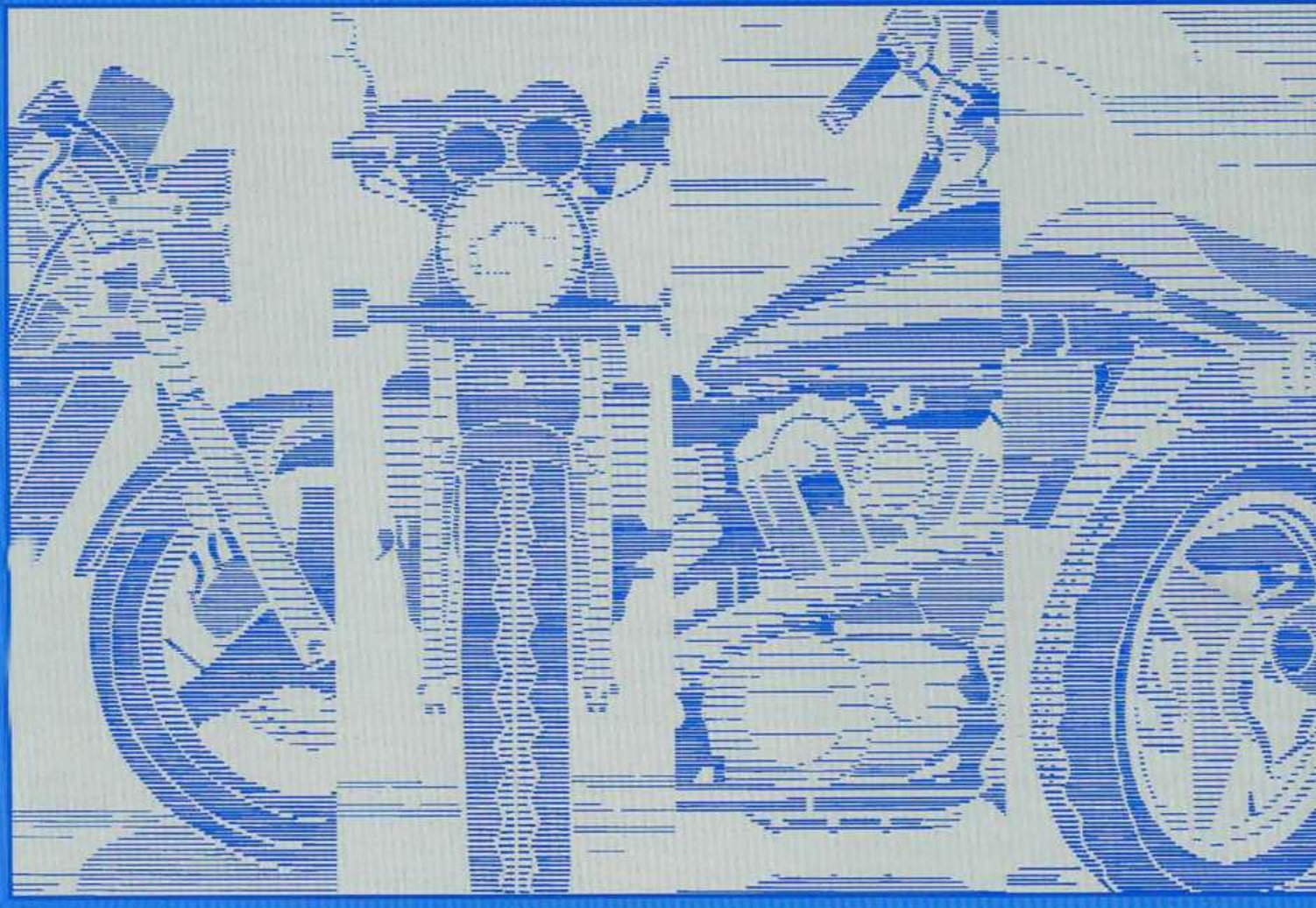
HONDA

SERVICE MANUAL



WORKSHOP MANUAL

VF1000F/FII-F

IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

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

HOW TO USE THIS MANUAL

This shop manual describes the technical features and servicing procedures for the VF1000F and VF1000F-II.

Thoughout the manual, the following abbreviations are used to identify individual models.

CODE	AREA (TYPE)
ED	Europe
E	U.K.
F	France
G	Germany
U	Australia
SA	South Africa
ND	Northern Europe
SW	Switzerland
AR	Austria
SD	Sweden
IT	Italy
<FI>	<Finland>
H	Netherland

<>: VF1000F-II only

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.

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 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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HONDA MOTOR CO., LTD.
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1 GENERAL INFORMATION

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GENERAL SAFETY

WARNING

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

WARNING

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

WARNING

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

WARNING

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

SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do no 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, unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.

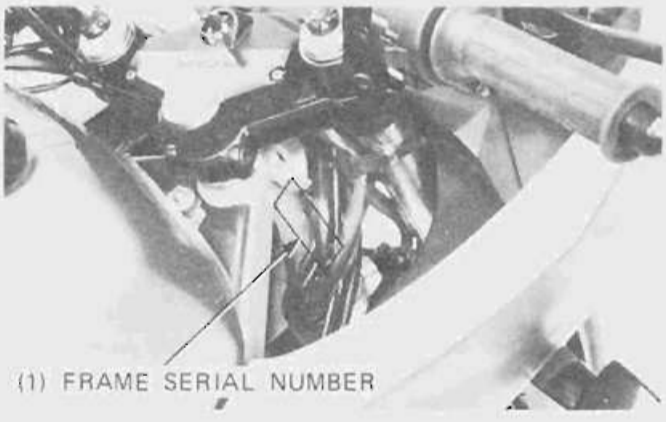
MODEL IDENTIFICATION



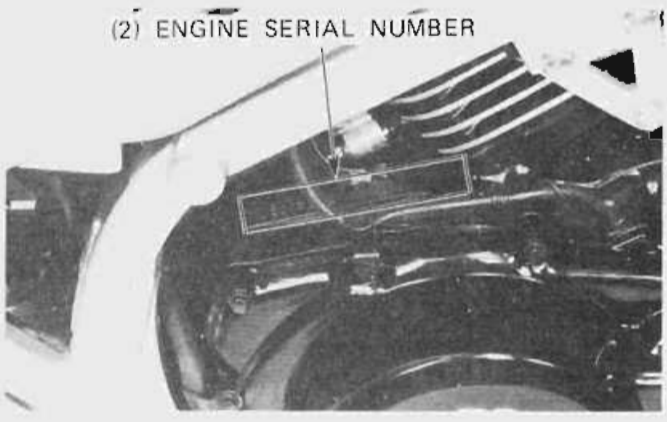
VF1000F



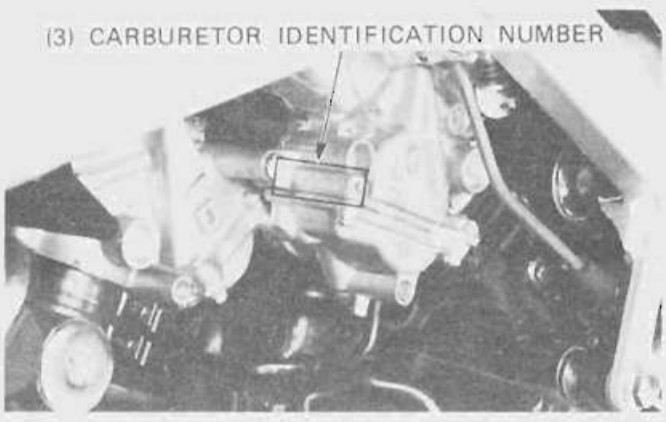
VF1000F-II



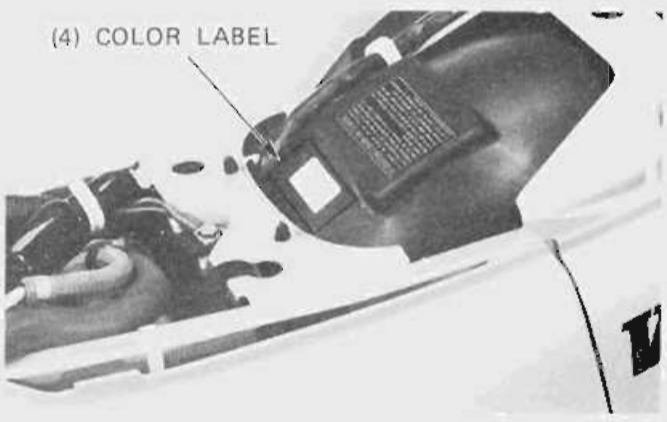
The frame serial number is stamped on the right side of the steering head.



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



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



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

SPECIFICATIONS

ITEM				SPECIFICATIONS
DIMENSIONS	Overall length			SW, SD, FI: 2,310 mm (90.9 in) Other models: 2,270 mm (89.4 in)
	Overall width			765 mm (30.1 in)
	Overall height			VF1000F: 1,250 mm (49.2 in) VF1000F-II: 1,275 mm (50.2 in)
	Wheelbase			1,550 mm (61.0 in)
	Seat height			815 mm (32.1 in)
	Ground clearance			145 mm (5.7 in)
	Dry weight			VF1000F: 240 kg (529 lb) VF1000F-II: 245 kg (540 lb)
	Curb weight			VF1000F: 266 kg (586 lb) VF1000F-II: 271 kg (597 lb)
FRAME	Type			Double cradle rectanglar pipe
	Front suspension, travel			Telescopic fork, 140 mm (5.5 in)
	Rear suspension, travel			Swing arm, 120 mm (4.7 in)
	Front suspension air pressure			0–40 kPa (0–0.4 kg/cm^2, 0–6 psi)
	Rear suspension air pressure			0–300 kPa (0–3.0 kg/cm^2, 0–43 psi)
	Front tire size			100/90V18–V250
	Rear tire size			140/80V17–V250, *140/80VR17–V250
	Cold tire pressure	Driver only	Front	250 kPa (2.50 kg/cm^2, 36 psi)
			Rear	290 kPa (2.90 kg/cm^2, 41 psi)
		Driver and one passenger	Front	250 kPa (2.50 kg/cm^2, 36 psi)
			Rear	290 kPa (2.90 kg/cm^2, 41 psi)
	Front brake, lining swept area			Double disc, 904 cm^2 (140.1 sq in)
	Rear brake, lining swept area			Single disc, 452 cm^2 (65.9 sq in)
	Fuel tank capacity			23 liters (6.1 US gal, 5.0 Imp gal)
	Fuel tank reserve capacity			4 liters (1.1 US gal, 0.9 Imp gal)
	Caster angle			29°
	Trail length			116 mm(4.6 in)
	Front fork oil capacity			Right: 455 cm^3 (15.4 US oz, 16.0 Imp oz) Left: 475 cm^3 (16.1 US oz, 16.7 Imp oz)
ENGINE	Type			Water cooled 4-stroke, DOHC engine
	Cylinder arrangement			4 cylinder 90° V
	Bore and stroke			77 x 53.6 mm (3.03 x 2.11 in)
	Displacement			998 cm^3 (60.5 cu in)
	Compression ratio			10.5:1
	Valve train			Silent, multi-link chain drive and DOHC with rocker arms
	Maximum horsepower			G, SD, AR: 73.5 kW (100 ps)/9,000 min^{-1} (rpm) (DIN) F: 75 kW (102 ps)/9,500 min^{-1} (rpm) (ISO) SW: 68 kW (92 ps)/7,500 min^{-1} (rpm) (DIN) Other models: 85 kW (116 ps)/10,000 min^{-1} (rpm) (DIN)
	Maximum torque			G, SD, AR: 83 N·m (8.5 kg-m, 61 ft-lb)/8,000 min^{-1} (rpm) (DIN) F: 160 N·m (16.4 kg-m, 119 ft-lb)/8,000 min^{-1} (rpm) (French torque) SW: 88 N·m (9.0 kg-m, 65 ft-lb)/7,000 min^{-1} (rpm) (DIN) Other models: 89 N·m (9.1 kg-m, 66 ft-lb)/8,000 min^{-1} (rpm) (DIN)
	Oil capacity	After disassembly		VF1000F: 3.5 lieters (3.7 US qt, 3.1 Imp qt) VF1000F-II: 3.7 liters (3.9 US qt, 3.3 Imp qt)
		After draining		VF1000F: 2.9 liters (3.1 US qt, 2.55 Imp qt) VF1000F-II: 3.0 liters (3.2 US qt, 2.64 Imp qt)
	Coolant capacity			VF1000F: 3.2 liters (3.4 US qt, 2.8 Imp qt) VF1000F-II: 3.3 liters (3.5 US qt, 2.9 Imp qt)
	Lubrication system			Forced pressure and wet sump
	Air filtration			Paper filter
	Cylinder compression			1,275 ± 196 kPa (13 ± 2 kg/cm^2, 185 ± 28 psi)

*No application for SW and optional for other models.

ITEM		SPECIFICATIONS	
ENGINE	Intake valve Opens	10° BTDC ┐	
	Closes	40° ABDC ┘ at 1 mm lift	
	Exhaust valve Opens	40° BBDC ┐	
	Closes	10° ATDC ┘	
	Valve clearance (Cold)	IN and EX: 0.14 mm (0.0055 in)	
	Engine weight (Dry)	VF1000F: 93.2 kg (205 lb), VF1000F-II: 93.5 kg(206 lb)	
	Idle speed	1,000 ± 100 min^{-1} (rpm)	
	Cylinder numbering	No. 1 – Left rear No. 2 – Left front No. 3 – Right rear No. 4 – Right front	
CARBURE-TION	Type/throttle bore	KEIHIN VD/36 mm (1.42 in)	
	Identification number	G, SD, AR: VD85F SW: VD85G F: VD85H Other models: VD85E	
	Pilot screw initial setting	SW: 2-3/4 turns out Other models: 2-1/2 turns out	
	Float level	7.5 mm (0.30 in)	
DRIVE TRAIN	Clutch	Wet, multi-plate	
	Transmission	5-speed	
	Primary reduction	VF1000F: 1.971 VF1000F-II: 1.888	
	Final reduction	2.529	
	Gear ratio I	2.733	
	Gear ratio II	1.894	
	Gear ratio III	1.500	
	Gear ratio IV	1.240	
	Gear ratio V	1.037	
	Gearshift pattern	Left foot operated return system, 1-N-2-3-4-5	
ELECTRICAL	Ignition	Full transistor ignition	
	Ignition timing "F" mark	10° BTDC at idle	
	Full advance	37° BTDC at 3,800 min^{-1} (rpm)	
	Starting system	Starter motor	
	Alternator	VF1000F: 350W/5,000 min^{-1} (rpm) VF1000F-II: 360W/5,000 min^{-1} (rpm)	
	Battery capacity	12V–16AH	
	Spark plug	NGK	ND
	Standard	DPR9EA-9<DP9EA-9>	X27EPR-U9<X27EP-U9>
	For cold climinate (Below 5°C, 41°F)	DPR8EA-9<DP8EA-9>	X24EPR-U9<X24EP-U9>
	Spark plug	0.8–0.9 mm (0.031–0.035 in)	
	Firing order	1-4-3-2	
	Fuse/main fuse	10A, 15A/30A	
LIGHTS	Headlight (High/low beam)	60/55W	
	Tail/stoplight	5/21W	
	Turn signal light	21W	
	Instrument light	3.4W	
	Neutral indicator	3W	
	Turn signal indicator	3W	
	High beam indicator	3W	
	Oil pressure indicator	3W	
	Brake and taillight indicator	3W	
	Position light	4W	

TORQUE VALUES

ENGINE

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Cylinder head cover	8	6	8–12 (0.8–1.2, 6–9)	
Camshaft holder	24	6	10–14 (1.0–1.4, 7–10)	
Cylinder head	8	8	21–25 (2.1–2.5, 15–18)	
	16	9	43–47 (4.3–4.7, 31–34)	
Alternator	1	12	85–105 (8.5–10.5, 61–76)	
Primary drive gear	1	12	85–105 (8.5–10.5, 61–76)	
Clutch lock nut	1	22	80–90 (8.0–9.0, 58–65)	
Crankcase	14	9	38–42 (3.8–4.2, 27–30)	
	3	8	21–25 (2.1–2.5, 15–18)	
	15	6	10–14 (1.0–1.4, 7–10)	
Rocker arm shaft cap bolt	8	22	45–50 (4.5–5.0, 33–36)	Apply LOCTITE 271 to the threads.
Cam sprocket	8	7	18–20 (1.8–2.0, 13–14)	
Starter clutch	3	8	26–30 (2.6–3.0, 19–22)	
Shift fork center	1	7	16–20 (1.6–2.0, 12–14)	
Oil filter	1	20	15–20 (1.5–2.0, 11–14)	
Countershaft bearing holder	3	8	21–25 (2.1–2.5, 15–18)	
Drive sprocket	1	10	50–54 (5.0–5.4, 36–39)	
Valve adjustment nuts	16	7	21–25 (2.1–2.5, 15–18)	
Drain plug	1	12	35–40 (3.5–4.0, 25–29)	
Connecting rod nuts	8	8	30–34 (3.0–3.4, 22–25)	Apply 3-Bond Sealant, or its equivalent to the threads.
Oil pressure switch	1	–	10–14 (1.0–1.4, 7–10)	
Spark plugs	4	12	12–16 (1.2–1.6, 9–12)	
Slave cylinder bleed valve	1	–	4–7 (0.4–0.7, 2.9–5.1)	

CHASSIS

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Steering stem nut	1	24	90–120 (9.0–12.0, 65–87)	
Steering bearing adjustment nut	1	26	23–27 (2.3–2.7, 17–20)	
Top bridge pinch bolt	1	8	20–30 (2.0–3.0, 14–22)	
Front axle holder	4	8	18–25 (1.8–2.5, 13–18)	
Front axle nut	1	14	55–65 (5.5–6.5, 40–47)	
Front fork top pinch bolts	2	7	20–30 (2.0–3.0, 14–22)	
Front fork bottom pinch bolts	2	10	45–55 (4.5–5.5, 33–40)	

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Brake caliper bracket mount bolts (Right)	2	10	30–40 (3.0–4.0, 22–29)	Front brake calipers
(Left-upper)	1	10	30–40 (3.0–4.0, 22–29)	
Anti-dive piston pin bolt	1	6	10–15 (1.0–1.5, 7–11)	
Brake caliper mount bolts	3	8	20–25 (2.0–2.5, 14–18)	Front and rear brake calipers
Brake caliper pivot bolts	3	12	25–30 (2.5–3.0, 18–22)	
Front brake discs	12	8	35–40 (3.5–4.0, 25–29)	
Shock arm-to-frame bolts	2	10	40–50 (4.0–5.0, 29–36)	
Shock link-to-shock arm bolt	1	10	40–50 (4.0–5.0, 29–36)	
Shock absorber mount bolts	2	10	40–50 (4.0–5.0, 29–36)	
Swing arm pinch bolt	1	8	20–30 (2.0–3.0, 14–22)	
Swing arm left pivot bolt	1	25	85–105 (8.5–10.5, 61–76)	
Swing arm right pivot bolt	1	16	85–105 (8.5–10.5, 61–76)	
Rear brake torque rod				
8 mm	1	8	18–25 (1.8–2.5, 13–18)	
10 mm	1	10	30–40 (3.0–4.0, 22–29)	
Final driven sprocket	5	12	80–100 (8.0–10.0, 58–72)	
Rear brake disc	6	8	35–40 (3.5–4.0, 25–29)	
Rear axle nut	1	18	85–105 (8.5–10.5, 61–76)	
Sub-frame bolts (upper and lower)	4	10	35–45 (3.5–4.5, 25–33)	Apply oil to lower bolts
Handlebar pinch bolts	2	8	30–40 (3.0–4.0, 22–29)	
Rear brake actuating arm	1	6	10–15 (1.0–1.5, 7–11)	
Side stand	1	10	35–45 (3.5–4.5, 25–33)	
Engine rear hanger bolts (upper)	1	10	60–70 (6.0–7.0, 43–51)	
(lower)	1	10	35–45 (3.5–4.5, 25–33)	
Engine center hanger bolts	6	8	24–30 (2.4–3.0, 17–22)	
Engine front hanger bolts	2	10	35–45 (3.5–4.5, 25–33)	
Gearshift arm	1	6	10–15 (1.0–1.5, 7–11)	
Front fork tube cap	2	–	15–30 (1.5–3.0, 11–22)	
Front fork socket bolt	2	8	15–25 (1.5–2.5, 11–18)	
Anti-dive case	4	6	6–9 (0.6–0.9, 4–7)	
Hose oil bolt	9	10	25–35 (2.5–3.5, 18–25)	
Oil cooler hose bolt	4	6	10–14 (1.0–1.4, 7–10)	

Torque specifications listed above are for important fasteners. Others should be tightened to standard torque valves listed 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, 2–4)
6 mm bolt and nut	8–12 (0.8–1.2, 6–9)	6 mm screw	7–11 (0.7–1.1, 5–8)
8 mm bolt and nut	18–25 (1.8–2.5, 13–18)	6 mm flange bolt and nut	10–14 (1.0–1.4, 7–10)
10 mm bolt and nut	30–40 (3.0–4.0, 22–29)	8 mm flange bolt and nut	24–30 (2.4–3.0, 17–22)
12 mm bolt and nut	50–60 (5.0–6.0, 36–43)	10 mm flange bolt and nut	35–45 (25–33)

TOOLS

SPECIAL

DESCRIPTION	TOOL NUMBER	APPLICATION	REFERENCE PAGE
Oil pressure gauge	07506–3000000	Oil pressure inspection	2-6
Oil pressure gauge attachment	07510–4220100		
Oil filter wrench	07912–6110001	Oil filter removal/installation	2-3, 2-4
Vacuum gauge	07404–0020000	Carburetor synchronization	3-10
Carburetor pilot screw wrench	07908–4220201		
Valve adjusting wrench	07908–MB00100	Valve clearance adjustment	3-9
Compression gauge attachment	07510–MB00101	Cylinder compression inspection	3-12
Snap ring pliers	07914–3230001	Master cylinder dis/assembly	7-5, 17-8, 17-9
		Front fork dis/assembly	15-15, 15-20
Lock nut wrench	07916–4220000	Clutch removal/installation	7-10, 7-15
Valve guide reamer, 5.5 mm	07984–2000000	Valve guide reaming	10-11, 10-12
Driver	07949–3710000	Countershaft bearing installation	13-4
Fork seal driver	07947–KA50100	Front fork seal installation	15-19
Fork seal driver attachment	07947–KF00100		15-19
Steering stem socket	07916–3710100	Steering stem removal/installation	15-24, 15-26
Bearing race remover	07946–3710500	Ball race removal	15-25
Ball race remover	07953–4250002	Ball race removal	15-24, 15-25
Steering stem driver	07946–MB00000	Cone race installation	15-26
Needle bearing remover	07931–MA70000	Swing arm bearing removal	16-16
Oil seal driver attachment	07965–MB00100	Rear shock absorber oil seal replacement	16-11
Oil seal driver	07965–MC70100		16-9, 16-11
Oil seal driver attachment ring	07965–ME70100		16-11
Oil seal driver attachment	07965–MA10200		16-9, 16-10, 16-11
Timing inspection cover	07993–MB40000	Ignition timing inspection	19-2
Driver	07965–1480100	Rear shock absorber spherical bearing installation	16-12
Attachment	07946–KA30200		16-12

COMMON

DESCRIPTION	TOOL NUMBER	APPLICATION	REFERENCE PAGE
Float level gauge	07401–0010000	Float level inspection	4-7
Universal holder	07725–0030000	Clutch removal/installation	7-10, 7-15
Driver	07749–0010000	Bearing installation	
Attachment, 42 x 47 mm	07746–0010300	Clutch outer needle bearing removal	7-13
		Left rear wheel bearing installation	16-5
		Front wheel bearing installation	15-9
		Upper ball race installation	15-25

DESCRIPTION	TOOL NUMBER	APPLICATION	REFERENCE PAGE
Pilot, 40 mm	07746–0040900	Clutch outer needle bearing removal	7-13
Gear holder	07724–0010100	Primary drive gear removal/ installation	7-9, 7-17
Flywheel holder	07725–0040000	Flywheel removal/installation	9-2, 9-3
Rotor puller	07733–0020001	Flywheel removal	9-2
Valve guide remover, 5.5 mm	07742–0010100	Vlave guide removal	10-11
Valve guide driver	07743–0020000	Valve guide installation	10-11
Valve spring compressor	07757–0010000	Cylinder head dis/assembly	10-9, 10-13
Attachment, 52 x 55 mm	07746–0010400	Countershaft bearing installation	13-4
		Lower ball race installation	15-25
		Right rear wheel bearing installation	16-5
Driver	07746–0030100	Mainshaft bearing installation	13-6
Attachment, I.D. 30 mm	07746–0030300		
Pilot, 15 mm	07746–0040300	Front wheel bearing installation	15-9
Lock nut wrench, 30 x 32 mm	07716–0020400	Steering stem removal/ installation	15-23, 15-27
Extension	07716–0020500		
Bearing remover shaft	07746–0050100	Front wheel bearing removal	15-8
		Rear wheel bearing removal	16-5
Bearing remover head, 15 mm	07746–0050400	Front wheel bearing removal	15-8
Attachment, 32 x 35 mm	07746–0010100	Swing arm bearing installation	16-16
Attachment, 37 x 40 mm	07746–0010200		
Pilot, 17 mm	07746–0040400		
Attachment, 62 x 68 mm	07746–0010500	Final driven finage bearing installation	16-6
Pilot, 20 mm	07746–0040500	Rear wheel bearing installation	16-5
		Swing arm bearing installation	16-16
Pilot, 25 mm	07746–0040600	Final driven flange bearing installation	16-6
Bearing remover head, 20 mm	07746–0050600	Rear wheel bearing removal	16-5

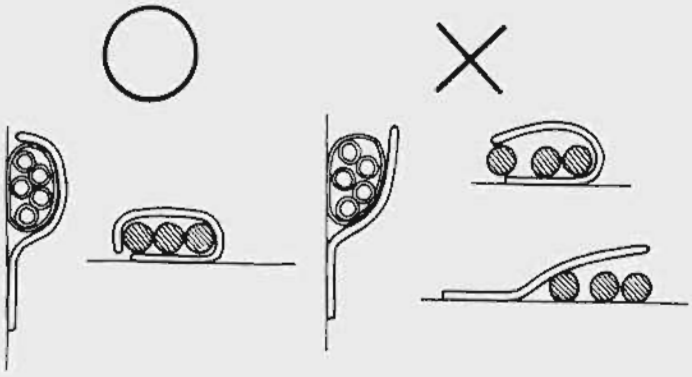
VALVE SEAT CUTTER

DESCRIPTION	TOOL NUMBER	APPLICATION	REFERENCE PAGE
Flat cutter, 28 mm	07780–0012100	Valve seat refacing (EX. 32°)	10-12
Flat cutter, 33 mm	07780–0012900	Valve seat refacing (IN. 32°)	10-12
Seat cutter, 29 mm	07780–0010300	Valve seat refacing (EX. 45°)	10-12
Seat cutter, 33 mm	07780–0010800	Valve seat refacing (IN. 45°)	10-12
Interior cutter, 30 mm	07780–0014000	Valve seat refacing (IN., EX. 60°)	10-12
Valve seat cutter holder	07781–0010101	Valve seat refacing	10-12

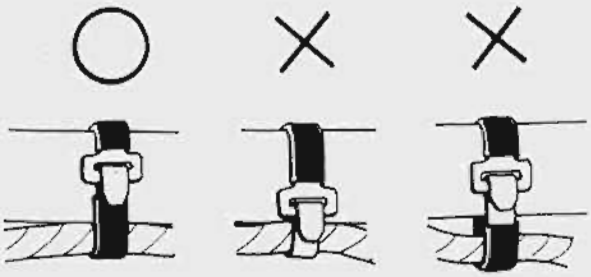
CABLE & HARNESS ROUTING

Note the following when routing cables and wire harnesses.

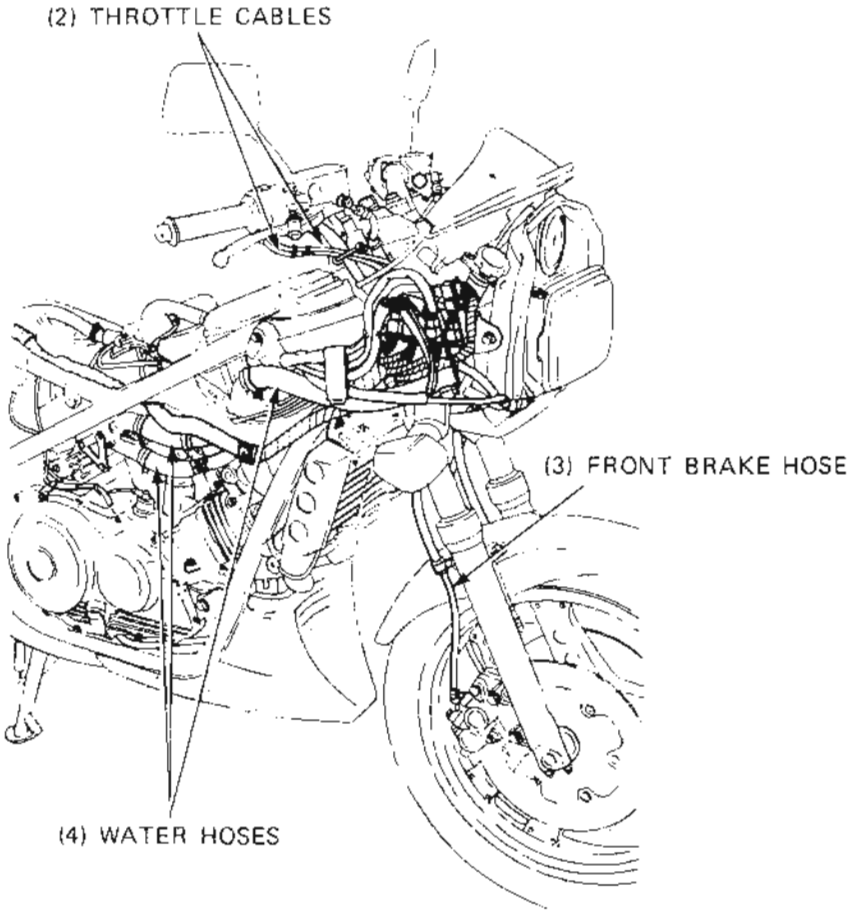
- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against the weld or end of its clamp when a weld-on clamp is used.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are neither pulled tight nor have excessive slack.
- Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use a wire or harness with a broken insulator. Repair by wrapping them with protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners.
- Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other parts that get hot.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interferring with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched by or interfere with adjacent or surrounding parts in all steering positions.

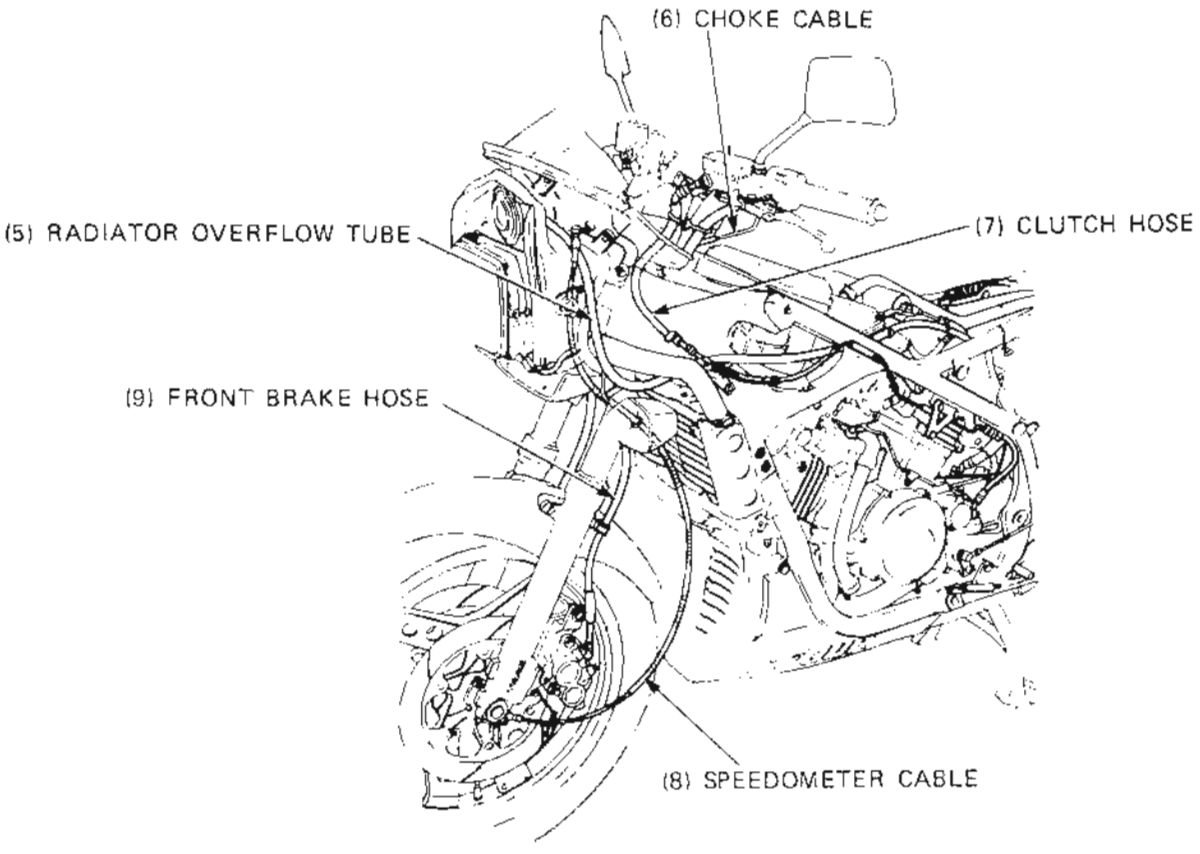




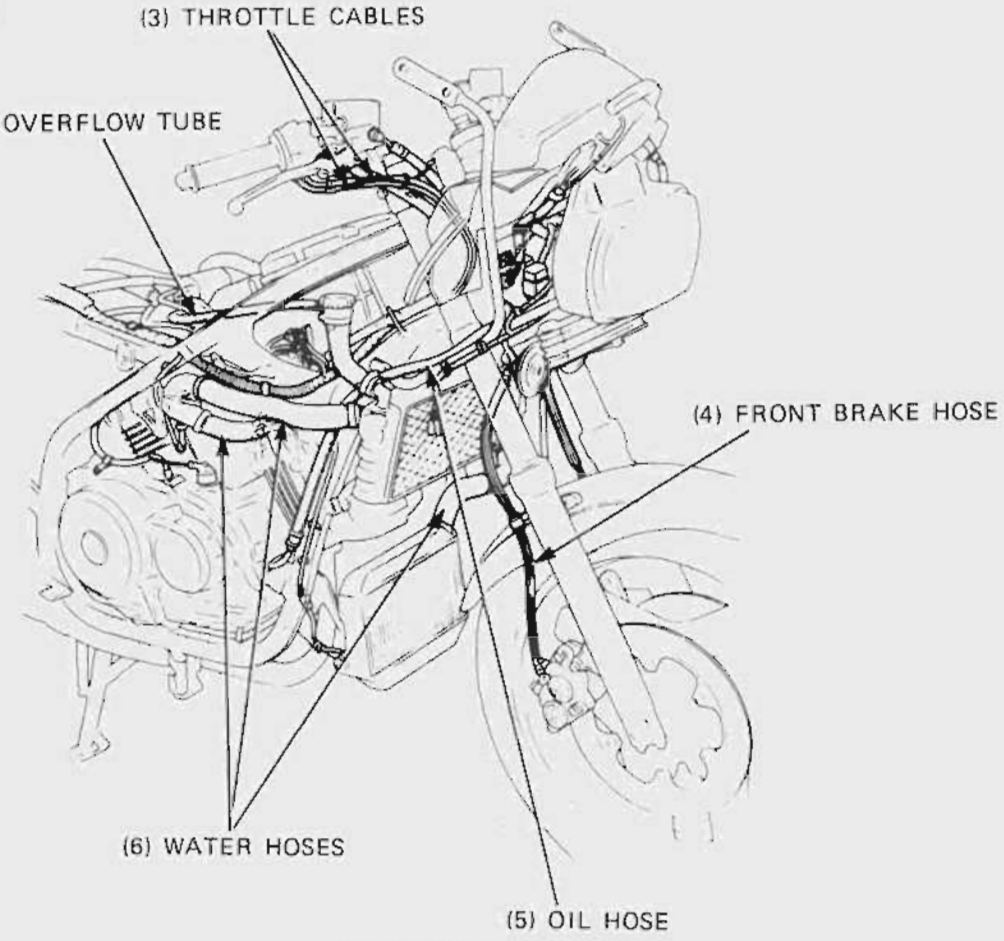


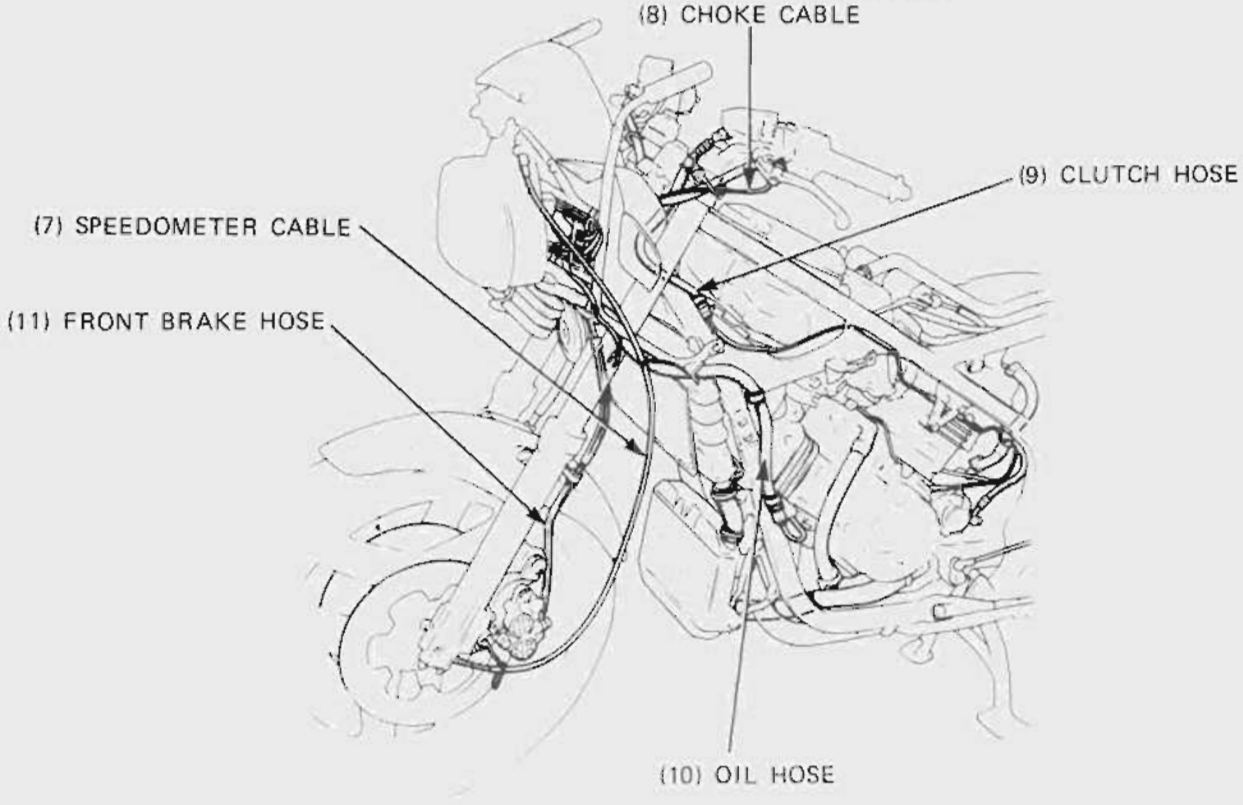
(1) VF1000F MODEL



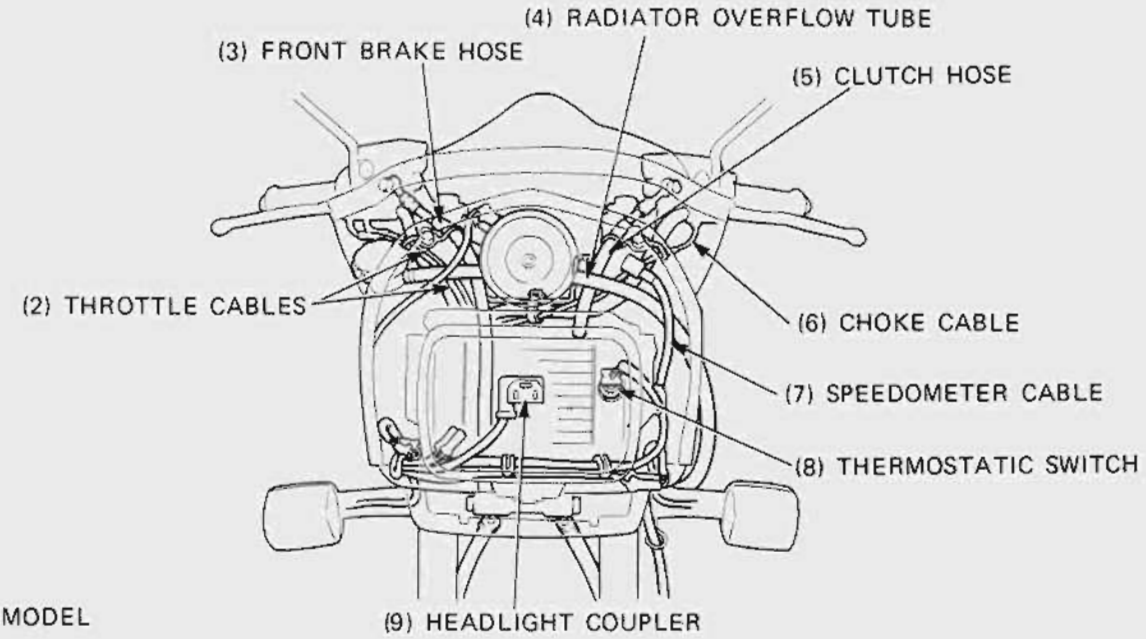


(1) VF1000F-II MODEL

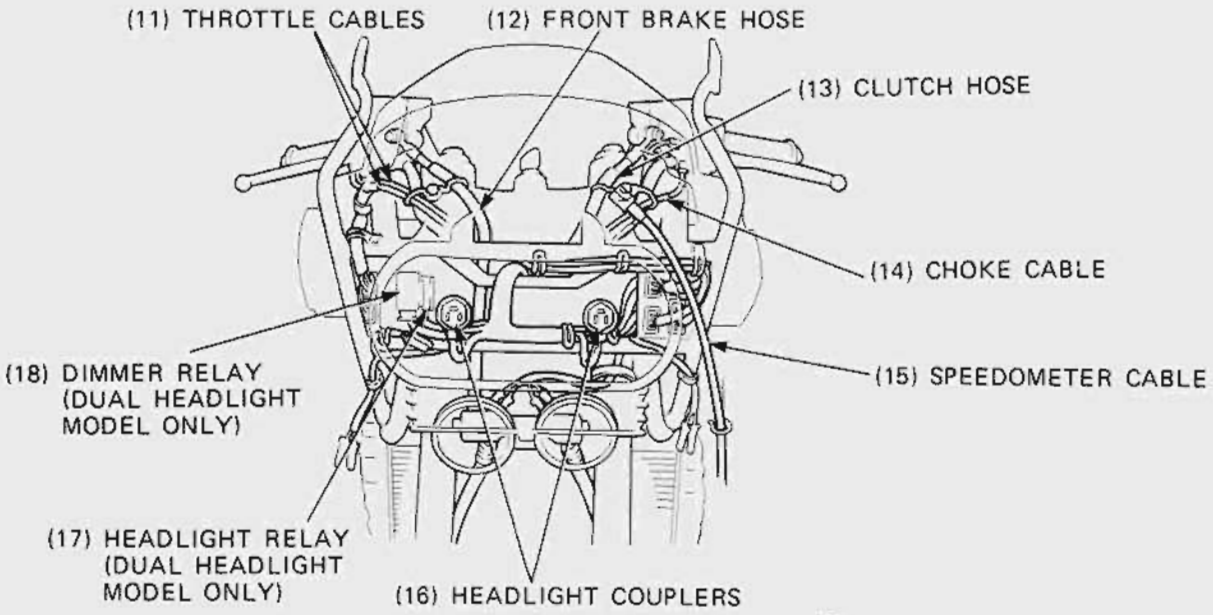


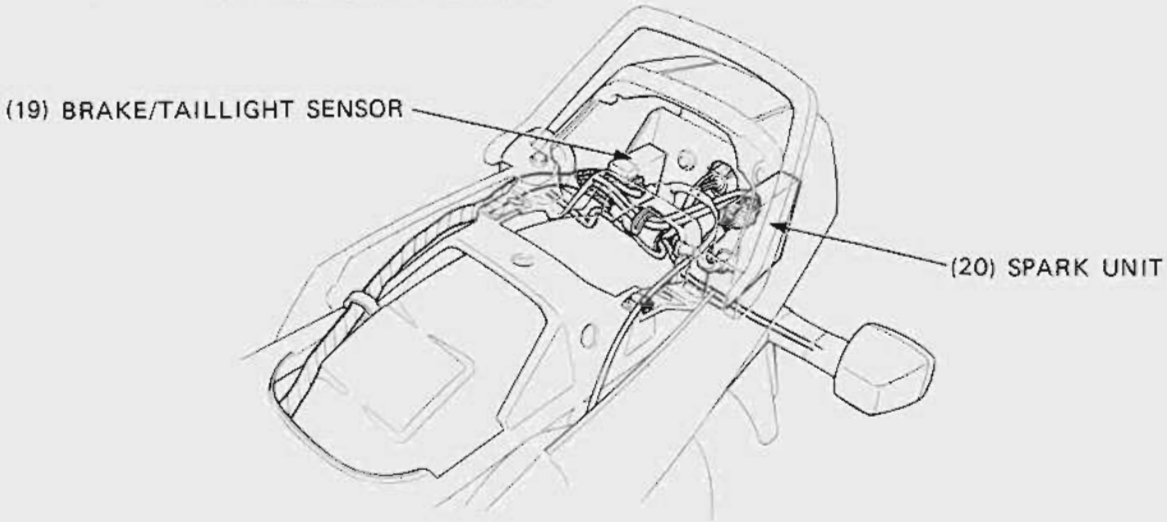


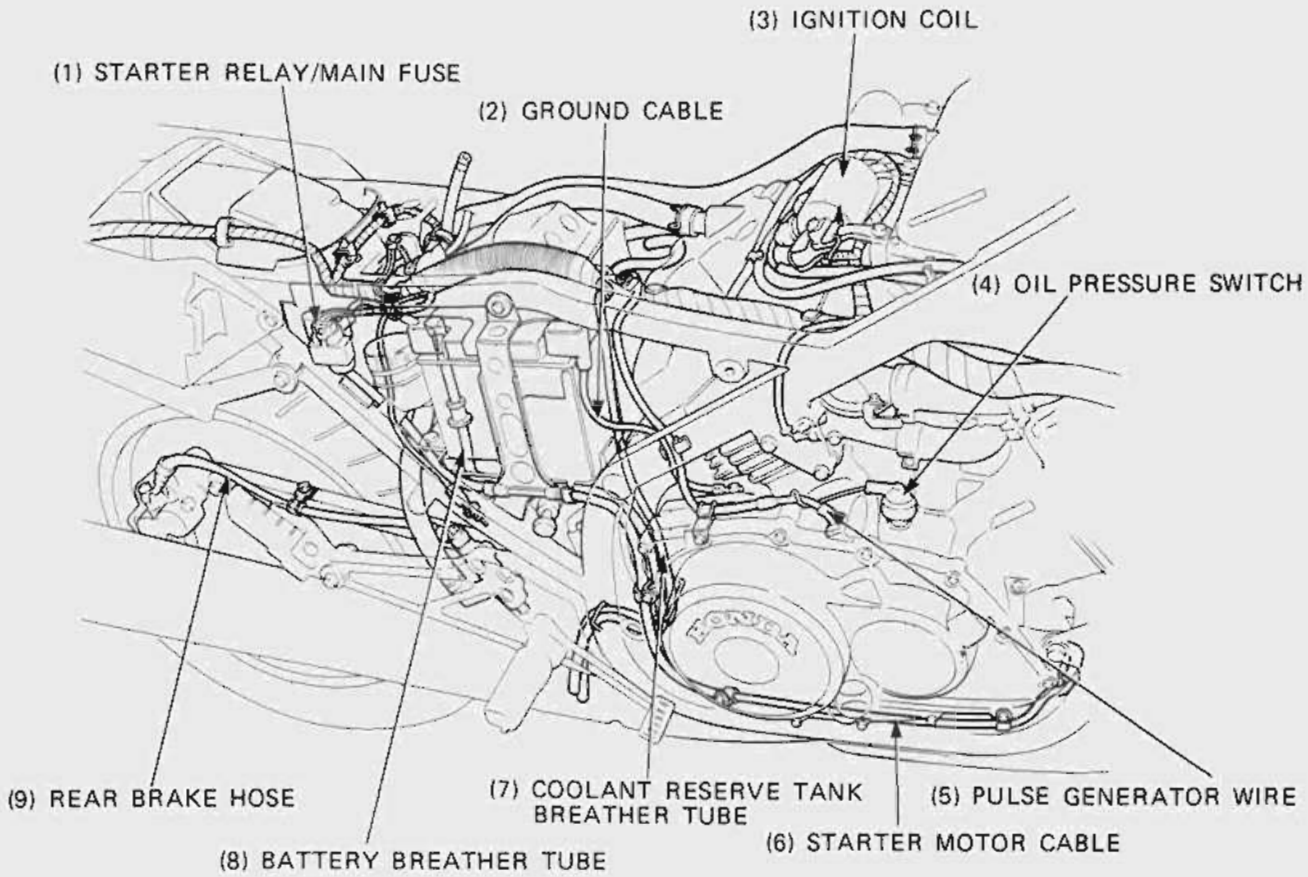
(1) VF1000F MODEL

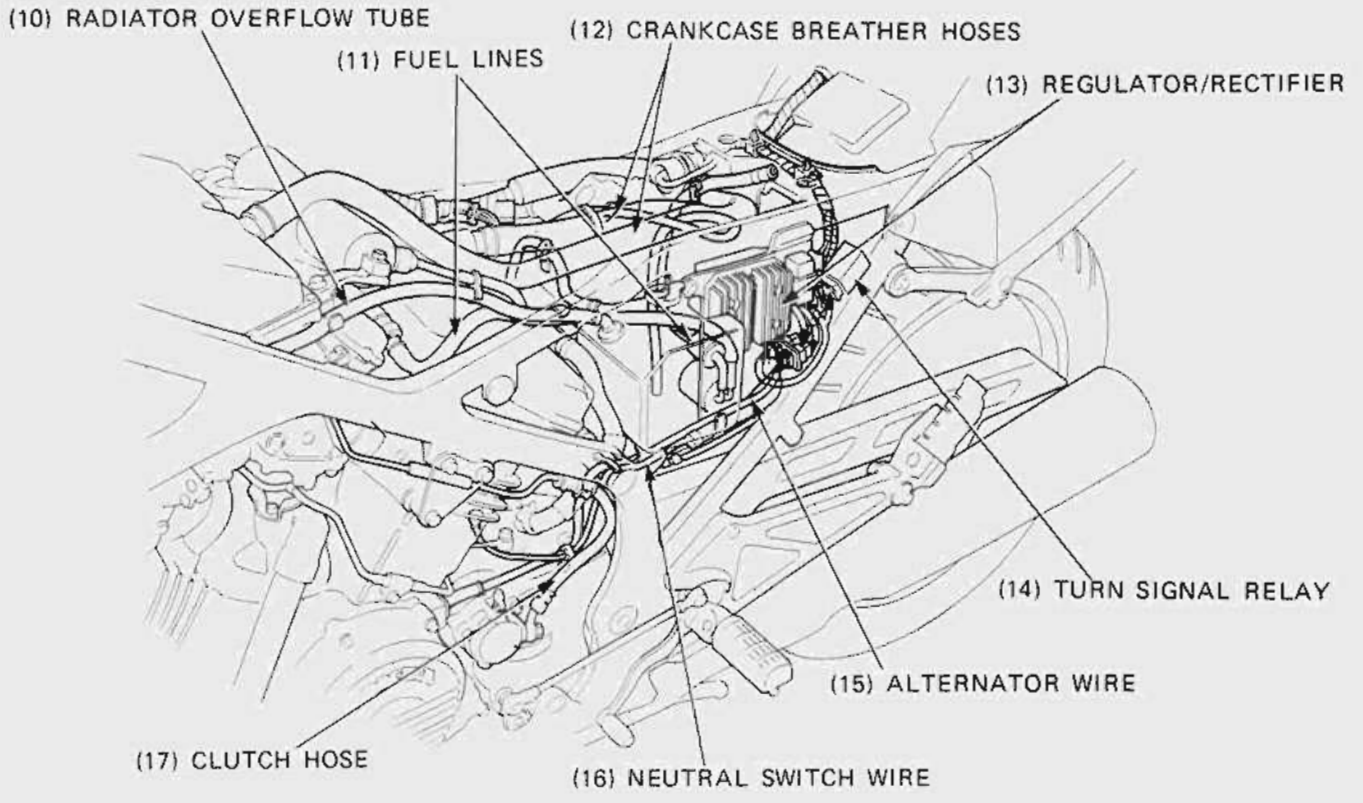


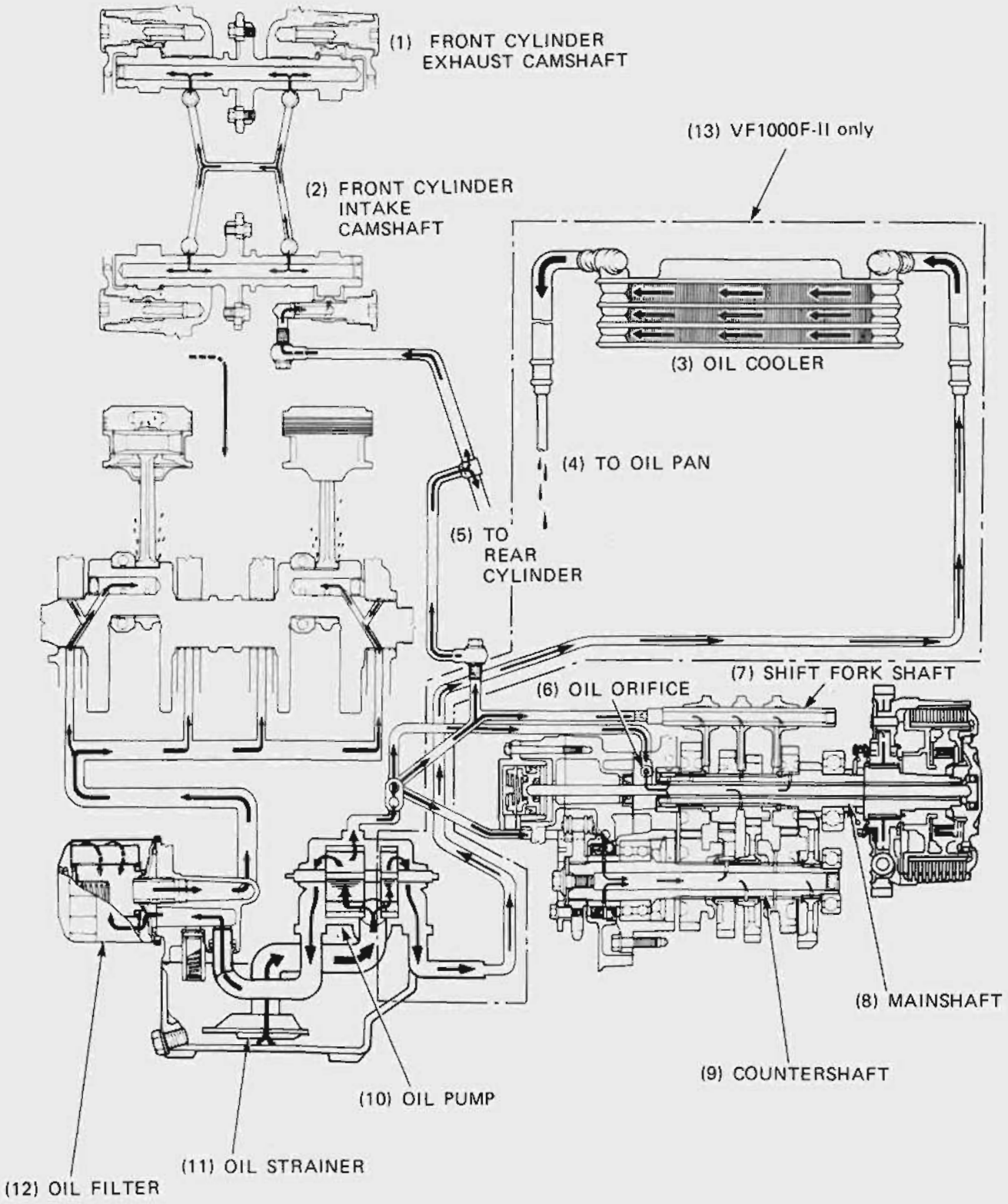
(10) VF1000V-II MODEL






(3) IGNITION COIL
(1) STARTER RELAY/MAIN FUSE
(2) GROUND CABLE
(4) OIL PRESSURE SWITCH
(9) REAR BRAKE HOSE
(7) COOLANT RESERVE TANK BREATHER TUBE
(5) PULSE GENERATOR WIRE
(6) STARTER MOTOR CABLE
(8) BATTERY BREATHER TUBE


(10) RADIATOR OVERFLOW TUBE
(12) CRANKCASE BREATHER HOSES
(11) FUEL LINES
(13) REGULATOR/RECTIFIER
(14) TURN SIGNAL RELAY
(15) ALTERNATOR WIRE
(17) CLUTCH HOSE
(16) NEUTRAL SWITCH WIRE


(1) FRONT CYLINDER EXHAUST CAMSHAFT
(2) FRONT CYLINDER INTAKE CAMSHAFT
(13) VF1000F-II only
(3) OIL COOLER
(4) TO OIL PAN
(5) TO REAR CYLINDER
(6) OIL ORIFICE
(7) SHIFT FORK SHAFT
(8) MAINSHAFT
(9) COUNTERSHAFT
(10) OIL PUMP
(11) OIL STRAINER
(12) OIL FILTER

2 LUBRICATION

SERVICE INFORMATION	2-1	OIL PRESSURE CHECK	2-6
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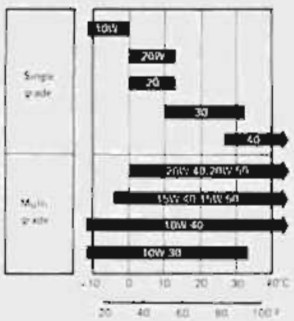
SERVICE INFORMATION

GENERAL

- The VF1000F-II model is equipped with the oil cooler and its oil pump has exclusive rotors to send the oil to the oil cooler. However, the engine lubrication circuits of the VF1000F model and VF1000F-II model are the same.

SPECIFICATIONS

Engine oil

Oil capacity	VF1000F	3.5 liters (3.7 US qt, 3.1 Imp qt) after disassembly 2.9 liters (3.1 US qt, 2.55 Imp qt) after draining
	VF1000F-II	3.7 liters (3.9 US qt, 3.3 Imp qt) after disassembly 3.0 liters (3.2 US qt, 2.64 Imp qt) after draining
Oil recommendation		Use HONDA 4-STROKE OIL or equivalent. API SERVICE CLASSIFICATION: SE or SF. VISCOSITY: SAE 10W-40 Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. OIL VISCOSITIES 
Oil pressure (at oil pressure switch)		540 ± 70 kPa (5.4 ± 0.7 kg/cm^2, 77 ± 10 psi) at 5,000 min^{-1} (rpm) (80°C/176°F)
Oil pump delivery		56.3 liter (59.6 US qt, 49.6 Imp qt)/min. at 5,600 min^{-1} (rpm)

Oil pump service data

	STANDARD	SERVICE LIMIT
Rotor tip clearance	0.15 mm (0.006 in)	0.20 mm (0.008 in)
Pump body clearance	0.15–0.23 mm (0.006–0.009 in)	0.35 mm (0.014 in)
Pump end clearance	0.02–0.07 mm (0.001–0.003 in)	0.10 mm (0.004 in)

TORQUE VALUES

Engine oil drain plug	35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)
Engine oil filter	15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)
Oil pressure switch	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Oil cooler hose bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Special

Oil pressure gauge	07506–3000000
Oil pressure gauge attachment	07510–4220100
Oil filter wrench	07912–6110001

TROUBLESHOOTING

Oil level too low
- External oil leaks
- Worn piston rings
- Worn valve guide or seal

Oil contamination
- Oil or filter not changed often enough
- Head gasket faulty
- Worn piston rings

Low oil pressure
- Oil level low
- Pressure relief valve stuck open
- Plugged oil pick-up screen
- Oil pump worn
- External oil leaks

High oil pressure
- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Incorrect oil being used

No oil pressure
- Oil level low
- Oil pump drive chain broken
- Oil pump faulty
- Internal oil leakage

ENGINE OIL LEVEL

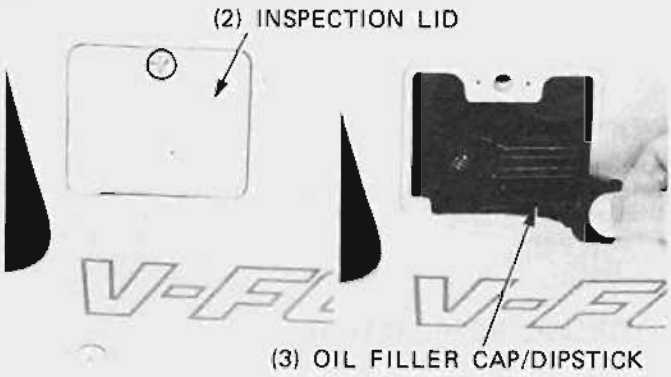
Put the motorcycle on its center stand on level ground. Start the engine and let it idle for 2–3 minutes. Turn off the engine.

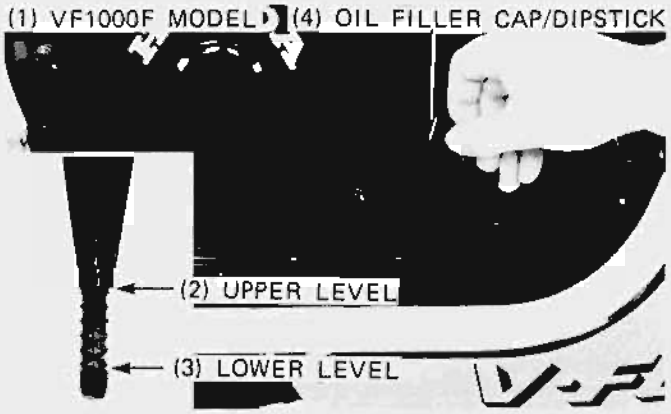
On VF1000F-II model, remove the oil level inspection lid.
Remove the oil filler cap/dipstick, wipe it clean and insert it without screwing it in. Remove the filler cap/dipstick and check the oil level.
The oil level should be between the upper and lower level marks on the dipstick.

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

On VF1000F-II model, reinstall the inspection lid.

Start the engine and check the oil pressure with the oil pressure warning light. The light should go off within 2–3 seconds after the engine starts.
If it does not, stop the engine and check the oil pump, oil circuit and/or oil pressure switch.





ENGIE OIL & FILTER CHANGE

NOTE

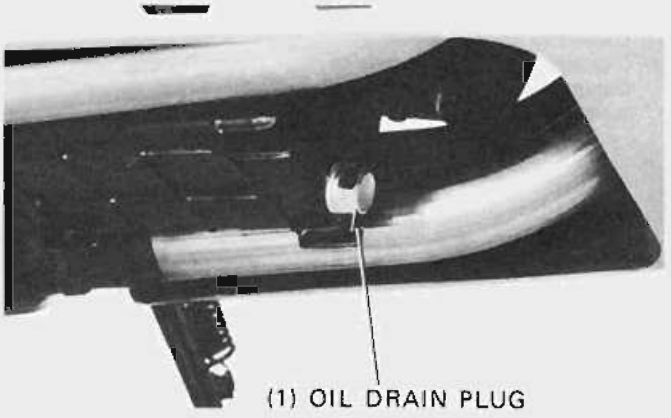
- Change engine oil with the engine warm and the motorcycle on its center stand to assure complete and rapid draining.

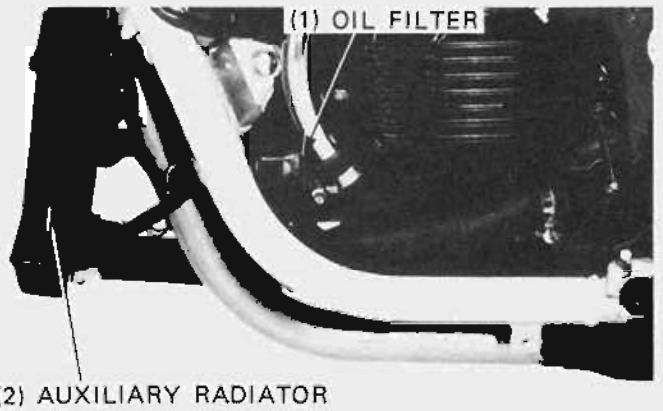
Stop the engine.
Remove the oil filler cap/dipstick, oil drain plug and drain the oil.

Remove the lower cowl.

On VF1000F-II model, remove the auxiliary radiator mount bolts. Move the auxiliary radiator away from the engine, but do not disconnect its hoses.

Remove the oil filter with a filter wrench (07912–6110001) and let the remaining oil drain out. Discard the oil filter.





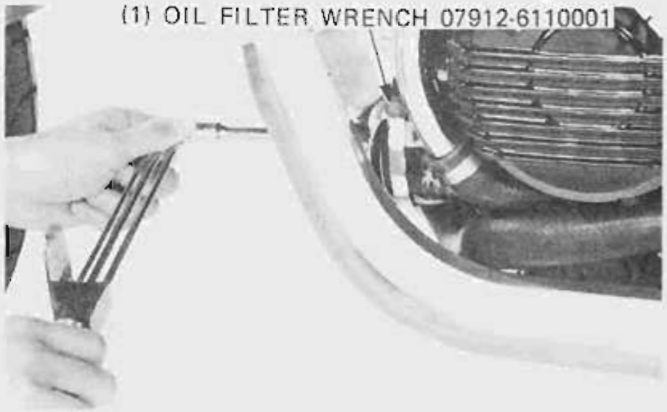
Check that the sealing washer on the drain plug is in good condition and install the plug. Replace the oil filter with a new one. Check that the oil filter O-ring is in good condition, and coat it with oil before installing it.
Install and tighten the oil filter.

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

Fill the crankcase with the recommended oil (page 2-1).
CAPACITY:
VF1000F:2.9 liters (3.1 US qt, 2.55 Imp qt)
VF1000F-II: 3.0 liters (3.2 US qt, 2.64 Imp qt)
Reinstall the oil filler cap/dipstick.

Start the engine and let it idle for 2–3 minutes, then stop the engine.
Make sure that the oil level is at the upper level mark on the dipstick.
Make sure that there are no oil leaks.

On VF1000F-II model, reinstall the auxiliary radiator.
Install the lower cowl.



OIL STRAINER/PRESSURE RELIEF VALVE

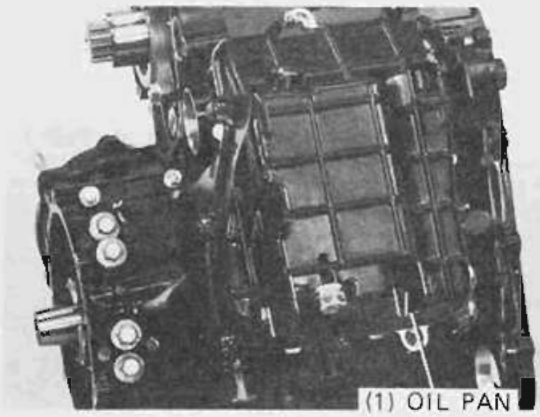
NOTE

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

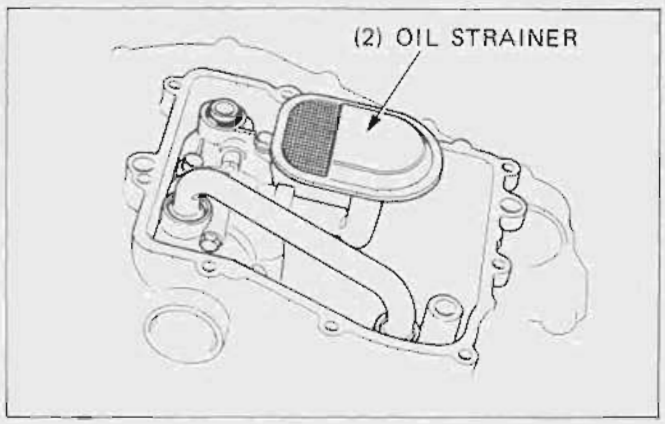
Remove the lower cowl.
Remove the exhaust chamber.

Drain the engine oil (page 2-3).

Remove the oil pan bolts and oil pan.

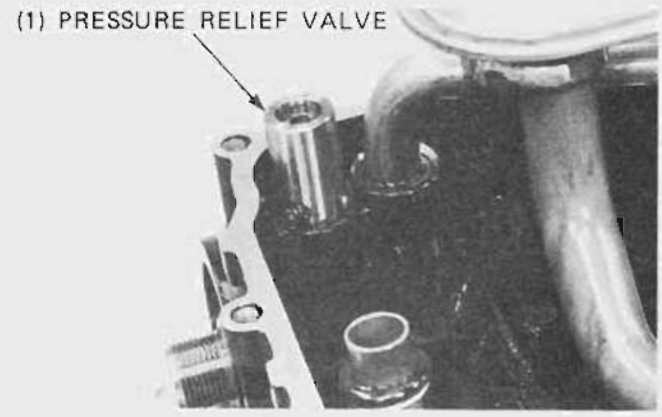


Remove and clean the oil strainer.

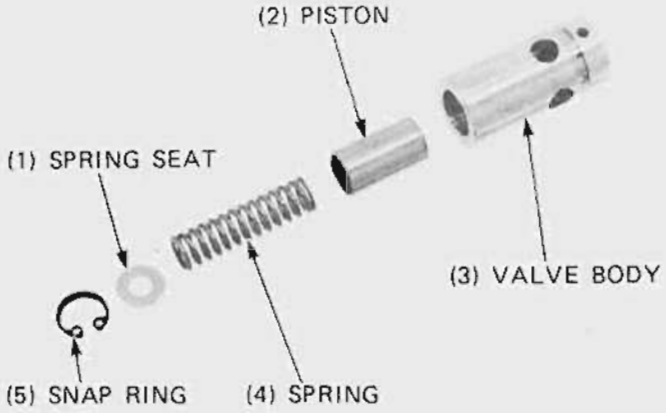


Remove the oil pressure relief valve.

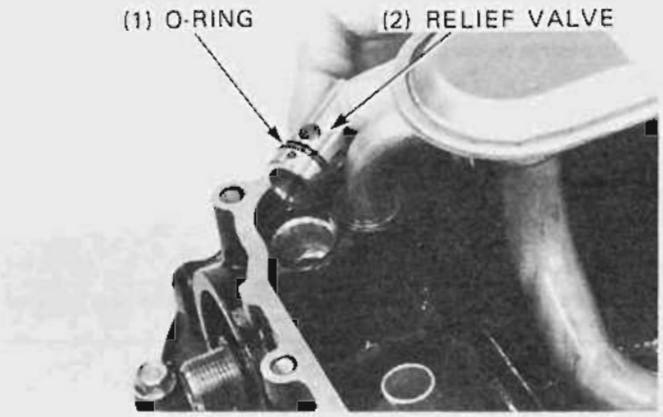
Check the operation of the pressure relief valve.



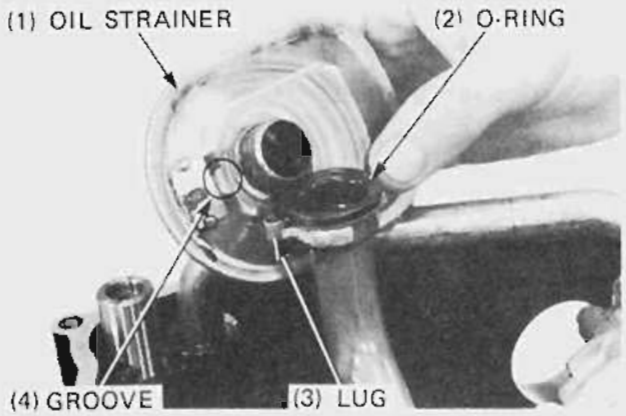
Disassemble the relief valve by removing the snap ring.
Inspect the piston for wear, sticking or damage.
Inspect the spring for weak or damage.
Assemble the relief valve in the reverse order of disassembly.



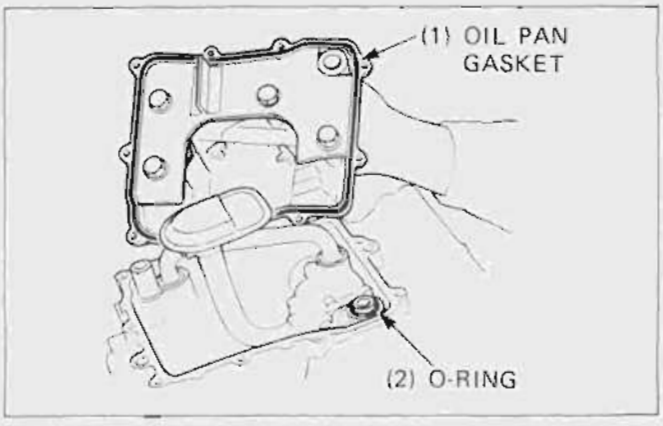
Make sure that the O-ring is in good condition and install the relief valve.



Make sure the O-ring is in good condition and install the oil strainer aligning its groove with the lug on the oil strainer tube pipe.



On VF1000F-II model, make sure that the O-ring on the oil pump of the oil cooler circuit is in good condition.
Install the oil pan with a new gasket.
Tighten the oil pan bolts in 2–3 steps in a crisscross pattern.
Install the exhaust pipes.
Fill the crankcase with the recommended oil (page 2-1).
Install the lower cowl.



OIL PRESSURE CHECK

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

Start the engine and check the oil pressure at 5,000 rpm.

OIL PRESSURE:
540 ± 70 kPa (5.4 ± 0.7 kg/cm², 77 ± 10 psi) at 5,000 min⁻¹ (rpm) (80°C/176°F)


(1) OIL PRESSURE SWITCH

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

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


(1) OIL PRESSURE GUAGE 07506–3000000
(2) OIL PRESSURE GAUGE ATTACHMENT 07510–4220100

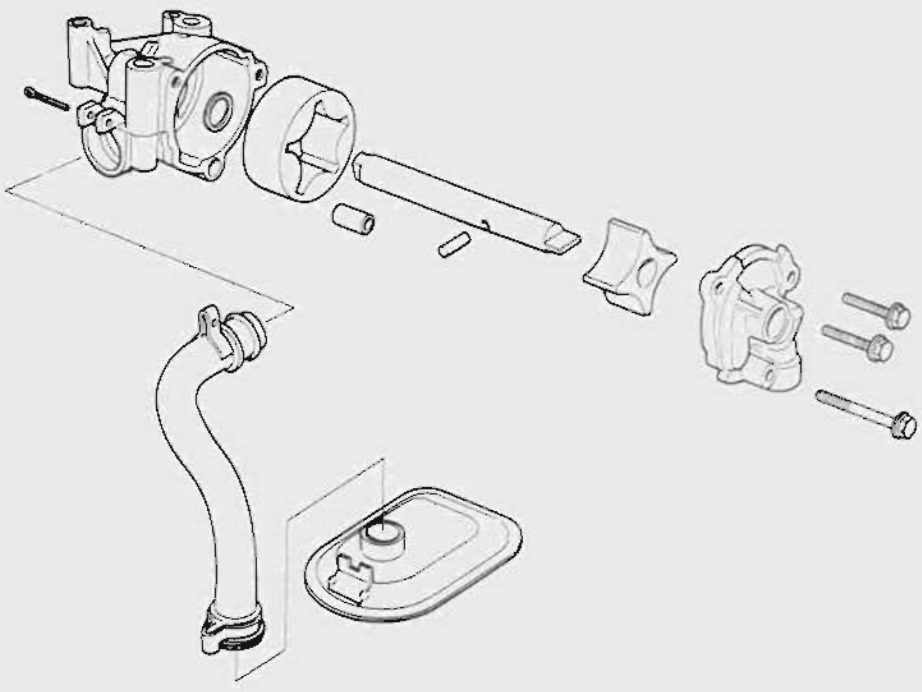
Connect the oil pressure swtich wire.
Start the engine and check the oil pressure warning light.
The warning light should go off within few seconds after the engine starts.
If the warning light stays on, stop the engine immediately and determine the cause.

OIL PUMP

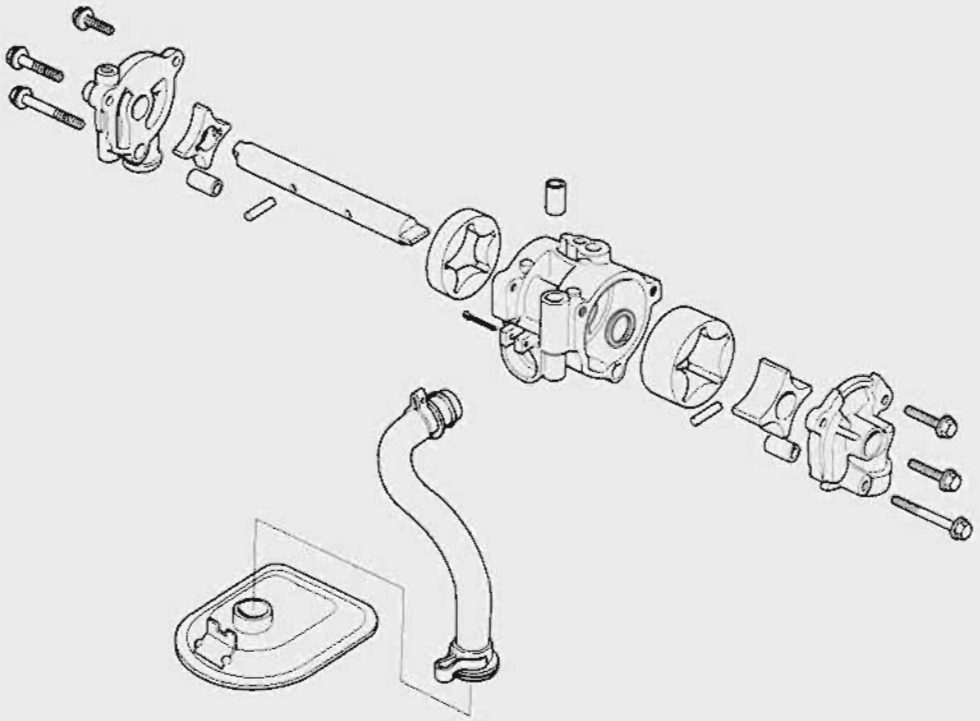
NOTE

- The oil pump of the VF1000F-II model is different from the one of the VF1000F model and has two trochoid pump; one is for the oil cooler circuit and the other is for the engine lubrication circuit. The figures show those of VF1000F-II model.

VF1000F model



VF1000F-II model

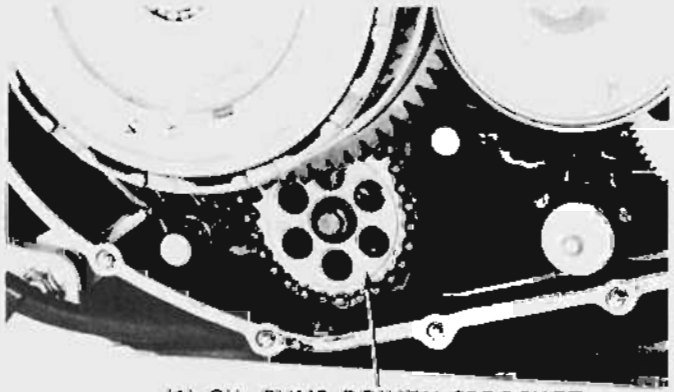


REMOVAL

NOTE

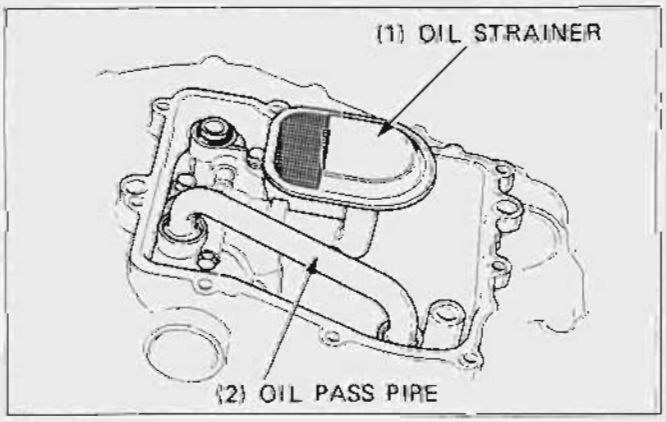
- The oil pump can be removed with the engine mounted in the frame.

Drain the engine oil.
Remove the clutch cover.
Remove the oil pump driven sprocket by removing the bolt and washer.



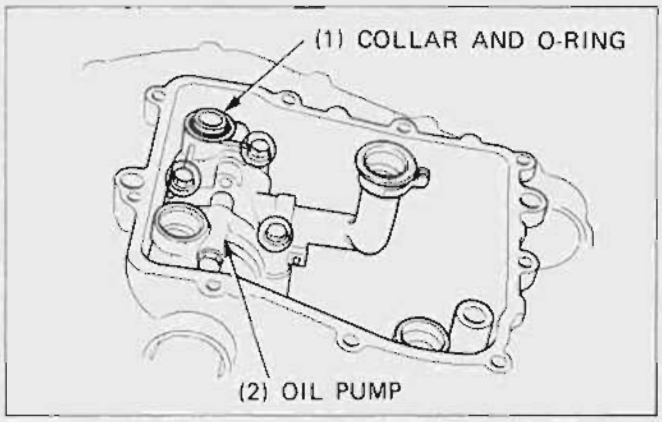
(1) OIL PUMP DRIVEN SPROCKET

Remove the oil pan (page 2–4).
Remove the oil strainer and oil pass pipe.

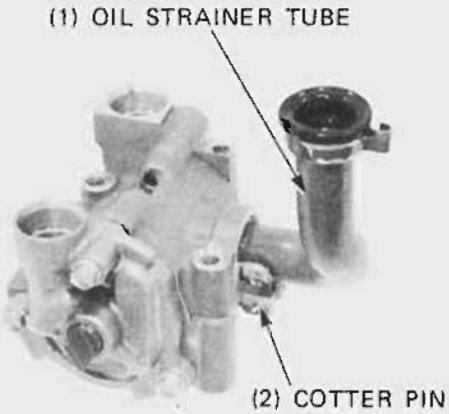


On VF1000F-II model, remove the collar and O-ring from the oil cooler pump.

Remove the three mounting bolts and the oil pump.



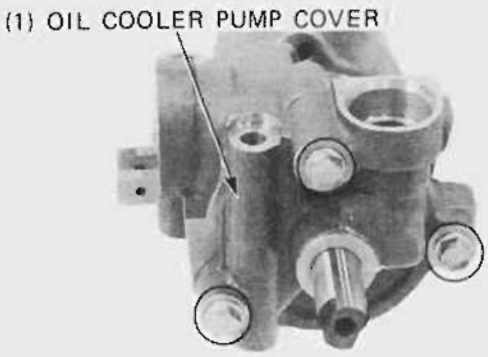
Remove the cotter pin and the oil strainer tube from the oil pump body.



DISASSEMBLY

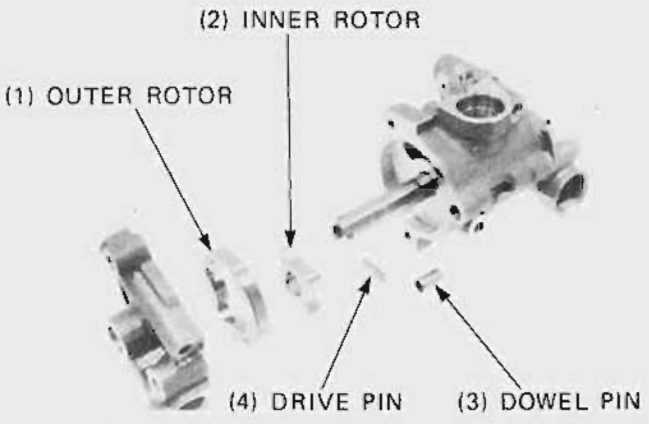
Oil cooler pump (VF1000F-II model only)

Remove the oil cooler pump cover.



Remove the dowel pin, inner and outer rotors from the pump body.

Remove the drive pin from the rotor shaft.



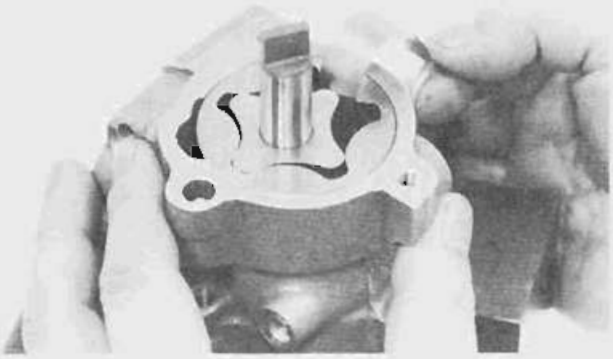
Lubricating oil pump.
Remove the oil pump body cover.
Remove the dowel pin from the pump body.



(1) OIL PUMP BODY COVER

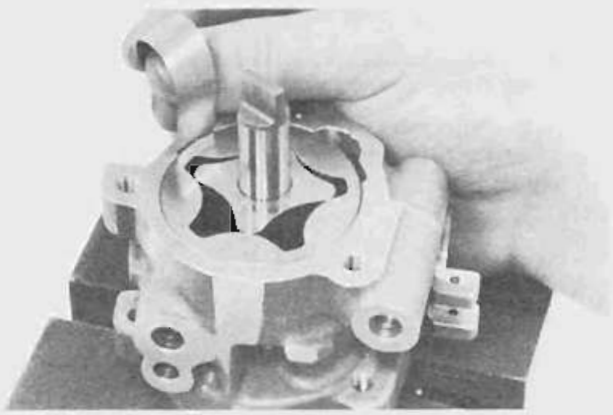
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



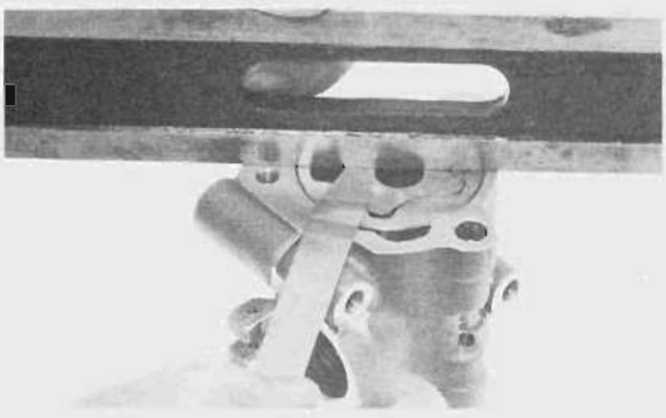
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



On VF1000F-II model, remove the oil cooler pump (page 2-8).
Remove the rotor shaft and measure the pump end clearance.

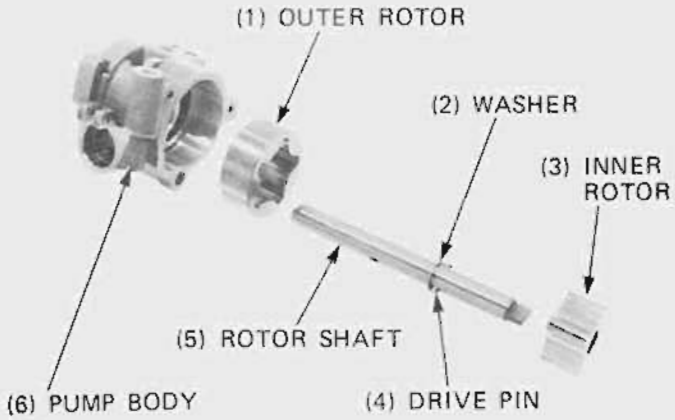
SERVICE LIMIT: 0.10 mm (0.004 in)



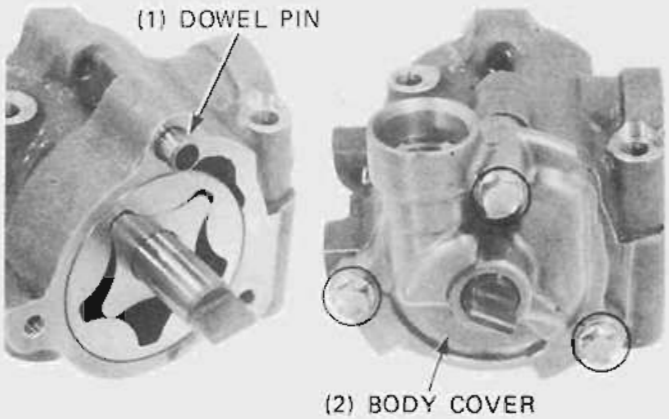
ASSEMBLY

Lubricating oil pump

Install the washer onto the rotor shaft.
Insert the drive pin into the rotor shaft.
Install the outer rotor into the pump body and inset the rotor shaft.
Install the inner rotor onto the rotor shaft, aligning the slots in the rotor with the drive pin.

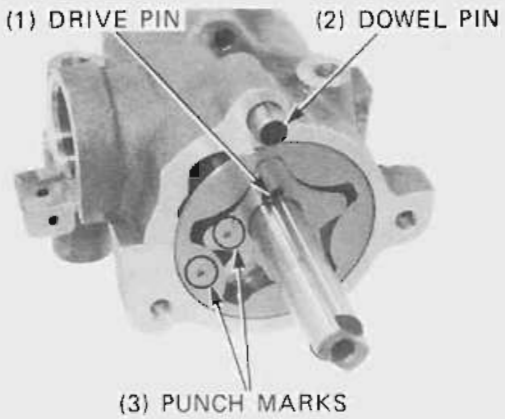


Install the dowel pin and the pump body cover.

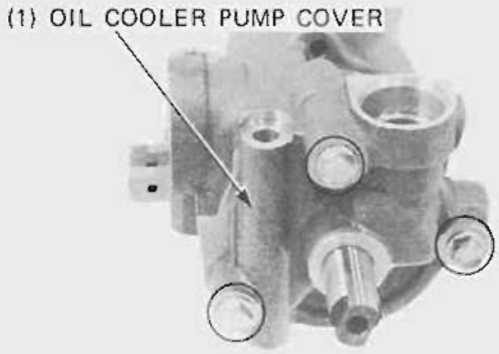


Oil cooler pump (VF1000F-II model only)

Insert the drive pin into the rotor shaft.
Install the outer rotor with the punch mark facing out.
Install the inner rotor with the punch mark facing out, aligning the cutouts with the drive pin.
Install the dowel pin.

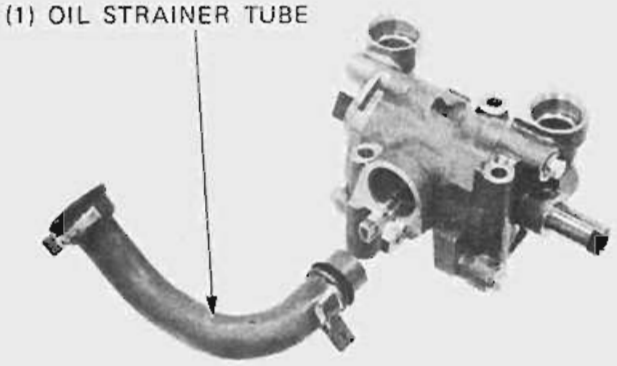


Install the oil cooler pump coer.

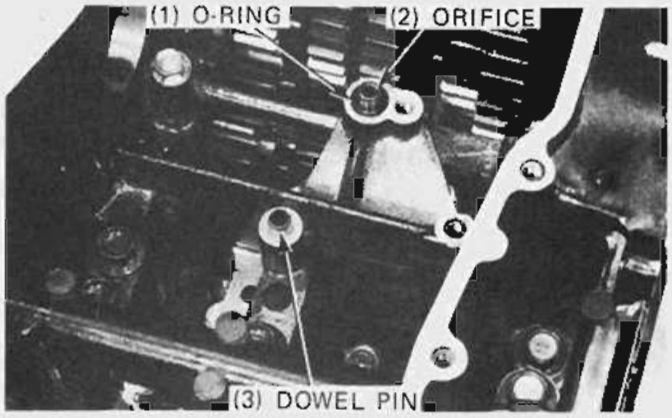


INSTALLATION

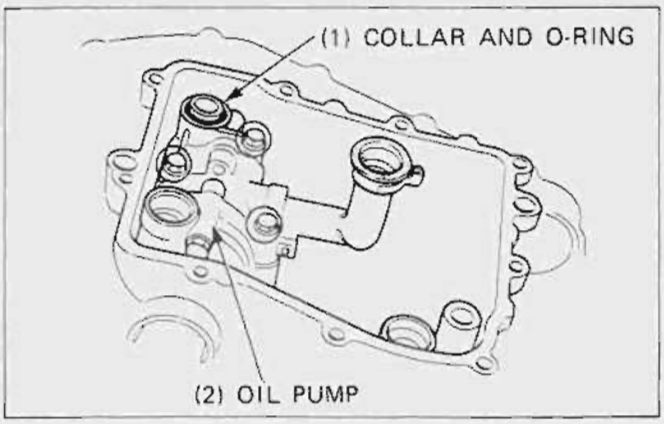
Make sure that the oil strainer tube O-ring is in good condition and install the oil strainer tube with a new cotter pin.



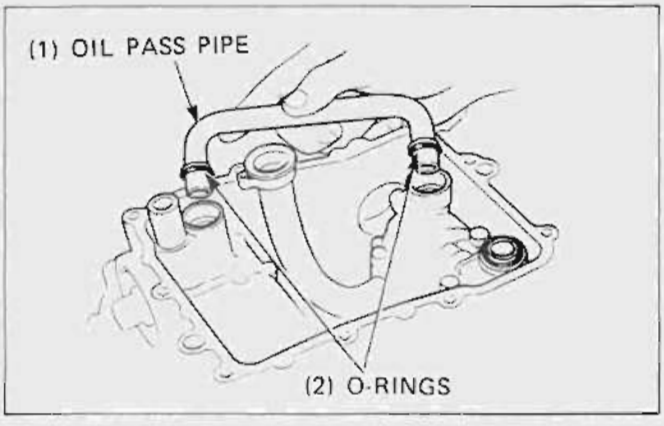
Install the dowel pin, oil orifice and a new O-ring.



Install the oil pump and tighten the three mounting bolts.
Make sure that the oil pump shaft rotates freely.
On VF1000F-II model, install the O-ring and collar onto the oil cooler pump outlet, making sure that the O-ring is in good condition.

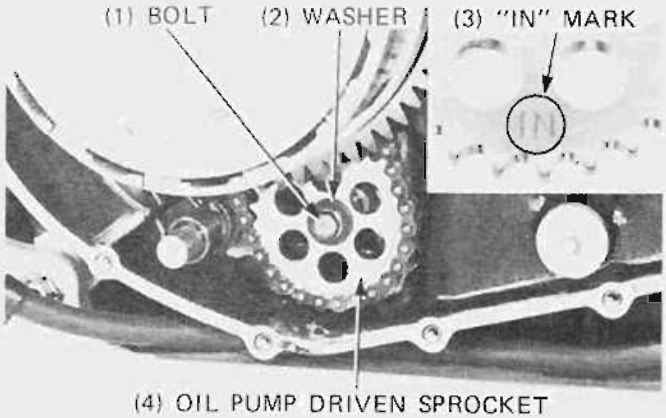


Make sure the O-rings on the oil pass pipe are in good condition and install the oil pass pipe.
Install the oil strainer and oil pan (page 2-5).



Place the oil pump driven sprocket into the oil pump drive chain with the "IN" mark facing to the crankcase.

Install the driven sprocket onto the shaft.
Install the washer and tighten the bolts securely.
Install the clutch cover (page 7-18).



OIL COOLER (VF1000F-II MODEL ONLY)

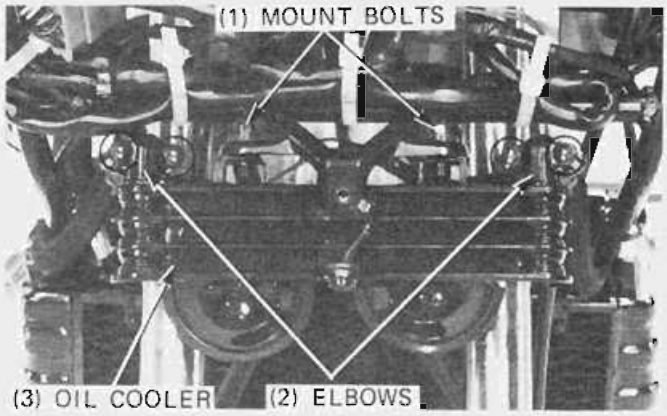
INSPECTION

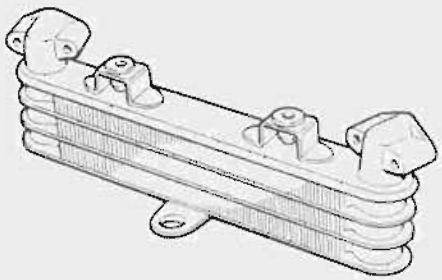
Remove the fairing (page 14-1).

Inspect the oil cooler soldered joints and seams for leaks.
Blow dirt out from between core fins with compressed air.
If insects, etc., are clogging the oil cooler, wash them off with low pressure water.
Carefully straighten any bent fins.

REMOVAL

Drain the engine oil (page 2-3).
Disconnect the oil inlet and outlet hoses at the elbows by removing the four bolts.
Remove the two mount bolts and the oil cooler.





INSTALLATION

Replace the O-rings on the hose ends with new ones.

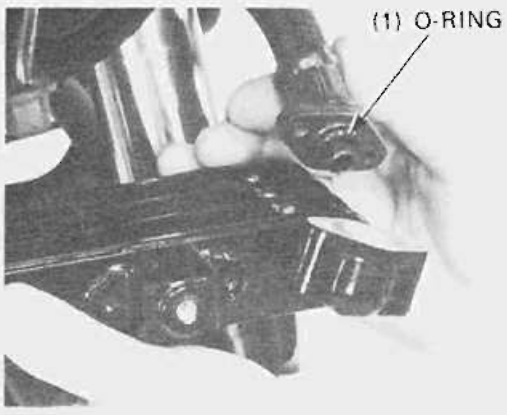
Set the oil cooler on the rubber mount and tighten the two mount bolts securely.

Connect the oil inlet and outlet hoses to the elbows of the oil cooler and tighten the four bolts.

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

Fill the crankcase with the recommended oil (page 2-3).
Start the engine and check for oil leaks.

Install the fairing (page 14-1).

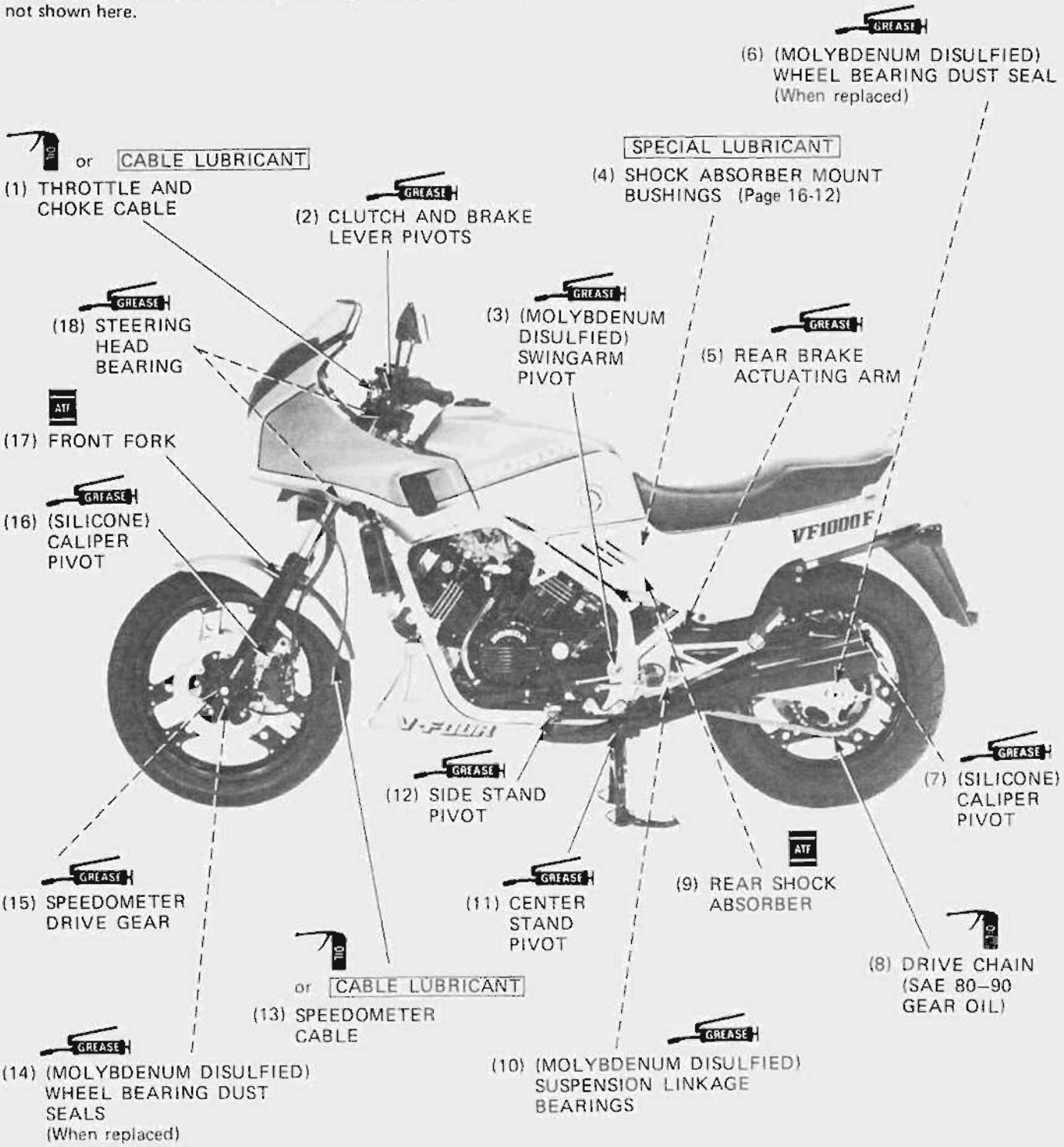


CONTROL CABLE LUBRICATION

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

LUBRICATION POINTS

Use general purpose grease when no other specification is given. Apply oil or grease to any 2 sliding surfaces and cables not shown here.



3 MAINTENANCE

SERVICE INFORMATION	3-1	CYLINDER COMPRESSION	3-11
MAINTENCANCE SCHEDULE	3-3	DRIVE CHAIN	3-11
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FUEL FILTER	3-4	BRAKE FLUID	3-13
THROTTLE OPERATION	3-5	BRAKE PAD WEAR	3-13
CARBURETOR CHOKE	3-5	BRAKE SYSTEM	3-14
AIR CLEANER	3-6	BRAKE LIGHT SWITCH	3-14
CRANKCASE BREATHER	3-6	HEADLIGHT AIM	3-14
SPARK PLUGS	3-7	CLUTCH	3-15
VALVE CLEARANCE	3-7	SIDE STAND	3-15
CARBURETOR SYNCHRONIZATION	3-9	SUSPENSION	3-15
CARBURETOR IDLE SPEED	3-10	NUTS, BOLTS, FASTENERS	3-17
RADIATOR COOLANT	3-10	WHEELS	3-17
RADIATOR CORE	3-10	STEERING HEAD BEARINGS	3-18
COOLING SYSTEM HOSES & CONNECTIONS	3-10		

SERVICE INFORMATION

GENERAL

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

WARNING

- *Support the motorcycle on the center stand on a level surface before starting any work.*
- *When 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.*

SPECIFICATIONS

<ENGINE>

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

Spark plugs:

< > : U

Standard		For cold climate (below 5°C, 41°F)	
NGK	ND	NGK	ND
DPR9EA-9 <DP9EA-9>	X27EPR-U9 <X27EP-U9>	DPR8EA-9 <DP8EA-9>	X24EPR-U9 <X24EP-U9>

Spark plug gap: 0.8–0.9 mm (0.031–0.035 in)
Valve clearance
Cold (Below 35°C, 95°F): Intake/Exhaust: 0.14 mm (0.0055 in)
Idle speed: 1,000 ± 100 min^{-1} (rpm)
Carburetor synchronization: All carburetors within 60 mm (2.4 in) Hg
Cylinder compression: 1,275 ± 196 kPa (13.0 ± 2.0 kg/cm^2, 185 ± 28 psi)

<CHASSIS>

Drive chain slack: 15–25 mm (5/8–1 in)
Suspension air pressure: Front, 0– 40 kPa (0–0.4 kg/cm^2, 0–6 psi)
Rear, 0–300 kPa (0–3.0 kg/cm^2, 0–43 psi)

Tire:

Tire size		Front	Rear
		100/90V18-V250	*140/80VR17-V250 140/80V17-V250
Cold tire pressure, kPa (kg/cm^2, psi)	Drive only	250 (2.50, 36)	290 (2.90, 42)
	Driver and one passenger	250 (2.50, 36)	290 (2.90, 42)
Tire brand	Bridgestone	G531	G532, *G520, *R104
	Dunlop	K500	K500, *K400

* No application for SW and optional for other models.

TORQUE VALUES

Valve adjusting screw lock nut	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
Rear axle nut	85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

TOOLS

Special

Vacuum gauge	07404–0020000
Carburetor pilot screw wrench	07908–4220201
Valve adjusting wrench	07908–MB00100
Compression gauge attachment	07510–MB00101

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

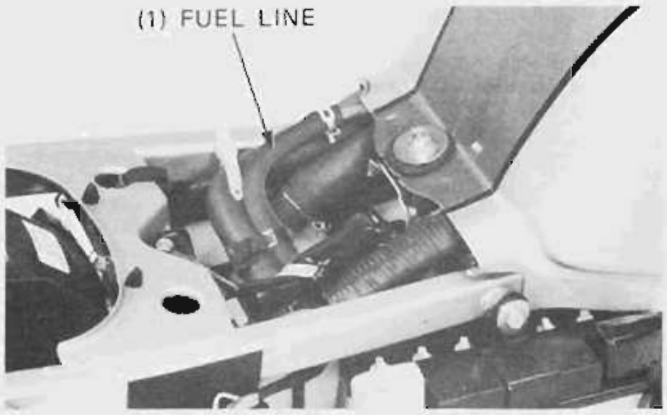
	ITEM / FREQUENCY	WHICHEVER COMES FIRST / EVERY	ODOMETER READING (NOTE 3) 1,000 km (600 mi)	6,000 km (3,750 mi)	12,000 km (7,500 mi)	18,000 km (11,250 mi)	24,000 km (15,000 mi)	30,000 km (18,750 mi)	36,000 km (22,500 mi)	Refer to page
*	FUEL LINES				I		I		I	3-4
*	FUEL FILTER								R	3-4
*	THROTTLE OPERATION				I		I		I	3-5
*	CARBURETOR-CHOKE				I		I		I	3-5
*	AIR CLEANER	NOTE 1			R		R		R	3-6
	CRANKCASE BREAHTER	NOTE 2		C	C	C	C	C	C	3-6
	SPARK PLUGS			I	R	I	R	I	R	3-7
*	VALVE CLEARANCE		I		I		I		I	3-7
	ENGINE OIL	YEAR	R		R		R		R	2-3
	ENGINE OIL FILTER	YEAR	R		R		R		R	2-3
*	CARBURETOR SYNCHRONIZATION		I		I		I		I	3-9
*	CARBURETOR IDLE SPEED		I	I	I	I	I	I	I	3-10
	RADIATOR COOLANT				I		I		*R	3-10
*	RADIATOR CORE				I		I		I	3-10
*	COOLING SYSTEM HOSES & CONNECTIONS				I		I		I	3-10
	DRIVE CHAIN		I, L EVERY 1,000 km (600 mi)							3-11
	BATTERY	MONTH		I	I	I	I	I	I	3-12
	BRAKE FLUID	MONTH I 2 YEARS *R		I	I	*R	I	I	*R	3-13
	BRAKE PAD WEAR			I	I	I	I	I	I	3-13
	BRAKE SYSTEM		I		I		I		I	3-14
*	BRAKE LIGHT SWITCH				I		I		I	3-14
*	HEADLIGHT AIM				I		I		I	3-14
	CLUTCH FLUID	MONTH I 2 YEARS *R		I	I	*R	I	I	*R	3-15
	CLUTCH SYSTEM				I		I		I	3-15
	SIDE STAND				I		I		I	3-15
*	SUSPENSION				I		I		I	3-15
*	NUTS, BOLTS, FASTENERS		I		I		I		I	3-17
**	WHEELS				I		I		I	3-17
**	STEERING HEAD BEARINGS		I		I		I		I	3-18

* 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 THAT 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.

