Paper Book Part No. 67MK400

HOW TO USE THIS MANUAL

This shop manual describes the technical features and servicing procedures for the XBR500.

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

Throughout the manual, the following abbreviations are used to identity individual models.

CODE	AREA (TYPE)
ED	Europe
E	U.K.
F	France
*G-I	Germany
H	Netherlands
*G-II	Germany
SW	Switzerland
SD	Sweden

*G-I : Full power type
*G-II: Limited power type

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 19 describe parts of the motorcycle, grouped according to location.

Find the section you wat 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 trouble-shooting for the section. The subsequent pages give detailed procedures.

If you don't know the source of the trouble, go to section 20 TROUBLESHOOTING.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. HONDA MOTOR CO., LTD. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION.

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SERVICE PUBLICATIONS OFFICE

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IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains *some* warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda might be done or of the 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.

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

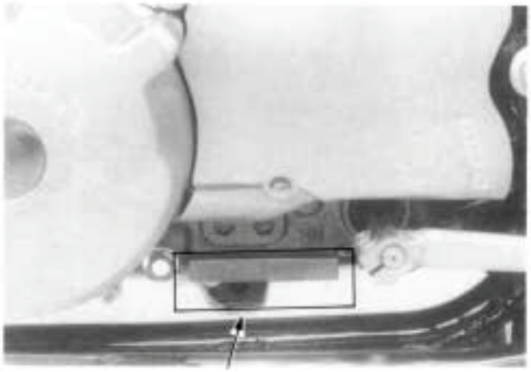
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-ring, 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 clean solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on page 1-11, Cable and Harness Routing.

MODEL IDENTIFICATION





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



(2) The engine serial number is stamped on the left side of the lower crankcase.



(3) The carburetor identification number is on the left side of the carburetor.



(4) The color label is attached to the rear fender below the seat.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
DIMENSIONS	Overall length	2,120 mm (83.5 in) <SW: 2,155 mm (84.8 in)>	
	Overall width	685 mm (27.0 in)	
	Overall height	1,055 mm (41.5 in)	
	Wheelbase	1,400 mm (55.1 in)	
	Ground clearance	160 mm (6.3 in)	
	Dry weight	157 kg (346 lb)	
FRAME	Type	Semi double cradle	
	Front suspension, travel	Telescopic 140 mm (5.5 in)	
	Rear suspension, travel	Swing arm 100 mm (3.9 in)	
		Front	Rear
	Tire size	100/90–18 56S	110/90–18 61S
	Driver only	200 kPa (2.00 kg/cm², 28 psi)	200 kPa (2.00 kg/cm², 28 psi)
	Driver and one passenger	200 kPa (2.00 kg/cm², 28 psi)	250 kPa (2,50 kg/cm², 36 psi)
	Front brake, lining swept area	Disc brake, 452 cm² (70.06 sq in)	
	Rear brake, lining swept area	132 cm² (20.46 sq in)	
	Fuel capacity	19 lit (5.0 US gal, 4.2 Imp gal)	
	Fuel reserve capacity	3.3 lit (0.9 US gal, 0.7 Imp gal)	
	Caster	29° 30′	
	Trail	115 mm (4.5 in)	
	Front fork oil capacity	283 cm³ (9.6 oz)	
ENGINE	Type	Air-cooled 4-stroke SOHC	
	Cylinder arrangement	Vertical single	
	Bore x stroke	92.0 x 75.0 mm (3.62 x 2.95 in)	
	Displacement	498 cm³ (30.4 cu, in)	
	Compression ratio	8.9 : 1	
	Valve train	4-valve, silent chain driven SOHC	
	Maximum horsepower	31.5 KW (43 BHP)/7,000 min⁻¹ (rpm)	
	Maximum torque	4.4 kg-m (31.8 ft-lb)/6,000 min⁻¹ (rpm)	
	Engine oil capacity	2.3 lit (2.4 US qt, 2.0 Imp qt) at engine assembly	
		1.6 lit (1.7 US qt, 1.4 Imp qt) at oil change	
	Lubrication system	Forced pressure and dry sump	
	Air filtration system	Paper element	
	Cylinder compression	1,250 ± 150 kPa (12.5 ± 1.5 kg/cm², 172 ± 21 psi)	
	Intake valve Opens	5°BTDC <G-II type: 5°ATDC>	
	Closes	40°ABDC <G-II type: 30°ABDC>	
	Exhaust valve Opens	45°BBDC <G-II type: 35°BBDC>	
	Closes	5°ATDC <G-II type: 5°BTDC>	
	Valve clearance Intake	0.10 mm (0.004 in)	
	Exhaust	0.12 mm (0.005 in)	
CARBURETOR	Type	Constant vacuum	
	Identification number	VD10A <G-II type: VE10B,	
	Main jet	#152 <G-II, SW type: #158>	
	Slow jet	#48	
	Pilot screw initial opening	2-3/4 <G-II type: 2-1/4,	
	Float level	18.5 mm (0.73 in)	
	Idle speed	1,200±100 min⁻¹ (rpm)	

ITEM		SPECIFICATIONS
DRIVE TRAIN	Clutch type	Wet multi-plate
	Transmission	5-speed constant mesh
	Primary reduction	2.482 (72/29)
	Gear ratio I	2.384 (31/13)
	Gear ratio II	1.555 (28/18)
	Gear ratio III	1.200 (24/20)
	Gear ratio IV	1.000 (23/23)
	Gear ratio V	0.875 (21/24)
	Final reduction	2.400 (36/15) <G-II : 2.571>
	Gearshift pattern	Left foot operated return system (1-N-2-3-4-5)
ELECTRICAL	Ignition	CDI
	Ignition timing Initial	8 ± 2° BTDC at 1,200 ± 100 min^{-1} (rpm) (F mark)
	Full advance	29 ± 2° BTDC at 5,000 min^{-1} (rpm)
	Alternator	170 W/5,000 min^{-1} (rpm)
	Battery capacity	12V–12 AH
	Spark plug	DPR8EA-9 (NGK) or X24EPR-U9 (ND) / DPR9EA-9 (NGK) or X27EPR-U9 (ND) <G-II, SW types: DPR8EA-9 (NGK) or X24EPR-U9 (ND)>
		DPR7EA-9 (NGK) or X22EPR-U9 (ND) <Except G-I, H types> / DPR8EA-9 (NGK) or X24EPR-U9 (ND) <G-II, SW types: DPR7EA-9 (NGK) or X22EPR-U9 (ND)>
		DPR9EA-9 (NGK) or X27EPR-U9 (ND) / <G-II, SW types: DPR9EA-9 (NGK) or X27EPR-U9 (ND)>
	Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
	Headlight, Hight/Low	60/55 W
	Brake and taillight	21/5 W
	Turn signal light, Front/Rear	21/21 W
	Speedometer light	3.4 W x 2
	Tachometer light	3 W x 2
	Neutral indicator	3 W
	Turn signal indicator	3 W
	Hight beam indicator	3 W
		* : Except G-I, H types

TORQUE VALUES

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)	REMARKS
Spark plug	1	12	15–20 (1.5–2.0, 11–15)	
Crankcase drain bolt	1	12	20–30 (2.0–3.0, 15–22)	
Oil filter cover bolt	3	6	8–10 (0.8–1.0, 5–7)	
Valve adjusting screw lock nut	4	7	23–27 (2.3–2.7, 17–20)	
Cylinder head bolt	6	8	28–32 (2.8–3.2, 20–23)	Apply engine oil to the washer
Cam sprocket bolt	2	7	18–22 (1.8–2.2, 13–16)	
Cylinder head cover bolt	1	8	20–26 (2.0–2.6, 15–19)	
	1	6	10–14 (1.0–1.4, 7–10)	
	11	6	8–12 (0.8–1.2, 6–9)	6 mm flange bolt with 8 mm head
Rocker arm shaft	4	14	25–30 (2.5–3.0, 18–22)	
Crankcase cover bolt	19	6	10–14 (1.0–1.4, 7–10)	
Primary drive gear lock nut	1	18	70–80 (7.0–8.0, 51–58)	
Neutral switch	1	10	10–14 (1.0–1.4, 7–10)	
Sub rocker arm shaft IN.	4	14	25–30 (2.5–3.0, 18–22)	
EX.	4	12	20–25 (2.0–2.5, 15–18)	
Cylinder bolt	4	10	40–44 (4.0–4.4, 29–32)	Apply engine oil to the washer
Clutch lock nut	1	18	70–80 (7.0–8.0, 51–58)	
Flywheel bolt	1	12	115–135 (11.5–13.5, 84–98)	Apply molybdenum disulfide grease to the threads
Gear shift drum stopper plate bolt	1	6	10–14 (1.0–1.4, 7–10)	
Shift drum stopper arm bolt	1	8	22–28 (2.2–2.8, 16–20)	
Gearshift return spring pin	1	8	22–26 (2.2–2.6, 16–19)	
Shift fork set bolt	1	7	13–17 (1.3–1.7, 9–12)	
Kick starter stopper plate bolt	2	8	22–28 (2.2–2.8, 16–20)	
Mainshaft bearing plate bolt	1	8	22–28 (2.2–2.8, 16–20)	
Tensioner mounting bolt	1	6	10–14 (1.0–1.4, 7–10)	Apply thread lock agent to the threads
Starter clutch torx bolt	6	8	28–32 (2.8–3.2, 20–23)	
Stator mounting bolt	3	6	8–12 (0.8–1.2, 6–9)	
Crankcase socket bolt	11	6	10–14 (1.0–1.4, 7–10)	

FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)	REMARKS
Oil tank drain bolt	1	12	20–30 (2.0–3.0, 14–22)	
Fuel cup	1	–	3–5 (0.3–0.5, 2–4)	
Oil hose mount bolt	2	6	7–11 (0.7–1.1, 5–8)	
mount nut	2	6	8–12 (0.8–1.2, 6–9)	
Side stand pivot bolt	1	10	35–45 (3.5–4.5, 25–33)	
Fuel tank mounting bolt	1	6	8–12 (0.8–1.2, 6–9)	
Engine rear hanger bolt	1	10	80–100 (8.0–10.0, 58–72)	
Hanger and bracket bolt	4	10	35–45 (3.5–4.5, 25–33)	
	6	8	24–30 (2.4–3.0, 17–22)	
Exhaust pipe joint nut	4	8	8–12 (0.8–1.2, 6–9)	
Exhaust pipe clamp bolt	4	8	15–25 (1.5–2.5, 11–18)	
Exhaust muffler mount bolt	2	8	20–30 (2.0–3.0, 15–22)	
Foot peg bracket bolt	4	8	20–30 (2.0–3.0, 15–22)	
Handlebar pinch bolt	2	8	18–25 (1.8–2.5, 13–18)	

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)	REMARKS
Front axle	1	12	55–65 (5.5–6.5, 40–47)	
Front axle holder nut	4	8	18–25 (1.8–2.5, 13–18)	
Front fork upper pinch bolt	2	7	9–13 (0.9–1.3, 7–9)	
Front fork lower pinch bolt	2	8	30–40 (3.0–4.0, 22–29)	
Front fork cap	2	31	15–30 (1.5–3.0, 11–22)	
Front fork socket bolt	2	8	15–25 (1.5–2.5, 11–18)	Apply thread lock agent to the threads
Steering bearing adjusting nut	1	26	Initial: 30–40 (3.0–4,0, 22–29) Final: 14–16 (1.4–1.6, 10–12)	Apply engine oil to the threads Refer to page 12–21
Steering stem nut	1	24	80–120 (8.0–12.0, 58–87)	
Front brake disc mount bolt	6	8	37–43 (3.7–4.3, 27–31)	Apply thread lock agent to the threads
Brake hose oil bolt	2	10	30–40 (3.0–4.0, 22–29)	
Caliper bleed valve	1	7	4–7 (0.4–0.7, 3–5)	
Caliper pad pin retainer bolt	1	6	8–13 (0.8–1.3, 6–9)	
Caliper bracket bolt	2	10	30–40 (3.0–4.0, 22–29)	
Caliper mount bolt	1	8	20–25 (2.0–2.5, 14–18)	
Caliper pivot bolt	1	12	25–30 (2.5–3.0, 18–22)	
Swing arm pivot bolt	1	14	80–100 (8.0–10.0, 58–72)	
Rear axle nut	1	16	80–100 (8.0–10.0, 58–72)	
Rear shock absorber mount nut/bolt	4	10	40–50 (4.0–5.0, 29–36)	
Chain slider mounting screw	3	5	5–7 (0.5–0.7, 4–5)	
Rear brake arm bolt	1	6	8–12 (0.8–1.2, 6–9)	
Brake pedal bolt	1	8	18–25 (1.8–2.5, 13–18)	
Gear shift pedal bolt	1	6	8–12 (0.8–1.2, 6–9)	
Kick starter arm bolt	1	8	18–25 (1.8–2.5, 13–18)	Apply thread lock agent to the threads
Damper rod lock nut	2	10	30–40 (3.0–4.0, 22–29)	
Driven sprocket nut	5	10	60–70 (6.0–7.0, 43–51)	

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

STANDARD TORQUE VALUES

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

TOOLS

SPECIAL

*: These tools are newly designed and have not been used before.

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Pilot screw wrench	07908–4220201		4-9
Cylinder compression gauge attachment	07908–KK60000		3-16
Snap ring pliers	07914–3230001		14-8
Steering stem socket	07916–3710100		12-19, 21
Crankcase assembly tool	07931–KF00000		11-5
Threaded adaptor	07931–KF00200		11-5
Puller shaft	07931–ME40000		11-5
Assembly coller	07931–KF00100		11-5
Crankshaft puller	07935–KF00001		11-2
Bearing remover set	07936–3710001		13-14
Remover spindle assembly	07936–3710600		13-14
Remover handle	07936–3710100		13-14
Knock pin puller set	07936–MA70000	Decompressor lifter lever dowel pin	6-5
Sliding shaft	07936–MA70100		6-5
Remover weight	07741–0010201		6-5, 13-14
Attachment	07945–3330300	Dall race lower	12-21
Steering stem driver	07946–MB00000		12-21
Attachment	07946–6790200	Left crankcase bearing	11-4
Attachment	07946–3290000	Ball race upper	12-20
Fork seal driver attachment	07947–KA20200		12-16
Ball race remover	07953–3330000	Ball race upper	12-20
Attachment	07953–KM10100	Ball race lower	12-20
Valve guide reamer	07984–5510000		6-12
* Tensioner setting holder	07973–MG30002		6-6, 8, 16
Bearing puller	07931–MK20100	┐	11-2
Universal bearing puller	07631–0010000	├Left crankcase bearing	11-2
Attachment	07960–1870100	┘	11-2
Torx bit (T40)	07703–0010100		18-3

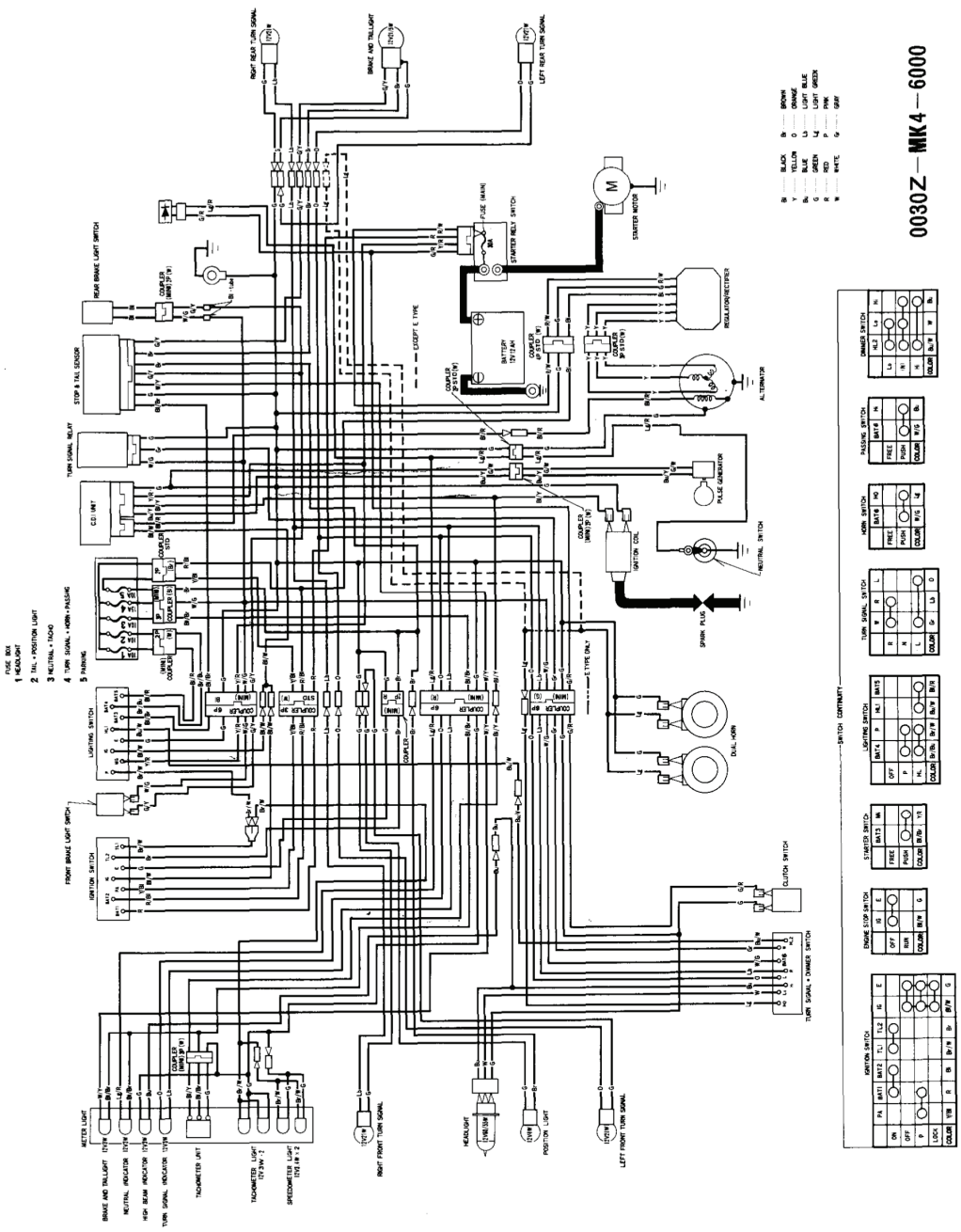
COMMON

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Float level gauge	07401–0010000		4-7
Wrench, 10 x 12 mm	07708–0030200	Valve clearance	3-8
Adjusting wrench A	07708–0030300	Valve clearance	3-8
Lock nut wrench, 30 x 32 mm	07716–0020400		12-19, 12-22
Clutch center holder	07724–0050000	Clutch	8-5, 18
Flywheel holder	07725–0040000		9-3, 4
Rotor puller	07733–0020001		9-3
Valve guide remover, 6.6 mm	07742–0010200		6-11, 6-12
Driver pin, 2.5 mm	07744–0010100	Oil pump	8-10
Attachment, 24 x 26 mm	07746–0010700		8-4
Attachment, 32 x 35 mm	07746–0010100		13-14
Attachment, 37 x 40 mm	07746–0010200		12-9, 13-6
Attachment, 42 x 47 mm	07746–0010300		12-9, 13-6
Attachment, 72 x 75 mm	07746–0010600		11-4
Attachment, 35 mm I.D.	07746–0030400	Crankshaft	11-5
Pilot, 15 mm	07746–0040300		12-9
Pilot, 17 mm	07746–0040400		13-6
Pilot, 20 mm	07746–0040500		8-4, 13-14
Pilot, 35 mm	07746–0040800		11-4
Pilot, 40 mm	07746–0040900		11-4
Fork seal driver	07747–0010100		12-16
Driver	07749–0010000		—
Shock absorber compressor	07959–3290001		13-12
Valve spring compressor	07757–0010000		6-10, 6-15
Gear holder	07724–0010100	Primary drive gear	10-3, 10-12
Bearing remover head, 15 mm	07746–0050400		12-8
Bearing remover shaft	07746–0050100		12-8
Bearing remover head, 17mm	07746–0050500		13-5

VALVE SEAT CUTTERS

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Valve seat cutter, 35 mm	07780–0010400	45° EX	6-13, 6-14
Valve seat cutter, 40 mm	07780–0010500	45° IN	6-13, 6-14
Valve seat cutter, 35 mm	07780–0012300	32° EX	6-13, 6-14
Valve seat cutter, 38.5 mm	07780–0012400	32° IN	6-13, 6-14
Valve seat cutter, 37.5 mm	07780–0014100	60° IN/EX	6-13, 6-14
Cutter holder, 6.6 mm	07781–0010201		6-13, 6-14

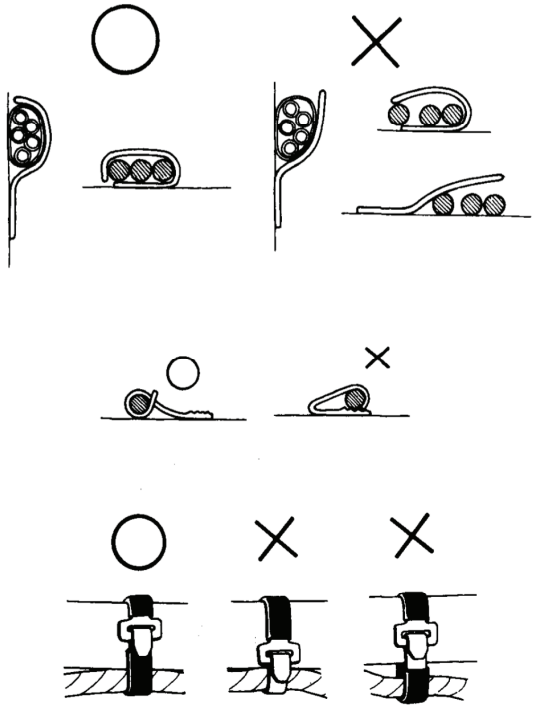
WIRING DIAGRAM

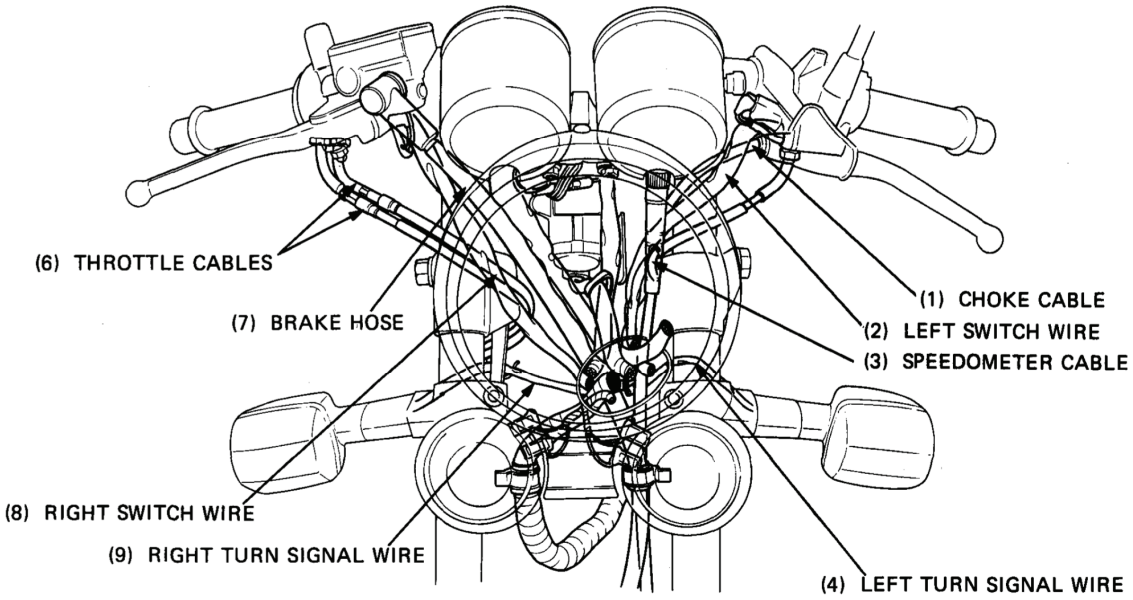


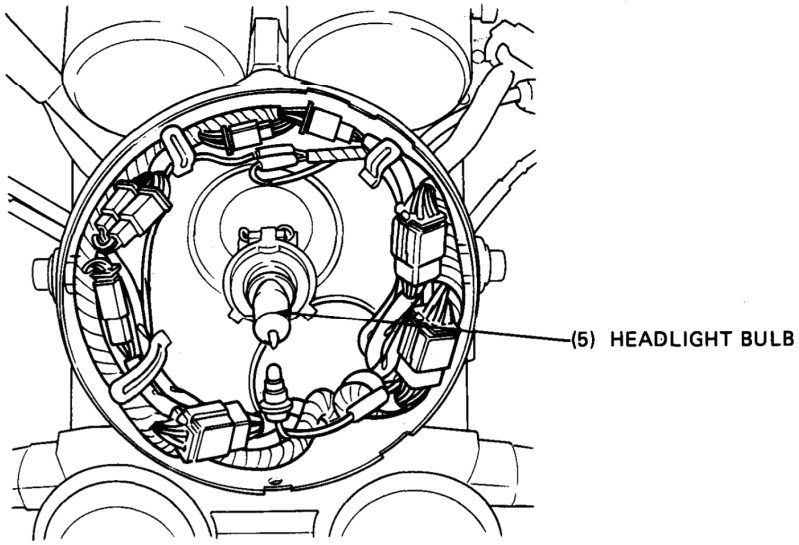
CABLE AND HARNESS ROUTING

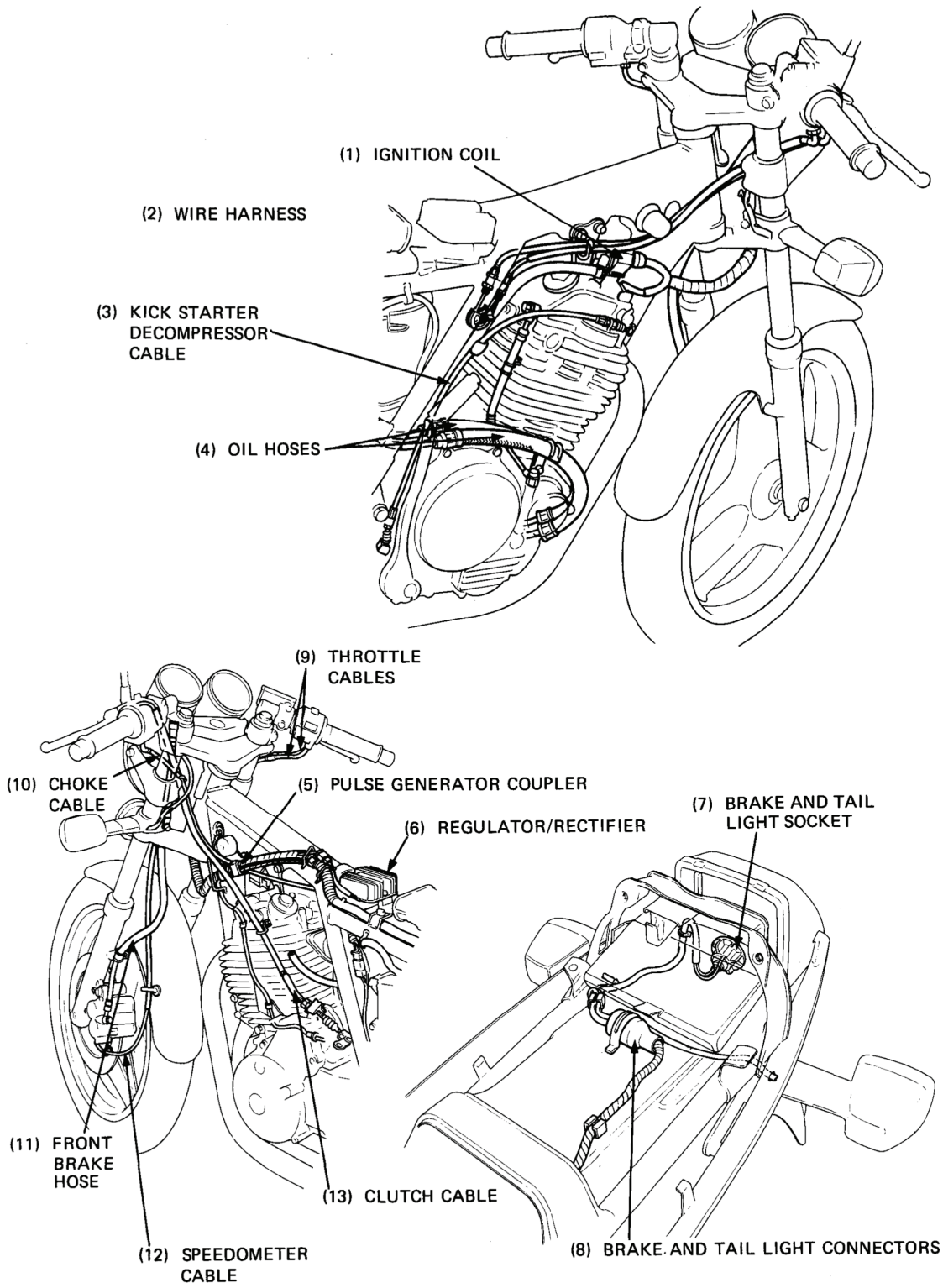
Note the folowing when routing cable and wire harness.

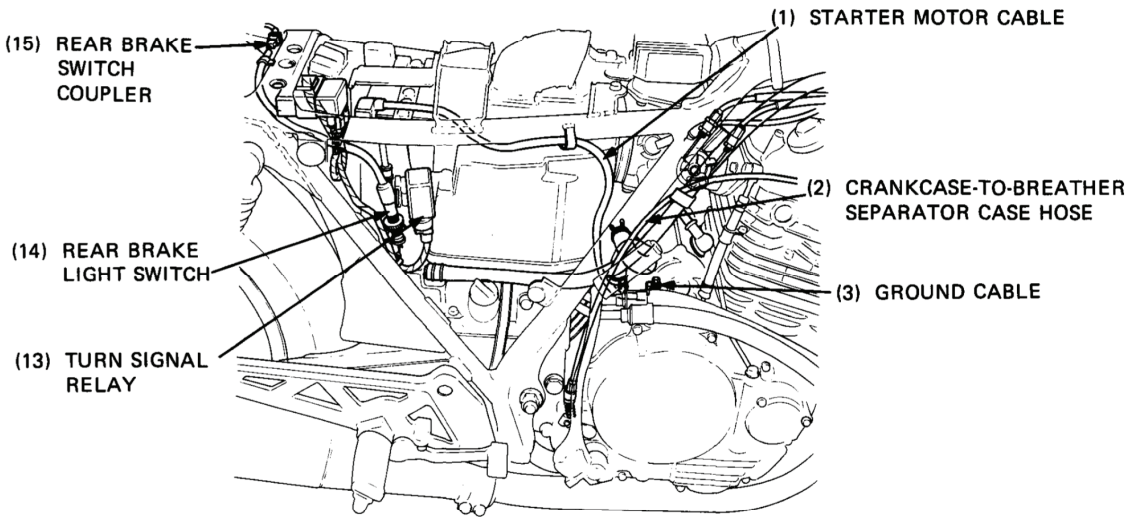
- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against the weld or end of its clamp.
- Secure wires and wire harness to the frame with their respective wire bands at the designated locations. Tighten the bands so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

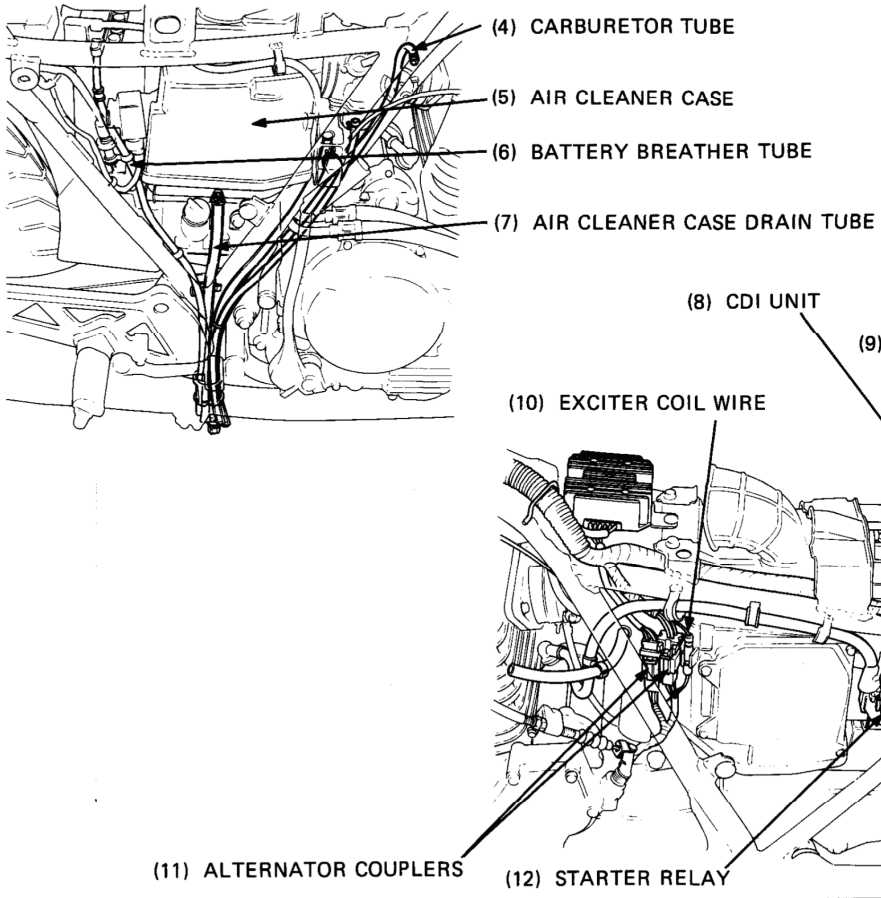


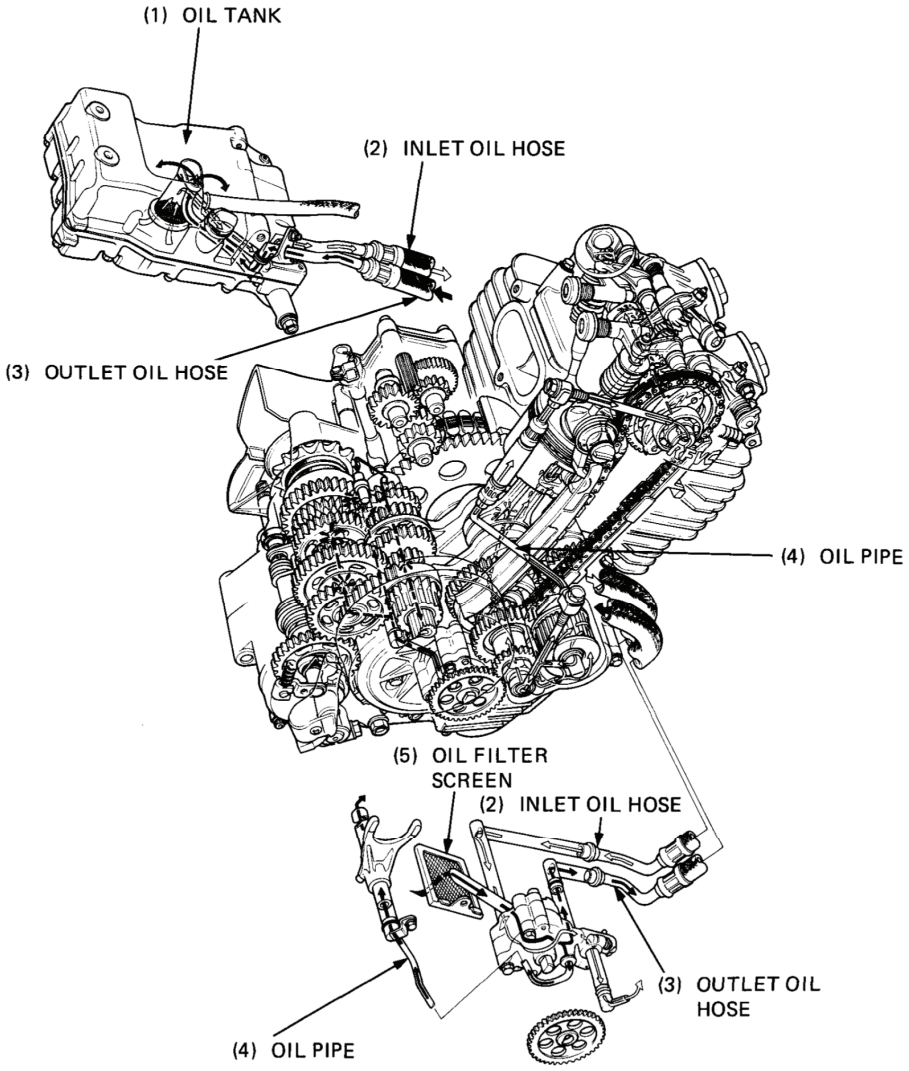

(6) THROTTLE CABLES
(7) BRAKE HOSE
(8) RIGHT SWITCH WIRE
(9) RIGHT TURN SIGNAL WIRE
(1) CHOKE CABLE
(2) LEFT SWITCH WIRE
(3) SPEEDOMETER CABLE
(4) LEFT TURN SIGNAL WIRE


(5) HEADLIGHT BULB


(1) IGNITION COIL
(2) WIRE HARNESS
(3) KICK STARTER DECOMPRESSOR CABLE
(4) OIL HOSES
(9) THROTTLE CABLES
(10) CHOKE CABLE
(5) PULSE GENERATOR COUPLER
(6) REGULATOR/RECTIFIER
(7) BRAKE AND TAIL LIGHT SOCKET
(11) FRONT BRAKE HOSE
(13) CLUTCH CABLE
(12) SPEEDOMETER CABLE
(8) BRAKE AND TAIL LIGHT CONNECTORS


(1) STARTER MOTOR CABLE
(2) CRANKCASE-TO-BREATHER SEPARATOR CASE HOSE
(3) GROUND CABLE
(13) TURN SIGNAL RELAY
(14) REAR BRAKE LIGHT SWITCH
(15) REAR BRAKE SWITCH COUPLER


(4) CARBURETOR TUBE
(5) AIR CLEANER CASE
(6) BATTERY BREATHER TUBE
(7) AIR CLEANER CASE DRAIN TUBE
(8) CDI UNIT
(9) BRAKE AND TAIL LIGHT SENSOR UNIT
(10) EXCITER COIL WIRE
(11) ALTERNATOR COUPLERS
(12) STARTER RELAY


(1) OIL TANK
(2) INLET OIL HOSE
(3) OUTLET OIL HOSE
(4) OIL PIPE
(5) OIL FILTER SCREEN
(2) INLET OIL HOSE
(3) OUTLET OIL HOSE
(4) OIL PIPE

2. LUBRICATION

SERVICE INFORMATION	2-1	ENGINE OIL FILTER	2-3
TROUBLESHOOTING	2-1	OIL FILTER SCREEN	2-4
ENGINE OIL LEVEL CHECK	2-2	OIL STRAINER	2-5
ENGINE OIL CHANGE	2-2	LUBRICATION POINTS	2-7

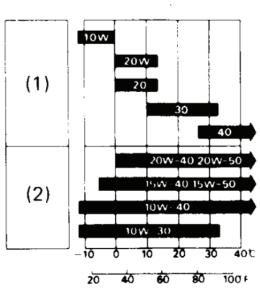
SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

Oil capacity	2.3 liter (1.4 US qt, 2.0 Imp qt) at engine assembly 1.6 liter (1.7 US qt, 1.4 Imp qt) at oil change
Recommended oil:	HONDA 4 stroke oil or equivalent API service classification SE or SF
Oil pump deliverty	Pump A 7.5 lit (7.9 US qt, 6.6 Imp qt)/min. at 5,300 min-1 (rpm) Pump B 10.0 lit (10.6 US qt, 8.8 Imp qt)/min. at 5,300 min-1 (rpm)



(1) Single grade
(2) Multi grade

TORQUE VALUES

Crankcase drain bolt	20–30 N·m (2.0–3.0 kg-m, 15–22 ft-lb)
Oil tank drain bolt	20–30 N·m (2.0–3.0 kg-m, 15–22 ft-lb)
Oil filter cover bolt	8–10 N·m (0.8–1.0 kg-m, 5–7 ft-lb)

TROUBLESHOOTING

Oil lever too low
- Normal oil consumption
- External oil leaks
- Worn piston rings

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

ENGINE OIL LEVEL CHECK

The oil filler cap is in engine oil tank and has a dipstick for measuring the oil level.
To inspect the engine oil level, following the instructions described below:

NOTE

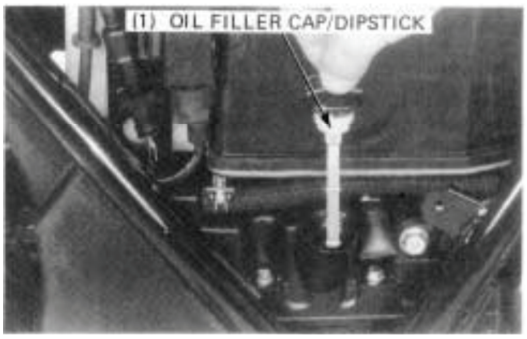
- The oil level cannot be checked accurately immediately after the motorcycle has been stopped.

1. With the motorcycle on its center stand on level ground, start and warm the engine until it runs smoothly. Remove the right side cover.
2. Let the engine idle at 1,200±100 min^{-1} (rpm) for 3 minutes until the engine oil level stabilizes.

NOTE

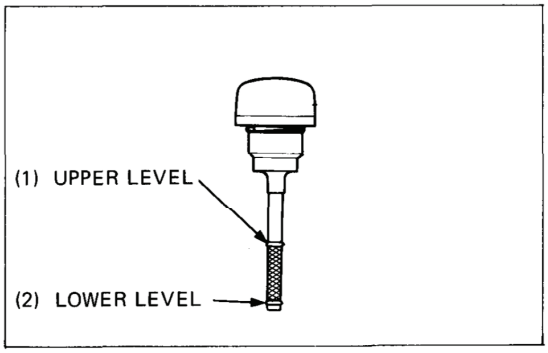
- Do not allow the engine to run above the idle speed or the engine oil level cannot be checked accurately.

3. Stop the engine and remove the oil filler cap/dipstick immediately, wipe it clean and insert the dipstick without screwing it in. The oil level should be between the upper and lower level marks on the dipstick.
4. If the oil is near the lower level mark, add the recommended oil up to the upper level mark on the dipstick. Do not overfill.
   Reinstall the filler cap/dipstick. Check for oil leaks.



CAUTION

- *Running the engine with insufficient oil can cause serious engine damage.*

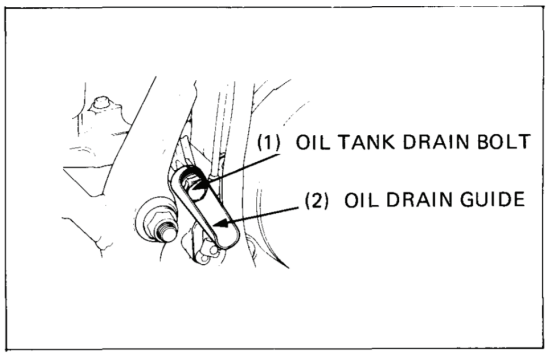


ENGINE OIL CHANGE

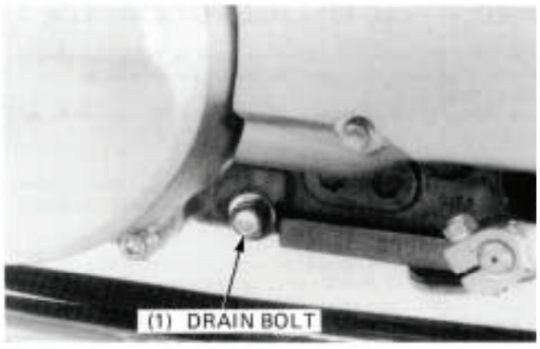
NOTE

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

1. Start the engine and let it idle for a few minutes.
2. Stop the engine and place an oil drain pan under the engine. Remove the oil filler cap/dipstick and loosen the drain bolt on the oil tank. Install the oil guide, included in the tool kit, on the oil tank as shown. Remove the oil drain bolt to drain the oil from the oil tank.



3. Remove the drain bolt on the left crankcase to drain the oil from the crankcase.
4. With the engine stop switch OFF, operate the kick starter several times to drain any oil whick may be left in the engine.
5. After the oil has completely drained, make sure the sealing washers on the drain bolts are in good condition.
6. Install the crankcase drain bolt and oil tank drain bolt.



CAUTION

- *Oil quantity is about 1.6 liters (1.7 US qt, 1.4 Imp qt) at oil change, and about 1.7 liters (1.8 US qt, 1.5 Imp qt) at filter change.*

TORQUE:
Crankcase drain bolt: 20–30 N·m (2.0–3.0 kg-m, 15–22 ft-lb)
Oil tank drain bolt: 20–30 N·m (2.0–3.0 kg-m, 15–22 ft-lb)

7. Poor 1.6 liters (1.7 US qt, 1.4 Imp qt) at oil change, or 1.7 liters (1.8 US qt, 1.5 Imp qt) at oil filter change of the recommended oil into the oil tank up to the upper level mark on the dipstick in two or three steps. Install the oil filler cap/dipstick.
8. Perform the step 1 thru 3 of engine oil level check procedure described in page 2-2.
9. Add recommended oil into the oil tank up to the upper level mark on the dipstick.
10. Reinstall the filler cap/dipstick and right side cover. Check for oil leaks.

