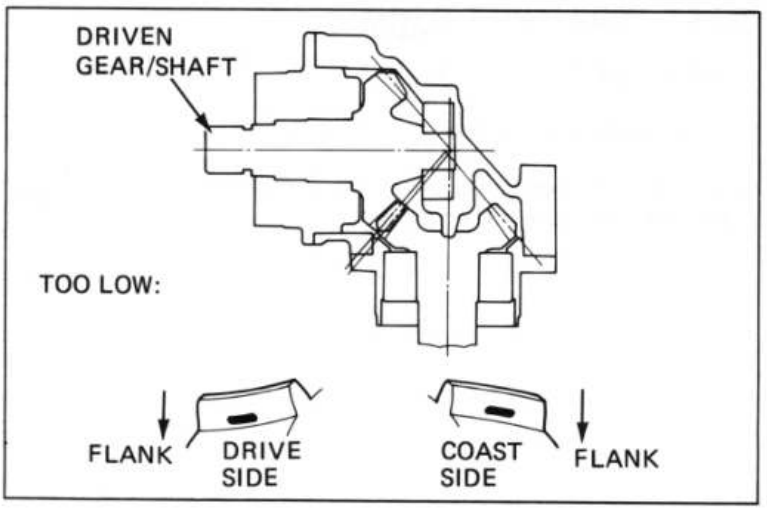
Replace the driven gear adjustment shim with a thicker one if the contact is too low.

The pattern will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the shim is changed by 0.10 mm (0.04 in).

OUTPUT DRIVEN GEAR ADJUSTMENT SHIM:

A: 0.40 mm (0.016 in)
B: 0.45 mm (0.018 in)
C: 0.50 mm (0.020 in) STANDARD
D: 0.55 mm (0.022 in)
E: 0.60 mm (0.024 in)

Check the backlash (See page 13-19).



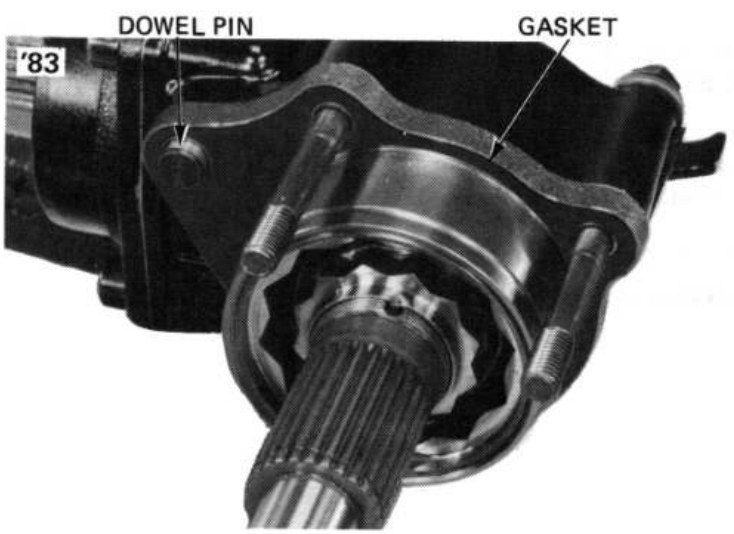
OUTPUT GEAR CASE INSTALLATION

'83:

Install the dowel pin and a new gasket over the output drive shaft bearing holder.

After '83:

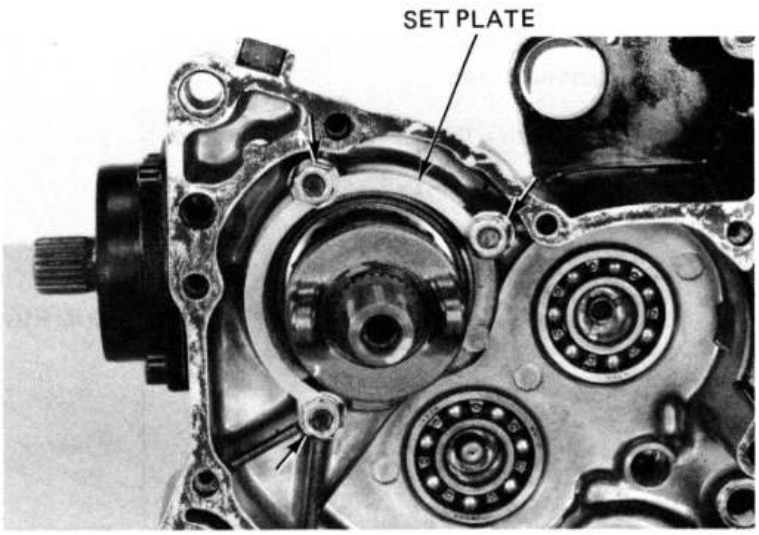
Install the dowel pin.



Install the output gear assembly into the crankcase.
Install the set plate and 8 mm nuts.
Tighten the nuts to the specified torque.

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

Bend the lock tabs up.



SHIFT FORK/SHIFT DRUM

SHIFT FORK DISASSEMBLY

Remove the outer shift forks from the shaft.

Bend the lock washer tab down and remove the center fork mounting bolt and fork.



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.

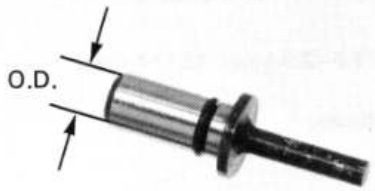
Measure the shift drum I.D.

SERVICE LIMIT: 12.55 mm (0.494 in)



Measure the shift drum holder O.D.

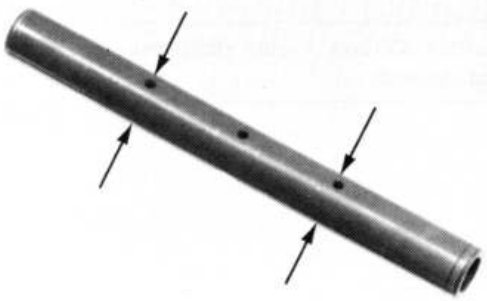
SERVICE LIMIT: 12.35 mm (0.486 in)



Check for scratches, scoring or evidence of insufficient lubrication.

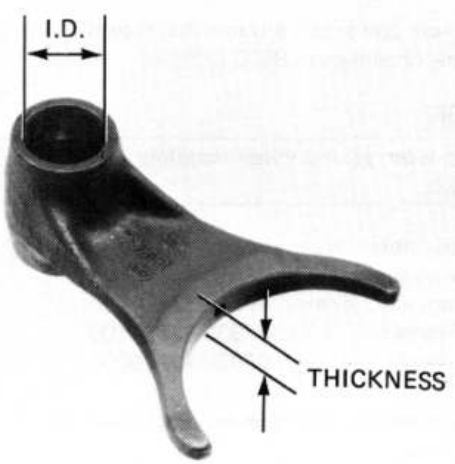
Measure the shift fork shaft O.D. at the right and left shift fork surfaces.

SERVICE LIMIT: 13.90 mm (0.547 in)



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

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



SHIFT FORK ASSEMBLY

Install the center shift fork onto the shaft.

Install the lock washer and tighten the center fork bolt.

TORQUE: 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

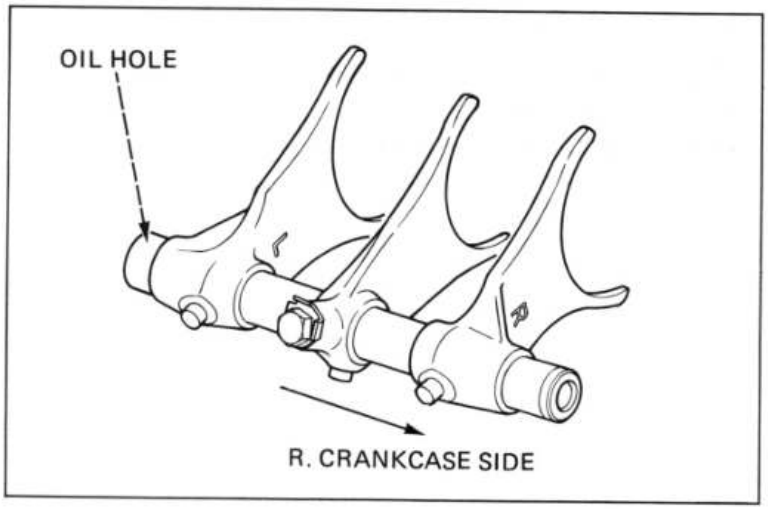
Bend the lock washer tabs up.



Install the R.L. forks facing as shown against the center shift fork.

NOTE:

> Make sure the oil hole in the shift fork shaft toward the left.



CRANKCASE BEARINGS REPLACEMENT

LEFT CRANKCASE BEARINGS

Heat the left crankcase around the mainshaft and counter shaft bearings to 80°C (176°F).

CAUTION:

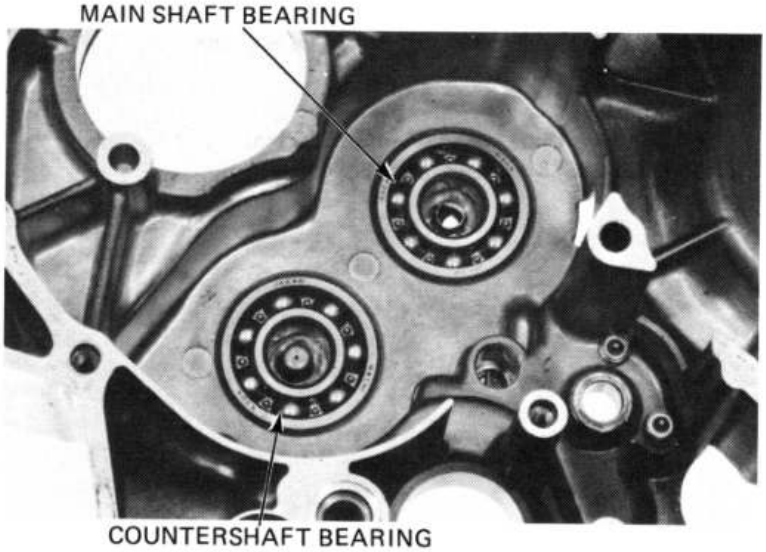
> *Always wear gloves when handling a heated crankcase.*

Remove the main and countershaft bearings with the following tools:

Bearing Remover, 20 mm	07936–3710600
Remover Handle	07936–3710100
Remover Weight	07936–3710200

Drive a new bearing into the left crankcase with the following tools:

Attachment	07946–3710200
Driver	07949–3710000



RIGHT CRANKCASE BEARINGS

Heat the right crankcase around the mainshaft, countershaft, output drive shaft and shift drum bearings to 80°C (176°F).

CAUTION:

Always wear gloves when handling a heated crankcase.

Remove the bearings with the following tools:

Bearing Remover, 20 mm	07936–3710600
Remover Handle	07936–3710100
Remover Weight	07936–3710200

Drive the new bearings into the right crankcase with the following tools:

Main shaft:

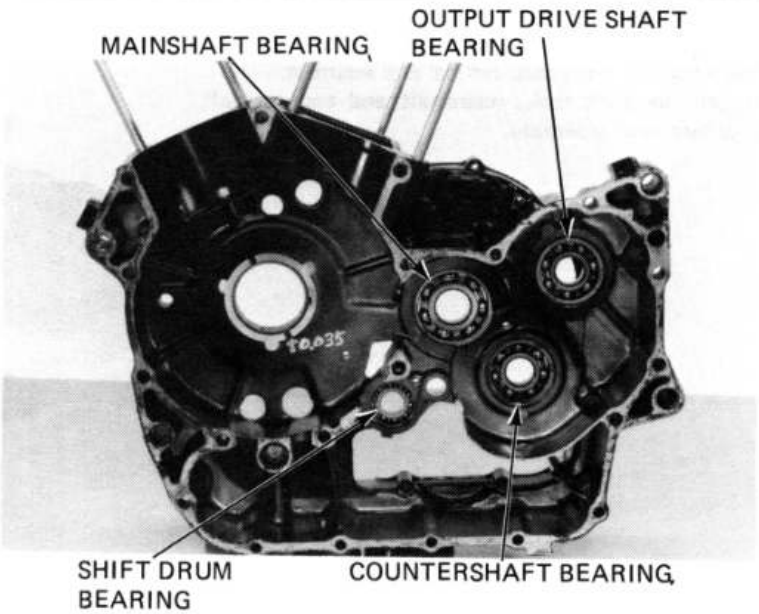
Attachment, 62 x 68 mm	07746–0010500
Pilot, 25 mm	07746–0040600
Driver	07749–0010000

Counter shaft/Output drive shaft:

Driver	07749–0010000
Attachment	07946–3710200

Shift Drum:

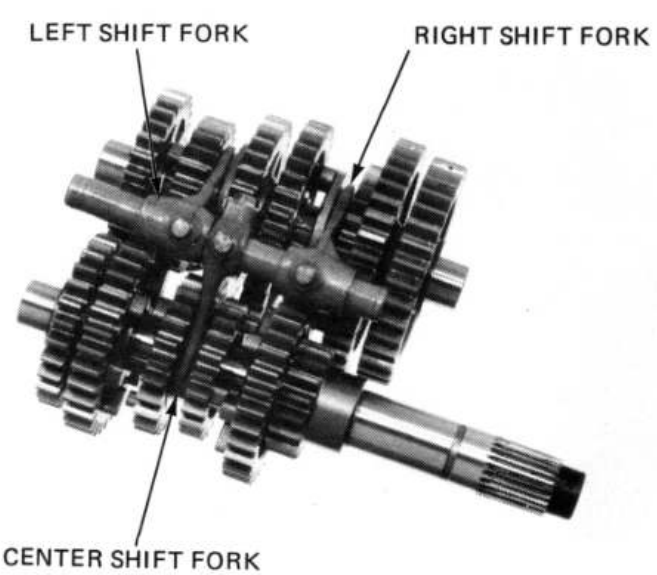
Attachment, 32 x 35 mm	07746–0010100
Pilot, 17 mm	07746–0040400
Driver	07749–0010000



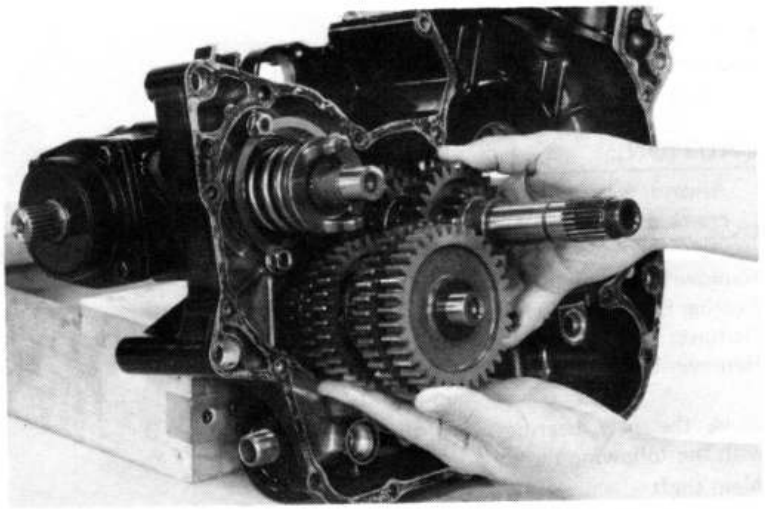
TRANSMISSION INSTALLATION

Install the shift fork onto the mainshaft and countershaft as shown:

Center shift fork to M2/3 gear groove.
Right shift fork to C5 gear groove.
Left shift fork to C6 gear groove.



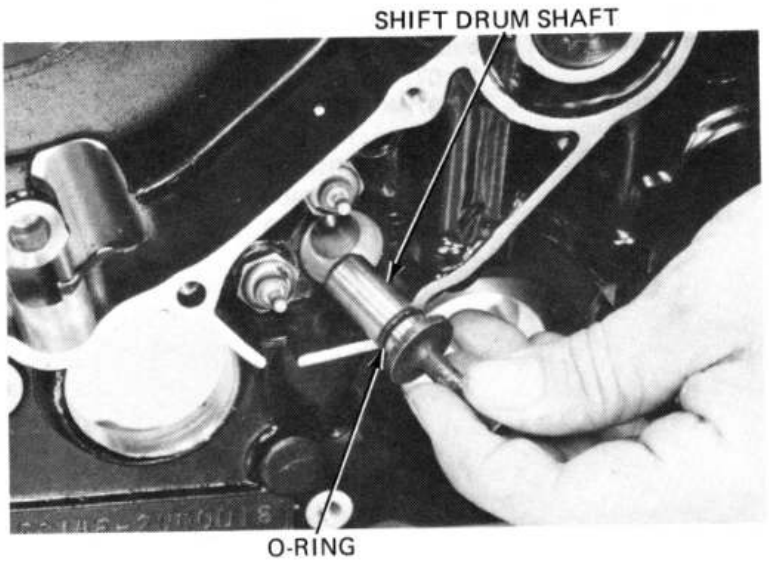
Place the left crankcase vertical and secure it.
Install the shift fork, mainshaft and countershaft together as an assembly.

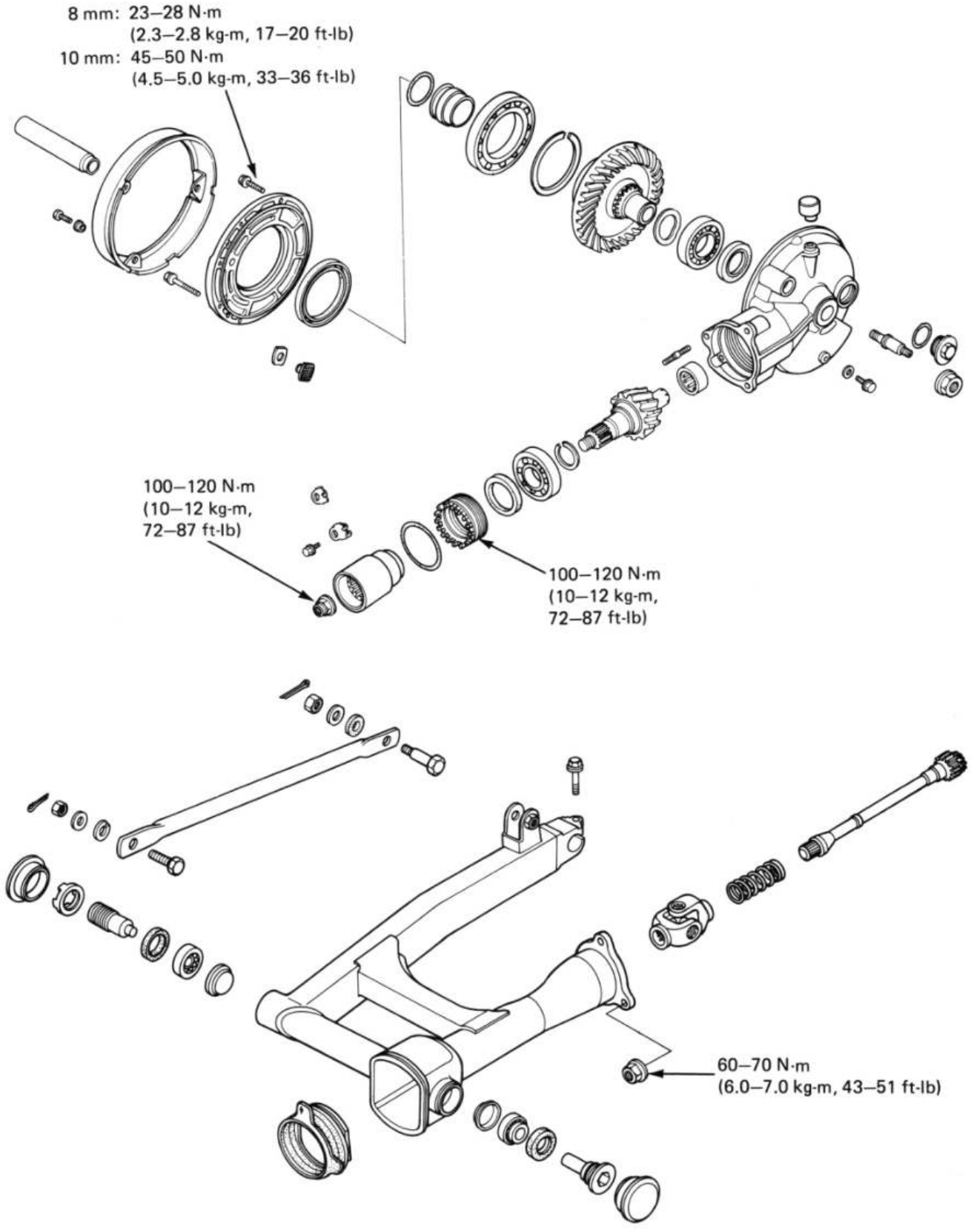


Install the shift drum aligning the grooves with the boss of each shift fork.

Install the shift drum shaft with a new O-ring.

Assemble the crankcase (page 12-4).




8 mm: 23–28 N·m
(2.3–2.8 kg-m, 17–20 ft-lb)
10 mm: 45–50 N·m
(4.5–5.0 kg-m, 33–36 ft-lb)
100–120 N·m
(10–12 kg-m,
72–87 ft-lb)
100–120 N·m
(10–12 kg-m,
72–87 ft-lb)
60–70 N·m
(6.0–7.0 kg-m, 43–51 ft-lb)

14. DRIVE TRAIN

SERVICE INFORMATION	14–1
TROUBLESHOOTING	14–2
FINAL DRIVE REMOVAL	14–3
DRIVE SHAFT	14–3
UNIVERSAL JOINT	14–4
FINAL DRIVE GEAR	14–5
FINAL DRIVE INSTALLATION	14–17

SERVICE INFORMATION

GENERAL

- The final drive gear assembly must be removed together with the drive shaft.
- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check tooth contact pattern and gear backlash when the bearing, gear set and/or gear case has been replace.
- When using the lock nut wrench, use a deflecting beam type torque wrench 355–510 mm's (14–20 inches) long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench what the torque wrench scale reading should be given with the actual torque specification.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Final gear oil	Capacity	170 cc (5.8 ozs)	—
	Recommended oil	Hypoid-gear oil API, GL–5 Above 5°C/41°F SAE #90 Below 5°C/41°F SAE #80	—
Gear backlash		0.08–0.18 mm (0.003–0.007 in)	0.30 mm (0.012 in)
Gear assembly preload		0.2–0.3 N·m (2–3 kg-m, 1.7–2.6 in-lb)	—

TORQUE VALUES

Pinion bearing retainer	100–120 N·m (10–12 kg-m, 72–87 ft-lb)
Pinion nut	100–120 N·m (10–12 kg-m, 72–87 ft-lb)
Gear case cover bolt 10 mm	45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)
8 mm	23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
Final gear case attaching nut	60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)

TOOLS

Special

Attachment	07945–3330300
Attachment	07947–6340201
Lock nut wrench, 30/64 mm	07916–MB00000 or 07910–MA10100
Pinion puller	07931–4630200 and 07931–MB00000 or 07935–MB00000
Pinion joint holder	07924–ME90000
Driver	07931–4630300 or 07947–3710101 and 07746–0010200
O-ring guide	07973–4630200
Bearing remover, 35 mm	07936–3710400

Common

Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Attachment, 52 x 55 mm	07746–0010400
Attachment, 32 x 35 mm	07746–0010100
Pilot, 30 mm	07746–0040700
Driver C	07746–0030100 ┐ or Driver 07945–3710200
Attachment, 25 mm I.D.	07746–0030200 ┘

TROUBLESHOOTING

Excessive noise

1. Worn or scored ring gear shaft and driven flange.
2. Scored driven flange and wheel hub.
3. Worn or scored drive pinion and splines.
4. Worn pinion and ring gears.
5. Excessive backlash between pinion and ring gear.
6. Oil level too low.

Oil leak

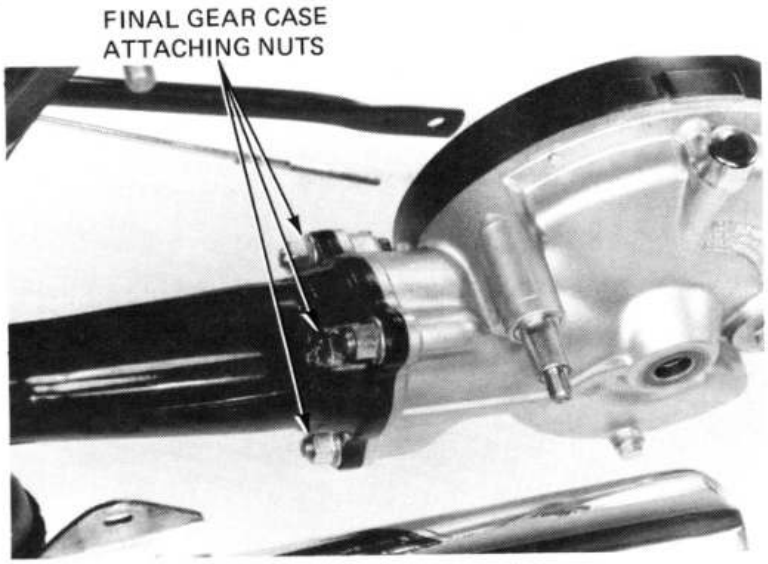
1. Clogged breather.
2. Oil level too high.
3. Seals damaged.

FINAL DRIVE REMOVAL

Place the motorcycle on its center stand. Drain the final gear oil (page 2-11) and remove the rear wheel (page 16-3).

Remove the left shock absorber (page 16-10).

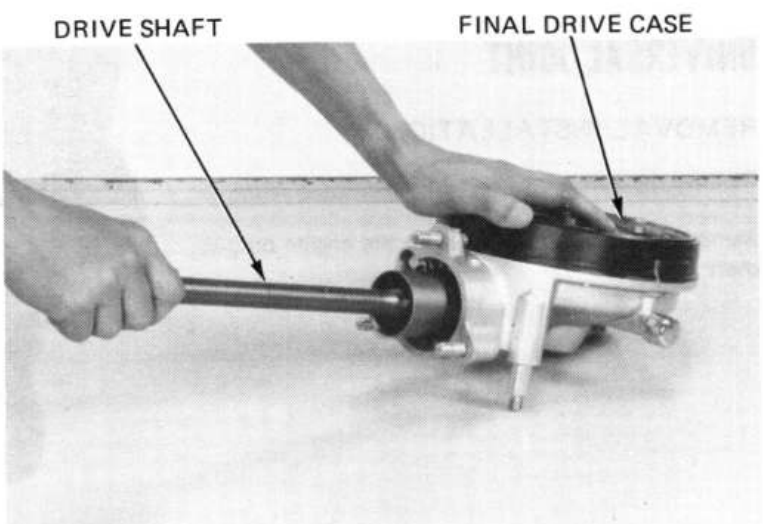
Remove the final gear case attaching nuts and remove the gear case from the swingarm.



DRIVE SHAFT

REMOVAL

Separate the drive shaft from the gear case by gently revolving the shaft in a circular motion while tugging slightly.

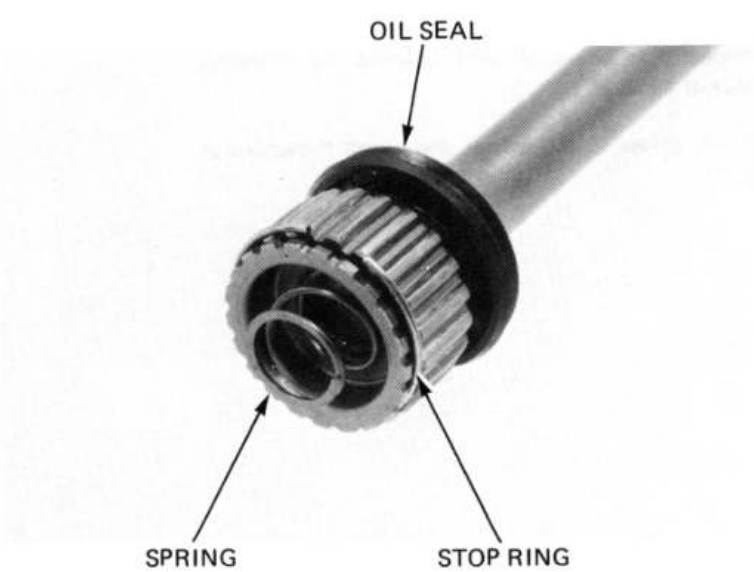


DISASSEMBLY

Remove the spring, oil seal and stop ring from the drive shaft.

NOTE:

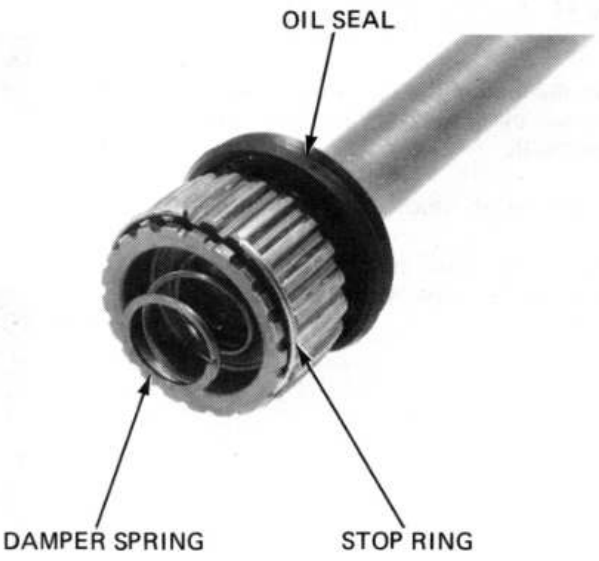
> Replace the oil seal with a new one if it is removed.



ASSEMBLY

Place a new oil seal over the drive shaft.

Install the damper spring and new stop ring.

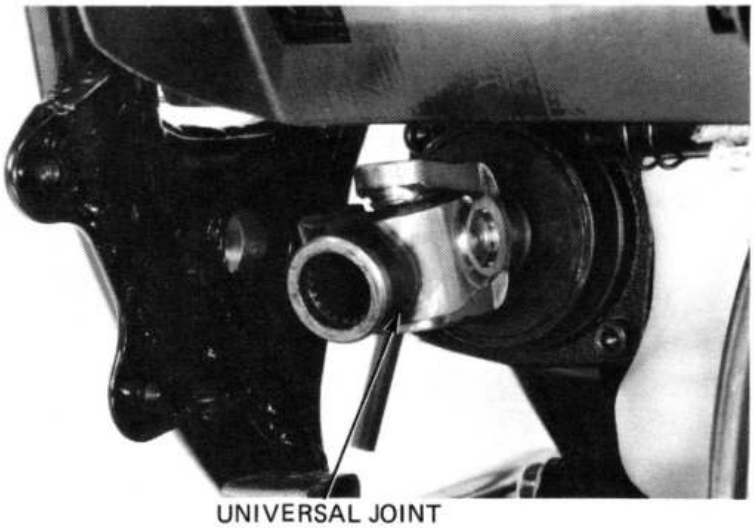


UNIVERSAL JOINT

REMOVAL/INSTALLATION

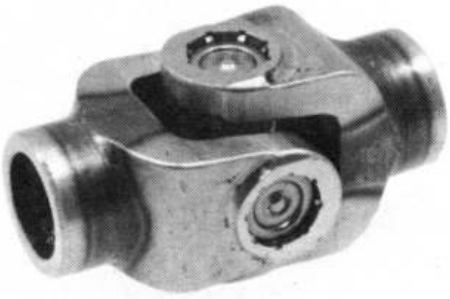
Remove the swingarm (page 16-13).

Remove the universal joint from the engine output shaft.



Inspect the universal joint bearings for excessive play or damage.

Apply grease to the splines and install the universal joint.

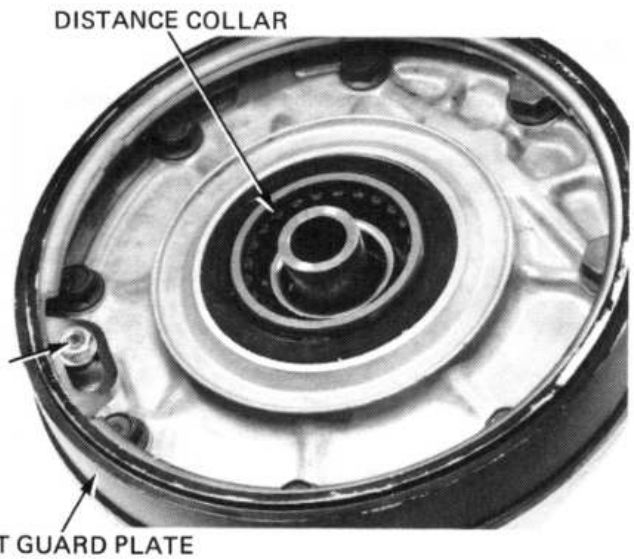


FINAL DRIVE GEAR

RING GEAR REMOVAL

Remove the distance collar.

Remove the dust guard plate bolts. Remove the dust guard plate by turning it clockwise.

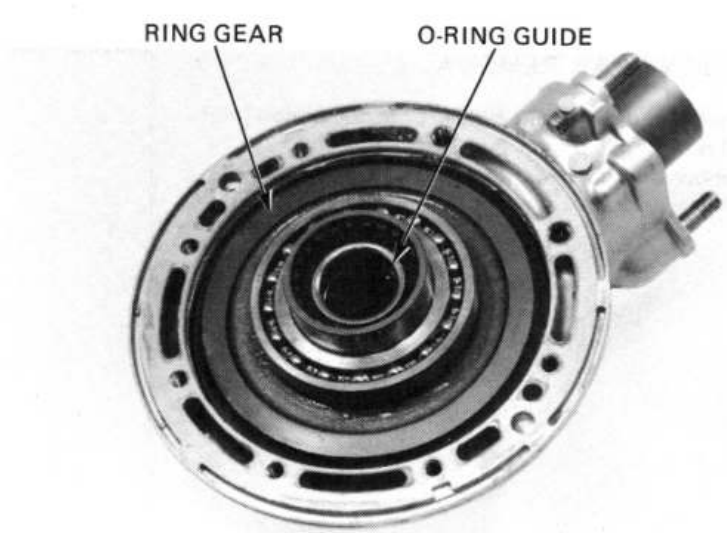


Remove the eight case cover bolts and cover. If the ring gear stays in the cover, do the following:
Place the cover in a press with the ring gear down. Make sure the cover is secrely supported.
Press the ring gear out of the cover with driver 07749–0010000 and attachment 07746–0010100.



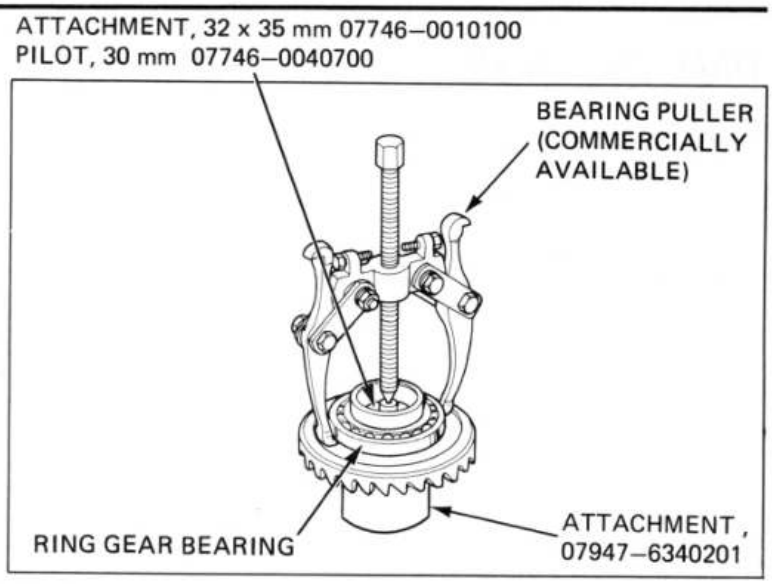
Remove the ring gear from the final drive case.

Remove the O-ring guide by tapping it from the opposite side.



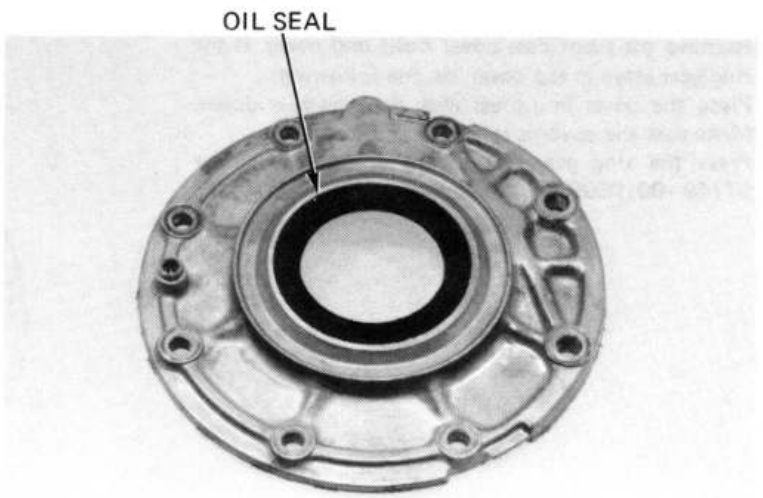
RING GEAR BEARING REMOVAL

Remove the ring gear bearing and gear adjusting spacer.



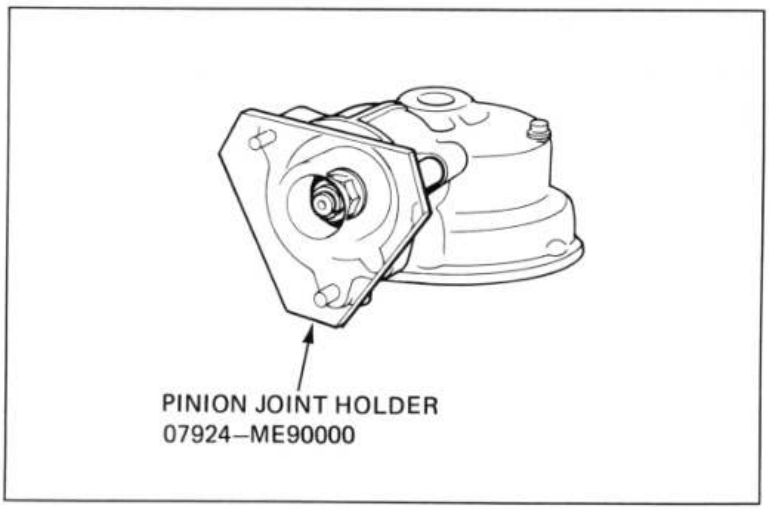
CASE COVER OIL SEAL REPLACEMENT

Remove the oil seal from the case cover and press in a new oil seal.

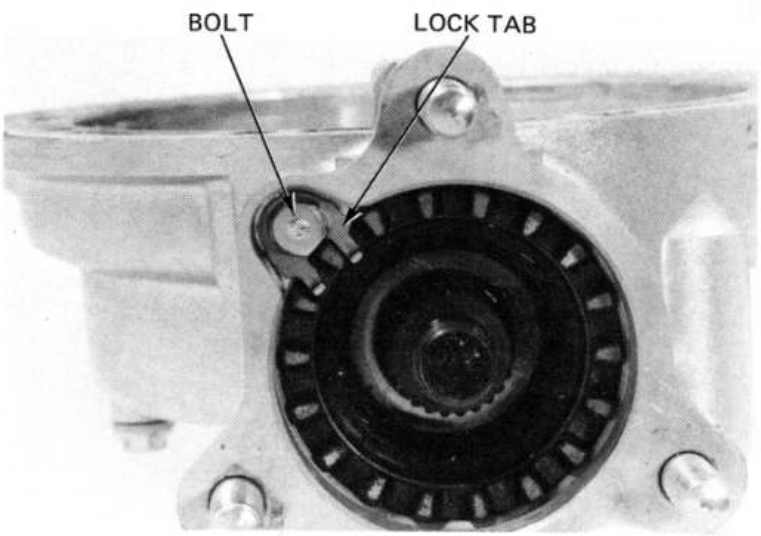


PINION GEAR REMOVAL

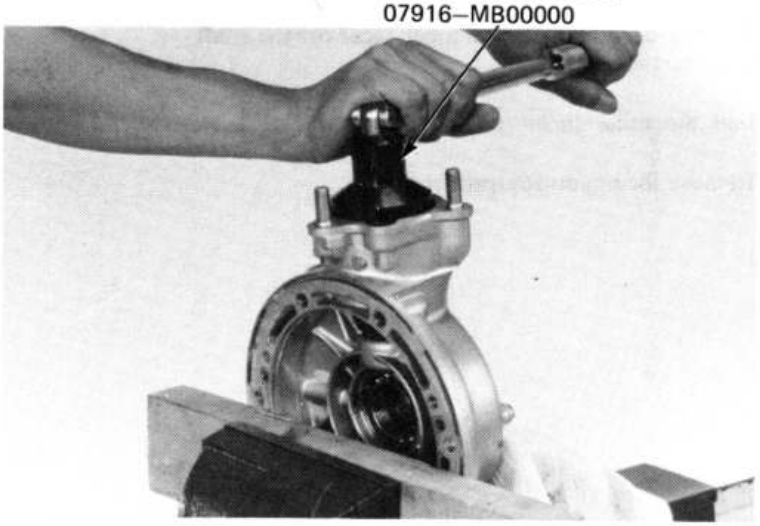
Install the pinion joint holder onto the pinion joint and remove the pinion shaft nut.
Remove the tool and pinion joint.



Remove the retainer lock tab.



Remove the pinion retainer with the pinion retainer wrench.

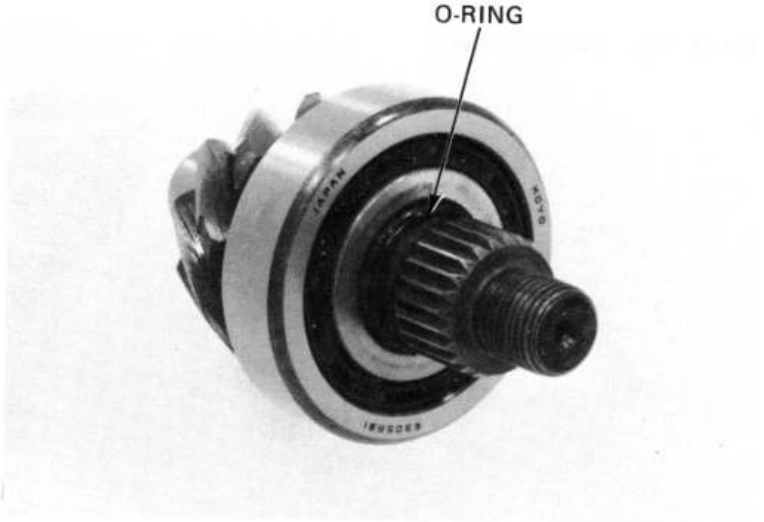


Pull the pinion assembly off with the pinion puller.



PINION BEARING REMOVAL

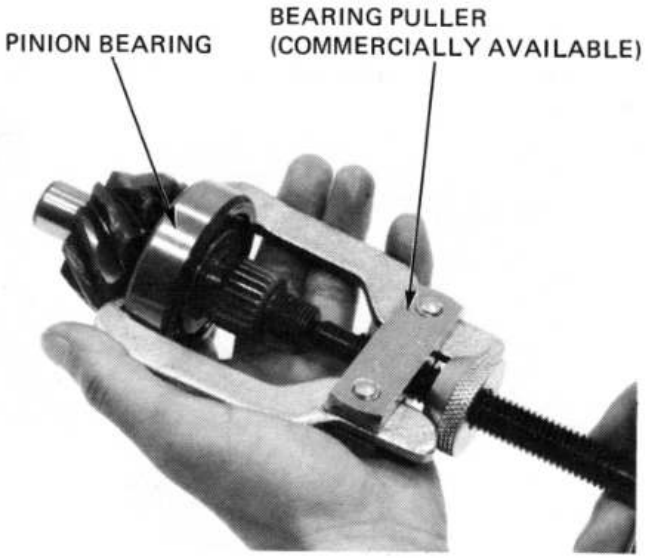
Remove the O-ring from the pinion shaft.



Pull the bearing outer and inner races off the shaft with the bearing puller.

Pull the other inner race off with the same tool.

Remove the pinion adjustment spacer.



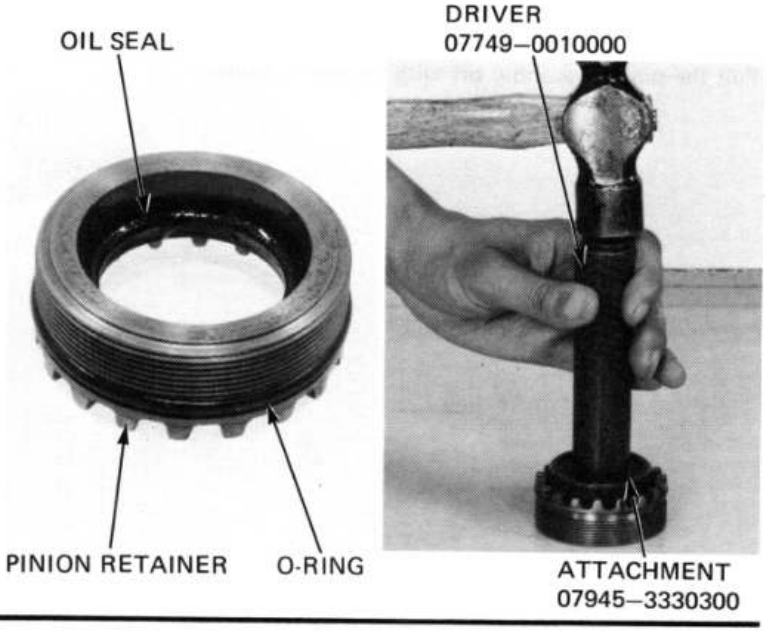
PINION RETAINER OIL SEAL REPLACEMENT

Remove the O-ring and oil seal from the pinion retainer.

Drive a new oil seal into the retainer.

Coat a new O-ring with oil and install it onto the retainer.

To install new oil seal, use driver 07945–3330300.



CASE BEARING AND OIL SEAL REPLACEMENT

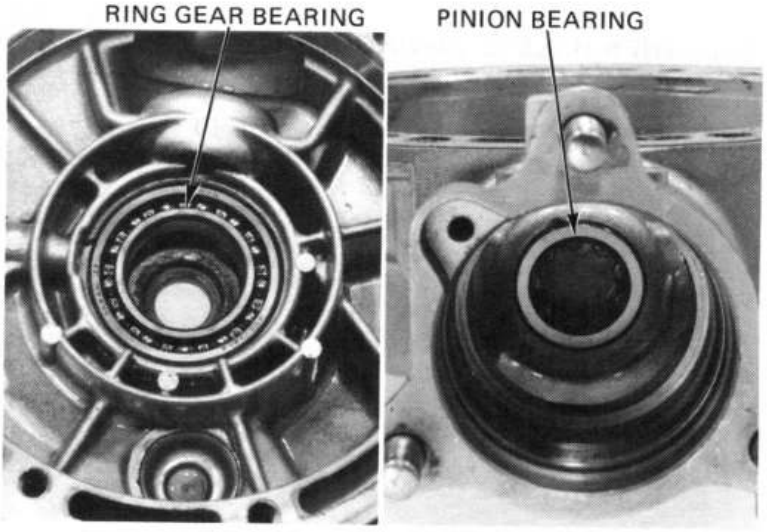
Heat the gear case 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

WARNING

Always wear gloves when handling the gear case after it has been heated.

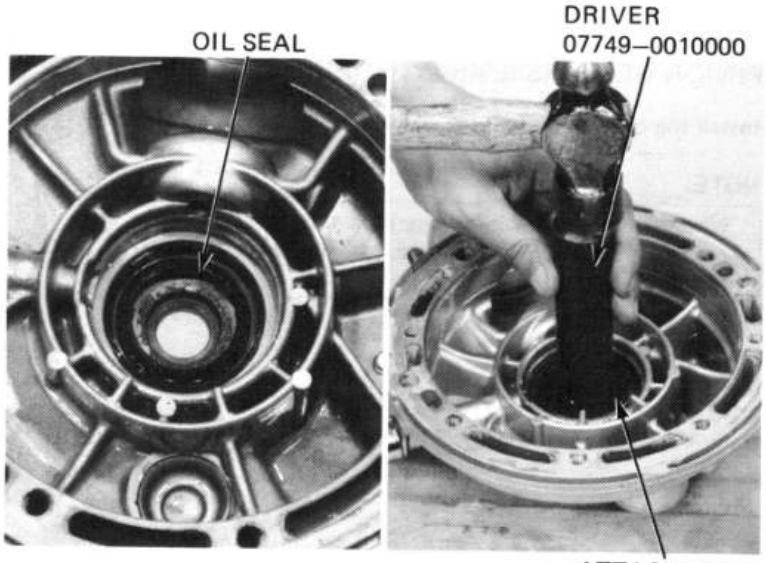
NOTE:

Use bearing remover, 35 mm, 07936–3710400 to remove ring gear case bearing.

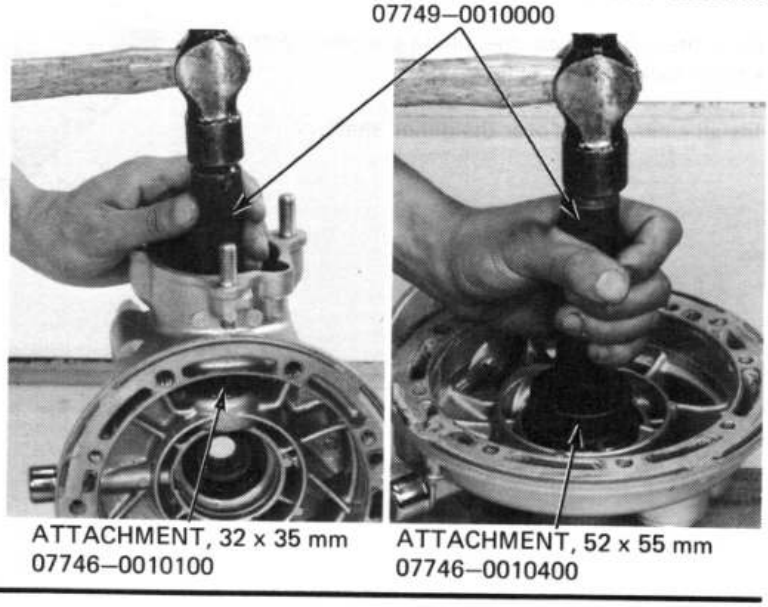


Remove the ring gear shaft oil seal.

Drive a new oil seal into the case, using the special tools.

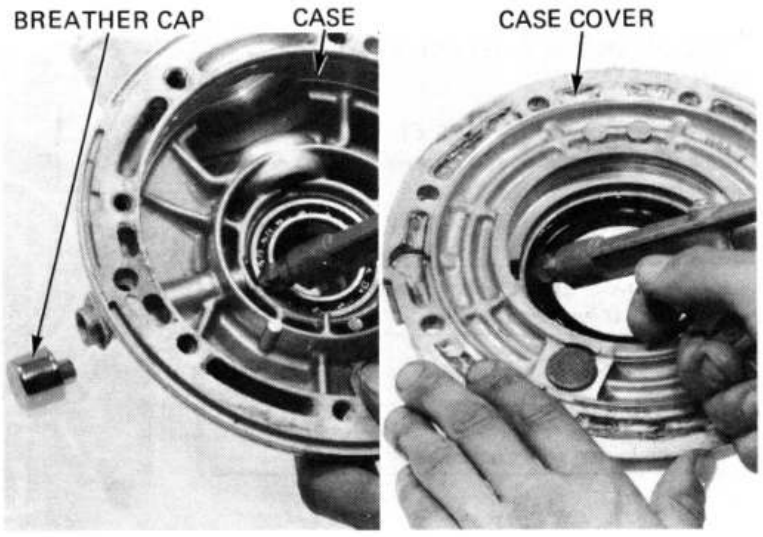


Drive new pinion and ring gear bearings into the case.



BREATHER HOLE CLEANING

Remove the breather hole cap and blow through the breather hole with compressed air.

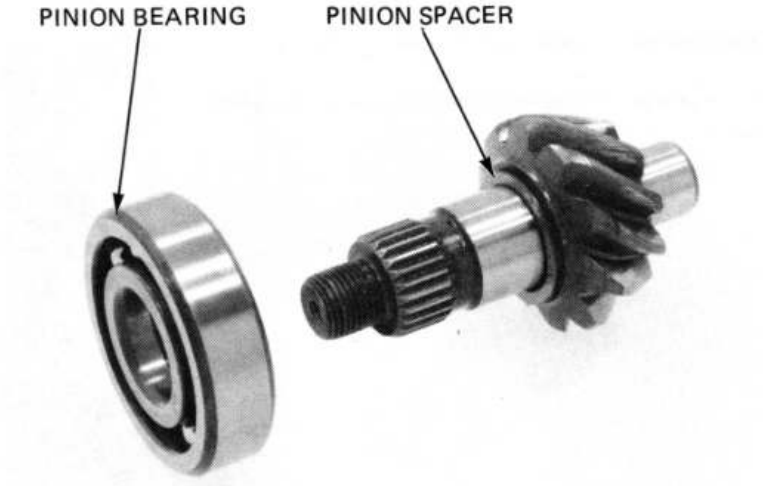


PINION GEAR ASSEMBLY

Install the original pinion gear spacer.

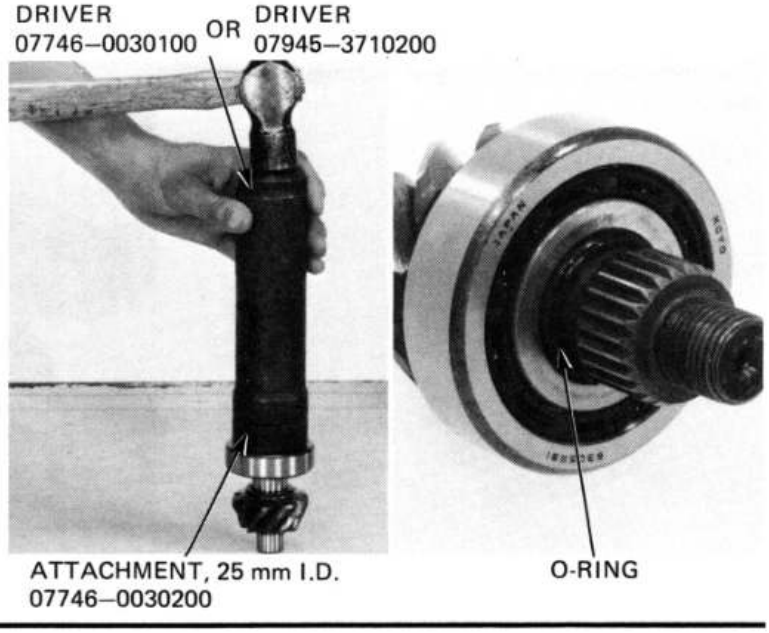
NOTE:

> When the gear set, pinion bearing and/or gear case has been replaced, use a 2.0 mm thick spacer.



Press the bearing onto the pinion gear shaft with the special tools shown.

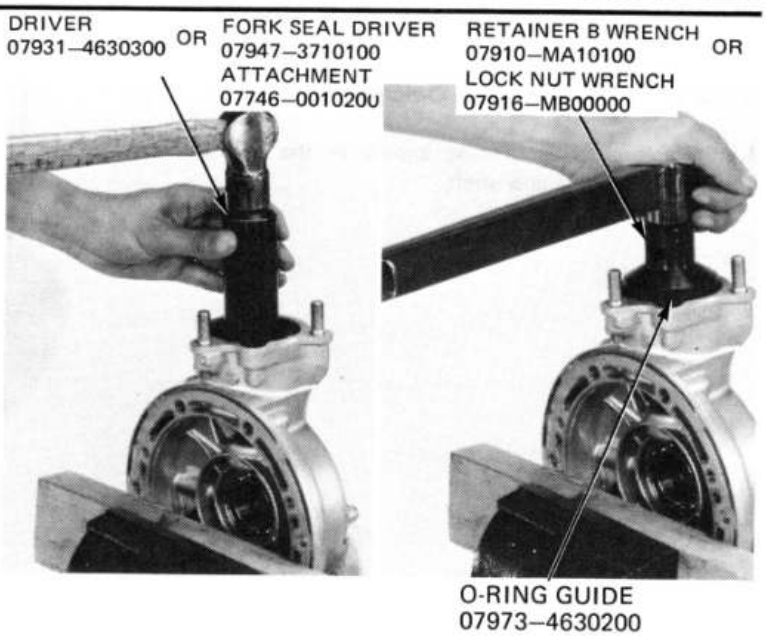
Install a new O-ring over the pinion shaft.



Place the pinion assembly into the gear housing. Drive the pinion assembly into the gear case until pinion retainer threads can engage with the case threads.
Apply gear oil to the O-ring and threads on the pinion retainer. Install the O-ring guide tool.