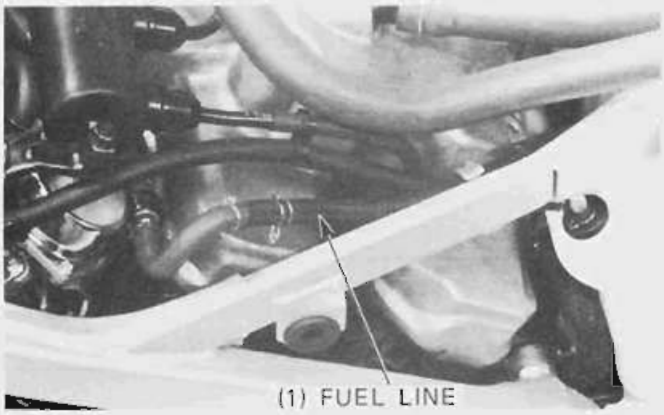
FUEL LINES

Remove the seat and check the fuel line between the fuel tank and fuel filter.



Remove the fuel tank and check the fuel line between the fuel filter and carburetor.

Replace any parts which show deterioration, damage or leakage.



FUEL FILTER

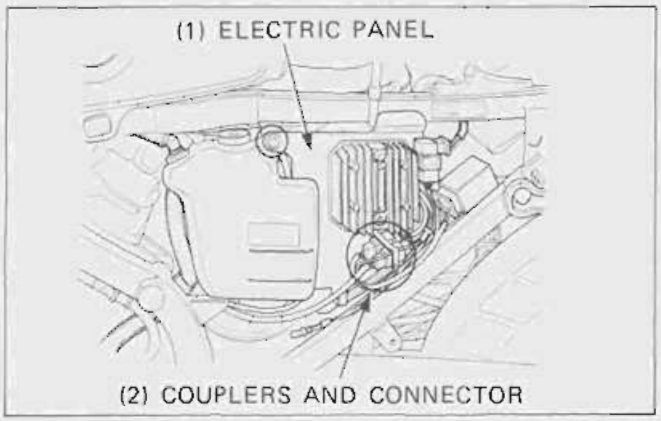
WARNING

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

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

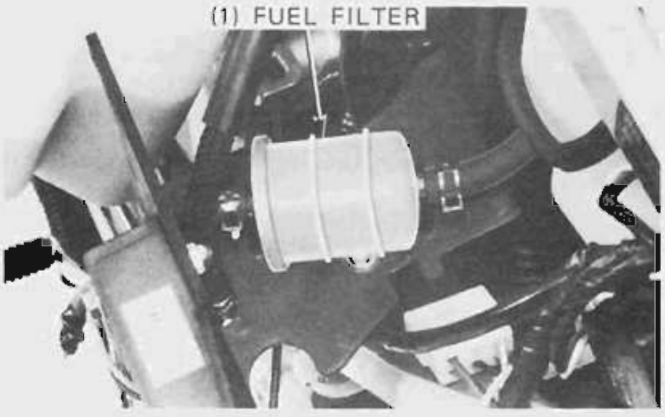
Remove the seat and left frame side cover.

Disconnect the regulator/rectifier and alternator wire couplers and neutral switch wire connector.



Remove the electric panel mounting bolts and pull the panel out of the frame.

Remove the fuel filter from the electric panel.
Clamp the fuel inlet line and disconnect the fuel lines from the filter.



Install the fuel filter in the reverse order of removal.

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

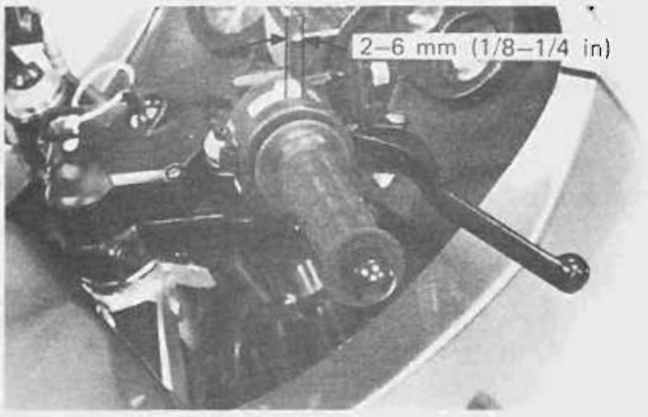
THROTTLE OPERATION

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

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

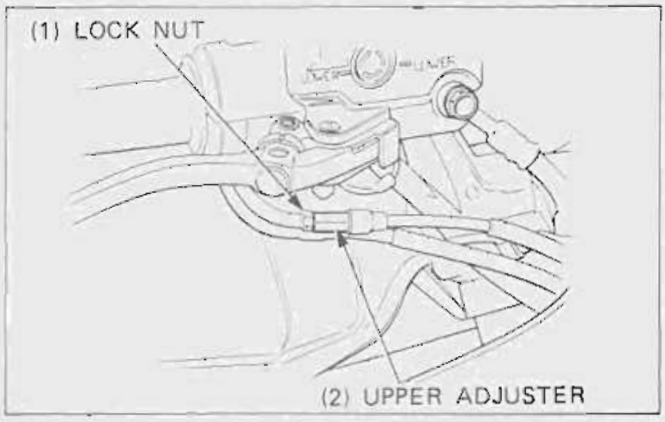
Measure throttle grip free play at the throttle grip flange.

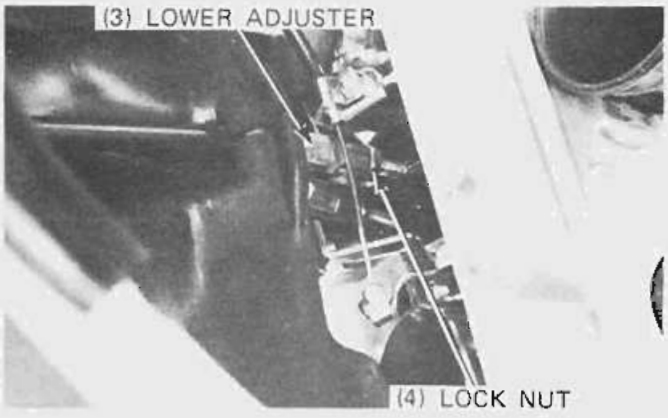
FREE PLAY: 2–6 mm (1/8–1/4 in)



Adjustment can be made at either end of the throttle cable. Minor adjustments are made with the upper adjuster and major adjustments are made with the lower adjuster after removing the fuel tank and air cleaner case.
Adjust by loosening the lock nut and turning the adjuster.
Tighten the lock nut and recheck throttle operation.

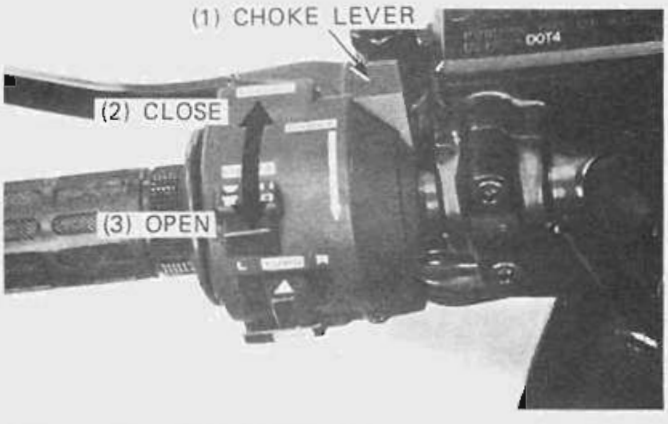
Install the air cleaner case and fuel tank, and check throttle free paly once more. Also check for fuel leaks.





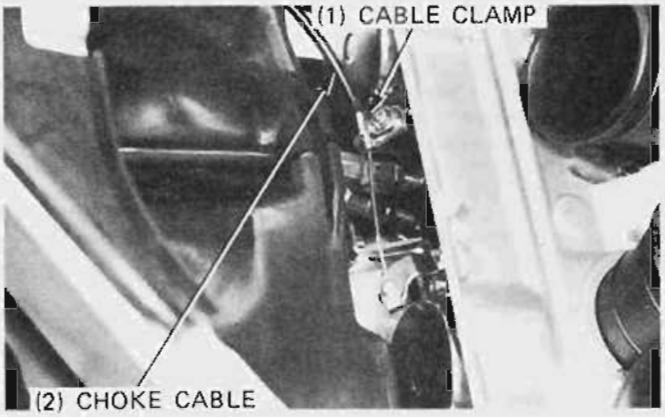
CARBURETOR CHOKE

The choke system uses a fuel enrichening circuit controlled by a bystarter valve. The bystarter valve opens the enrichening circuit via cable when the choke lever on the handlebar is pulled back.
Check for smooth operation of the choke lever.
Lubricate the choke cable, if the operation is not smooth.
Pull the choke lever on the handlebar all the way back to the fully open. Make sure the choke valve is open by trying to move the choke lever on the carburetor, after removing the fuel tank and air cleaner case.
There should be no free play.



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

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



AIR CLEANER

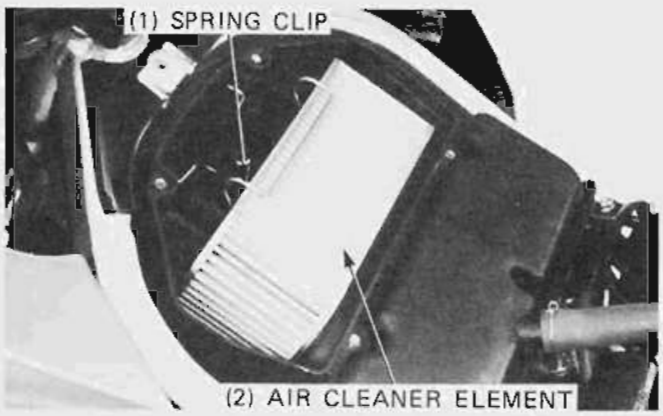
Remove the fuel tank.
Remove the air cleaner case cover screws and the cover.



Remove the spring clip and the air cleaner element.
Discard the element in accordance with the maintenance schedule.

Also, replace the element any time it is excessively dirty or damaged.

Install a new element and secure it with the spring clip.
Install the air cleaner cover and fuel tank.



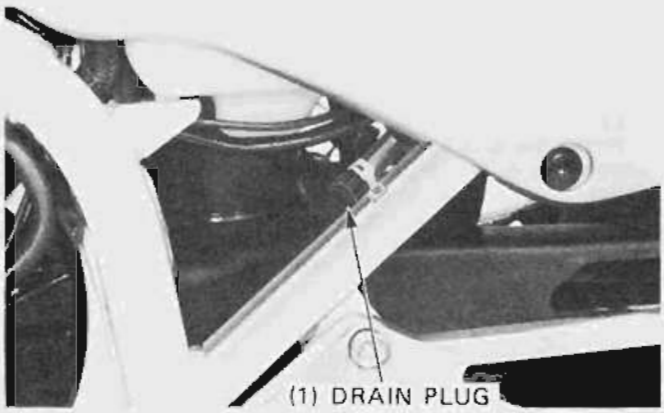
CRANKCASE BREATHER

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

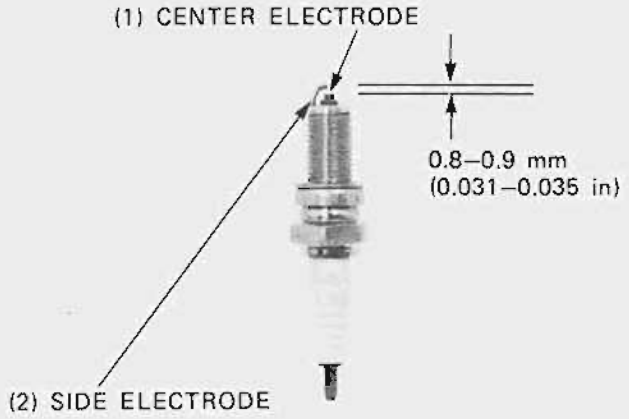
Install the drain plug.

NOTE

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



SPARK PLUGS



RECOMMENDED SPARK PLUGS

< >: U

	NGK	ND
Standard	DPR9EA-9 <DP9EA-9>	X27EPR-U9 <X27EP-U9>
For cold Climate (Below 5°C, 41°F)	DPR8EA-9 <DP8EA-9>	X24EPR-U9 <X27EP-U9>

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

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

Adjust by bending the side electrode carefully.
With the plug washer attached, thread each spark plug in by hand to prevent crossthreading. Continue tightening by hand until the spark plug bottoms. Then, 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

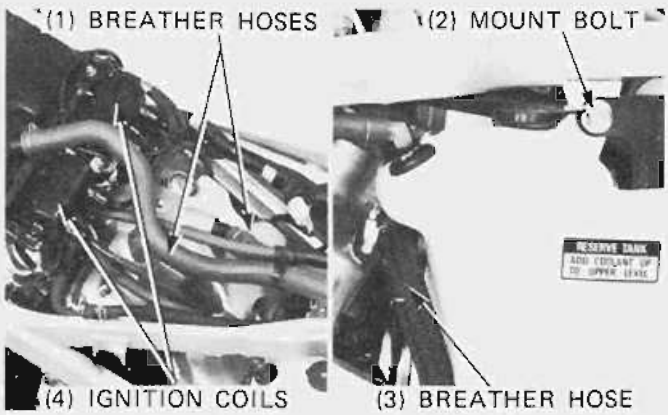
- Inspect and adjust valve clearance while the engine is cold (below 35°C, 95°F).

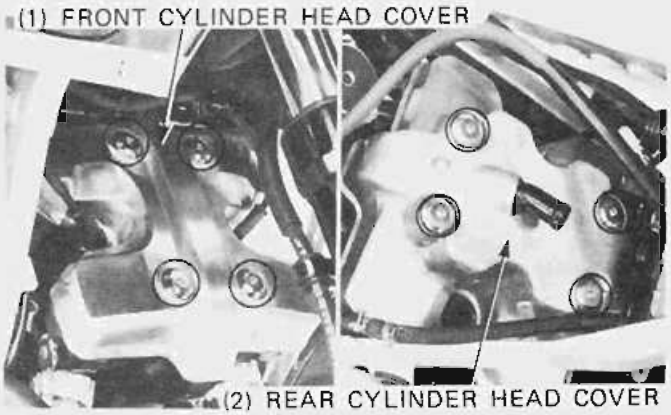
Remove the cooling fan (page 6-7).
Remove the fuel tank (page 4-3)

Disconnect the breather hoses from the air cleaner case and rear cylinder head cover.
Remove the spark plug caps from the plugs and remove the ignition coils with their brackets.
Remove the reservoir tank mount bolt and the reservoir tank.
Disconnect the breather hose from the rear cylinder head cover.

Remove the front and rear cylinder head covers.

Remove the alternator cover. (page 9-2).

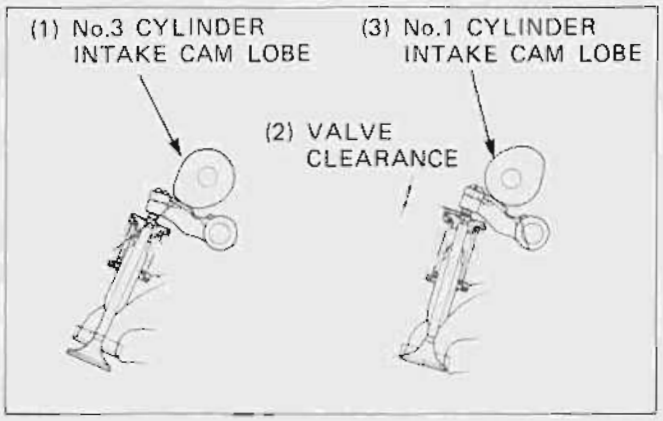




To check the No. 1 cylinder intake valve clearances, turn the crankshaft counterclockwise so that the No. 3 cylinder intake valves are at maximum lift.

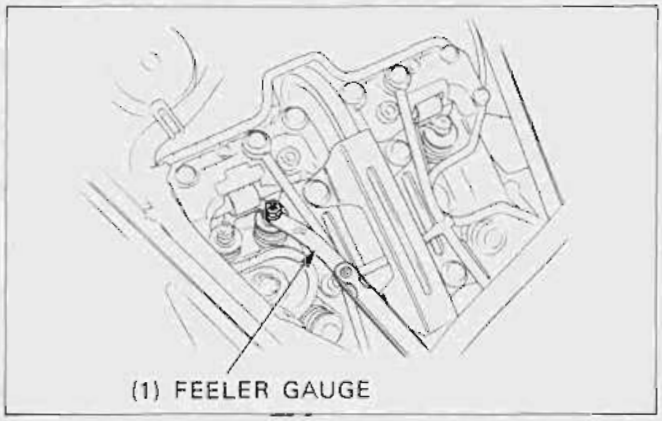
NOTE

- When checking and adjusting the valve clearance, the adjacent cam lobes of the same camshaft as to be checked and adjusted must face to the rocker arm and their valves must be at maximum lift.



Check the valve clearances for No. 1 cylinder intake valves using two feeler gauges for each pair of valves; one for each valve that shares a common rocker arm.

VALVE CLEARANCE (IN, EX): 0.14 mm (0.0055 in)



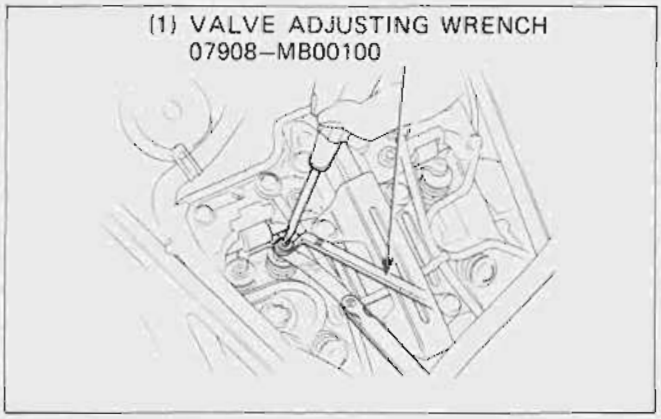
Adjust the valve clearance as follows:
Loosen the lock nuts and turn the adjusting screws until there is a slight drag on both feeler gauges.
Both feeler gauges should remain inserted during adjustment.

Hold the adjusting screws and tighten the lock nuts.

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

CAUTION

- *The lock nuts will come loose if not tightened to the correct torque value.*



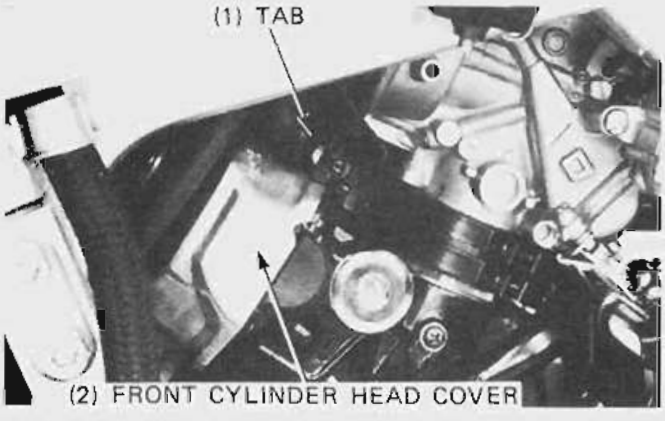
Recheck the valve clearance.

Turn the crankshaft counterclockwise, and check and adjust the remaining valve clearances in the same method as for the No. 1 cylinder intake valves.

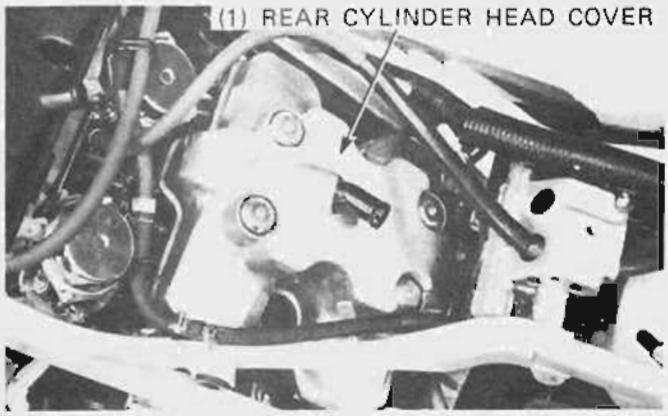
Clean the gasket groove in the cylinder head cover, apply sealant to the gasket groove and install the gasket.
Apply sealant to around the projections of the gasket.

Install the front cylinder head cover with its tabs facing up and tighten the cover bolts.

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



Install the rear cylinder head cover and tighten the cover bolts.
Install the removed parts in the reverse order of removal.



CARBURETOR SYNCHRONIZATION

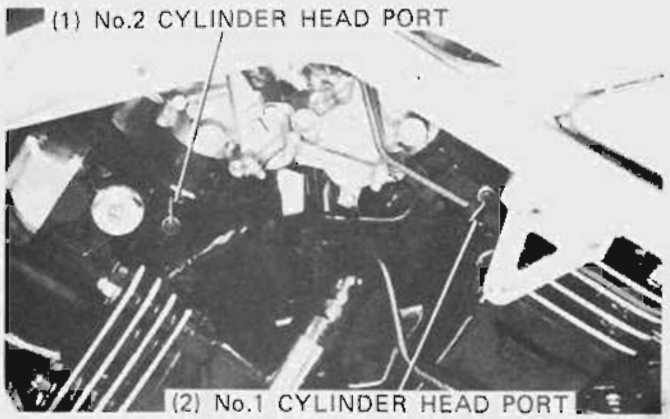
NOTE

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

On VF1000F-II model, remove the under cowl (page 14-1).

Remove the plugs from the No. 1, 2, 3 and 4 cylinder head ports and install the vacuum gauge adapters.

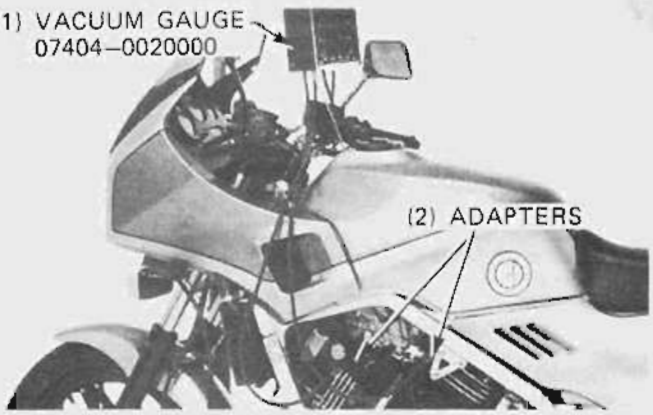
Connect the vacuum gauges.



Start the engine and adjust the idle speed.

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

Check that all carburetors are within 60 mm (2.4 in) Hg.



Synchronize to specification by turning the adjusting screws with a carburetor pilot screw wrench (07908-4220201).

NOTE

- The No. 4 carburetor cannot be adjusted; It is the base carburetor.



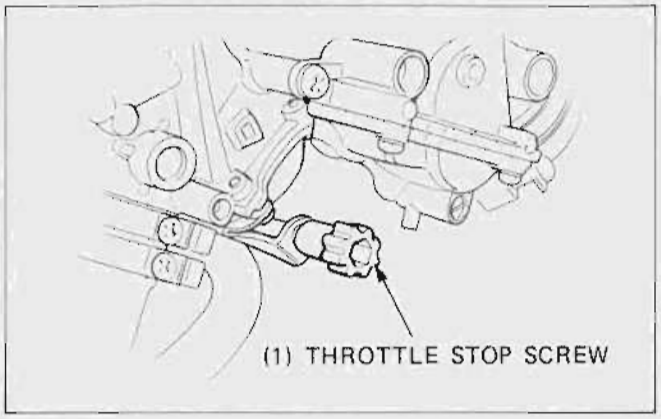
CARBURETOR IDLE SPEED

NOTE

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

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

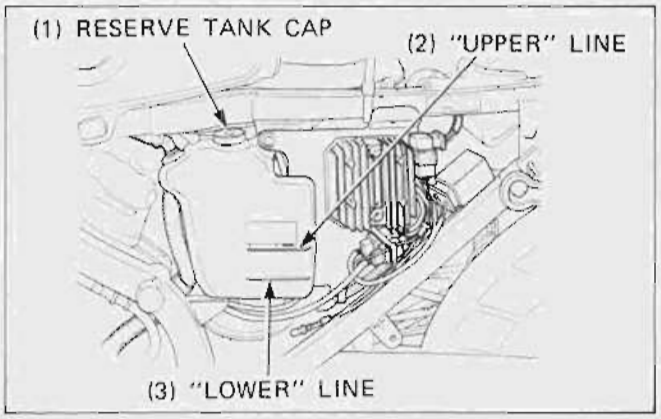
IDLE SPEED: 1,000 ± 100 min^{-1} (rpm)



RADIATOR COOLANT

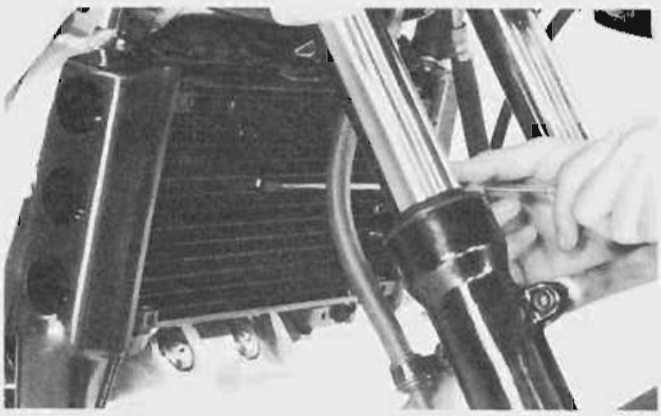
Remove the left frame side cover.

Check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be between the "UPPER" and "LOWER" level lines.
If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and anti-freeze.
Reinstall the cap and frame side cover.



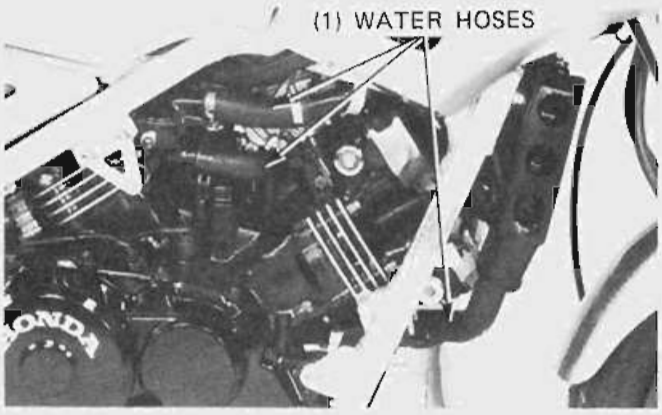
RADIATOR CORE

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



COOLING SYSTEM HOSES & CONNECTIONS

Inspect the hoses for cracks or deterioration, and replace if necessary.
Check the tightness of all hose clamps.



CYLINDER COMPRESSION


(1) COMPRESSION GAUGE ATTACHMENT 07510–MB00101

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

NOTE

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

COMPRESSION PRESSURE:
1,275 ± 196 kPa (13.0 ± 2.0 kg/cm², 185 ± 28 psi)

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

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

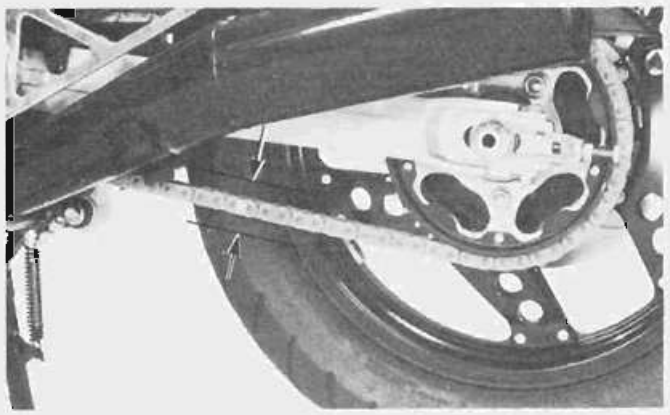
DRIVE CHAIN

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

SLACK: 15–25 mm (5/8–1 in)

CAUTION

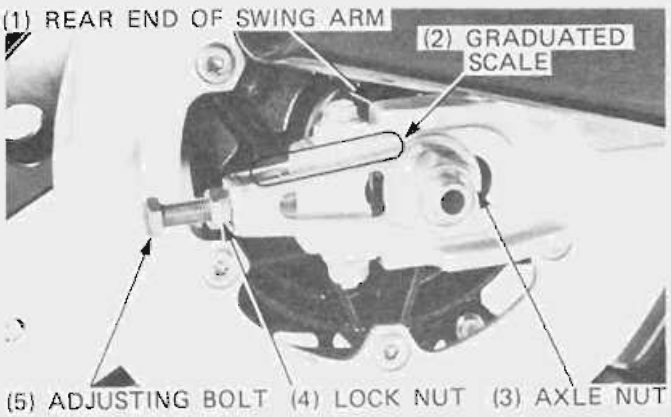
- *Excessive chain slack, 40 mm (1-5/8 in) or more, may damage the frame.*



Adjust as follows:
Loosen the axle nut.
Loosen the adjusting bolt lock nuts.
Turn both adjusting bolts an equal number of turns until the correct drive chain slack is obtained.

CAUTION

- *Make sure that the same alignment marks on both adjusting plates align with the ends of the swingarm.*



Tighten the adjusting bolt lock nuts.

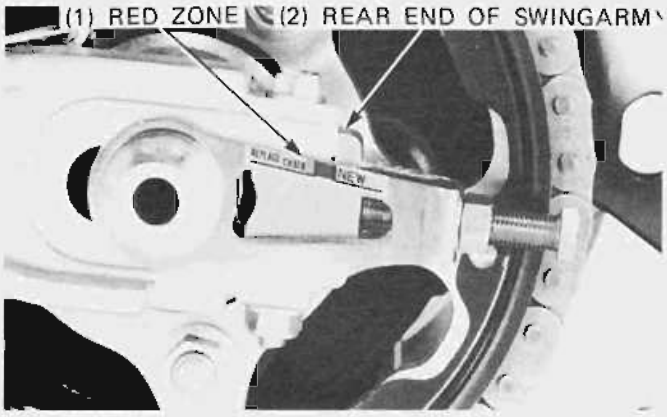
Tighten the rear axle nut.

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

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

Check the chain wear label. If the red zone on the label align, or is beyond, the rear end of the swingarm after the chain has been adjusted, the chain must be replaced.

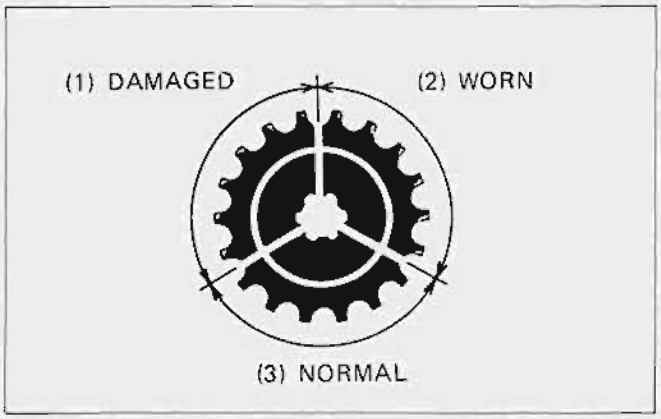
REPLACEMENT CHAIN: D.I.D. 50ZL or RK50LO



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

NOTE

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

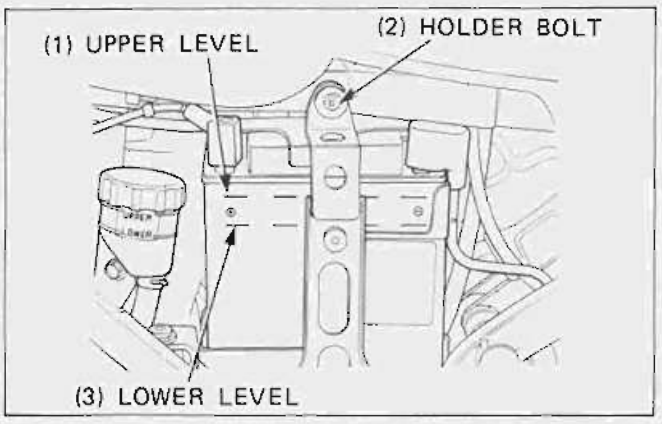


Lubrication and cleaning:
The drive chain on this motorcycle is equipped with small O-rings between the link plates. The O-rings can be damaged by steam cleaner, high pressure washers, and certain solvents. Clean the chain with kerosene. Wipe dry and lubricate only with SEA 80 or 90 gear oil. Commercial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

BATTERY

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

Remove the battery holder bolt, then swing the holder out of the way.



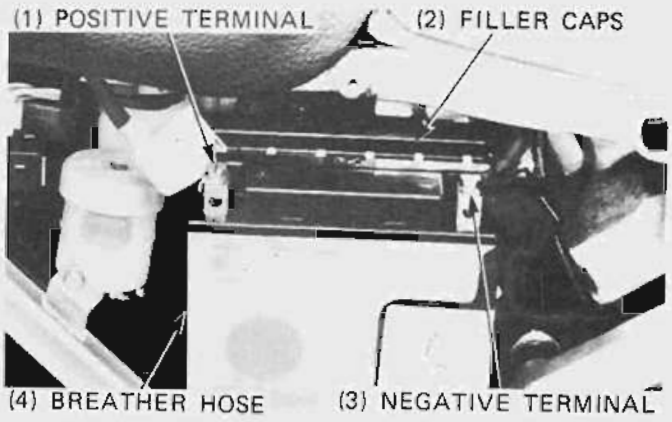
Disconnect the negative cable at the battery, then disconnect the positive cable.
Disconnect the battery breather hose from the battery.
Pull the battery out, remove the filler caps and add distilled water to the upper level line.
Reinstall the filler caps and the battery.

NOTE

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

WARNING

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



BRAKE FLUID

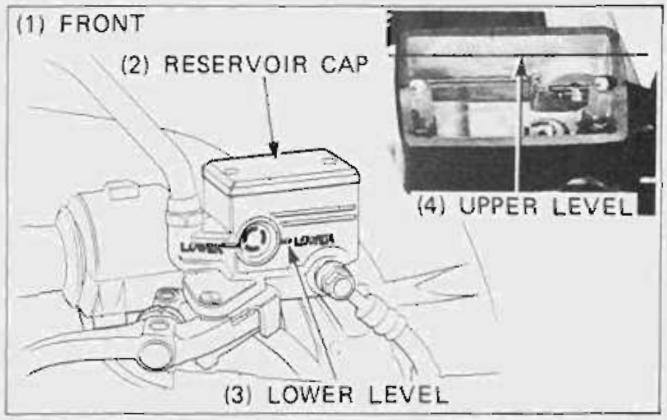
Check the brake fluid level at the brake fluid reservoir.
If the level nears the lower level mark, remove the reservoir cap, set plate and diaphragm and fill the reservoir to the upper level mark with DOT 4 brake fluid from a sealed container.

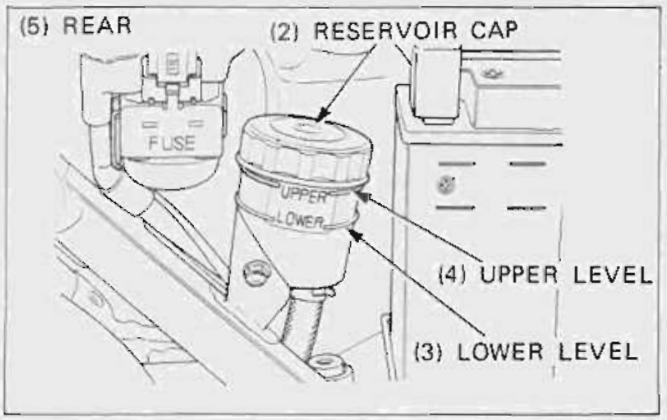
Check the entire system for leaks, if the level is low.

CAUTION

- *Do not remove the reservoir cap until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different type of fluid, as they are not compatible with each other.*
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts.*

Refer to section 17 for brake bleeding procedures.



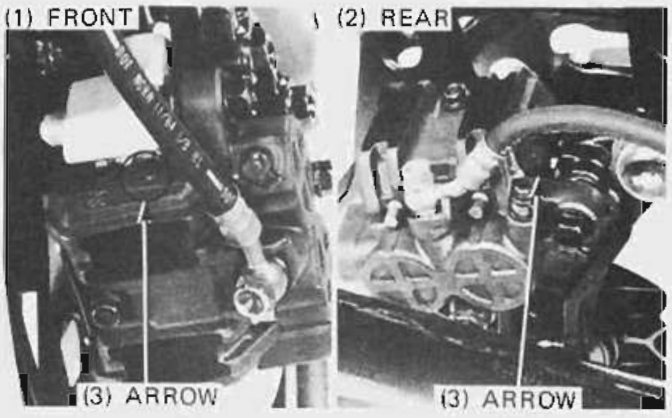


BRAKE PAD WEAR

Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly.
Replace the brake pads if the wear line on the pads reaches the edge of the brake disc (page 17-4).

CAUTION

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



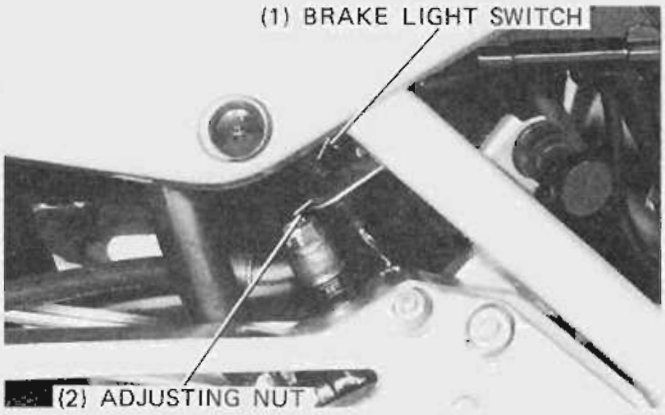
BRAKE SYSTEM

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

BRAKE LIGHT SWITCH

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

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



HEADLIGHT AIM

NOTE

- Adjust the headlight beam as specified by local laws and regualtions.
- On dual headlight model, adjust the right and left headlights individually.

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

WARNING

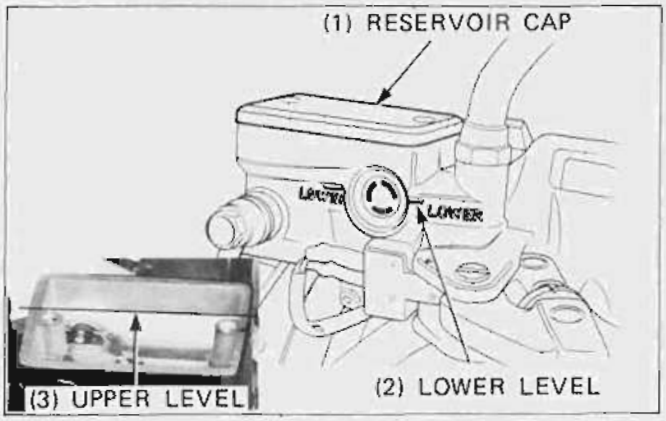
- *An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.*





CLUTCH

Check the clutch fluid level at the clutch master cylinder reservoir. If the level nears the lower level mark, remove the reservoir cap, set plate and diaphragm, and fill the reservoir to the upper level mark with DOT 4 brake fluid from a sealed container.
Check the clutch hydraulic system for leaks if the level is low.

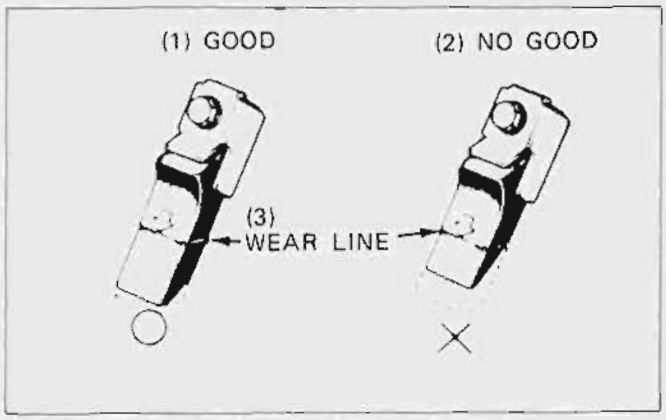


CAUTION

- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts.*
- *Do not remove the reservoir cap until the handlever has been turned so that the reservoir is level.*
- *Do not mix different type of fluid, as they are not compatible with each other.*

SIDE STAND

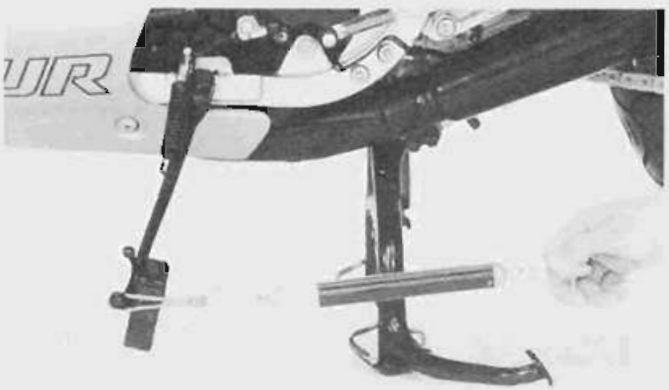
Place the motorcycle on its center stand.
Check the rubber pad on the side stand for deterioration and wear.
Replace the rubber pad if wear extends to the wear line.



NOTE

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

Check the side stand spring for damage or loss of tension.
Spring tension is correct if the measurements fall within 2–3 kg (4.4–6.6 lbs), when pulling the side stand lower end with a spring scale.
Check the side stand assembly for freedom of movement.
Make sure that the side stand is not bent.



SUSPENSION

WARNING

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



FRONT

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

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

AIR PRESSURE:
0–40 kPa (0–0.4 kg/cm², 0–6 psi)


(1) AIR VALVE

ANTI-DIVE SYSTEM INSPECTION

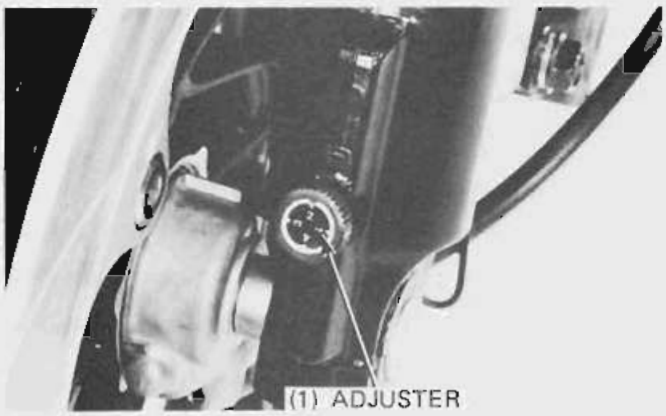
WARNING

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

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

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

Inspect and if necessary, repair the system (Refer to section 15).


(1) ADJUSTER

REAR

Place the motorcycle on its center stand.
Move the rear wheel sideways with force to see if the swingarm bearings are worn.
Replace the bearings if there is any looseness (page 16-14).



Check the action of the rear shock absorbers by compressing them several times.

Check entire shock absorber assembly for leaks or damage.
Replace any damaged components which cannot be repaired.

Tighten all nuts and bolts.

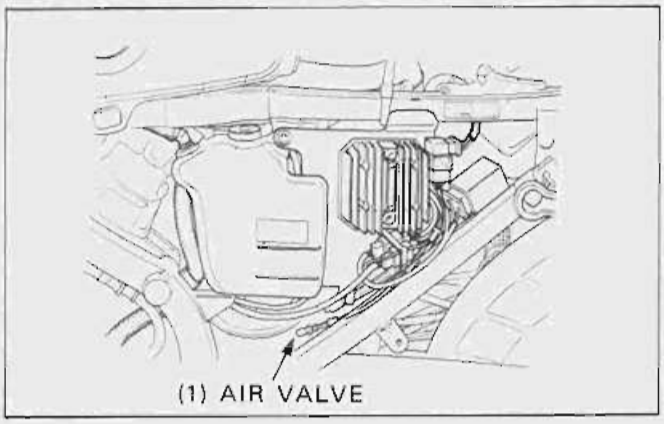


Remove the left side cover.
Remove the valve cap and measure the shock absorber air pressure.

REAR SHOCK ABSORBER AIR PRESSURE:
0–300 kPa (0–3.0 kg/cm², 0–43 psi)

NOTE

- Check the air pressure when the shock absorber is cold.



NUTS, BOLTS, FASTENERS

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

WHEELS

NOTE

- Tire pressure should be checked when tires are COLD.

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

RECOMMENDED TIRES AND PRESSURES:

		Front	Rear
Tire size		100/90V18–V250	140/80V17–V250 *140/80VR17-V250
Cold tire pressure kPa, (kg/cm², psi)	Driver only	250 (2.5, 36)	290 (2.9, 42)
	Driver and one passenger	250 (2.5, 36)	290 (2.9, 42)
Tire brand	BRIDGESTONE	G531	G532, *G520, *R104
	DUNLOP	K500	K500, *K400

* No application for SW and optional for other models.



Check the front and rear wheels for trueness (Section 15 and 16).
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

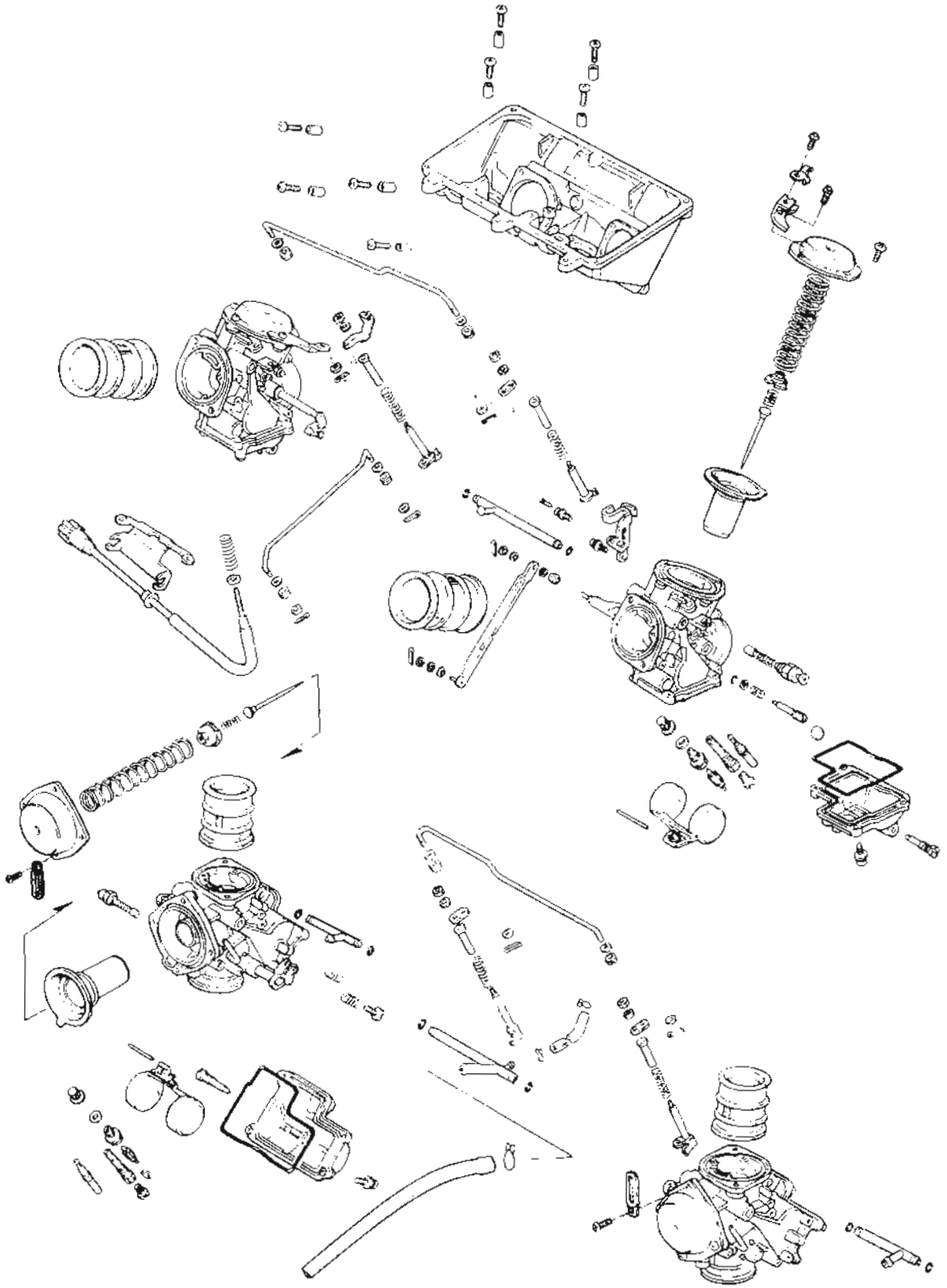
NOTE

- 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 movements, adjust the steering head bearing by turning the steering head adjusting nut (page 15-26).





4 FUEL SYSTEM

SERVICE INFORMATION	4-1	PILOT SCREW	4-8
TROUBLESHOOTING	4-2	CARBURETOR SEPARATION	4-9
FUEL TANK	4-3	CARBURETOR ASSEMBLY	4-11
AIR CLEANER	4-4	CARBURETOR INSTALLATION	4-14
CARBURETOR REMOVAL	4-5	PILOT SCREW ADJUSTMENT	4-14
VACUUM CHAMBER	4-6	FUEL PUMP	4-15
FLOAT CHAMBER	4-7		

SERVICE INFORMATION

GENERAL

WARNING

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

- The front cylinders use down draft carburetors.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain screws that can be loosened to drain residual gasoline.
- Fuel pump inspection is in section 21.
- The No. 1 and No. 3 carburetors use different jet needles (thinner) and shorter springs than the No. 2 and No. 4 carburetors. Do not interchange these parts.

TOOLS

Common

Float level gauge	07401–0010000

SPECIFICATIONS

Item		Specifications
Carburetor type		KEIHIN VD
Throttle bore		36 mm (1.42 in)
Venturi bore	Primary	12.2 mm (0.48 in)
	Secondary	34 mm (1.34 in)
Identification number		G, SD, AR: VD85F SW: VD85G F: VD85H Other models: VD85E
Float level		7.5 mm (0.30 in)
Main jet		#110
Idle speed		1,000±100 min^{-1} (rpm)
Throttle grip free play		2–6 mm (0.08–0.24 in)
Pilot screw initial opening		See page 4–14

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetors
- Engine flooded with fuel
- No spark at plug (ignition system faulty)
- Air cleaner clogged
- Intake air leak
- Improper choke operation
- Improper throttle operation

Hard starting or stalling after starting
- Improper choke operation
- Ignition malfunction
- Carburetor faulty
- Fuel contaminated
- Intake air leak
- Idle speed incorrect

Rough idle
- Ignition system faulty
- Idle speed incorrect
- Incorrect carburetor synchronization
- Carburetor faulty
- Fuel contaminated

Misfiring during acceleration
- Ignition system faulty

Backfiring
- Ignition system faulty
- Carburetor faulty

Poor performance (driveability) and poor fuel economy
- Fuel system clogged
- Ignition system faulty

Lean mixture
- Clogged fuel jets
- Faulty float valve
- Float level low
- Fuel cap vent blocked
- Fuel strainer screen clogged
- Restricted fuel line
- Air vent tube clogged
- Intake air leak
- Restricted or faulty fuel pump

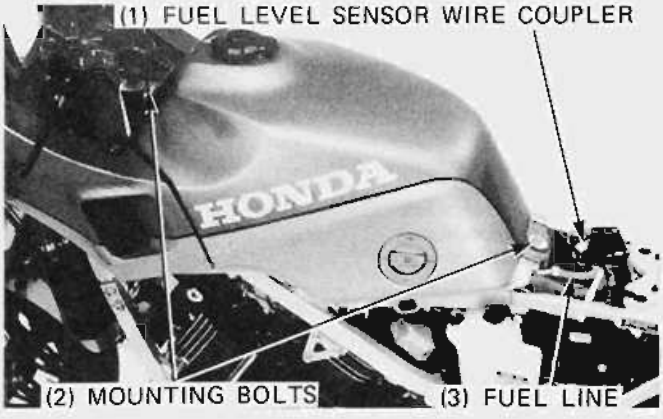
Rich mixture
- Clogged air jets
- Vacuum piston stuck closed
- Faulty float valve
- Float level too high
- Choke stuck or clogged
- Dirty air cleaner

FUEL TANK

WARNING

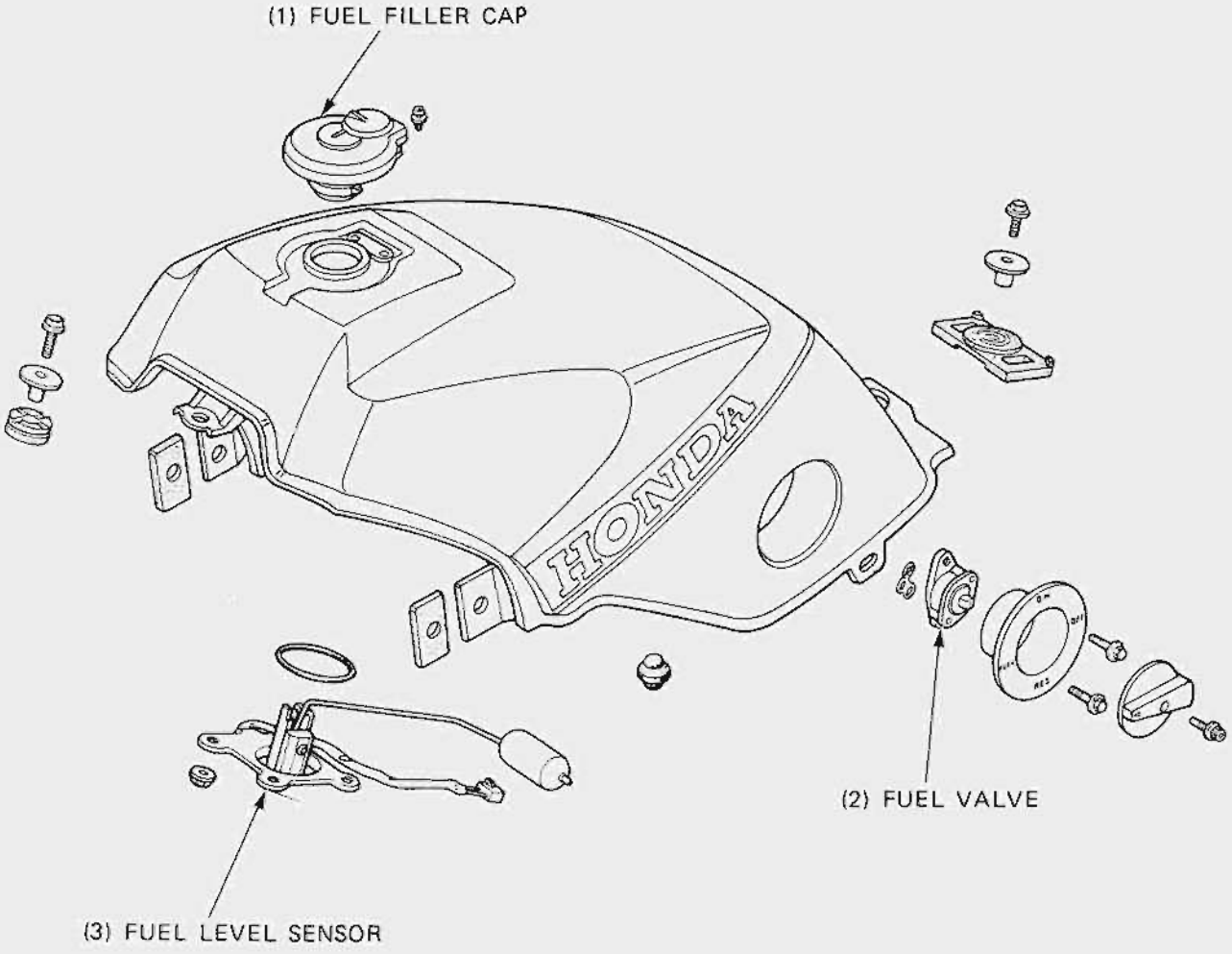
- *Do not allow flames or sparks near gasoline.*
- *Wipe up spilled gasoline at once.*

Remove both frame side covers and seat.
Turn the fuel valve OFF and disconnect the fuel line at the fuel tank outlet tube.
Disconnect the fuel level sensor wire coupler.
Remove the two fuel tank mounting bolts and fuel tank.
Turn the fuel valve ON and drain the fuel into a clean container.



Check the vent hole of the filler cap for blockage.
Check that fuel is flowing out of the fuel valve freely.

Make sure that there are no fuel leaks.



AIR CLEANER

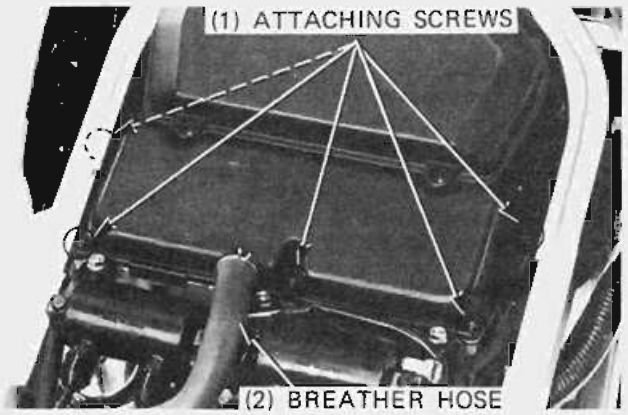
AIR CLEANER CASE REMOVAL

Remove the fuel tank.

Disconnect the breather hose from the air cleaner case.
Remove the five attaching screws and the air cleaner case.

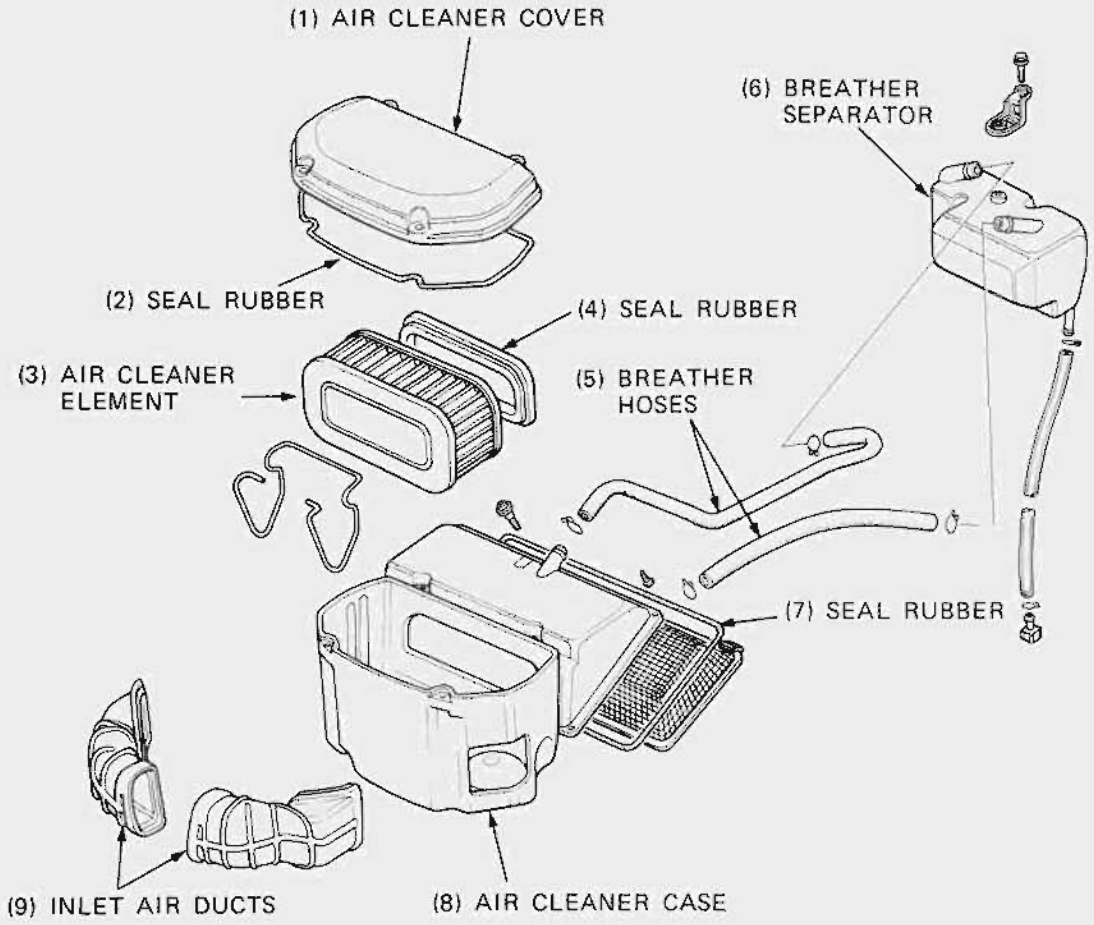
Check the air cleaner case seal rubbers for deterioration or damage.

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



CRANKCASE VENTILATION SYSTEM

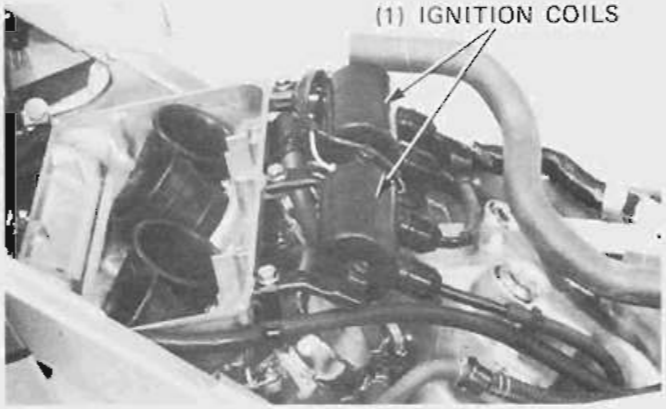
Check that the breather tube is not restricted.



CARBURETOR REMOVAL

Remove the fuel tank and air cleaner case.

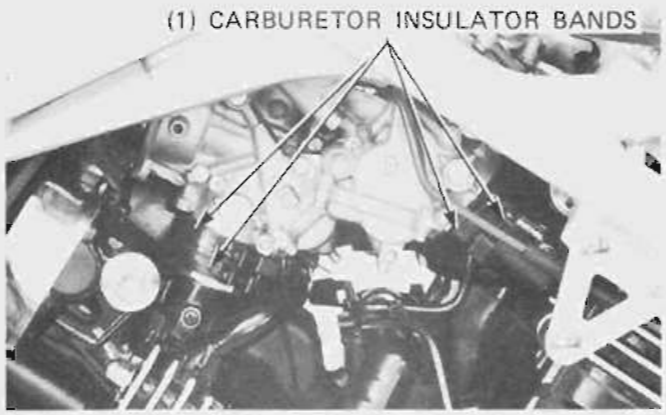
Remove the ignition coils with their bracket from the air chamber by removing the three bolts.



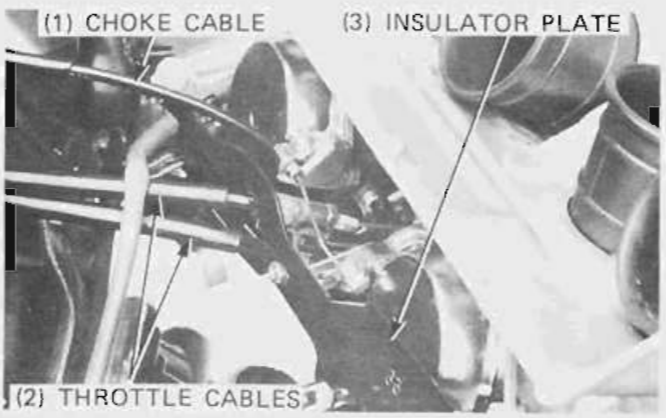
Disconnect the fuel line.



Loosen all carburetor insulator bands and remove the carburetor assembly from the intake pipes.



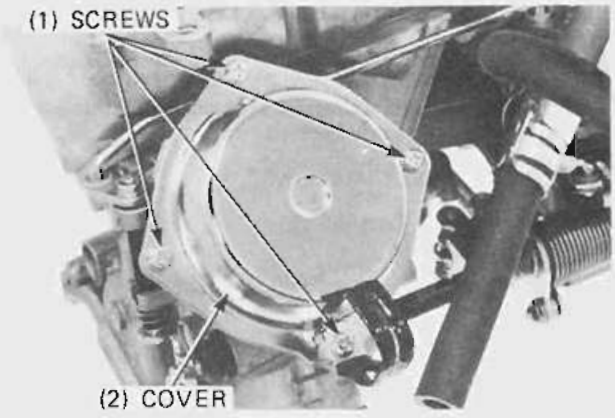
Remove the insulator plate from the carburetor.
Remove the choke and throttle cables from their brackets and disconnect the cable ends from the arm and drum.



VACUUM CHAMBER

REMOVAL

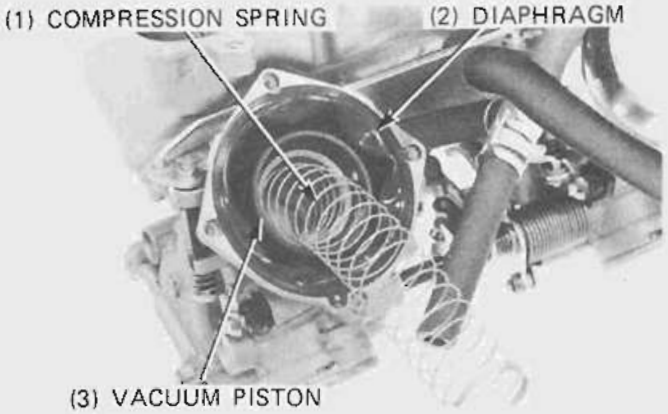
Remove the four vacuum chamber cover screws and cover.



CAUTION:

- *Do not interchange vacuum chamber covers, springs, pistons or jet needles between carburetors.*

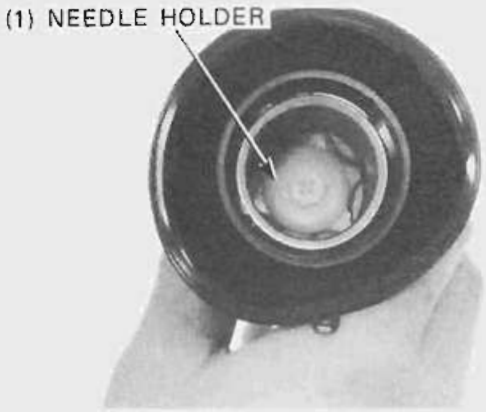
Remove the compression spring, diaphragm and vacuum piston.
Inspect the vacuum piston for wear, nicks, scratches or other damage.
Make sure the piston moves up and down freely in the chamber.



NOTE

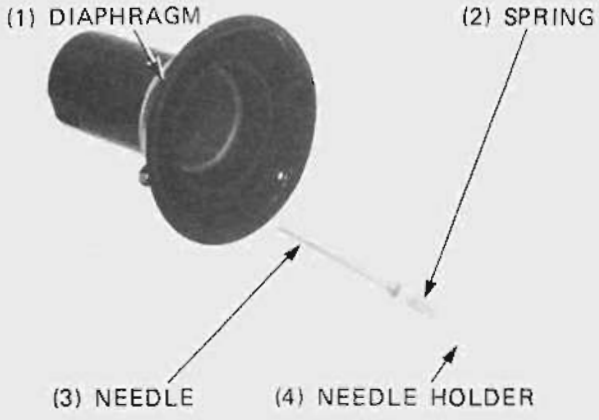
- No. 1 and No. 3 carburetors use thinner jet needles and shorter springs than the No. 2 and No. 4 carburetors.

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



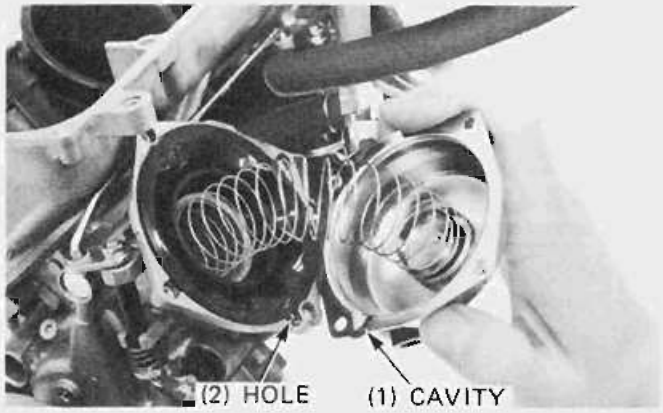
Inspect the needle for excessive wear at the tip and for bending, or other damage.

Check for a torn diaphragm or other deterioration.



INSTALLATION

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



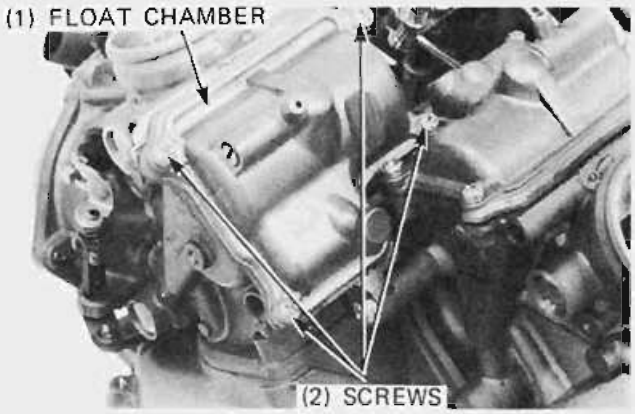
NOTE

- Be sure the thinner jet needles and shorter springs are installed in the No. 1 and No. 3 carburetors.

FLOAT CHAMBER

REMOVAL

Remove the four float chamber screws and the float chamber.

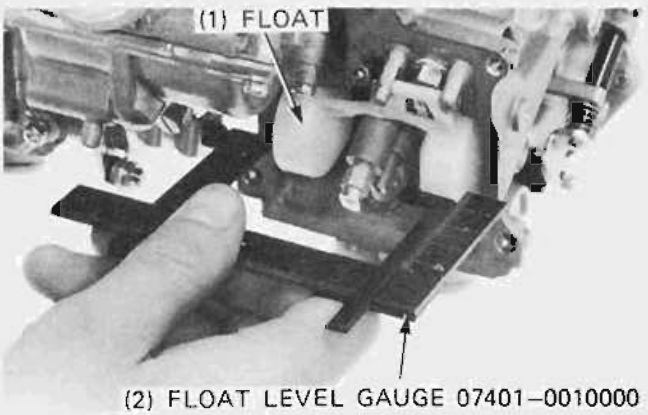


FLOAT LEVEL

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

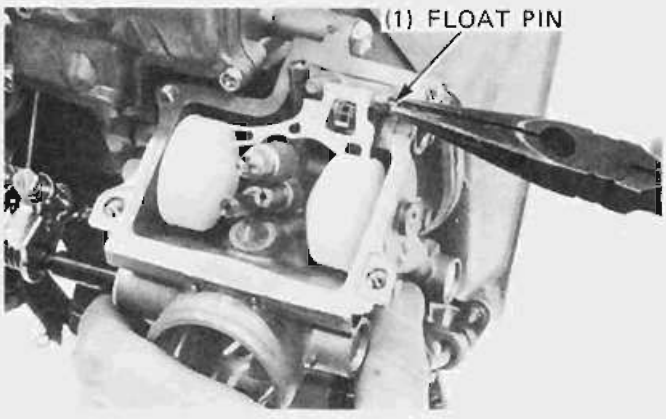
FLOAT LEVEL: 7.5 mm (0.30 in)

Adjust the float level by carefully bending the float tang.

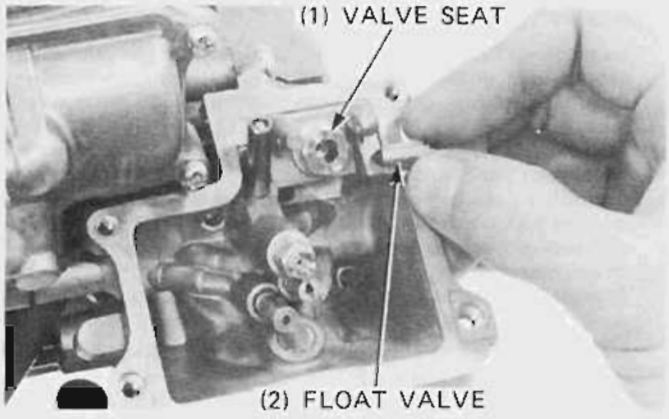


FLOAT AND JETS

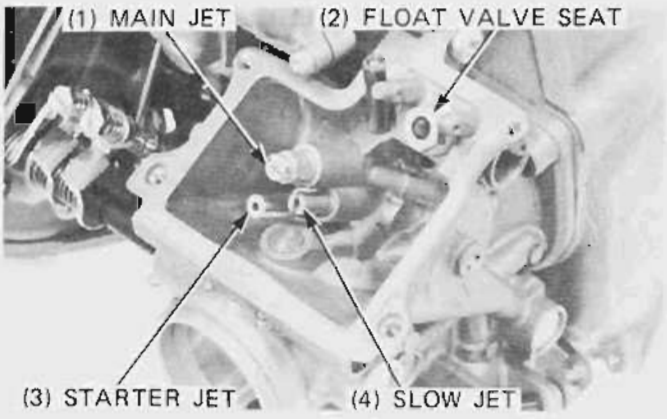
Remove the float pin, float and float valve.



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



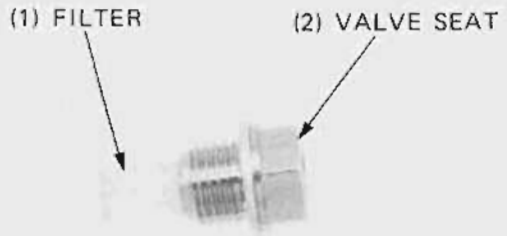
Remove the starter jet, main jet and slow jet.
Remove the float valve seat and filter.



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

ASSEMBLY

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



PILOT SCREW

REMOVAL

NOTE

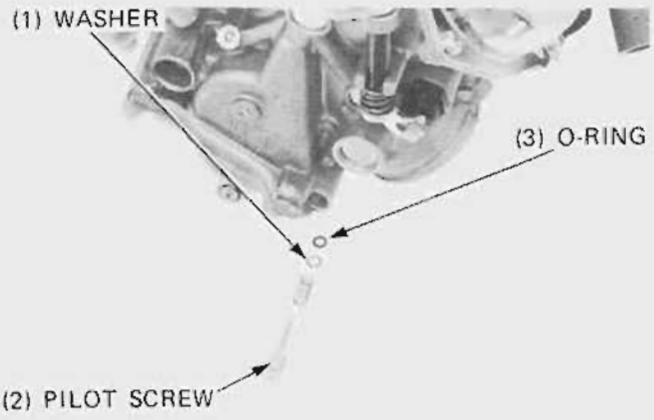
- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.

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

CAUTION

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

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



INSTALLATION

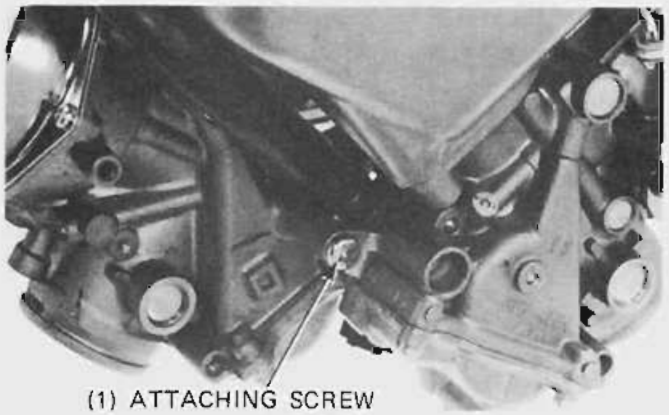
Install the pilot screws and return them to their original position as noted during removal.
Perform pilot screw adjustment if a new pilot screw is installed (page 4-14).

NOTE

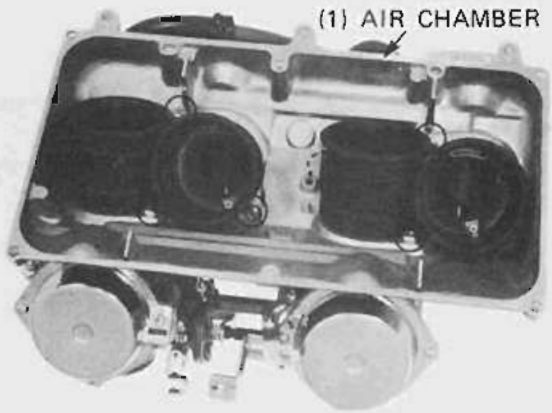
- If you replace the pilot screw in one carburetor, you must replace the pilot screws in the other carburetors for proper pilot screw adjustment.

CARBURETOR SEPARATION

Remove the No. 1-to-No. 2 carburetor attaching screw, and No. 3-to-No. 4 carburetor attaching screw.

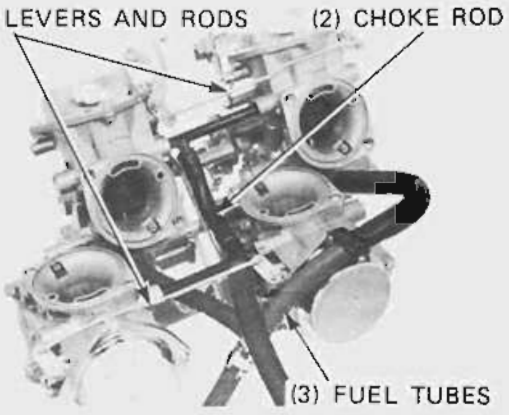

(1) ATTACHING SCREW

Remove the screws attaching the air chamber to the carburetors and separate the chamber and carburetors.


(1) AIR CHAMBER

Remove the fuel tubes.

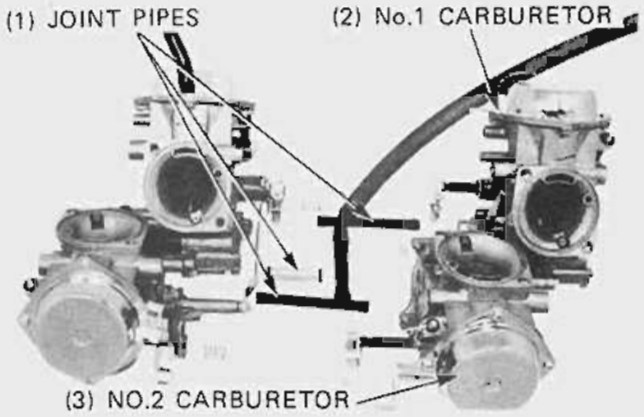
Remove the nuts, and remove the choke levers and rods.
Remove the cotter pins and washers, and remove the choke rod.


(1) CHOKE LEVERS AND RODS (2) CHOKE ROD
(3) FUEL TUBES

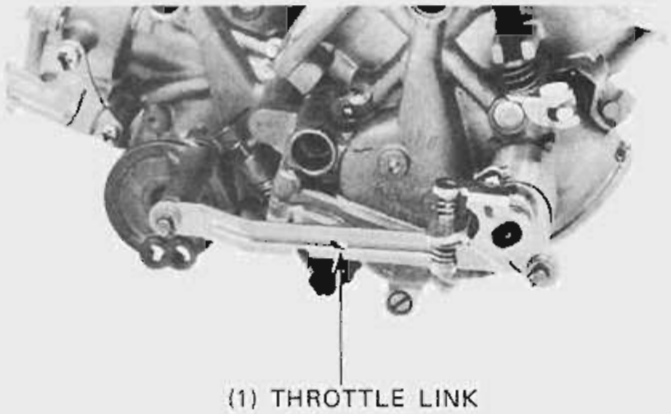
Carefully separate the No. 1 carburetor from the assembly. Then separate the No. 2 carburetor.

CAUTION

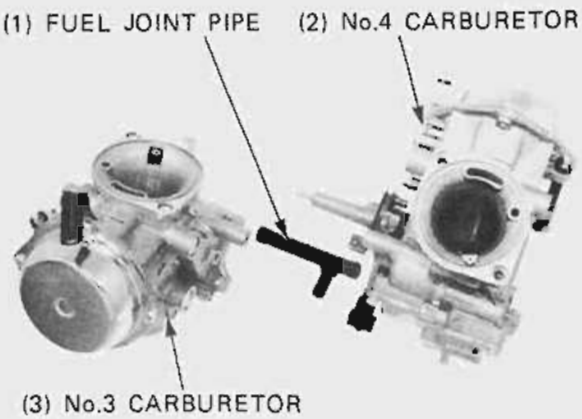
- *Separate the carburetors horizontally to prevent damage to the joint pipes.*



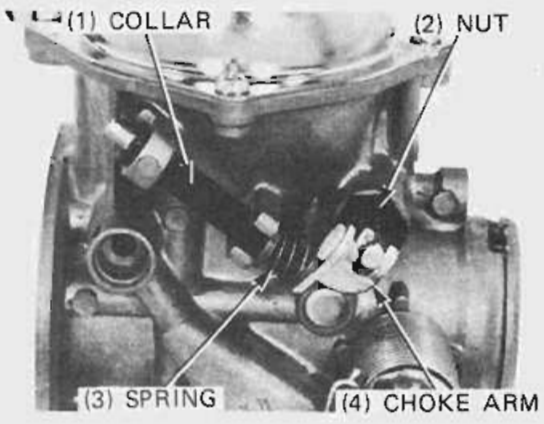
Disconnect the throttle link from the No. 3 and 4 caburetors by removing the cotter pins.



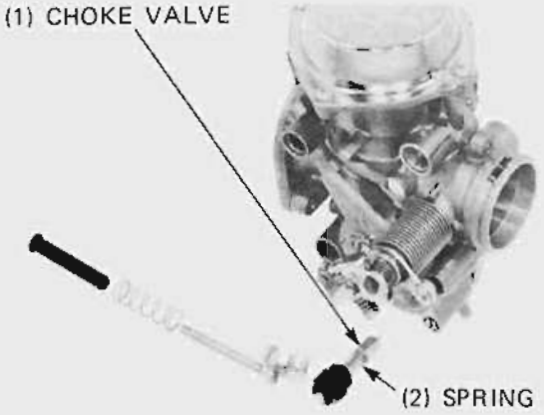
Carefully separate the No. 3 and No. 4 carburetors.



Remove the choke arm collar and remove the choke arm and spring.
Remove the choke valve nut, spring and valve.

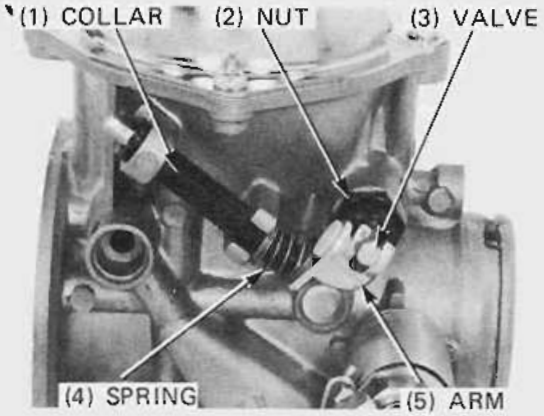


Check the choke valve and spring for nicks, grooves, or other damage.

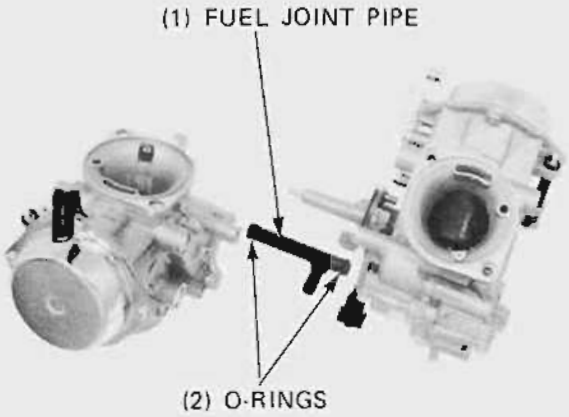


CARBURETOR ASSEMBLY

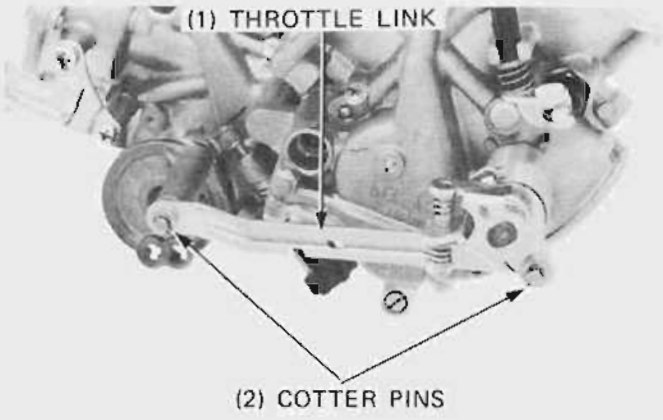
Install the choke valve, valve spring and nut and tighten the nut.
Install the choke arm and spring while hooking the arm to the groove in the choke valve. Install the choke arm collar.



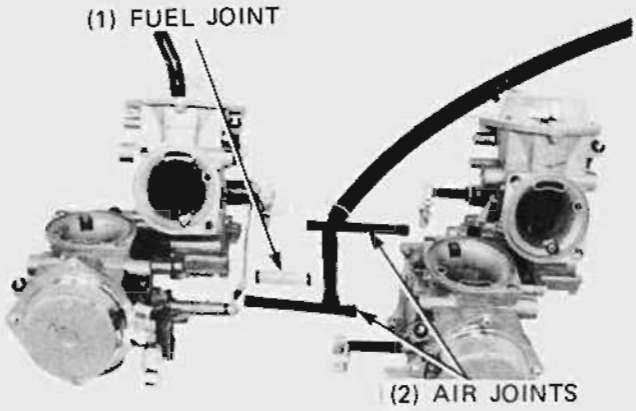
Coat the new O-rings with oil and install them on the fuel joint pipe for No. 3 and No. 4 carburetors.
Install the fuel joint pipe to the No. 3 and No. 4 carburetors.



Reconnect the throttle linkage between the No. 3 and No. 4 carburetors, using new cotter pins.



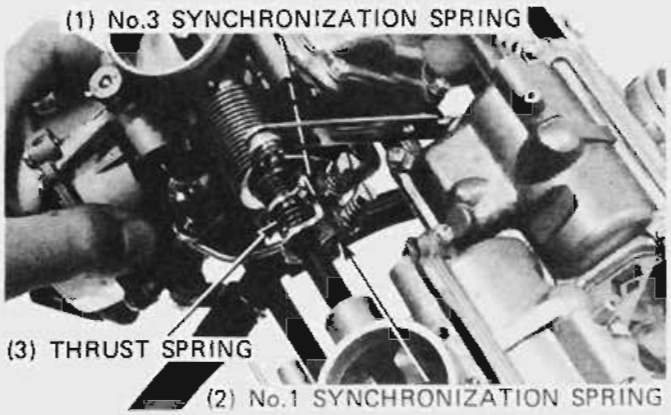
Coat new O-rings with oil and install them on the fuel and air joint pipes.
Put the No. 1 and No. 2 carburetors together with the joint pipes.



Loosen the synchronization adjusting screws until there is no tension.
Install the synchronization springs.
Install the thrust springs between the throttle valve shafts.

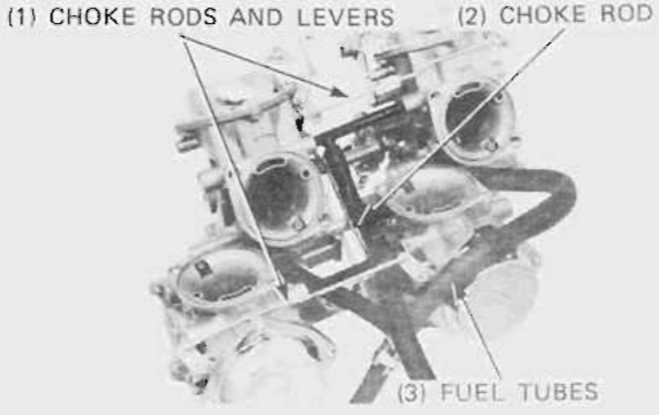


Make sure the fuel joint and air joint pipes are securely installed.

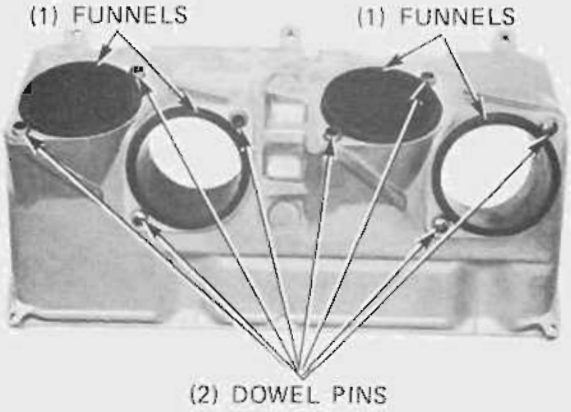


Install the fuel tubes.

Install the choke rods and levers, using the nuts and new cotter pins.

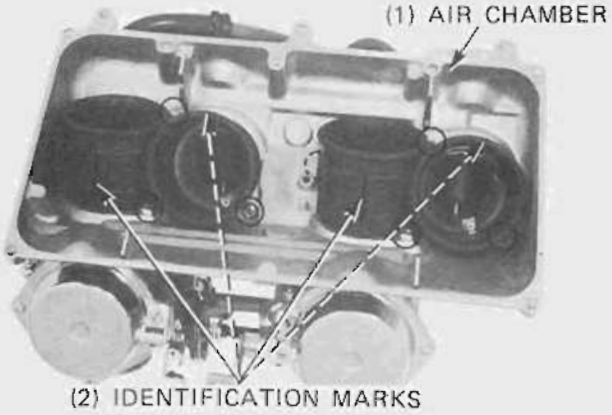


Make sure the air chamber funnels and dowel pins are in place.

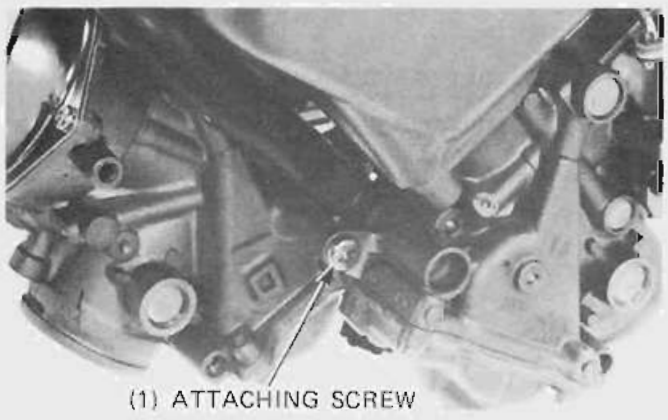


Make sure that the identification marks on the air chamber funnels are facing up as shown.

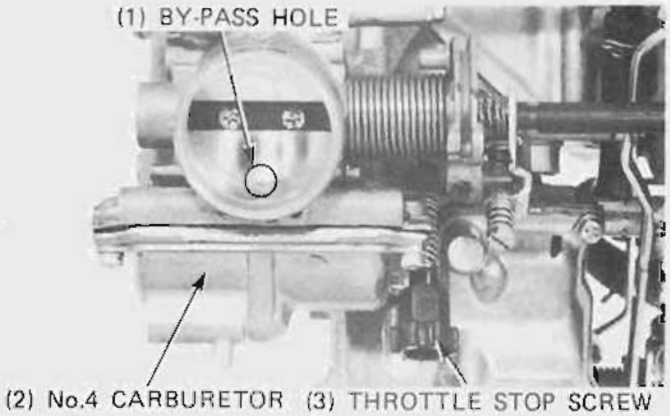
Place the air chamber over the carburetors aligning the dowel pins with the carburetor holes.
Attach the air chamber to the carburetors with the eight screws.



Install the No. 1-to-No. 2 carburetor attaching screw and No. 3-to-No. 4 carburetor attaching screw.



Turn the throttle stop screw to align the No. 4 throttle valve with the edge of the by-pass hole.



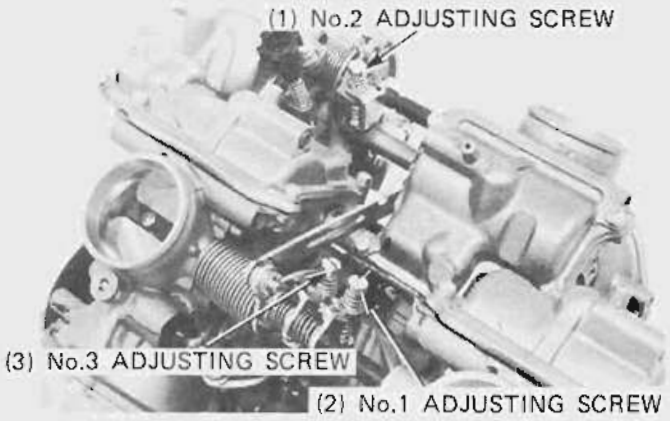
Align each throttle valve with the by-pass hole edge by turning the synchronization adjusting screws.

Inspect throttle operation as described below:

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

Make sure that 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.



CARBURETOR INSTALLATION

Installation is essentially the reverse of removal.

NOTE

- Route the throttle and choke cables properly (pages 1-9 to 1-13)

Perform the following inspections and adjustments.

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

PILOT SCREW ADJUSTMENT

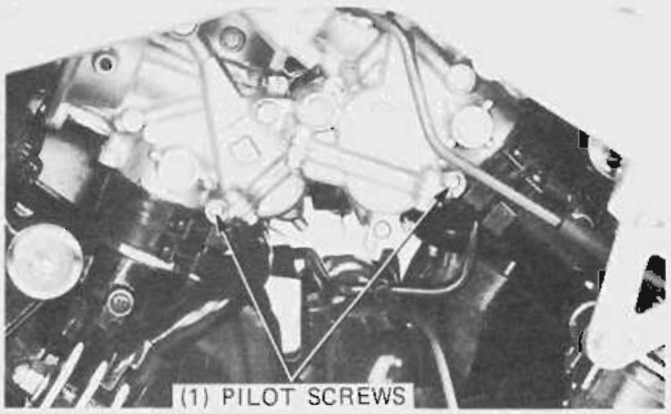
IDLE DROP PROCEDURE

NOTE

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

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

   INITIAL OPENING: SW: 2-3/4 turns out
   Other models : 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 according to its manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.

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

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by successive 1/2 turn until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2, 3 and 4 carburetor pilot screws.

FUEL PUMP

REMOVAL/INSTALLATION

WARNING

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

Remove the seat and left frame side cover.

Disconnect the regulator/rectifier and alternator wire couplers, and neutral switch wire connector.

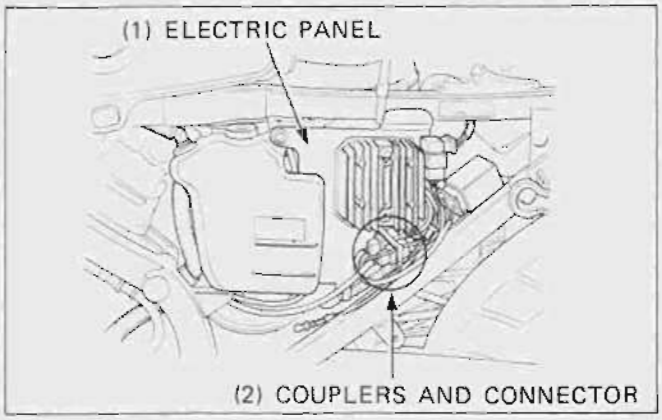
Remove the two electric panel mounting bolts and pull the electric panel out of the frame.

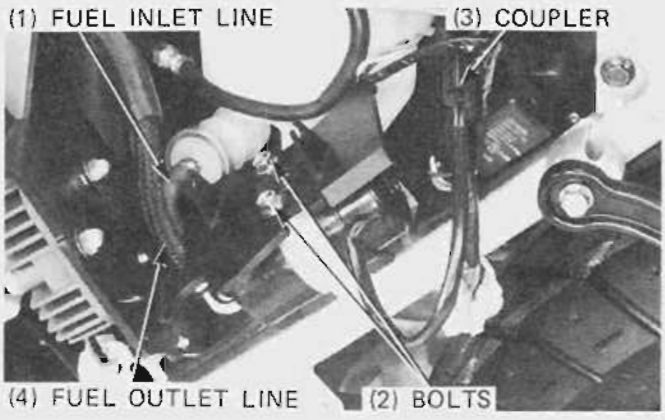
Disconnect the fuel pump wire coupler.

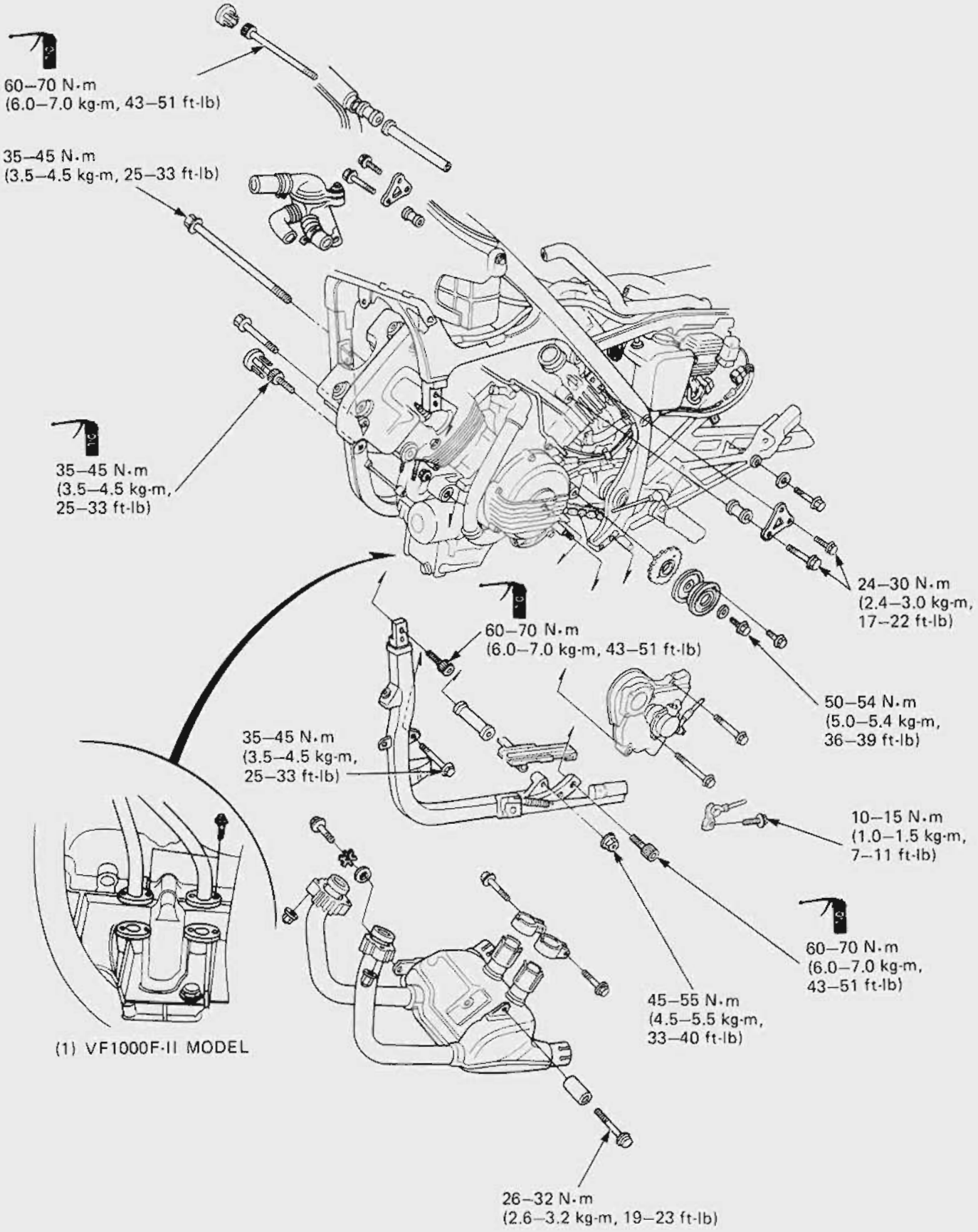
Clamp the fuel inlet line and disconnect the fuel inlet and outlet lines.

Remove the fuel pump attaching bolts and the fuel pump.

Install the fuel pump in the reverse order of removal.






60–70 N·m
(6.0–7.0 kg-m, 43–51 ft-lb)
35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)
35–45 N·m
(3.5–4.5 kg-m,
25–33 ft-lb)
24–30 N·m
(2.4–3.0 kg-m,
17–22 ft-lb)
60–70 N·m
(6.0–7.0 kg-m, 43–51 ft-lb)
50–54 N·m
(5.0–5.4 kg-m,
36–39 ft-lb)
35–45 N·m
(3.5–4.5 kg-m,
25–33 ft-lb)
10–15 N·m
(1.0–1.5 kg-m,
7–11 ft-lb)
60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)
45–55 N·m
(4.5–5.5 kg-m,
33–40 ft-lb)
(1) VF1000F-II MODEL
26–32 N·m
(2.6–3.2 kg-m, 19–23 ft-lb)

5 ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	5-1	ENGINE INSTALLATION	5-5
ENGINE REMOVAL	5-2		

SERVICE INFORMATION

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following parts or components can be serviced with the engine installed in the frame:
  - Clutch
  - Alternator
  - Cooling system
  - Gearshift linkage
  - Starter motor
  - Front cylinder head
  - Carburetors
- The muffler of the VF1000F/VF1000F-II is black chromeplated. To clean the muffler, use a soft sponge and flush with sufficient water. After washing, let it dry and coat with non-compounded silicone wax.
  Apply a heat-resist and black paint if the black chrome plating is scratched or scored.

SPECIFICATIONS

Engine dry weight	VF1000F: 93.2 kg (205 lb)
	VF1000F-II: 93.5 kg (206 lb)
Oil capacity	VF1000F: 3.5 liters (3.7 US qt, 3.1 Imp qt)
	VF1000F-II: 3.7 liters (3.9 US qt, 3.3 Imp qt)

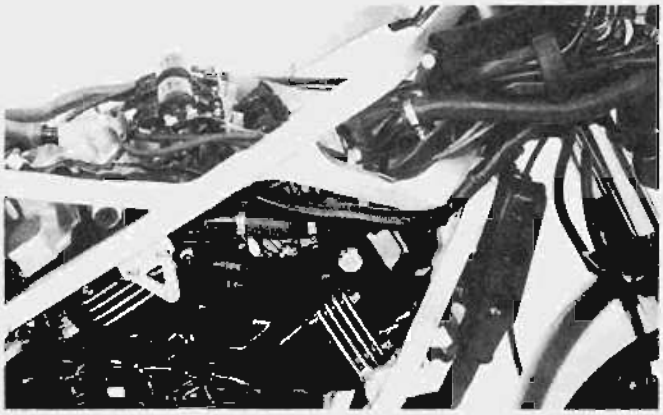
TORQUE VALUES

Drive sprocket bolt	50–54 N·m (5.0–5.4 kg-m, 36–39 ft-lb)
Engine rear upper hanger bolt	60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)
Engine rear lower hanger bolt	45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)
Engine center hanger bolts	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
Engine front hanger bolts	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Sub-frame bolts	60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)
Exhaust chamber mount bolts	26–32 N·m (2.6–3.2 kg-m, 19–23 ft-lb)
Gearshift arm bolt	10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb)

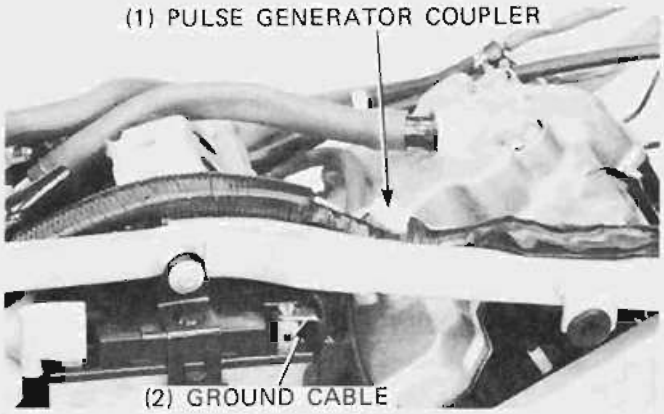
ENGINE REMOVAL

Place the motorcycle on its center stand.
Remove the seat, right and left frame side covers.
Remove the fairing and fuel tank.
Drain the engine oil (page 2-3) and coolant (page 6-3).
Remove the following components:

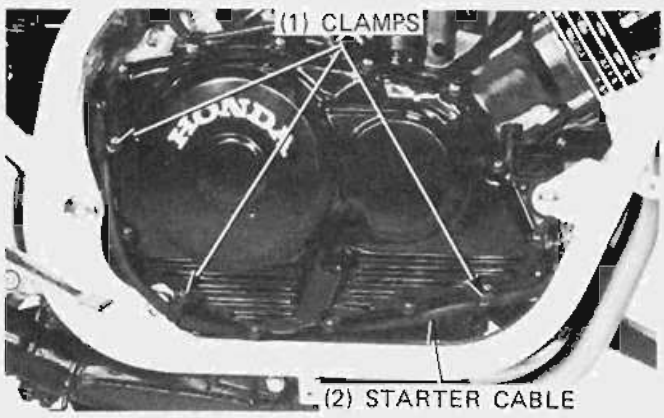
—carburetor (page 4-5)
—main radiator (page 6-6)
—auxiliary radiator (VF1000F-II model only, page 6-9).



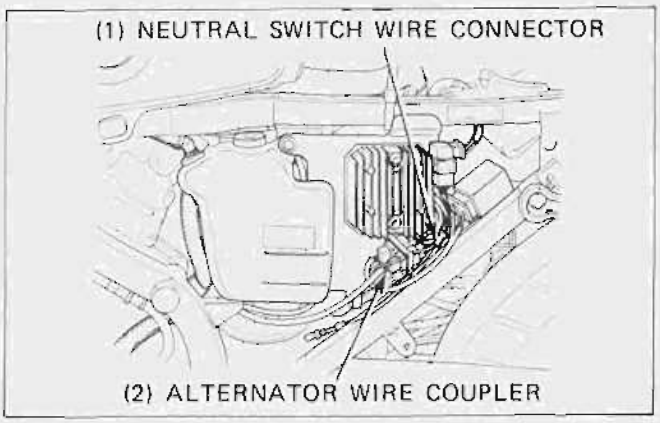
Disconnect the ground cable from the battery.
Disconnect the pulse generator wire coupler.



