HOW TO USE THIS MANUAL

Follow the Maintenance Schedule (section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Enivronmental 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 22.

If you don't know the source of the trouble, go to section 23, 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.

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SERVICE PUBLICATIONS OFFICE

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HONDA CB1000C 1. GENERAL INFORMATION

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GENERAL SAFETY

WARNING

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

WARNING

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

WARNING

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

WARNING

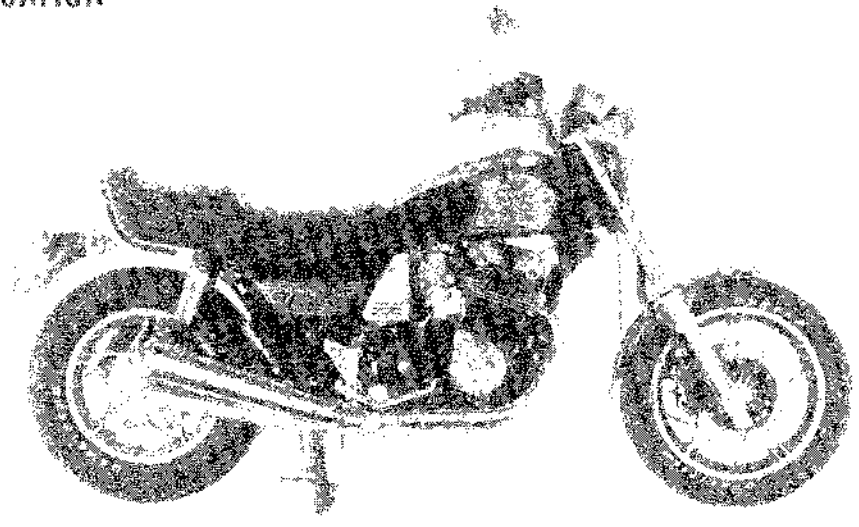
The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.

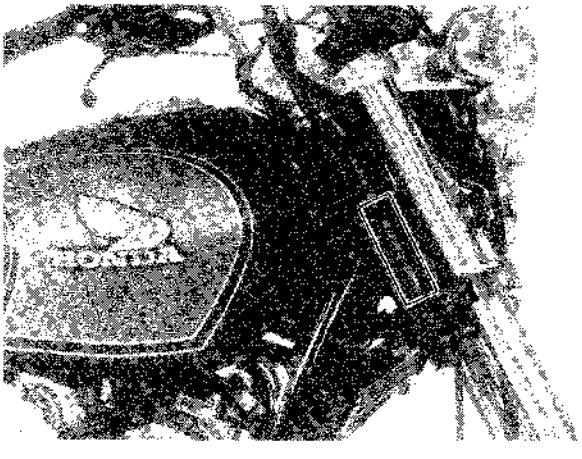
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. 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 larger-diameter or inner bolts first, and tighten to the specified torque diagonally in 2–3 steps, unless a particular sequence is specified.
6. Clean parts in non flammable or high flash point solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.

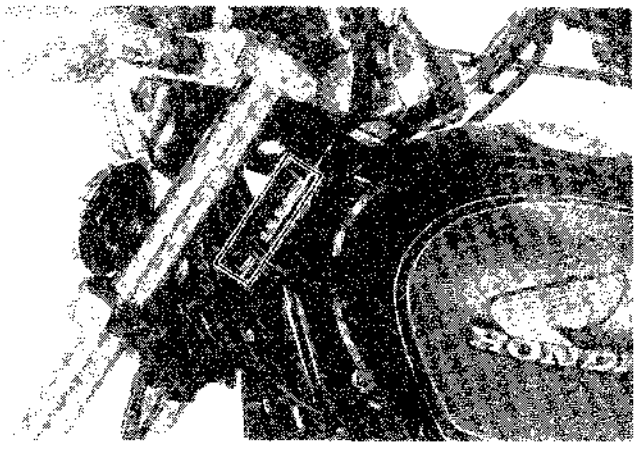
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MODEL IDENTIFICATION





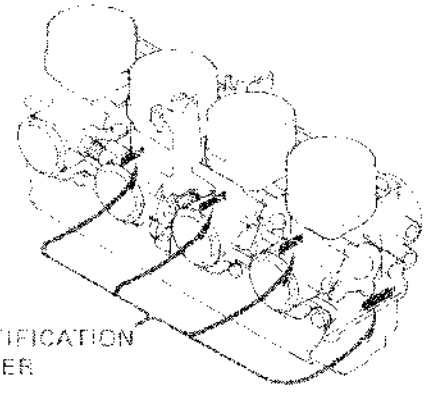
The frame serial number is stamped on the steering head right side.



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



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



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

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SPECIFICATIONS

ITEM			
DIMENSIONS	Overall length		2,325 mm (91.5 in)
	Overall width		890 mm (35.0 in)
	Overall height		1,220 mm (48.0 in)
	Wheelbase		1,612 mm (63.5 in)
	Seat height		790 mm (31.1 in)
	Foot peg height		325 mm (12.8 in)
	Ground clearance		150 mm (5.9 in)
	Dry weight		265 kg (584 lb)
	Curb weight		281.5 kg (620.4 lb)
FRAME	Type		Double cradle
	Front suspension	Travel	Telescopic fork 160 mm (6.3 in)
		Air pressure	40–100 kPa (0.4–1.0 kg/cm², 6–14 psi)
	Rear suspension	Travel	Swing arm 98 mm (3.9 in)
		Air pressure	0–400 kPa (0–4.0 kg/cm², 0–57 psi)
	Gross vehicle weight rating		497 kg (1,095 lb)
	Vehicle capacity load		215 kg (475 lb)
	Front tire size		110/90-18-62H or M110/90-18
	Rear tire size		140/90-16-67H or M140/90-16
	Cold tire pressures	Up to 90 kg (200 lbs) load Front	225 kPa (2.25 kg/cm², 32 psi)
		Up to 90 kg (200 lbs) load Rear	225 kPa (2.25 kg/cm², 32 psi)
		Up to vehicle capacity load Front	225 kPa (2.25 kg/cm², 32 psi)
		Up to vehicle capacity load Rear	280 kPa (2.8 kg/cm², 40 psi)
	Front brake, lining swept area		Double disc brake 1,200 cm² (186.0 sq in)
	Rear brake, lining swept area		Single disc brake 853 cm² (101.2 sq in)
	Fuel capacity		16.5 liters (4.4 US gal, 3.6 Imp gal)
	Fuel reserve capacity		3.0 liters (0.8 US gal, 0.7 Imp gal)
	Caster angle		29°
	Trail		99 mm (3.9 in)
	Front fork oil capacity		RIGHT: 455 cc (15.4 ozs) LEFT: 470 cc (15.9 ozs)
ENGINE	Type		Air cooled 4-stroke DOHC 4 valves per cylinder
	Cylinder arrangement		4 cylinder in-line
	Bore and stroke		67.0 x 69.0 mm (2.64 x 2.72 in)
	Displacement		973 cm³ (59.4 cu in)
	Compression ratio		9.0 : 1
	Valve train		Chain driven DOHC 4 Valves per cylinder
	Maximum horse power		89.2 BHP/8,000 rpm
	Maximum torque		8.4 kg-m (60.7 ft-lb)/6,500 rpm
	Oil capacity		4.5 liters (4.7 US qt, 4.0 Imp qt) after disassembly
			3.5 liters (3.7 US qt, 3.0 Imp qt) after draining
	Lubrication system		Forced pressure and wet sump
	Air filtration		Paper
	Cylinder compression		12.0 ± 2.0 kg/cm² (170 ± 28 psi)
	Intake valve	Opens	10° (BTDC) at 1 mm lift, 63° (BTDC) at 0 lift
		Closes	35° (ABDC) at 1 mm lift, 98° (ABDC) at 0 lift
	Exhaust valve	Opens	40° (BBDC) at 1 mm lift, 70° (BBDC) at 0 lift
		Closes	5° (ATDC) at 1 mm lift, 93° (ATDC) at 0 lift
	Valve clearance	(Cold)	IN: 0.06–0.13 mm (0.002–0.005 in) EX: 0.06–0.13 mm (0.002–0.005 in)
	Engine weight		106 kg (234 lb)
	Idle speed		1,000 ± 100 rpm

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ITEM		
CARBURETION	Carburetor type	VB, 32 mm (1.26 in) venturi bore
	Identification number	VB55A
	Pilot screw initial setting	See page 4-18
	Float level	15.5 mm (0.61 in)
DRIVE TRAIN	Clutch	Wet, multi-plate
	Transmission	5-speed constant-mesh with dual range subtransmission
	Primary reduction	1.000/2.042 : 1
	Final reduction	3.100
	Secondary reduction (subtransmission)	
	I (High range)	0.595
	II (Low range)	0.721
	Third reduction	1.200
	Gear ratio I	2.375
	Gear ratio II	1.789
	Gear ratio III	1.391
	Gear ratio IV	1.160
	Gear ratio V	0.964
	Gear shift pattern	Left foot operated return system, 1-N-2-3-4-5
	Subtransmission gear oil capacity	600 cc (20.3 oz)
	Final drive gear oil capacity	150 cc (5.1 oz)
ELECTRICAL	Ignition	Transistorized
	Ignition timing "F–I" mark	10° BTDC at idle
	Full advance	38.5° BTDC at 3,300 rpm
	Starting system	Starting motor
	Alternator	Three phase 266 W/5,000 rpm
	Battery capacity	12 V – 14 AH
	Spark plug	Standard: ND X27ESR-U; NGK DR8ES
		For cold climate below 5°C (41°F): ND X24ESR-U; NGK DR8ES-L
	Spark plug gap	0.6–0.7 mm (0.024–0.028 in)
	Firing order	1–2–4–3
	Fuse/Main fuse	15 A/30 A
LIGHTS	Headlight (high/low beam)	60/55 W H4 BULB (Phillips 12342/99 or equivalent)
	Tail/stoplight	8/27 W 3/32 cp SAE NO. 1157
	Front turn signal/running light	23/8 W 32/3 cp SAE NO. 1034
	Rear turn signal	23 W 32 cp SAE NO. 1073
	Speedometer light	3.4 W 2 cp SAE NO. 57
	Tachometer light	3.4 W 2 cp SAE NO. 57
	Neutral indicator	3.0 W 2 cp
	Turn signal indicator	3.0 W 2 cp
	High beam indicator	3.0 W 2 cp
	Position light	8.0 W 3 cp SAE NO. 1034

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TORQUE VALUES

• ENGINE

Item	Q'ty	Thread Dia (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Cylinder head cover bolts	8	6	8–12 (0.8– 1.2, 6– 9)	
Camshaft holder bolts	24	6	12–16 (1.2– 1.6, 9–12)	Apply molybdenum disulfide grease to threads and underside of nuts
Cylinder head bolts	12	10	36–40 (3.6– 4.0, 26–29)	
Camshaft sprocket bolts	4	7	22–26 (2.2– 2.6, 16–19)	
Spark plugs	4		12–19 (1.2– 1.9, 9–14)	
Crankcase bolts		8	21–25 (2.1– 2.5, 15–18)	Apply molybdenum disulfide grease to threads and underside of nuts
Alternator	1	12	80–100 (8.0–10.0, 58–72)	
Primary shaft	1	12	80–100 (8.0–10.0, 58–72)	
Mainshaft	1	16	38–42 (3.8– 4.2, 28–30)	
Connecting rod nuts	8		32 (3.2, 23)	
Oil Filter center bolt	1		28–32 (2.8– 3.2, 20–23)	
Oil pressure switch	1		15–20 (1.5– 2.0, 11–14)	Apply liquid sealant
Neutral switch	1		16–20 (1.6– 2.0, 12–14)	
Oil drain plug	1	14	35–40 (3.5– 4.0, 25–29)	
Oil line	2	10	21–25 (2.1– 2.5, 15–18)	
Spark advancer	1	8	33–37 (3.3– 3.7, 24–27)	Apply LOCTITE® 271 to the threads
Starting clutch bolts	3	8	26–30 (2.6– 3.0, 19–22)	
Subtransmission	9	8	30–34 (3.0– 3.4, 22–25)	
Oil level check bolt	1	12		
Oil drain bolt	1	8	16–20 (1.6– 2.0, 12–14)	

• CHASSIS

Item	Q'ty	Thread Dia (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Steering stem nut	1	24	80–120 (8.0–12.0, 58–87)	Apply oil to threads and tighten to 20 N·m (2.0 kg-m, 14 ft-lb) when a genuine Honda fairing is installed.
Steering bearing adjustment nut	1	26	14–16 (1.4– 1.6, 10–12)	
Handlebar upper holder bolts	4	8	20–30 (2.0– 3.0, 14–22)	
Front fork top pinch bolts	2	7	9–13 (0.9– 1.3, 7– 9)	
Front fork tube caps	2	31	15–30 (1.5– 3.0, 11–22)	
Front fork bottom pinch bolts	2	10	45–55 (4.5– 5.5, 33–40)	
Axle pinch bolts	4	10	15–25 (1.5– 2.5, 11–18)	
Front axle	1	12	55–65 (5.5– 6.5, 40–47)	
Front fork socket bolts	2	8	15–25 (1.5– 2.5, 11–18)	
Front fork drain bolts	2	6	6– 9 (0.6– 0.9, 4.3–7)	

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Item	Q'ty	Thread Dia (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Front brake disc nuts	6		30 - 35 (3.0 - 3.5, 22 - 25)	UBS
Rear brake disc nuts	6		30 - 35 (3.0 - 3.5, 22 - 25)	
Rear axle nut	1	18	80 - 100 (8.0 - 10.0, 58 - 72)	
Rear axle holding bolt	1	8	24 - 29 (2.4 - 2.9, 17 - 21)	
Rear brake pedal holder bolts	2	10	35 - 45 (3.5 - 4.5, 25 - 33)	
Rear brake pedal	1	8	18 - 25 (1.8 - 2.5, 13 - 18)	
Rear brake torque link	1	8	18 - 25 (1.8 - 2.5, 13 - 18)	
Rear shock absorber cap nuts	4	16	30 - 40 (3.0 - 4.0, 22 - 29)	
Rear shock absorber pin bolt	1	14	40 - 50 (4.0 - 5.0, 29 - 36)	
Engine hanger bolts	5	10	35 - 45 (3.5 - 4.5, 25 - 33)	
Rear shock absorber rod lock nuts	2	11	35 - 60 (3.5 - 6.0, 25 - 43)	
Rear shock absorber air valve (3-way joint)	1	8	4 - 7 (0.4 - 0.7, 2.9 - 5.1)	
Rear shock absorber hose connector (3-way joint)	2	8	4 - 7 (0.4 - 0.7, 2.9 - 5.1)	
Rear shock absorber hose joints	2	8	4 - 7 (0.4 - 0.7, 2.9 - 5.1)	
Rear shock absorber hose joints (3-way)	2	10	15 - 20 (1.5 - 2.0, 11 - 14)	
3-way joint	1	14	19 - 23 (1.9 - 2.3, 14 - 17)	
Swing arm pivot bolts				
(Right)	1	35	50 - 70 (5.0 - 7.0, 36 - 51)	
(Left)	1	35	15 - 20 (1.5 - 2.0, 12 - 14)	
Swing arm pivot nut	1	35	50 - 70 (5.0 - 7.0, 36 - 51)	
Oil bolt	1		25 - 35 (2.5 - 3.5, 18 - 25)	
Front caliper bracket bolts (Right)	2		30 - 40 (3.0 - 4.0, 22 - 29)	
Upper mount bolt	1		30 - 40 (3.0 - 4.0, 22 - 29)	
Piston pin bolt	1		20 - 25 (2.0 - 2.5, 14 - 18)	
Lower mount bolt	1		20 - 25 (2.0 - 2.5, 14 - 18)	

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Item	Q'ty	Thread Dia (mm)	Torque N·m (kg·m, ft·lb)	Remarks
Front caliper bolt	1		20–25 (2.0–2.5, 14–18)	
Front caliper shaft	1		25–30 (2.5–3.0, 18–22)	
Rear caliper bolt	1		20–25 (2.0–2.5, 14–18)	
Rear caliper shaft	1		25–30 (2.5–3.0, 18–22)	
Rear master cylinder bolts	2		20–25 (2.0–2.5, 14–18)	
Final gear case bolts	3	10	35–45 (3.5–4.5, 25–33)	UBS
Final gear case cover bolts	2	10	35–45 (3.5–4.5, 25–33)	
	6	8	23–28 (2.3–2.8, 17–20)	
Final gear case drain bolt	1	6	10–14 (1.0–1.4, 7–10)	
Filler cap bolt	1	30	10–14 (1.0–1.4, 7–10)	
Pinion nut	1	16	40–50 (4.0–5.0, 29–36)	

Torque specifications listed above are for the most important fasteners. Fasteners not listed specifically should be tightened to the standard torque values below.

• 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, 3– 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)

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TOOLS

• SPECIAL TOOLS

Tool Name	Tool No.	Q'ty	Ref. page
Vacuum gauge set	07404–0020000	1	3–11,
Oil pressure gauge	07506–3000000	1	2–5,
Oil pressure gauge attachment	07510–4220100	1	2–4,
Primary gear holder	07924–4250000	1	8–6,
Bearing race remover	07953–4250002	1	14–28
Carburetor adjusting wrench	07908–4220100	1	3–12,
Carburetor pilot screw wrench	07908–4220201	1	4–18
Snap ring pliers	07914–3230001	1	14–18, 14–24, 15–10, 17–9
Steering stem socket	07916–3710100	1	14–27, 14–29
6 mm hollow set wrench	07917–3230000	1	14–17, 14–23
Bearing race remover	07946–3710500	1	14–28
Steering stem driver	07946–MB00000	1	14–27
Piston base	07958–3000000	2	7–8
Tool holder set	07964–4220002	1	3–8,
Valve guide reamer 5.5 mm	07984–2000000	1	6–14, 6–15
Piston ring compressor	07954–3690000	2	7–8
Valve lifter bore protector	07999–4220000	1	6–11, 6–17
Socket bit 10 mm	07917–3710000	1	8–6, 15–12, 15–16
Clutch adjusting wrench	07908–3230000	1	3–19
Valve seat cutter 27.5 mm	07780–0010100	1	6–16
Valve seat flat cutter 28 mm	07780–0012100	1	
Valve seat flat cutter 25 mm	07780–0012000	1	
Valve seat interior cutter 30 mm	07780–0014000	1	
Valve seat interior cutter 24 mm	07780–0014200	1	
Valve seat cutter holder 5.5 mm	07781–0010100	1	
Retainer wrench A	07910–4610100	1	10–10, 10–14
Retainer wrench B	07910–4610200	1	10–10, 10–12, 16–11
Damper compressor	07964–4610000	1	10–3, 10–7,
Preload inspection tool	07998–4610000	1	10–13,
Subtransmission base	07965–4610000	1	10–9
Bearing driver attachment	07946–8710701	1	14–28,
Clutch center holder	07923–3710000	1	8–4, 8–9
Bearing remover set	07936–8890100	1	15–14
P.V.T. adjust wrench	07908–4690001	1	15–12, 15–16
Final retainer wrench	07910–3710000	1	16–4, 16–6, 16–11
Oil seal driver attachment	07946–6920100	1	16–7, 16–10
Retainer wrench B	07910–4630100	1	16–9

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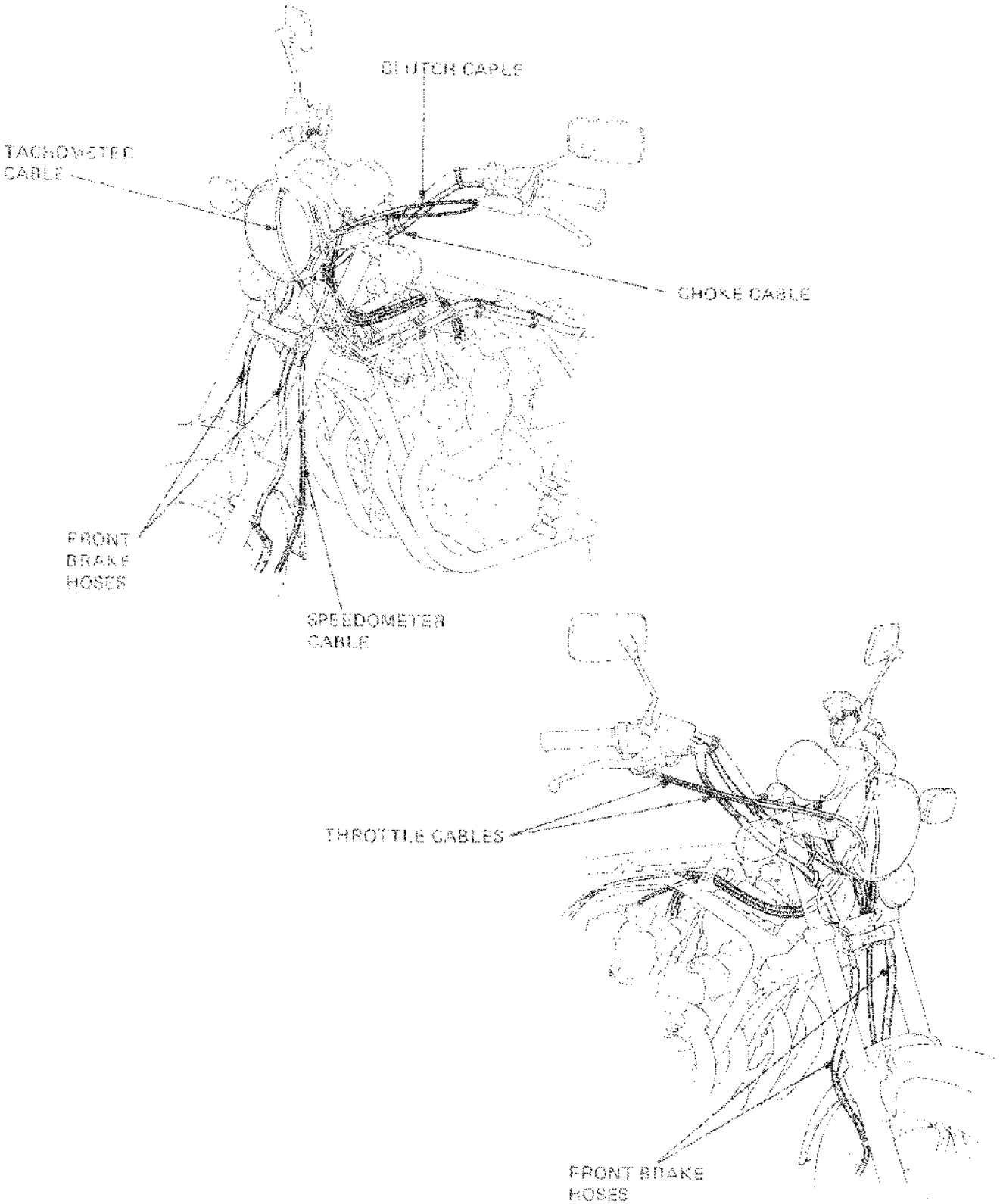
Tool Name	Tool No.	Q'ty	Ref. page
Fork seal driver	07947–3710100	1	15–10
Dis/assembly tool A	07965–3710100	1	16–5
Preload inspection tool	07924–3710000	1	16–9, 16–12, 16–13
Oil seal remover	07948–4630100	1	16–6
Final assembly/disassembly base A	07965–4630100	1	16–3, 16–9
Disassembly tool B	07965–4630300	1	16–5
Oil seal guide	07973–4630100	1	16–10
O-ring guide	07973–4630200	1	16–10, 16–11
Pinion gear dis/assembly tool	07935–MB00000	1	16–12
Fork seal driver	07947–4630100	1	14–23

• COMMON TOOLS

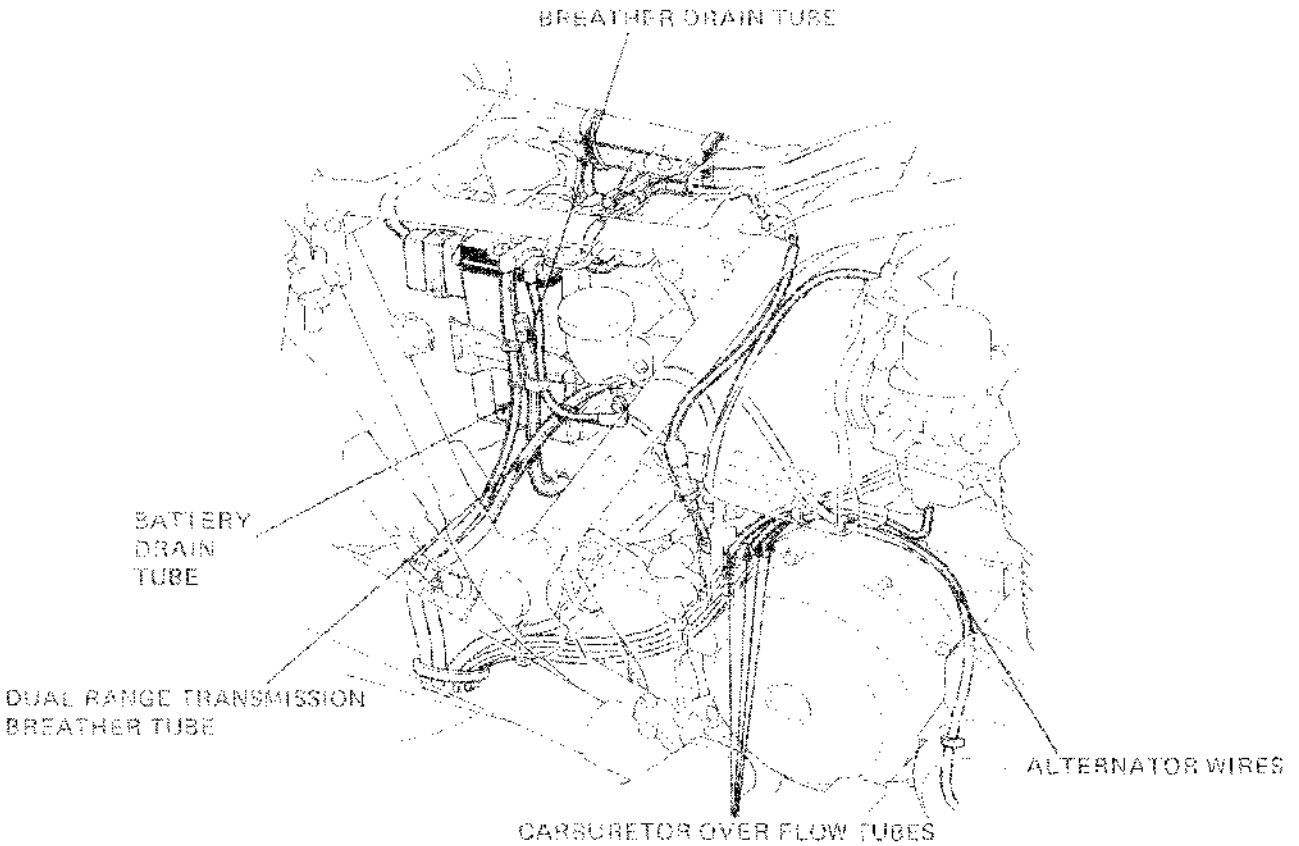
Tool Name	Part No.	Q'ty	Alternate Tool	Part No.	Ref. Page
Float level gauge	07401–0010000	1			4–9
Lock nut wrench 20 x 24 mm	07716–0020100	1			8–4, 8–9
30 x 32 mm	07716–0020400	1			14–26, 14–30
Extension bar	07716–0020500	1			14–26
Rotor puller	07733–0020001	1			
Valve guide remover 5.5 mm	07742–0010100	1	Valve guide driver	07942–3290100	6–15
Valve guide driver B	07742–0020200	1	Valve guide driver	07942–3290200	6–15
Bearing driver outer 37 x 40 mm	07746–0010200	1	Bearing driver	07946–4300200	10–11, 15–14
Bearing driver outer 42 x 47 mm	07746–0010300	1	Bearing driver	07945–3330100	10–12, 14–14, 15–5
Bearing driver outer 52 x 55 mm	07746–0010400	1	Bearing driver	07946–9370100 3290000	2–11,
Bearing driver handle outer A	07749–0010000	1	Driver handle attachment	07949–6110000	2–11, 14–14, 16–7 16–10,
Bearing driver handle Inner B	07746–0020100	1	Bearing driver	07945–3230201	13–12, 13–13
Bearing driver handle Inner C	07746–0030100	1	Bearing driver	07945–3710200	12–8
Bearing driver inner 25 mm	07746–0030200	1			
Valve spring compressor	07757–0010000	1	Valve spring compressor	07957–3290001	6–11, 6–17
Drive pilot 15 mm	07746–0040300	1			14–14
Drive pilot 20 mm	07746–0040400	1			15–5
Shock absorber c compressor	07959–3290001	1			

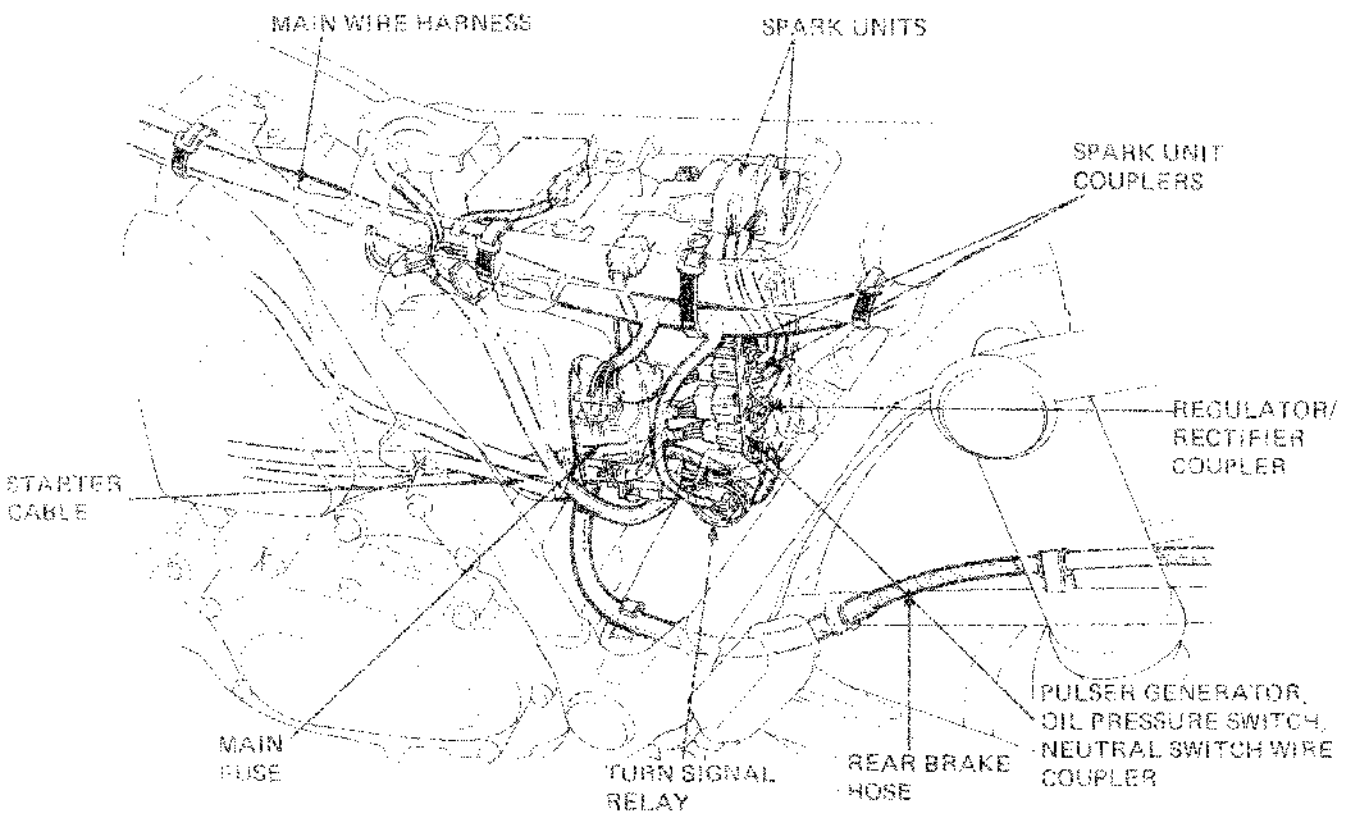
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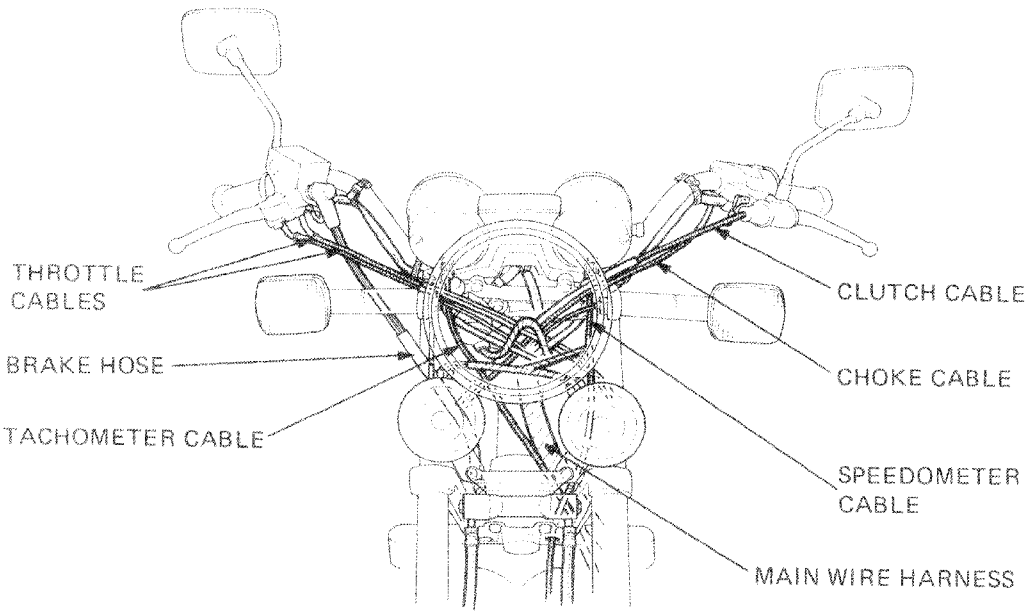
CABLE & HARNESS ROUTING

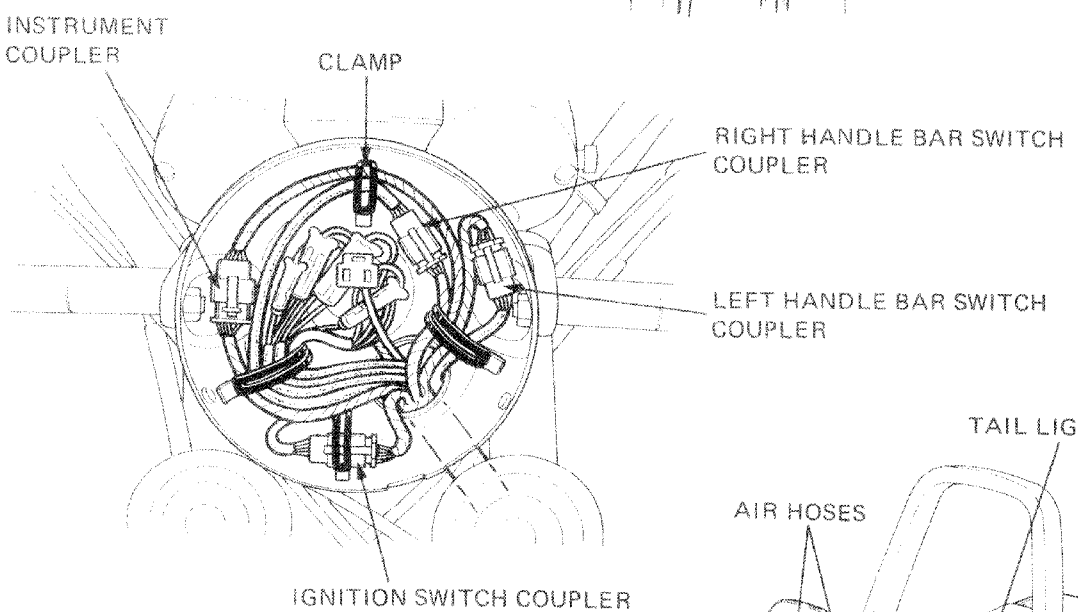


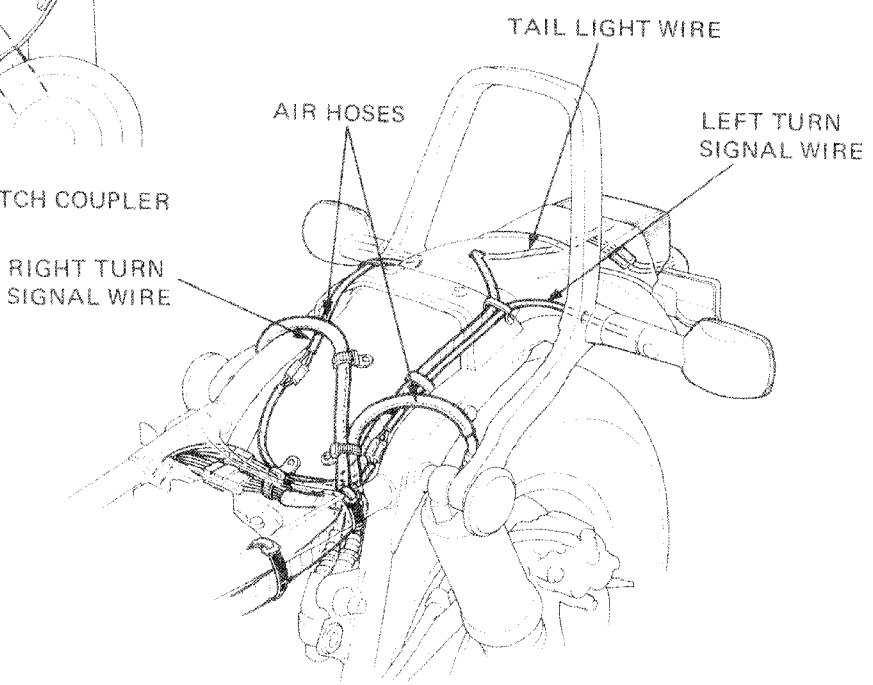
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BREATHER DRAIN TUBE
BATTERY DRAIN TUBE
DUAL RANGE TRANSMISSION BREATHER TUBE
ALTERNATOR WIRES
CARBURETOR OVER FLOW TUBES


MAIN WIRE HARNESS
SPARK UNITS
SPARK UNIT COUPLERS
REGULATOR/ RECTIFIER COUPLER
STARTER CABLE
MAIN FUSE
TURN SIGNAL RELAY
REAR BRAKE HOSE
PULSER GENERATOR, OIL PRESSURE SWITCH, NEUTRAL SWITCH WIRE COUPLER







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EMISSION CONTROL SYSTEM

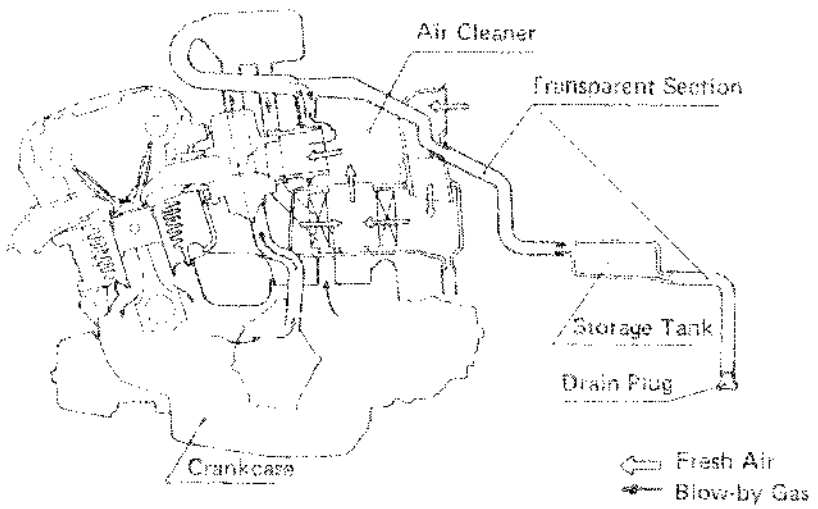
The CB1000C is equipped with two Emission Control Systems.

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. The exhaust emission control system is separate from the crankcase emission control system.

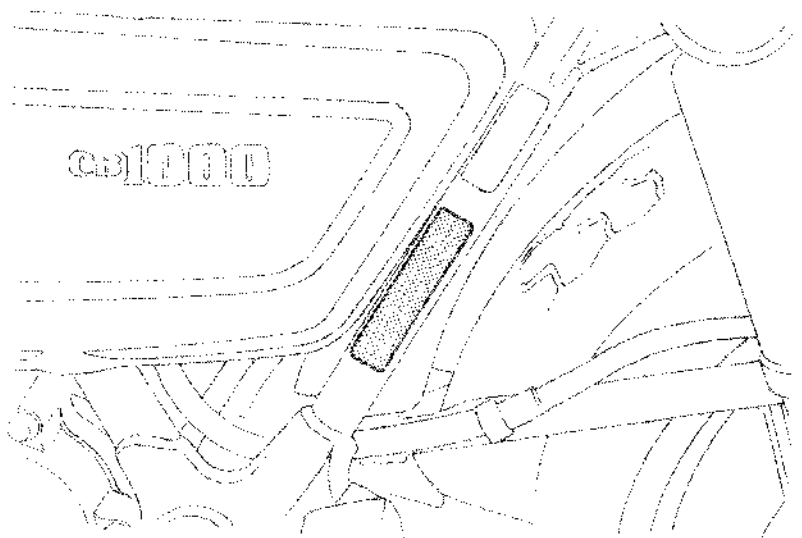
CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and carburetor. Liquids are collected in the storage tank.



EMISSION CONTROL INFORMATION LABEL

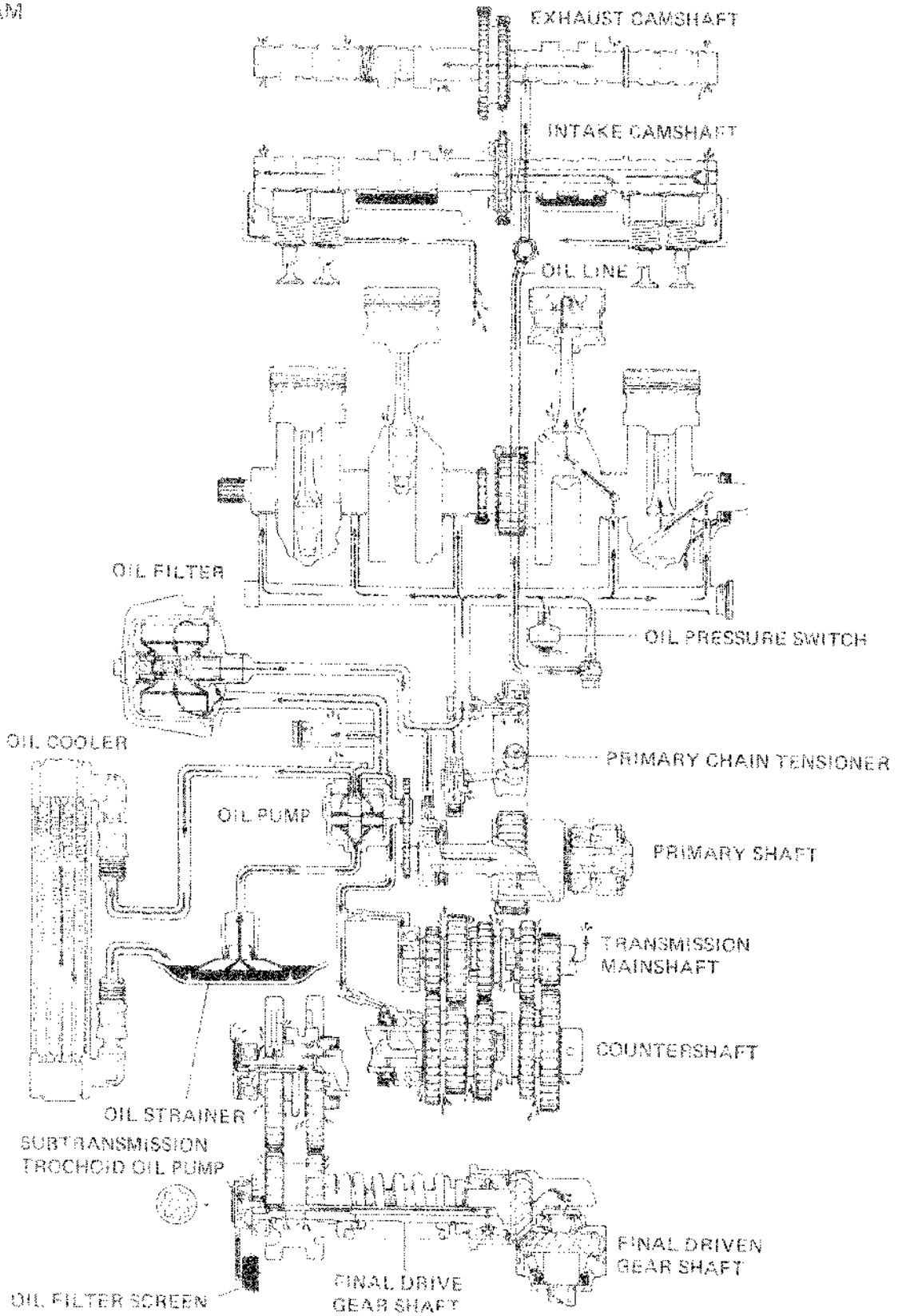
An Emission Control Information Label is located on the frame as shown. It contains basic tune-up specifications.



Vehicle Emission Control Information Label

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ENGINE LUBRICATION DIAGRAM



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2. LUBRICATION

SERVICE INFORMATION	2–1	OIL PUMP	2– 5
TROUBLESHOOTING	2–2	SUBTRANSMISSION OIL	2– 9
<ENGINE LUBRICATION>		SUBTRANSMISSION OIL PUMP	2–10
ENGINE OIL LEVEL	2–3	<CHASSIS LUBRICATION>	
ENGINE OIL & FILTER CHANGE	2–3	FINAL DRIVE GEAR OIL	2–12
OIL STRAINER CLEANING	2–4	DRIVE SHAFT COUPLING	2–12
OIL PRESSURE CHECK	2–4	CONTROL CABLE LUBRICATION	2–12
OIL COOLER INSPECTION	2–5	LUBRICATION POINTS	2–13

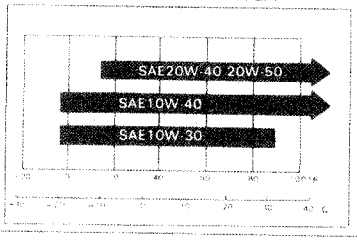
SERVICE INFORMATION

GENERAL

Oil pressure relief valve: See Section 13 (Crankshaft/Primary shaft)

SPECIFICATIONS

Engine oil

Oil capacity	3.5 lit (3.7 US qt, 3.0 Imp qt) at change 4.5 lit (4.7 US qt, 4.0 Imp qt) at 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 pump delivery	Engine 41 lit (43 US qt, 36 Imp qt)/min. at 7,000 rpm Cooler 18 lit (19 US qt, 16 Imp qt)/min. at 7,000 rpm
Oil pressure (at oil pressure switch)	550 kPa (5.5 kg/cm^2, 78 psi) at 7,000 rpm (80°C/176°F)

Oil pump service data

	Standard	Service limit
Rotor tip clearance (Engine/Cooler)	0.15 mm (0.006 in)	0.20 mm (0.008 in)
Pump body clearance (Engine/Cooler)	0.15–0.22 mm (0.006–0.009 in)	0.35 mm (0.014 in)
Pump end clearance (Engine/Cooler)	0.02–0.07 mm (0.001–0.003 in)	0.10 mm (0.004 in)

Subtransmission

Oil capacity	600 cc (20.3 oz)
Recommended oil	Hypoid gear oil API, GL-5 SAE #80

Final drive gear

Oil capacity	150 cc (5.1 oz)		
Recommended oil	Hypoid gear oil API, GL-5	Above 5°C/41°F Below 5°C/41°F	SAE #90 SAE #80

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TORQUE VALUES

Engine oil drain plug	35—40 N·m (3.5—4.0 kg-m, 25—29 ft-lb)	
Engine oil filter bolt	28—32 N·m (2.8—3.2 kg-m, 20—23 ft-lb)	
Oil pressure switch	15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)	Apply Loctite ®
Subtransmission oil drain bolt	16 - 20 N·m (1.6—2.0 kg-m, 12—14 ft-lb)	
Subtransmission oil level check bolt	35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)	
Subtransmission cover	30—34 N·m (3.0 - 3.4 kg-m, 22—25 ft-lb)	

TOOLS

Special		
Oil Pressure Gauge	07506—3000000	Not available in U.S.A.
Oil Pressure Gauge Attachment	07510—4220100	
Common		
Driver	07749—0010000	or 07949—6110000
Attachment, 52 x 55 mm	07746—0010400	or 07946—9370100

TROUBLESHOOTING

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

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

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

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.

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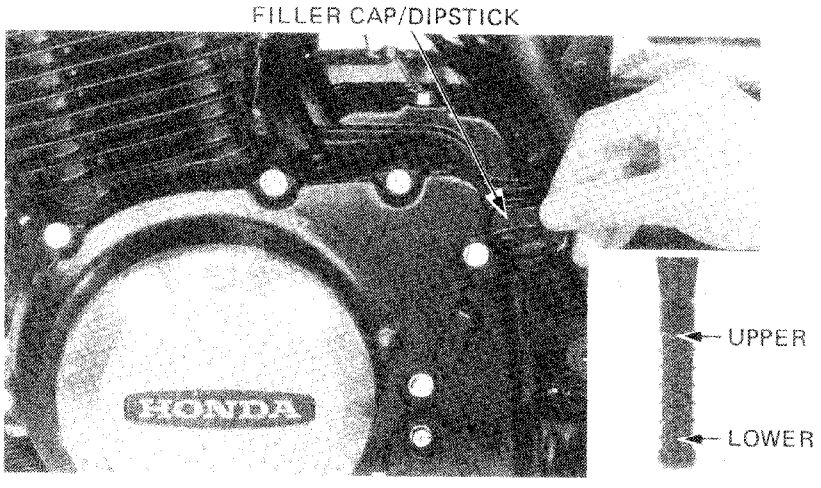
<ENGINE LUBRICATION>
ENGINE OIL LEVEL

Run the engine and allow to idle for 2–3 minutes.

Stop the engine and support the motorcycle on the center stand. Wait 2–3 minutes and check the oil level with the filler cap dipstick. Do not screw in the cap when making this check.

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

Check the oil pressure warning light. This light should go off when the engine starts. If it does not, check the oil pump function and/or oil circuit.



ENGINE OIL & FILTER CHANGE

NOTE

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

Warm the engine up to normal operating temperature and stop the engine.

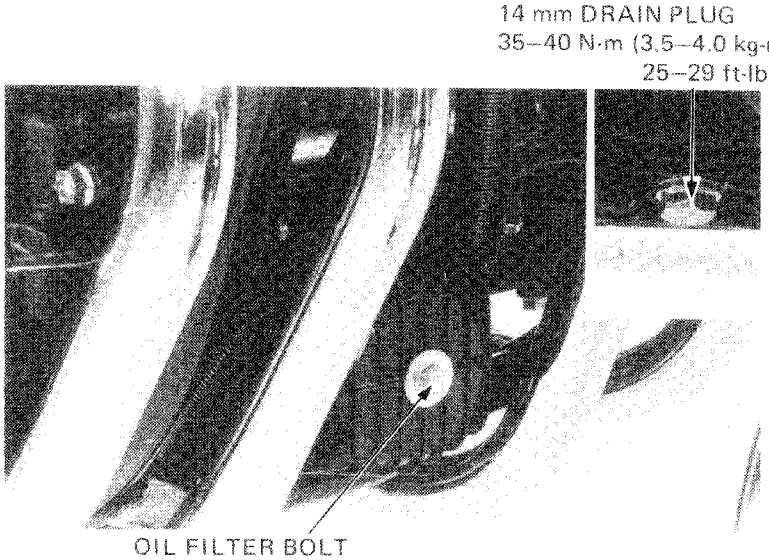
Place the motorcycle on its center stand.
Remove the oil filler cap, drain plug and oil filter cover and drain the oil.

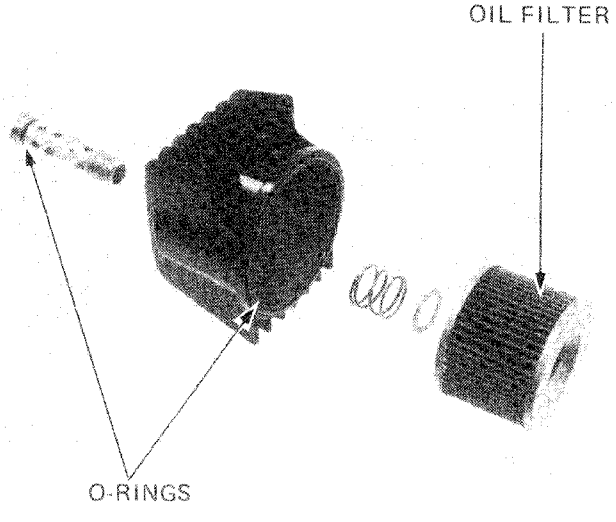
Make sure that the sealing washer on the drain plug and the O-rings on the oil filter bolt and oil filter cover are in good condition.

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

Fill the crankcase with 3.5 lit (3.7 US qt, 3.0 Imp qt) of the recommended oil and install the oil filler cap.

Start the engine and let it idle for 2–3 minutes.
Stop the engine. Wait 2–3 minutes and check that the oil level mark on the dipstick.
Add the recommended oil to the upper level, if necessary.
Make sure that there are no oil leaks.





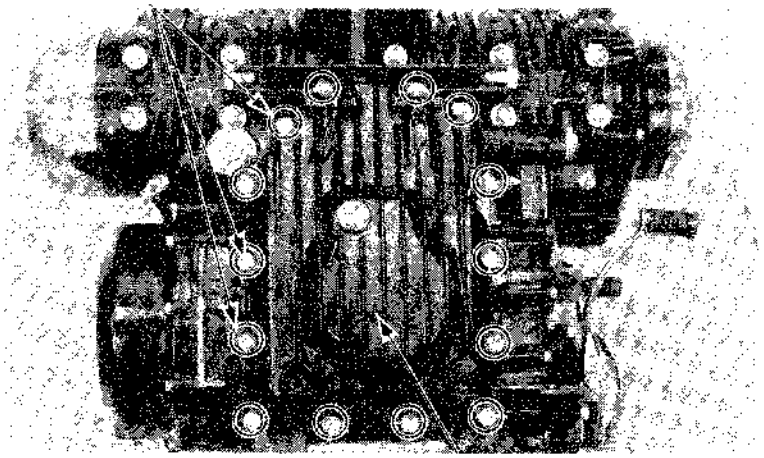
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OIL STRAINER CLEANING

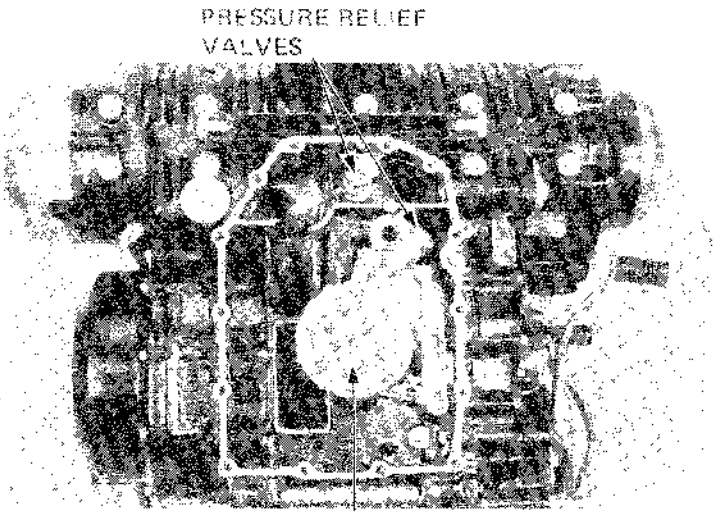
NOTE

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

Remove the oil filler cap, drain plug and oil filter bolt.
Remove the exhaust pipes.
Disconnect the oil cooler hoses and remove the oil pan bolts and oil pan.



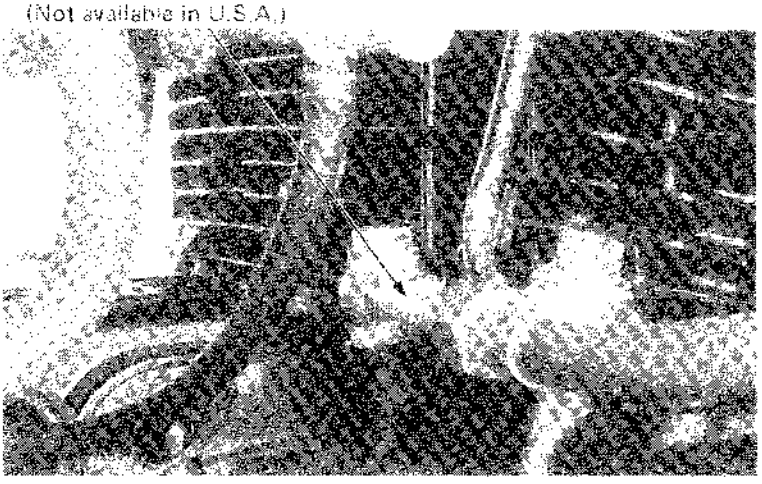
Remove and clean the oil strainer.
Check the operation of the pressure relief valves.
Install the oil strainer and oil pan.
Connect the oil hoses and install the exhaust pipes.
Fill the crankcase with recommanded oil (Page 2-3).



OIL PRESSURE CHECK

Warm the engine up to normal operating temperature (approximately 80°C/176°F).
Stop the engine and remove the oil pressure switch.
Connect an oil pressure gauge to the pressure switch hole.
Check the oil level.

OIL PRESSURE GAUGE ATTACHMENT 07510-4220100 (Not available in U.S.A.)



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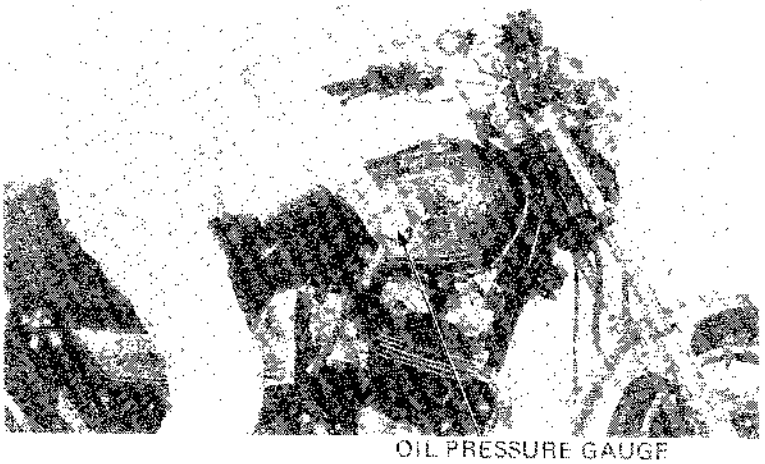
Start the engine and check the oil pressure at 7,000 rpm.

OIL PRESSURE:
550 kPa (5.5 kg/cm², 78 psi) at 7,000 rpm
(80°C/176°F)

Stop the engine.
Apply Loctite ® to the pressure switch threads and reinstall it.

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

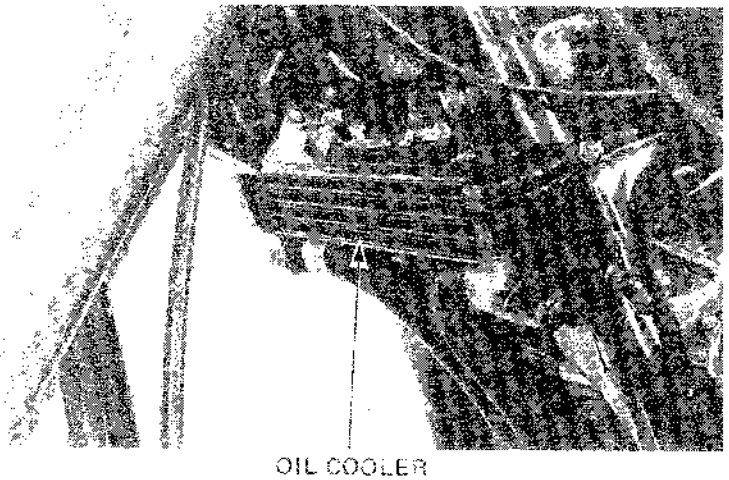
Connect the oil pressure switch.
Start the engine and check that the oil pressure warning light goes out. If the oil pressure warning light stays on, stop the engine immediately and determine the cause.
Refer to page 21-2 for warning switch inspection



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

OIL COOLER INSPECTION

Check for damage to the oil cooler core.
Clean the core if necessary



OIL COOLER

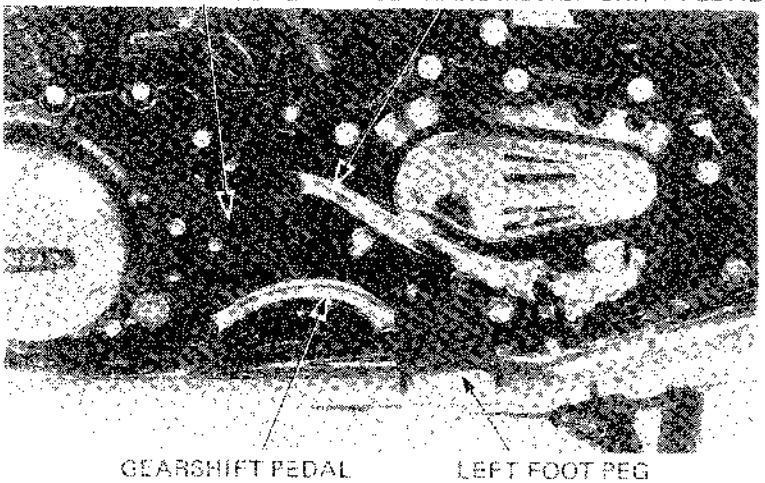
OIL PUMP

REMOVAL

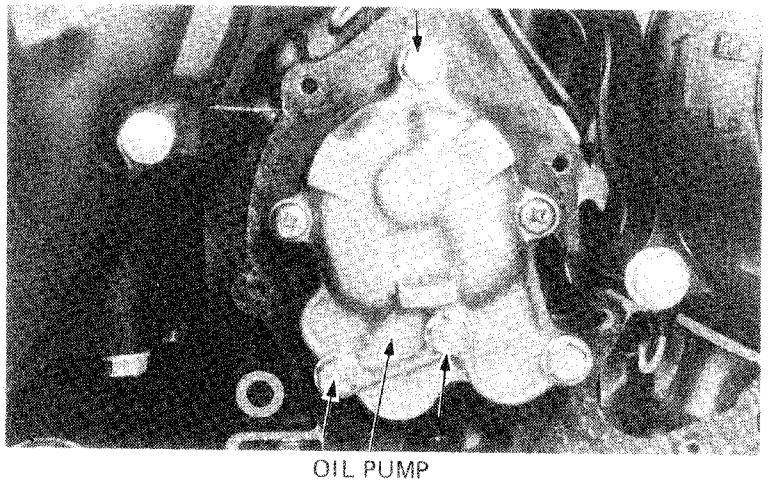
NOTE

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

Drain the engine oil.
Remove the left foot peg.
Remove the subtransmission shift pedal and gearshift pedal.
Remove the oil pump cover.



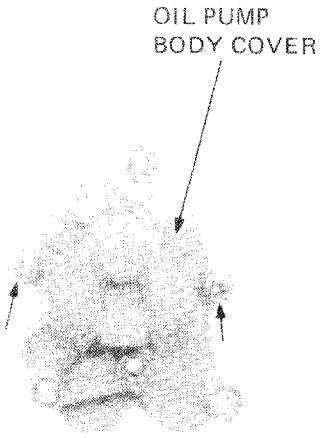
Remove the oil pump.



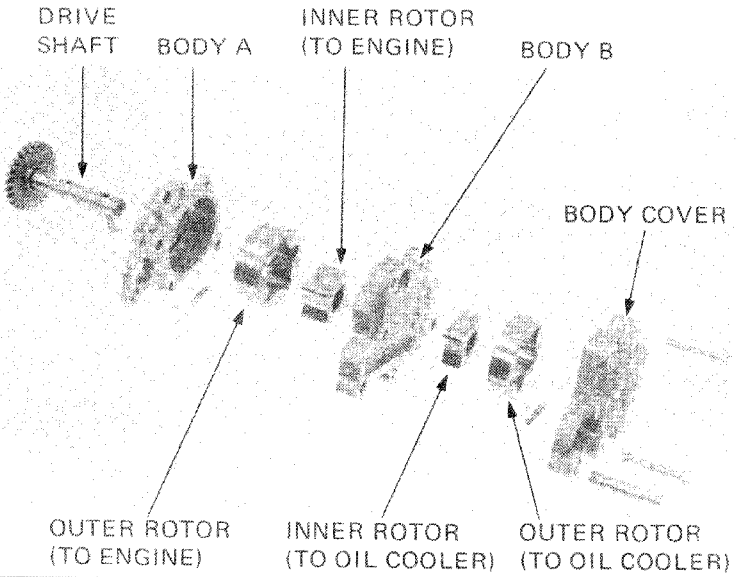
OIL PUMP

DISASSEMBLY

Remove the oil pump body cover.



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



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INSPECTION

Measure the rotor tip clearance.

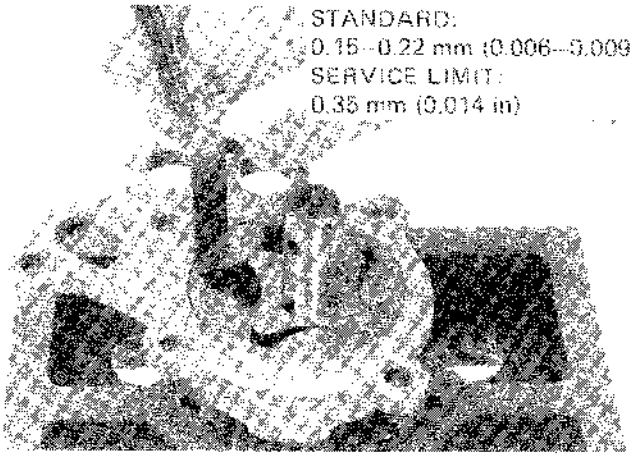
NOTE

Specifications are the same for the engine and cooler oil pumps.



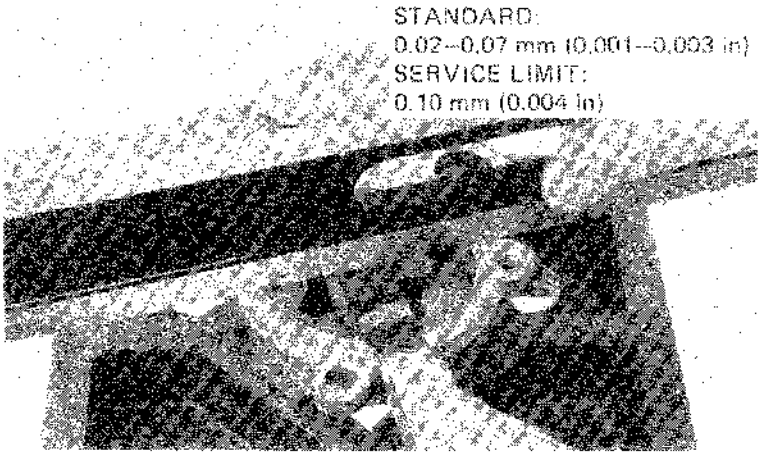
STANDARD:
0.15 mm (0.004 in)
SERVICE LIMIT:
0.20 mm (0.008 in)

Measure the pump body clearance.



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

Measure the pump end clearance.

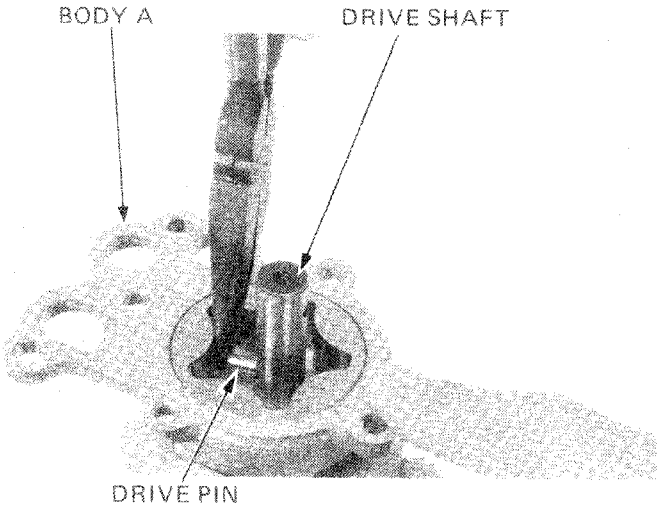


STANDARD:
0.02–0.07 mm (0.001–0.003 in)
SERVICE LIMIT:
0.10 mm (0.004 in)

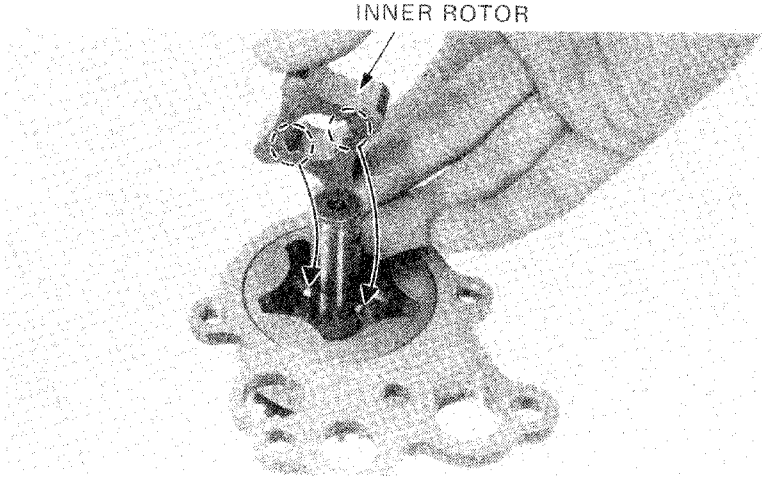
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ASSEMBLY

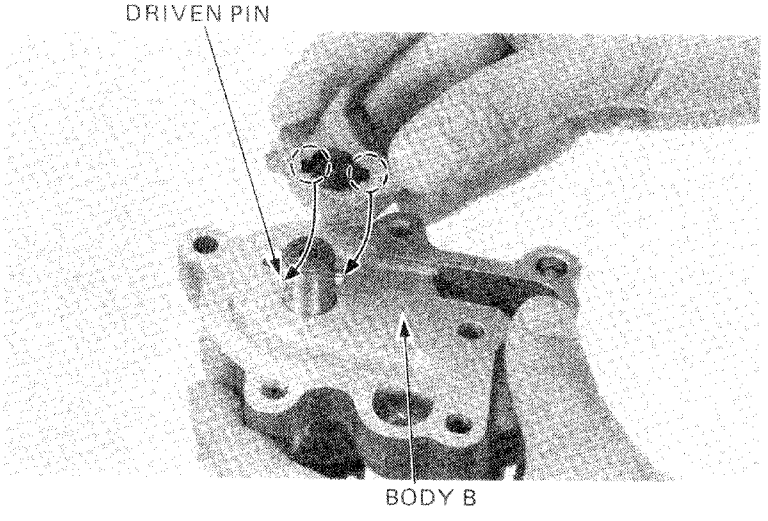
Install the engine outer rotor into body A.
Insert the drive shaft.
Insert the drive pin into the drive shaft.



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



Install body B and insert the drive pin into the shaft.
Align the slot in the inner rotor with the drive pin.
Install the side covers and tighten the screws.



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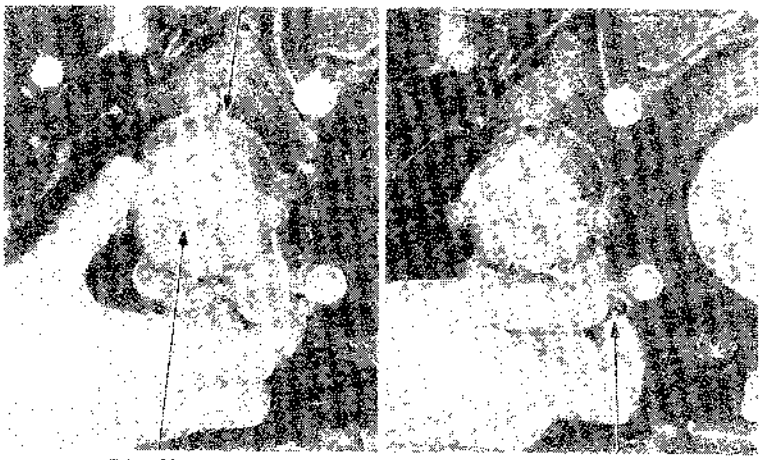
INSTALLATION

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

Install the oil pump cover with the sealing washers and bolts to the "○" mark points.

Tighten the oil pump cover bolts.

Install the gearshift pedal and left foot peg.
Fill the engine with the recommended oil (page 2-3).



SUBTRANSMISSION OIL

CHECK

Place the motorcycle on its center stand.
Shift the subtransmission into low position.
Remove the protector cover and oil check bolt.
Check that the subtransmission is filled to the lower edge of the inspection hole with oil.

If the oil level is low, check for oil leaks.
Add the recommended oil (below) until it reaches the lower edge of the inspection hole.
Install the check bolt.

TORQUE: 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)

CHANGE

Remove the oil filler cap.
Remove the drain bolt and drain the oil.

Install the drain bolt.

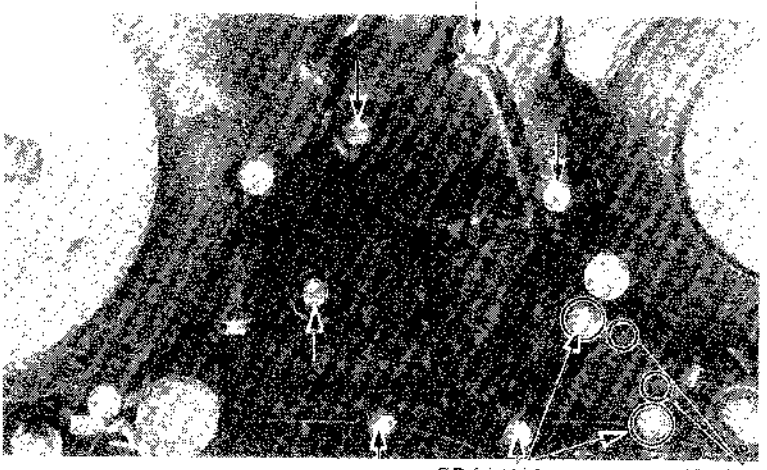
TORQUE: 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

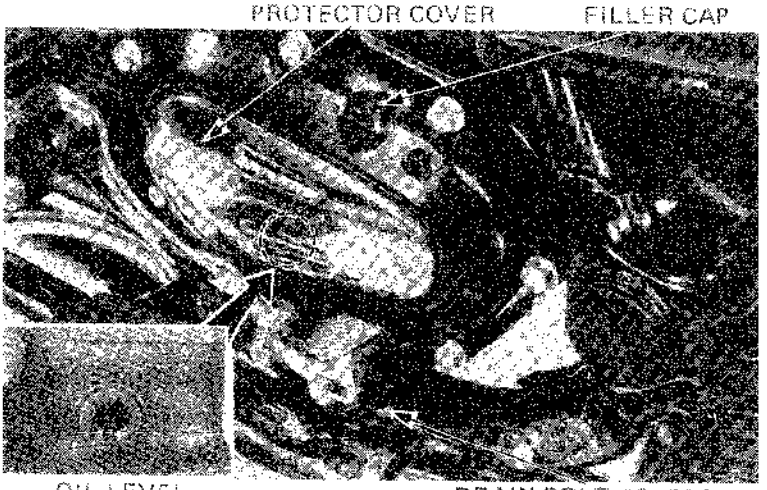
Remove the check bolt.
Fill the subtransmission with the recommended oil up to the lower edge of the inspection hole.

OIL CAPACITY: 600 cc (20.3 oz)
RECOMMENDED OIL:
HYPOID GEAR OIL API, GL-6 SAE #80

Install the check bolt.

TORQUE: 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)



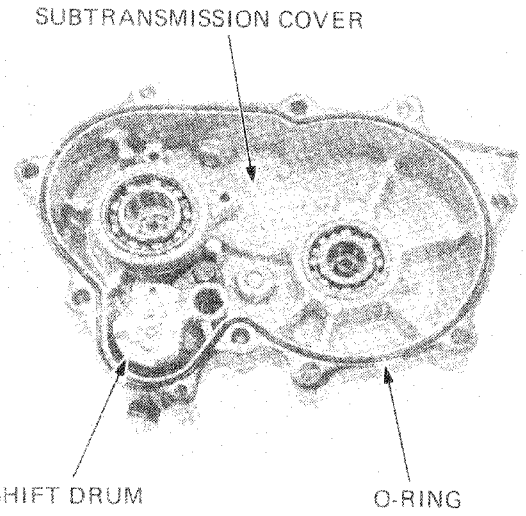


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SUBTRANSMISSION OIL PUMP

REMOVAL

Drain the subtransmission oil (Page 2-9).
Remove the subtransmission cover (Page 10-3).
Remove the shift drum and O-ring.

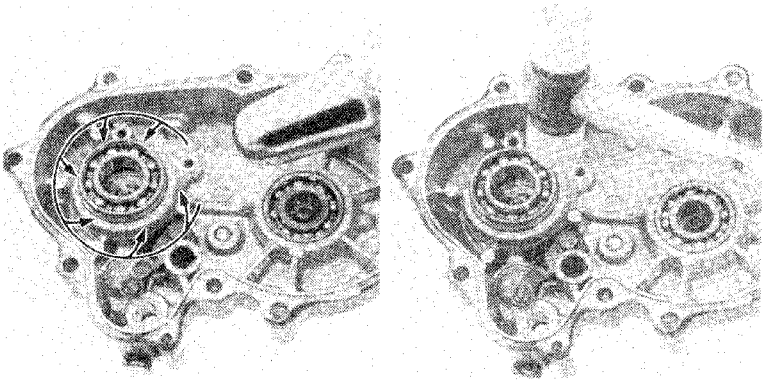


Heat the case around the bearing evenly with a 1 kw dryer for 3 minutes.

Remove the bearing tapping the case lightly with a plastic hammer.

WARNING

Be sure to wear gloves when removing the heated bearing.

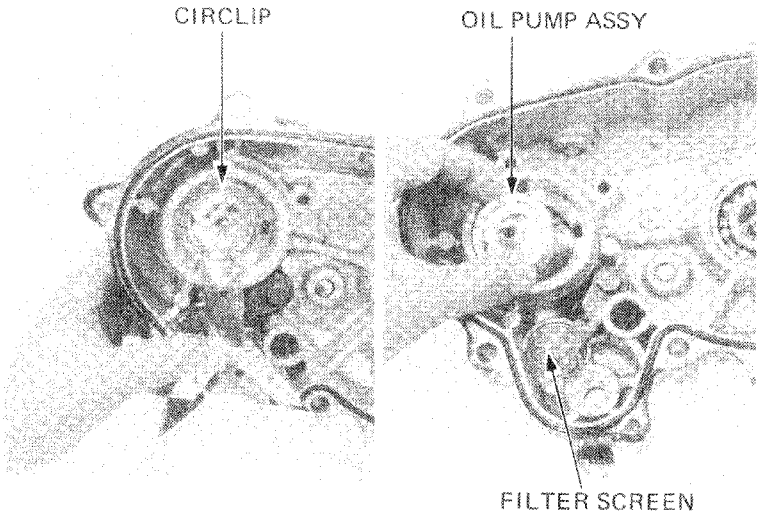


Remove the circlip and oil pump assy.

Clean the filter screen with compressed air.

CAUTION

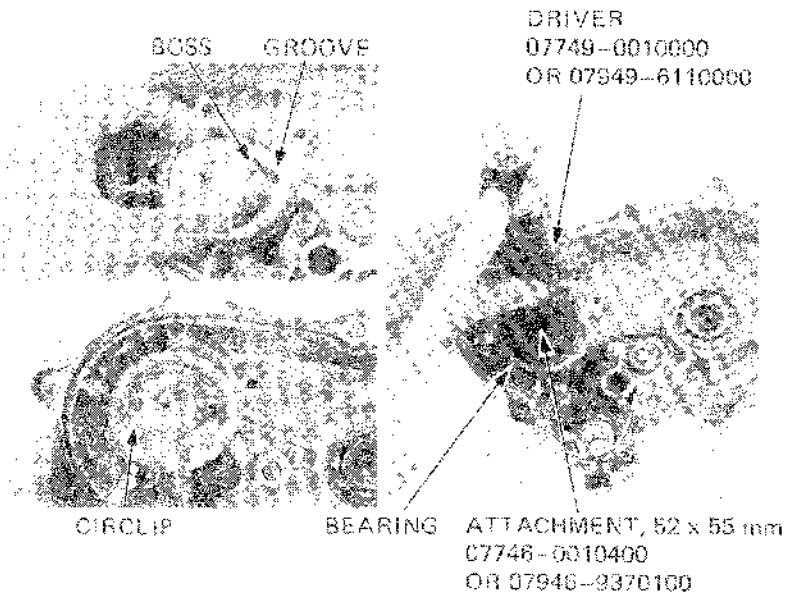
Do not remove the filter screen.



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INSTALLATION

Clean the oil pump assembly, bearing and cover thoroughly.
Install the oil pump assembly, aligning the oil pump boss with the cover groove.
Install the circlip and drive the bearing into the cover.

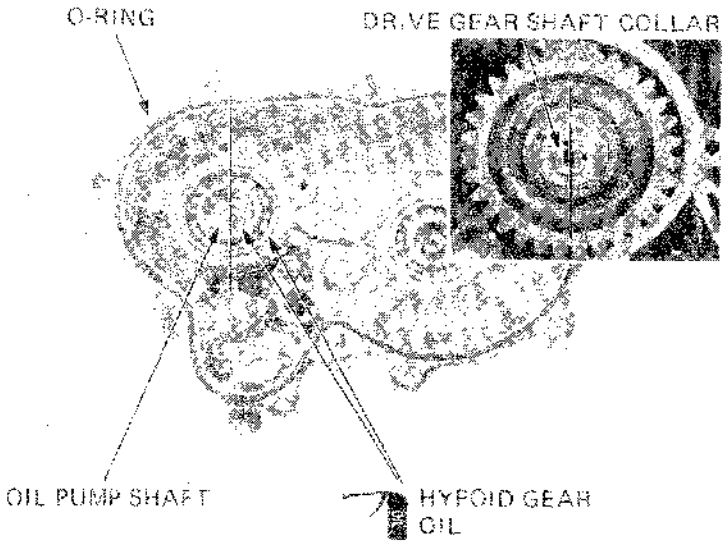


Lubricate the oil pump and bearing with hypoid gear oil, SAE #80.

Install the shift drum.
Turn the rear wheel or drive gear by hand so that the slot in the drive gear shaft collar is vertical.
Install the case cover with the oil pump drive shaft boss aligned with the collar slot and new O-ring.

CAUTION

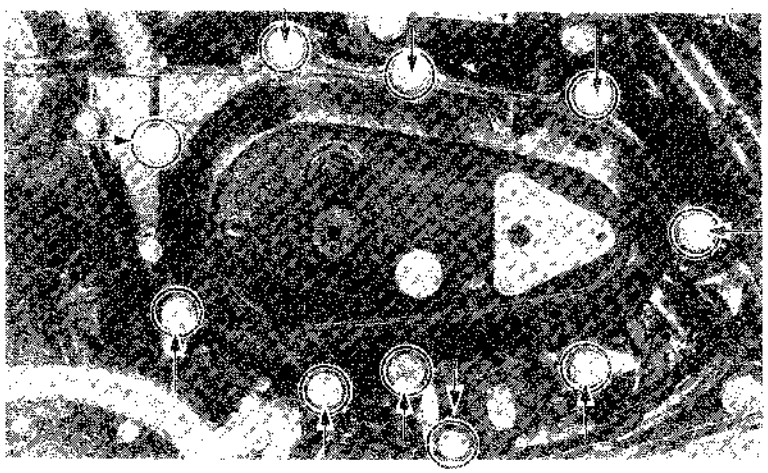
Check the location of the shift drum and shift fork if difficulty is encountered in installing the cover (See page 10-7, 10-8). Do not strike the cover with excessive force.



Tighten the cover bolts.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

Install the exhaust pipe heat shield.
Fill the case with the recommended oil (page 2-9).
Install the removed parts (page 10-8).



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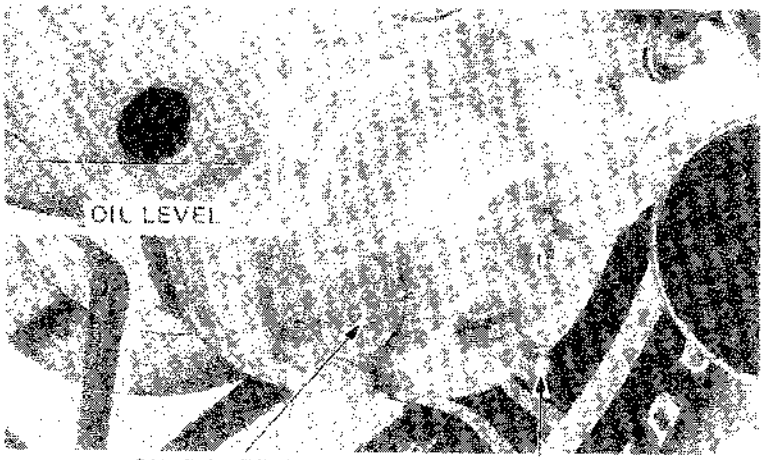
<CHASSIS LUBRICATION>

FINAL DRIVE GEAR OIL

CHECK

Place the motorcycle on its center stand.
Remove the oil filler cap.
Check that the final gear case is filled up to the lower edge of the oil filler hole.

Check for leaks, if the level is low. Pour the recommended oil (below) through the oil filler hole until it reaches the lower edge.
Reinstall the oil filler cap.



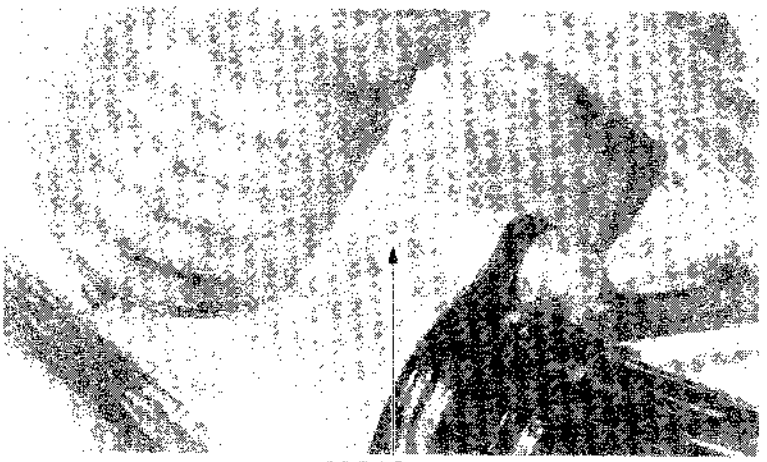
CHANGE

Remove the oil filler cap.
Remove the 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 lower edge of the oil filler hole.

OIL CAPACITY: 150 cc (5.1 oz)

RECOMMENDED OIL: HYPOID GEAR OIL
API, GL-5 SAE #90 (Above 5°C/41°F)
SAE #80 (Below 5°C/41°F)

Reinstall the oil filler cap.



DRIVE SHAFT COUPLING

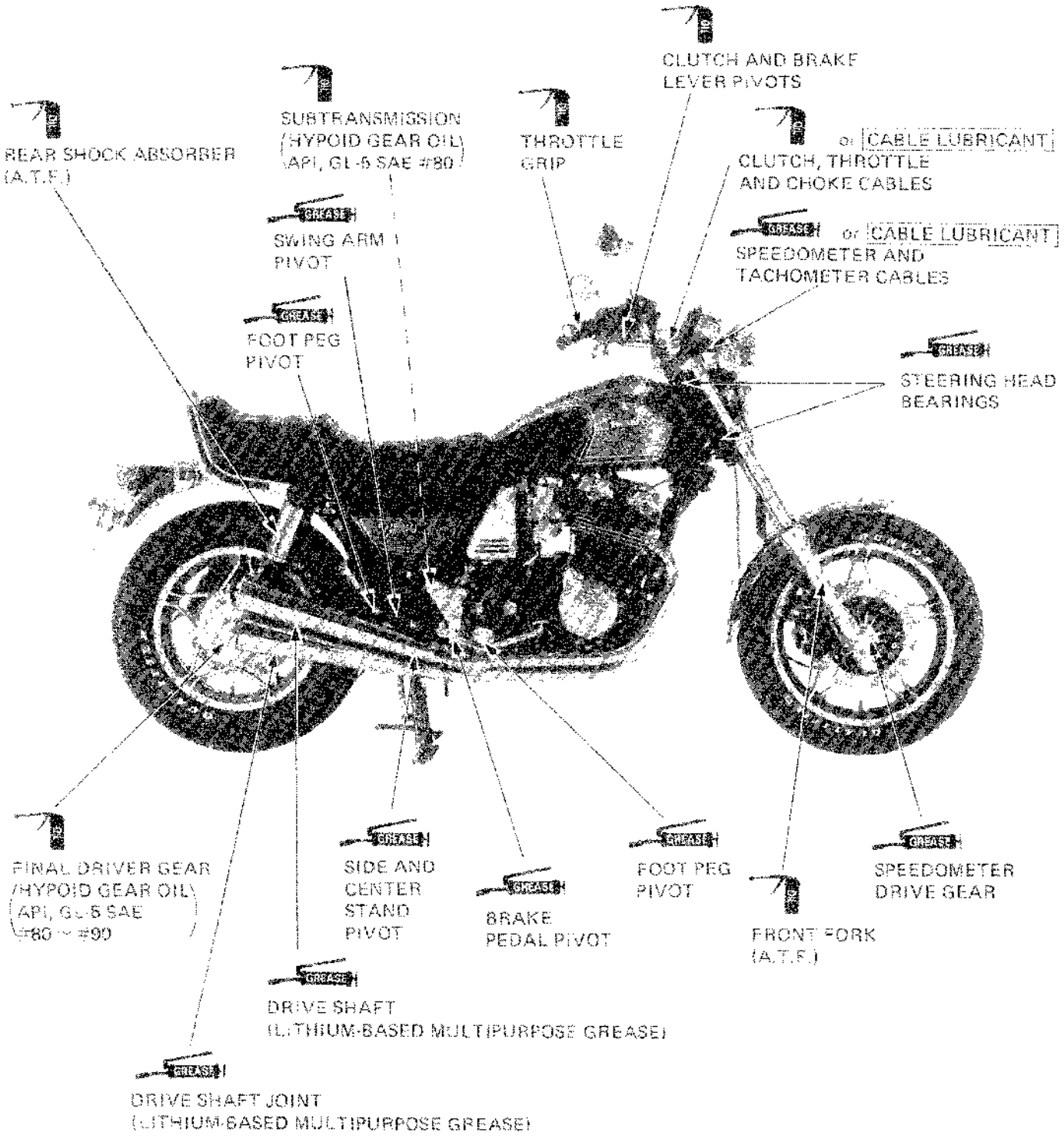
Pump LITHIUM-BASED multipurpose grease through the drive shaft joint grease fitting.

CONTROL CABLE LUBRICATION

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

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LUBRICATION POINTS



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3. MAINTENANCE

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3

SERVICE INFORMATION

GENERAL

- Engine oil — See page 2-3.
- Engine oil filter — See page 2-3.
- Subtransmission oil — See page 2-9.
- Final drive gear oil — See page 2-12.

SPECIFICATIONS

<Engine>
Spark plugs: Recommended spark plugs

Standard	ND	X27ESR-U
	NGK	DR8ES
For cold climate below 5°C (41°F)	ND	X24ESR-U
	NGK	DR8ES-L

Spark plug gap: 0.6–0.7 mm (0.024–0.028 in)

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Ignition timing

At idle	: 10° BTDC
Advance starts	: 1,800 rpm
Full advance	: 38°30′ BTDC at 3,300 rpm

Valve clearance:
Cold (Below 35°C/95°F) Intake/Exhaust : 0.06–0.13 mm (0.002–0.005 in)

Idle speed : 1,000 ± 100 rpm

Carburetor synchronization : Maximum allowable vacuum difference between cylinders 60 mm Hg (2.4 in Hg)

Cylinder compression : 1,200 ± 200 kPa (12 ± 2 kg/cm², 170 ± 28 psi)

Throttle grip free play : 2–6 mm (1/8–1/4 in)

<CHASSIS>

Clutch lever free play : 10–20 mm (3/8–3/4 in)

Tire

		Front	Rear
Tire size		110/90–18 62H M110/90–18	140/90–16 67H M140/90–16
Cold tire pressures 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 TUBELESS ONLY DUNLOP		F11	K127C

Suspension air pressure : Front 40–100 kPa (0.4–1.0 kg/cm², 6–14 psi)
Rear 0–400 kPa (0–4.0 kg/cm², 0–57 psi)

TOOLS

Special

Valve lifter depressor	07964–4220002
Valve lifter holder	07964–4220002 or M9501–277-94752 (U.S.A. only)
Vacuum gauge	07404–0020000 or M937B–021–XXXXX (U.S.A. only)
Carburetor adjusting wrench	07908–4220100
Clutch adjusting wrench	07908–3200000

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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
L : LUBRICATE

		ITEM \ FREQUENCY	WHICHEVER COMES FIRST ➡ / EVERY ⬇	ODOMETER READING (NOTE 3) 800 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
EMISSION RELATED ITEMS	*	FUEL LINES			I	I	I	I	I	I	Page 3-4
	*	FUEL STRAINER		C	C	C	C	C	C	C	Page 3-4
	*	THROTTLE OPERATION		I	I	I	I	I	I	I	Page 3-5
	*	CARBURETOR CHOKE			I	I	I	I	I	I	Page 3-5
		AIR CLEANER	NOTE 1		C	R	C	R	C	R	Page 3-6
		CRANKCASE BREATHER	NOTE 2		C	C	C	C	C	C	Page 3-7
		SPARK PLUGS			R	R	R	R	R	R	Page 3-7
	*	VALVE CLEARANCE		I	I	I	I	I	I	I	Page 3-7
		ENGINE OIL	YEAR	R	R	R	R	R	R	R	Page 2-3
		ENGINE OIL FILTER	YEAR	R	R	R	R	R	R	R	Page 2-3
	*	CAM CHAIN TENSION		A	A	A	A	A	A	A	Page 3-12
	*	CARBURETOR SYNCHRONIZATION		I	I	I	I	I	I	I	Page 3-12
	*	CARBURETOR IDLE SPEED		I	I	I	I	I	I	I	Page 3-13
NON-EMISSION RELATED ITEMS	*	DRIVE SHAFT JOINT				L		L		L	Page 2-12
		SUBTRANSMISSION OIL				I		I		R	Page 2-9
		FINAL DRIVE OIL				I		I		R	Page 2-12
		BATTERY	MONTH	I	I	I	I	I	I	I	Page 3-16
		BRAKE FLUID	MONTH I 2 YEARS* R	I	I	I	*R	I	I	*R	Page 3-16
		BRAKE PAD WEAR			I	I	I	I	I	I	Page 3-17
		BRAKE SYSTEM		I	I	I	I	I	I	I	Page 3-17
	*	BRAKE LIGHT SWITCH		I	I	I	I	I	I	I	Page 3-18
	*	HEADLIGHT AIM		I	I	I	I	I	I	I	Page 3-18
		CLUTCH		I	I	I	I	I	I	I	Page 3-19
		SIDE STAND			I	I	I	I	I	I	Page 3-20
	*	SUSPENSION		I	I	I	I	I	I	I	Page 3-20
	*	NUTS, BOLTS, FASTENERS		I	I	I	I	I	I	I	Page 3-21
	**	WHEELS		I	I	I	I	I	I	I	Page 3-22
	**	STEERING HEAD BEARING		I		I		I		I	Page 3-22

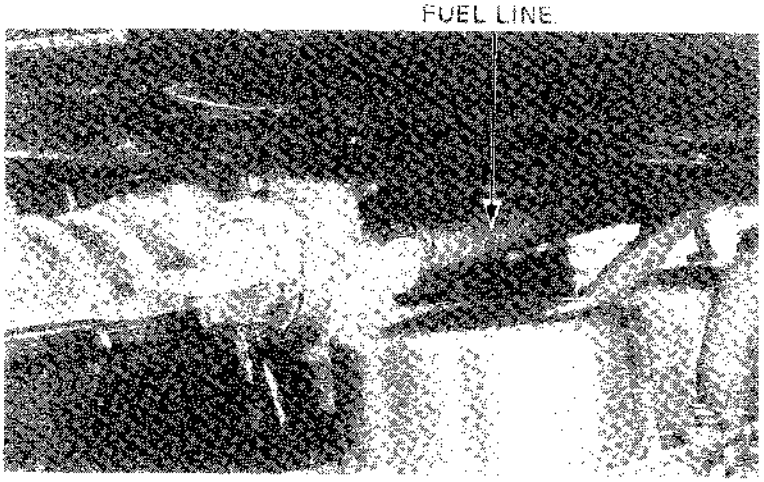
* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.
** IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTES: 1. SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.
2. SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE.
3. FOR HIGHER ODOMETER READINGS, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.

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<ENGINE>
FUEL LINES

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



FUEL STRAINER

Turn the fuel valve OFF.

Remove the fuel cup, O-ring and filter screen, draining the gasoline into a suitable container.

⚠ WARNING

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

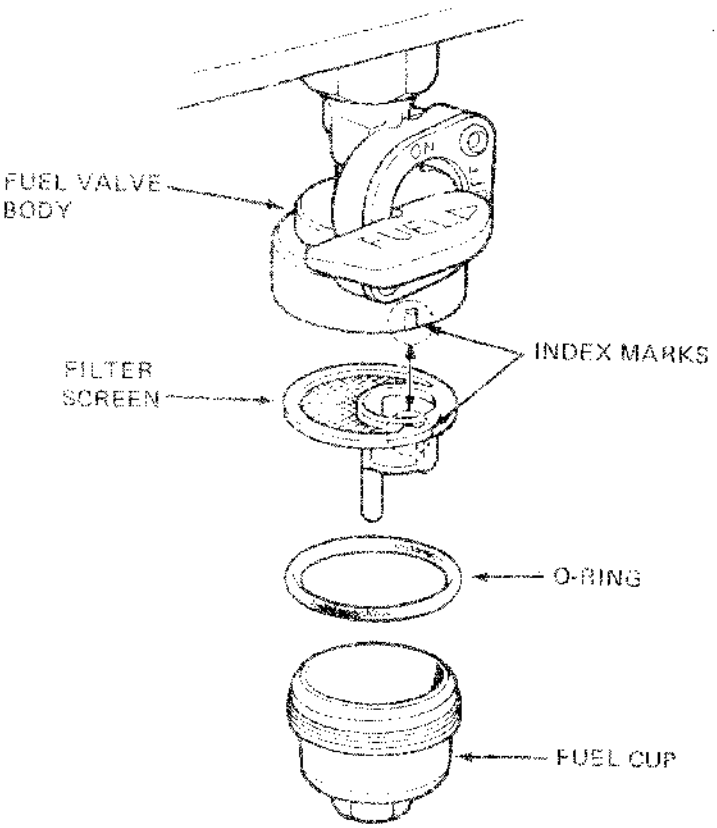
Wash the cup and filter screen in clean non-flammable or high flash point solvent.

Reinstall the screen securely, aligning the index marks on the fuel valve body and filter screen. Install a new O-ring into the fuel valve body. Reinstall the fuel cup, making sure the new O-ring is in place.

Hand tighten the fuel cup and then torque to specification.

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

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



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THROTTLE OPERATION

NOTE

The accelerator pump may flood the carburetors during this inspection.

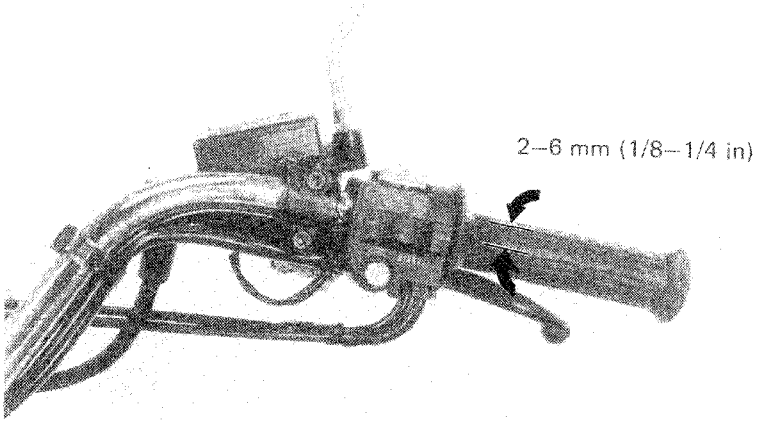
Check for smooth throttle grip full opening and automatic full closing in all steering positions. Check the throttle cables and replace them if they are deteriorated, kinked or damaged.
Lubricate the throttle cables (page 2-13) if throttle operation is not smooth.

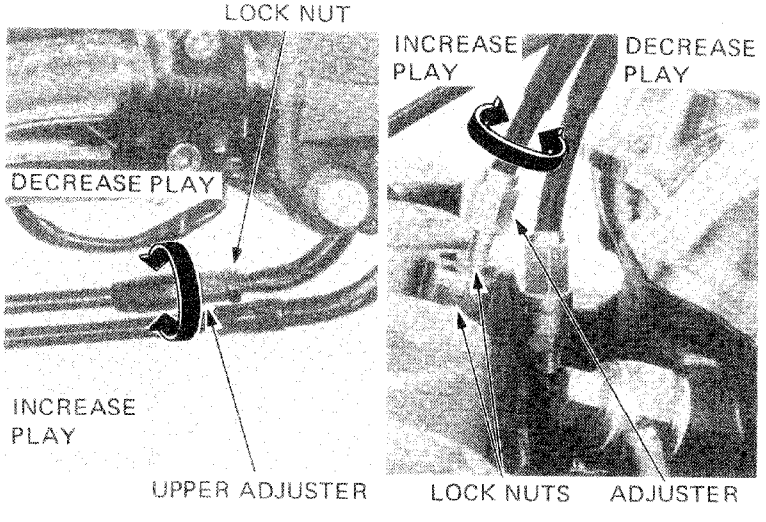
Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2–6 mm (1/8–1/4 in)

Adjustment can be made at either end of the throttle cable. Minor adjustments are made at the upper end and major adjustments are made at the lower end, after removing the fuel tank.

Adjust by loosening the lock nut and turning the adjuster. Tighten the lock nut and recheck throttle operation.
Reinstall the fuel tank if removed.



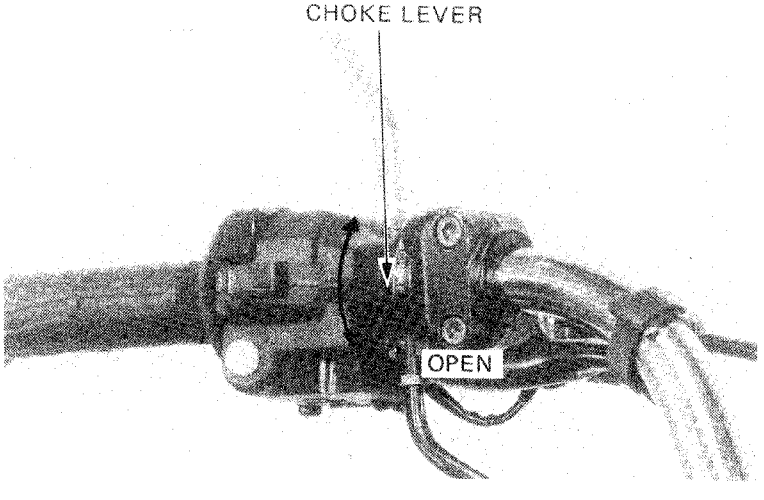


CARBURETOR CHOKE

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

Push the choke lever on the handlebar all the way up to fully closed and make sure the choke valve is closed by moving the choke lever on the carburetor, after removing the fuel tank. There should be no free play.

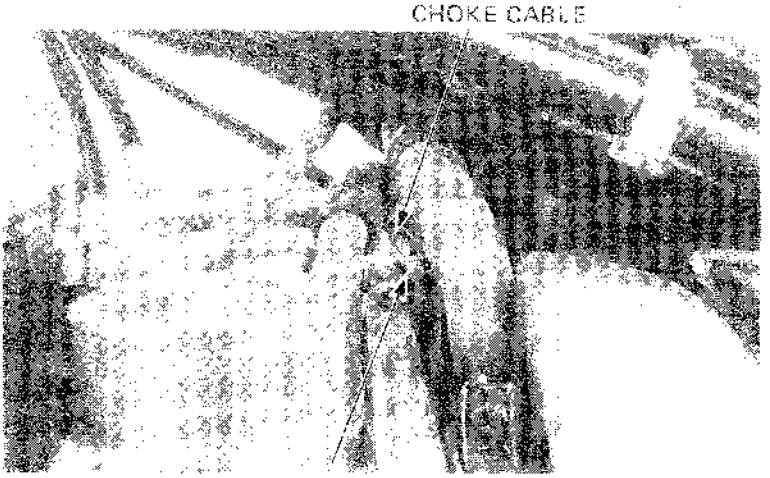
Adjust by loosening the choke cable clamp on the carburetor and moving the choke cable casing so the choke lever is fully closed.
Tighten the clamp.



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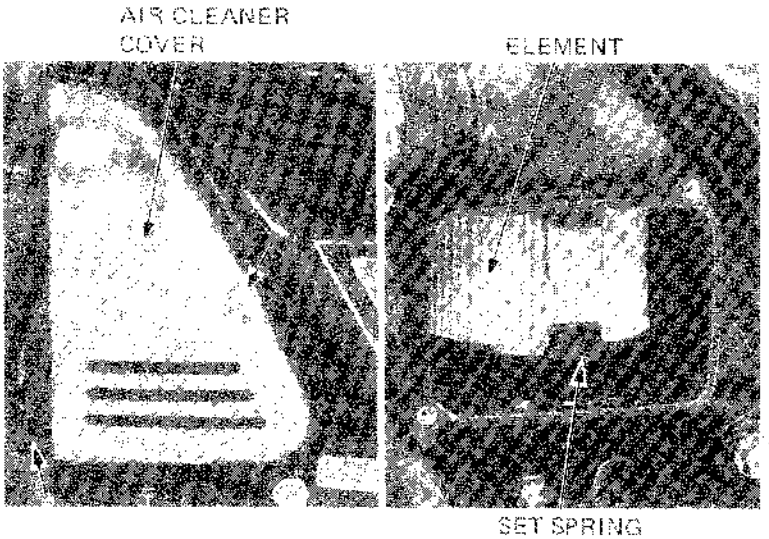
Pull the choke lever all the way down to fully open. Make sure the choke valve is fully open by checking for free play in the cable between the lever on the carburetor and cable casing.

Reinstall the removed parts in the reverse order of disassembly.



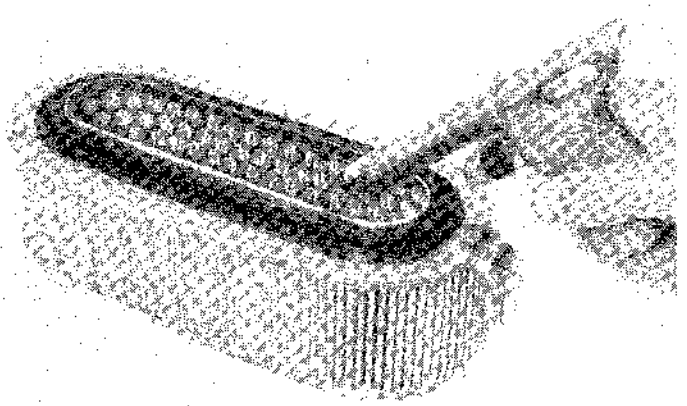
AIR CLEANER

Remove the two air cleaner cover screws and retainer.
Pull out the air cleaner element.



Tap the element lightly to loosen dust. Blow away the remaining dust by applying compressed air from the inside of the element. Replace the element if it is excessively dirty, torn or damaged.

Install the element, element set spring and air cleaner cover.



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CRANKCASE BREATHER

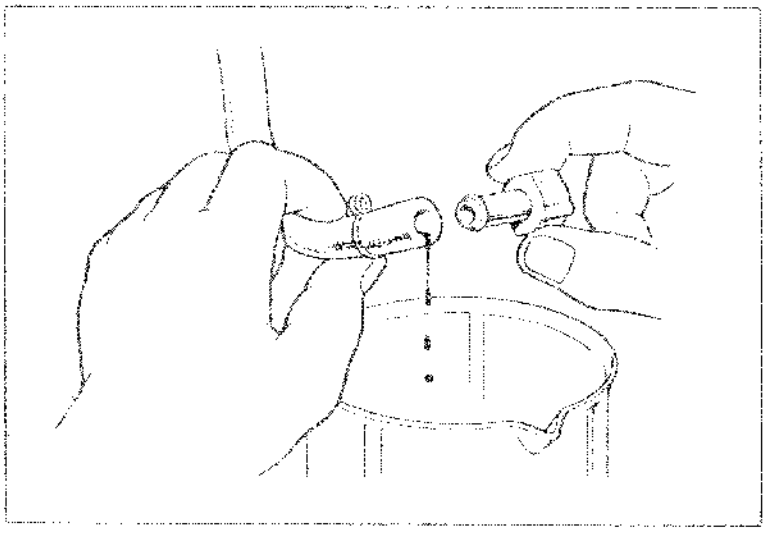
Remove the frame right side cover and remove the tube from the clip on the battery holder.

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

Install the drain plug.

NOTE

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



SPARK PLUGS

RECOMMENDED SPARK PLUGS

Standard	ND	X27ESR-U
	NGK	DR8ES
For cold climate below 5°C (41°F)	ND	X24ESR-U
	NGK	DR8ES-L

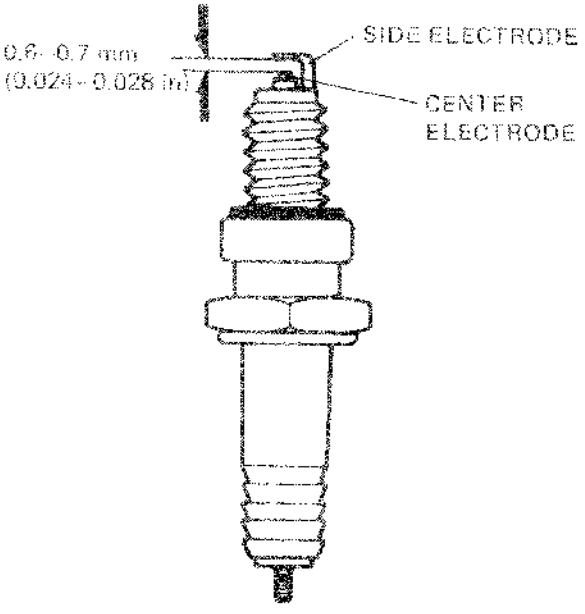
Disconnect the spark plug caps.
Clean any dirt from around the spark plug bases.
Remove and discard the spark plugs.
Measure the new spark plug gaps using a wire-type tester gauge.

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

Adjust by bending the side electrode carefully.

With the plug washer attached, thread the spark plugs 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.

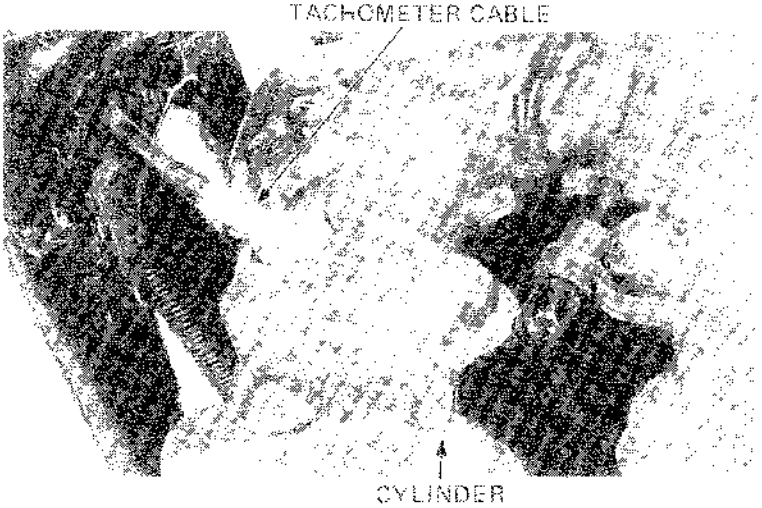


VALVE CLEARANCE

NOTE

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

Remove the right and left frame side covers and seat.
Turn the fuel valve OFF and remove the fuel tube and fuel tank.
Remove the tachometer cable and spark plug caps.
Remove the cylinder head cover bolts and cylinder head cover.
Remove the alternator cover.



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Rotate the crankshaft clockwise to align index mark # 1 on the exhaust camshaft right end with the forward cylinder head mating surface. Measure the clearance of the No. 1 and No. 3 exhaust valves by inserting a feeler gauge between the camshaft and the valve lifter shim.

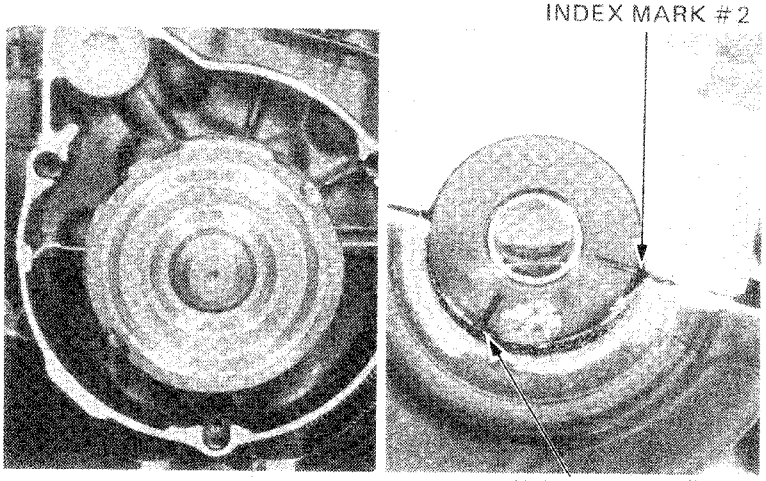
Rotate the crankshaft clockwise and align index mark # 2 with the forward mating surface. Check the clearance of the No. 1 and No. 3 intake valves.

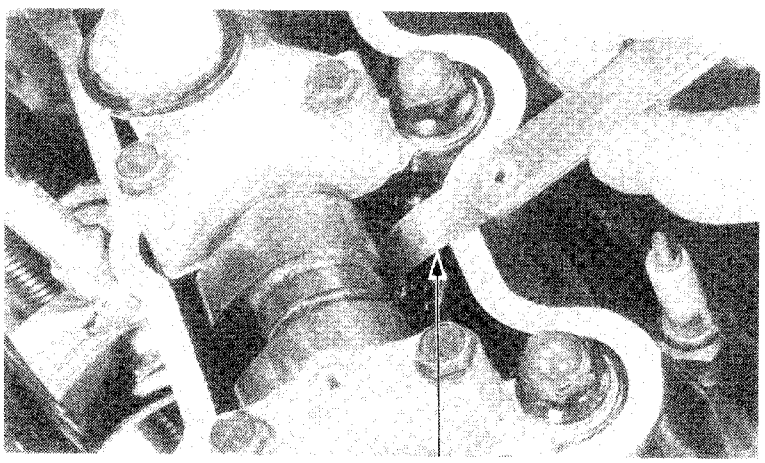
Rotate the crankshaft clockwise and align index mark # 1 with the rear cylinder head mating surface. Measure the clearance of the No. 2 and No. 4 exhaust valves.

Rotate the crankshaft once more and align index mark # 2 with the rear mating surface. Measure the No. 2 and No. 4 intake valve clearances.

VALVE CLEARANCE (cold):
0.06–0.13 mm (0.002–0.005 in)

If the clearance is not correct, replace the shim with one of correct thickness. See adjustment below.





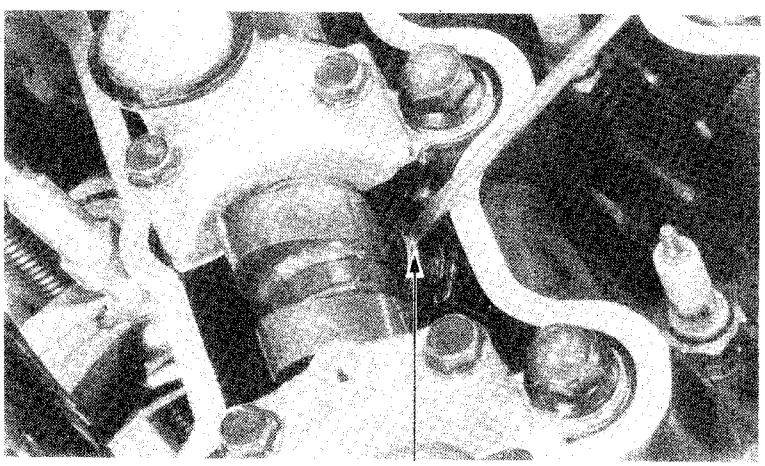
ADJUSTMENT

NOTE

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

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

Rotate the valve lifter until the notch is facing the spark plug hole.



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Rotate the crankshaft so that the cam lobes face directly away from the valve lifters.

Insert the depressor between the cam and shim, and push it in until it stops. The valve depressor has a ramp which will open the valve.

CAUTION

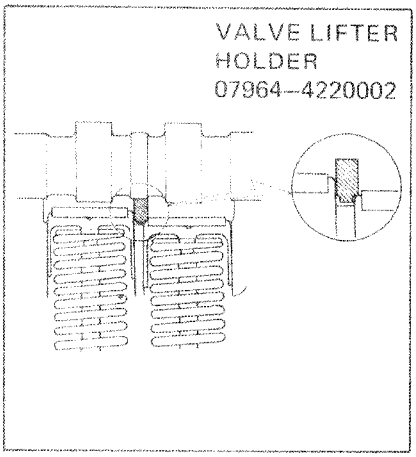
Use the depressor as a wedge, not as a pry bar, or the lifter and camshaft may be damaged.

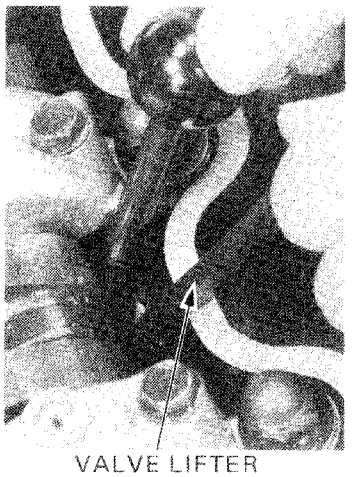


Position the end of the valve lifter holder under the camshaft so it rests on the edge of the depressed lifter and contacts the side of the adjacent lifter. Do not let the lifter holder contact the shim or you will not be able to remove it.

CAUTION

When the valve lifter holder is inserted, do not let it damage the cylinder head cover mating surface.

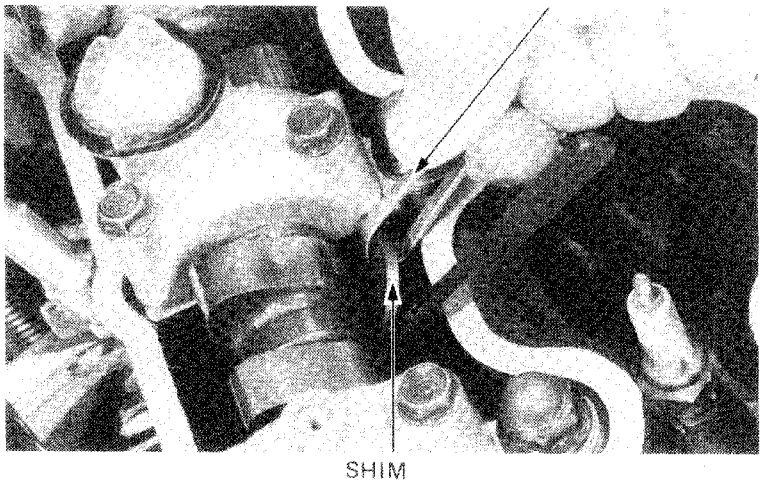




Pull out the depressor and remove the shim with tweezers or a magnet.

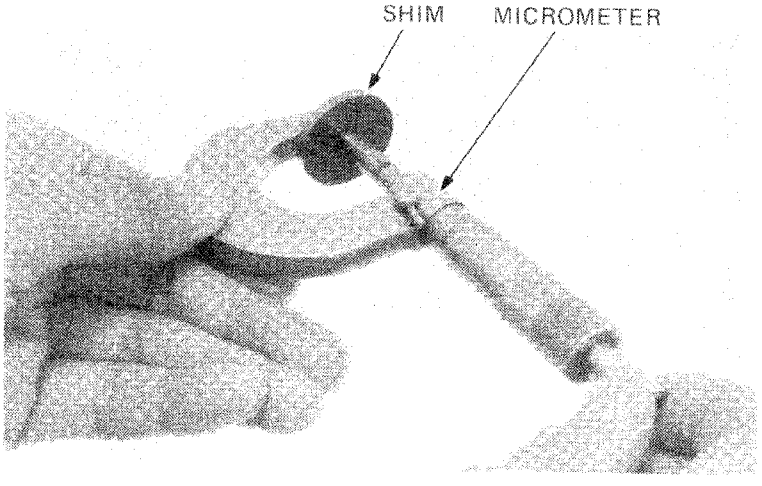
NOTE

- The valve depressor can be used to lift the shim out of the lifter.
- If more clearance is needed to remove the shim, reinsert the valve depressor and invert the valve lifter holder. Pull out the valve depressor and remove the shim.



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Measure the thickness of the removed shim with a micrometer. Select the correct replacement shim using the chart on Page 3-11.



To remove the valve lifter holder, reinstall the depressor.
First remove the holder and then the depressor.

Rotate the crankshaft several turns to fully seat the replacement shim and then recheck the valve clearance.

Reinstall the removed parts.

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

VALVE SHIM SELECTION CHART

STANDARD VALVE CLEARANCE = 0.06–0.13 mm (0.002–0.005 in)

EX

PRESENT SHIM SIZE mm

SHIM mm	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45

EX ↓

VALVE CLEARANCE mm	SPECIFIED CLEARANCE	NO CHANGE REQUIRED
0.01–0.05	2.35	2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.06–0.13	2.40	2.45 2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.14–0.16	2.45	2.50 2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.17–0.21	2.50	2.55 2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.22–0.26	2.55	2.60 2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.27–0.31	2.60	2.65 2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.32–0.36	2.65	2.70 2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.37–0.41	2.70	2.75 2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.42–0.46	2.75	2.80 2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.47–0.51	2.80	2.85 2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.52–0.56	2.85	2.90 2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.57–0.61	2.90	2.95 3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.62–0.66	2.95	3.00 3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.67–0.71	3.00	3.05 3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.72–0.76	3.05	3.10 3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.77–0.81	3.10	3.15 3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.82–0.86	3.15	3.20 3.25 3.30 3.35 3.40 3.45 3.50
0.87–0.91	3.20	3.25 3.30 3.35 3.40 3.45 3.50
0.92–0.96	3.25	3.30 3.35 3.40 3.45 3.50
0.97–1.01	3.30	3.35 3.40 3.45 3.50
1.02–1.06	3.35	3.40 3.45 3.50
1.07–1.11	3.40	3.45 3.50
1.12–1.16	3.45	3.50
1.17–1.21	3.50	
1.22–1.26		
1.27–1.31		

REPLACE WITH THIS SHIM

NOTES:
1. Measure the valve clearance while the engine is cold.
2. For shim replacement, see page 2–8.
3. Measure old and new shims with a micrometer.
4. The chart is for reference only.
   After installing new shims, recheck the valve clearance and adjust if necessary.
   Before rechecking, rotate the camshafts 2–3 times to seat the shims in the lifters.
5. If the shim thickness required exceeds 3.50 mm, there is carbon build-up on the valve seat. Remove the carbon and reface the seat.

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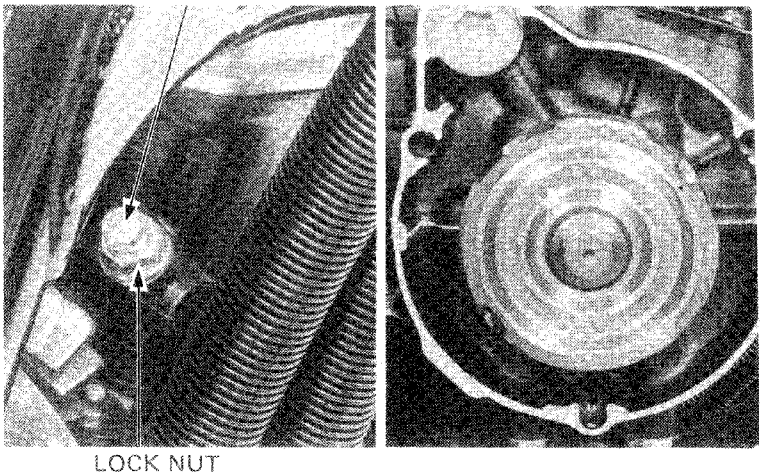
CAM CHAIN TENSIONER

NOTE

Make adjustment with engine off.

Remove the alternator cover.
Loosen the front cam chain tensioner lock nut and bolt at the front of the cylinder head.

Tighten the bolt while rotating the crankshaft clockwise. Tighten the lock nut.

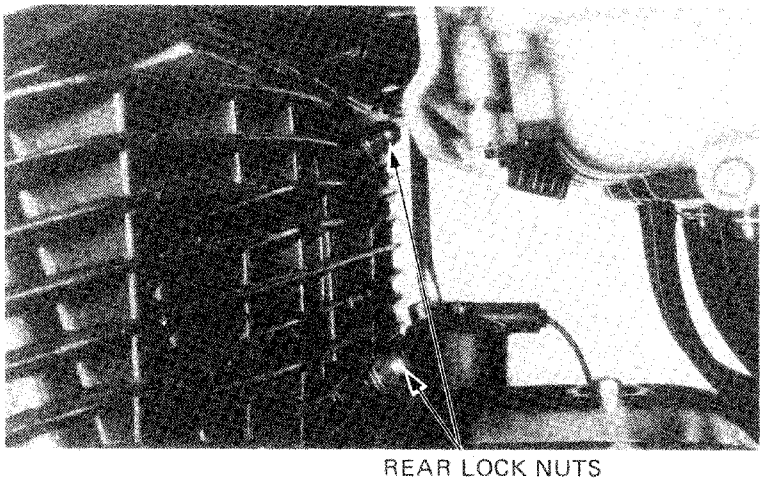


Loosen both top and bottom lock nuts on the rear cam chain tensioner.

Tighten the lock nuts while rotating the crankshaft clockwise.

The tensioner will automatically position itself to provide the correct tension when the lock bolt and nuts are loosened.

Install the alternator cover.



CARBURETOR SYNCHRONIZATION

NOTE

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

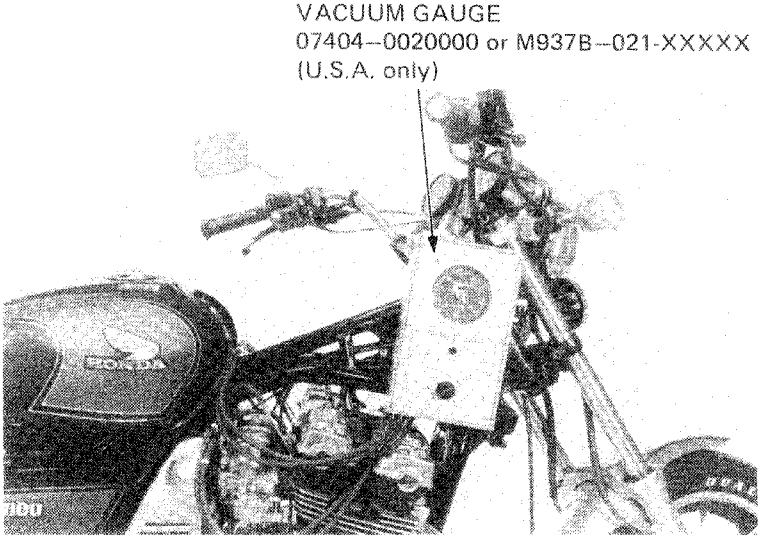
Remove both frame side covers and seat.