CAUTION

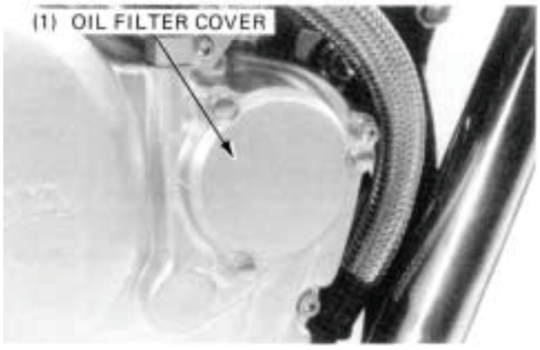
- *Running the engine with insufficient oil can cause serious engine damage.*

ENGINE OIL FILTER

NOTE

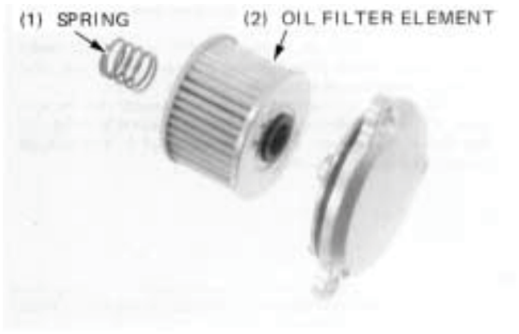
- The oil filter should be changed after draining the engine oil.

1. Remove the three bolts securing the cover and the cover.



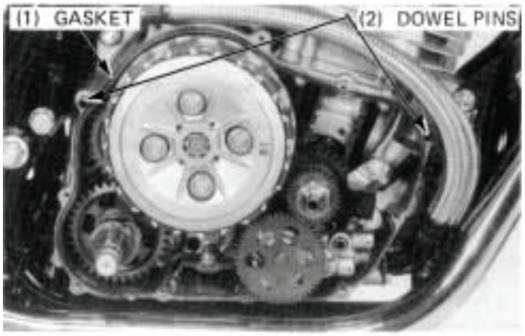
2. Remove and discard the oil filter element.
3. Check that the O-ring on the oil filter cover is in good condition.
   Install the spring, a new oil filter element and the oil filter cover, and tighten the bolts.

TORQUE: 8–10 N·m (0.8–1.0 kg-m, 5-7 ft-lb)

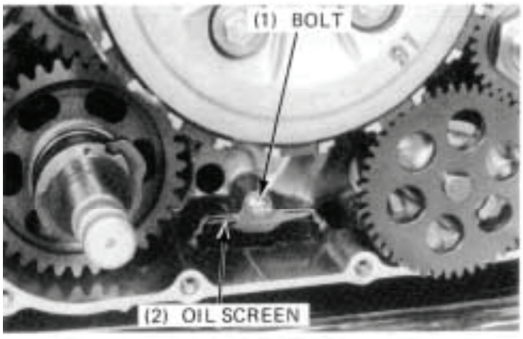


OIL FILTER SCREEN (in the right crankcase)

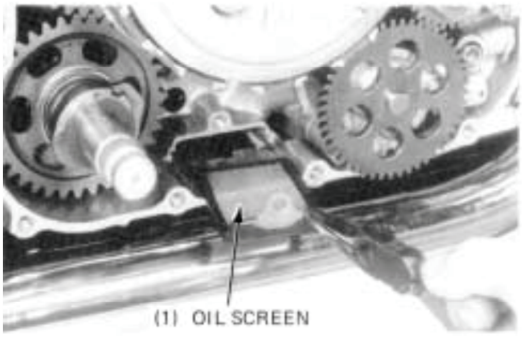
Remove the right crankcase cover (page 8-3), gasket and dowel pins.



Remove the bolt attaching the oil screen to the right crankcase.



Remove the oil screen and clean it.
Install the oil screen and tighten the bolt.
Install the right crankcase cover (page 8-19).
Fill the crankcase with the recommended oil (page 2-1).



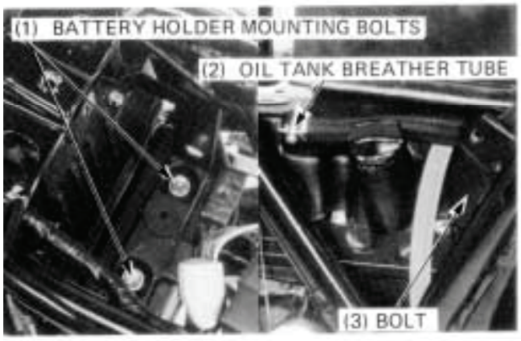
OIL STRAINER

REMOVAL

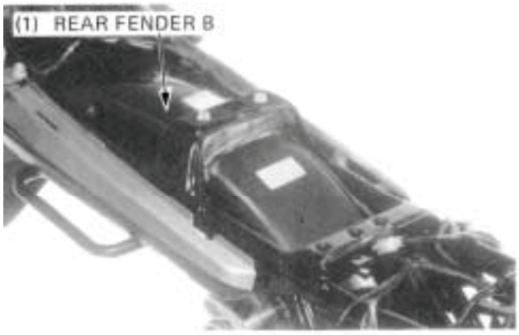
Drain the engine oil (page 2-2).
Remove the rear wheel (page 13-3).
Remove the seat and rear shock absorber upper mounting nuts.



Remove the battery (page 17-2).
Remove the battery holder-to-oil tank mounting bolts.
Remove the oil tank mount bolt from the right side.
Remove the oil tank mount bolt and spacer from the left side.
Disconnect the oil tank breather tube from the oil tank.



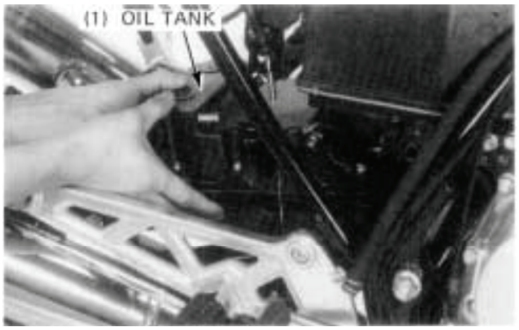
Remove rear fender B by removing the bolt.



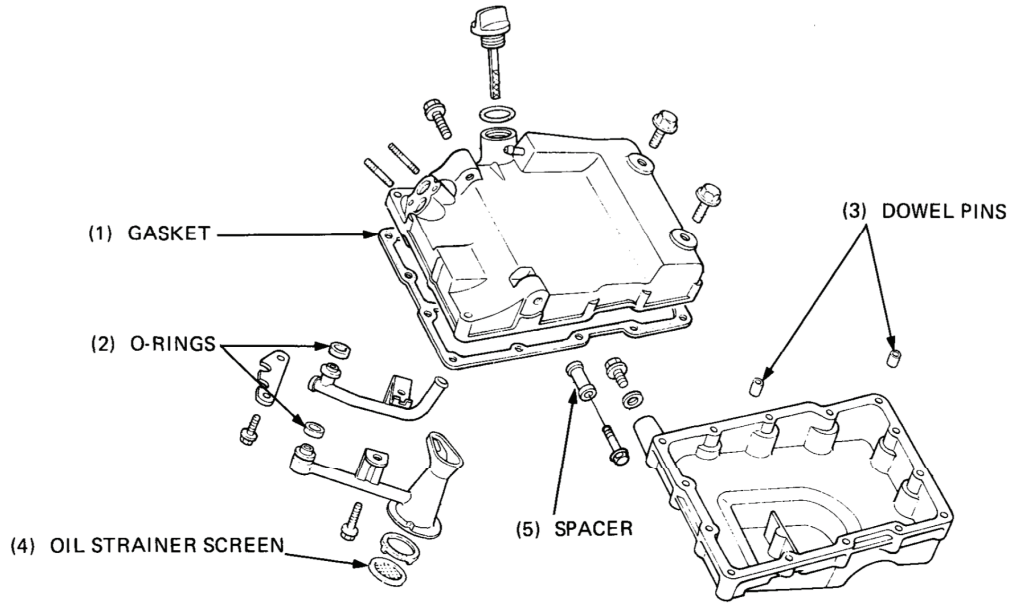
Disconnect the oil hoses from the oil tank by removing the mounting nuts.



Remove the oil tank from the frame

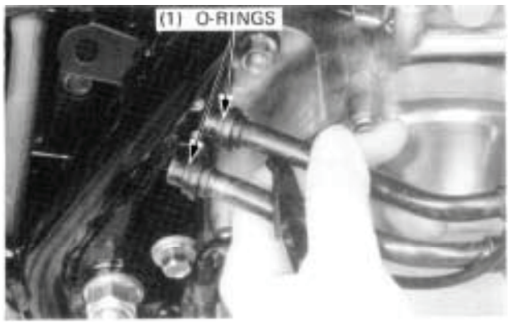


Remove the oil tank mounting bolts and separate the oil tank.
Clean the oil strainer.
Replace the oil strainer if necessary.



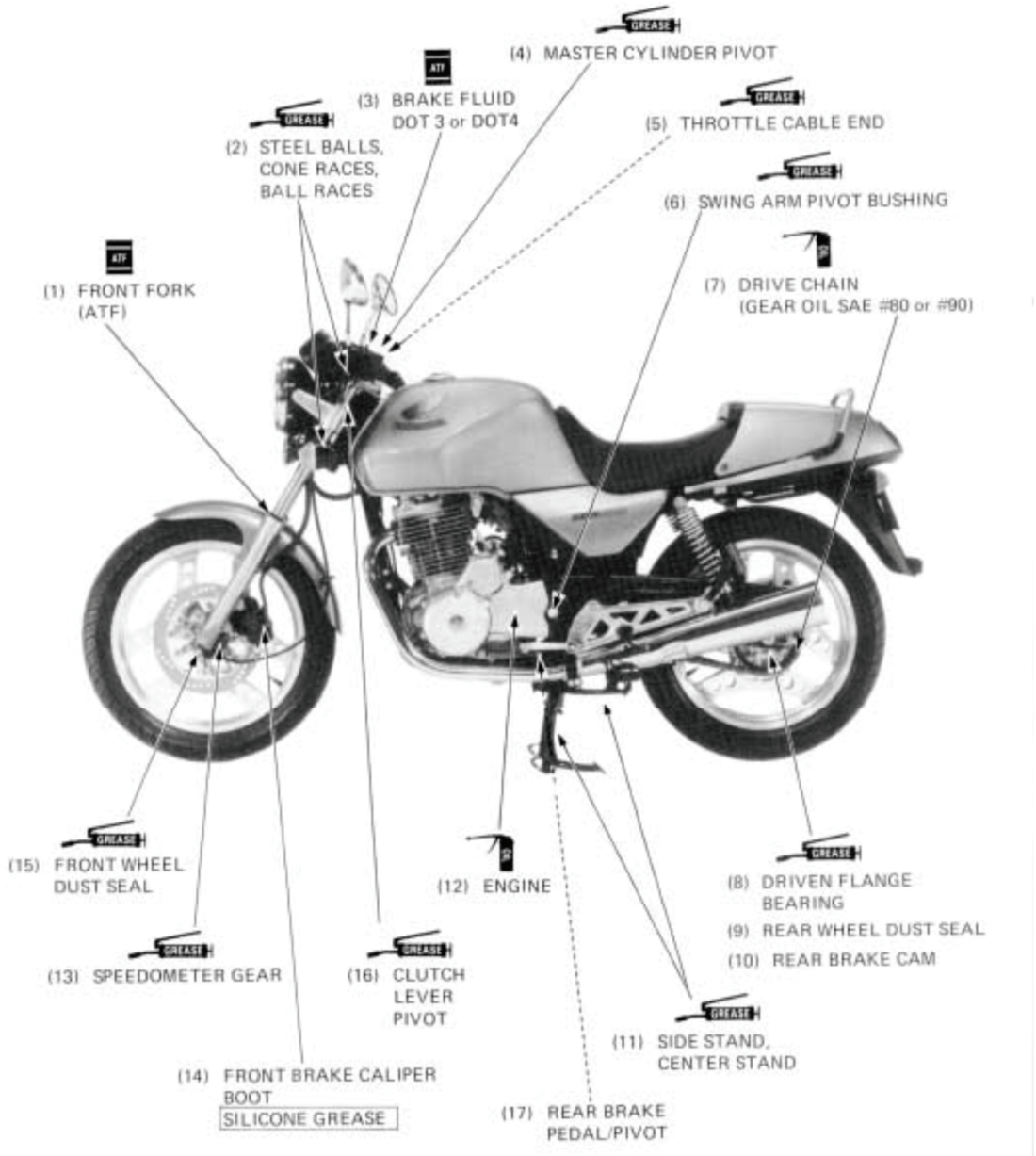
INSTALLATION

Install the removed parts in the reverse order of removal.
Install the O-rings and tighten the nuts securely.
Fill the engine oil (page 2-3), start the engine and check for oil leaks.



LUBRICATION POINTS

Use general purpose grease where a specification is not given. Apply oil or grease to sliding surfaces and cables not shown here.



3. MAINTENANCE

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CARBURETOR CHOKE	3-5	HEADLIGHT AIM	3-13
AIR CLEANER	3-6	CLUTCH SYSTEM	3-13
CRANKCASE BREATHER	3-6	SIDE STAND	3-14
SPARK PLUG	3-7	SUSPENSIONS	3-14
VALVE CLEARANCE	3-7	WHEELS	3-15
DECOMPRESSOR SYSTEM	3-8	STEERING HEAD BEARINGS	3-15
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DRIVE CHAIN	3-9	CYLINDER COMPRESSION	3-16

SERVICE INFORMATION

GENERAL

- 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.

- Engine oil level check ..... page 2-2
  Engine oil change ..... page 2-2
  Engine oil filter replacement .. page 2-3
  Oil screen cleaning ..... page 2-4

SPECIFICATIONS

≪ ENGINE ≫

Ignition timing	Initial	8° ± 2° BTDC at 1,200 ± 100 min^{-1} (rpm) (F mark)
	Full advance	29° ± 2° BTDC at 5,000 min^{-1} (rpm)

Spark plug	DPR8EA-9 (NGK) or X24EPR-U9 (ND)	DPR9EA-9 (NGK) or X27EPR-U9 (ND) <G-II, SW types: DPR8EA-9 (NGK) or X24EPR-U9 (ND)>
	DPR7EA-9 (NGK) or X22EPR-U9 (ND) <Except G-I, H types>	DPR8EA-9 (NGK) or X24EPR-U9 (ND) <G-II, SW types: DPR7EA-9 (NGK) or X22EPR-U9 (ND)>
	DPR9EA-9 (NGK) or X27EPR-U9 (ND)	<G-II, SW types: DPR9EA-9 (NGK) or X27EPR-U9 (ND)>

Spark plug gap		0.8–0.9 mm (0.031–0.035 in)
Valve clearance	IN	0.10 mm (0.004 in)
	EX	0.12 mm (0.005 in)
Idle speed		1,200 ± 100 min^{-1} (rpm)
Cylinder compression		1,250 ± 150 kPa (12.5 ± 1.5 kg/cm^2, 175 ± 21 psi)
Starter decompressor lever free play		1–3 mm (1/16–1/8 in)

≪ CHASSIS ≫

Throttle grip free play	2–6 mm (1/8–1/4 in)
Rear brake free play	20–30 mm (3/4–1-1/4 in)
Clutch lever free play	10–20 mm (3/8–3/4 in)
Drive chain slack	15–20 mm (5/8–1 in)

Tires

		Front	Rear
Tire size		100/90-18 56S	110/90-18 61S
Cold tire pressures kPa (kg/cm^2, psi)	Driver only	200 (2.00, 28)	200 (2.00, 28)
	Driver and one passenger	200 (2.00, 28)	250 (2.50, 36)
Tire brand TUBELESS ONLY BRIDGESTONE DUNLOP		 G531 K625A	 G532 K625

TORQUE VALUES

Rear axle nut	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Fuel cup	3–5 N·m (0.3–0.5 kg-m, 2–4 ft-lb)
Valve adjusting screw lock nut	23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)

TOOLS

SPECIAL

Cylinder compression gauge attachment	07908–KK60000

COMMON

Wrench, 10 x 12 mm	07708–0030200
Adjusting wrench A	07708–0030300

MAINTENANCE SCHEDULE

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

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

	ITEM / FREQUENCY	WCHICHEVER 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 LINE			I	I	I	I	I	I	3-4
*	FUEL STRAINER SCREEN			C	C	C	C	C	C	3-4
*	THROTTLE OPERATION			I	I	I	I	I	I	3-4
*	CARBURETOR CHOKE			I	I	I	I	I	I	3-5
	AIR CLEANER	(NOTE 1)				R			R	3-6
	CRANKCASE BREATHER	(NOTE 2)		C	C	C	C	C	C	3-6
	SPARK PLUG			I	R	I	R	I	R	3-7
*	VALVE CLEARANCE		I	I	I	I	I	I	I	3-7
	ENGINE OIL	YEAR R	R	EVERY 3,000 km (1,875 mi) R						2-2
	ENGINE OIL FILTER	YEAR R	R	R	R	R	R	R	R	2-4
*	DECOMPRESS SYSTEM		I	I	I	I	I	I	I	3-8
*	CARBURETOR IDLE SPEED		I	I	I	I	I	I	I	3-8
	DRIVE CHAIN		EVERY 1,000 km (600 mi) I, L							3-9
	BATTERY	MONTH I		I	I	I	I	I	I	3-10
	BRAKE FLUID	MONTH I 2 YEARS *R		I	I	*R	I	I	*R	3-11
	BRAKE SHOE/PAD WEAR			I	I	I	I	I	I	3-11
	BRAKE SYSTEM		I	I	I	I	I	I	I	3-12
*	BRAKE LIGHT SWITCH			I	I	I	I	I	I	3-13
*	HEADLIGHT AIM			I	I	I	I	I	I	3-13
	CLUTCH SYSTEM		I	I	I	I	I	I	I	3-13
	SIDE STAND			I	I	I	I	I	I	3-14
*	SUSPENSION			I	I	I	I	I	I	3-14
*	NUT, BOLT, FASTENER		I	I	I	I	I	I	I	3-15
**	WHEEL			I	I	I	I	I	I	3-15
**	STEERING HEAD BEARING		I		I		I		I	3-15

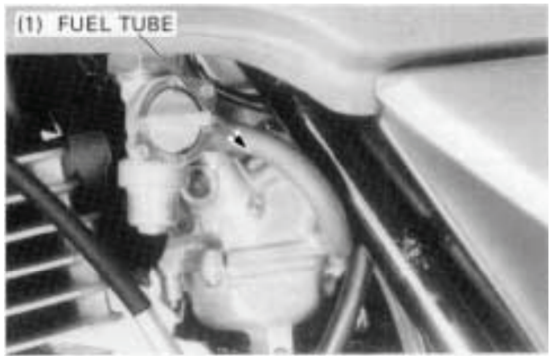
* Should be serviced by an authorized HONDA dealer, unless the owner has proper tools and service data and is mechanically qualified. Refer to the official HONDA shop manual.

** In the interest of safety, we recommend these items be serviced ONLY by an 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 reading, repeat at the frequency interval established here.

FUEL LINE

Replace any cracked, damaged or leaking parts.



FUEL STRAINER SCREEN

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

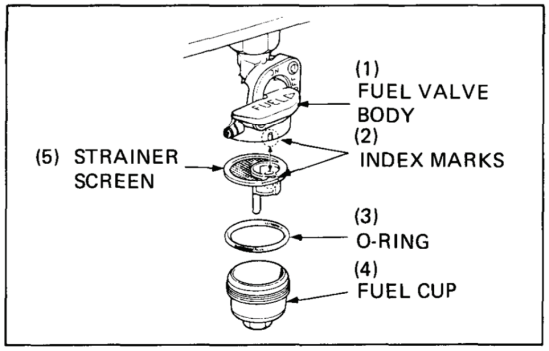
WARNING

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

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

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

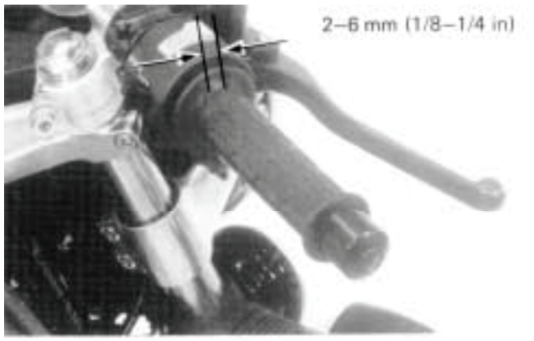
After installing, turn the fuel valve ON and check that there are no fuel leaks.



THROTTLE OPERATION

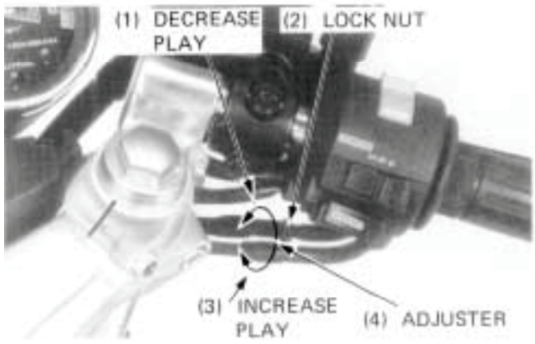
Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Make sure there is no deterioration, damage, or kinking in the throttle cables. Replace any damaged parts. Make sure that the throttle grip free play is 2–6 mm (1/8–1/4 in) at the throttle grip flange.



Throttle grip free play can be adjusted at either end of the throttle cable.

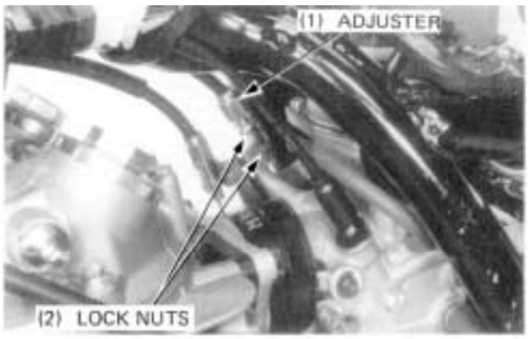
Minor adjustments are made with the upper throttle cable adjuster.



Major adjustments are made with the lower adjuster.

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

Recheck throttle operation. Replace any damaged parts.

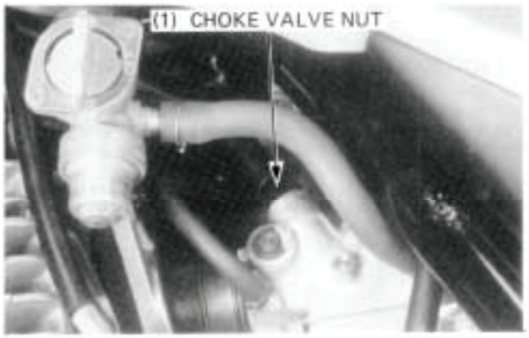


CARBURETOR CHOKE

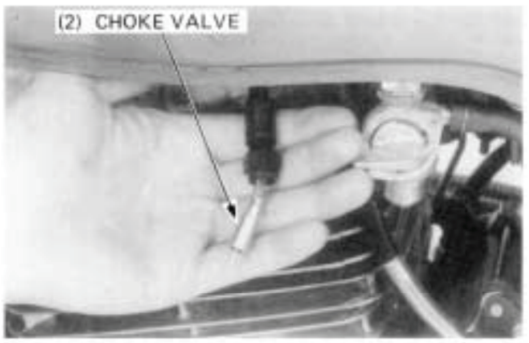
Check that the choke lever moves smoothly. Lubricate the choke cable, if the operation is not smooth.



Loosen the choke valve nut and remove the choke valve from the carburetor.
Pull the choke lever on the handlebar all the way back to fully open position and check for smooth operation of the choke lever.
There should be no free play.
Lubricate the choke cable, if the operation is not smooth.



Check the valve seat on the choke valve for damage. Reinstall the choke valve in the reverse order of removal.

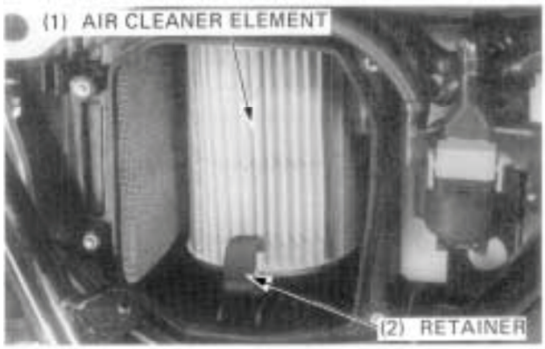


AIR CLEANER

Remove the frame left side cover.
Remove the air cleaner cover screws and the cover.



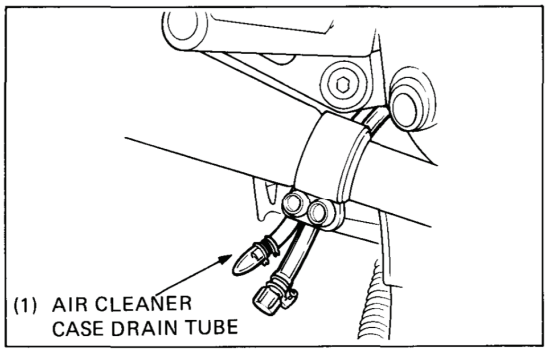
Pull out the air cleaner element retainer.
Take out and discard the air cleaner element.
Install a new element.
Install the parts in the reverse order of removal.



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

NOTE

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



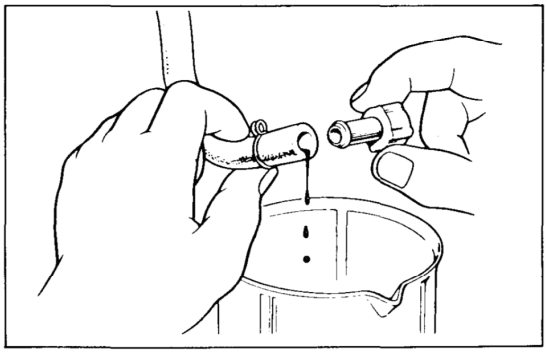
CRANKCASE BREATHER

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

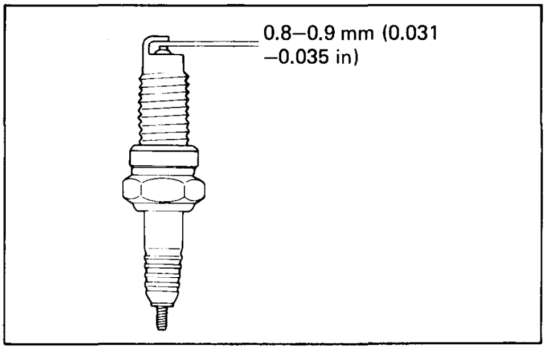
Install the drain plug.

NOTE

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



SPARK PLUG



Disconnect the spark plug cap and remove the spark plug.

Visually inspect the spark plug. Discard it if the insulator is cracked or chipped.

Measure the spark plug gap with a wire-type feeler gauge.
Adjust the gap by bending the side electrode carefully.

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

DPR8EA-9 (NGK) or X24EPR-U9 (ND)	DPR9EA-9 (NGK) or X27EPR-U9 (ND) <G-II, SW types: DPR8EA-9 (NGK) or X24EPR-U9 (ND)>
DPR7EA-9 (NGK) or X22EPR-U9 (ND) <Except G-I, H types>	DPR8EA-9 (NGK) or X24EPR-U9 (ND) <G-II, SW types: DPR7EA-9 (NGK) or X22EPR-U9 (ND)>
DPR9EA-9 (NGK) or X27EPR-U9 (ND)	<G-II, SW types: DPR9EA-9 (NGK) or X27EPR-U9 (ND)>

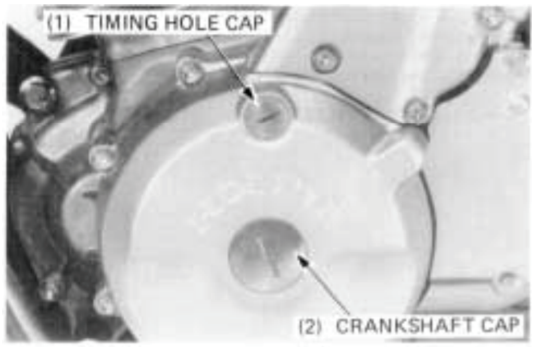
Make sure the sealing washer is in good condition.

Install the spark plug, tighten it by hand, then use a spark plug wrench for the final tightening.

VALVE CLEARANCE

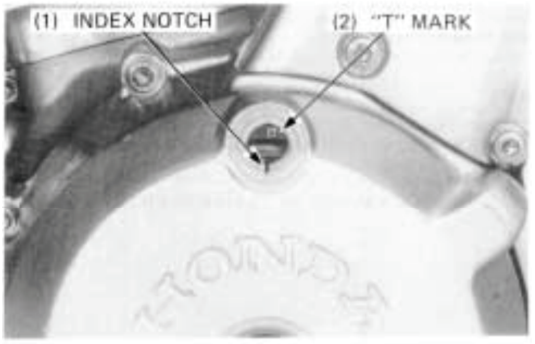
NOTE

- Inspect and adjust valve clearance while the engine is cold (below 35°C/95°F).
  Make sure the decompressor valve lifters have some free play during this maintenance.



Remove the seat.
Turn the fuel valve OFF, disconnect the fuel line, and remove the tank.

Remove the crankshaft and timing mark hole caps.
Remove the valve adjuster covers.

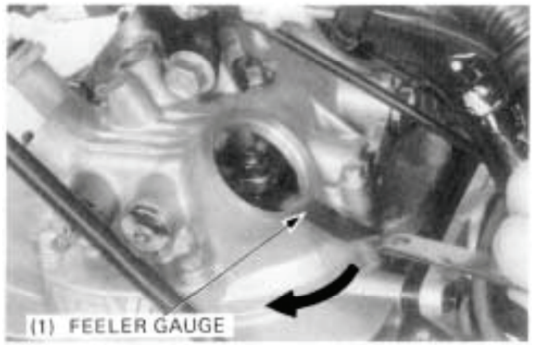


Rotate the flywheel counterclockwise to align the "T" mark with the index notch on the left crankcase cover.
Make sure the piston is at TDC (Top Dear Center) on the compression stroke.

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

NOTE

- When checking the clearance, slide the feeler gauge from the inside out in the arrow direction.



VALVE CLEARANCES:
Intake 0.10 mm (0.004 in)
Exhaust: 0.12 mm (0.005 in)

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

Hold the adjusting screw and tighten the lock nut.

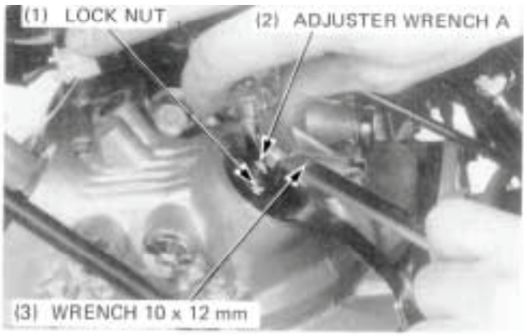
TORQUE: 23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)

TOOLS

Adjuster wrench A	**07708–0030300**
Wrench 10 x 12 mm	**07708–0030200**

Adjust the starter decompressor free play.

Install the removed parts in the reverse order of removal.



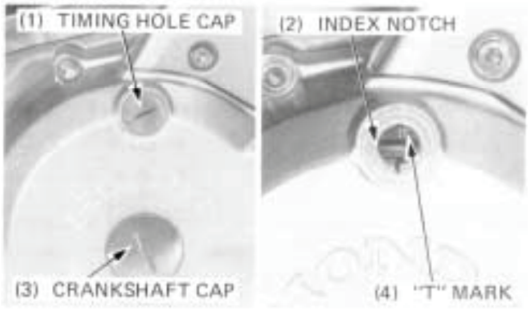
DECOMPRESSOR SYSTEM

NOTE

- Always adjust the decompressor cable after adjusting the valve clearance.

Remove the crankshaft and timing hole caps.

Rotate the flywheel counterclockwise to align the "T" mark with the index notch. Make sure that the piston is at TDC (Top Dead Center) on the compression stroke.



Measure kick starter decompressor cable free play at the tip of the decompressor valve lifter lever.

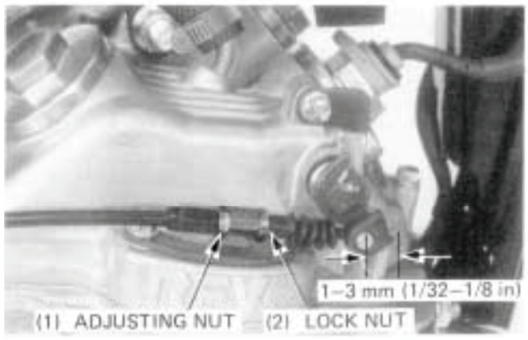
FREE PLAY: 1–3 mm (1/32–1/8 in)

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

CAUTION

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

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



CARBURETOR IDLE SPEED

NOTE

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

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

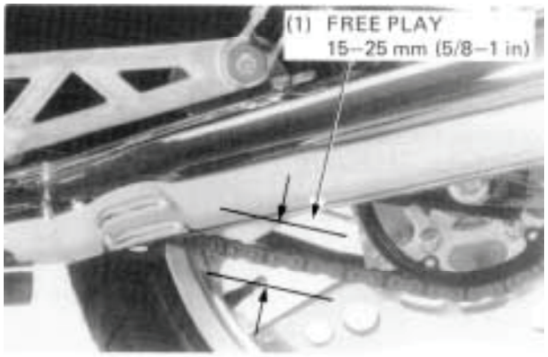
IDLE SPEED: 1,200 ± 100 min^{-1} (rpm)



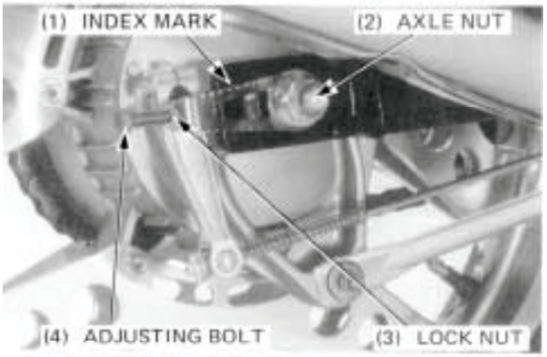
DRIVE CHAIN

Turn the ignition switch off, place the motorcycle on its center stand and shift the transmission into neutral.
Move the chain up and down with your fingers and measure the amount of slack. The slack should be adjusted to 15–25 mm (5/8– 1 in) and never be allowed to exceed 50 mm (2 in).

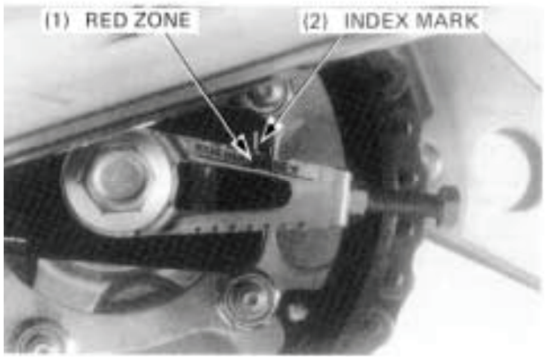
DRIVE CHAIN SLACK: 15–25 mm (5/8–1 in)



To adjust the drive chain:
Loosen the rear axle nut.
Loosen the lock nut and turn the adjusting bolt on both the right and left chain adjusters an equal amount of turns to increase or decrease chain slack. Align the chain adjuster index marks with corresponding scale graduations on both sides of the swing arm.



Check the chain wear label when adjusting the chain.
If the red zone on the label aligns with the index mark after the chain has been adjusted to 15–25 mm (5/8–1 in) slack, the chain is excessively worn and must be replaced.



When the drive chain becomes extremely dirty, it should be removed and cleaned prior to lubrication.
Remove the rear wheel (Page 13-3) and the swing arm (Page 13-13).
Remove the drive sprocket cover and drive chain.

Clean the drive chain with kerosene and wipe dry.

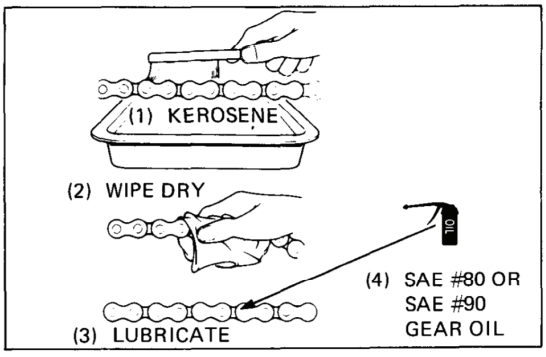
CAUTION

- *Do not use a steam cleaner, high pressure washers or solvents as these will damage the O-rings.*

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

CAUTION

- *Do not use commercial aerosol chain lubricants. They contain solvents which could damage the O-rings.*

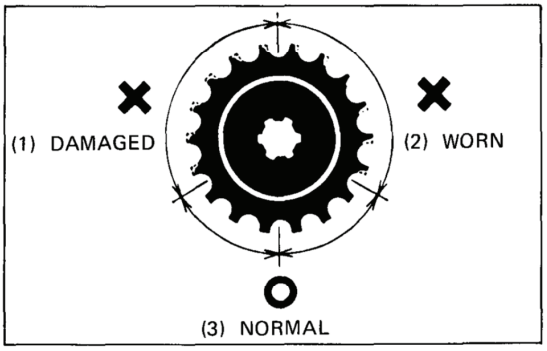


DRIVE AND DRIVEN SPROCKET:

Inspect the drive and driven sprocket teeth for excessive wear or damage. Replace if necessary.

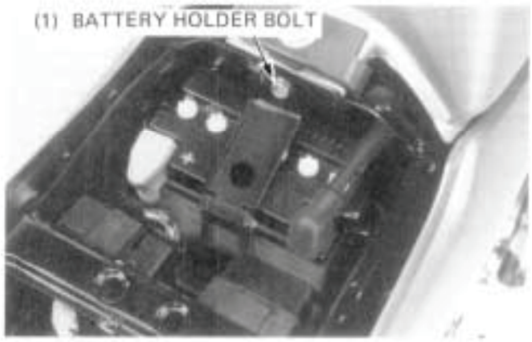
NOTE

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



BATTERY

Remove the seat.
Inspect the battery fluid level.
If the fluid level nears the lower level, remove the battery holder bolt.



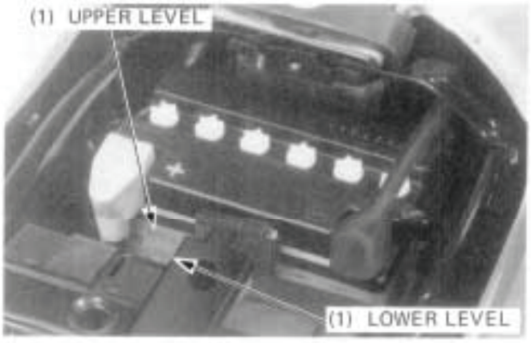
Remove the battery caps and add distilled water up to the upper level.

NOTE

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

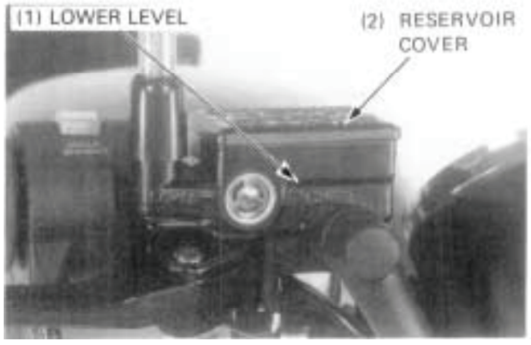
WARNING

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

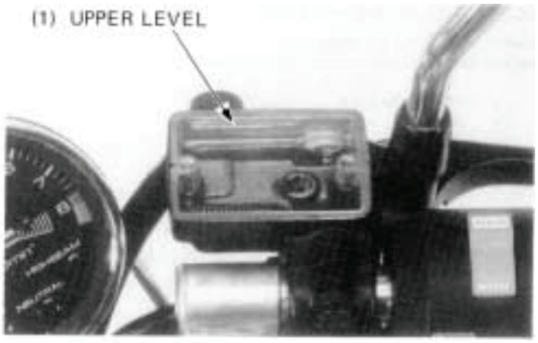


BRAKE FLUID

Check the front brake fluid reservoir level.
If the level nears the lower level mark, remove the reservoir cover screws, cover and diaphragm.



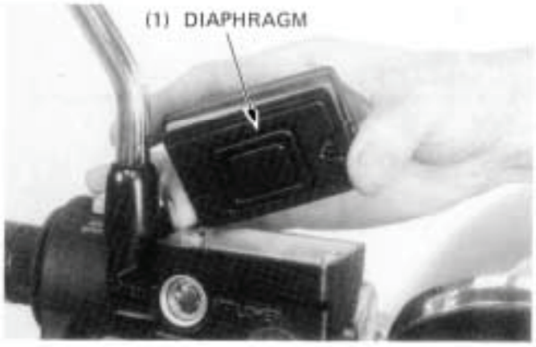
Fill the reservoir with the DOT 3 or 4 BRAKE FLUID up to the upper level mark.



CAUTION

- *Do not remove the cover until the handlebar had been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Refer to section 14 for brake bleeding procedures.
Install the diaphragm and cover, and tighten the screws.



BRAKE SHOE/PAD WEAR

Inspect the pads visually from the direction as indicated by arrow during all regular service intervals to determine the pad wear.

If the pads wear to the wear lines, both pads must be replace.
Make sure there are no fluid leaks.



Check the brake oil hose and fitting for deterioration or cracks.

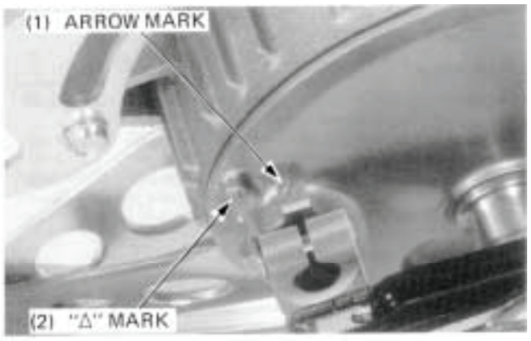


CAUTION

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

BRAKE SHOE INSPECTION

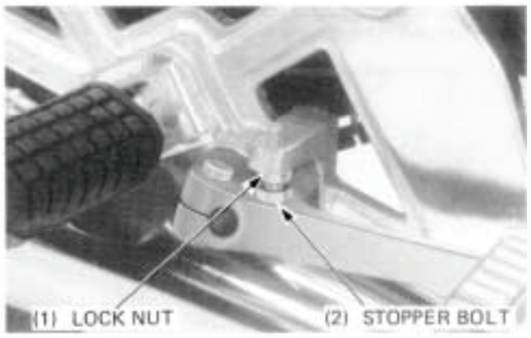
Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "Δ" on the brake panel when the brake is applied.



BRAKE SYSTEM

BRAKE PEDAL HEIGHT

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



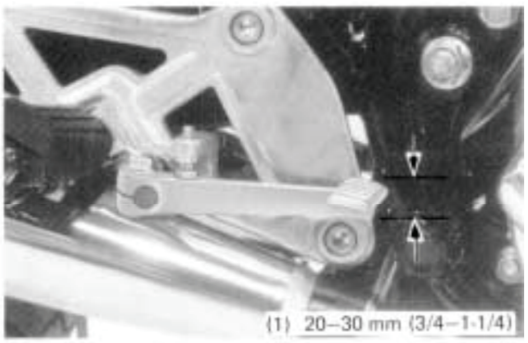
BRAKE PEDAL FREE PLAY

NOTE

- Adjust the brake pedal free play after adjusting the brake pedal height.

Measure the brake pedal free play.

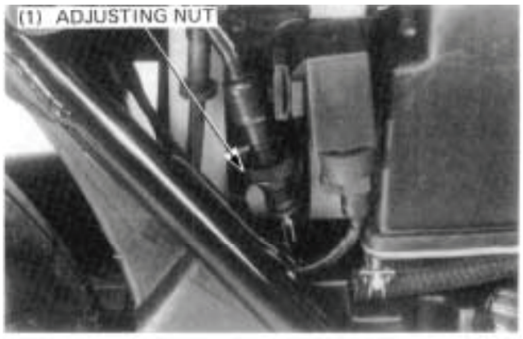
FREE PLAY: 20–30 mm (3/4–1-1/4 in)



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



BRAKE LIGHT SWITCH



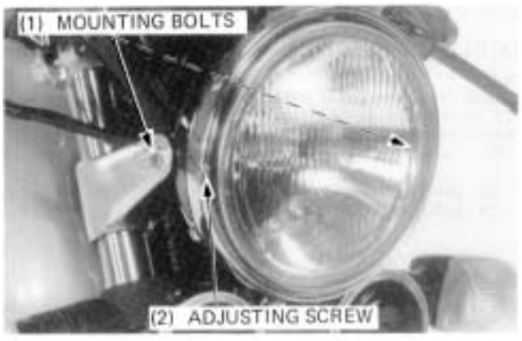
NOTE

- The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light will light when the brake pedal is depressed and the brake begins engagement.
Hold the switch body and turn the adjusting nut as required.

HEADLIGHT AIM

Adjust vertical aim by loosening both headlight case mounting bolts and tilting the headlight as required.
Align the punch marks on the headlight case and bracket.



Adjust horizontal aim by turning the adjusting screw on the headlight rim.
Turn the adjusting screw clockwise to direct the beam toward the left side of the rider.

NOTE

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

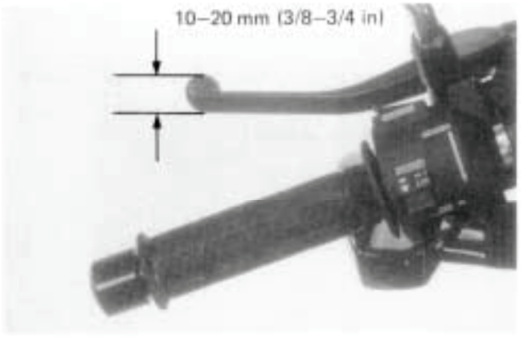
WARNING

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

CLUTCH SYSTEM

Measure the clutch free play at the lever end.