Screw in the pinion retainer to press the pinion bearing in place, then tighten it to the specified torque.

TORQUE:
100–120 N·m (10–12 kg-m, 72–87 ft-lb)



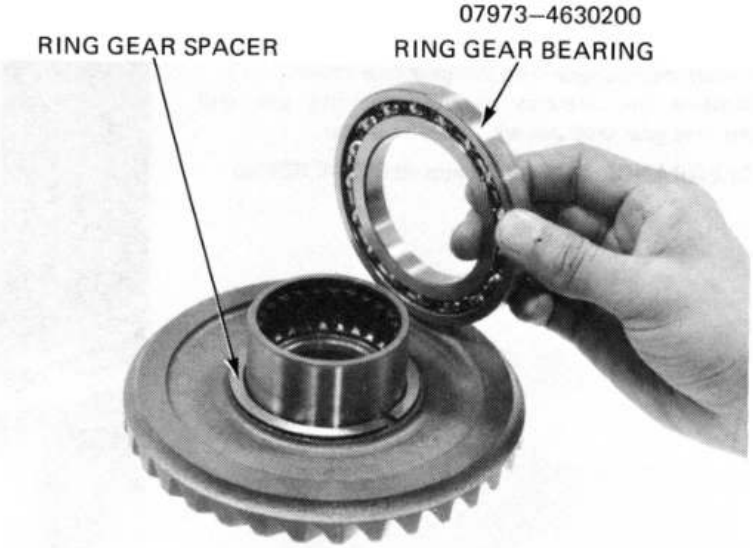
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

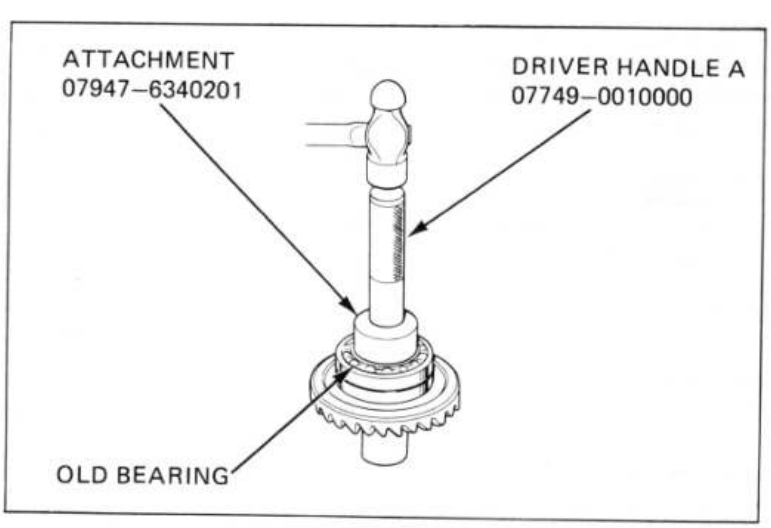
NOTE:

> If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm thick spacer.

Place the ring gear bearing over the ring gear shaft.

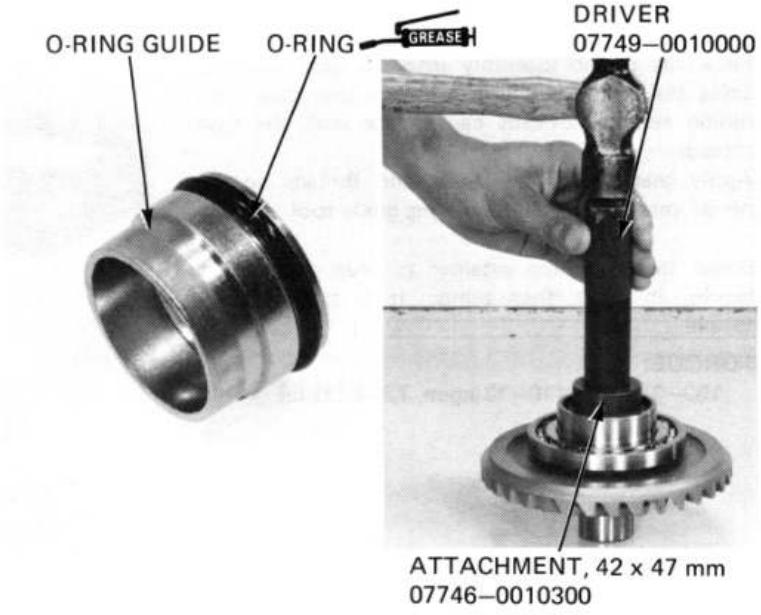


Place a new ring gear bearing on the ring gear shaft. Place the old bearing on top of it. Then, drive the new bearing onto the shaft with the old bearing and attachment. Then remove the old bearing.



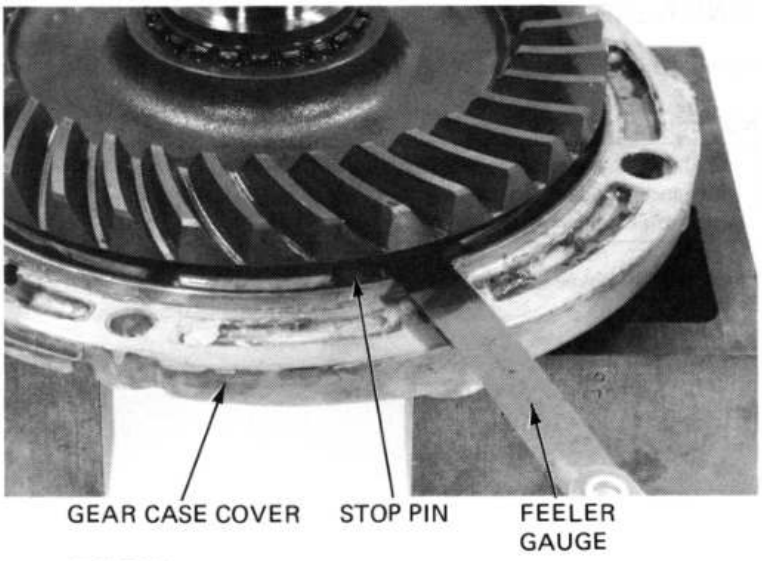
Install a new O-ring onto the O-ring guide.

Apply grease to the O-ring and drive the O-ring guide onto the ring gear shaft.



Install the ring gear into the gear case cover.
Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE: 0.30–0.60 mm (0.012–0.024 in)



Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

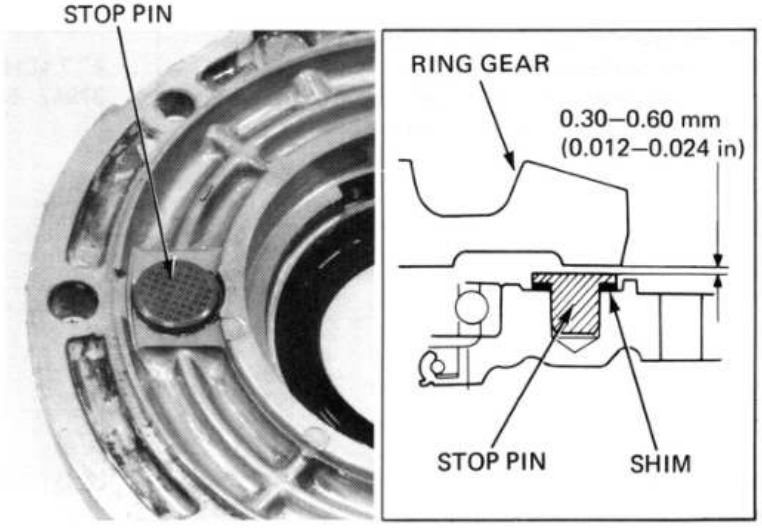
WARNING

Always wear gloves when handling the gear case after it has been heated.

Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: **A: 0.10 mm (0.004 in)**
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.

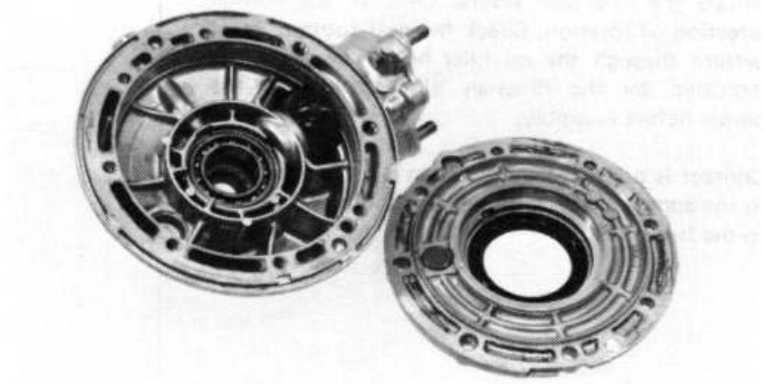


Clean all sealing material off the mating surfaces of the gear case and cover.

NOTE:

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

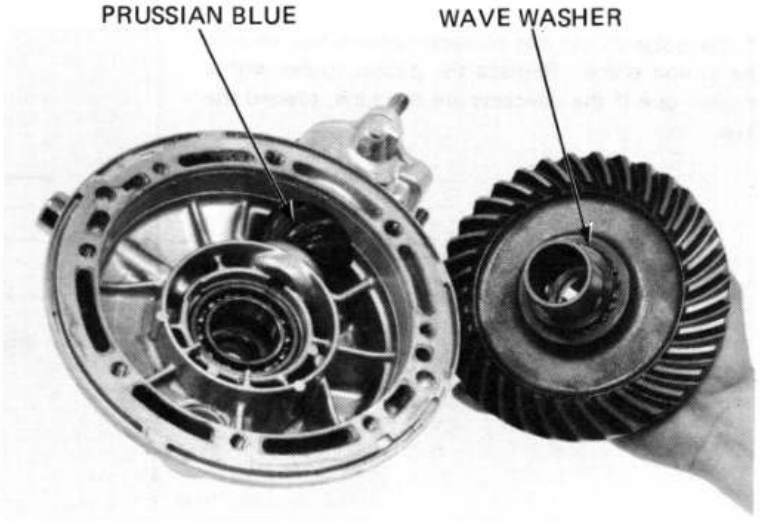
Apply liquid sealant to the mating surface of the gear case cover.



GEAR TOOTH CONTACT PATTERN CHECK

Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check. Place the wave washer and ring gear into the gear case.

Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.

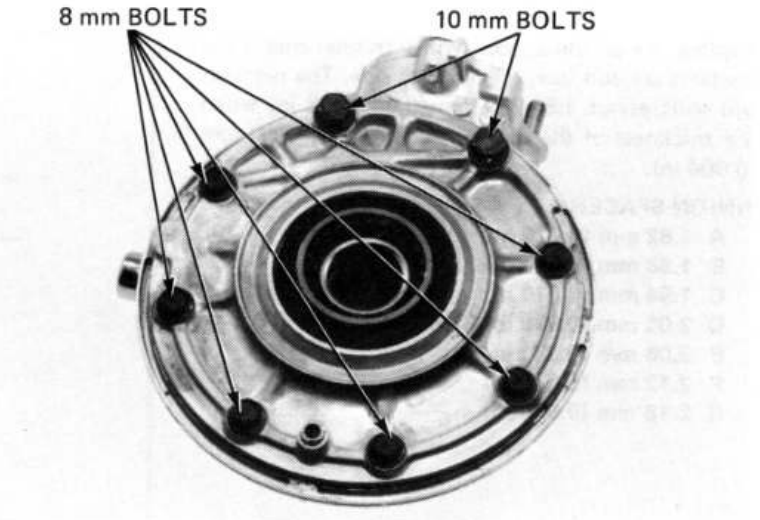


Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE: 23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)

Then tighten the 10 mm bolts.

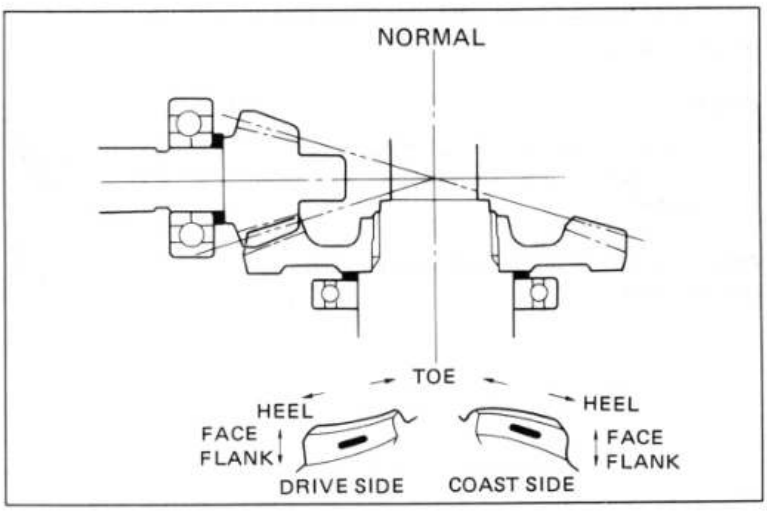
TORQUE: 40–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)



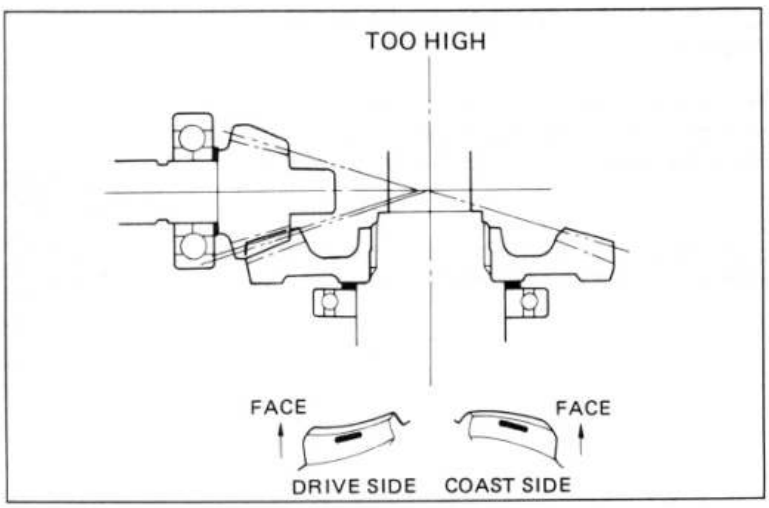
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in the normal direction of rotation. Check the gear tooth contact pattern through the oil filler hole. The pattern is indicated by the Prussian Blue applied to the pinion before assembly.

Contact is normal if the Prussian Blue is transfered to the approximate center of each tooth and slightly to the flank side.



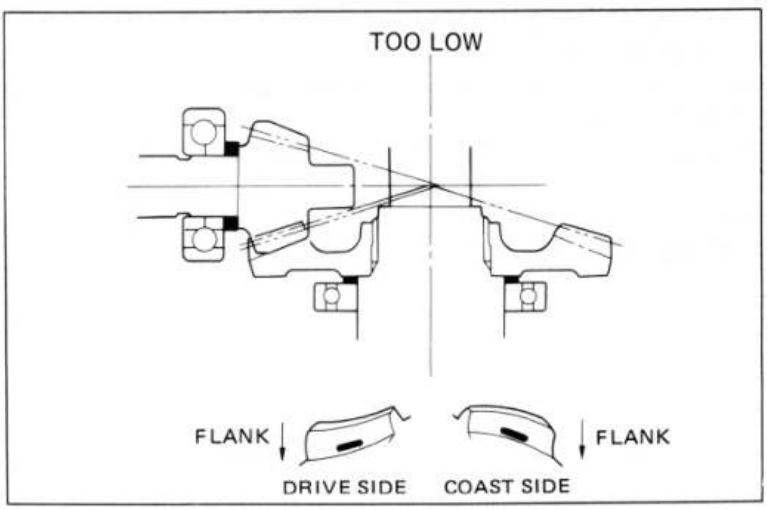
If the patterns are not correct, remove and replace the pinion spacer. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.



Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side. The patterns will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACER:

- **A 1.82 mm (0.072 in)**
- **B 1.88 mm (0.074 in)**
- **C 1.94 mm (0.076 in)**
- **D 2.00 mm (0.079 in) Standard**
- **E 2.06 mm (0.081 in)**
- **F 2.12 mm (0.084 in)**
- **G 2.18 mm (0.086 in)**

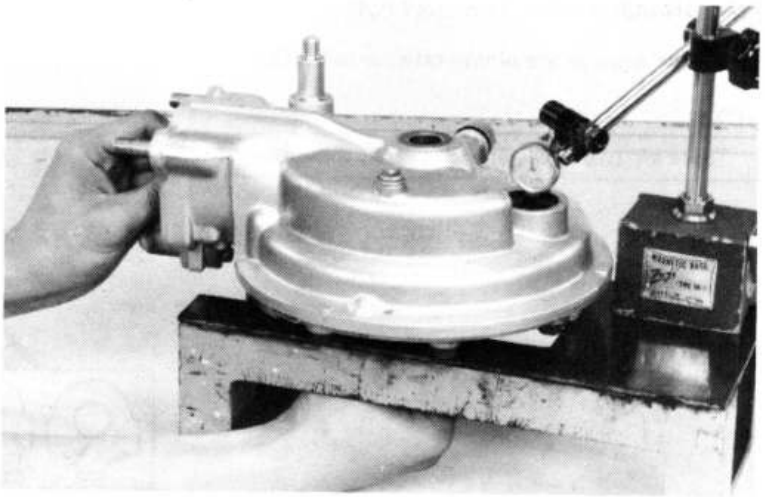


BACKLASH INSPECTION

Remove the oil filler cap.

Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Hold the pinion gear spline by hand. Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

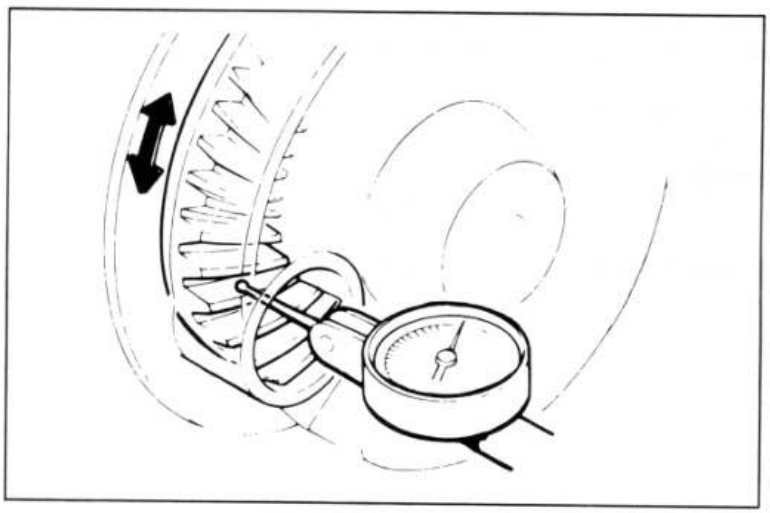
STANDARD: 0.08–0.18 mm (0.003–0.007 in)
SERVICE LIMIT: 0.30 mm (0.02 in)



Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

DIFFERENCE OF MEASUREMENT
SERVICE LIMIT: 0.10 mm (0.004 in)



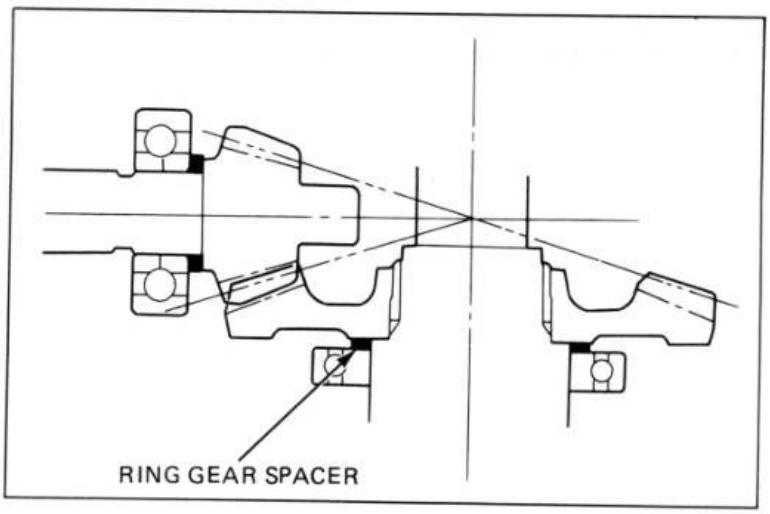
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is too small, replace the ring gear spacer with a thinner one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER:

- **A 1.82 mm (0.072 in)**
- **B 1.88 mm (0.074 in)**
- **C 1.94 mm (0.076 in)**
- **D 2.00 mm (0.079 in) Standard**
- **E 2.06 mm (0.081 in)**
- **F 2.12 mm (0.084 in)**
- **G 2.18 mm (0.086 in)**
- **H 2.24 mm (0.088 in)**
- **I 2.30 mm (0.091 in)**

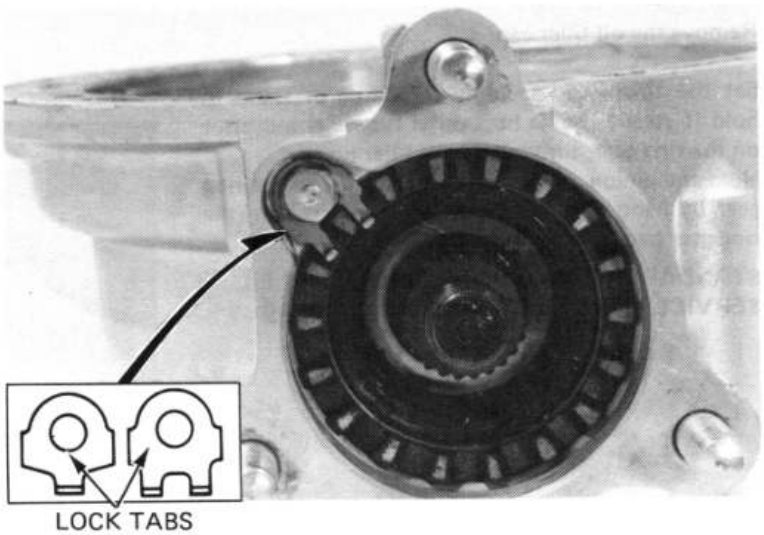


PINION JOINT INSTALLATION

Install the appropriate pinion retainer lock tab.

NOTE:

There are two types of lock tabs as shown.

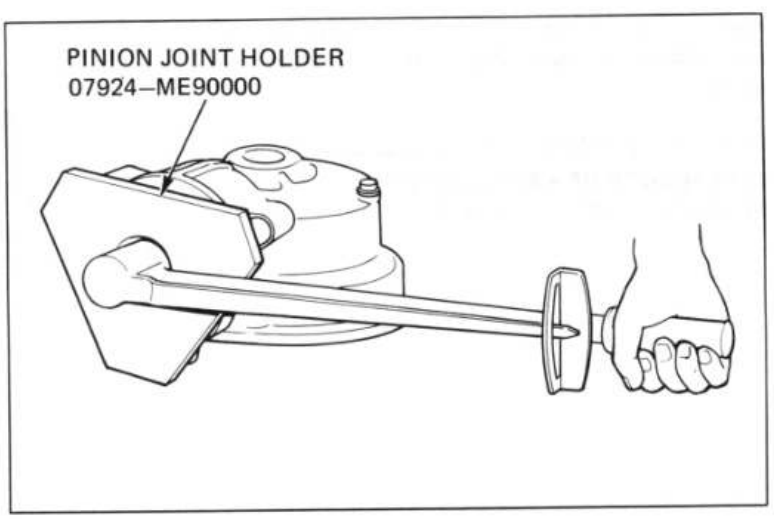


Apply gear oil to the oil seal lip contact surface of the pinion joint and install the pinion joint.

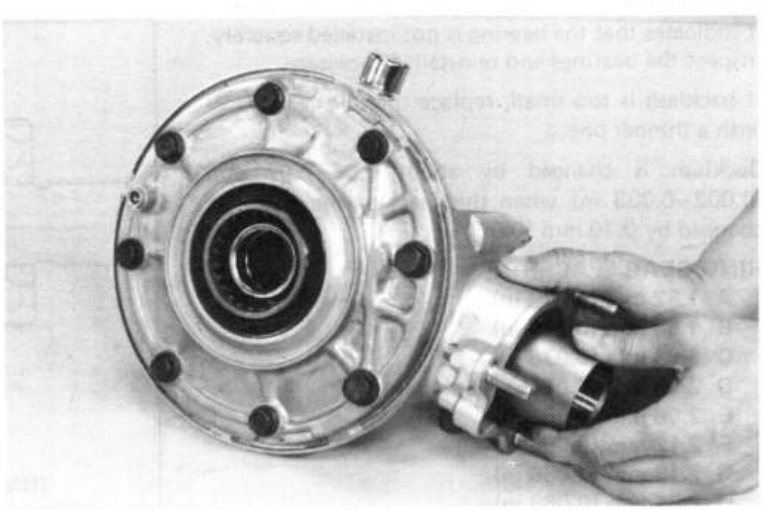
Install the pinion joint holder tool and tighten the pinion nut.

TORQUE:
100–120 N·m (10–12 kg-m, 72–87 ft-lb)

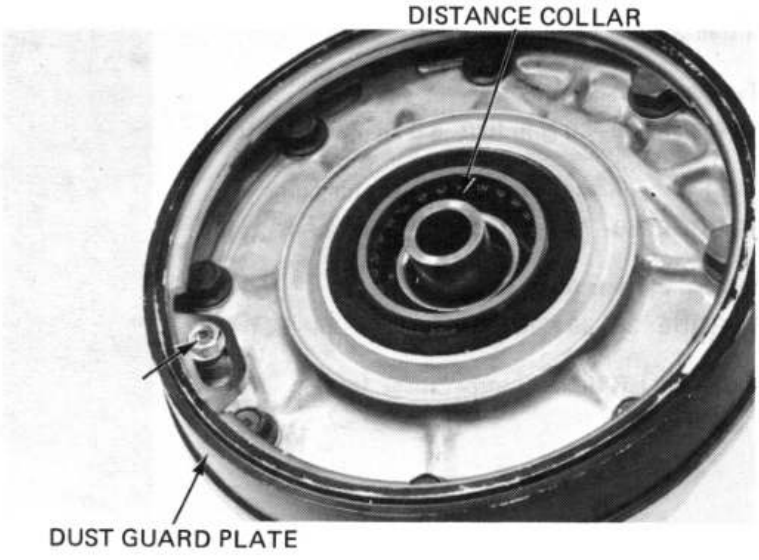
Remove the pinion joint holder tool.



Make sure that the gear assembly rotates smoothly without binding by turning the pinion joint.



Install the dust guard plate and torque the bolt. Install the distance collar.



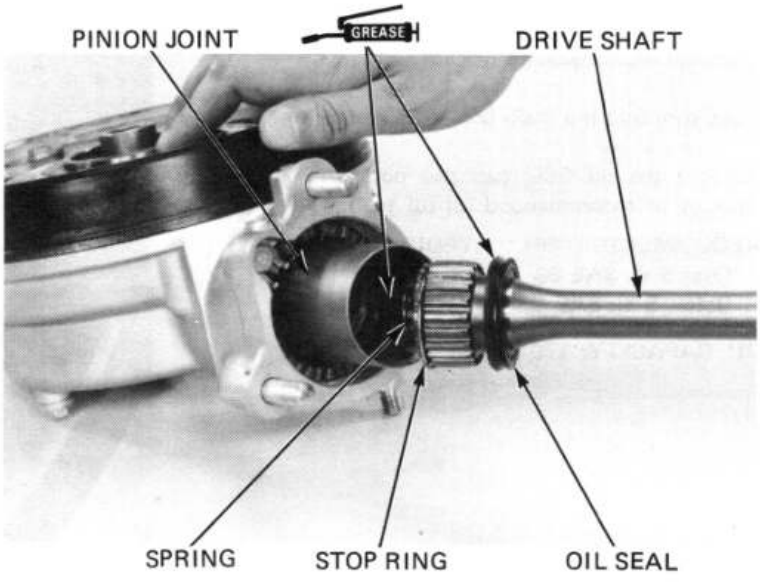
FINAL DRIVE INSTALLATION

Apply grease to the pinion joint splines and drive shaft oil seal.

Insert the drive shaft into the pinion joint until the stop ring seats in the pinion joint spline grooves.

NOTE:

- Make sure that the stop ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.



Insert the drive shaft assembly into the swingarm and align its splines with the universal joint.

Attach the gear case onto the swingarm loosely.

NOTE:

To ease axle installation, do not tighten the gear case nuts until after the axle is installed.



Install the rear wheel (page 16-7).

Tighten the axle nut.

TORQUE: 60–80 N·m (6.0–8.0 kg-m, 44–58 ft-lb)

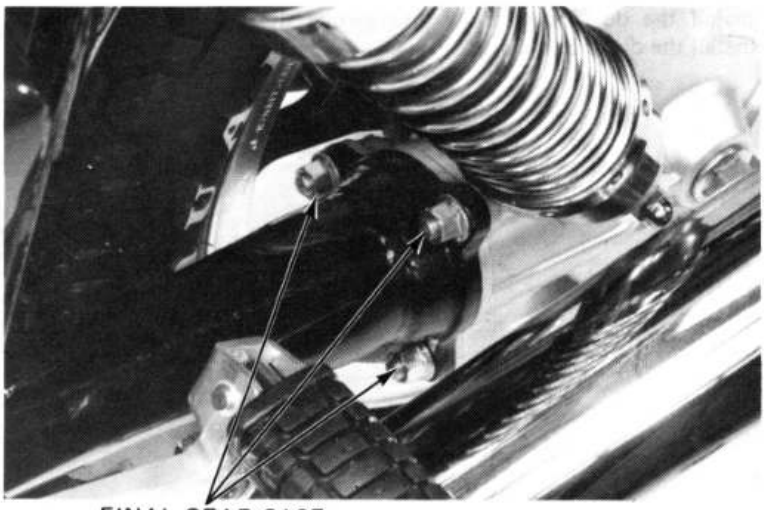
Tighten the three final gear case attaching nuts.

TORQUE: 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)

Tighten the axle pinch bolt.

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

Install the left shock absorber (page 16-12).



FINAL GEAR CASE
ATTACHING NUTS

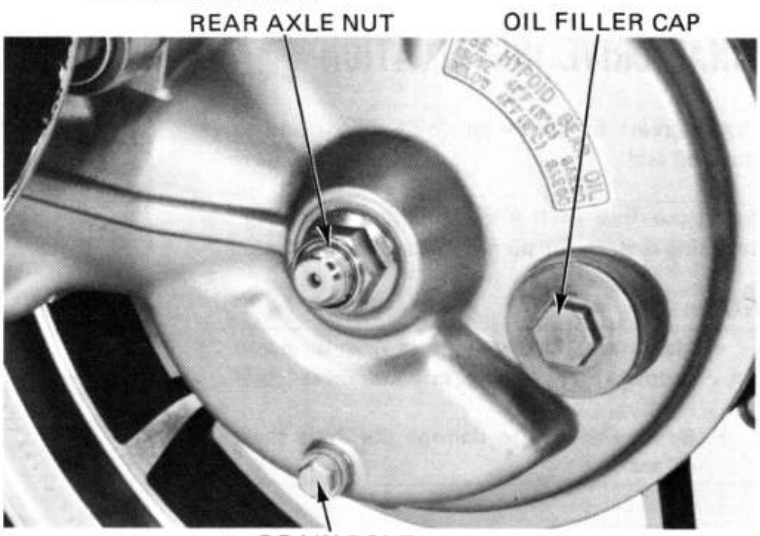
Place the motorcycle on its center stand.

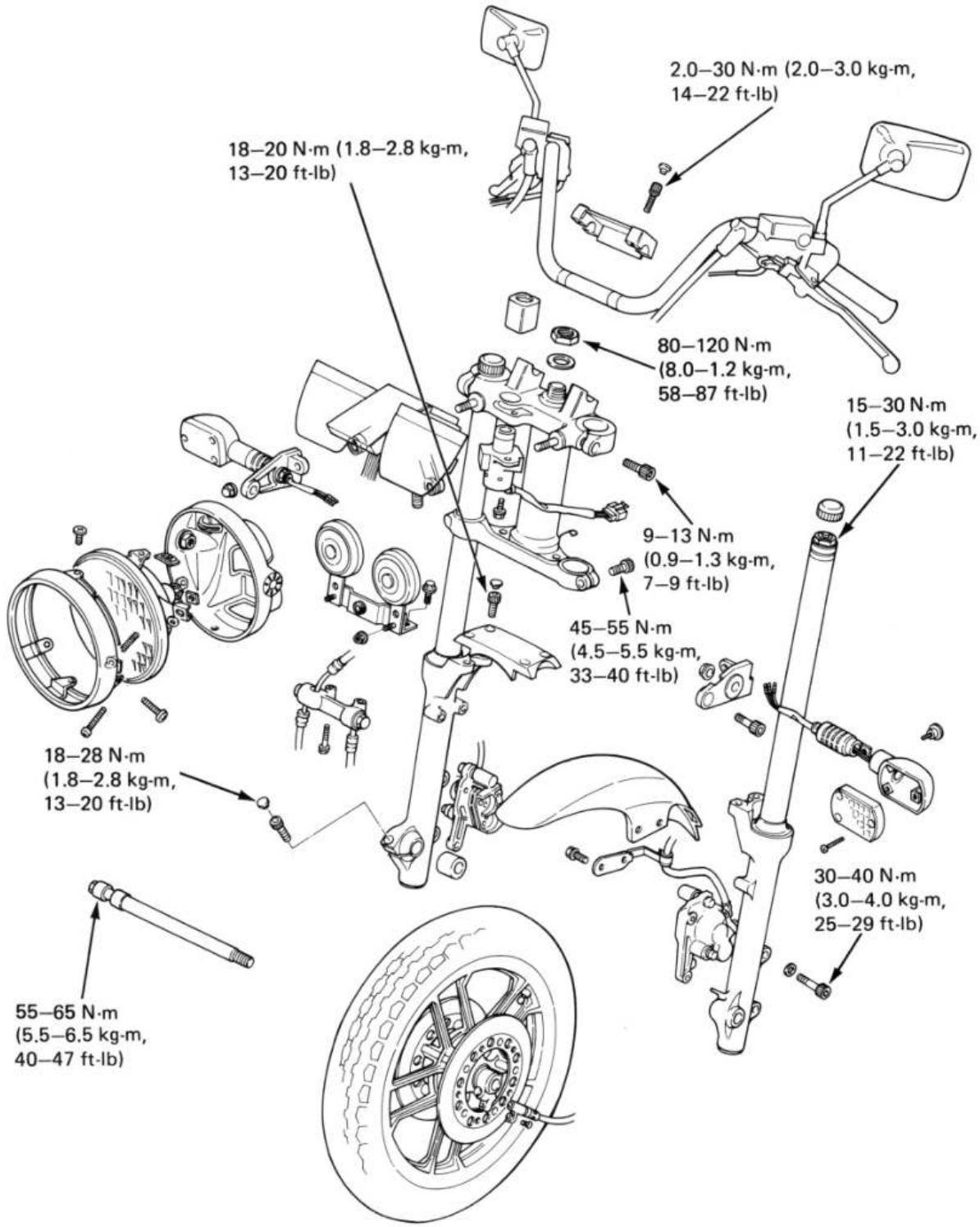
Make sure that the drain bolt is tightened.

Remove the oil filler cap and pour the specified amount of recommended oil up to the filler neck.

RECOMMENDED OIL: HYPOID GEAR OIL
Over 5°C: SAE 90
Below 5°C: SAE 80

OIL CAPACITY: 170 cc (5.8 oz)




2.0–30 N·m (2.0–3.0 kg-m,
14–22 ft-lb)
18–20 N·m (1.8–2.8 kg-m,
13–20 ft-lb)
80–120 N·m
(8.0–1.2 kg-m,
58–87 ft-lb)
15–30 N·m
(1.5–3.0 kg-m,
11–22 ft-lb)
9–13 N·m
(0.9–1.3 kg-m,
7–9 ft-lb)
45–55 N·m
(4.5–5.5 kg-m,
33–40 ft-lb)
18–28 N·m
(1.8–2.8 kg-m,
13–20 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
25–29 ft-lb)
55–65 N·m
(5.5–6.5 kg-m,
40–47 ft-lb)

15. FRONT WHEEL/SUSPENSION

SERVICE INFORMATION	15–1	HANDLEBARS	15–9
TROUBLESHOOTING	15–2	FRONT WHEEL	15–13
HEADLIGHT	15–3	FRONT FORKS	15–20
IGNITION SWITCH	15–4	STEERING STEM	15–28
INSTRUMENTS	15–6		

SERVICE INFORMATION

GENERAL

- A jack or other support is required to support the motorcycle.
- Never ride on the rim.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle shaft runout		—	0.2 mm (0.01 in)
Front wheel rim runout	Radial	0.3 mm (0.01 in) max.	2.0 mm (0.08 in)
	Axial	0.3 mm (0.01 in) max.	2.0 mm (0.08 in)
Wheel bearing play		—	0.03 mm (0.001 in)
Fork spring free length		465.6 mm (18.33 in)	456.3 mm (18.0 in)
Fork tube runout		—	0.2 mm (0.01 in)
Front fork fluid capacity		467.5–472.5 cc (15.82–15.99 ozs)	———
Front fork air pressure		0–6 psi (0–40 kPa, 0–0.4 kg/cm^2)	———

TORQUE VALUES

Handlebar upper holder	20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Caliper mounting bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Front axle	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Axle pinch bolt	18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)
Front fork socket bolt	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
Fork tube cap	15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb)
Steering stem nut	80–120 N·m (8.0–12.0 kg-m, 58–87 lb-ft)
Brake disc	35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)
Front fork top pinch bolt	9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)
Front fork bottom pinch bolt	45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)
Front fork brace socket bolt	18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

TOOLS

Special

Hex. wrench, 6 mm	07917–3230000 or commercially available
Snap ring pliers	07914–3230001 or commercially available
Fork seal driver	07947–4630100
Race remover/installer	07946–3710400
Steering stem driver	07946–MB00000 or 07946–3710100 and 07964–MB00200

Common

Driver	07749–0010000
Pilot, 15 mm	07746–0010300
Lock nut wrench, 30 x 32 mm	07716–0020400 or commercially available

Common

Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 15 mm	07746–0040300
Lock nut wrench, 30 x 32 mm	07716–0020400 or commercially available
Extension bar	07716–0020500 or commercially available
Wheel bearing remover expander	07746–0050100 or commercially available
Wheel bearing remover collet, 15 mm	07746–0050400 or commercially available
Pin spanner	07702–0010000

TROUBLESHOOTING

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

Steers to one side or does not track straight
1. Unevenly adjusted right and left shock absorbers.
2. Bent front forks.
3. Bent front axle; wheel installed incorrectly.

Front wheel wobbling
1. Bent rim.
2. Worn front wheel bearings.
3. Faulty tire.
4. Axle nut tightened properly.

Soft suspension
1. Weak for springs.
2. Insufficient fluid in front forks.
3. Front fork air pressure incorrect.

Hard suspension
1. Incorrect fluid weight in front forks.
2. Front fork air pressure incorrect.
3. Bent fork tubes.
4. Clogged fluid passage.

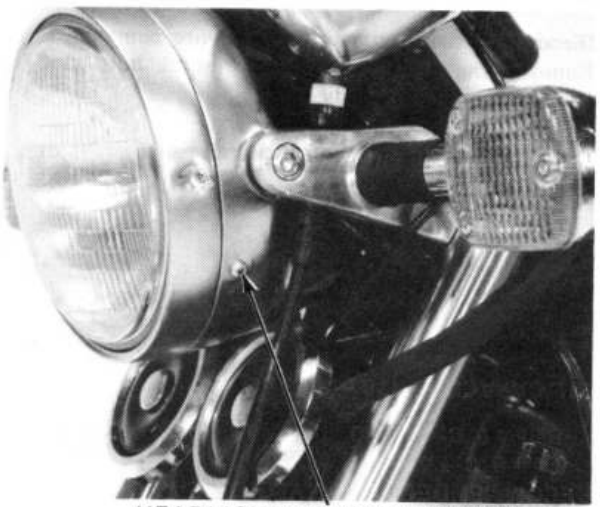
Front suspension noise
1. Worn slider or guide bushings.
2. Insufficient fluid in forks.
3. Loose front fork fasteners.
4. Lack of grease in speedometer gearbox.

HEADLIGHT

REMOVAL

Remove the two headlight mounting screws.

Disconnect the wire coupler and remove the headlight.

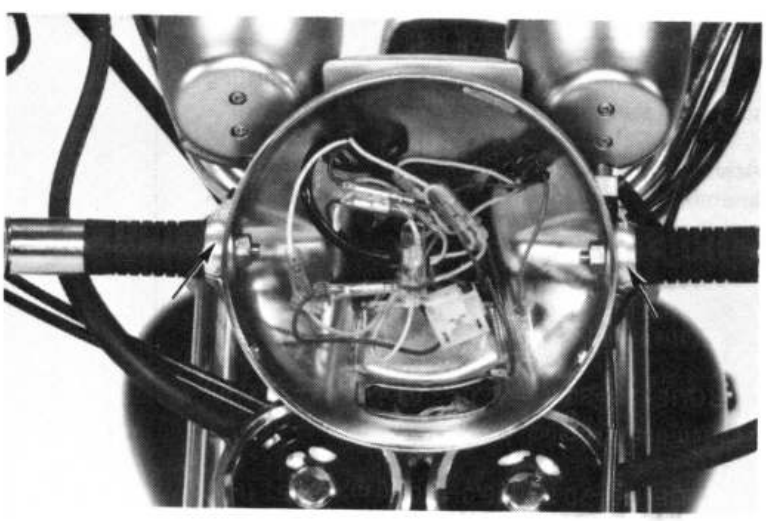


HEADLIGHT MOUNTING SCREW

CASE REMOVAL/INSTALLATION

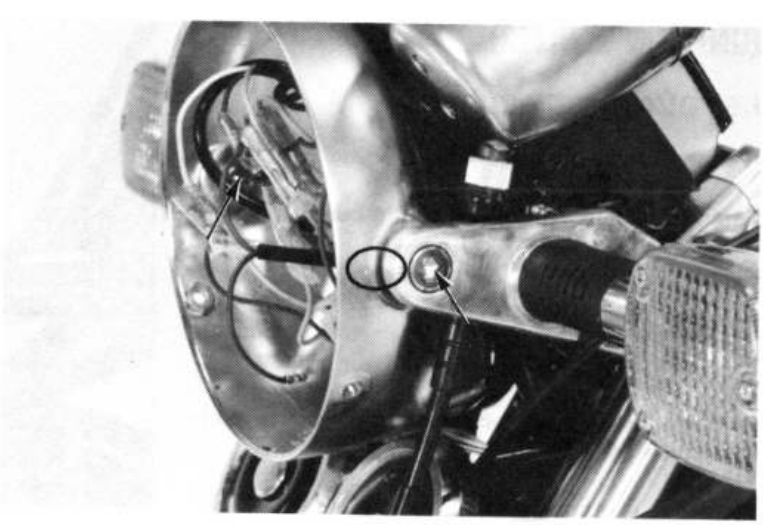
Disconnect the wire connectors in the headlight case.

Remove the headlight case mounts and headlight case.



Install the headlight case in the reverse order of removal.

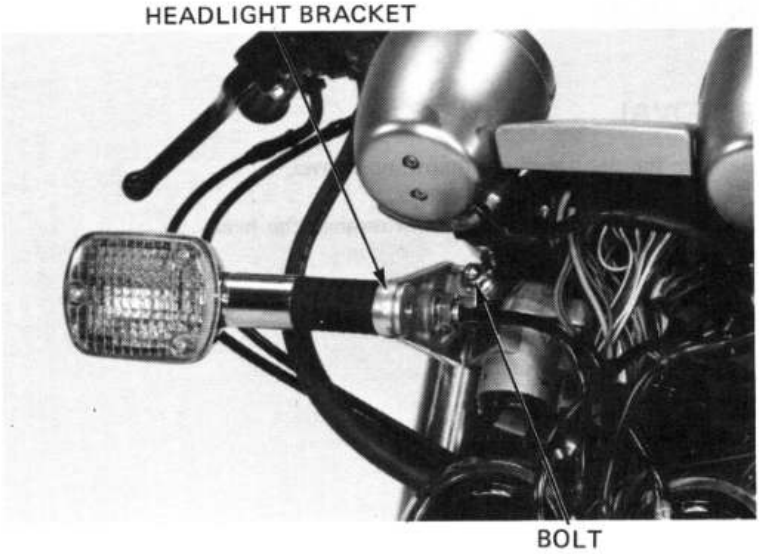
Align the index mark on the headlight case with index mark on the headlight bracket.



BRACKET REMOVAL/INSTALLATION

Disconnect the front turn signal wire connectors. Remove the headlight bracket mount bolts and bracket/turn signal assemblies.

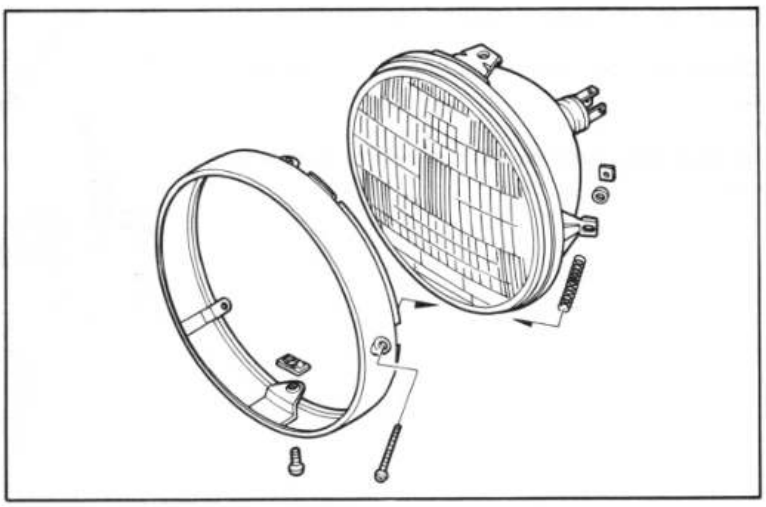
Install the headlight bracket in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Remove the retaining screws, horizontal adjusting screw and sealed beam unit from the rim.

Assemble the headlight in the reverse order of disassembly. After installation, adjust the headlight aim (page 3-16).



IGNITION SWITCH

REMOVAL/INSTALLATION

Remove the headlight and headlight case.

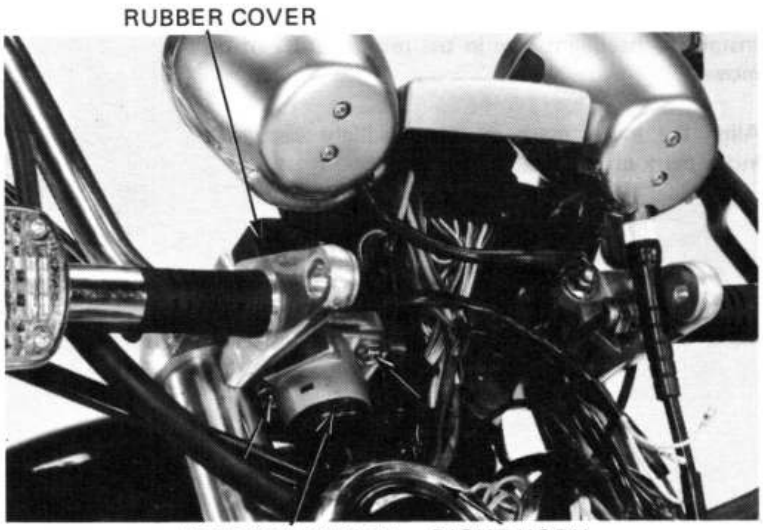
Remove the bolt attaching the right horn and horn.

Remove the ignition switch rubber cover.

Remove the instrument lower cover and disconnect the ignition switch wire couplers.

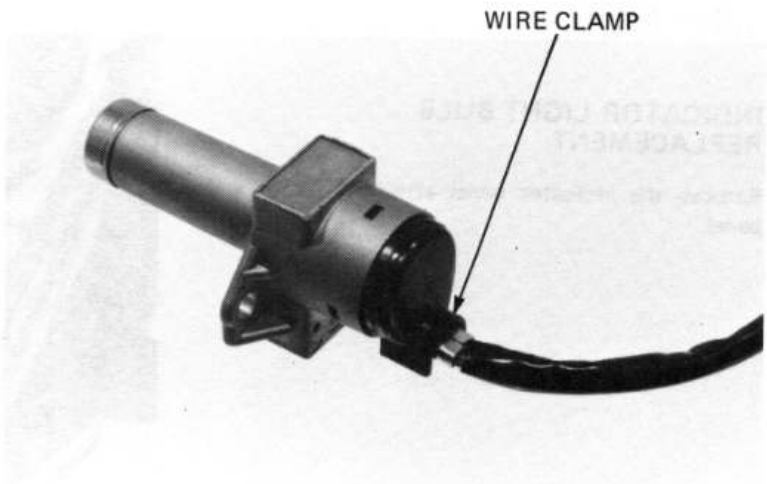
Remove the ignition switch mounting bolts, and ignition switch.

Install the ignition switch in the reverse order of removal.

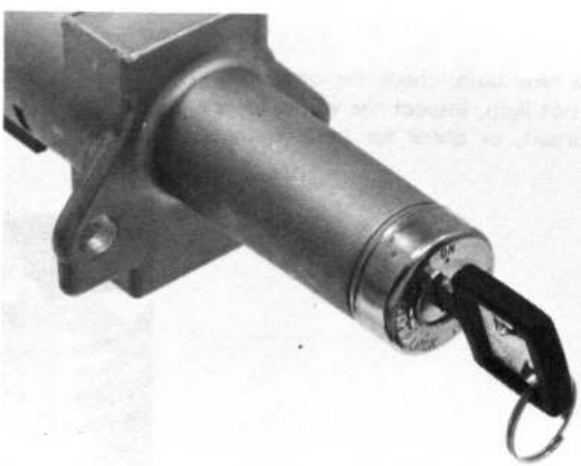


DISASSEMBLY/ASSEMBLY

Open the wire clamp.

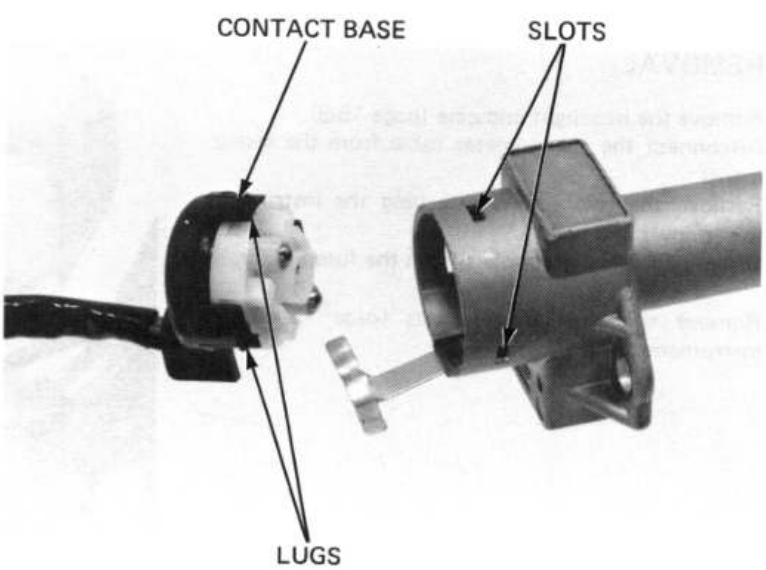


Insert the ignition key and turn it to between the ON and OFF detent positions.



Push in the lugs in the slots and pull the contact base from the switch.

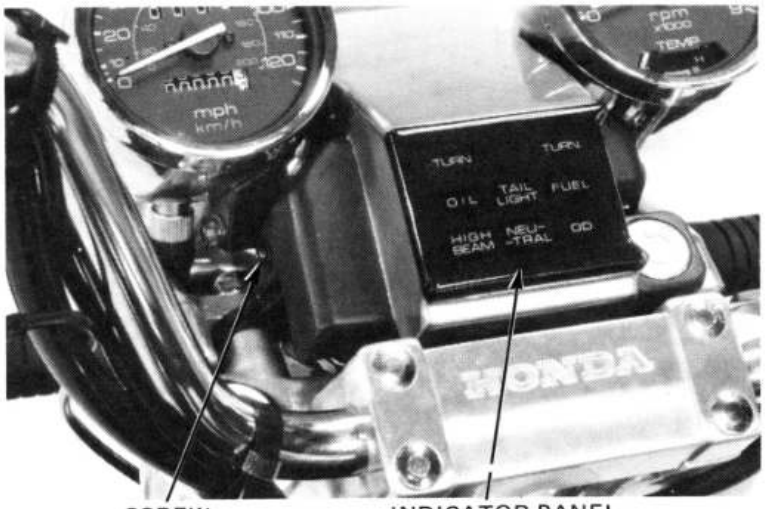
Assemble the ignition switch in the reverse order of disassembly.



INSTRUMENTS

INDICATOR LIGHT BULB REPLACEMENT

Remove the indicator panel attaching screws and panel.



Replace the bulb.

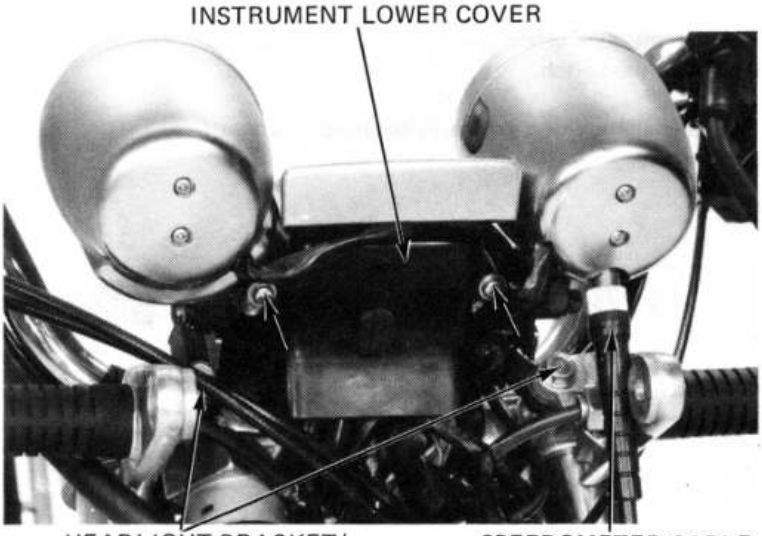
After installing a new bulb, check for continuity. If the bulb does not light, inspect the wiring for an open or short circuit, or check for loose connections.



REMOVAL

Remove the headlight and case (page 15-3).
Disconnect the speedometer cable from the instruments.
Remove the two screws attaching the instrument lower cover and cover.
Disconnect all wire couplers from the fuse holder.

Remove the headlight brackets (page 15-4) and instruments.

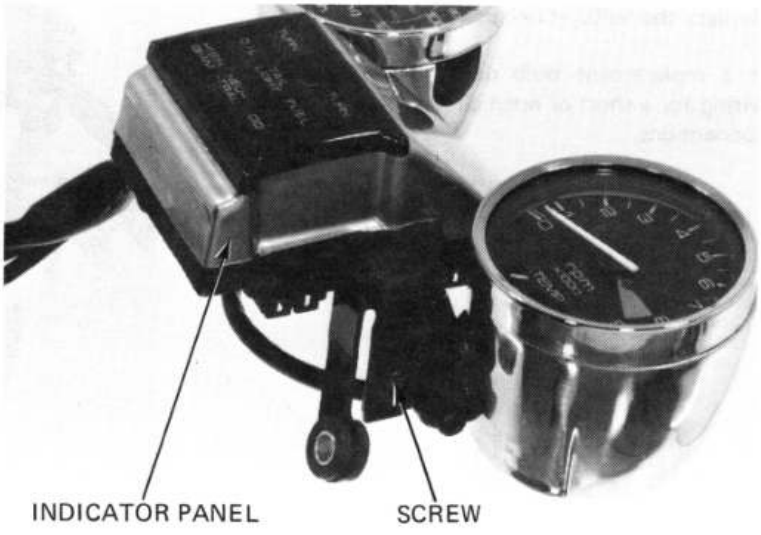


DISASSEMBLY

CAUTION:

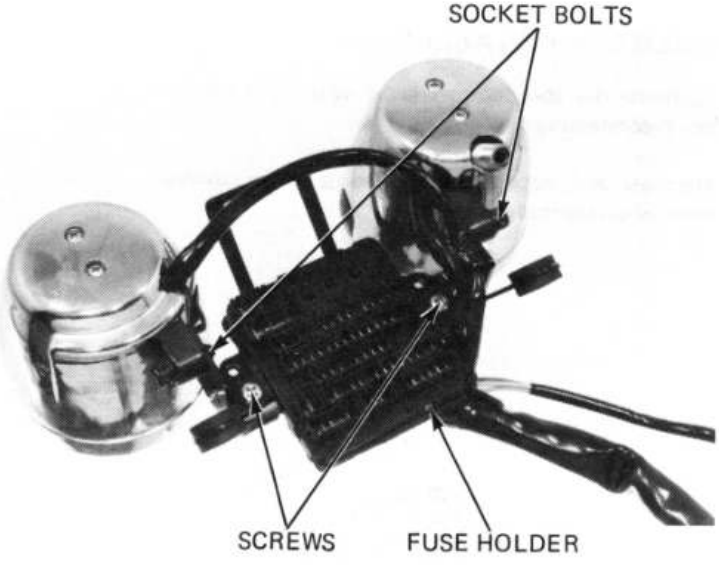
> *Do not leave the instruments upside down or damping fluid will leak onto the inside of the lens.*

Remove the screws attaching the indicator panel and panel.