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

Prepare a longer fuel line and connect it between the fuel tank and carburetor. Position the fuel tank higher than normal.

Remove the cylinder head port plugs and install the vacuum gauge adapters.

Connect the vacuum gauges to the adapters.



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ADJUSTMENT

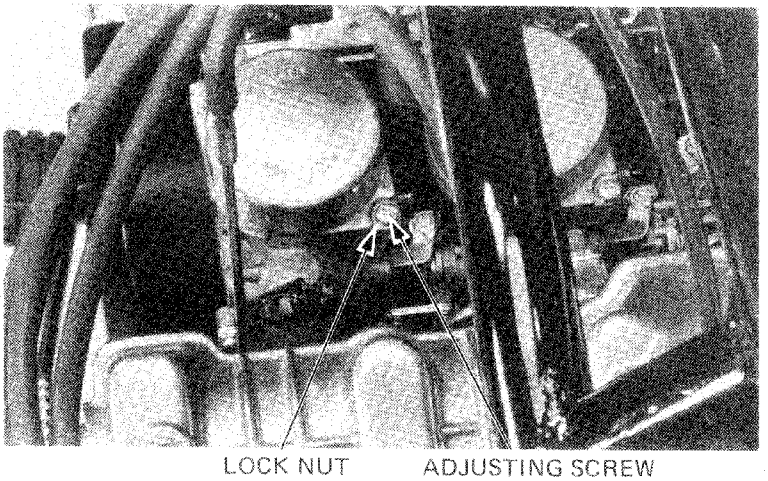
NOTE

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

Start the engine and adjust the idle speed.

IDLE SPEED: 1,000 ± 100 rpm

Check that the difference in vacuum readings is 60 mm Hg (2.4 in Hg) or less.

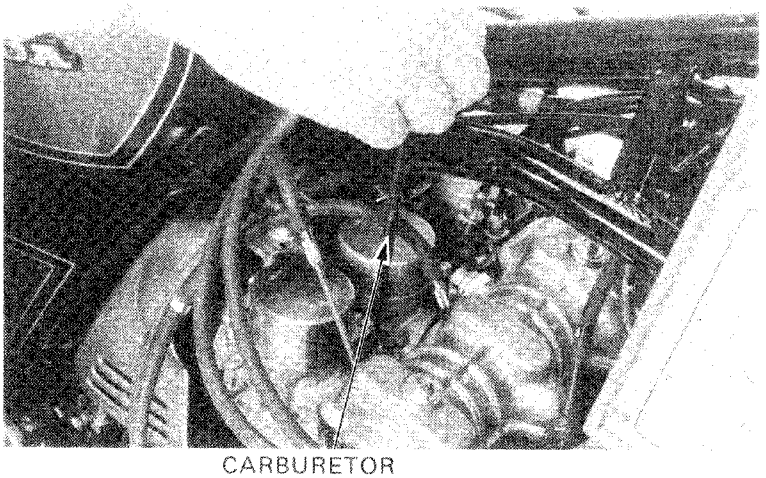


LOCK NUT ADJUSTING SCREW

Adjust by loosening the lock nuts and turning the adjusting screws with the carburetor adjusting wrench. Hold the adjusting screws and tighten the lock nuts.
Recheck the idle speed and synchronization.

Remove the gauges, and install the port plugs.

Install the fuel tank, fuel tube, seat and both frame side covers.



CARBURETOR
ADJUSTING WRENCH
07908–4220100

CARBURETOR IDLE SPEED

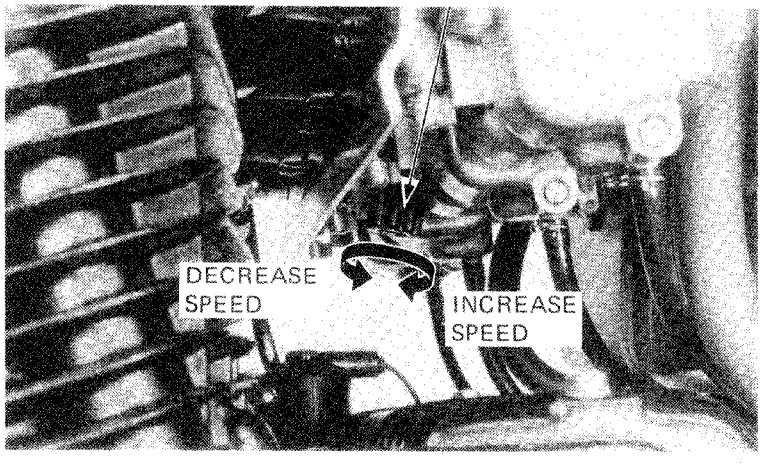
NOTE

- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate idle 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.

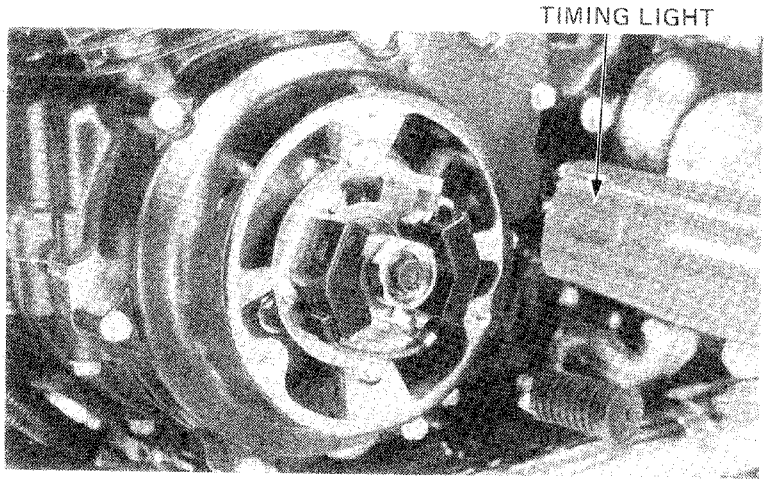
Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,000 ± 100 rpm



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IGNITION TIMING



• DYNAMIC

Remove the pulse generator cover.
Connect a stroboscopic timing light to the No. 1 cylinder's spark plug wire.

Start the engine and let it idle.

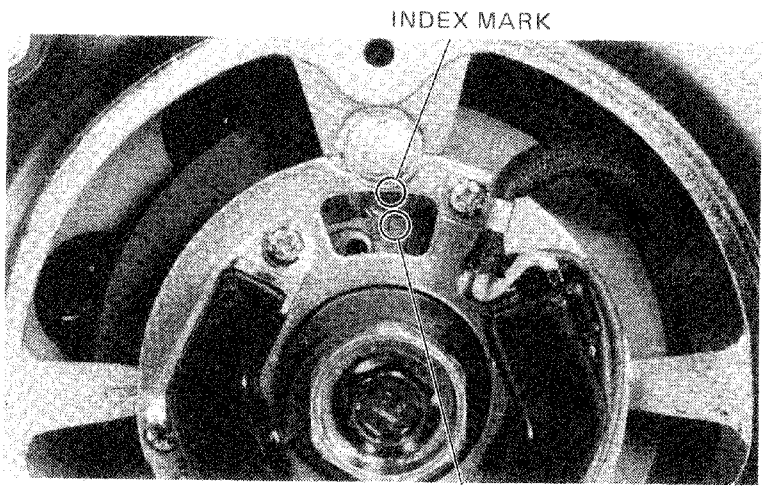
IDLE SPEED: 1,000 ± 100 rpm

Aim the timing light at the timing mark. The "1,4 F-I" mark should align with the index mark.

ADJUSTMENT

Adjust by loosening the two pulse base plate screws and rotating the plate.

Tighten the screws and recheck the timing.



• STATIC

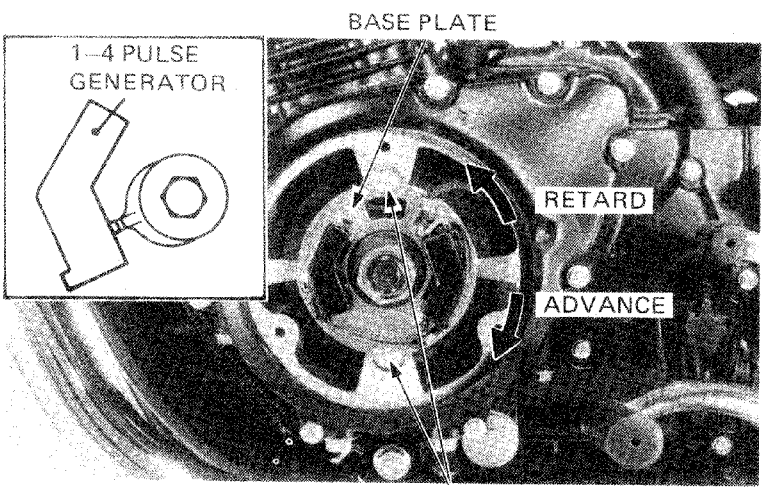
Remove the pulse generator cover.

Rotate the crankshaft counterclockwise and align the "1,4 S-F" mark with the index mark.

NOTE

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

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



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SPARK ADVANCER

Remove the pulse generator cover.

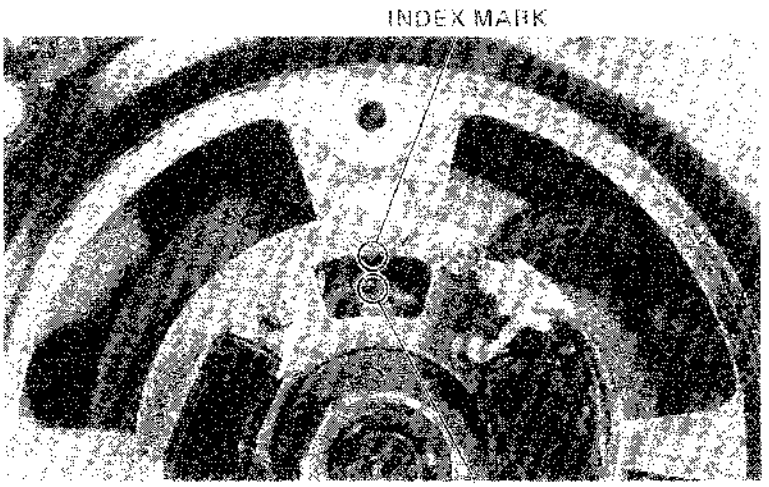
Connect a timing light to the No. 1 spark plug wire.
Start the engine.
Bring engine speed to 3,200 rpm or above and check that the index mark is between the full advance marks.

CAUTION

Do not allow engine speed to exceed 8,500 rpm or engine damage may result.

Replace the advancer assembly if it is not functioning properly.

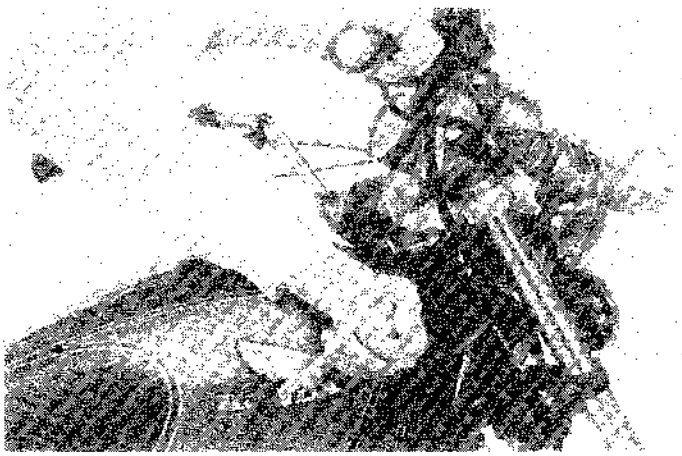
Install the pulse generator cover.



CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.
Stop the engine and remove the fuel tank.
Disconnect the spark plug caps and remove the spark plugs.
Insert the compression gauge.
Open the choke and throttle valves fully 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:
1,200 ± 200 kPa (12 ± 2 kg/cm², 170 ± 28 psi)



If compression is low, check for the following:
- Leaky valves.
- Improper valve clearance
- Leaking cylinder head gasket.
- Worn piston/rings/cylinder

High compression indicates that carbon deposits have accumulated on the combustion chamber or the piston crown.

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<CHASSIS>
BATTERY

Remove the seat by removing the seat bolt on each side.
Disconnect the battery: the negative lead first, then the positive lead.
Remove the negative cable and crankcase breather tube from the clamp.
Remove the battery holder bolt and open the battery holder.
Pull out the battery and inspect the battery fluid level.
When the fluid level nears the lower level, refill with distilled water to the upper level.

NOTE

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

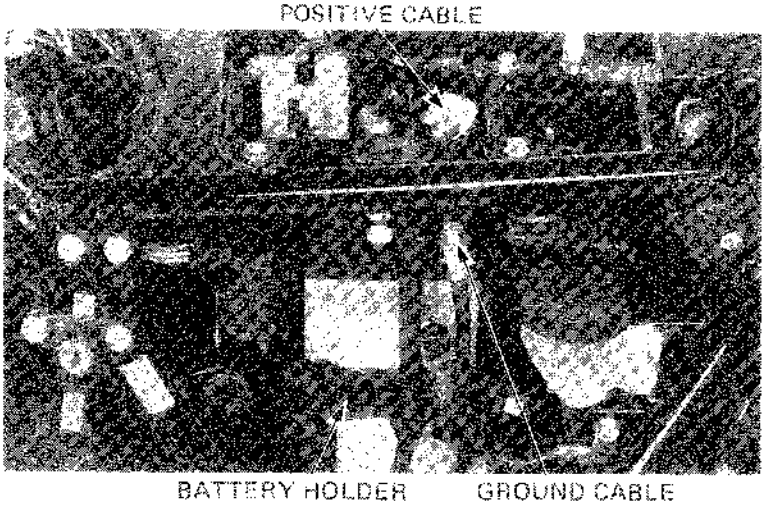
WARNING

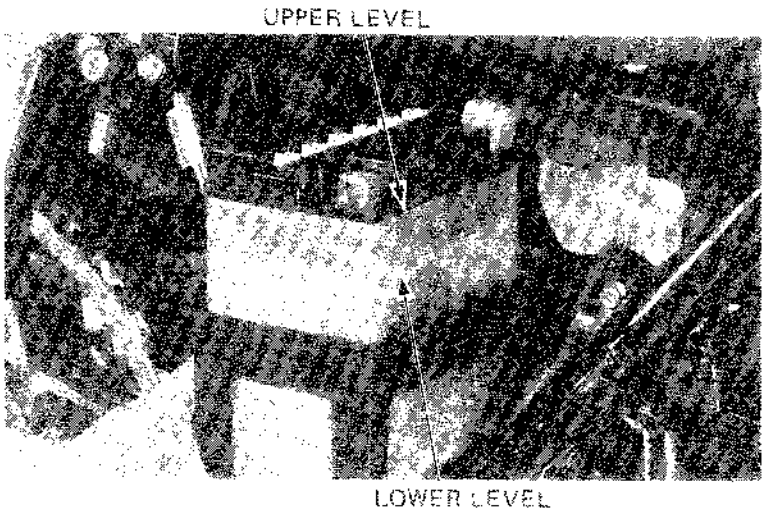
The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. If electrolyte gets in your eyes, flush them with water and get prompt medical attention.

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

NOTE

Connect the battery positive lead first, then the negative lead.





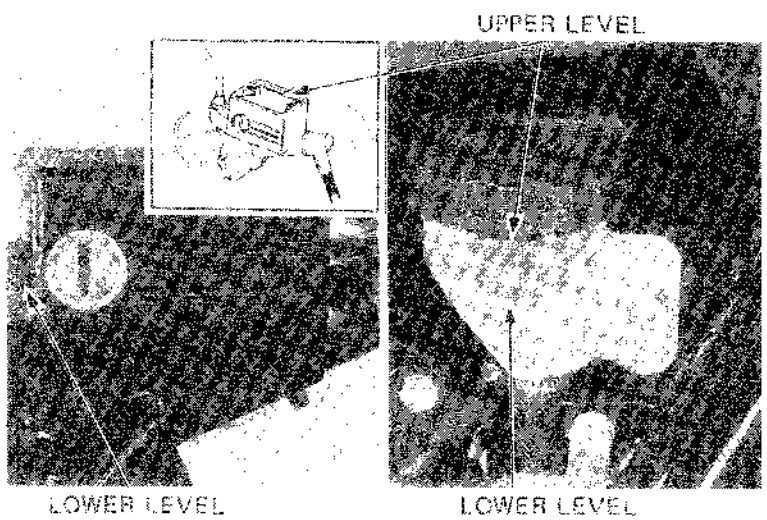
BRAKE FLUID

Check the front and rear brake fluid reservoir level.

If the level nears the lower level mark, fill the reservoir with SAE J1703 or DOT–3 Brake Fluid to the upper level mark.
Check the entire system for leaks, if the level is low.

CAUTION

- *Do not remove the cover until the handlebar has been turned 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 with the cap removed.*



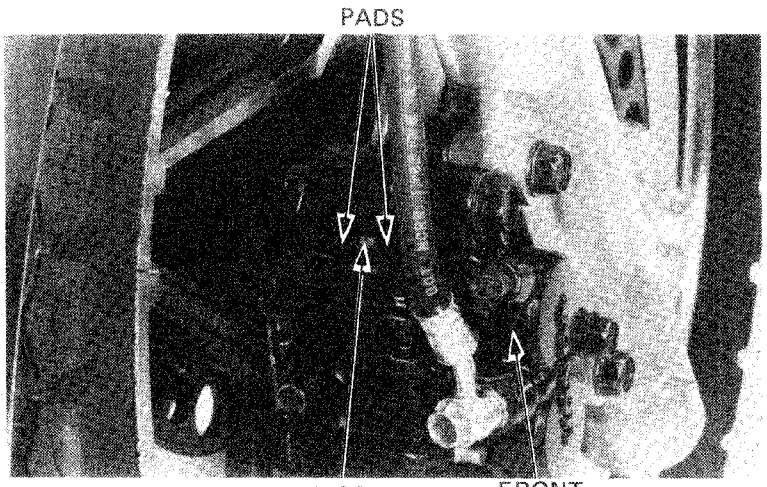
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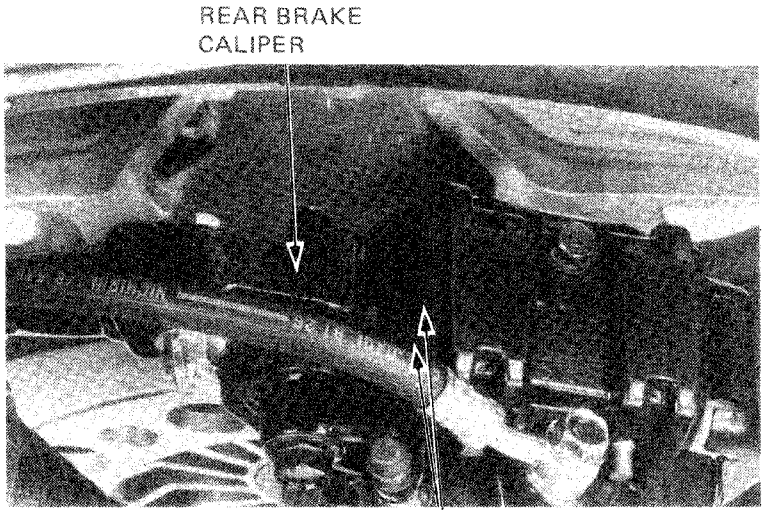
BRAKE PAD WEAR

Replace the brake pads if the red line on the top of the pads reaches the edge of the brake disc (Refer to Section 17).

CAUTION

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





BRAKE SYSTEM

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

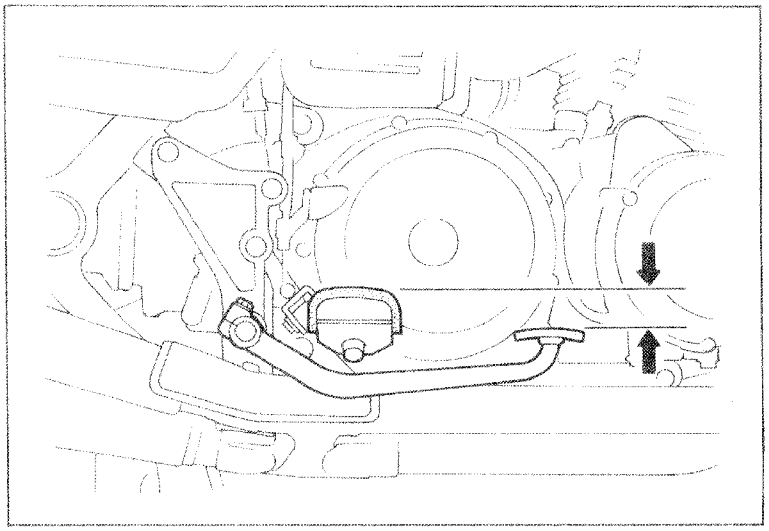
REAR BRAKE PEDAL HEIGHT

Adjust the pedal height so that the distance between the pedal and upper face of the footpeg is correct.

CAUTION

Improper brake pedal height adjustment can cause brake drag.

PEDAL HEIGHT: 5–8 mm (0.197–0.315 in)



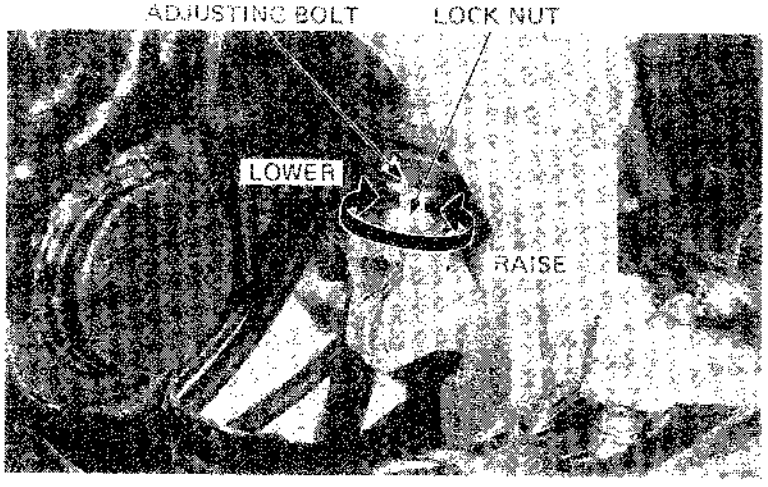
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Adjust as follows;

Loosen the stopper bolt lock nut and screw in the stopper bolt.
Loosen the adjusting bolt lock nut. Turn the adjusting bolt until the correct pedal height is obtained.

Tighten the lock nut securely.

Screw out the stopper bolt until it touches the brake pivot arm, then turn the stopper bolt clockwise 1/2–1 turn. Tighten the stopper bolt lock nut.
After adjusting pedal height, adjust the brake light switch.



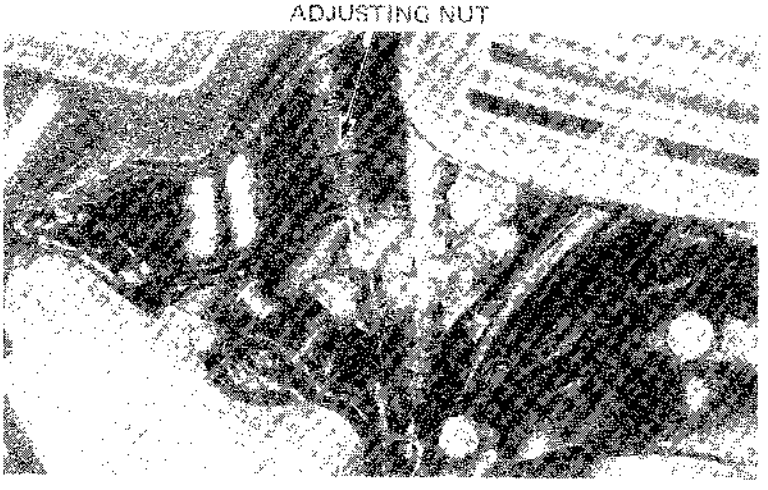
BRAKE LIGHT SWITCH

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

NOTE

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

Adjust by turning the switch adjusting nut as shown.



HEADLIGHT AIM

Adjust vertically by loosening both headlight case mounting bolts.

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

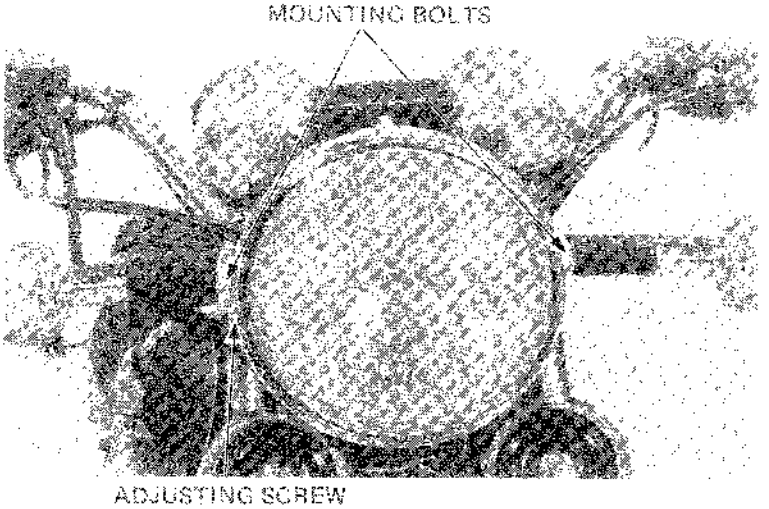
Turn the adjusting screw clockwise to direct the beam toward the right side of the rider.

NOTE

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

CAUTION

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

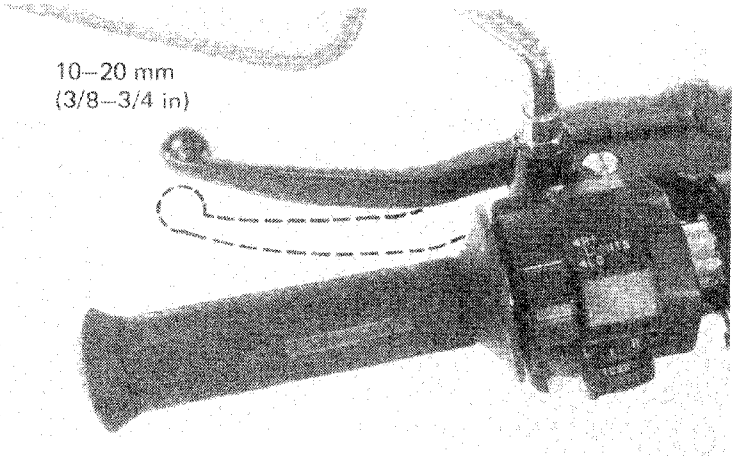


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CLUTCH

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

FREE PLAY: 10–20 mm (3/8–3/4 in)



ADJUSTMENT

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

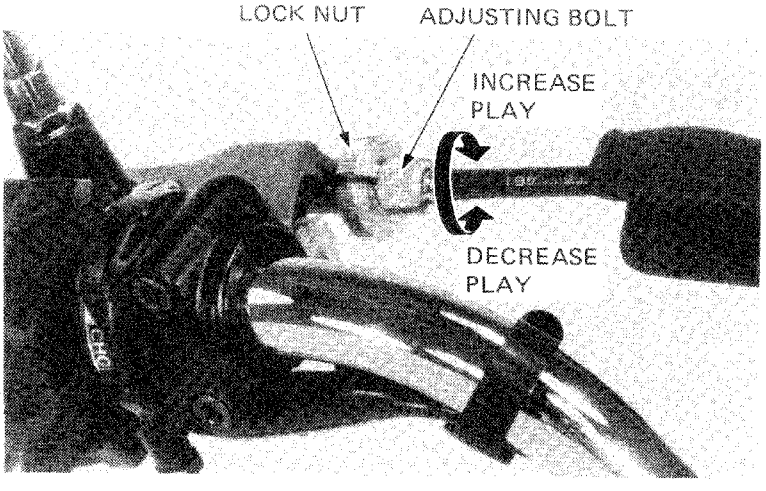
Tighten the lock nut.

NOTE

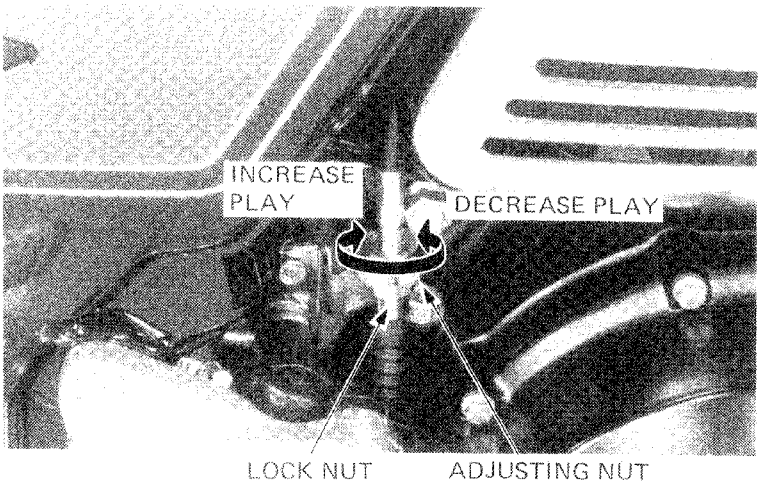
Do not expose the adjusting bolt threads more than 8 mm (5/16 in).

If adjustment cannot be made with the clutch lever adjusting bolt, screw the adjusting bolt all the way in and back it out 1 turn.

Adjustment must be made at the clutch housing.



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



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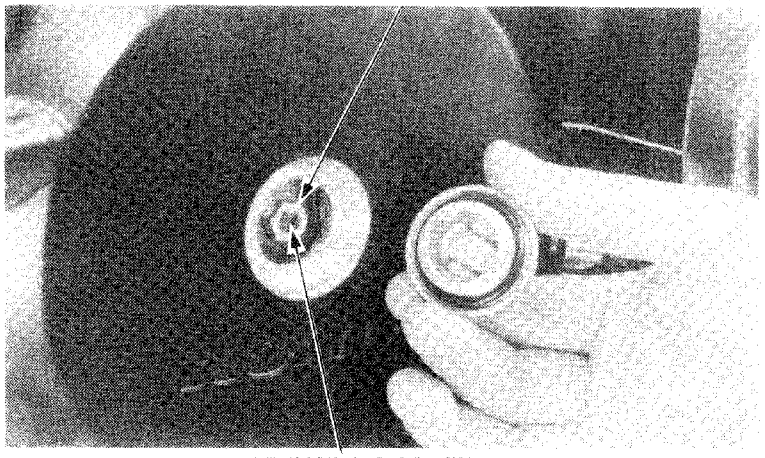
Remove the clutch lifter cap, loosen the clutch lifter lock nut. Then turn the adjusting screw clockwise until a slight resistance is felt.
From this position, turn the clutch adjusting screw counterclockwise 1–1-1/2 turns, and tighten the lock nut.

Install the lifter cap.

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

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

After adjustment, be sure all lock nuts are tightened securely. Check to see that the clutch is not slipping and is properly disengaging.



ADJUSTING SCREW
CLUTCH ADJUSTING WRENCH
07908–3230000

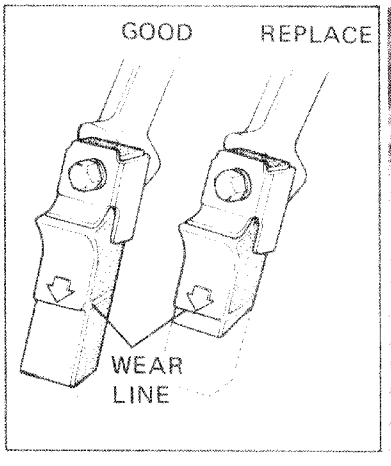
SIDE STAND

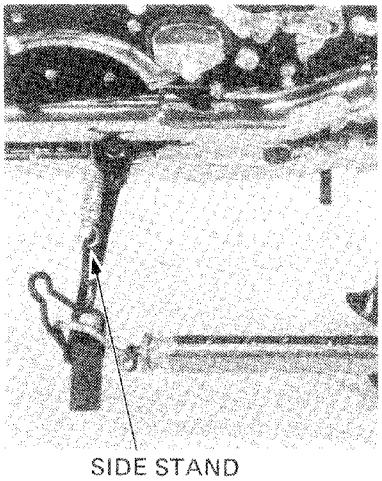
Check the rubber pad for deterioration or wear. Replace if any wear exceeds to the wear line as shown.

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

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

Spring tension is correct if the measurements fall within 1.5–2.5 kg (3.3–5.5 lb) when pulling the side stand lower end with a spring scale.





SIDE STAND

SUSPENSION

WARNING

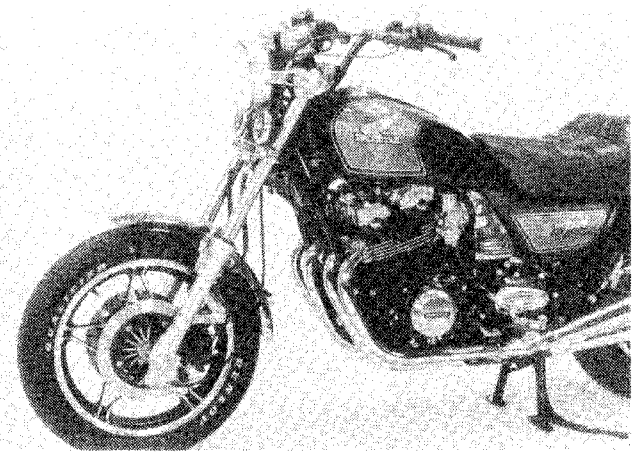
Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts impair vehicle stability and control.

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.



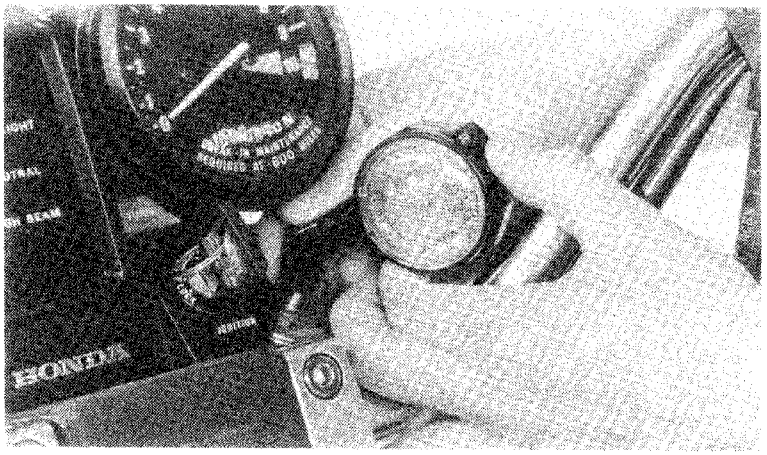
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Place the vehicle on its center stand.
Remove the valve cap and measure the front fork air pressure.

FRONT FORK AIR PRESSURE:
40–100 kPa (0.4–1.0 kg/cm², 6–14 psi)

NOTE

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

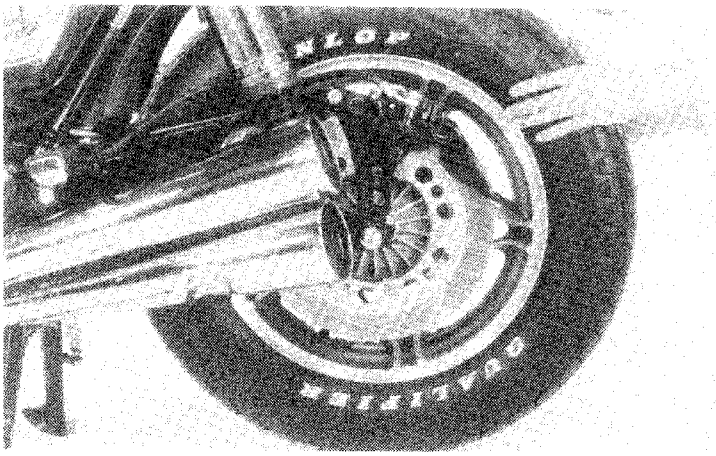


REAR

Place the motorcycle on its center stand.

Move the rear wheel sideways with force to see if the swing arm bearings are worn. Replace if excessively worn (page 15-13).
Check the shock absorbers for leaks or damage.

Tighten all rear suspension nuts and bolts.



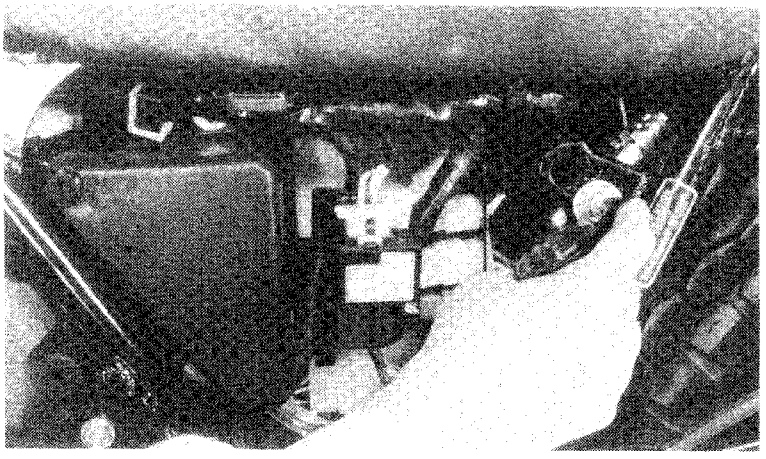
Remove the left side cover.

Remove the valve cap and measure the rear shock absorber air pressure.

REAR SHOCK ABSORBER AIR PRESSURE:
0–400 kPa (0–4.0 kg/cm², 0–57 psi)

NOTE

Check the air pressure when the rear shock absorbers are cold.



NUTS, BOLTS, FASTENERS

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

Check all cotter pins and safety clips.

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WHEELS

NOTE

Tire pressure should be checked when tires are COLD.

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

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		Front	Rear
Tire size		110/90–18 62H M110/90–18	140/90–16 67H M140/90–16
Cold tire pressures 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 TUBELESS ONLY DUNLOP		F11	K127C



Check the front and rear wheels for trueness.

Measure the tread depth at the center of the tires.

Replace the tires if the tread depth reaches the following limit.

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

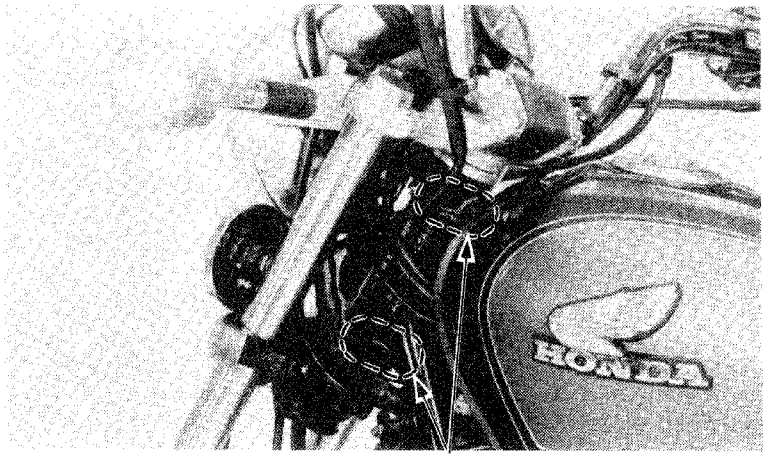
STEERING HEAD BEARINGS

NOTE

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

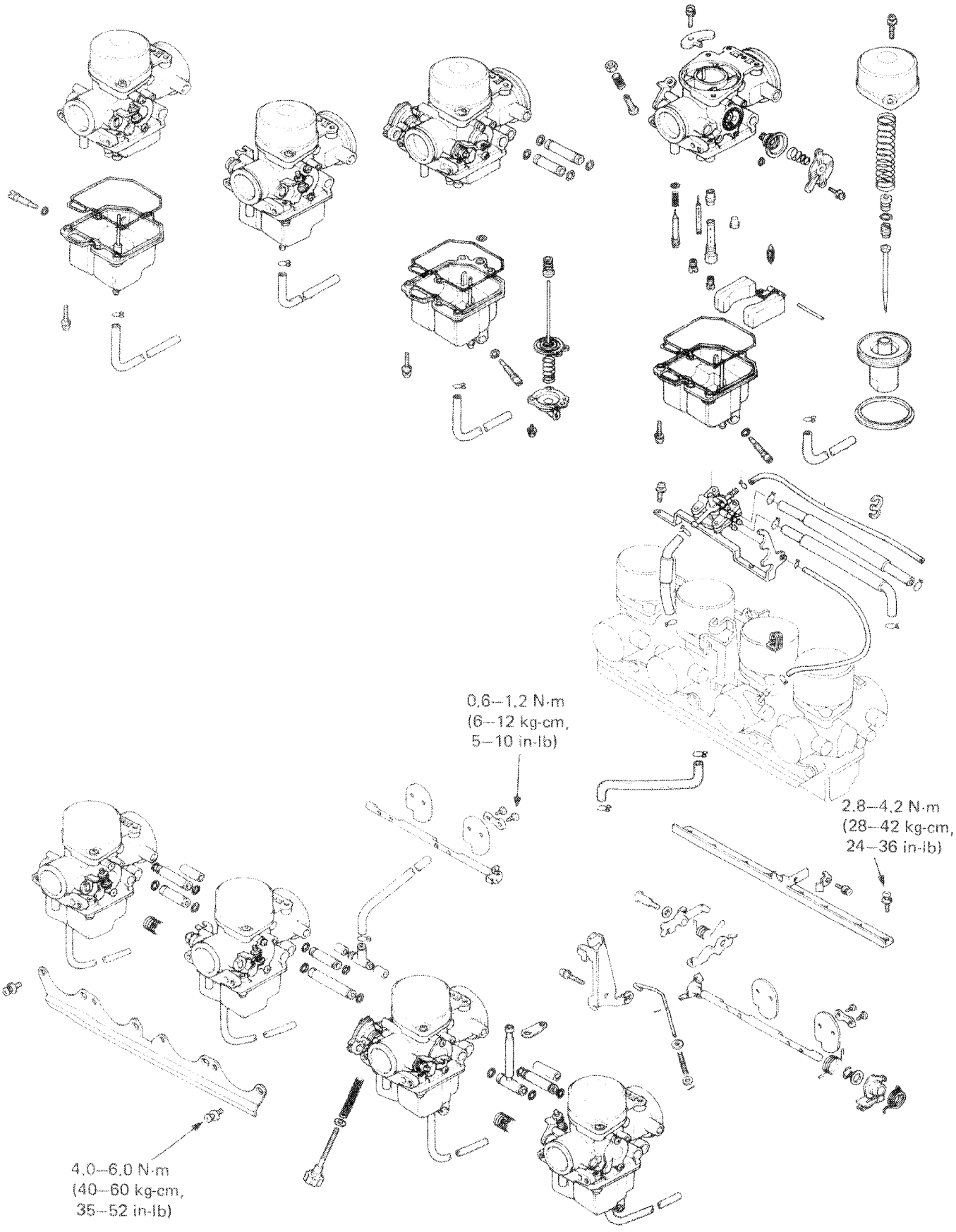
Raise the front wheel off the ground and check that the handlebar rotates freely.

If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 14-30).



BEARINGS

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4. FUEL SYSTEM

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4

SERVICE INFORMATION

GENERAL

- The carburetors are equipped with a fuel line diaphragm. After carburetor overhaul, it is necessary to crank the engine for 2–3 seconds, three times with the throttle fully closed to fill the float chambers.
- The pilot screws are factory pre-set and should not be removed unless the carburetor is overhauled.
- Use caution when working with gasoline. Always work in a well-ventilated area and away from sparks or open flames.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain plugs that can be loosened to drain residual gasoline.

SPECIFICATIONS

Venturi dia.	32 mm (1.3 in)
Identification No.	VB55A
Float level	15.5 mm (0.61 in)
Main jet	Pri. : 68 2nd. : 110
Slow jet	35
Idle speed	1,000 ± 100 rpm
Throttle grip free play	2–6 mm (1/8–1/4 in)
Fast idle	1,000–2,500 rpm (after break-in)
Pilot screw initial opening	See page 4-17

TORQUE VALUES

Front bracket	4–6 N·m (40–60 kg-cm, 35–52 in-lb)
Rear bracket	2.8–4.2 N·m (28–42 kg-cm, 24–36 in-lb)
Choke valve	0.6–1.2 N·m (6–12 kg-cm, 5–10 in-lb)

TOOLS

Common

Float gauge	07401–0010000

Special

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

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TROUBLESHOOTING

Fuel not reaching carburetors
1. Fuel line diaphragm vent tube clogged.
2. Fuel line diaphragm vacuum tube clogged.
3. Clogged fuel line diaphragm.
4. Clogged fuel line diaphragm check valve.

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

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

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

Misfiring during acceleration
1. Ignition malfunction.
2. Faulty air-cutoff valve

Backfiring
1. Ignition malfunction.
2. Carburetor malfunction.
3. Faulty air-cutoff valve.

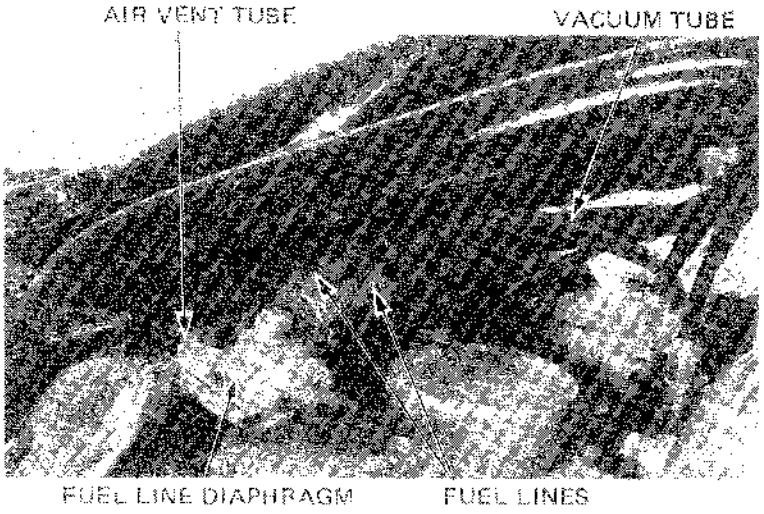
Poor performance (driveability) and poor fuel economy
1. Fuel system clogged.
2. Ignition malfunction.

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

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

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FUEL LINE DIAPHRAGM



REMOVAL

Turn the fuel valve off. Remove the seat and fuel tank.

Disconnect the fuel lines, vacuum tube and air vent tube.

Unscrew the screws attaching the fuel line diaphragm to the carburetors. Remove the fuel line diaphragm.

INSPECTION

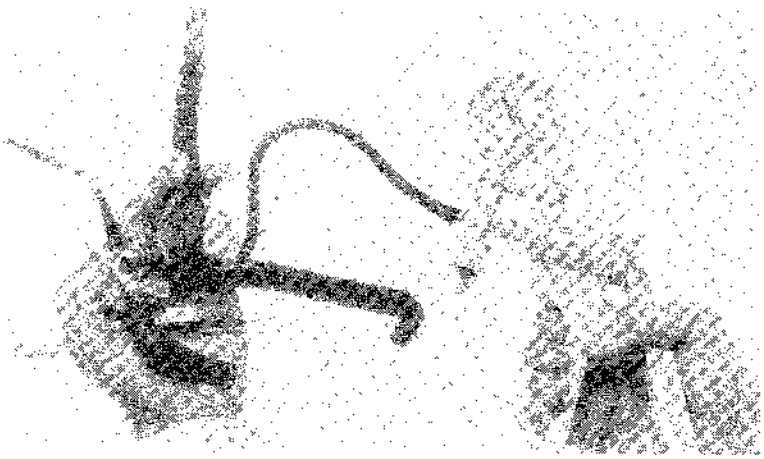
Remove the fuel line diaphragm (see above).

Disconnect the inlet fuel line from the diaphragm, and connect a longer tube to the fuel tank.

Place a suitable drainage container under the outlet fuel tube.

Turn the fuel valve on. Fuel should not flow from the outlet line.

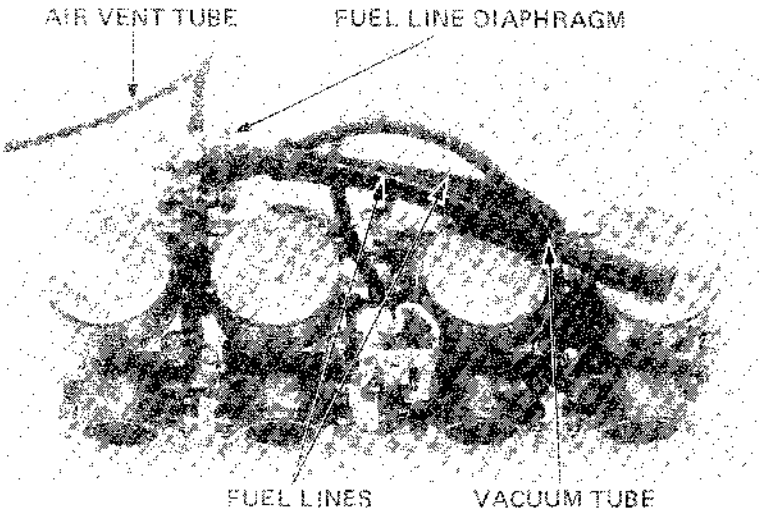
Connect a vacuum gauge to the diaphragm vacuum outlet. Fuel should flow out from the outlet tubes when 10–20 mm Hg (0.4–0.8 in Hg) of vacuum is applied.
If the flow is restricted, replace the fuel line diaphragm.



Installation of the fuel line diaphragm is the reverse of removal.

NOTE

Check that air or gasoline is not leaking past the fuel line joints or connections.



CARBURETOR TUBE ROUTING

Route the carburetor tubes and lines as shown.

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CARBURETOR REMOVAL

Remove the both frame side covers and the seat.
Turn the fuel valve "OFF" and disconnect the fuel line.

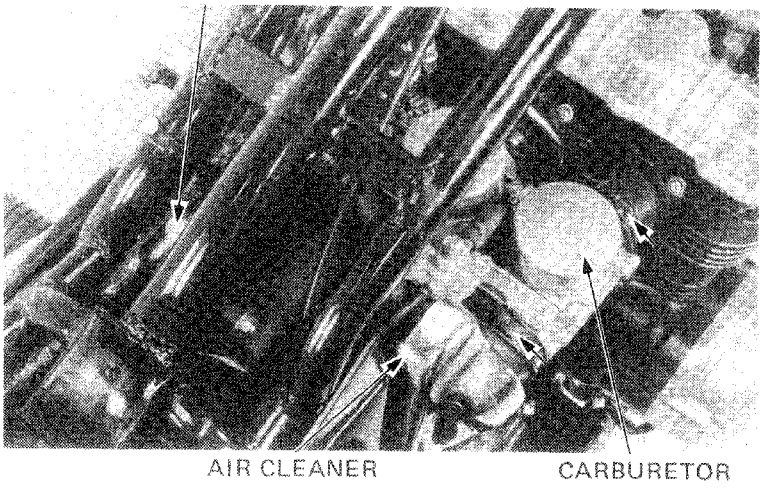
Remove the fuel tank (page 4-19).

Loosen the air cleaner mounting bolt.

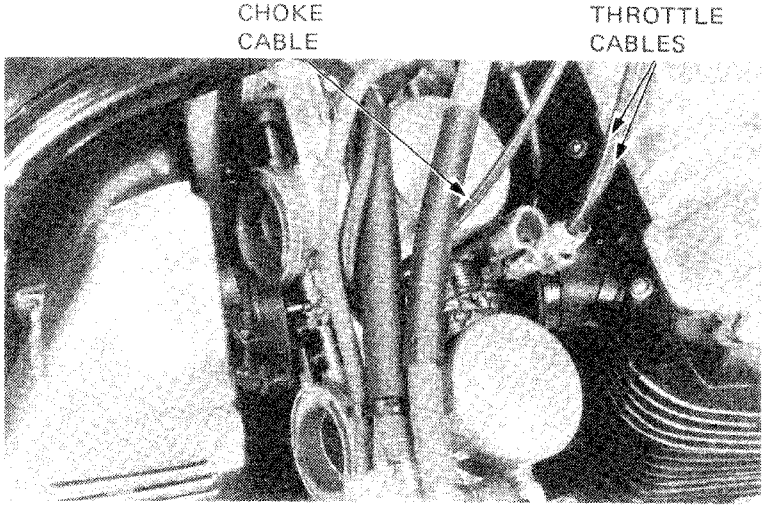
Loosen the air cleaner connecting bands and move the air cleaner to the rear.

Loosen the carburetor insulator bands.

Drain residual fuel into a container by loosening each drain screw.



Pull the carburetor assembly out from the right side for enough to disconnect the throttle and choke cables.
Remove the carburetor assembly.



VACUUM CYLINDER DISASSEMBLY

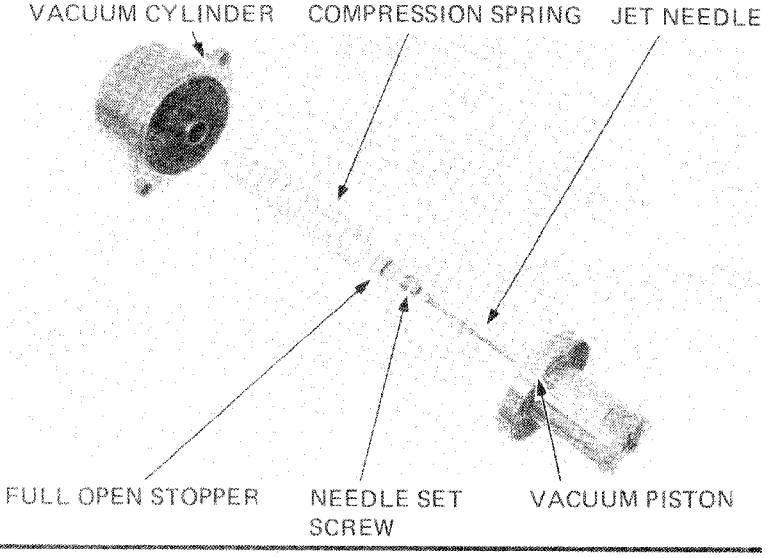
Remove the vacuum cylinders from the carburetor bodies. Carefully lift the vacuum piston out with the needle and compression spring.

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

Remove the full open stopper and needle set screw.

Separate the jet needle from the piston.

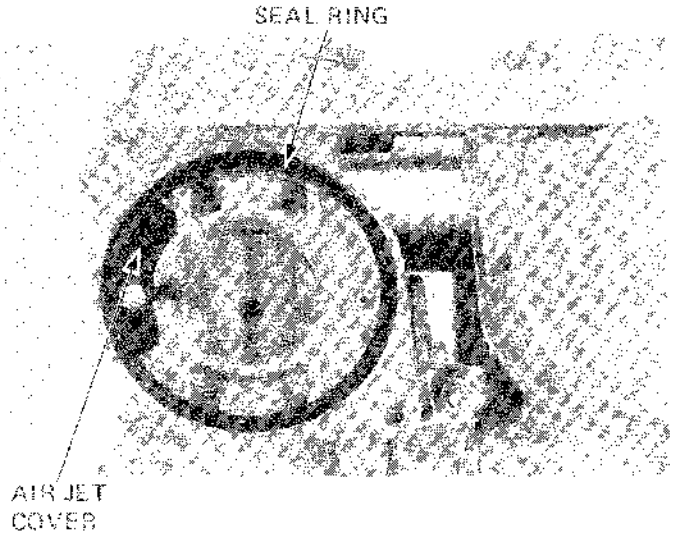
Inspect the needle and seat for deposits, bending, grooves, or other damage.



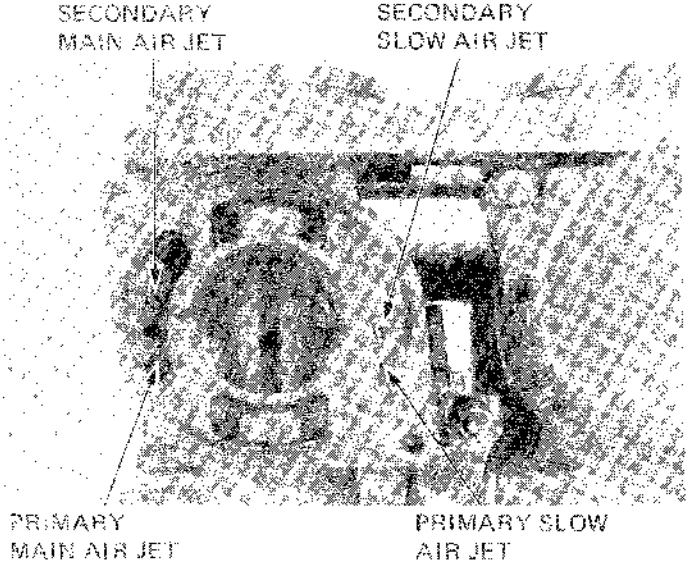
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Carefully lift the seal ring off the carburetor body.

Remove the air jet cover.



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



PILOT SCREW

REMOVAL

NOTE

The pilot screws are factory pre-set and should not be removed unless the carburetor is overhauled.

Remove the float chambers (U.S.A. only).

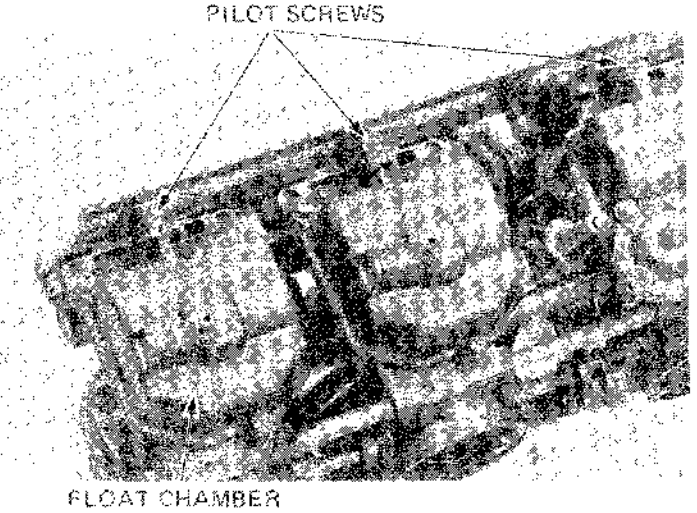
Turn each pilot screw in and carefully count the number of turns before it seats lightly.
Make a note of this to use as a reference when reinstalling the pilot screws.

CAUTION

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

Remove each pilot screw.

Inspect the pilot screws and replace them all if any are worn or damaged.



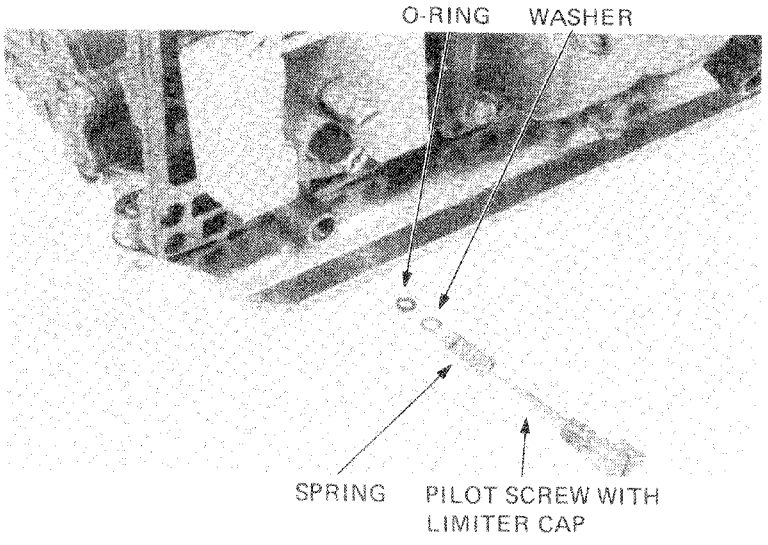
INSTALLATION

Install the pilot screw and return it to its original position as noted during removal.

Perform pilot screw adjustment if a new pilot screws are installed (page 4-18).

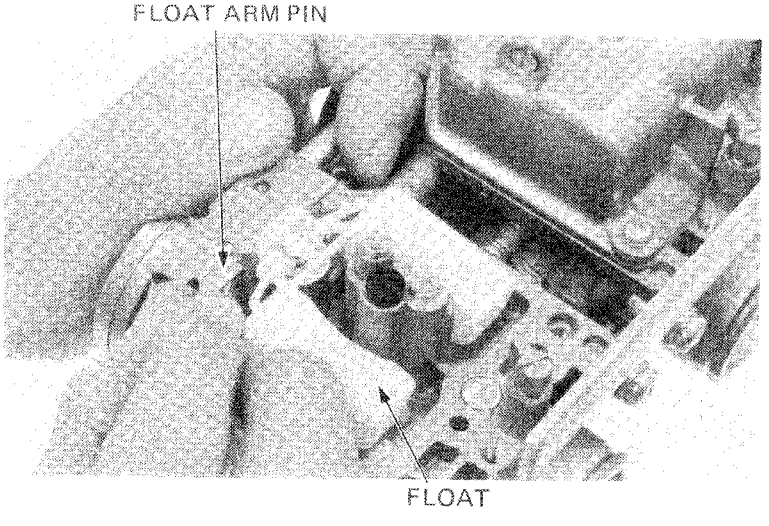
NOTE

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



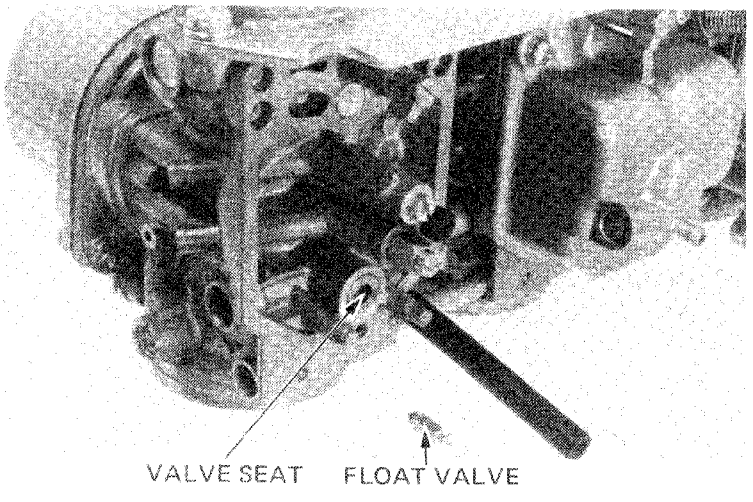
FLOAT AND JETS

Press out and remove the float arm pin.
Remove the float and float valve.



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

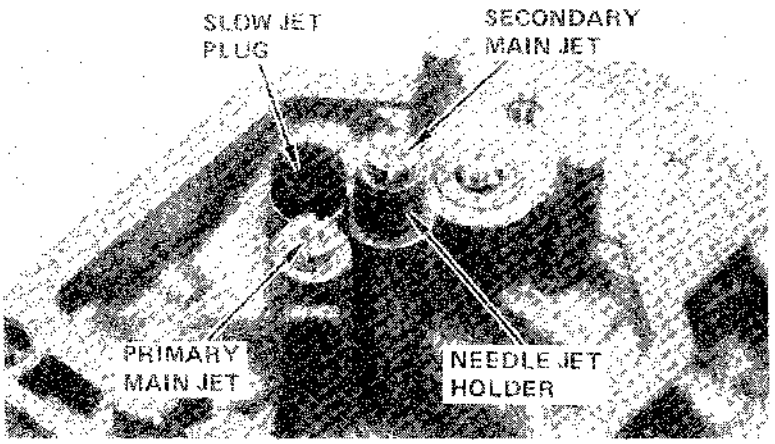
Inspect the operation of the float valve.



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Remove the secondary main jet and primary main jet.

Remove the slow jet plug and slow jet.

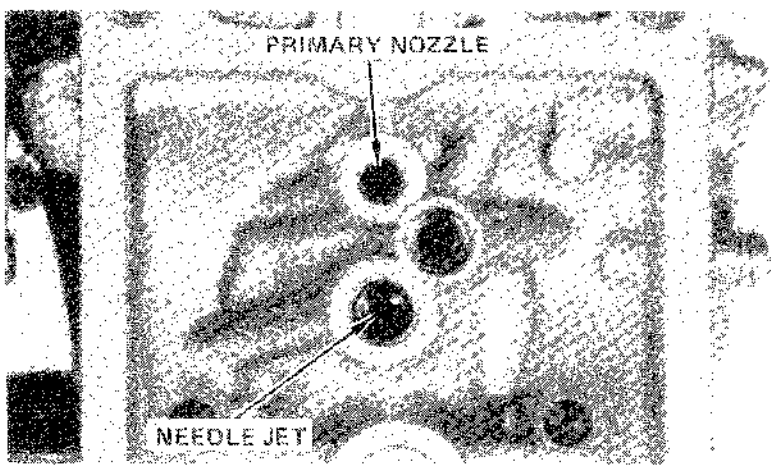


Remove the primary nozzle and needle jet holder.

Tilt the carburetor to remove the needle jet.
Blow all jets and body passages with compressed air.

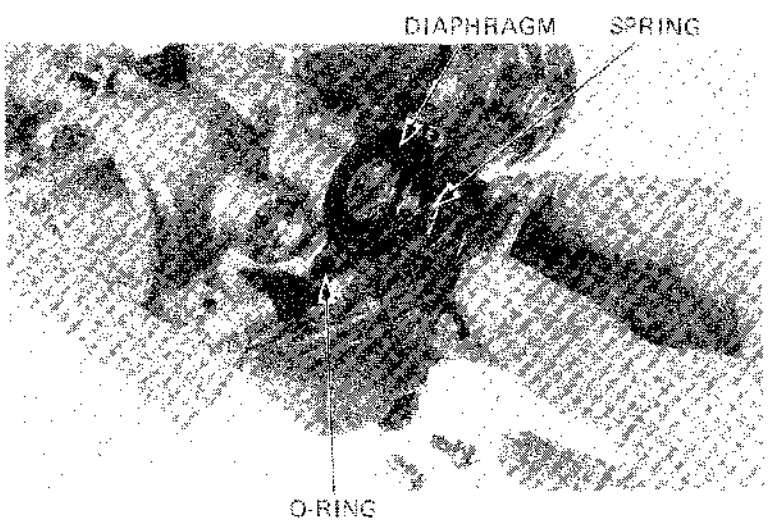
NOTE

If the needle jet is difficult to remove, carefully press the needle jet from the cylinder side with a non-metallic object to prevent damage to the needle jet.



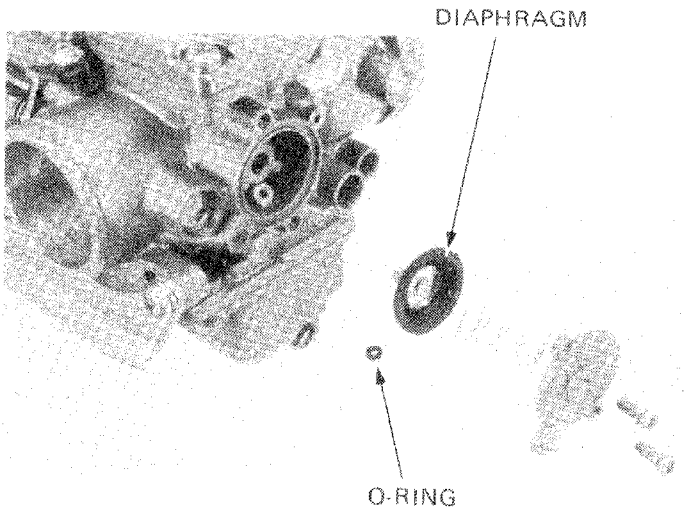
AIR-CUTOFF VALVE DISASSEMBLY

Remove the air-cutoff valve cover and spring.
Remove the diaphragm and O-ring.



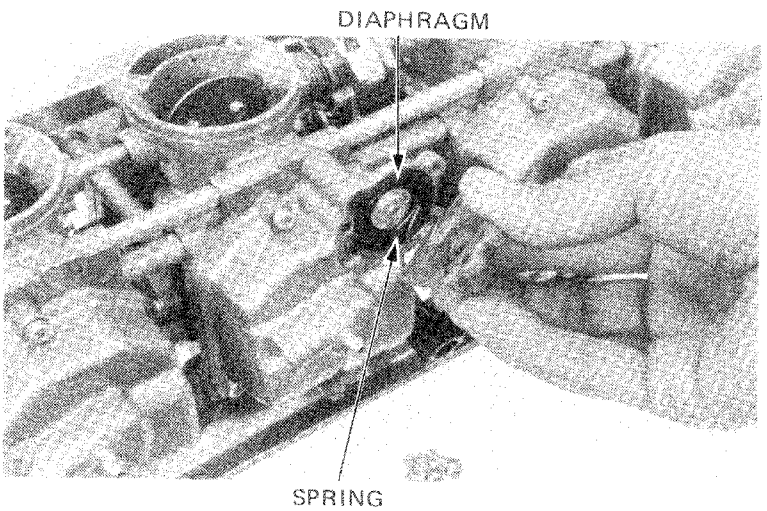
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Inspect the diaphragm and valve for cracks or brittleness.



ACCELERATOR PUMP DISASSEMBLY

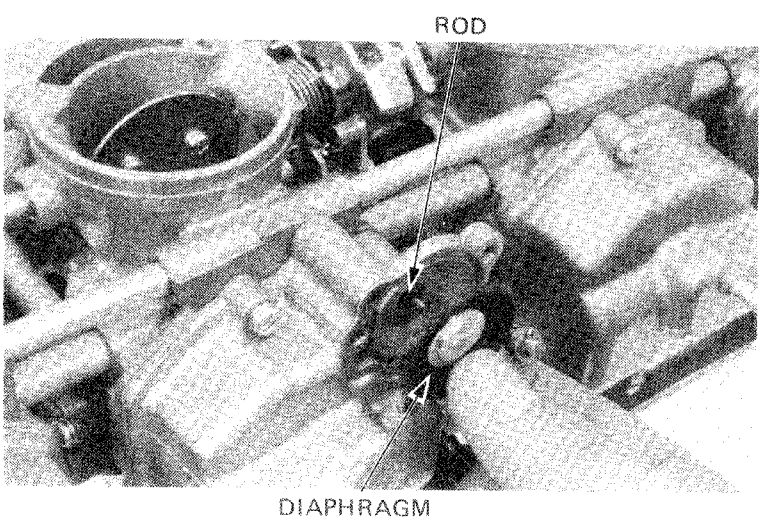
Remove the accelerator pump cover and spring.



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

NOTE

Be sure the rod is not bent.



COMPONENT ASSEMBLY

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

NOTE

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

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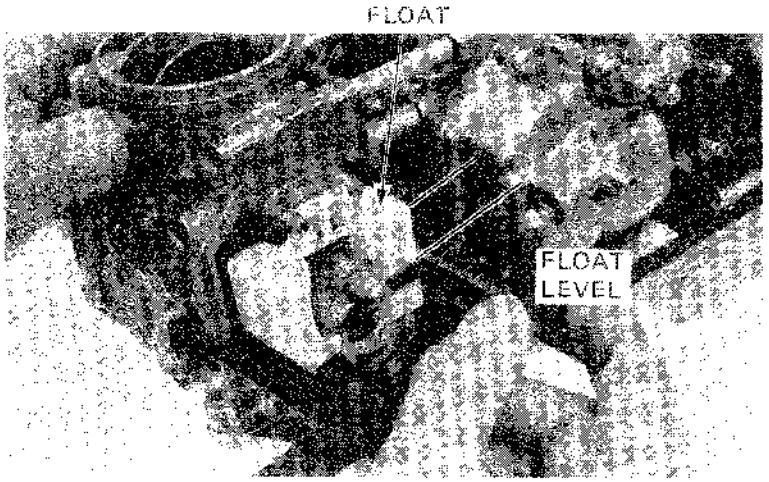
FLOAT LEVEL

Remove the float chamber.

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

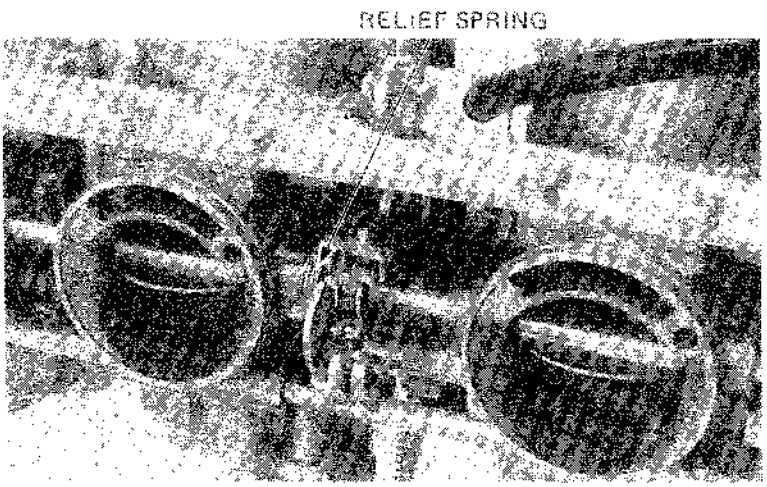
FLOAT LEVEL: 15.5 ± 1 mm (0.61 ± 0.04 in)

Replace the float, if the float level is not within the specification.



CARBURETOR SEPARATION

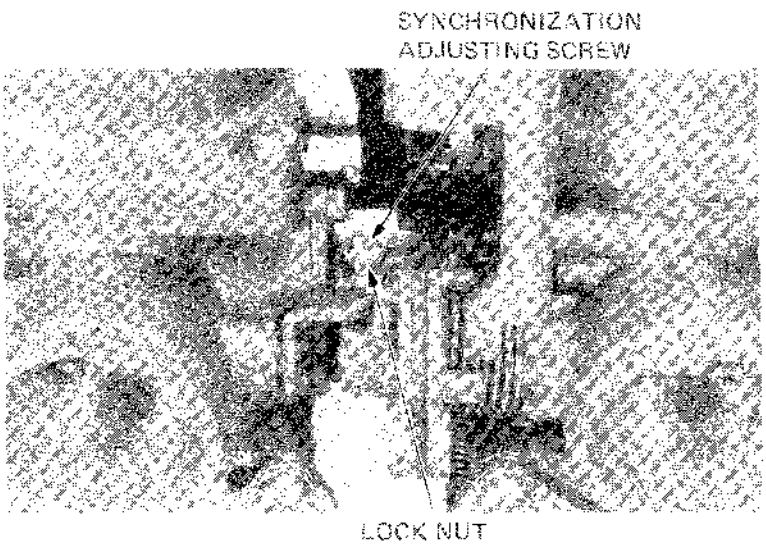
Unhook the choke relief spring from the choke shaft arm of the No. 2 and No. 3 carburetors.



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

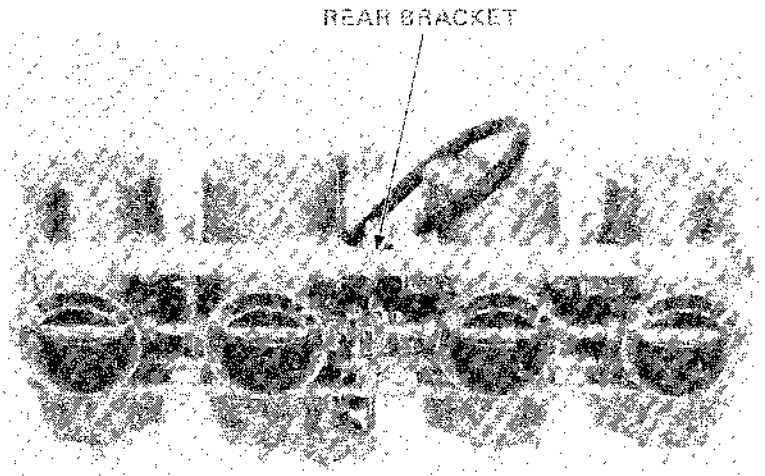
NOTE

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

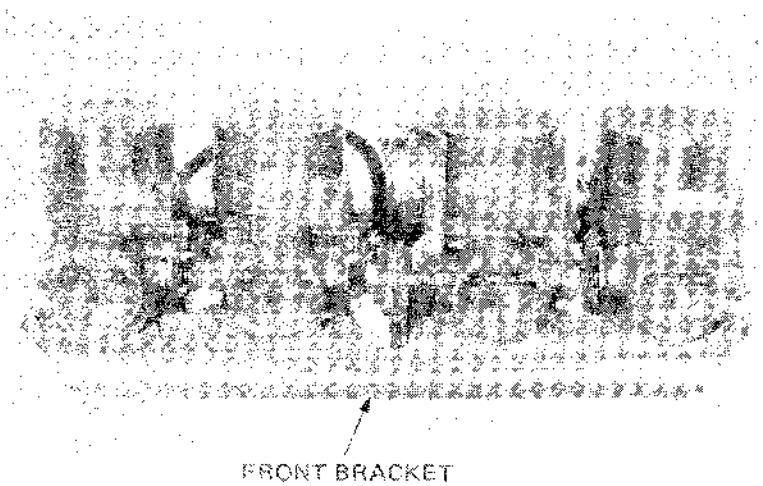


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Remove the rear bracket.



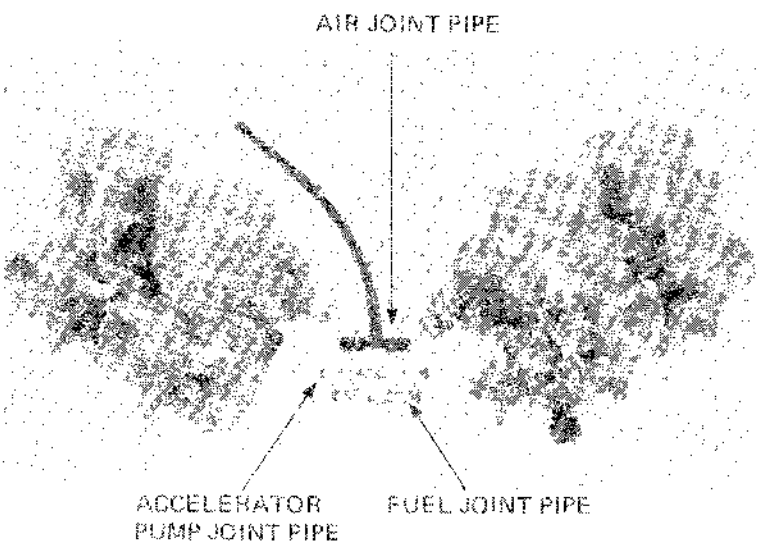
Remove the front bracket.



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

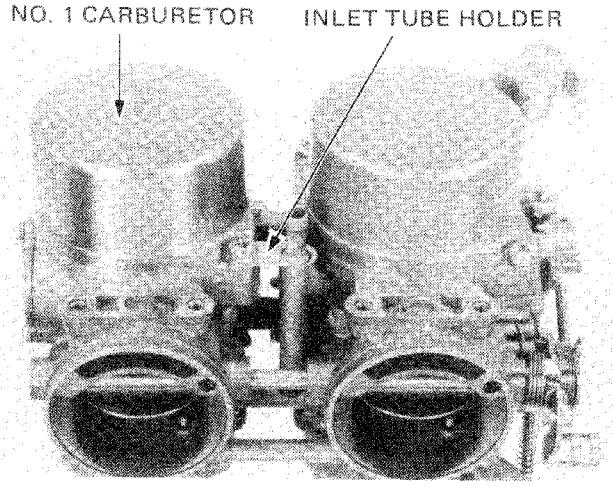
CAUTION

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



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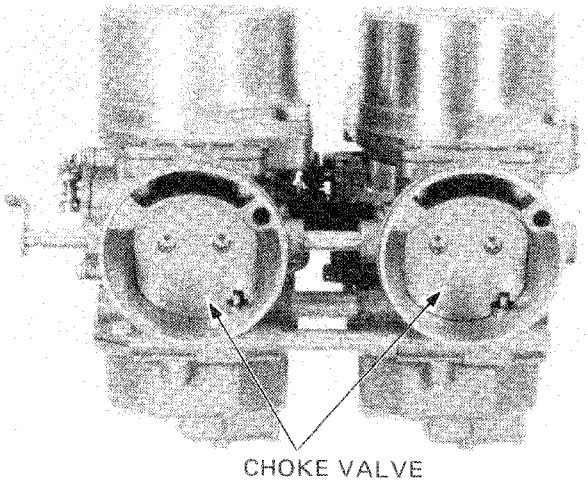
Remove the fuel inlet tube holder from the No. 1 carburetor.



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

NOTE

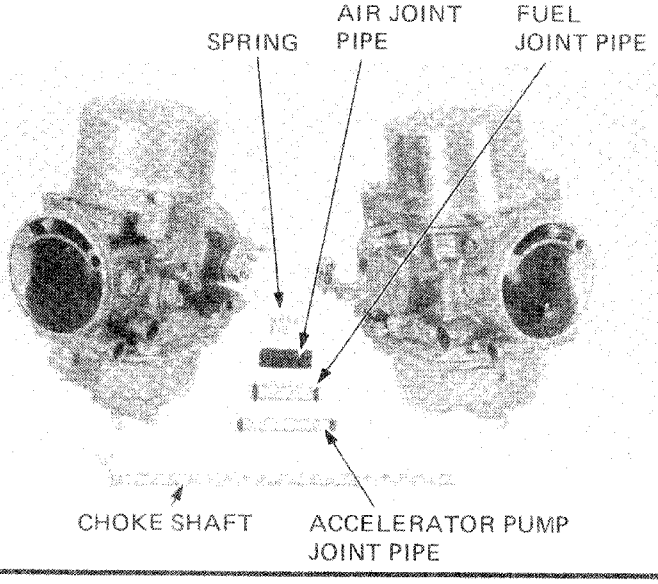
Do not allow the cut ends to enter the carburetors.



Carefully separate the individual carburetors.

CAUTION

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



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LINKAGE

DISASSEMBLY

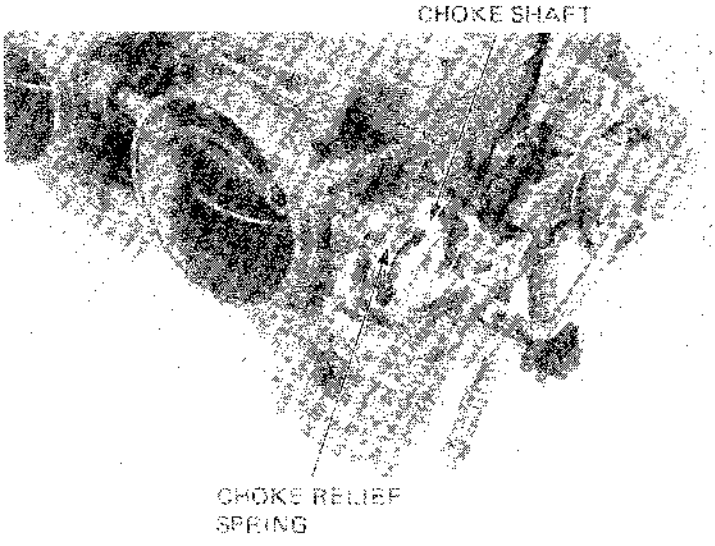
Note the spring positions.

Remove the choke valves.

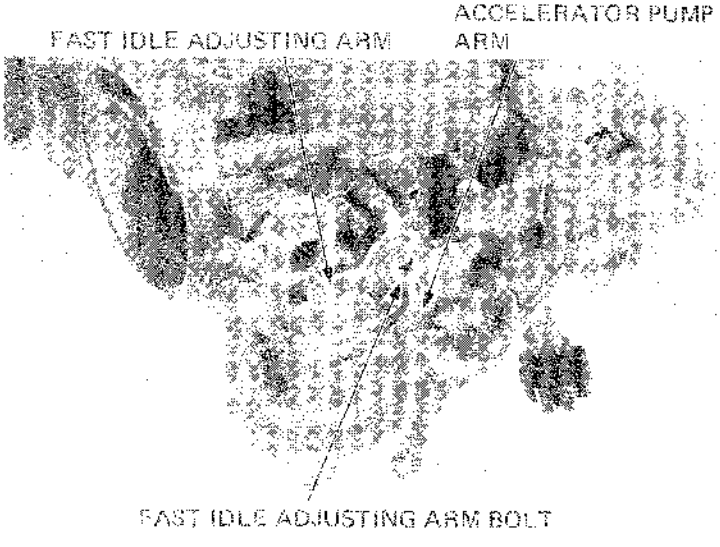
Remove the choke relief spring from the choke link and pull the choke shaft out.

CAUTION

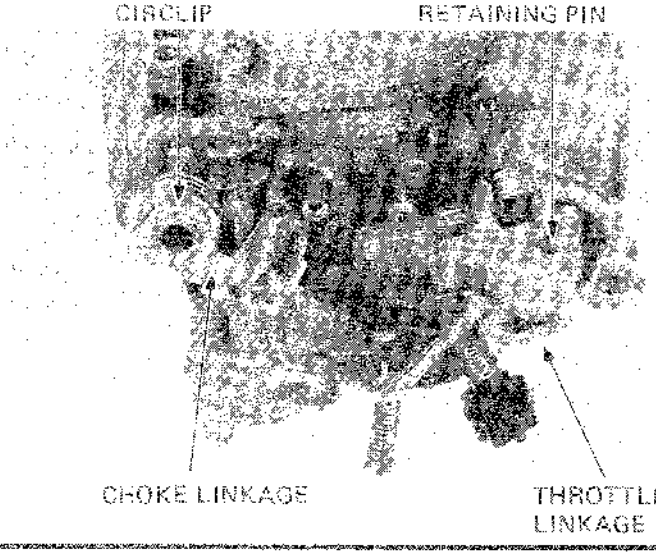
Do not reuse the choke shaft, or choke valves and screws.



Remove the fast idle adjusting arm bolt, fast idle adjusting arm and springs.
Remove the accelerator pump arm.



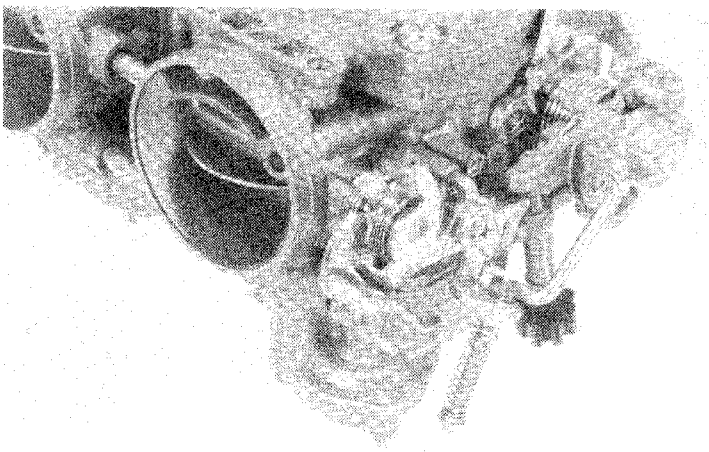
Drive out the retaining pin and remove the throttle linkage.
Remove the choke linkage circlip and linkage.



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ASSEMBLY

To assemble the carburetor linkage, reverse the disassembly procedure.



CARBURETOR ASSEMBLY

NOTE

Assemble one pair of carburetors at a time.

Install new o-rings on the fuel joint pipes.

NOTE

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

Install the fuel joint, accelerator pump joint and air vent pipes.

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

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

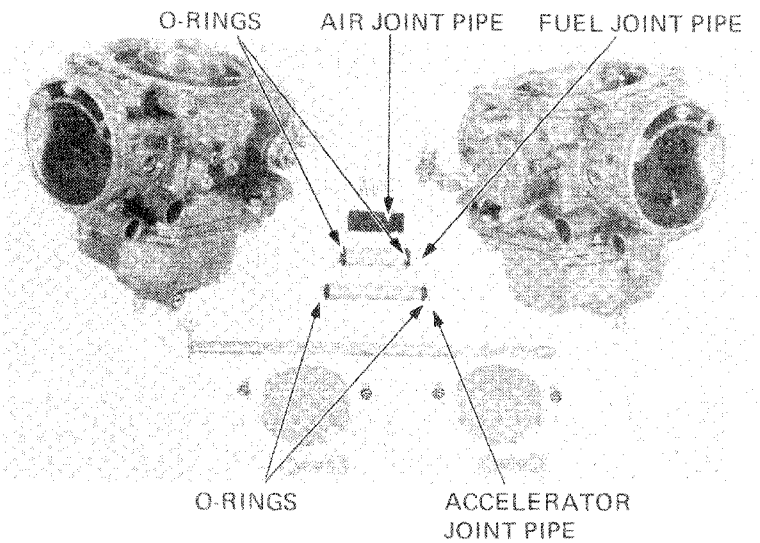
Assemble the No. 3 and No. 4 carburetors, pressing them together carefully.

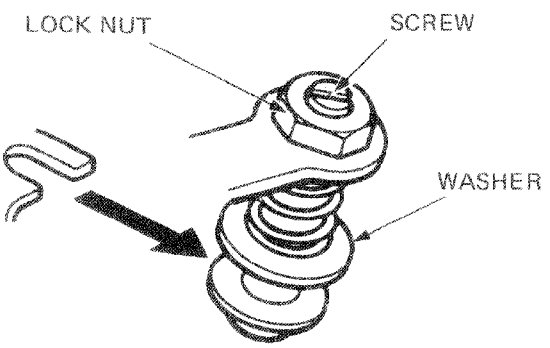
NOTE

The large washer should be positioned on the spring side.

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

Insert new choke shafts and assemble the carburetor linkage.





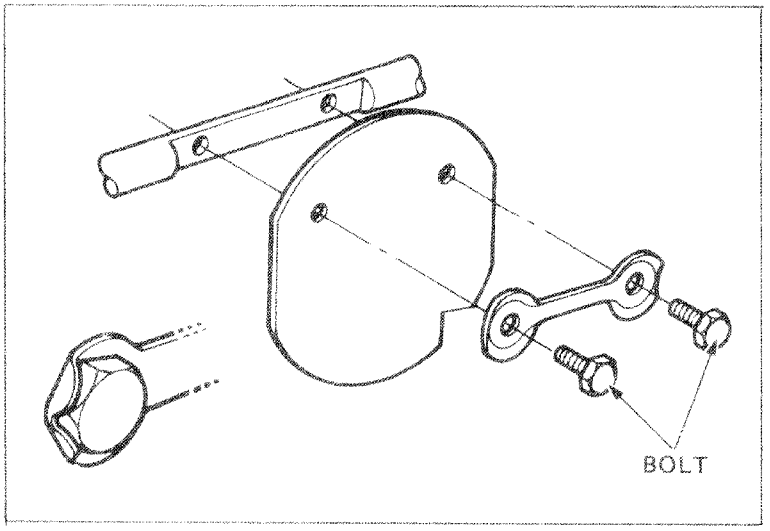
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Tighten the choke valve bolts.

TORQUE: 0.6–1.2 N·m (6–12 kg-cm, 5–11 in-lb)

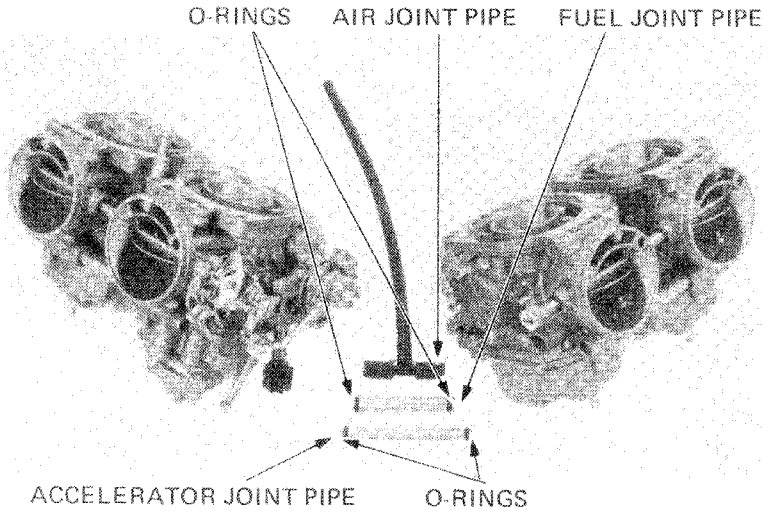
Fold the tabs of the lock washer up.

Check the throttle and choke operation.



Apply a thin coating of oil to new o-rings and put them on the fuel joint pipes.

Loosen the synchronization adjusting screw until there is no tension and assemble each pair of carburetors.



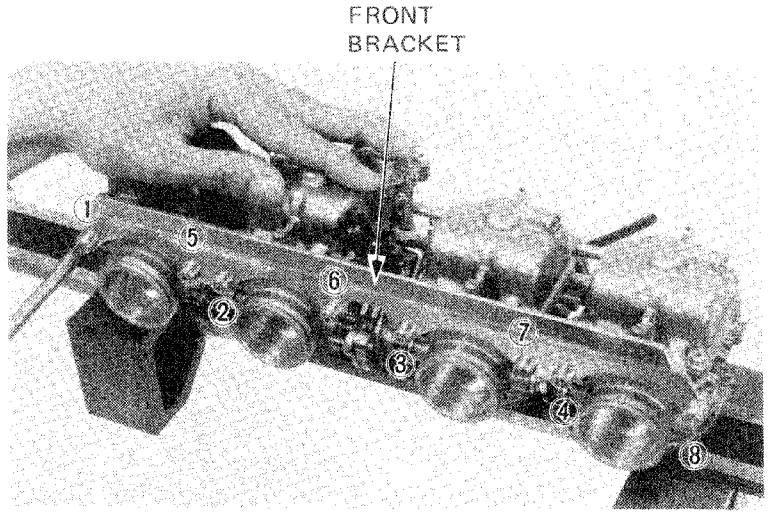
Install the front bracket loosely. Place the carburetors on a flat surface with the float chambers up.

Press the carburetors together carefully and evenly tighten the screws in the sequence shown in two or more steps to prevent carburetor misalignment.

TORQUE: 2.8–4.2 N·m (0.28–0.42 kg-m, 2–3 ft-lb)

NOTE

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

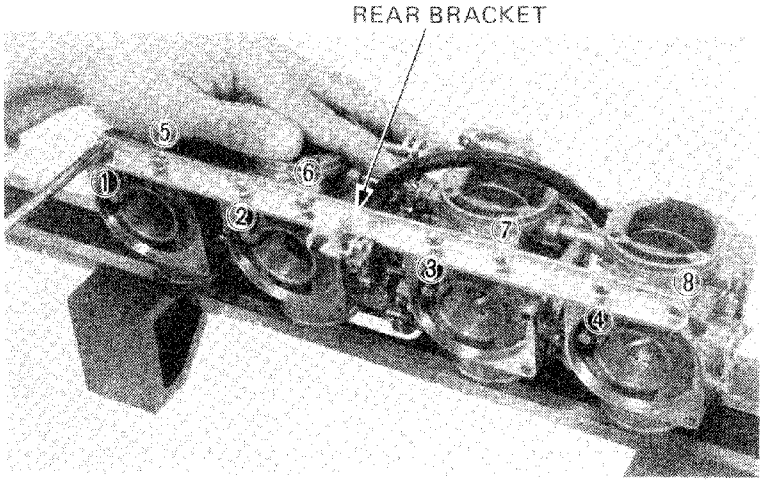


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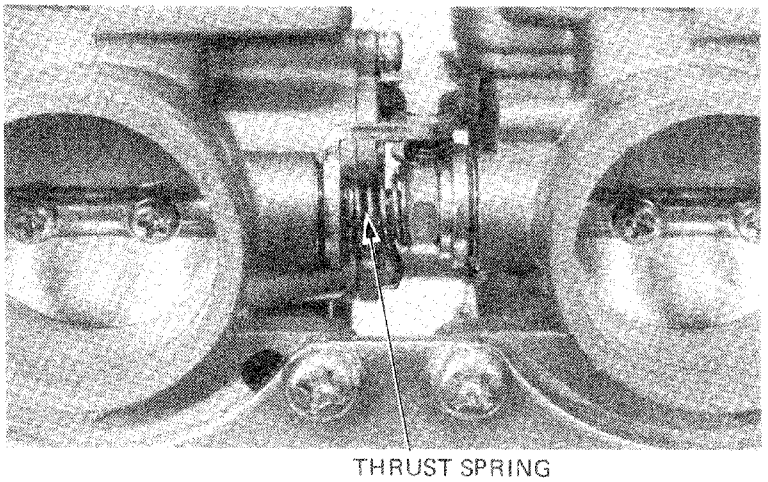
Install the rear bracket using the same procedure as for the front bracket.

TORQUE: 2.8–4.2 N·m (0.28–0.42 kg-m, 2–3 ft-lb)

Install the throttle cable holder.

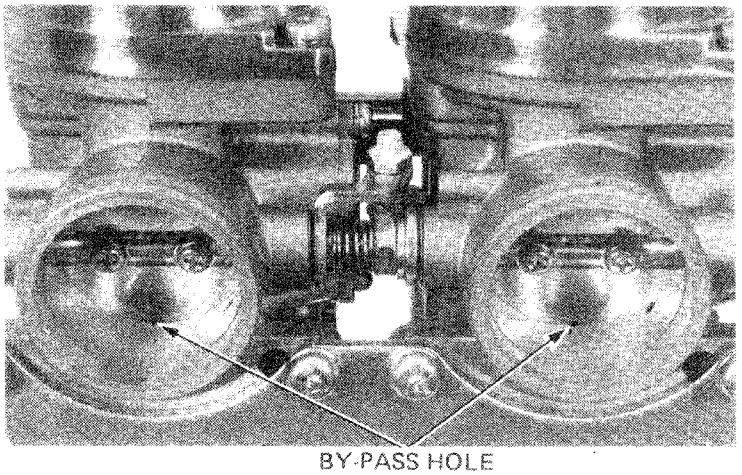


Install the thrust springs between the No. 1 and 2, and No. 3 and 4 carburetor throttle linkage.



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

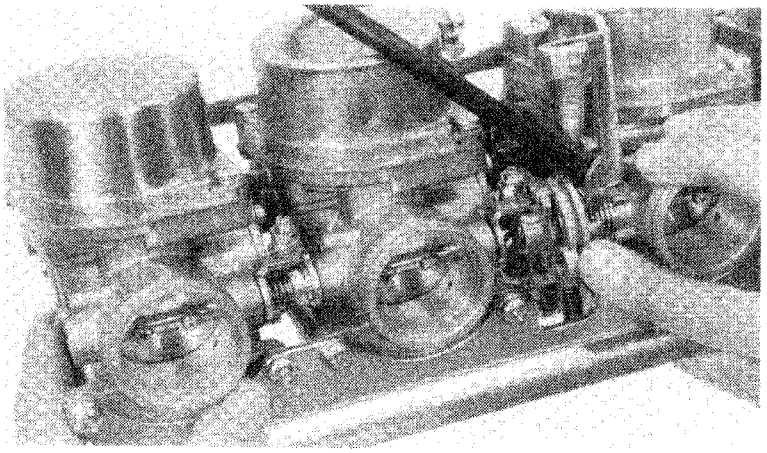
Make the distance between each by-pass hole and throttle valve equal.



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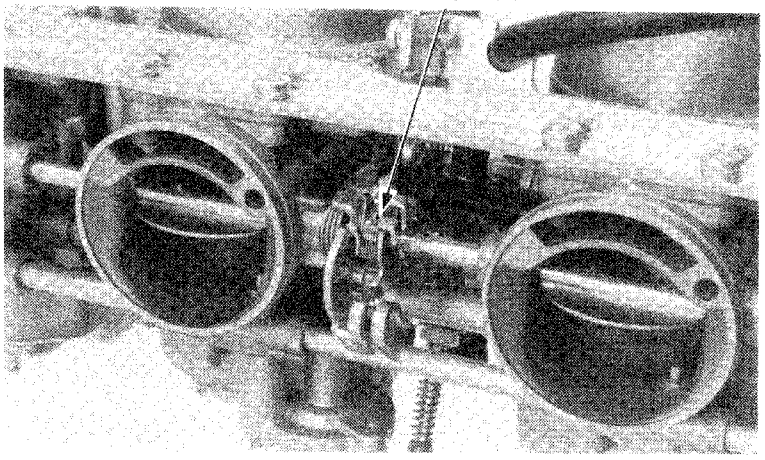
Inspect throttle operation as described below:

- 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.



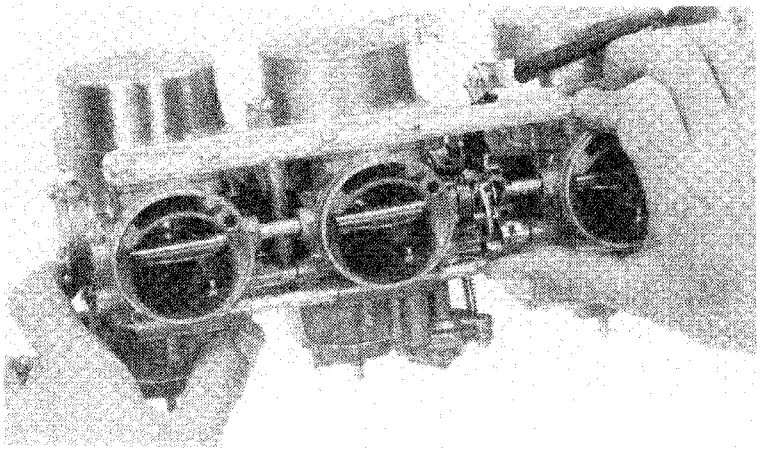
Hook the choke relief spring to the choke shaft arm of the No. 3, 4 carburetors.

Install the choke valves, but do not tighten the bolts.



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

Release the choke linkage and make sure that it returns smoothly.



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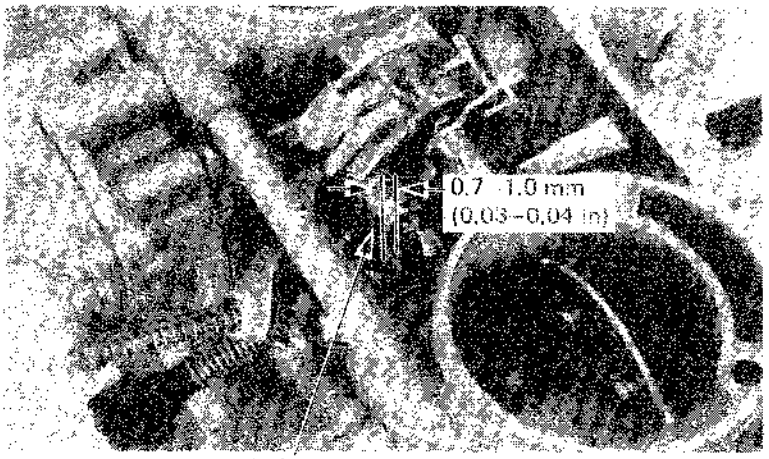
FAST IDLE ADJUSTMENT

FAST IDLE: 1,000–2,500 rpm

Close the throttle valve and open the choke valve. Measure the clearance between the throttle link and fast idle adjusting arm pin.

CLEARANCE: 0.7–1.0 mm (0.03–0.04 in)

Bend the forked end of the fast idle adjusting arm open or closed to adjust.



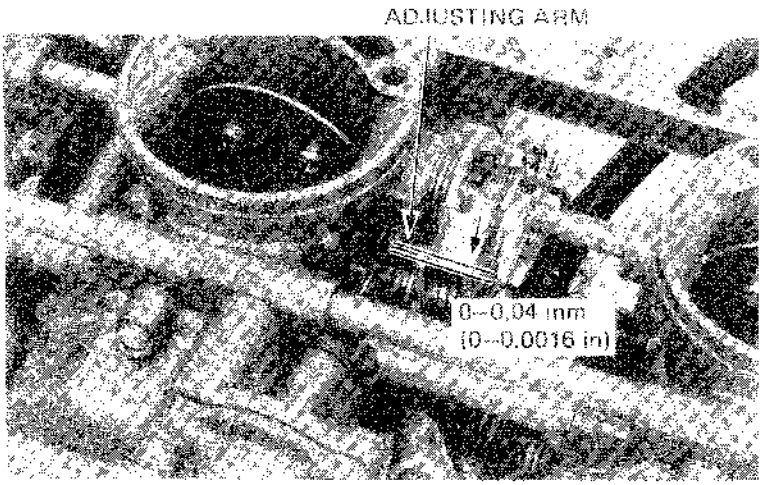
ADJUSTING ARM

ACCELERATOR PUMP ADJUSTMENT

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

CLEARANCE: 0–0.04 mm (0–0.0016 in)

Adjust by bending the adjusting arm.



CARBURETOR INSTALLATION

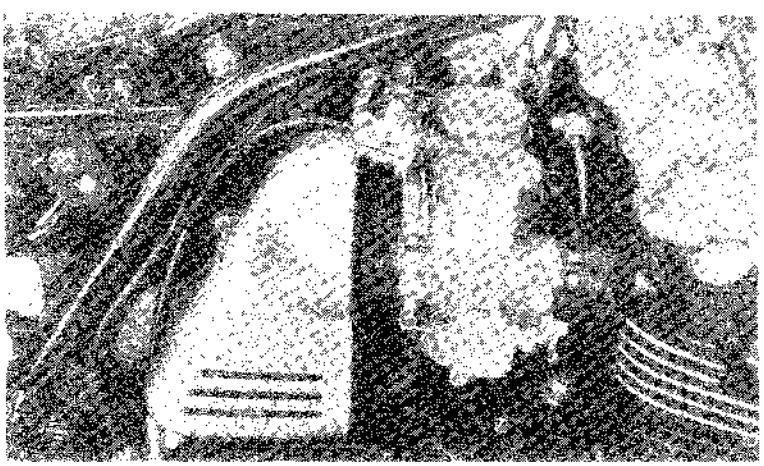
The installation sequence is essentially the reverse of removal.

NOTE

Route the throttle and choke cables properly (Page 1-9 to 1-10).

Perform the following inspections and adjustments.

- Throttle operation (Page 3-4)
- Carburetor choke (Page 3-6).
- Carburetor idle speed (Page 3-12).



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 (See page 4-5).
- 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: 2-1/2 turns out

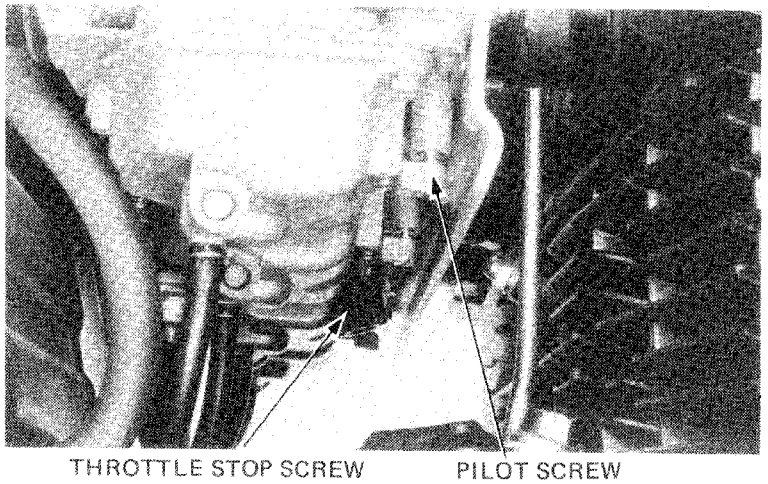
CAUTION

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

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

   IDLE SPEED: 1,000 rpm

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 it 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, 3 and 4 carburetor pilot screws.



THROTTLE STOP SCREW PILOT SCREW

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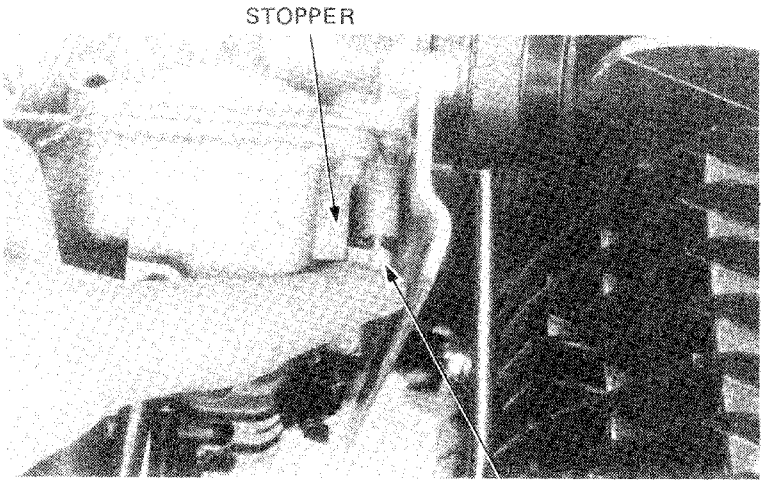
LIMITER CAP INSTALLATION

If the pilot screws are replaced, new limiter caps must be installed after pilot screw adjustment is completed.

After adjustment, cement the limiter cap over the pilot screw, using LOCTITE ® 601 or equivalent. The limiter cap should be placed against its stop, preventing further adjustment that would enrich the fuel mixture (limiter cap position permits clockwise rotation and prevents counterclockwise rotation).

NOTE

- Do not turn the pilot screws when installing the limiter caps.
- A pilot screw limiter cap must be installed. It prevents misadjustment that could cause poor performance and increase exhaust emissions.

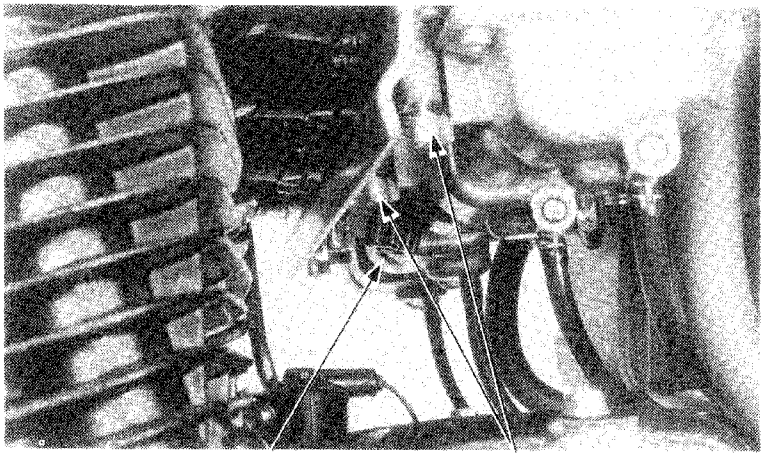


HIGH ALTITUDE ADJUSTMENT

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

Warm up the engine to operating temperature.

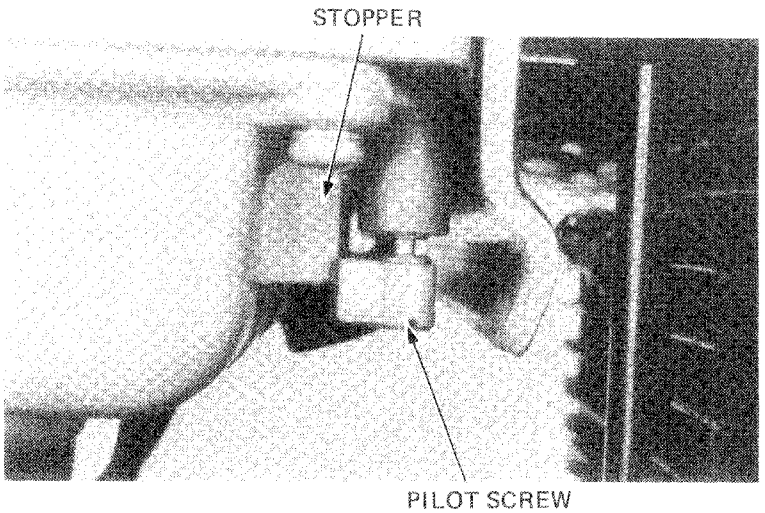
Stop-and-go driving for 10 minutes is sufficient to warm the engine.



Turn each pilot screw clockwise 1/2 turn. Adjust the idle speed to 1,000 ± 100 rpm with the throttle stop screw.

NOTE

These adjustments must be made at high altitude to ensure proper high altitude operation.



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Attach the Vehicle Emission Control Information Update label as shown. Refer to Service Letter #132.



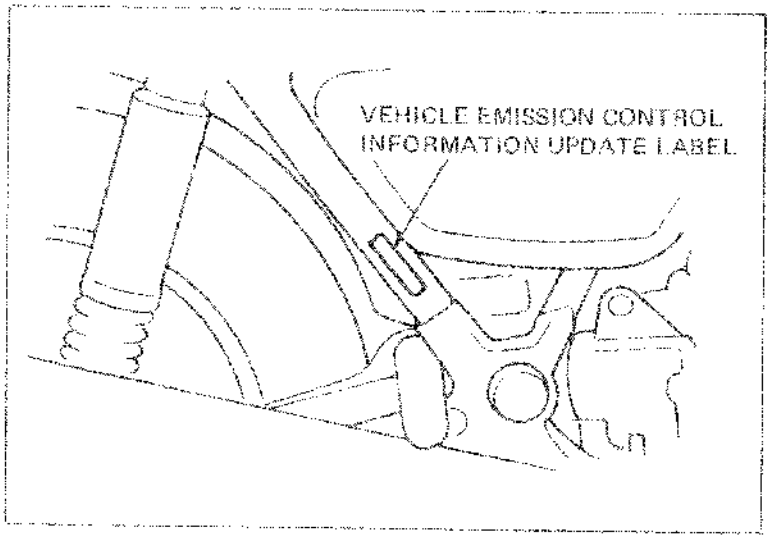
NOTE

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

WARNING

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

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



FUEL TANK

WARNING

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

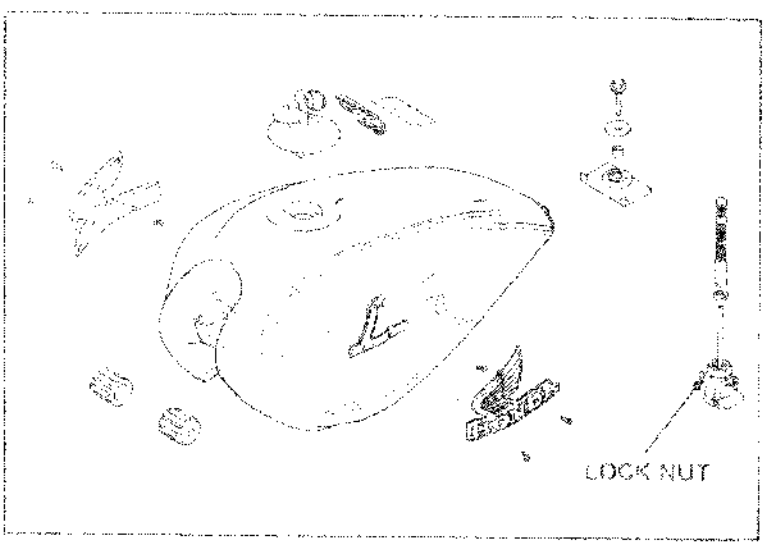
Check the vent hole of the filler cap for blockage.

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

NOTE

Do not overtighten the fuel valve lock nut.

Make sure there are no fuel leaks.



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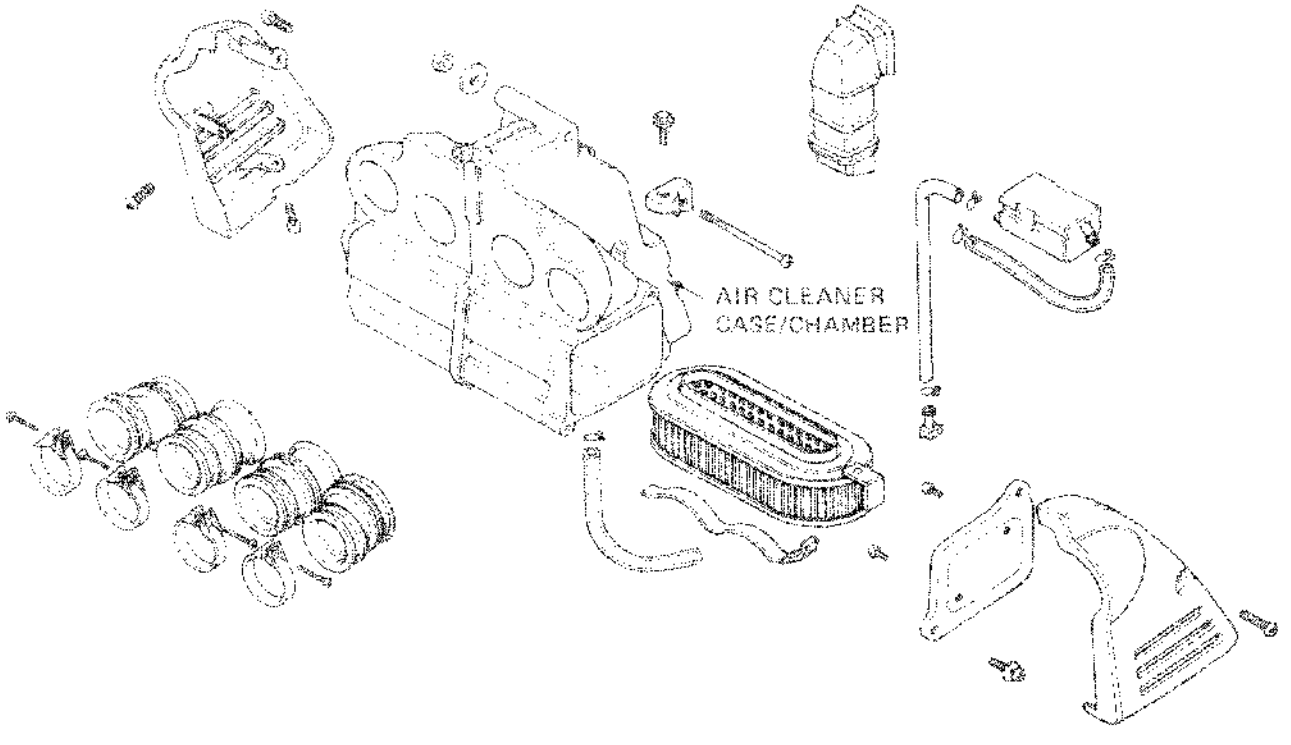
AIR CLEANER

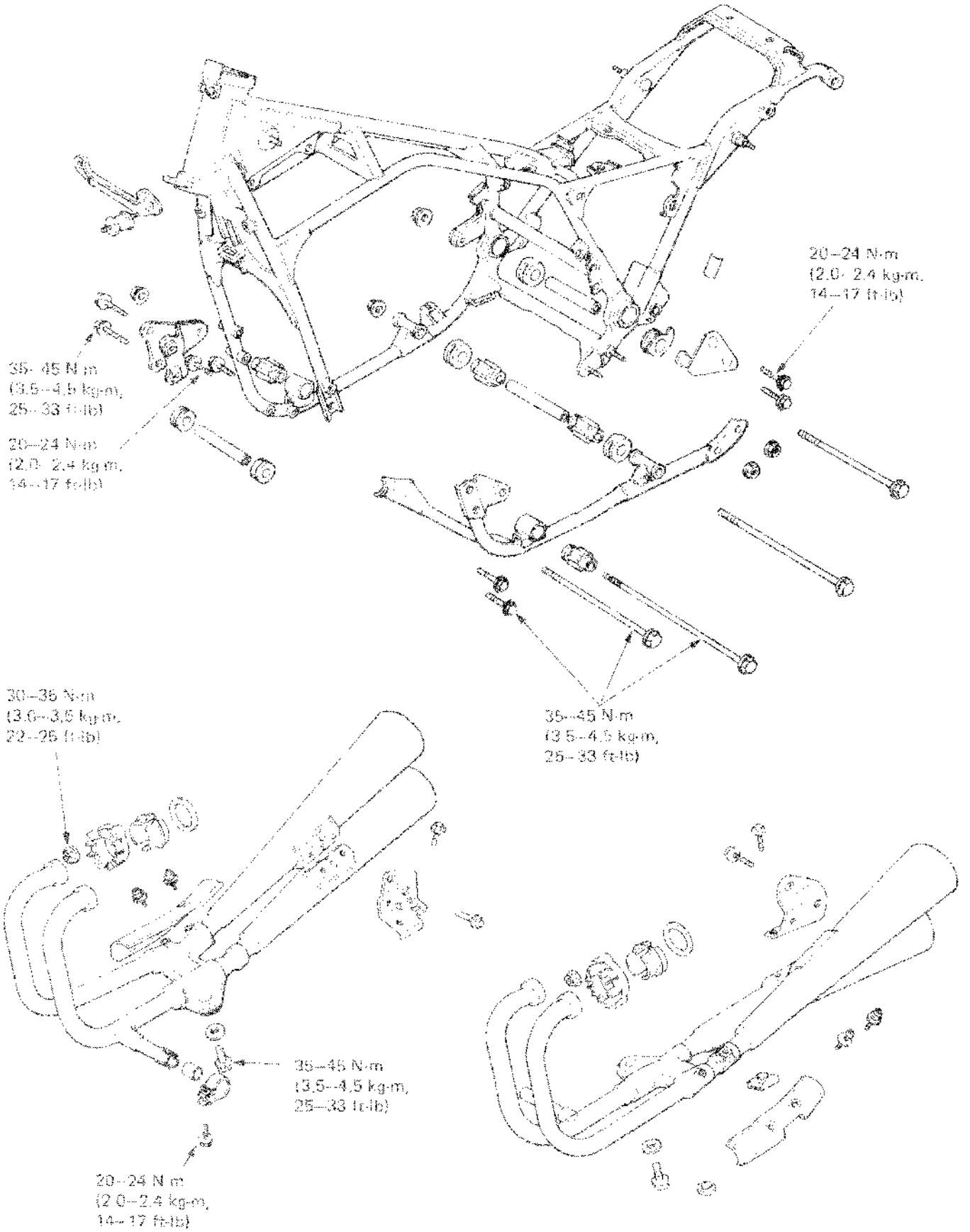
CASE/CHAMBER

Check the air cleaner case for deterioration.

CRANKCASE VENTILATION SYSTEM

Check that the breather tube is not restricted.





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5. ENGINE REMOVAL/INSTALLATION

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

SERVICE INFORMATION

GENERAL

- The following parts or components can be serviced with the engine installed in the frame:
  - Clutch
  - Gear shift linkage
  - Camshaft
  - Alternator
  - Starter motor
  - Carburetor

SPECIFICATIONS

Engine dry weight	108 kg (234 lb)
Oil capacity	4.5 liter (4.7 US qt) at engine assembly
	3.5 liter (3.7 US qt) at change

TORQUE VALUES

Engine hanger bolts		
8 mm bolt	20–24 N·m (2.0–2.4 kg·m, 14–17 ft·lb)	
10 mm bolt	35–45 N·m (3.5–4.5 kg·m, 25–33 ft·lb)	
Rear axle nut	80–100 N·m (8.0–10.0 kg·m, 58–72 ft·lb)	
Final gear case nuts	35–45 N·m (3.5–4.5 kg·m, 25–33 ft·lb)	Apply oil to threads.
Exhaust pipe joint nuts	30–35 N·m (3.0–3.5 kg·m, 22–25 ft·lb)	Tightening sequence, see page 5-7
Muffler hanger setting bolts	35–45 N·m (3.5–4.5 kg·m, 25–33 ft·lb)	
Exhaust pipe mounting under bolts	35–45 N·m (3.5–4.5 kg·m, 25–33 ft·lb)	
Exhaust pipe joint band bolts	20–24 N·m (2.0–2.4 kg·m, 14–17 ft·lb)	

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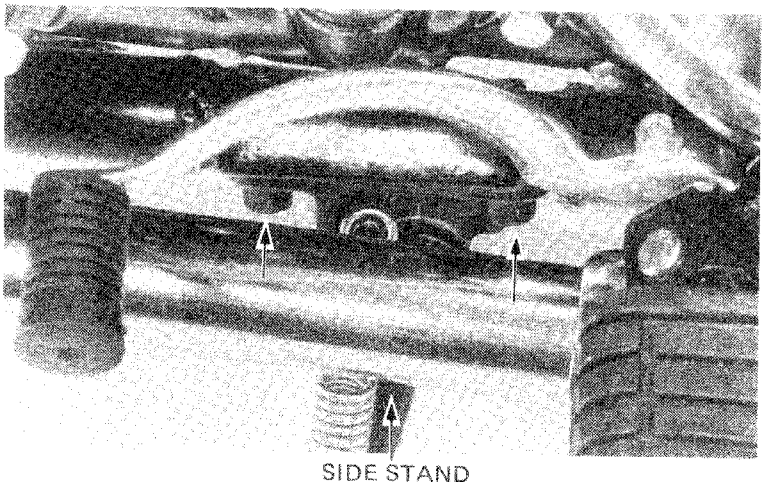
ENGINE REMOVAL

Place the motorcycle on its center stand and drain the engine oil (page 2-3).

Remove the seat and fuel tank.

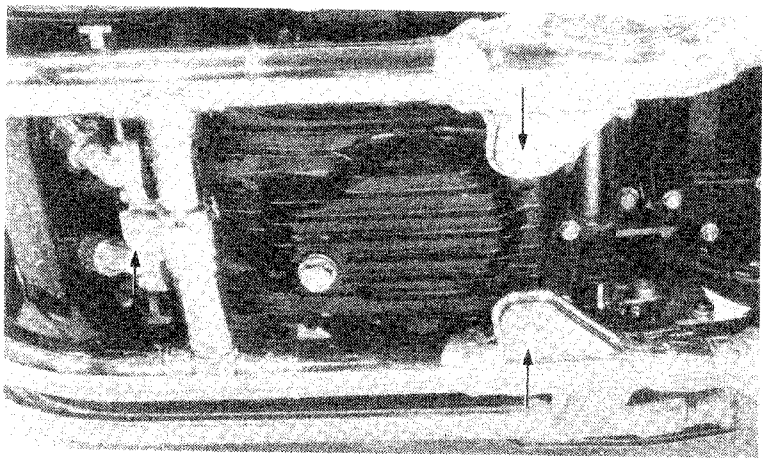
Remove the left and right frame side covers.

Remove the side stand.

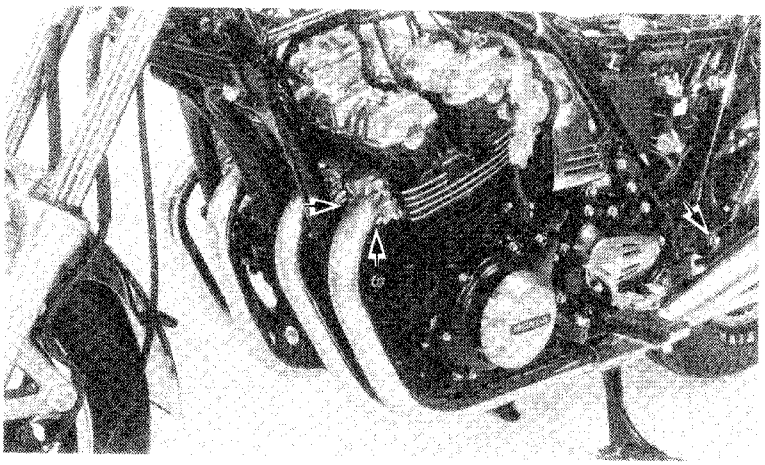


SIDE STAND

Remove the exhaust pipe center mounting bolts.
Loosen the exhaust pipe joint clamp bolt.



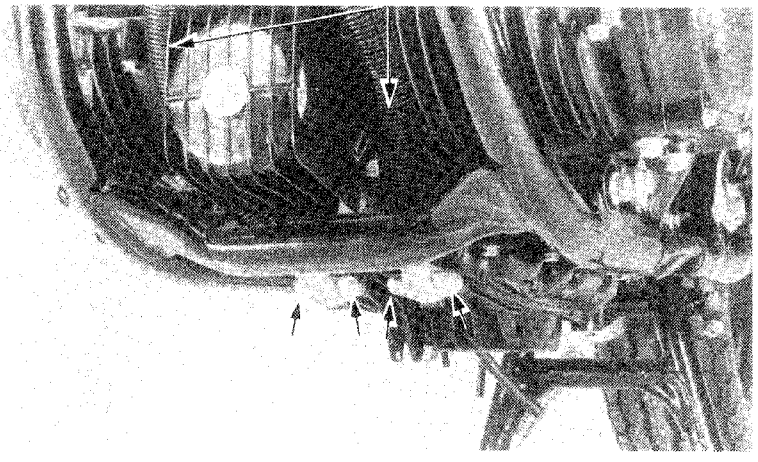
Remove the exhaust pipes.