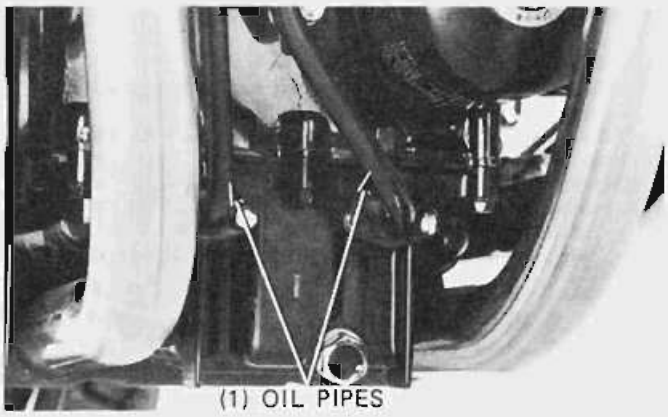
Disconnect the starter cable from the starter motor and free the cable from its clamps.



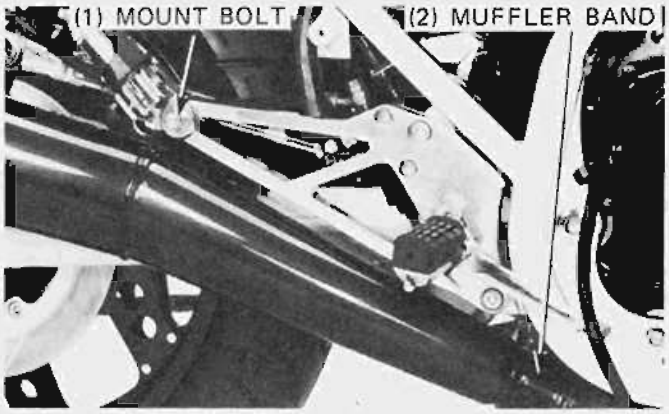
Disconnect the neutral switch wire connector and alternator wire coupler.



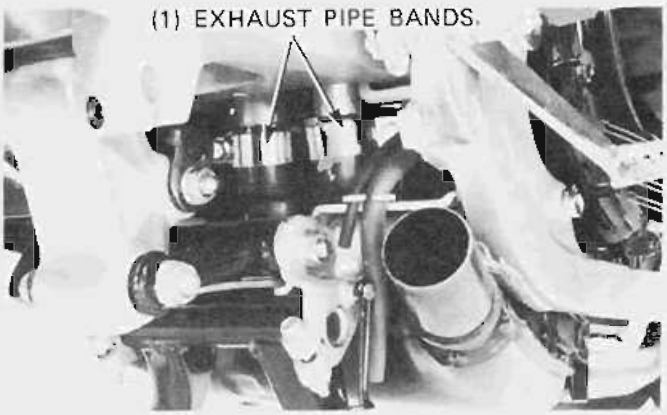
On VF1000F-II model, remove the oil pipes from the oil pan.



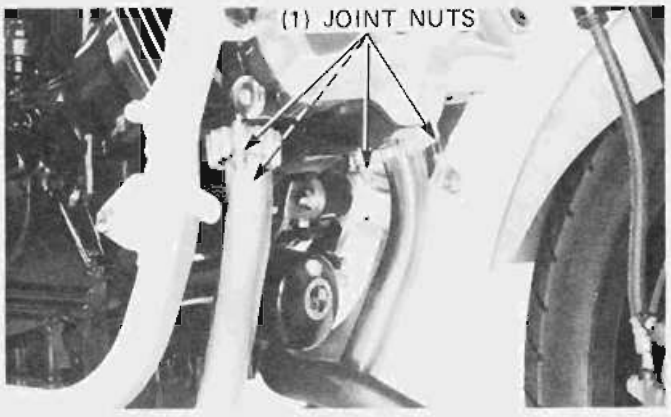
Loosen the muffler bands, remove the muffler mounting bolts, and remove the left and right mufflers.



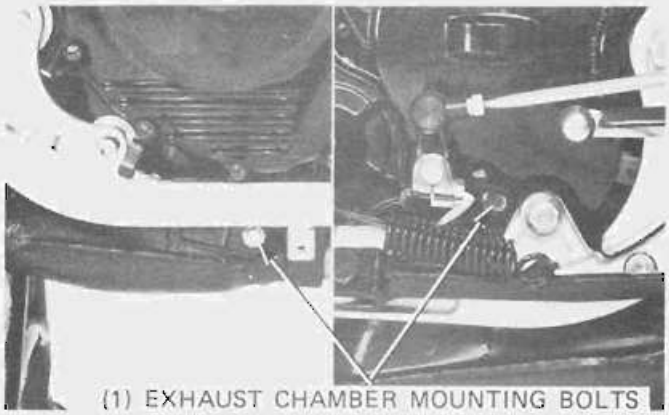
Loosen the rear exhaust pipe bands.



Remove the front exhaust pipe joint nuts.



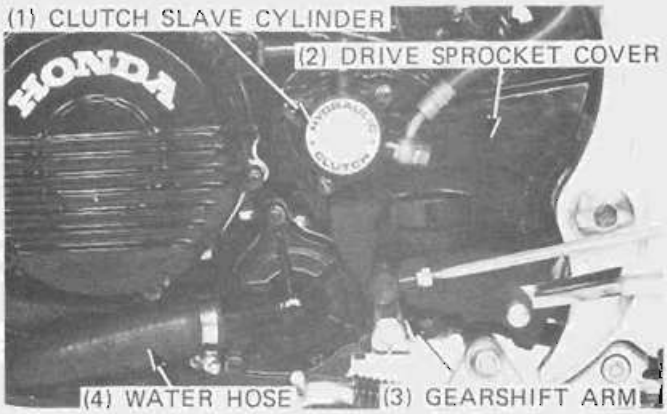
Remove the two exhaust chamber mounting bolts and the exhaust pipe/chamber.



Remove the gearshift arm from the gearshift spindle.
Remove the water hose from the water pump.
Remove the clutch slave cylinder by removing the three bolts.

NOTE

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



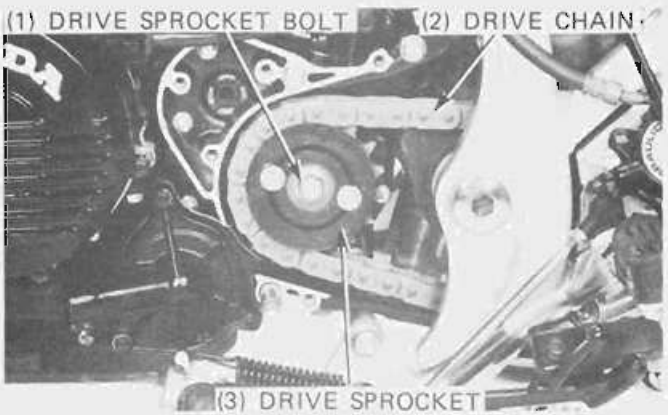
Remove the drive sprocket cover.

Loosen the axle nut, drive chain adjusting bolt lock nuts and adjusting bolts.

Remove the drive sprocket bolt and remove the drive sprocket with the drive chain.

NOTE

- Do not forget to install the O-ring between the drive sprocket washer and countershaft when installing the drive sprocket.

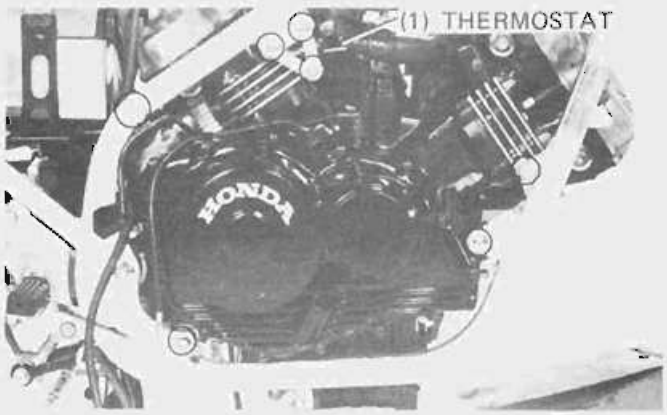


Place the floor jack or other adjustable support under the engine.

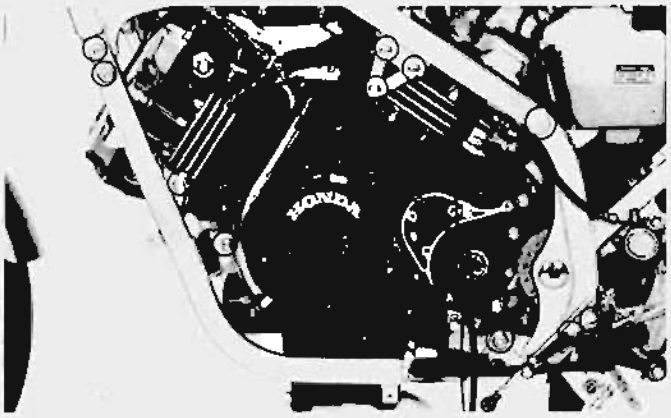
NOTE

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

Remove the engine mount bracket, thermostat and engine mount bolts from the right side.

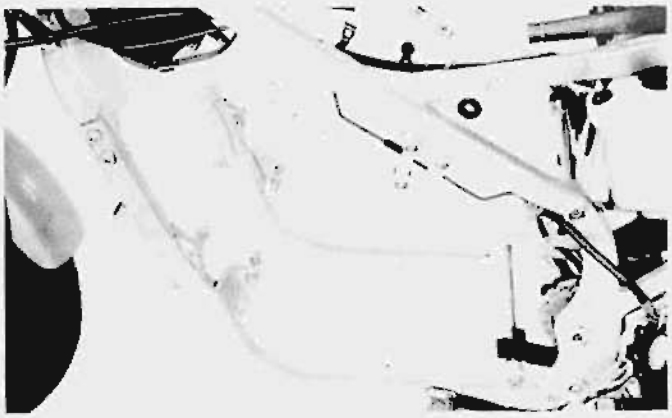


Remove the sub-frame and engine mount bolts from the left side and remove the engine from the frame carefully.



ENGINE INSTALLATION

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



CAUTION

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

NOTE

- Install all engine mount collars in proper position and direction.
- When installing the clutch slave cylinder, temporarily install it to the drive sprocket cover, release the clutch lever from the handle grip by removing the string, and then tighten the slave cylinder mount bolts.
- The slave cylinder is mounted with the 6 mm bolt and two locating bolts. Install the bolts in their proper location.
- Install the gearshift arm aligning the punch marks on the gearshift arm and spindle.

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

NOTE

- Route the wires and cables properly (pages 1-9 thru 1-13).
- Fill the crankcase to the proper level with the recommended oil (page 2-1).
- Fill the cooling system (page 6-3).
- Perform the following inspections and adjustments:
  Throttle operation (page 3-5).
  Clutch (page 3-15).
  Drive chain (page 3-12).

6 COOLING SYSTEM

SERVICE INFORMATION	6-1	THERMOSTAT	6-4
TROUBLESHOOTING	6-1	RADIATOR/COOLING FAN	6-6
SYSTEM TESTING	6-2	WATER PUMP	6-10

SERVICE INFORMATION

GENERAL

WARNING

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

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

SPECIFICATIONS

Radiator cap relief pressure	75–105 kPa (0.75–1.05 kg/cm², 10.7–14.9 psi)	
Freezing point (Hydrometer test):	55% Distilled water + 45% ethylene glycol: –32°C (–25°F) 50% Distilled water + 50% ethylene glycol: –37°C (–34°F) 45% Distilled water + 55% ethylene glycol: –44.5°C (–48°F)	
Coolant capacity:	VF1000F	VF1000F-II
Radiator and engine	2.89 liters (3.1 US qt, 2.5 Imp qt)	2.99 liters (3.2 US qt, 2.6 Imp qt)
Reserve tank	0.31 liters (0.3 US qt, 0.3 Imp qt)	0.31 liters (0.3 US qt, 0.3 Imp qt)
Total system	3.2 liters (3.4 US qt, 2.8 Imp qt)	3.3 liters (3.5 US qt, 2.9 Imp qt)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 8 mm at 95°C (0.315 in at 203°F)	
Boiling point (with 50–50 mixture):	Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F)	

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature gauge or gauge sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses, or water jacket
- Fan blades bent
- Faulty fan motor

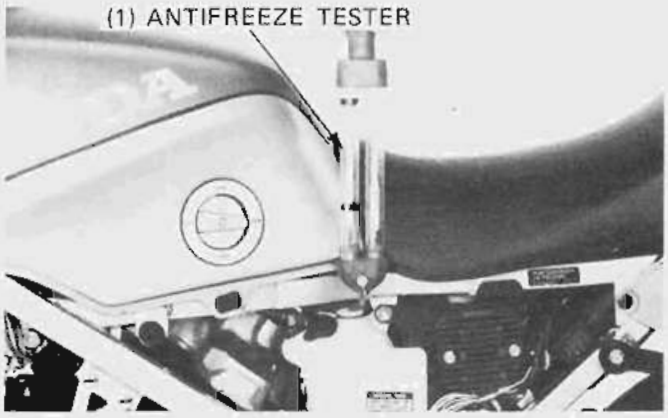
Engine temperature too low
- Faulty temperature gauge or gauge sensor
- Thermostat stuck open

Coolant leaks
- Faulty pump mechanical seal
- Deteriorated O-rings

SYSTEM TESTING

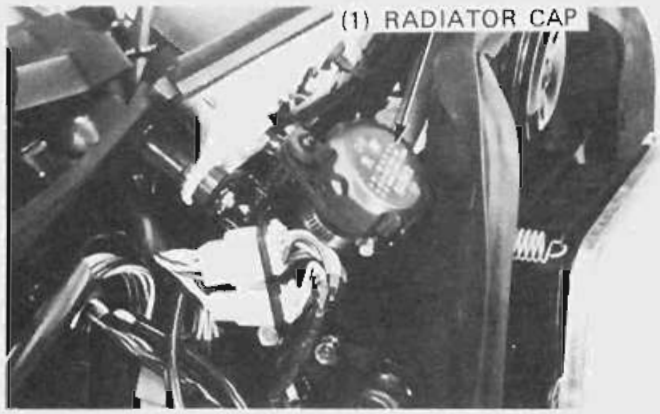
COOLANT

Remove the frame left side cover and reserve tank cap.
Test the coolant mixture with an antifreeze tester.
For maximum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.



RADIATOR CAP INSPECTION

On VF1000F model, remove the fairing (page 14-1).
Remove the radiator cap.



WARNING

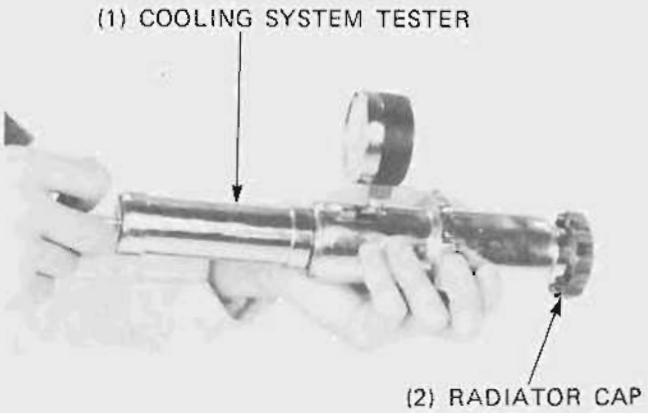
- *The engine must be cool before removing the cap.*

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

NOTE

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

RADIATOR CAP RELIEF PRESSURE:
75–105 kPa (0.75–1.05 kg/cm^2, 10.7–14.9 psi)



SYSTEM PRESSURE TEST

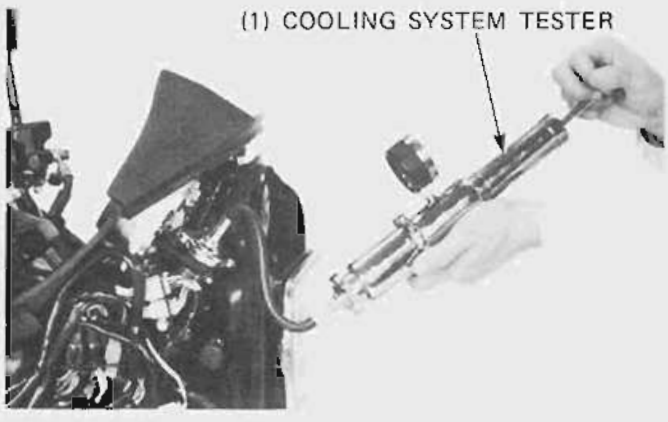
Remove the fairing (VF1000F model only) and radiator cap.

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

CAUTION

- *Excessive pressure can damage the radiator.*
- *Do not exceed 1.05 kg/cm^2 (14.9 psi)*

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



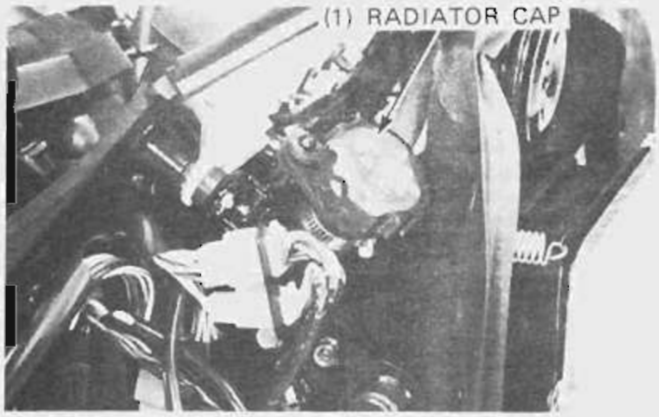
COOLANT REPLACEMENT

WARNING

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

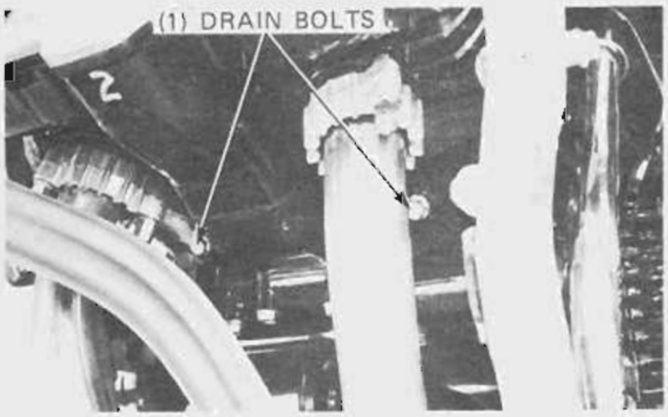
On VF1000F model, remove the fairing (page 14-1).

Remove the radiator cap.

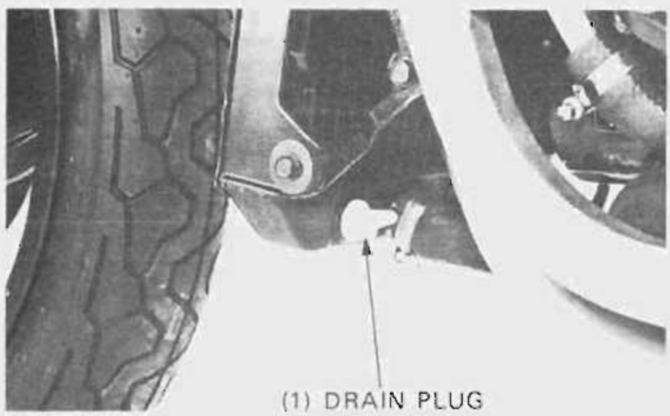


Remove the lower cowl.

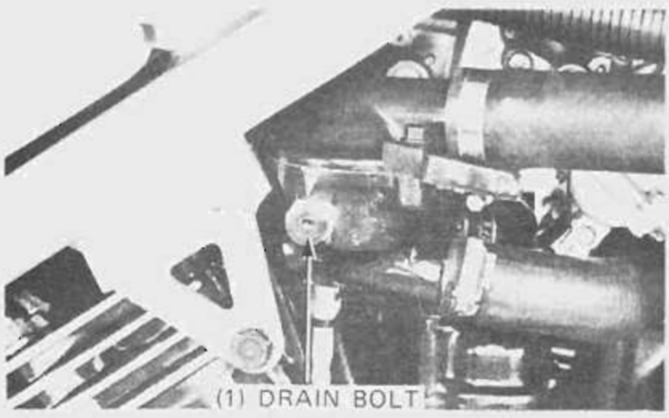
Remove the drain bolts from the front cylinders and drain the coolant from the front cylinders.



On VF1000F-II model, remove the drain plug from the auxiliary radiator and drain the coolant from the radiators.



Remove the drain bolt from the thermostat and drain the coolant from the auxiliary radiator (VF1000F model) and thermostat.



Remove the drain bolt from the water pump and drain the remaining coolant from the system.

Make sure that the drain bolt sealing washers are in good condition and reinstall the drain bolts.
On VF1000F-II model, make sure that the drain plug sealing rubber is in good condition and reinstall the plug.

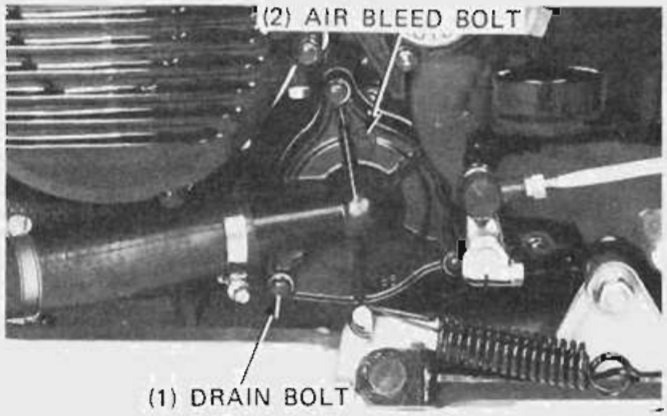
Fill the system with a 50–50 mixture of distilled water and ethylene glycol.
Bleed air from the cooling system.

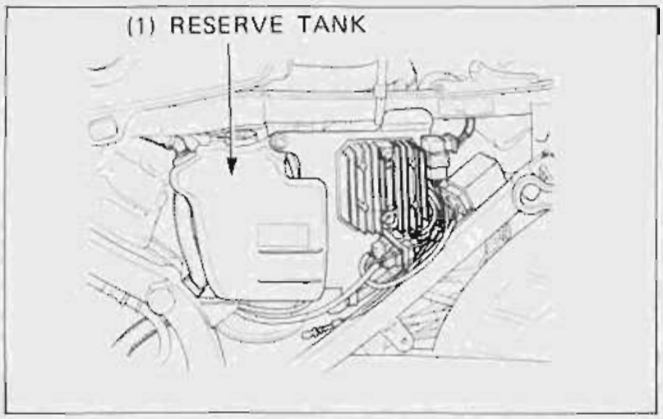
- Start the engine, allow it to idle and loosen the air bleed bolt to bleed the air. Tighten the bleed bolt when the coolant begin to flow out of the bleed hole. Continue to run the engine until there are no air bubbles in the coolant, and the level stabilizes.
- Stop the engine and add coolant up to the proper level if necessary.

Reinstall the radiator cap.

Remove the left side cover and check the coolant level in the reserve tank.
Fill the coolant to the correct level if level is low.

Install the fairing (VF1000F model), lower cowl and left frame side cover.





THERMOSTAT

REMOVAL

On VF1000F model, remove the fairing.

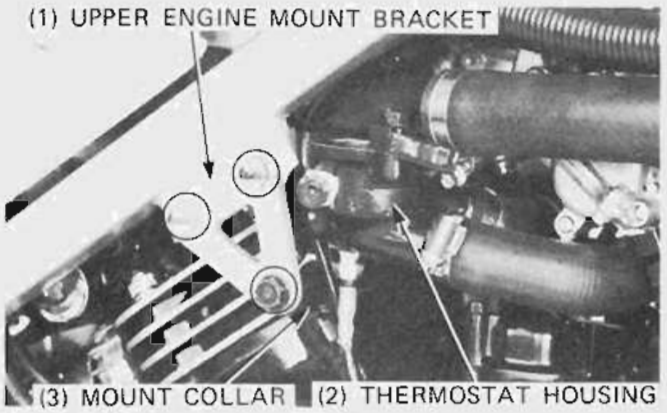
On VF1000F-II model remove the lower cowl.

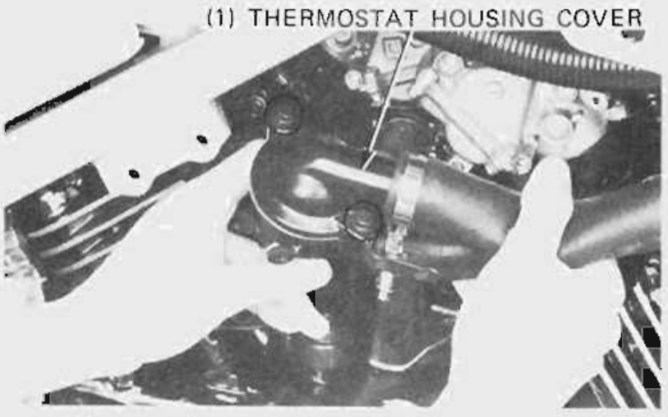
Remove the radiator cap.

Remove the drain bolt from the thermostat housing and drain the coolant.

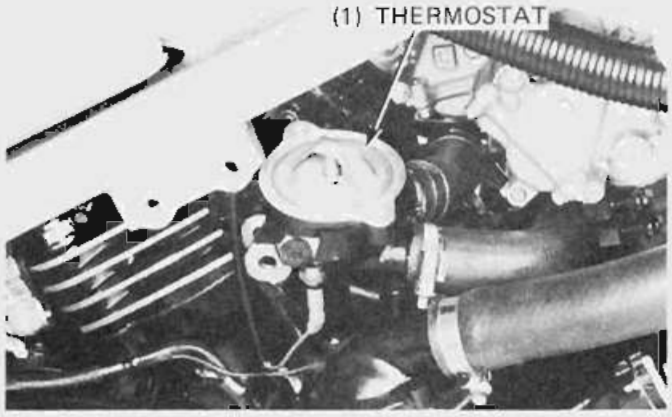
Remove the right upper engine mount bracket and collar.

Remove the two bolts and the thermostat housing cover.





Remove the thermostat from the housing.

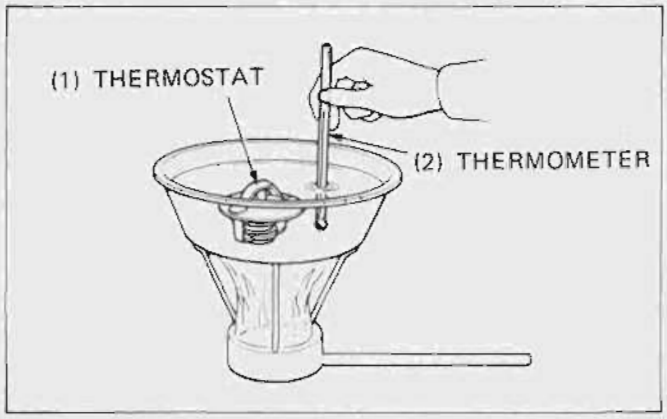


INSPECTION

Inspect thermostat visually for damage.
Suspend the thermostat in heated water to check its operation.

NOTE

- If the thermostat or thermometer touches the pan, you'll get a false reading.



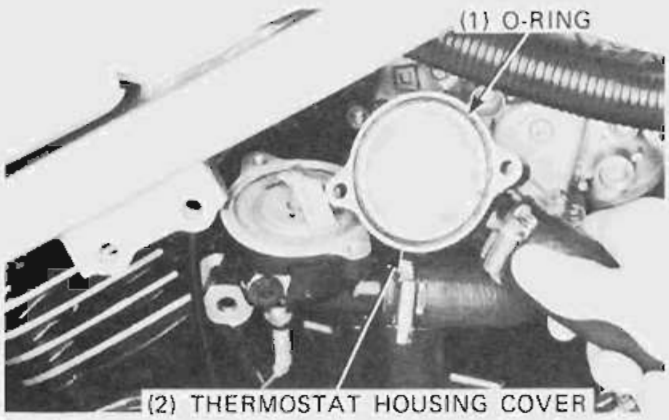
Replace thermostat if valve stays open at room temperature, or if it responds at temperatures other then those specified.

Technical Data

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

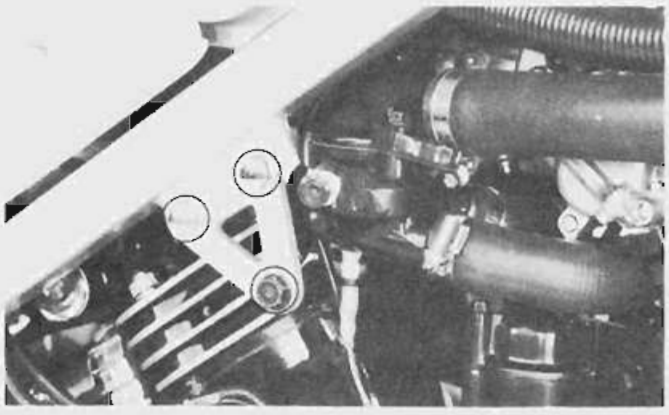
INSTALLATION

Install the thermostat into the housing.
Install a new O-ring onto the thermostat housing cover.
Install the cover onto the housing and tighten the bolts securely.



Install the right upper engine mount bolt through the mount bracket, collar and thermostat housing, and install the bracket bolts.
Tighten the bolts.

TORQUE: 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)



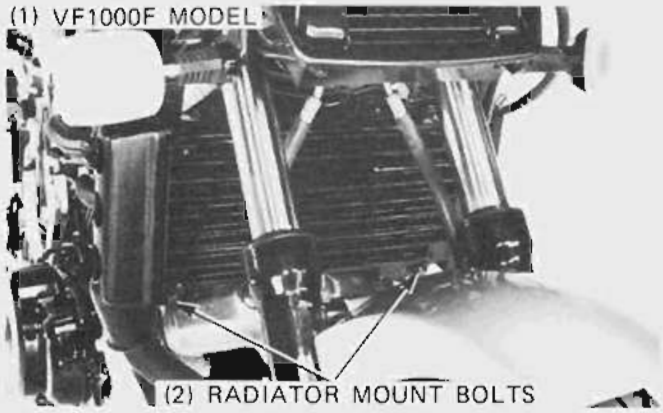
Fill and bleed the cooling system (page 6-4).

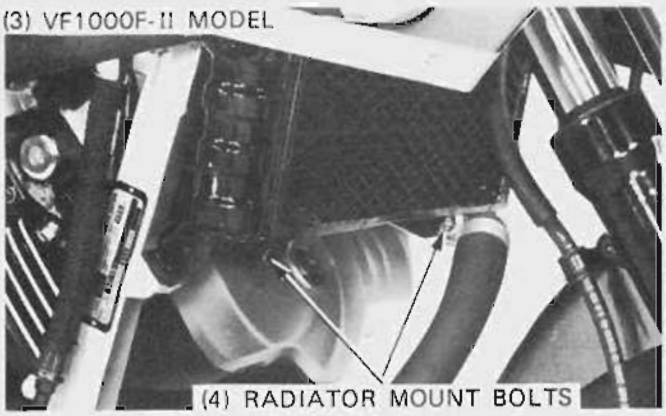
RADIATOR/COOLING FAN

MAIN RADIATOR REMOVAL

Drain the coolant from the radiators (page 6-3).

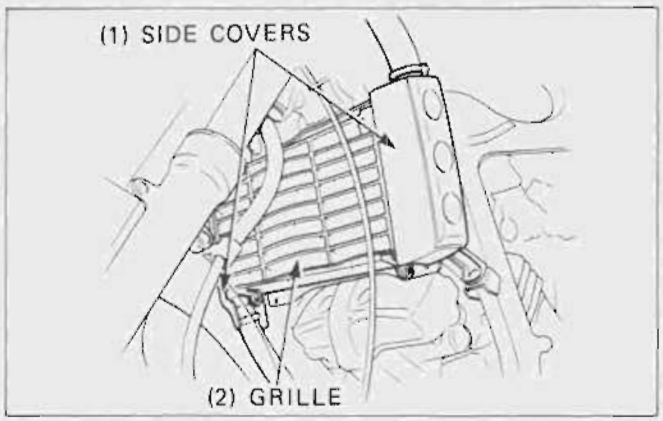
Remove the two radiator mount bolts and the main radiator from the bracket.





On VF1000F model, remove the main radiator side covers and grille.

Disconnect the radiator hoses and remove the radiator.



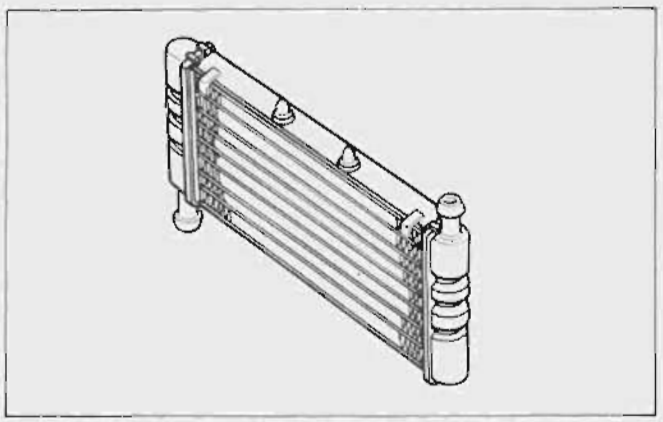
MAIN RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.
Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

MAIN RADIATOR INSPECTION

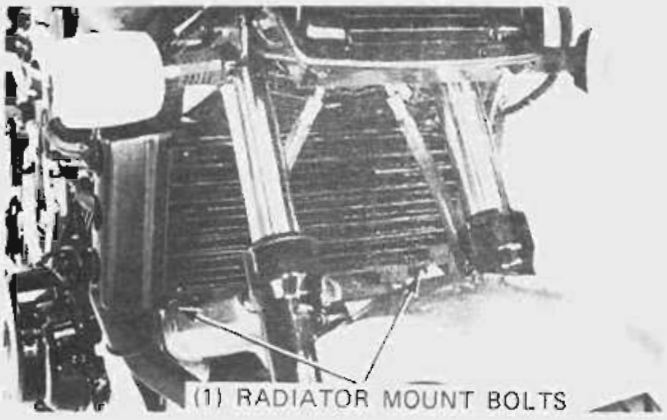
Install the main radiator in the reverse order of removal.

After installation, fill and bleed the cooling system (page 6-4).



COOLING FAN REMOVAL/DISASSEMBLY

Remove the lower cowl.
Remove the radiator mount bolts and the radiator from the cooling fan shroud.
On VF1000F-II model, remove the auxiliary radiator mount bolts.



NOTE

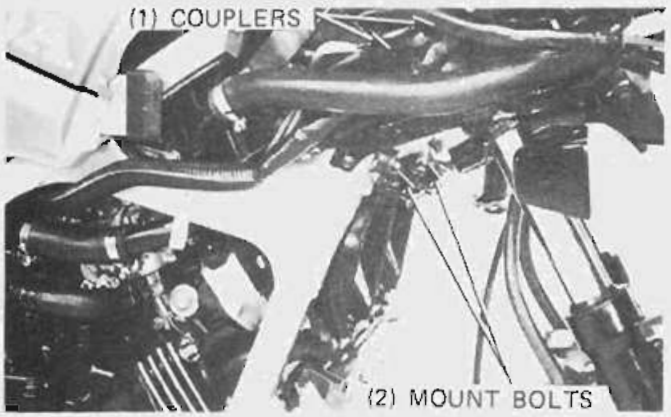
- It is not necessary to disconnect the radiator hoses when removing the cooling fan.

Turn the ignition switch off and disconnect the battery negative cable from the battery.

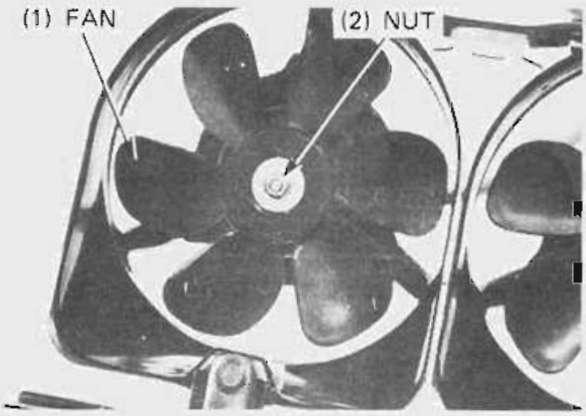
On VF1000F model, remove the fairing.

Disconnect the fan motor couplers.

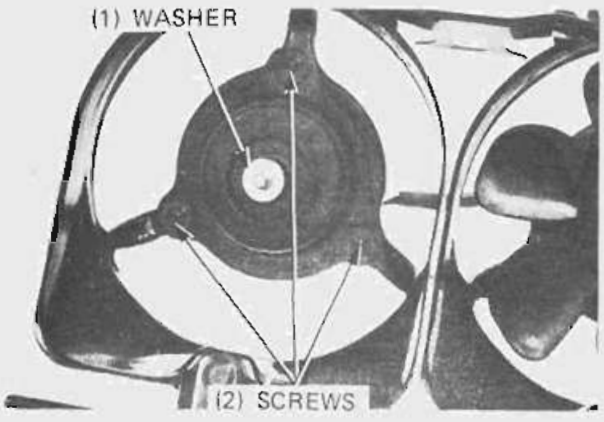
Remove the two mount bolts and the cooling fan assembly.



Remove the fan from the motor by removing the nut.



Remove the washer from the motor shaft.
Remove the three screws and the fan motor from the shroud.

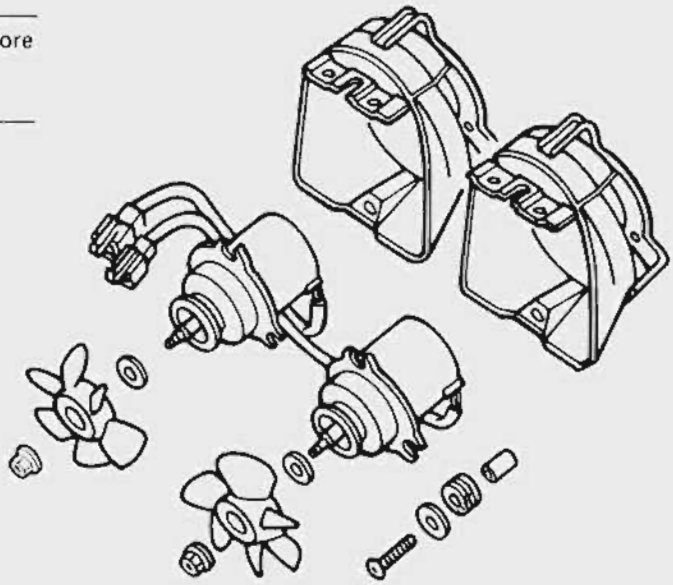


COOLING FAN ASSEMBLY/INSTALLATION

Assemble and install the cooling fan in the reverse order of removal.

NOTE

- Apply thread lock agent to the motor shaft threads before installing the fan mount nut.
- Route the fan motor wire properly (page 1-9).



AUXILIARY RADIATOR REMOVAL

VF1000F model

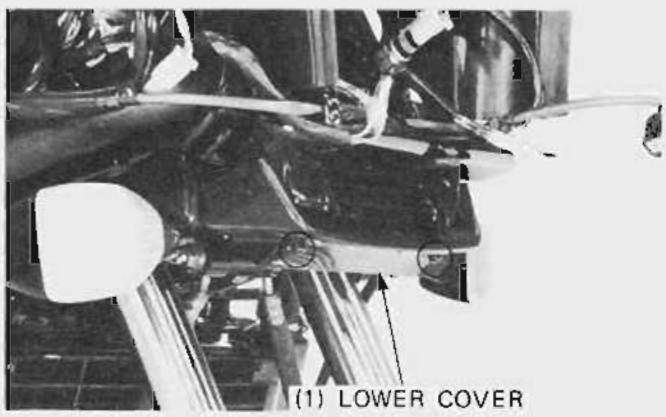
Drain the coolant from the auxiliary radiator at the thermostat housing.

Remove the headlight with its bracket.

Disconnect the overflow tube from the filler neck.
Disconnect the filler neck hose at the auxiliary radiator and remove the filler neck with the hose.

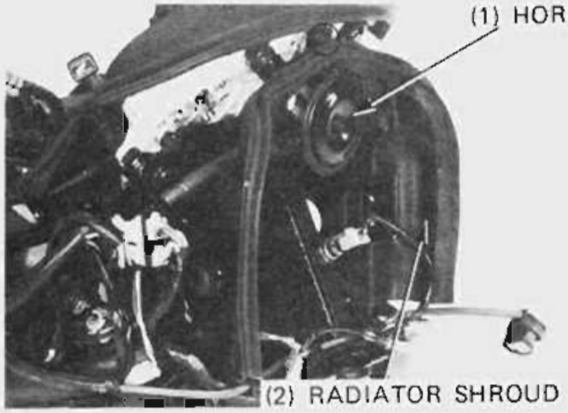


Remove the auxiliary radiator lower cover by removing the two screws.



Disconnect the horn wires and remove the horn mount bolt and the horn.

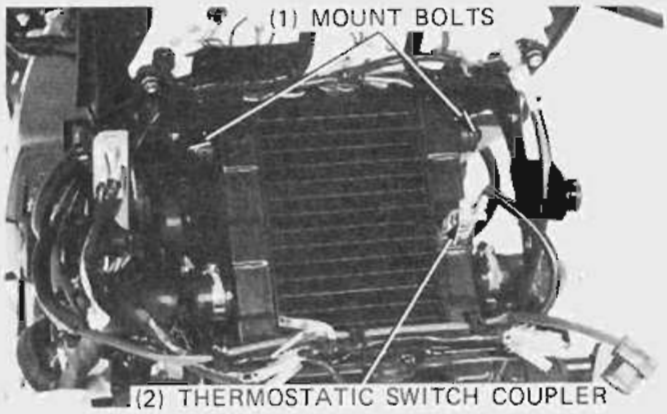
Remove the auxiliary radiator shroud.



Disconnect the thermostatic switch coupler from the switch.

Remove the auxiliary radiator mount bolts and the auxiliary radiator from the stay.

Disconnect the radiator hoses and remove the auxiliary radiator.



VF1000F-II model

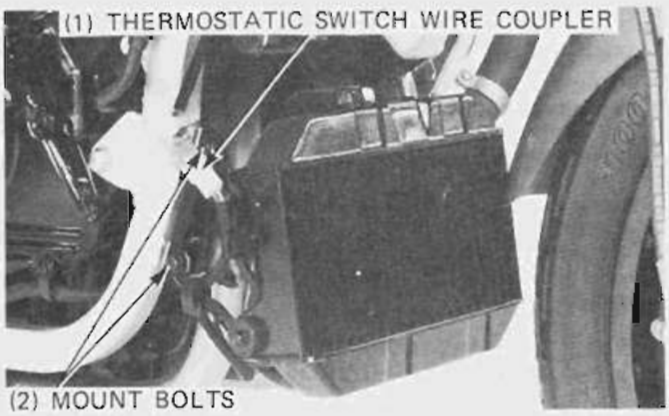
Drain the coolant from the radiators (page 6-3).

Disconnect the thermostatic switch wire coupler.

Disconnect the radiator hoses.

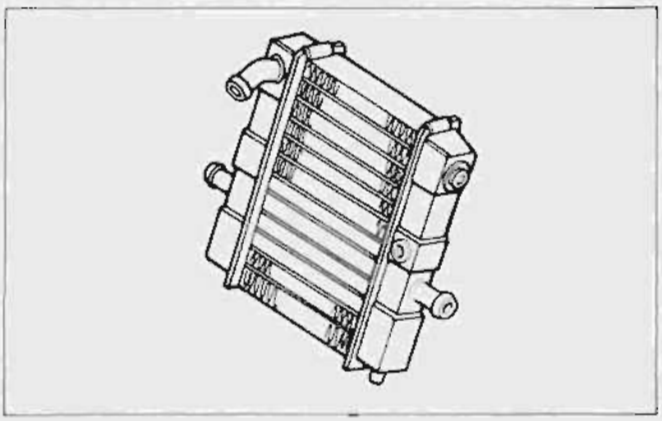
Remove the auxiliary radiator bracket mount bolts and the auxiliary radiator with the brackets.

Remove the brackets from the auxiliary radiator.



AUXILIARY RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.
Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.



AUXILIARY RADIATOR INSTALLATION

Install the auxiliary radiator in the reverse order of removal.

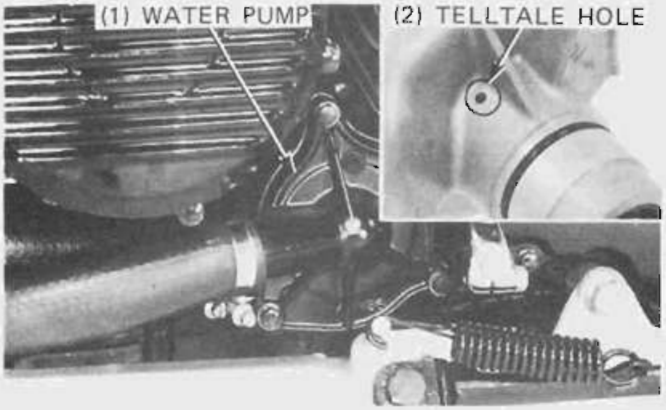
After installation, fill and bleed the cooling system (page 6-4).

WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the lower cowl.

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



REMOVAL

Drain the coolant (page 6-3).

Remove the slave cylinder from the right crankcase rear cover by removing the three bolts.

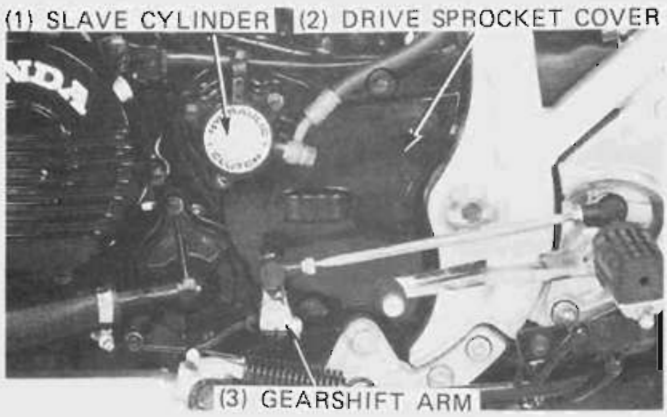
NOTE

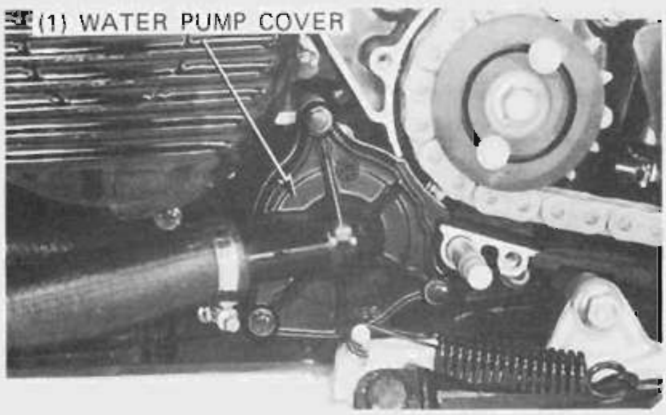
- To prevent the clutch system from air contamination, and the slave cylinder piston from falling, squeeze the clutch lever immediately after removing the slave cylinder, and tie the lever to the handle grip with a string.

Remove the gearshift arm from the gearshift spindle.

Remove the two bolts and the drive sprocket cover.

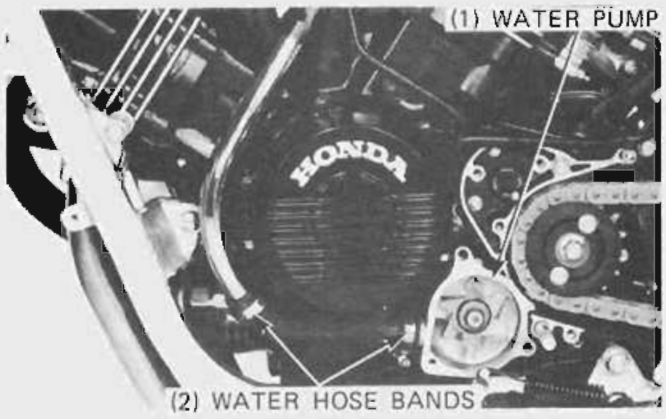
Remove the water pump cover.





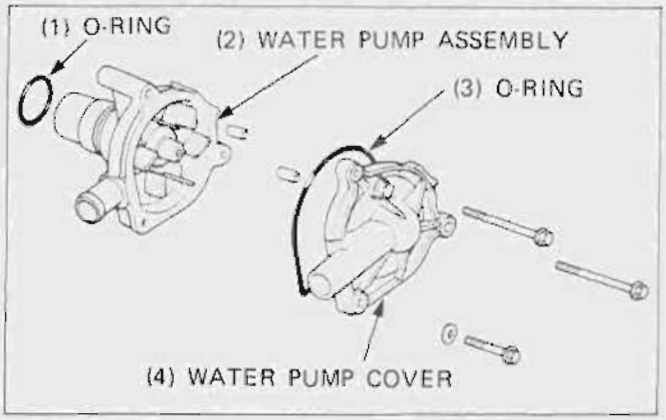
Loosen the water hose bands and remove the water hose.

Pull the water pump out of the right crankcase.



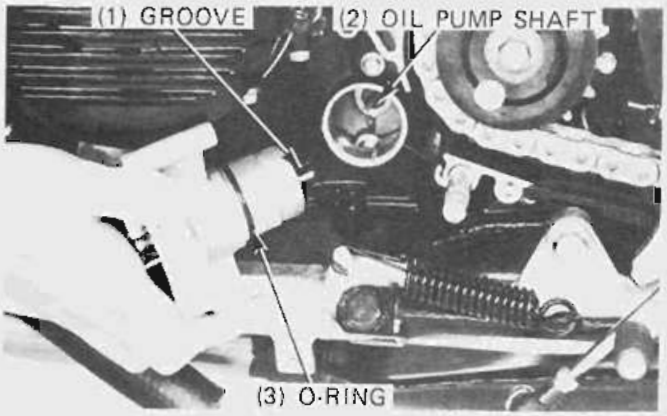
INSPECTION

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

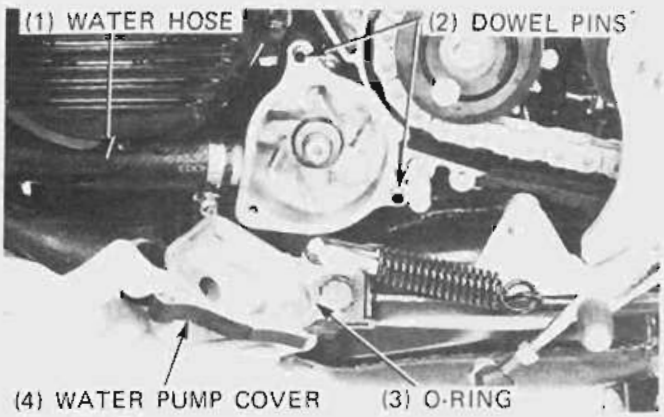


INSTALLATION

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



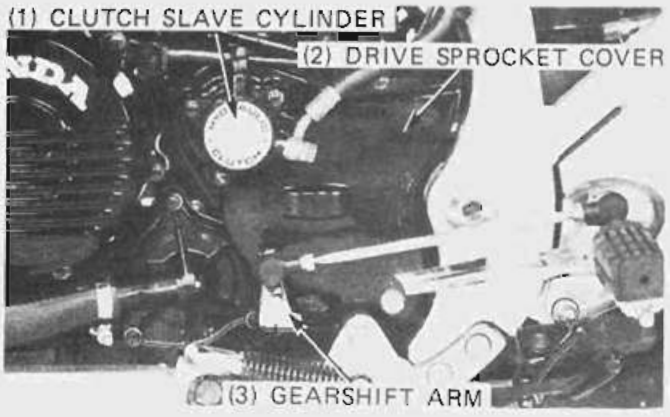
Install the water hose to the water pump and water pipe and tighten the hose bands securely.
Install the dowel pins and install a new O-ring in the groove of the water pump cover.
Install the water pump cover and torque the bolts.

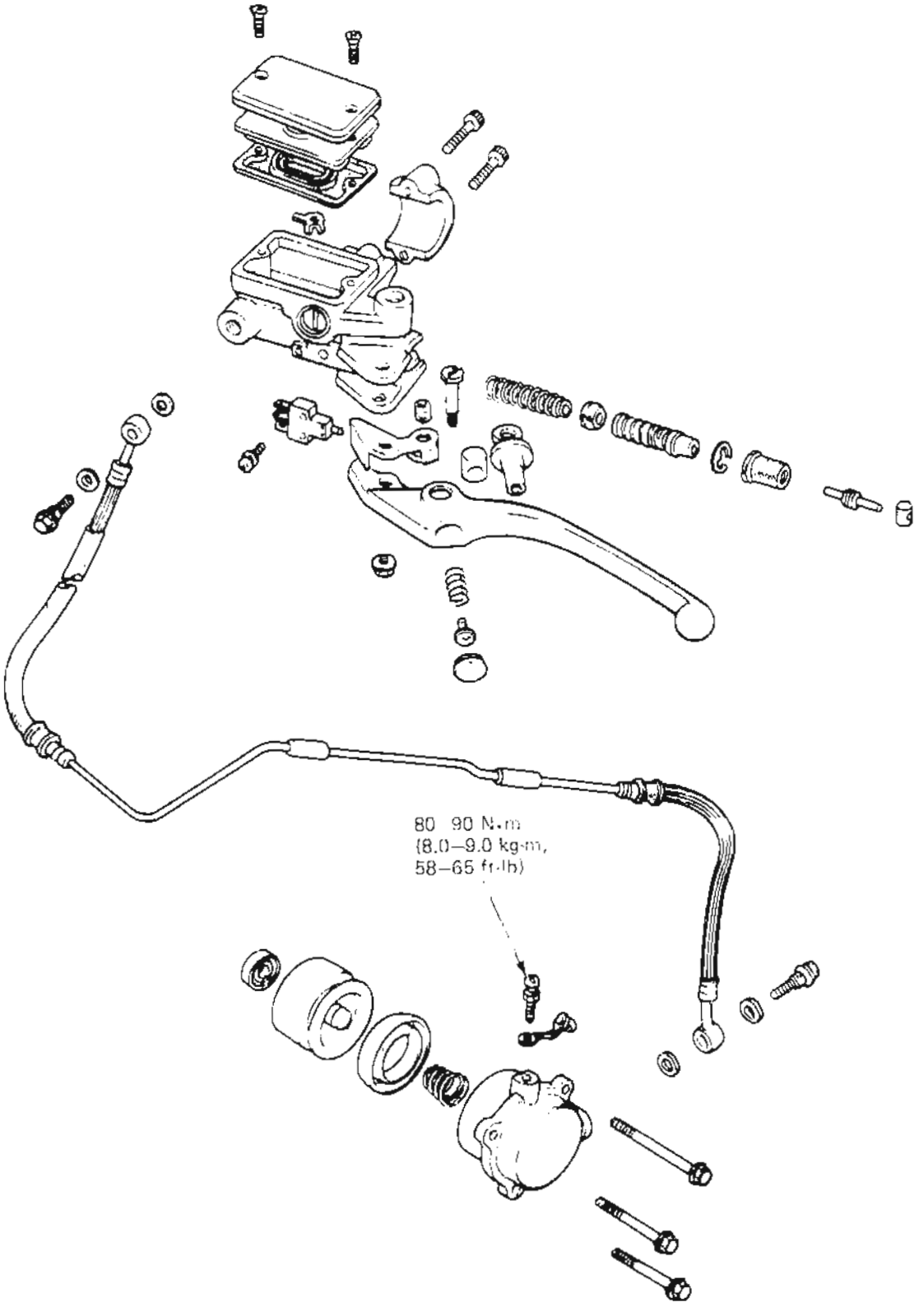


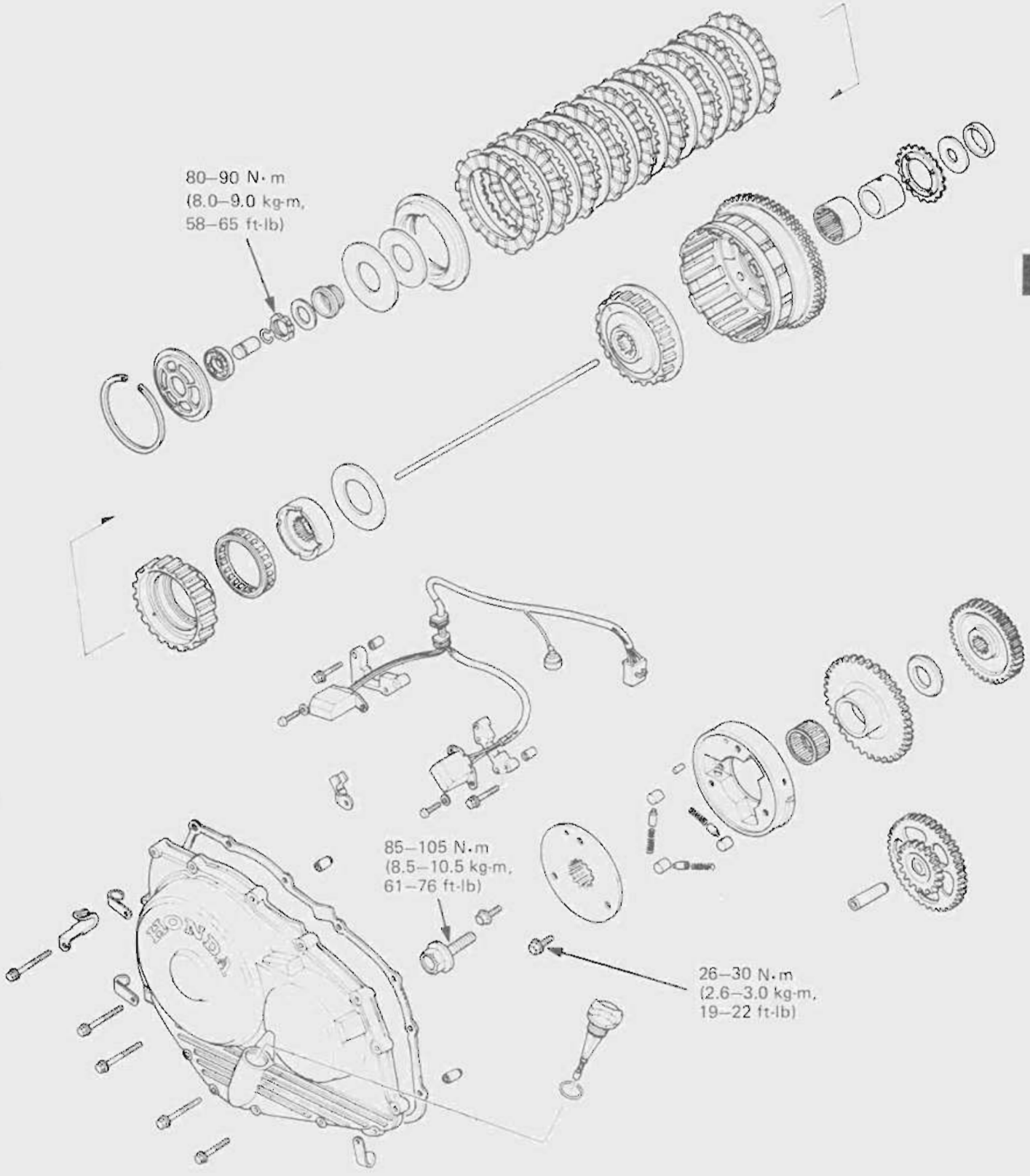
Install the drive sprocket cover.
Install the gearshift arm onto the spindle, aligning the punch marks on the arm and spindle.

Temporarily install the clutch slave cylinder to the right crankcase rear cover, release the clutch lever from the handle grip by removing the string, and then tighten the three mount bolts.

Fill and bleed the cooling system (page 6-4).




80 90 N·m
(8.0–9.0 kg-m,
58–65 ft-lb)


80–90 N·m
(8.0–9.0 kg-m,
58–65 ft-lb)
85–105 N·m
(8.5–10.5 kg-m,
61–76 ft-lb)
26–30 N·m
(2.6–3.0 kg-m,
19–22 ft-lb)

7 CLUTCH

SERVICE INFORMATION	7-1	CLUTCH COVER REMOVAL	7-8
TROUBLESHOOTING	7-2	STARTER CLUTCH DISASSEMBLY	7-8
CLUTCH FLUID REPLACEMENT/ AIR BLEEDING	7-3	CLUTCH DISASSEMBLY	7-10
CLUTCH MASTER CYLINDER	7-4	CLUTCH ASSEMBLY	7-13
CLUTCH SLAVE CYLINDER	7-6	STARTER CLUTCH ASSEMBLY	7-16
		CLUTCH COVER INSTALLATION	7-18

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Clutch master cylinder	Cylinder I.D.	14.000–14.043 mm (0.5512–0.5524 in)	14.06 mm (0.553 in)
	Piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.94 mm (0.549 in)
Clutch slave cylinder	Cylinder I.D.	33.600–33.622 mm (1.3228–1.3253 in)	33.68 mm (1.326 in)
	Piston O.D.	33.550–33.575 mm (1.3209–1.3218 in)	33.53 mm (1.320 in)
Clutch	Outer guide I.D.	29.995–30.012 mm (1.1809–1.1816 in)	30.08 mm (1.184 in)
	Spring free height	4.4 mm (0.17 in)	4.2 mm (0.165 in)
	Clutch center B I.D.	74.414–74.440 mm (2.9297–2.9307 in)	74.47 mm (2.932 in)
	One way clutch inner O.D.	57.755–57.768 mm (2.2738–2.2743 in)	57.72 mm (2.272 in)
	Disc thickness	3.72–3.88 mm (0.147–0.153 in)	3.1 mm (0.12 in)
	Plate warpage	–	0.30 mm (0.012 in)
Starter clutch	Driven gear O.D.	47.175–47.200 mm (1.8573–1.8583 in)	47.16 mm (1.857 in)

TORQUE VALUES

Primary drive gear	85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)
Clutch lock nut	80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)
Starter clutch	26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb)

TOOLS

Special

Snap ring pliers	07914–3230001
Lock nut wrench	07916–4220000

Common

Universal holder	07725–0030000
Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 40 mm	07746–0040900
Gear holder	07724–0010100

TROUBLESHOOTING

Clutch lever soft or spongy
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

Clutch lever too hard
- Sticking piston(s)
- Clogged hydraulic system

Clutch slips
- Hydraulic system sticking
- Discs worn
- Springs weak

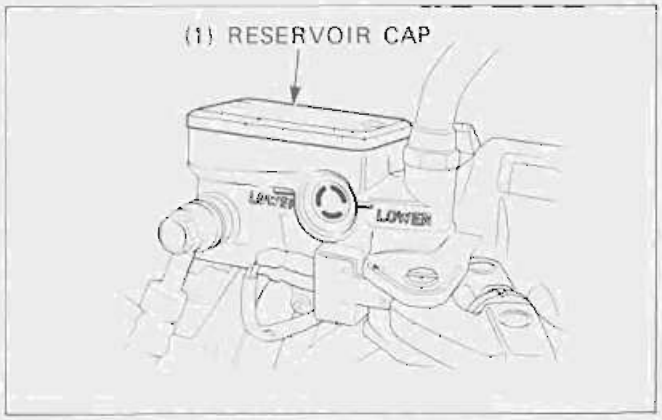
Clutch will not disengage
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking
- Hydraulic system sticking
- Plates warped

Motorcycle creeps with clutch disengaged
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking
- Hydraulic system sticking
- Plates warped

Excessive lever pressure
- Hydraulic system sticking
- Lifter mechanism damaged

Clutch operation feels rough
- Outer drum slots rough
- Sticking piston(s)

CLUTCH FLUID REPLACEMENT/AIR BLEEDING



CAUTION

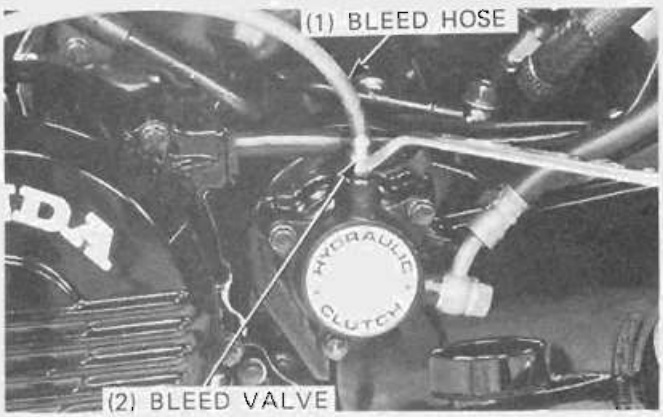
- *Do not allow foreign material to enter the system when the diaphragm is removed.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

CLUTCH FLUID DRAINING

Remove the reservoir cap, set plate and diaphragm with the fluid reservoir parallel to the ground.

Connect a bleed hose to the slave cylinder bleed valve.

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



CLUTCH FLUID FILLING/AIR BLEEDING

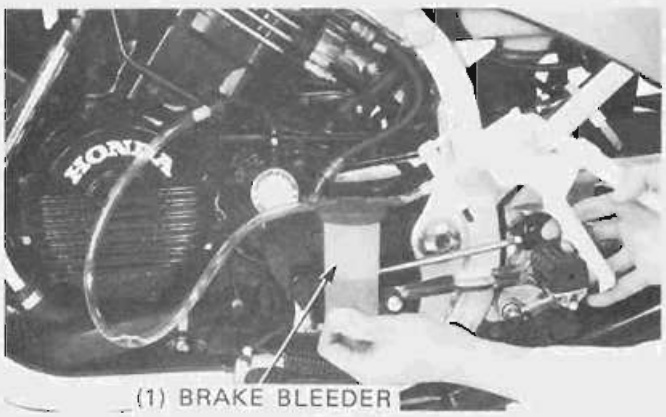
Fill the reservoir with DOT 4 brake fluid from a sealed container.

CAUTION

- *Do not mix different types of fluid. They are not compatible with each other.*

Connect a commercially available brake bleeder to the slave cylinder bleed valve.

Pump the brake bleeder and loosen the bleed valve.
Add fluid when the fluid level in the master cylinder reservoir is low.



NOTE

- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- Use only DOT 4 brake fluid from a sealed container.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

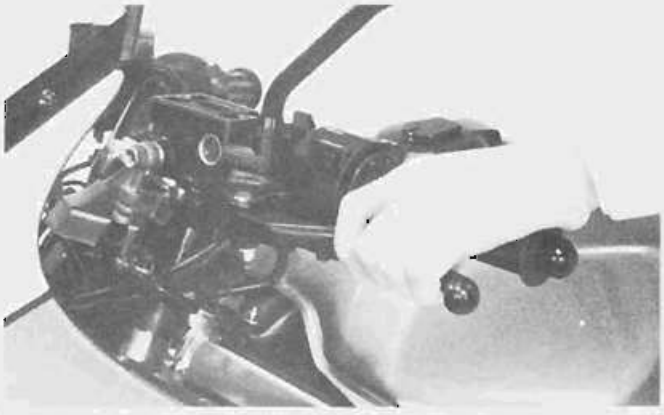
Repeat above procedures until air bubbles do not appear in the plastic hose.

NOTE

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

Close the bleed valve and operate the clutch lever. If it feels spongy, bleed the system by performing the available bleeding procedure.

If a brake bleeder is not available, perform the following procedures:



Pump up the system pressure with the clutch lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.

Connect the bleed hose to the bleed valve and bleed the system as follows:

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

NOTE

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

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

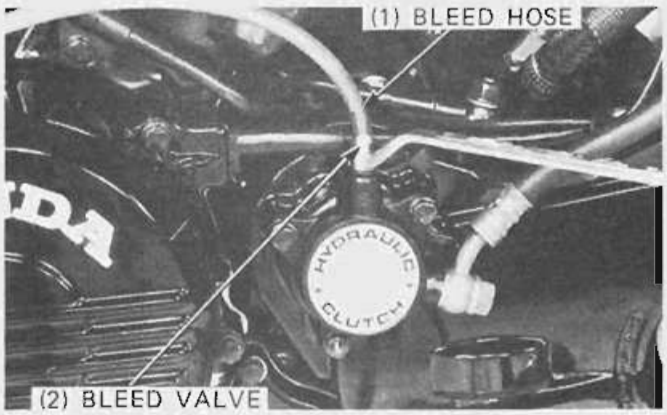
Repeat steps 1 and 2 until air bubbles cease to appear in the fluid coming out of the bleed valve.

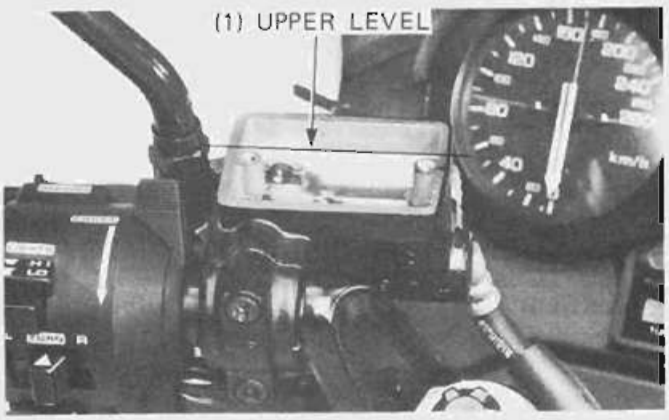
Tighten the bleed valve.

TORQUE: 4–7 N.m (0.4–0.7 kg-m, 3–5 ft-lb)

Fill the master cylinder reservoir to the upper level line with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap.





CLUTCH MASTER CYLINDER

DISASSEMBLY

Drain the clutch fluid from the hydraulic system (page 7-3).

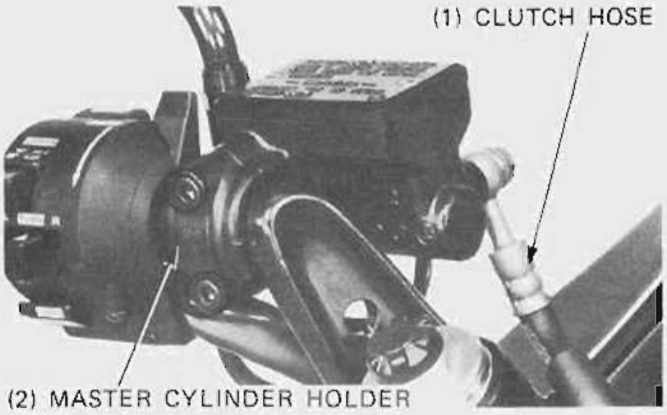
Disconnect the clutch switch wires from the switch.
Remove the rear view mirror from the master cylinder (VF1000F model only).
Remove the clutch hose from the master cylinder.

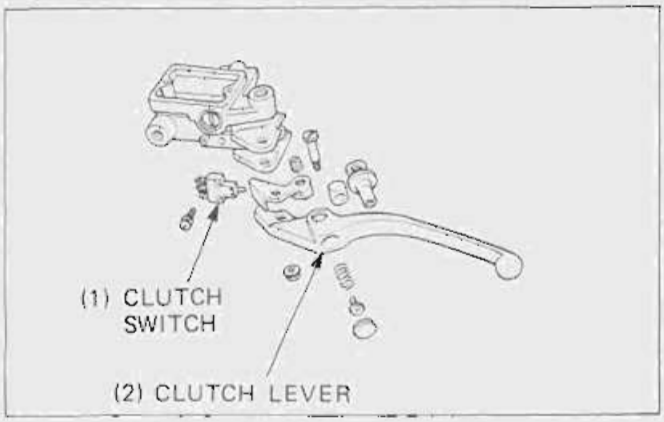
CAUTION

- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the clutch hose to prevent contamination.*

Remove the master cylinder holder and the master cylinder.

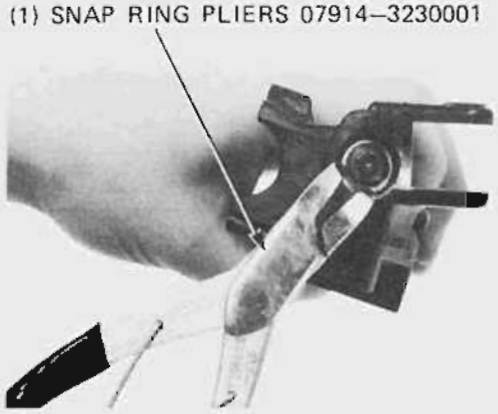
Remove the clutch switch.
Remove the clutch lever, end piece, push rod and boot.





Remove the snap ring, washer, master piston, primary cup and spring from the master cylinder.

Clean the master cylinder, reservoir and master piston in clean clutch fluid.



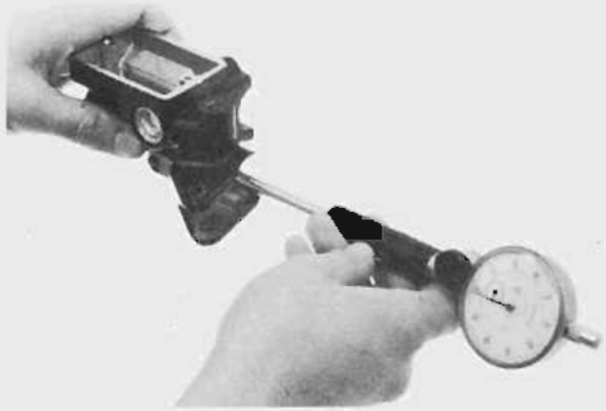
INSPECTION

Check the primary and secondary cups for wear, deterioration or damage.

Check the master cylinder and piston for scratches, scoring or nicks.

Measure the master cylinder I.D.

SERVICE LIMIT: 14.06 mm (0.553 in)



Measure the master piston O.D.

SERVICE LIMIT: 13.94 mm (0.549 in)

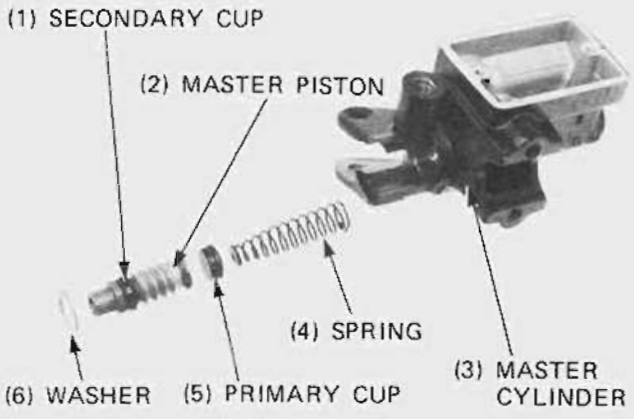


ASSEMBLY

NOTE

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

Coat the master piston, primary and secondary cups with clean clutch fluid, then install the spring, primary cup, master piston and washer into the master cylinder being careful not to allow the lips of the cups to turn inside out.
Install the snap ring being certain it is firmly seated in the groove.

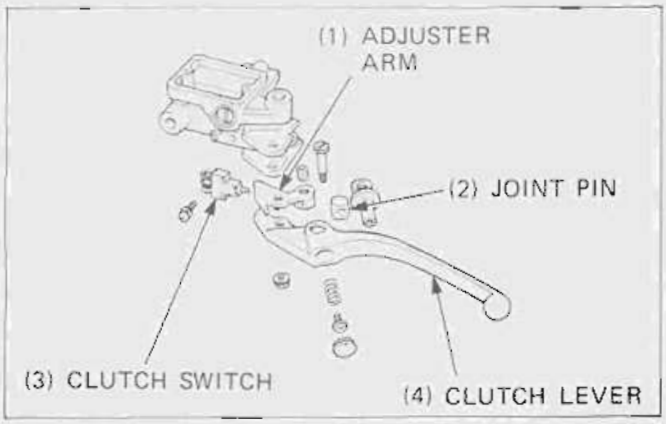


Install the boot, push rod, end piece and clutch lever.

NOTE

- If the clutch lever adjuster has been disassembled, be sure the joint pin is installed with its arrow mark facing the adjuster arm.

Install the clutch switch.
Install the rear view mirror (VF1000F model only).



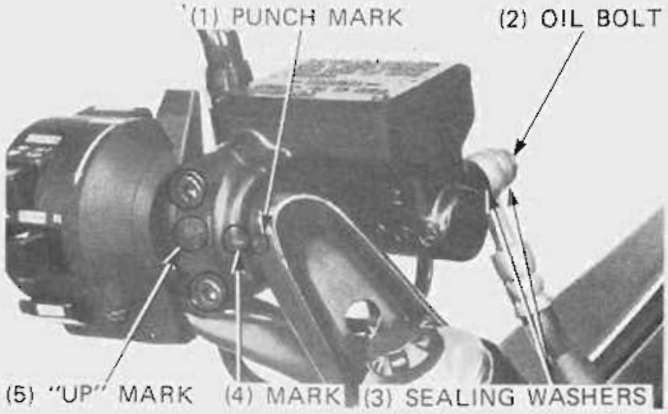
Place the master cylinder on the handlebar and install the holder with the "UP" mark facing up.
Align the mark on the holder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

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

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Connect the clutch switch wires.

Fill and bleed the clutch system (page 7-3).



CLUTCH SLAVE CYLINDER

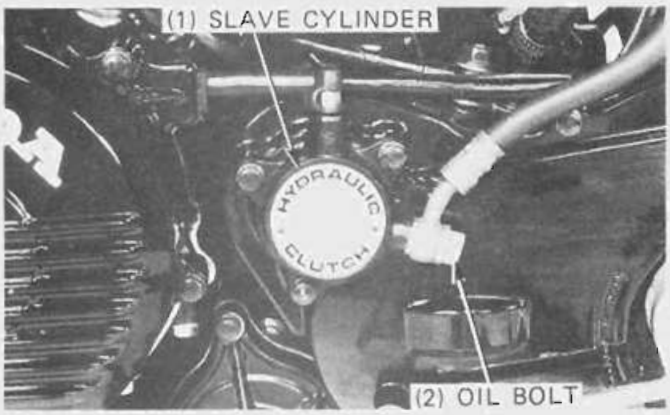
DISASSEMBLY

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

CAUTION

- *Avoid spilling clutch fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

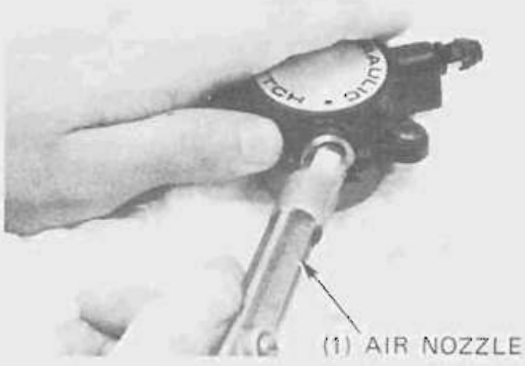
Remove the slave cylinder.



Remove the piston from the cylinder.

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

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



Remove the spring from the slave cylinder.

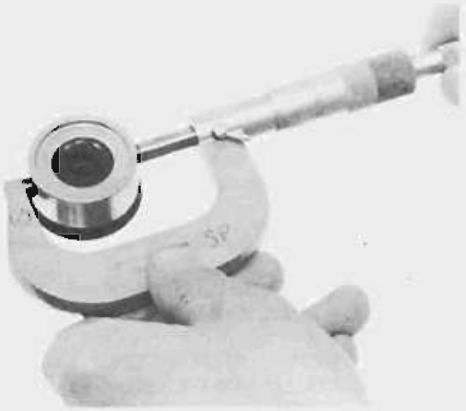
Remove the oil and piston seals.
Clean the piston groove with clutch fluid.
Check the piston spring for weakness or damage.



PISTON O.D. INSPECTION

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

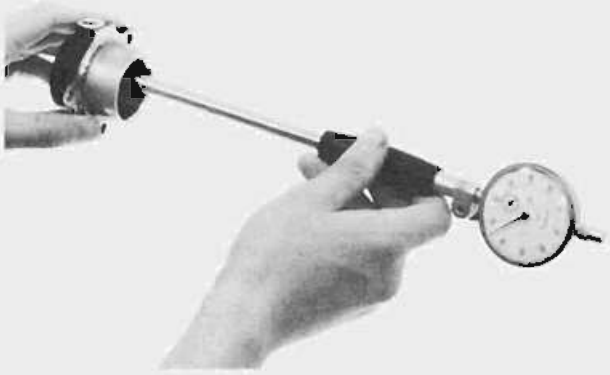
SERVICE LIMIT: 33.53 mm (1.320 in)



CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 33.68 mm (1.326 in)

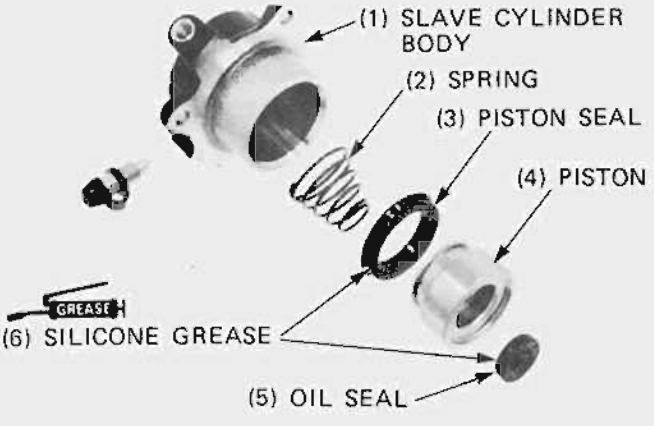


ASSEMBLY

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

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

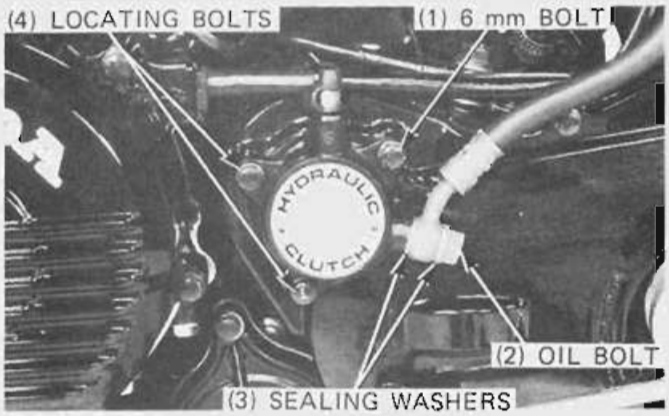
Be certain the piston seal is seated in the piston groove. Place the piston in the cylinder with the seal end facing out.



Install the slave cylinder with a 6 mm bolt and two 6 mm locating bolts.

Connect the clutch hose with the oil bolt and the two sealing washers.

Fill the clutch fluid reservoir and bleed the clutch system (page 7-3).



CLUTCH COVER REMOVAL

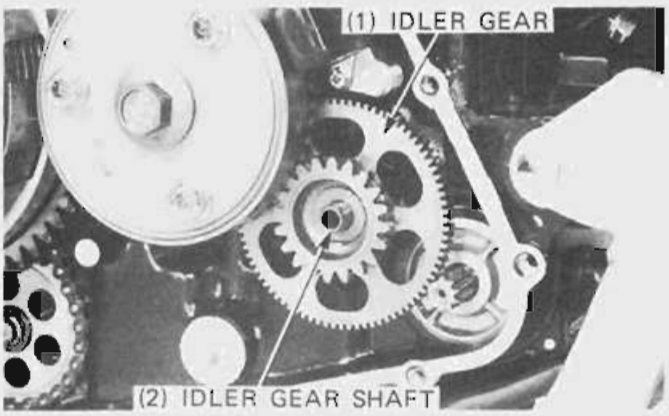
Drain the engine oil (page 2-3).
Remove the clutch cover, gasket and dowel pins.



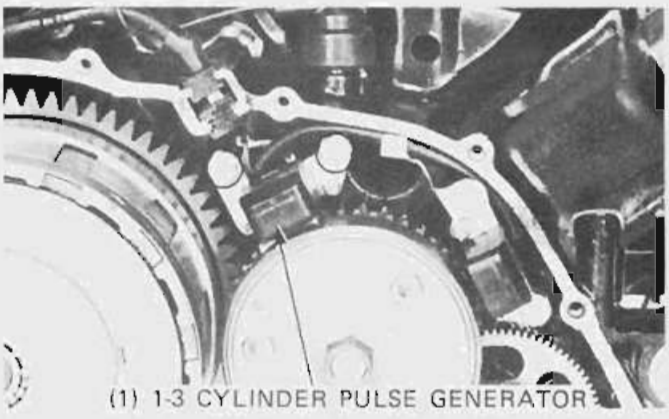
STARTER CLUTCH DISASSEMBLY

Remove the starter idle gear shaft and gear.

Remove the idler gear by rotating the starter clutch clockwise with a wrench, or by rotating the idler gear clockwise to turn the starter motor shaft counterclockwise.

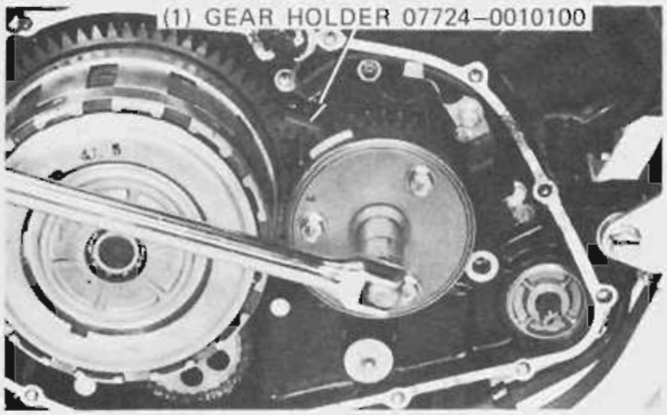


Remove the 1-3 cylinder pulse generator.

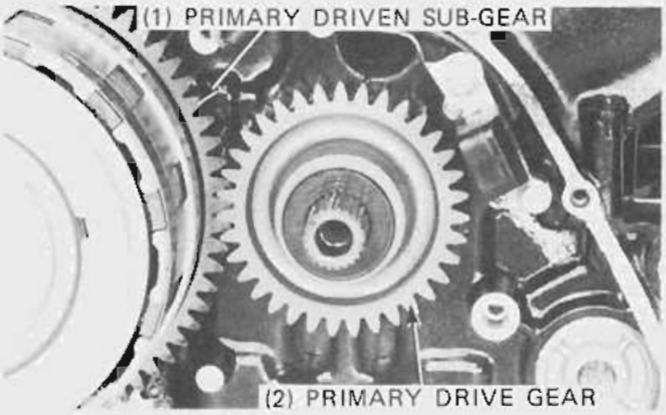


Mesh the gear holder between the primary drive and driven gears to hold the crankshaft, and loosen the bolt.

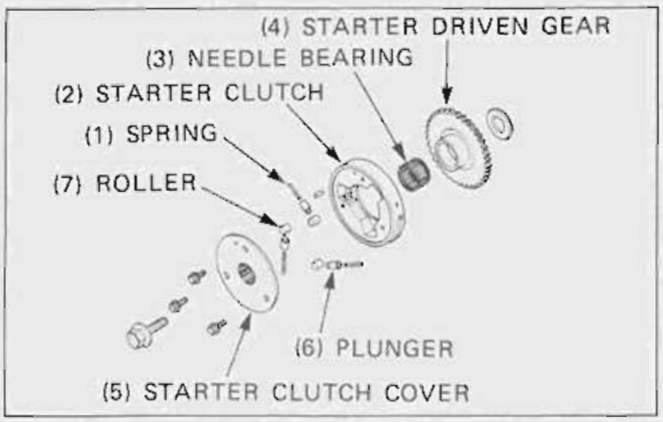
Remove the starter clutch.



Shift the primary driven sub-gear with a screw-driver to take preload off the primary drive gear and remove the primary drive gear.



Remove the starter driven gear and needle bearing from the starter clutch.
Inspect the rollers for smooth operation.
Remove the starter clutch cover by removing the three bolts.
Remove the clutch rollers, plungers and springs.
Check the rollers for excessive wear.



STARTER DRIVEN GEAR INSPECTION

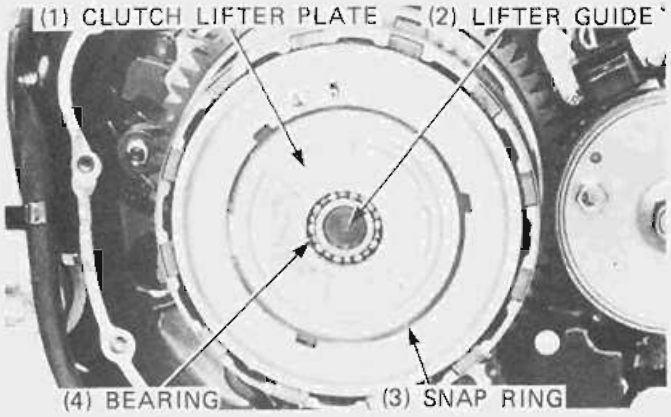
Inspect the driven gear for damage or excessive wear.
Measure the driven gear O.D.

SERVICE LIMIT. 47.16 mm (1.857 in)



CLUTCH DISASSEMBLY

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



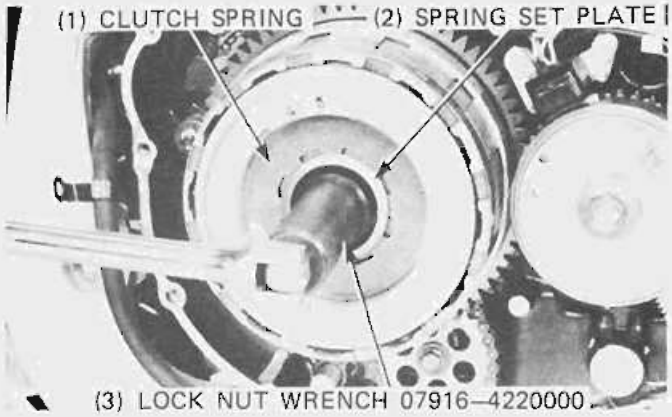
Shift the transmission into 5th gear and apply the rear brake.

NOTE

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

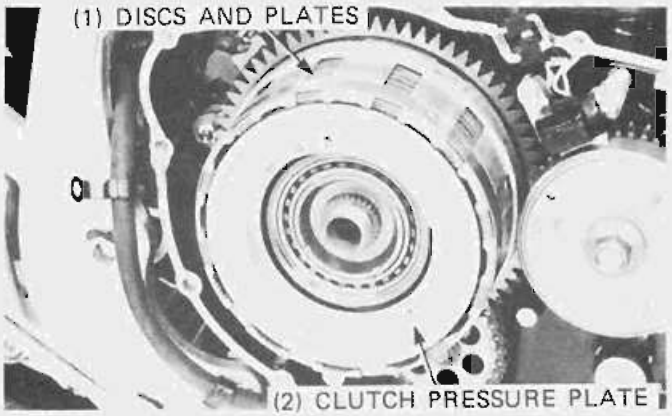
Remove the lock nut and lock washer.

Remove the clutch spring set plate, clutch spring and washer.

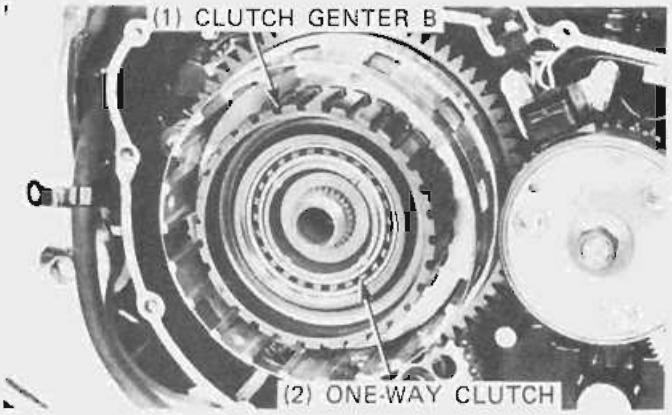


Remove the clutch pressure plate.

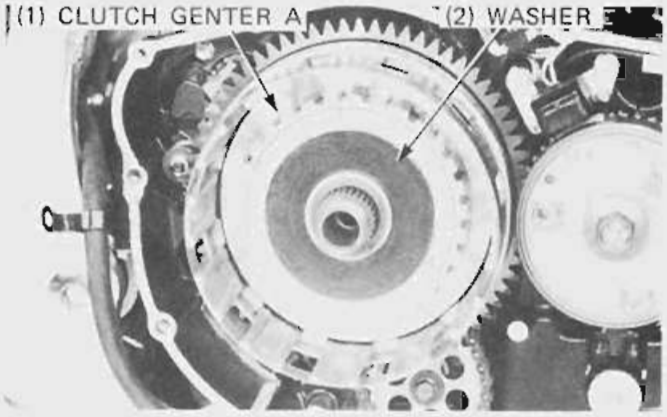
Remove the clutch plates and discs.



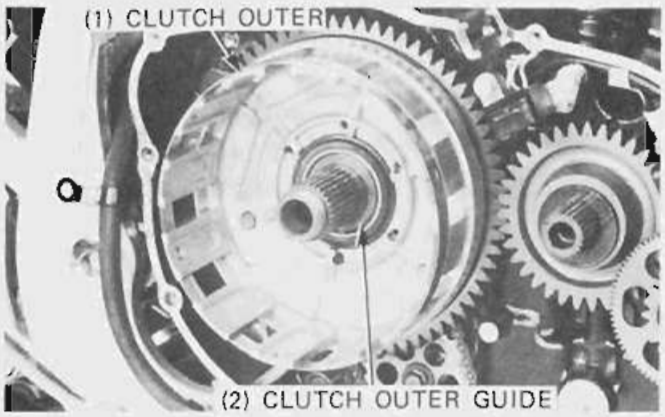
Remove clutch center B and the one-way clutch as an assembly.



Remove clutch center A and washer.
Remove the starter clutch (page 7-8).



Shift the primary driven sub-gear with a screwdriver and remove the clutch outer and outer guide.



INSPECTION

Clutch spring

Measure the height of the clutch spring.

SERVICE LIMIT. 4.2 mm (0.165 in)

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

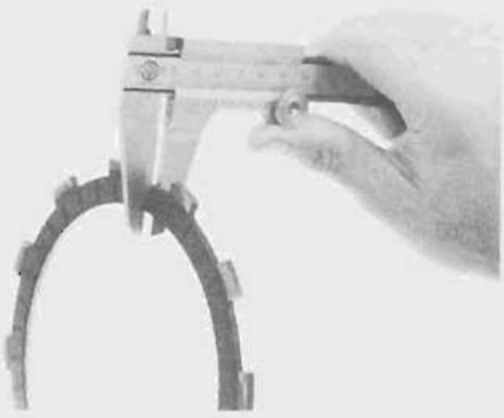


Clutch disc

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

SERVICE LIMIT. 3.1 mm (0.12 in)

Replace any discs that are thinner than the service limit.



Clutch plate

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

SERVICE LIMIT. 0.30 mm (0.012 in)



One way clutch

Inspect the one way clutch for smooth operation.

Check the rollers for excessive wear.



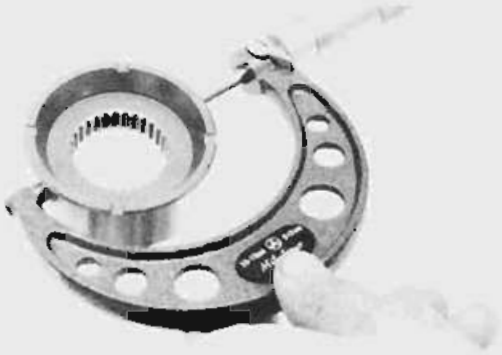
Measure the I.D. of clutch center B.

SERVICE LIMIT: 74.47 mm (2.932 in)



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

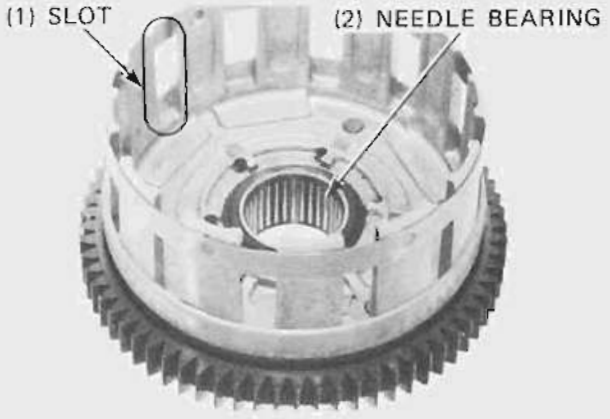
SERVICE LIMIT: 57.72 mm (2.272 in)



Clutch outer

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

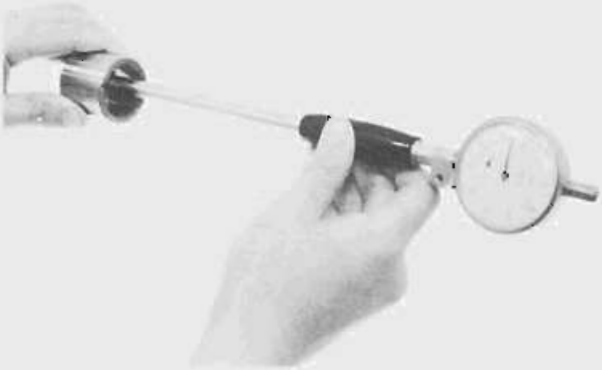
If the needle bearing is difficult to remove from the clutch housing, use the following tools:
Driver: 07749–0010000
Attachment, 42 x 47 mm: 07746–0010300
Pilot, 40 mm: 07746–0040900



Clutch outer guide

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

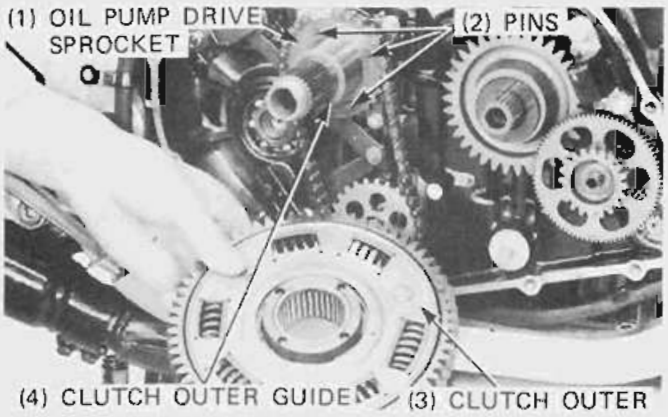
SERVICE LIMIT: 30.08 mm (1.184 in)



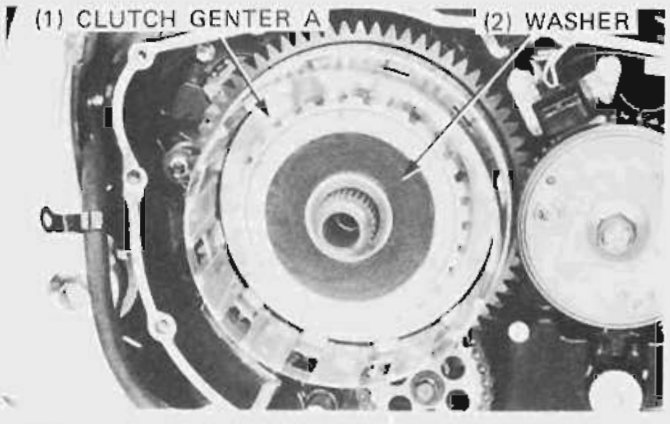
CLUTCH ASSEMBLY

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

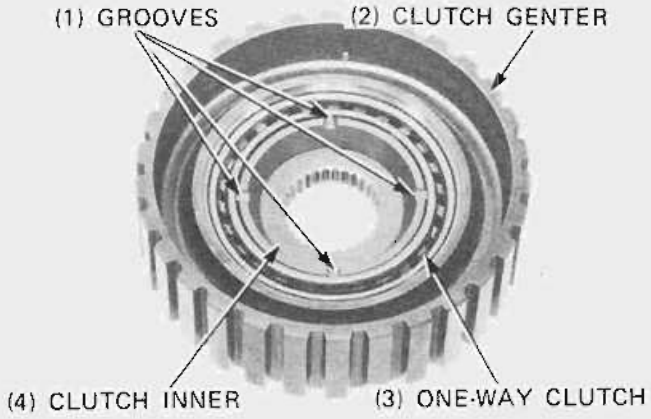
Align the holes in the clutch outer with the pins on the oil pump drive sprocket and install the clutch outer over the guide.



Install clutch center A and the washer.
Install the starter clutch (page 7-16).



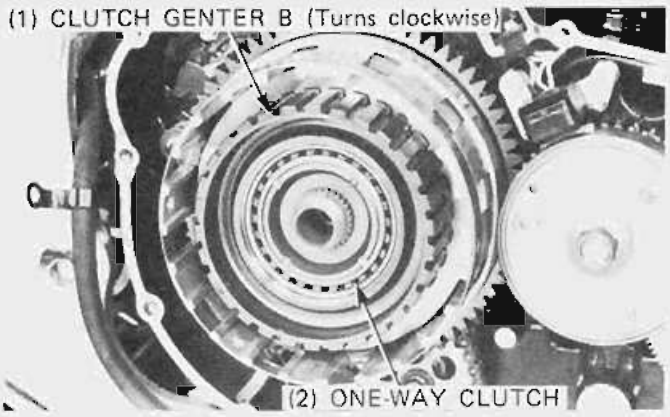
Place the clutch center B with the grooved side facing down. Install the one-way clutch into the clutch center B with its flanged cage facing up.
Install the clutch inner into the one-way clutch with its grooves facing up. Turn it counterclockwise as you install it.



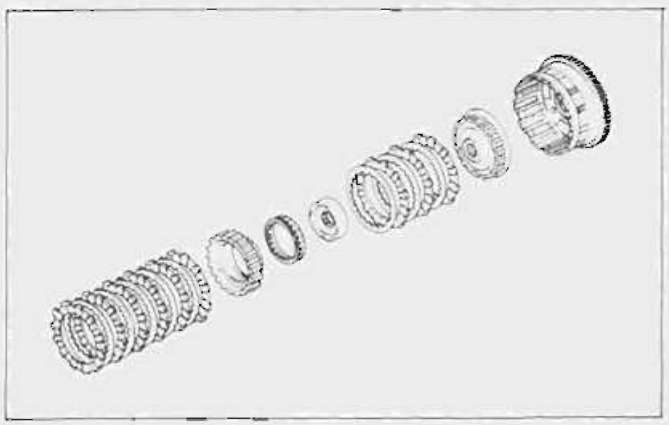
Install the one-way clutch/clutch center B assembly over the mainshaft.

NOTE

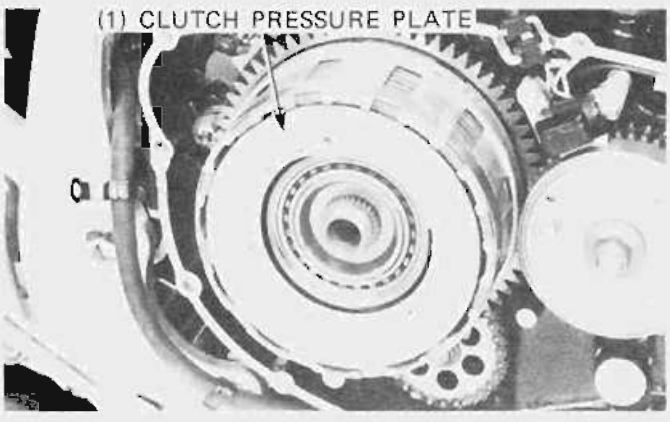
- Make sure the one way clutch assembly is installed correctly by turning the clutch center B. The clutch center should turn clockwise freely and should not turn counterclockwise.



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



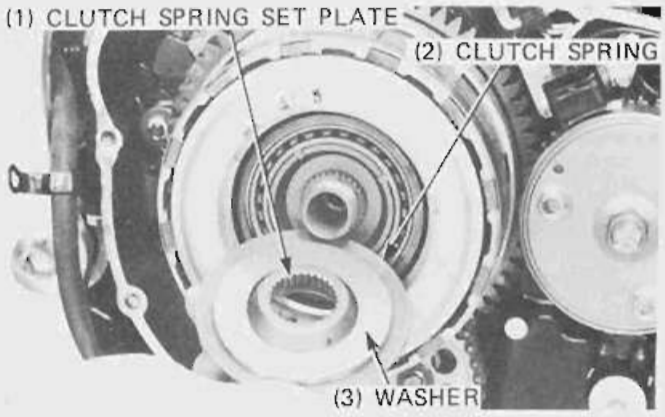
Install the clutch pressure plate.



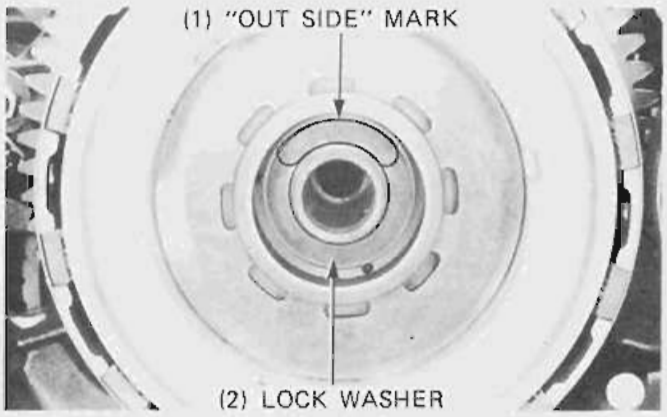
Install the clutch spring set plate, clutch spring, and washer.

NOTE

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



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

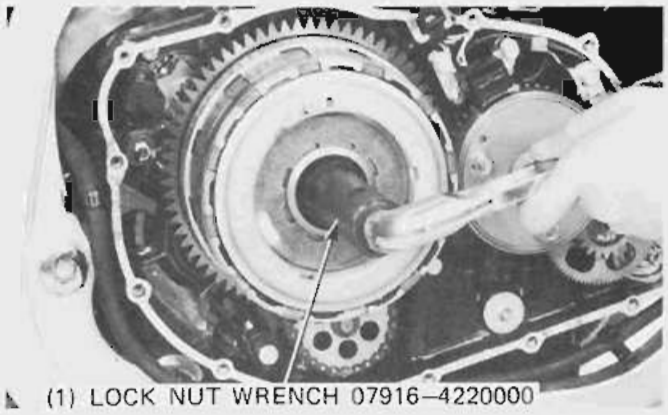


Place the transmission in 5th gear and apply rear brake.
Install and tighten the lock nut.

NOTE

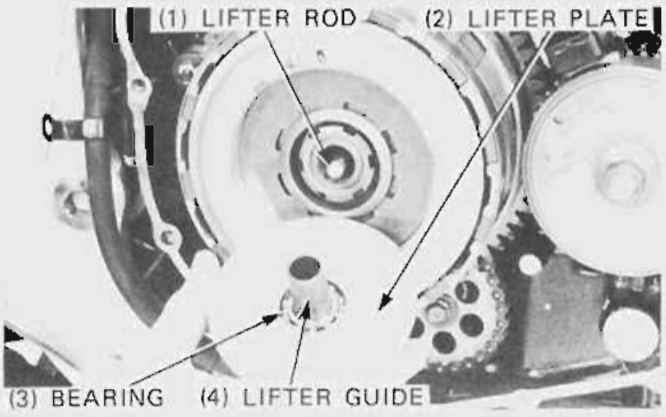
- If servicing the clutch with the engine out of the frame, shift the transmission into gear and hold the drive sprocket with the HOLDER 07725–0030000.

TORQUE: 80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)

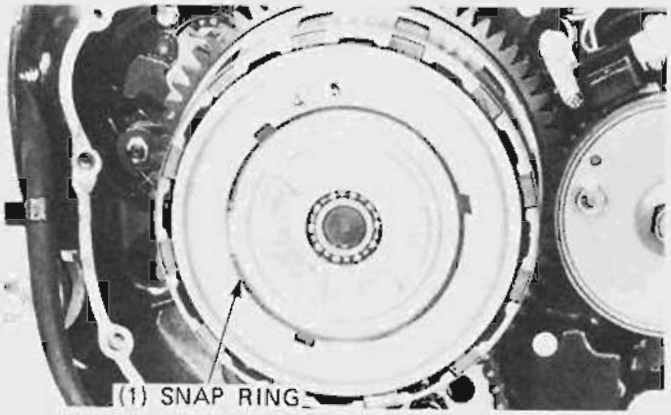


Install the clutch lifter rod.

Install the clutch lifter plate, lifter guide and bearing.