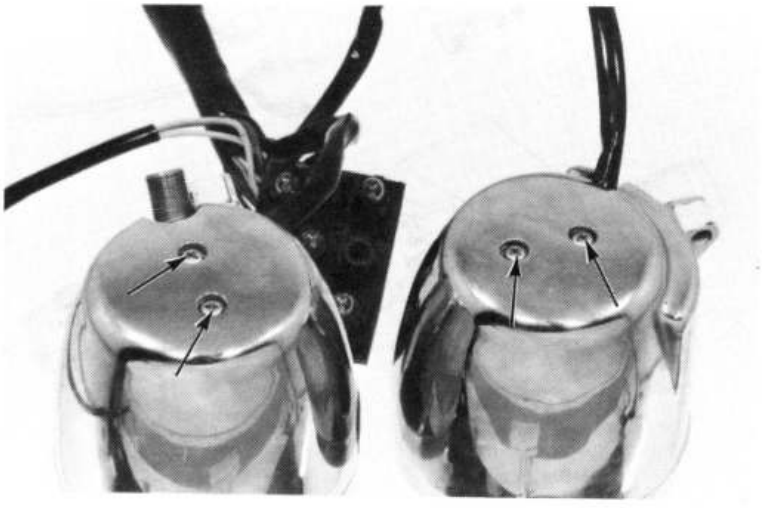


Remove the screws attaching the fuse holder and fuse holder from the instruments.

Remove the socket bolts attaching the instruments to the bracket.

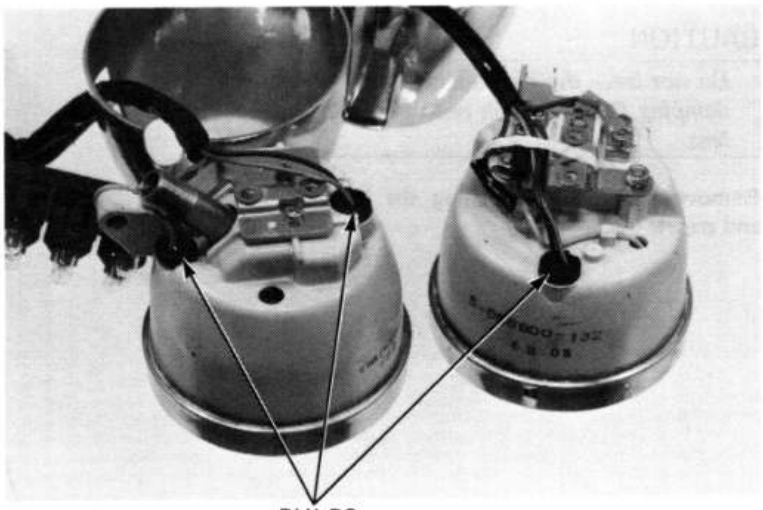


Remove the meter lower cover screws.



Replace the bulbs, if necessary.

If a replacement bulb does not light, check the wiring for a short or open circuit, or check for loose connections.

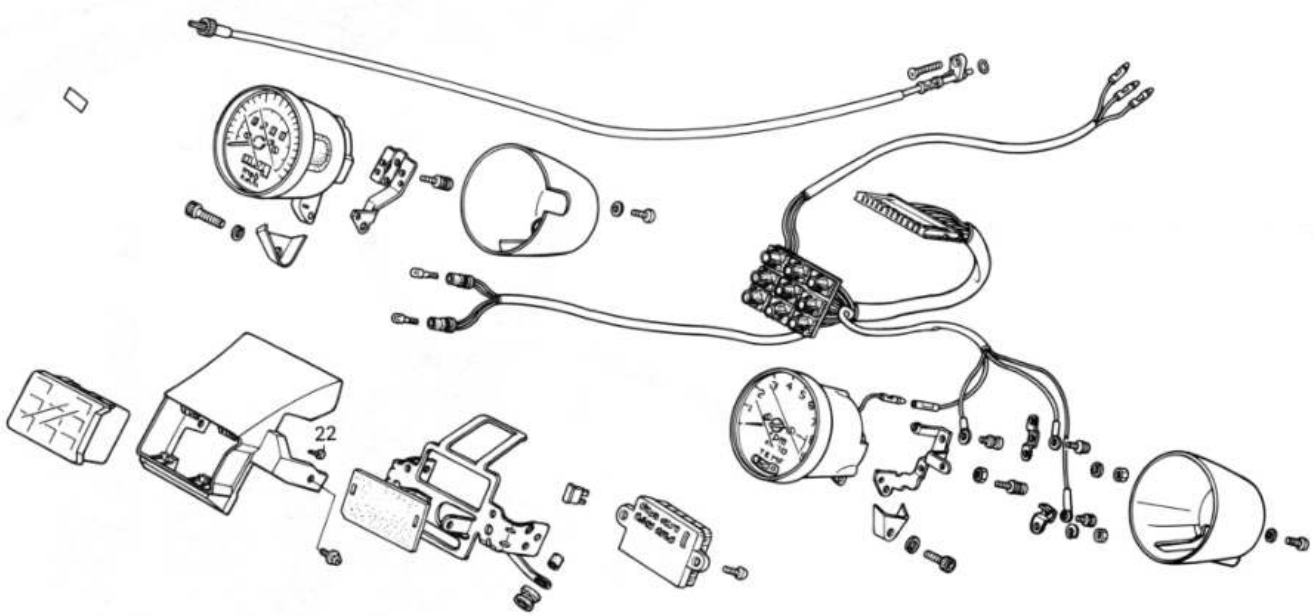


BULBS

ASSEMBLY/INSTALLATION

Lubricate the speedometer cable with light oil before reconnecting.

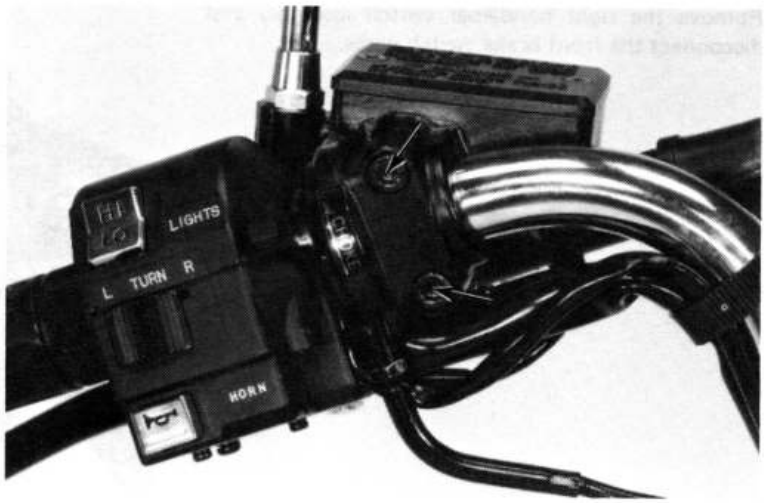
Assemble and install the instruments in the reverse order of disassembly and removal.



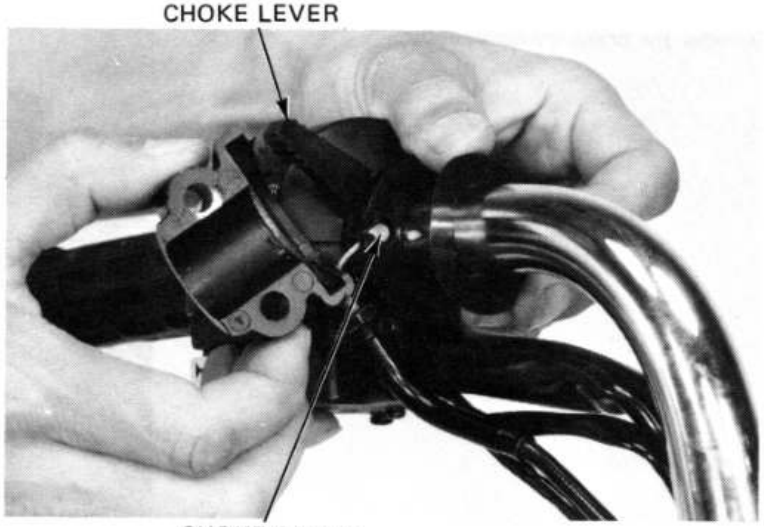
HANDLEBARS

REMOVAL

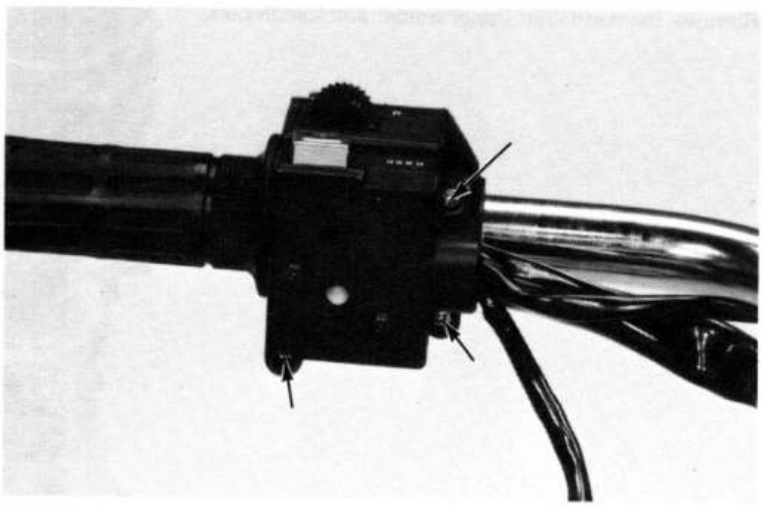
Disconnect the clutch switch wires and remove the clutch master cylinder.



Disconnect the choke cable from the choke lever.



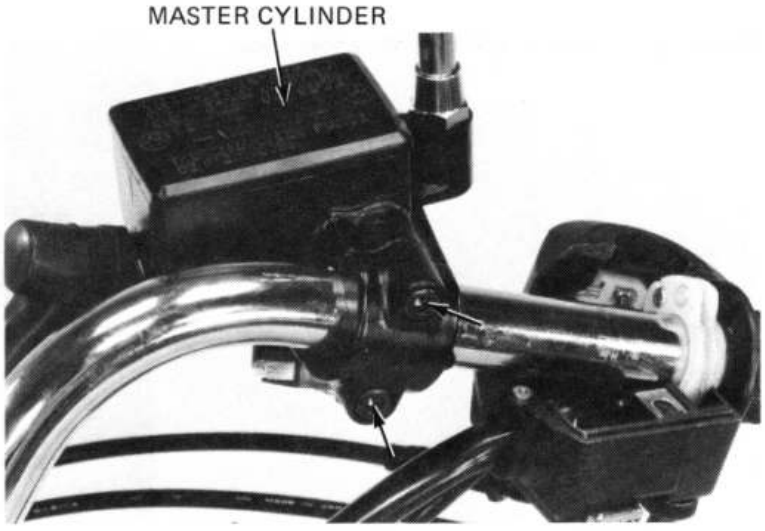
Remove the left handlebar switch assembly.



Remove the right handlebar switch assembly and disconnect the front brake switch wires.



Remove the brake master cylinder.

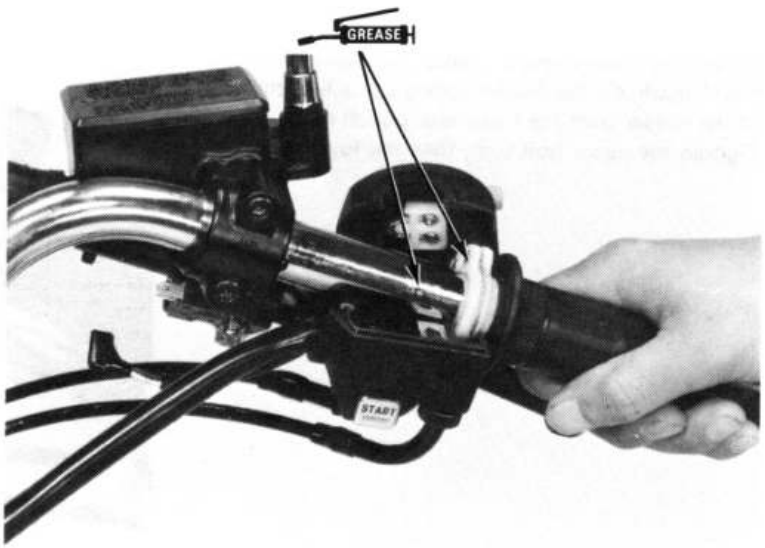


Remove the handlebar upper holder and handlebars.

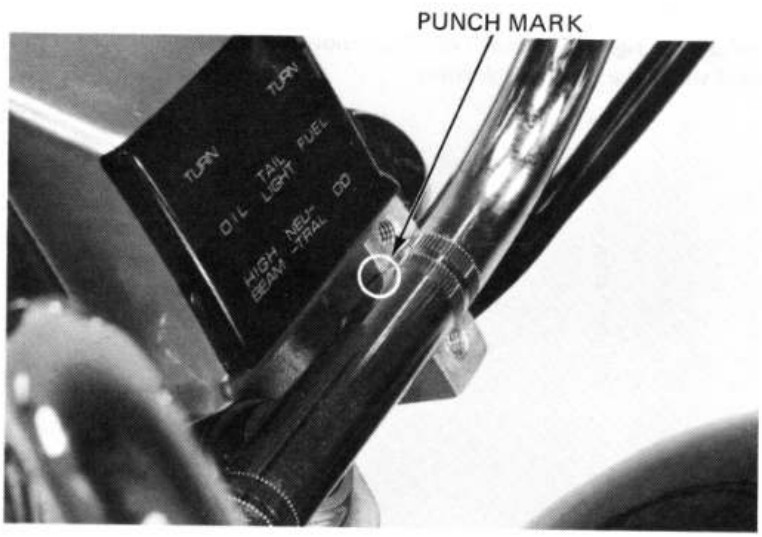


INSTALLATION

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

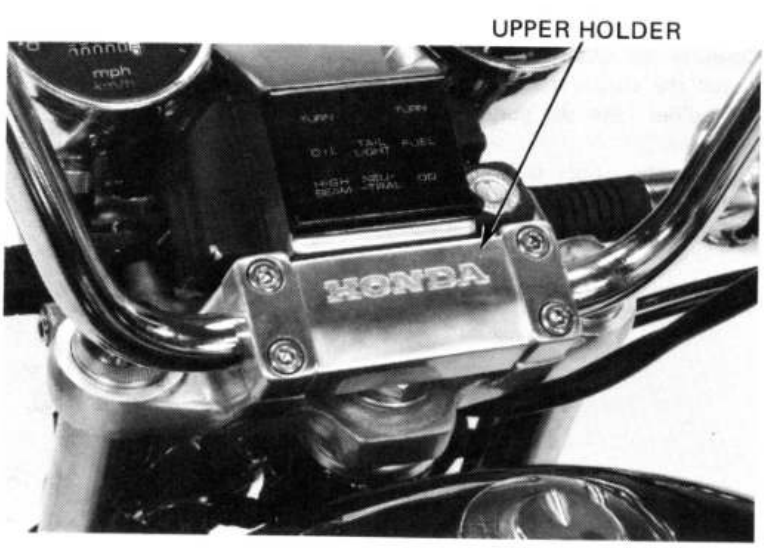


Place the handlebar onto the lower holder aligning the punch mark with the upper face of the lower holder.

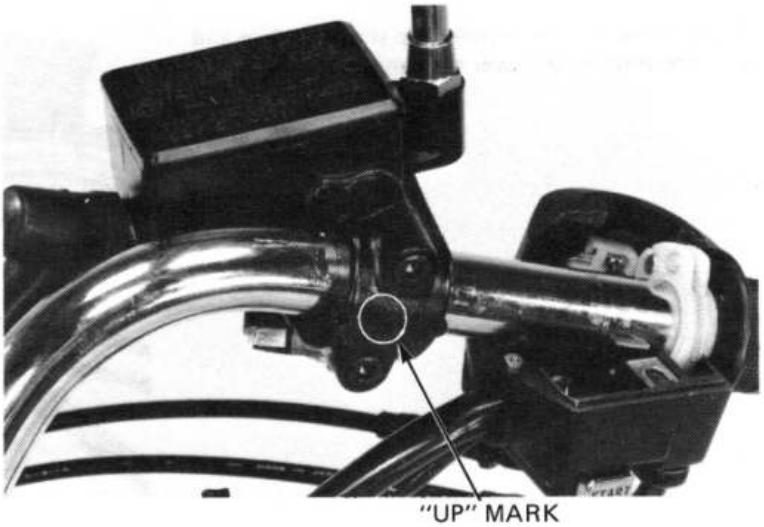


Install the upper holder, tighten the forward bolts first, then tighten the rear bolts.

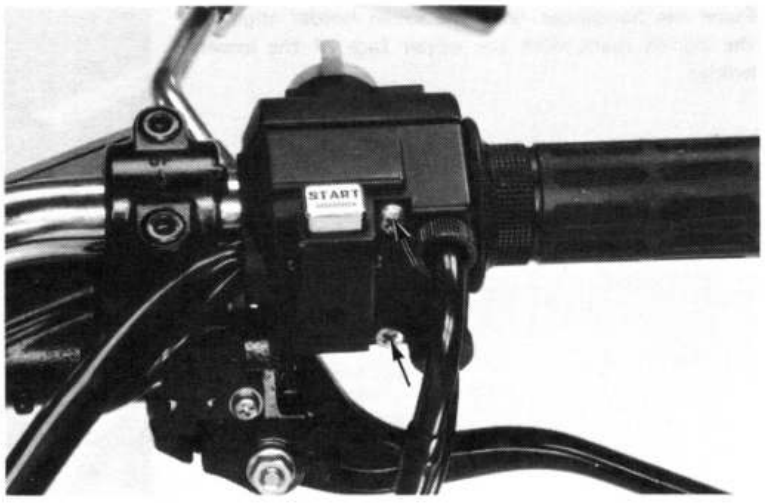
TORQUE: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)



Install the front brake master cylinder with the "UP" mark on the holder facing up. Align the end of the holder with the handlebar punch mark. Tighten the upper bolt first, then the lower bolt.



Install the right handlebar switch assembly and connect the brake light switch wires.



Connect the choke cable to the choke lever and install the clutch master cylinder. Align the end of the holder with the punch mark on the handlebar.

Tighten the upper bolt first, then the lower bolt. Install the left handlebar switch and connect the clutch switch wires.

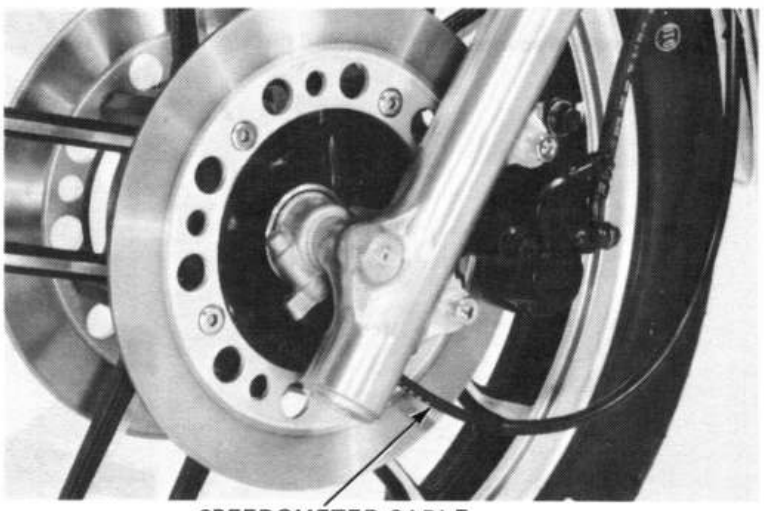
Route the switch wires properly (page 1-9).



FRONT WHEEL

REMOVAL

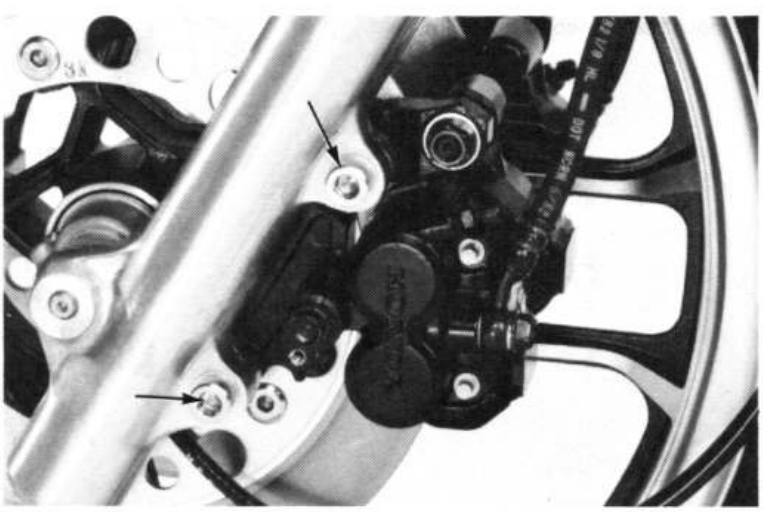
Place the motorcycle on its center stand.
Place a jack under the engine and raise the front wheel off the ground.
Remove the speedometer cable set screw and the speedometer cable.


SPEEDOMETER CABLE

Remove the left brake caliper mounting bolts and remove the caliper from the fork leg.

NOTE:

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



Loosen the axle pinch bolt.

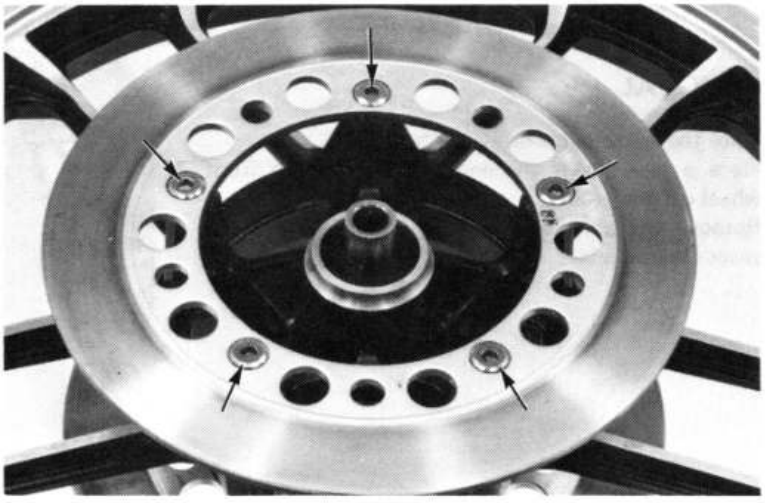
Loosen and remove the front axle.

Remove the front wheel.

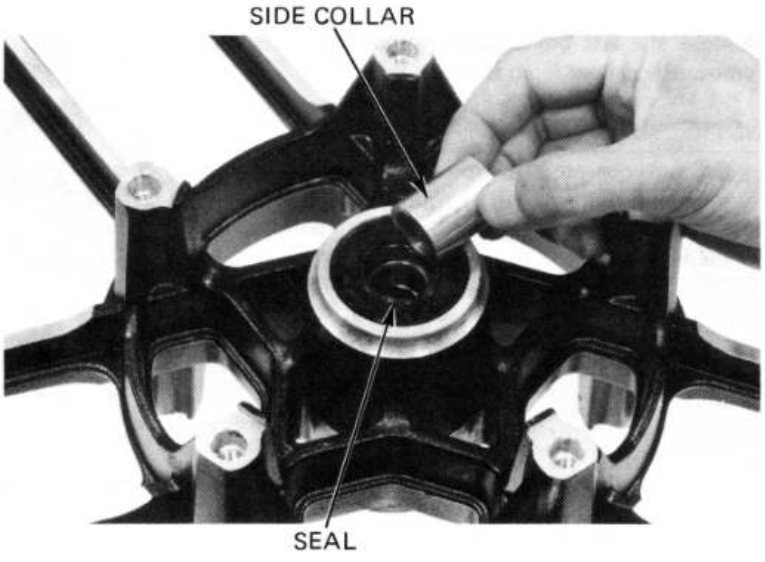

FRONT AXLE

DISASSEMBLY

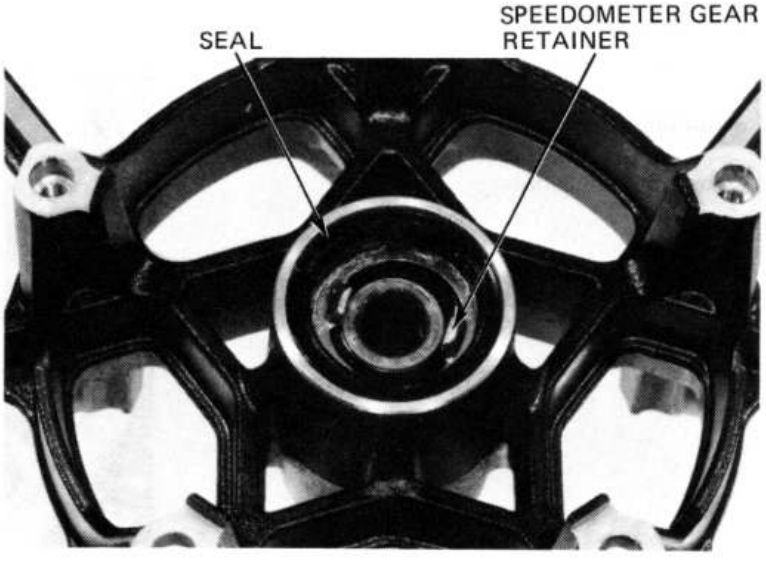
Remove the brake disc mounting bolts, and discs.



Remove the side collar and right seal.



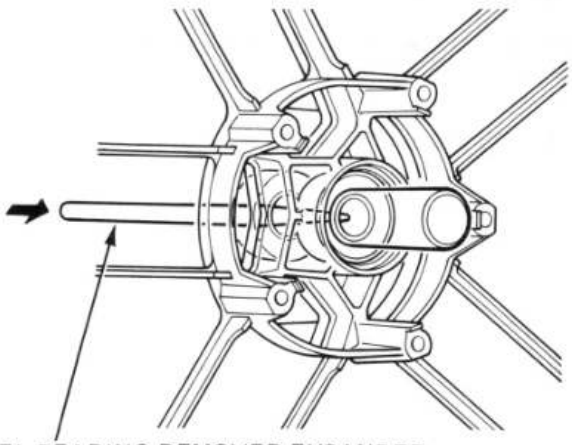
Remove the left seal and speedometer gear retainer.



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

NOTE:

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

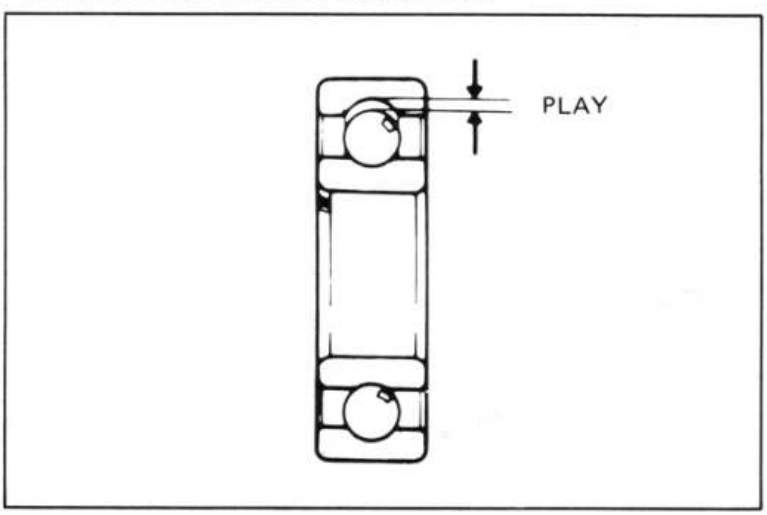


WHEEL BEARING REMOVER EXPANDER
07746–0050100
WHEEL BEARING REMOVER COLLET,
15 mm 07746–0050400 OR
COMMERCIALLY AVAILABLE IN U.S.A.

WHEEL BEARING INSPECTION

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

SERVICE LIMIT: 0.03 mm (0.001 in)



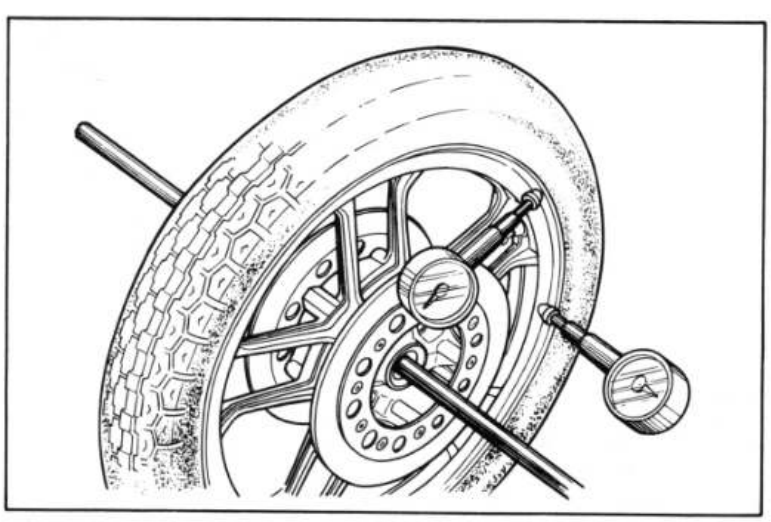
WHEEL INSPECTION

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

NOTE:

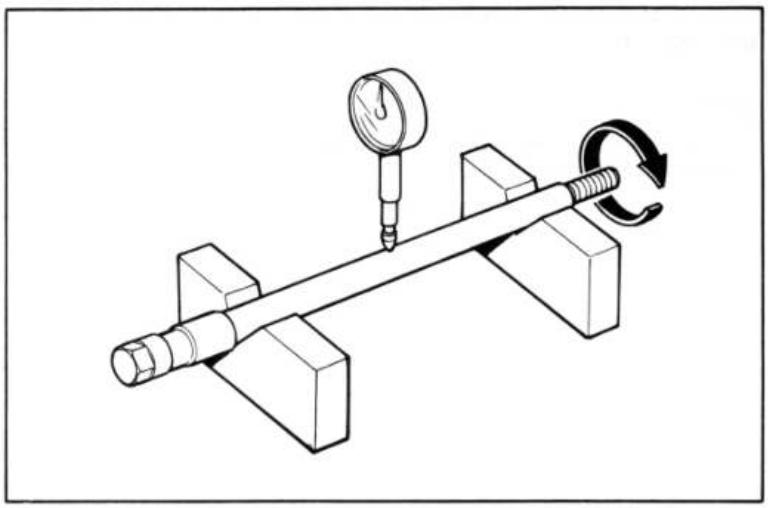
> The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



AXLE INSPECTION

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

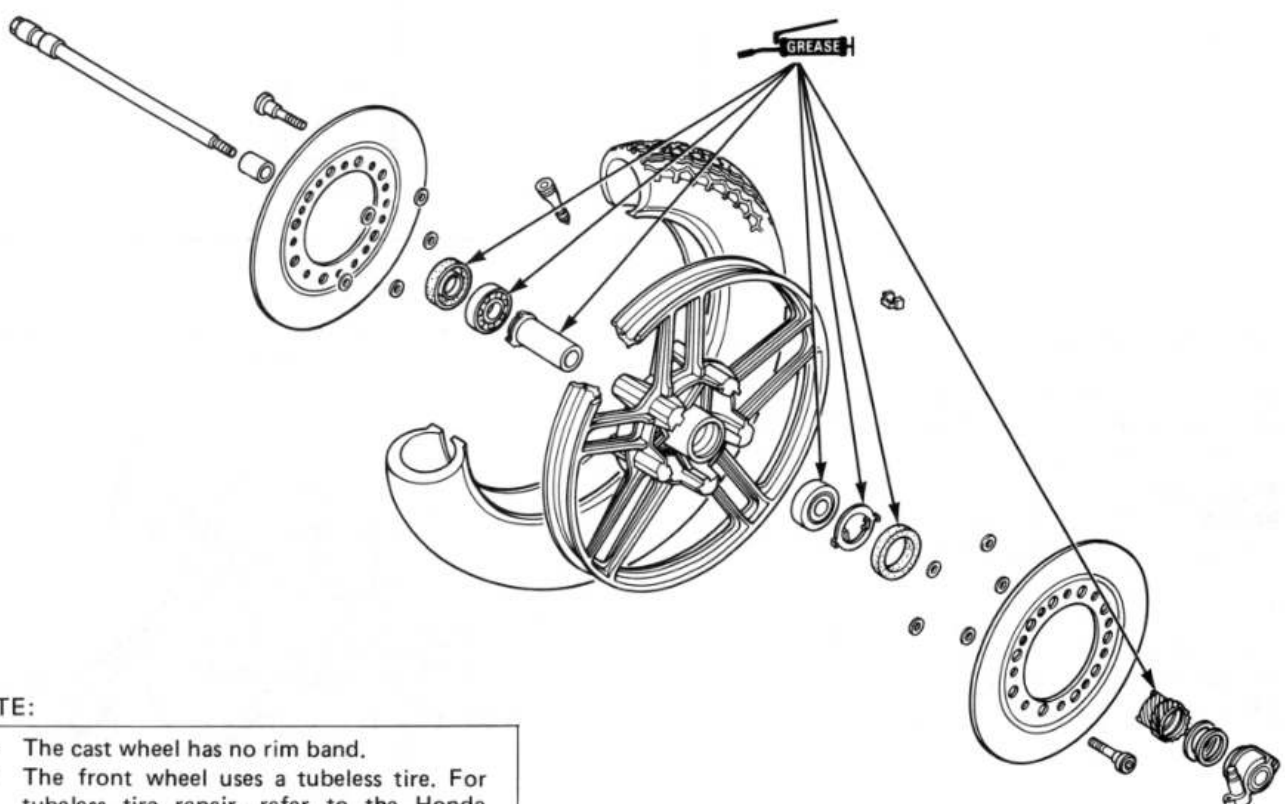
SERVICE LIMIT: 0.2 mm (0.01 in)



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 tire. For tubeless tire repair, refer to the Honda Tubeless Tire Manual.

Pack all bearing cavities with grease.

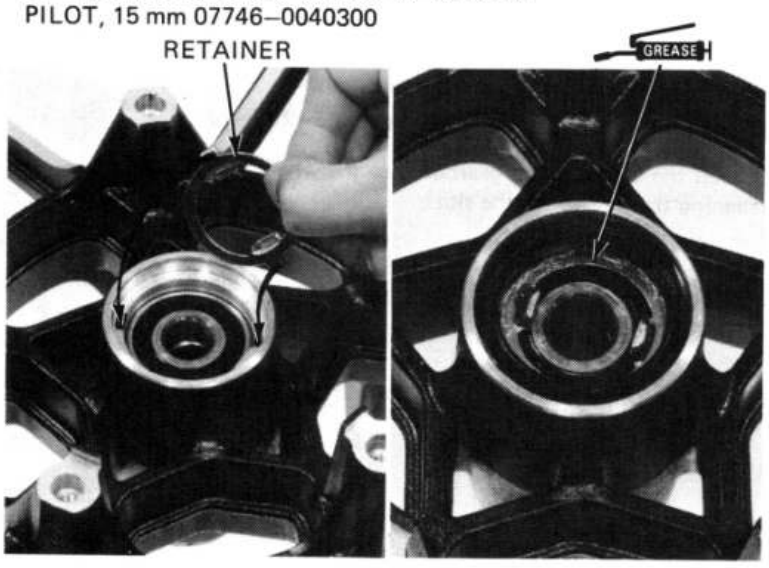
Drive in the right bearing first and press the distance collar into place.

Drive in the left bearing squarely making sure that it is fully seated and that the sealed side is facing out.

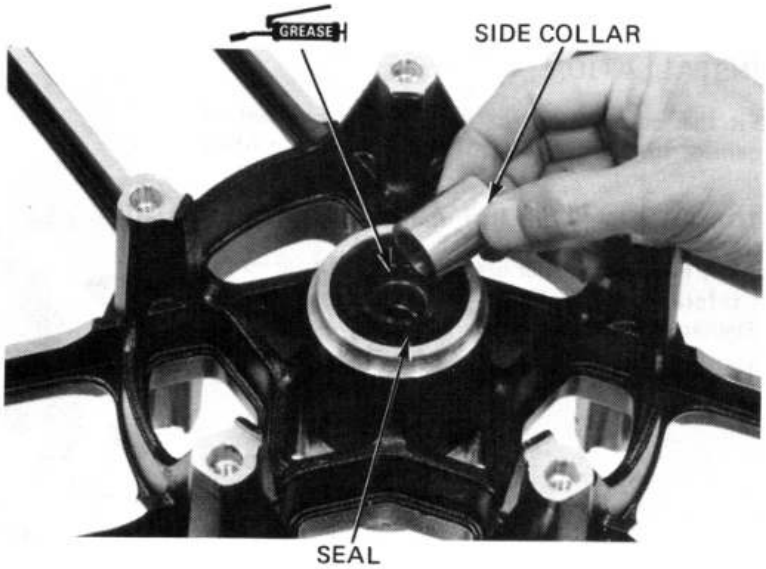


Install the speedometer gear retainer into the wheel hub, aligning the tangs with the slots.

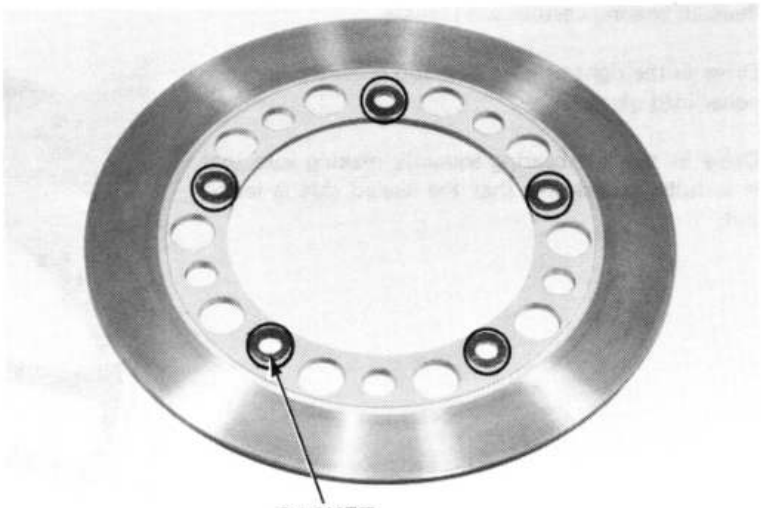
Install the left seal.



Install the right seal and side collar.



Attach new gaskets to the brake discs.

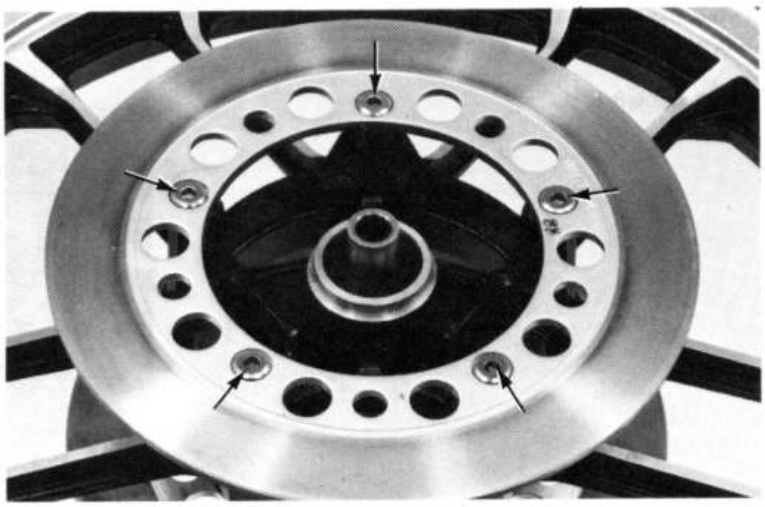


Install the brake discs onto the wheel hub.

TORQUE: 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)

Install the speedometer gearbox into the wheel hub, aligning the tangs with the slots.

Clean the brake discs with a high quality degreasing agent.



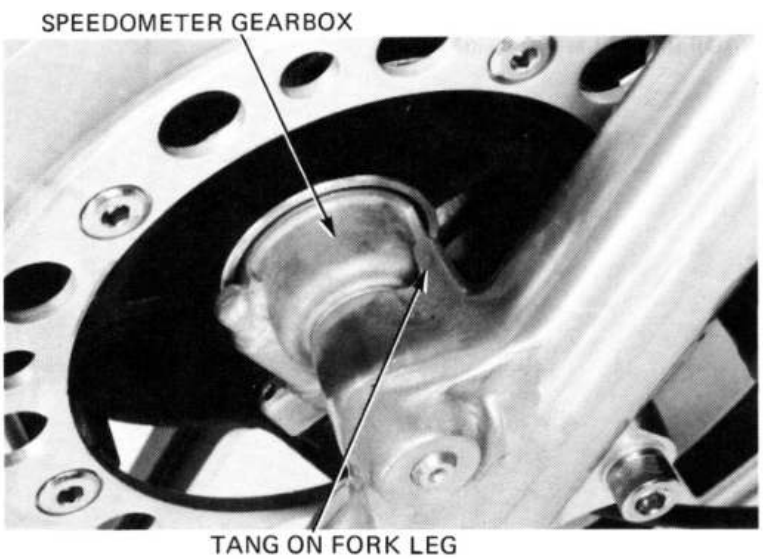
INSTALLATION

Fit the calipers over the discs, taking care not to damage the brake pads. Install the caliper mounting bolts.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

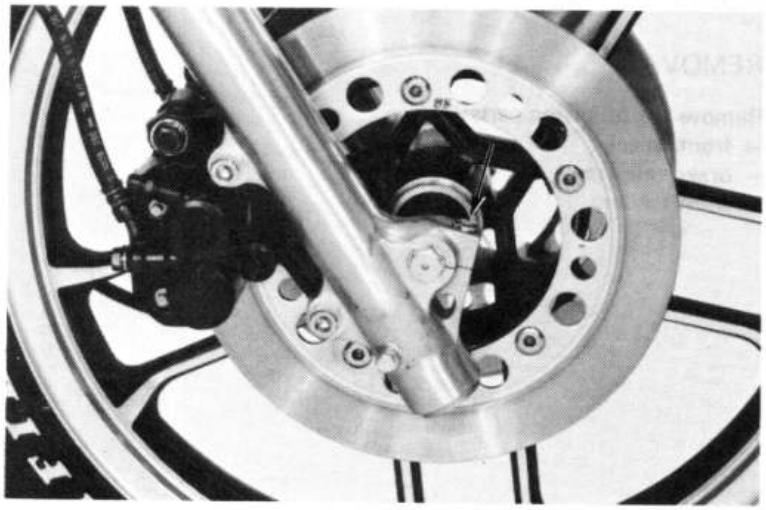
Align the speedometer gearbox with the tang on the left fork leg as shown.
Tighten the axle to the specified torque.

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

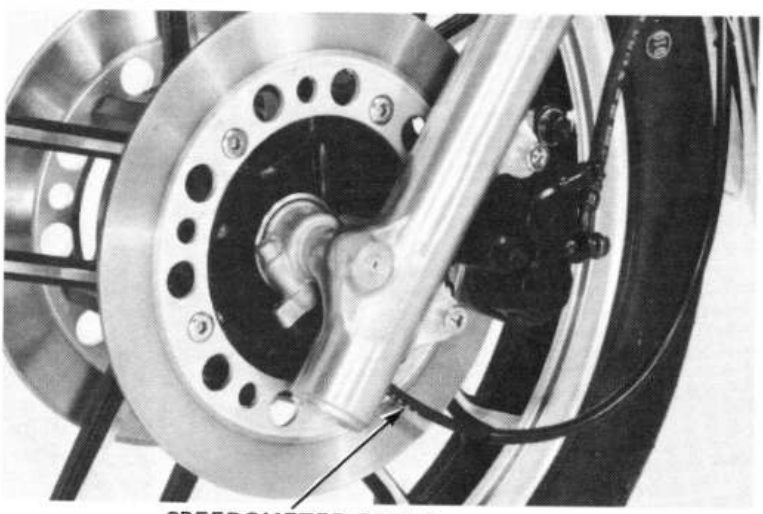


Tighten the axle pinch bolt to the specified torque.

TORQUE: 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)



Install the speedometer cable into the speedometer gearbox and tighten the set screw.

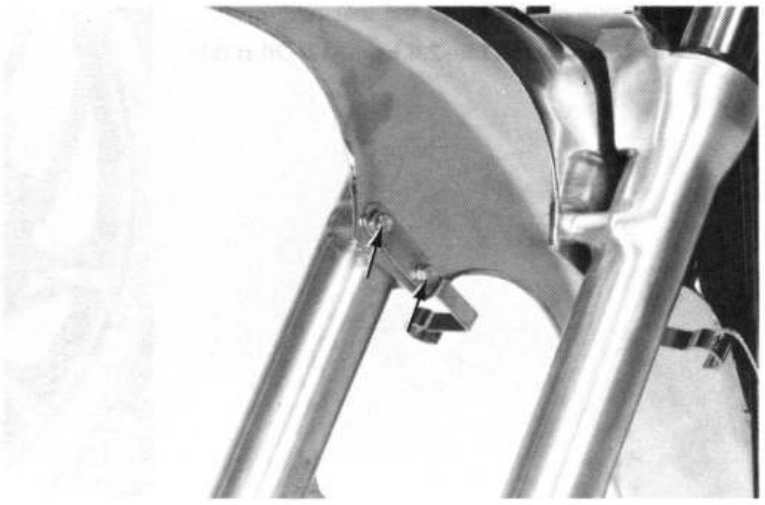


SPEEDOMETER CABLE

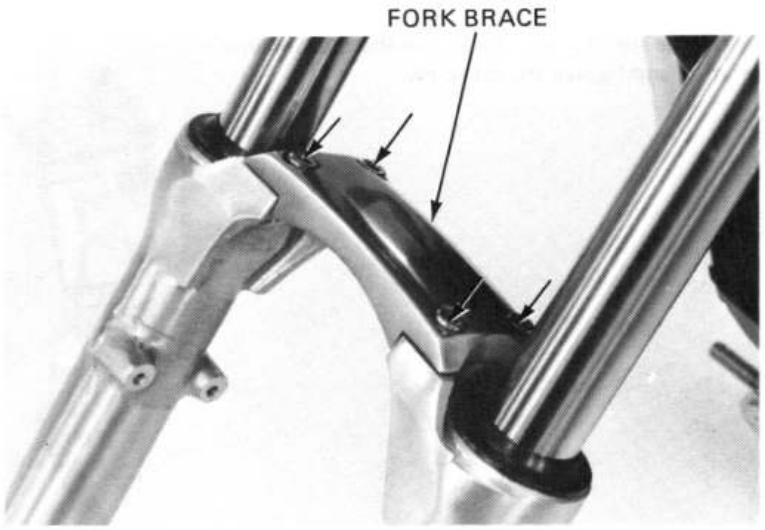
FRONT FORKS

REMOVAL

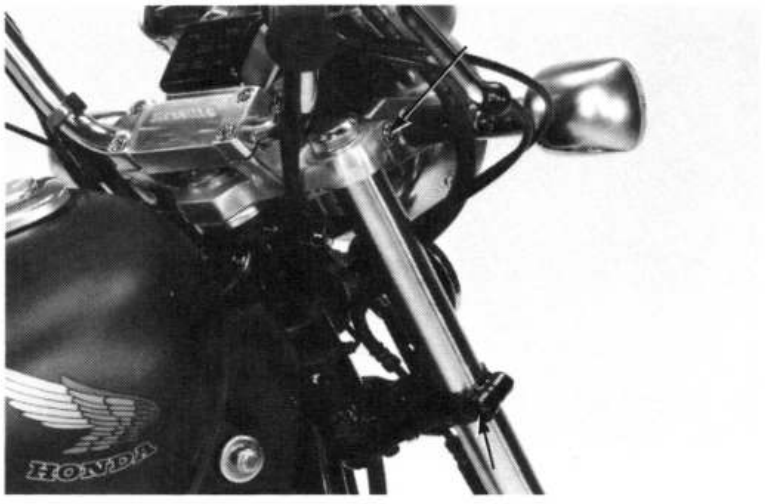
Remove the following parts:
- front wheel.
- brake calipers.
- front fender.



Remove the fork brace.



Loosen the fork upper and lower pinch bolts and remove the front fork tube.



DISASSEMBLY

Depress the air valve and release front fork air pressure.

CAUTION:

- *If air pressure is not released before disassembling, the fork tube cap may become a projectile.*
- *The cap is also under spring pressure. Use care when removing and wear eye and face protection.*

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

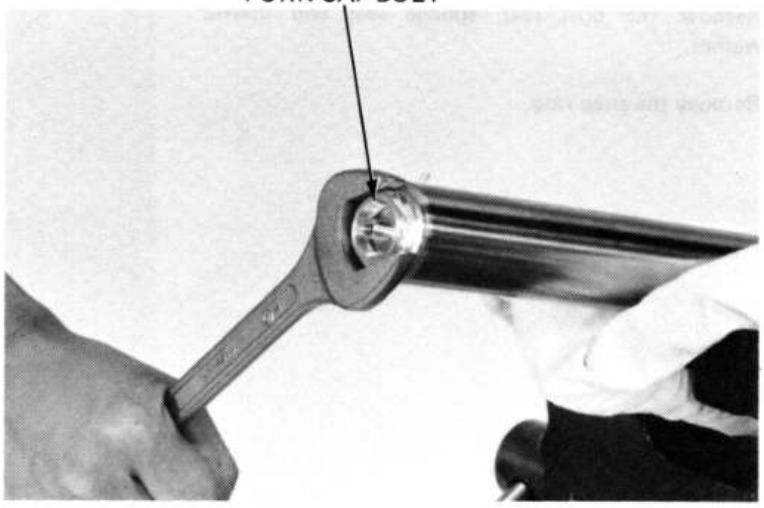
CAUTION:

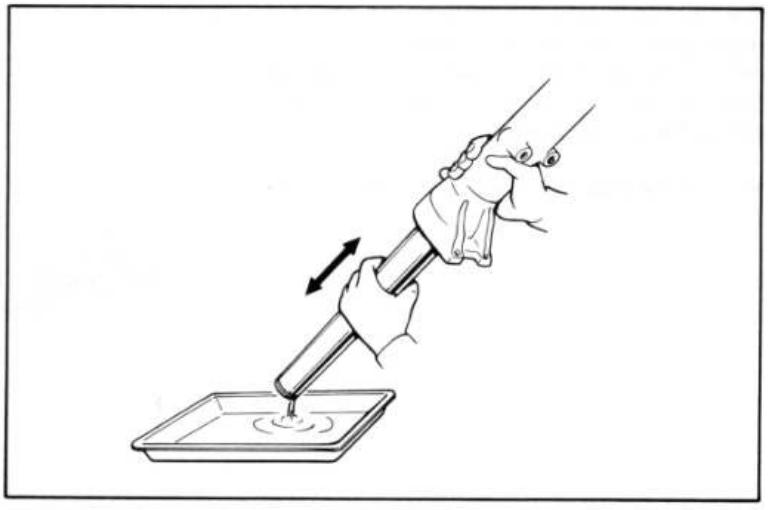
Be careful not to damage the fork tube's sliding surface.

Remove the fork spring, spacer and washer.

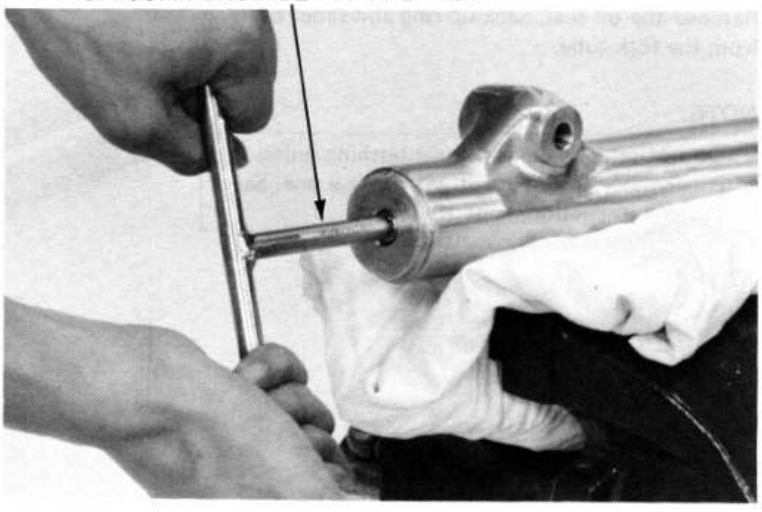
Pour out the fork fluid by pumping the fork up and down several times.

FORK CAP BOLT





HEX WRENCH, 6 mm 07917–3230000
OR COMMERCIALLY AVAILABLE



Hold the fork slider in a vise with soft jaws or a shop towel.

Remove the socket bolt with a hex wrench.

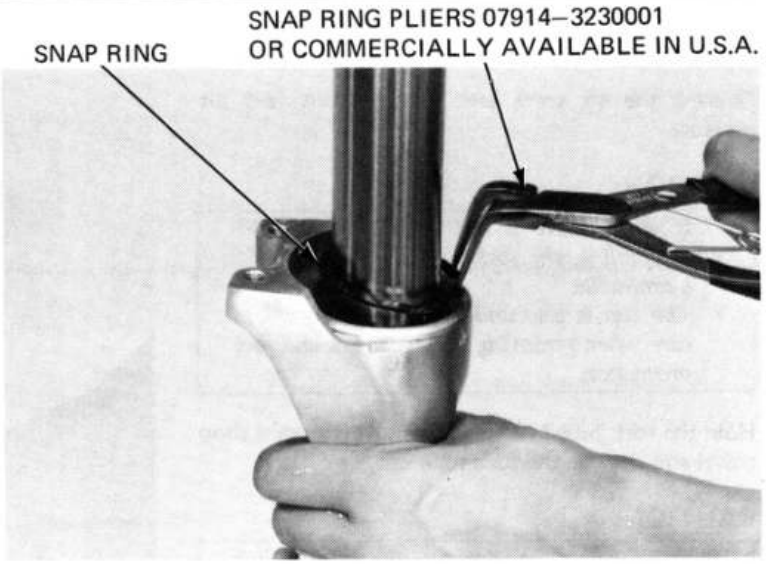
NOTE:

Temporarily install the spring and fork bolt if difficulty is encountered in removing the bolt.

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

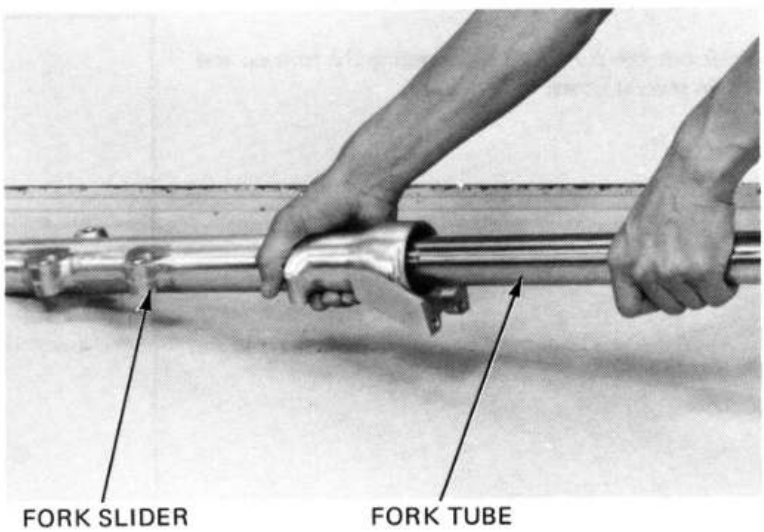
Remove the dust seal, sponge seal and plastic washer.

Remove the snap ring.



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.