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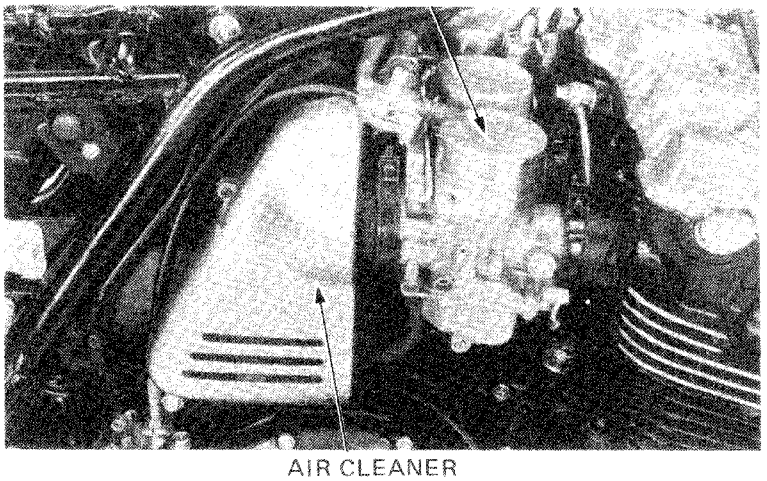
Disconnect the oil cooler hoses from the engine.

OIL COOLER HOSES



Remove the air cleaner and carburetor.

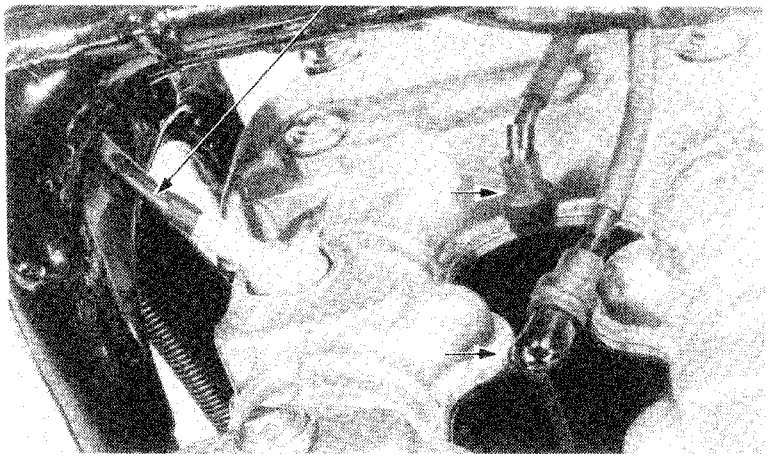
CARBURETOR



AIR CLEANER

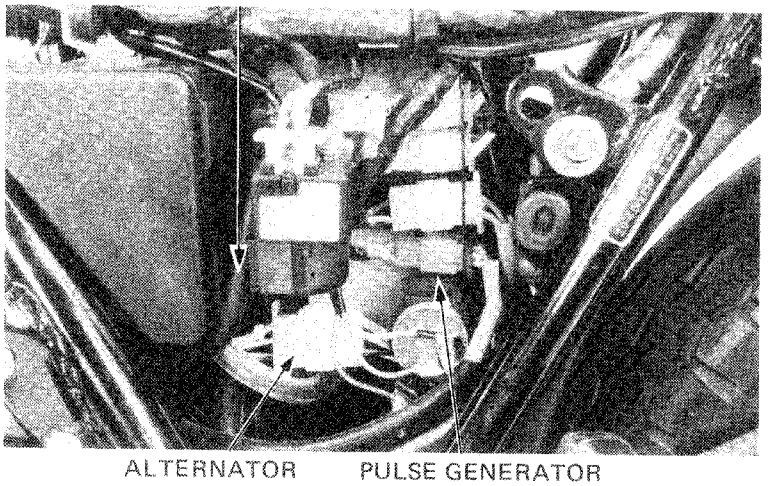
Disconnect the tachometer cable and spark plug caps.

TACHOMETER CABLE

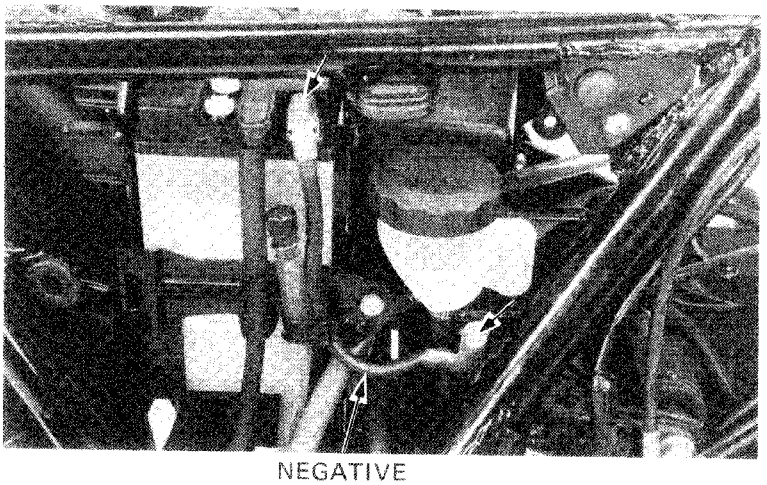


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Disconnect the starter motor cable, alternator and pulse generator couplers.

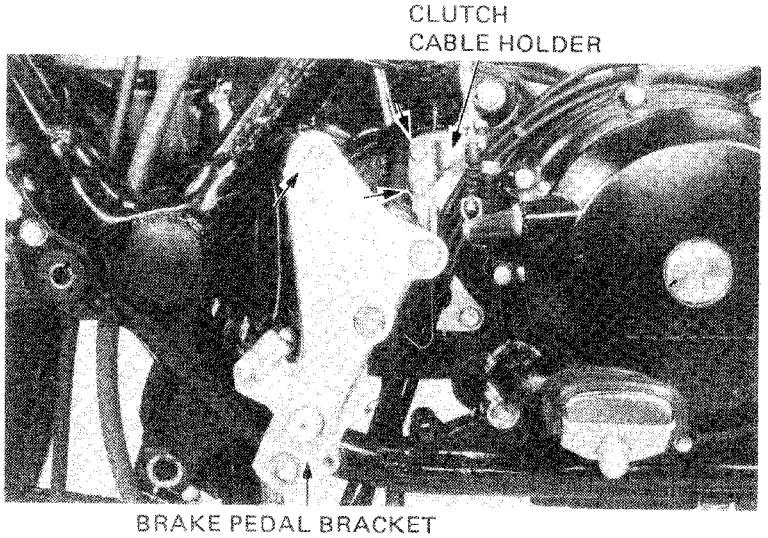


Disconnect the battery negative cable.



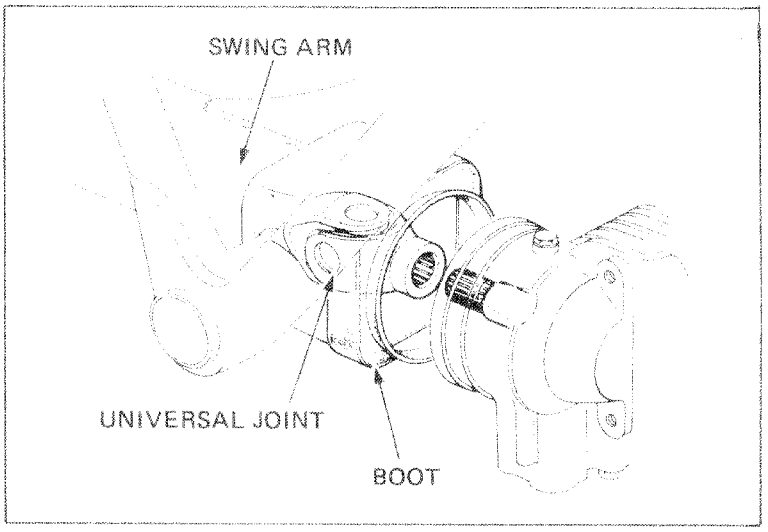
Remove the brake pedal, brake pedal bracket lower mounting bolt and loosen the upper bolt.

Disconnect the clutch cable and remove the clutch cable holder.

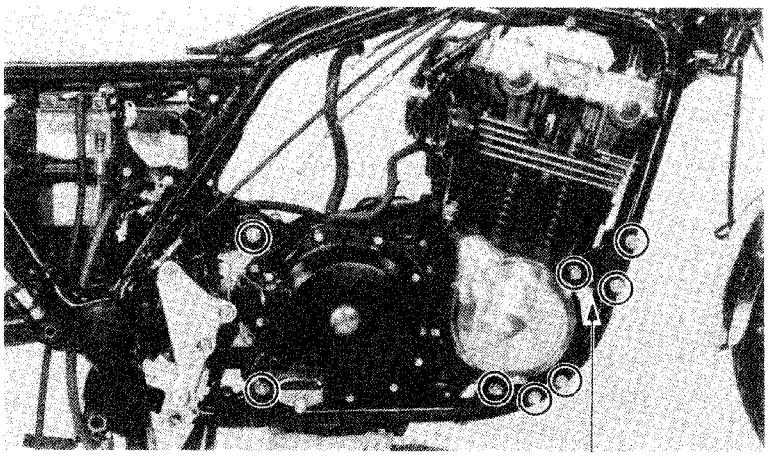


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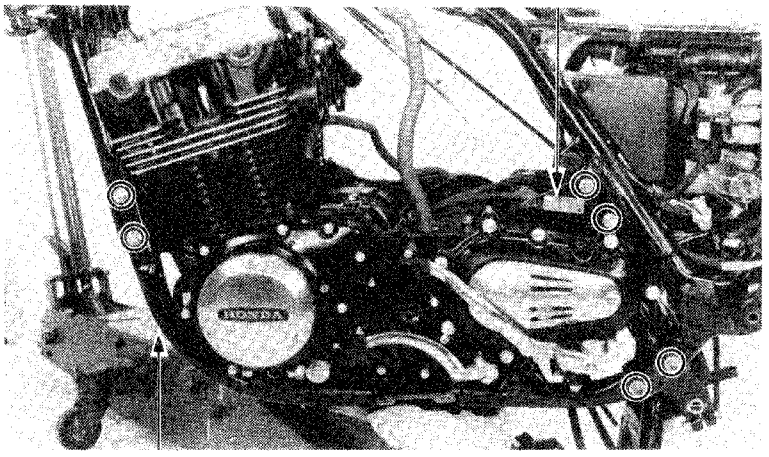
Remove the rear wheel (page 15-2).
Remove the final drive gear.
Pull the swing arm boot back and disengage the drive shaft from the engine.



Use a jack to support the engine.
Remove the engine mounting bolts and right engine hanger bracket.



Remove the rear engine hanger bracket.
Remove the left side sub-frame.
Remove the engine from the left side.

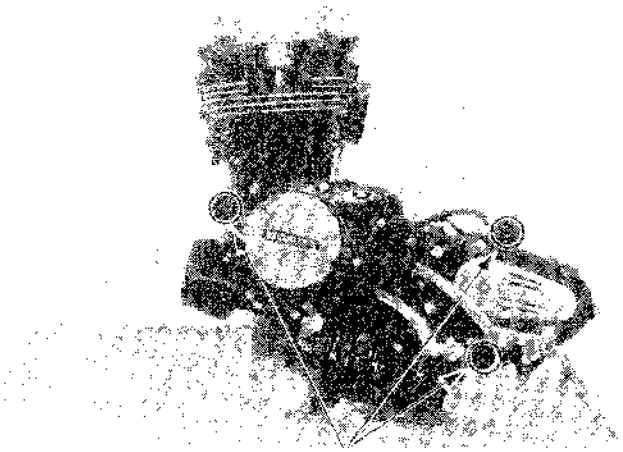


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ENGINE INSTALLATION

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

Install the engine mount rubbers.

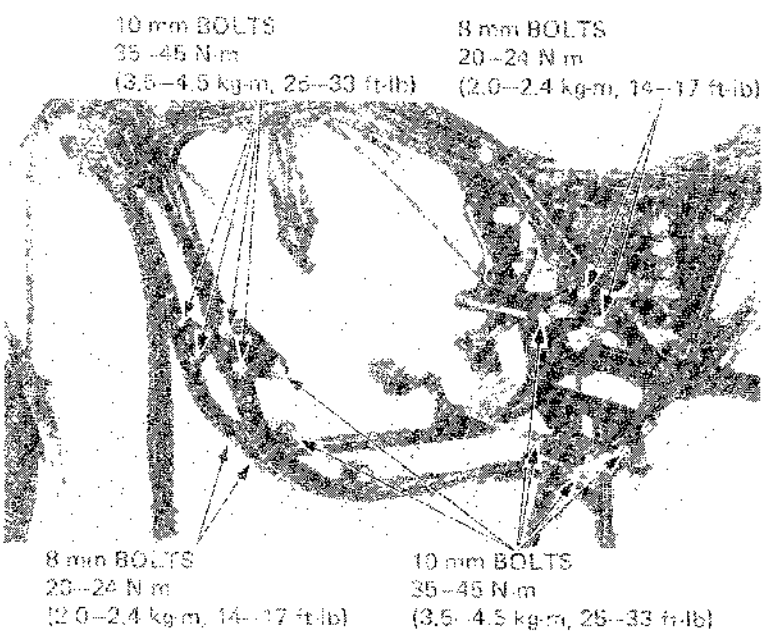


MOUNT RUBBERS

Install the engine in the reverse order of removal.

NOTE

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

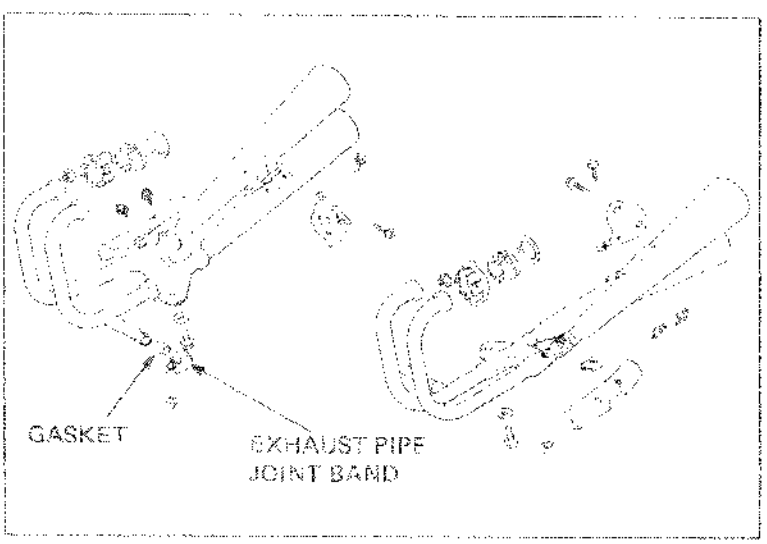


EXHAUST PIPE INSTALLATION

Install a new exhaust pipe joint gasket.

Assemble the left and right exhaust pipes.

Tighten the exhaust pipe band loosely.



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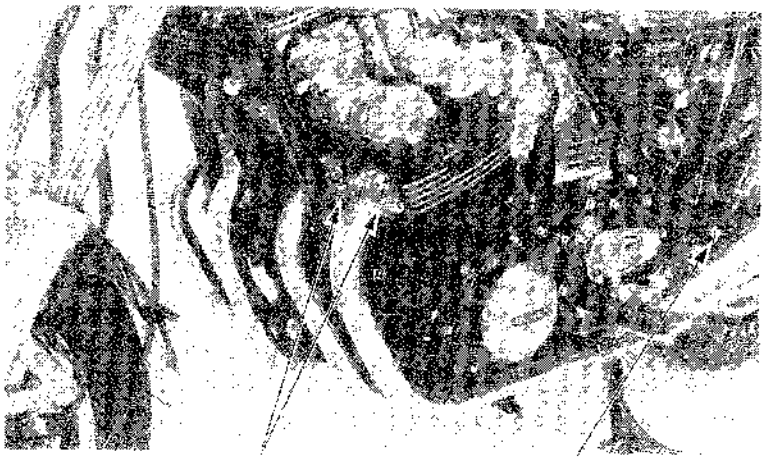
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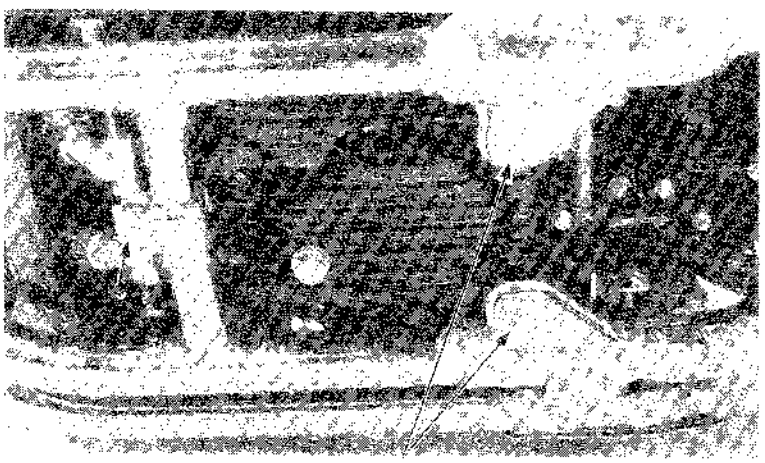
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Install the exhaust pipes.

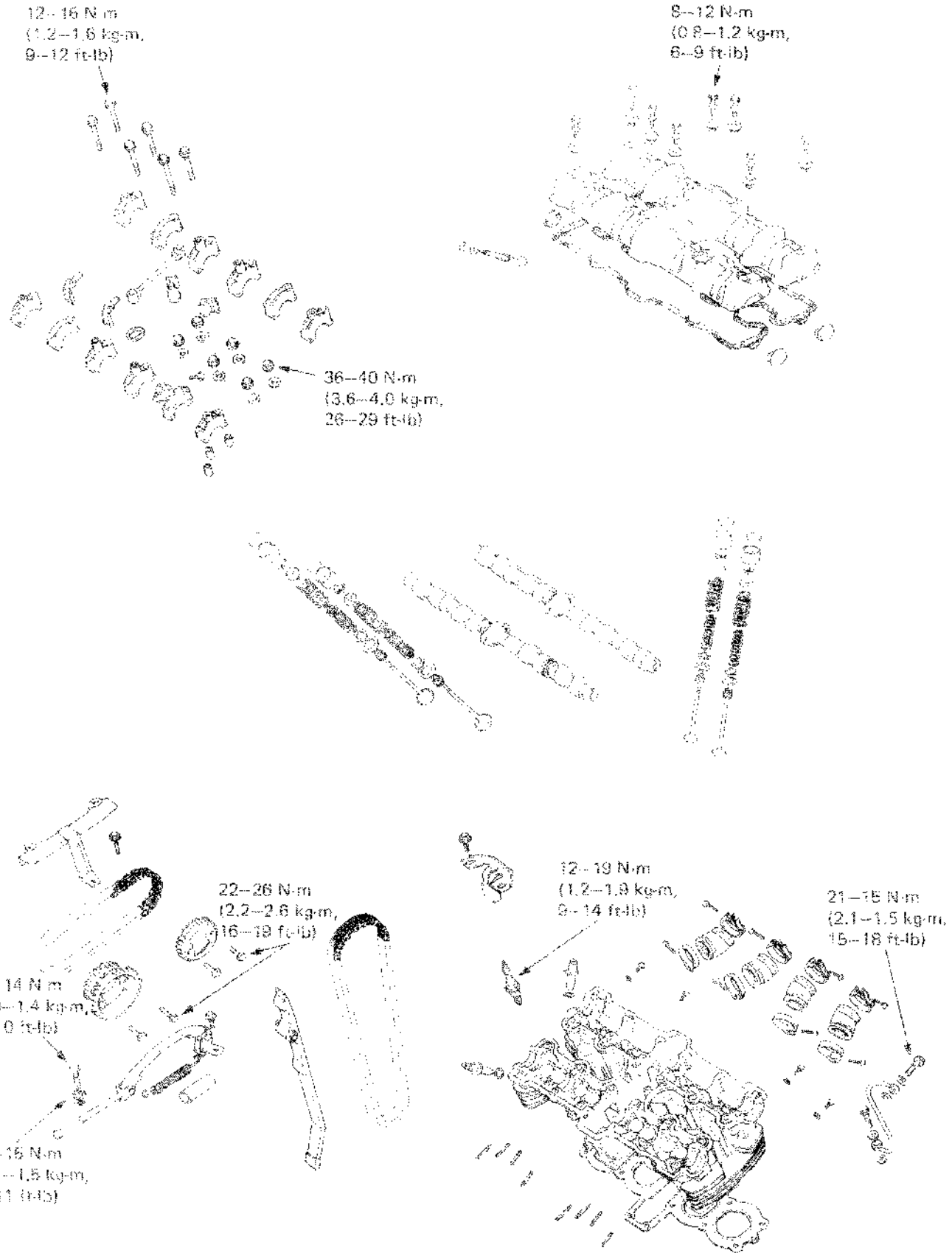
Loosely install all bolts and nuts, then tighten them in the following order:

1. Exhaust pipe joint nuts.
   TORQUE: 30 - 35 N·m
   (3.0–3.5 kg·m, 22–25 ft·lb)
2. Exhaust pipe mounting under bolts.
   TORQUE: 35–45 N·m
   (3.5–4.5 kg·m, 25–33 ft·lb)
3. Rear muffler hanger setting bolts.
   TORQUE: 35–45 N·m
   (3.5–4.6 kg·m, 25–33 ft·lb)
4. Exhaust pipe joint band bolt.
   TORQUE: 20–24 N·m
   (2.0–2.4 kg·m, 14–17 ft·lb)





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6. CYLINDER HEAD/VALVE

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

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Compression pressure			12 ± 2 kg/cm² (171 ± 28 psi)	—
Camshaft	Cam height	IN.	37.420–37.580 mm (1.4732–1.4795 in)	37.3 mm (1.47 in)
		EX.	37.920–38.080 mm (1.4929–1.4992 in)	37.8 mm (1.49 in)
	Oil clearance	A and F	0.040–0.082 mm (0.0016–0.0032 in)	0.13 mm (0.005 in)
		Tachometer gear holder and G	0.062–0.109 mm (0.0024–0.0043 in)	0.16 mm (0.006 in)
		B and H	0.085–0.139 mm (0.0033–0.0055 in)	0.19 mm (0.008 in)
		C and J	0.085–0.139 mm (0.0033–0.0055 in)	0.19 mm (0.008 in)
		D and K	0.062–0.109 mm (0.0024–0.0043 in)	0.16 mm (0.006 in)
		E and L	0.040–0.082 mm (0.0016–0.0032 in)	0.13 mm (0.005 in)
	Run out		—	0.1 mm (0.004 in)
	Side clearance		0.05–0.25 mm (0.002–0.0098 in)	0.4 mm (0.02 in)
Valve lifter	Valve lifter O.D.		27.972–27.993 mm (1.1013–1.1021 in)	27.96 mm (1.101 in)
	Valve lifter bore I.D		28.010–28.026 mm (1.1028–1.1034 in)	28.04 mm (1.104 in)
	Lifter to cylinder head clearance		—	0.07 mm (0.003 in)
Valve spring	Free length	IN. Outer	43.9 mm (1.73 in)	42.5 mm (1.67 in)
		IN. Inner	40.7 mm (1.60 in)	39.8 mm (1.57 in)
		EX. Outer	43.9 mm (1.73 in)	42.5 mm (1.67 in)
		EX. Inner	40.7 mm (1.60 in)	39.8 mm (1.57 in)
	Preload/length	IN. Outer	12.6–14.6 kg/37.5 mm (27.78–32.19 lbs/1.48 in)	12.0 kg/37.5 mm (26.46 lbs/1.48 in)
		IN. Inner	6.39–7.81 kg/34.5 mm (14.087–17.218 lbs/1.36 in)	6.0 kg/34.5 mm (13.23 lbs/1.36 in)
		EX. Outer	12.6–14.6 kg/37.5 mm (27.78–32.19 lbs/1.48 in)	12.0 kg/37.5 mm (26.46 lbs/1.48 in)
		EX. Inner	6.39–7.81 kg/34.5 mm (14.087–17.318 lbs/1.36 in)	6.0 kg/34.5 mm (13.23 lbs/2.36 in)

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			STANDARD	SERVICE LIMIT
Valve guide and valve	Valve stem O.D	IN.	5.475–5.490 mm (0.2156–0.2161 in)	5.47 mm (0.215 in)
		EX.	5.455–5.470 mm (0.2148–0.2154 in)	5.45 mm (0.214 in)
	Valve guide I.D.	IN.	5.500–5.515 mm (0.2165–0.2171 in)	5.54 mm (0.218 in)
		EX.	5.500–5.515 mm (0.2165–0.2171 in)	5.54 mm (0.218 in)
	Stem-to-guide clearance	IN.	0.010–0.040 mm (0.0004–0.0016 in)	0.07 mm (0.003 in)
		EX.	0.030–0.060 mm (0.0012–0.0024 in)	0.09 mm (0.004 in)
	Valve seat width		1.0 mm (0.004 in)	1.5 mm (0.06 in)
Cylinder head	Warpage		–	0.10 mm (0.004 in)
Cam chain	Length		175.70–175.92 mm (6.917–6.926 in)	177.3 mm (6.98 in)

TORQUE VALUES

Cam chain tensioner bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Cam chain tensioner lock nut	11–15 N·m (1.1–1.5 kg-m, 8–11 ft-lb)
Cylinder head cover bolts	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Camshaft holder bolts	12–16 N·m (1.2–1.6 kg-m, 9–12 ft-lb)
Cylinder head bolts	36–40 N·m (3.6–4.0 kg-m, 26–29 ft-lb)
Cam sprocket bolts	22–26 N·m (2.2–2.6 kg-m, 16–19 ft-lb)
Spark plugs	12–19 N·m (1.2–1.9 kg-m, 9–14 ft-lb)
Oil pipe line bolts	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)

TOOLS

Special

Valve guide reamer	07984–2000000
Valve lifter hole protector	07999–4220000

Common

Valve guide remover, 5.5 mm	07742–0010100 — or 07942–3290100
Valve guide driver	07742–0020200 — or 07942–3290100
Valve spring compressor	07757–0010000

TROUBLESHOOTING

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

Low Compression or Uneven compression

1. Valves
   - Incorrect valve adjustment.
   - Burned or bent valves.
   - Incorrect valve timing.
   - Broken valve spring.
2. Cylinder head
   - Leaking or damaged head gasket.
   - Warped or cracked cylinder head.
3. Cylinder and piston (Refer to Section 7).

Compression too High

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

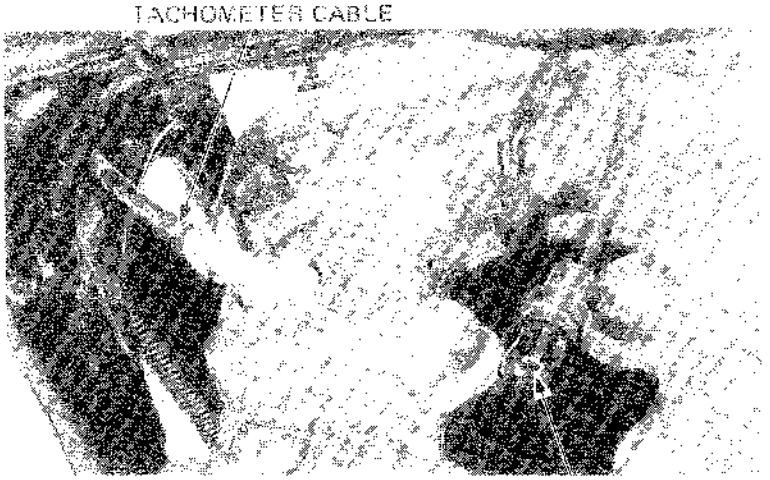
Excessive Noise

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

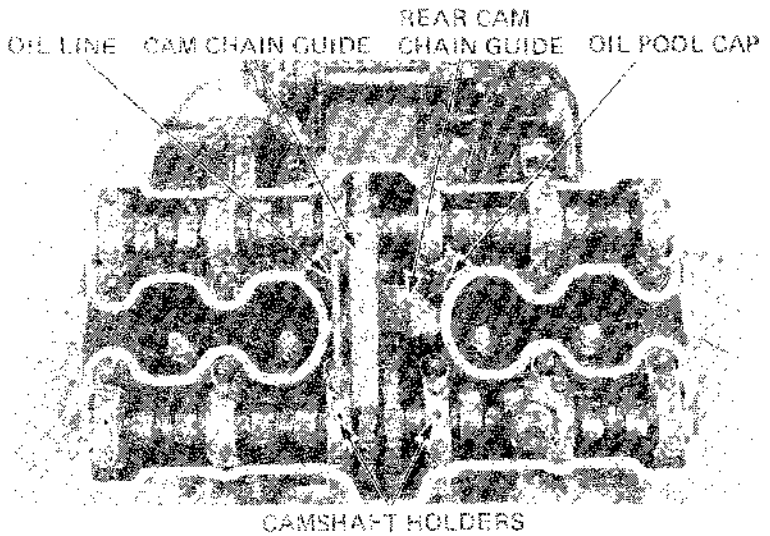
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CAMSHAFT REMOVAL

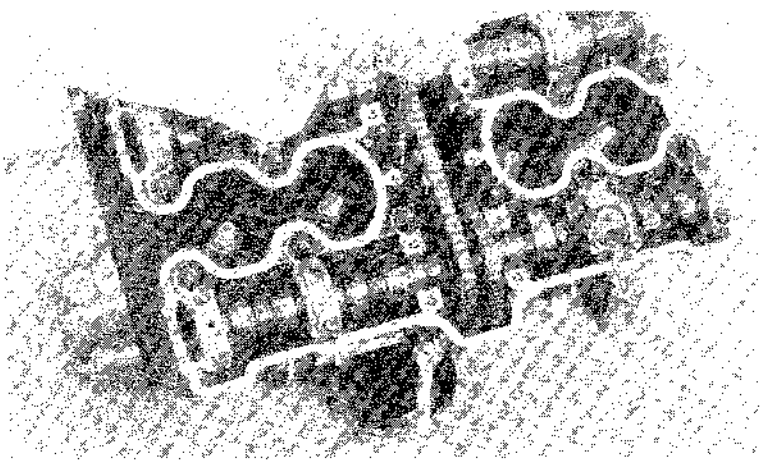
Place the motorcycle on its center stand.
Remove the seat and the fuel lines and fuel tank.
Disconnect the tachometer cable, and remove the spark plug caps.



Remove the cylinder head cover bolts and the cylinder head cover.
Remove the oil line and cam chain guide.
Remove the B, C, H and J camshaft holders.
Remove the oil pool caps and rear cam chain guide attaching plate.
Remove the dowel pins.

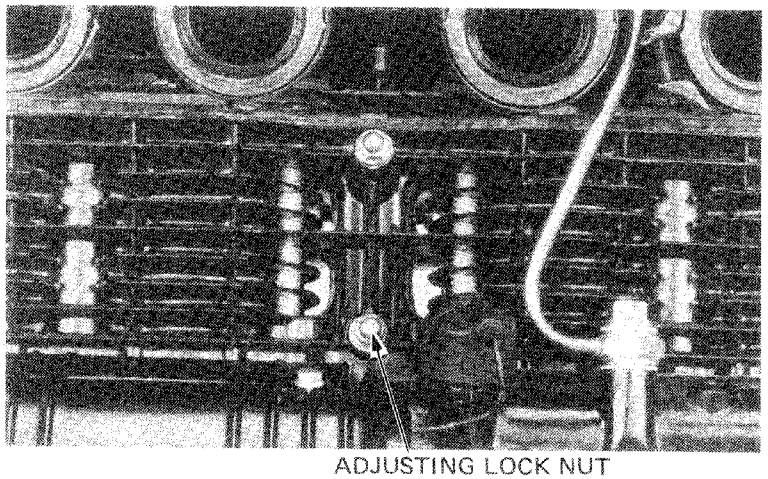


Loosen the front cam chain tensioner lock nut and bolt.
Press the cam chain tensioner down to reduce chain tension.
Tighten the lock bolt and nut.

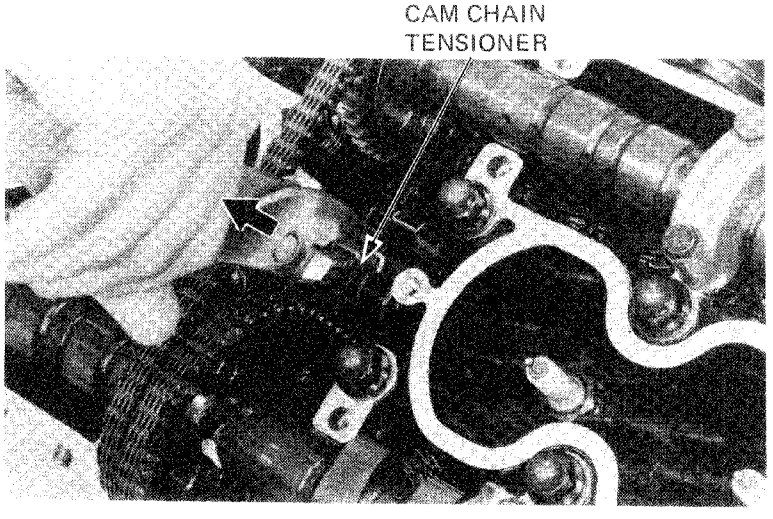


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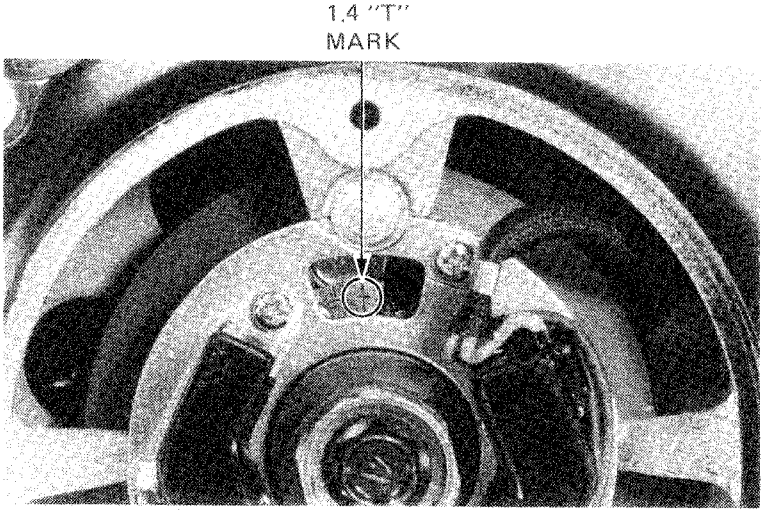
Loosen the lower rear chain tensioner adjusting lock nut.



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



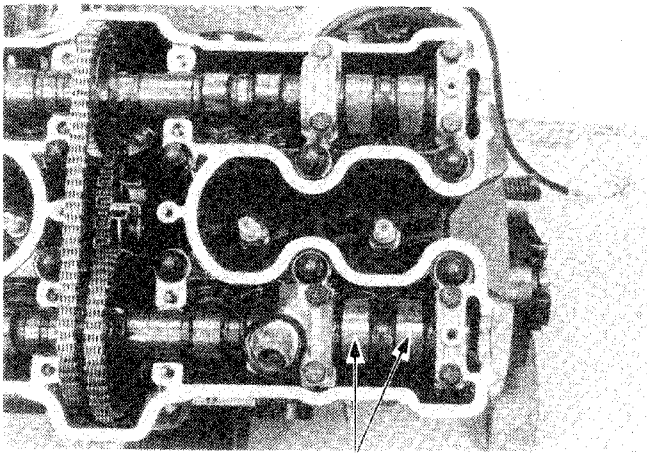
Remove the pulse generator cover.
Turn the crankshaft counterclockwise until the 1.4 "T" mark aligns with the index mark.



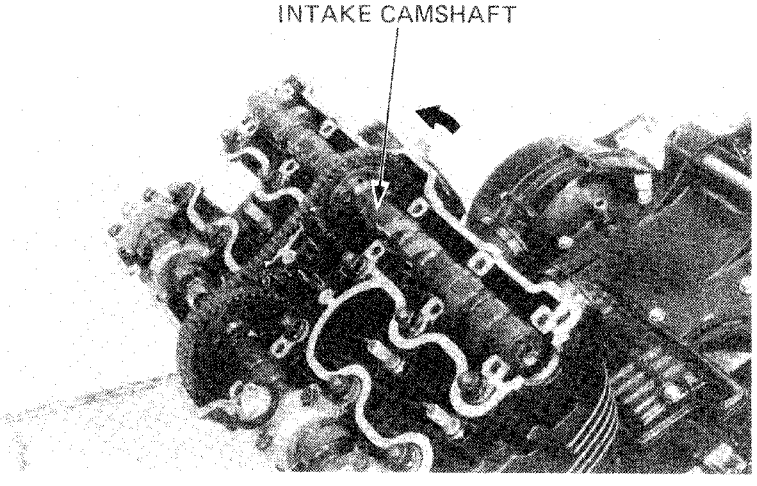
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Make sure the No. 1 or 4 cylinder intake and exhaust cam lobes face the spark plug.

Remove the G and K camshaft holders.
Remove the F and L holders.
Remove the dowel pins.


NO. 1 CAM LOBES

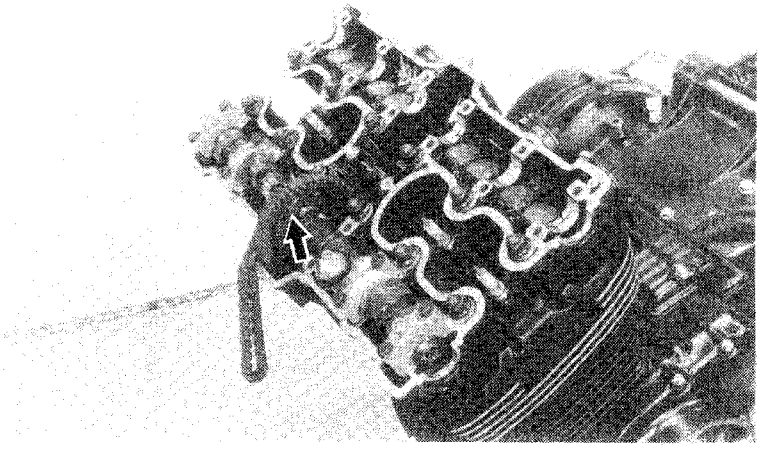
Remove the intake camshaft.



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

Remove the D and tachometer gear camshaft holders.
Remove the A and E holders.

Remove the exhaust camshaft.
Remove the dowel pins.



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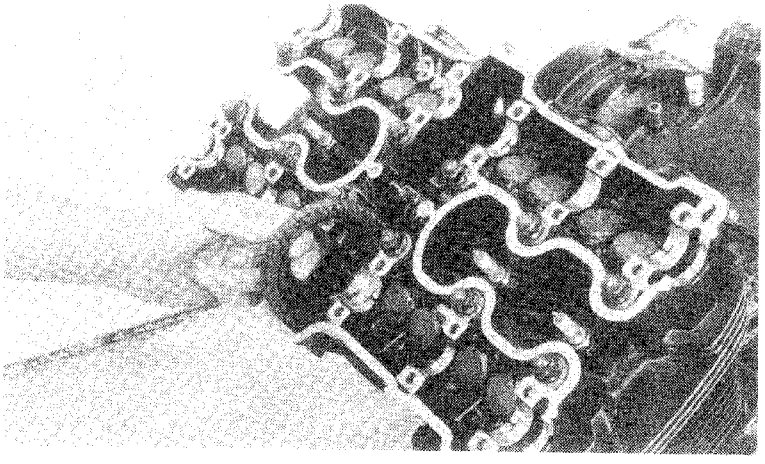
NOTE

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

Remove the camshaft sprocket and exhaust camshaft drive chain.

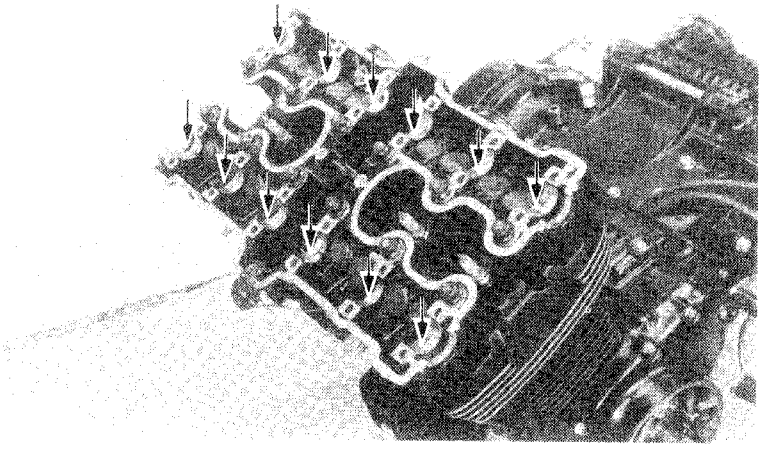
NOTE

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



CAM BEARING SURFACE INSPECTION

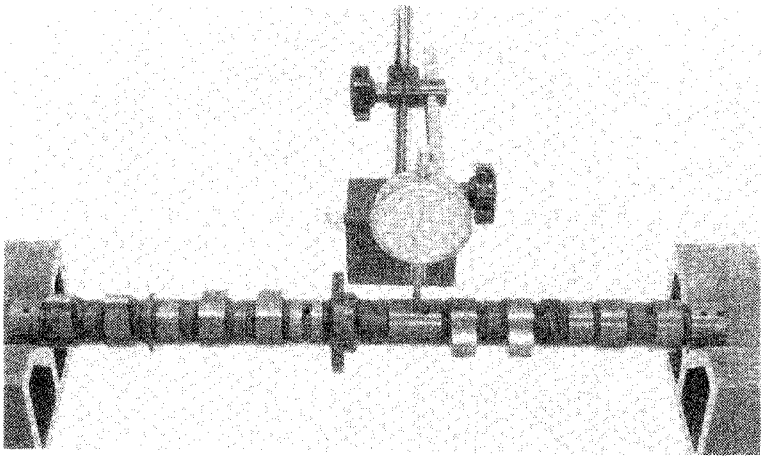
Inspect the cam bearing surfaces for scoring, scratches, or evidence of insufficient lubrication.
Inspect the bearing surface of the camshaft holders.



CAMSHAFT RUNOUT

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

SERVICE LIMIT:
0.10 mm (0.004 in)

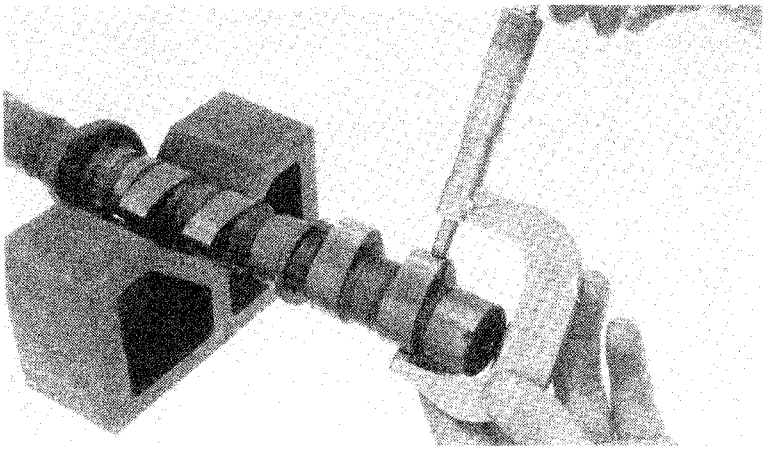


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CAM INSPECTION

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

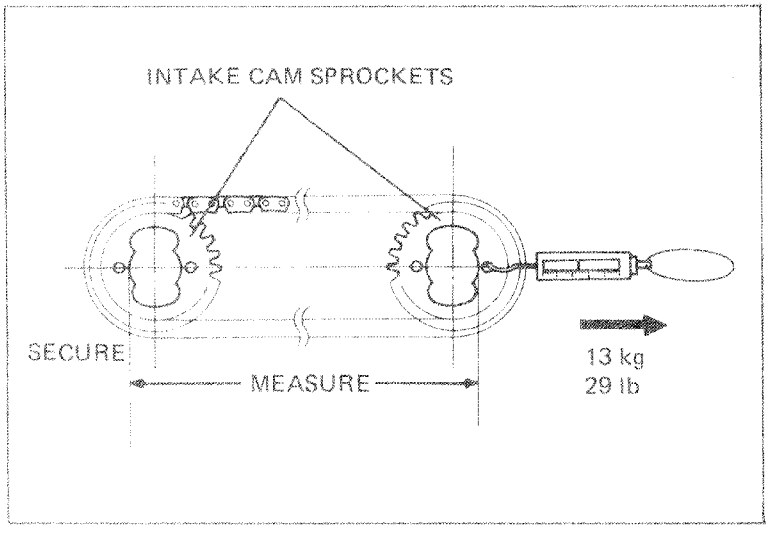
SERVICE LIMITS: IN: 37.3 mm (1.47 in)
EX: 37.8 mm (1.49 in)



CAM CHAIN LENGTH MEASUREMENT

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

SERVICE LIMIT: 177.3 mm (6.98 in)



CAM CHAIN GUIDE INSPECTION

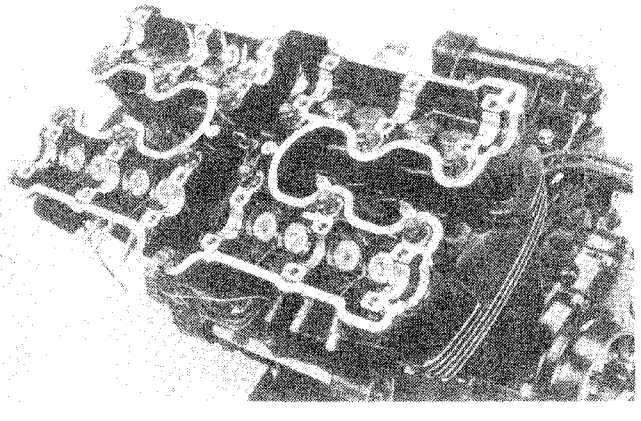
Inspect the upper cam chain guide for damage or excessive wear.

CAMSHAFT OIL CLEARANCE

Remove the adjusting shims and the valve lifters.

NOTE

Mark each part and its location to ensure correct reassembly.

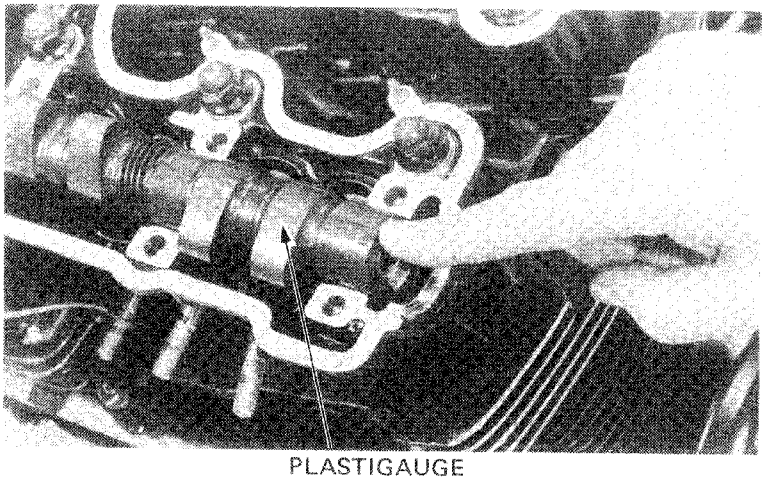


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Lay a strip of plastigauge lengthwise on top of each camshaft journal.

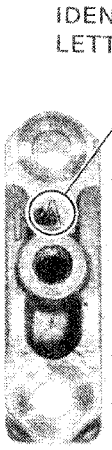
NOTE

Wipe any oil from the journals before using plastigauge.



PLASTIGAUGE

Check the camshaft holder identification letter before installing.

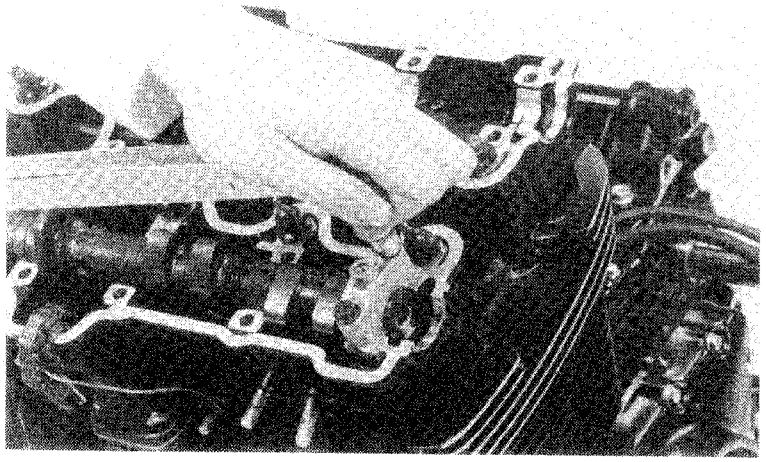


Install the camshaft holders and tighten in a criss-cross pattern.

NOTE

Do not rotate the camshaft when using plastigauge.

TORQUE: 12–16 N·m (1.2–1.6 kg-m, 9–12 ft-lb)



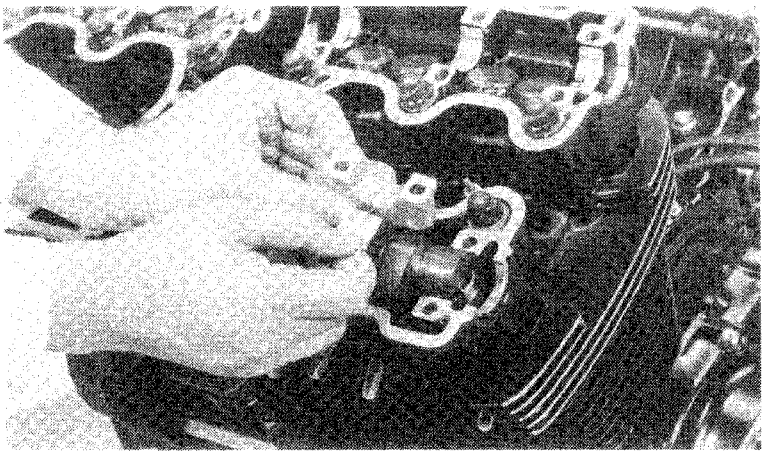
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Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

SERVICE LIMITS:

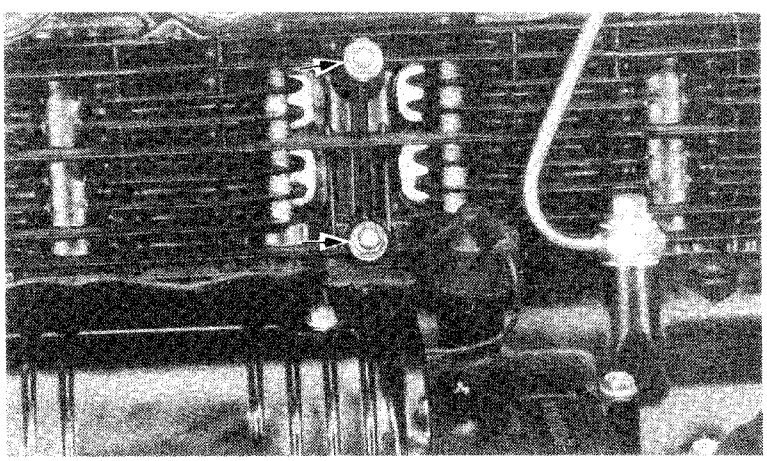
A, E, F and L:	0.13 mm (0.005 in)
Gear holder, D,G and K:	0.16 mm (0.006 in)
B, C, H and J:	0.19 mm (0.008 in)

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

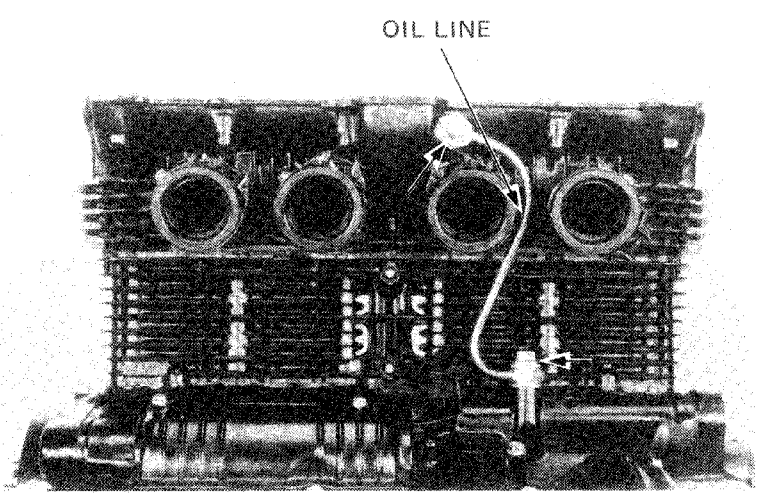


CYLINDER HEAD REMOVAL

Remove the two rear cam chain tensioner lock nuts.

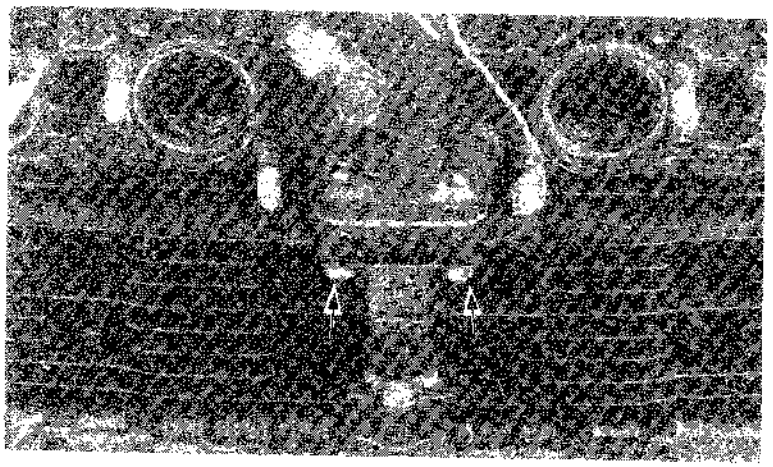


Remove the oil line.



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Remove the two bolts at the front cam chain housing.

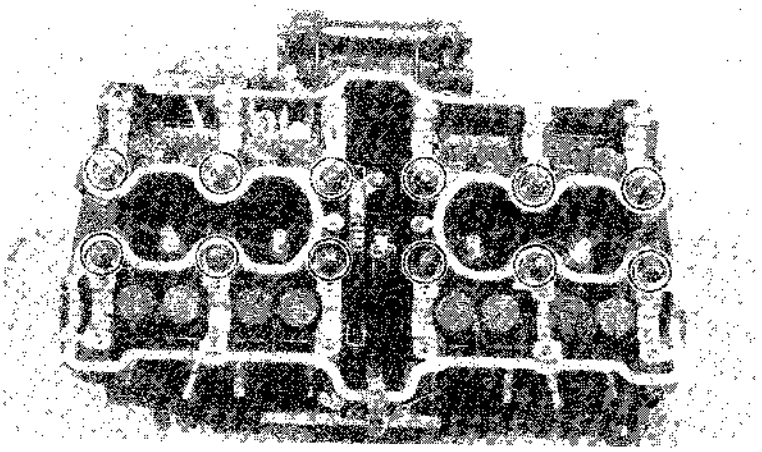


Remove the 12 cap nuts.

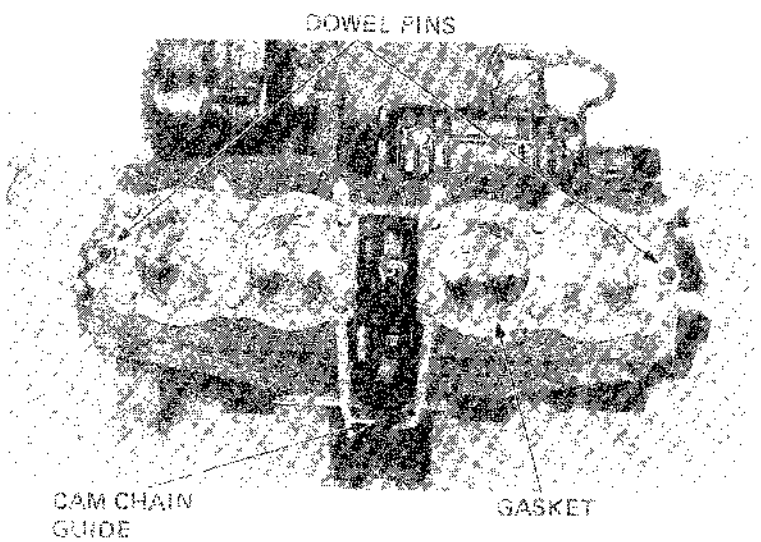
NOTE

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

Remove the cylinder head.



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



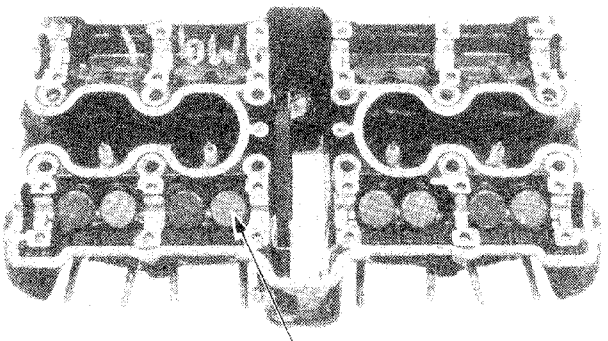
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CYLINDER HEAD DISASSEMBLY

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

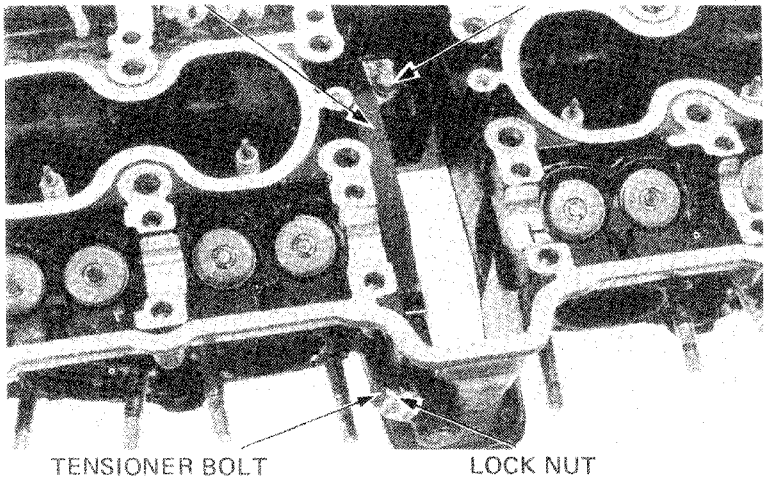
NOTE

Mark all disassembled parts to ensure correct reassembly.



SHIM AND LIFTER

Loosen the cam chain tensioner lock nut and bolts.
Remove the bolt in the cylinder head.
Pull the chain tensioner back and remove.



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

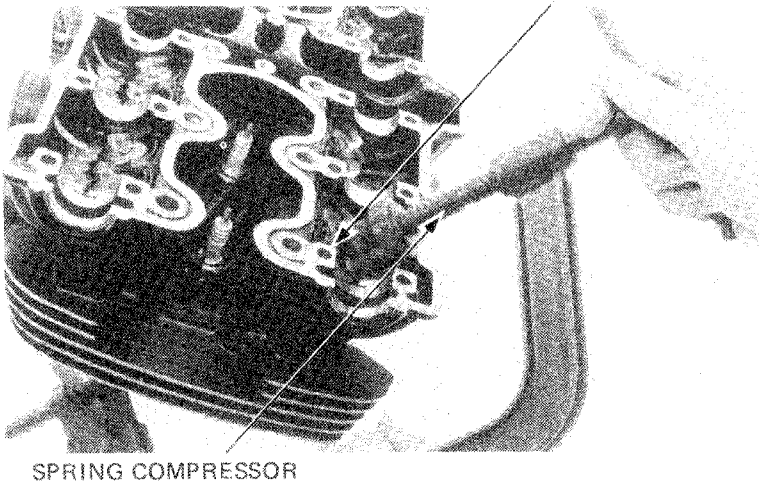
CAUTION

- *Use the Valve lifter bore protector tool to prevent bore surface damage during valve disassembly.*
- *To prevent loss of tension, do not compress the valve springs more than necessary to remove the keepers.*

NOTE

Mark all disassembled parts for their location to ensure correct reassembly.

Remove the valve stem seals.

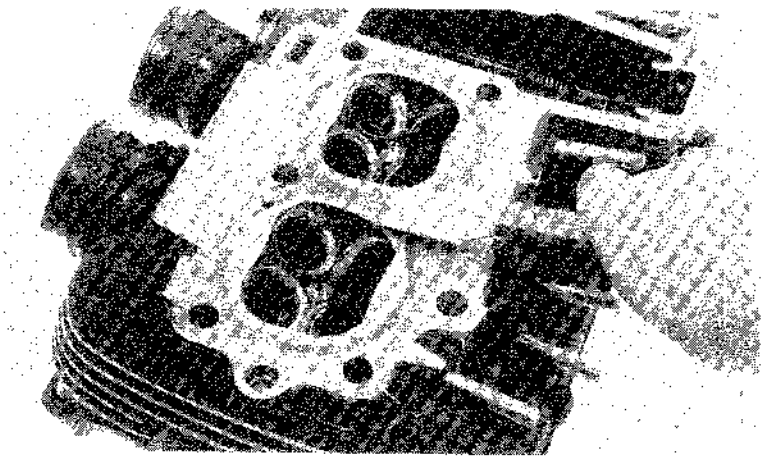


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Remove carbon deposits from the combustion chambe-.
Clean off the head gasket surfaces.

NOTE

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



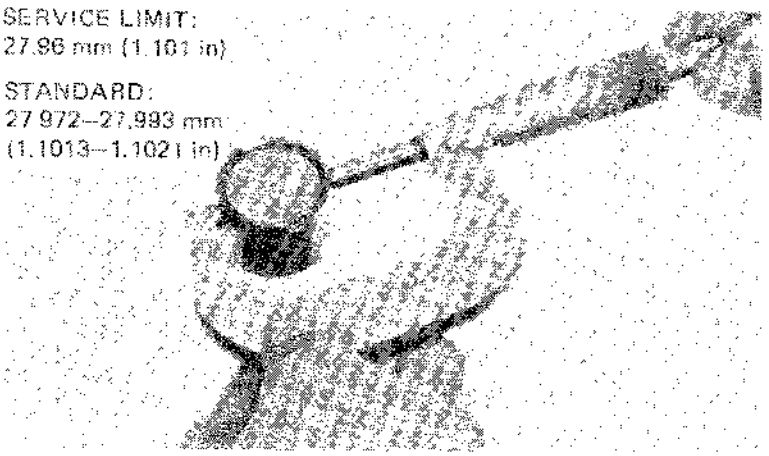
INSPECTION

VALVE LIFTER O.D.

Measure valve lifter O.D.

SERVICE LIMIT:
27.96 mm (1.101 in)

STANDARD:
27.972–27.993 mm
(1.1013–1.1021 in)



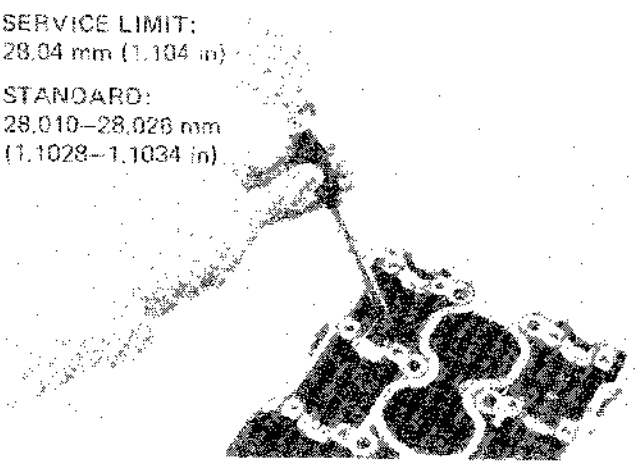
VALVE LIFTER BORE

Measure valve lifter bore I.D.

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

SERVICE LIMIT:
28.04 mm (1.104 in)

STANDARD:
28.010–28.026 mm
(1.1028–1.1034 in)

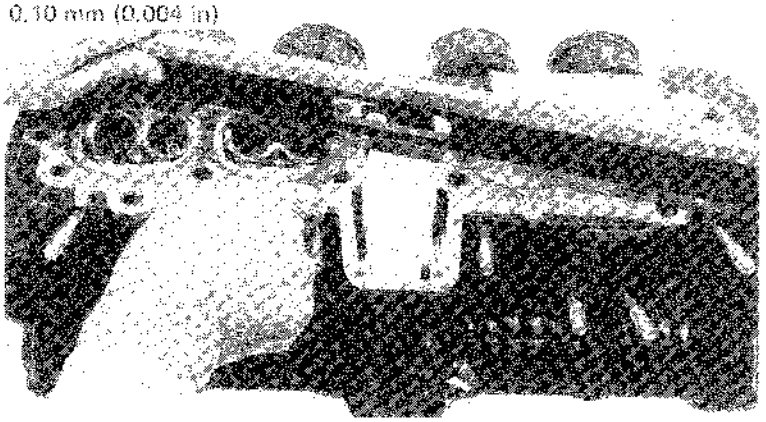


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CYLINDER HEAD

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

SERVICE LIMIT:
0.10 mm (0.004 in)

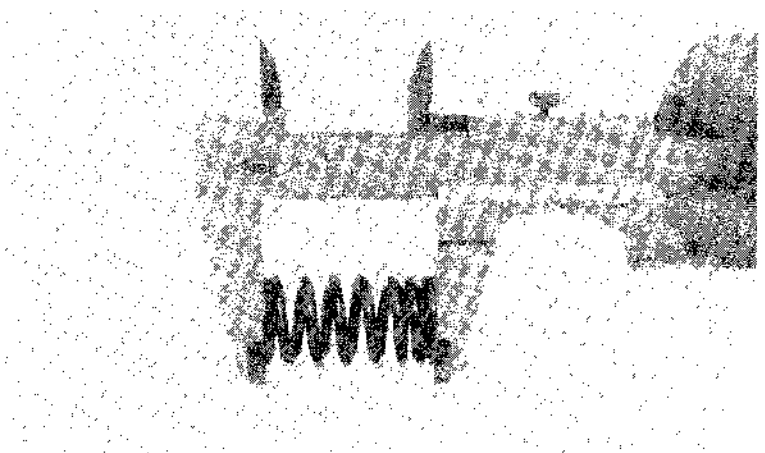


VALVE SPRING FREE LENGTH

Measure the length of the inner and outer valve springs.

SERVICE LIMITS:
Inner: IN/EX: 39.8 mm (1.57 in)
Outer: IN/EX: 42.5 mm (1.67 in)

STANDARDS:
Inner: IN/EX: 40.7 mm (1.60 in)
Outer: IN/EX: 43.9 mm (1.73 in)

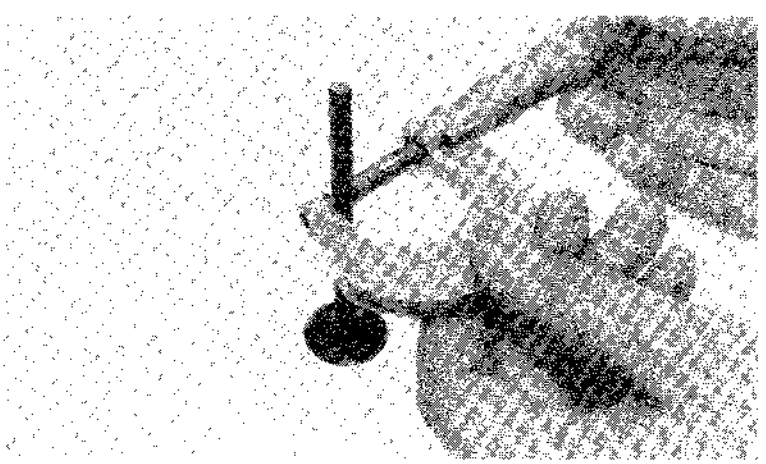


VALVE STEM-TO-GUIDE CLEARANCE

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

SERVICE LIMITS: IN: 5.47 mm (0.215 in)
EX: 5.45 mm (0.214 in)

STANDARDS:
IN: 5.475–5.490 mm (0.2156–0.2161 in)
EX: 5.455–5.470 mm (0.2148–0.2154 in)



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NOTE

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

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

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

STANDARD: IN/EX 5.500–5.515 mm (0.2165–0.2171 in)

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

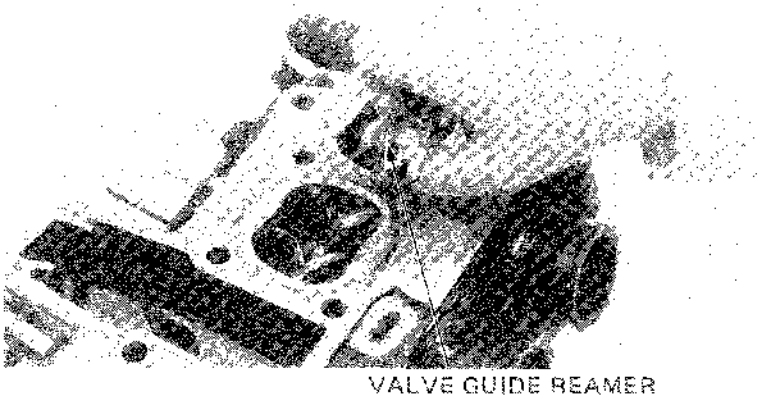
SERVICE LIMITS: IN. 0.07 mm (0.003 in)
EX. 0.09 mm (0.004 in)

STANDARDS:
IN: 0.010–0.040 mm (0.0004–0.0016 in)
EX: 0.030–0.060 mm (0.0012–0.0024 in)

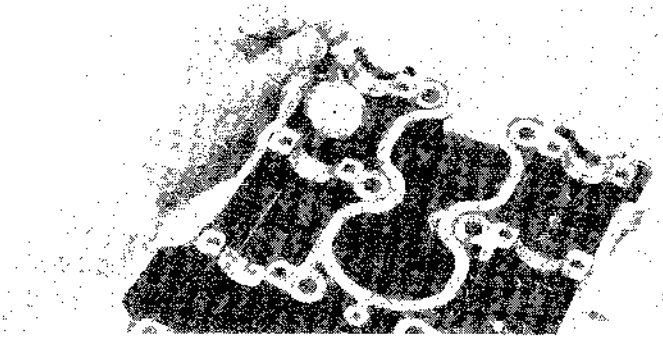
If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limits with new guides, replace the valves.

NOTE

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



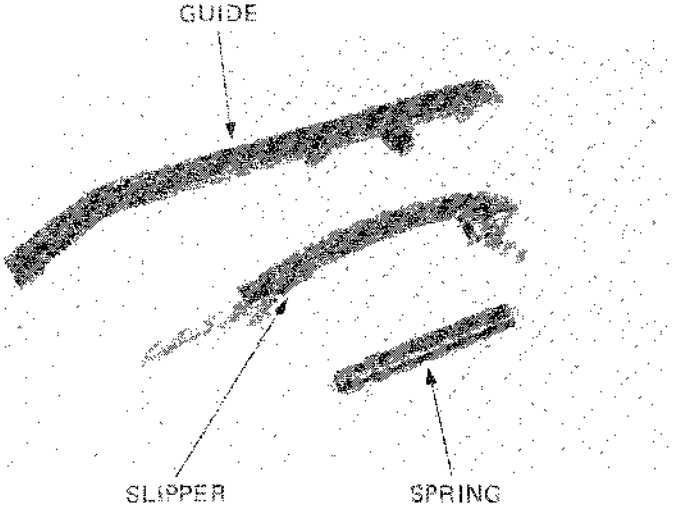
VALVE GUIDE REAMER
07984–2000000, 5.5 mm



CAM CHAIN GUIDE AND CAM CHAIN TENSIONER

Inspect the cam chain guide for damage or excessive wear.

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



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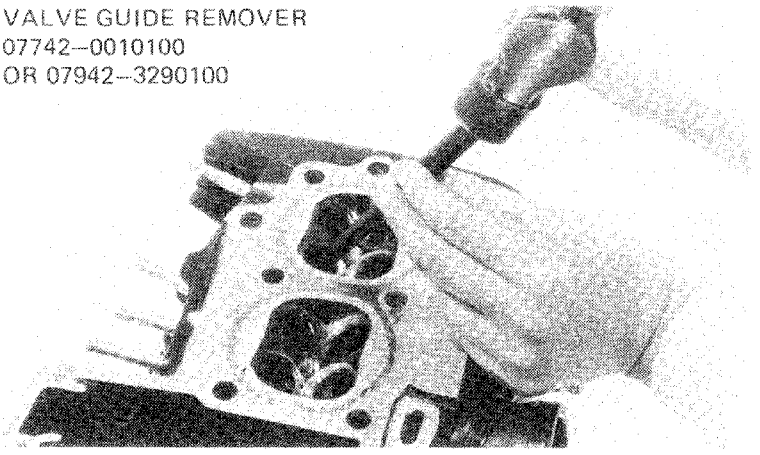
VALVE GUIDE REPLACEMENT

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

NOTE

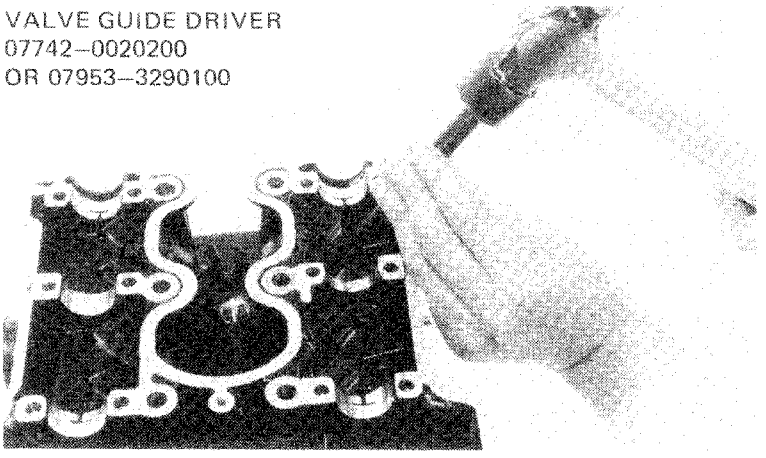
When driving out the valve guide, do not damage the head.

VALVE GUIDE REMOVER
07742–0010100
OR 07942–3290100



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

VALVE GUIDE DRIVER
07742–0020200
OR 07953–3290100

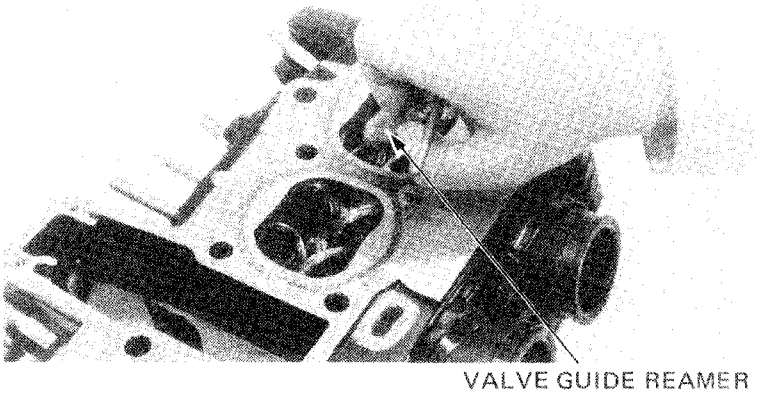


Ream the new valve guide after installation.

NOTE

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

Reface the valve seat (Page 6-16).
Clean the cylinder head thoroughly to remove any metal particles.



VALVE GUIDE REAMER
07984–2000000, 5.5 mm

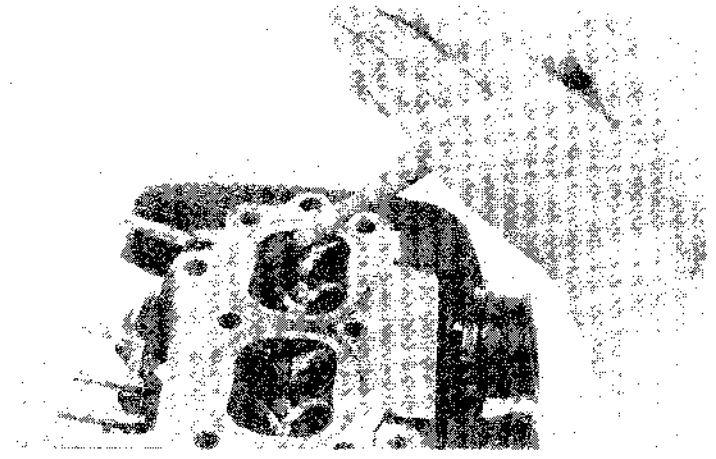
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VALVE SEAT INSPECTION/REFACING

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

NOTE

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



Remove the valve and inspect the face.

CAUTION

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

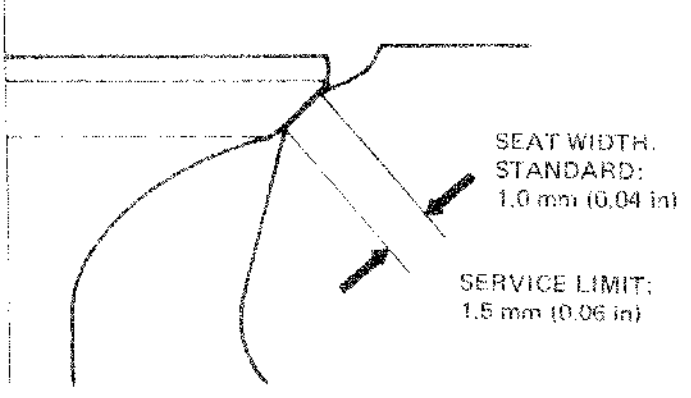
Inspect the valve seat.

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

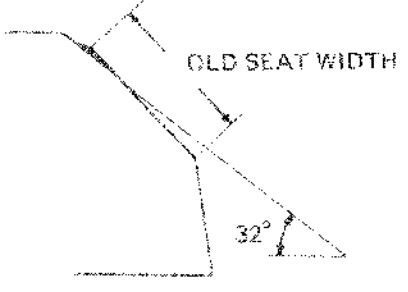
NOTE

Follow the refacer manufacturer's operating instructions

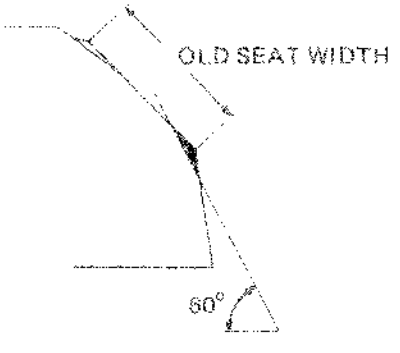
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure. After lapping, wash any residual compound off the cylinder head and valve.



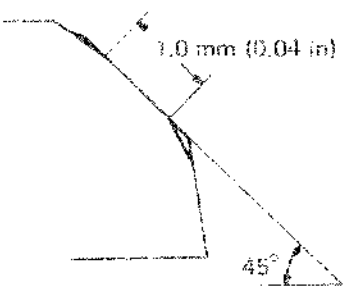
IN: CUTTER (28φ)
EX: CUTTER (25φ)



IN: CUTTER (30φ)
EX: CUTTER (24φ)



IN, EX: CUTTER (27.5φ)



HOLDER NO. 07781-0010100

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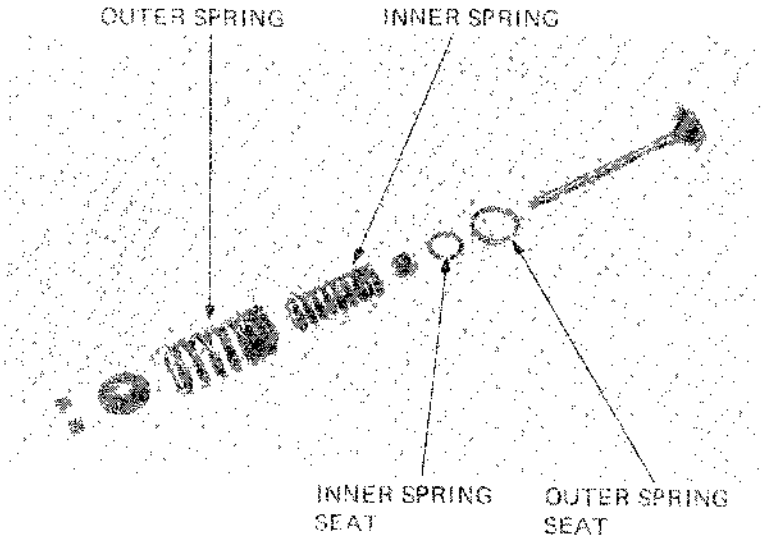
CYLINDER HEAD ASSEMBLY

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

NOTE

- Install new valve stem seals when assembling.
- To avoid damage to the stem seal, turn the valve slowly when inserting.

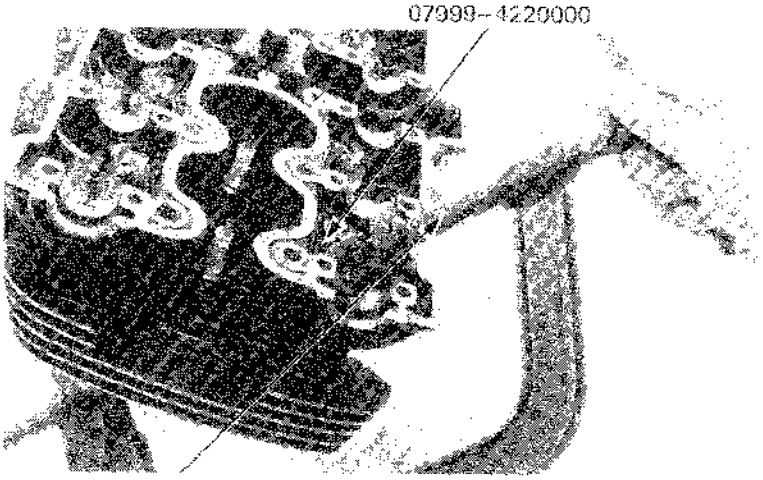
Install the valve springs and retainers. The valve springs with the tightly wound coils should face the cylinder head combustion chamber.



Install the valve cotters.

CAUTION

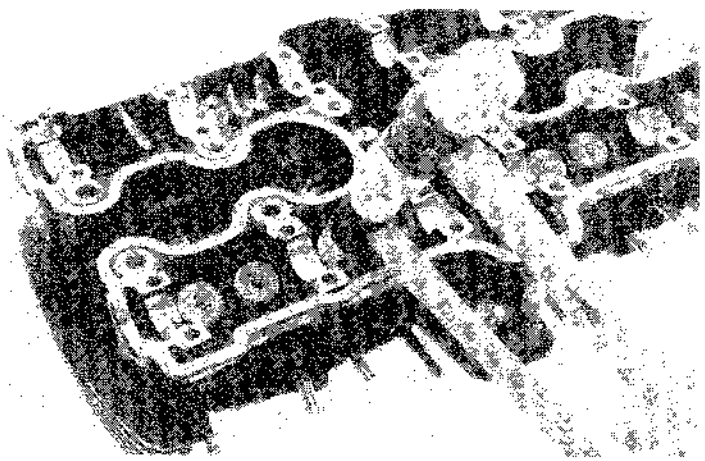
To prevent loss of tension, do not compress the valve springs more than necessary to install the valve cotters.



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

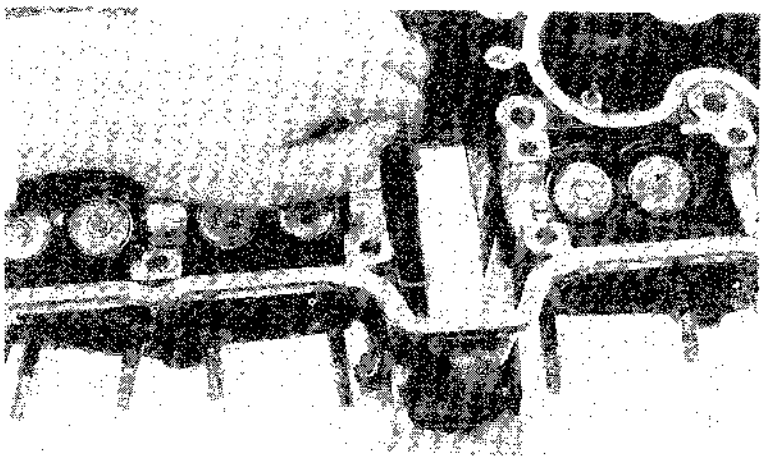
NOTE

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



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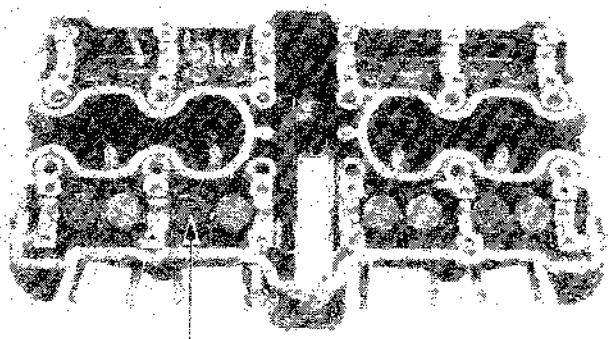
Install the front cam chain tensioner.
Push the chain tensioner down and tighten the lock bolt and nut.



Install the valve lifters and adjustment shims.

NOTE

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

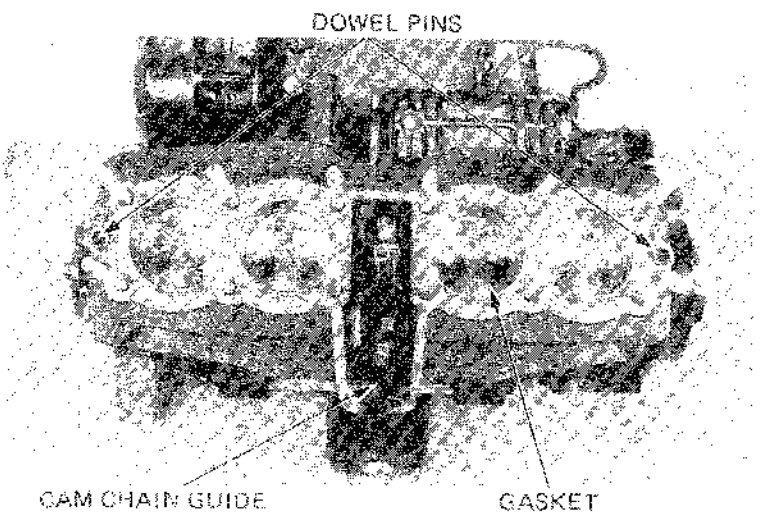


SHIM AND LIFTER

CYLINDER HEAD INSTALLATION

Clean the cylinder head surfaces of any gasket material.
Install the dowel pins and cam chain guide.

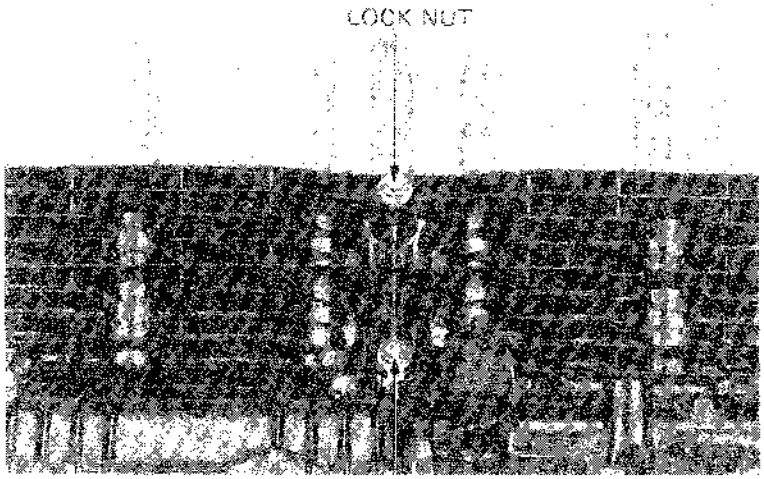
Install a new cylinder head gasket with the 5 mm wide side of the bore grommet facing up



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Loosely install the two cam chain tensioner lock nuts.

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



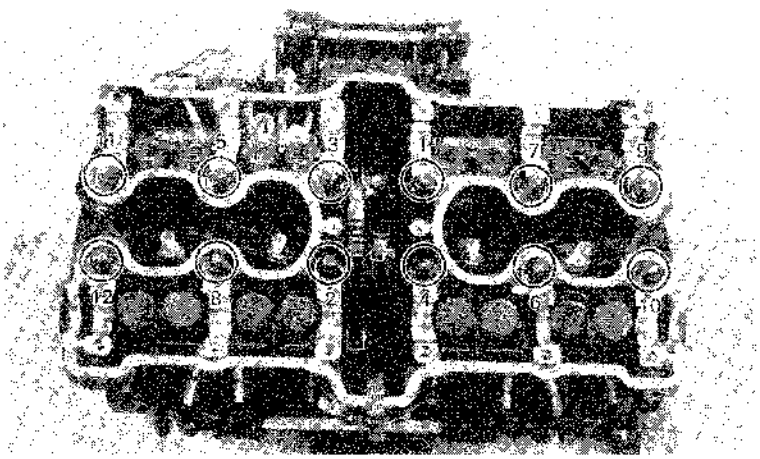
ADJUSTING LOCK NUT

Install the cylinder head assembly.
Tighten the cap nuts in the sequence shown.

TORQUE:
10 mm cap nut:
36–40 N·m (3.6–4.0 kg-m, 26–29 ft-lb)

NOTE

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

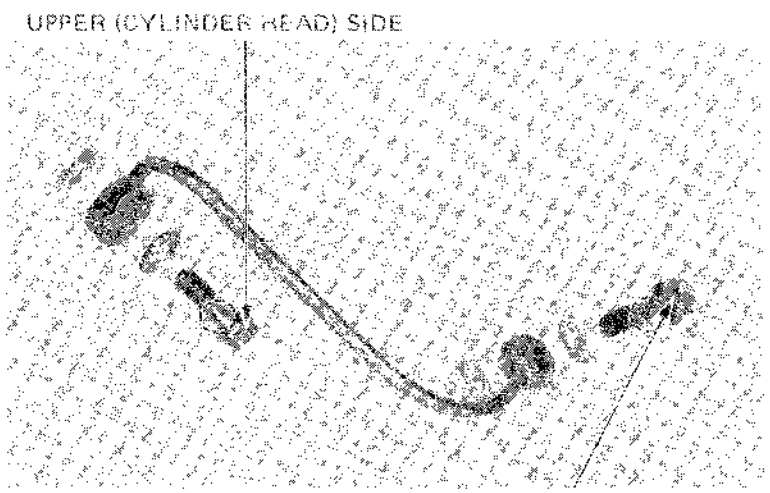


Tighten the two bolts at the front cam chain housing, install the oil cooler hose setting plate and tighten the two oil line bolts.

NOTE

Use the bolt with the big hole to tighten the upper oil line.

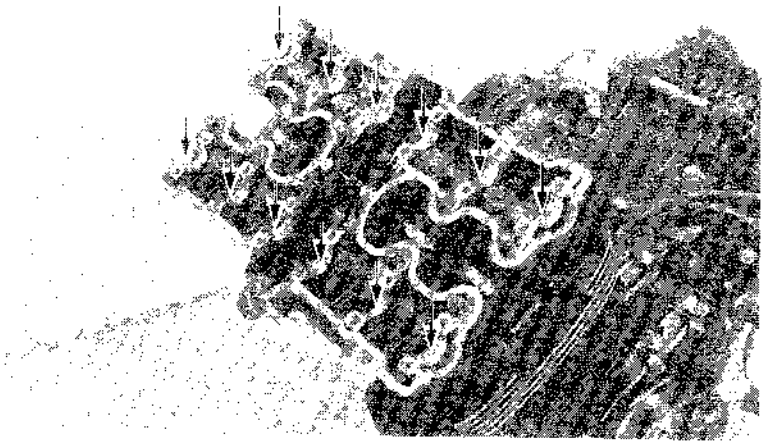
TORQUE: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)



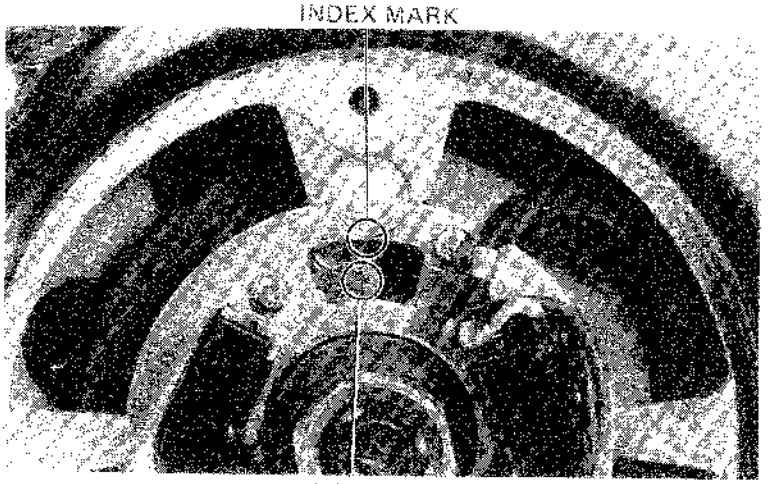
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CAMSHAFT INSTALLATION

Lubricate the camshaft bearings with molybdenum disulfide grease.



Turn the crankshaft counterclockwise until the 1.4 "T" and index marks align.

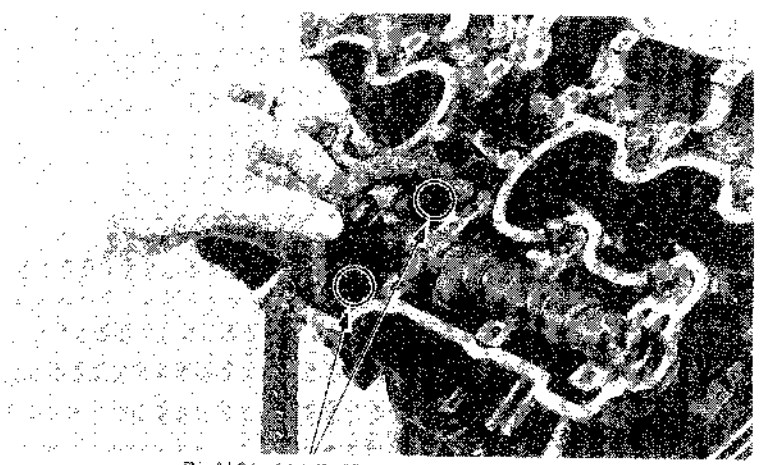


Place the intake cam chain over the exhaust camshaft sprocket, aligning the sprocket punch marks with the cylinder head surface.

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

NOTE

Install camshaft holders with directional arrows pointing towards the front of the engine.



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

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

TORQUE: 18 - 20 N·m (1.8–2.0 kg-m, 13–15 ft-lb)

Tighten the camshaft holder bolts in a crisscross pattern.

TORQUE: 12–16 N·m (1.2–1.6 kg-m, 9–12 ft-lb)

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

Make sure that the 1.4 "T" and index marks are aligned as shown on page 6-20 and the No. 1 cam lobes face toward the spark plug. Recheck the position of the exhaust camshaft sprocket; the punch marks must align with the cylinder head surface. Place the intake cam chain over the intake camshaft and sprocket, aligning the sprocket punch marks with the cylinder head surface.

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

NOTE

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

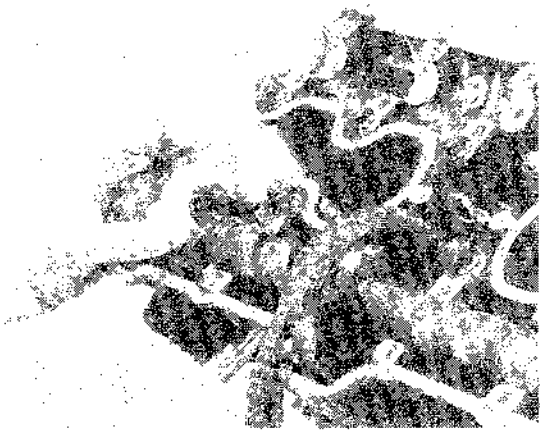
Loosely install the F and L camshaft holders. Install the G and K holders loosely, positioning the camshaft so its flange fits into the slot in the K holder.

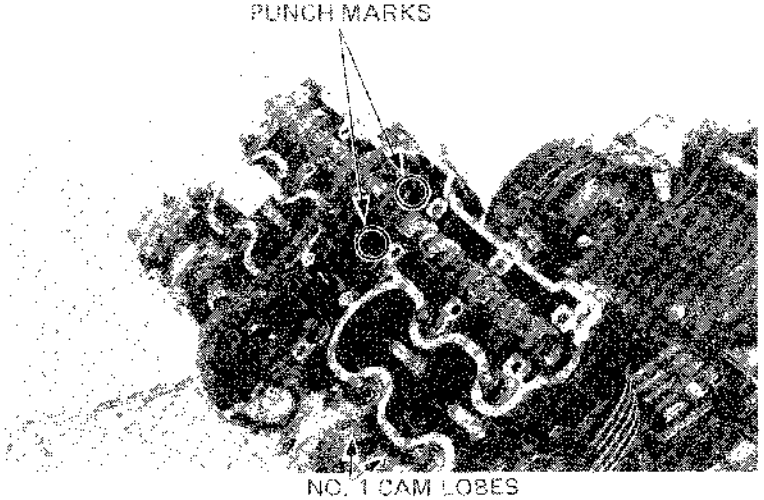
Install and tighten the camshaft sprocket bolts, following the same procedures described for exhaust camshaft installation.

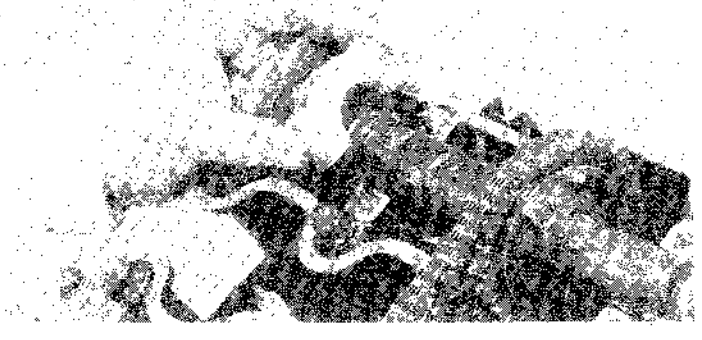
Tighten the camshaft holder bolts in a crisscross pattern.

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

Recheck the crankshaft and camshaft sprocket alignment.

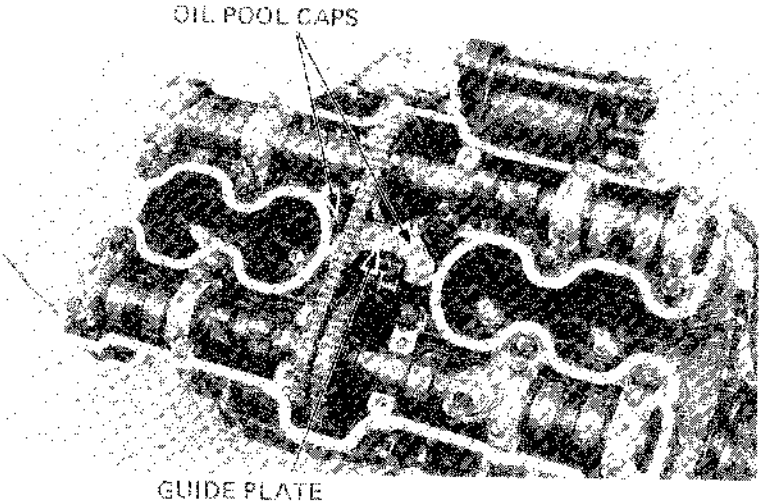




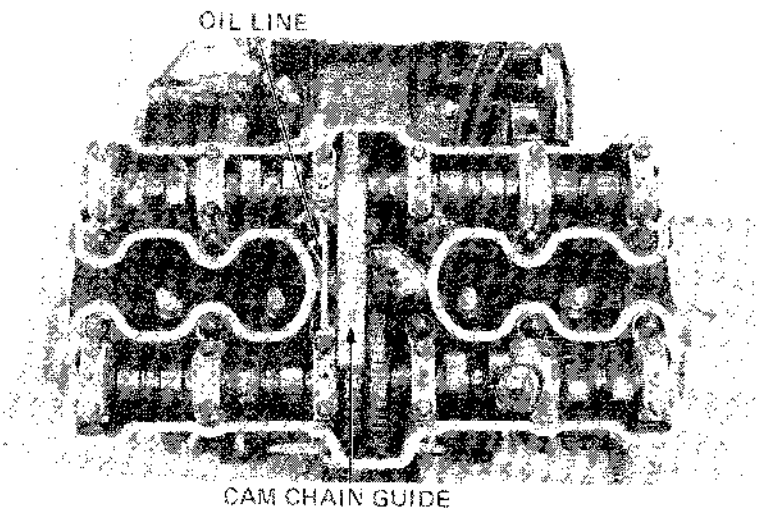


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Install the exhaust cam chain guide attaching plate and oil pool caps.



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

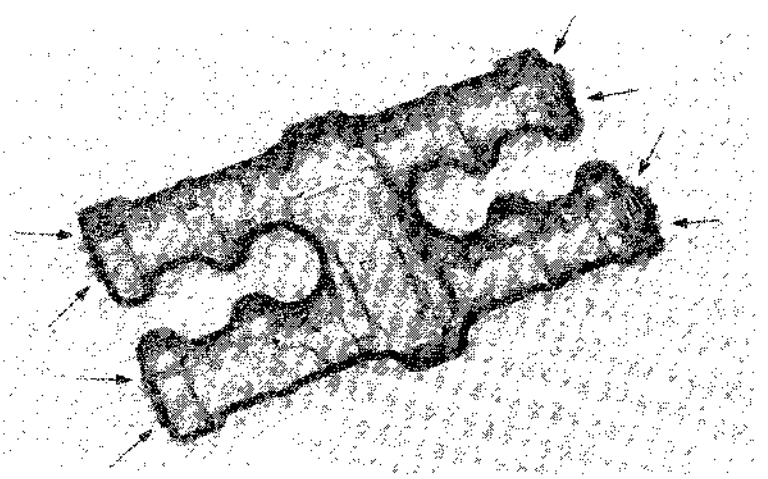


Fill the oil pockets in the head with oil so that the cam lobes are submerged.
Adjust the valve clearance (Page 3-7).

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

NOTE

Clean the gasket before applying sealant.



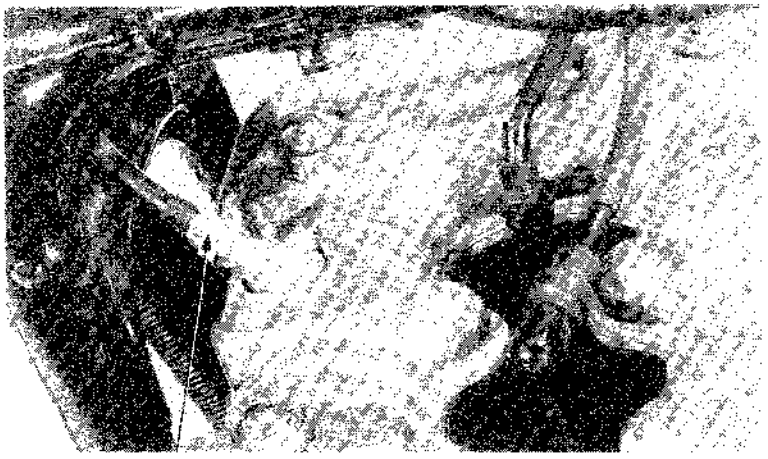
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Install the cylinder head cover.

Connect the tachometer cable and attach the spark plug caps.

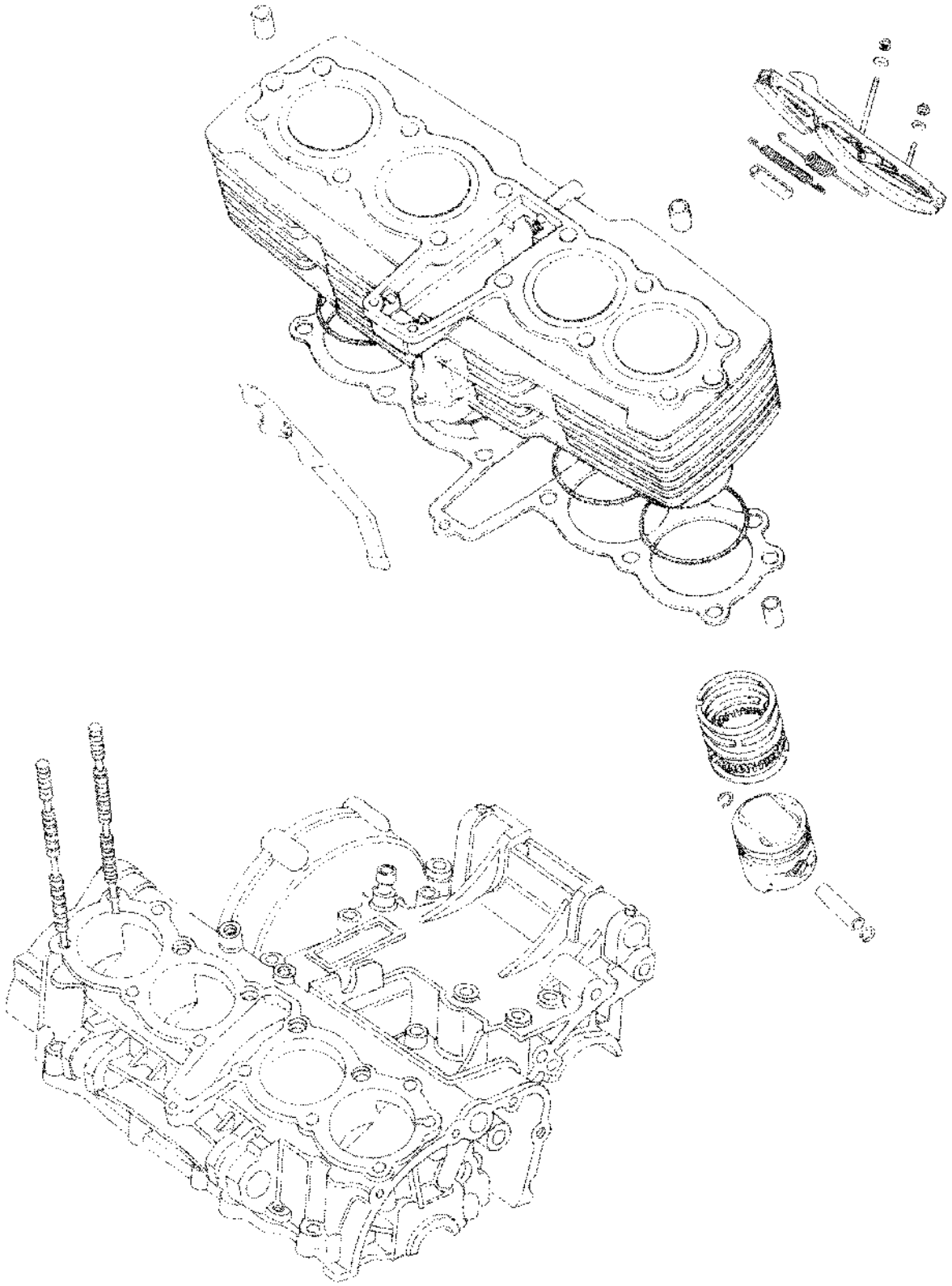
Install the pulse generator cover.

Adjust cam chain tension (Page 3-11).



TACHOMETER CABLE

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7. CYLINDER/PISTON

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

SERVICE INFORMATION

GENERAL

- The engine must be removed to perform cylinder/piston maintenance and inspection.

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Cylinder	I.D.		67.00–67.01 mm (2.6378–2.6382 in)	67.1 mm (2.641 in)
	Warpage		—	0.10 mm (0.004 in)
Piston, piston rings and piston pin	Piston ring-to-groove clearance	TOP	0.015–0.045 mm (0.0006–0.0018 in)	0.09 mm (0.004 in)
		SECOND	0.015–0.045 mm (0.0006–0.0018 in)	0.09 mm (0.004 in)
	Ring end gap	TOP	0.10–0.25 mm (0.004–0.0010 in)	0.45 mm (0.018 in)
		SECOND	0.10–0.25 mm (0.004–0.0010 in)	0.45 mm (0.018 in)
		OIL (SIDE RAIL)	0.30–0.90 mm (0.012–0.035 in)	1.1 mm (0.04 in)
	Piston O.D.		66.96–66.99 mm (2.636–2.637 in)	66.90 mm (2.63 in)
	Piston pin bore		17.002–17.008 mm (0.6694–0.6696 in)	17.05 mm (0.671 in)
	Connecting rod small end I.D.		17.016–17.034 mm (0.6706–0.6699 in)	17.076 mm (0.672 in)
	Piston pin O.D.		16.994–17.000 mm (0.6690–0.6693 in)	16.98 mm (0.669 in)
	Piston-to-piston pin clearance		0.002–0.014 mm (0.0001–0.0006 in)	0.04 mm (0.002 in)
	Cylinder-to-piston clearance		0.010–0.050 mm (0.0004–0.002 in)	0.10 mm (0.004 in)
	Piston pin-to-connecting rod clearance		0.016–0.040 mm (0.0006–0.0016 in)	0.060 mm (0.0024 in)

TOOLS

Special

Piston Base (2 required)	07958–3000000
Piston Ring Compressor (2 required)	07954–3690000

TROUBLESHOOTING

Compression low
1. Worn cylinder or piston rings.

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

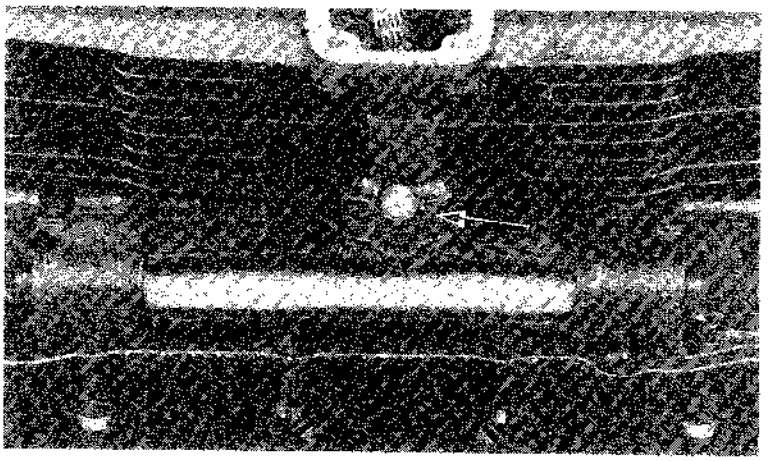
Overheating
1. Excessive carbon build-up on the piston or combustion chamber wall.

Knocking or abnormal noise
1. Worn piston and cylinder.
2. Excessive carbon build-up.

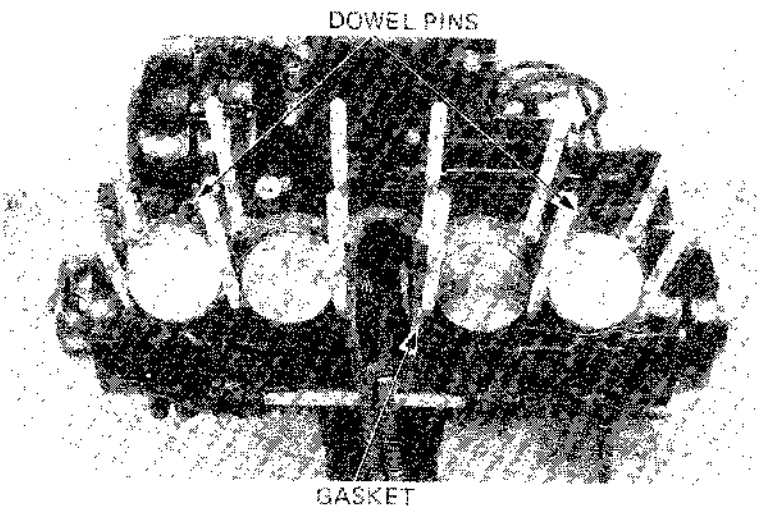
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CYLINDER REMOVAL

Remove the cylinder head (Section 6).
Remove the bolt at the lower front cylinder base and remove the cylinder.
Remove the cam chain tensioner from the cylinder.



Remove the cylinder gasket and dowel pins.

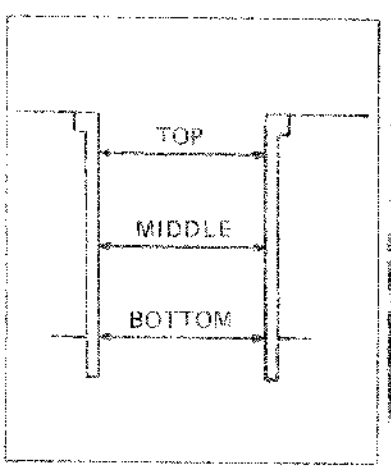


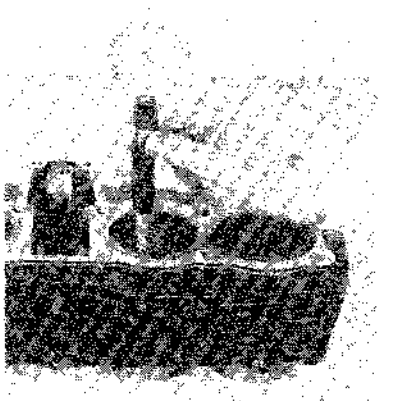
CYLINDER INSPECTION

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

STANDARD: 67.00–67.01 mm
(2.6378–2.6382 in)

SERVICE LIMIT: 67.1 mm (2.641 in)

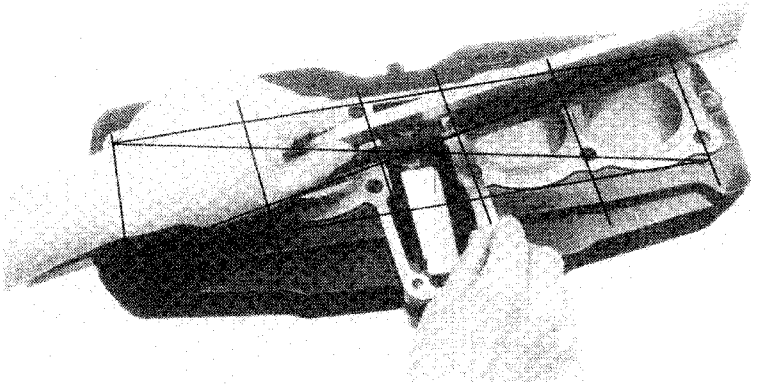




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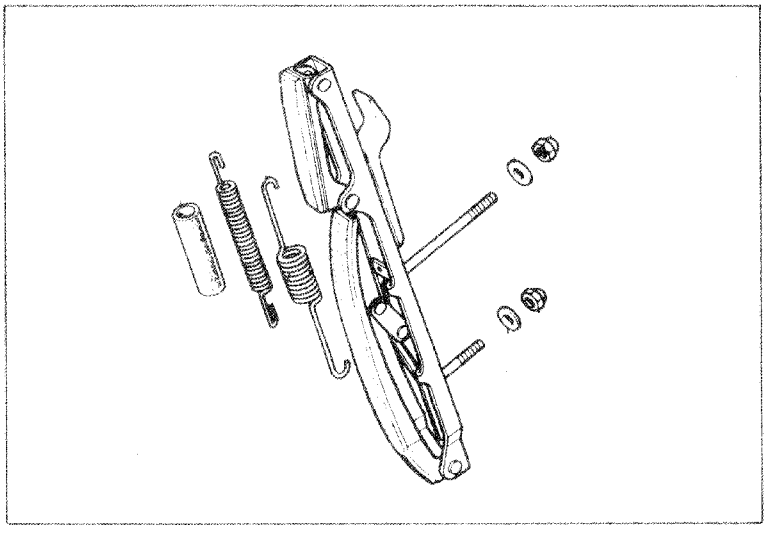
Inspect the top of the cylinder for warpage.
Check in an X pattern as shown.

SERVICE LIMIT:
0.10 mm (0.004 in)



CAM CHAIN TENSIONER INSPECTION

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



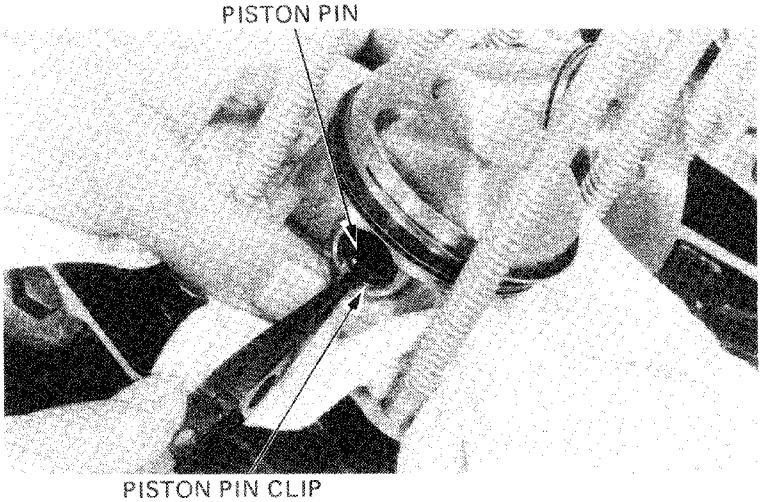
PISTON REMOVAL

Remove each piston pin clip with needle nose pliers being careful not to allow clips to fall into the crankcase.

Press the piston pin out.

NOTE

Mark the pistons to indicate their cylinder positions.



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PISTON/PISTON RING INSPECTION

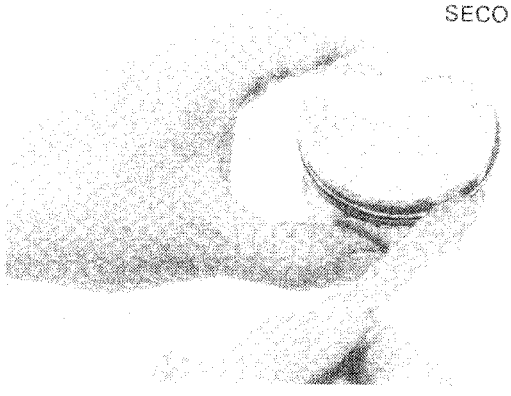
Inspect the piston ring-to-groove clearance.

NOTE

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

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

SERVICE LIMIT:
TOP 0.09 mm (0.004 in)
SECOND 0.09 mm (0.004 in)



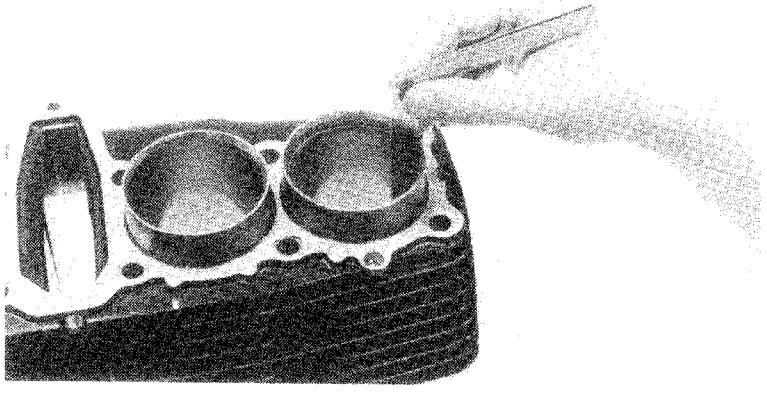
Insert each piston ring into the cylinder, and measure the end gap.

SERVICE LIMITS:

TOP:	0.5 mm (0.02 in)
SECOND:	0.5 mm (0.02 in)
OIL (Side rail):	1.1 mm (0.04 in)

STANDARD END GAPS:

TOP:	0.10–0.25 mm (0.004–0.010 in)
SECOND:	0.10–0.25 mm (0.004–0.010 in)
OIL (Side rail):	0.30–0.90 mm (0.012–0.035 in)

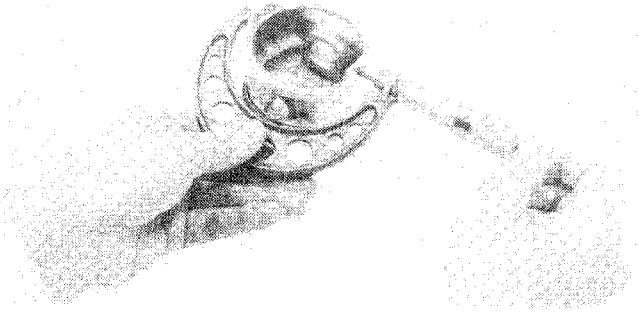


Measure the piston O.D. at the skirt, 10 mm (0.4 in) from the bottom.

SERVICE LIMIT: 66.90 mm (2.634 in)
STANDARD: 66.96–66.99 mm (2.636–2.637 in)

Calculate the cylinder-to-piston clearance.

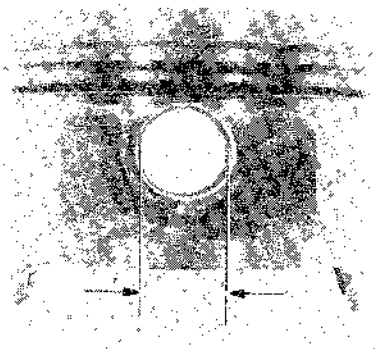
SERVICE LIMIT: 0.10 mm (0.004 in)



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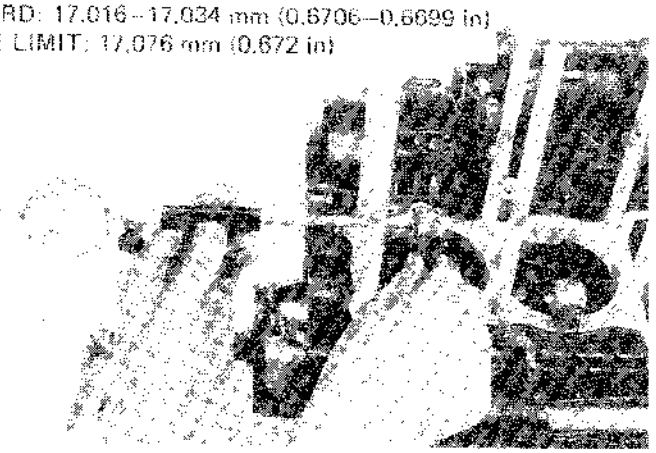
Measure the piston pin hole I.D.

STANDARD: 17.002–17.008 mm (0.6694–0.6696 in)
SERVICE LIMIT: 17.05 mm (0.671 in)



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

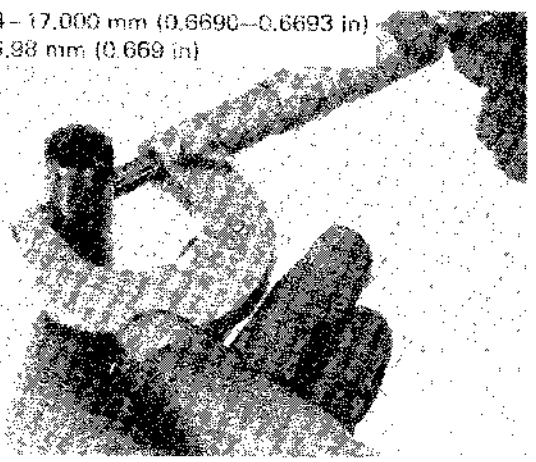
STANDARD: 17.016–17.034 mm (0.6706–0.6699 in)
SERVICE LIMIT: 17.076 mm (0.672 in)



Measure the piston pin O.D.

Determine the piston-to-piston pin clearance.
SERVICE LIMIT: 0.04 mm (0.002 in)

STANDARD: 16.994–17.000 mm (0.6690–0.6693 in)
SERVICE LIMIT: 16.98 mm (0.669 in)

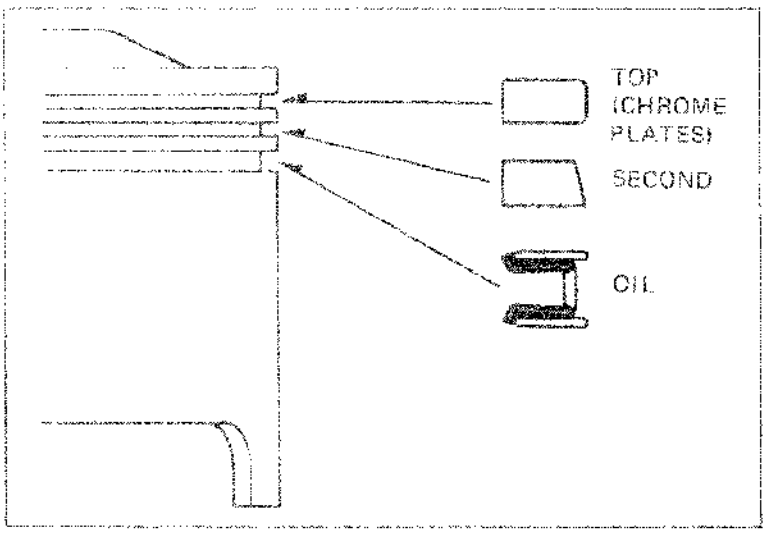


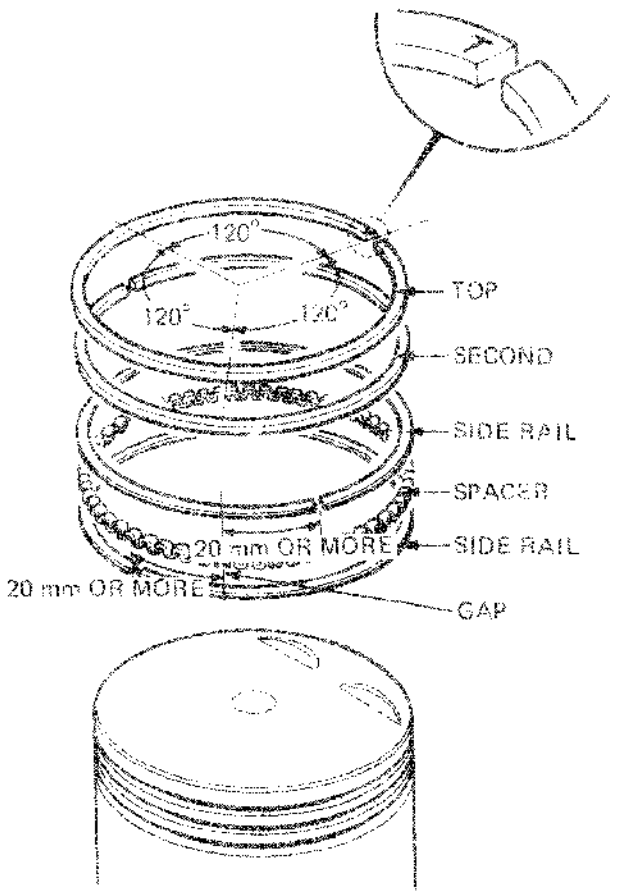
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PISTON RING INSTALLATION

Install the piston rings with the markings facing up. After installation, the rings should rotate freely.

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





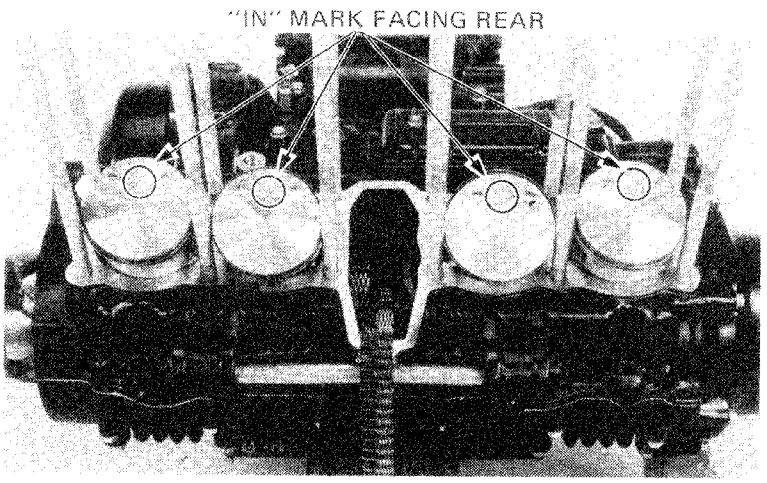
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PISTON INSTALLATION

Apply molybdenum disulfide grease to the connecting rod small ends.
Install the pistons, piston pins and clips.
Install the pistons with the "IN" mark toward the carburetor side. Install the piston pins and clips, being careful not to drop the clips into the crankcase.