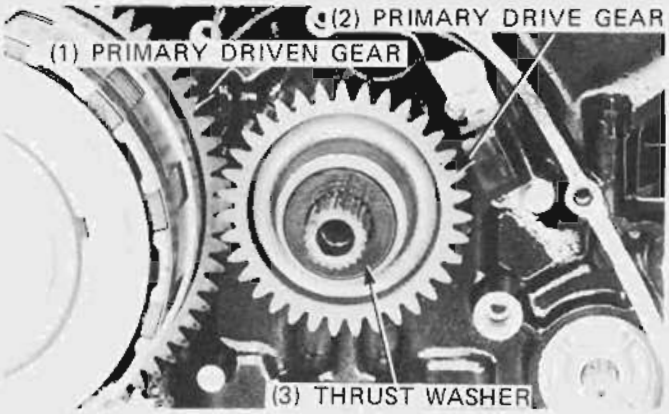
Install the snap ring.



STARTER CLUTCH ASSEMBLY

Install the primary drive gear onto the crankshaft while moving the primary driven gear with a screw-driver.

Install the thrust washer on the crankshaft.

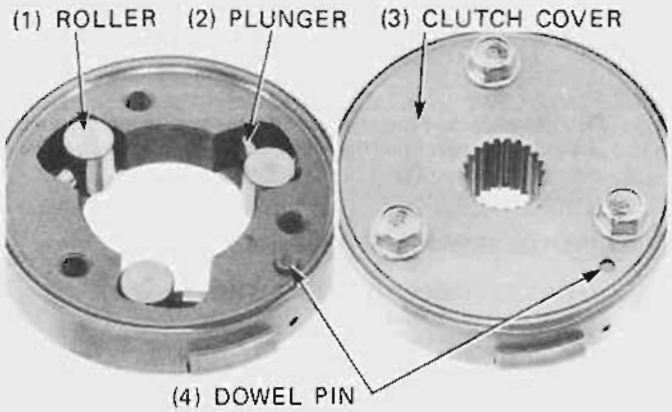


Install the springs, plungers and rollers into the starter clutch.
Install the dowel pin.
Install the starter clutch cover aligning the dowel pin hole with the dowel pin and tighten the bolts.

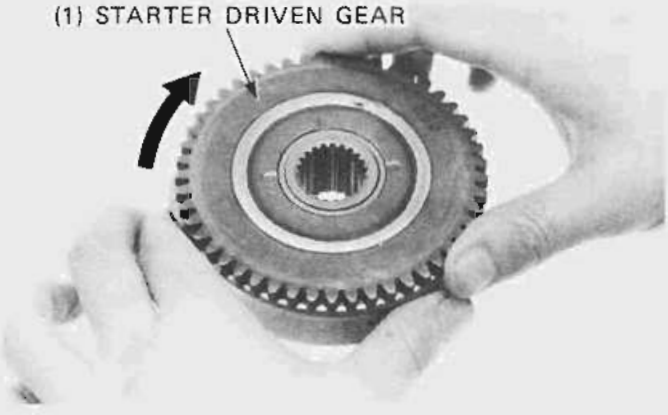
TORQUE: 26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb)

NOTE

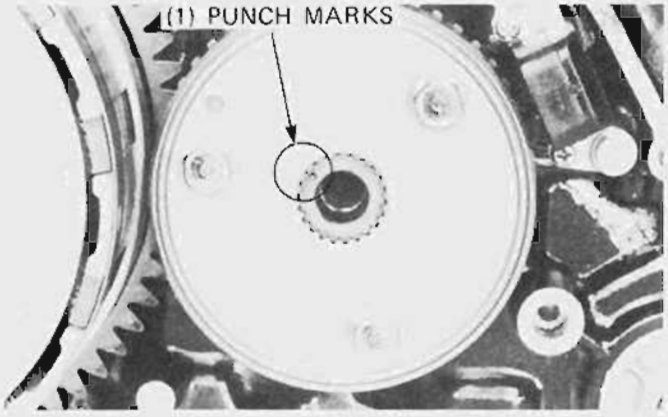
- Apply a locking agent to the bolt threads.



Install the starter driven gear by turning it clockwise.

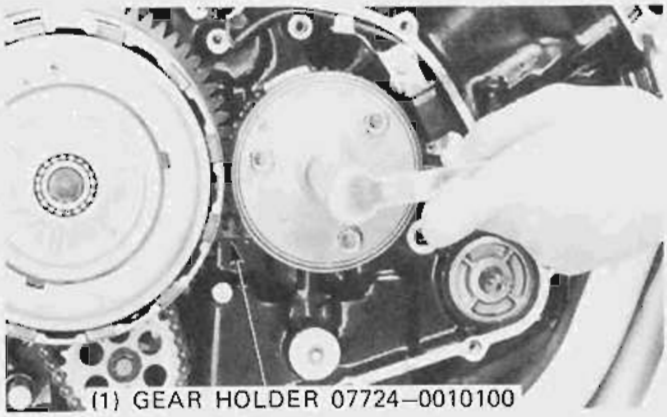


Align the punch marks on the starter clutch and crankshaft and install the starter clutch.

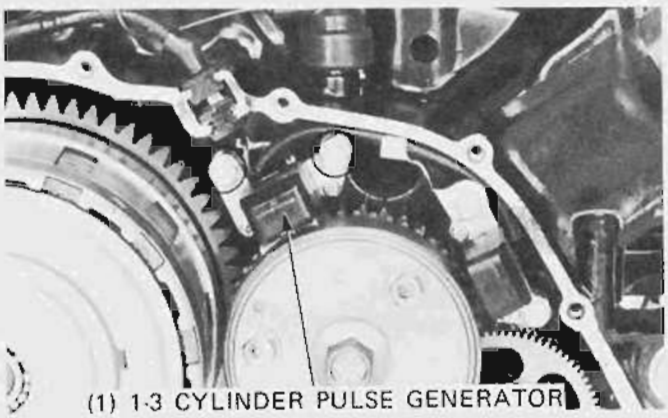


Mesh the gear holder between the primary drive and driven gears to hold the crankshaft and tighten the primary gear bolt.

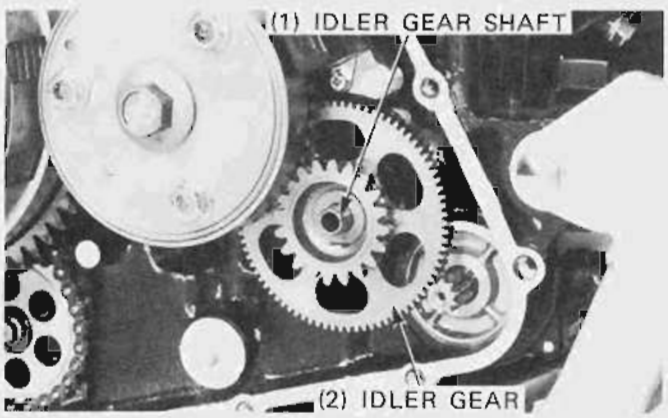
TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)



Install the 1-3 cylinder pulse generator.

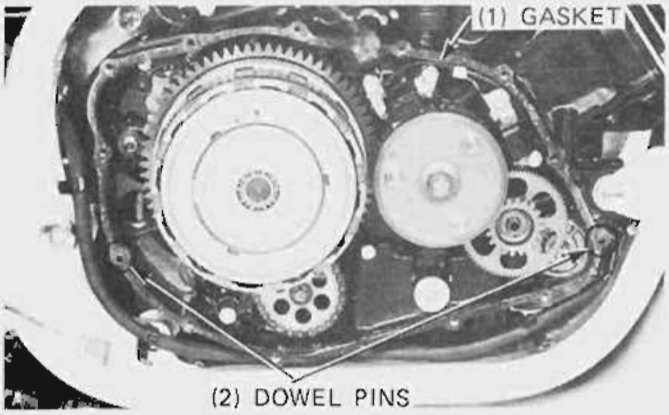


Install the starter idler gear and shaft.

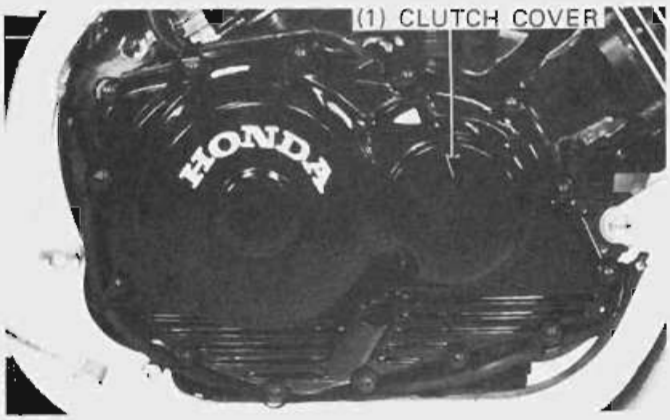


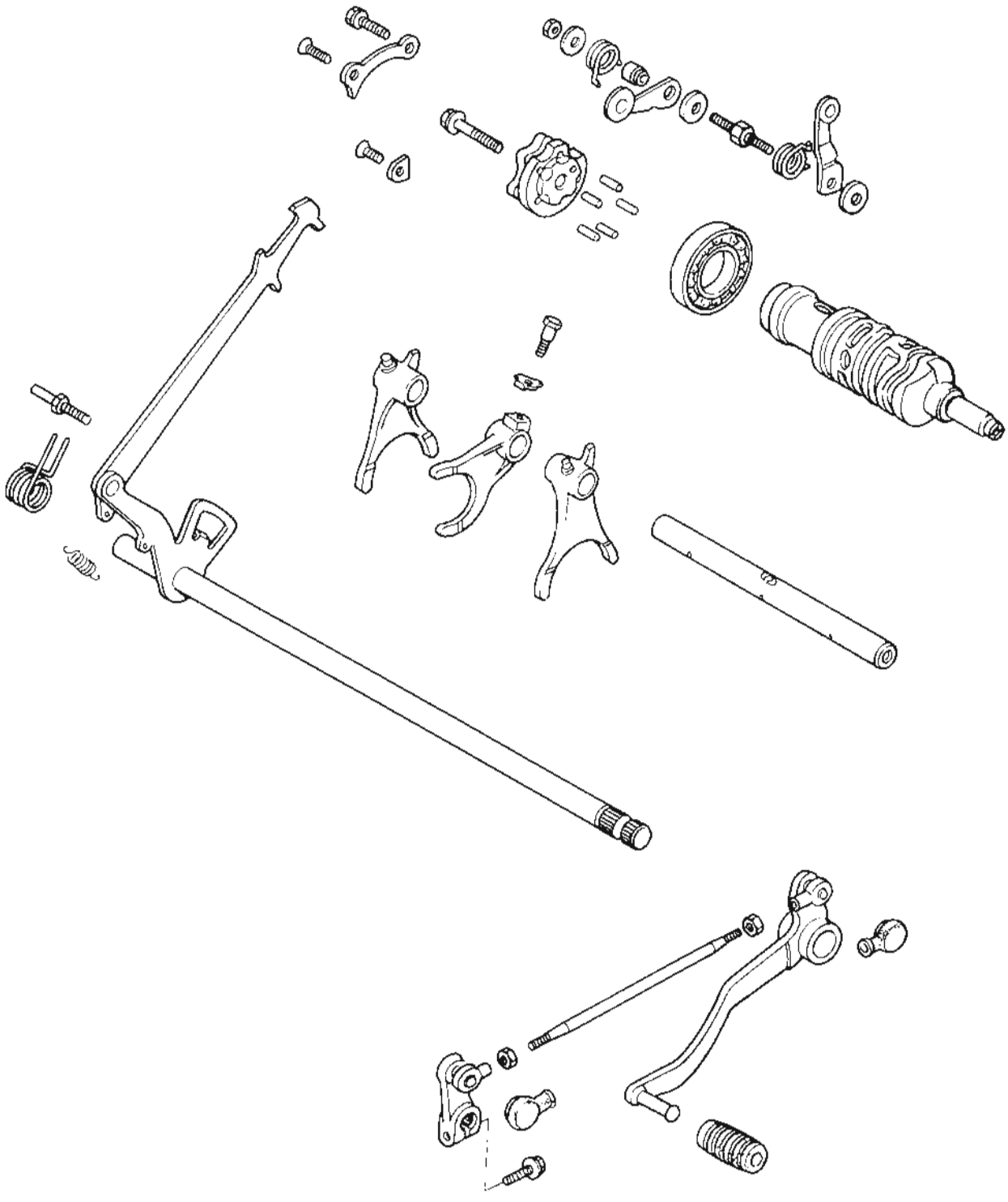
CLUTCH COVER INSTALLATION

Install the dowel pins and a new gasket.



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





8 GEARSHIFT LINKAGE

SERVICE INFORMATION	8-1	GEARSHIFT LINKAGE REMOVAL	8-2
TROUBLESHOOTING	8-1	GEARSHIFT LINKAGE INSTALLATION	8-3

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.

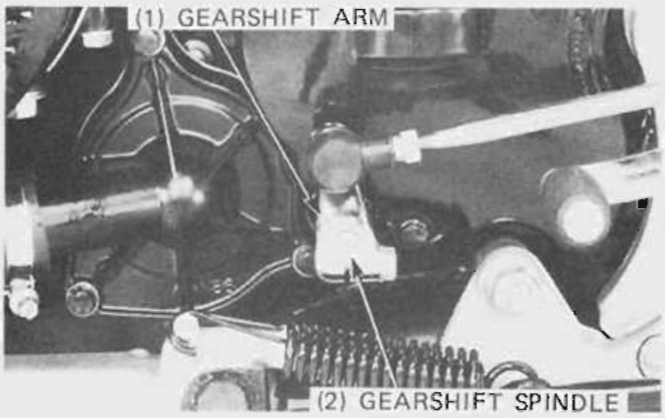
TROUBLESHOOTING

Hard to shift
- Air bubbles in the clutch hydraulic system
- Shift forks bent
- Shift claw bent
- Shift drum cam grooves damaged

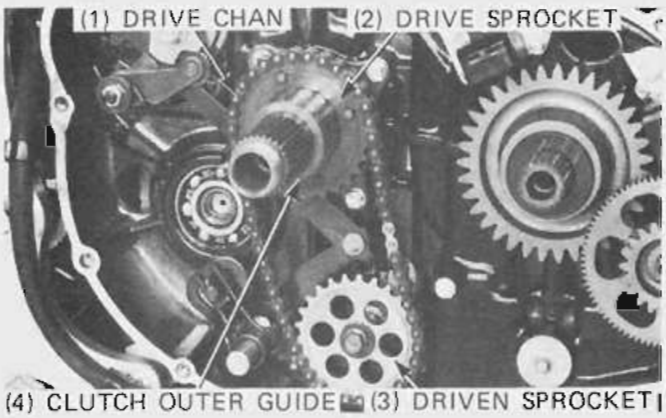
Transmission jumps out of gear
- Gear dogs worn
- Shift shaft bent
- Shift drum stopper broken
- Shift forks bent

GEARSHIFT LINKAGE REMOVAL

Drain the engine oil (page 2-3).
Remove the gearshift arm from the shift spindle.
Remove the clutch cover and clutch assembly (Section 7).



Remove the oil pump driven sprocket bolt.
Remove the clutch outer guide, and remove the oil pump drive chain, drive and driven sprocket together.



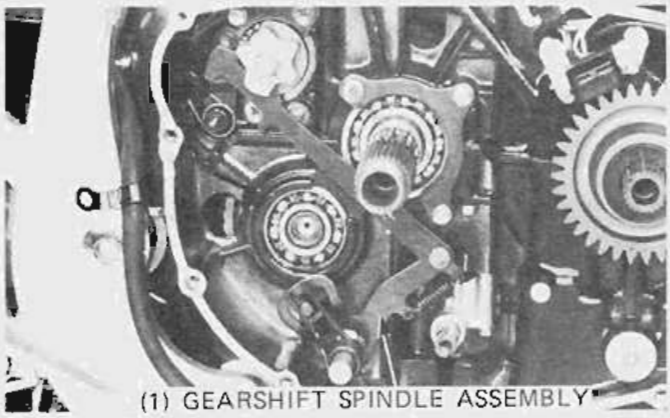
Remove the drum stopper arm nut, washer, spring, collar, and arm.



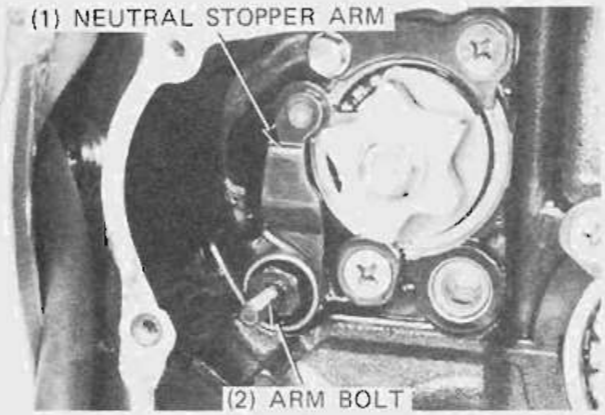
Remove the tab washer.



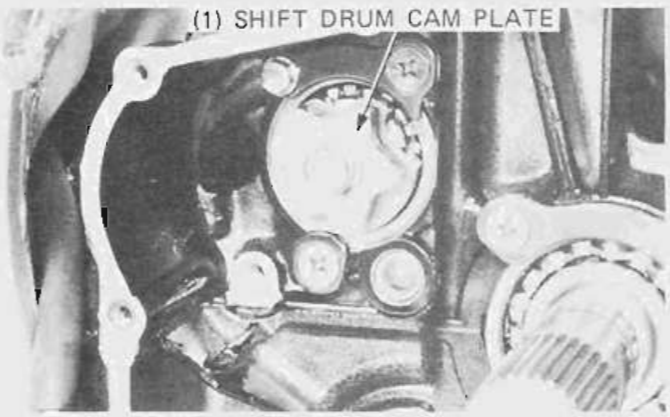
Pull the gearshift spindle assembly out of the crankcase.



Remove the neutral stopper arm bolt, arm spring and washer.

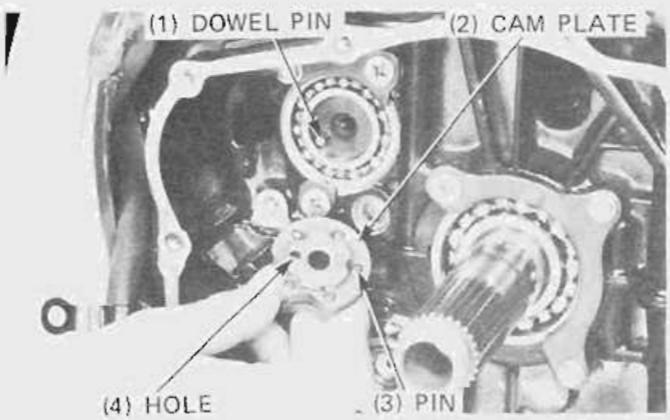


Remove the shift drum cam plate bolt and cam plate.

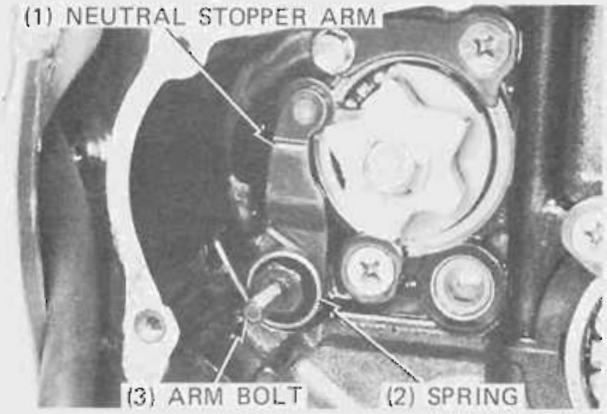


GEARSHIFT LINKAGE INSTALLATION

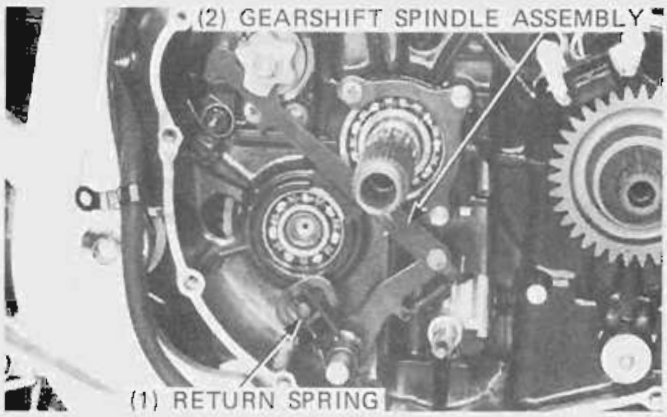
Install the dowel pin in the hole of the shift drum.
Insert the five pins in the holes of the cam plate.
Align the cam plate hole with the dowel pin on the shift drum and install the cam plate.
Tighten the bolt securely.



Install the washer, neutral stopper arm, spring and arm bolt.
Tighten the arm bolt securely.



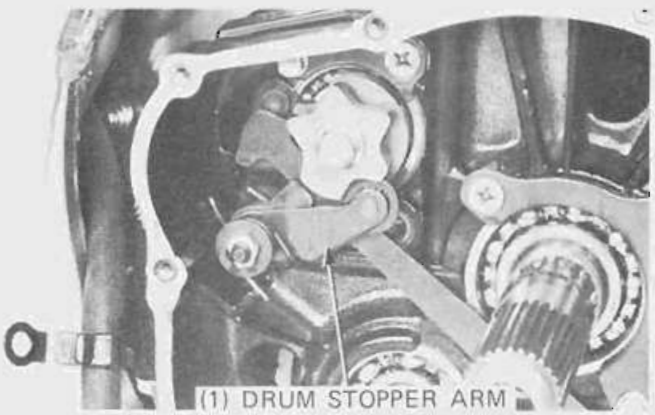
Assemble the gearshift spindle and return spring and install as shown.



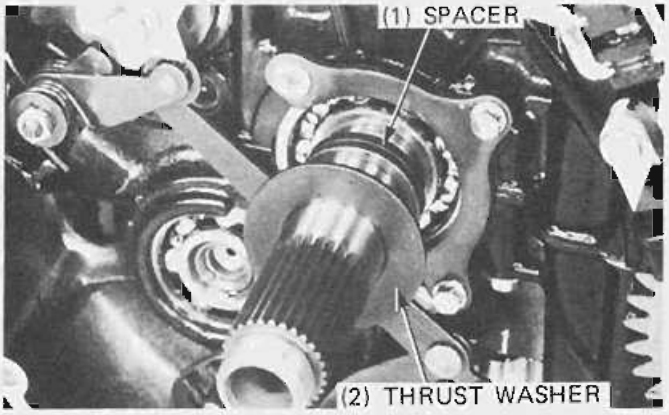
Install the tab washer onto the stopper arm bolt.



Install the drum stopper arm, collar, spring, washer and nut over the arm bolt.
Tighten the nut securely.
Rotate the gearshift spindle and check the linkage for smooth operation.

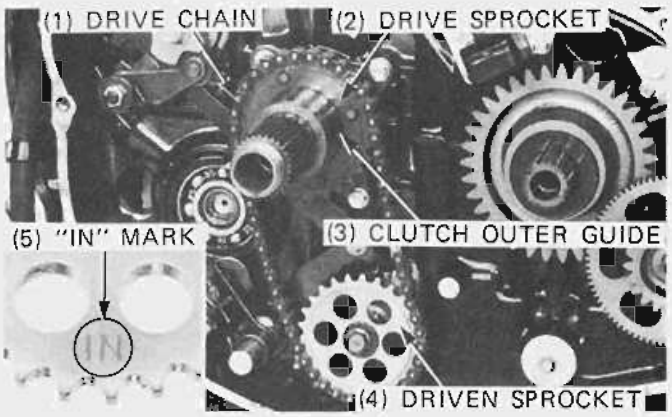


Make sure that the spacer and thrust washer are installed on the crankshaft.



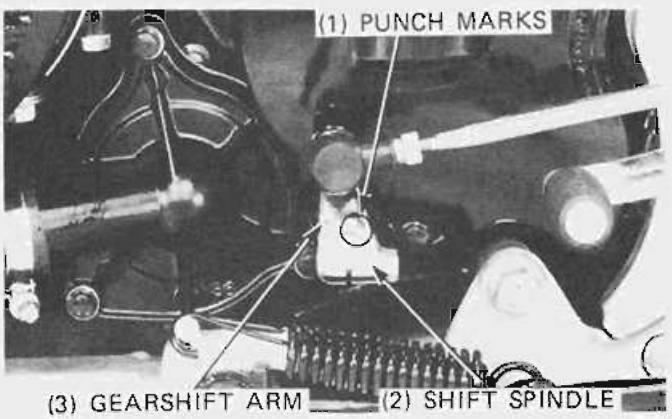
Install the oil pump drive chain, drive and driven sprockets with the "IN" mark on the driven sprocket facing to the crankcase.
Tighten the driven sprocket bolt securely.

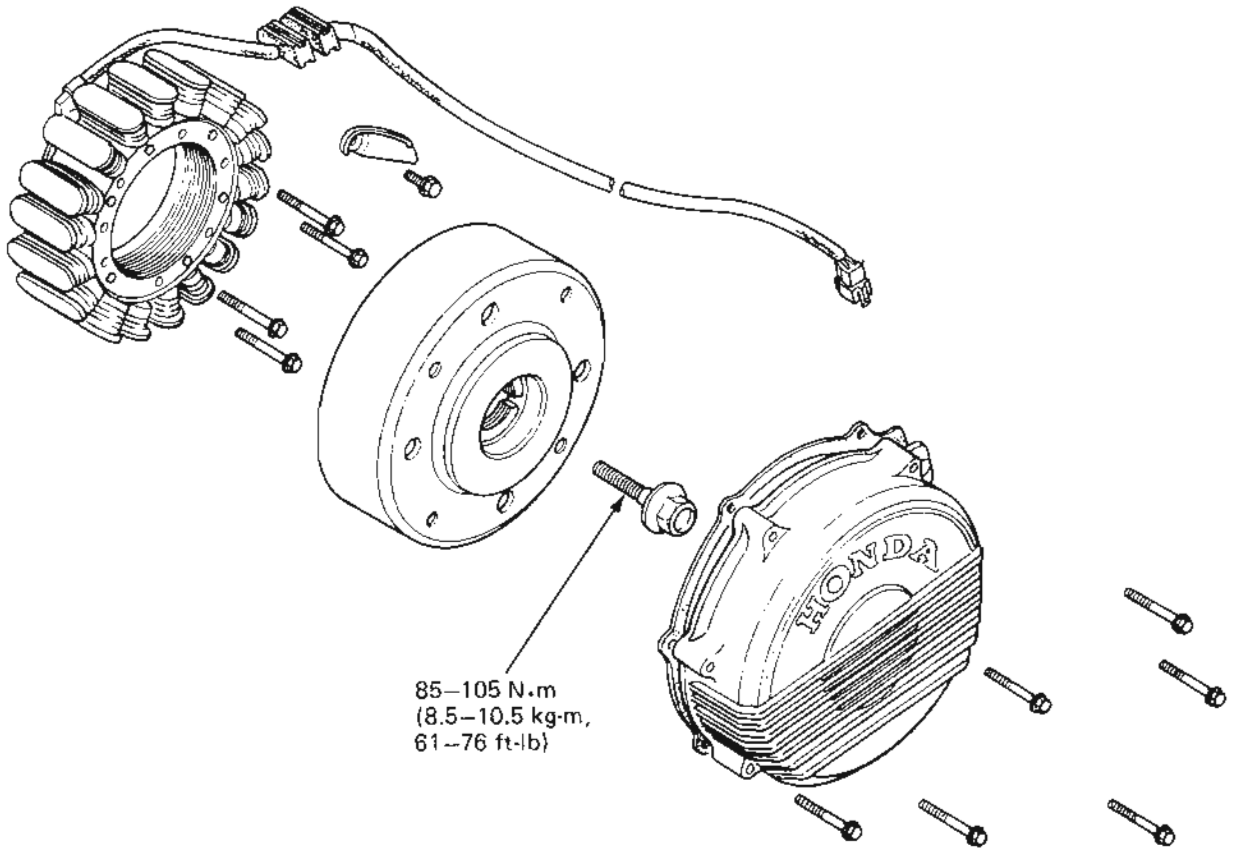
Install the clutch assembly and cover (Section 7).



Align the punch marks on the gearshift arm and gearshift spindle and install the gearshift arm on the shift shaft.

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




HONDA
85–105 N·m
(8.5–10.5 kg-m,
61–76 ft-lb)

9 ALTERNATOR

SERVICE INFORMATION	9-1	STATOR INSTALLATION	9-3
FLYWHEEL REMOVAL	9-2	FLYWHEEL INSTALLATION	9-3
STATOR REMOVAL	9-2		

SERVICE INFORMATION

GENERAL

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

TORQUE VALUE

Alternator rotor/Flywheel bolt	85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

TOOLS

Common	
Flywheel holder	07725–0040000
Rotor puller	07733–0020001

FLYWHEEL REMOVAL

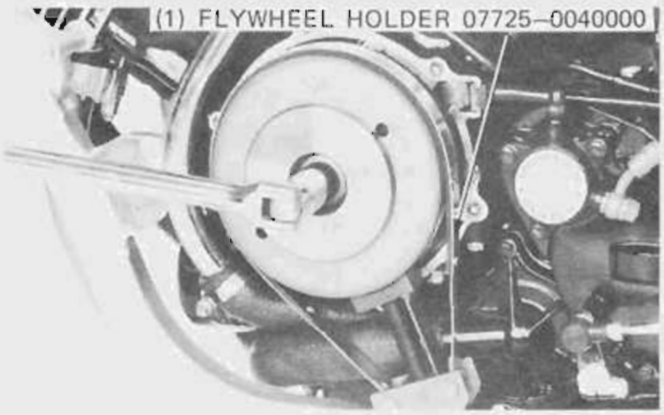
On VF1000F-II model, remove the lower cowl (page 14-1).

Place a container under the alternator cover to catch engine oil.

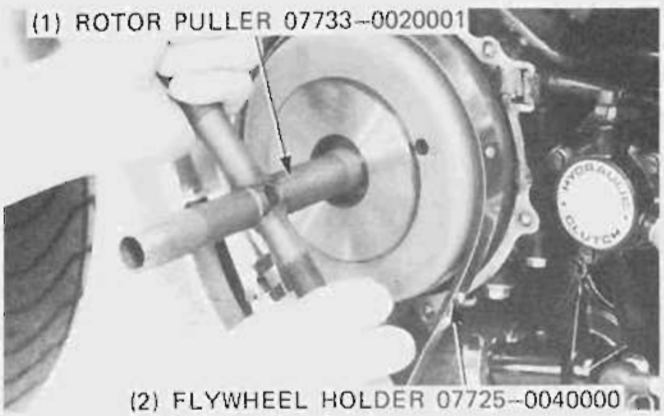
Remove the alternator cover.



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

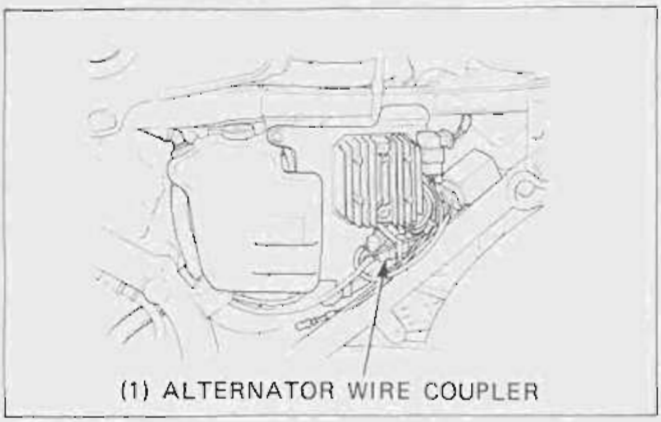


Remove the flywheel with the rotor puller.
Remove the woodruff key from the crankshaft.

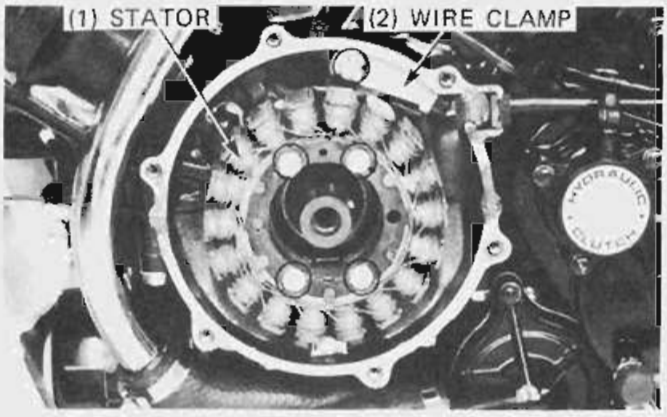


STATOR REMOVAL

Remove the left frame side cover.
Disconnect the alternator wire coupler and free the alternator wire from the clamp.



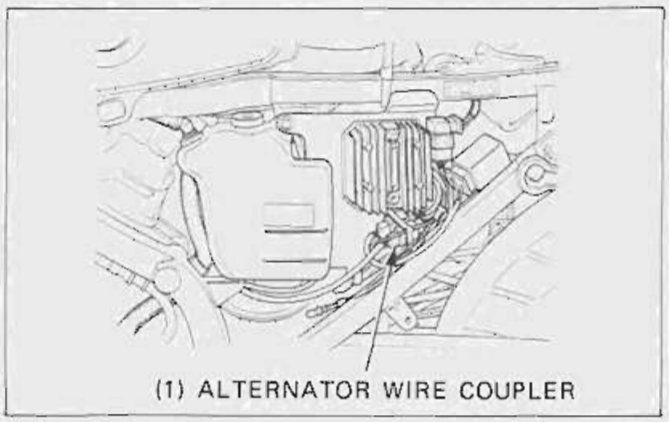
Remove the stator by removing the bolts and wire clamp.



STATOR INSTALLATION

Install the stator and wire clamp.

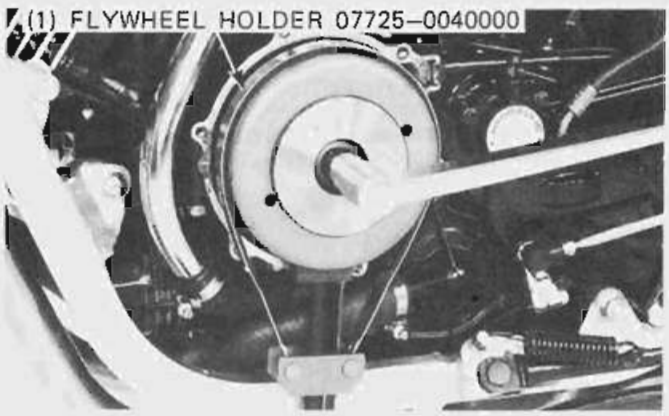
Route the alternator wire properly, secure it with clamp and connect the alternator wire coupler to the main harness.
Install the left frame side cover.



FLYWHEEL INSTALLATION

Install the woodruff key into the crankshaft.
Install the flywheel by aligning its keyway with the key in the crankshaft.
Hold the flywheel with the flywheel holder and torque the flywheel bolt.

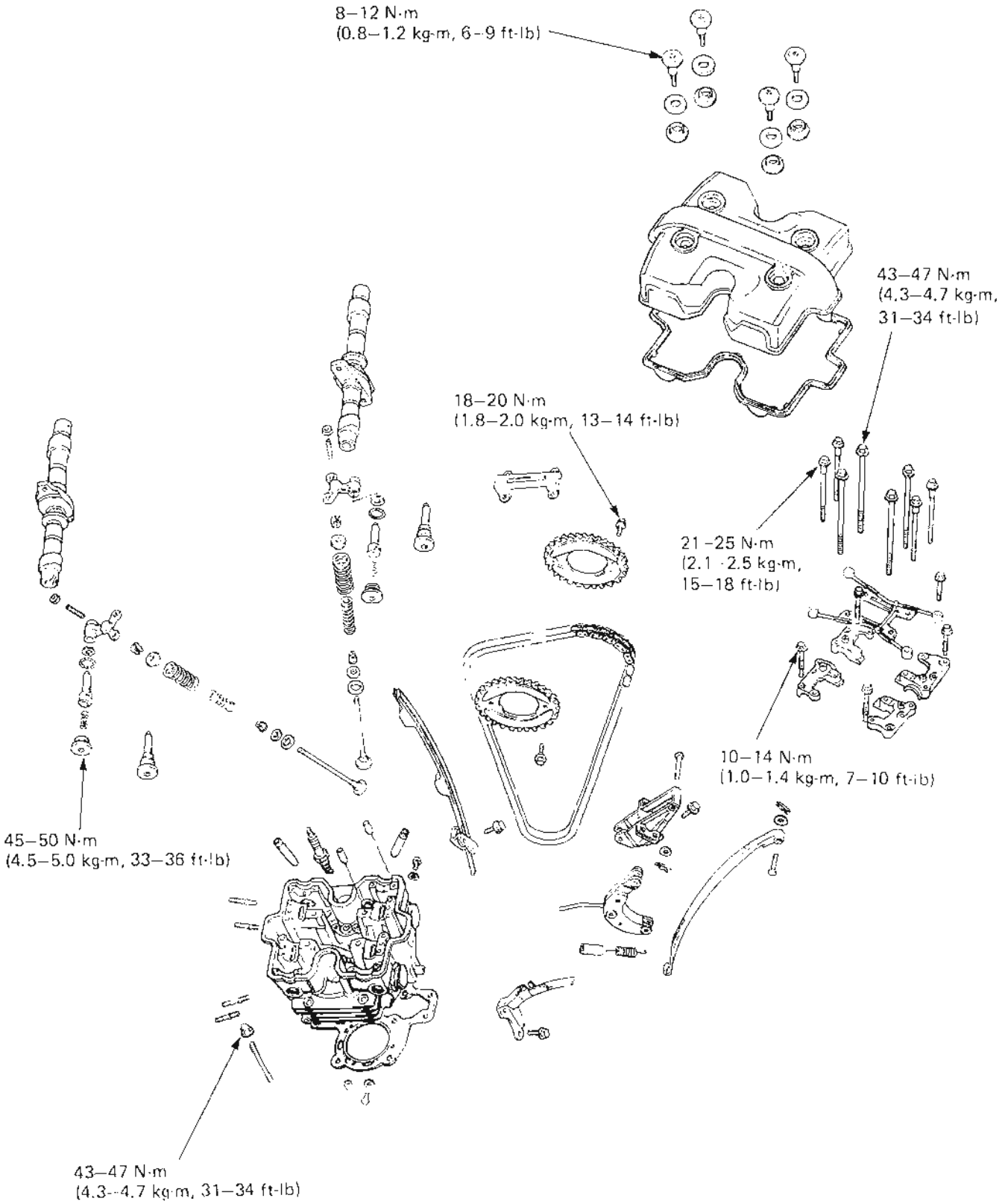
TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)



Install the alternator cover.

Check engine oil level and add if necessary (page 2-3).




8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
43–47 N·m
(4.3–4.7 kg-m,
31–34 ft-lb)
18–20 N·m
(1.8–2.0 kg-m, 13–14 ft-lb)
21–25 N·m
(2.1–2.5 kg-m,
15–18 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
45–50 N·m
(4.5–5.0 kg-m, 33–36 ft-lb)
43–47 N·m
(4.3–4.7 kg-m, 31–34 ft-lb)

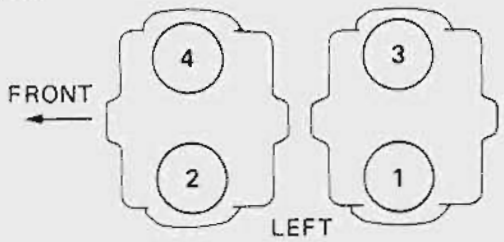
10 CYLINDER HEAD/VALVE

SERVICE INFORMATION	10-1	VALVE GUIDE REPLACEMENT	10-11
TROUBLESHOOTING	10-2	VALVE SEAT INSPECTION/ REFACING	10-12
CAMSHAFT REMOVAL	10-3	CYLINDER HEAD ASSEMBLY	10-13
CYLINDER HEAD REMOVAL	10-6	CYLINDER HEAD INSTALLATION	10-14
CYLINDER HEAD DISASSEMBLY	10-8	CAMSHAFT INSTALLATION	10-16

SERVICE INFORMATION

GENERAL

- The front cylinder head can be removed with the engine in the frame.
- The rear cylinder head cannot be removed with the engine in the frame; however its camshafts and cam chain tensioner can be removed with the engine in the frame.
- If the cam sprockets of either front or rear cylinder are removed, the valve timing of both cylinders must be chekced during reinstallation.
- Camshaft lubricating oil is fed through the external oil lines. Be sure the oil lines are not clogged.
- During assembly, apply molybdenum disulfide grease to the camshaft holder surfaces to provide initial lubrication.
- The cylinder numbering is given below:



SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Compression pressure			1,275 ± 196 kPa (13 ± 2 kg/cm², 184 ± 28 psi)	–
Camshaft	Cam height	IN	35.459–35.619 mm (1.3960–1.4023 in)	35.40 mm (1.394 in)
		EX	35.459–35.619 mm (1.3960–1.4023 in)	35.40 mm (1.394 in)
	Runout		–	0.03 mm (0.001 in)
	Journal O.D.	Both ends	23.949–23.970 mm (0.9429–0.9437 in)	23.87 mm (0.940 in)
		Center	23.861–23.882 mm (0.9394–0.9402 in)	23.69 mm (0.933 in)
	Bearing hole I.D.		24.000–24.021 mm (0.9449–0.9457 in)	24.07 mm (0.948 in)
	Oil clearance	Both ends	0.030–0.072 mm (0.0012–0.0028 in)	0.10 mm (0.004 in)
		Center	0.118–0.160 mm (0.0046–0.0063 in)	0.20 mm (0.008 in)
Rocker arm	Rocker arm I.D.		12.000–12.018 mm (0.4724–0.4731 in)	12.05 mm (0.474 in)
	Shaft O.D.		11.966–11.984 mm (0.4711–0.4718 in)	11.93 mm (0.470 in)
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)	5.44 mm (0.214 in)
	Valve guide I.D.		5.500–5.515 mm (0.2165–0.2171 in)	5.55 mm (0.219 in)
	Stem-to-guide clearance	IN	0.010–0.040 mm (0.0004–0.0016 in)	0.08 mm (0.003 in)
		EX	0.030–0.060 mm (0.0012–0.0024 in)	0.10 mm (0.004 in)
	Valve seat width		1.0 mm (0.04 in)	1.3 mm (0.05 in)
Valve spring	Free length	Inner	39.01 mm (1.536 in)	37.7 mm (1.48 in)
		Outer	44.94 mm (1.769 in)	43.5 mm (1.71 in)
Cylinder head	Warpage		–	0.1 mm (0.004 in)

TORQUE VALUES

Cylinder head cover bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Camshaft holder 6 mm bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Cylinder head 9 mm bolt	43–47 N·m (4.3–4.7 kg-m, 31–34 ft-lb)
Cylinder head 8 mm bolt	21 25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
Rocker arm shaft cap bolt	45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)
Cam sprocket bolt	18–20 N·m (1.8–2.0 kg-m, 13–14 ft-lb)

TOOLS

Special

Valve guide reamer, 5.5 mm	07984–2000000

Common

Valve guide remover, 5.5 mm	07742–0010100
Valve guide driver	07743–0020000
Valve spring compressor	07757–0010000

Valve seat cutter

Flat cutter, 28 mm (32° EX)	07780–0012100
Flat cutter, 33 mm (32° IN)	07780–0012900
Seat cutter, 29 mm (45° EX)	07780–0010300
Seat cutter, 33 mm (45° IN)	07780–0010800
Interior cutter, 30 mm (60° IN, EX)	07780–0014000
Cutter holder, 5.5 mm	07781–0010101

TROUBLESHOOTING

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

Low compression

- Valves
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
- Cylinder head
  - Leaking or damaged head gasket
    Warped or cracked cylinder head
- Cylinder and piston (Refer to Section 12)

Compression too high

- Excessive carbon build-up on piston or combustion chamber

Excessive noise

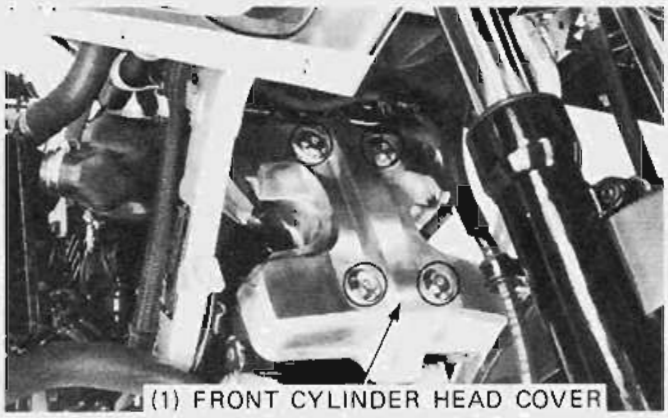
- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Worn rocker arm and/or shaft

CAMSHAFT REMOVAL

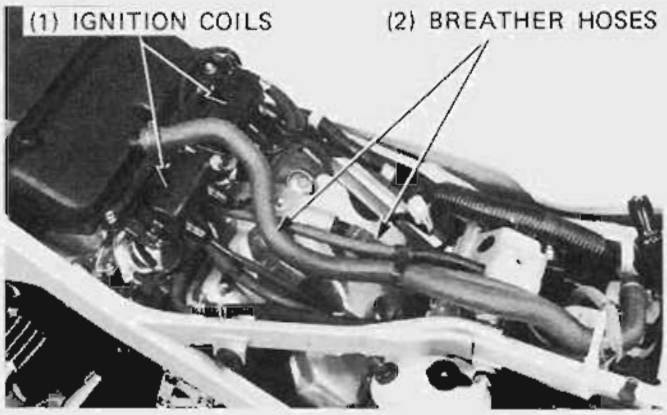
NOTE

- The camshafts can be removed with the engine in the frame.

Remove the cooling fans (page 6-7).
Remove the front cylinder head cover.



Remove the fuel tank (page 4-3).
Disconnect the breather hoses from the air cleaner case and rear cylinder head cover.
Remove the spark plug caps from the rear cylinder plugs and remove the ignition coil with their brackets.



Remove the reserve tank mount bolt and the reserve tank.
Disconnect the breather hose from the rear cylinder head cover.

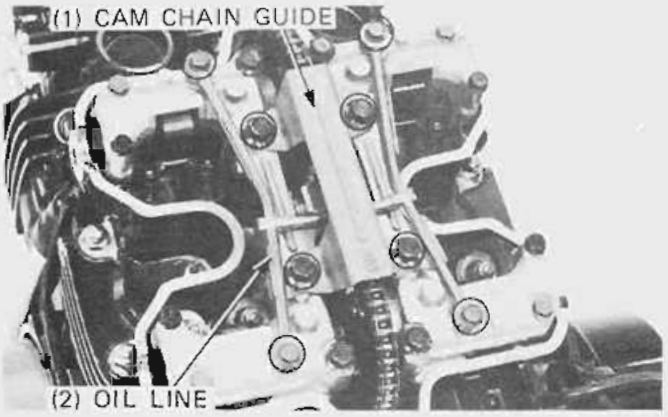


Remove the rear cylinder head cover.

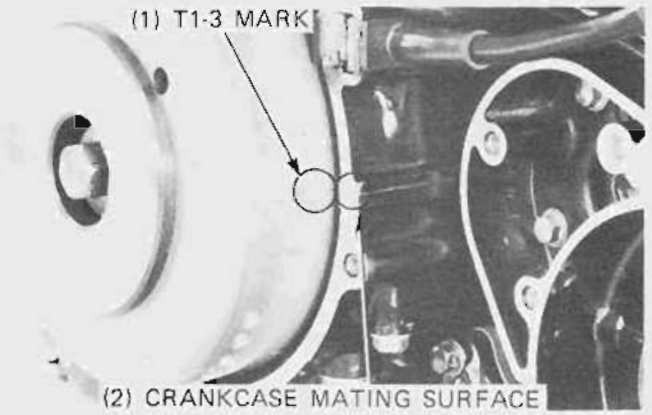


Remove the oil line and cam chain guide mounting bolts, and the cam chain guide.
Remove the alternator cover and rotate the crankshaft counterclockwise until the cam chain has free play.

Remove the oil line by pulling up the middle of the chain.



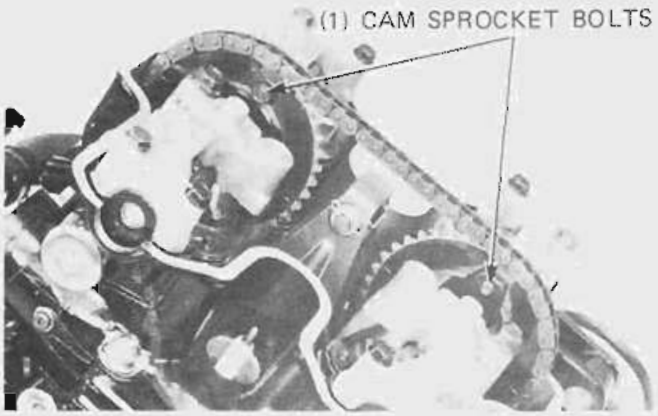
Turn the crankshaft counterclockwise until the T1-3 mark aligns with the rear crankcase mating surfaces.



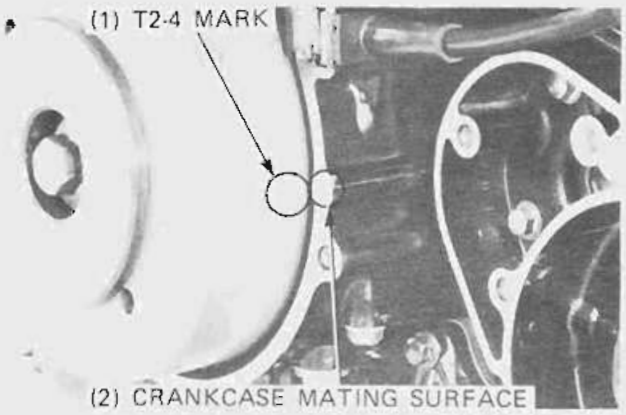
Place rags or shop towels in the rear cylinder head to prevent parts from being dropped into the crankcase.

Remove the rear cylinder intake and exhaust cam sprocket bolts.

Turn the crankshaft counterclockwise one turn (360°) and remove the other rear cylinder cam sprocket bolts.

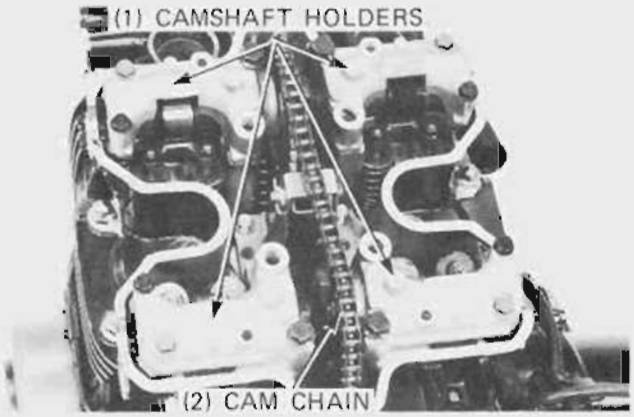


Turn the crankshaft counterclockwise until the T2-4 mark aligns with the rear crankcase mating surface.
Remove the front cylinder intake and exhaust cam sprocket bolts.
Turn the crankshaft counterclockwise one turn (360°) and remove the other cam sprocket bolts.

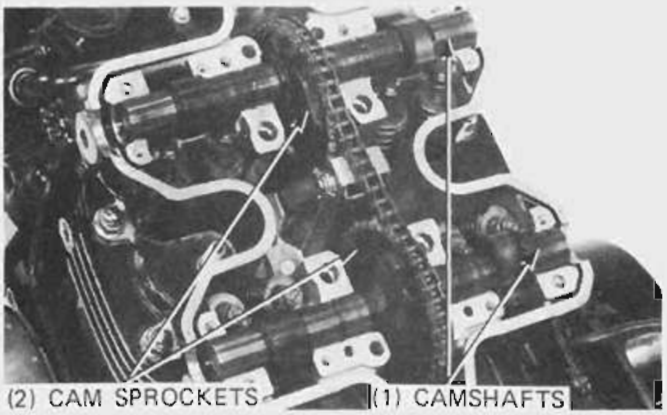


Slide the cam sprockets and chains off the camshaft sprocket flange.

Remove the cam chain from the sprockets and remove the camshaft holders. Mark the camshaft holders so that they can be reinstalled in their original locations.



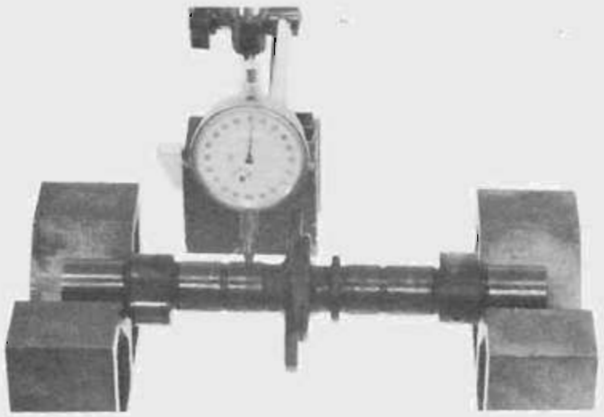
Remove the intake and exhaust camshafts and cam sprockets.



CAMSHAFT INSPECTION

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

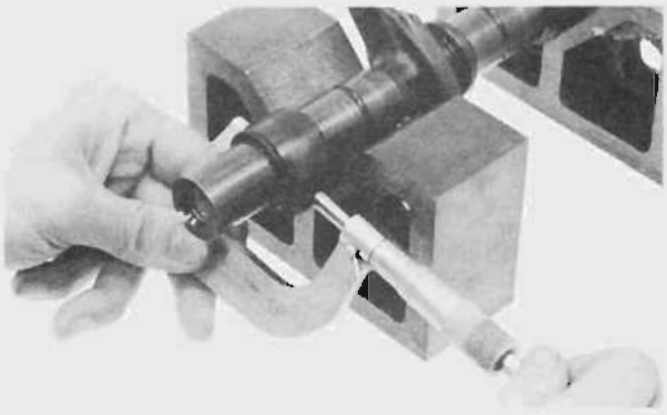
SERVICE LIMIT: 0.03 mm (0.001 in)



Check the cam lobe and journal surfaces for scoring, scratches or evidence of insufficient lubrication.

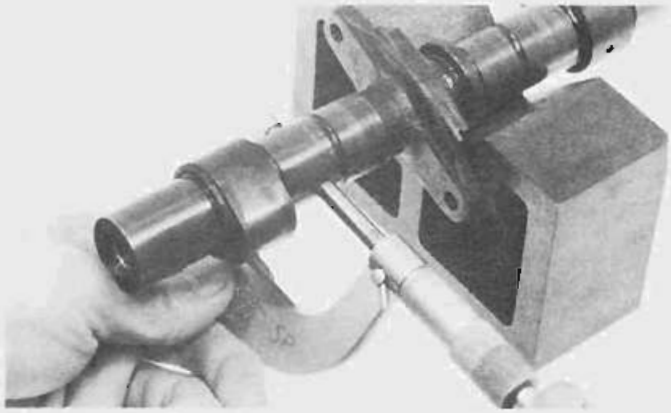
Measure each cam height with a micrometer.

SERVICE LIMIT: 35.40 mm (1.394 in)

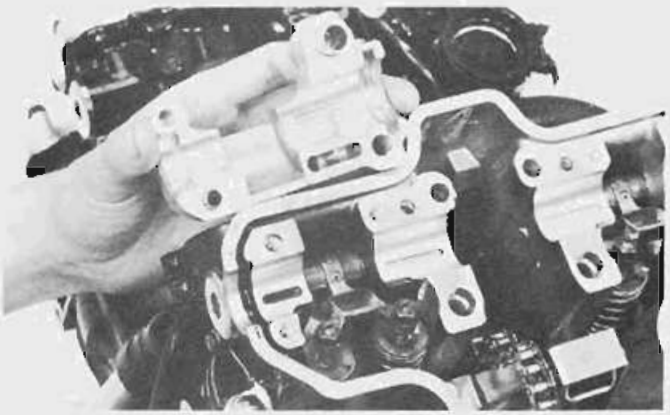


Measure each camshaft journal O.D.

SERVICE LIMITS: Both ends: 23.87 mm (0.940 in)
Center: 23.69 mm (0.933 in)



Check the camshaft journal bearing surfaces of the camshaft holder and cylinder head for scoring, scratches or evidence of insufficient lubrication.
Install the camshaft holders, oil pipe and cam chain guide and tighten the bolts in 2-3 steps in a crisscross pattern.



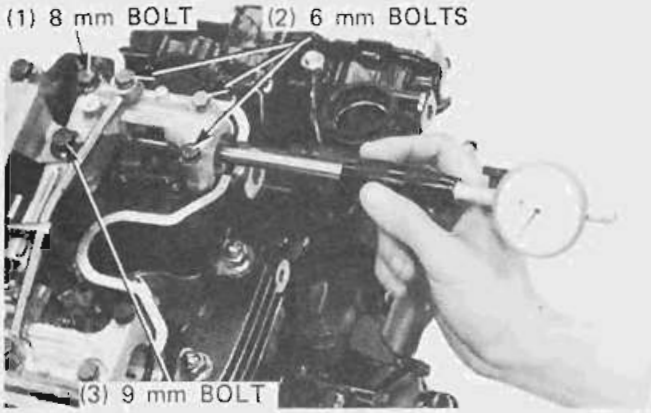
TORQUE:
6 mm bolts: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
8 mm bolts: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
9 mm bolts: 43–47 N·m (4.3–4.7 kg-m, 31–34 ft-lb)

Measure the camshaft journal bearing I.D.

SERVICE LIMIT: 24.07 mm (0.948 in)

Calculate the camshaft journal oil clearance.

SERVICE LIMITS: Both ends: 0.10 mm (0.004 in)
Center: 0.20 mm (0.008 in)



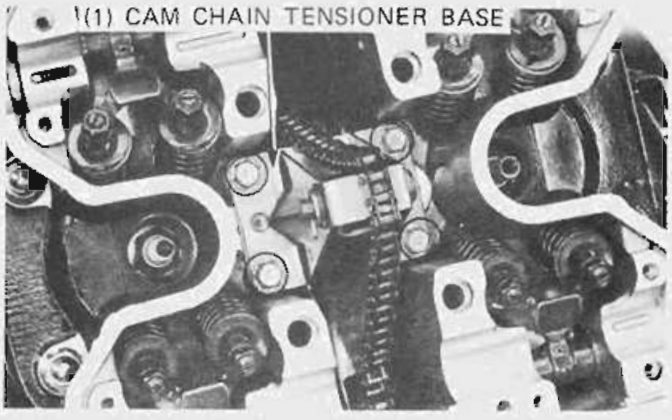
If the oil clearance exceeds the service limits, determine if a new camshaft with standard dimensions would bring the clearance within tolerance. If so, replace any camshaft as necessary.
If the oil clearance exceeds the service limits with new camshaft, also replace the camshaft holders and cylinder head as a set.

CYLINDER HEAD REMOVAL

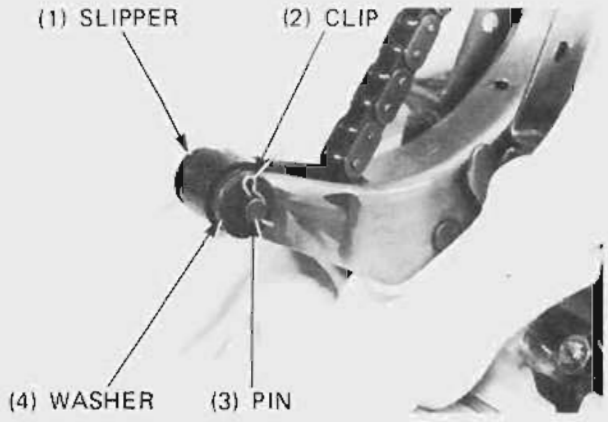
NOTE

- The front and rear cylinder cam chain tensioner, and front cylinder head can be removed with the engine installed in the frame. But to remove the rear cylinder head, you must remove the engine from the frame.

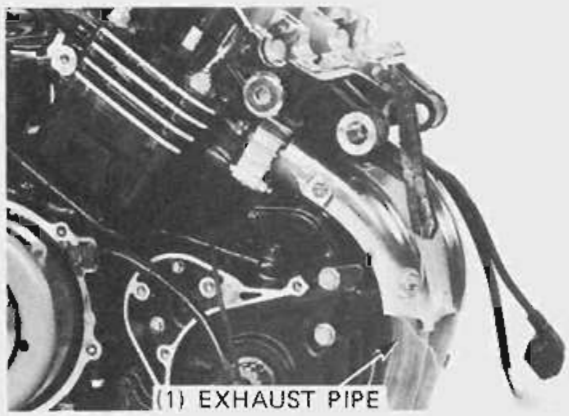
Remove the cam chain tensioner mounting bolts and pull the cam chain tensioner base up.



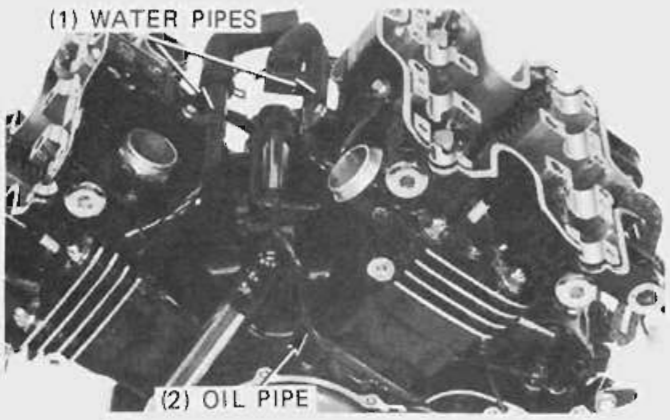
Remove the clip, washer, pin and tensioner slipper from the tensioner base.
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
Remove the cam chain tensioner base.



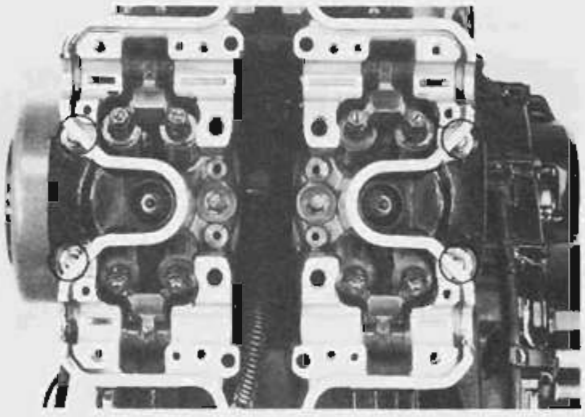
Remove the exhaust pipe from the rear cylinder head.



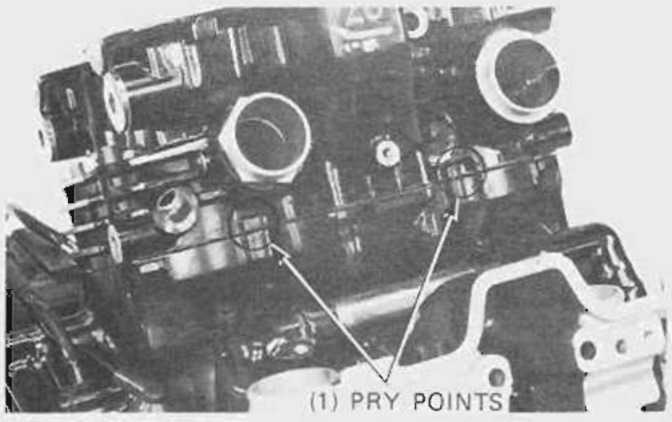
Remove the water pipes and O-rings from the cylinder heads.
Remove the oil pipe from the engine.



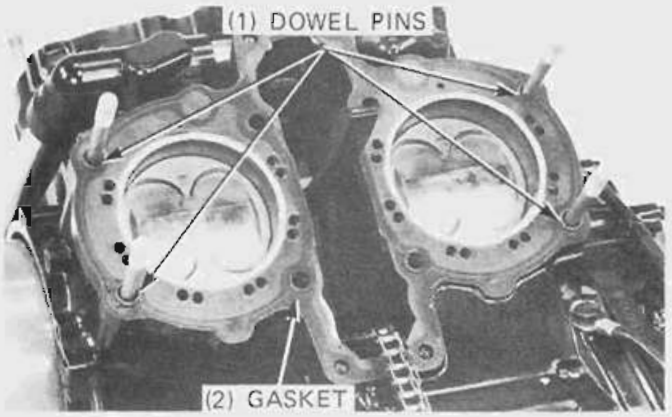
Remove the cylinder head nuts.



Separate the cylinder head from the cylinder by prying it at the pry points and remove the cylinder head.

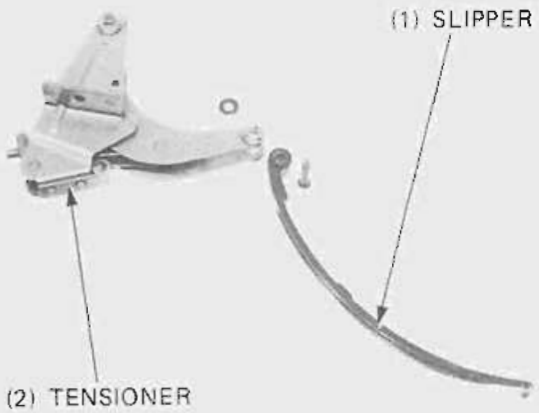


Remove the cylinder head gasket and dowel pins.



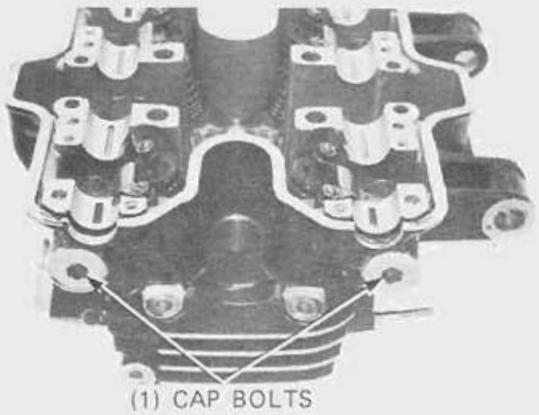
CAM CHAIN TENSIONER INSPECTION

Check the cam chain tensioner for damage or spring weakness.
Check the tensioner slipper for wear or damage.
Replace if necessary.

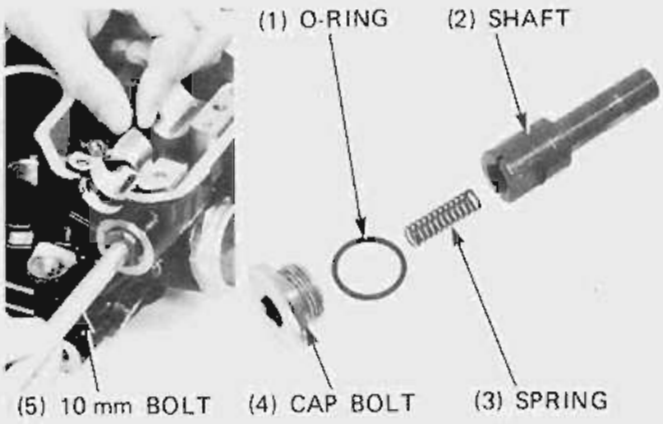


CYLINDER HEAD DISASSEMBLY

Remove the spark plugs.
Remove the rocker arm shaft cap bolts, O-rings and springs.



Screw a 10 mm bolt in the threaded hole of the rocker arm shaft and remove the rocker arm shaft and rocker arm.
Remove the remaining rocker arm shafts and rocker arms.



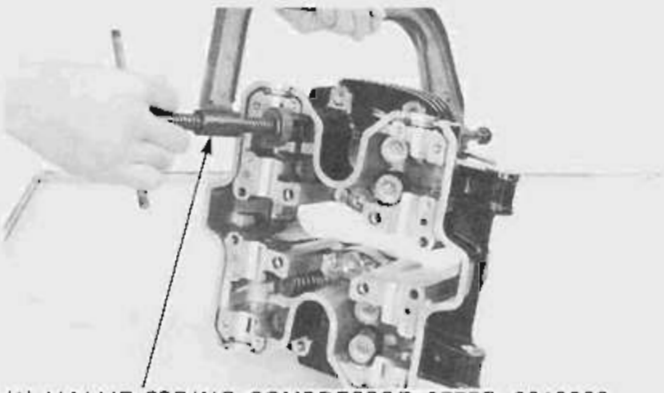
To keep the valve spring compressor from interfering with the cylinder head, remove the large retainer from the compressor attachment.
Remove the valve spring cotters, retainers, springs and valves.

CAUTION

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

NOTE

- Mark all disassembled parts to ensure correct reassembly.



Remove the valve stem seals.

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

NOTE

- Gaskets will come off easier if soaked in solvent.

CAUTION

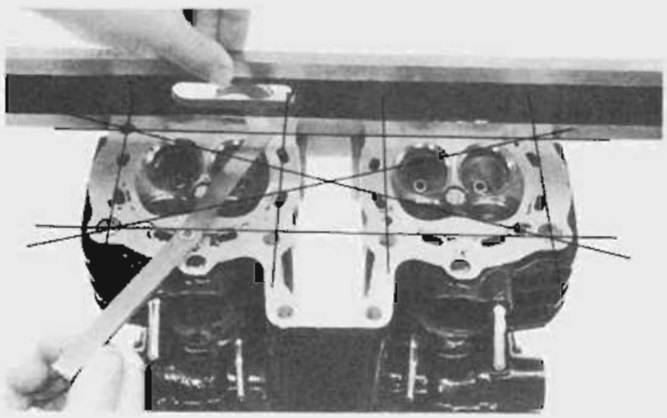
- *Do not damage the gasket surfaces.*



CYLINDER HEAD INSPECTION

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

SERVICE LIMIT: 0.1 mm (0.004 in)

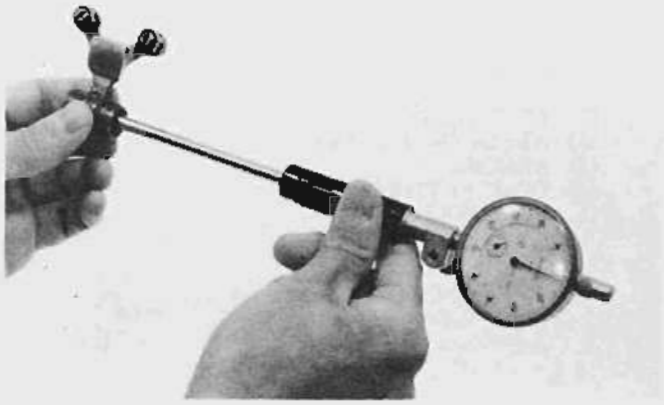


ROCKER ARM INSPECTION

Inspect the rocker arms for wear or damage to the camshaft contact surface or for a clogged oil hole.

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)



ROCKER ARM SHAFT AND SPRING INSPECTION

Measure each rocker arm shaft O.D.

SERVICE LIMIT: 11.93 mm (0.470 in)

Inspect the shaft for wear or damage and calculate the shaft-to-rocker arm clearance.

SERVICE LIMIT: 0.12 mm (0.005 in)

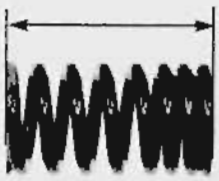
Inspect the rocker arm shaft spring for wear or damage.



VALVE SPRING INSPECTION

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

SERVICE LIMIT:
INNER (IN, EX): 37.7 mm (1.48 in)
OUTER (IN, EX): 43.5 mm (1.71 in)

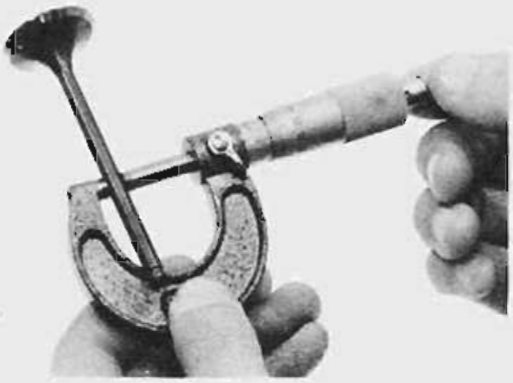




VALVE STEM-TO-GUIDE CLEARANCE

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

SERVICE LIMITS: IN: 5.47 mm (0.215 in)
EX: 5.44 mm (0.214 in)



NOTE

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

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

SERVICE LIMIT: 5.55 mm (0.219 in)

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

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

NOTE

- If the stem-to-guide clearance exceeds the service limits, determine if a new guide 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 10-12).



(1) VALVE GUIDE REAMER 07984–2000000



VALVE GUIDE REPLACEMENT

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

CAUTION

- *Do not use a torch to heat the cylinder; it may cause warping.*
- *To avoid burns, wear heavy gloves when handling the heated cylinder head.*

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



(1) VALVE GUIDE REMOVER, 5.5 mm 07742–0010100

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

NOTE

- Cylinder head heat should still be at 100°C (212°F) for installation of the new guides.

(1) VALVE GUIDE DRIVER 07743–0020000



Let the cylinder head cool to room temperature and ream the new valve guides.

NOTE

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

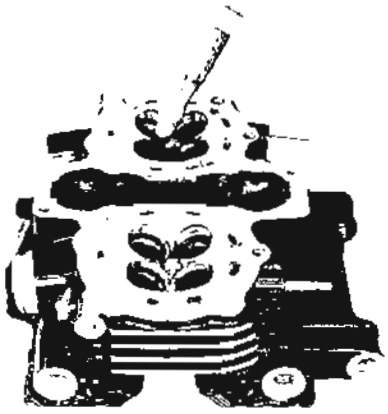
Reface the valve seats and clean the cylinder head thoroughly to remove any metal particles.



(1) VALVE BUIDE REAMER 07984–2000000

VALVE SEAT INSPECTION/REFACING

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



Remove the valve and inspect the face.

CAUTION

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

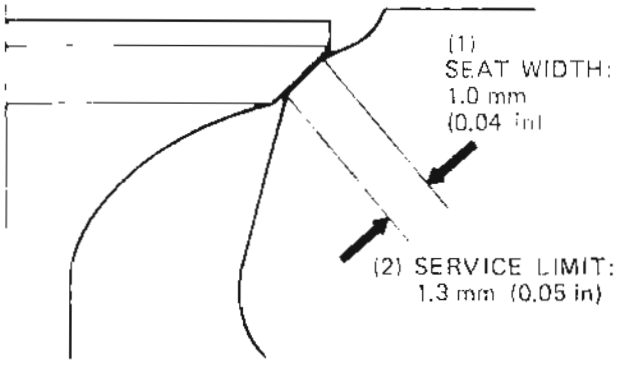
Inspect the valve seat.

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

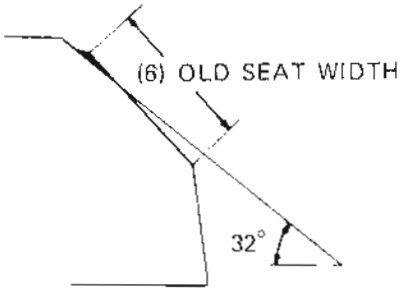
NOTE

- Follow the refacer manufacturer's operating instructions.

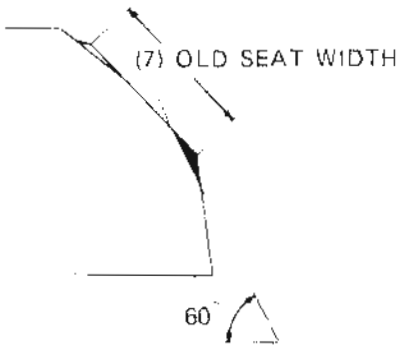
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.
After lapping, wash any residual compound off the cylinder head and valve.



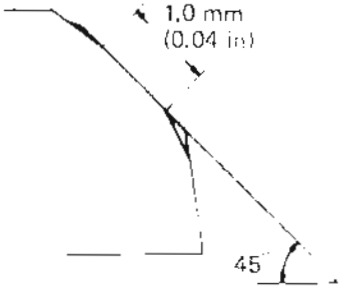
(3) IN: CUTTER 33 mm
EX: CUTTER 28 mm



(4) IN, EX: CUTTER 30 mm



(5) IN: CUTTER 33 mm
EX: CUTTER 29 mm



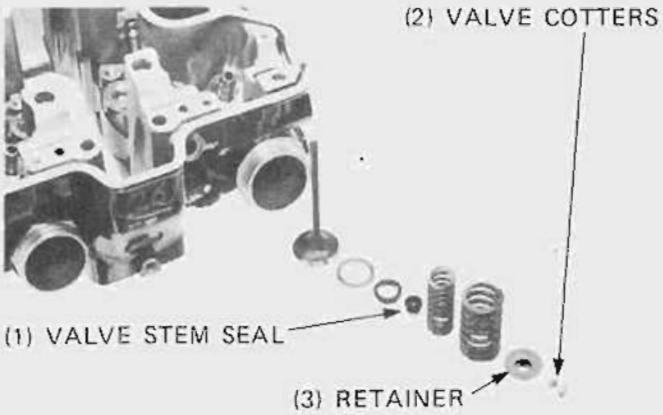
CYLINDER HEAD ASSEMBLY

NOTE

- Install new valve stem seals when assembling.

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

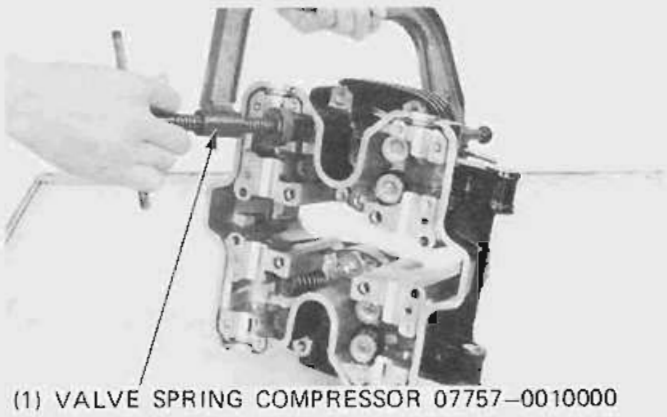
Install the valve springs and retainers. The spring's tightly wound coils should face toward the head.



Install the valve cotters.

CAUTION

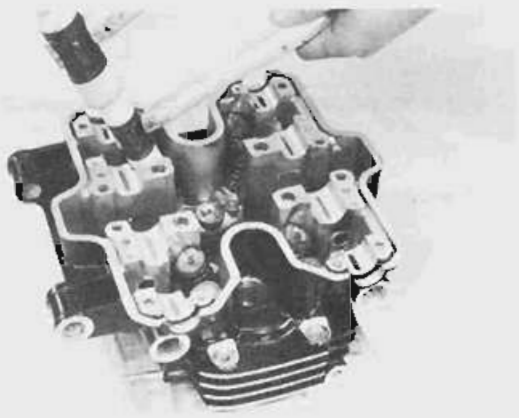
- *To prevent a loss of tension, do not compress the valve spring more than necessary to install the valve cotters.*



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

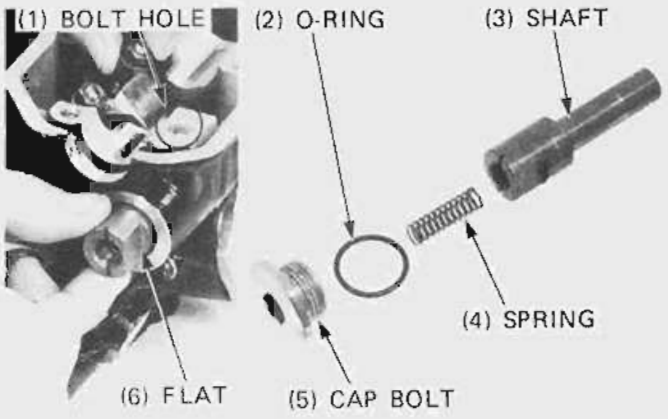
NOTE

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



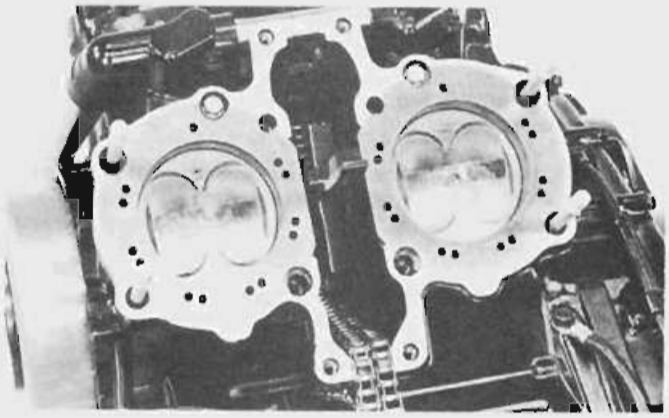
Coat the rocker arms and shafts with engine oil.
Install the rocker arms and shafts into the cylinder head, aligning the flat on the rocker arm shaft with the camshaft holder bolt hole.
Install new O-rings onto the rocker arm shaft cap bolts.
Apply thread lock agent to the cap bolt threads and install the springs and cap bolts.
Tighten the cap bolts.

TORQUE: 45–50 N·m (4.5–5.5 kg-m, 33–36 ft-lb)

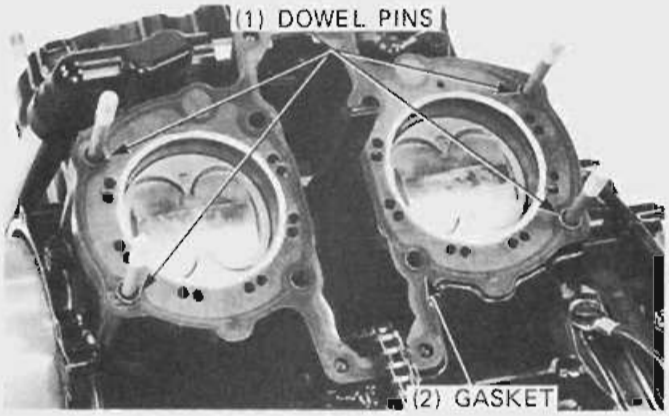


CYLINDER HEAD INSTALLATION

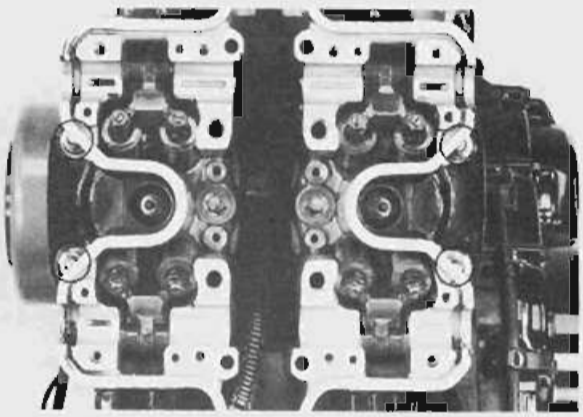
Clean the cylinder head gasket surface being careful not to damage it.



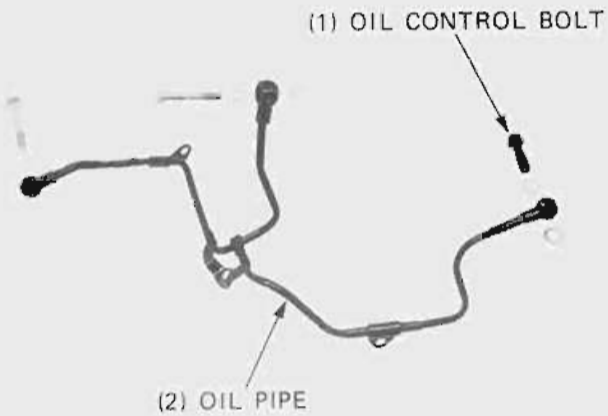
Install the dowel pins and a new gasket.
Install the cylinder head.



Install the cylinder head and temporarily tighten the cylinder head nuts.



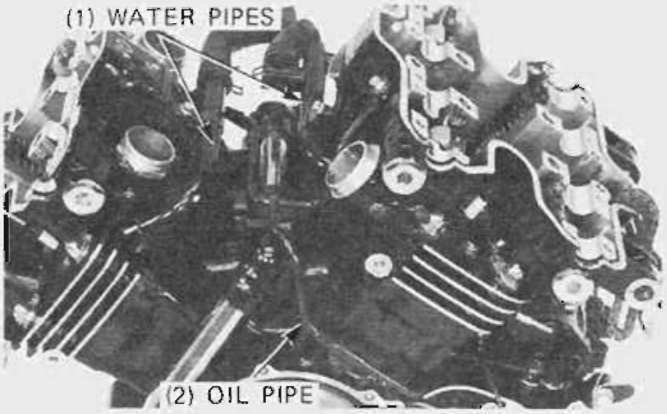
Blow the oil pipe and oil control bolt with compressed air.
Make sure that the sealing washers are in good condition.



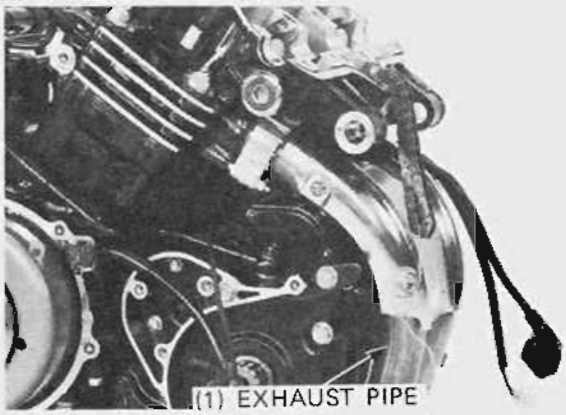
Install the oil pipe with the oil bolts and sealing washers, tighten the oil pipe set bolts and then tighten the oil bolts.

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

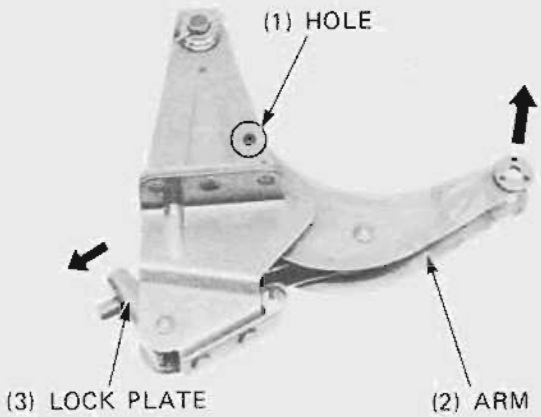
Install new O-rings onto the water pipes and install the water pipes.



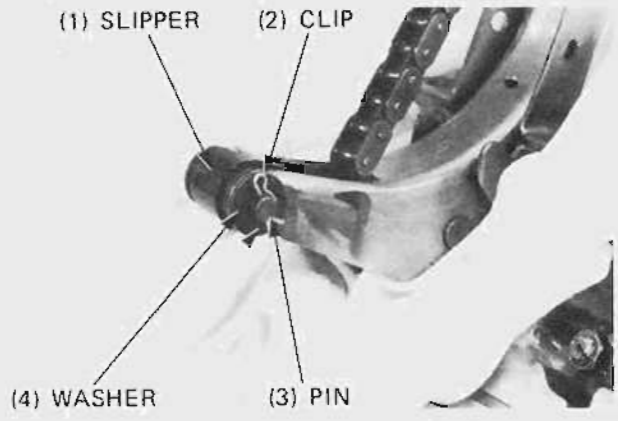
Install the rear cylinder exhaust pipe.



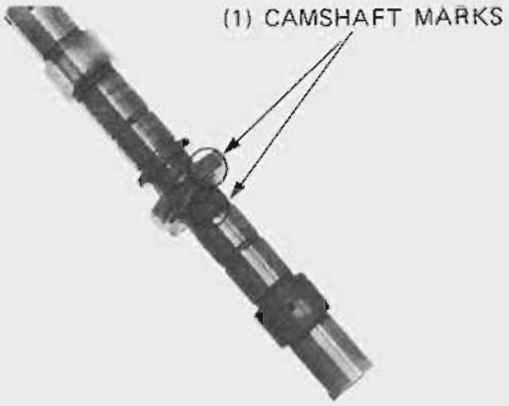
Move the cam chain tensioner in the direction shown while pushing back the tensioner rod lock plate, until the holes in the tensioner base and tensioner align, and insert a pin or piece of wire through the holes.



Pass the cam chain through the cam chain tensioner and install the tensioner slipper with the pin, washer and clip.
Fit the lower end of the slipper in the slipper base correctly and place the tensioner base on the cylinder head.
Do not install the cam chain tensioner base mounting bolts.



CAMSHAFT INSTALLATION



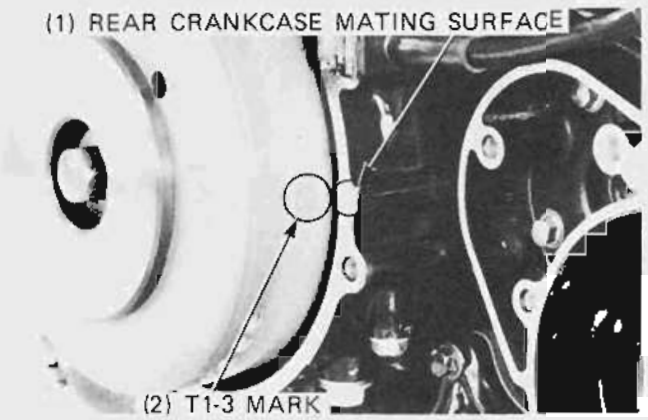
NOTE

- Check the camshaft marks so that you install each camshaft in its correct location.
- The marks on the camshaft mean:
  EXR, ER: Rear cylinder exhaust camshaft
  INR, IR: Rear cylinder intake camshaft
  EXF, EF: Front cylinder exhaust camshaft
  INF, IF: Front cylinder intake camshaft
- The camshaft sprockets are interchangeable.

Lubricate the cylinder head camshaft journal bearing surfaces with molybdenum disulfide grease.

REAR CYLINDER CAMSHAFT

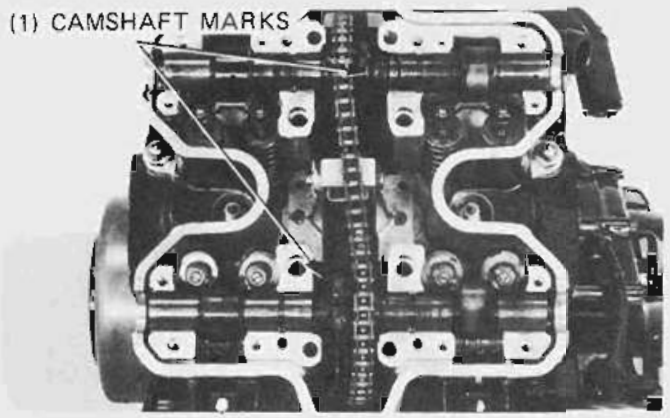
Turn the crankshaft counterclockwise and align the T1-3 mark on the flywheel with the rear crankcase mating surface.



CAUTION

- *When turning the crankshaft, make sure the cam chains don't jam at the cam chain tensioners or at the crankshaft.*

Install the intake and exhaust camshafts and sprockets through the rear cylinder cam chain as shown.
Turn the camshafts so the camshaft marks face up.



NOTE

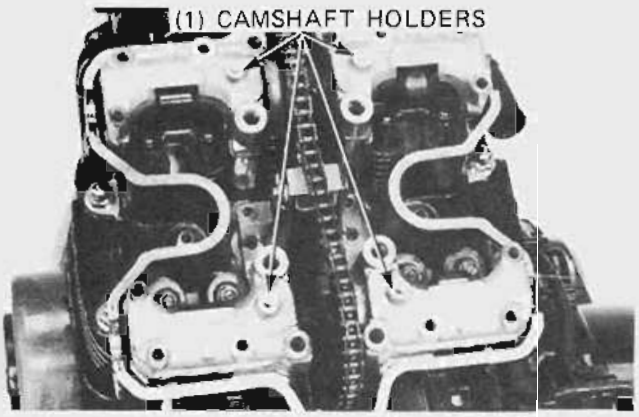
- If the front cylinder camshafts were not removed, check that the front camshaft marks face up. If not, turn the crankshaft counterclockwise 360 degrees (one turn).

If a valve clearance adjuster keeps the camshaft from seating fully in the cylinder head, back the adjuster out all the way.

CAUTION

- *If you force a valve open while installing the camshaft holders, you may damage the holders or the camshaft bearing surfaces.*

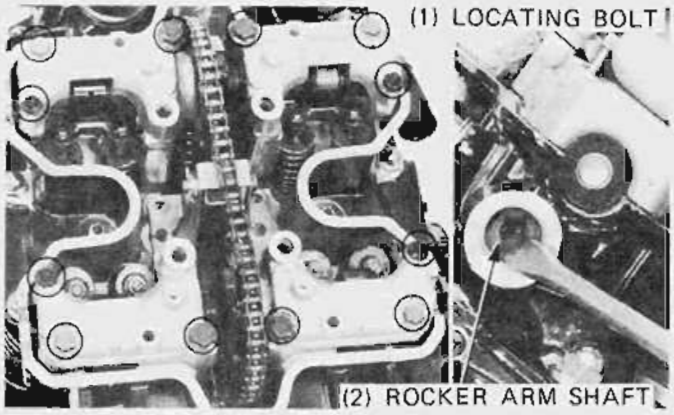
Place the camshaft holders in the same locations noted during removal. The groove in the bottom of the holder must align with the camshaft locating ridge.



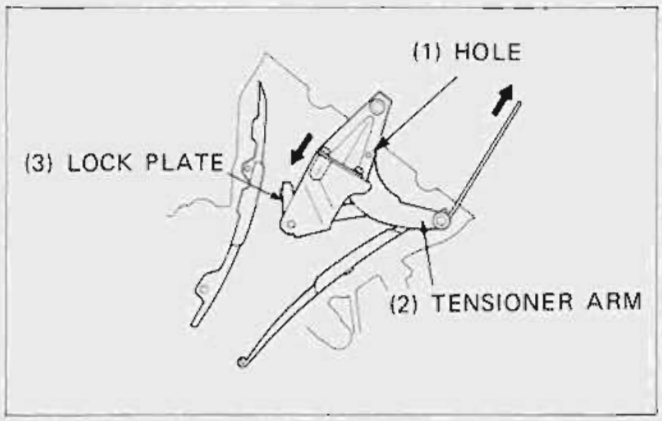
Install the camshaft holder bolts, but do not tighten them yet.

NOTE

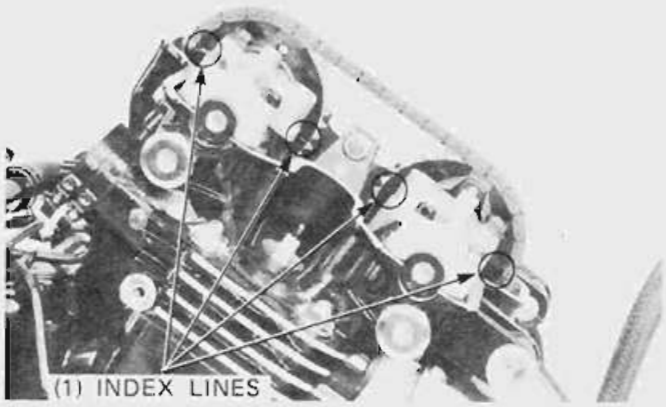
- The camshaft holder bolts in each corner of the cylinder head are the rocker arm shaft locating bolts. If the flat of the rocker arm shaft does not align with the bolt hole, remove the cap bolt and spring, and align the flat with the bolt hole by turning the rocker arm shaft with a screw driver.



If the cam chain tensioner was not removed, lock the cam chain tensioner for minimum tension: pull or pry the tensioner arm up while pushing the lock plate back and hold the arm by inserting a pin through the holes in the tensioner base and arm.



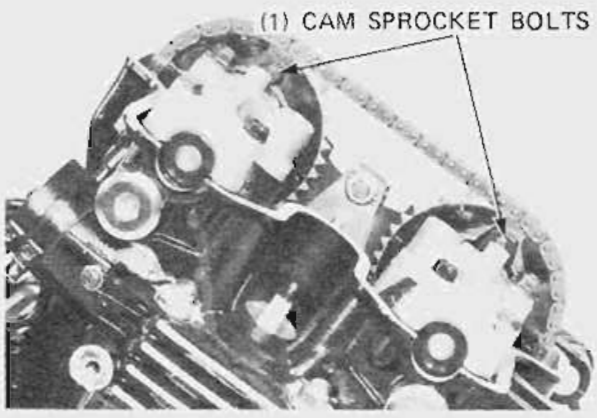
Check the camshaft marks are still facing up, then align the cam sprocket index lines with the top of the cylinder head.
Place the cam chain on the sprockets.
Slide the cam sprockets onto the camshaft flanges.



Align the cam sprocket bolt holes in the sprockets and camshafts, and install the bolts.
Turn the crankshaft counterclockwise 360° and install the remaining sprocket bolts.
Tighten the sprocket bolts.

TORQUE: 18–20 N·m (1.8–2.0 kg-m, 13–14 ft-lb)

Align the T1-3 mark with the rear crankcase mating surface and check that the cam sprocket index lines align with the top of the cylinder head.

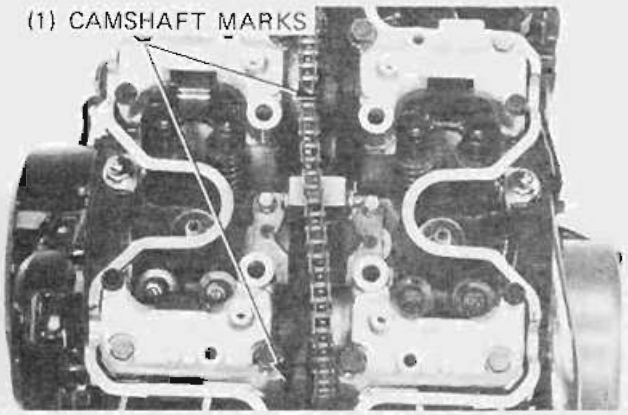


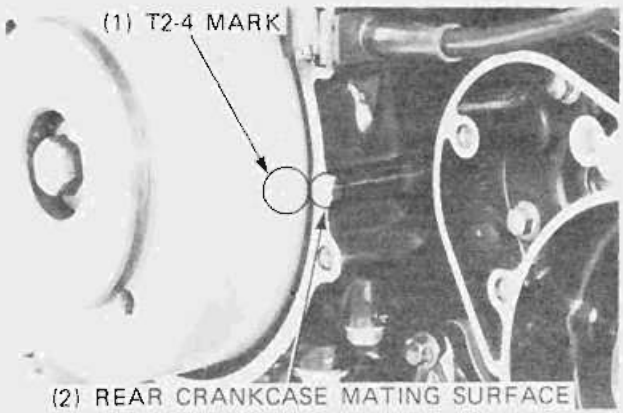
FRONT CYLINDER CAMSHAFT

NOTE

- If the rear cylinder camshafts were removed, install them first, then install the front cylinder camshafts. If the rear cylinder camshafts were not serviced, remove the rear cylinder head cover to check the timing marks.

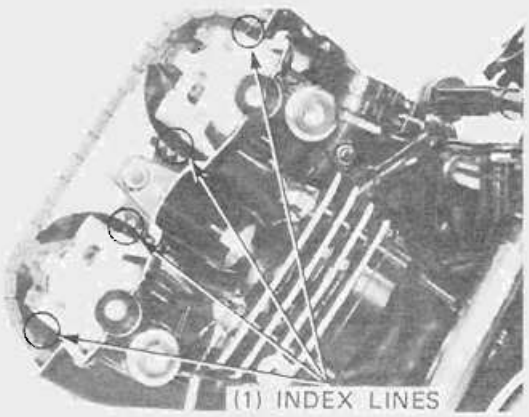
Turn the crankshaft counterclockwise and align the T1-3 mark with the rear crankcase mating surface.
Check the rear cylinder camshaft marks are facing up. If not, turn the crankshaft counterclockwise 360° (one turn).
Install the front cylinder camshafts, sprockets and camshaft holders, as described for the rear cylinder (page 10-16).
Check the camshaft marks are facing up, align the cam sprocket index lines with the top of the cylinder head and place the cam chain on the sprockets.
Align the T2-4 mark with the rear crankcase mating surface by turning the crankshaft counterclockwise 90°.
Slide the cam sprockets onto the camshaft flanges and intall the cam sprocket bolts.





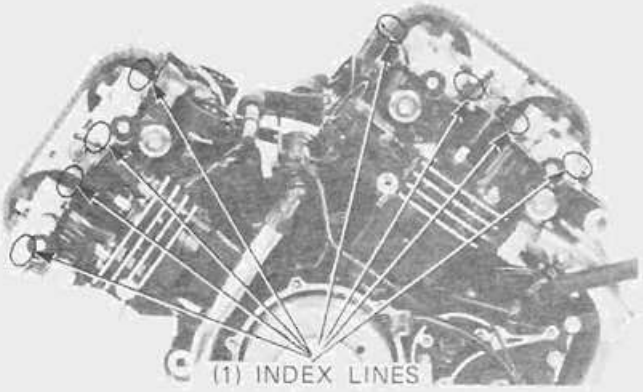
Turn the crankshaft counterclockwise 270° and align the T1-3 mark with the rear crankcase mating surface.
Check that the cam sprocket index lines align with the top of the cylinder head and install the remaining cam sprocket bolts.
Tighten the cam sprocket bolts.

TORQUE: 18–20 N·m (1.8–2.0 kg·m, 13–14 ft·lb)

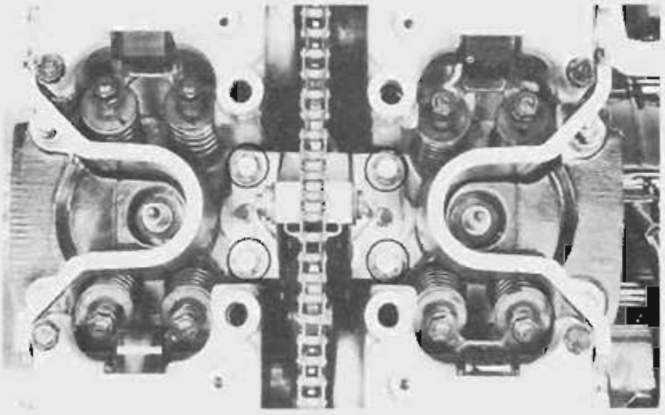


VALVE TIMING INSPECTION

Check the front-to-rear cylinder camshaft timing as follows:
Align the T1-3 mark with the rear crankcase mating surface.
The index lines on all cam sprockets must align with the top of the cylinder heads and all camshaft marks must face either up or down.

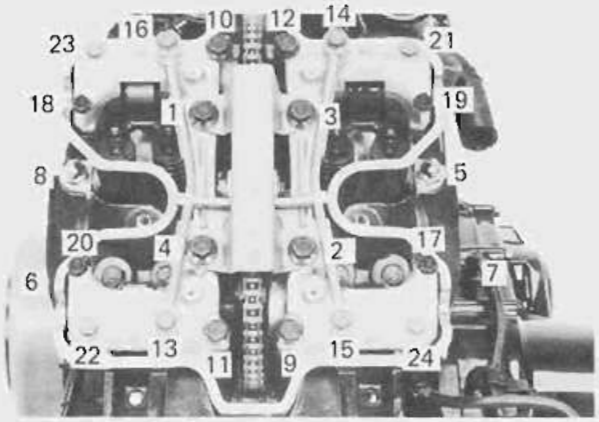


Install and tighten the cam chain tensioner mounting bolts.
Unlock the cam chain tensioner by removing the pin.

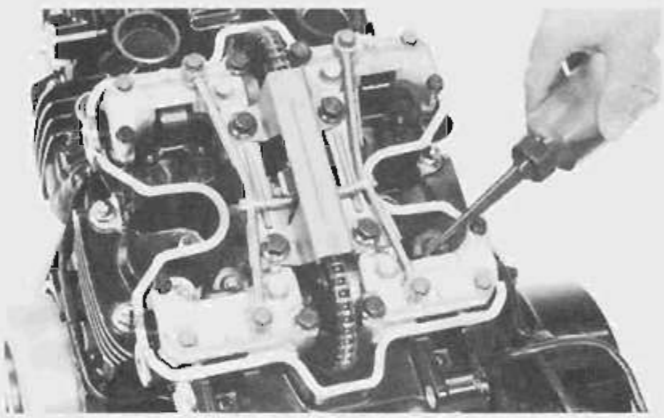


Turn the crankshaft counterclockwise until there is maximum cam chain free play and install the oil pipe under the cam chain.
Install the cam chain guide onto the oil pipe base plate.
Tighten the camshaft holder bolts and cylinder head bolts and nuts in a crisscross pattern in 2-3 steps.

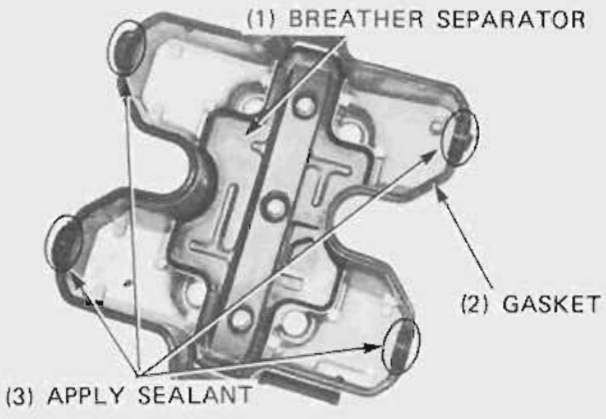
TORQUE:
- **9 mm: 43–47 N·m (4.3–4.7 kg-m, 31–34 ft-lb)**
- **8 mm: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)**
- **6 mm: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)**



Lubricate the cam lubes with clean engine oil.



Adjust the valve clearance (page 3-7).
Remove the breather separator from the rear cylinder head cover and clean it.
Clean gasket groove in the cylinder head cover, and install a new gasket onto the cylinder head cover.
Apply sealant to the half moon portion of the cylinder head cover gasket.



Install the cylinder head cover.

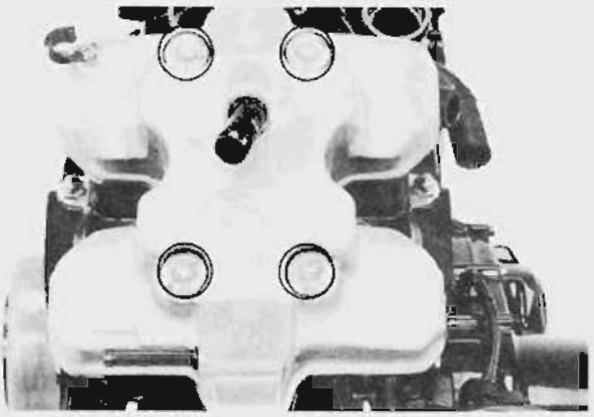
NOTE

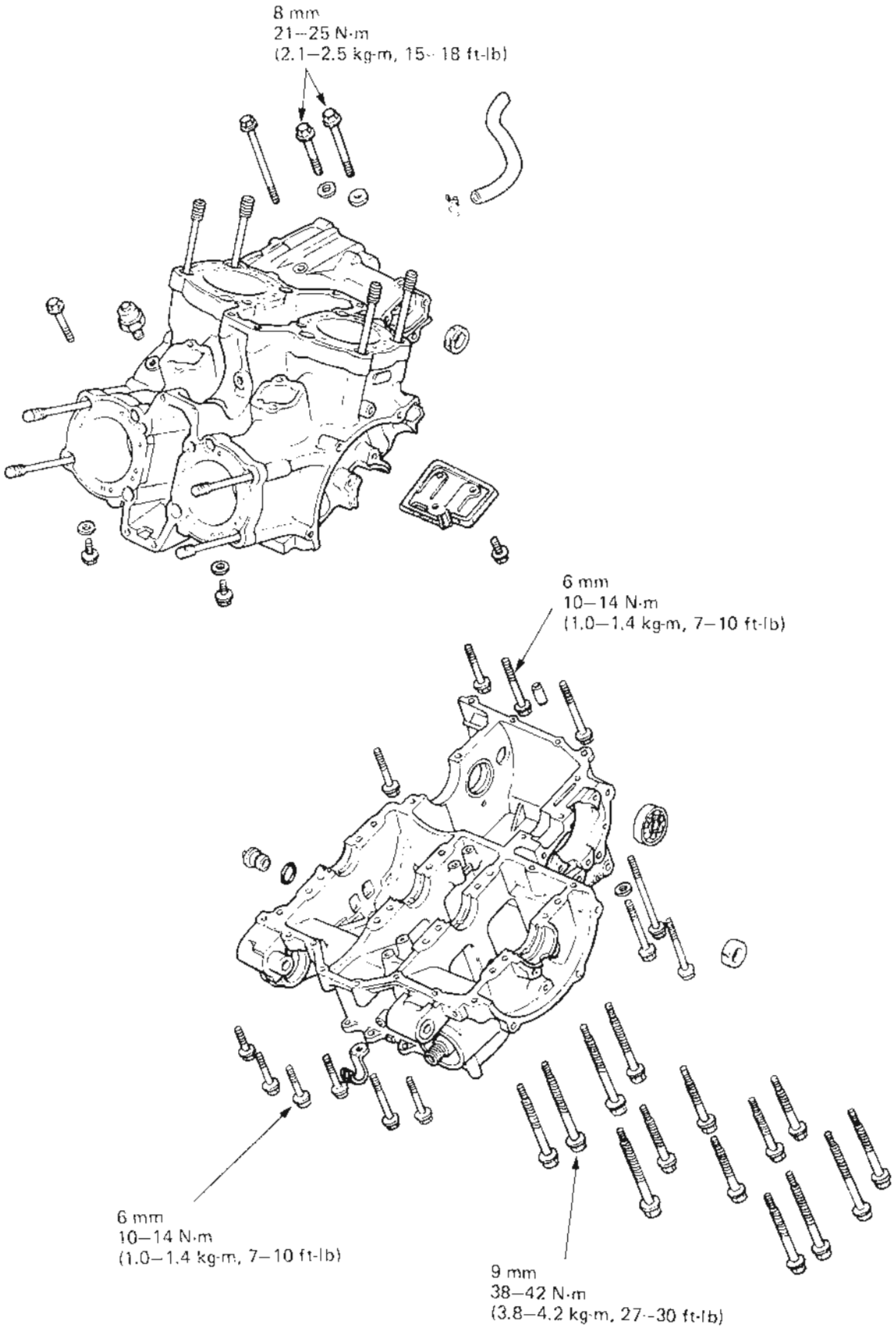
- Install the front cylinder head cover with its insulator grooves facing up.