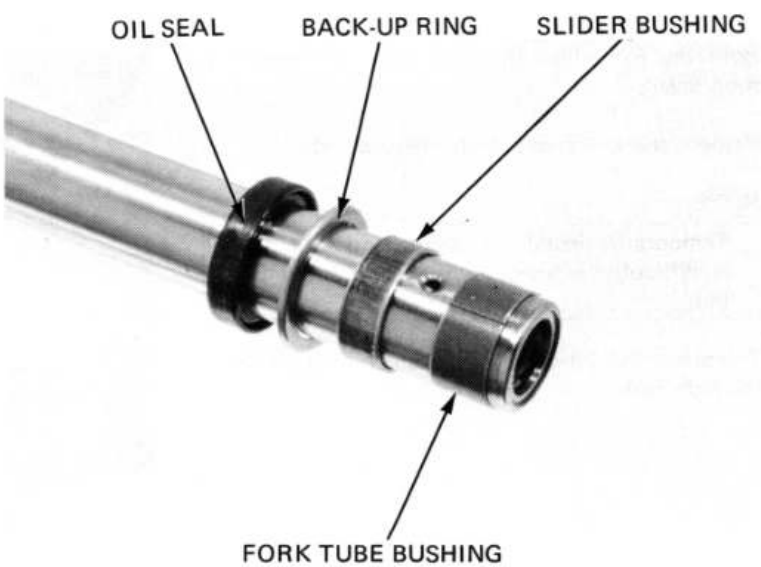
Remove the oil lock piece from inside the slider.



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. See bushing inspection, page 15-24.



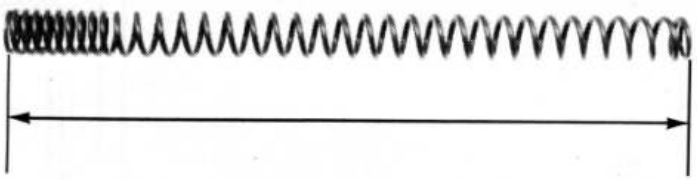
INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMIT: 465.6 mm (18.3 in)

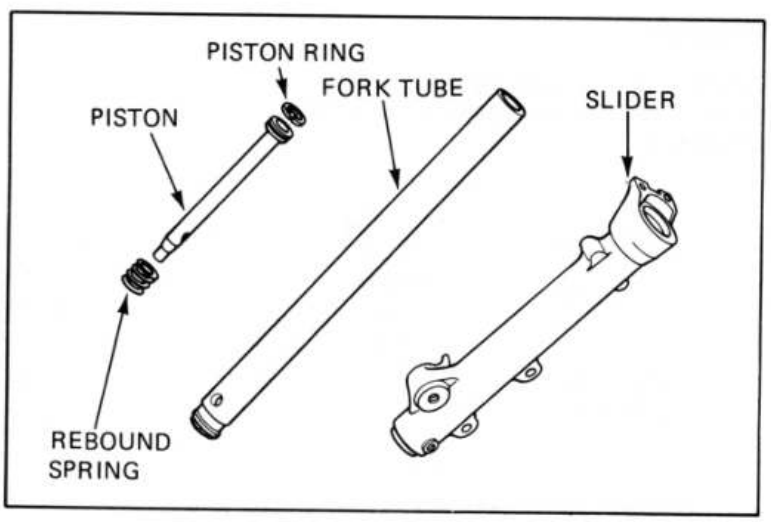
Replace the spring if it is shorter than the service limit.



FORK TUBE/FORK SLIDER/PISTON

Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

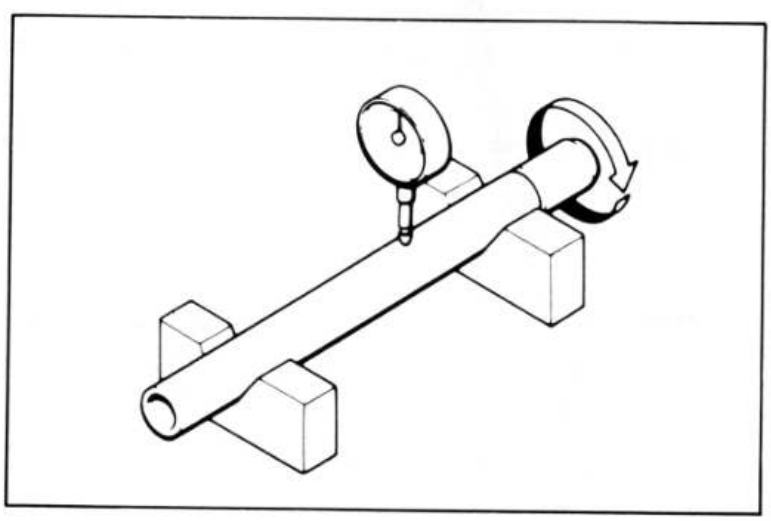
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



FORK TUBE

Set the fork tube in V blocks and read the runout. Use 1/2 the total indicator reading to determine the actual runout.

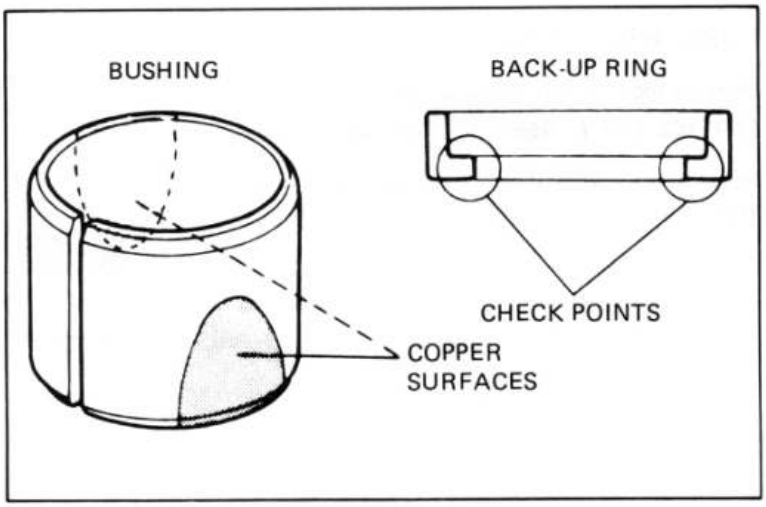
SERVICE LIMIT: 0.20 mm (0.008 in)



BUSHING/BACK-UP RING

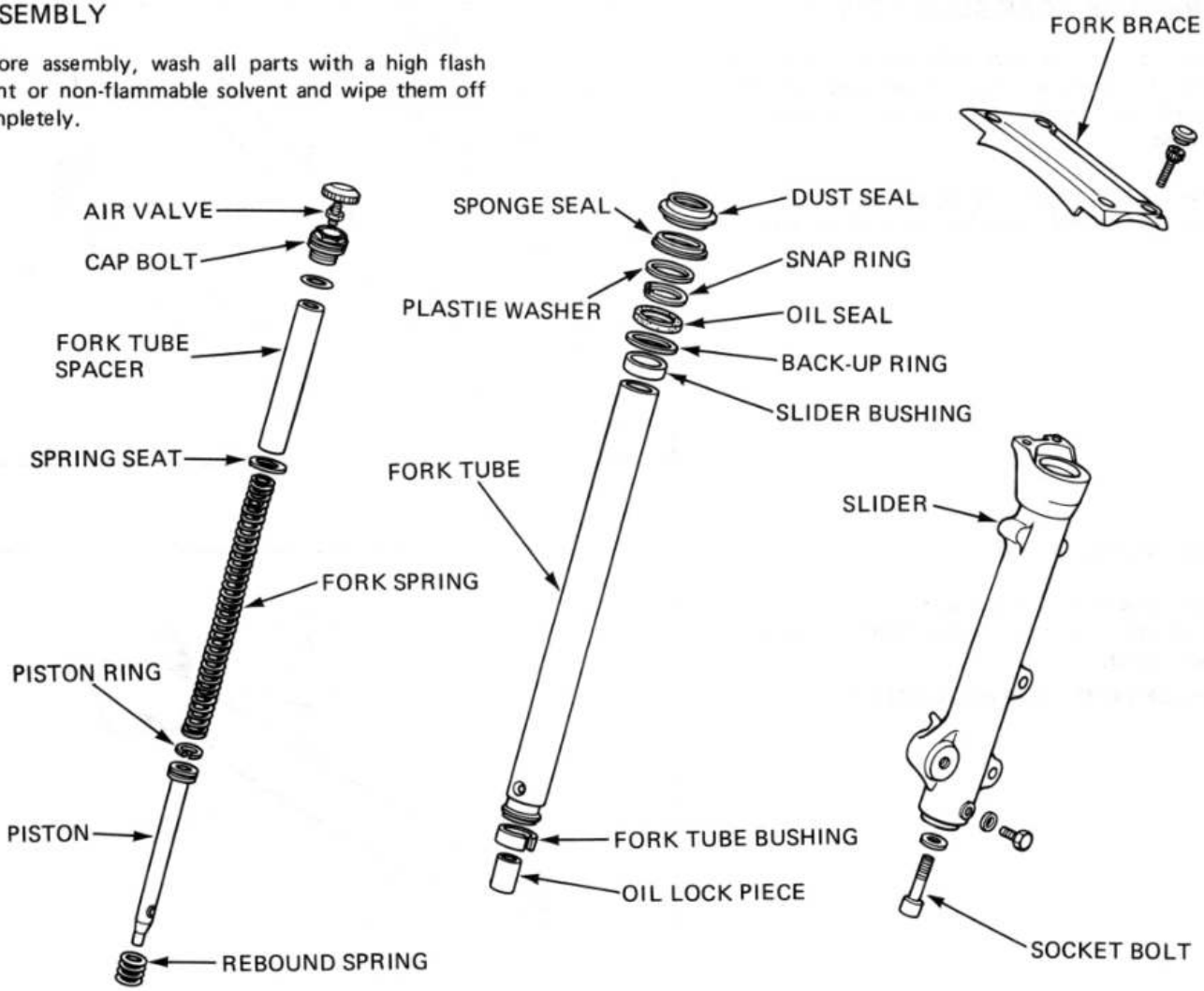
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

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



ASSEMBLY

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.

Place the oil lock piece on the end of the piston and insert the fork tube into the slider.

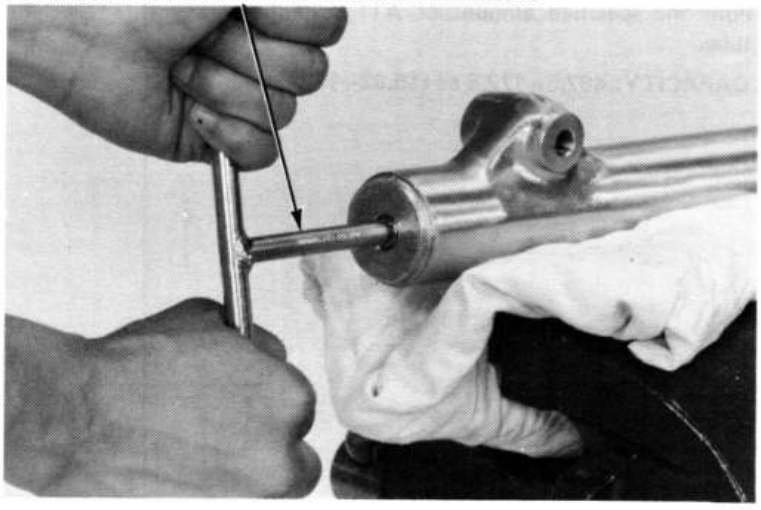
Place the fork slider in a vise with soft jaws or a shop towel. Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE:

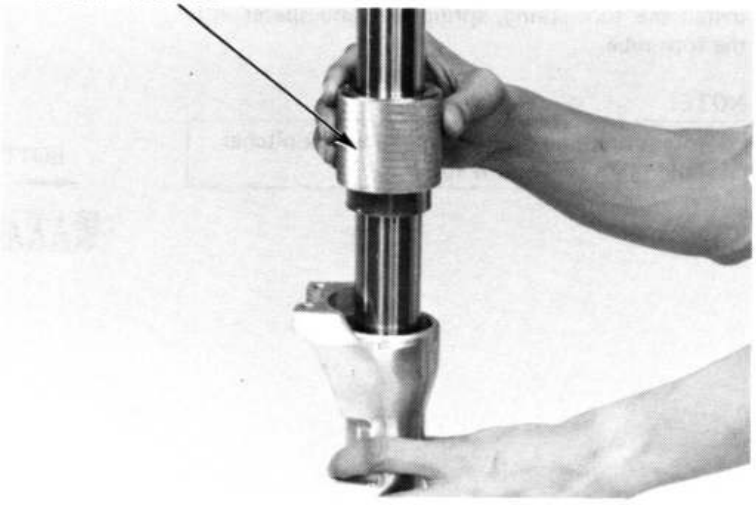
> Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

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

HEX WRENCH, 6 mm 07917–3230000
OR COMMERCIALLY AVAILABLE IN U.S.A.



FORK SEAL DRIVER
07947–4630100

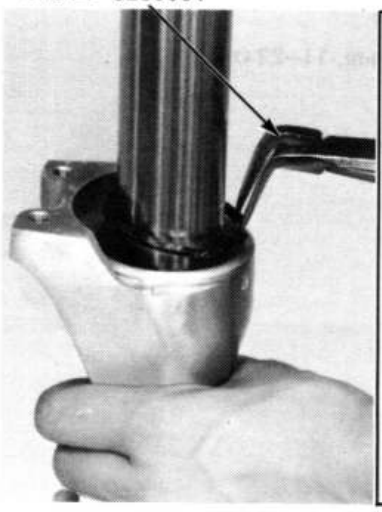


Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top.

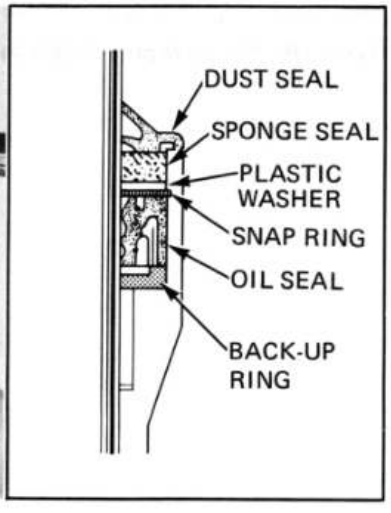
Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool.

Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.

SNAP RING PLIERS
07914–3230001

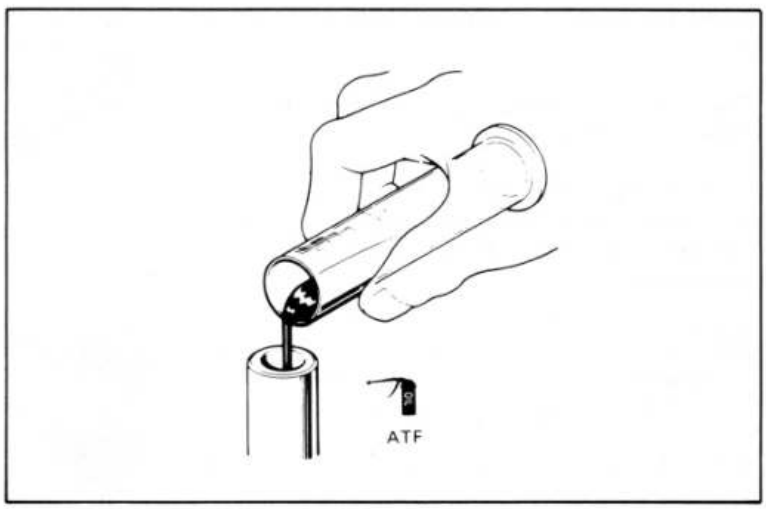


Install the snap ring with its radiused edge facing down and install the plastic washer, sponge and dust seals.



Pour the specified amount of ATF into the fork tube.

CAPACITY: 467.5–472.5 cc (15.82–15.99 ozs)



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

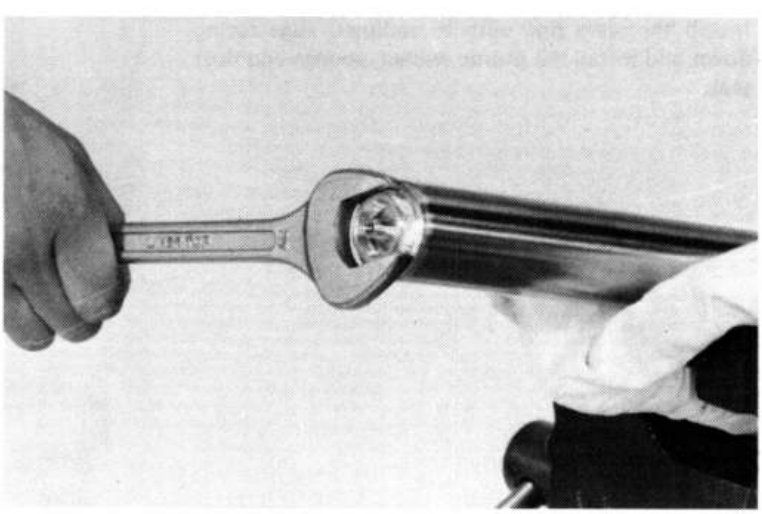
NOTE:

> Note the spring direction, the narrow pitches should face toward the top.



Install and torque the fork tube cap.

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



FRONT FORK INSTALLATION

Install the front forks.

Tighten the bottom pinch bolts.

TORQUE: 45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)

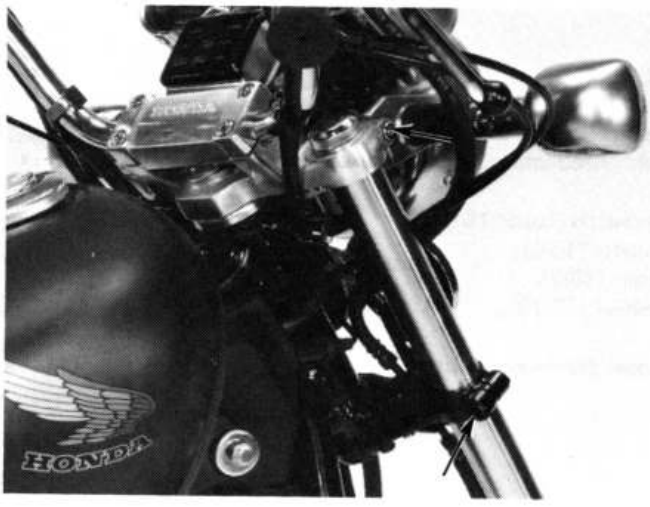
Tighten the top pinch bolts.

TORQUE: 9–13 N·m (0.9–1.3 kg-m, 7–8 ft-lb)

Loosely install the front fork brace.

NOTE:

> Do not install the fork brace before torqueing the front fork pinch bolts.

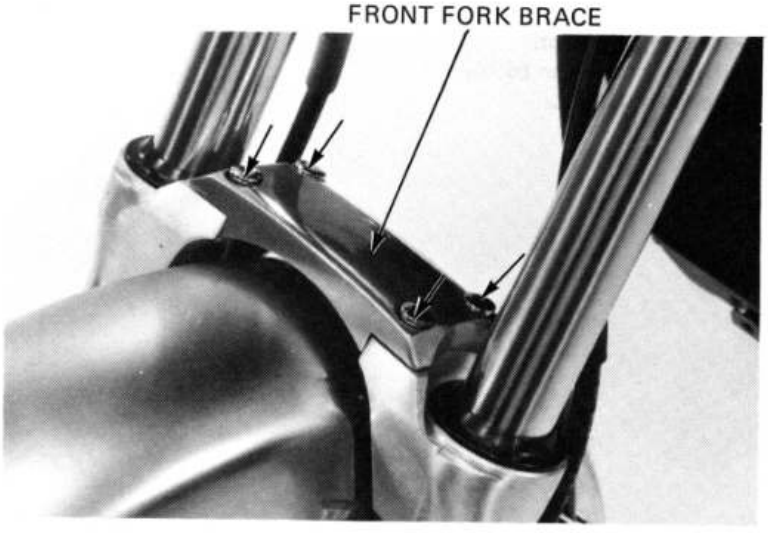


Install the removed parts in the reverse order of removal.
- front fender.
- brake calipers.
- front wheel.

Tighten the front fork brace to the specified torque.

TORQUE: 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

Install the bolt caps.



Fill the fork tubes with air to 0–40 kPa (0–4.0 kg/cm², 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/cm², 43 psi). Do not exceed this or fork tube component damage may occur.*

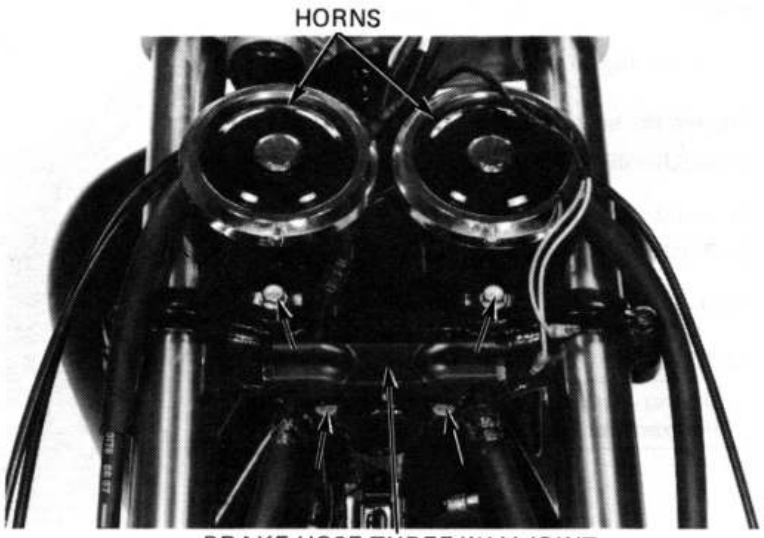
With the front brake applied, pump the front forks up and down several times. Place the motorcycle on its center stand. Check the air pressure and adjust if necessary.



STEERING STEM

REMOVAL

Remove the following components.
- headlight, headlight case and brackets (page 15-3, 15-4).
- ignition switch (page 15-4).
- instruments (15-6).
- handlebar (15-9).
- front wheel (15-13).
- horns.
- brake hose three-way joint.



- steering stem nut.
- front forks (page 15-20).
- fork top bridge.

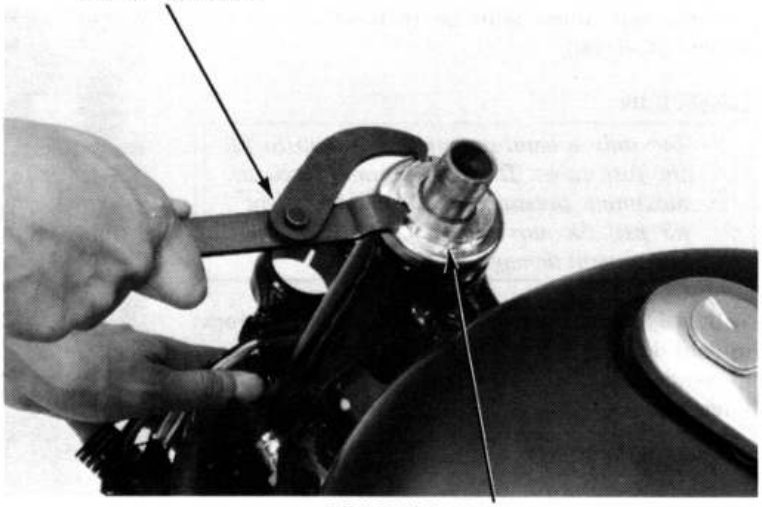


Remove the bearing adjustment nut.

Remove the steering stem, top cone race and steel balls.

NOTE:

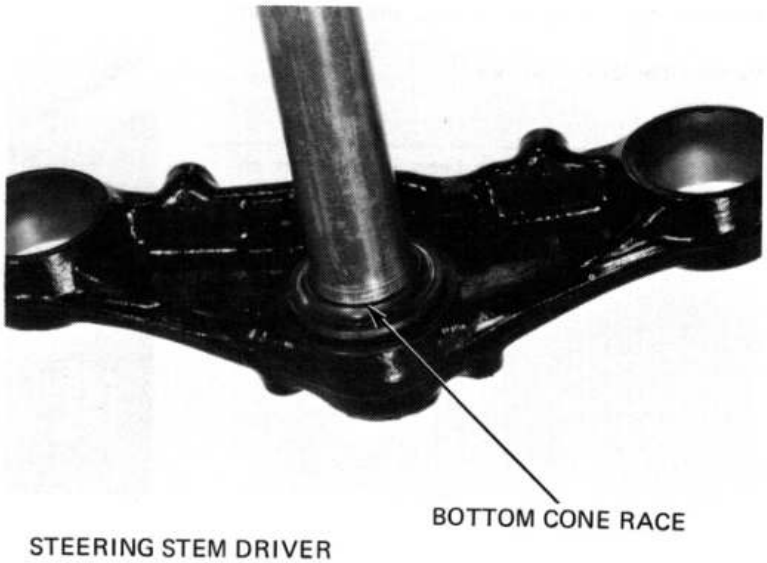
Do not allow the steel balls to fall.



BOTTOM CONE RACE REPLACEMENT

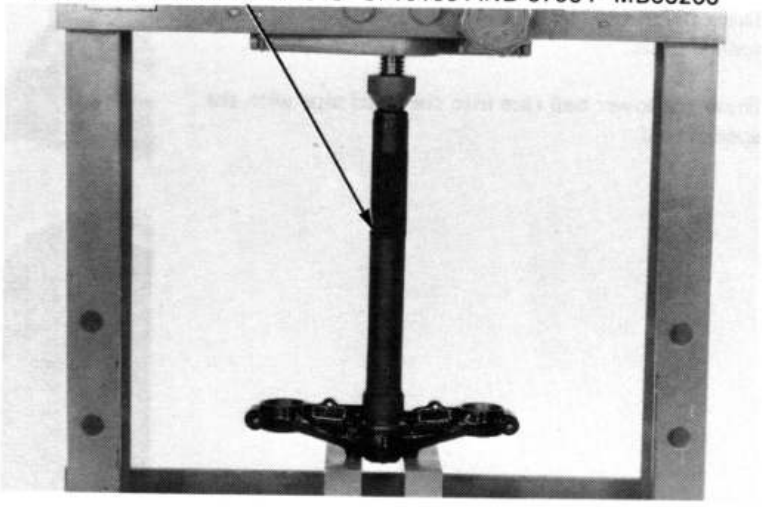
Inspect the bottom cone race for wear or damage and replace if necessary.

Remove the bottom cone race with a hammer and a drift.



Install a new washer and dust seal and drive a new bottom cone race into place.

STEERING STEM DRIVER
07946–MB00000 OR 07946–3710100 AND 07964–MB00200



BALL RACE REPLACEMENT

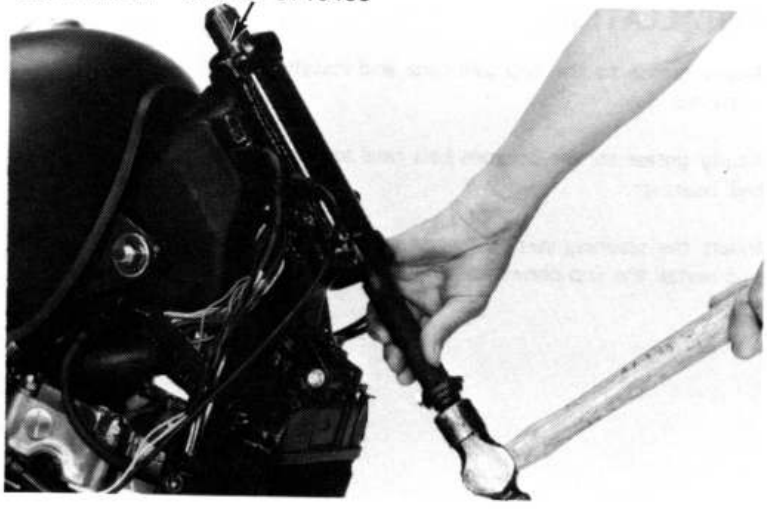
Inspect the top and bottom ball races and replace if worn or damaged.

Remove the upper ball race with the special tool.

NOTE:

> Remove the sliding guide from the bearing race remover.

BEARING RACE REMOVER/
INSTALLER 07946–3710400



Reinstall the sliding guide onto the race remover.

Remove the lower ball race.

NOTE:

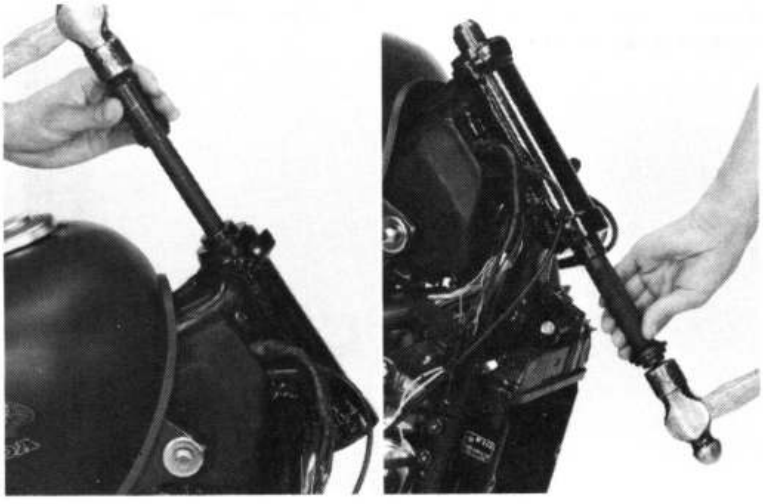
> If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.



BEARING RACE REMOVER/INSTALLER
07946–3710400

Drive the upper ball race into the head pipe with the special tools.

Drive the lower ball race into the head pipe with the special tool.

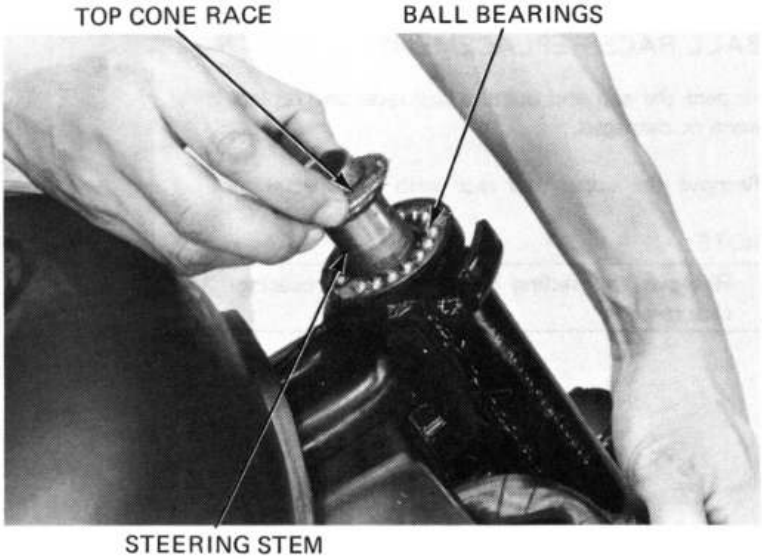


INSTALLATION

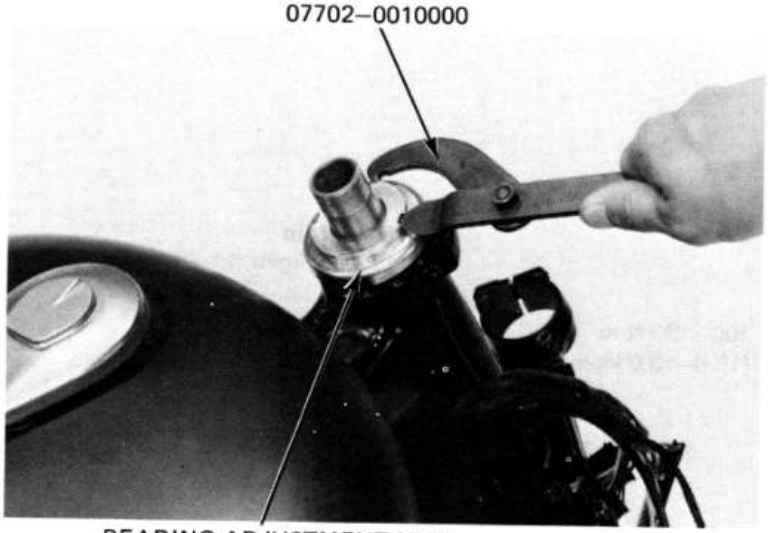
Apply grease to the top ball race and install 18 ball bearings.

Apply grease to the bottom ball race and install 19 ball bearings.

Insert the steering stem into the steering head pipe and install the top cone race.



Install the bearing adjustment nut and tighten it snug against the top cone race. Then, back it off 1/8 turn.
Make sure that there is no vertical movement and that the stem rotates freely.



LOCK NUT WRENCH, 30 x 32 mm
COMMERCIALLY AVAILABLE IN U.S.A.

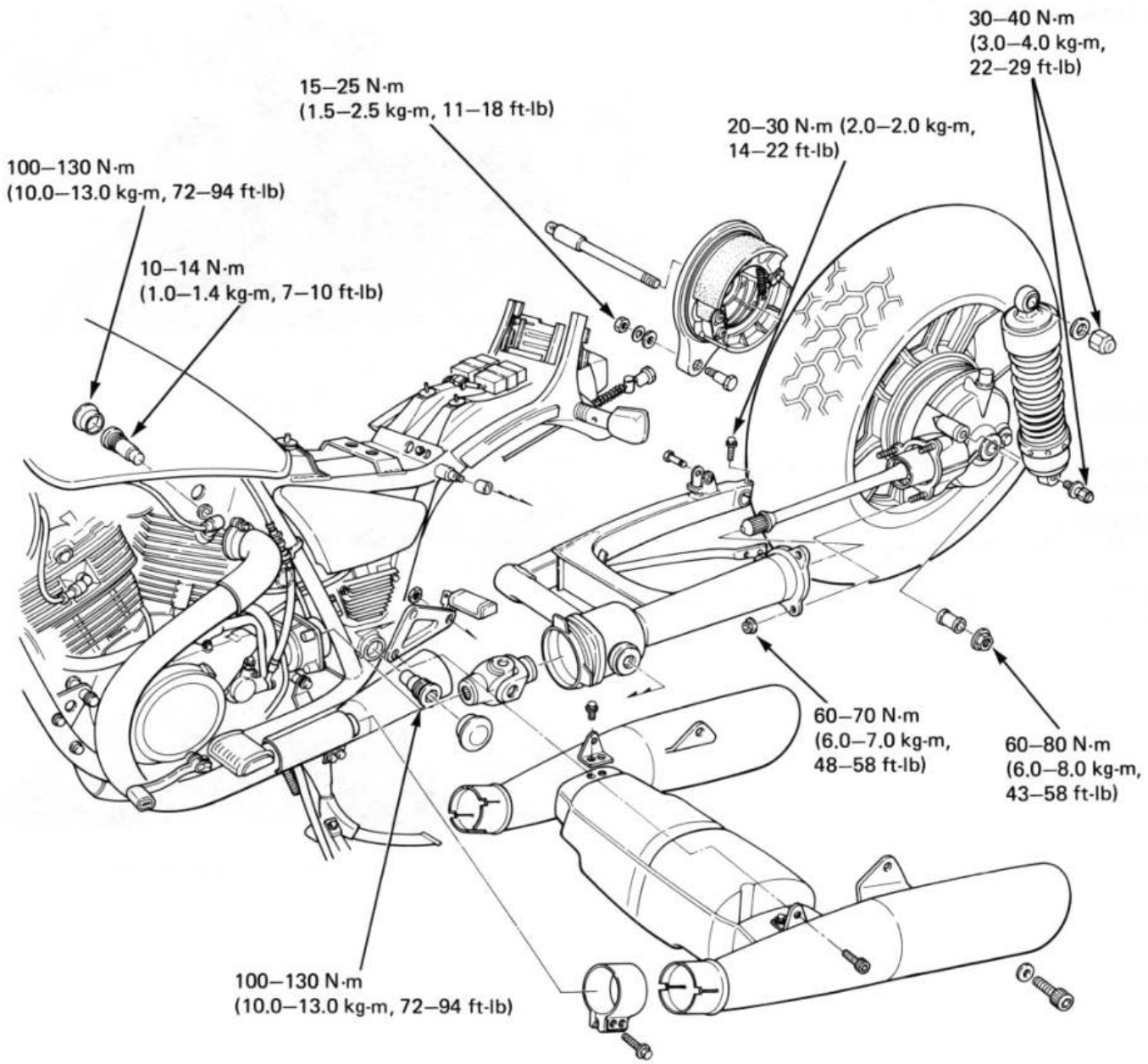
Install the fork top bridge and stem nut.

Temporarhly install the front forks and tighten the stem nut.

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

Install the removed parts in the reverse order of removal.




30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)
20–30 N·m (2.0–2.0 kg-m,
14–22 ft-lb)
100–130 N·m
(10.0–13.0 kg-m, 72–94 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
60–70 N·m
(6.0–7.0 kg-m,
48–58 ft-lb)
60–80 N·m
(6.0–8.0 kg-m,
43–58 ft-lb)
100–130 N·m
(10.0–13.0 kg-m, 72–94 ft-lb)

16. REAR WHEEL/SUSPENSION/BRAKE

SERVICE INFORMATION	16–1	REAR BRAKE PANEL	16–10
TROUBLESHOOTING	16–2	SHOCK ABSORBER	16–10
REAR WHEEL	16–3	SWINGARM	16–13

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.
- Never ride on the rim.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle runout		–	0.2 mm (0.01 in)
Rear wheel rim runout	Radial	–	2.0 mm (0.08 in)
	Axial	–	2.0 mm (0.08 in)
Wheel bearing play		–	0.03 mm (0.001 in)
Shock absorber spring free length		223.8 mm (8.81 in)	211 mm (8.3 in)
Brake drum I.D.		160.0–160.3 mm (6.30–6.31 in)	161 mm (6.34 in)
Rear brake lining thickness		4.9–5.0 mm (0.19–0.20 in)	2.0 mm (0.08 in)

TORQUE VALUES

Rear axle nut	60–80 N·m (6.0–8.0 kg-m, 43–58 ft-lb)
Brake torque link bolt	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
Axle pinch bolt	20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Brake arm	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
Shock absorber mount bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Final driven flange	50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
Swingarm left pivot bolt	100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
Swingarm right pivot bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Swingarm pivot lock nut	100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)

TOOLS

Special

Shock absorber compressor attachment	07959–MB10000	
Swingarm pivot lock nut wrench	07908–ME90000	
Socket bit, 10 mm	07917–3710000	Commercially available in U.S.A.
Swingarm bearing remover	07936–4150000	or 07936–3710500
Slide hammer handle	07936–3710100	

Common

Driver	07749–0010000	
Attachment, 42 x 47 mm	07746–0010300	
Pilot, 17 mm	07746–0040400	
Attachment, 32 x 35 mm	07746–0010100	
Shock absorber compressor	07959–3290001	
Wheel bearing remover collet, 17 mm	07746–0050500	
Wheel bearing remover expander	07746–0050100	
Remover weight	07741–0010201	or 07936–3710200

TROUBLESHOOTING

Oscillation
1. Bent rim.
2. Loose wheel bearings.
3. Faulty tire.
4. Loose axle.
5. Tire pressure incorrect.
6. Swingarm bearings worn.
7. Worn tires.

Soft suspension
– Weak spring(s).

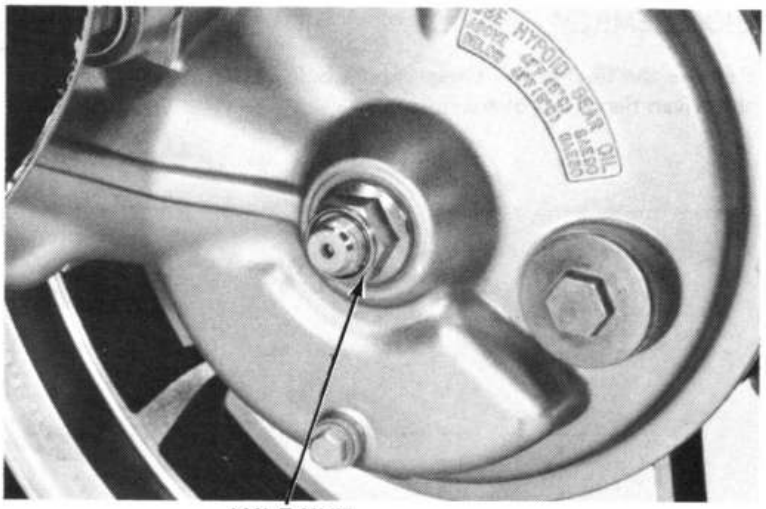
Hard suspension
– Bent shock absorber.

Suspension noise
1. Shock case binding.
2. Loose fasteners.

REAR WHEEL

REMOVAL

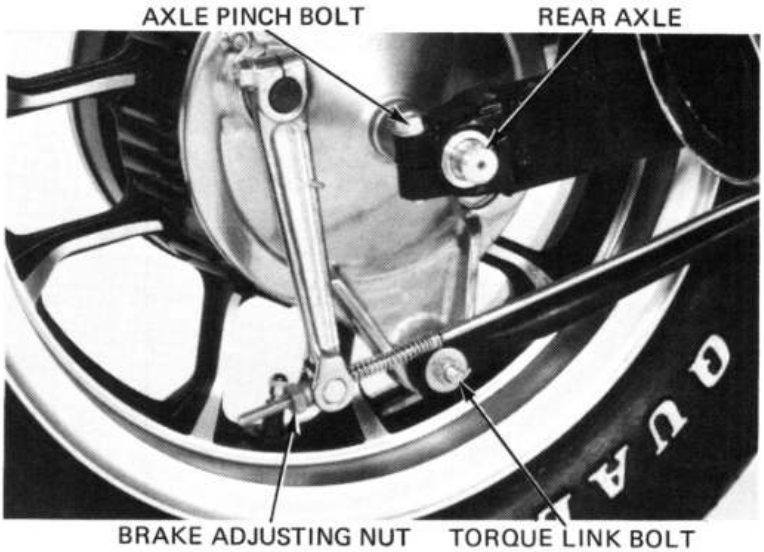
Place the motorcycle on its center stand and loosen the axle nut.



Remove the brake torque link bolt and disconnect the torque link.

Remove the brake adjusting nut and the brake rod.

Loosen the axle pinch bolt and remove the rear axle.



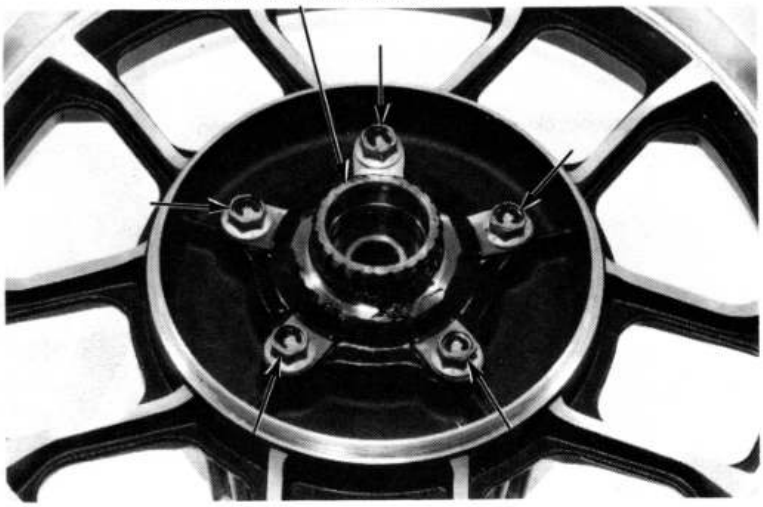
Move the wheel to the right to separate it from the final drive gear case and remove the rear wheel.



DISASSEMBLY

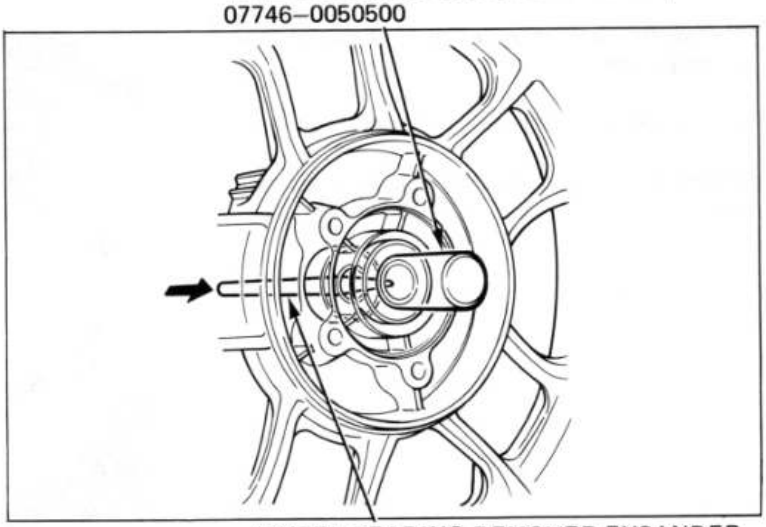
Remove the final driven flange mount bolts and lift the driven flange out of the hub.

FINAL DRIVEN FLANGE



Remove the wheel bearings and distance collar with the special tool.

WHEEL BEARING REMOVER COLLET, 17 mm
07746–0050500



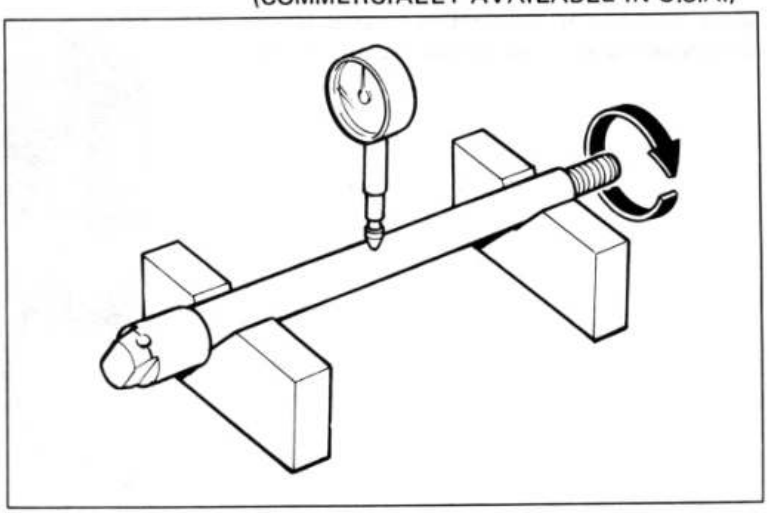
WHEEL BEARING REMOVER EXPANDER
07746–0050100
(COMMERCIALLY AVAILABLE IN U.S.A.)

INSPECTION

AXLE

Set the axle in V blocks and read the axle runout with a dial indicator. The actual axle runout is 1/2 of the total indicator reading.

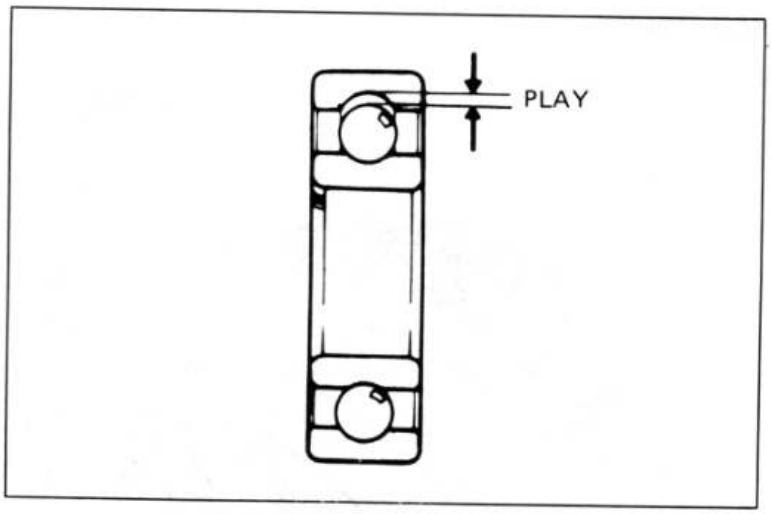
SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL BEARINGS

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

SERVICE LIMIT: 0.03 mm (0.001 in)

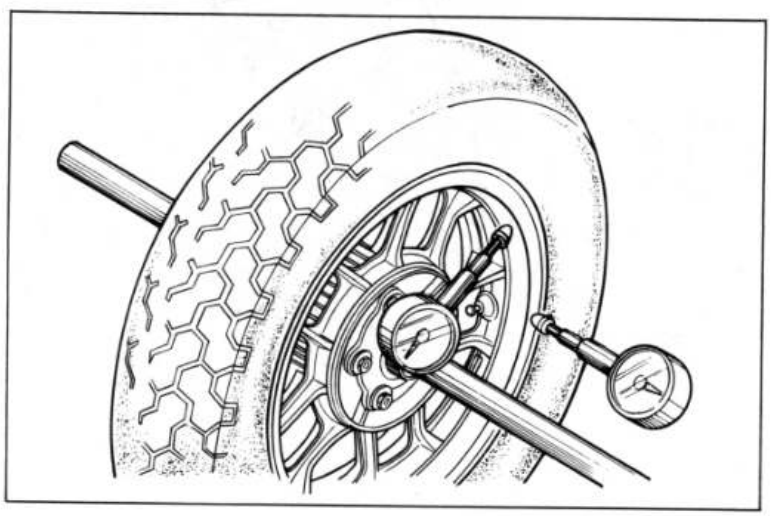


WHEEL RIM RUNOUT

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)

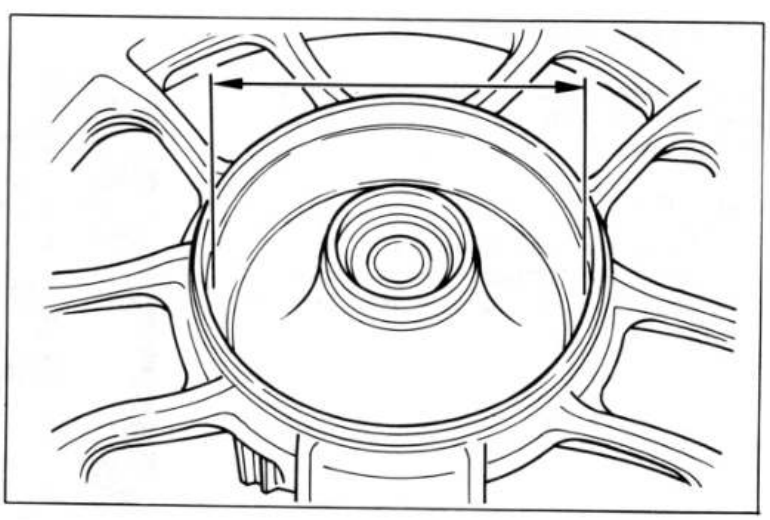
The wheel cannot be serviced and must be replaced if the above limits are exceeded.



BRAKE DRUM I.D.

Measure the brake drum I.D.

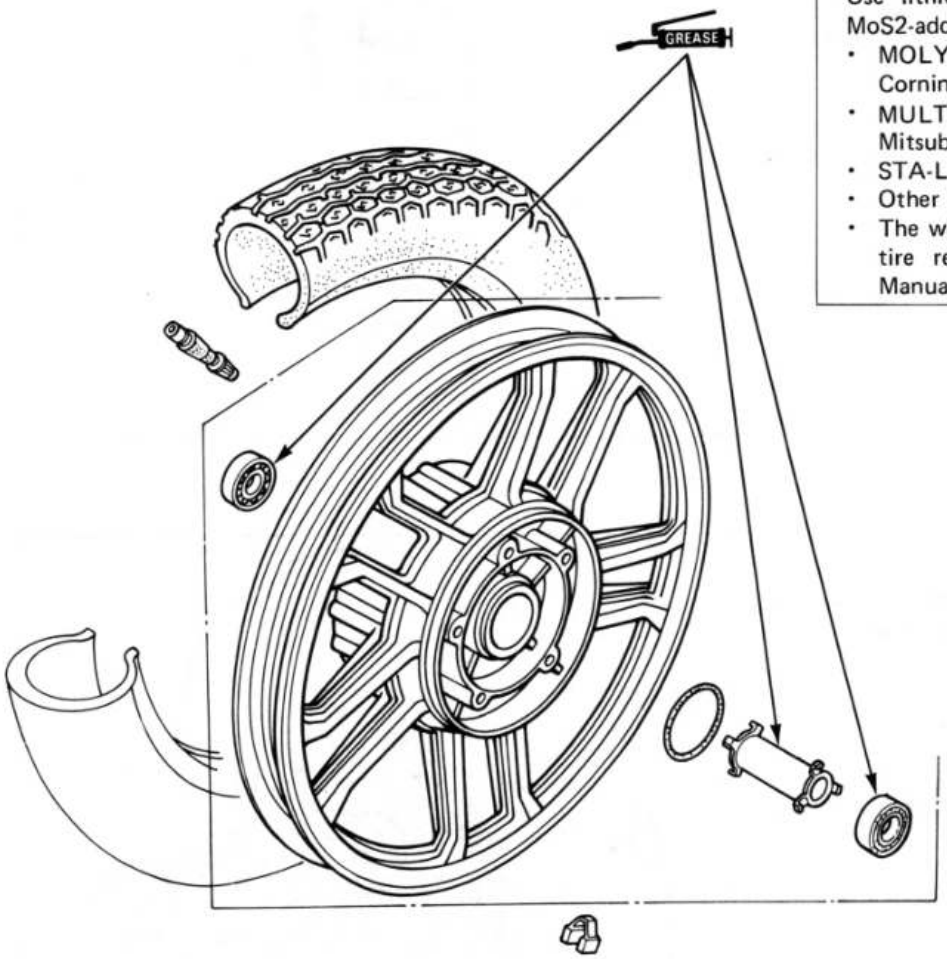
SERVICE LIMIT: 161 mm (6.34 in)

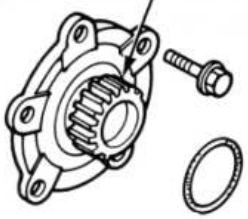


ASSEMBLY

NOTE:

Use lithium-based Multipurpose grease with MoS2-additive as follows:
- MOLYKOTE BR2-S manufactured by Dow Corning, U.S.A.
- MULTIPURPOSE M-2 manufactured by Mitsubishi Oil, Japan.
- STA-LUBE NLGI #2.
- Other lubricants of equivalent quality.
- The wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.





Pack all bearing cavities with grease.

Press the distance collar into place from the left side. Drive the right ball bearing in first, then the left ball bearing.

CAUTION:

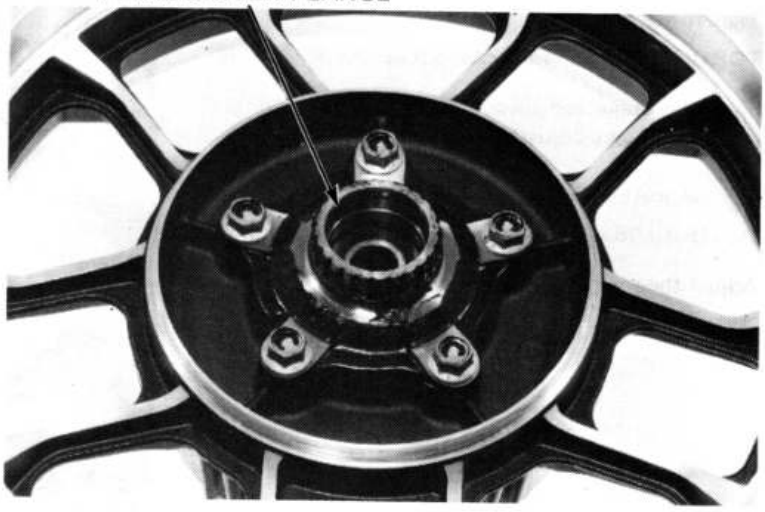
- *Drive the bearings in squarely.*
- *Install the bearings with the sealed end facing out, making sure they are fully seated.*



Install the final driven flange onto the rear wheel. Apply LOCTYTE® to the bolt threads and tighten the bolts to the specified torque.

TORQUE: 50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

FINAL DRIVEN FLANGE



INSTALLATION

Apply Multipurpose NLGI No. 2 grease (MoS2-additive) to the final driven flange and ring gear engagement splines.

Loosen the final gear case attaching nuts to ease axle installation and to assure proper driven flange alignment.

Engage the rear wheel with the final drive case, making sure the splines are correctly aligned.