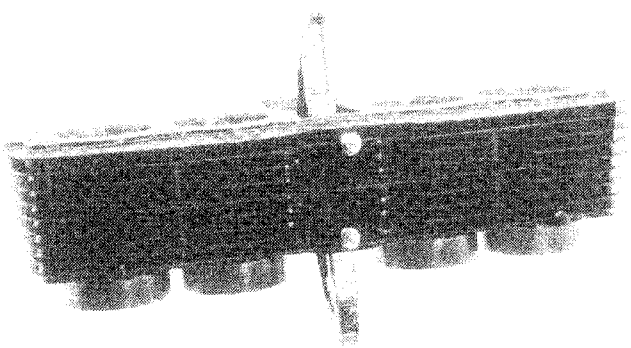
NOTE

- Install the pistons in their original positions.
- Stuff shop towels into the crankcase to catch dropped clips.

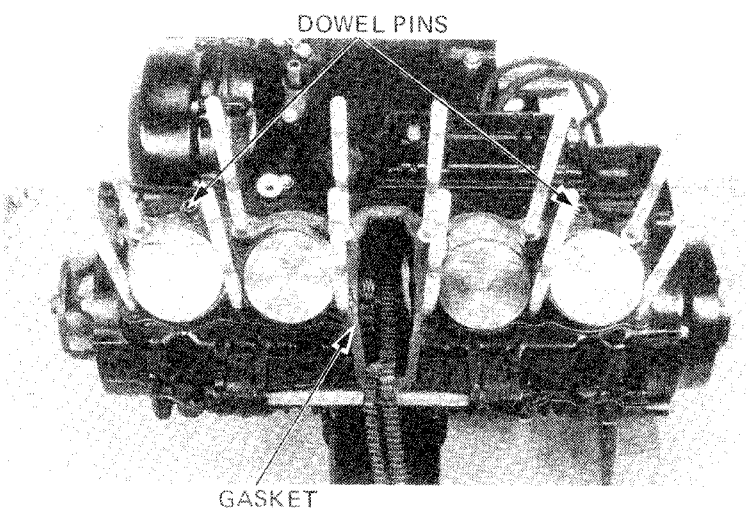


CYLINDER INSTALLATION

Install the cam chain tensioner.



Install the dowel pins and gasket.

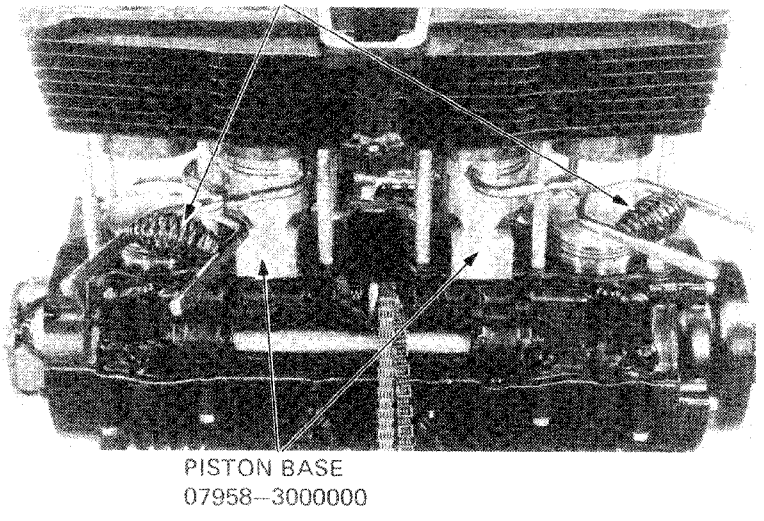


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Install the cylinder.

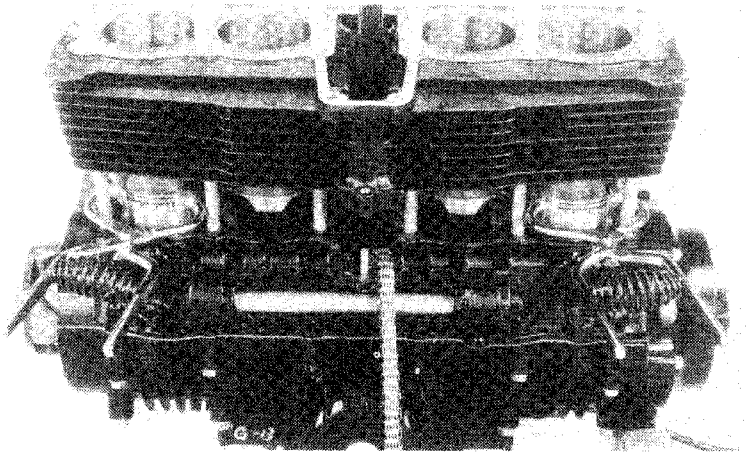
NOTE

Before using the special tools, position the No. 2 and No. 3 pistons at T.D.C.

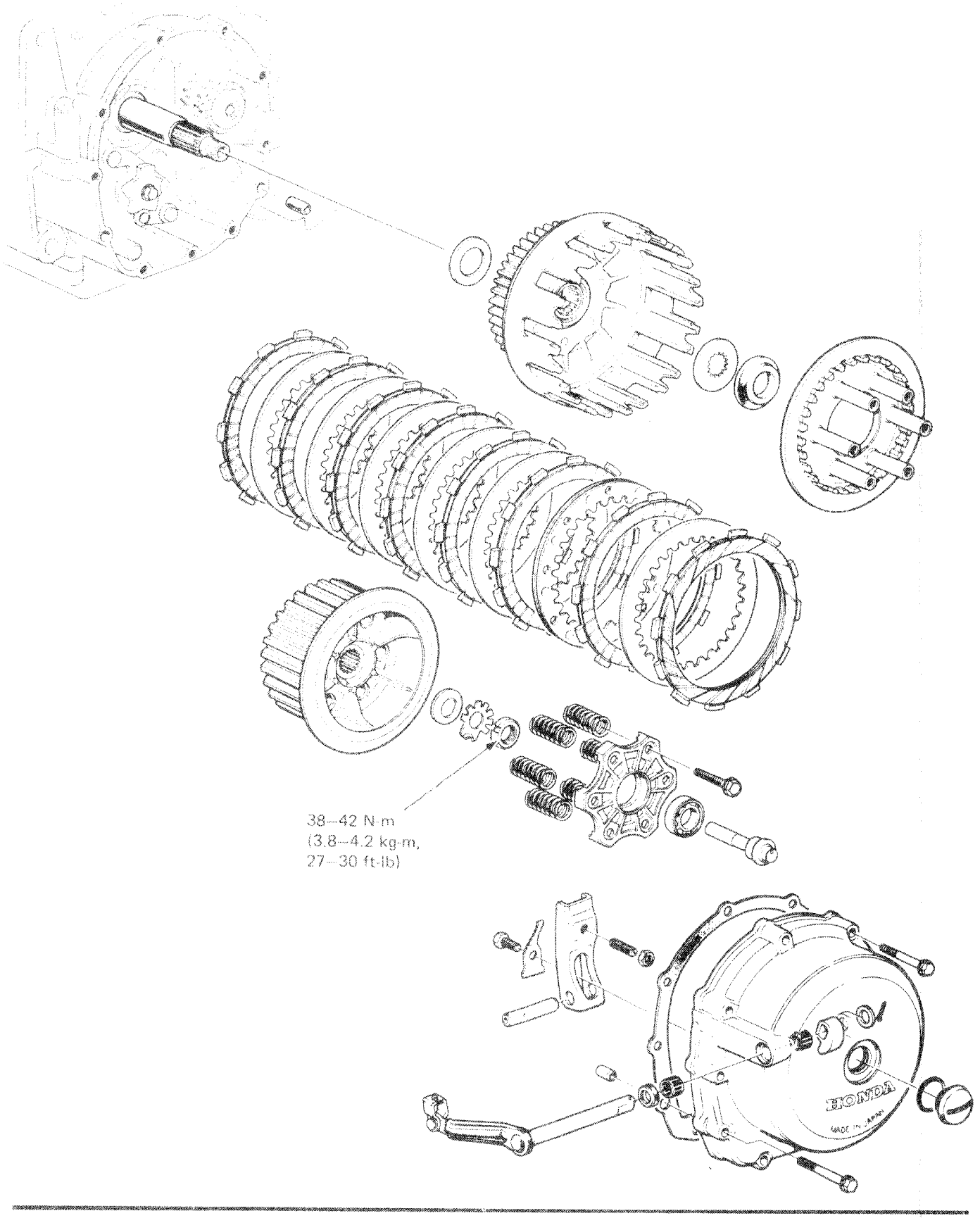


Tighten the cylinder base nut securely after installation.

Install a new cylinder head gasket. Install the dowel pins and cam chain guide.
Install the cylinder head (Section 6).



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8. CLUTCH

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

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch and starter clutch.
- Clutch maintenance can be done with the engine in the frame.

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Clutch	Lever free play (at lever end)		10–20 mm (3/8–3/4 in)	———
	Spring free length		40.3 mm (1.59 in)	38.9 mm (1.53 in)
	Spring preload/length		19.6–21.4 kg/27.4 mm (43.21–47.18 lbs/1.08 in)	18.1 kg/27.4 mm (39.91 lbs/1.08 in)
	Disc thickness	A	3.72–3.88 mm (0.146–0.153 in)	3.4 mm (0.13 in)
		B	3.72–3.88 mm (0.146–0.153 in)	3.4 mm (0.13 in)
	Plate warpage		———	0.30 mm (0.012 in)
Starter clutch	Drive gear O.D.		42.275–42.300 mm (1.6644–1.6654 in)	42.255 mm (1.6636 in)

TORQUE VALUES

Clutch lock nut	38–42 N·m (3.8–4.2 kg-m, 27–30 ft-lb)
Primary drive gear lock bolt	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Starter clutch locking bolt	26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb)
Spark advancer bolt	33–37 N·m (3.3–3.7 kg-m, 24–27 ft-lb)

TOOLS

Special	
Primary Gear Holder	07924–4250000 – Not available in U.S.A.
Clutch Center Holder	07923–3710000 or 07923–4610000
10 mm Socket Bit	07916–3710000 or Commercially available in U.S.A.
Common	
Lock Nut Wrench 20 x 24 mm	07716–0020100 or 07916–3710000
Handle	07716–0020500 or Commercially available in U.S.A.

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TROUBLESHOOTING

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

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

Clutch will not disengage
1. Too much free play.
2. Plates warped.

Motorcycle creeps with clutch disengaged
1. Too much free play.
2. Plates warped.

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

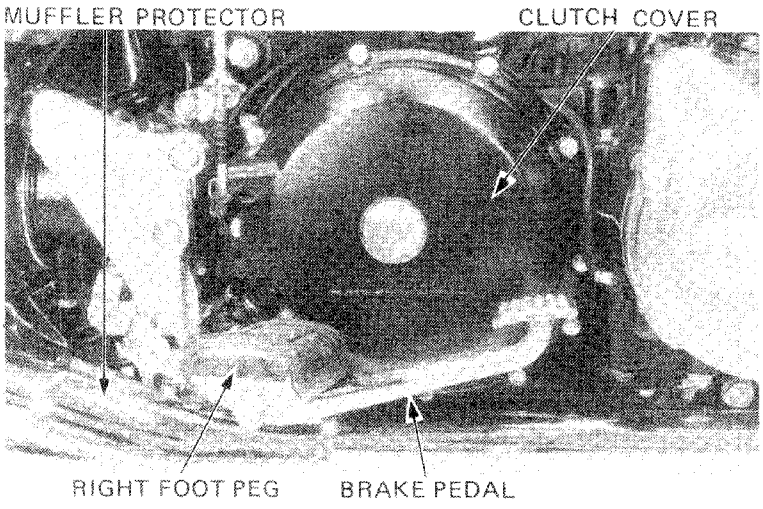
Clutch operation feels rough
1. Outer drum slots rough.

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CLUTCH COVER REMOVAL

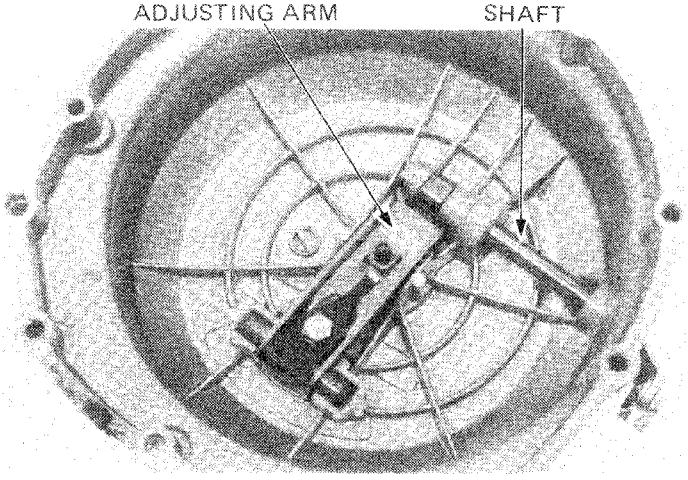
Drain the engine oil thoroughly (Page 2-2).

Disconnect the clutch cable at the lower adjuster and remove the rear brake pedal and right foot peg.
Remove the muffler protector.
Remove the clutch cover, gasket and dowel pins.

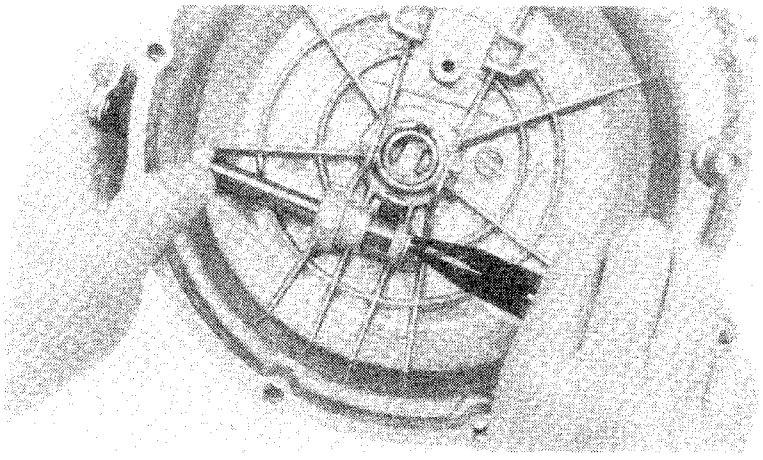


CLUTCH LIFTER REMOVAL

Remove the adjusting arm.



Remove the clutch lifter shaft.



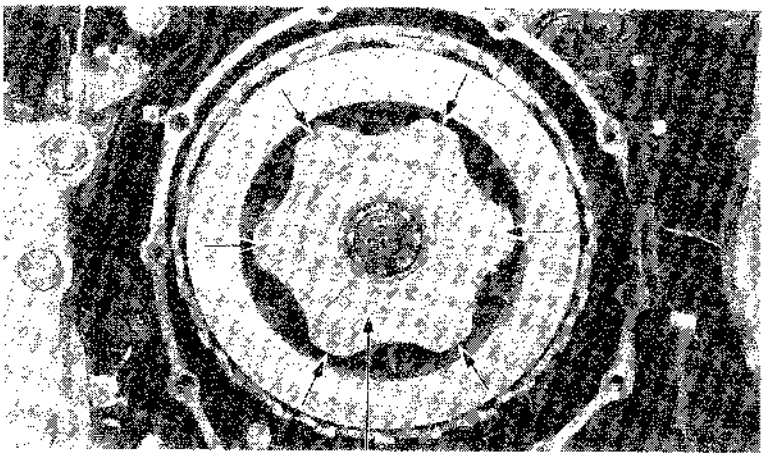
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REMOVAL

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

NOTE

Loosen the bolts in a crisscross pattern in 2–3 steps.



LIFTER PLATE

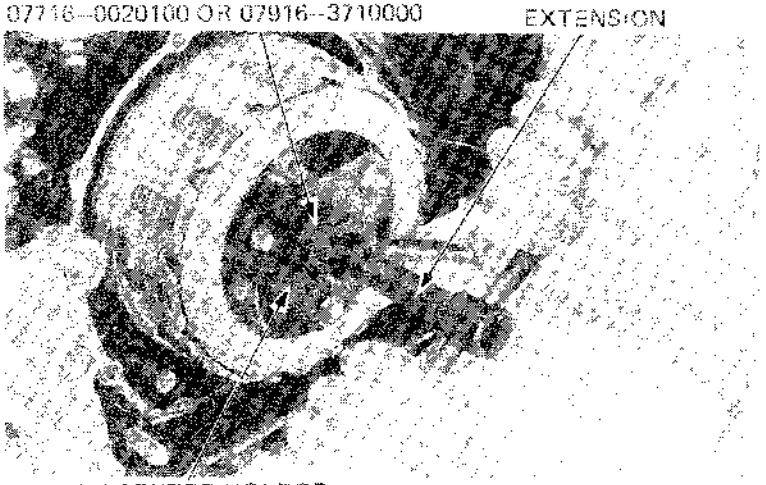
Remove the clutch springs.

Straighten the lock washer tab.

LOCK NUT WRENCH, 20 x 24 mm
07716–0020100 OR 07916–3710000

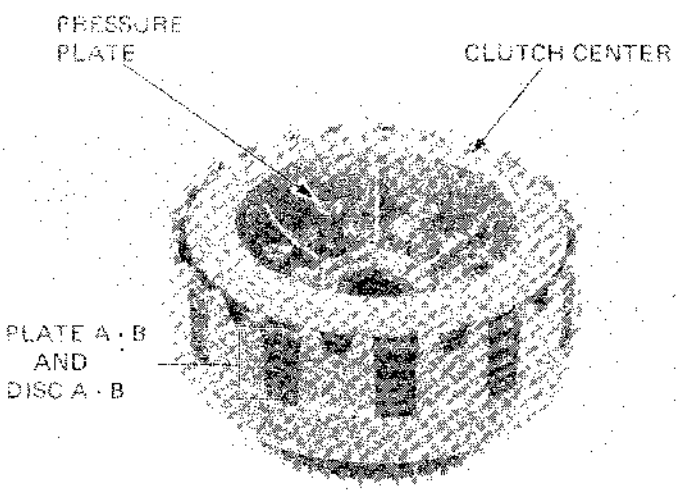
EXTENSION

Install the clutch holder on the clutch center with three, 6 mm bolts.
Remove the lock nut, lock washer and washer.
The clutch can now be removed as a unit.



CLUTCH CENTER HOLDER
07923–3710000 OR 07923–4610000

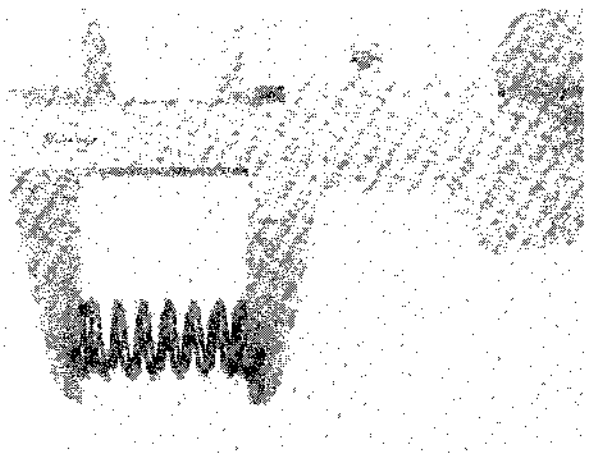
Remove the clutch assembly.



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CLUTCH SPRING INSPECTION

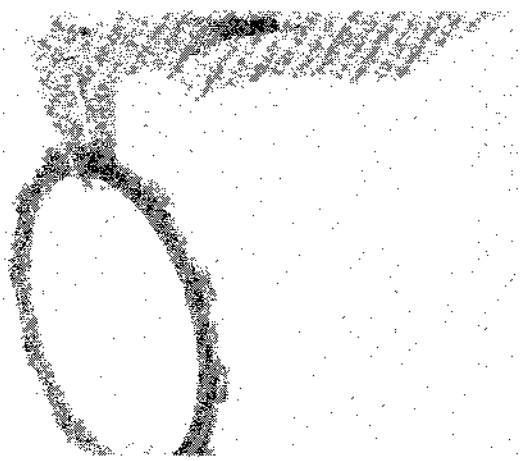
Measure the spring free lengths. Replace the springs if they are shorter than the service limit.



STANDARD: 40.3 mm (1.59 in)
SERVICE LIMIT: 38.0 mm (1.53 in)

CLUTCH DISC INSPECTION

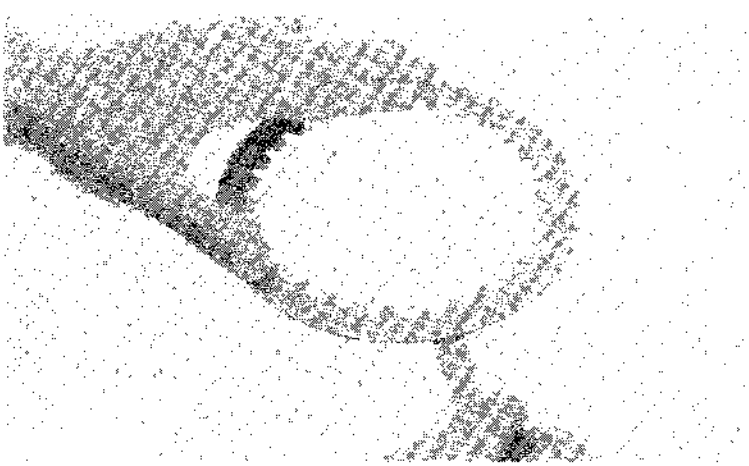
Replace the clutch discs if they show signs of scoring or discoloration.
Measure the disc thickness.



STANDARD: 3.72–3.88 mm
(0.146–0.153 in)
SERVICE LIMIT: 3.4 mm (0.13 in)

PLATE INSPECTION

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

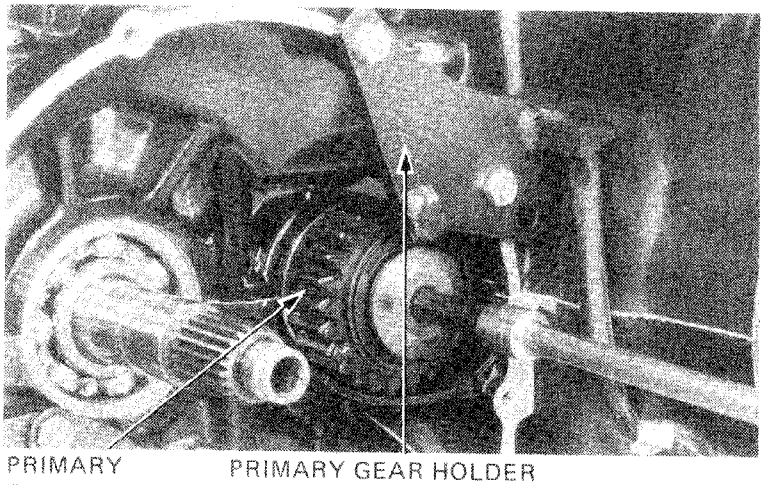


SERVICE LIMIT:
0.30 mm (0.012 in)

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PRIMARY DRIVE GEAR REMOVAL

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

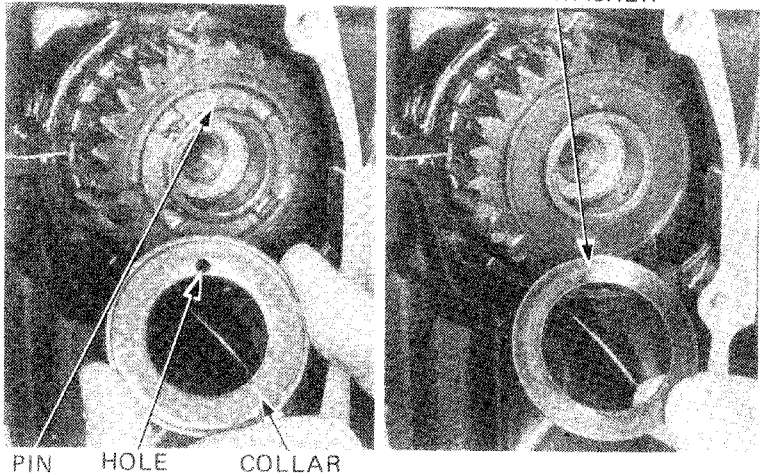


PRIMARY DRIVE GEAR

PRIMARY GEAR HOLDER
07924—4250000 (NOT AVAILABLE IN U.S.A.)

CLUTCH INSTALLATION

Install the primary drive gear with the large gear facing out.
Install the collar and lock washer as shown.



LOCK WASHER

PIN

HOLE

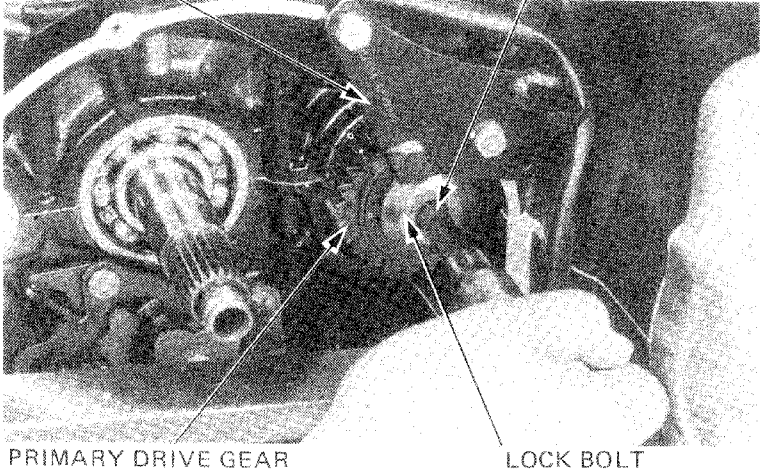
COLLAR

PRIMARY GEAR HOLDER
07924—4250000
(NOT AVAILABLE IN U.S.A.)

10 mm SOCKET BIT
07917—3710000
(COMMERCIALLY AVAILABLE IN U.S.A.)

Tighten the lock bolt.

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



PRIMARY DRIVE GEAR

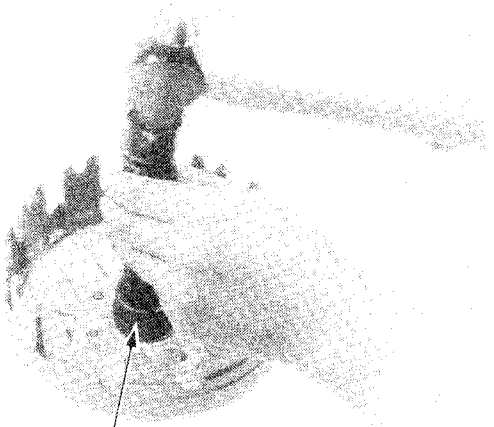
LOCK BOLT

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CLUTCH OUTER NEEDLE BEARING REPLACEMENT

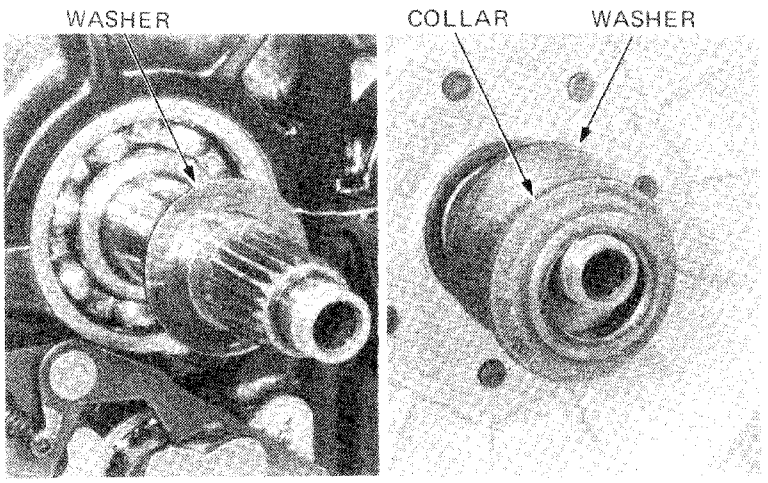
Remove the needle bearings as shown.

Install the needle bearing into the clutch outer with the number on the bearing facing out.



Install the washer and clutch outer.

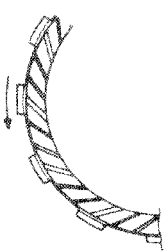
Install the washer and collar.

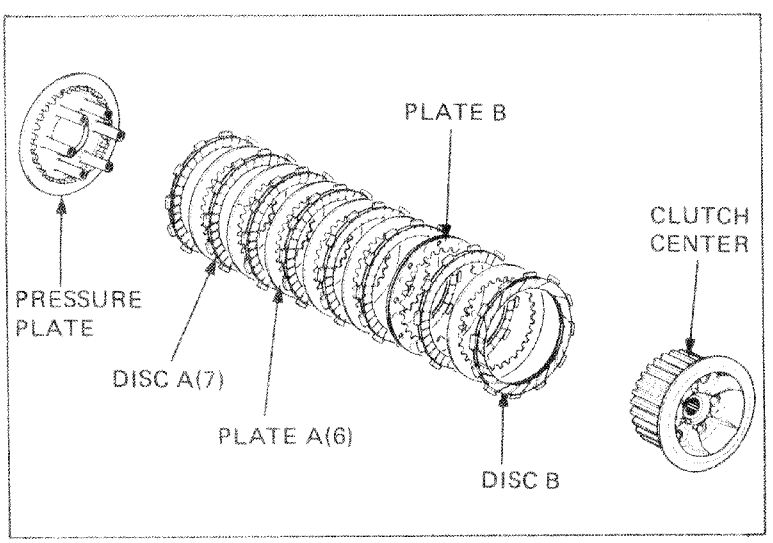


Assemble the clutch discs A and B, plate A and B, clutch pressure plate, and clutch center.

NOTE

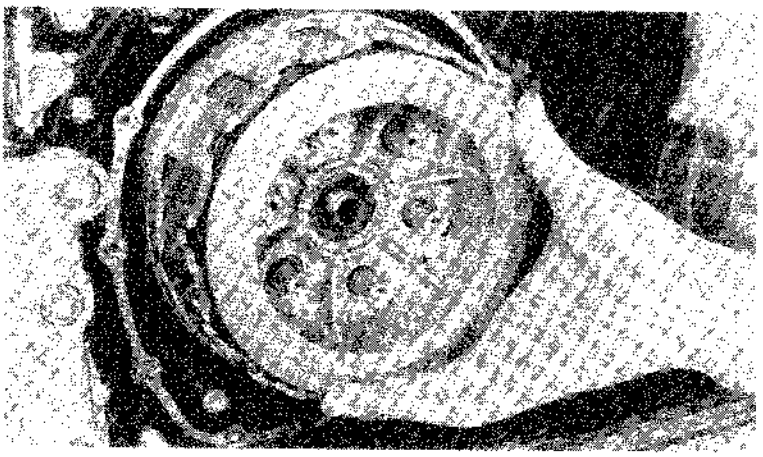
- Before installing the clutch, coat the discs and plates with engine oil.
- Install disc B with the grooves facing in the direction shown.



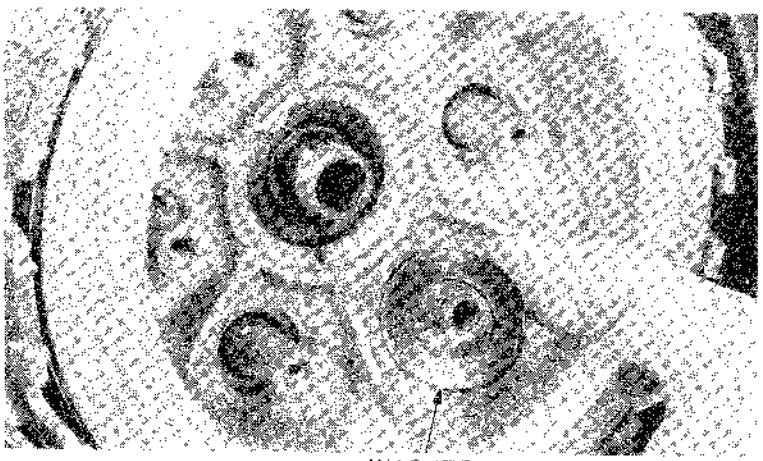


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Install the clutch assembly, by rotating the clutch center.

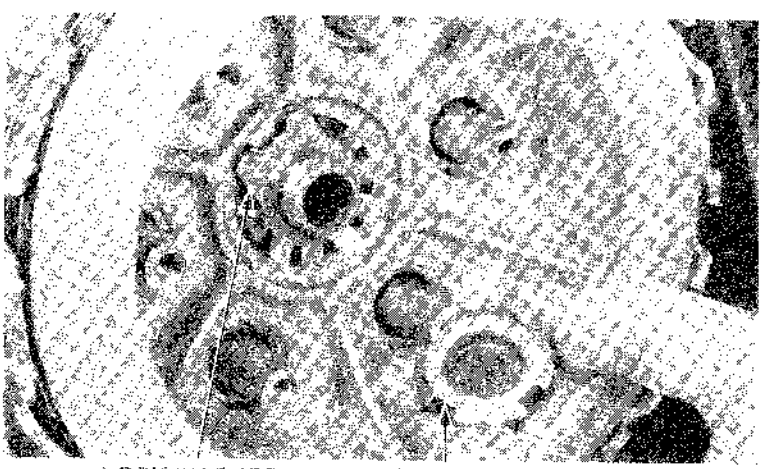


Install the plain washer with the "OUTSIDE" mark facing out.



WASHER

Position the lock washer as shown.
Install the lock nut with the chamfer facing out.



LOCK WASHER LOCK NUT

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Install the clutch holder on the clutch center with three, 6 mm bolts.

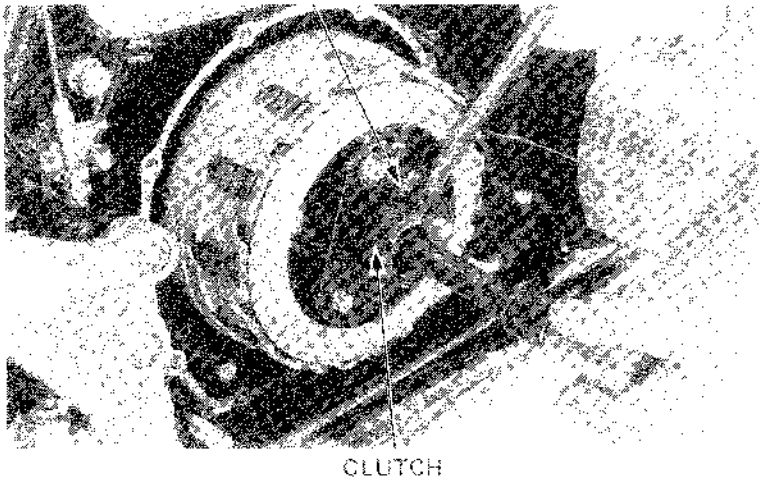
Tighten the lock nut.

TORQUE: 38–42 N·m (3.8–4.2 kg-m, 27–30 ft-lb)

Bend the lock washer tab as shown.

Install the clutch springs, lifter plate, bearing and lifter guide. Tighten the bolts.

LOCK NUT WRENCH, 20 x 24 mm
07716–0020100 OR 07916–3710000

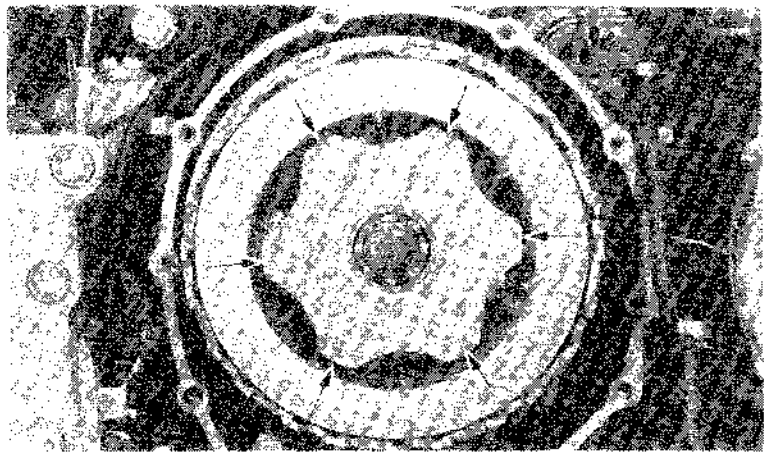


CLUTCH
CENTER HOLDER
07923–3710000 OR 07923–4610000

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

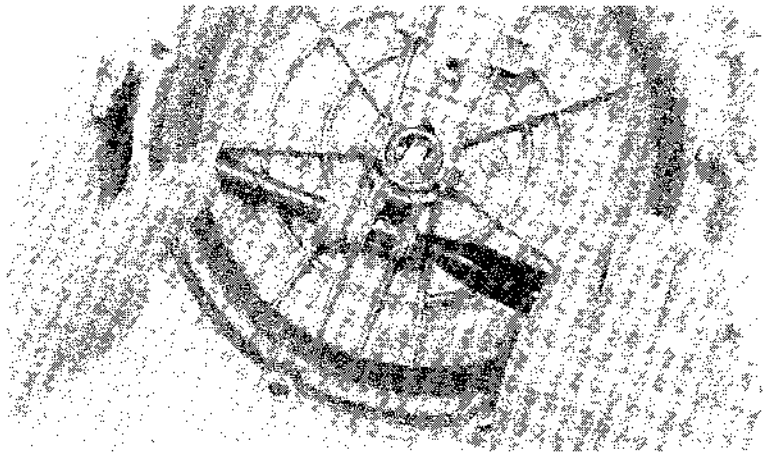
NOTE

Tighten the bolts in a crisscross pattern in 2–3 steps.



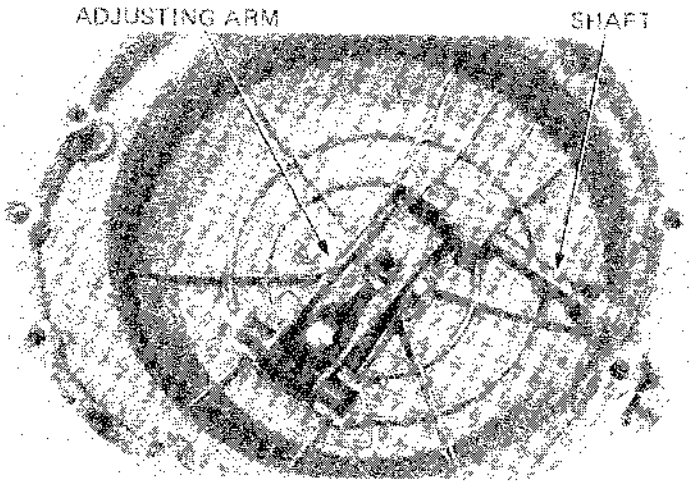
CLUTCH COVER INSTALLATION

Install the clutch lifter cam and shaft washer.
Insert the cotter pin and spread the ends.

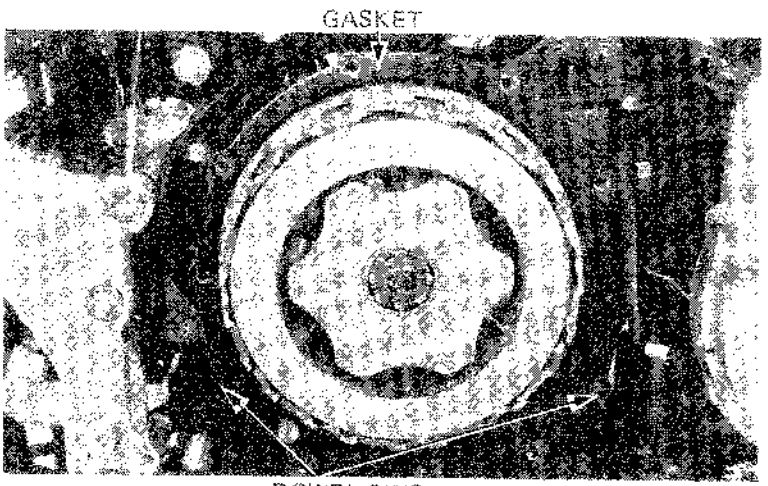


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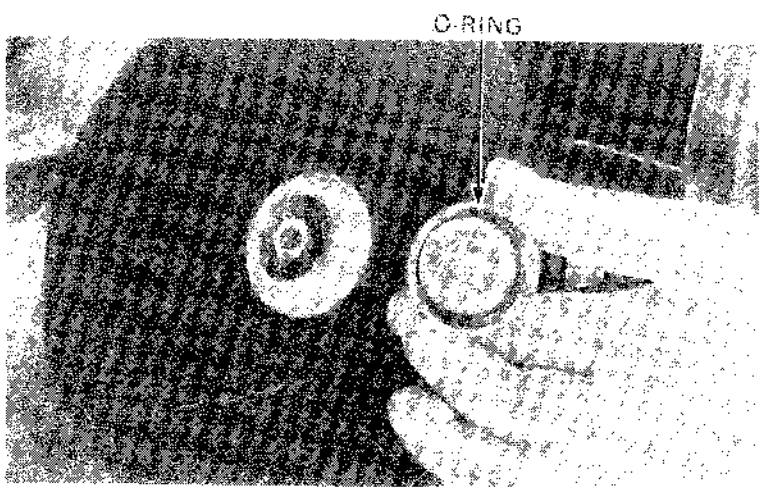
Install the adjusting arm and spring.



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



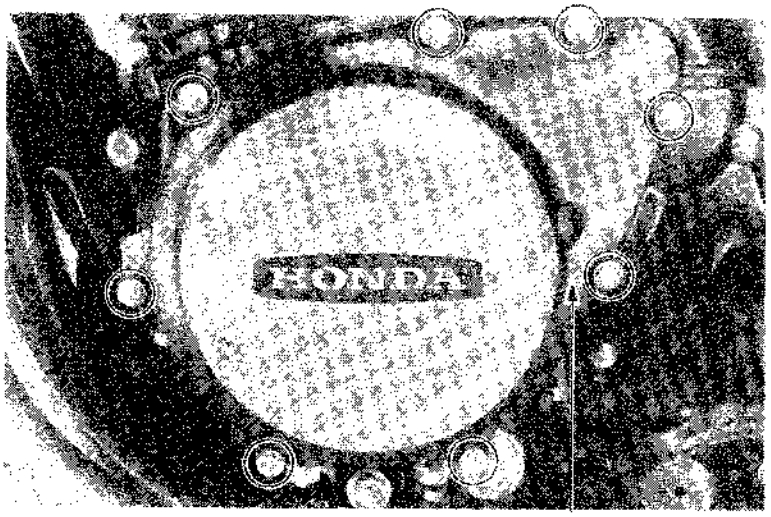
Adjust the clutch (Page 3-19).
Apply grease to the adjusting hole cap O-ring and install.



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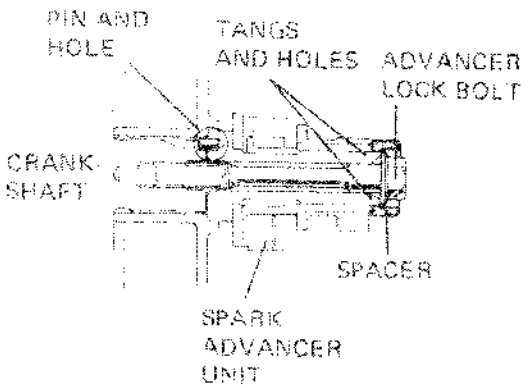
STARTER CLUTCH DISASSEMBLY

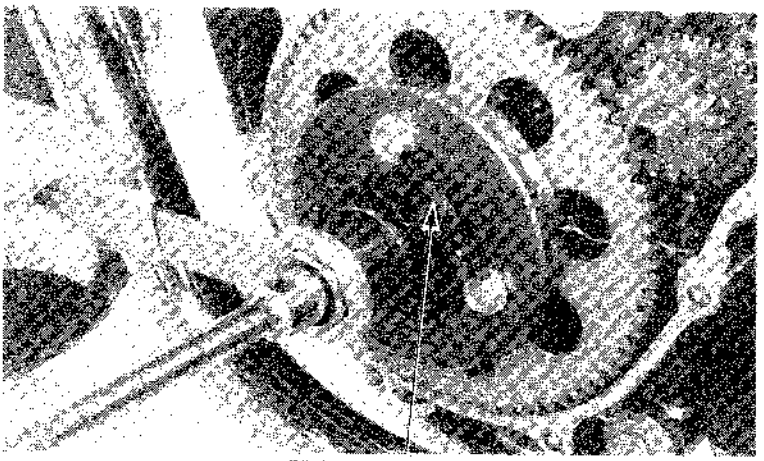
Remove the left crankcase cover with the pulse generator assembly.



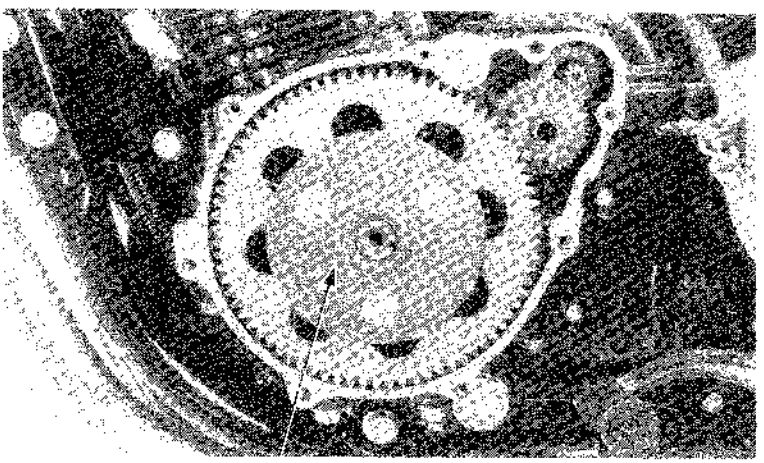
LEFT CRANKCASE COVER

Remove the spark advancer unit.



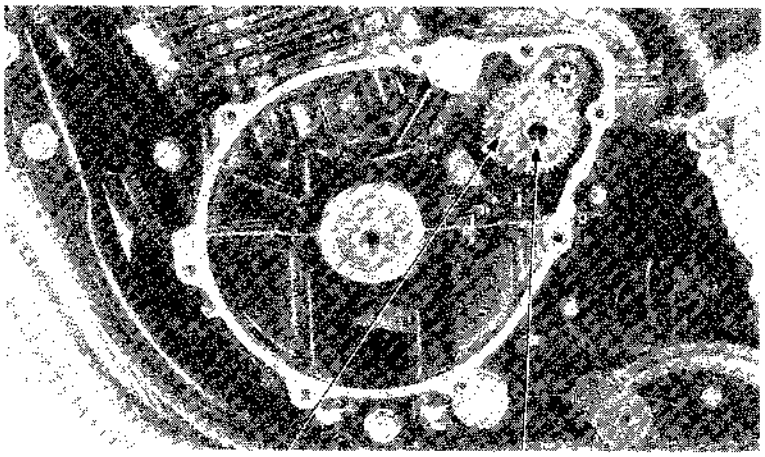

SPARK ADVANCER

Remove the starter clutch assembly.

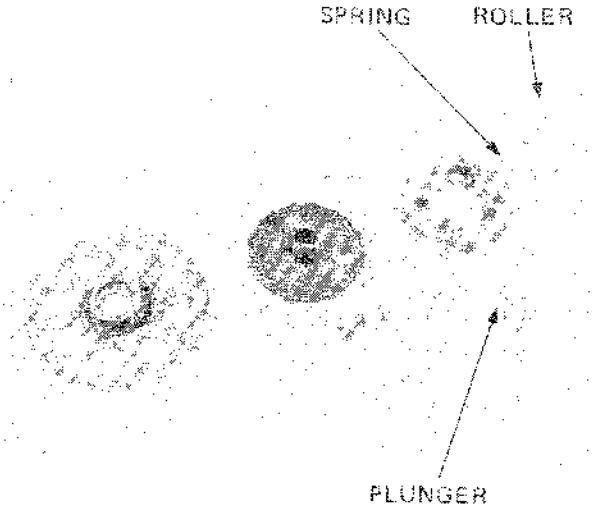

STARTER CLUTCH

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Remove the starter driven gear and shaft.



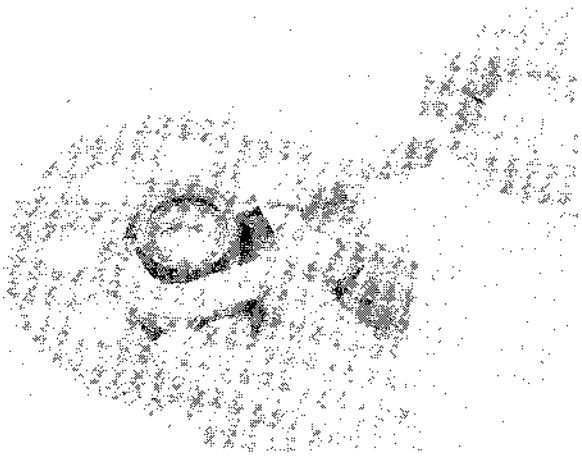
Inspect the rollers for smooth operation.
Remove the rollers and check for excessive wear.
Clean all parts with non-flammable or high flash point solvent.



STANDARD: 42.275–42.300 mm (1.6644–1.6654 in)
SERVICE LIMIT: 42.255 mm (1.6636 in)

STARTER DRIVE GEAR INSPECTION

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



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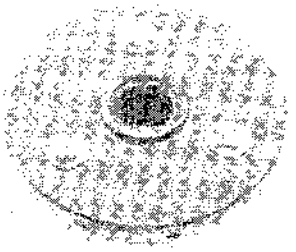
STARTER CLUTCH ASSEMBLY

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

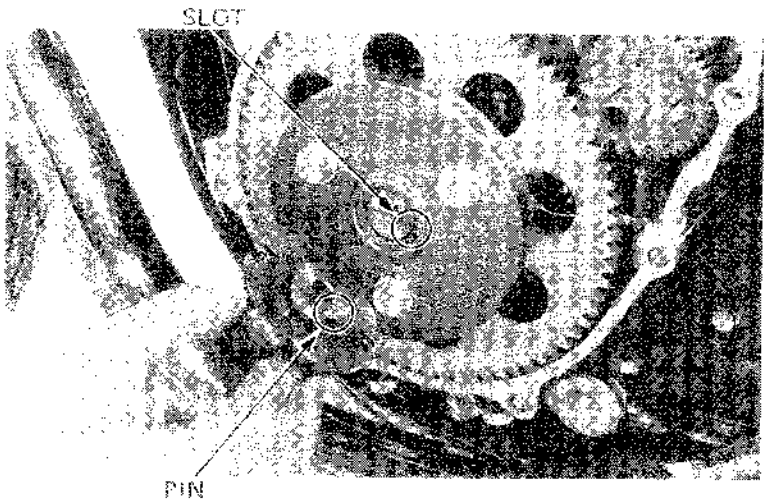
TORQUE: 26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb)

NOTE

Apply a locking agent to the locking bolt's threads



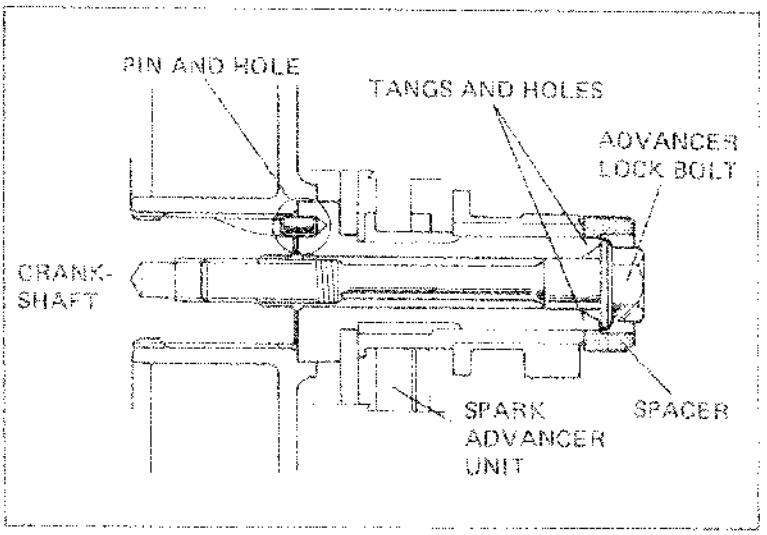
Install the advancer assembly. Align the pin on the spark advancer unit with the slot on the crankshaft.



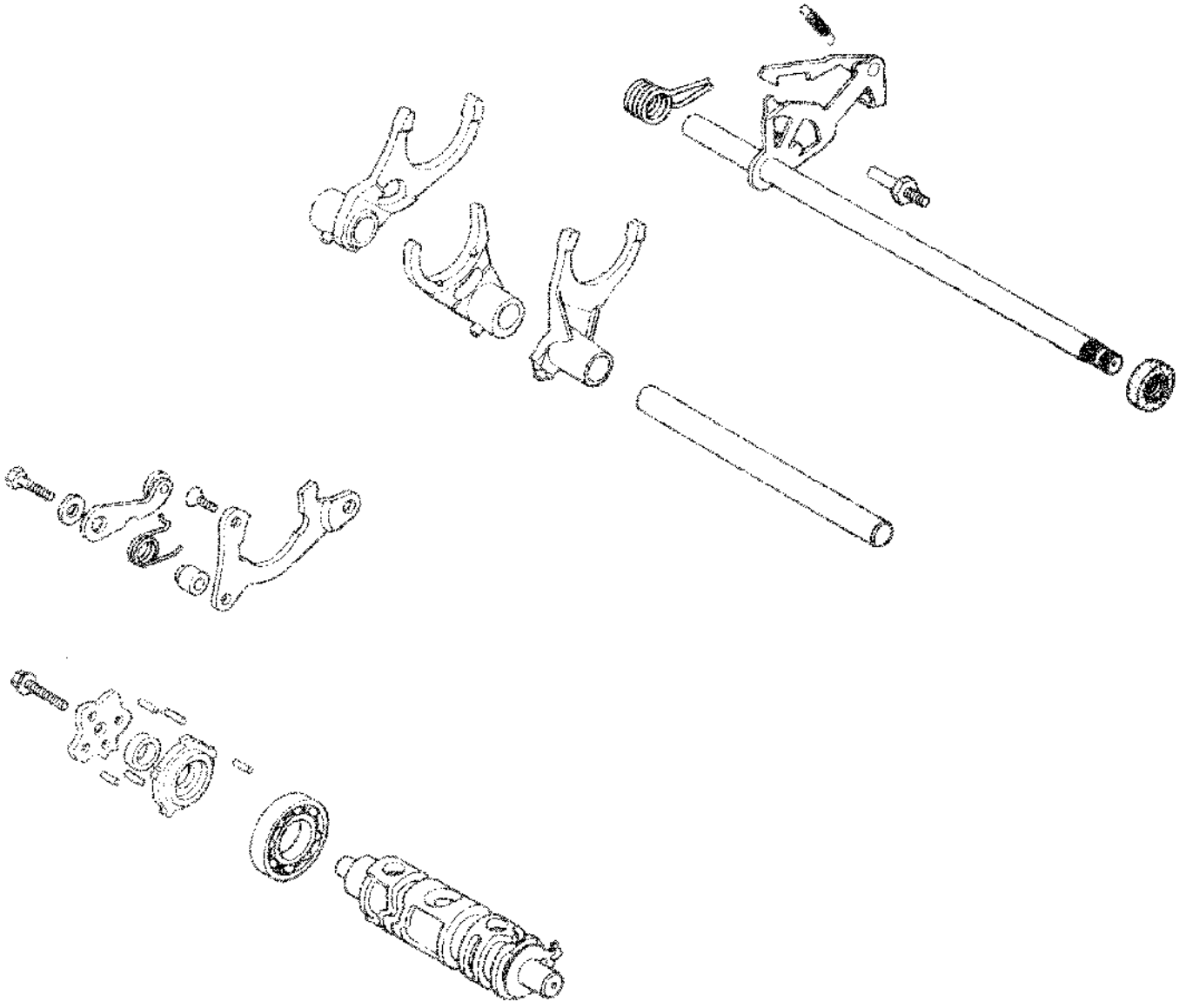
Install the spacer aligning the tangs with the holes, and tighten the advancer lock bolt to the specified torque.

TORQUE: 33–37 N·m (3.3–3.7 kg-m, 24–27 ft-lb)

Install the left crankcase cover.



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9. GEARSHIFT LINKAGE

SERVICE INFORMATION	9–1
TROUBLESHOOTING	9–1
GEARSHIFT LINKAGE REMOVAL	9–2
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.

TORQUE VALUE

Neutral switch	16–20 N-m (1.6–2.0 kg-m, 12–14 ft-lb)

TROUBLESHOOTING

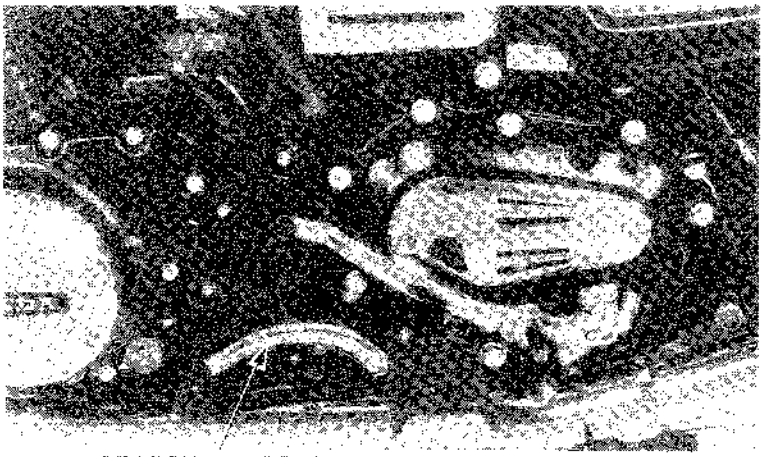
Hard to shift
1. Transmission clutch adjustment; too much free play.
2. Shift forks bent.
3. Shift shaft bent.
4. Shift claw bent.
5. Shift drum cam grooves damaged.

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

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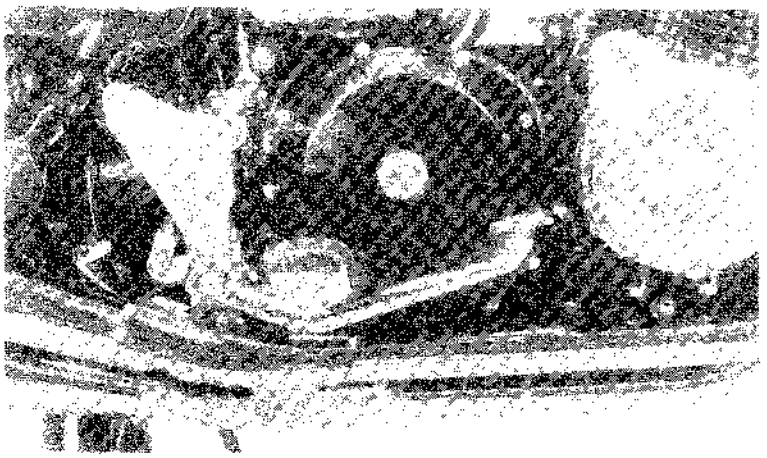
GEARSHIFT LINKAGE REMOVAL

Drain the engine oil and remove the gearshift pedal.

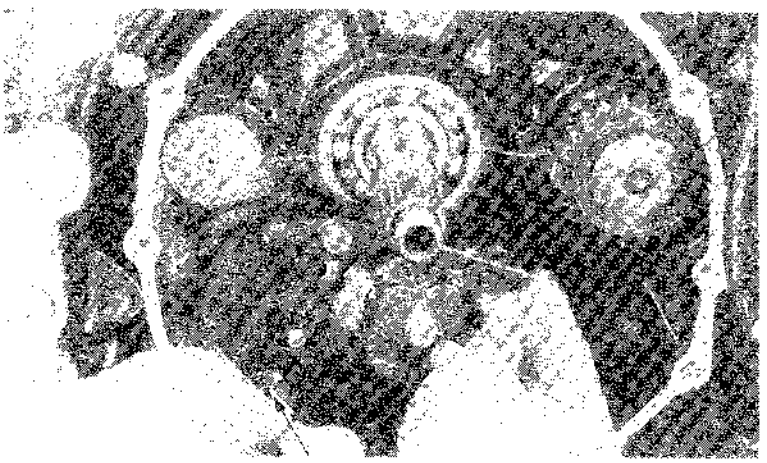


GEARSHIFT PEDAL

Remove the clutch cover and clutch assembly (Section 8).



Pull the gearshift spindle assembly out.

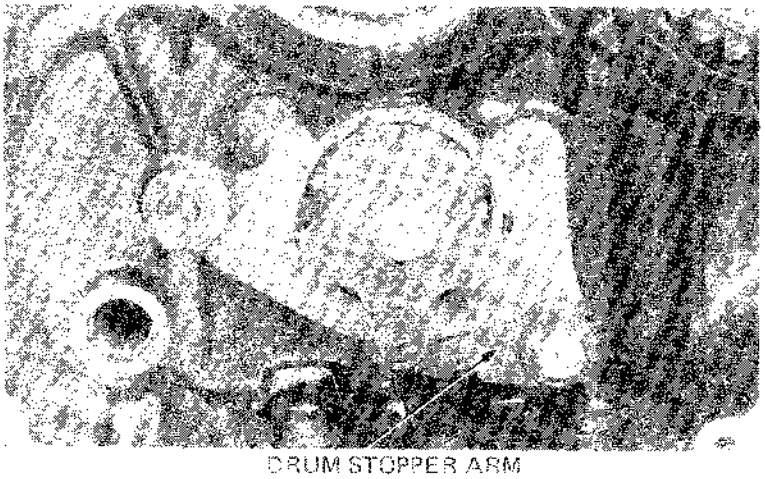


GEARSHIFT SPINDLE

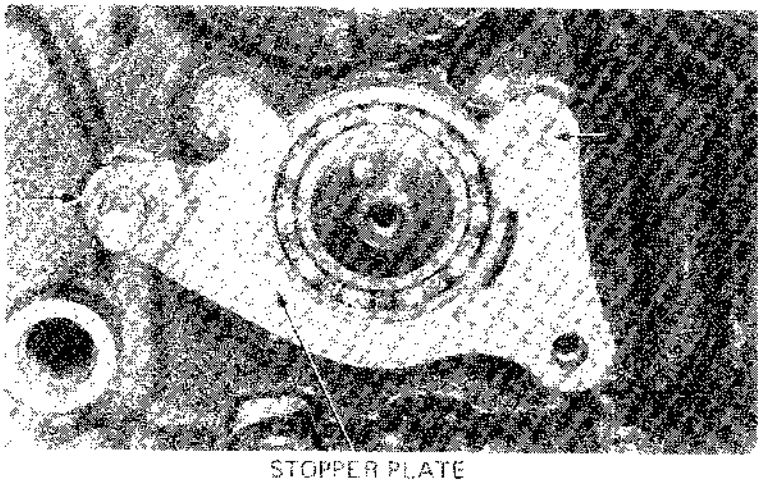
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Remove the drum stopper arm bolt, arm and spring.
Remove the roller stopper plate bolt and plate.


DRUM STOPPER ARM

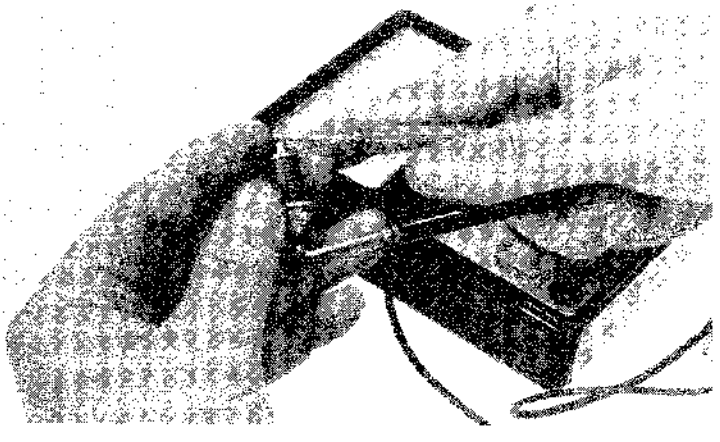
If bearing removal is necessary, remove the bearing stopper plate.


STOPPER PLATE

NEUTRAL SWITCH INSPECTION

Remove the oil pump cover and neutral switch.

Check for continuity between the top and bottom terminals. The switch is normal if there is continuity.
Also check for shorts between the top terminal and any body ground. Replace the switch if there is continuity.



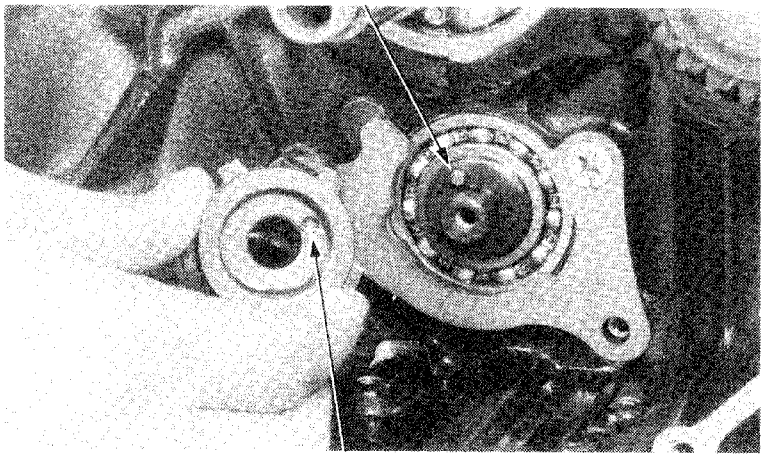
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GEARSHIFT LINKAGE INSTALLATION

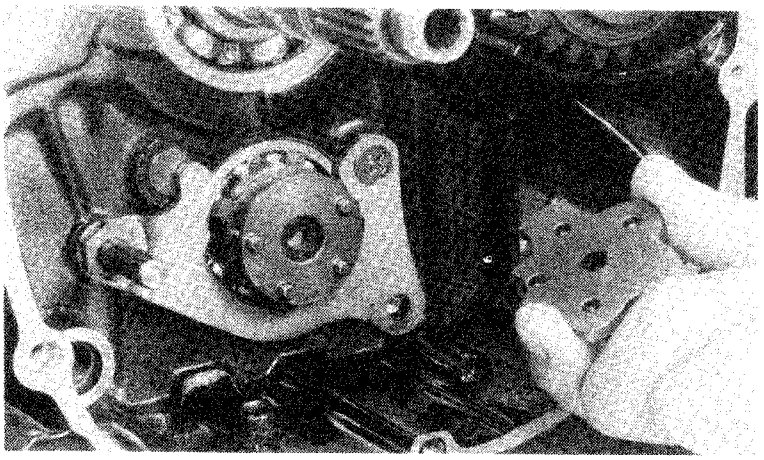
Align the hole in the roller stopper base plate with the pin on the shift drum.

NOTE

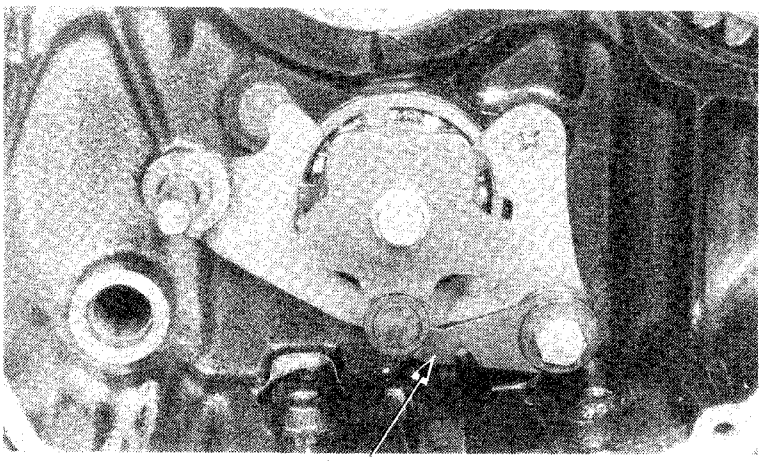
If bearing replacement is necessary, apply a locking agent to the screw threads.



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

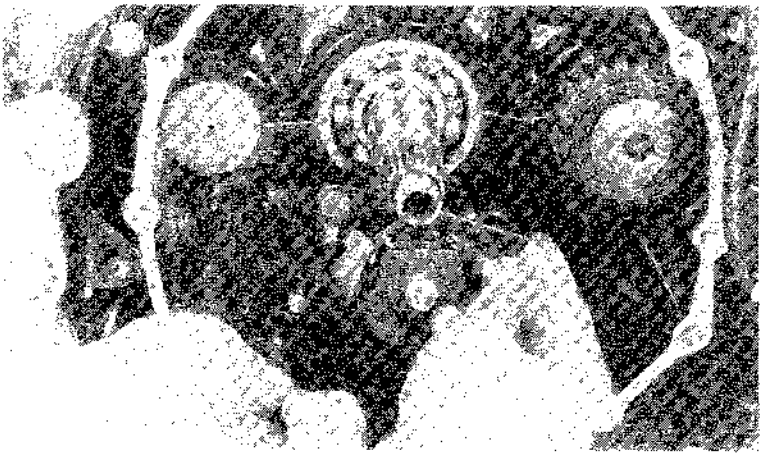


Install the drum stopper arm, bolt and return spring. Tighten the bolt securely.

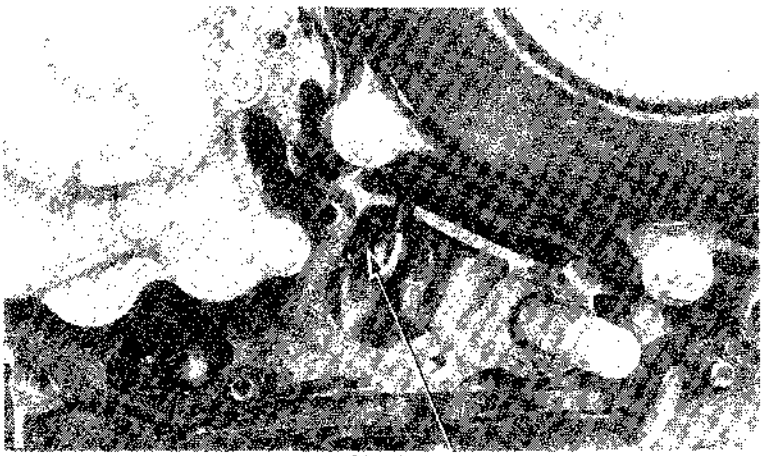


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Assemble the gear shift spindle and return spring. Install as shown.
Rotate the gearshift spindle and check the linkage for smooth operation.
Install the clutch assembly and cover.
Install the gearshift pedal.

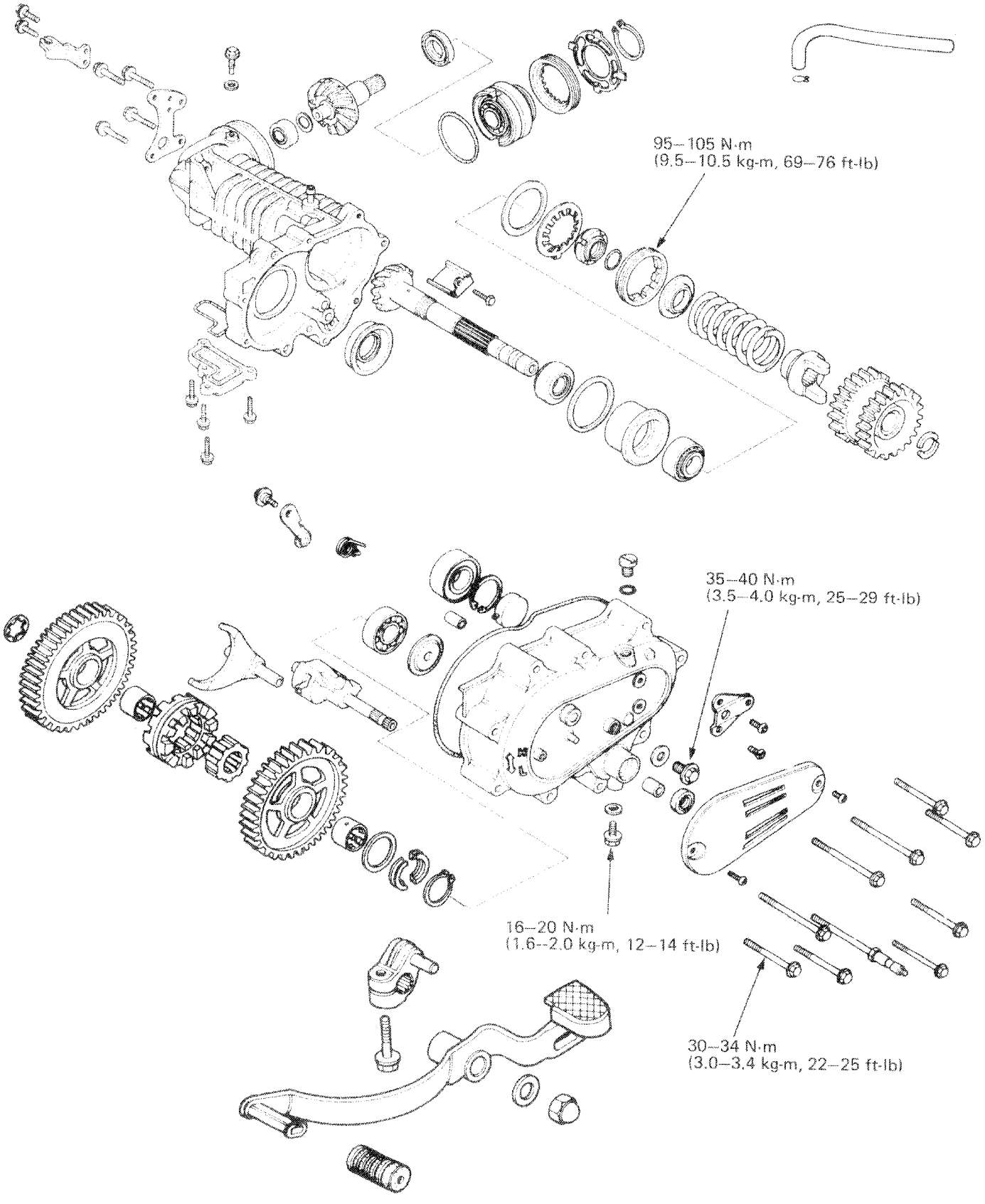


Install the neutral switch and connect the switch wire.
Install the oil pump cover.



NEUTRAL SWITCH

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10. SUBTRANSMISSION

SERVICE INFORMATION	10– 1	RETAINER B OIL SEAL REPLACEMENT	10– 9
TROUBLESHOOTING	10– 2	DRIVE GEAR REPLACEMENT	10–13
SUBTRANSMISSION DISASSEMBLY	10– 3	SUBTRANSMISSION CASE INSTALLATION	10–15
SUBTRANSMISSION ASSEMBLY	10– 6		
SUBTRANSMISSION CASE REMOVAL	10– 9		

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- These parts can be serviced with the subtransmission in the frame.
  - Reduction drive/driven gears and collars.
  - Damper lifter, sping and spring seat.
  - Gear shift linkage.
  - Subtransmission oil pump (see Section 2).

- The swing arm and subtransmission must be removed to service these parts.
  - Subtransmission case and oil seal.

- Replace the subtransmission as an assembly if bearings, drive or driven gears need replacement.

10

SPECIFICATIONS

	STANDARD	SERVICE LIMIT
Reduction drive gear I.D.	31.000–31.025 mm (1.220–1.222 in)	31.04 mm (1.222 in)
Reduction drive gear collar O.D.	30.950–30.975 mm (1.218–1.229 in)	30.94 mm (1.218 in)
Reduction driven gear I.D.	25.000–25.021 mm (0.984–0.985 in)	25.04 mm (0.986 in)
Final drive gear shaft O.D.	24.959–24.980 mm (0.982–0.983 in)	24.95 mm (0.982 in)
Final drive gear damper spring free length	107.7 mm (4.24 in)	———
Final drive gear backlash	0.08 – 0.18 mm (0.003–0.007 in)	0.25 mm (0.010 in)
Shift fork claw thickness	6.00 – 6.10 mm (0.236–0.240 in)	5.7 mm (0.22 in)
Reduction gear backlash	0.072– 0.143 mm (0.003–0.006 in)	0.20 mm (0.008 in)

Subtransmission
Oil capacity — 0.6 liter (0.61 US qt)
Hypoid gear oil API, GL-5 SAE #80

TORQUE VALUES

Subtransmission cover	30– 34 N·m (3.0– 3.4 kg-m, 22–25 ft-lb)
Oil level check bolt	35– 40 N·m (3.5– 4.0 kg-m, 25–29 ft-lb)
Oil drain bolt	16– 20 N·m (1.6– 2.0 kg-m, 12–14 ft-lb)
Oil cap bolt	4– 6 N·m (0.4– 0.6 kg-m, 3– 4 ft-lb)
Final drive gear ass'y. lock nut	95–105 N·m (9.5–10.5 kg-m, 69–76 ft-lb)

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TOOLS

Special		
Retainer wrench A	07910-4610100	Not available in U.S.A.
Retainer wrench B	07910-4610200	
Damper compressor	07964-4610000	
Preload inspection tool	07998-4610000	
Subtransmission base	07965-4610000	Not available in U.S.A.
Common		
Driver	07749-0010000	or 07949-6110000
Attachment 37 x 40 mm	07746-0010200	
Attachment 42 x 47 mm	07746-0010300	
Driver	07746-0030100	

TROUBLESHOOTING

Hard to shift

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

Transmission jumps out of gear

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

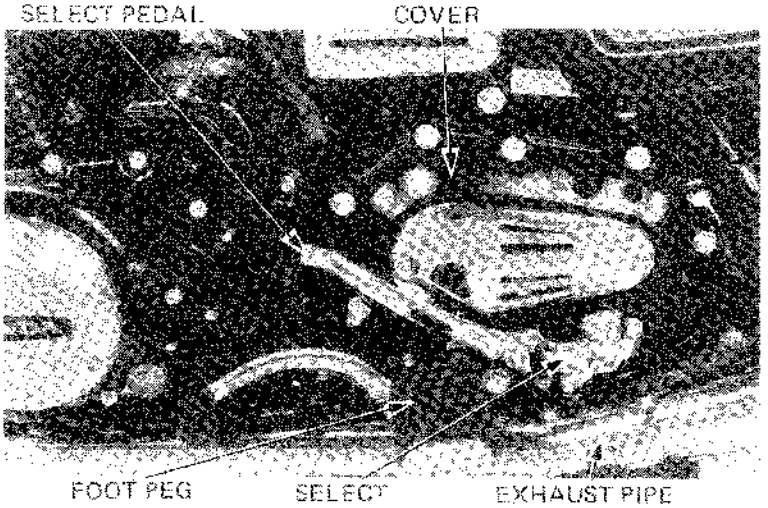
Final drive gear noise

1. Oil level too low.
2. Excessive backlash.
3. Drive shaft splines damaged or worn.
4. Insufficient lubricant.

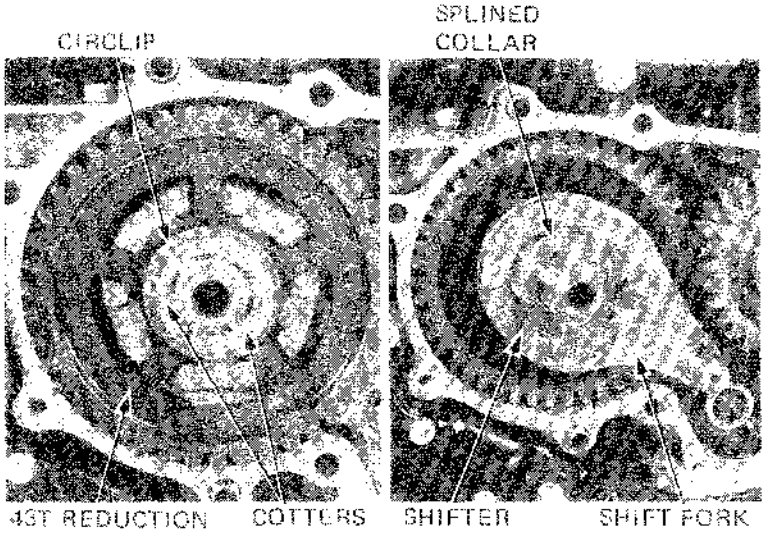
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SUBTRANSMISSION DISASSEMBLY

Remove the foot pegs and exhaust pipe heat shield.
Remove the select pedal and arm.
Drain the oil (Page 2-9).
Remove the protector cover.
Remove the subtransmission cover.



Remove the circlip, washer and cotters.
Remove the 43T reduction drive gear and collar.
Remove the shift drum, shift fork and shifter with spline collar.



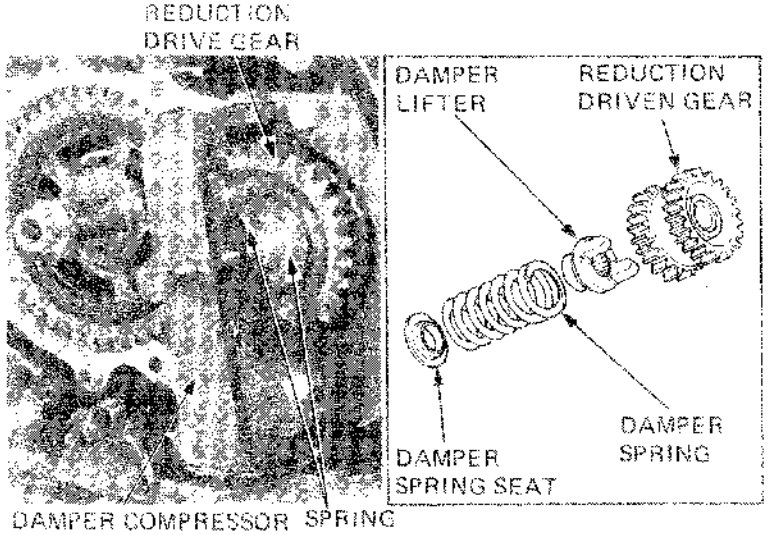
Compress the reduction driven gear with the special tool and remove the spring cotters.

After removing the spring cotters, loosen the special tool until the spring is fully released.
Then, remove the tool.

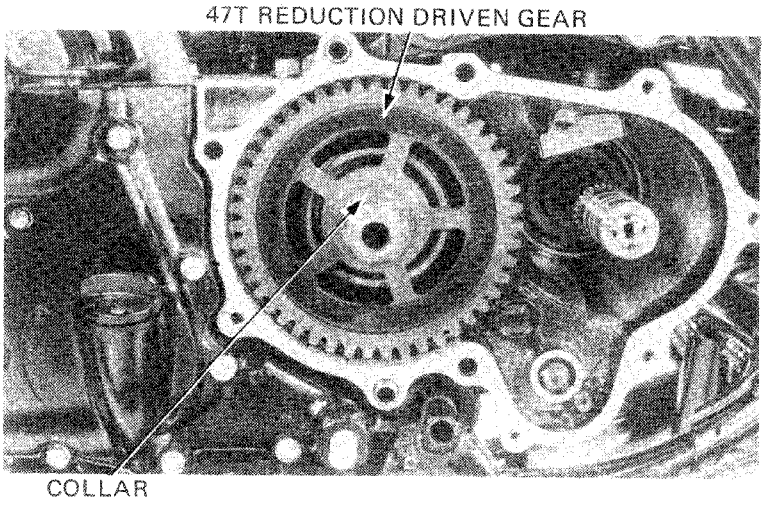
WARNING

The reduction driven gear will pop out when the tool is removed without releasing the spring.

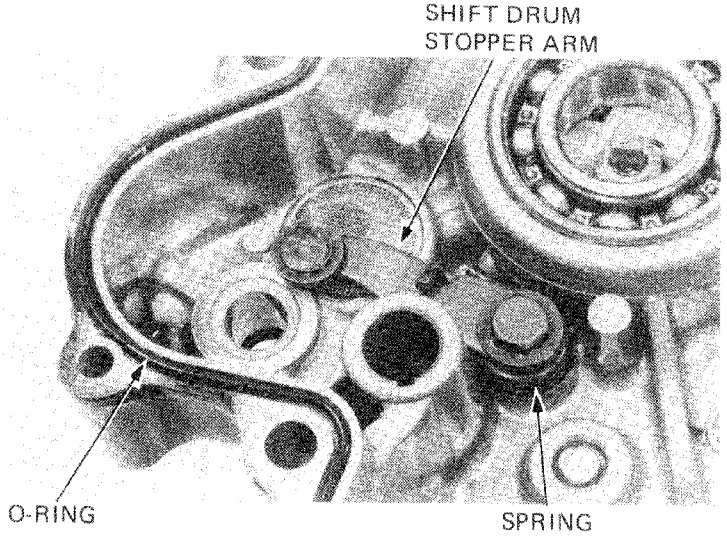
Remove the reduction driven gear, damper lifter, damper spring and damper spring seat.



Remove the collar and the 47T reduction driven gear and washer.



Remove the shift drum stopper arm, spring and O-ring.



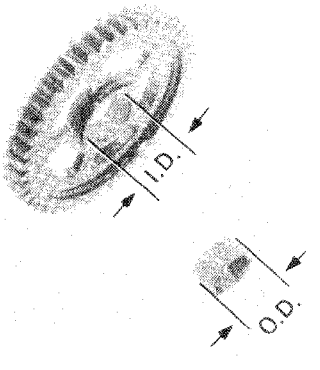
INSPECTION

Check the drive gear slots, teeth and rubber for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure each gear I.D. and collar O.D.

SERVICE LIMIT:

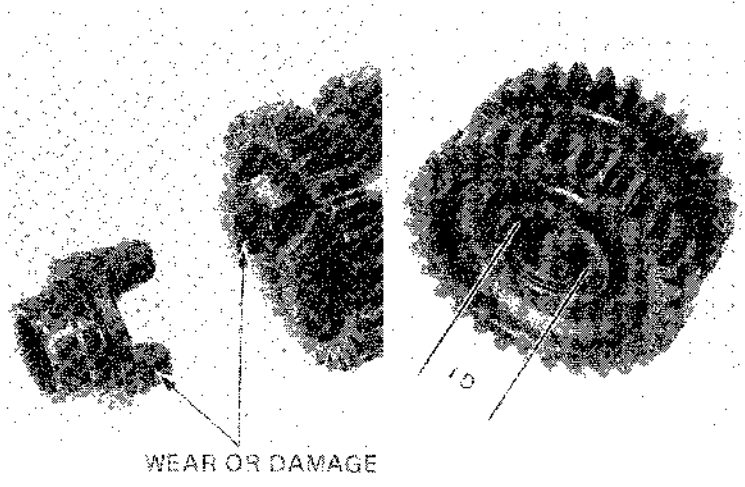
DRIVE GEAR (43T, 47T) I.D.:
31.04 mm (1.222 in)
GEAR COLLAR O.D.:
30.94 mm (1.218 in)



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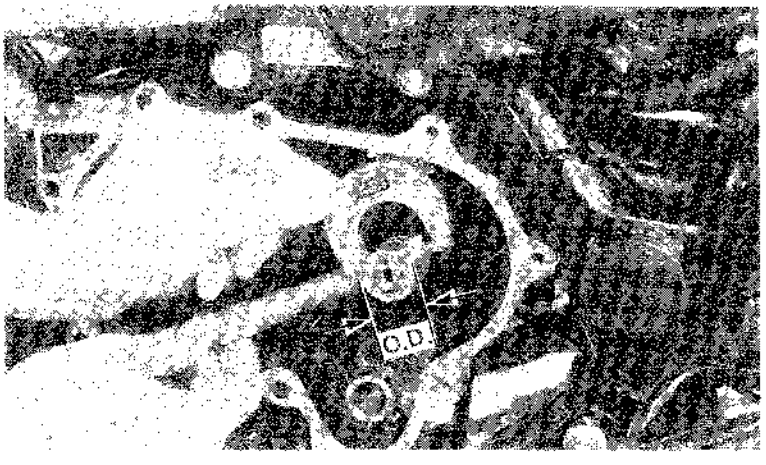
Check the driven gear teeth for excessive or abnormal wear, or evidence of insufficient lubrication.
Check the damper lifter for wear or damage.
Measure the driven gear I.D.

SERVICE LIMIT: 25.04 mm (0.982 in)

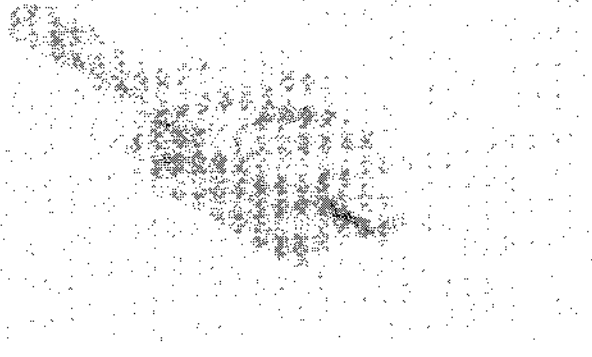


Measure the final drive gear shaft O.D.

SERVICE LIMIT: 24.95 mm (0.982 in)



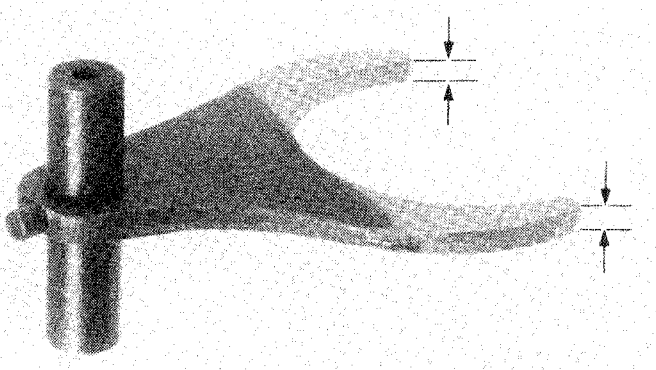
Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for damage.



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Measure the shift fork claw thickness.

SERVICE LIMIT: 5.7 mm (0.22 in)

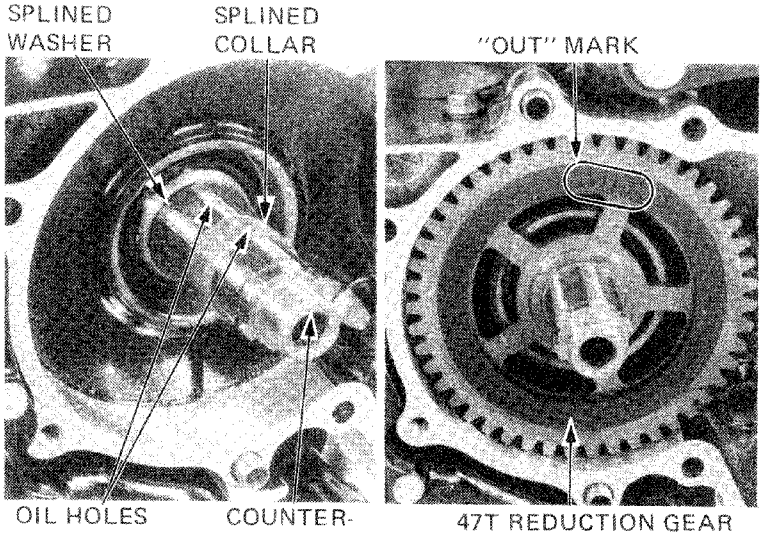


SUBTRANSMISSION ASSEMBLY

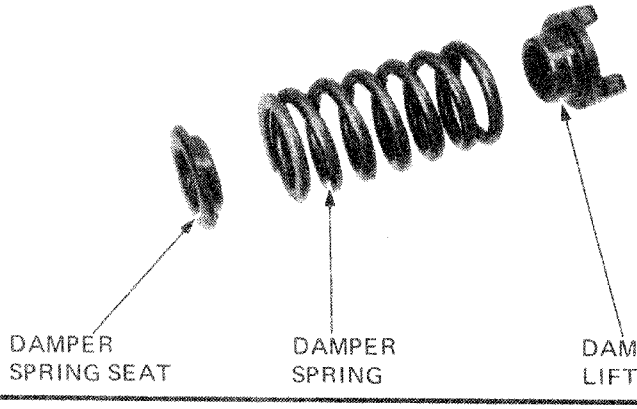
Install the splined washer onto the countershaft.

Install a reduction drive gear collar, aligning the collar's and the countershaft's oil holes.

Install the 47T reduction drive gear with the "OUT" mark facing toward you.

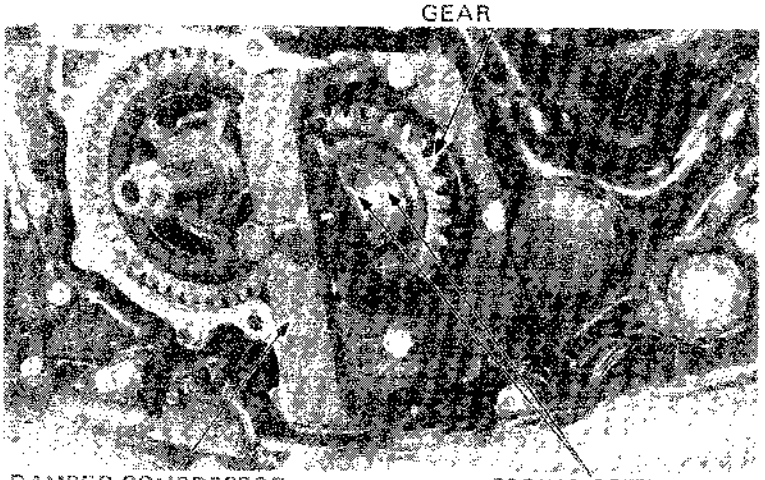


Install the damper spring seat, damper spring and damper lifter.



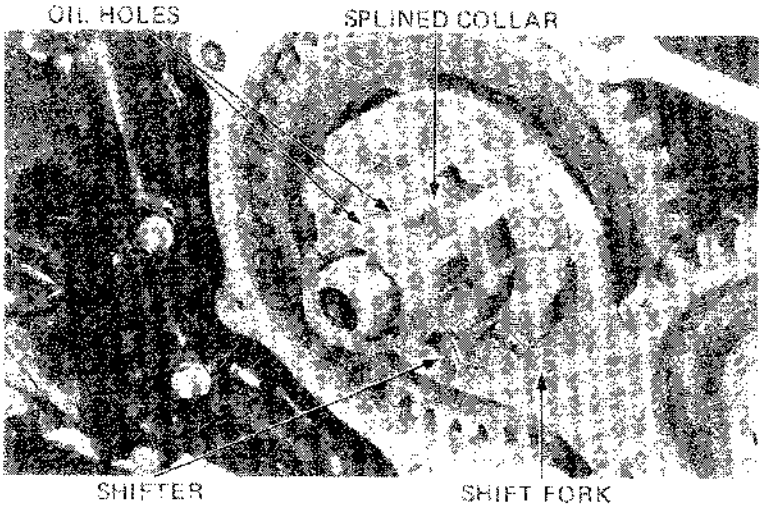
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Install the reduction driven gear, and compress it with the special tool.
Install the spring cotters.
Remove the special tool.



Install the splined collar.
Install the shifter and shift fork as an assembly.
Engage the shifter dogs with the drive gear.

Install the other drive gear collar, aligning the collar's and the countershaft's oil holes.

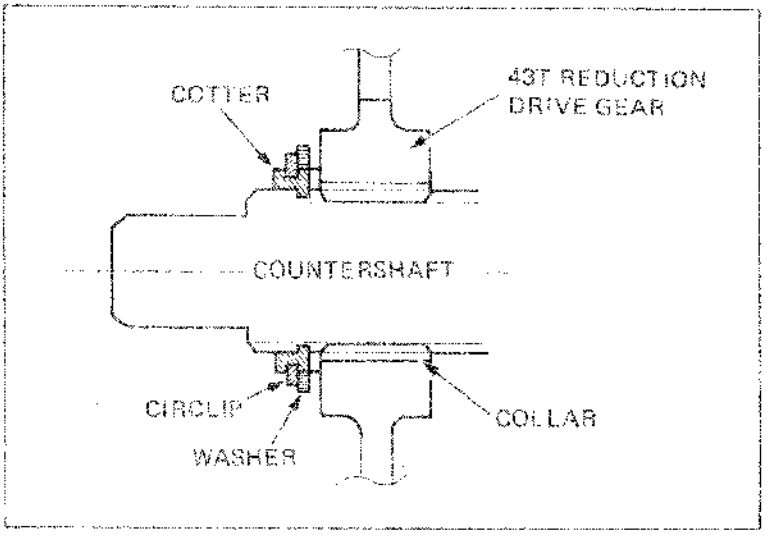


Install the 43T reduction drive gear with the "OUT" mark facing out toward you.

Seat the cotters into the countershaft grooves.

Place the thrust washer over the cotters.

Seat the cotter circlip into the cotter groove.



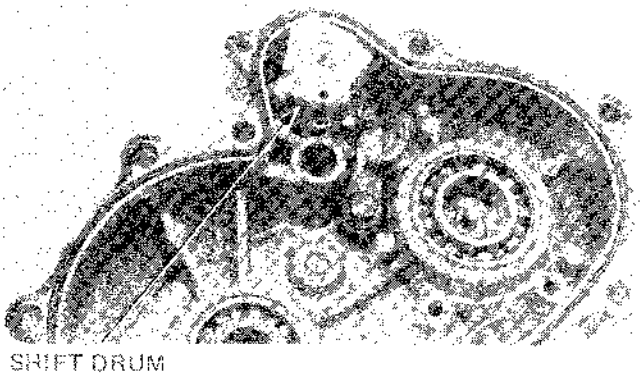
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Install the stopper arm and spring.
Install the shift drum as shown.

NOTE

The shift drum groove will engage the shift fork boss automatically when the shift drum is assembled as shown.

Apply grease to a new o-ring and set the o-ring in the groove of the cover securely.



SHIFT DRUM

Install the subtransmission cover.

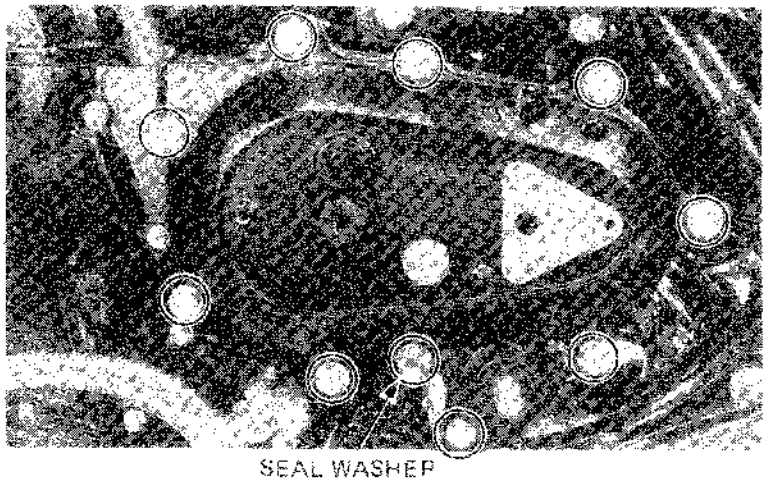
NOTE

- Check the location of the shift drum or shift fork if difficulty is encountered in installing the cover.
- Do not strike the cover with excessive force.

Tighten the cover bolts.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

Install the protector cover.
Install the exhaust pipe heat shield.
Fill the case with the recommended oil (Page 2-9).



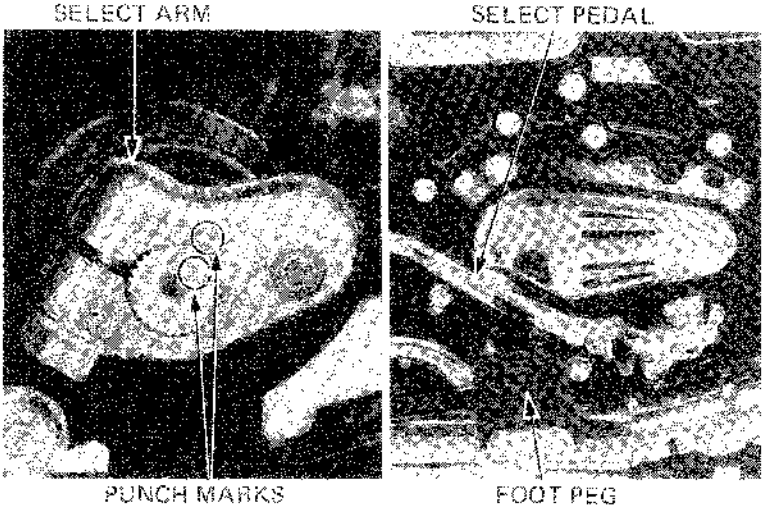
SEAL WASHER

Align the punch marks and install the select arm and select pedal.

NOTE

Make sure that the select pedal toe end is in the "HI" position on the cover.

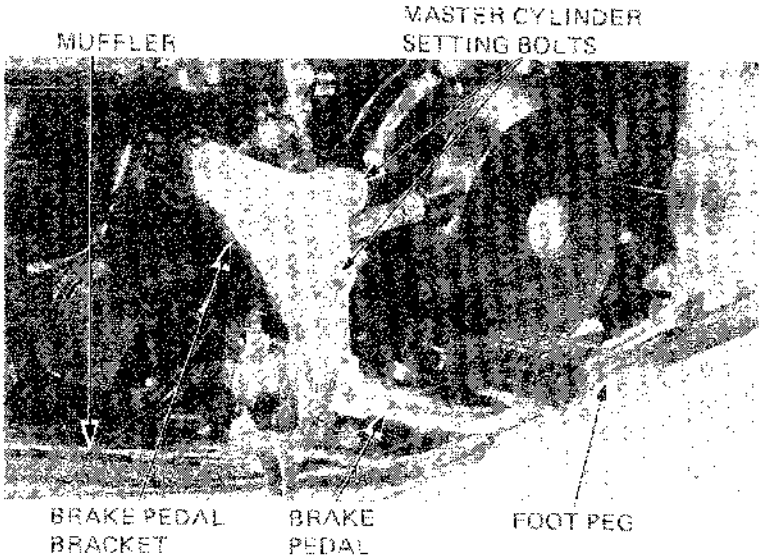
Install the foot pegs.



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SUBTRANSMISSION CASE REMOVAL

Remove the following:
- mufflers (Page 5-2),
- subtransmission (Page 10-3),
- swing arm (Page 15-12),
- foot pegs,
- right exhaust pipe heat shield,
- rear brake pedal, brake pedal bracket, and master cylinder bolts.



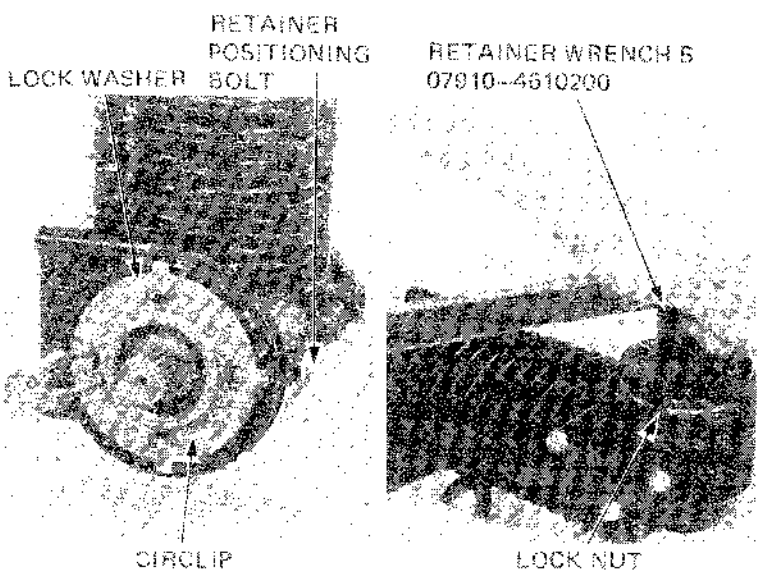
Remove the subtransmission case mounting bolts and the subtransmission case.



RETAINER B OIL SEAL REPLACEMENT

RETAINER B AND DRIVEN GEAR ASSEMBLY REMOVAL

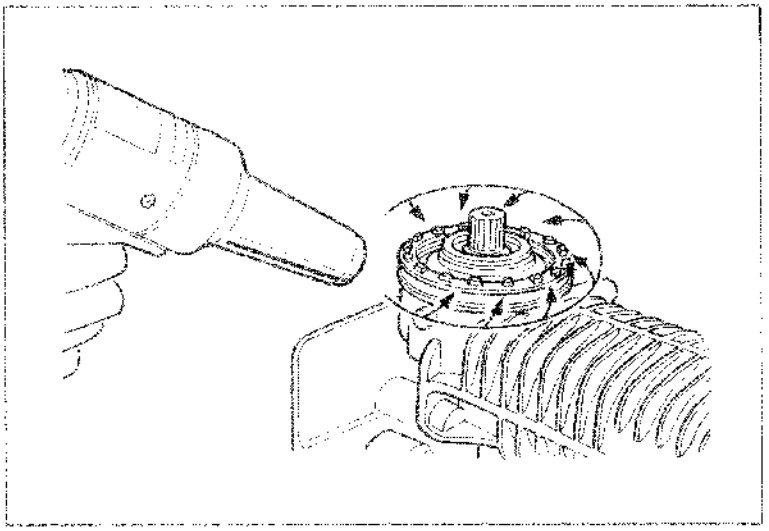
Remove the circlip and lock washer.
Remove the retainer positioning bolt.
Remove the lock nut.



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Heat the outside of the case evenly with a 1 kw dryer for 15 minutes.

Hold the dryer about 5 cm (2 in) from the case.



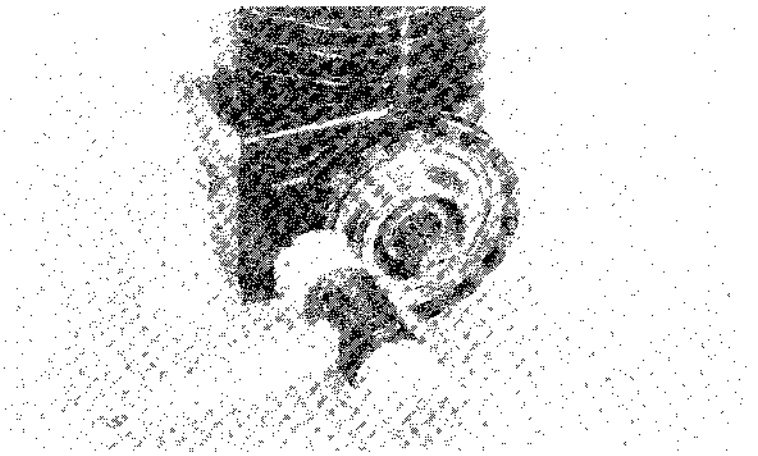
Remove retainer B and driven gear assembly, tapping around the case with a plastic hammer.

NOTE

Check that the 30203C bearing outer is removed with the gear assembly.

⚠ WARNING

Be sure to wear gloves when removing the parts from the heated case.

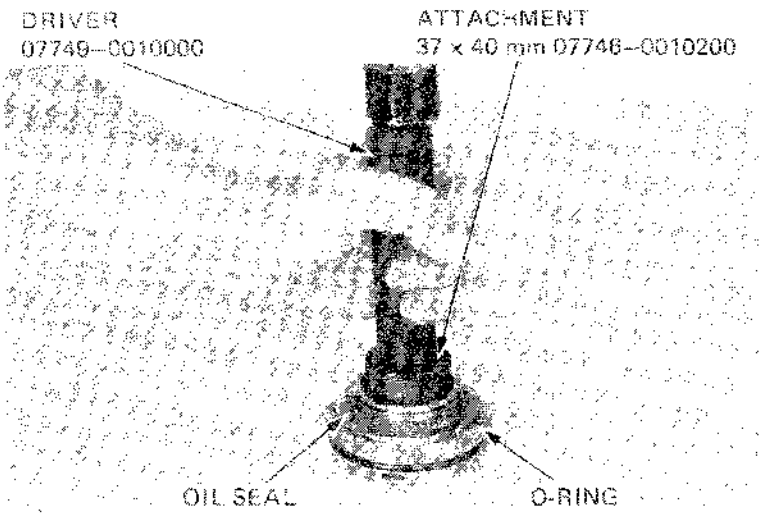


RETAINER B OIL SEAL AND O-RING REPLACEMENT

Drive out the oil seal and remove the retainer B o-ring.

NOTE

Replace the O-ring with a new one whenever retainer B is disassembled.



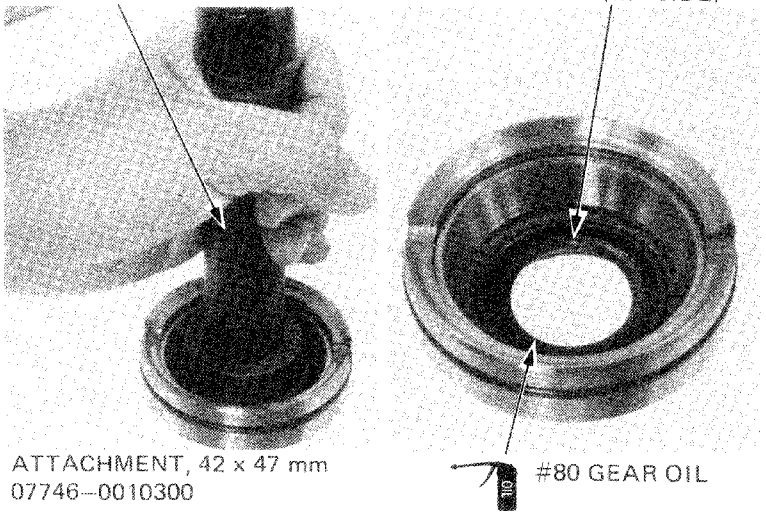
148

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Install a new O-ring on retainer B.
Coat the new oil seal with gear oil and drive it into retainer B.

NOTE

- Install the oil seal with the sealing lip facing the inside.
- Avoid damaging the oil seal spring band.
- Before driving in the oil seal check that the 20306C bearing is in place in retainer B.

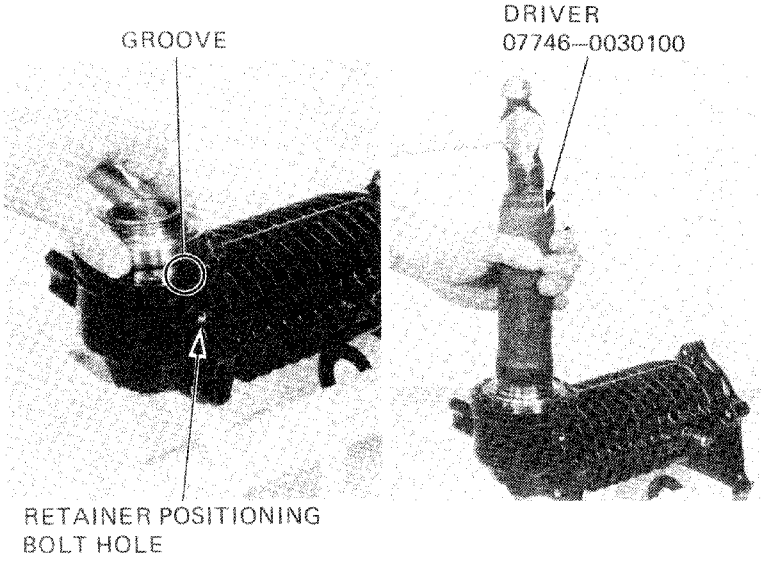


RETAINER B AND DRIVEN GEAR INSTALLATION

Place retainer B over the driven shaft, aligning the groove with the retainer positioning bolt hole and drive it into the case until the 20306C bearing outer race lightly seats on the inner bearing.

CAUTION

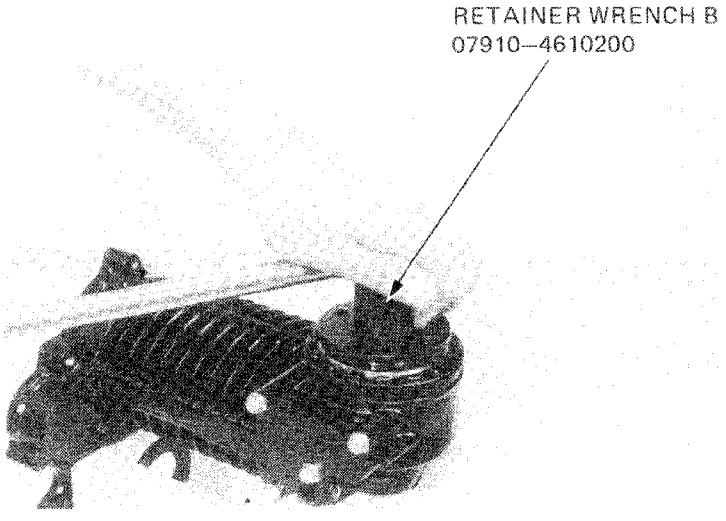
- *Drive retainer B in squarely.*
- *Rotate the driven shaft while driving retainer B. Stop driving when resistance is felt.*



Install and tighten the lock nut.

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

Rotate the driven gear shaft 2–3 turns.

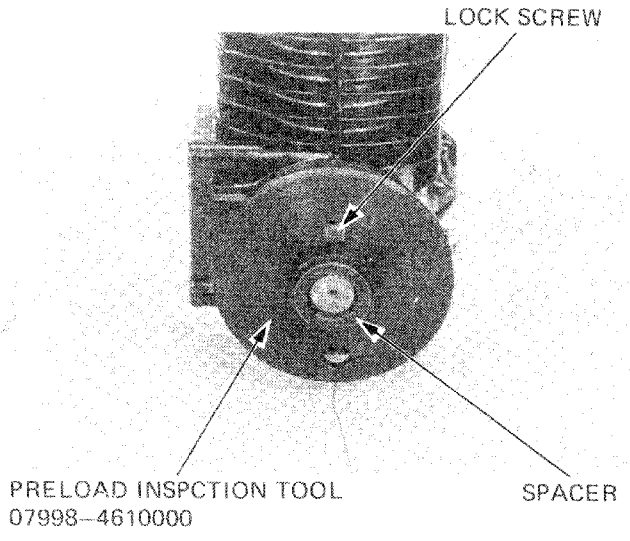


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Slide the PRELOAD INSPECTION TOOL over the shaft through a spacer.
Secure with the lock screw.

NOTE

Before tightening, make sure that the end of the lock screw is inserted in the shaft splines.



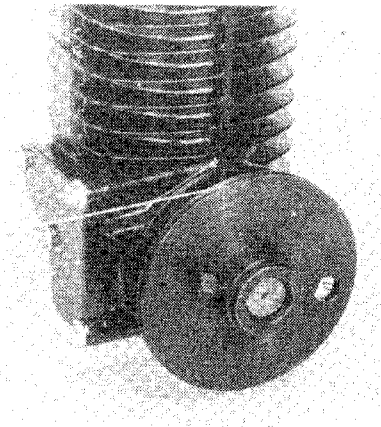
DRIVEN GEAR PRELOAD INSPECTION

Wind the string around the groove of the tool.
Attach a spring scale to the string and measure the force needed to turn the tool.

NOTE

Force required to begin gear movement may exceed preload limits.

DRIVEN GEAR PRELOAD:
0.6–0.8 kg (1.32–1.76 lbs)
[3.0–4.0 kg-cm, 2.6–3.5 in-lb]



To increase the preload, turn in the lock nut.

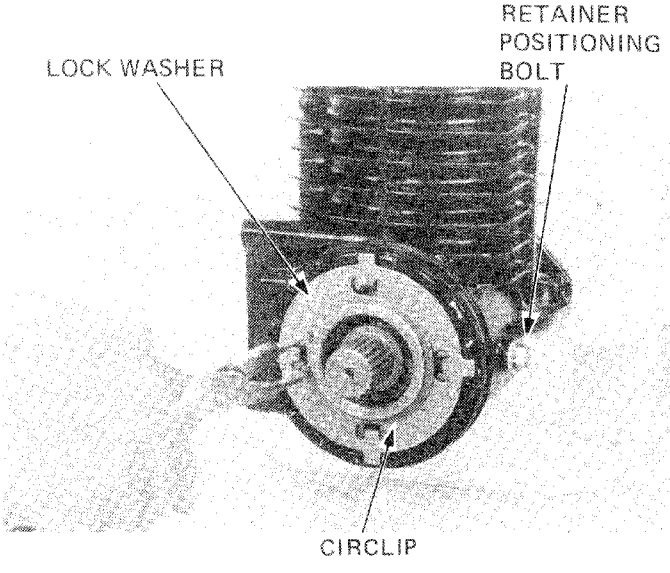
NOTE

Turn the shaft 2–3 rotations each time the nut is tightened.

Recheck the preload.

Install and tighten the retainer positioning bolt.

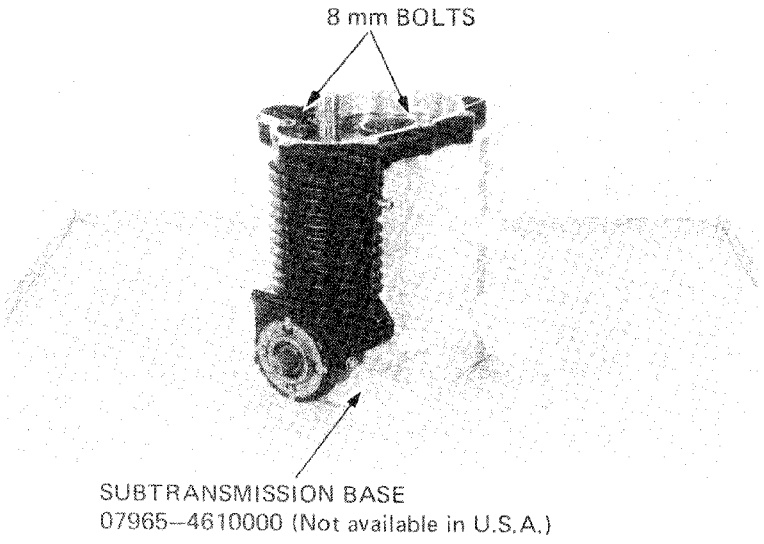
Install the lock washer and circlip.



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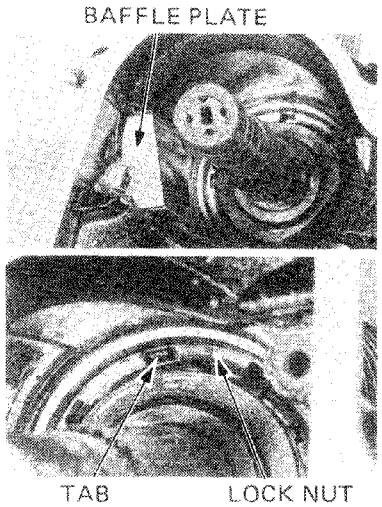
DRIVE GEAR REPLACEMENT

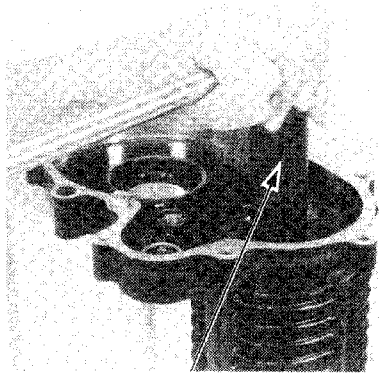
Attach the subtransmission case to the base with two 8 x 40 mm bolts.



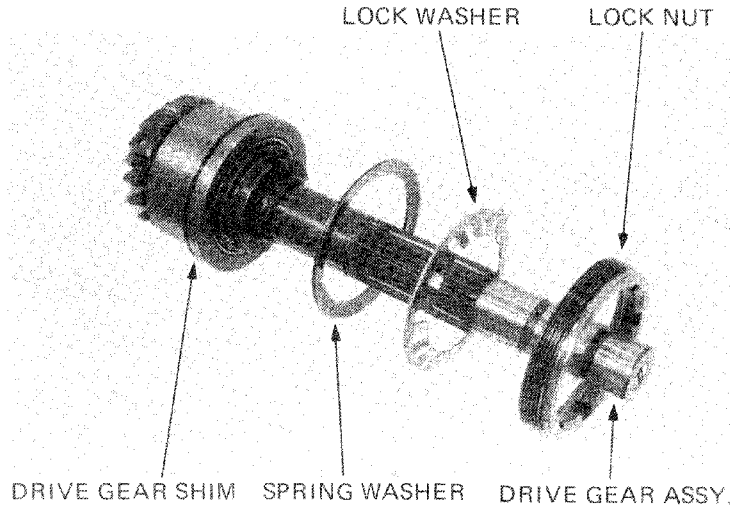
Remove the baffle plate.
Straighten the lock washer tab.

Remove the lock nut.





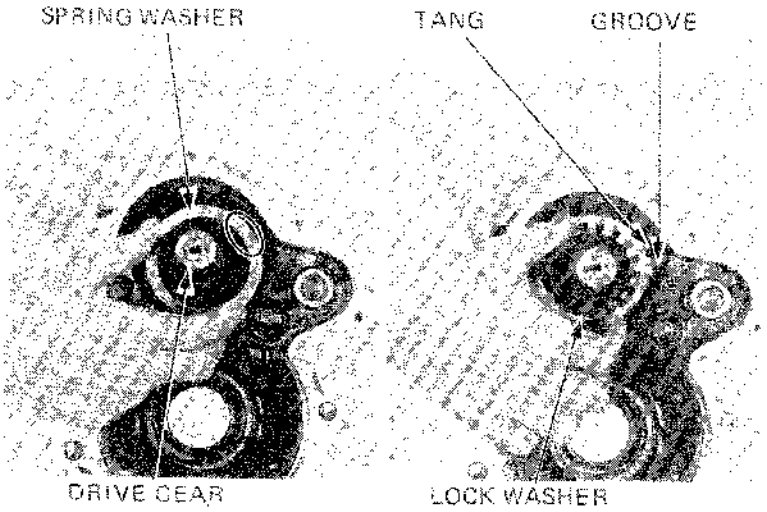
Remove the lock washer, spring washer and drive gear assembly with the drive gear shim.



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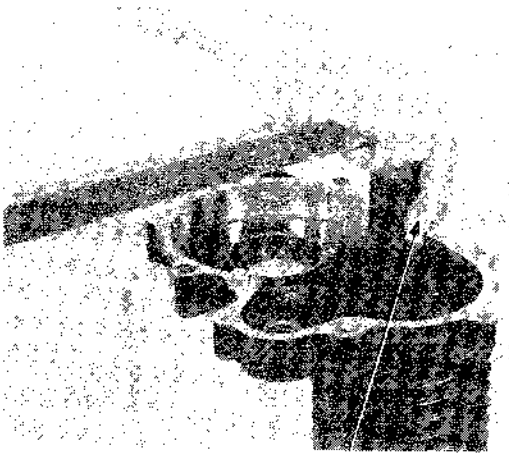
Install the drive gear assembly with shim into the final gear case.
Install the spring washer with the "OUT" mark facing out.

Install the lock washer aligning the lock washer tang with the case groove.



Install and tighten the lock nut.

TORQUE: 95–105 N·m
(9.5–10.5 kg-m, 69–76 ft-lb)

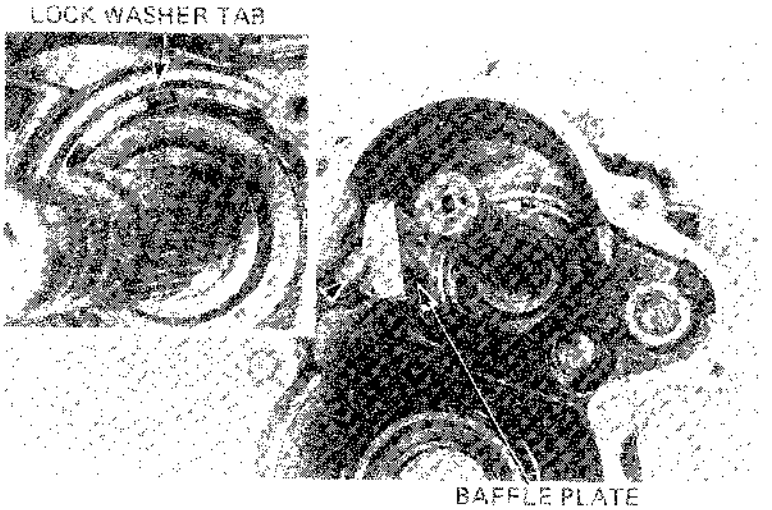


RETAINER WRENCH A
07910–4610100 (Not available in U.S.A.)

Bend the tabs of the lock washer into the lock nut.

Install the baffle plate.

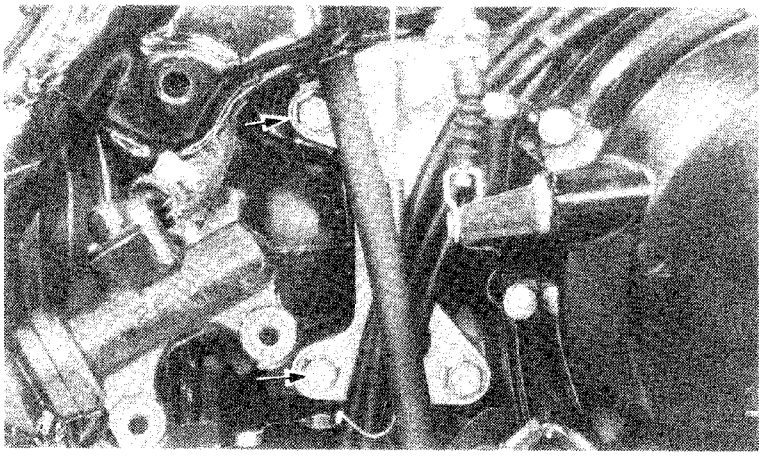
Coat the bolt threads and underside of the bolt with thread lock and tighten them.
Remove the final drive case from the base.



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SUBTRANSMISSION CASE INSTALLATION

Attach the subtransmission case to the engine.
Install the subtransmission (Page 10-6) and tighten the subtransmission case mounting bolts.

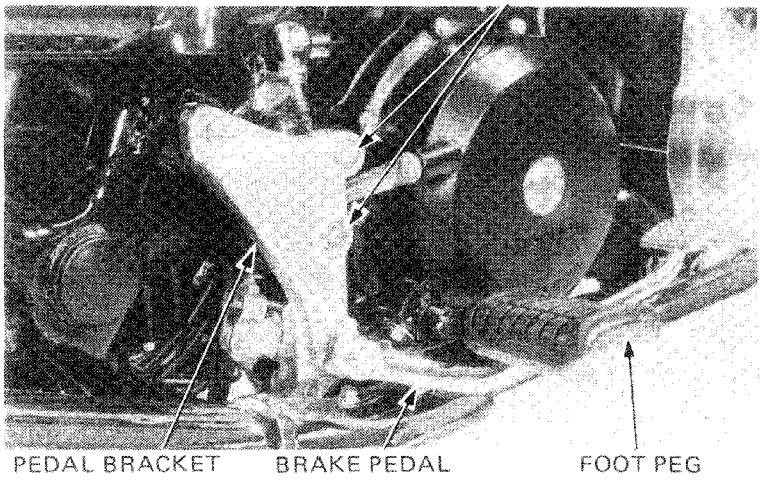


Install the master cylinder holder bolts, then the master cylinder mounting bolts.
Install the brake pedal and mufflers.