Tighten the cylinder head cover bolts.

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

Install the removed parts in the reverse order of removal.




8 mm
21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)
6 mm
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
6 mm
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
9 mm
38–42 N·m
(3.8–4.2 kg-m, 27–30 ft-lb)

11 CRANKCASE

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

SERVICE INFORMATION

GENERAL

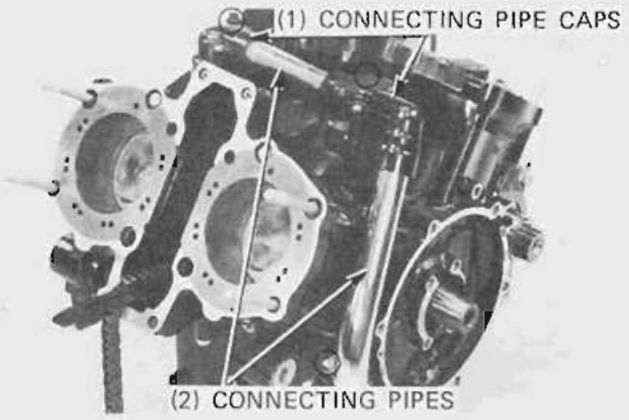
- To service the pistons, crankshaft, connecting rods and transmission, the crankcase halves must be separated.
- The following parts must be removed before disassembling the crankcase.
  - Oil pan — Refer to section 2
  - Oil pump — Refer to section 2
  - Water pump — Refer to section 6
  - Clutch/starter clutch — Refer to section 7
  - Gearshift linkage — Refer to section 8
  - Alternator — Refer to section 9
  - Cylinder heads — Refer to section 10
  - Starter motor — Refer to section 20
  - Neutral switch — Refer to section 21

TORQUE VALUES

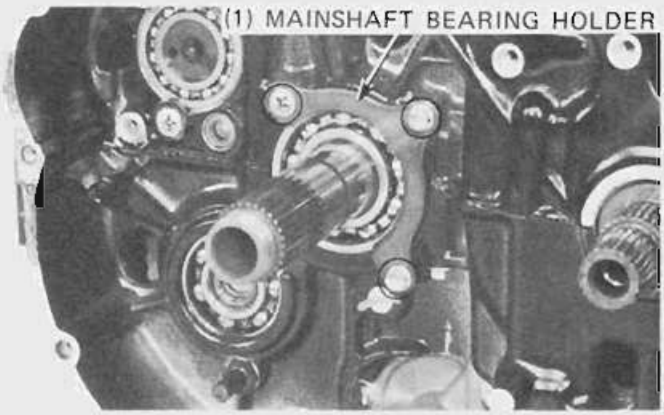
9 mm bolt	38–42 N·m (3.8–4.2 kg·m, 27–30 ft·lb)
8 mm bolt	21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)
6 mm bolt	10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)

CRANKCASE DISASSEMBLY

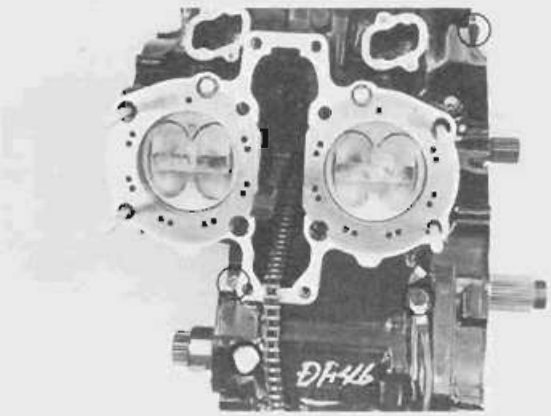
Refer to Service Information (page 11-1) for removal of necessary parts before disassembling crankcase.
Remove the water connecting pipes and caps by removing the three bolts.
Remove the O-rings from the caps and pipes.



Remove the mainshaft bearing holder by removing the screw and bolts.



Remove the upper crankcase bolts.

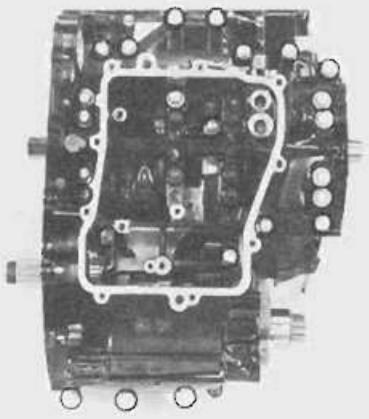


Turn the engine over and remove the lower crankcase bolts.

NOTE

- Remove the bolts in two or more steps and in a crisscross pattern to prevent distorting the crankcase.

Separate the crankcase.

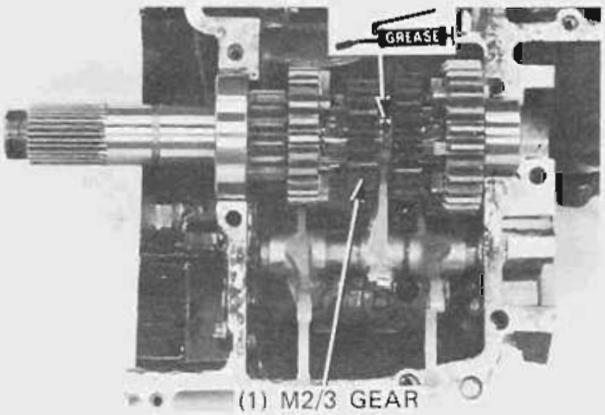


Remove the following parts:
- Piston and connecting rods (Section 12).
- Crankshaft (Section 12).
- Shift fork and shift drum (Section 13).
- Transmission (Section 13).
- Front and rear cylinder cam chain guides and slipper bases.

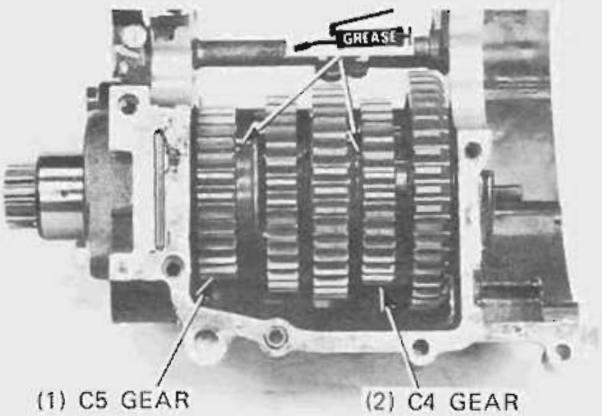


CRANKCASE ASSEMBLY

Install the following parts:
- Shift fork and shift drum (Section 13).
- Transmission (Section 13).
- Crankshaft (Section 12).
- Piston and connecting rods (Section 12).
- Front and rear cylinder cam chain guides and slipper bases.



Apply molybdenum disulfide grease to the shift fork grooves of the M2/3, C4 and C5 gears.



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

CAUTION

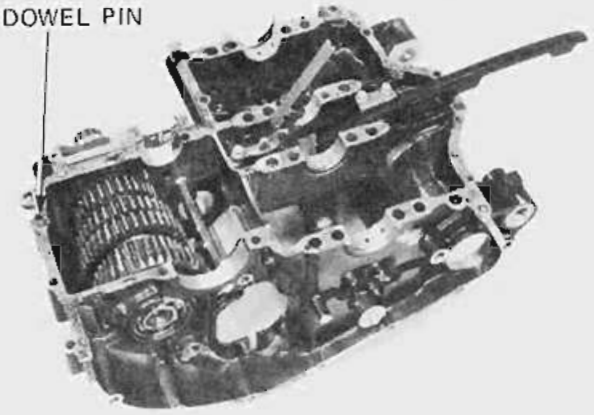
- *Do not apply sealant to the area near the main bearings.*

(1) DO NOT COAT THIS AREA





Install the dowel pin into the lower crankcase.

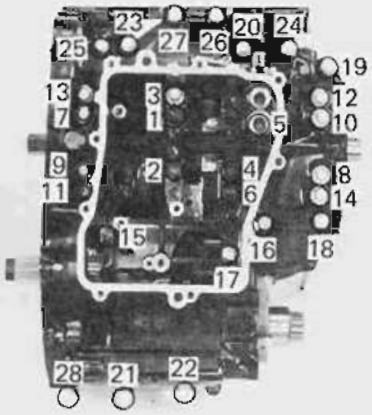


Assemble the crankcase halves, aligning the shift forks with the fork grooves of the gears, and inserting the cam chain tensioner slipper bases and guide properly. Tighten the bolts in 2–3 steps in the sequence shown.

NOTE

- The bolts of their tightening sequence 13, 14, 16, 20, 23 and 24, have washers.

TORQUE: 9 mm: 38–42 N·m (3.8–4.2 kg-m, 27–30 ft-lb)
8 mm: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
6 mm: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

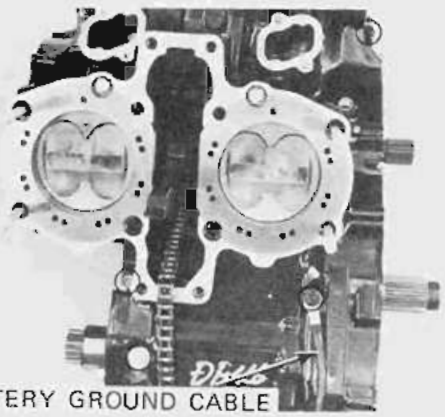


Tighten the upper crankcase bolts to the specified torque in a crisscross pattern and in 2–3 steps.

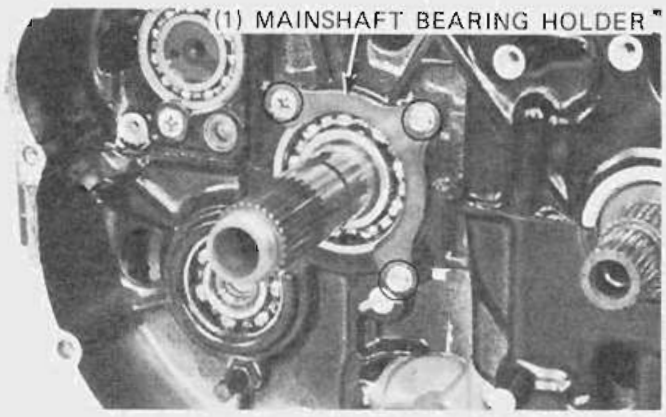
TORQUE: 8 mm: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
6 mm: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

NOTE

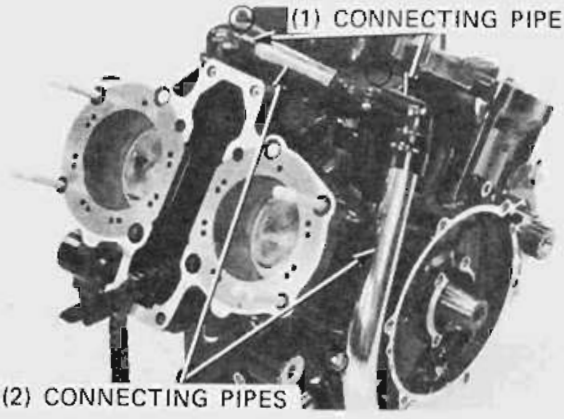
- Do not forget to install the battery ground cable under the 6 mm bolt head as shown.

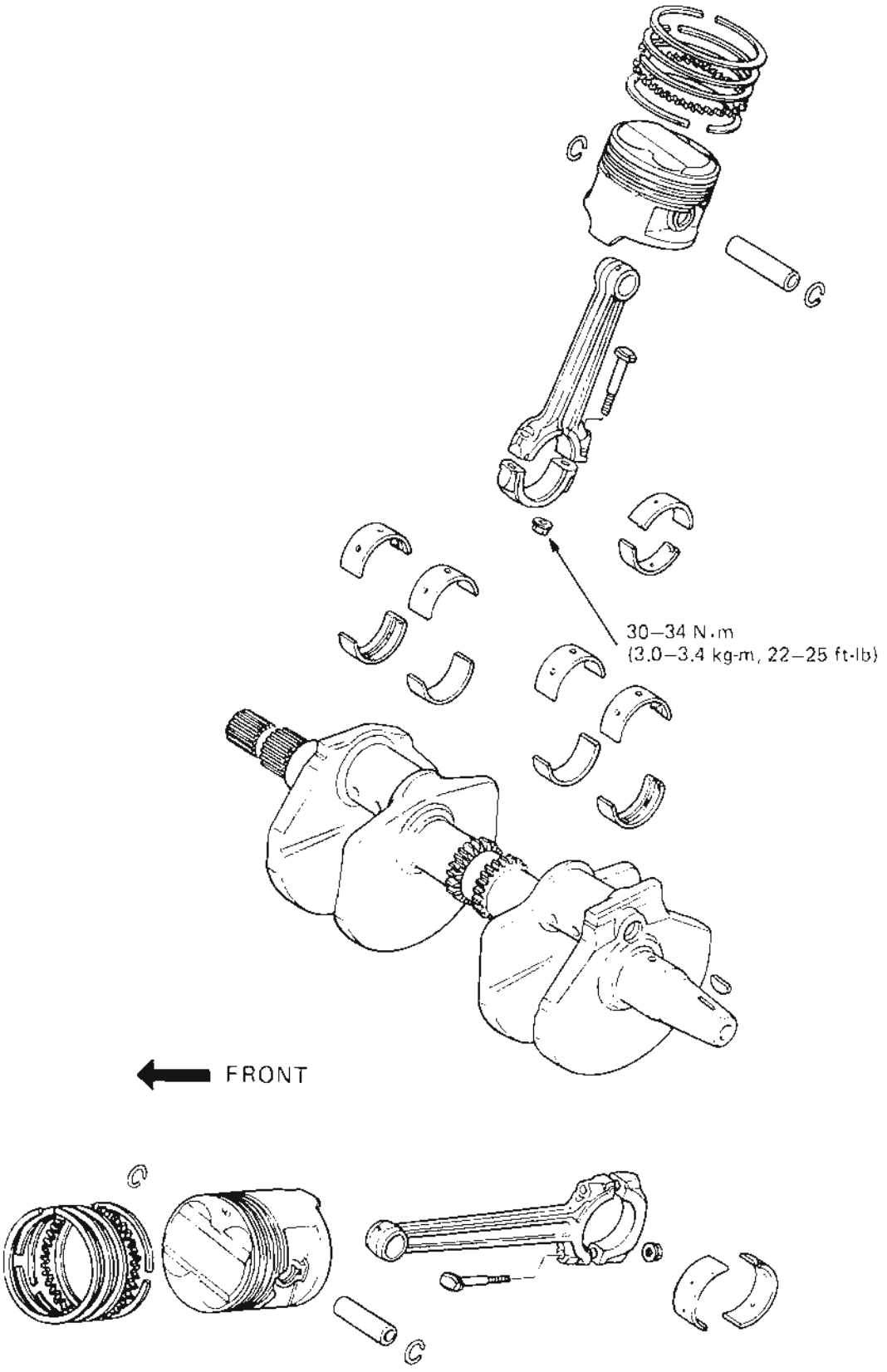


Install the mainshaft bearing holder and tighten the screw and bolts.



Install new O-rings onto the ends of the connecting pipes and assemble the connecting pipes and pipe caps. Install new O-rings in the grooves of the pipe caps and install the caps onto the crankcase.
Tighten the three bolts securely.




30–34 N.m
(3.0–3.4 kg-m, 22–25 ft-lb)
FRONT

12 CRANKSHAFT/PISTON

SERVICE INFORMATION	12–1	BEARING INSPECTION	12–6
TROUBLESHOOTING	12–2	BEARING SELECTION	12–8
CONNECTING ROD REMOVAL	12–3	CRANKSHAFT INSTALLATION	12–9
PISTON REMOVAL	12–4	PISTON AND ROD INSTALLATION	12–10
CRANKSHAFT REMOVAL	12–5		

SERVICE INFORMATION

GENERAL

- All bearing inserts are 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.
- Before removing the piston and connecting rod assemblies, clean the top of the cylinder of any carbon deposits.
- For servicing the piston, connecting rod and crankshaft, the crankcase assembly must be separated (Section 11).

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.10–0.30 mm (0.004–0.012 in)	0.40 mm (0.016 in)
	Runout		–	0.03 mm (0.001 in)
	Crankpin oil clearance		0.028–0.052 mm (0.0011–0.0020 in)	0.08 mm (0.003 in)
	Main journal oil clearance		0.020–0.044 mm (0.0008–0.0017 in)	0.08 mm (0.003 in)
Cylinder	I.D.		77.000–77.015 mm (3.0315–3.0321 in)	77.10 mm (3.035 in)
	Taper		–	0.05 mm (0.002 in)
	Out of round		–	0.05 mm (0.002 in)
	Warpage		–	0.10 mm (0.004 in)
Piston	Ring-to-groove clearance	Top	0.015–0.045 mm (0.0006–0.0018 in)	0.10 mm (0.004 in)
		Second	0.015–0.045 mm (0.0006–0.0018 in)	0.10 mm (0.004 in)
	Ring end gap	Top	0.32–0.47 mm (0.013–0.019 in)	0.65 mm (0.026 in)
		Second	0.32–0.47 mm (0.013–0.019 in)	0.65 mm (0.026 in)
		Oil (Side rail)	0.30–0.90 mm (0.012–0.035 in)	1.10 mm (0.043 in)
	Piston O.D.		76.955–76.970 mm (3.0297–3.0303 in)	76.85 mm (3.026 in)
	Piston-to-cylinder clearance		0.30–0.06 mm (0.0012–0.0024 in)	0.10 mm (0.004 in)
	Piston pin bore		20.002–20.008 mm (0.7875–0.7877 in)	20.06 mm (0.790 in)
	Piston pin O.D.		19.994–20.000 mm (0.7872–0.7874 in)	19.98 mm (0.787 in)
	Piston-to-piston pin clearance		0.002–0.014 mm (0.0001–0.0006 in)	0.04 mm (0.002 in)
	Connecting rod small end I.D.		20.016–20.034 mm (0.7880–0.7887 in)	20.08 mm (0.791 in)
	Piston pin-to-connecting rod clearance		0.016–0.040 mm (0.0006–0.0016 in)	0.060 mm (0.0024 in)
Cam chain	Length at 13 kg (29 lb) tension		–	328.9 mm (12.95 in)

TORQUE VALUE

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

TROUBLESHOOTING

Excessive noise
- Crankshaft
  - Worn main bearing
  - Worn rod bearing

- Piston and Connecting Rod
  - Worn piston or cylinder
  - Worn piston pin or pin hole
  - Worn rod small end

Low compression or uneven compression
- Worn cylinder or piston ring

Excessive smoke
- Worn cylinder, piston or piston rings
- Improperly installed piston rings
- Damaged piston or cylinder

Overheating
- Excessive carbon build-up on piston head
- Blocked or restricted flow of coolant
- Sticking thermostat

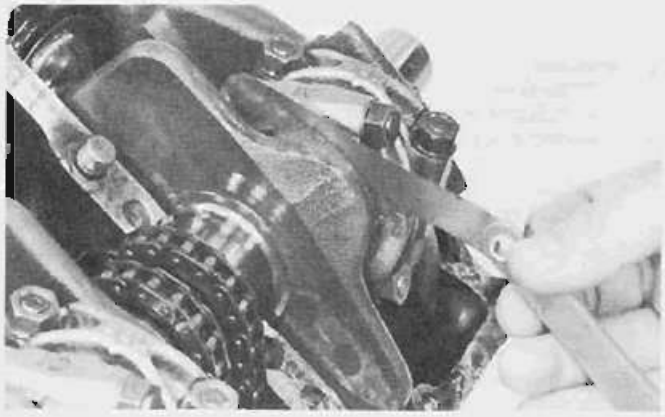
Knocking or abnormal noise
- Worn pistons and cylinder
- Excessive carbon build-up on piston head.

CONNECTING ROD REMOVAL

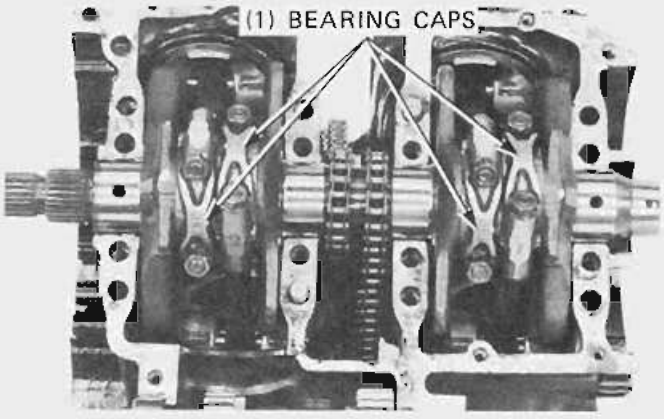
Separate the crankcase assembly (Section 11).

Check the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)



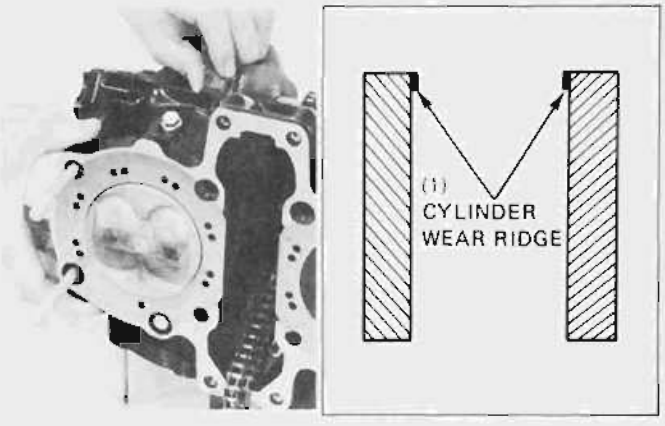
Remove the connecting rod bearing caps and note their locations.



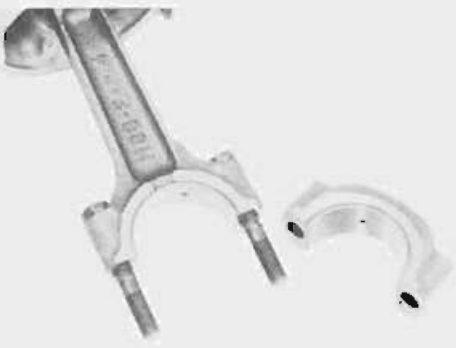
Push the connecting rods and pistons out through the top of the cylinder bores.

CAUTION

- *On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel. Any ridge must be removed with an automotive type ridge reamer before removing the pistons to allow the pistons and rings to pass through the cylinder.*



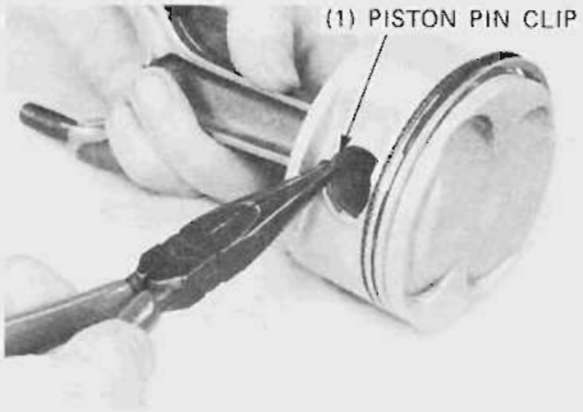
Mark the rods, pistons, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins.



PISTON REMOVAL

Remove the piston pin clips. Push the piston pin out and remove the piston.

Mark the piston pins to indicate their correct piston position.



PISTON/PISTON RING INSPECTION

Remove the piston rings and mark them to indicate the correct cylinder and piston position.

Clean the piston crown, removing all carbon deposits.
Inspect the piston for cracks or other damage and the ring grooves for excessive wear and carbon build-up.

Measure the piston ring-to-groove clearance.

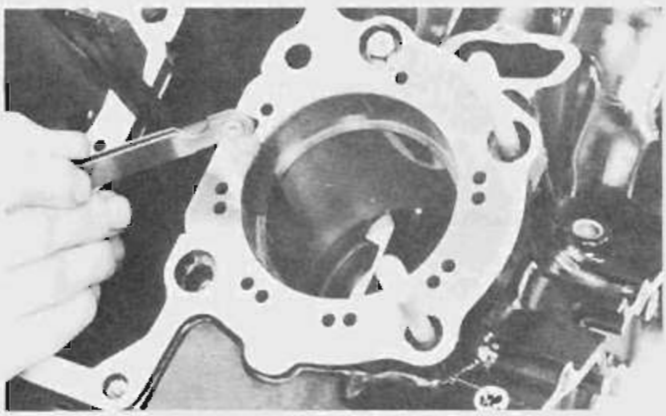
SERVICE LIMIT: 0.10 mm (0.004 in) (TOP/SECOND)



Using a piston, push the ring into the cylinder squarely and measure the end gap.

SERVICE LIMITS:

TOP:	**0.65 mm (0.026 in)**
SECOND:	**0.65 mm (0.026 in)**
OIL (Side rail):	**1.10 mm (0.043 in)**



Measure the piston O.D.

NOTE

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

SERVICE LIMIT: 76.85 mm (3.026 in)



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

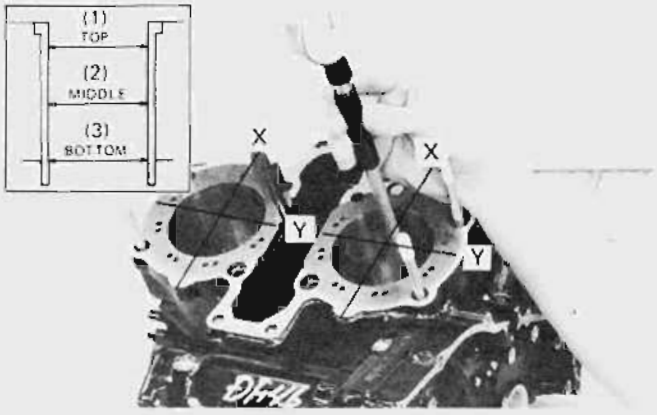
SERVICE LIMIT: 77.10 mm (3.035 in)

Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

Oversize pistons are available in the following sizes:

0.25 and 0.50 mm



Measure each piston pin hole I.D.

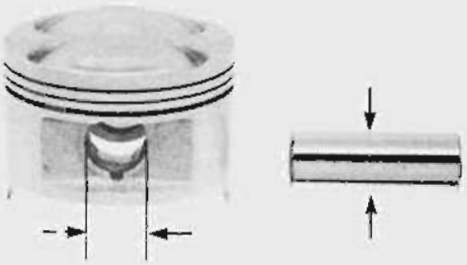
SERVICE LIMIT: 20.06 mm (0.790 in)

Measure each piston pin O.D.

SERVICE LIMIT: 19.98 mm (0.787 in)

Calculate the piston pin-to-piston clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)

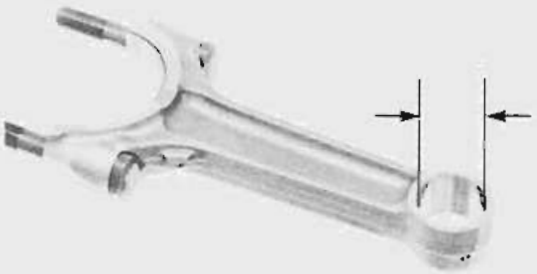


Measure the connecting rod small end I.D. If the reading exceeds the service limit, replace the rod.

SERVICE LIMIT: 20.08 mm (0.791 in)

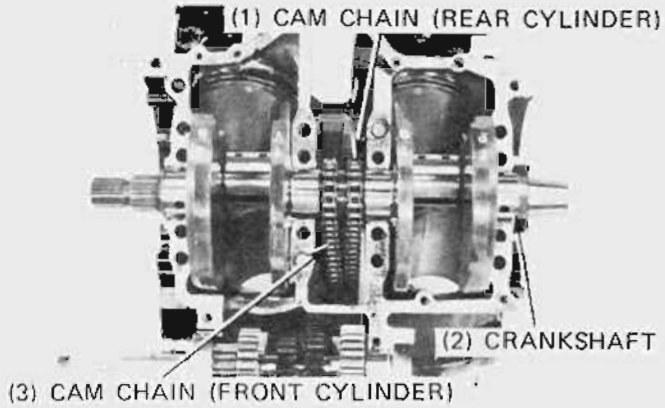
Calculate the piston pin-to-connecting rod clearance.

SERVICE LIMIT: 0.060 mm (0.0024 in)



CRANKSHAFT REMOVAL

Remove the crankshaft and cam chains.

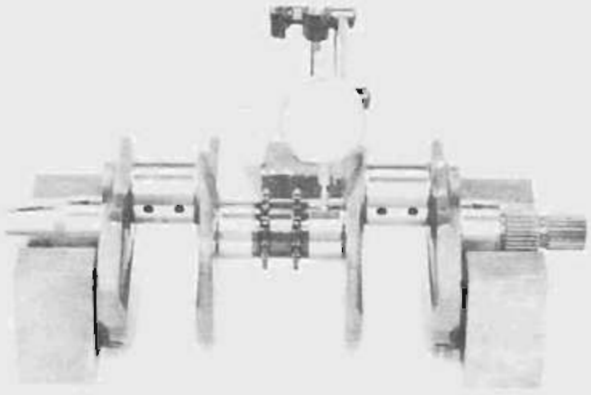


CRANKSHAFT INSPECTION

Set the crankshaft on a stand or V-blocks.
Set a dial indicator on the center main bearing journal. Rotate the crankshaft two revolutions and read the runout.

Actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT: 0.03 mm (0.001 in)



CAM CHAIN LENGTH INSPECTION

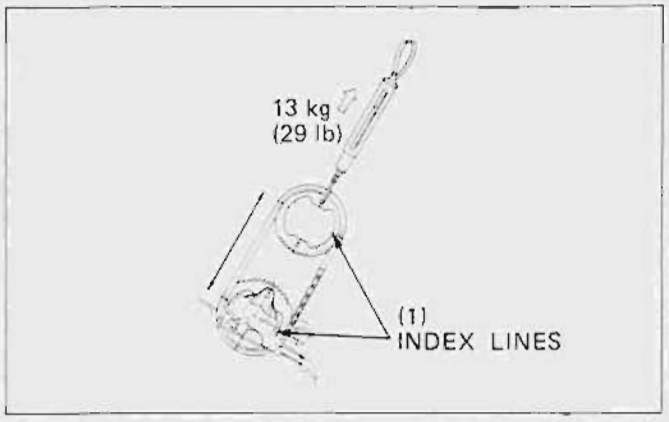
Place the cam chain on the camshaft sprockets with the index lines positioned as indicated.
Secure one camshaft sprocket and apply 13 kg (29 lbs) of tension to the other.
Then measure the distance between the index lines as shown.

SERVICE LIMIT: 328.9 mm (12.95 in)

NOTE

- The lidex lines should be parallel to each other.

Replace the cam chain if it is longer than the service limit.



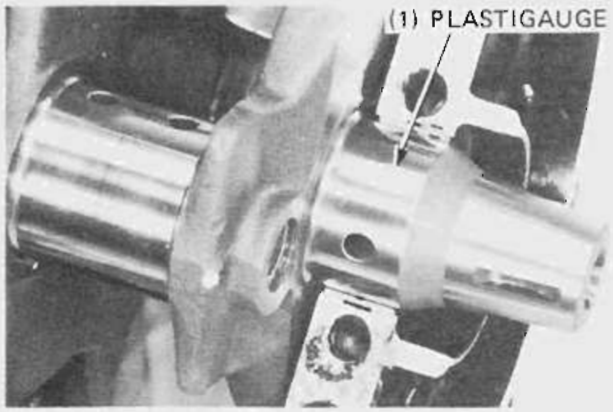
BEARING INSPECTION

MAIN BEARING

Inspect the bearing inserts for unusual wear or damage.
Reinstall the upper crankcase's main bearing inserts, then carefully lower the crankshaft in place.
Wipe all oil from the bearing inserts and journals.
Put a piece of plastigauge on each journal.

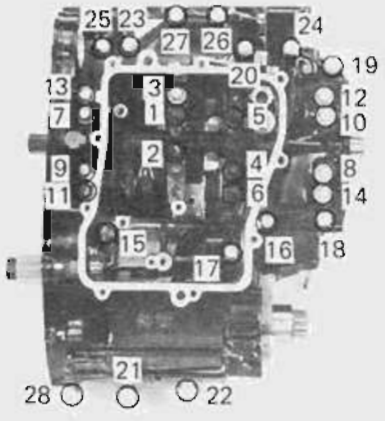
NOTE

- Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.



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

TORQUE VALUES:
6 mm bolt: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
9 mm bolt: 38–42 N·m (3.8–4.2 kg-m, 27–30 ft-lb)

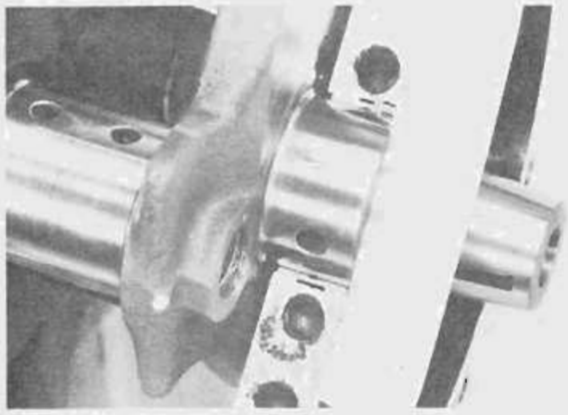


NOTE

- Do not rotate the crankshaft during inspection.

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

OIL CLEARANCE SERVICE LIMIT:
0.08 mm (0.003 in)

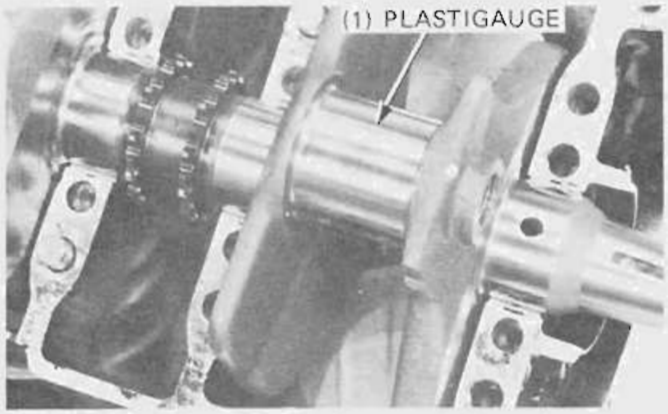


CRANKPIN BEARING

Inspect the bearing inserts for unusual wear or damage.
Wipe all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin.

NOTE

- Do not put the plastigauge over the oil hole in the crankpin.
- The bearing tabs should face toward the exhaust ports. Remember the front and rear cylinder exhaust ports face opposite directions.

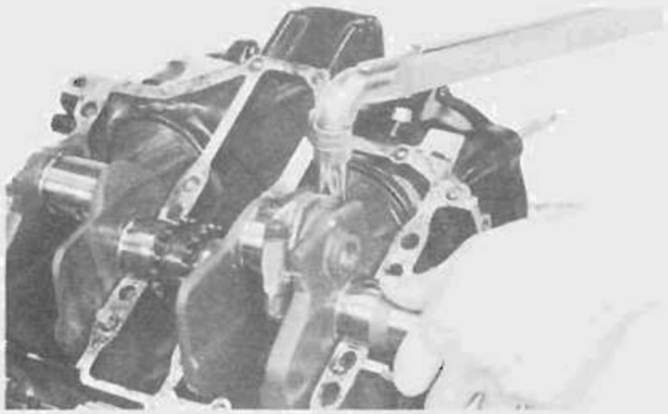


Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

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

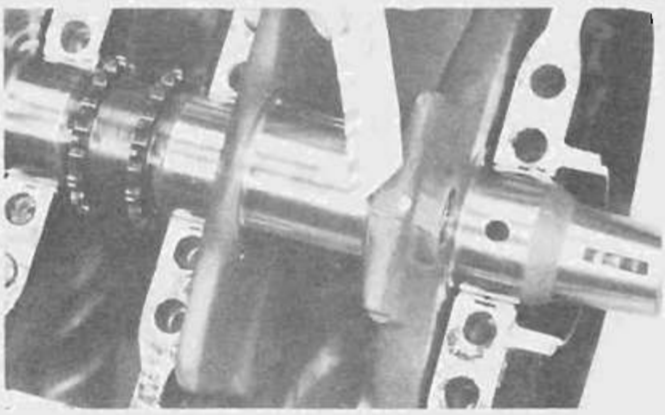
NOTE

- Do not rotate the crankshaft during inspection.



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

OIL CLEARANCE SERVICE LIMIT:
0.08 mm (0.003 in)



BEARING SELECTION

MAIN BEARING

The code letters (A or B) stamped on the rear portion of the upper crankcase identifies the inside diameter (I.D.) of each main bearing journal, from left-to-right.

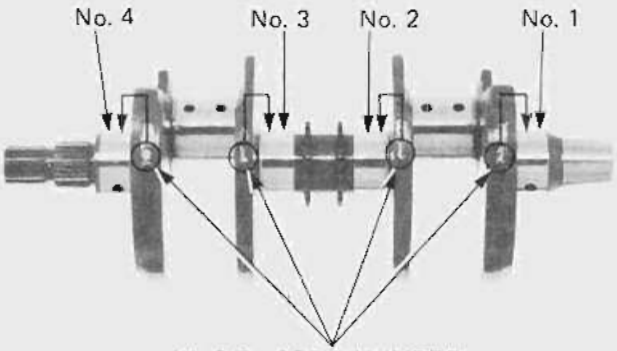


(1) I.D. CODE LETTER

The code numbers (1 or 2) stamped on each crankshaft counter weight identifies the outside diameter (O.D.) of its main journal.
Cross reference the crankcase and crank journal codes to select the correct replacement bearing.

NOTE

- The No.1 and No.4 main bearings are different from the No.2 and No.3 main bearings. No.1 and No.4 bearings have the grooves in their I.D. and No.2 and No.3 bearings have no grooves.



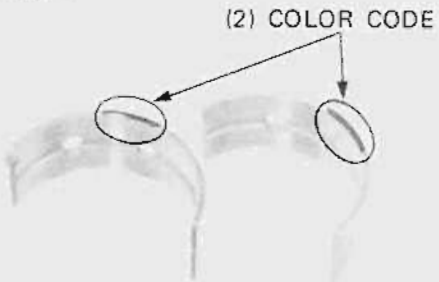
(1) O.D. CODE NUMBER

MAIN BEARING SELECTION TABLE

CRANKSHAFT O.D. CODE NUMBER / CRANKCASE I.D. CODE LETTER		1	2
		37.992–38.000 mm (1.4957–1.4961 in)	37.984–37.992 mm (1.4954–1.4957 in)
A	41.000–41.008 mm (1.6142–1.6145 in)	C (Pink) <Brown>	B (Yellow) <Black>
B	41.008–41.016 mm (1.6145–1.6148 in)	B (Yellow) <Black>	A (Green) <Blue>

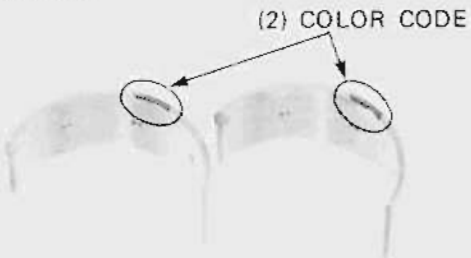
( ): No. 1 and No. 4 main bearings
< >: No. 2 and No. 3 main bearings

(1) No. 1 and No. 4



MAIN BEARING INSERT THICKNESS:
A: 1.502–1.506 mm (0.0591–0.0593 in)
B: 1.498–1.502 mm (0.0590–0.0591 in)
C: 1.494–1.498 mm (0.0588–0.0590 in)

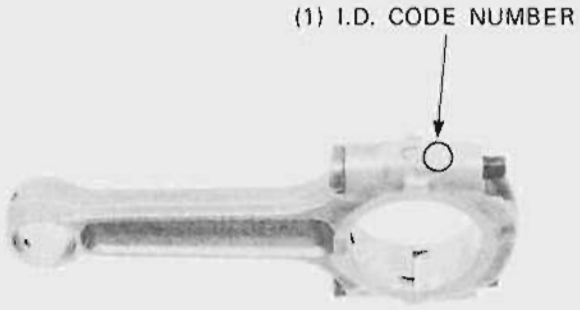
(3) No. 2 and No. 3



CRANKPIN BEARING

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

The code numbers (1 or 2) stamped on each connecting rod identifies its inside diameter (I.D.).

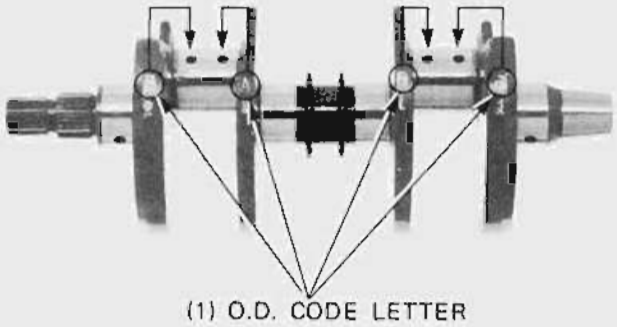


The code letters (A or B) stamped on each crankshaft counter weight identifies the outside diameter (O.D.) of its crankpin.

Cross reference the crankpin and rod codes to select the correct replacement bearing.

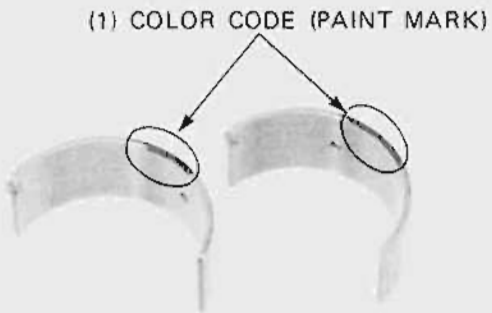
NOTE

- The rear cylinder crankpin bearings are different from the front cylinder crankpin bearings in the oil hole position. They are identified by the number of the color paint marks. The rear cylinder bearing has two marks and front cylinder bearing has one mark.



CRANKPIN BEARING SELECTION TABLE

CRANKPIN O.D. CODE LETTER / CONNECTING ROD CODE NUMBER		A	B
		39.992–40.000 mm (1.5745–1.5748 in)	39.984–39.992 mm (1.5742–1.5745 in)
1	43.000–43.008 mm (1.6929–1.6932 in)	C (Pink)	B (Yellow)
2	43.008–43.016 mm (1.6923–1.6935 in)	B (Yellow)	A (Green)

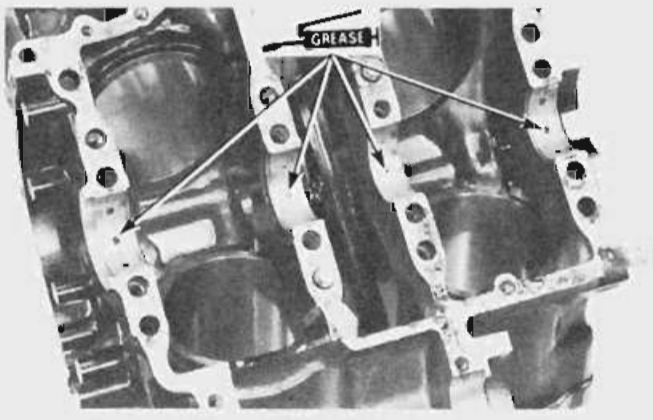


BEARING INSERT THICKNESS

A (Green): 1.494–1.498 mm (0.0588–0.0590 in)
B (Yellow): 1.490–1.494 mm (0.0587–0.0588 in)
C (Pink): 1.486–1.490 mm (0.0585–0.0587 in)

CRANKSHAFT INSTALLATION

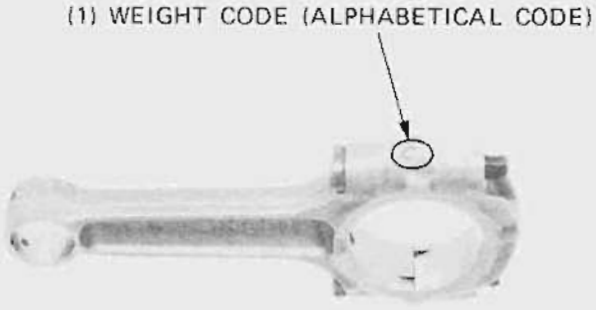
Install the main bearings into the upper crankcase.
Apply molybdenum disulfide grease to the upper and lower main bearings.
Install the crankshaft with the cam chains.



The weight code is stamped on the connecting rod by the alphabetical code.
When replacing the connecting rod, perform the weight selection between the No. 1 and 2 connecting rods, or No. 3 and 4 connecting rods in accordance with the selection table.

NOTE

- It is not necessary to perform the weight selection between the No. 1 and 3, or No. 2 and 4 connecting rods.
- The "o" mark in the table indicates that the matching is possible in the crossed codes.
- The cylinders are arranged in the order of No. 1, 2, 3, 4 from the alternator side.



#1, #2 CONNECTING RODS						#3, #4 CONNECTING RODS					
#2 ROD CODE / #1 ROD CODE	A	B	C	D	E	#4 ROD CODE / #3 ROD CODE	A	B	C	D	E
A				○	○	A				○	○
B			○	○	○	B			○	○	○
C		○	○	○		C		○	○	○	
D	○	○	○			D	○	○	○		
E	○	○				E	○	○			

PISTON AND ROD INSTALLATION

Clean the piston domes, ring lands, and skirts.
Carefully install the piston rings onto the piston.
Stagger the ring end gaps as shown.

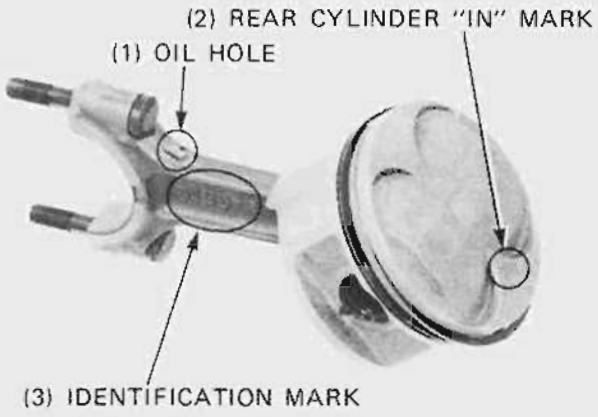
NOTE

- Be careful not to damage the piston and piston rings during assembly.
- All rings should be installed with the markings facing up.
- After installing the rings they should rotate freely, without sticking.



Coat the rod's small end with molybdenum disulfide grease.

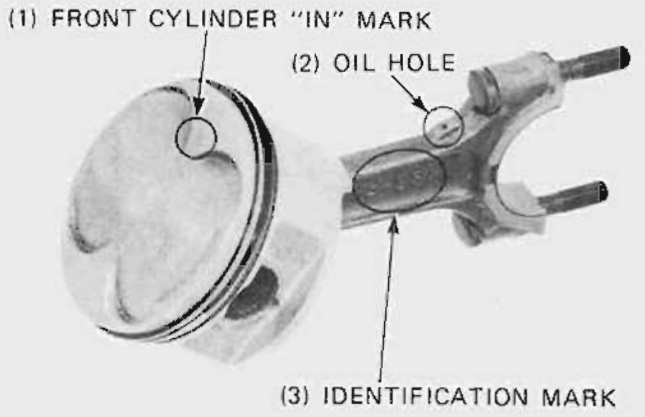
Rear cylinder:
Note that the rear cylinder connecting rods are marked "MB6-R".
Install the pistons on the rear connecting rods so that the intake "IN" mark is facing opposite the oil hole in the rod.



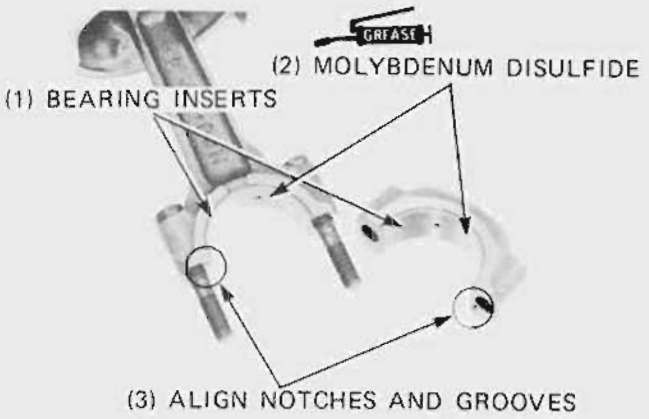
Front cylinders:
Note that the front cylinder connecting rods are marked "MB6-F".
Install the pistons on the front rods so that the intake "IN" mark is facing the same direction as the oil hole in the rod.

NOTE

- Do not interchange the pistons, piston pins or connecting rods.
- Make sure that the piston pin clips are properly seated.



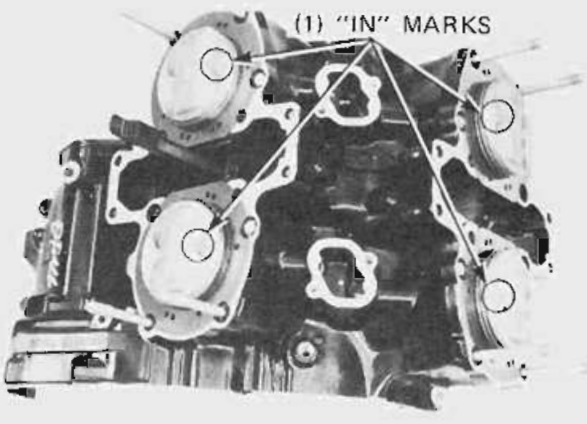
Align the notches on the crankpin bearing inserts with the grooves in the connecting rod and cap and install the inserts. Apply molybdenum disulfide grease to the crankpin bearings.



Coat the cylinders, piston rings/grooves and piston with oil. To prevent damaging the crankshaft, slip short sections of rubber hose over the rod bolts before installation.
Install the rod and piston assemblies into the cylinders from the top of the crankcase. Be sure each assembly is returned to its original position as noted during removal.

NOTE

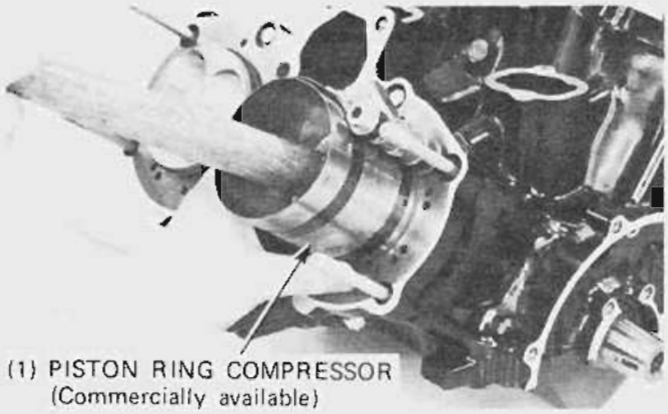
- The piston intake "IN" marks should be facing each other as shown.



Compress the piston rings with a ring compressor and insert the piston and rod into the cylinder until the rod seats on the crankpin.

NOTE

- Be careful not to damage the pistons or rings during assembly.



(1) PISTON RING COMPRESSOR (Commercially available)

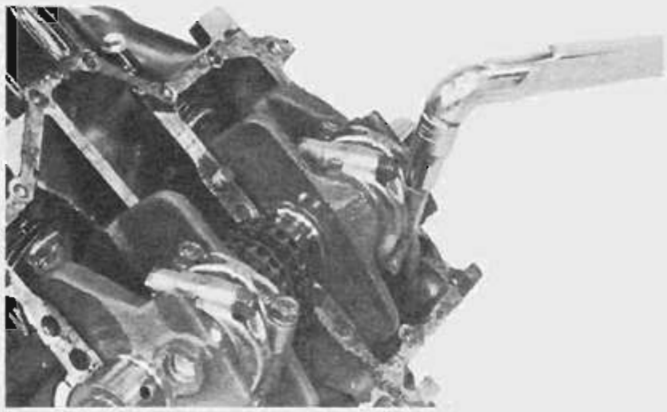
Flip the upper crankcase over.

Install and torque the connecting rod caps.

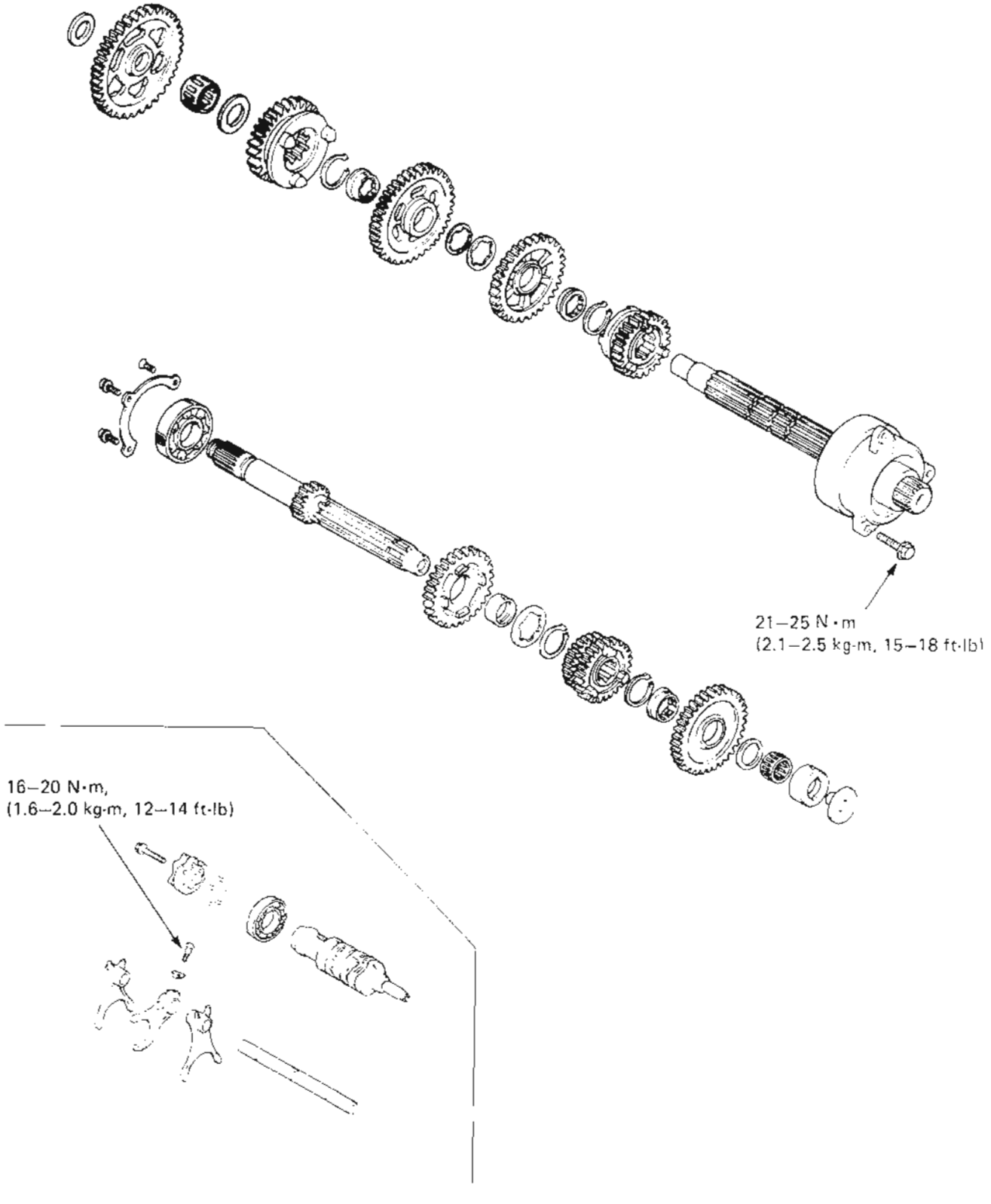
TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

NOTE

- Be sure the bearing caps are installed in their correct location as marked during removal.
- Tighten the nuts in two or more steps.
- After tightening the bolts, check that the rods move freely without binding.



Assemble the crankcase (See page 11-3).


21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)
16–20 N·m,
(1.6–2.0 kg-m, 12–14 ft-lb)

13 TRANSMISSION

SERVICE INFORMATION	13-1	SHIFT FORK AND SHIFT DRUM	13-4
TROUBLESHOOTING	13-2	TRANSMISSION ASSEMBLY	13-6
TRANSMISSION DISASSEMBLY	13-3		

SERVICE INFORMATION

GENERAL

- The gearshift linkage can be serviced with the engine in the frame (Section 8).
- For internal transmission repairs, the crankcase must be separated (Section 11).

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M4, M5 gear	31.000–31.016 mm (1.2205–1.2211 in)	31.04 mm (1.222 in)
		C2, C3 gear	31.000–31.016 mm (1.2205–1.2211 in)	31.04 mm (1.222 in)
	Gear bushing O.D.	M4, M5 gear	30.950–30.975 mm (1.2185–1.2195 in)	30.94 mm (1.218 in)
		C2, C3 gear	30.950–30.975 mm (1.2185–1.2195 in)	30.93 mm (1.218 in)
	Gear bushing I.D.	M4	27.995–28.016 mm (1.1022–1.1030 in)	28.04 mm (1.104 in)
	Mainshaft O.D. (at M4)		27.977–27.990 mm (1.1015–1.1020 in)	27.92 mm (1.099 in)
	Gear-to-bushing clearance	M4, M5	0.025–0.066 mm (0.0010–0.0026 in)	0.10 mm (0.004 in)
		C2, C3	0.025–0.066 mm (0.0010–0.0026 in)	0.11 mm (0.004 in)
	Busning-to-shaft clearance	M4	0.005–0.039 mm (0.0002–0.0015 in)	0.06 mm (0.002 in)
Shift fork	Claw thickness		6.43–6.50 mm (0.253–0.256 in)	6.1 mm (0.24 in)
	I.D.	Left and right	14.000–14.021 mm (0.5512–0.5520 in)	14.04 mm (0.553 in)
Fork shaft	O.D.		13.966–13.984 mm (0.5498–0.5505 in)	13.90 mm (0.547 in)

TORQUE VALUES

Countershaft bearing holder	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
Shift fork center	16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

TOOLS

Special

Driver	07949–3710000

Common

Attachment, 52 x 55 mm	07746–0010400
Driver	07746–0030100
Attachment, 30 mm	07746–0030300

TROUBLESHOOTING

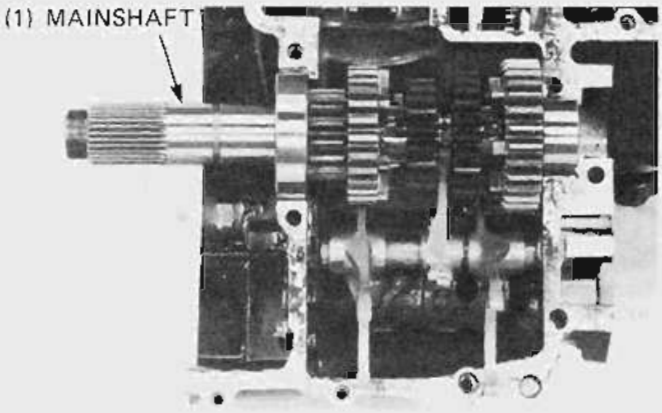
Hard to shift
- Clutch slave cylinder sticking
- Shift fork bent
- Shift shaft bent
- Shift claw bent
- Shift drum cam grooves damaged

Transmission jumps out of gear
- Gear dogs worn
- Shift shaft bent
- Shift drum stopper broken
- Shift forks bent

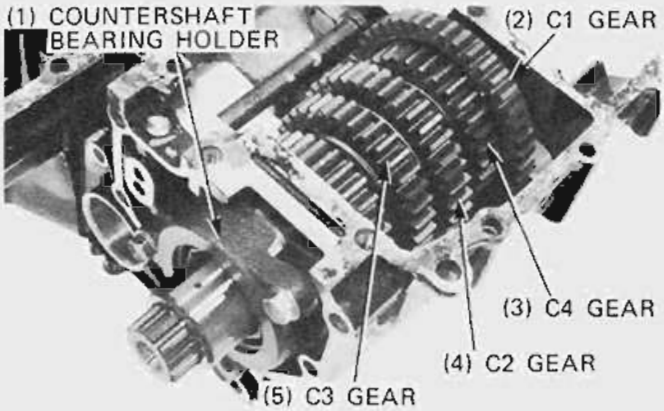
TRANSMISSION DISASSEMBLY

Separate the crankcase (section 11).
Remove the dowel pins from the crankcase.

Remove the mainshaft.



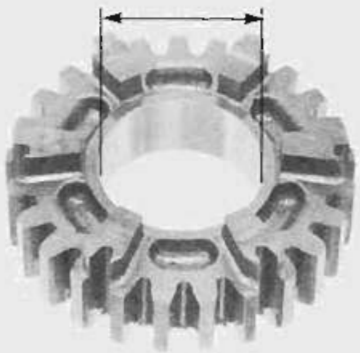
Remove the countershaft bearing holder bolts.
Pull the countershaft out and remove the thrust washer, C1 gear, needle bearing and thrust washer from the shaft.
Remove the snap ring and slide the C2 gear and bushing to the right.
Remove the stopper ring and spline collar from their groove and remove the C4 gear, snap ring, bushing, C2 gear, stopper ring, spline collar, C3 gear and bushing from the shaft, then remove the countershaft from the lower crankcase.



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

Measure the I.D. of each gear.

SERVICE LIMIT:
M4, M5 gear: 31.04 mm (1.222 in)
C2, C3 gear: 31.04 mm (1.222 in)



Measure the O.D. of the gear bushings.

SERVICE LIMIT:
M4, M5: 30.94 mm (1.218 in)
C2, C3: 30.93 mm (1.218 in)



Calculate the clearance between the gear bushings and the gears.

SERVICE LIMIT:
M4, M5: 0.10 mm (0.004 in)
C2, C3: 0.11 mm (0.004 in)

Measure the I.D. of the gear bushings.

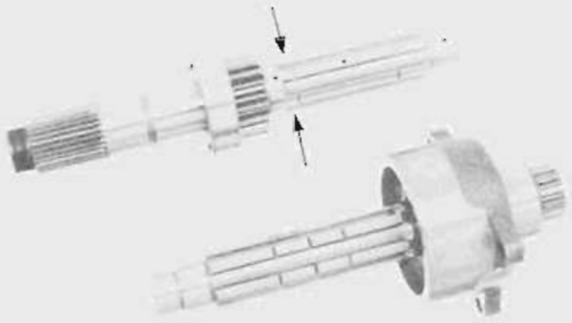
SERVICE LIMIT:
M4 gear bushing: 28.04 mm (0.986 in)

Measure the O.D. of the mainshaft.

SERVICE LIMIT:
Mainshaft (at M4 bushing): 27.92 mm (0.981 in)

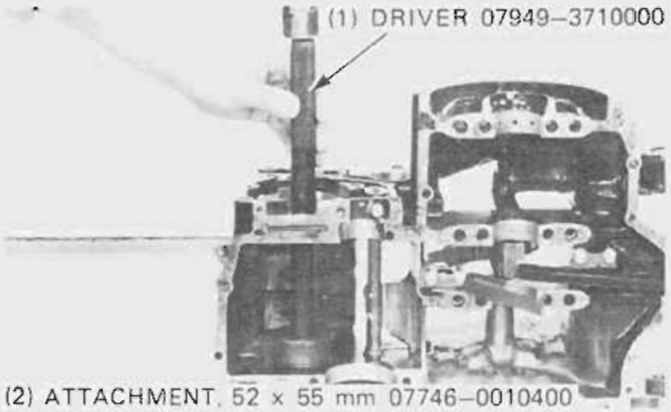
Calculate the clearance between the bushing and shaft.

SERVICE LIMIT:
M4 bushing-to-shaft: 0.06 mm (0.002 in)



COUNTERSHAFT BEARING REPLACEMENT

Drive the countershaft bearing out of the lower crankcase.
Drive a new countershaft bearing into the crankcase using the special tools.



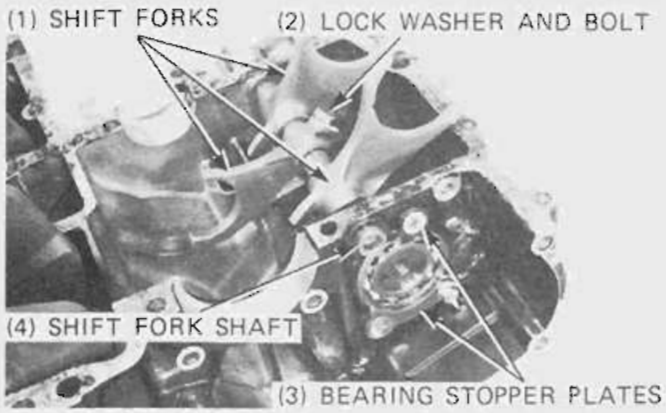
SHIFT FORK AND SHIFT DRUM

REMOVAL

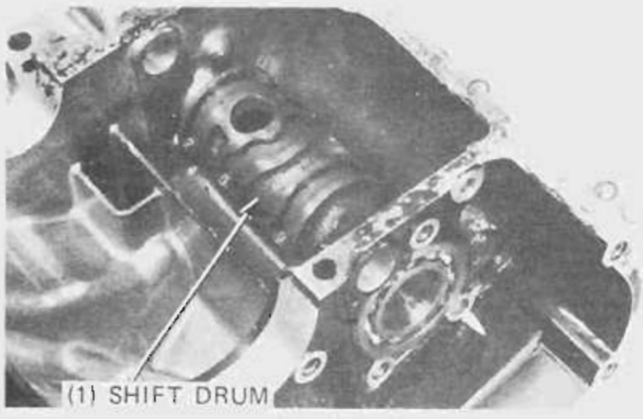
Bend the lock washer tab down and remove the center fork mounting bolt.

Remove the shift fork shaft and shift forks.

Remove the bearing stopper plates.



Remove the shift drum.



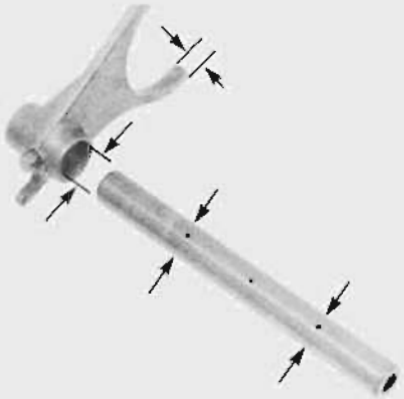
GEAR SHIFT DRUM AND SHIFT FORK INSPECTION

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



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

Check for scratches, scoring or evidence of insufficient lubrication.
Measure the shift fork shaft O.D. at right and left shift fork surfaces.



SERVICE LIMIT: 13.90 mm (0.547 in)

Measure the right and left shift fork I.D.

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

Measure the shift fork claw thickness.

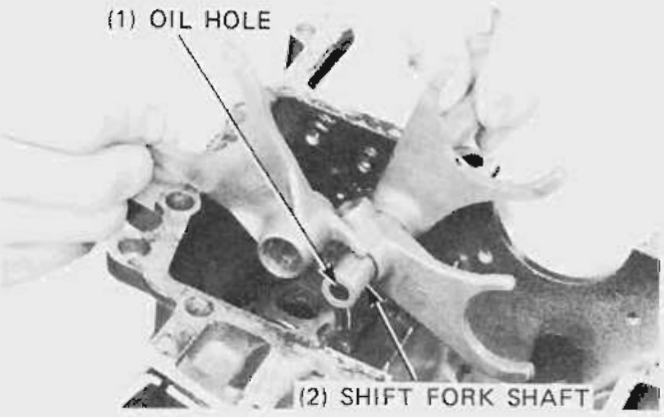
SERVICE LIMIT: 6.1 mm (0.24 in)

INSTALLATION

Install the shift drum.

Install the shift fork shaft so that the oil hole end is toward the right .

Install the shift forks onto the shaft.

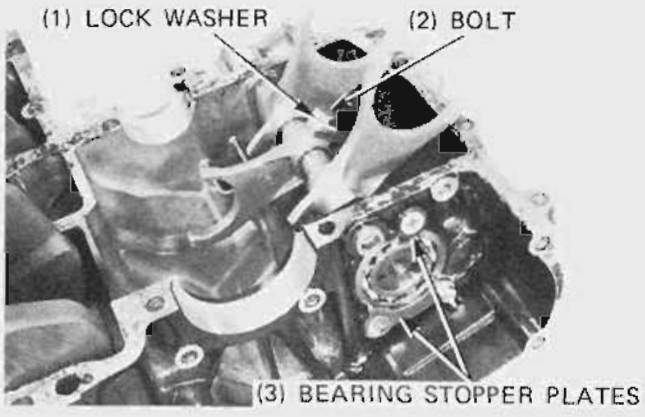


Install a new lock washer and the bolt to the center shift fork and tighten the bolt.

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

Bend up the lock washer's tabs.

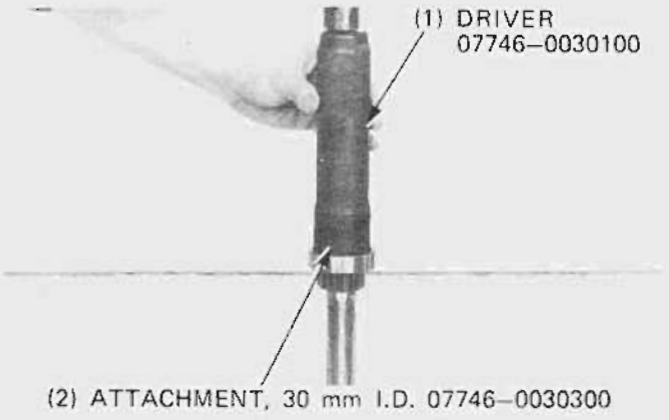
Apply a locking agent to the screw threads and install the bearing stopper plates.



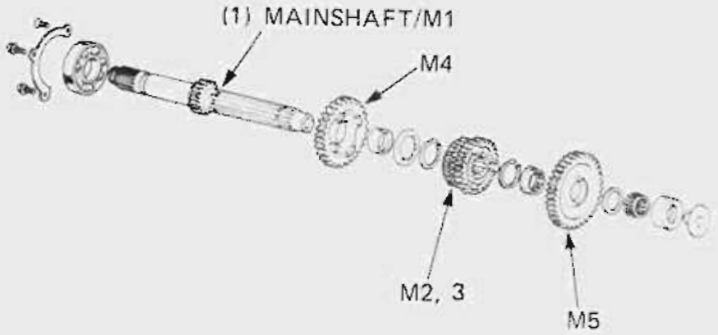
TRANSMISSION ASSEMBLY

MAINSHAFT

Check the mainshaft bearing and replace it if it is damaged or has excessive play.
Drive a new mainshaft bearing onto the mainshaft.
Assemble the mainshaft.

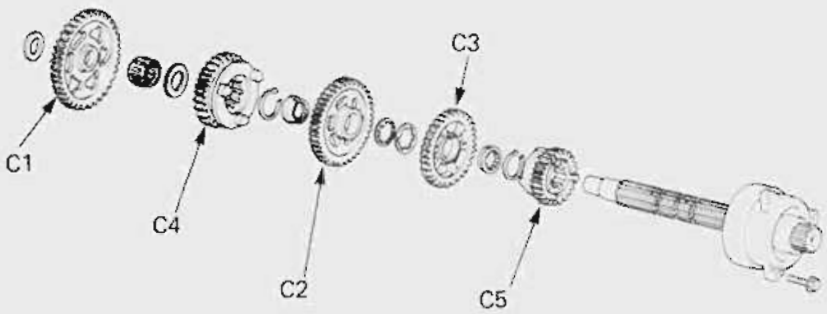


Check the gears for freedom of movement or rotation on the shaft.
Check that the snap rings are seated in the grooves.



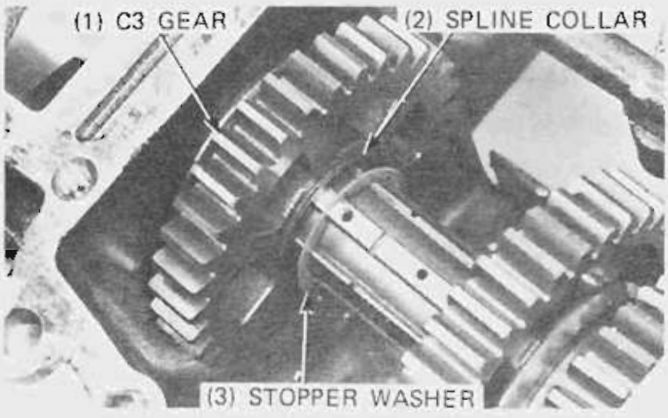
COUNTERSHAFT

Before installing the countershaft in the crankcase, install the C5 gear and snap ring.



Install the countershaft into the lower crankcase and install the C3 gear bushing, C3 gear, spline collar, stopper washer, C2 gear, C2 gear bushing, snap ring and C4 gear onto the countershaft.

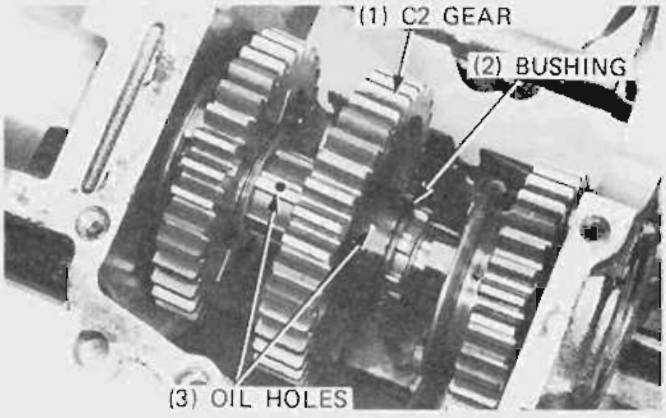
Set the spline collar into the groove in the mainshaft and install the stopper washer while aligning the tabs with the grooves in the spline collar.



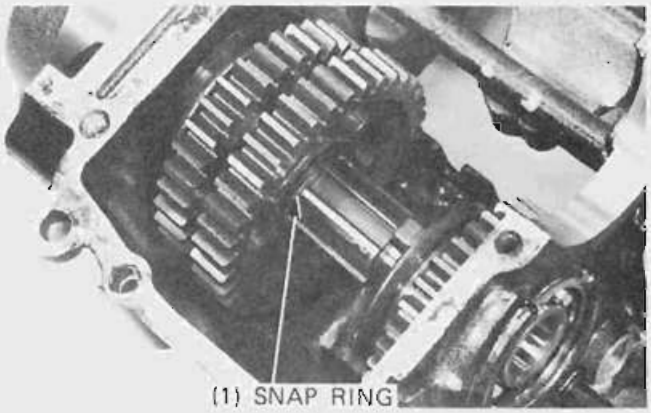
Position the C2 gear and bushing.

NOTE

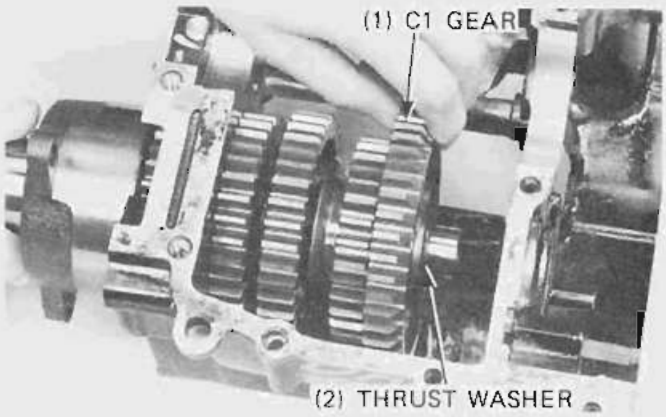
- Align the oil hole in the splined bushing with the oil hole in the countershaft.



Secure the C2 gear with the snap ring.



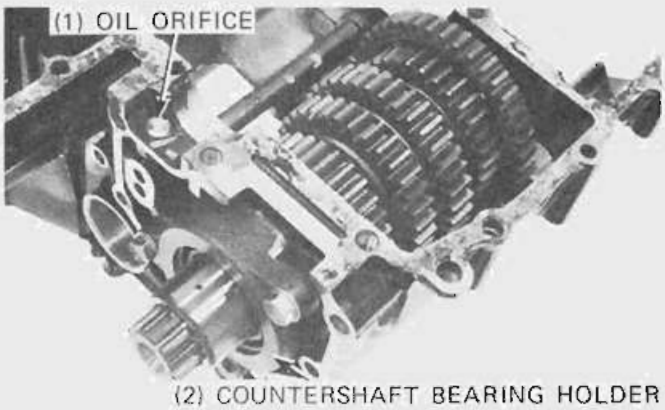
Install the thrust washer, needle bearing, C1 gear and thrust washer onto the countershaft.



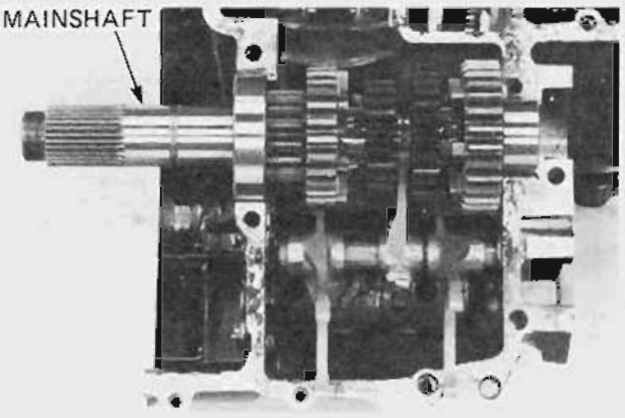
Install the countershaft bearing holder bolts and tighten them.

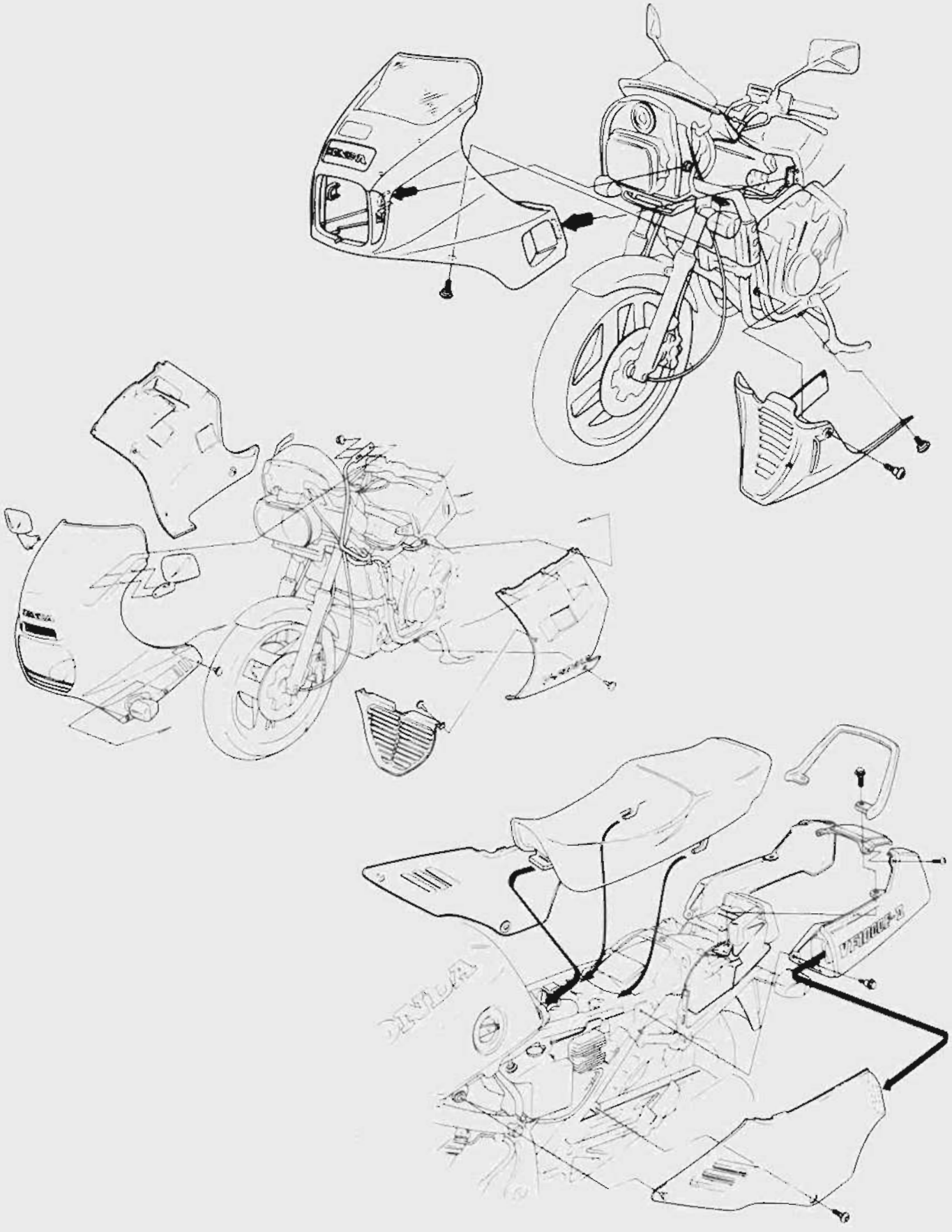
TORQUE: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)

Check that the oil orifice is clear.



Install the mainshaft, then reassemble the upper and lower crankcase (see Section 11).





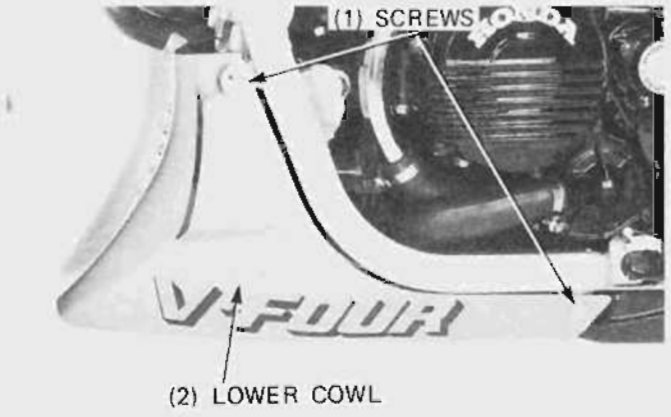
14 FAIRING

LOWER COWL	14-1	SEAT COWL	14-2
FAIRING	14-1	REAR FENDER	14-3

LOWER COWL

VF1000F MODEL

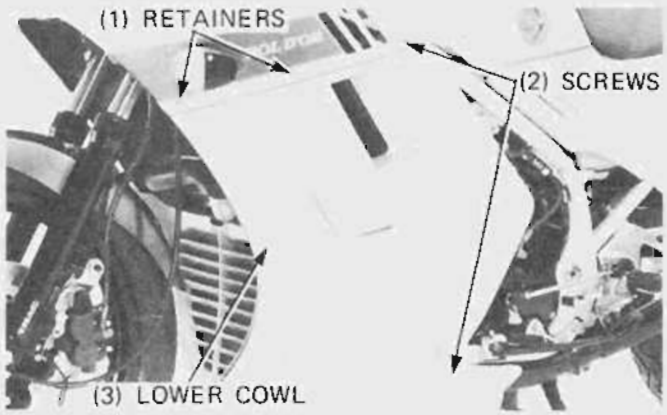
Remove the four attaching screws and the lower cowl.
Install the lower cowl in the reverse order of removal.



VF1000F-II MODEL

Remove the four attaching screws and release the four retainer by turning them counterclockwise.
Move the front wheel fully to right or left, and remove the lower cowl being careful not to damage it.

Install the lower cowl in the reverse order of removal.



FAIRING

VF1000F MODEL

Remove the two attaching screws.
Pull the fairing forward and release the retaining tabs from the fuel tank, lower the fairing lightly and remove it by pulling it forward.

Install the fairing in the reverse order of removal.

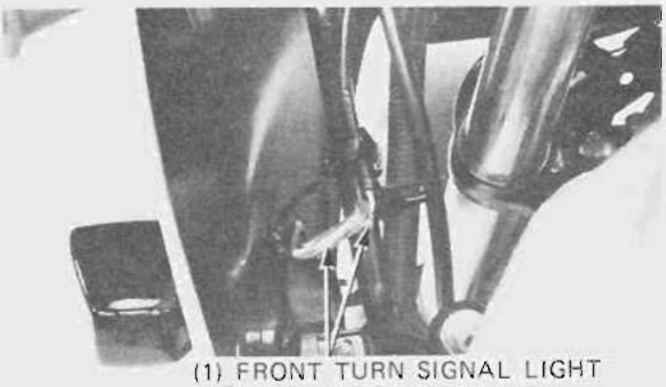


VF1000F-11 MODEL

Remove the lower cowl.

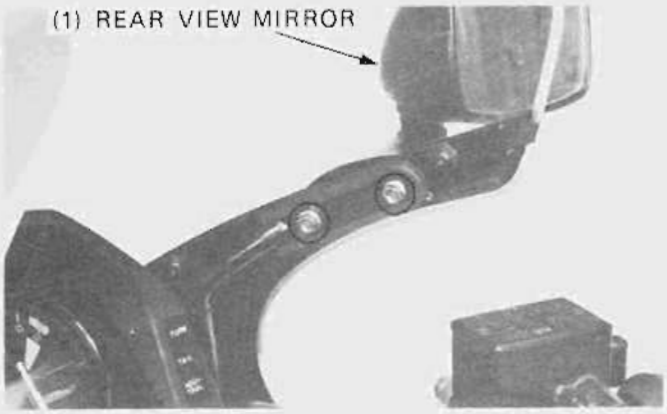
Remove the fuel tank side covers.

Disconnect the left and right front turn signal light wire connectors.


(1) FRONT TURN SIGNAL LIGHT WIRE CONNECTORS

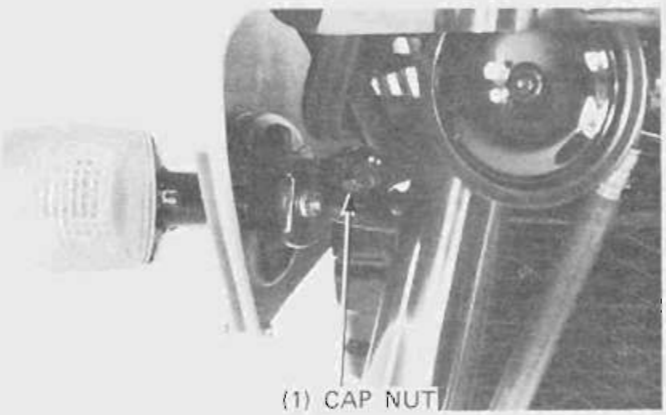
Remove the fairing inner covers.

Remove the left and right rear view mirrors.


(1) REAR VIEW MIRROR

Remove the two cap nuts and the fairing.

Install the fairing in the reverse order of removal.


(1) CAP NUT

SEAT COWL

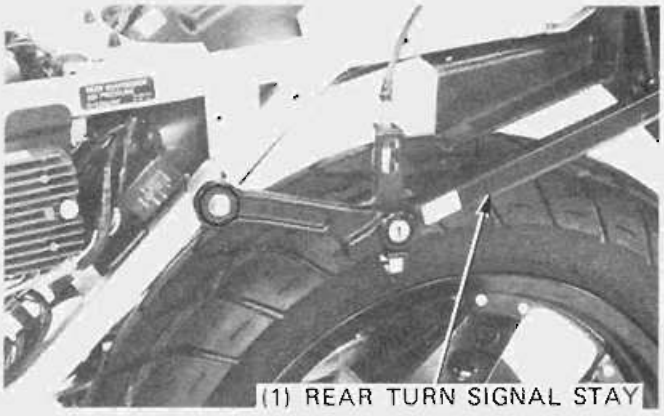
Remove the seat, left and right frame side covers.
Remove the two bolts and the rear grip.
Remove the two bolts and the seat cowl.

Install the seat cowl in the reverse order of removal.



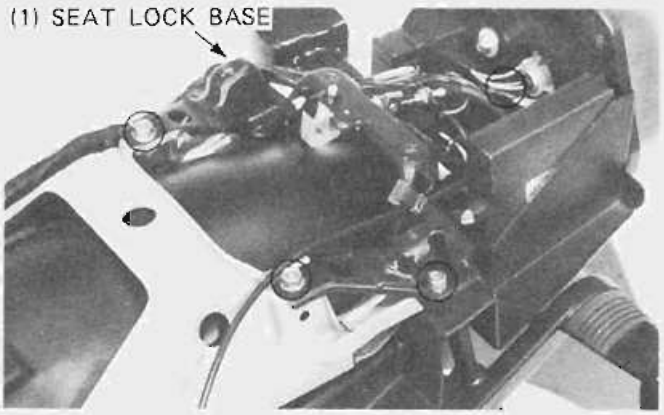
REAR FENDER

Remove the seat cowl.
Remove the bolts attaching the rear turn signal light stays to the frame.



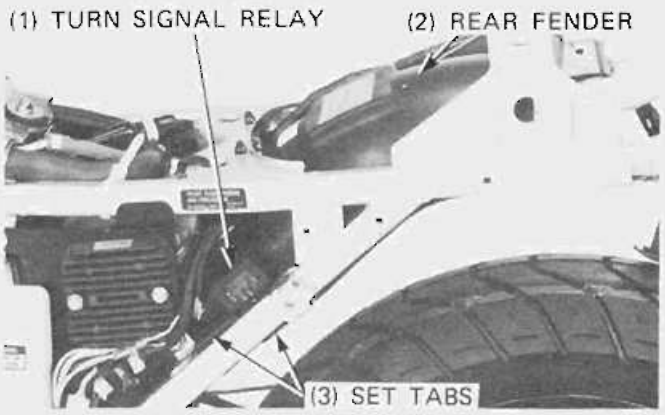
Remove the rear compartment under cover by removing the two bolts.

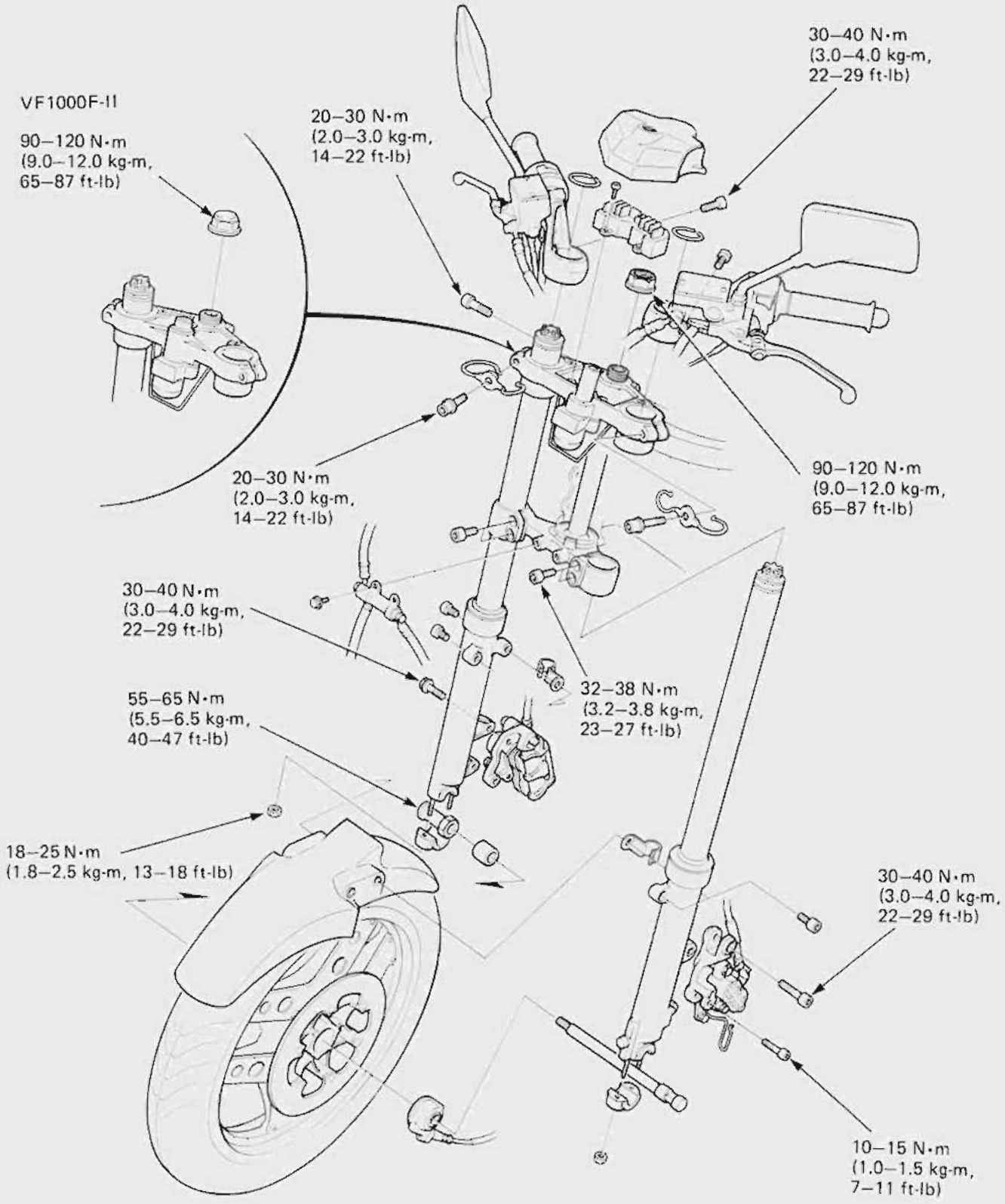
Remove the rear turn signal stays and seat lock base by removing the two socket bolts and three 8 mm bolts.



Remove the starter relay switch from the right side of the rear fender.
Remove the turn signal relay from the left side of the rear fender.
Release the rear fender set tabs from the frame and remove the rear fender.

Install the rear fender in the reverse order of removal.




VF1000F-II
90–120 N·m
(9.0–12.0 kg-m,
65–87 ft-lb)
20–30 N·m
(2.0–3.0 kg-m,
14–22 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
20–30 N·m
(2.0–3.0 kg-m,
14–22 ft-lb)
90–120 N·m
(9.0–12.0 kg-m,
65–87 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
32–38 N·m
(3.2–3.8 kg-m,
23–27 ft-lb)
55–65 N·m
(5.5–6.5 kg-m,
40–47 ft-lb)
18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
10–15 N·m
(1.0–1.5 kg-m,
7–11 ft-lb)

15 FRONT WHEEL/SUSPENSION

SERVICE INFORMATION	15-1	FRONT WHEEL	15-6
TROUBLESHOOTING	15-2	FRONT FORKS	15-13
HANDLEBARS	15-3	STEERING STEM	15-23

SERVICE INFORMATION

GENERAL

- A jack or other support is required to support the front of the motorcycle when you are working on the front wheel or fork.
- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the TUBELESS TIRE MANUAL.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle shaft runout		–	0.2 mm (0.01 in)
Front wheel rim runout	Radial	–	2.0 mm (0.08 in)
	Axial	–	2.0 mm (0.08 in)
Fork spring free length		377.3 mm (14.85 in)	370 mm (14.6 in)
Fork tube runout		–	0.2 mm (0.01 in)
Front fork fluid capacity	Right	455 cc (15.4 US oz, 16.0 Imp oz)	–
	Left	475 cc (16.1 US oz, 16.7 Imp oz)	–
Front fork air pressure		0–40 kPa (0–0.4 kg/cm^2, 0–6 psi)	–
Steering head bearing preload		1.0–1.6 kg (2.21–3.53 lb)	–

TORQUE VALUES

Steering stem nut	90–120 N·m (9.0–12.0 kg·m, 65–87 ft·lb)
Steering bearing adjustment nut	23–27 N·m (2.3–2.7 kg·m, 17–20 ft·lb)
Top bridge pinch bolt	20–30 N·m (2.0–3.0 kg·m, 14–22 ft·lb)
Front axle holder	18–25 N·m (1.8–2.5 kg·m, 13–18 ft·lb)
Front axle nut	55–65 N·m (5.5–6.5 kg·m, 40–47 ft·lb)
Fork top pinch bolts	20–30 N·m (2.0–3.0 kg·m, 14–22 ft·lb)
Fork bottom pinch bolts	32–38 N·m (3.2–3.8 kg·m, 23–27 ft·lb)
Handlebar pinch bolts	30–40 N·m (3.0–4.0 kg·m, 22–29 ft·lb)
Front brake caliper bracket mount bolts	30–40 N·m (3.0–4.0 kg·m, 22–29 ft·lb)
Anti-dive piston pin bolt	10–15 N·m (1.0–1.5 kg·m, 7–11 ft·lb)
Front brake disc	35–40 N·m (3.5–4.0 kg·m, 25–29 ft·lb)
Front fork cap	15–30 N·m (1.5–3.0 kg·m, 11–22 ft·lb)
Front fork socket bolt	15–25 N·m (1.5–2.5 kg·m, 11–18 ft·lb)
Anti-dive case socket bolts	6–9 N·m (0.6–0.9 kg·m, 4–7 ft·lb)

TOOLS

Special

Snap ring pliers	07914–3230001
Fork seal driver	07947–KA50100
Fork seal driver attachment	07947–KF00100
Steering stem socket	07916–3710100
Bearing race remover	07946–3710500
Ball 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
Extension	07716–0020500
Attachment, 52 x 55 mm	07746–0010400
Bearing remover shaft	07746–0050100
Bearing remover head, 15 mm	07746–0050400

TROUBLESHOOTING

Hard steering
- Steering bearing adjustment nut too tight
- Faulty steering stem bearings
- Damaged steering stem bearings
- Insufficient tire pressure

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

Front wheel wobbling
- Bent rim
- Worn front wheel bearings
- Faulty tire
- Axle nut tightened improperly

Soft suspension
- Weak fork springs
- Insufficient fluid in forks
- Fork air pressure incorrect

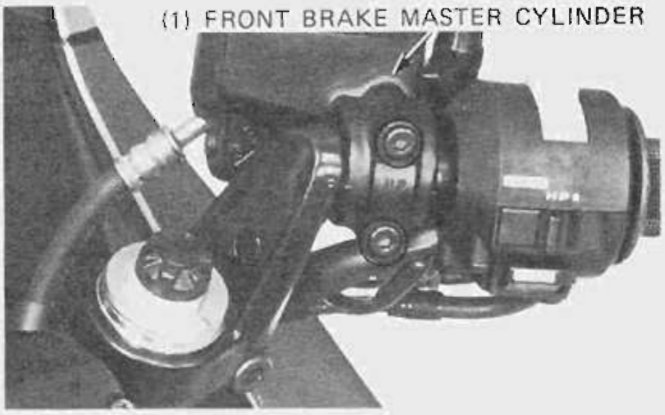
Hard suspension
- Incorrect fluid weight in forks
- Fork air pressure incorrect
- Bent fork tubes
- Clogged fluid passage
- Clogged anti-dive orifice

Front suspension noise
- Worn slider or guide bushings
- Insufficient fluid in forks
- Loose front fork fasteners
- Lack of grease in speedometer gearbox

HANDLEBARS

RIGHT HANDLEBAR REMOVAL

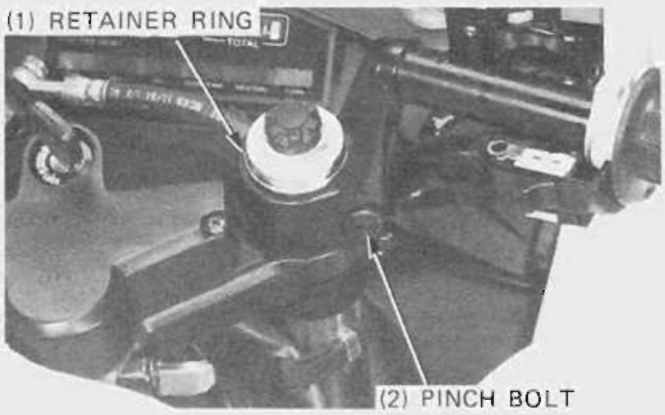
Disconnect the front brake switch wires from the switch.
Remove the front brake master cylinder.



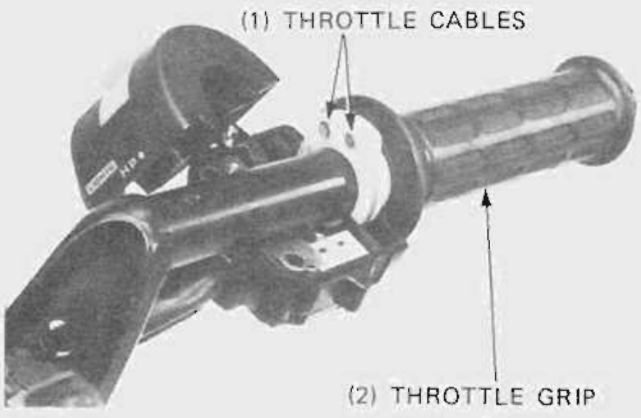
Remove the right handlebar switch housing screws.



Remove the handlebar retainer ring.
Loosen the handlebar pinch bolt and remove the right handlebar from the fork tube.

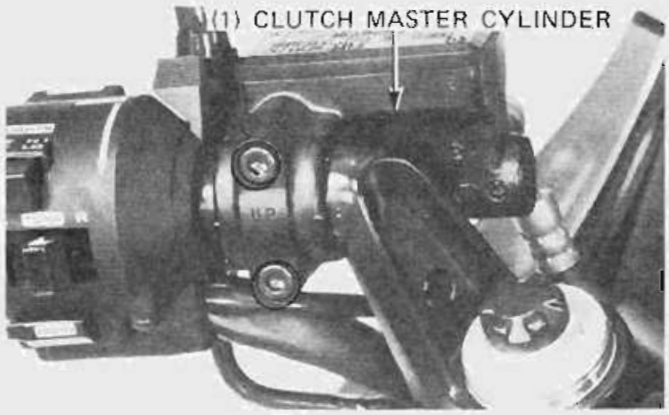


Remove the throttle grip and switch housing from the handlebar and disconnect the throttle cables from the grip flange.

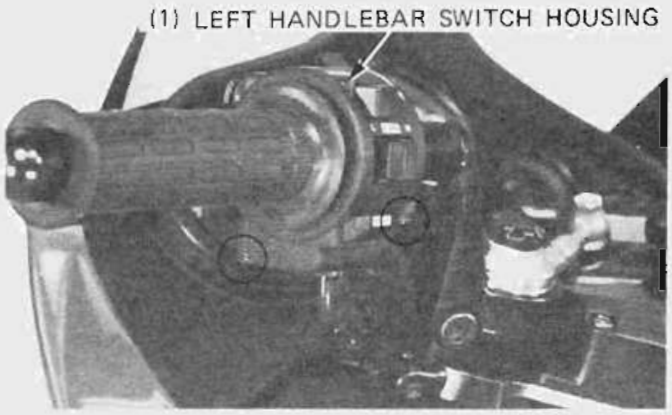


LEFT HANDLEBAR REMOVAL

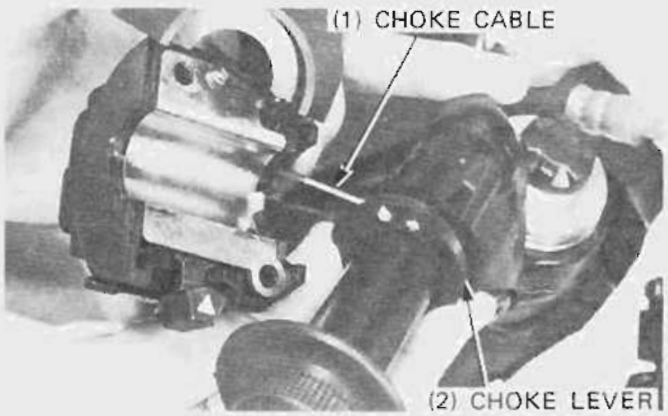
Disconnect the clutch switch wires from the switch.
Remove the clutch master cylinder.



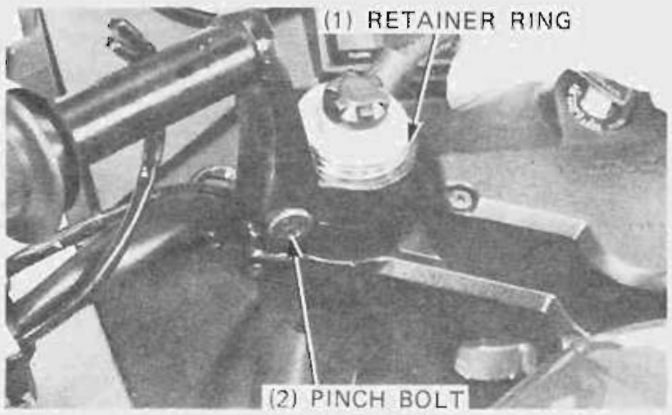
Remove the left handlebar switch housing screws.



Disconnect the choke cable from the choke lever and remove the left handlebar switch housing.



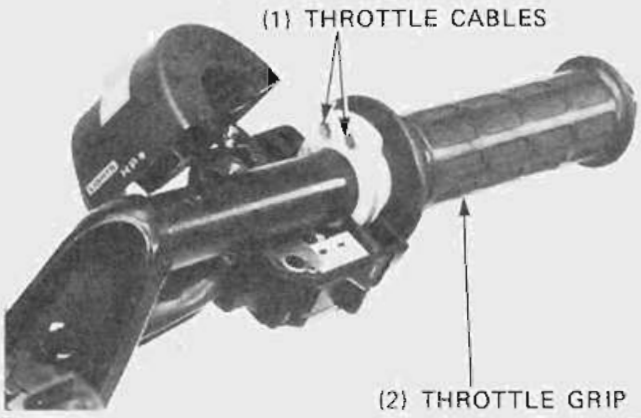
Remove the handlebar retainer ring.
Loosen the handlebar pinch bolt and remove the left handlebar from the fork tube.



RIGHT HANDLEBAR INSTALLATION

Clean the throttle grip sliding surface of the right handlebar.