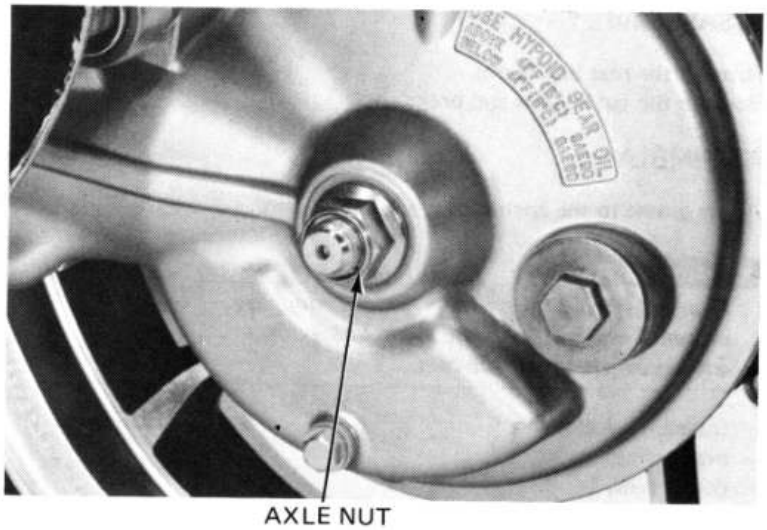
Insert the rear axle through the swingarm, side collar, brake panel, hub and final drive gear.

Tighten the axle nut.

TORQUE: 60–80 N·m (6.0–8.0 kg-m, 43–58 ft-lb)

Tighten the final gear case attaching nuts.

TORQUE: 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)



AXLE NUT

Tighten the axle pinch bolt.

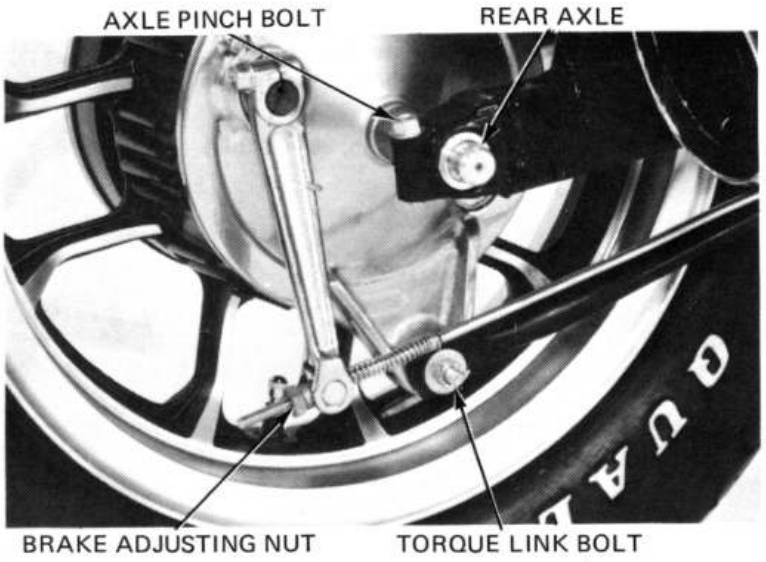
TORQUE: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)

Place the brake rod through the brake arm pin and install the brake adjusting nut.

Tighten the brake torque link bolt.

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

Adjust the rear brake (page 3-18).



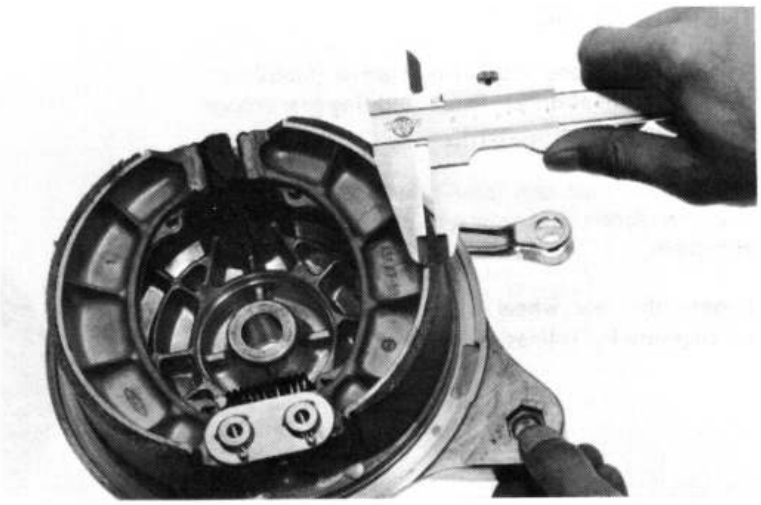
REAR BRAKE PANEL

LINING THICKNESS INSPECTION

Measure the rear brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

Replace the brake shoes if thinner than the service limit.



DISASSEMBLY

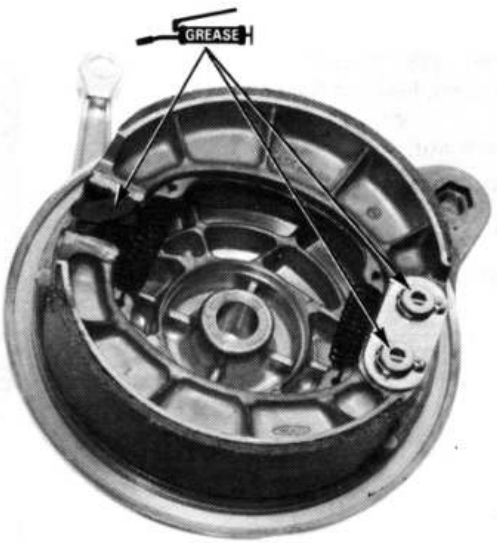
Remove the rear brake arm.
Remove the cotter pins and brake shoes.

ASSEMBLY

Apply grease to the anchor pins and brake cam.

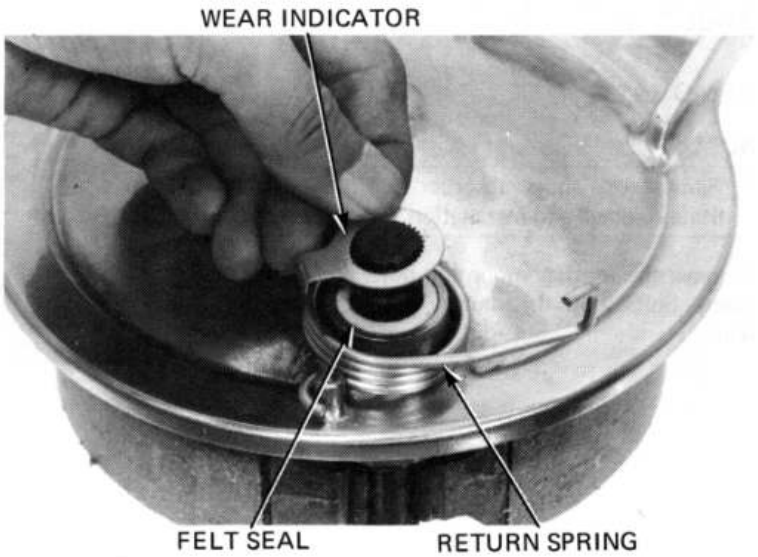
WARNING

Contaminated brake linings reduce stopping power. Keep grease off the brake linings. Wipe any excess grease off the cam.



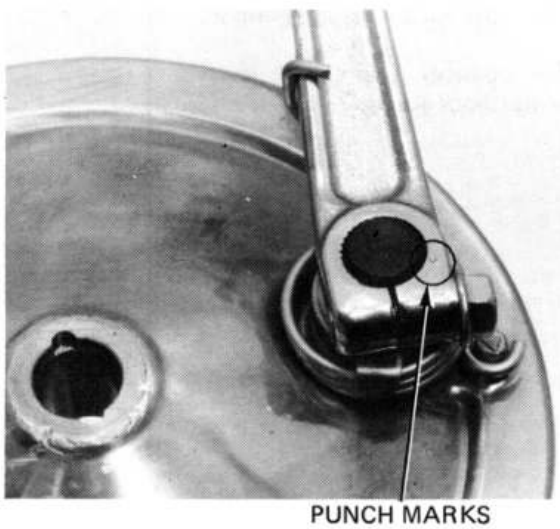
– Install the following.
– brake shoes.
– cotter pins.

Install the felt seal, return spring and wear indicator.

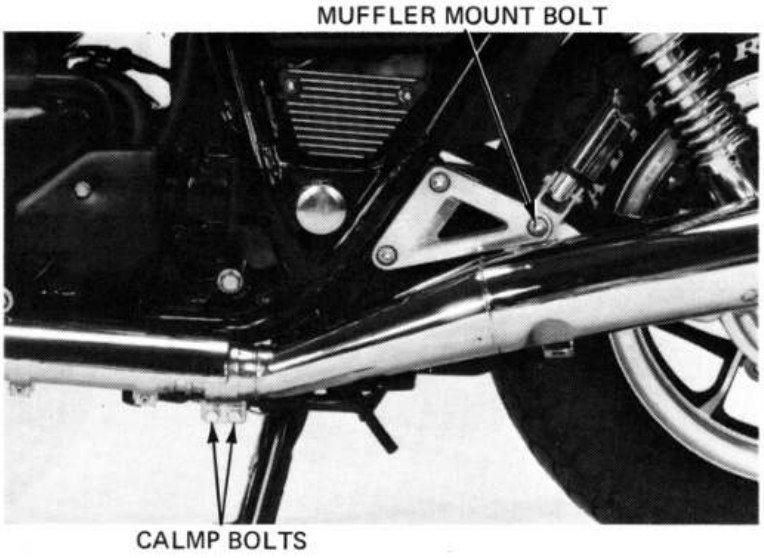


Install the brake arm, aligning the punch marks and tighten the brake arm bolt.

TORQUE: 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)



SHOCK ABSORBER



REMOVAL

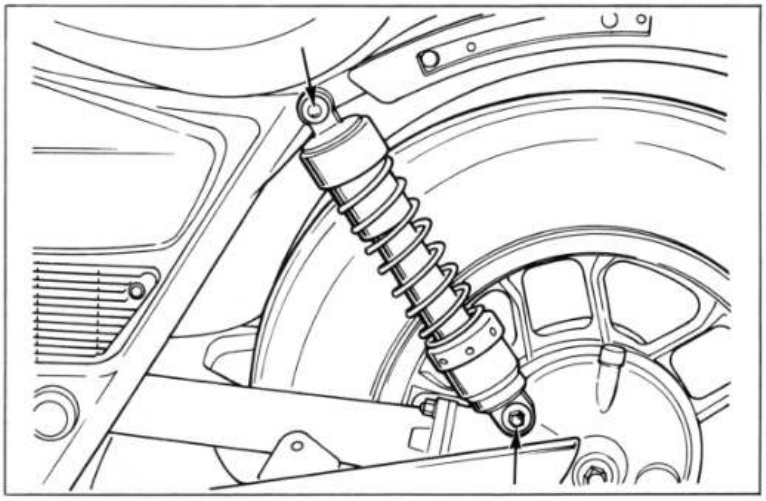
NOTE:

> Remove one shock absorber at a time to facilitate removal and installation.

Remove the muffler mounting bolts and loosen the clamp bolts. Pull the muffler slightly toward the rear.

Adjust the shock absorber to the softest position.

Remove the shock absorber upper and lower mounts and remove the shock absorber.



DISASSEMBLY

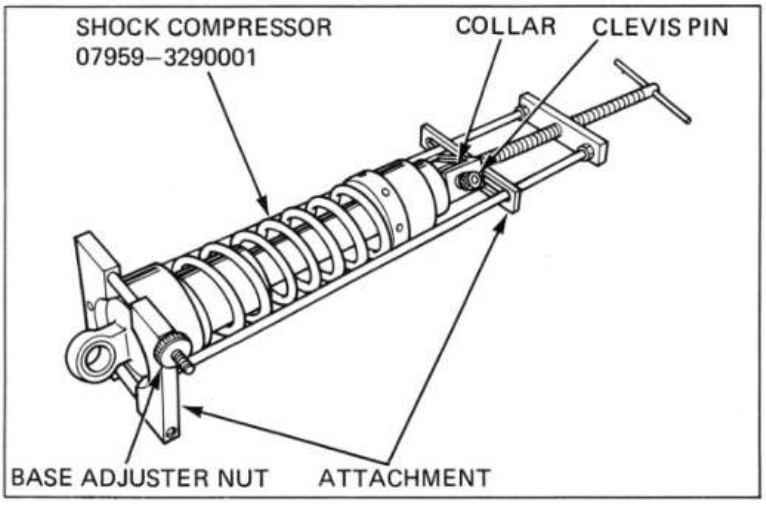
Replace base and guide of shock compressor, P/N 07959–3290001 with attachments, 07959–MB10000.

Place the collar P/N 52486–463–0000 or equivalent in the shock's bottom joint before putting the shock in the compressor.

Set the shock in the compressor as shown and compress the spring 30 mm by turning the compressor handle.

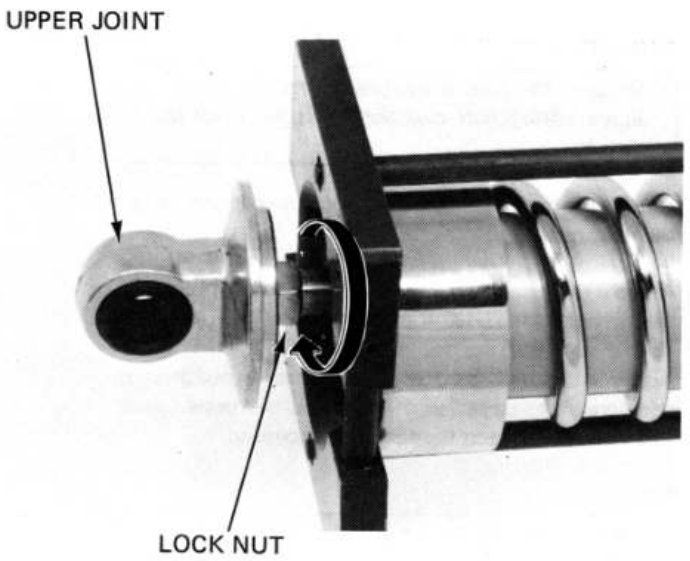
CAUTION:

> *Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.*



place the upper joint in a vise and pull the shock rod out.

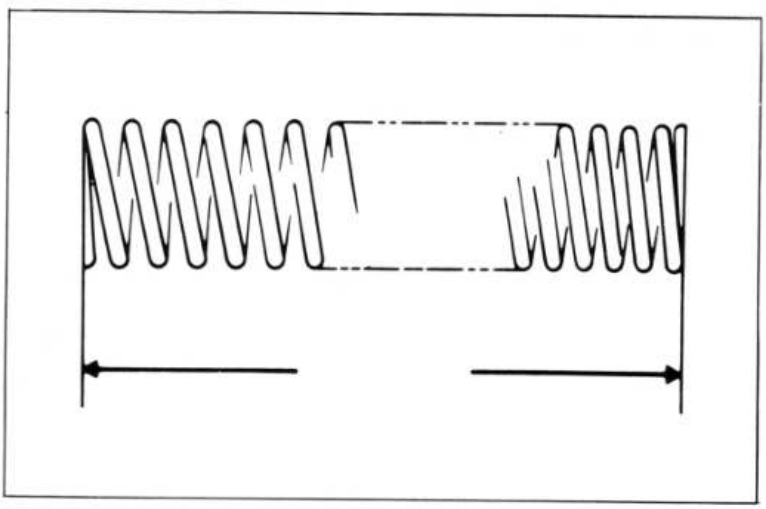
Separate the upper joint rotating the lock nut in the direction shown and remove the compressor.



SPRING FREE LENGTH

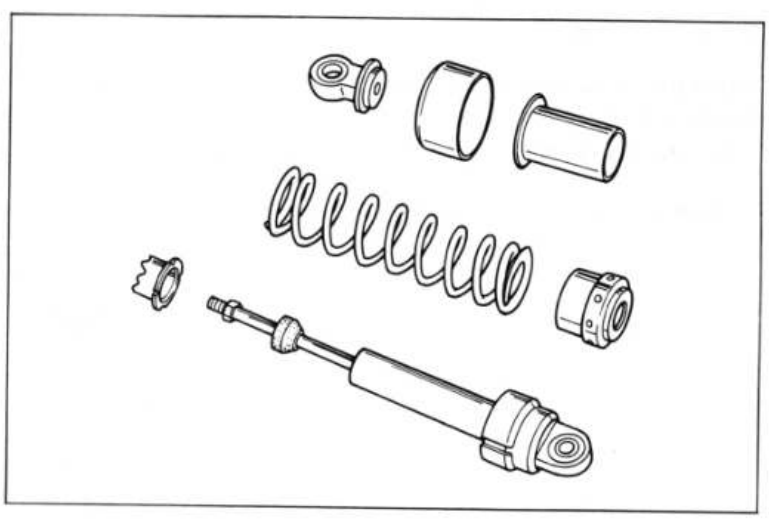
Measure the rear shock absorber spring free length.

SERVICE LIMIT: 211 mm (8.3 in)



ASSEMBLY

Place the spring adjuster, the spring lower seat, spring upper seat and stopper rubber on the damper.



CAUTION:

Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.

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

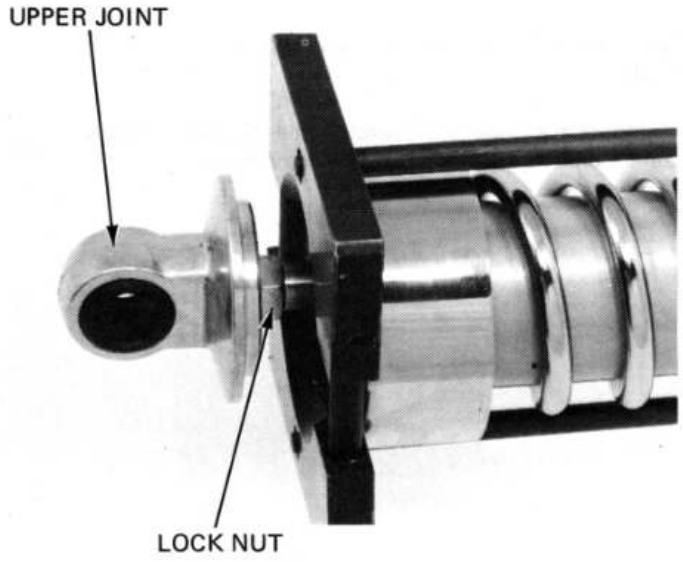
Attach the shock absorber compressor, screwing in the compressor's base adjuster nut.

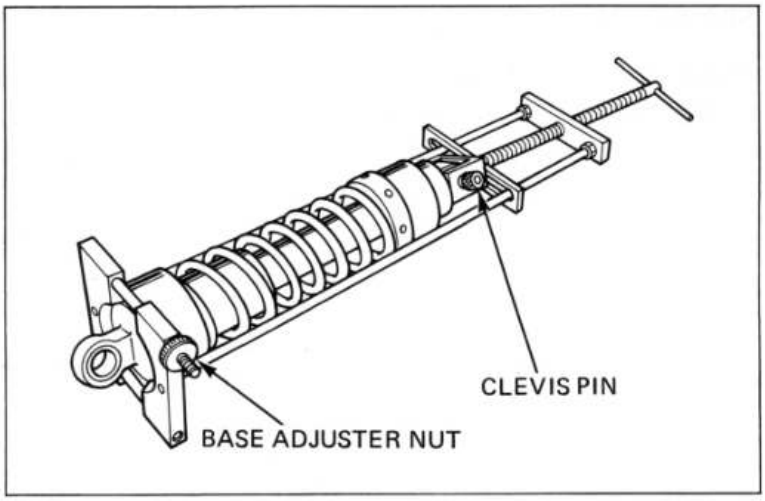
Apply a locking agent to the damper rod threads and screw the upper joint on. Hold the upper joint in a vise and tighten the lock nut securely.

NOTE:

Check that the lock nut is seated against the rod's bottom thread.

Align the spring seat with the upper joint while releasing the compressor.



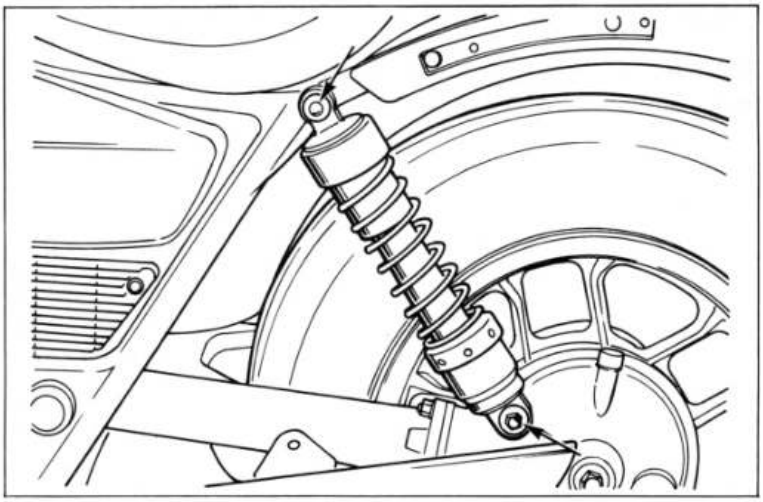


INSTALLATION

Install the shock absorber onto the frame.
Tighten the upper and lower mounts.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

Tighten the exhaust muffler mount and clamp bolts.

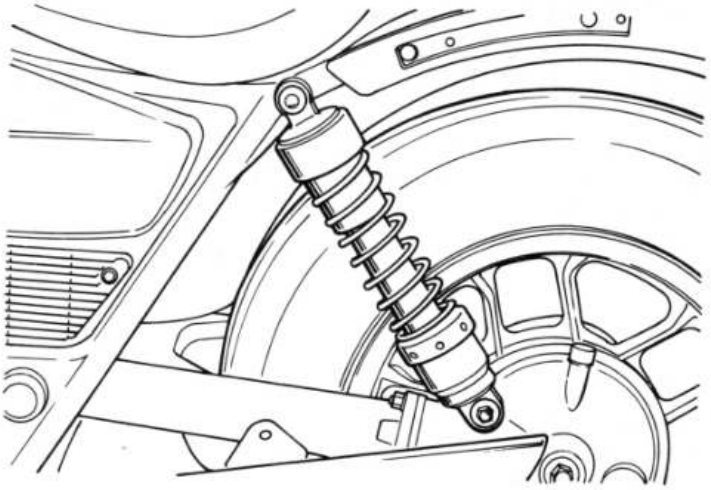


SWINGARM

REMOVAL

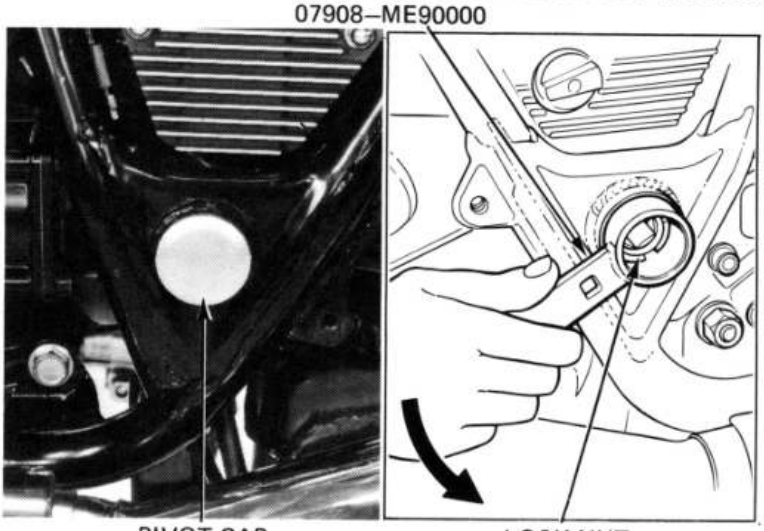
Remove the rear wheel (page 16-3) and the final drive gear case (page (14-3).

Remove the rear shock absorbers (page 16-10).



Remove the swingarm pivot caps and loosen the right pivot bolt lock nut.

SWINGARM PIVOT LOCK NUT WRENCH
07908–ME90000



PIVOT CAP

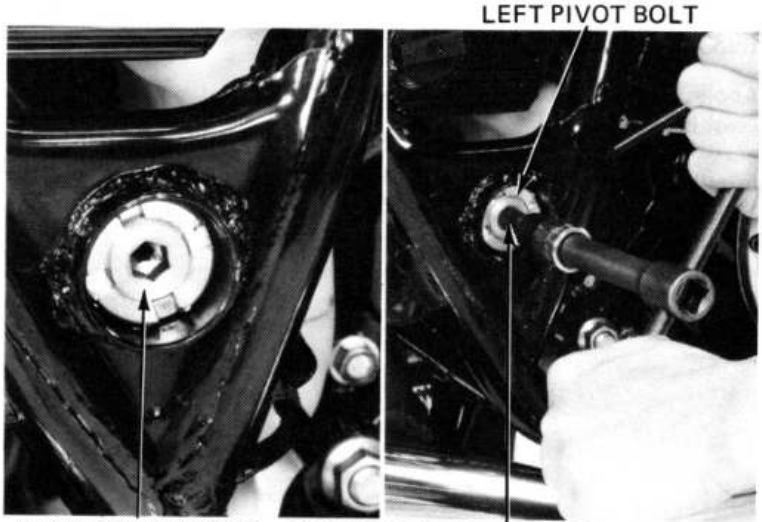
LOCK NUT

Remove the right pivot bolt, using the 10 mm socket bit.

Remove the left pivot bolt and remove the swingarm.

Remove the boot from the swingarm.

LEFT PIVOT BOLT



RIGHT PIVOT BOLT

SOCKET BIT, 10 mm 07917–3710000
COMMERCIALLY AVAILABLE IN U.S.A.

PIVOT BEARING REPLACEMENT

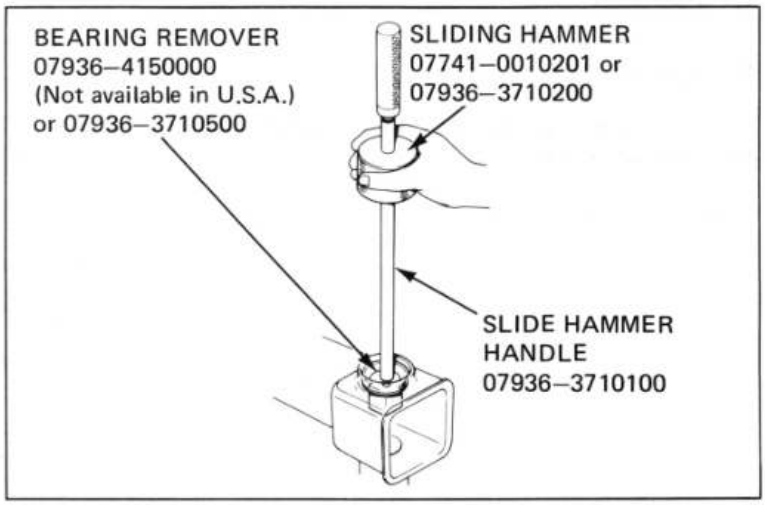
Punch or drill a 13 mm (1/2 in) hole into each grease retainer.

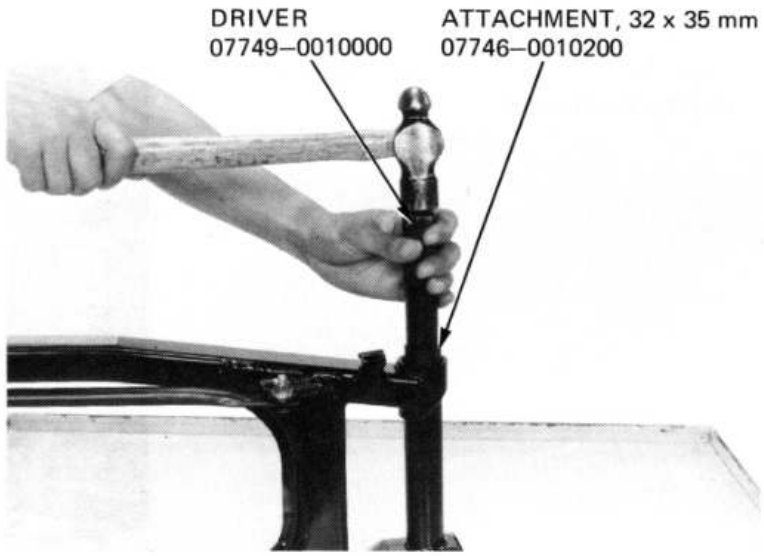
Remove the attachment from the special tool, 07936–3710500. Slide the shaft through the hole and install a 29 mm (O.D.) washer or equivalent attachment onto the shaft.
Install the slide hammer and handle remove the race.
Repeat for the other side.

NOTE:

> Replace the bearing inner and outer races as a set. Replace the grease retainer plate whenever it is removed.

Install new grease retainer plates and drive new bearing outer races into the swingarm pivot.



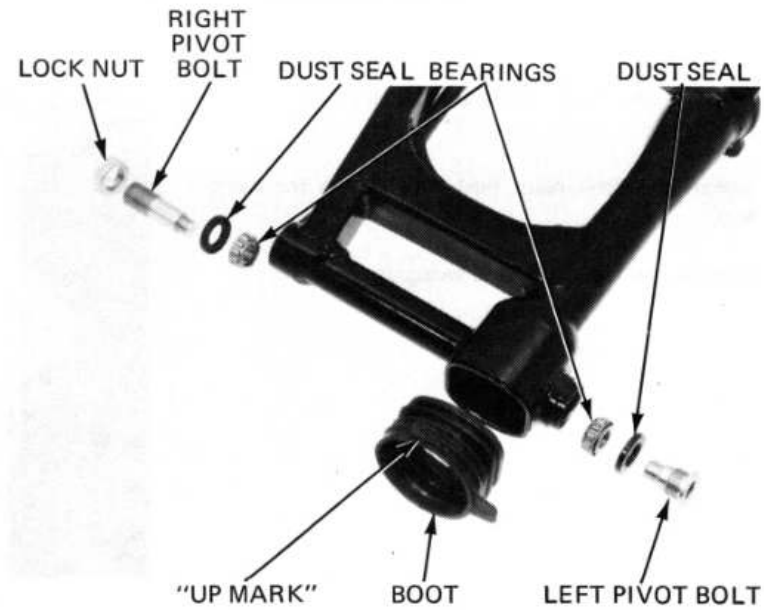


INSTALLATION

Apply grease to the pivot bearings dust seals and pivot bolt tips.

Install the bearings and dust seals.

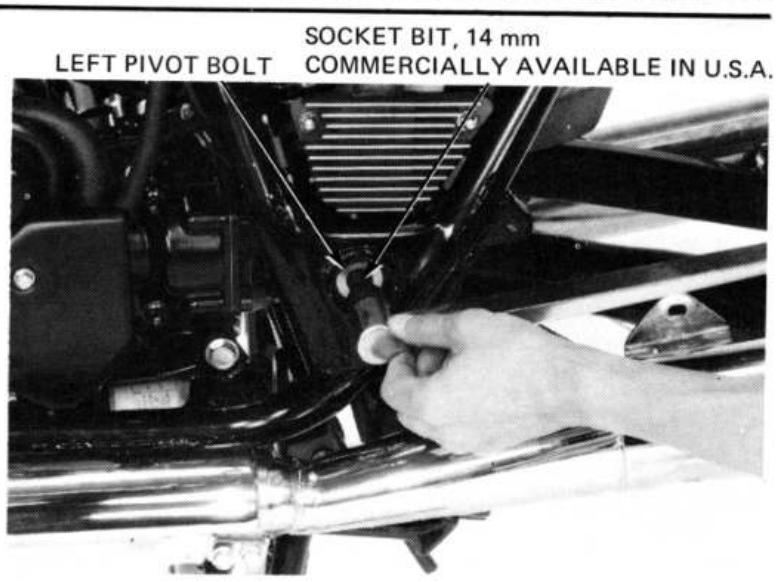
Install the swingarm boot with its "UP" mark up.



Install the swingarm and pivot bolts.

Tighten the left pivot bolt to the specified torque.

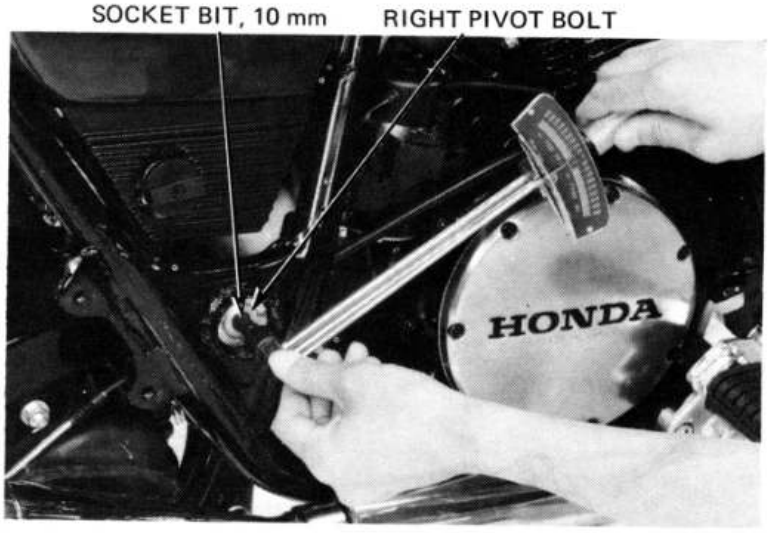
TORQUE: 100–130 N·m
(10.0–13.0 kg-m, 72–94 ft-lb)



Tighten the right pivot bolt to 20 N·m (2.0 kg-m, 14 ft-lb), loosen it and retighten to the specified torque.

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

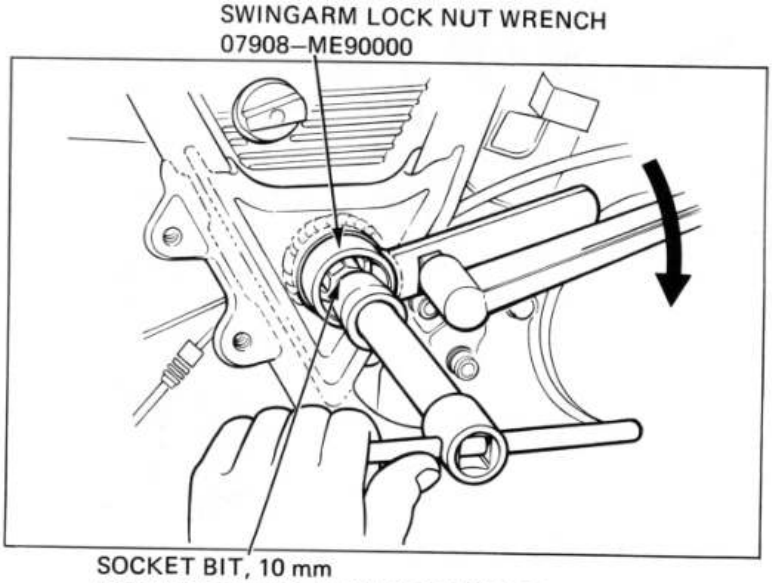
Move the swingarm up and down several times. Retighten the right pivot bolt to the specified torque.

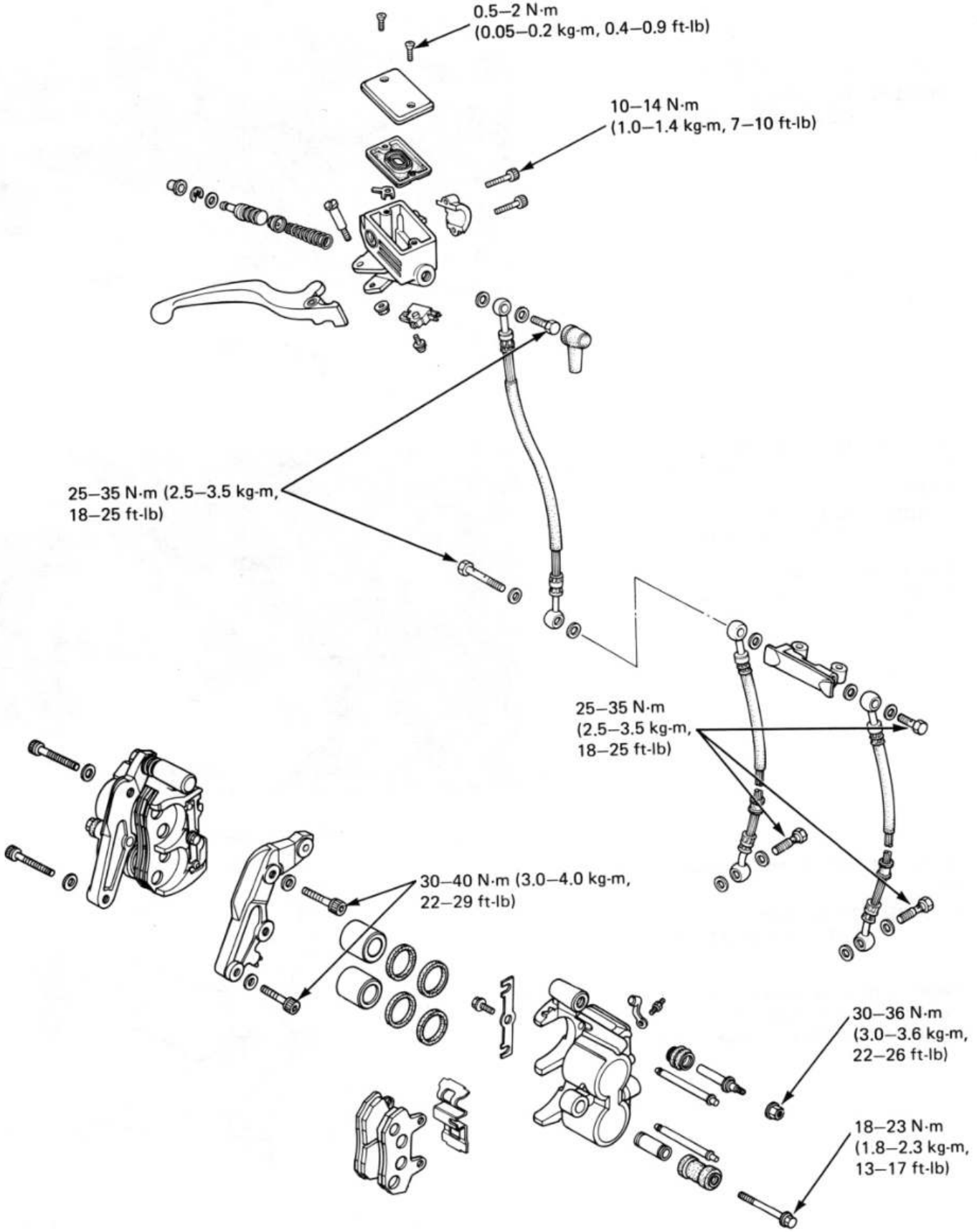


Tighten the lock nut while holding the right pivot bolt.

TORQUE: 100–130 N·m
(10.0–13.0 kg-m, 72–94 ft-lb)

Install the final gear (page 14-17).
Install the rear wheel (page 16-7).
Install the shock absorbers (page 16-12).




0.5–2 N·m
(0.05–0.2 kg-m, 0.4–0.9 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
25–35 N·m (2.5–3.5 kg-m,
18–25 ft-lb)
25–35 N·m
(2.5–3.5 kg-m,
18–25 ft-lb)
30–40 N·m (3.0–4.0 kg-m,
22–29 ft-lb)
30–36 N·m
(3.0–3.6 kg-m,
22–26 ft-lb)
18–23 N·m
(1.8–2.3 kg-m,
13–17 ft-lb)

17. HYDRAULIC BRAKE

SERVICE INFORMATION	17–1
TROUBLESHOOTING	17–2
BRAKE FLUID REPLACEMENT/AIR BLEEDING	17–3
BRAKE PAD/DISC	17–5
MASTER CYLINDER	17–7
BRAKE CALIPERS	17–10

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.

SPECIFICATIONS

	STANDARD	SERVICE LIMIT
Front disc thickness	4.8–5.2 mm (0.19–0.20 in)	4.0 mm (0.16 in)
Front disc runout	———	0.3 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.	30.148–30.280 mm (1.1901–1.1921 in)	30.29 mm (1.193 in)
Front caliper cylinder I.D.	30.230–30.280 mm (1.1902–1.2913 in)	30.14 mm (1.187 in)

TORQUE VALUES

Brake hose bolt	25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Front brake caliper bracket	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Front brake caliper bolt	18–23 N·m (1.8–2.3 kg-m, 13–17 ft-lb)
Front brake caliper pivot bolt	30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)

TOOL

Special

Snap ring pliers	07914–3230001

TROUBLESHOOTING

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

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

Brakes drag
1. Hydraulic system sticking.
2. Sticking piston(s)
3. Incorrect rear brake pedal adjustment.

Brakes grab or pull to one side
1. Pads contaminated.
2. One side of front brake faulty.
3. Disc or wheel misaligned.

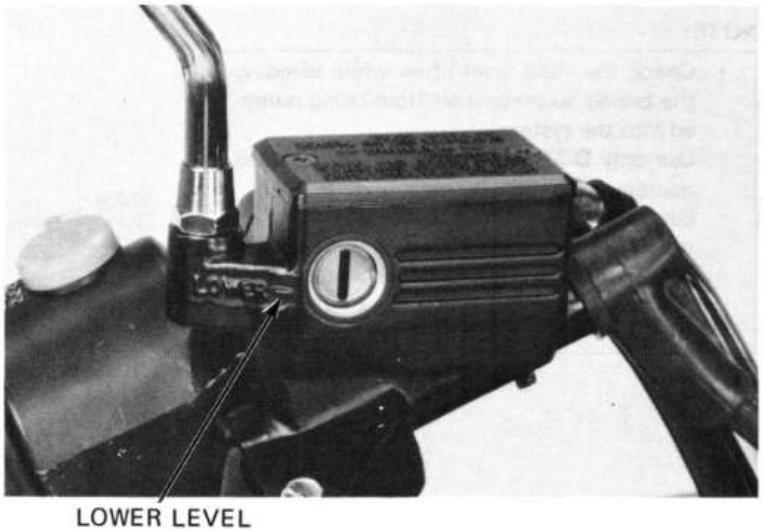
Brake chatter or squeal
1. Pads contaminated.
2. Excessive disc runout.
3. Caliper installed incorrectly.
4. Disc or wheel misaligned.

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

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

CAUTION:

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



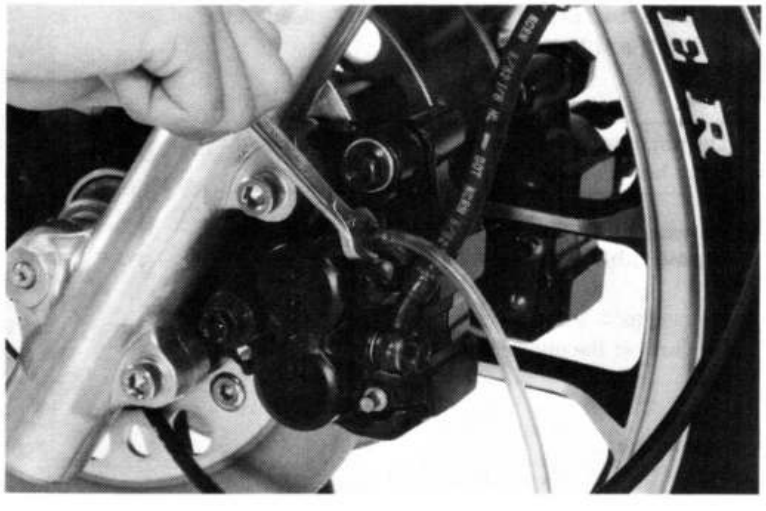
BRAKE FLUID DRAINING

Connect a bleed hose to the bleed valve.

Loosen the caliper bleed valve and pump the brake lever. Stop operating the lever when fluid stops flowing out of the bleed valve.

WARNING

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



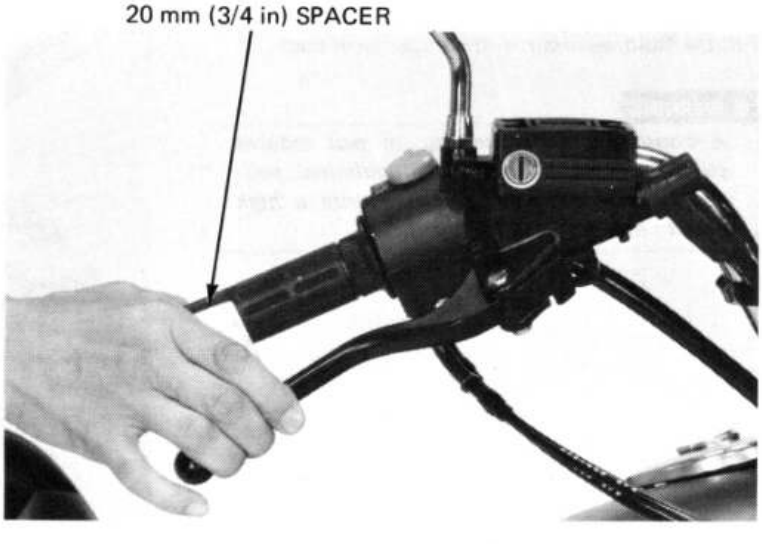
BRAKE FLUID FILLING

NOTE:

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

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

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



AIR BLEEDING

NOTE:

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- Use only **DOT 3 brake fluid** from a sealed container.
- Do not mix brake fluid types and never reuse the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.



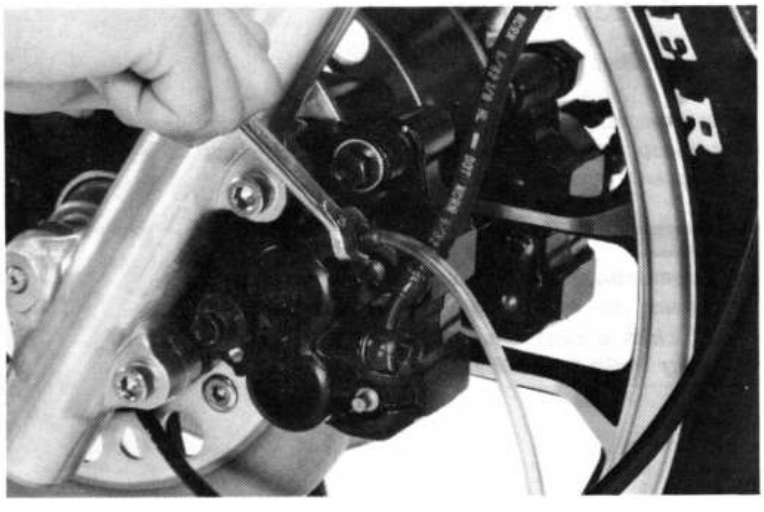
1) Squeeze the brake lever, oepn the bleed valve 1/2 turn and then close the valve.

NOTE:

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

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

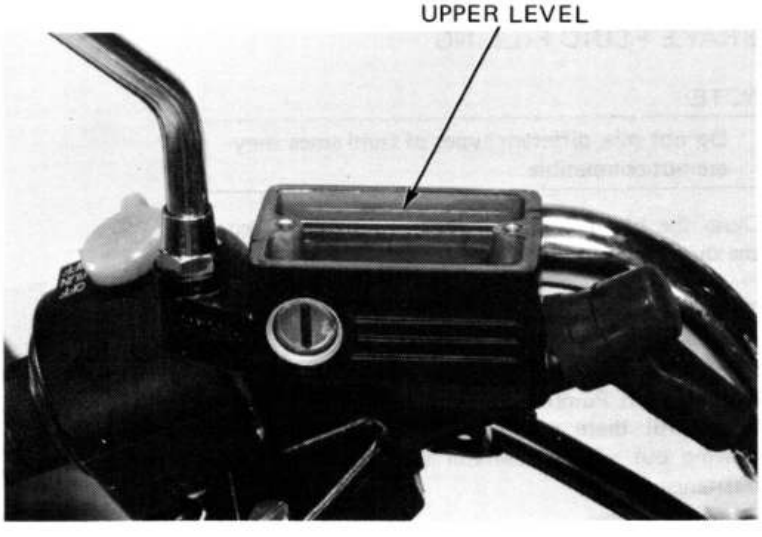
Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.



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.



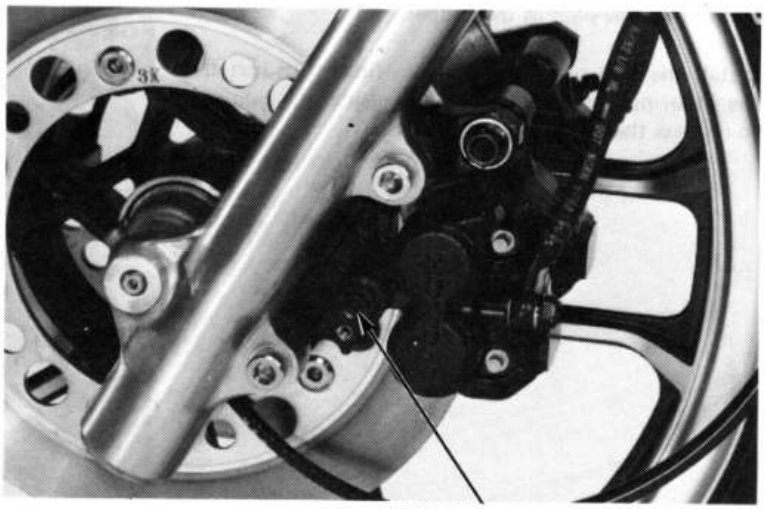
BRAKE PAD/DISC

PAD REPLACEMENT

NOTE:

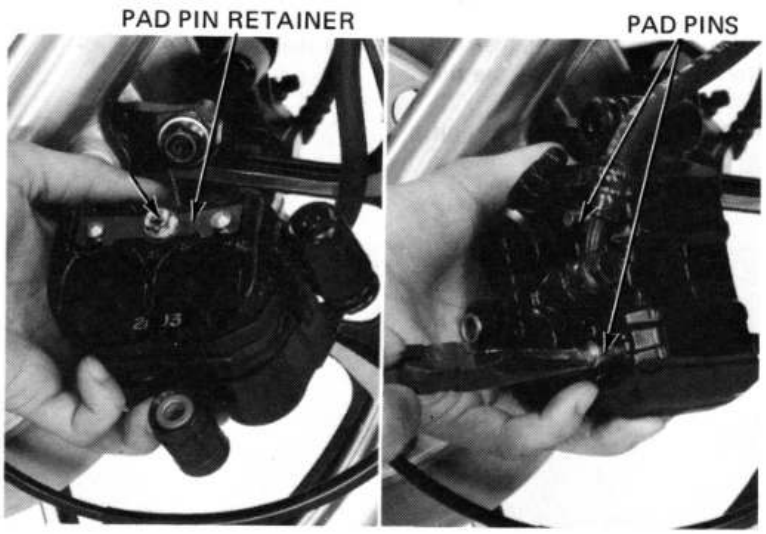
> Always replace the brake pads in pairs to assure even disc pressure.

Remove the caliper bolt.
Pivot the caliper up out of the way.



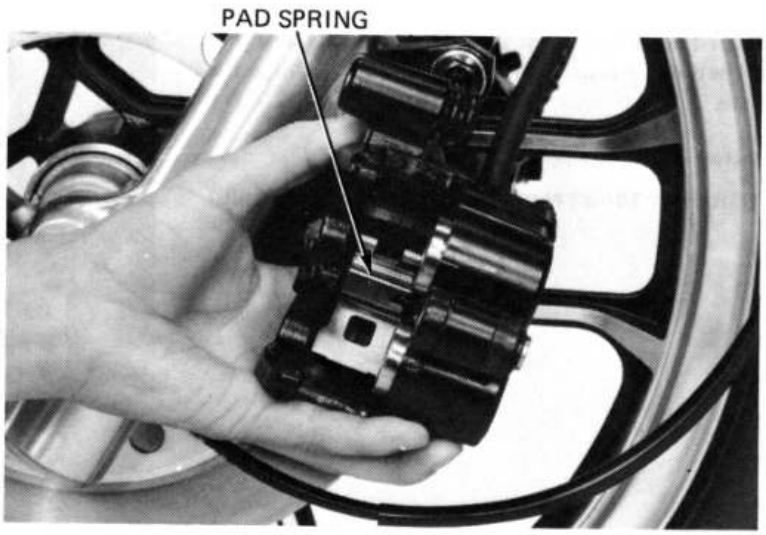
Remove the pad pin retainer and pull the pad pins out of the caliper.

Remove the brake pads.



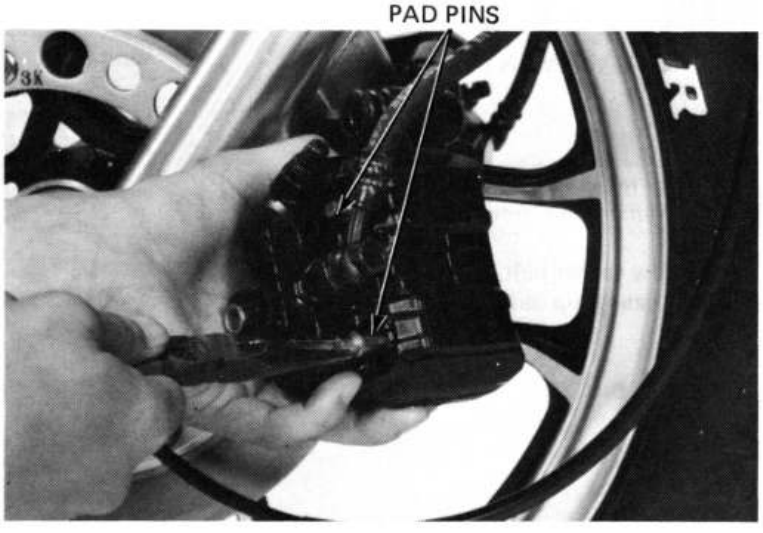
Position the pad spring in the caliper as shown.

Push the caliper pistons in all the way.



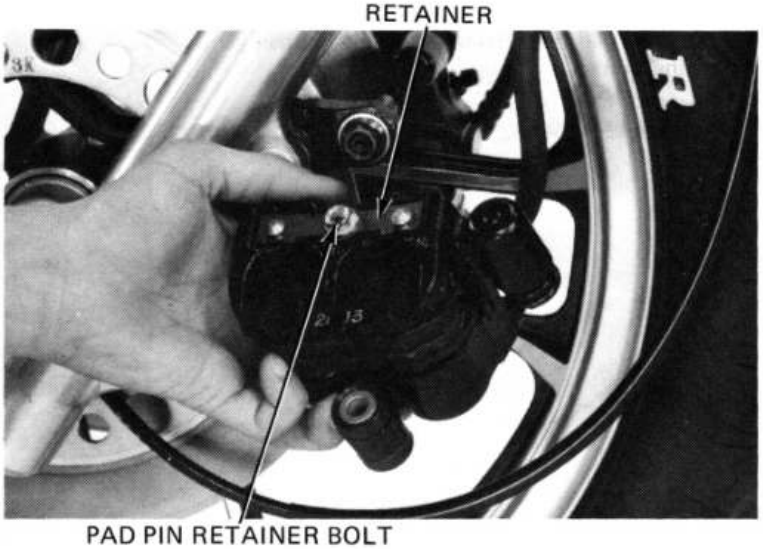
Install the new pads in the caliper.

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.

Install the pad pin retainer bolt.

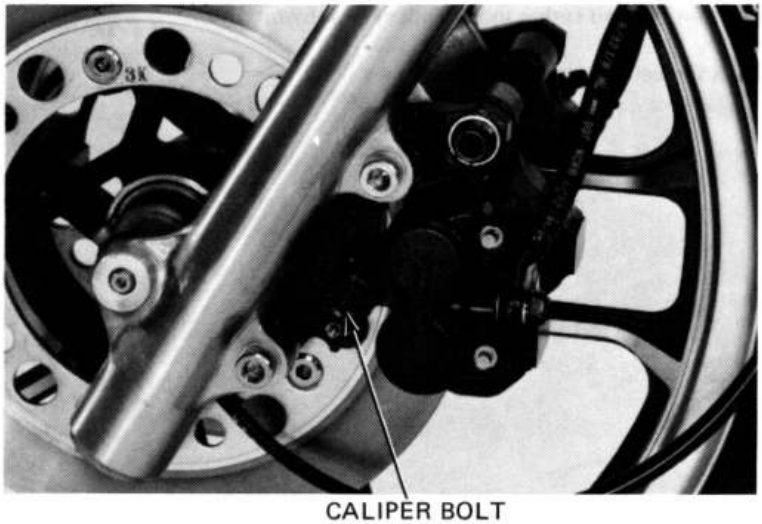


PAD PIN RETAINER BOLT

Pivot the caliper down so the brake disc is positioned between the pads, making sure not to damage the pads.

Install the caliper bolt and tighten it.