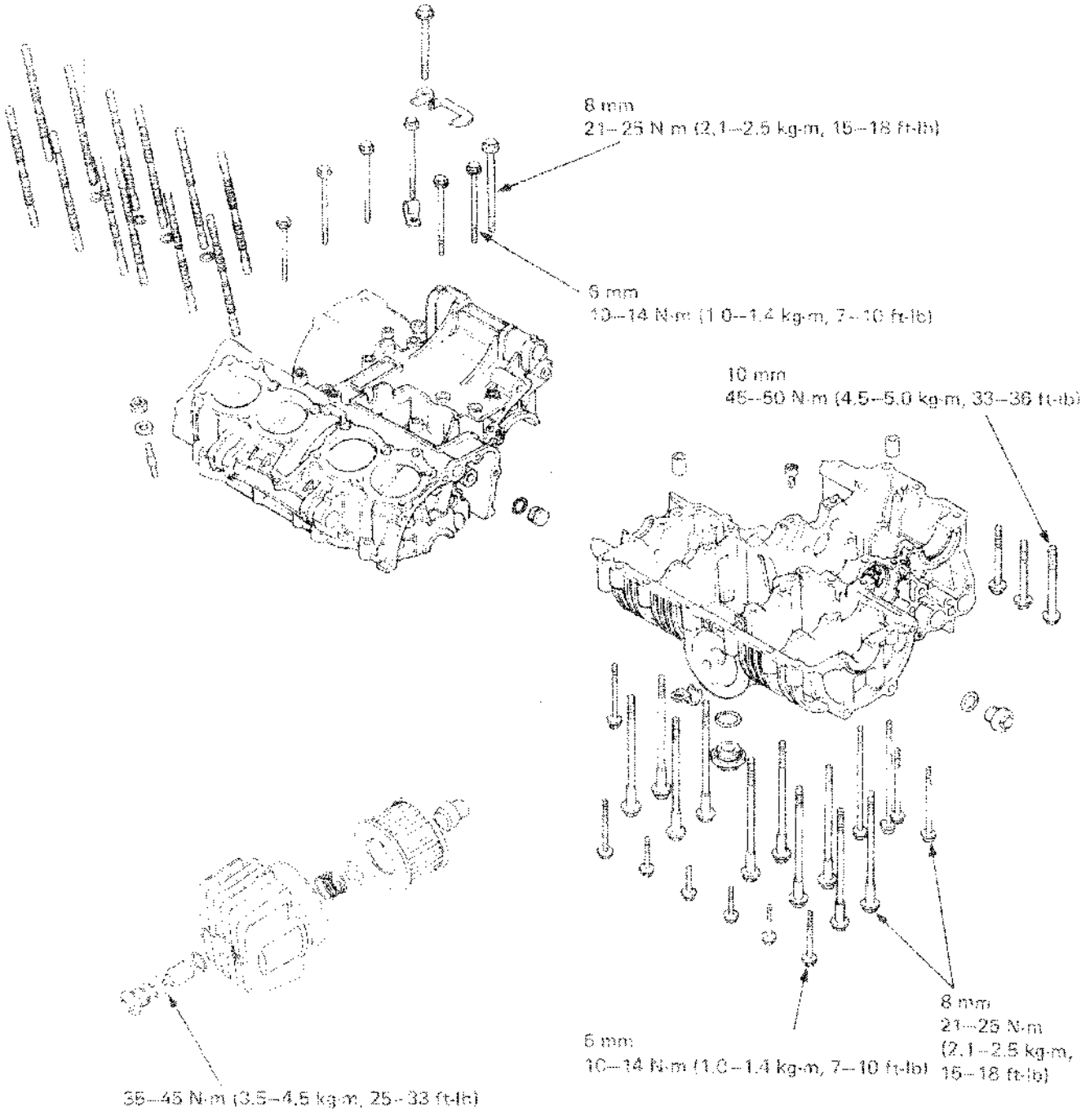
Install the foot pegs and swing arm (Page 15-15).

Fill the subtransmission with the recommended oil (Page 2-9).

OIL CAPACITY: 0.6 liter
(0.63 U.S. qt.)
OIL TYPE: Hypoid Gear Oil
API, GL-5
SAE #80



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11. CRANKCASE

SERVICE INFORMATION	11–1
CRANKCASE DISASSEMBLY	11–2
CRANKCASE ASSEMBLY	11–3

SERVICE INFORMATION

GENERAL

* To repair the crankshaft, connecting rod, primary shaft and the transmission including the shift fork and drum, it is necessary to separate the crankcase halves.
* The following parts must be removed before disassembling the crankcase.

* Oil pan	See section 2
* Oil pump	See section 2
* Cylinder head	See section 6
* Cylinder/pistons	See section 7
* Clutch and starter clutch	See section 8
* Gearshift linkage	See section 9
* Subtransmission	See section 10
* Alternator	See section 18
* Starter motor	See section 20

TORQUE VALUES

8 mm bolt (Crankshaft)	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
8 mm bolt (Crankcase)	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
6 mm bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
10 mm bolt	45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)

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CRANKCASE DISASSEMBLY

Remove the upper crankcase bolts.

Turn the engine upside-down and remove the lower crankcase bolts.

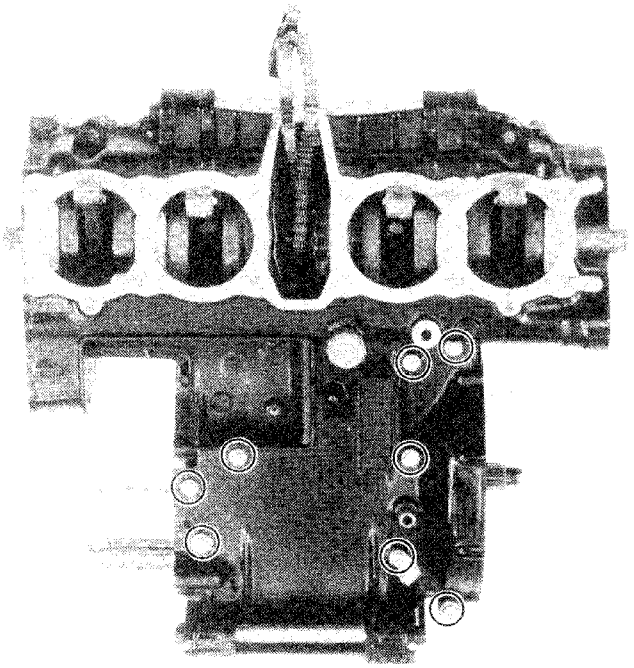
NOTE

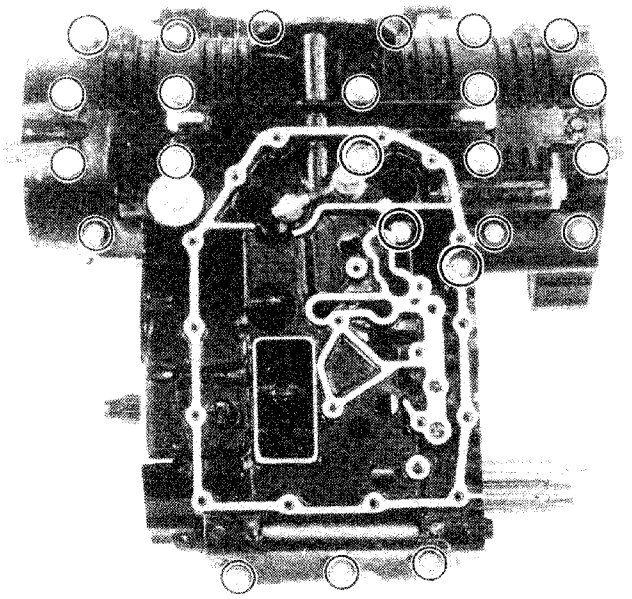
Remove the bolts in two or more steps and in a crisscross pattern to prevent warpage.

Separate the crankcase.

CAUTION

Do not pry between the upper and lower cases.



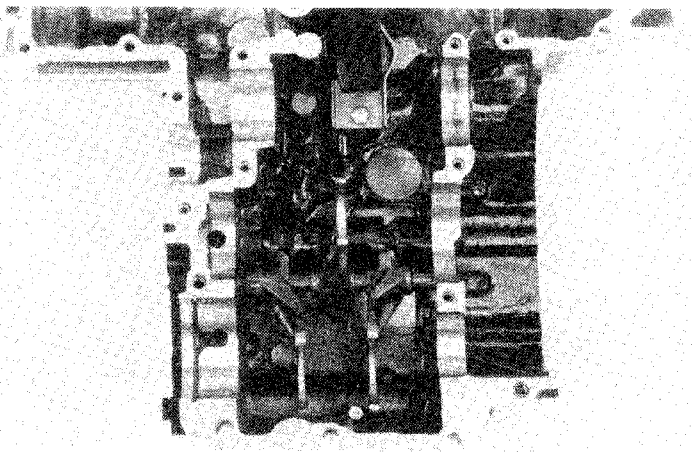


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CRANKCASE ASSEMBLY

NOTE

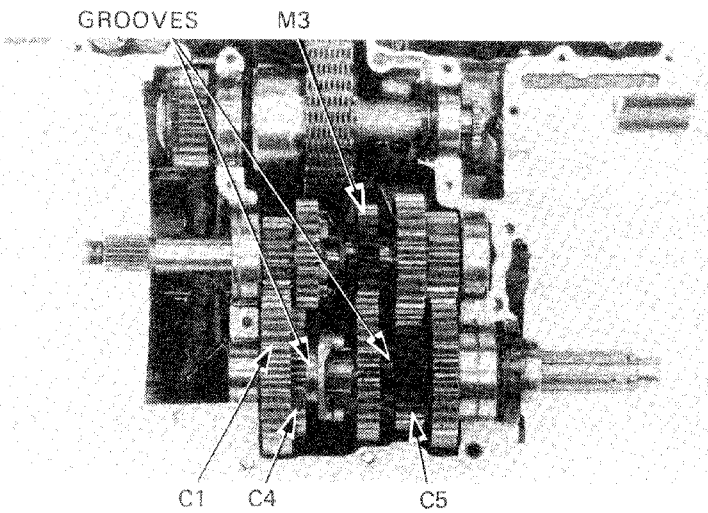
When the gearshift linkage is installed in the lower crankcase, shift the transmission into first for easy crankcase assembly.



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

Apply molybdenum disulfide grease to the groove of the M3 gear and C4, C5 gears.

Apply molybdenum disulfide grease to the crankshaft main bearings.



LOWER CRANKCASE

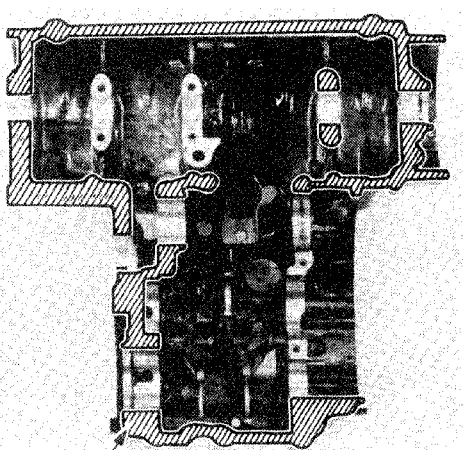
Clean the crankcase mating surfaces.
Apply liquid sealant to the mating surface of the lower and upper crankcase.

CAUTION

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

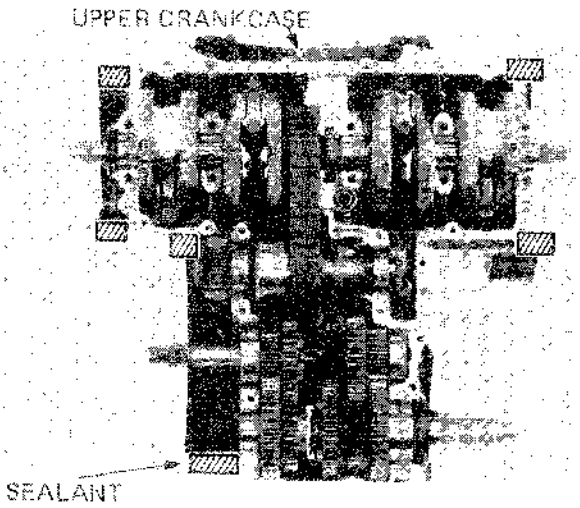


UPPER CRANKCASE



SEALANT

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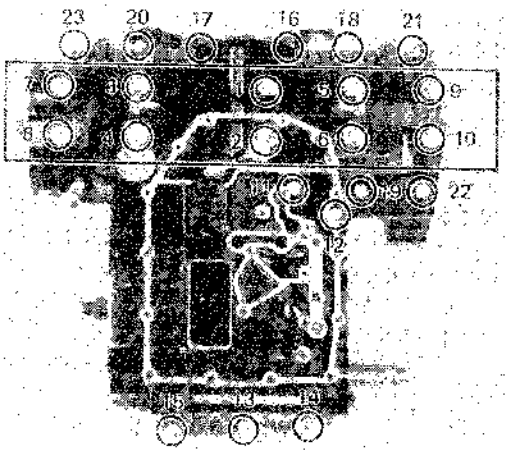


Assemble the crankcase halves, aligning the shift fork claws with the gears.

Tighten the bolts to the specified torque values in the sequence shown.

TORQUE VALUES:

8 mm bolt (Crankshaft)
21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
8 mm bolt (Crankcase)
21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
6 mm bolt
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
10 mm bolt
45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)



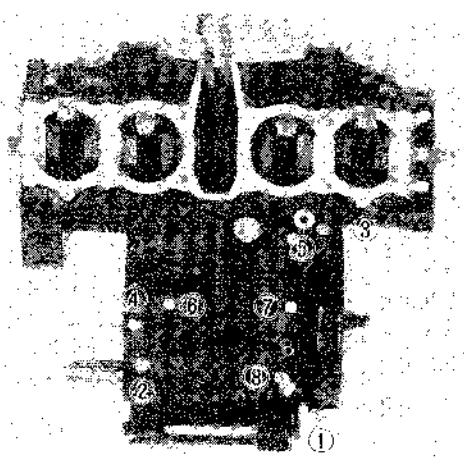
NOTE

- Make sure that the plain washers are under the bolt heads of the ten crankshaft bearing bolts.
- Apply engine oil to the threads and head of the ten crankshaft holding bolts.

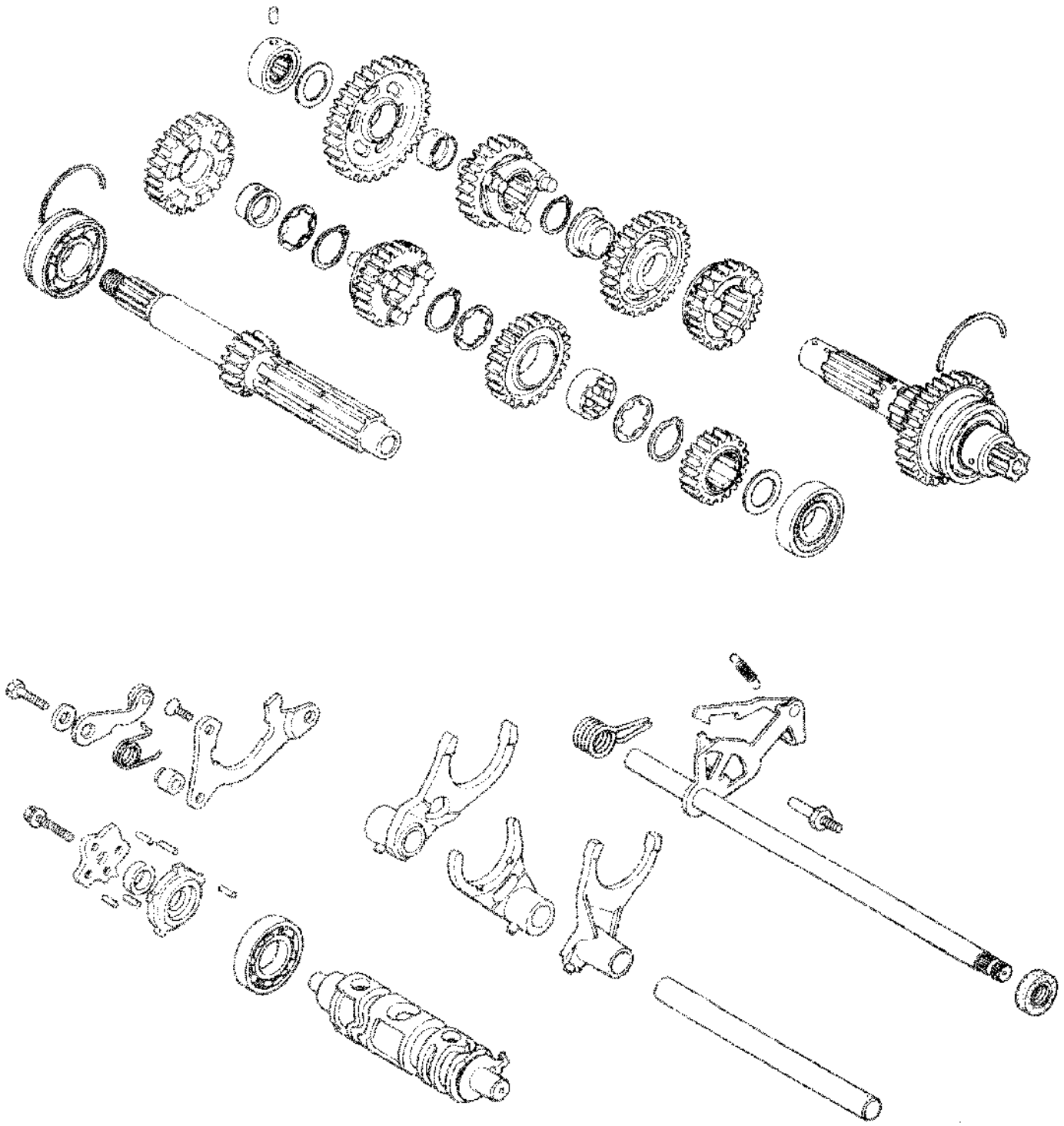
Tighten the upper crankcase bolts to the specified torque, proceeding front to rear.

NOTE

If the oil galley cap is removed, apply molybdenum disulfide grease to the threads before installing.



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12. TRANSMISSION

SERVICE INFORMATION	12–1
TROUBLESHOOTING	12–2
TRANSMISSION DISASSEMBLY	12–3
SHIFT FORK AND SHIFT DRUM	12–5
TRANSMISSION ASSEMBLY	12–8

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The gearshift linkage can be serviced with the engine in the frame (Section 9).
- For internal transmission repairs, the crankcase must be separated (Section 11).

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Transmission	Backlash	low, 2nd	0.021– 0.110 mm (0.0008–0.0043 in)	0.15 mm (0.006 in)
		3rd, 4th, 5th	0.023– 0.117 mm (0.0009–0.0046 in)	0.15 mm (0.006 in)
	Gear I.D.	M4 gear	31.025–31.050 mm (1.2215–1.2224 in)	31.07 mm (1.223 in)
		M5 gear	31.025–31.050 mm (1.2215–1.2224 in)	31.07 mm (1.223 in)
		C1 gear	25.000–25.021 mm (0.9843–0.9851 in)	25.06 mm (0.987 in)
		C3 gear	31.025–31.050 mm (1.2215–1.2224 in)	31.07 mm (1.223 in)
	Gear bushing	M5 O.D.	30.950–30.975 mm (1.2185–1.2195 in)	30.93 mm (1.218 in)
		C1 O.D.	24.959–24.980 mm (0.9826–0.9835 in)	24.93 mm (0.981 in)
		C1 I.D.	22.010–22.031 mm (0.8665–0.8673 in)	22.06 mm (0.869 in)
		M4 I.D.	27.985–28.006 mm (1.1018–1.1026 in)	28.035 mm (1.104 in)
		M4 O.D.	30.950–30.975 mm (1.2185–1.2195 in)	30.93 mm (1.218 in)
		C3 I.D.	27.985–28.006 mm (1.1018–1.1026 in)	28.035 mm (1.104 in)
		C3 O.D.	30.950–30.975 mm (1.2185–1.2195 in)	30.93 mm (1.218 in)
	Mainshaft O.D.	at M4	27.959–27.980 mm (1.1007–1.1016 in)	27.930 mm (1.0996 in)
	Countershaft O.D.	at C1 bushing	21.987–22.000 mm (0.8656–0.8661 in)	21.930 mm (0.8634 in)
		at C3	27.959–27.980 mm (1.1007–1.1016 in)	27.930 mm (1.0996 in)
	Gear to bushing or shaft clearance	M5 to M5 bushing	0.050– 0.100 mm (0.0020–0.0039 in)	0.12 mm (0.005 in)
		C1 to C1 bushing	0.010– 0.0044 mm (0.0004–0.0017 in)	0.10 mm (0.004 in)
		C1 bushing to shaft	0.020– 0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		M4 to M4 bushing	0.050– 0.100 mm (0.0020–0.0039 in)	0.12 mm (0.005 in)
		M4 bushing to shaft	0.020– 0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		C3 to C3 bushing	0.050– 0.100 mm (0.0020–0.0039 in)	0.12 mm (0.005 in)
		C3 bushing to shaft	0.020– 0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
Shift fork	Claw thickness		6.43 – 6.50 mm (0.253–0.256 in)	6.1 mm (0.24 in)
	I.D.		13.000–13.018 mm (0.5118–0.5125 in)	13.04 mm (0.513 in)
Fork shaft	O.D.		12.966–12.984 mm (0.5105–0.5112 in)	12.90 mm (0.508 in)

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TOOLS

Common

Driver	07746–0030100	or 07945–3710200
Attachment, 25 mm	07746–0030200	

TROUBLESHOOTING

Hard to shift

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

Transmission jumps out of gear

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

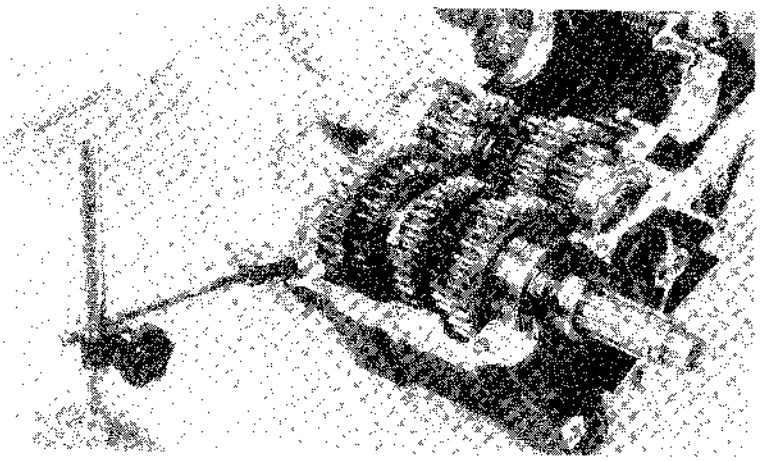
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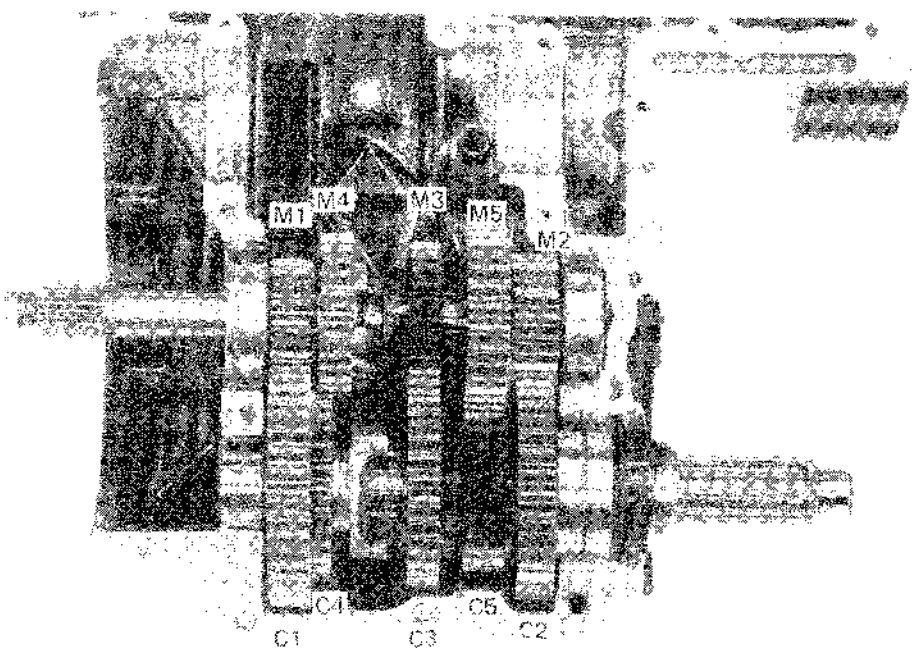
For servicing of the gearshift linkage, see Section 9.

TRANSMISSION DISASSEMBLY

Separate the crankcase (Section 11).
Inspect each gear for backlash.
SERVICE LIMIT: 0.15 mm (0.006 in)



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



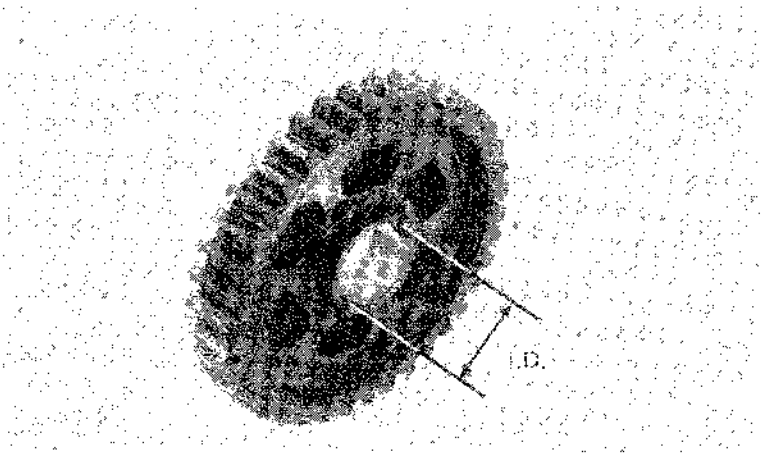
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TRANSMISSION INSPECTION

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

SERVICE LIMITS:

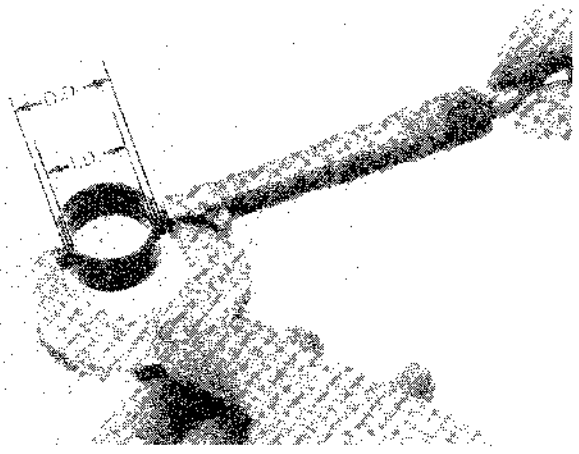
M4 gear:	31.07 mm (1.113 in)
M5 gear:	31.07 mm (1.113 in)
C1 gear:	25.06 mm (0.987 in)
C3 gear:	31.07 mm (1.113 in)



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

SERVICE LIMITS:

M5 O.D.:	30.93 mm (1.218 in)
C1 O.D.:	24.93 mm (0.981 in)
C1 I.D.:	22.06 mm (0.869 in)
M4 O.D.:	30.93 mm (1.218 in)
M4 I.D.:	28.035 mm (1.104 in)
C3 O.D.:	30.93 mm (1.218 in)
C3 I.D.:	28.035 mm (1.104 in)



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

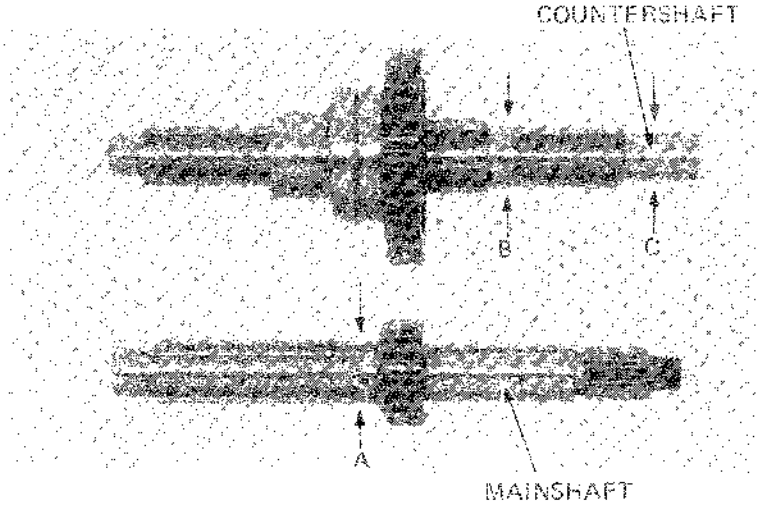
SERVICE LIMITS:

A (at M4 gear):	27.930 mm (1.0996 in)
B (at C3 gear):	27.930 mm (1.0996 in)
C (at C1 bushing):	21.930 mm (0.8634 in)

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

SERVICE LIMITS:

M5 to M5 bushing:	0.12 mm (0.005 in)
M4 to M4 bushing:	0.12 mm (0.005 in)
M4 bushing to shaft:	0.10 mm (0.004 in)
C1 to C1 bushing:	0.10 mm (0.004 in)
C1 bushing to shaft:	0.10 mm (0.004 in)
C3 to C3 bushing:	0.12 mm (0.005 in)
C3 bushing to shaft:	0.10 mm (0.004 in)

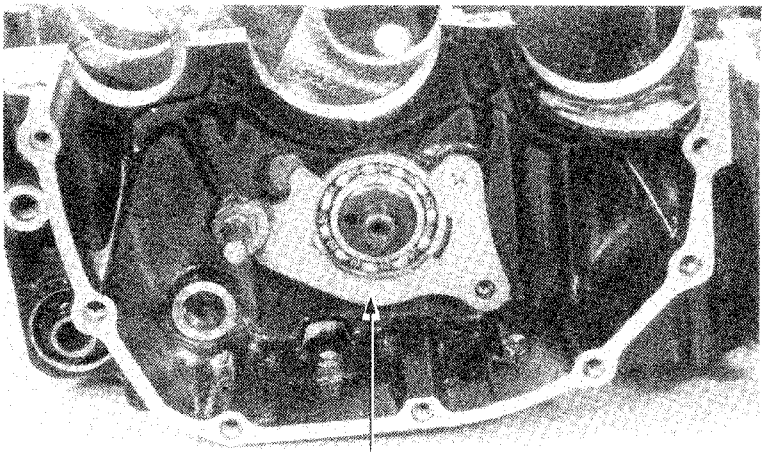


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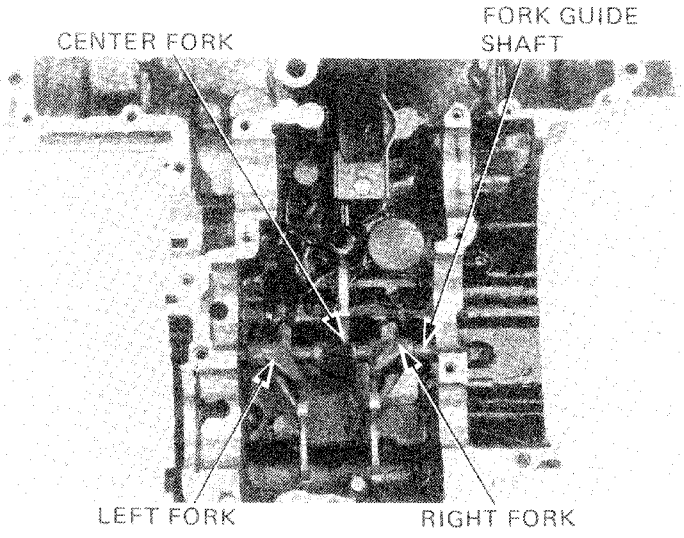
SHIFT FORK AND SHIFT DRUM

REMOVAL

Remove the bearing stopper plate.

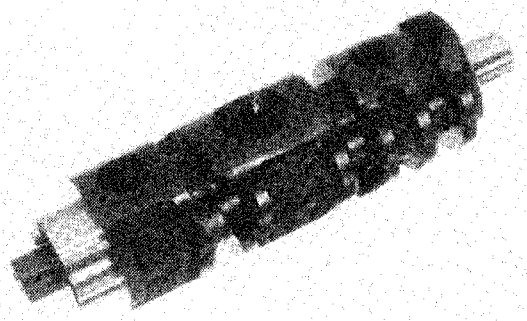


Remove the shift fork shaft, shift forks and the shift drum.



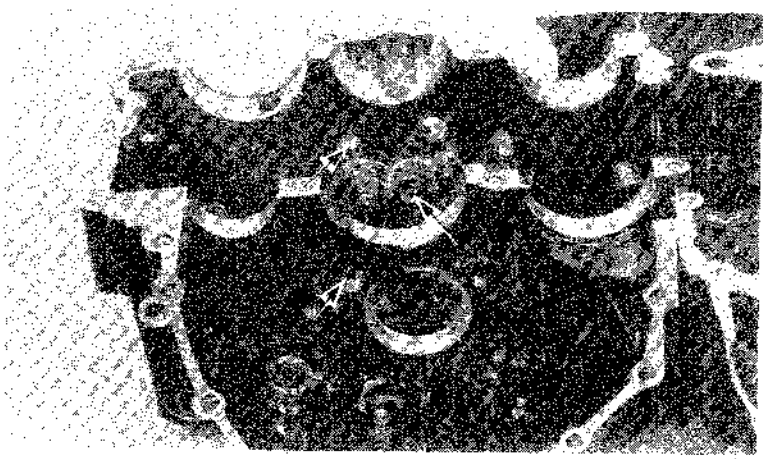
GEARSHIFT DRUM AND SHIFT FORK INSPECTION

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

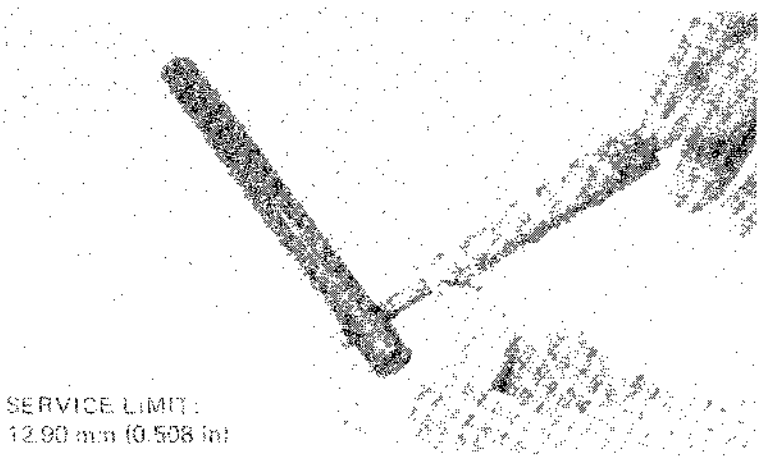


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Inspect the shift drum hole and shift fork shaft hole for scoring or scratches.



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

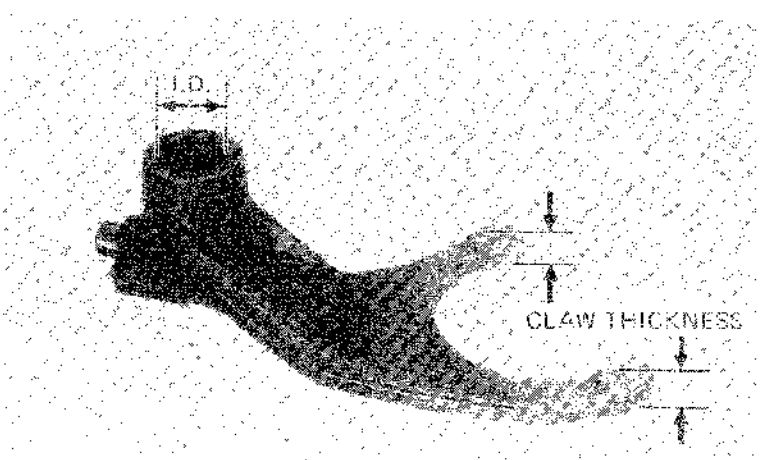


SERVICE LIMIT:
12.90 mm (0.508 in)

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

SERVICE LIMITS:

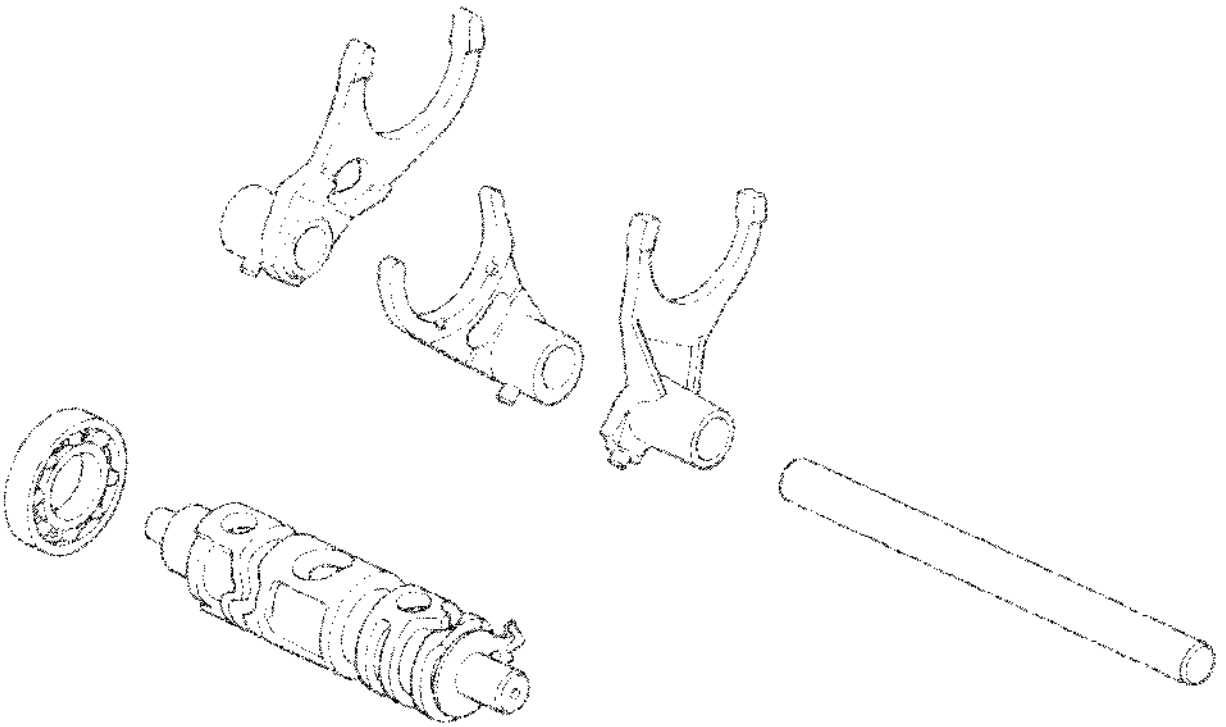
I.D.:	13.04 mm (0.513 in)
CLAW THICKNESS:	6.1 mm (0.24 in)



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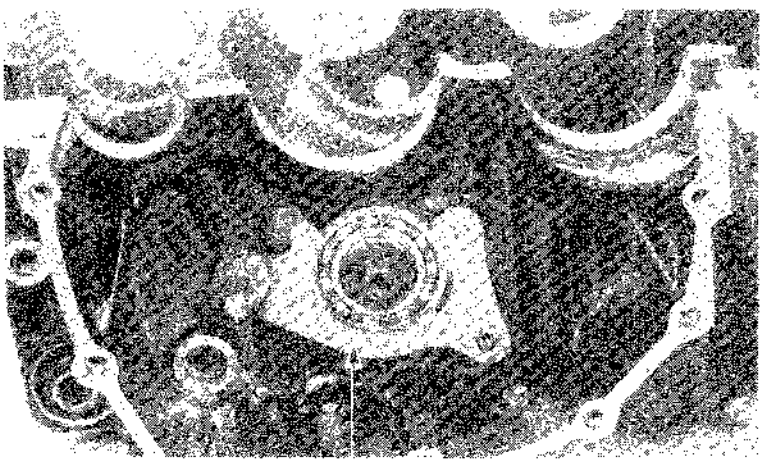
INSTALLATION

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



CAUTION

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



BEARING STOPPER PLATE

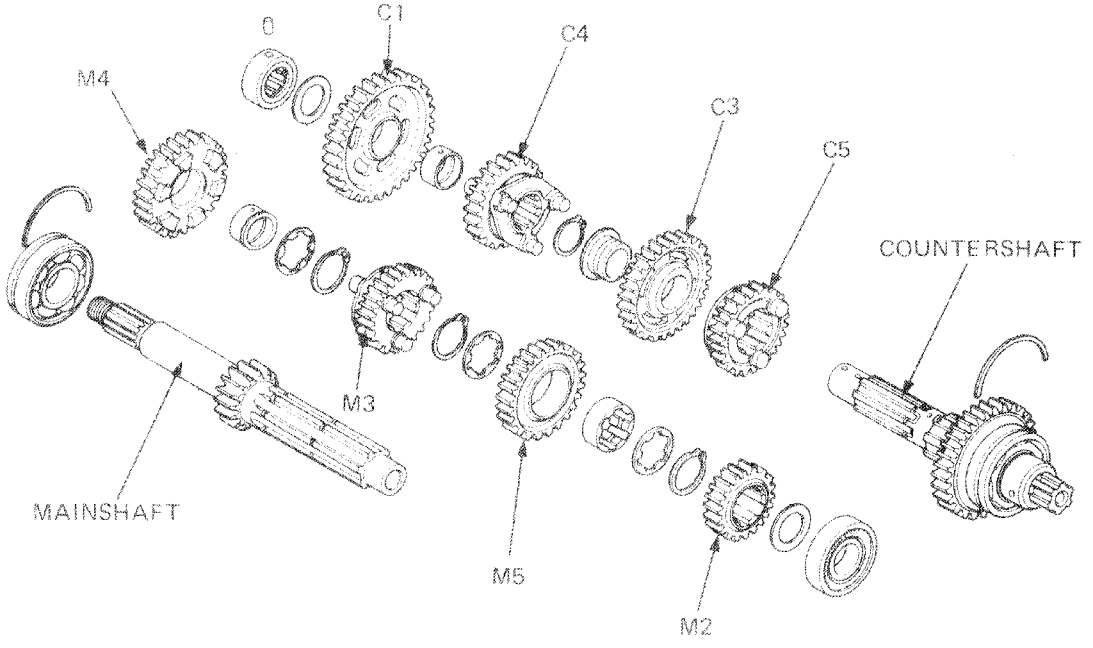
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TRANSMISSION ASSEMBLY

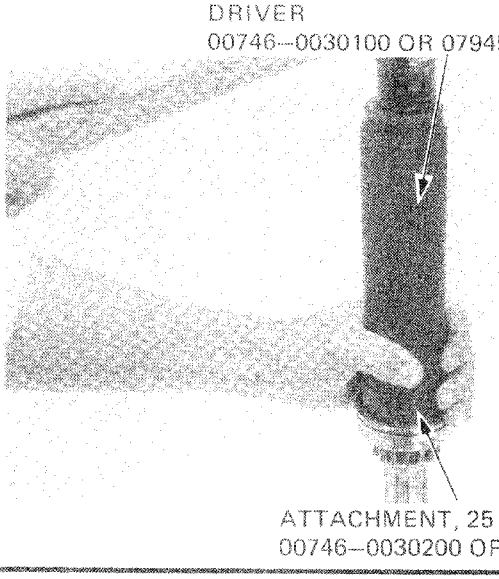
Assemble the mainshaft and countershaft.

NOTE

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

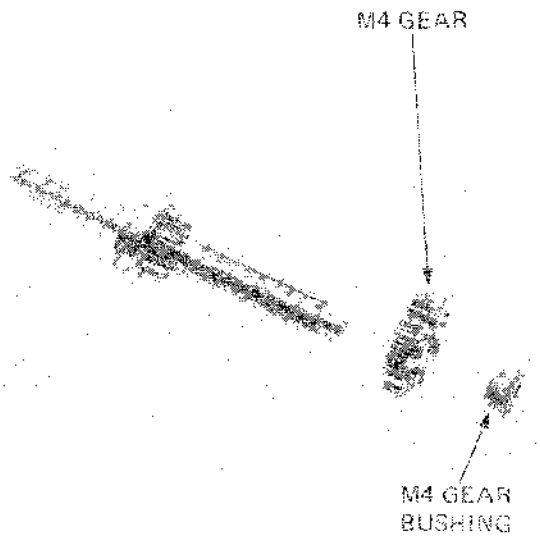


Install the mainshaft bearing with the tools shown.

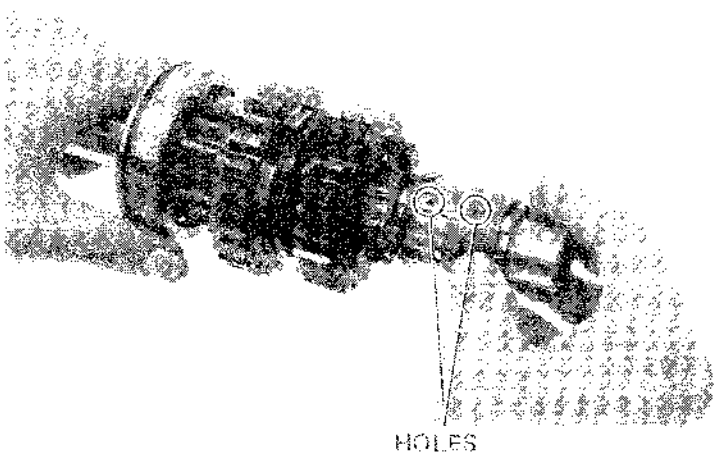


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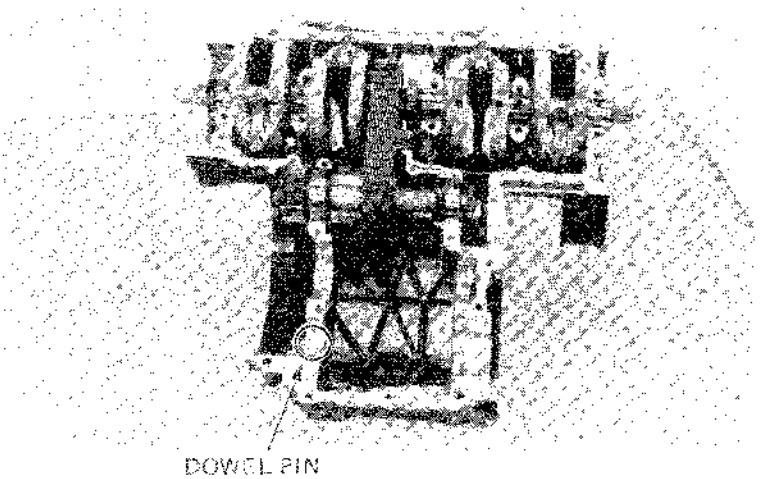
Install the M4 gear and the M4 gear bushing to the mainshaft as shown.



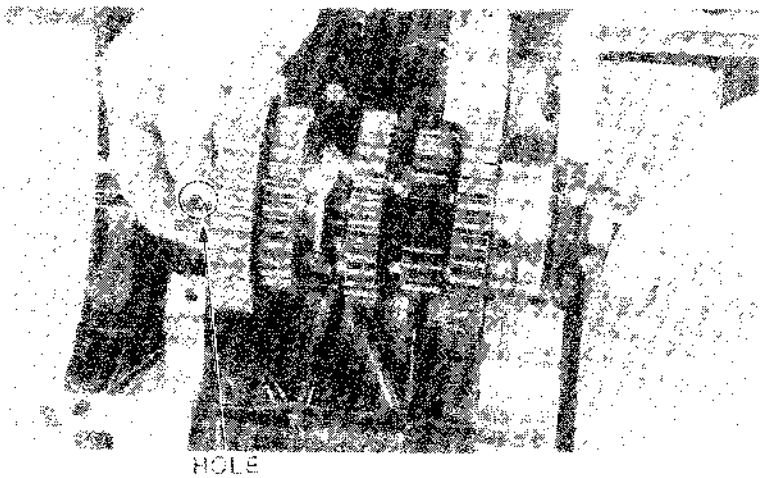
Align the hole in the M5 gear bushing with the hole in the mainshaft.



Insert the dowel pin.

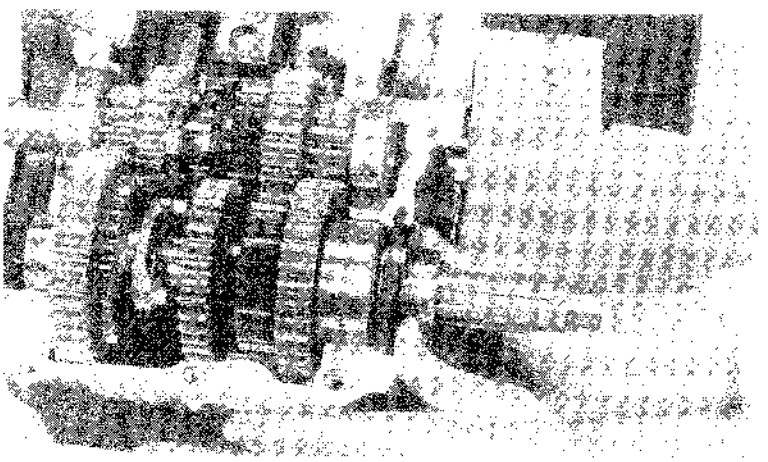


Align the hole in the countershaft bearing with the dowel pin



NOTE

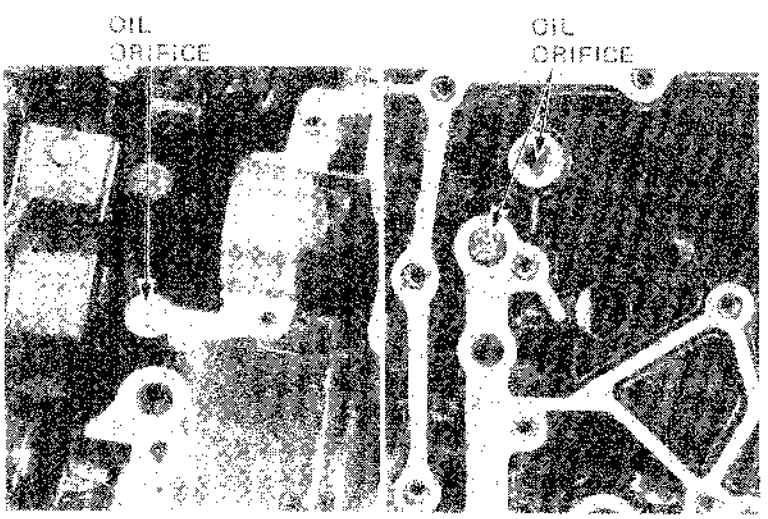
Push the countershaft oil seal in until the oil seal lip is seated completely on the bearing before assembling the lower crankcase to prevent oil leakage.



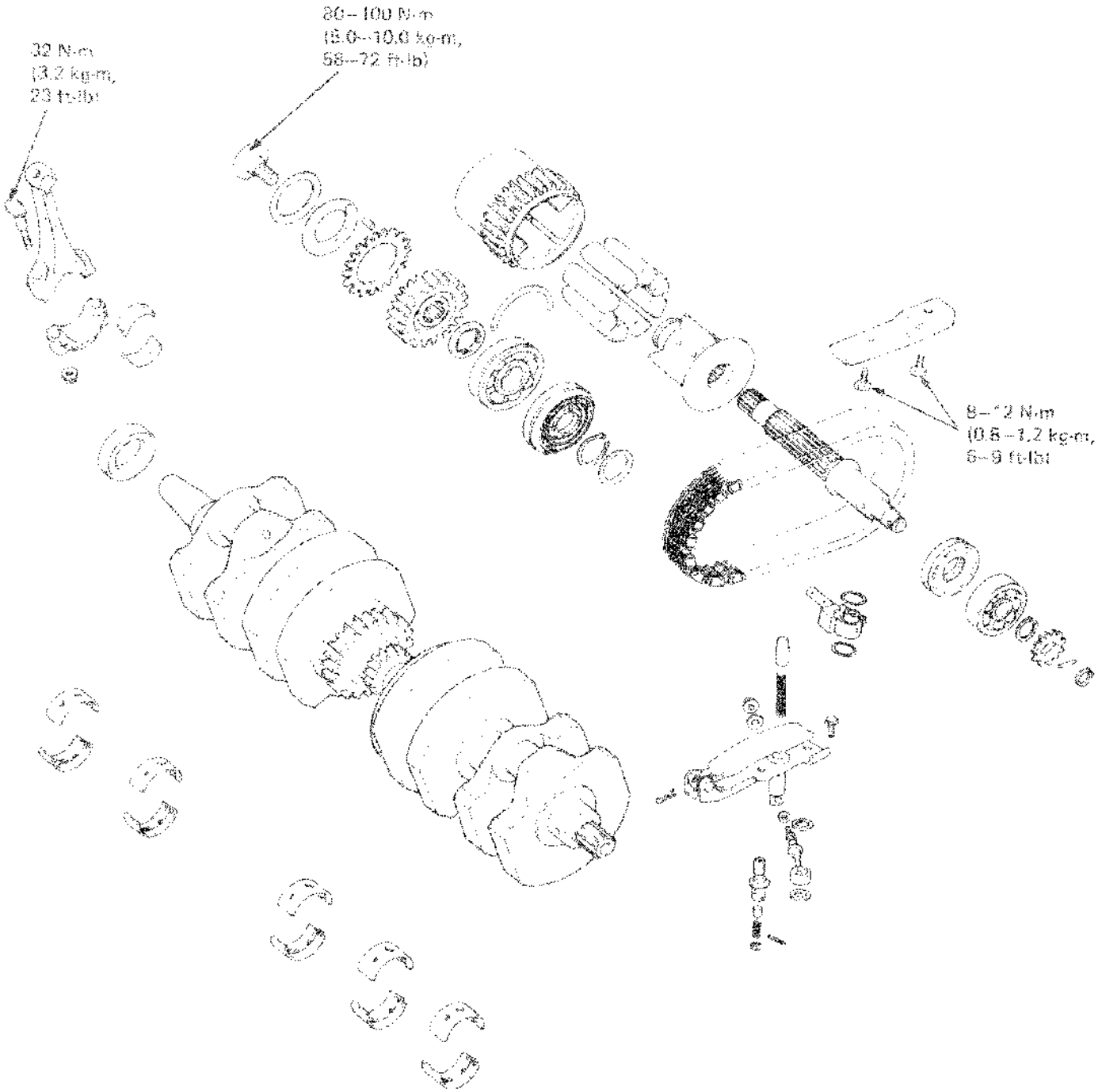
Install the lower crankcase (Refer to Section 11).

NOTE

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



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13. CRANKSHAFT/PRIMARY SHAFT

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CONNECTING ROD INSTALLATION	13–10
PRIMARY SHAFT ASSEMBLY	13–12
PRIMARY CHAIN TENSIONER ASSEMBLY	13–13

SERVICE INFORMATION

GENERAL

- All bearing inserts are a select fit and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfide grease to the main journals and crankpins during assembly

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Electric Starter	Drive gear O.D.	47.176–47.200 mm (1.8573–1.8583 in)	47.155 mm (1.8565 in)
	Idle gear I.D.	10.000–10.015 mm (0.3937–0.3943 in)	10.04 mm (0.395 in)
	Idle gear shaft O.D.	11.966–11.984 mm (0.4711–0.4718 in)	11.95 mm (0.470 in)
	Idle gear-to-shaft clearance	———	0.10 mm (0.004 in)
Crankshaft	Connecting rod big end side clearance	0.05–0.20 mm (0.002–0.008 in)	0.3 mm (0.01 in)
	Runout	———	0.05 mm (0.002 in)
	Crankpin oil clearance	0.020–0.060 mm (0.0008–0.0024 in)	0.08 mm (0.003 in)
	Main journal oil clearance	0.020–0.060 mm (0.0008–0.0024 in)	0.08 mm (0.003 in)
Cam chain	Length at 13 kg tension	315.40–315.74 mm (12.417–12.431 in)	318.2 mm (12.53 in)
Primary chain	Length at 36 kg tension	139.3–139.5 mm (5.48–5.49 in)	140.9 mm (5.55 in)

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TOOLS

Common	
Driver	07746 - 0020100 or 07749 - 3230201
Attachment, 20 mm I.D.	07746 - 0020400

TORQUE VALUES

Crankpin	32 N·m (3.2 kg-m, 23 ft-lb)
Crankshaft	21—25 N·m (2.1—2.5 kg-m, 15—18 ft-lb)
Primary chain tensioner bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Primary shaft lock bolt	80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)

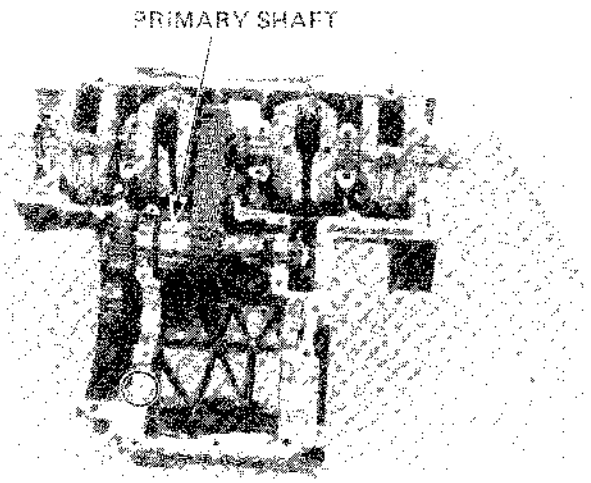
TROUBLESHOOTING

Excessive noise
- Worn main journal bearing
- Worn crank pin bearing

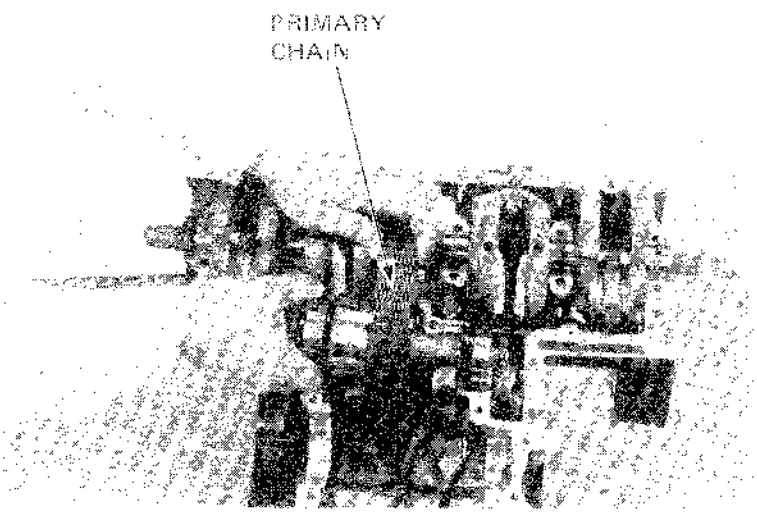
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PRIMARY SHAFT REMOVAL

Remove the starting motor (Section 20)
Remove the alternator (Section 18).
Loosen the primary shaft drive gear lock bolt (Section 8)
Disassemble the crankcase (Section 11) and remove the transmission assembly (Section 12).



Raise the primary shaft assembly and remove the primary chain.

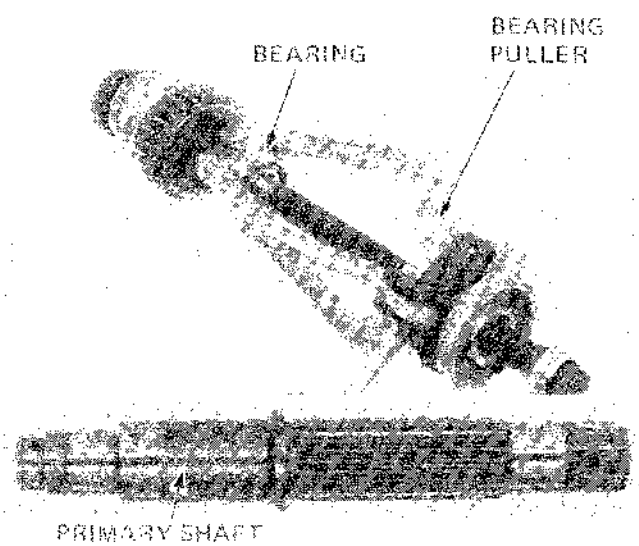


PRIMARY SHAFT DISASSEMBLY

Remove the bearing.

PRIMARY SHAFT INSPECTION

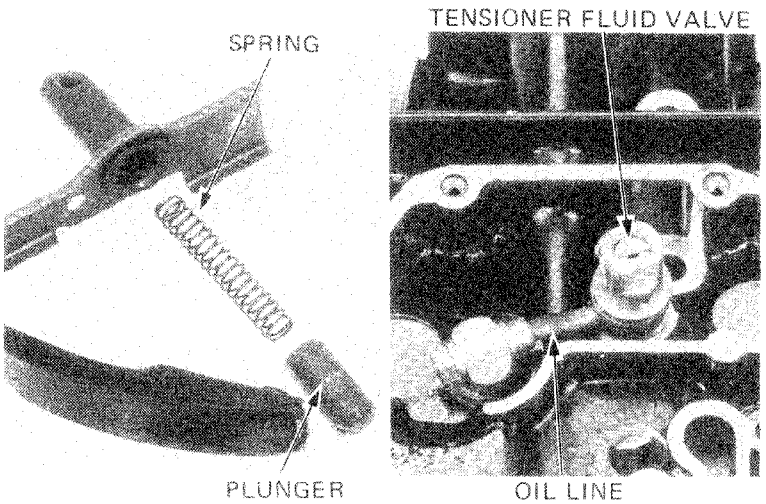
Check for scoring, wear or other damage.



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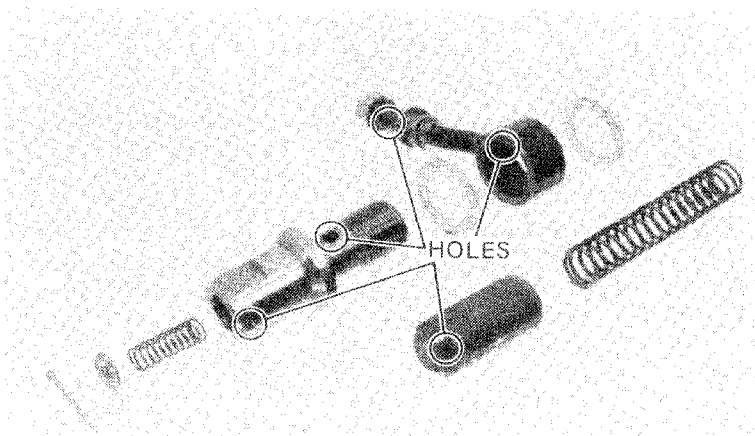
PRIMARY CHAIN TENSIONER DISASSEMBLY

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



INSPECTION

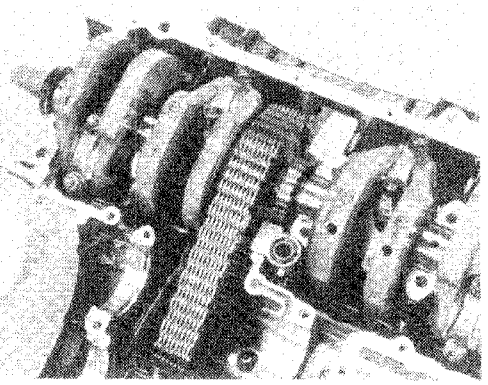
Check the holes in the oil line and plunger for blockage.
Clean all parts with non-flammable or high flash point solvent.
Inspect the slipper for damage or excessive wear.



CONNECTING ROD REMOVAL

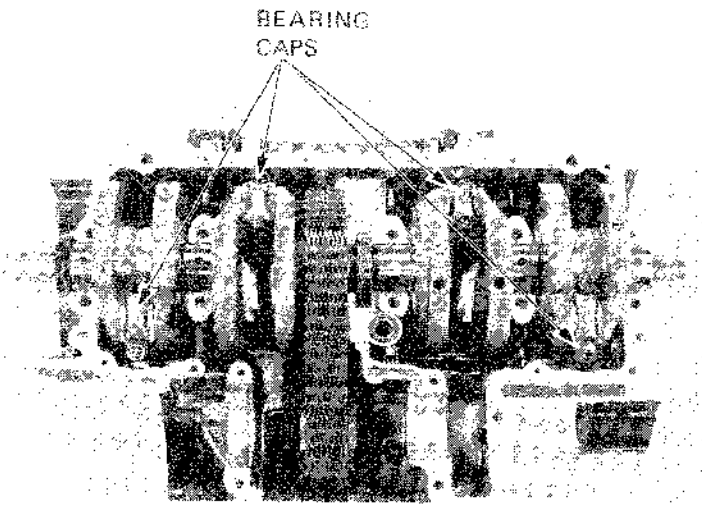
Check the connecting rod side clearance.

SERVICE LIMIT:
0.3 mm (0.01 in)



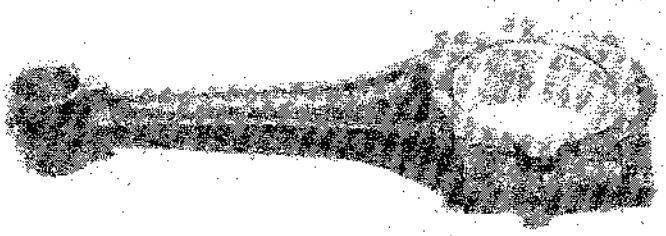
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Remove the bearing caps and rods.



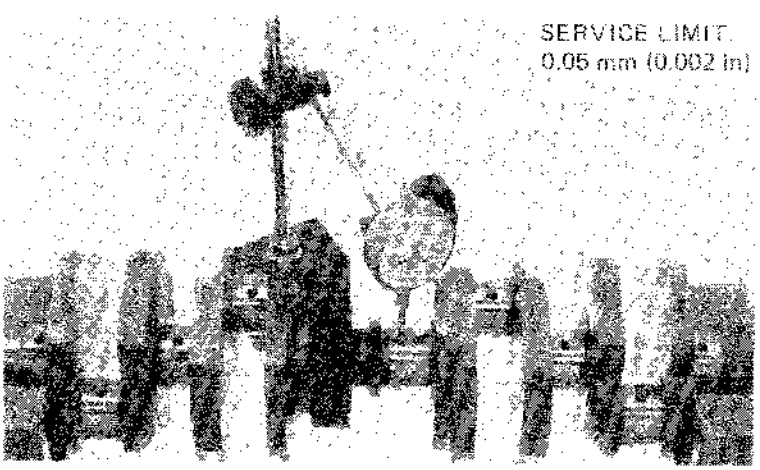
NOTE

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



CRANKSHAFT INSPECTION

Remove the cam chain and primary chain.
Set the crankshaft on a stand or V blocks.
Set a dial indicator to the center main journal.
Rotate the crankshaft two revolutions and read runout at the center journal.
Actual runout is 1/2 of Total Indicator Reading.



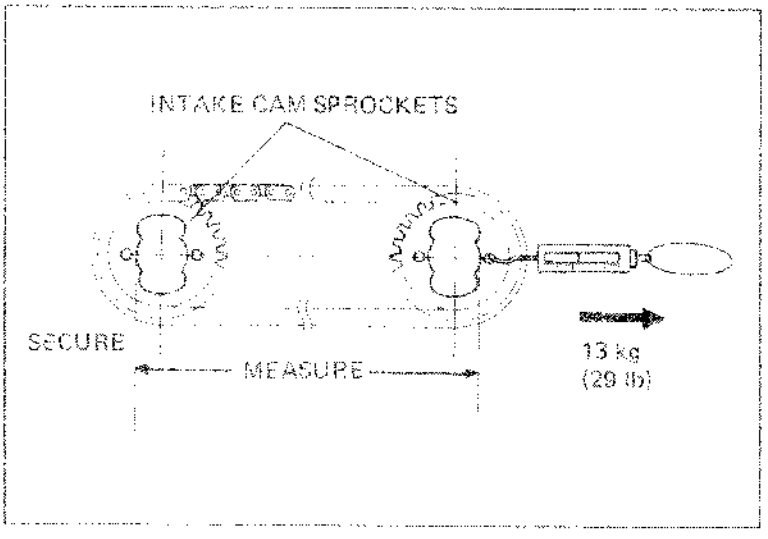
SERVICE LIMIT:
0.05 mm (0.002 in)

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CAM CHAIN LENGTH MEASUREMENT

Place the cam chain over the intake cam sprockets. Secure one sprocket. Apply 13 kg (29 lb) of tension with a spring scale to the other sprocket. Measure the chain length as shown.

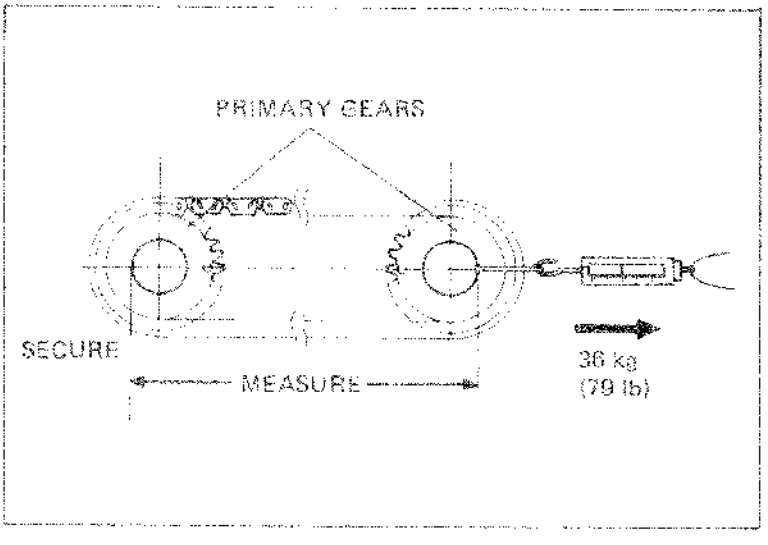
SERVICE LIMIT: 318.2 mm (12.53 in)



PRIMARY CHAIN LENGTH MEASUREMENT

Place the primary chain over the primary driven gears. Secure one gear.
Apply 36 kg (79 lb) of tension with a spring scale to the other gear. Measure the chain length as shown.

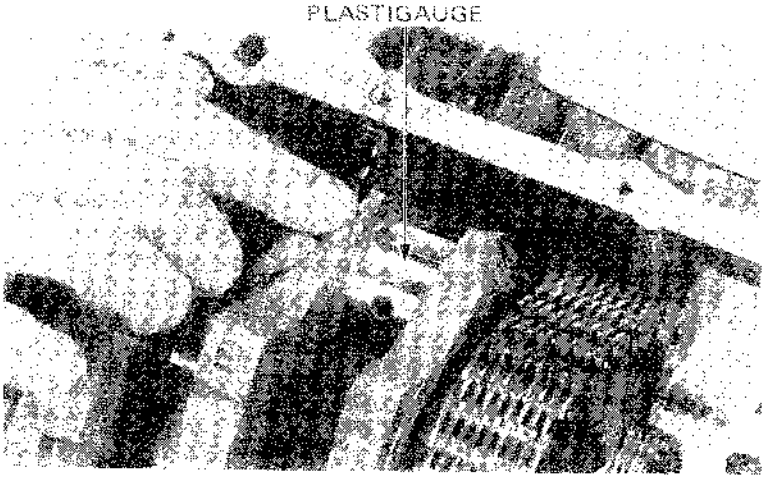
SERVICE LIMIT: 146.9 mm (5.54 in)



BEARING INSPECTION

CONNECTING RODS

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



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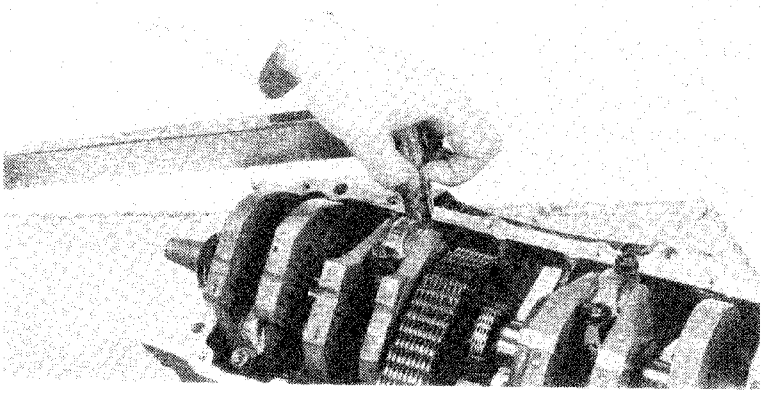
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Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 32 N-m (3.2 kg-m, 23 ft-lb)

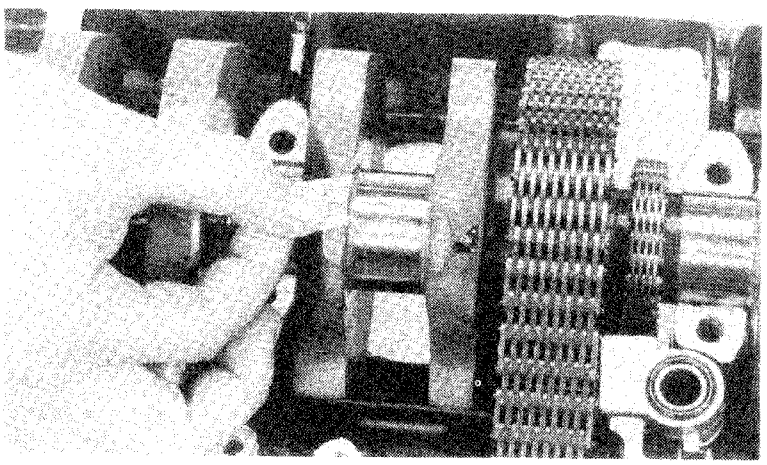
NOTE

Do not rotate the crankshaft during inspection.



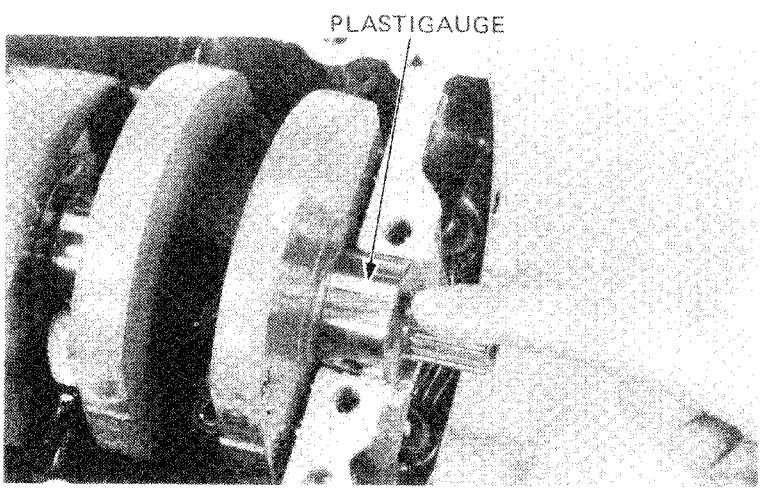
Remove the caps and measure the compressed plastigauge on each crankpin.

OIL CLEARANCE SERVICE LIMIT:
0.08 mm (0.003 in)



MAIN BEARINGS

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



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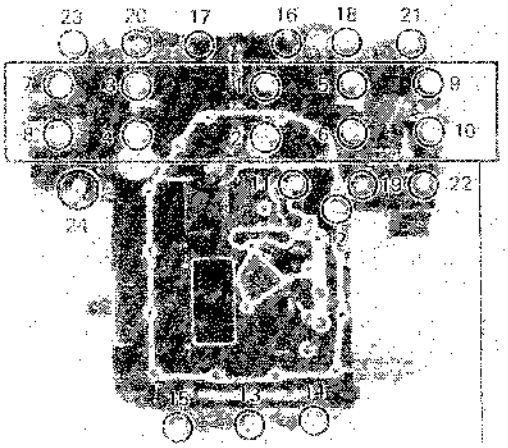
Install the main bearings on the correct journals on the lower crankcase and tighten them evenly in the sequence shown and in 2–3 steps.

TORQUE VALUES:

8 mm bolt (Crankshaft)
21–26 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
8 mm bolt (Crankcase)
21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
6 mm bolt
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
10 mm bolt
45–60 N·m (4.5–5.0 kg-m, 33–36 ft-lb)

NOTE

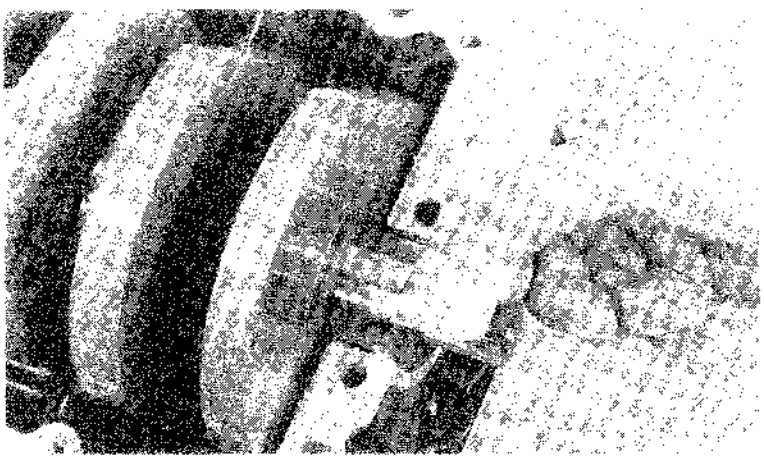
Do not rotate the crankshaft during inspection.



CRANKSHAFT BEARING BOLT

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

OIL CLEARANCE SERVICE LIMIT:
0.08 mm (0.003 in)

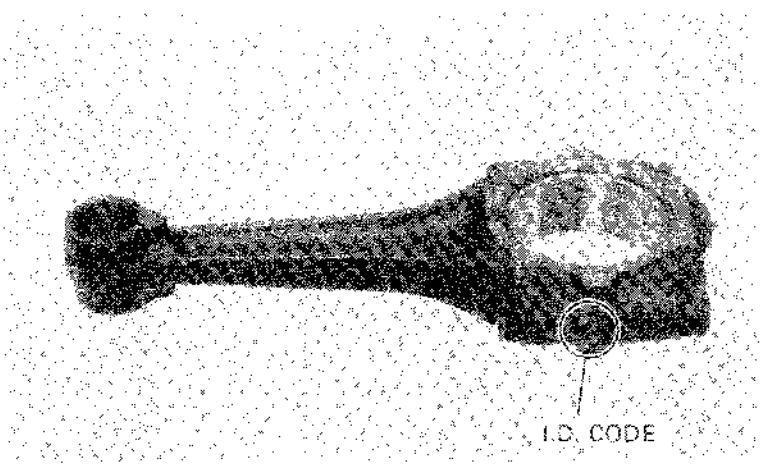


BEARING SELECTION

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

CONNECTING ROD BEARING INSERTS

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

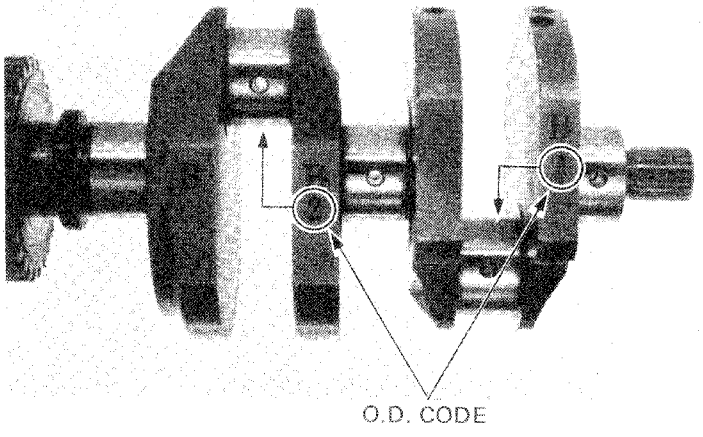


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Determine and record the corresponding crankpin O.D. code number (or measure the crankpin O.D.).

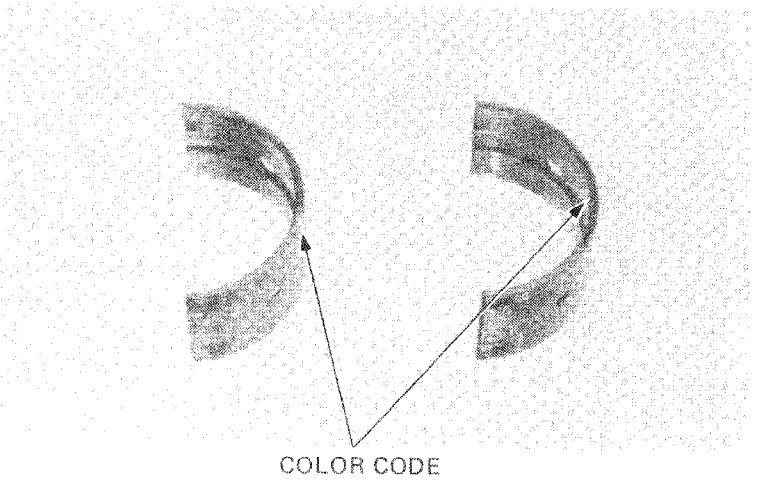
NOTE

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



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

CONNECTING ROD I.D. CODE NO.			CRANKPIN O.D. CODE NO. 1: 35.992–36.000 mm	2: 35.984–35.992 mm	3: 35.975–35.984 mm
	1	39.000–39.008 mm	E (Yellow)	D (Green)	C (Brown)
	2	39.008–39.016 mm	D (Green)	C (Brown)	B (Black)
	3	39.016–39.024 mm	C (Brown)	B (Black)	A (Blue)



BEARING INSERT THICKNESS:

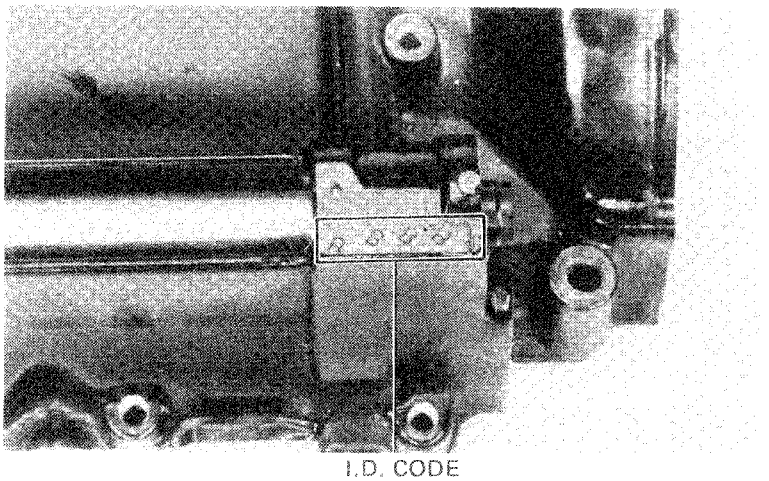
A (Blue): 1.502–1.506 mm (0.0591–0.0593 in)
B (Black): 1.498–1.502 mm (0.0590–0.0591 in)
C (Brown): 1.494–1.498 mm (0.0588–0.0590 in)
D (Green): 1.490–1.494 mm (0.0587–0.0588 in)
E (Yellow): 1.486–1.490 mm (0.0585–0.0587 in)

MAIN BEARING

Determine and record crankcase I.D. code numbers.

NOTE

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

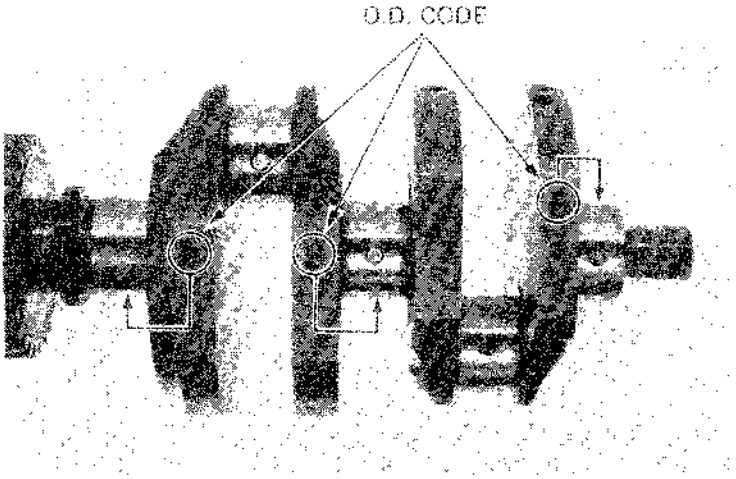


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Determine and record the corresponding main journal O.D. code letters (or measure the main journal O.D.).

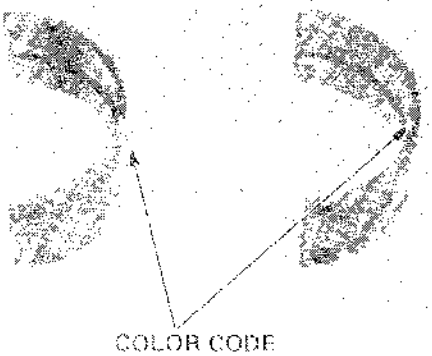
NOTE

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



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

CASE I.D. CODE	MAIN JOURNAL O.D. CODE NO. A: 38.002 (38.003) mm	B: 25.864 (25.892 mm)	C: 25.874 (25.884 mm)
A	38.000 – 38.018 mm	D (Yellow)	C (Green)	B (Brown)
B	38.008 – 38.016 mm	C (Green)	B (Brown)	A (Black)
C	38.016 – 38.024 mm	B (Brown)	A (Black)	E (Blue)



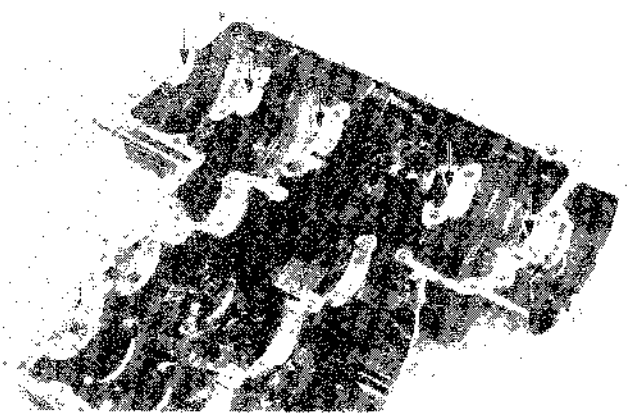
MAIN BEARING INSERT THICKNESS:
A (Black): 1.498–1.502 mm (0.0590–0.0591 in)
B (Brown): 1.494–1.498 mm (0.0588–0.0590 in)
C (Green): 1.490–1.494 mm (0.0587–0.0588 in)
D (Yellow): 1.486–1.490 mm (0.0585–0.0587 in)
E (Blue): 1.502–1.506 mm (0.0591–0.0593 in)

CONNECTING ROD INSTALLATION

Install the main bearings into the upper crankcase.

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

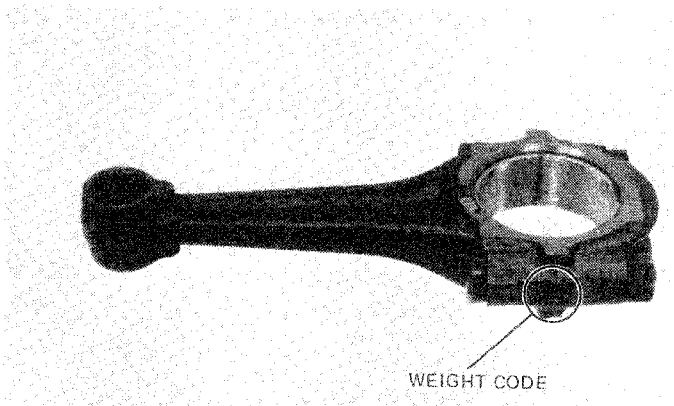
Install the crankshaft with the cam chain and primary chain at the same time.



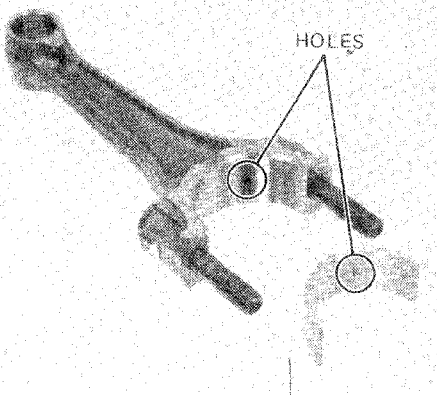
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Before installing the connecting rods, make sure that the weight code combination is properly made:

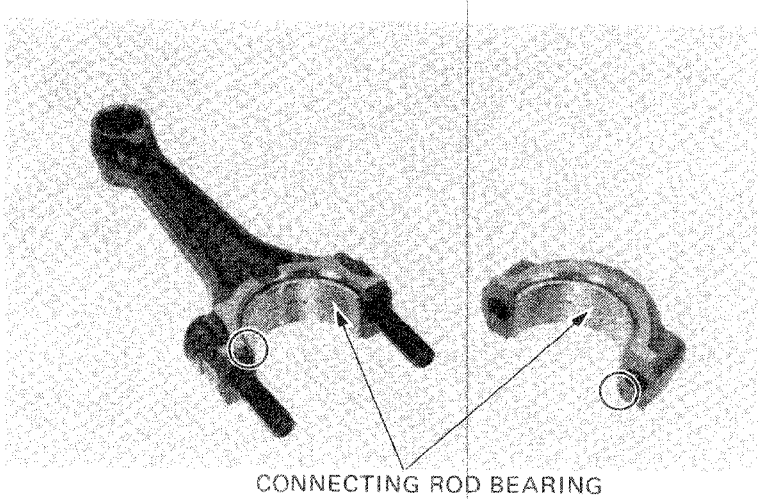
Factory set code	Available code
A	B
B	
C	D
D	
E	
F	F
G	



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



Install the connecting rod and cap bearing inserts. Apply molybdenum disulfide grease to the connecting rod bearings.

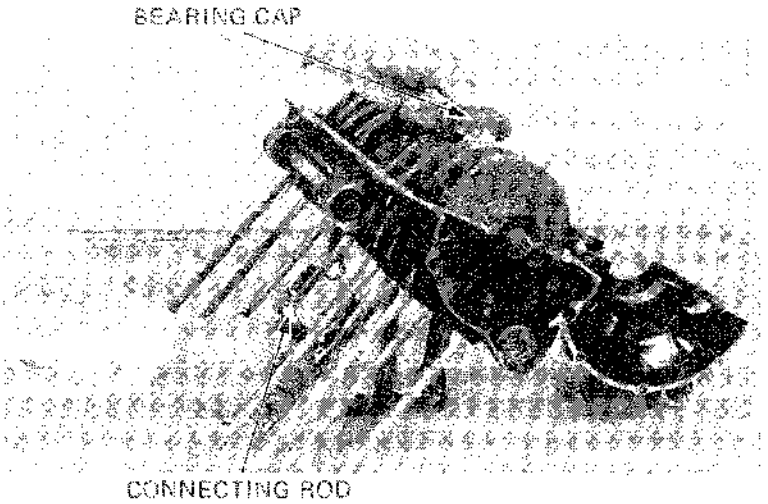


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Install the connecting rods and bearing caps.

NOTE

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

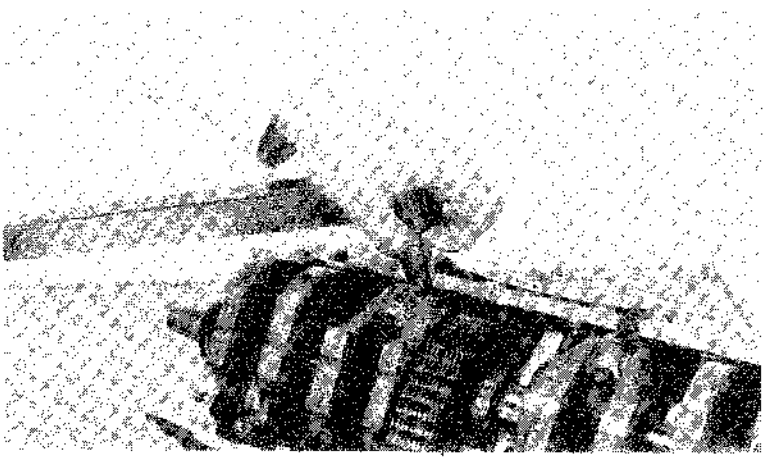


Tighten the connecting rod bearing cap bolts.

TORQUE: 32 N·m (3.2 kg-m, 23 ft-lb)

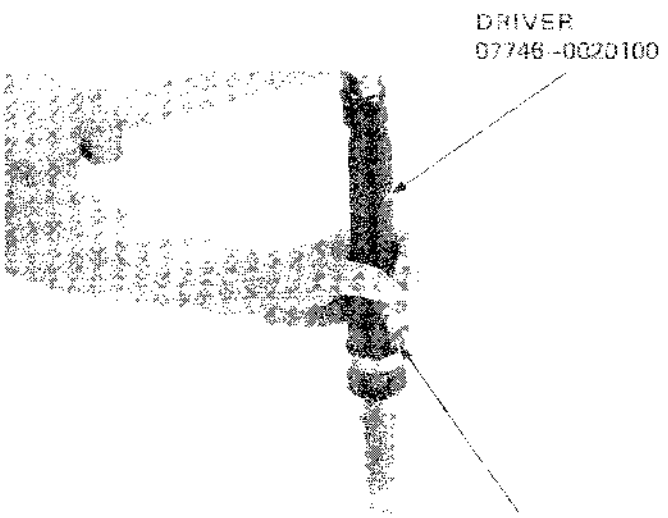
NOTE

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



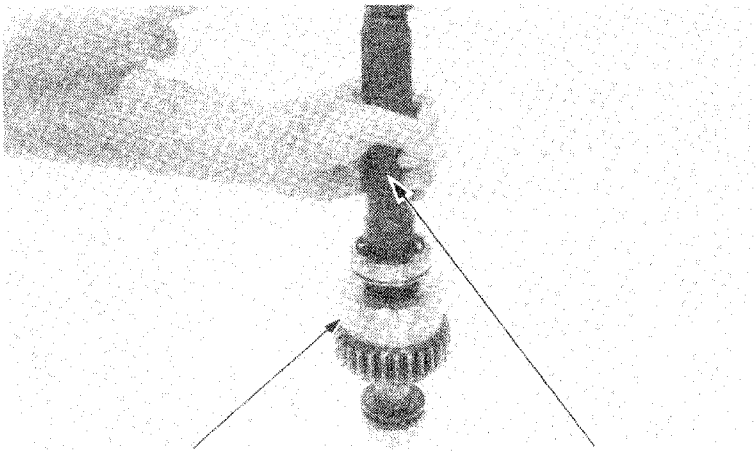
PRIMARY SHAFT ASSEMBLY

Insert the bearing into the primary shaft.



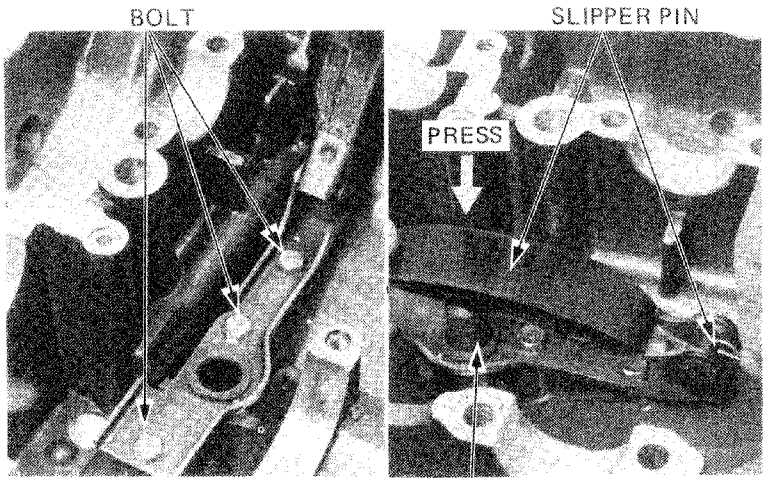
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Install the damper and bearings.
Tighten the lock bolt (Section 8).

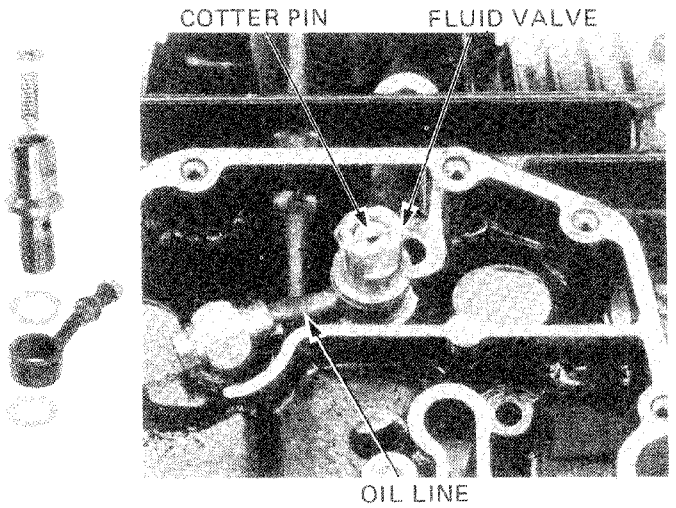


PRIMARY CHAIN TENSIONER ASSEMBLY

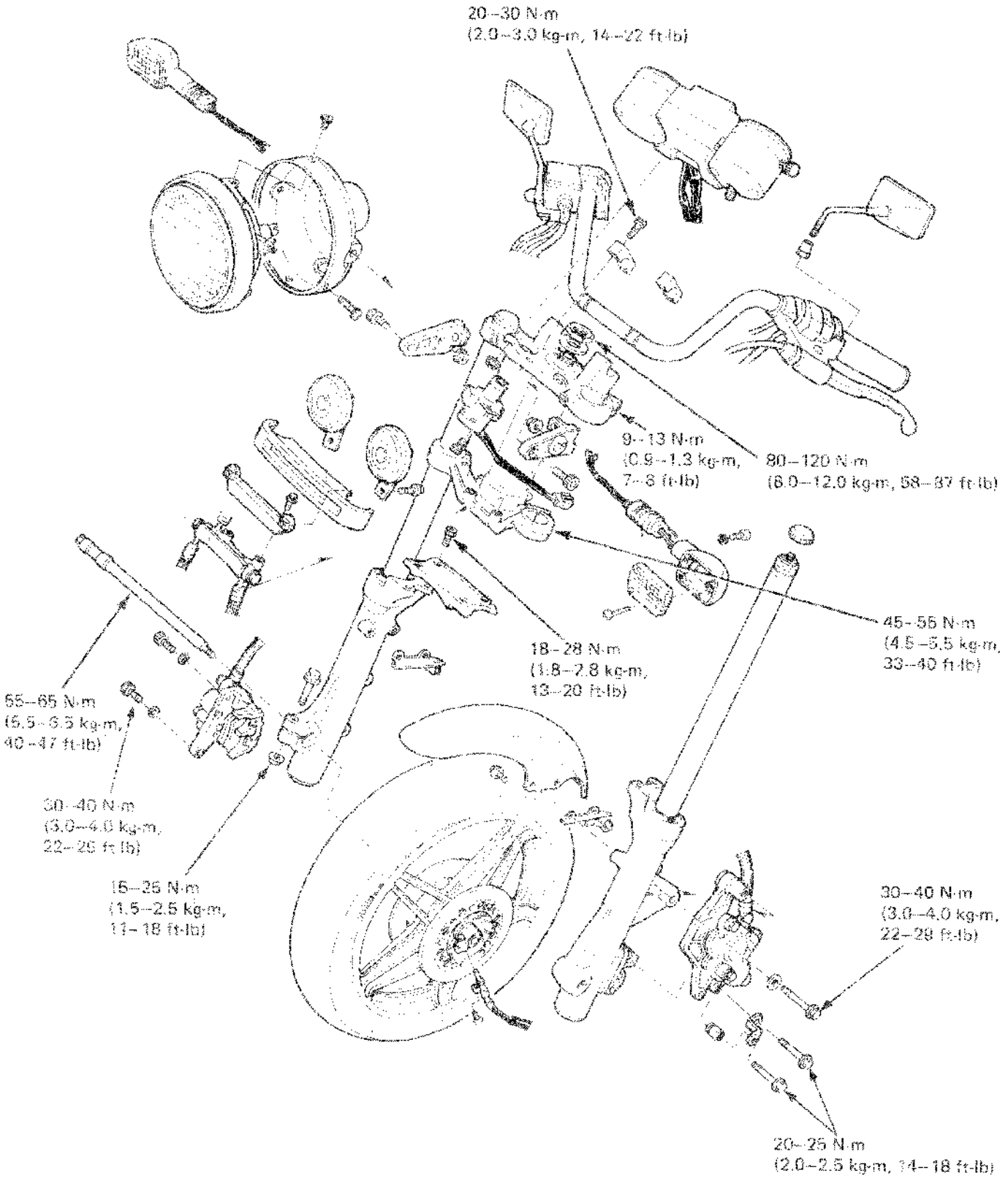
Install the slipper base and tighten the bolts securely.
Insert the spring and plunger.
Press the slipper down and install the pin.



Install the fluid valve and oil line. Tighten the nut.
Insert the spring and plunger and install the cotter pin as shown.



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14. FRONT WHEEL/SUSPENSION

SERVICE INFORMATION	14– 1
TROUBLESHOOTING	14– 2
HEADLIGHT	14– 3
INSTRUMENTS	14– 4
HANDLEBAR	14– 6
FRONT WHEEL	14–11
FRONT FORK	14–16
STEERING STEM	14–26

SERVICE INFORMATION

GENERAL

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

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		480.9 mm (18.9 in)	471.3 mm (18.6 in)
Fork tube runout		———	0.2 mm (0.01 in)
Front fork fluid capacity		Right 455 cc (15.4 oz) Left 470 cc (15.9 oz)	———
Front fork air pressure		40–100 kPa (0.4–1.0 kg/cm^2, 6–14 psi)	———

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	15–25 N·m (1.5–2.5 kg-m, 11–18 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 bearing adjustment nut	14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)
Steering stem nut	80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
Brake disc	30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)
Fork top bridge pinch bolt	9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)
Fork bottom pinch bolt	45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)

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TOOLS

Special	
Hex. wrench, 6 mm	07917–3230000 or commercially available
Snap ring pliers	07914–3230001 or commercially available
Fork seal driver	07947–4630100
Steering stem socket	07916–3710100
Bearing race driver attachment	07946–3710701
Bearing race remover	07946–3710500
Bearing race remover	07953–4250002
Steering stem driver	07946–MB00000
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
Bearing driver outer, 52 x 55 mm	07746–0010400

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 not 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.
5. Clogged anti-dive orifice.

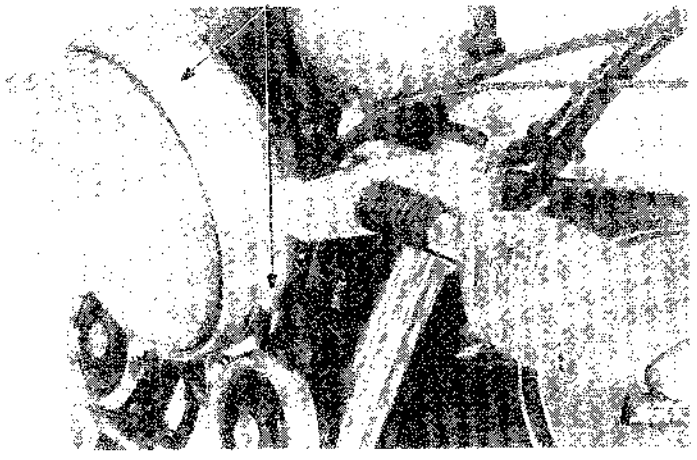
Front suspension noise
1. Worn slider or guide bushings.
2. Insufficient fluid in forks.
3. Loose front fork fasteners.
4. Lack of grease in speedometer gearbox.

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HEADLIGHT

Remove the three headlight mounting screws. Disconnect the wire coupler and remove the headlight.

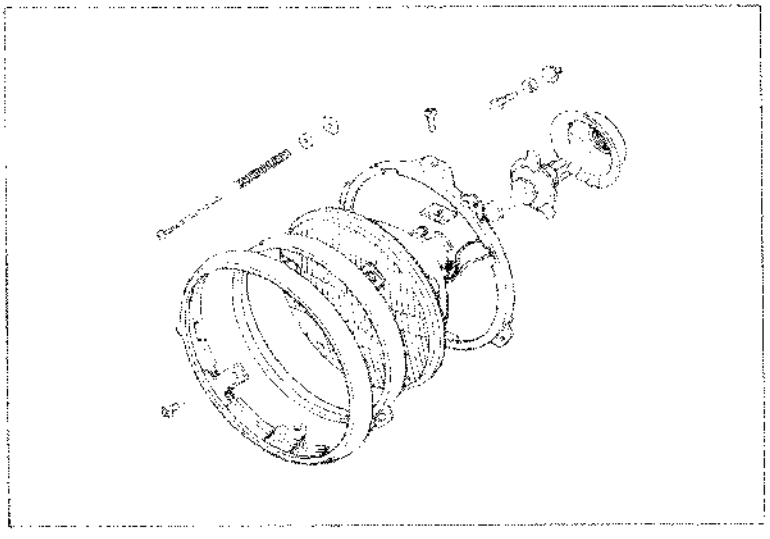
HEADLIGHT MOUNTING SCREWS



Remove the retaining screws and horizontal adjusting screw from the rim.
Remove the two headlight unit retaining screws, and headlight.

Assembly and installation is essentially the reverse of disassembly: connect the wire coupler and install the headlight with the mounting screws.

After reinstalling the headlight, adjust the headlight beam aim (Page 3-18).



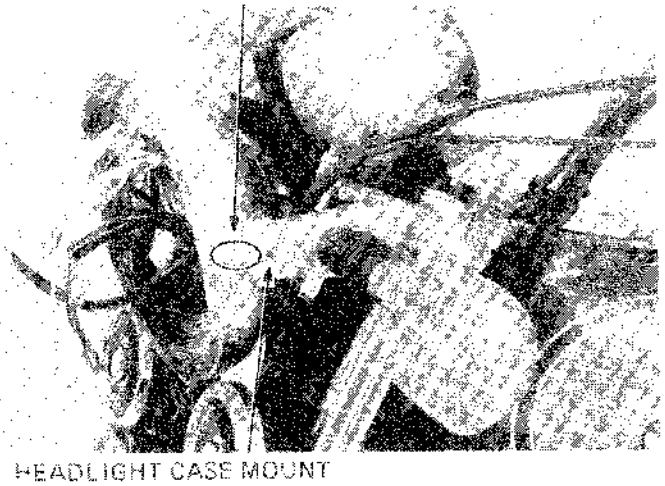
HEADLIGHT CASE

Remove the headlight case mounts and headlight case.

Install the headlight case in the reverse order of removal.

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

PUNCH MARKS

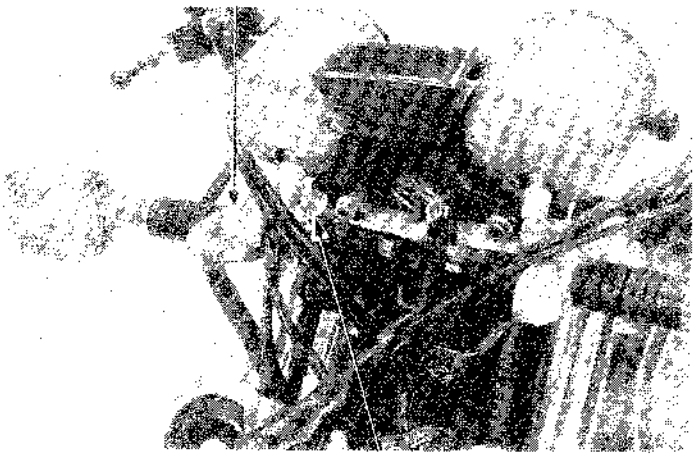


HEADLIGHT CASE MOUNT

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BRACKET REMOVAL/INSTALLATION

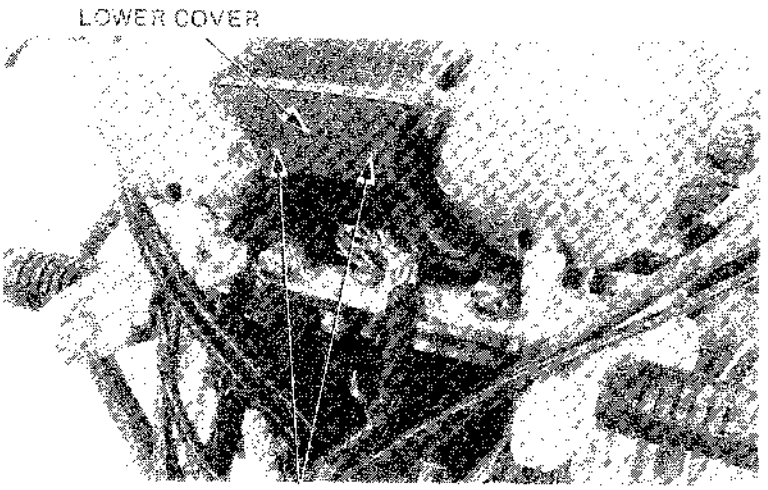
Disconnect the front turn signal wires.
Remove the headlight bracket mount bolts and bracket/turn signal assemblies.
Install the headlight bracket/turn signal assemblies in the reverse order of removal.
Connect the front turn signal wires.



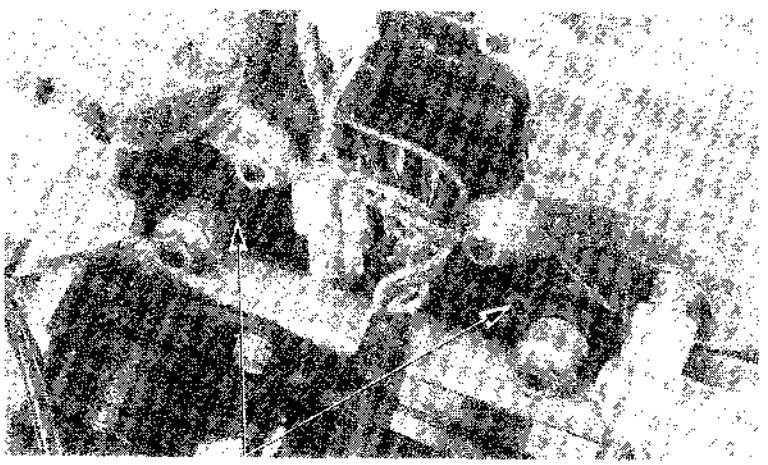
INSTRUMENTS

INDICATOR LIGHT BULB REPLACEMENT

Remove the headlight and case (Page 14-3).
Remove the instrument lower cover attaching screws, and lower cover.

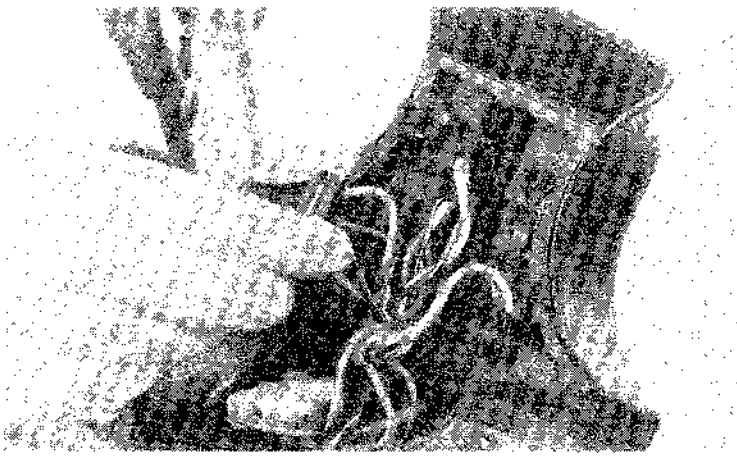


Remove the upper cover attaching screws, and upper cover.



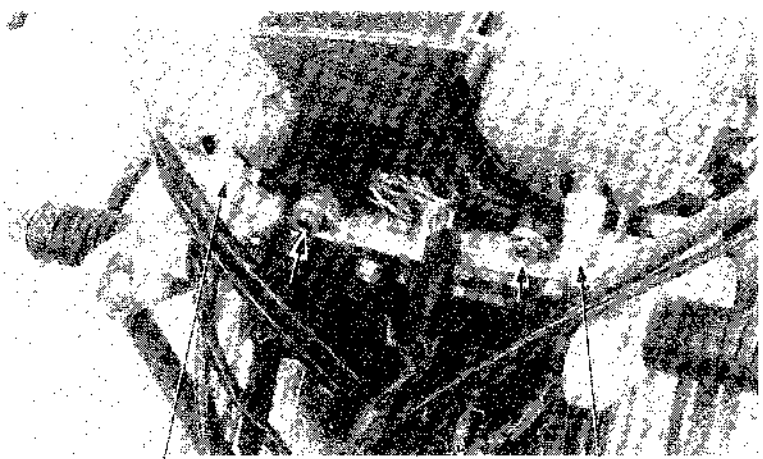
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Replace the bulb.
After installing a new bulb, check for continuity. If the bulb does not light, inspect the wiring for an open or short circuit, or check for loose connections.



REMOVAL

Remove the headlight and case (Page 14-3).
Disconnect the speedometer cable and tachometer cable from the instruments.
Disconnect the instrument wire couplers.
Remove the instrument mounting nuts, and instruments.

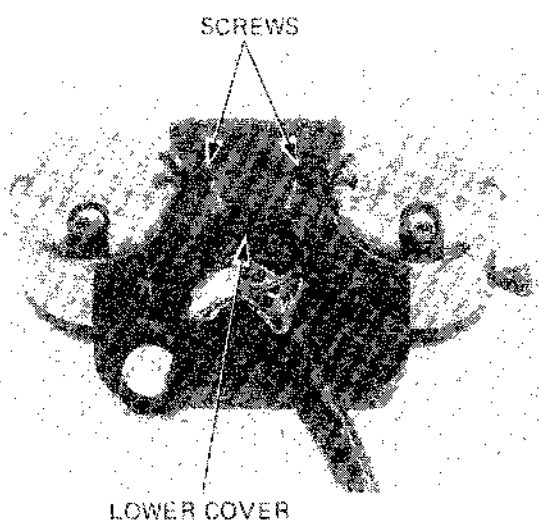


METER BULB REPLACEMENT

Remove the instrument lower cover.

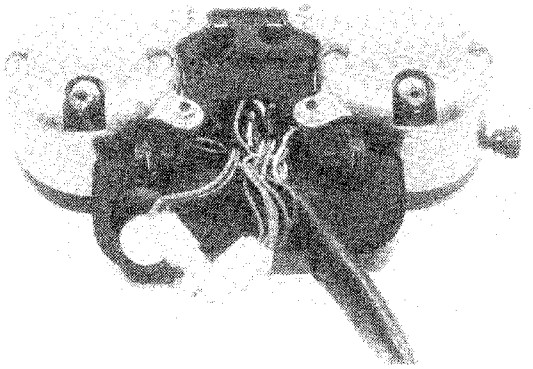
CAUTION

Do not leave the instrument upside down for a long time.

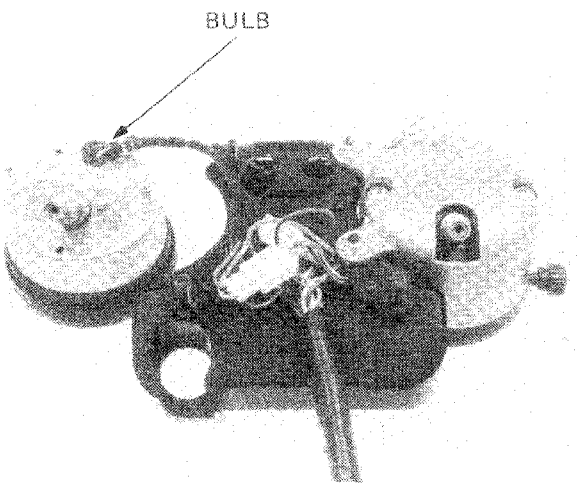


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Remove the meter setting nuts and meters.
Remove the meter lower cover screws.



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



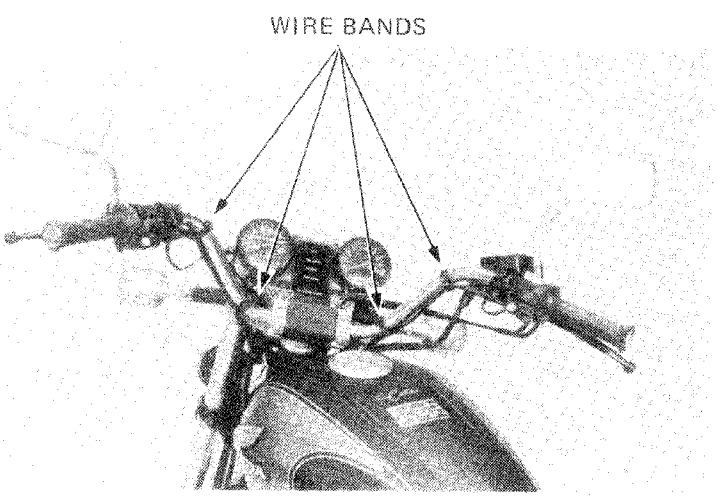
ASSEMBLY AND INSTALLATION

Lubricate the speedometer cable and tachometer cable before reconnecting.
Assemble and install the instruments in the reverse order of disassembly and removal.

HANDLEBAR

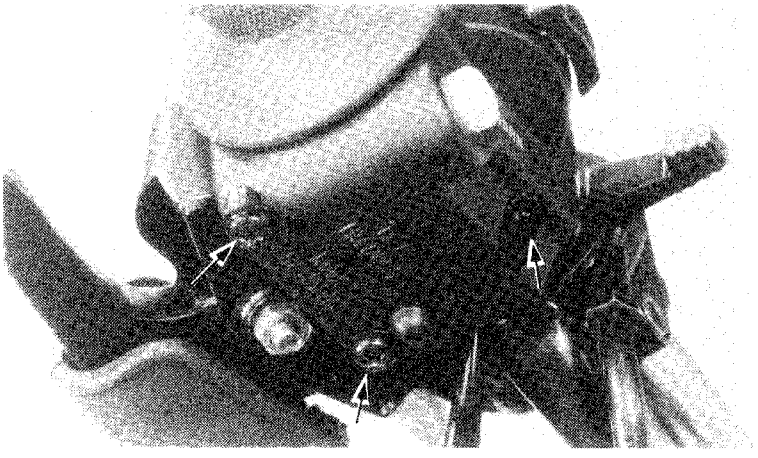
REMOVAL

Remove the wire bands.
Remove the headlight and case (Page 14-3).

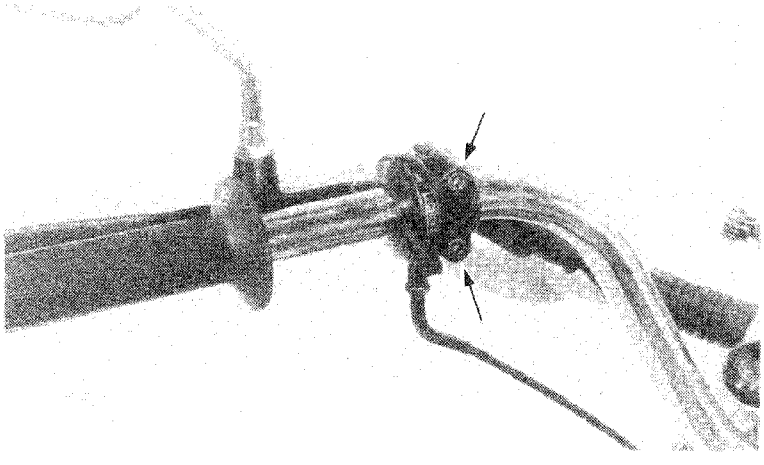


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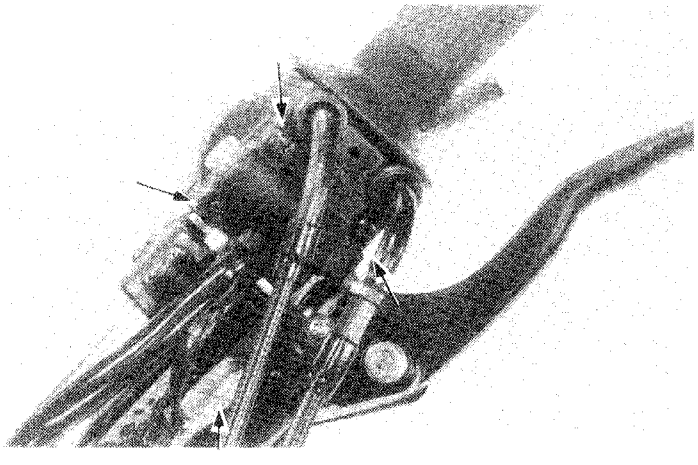
Disconnect the clutch switch wires.
Remove the left handlebar switch and disconnect the clutch cable.



Remove the choke lever holder.
Disconnect the choke cable from the choke lever.

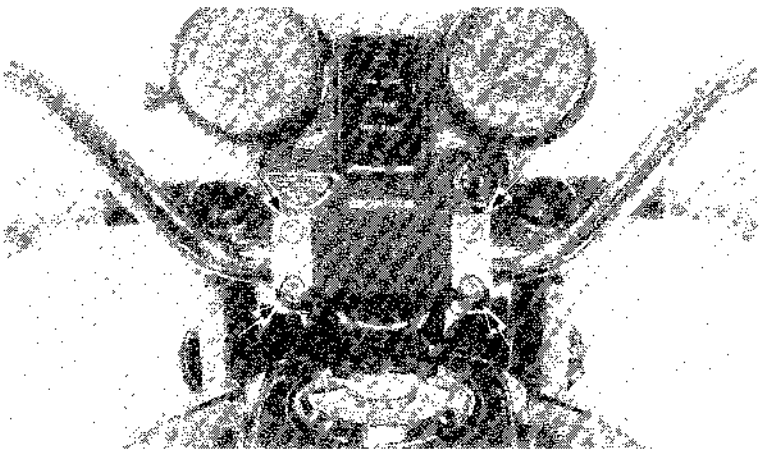


Disconnect the brakelight switch wires.
Remove the right handlebar switch and throttle grip.
Remove the front master cylinder with the brake lever.



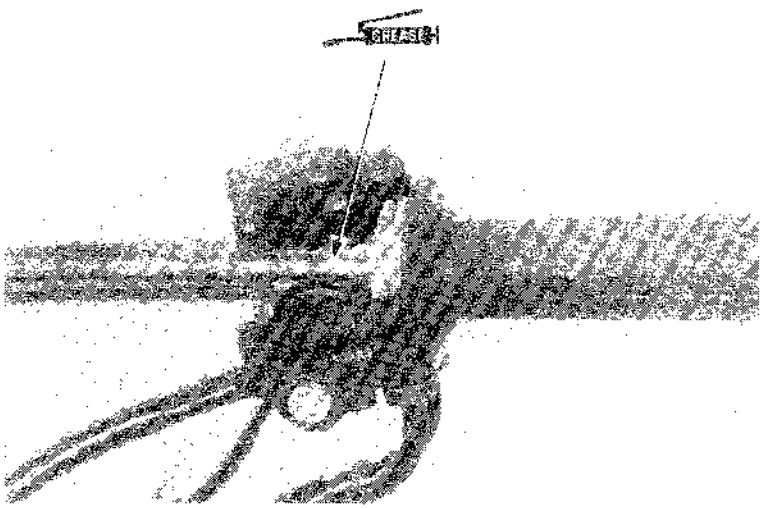
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Remove the handlebar upper holders, and handlebar



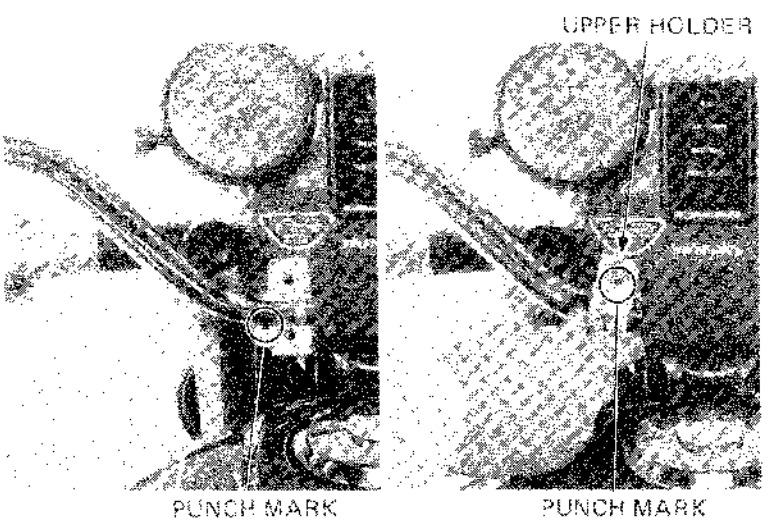
INSTALLATION

Apply grease to the throttle grip sliding surface.



Place the handlebar onto the lower holder aligning the punch mark with the upper face of the lower holder.
Install the upper holders with the punch mark on the holder facing up.
Tighten the forward bolts first, then tighten the rear bolts.

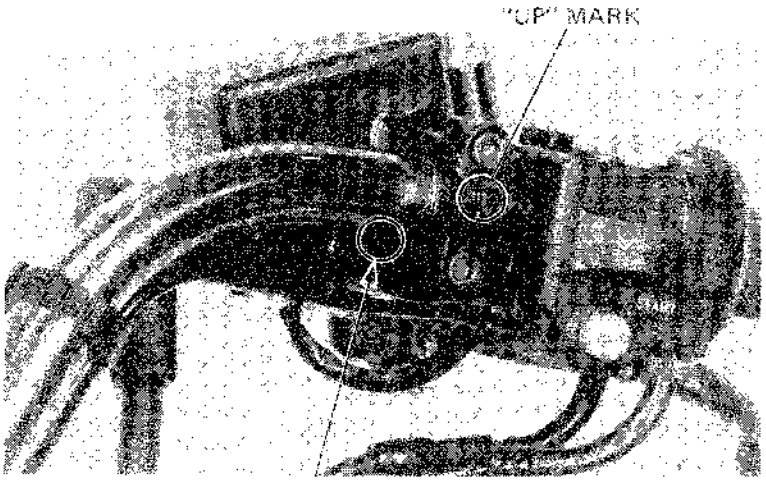
TORQUE: 20–30 N·m (2.0–3.0 kg·m, 14–22 ft·lb)



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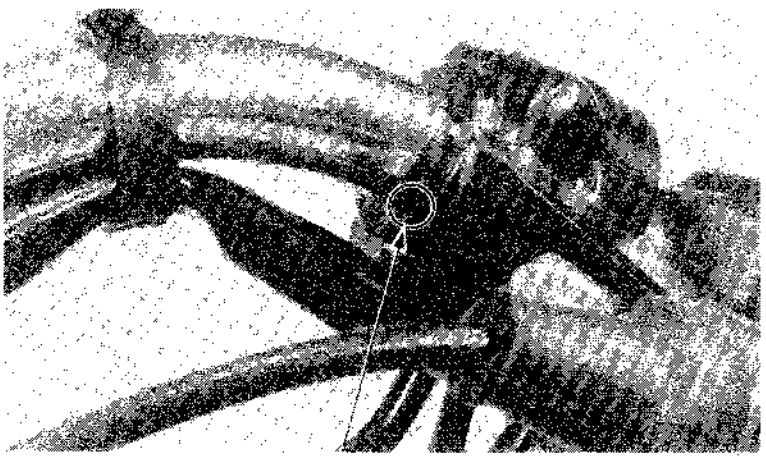
Install the front brake master cylinder with "UP" mark on the holder facing up. Align the end of the holder with the handlebar punch mark. Tighten the upper bolt first, then the lower bolt.

Install the right handlebar switch and connect the brake light switch wires.



Connect the choke cable to the choke lever.
Align the end of the holder with the punch mark on the handlebar.
Tighten the upper bolt first, then the lower bolt.

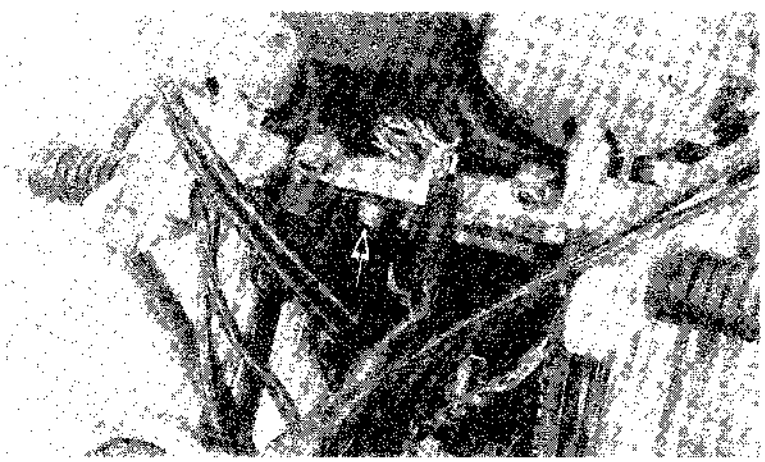
Install the left handlebar switch and connect the clutch switch wires.
Connect the clutch cable.
Route the switch wires (Page 1-11) and install the headlight and case (Page 14-3).