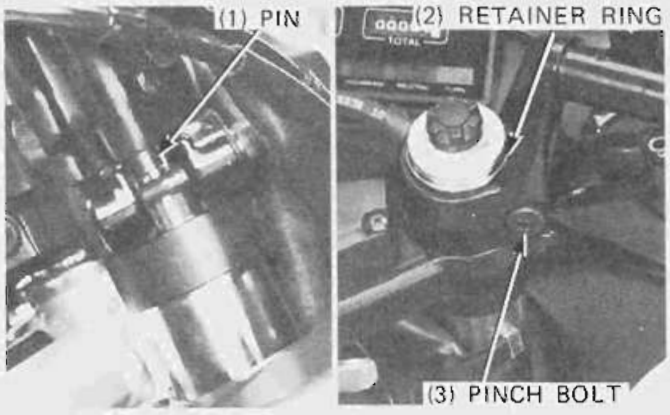
Connect the throttle cables to the throttle grip flange and install the throttle grip onto the right headlebar.



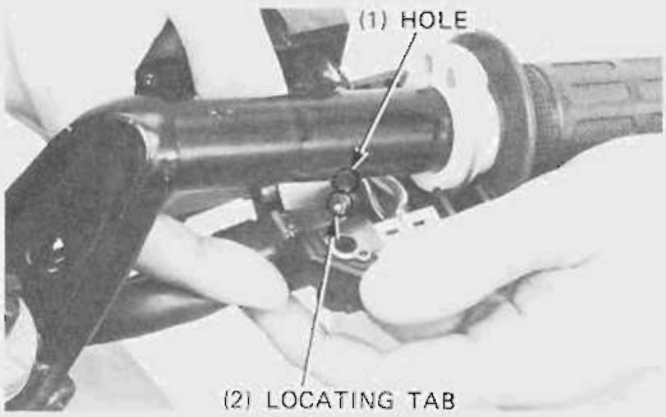
Install the handlebar onto the fork tube and on the fork top bridge, aligning the pin on the bottom of the handlebar with the slit of the top bridge.
Contact the pin with the rear side of the slit and tighten the pinch bolt.

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

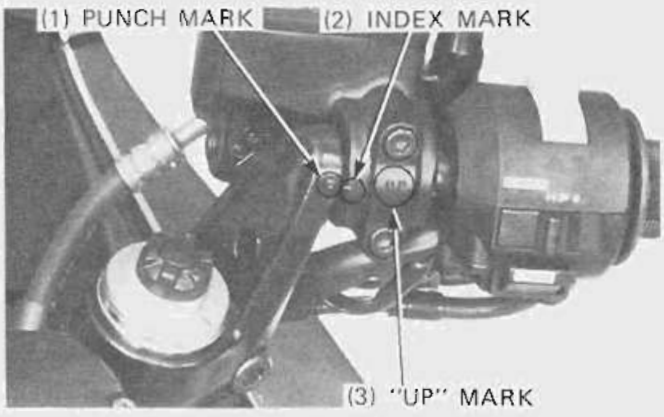
Install the handlebar retainer ring.



Align the locating tab of the handlebar switch housing with the hole in the handlebar and install the housing with the screws.
Tighten the forward screw first, then tighten the rear screw.



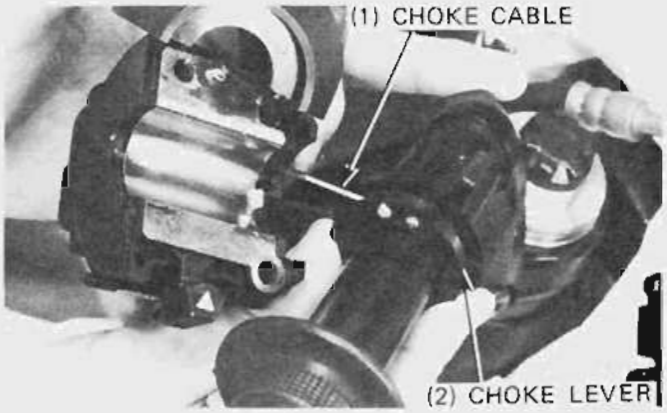
Place the front brake master cylinder on the handlebar and install the holder with the "UP" mark facing up.
Align the index mark on the holder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.



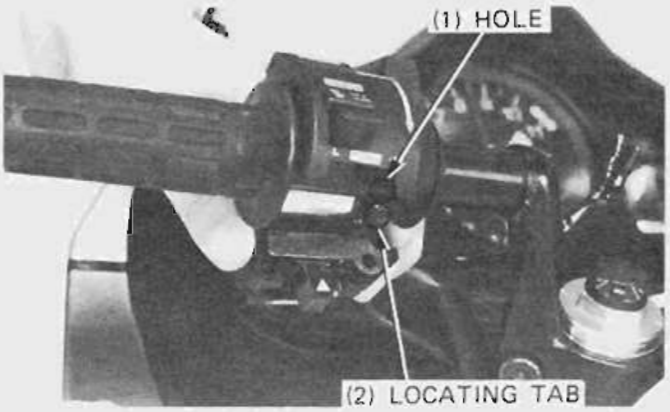
LEFT HANDLEBAR INSTALLATION

Install the left handlebar onto the fork tube and on the top bridge in the same manner as right handlebar (page 15-5).

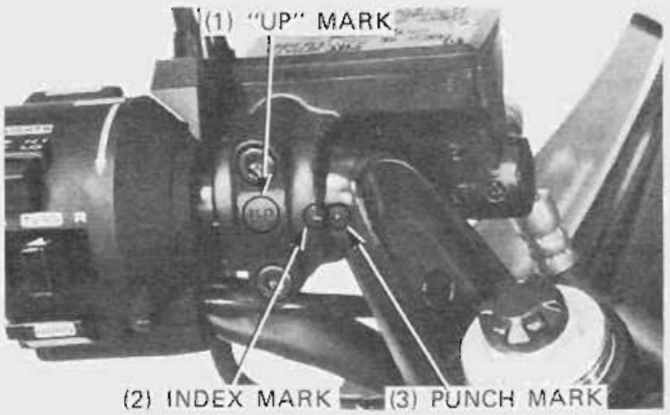
Connect the choke cable to the choke lever.



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



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



FRONT WHEEL

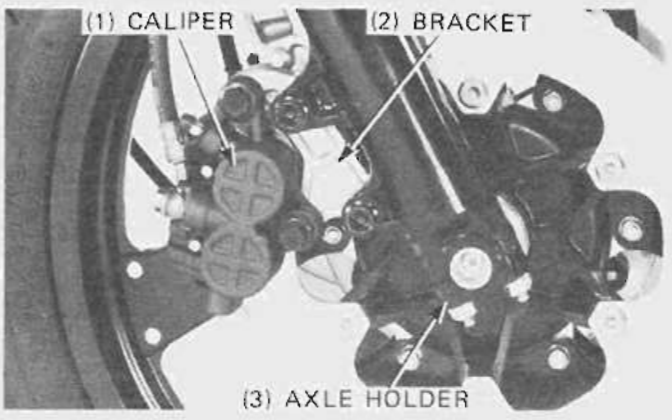
REMOVAL

Remove the right front brake caliper with its bracket from the fork leg.

NOTE

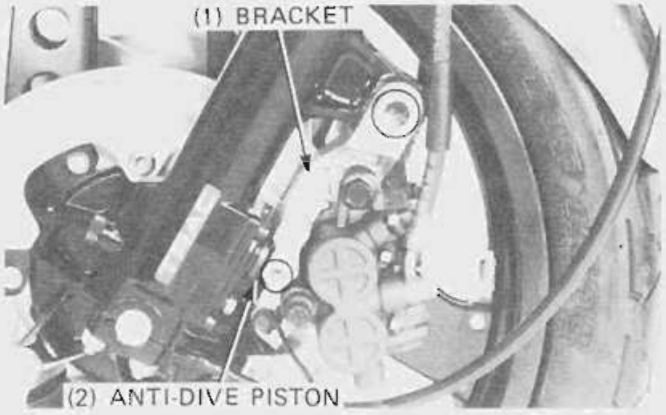
- Do not operate the front brake lever after removing the caliper. It causes the caliper pistons to move out and make reassembly difficult.

Remove the right axle holder.



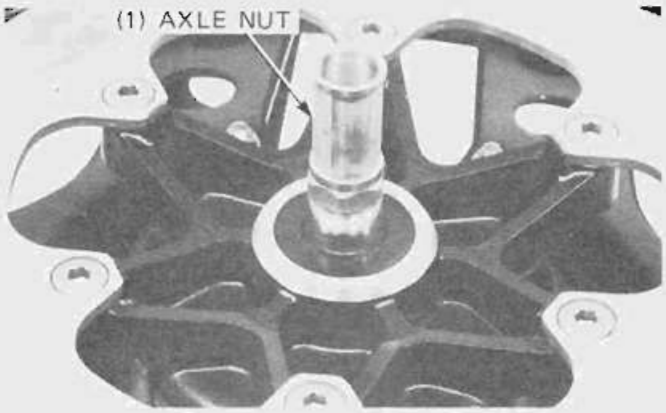
Remove the speedometer cable set screw and disconnect the speedometer cable.
Remove the left front brake caliper with its bracket from the fork leg and anti-dive piston.
Remove the left axle holder.

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

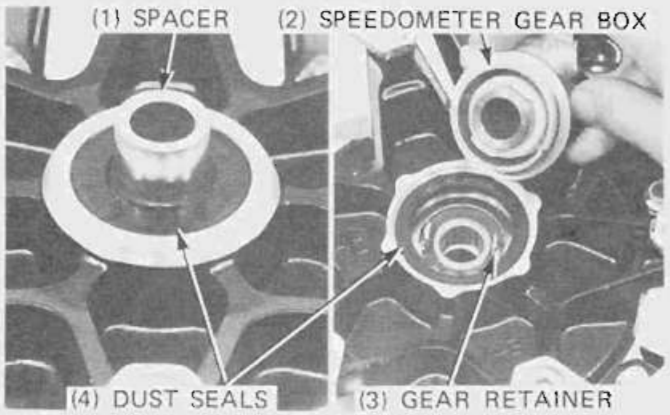


DISASSEMBLY

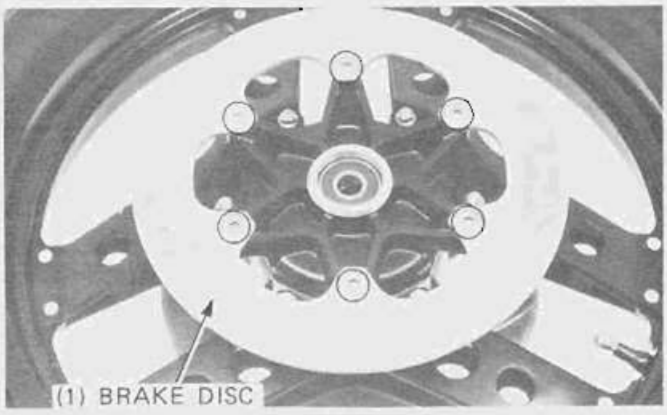
Remove the front axle nut and axle.



Remove the spacer and dust seal from the right side.
Remove the speedometer gear box, dust seal and speedometer gear retainer from the left side.

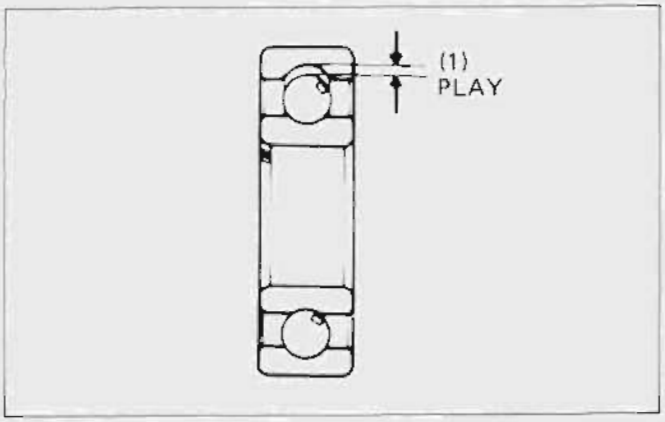


Remove the left and right brake discs.



WHEEL BEARING INSPECTION

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



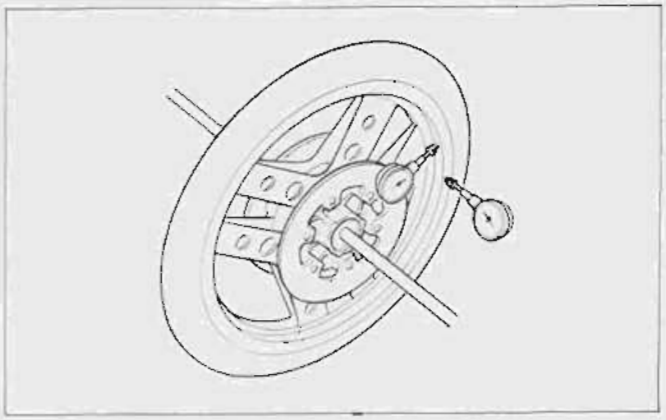
WHEEL INSPECTION

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

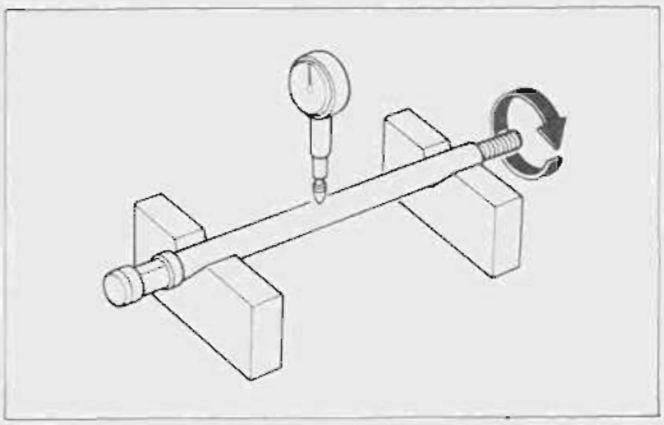
- The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



AXLE INSPECTION

Set the axle in V blocks and measure the runout.

SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL BEARING REMOVAL

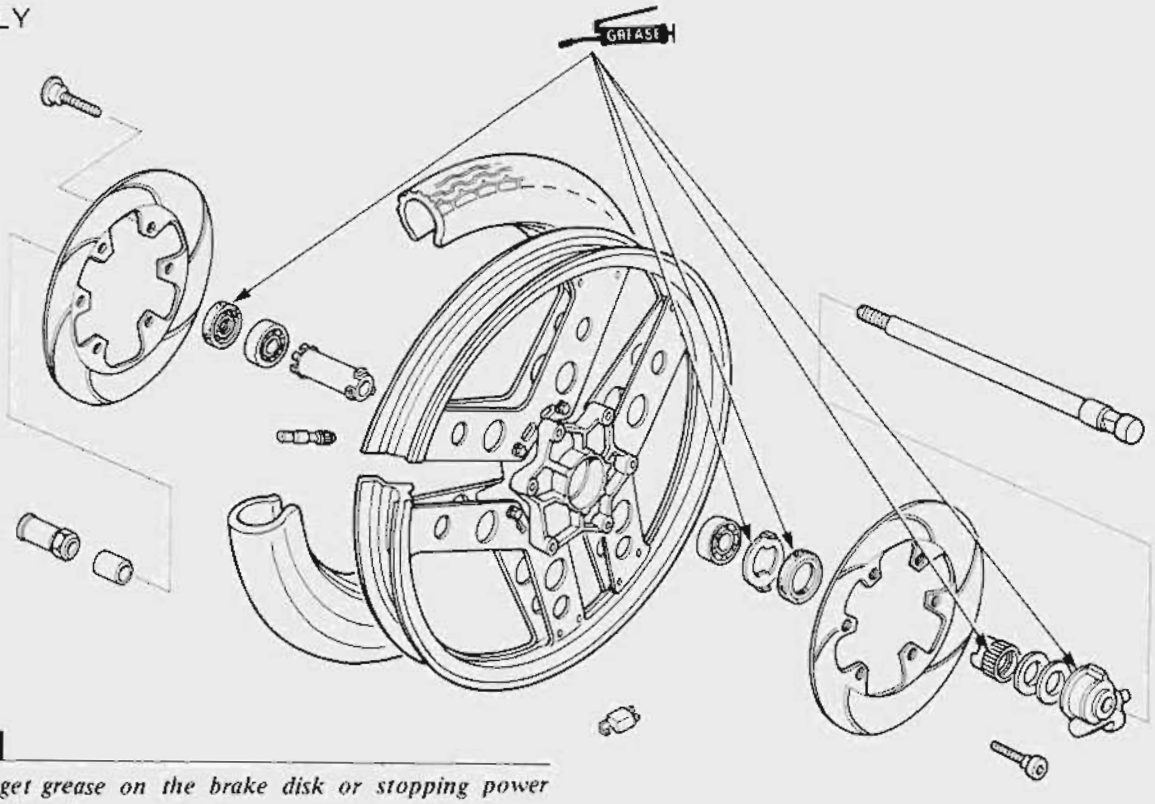
If the bearing need replacement, remove the bearings and distance collar.

NOTE

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



ASSEMBLY



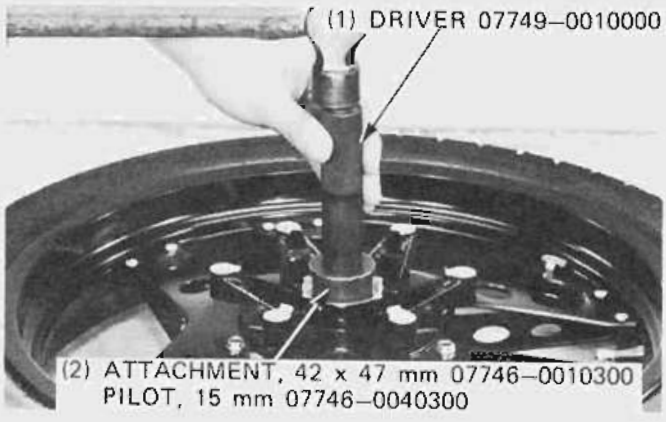
WARNING

- *Do not get grease on the brake disk or stopping power will be reduced.*

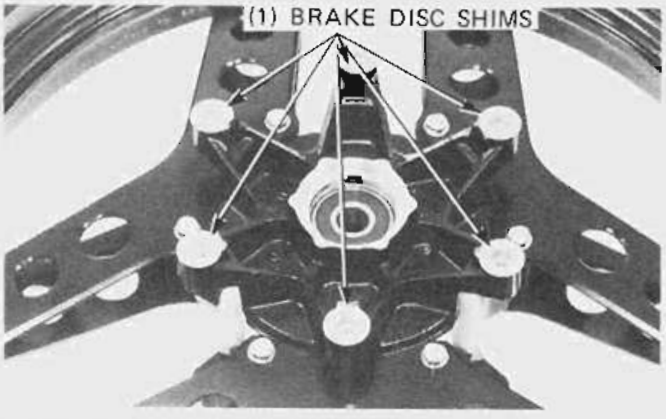
NOTE

- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the Honda Tubeless Tire Manual.

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

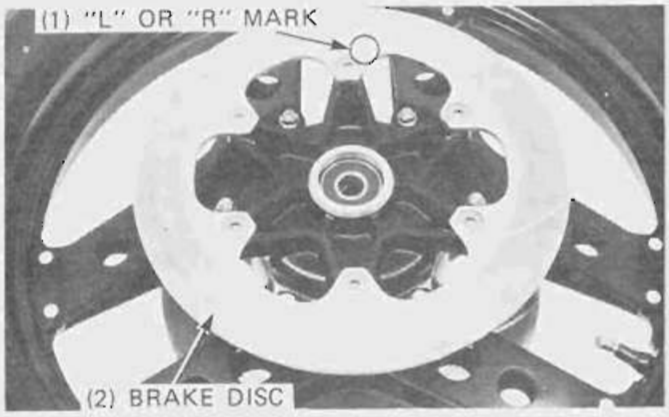


Install the brake disc shims on the disc mounting flange.

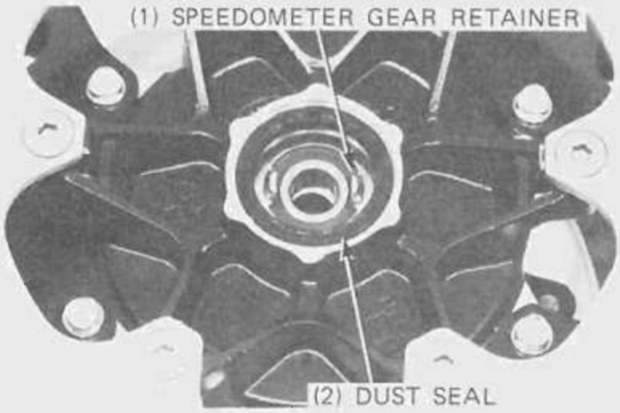


Install the brake disc with the "L" mark (left disc) or "R" mark (right disc) facing out, and tighten the mounting bolts.

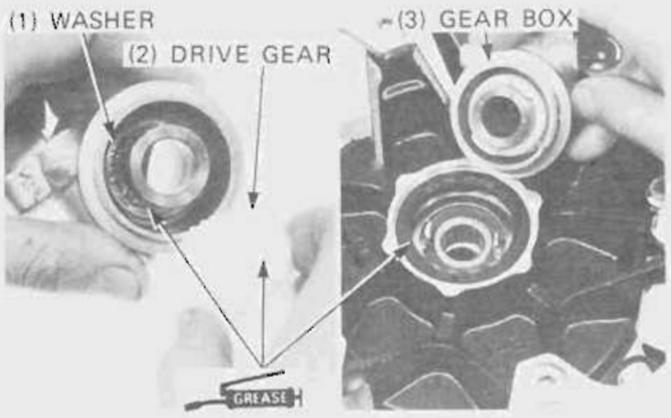
TORQUE: 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)



Install the speedometer gear retainer in the left side of the wheel hub, aligning its tangs with the slots in the hub.
Apply molybdenum disulfide grease to the dust seal lips and install the dust seal.

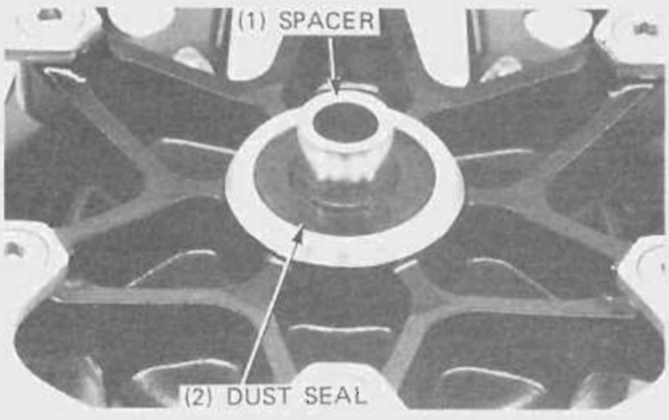


Fill the speedometer gear box with grease and install the plain washer and drive gear.
Install the speedometer gear box in the wheel hub, aligning the tangs with the slots.



Apply molybdenum disulfide grease to the dust seal lips and install the dust seal into the right side of the wheel hub.

Install the spacer.



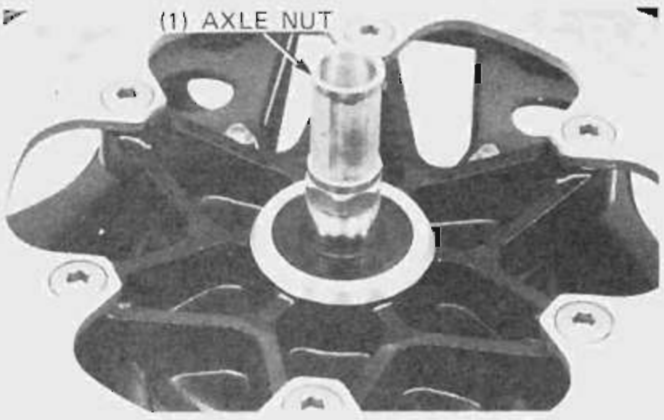
Install the front axle and axle nut. Tighten the axle nut.

TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–70 ft-lb)

NOTE

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

Clean the brake discs with a high quality degreasing agent.



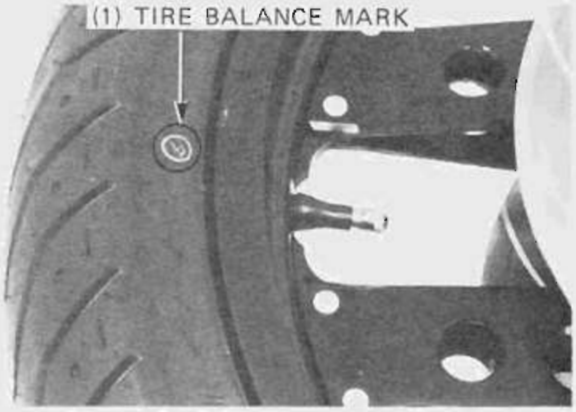
WHEEL BALANCE

CAUTION

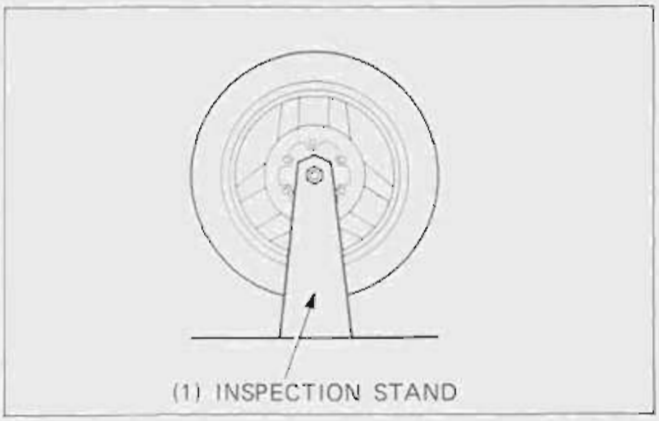
- *Wheel balance directly affects the stability, handling and overall safety of the motorcycle.*
- *Always check balance when the tire has been removed from the rim.*

NOTE

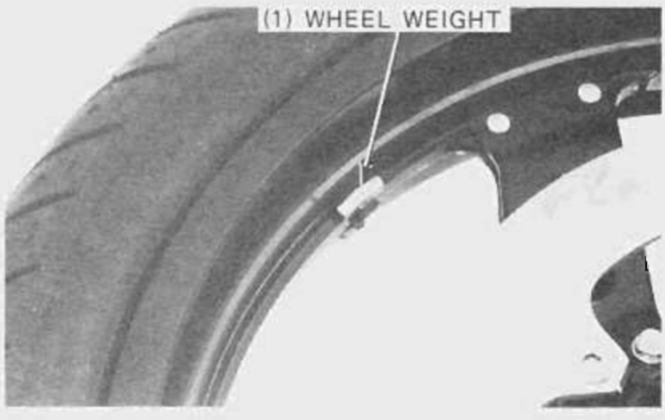
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to he valve stem. Remount the tire if necessary.



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



To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it's spun.
Do not add more than 60 grams to the front wheel.

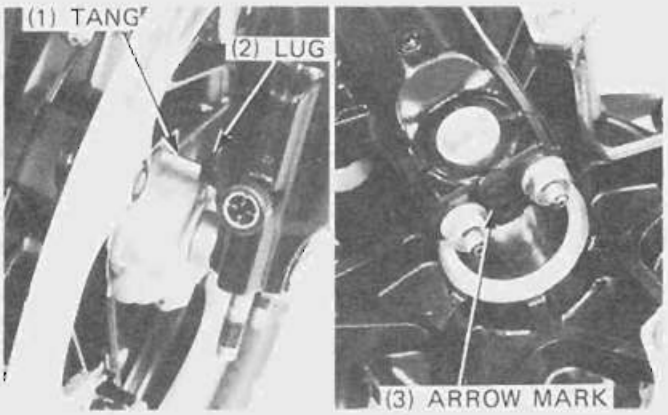


INSTALLATION

Position the wheel between he fork legs.
Lower the engine so the fork legs rest on the top of the axle.

Position the tang on the speedometer gear box against the lug on the left fork leg.

Install the axle holders with the arrow pointing forward.

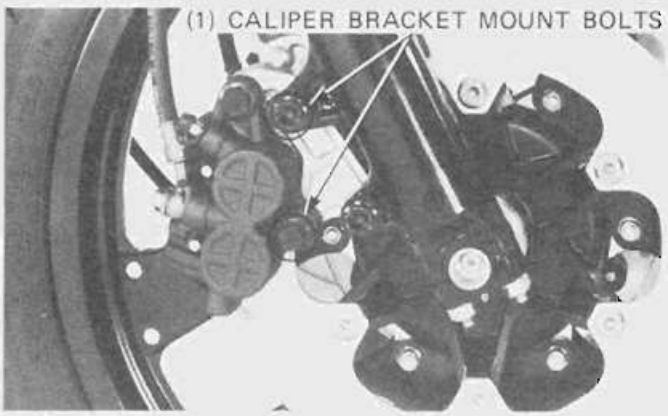


Install the right front caliper and tighten the bracket mount bolts.

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

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

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



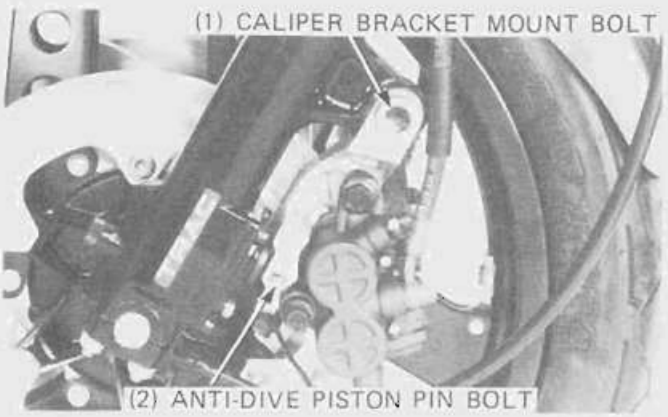
Install the left front caliper.
Tighten the anti-dive piston pin bolt.

TORQUE: 10–15 N·m (1.0–1.5 kg-m, 7–9 ft-lb)

Tighten the caliper bracket mount bolt.

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

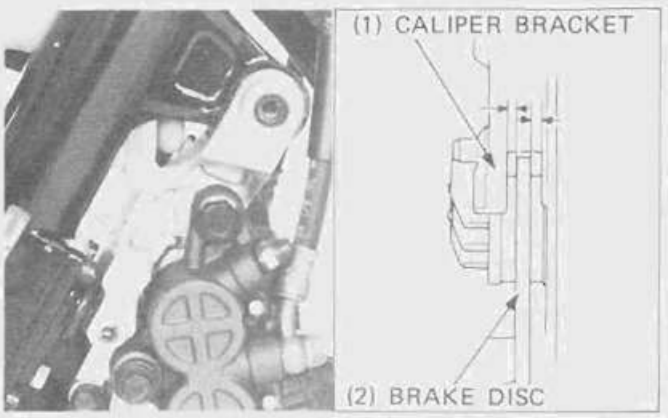
Connect the speedometer cable and secure it with the screw.



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

WARNING

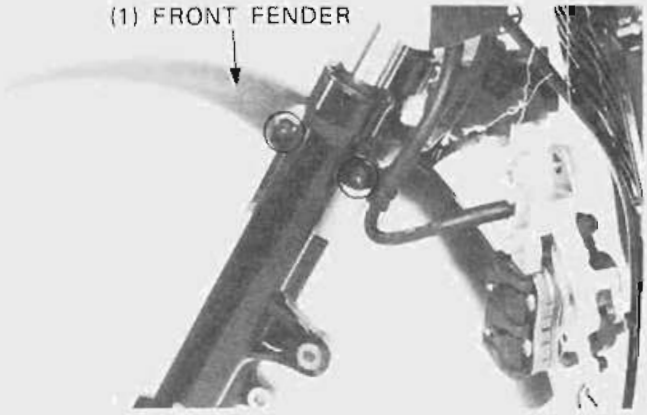
- *Failure to provide adequate disc to caliper holder clearance may damage the brake disc and impair brake efficiency.*



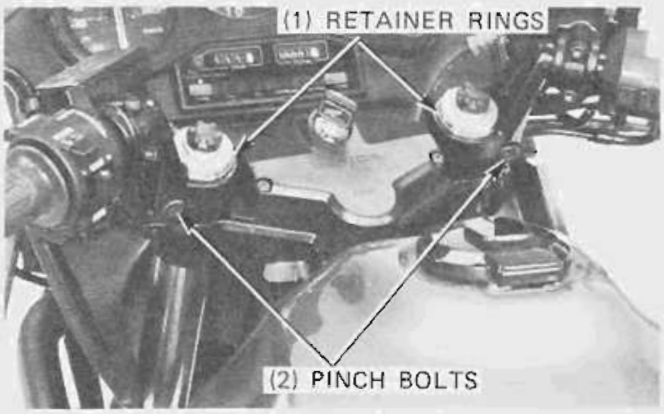
FRONT FORKS

REMOVAL

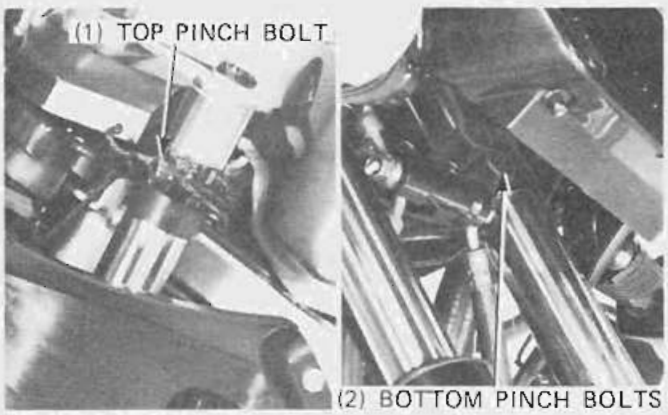
Remove the following:
- fairing (page 14-1)
- front wheel (page 15-6)
- front fender.



Loosen the handlebar pinch bolts, remove the retainer rings and remove the left and right handlebar from the fork tubes.



Loosen the fork top and bottom pinch bolts.



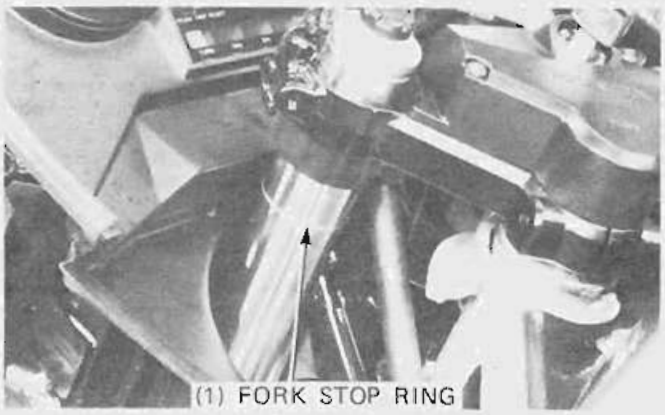
Pull each fork tube out of the top bridge.

NOTE

- Because of the friction caused by the air joint O-rings, you'll have to turn the tubes while pulling down.

Remove the fork stop rings.

Pull each fork tube out of the fork bottom bridge.



If replacement of the air joint is necessary, remove the fuse holder cover (VF1000F model only) and remove the two screws which attach the fork air joint to the fork top bridge.



DISASSEMBLY

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

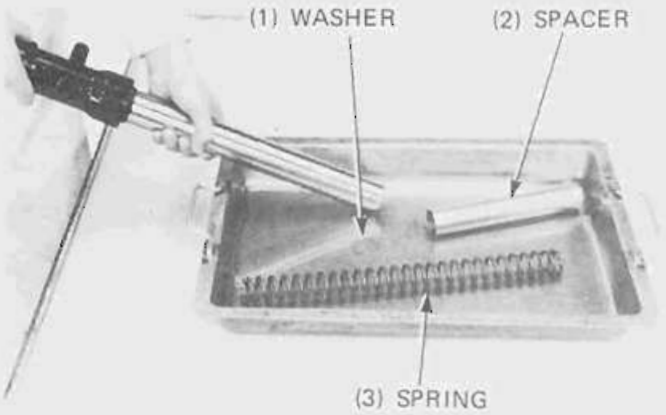
CAUTION

- *Do not damage the sliding surface.*



Remove the spacer, washer and fork spring.

Drain the fork fluid by pumping the fork up and down several times.



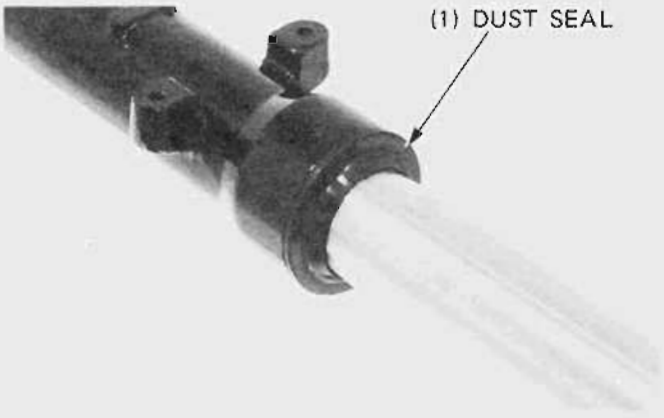
Hold the fork slider in a vise with soft jaws or a shop towel. Remove the socket bolt with a hex wrench.

NOTE

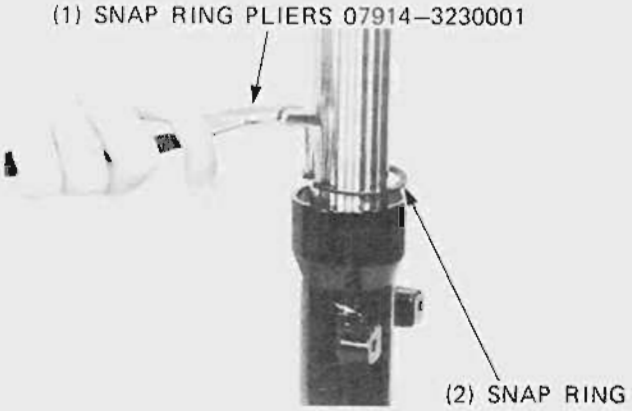
- Temporarily install the spring and fork cap if difficulty is encountered in removing the socket bolt.



Remove the dust seal.

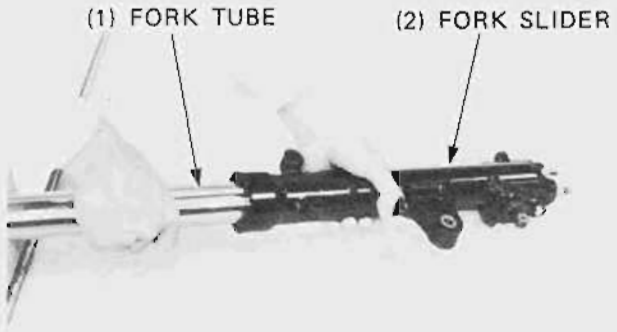


Remove the snap ring.



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

Remove the oil lock piece from inside the slider.

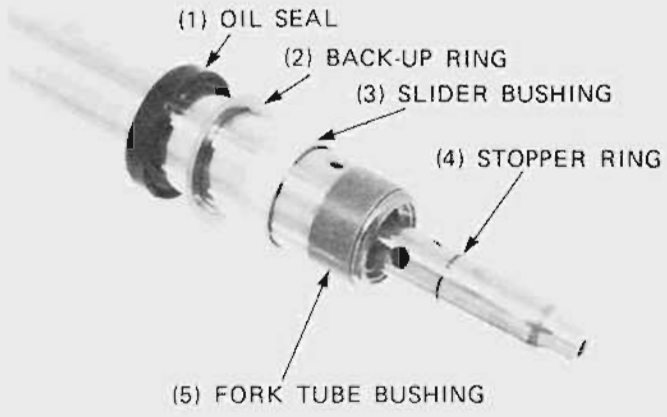


Remove the oil seal, back-up ring and slider bushing from the fork tube.

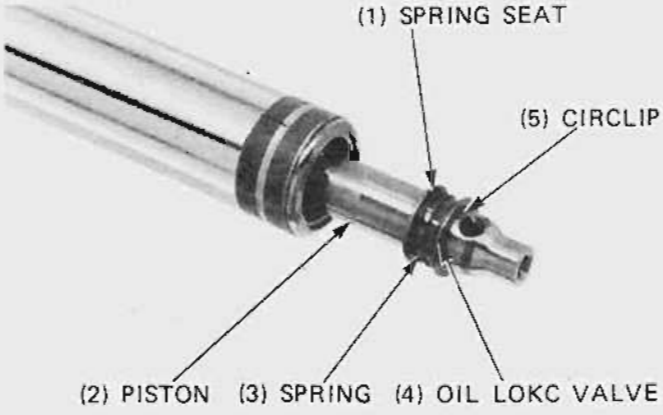
NOTE

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

On the right fork, remove the stopper ring and then remove the piston and rebound spring from the fork tube.



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.



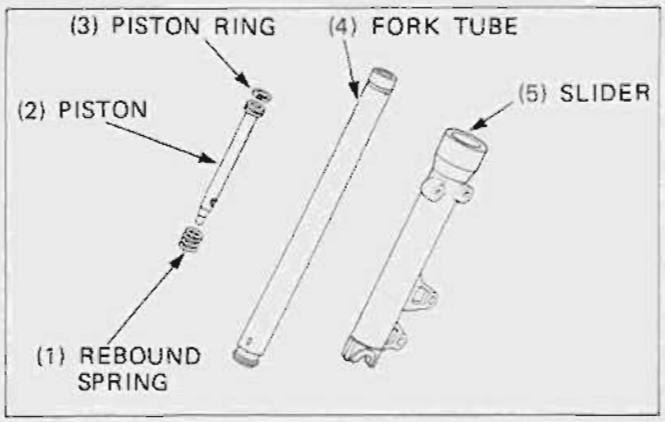
INSPECTION

Measure the fork spring free length.

SERVICE LIMIT: 370 mm (14.6 in)

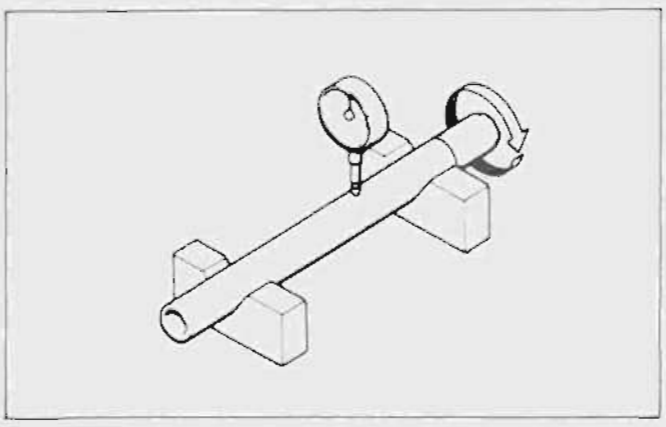


Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



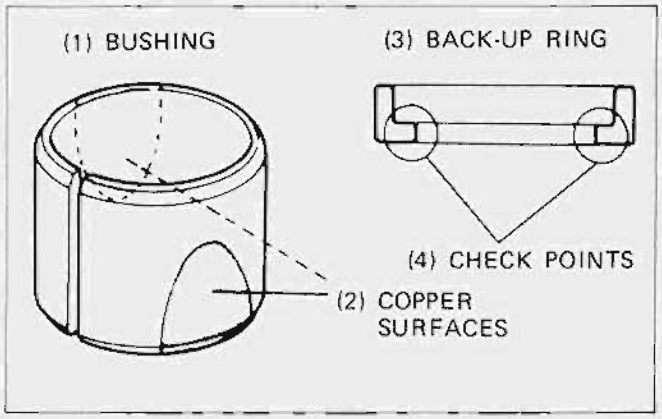
Set the fork tube in V blocks and check its runout.

SERVICE LIMIT: 0.20 mm (0.008 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.

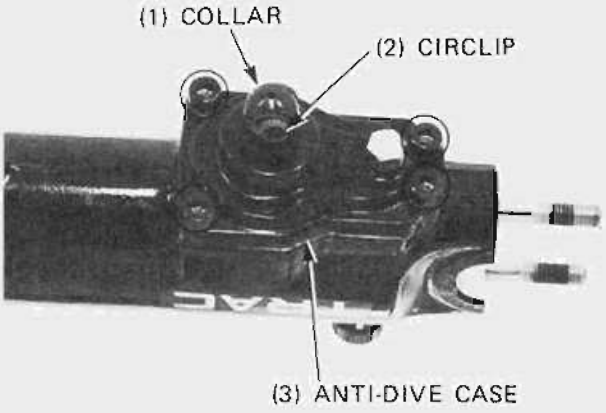
Check the back-up ring; replace it if there is any distortion at the points shown.



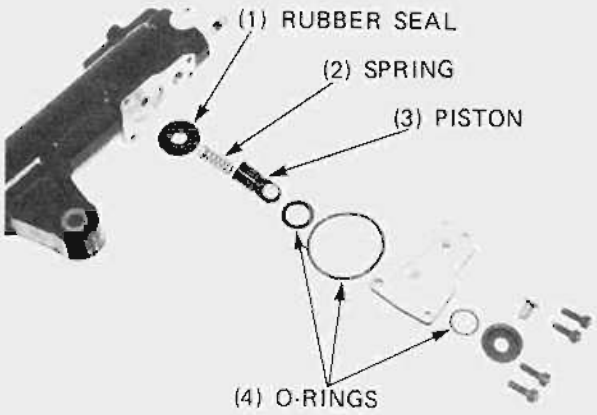
ANTI-DIVE CASE

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

Remove the circlip from the collar.
Remove the collar and boot from the anti-dive piston.

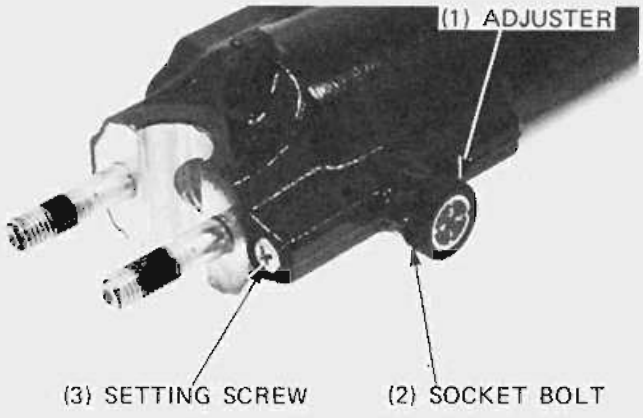


Remove the rubber seal, spring, piston and O-rings.



Remove the adjuster socket bolt and the adjuster.
Remove the detent ball setting screw, washer, spring and detent ball.

Remove the orifice from he fork slider.

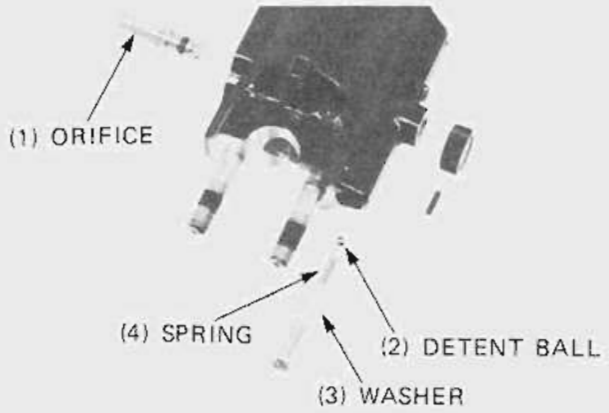


Check the orifice for clogging by applying compressed air. Also check the orifice for damage and replace if necessary.

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

NOTE

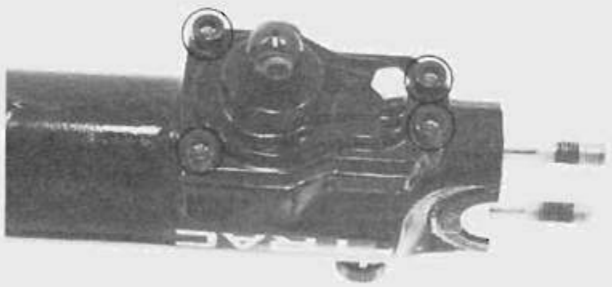
- Apply a thread Lock Agent to the threads of the screws and socket bolts before assembly.
- Apply ATF to the piston and piston O-ring.
- Apply silicone grease to the pivot bolt collar.



Tighten the anti-dive case socket bolts.

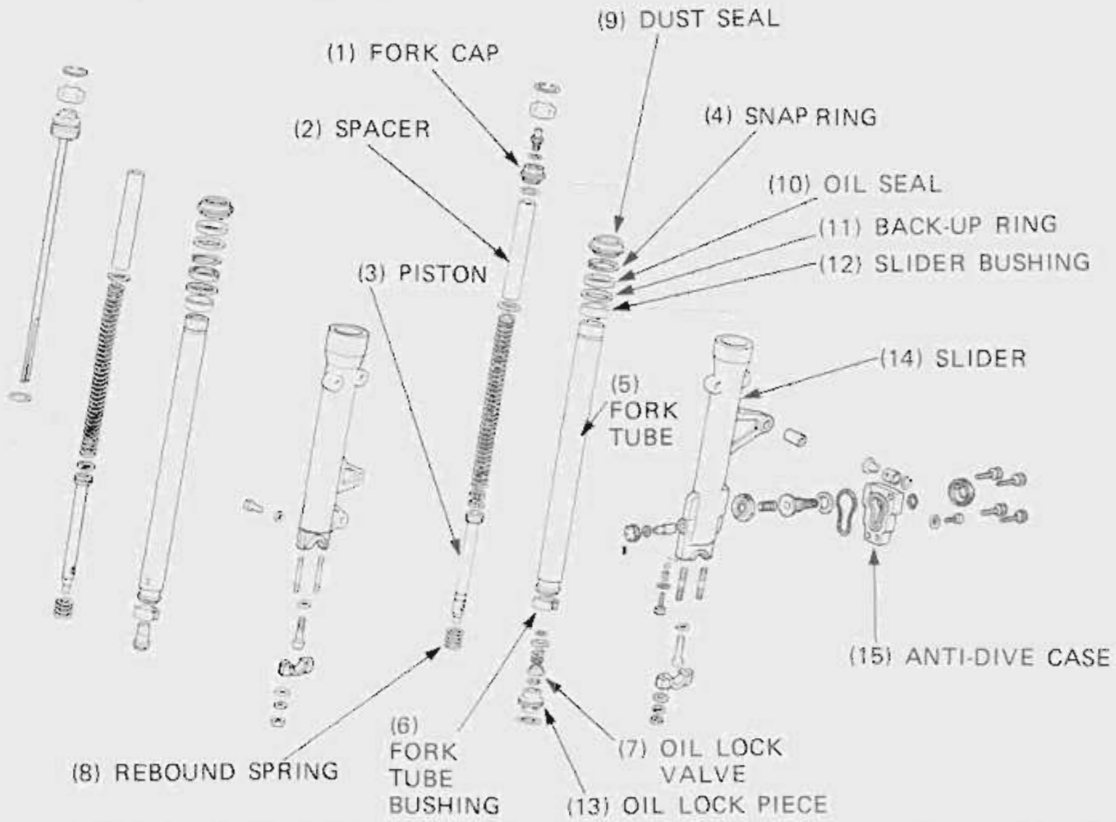
TORQUE: 6–9 N·m (0.6–0.9 kg-m, 4–7 ft-lb)

Check the operation of the collar and piston.

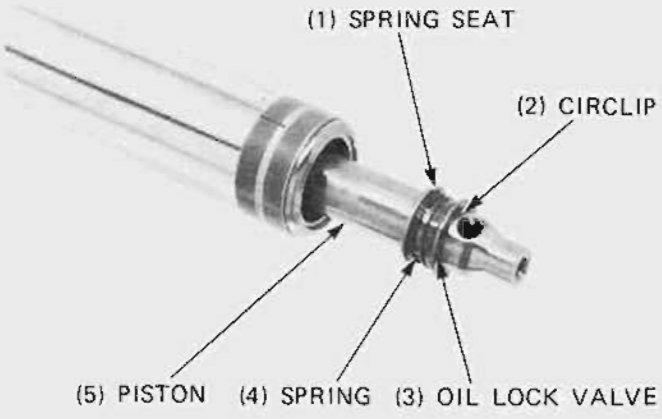


ASSEMBLY

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



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.



On the right fork, install the stopper ring onto the piston.
Place the oil lock piece on the end of the piston.



Insert the fork tube into the slider.

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

NOTE

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

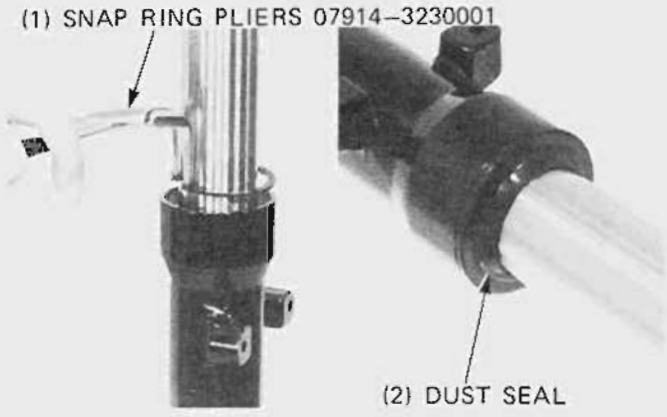
TORQUE: 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)



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 drive 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.

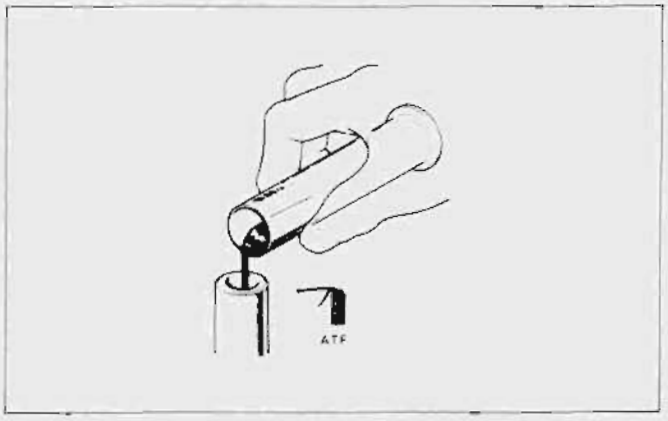


Install the snap ring with its radiused edge facing down and install the dust seal.



Pour the specified amount of ATF into the fork tube.

CAPACITY.
Right fork: 455 cc (15.4 US oz, 16.0 Imp oz)
Left fork: 475 cc (16.1 US oz, 16.7 Imp oz)



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

NOTE

- Note the spring direction; the small coil end must face toward the bottom.

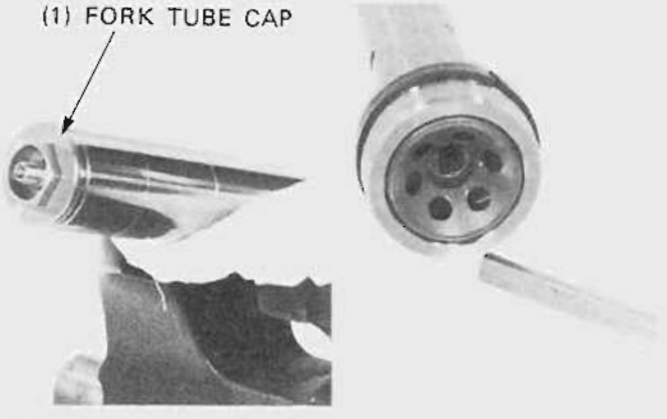


Install and torque the fork tube cap.

NOTE

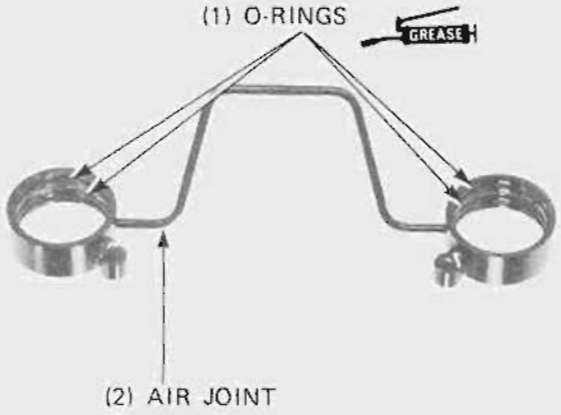
- On the right fork, align the cavity on the damping adjuster rod with the flat side in the piston.

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



INSTALLATION

Make sure the air joint O-rings are in good condition and apply grease to them.



Install the air joint onto the fork top bridge and tighten the two screws.

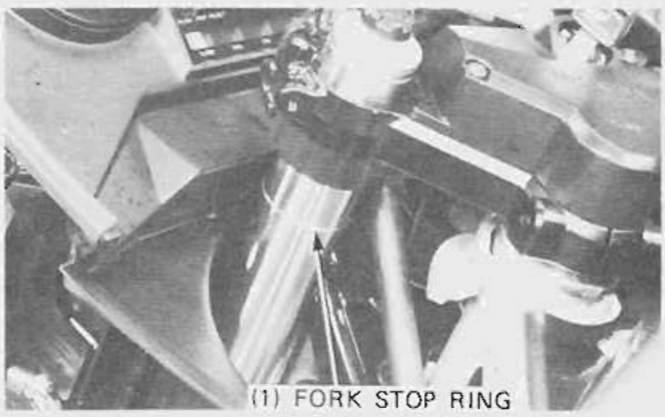
Install the fuse holder cover (VF1000F model only).



Install the forks and temporarily tighten the bottom pinch bolts.

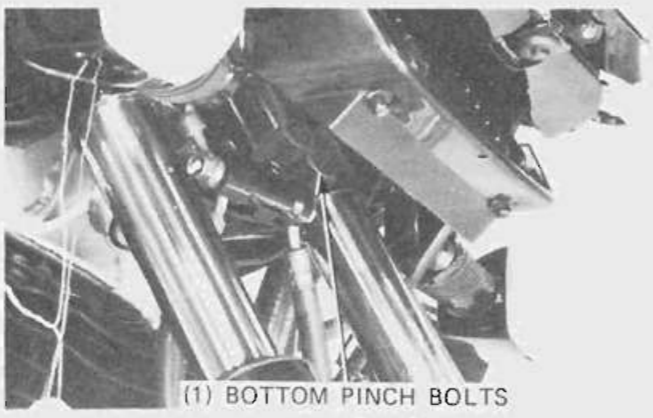
Install the fork stop rings in the grooves in the fork tube.

Push the fork tubes up until the stop rings contact the air joints.



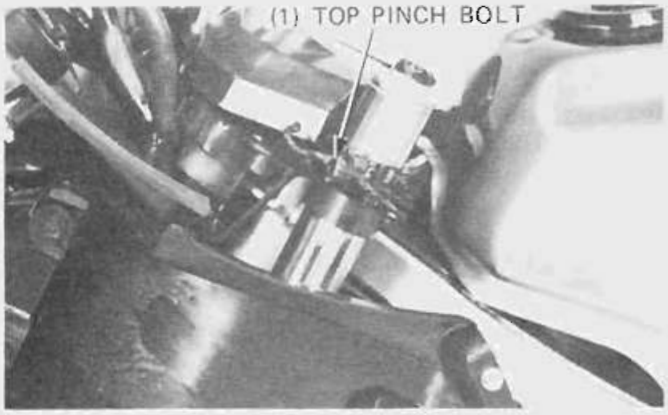
Tighten the bottom pinch bolts.

TORQUE: 32–38 N·m (3.2–3.8 kg-m, 23–27 ft-lb)



Tighten the top pinch bolts.

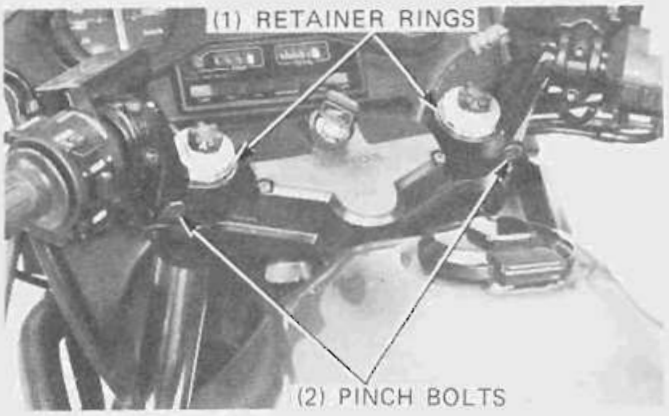
TORQUE: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)



Install the left and right handlebars onto the fork tubes and on the fork top bridge, aligning the pin on the bottom of the handlebar with the slit of the top bridge.
Contact the pins with the rear sides of the slits and tighten the handlebar pinch bolts.

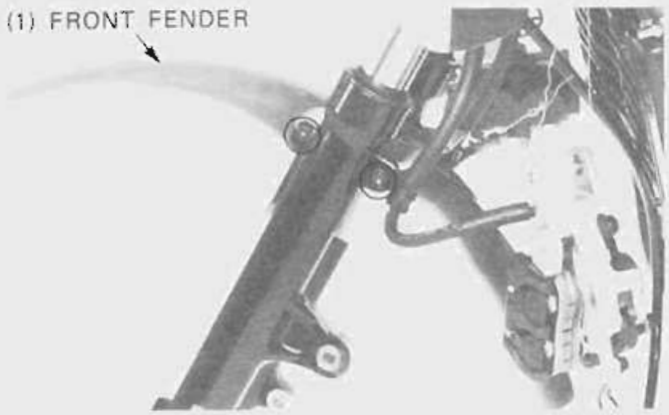
TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

Install the handlebar retainer rings.



Loosely install the front fender.
Install the following parts:
- front wheel (page 15-12).
- fairing (page 14-1).

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



Fill the fork tubes with air.

RECOMMENDED PRESSURE:
0–40 kPa (0–0.4 kg/cm², 0–6 psi)

CAUTION

- *Use only a hand-operated air pump to fill the fork tubes. Do not use compressed air.*
- *Maximum pressure is 300 kPa (3 kg/cm², 43 psi). Do not exceed this or fork tube component damage may occur.*

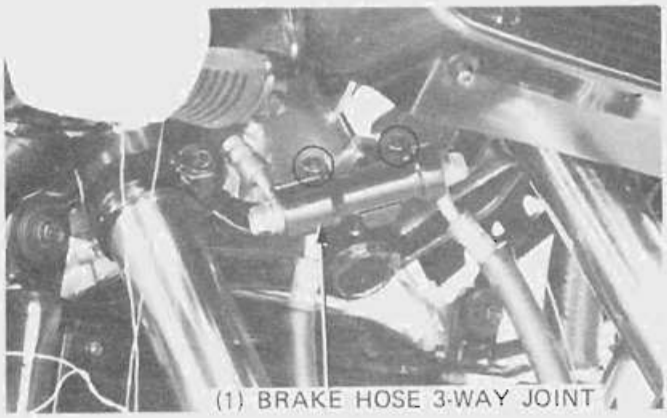
With the front brake applied, pump the forks up and down several times. Place the motorcycle on its center stand. Check the air pressure and adjust if necessary.

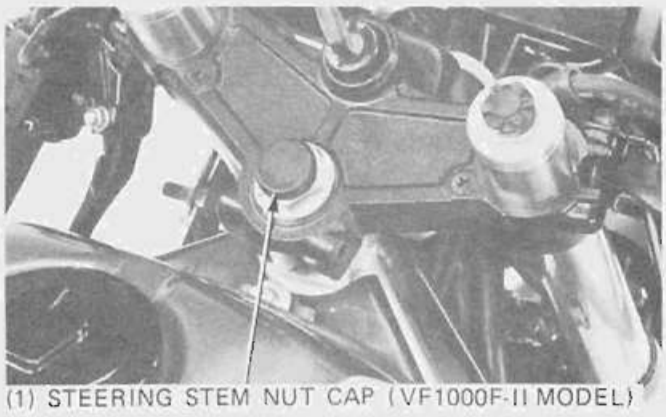


STEERING STEM

REMOVAL

Remove the following parts:
- fairing (page 14-1)
- handlebars (page 15-3)
- front wheel (page 15-6)
- brake hose 3-way joint
- fuse holder on VF1000F model (page 21-6)
- steerings stem nut cap on VF1000F-II model.

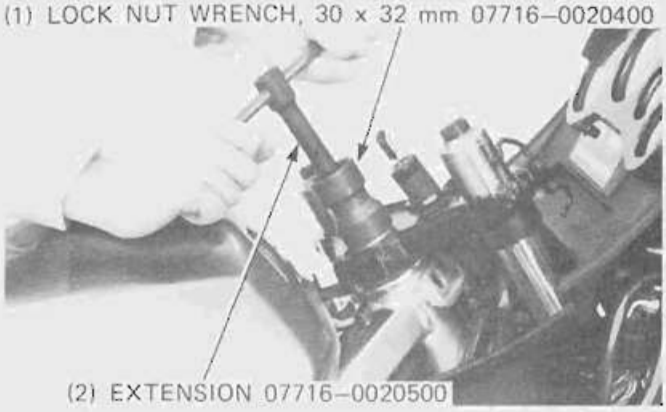

(1) BRAKE HOSE 3-WAY JOINT


(1) STEERING STEM NUT CAP (VF1000F-II MODEL)

Loosen and remove the steering stem nut.

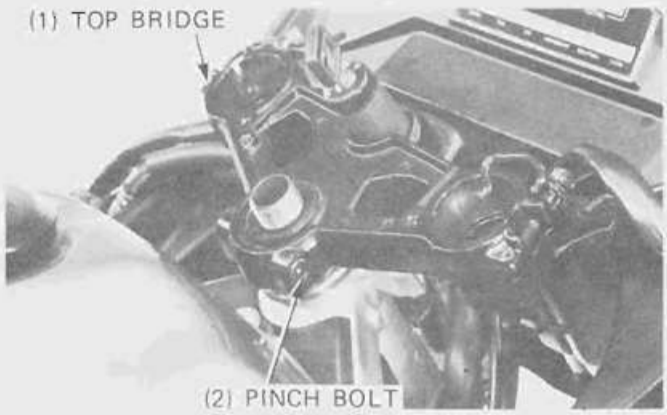
Remove the forks.

(1) LOCK NUT WRENCH, 30 x 32 mm 07716–0020400

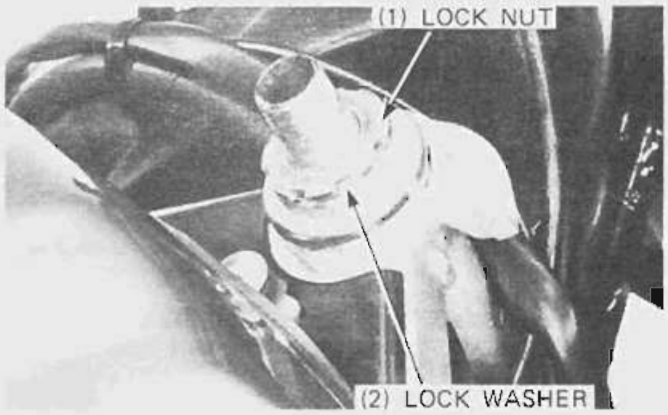

(2) EXTENSION 07716–0020500

Loosen the top bridge pinch bolt and remove the top bridge with the fork air joint.

(1) TOP BRIDGE


(2) PINCH BOLT

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



Loosen the bearing adjustment nut and remove the steering stem.



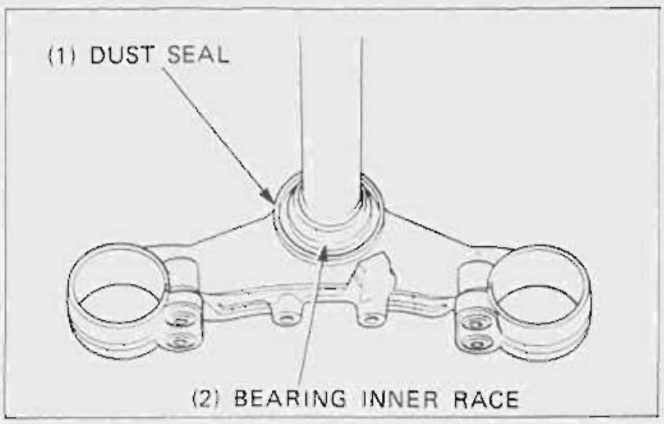
Check the steering stem bearings for damage or wear.

BEARING REPLACEMENT

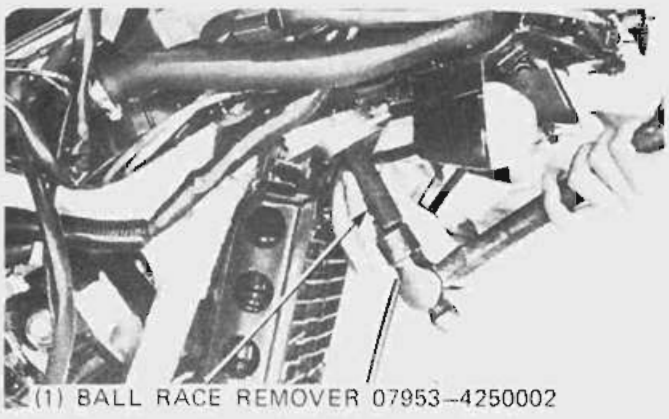
NOTE

- Replace the bearing and bearing race as a set.

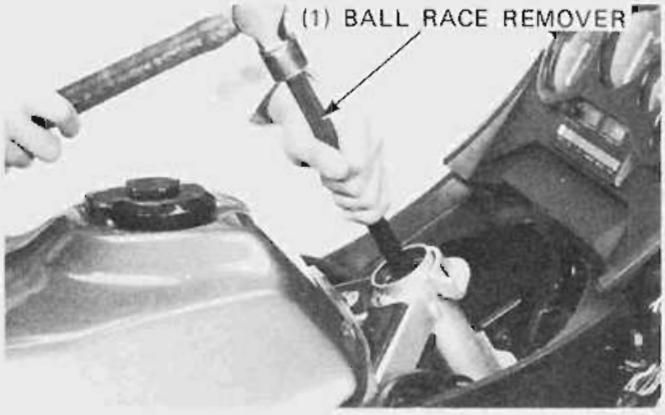
Remove the grease retainer.
Remove the bearing inner race and dust seal from the steering stem.



Remove the upper bearing race with the special tool.



Remove the lower bearing outer race with special tools

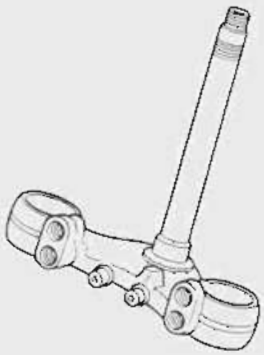


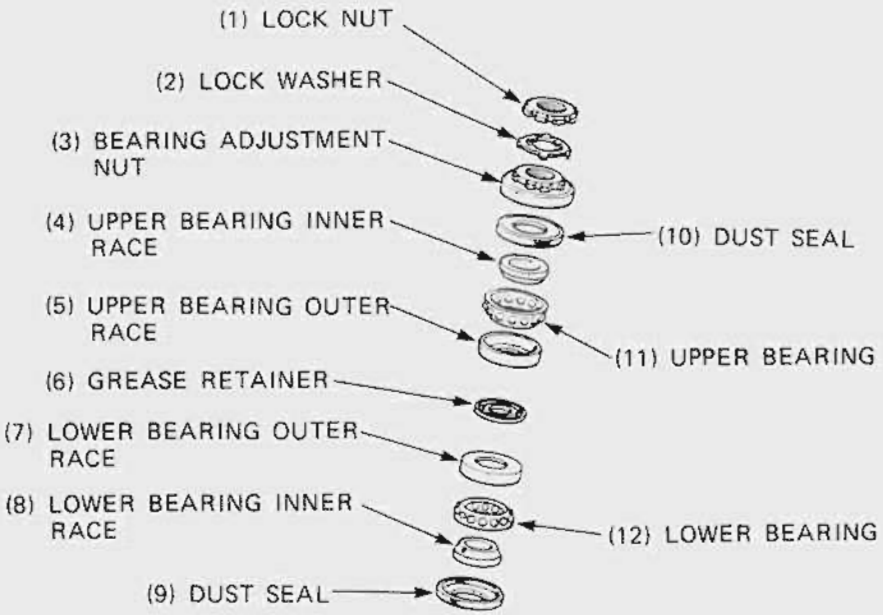
TOOLS

Ball race remover	07953–4250002
Bearing race remover	07946–3710500

NOTE

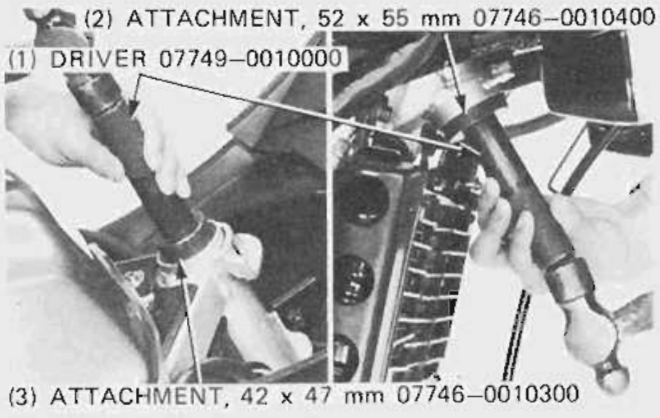
- If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.





Drive the upper bearing outer race into the steering head.

Drive the lower bearing outer race into the steering head.



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



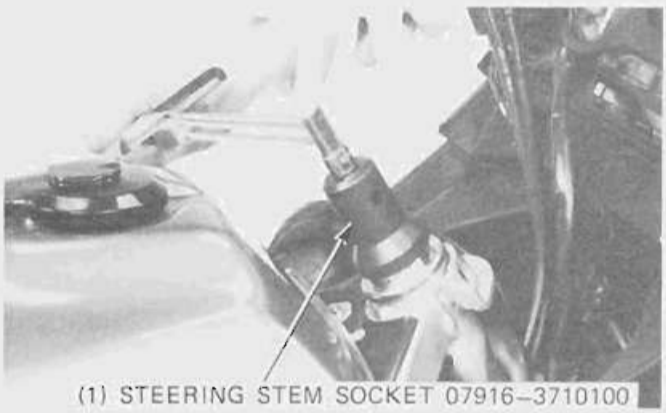
INSTALLATION

Pack the bearing cavities with bearing grease.
Install the lower bearing onto the steering stem.
Install the grease retainer onto the steering stem.
Insert the steering stem into the steering head.
Install the upper bearing and upper bearing inner race into the steering head.
Install the dust seal.

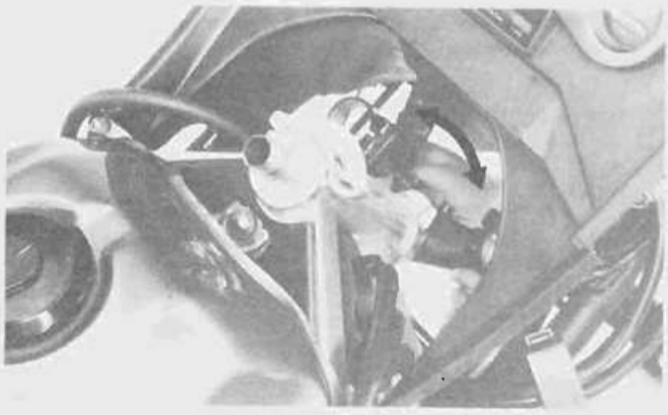


Install and tighten the adjustment nut to the specified torque.

TORQUE: 23–27 N·m (2.3–2.7 kg-m, 14–22 ft-lb)



Turn the steering stem lock-to-lock 4–5 times to seat the bearings, then tighten the nut to the same torque.



Install a new bearing adjustment nut lock washer aligning the tabs with the grooves in the nut. Bend two opposite tabs down into the grooves.

NOTE

- DO NOT install a used bearing adjustment nut lock washer.

Hand tighten the lock nut.
Hold the adjustment nut and further tighten he 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.

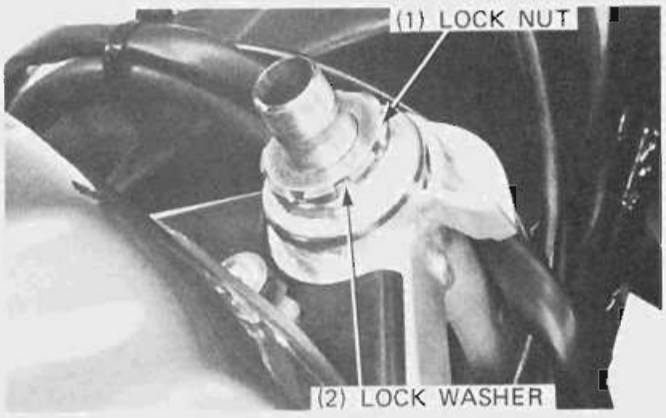
Bend two lock washer tabs up into the lock nut grooves.

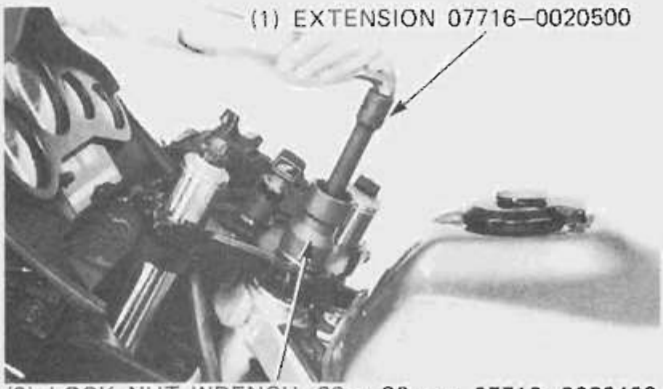
Install the top bridge with the fork air joint.
Install the front forks (page 15–21).
Install and tighten the steering stem nut.

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

Tighten the fork top bridge pinch bolt.

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





(2) LOCK NUT WRENCH, 30 x 32 mm 07716–0020400

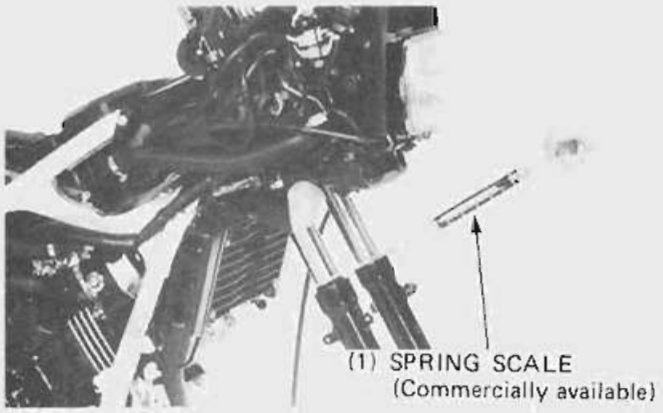
STEERING HEAD BEARING PRELOAD

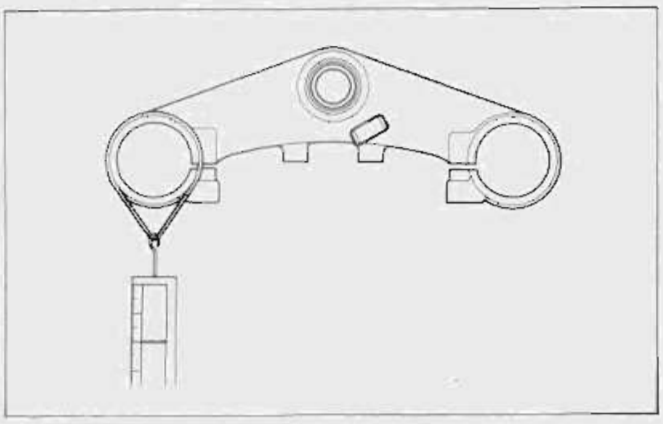
Install the front wheel (page 15-12).
Place a stand under the engine and raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube and measure the steering head bearing preload.

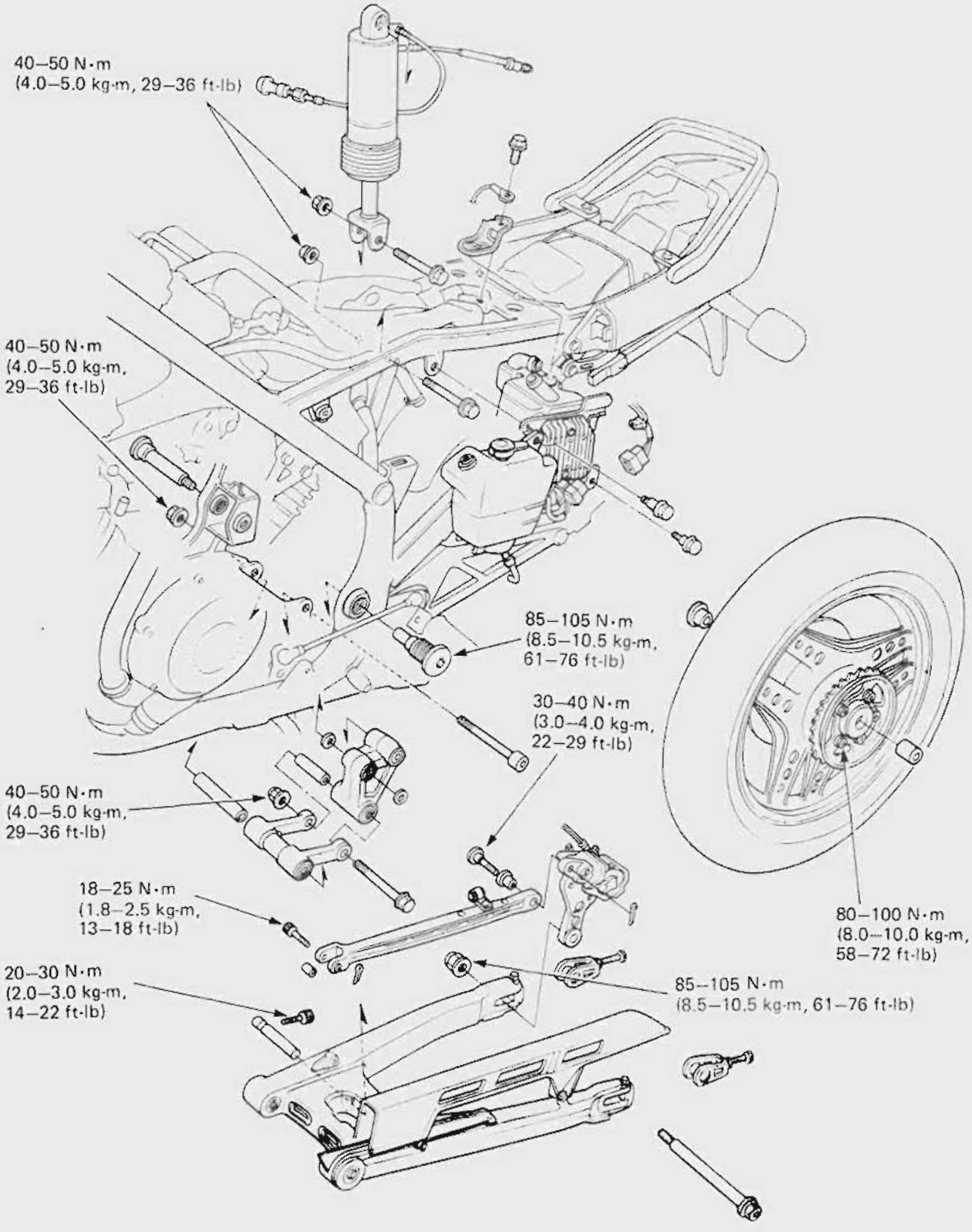
NOTE

- Make sure that there is no cable and wire harness interference.

The preload should be within 1.0–1.6 kg (2.21–3.53 lb) for right and left turns.
If the readings do not fall within the range, lower the front wheel and adjust the bearing adjustment nut.
After making sure the bearing preload is acceptable, install the removed parts in the reverse order of removal.






40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)
40–50 N·m
(4.0–5.0 kg-m,
29–36 ft-lb)
85–105 N·m
(8.5–10.5 kg-m,
61–76 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
40–50 N·m
(4.0–5.0 kg-m,
29–36 ft-lb)
18–25 N·m
(1.8–2.5 kg-m,
13–18 ft-lb)
20–30 N·m
(2.0–3.0 kg-m,
14–22 ft-lb)
80–100 N·m
(8.0–10.0 kg-m,
58–72 ft-lb)
85–105 N·m
(8.5–10.5 kg-m, 61–76 ft-lb)

16 REAR WHEEL/SUSPENSION

SERVICE INFORMATION	16-1	SHOCK ABSORBER	16-7
TROUBLESHOOTING	16-2	SWING ARM	16-14
REAR WHEEL	16-3		

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the TUBELESS TIRE MANUAL.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle runout		–	0.2 mm (0.01 in)
Rear wheel rim runout	Radial	–	2.0 mm (0.08 in)
	Axial	–	2.0 mm (0.08 in)
Shock absorber air pressure		0–300 kPa (0–3.0 kg/cm^2, 0–43 psi)	

TORQUE VALUES

Shock arm-to-frame bolts		40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Shock link-to-shock arm bolt		40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Rear shock absorber mount bolts		40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Swing arm pinch bolt		20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Swing arm pivot bolts		85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)
Rear brake torque rod	8 mm	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
	10 mm	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Final driven sprocket		80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Rear brake disc		35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)
Rear axle nut		85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

TOOLS

Special

Needle bearing remover	07931–MA70000
Oil seal driver	07965–MC70100
Oil seal driver attachment ring	07965–ME70100
Oil seal driver attachment	07965–MB00100
Oil seal driver attachment	07965–MA10200
Driver	07965–1480100
Attachment	07946–KA30200

Common

Attachment, 32 x 35 mm	07746–0010100
Attachment, 37 x 40 mm	07746–0010200
Attachment, 42 X 47 mm	07746–0010300
Attachment, 52 x 55 mm	07746–0010400
Attachment, 62 x 68 mm	07746–0010500
Pilot, 17 mm	07746–0040400
Pilot, 20 mm	07746–0040500
Pilot, 25 mm	07746–0040600
Driver	07749–0010000
Bearing remover shaft	07746–0050100
Bearing remover head, 20 mm	07746–0050600

TROUBLESHOOTING

Oscillation
- Bent rim
- Loose wheel bearings
- Faulty tire
- Loose axle
- Tire pressure incorrect
- Swingarm bearings worn
- Worn tires

Soft suspension
- Weak spring
- Insufficient fluid in shock absorber
- Shock absorber air pressure incorrect

Hard suspension
- Incorrect fluid weight in shock absorber
- Bent shock absorber
- Shock absorber air pressure incorrect

Suspension noise
- Shock case binding
- Loose fasteners

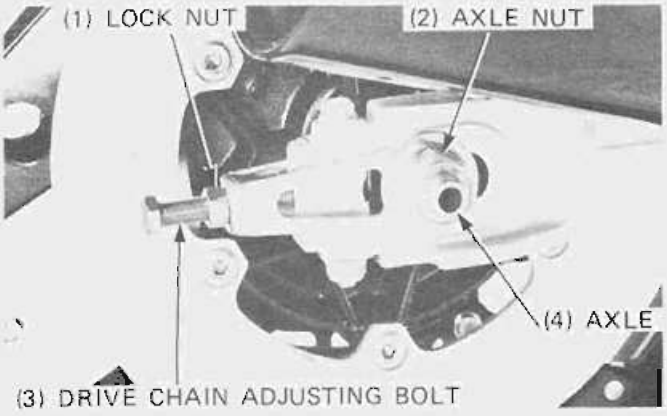
REAR WHEEL

REMOVAL

Place the motorcycle on its center stand.
Loosen the drive chain adjusting bolts lock nuts and the adjusting bolts.

Remove the axle nut and axle.

Push the wheel forward and remove the drive chain from the driven sprocket and remove the rear wheel.

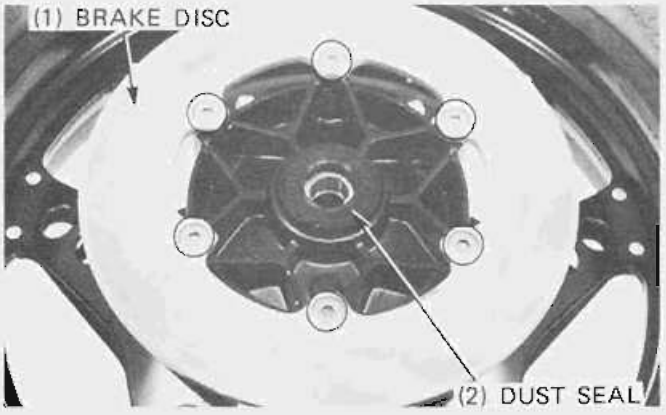


NOTE

- If you depress the brake pedal after the rear wheel is removed the caliper piston will move out and make reassembly difficult.

DISASSEMBLY

Remove the rear brake disc.
Remove the dust seal.

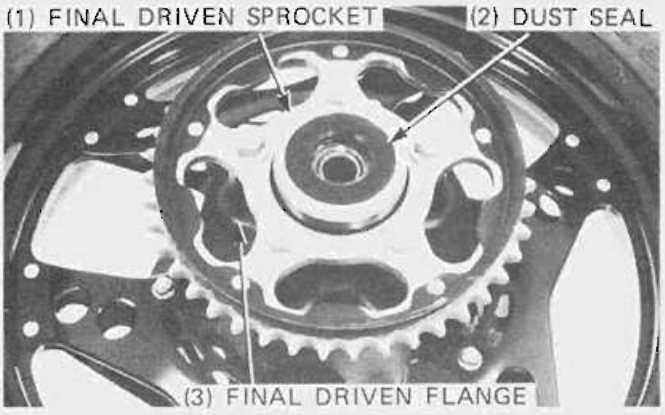


Remove the final driven sprocket and driven flange together.

NOTE

- Do not separate the driven sprocket and flange, unless replacement of the driven sprocket or flange is necessary.

Remove the dust seal from the final driven flange.

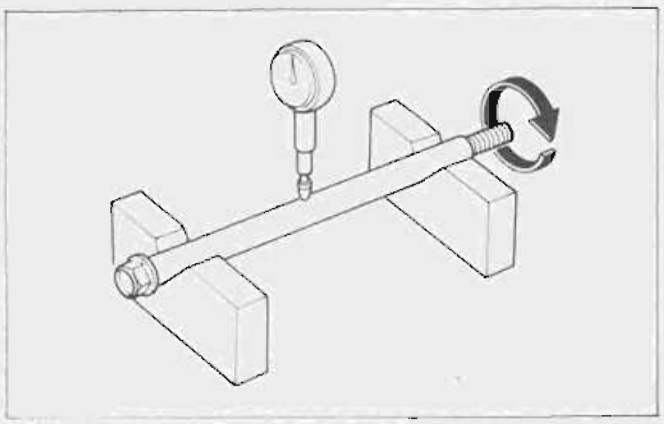


INSPECTION

Axle

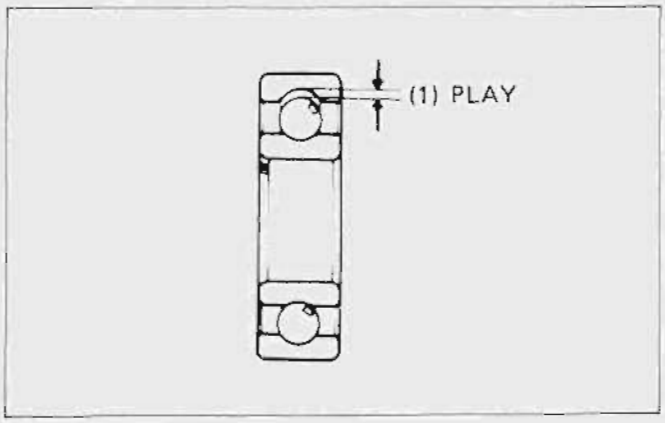
Set the axle in V blocks and read the axle runout with a dial indicator.

SERVICE LIMIT: 0.2 mm (0.01 in)



Rear wheel bearing

Check the wheel bearing play by rotating the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.



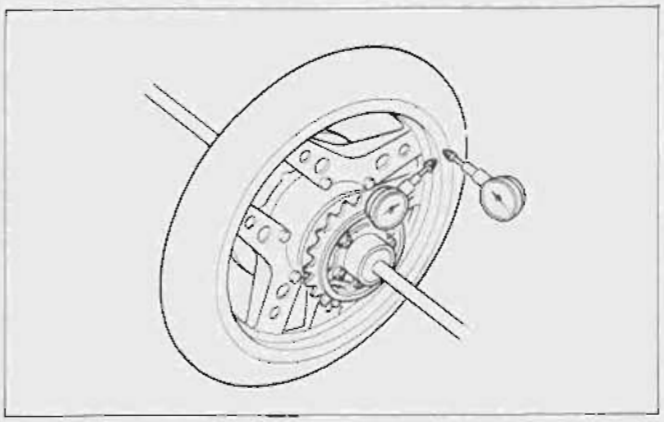
Rear wheel rim runout

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

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

NOTE

- The wheel cannot be serviced and must be replaced if the above limits are exceeded.

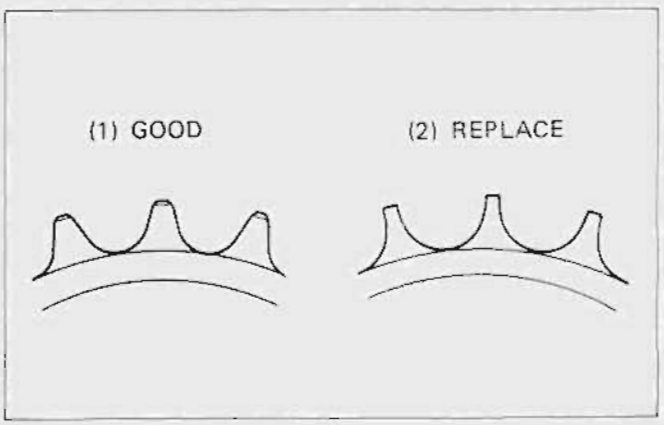


Final driven sprocket

Check the condition of the final driven sprocket teeth. Replace the sprocket if it is worn or distorted.

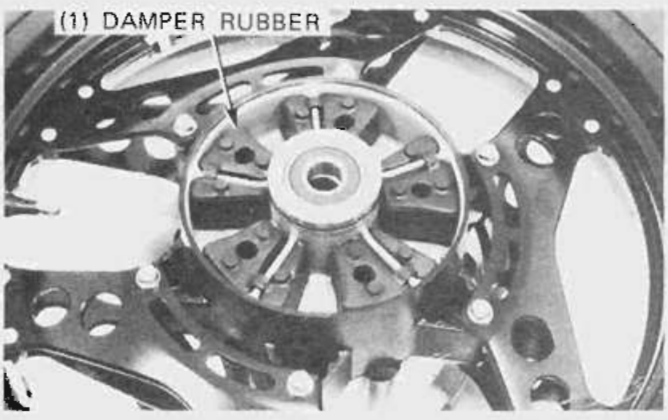
NOTE

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.



Damper rubbers

Replace the damper rubbers if they are damaged or deteriorated.



BEARING REPLACEMENT

Remove the wheel bearings.

NOTE

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

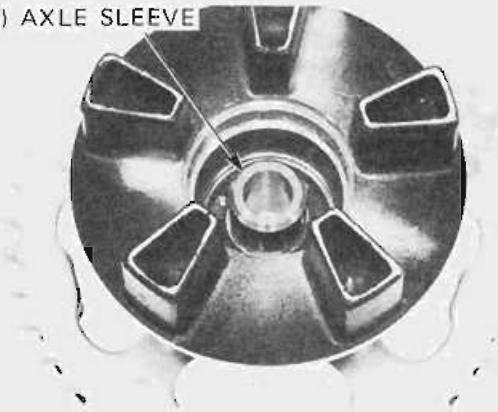
(1) BEARING REMOVER SHAFT 07746–0050100



(2) BEARING REMOVER HEAD, 20 mm 07746–0050600

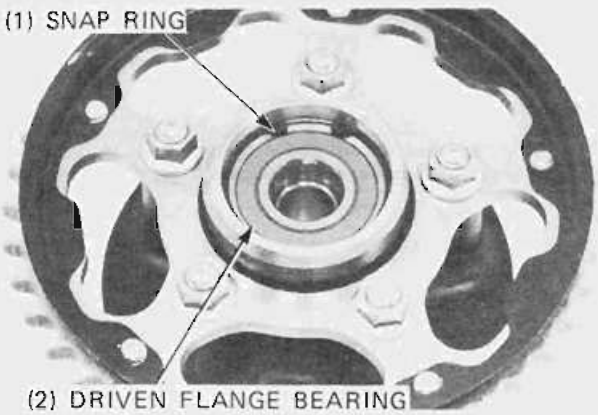
Remove the rear axle sleeve.

(1) AXLE SLEEVE



Remove the snap ring.
Drive the driven flange bearing out.

(1) SNAP RING



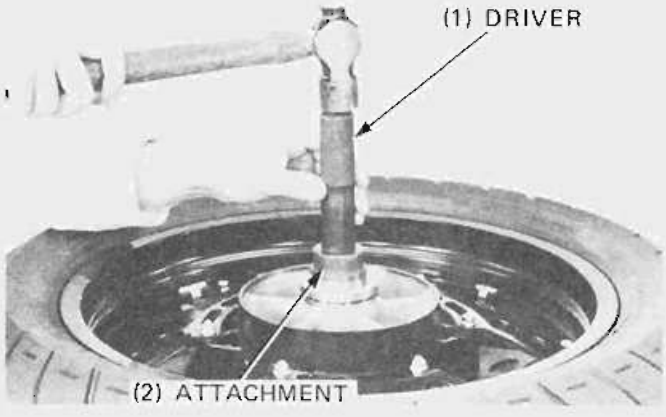
(2) DRIVEN FLANGE BEARING

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

TOOLS

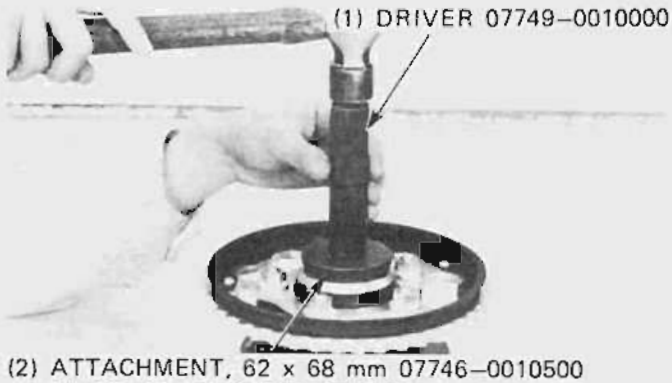
Right wheel bearing:	
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500
Left wheel bearing:	
Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500

(1) DRIVER



(2) ATTACHMENT

Drive a new driven flange bearing in the driven flange squarely until it is seated.
Install the snap ring and rear axle sleeve.



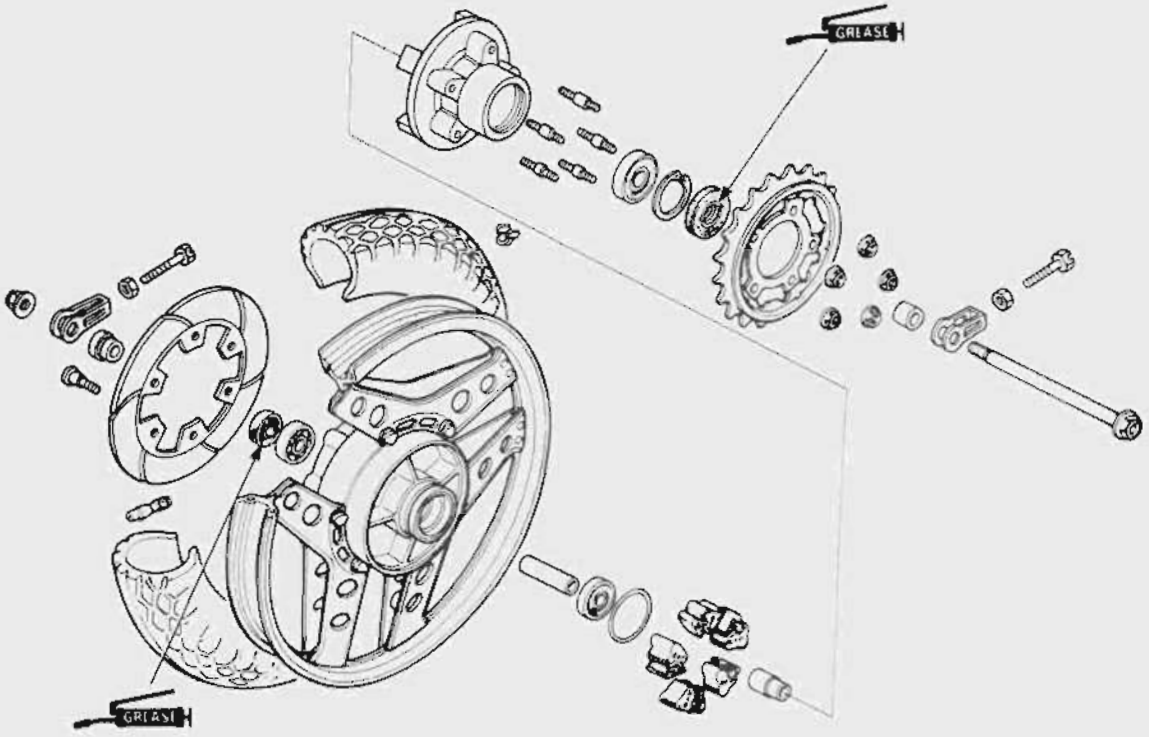
ASSEMBLY

NOTE

- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.

WARNING

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

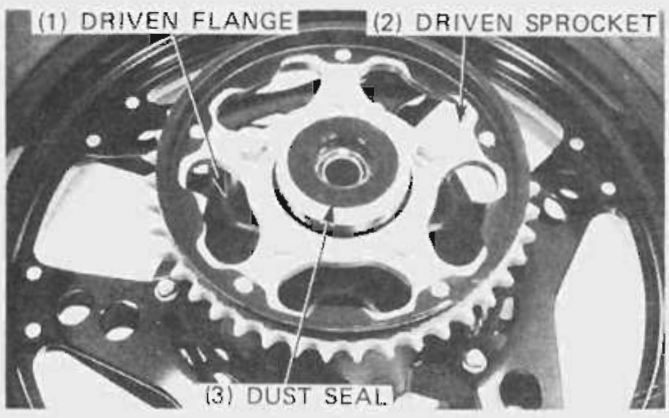


Install the rear axle sleeve, final driven flange and driven sprocket.

If the driven sprocket was removed from the flange, tighten the driven sprocket nuts to the specified torque.

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

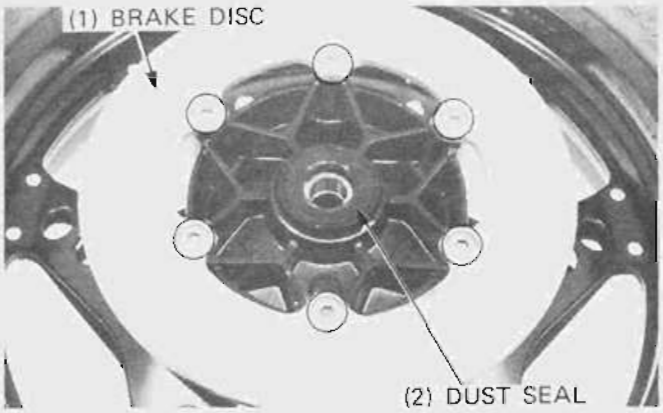
Install the dust seal.



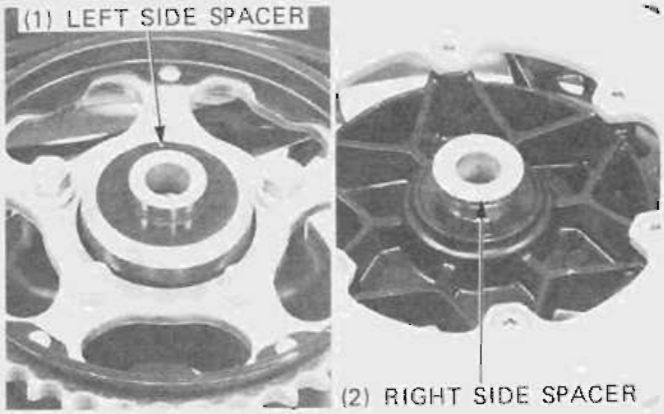
Install the brake disc and tighten the bolts.

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

Install the dust seal.



Install the left and right side spacers.



INSTALLATION

Install the rear wheel in the reverse order of removal.

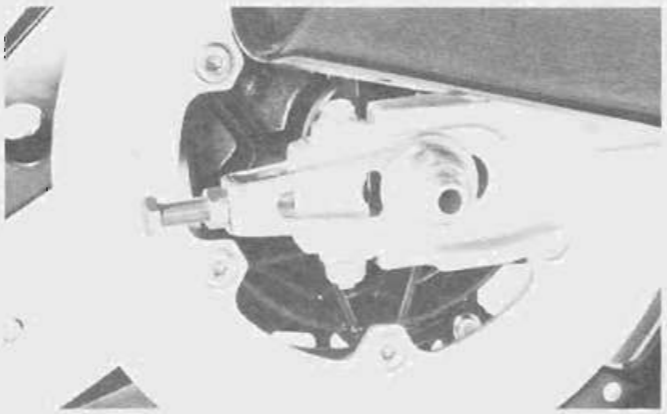
NOTE

- When installing the wheel, carefully fit the brake disc between the brake pads.
- After installing the wheel, apply the brake several times. Then check that the wheel rotates freely. Recheck wheel installation if the brake drags or if the wheel does not rotate freely.

Tighten the rear axle nut.

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

Adjust the drive chain slack (page 3-11).

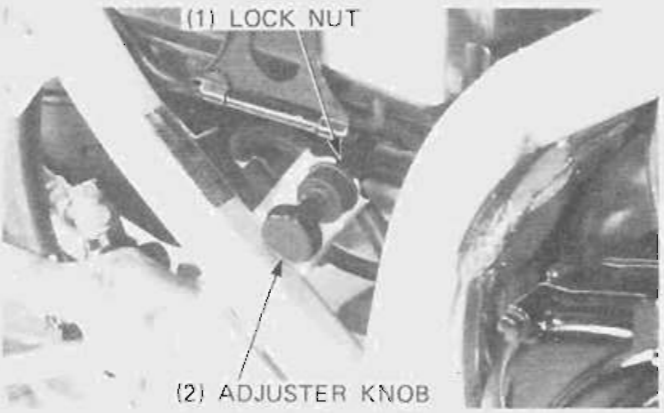


SHOCK ABSORBER

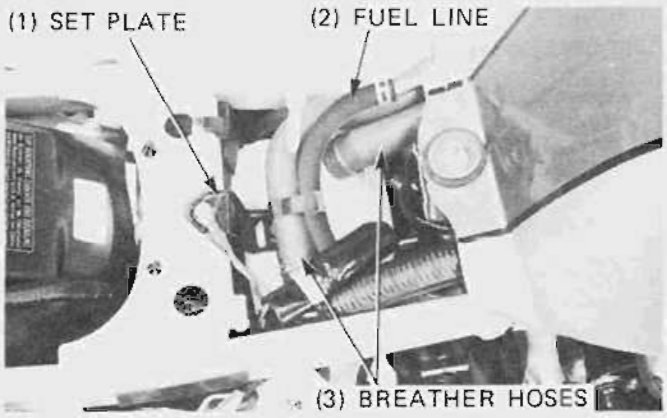
REMOVAL

Place the motorcycle on its center stand.

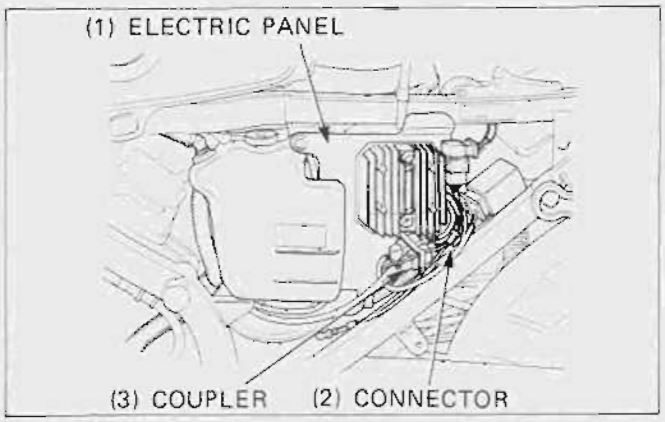
Remove the seat, left and right frame side covers.
Remove the damping force adjuster knob from the frame by loosening the lock nut.
Remove the battery (page 18-2).