FREE PLAY: 10–20 mm (3/8–3/4 in)

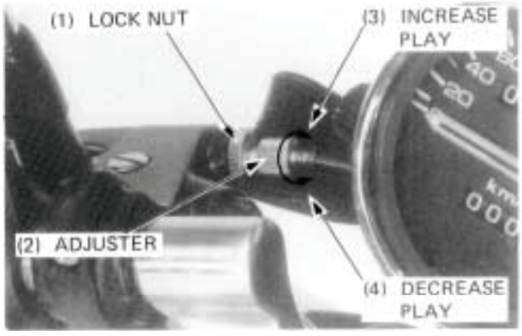


Minor adjustments are made with the upper adjuster.

Pull the lever cover back, loosen the lock nut and turn the adjuster to obtain the specified free play.

Tighten the lock nut and install the cover.

Check clutch operation.

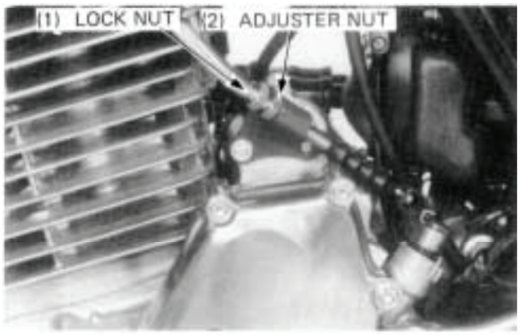


Major adjustments are made with the lower adjuster.

Turn the upper adjuster in all the way and back out 1 turn.

Loosen the lock nut and turn the adjuster nut to obtain the specified free play.

Tighten the lock nuts and check clutch operation.



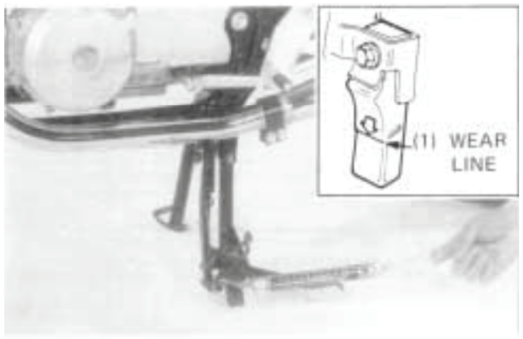
SIDE STAND

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

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

NOTE

- When replacing, use a rubber pad with the mark "above 259 lb only".
  Spring tension is correct if the measurements fall within 2–3 kg (4.4–6.6 lb) when pulling the side stand lower end with a spring scale.



SUSPENSIONS

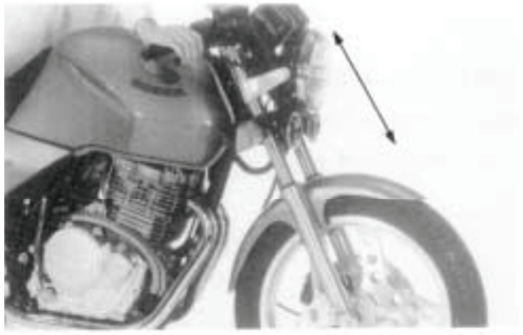
FRONT

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

Check the entire fork assembly for signs of leaks, or damage.
Replace any components which are unrepairable.
Tighten all nuts and bolts to the specified torque value.

WARNING

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

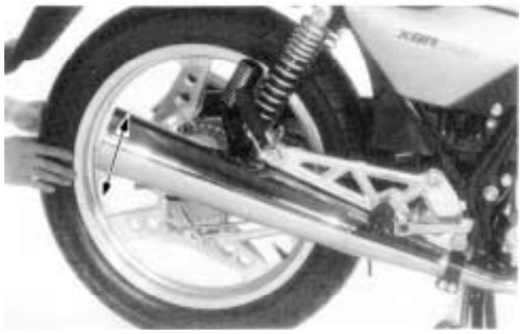


REAR

Place the vehicle on its center stand to raise the rear wheel.

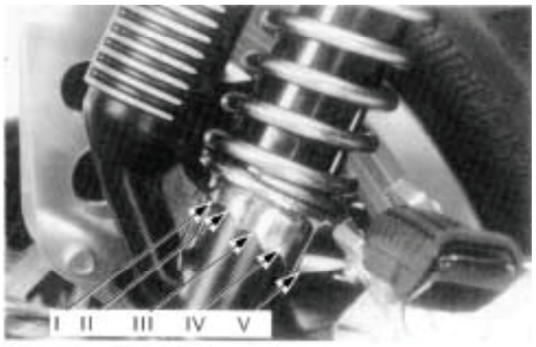
Move the rear wheel sideways with force to see if the swing arm bushings are worn. Replace if excessively worn.
Check the entire suspension assembly, being sure it is securely mounted and not damaged or distorted.

Tighten all nuts and bolts to the specified torque value.



REAR SHOCK ABSORBER

Position I is for light loads and smooth rod conditions. Position II to V progressively increase spring tension for a stiffier rear suspension and can be used when the motorcycle is more heavily loaded or operated on rough rods.
Be sure to adjust both shock absorbers to the same position. Adjustment can be made with the hook spanner.



SWING ARM

Pump grease into the swing arm pivot bushing through the grease fitting on the swing arm.



WHEELS

TIRE PRESSURE

NOTE

- Tire pressure should be checked when the tires are COLD.

		Front	Rear
Tire size		100/90-18 56S	110/90-18 61S
Cold tire pressures kPa (kg/cm^2, psi)	Driver only	200 (2.00, 28)	200 (2.00, 28)
	Driver and one passenger	200 (2.00, 28)	250 (2.50, 36)

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



STEERING HEAD BEARINGS

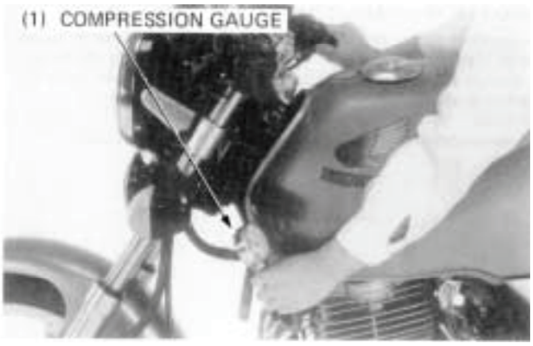
Raise the front wheel off the ground and check that the handlebar rotates freely. Check that the control cables do not interfere with handlebar rotation. If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearings by turning the steering head adjusting nut (page 12-21).



NUTS, BOLTS, FASTENERS

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

CYLINDER COMPRESSION



Warm up the engine.

Stop the engine and remove the spark plug. Remove the fuel tank if necessary.
Insert a compression gauge and push the choke lever in all the way. Turn the engine stop switch OFF.
Open the throttle grip fully. Crank the engine with the electric starter until the gauge stops rising.
Check the gauge reading.

TOOL
Cylinder compression gauge attachment:
07908–KK60000

NOTE

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

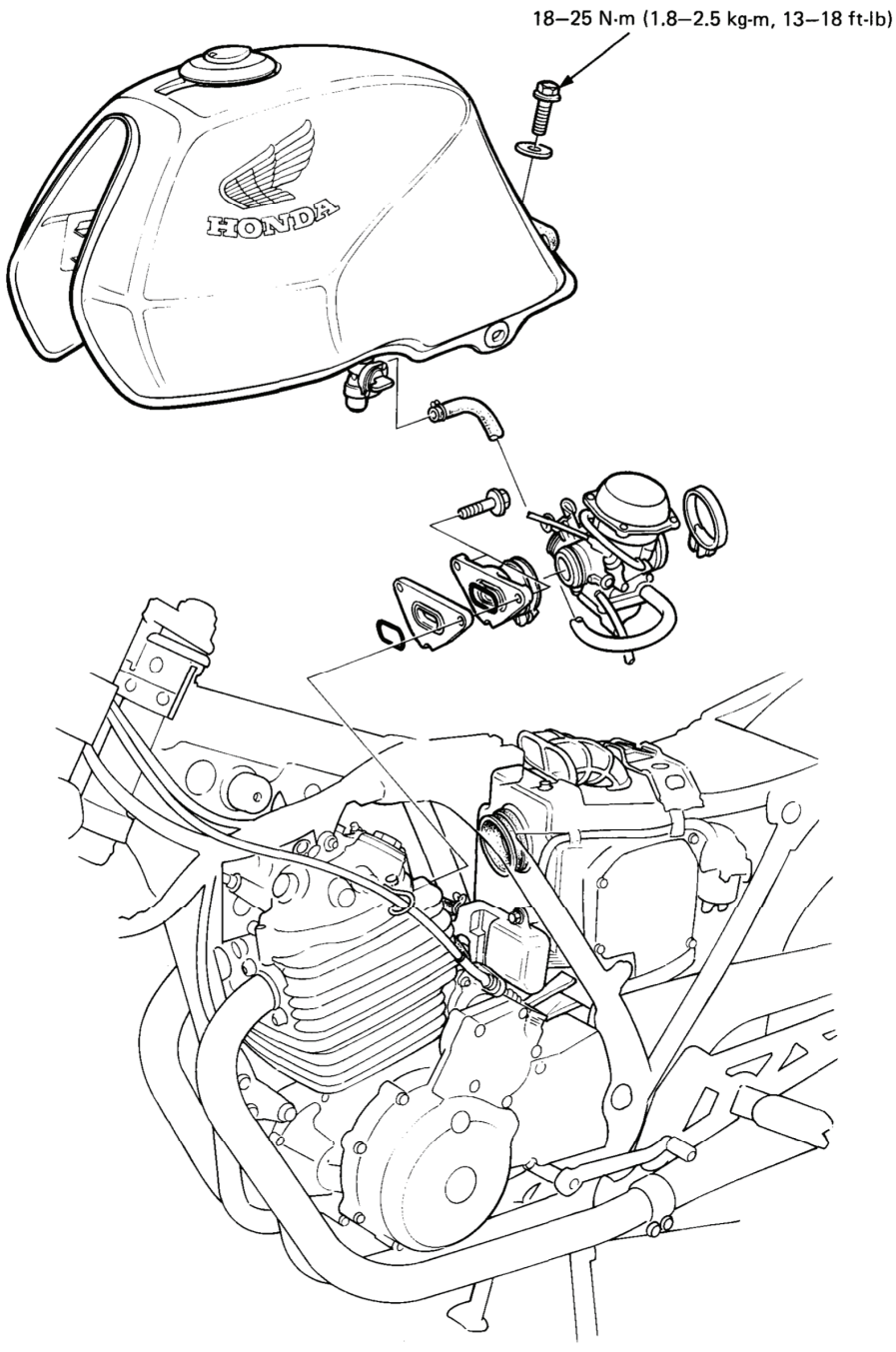
COMPRESSION: 1,250 ± 150 kPa (12.5 ± 1.5 kg/cm^2, 172 ± 21 psi)

Low compression can be caused by:

Improper valve adjustment
Valve leakage
Leaking cylinder head gasket
Worn piston rings or cylinder

High compression can be caused by:

Carbon deposits in the combustion chamber or on the piston head.


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

4. FUEL SYSTEM

SERVICE INFORMATION	4-1	CARBURETOR INSTALLATION	4-8
TROUBLESHOOTING	4-2	PILOT SCREW ADJUSTMENT	4-9
CARBURETOR REMOVAL	4-3	FUEL TANK	4-10
CARBURETOR DISASSEMBLY	4-4	AIR CLEANER CASE	4-11
CARBURETOR ASSEMBLY	4-6		

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

Fuel tank capacity	19 lit (5.0 US gal, 4.2 Imp gal)
Reserve capacity	3.3 lit (0.9 US gal, 0.7 Imp gal)
Carburetor	
Type	Constant Vacuum
Identification number	VD10A <G-II type: VE10B,
Float level	18.5 mm (0.73 in)
Pilot screw opening	2-3/4 <G-II type: 2-1/4,
Main jet	#152 <G-II, SW type: #158>
Slow jet	#48
Idle speed	1,200 ± 100 min^{-1} (rpm)
Throttle grip free play	2–6 mm (1/8–1/4 in)

TORQUE VALUE

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

TOOLS

SPECIAL

Pilot screw wrench	07908-4220201

COMMON

Float level gauge	07401–0010000

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetor
- Too much fuel getting to cylinder
- No spark at plug (ignition malfunction)
- Air cleaner clogged

Engine idles roughly, stalls, or runs poorly
- Idle speed incorrect
- Ignition malfunction
- Rich mixture
- Lean mixture
- Air cleaner dirty
- Insulator leaks

Lean mixture
- Carburetor fuel jet clogged
- Fuel filler cap vent hole blocked
- Fuel filter clogged
- Fuel line kinked or restricted
- Float valve faulty
- Float level too low
- Intake air leak

Rich mixture
- Starter valve stuck open or damage
- Float valve faulty
- Float level too high
- Carburetor air jet clogged
- Air cleaner dirty

CARBURETOR REMOVAL

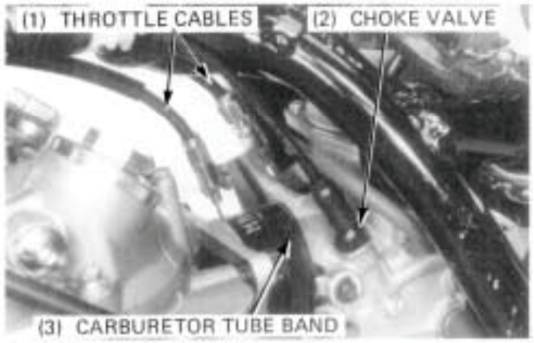
Remove the seat and fuel tank (page 4-10).
Loosen the drain screw and drain the fuel into a suitable container.

WARNING

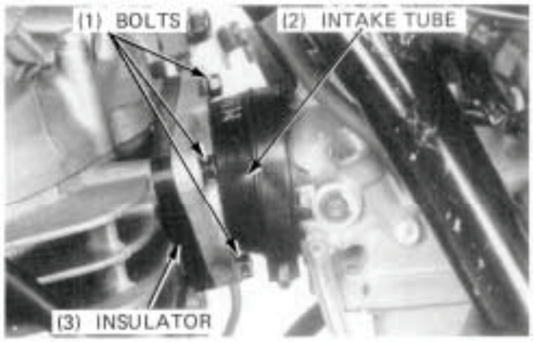
Keep gasoline away from frames or sparks. Wipe up spilled gasoline at once.



Loosen the carburetor tube bands.
Disconnect the throttle cables and choke valve from the carburetor.



Remove the three bolts attaching the intake tube to the cylinder head.
Remove the insulator with O-rings and the intake tube.



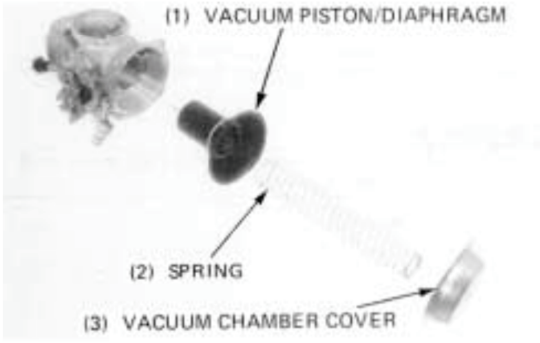
Pull the carburetor away from the engine through the lift side.



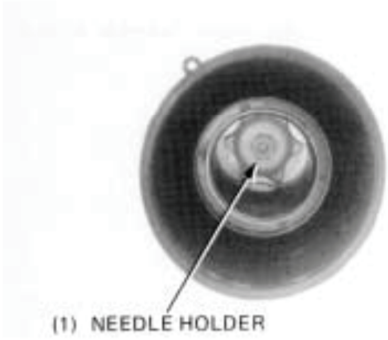
CARBURETOR DISASSEMBLY

VACUUM CHAMBER

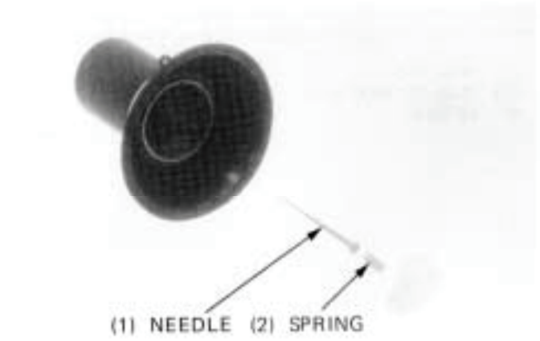
Remove the four vacuum chamber cover screws and cover.
Remove the compression spring and diaphragm/vacuum piston.
Inspect the vacuum piston and diaphragm for wear, scratches or other damage.
Make sure the piston moves up and down freely in the chamber.



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

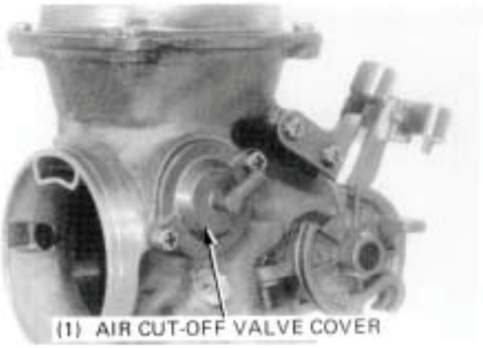


Inspect the needle for excessive wear at tip and for bending, or other damage.
Check the diaphragm for torn or deterioration.



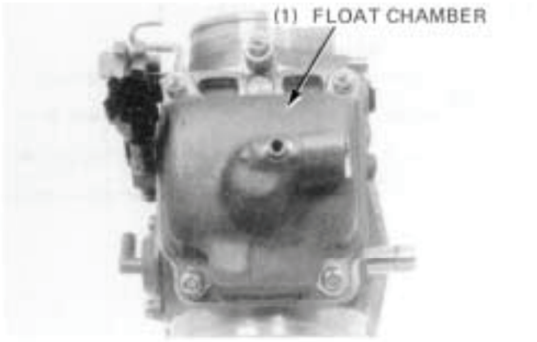
AIR CUT-OFF VALVE

Remove the two screws attaching the air cut-off valve cover and the cover.
Remove the spring and diaphragm.

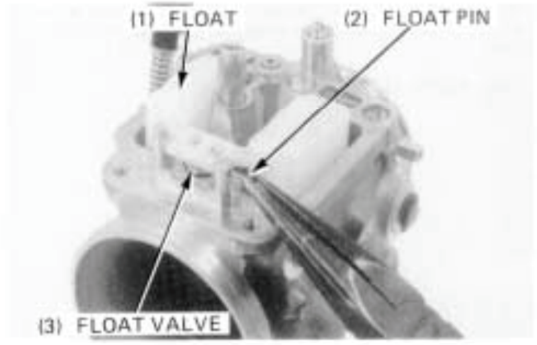


FLOAT CHAMBER

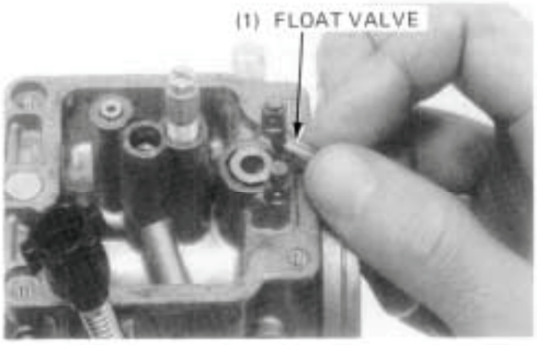
Remove the four float chamber screws and the float chamber.



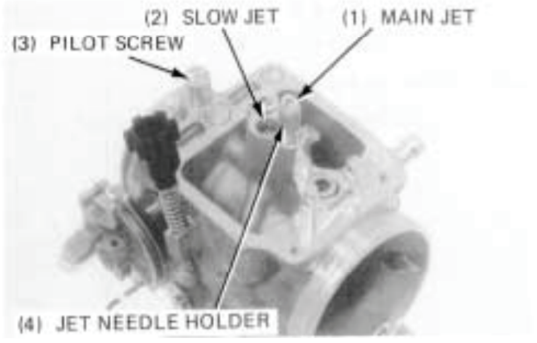
Remove the float pin, float and float valve.



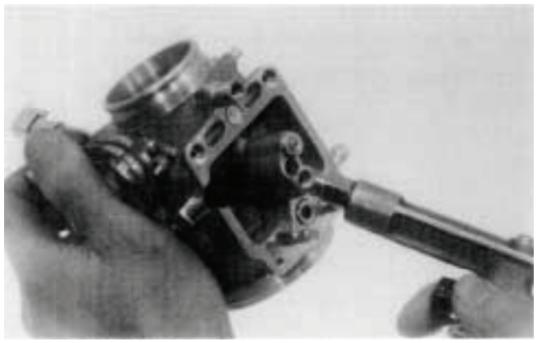
Inspect the float valve for grooves and nicks.



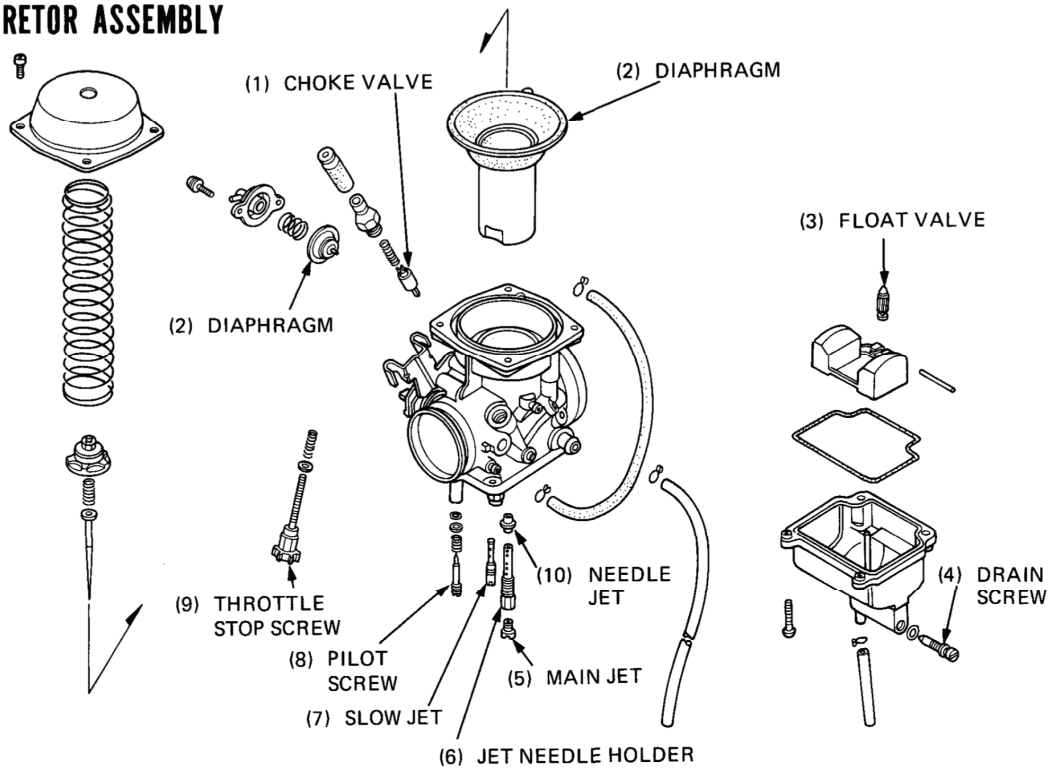
Remove the main jet, slow jet, jet needle holder, needle jet and pilot screw.



Blown open all passages with compressed air before installing jets and valve.

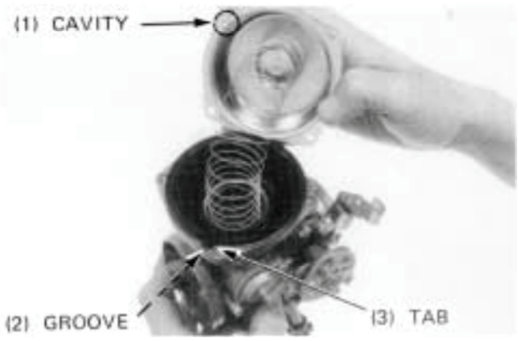


CARBURETOR ASSEMBLY



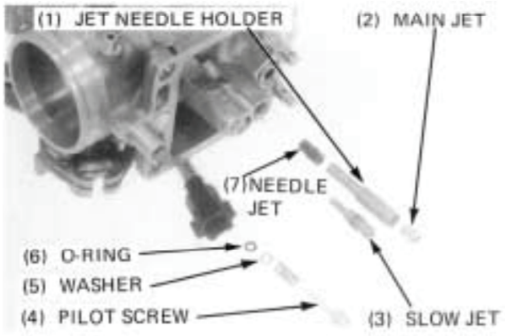
VACUUM CHAMBER

Install the vacuum piston/diaphragm as follows:
Install the needle onto the piston/diaphragm, and secure with the spring and needle holder.
Insert the vacuum piston into the carburetor and aligning the tab on the diaphragm with the carburetor groove.
Install the spring and vacuum chamber cover, aligning its cavity with the tab on the diaphragm, and secure with the screws.

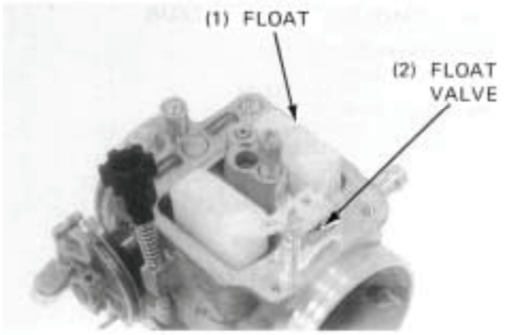


FLOAT CHAMBER

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



Install the float with the float valve onto the carburetor.
Inspect the operation of the float valve.

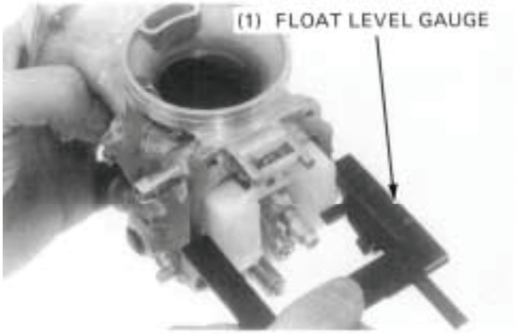


FLOAT LEVEL INSPECTION

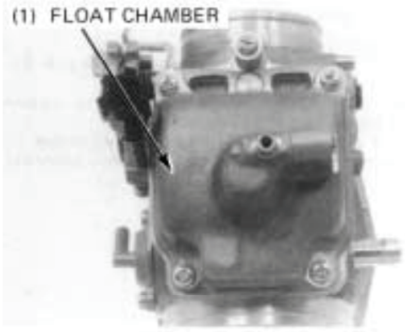
Measure the float level with the float tang just contacting the float valve.

SPECIFICATION: 18.5 mm (0.73 in)

TOOL:
Float level gauge 07401–0010000

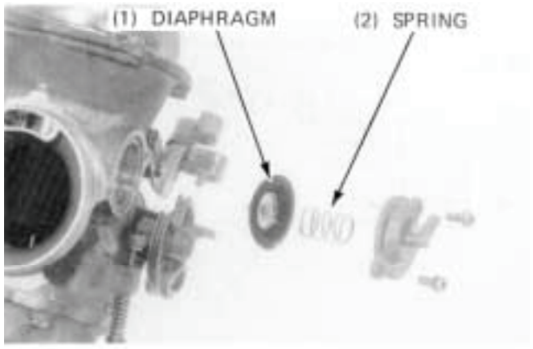


Install the float chamber and tighten the screws.

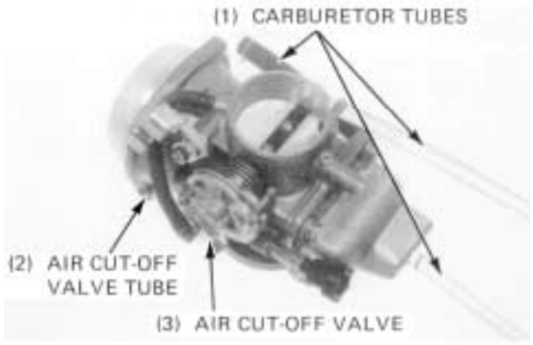


AIR CUT-OFF VALVE

Check the diaphragm for pin hole or other damage.
Assemble the air cut-off valve in the reverse order of disassembly.



Install the air cut-off valve tube.
Install the carburetor tubes.



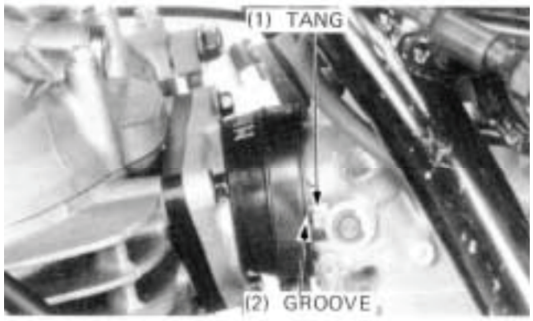
CARBURETOR INSTALLATION

Installation is essentially the reverse order of removal.

CAUTION

- *When installing the insulator onto the cylinder head, be careful not to damage the O-rings.*

Align the tang on the carburetor with the groove on the intake tube.

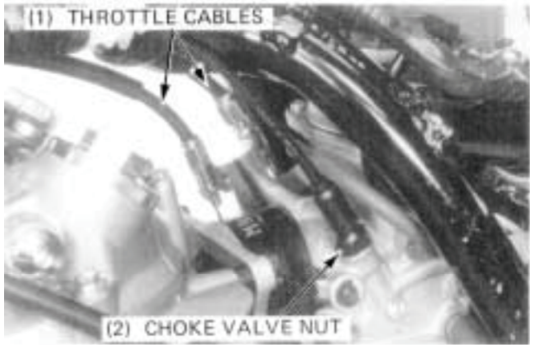


Install the choke valve into the carburetor securely.
Tighten the choke valve nut.
Install the throttle cables.

NOTE

- Route the throttle and choke cable properly (page 1-11).

Perform the following inspection and adjustments.
- Throttle operation (page 3-4).
- Idle speed (page 3-8).



PILOT SCREW ADJUSTMENT

TOOL:
Pilot screw wrench 07908–4220201

NOTE

- The pilot screw is factory pre-set and no adjustment is necessary unless the pilot screw is replaced (page 4-4).

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

INITIAL OPENING: 2-3/4 <G-II type: 2-1/4, SW type: 1-5/8>

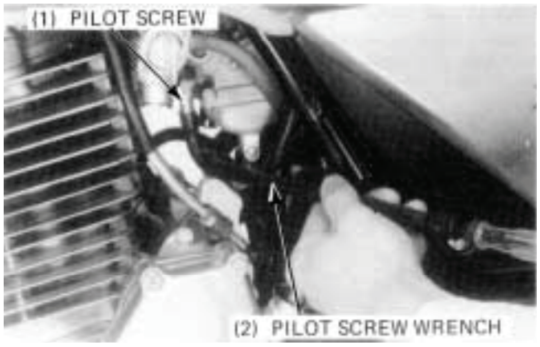
CAUTION:

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

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

IDLE SPEED: 1,200 ± 100 min^{-1} (rpm)

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Repeat the steps 4 and 5.
7. Readjust the idle speed with throttle stop screw.



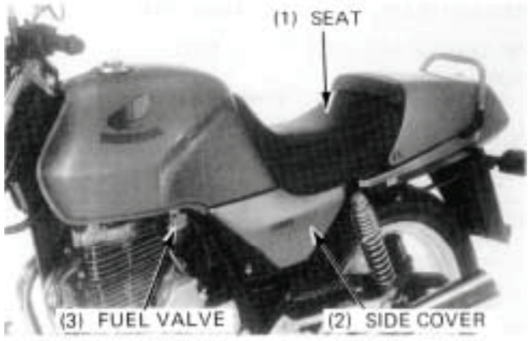
FUEL TANK

WARNING

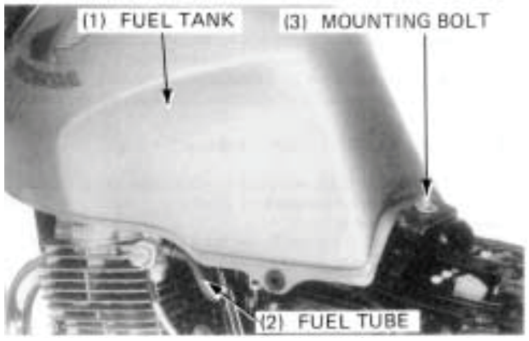
- ***Keep gasoline away from flames or sparks. Wipe up spilled gasoline at once.***

REMOVAL

Remove the seat and side covers.
Turn the fuel valve OFF.



Place the clean container under the fuel tube and disconnect the fuel tube from the fuel valve.
Remove the fuel tank mounting boly and fuel tank.



INSTALLATION

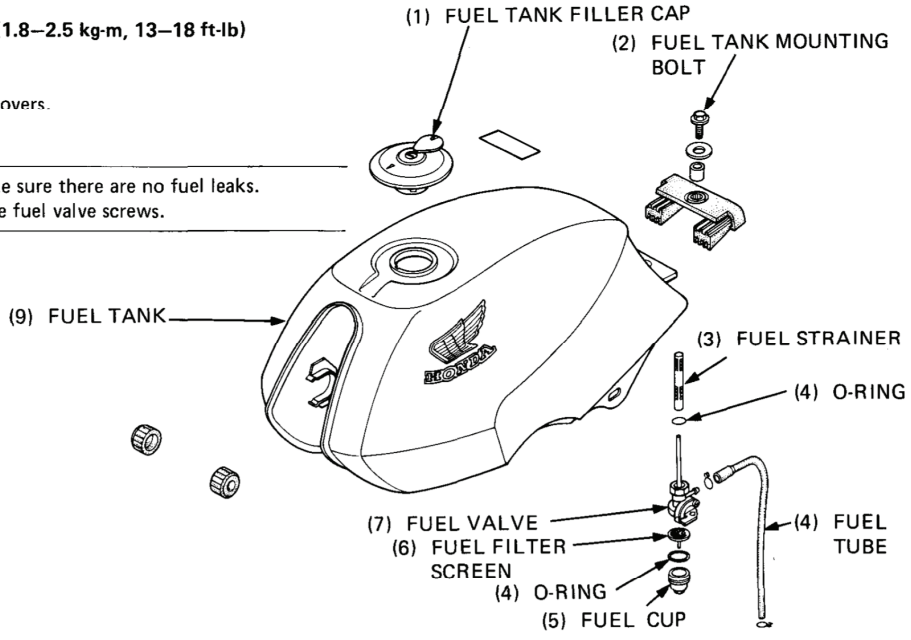
Install the fuel tank with the mounting bolt.

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

Connect the fuel tube.
Install the seat and side covers.

NOTE

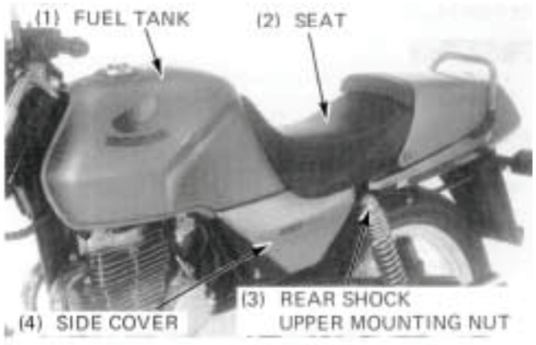
- After assembling, make sure there are no fuel leaks.
- Do not overtighten the fuel valve screws.



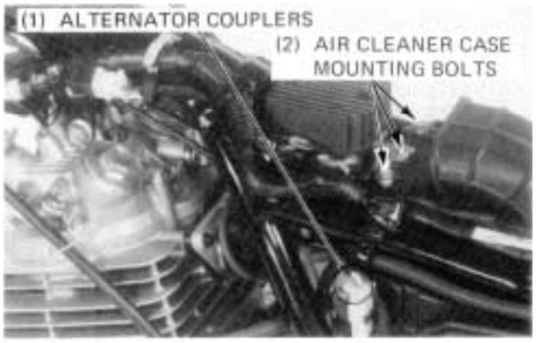
AIR CLEANER CASE

REMOVAL

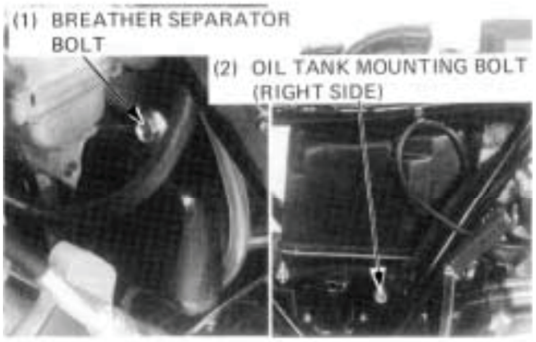
Remove the following:
- seat, side covers and fuel tank.
- battery and battery holder (page 2-5).
- rear wheel (page 13-3).
- rear shock absorber mounting nuts.
- rear fender



- alternator couplers from the air cleaner case.
- air cleaner case mounting bolts.



- air cleaner element and breather separator mounting bolt.
- oil tank mounting bolt from the right.
- oil tank mounting bolt and the spacer from the left side.

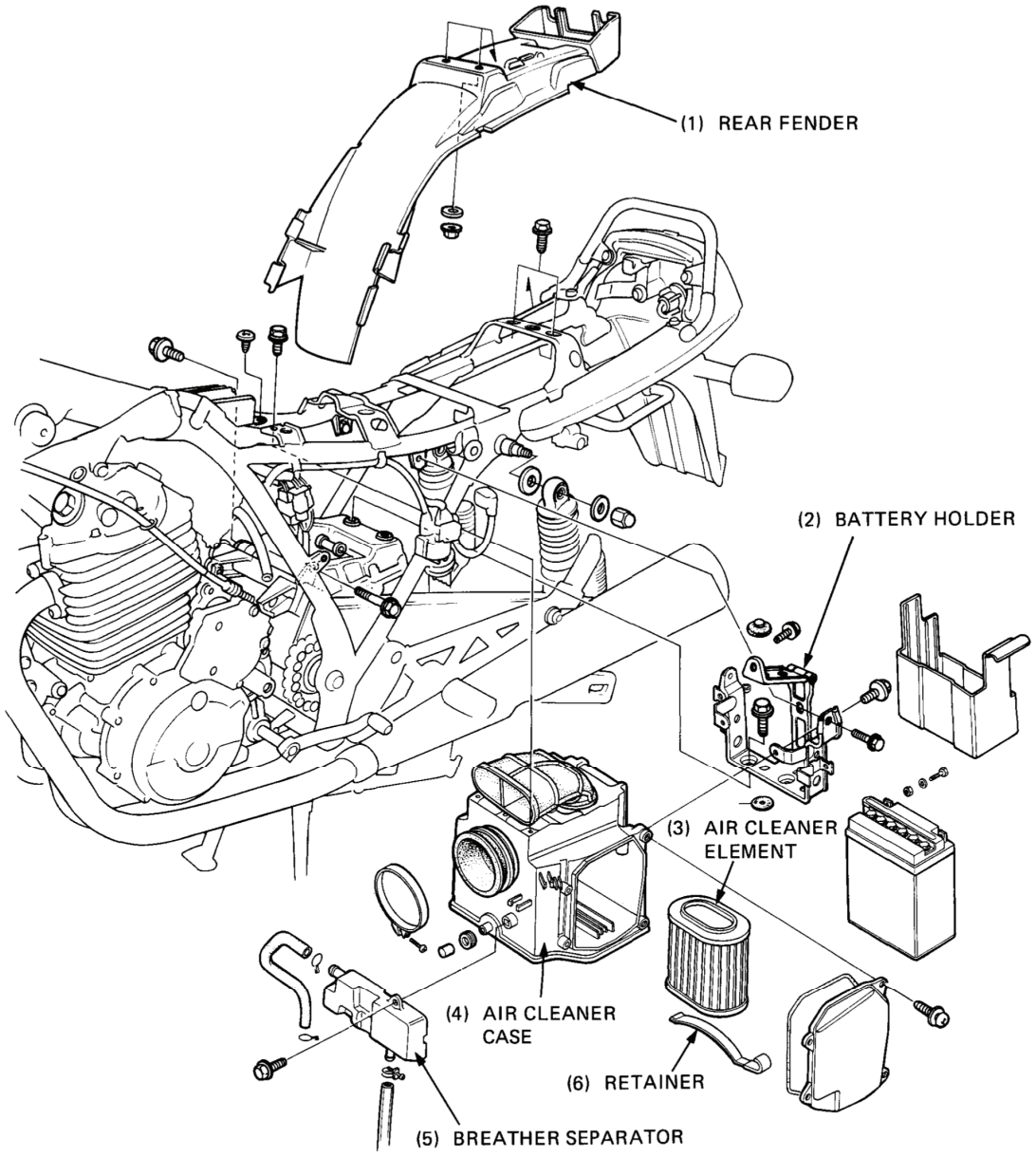


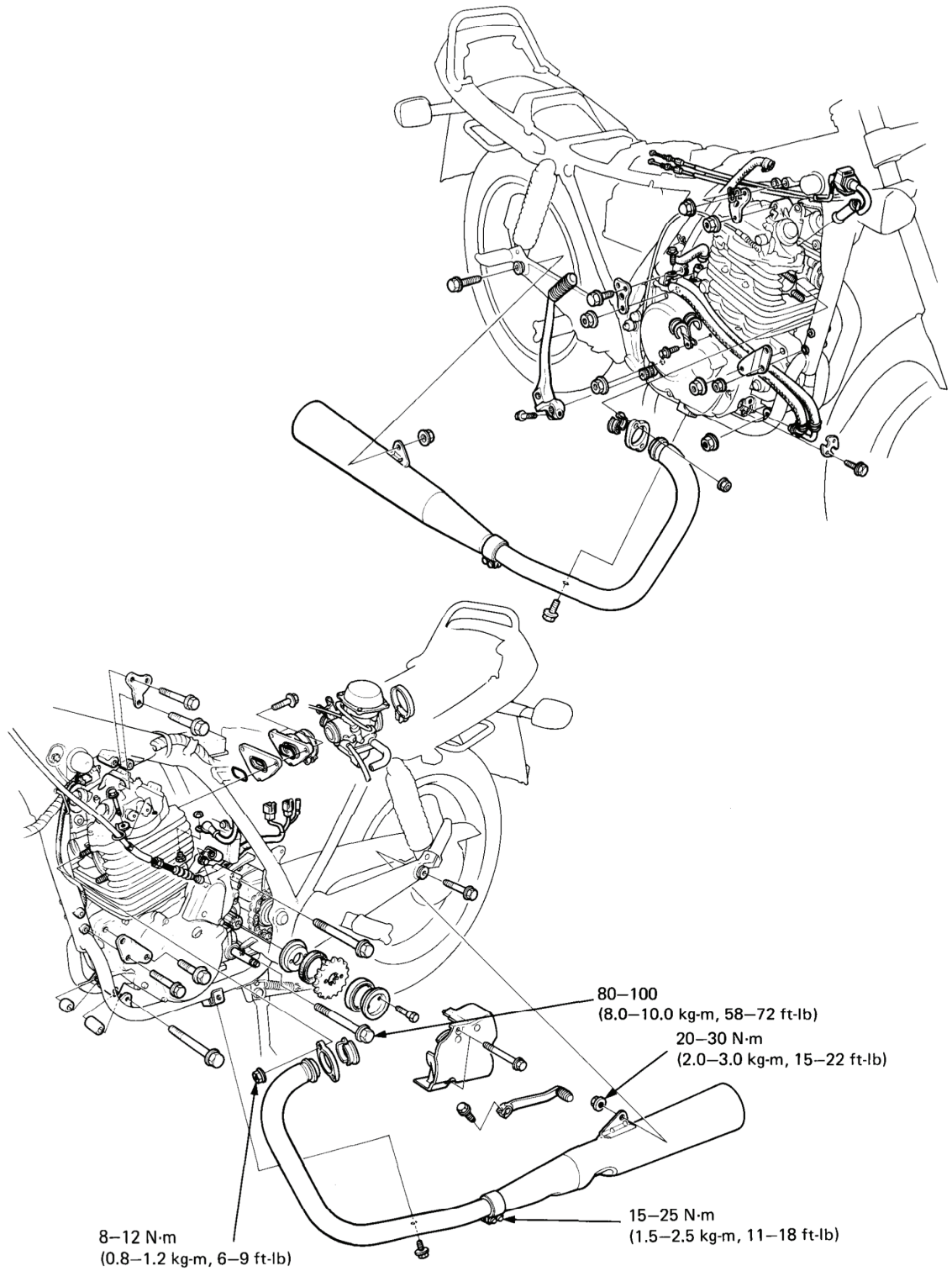
- air cleaner case from the rear.



INSTALLATION

Install the air cleaner in the reverse order of removal.