IGNITION SWITCH REPLACEMENT

Remove the headlight and headlight case (Page 14-3).
Disconnect the ignition switch wire coupler.
Remove the ignition switch mounting bolts, and ignition switch.

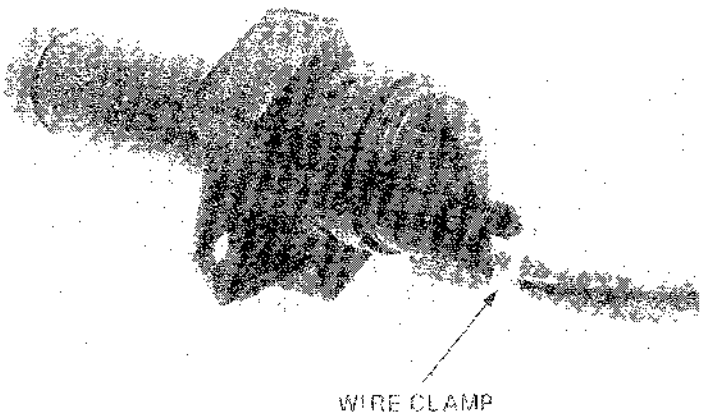
Install the ignition switch in the reverse order of removal.



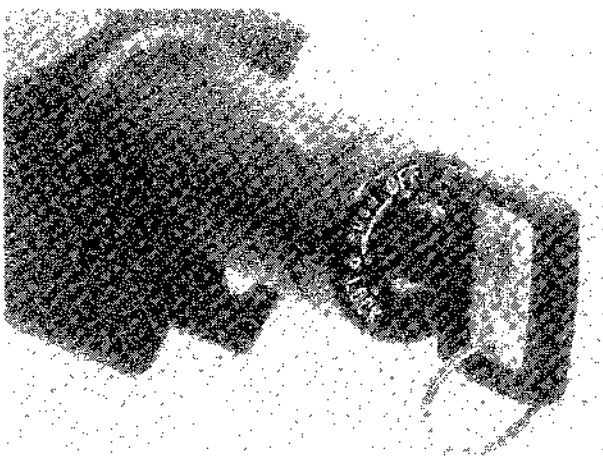
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DISASSEMBLY/ASSEMBLY

Bend the wire clamp tongue up.

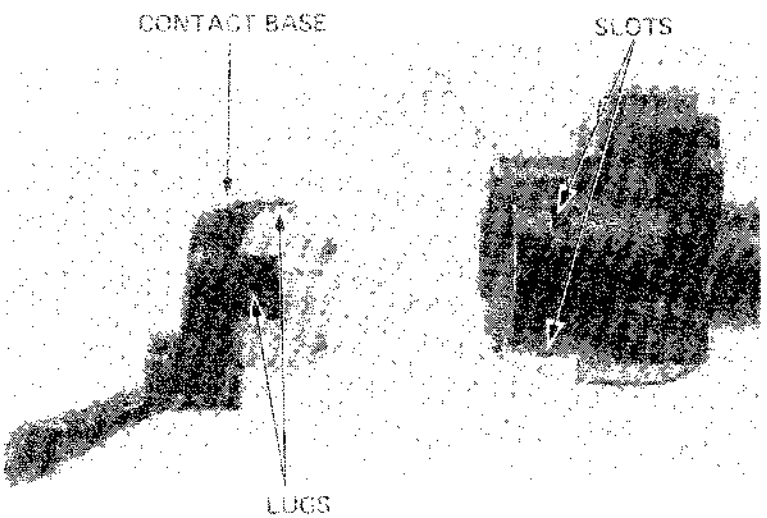


Insert the ignition key and turn it to between the ON and OFF detent positions.



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.

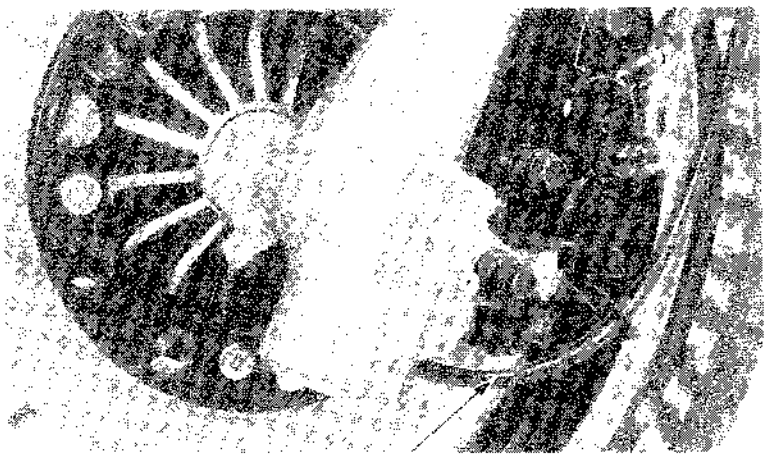


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FRONT WHEEL

REMOVAL

Remove the speedometer cable set screw and the speedometer cable.

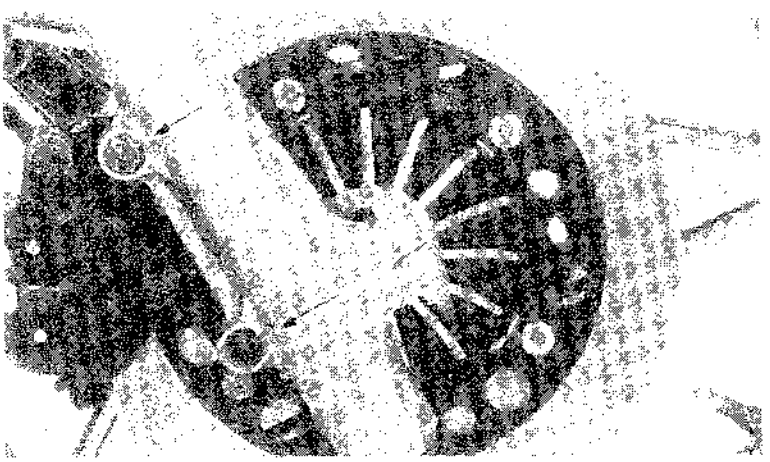


SPEEDOMETER CABLE

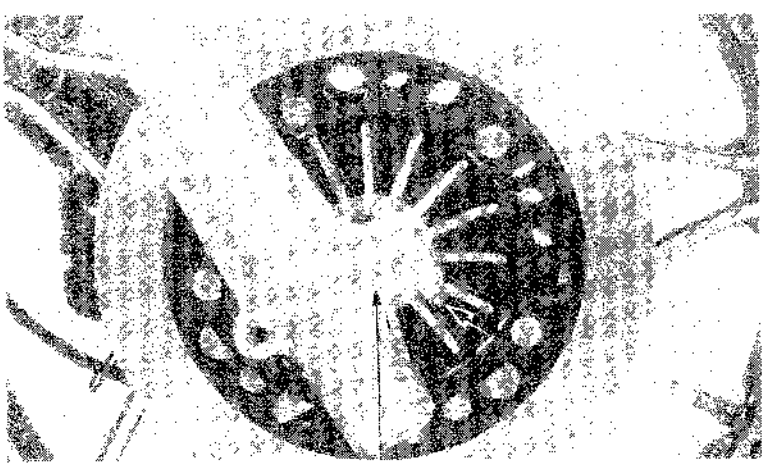
Remove the right caliper assemblies by loosening the bolts.

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.

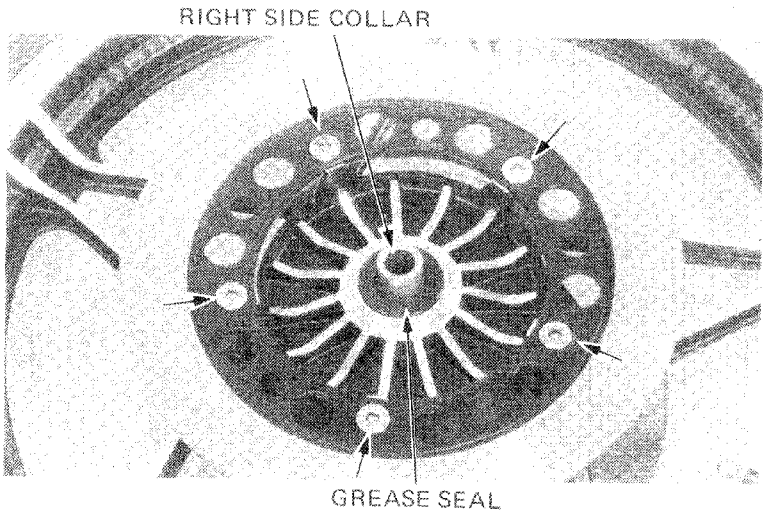


FRONT AXLE

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DISASSEMBLY

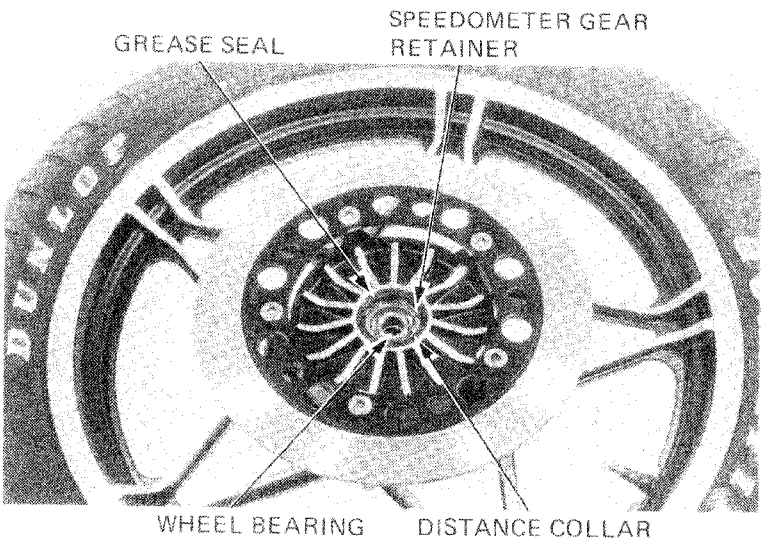
Remove the brake disc mounting bolts and disc.
Remove the right side collar and right grease seal.



Remove the speedometer gear box.
Remove the left seal and speedometer gear retainer.
Remove the wheel bearings (see below) and the distance collar from the hub.

NOTE

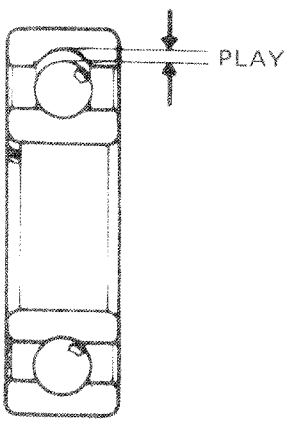
If the bearings are removed, they must be replaced with new ones.



WHEEL BEARING INSPECTION

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

SERVICE LIMIT: 0.03 mm (0.001 in)



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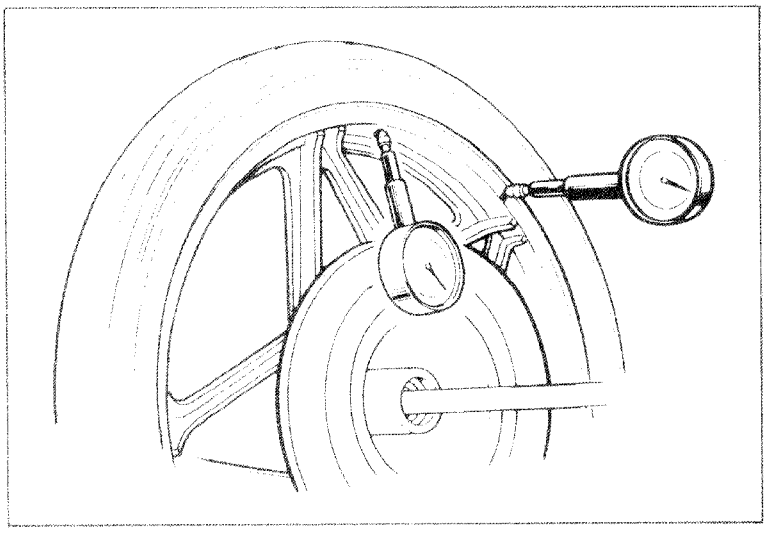
WHEEL INSPECTION

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

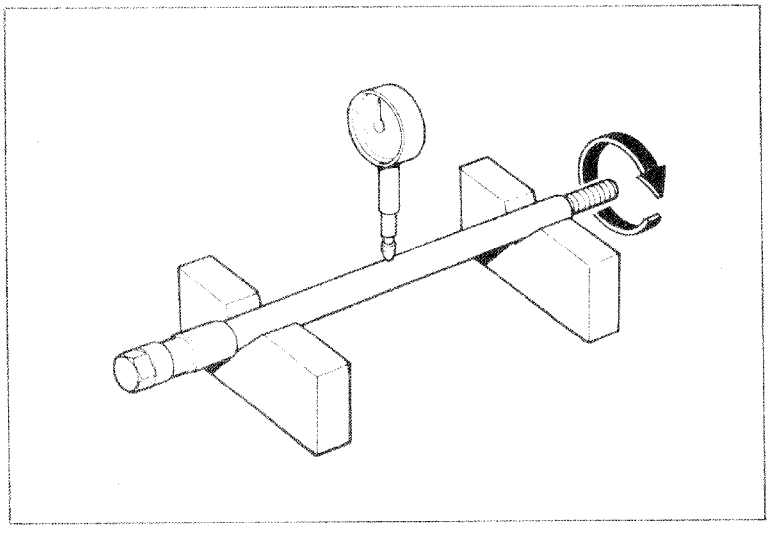
The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



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)



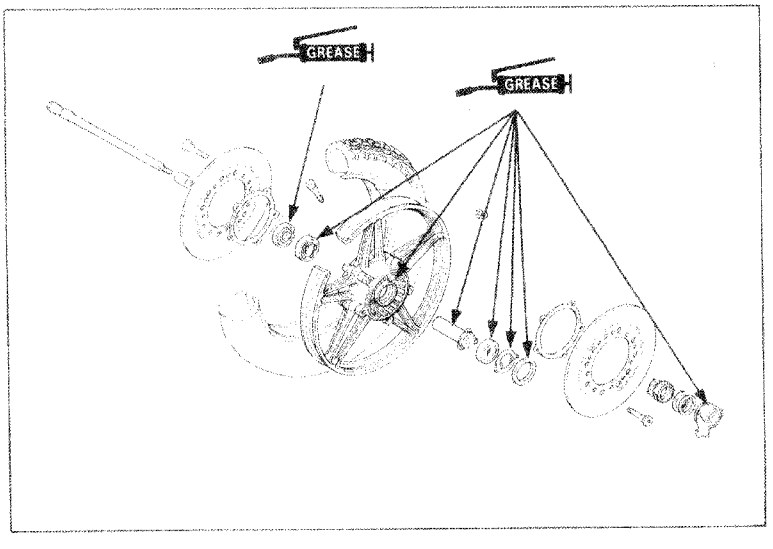
ASSEMBLY

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.



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

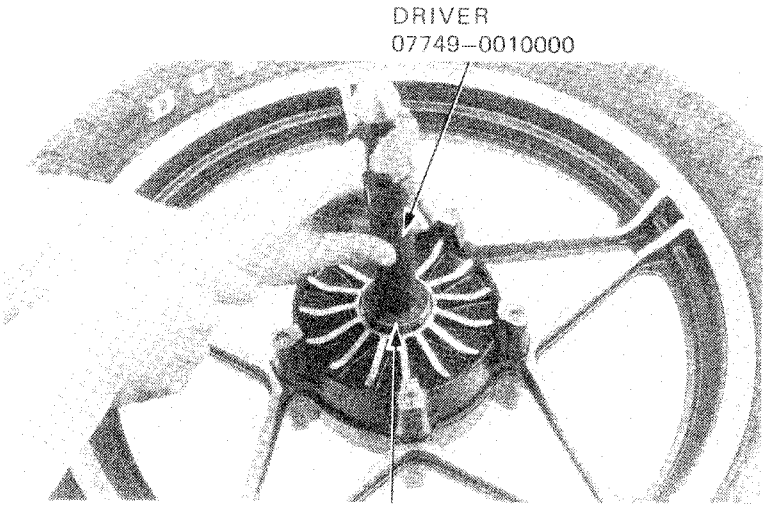
NOTE

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

Drive in the left bearing squarely.

NOTE

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



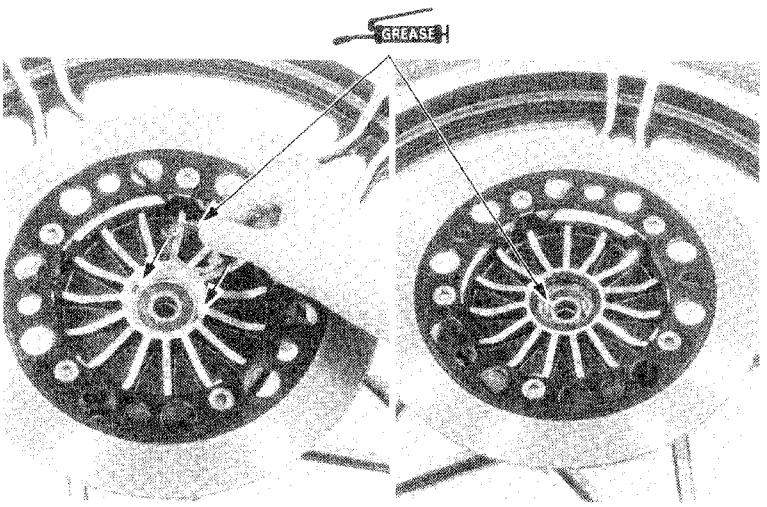
Install the speedometer gear retainer in the wheel hub, aligning the tangs with the slots.
Install the left grease seal.

Install the brake disc with the "L" mark on the left.

TORQUE: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

NOTE

When installing the brake disk, apply grease to the bolt thread.

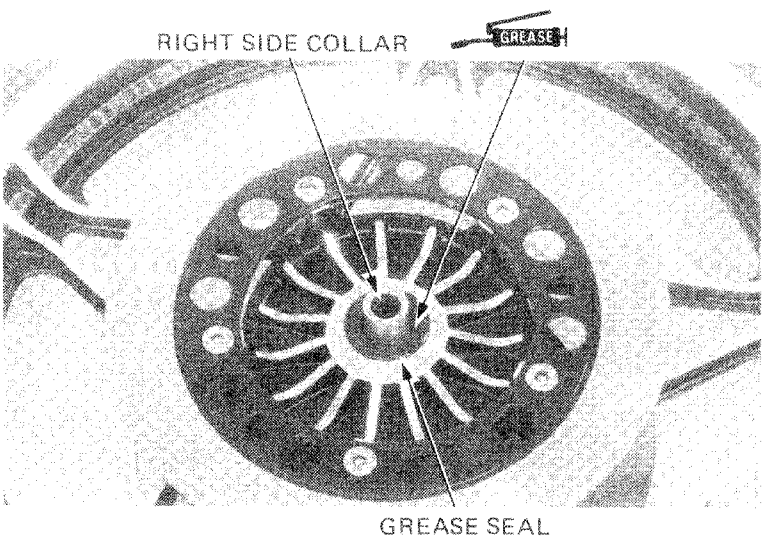


Install the right grease seal and right side collar.
Install the brake disc with the "R" mark on the right.

TORQUE: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

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

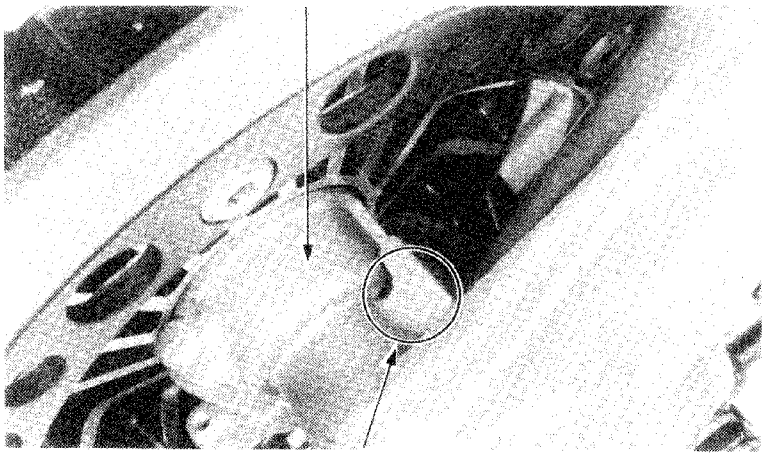
Clean the brake discs with a high quality degreasing agent.



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INSTALLATION

Place the wheel between the fork tubes and align the speedometer gearbox with the tang on the left fork leg as shown.
Install the axle.

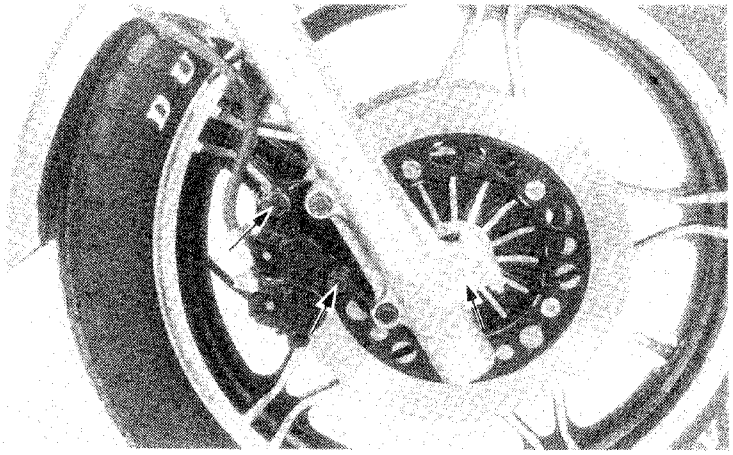


Install the right caliper assemblies, taking care not to damage the brake pads.
Tighten the caliper mounting bolts.

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

Tighten the axle to the specified torque.

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



Measure the distance between the outside surface of the right brake disc and the rear of the right caliper holder with a 0.7 mm (0.028 in) feeler gauge. If the gauge cannot be inserted, pull the right fork out until the gauge can be inserted.

Tighten the axle pinch bolt to the specified torque.

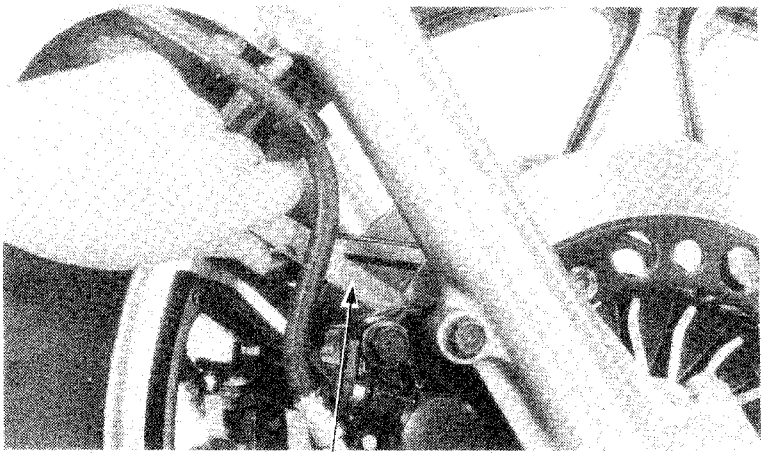
TORQUE: 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)

There should be at least 0.7 mm (0.028 in) clearance between the caliper holder and disc.

CAUTION:

After installing the wheel, apply the brakes several times and recheck the clearance on both sides. Failure to provide clearance will damage the brake discs and affect braking efficiency.

Install the speedometer cable.



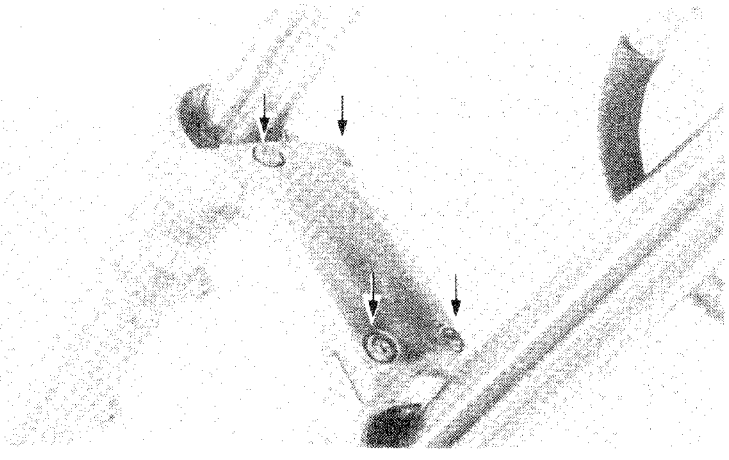
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FRONT FORK

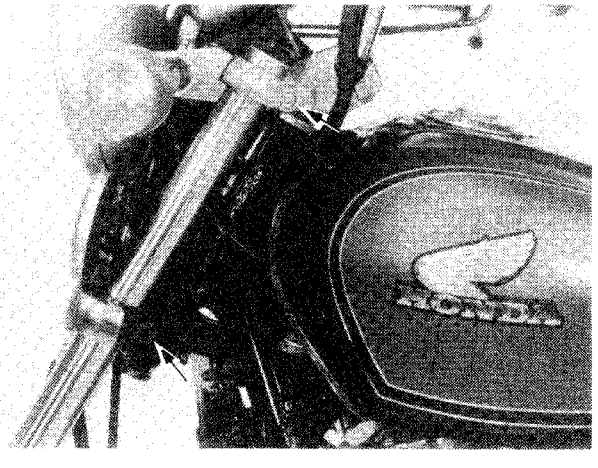
Remove the front wheel (Page 14-11).
Remove the brake caliper and the fender.



Remove the fork brace.



Loosen the fork upper and lower pinch bolts.
Pull the fork tubes down and out while twisting to remove them.



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DISASSEMBLY

Depress the air valve and release front fork air pressure.

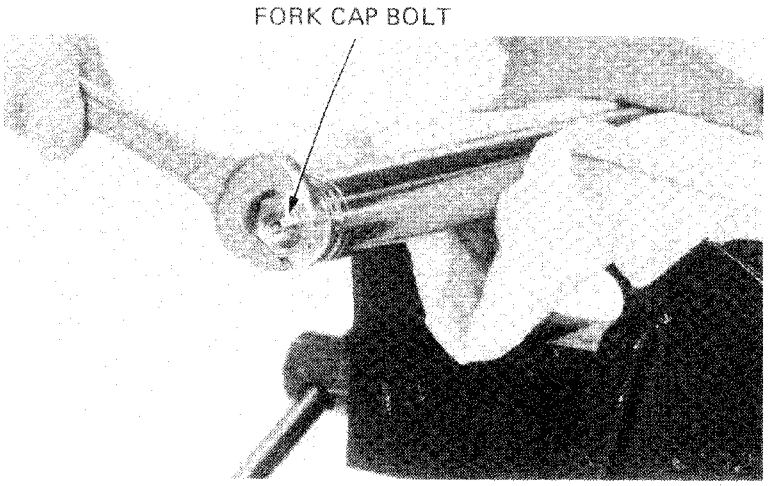
CAUTION

If air pressure is not released before disassembling, the fork 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.

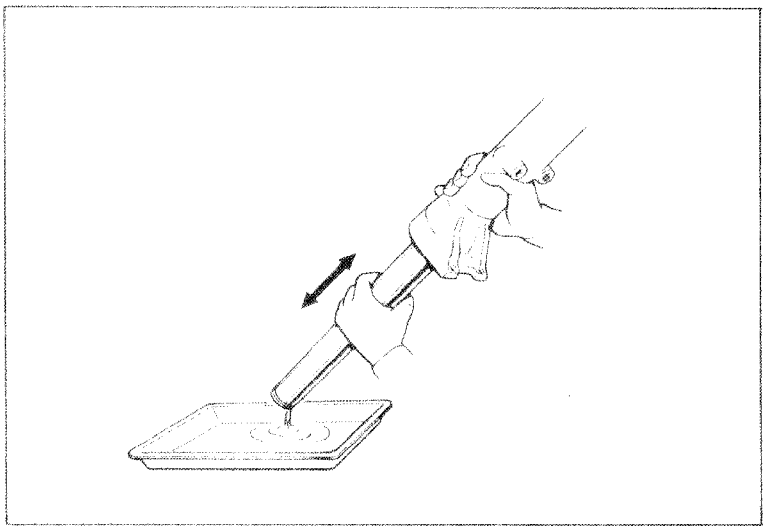
CAUTION

Do not damage the sliding surface.



Remove the collar, washer and fork spring.

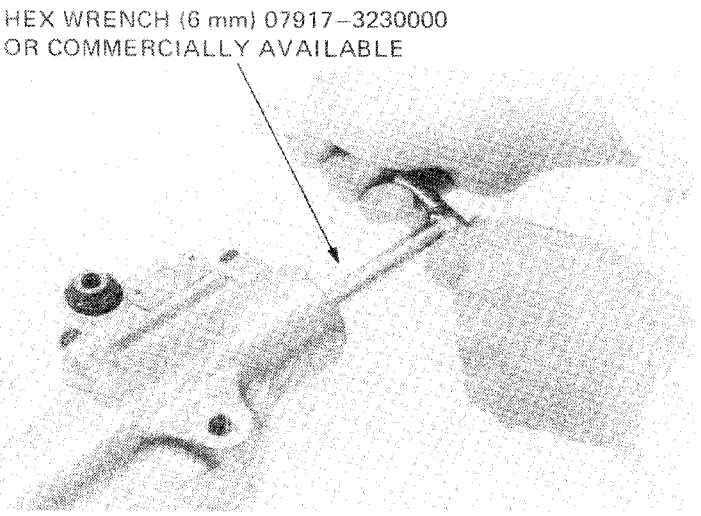
Pour out the fork fluid by pumping the fork up and down several times.



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

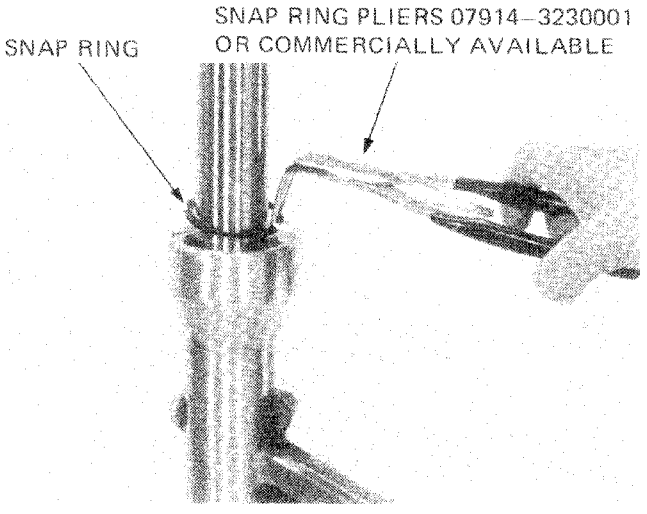
NOTE

Temporarily install the spring and fork bolt if the bolt is difficult to remove.



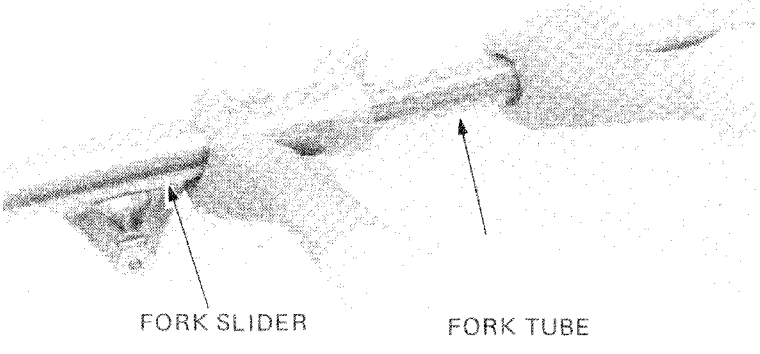
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Remove the dust seal and snap ring.



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.

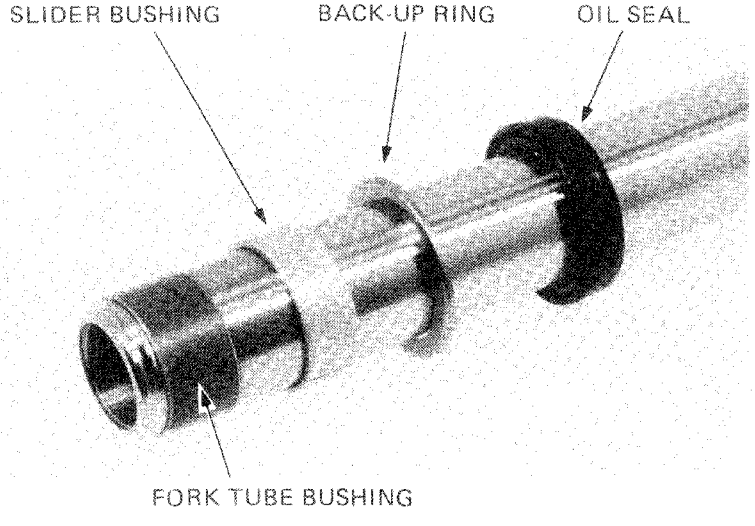
Remove the oil lock piece from inside the slider.



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

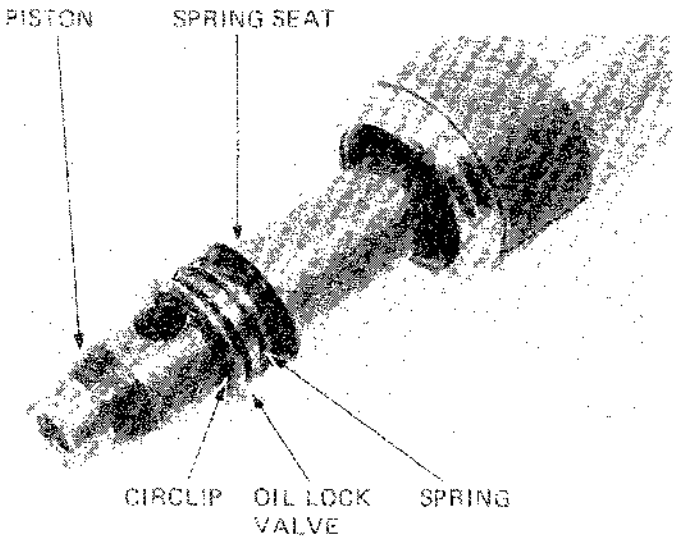
NOTE

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



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

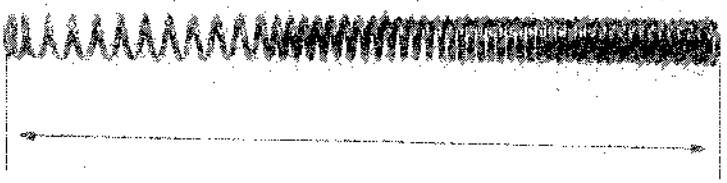


INSPECTION

Measure the fork spring free length.

SERVICE LIMIT: 471.3 mm (18.6 in)

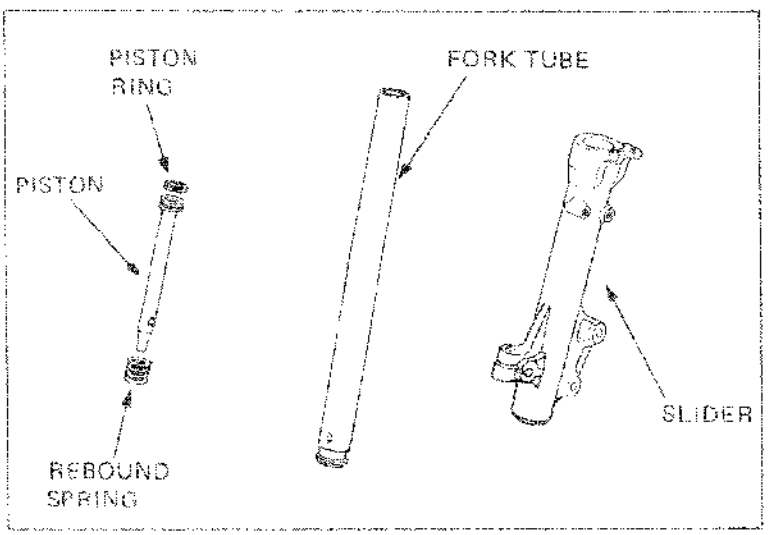
Replace the spring if it is shorter than the service limit.



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.

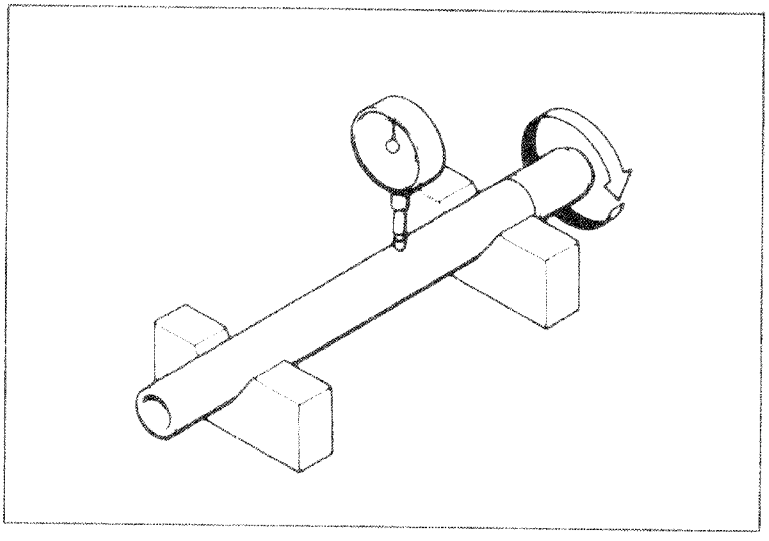
Check the fork piston ring for wear or damage.

Check the rebound spring for fatigue or damage.



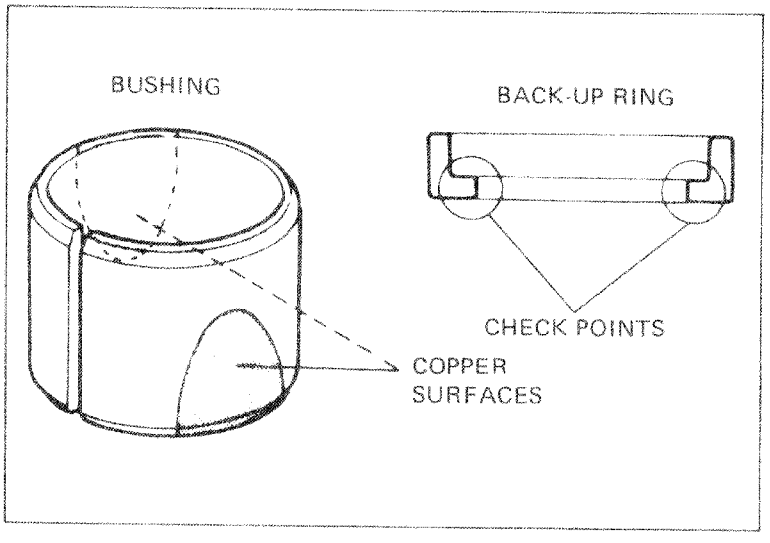
Set the fork tube in V blocks and read the runout. Use 1/2 the total indicator reading to determine the actual runout.

SERVICE LIMIT: 0.2 mm (0.01 in)



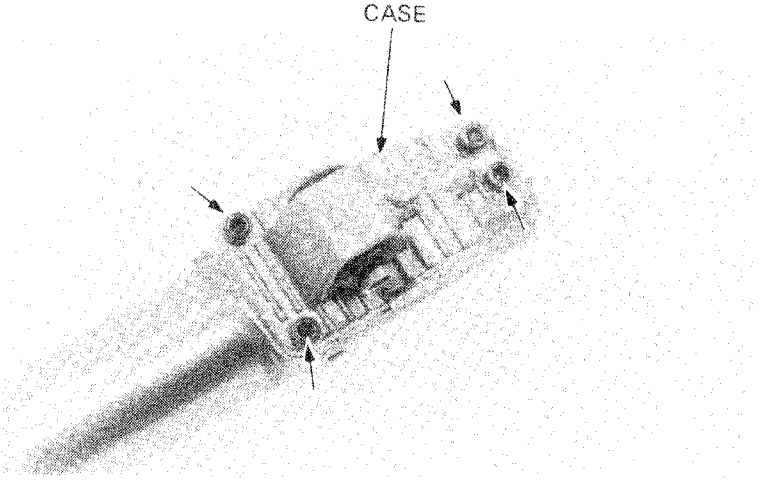
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring. Replace it if there is any distortion at the points shown.



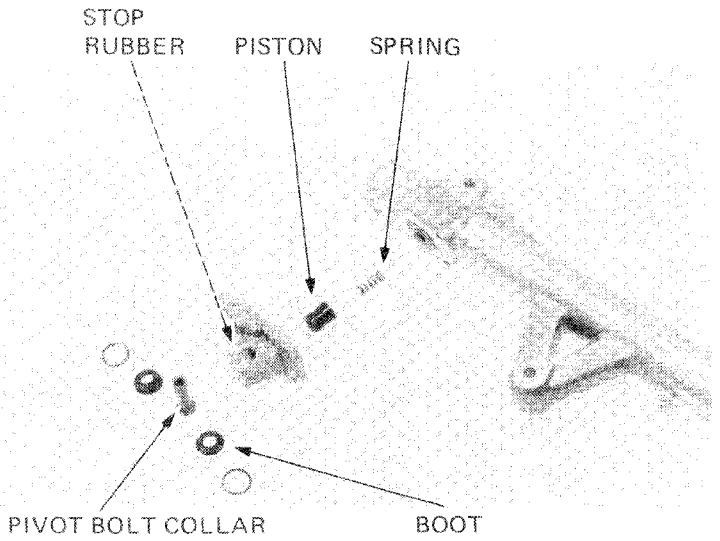
ANTI-DIVE CASE DISASSEMBLY/ ASSEMBLY

Remove the four socket bolts and remove the anti-dive case.

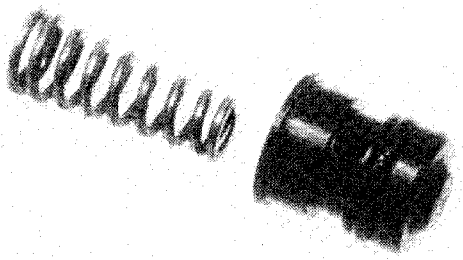


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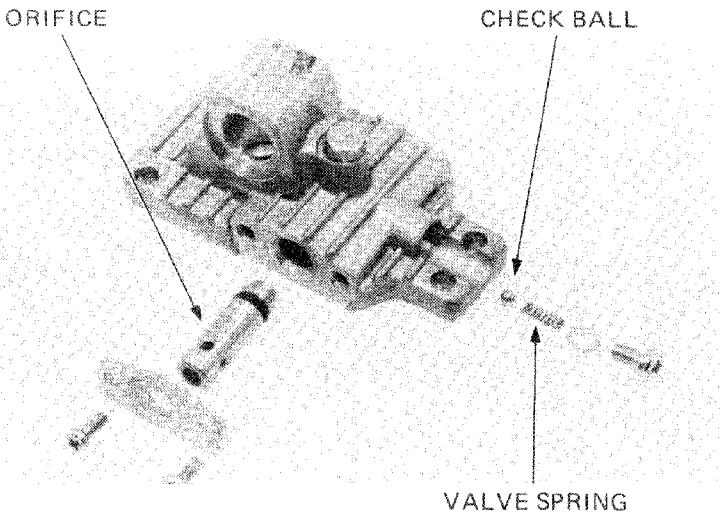
Remove the piston and spring.
Remove the boots, pivot bolt collar and stop rubber.



Check the spring and piston for wear or damage.



Remove the orifice setting plate screws, setting plate and orifice.
Check the orifice for clogging by applying compressed air. Also check the orifice for damage and replace if necessary.
Remove the check valve setting screw, valve spring and check ball.



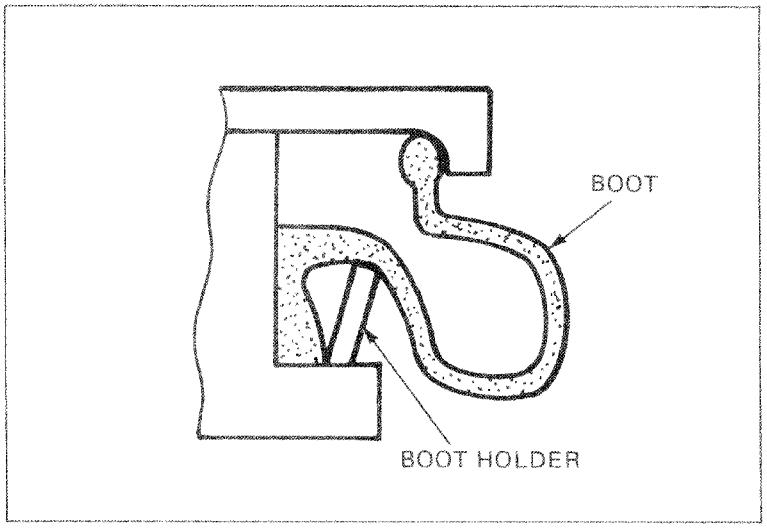
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Assemble the anti-dive case in the reverse order of disassembly.

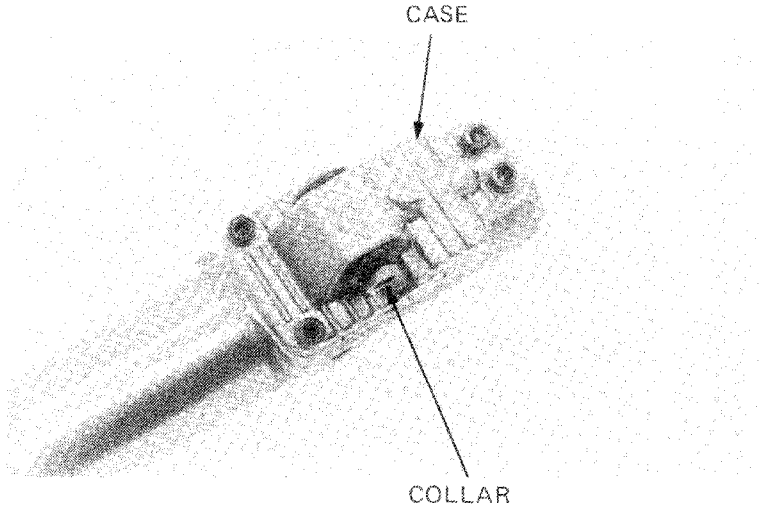
NOTE

Apply a THREAD LOCK AGENT to the threads of the screws and socket bolts before assembly.

Apply ATF to the piston and piston o-ring.
Apply silicone grease to the pivot bolt collar.
Install the pivot bolt collar boot holder as shown.

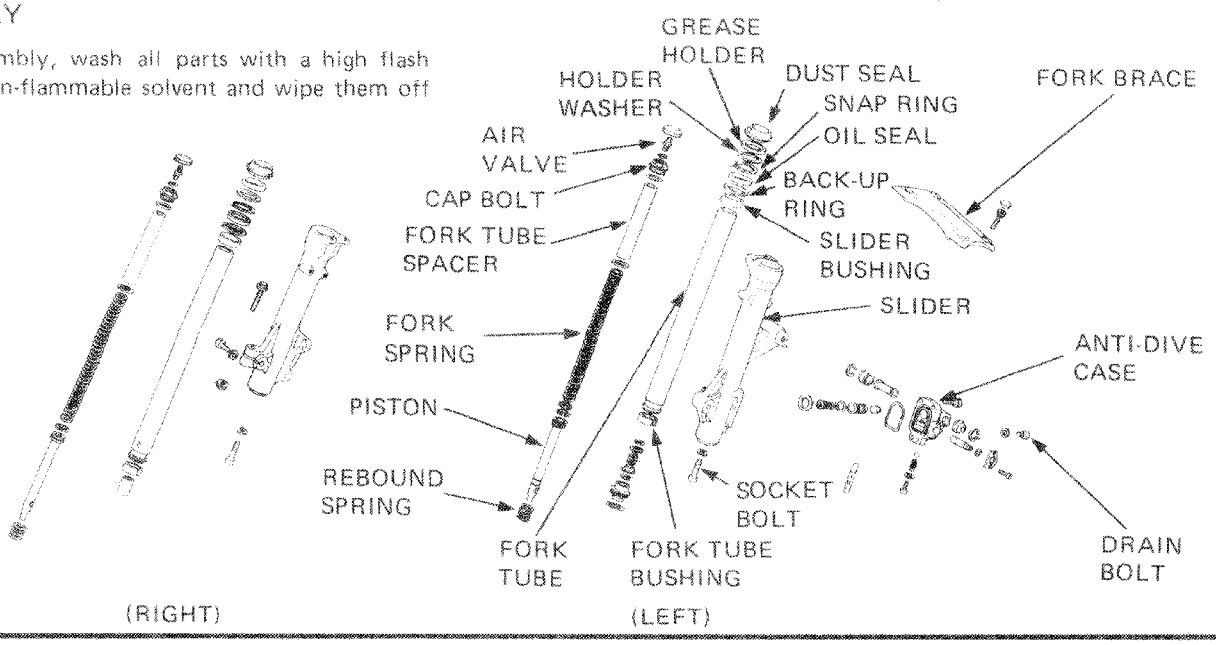


Check the operation of the collar and piston.



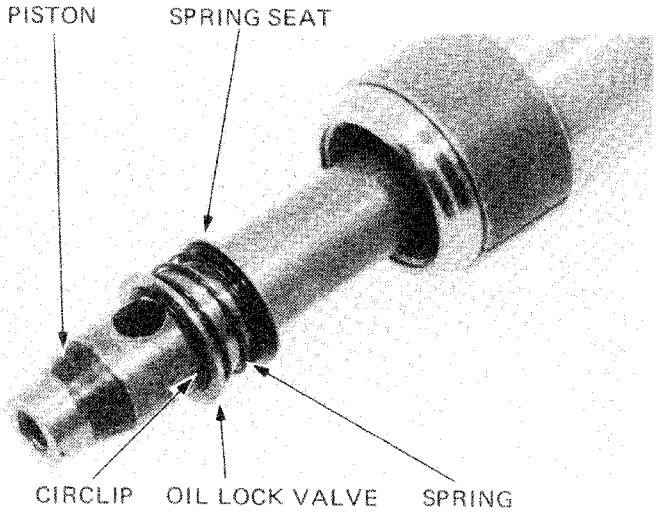
ASSEMBLY

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



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Insert the rebound spring and piston into the fork tube.
On the left fork, install the spring seat, valve spring, oil lock valve and circlip on the piston.
Place the oil lock piece on the end of the piston and insert the fork tube into the slider.



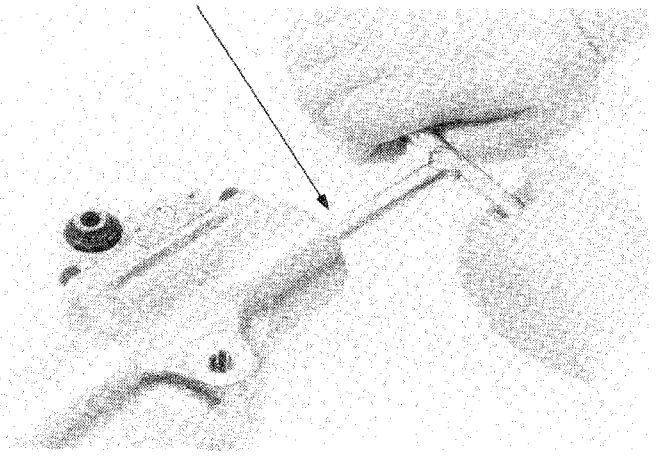
Place the fork slider in a vise with soft jaws or a shop towel.
Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

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

NOTE

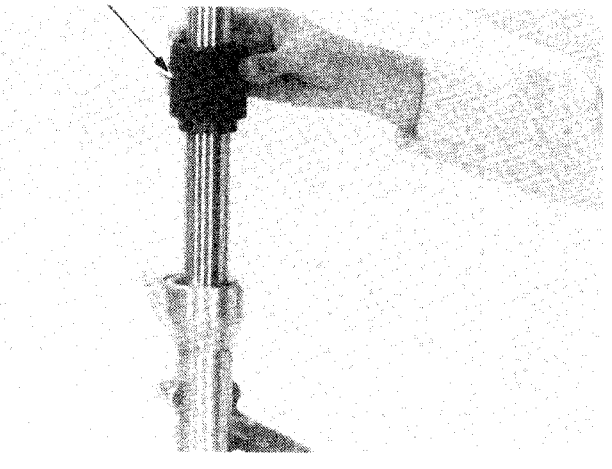
Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

HEX WRENCH, 6 mm 07917–3230000
OR COMMERCIALLY AVAILABLE



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.

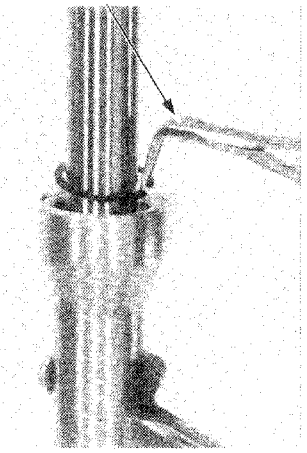
FORK SEAL DRIVER
07947–4630100

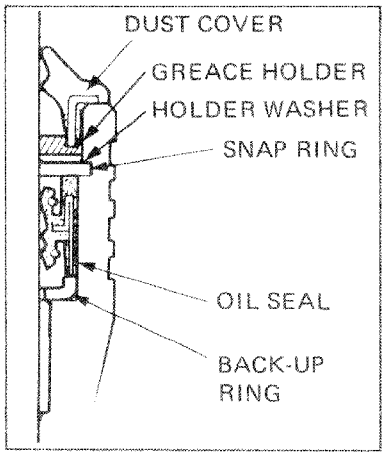


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Install the snap ring with its radiused edge facing down.
Install the holder washer and the grease holder.
Install the dust seal.

SNAP RING PLIERS
07914-3230001

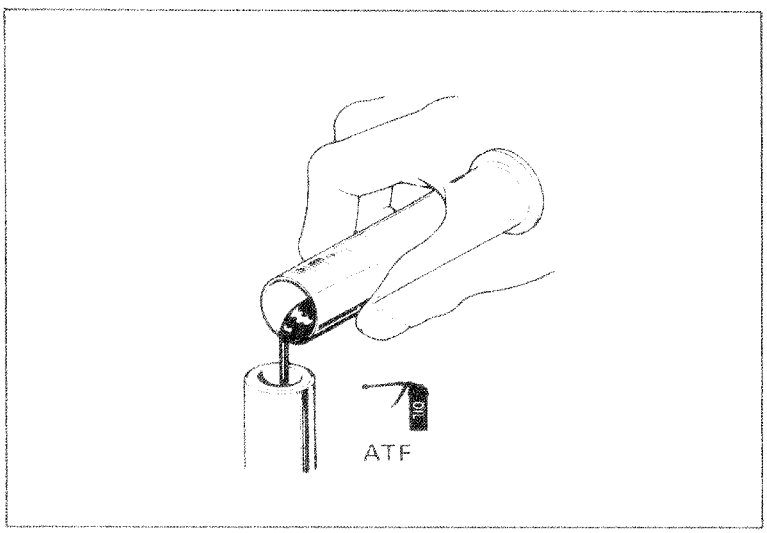




Pour the specified amount of ATF into the fork tube.

CAPACITY:

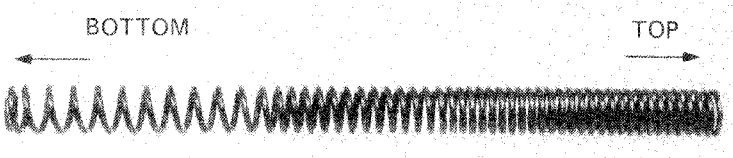
Right fork	455 cc (15.4 oz)
Left fork	470 cc (15.9 oz)



Install the fork spring, washer and collar in the fork tube.

NOTE

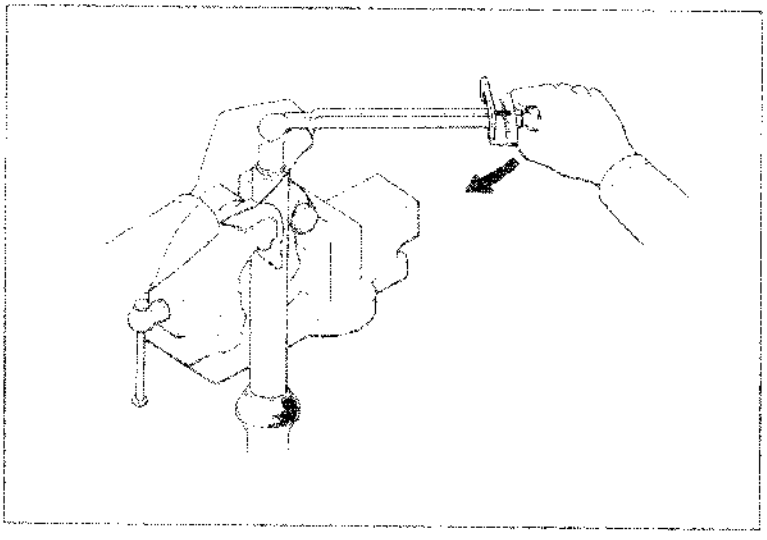
Note the spring direction, the tight windings should face toward the top.



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Install and torque the fork tube cap.

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



INSTALLATION

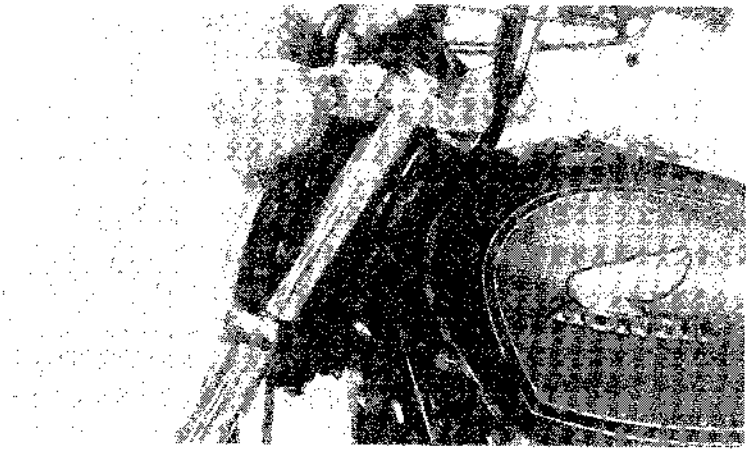
Install the left front fork with the groove on the fork flush with the top of the fork bridge.
Tighten the bottom pinch bolt.

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

Tighten the top pinch bolt.

TORQUE: 9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)

Install the right front fork loosely.
Install the fork brace hex bolts loosely.
Tighten the bottom and top pinch bolts on the right fork to the specified torque valves above.
Install the front fender and brake caliper.
Install the front wheel (Page 14-15).



Tighten the fork brace bolts to the specified torque.

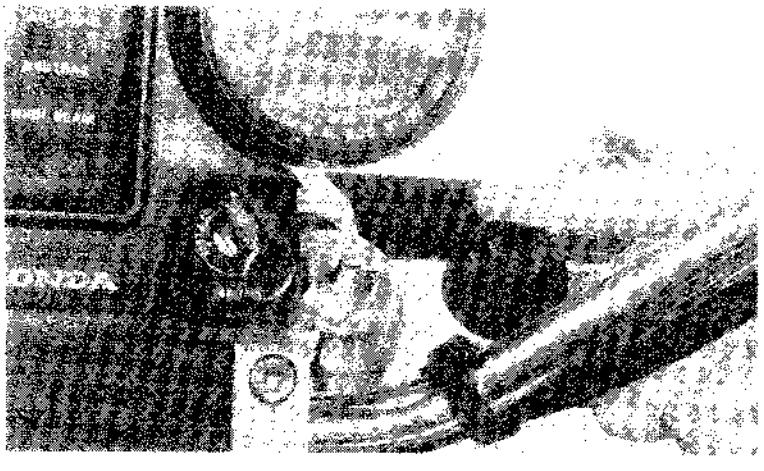
TORQUE: 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

Fill the fork tubes with air to 40 - 100 kPa (0.4 - 1.0 kg/cm^2, 6 - 14 psi).

CAUTION

- *Use only a hand operated air pump to fill to fork tubes. Do not use compressed air.*
- *Maximum pressure is 300 kPa (3 kg/cm^2, 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.

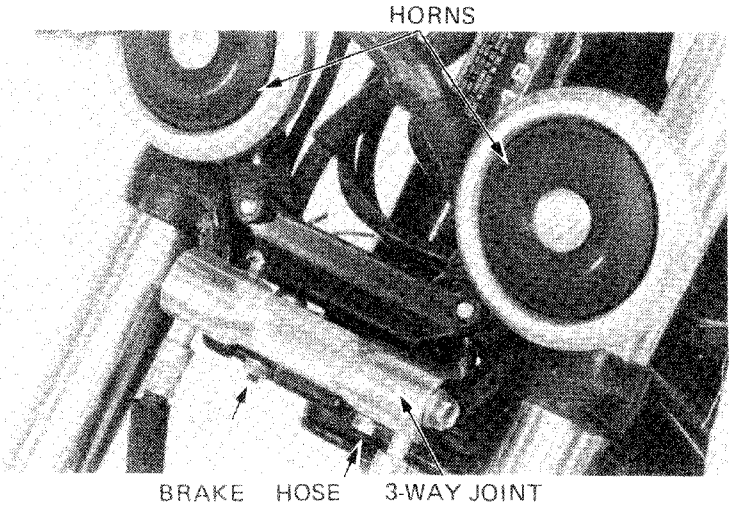


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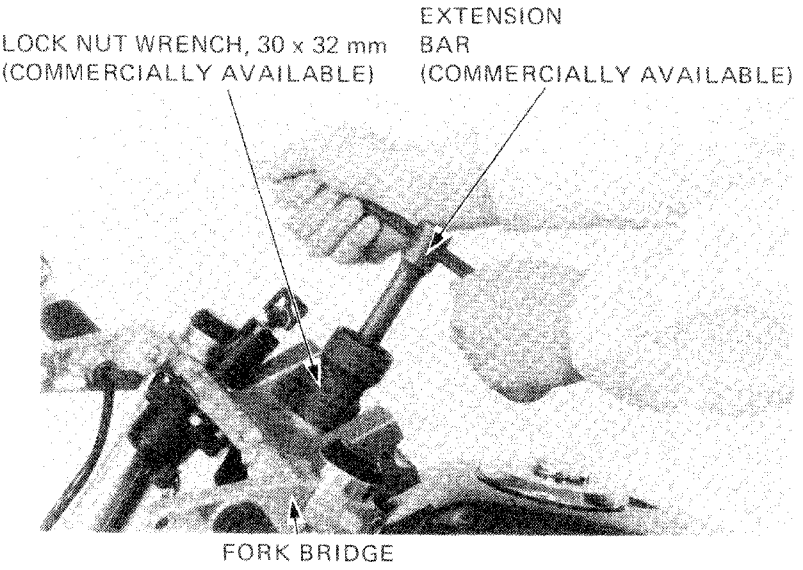
STEERING STEM

REMOVAL

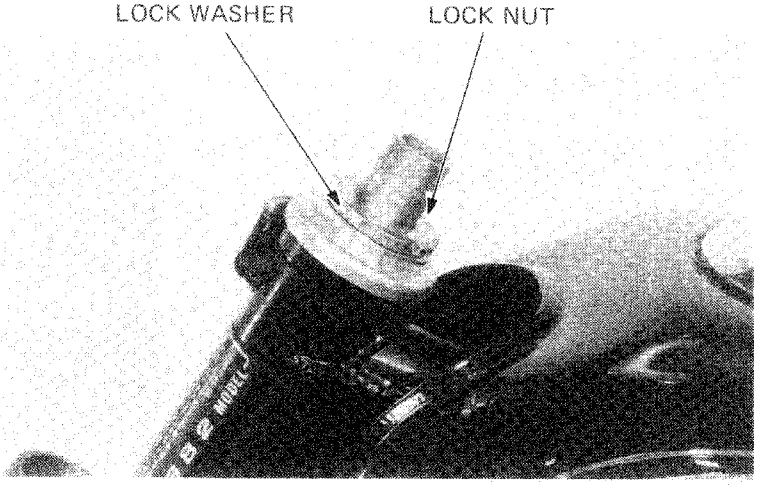
Remove the following parts:
- headlight, headlight case (Page 14-3).
- instruments (Page 14-5).
- handlebar (Page 14-6).
- front wheel (Page 14-11).
- calipers (Page 17-11).
- 3-way joint and horn.



Remove the steering stem nut.
Remove the front forks (Page 14-16).
Remove the fork bridge.

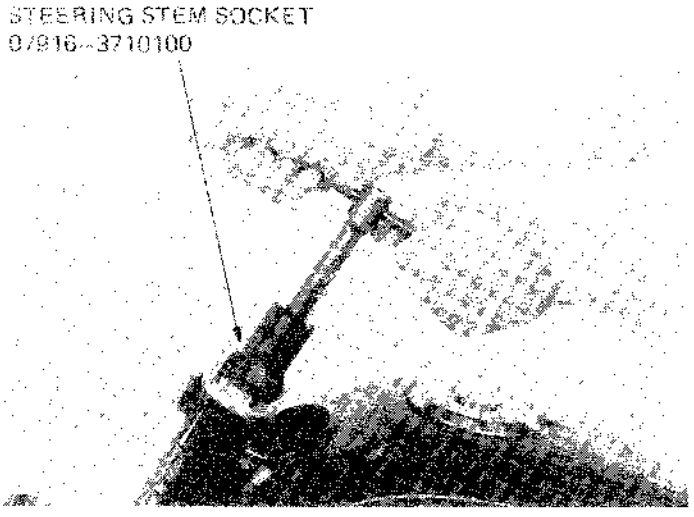


Bend the lock washer tab down and remove the lock nut and lock washer.



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Remove the bearing adjustment nut and the steering stem.

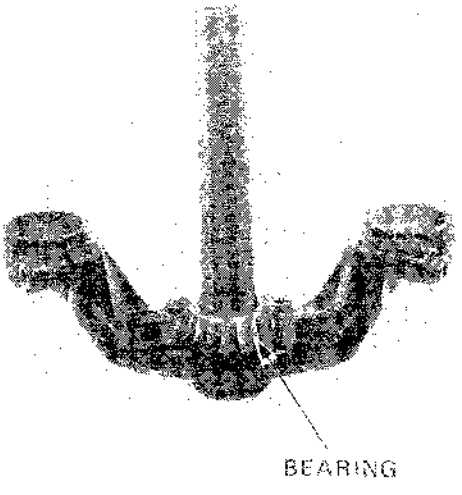


Check the steering stem bearing for damage or wear.

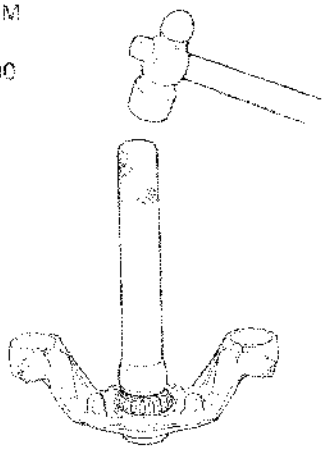
NOTE

Replace the bearing and bearing race as a set.

Remove the bearing from the steering stem.

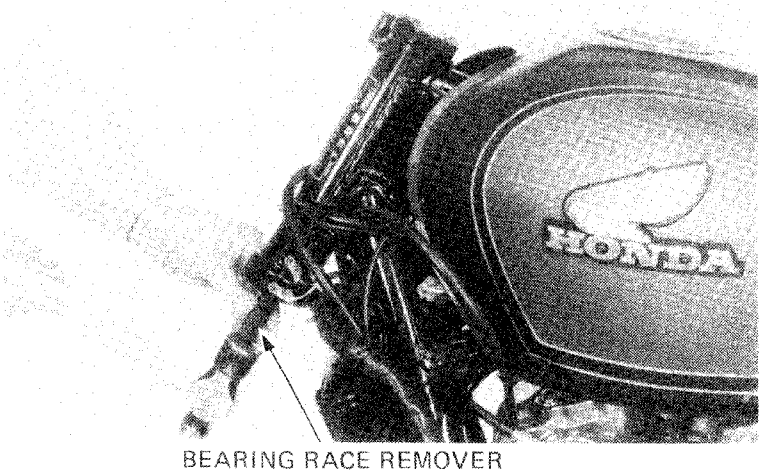


Install a dust seal onto the steering stem and press the lower bearing inner race over the stem with the special tool.



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Remove the upper bearing race with the special tool.

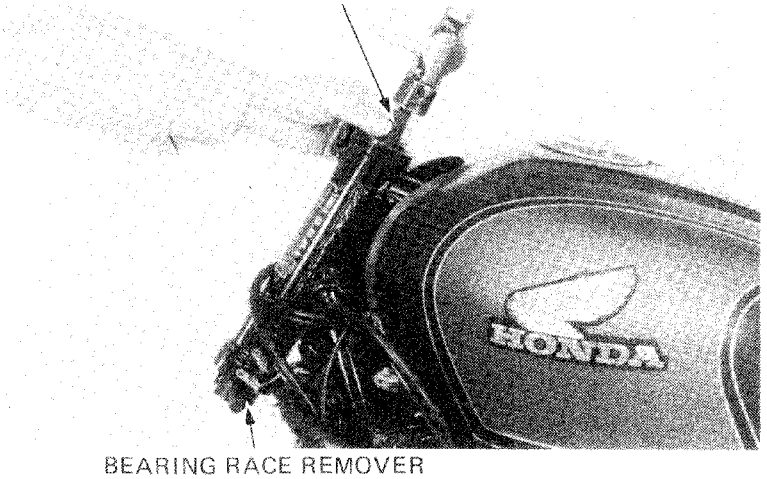


BEARING RACE REMOVER
07954--4250002

Remove the lower bearing race with the special tool.

NOTE

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

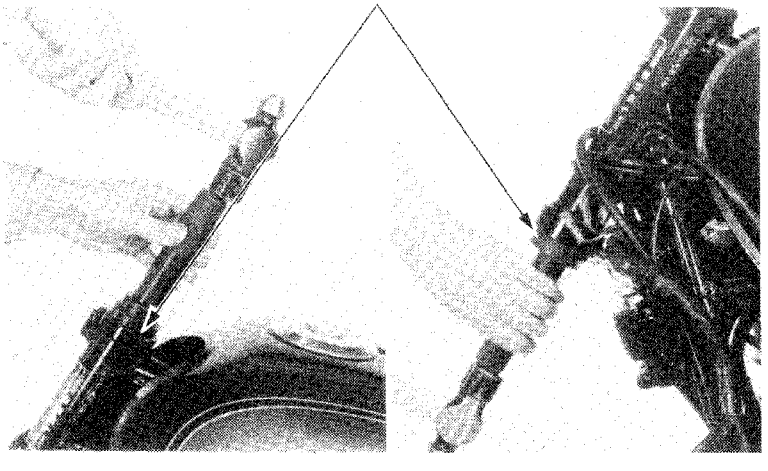


BEARING RACE REMOVER
07954–4250002

BEARING RACE REMOVER
07946–3710500

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

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

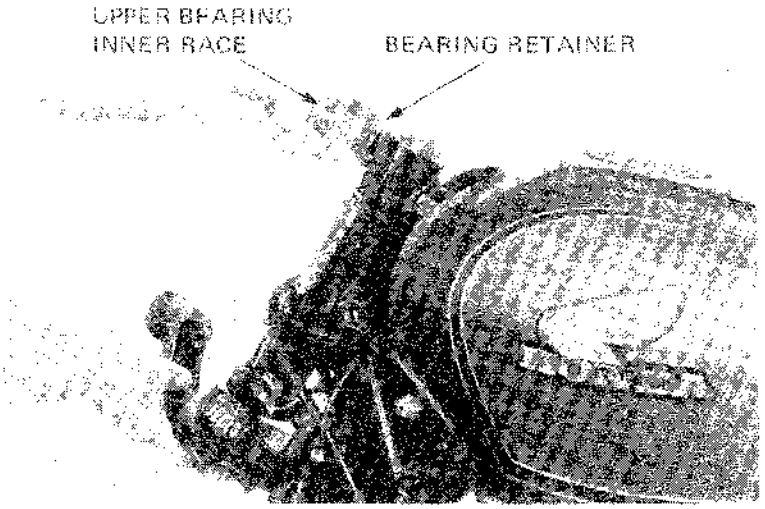


BEARING DRIVER ATTACHMENT
07946–3710701

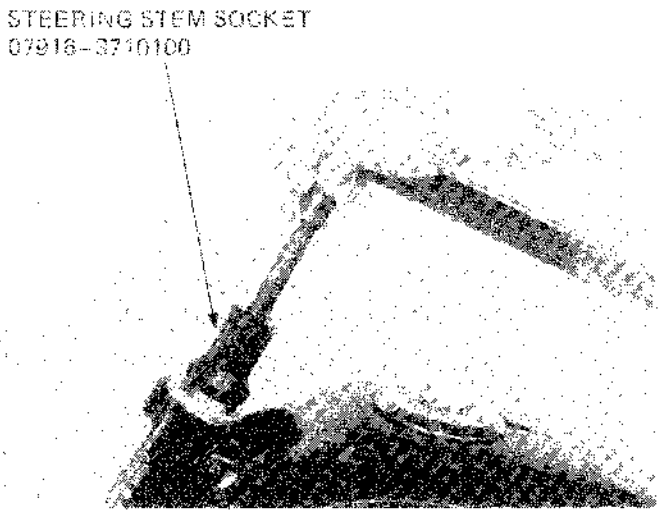
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INSTALLATION

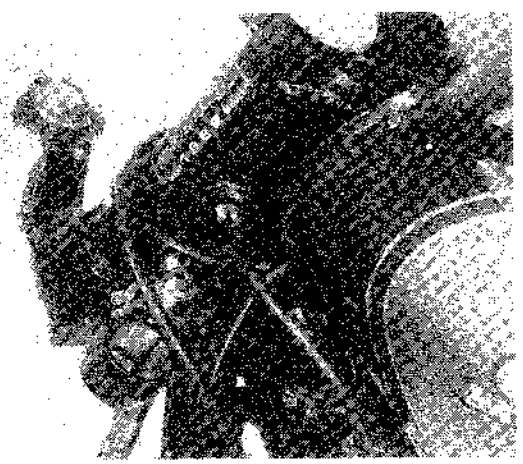
Pack the bearing cavities with bearing grease.
Insert the steering stem into the steering head pipe and install the bearing retainer and upper bearing inner race.



Install and tighten the adjustment nut.
TORQUE: 14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)



Turn the steering stem lock-to-lock 5 times to seat the bearing and tighten the adjusting nut again.
Repeat the bearing tightening and steering stem turning sequence twice.
If the nut does not need tightening after turning the steering stem the first or second time, remove the nut and inspect it and the steering stem threads for dirt or burrs.

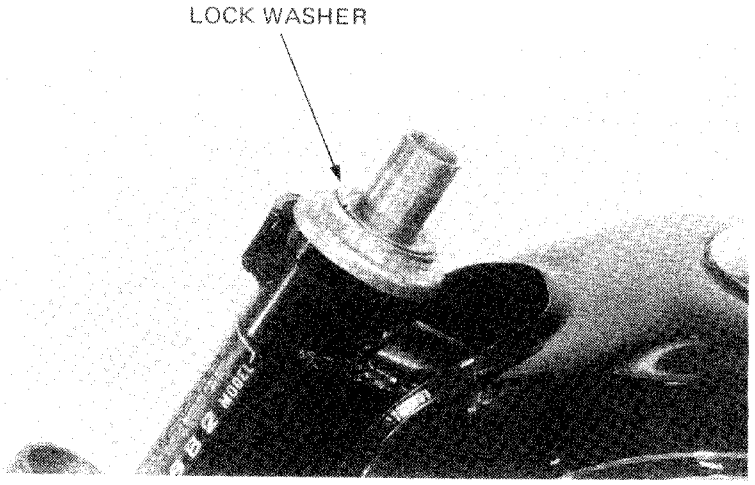


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Install a new bearing adjustment nut lock washer aligning the tabs with the grooves in the nut.

NOTE

Do not install a used bearing adjustment nut lock washer.

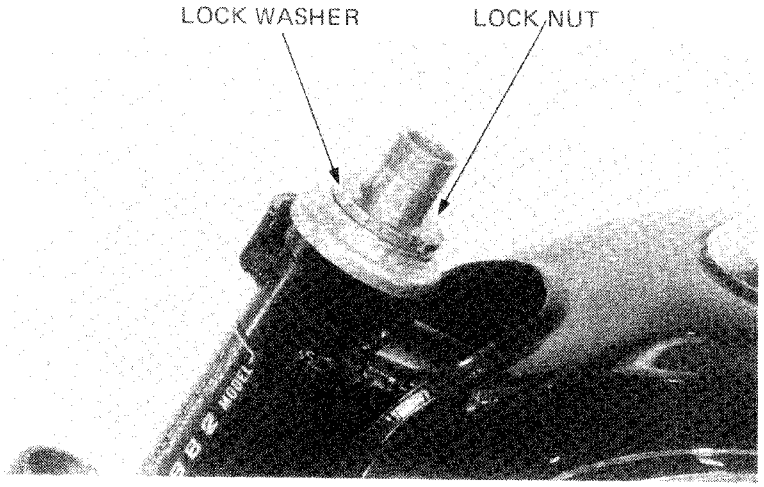


Hand tighten the lock nut.
Hold the adjustment nut and further tighten the lock nut only enough to align its grooves with the lock washer tabs.

NOTE

If the lock nut grooves cannot be easily aligned with the lock washer tabs, remove the nut, turn it over and reinstall it.

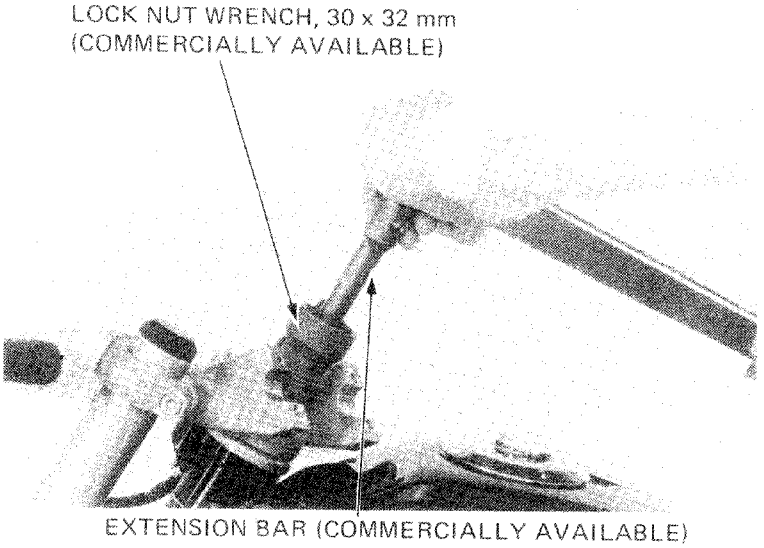
Bend two lock washer tabs up into the lock nut grooves.



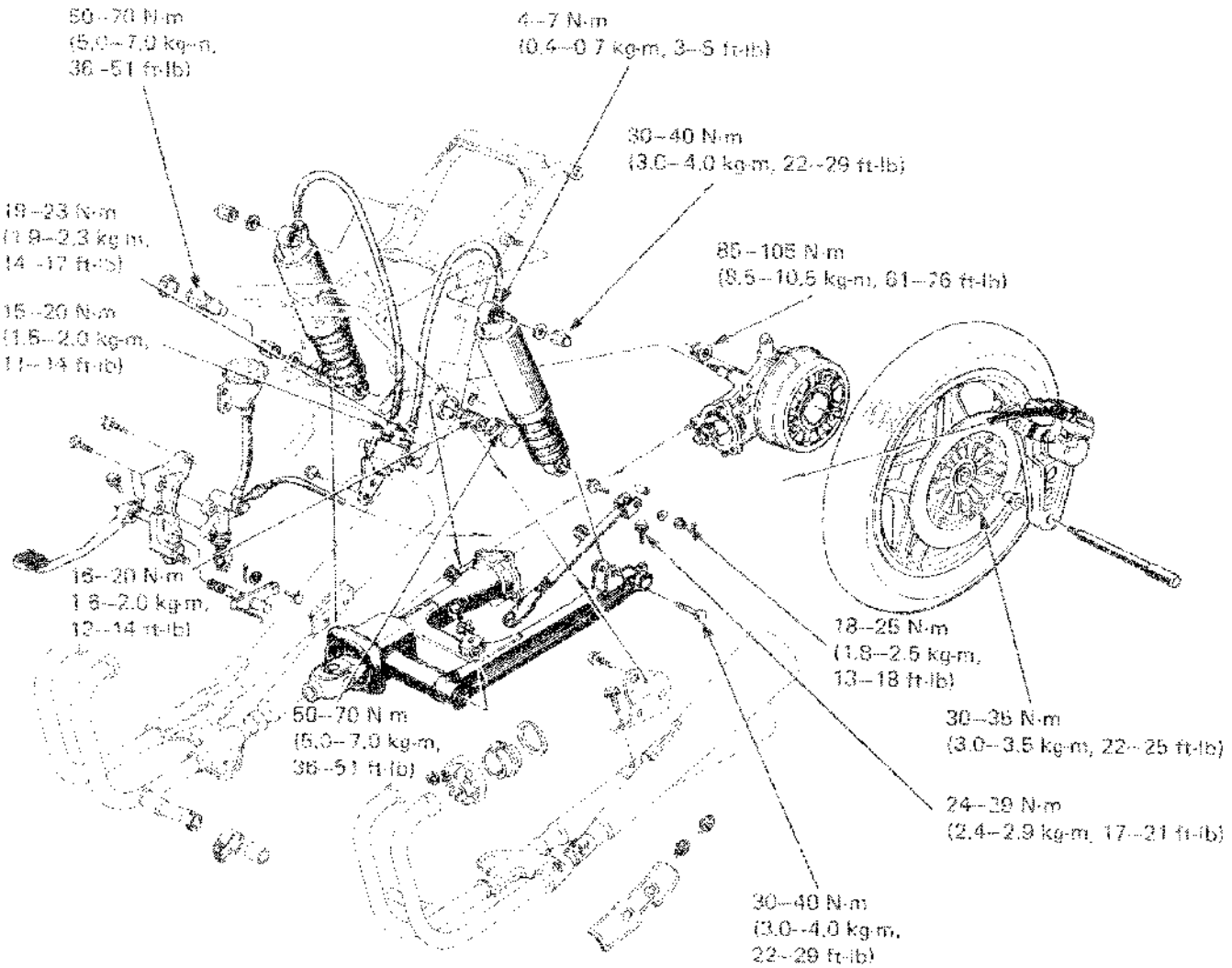
Install the front forks (Page 14-25).
Install the fork bridge and tighten the stem nut.

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.



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15. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	15– 1
TROUBLESHOOTING	15– 1
REAR WHEEL	15– 2
SHOCK ABSORBER	15– 8
SWING ARM	15–12

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 or try to bend wheel.
- Avoid damaging the cast wheel.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle runout		———	0.2 mm (0.01 in)
Rear wheel rim runout	Radial	———	2.0 mm (0.08 in)
	Axial	———	2.0 mm (0.08 in)
Shock absorber air pressure		0–400 kPa (0–4.0 kg/cm², 0–57 psi)	———
Shock absorber fluid capacity		365 cc (12.5 ozs)	———

TORQUE VALUES

Rear brake disc	30–35 N·m	(3.0–3.6 kg-m, 22–25 ft-lb)
Rear axle nut	80–100 N·m	(8.0–10.0 kg-m, 58–72 ft-lb)
Rear axle pinch bolt	24–29 N·m	(2.4–2.9 kg-m, 17–21 ft-lb)
Rear shock absorber	30–40 N·m	(3.0–4.0 kg-m, 22–29 ft-lb)
Rear brake torque link	18–25 N·m	(1.8–2.5 kg-m, 13–18 ft-lb)
Swing arm pivot bolt	50–70 N·m	(5.0–7.0 kg-m, 36–51 ft-lb)
Swing arm pivot adjusting bolt	16–20 N·m	(1.6–2.0 kg-m, 12–14 ft-lb)
Swing arm pivot bolt lock nut	50–70 N·m	(5.0–7.0 kg-m, 36–51 ft-lb)
3-way joint lock nut	19–23 N·m	(1.8–2.3 kg-m, 14–17 ft-lb)
Air hose (to 3 way joint)	15–20 N·m	(1.5–2.0 kg-m, 11–14 ft-lb)
(to shock absorber)	4–7 N·m	(0.4–0.7 kg-m, 3–5 ft-lb)
Air hose connector	8–12 N·m	(0.8–1.2 kg-m, 6–9 ft-lb)
Air valve	4–7 N·m	(0.4–0.7 kg-m, 3–5 ft-lb)

TOOLS

Common	
Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Attachment, 52 x 55 mm	07746–0010400
Pilot, 20 mm	07746–0040500
Pilot, 25 mm	07746–0040600
Special	
Fork seal driver	07947–3710100
Swingarm pivot lock nut wrench	07908–4690001 or KS-HBA-08-469 (U.S.A. only)
Hex wrench 10 mm	07917–3710000 (Commercially available)

TROUBLESHOOTING

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

Soft Suspension
1. Weak spring.
2. Insufficient fluid in shock absorber.
3. Shock absorber air pressure incorrect.

Hard Suspension
1. Incorrect fluid weight in shock absorber.
2. Bent shock absorber.
3. Shock absorber air pressure incorrect.

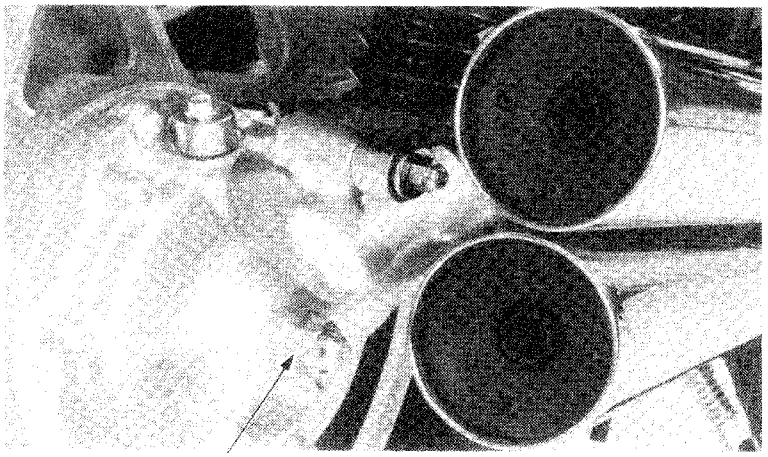
Suspension Noise
1. Shock case binding.
2. Loose fasteners.

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REAR WHEEL

REMOVAL

Place the motorcycle on its center stand.
Support the rear wheel so it will not drop when the shock absorber is disconnected.
Remove the axle nut.

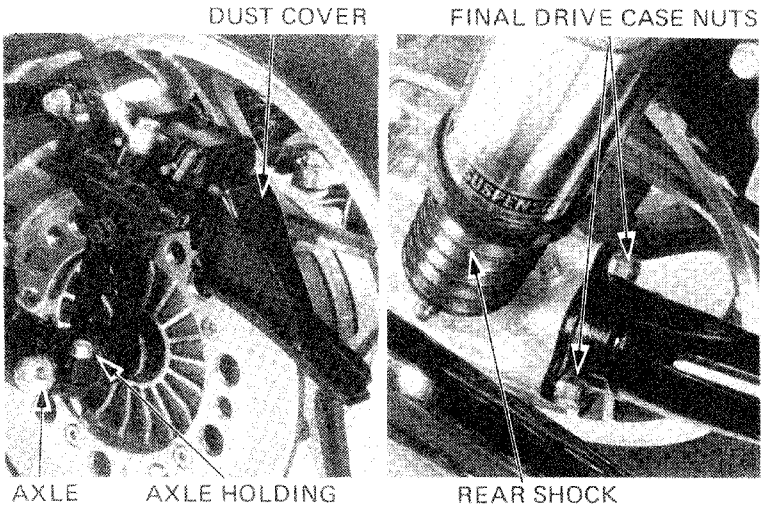


Loosen the axle holding bolt. Remove the brake disc dust cover.
Remove the right shock absorber nut and shock absorber from the final drive case.
Pull out the rear axle.

CAUTION

Support the caliper assembly and swingarm before removing the rear axle so that it does not hang from the brake hose. Do not twist the brake hose.

Separate the wheel from the final drive case.
Remove the three final drive case nuts.

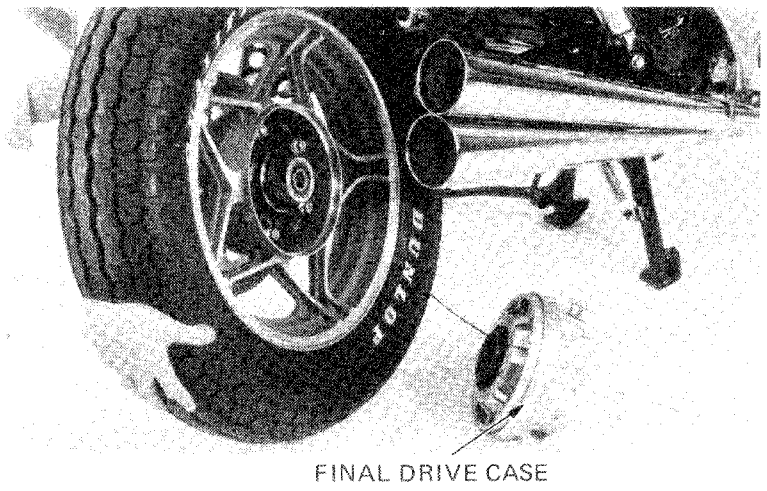


Move the wheel backward and remove the final drive case.

CAUTION

Do not lay the final drive case over. The gear oil may flow out of the breather.

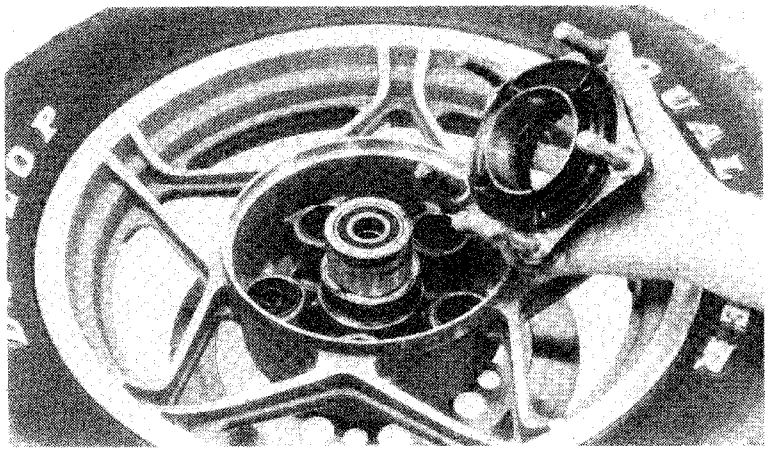
Remove the wheel.



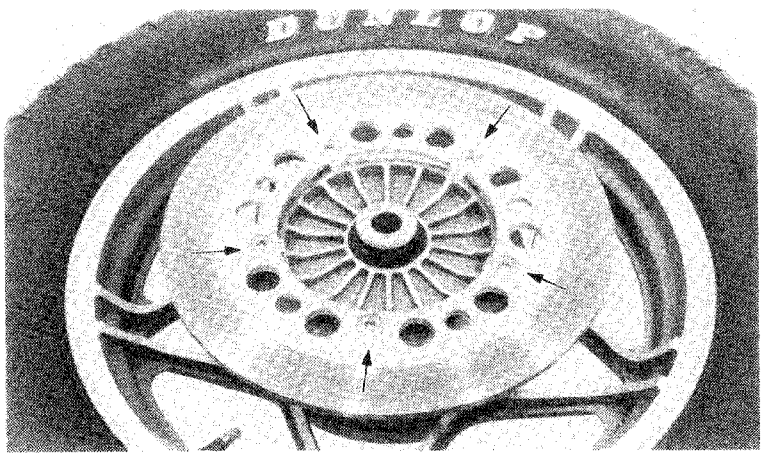
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DISASSEMBLY

Remove the final driven flange.



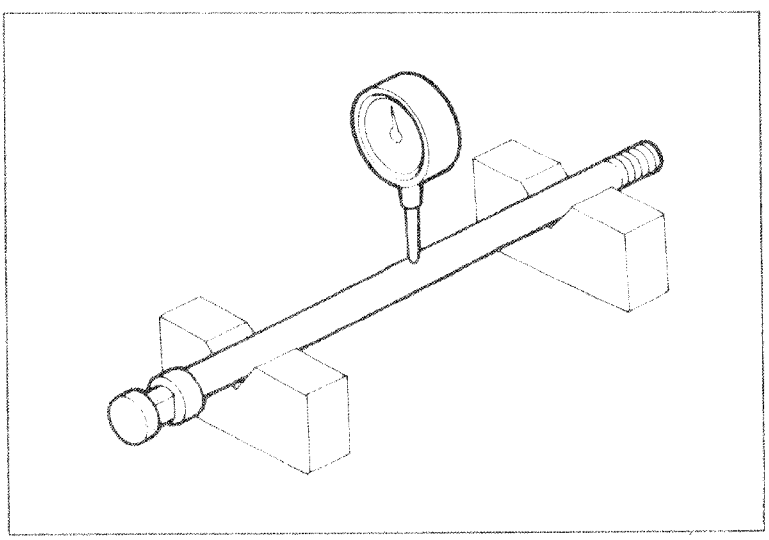
Remove the brake disc socket bolts and disc.



AXLE INSPECTION

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

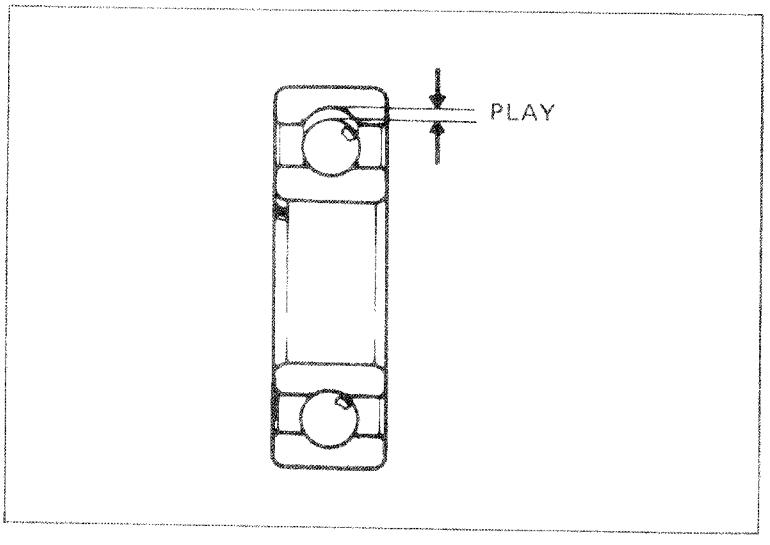
SERVICE LIMIT: 0.2 mm (0.01 in)



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REAR WHEEL BEARING PLAY INSPECTION

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



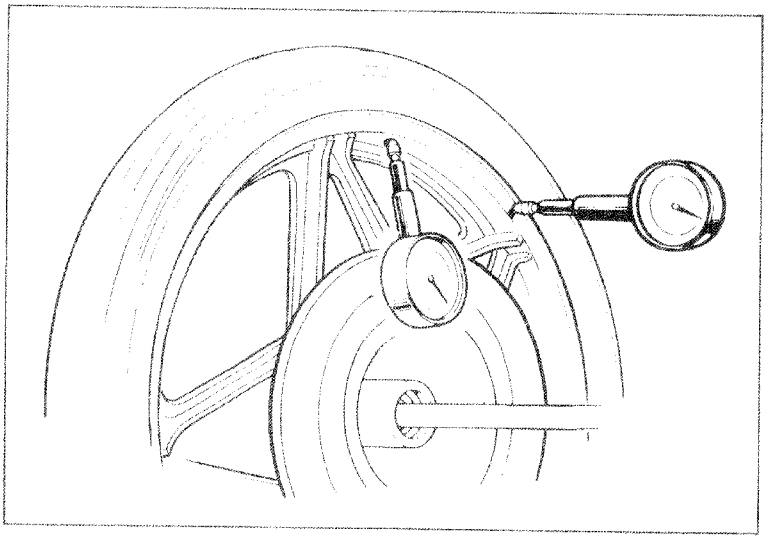
REAR WHEEL RIM RUNOUT INSPECTION

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

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

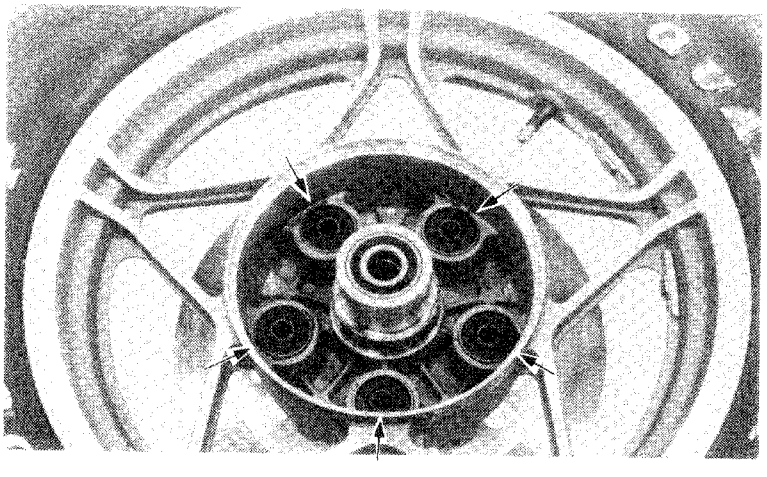
NOTE

The cast wheel cannot be serviced and must be replaced if the above limits are exceeded.



DAMPER RUBBER INSPECTION

Replace the damper rubbers if they are damaged or deteriorated.



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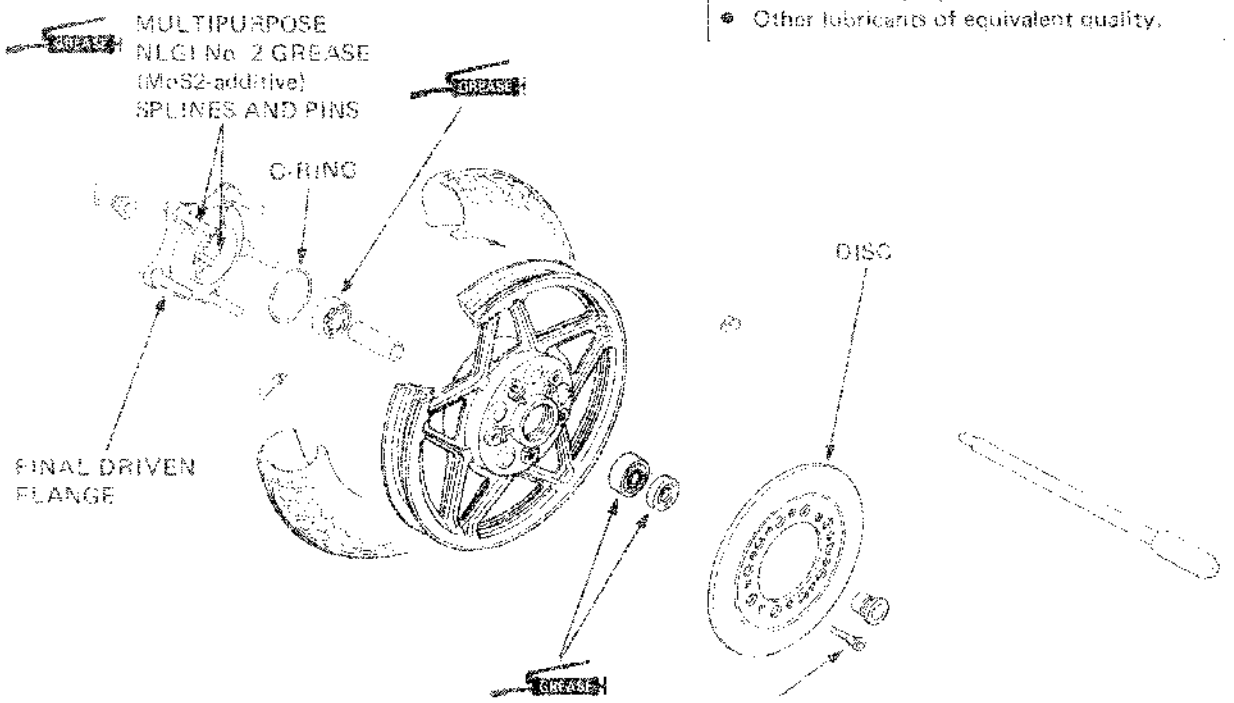
ASSEMBLY

NOTE

The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to Tubeless Tire manual.

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.
- Other lubricants of equivalent quality.



WARNING

Do not get grease on the brake disc.

Apply multipurpose grease to the holes of the rubber dampers.
Press the distance collar into place from the left side.
Drive in the right ball bearing 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.

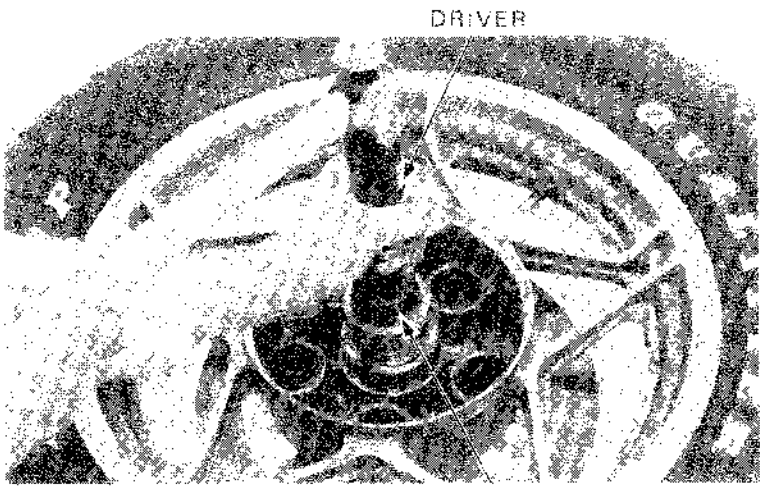
Install the brake disc and socket bolts.

TORQUE: 30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)

Clean the brake disc with a high quality degreasing agent.

CAUTION

When installing the brake disc apply grease to the bolt threads.



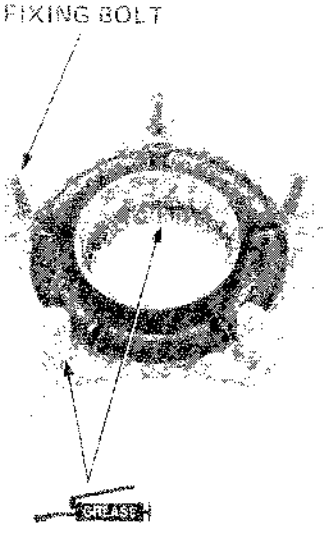
DRIVER, 42 x 47 mm
PILOT, 20 mm

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Install the fixing bolts as shown.
Install the new nuts.

Apply Multipurpose NLGI No. 2 Grease (MoS2-additive) to the fixing bolts and inside of the final driven flange.

Install the final driven flange onto the rear wheel.



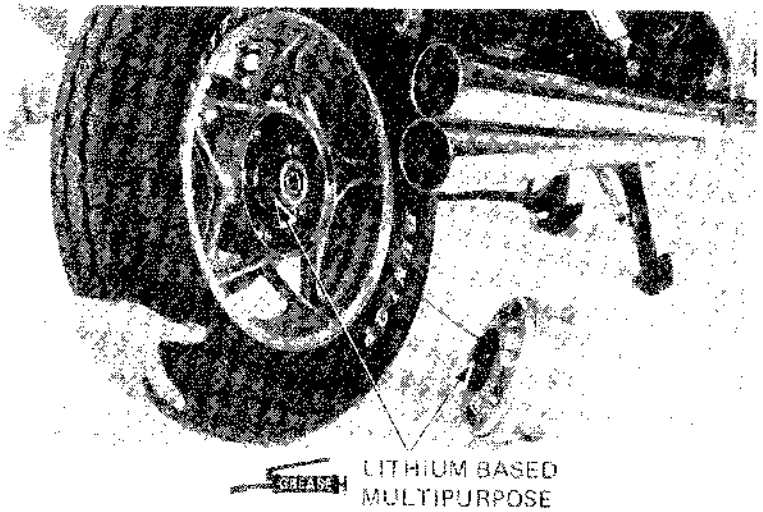
INSTALLATION

Apply Multipurpose NLGI No. 2 Grease (MoS2-additive) to the final driven flange spline of the rear wheel and ring gear.

Set the rear wheel under the rear fender and place the final drive case into the rear wheel.

NOTE

Be sure the splines on the wheel hub fit into the final drive case.



Push the rear wheel forward and install the final drive case onto the swing arm.

NOTE

Be sure the splines on the final drive case fit into the driveshaft end.

Tighten the final drive case nuts.

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

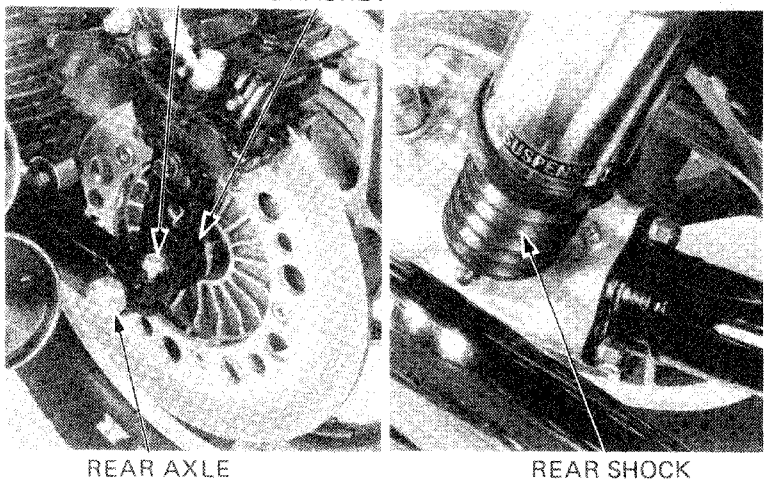


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Install the rear axle through the swing arm, washer and brake caliper bracket.

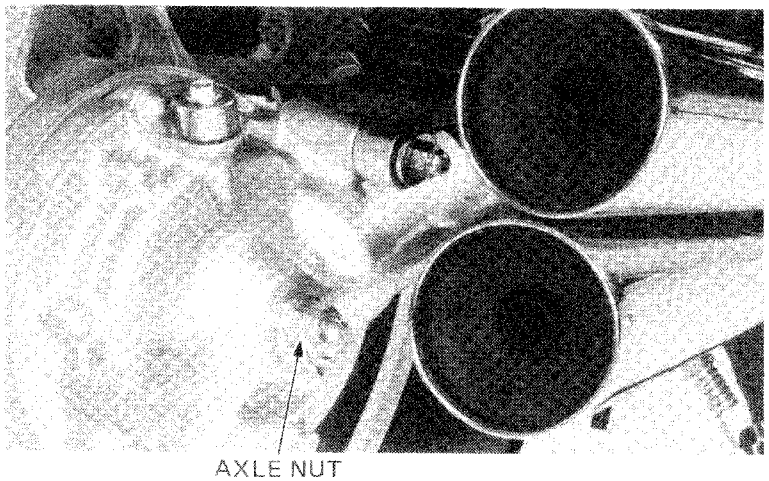
Install the right rear shock absorber to the final drive case and tighten the cap nut.

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



Install and tighten the axle nut.

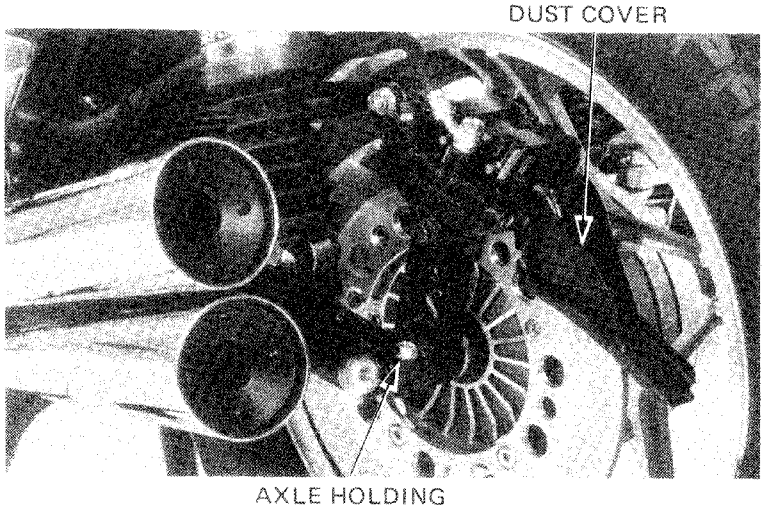
TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)



Tighten the axle holding bolt.

TORQUE: 24–29 N·m (2.4–2.9 kg-m, 17–21 ft-lb)

Install the dust cover.



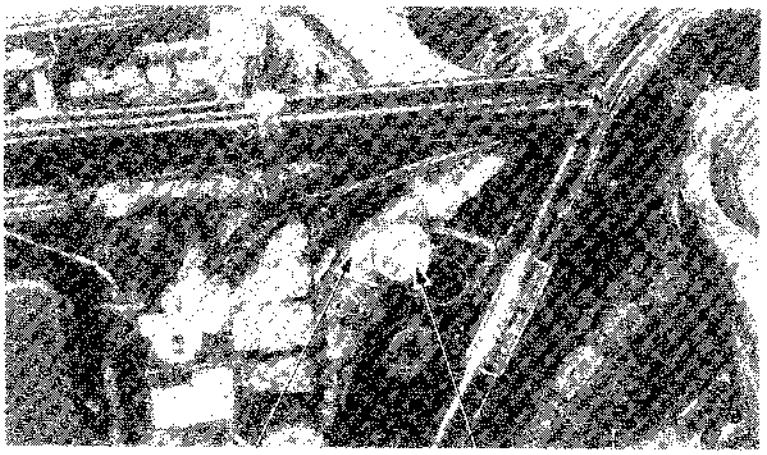
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SHOCK ABSORBER

REMOVAL

Remove the left side cover and seat.
Remove the air valve cap.

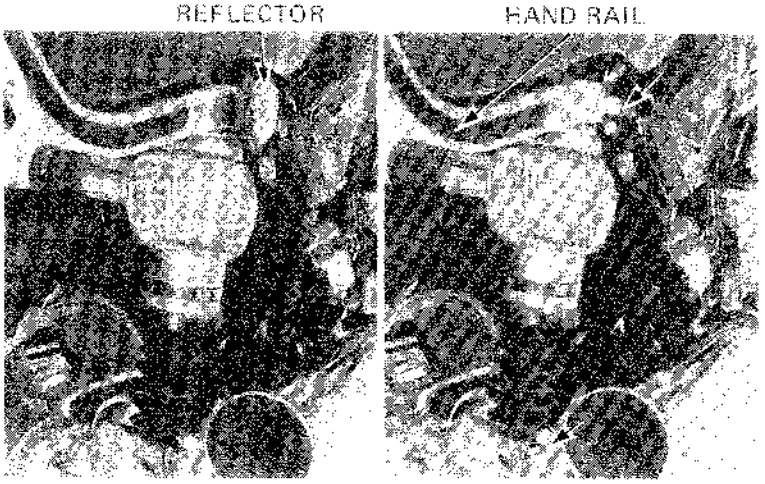
Remove the 3-way joint lock nut and 3-way joint.



Disconnect the air hoses from the 3-way joint.



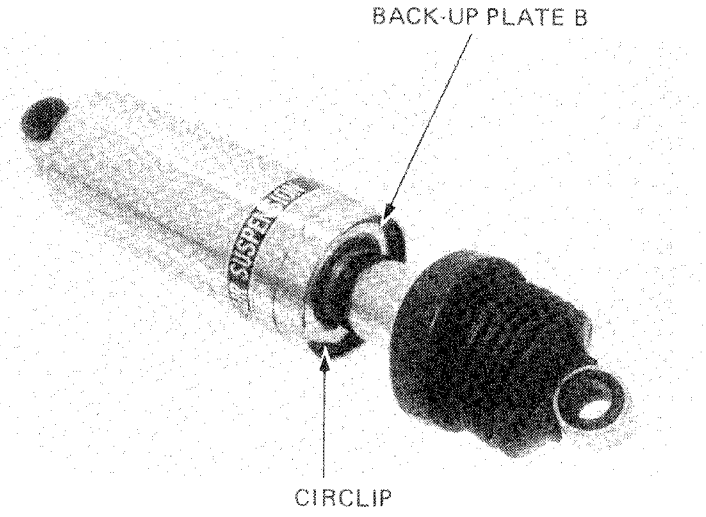
Remove the side reflectors, hand rail and the rear shock absorber.



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DISASSEMBLY

Disconnect the airhose and remove the boot.
Remove the circlip and back-up plate "B".
Turn the shock upside down and drain as much oil as possible.



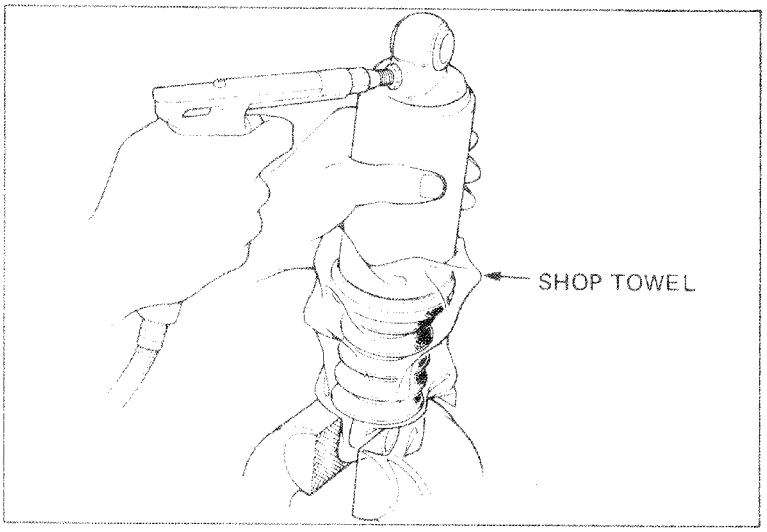
Reconnect the boot to the shock outer.
Place the shock lower mount in a vise with soft jaws. Place a shop towel around the boot area to prevent oil splashing.

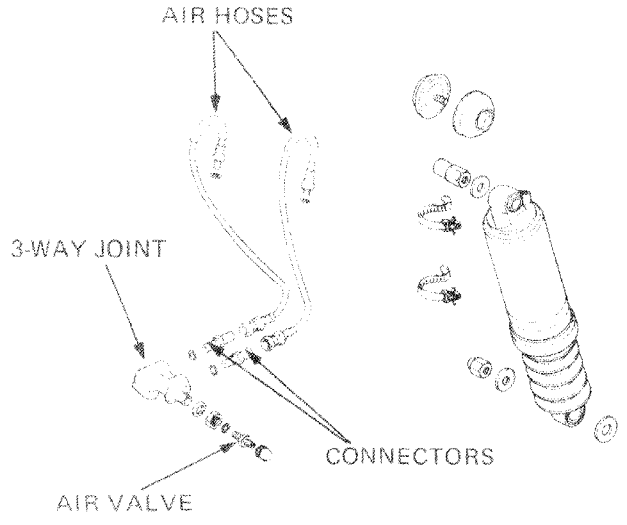
WARNING

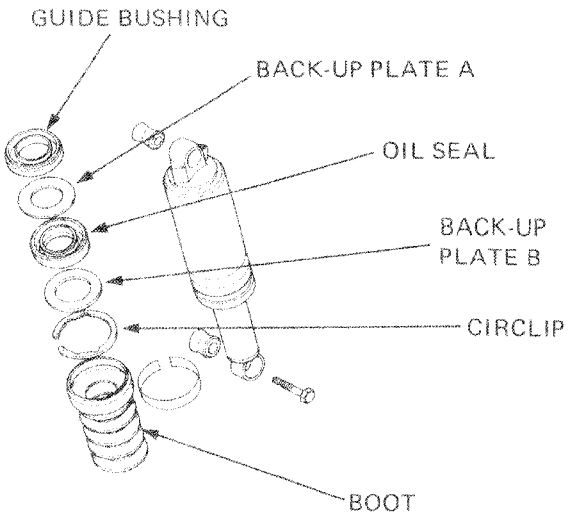
Do not hold the shock below the seal during the next operation because the seal, back-up plate and the guide bushing will come out with force. Wear eye and face protection.

Remove the oil seal by applying compressed air. The seal may stick, therefore small air spurts may be necessary.
Drain the shock oil.
Remove back-up plate A and the guide bushing.

Check the guide bushing for wear.







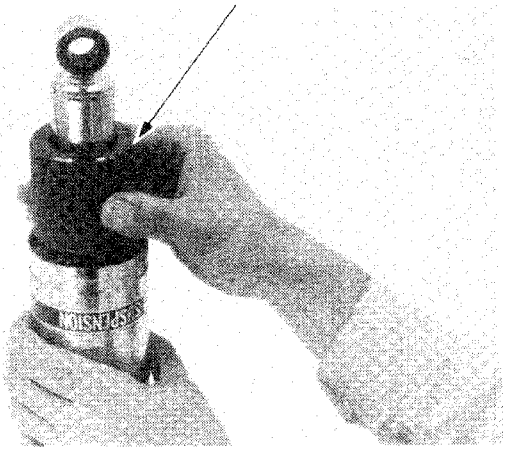
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ASSEMBLY

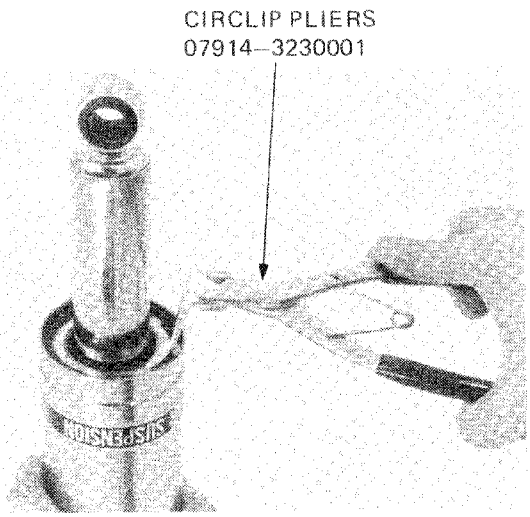
Clean all the disassembled parts.
Fill the shock absorber with the specified amount of ATF.

CAPACITY: 365 cc (12.5 ozs)

Install the guide bushing and back-up plate A.
Dip a new oil seal in ATF.
Install the oil seal and back up plate.
Drive them into the shock absorber with the fork seal driver.

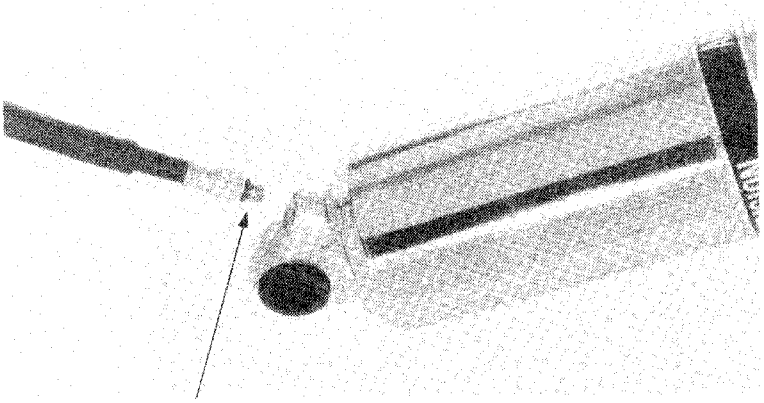


Install the circlip with the sharp edge facing up.
Install the boot.



Apply grease to a new air hose connector O-ring.
Install the air hose.

TORQUE: 4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)

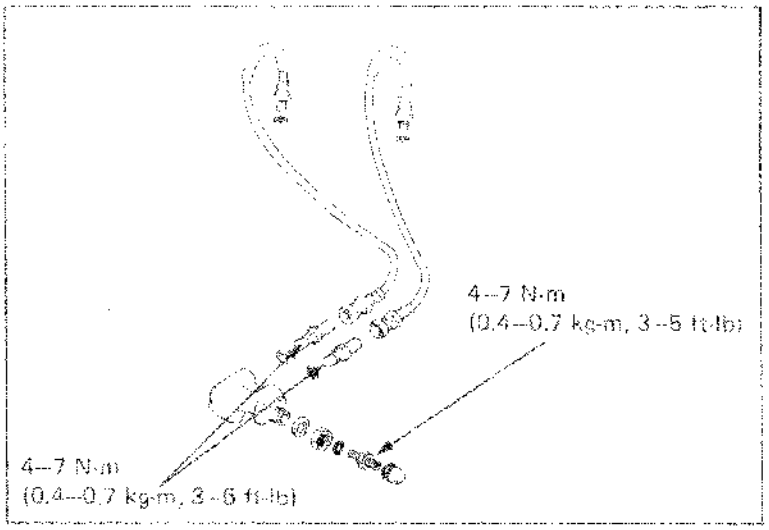


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INSTALLATION

Apply grease to new O-rings.

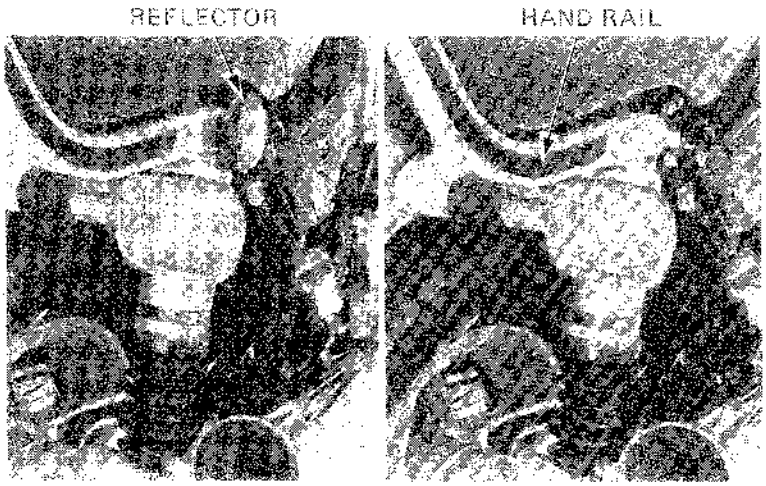
Install the connectors and air valve.



Install the shock absorber.

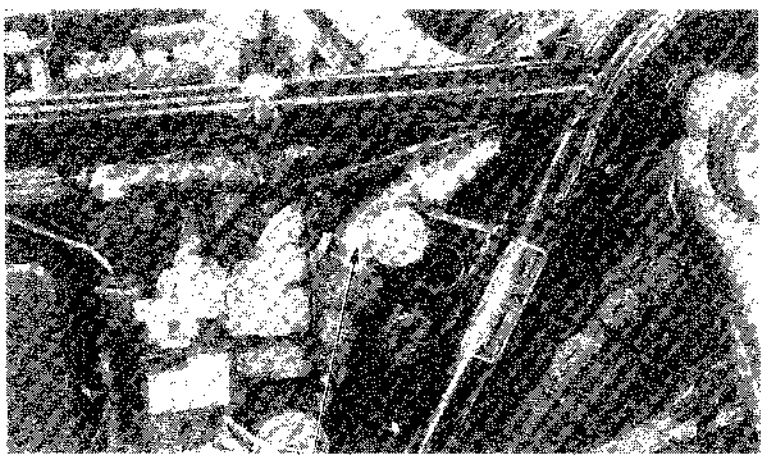
TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

Install the hand rail and the reflectors.



Connect the air hose to the 3-way joint.
Install the 3-way joint and connect the switch wire.

Fill the rear shock absorber with air to 0–400 kPa (0–4.0 kg/cm², 0–57 psi).



3-WAY JOINT

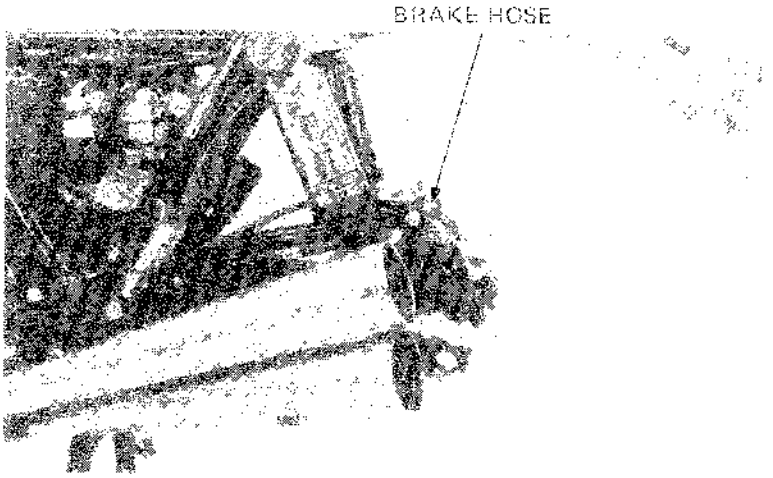
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SWING ARM

REMOVAL

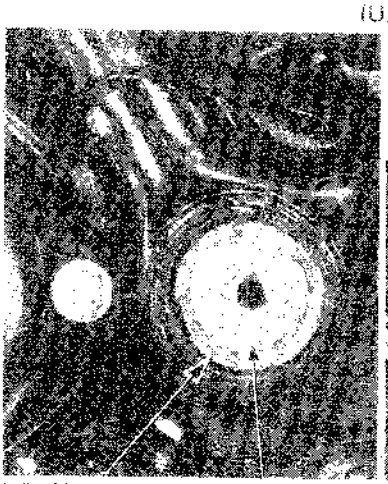
Remove the rear wheel (Page 15-2).
Remove the rear shock absorber lower mounting bolt and nut.
Remove the brake hose from the swing arm.

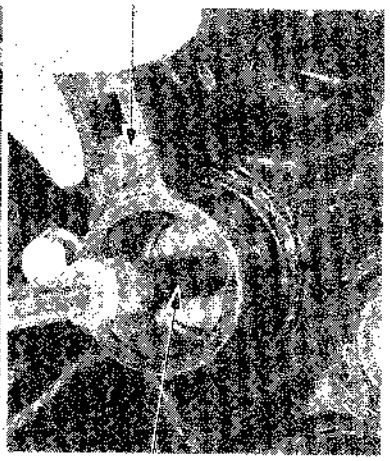
Remove the cotter pin and remove the rear brake caliper.



Remove the left swing arm pivot cap.
Loosen the lock nut and remove the swing arm pivot adjusting bolt.

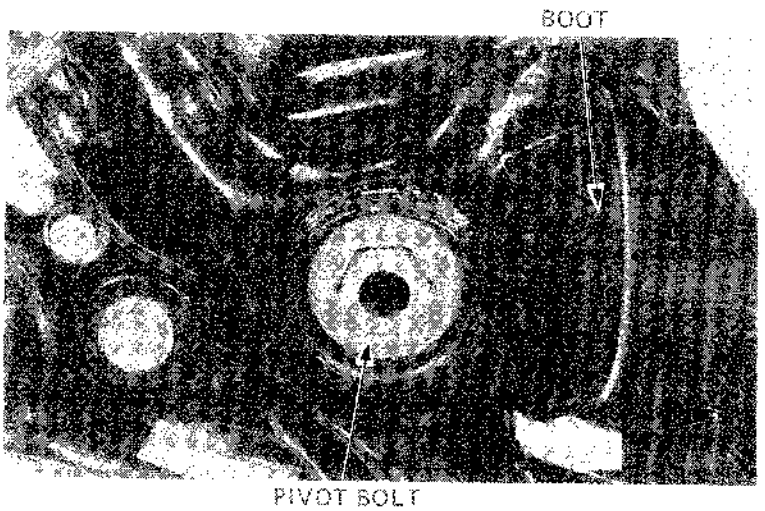
SWING ARM PIVOT LOCK NUT WRENCH 07908-4690001 OR KS-HBA-08-469 (U.S.A. only)





Remove the right swing arm pivot cap and swing arm pivot bolt.
Remove the swing arm.