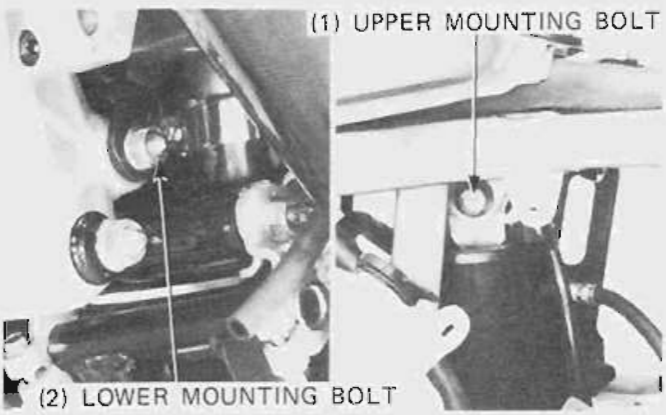
Disconnect the breather hoses from he breather separator.
Remove the breather separator set plate.
Turn the fuel valve off and disconnect the fuel line from the fuel tank.



Disconnect the alternator wire coupler and neutral switch wire connector.
Remove the electric panel mounting bolts and take the electric panel and breather separator out of the frame.

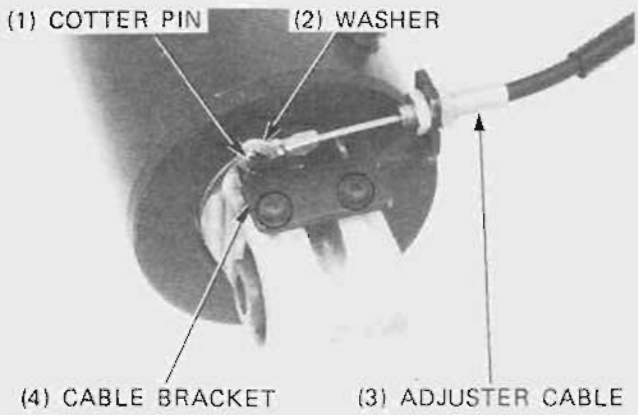


Remove the shock absorber lower mounting bolt.
Remove the shock absorber upper mounting bolt, tilt the shock absorber rearward and remove it from the frame by pulling it up.

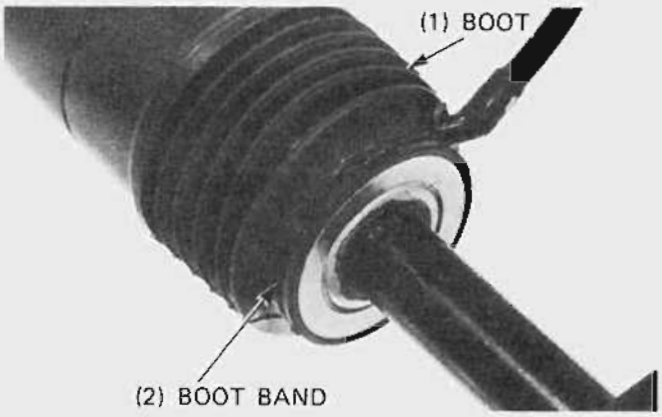


OIL SEAL REPLACEMENT

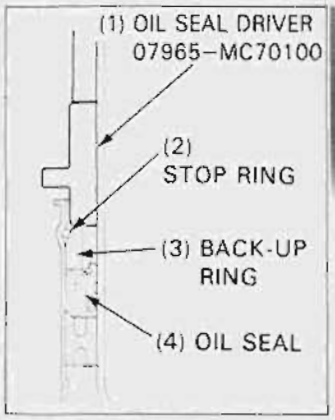
Remove the cotter pin and washer,and disconnect the damping force adjuster cable from the adjuster lever.
Remove the two screws and the adjuster cable bracket from the shock upper mount.

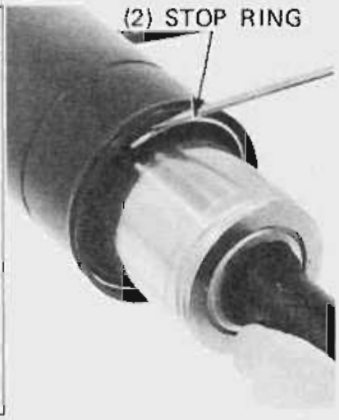


Remove the boot band and boot.

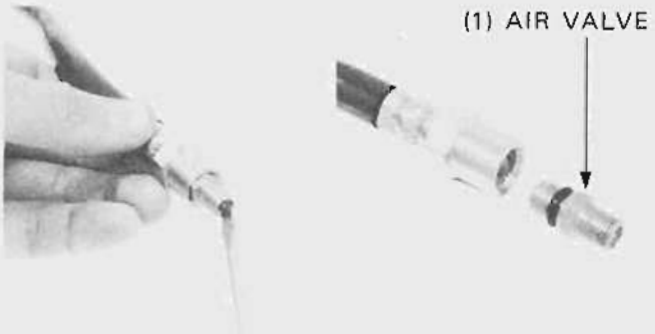


Press down on the back-up ring and oil seal, and remove the stop ring and back-up ring.





Release air pressure and remove the air valve from the hose.



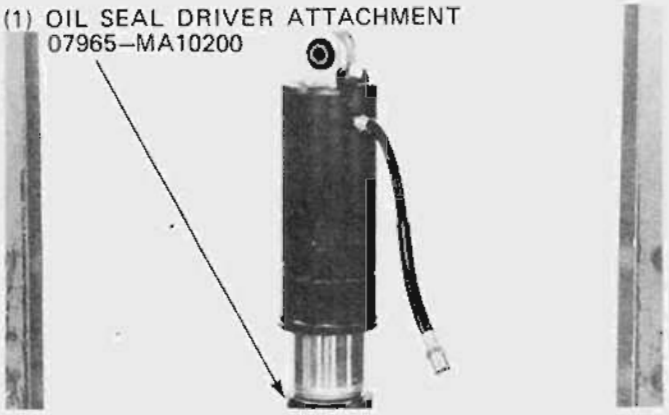
Place about 300 cm^3 (10.1 oz) of damper oil (ATF or equivalent) in a clean container.
Place the shock absorber in a hydraulic press with an OIL SEAL DRIVER ATTACHMENT positioned as shown.
Place the air hose in the oil and press the shock absorber several times until the damper is filled with the oil.

NOTE

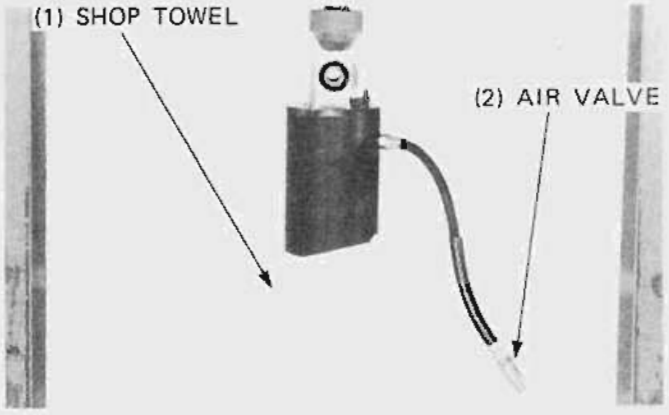
- Do not over-press the shock.
- This shock absorber's stroke is 46 mm (1.81 in).



Place the shock absorber up right in an oil drain pan. Let the shock stand for 5 minutes to allow air to escape.



Reinstall the air valve in the air hose.
Place the shock absorber in the hydraulic press using the oil seal driver attachment.
Wrap a shop towel around the shock absorber.
Press the oil seal out by compressing the shock absorber.



Leave the shock absorber for another 5 minutes to let any remaining ATF drain out.

NOTE

- Do not tilt the shock absorber or ATF will flow out of the damper case.



Turn the shock absorber upside down as soon as all the ATF has drained from the outer case.
Fill the damper case with the specified amount of ATF.

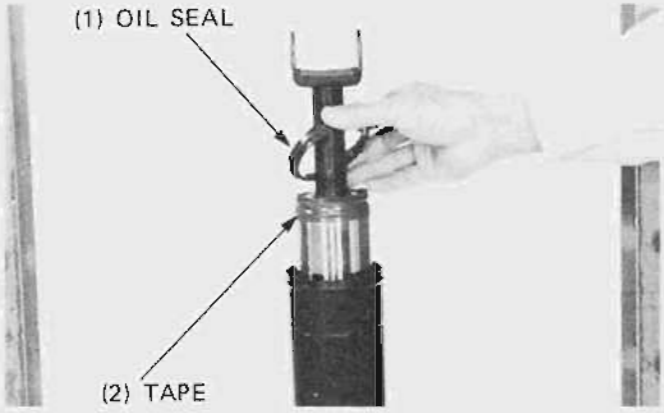
SPECIFIED AMOUNT: 265 cc (8.96 US oz., 9.33 Imp oz.)



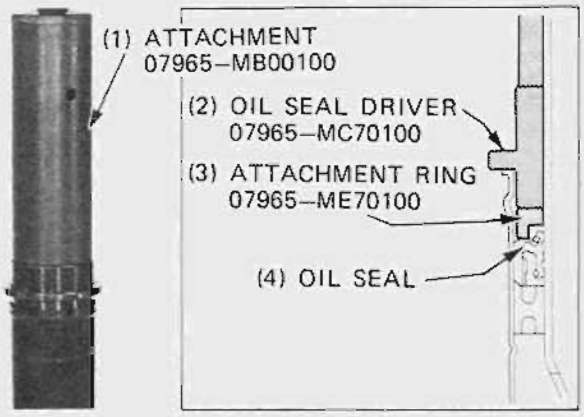
Install the guide bushing into the damper case.
Wrap a piece of tape around the groove at the end of the shock absorber.
Dip the oil seal in damper oil and install it on the damper.

CAUTION

- *Be careful not to damage the oil seal during installation.*



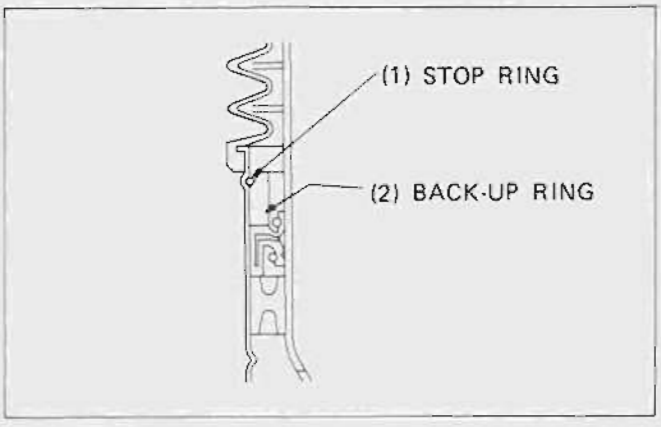
Press the oil seal into the shock absorber with special tools using a hydraulic press until the oil seal driver stops at the edge of the outer case.



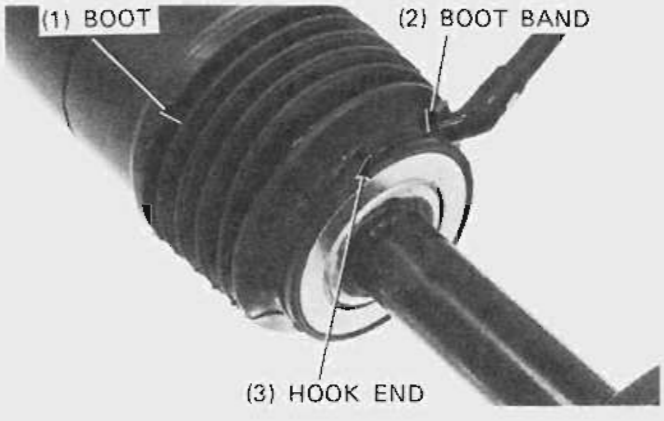
Install the back-up ring.
Install the stop ring, being certain that it is seated in the ring groove in the outer case.

NOTE

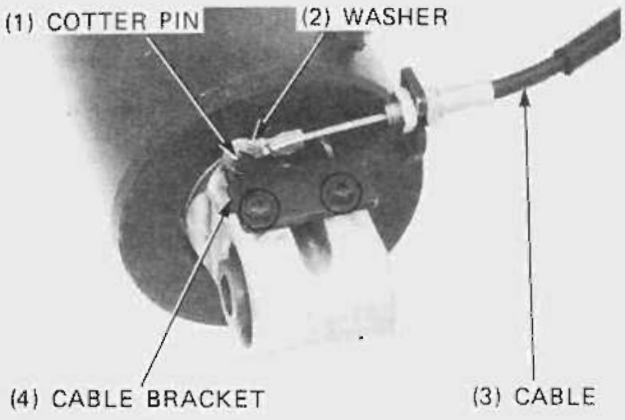
- Be sure stop ring is seated in the ring groove all the way around.



Install the boot.
Install the boot band with its hook end facing down.

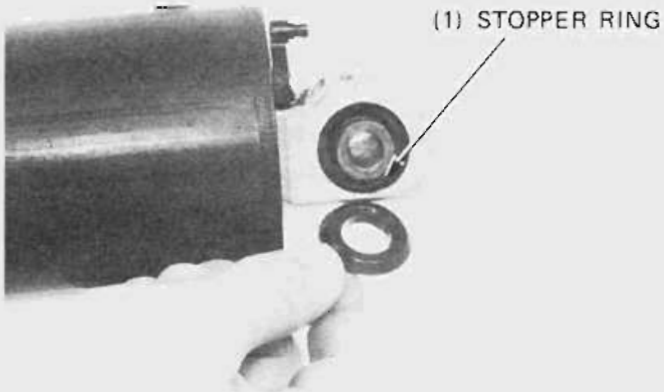


Apply thread lock agent to the threads of the damping force adjuster cable bracket attaching screws and install the bracket onto the absorber upper mount.
Connect the adjuster cable to the adjuster lever with the washer and a new cotter pin.



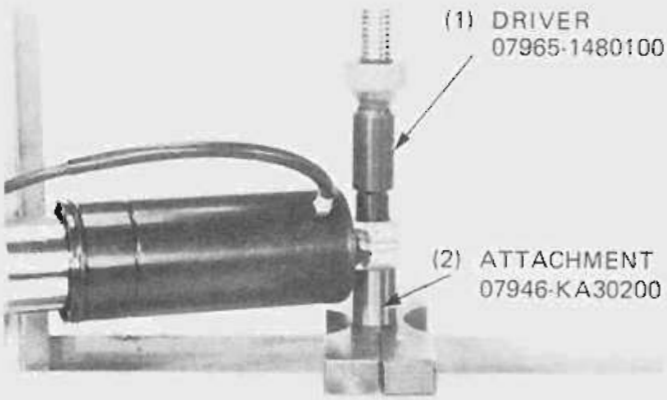
SPHERICAL BEARING REPLACEMENT

Remove the damping force adjuster cable from the lever and remove the adjuster cable bracket from the shock upper mount.
Remove the stopper rings.
Press the spherical bearing out of the upper mount.



Install the stopper ring.
Press a new spherical bearing in the shock upper mount.

Install the other stopper ring.
Install the damping force adjuster cable bracket and connect the cable to the lever.



INSTALLATION

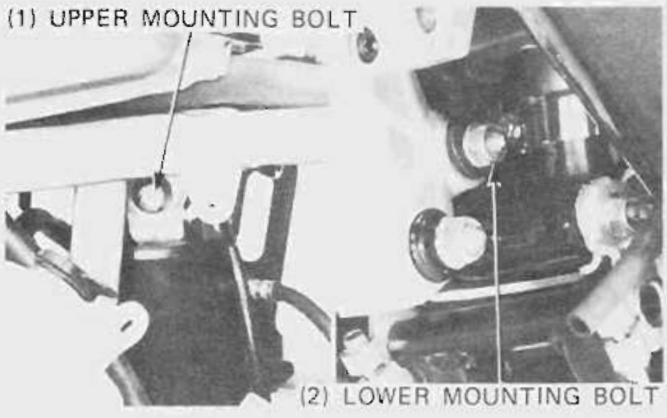
Apply paste grease (containing more than 45% of molybdenum) to the upper mounting bushings.

NOTE

- Use paste grease (containing more than 45% of molybdenum) as follows:
  - MOLYKOTE G-n PASTE manufactured by Dow Corning, U.S.A.
  - Locol Paste manufactured by Sumico Lubricant, Japan.
  - Other lubricants of equivalent quality.

Install the shock absorber in the frame and tighten the upper and lower mounting bolts.

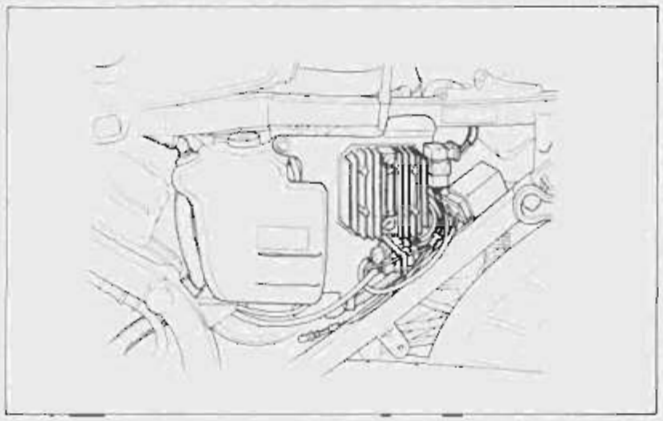
TORQUE: 40–50 N·m (4.0–5.0 kg·m, 29–36 ft·lb)



Install the removed parts in the reverse order or removal.

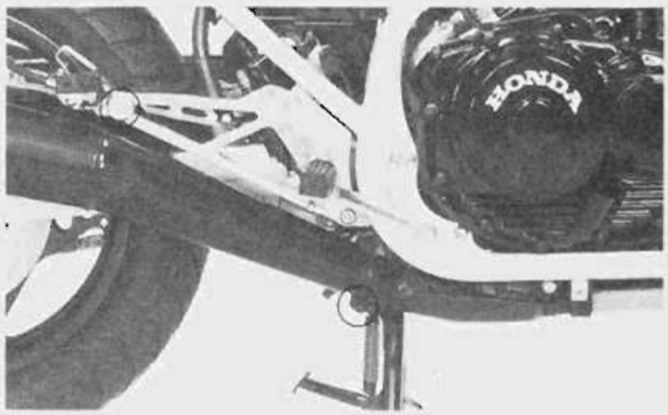
NOTE

- Route the wires, cables and hoses properly (page 1-9).
- After installation, adjust the rear shock absorber air pressure (page 3-17).



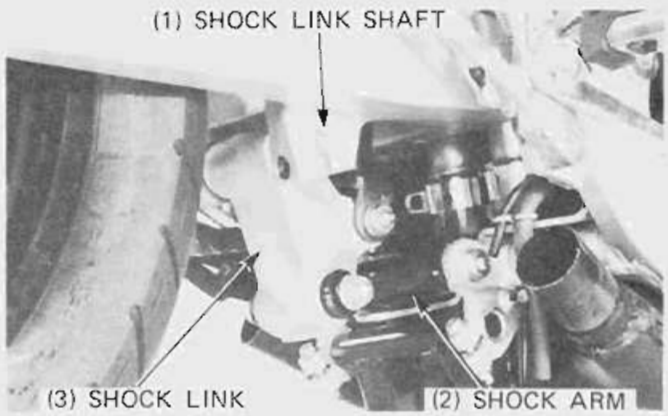
SHOCK ABSORBER LINKAGE

Remove the left and right mufflers.



Remove the shock link by removing the shock absorber lower mounting bolt, shock link-to-shock arm bolt, swingarm pinch bolt, and shock link shaft.

Remove the front exhaust pipe joint nuts and exhaust chamber mounting bolts, loosen the rear exhaust pipe connecting band and lower the exhaust chamber.
Remove the shock arm bolt and the shock arm from he frame.



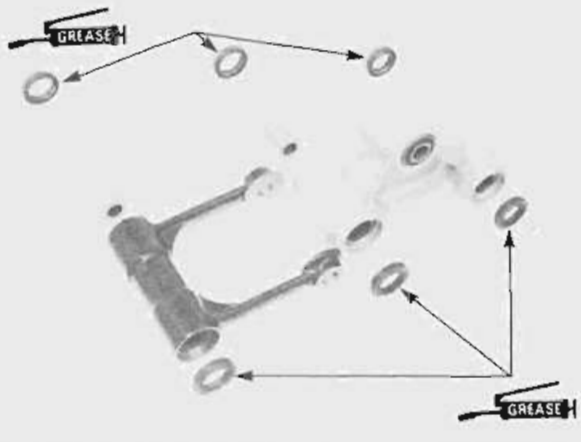
Remove the dust seals and collars.
Check the bushing and needle bearings for wear or damage.

NOTE

- The bushing and needle bearings cannot be replaced. If they are damaged or worn, replace the shock link and/or shock arm.

Check the dust seals and collars for wear or damage.
Replace if necessary.

Apply molybdenum disulfide grease to the needle bearings and dust seals.
Install the collars and dust seals.



Install the shock arm to the frame.

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

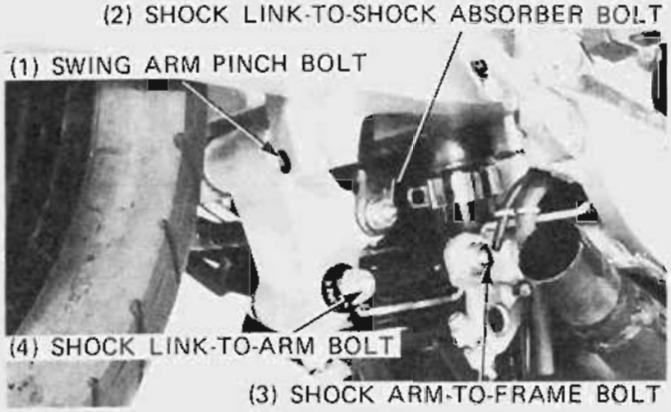
Raise the exhaust chamber to the proper installation position and tighten the joint nuts, connecting bands and mount bolts (section 5).

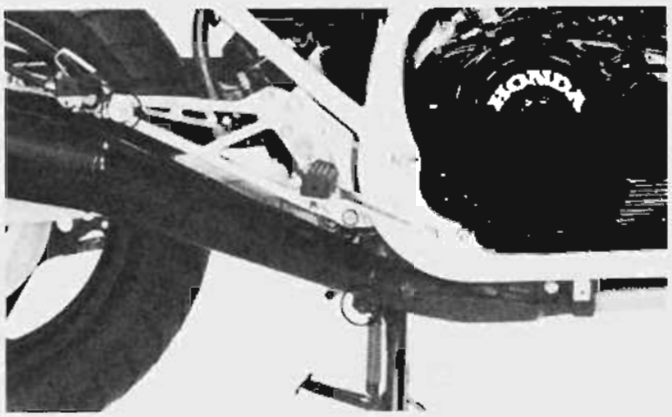
Apply paste grease (containing more than 45% of molybdenum) to the shock absorber lower mounting bushing (page 16-12).

Install the shock link and tighten the each bolt in the order listed.

TORQUE:
- **SHOCK LINK-TO-SHOCK ABSORBER**
  - **40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)**
- **SHOCK LINK-TO-SHOCK ARM:**
  - **40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)**
- **SWINGARM PINCH BOLT:**
  - **20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)**

Install the mufflers.

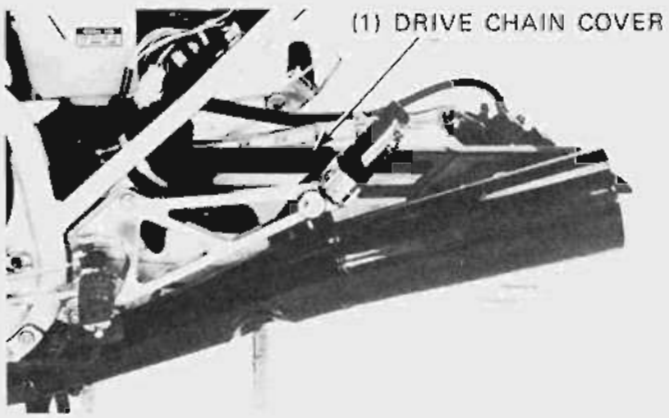




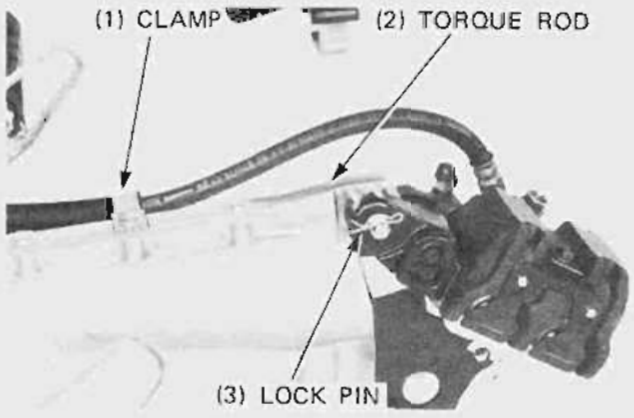
SWING ARM

REMOVAL

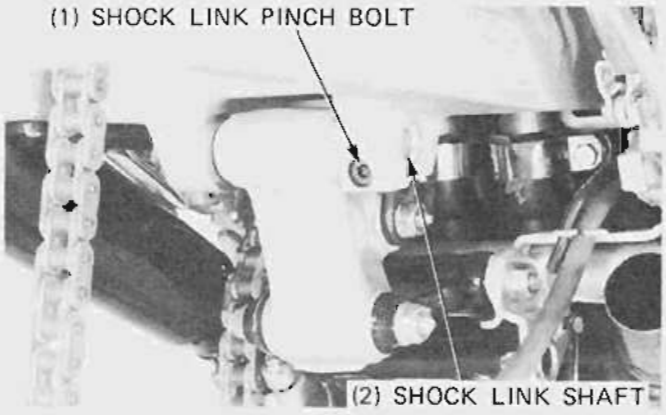
Remove the rear wheel (page 16-3).
Remove the right muffler.
Remove the drive chain cover.



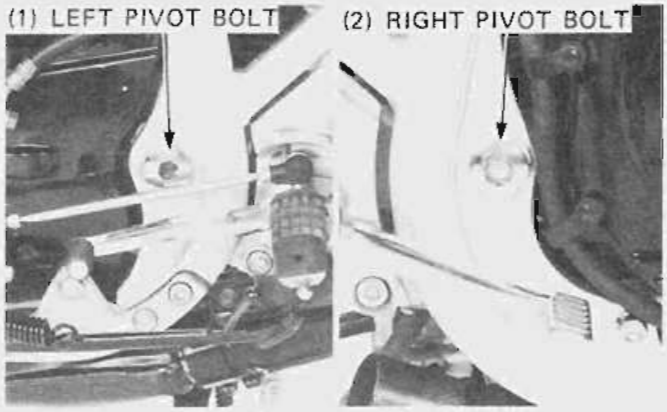
Remove the lock pin from the rear brake torque rod bolt and remove the bolt and rear brake caliper from the torque rod.
Remove the brake hose clamp from the torque rod.



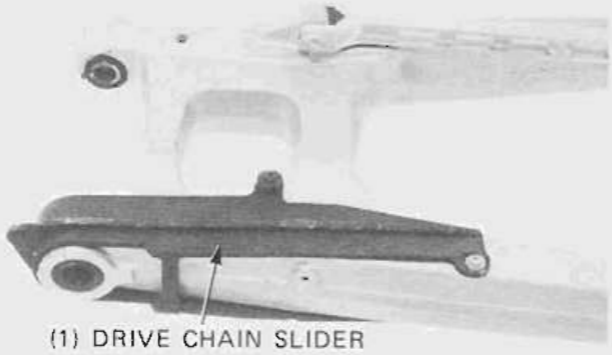
Remove the shock link pinch bolt and shock link shaft.



Remove the gearshift arm from the shift spindle.
Remove the left and right swing arm pivot bolts.
Remove the swing arm from the frame.

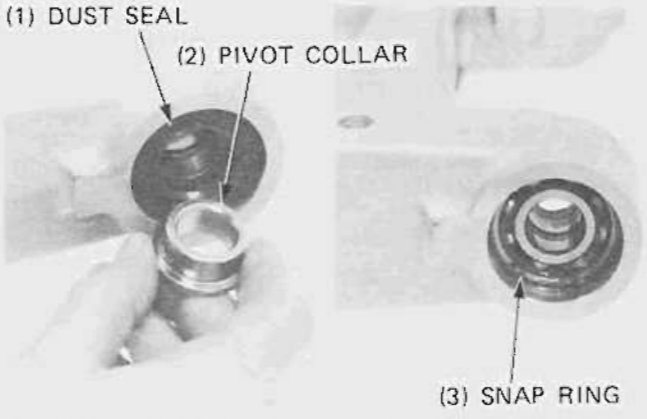


Remove the drive chain slider from the swingarm.

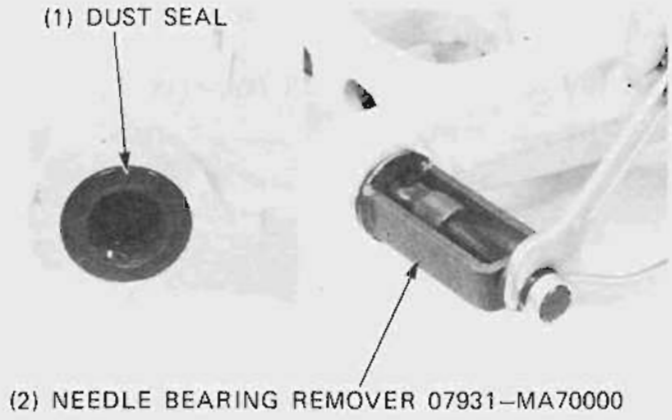


PIVOT BEARING REPLACEMENT

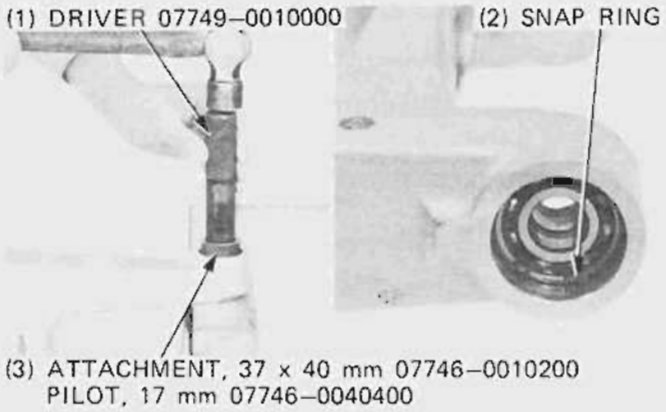
Remove the pivot collar from the swing arm's right pivot.
Remove the dust seal.
Remove the snap ring and drive out the right pivot bearings.



Remove the dust seal from the swing arm's left pivot.
Remove the left pivot needle bearing with a special tool.

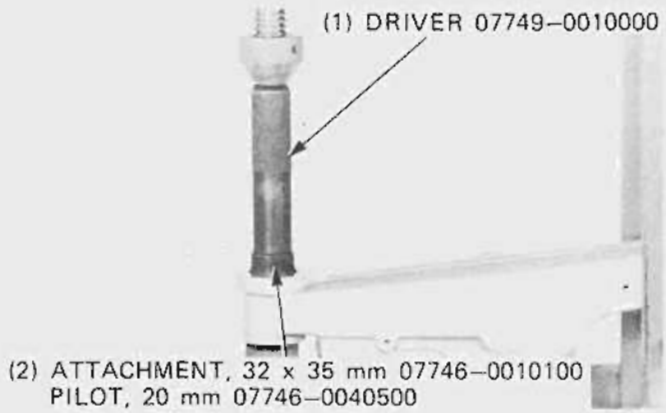


Apply molybdenum disulfide grease to new ball bearing cavities.
Support the swing arm as shown to prevent it from damaging, and drive the ball bearings in the swing arm's right pivot squarely with the markings facing out until they are fully seated.
Install the snap ring.



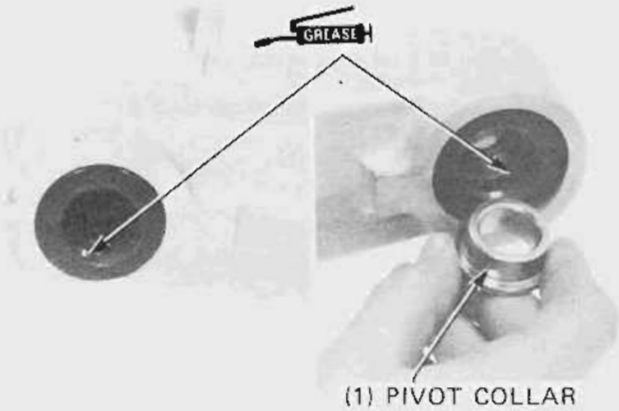
Apply molybdenum disulfide grease to the inside of new needle bearing.
Press the needle bearing in the swing arm's left pivot using a hydraulic press.

Install the dust seals into both pivots.



INSTALLATION

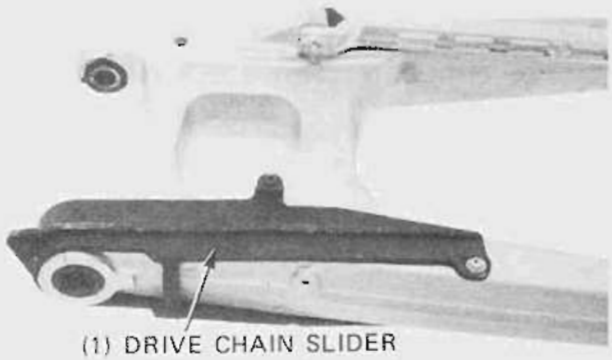
Apply molybdenum disulfide grease to the dust seal lips.
Install the pivot collar into the right pivot.



INSTALLATION

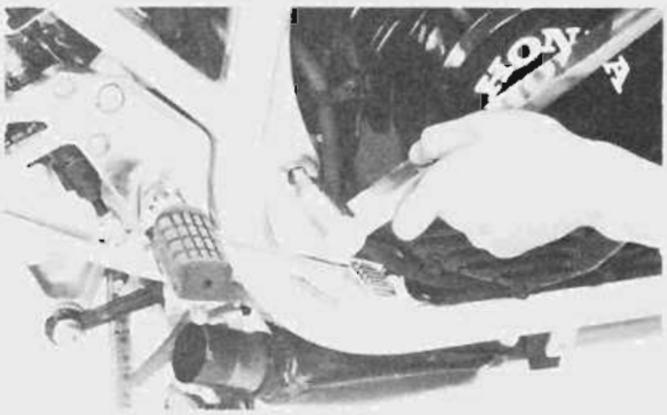
Install the drive chain slider.

Install the swing arm in the frame.


(1) DRIVE CHAIN SLIDER

Install the left and right pivot bolts.
Tighten the right pivot bolt.

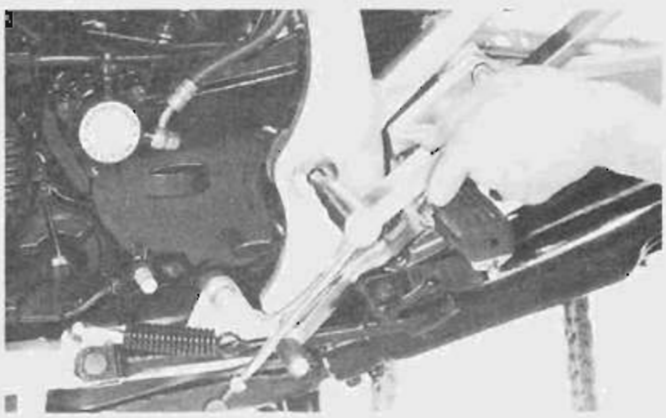
TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)



Tighten the left pivot bolt.

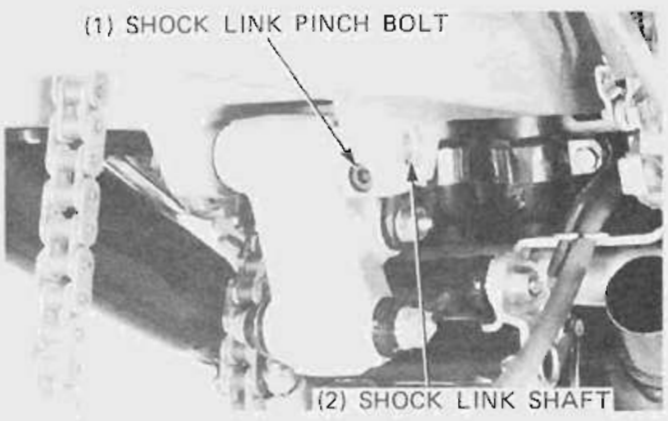
TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Install the gearshift arm onto the shift spindle, aligning the punch marks on the arm and spindle.
Tighten the gearshift arm bolt.

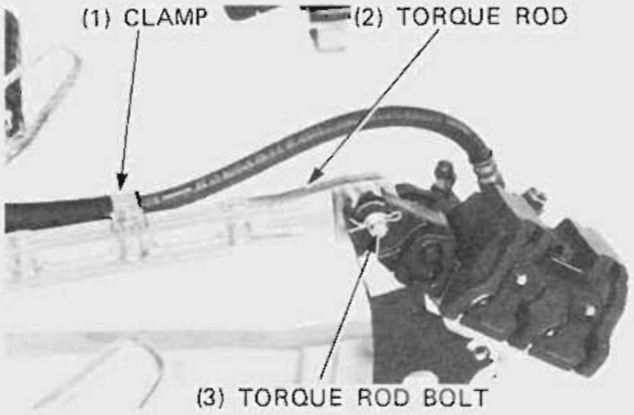


Connect the swing arm and shock link and install the shock link shaft and shock link pinch bolt.
Tighten the shock link pinch bolt.

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



Connect the rear brake torque rod to the rear brake caliper and temporarily tighten the torque rod bolt.
Install the rear brake hose clamp onto the torque rod.

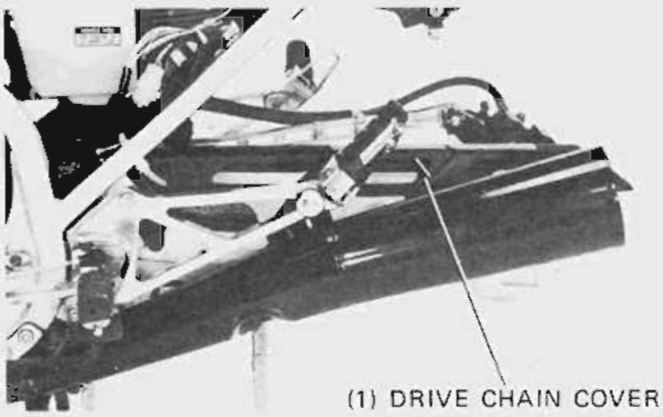


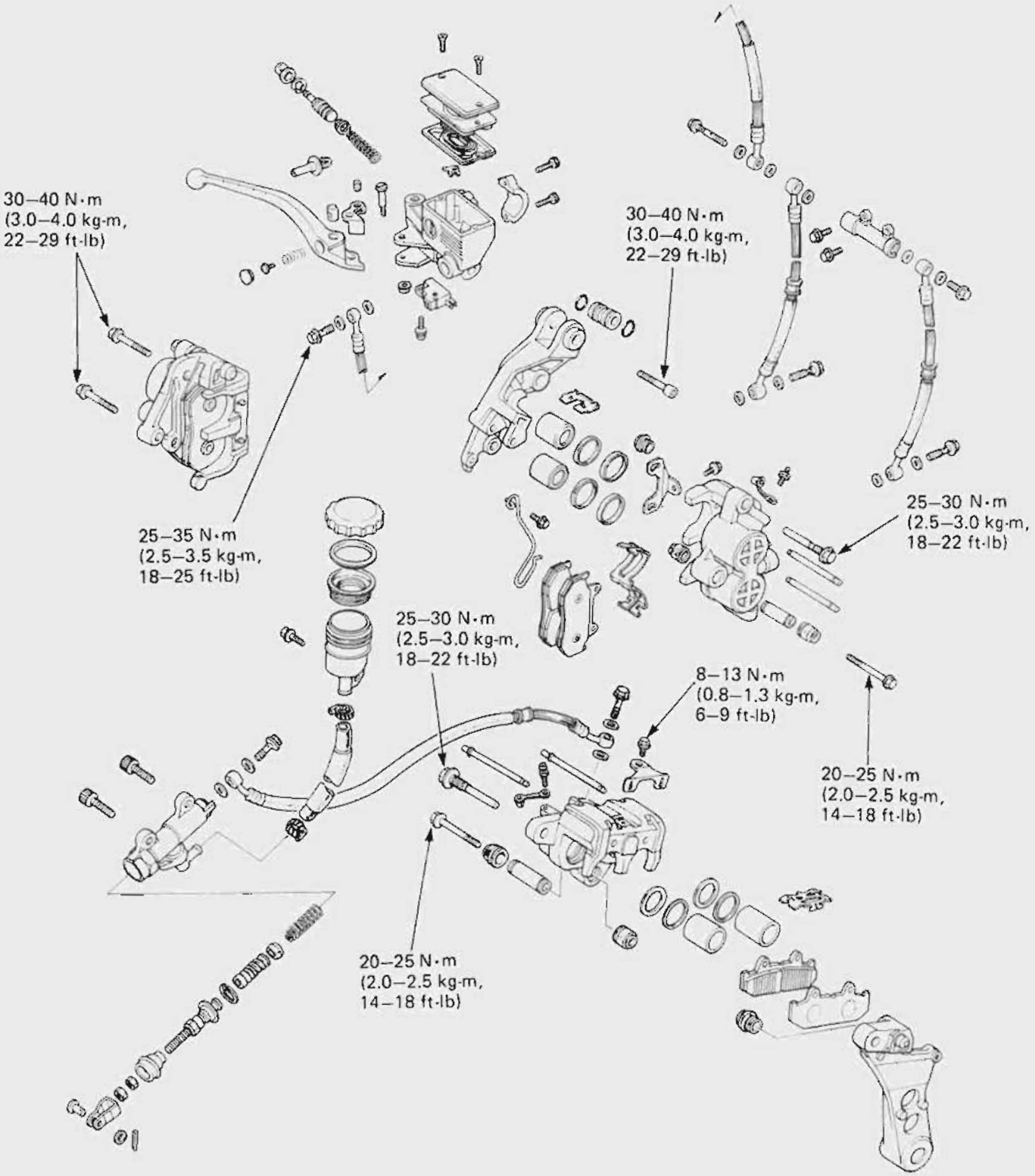
Install the drive chain cover onto the swing arm.
Install the rear wheel (page 16-7).

Tighten the rear brake torque rod bolt and secure it with the lock pin.

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

Install the right muffler.




30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
25–35 N·m
(2.5–3.5 kg-m,
18–25 ft-lb)
25–30 N·m
(2.5–3.0 kg-m,
18–22 ft-lb)
25–30 N·m
(2.5–3.0 kg-m,
18–22 ft-lb)
8–13 N·m
(0.8–1.3 kg-m,
6–9 ft-lb)
20–25 N·m
(2.0–2.5 kg-m,
14–18 ft-lb)
20–25 N·m
(2.0–2.5 kg-m,
14–18 ft-lb)

17 HYDRAULIC BRAKE

SERVICE INFORMATION	17-1	BRAKE PAD/DISC	17-4
TROUBLESHOOTING	17-2	FRONT MASTER CYLINDER	17-8
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	17-3	BRAKE CALIPERS	17-10
		REAR MASTER CYLINDER	17-12

SERVICE INFORMATION

GENERAL

- The brake calipers can be removed without disconnecting the hydraulic system.
- Bleed the hydraulic system if it is disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Brake fluid will damage painted, plastic, and rubber parts. Whenever handling brake fluid, protect the painted, plastic, and rubber parts by covering them with a rag. If fluid does get on these parts, wipe it off with a clean cloth.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Front disc thickness	4.5–5.2 mm (0.177 –0.205 in)	4.0 mm (0.157 in)
Front disc runout	–	0.30 mm (0.012 in)
Front master cylinder I.D.	15.870–15.913 mm (0.6248–0.6265 in)	15.925 mm (0.6270 in)
Front master piston O.D.	15.827–15.854 mm (0.6231–0.6242 in)	15.815 mm (0.6226 in)
Front caliper piston O.D.	31.948–31.998 mm (1.2578–1.2598 in)	31.940 mm (1.2575 in)
Front caliper cylinder I.D.	32.030–32.080 mm (1.2610–1.2630 in)	32.090 mm (1.2634 in)
Rear master cylinder I.D.	14.000–14.043 mm (0.5512–0.5529 in)	14.055 mm (0.5533 in)
Rear master piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.945 mm (0.5490 in)
Rear caliper cylinder I.D.	32.030–32.080 mm (1.2610–1.2630 in)	32.090 mm (1.2634 in)
Rear caliper piston O.D.	31.948–31.998 mm (1.2578–1.2598 in)	31.940 mm (1.2575 in)
Rear disc thickness	6.5–7.2 mm (0.256–0.283 in)	6.0 mm (0.236 in)
Rear disc runout	–	0.30 mm (0.012 in)

TORQUE VALUES

Front brake caliper bracket mount bolt (Right)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Front brake caliper bracket mount bolt (Left-upper)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Anti-dive piston pin bolt	10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb)
Brake caliper mount bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Brake caliper pivot bolt	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Brake hose oil bolt	25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Rear brake actuating arm	10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb)
Pad pin retainer bolt	8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)

TOOL

Special

Snap ring pliers	07914–3230001

TROUBLESHOOTING

Brake lever/pedal soft or spongy
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

Brake lever/pedal too hard
- Sticking piston(s)
- Clogged hydraulic system
- Pads glazed or worn excessively

Brake drag
- Hydraulic system sticking
- Sticking piston(s)

Brakes grab
- Pads contaminated
- Disc or wheel misaligned

Brake chatter or squeal
- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly
- Disc or wheel misaligned

BRAKE FLUID REPLACEMENT/AIR BLEEDING

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.*

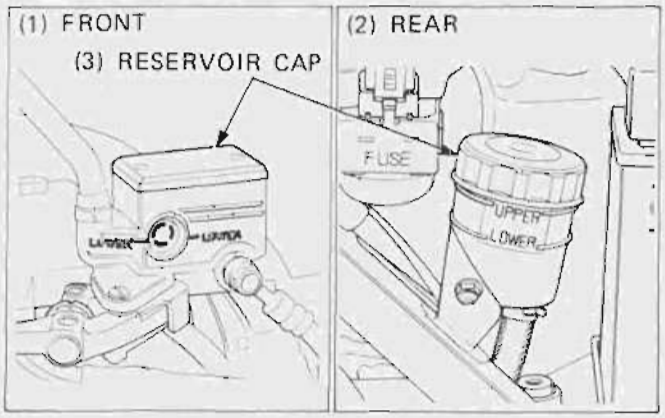
CAUTION

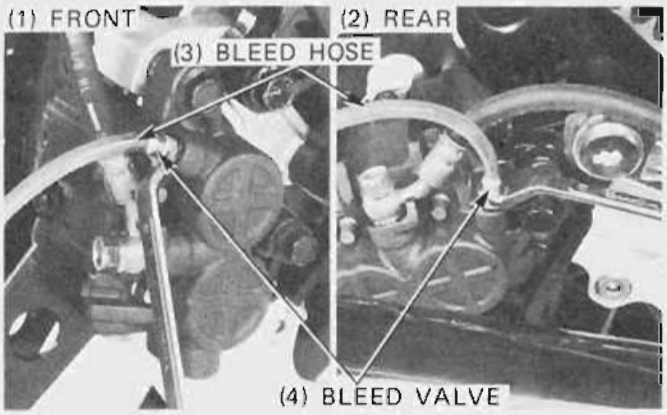
- *Do not allow foreign material to enter the system when filling the brake fluid reservoir.*
- *Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

BRAKE FLUID DRAINING

Remove the right frame side cover when you are to service the rear brake.
Remove the reservoir cap, set plate and diaphragm with the reservoir parallel to the ground.

Connect a bleed hose to the caliper bleed valve.
Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve.





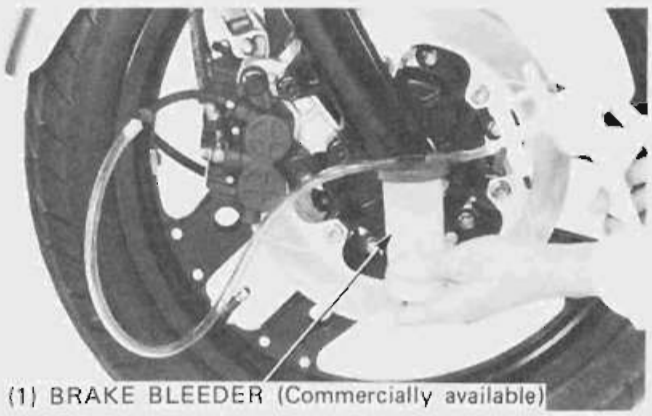
BRAKE FLUID FILLING/AIR BLEEDING

Fill the brake fluid reservoir with DOT 4 brake fluid from a sealed container.

CAUTION

- *Do not mix different types of fluid. They are not compatible with each other.*

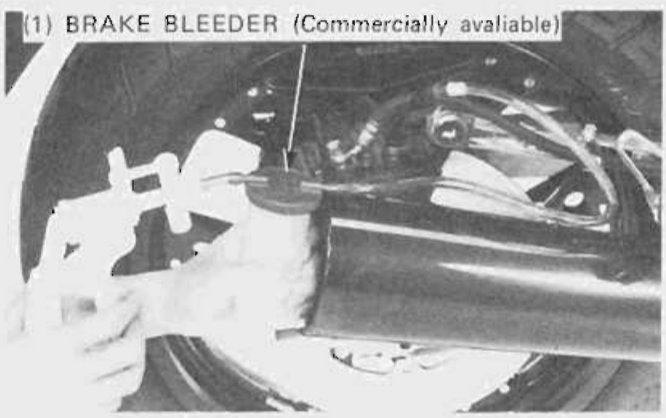
Connect the commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve.
Add brake fluid when the fluid level in the reservoir is low.



NOTE

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- Use only DOT 4 brake fluid from a sealed container.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat the above procedures until air bubbles do not appear in the plastic hose.



NOTE

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

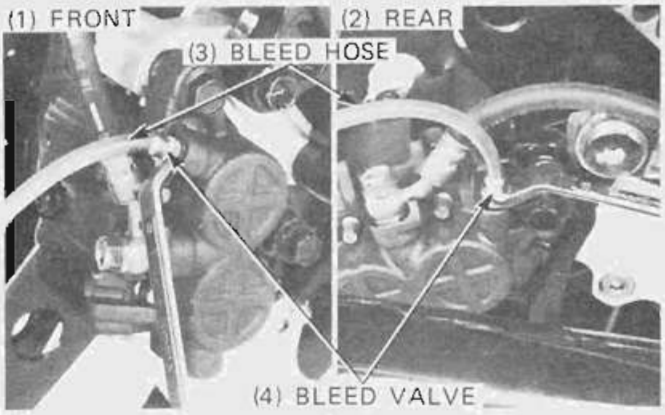
Close the bleed valve and operate the brake lever or pedal.
If it feels spongy, bleed the system by performing the available bleeding procedure.

If the brake bleeder is not available, perform the following procedure:
Pump up the system pressure with the brake lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir small hole.



Connect the bleed hose to the bleed valve and bleed the system as follows:

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



NOTE

- Do not release the brake lever or pedal until the bleed valve is closed.

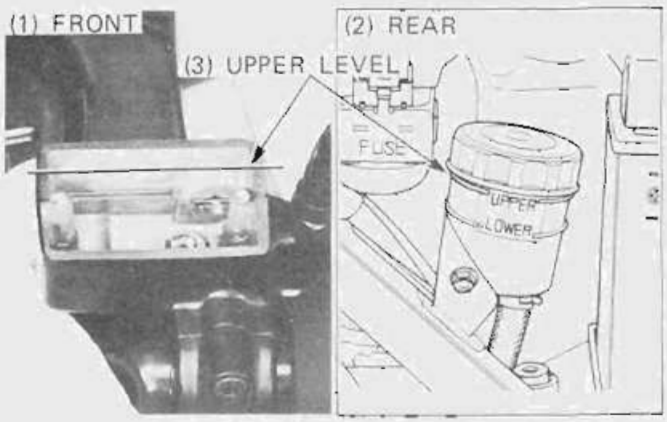
2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until air bubbles cease to appear in the fluid coming out of the bleed valve.

Tighten the bleed valve.

TORQUE: 4–7 N·m (0.4–0.7 kg-m, 2.9–5.1 ft-lb)

Fill the brake fluid reservoir to the upper level mark with DOT 4 brake fluid from a sealed container.



Install the diaphragm, set plate and reservoir cap.
Install the right frame side cover when it was removed.

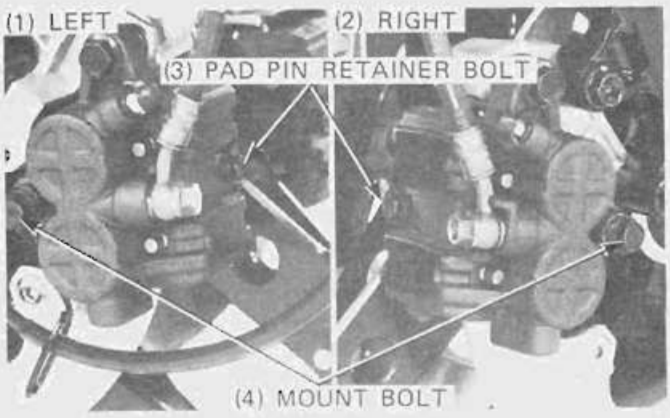
BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

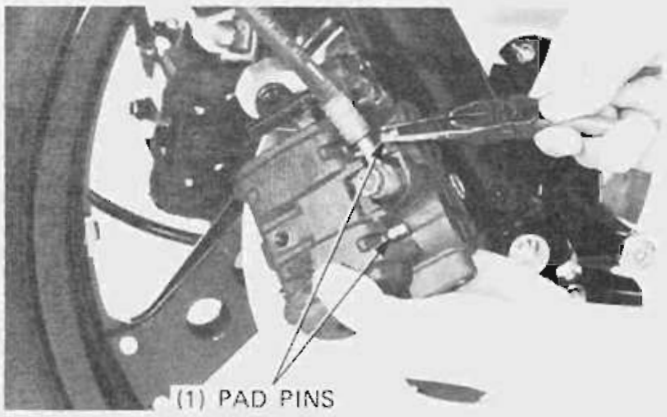
NOTE

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

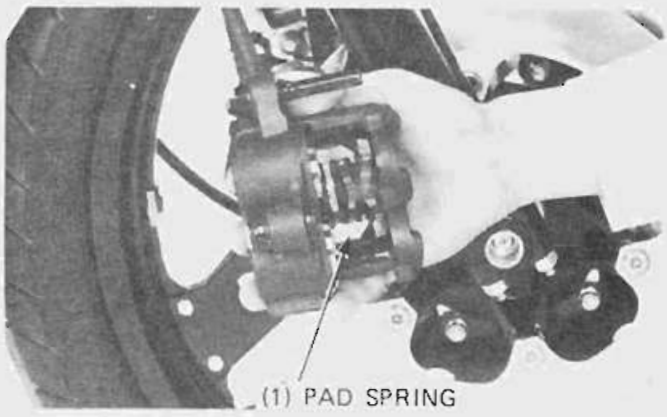
Loosen the pad pin retainer bolt.
Remove the caliper mount bolt.
Pivot the caliper up out of the way and remove the caliper from the bracket.



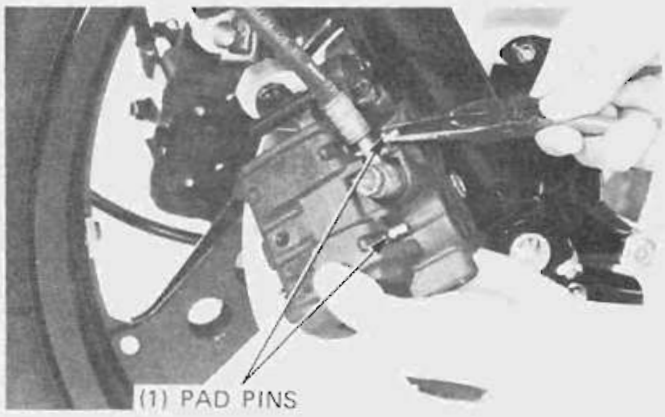
Remove the pad pin retainer and pull the pad pins out of the caliper.
Remove the brake pads.



Position the pad spring in the caliper as shown.

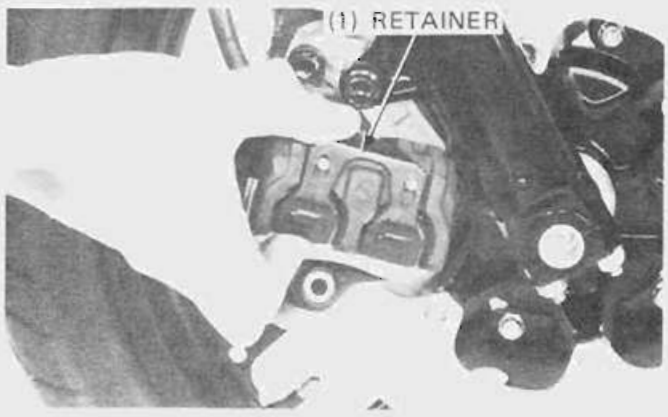


Install the new pads in the caliper.
Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.

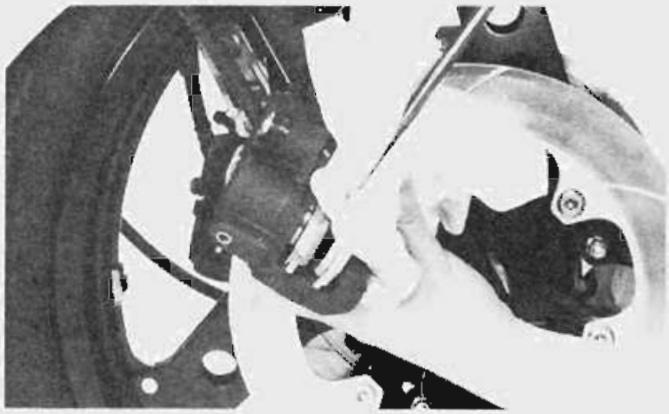


Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.

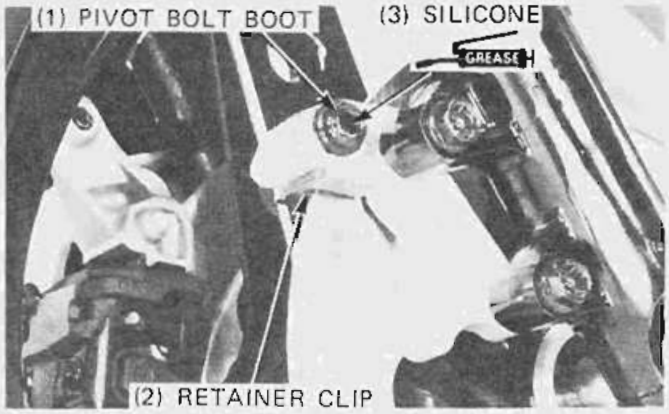
Install the pad pin retainer bolt.



Push the caliper pistons in all the way.



Apply silicone grease to the caliper pivot bolt and the inside of the pivot bolt boot.
Make sure that the retainer clip is in position on the caliper bracket.

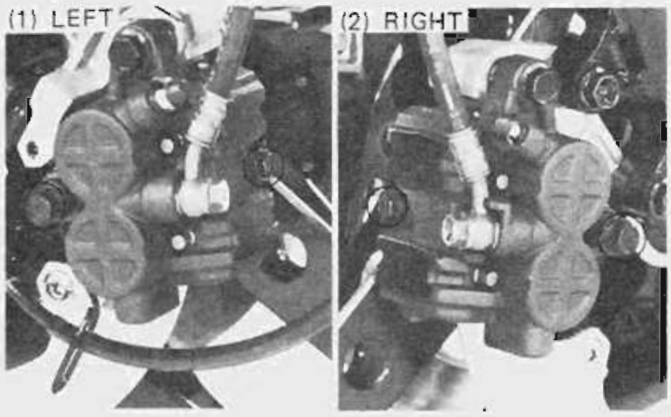


Insert the caliper pivot bolt into the caliper bracket and pivot the caliper down so that the brake disc is positioned between the pads, being careful not to damage the pads.
Install the caliper mount bolt and tighten it.

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

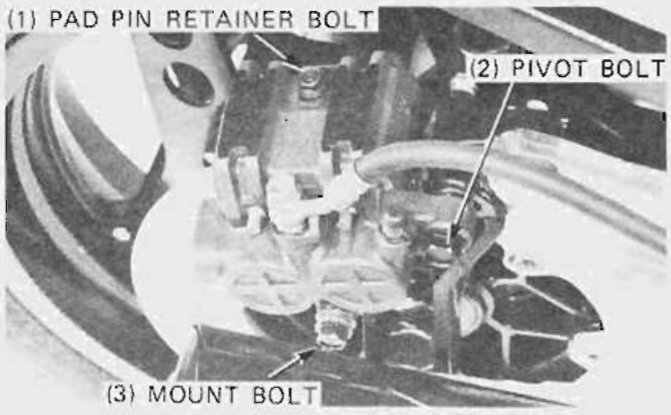
Tighten the pad pin retainer bolt.

TORQUE: 8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)

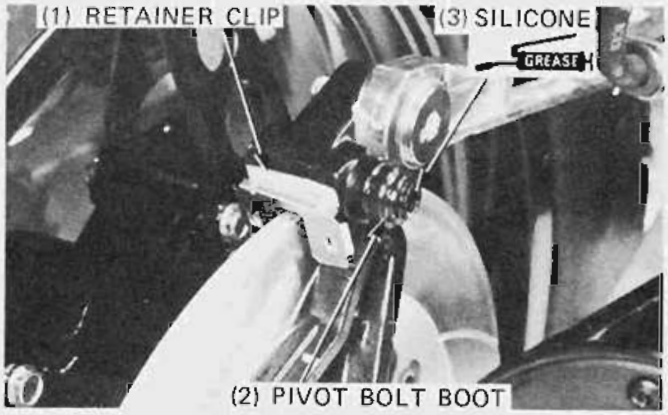


REAR BRAKE PAD REPLACEMENT

Loosen the pad pin retainer bolt.
Remove the caliper pivot bolt and mount bolt.
Remove the caliper from the bracket and replace the pads using the same method as used for front brake pad replacement.



Before installing the caliper onto the bracket, apply silicone grease to the inside of the pivot bolt boot and make sure that the retainer clip is in position on the bracket.

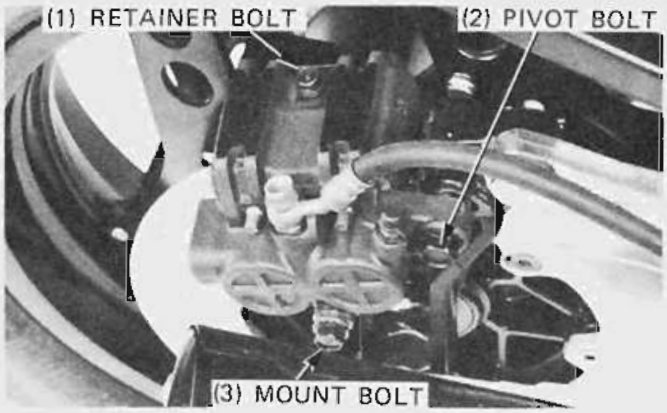


Place the caliper over the disc so that the disc is positioned between the pads, being careful not to damage the pads, and install the caliper onto the bracket.

Apply silicone grease to the caliper pivot bolt and install the caliper mount bolt and pivot bolt.
Tighten the bolts.

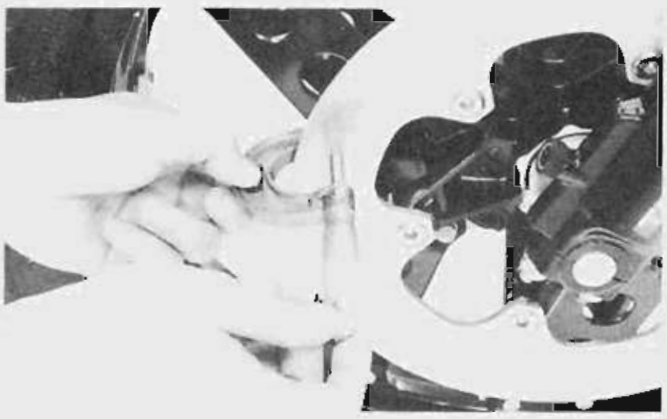
TORQUE:

Caliper mount bolt:	**20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)**
Caliper pivot bolt:	**25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)**



Tighten the pad pin retainer bolt.

TORQUE: 8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)



DISC THICKNESS

Measure the thickness of the disc.

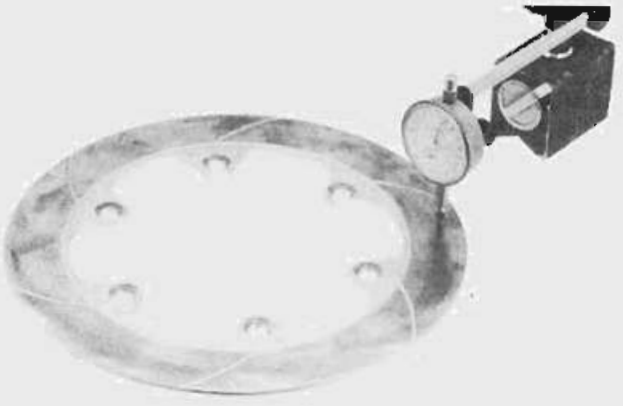
SERVICE LIMITS:
Front: 4.0 mm (0.16 in)
Rear: 6.0 mm (0.24 in)

DISC WARPAGE

Remove the brake disc from the wheel (pages 15-7, 16-3).

Measure the brake disc for warpage.

SERVICE LIMIT: 0.30 mm (0.012 in)



FRONT MASTER CYLINDER

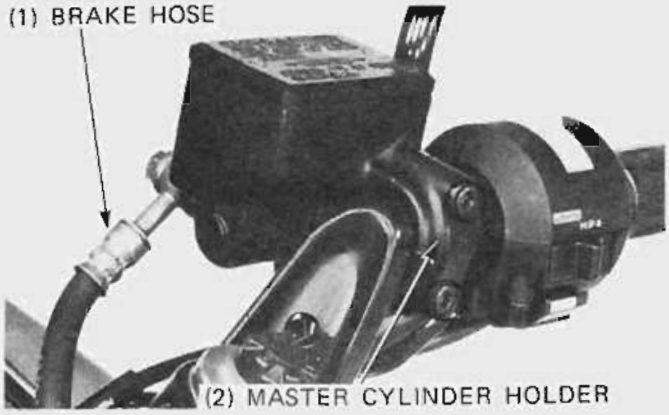
DISASSEMBLY

Drain the brake fluid from the hydraulic system (page 17-3).

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

CAUTION

- *Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

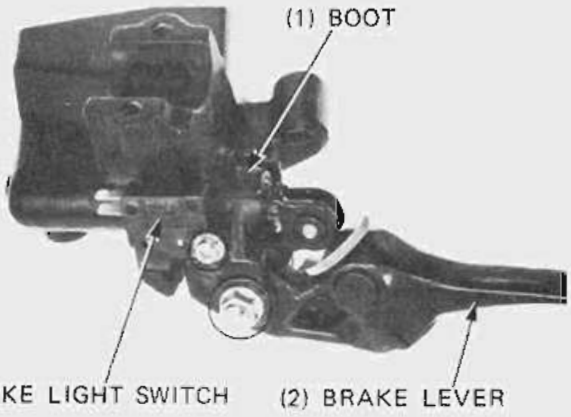


Remove the master cylinder holder and the master cylinder.

Remove the rear view mirror (VF1000F model only).

Remove the brake lever and brake light switch from the master cylinder body.

Remove the piston boot.



Remove the snap ring from the inside of the master cylinder body.

Remove the master piston, primary cup and spring from the master cylinder body.

Clean the master cylinder, reservoir and master piston in clean brake fluid.



INSPECTION

Check the primary and secondary cups for wear, deterioration or damage.

Check the master cylinder and piston for wear, scratches or scoring.

Measure the master piston O.D.

SERVICE LIMIT: 15.815 mm (0.6226 in)

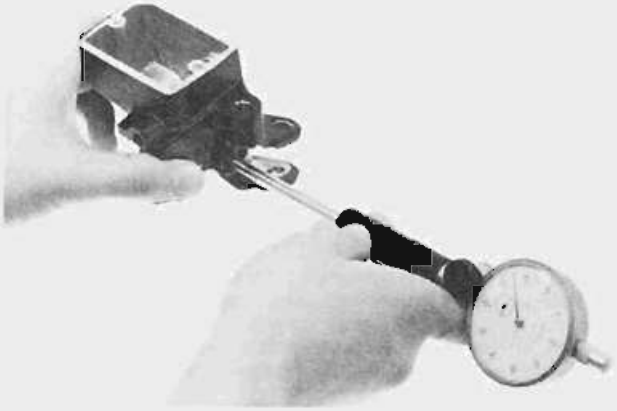


NOTE

- The master piston, piston cups, spring and snap ring must be replaced as a set.

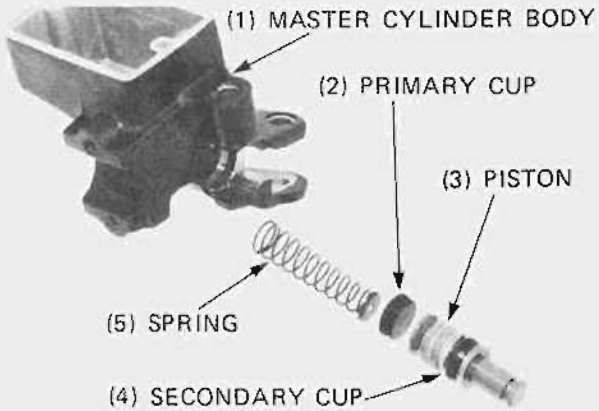
Measure the master cylinder I.D.

SERVICE LIMIT: 15.925 mm (0.6270 in)



ASSEMBLY

Coat the master piston, primary and secondary cups with clean brake fluid.
Install the spring, primary cup and master piston with the secondary cup into the master cylinder, being careful not to allow the lips of the cups to turn inside out.
Install the snap ring so that it is firmly seated in the groove.
Install the piston boot.

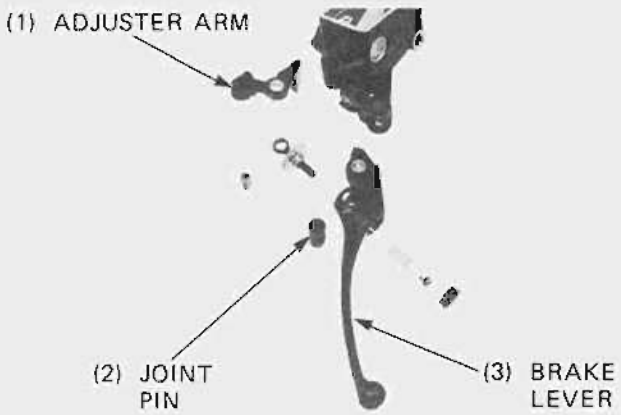


Install the brake light switch and brake lever.

NOTE

- If the brake lever adjuster has been disassembled, be sure the joint pin is installed with its arrow mark facing the adjuster arm.

Install the rear view mirror (VF1000F model only).

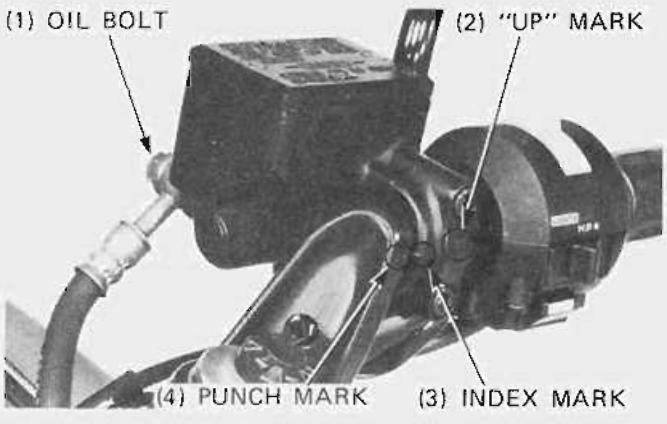


Place the master cylinder on the handlebar and install the holder with the "UP" mark facing up.
Align the index mark on the holder with the punch mark on the handlebar, and tighten the upper bolt first then tighten the lower bolt.
Connect the brake hose to the master cylinder with the oil bolt and two sealing washers.
Tighten the oil bolt.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Connect the brake light switch wires to the switch.

Fill and bleed the front brake hydraulic system (page 17-3).



BRAKE CALIPERS

REMOVAL

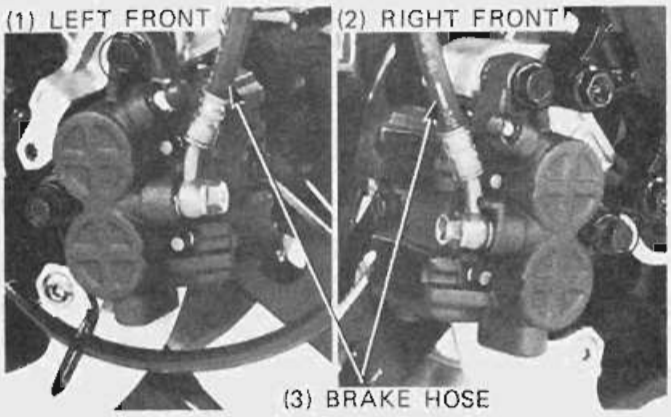
Drain the brake fluid from the hydraulic system (page 17-3).

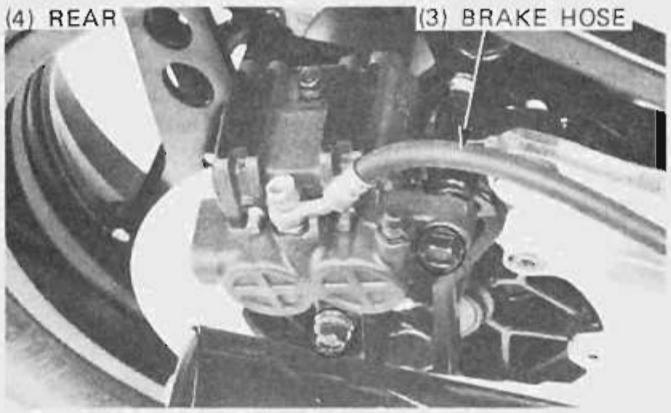
Remove the brake hose from the caliper.

CAUTION

- *Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

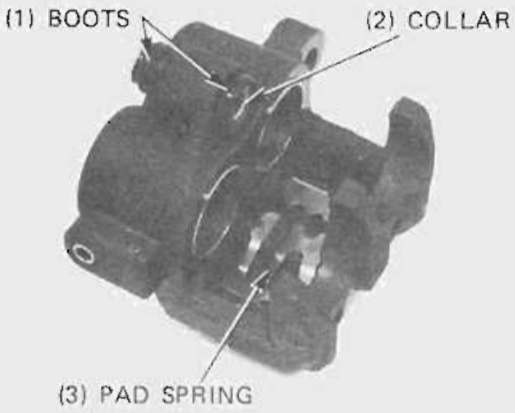
Loosen the pad pin retainer bolt.
Remove the caliper mount bolt and pivot bolt, and remove the caliper from the bracket.





DISASSEMBLY

Remove the following:
– brake pads (page 17-4)
– pad spring
– pivot boots and collar.



Place a shop towel over the pistons, place the caliper with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the pistons.

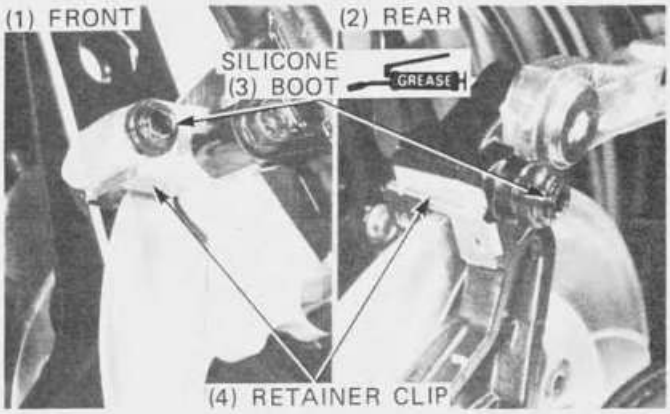
WARNING

- *Do not use high pressure air or bring the nozzle too close to the inlet.*



Make sure that the retainer clip is in position on the caliper bracket and that the caliper pivot bolt boot is in good condition.

Apply silicone grease to the inside of the pivot bolt boot.



Install the caliper assembly onto the caliper bracket and over the brake disc so that the disc is positioned between the pads, being careful not to damage the pads.

Apply silicone grease to the caliper pivot bolt and install the caliper pivot bolt and mount bolt.
Tighten the pivot bolt.

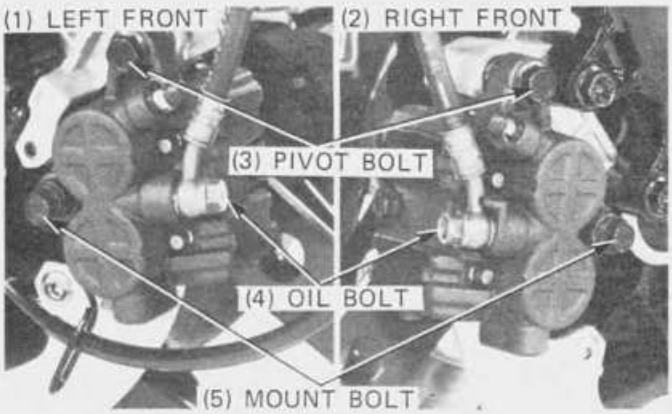
TORQUE: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

Tighten the mount bolt.

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

Tighten the pad pin retainer bolt.

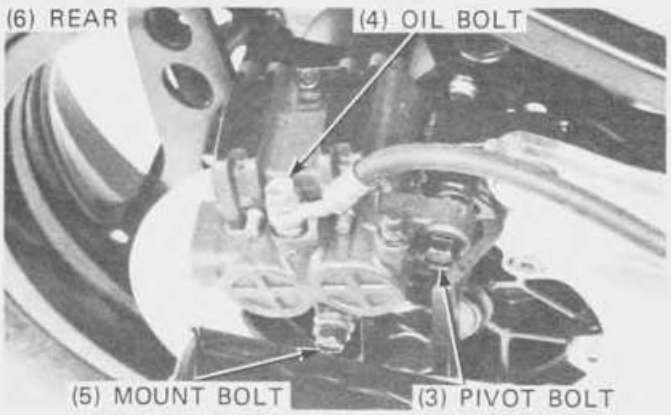
TORQUE: 8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)



Connect the brake hose to the caliper with the oil bolt and two sealing washers.
Tighten the oil bolt.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Fill and bleed the brake hydraulic system (page 17-3)



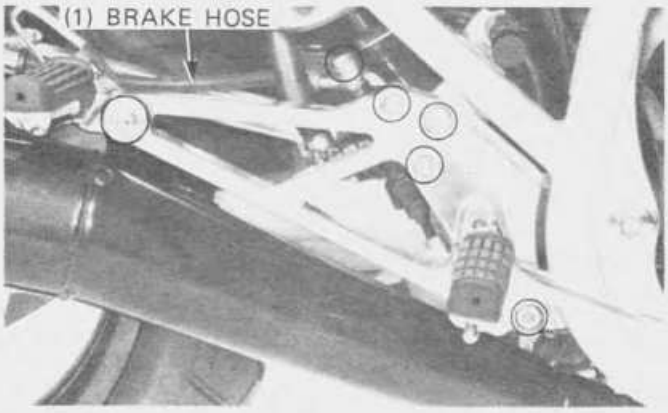
REAR MASTER CYLINDER

REMOVAL

Drain the rear brake hydraulic system (page 17-3).
Remove the brake hose bolt and disconnect the brake hose.

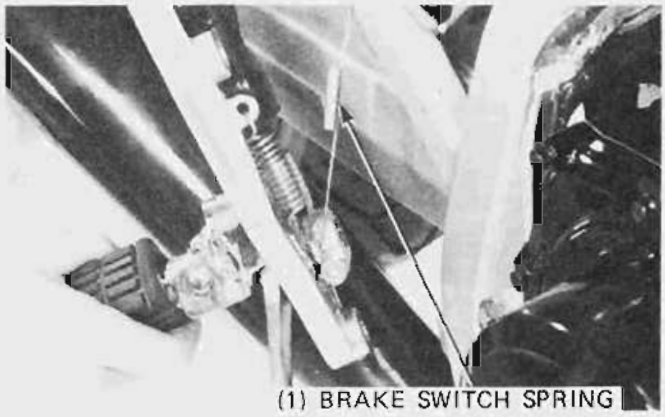
CAUTION

- *Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

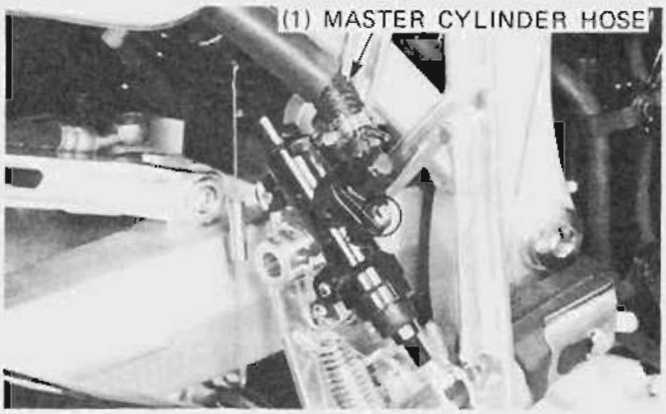


Loosen the rear master cylinder mount bolts.
Remove the right footpeg bracket.

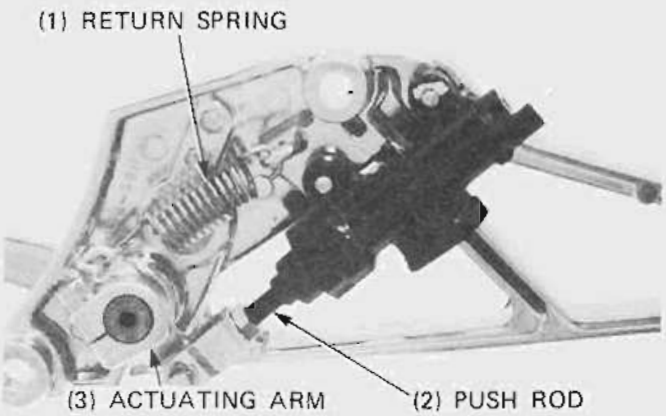
Unhook the rear brake switch spring from the rear brake actuating arm.



Remove the hose connector screw and disconnect the master cylinder hose.



Unhook the brake pedal return spring from the actuating arm.
Remove the actuating arm bolt.
Remove the master cylinder mount bolts and remove the master cylinder and actuating arm together.
Remove the cotter pin, washer and joint pin, and disconnect the actuating arm from the master cylinder push rod.



DISASSEMBLY

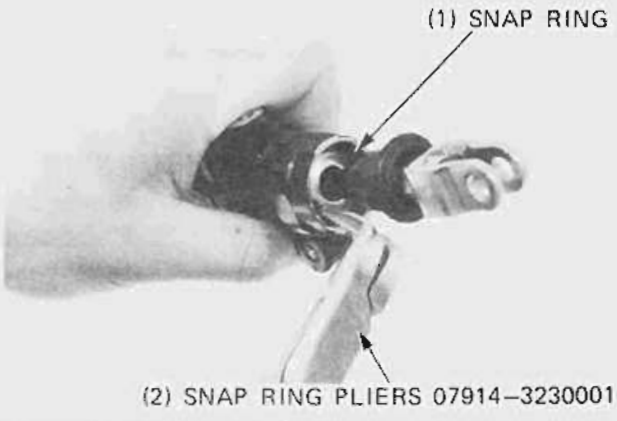
Remove the rubber boot.

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

Remove the master piston, primary cup and spring.

It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.

Clean the master cylinder and piston with clean brake fluid.

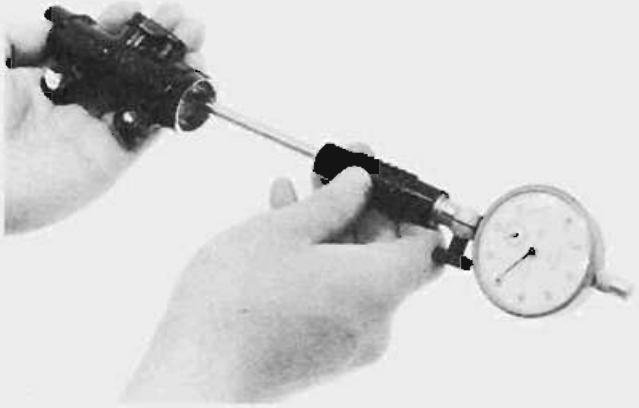


INSPECTION

Check the master cylinder bore for scratches, scoring or other damage.

Measure the master cylinder I.D.

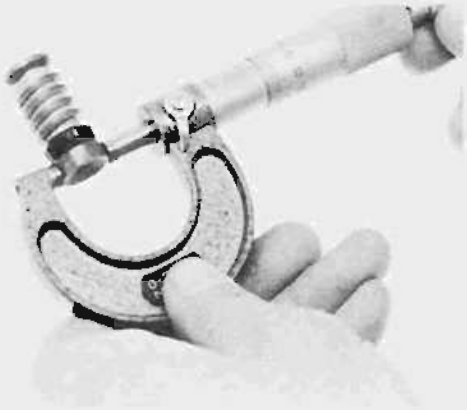
SERVICE LIMIT: 14.055 mm (0.5533 in)



Check the master piston for scratches, scoring or other damage.

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



Check the primary and secondary cups for wear, deterioration or damage.

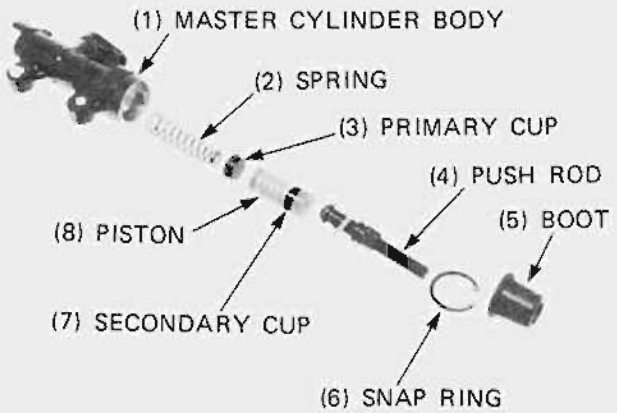
NOTE

- The master piston, spring, push rod, snap ring, boot, primary and secondary cups must be replaced as a set.

ASSEMBLY

Coat the master piston, primary and secondary cups with clean brake fluid.
Install the spring, primary cup and master piston with the secondary cup into the master cylinder, being careful not to allow the lips of the cups to turn inside out.

Install the snap ring so that it is firmly seated in the groove.
Install the piston boot.

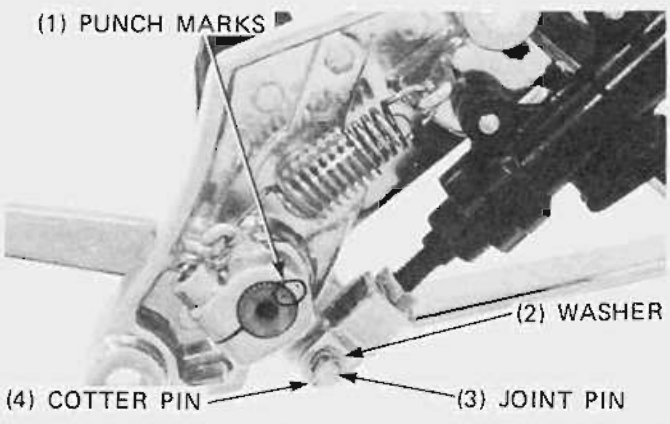


INSTALLATION

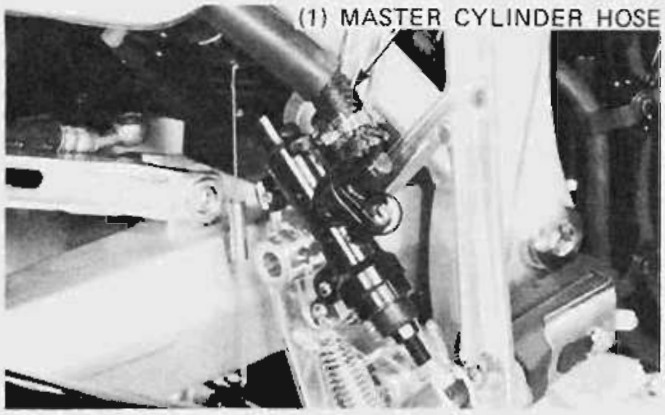
Connect the actuating arm to the master cylinder push rod with the joint pin, washer and a new cotter pin.
Install the actuating arm onto the pedal shaft, aligning the punch marks on the arm and shaft.
Install the master cylinder onto the right foot peg bracket with the two mount bolts.
Install and tighten the actuating arm bolt.

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

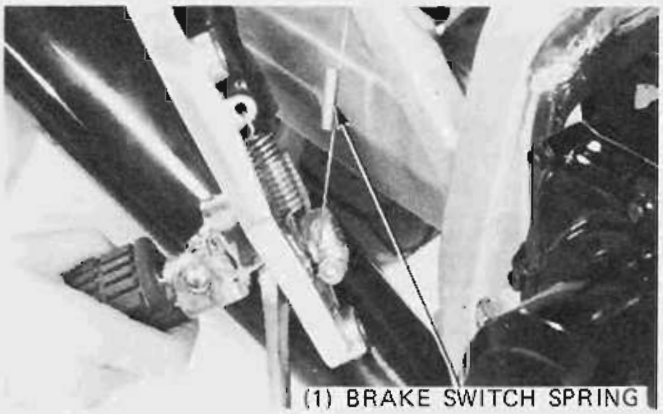
Hook the brake pedal return spring to the actuating arm.



Connect the master cylinder hose to the master cylinder with a new O-ring and screw.



Hook the rear brake switch spring to the actuating arm.

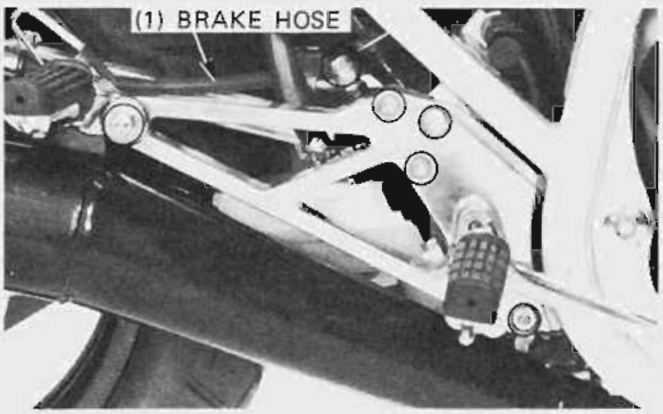


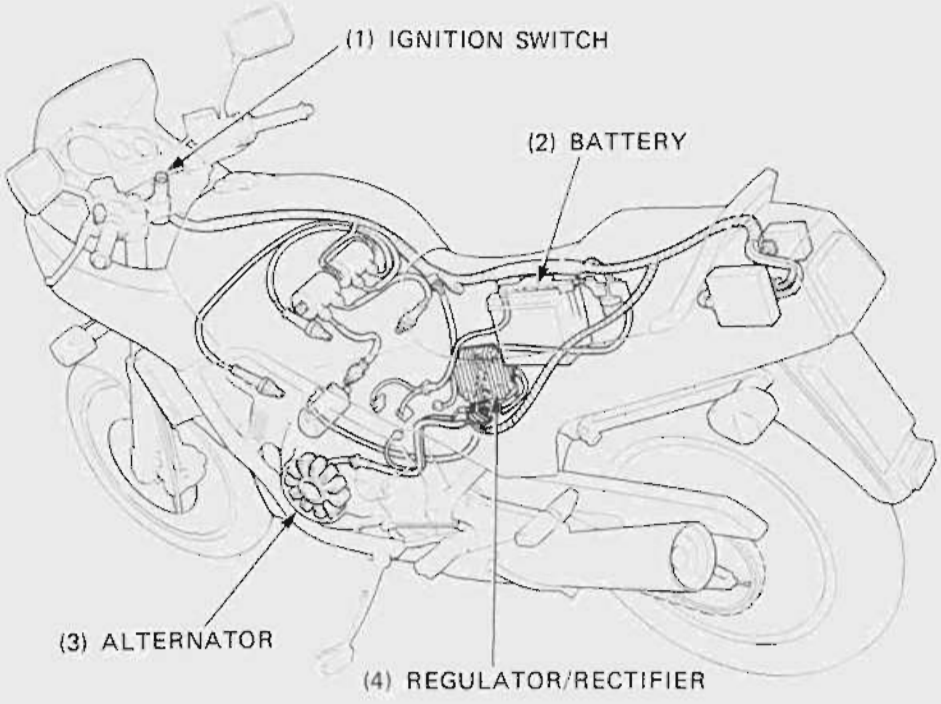
Install the right footpeg bracket.
Tighten the bracket bolts.
Tighten the rear brake master cylinder mount bolts.

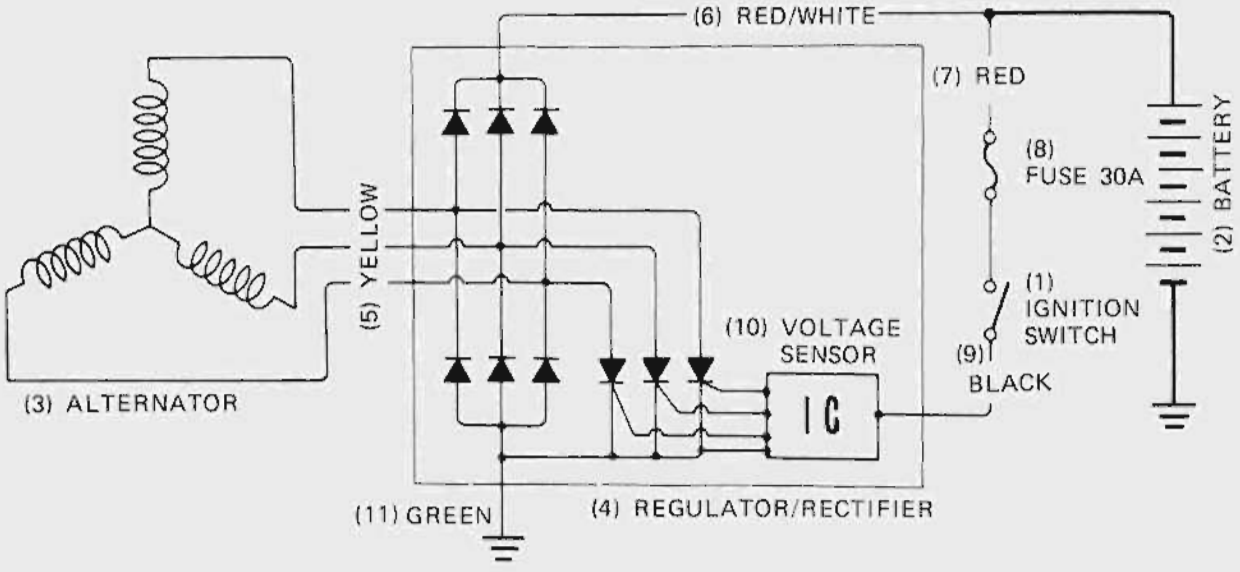
Connect the rear brake hose with the fluid bolt and two sealing washers.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Fill and bleed the rear brake system (page 17-3).




(1) IGNITION SWITCH
(2) BATTERY
(3) ALTERNATOR
(4) REGULATOR/RECTIFIER


(6) RED/WHITE
(7) RED
(8) FUSE 30A
(2) BATTERY
(1) IGNITION SWITCH
(9) BLACK
(10) VOLTAGE SENSOR
IC
(5) YELLOW
(3) ALTERNATOR
(11) GREEN
(4) REGULATOR/RECTIFIER

18 BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	18-1	BATTERY	18-2
TROUBLESHOOTING	18-1	CHARGING SYSTEM	18-3

SERVICE INFORMATION

GENERAL

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery only in an emergency; slow-charging is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

WARNING

- *Do not smoke or allow flames near a charging battery. The gas produced by a battery will explode if flames or sparks are brought near.*

- All charging system components can be tested on the motorcycle.
- Alternator removal is in Section 9.

SPECIFICATIONS

Battery	Capacity	12V 16AH	
	Specific gravity	1.280/20°C (68°F)	
	Charging rate	1.6 amperes maximum	
Alternator Capacity		1,000 min^{-1} (rpm)	5,000 min^{-1} (rpm)
		10.2A min. (No load)	25.0A min. (No load)
Voltage regulator		Transistorized non-adjustable regulator	

TROUBLESHOOTING

No power – key turned on:
- Dead battery
  - Low fluid level
  - Low specific gravity
  - Charging system failure
- Disconnected battery cable
- Main fuse burned out
- Faulty ignition switch

Low power – key turned on:
- Weak battery
  - Low fluid level
  - Low specific gravity
  - Charging system failure
- Loose battery connection

Low power – engine running:
- Battery undercharged
  - Low fluid level
  - One or more dead cells
- Charging system failure

Intermittent power:
- Loose battery
- Loose connection or short circuit charging system
- Loose connection or short circuit starting system
- Loose connection or short circuit in ignition system

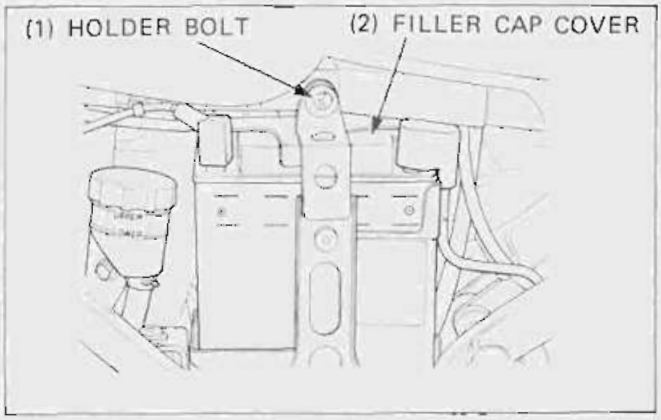
Charging system failure:
- Loose, broken or shorted wire or connection
- Faulty voltage regulator/rectifier
- Faulty alternator

BATTERY

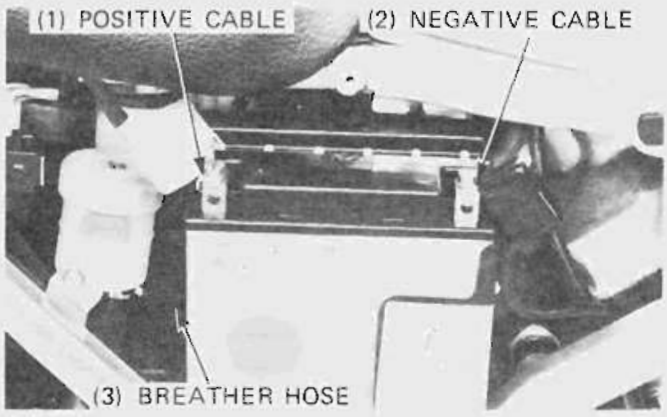
REMOVAL

Remove the frame right side cover.

Remove the battery holder bolt and pull the battery out of the frame.
Remove the filler cap cover.



Disconnect the negative cable first, then disconnect the positive cable.
Disconnect the battery breather hose from the battery and remove the battery.



TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY: 1.270–1.290 (20°C, 68°F)

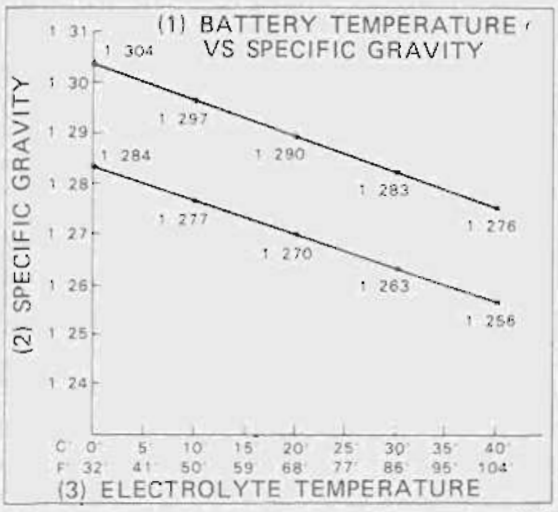
1.270–1.290	Fully charged
Below 1.260	Undercharged

NOTES

- The battery must be recharged if the specific gravity is below 1.230.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.

WARNING

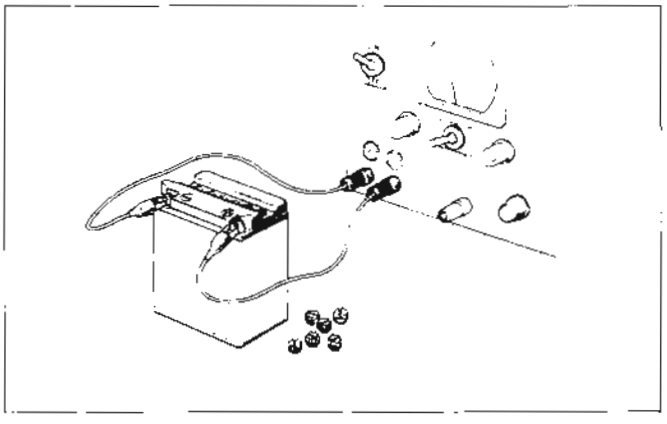
- *The battery contains sulfuric acid. Avoid contact with skin, eyes, or clothing.*
- *Antidote: Flush with water and get prompt medical attention.*



(4) Specific gravity changes by 0.007 for every 10°C.

CHARGING

Remove the battery cell caps.
Fill the battery cells with distilled water to the upper level line, if necessary.
Connect he charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.



Charging current: 1.6 amperes max.

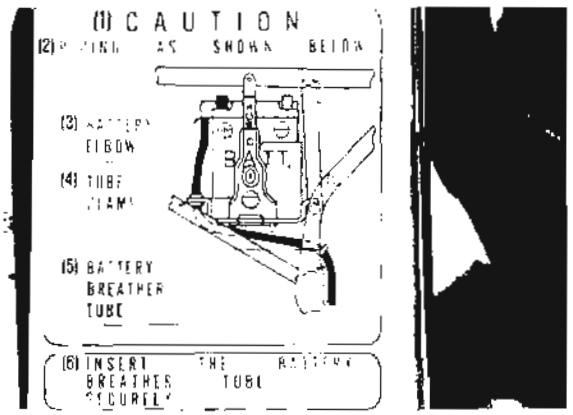
Charge the battery until specific gravity is 1.270–1.290 at 20°C (68°F).

WARNING

- *Before charging a battery, remove the cap from each cell.*
- *Keep flames and sparks away from a charging battery.*
- *Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks.*
- *Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).*

CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Route the breather tube as shown on the battery caution label.*



After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

CURRENT TEST

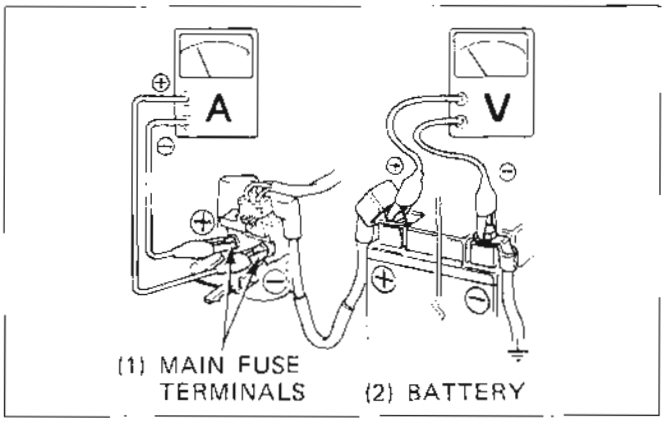
NOTE

- Be sure the battery is in good condition before performing this test.

Warm up the engine.

Remove the left and right frame side covers.
Disconnect the black wire from the regulator/rectifier coupler.
Open the main fuse cover and remove the main fuse.

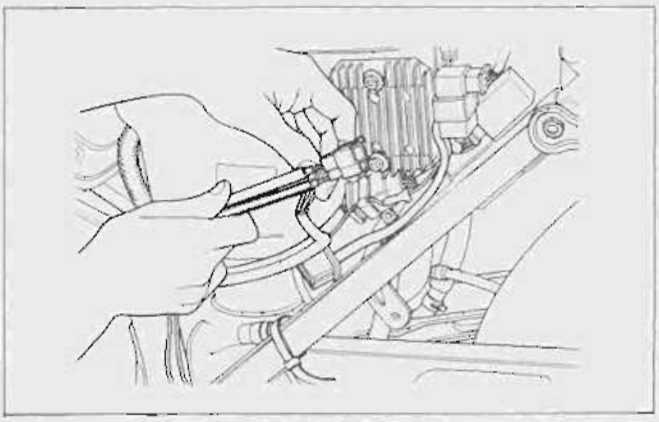
Connect a voltmeter and ammeter as shown.
Allow engine to idle.



Increase engine speed slowly.
Charging amperage should be a minimum of 10.2 amperes at 1,000 rpm and should be a minimum of 25.0 amperes at 5,000 rpm.
Check the stator (page 18-4) and then the regulator/rectifier (page 18-4), if the charging specifications are not met.

STATOR CONTINUITY TEST

Remove the left side cover.
Disconnect the alternator and regulator/rectifier coupler.
Check for continuity between the leads, and between the leads and ground.
Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.



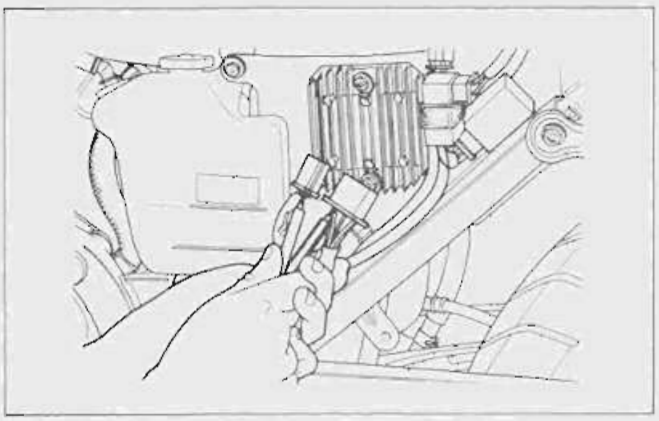
VOLTAGE REGULATOR/RECTIFIER TEST

Remove the left side cover.
Disconnect the regulator/rectifier couplers.

Check for continuity between the leads with an ohmmeter.