80–100
(8.0–10.0 kg-m, 58–72 ft-lb)
20–30 N·m
(2.0–3.0 kg-m, 15–22 ft-lb)
15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

5. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	5-1	ENGINE INSTALLATION	5-4
ENGINE REMOVAL	5-2		

SERVICE INFORMATION

GENERAL

- A jack or adjustable support is required to maneuver the engine.
- Parts requiring engine removal for servicing:

Cylinder head	Section 6
Cylinder	Section 7
Crankshaft	Section 11
Balancer	Section 11
Transmission	Section 10
Shift linkage	Section 10

SPECIFICATIONS

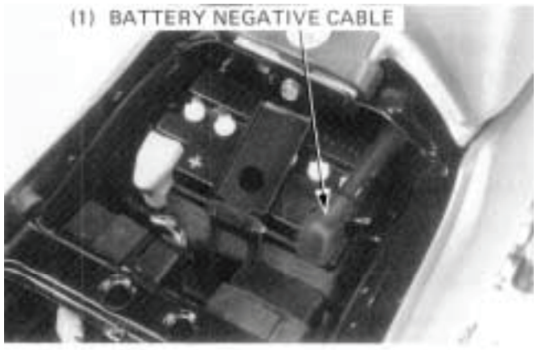
Engine weight	50 kg (110 lb)
Oil capacity	2.3 lit (2.4 US qt, 2.0 Imp qt) at engine assembly
	1.6 lit (1.7 US qt, 1.4 Imp qt) at oil change

TORQUE VALUES

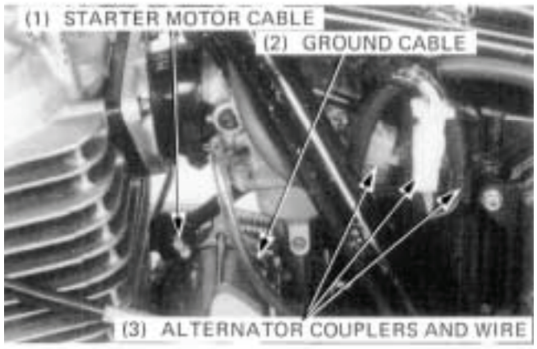
Engine rear hanger bolt:	
10 mm	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Engine hanger and bracket bolts:	
8 mm	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
10 mm	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
Exhaust pipe clamp bolt	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
Exhaust pipe joint nut	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Exhaust muffler mount bolt	20–30 N·m (2.0–3.0 kg-m, 15–22 ft-lb)
Rear axle nut	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

ENGINE REMOVAL

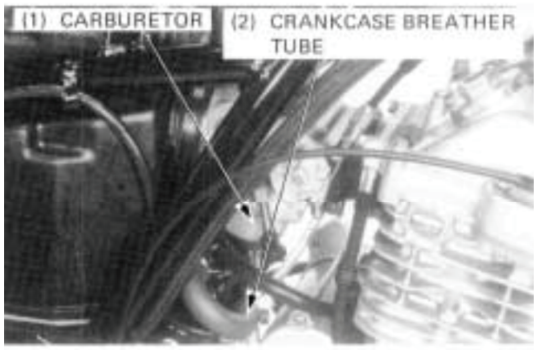
Remove the seat and disconnect the negative cable at the battery.
Turn the fuel valve OFF and remove the fuel tank (page 4-10).
Remove the exhaust pipe (page 15-2).
Drain the oil from the engine and oil tank (page 2-2).



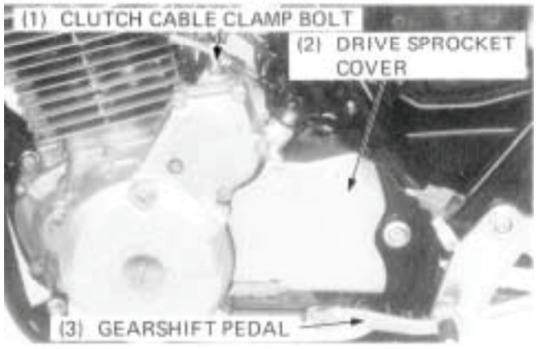
Disconnect the starter motor cable and engine ground cable.
Disconnect the alternator couplers and wire.



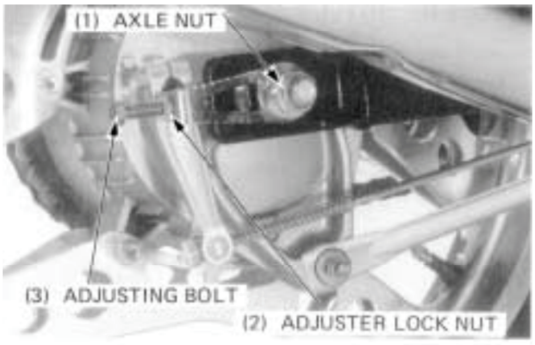
Remove the carburetor (page 4-3).
Disconnect the crankcase breather tube from the crankcase.



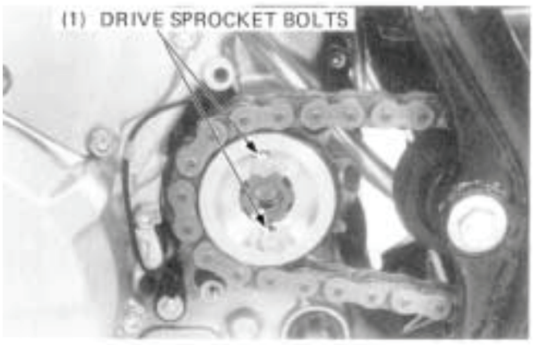
Remove the clutch cable clamp bolt and disconnect the clutch cable from the clutch lifter lever.
Remove the drive sprocket cover.
Remove the gearshift pedal.



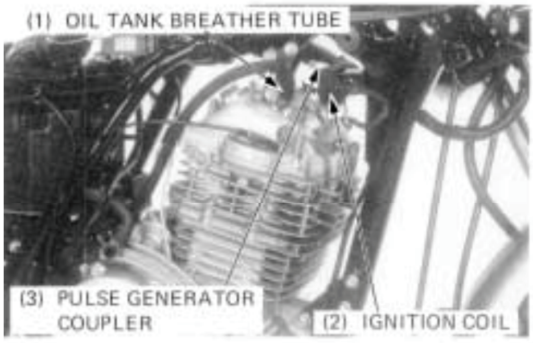
Loosen the axle nut, drive chain adjuster lock nuts and adjusting bolts to loosen the drive chain.



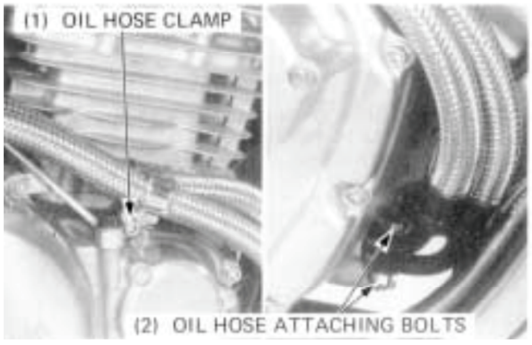
Remove the drive sprocket bolts and remove the drive sprocket with the drive chain.



Disconnect the oil tank breather tube from the cylinder head.
Remove the ignition coil with the spark plug wire.
Disconnect the pulse generator wire coupler.



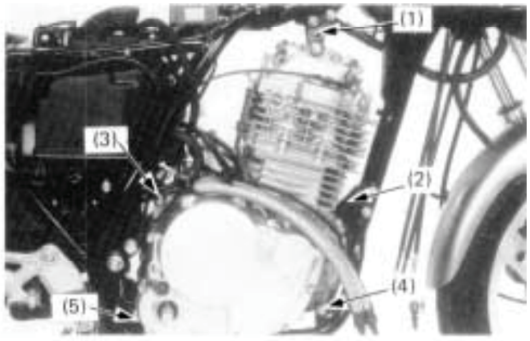
Remove the kick starter pedal.
Remove the oil hose clamp from the right crankcase cover.
Disconnect the oil hoses from the engine by removing the oil hose attaching bolts.



Place a jack or padded block under the engine.
Remove the (1) upper, (2) front and (3) rear brackets.
Remove the (4) front and (5) rear engine hanger bolts.

NOTE

- Note the direction of the engine mounting bolts.



Lower the jack and remove the engine from the left side.



ENGINE INSTALLATION

Install the engine from the left side.
Use a jack or other adjustable support to carefully maneuver the engine into place.



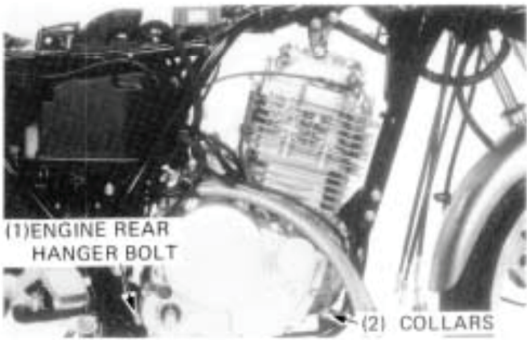
CAUTION

- *Use the correct bolt and collars in their proper positions.*

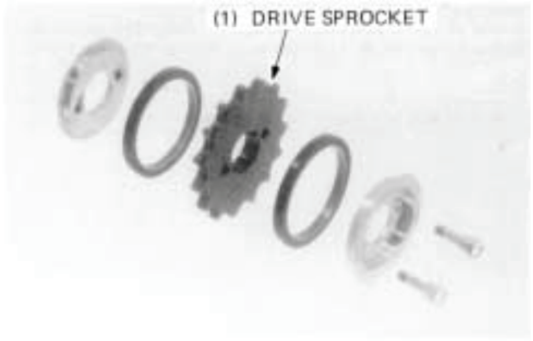
Install the bracket, collars, bolts and nuts.

Tighten all bolts to the proper torque speicifications.

TORQUE:
Engine rear hanger bolt:
10 mm: 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Engine hanger and bracket bolts:
8 mm: 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
10 mm: 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

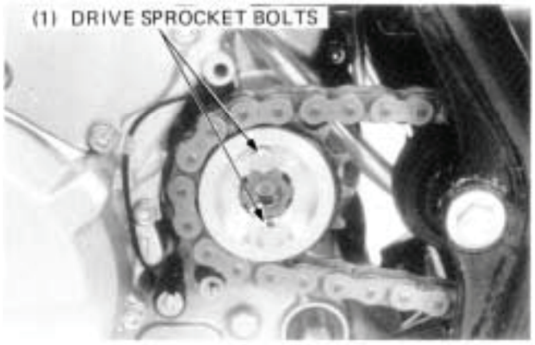


Install the drive sprocket as shown.



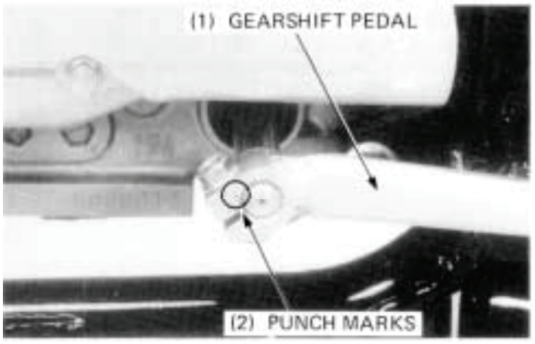
Install the drive sprocket bolts and tighten them.

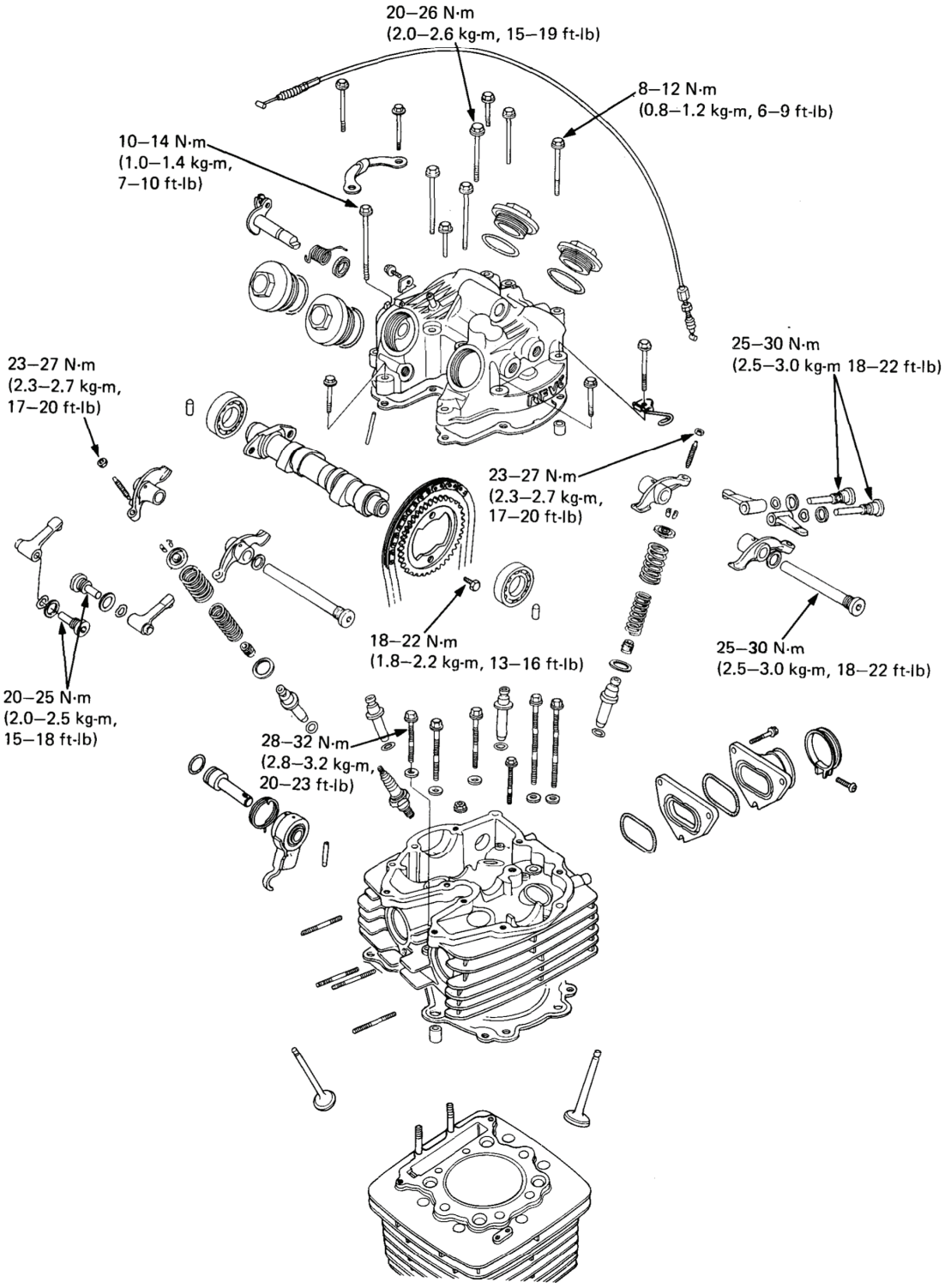
Install the drive sprocket cover.



Install the gearshift pedal, aligning the punch marks on the gearshift shaft and pedal.
Install the removed parts in the reverse order of removal.
Route the cables and wires properly (page 1-11).
After installing the engine, perform the following inspections and adjustments:
- engine oil level (page 2-2).
- throttle grip free play (page 3-4).
- drive chain free play (page 3-9).
- clutch cable free play (page 3-13).
- rear brake pedal free play (page 3-12).

Check all electrical equipment for proper operation and exhaust pipe for leaking.




20–26 N·m
(2.0–2.6 kg-m, 15–19 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
10–14 N·m
(1.0–1.4 kg-m,
7–10 ft-lb)
23–27 N·m
(2.3–2.7 kg-m,
17–20 ft-lb)
25–30 N·m
(2.5–3.0 kg-m 18–22 ft-lb)
23–27 N·m
(2.3–2.7 kg-m,
17–20 ft-lb)
18–22 N·m
(1.8–2.2 kg-m, 13–16 ft-lb)
25–30 N·m
(2.5–3.0 kg-m, 18–22 ft-lb)
20–25 N·m
(2.0–2.5 kg-m,
15–18 ft-lb)
28–32 N·m
(2.8–3.2 kg-m,
20–23 ft-lb)

6. CYLINDER HEAD/VALVES

SERVICE INFORMATION	6-1	VALVE SEAT INSPECTION AND REFACING	6-12
TROUBLESHOOTING	6-3	CYLINDER HEAD ASSEMBLY	6-15
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CYLINDER HEAD DISASSEMBLY	6-8		

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the cylinder head, valves, camshaft and rocker arms. All these operations can be accomplished with the engine installed in the frame.
- Lubricate the camshaft journal and cam lobes with molybdenum disulfide grease for initial lubrication.
- Pour clean engine oil into the oil pockets in the cylinder head to lubricate the cams before installing the cylinder head cover.

SPECIFICATIONS

ITEM				STANDARD	SERVICE LIMIT
Compression				1,250±150 kPa (12.5±1.5 kg/cm², 172±21 psi)	———
Camshaft	Cam lobe height	IN	Standard	34.023 mm (1.3395 in)	31.155–31.315 mm (1.2266–1.2329 in) <G-II type: 28.588–28.748 mm (1.1255–1.1318 in)>
			Service limit	33.85 mm (1.333 in)	31.05 mm (1.222 in) <G-II type: 28.50 mm (1.122 in)>
		EX	Standard	33.976 mm (1.3376 in)	31.091–31.251 mm (1.2241–1.2304 in) <G-II type: 28.614–28.774 mm (1.1265–1.1328 in)>
			Service limit	33.81 mm (1.331 in)	31.00 mm (1.220 in) <G-II type: 28.53 mm (1.123 in)>
	Runout			———	0.04 mm (0.002 in)
Sub-rocker arm I.D.		IN		8.000–8.015 mm (0.3150–0.3156 in)	8.05 mm (0.317 in)
		EX		7.000–7.015 mm (0.2756–0.2762 in)	7.05 mm (0.278 in)
Sub-rocker arm shaft O.D.		IN		7.972–7.987 mm (0.3139–0.3144 in)	7.92 mm (0.312 in)
		EX		6.972–6.987 mm (0.2745–0.2751 in)	6.92 mm (0.272 in)
Sub-rocker arm-to-shaft clearance				0.013–0.043 mm (0.0005–0.0017 in)	0.08 mm (0.003 in)
Rocker arm I.D.				11.50–11.518 mm (0.4528–0.4535 in)	11.55 mm (0.455 in)
Rocker arm shaft O.D.				11.466–11.484mm(0.4514–0.4521 in)	11.41 mm (0.449 in)
Rocker arm shaft-to-arm clearance				0.016–0.052 mm (0.0006–0.0020 in)	0.14 mm (0.006 in)
Valve spring	Free length		Inner	34.08 mm (1.342 in)	33.1 mm (1.30 in)
			Outer	38.14 mm (1.502 in)	37.1 mm (1.46 in)
	Preload/length		Inner	6.75±0.54 kg/28 mm (14.9±1.2 lb/1.10 in)	———
			Outer	15.4±1.2 kg/31.5 mm (34.0±2.6 lb/1.24 in)	———

ITEM			STANDARD	SERVICE LIMIT
Valve	Stem O.D.	IN	6.575–6.590 mm (0.2589–0.2594 in)	6.56 mm (0.258 in)
		EX	6.560–6.575 mm (0.2583–0.2589 in)	6.55 mm (0.258 in)
	Guide I.D.	IN	6.600–6.615 mm (0.2598–0.2604 in)	6.63 mm (0.261 in)
		EX	6.600–6.615 mm (0.2598–0.2604 in)	6.63 mm (0.261 in)
	Stem-to-guide clearance	IN	0.010–0.040 mm (0.0004–0.0016 in)	0.065 mm (0.0026 in)
		EX	0.025–0.055 mm (0.0010–0.0022 in)	0.080 mm (0.0031 in)
Cylinder head	Warpage		———	0.10 mm (0.004 in)
	Valve seat width	IN/EX	1.1–1.2 mm (0.04–0.05 in)	1.8 mm (0.07 in)

TORQUE VALUES

Cylinder head bolt		28–32 N·m (2.8–3.2 kg-m, 20–23 ft-lb)
Cam sprocket bolt		18–22 N·m (1.8–2.2 kg-m, 13–16 ft-lb)
Cylinder head cover 6 mm flange bolt with 8 mm head		8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Rocker arm shaft		25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Sub-rocker arm shaft IN		25–30 N·m (3.0–2.0 kg-m, 18–22 ft-lb)
Sub-rocker arm shaft EX		20–25 N·m (2.0–2.5 kg-m, 15–18 ft-lb)
Valve adjuster lock nut		23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)
Engine upper bracket bolt	8 mm	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
	10 mm	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

TOOLS

SPECIAL

Valve guide reamer		07984–551000
Tensioner setting holder		07973–MG30002
Knock pin puller set		07936–MA70000
Sliding shaft		07936–MA70100
Remover weight		07741–0010201

COMMON

Valve guide remover,	6.6 mm	07742–0010200
Valve spring compressor		07757–0010000

Valve seat cutter

Valve seat cutter	35 mm	07780–0010400
Valve seat cutter	40 mm	07780–0010500
Valve seat cutter	35 mm	07780–0012300
Valve seat cutter	38.5 mm	00780–0012400
Valve seat cutter	37.5 mm	00780–0014100
Cutter holder	6.6 mm	00781–0010201

TROUBLESHOOTING

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

Low compression
- Valve
  - Incorrect valve adjustment
  - Burned or bend valves
  - Incorrect valve timing
  - Broken valve spring

- Cylinder head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head

High compression
- Excessive carbon build-up on piston corwn or combustion chamber

Excessive noise
- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn rocker arm or camshaft
- Loose or worn can chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth

Poor idling
- Compression too low
- Decompressor out of adjustment

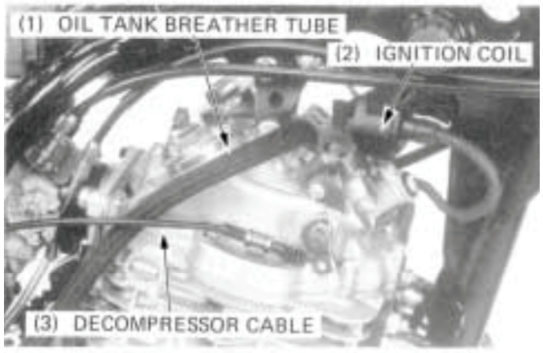
Kick starting difficult
- Decompressor out of adjustment

CYLINDER HEAD COVER REMOVAL

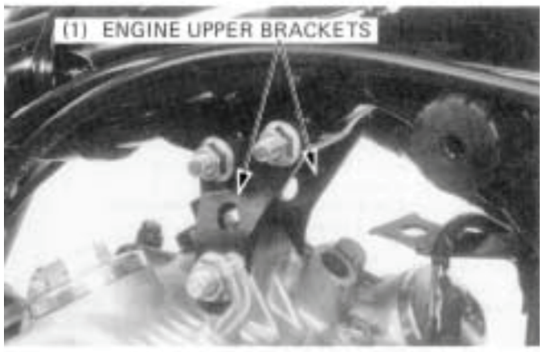
NOTE

- Position the camshaft so that the cam lobes face down by aligning the T mark on the flywheel with the index notch on the left crankcase cover.

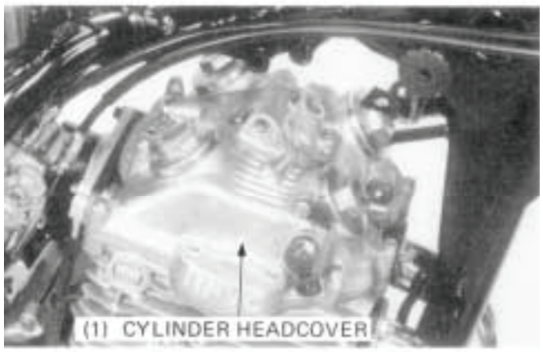
Remove the fuel tank (page 4-10).
Remove the decompressor holder attaching bolts and disconnect the cable from the valve lifter lever.
Disconnect the oil tank breather tube at cylinder head.
Remove the ignition coil with spark plug wires.
Remove the oil pipe bolt, sealing washers from the cylinder head.



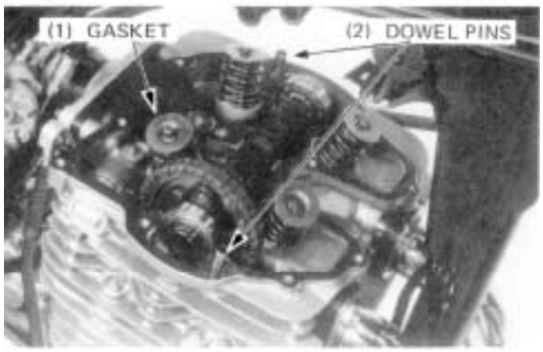
Remove the engine upper brackets by removing the 8 mm bolts and 10 mm bolt.



Remove the cylinder head cover bolts and cover.



Remove the dowel pins and head cover gasket.

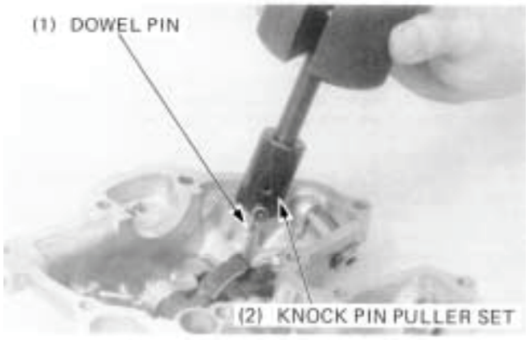


CYLINDER HEAD COVER DISASSEMBLY

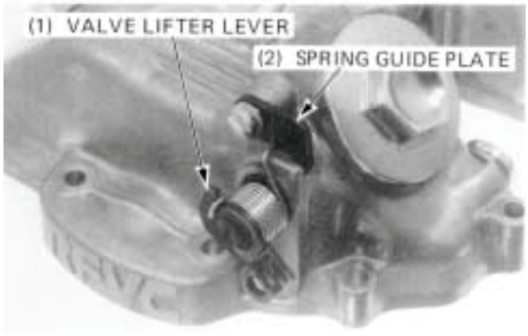
Remove the dowel pin using the special tools.

TOOLS:

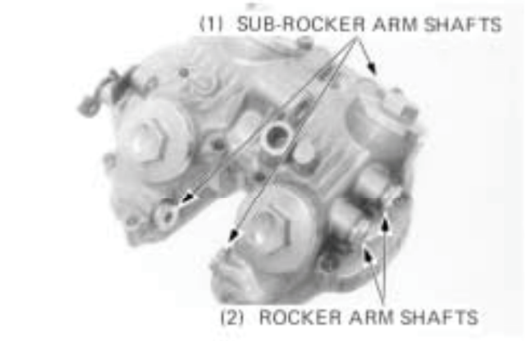
Knock pin puller set	**07936–MA70000**
Sliding shaft	**07936–MA70100**
Remover weight	**07741–0010201**



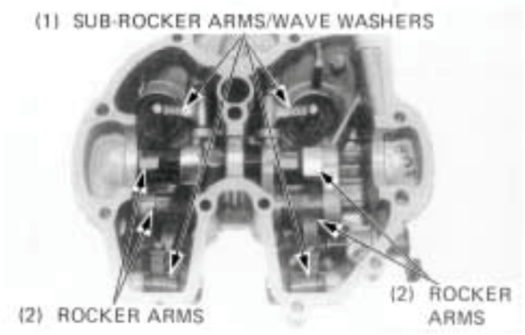
Pull out the valve lifter lever and remove the spring and spring guide plate.



Loosen the sub-rocker arm shafts and rocker arm shafts.



Remove the sub-rocker arm shafts, sealing washers, wave washers and sub-rocker arms.
Remove the rocker arm shafts, copper washers and rocker arms.



SUB-ROCKER ARM AND SHAFT INSPECTION

Inspect the sub-rocker arms and shafts for wear or damage.

Measure the sub-rocker arm I.D.

SERVICE LIMIT: IN 8.05 mm (0.317 in)
EX 7.05 mm (0.228 in)



Measure the sub-rocker arm shaft O.D.

SERVICE LIMIT: IN 7.92 mm (0.312 in)
EX 6.92 mm (0.272 in)

Calculate the sub-rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)

ROCKER ARM AND SHAFT INSPECTION

Inspect the rocker arms for damage or wear.

NOTE

- If any rocker arm require servicing or replacement, inspect the cam lobes for scoring, chipping or flat spots.



Measure the I.D. of each rocker arm.

SERVICE LIMIT: 11.55 mm (0.455 in)

Inspect the rocker arm shafts for wear or damage.
Measure the O.D.

SERVICE LIMIT: 11.41 mm (0.449 in)



Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.14 mm (0.006 in)

CAMSHAFT REMOVAL

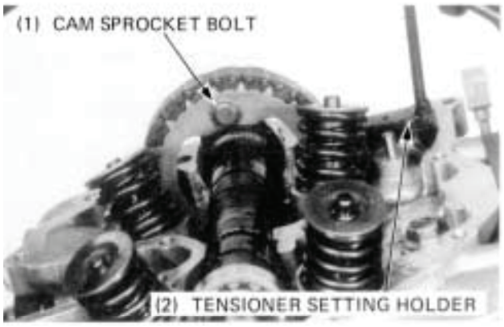
Turn the crankshaft and remove the cam sprocket bolts.

CAUTION

- *Be careful not to drop the bolts into the crankcase.*

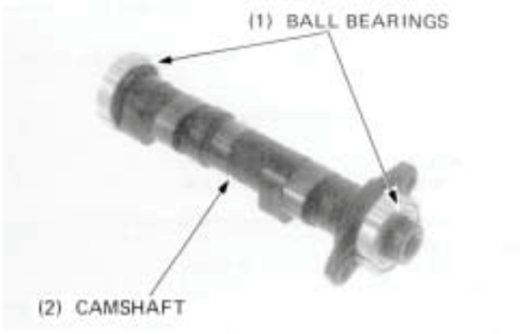
Set up the tensionner setting holder on the tensioner lifter to loosen the cam chain as shown.

TOOL:
Tensioner setting holder 07973—MG30002



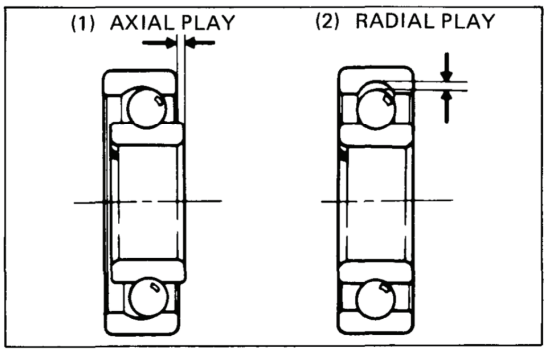
Pull the cam sprocket off the camshaft flange shoulder and remove the cam chain from the cam sprocket.
Remove the camshaft and sprocket.

Remove the camshaft ball bearings from the camshaft.



CAMSHAFT BEARING INSPECTION

Check each camshaft bearing for play or damage.
Replace a bearing with a new one if it is noisy or has excessive play.



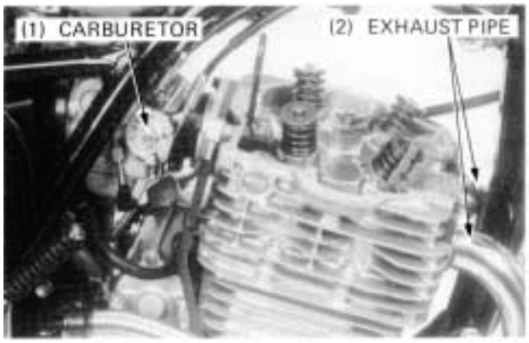
Check each cam lobe for wear or damage.
Measure the cam lobe height.

IN	Standard	34.023 mm (1.3395 in)	31.155–31.315 mm (1.2266–1.2329 in) <G-II type: 28.588–28.748 mm (1.1255–1.1318 in)>
	Service limit	33.85 mm (1.333 in)	31.05 mm (1.222 in) <G-II type: 28.50 mm (1.122 in)>
EX	Standard	33.976 mm (1.3376 in)	31.091–31.251 mm (1.2241–1.2304 in) <G-II type: 28.614–28.774 mm (1.1265–1.1328 in)>
	Service limit	33.81 mm (1.331 in)	31.00 mm (1.220 in) <G-II type: 28.53 mm (1.123 in)>

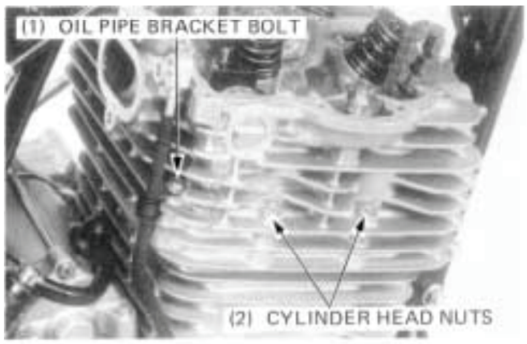


CYLINDER HEAD REMOVAL

Remove the following.
- cylinder head cover (page 6-4).
- camshaft (page 6-6).
- carburetor (page 4-3).
- exhaust pipe (page 15-2).



Remove the oil pipe bracket bolt, oil pipe bolt and sealing washers at the right crankcase cover (page 8-3).
Remove the oil pipe from the engine.
Remove the two cylinder head nuts.



Remove the six cylinder head bolts.

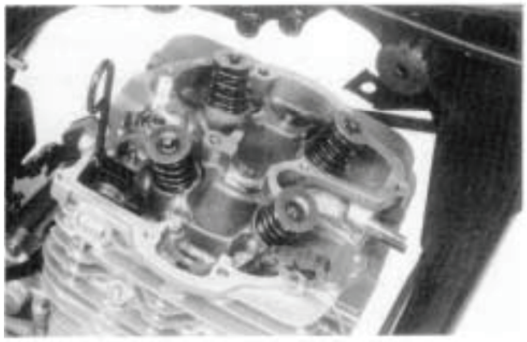
NOTE

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

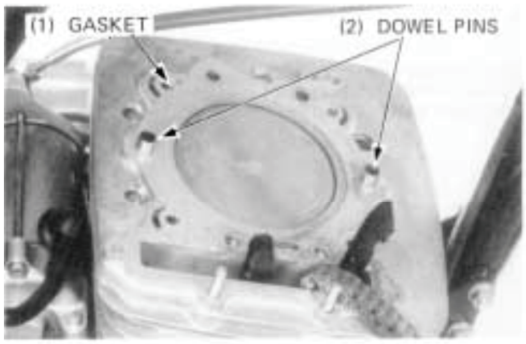
Remove the cylinder head.

CAUTION

- *Be careful not to damage the cylinder head mating surfaces.*



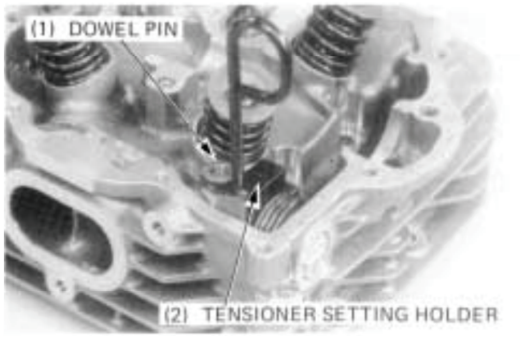
Remove the cylinder head gasket and dowel pins.



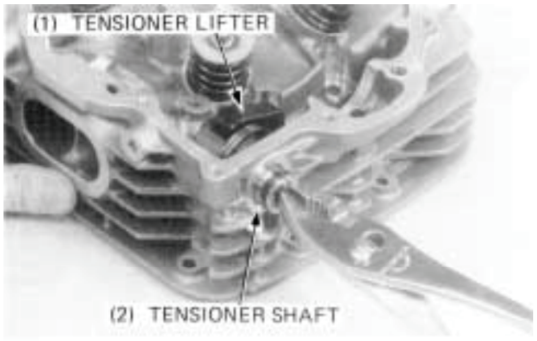
CYLINDER HEAD DISASSEMBLY

Remove the dowel pin and tensioner setting holder.

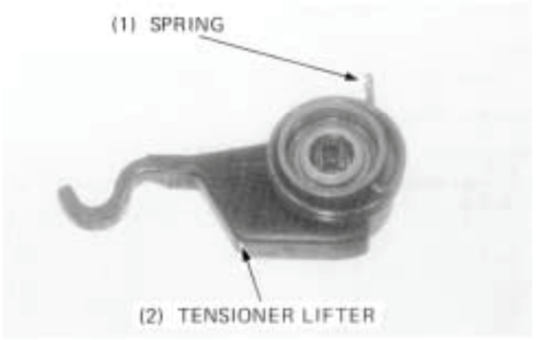
TOOL:
Tensioner setting holder 07973—MG30002



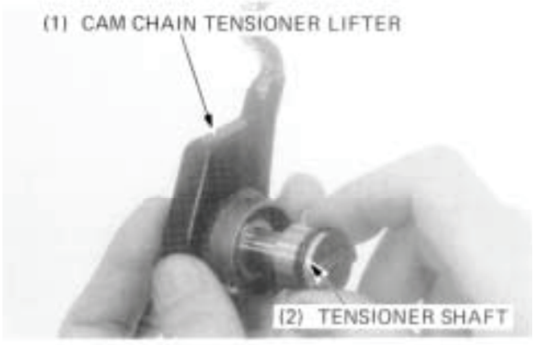
Pull out the tensioner shaft by turning it clockwise and remove the tensioner lifter.



Remove the spring from the tensioner lifter.



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



Check the tensioner lifter and tensioner shaft for excessive or abnormal wear or damage.



Remove the tensioner lifter (page 6-8).
Remove the valve spring cotters, retainers, springs, and valves with a valve spring compressor.

TOOL:
Valve spring compressor 07757–0010000

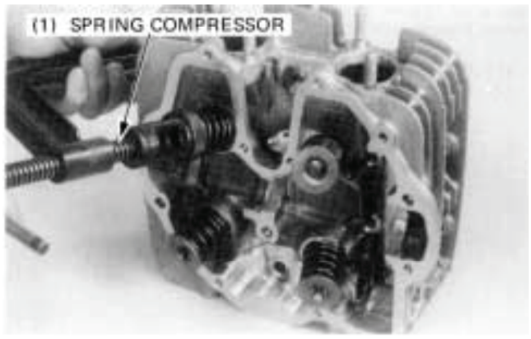
CAUTION

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

NOTE

- Mark all parts to ensure that they are reassembled in their original locations.

Remove the spring seats and valve stem seals.



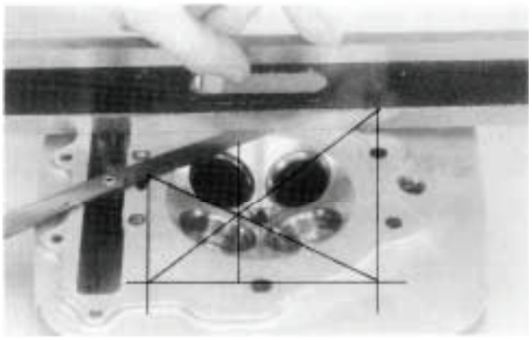
Remove the carbon deposits from the combustion chamber.
Carefully clean any gasket material from the cylinder head.



CYLINDER HEAD INSPECTION

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

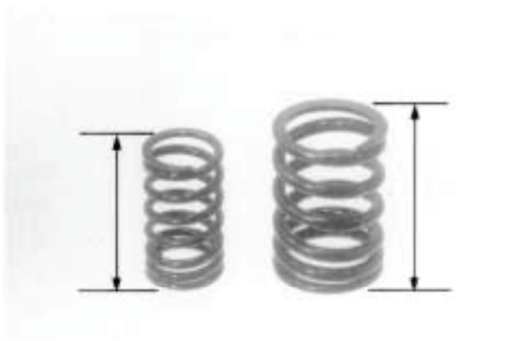
SERVICE LIMIT: 0.1 mm (0.004 in)



VALVE SPRING INSPECTION

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

SERVICE LIMIT: INNER: 33.1 mm (1.30 in)
OUTER: 37.1 mm (1.46 in)



VALVE/VALVE GUIDE INSPECTION

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

SERVICE LIMIT: IN 6.56 mm (0.258 in)
EX 6.55 mm (0.258 in)

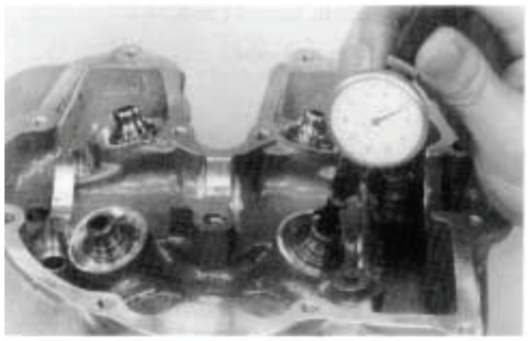


Measure andrecord each valve guide I.D. using a ball gauge or inside micrometer.

NOTE

- Ream the guides to remove the carbon buildup before checking the valve guide I.D.

SERVICE LIMIT: IN 6.63 mm (0.261 in)
EX 6.63 mm (0.261 in)



Calculate the stem-to-guide clearance.

VALVE STEM-TO-GUIDE CLEARANCE
SERVICE LIMITS: IN 0.065 mm (0.0026 in)
EX 0.080 mm (0.0031 in)

NOTE

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

If stem-to-guide clearance still exceeds the service limit when new guides are installed, replace the valves.

NOTE

- Reface valve seats whenever new valve guides are installed.

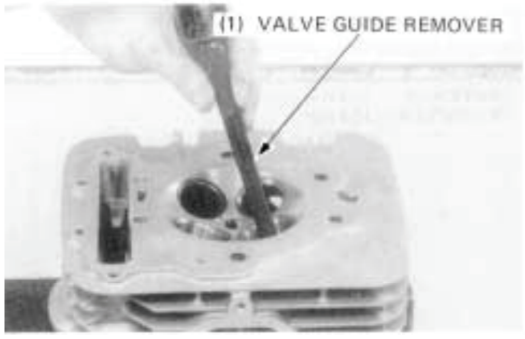
VALVE GUIDE REPLACEMENT

Support the cylinder head and drive out the guide from the combustion chamber side.

CAUTION

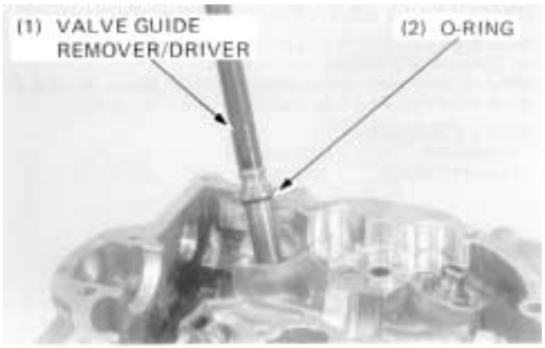
- *Do not damage the cylinder head during guide removal.*

TOOL:
Valve guide remover 07742–0010200



Apply molybdenum disulfide grease to the I.D. of a new valve guide.
Install the new valve guide from the top of the head, then check that it wasn't damaged during installation.

TOOL:
Valve guide remover/driver 07742–0010200

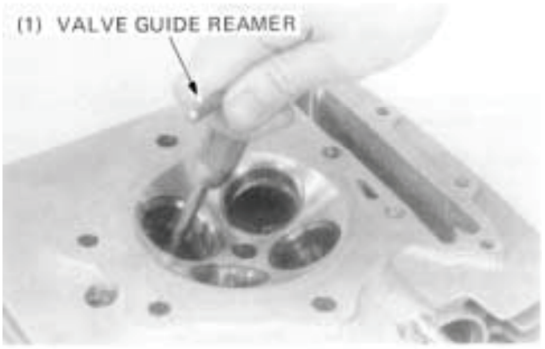


Ream the new valve guides after installation.

TOOL:
Valve guide reamer 07984–551000

NOTE

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



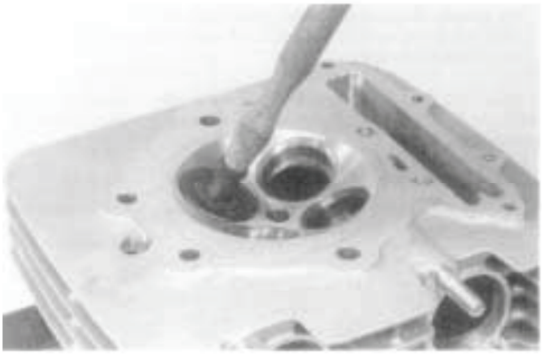
Reface the valve seats.
Clean the cylinder head thoroughly to remove any metal particless.

VALVE SEAT INSPECTION AND REFACING

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

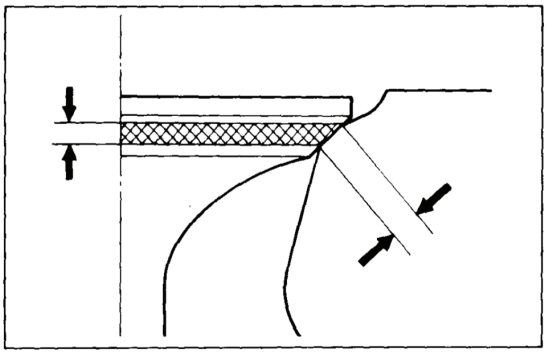
CAUTION

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



Inspect the width of each valve seat.

STANDARD: 1.1–1.2 mm (0.04–0.05 in)
SERVICE LIMIT: 1.8 mm (0.07 in)



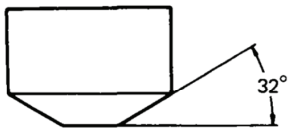
If the seat is too wide, too narrow, or has low spots, the seat must be refinished for good sealing.

NOTE

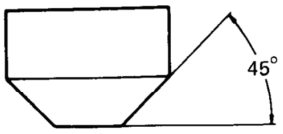
- Follow the refacer manufacturer's operating instructions.