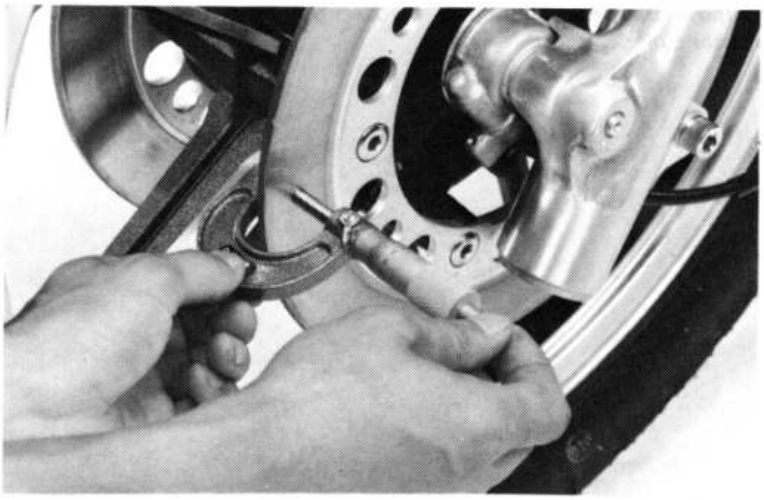
TORQUE: 18–23 N.m (1.8–2.3 kg-m, 13–17 ft-lb)


CALIPER BOLT

DISC THICKNESS

Measure the thickness of each disc.

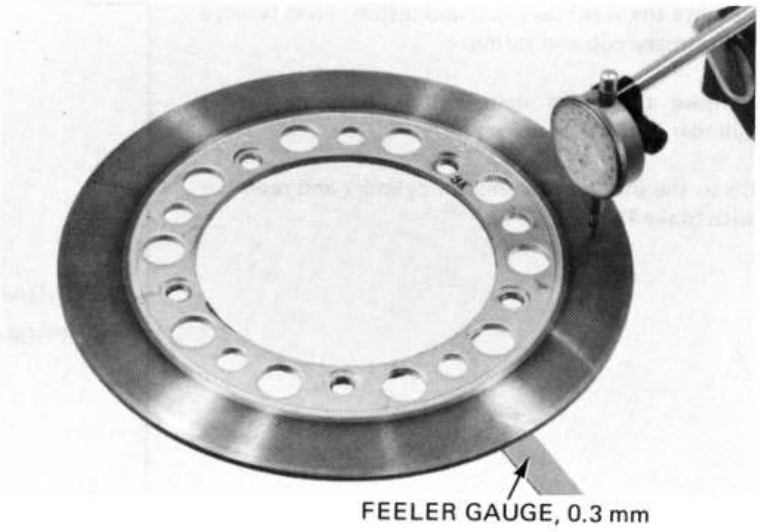
SERVICE LIMIT: 4.0 mm (0.16 in)



BRAKE DISC WARPAGE

Measure the brake disc for warpage with a feeler gauge on a surface plate.

SERVICE LIMIT: 0.30 mm (0.012 in)



FEELER GAUGE, 0.3 mm

MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system.

Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

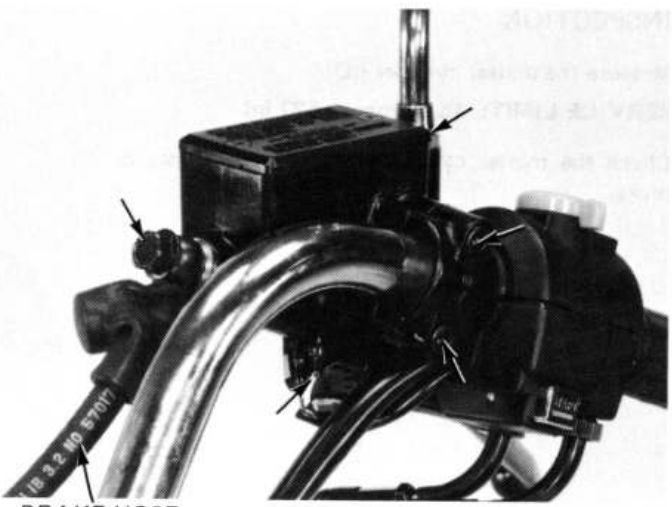
CAUTION:

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

NOTE:

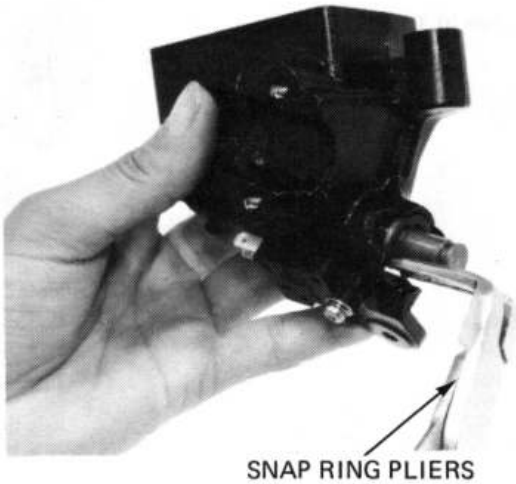
> When removing the oil hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the master cylinder.



BRAKE HOSE

Remove the piston boot and the circlip from the master cylinder body.

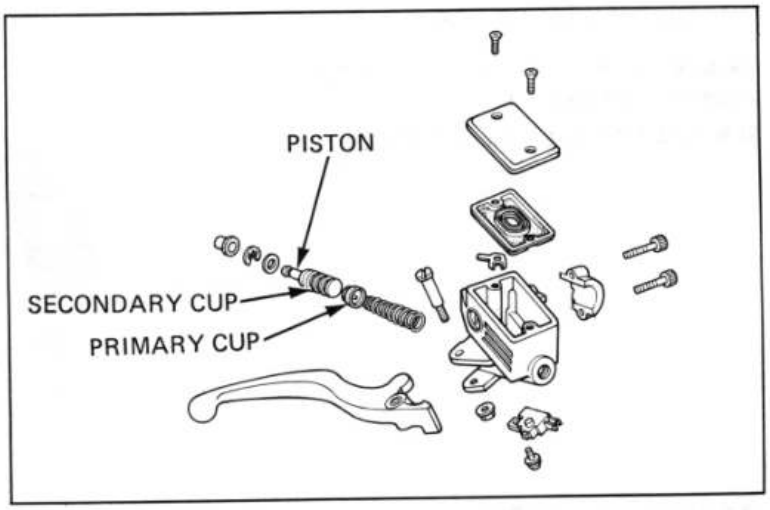


SNAP RING PLIERS
07914–3230001

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.

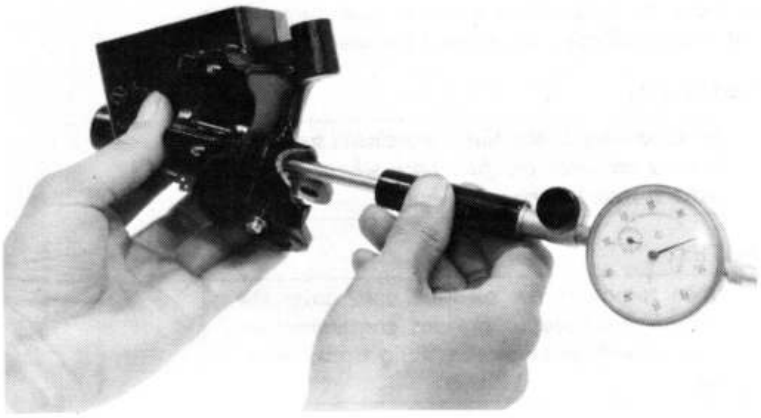


INSPECTION

Measure the master cylinder I.D.

SERVICE LIMIT: 15.93 mm (0.627 in)

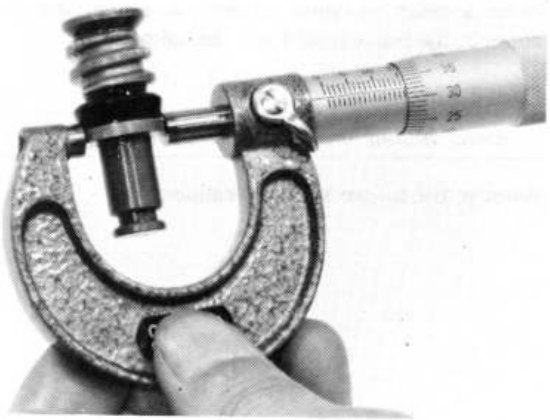
Check the master cylinder for scores, scratches or nicks.



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:

Handle the master cylinder piston, cylinder and spring as a set.

Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and primary cup together.

Dip the piston cup in brake fluid before assembly.

CAUTION:

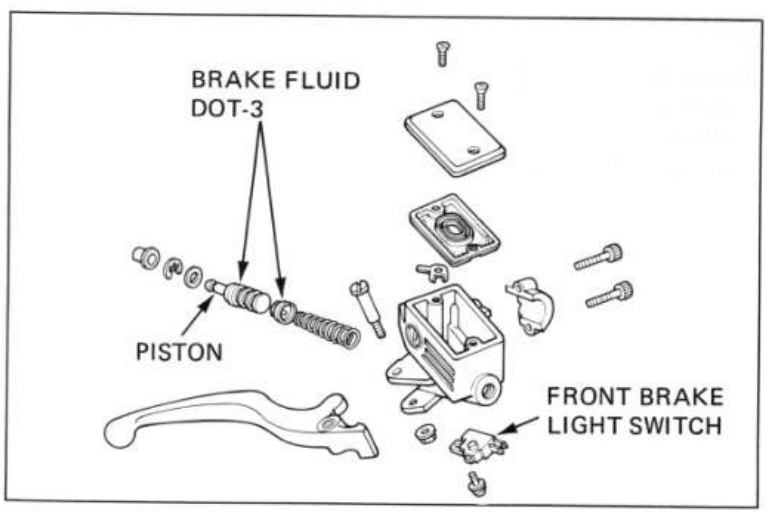
When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.

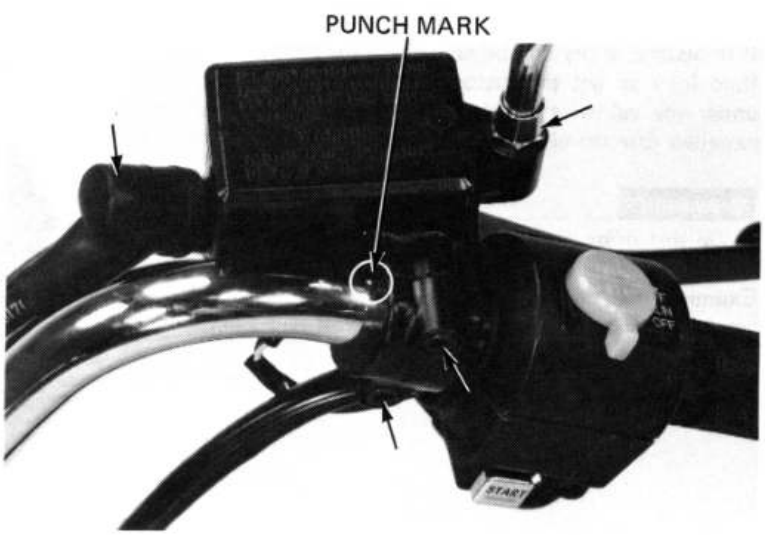
Install the piston clip and boot.

Place the master cylinder on the handlebar and install the holder with the two mounting bolts. Tighten the top bolt first. Install the oil hose with the bolt and its two sealing washers.

Install the brake lever.

Fill the reservoir to the upper level and bleed the brake system according to page 17-4.





BRAKE CALIPERS

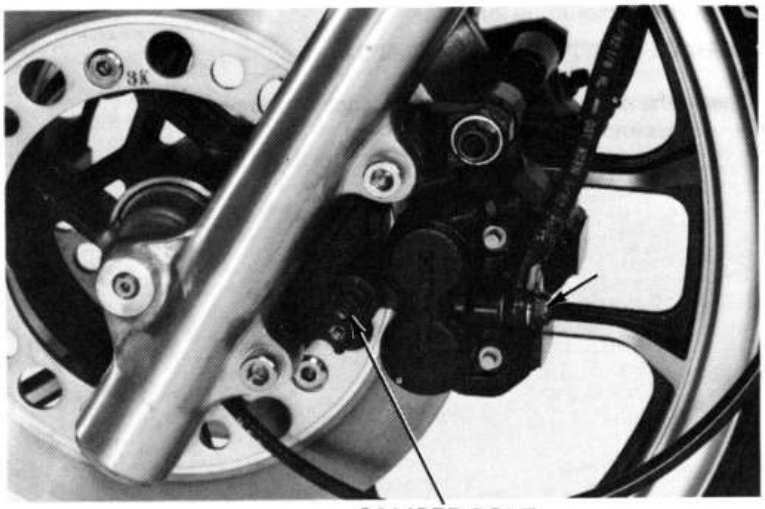
REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION:

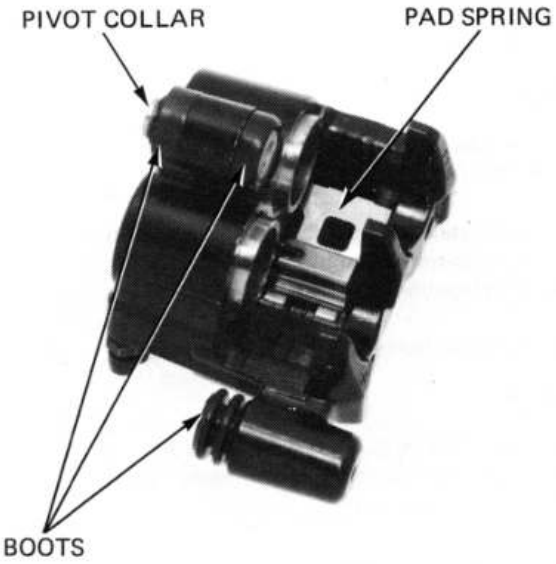
Avoid spilling brake fluid on painted surfaces.

Remove the caliper bolt and caliper.



DISASSEMBLY

Remove the following:
- pads and pad spring.
- caliper pivot collar and boots.
- pistons from the caliper.

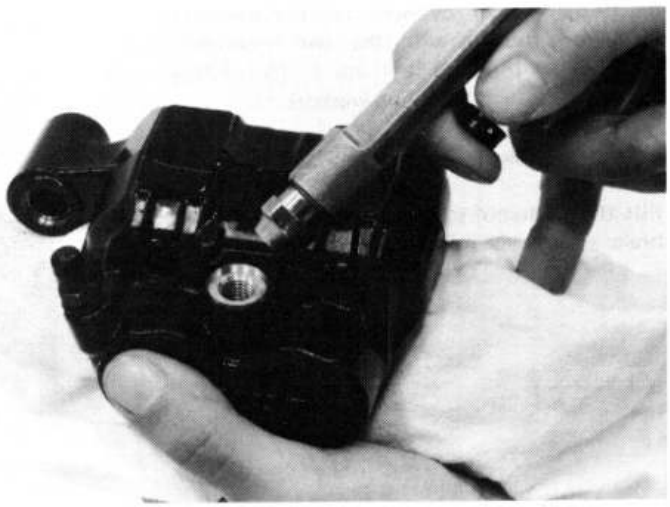


If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.

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.

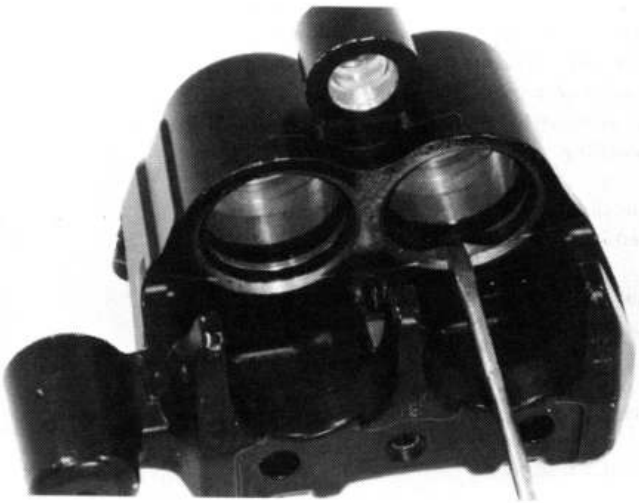


Push the piston seals in, lift them out and discard them.

Clean the oil seal grooves with brake fluid.

CAUTION:

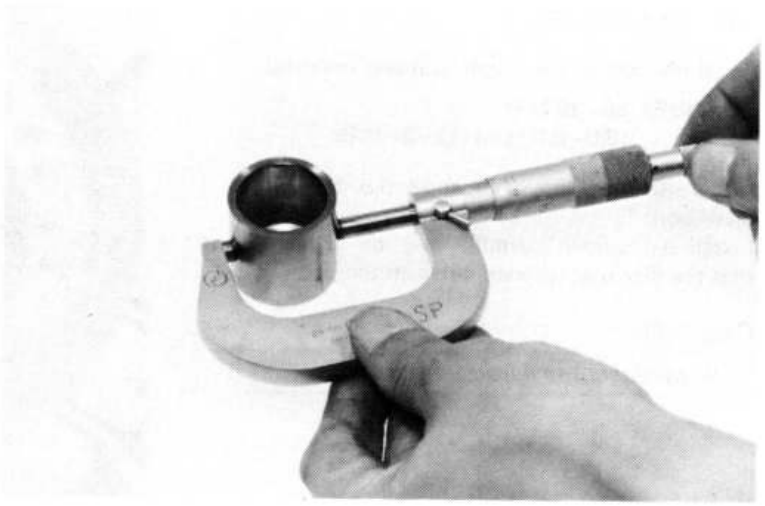
Be careful not to damage the piston sliding surfaces when removing the seals.



PISTON INSPECTION

Check the pistons for scoring, scratches or other faults. Measure the piston diameter with a micrometer.

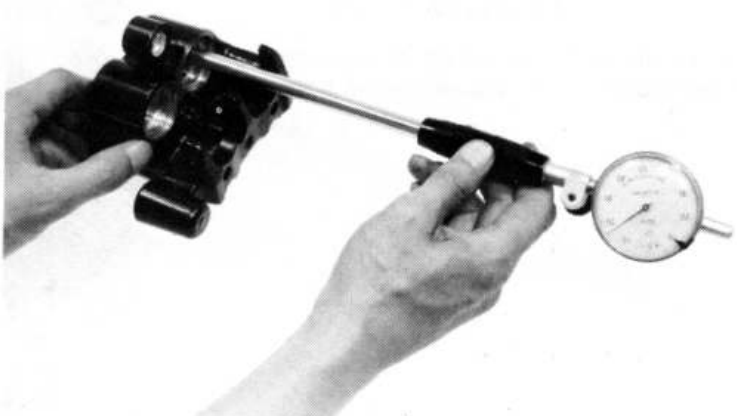
SERVICE LIMIT: 30.14 mm (1.187 in)



CYLINDER INSPECTION

Check the caliper cylinder bore for scoring, scratches or other faults. Measure the caliper cylinder bore.

SERVICE LIMIT: 30.29 mm (1.193 in)



ASSEMBLY

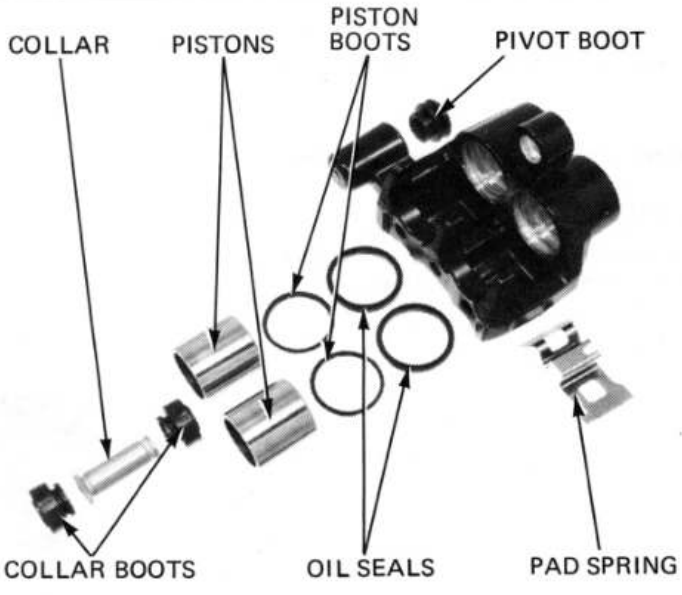
If the piston boots are hardened or deteriorated, replace them with new ones. The piston seals must be replaced with new ones whenever they are removed. Coat the seals with silicone grease or brake fluid before assembly.

Install the pistons with the dished ends toward the pads. Then install the piston boots.

Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly.

Install the pad spring and pads.

Install the pivot boot.



INSTALLATION

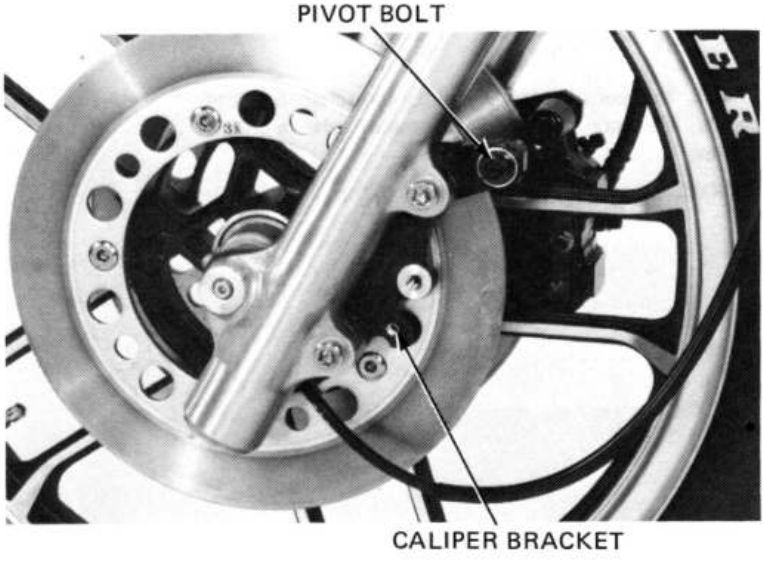
Install the caliper pivot bolt, if it was removed.

TORQUE: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)

Apply silicone grease or brake fluid to the caliper pivot bolt.
Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

CAUTION:

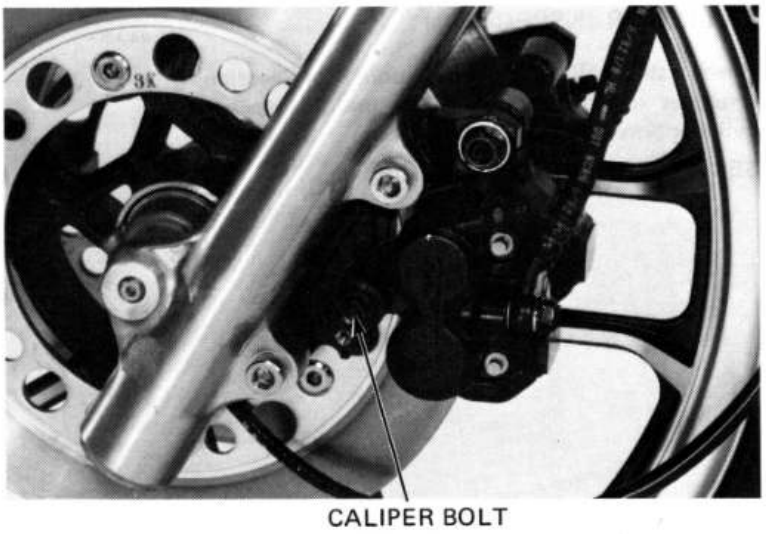
Be careful not to damage the pads.

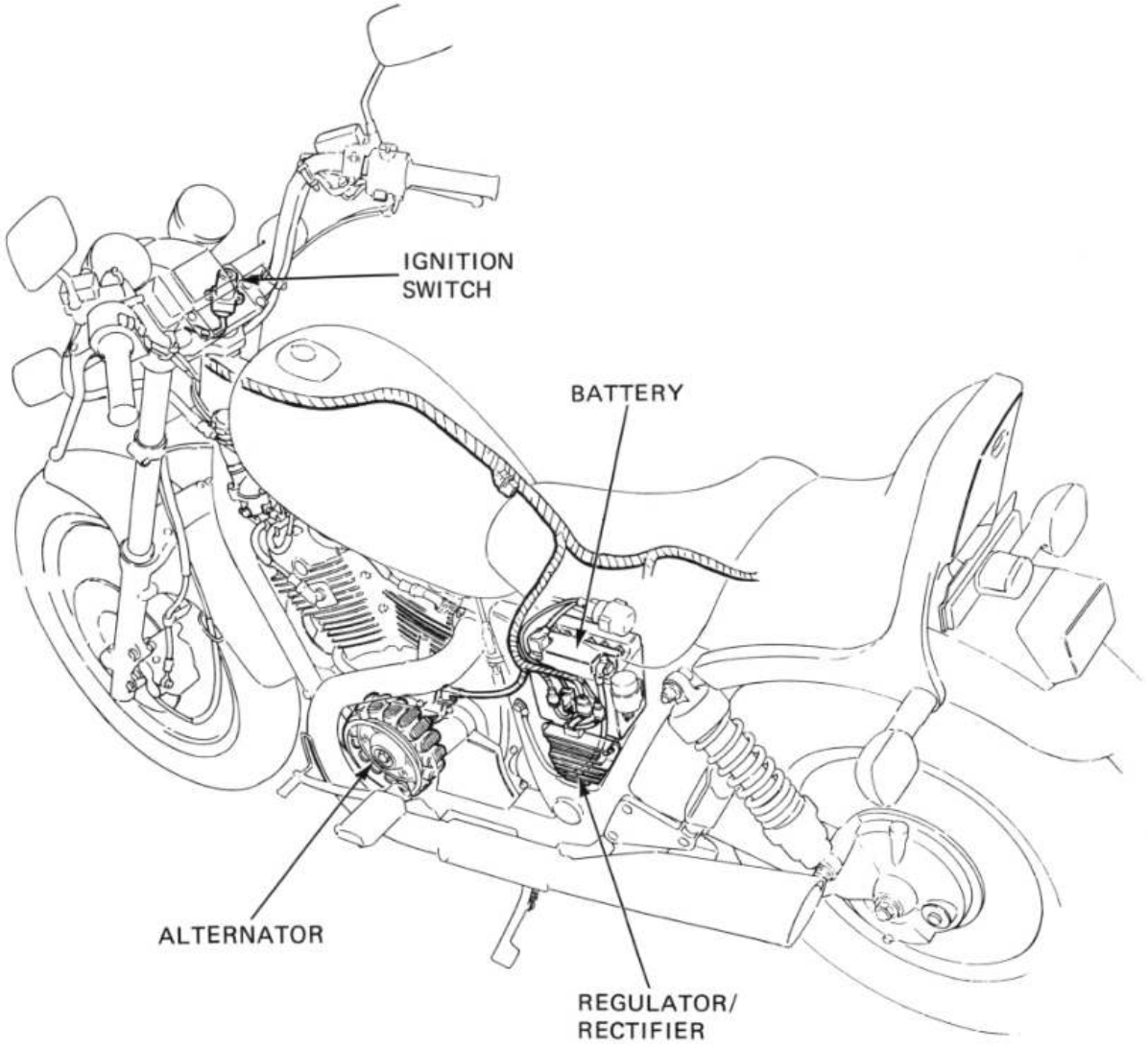


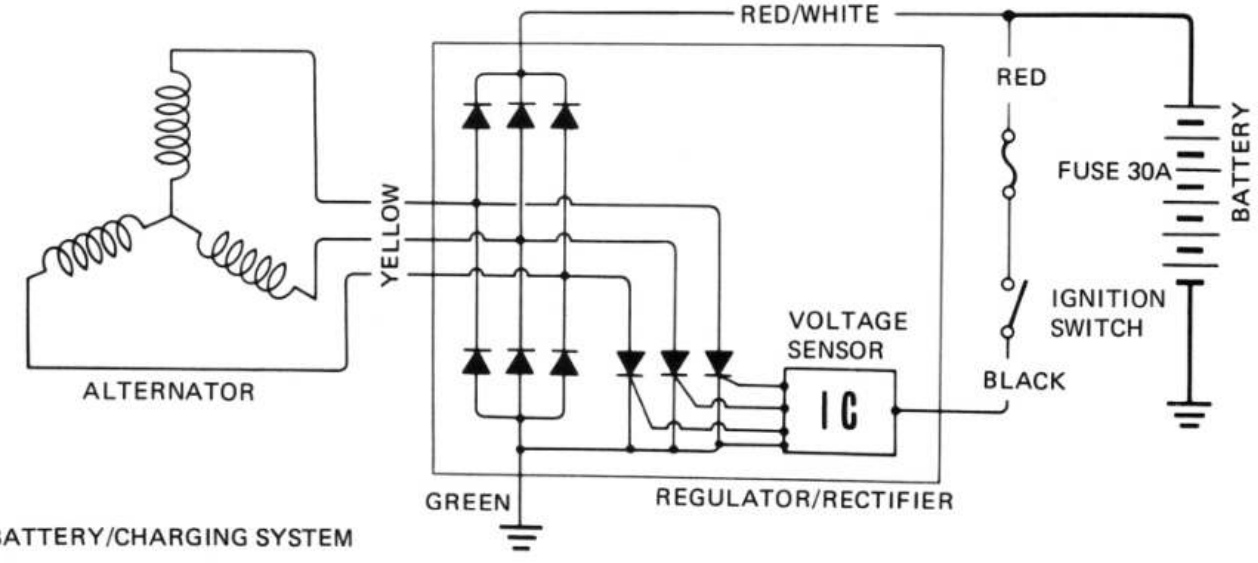
Install the caliper bolt.

TORQUE: 18–23 N·m (1.8–2.3 kg-m, 13–17 ft-lb)

Connect the brake hose and fill the brake fluid reservoir. Bleed the front brake system (page 17-4).







BATTERY/CHARGING SYSTEM

18. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	18–1
TROUBLESHOOTING	18–2
BATTERY	18–3
CHARGING SYSTEM	18–4

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, and keep flames away from 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.
- Alternator removal is in Section 8.

SPECIFICATIONS

Battery	Capacity	12V 16AH	
	Specific gravity	1.280/20°C (68°F)	
	Charging rate	1.4 amperes maximum	
Alternator Capacity		1,000 rpm	5,000 rpm
		11.8A min. (No. load)	25.6A min. (No load)
Voltage regulator		Transistorized non-adjustable regulator	

TROUBLESHOOTING

No power – key turned on:

1. Dead battery.
   - Low fluid level.
   - Low specific gravity.
   - Charging system failure.
2. Disconnected battery cable.
3. Main fuse burned out.
4. Faulty ignition switch.

Low power – key turned on:

1. Weak battery.
   - Low fluid level.
   - Low specific gravity.
   - Charging system failure.
2. Loose battery connection.

Low power – engine running:

1. Battery undercharged.
   - Low fluid level.
   - One or more dead cells.
2. Charging system failure.

Intermittent power:

1. Loose battery connection.
2. Loose charging system connection.
3. Loose starting system connection.
4. Loose connection or short circuit in ignition system.
5. Loose connection or short circuit in lighting system.

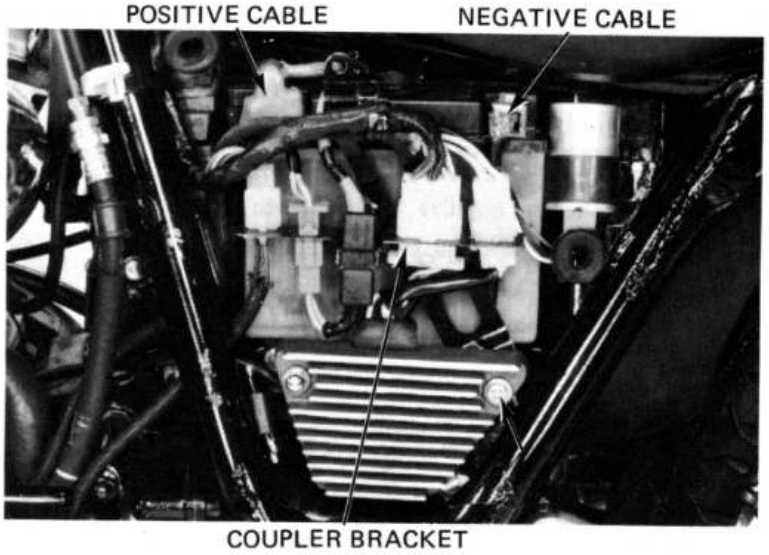
Charging system failure:

1. Loose, broken or shorted wire or connection.
2. Faulty voltage regulator/rectifier.
3. Faulty alternator.

BATTERY

REMOVAL

Remove the left side cover.
Remove the regualtor/rectifier mount screw.
Disconnect the ground cable at the battery terminal.
Open the coupler bracket, then disconnect the positive cable.
Remove the battery.



TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY: 1.270–1.290 (20°C, 68°F)

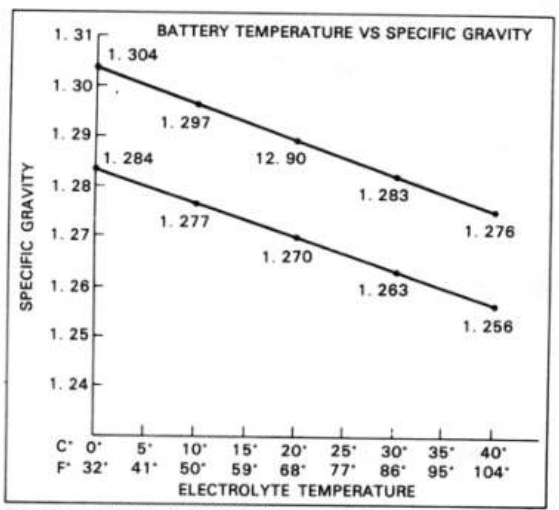
1.270–1.290	Fully charged
Below 1.260	Undercharged

NOTES:

- 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 sulfuric acid. Avoid contact with skin, eyes, or clothing.
Antidote: Flush with water and get prompt medical attention.

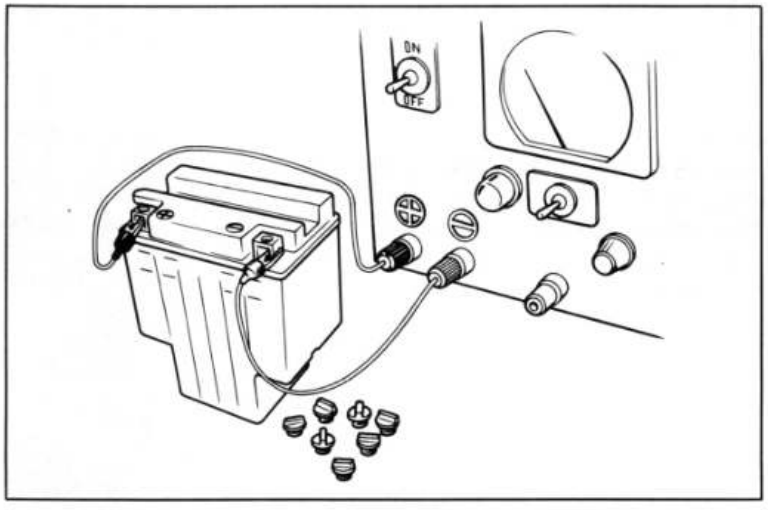


Specific gravity changes by 0.007 for every 10°C.

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: 1.6 amperes max.
Charge the battery until specific gravity is 1.270–1.290 at 20°C (68°F).



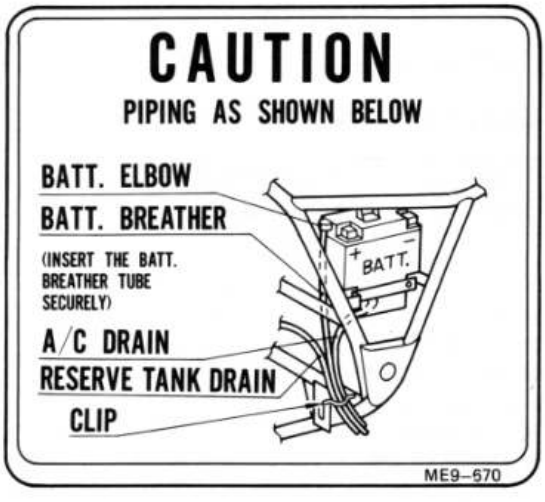
WARNING

- *Before charging a battery, remove the cap from each cell.*
- *Keep flames and sparks away 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:

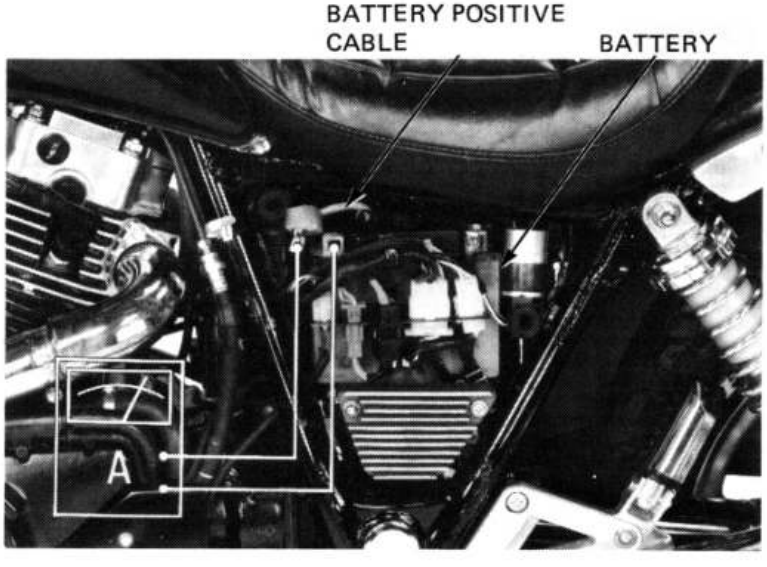
Be sure the battery is in good condition before performing this test.

Warm up the engine.

Remove the frame right side cover.

Disconnect the black wire at the regulator/rectifier coupler and disconnect the headlight.

Disconnect the battery positive cable at the battery terminal and connect an ammeter between the battery cable and terminal.



Allow the engine to idle.

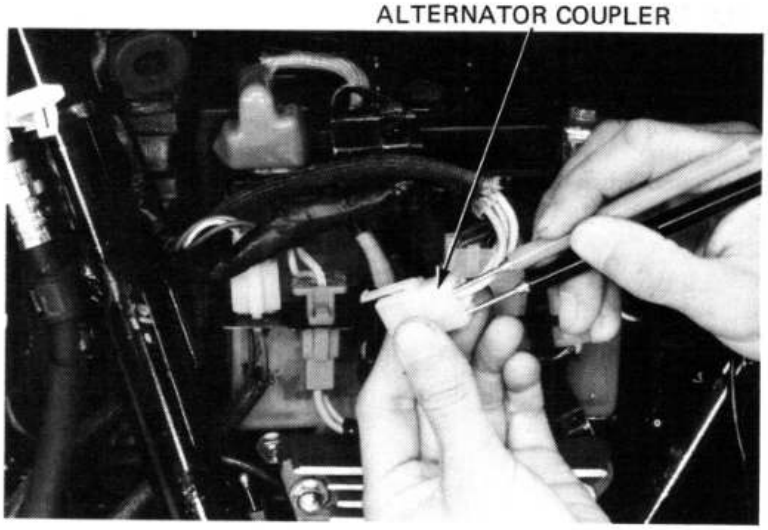
Increase engine speed slowly. Charging amperage should be a minimum of 11.8 at 1,000 rpm and should be a minimum of 25.6 amperes at 5,000 rpm.

Check the stator (page 18-5) and then the regulator/rectifier (page 18-5), if the charging specifications are not met.

STATOR CONTINUITY TEST

Remove the left side cover.
Disconnect the alternator coupler.
Check for continuity between the leads, and between the leads and ground.
Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.

ALTERNATOR COUPLER



VOLTAGE REGULATOR/RECTIFIER TEST

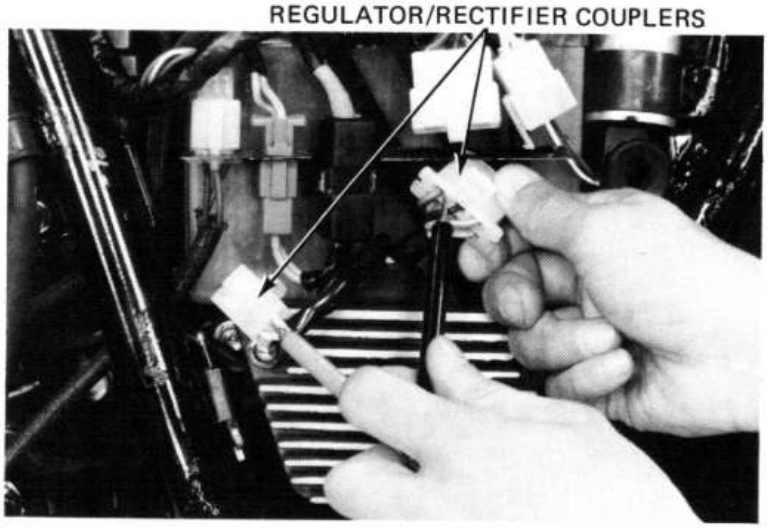
Remove the left side cover.
Disconnect the regulator/rectifier couplers.

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.

REGULATOR/RECTIFIER COUPLERS

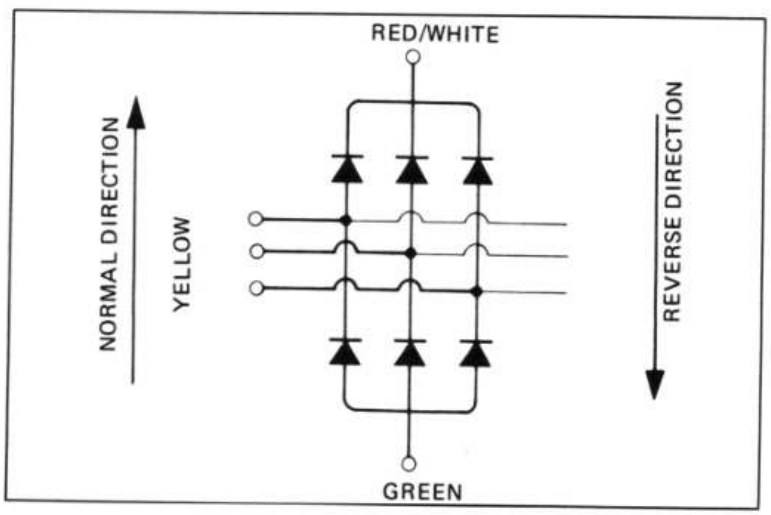


NORMAL DIRECTION: CONTINUITY

	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

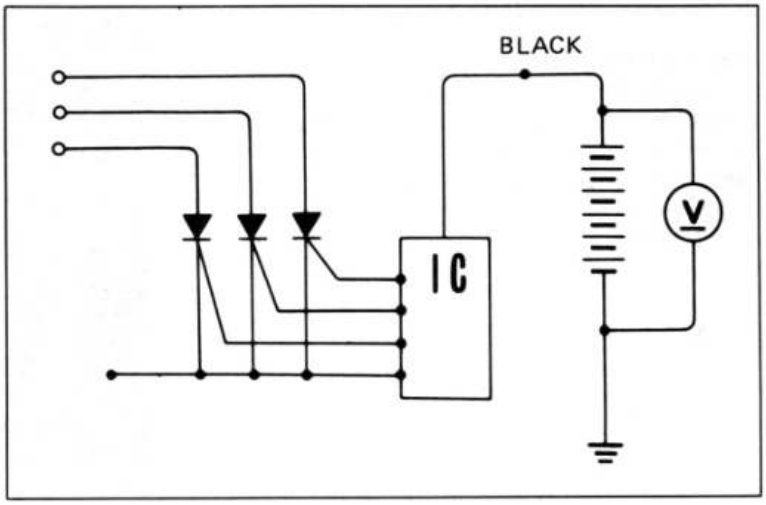
REVERSE DIRECTION: NO CONTINUITY

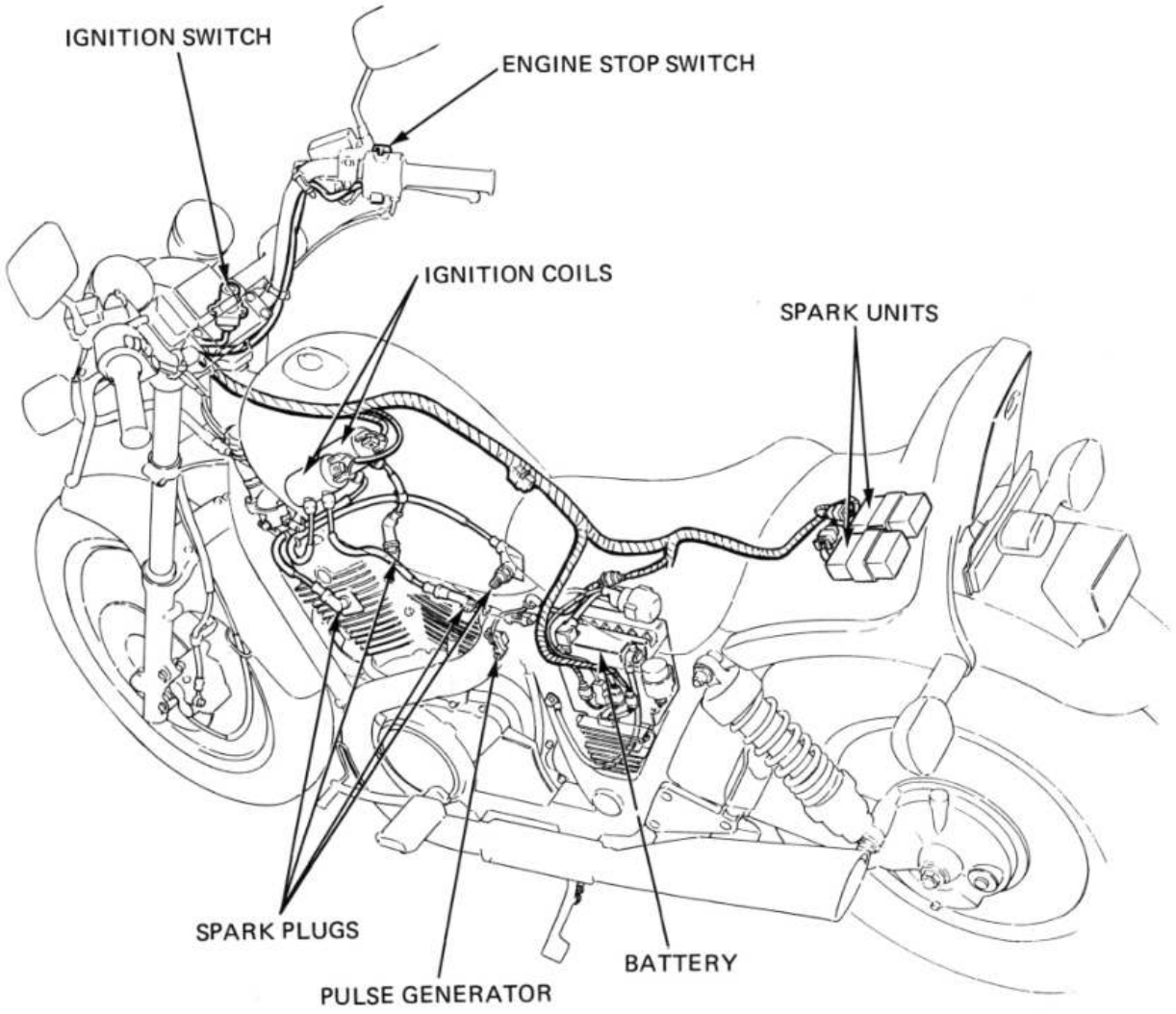
	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE

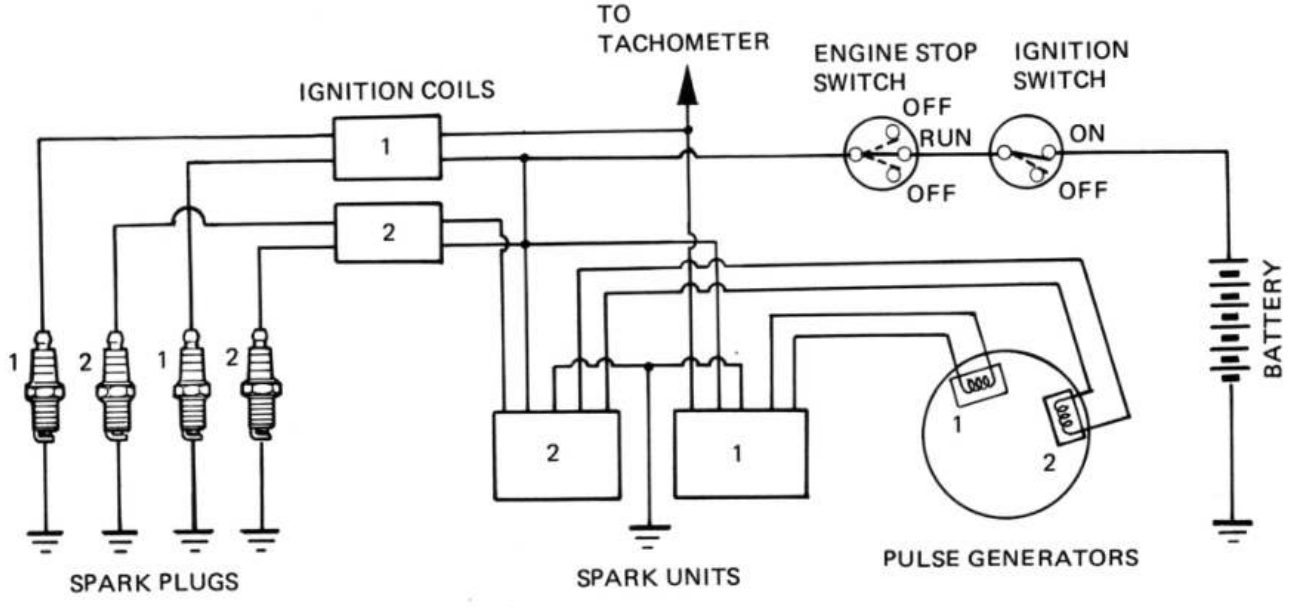


VOLTAGE REGULATOR PERFORMANCE TEST

Connect a voltmeter across the battery.
Check regulator performance with the engine running. The regulator must divert current to ground when battery voltage reaches 14.0 ~ 15.0 V.




IGNITION SWITCH
ENGINE STOP SWITCH
IGNITION COILS
SPARK UNITS
SPARK PLUGS
PULSE GENERATOR
BATTERY


TO TACHOMETER
ENGINE STOP SWITCH
IGNITION SWITCH
IGNITION COILS
OFF
RUN
OFF
ON
OFF
1
2
1
2
1
2
2
1
1
2
BATTERY
SPARK PLUGS
SPARK UNITS
PULSE GENERATORS

19. IGNITION SYSTEM

SERVICE INFORMATION	19–1
TROUBLESHOOTING	19–2
IGNITION COIL	19–3
TRANSISTORIZED IGNITION SYSTEM	19–4

SERVICE INFORMATION

GENERAL

- A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments can be made.

SPECIFICATIONS

		ND	NGK
Spark plug	Standard	X24EPR-U9	DPR8EA-9
	For cold climate below 5°C (41°F)	X22EPR-U9	DPR7EA-9
	For extended high speed driving	X27EPR-U9	DPR9EA-9
Spark plug gap		0.8–0.9 mm (0.031–0.035 in)	
Ignition timing	'83, '84:	At idle 5° BTDC	
	After '84:	At idle 10° BTDC	
	'83, '84:	Full advance 26° BTDC/3,500 rpm	
	After '84:	Full advance 26° BTDC/4,000 rpm	
Pulse air gap		0.3–0.9 mm (0.012–0.035 in)	

TROUBLESHOOTING

The ignition system has two sub-systems; one for the No. 1 cylinder and one for the No. 2 cylinder. Determine which sub-system is faulty, then proceed to the detailed tests below.

Engine cranks but will not start
1. Engine stop switch OFF.
2. No spark at plugs.
3. Faulty transistorized spark unit.
4. Faulty pulse generator.

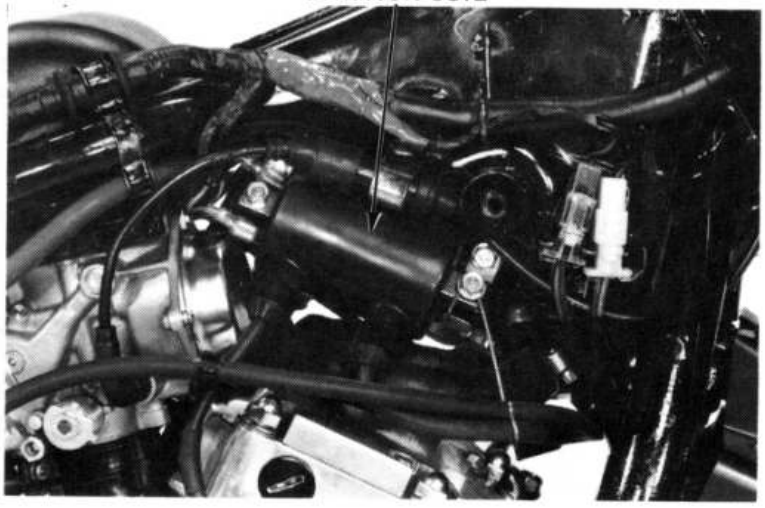
No spark at plug
1. Engine stop swtich OFF.
2. Poorly connected, broken or shorted wires.
   - Between ignition switch and engine stop switch.
   - Between spark unit and engine stop switch.
   - Between spark unit and ignition coil.
   - Between ignition coil and plug.
   - Between spark unit and pulse generator.
3. Faulty ignition coil.
4. Faulty ignition switch.
5. Faulty spark unit.
6. Faulty pulse generator.

Engine starts but runs poorly
1. Ignition primary circuit.
   - Faulty ignition coil.
   - Loose or bare wire.
   - Intermittent short circuit.
2. Secondary circuit.
   - Faulty plug.
   - Faulty spark plug wire.

Timing advance incorrect
1. Faulty pulse generator.
2. Faulty spark unit.

IGNITION COIL

IGNITION COIL



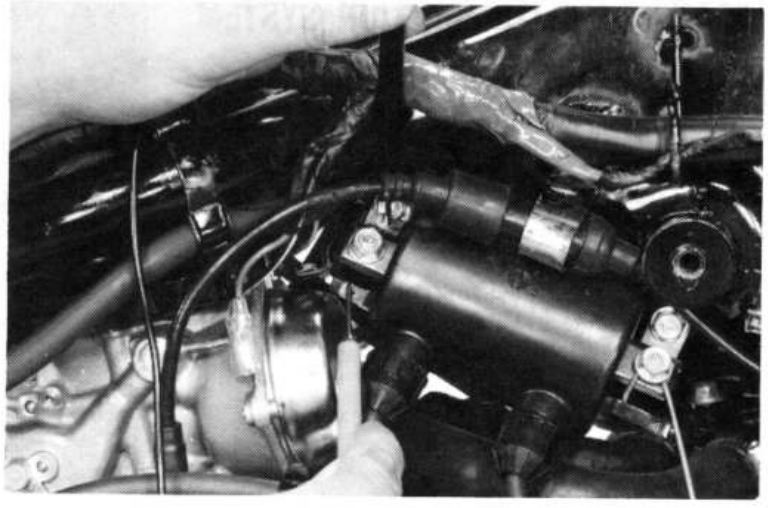
REMOVAL

Remove the seat and, fuel tank and disconnect the ignition coil wire leads.
Remove the coils by removing the attaching bolts.

CONTINUITY TEST

Measure the primary coil resistance.

RESISTANCE: 2.0 ohms



Measure the secondary coil resistance with the spark plug caps in place.

RESISTANCE: 29–40 k ohms



Remove the spark plug caps and measure the secondary coil resistance.

RESISTANCE 20.6–27.4 k ohms



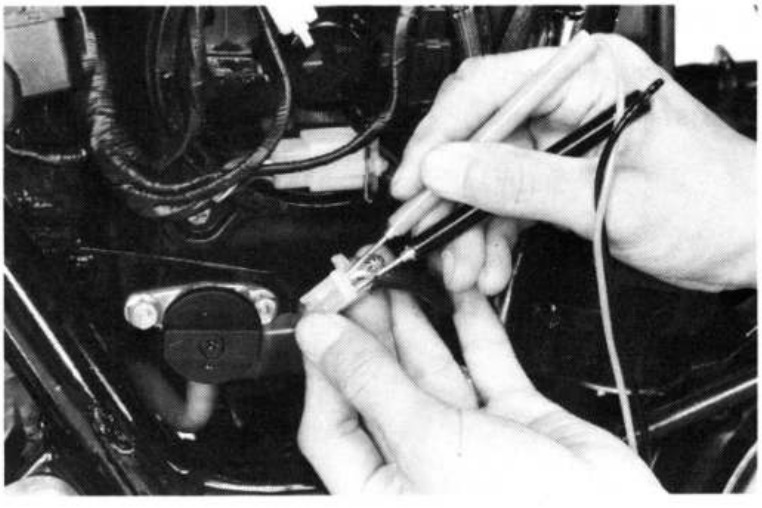
TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR TEST

Remove the frame right side cover.
Disconnect the pulse generator coupler and measure the coil resistance.