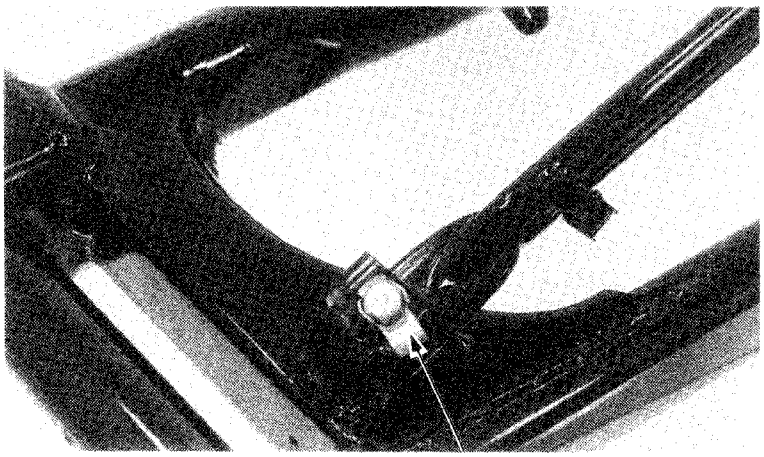
Detach the rubber boot and remove the universal joint circlip.



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DISASSEMBLY

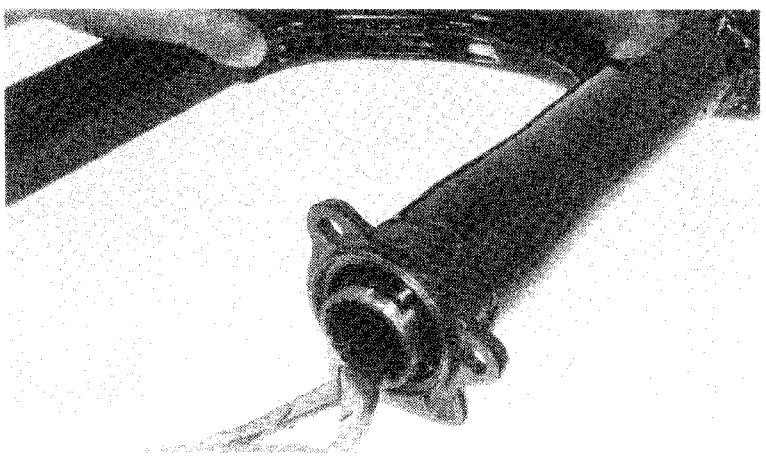
Straighten the lock washer tab and remove the brake torque link.

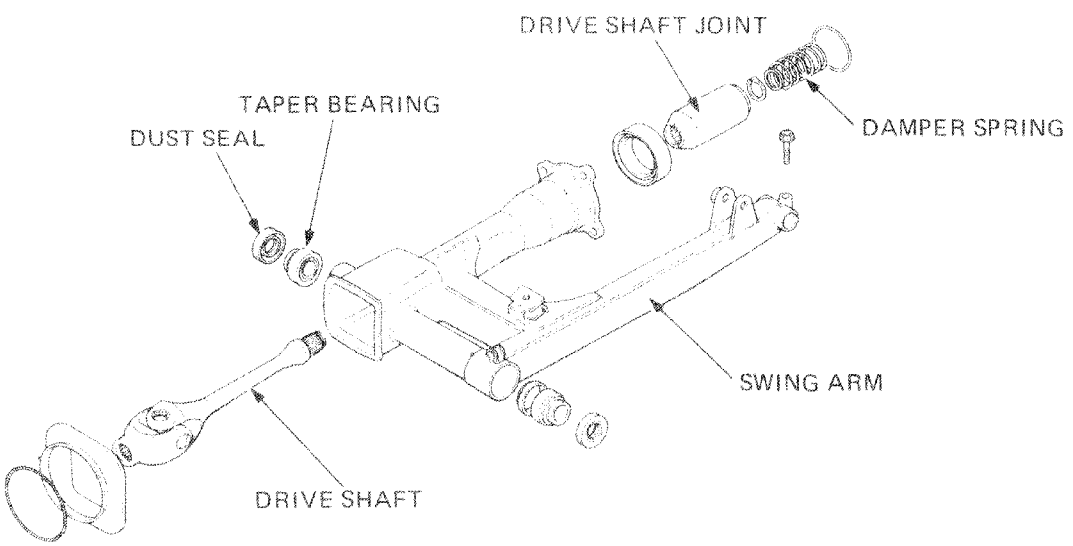


Remove the circlip and drive shaft coupling.

Remove the drive shaft from the swing arm.

Remove the dust seal and pivot bearing.

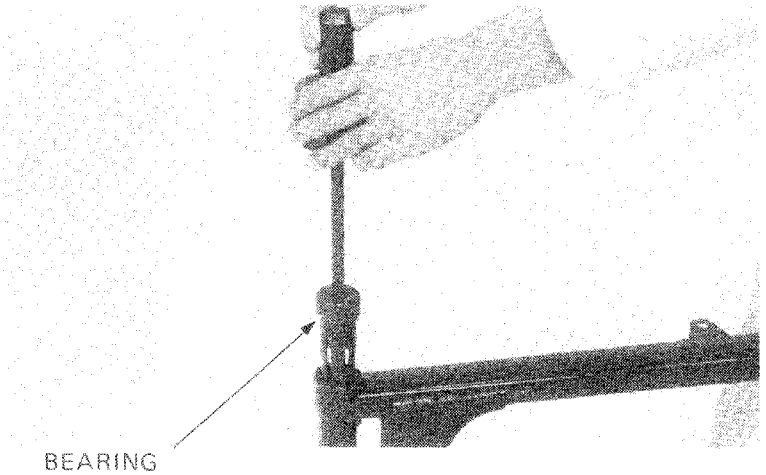




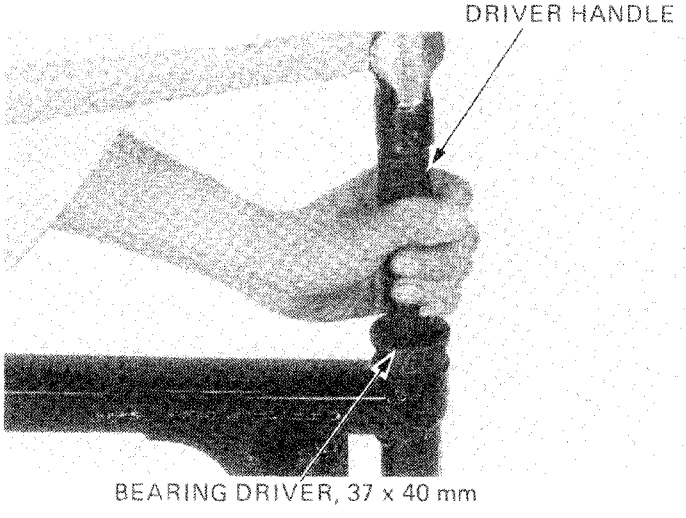
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PIVOT BEARING REPLACEMENT

Remove the bearing outer race.

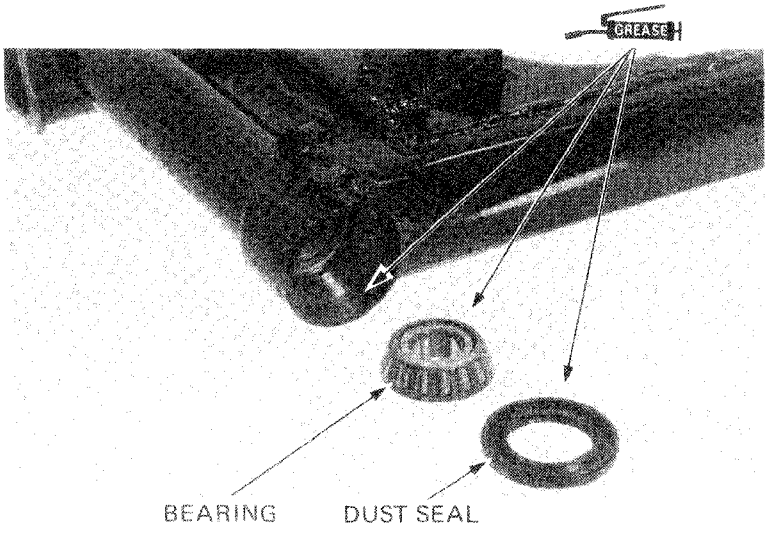


Drive in a new bearing outer race into the swing arm left pivot.



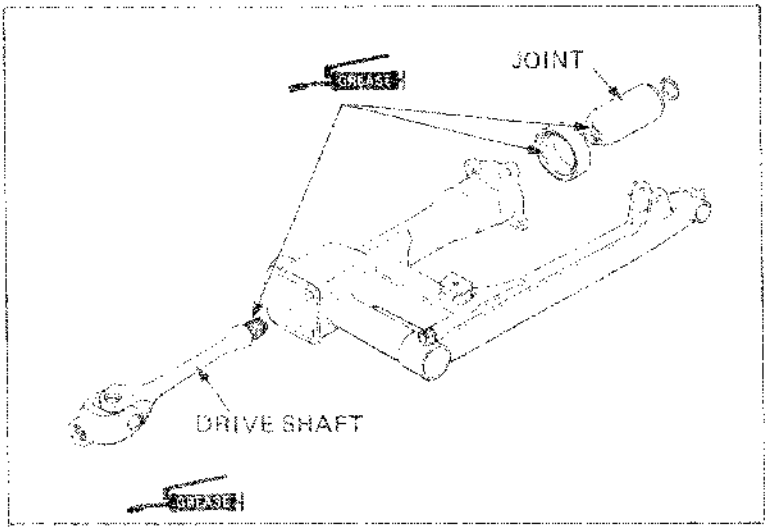
ASSEMBLY

Apply grease to the pivot bearing and inside of the dust seal.
Install the bearing and dust seal.

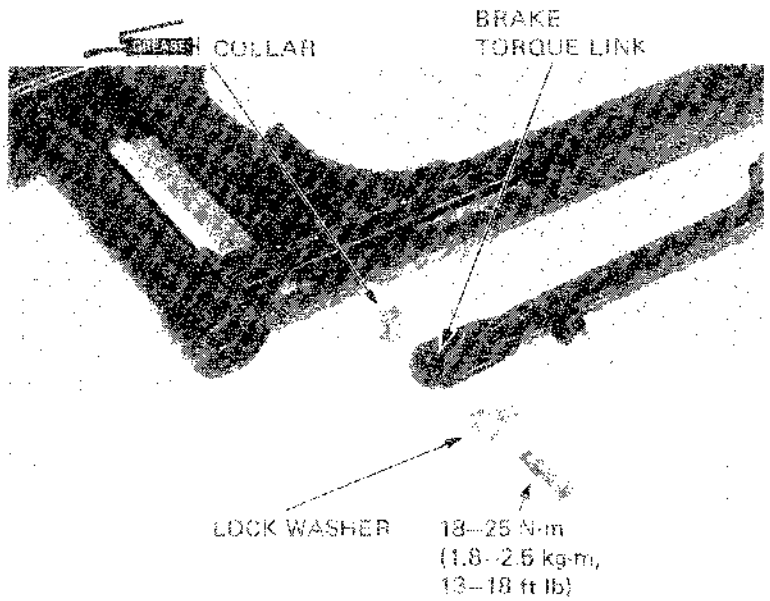


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Apply Multipurpose NLGI No. 2 Grease (MoS2-additive) to the drive shaft, dust seal and joint.
Install the drive shaft, joint and circlip.



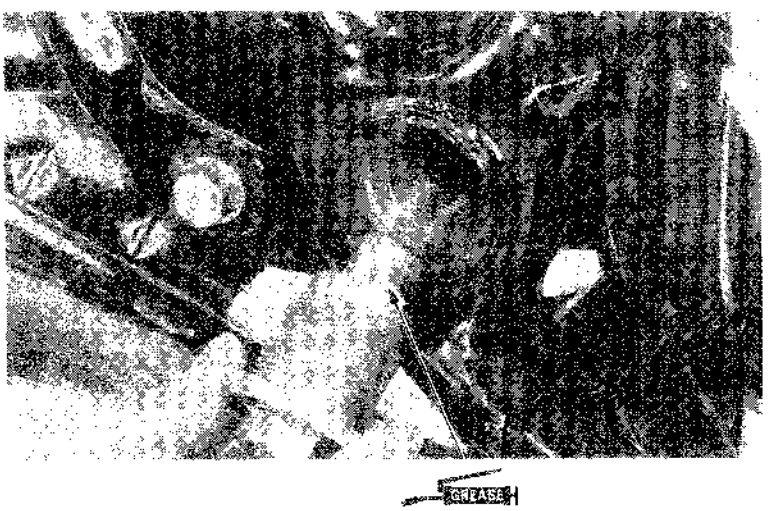
Apply grease to the brake torque link pivot collar.
Install the brake torque link with a new lock washer.



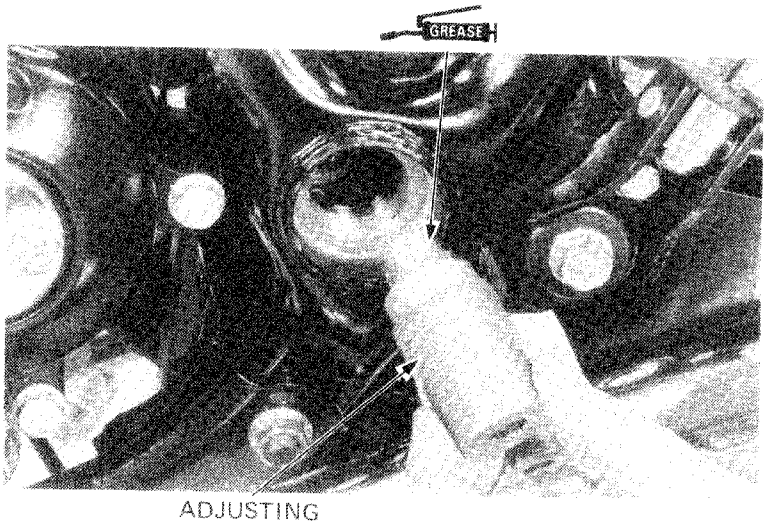
INSTALLATION

Apply grease to the pivot bolt tip.
Align the universal joint and drive shaft before the swing arm is in position.
Install the swing arm and pivot bolt.

TORQUE: 50–70 N·m (5.0–7.0 kg-m, 36–51 ft-lb)



Apply grease to the pivot adjusting bolt.



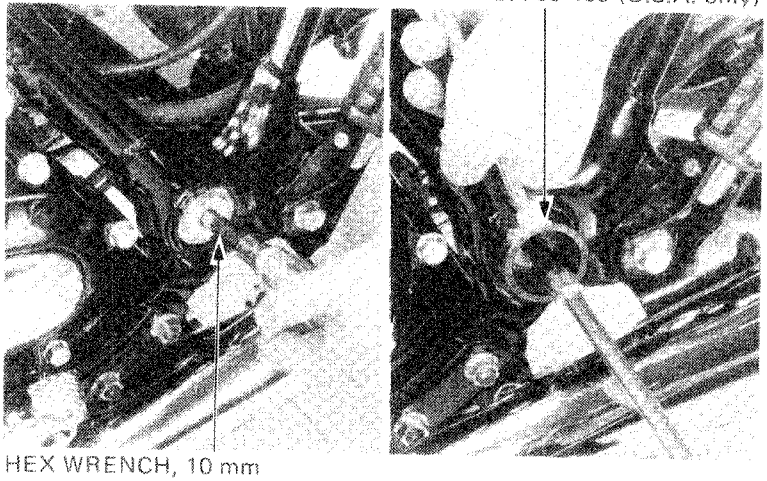
SWING ARM PIVOT LOCK NUT WRENCH
07908–4690001
OR KS-HBA-08-469 (U.S.A. only)

Tighten the pivot adjusting bolt.

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

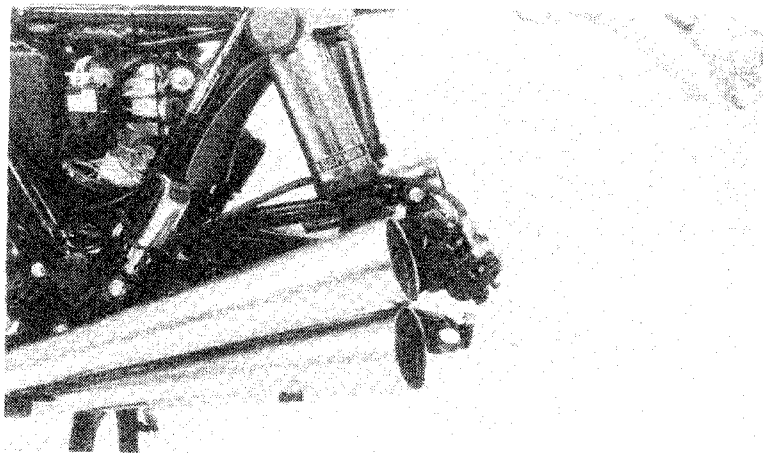
Move the swing arm up and down several times.
Retighten the pivot adjusting bolt to the specified torque.
Tighten the locknut while holding the adjusting nut to keep from turning.

TORQUE: 50–70 N·m (5.0–7.0 kg-m, 36–51 ft-lb)

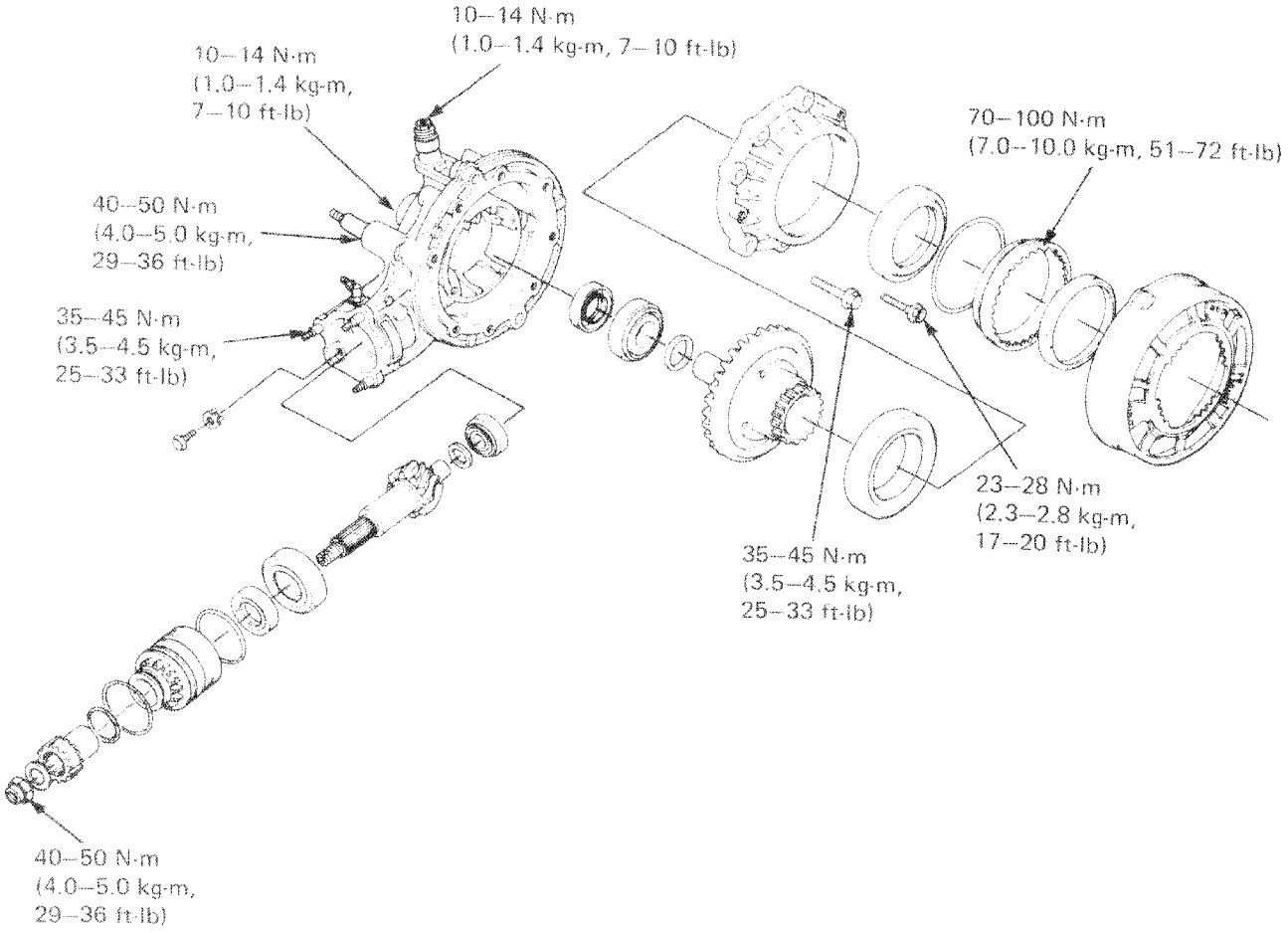


HEX WRENCH, 10 mm
07917–3710000 OR
(COMMERCIALLY AVAILABLE)

Install the following:
- rear brake caliper.
- brake hose.
- rear shock absorber lower mounting bolt and nut.
- rear wheel (Page 15-6).



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16. FINAL DRIVE

SERVICE INFORMATION	16– 1	OIL SEAL REMOVAL/INSTALLATION	16– 4
TROUBLESHOOTING	16– 2	PRELOAD ADJUSTMENT	16–11
FINAL GEAR CASE REMOVAL	16– 3	FINAL GEAR CASE INSTALLATION	16–15
BACKLASH INSPECTION	16– 3		

SERVICE INFORMATION

GENERAL

The final drive gear assembly must be removed for:
- Backlash inspection
- Oil seal and O-ring replacement

Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Final gear oil	capacity	140–160 cc (4.7–5.4 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		9.0–11.5 kg-cm (7.8–10.0 in-lb)	———
Pinion gear preload		5–6 kg-cm (4.3–5.2 in-lb)	———

TORQUE VALUES

Final gear case cover 10 mm bolts:	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
8 mm bolts:	23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
Final gear case nuts	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Rear shock absorbers	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Drain bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Filler cap	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Pinion shaft nut	40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Rear axle nut	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Axle pinch bolt	24–29 N·m (2.4–2.9 kg-m, 17–21 ft-lb)

16

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TOOLS

Special	
Retainer wrench	07910—3710000
Final gear case base A	07965—4630100 — Not available in U.S.A.
Retainer wrench B	07910—4630100
Pinion gear dis/assembly tool	07935—MB00000
Oil seal remover	07948—4630100 — Not available in U.S.A.
Dis/assembly tool A	07965—3710101
Dis/assembly tool B	07965—4630300 — Not available in U.S.A.
Oil seal guide	07973—4630100
O-ring guide	07973—4630200
Preload inspection tool	07924—3710000
Oil seal driver attachment	07946—6920100 — Not available in U.S.A. or 07945—3330100
Attachment	07946—9370100
Common	
Driver	07749—0010000 or 07949—6110000
Pilot 20 mm	07746—0040400

TROUBLESHOOTING

Rear Wheel Will Not Rotate Freely

1. Rear brake dragging.
2. Damaged wheel bearing.
3. Damaged ring and pinion gear bearings.
4. Bent rear axle.
5. Bent swingarm.
6. Excessive final gear assembly preload.

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.

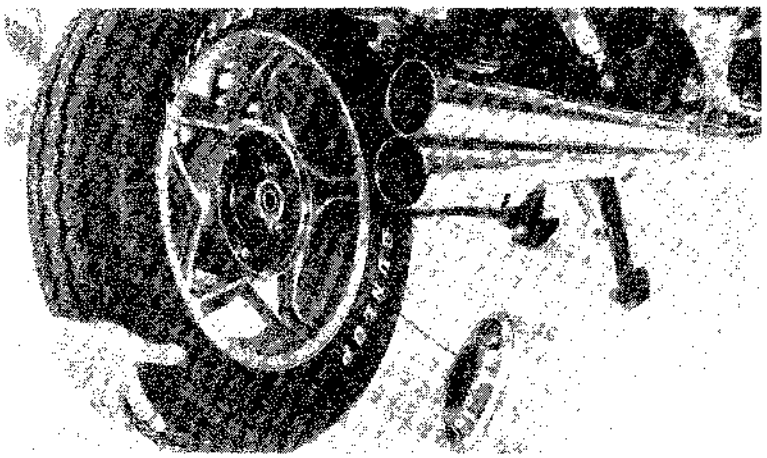
Oil Leak

1. Clogged hub breather.
2. Oil level too high.
3. Seals damaged.

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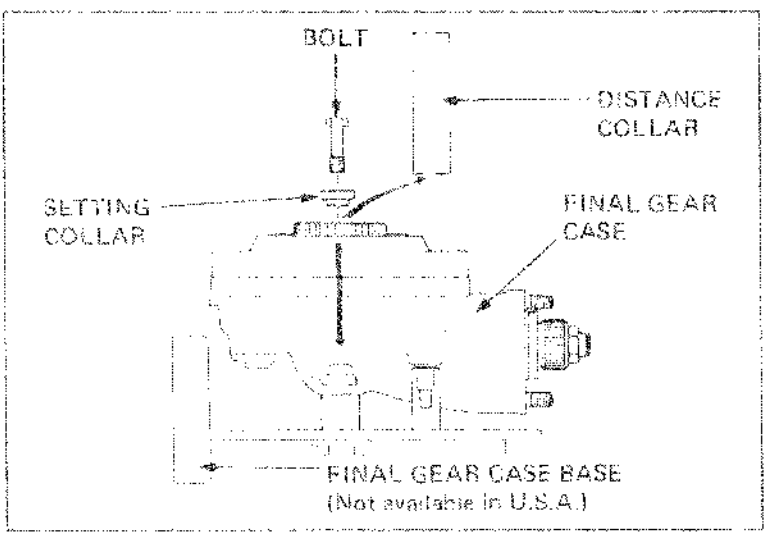
FINAL GEAR CASE REMOVAL

Place the motorcycle on its center stand.
Remove the rear wheel (Page 15-2).
Drain the final gear oil if disassembling the gear case.



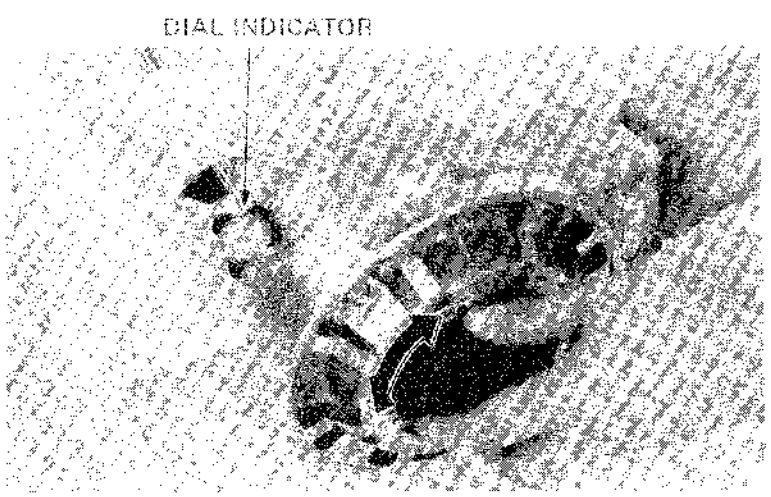
BACKLASH INSPECTION

Remove the distance collar.



Remove the oil filler cap.
Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Place a preload inspection tool over the pinion spline. Secure it with the three final gear case attaching nuts inverted, finger tighten only.
Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read back lash.

STANDARD: 0.08–0.18 mm (0.003–0.007 in)
SERVICE LIMIT: 0.30 mm (0.012 in)

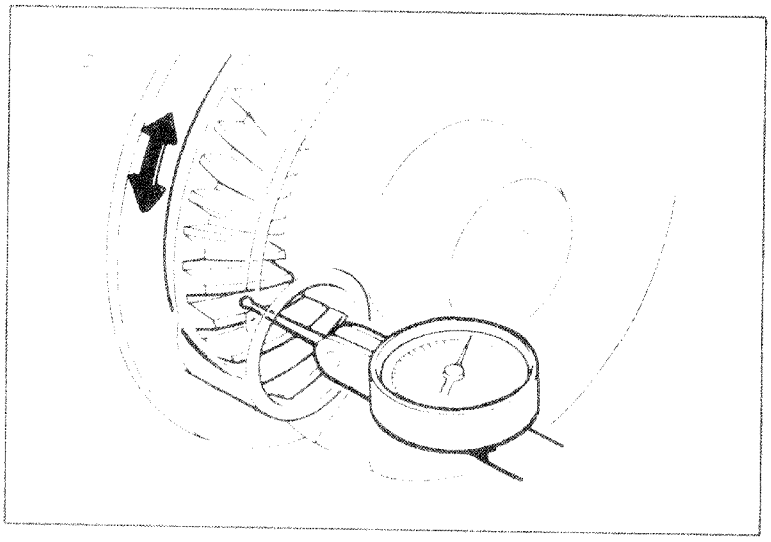


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Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more. Compare the difference of the three measurements.

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

If backlash is excessive, check the final gear assembly preload (Page 16-13).
If preload is correct, the final driven gear case assembly needs replacement.



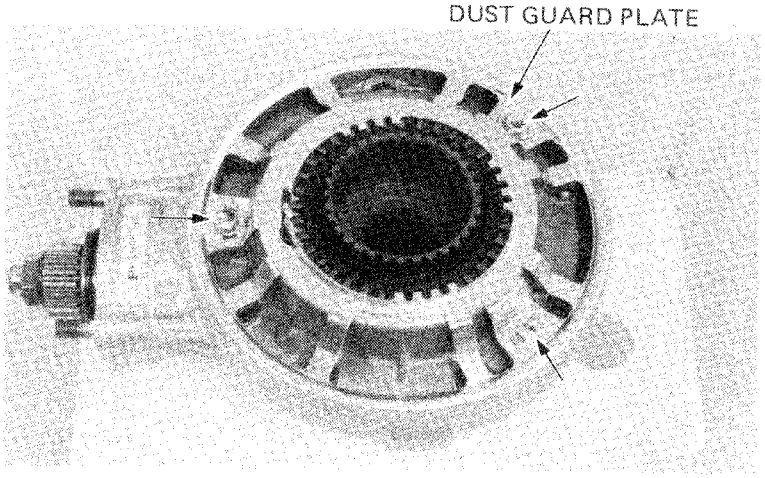
OIL SEAL REMOVAL/INSTALLATION

NOTE

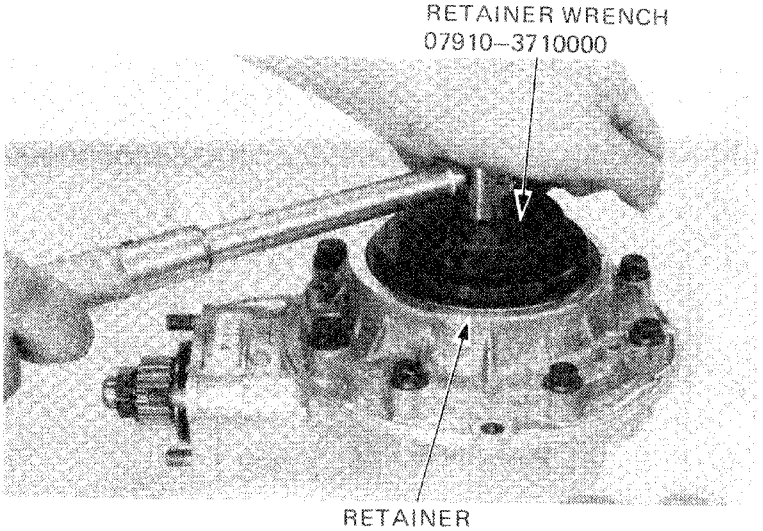
Replace all final gear case oil seals and O-rings whenever the case is disassembled.

RING GEAR BEARING RETAINER

Remove the final gear case assembly from the motorcycle (Page 16-3).
Remove the distance collar.
Straighten the dust guard plate lock washer tabs and remove the dust guard plate.



Remove the ring gear bearing preload retainer with the retainer wrench.
Remove the O-ring.

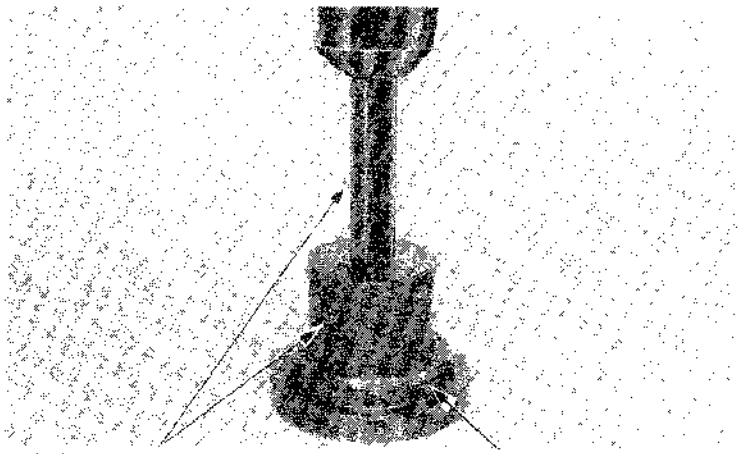


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Remove the dust and oil seals from the retainer with a press and special tools.

NOTE

Place the dis/assembly tool B with its deep bore facing down.



DIS/ASSEMBLY TOOL A (2 Pcs.)
07965–3710101

DIS/ASSEMBLY TOOL B
07965–4630300
(Not available in U.S.A.)

Coat both new seals outer edges with gear oil.
Press the new seals into the ring gear bearing preload retainer.

NOTE

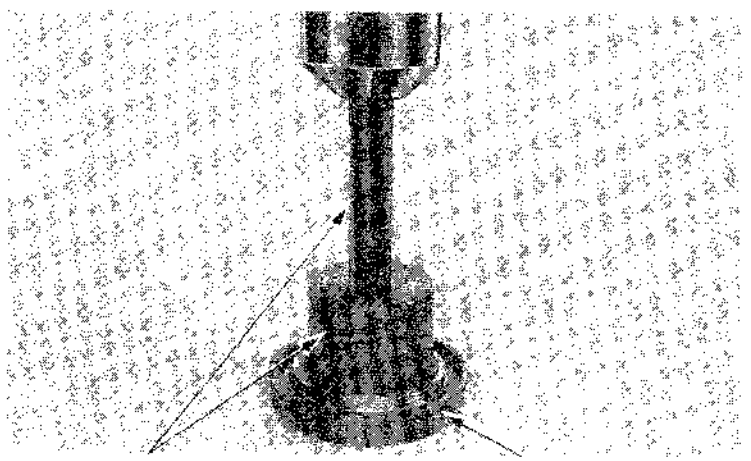
Place the dis/assembly tool B with its deep bore facing up.

Coat the new o-ring with gear oil and install it.
Install the ring gear bearing retainer being careful not to fold or damage the oil seal lips.

NOTE

After installing the ring gear bearing preload retainer, do the following:

- Final gear assembly preload check (Page 16-13).
- Backlash inspection (Page 16-3).



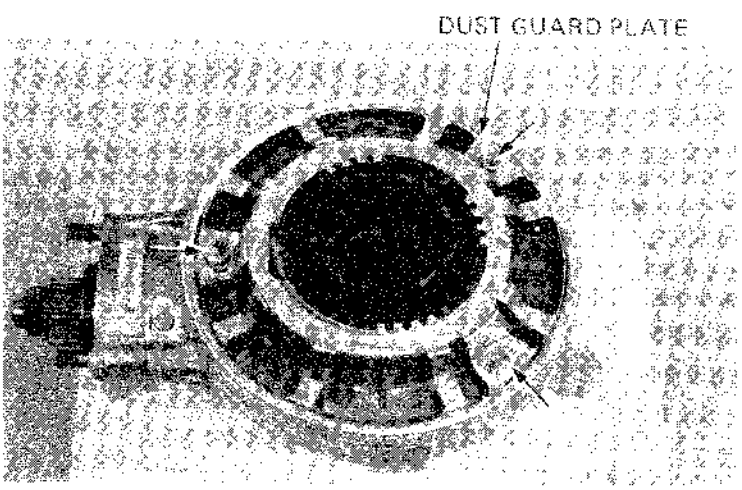
DIS/ASSEMBLY TOOL A (2 Pcs.)
07965–3710101

DIS/ASSEMBLY TOOL B
07965–4630300
(Not available in U.S.A.)

GEAR CASE

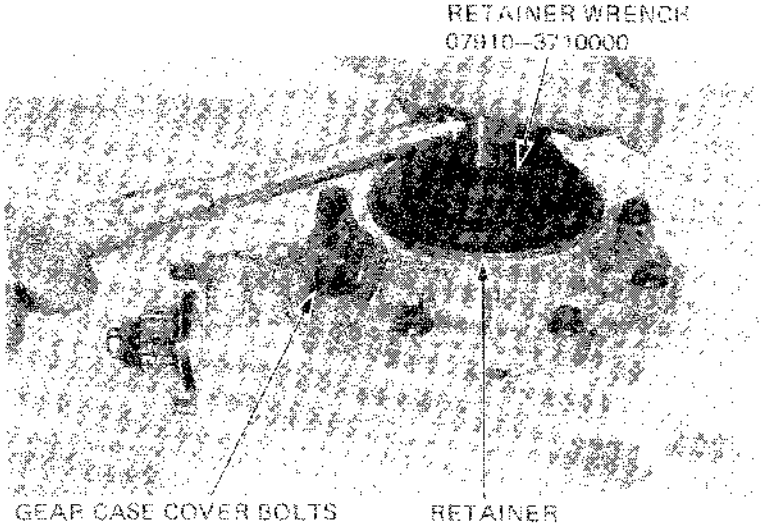
Remove the final gear case assembly from the motorcycle (Page 16-3).
Remove the distance collar.

Straighten the dust guard plate lock washer tabs and remove the dust guard plate.



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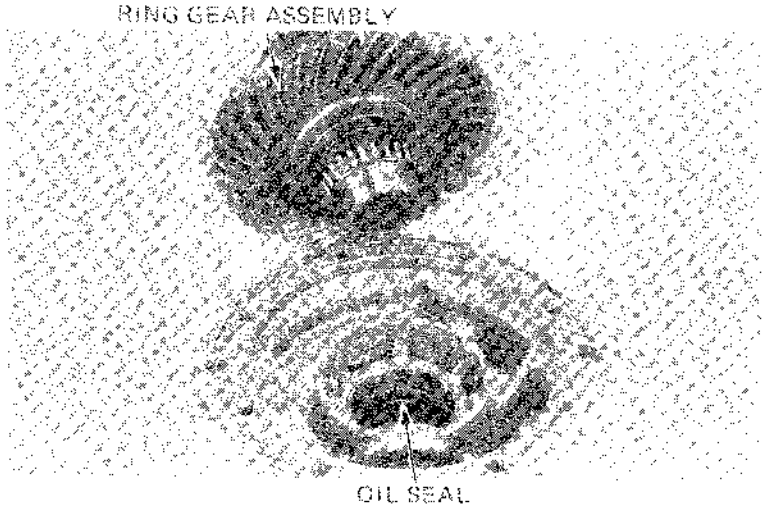
Loosen the ring gear bearing preload retainer 5 notches with the retainer wrench.
Remove the eight gear case bolts and lift the gear case cover from the final gear case.



Remove the ring gear assembly.

NOTE

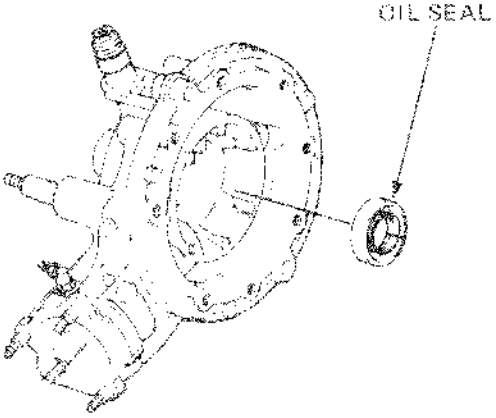
Use care when removing the ring gear as the oil seal spring band is easily turned inside out.



Remove the oil seal from the gear case.

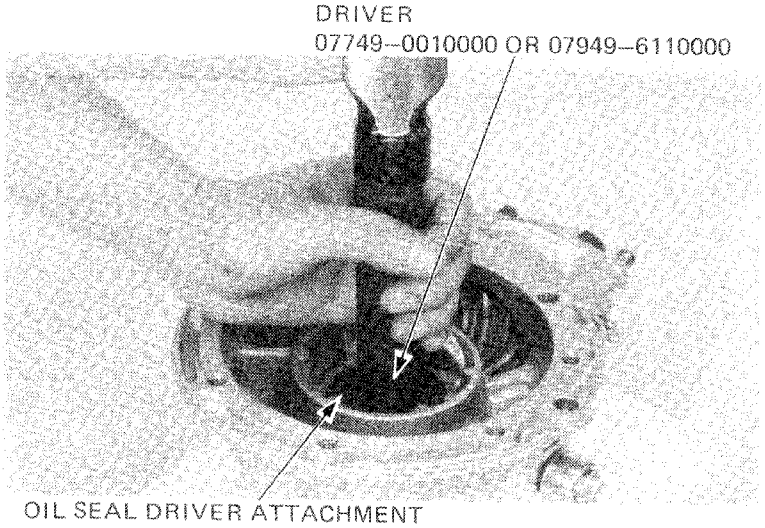
CAUTION

Be careful not to damage the case during seal removal.



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Coat the new oil seal with gear oil.
Install the oil seal squarely into the case being careful not to damage the bearing race.

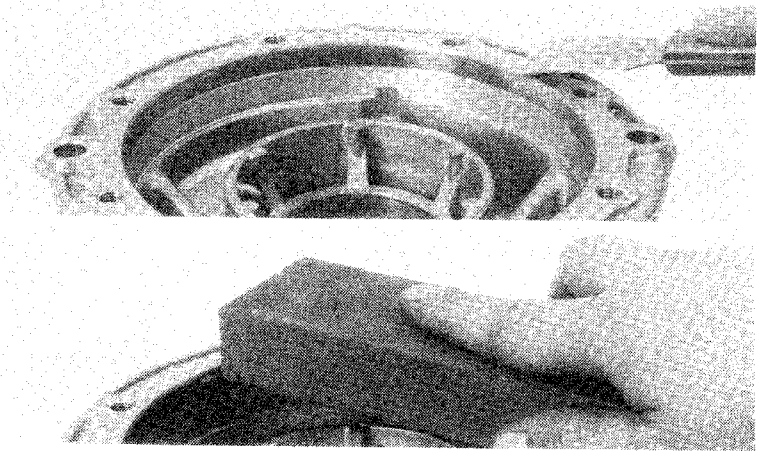


Remove the old sealant from the gear case and cover surfaces.

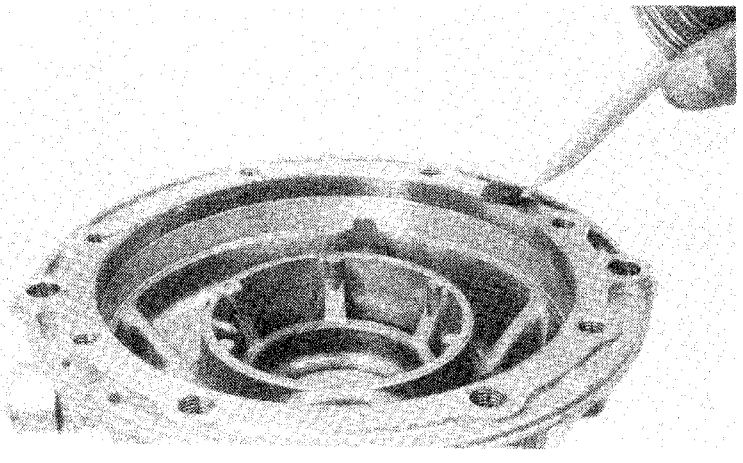
NOTE

- Keep the gear case clean.
- Be careful not to damage the gear case and cover mating surfaces.

Clean the gear case and cover mating surfaces with an oil stone.

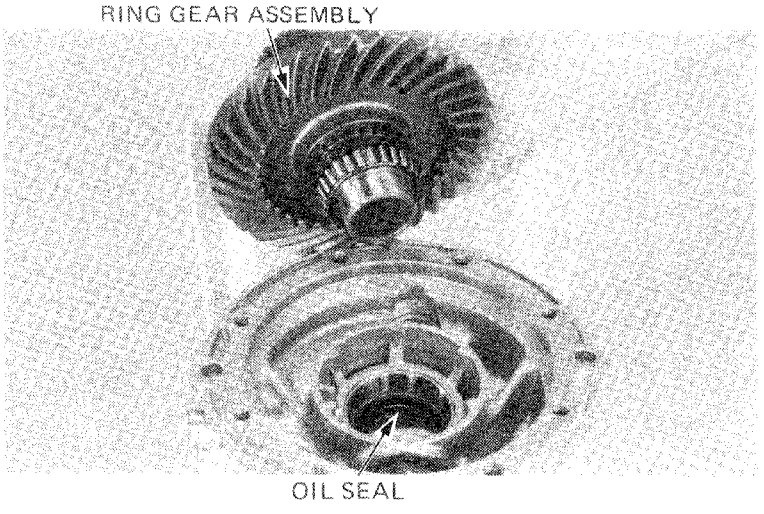


Apply a liquid sealant to the gear case and cover mating surfaces.



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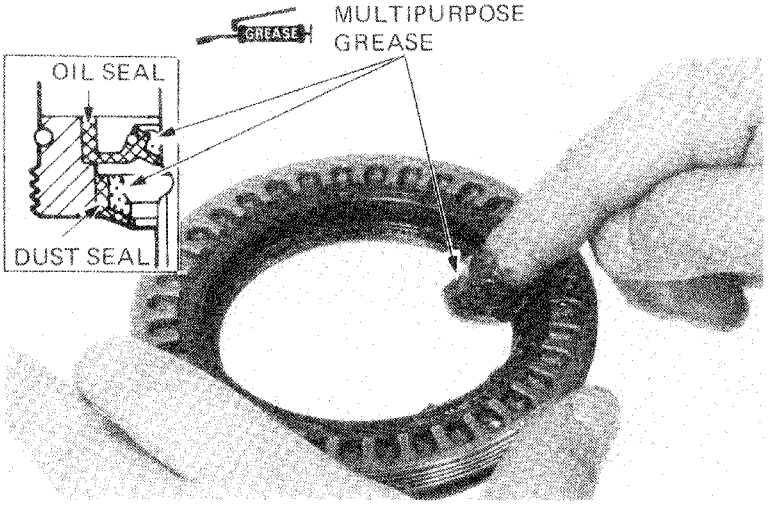
Coat the gear case oil seal lips with gear oil.
Install the ring gear assembly, being careful not to damage or fold the oil seal lips.



Fill the ring gear bearing retainer oil and dust seals with multipurpose NLGI No. 2 grease (MoS2-additive).

NOTE

Use a lithium-based multipurpose grease with MoS2-additive from one of the following manufacturers:
- MOLYKOTE BR2-S by Dow Corning, U.S.A.
- MULTIPURPOSE M-2 by Mitsubishi Oil, Japan
- Other lubricants of equivalent quality

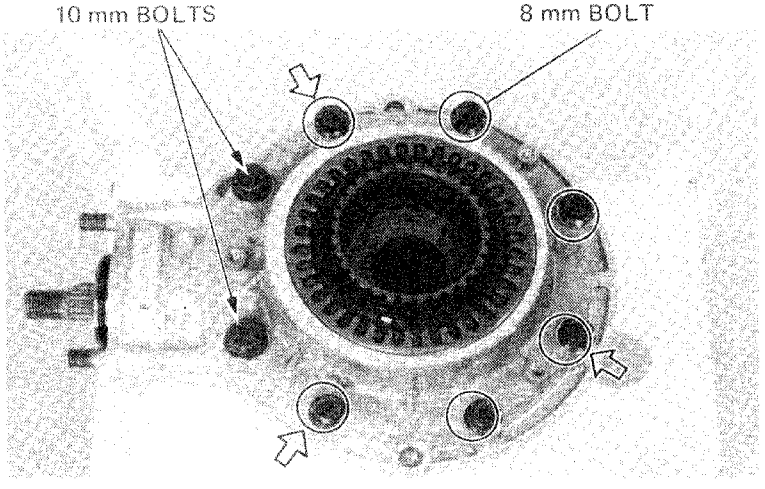


Place the gear case cover onto the final gear case.
Insert the gear case cover bolts, positioning the three bolts with the symbol " ⇧ " in the photo at the locations shown. Alternately tighten these bolts until the cover just touches the gear case.
Tighten all eight bolts in a crisscross pattern.

TORQUE:
8 mm bolts: 23–28 N·m
(2.3–2.8 kg-m, 17–20 ft-lb)
10 mm bolts: 35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)

NOTE

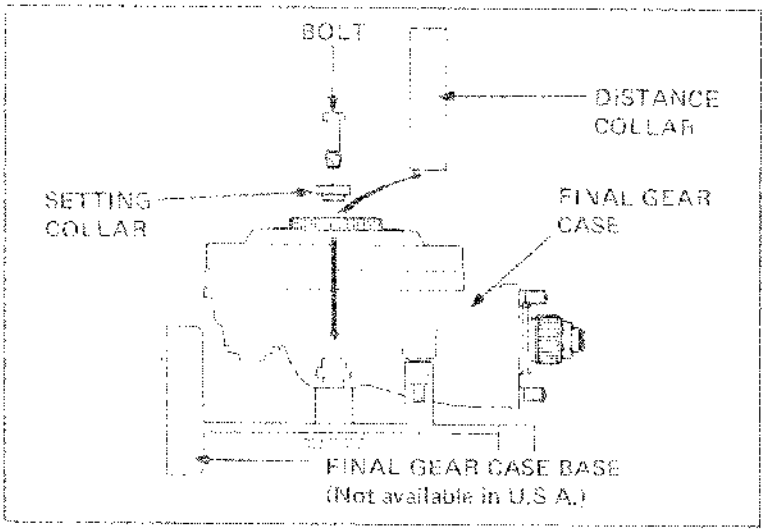
After installing the gear case cover, do the following:
- Final gear assembly preload check (Page 16-13).
- Backlash inspection (Page 16-3).



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PINION GEAR RETAINER

Remove the final gear case assembly from the motorcycle (Page 16-3).
Remove the distance collar



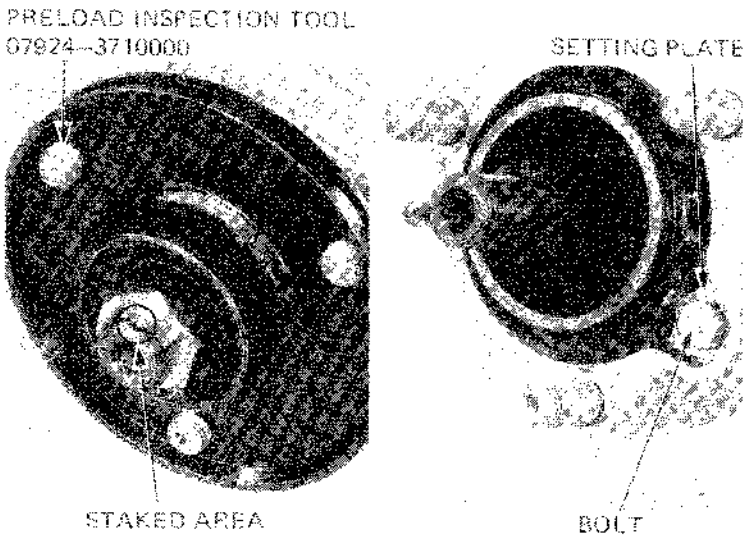
Install the preload inspection tool onto the pinion shaft.
Remove the pinion shaft nut and washer.

NOTE

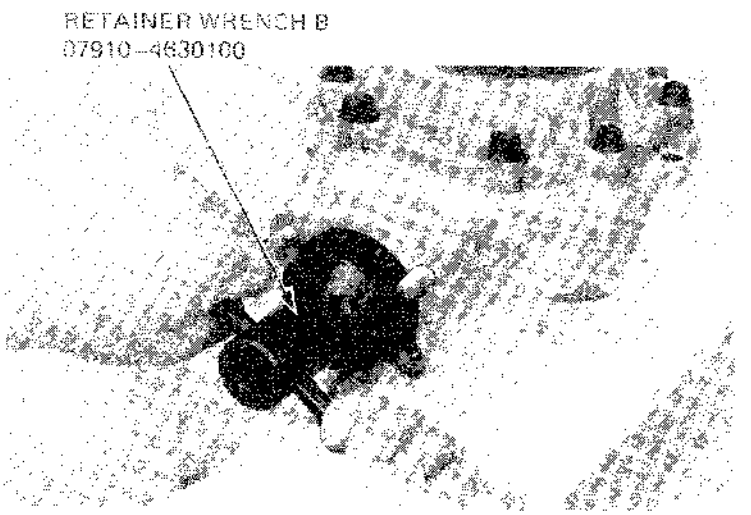
The nut can be removed without grinding off the staked areas.

Remove the inspection tool and pinion joint.

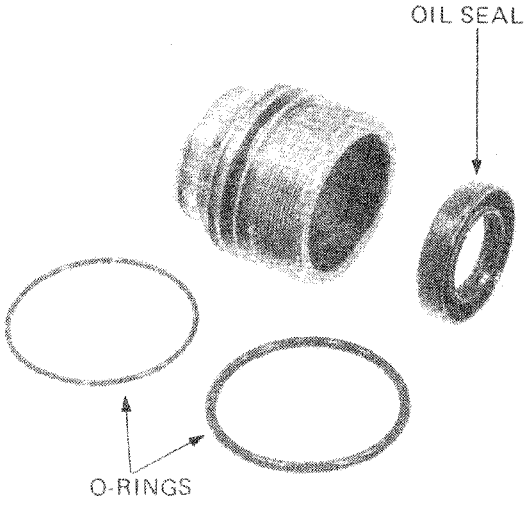
Remove the retainer setting plate.



Remove the pinion retainer with the pinion gear retainer wrench.



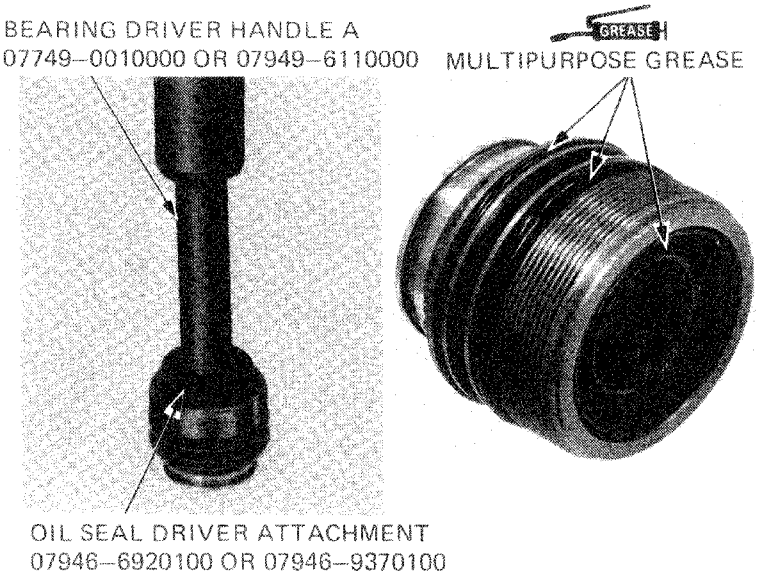
Remove the retainer O-rings and oil seal.



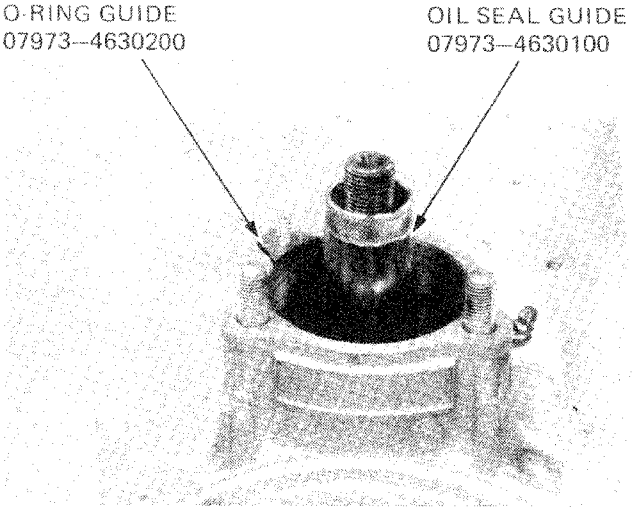
Coat the new O-rings with MULTIPURPOSE NLGI No. 2 grease (MoS2-additive) and install them onto the retainer.

Fill the new oil seal groove with MULTIPURPOSE NLGI No. 2 grease (MoS2-additive).

Install the oil seal into the retainer with the oil seal driver.



Set the O-ring guide into the gear case cutout.
Install the oil seal guide over the pinion shaft.



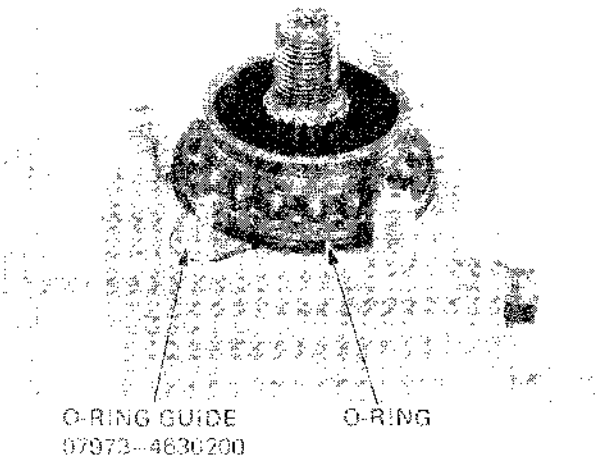
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Push the retainer into place with the retainer wrench until the oil seal guide is compacted.

CAUTION

- *Be careful not to damage the o-rings.*
- *The retainer has extra fine threads, and it is very easy to cross-thread, if you are not careful.*

Remove the oil seal and O-ring guides when retainer B seats against the bearing outer.



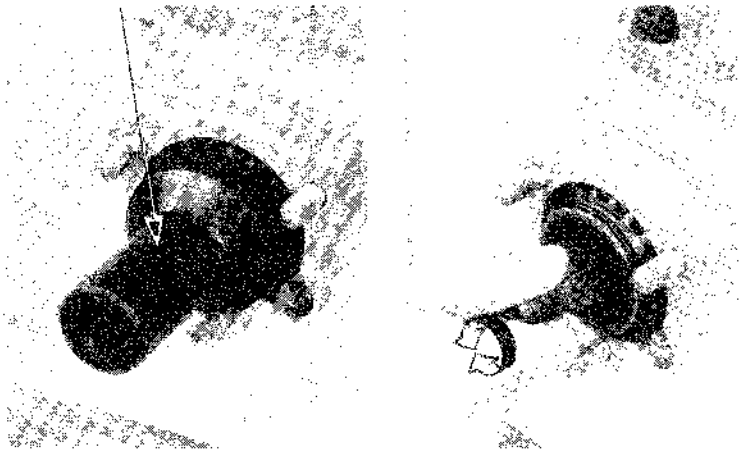
RETAINER WRENCH B
07910-4630100

Thread the retainer into the case by hand. Turn the pinion shaft intermittently. Stop tightening the retainer when pinion shaft rotating resistance is felt. Do not overtighten the retainer.

NOTE

- If the retainer is overtightened, it will cause excessive preload.
- A high amount of drag is normal because of the O-rings.

Check the pinion gear preload (below).



PRELOAD ADJUSTMENT

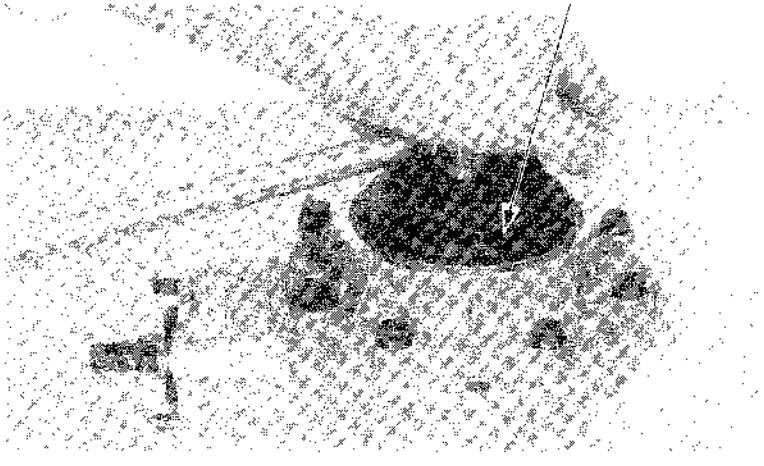
PINION GEAR RETAINER

NOTE

Use this procedure whenever the pinion gear retainer is removed.

Remove the dust guard plate.
Remove the ring gear assembly (Page 16-5, 16-6).

RETAINER WRENCH
07910-3710000



Install the preload inspection tool onto the pinion gear shaft.

Wind the wire around the tool groove and attach a spring scale. Measure the preload force needed to turn the pinion shaft in the normal direction of rotation.

PRELOAD: Pinion gear
1,000–1,200 g (2.2–2.7 lb)
5.0–6.0 kg-cm (4.3–5.2 in-lb)

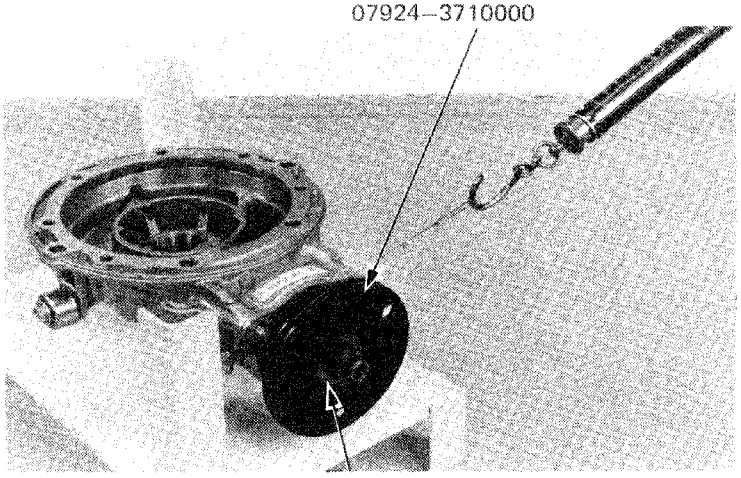
Rotate the pinion shaft 50–60 turns if measurements are not even.

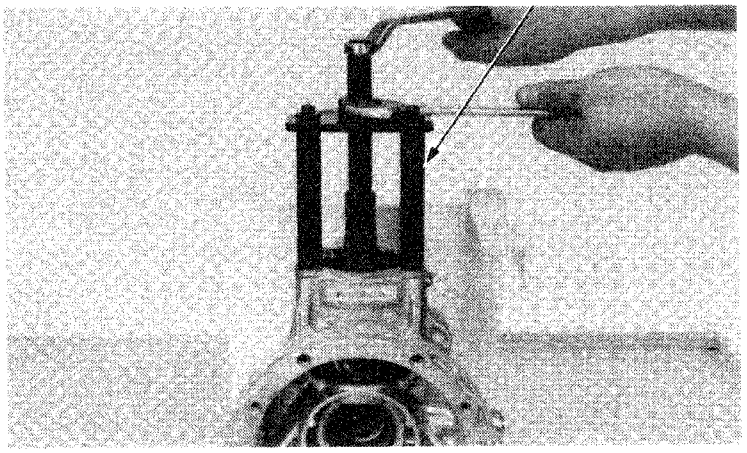
NOTE

Force required to begin movement may exceed preload specifications.

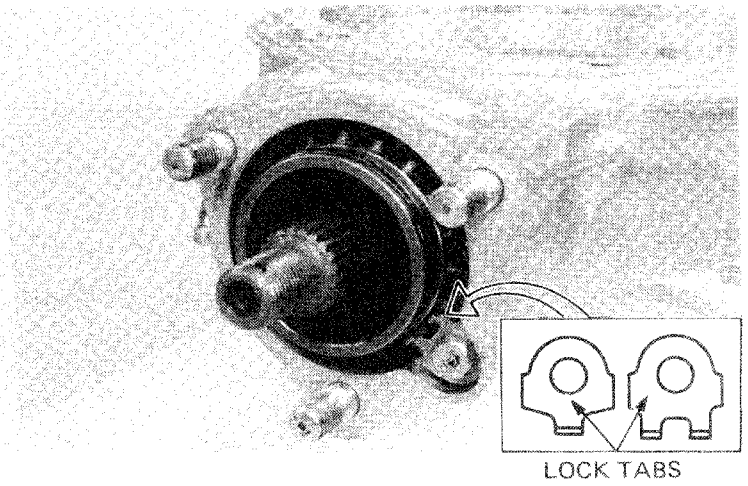
Tighten the retainer to increase preload.

Loosen the retainer and pull up on the pinion shaft with the special tool, if preload is excessive.





After adjustment, install the proper retainer lock tab. There are two types.
Install the ring gear assembly (Page 16-7, 16-8).
Check the final gear assembly preload (Page 16-13).



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RING GEAR RETAINER

NOTE

Use this procedure whenever the ring gear bearing retainer is removed, or if final gear assembly preload is being checked.

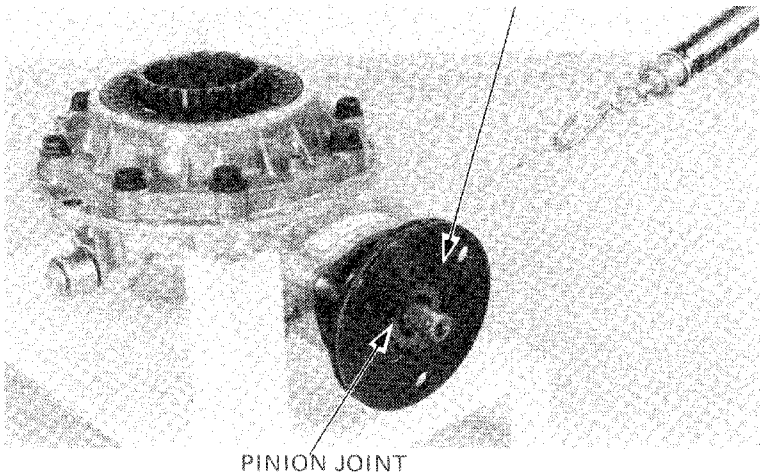
Install the preload inspection tool onto the pinion gear shaft.
Wind the wire around the tool groove and attach a spring scale. Measure the preload force needed to turn the pinion shaft in the normal direction of rotation.

PRELOAD:
1,800–2,300 g (4–5 lb)
(9.0–11.5 kg-cm, 7.8–10.0 in-lb)

NOTE

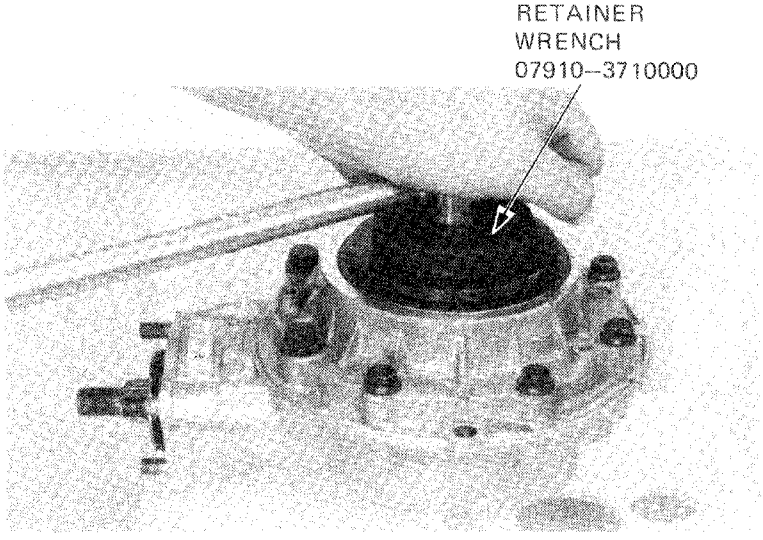
Force required to begin pinion movement may exceed preload specifications.

Remove the dust guard plate, if adjustment is necessary.



Tighten or loosen the ring gear retainer as required to obtain the correct preload.

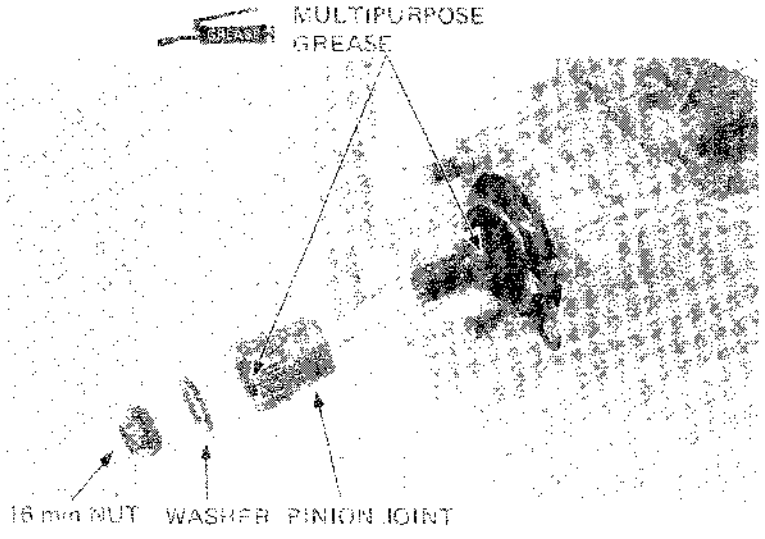
Remove the preload inspection tool.



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Apply multi-purpose NLGI No. 2 grease (MoS2-additive) to the pinion shaft and inside of the pinion joint.

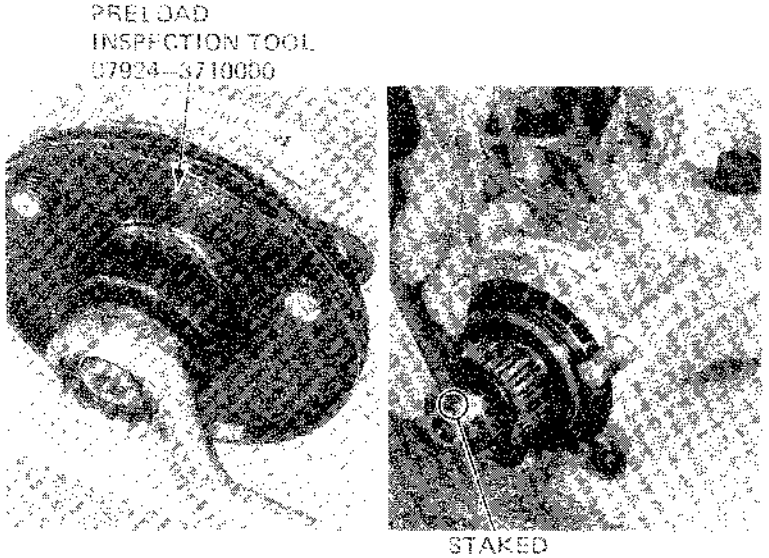
Install the pinion joint, washer and 16 mm nut.



Install the Preload Inspection Tool to hold the pinion shaft, and tighten the 16 mm nut.

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

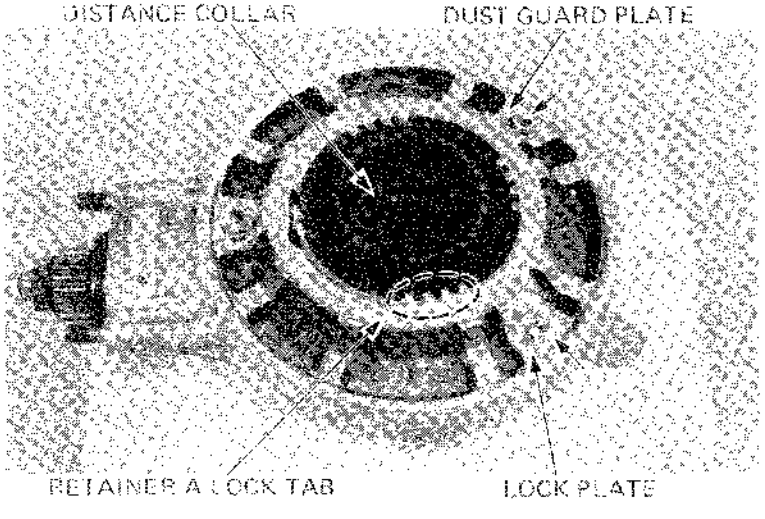
Stake the 16 mm nut to a minimum depth of 1 mm (0.04 in) at one two locations. Be careful not to damage the pinion shaft threads.



Install the dust guard plate and bend the three lock tabs up.

Bend one of the bearing retainer lock tabs down.

Remove the final gear case from the base, and insert the distance collar.

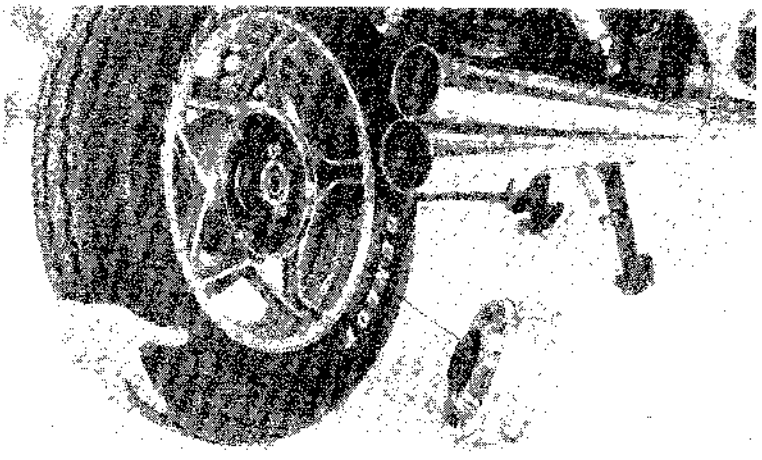


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FINAL GEAR CASE INSTALLATION

Install the rear wheel and the final gear case (Page 15-8).



Apply Multipurpose NLGI No. 2 grease (MoS2 additive) to the drive shaft joint grease fitting.

QUANTITY: 90 g approx. (at disassembly)

Make sure the final drive gear case drain bolt is tight.

Remove the oil filler cap.

Add the recommended lubricant until it reaches the filler neck threads.

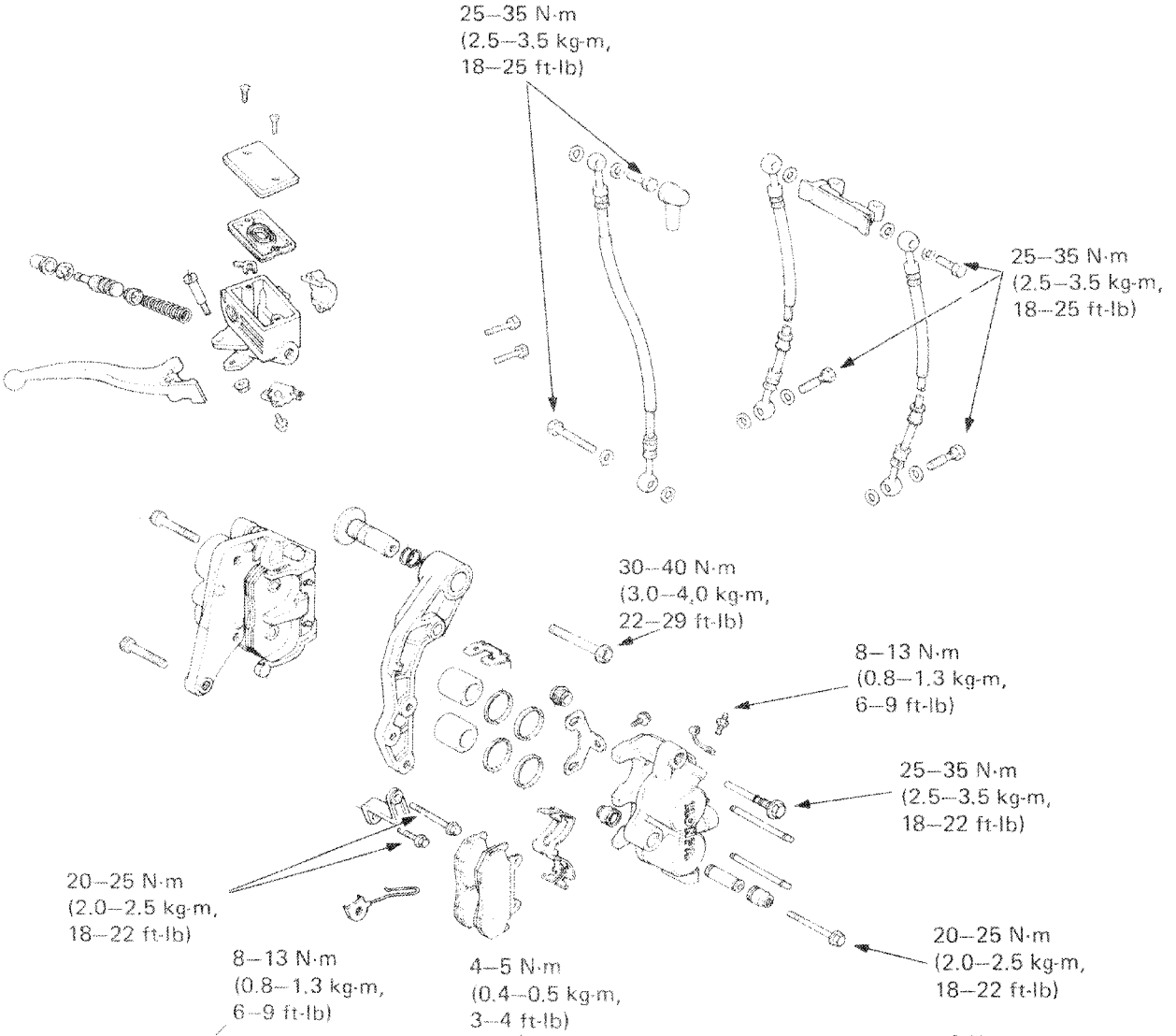
RECOMMENDED OIL:
Hypoid Gear Oil API, GL-5
Above 5°C/41°F: SAE #90
Below 5°C/41°F: SAE #80

OIL CAPACITY: 140 - 160 cc (4.7 - 5.4 oz)

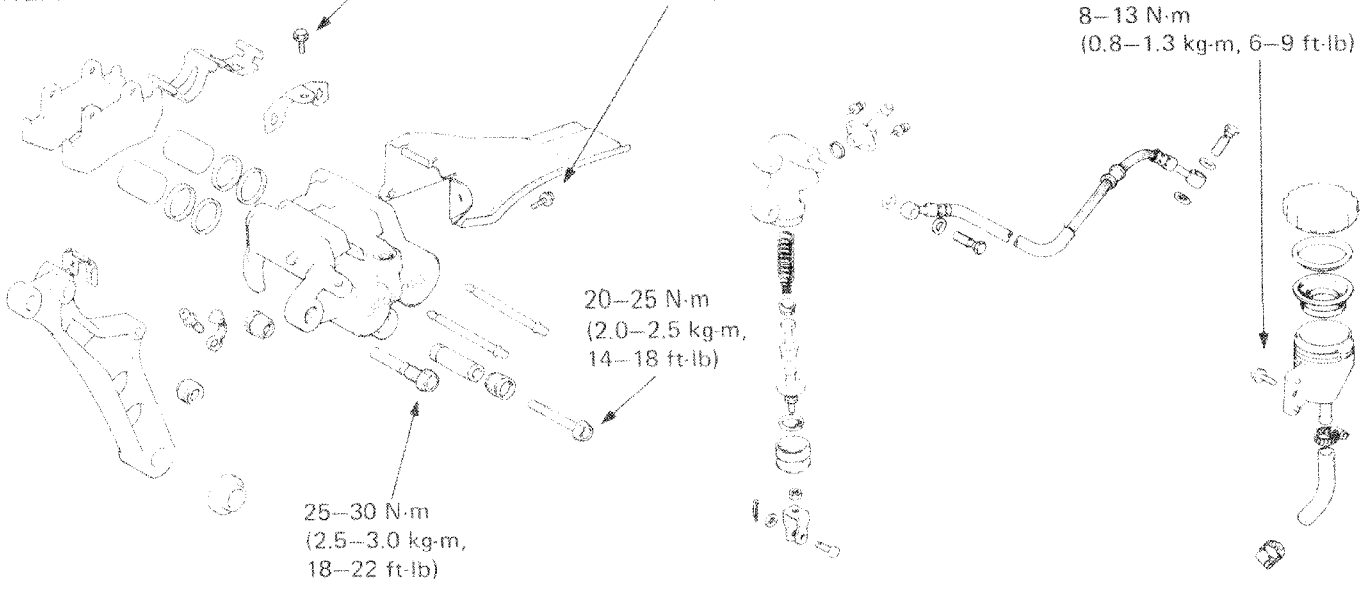


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FRONT:



REAR:



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17. HYDRAULIC BRAKES

SERVICE INFORMATION	17– 1
TROUBLESHOOTING	17– 2
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	17– 3
BRAKE PAD/DISC	17– 5
FRONT MASTER CYLINDER	17– 9
FRONT BRAKE CALIPER	17–11
REAR MASTER CYLINDER	17–15
REAR BRAKE CALIPER	17–17
BRAKE PEDAL SHAFT	17–20

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

	STANDARD	SERVICE LIMIT
Front disc thickness	4.8–5.2 mm (0.19–0.21 in)	4.0 mm (0.16 in)
Front disc warpage	———	0.30 mm (0.012 in)
Front master cylinder I.D.	14.000–14.043 mm (0.5512–0.5529 in)	14.055 mm (0.5533 in)
Front master piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.940 mm (0.5488 in)
Front caliper piston O.D.	30.148–30.198 mm (1.1869–1.1889 in)	30.14 mm (1.187 in)
Front caliper cylinder I.D.	30.23–30.28 mm (1.190–1.192 in)	30.29 mm (1.193 in)
Rear master cylinder I.D.	14.000–14.043 mm (0.5512–0.5529 in)	14.06 mm (0.553 in)
Rear master piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.940 mm (0.5488 in)
Rear caliper cylinder I.D.	30.23–30.28 mm (1.1901–1.1921 in)	30.29 mm (1.193 in)
Rear caliper piston O.D.	30.148–30.198 mm (1.1869–1.1889 in)	30.14 mm (1.187 in)
Rear disc thickness	6.8–7.2 mm (0.27–0.28 in)	6.0 mm (0.24 in)
Rear disc runout	———	0.30 mm (0.012 in)

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TORQUE VALUES

Oil bolt	25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Caliper bleed valve	4– 7 N·m (0.4–0.7 kg-m, 3– 5 ft-lb)
Pin retainer	8–13 N·m (0.8–1.3 kg-m, 6– 9 ft-lb)
Front brake disc	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Front caliper bracket (Right)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Upper mount bolt (Left)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Piston pin bolt (Left)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Lower mount bolt (Left)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Front caliper bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Front caliper shaft	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Rear brake disc	27–33 N·m (2.7–3.3 kg-m, 20–24 ft-lb)
Rear brake torque rod nut	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Rear caliper bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Rear caliper shaft	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Dust cover	4– 5 N·m (0.4–0.5 kg-m, 3– 4 ft-lb)
Rear master cylinder oil reservoir	8–13 N·m (0.8–1.3 kg-m, 6– 9 ft-lb)
Rear master cylinder	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

TOOL

Special

Snap ring pliers	07914–3230001

TROUBLESHOOTING

Brake Lever/Pedal Soft or Spongy

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

Brake Lever/Pedal Too Hard

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

Brakes Drag

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

Brakes Grab or Pull to One Side

1. Pads contaminated.
2. Disc or wheel misaligned.

Brakes Chatter or Squeal

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

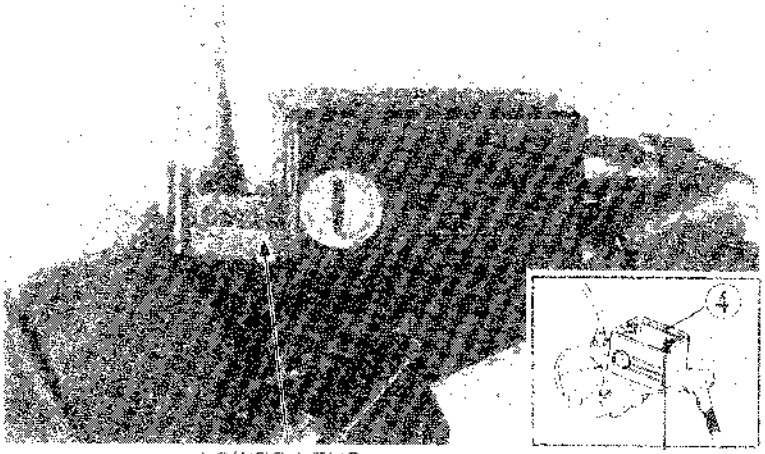
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BRAKE FLUID REPLACEMENT/AIR BLEEDING

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

CAUTION

- *Install the diaphragm on the reservoir when operating the brake lever/pedal. 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 whenever the system is serviced.*



LOWER LEVEL UPPER LEVEL

BRAKE FLUID DRAINING

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

⚠ WARNING

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



BRAKE FLUID FILLING

NOTE

Do not mix different types of fluid since they may not be compatible.

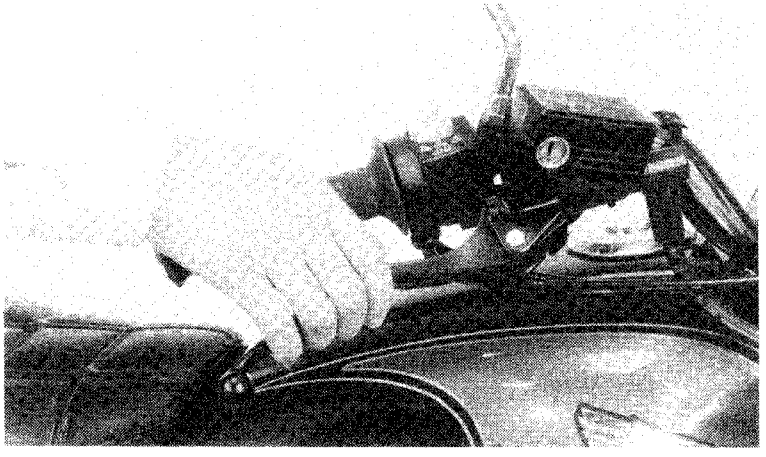
Close the bleeder valve, fill the reservoir, and install the diaphragm.
To prevent piston overtravel and brake fluid see page, keep a 20 mm (3/4 in) space to the handlebar grip when bleeding the front brake system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever (or pedal) resistance is felt.

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AIR BLEEDING

NOTE

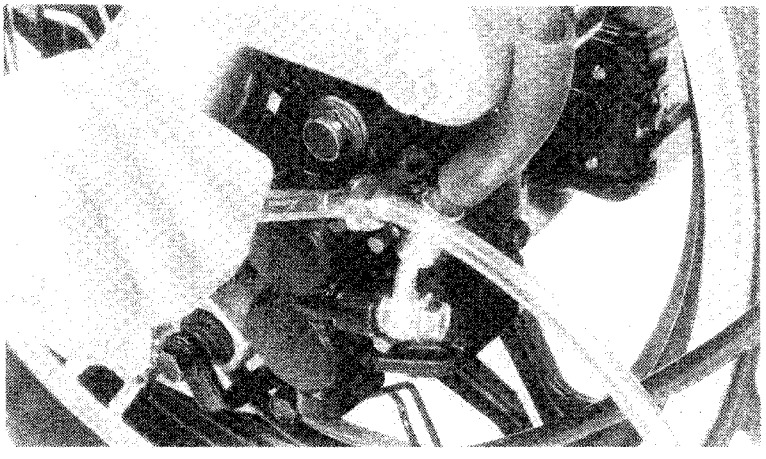
- Use this procedure for the front and rear brakes.
- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- Use only DOT3 brake fluid from a sealed container.
- Do not mix brake fluid types and never re-use the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.



1. Squeeze the brake lever (or depress the brake pedal), open the bleeder valve 1/2 turn then close the valve.

NOTE

Do not release the brake lever (or pedal) until the bleeder valve has been closed again.



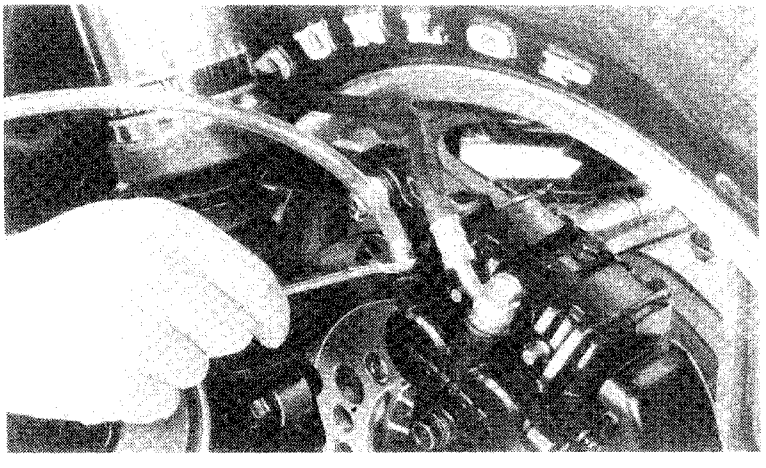
2. Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.

Repeat the above steps until bubbles no longer 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.



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BRAKE PAD/DISC

FRONT PAD REPLACEMENT

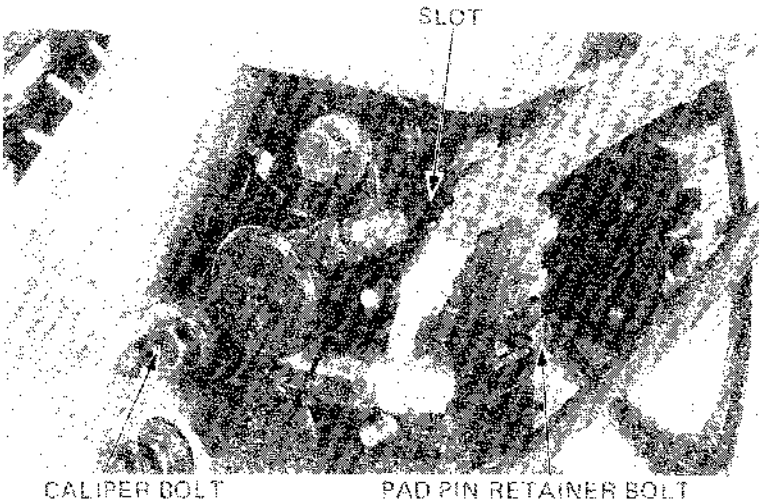
Check the brake pads for wear by looking through the slot pointed to by the cast arrow on the caliper assembly.

Replace the brake pads if the wear line on the pads reaches the edge of the brake disc.

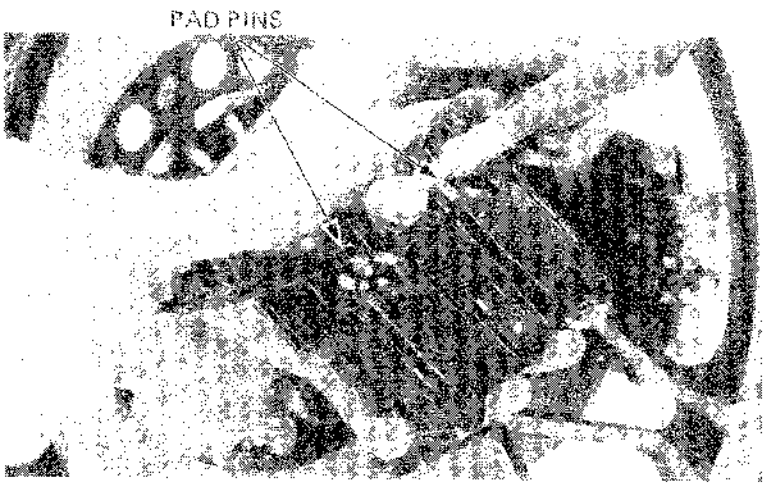
NOTE

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

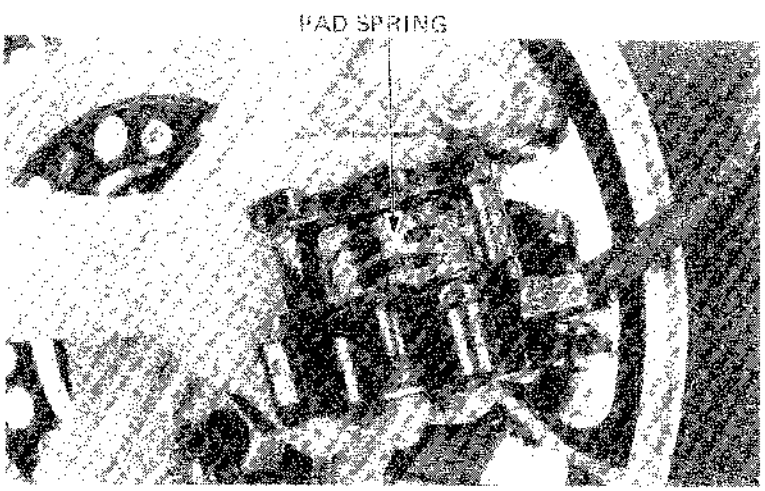
Remove the pad pin retainer and caliper bolts.
Pivot the caliper up out of the way.



Remove the pad pin retainer and pull the pad pins out of the caliper.
Remove the brake pads.

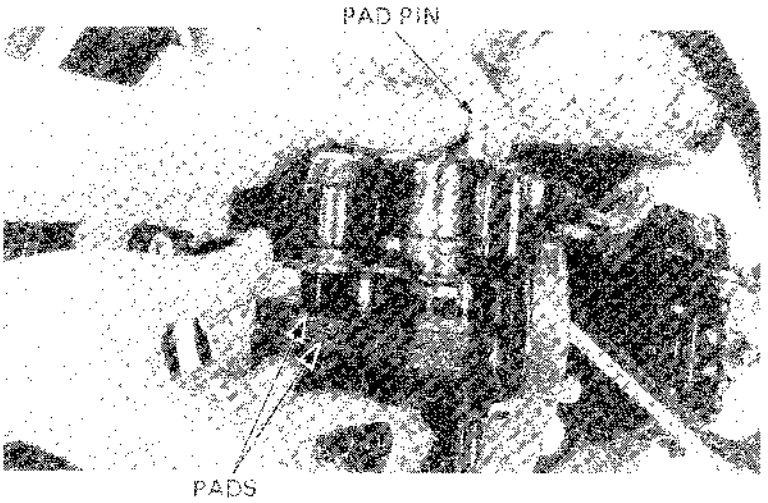


Position the pad spring in the caliper as shown.
Push the caliper pistons in all the way.

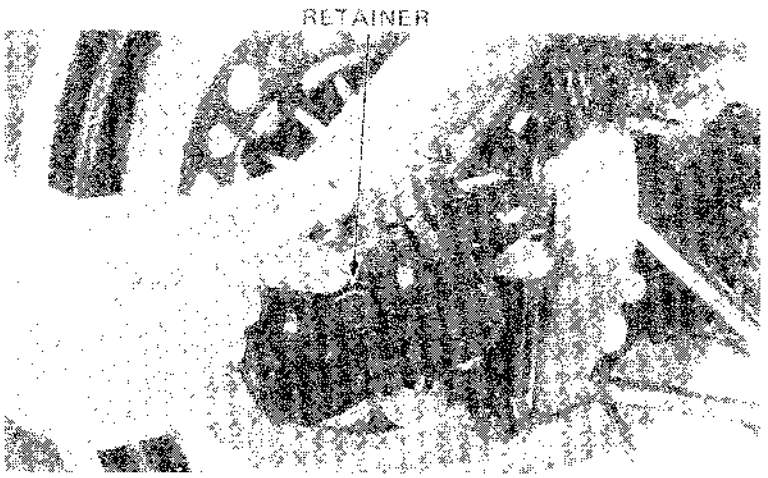


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Install the new pads in the caliper.
Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.

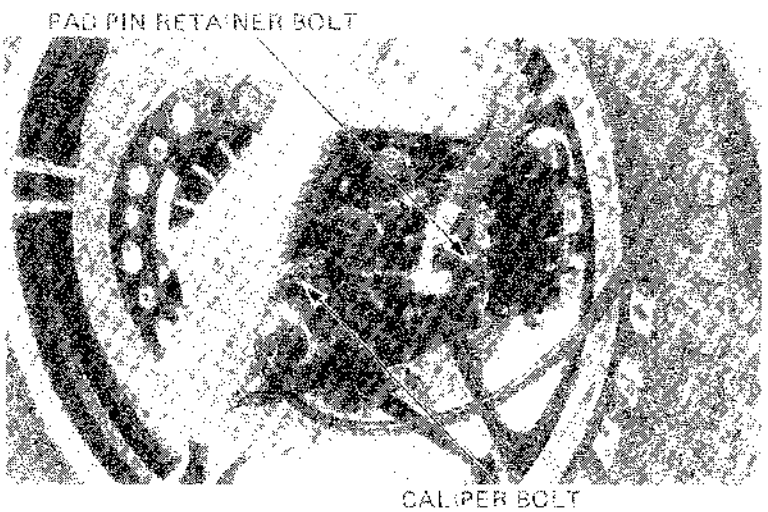


Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.



Install the pad pin retainer bolt.
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: 20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)



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REAR BRAKE PAD REPLACEMENT

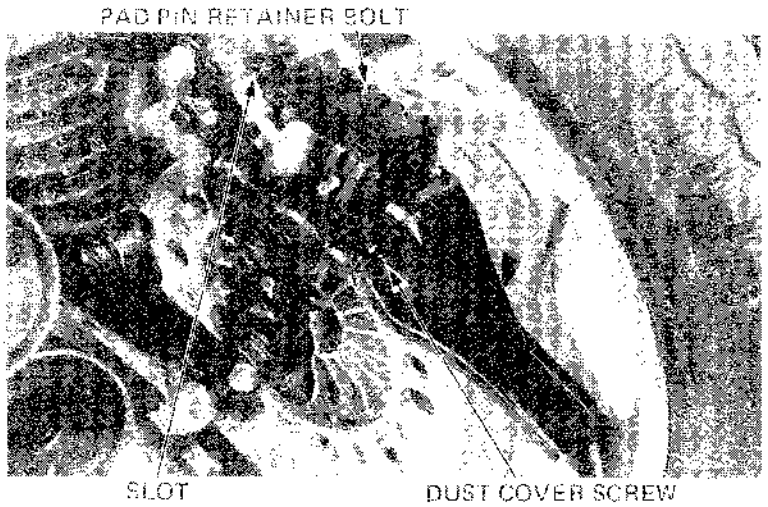
Check the brake pads for wear by looking through the slot pointed to by the cast arrow on the caliper assembly.

Replace the brake pads if the wear line on the pads reaches the edge of the brake disc.

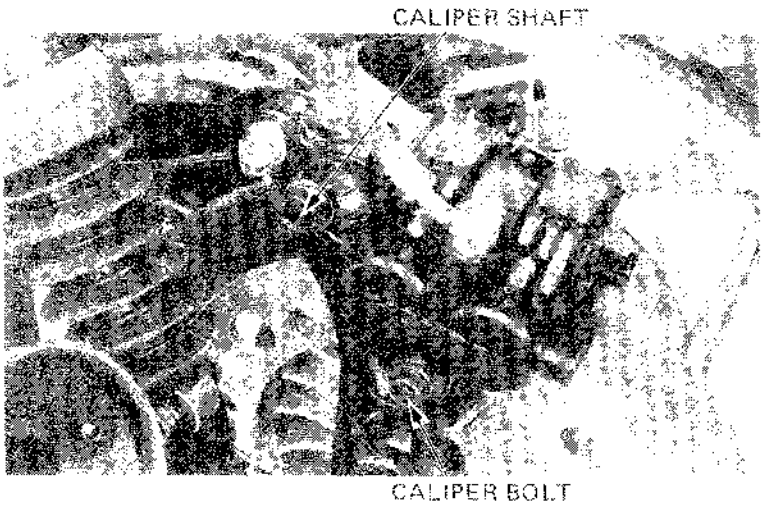
NOTE

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

Remove the dust cover and pad pin retainer.

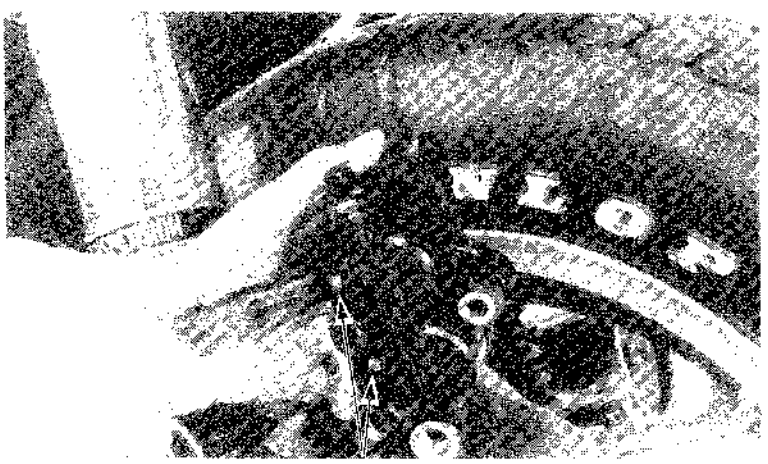


Remove the caliper bolt and caliper shaft.
Remove the caliper from the caliper bracket.



Pull out the two pad pins and remove the pads from 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.



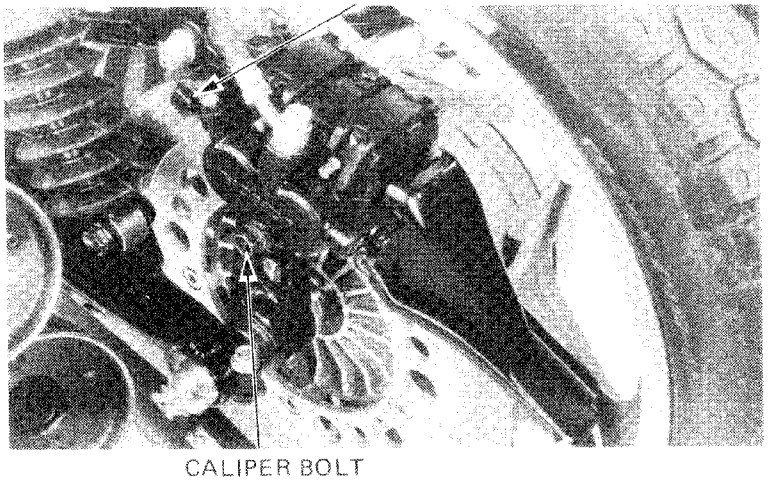
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Install and tighten the caliper shaft.

TORQUE: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

Install and tighten the caliper bolt.

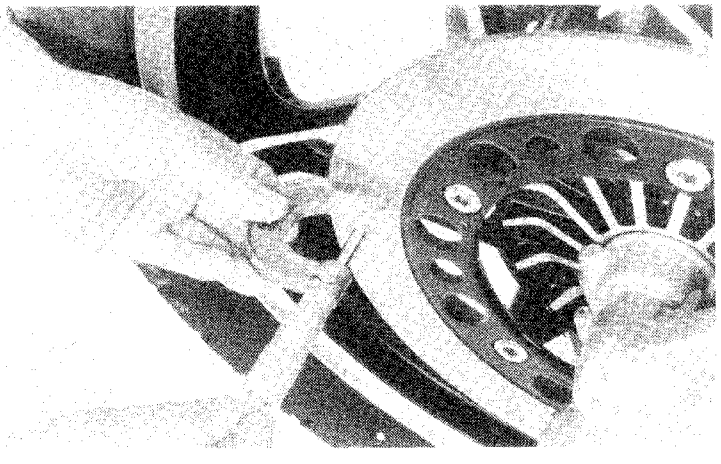
TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)



DISC THICKNESS

Measure the disc thickness.

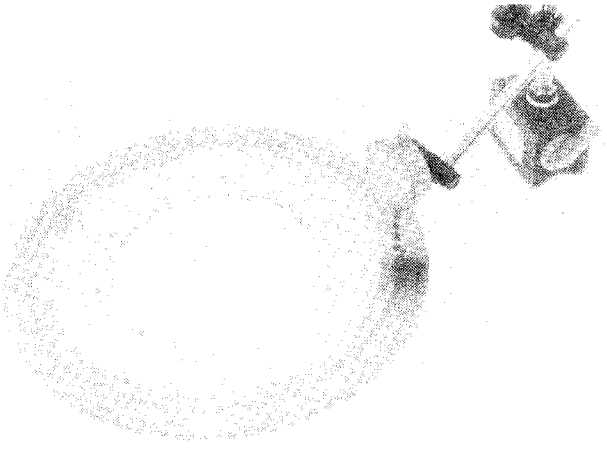
SERVICE LIMIT
FRONT: 4.0 mm (0.16 in)
REAR: 6.0 mm (0.24 in)



DISC WARPAGE

Measure the brake disc warpage on a surface plate with a dial indicator.

SERVICE LIMIT: 0.3 mm (0.012 in)



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FRONT MASTER CYLINDER

DISASSEMBLY

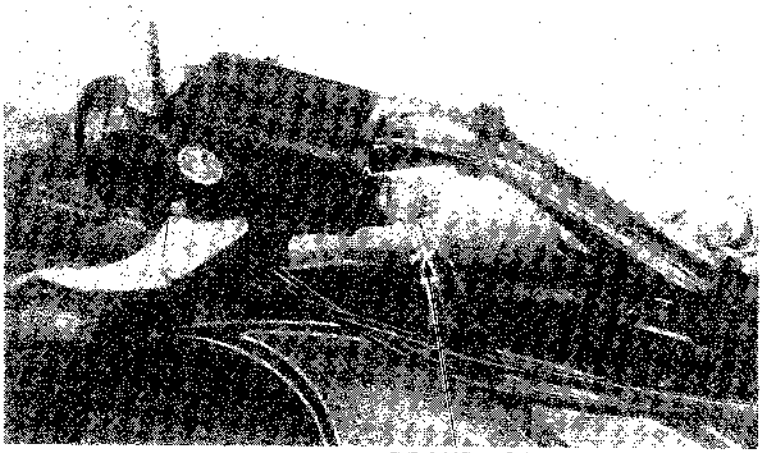
Drain brake fluid from the hydraulic system.
Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

CAUTION

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

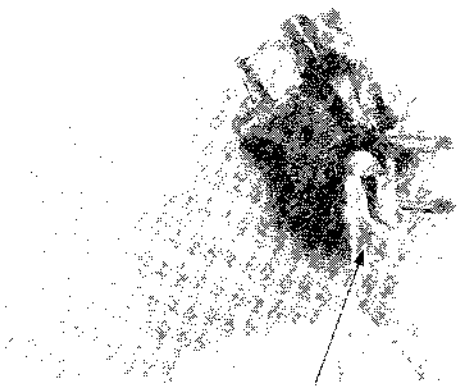
NOTE

When removing the oil hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.


BRAKE HOSE

Remove the master cylinder.

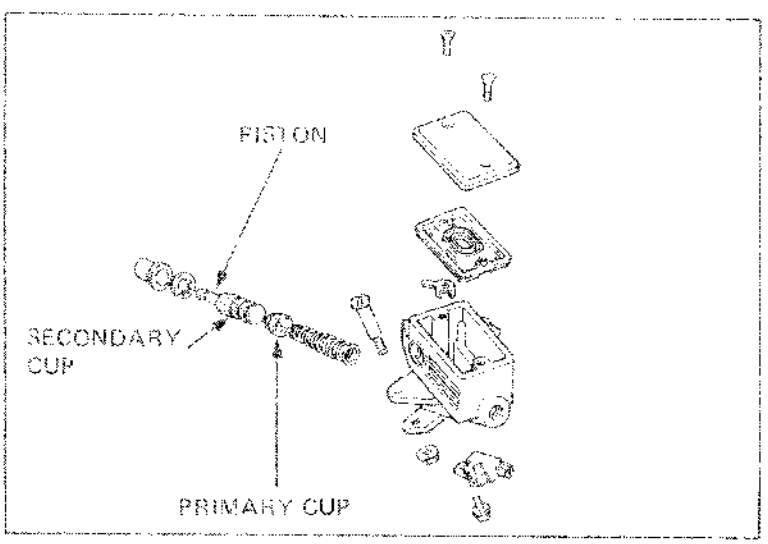
Remove the piston boot and the circlip from the master cylinder body.


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.

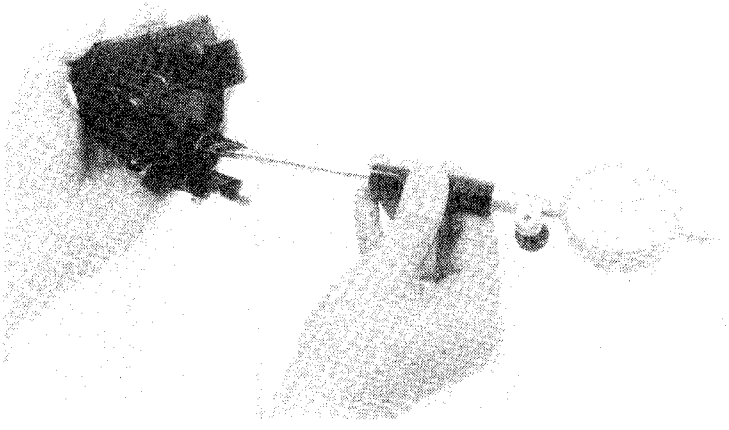


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FRONT MASTER CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 14.055 mm (0.5533 in)

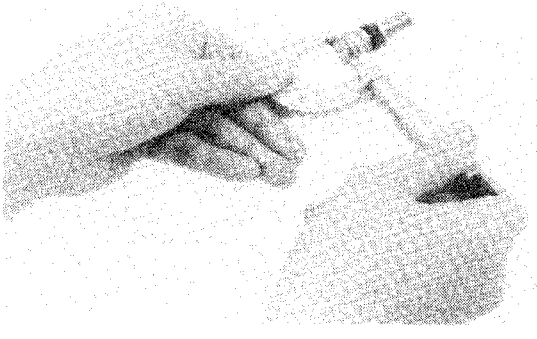


FRONT MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.940 mm (0.5488 in)

Check the primary and secondary cups for damage before assembly.



ASSEMBLY

CAUTION

Handle the master cylinder piston, cylinder and spring as a set.

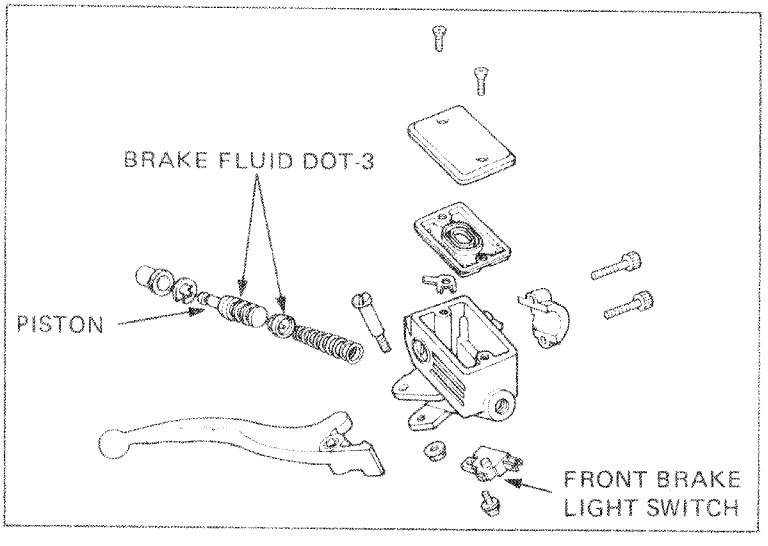
Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and primary cup together.

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.

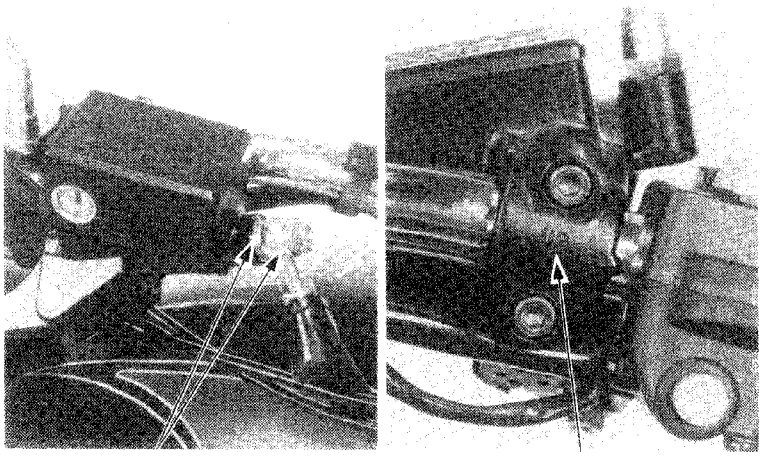
Install the piston, clip and boot.



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Place the master cylinder on the handlebar and install the holder with "UP mark" facing up and 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.



FRONT BRAKE CALIPER

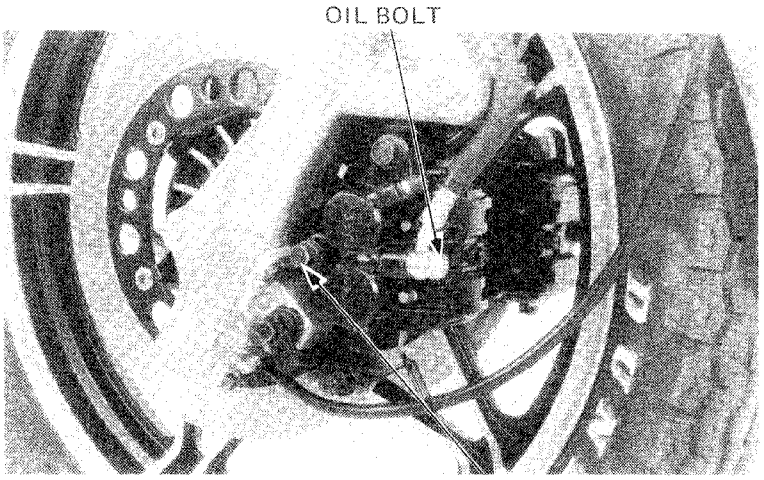
REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION

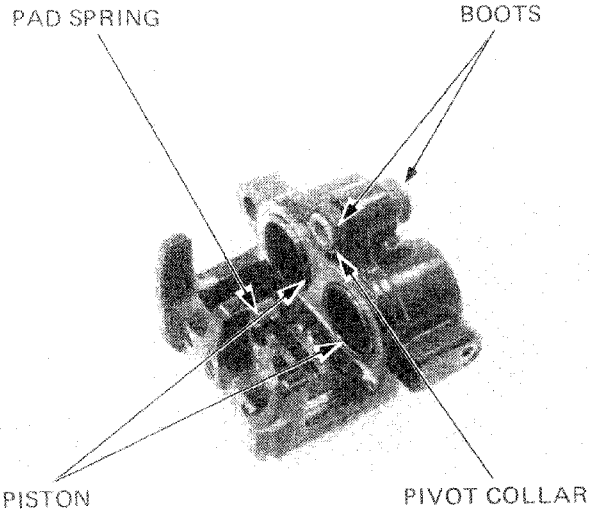
Avoid spilling brake fluid on painted surfaces.

Remove the caliper bolt and caliper.



DISASSEMBLY

Remove the pads and pad spring.
Remove the caliper pivot collar and boots.
Remove the pistons from the caliper.



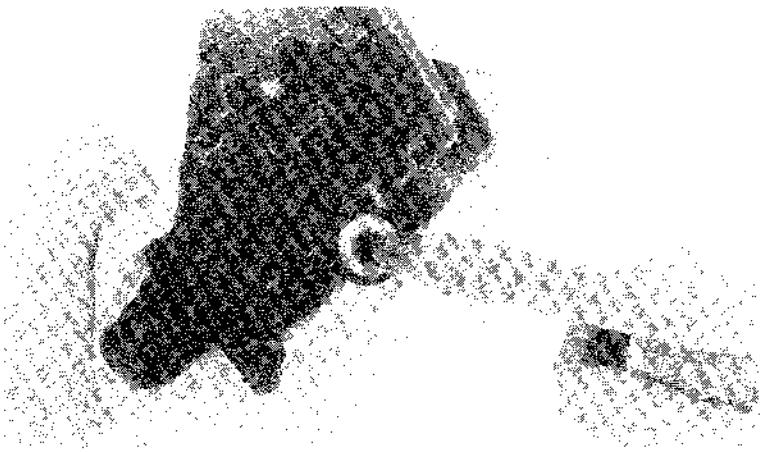
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If necessary, apply compressed air to the caliper fluid inlet to get the pistons out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.

⚠ WARNING

Do not bring the nozzle too close to the inlet.

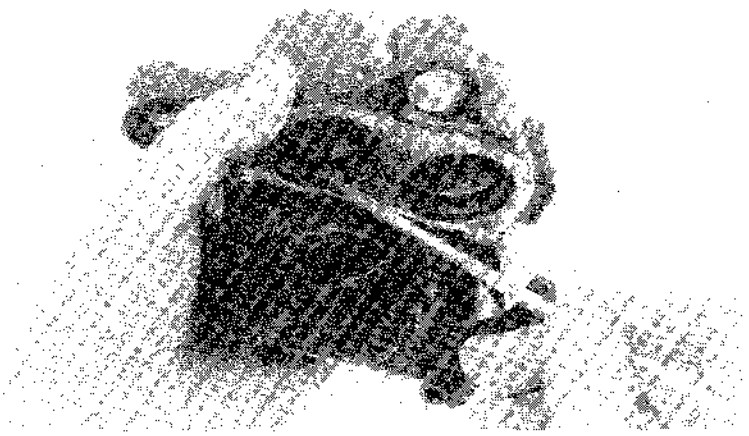
Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.



Push the piston seals in and lift them out, then discard them.
Clean the oil seal grooves with brake fluid.

CAUTION

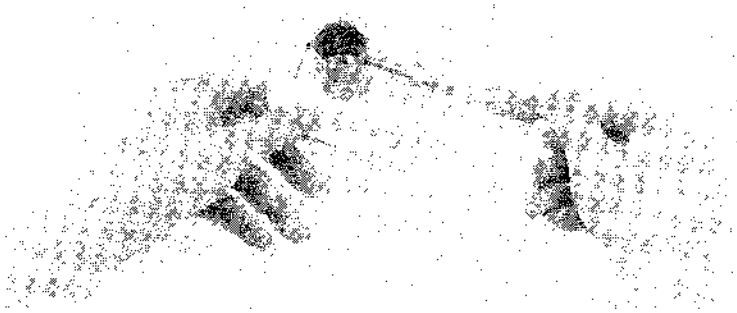
Be careful not to damage the piston sliding surfaces.



FRONT CALIPER PISTON O.D. 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)

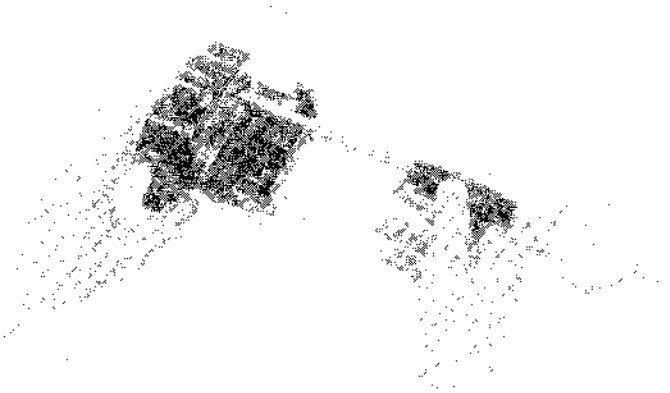


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INSPECTION

Check the caliper cylinder for scoring, scratches or other faults. Measure the caliper cylinder bore.

SERVICE LIMIT: 30.23 mm (1.193 in)



ASSEMBLY

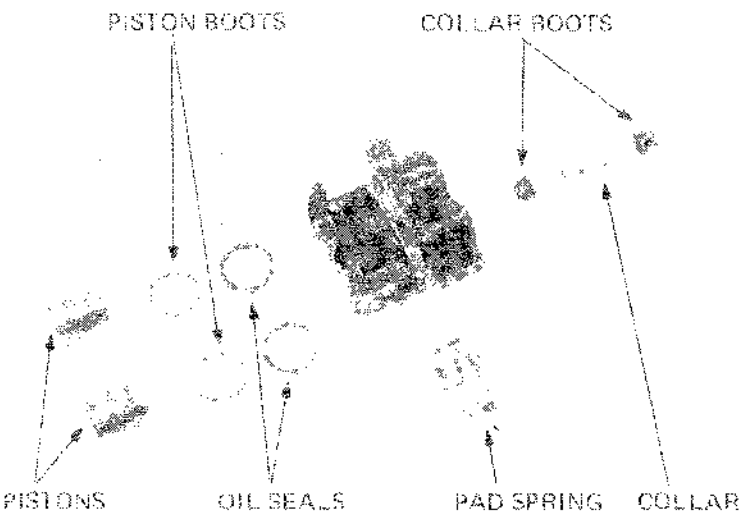
If the piston boots are hardened or deteriorated, replace them with new ones.

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.



INSTALLATION

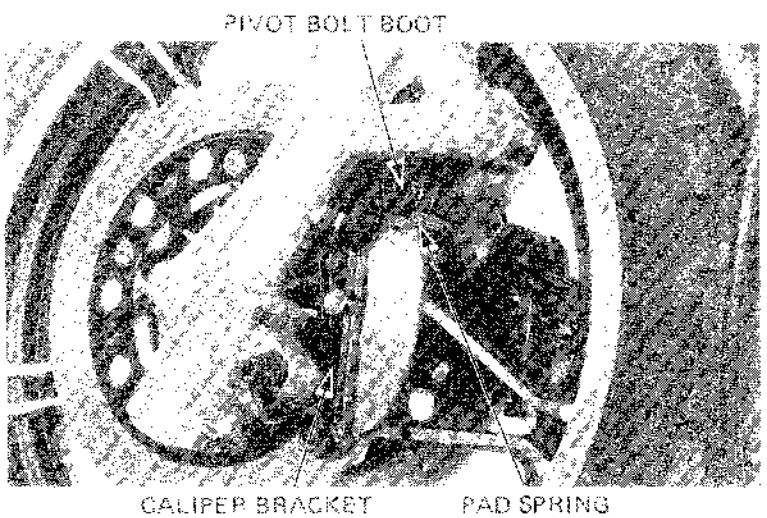
Install the pad spring on the caliper bracket as shown.

Inspect the condition of the caliper pivot bolt boot. 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 pad.



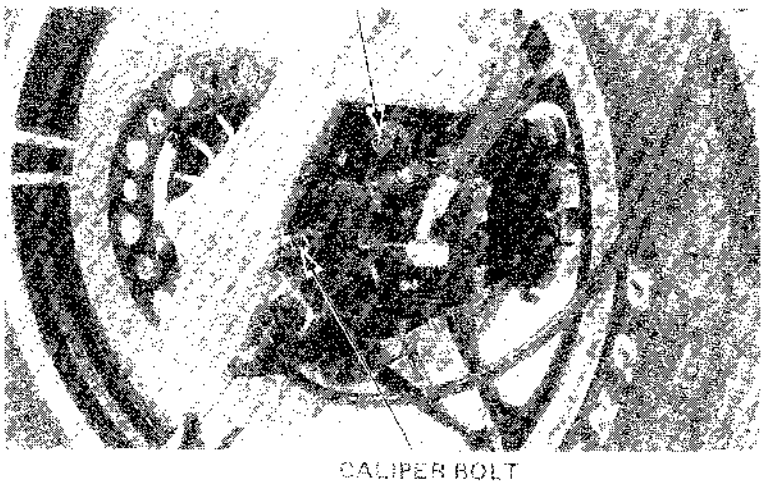
Install the caliper shaft, if it was removed.

TORQUE: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

Install the caliper bolt.

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

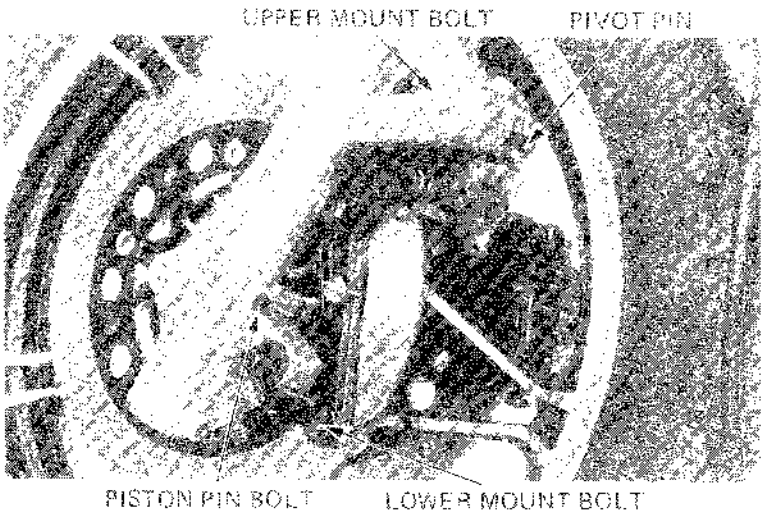
Connect the brake hose and fill the brake fluid reservoir. Bleed the front brake system (Page 17-4).



FRONT CALIPER BRACKET DISASSEMBLY

On the right caliper bracket, remove the two caliper bracket mounting bolts and remove the bracket.

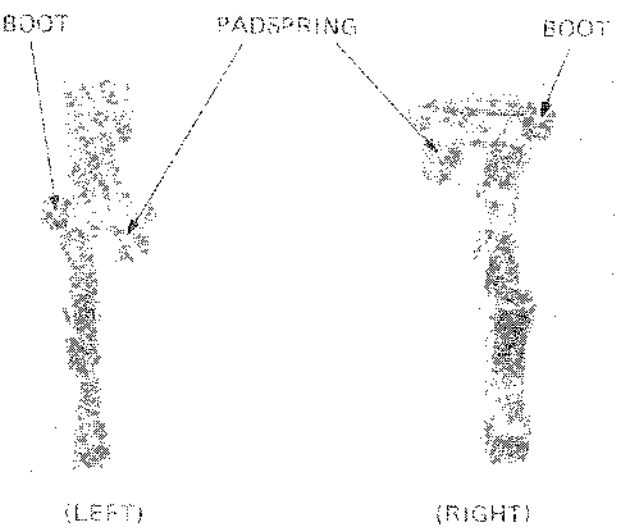
On the left caliper bracket, remove the upper mount bolt, lower mount bolt and piston pin bolt. Remove the pivot pin and the caliper bracket. Remove the boot and pad spring from the caliper bracket, making sure that they are in good condition.



FRONT CALIPER BRACKET ASSEMBLY

Install the boot and pad spring.
Attach the caliper bracket to the front fork.

(LEFT)
TORQUE:
UPPER MOUNT BOLT:
30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
PISTON PIN BOLT:
20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
LOWER MOUNT BOLT:
20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
(RIGHT)
CALIPER BRACKET MOUNT BOLT:
30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)



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REAR MASTER CYLINDER

REMOVAL

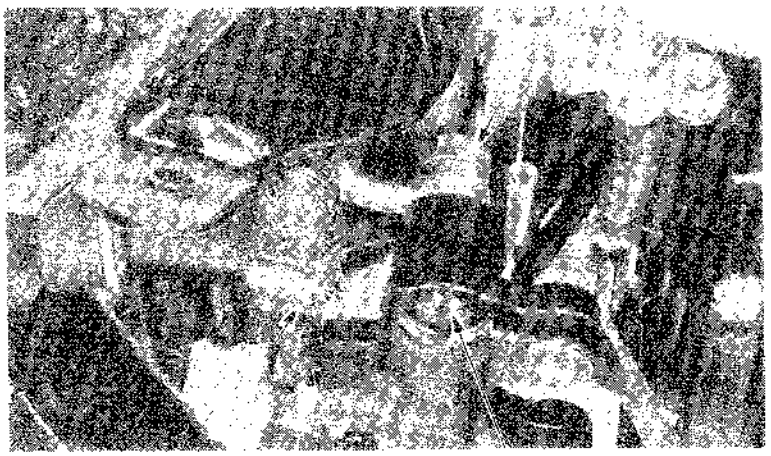
Remove the following:
- frame right side cover
- brake pedal
- right muffler
- master cylinder set ng bolts
- brake pedal bracket
- cotter pin and joint pin



Place a clean drip pan under the brake line.
Disconnect the brake line on the back of the master cylinder.