VALVE SEAT CUTTERS

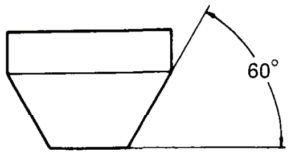
(1) IN: 07780–0012400
EX: 07780–0012300



(2) IN: 07780–0010500
EX: 07780–0010400



(3) IN: 07780–0014100
EX: 07780–0014100



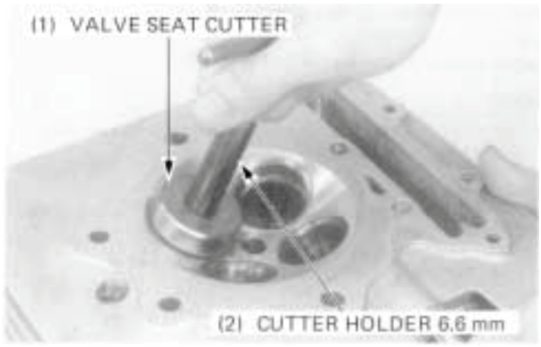
VALVE SEAT GRINDING

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

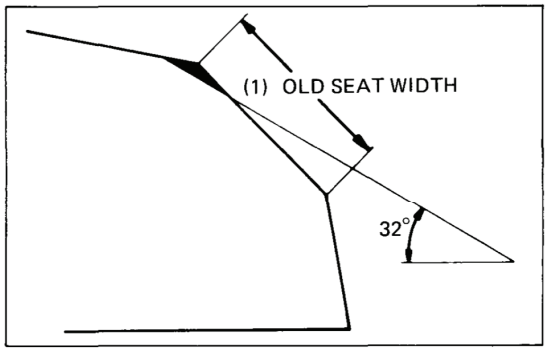
NOTE

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

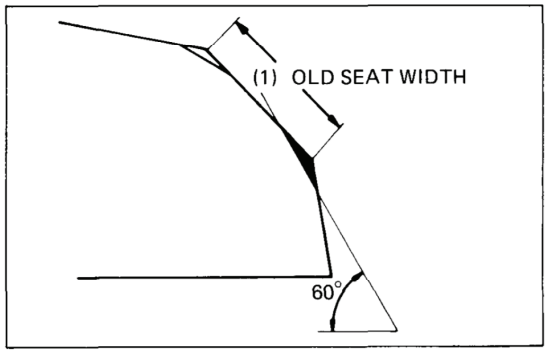
TOOL:
Cutter holder 6.6 mm 07781–0010201



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



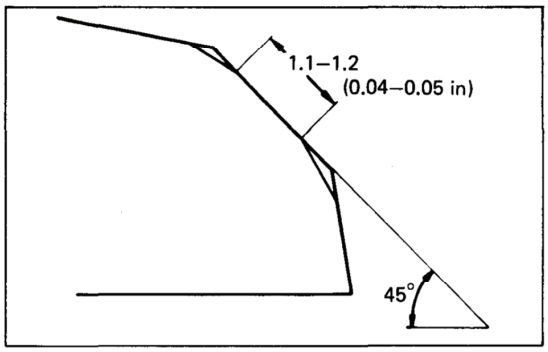
Use a 60 degree cutter and remove the botton 1/4 of the old seat.



Use a 45 degree finish cutter and cut the seat to the proper width.

NOTE

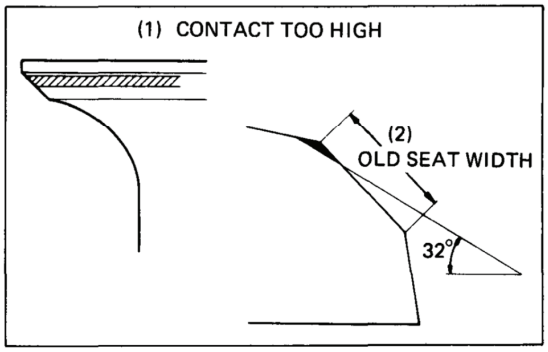
- Make sure that all pitting and irregularities are removed. Refinish if necessary.



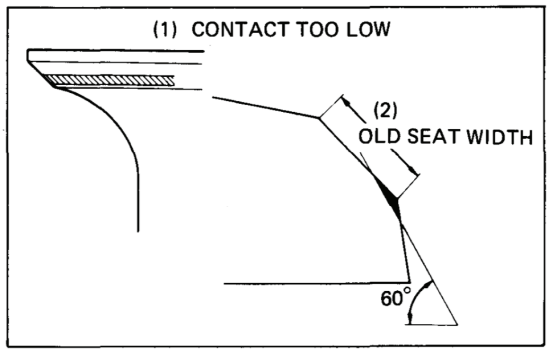
NOTE

- The location of the valve seat in relation to the valve face is very important for good sealing and maximum valve service.

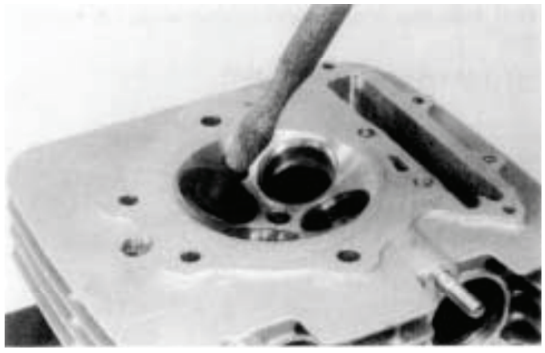
Apply a thin coating of Prussian Blue to the the valve seat.
Press the valve through the valve guide and onto the seat to make a clear pattern.
Remove to inspect the valve.
If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.
Refinish the seat to the correct width using a 45 degree finish cutter.



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

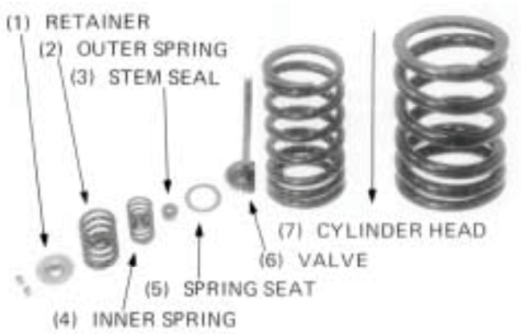


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.
After lapping, wash all residual compound off the cylinder head, valve, and valve guide.



CYLINDER HEAD ASSEMBLY

Lubricate each valve stem with oil, then insert the valves into the valve guides.
Install new valve stem seal.
Install the valve spring seat, springs and retainers.
The springs tightly would coils should face in toward the combustion chamber.

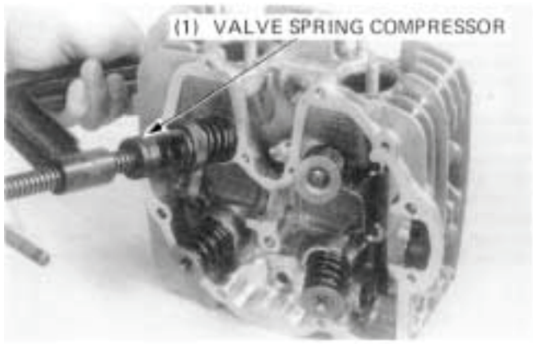


Compress the valve springs using the valve spring compressor, then install the valve cotters.

CAUTION

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

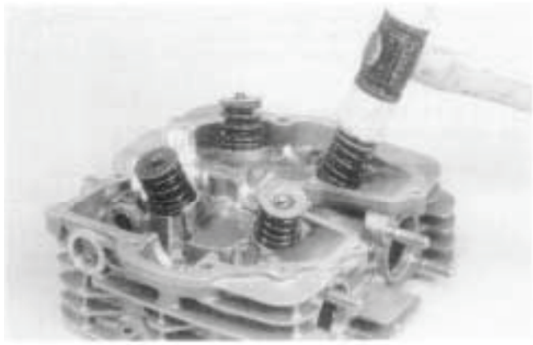
TOOL:
Valve spring compressor 07757–0010000



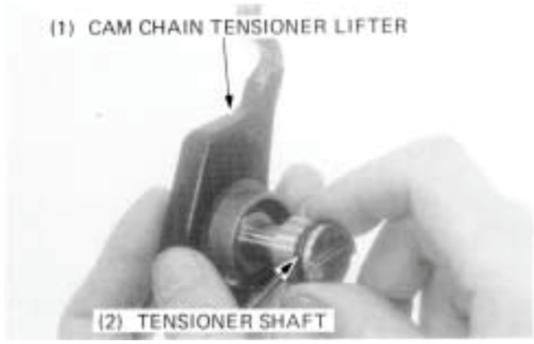
Tap the valve stems gently with a plastic hammer to firmly seat the cotters.

CAUTION

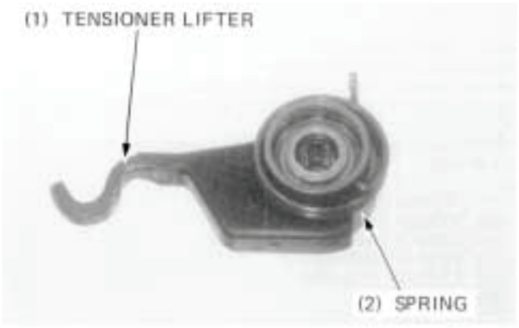
- *Support the cylinder head above the working bench surface to prevent possible valve damage.*



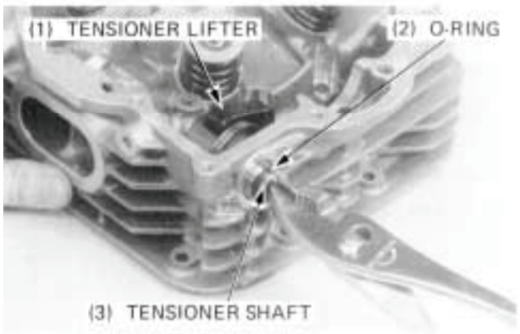
Insert the tensioner shaft into the tensioner lifter and inspect the tensioner lifter by turning the shaft.
The tensioner shaft should turn clockwise freely and should not turn counterclockwise.



Install the spring on the tensioner lifter as shown.

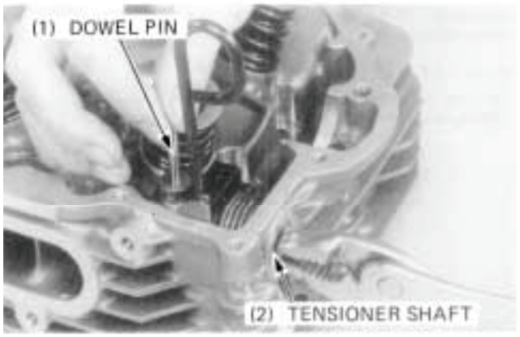


Install the tensioner lifter on the cylinder head.
Apply engine oil to a new O-ring and install it in the groove of the tensioner shaft.
Insert the tensioner shaft into the tensioner lifter through the cylinder head.



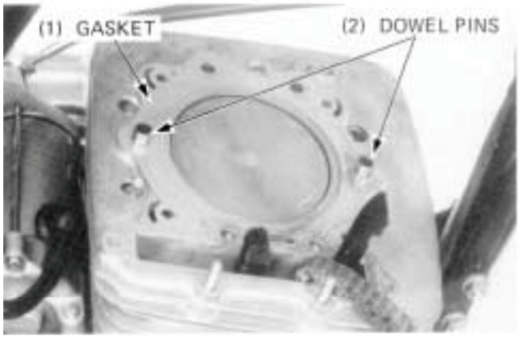
Set up the special tool on the tensioner lifter, and align the hole in the tensioner shaft with the hole in the cylinder head while turning the tensioner shaft clockwise and insert the dowel pin.

TOOL:
Tensioner setting holder **07973—MG30002**



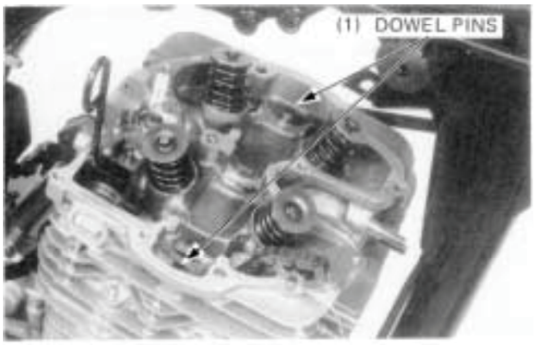
CYLINDER HEAD INSTALLATION

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

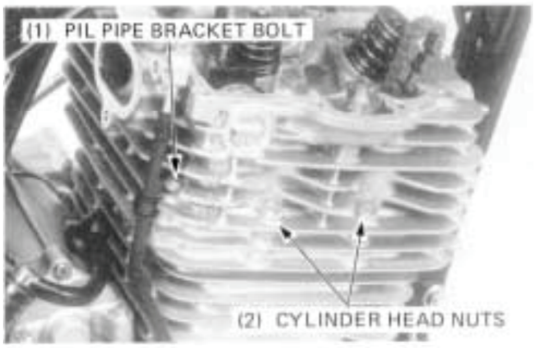


Install the cylinder head.
Install the dowel pins onto the cylinder head.
Apply engine oil to the cylinder head bolts and washer, and tighten the cylinder head bolts in a crisscross pattern in two or more steps.

TORQUE: 28–32 N·m (2.8–3.2 kg-m, 20–23 ft-lb)

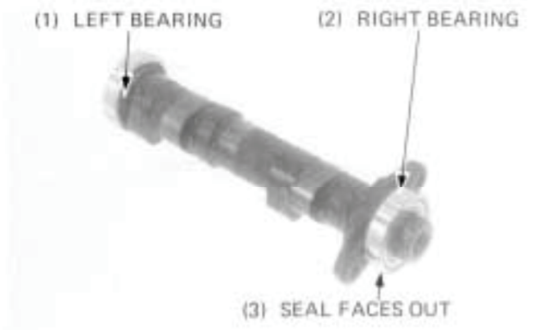


Tighten the cylinder head nuts.
Install the oil pipe, bracket bolt, oil bolt and sealing washers.
Install the following:
– carburetor (page 4-3).
– exhaust pipe (page 15-2).



CAMSHAFT INSTALLATION

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



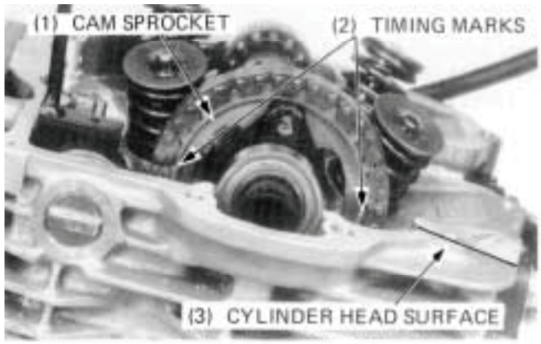
Place the cam sprocket inside the cam chain with its dished face facing the right side.
Install the camshaft through the sprocket and cam chain.

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



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

Position the cam sprocket onto the shoulder of the camshaft.



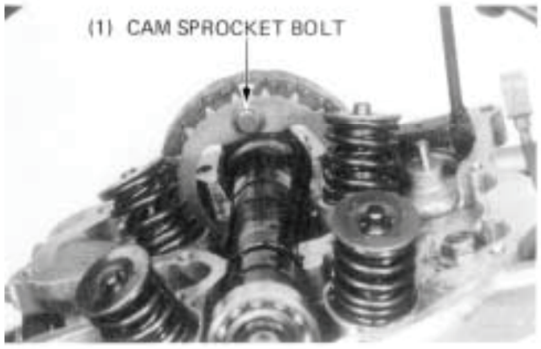
Install the sprocket bolt and tighten it.
Turn the crankshaft and install the other sprocket bolt.

NOTE

Align the T mark with the index notch and make sure that the timing marks on the sprocket align with the upper surface of the cylinder head.

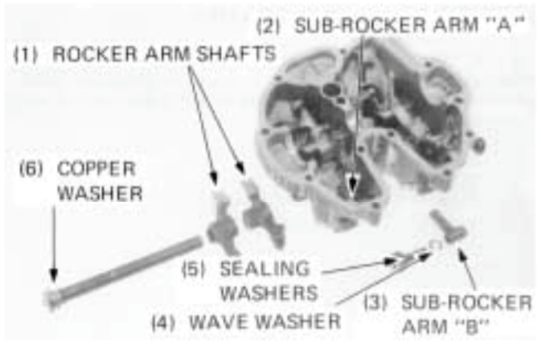
Tighten the sprocket bolts to the specified torque.

TORQUE: 18–22 N·m (1.8–2.2 kg-m, 13–16 ft-lb)

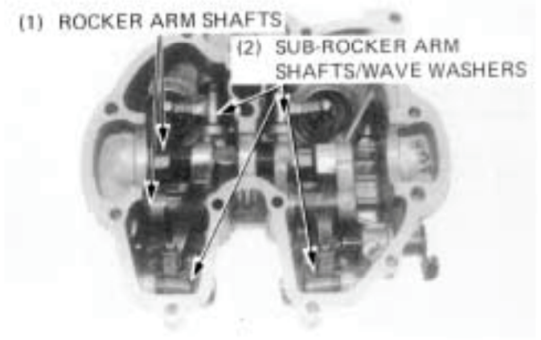


CYLINDER HEAD COVER ASSEMBLY

Install the rocker arms on the cover.
Install sub-rocker arms"A", "B" and "KE5", and the wave washers.



Apply engine oil to the rocker arm shafts and install the rocker arm shafts and copper washers.
Apply engine oil to the sub-rocker arm shafts and install the sub-rocker arm shafts and sealing washers.

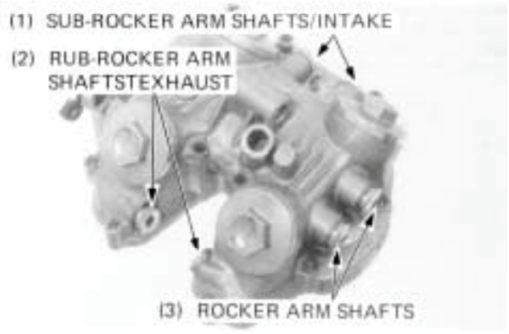


Tighten the rocker arm shafts to the specified torque.

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

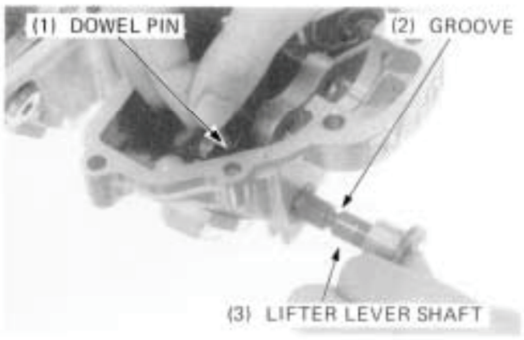
Tighten the sub-rocker arm shafts to the specified torque.

TORQUE: IN 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
EX 20–25 N·m (2.0–2.5 kg-m, 15–18 ft-lb)

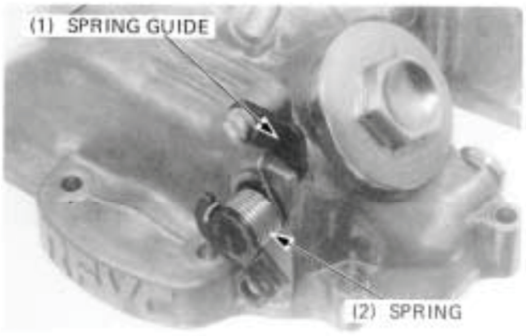


Apply grease to the lifter lever dowel pin to prevent it from falling into the crankcase when installing the cylinder head cover.

Align the cut-out of the lever shaft with the hole in the cylinder head cover and insert the dowel pin.

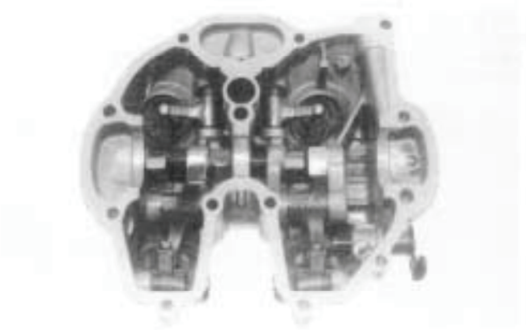


Install the spring and spring guide as shown.

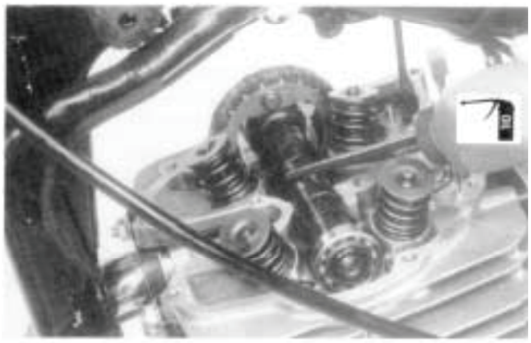


CYLINDER HEAD COVER INSTALLATION

Clean the cylinder head mating surface of the cylinder head cover.

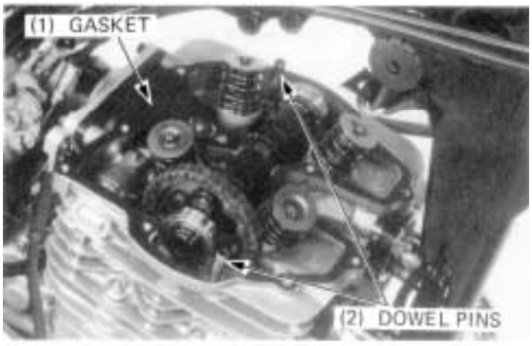


Pour clean engine oil into the oil pockets in the cylinder head so that the com lobes are completely submerged.



Install a new cylinder head cover gasket and dowel pins.

Position the camshaft so that both cam lubes face down by rotating the crankshaft.



Loosen all the valve adjusting screws and install the cylinder head cover.

Tighten the cylinder head voer bolts to the specified torque.

TORQUE:

8 mm bolt:	**20–26 N·m (2.0–2.6 kg-m, 15–19 ft-lb)**
6 mm bolt:	**10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)**
6 mm flange bolt with 8mm head:	**8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)**



NOTE

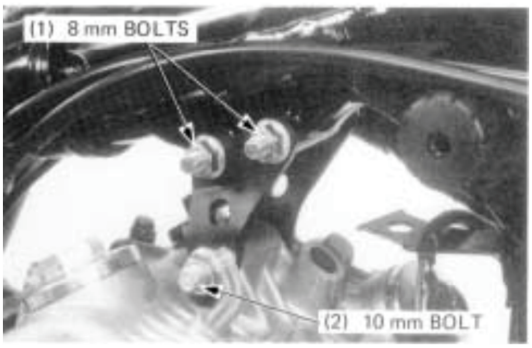
- Tighten the head cover bolts in a crisscross pattern in two or more steps.

Adjust the valve clearance (page 3-7).

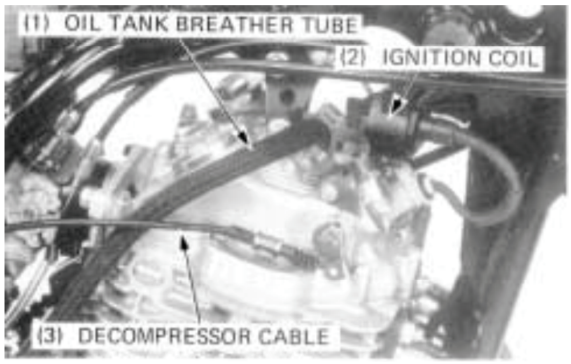
Install the engine upper brackets and tighten the bolts to the specified torque.

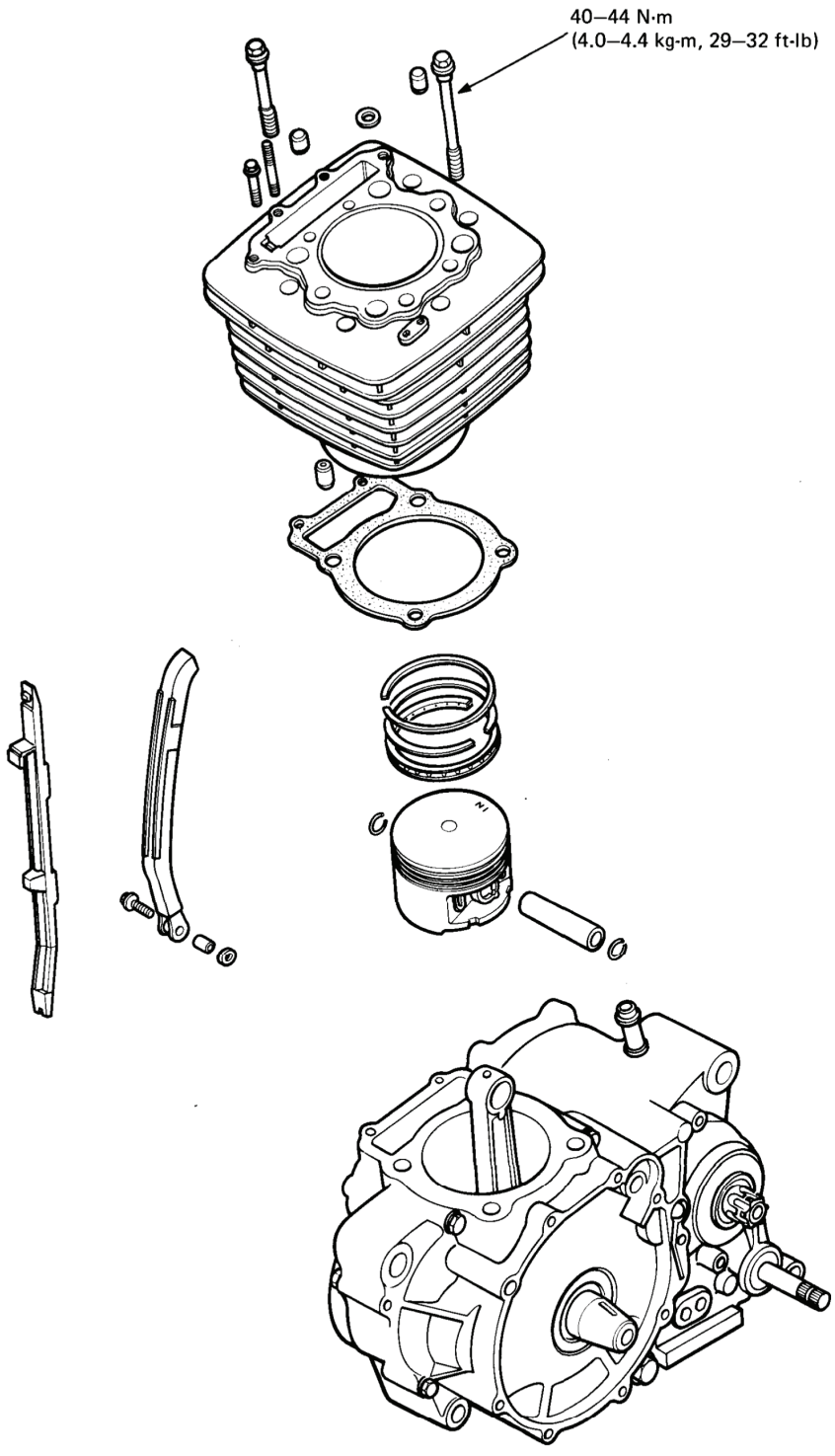
TORQUE:

8 mm bolts 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
10 mm bolt 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)



Install the following parts:
- ignition coil.
- oil tank breather tube.
- oil pipe bolt and sealing washers to the cylinder head.
- kick starter decompressor calbe and holder.




40–44 N·m
(4.0–4.4 kg-m, 29–32 ft-lb)

7. CYLINDER/PISTON

SERVICE INFORMATION	7-1	PISTON REMOVAL	7-4
TROUBLESHOOTING	7-2	PISTON INSTALLATION	7-8
CYLINDER REMOVAL	7-3	CYLINDER INSTALLATION	7-8

SERVICE INFORMATION

GENERAL

- Cylinder and piston maintenance and inspection can be accomplished without removing the engine from the frame.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		92.000–92.010 mm (3.6200–3.6224 in)	92.12 mm (3.627 in)
	Taper		———	0.05 mm (0.002 in)
	Out of round		———	0.05 mm (0.002 in)
	Warpage across top		———	0.10 mm (0.004 in)
Piston, piston ring, piston pin	Piston O.D. at skirt		91.955–91.980 mm (3.6203–3.6213 in)	91.85 mm (3.616 in)
	Piston pin bore		24.002–24.008 mm (0.9450–0.9452 in)	24.08 mm (0.948 in)
	Piston pin-to-piston clearance		0.007–0.019 mm (0.0003–0.0007 in)	0.08 mm (0.003 in)
	Piston ring end gap	Top	0.20 –0.40 mm (0.0079–0.0157 in)	0.50 mm (0.020 in)
		Second	0.40 –0.55 mm (0.0157–0.0217 in)	0.65 mm (0.026 in)
		Oil (side rail)	0.20 –0.90 mm (0.008 –0.035 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)
	Cylinder-to-piston clearance		0.020–0.055 mm (0.0008–0.0022 in)	0.10 mm (0.004 in)
	Piston pin O.D.		23.989–23.995 mm (0.9444–0.9447 in)	23.95 mm (0.943 in)
Connecting rod small end I.D.			24.020–24.041 mm (0.9457–0.9465 in)	22.041 mm (0.8678 in)

TORQUE VALUES

Cylinder bolt	40–44 N·m (4.0–4.4 kg-m, 29–32 ft-lb)

TROUBLESHOOTING

Low compression
- Worn cylinder or piston rings

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

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

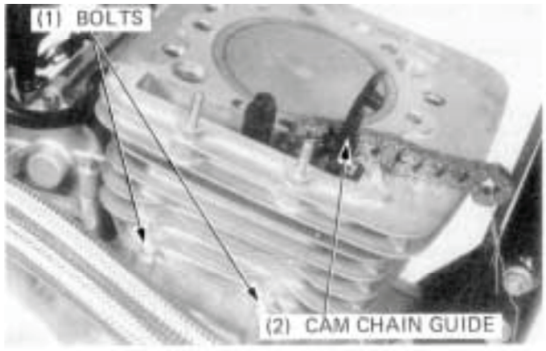
Knocking or abnormal noise
- Worn piston and cylinder
  Excessive carbon build-up piston crown or combustion chamber

CLINDER REMOVAL

Remove the cylinder head (Section 6).

Remove the two cylinder head base mounting bolts.

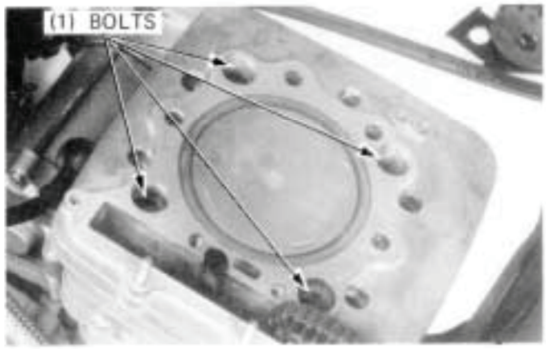
Remove the cam shin guide.



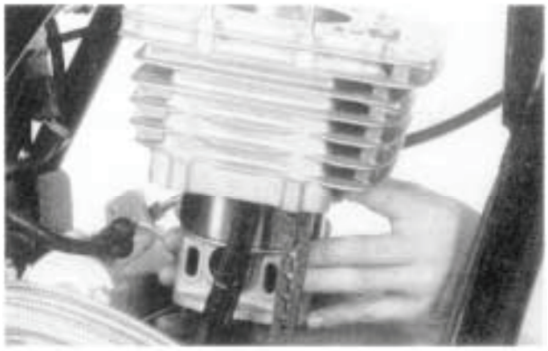
Remove the four cylinder mounting bolts.

NOTE

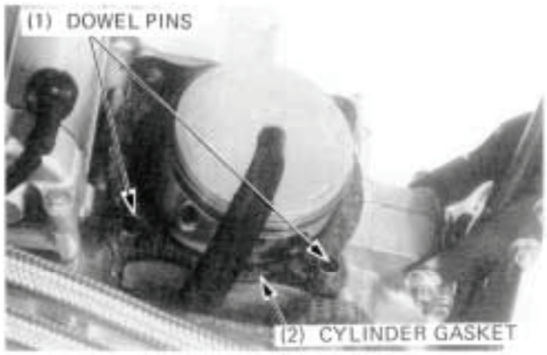
- Loosen the bolts in crisscross pattern in two or more steps.



Remove the cylinder.



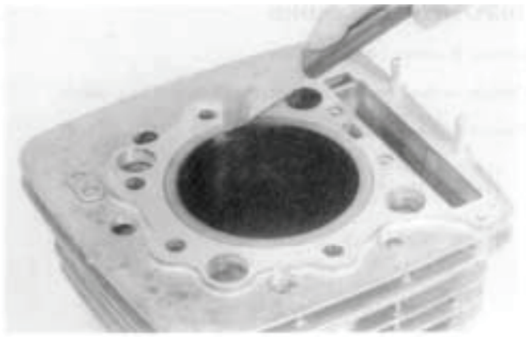
Remove the dowel pins and cylinder gasket.



Clean any gasket material from the cylinder surface.

NOTE

- Gasket material will come off easier if it soaked in solvent.



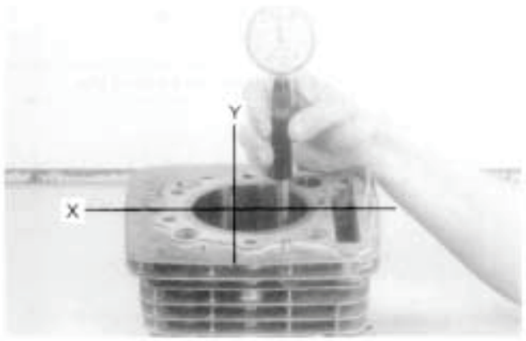
CYLINDER INSPECTION

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

SERVICE LIMIT: 92.12 mm (3.627 in)

NOTE

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

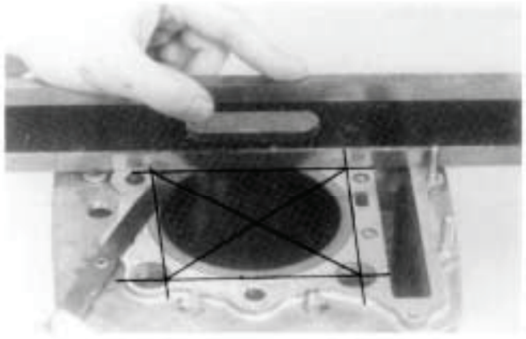


Calculate the taper and out of round.

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

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)

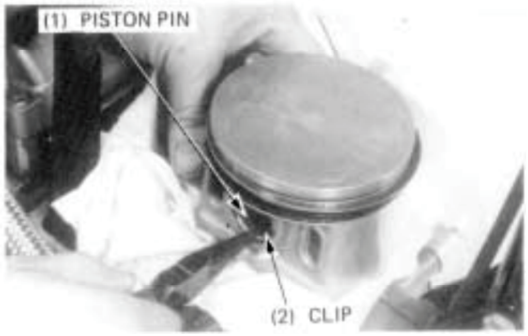


PISTON REMOVAL

Place clean shop towels in the crankcase to keep the piston pin clips, or other parts from falling into the crankcase.

Remove the piston pin clips with pliers.

Press the piston pin out of the piston.



Remove the piston rings.
Inspect the piston for damaged and the ring grooves for wear.

CAUTION

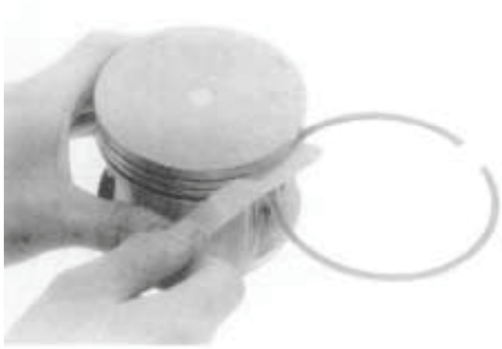
- *Piston rings are easily broken; take care not to damage them during removal.*



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT: TOP 0.10 mm (0.004 in)
2nd 0.10 mm (0.004 in)



Insert each piston ring into the cylinder, above 20 mm (0.750 in) in from the bottom.
To ensure that it's square in the bore, use a piston to push it in.

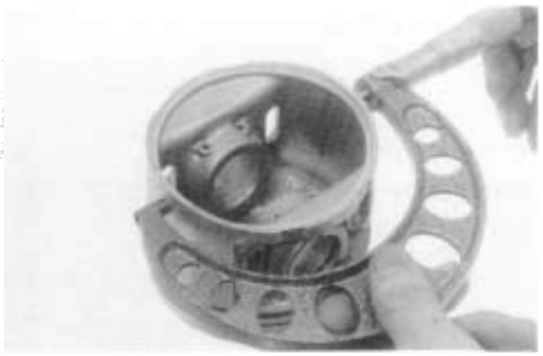


Measure the ring end gap.

SERVICE LIMIT: TOP 0.50 mm (0.020 in)
2nd 0.65 mm (0.026 in)

Measure the piston diameter 10 mm from the bottom.

SERVICE LIMIT: 91.85 mm (3.616 in)



Calculate the piston-to-cylinder clearance by subtracting the piston O.D. from the cylinder I.D. (page 7-4)

SERVICE LIMIT: 0.10 mm (0.004 in)

Measure the piston pin hole I.D.

SERVICE LIMIT: 24.08 mm (0.948 in)



Measure the piston pin O.D.

SERVICE LIMIT: 23.95 mm (0.943 in)

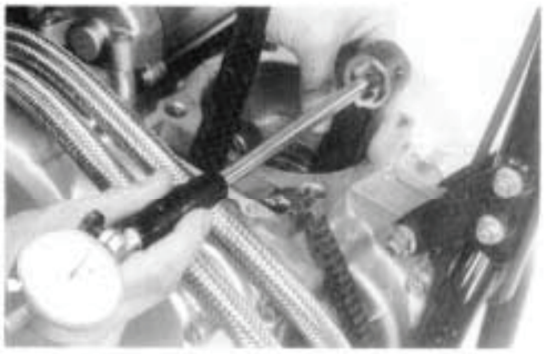
Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 22.041 mm (0.8678 in)



PISTON RING INSTALLATION

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

CAUTION

- *Do not use a wire brush to clean ring lands, or cut lands deeper with a cleaning tool.*



Install the piston rings with the marks facing up.

CAUTION

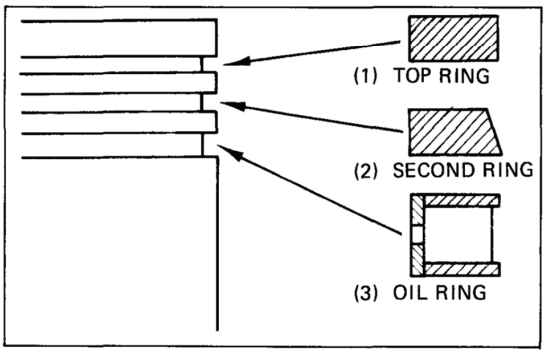
- *Avoid piston and piston ring damage during installation.*

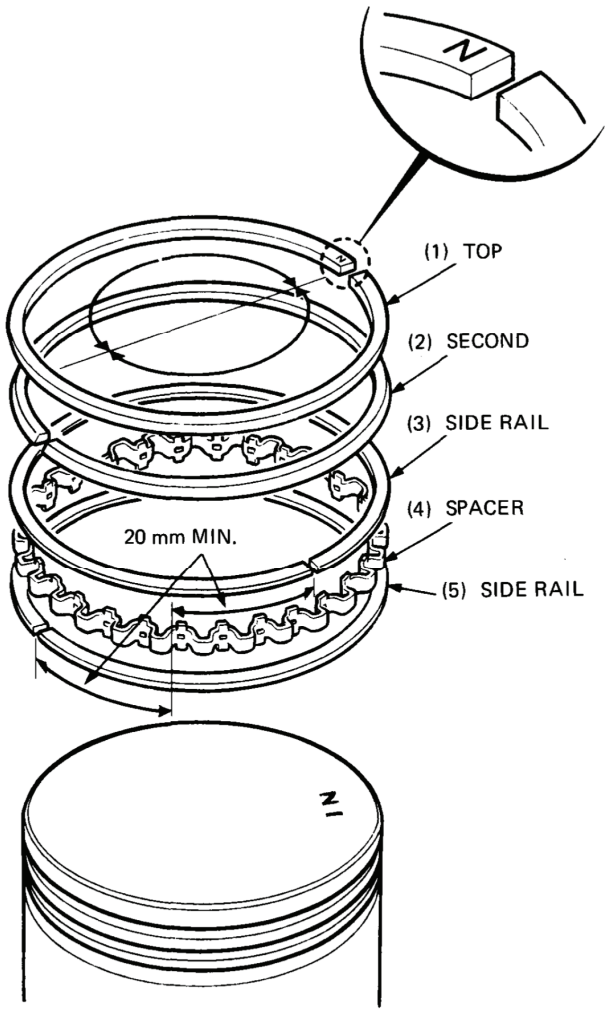
Stagger the compression (1st and 2nd) and oil rings (side rails) 180 degrees apart as shown.

NOTE

- Install the oil ring spacer first, then install the side rails.

After installation, rings should be free to rotate in the grooves.



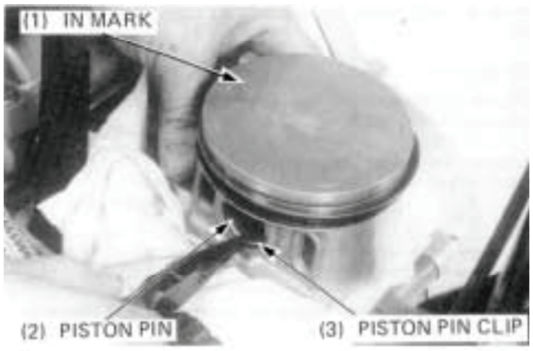


PISTON INSTALLATION

Apply molybdenum disulfide grease to the piston O.D.

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

Install new piston pin clips and apply engine oil to the piston.



NOTE

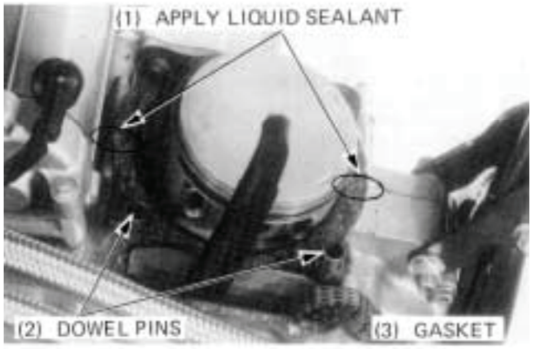
- Do not align the piston pin clip end gap with the piston cut-out.
- Place a shop towel around the piston skirt and in the crankcase ot prevent the piston pin clips from falling into the crankcase.

CYLINDER INSTALLATION

Apply a liquid sealant to the crankcase mating area to prevent oil leaks.

Install a new cylinder base gasket and dowel pins.

Place the piston at bottom dead center.

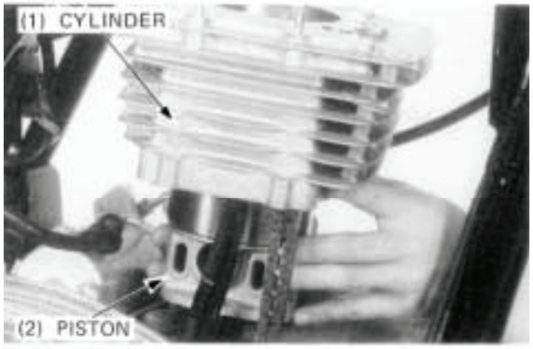


Coat the cylinder bore, piston and piston rings with fresh engine oil.

Carefully lower the cylinder over the piston by compressing the piston ring, one at a time.

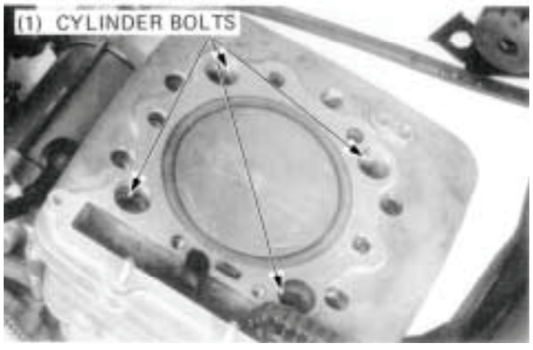
CAUTION

- *Do not force the cylinder over a ring; your may damage the piston and piston ring.*



Apply engine oil to the cylinder bolts, washer and tighten the cylinder bolts in crisscross pattern in two or more steps.