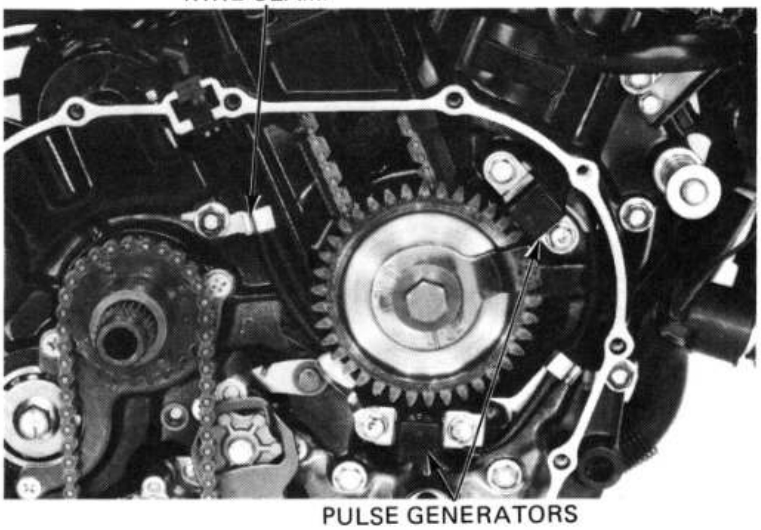
RESISTANCE: 480 ohms ± 10%

Between white and yellow leads (1 cyliner)
Between white and blue leads (2 cylinder)



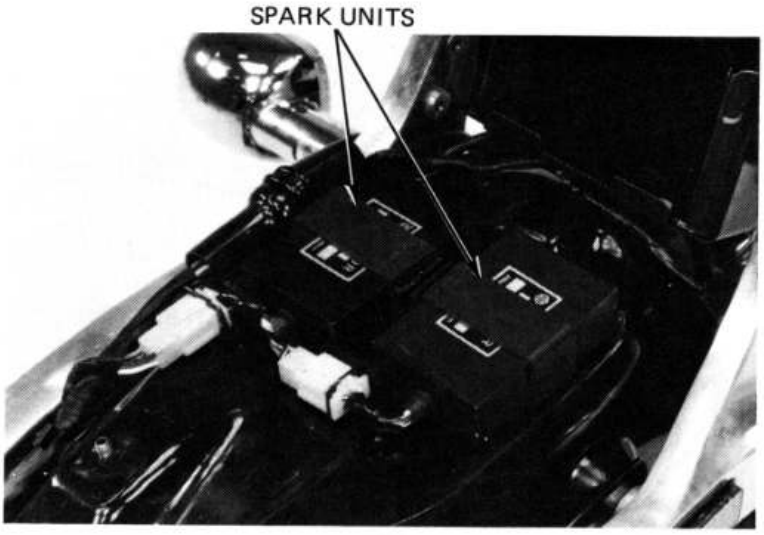
PULSE GENERATOR REPLACEMENT

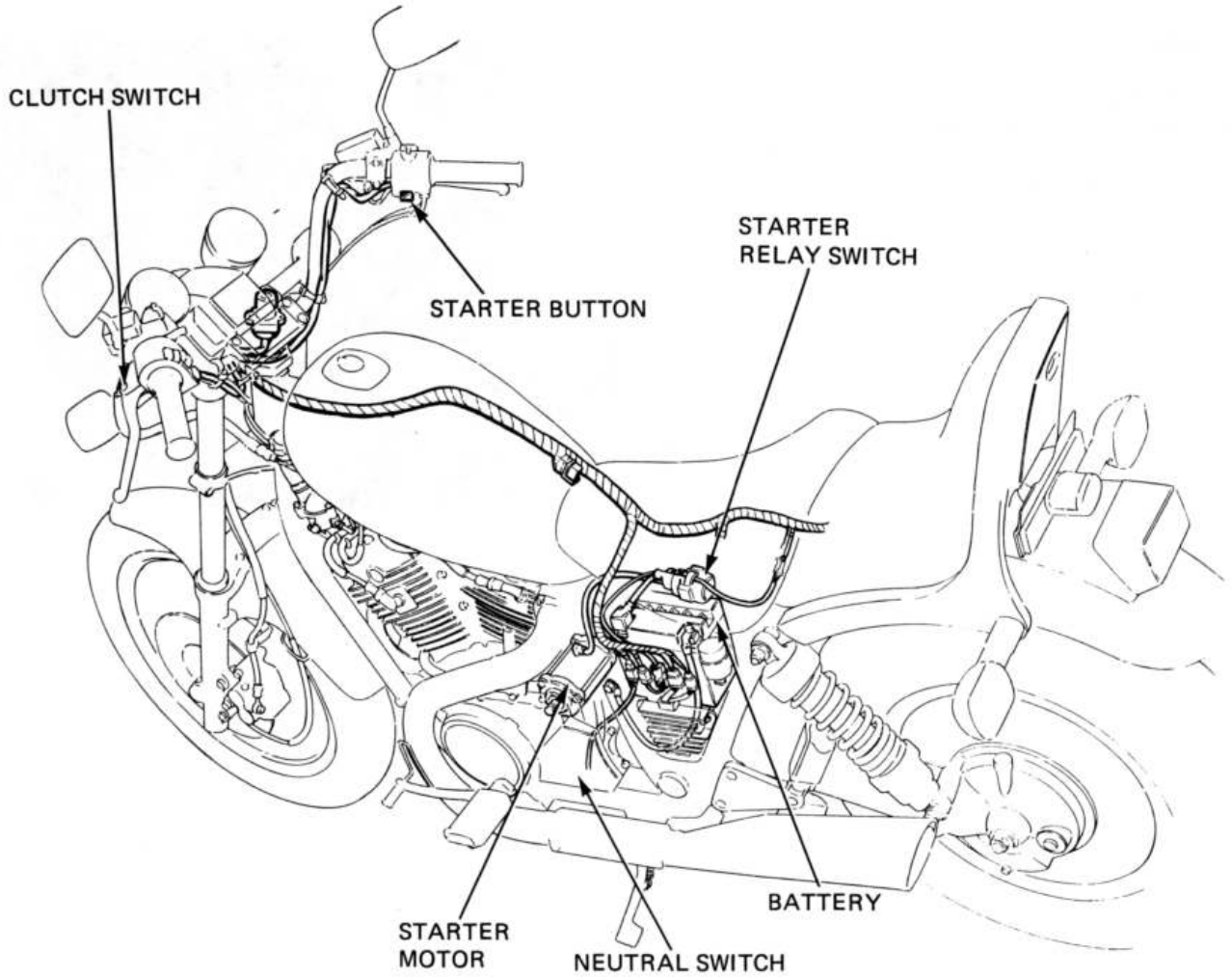
Remove the right crankcase cover and clutch assembly (section 7).
Remove the pulse generator mounting bolts and wire clamp.
Remove the pulse generators.
Install new pulse generators.
Install the clutch assembly and right side cover (section 7).
Recheck the ignition timing (page 3-8).

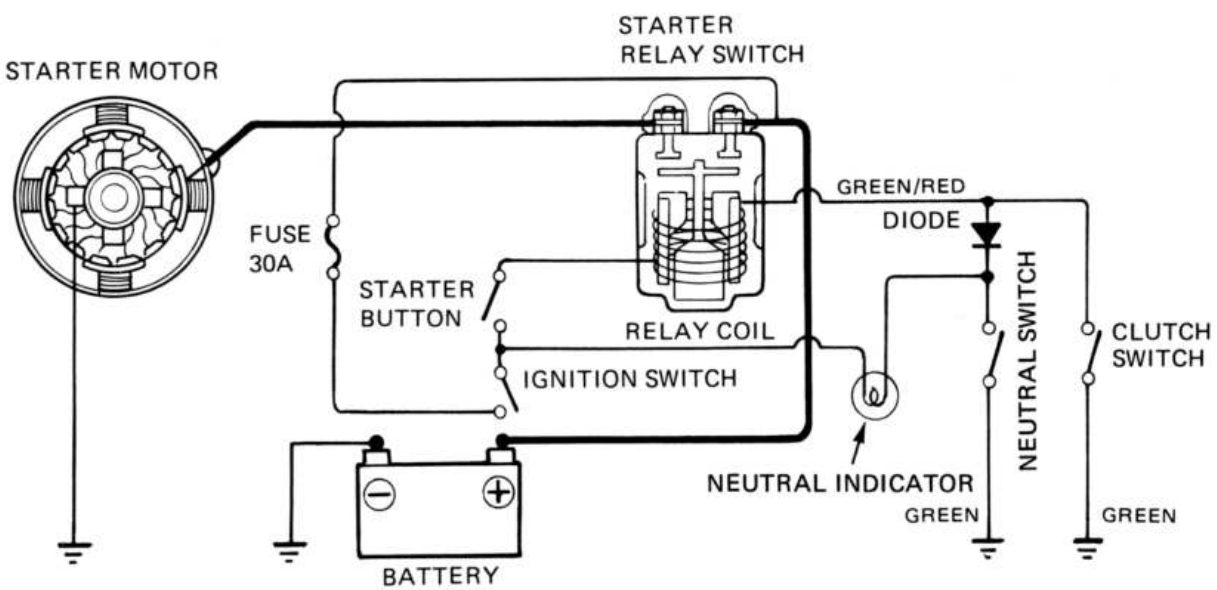


SPARK UNIT

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.




CLUTCH SWITCH
STARTER BUTTON
STARTER
RELAY SWITCH
STARTER
MOTOR
NEUTRAL SWITCH
BATTERY


STARTER MOTOR
STARTER
RELAY SWITCH
FUSE
30A
STARTER
BUTTON
RELAY COIL
IGNITION SWITCH
GREEN/RED
DIODE
NEUTRAL SWITCH
CLUTCH
SWITCH
NEUTRAL INDICATOR
GREEN
GREEN
BATTERY

20. ELECTRIC STARTER

SERVICE INFORMATION	20–1
TROUBLESHOOTING	20–1
STARTER MOTOR	20–2
STARTER RELAY SWITCH	20–5
CLUTCH DIODE	20–5

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
1. Battery discharged.
2. Faulty ignition switch.
3. Faulty starter switch.
4. Faulty neutral switch.
5. Faulty starter relay switch.
6. Loose or disconnected wire or cable.
7. Clutch diode open.

Starter motor turns engine slowly
1. Low specific gravity.
2. Excessive resistance in circuit.
3. Binding in starter motor.

Starter motor turns, but engine does not turn
1. Faulty starter clutch.
2. Faulty starter motor gears.
3. Faulty starter motor or idle gear.

Starter motor and engine turns, but engine does not start
1. Faulty ignition system.
2. Engine problems.
   - Low compression.
   - Fouled spark plugs.

STARTER MOTOR

REMOVAL

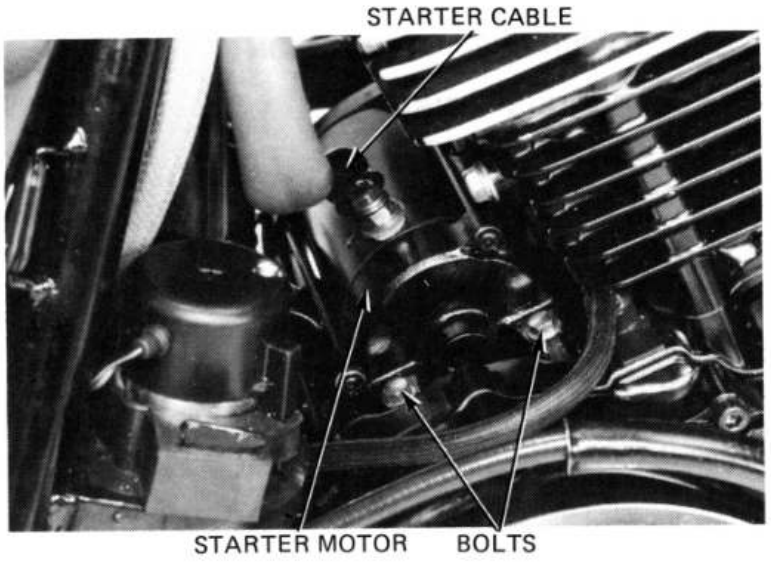
WARNING

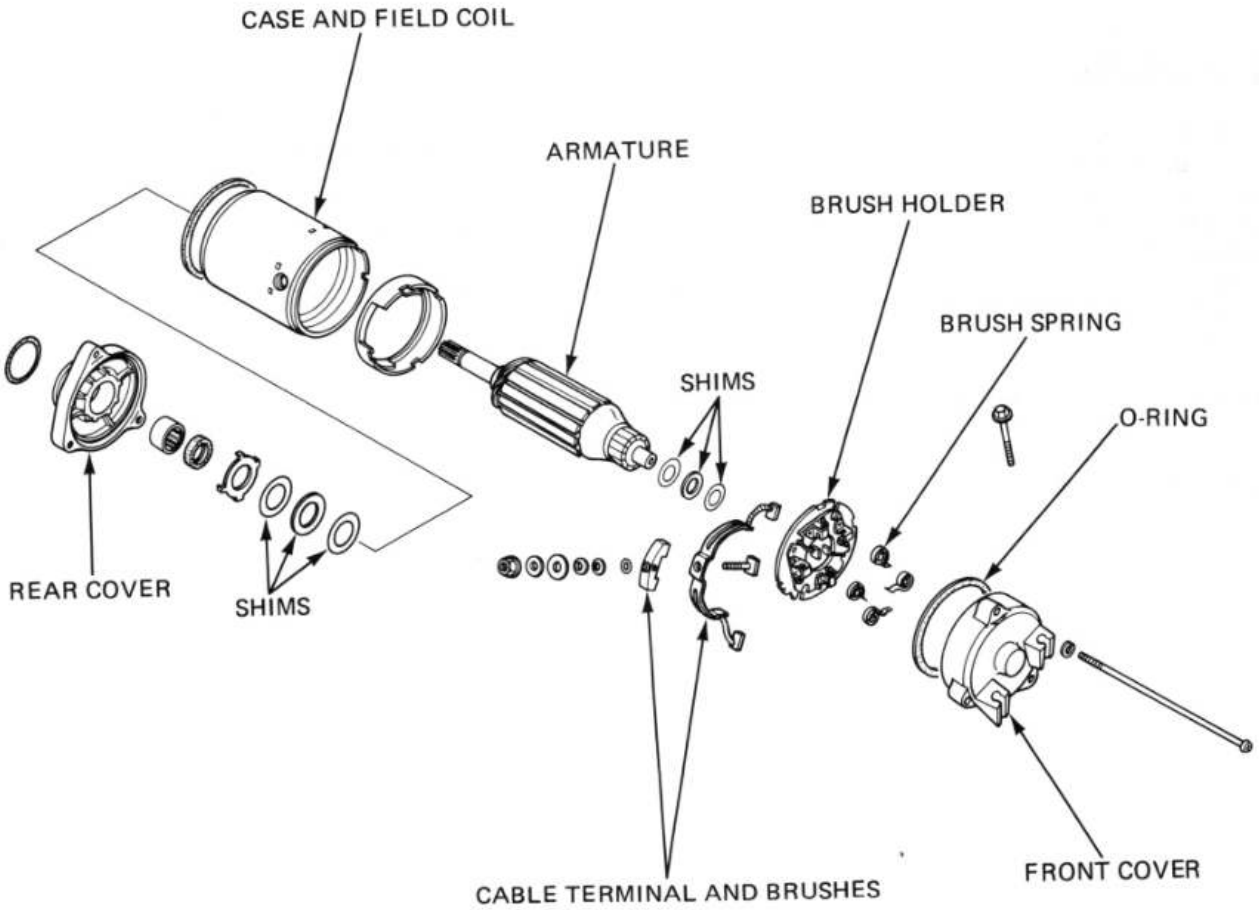
With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the alternator cover, flywheel and starter drive gear (section 8).

Disconnect the starter motor cable at the motor.

Remove the starter motor mounting bolts, and starter motor.





BRUSH INSPECTION

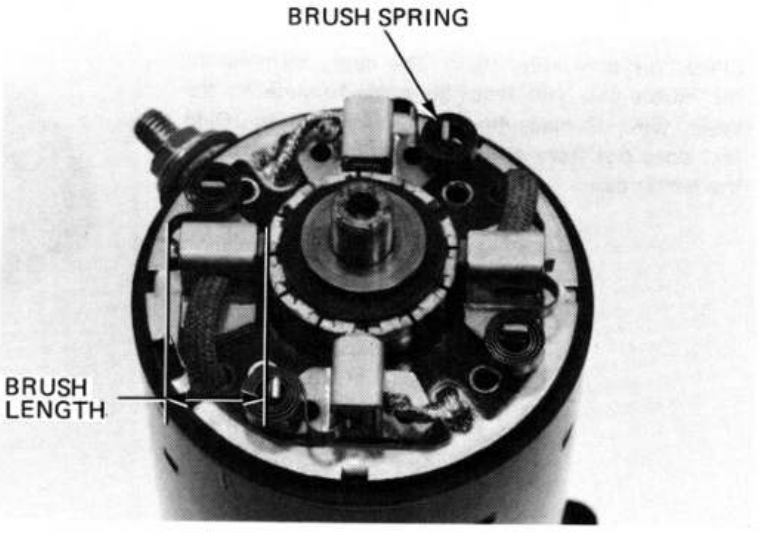
Remove the starter motor case screws.

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:	**545 g (19.2 oz)**



COMMUTATOR INSPECTION

Remove the starter motor case.

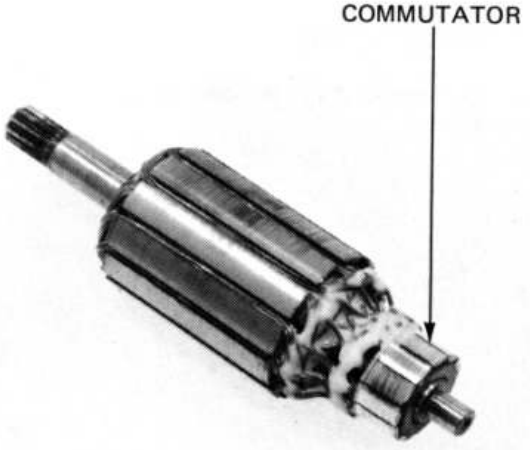
NOTE:

> Record the location and number of thrust washers.

Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils.

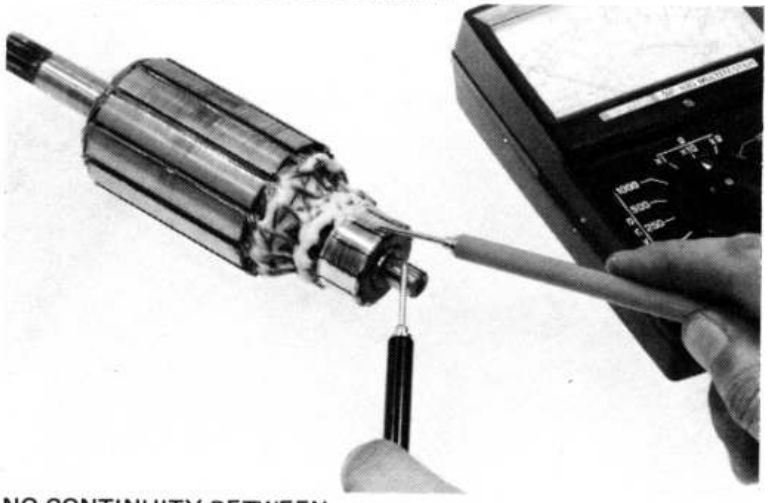
NOTE:

> Do not use emery or sand paper on the commutator.



Check for continuity between pairs of commutator bars. Also, make a resistance check between individual commutator bars and the armature shaft. There should be no continuity.

CONTINUITY BETWEEN
COMMUTATOR BAR PAIRS: NORMAL



NO CONTINUITY BETWEEN
COMMUTATOR BARS AND ARMATURE SHAFT: NORMAL

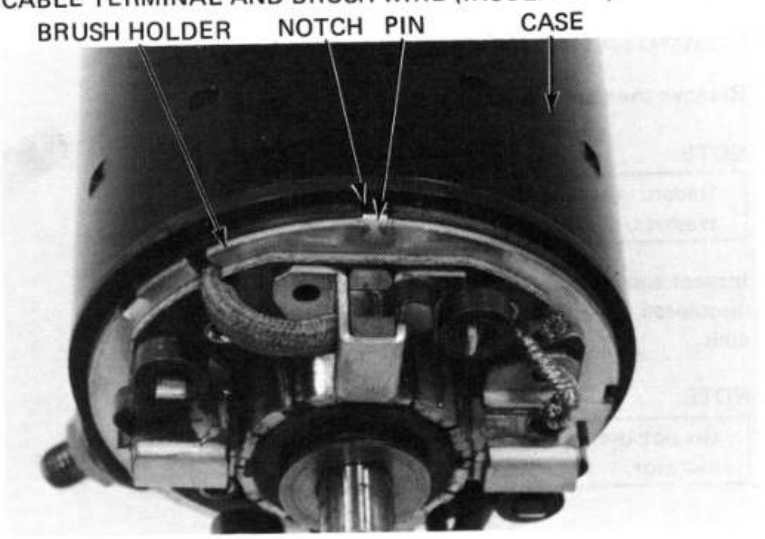
FIELD COIL INSPECTION

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 does not have continuity or if it is shorted to the motor case.

NO CONTINUITY BETWEEN
CABLE TERMINAL AND MOTOR CASE: NORMAL



CONTINUITY BETWEEN
CABLE TERMINAL AND BRUSH WIRE (INSULATED): NORMAL

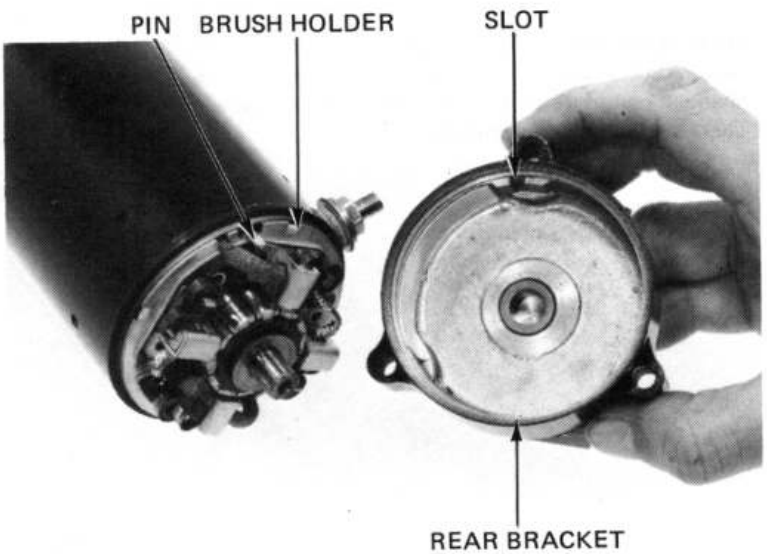


ASSEMBLY/INSTALLATION

Assemble the starter motor. Align the case notch with the brush holder pin.

Install the rear cover aligning its slot with the brush holder pin.

Install the starter motor in the reverse order of removal.



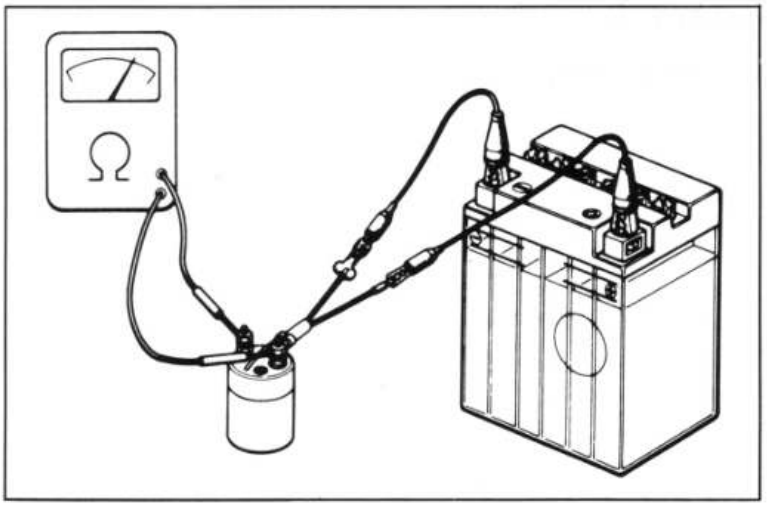
STARTER RELAY SWITCH

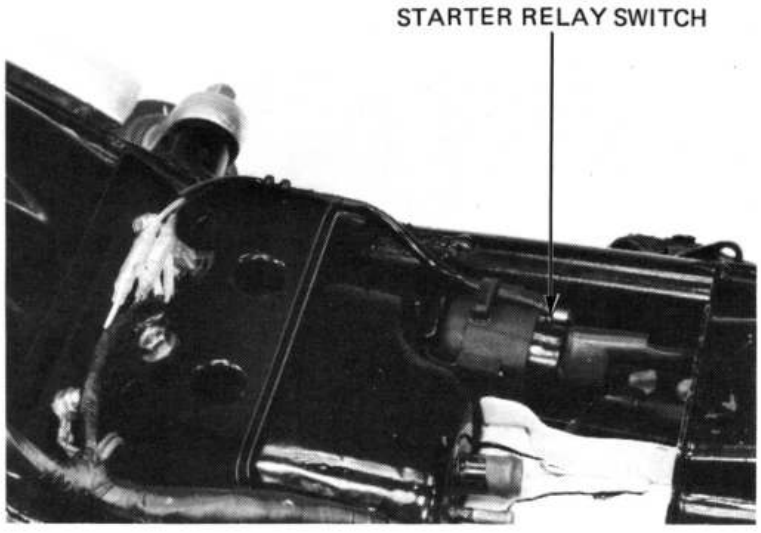
INSPECTION

Depress the starter switch button with the ignition ON. The coil is normal if the starter relay switch clicks.

Connect an ohmmeter to the starter relay switch terminals.

Connect a 12 V battery to the switch cable terminals. The switch is normal if there is continuity.



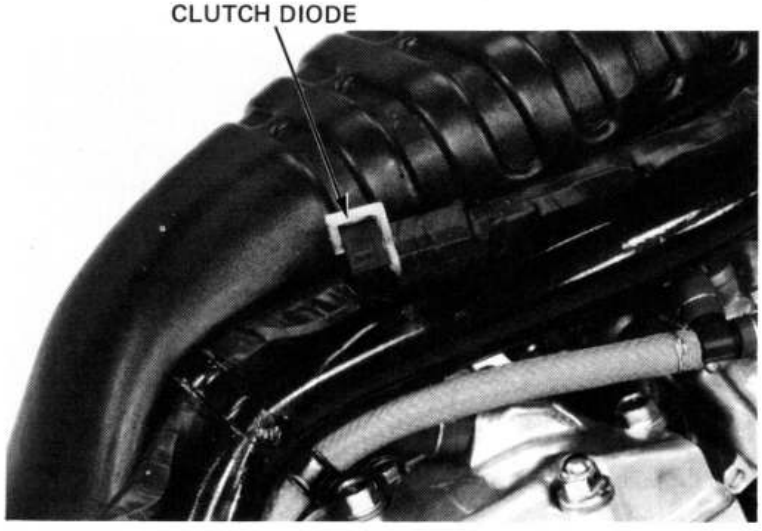


CLUTCH DIODE

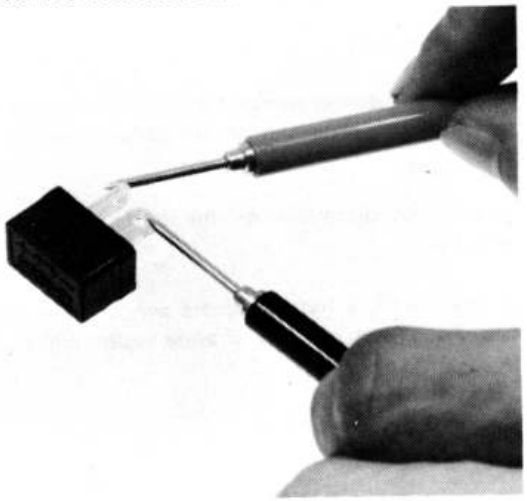
REMOVAL

Remove the fuel tank.

Remove the clutch diode from the wire harness.



NORMAL DIRECTION: CONTINUITY
REVERSE DIRECTION: NO CONTINUITY



INSPECTION

Check for continuity with an ohmmeter.

21. SWITCHES

SERVICE INFORMATION	21–1	IGNITION SWITCH	21–5
OIL PRESSURE SWITCH	21–2	FUEL PUMP	21–6
BRAKE LIGHT SWITCH	21–2	THERMOSTATIC SWITCH	21–7
NEUTRAL/OD SWITCHES	21–3	TEMPERATURE SENSOR	21–7
CLUTCH SWITCH	21–3	TEMPERATURE GAUGE	21–9
HANDLEBAR SWITCHES	21–4	TACHOMETER	21–9

SERVICE INFORMATION

GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other wires which correspond with the band color.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following color codes used are indicated throughout this section and on the wiring diagram.

B = Blue	G = Green	LG = Light Green	R = Red
Bk = Black	Gr = Grey	O = 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 or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

OIL PRESSURE SWITCH

Drain the engine oil.

Disconnect the oil pressure switch lead and remove the switch.

Check for continuity while applying pressure to the switch.

Replace the switch if necessary.

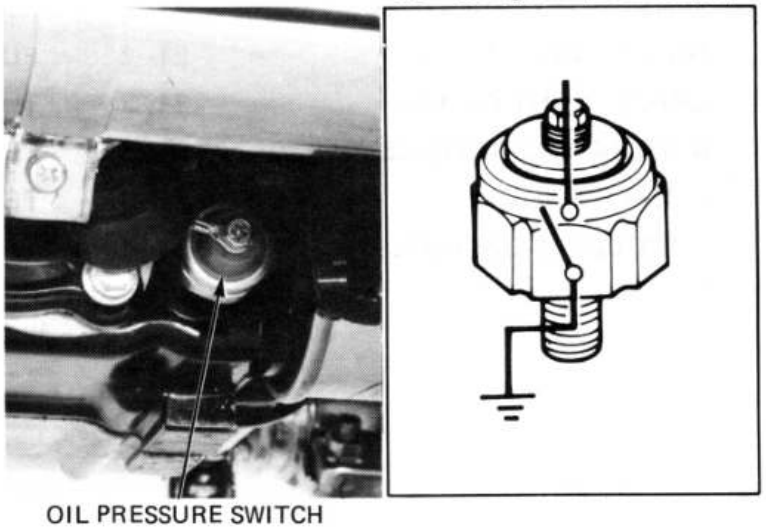
Apply a liquid sealant to the switch threads before installing the switch.

Screw the switch in the crankcase and leave 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)

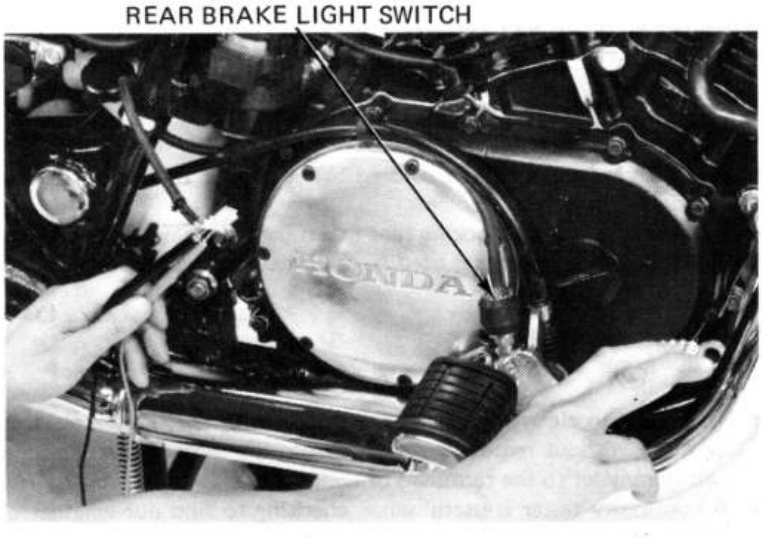
NOTE:

> Do not overtighten the switch to prevent the crankcase from damage.



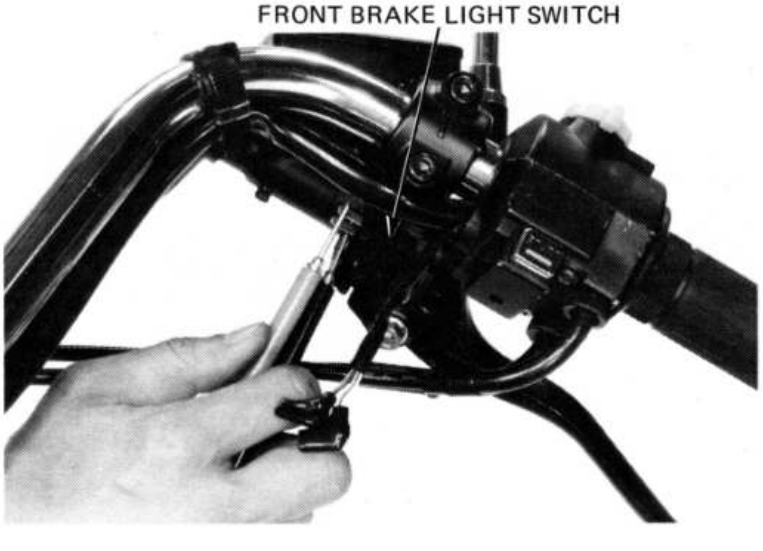
BRAKE LIGHT SWITCH

Check the rear brake light switch for continuity with the rear brake applied.



Check the front brake light switch for continuity with the front brake applied.

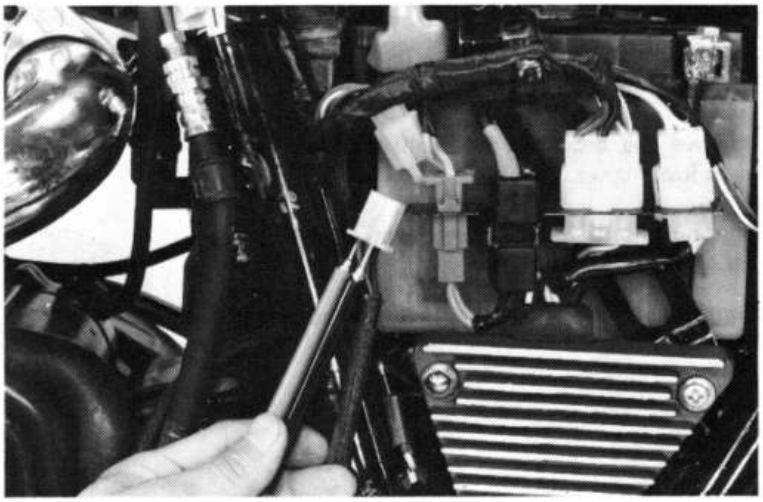
Replace the switches if necessary.



NEUTRAL/OD SWITCHES

Remove the left side cover and disconnect the neutral/OD switch coupler.

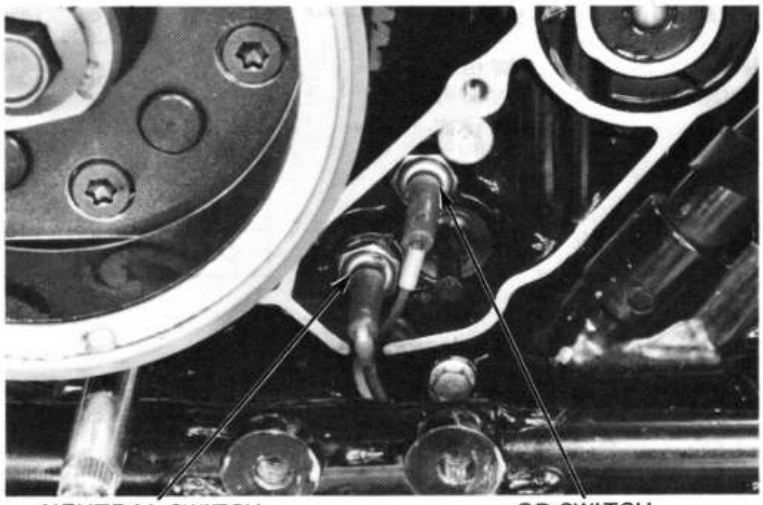
Color code / Position	Lg/R	G/O
1st		
N	○	
2nd		
3rd		
4th		
5th		
OD		○



REMOVAL/INSTALLATION

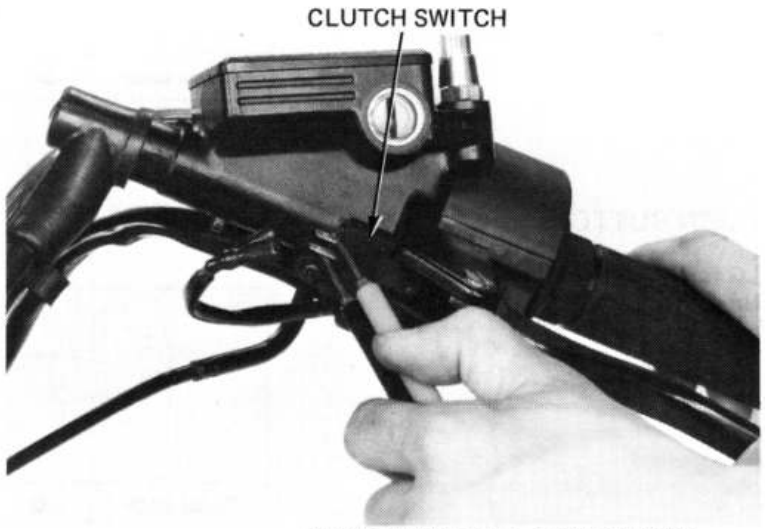
Remove the alternator cover (page 8-2).
Disconnect the wire from the switch and remove the switch.
Install the neutral and OD switches in the reverse order of removal.

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



CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and applied. Replace if necessary.



CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASED: NO CONTINUITY

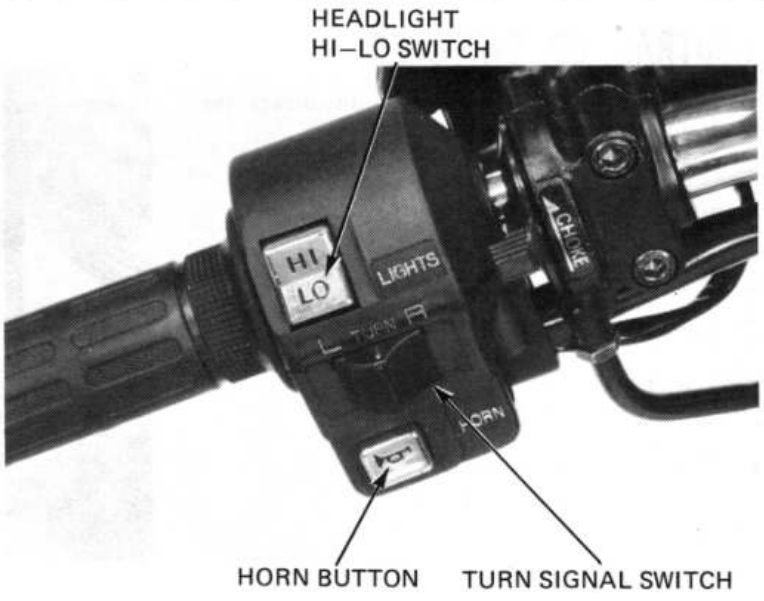
HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, etc.) must be replaced as assemblies.

Remove the headlight, headlight case and instrument lower cover.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires in each chart.



HEADLIGHT HI–LOW SWITCH

HI: B/W to B
MIDDLE (N): B/W to W to B
LO: B/W to W

Headlight Hi–Low Switch

	HL	Hi	Lo
Hi	○	○	
(N)	○	○	○
Lo	○		○
Color code	B/W	B	W

TURN SIGNAL SWITCH

LEFT: Gr to O, Br/W toLB/W
OFF: Br/W to LB/W and O/W
RIGHT: Gr to LB, Br/W to O/W

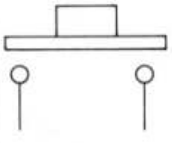
Turn Signal Switch

	W	L	R	TL	PR	PL
LEFT	○	○		○	○	
OFF				○	○	○
RIGHT	○		○	○		○
Color code	Gr	O	LB	Br/W	LB/W	O/W

HORN BUTTON

LG to W/G with button depressed
No continuity with button released

Horn Button

	Ho	E
		
Color code	LG	W/G

STARTER BUTTON

Bk to Y/R with button pushed in.
Bk/R to B/W with button out.

Starter Button

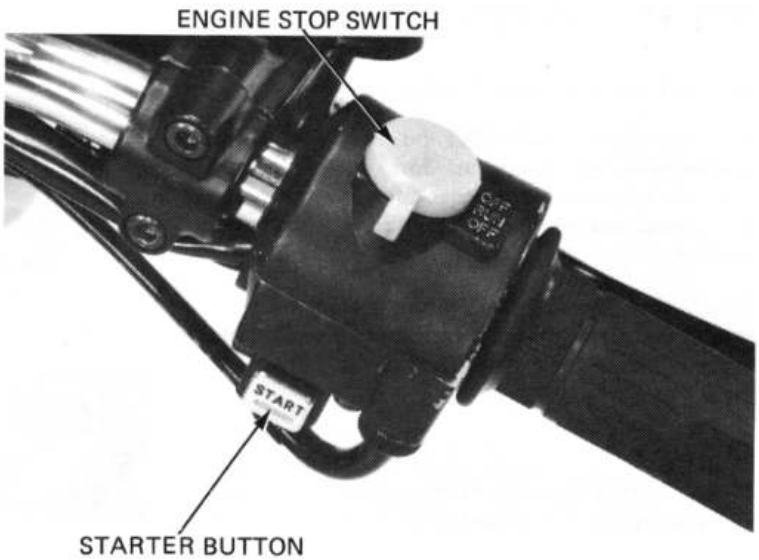
	BAT_2	ST	BAT_5	HL
OUT			○—○	
START	○—○			
Color code	Bk	Y/R	Bk/R	B/W

ENGINE STOP SWITCH

RUN: Bk to Bk/W
OFF: No continuity

Engine Stop Switch

	BAT_2	IG
OFF		
RUN	○—○	
OFF		
Color code	Bk	Bk/W



IGNITION SWITCH

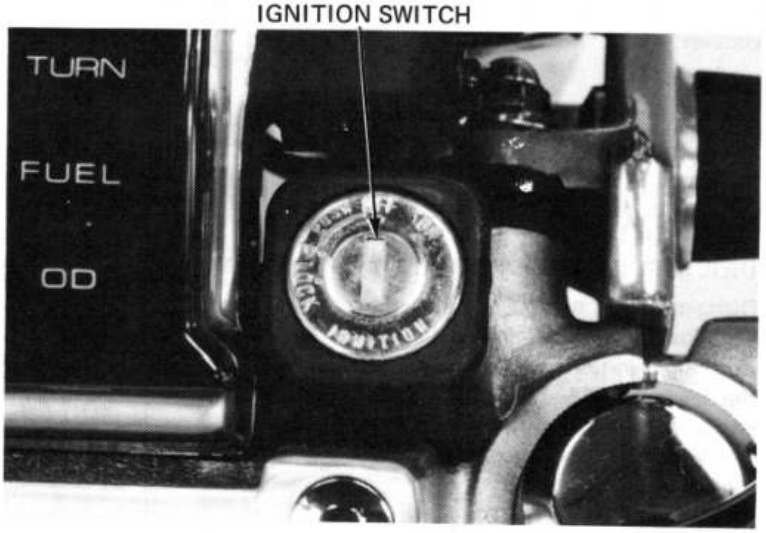
Remove the headlight, headlight case and instrument lower cover and disconnect the ignition switch coupler.

Check continuity of terminals on the ignition switch coupler in each switch position.

SWITCH POSITION

LOCK: No continuity
OFF: No continuity
ON: R to Bk, Br/W to Br – continuity
PARK: Br to R – continuity

Terminal / Position	PA	BAT_1	IG	TL_1	TL_2
ON		○—○		○—○	
OFF					
P	○—○				
LOCK					
Color code	Br	R	Bk	Br/W	Br



LOW FUEL WARNING LIGHT

Place the motorcycle on its center stand.

Turn the ignition switch ON and check that the low fuel warning light comes on for 1 to 4 seconds. If the light does not go on, check for a blown fuse or bulb, loose connection or open circuit in the wire harness.

Check that the low fuel warning light comes on within 60 seconds after the ignition switch has been turned ON with the amount of fuel in the fuel tank below 1.7 liters (0.45 US gal).

NOTE

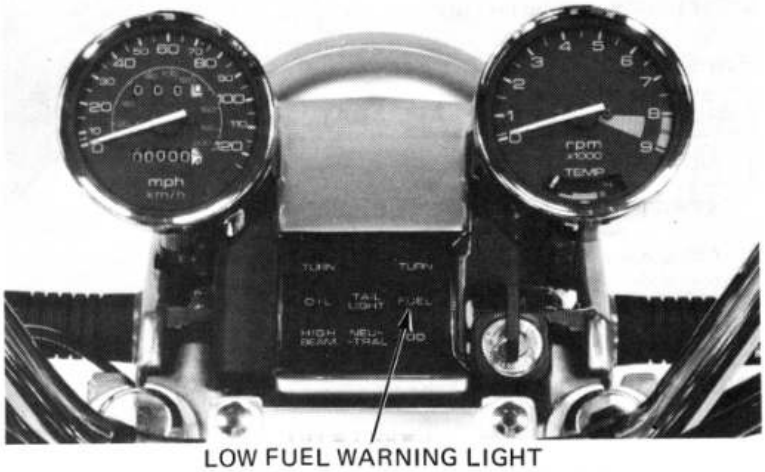
The light will not go on immediately after the ignition switch is turned ON.

If the light does not go on within 60 seconds, replace the sensor.

Check that the low fuel warning light will not light when the ignition switch is turned ON when the amount of fuel in the fuel tank is more than 6.5 liters (1.72 US gal).

If the warning light goes on, check for a short circuit in the wire harness or coupler.

Replace the fuel reserve sensor if shorts are not found.



LOW FUEL WARNING LIGHT

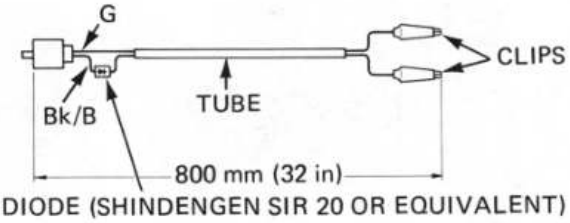


FUEL PUMP

WARNING

Do not allow flames or sparks near gasoline.

Fabricate the special test wire harness as shown and connect it between the battery and the fuel pump coupler.

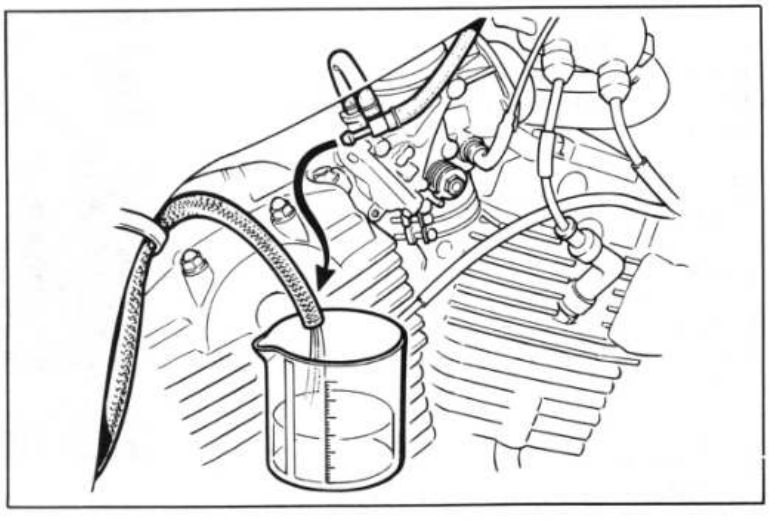


DIODE (SHINDENGEN SIR 20 OR EQUIVALENT)

Disconnect the fuel tube at the carburetor and hold a graduated beaker under the tube.

Turn the ignition switch on and let fuel flow into the beaker for 5 seconds, then turn the ignition switch off. Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

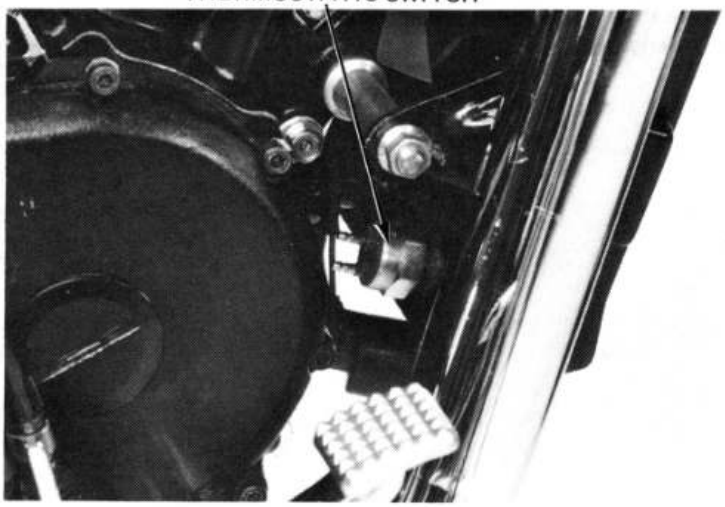
FUEL PUMP FLOW CAPACITY:
614 cc (22 oz) ± 10%/minute



THERMOSTATIC SWITCH

The cooling fan motor is actuated by the thermostatic switch located in the left tank of the radiator.

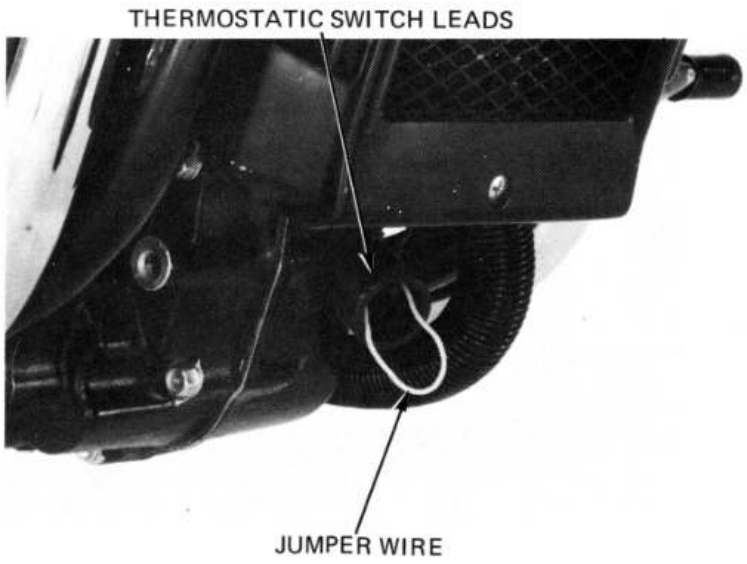
Run the engine until coolant temperature reaches 80–102°C (176–216°F). The fan motor should start running. The fan motor should stop when the coolant temperature drops to 93–97°C (200–207°F).



If the fan motor does not start, disconnect the black and green leads from the thermostatic switch and short them together with a jumper wire as shown.

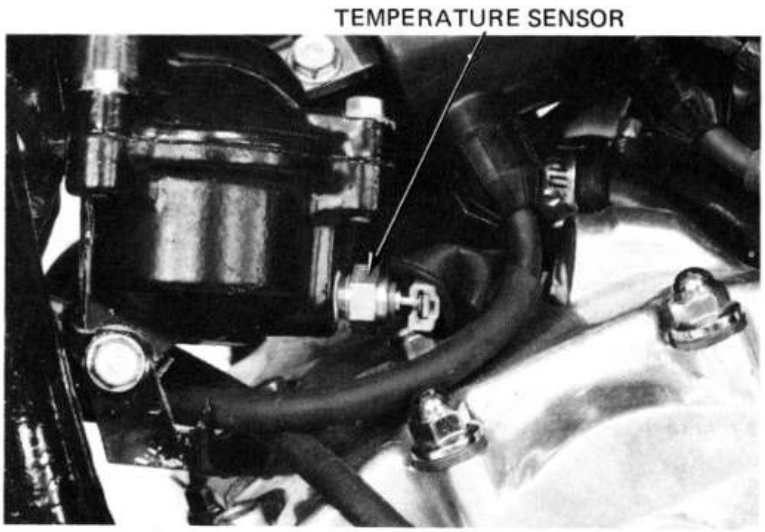
Turn the ignition switch on. The cooling fan motor should start running. If it starts, repalce the fan thermostatic switch and retest.

If it does not start, check for battery voltage from the black lead (positive) to the black/blue lead (negative) of the fan motor coupler. If there is no voltage, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit.

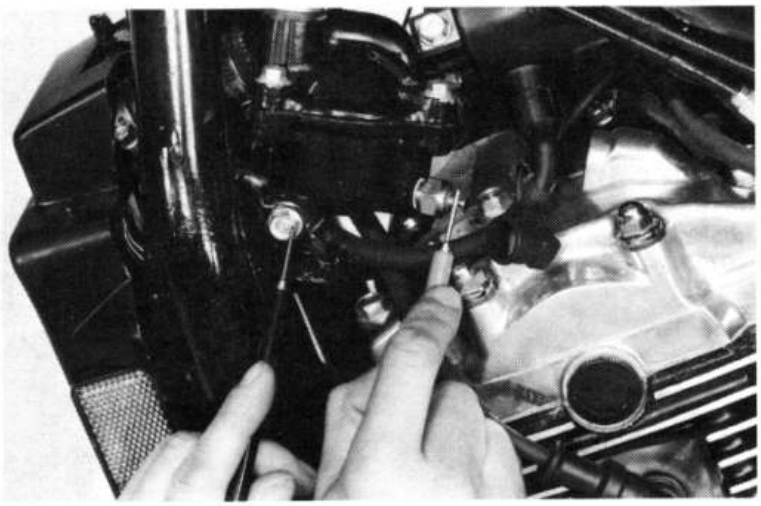


TEMPERATURE SENSOR

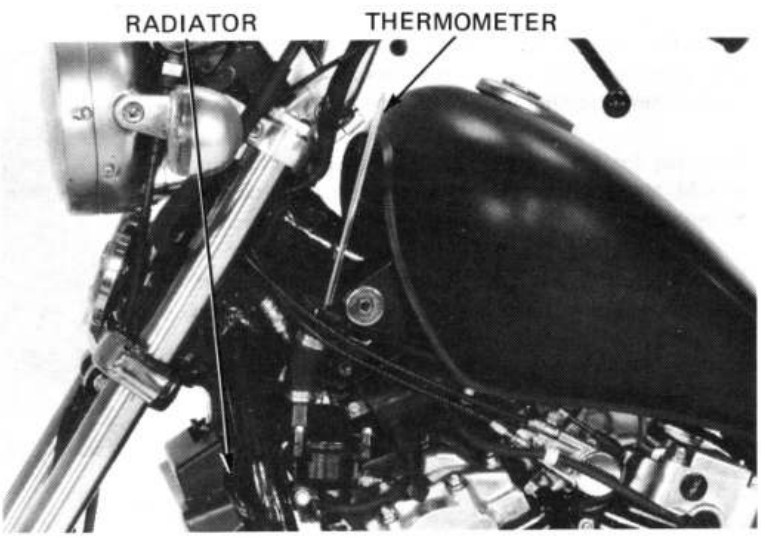
Disconnect the green/blue wire from the temperature sensor.



With the engine cold, use an ohmmeter to measure resistance between the temperature sensor terminal and the engine.



Check the temperature of the coolant.



Run the engine and measure the change in resistance of the sensor with the engine at the operating temperatures in the chart.

Temperature	60°C (140°F)	85°C (185°F)	110°C (230°F)	120°C (248°F)
Resistance (Ohms)	104.0	43.9	20.3	16.1

Replace the sensor if it is out of specifications by more than 10% at any temperature listed.