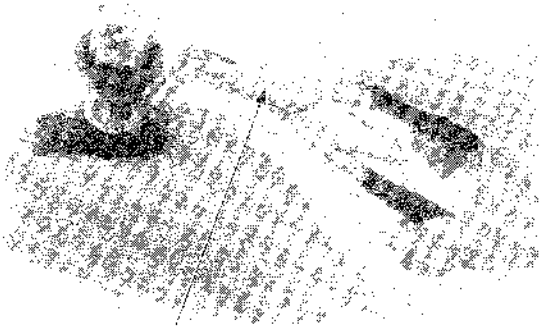
CAUTION

Avoid spilling brake fluid on painted surfaces.



DISASSEMBLY

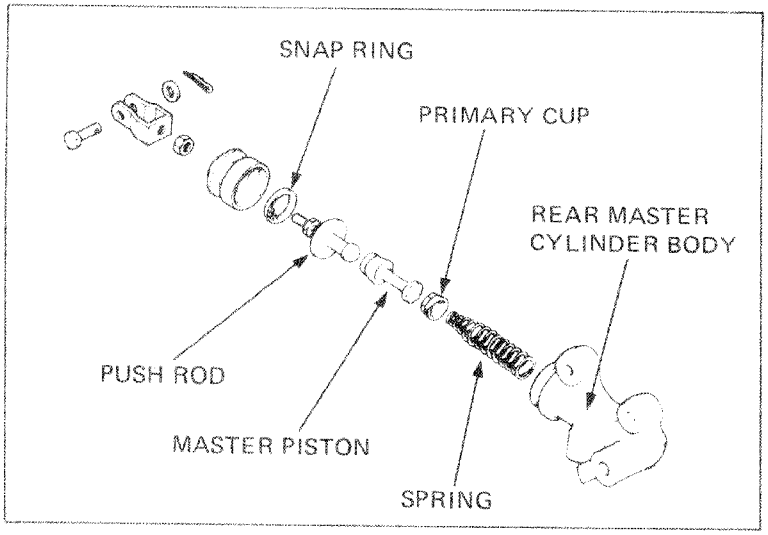
Remove the rubber cover.
Remove the circlip and push rod from the master cylinder body.



Remove the master piston, primary cup and spring.

It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.

Clean all parts with brake fluid.

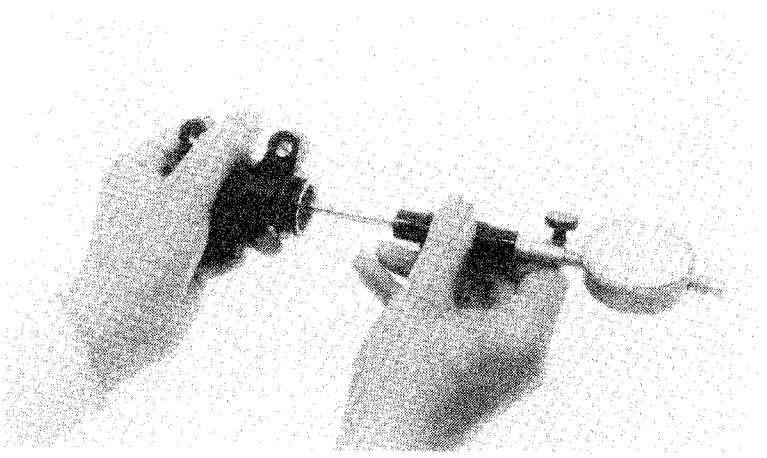


REAR MASTER CYLINDER I.D. INSPECTION

Measure the inside diameter of the master cylinder bore.

SERVICE LIMIT: 14.06 mm (0.553 in)

Check for scores, scratches or nicks.

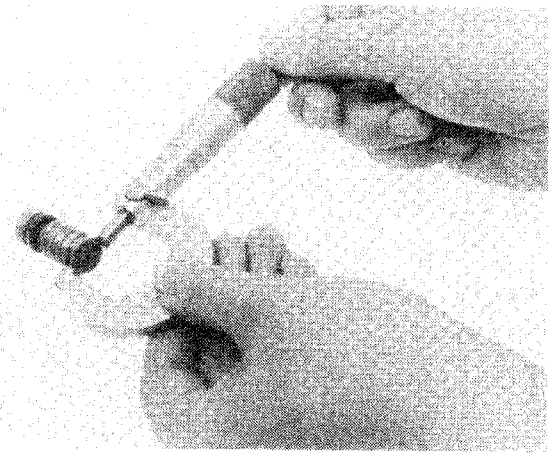


REAR MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.940 mm (0.5488 in)

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



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REAR MASTER CYLINDER ASSEMBLY

CAUTION

Handle the master cylinder piston, cylinder and spring as a set.

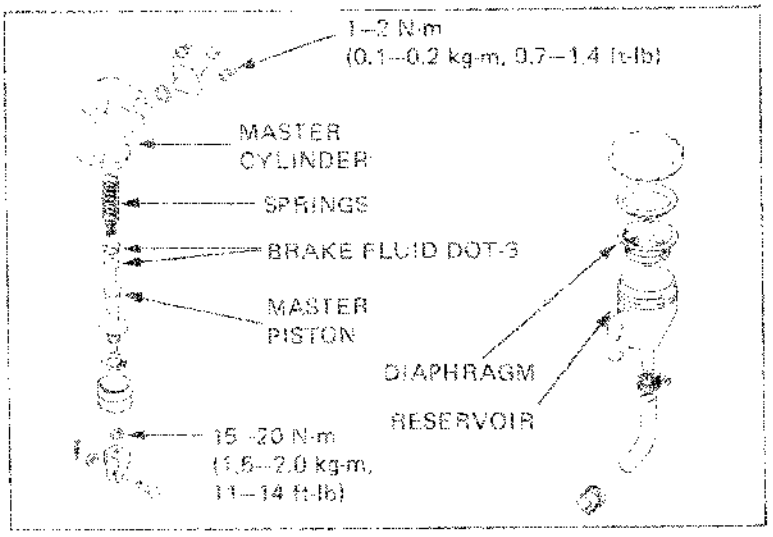
Assemble the master cylinder.
Coat all parts with clean brake fluid.

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 snap ring is seated firmly in the groove.

Install the following:
— primary cup and piston
— push rod and circlip.
— boot, nut and rod eye.



Install the master cylinder on the master cylinder bracket.

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

Connect the brake hose and brake rod.
Install the right muffler.
Bleed the brake hydraulic system after assembly (Page 17-4).



REAR BRAKE CALIPER

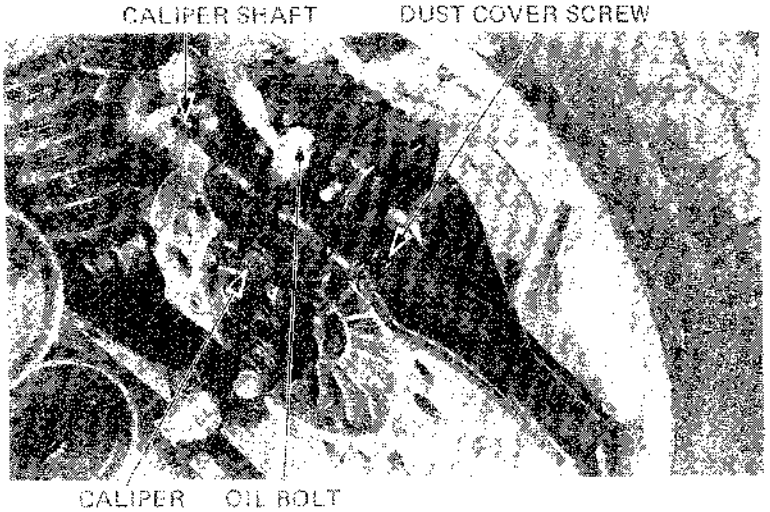
REMOVAL

Drain the brake hydraulic system (Page 17-3).
Disconnect the brake hose and remove the dust cover.

NOTE

Avoid spilling brake fluid on painted surfaces and the brake surfaces.

Remove the caliper bolt and caliper shaft.



DISASSEMBLY

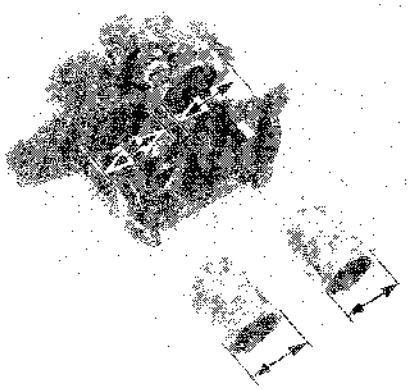
Refer to Front Brake Caliper (Page 17-11).

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REAR BRAKE CALIPER PISTON O.D. INSPECTION

Check the piston for scoring or scratches.
Measure the piston diameter.

SERVICE LIMIT: 30.14 mm (1.187 in)



REAR BRAKE CALIPER CYLINDER I.D. INSPECTION

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

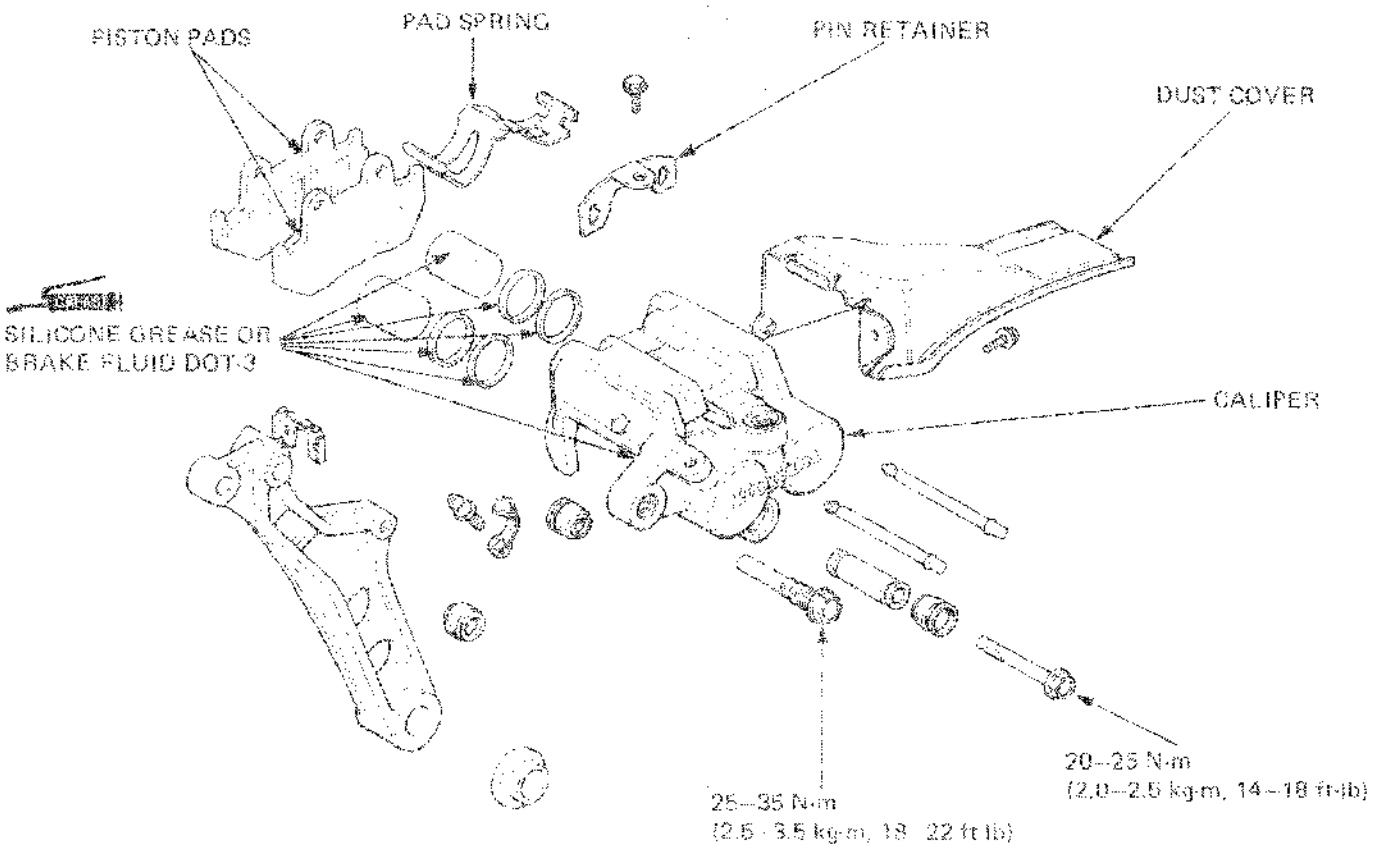
SERVICE LIMIT: 30.23 mm (1.193 in)

ASSEMBLY

Refer to the Front Brake Caliper (Page 17-13).

WARNING

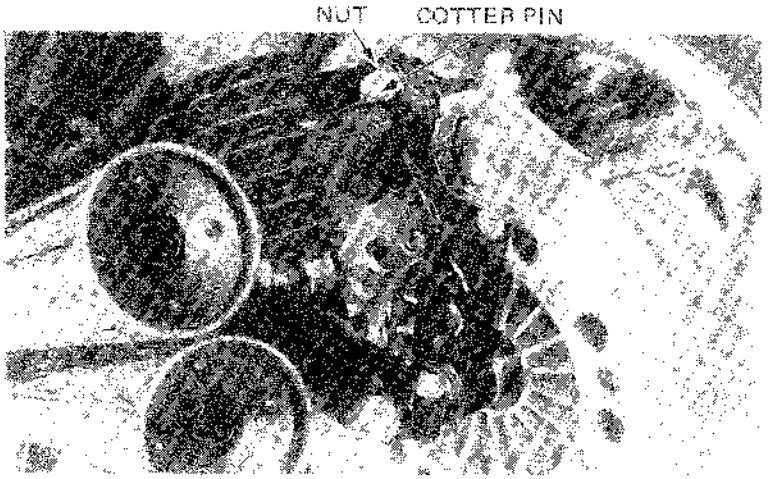
A contaminated brake disc or pad reduces stopping power. Do not allow grease to contact pad faces.



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REAR CALIPER BRACKET DISASSEMBLY

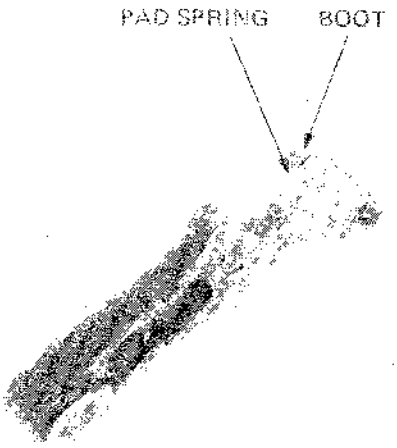
Remove the rear brake caliper (Page 17-17).
Remove the axle nut and rear axle.
Remove the bracket cotter pin and nut.
Disconnect the brake torque link from the rear brake caliper bracket.
Remove the rear caliper bracket.



REAR CALIPER BRACKET ASSEMBLY

Install the boot and pad spring.

Install the rear caliper bracket in the reverse order of removal.



BRAKE PEDAL SHAFT

REMOVAL/INSTALLATION

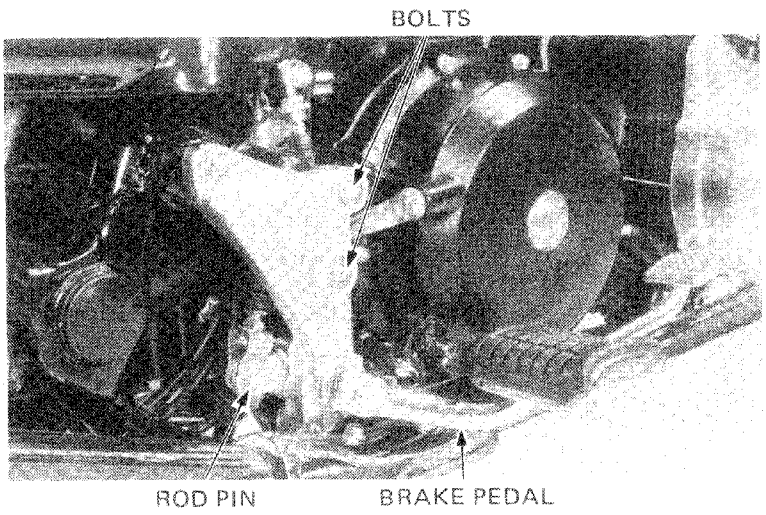
NOTE

The brake pedal shaft can be removed and installed without removing the muffler.

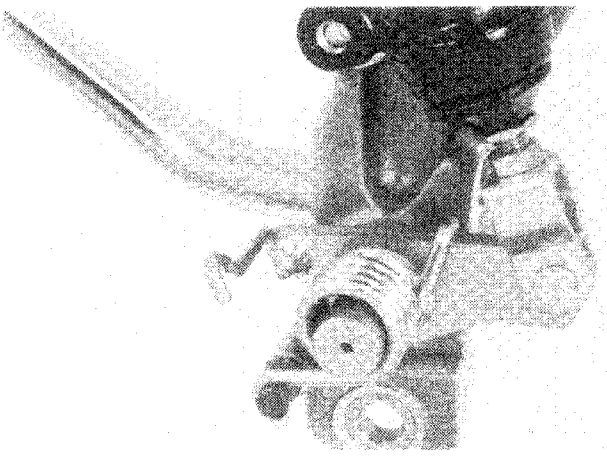
Remove the brake pedal.

Remove the allen head bolt and rod pin.
Remove the rear master cylinder.

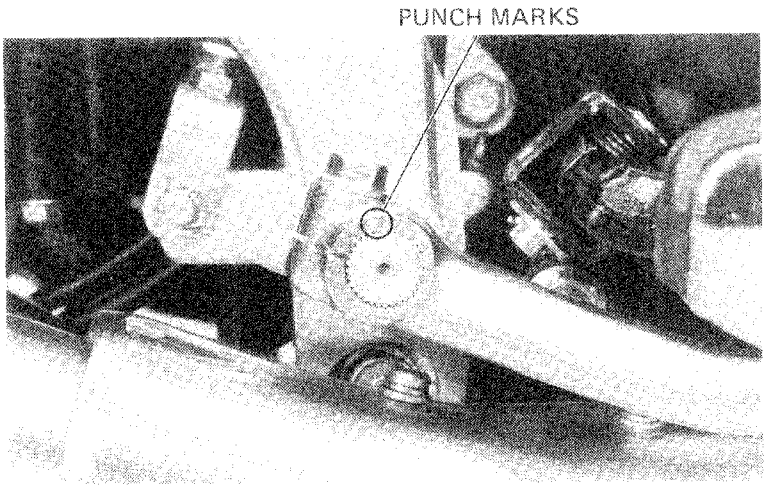
Remove the rear brakelight switch spring and rear brake pedal shaft.



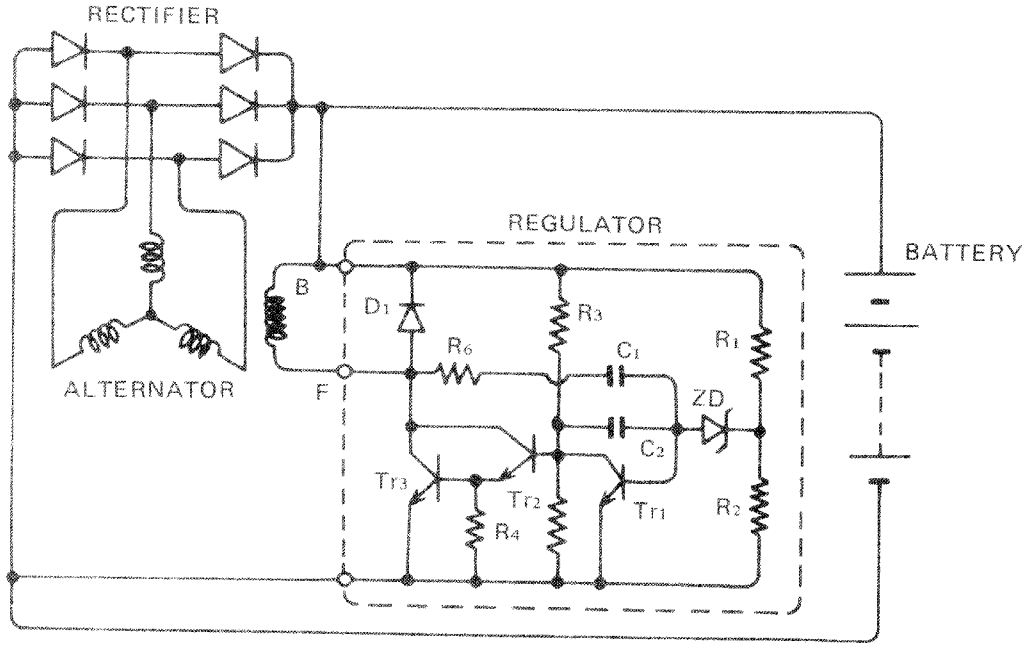
Install the brake return spring as shown.



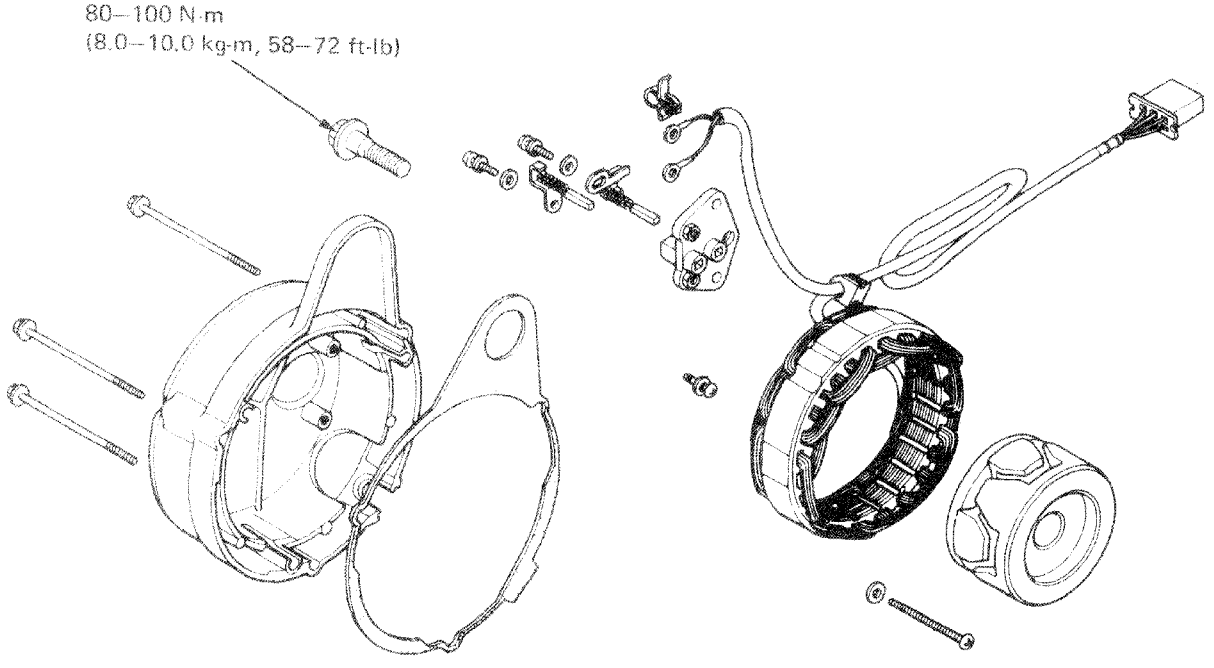
Align the punch marks and install the rear brake pedal.



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BATTERY/CHARGING SYSTEM



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18. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	18–1
TROUBLESHOOTING	18–2
BATTERY	18–3
CHARGING SYSTEM	18–4
ALTERNATOR REMOVAL/INSTALLATION	18–5
STATOR/ROTOR	18–7
VOLTAGE REGULATOR/RECTIFIER	18–8

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 a flame or spark is brought near.

- All charging system components can be tested on the motorcycle.

SPECIFICATIONS

Battery	Capacity	12 V 14 AH	
	Specific gravity	1.280/20°C (68°F)	
	Charging rate	1.4 amperes maximum	
Alternator Capacity		1,500 rpm	5,000 rpm
		6.5 A min	18 A min
Voltage regulator		Transistorized non-adjustable regulator	

TOOL

Common

Rotor puller	07733–002001

18

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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.

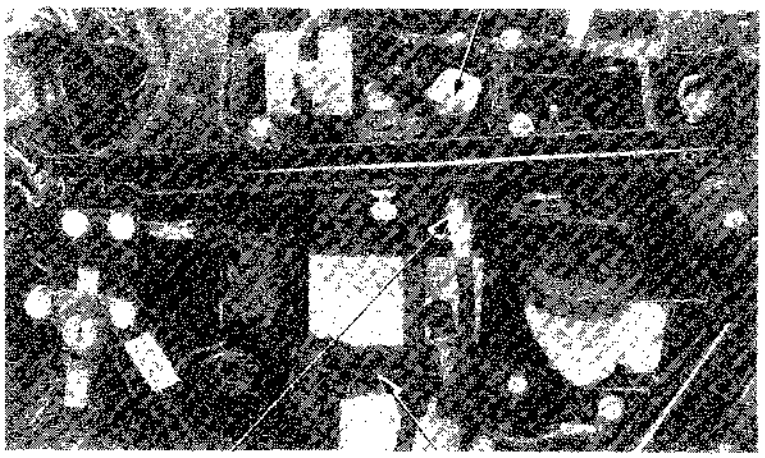
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BATTERY

REMOVAL

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

Disconnect the ground cable at the battery terminal.
Disconnect the positive cable at the battery terminal.
Remove the ground cable and the crankcase breather tube from the clamp.
Open the battery holder and remove the battery.



TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY: 1.270–1.290
(20°C, 68°F)

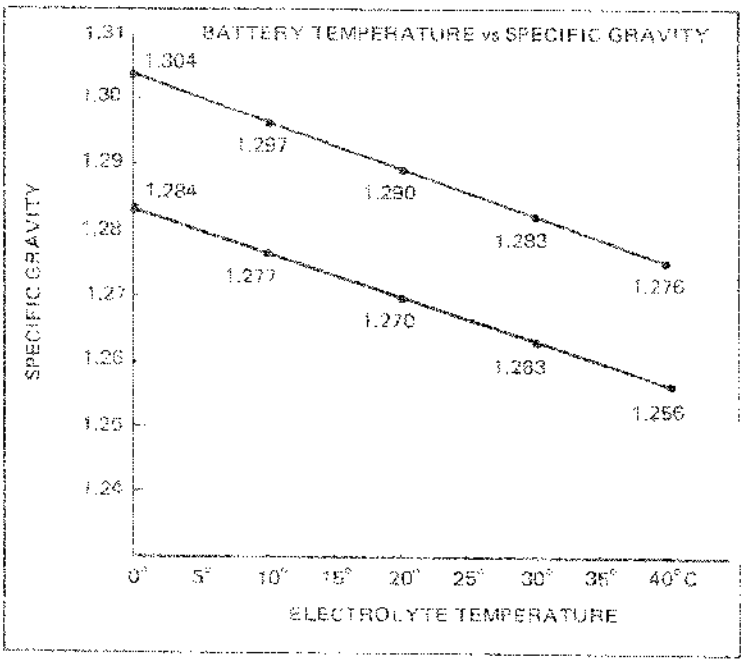
1.270 – 1.290	Fully charged
Below 1.260	Undercharged

NOTE

- The battery must be recharged if the specific gravity is below 1.230.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.

⚠ WARNING

The battery contains sulfuric acid. Avoid contact with skin, eyes, or clothing.
Antidote: Flush with water and get prompt medical attention.



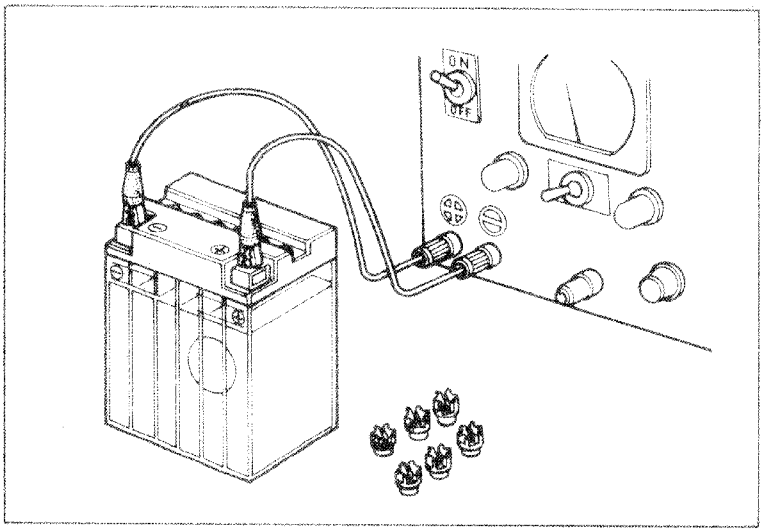
Specific gravity changes by 0.007 for every 10°C.

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CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.

Charging current:
1.4 amperes max.
Charging:
Charge the battery until specific gravity is 1.270–1.290 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.*
- *Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).*

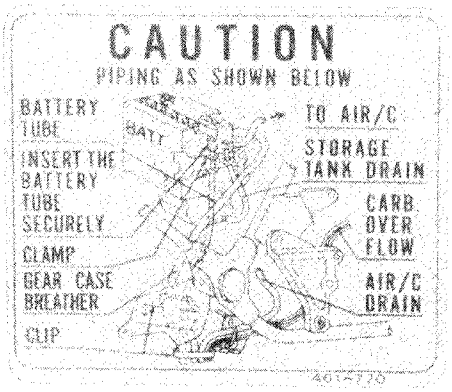
CAUTION

Quick-charging should only be done in an emergency; slow-charging is preferred.

After installing the battery, coat the terminals with clean grease.

CAUTION

Route the breather tube as shown on the battery caution label.



CHARGING SYSTEM

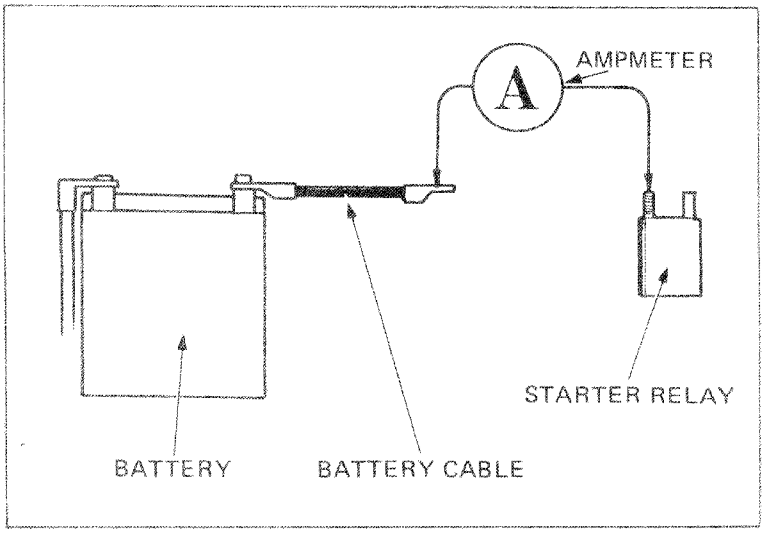
Current Test

NOTE

Be sure the battery is in good condition before performing this test.

Warm up the engine and remove the frame left side cover.
Turn headlight high beam on and run engine above 2,000 rpm.
Disconnect the battery positive cable at the starter relay and connect an ammeter between the battery cable and terminal.
Allow engine to idle.

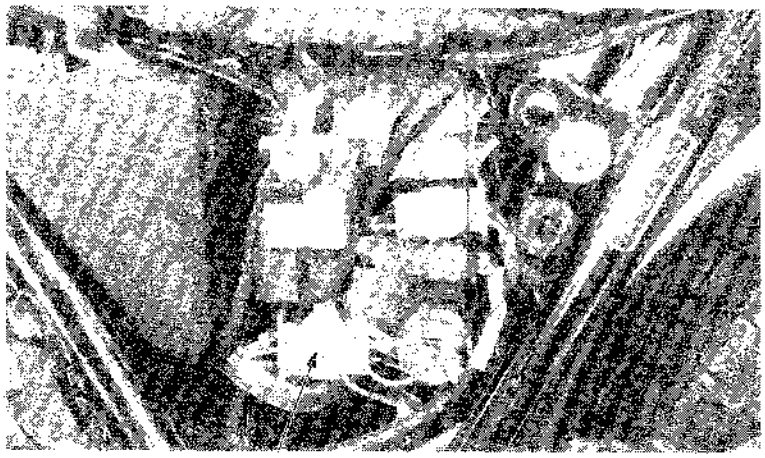
Increase engine speed slowly.
Charging amperage should begin by 1,700 rpm and should be a minimum of 8 amperes at 5,000 rpm.
Check the stator (Page 18-7) and then the regulator/rectifier (Page 18-8), if the charging specifications are not met.



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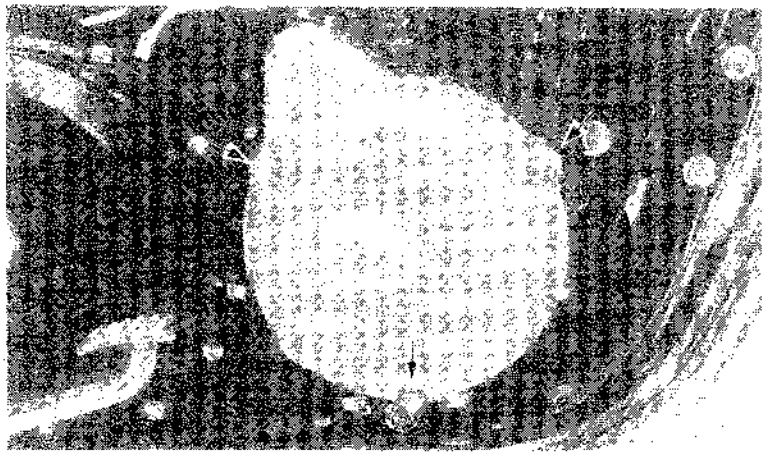
ALTERNATOR REMOVAL/INSTALLATION

Remove the right side cover and disconnect the alternator coupler.



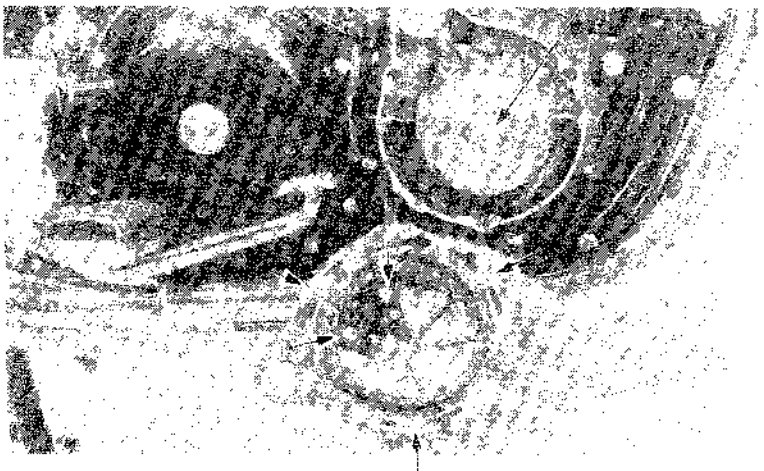
ALTERNATOR COUPLER

Remove the alternator cover by loosening three bolts.

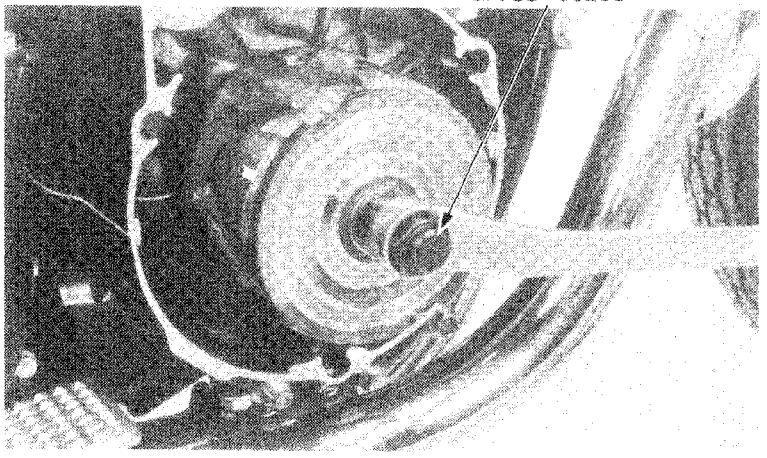


ALTERNATOR ROTOR BOLT

Remove the alternator stator with the brush holder by loosening five screws.
Shift the transmission into gear and apply the rear brake.
Remove the alternator rotor bolt.



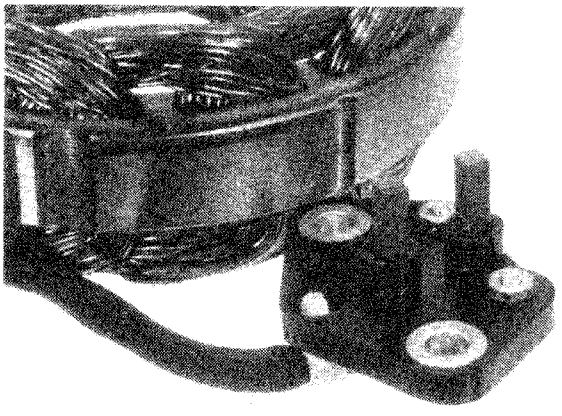
Remove the rotor with the rotor puller while applying the rear brake.



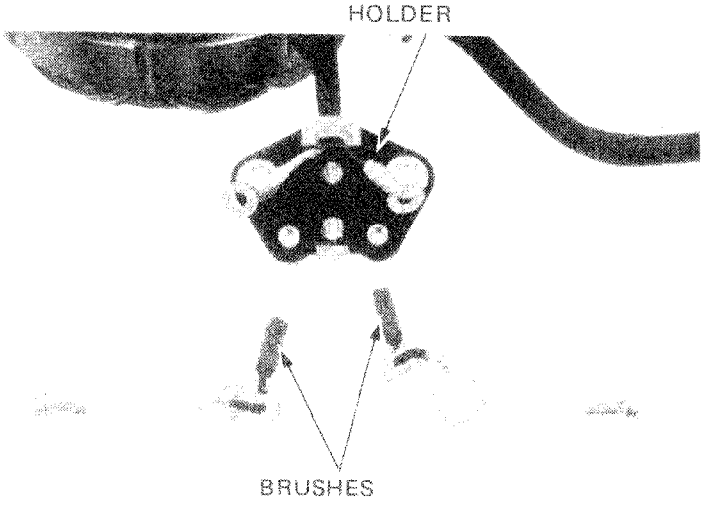
INSPECTION

Inspect the length of each brush as shown.
If they show wear to the scribed service limit line, replace the brushes.

SERVICE LIMIT: Scribed line



Remove and replace the brushes by removing the mounting screws.



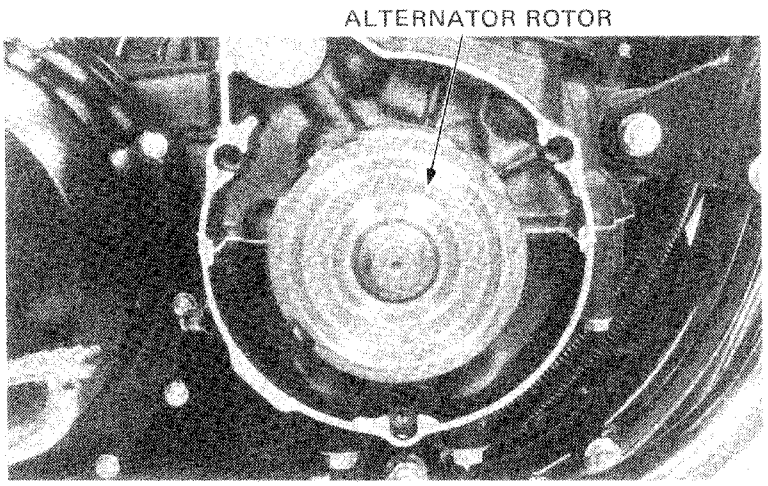
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INSTALLATION

Install the alternator rotor.

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

Route the alternator leads properly.



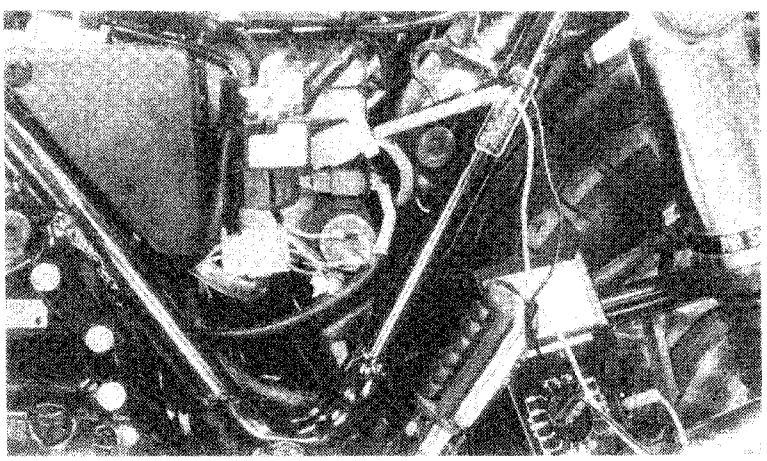
STATOR/ROTOR

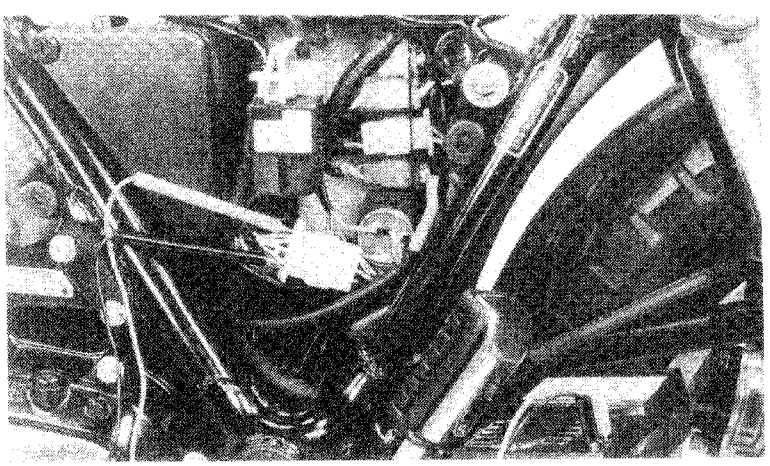
INSPECTION

Remove the frame right and left side covers.
Turn the ignition switch on and measure battery voltage.

Connect a DC voltmeter to regulator R/W wire and ground. Read the voltage, it should be equal to the battery voltage. Check wire and battery cable connections, if not.

Connect a DC voltmeter to the stator six pole connector B and W wires, without disconnecting them. Read the voltage, it should be equal to the battery voltage. Check the wire and battery cable connections if battery voltage is not equal.





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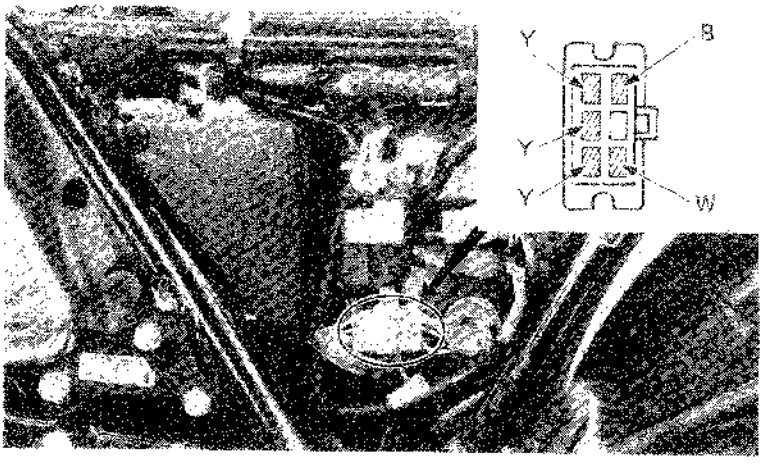
STATOR CONTINUITY TEST

Warm up the engine.
Stop the engine and remove the frame right side cover.
Check the resistance of the stator six pole connector wires.

Use the R x 1 ohmmeter scale.

B – W: 10 – 12 Ω
Y – Y: 0.4 – 0.5 Ω
Y – ground: ∞

Replace the stator if not within specifications.



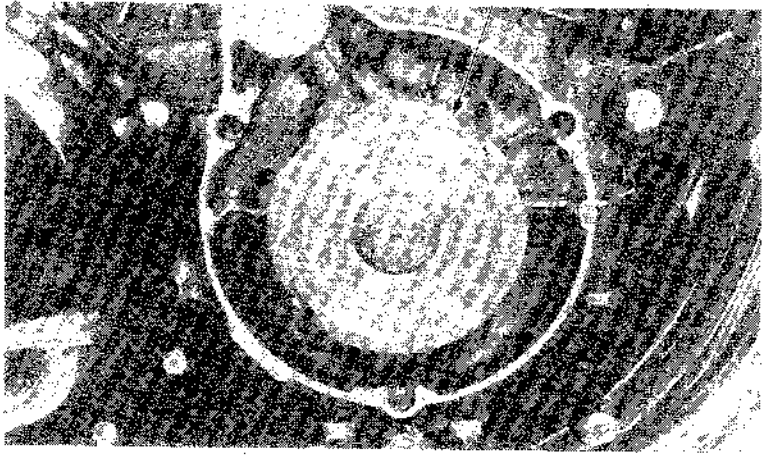
ROTOR CONTINUITY TEST

Remove the alternator cover.
Remove the brush assembly.
Check the resistance between the two rotor slip rings.

SLIP RING - TO - SLIP RING: 3.6 – 4.4 Ω

Replace the rotor, if not within specifications.

ALTERNATOR ROTOR



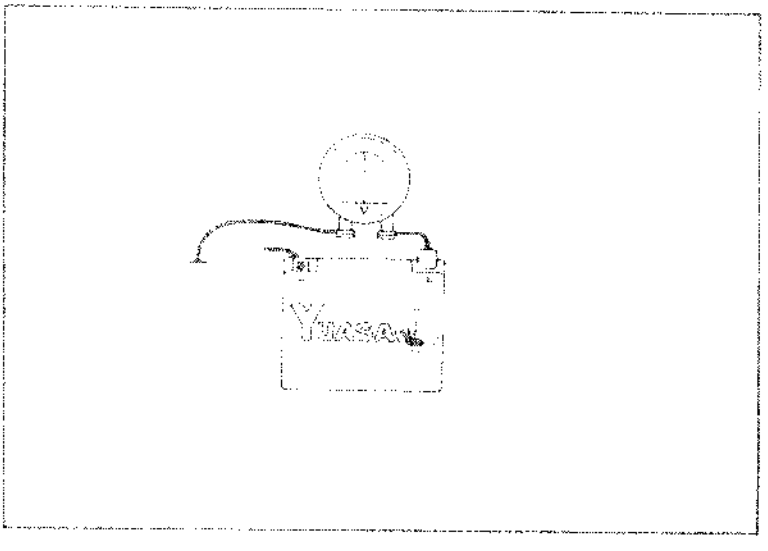
VOLTAGE REGULATOR/RECTIFIER

VOLTAGE REGULATOR TEST

Remove the frame left side cover.
Start the engine and connect a DC voltmeter; positive lead to battery positive and negative lead to a frame ground.
Increase engine speed to 3,000 rpm and read the voltmeter.

MAXIMUM VOLTAGE: 14 – 15 V

Replace the voltage regulator, if not within specifications.



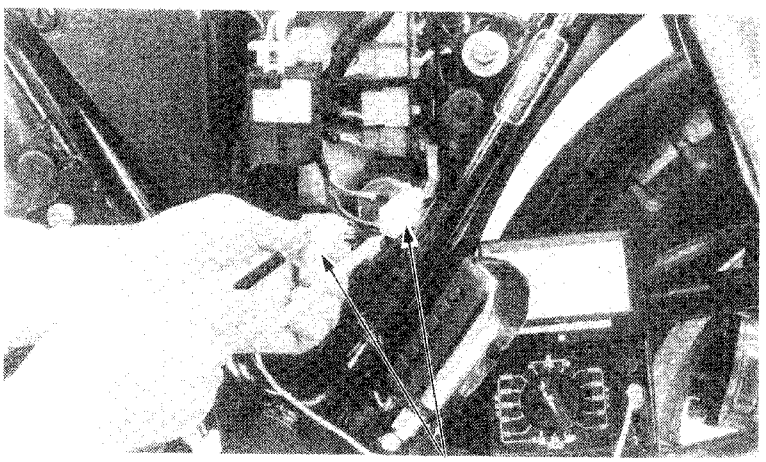
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RECTIFIER TEST

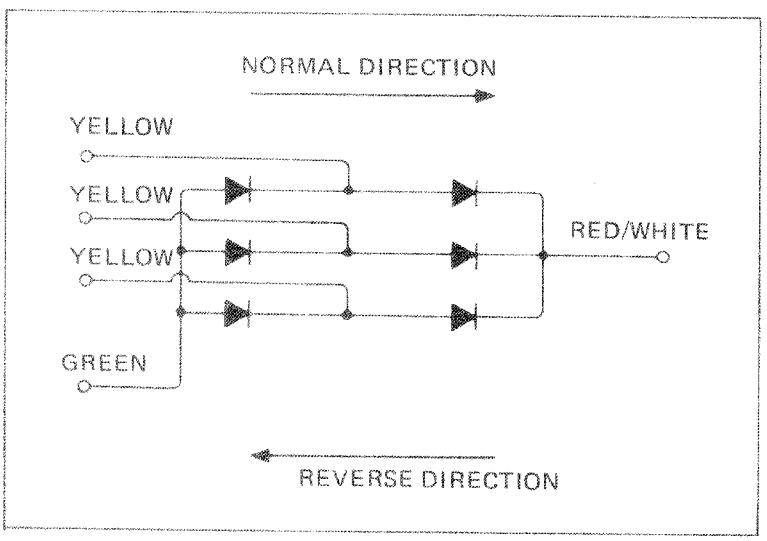
Check the resistance between the leads with an ohmmeter.

RESISTANCE IN ONE DIRECTION:
Green and any yellow: 5–40 Ω
Red/white and any yellow: 5–40 Ω

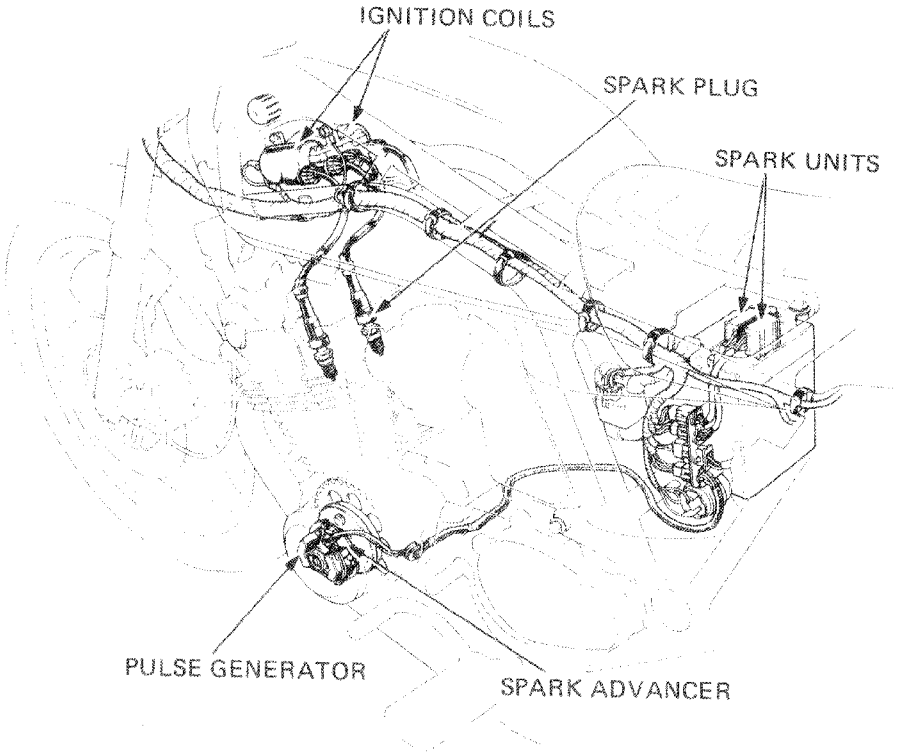
RESISTANCE IN OTHER DIRECTION:
Red/white and any yellow: 2000 Ω min.
Green and any yellow: 2000 Ω min.

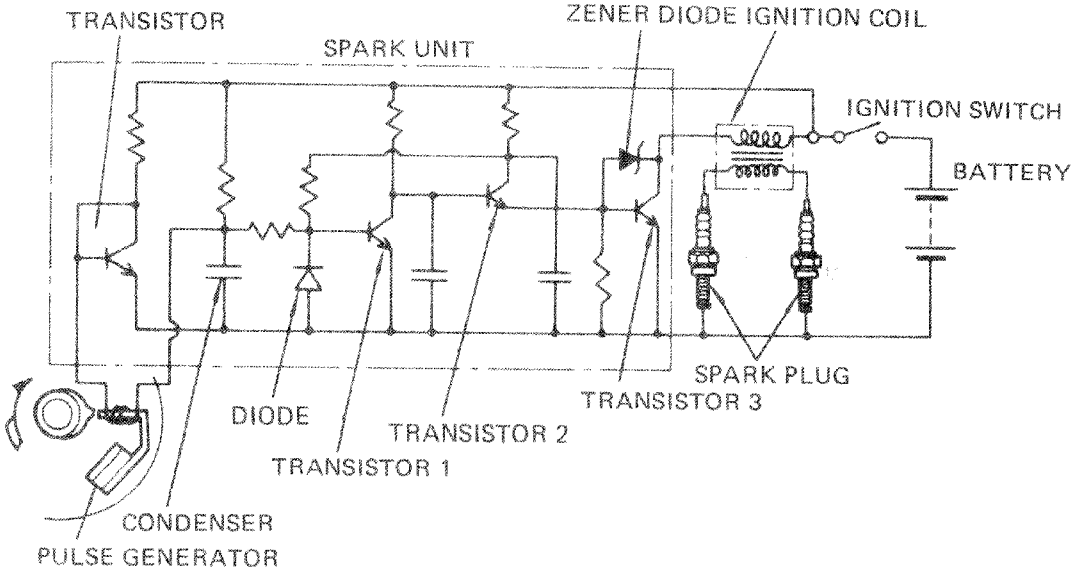


REGULATOR/
RECTIFIER
COUPLER



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19. IGNITION SYSTEM

SERVICE INFORMATION	19–1
TROUBLESHOOTING	19–2
IGNITION COIL	19–3
TRANSISTORIZED IGNITION SYSTEM (Pulse Generator, Spark Unit)	19–3
SPARK ADVANCER	19–5

SERVICE INFORMATION

GENERAL

- A transistorized ignition system is used and no adjustments are to be made unless the pulse generator screws are loosened. If these screws are loosened, ignition timing for either the No. 1 or No. 4 cylinder must be adjusted.

SPECIFICATIONS

Spark plug	ND	Standard	X27ESR-U	
		For cold climate Below 5°C (41°F)	X24ESR-U	
	NGK	Standard	DR8ES	
		For cold climate Below 5°C (41°F)	DR8ES-L	
Spark plug gap			0.6–0.7 mm (0.024–0.028 in)	
Ignition timing			At idle	10° (BTDC)
			Full advance	38.5° BTDC/3,200 rpm
Ignition coil			3-point spark test	6 mm (1/4 in) minimum

19

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TROUBLESHOOTING

The ignition system has two sub-systems; one for the No. 1 and No. 4 cylinders and one for No. 2 and No. 3 cylinders. Determine which sub-system is faulty, then proceed to the detailed tests below.

Engine cranks but will not start.
1. Engine stop switch OFF.
2. No spark at plugs.
3. Faulty transistorized spark unit.
4. Faulty pulser generator.

No spark at plug.
1. Engine stop switch 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 pulser generator.
3. Faulty ignition coil.
4. Faulty ignition switch.
5. Faulty spark unit.
6. Faulty pulser generator.

Engine starts but runs poorly.
1. Ignition primary circuit.
   - Faulty ignition coil.
   - Loose or bare wire.
   - Intermittent short circuit.
2. Secondary circuit.
   - Faulty spark plug.
   - Faulty spark plug wire.

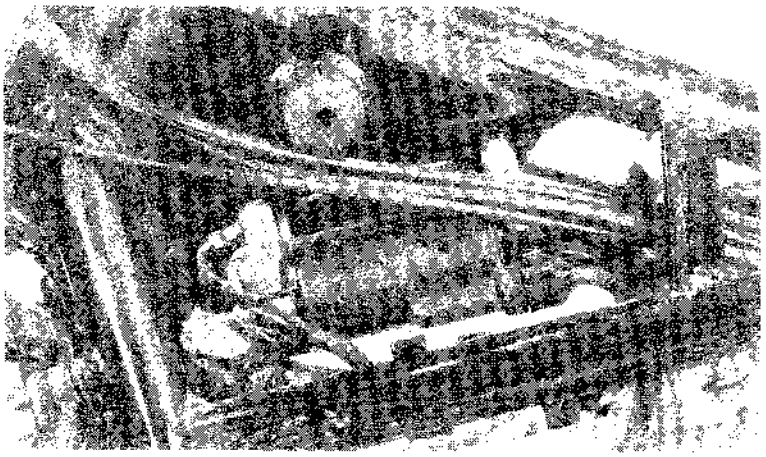
Timing advance incorrect.
- Centrifugal advancer faulty.

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IGNITION COIL

REMOVAL

Remove the fuel tank and disconnect the ignition coil wire leads.
Remove the coils by removing the attaching bolts.



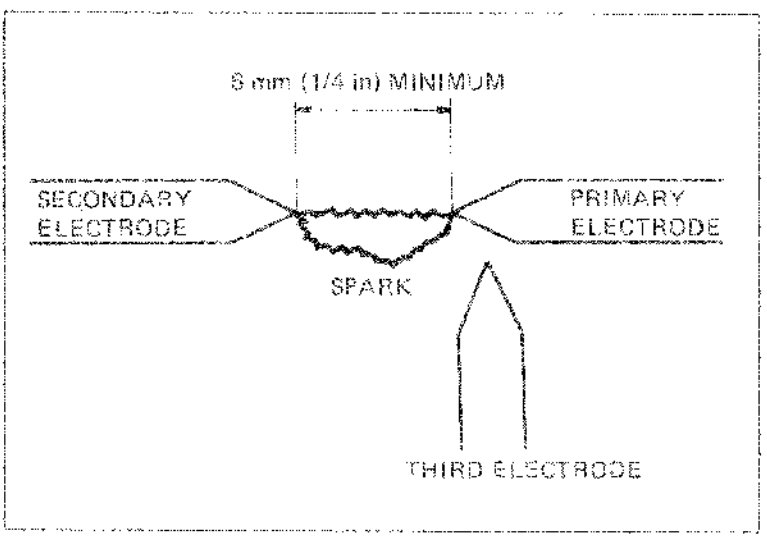
PERFORMANCE TEST

Perform the 3-point spark test with a coil tester.

SERVICE LIMIT: 6 mm (1/4 in) min.

NOTE

Follow the coil tester manufacturers instructions.

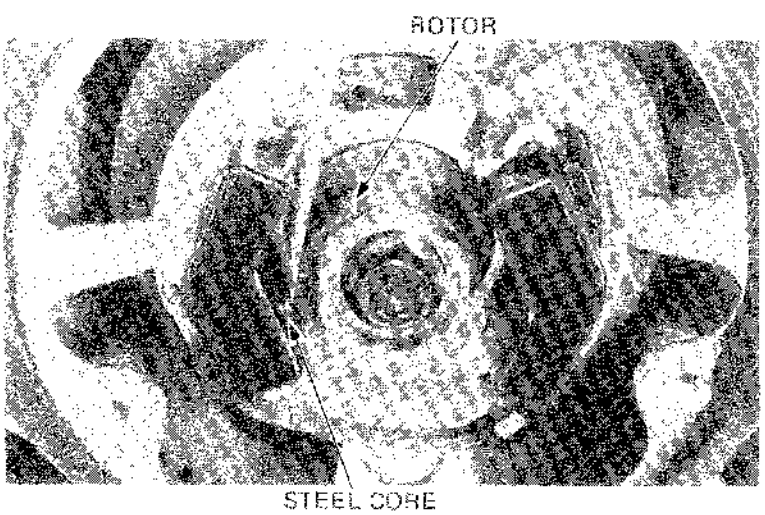


TRANSISTORIZED IGNITION SYSTEM

INSPECTION

System

Disconnect the No. 1 and 2 spark plug caps and remove the spark plugs.
Place each spark plug against any convenient engine ground.
Remove the pulse generator cover.
Turn the ignition switch on.
Touch the end of a screwdriver to the rotor and one pulse generator steel core. Repeat this operation several times.
One spark plug should spark.
A good spark to the plug means that the ignition system for that cylinder is in good shape.
Repeat the above for the other pulse coil.



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PULSER GENERATOR

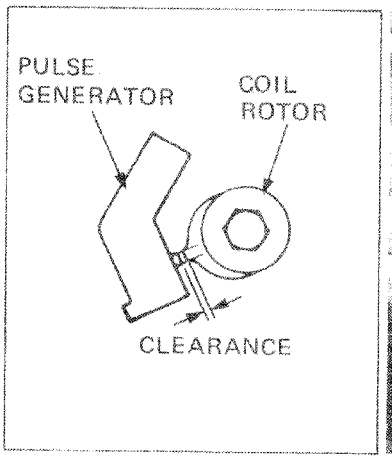
Measure the coil resistance.

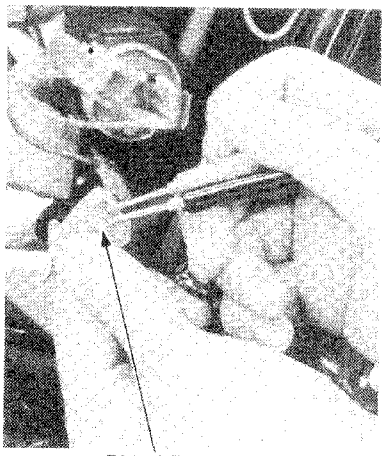
COIL RESISTANCE: 530 ± 50 Ω (20°C, 68°F)

Between yellow leads (2, 3 cylinders)
Between blue leads (1, 4 cylinders)

Measure the clearance between the pulser generator steel core and the rotor tooth.
Adjust the clearance by moving the pulser generator coil.
Replace the pulser generator assembly if necessary.

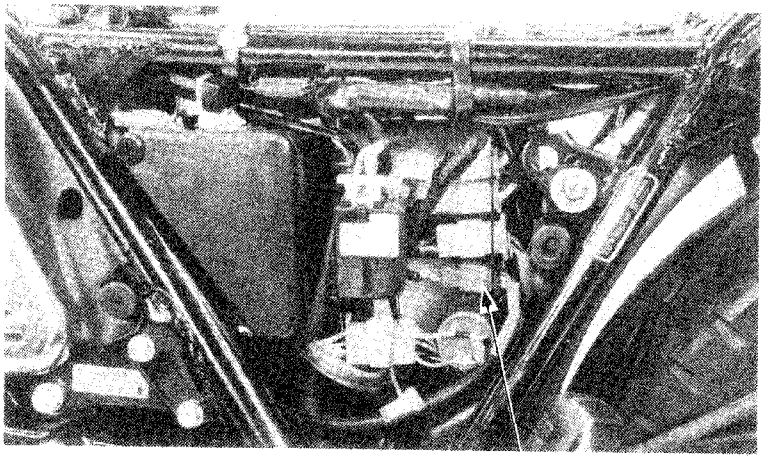
CLEARANCE: 0.4–0.7 mm (0.016–0.027 in)



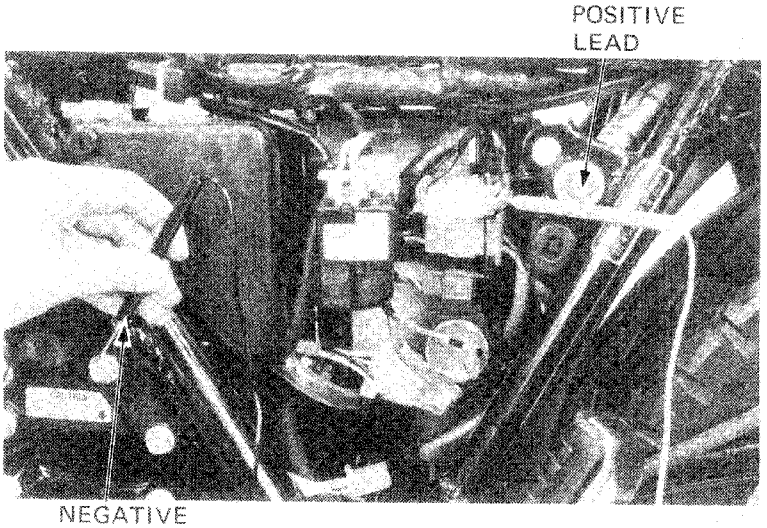


SPARK UNIT

Disconnect the red coupler. Turn the ignition switch on. Set the voltmeter to the 0–25 V DC scale.



Touch the positive meter lead to the blue wire (with yellow tube) of coupler A; ground the negative lead. The meter should read 12 V (battery voltage).



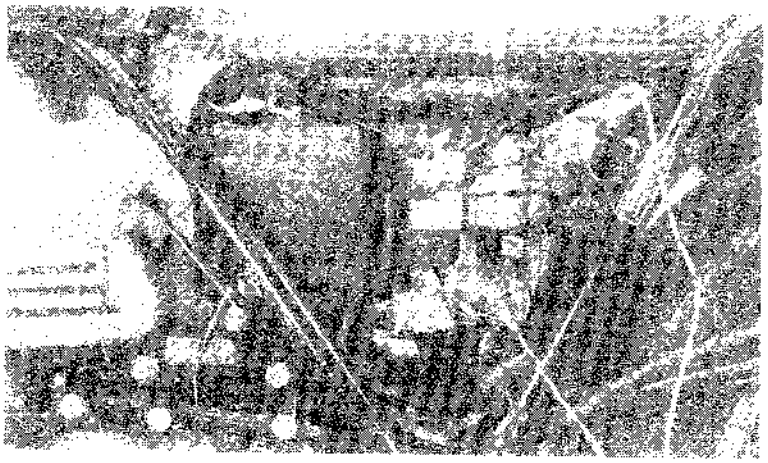
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With the voltmeter leads in place, use a jumper wire to ground the blue wire (with white tube) terminal on the male (spark unit) side of the red coupler. Voltage should drop to 0–2 V DC.

Move the positive voltmeter lead to the yellow wire of coupler B. Voltage should be 12 V DC.

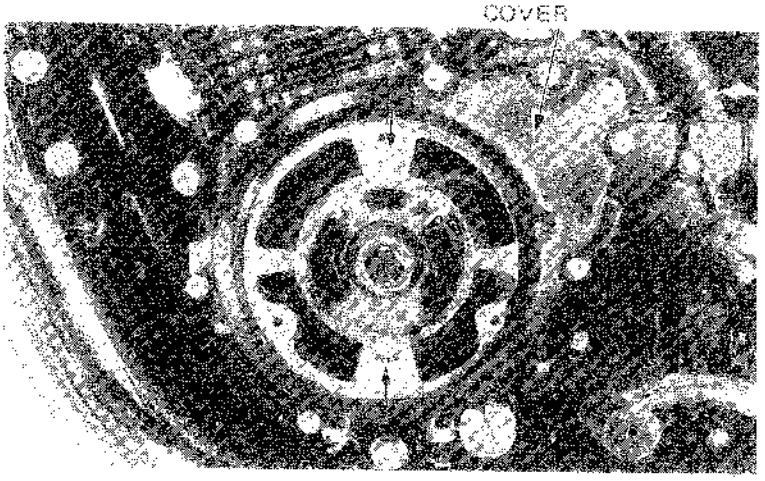
Move the jumper lead from the blue wire (with white tube) to the yellow wire (with white tube) terminal of the red coupler. Voltage should drop to 0–2 V DC.

Replace the spark units if they are faulty.



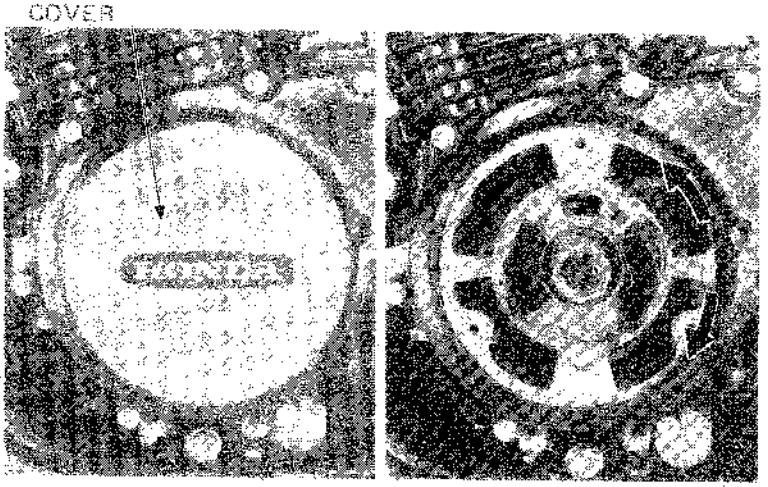
PULSER REPLACEMENT

If pulser replacement is necessary, loosen the two pulser base plate screws.
Remove the left crankcase cover.
Remove the left rear crankcase cover.
Replace the pulse generator assembly.
Adjust the ignition timing (Page 3-13).



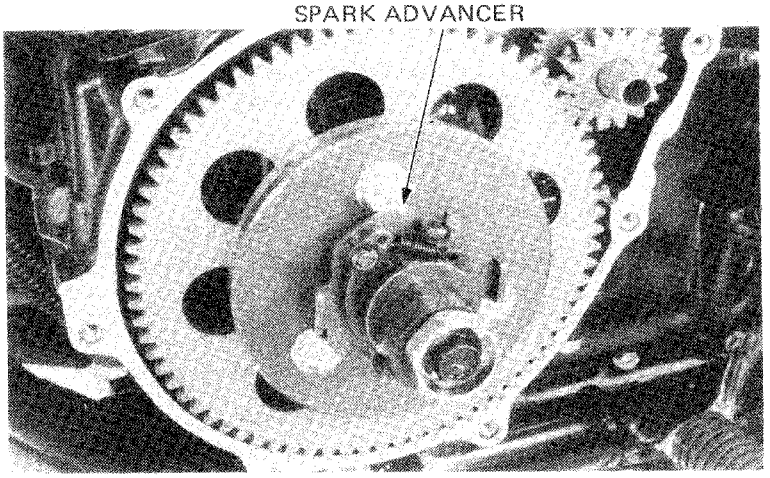
SPARK ADVANCER

For the centrifugal advancer test, see page 3-13.
Remove the pulse generator cover screws and cover.
Remove the left crankcase cover screws and cover.



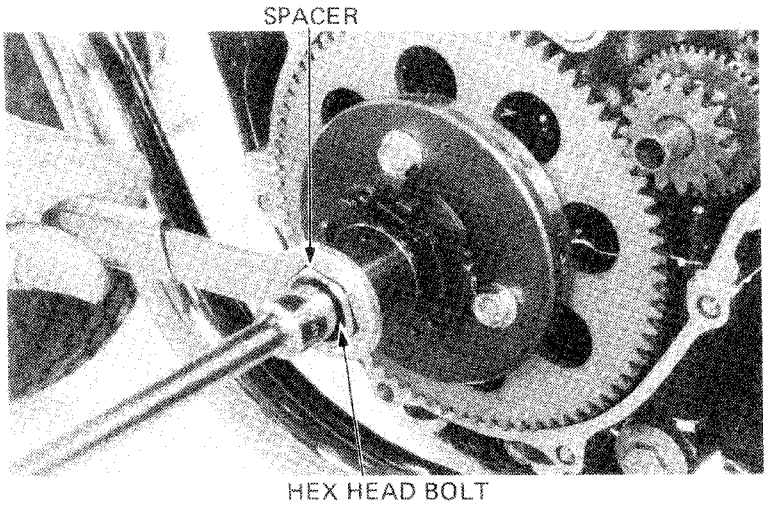
ADVANCER VISUAL INSPECTION

Check the centrifugal advancer cam for sticking. Lubricate the sliding surfaces, and check the spring for loss of tension and advancer pin for excessive wear if the advancer fails to return.



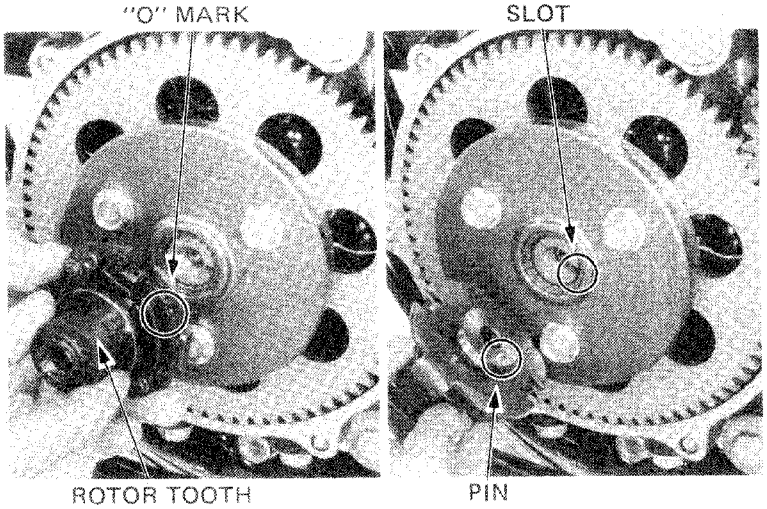
ADVANCER REPLACEMENT

Remove the bolt by holding the spacer.
Remove the advancer.



Align the rotor tooth with the "O" mark on the advancer.
Align the pin on the advancer with the slot in the crankshaft.
Tighten the hex head bolt.

TORQUE: 33–37 N·m (3.3–3.7 kg-m, 24–27 ft-lb)



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20. ELECTRIC STARTER

SERVICE INFORMATION	20–1
TROUBLESHOOTING	20–1
STARTER MOTOR	20–2
STARTER RELAY SWITCH	20–5

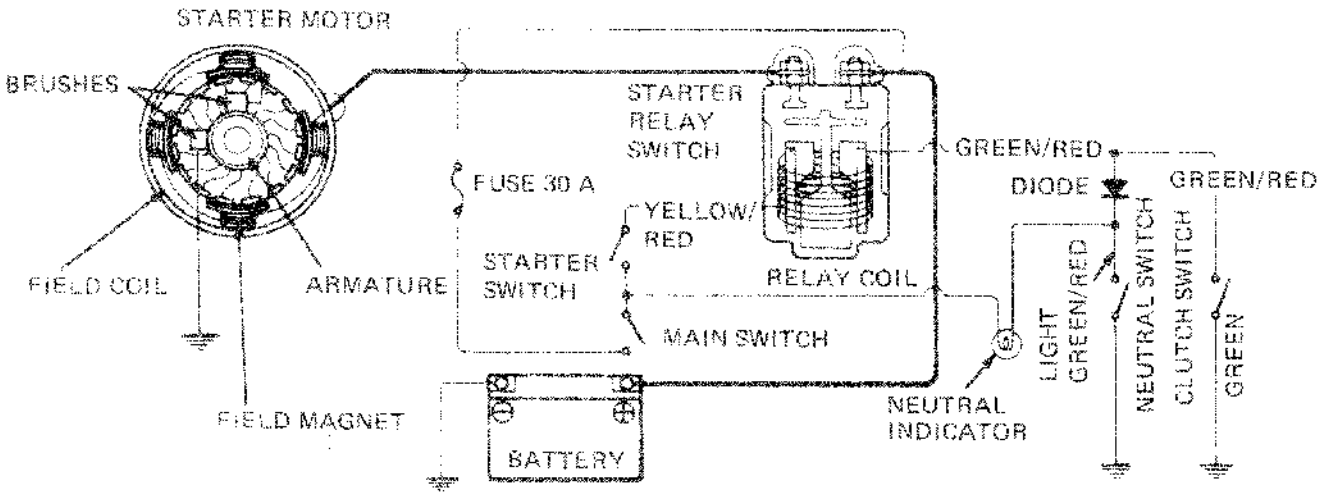
SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	560 g – 680 g (19.75 – 23.99 oz)	560 g (19.75 oz)
		12.0 – 13.0 mm (0.47 – 0.51 in)	7.5 mm (0.30 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. Neutral 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.

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STARTER MOTOR

REMOVAL

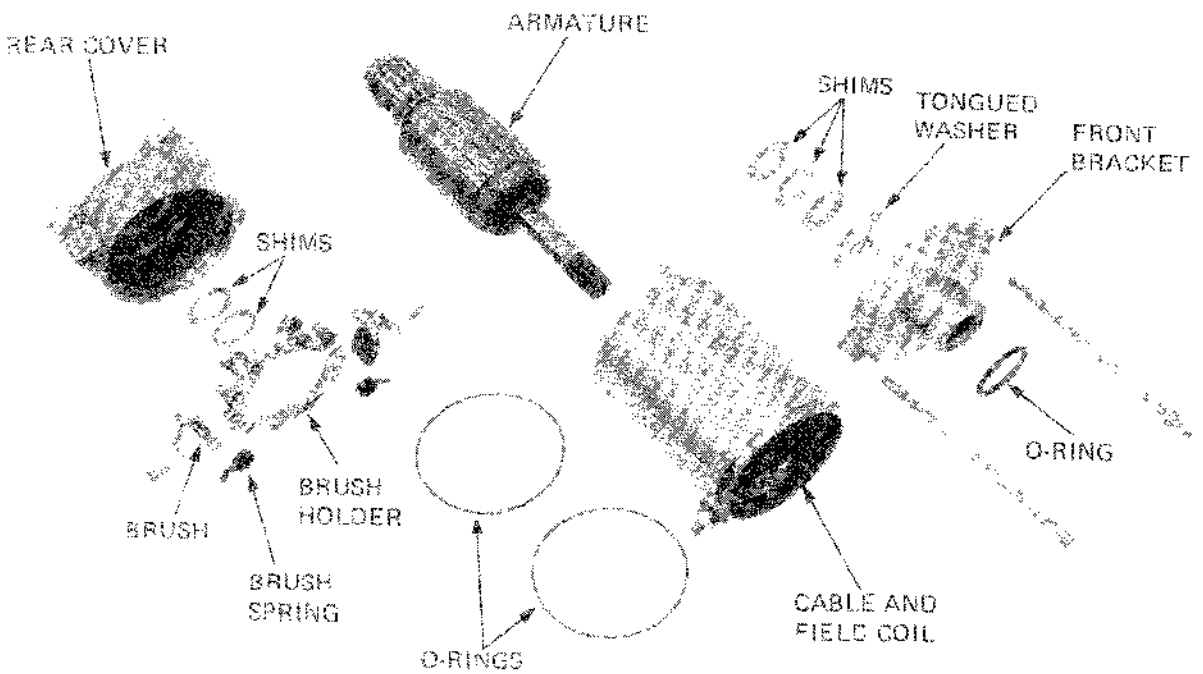
⚠ WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the right frame side cover and disconnect the starter cable at the starter relay switch.

Remove the starter motor cover and starter motor.





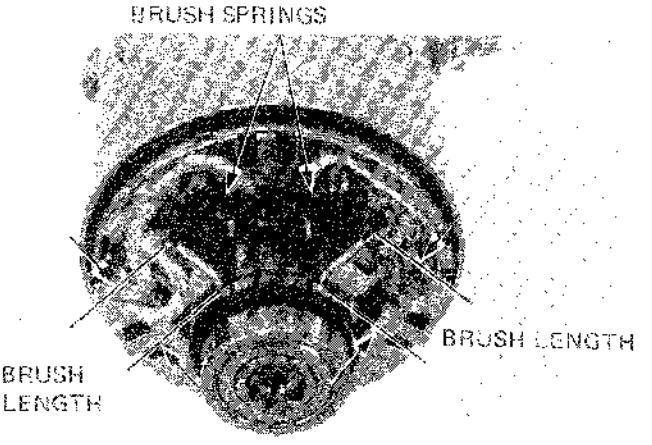
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BRUSH INSPECTION

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length:	7.5 mm (0.30 in)
Brush spring tension:	560 g (19.75 oz)



COMMUTATOR INSPECTION

Remove the starter motor case.

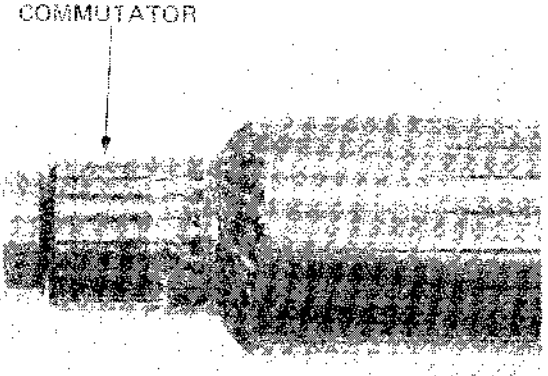
NOTE

Record the location and number of thrust washers.

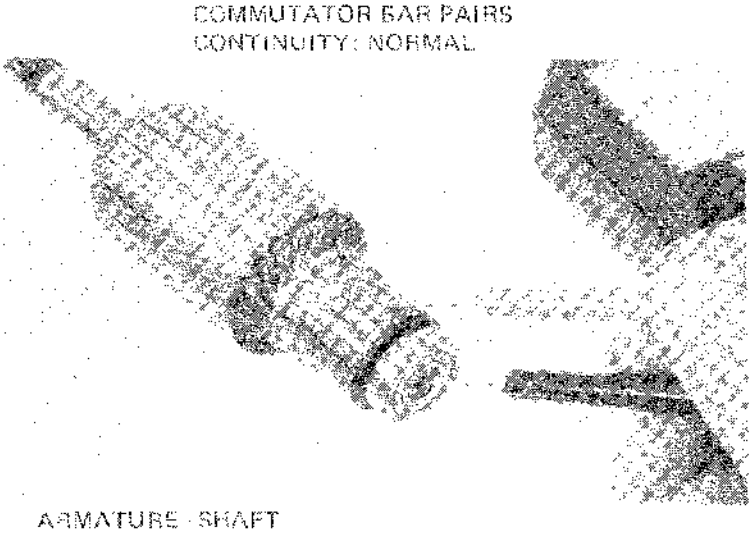
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.

NOTE

Do not use emery or sand paper on the commutator.



Check for continuity between pairs of commutator bars, and also between commutator bars and armature shaft.

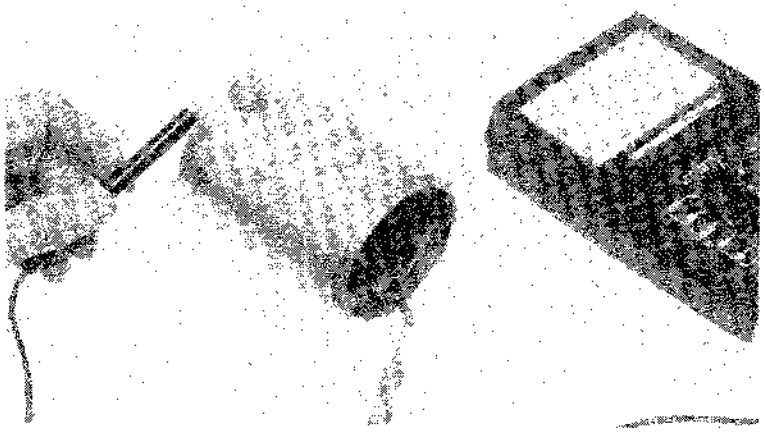


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FIELD COIL INSPECTION

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire.
Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.

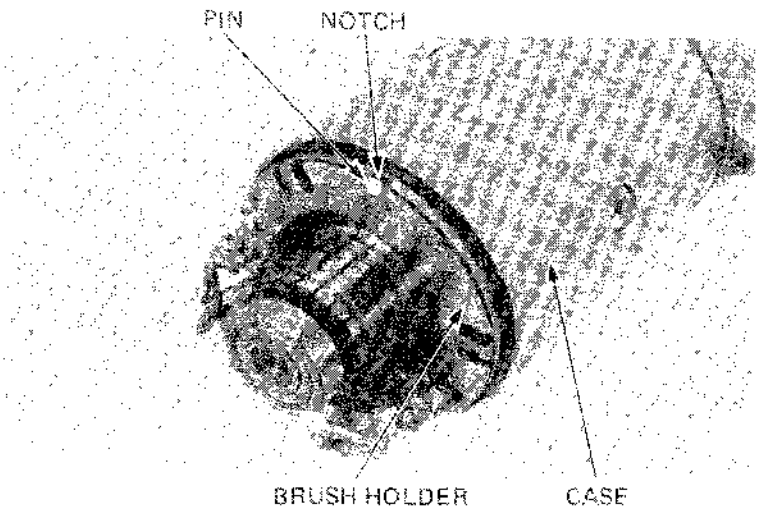
CABLE TERMINAL–MOTOR CASE
NO CONTINUITY: NORMAL



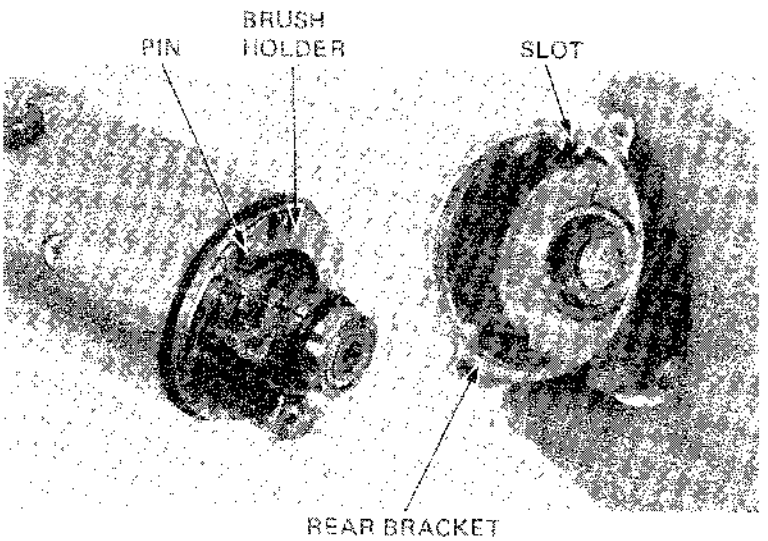
CABLE TERMINAL–BRUSH WIRE
CONTINUITY:NORMAL

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.



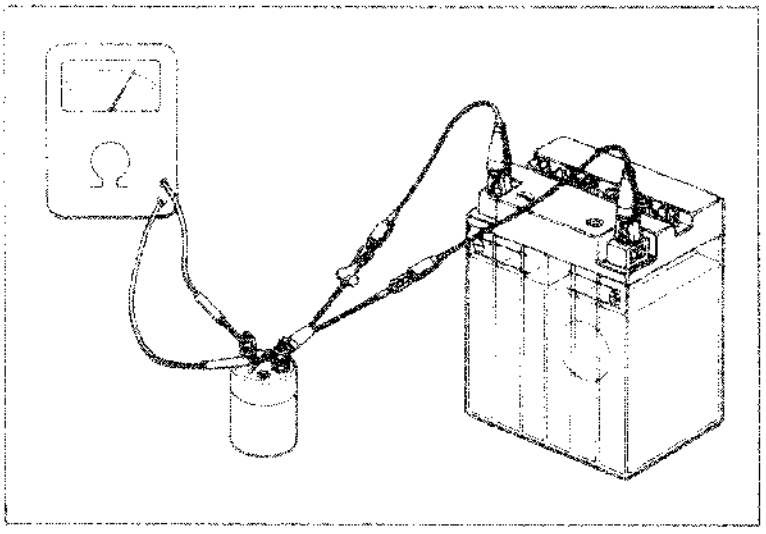
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STARTER RELAY SWITCH

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.



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21. SWITCHES

SERVICE INFORMATION	21-1	HANDLEBAR SWITCHES	21-3
OIL PRESSURE WARNING SWITCH	21-2	IGNITION SWITCH	21-5
BRAKE SWITCHES	21-2	CLUTCH SWITCH	21-5
NEUTRAL SWITCH	21-2	BRAKE AND TAILLIGHT SENSOR	21-5

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.

L = Blue	G = Green	Lg = Light Green	R = Red
B = Black	Gr = Grey	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

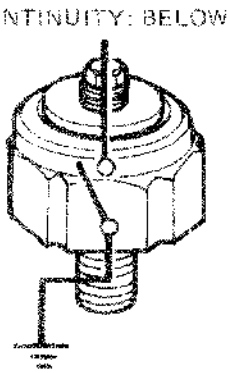
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity 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, as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

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OIL PRESSURE WARNING SWITCH

Check for continuity while applying pressure to the switch. Replace the switch if necessary.
Apply a liquid sealant to the switch threads before reinstalling.

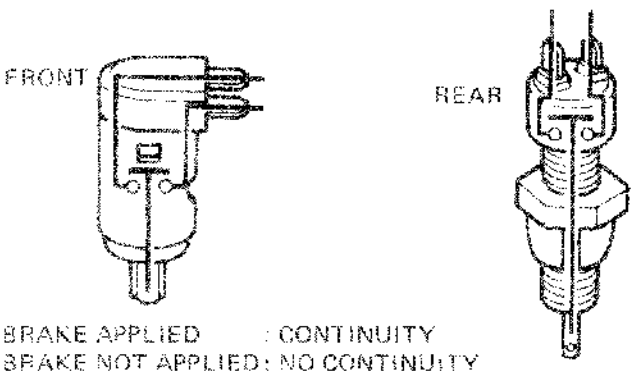


BRAKE SWITCHES

Check the rear brakelight switch for continuity with the rear brake applied.

Check the front brakelight switch for continuity with the front brake applied.

Replace the switches if necessary.



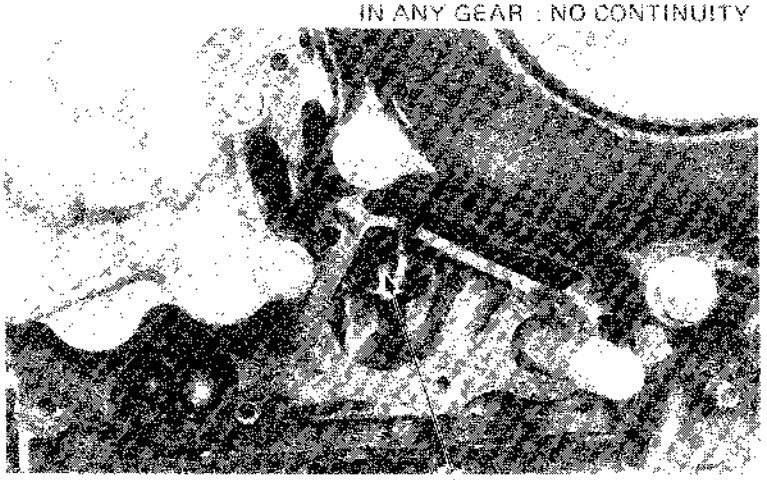
NEUTRAL SWITCH

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

Check the switch for continuity between the switch terminal (wire removed) and ground with the transmission in neutral and with the transmission in any gear.

Replace the neutral switch if necessary.

IN NEUTRAL : CONTINUITY
IN ANY GEAR : NO CONTINUITY

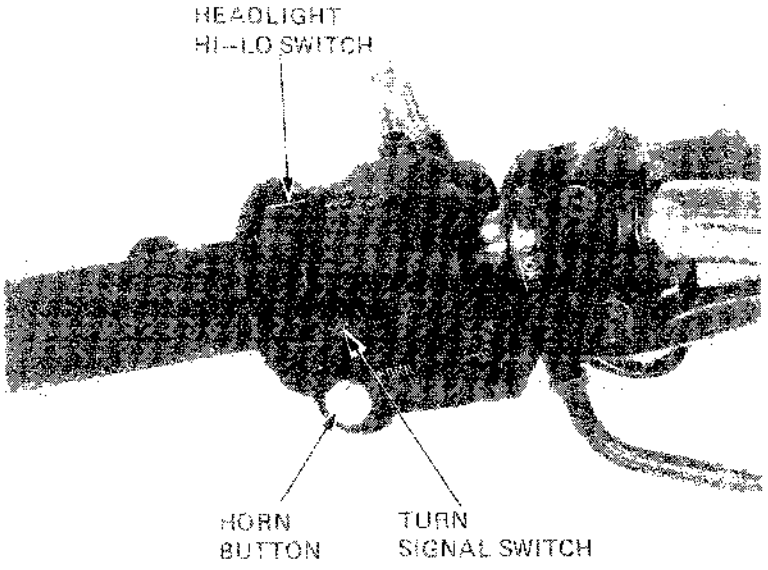


NEUTRAL SWITCH

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HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn) must be replaced as assemblies.
Continuity tests for the components of the handlebar cluster switches follow:
Continuity should exist between the color coded wires on each chart.



HEADLIGHT HI–LOW SWITCH

HI:	L/W to L
MIDDLE (N):	L/W to L to W
LO:	L/W to W

Headlight Hi–Low Switch

	HL	Hi	Lo
Hi	○	○	
(N)	○	○	○
Lo	○		○
Code color	L/W	L	W

TURN SIGNAL SWITCH

LEFT:	Gr to O, Br/W to Lb/W
OFF:	No continuity
RIGHT:	Gr to Lb, Br/W to O/W

Turn Signal Switch

	W	L	R
LEFT	○	○	
OFF			
RIGHT	○		○
Code color	Gr	O	Lb

HORN BUTTON

LG to G with button depressed
No continuity with button released

Horn Button

	Ho	E
	○	○
Code color	Lg	G

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STARTER BUTTON

B to Y/R with button depressed.

Starter Button

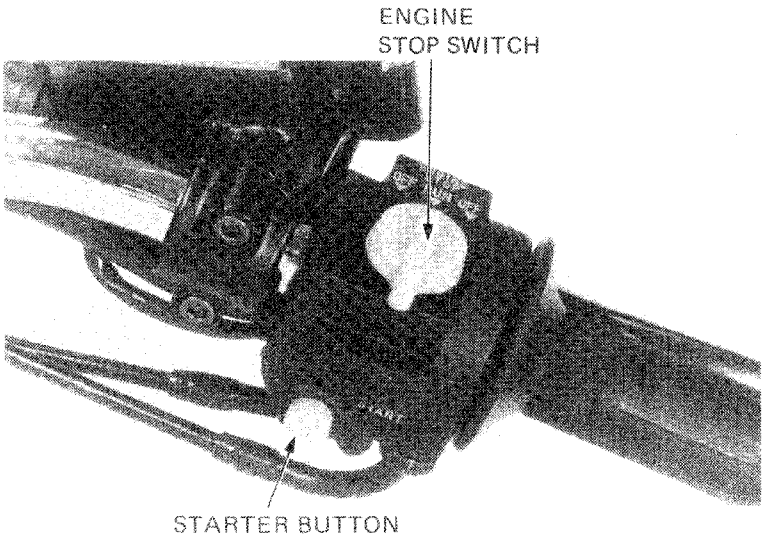
	BAT_2	ST
FREE		
START	○	○
Code color	B	Y/R

ENGINE STOP SWITCH

RUN: B to B/W
OFF: No continuity

Engine Stop Switch

	BAT_2	IG
OFF		
RUN	○	○
OFF		
Code color	B	B/W



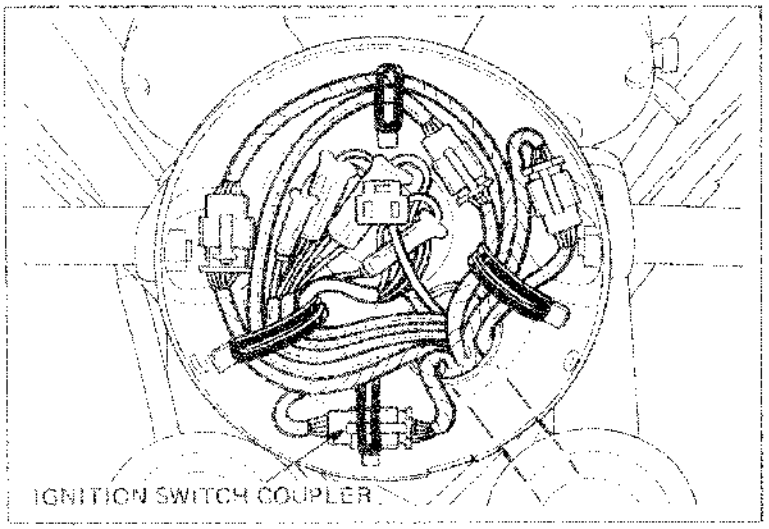
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IGNITION SWITCH

Remove the headlight and disconnect the coupler.

Check continuity of the terminals on the ignition switch in each switch position.

	BAT	IG	TL	TL	PA
OFF					
ON	○	○	○	○	
P	○				○
COLOR	R	B	Br/W	Br	Br


IGNITION SWITCH COUPLER

CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and applied.
Replace if necessary.

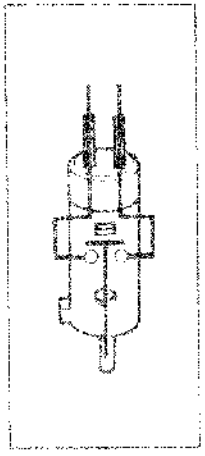
CLUTCH LEVER OUT: CONTINUITY
CLUTCH LEVER IN: NO CONTINUITY

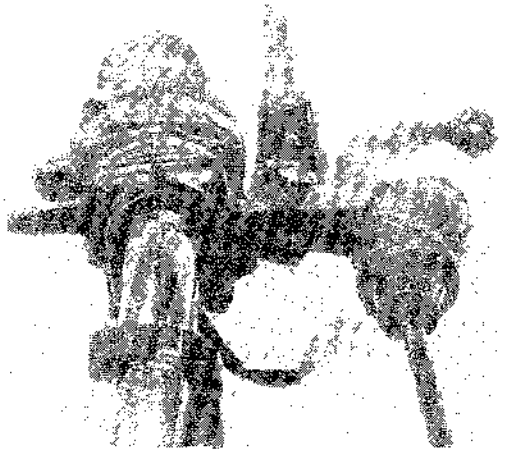
REMOVAL

Unplug the wires and remove the clutch lever and cable.
Remove the switch.

NOTE

The switch case has a small protrusion that must point toward the handlebar when installed.



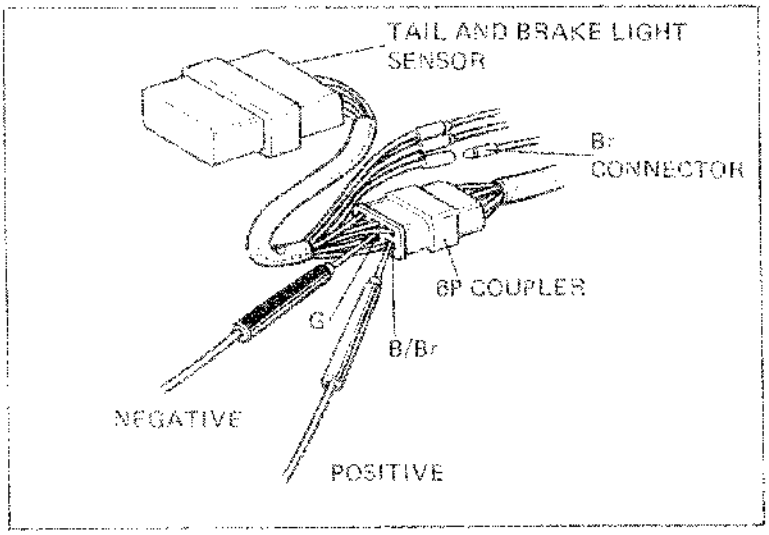


BRAKE AND TAILLIGHT SENSOR

TAILLIGHT CIRCUIT

Remove the seat.
Disconnect the Br connector of the brake and taillight sensor connectors.
Turn the ignition switch ON, check that the brake and taillight warning pilot lamp comes on.

If the warning light does not come on check voltage at the B/Br and G terminals of the brake and taillight sensor coupler (6P).
If there is no voltage, check and repair the circuit wiring and connections.

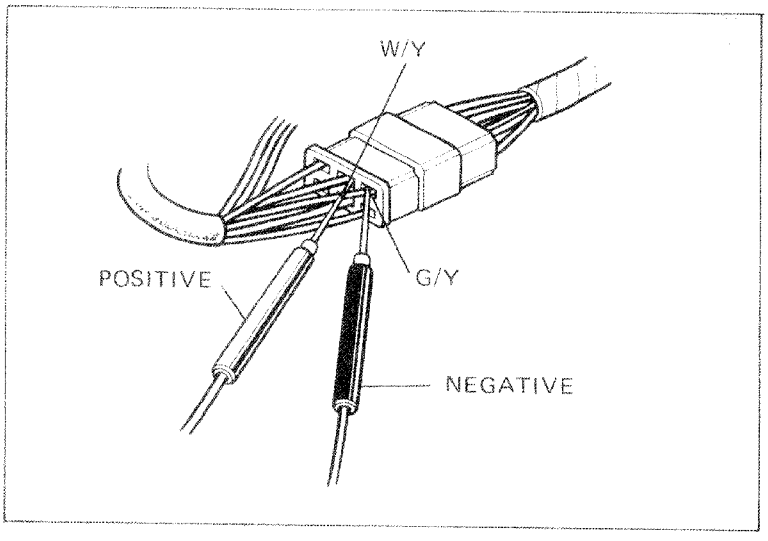


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If there is voltage, measure the voltage at the W/Y (positive) and G/Y (negative) terminals.

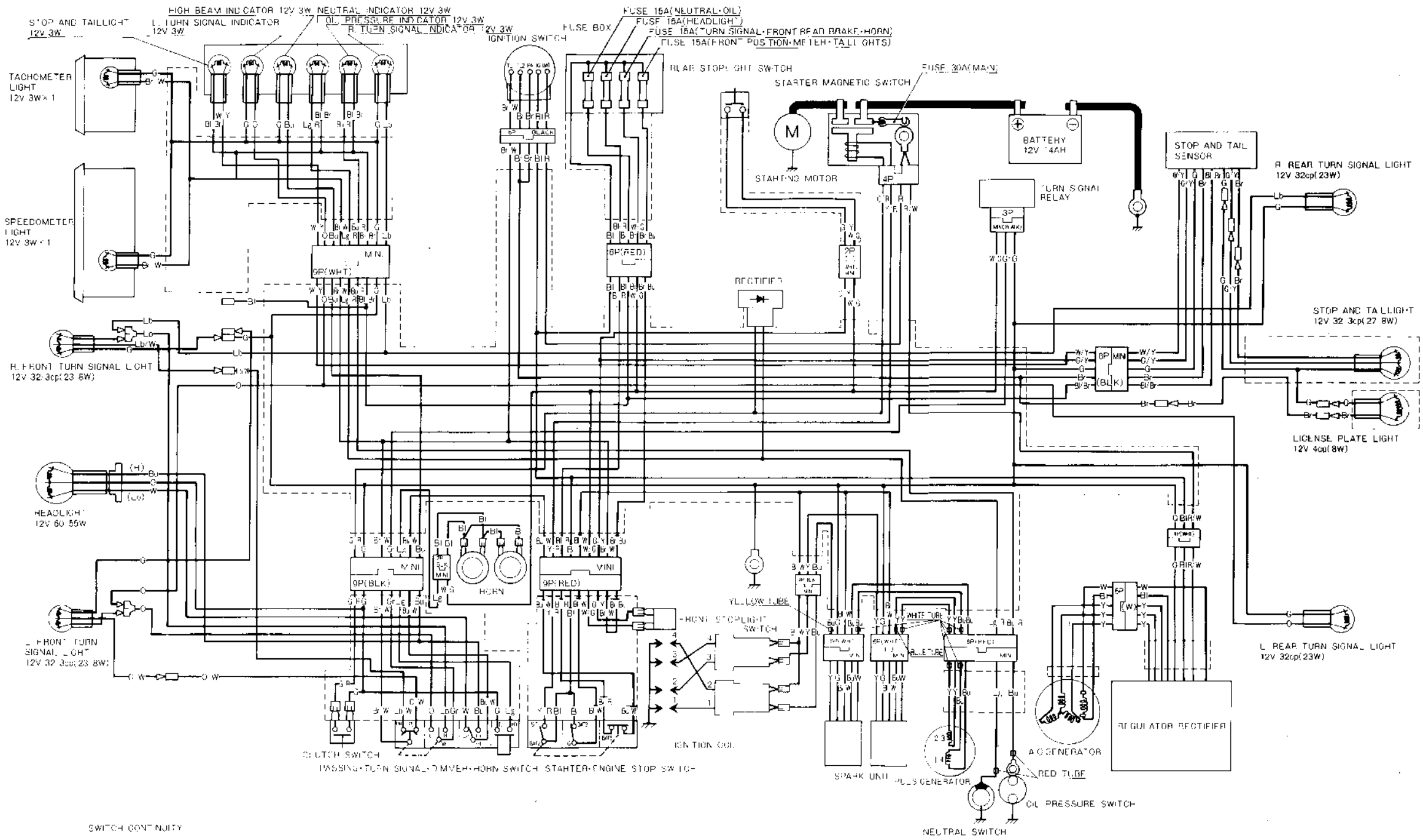
VOLTAGE: 5 V

If there is no voltage, replace the brake and tail light sensor.
Connect the Br connector and reinstall the removed parts.

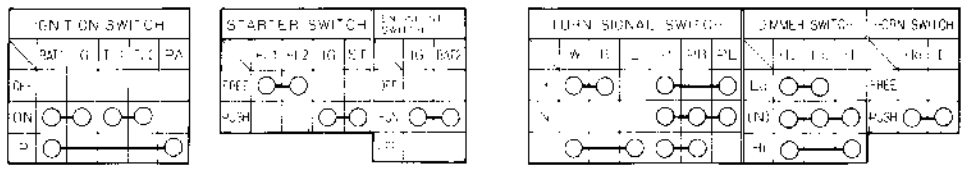


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22. WIRING DIAGRAM



SWITCH CONTINUITY



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Lb	BLUE	Dg	DARK GREEN
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

23. TECHNICAL FEATURES

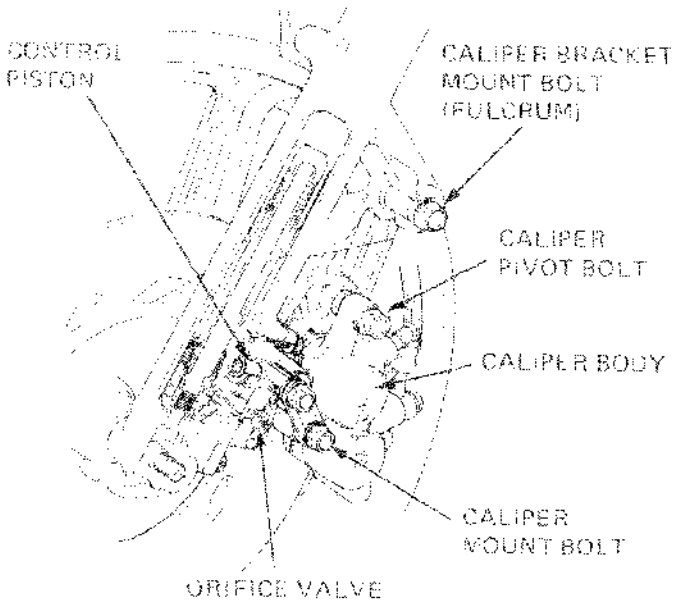
ANTI-DIVE FRONT SUSPENSION	23–2
OIL COOLER, OIL PUMP	23–3
DUAL RANGE SUBTRANSMISSION	23–4
SHAFT DRIVE	23–6

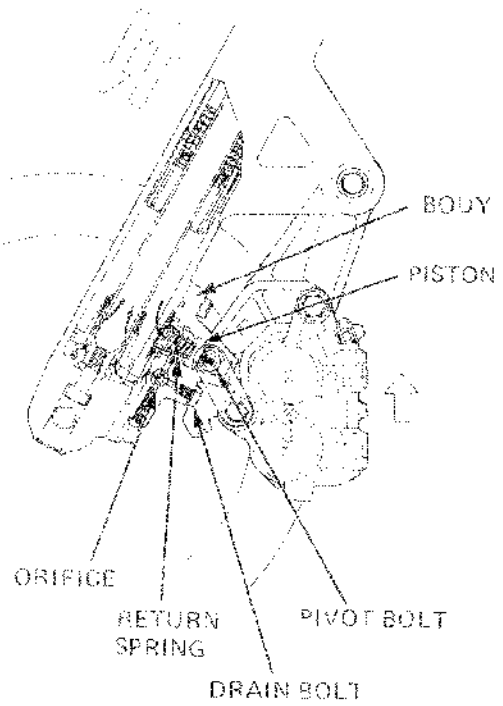
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ANTI-DIVE FRONT SUSPENSION

GENERAL

This motorcycle has an anti-dive front suspension system with four-way adjustability to provide the desired ride under various braking conditions. The system consists of a piston, return spring, oil control orifice and body.





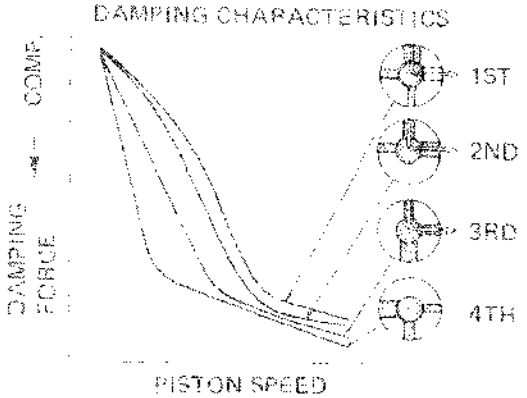
OPERATION

When the motorcycle is slowed or stopped, the brake disc is squeezed by the brake pads, causing the brake caliper to pivot on its bracket mounting bolt.

This movement causes the pivot bolt to push the piston in, uncovering the oil control orifice.

Since the orifice has four oil passages of different diameters, the desired damping can be selected by turning it. Always adjust the right and left to the same position.

DAMPING CHARACTERISTICS



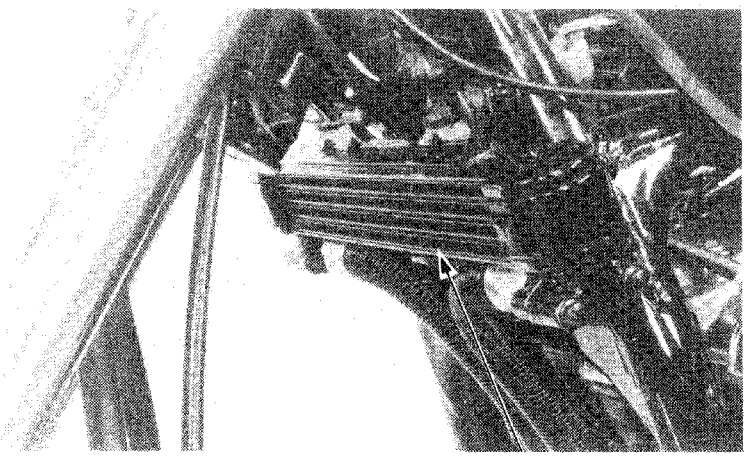
Front Suspension Adjustment Chart

POSITION	DAMPING EFFECT
1	SOFT
2	STANDARD
3	FIRM
4	EXTRA FIRM

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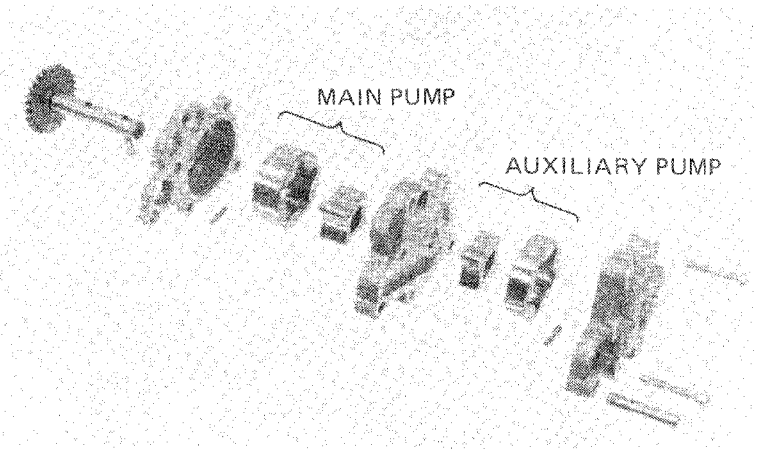
OIL COOLER, OIL PUMP

The engine uses a wet sump lubrication system in which the oil reservoir (sump) is the bottom of engine.

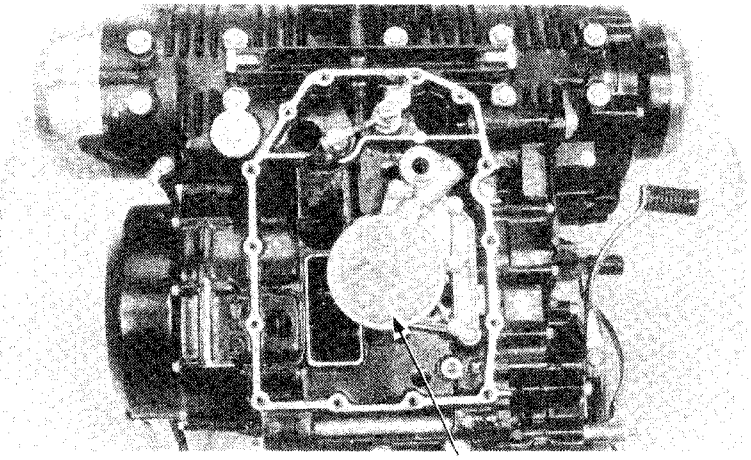


OIL COOLER

A tandem trochoid pump supplies oil to the bearings and other moving parts of the engine. Oil from the sump is forced by the main pump into the crankshaft and cylinder head. The auxiliary pump feeds oil to the primary shaft and transmission. The oil cooler is in the auxiliary pump circuit and cools the oil drawn from the sump by the auxiliary pump.
The oil damper in the primary chain receives oil from this pump circuit.



Oil from the sump must pass through a strainer before it enters the pumps.



OIL STRAINER

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DUAL RANGE SUBTRANSMISSION

Power from the main transmission countershaft is transmitted to the drive shaft as follows: Reduction drive gears (43T, 47T) — Reduction driven gears (31T, 30T) — Damper lifter — Final drive gear — Final driven gear — Drive shaft.

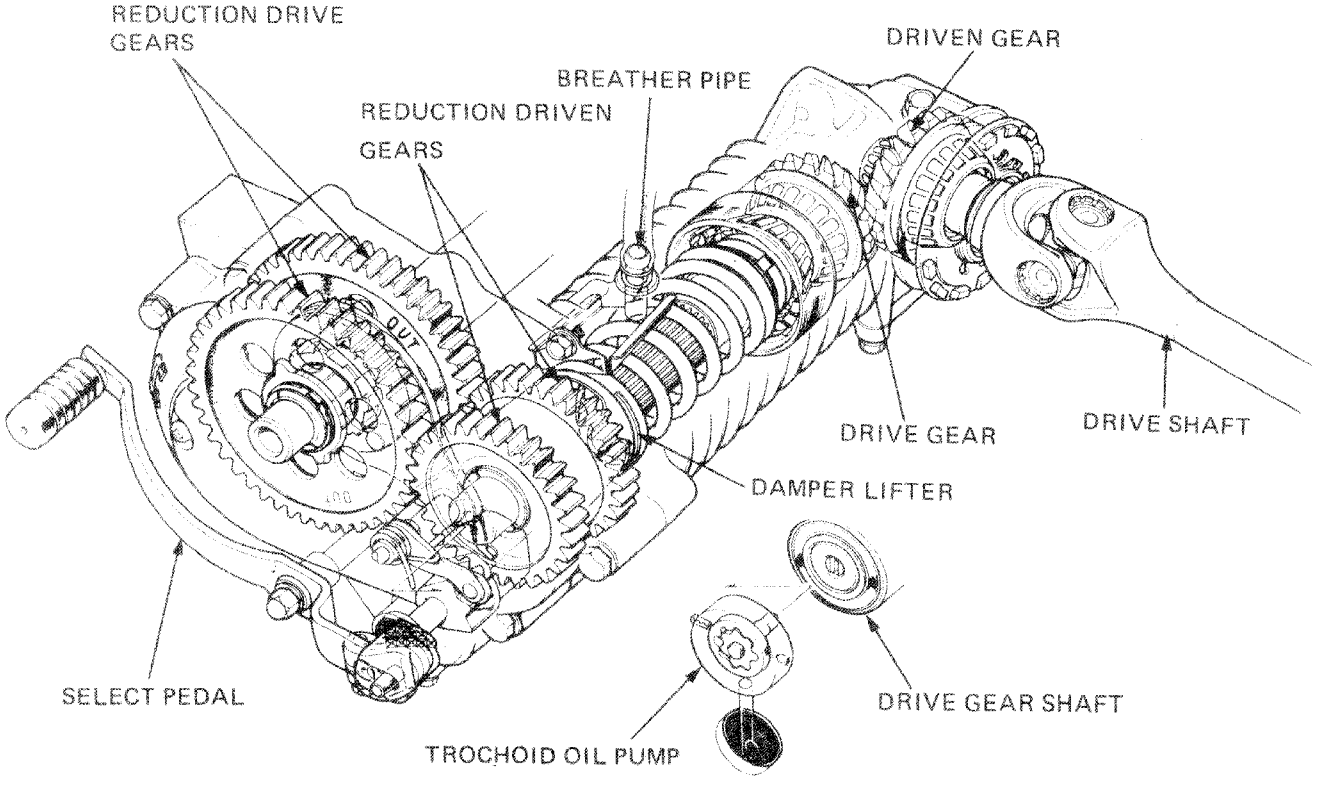
The dual transmission has two speed ranges, high (Ratio: 0.638 : 1), and low (Ratio: 0.721 : 1). Gear selection is by means of a foot pedal.

Low range (LO) — For winding mountain roads or sporty riding where extra power and acceleration are desired.

High range (HI) — For highway riding and good fuel economy.

Power from the reduction driven gear is transmitted to the drive shaft by means of bevel gears. The gears are spiral type and run on two tapered roller bearings.

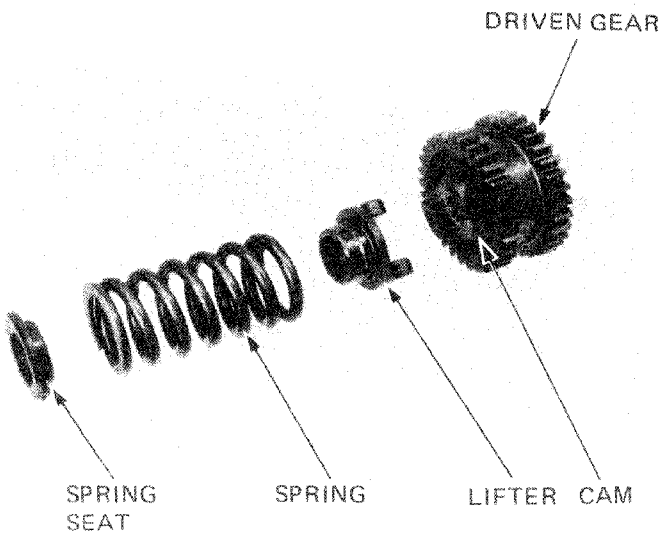
The gear case is filled with hypoid gear oil. A part of the oil is directed under pressure through the passage in the drive gear shaft to the driven gear by means of a trochoid pump. A breather controls the oil pressure within the case.



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The damper uses a lifter, spring and cam which is integrated with the reduction driven gear. The lifter and reduction driven gear fit on the end of the shaft. The reduction gear is free wheeling and the lifter is splined. It is held against the cam by means of the spring.

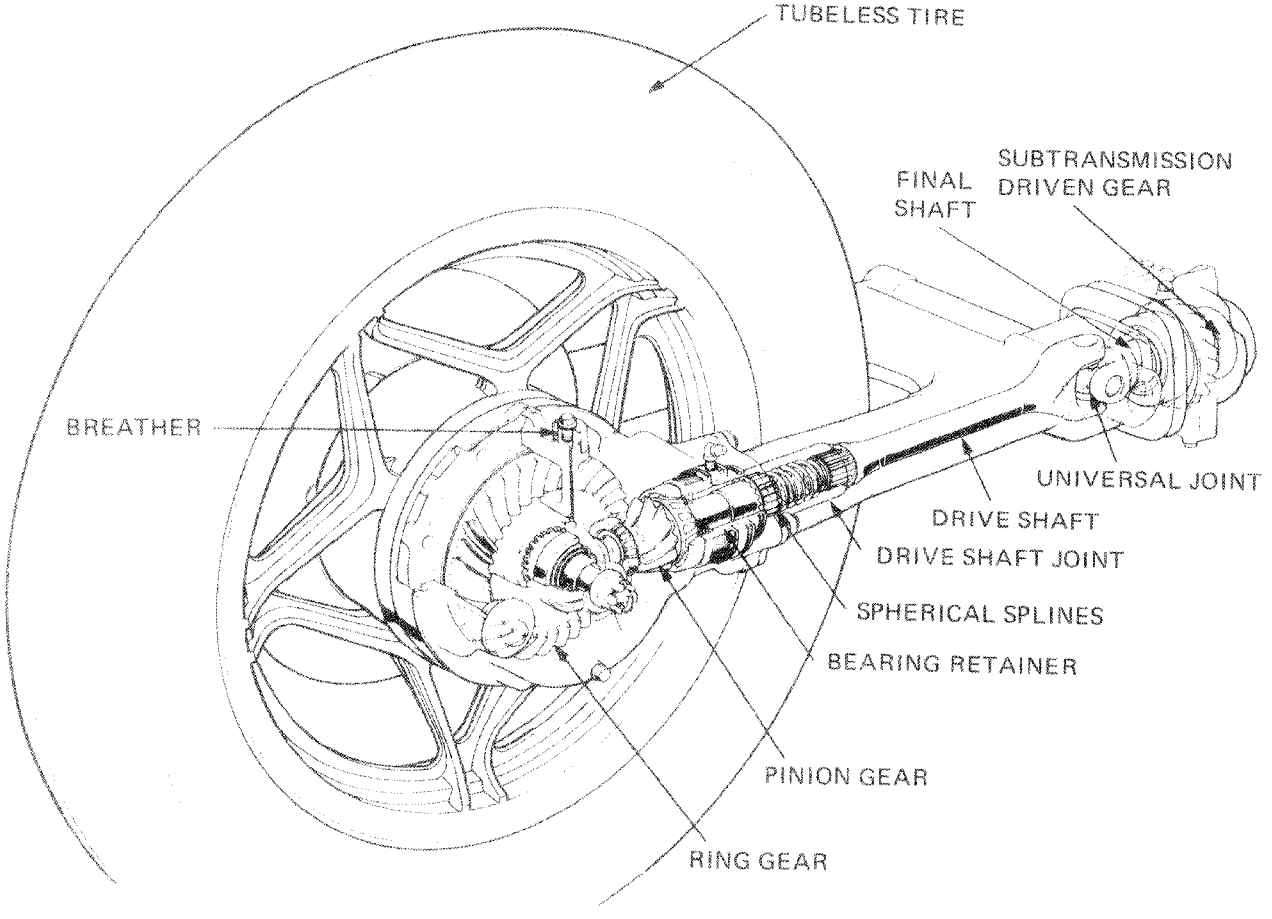
During acceleration or deceleration, the lifter rides over the cam, compressing the spring. The relative movement between the lifter and cam, relieves the shock imposed on the driveline components.



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SHAFT DRIVE

The power transmitting system uses a shaft drive. Power is transmitted by way of:
Final shaft – Universal joint –Drive shaft – Drive shaft joint – Pinion gear – Ring gear – Driven flange – Rear wheel. The pinion gear uses spherical splines to allow relative movement between the drive shaft and this gear when the rear wheel moves up and down. The final gear case is filled with hypoid gear oil and is equipped with a breather. The pinion gear bearing retainer is packed with special grease.



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24. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		POSSIBLE CAUSE
1. Check fuel flow to carburetor.	NOT REACHING CARBURETOR →	(1) Fuel tank empty. (2) Clogged fuel tube or fuel filter. (3) Sticking float valve. (4) Clogged fuel tank cap breather hole.
REACHING CARBURETOR ↓		
2. Perform 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 alternator. (6) Broken or shorted ignition coil. (7) Faulty ignition switch. (8) Faulty pulse generator.
GOOD SPARK ↓		
3. Test cylinder compression	LOW COMPRESSION →	(1) Improper valve clearance. (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 FIRES BUT STOPS →	(1) Improper choke operation. (2) Carburetor incorrectly adjusted. (3) Intake pipe leaking. (4) Improper ignition timing (Spark unit or pulser generator). (5) Incorrect fast idle. (6) 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.

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ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand. WHEEL SPINS FREELY	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging. (2) Worn or damaged wheel bearings. (3) Wheel bearing needs lubrication. (4) Final gear bearing damaged.
2. Check tire pressure PRESSURE NORMAL	PRESSURE LOW →	(1) Punctured tire. (2) Faulty tire valve.
3. Accelerate rapidly from low to second. ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED	ENGINE SPEED CHANGED WHEN CLUTCH IS RELEASED →	(1) Clutch slipping. (2) Worn clutch disc/plate. (3) Warped clutch disc/plate.
4. Accelerate lightly. ENGINE SPEED INCREASES	ENGINE SPEED NOT INCREASED →	(1) Carburetor choke closed. (2) Clogged air cleaner. (3) Restricted fuel flow. (4) Clogged fuel tank cap vent hole. (5) Clogged muffler.
5. Check ignition timing. CORRECT	INCORRECT →	(1) Faulty spark unit. (2) Faulty pulse generator. (3) Faulty ignition advancer
6. Check valve clearance. CORRECT	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat.
7. Test cylinder compression NORMAL	TOO LOW →	(1) Valve stuck open. (2) Worn cylinder and piston rings. (3) Leaking head gasket. (4) Improper valve timing.
8. Check carburetor for clogging. NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough.
9. Remove spark plug. NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough. (2) Spark plug with incorrect heat range.
10. Check oil level and condition. CORRECT	INCORRECT →	(1) Oil level too high. (2) Oil level too low. (3) Contaminated oil.
11. Remove cylinder head cover and inspect lubrication. VALVE TRAIN LUBRICATED PROPERLY	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage. (2) Clogged oil control orifice.
12. Check for engine overheating. NOT OVERHEATING	OVERHEATING →	(1) Excessive carbon build-up in combustion chamber. (2) Use of poor quality fuel. (3) Clutch slipping.
13. Accelerate or run at high speed. ENGINE DOES NOT KNOCK	ENGINE KNOCKS →	(1) Worn piston and cylinder. (2) Wrong type of fuel. (3) Excessive carbon build-up in combustion chamber. (4) Ignition timing too advanced (Faulty spark unit or advancer).

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POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance.	INCORRECT →	(1) Improper valve clearance. (2) Improper ignition timing (Faulty spark unit or spark advancer).
CORRECT ↓		
2. Check carburetor pilot screw adjustment.	INCORRECT → See Fuel System Section	
CORRECT ↓		
3. Check for leaking 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) Alternator faulty. (4) Faulty ignition coil. (5) Faulty spark advancer.
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance. (2) Faulty spark unit. (3) Faulty pulse generator. (4) Faulty spark advancer.
CORRECT ↓		
2. Disconnect fuel tube at carburetor.	FUEL FLOW RESTRICTED →	(1) Lack of fuel in tank (2) Clogged fuel line. (3) Clogged fuel tank breather hole (4) Clogged fuel valve.
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet.	CLOGGED →	(1) Clean.
NO CLOG ↓		
4. Check valve timing.	INCORRECT →	(1) Cam sprocket not installed properly.
CORRECT ↓		
5. Check valve spring tension.	WEAK →	(1) Faulty spring.
NOT WEAKENED		

POOR HANDLING → Check tire pressure

1. If steering is heavy. →	(1) Steering top thread nut too tight. (2) Damaged steering head bearings.
2. If either wheel is wobbling. →	(1) Excessive wheel bearing play (2) Bent rim. (3) Improperly installed wheel hub. (4) Swing arm pivot bearing excessively worn. (5) Bent frame. (6) Swing arm 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 swing arm.

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