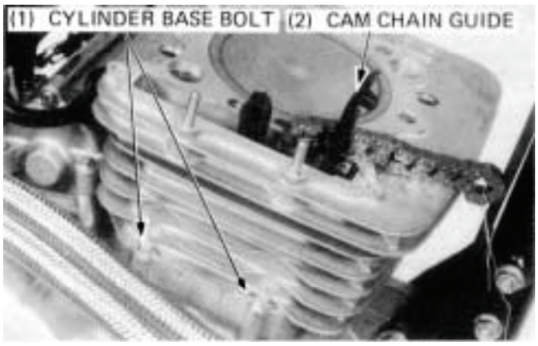
TORQUE: 40–44 N·m (4.0–4.4 kg-m, 29–32 ft-lb)

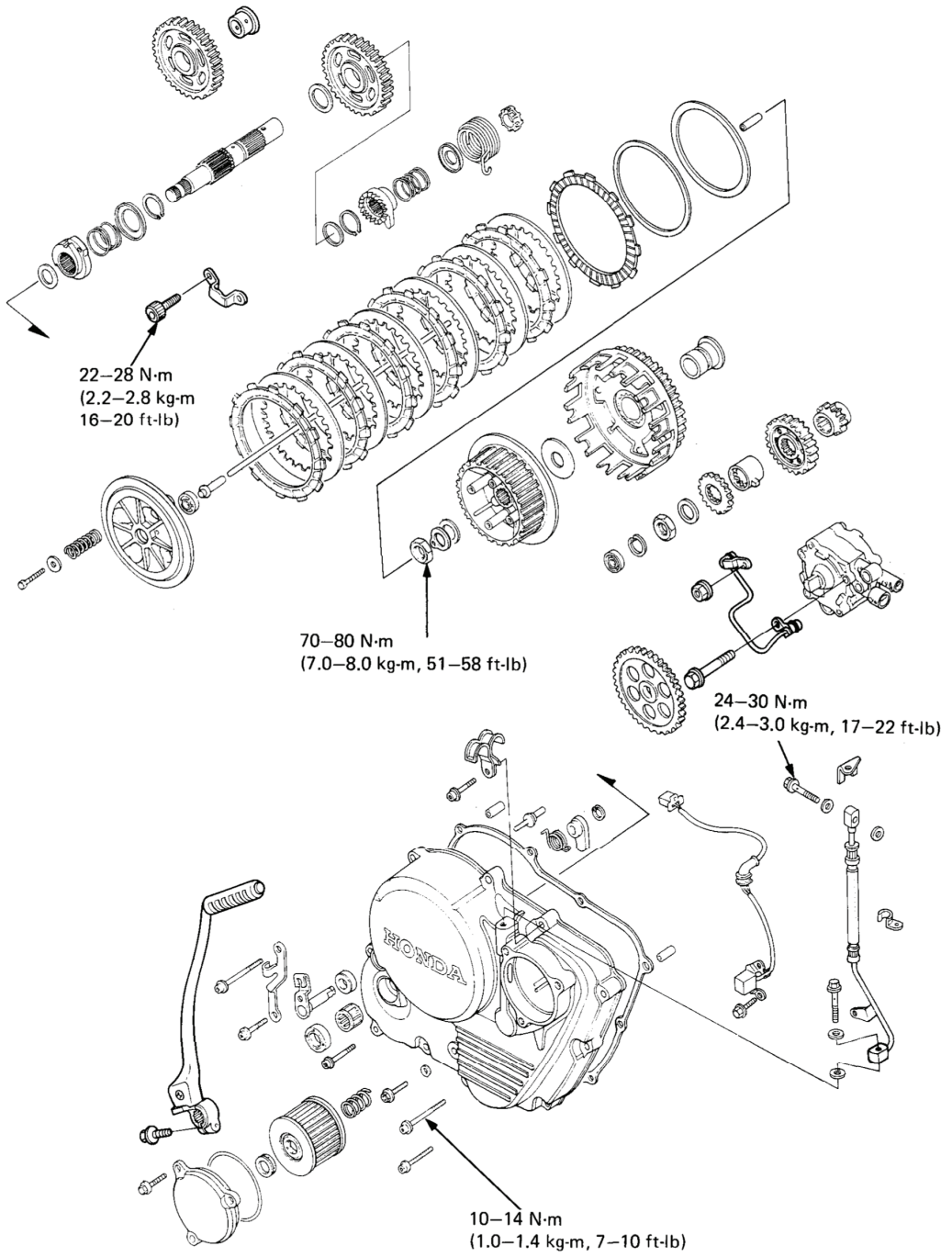


Tighten the cylinder base bolts.
Install the cam chain guide.
Install the cylinder head (page 6-16).

NOTE

- Push the cam chain guide in until it bottoms in the crankcase guide hole.




22–28 N·m
(2.2–2.8 kg-m
16–20 ft-lb)
70–80 N·m
(7.0–8.0 kg-m, 51–58 ft-lb)
24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)
HONDA
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

8. CLUTCH/OIL PUMP/KICK STARTER

SERVICE INFORMATION	8-1	OIL PUMP	8-7
TROUBLESHOOTING	8-2	KICK STARTER	8-13
RIGHT CRANKCASE COVER REMOVAL	8-3	CLUTCH INSTALLATION	8-17
CLUTCH REMOVAL	8-5	RIGHT CRANKCASE COVER INSTALLATION	8-20

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch, oil pump, kick starter, and right crankcase cover. All these operations can be accomplished with the engine installed.
- When the existing clutch discs are replaced, coat new discs with engine oil prior to assembly.
- For shift linkage replacement, refer to section 10.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Clutch	Lever free play (at lever end)		10–20 mm (3/8–3/4 in)	————
	Clutch spring free length	Standard	44.3 mm (1.774 in)	43.8 mm (1.72 in)
		Service limit	42.7 mm (1.68 in)	42.3 mm (1.67 in)
	Spring preload/length		25±1.3 kg/28.5 mm (4.9±2.9 lb/1.12 in)	————
	Disk thickness	(A)	1.35–1.45 mm (0.053–0.057 in)	1.1 mm (0.04 in)
		(B)	2.92–3.08 mm (0.115–0.121 in)	2.6 mm (0.10 in)
	Plate warpage		————	0.3 mm (0.01 in)
	Clutch outer I.D.		27.000–27.021 mm (1.0630–1.0638 in)	27.05 mm (1.065 in)
	Outer guide O.D.		26.959–26,980 mm (1.0614–1.0622 in)	26.91 mm (1.059 in)
	Mainshaft-to-clutch outer guide clearance		0.010–0.068 mm (0.0004–0.0027 in)	0.12 mm (0.005 in)
Oil pump	Inner rotor-to-outer rotor clearance		0.15 mm (0.006 in) max	0.20 mm (0.008 in)
	Outer rotor-to-body clearance		0.15–0.22 mm (0.006–0.009 in)	0.25 mm (0.010 in)
	Rotor-to-cover clearance		0.04–0.09 mm (0.002–0.004 in)	0.12 mm (0.005 in)
Kick starter	Starter idler gear I.D.		20.000–20.021 mm (0.7874–0.7882 in)	20.11 mm (0.792 in)
	Idler gear bushing	O.D.	19.959–19.980 mm (0.7858–0.7866 in)	19.90 mm (0.783 in)
		I.D.	16.000–16.018 mm (0.6299–0.6306 in)	16.03 mm (0.631 in)
	Kick starter gear I.D.		22.000–22.033 mm (0.8661–0.8674 in)	22.12 mm (0.871 in)
	Kick starter spindle O.D.		21.959–21.980 mm (0.8645–0.8654 in)	21.90 mm (0.862 in)

TORQUE VALUES

Clutch lock nut	70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Right crankcase cover bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Kick starter stopper plate bolt	22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb)

TOOLS

COMMON

Driver	07749–0010000
Attachment, 24x26 mm	07746–0010700
Pilot, 20 mm	07746–0040500
Clutch center holder	07724–0050000
Driver pin, 2.5 mm	07744–0010100

TROUBLESHOOTING

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

Clutch slips when accelerating
- No free play
- Discs worn
- Springs weak

Clutch will not disengage
- Too much free play
- Plates warped

Motorcycle creeps with clutch disengaged
- Too much free play
- Plates warped

Excessive lever pressure
- Clutch cable kinked, damaged or dirty
- Lifter mechanism damaged

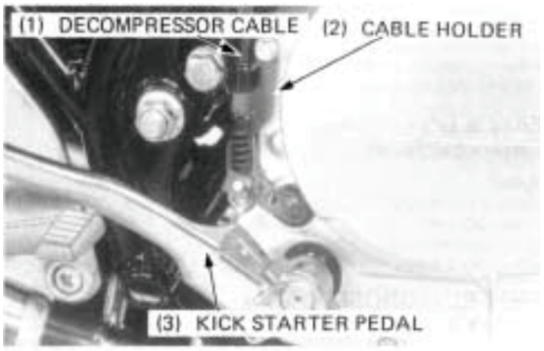
Clutch operation feels rough
- Outer drum slots rough
- Dirty clutch cable

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

RIGHT CRANKCASE COVER REMOVAL

REMOVAL

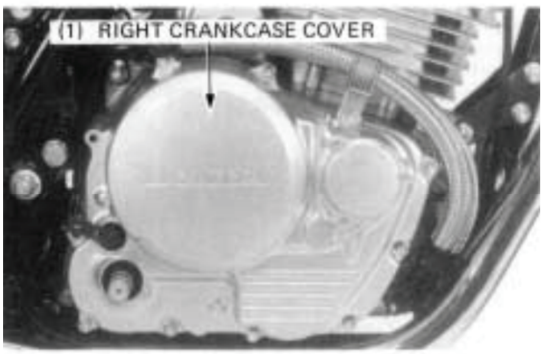
Drain oil from the engine and oil tank (page 2-2).
Remove the kick starter pedal.
Remove the cable holder attaching bolt and disconnect the decompressor cable at the kick starter lever.



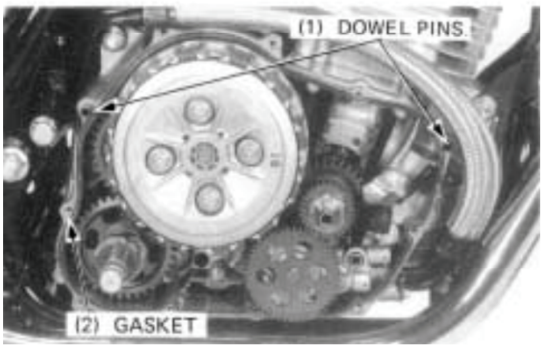
Remove the lower oil bolt, sealing washers and oil pipe bracket bolt.
Disconnect the oil pipe from the right crankcase cover.



Remove the bolts holding the right crankcase cover, and remove the cover.

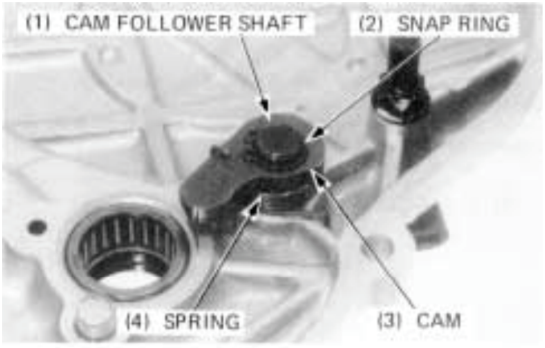


Remove the dowel pins and gasket.

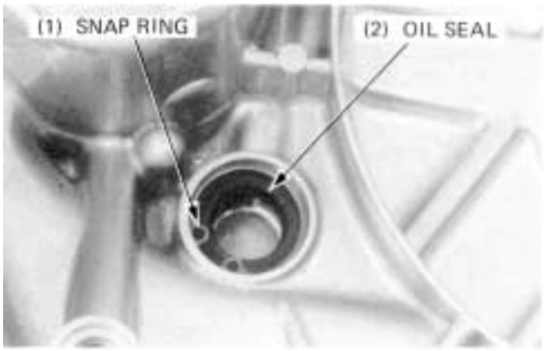


DISASSEMBLY/ASSEMBLY

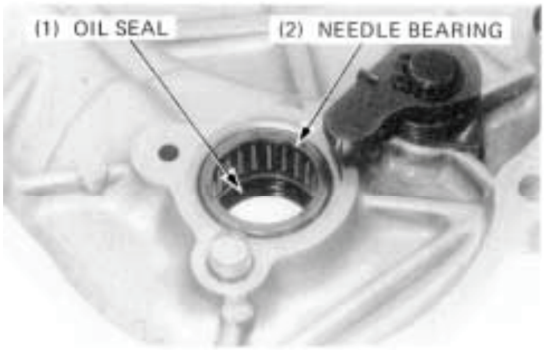
Remove the snap ring, cam, return spring and camshaft.



Remove the snap ring and oil seal.
Install a new oil seal.
Install the snap ring.



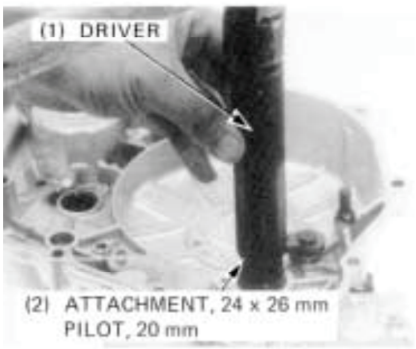
Check the oil seal and needle bearing for wear, excessive play or damage and replace if necessary.
Remove the oil seal and needle bearing from the right crankcase coaver.



Drive a new needle bearing with the special tools.
Install a new oil seal.

TOOLS:

Driver	**07749–0010000**
Attachment, 24 x 26 mm	**07746–0010700**
Pilot, 20 mm	**07746–0040500**



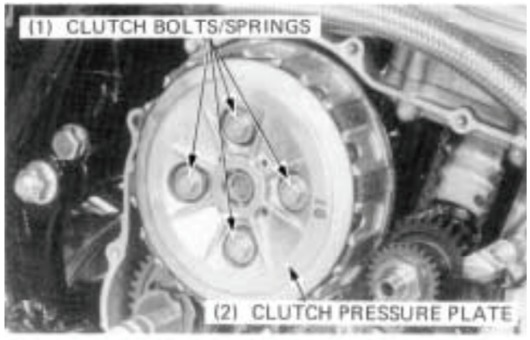
CLUTCH REMOVAL

Remove the four clutch bolts and springs.

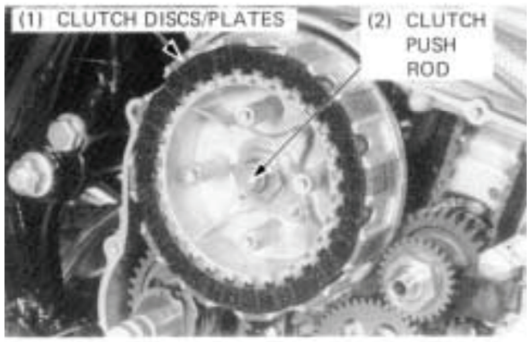
NOTE

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

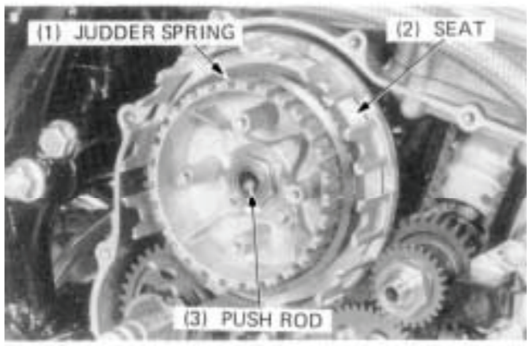
Remove the clutch pressure plate.



Remove the clutch push rod tip and release bearing on the clutch pressure plate.
Remove the clutch discs and plates.



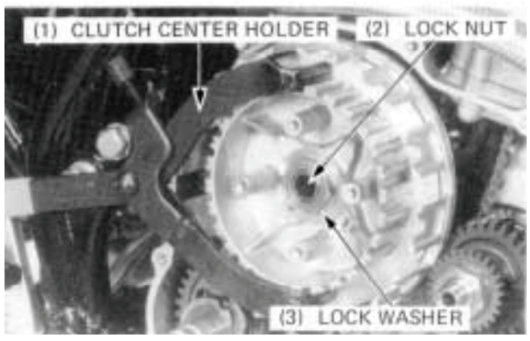
Remove the judder spring and seat.
Remove the push rod.



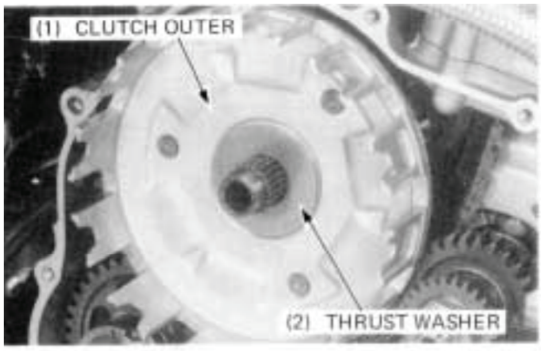
Straighten the tubs of the lock washer.
Hold the clutch center with the clutch center holder.
Remove the lock nut, lock washer and washer.
Remove the clutch center holder and clutch center.

TOOL:

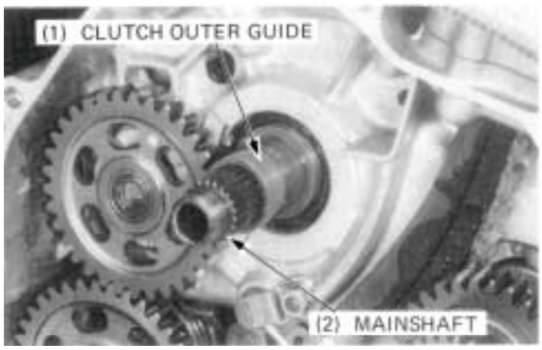
Clutch center holder **07724–0050000**



Remove the thrust washer and clutch outer.



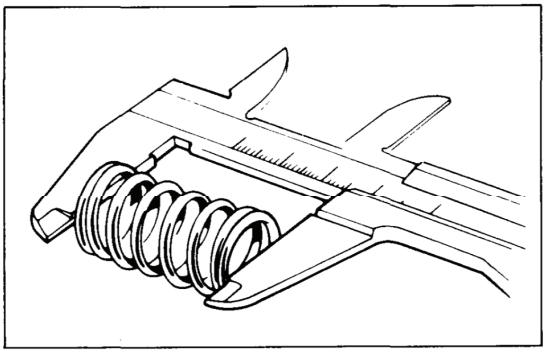
Remove the clutch outer guide from the mainshaft.



SPRING INSPECTION

Measure the free length of each spring.

Standard	44.3 mm (1.774 in)	43.8 mm (1.72 in)
Service limit	42.7 mm (1.68 in)	42.3 mm (1.67 in)



Replace if shorter than the service limit.

NOTE

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

CLUTCH DISC INSPECTION

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

SERVICE LIMIT: (A) 1.1 mm (0.04 in)
(B) 2.6 mm (0.10 in)

NOTE

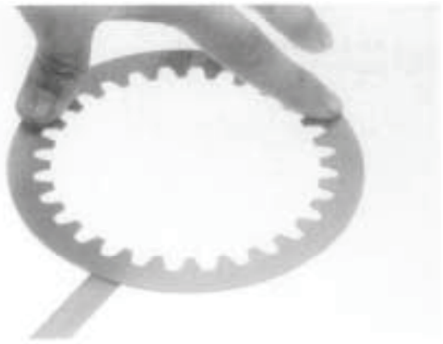
- Clutch discs and plates should be replaced as a set if any one si beyond the service limit.



CLUTCH PLATE INSPECTION

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

SERVICE LIMIT: 0.3 mm (0.01 in)



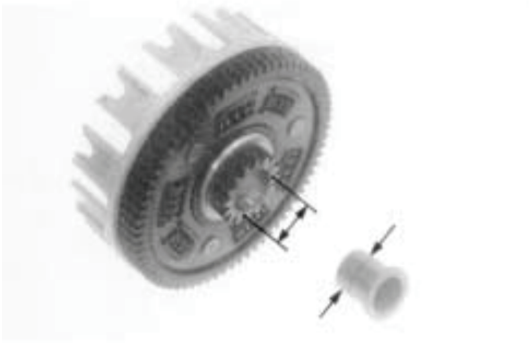
CLUTCH OUTER AND OUTER GUIDE INSPECTION

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

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

SERVICE LIMIT

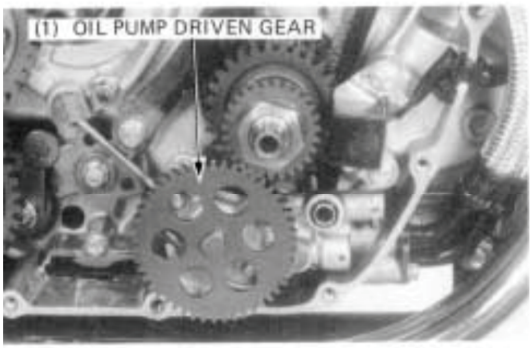
CLUTCH OUTER I.D.	**27.05 mm (1.065 in)**
OUTER GUIDE O.D.	**26.91 mm (1.059 in)**



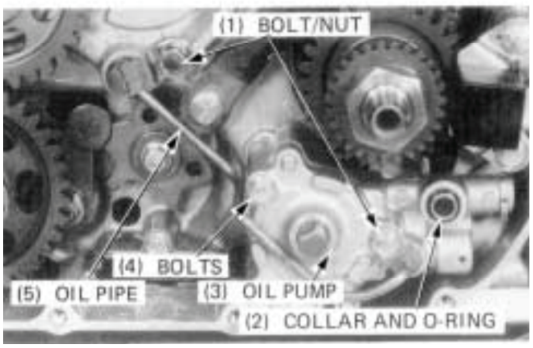
OIL PUMP

REMOVAL

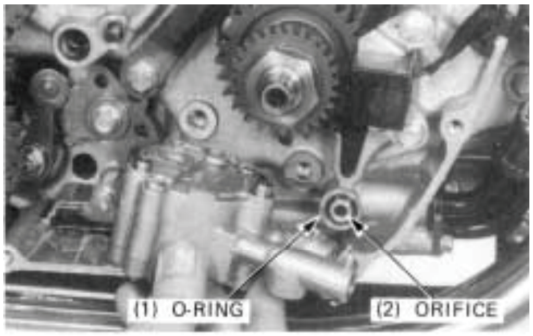
Remove the clutch (page 8-5).
Remove the oil pump driven gear.



Remove the collar and O-ring.
Remove the bolts attaching the oil pump and the oil pump from the right crankcase.

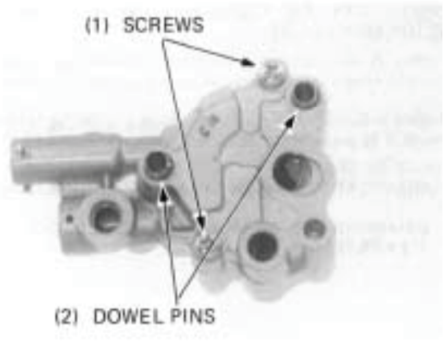


Remove the orifice and O-ring from the right crankcase.
Check that the oil orifice in the crankcase is clean by blowing through with compressed air.

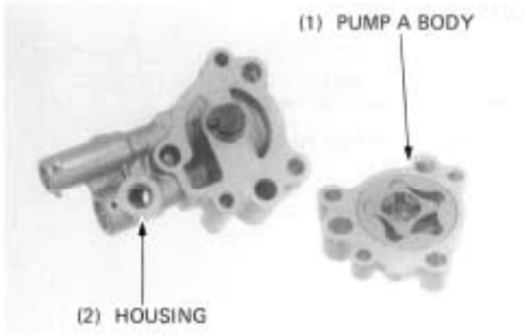


DISASSEMBLY

Remove the oil pump body screws and dowel pins.



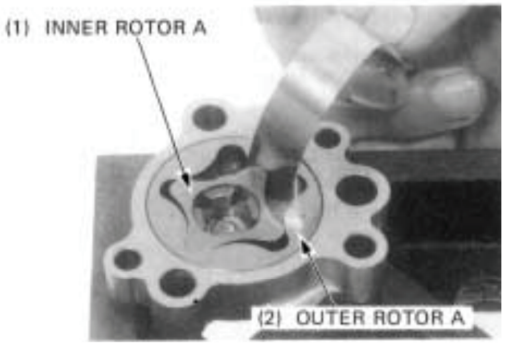
Remove the oil pump A body from the housing



OIL PUMP INSPECTION

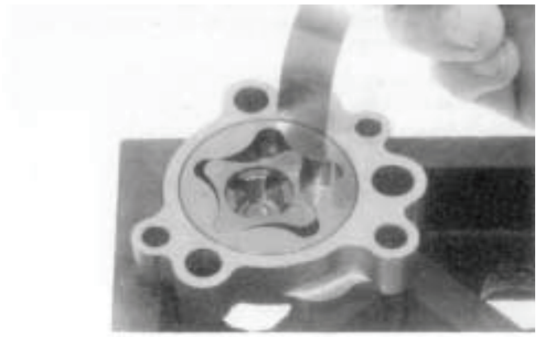
Measure the tip clearance between the inner and outer A rotors.

SERVICE LIMIT: 0.20 mm (0.008 in)



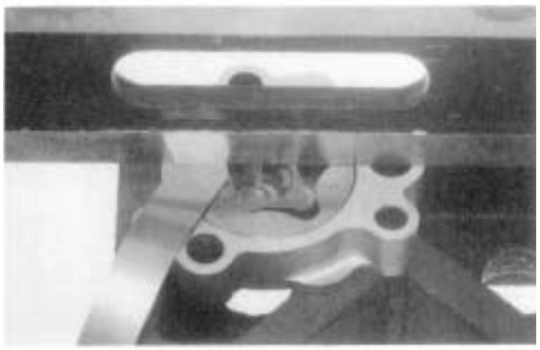
Measure the clearance between the outer rotor A and the pump A body.

SERVICE LIMIT: 0.25 mm (0.010 in)

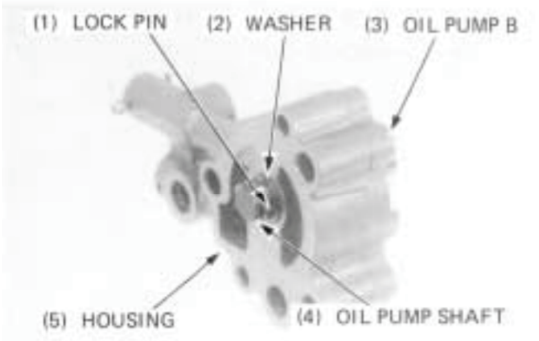


Measure the end clearance of pump A.

SERVICE LIMIT: 0.12 mm (0.005 in)

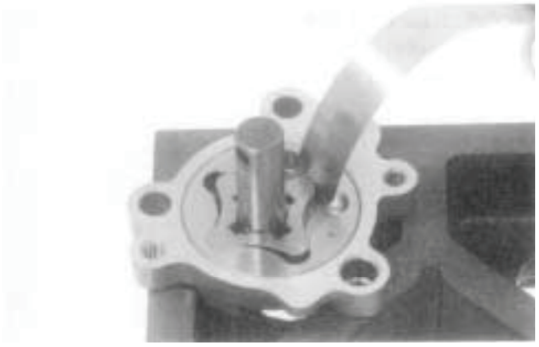


Remove the lock pin and washer from the oil pump shaft, then separate the housing from the oil pump B.



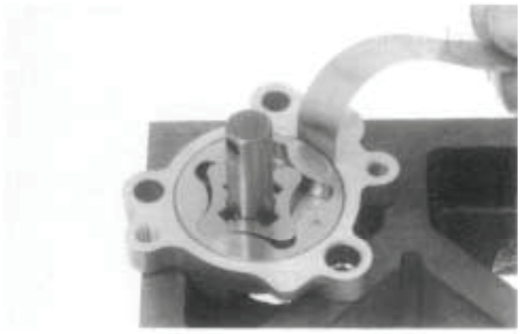
Measure the tip clearance between the inner and outer B rotors.

SERVICE LIMIT: 0.20 mm (0.008 in)

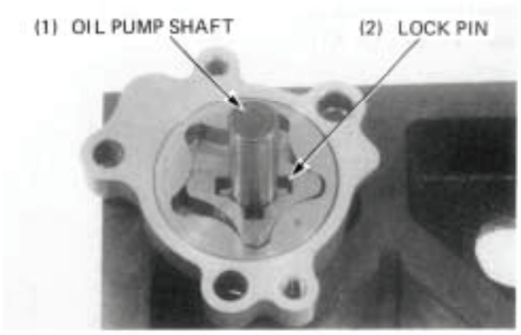


Measure the clearance between the outer rotor B and the pump B body.

SERVICE LIMIT: 0.25 mm (0.010 in)

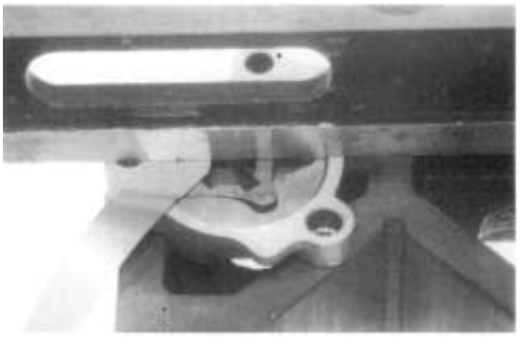


Remove the oil pump shaft and press out the lock pin from the shaft.



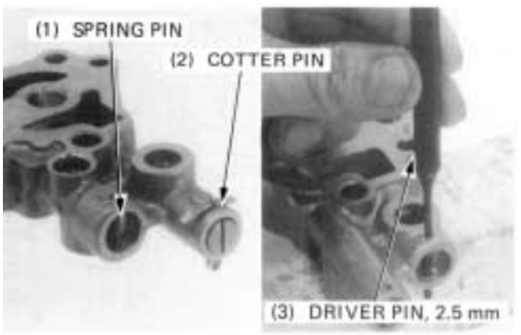
Measure the end clearance of pump B.

SERVICE LIMIT: 0.12 mm (0.005 in)



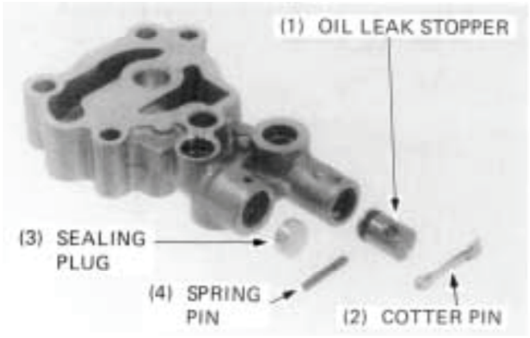
Remove the spring pin and the cotter pin from the housing.
Remove the oil leak stopper and plug.

TOOL:
Driver pin, 2.5 mm 07744–0010100

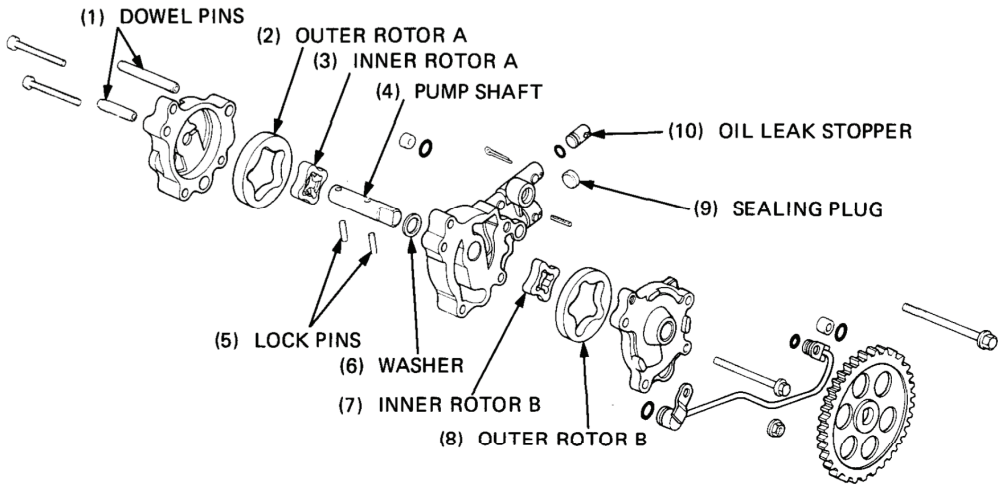


Inspect the O-ring and the oil leak stopper for damage.

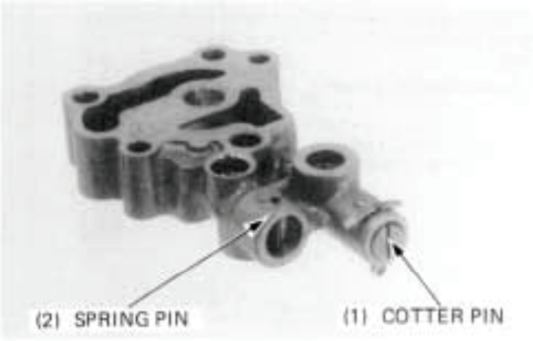
Clean as necessary. Also check the condition of the plug. Discard the old cotter pin and spring pin.



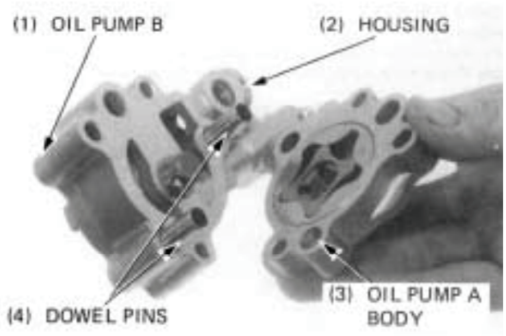
ASSEMBLY



Install the oi leak stopper into the housing, and align the hole in the oil leak stopper with the hole in the housing.
Install a new cotter pin.
Install the sealing plug with a new spring pin.



Assemble oil pump B and the housing, then slip the dowel pins into places.
Install the washer on the pump shaft and press the lock pin.
Install outer rotor A into the pump A body, then assemble onto the housing.

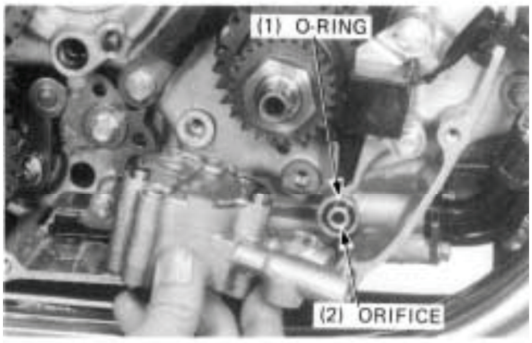


Tighten the two oil pump screws.

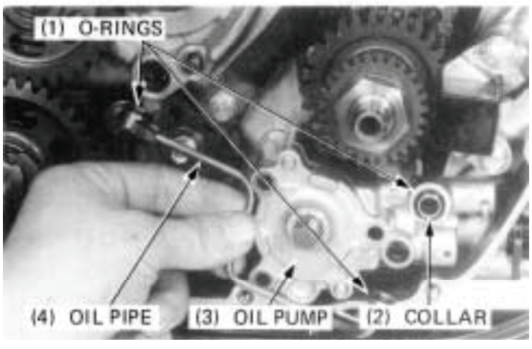


INSTALLATION

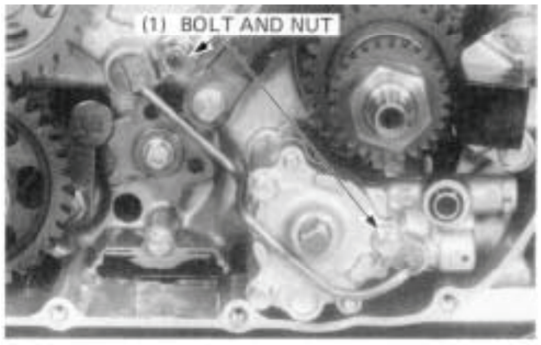
Install the orifice and a new O-ring onto the right crankcase.



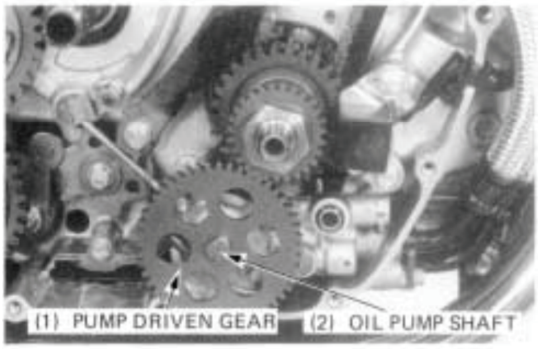
Install the oil pump onto the right crankcase.
Install the collar and a new O-ring.
Coat new O-rings with engine oil and install them on the oil pipe.
Install the oil pipe.



Tighten the oil pipe with bolt and nut.
Install the oil pump bolts and tighten them.



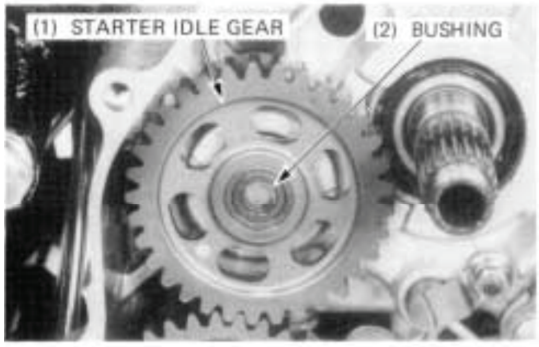
Install the oil pump driven gear over the oil pump shaft.
Install the clutch (page 8-17).



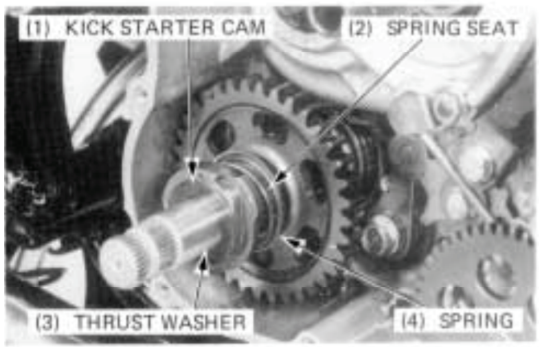
KICK STARTER

REMOVAL

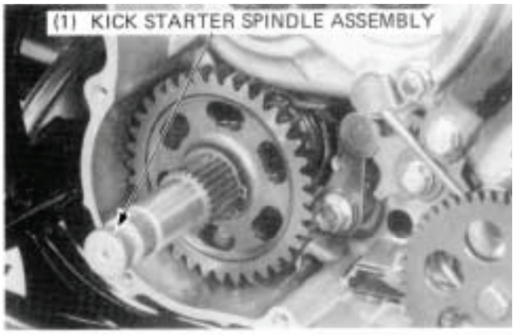
Remove the clutch (page 8-5).
Remove the starter idler gear and its flanged bushing.



Remove the thrust washer, kick starter cam, spring and spring seat from the spindle.

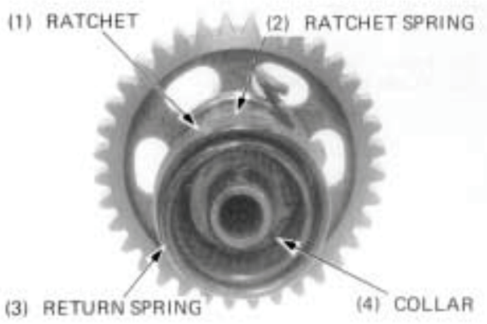


Remove the kick starter return spring from the right crankcase hole and remove the kick starter spindle assembly from the right crankcase.

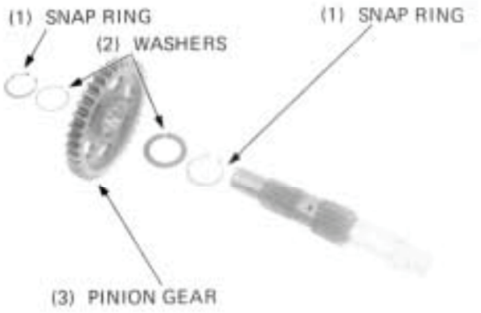


DISASSEMBLY

Remove the collar, return spring, spring seat, ratchet spring and rachet from the spindle.



Remove the snap rings, washers and pinion gear from the spindle.



INSPECTION

Measure the I.D. of the kick starter idler gear.

SERVICE LIMIT: 20.11 mm (0.792 in)

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

SERVICE LIMIT: I.D. 16.03 mm (0.631 in)
O.D. 19.90 mm (0.783 in)

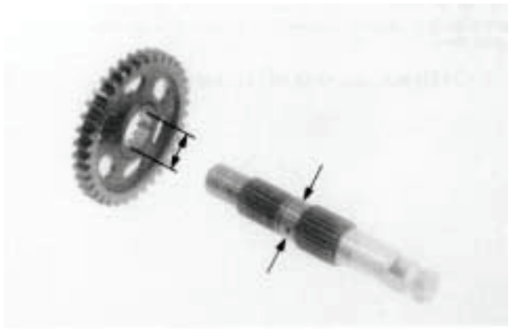


Measure the I.D. of the kick starter gear.

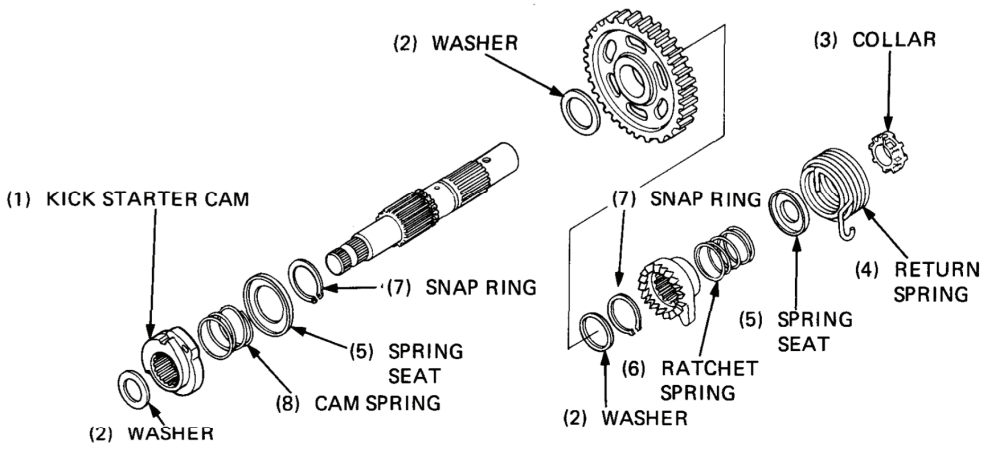
SERVICE LIMIT: 22.12 mm (0.871 in)

Measure the O.D. of the kick starter spindle.

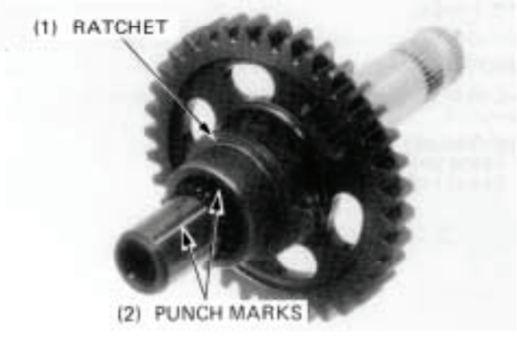
SERVICE LIMIT: 21.90 mm (0.862 in)



ASSEMBLY

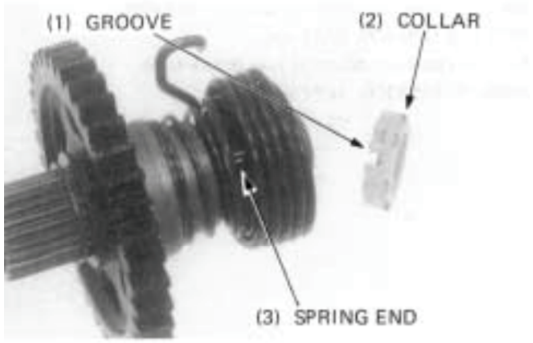


Align the punch marks on the ratchet and the spindle and install the ratchet over the spindle.



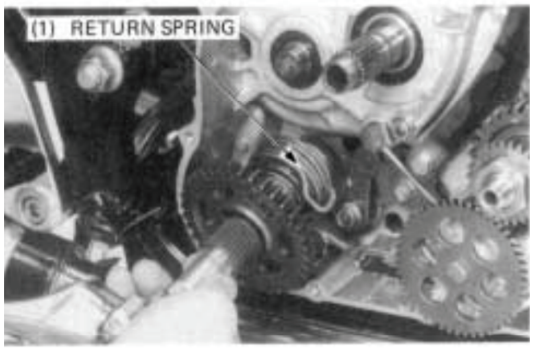
Install the ratchet spring and spring seat.

Install the return spring and insert its end into the hole in the spindle.
Install the collar aligning its groove with the spring end inserted into the hole in the spindle.

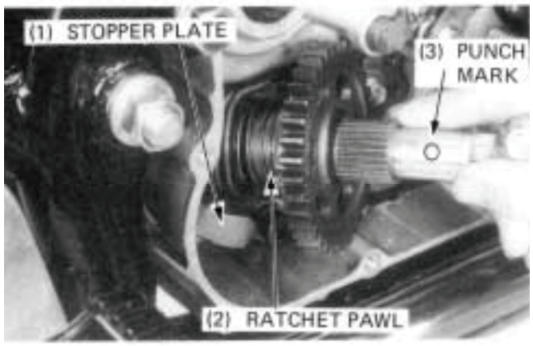


INSTALLATION

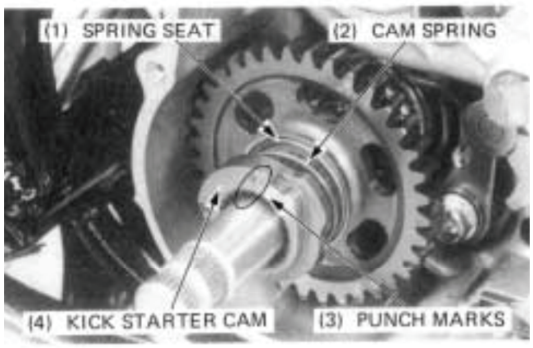
Hook the return spring to the right crankcase hole.



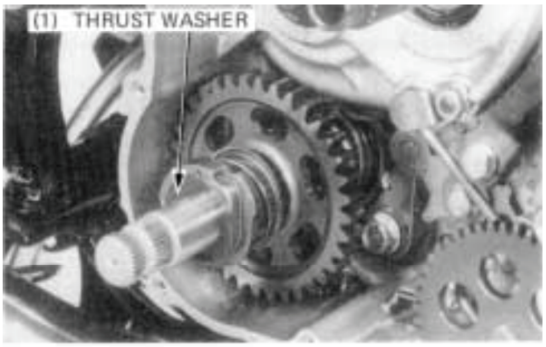
Turn the kick starter spindle counterclockwise until punch mark facing up.
Align the ratchet pawl with the stopper plate and install the spindle assembly.



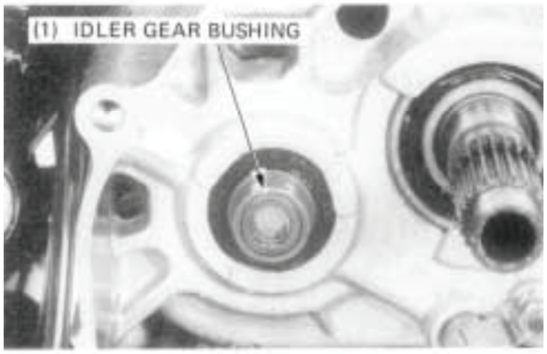
Install the spring seat and cam spring.
Align the punch marks on the starter cam and the spindle and install the starter cam.