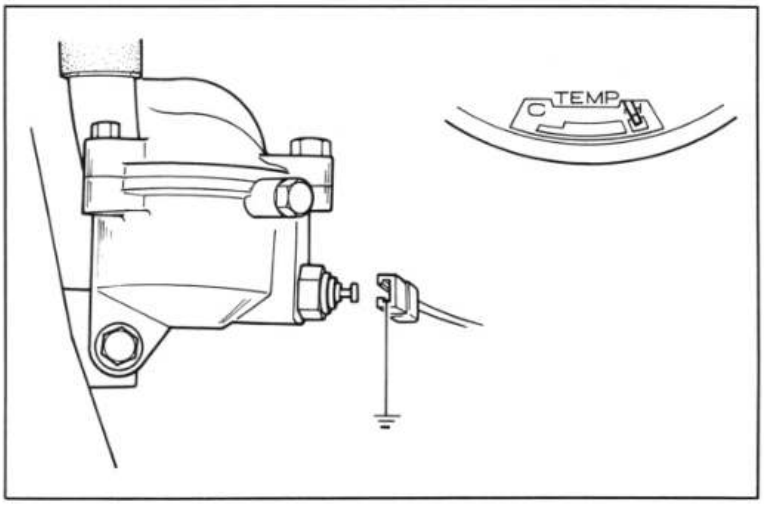
TEMPERATURE GAUGE

Disconnect the wire from the temperature sensor and short it to ground.

Turn the ignition switch to ON. The temperature gauge needle should move all the way to the right.

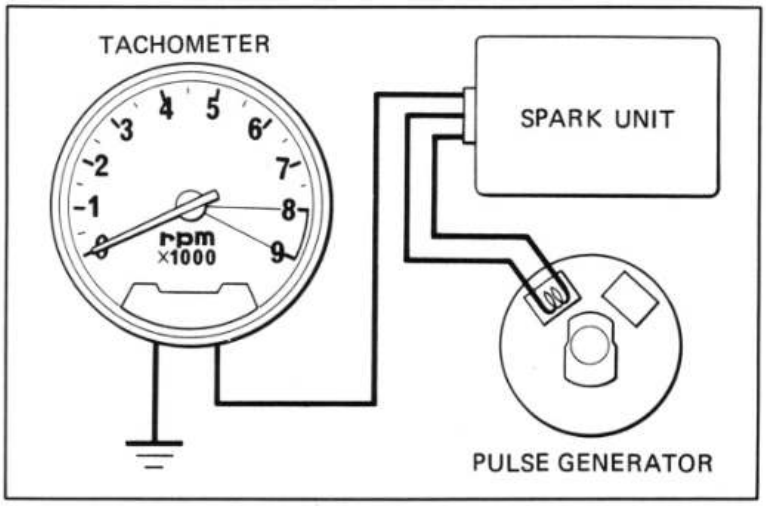
CAUTION

Do not leave the temperature sensor wire grounded for longer than a few seconds or the temperature gauge will be damaged.



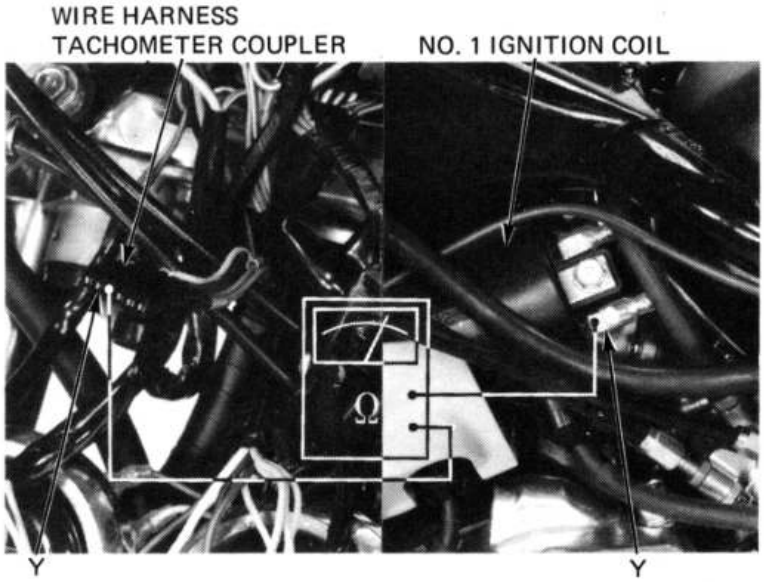
TACHOMETER

If the tachometer does not indicate properly, check and repair the No. 1 cylinder ignition system.



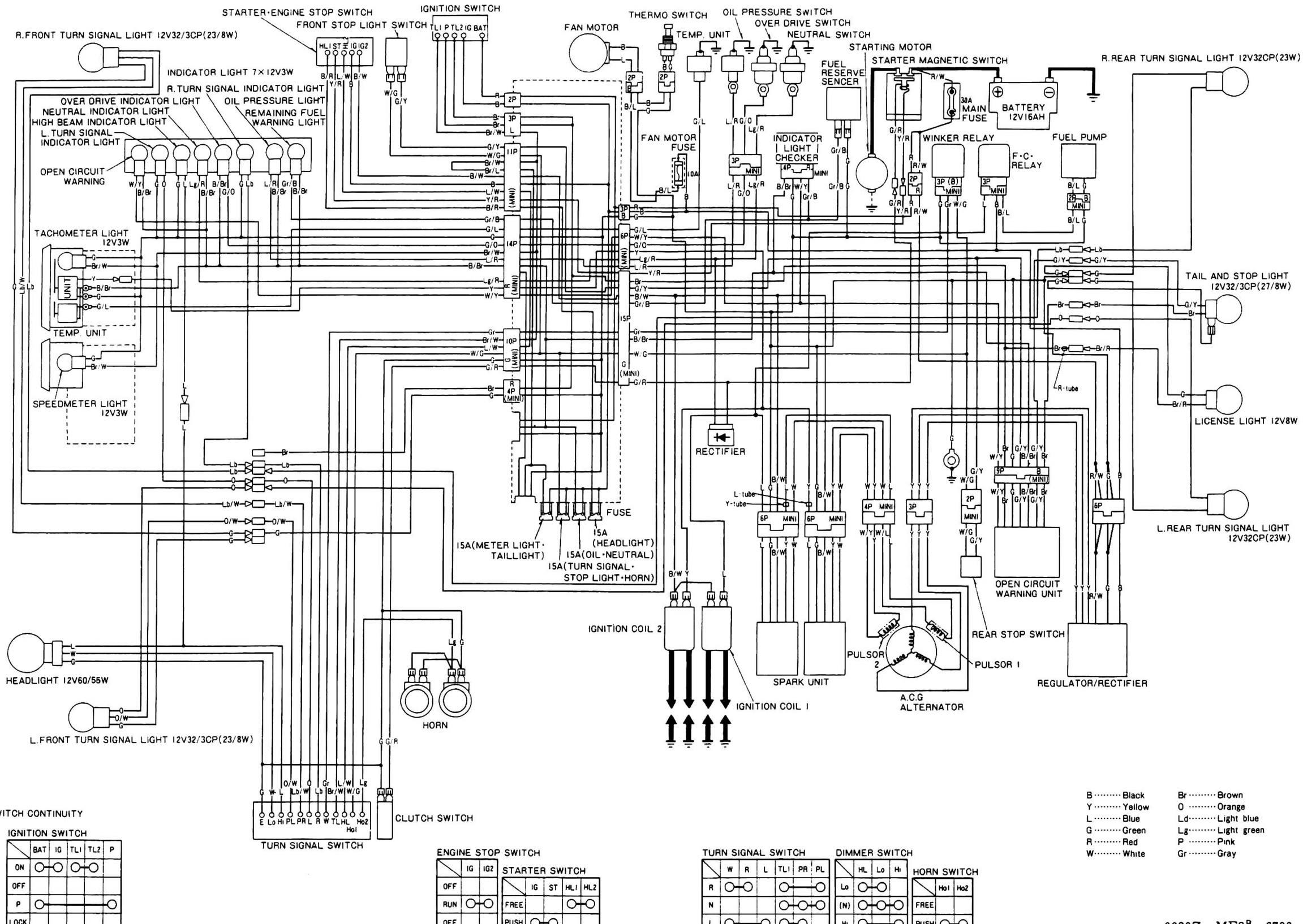
If the problem still appears, check continuity between the yellow wire terminal of the wire harness tachometer coupler and the yellow wire terminal of the No. 1 cylinder ignition coil and repair the circuit if necessary.

If there is continuity, replace the tachometer with a new one.



22. WIRING DIAGRAM

'83:



SWITCH CONTINUITY

IGNITION SWITCH

	BAT	IG	TL1	TL2	P
ON	○	○	○	○	
OFF					
P	○				○
LOCK					

ENGINE STOP SWITCH

	IG	IG2
OFF		
RUN	○	○
OFF		

STARTER SWITCH

	IG	ST	HL1	HL2
FREE			○	○
PUSH	○			

TURN SIGNAL SWITCH

	W	R	L	TL1	PR	PL
R	○	○		○		○
N				○	○	○
L	○		○		○	○

DIMMER SWITCH

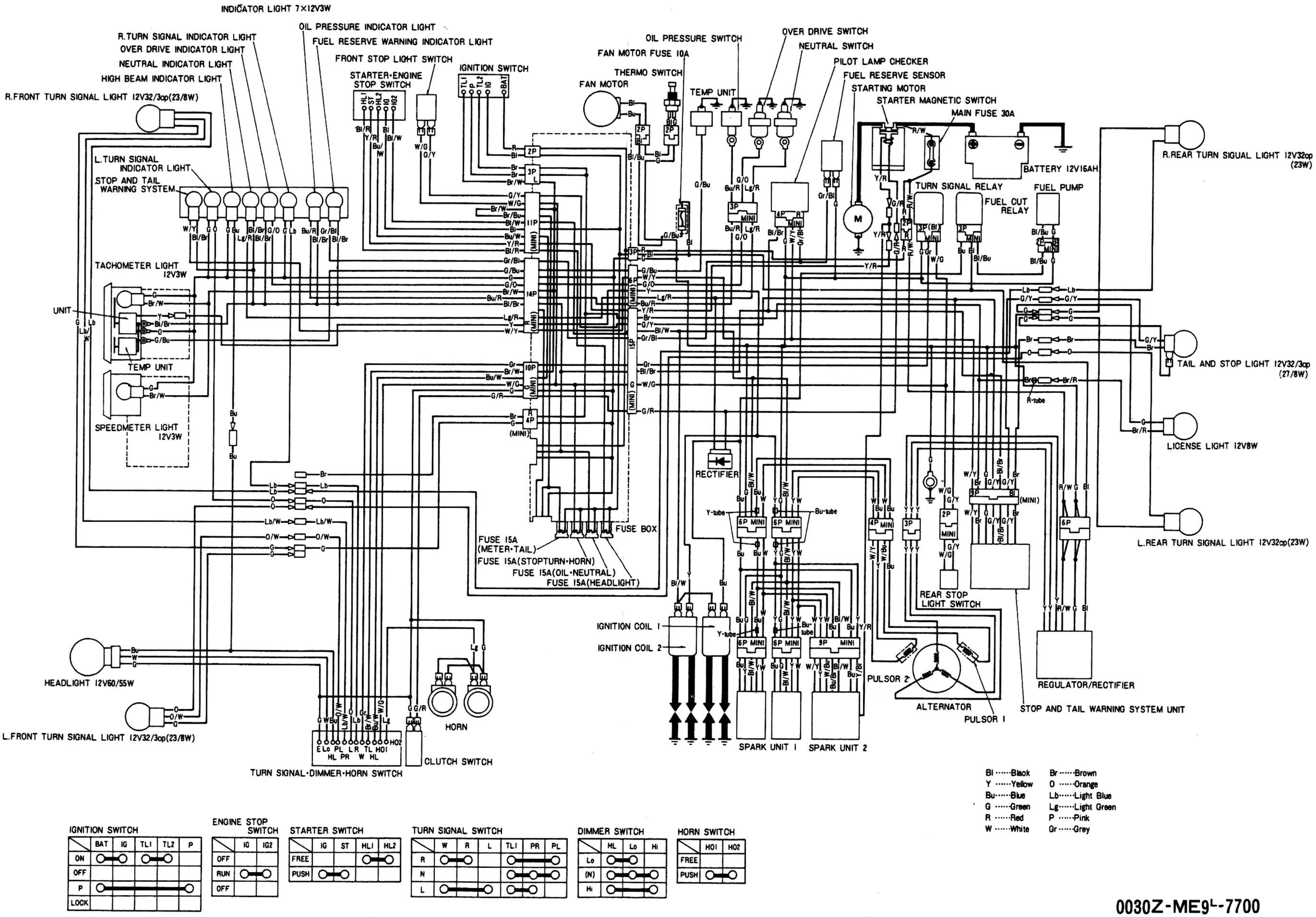
	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi		○	○

HORN SWITCH

	Ho1	Ho2
FREE		
PUSH	○	

B ····· Black
Y ····· Yellow
L ····· Blue
G ····· Green
R ····· Red
W ····· White
Br ····· Brown
O ····· Orange
Ld ····· Light blue
Lg ····· Light green
P ····· Pink
Gr ····· Gray

'84:



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·····Grey

IGNITION SWITCH

	BAT	IG	TLI	TL2	P
ON	●	●	●	●	
OFF					
P	●				●
LOCK					

ENGINE STOP SWITCH

	IG	IG2
OFF		
RUN	●	
OFF		

STARTER SWITCH

	IG	ST	HLI	HL2
FREE				●
PUSH	●			

TURN SIGNAL SWITCH

	W	R	L	TLI	PR	PL
R	●				●	
N					●	
L	●				●	

DIMMER SWITCH

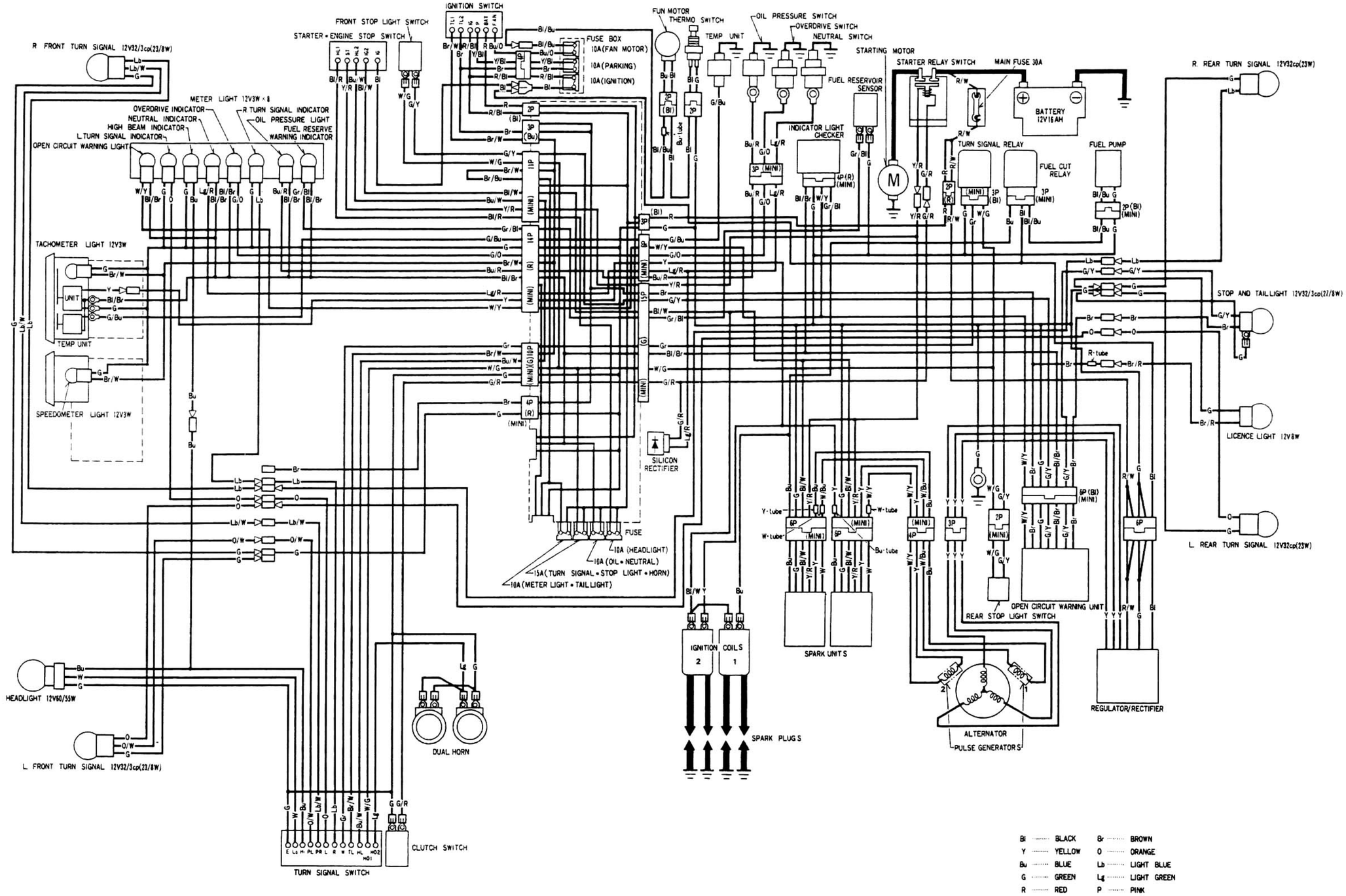
	HL	Lo	Hi
Lo	●		
(N)	●		●
Hi	●		

HORN SWITCH

	HOI	HO2
FREE		
PUSH	●	

0030Z-ME9L-7700

After '84:



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

SWITCH CONTINUITY

IGNITION SWITCH

	BAT	IG	FAN	TL1	TL2	P
ON	○	○	○	○	○	
OFF						
P	○					○
LOCK						

ENGINE STOP SWITCH

	IG	IG2
OFF		
RUN	○	○
OFF		

STARTER SWITCH

	IG	ST	HL1	HL2
FREE			○	○
PUSH	○	○		

TURN SIGNAL SWITCH

	W	R	L	TL1	PR	PL
R	○	○		○	○	
N				○	○	○
L	○		○	○		○

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
N	○		○
Hi		○	○

HORN SWITCH

	HO1	HO2
FREE		
PUSH	○	○

0030Z—ME9—7800

23. TECHNICAL FEATURES

THE HONDA V-TWIN ENGINE	23–2
OFF-SET DUAL-PIN CRANKSHAFT	23–3
HYDRAULIC VALVE ADJUSTER SYSTEM	23–4
3 VALVE/2 SPARK PLUGS	23–7
ONE-WAY CLUTCH SYSTEM	23–7

THE HONDA V-TWIN ENGINE

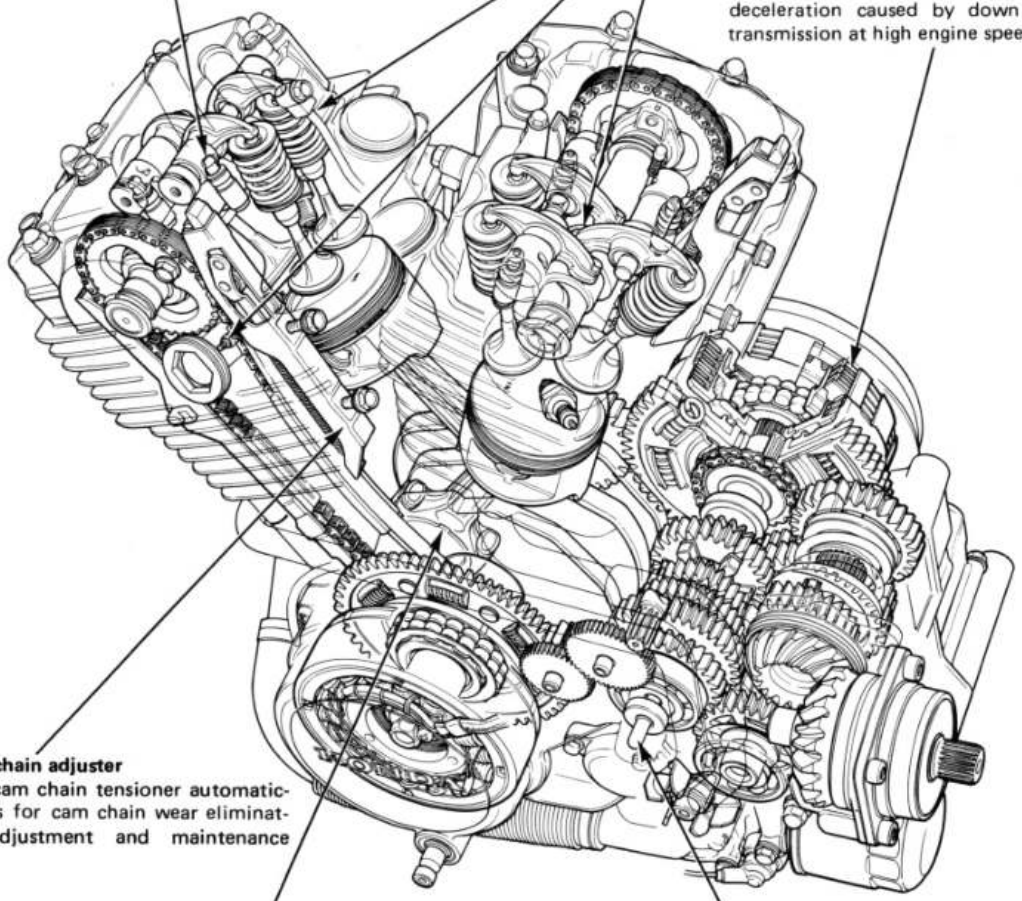
1983 shall be known as the year in motor history that Honda introduced their line of V-twin engines.
Although the V-twin engine is not new to motocycling, Honda has refined the design more than any other manufacturer. With liquid cooling, hydraulic valve tappets, a one-way clutch that helps prevent rear wheel lock-up and an off-set crankshaft that is designed to virtually eliminate primary imbalance; Honda's V-twin engine can be considered a new design.

Characteristics

- **Hydraulic valve adjuster system**
  are used for the first time in a Honda engine. They eliminate the need for periodic valve clearance inspection and/or adjustment.

- **3 valves/2 spark plugs**
  Per cylinder provides highly efficient engine breathing, driveability and fuel economy.

- **One-way clutch**
  prevents rear wheel lock-up during rapid deceleration caused by down shifting of the transmission at high engine speed.



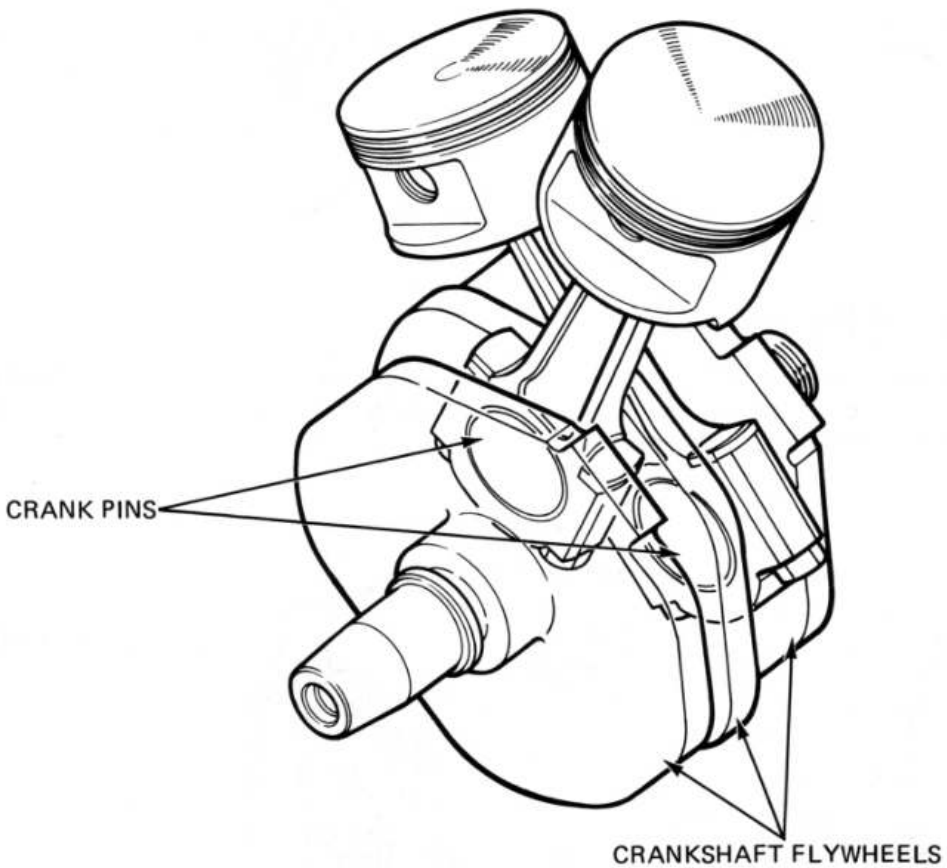
- **Automatic cam chain adjuster**
  The automatic cam chain tensioner automatically compensates for cam chain wear eliminating periodic adjustment and maintenance services.

- **Off-set dual-pin crankshaft**
  eleminates primary imbalance vibration.

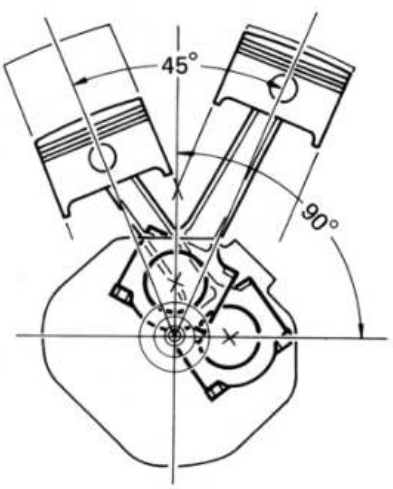
- **Self-adjusted hydraulic clutch**
  Hydraulically assisted, the clutch requires a lighter lever pull compared to cable operated motorcycle clutchs.
  This system also provides a consistently smooth feeling when the clutch lever is pulled in and released. The hydraulic system automatically compensates for wear and the only maintenance check required is the hydraulic fluid reservoir level.

OFF-SET DUAL-PIN CRANKSHAFT

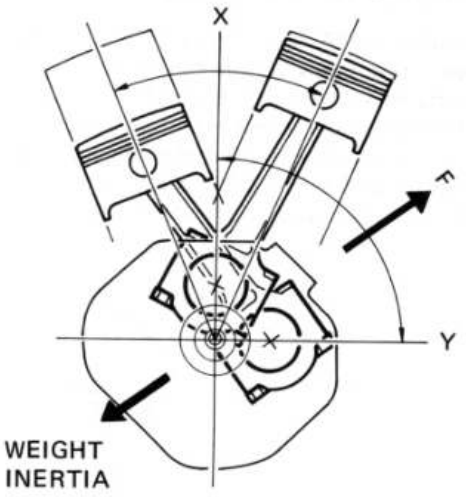
Unless its cylinders are 90° apart, the V-twin engine has an inherent primary imbalance.
The imbalance or resulting vibration can be severe.
Honda engineers wanted the compactness of a narrow V-twin with its cylinders only 45° appart, but without the primary imbalance. They ruled out counter-balancers because they would not contribute to the goal of compactness and light weight. So the engineers decided to try off-setting the crankshaft pins. They sucessfully developed a mathmatical formula to determine the amount of off-set needed for V-twin engines. The amount calculated for the VT750 just happens to be 90°. The off-set will be different for other sizes of Honda V-twins.



The front and rear crank pins are off-set 90° to each other. The connecting rods and pistons are inserted into the front and the rear cylinders which are 45° apart.

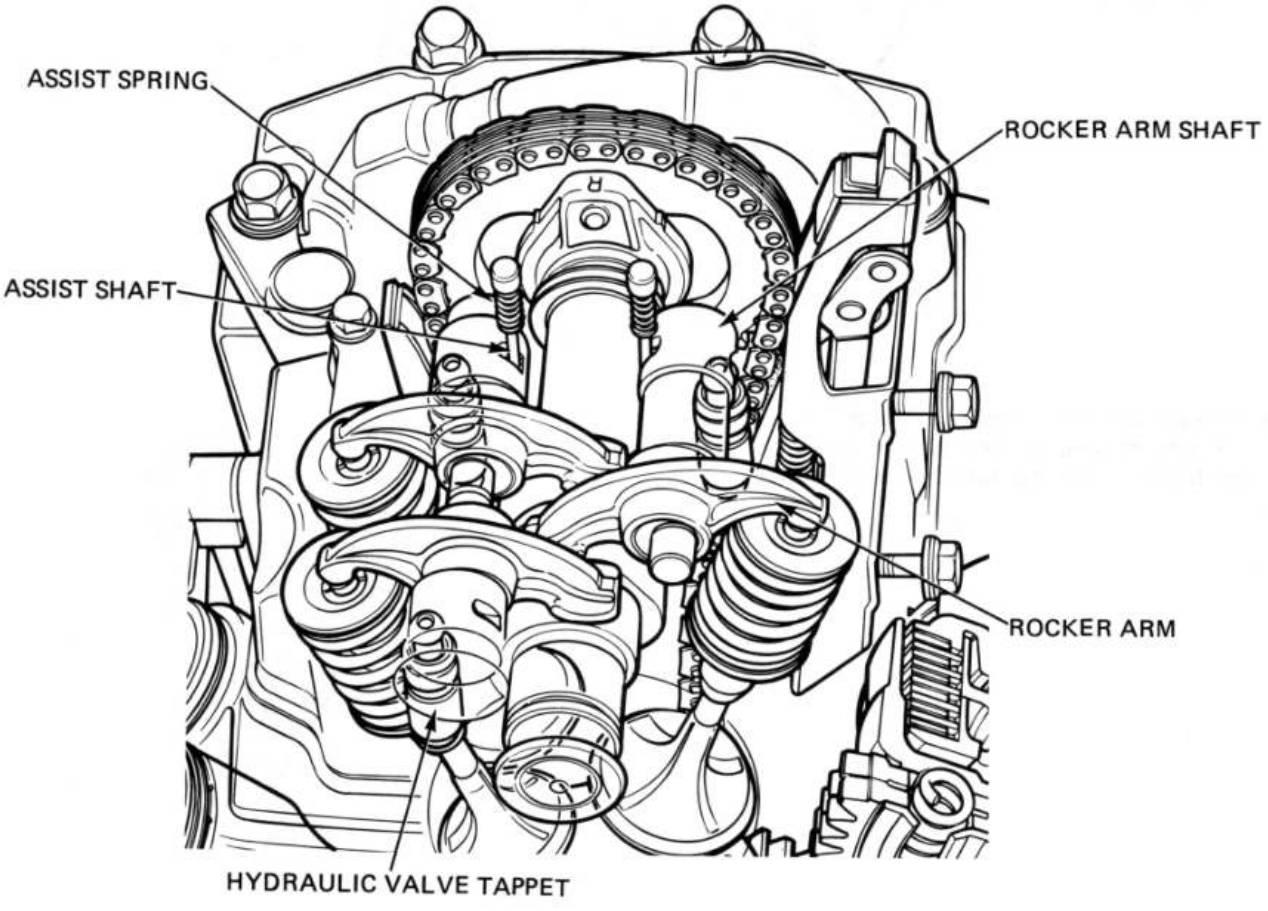


The primary force of inertia on a single cylinder engine occurs in the direction of the cylinder.
This causes the vibration that some single cylinder engines are known for. When applied to the V-twin engine the following occurs;
The primary force of inertia in directions X and Y combine to produce vector F. Vector F works in the direction between the front and rear crank pin centers.
To balance vector F, the crankshaft flywheels are precisely weighted in the opposite direction. The primary inertia produced by vector F and that of the flywheels oppose each other and cancel out overall primary vibration.



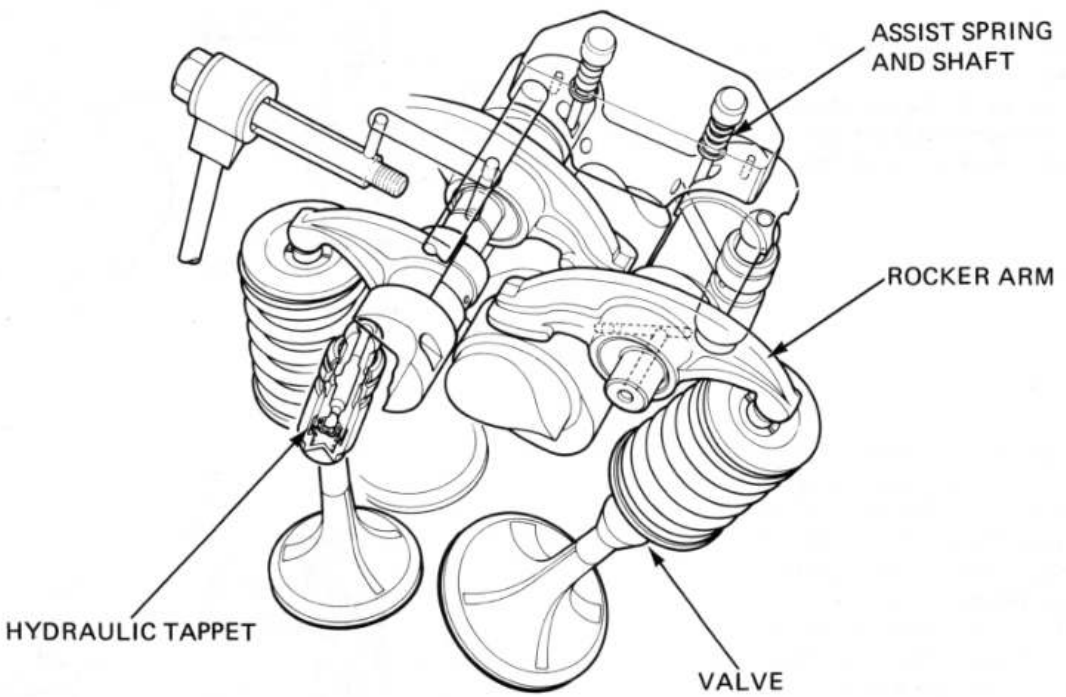
HYDRAULIC VALVE ADJUSTER SYSTEM

The engine is equipped with hydraulic valve tappets. This is the first time hydraulic tappets have been used in a Honda motorcycle engine. Hydraulic tappets do not require adjustment and help the engine to run quieter by keeping valve clearance at zero at all engine temperatures and engine speeds up to redline.

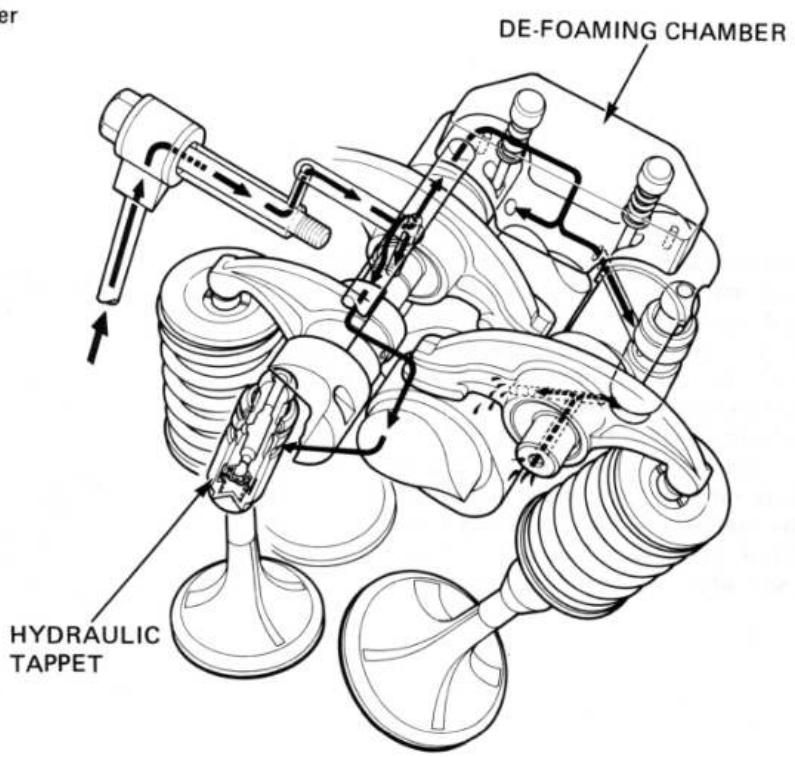


• Construction

A rocker arm is installed on an eccentric rocker arm shaft. An assist shaft and spring fit in a notch on top of the shaft. The hydraulic tappet fits in a notch in the bottom of the shaft. Together, they make the eccentric rocker arm shaft revolve to help maintain zero valve clearance.



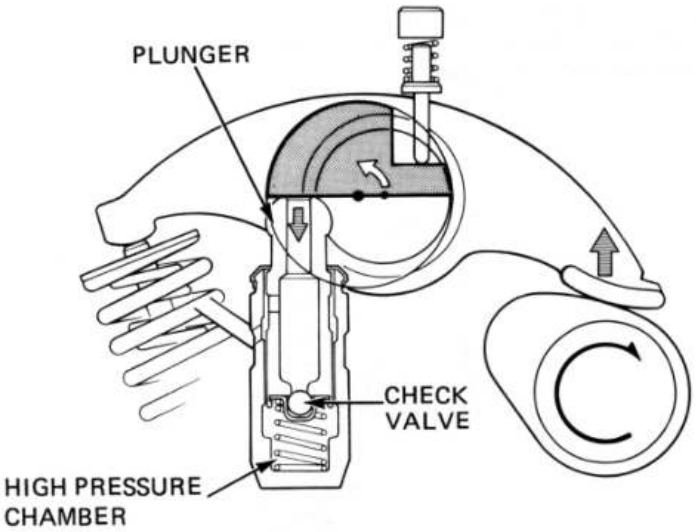
The tappets are continuously supplied with air-bled oil from the de-foaming chamber in the cylinder head cover where oil pass through.



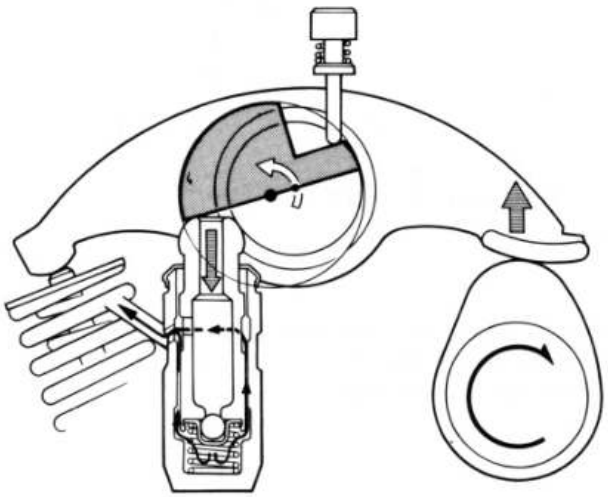
• Operation

When the camshaft lobe is not lifting the rocker arm, the tappet plunger is at rest. In this position its oil inlet hole aligns with the tappet body oil inlet hole. Oil enters the tappet reservoir through these holes.

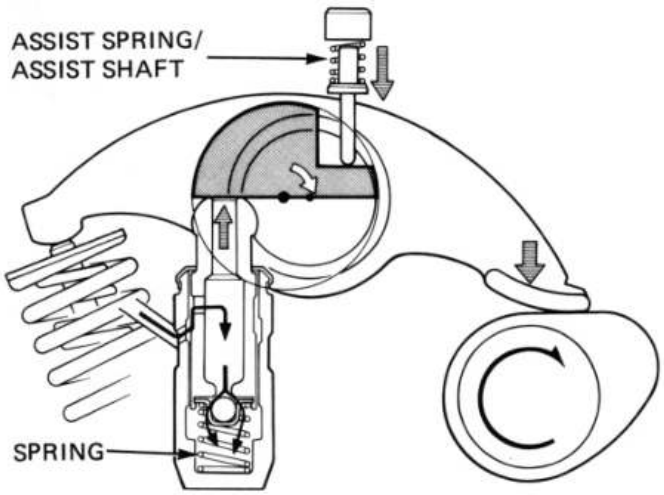
As the camshaft turns and lifts the rocker arm to open the valve, the eccentric roker arm shaft revolves. The shaft pushes the tappet plunger down and oil pressure in the tappet high pressure chamber increases causing the check valve to close.



As the cam lobe nears maximum lift, oil pressure in the high pressure chamber increases rapidly (because the check valve is closed). The high oil pressure keeps the check valve against the plunger. At the same time the rocker arm is pushing against the tappet plunger. This causes a very small amount of oil to leak out of the high pressure chamber between the plunger and body. This allows the plunger to absorb the shock from the effects of the cam lobe reaching maximum lift.



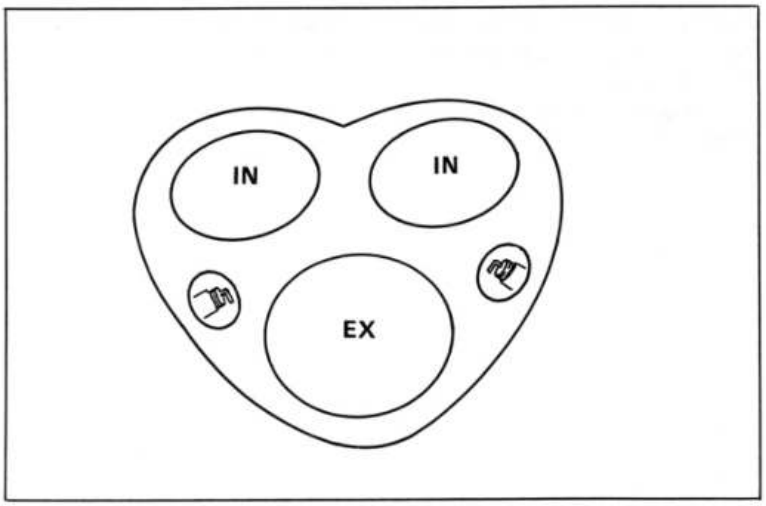
After the cam lobe passes maximum lift, the engine valve springs force the engine valve to close and to push against the rocker arm which follows the cam profile. This also causes the eccentric rocker arm shaft to change direction allowing the tappet plunger to be pushed up by the spring in the high pressure chamber. Oil pressure decreases as a result, the check valve leaves its seat and the plunger and body oil inlet holes realign allowing oil to re-enter the reservoir and high pressure chamber.
All of the above actions keep valve clearance at zero under all normal operating conditions.



3 VALVES/2 SPARK PLUGS

To have the appeal of a V-twin engine and also provide good low-speed driveability, plenty of engine torque and high fuel economy, a 3-valve/2 spark plug head design is used. There are 2 inlet valves of 31 mm diameter each and 1 exhaust valve with a diameter of 41 mm.

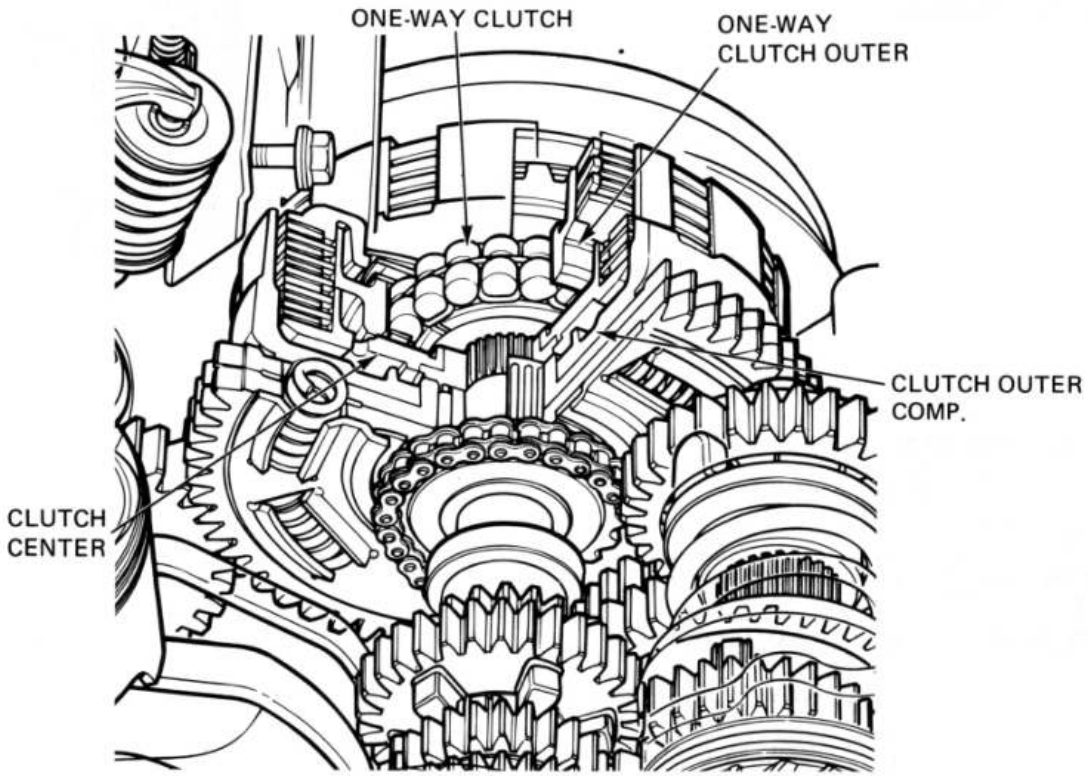
The spark plugs are located to provide the most rapid and complete combustion process: one on the left and one on the right side of the combustion chamber. This 2 spark plug design gives 30% better fuel economy and better driveability at low speeds when compared to a head with only one spark plug.



ONE-WAY CLUTCH SYSTEM

First time on a production motorcycle, this system has been proven on the race circuits of Europe in Hondas Gran Prix road racers.

Rear wheel lock up caused by rapid downshifting and the resulting high engine compression braking force; is prevented by the slippage of the one-way clutch.

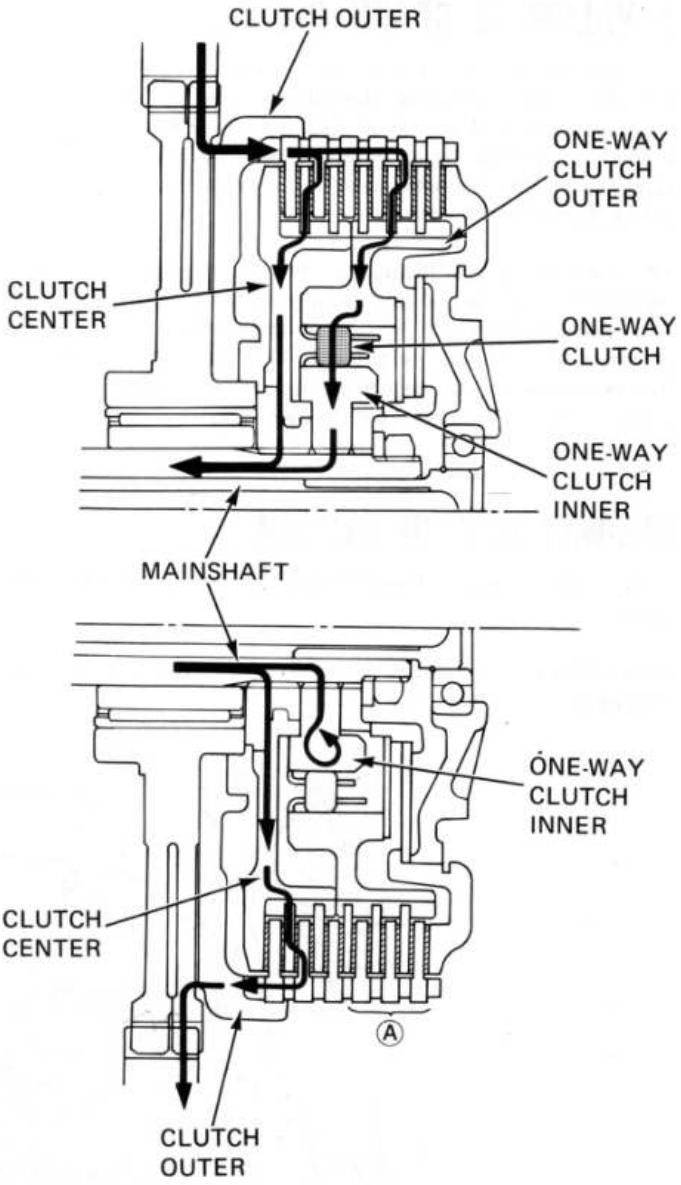


- **Construction**

The one-way clutch is installed with the clutch center inside the clutch outer. Half the clutch plates are controlled by the one-way clutch. The one-way clutch allows those plates to slip when backloading force during deceleration might normally cause the rear wheel to lock-up.
Except for the one-way clutch, the primary driven gear/clutch assembly is a conventional design.

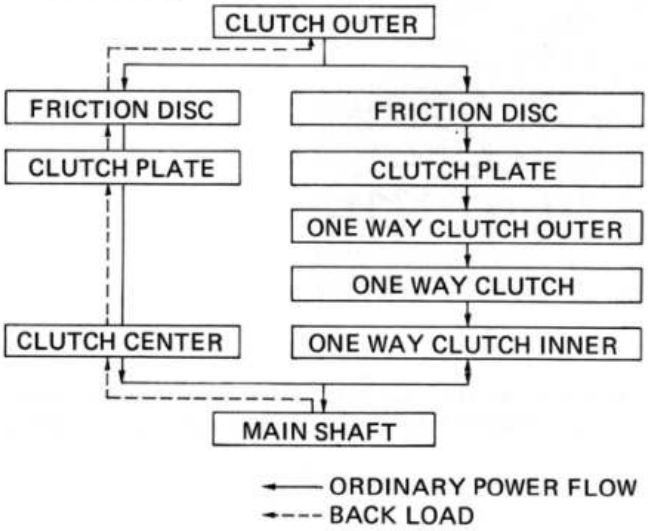
• Operation

During acceleration, cruising and deceleration, power is transmitted through the clutch in the normal manner:
Clutch outer → friction disc → plate → one-way clutch → mainshaft.



When there is a backloading on the clutch caused by the rear wheel nearing lock-up, the one-way clutch (A) will slip just enough to prevent the wheel from locking: without losing the benefit of maximum engine compression braking.

• POWER FLOW DIAGRAM



24. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START	24–1
ENGINE LACKS POWER	24–2
POOR PERFORMANCE AT LOW AND IDLE SPEEDS	24–3
POOR PERFORMANCE AT HIGH SPEED	24–3
POOR HANDLING	24–3
HYDRAULIC TAPPET	24–4

ENGINE DOES NOT START OR IS HARD TO START

1. Check fuel flow to carburetor.

NOT REACHING CARBURETOR → POSSIBLE CAUSE
- (1) Fuel tank empty.
- (2) Clogged fuel tube or fuel filter.
- (3) Sticking float valve.
- (4) Faulty fuel pump.
- (5) Pinched fuel tank vent hose.

REACHING CARBURETOR ↓

2. Perform a spark test.

WEAK OR NO SPARK →
- (1) Faulty spark plugs.
- (2) Fouled spark plugs.
- (3) Faulty spark unit.
- (4) Broken or shorted spark plug wires.
- (5) Faulty spark unit.
- (6) Broken or shorted ignition coil.
- (7) Faulty ignition switch.
- (8) Faulty pulse generator.

GOOD SPARK ↓

3. Test cylinder compression.

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) Improper valve timing.

COMPRESSION NORMAL ↓

4. Start by following normal procedure.

ENGINE STARTS BUT STOPS →
- (1) Improper choke operation.
- (2) Carburetor incorrectly adjusted.
- (3) Intake pipe leaking.
- (4) Improper ignition timing. (Spark unit or pulse generator).
- (5) Fuel contaminated.

ENGINE DOES NOT FIRE ↓

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.	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging. (2) Worn or damaged wheel bearings. (3) Wheel bearing needs lubrication. (4) Final gear bearing damaged.
WHEEL SPINS FREELY ↓		
2. Check tire pressure.	PRESSURE LOW →	(1) Punctured tire. (2) Faulty tire valve.
PRESSURE NORMAL ↓		
3. Accelerate rapidly from low to second.	ENGINE SPEED CHANGED WHEN CLUTCH IS RELEASED →	(1) Clutch slipping. (2) Worn clutch disc/plate. (3) Warped clutch disc/plate.
ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED ↓		
4. Accelerate lightly.	ENGINE SPEED DOES NOT INCREASE →	(1) Carburetor choke closed. (2) Clogged air cleaner. (3) Restricted fuel flow. (4) Clogged muffler. (5) Pinched fuel tank vent hose.
ENGINE SPEED INCREASES ↓		
5. Check ignition timing.	INCORRECT →	(1) Faulty spark unit. (2) Faulty pulse generator.
CORRECT ↓		
6. Check hydraulic tappet conditions.	INCORRECT →	(1) Clogged tappet oil holes. (2) Worn valve seat. (3) Dammaged tappet.
CORRECT ↓		
7. Test cylinder compression.	TOO LOW →	(1) Valve stuck open. (2) Worn cylinder and piston rings. (3) Leaking head gasket. (4) Improper valve timing.
NORMAL ↓		
8. Check carburetor for clogging.	CLOGGED →	• Carburetor not serviced. frequently enough.
NOT CLOGGED ↓		
9. Remove spark plug.	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough. (2) Spark plug with incorrect heat range.
NOT FOULED OR DISCOLORED ↓		
10. Check oil level and condition.	INCORRECT →	(1) Oil level too high. (2) Oil level too low. (3) Contaminated oil.
CORRECT ↓		
11. Remove cylinder head cover and inspect lubrication.	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage. (2) Clogged oil control orifice.
VALVE TRAIN LUBRICATED PROPERLY ↓		
12. Check for engine overheating.	OVERHEATING →	(1) Excessive carbon build-up. in combustion chamber. (2) Use of poor quality fuel. (3) Clutch slipping.
NOT OVERHEATING ↓		
13. Accelerate or run at high speed.	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).
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and hydraulic tappet condition.	INCORRECT →	(1) Tappet holes clogged. (2) Tappet damagged. (3) Improper ignition timing. (Faulty spark unit).
CORRECT ↓		
2. Check carburetor pilot screw adjustment.	INCORRECT →	See Fuel System Section.
CORRECT ↓		
3. Check for leaking intake pipe.	LEAKING →	(1) Deteriorated insulator O-ring. (2) Loose carburetor.
NO LEAK ↓		
4. Perform spark test.	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug. (2) Faulty spark unit. (3) Faulty ignition coil.
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

1. Check ignition timing.	INCORRECT →	(1) Faulty spark unit. (2) Faulty pulse generator.
CORRECT ↓		
2. Disconnect fuel tube at carburetor.	FUEL FLOW RESTRICTED →	(1) Clogged fuel line. (2) Clogged fuel tank breather hole. (3) Clogged fuel valve. (4) Faulty fuel pump.
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jets.	CLOGGED →	Clean.
NO CLOGGED JETS ↓		
4. Check valve timing.	INCORRECT →	Cam sprocket not installed properly.
CORRECT ↓		
5. Check valve spring tension.	WEAK →	Faulty spring.
NOT WEAKENED		

POOR HANDLING → Check tire pressure

1. If steering is heavy. →	(1) Steering stem adjustment nut 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. (6) Swingarm pivot adjusting bolt too tight.
3. If the motorcycle pulls to one side. →	(1) Faulty shock absorber. (2) Front and rear wheels not aligned. (3) Bent front fork. (4) Bent swingarm.

HYDRAULIC TAPPET

NOISEY TAPPET

1. Check for low oil level.
   Ride for five minutes with the engine speed over 3,000 rpm.
   Check oil level and condition.

   INCORRECT → (1) Contaminated oil.
   (2) Contaminated oil filter.

   CORRECT
   ↓
2. Check oil pressure.

   TOO LOW → (1) Clogged oil passage.
   (2) Clogged oil control orifice.
   (3) Oil level too low.

   NOT CLOGGED
   ↓
3. Remove cylinder head cover and oil hole caps and check lubrication.

   NOT LUBRICATED PROPERLY → (1) Clogged oil pipe.
   (2) Faulty O-ring.
   (3) Faulty oil hole cap.

   CORRECT
   ↓
4. Remove hydraulic tappet and check.

   INCORRECT → (1) Plunger sticking.
   (2) Faulty tappet.
   (3) Faulty one way valve.

   CORRECT

ENGINE LACKS POWER

1. Turn the engine for a few seconds with the starter.

   ENGINE STARTS → (1) Bubbly engine oil with over rev up.

   ENGINE DOES NOT START
   ↓
2. Check oil pressure.

   TOO LOW → (1) Oil level too low.
   (2) Clogged oil passage.
   (3) Contaminated oil.
   (4) Contaminated oil filter.

   CORRECT
   ↓
3. Remove tappet and check

   INCORRECT → (1) Faulty tappet (Replace).