NOTE

- The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

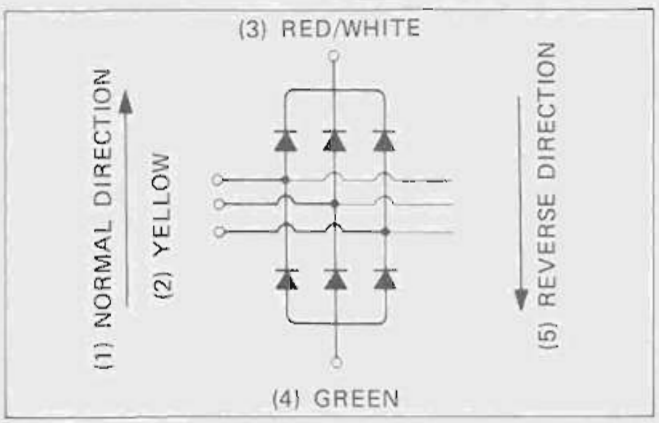


NORMAL DIRECTION: CONTINUITY

	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

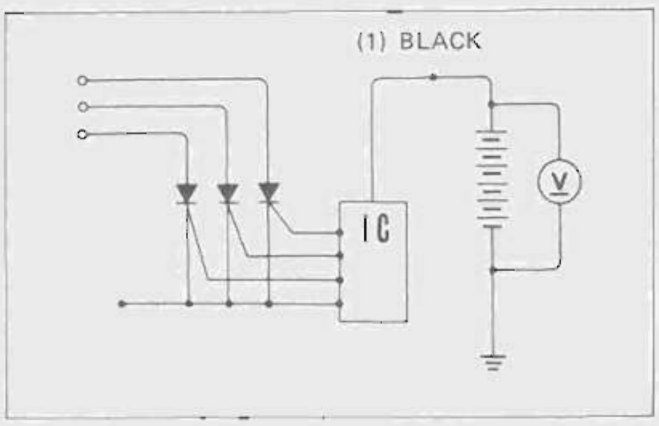
REVERSE DIRECTION: NO CONTINUITY

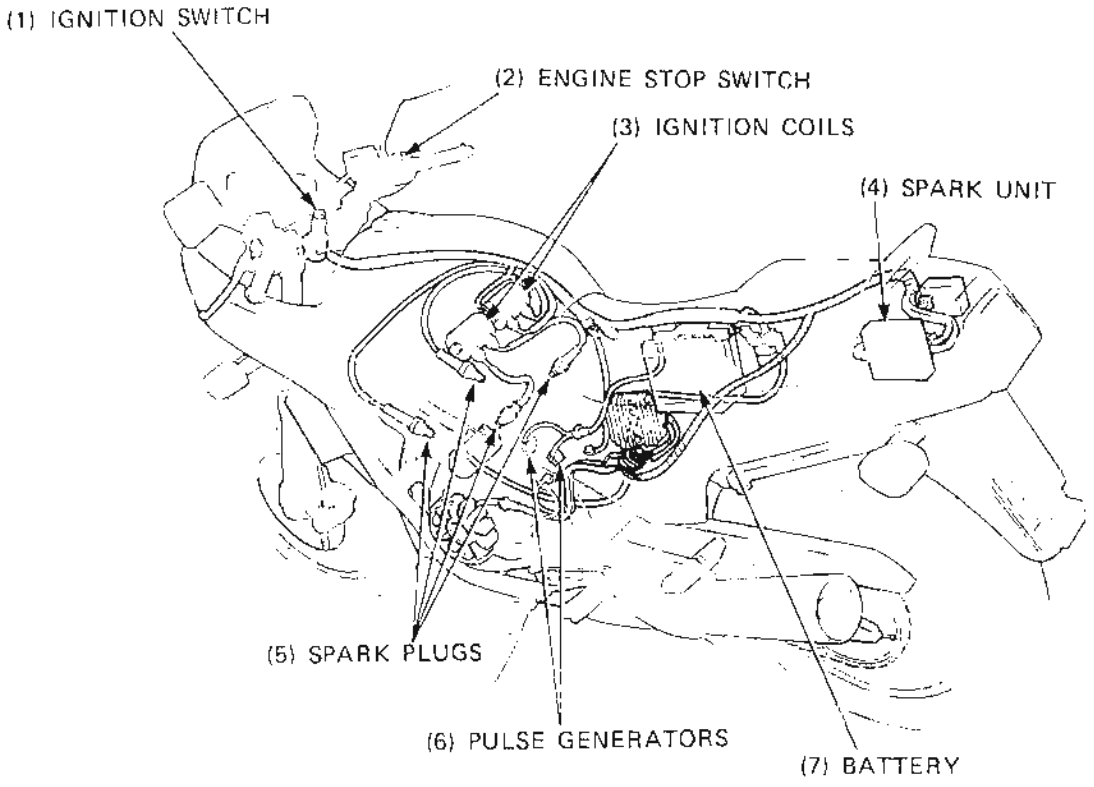
	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE

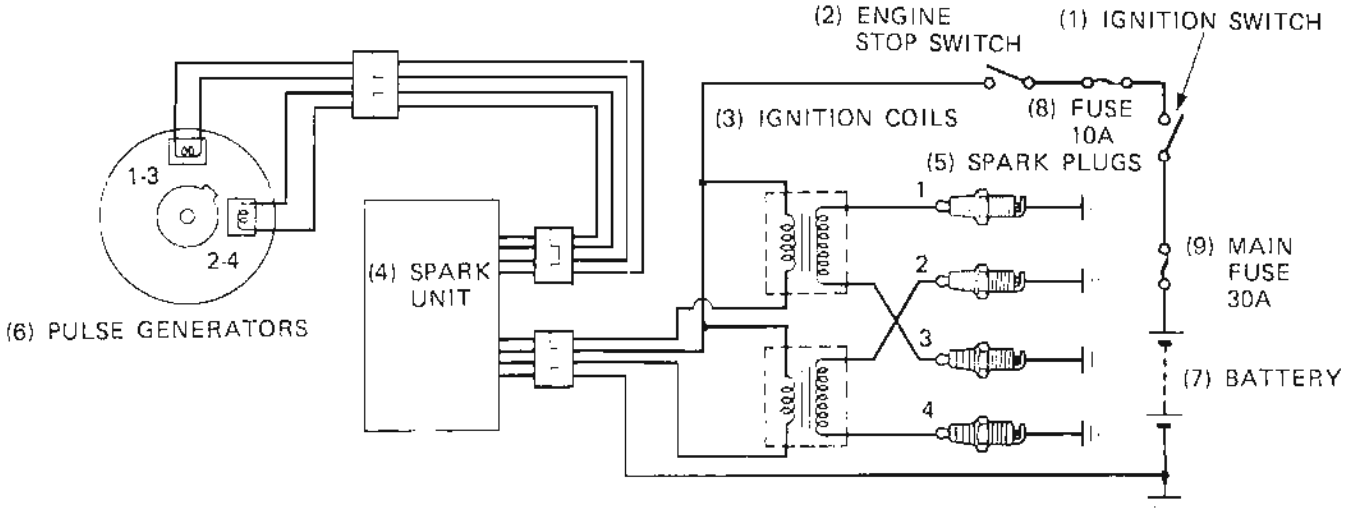


VOLTAGE REGULATOR PERFORMANCE TEST

Connect a voltmeter across the battery.
Check regulator performance with the engine running. The regulator must divert current to ground when battery voltage reaches 14.0 ~ 15.0 V.




(1) IGNITION SWITCH
(2) ENGINE STOP SWITCH
(3) IGNITION COILS
(4) SPARK UNIT
(5) SPARK PLUGS
(6) PULSE GENERATORS
(7) BATTERY


(2) ENGINE STOP SWITCH
(1) IGNITION SWITCH
(3) IGNITION COILS
(8) FUSE 10A
(5) SPARK PLUGS
1-3
2-4
(6) PULSE GENERATORS
(4) SPARK UNIT
1
2
3
4
(9) MAIN FUSE 30A
(7) BATTERY

19 IGNITION SYSTEM

SERVICE INFORMATION	19-1	IGNITION TIMING	19-2
TROUBLESHOOTING	19-1	TRANSISTORIZED IGNITION SYSTEM	19-3
IGNITION COIL	19-2		

SERVICE INFORMATION

GENERAL

- A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments can be made.

SPECIFICATIONS

< >: U

			ND	NGK
Spark plug	Standard		X27EPR-U9 <X27EP-U9>	DPR9EA-9 <DP9EA-9>
	For cold climate Below 5°C (41°F)		X24EPR-U9 <X24EP-U9>	DPR8EA-9 <DP8EA-9>
Spark plug gap			0.8–0.9 mm (0.031–0.035 in)	
Ignition timing			At idle 10° BTDC	
			Full advance 37° BTDC/3,800 rpm	
Ignition coil resistance	Primary coil			2.4–3.0 Ω
	Secondary coil	With plug cap and wire		21–28 kΩ
		Without plug cap and wire		13.6–15.4 kΩ
Pulse generator		Resistance		Approximately 470 Ω
		Air gap		0.3–0.9 mm (0.012–0.035 in)

TOOL

Special
Timing inspection cover 07998–MB40000

TROUBLESHOOTING

The ignition system has two sub-systems; one for the No. 1 and No. 3 cylinders and one for the No. 2 and No. 4 cylinders. Determine which sub-system is faulty, then proceed to the detailed tests below.

Engine cranks but will not start
- Engine stop switch OFF
- No spark at plugs
- Faulty transistorized spark unit
- Faulty pulse generator

No spark at plug
- Engine stop switch OFF
- Poorly connected, broken or shorted wires
  - Between ignition switch and engine stop switch
  - Between spark unit and engine stop switch
  - Between spark unit and ignition coil
  - Between ignition coil and plug
  - Between spark unit and pulse generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty spark unit
- Faulty pulse generator

Engine starts but runs poorly
- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Intermittent short circuit
- Secondary circuit
  - Faulty plug
  - Faulty high tension wire

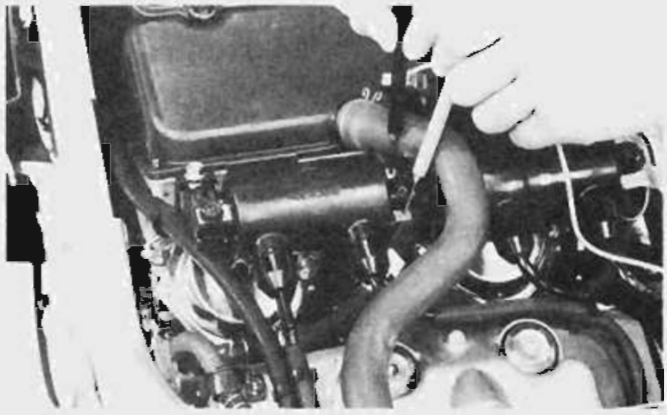
Timing advance incorrect
- Faulty pulse generator
- Faulty spark unit

IGNITION COIL

Remove the fuel tank (page 4-3).

Disconnect the primary wires from the ignition coil.
Measure the primary coil resistance between the coil primary terminals.

RESISTANCE: 2.4–3.0 Ω

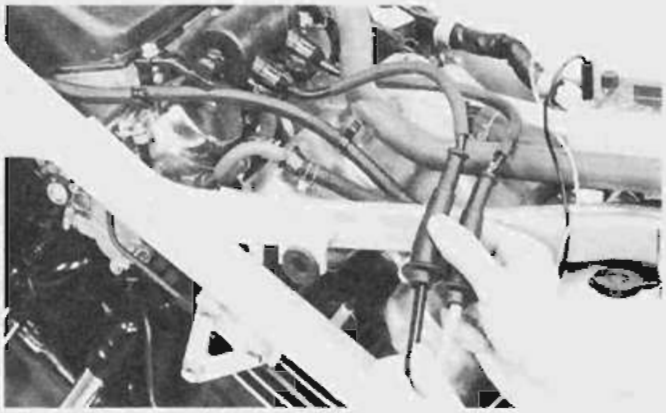


Remove the spark plug caps from the plugs.

Measure the secondary coil resistance with the spark plug wires and caps.

RESISTANCE: 21–28 kΩ

If the reading does not fall within the specifications, remove the spark plug wires from the ignition coil by loosening the retainer nuts.

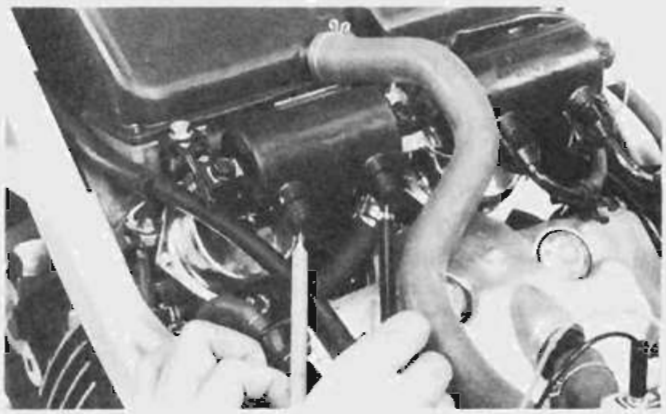


Measure the secondary coil resistance without spark plug wires and caps.

RESISTANCE: 13.6–15.4 kΩ

Replace any faulty parts with new ones.

Install the removed parts in the reverse order of removal.

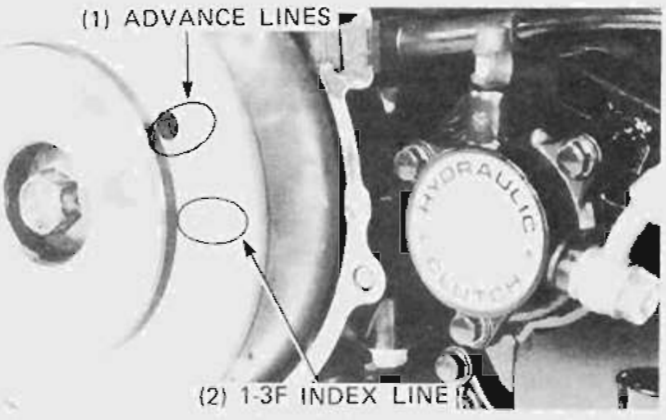


IGNITION TIMING

NOTE

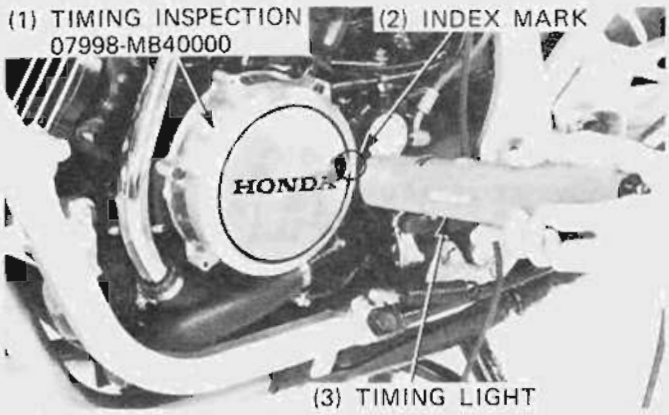
- The ignition system is transistorized and cannot be adjusted. If the ignition timing is incorrect, check the pulse generators. If the pulse generators are good, replace the spark unit.

Warm up the engine.
Remove the alternator cover.
Mark on the 1-3F index line and advance lines with a felt pen to identify.



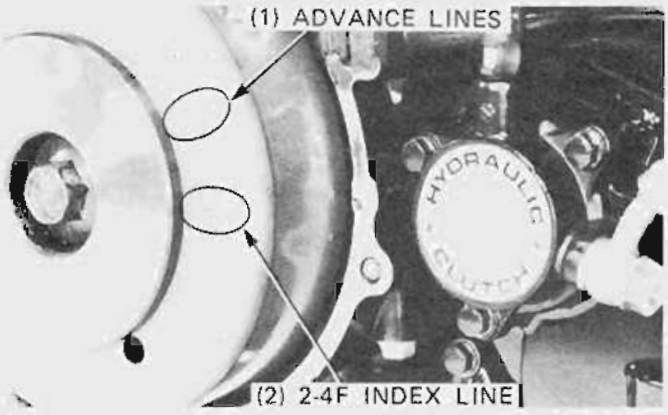
Install the timing inspection cover.
Connect he timing light to the No.1 or No.3 cylinder's spark plug wire.
Start the engine and check the ignition timing.
AT IDLE SPEED: The 1-3F index line should align with the index mark on the timing inspection cover.

1,300–1,750 rpm: The timing advance starts.
3,100–3,500 rpm: The timing advance ends and the index mark on the inspection cover should be between the full advance lines.



Connect the timing light to the No.2 or No.4 cylinder's spark plug wire and check the ignition timing for No.2 and No.4 cylinders.

After timing inspection, check the engine oil level and add if necessary.



TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR

Remove the fuel tank (page 4-3).

Disconnect the pulse generator wire coupler.
Measure the pulse generator coil resistance between the white/yellow and yellow terminals (for 1, 3 cylinders), or between white/blue and blue terminals (for 2, 4 cylinders).

RESISTANCE: Approximately 470 Ω

If the pulse generator is faulty, replace as follows:
Remove the clutch cover (page 7-8).
Remove the pulse generator mounting bolts and the pulse generators.
Make sure that the four pulse generator dowel pins are in position, then install new pulse generators.
Tighten the mounting bolts securely.
Measure the air gap between the pulse generator magnet and the rotor tip.

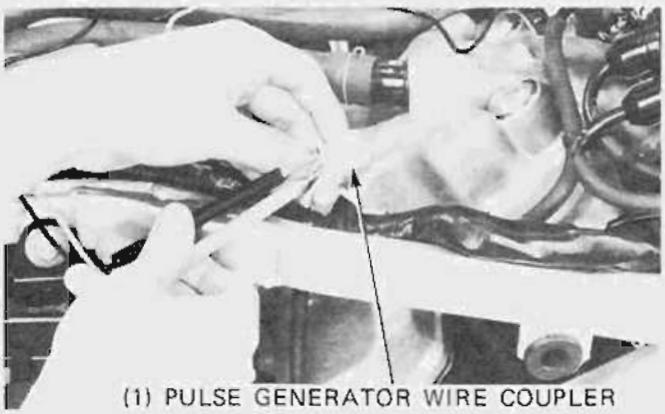
AIR GAP: 0.3–0.9 mm (0.012–0.035 in)

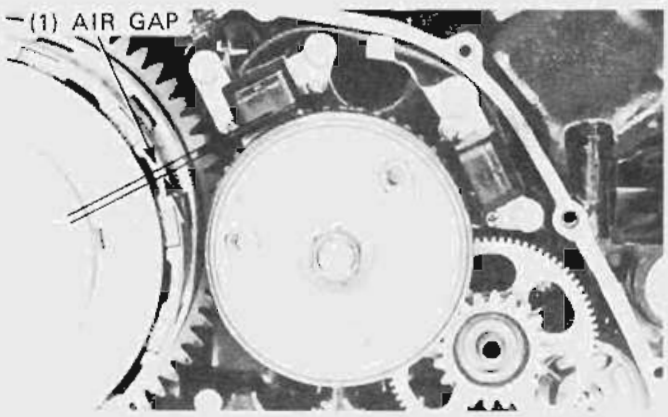
Install the clutch cover (page 7-18).
Connect the pulse generator wire coupler and install the fuel tank.

NOTE

- Route the pulse generator wire properly (page 1-9).

Check the ignition timing.





SPARK UNIT

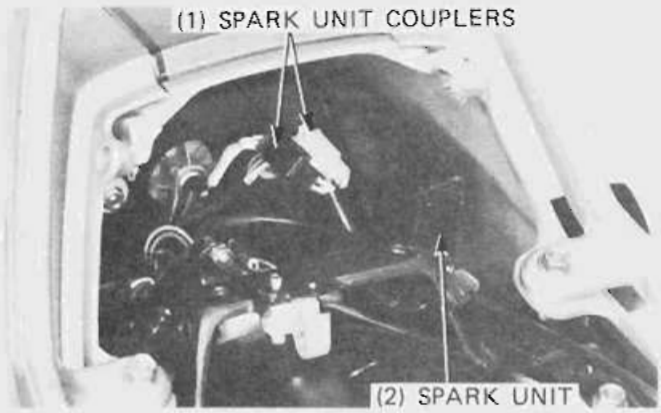
If the pulse generators, ignition coils, and wiring are good, and the ignition timing is not in specification, replace the spark unit with a new one and recheck the ignition timing.

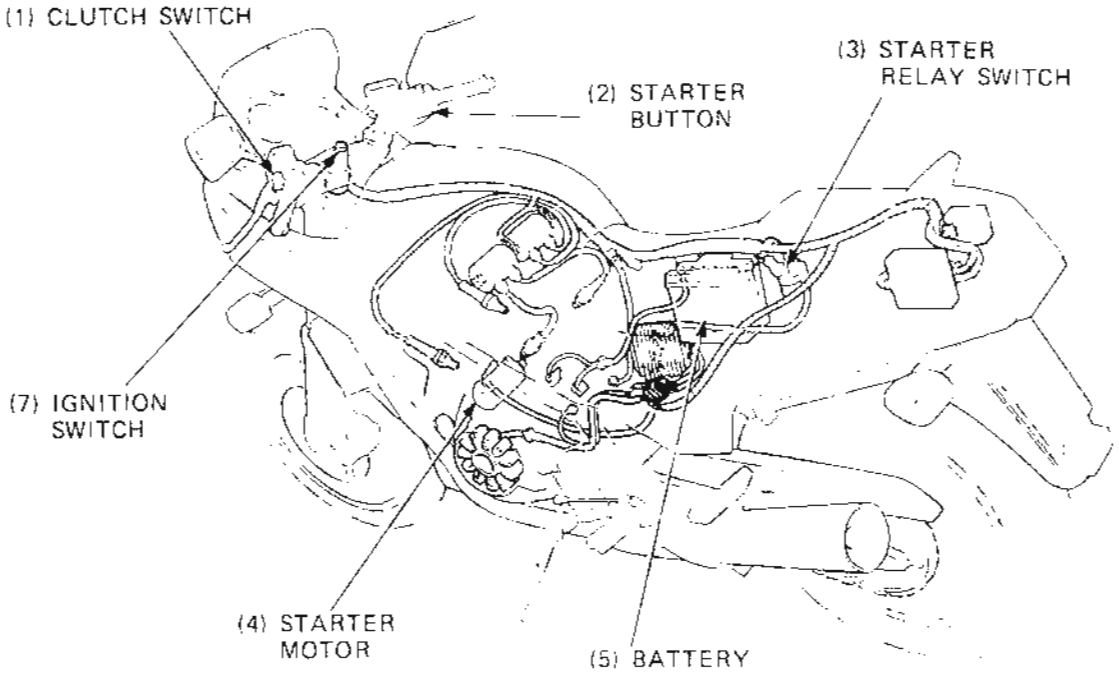
Remove the seat.
Remove the rear compartment under cover.

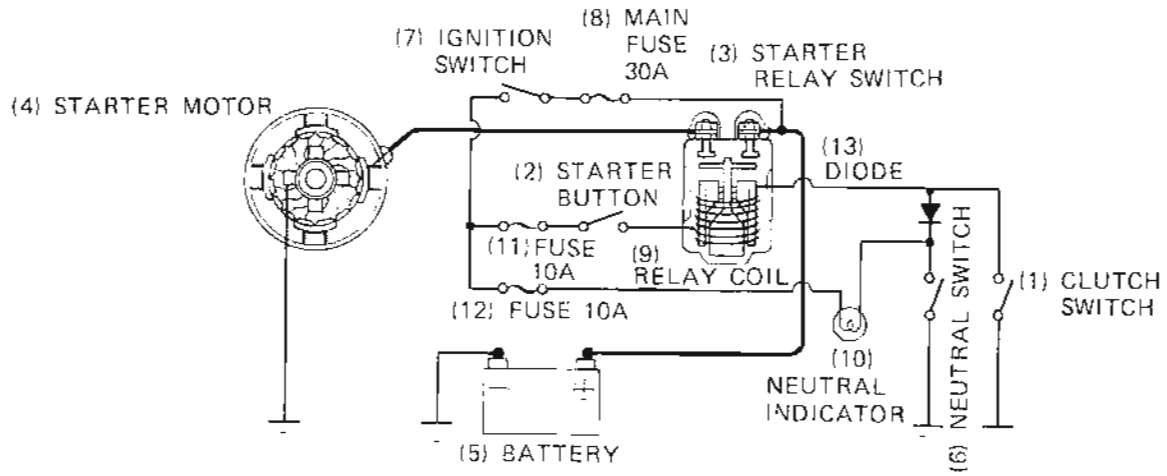


Disconnect the spark unit wire couplers and replace the spark unit.

Connect the spark unit wire couplers and install the under cover and seat.




(1) CLUTCH SWITCH
(2) STARTER BUTTON
(3) STARTER RELAY SWITCH
(7) IGNITION SWITCH
(4) STARTER MOTOR
(5) BATTERY


(7) IGNITION SWITCH
(8) MAIN FUSE 30A
(3) STARTER RELAY SWITCH
(4) STARTER MOTOR
(13) DIODE
(2) STARTER BUTTON
(11) FUSE 10A
(9) RELAY COIL
(12) FUSE 10A
(1) CLUTCH SWITCH
(10) NEUTRAL INDICATOR
(6) NEUTRAL SWITCH
(5) BATTERY

20 ELECTRIC STARTER

SERVICE INFORMATION	20-1	STARTER RELAY SWITCH	20-4
TROUBLESHOOTING	20-1	CLUTCH DIODE	20-4
STARTER MOTOR	20-2		

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	560–710 g (19.8–25.0 oz)	500 g (17.6 oz)
	Brush length	12.0–13.0 mm (0.47–0.51 in)	6.5 mm (0.26 in)

TROUBLESHOOTING

Starter motor will not turn:
- Battery discharged.
- Faulty ignition switch.
- Faulty starter switch.
- Faulty neutral switch.
- Faulty starter relay switch
- Loose or disconnected wire or cable.
- Clutch diode open.

Starter motor turns engine slowly
- Low specific gravity in battery.
- Excessive resistance in circuit.
- Binding in starter motor.

Starter motor turns, but engine does not turn:
- Faulty starter clutch.
- Faulty starter motor gears.
- Faulty starter motor or idle gear.

Starter motor and engine turns, but engine does not start
- Faulty ignition system.
- Engine problems.
  - Low compression.
  - Fouled spark plugs.

STARTER MOTOR

REMOVAL

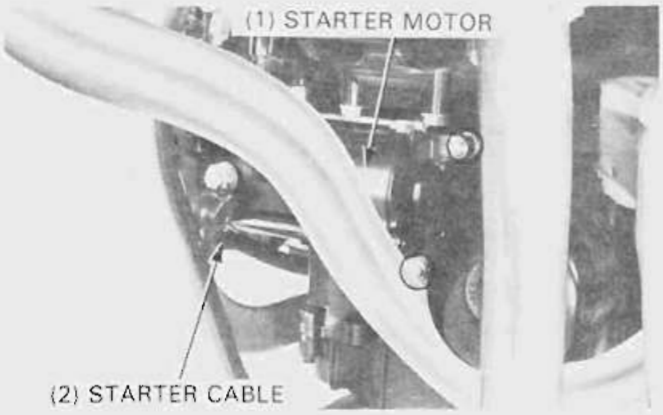
WARNING

- *With the ignition switch oFF, remove the negative cable at the battery before servicing the starter motor.*

Remove the lower cowl (page 14-1).

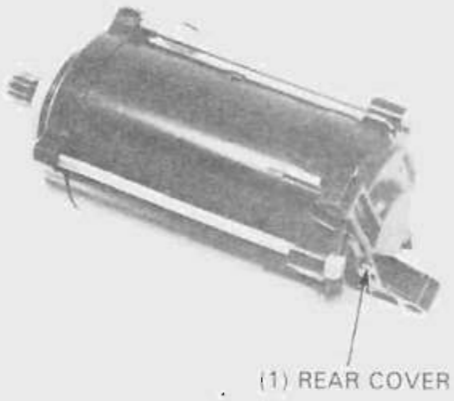
On VF1000F-II model, remove the auxiliary radiator from the frame without disconnecting the radiator hoses.

Disconnect the starter cable from the starter motor.
Remove the two starter motor mounting bolts and remove the motor from the crankcase.



BRUSH INSPECTION

Remove the three screws and the rear cover.



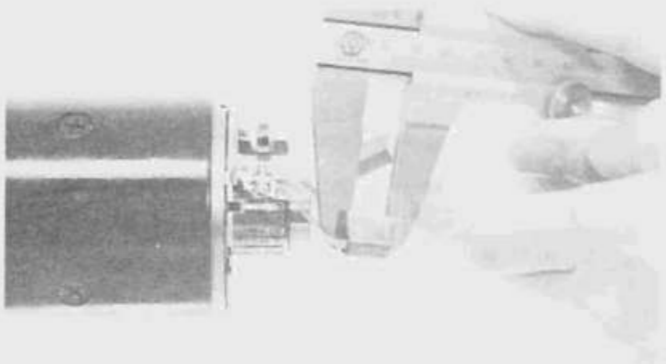
Remove the brushes from he brush holder.
Inspect the brushes and measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

Measure the brush spring tension with a spring scale.

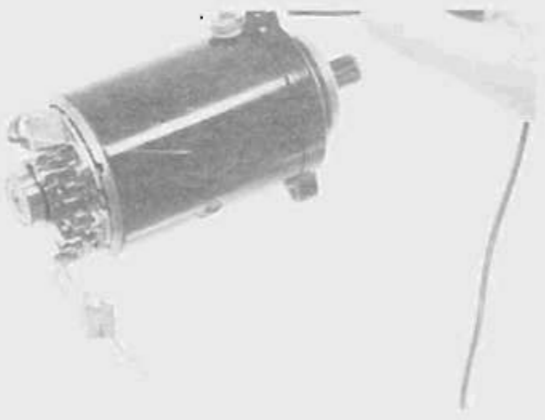
SERVICE LIMIT: 500 g (17.6 oz)

Replace the brush by removing the terminal screw if necessary.



FIELD COIL INSPECTION

Check the continuity between the cable terminal and insulated brush.
There should be continuity.
Check for continuity between the cable terminal and motor case.
There should be no continuity.
Replace the starter motor if the field coil does not have continuity or if it is shorted to the motor case.



COMMUTATOR INSPECTION

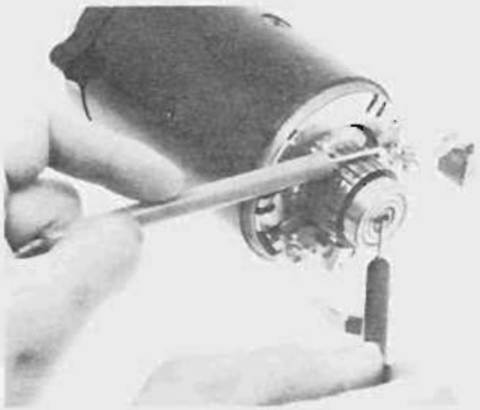
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.



CAUTION

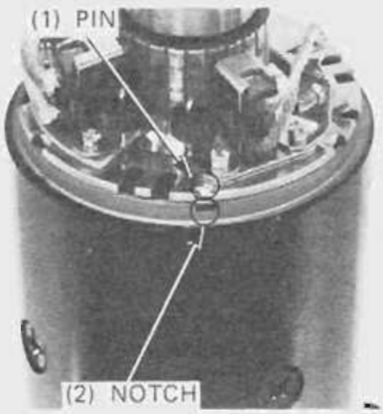
- *Do not use emery or sand paper on the commutator.*

Check the continuity between pairs of commutator bars.
There should be continuity.
Also, make a continuity check between individual commutator bars and the armature shaft.
There should be no continuity.

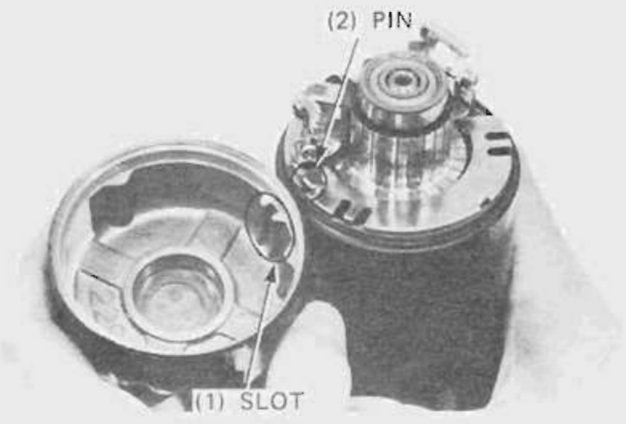


ASSEMBLY/INSTALLATION

Install the brushes into the brush holder.
Align the case notch with the brush holder pin.



Install a new O-ring onto the motor case.
Install the rear cover aligning its slot with the brush holder pin.



Align the index marks on the front cover and motor case, and install and tighten the three screws.

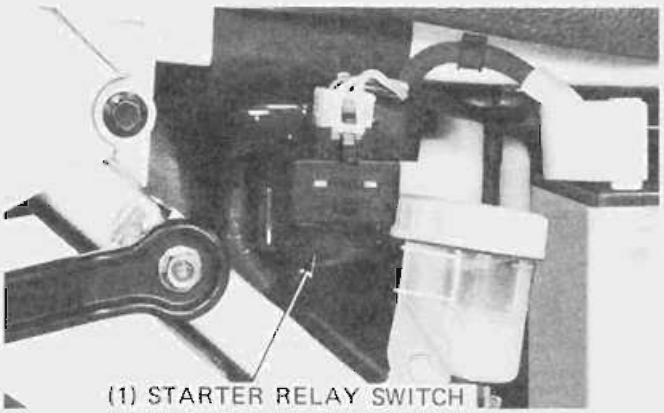
Install the starter motor in the reverse order of removal.



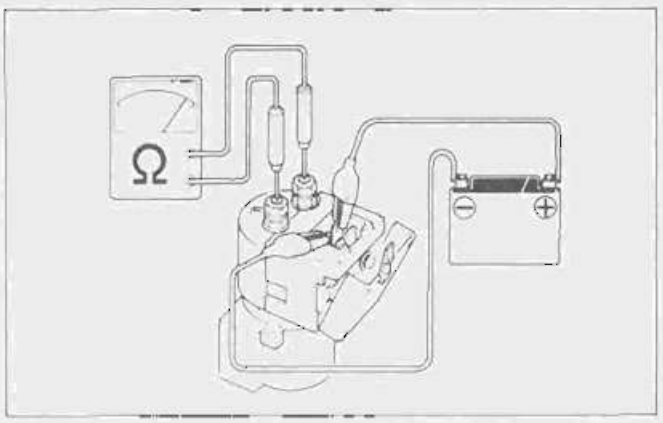
STARTER RELAY SWITCH

INSPECTION

Depress the starter switch button with the ignition ON.
The coil is normal if the starter relay switch clicks.



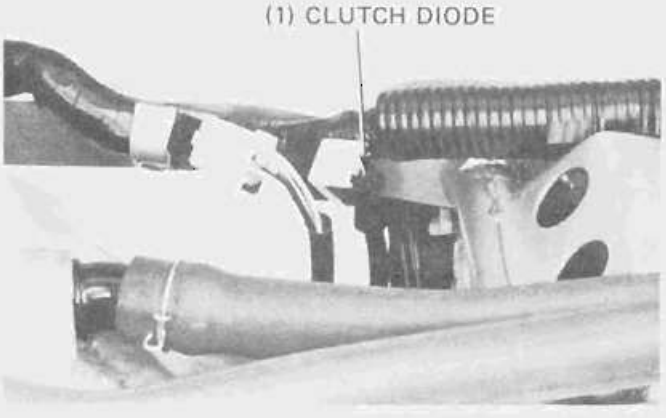
Connect an ohmmeter to the starter relay switch terminals.
Connect a 12 V battery to the switch cable terminals.
The switch is normal if there is continuity.



CLUTCH DIODE

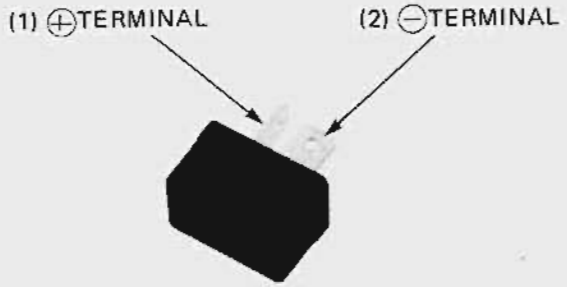
REMOVAL

Remove the fuel tank.
Remove the clutch diode from the wire harness.



INSPECTION

Connect the positive probe of the ohmmeter to the⊕terminal of the diode and connect the negative probe to the⊖terminal.
There should be continuity.
Check for continuity in the reverse direction.
There should be no continuity.



NOTE

- The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

21 SWITCHES

SERVICE INFORMATION	21-1	BRAKE AND TAILLIGHT SENSOR	21-9
OIL PRESSURE SWITCH	21-2	HEADLIGHT	21-9
BRAKE LIGHT SWITCH	21-2	INSTRUMENTS	21-11
NEUTRAL SWITCH	21-2	TACHOMETER	21-12
CLUTCH SWITCH	21-4	BRAKE/TAILLIGHT	21-12
HANDLEBAR SWITCH	21-5	TURN SIGNAL LIGHT	21-13
IGNITION SWITCH	21-6	HORN	21-13
FUSE BOX	21-6	FUEL UNIT/GAUGE	21-13
THERMOSTATIC SWITCH	21-7	FUEL PUMP RELAY	21-14
THERMOSENSOR	21-8	FUEL PUMP	21-15
TEMPERATURE GAUGE	21-8		

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.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Grey	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is specific coil resistance involved, or when checking for high resistance caused by corroded connections.

OIL PRESSURE SWITCH

Disconnect the oil pressure switch lead and remove the switch.

Check for continuity while applying pressure to the switch.

No continuity: Above 10–20 kPa (0.1–0.2 kg/cm², 1.4–2.8 psi)

Replace the switch if necessary.

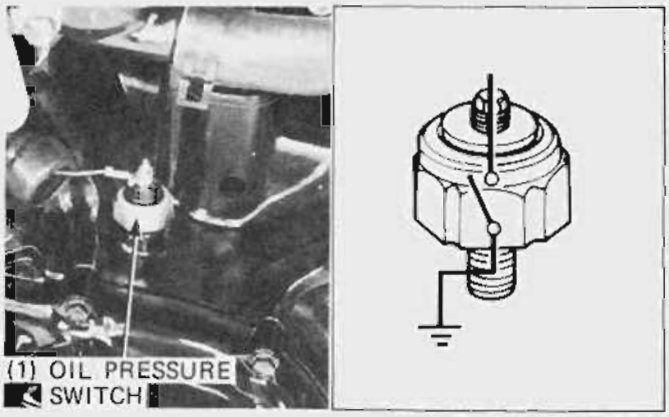
Apply a liquid sealant to the switch threads before installing the switch.

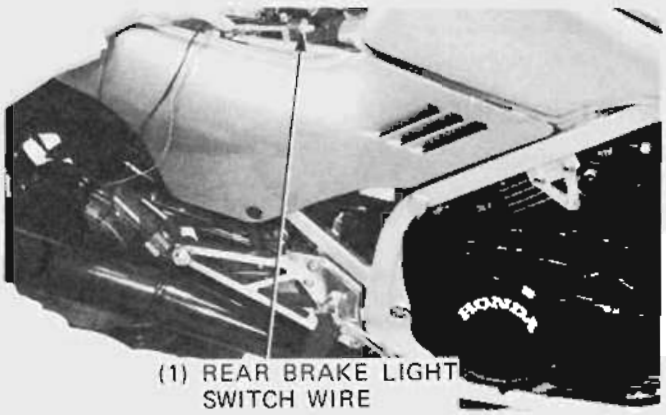
Screw the switch into the crankcase but stop two threads from the bottom. Then tighten it to the specified torque.

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

NOTE

- To prevent crankcase damage, do not overtighten the switch.





BRAKE LIGHT SWITCH

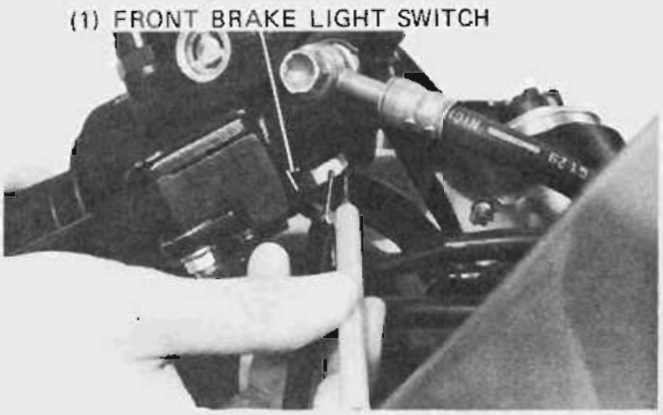
REAR

Check the rear brake light switch for continuity with the rear brake applied.

FRONT

Check the front brake light switch for continuity with the front brake applied.

Replace the switches if necessary.



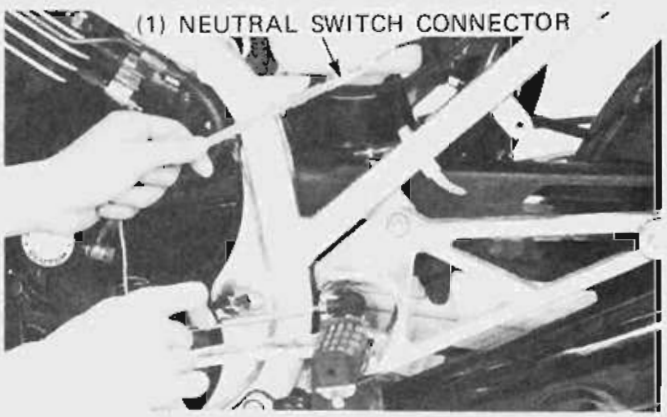
NEUTRAL SWITCH

INSPECTION

Remove the left side cover. Disconnect the neutral switch connector.

Check the switch for continuity between the switch connector terminal and ground.

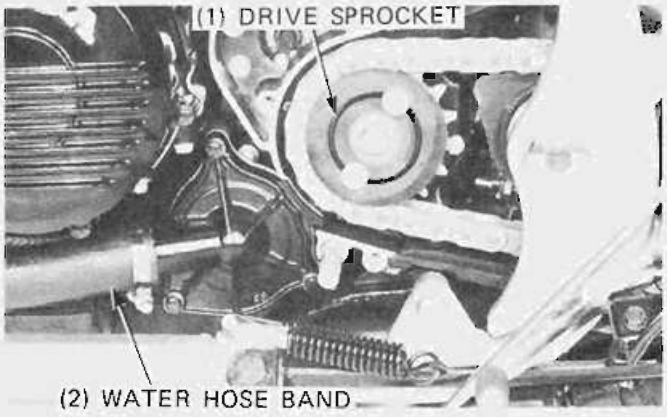
There should continuity with the transmission in neutral and no continuity with the transmission in any gear.



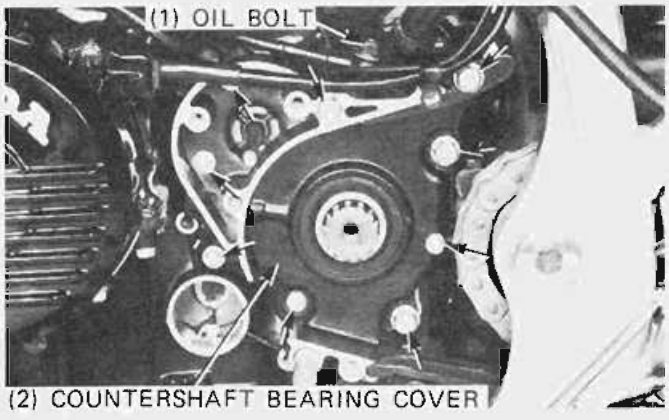
REMOVAL

Remove the slave cylinder and drive sprocket cover (page 6-10).

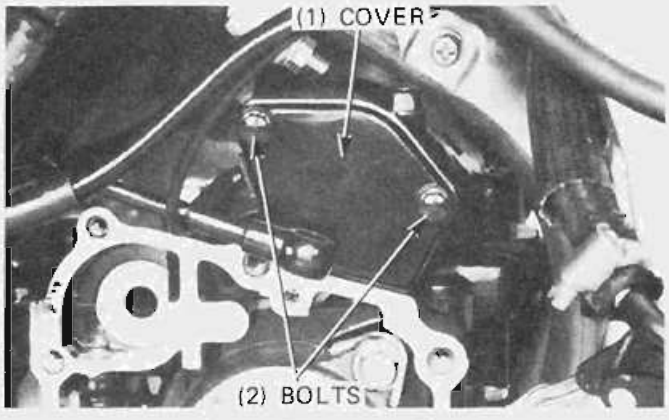
Loosen the water hose band and remove the water pump by removing the mount bolts.
Remove the drive sprocket mount bolts and drive sprocket (page 5-4).



Remove the oil bolt.
Remove the countershaft bearing cover by removing the mount bolt.



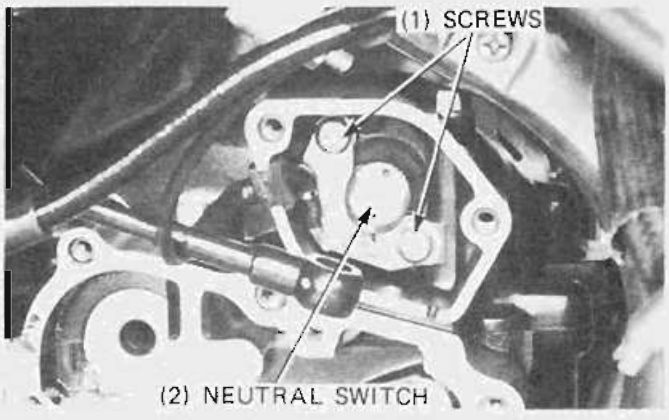
Remove the neutral switch cover bolts and cover.



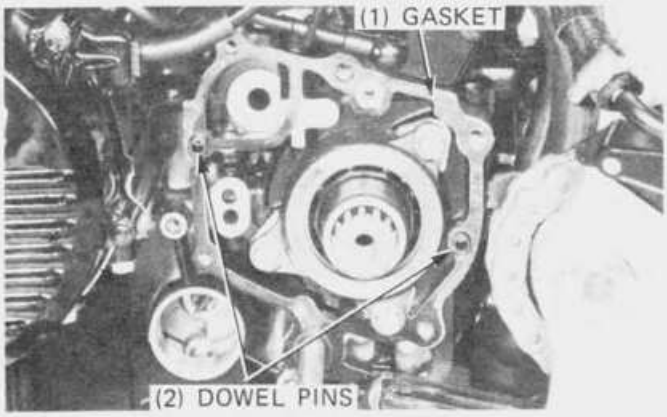
Remove the neutral switch attaching screws and the switch.

INSTALLATION

Install the neutral switch.
Install the neutral switch cover with the mount bolts.



Install the new gasket and dowel pins.



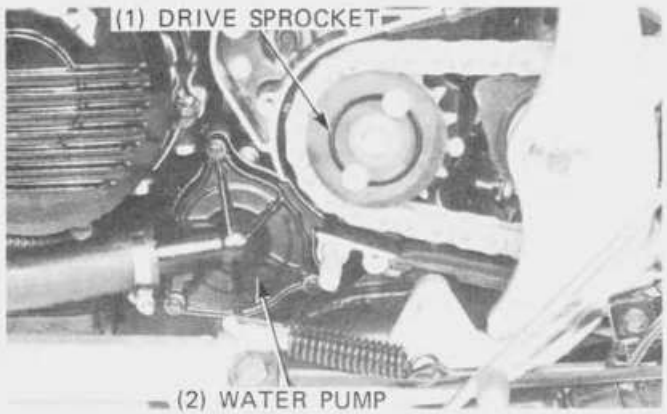
Install the countershaft bearing cover.
Tighten the oil bolt.



Install the water pump and hose.
Install the drive sprocket and tighten the drive sprocket mount bolt.

TORQUE: 50–54 N·m (5.0–5.4 kg-m, 36–39 ft-lb)

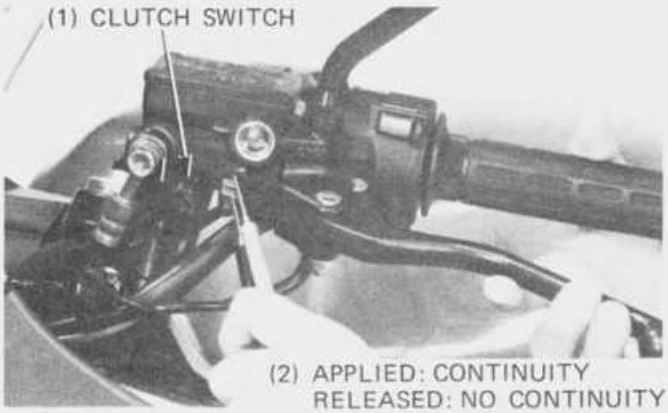
Install the clutch slave cylinder, drive sprocket cover, and gearshift pedal in the reverse order of removal.



CLUTCH SWITCH

Check the clutch switch for continuity with the clutch lever released and applied.

Replace if it is faulty.



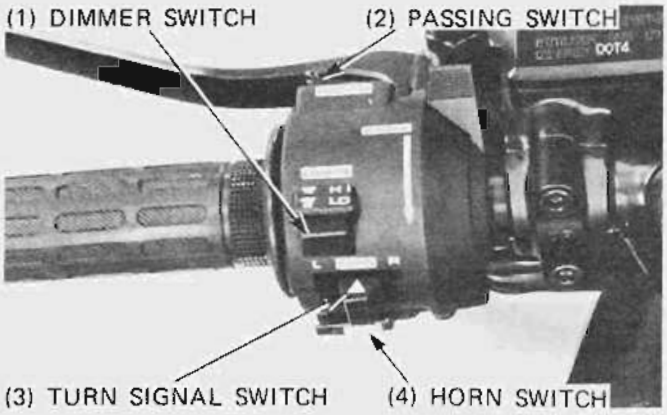
HANDLEBAR SWITCH

The handlebar cluster switches (lights, turn signals, horn, etc.) must be replaced as assemblies.

Remove the fairing (page 14-1).

Continuity tests for the components of the handlebar cluster switches as follow:

Continuity should exist between the color coded wires in each chart.



DIMMER SWITCH

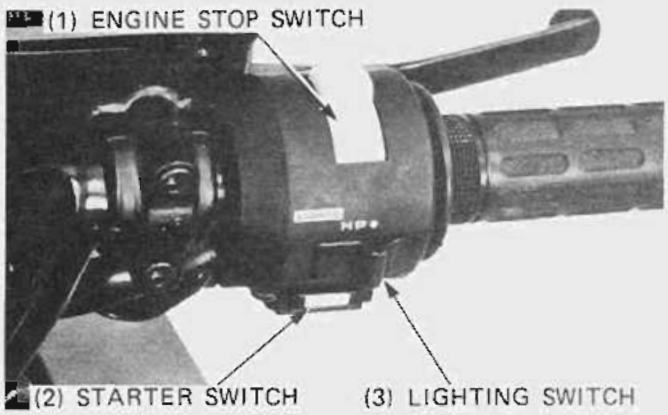
COLOR	Bu/W	W	Bu
Lo	○———	———○	
(N)	○———	———○	———○
Hi	○———		———○

PASSING SWITCH

COLOR	W/G	Bu
FREE		
PUSH	○———	———○

TURN SIGNAL SWITCH

COLOR	Gr	Lb	O
R	○———	———○	
N			
L	○———		———○



HORN SWITCH

COLOR	W/G	Lg
FREE		
PUSH	○———	———○

ENGINE STOP SWITCH

COLOR	Bl	Bl/W
OFF		
RUN	○———	———○

STARTER SWITCH

COLOR	Bl	Y/R
FREE		
PUSH	○———	———○

LIGHTING SWITCH

COLOR	Br/Bu	Bl/W	Bl/R	Bu/W
•				
P	○———	———○		
H	○———	———○	○———	———○

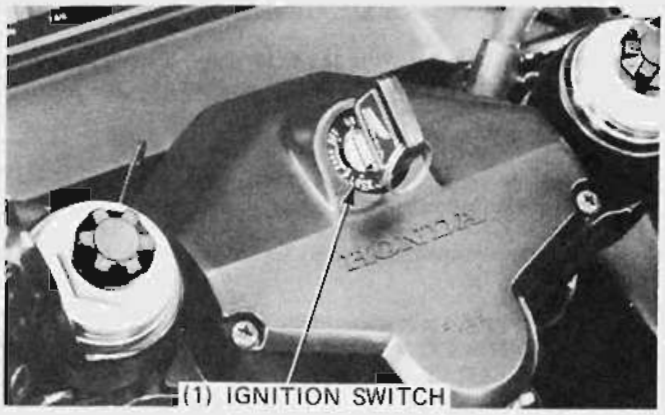
IGNITION SWITCH

INSPECTION

Remove the fairing (page 14-1) and disconnect the ignition switch coupler.

Check for continuity between the terminals in each switch position.

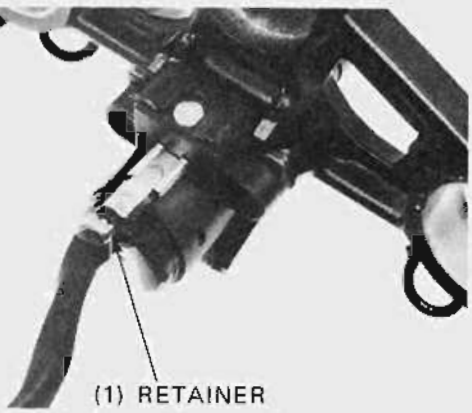
COLOR	R	R/Bl	Bu/O	Br/W	Br	Y/Bl
OFF						
ON	○	○	○	○	○	
P	○					○



REPLACEMENT

Remove the fairing (page 14-1) and top bridge (page 15-23).

Pry open the retainer.

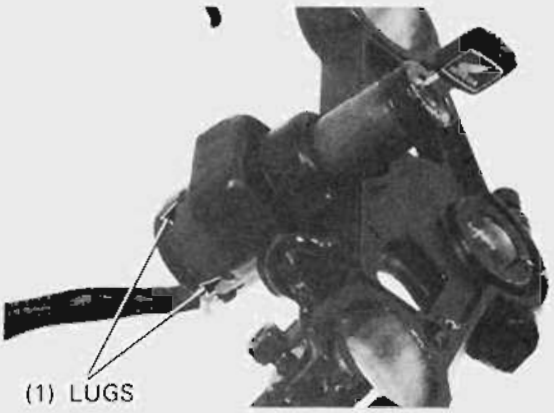


Turn the ignition key so it is partway between the ON and OFF detent positions.
Push the lugs that are locked in the slots, then pull the contact base from the switch.

NOTE

- On G and ND models, if the ignition switch lock cylinder must be replaced, remove the shear bolts that are attaching the cylinder to the top bridge, using the drill. Install a new cylinder and tighten the shear bolts until the bolt head twists off.

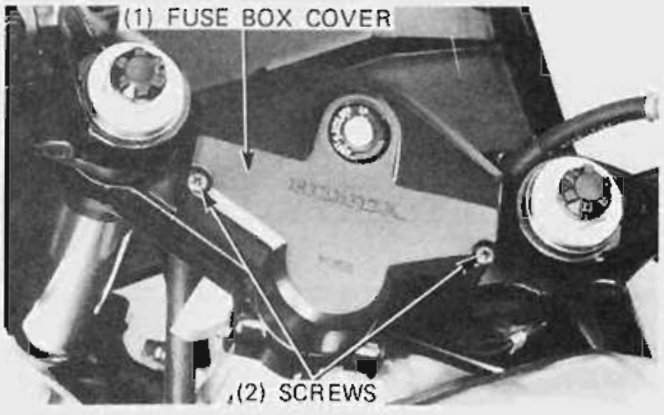
Install the contact base and top bridge in the reverse order of twists off.



FUSE BOX

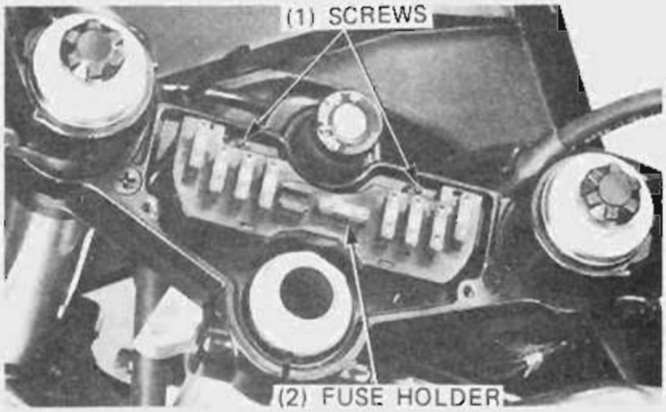
VE1000F MODEL

Remove the two screws and fuse box cover from the top bridge.



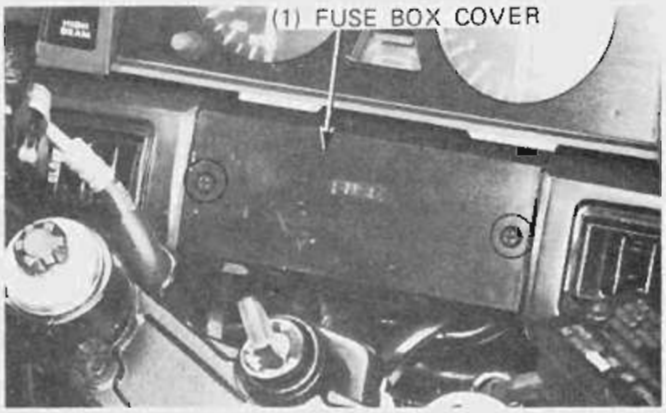
Remove the fairing (page 14-1) and disconnect the fuse box couplers (6P and 4P Red).

Remove the two screws and fuse holder from the top bridge.



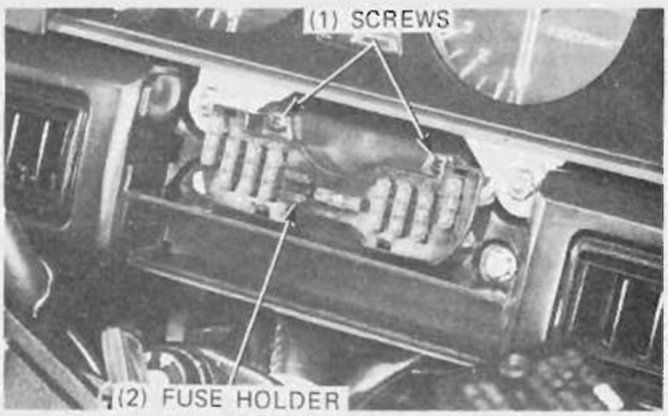
VF1000F-II MODEL

Remove the fuse box cover.



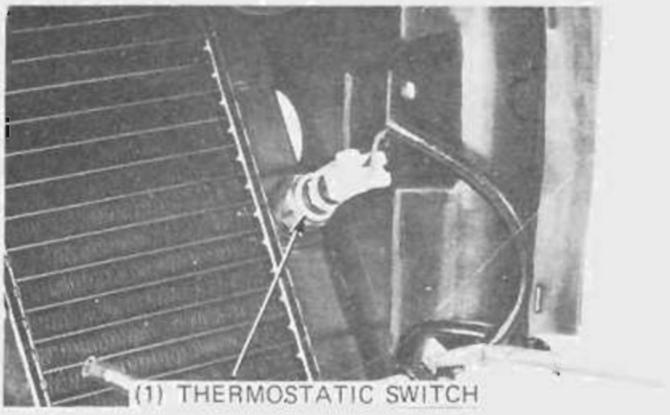
Remove the fairing (page 14-1) and disconnect the fuse box couplers (6P and 4P Red).

Remove the two screws and fuse holder.

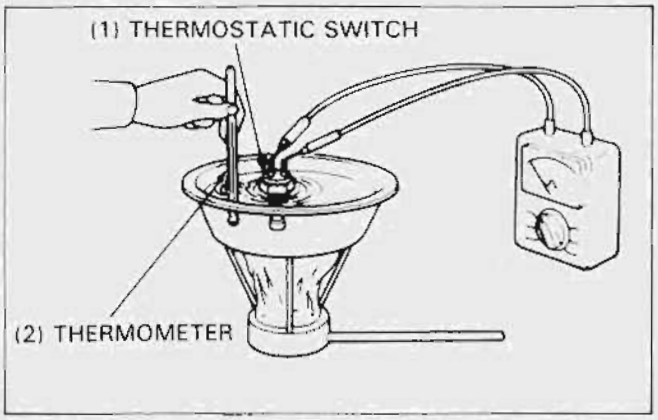


THERMOSTATIC SWITCH

The cooling fan motor is actuated by the thermostatic switch located in auxiliary radiator.
If the fan motor does not start, disconnect the black and green leads from the thermostatic switch and short them together with a jumper wire.
Turn the ignition switch on.
The cooling fan motor should start running.
If it does not start, check for battery voltage from the black lead (positive) to black/blue (negative) of the fan motor coupler.
If there is no voltage, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit.
If it start, inspect the fan thermostatic switch as follows:



Suspend the switch in a pan of coolant (50–50 mixture) and check the temperatures at which the switch opens and closes. Make sure that there is no switch continuity with room temperature and gradually raise the coolant temperature. The switch should have continuity (close) at 106–110°C (223–230°F) on VF1000F and 98–102°C (208–215°C) on VF1000F-II.



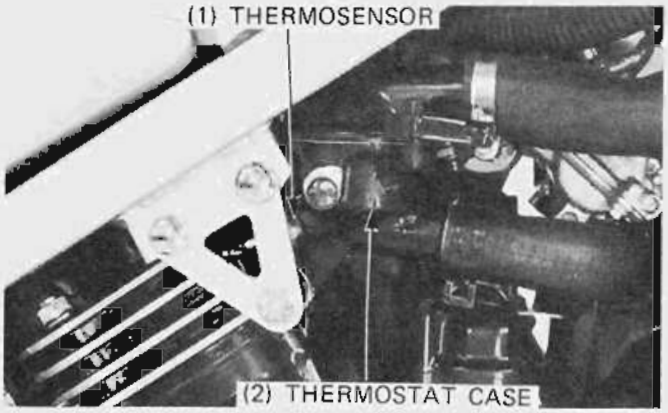
NOTE

- Keep temperature for constant 3 minutes before testing continuity. A sudden change of temperature will cause incorrect readings between the thermometer and the switch.
- Do not let the thermometer or swich touch the pan as it will give a false readings.
- Soak the switch in coolant up to its threads.

THERMOSENSOR

Disconnet the thermosensor wire.
Drain the coolant and remove the thermosensor from the thermostat case (page 6-4).
Suspend the sensor in oil over a burner and measure the resistance through the sensor as the oil heats up.

Temperature	50°C (122°F)	80°C (176°F)	100°C (212°F)	120°C (248°F)
Resistance	154Ω	52Ω	27Ω	16Ω

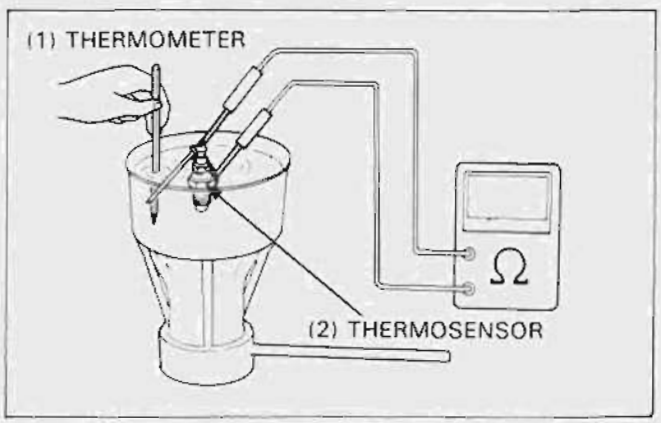


WARNING

- *Wear gloves and eye protection.*

NOTE

- Oil must be used as the heated liquid to check the function above 100°C (212°F).
- You'll get false readings if either the thermometer or thermosensor touches the pan.

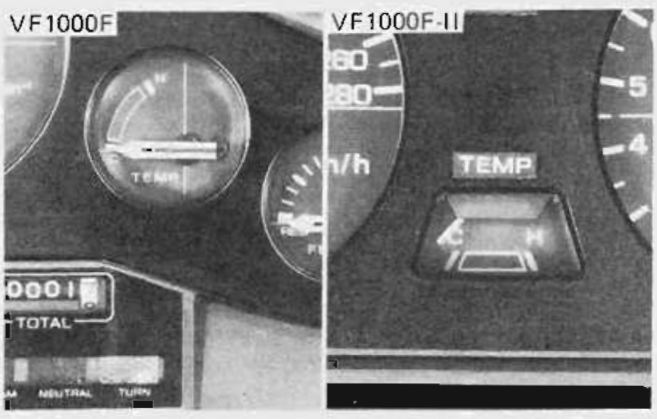


TEMPERATURE GAUGE

Disconnect the wire from the thermosensor and ground it to the engine.
Turn the ignition switch ON.
The temperature gauge needle should move all the way to the H (Hot).

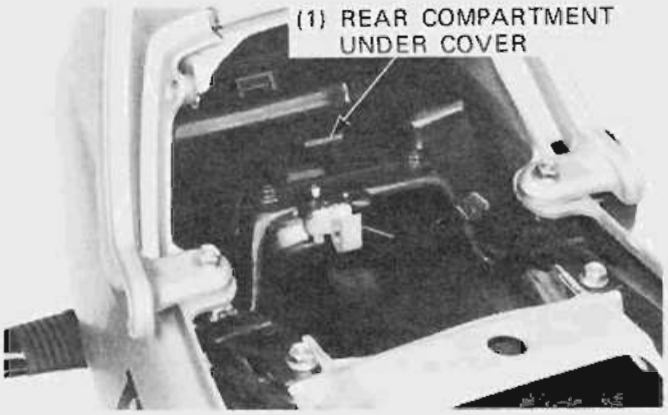
CAUTION

- *Do not leave the thermosensor wire grounded for longer than 5 seconds or the temperature gauge will be damaged.*



BRAKE AND TAILLIGHT SENSOR

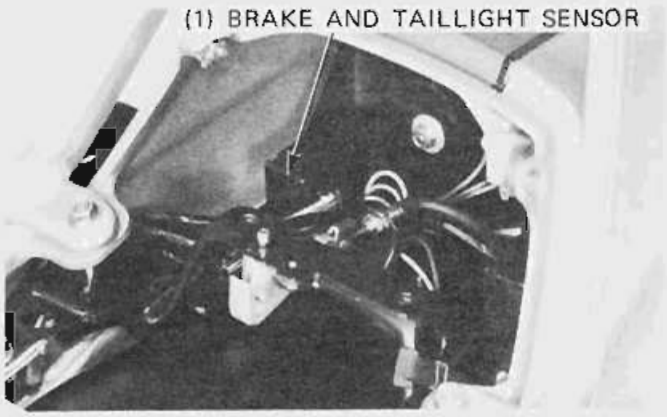
Remove the seat and rear compartment under cover.



Turn the ignition switch on.
Check the source voltage at the black/brown lead.
If there is no voltage, check and repair the source circuit.
If there is voltage, measure the voltage at the white/yellow (positive) and green/yellow (negative) wires.

VOLTAGE: 5V

If there is no voltage, replace the sensor unit.

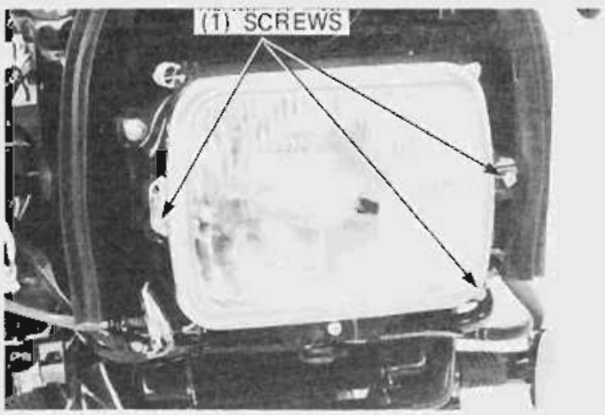


HEADLIGHT

SINGLE HEADLIGHT MODEL

Remove the fairing (page 14-1).

Remove the three screws and headlight from the headlight base.



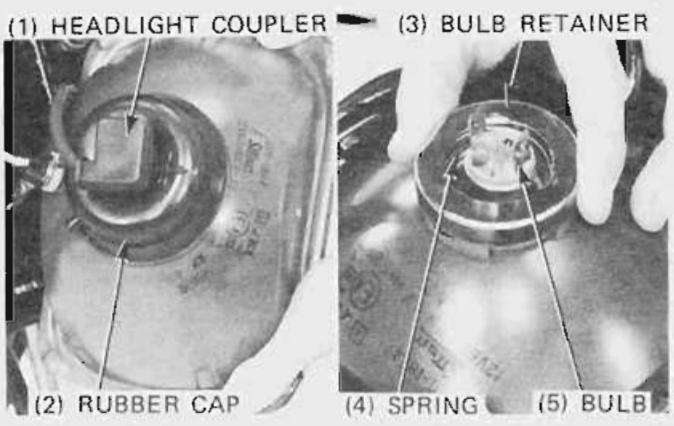
Disconnect the headlight coupler and rubber cap from the headlight.

Turn the bulb retainer counterclockwise and remove the retainer, spring and bulb.

Replace the bulb with a new one and install in the reverse order of removal.

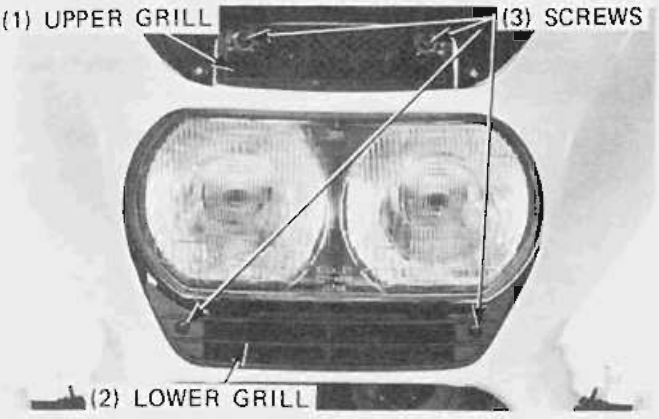
NOTE

- Install the rubber cap with its TOP mark facing up.

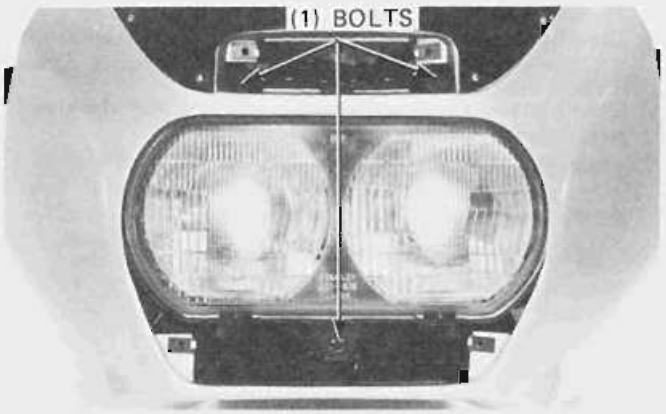


DUAL HEADLIGHT MODEL

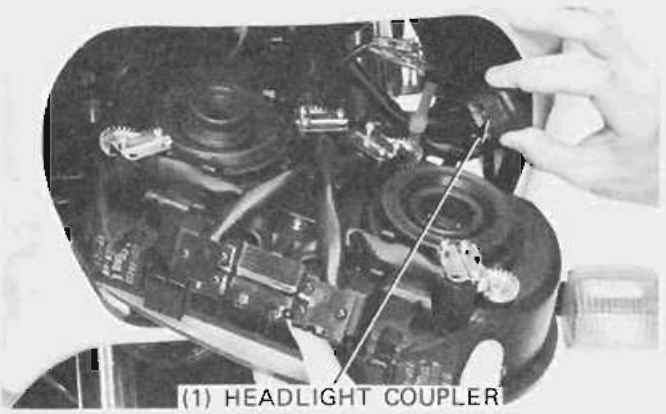
Remove the screws, and upper and lower grills.



Loosen the two upper bolts and remove the lower bolt and the headlight.



Disconnect the headlight couplers.

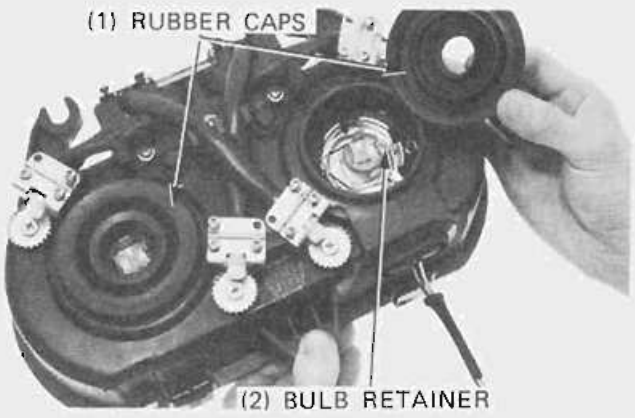


Remove the rubber caps, bulb retainers and bulbs, and replace the bulbs with new ones.

Install the headlight in the reverse order of removal.

NOTE

- Install the rubber caps securely.

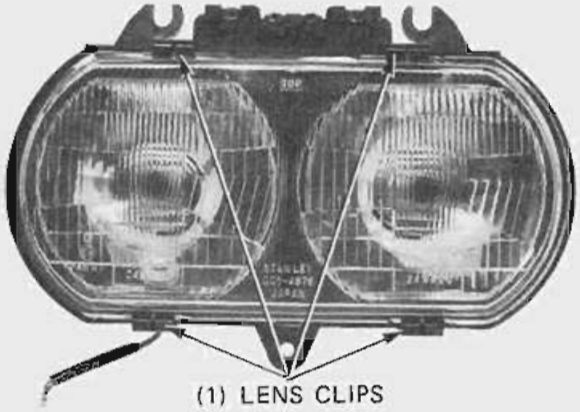


DISASSEMBLY/ASSEMBLY

Remove the headlight (page 21-10).

Remove the headlight lens clips and headlight lens.

Install the headlight lens with it TOP mark facing up and secure with four clips.

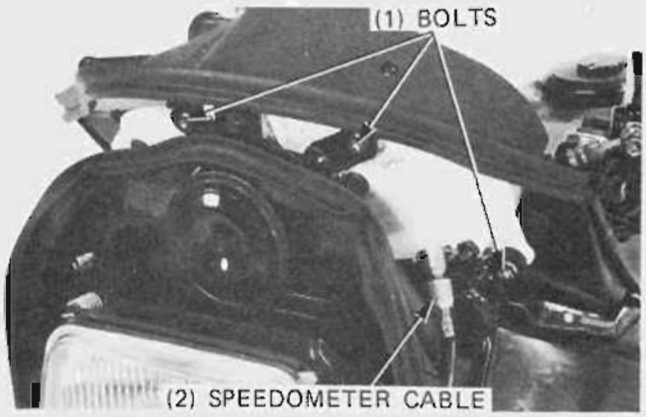


INSTRUMENTS

REMOVAL

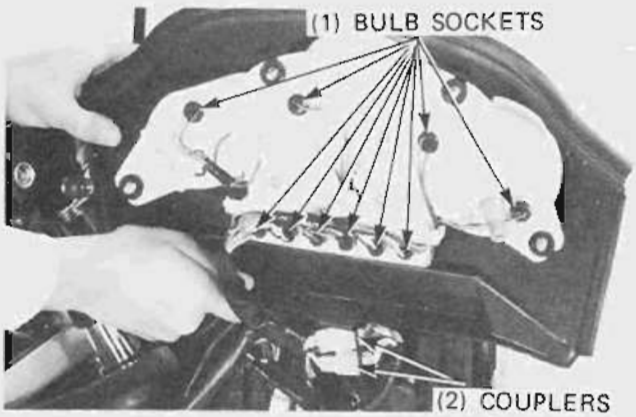
Remove the fairing (page 14-1).

Remove the four mount nuts and speedometer cable from the instruments.



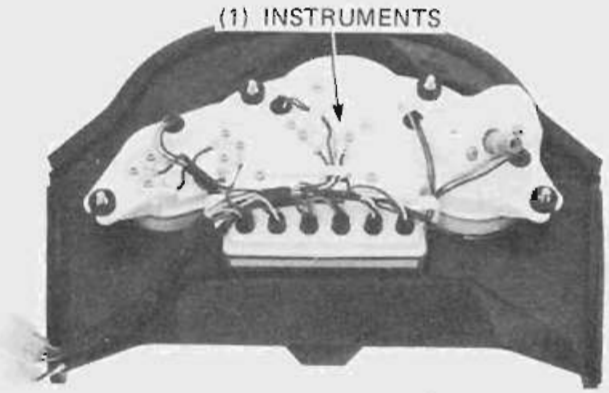
Replace the bulbs by pulling the bulb socket.

Disconnect the instruments couplers and remove the instruments.



DISASSEMBLY

Pull out the instruments.

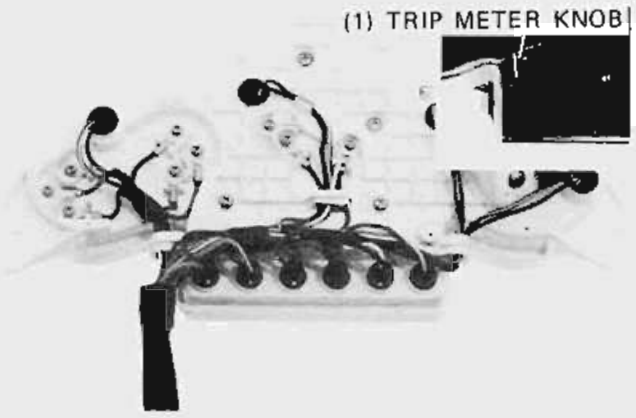


Remove the trip meter knob.

Remove the screws and disassemble the instruments.

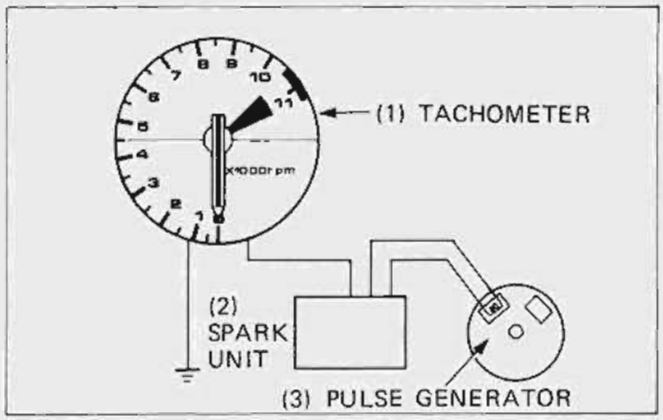
ASSEMBLY/INSTALLATION

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



TACHOMETER

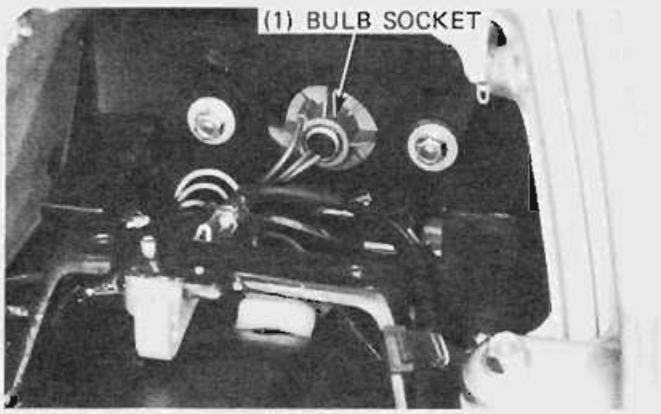
If the tachometer does not indicate properly, check and repair the 1-3 cylinder ignition system.
If the problem still appears, check continuity between the yellow wire terminal of the wire harness instrument coupler and the yellow wire of the 1-3 cylinder ignition coil. Repair or replace wire harness, if necessary.
If there is continuity, replace the tachometer with a new one.



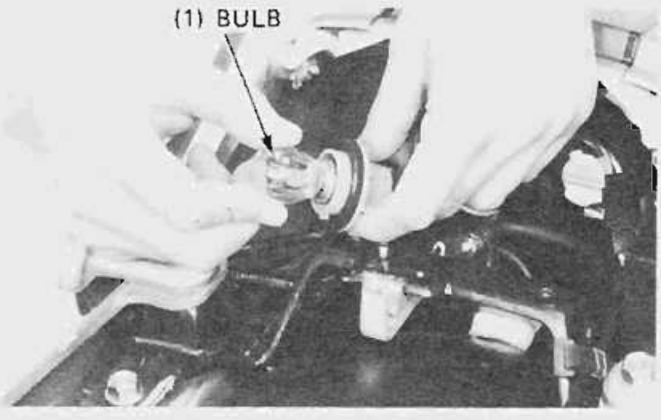
BRAKE/TAILLIGHT

Remove the seat and rear compartment under cover.

Turn the bulb socket counterclockwise.

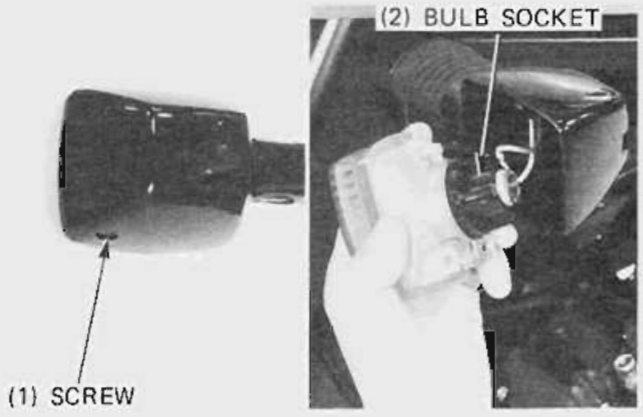


Replace the bulb with a new one and install in the reverse order of removal.



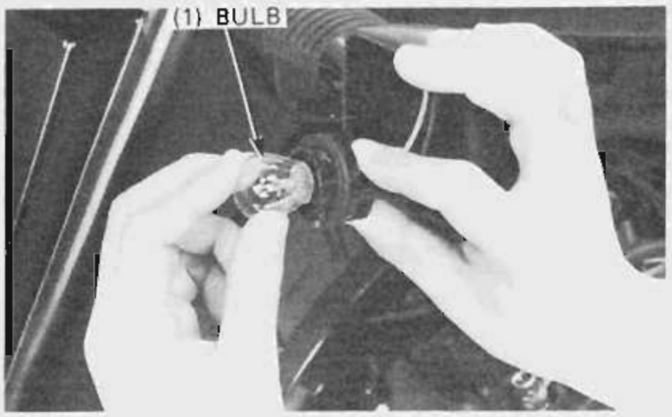
TURN SIGNAL LIGHT

Remove the screw and pull out the turn signal light lens.



Turn the bulb socket and replace the bulb.

Install the turn signal light in the reverse order of removal.

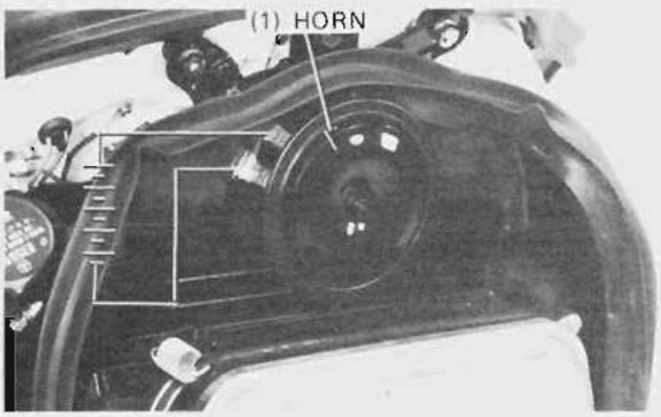


HORN

NOTE

- On models VF1000F, the fairing must be removed (page 14-1).

The horn is normal if it is sound when a 12 V battery is connected across the horn wire terminals. Replace the horn if necessary.

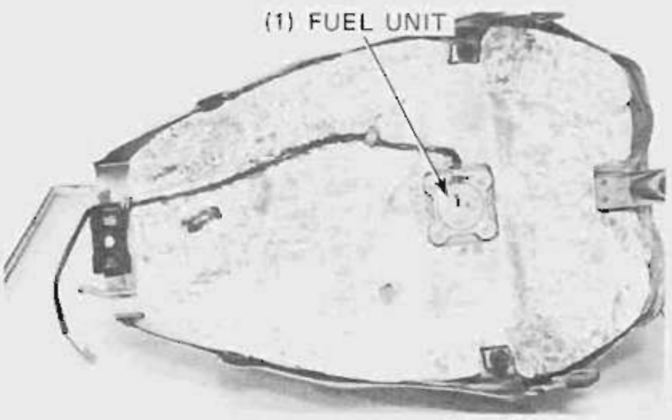


FUEL UNIT/GAUGE

FUEL UNIT

Drain and remove the fuel tank (page 4-3).

Remove the wire clamps, fuel unit attaching nuts and fuel unit from the fuel tank.

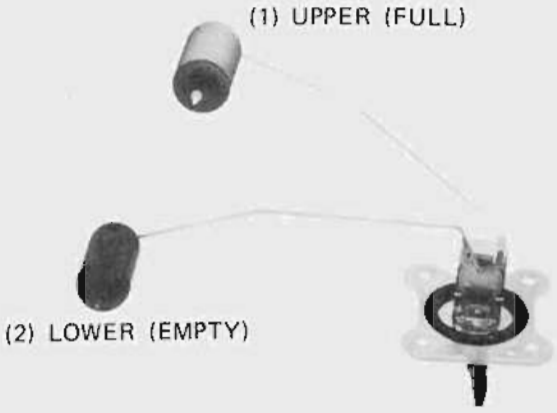


Remove the fuel unit from the fuel tank being careful not to damage or bend the fuel unit float arm.

Measure the resistance between the fuel unit wire terminals with the float at the UPPER (FULL) and LOWER (EMPTY) positions.

RESISTANCE:

FLOAT POSITION	RESISTANCE
UPPER (FULL)	4–10Ω
LOWER (EMPTY)	90–100Ω



FUEL GAUGE

Connect the fuel unit wire connectors to the wire harness and turn the ignition switch ON.

NOTE

- Before performing the following test, operate the turn signals to determine that the battery circuit is normal.

Check the fuel gauge needle for correct indication by moving the float up and down.

FLOAT POSITION	NEEDLE POSITION
UPPER (FULL)	"F" (FULL)
LOWER (EMPTY)	"E" (EMPTY)



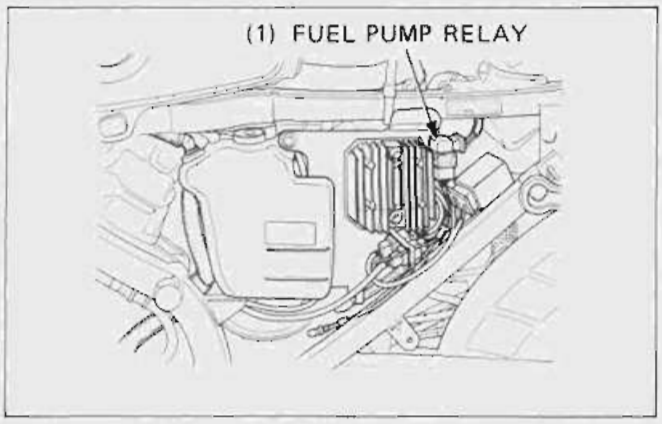
FUEL PUMP RELAY

Remove the left frame side cover.

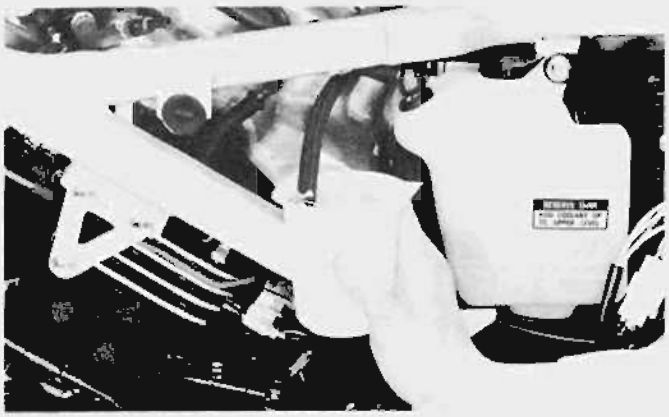
Turn the ignition switch ON and engine stop switch RUN.
Check the voltage between the white wire terminal of the fuel pump relay coupler and ground.
There should be no voltage.

Depress the starter button for a moment to turn the crankshaft but not start the engine.
Check that there is continuous battery voltage between the white wire terminal of the fuel pump relay coupler and the ground.

If the relay fails either check, replace it.



FUEL PUMP



Remove the seat and left frame side cover.

Turn the ignition switch off.
Disconnect the fuel pump relay coupler.
Short the white and black wire terminals at the fuel pump relay coupler with a jumper wire.

Disconnect the fuel line at the carburetor and hold a graduated beaker under the tube.

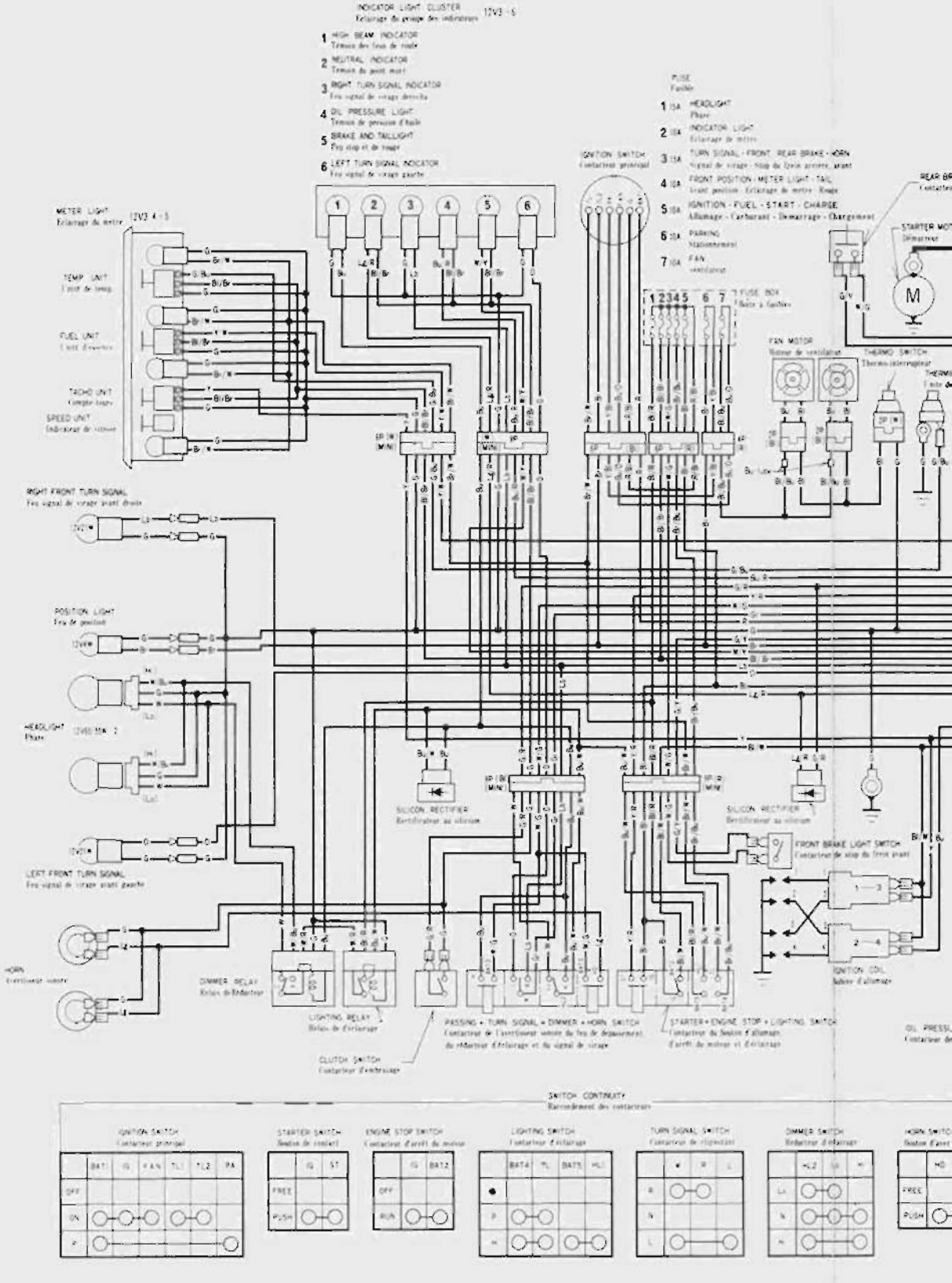
WARNING

- *Do not allow flames or sparks near gasoline.*

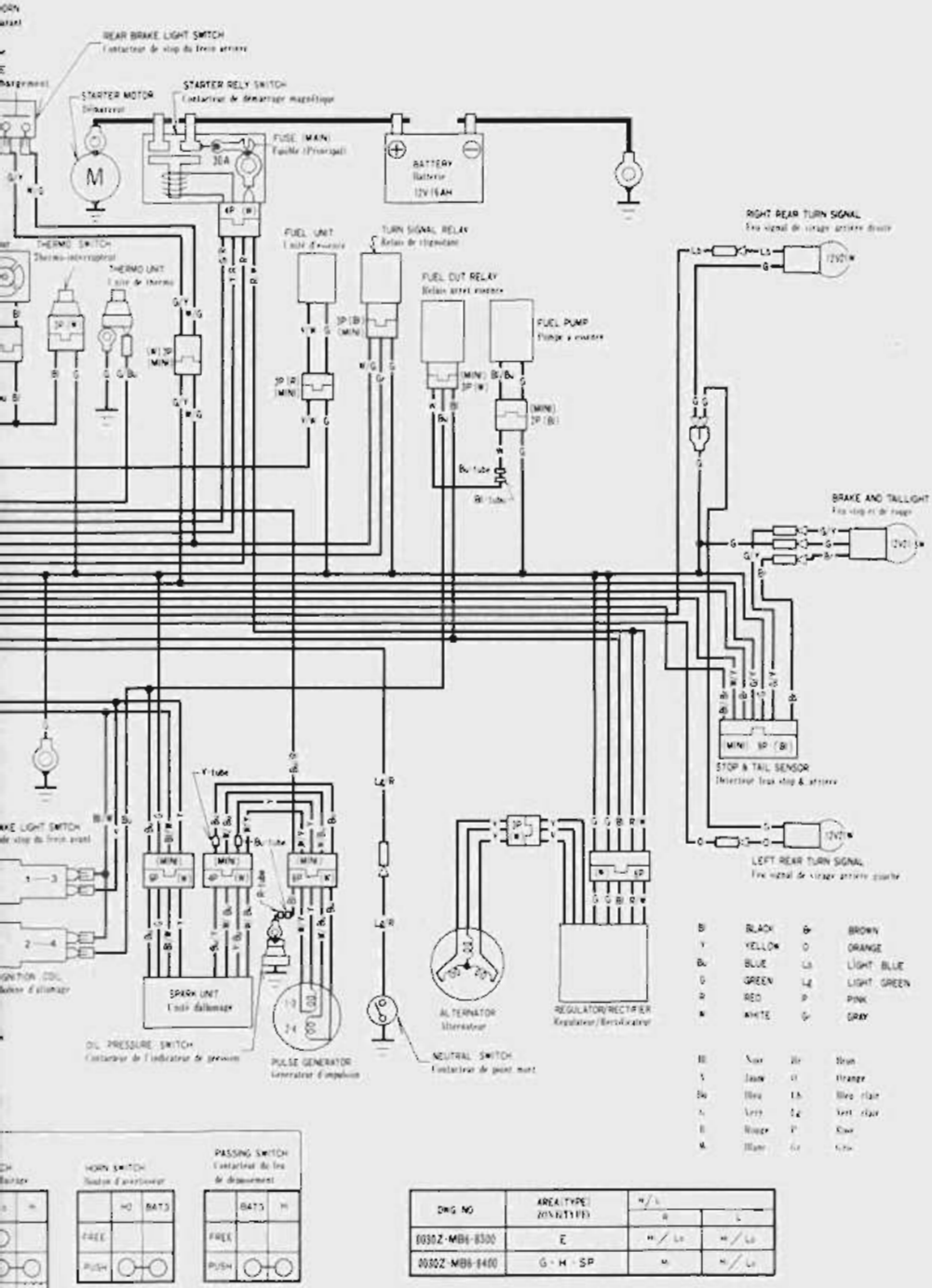
Turn the ignition switch on and let fuel flow into the beaker for 10 seconds, then turn the ignition switch off. Multiply the amount in the beaker by 6 to determine the fuel pump flow capacity per minute.

FUEL PUMP FLOW CAPACITY:
800 cc (27.0 US oz, 28.2 Imp oz) minimum/minute (at 13V)

DUAL HEADLIGHT M

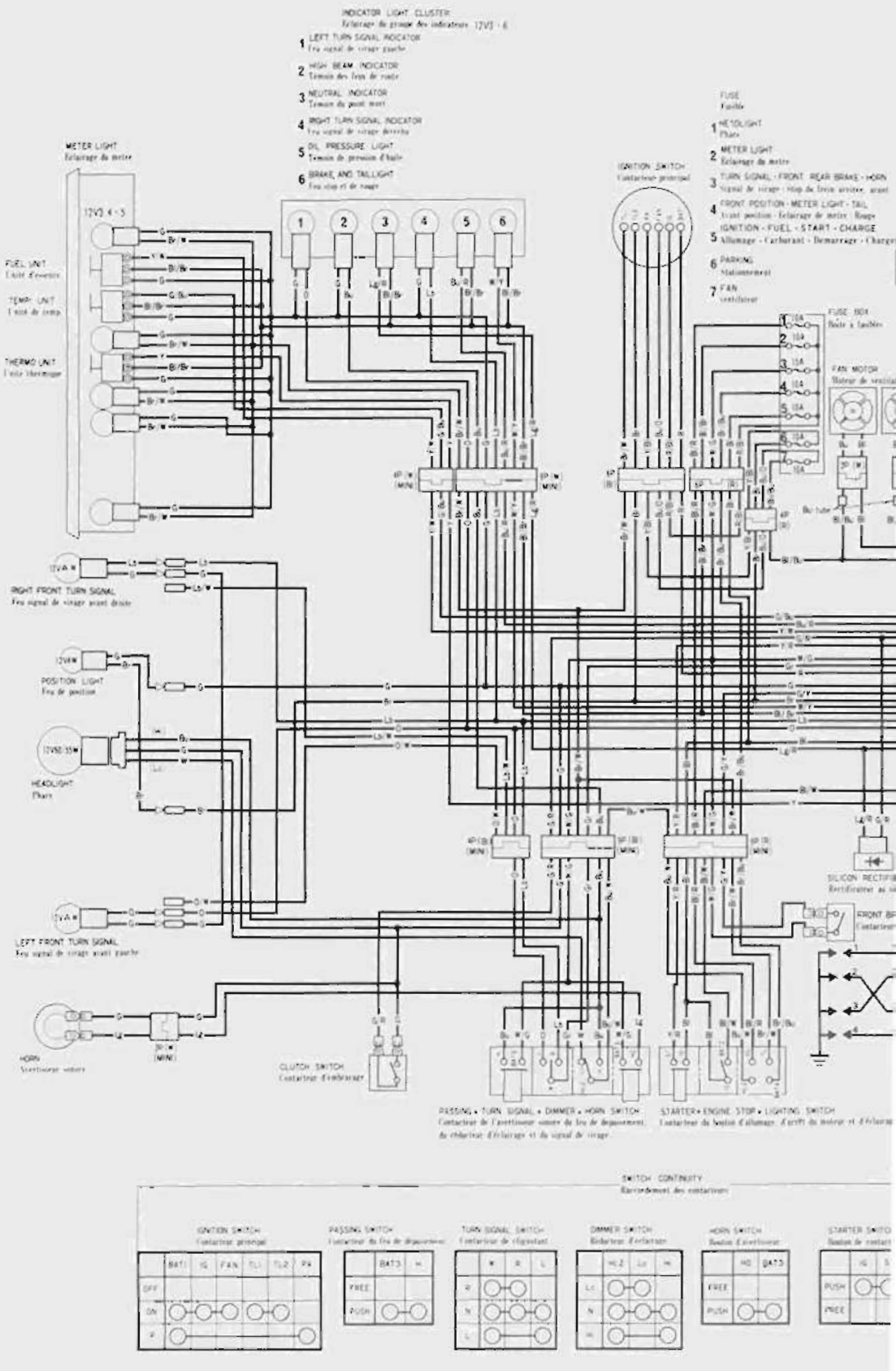


OLIGHT MODEL

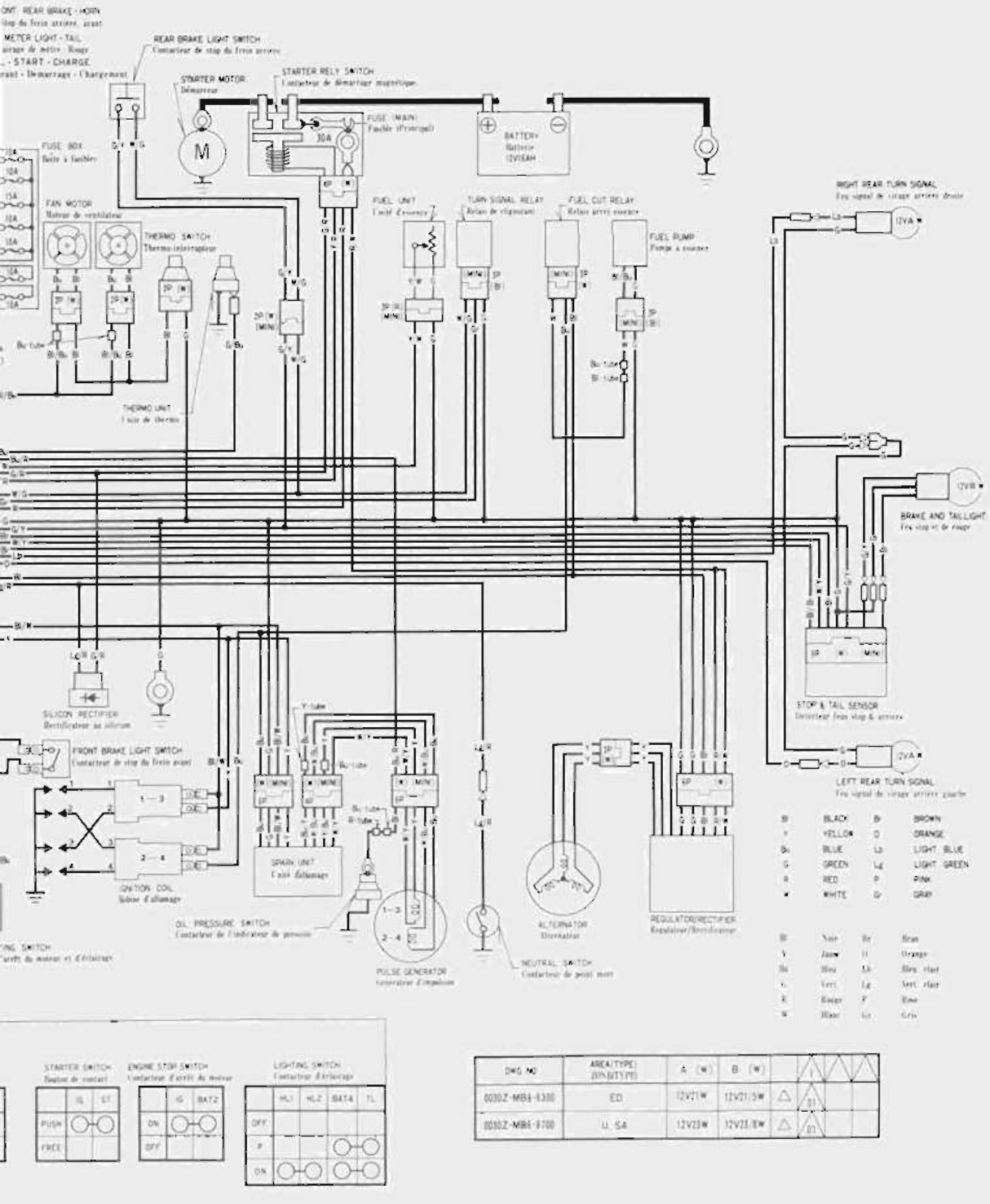


DRG NO	AREA/TYPE/ZONE(S) APPLIED	H/L	
		H	L
0030Z-MB6-8500	E	H / Lo	H / Lo
0030Z-MB6-8400	G · H · SP	H	H / Lo

SINGLE HEADL



E HEADLIGHT MODEL



DWG NO	AREA(TYPE) (DIN/STD TYPE)	A (W)	B (W)	
0030Z-MB6-8300	ED	12V21W	12V21/3W	△
0030Z-MB6-9700	U. SA	12V23W	12V23/8W	△

23 TROUBLE SHOOTING

ENGINE DOES NOT START OR IS HARD TO START	23-1	POOR PERFORMANCE AT HIGH SPEED	23-3
ENGINE LACKS POWER	23-1	POOR HANDLING	23-3
POOR PERFORMANCE AT LOW AND IDLE SPEEDS	23-3		

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 line or fuel filter (3) Sticking float valve (4) Faulty fuel pump (5) Faulty fuel pump relay (6) Pinched fuel tank vent hole
REACHING CARBURETOR ↓		
2. Perform a spark test	WEAK OR NO SPARK →	(1) Faulty spark plugs (2) Fouled spark plugs (3) Faulty spark unit (4) Broken or shorted high tension wires (5) Broken or shorted ignition coil (6) Faulty ignition switch (7) Faulty pulse generator (8) Faulty ignition coils
GOOD SPARK ↓		
3. Test cylinder compression	LOW COMPRESSION →	(1) Low battery charge (2) Improper valve clearance (too small) (3) Valve stuck open (4) Worn cylinder and piston rings (5) Damaged cylinder head gasket (6) Seized valve (7) Improper valve timing
COMPRESSION NORMAL ↓		
4. Start by following normal procedure	ENGINE STARTS BUT STOPS →	(1) Improper choke operation (2) Carburetor incorrectly adjusted (3) Intake pipe leaking (4) Improper ignition timing (Spark unit or pulse generator) (5) Fuel contaminated
ENGINE DOES NOT FIRE ↓		
5. Remove and inspect spark plug	WET PLUG →	(1) Carburetor flooded (2) Carburetor starter valve excessively open (3) Cylinder flooded (4) Air cleaner dirty

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearings (3) Drive chain too tight (4) Axle nut excessively tight
WHEEL SPINS FREELY ↓		

2. Check tire pressure	PRESSURE LOW →	(1) Punctured tire (2) Faulty tire valve
PRESSURE NORMAL ↓		
3. Accelerate rapidly from low to second ENGINE SPEED 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 DOES NOT INCREASE →	(1) Carburetor starter valve open (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged muffler (5) Clogged fuel tank vent hole
ENGINE SPEED INCREASES ↓		
5. Check ignition timing	INCORRECT →	(1) Faulty spark unit (2) Faulty pulse generator
CORRECT ↓		
6. Check valve clearance	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
CORRECT ↓		
7. Test cylinder compression	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing
NORMAL ↓		
8. Check carburetor for clogging	CLOGGED →	(1) Carburetor not serviced frequently enough
NOT CLOGGED ↓		
9. Remove spark plug	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough (2) Spark plug with incorrect heat range
NOT FOULED OR DISCOLORED ↓		
10. Check oil level and condition	INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
CORRECT ↓		
11. Remove cylinder head cover and inspect lubrication	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil control orifice
VALVE TRAIN LUBRICATED PROPERLY ↓		
12. Check for engine overheating	OVERHEATING →	(1) Coolant level low (2) Fan motor not working (3) Thermostat stuck closed (4) Excessive carbon build-up in combustion chamber (5) Use of poor quality fuel (6) Clutch slipping
NOT OVERHEATING ↓		
13. Accelerate or run at high speed	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Wrong type of fuel (3) Excessive carbon build-up in combustion chamber (4) Ignition timing too advanced (Faulty spark unit)
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty spark unit)
CORRECT ↓		
2. Check carburetor pilot screw adjustment	INCORRECT →	See Fuel System Section
CORRECT ↓		
3. Check for leaking intake pipe	LEAKING →	(1) Deteriorated insulator (2) Loose carburetor
NO LEAK ↓		
4. Perform spark test	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty spark unit (3) Faulty ignition coil
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

NOTE: Ignition to the No. 2 and No. 4 cylinders is cut-off at 11,300–11,800 rpm to prevent engine damage.

1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Faulty spark unit (3) Faulty pulse generator
CORRECT ↓		
2. Disconnect fuel line at carburetor	FUEL FLOW RESTRICTED →	(1) Fuel tank empty (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel valve (5) Faulty fuel pump
FUEL FLOWS FREELY ↓		
3. Remove carburetors and check for clogged jets	CLOGGED →	Clean
NO CLOGGED JETS ↓		
4. Check valve timing	INCORRECT →	Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire and suspensions pressures

1. If steering is heavy →	(1) Steering stem adjuster 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 (4) Swingarm pivot bearing excessively worn (5) Bent frame
3. If the motorcycle pulls to one side →	(1) Bent frame (2) Front and rear wheels not aligned (3) Bent front fork (4) Bent swingarm


HONDA