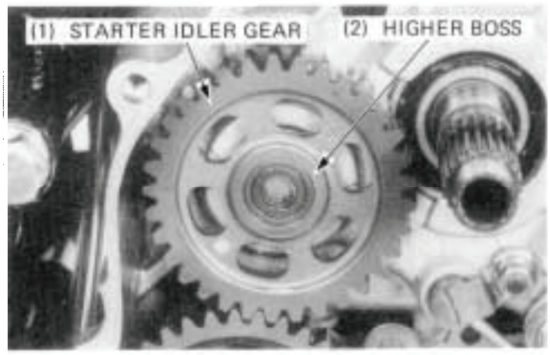
Install the thrust washer.



Install the starter idler gear bushing with its flange facing in.

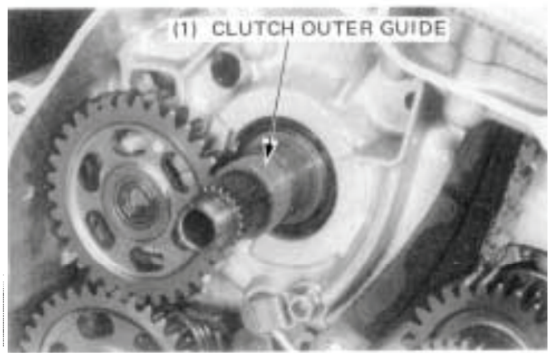


Install the starter idler gear with its higher boss facing out.
Install the clutch (page 8-17).

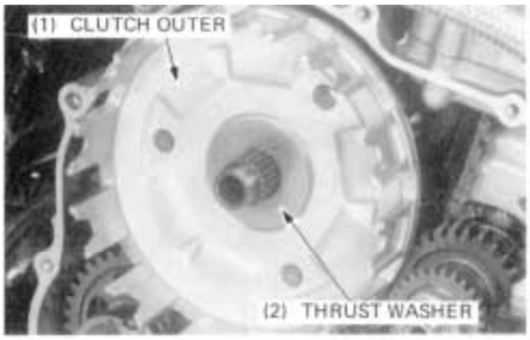


CLUTCH INSTALLATION

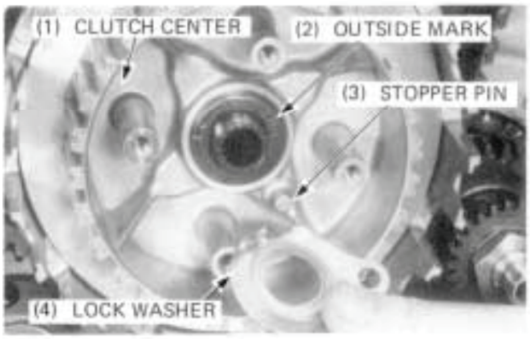
Apply molybdenum disulfide grease to the clutch outer guide.
Install the clutch outer guide onto the mainshaft.



Install the clutch outer over the outer guide, and the thrust washer.



Install the clutch center.
Install the washer with the OUTSIDE mark facing out.
Install the lock washer with the hole aligned with the stopper pin of the clutch center.

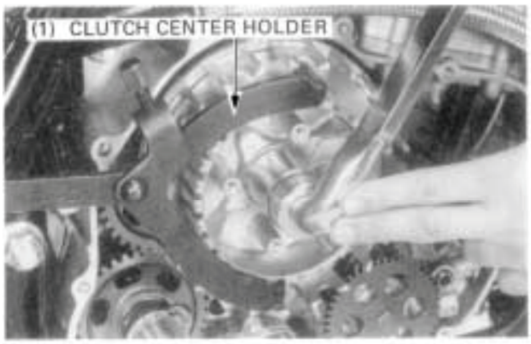


Install the clutch lock nut.
Install the clutch center holder to the clutch center.
Tighten the clutch lock nut to the specified torque.

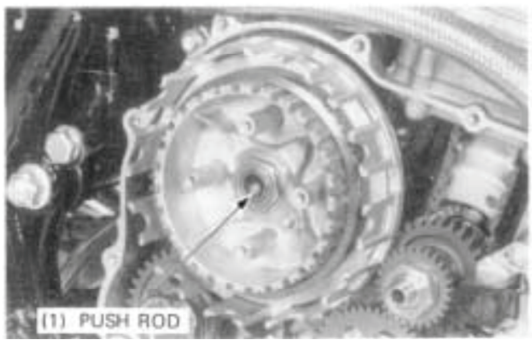
TORQUE: 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)

Remove the holder.

TOOL:
Clutch cener holder 07724–0050000



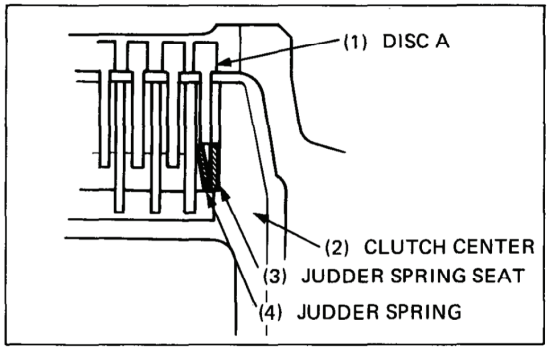
Install the push rod into the mainshaft.



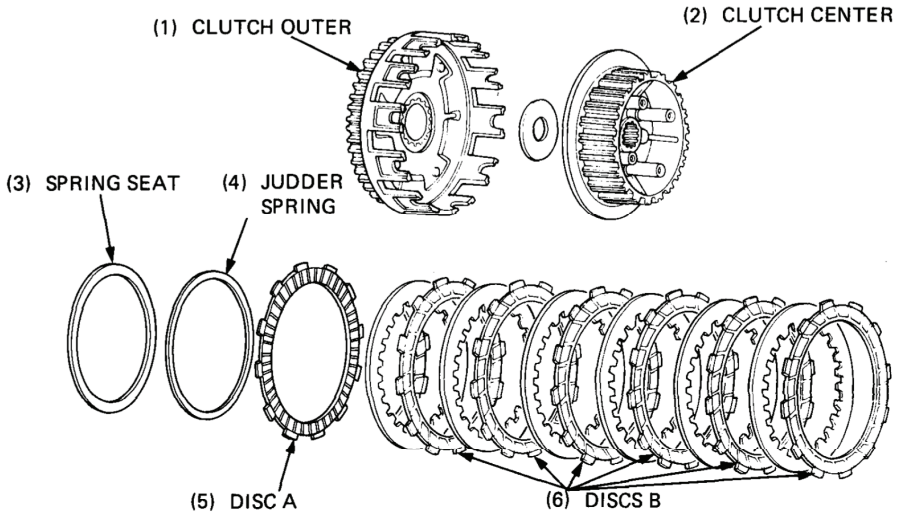
Coat the discs and plates with clean engine oil.
Install the judder spring seat and judder spring.
Install the disc A.

NOTE

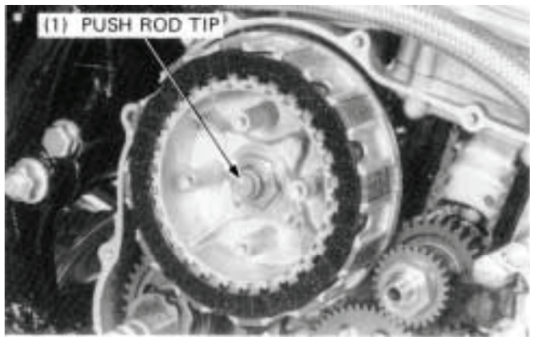
- Note the direction of the judder spring.



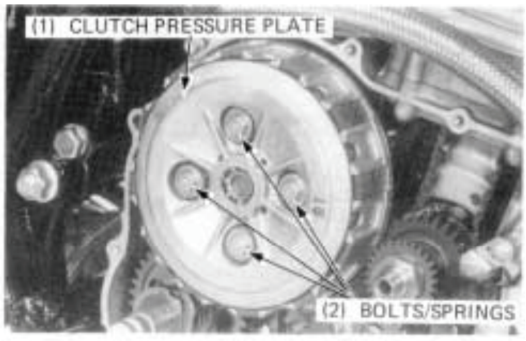
Install the plates and discs B as shown.



Install the clutch push rod tip into the mainshaft.

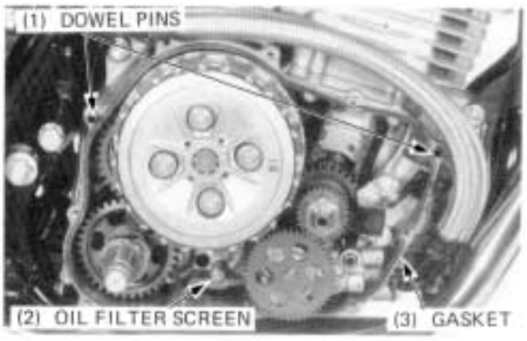


Install the bearing onto the clutch pressure plate.
Install the clutch pressure plate, bolts and spring.
Tighten the bolts in crisscross pattern in 2–3 steps.

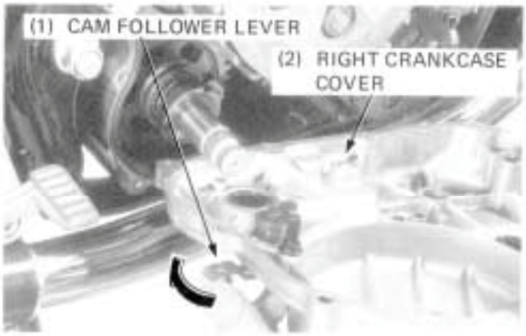


RIGHT CRANKCASE COVER INSTALLATION

Clean the oil filter screen (page 2-4).
Install the dowel pins and new gasket.

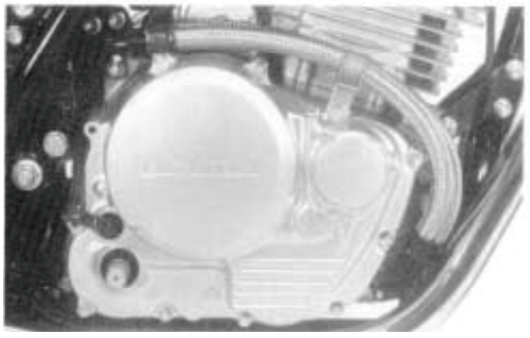


Install the right crankcase cover while pushing the cam follower lever down.
Check the operation of the decompression and clutch levers after installing the cover.



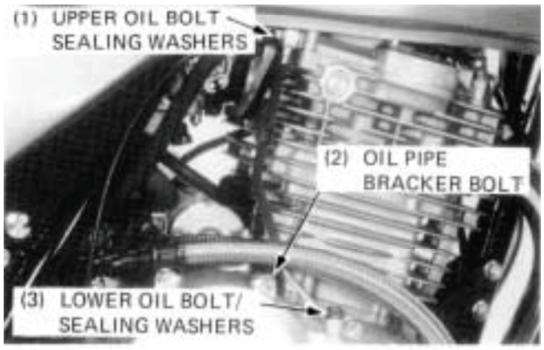
Tighten the right crankcase cover bolts.

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



Make sure that the oil pipe and oil pipe bolts are clean and the sealing washers are in good condition.
Tighten the oil bolt with two sealing washers.

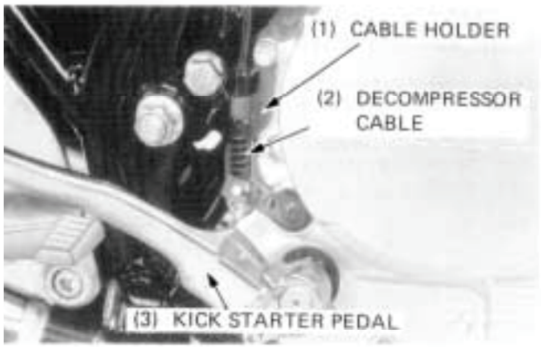
Tighten the oil pipe bracket bolt.

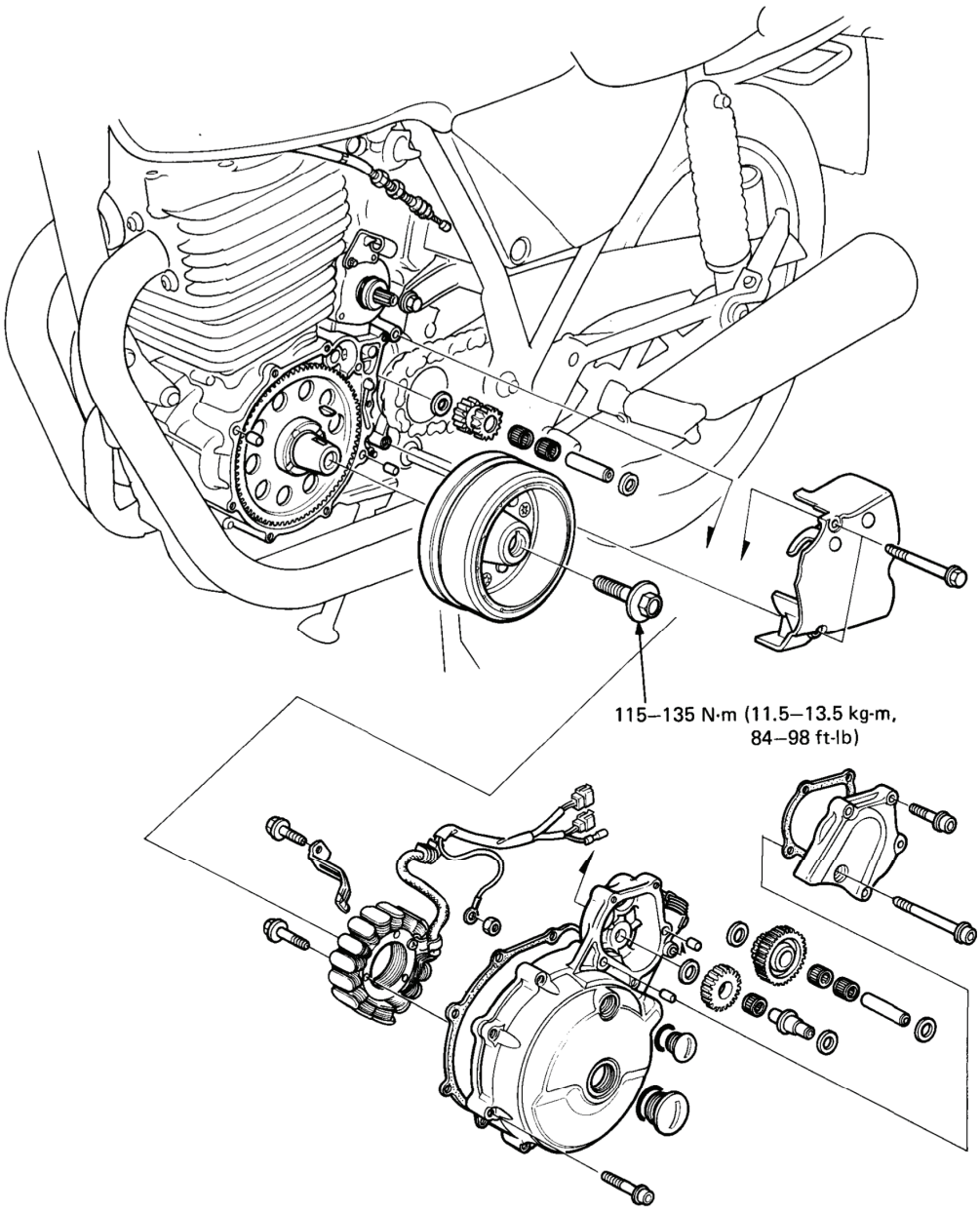


Connect the decompressor cable to the cam follower lever.

Install the cable holder and tighten the bolt.
Install the kick starter pedal.

Fill the oil tank with the recommended oil (page 2-1). Adjust the kick starter decompressor (page 3-8).




115–135 N·m (11.5–13.5 kg·m,
84–98 ft·lb)

9. ALTERNATOR

SERVICE INFORMATION	9-1	FLYWHEEL INSTALLATION	9-4
LEFT CRANKCASE COVER REMOVAL	9-2	LEFT CRANKCASE COVER INSTALLATION	9-4
FLYWHEEL REMOVAL	9-3		

SERVICE INFORMATION

GENERAL

- This section pertains to removal and installation of the alternator. These operations can be accomplished with the engine in the frame after removing the left crankcase cover.
- For alternator inspection, refer to section 17.
- For starter clutch and starter driven gear removal, refer to section 18.

TORQUE VALUES

Flywheel bolt	115–135 N·m (11.5–13.5 kg-m, 84–98 ft-lb)

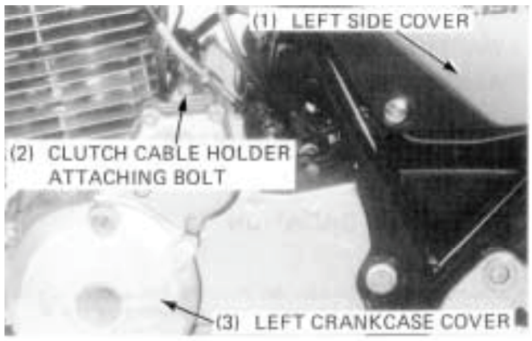
TOOLS

COMMON

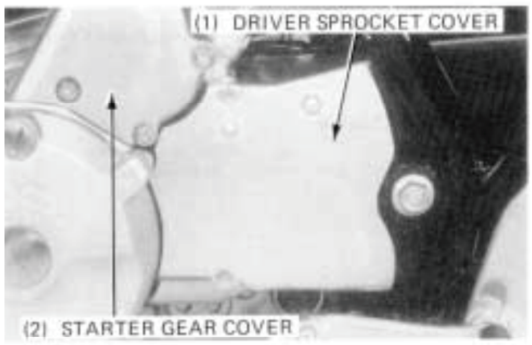
Flywheel holder	07725–0040000
Rotor puller	07733–0020001

LEFT CRANKCASE COVER REMOVAL

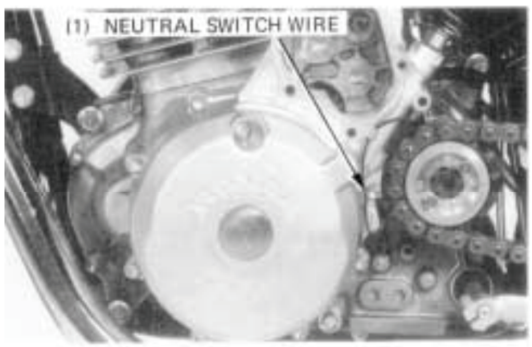
Remove the left side cover.
Disconnect the alternator couplers and wire.
Drain the oil from the engine.
Remove the cable holder attaching bolt and disconnect the clutch cable from the lifter arm.



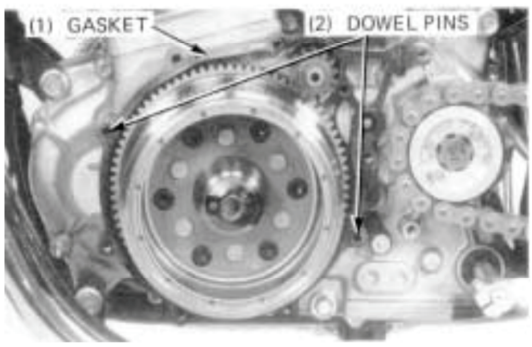
Remove the drive sprocket cover.
Remove the starter gear cover and gears (18-2).



Disconnect the neutral switch wire from the switch.
Remove the left crankcase cover bolts and cover.

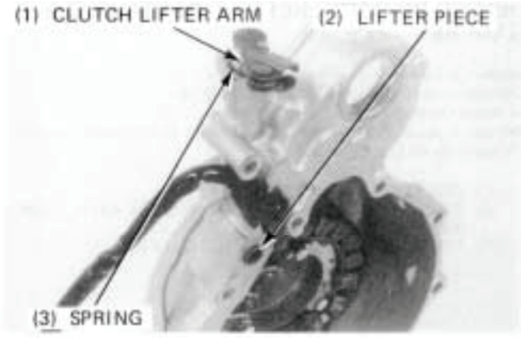


Remove the dowel pins and gasket.



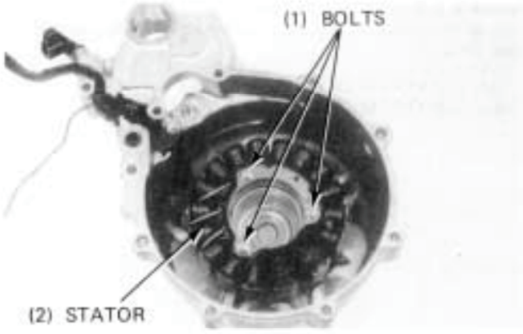
CLUTCH LIFTER ARM DISASSEMBLY

Remove the clutch lifter piece.
Remove the clutch lifter arm and spring.



ALTERNATOR STATOR REMOVAL

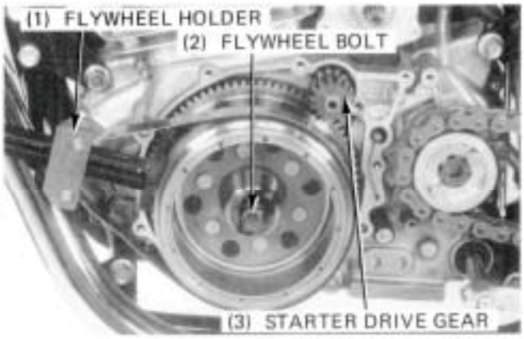
Remove the three bolts attaching the alternator stator to the left crankcase and the stator.



FLYWHEEL REMOVAL

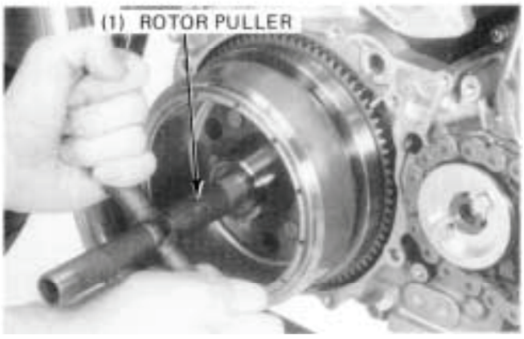
Remove the starter drive gear.
Hold the flywheel with the flywheel holder.
Remove the flywheel bolt.

TOOL:
Flywheel holder 07725–0040000



Remove the flywheel using the rotor puller.

TOOL:
Rotor puller 07733–0020001



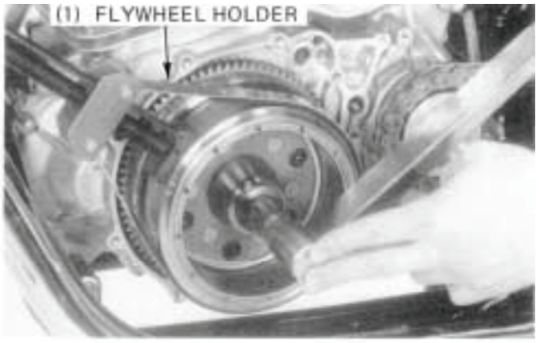
FLYWHEEL INSTALLATION

Install the flywheel by aligning the woodruff key on the crankshaft with the flywheel keyway.

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

TORQUE: 115–135 N·m (11.5–13.5 kg-m, 84–98 ft-lb)

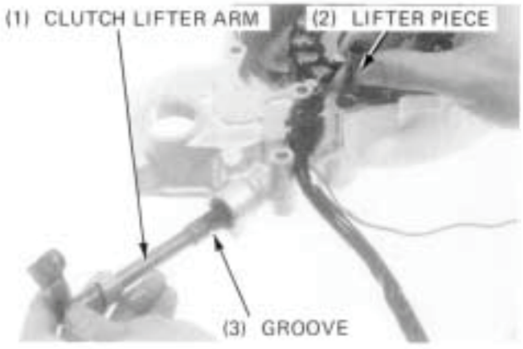
TOOL:
Flywheel holder 07725–0040000



LEFT CRANKCASE COVER INSTALLATION

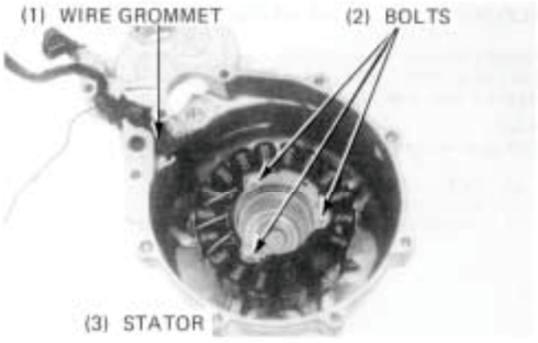
CLUTCH LIFTER ARM INSTALLATION

Install the spring onto the lifter arm.
Insert the lifter arm and hook the spring to the left crankcase cover.
Turn the lifter arm and install the lifter piece, aligning the groove on the lifter arm with the bottom of the lifter piece.

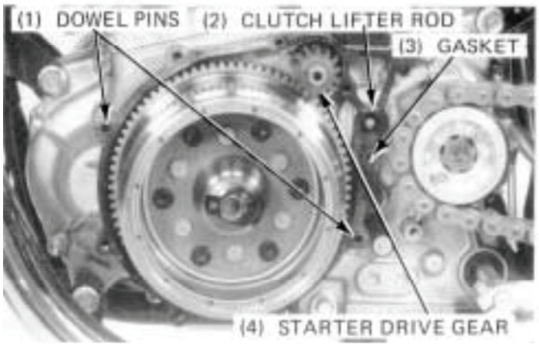


ALTERNATOR STATOR INSTALLATION

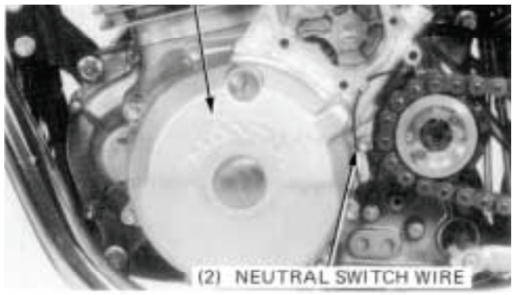
Install the stator onto the left crankcase ocver and apply locking agent to the stator mounting bolt threads.
Tighten the three bolt.
Route the stator wire and install the wire gromment into the groove in the cover as shown.



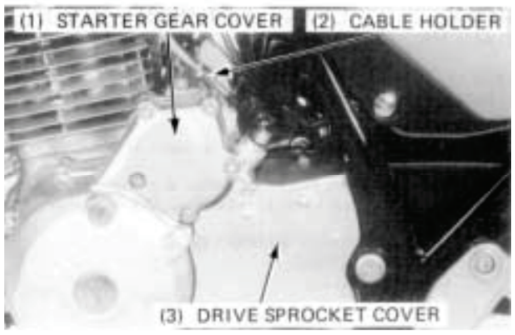
Install the two dowel pins and a new gasket.
Make sure the clutch lifter rod is in place.
Install the starter driver gear (page 18-4).

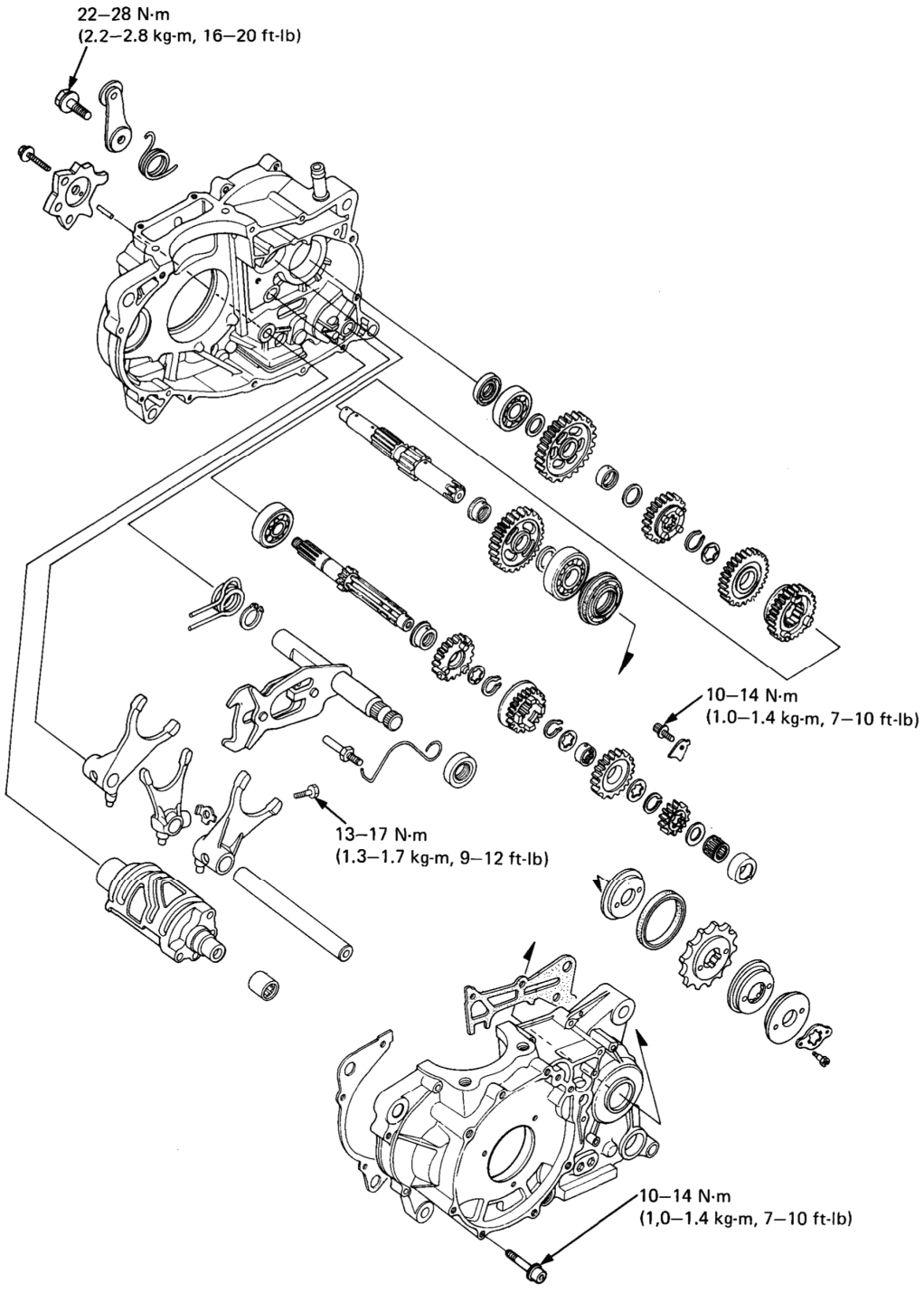


Install the left crankcase cover and connect the neutral switch wire.
Tighten the left crankcase cover bolts.



Install the starter gears (page 18-4) and starter gear cover.
Connect the clutch cable and tighten the cable holder bolts.
Install the drive sprocket cover.
Connect the alternator couplers and wire.
Fill the oil tank with the recommended oil (page 2-1).
Adjust the clutch (page 3-8).
Install the left side cover.




22–28 N·m
(2.2–2.8 kg-m, 16–20 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
13–17 N·m
(1.3–1.7 kg-m, 9–12 ft-lb)
10–14 N·m
(1,0–1.4 kg-m, 7–10 ft-lb)

10. SHIFT LINKAGE/TRANSMISSION

SERVICE INFORMATION	10-1	TRANSMISSION REMOVAL	10-5
TROUBLESHOOTING	10-2	TRANSMISSION ASSEMBLY	10-8
CRANKCASE SEPARATION	10-3	CRANKCASE ASSEMBLY	10-10

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the transmission and shift linkage.
- The gearshift stopper arm, plate and primary drive gear can be serviced with the engine install in the frame.
- Remove the following parts before separating the crankcase.

CYLINDER HEAD ..... Section 6
CYLINDER/PISTON ..... Section 7
CLUTCH/OIL PUMP/KICK STARTER ..... Section 8
ALTERNATOR ..... Section 9
STARTER DRIVEN GEAR ..... Section 18

SPECIFICATIONS

ITEM				STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M4		28.020–28.041 mm (1.1031–1.1040 in)	28.10 mm (1.106 in)
		M5		28.000–28.021 mm (1.1024–1.1032 in)	28.08 mm (1.106 in)
		C1		25.020–25.041 mm (0.9850–0.9859 in)	25.10 mm (0.988 in)
		C3		25.020–25.041 mm (0.9850–0.9859 in)	25.10 mm (0.988 in)
		C2		28.020–28.041 mm (0.1031–1.1040 in)	28.10 mm (1.106 in)
	Gear bushing	M5	O.D.	27.949–27.980 mm (1.1004–1.1016 in)	27.90 mm (1.098 in)
		M4	I.D.	25.020–25.041 mm (0.9850–0.9859 in)	25.10 mm (0.988 in)
			O.D.	27.979–28.000 mm (1.1015–1.1024 in)	27.93 mm (1.100 in)
		C1	I.D.	20.020–20.041 mm (0.7882–0.7890 in)	20.10 mm (0.791 in)
			O.D.	24.984–25.005 mm (0.9836–0.9844 in)	24.93 mm (0.981 in)
		C2	I.D.	25.020–25.041 mm (0.9850–0.9859 in)	25.10 mm (0.988 in)
			O.D.	27.979–28.000 mm (1.1015–1.1024 in)	27.93 mm (1.100 in)
	Gear-to-bushing clearance	M5		0.020–0.072 mm (0.0008–0.0028 in)	0.10 mm (0.004 in)
		M4		0.020–0.062 mm (0.008–0.0024 in)	0.10 mm (0.004 in)
		C1		0.015–0.057 mm (0.0006–0.0022 in)	0.10 mm (0.004 in)
		C2		0.020–0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
	Mainshaft O.D.	M4		24.959–24.980 mm (0.9826–0.9835 in)	24.91 mm (0.981 in)
	Countershaft O.D.	Starter idler		15.966–15.984 mm (0.6286–0.6293 in)	15.93 mm (0.627 in)
		C1		19.980–19.993 mm (0.7866–0.7871 in)	19.94 mm (0.785 in)
		C2		24.972–24.993 mm (0.9831–0.9840 in)	24.92 mm (0.981 in)
		C3		24.959–24.980 mm (0.9826–0.9835 in)	24.92 mm (0.981 in)
	Shaft-to-gear clearance	C3		0.040–0.082 mm (0.0016–0.0032 in)	0.15 mm (0.006 in)
	Shaft-to-bushing clearance	M4		0.027–0.068 mm (0.0011–0.0027 in)	0.10 mm (0.004 in)
		C1		0.027–0.061 mm (0.0011–0.0024 in)	0.10 mm (0.004 in)
		C2		0.027–0.069 mm (0.0011–0.0027 in)	0.10 mm (0.004 in)
Shift fork, shift fork shaft	Shift fork I.D.			14.000–14.018 mm (0.5512–0.5519 in)	14.05 mm (0.553 in)
	Shift fork claw thickness			4.93–5.00 mm (0.194–0.197 in)	4.5 mm (0.18 in)
	Shift fork shaft O.D.			13.966–13.984 mm (0.5498–0.5506 in)	13.90 mm (0.547 in)

TORQUE VALUES

Shift for set bolt	13–17 N·m (1.3–1.7 kg-m, 9–12 ft-lb)
Crankcase socket bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Stopper plate bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Stopper arm bolt	22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb)
Drive gear lock nut	70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)

TOOL

COMMON

Gear holder	07724–0010100

TROUBLESHOOTING

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

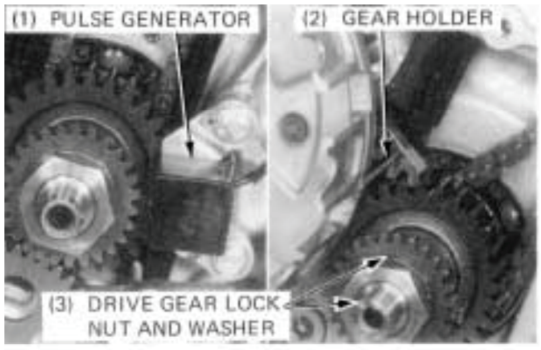
Transmission jumps out of gear
- Gear dogs worn
- Shift shaft bent
- Shift drum stopper broken
- Shift forks bent

CRANKCASE SEPARATION

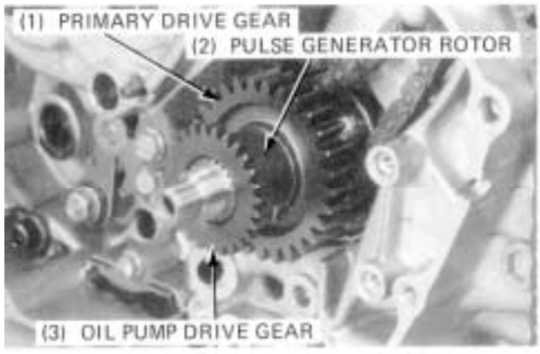
Remove the engine from the frame (Section 5).
Refer to Service Information (page 10-1) for removal of necessary parts before disassembling the crankcase.

Remove the pulse generator by removing the bolts.
Temporarily install the clutch outer guide and clutch outer onto the mainshaft.
Install the gear holder between the primary drive and driven gears.
Remove the drive gear lock nut, and washer.
Remove the gear holder.

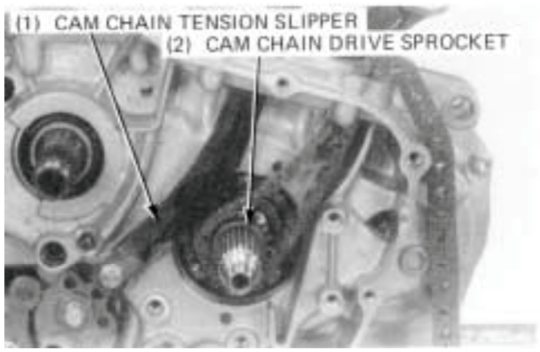
TOOL:
Gear holder 07724–0010100



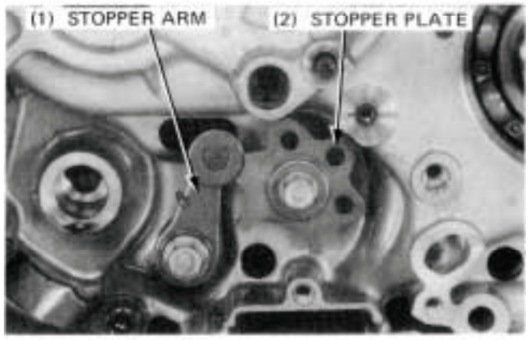
Remove the oil pump drive gear, pulse generator rotor and primary drive gear.



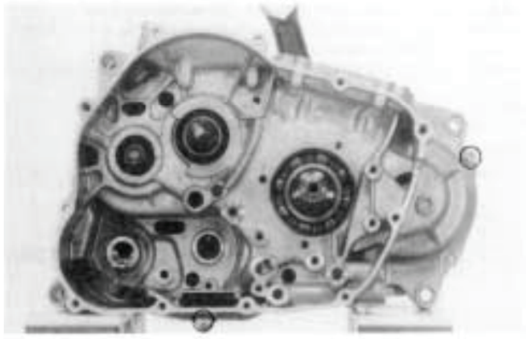
Remove the cam chain, tensioner slipper and drive sprocket.



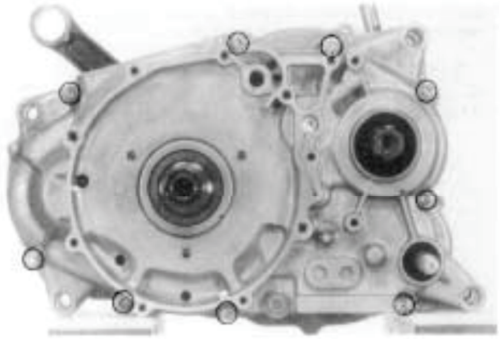
Remove the stopper arm bolt and arm.
Remove the stopper plate bolt and plate.



Remove the right crankcase bolts.



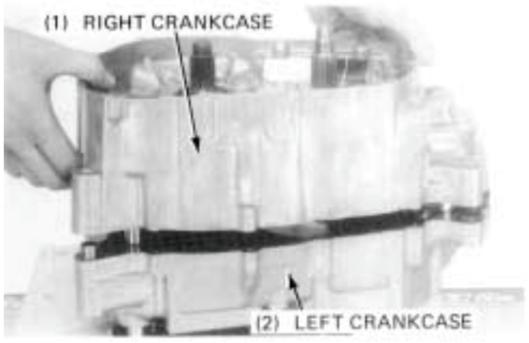
Remove the left crankcase bolts.



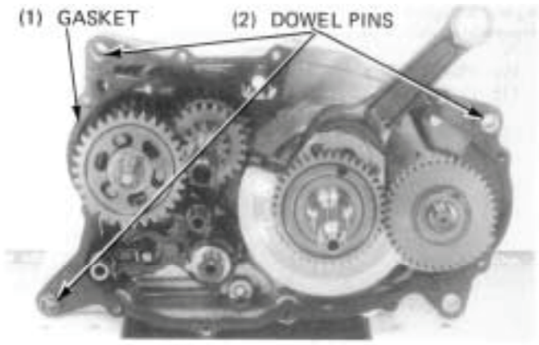
Place the left crankcase side down and separate the right crankcase from the left crankcase while tapping them at several locations with a soft hammer.

CAUTION

- *Do not pry between the left and right crankcases.*

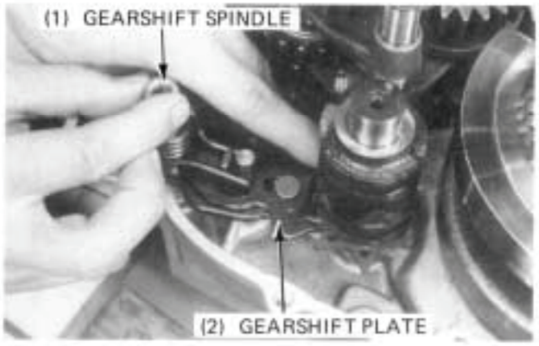


Remove the gasket and dowel pins.

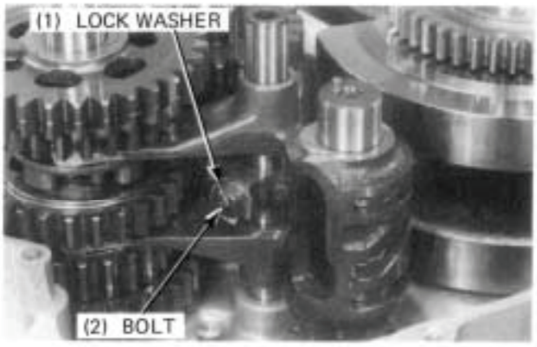


TRANSMISSION REMOVAL

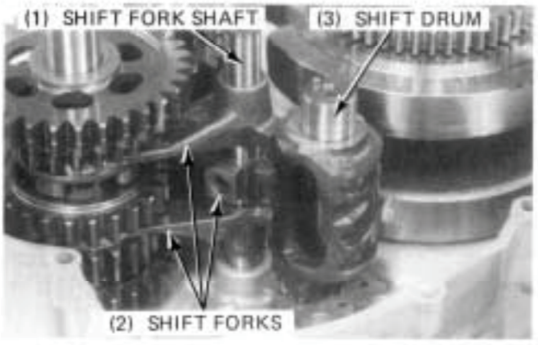
Pull the gearshift plate and remove the gearshift spindle.



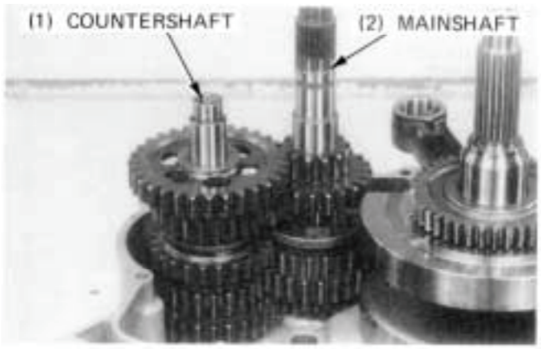
Bend down the lock washer tabs and remove the bolt and lock washer from the center shift fork.



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



Remove the mainshaft and countershaft as an assembly.
Disassemble the mainshaft and countershaft.



INSPECTION

Check each gear dog for excessive or abnormal wear.
Inspect the I.D. of each gear.

SERVICE LIMIT

M4	**28.10 mm (1.106 in)**
M5	**28.08 mm (1.106 in)**
C1	**25.10 mm (0.988 in)**
C3	**25.10 mm (0.988 in)**
C2	**28.10 mm (1.106 in)**



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

SERVICE LIMIT:

M5 O.D.	**27.90 mm (1.098 in)**
M4 O.D.	**27.93 mm (1.100 in)**
M4 I.D.	**25.10 mm (0.988 in)**
C1 O.D.	**24.93 mm (0.981 in)**
C1 I.D.	**20.10 mm (0.791 in)**
C2 O.D.	**27.93 mm (1.100 in)**
C2 I.D.	**25.10 mm (0.988 in)**

Calculate the clearance between the gear and bushing.

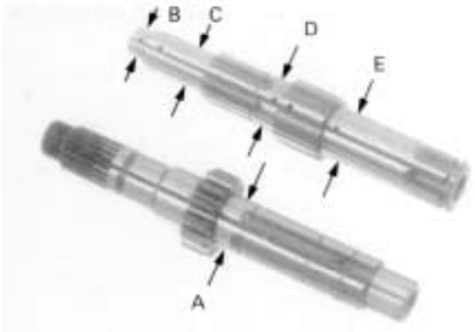
SERVICE LIMIT: 0.10 mm (0.004 in)

Measure the mainshaft and countershaft O.D.

SERVICE LIMIT:

A (M4):	**24.91 mm (0.981 in)**
B (Starter idler):	**15.93 mm (0.627 in)**
C (C1):	**19.94 mm (0.785 in)**
D (C3):	**24.92 mm (0.981 in)**
E (C2):	**24.92 mm (0.981 in)**

Calculate the clearance between the shaft and gear or bushing.

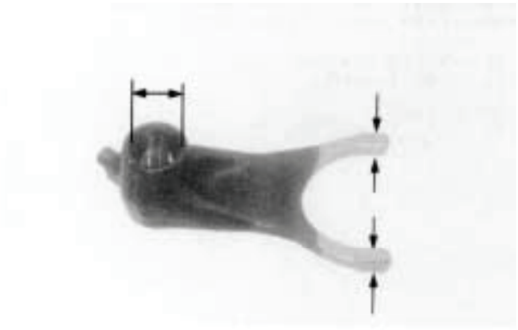


SERVICE LIMIT:

M4	**0.10 mm (0.004 in)**
C1	**0.10 mm (0.004 in)**
C2	**0.10 mm (0.004 in)**
C3	**0.15 mm (0.006 in)**

Measure the I.D. of the shift fork.

SERVICE LIMIT: 14.05 mm (0.553 in)

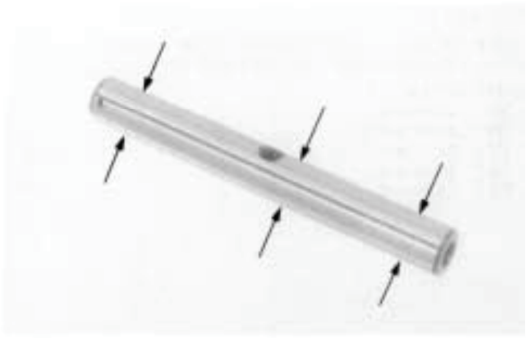


Measure the thickness of the shift fork shaft.

SERVICE LIMIT: 4.5 mm (0.18 in)

Measure the O.D. of the shift fork shaft.

SERVICE LIMIT: 13.90 mm (0.547 in)



Inspect the shift drum grooves and replace the drum if they are damaged or show excessive wear.

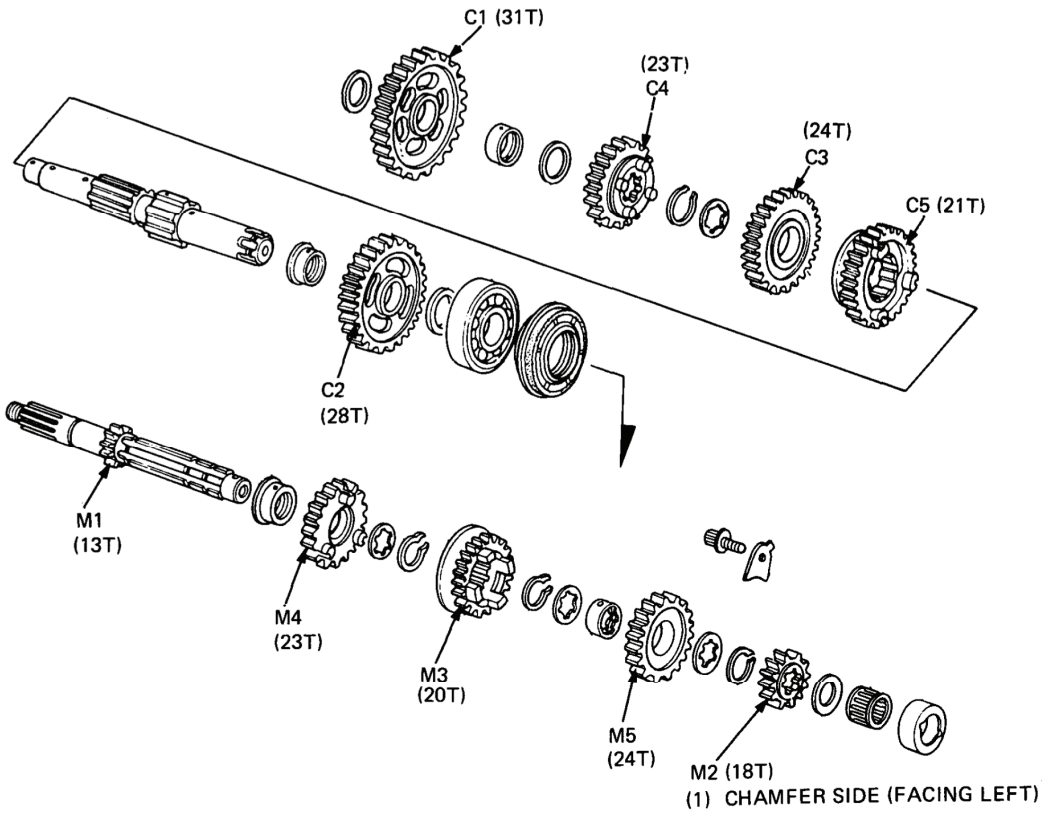


Inspect the shift shaft and springs for wear or damage.

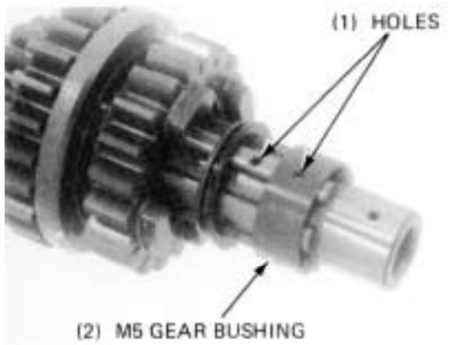


TRANSMISSION ASSEMBLY

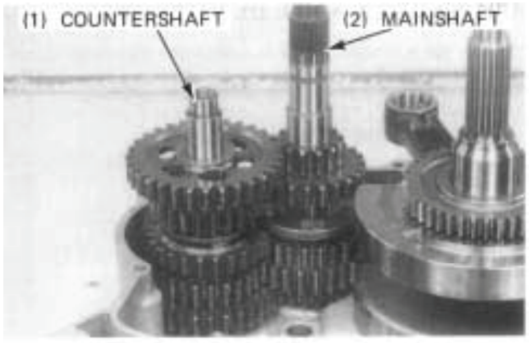
Check the gears for freedum of movement or rotation on the shaft.
Check that the snap rings are seated in the grooves.



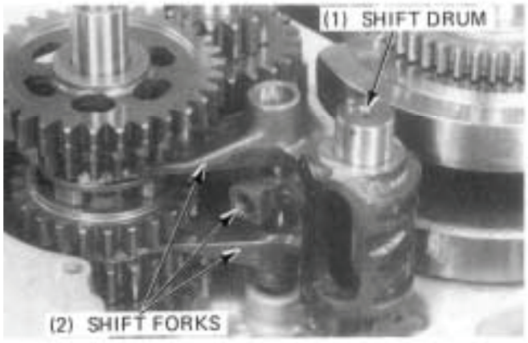
Align the hole in the M5 gear bushing with the hole in the mainshaft when installing.



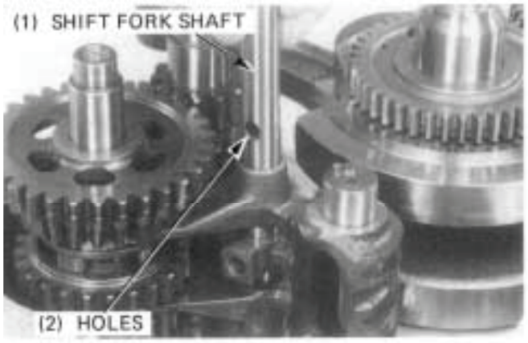
Install the mainshaft and countershaft into the left crankcase together.



Install the gearshift drum.
Install the shift forks as shown.

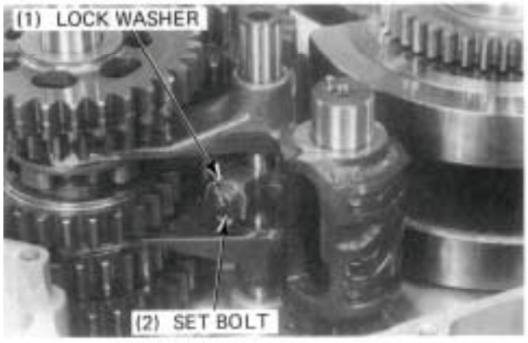


Insert the shift fork shaft into the shift forks and align the center shift fork set bolt holes.



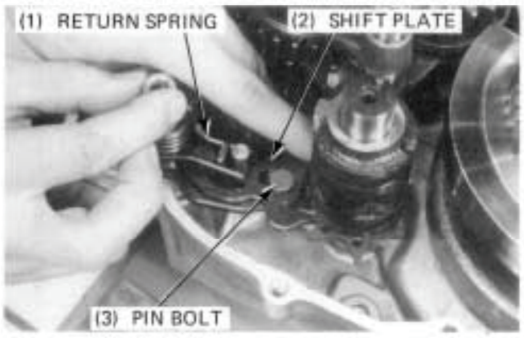
Install a new lock washer and shift fork set bolt.
Tighten the set bolt and bend up the lock washer tabs against the bolt head.

TORQUE: 13–17 N·m (1.3–1.7 kg-m, 9–12 ft-lb)



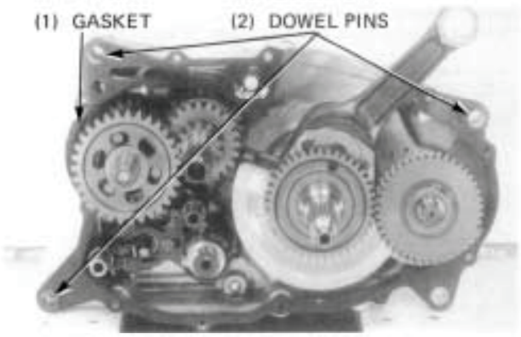
Assemble the shift spindle.

Align the return spring with the pin bolt and install the shift spindle while pulling the shift plate.



CRANKCASE ASSEMBLY

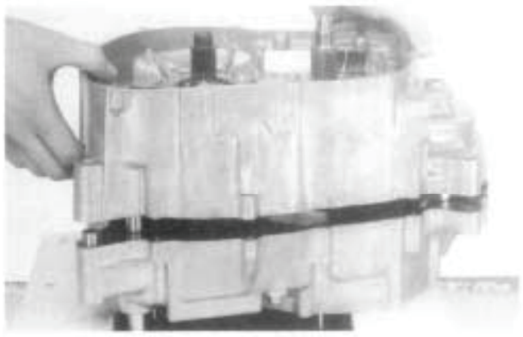
Install the three dowel pins and a new gasket.



Assemble the right and left crankcases being careful to align the dowel pins and shafts.

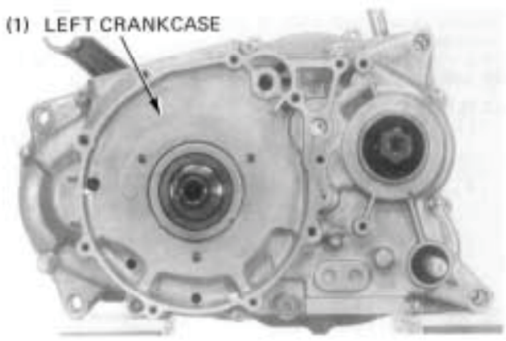
CAUTION

- *Don't force the crankcase halves together; if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.*



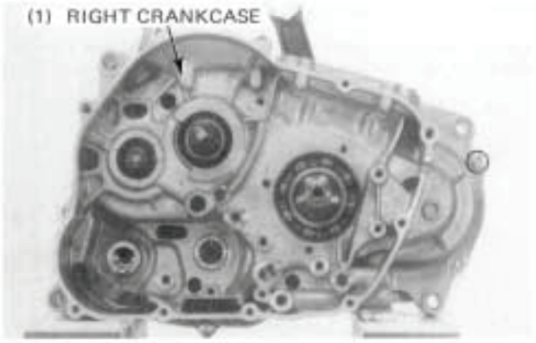
Install and tighten the left crankcase bolts in a crisscross pattern in 2–3 steps.

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



Install and tighten the right crankcase bolts in a crisscross pattern in 2–3 steps.

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



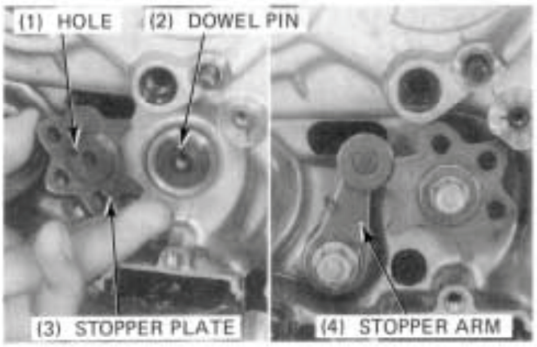
Align the hole in the stopper plate with the dowel pin on the gearshift drum and install the stopper plate.
Apply locking agent to the threads of the stopper plate bolt and tighten the bolt.

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

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

TORQUE: 22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb)

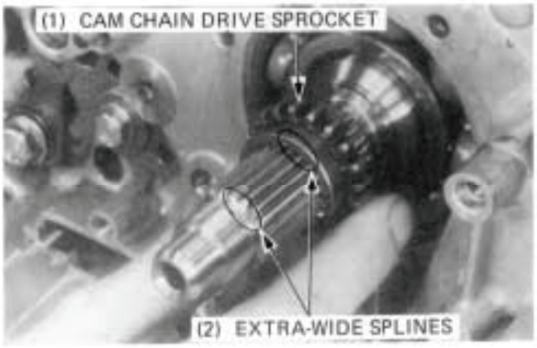
Install the gearshift pedal and check the transmission for smooth shifting.



Install the cam chain drive sprocket.

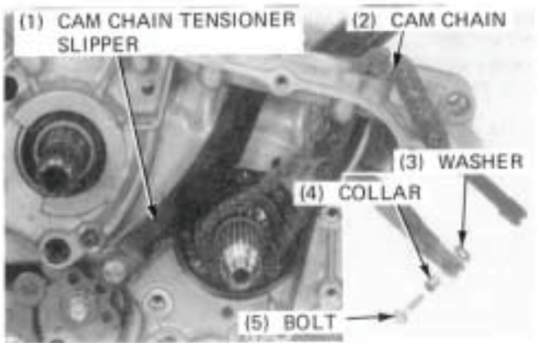
NOTE

- The cam chain drive sprocket will only go on one position because of extra-wide aligning spline.



Install the cam chain.
Install the cam chain tensioner slipper with the washer, collar and bolt.

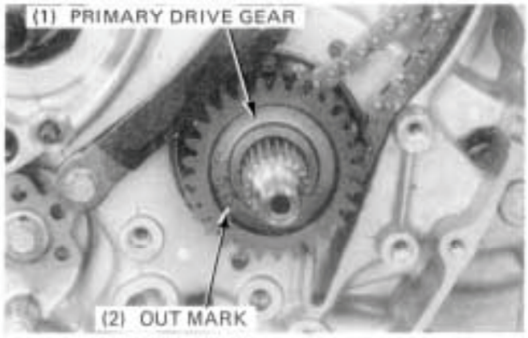
Apply thread lock agent to the tensioner mounting bolt threads.



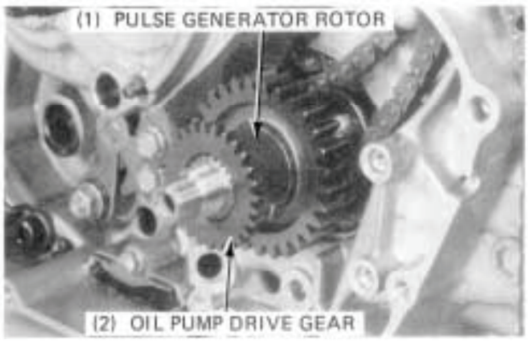
Install the primary drive gear with the OUT mark facing out.

NOTE

- The primary drive gear, pulse generator rotor, and oil pump drive gear will only go on in one position because of the extra-wide aligning spline.



Install the pulse generator rotor and oil pump drive gear.



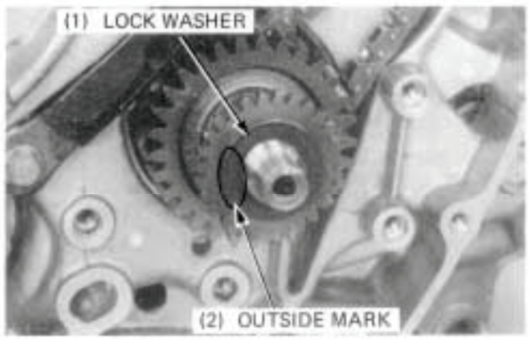
Install the lock washer with the OUTSIDE mark facing out.
Temporarily install the outer guide and clutch outer onto the mainshaft.

Install the gear holder between the primary drive gear and the driven gear.

TOOL:
Gear holder 07724–0010100

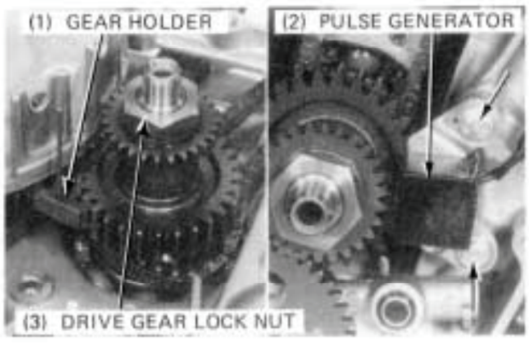
Install the drive gear lock nut and tighten it to the specified torque.

TORQUE: 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)

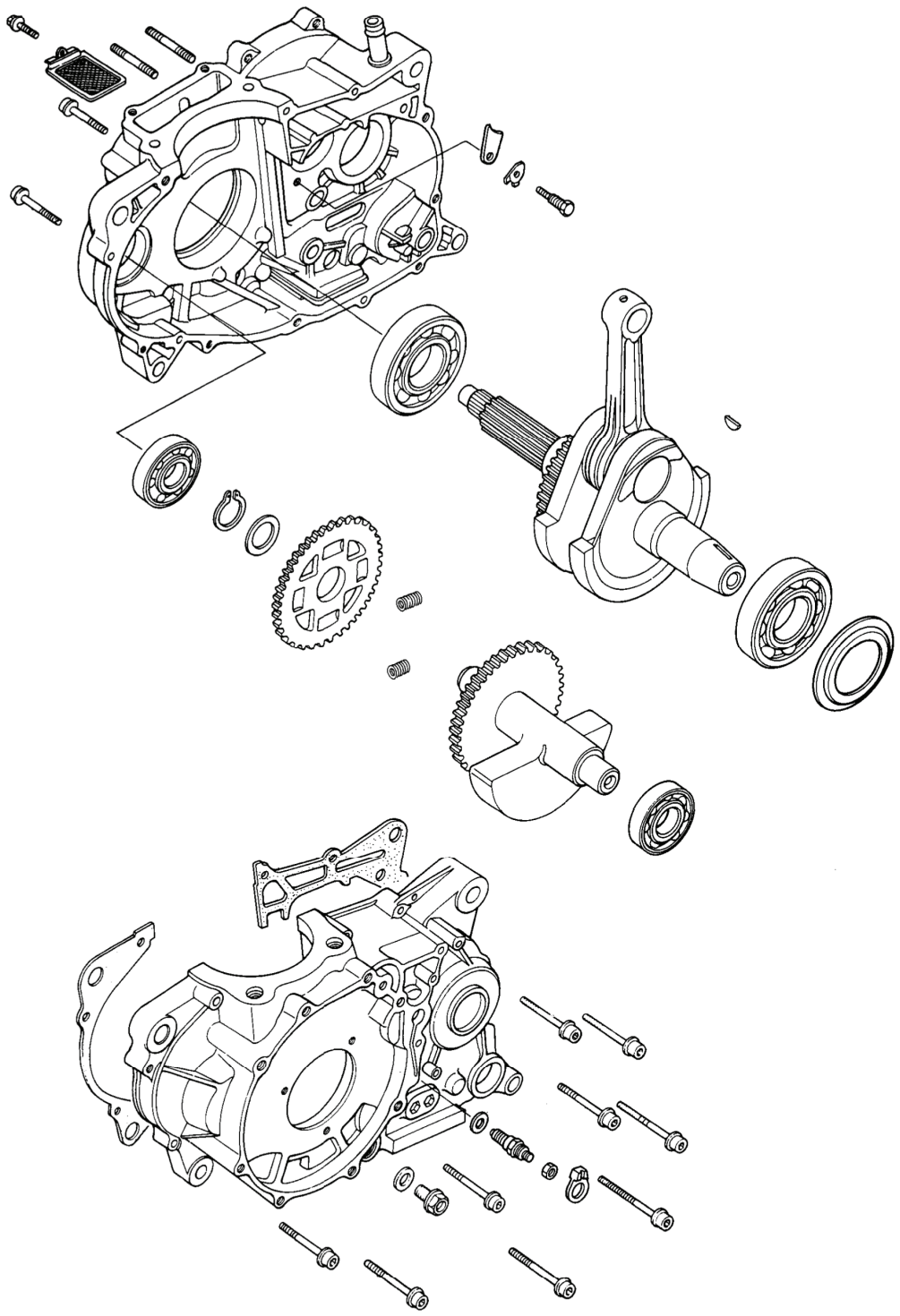


Remove the gear holder.
Install the pulse generator.
Check the air gap.

AIR GAP: 0.8 mm (0.03 in)



Install the following:
– oil pump (page 8-12).
– kick starter assembly (page 8-16).
– oil filler screen (page 2-4).
– clutch assembly (page 8-17).
– oil pump driven gear.
– starter driven gear (page 18-4).
– flywheel (page 18-4).



11. CRANKSHAFT/BALANCER

SERVICE INFORMATION	11-1	CRANKSHAFT/BALANCER REMOVAL	11-2
TROUBLESHOOTING	11-1	BALANCER/CRANKSHAFT INSTALLATION	11-5

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to repair the crankshaft, connecting rod, transmission and balancer. To separate the crankcase, refer to section 10.
- If the crankshaft is removed from the left crankcase, replace the left crankshaft bearing.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance	0.050–0.650 mm (0.0020–0.0256 in)	0.80 mm (0.031 in)
	Connecting rod big end radial clearance	0.006–0.018 mm (0.0002–0.0007 in)	0.05 mm (0.002 in)
	Crankshaft runout	———	0.05 mm (0.002 in)

11

TOOLS

SPECIAL

Bearing puller	07931–MK20100
Universal bearing puller	07631–0010000
Attachment	07960–1870100
Crankshaft puller	07935–KF00001
Threaded adapter	07931–KF00200
Puller shaft	07931–ME40000
Assembly collar	07931–KF00100
Attachment	07946–6790200

COMMON

Driver	07749–0010000
Attachment, 72 x 75 mm	07746–0010600
Pilot, 35 mm	07746–0040800
Pilot, 40 mm	07746–0040900
Attachment, 35 mm I.D.	07746–0030400

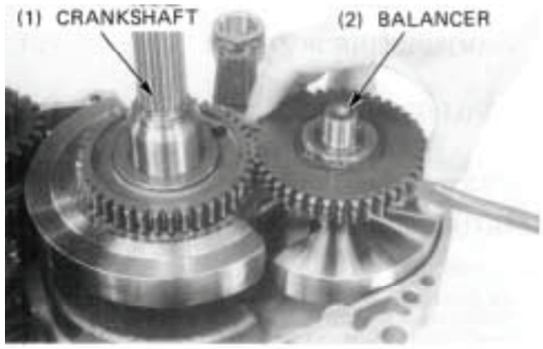
TROUBLESHOOTING

Excessive noise

- Crankshaft
  - Worn connection rod bearings
  - Bent connecting rod
  - Worn crankshaft bearings
- Balancer
  - Improper installation

CRANKSHAFT/BALANCER REMOVAL

Separate the crankcase (page 10-3).
Remove the balancer.
Remove the transmission (page 10-5).



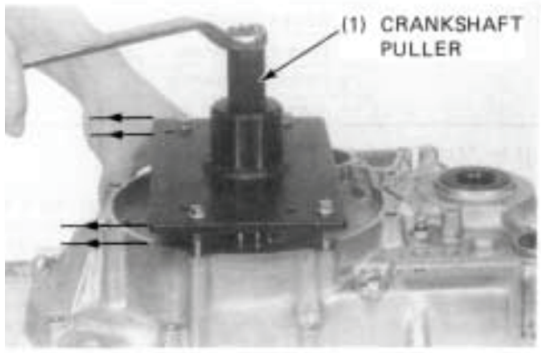
Remove the crankshaft from the left crankcase with a press or crankshaft puller.

CAUTION

- *Be careful not to damage the crankcase gasket surface.*
- *Set up the tool plate with the special tool parallel to the left crankcase surface.*

TOOL:

Crankshaft puller	**07935–KF00001**



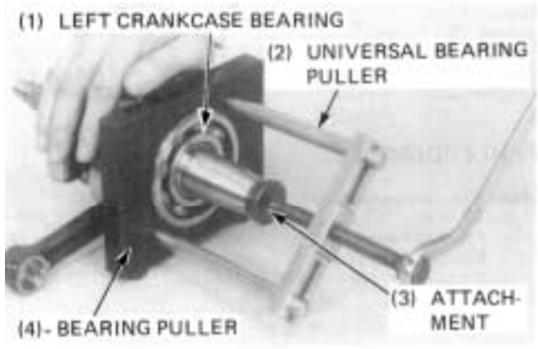
Remove the left crankshaft bearing with a bearing puller if it is removed with the crankshaft. Discard the bearing.

CAUTION

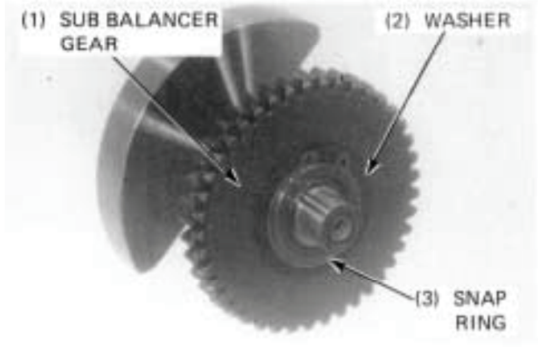
- *Always replace the left bearing with a new one if it is removed with the crankshaft.*

TOOLS:

Bearing puller	**07931–MK20100**
Universal bearing puller	**07631–0010000**
Attachment	**07960–1870100**



Remove the snap ring and washer.
Remove the sub balancer gear.

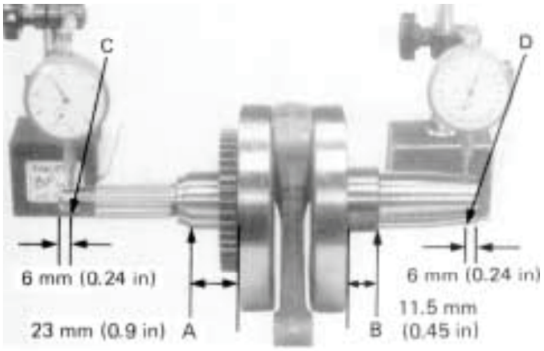


CRANKSHAFT INSPECTION

Measure the crankshaft runout.
Support the crankshaft at points A and B, and then measure the points C and D.

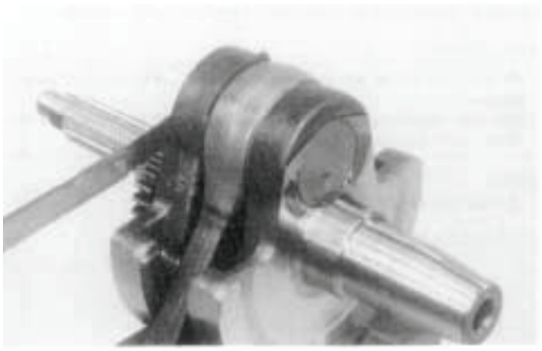
SERVICE LIMIT: 0.05 mm (0.002 in)

If runout exceeds the service limit, replace the crankshaft.



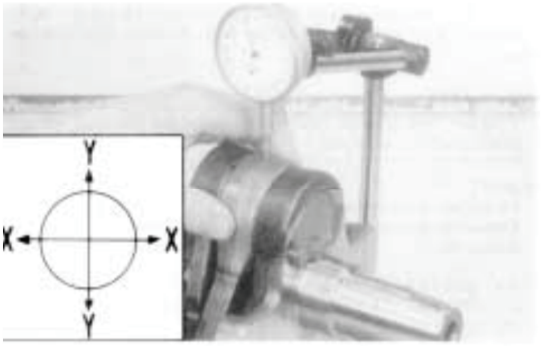
Measure the connecting rod big end side clearance with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)

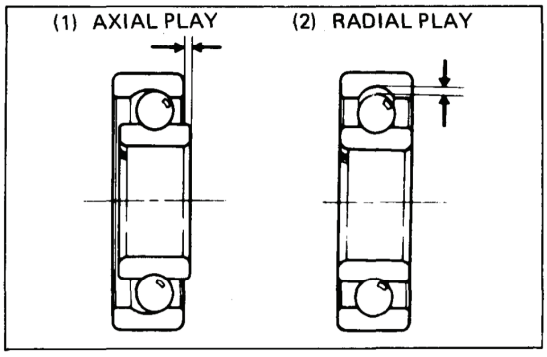


Measure the radial clearance at the connecting rod big end, at two points in the directions indicated by the arrows.

SERVICE LIMIT: 0.05 mm (0.002 in)

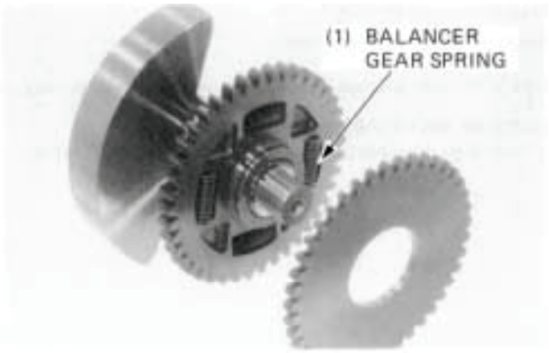


Spin the crankshaft bearing by hand and check for play.
The bearing must be replaced if it is noisy or has excessive play.



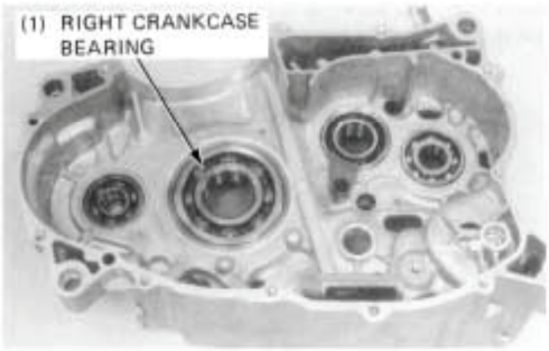
BALANCER INSPECTION

Inspect the balancer gear springs for wear or damage.

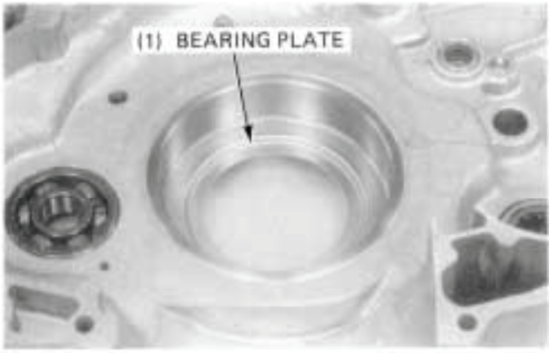


CRANKSHAFT BEARING REPLACEMENT

Drive out the right crankshaft bearing.



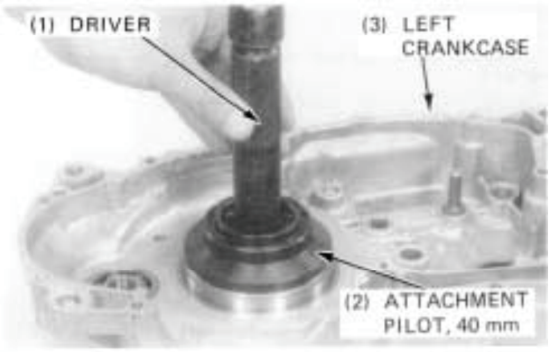
Install the bearing plate onto the left crankcase.



Drive in a new bearings onto the crankcase.

TOOLS:

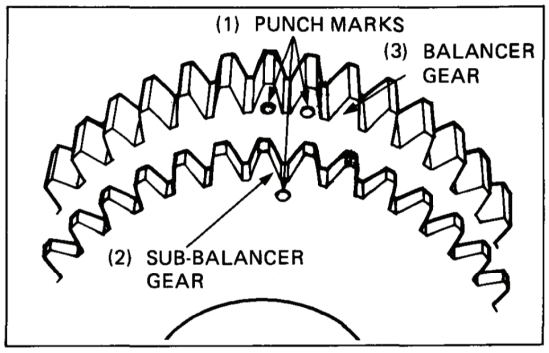
RIGHT CRANKCASE:	
Driver	**07749–0010000**
Shaft bearing; Attachment, 72 x 75 mm	**07746–0010600**
Pilot, 35 mm	**07746–0040800**
LEFT CRANKCASE:	
Driver	**07749–0010000**
Attachment	**07946–6790200**
Pilot, 40 mm	**07746–0040900**



BALANCER/CRANKSHAFT

INSTALLATION

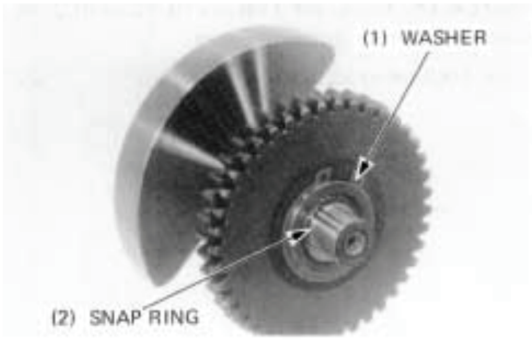
Install the spring and sub-balancer gear onto the balancer gear, aligning the punch marks as shown.



Install the washer onto the sub-balancer gear.
Install the snap ring.

NOTE

- Seat the snap ring in the groove of the gear with the sharp edge facing towards outside.

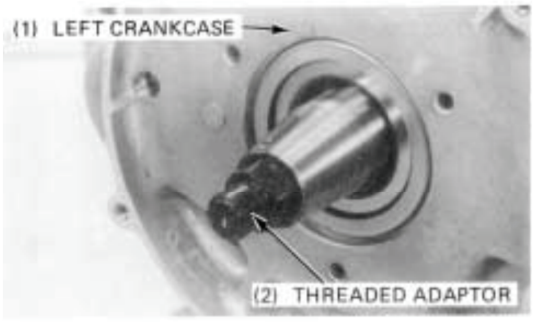


Clean the crankcase mating surfaces before assembling and check for wear or damage.

NOTE

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

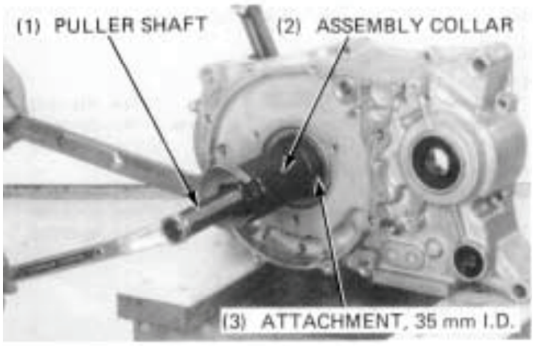
Install the threaded adaptor into the thread end of the crankshaft.
Position the crankshaft into the left crankcase.



Draw the crankshaft into the left crankcase with the crankshaft assembly tool noting the connecting rod location.
Remove the tool and the threaded adaptor.

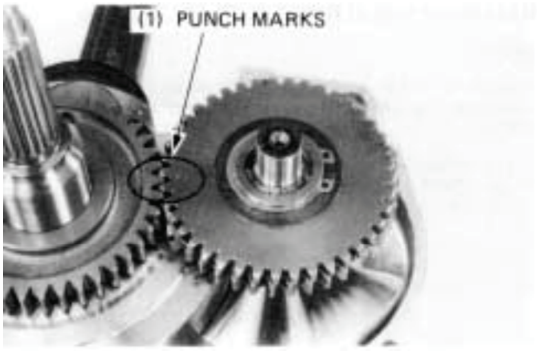
TOOLS:

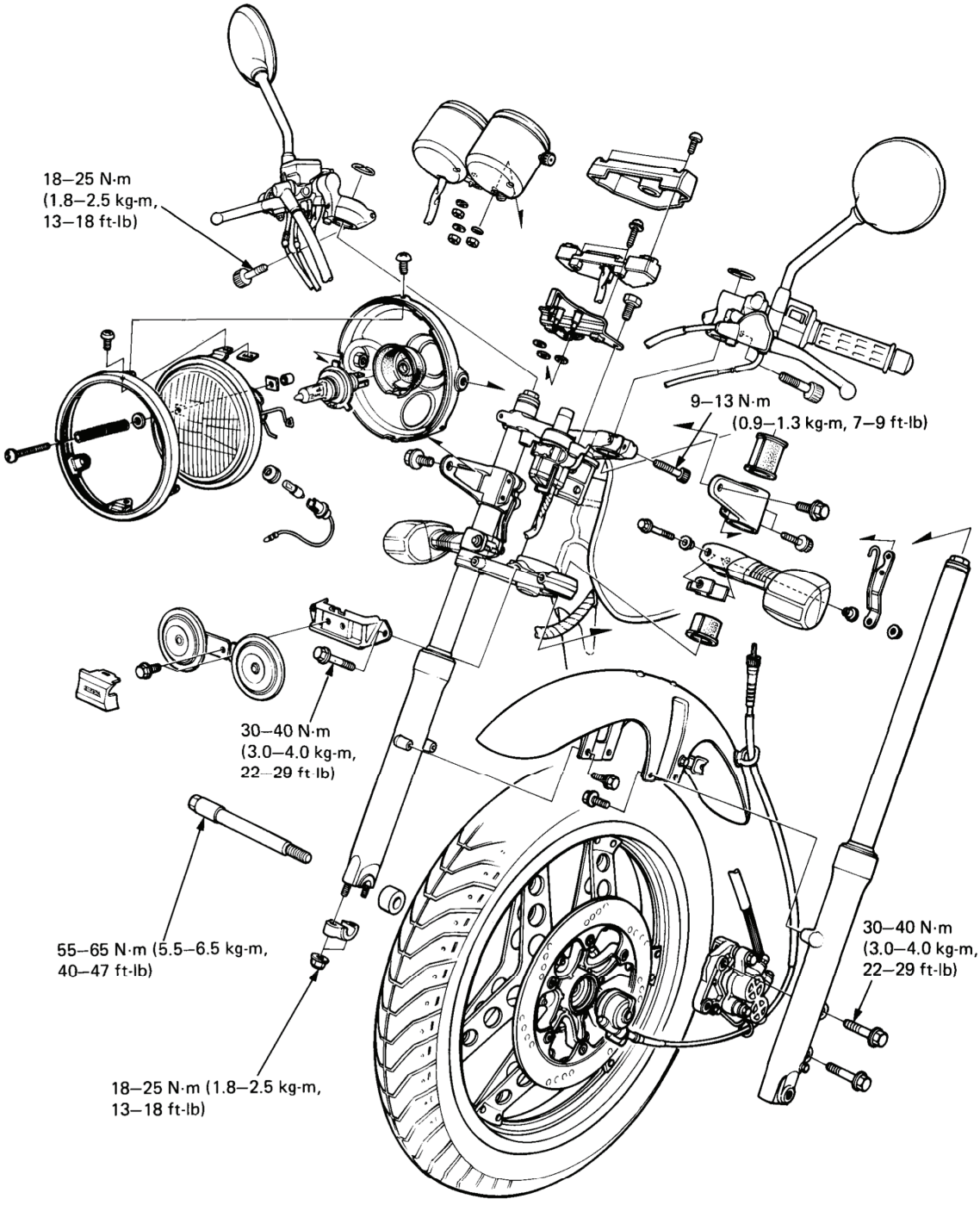
Threaded adaptor	**07931–KF00200**
Puller shaft	**07931–ME40000**
Assembly collar	**07931–KF00100**
Attachment, 35 mm I.D.	**07746–0030400**



Install the balancer into the left crankcase aligning the punch marks on the crankshaft gear and the sub-balancer gear.

Install the transmission (Section 10).
Assemble the crankcase (Section 10).




18–25 N·m
(1.8–2.5 kg-m,
13–18 ft-lb)
9–13 N·m
(0.9–1.3 kg-m, 7–9 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 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)

12. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	12-1	FRONT WHEEL	12-6
TROUBLESHOOTING	12-2	FRONT FORKS	12-11
HANDLEBARS	12-3	STEERING STEM	12-18

SERVICE INFORMATION

GENERAL

- A work stand or box is required to support the motorcycle.
- The front wheel uses a tubeless tire. For tubeless tire repaires, refer to the TUBELESS TIRE MANUAL.

SPECIFICATIONS

ITEMS		STANDARD	SERVICE LIMIT
Front axle runout		————	0.2 mm (0.01 in)
Front wheel rim runout	Radial	————	2.0 mm (0.08 in)
	Axial	————	2.0 mm (0.08 in)
Front fork spring free length		436.8 mm (17.2 in)	428 mm (16.9 in)
Front fork tube runout		————	0.2 mm (0.01 in)
Front fork oil level		283 mm (9.6 in)	————

TORQUE VALUES

Steering bearing adjustment nut	Initial torque: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb) Final torque: 14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)
Steering stem nut	80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
Front fork upper pinch bolt	9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)
Front fork lower pinch bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Handlebar pinch bolt	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Front axle	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Front axle holder nut	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
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)
Brake caliper bracket bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Brake disc mount bolt	37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)

TOOLS

SPECIAL

Ball race remover	07953–3330000
Ball race remover attachment	07953–KM10100
Steering stem driver	07946–MB00000
Fork seal driver	07747–0010100
Fork seal driver attachment	07947–KA20200
Attachment	07946–3290000 — For ball race
Attachment	07945–3330300 — For ball race

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
Bearing remover shaft	07746–0050100
Bearing remover head, 15 mm	07746–0050400

TROUBLESHOOTING

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

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

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

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

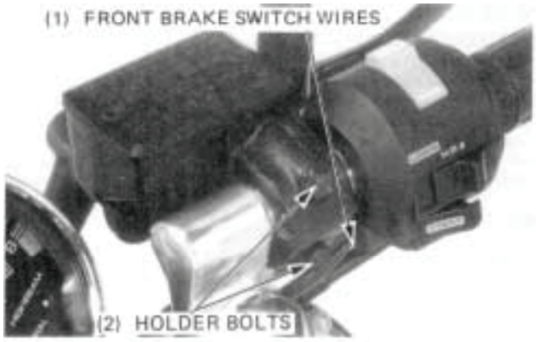
Hard suspension
- Incorrect fluid weight in front forks
- Incorrect fork air pressure
- Fork tube bent

Front suspension noise
- Slider binding
- Insufficient fluid in forks
- Loose front fork fasteners

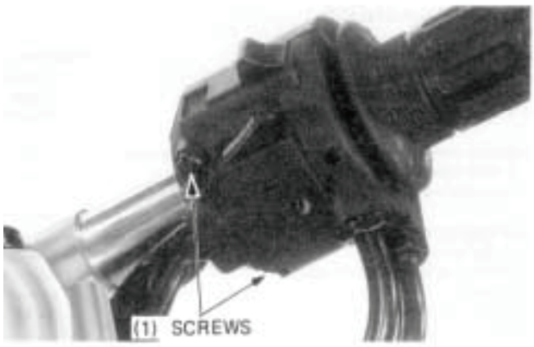
HANDLEBARS

RIGHT HANDLEBAR REMOVAL

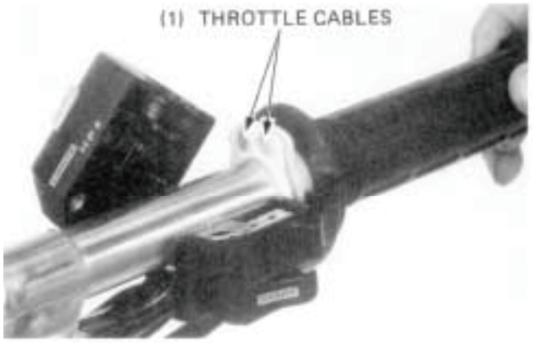
Disconnect the front brake switch wires from the switch. Remove the front brake master cylinder by removing the holder bolts.



Remove the right handlebar switch housing screws.



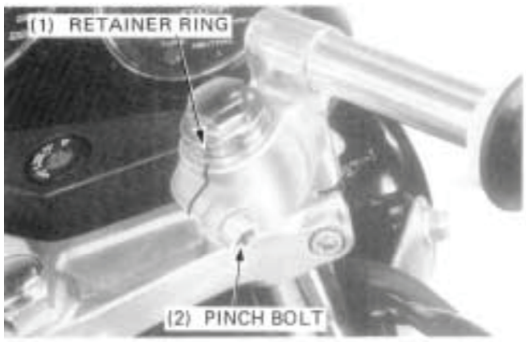
Disconnect the throttle cables and remove the right handlebar switch.



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

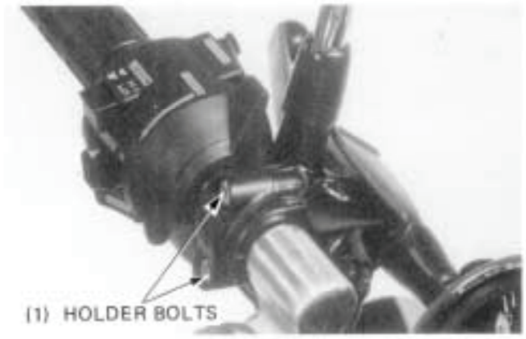


Remove the throttle grip. Remove the handlebar retainer ring. Loosen the handlebar pinch bolt and remove the right handlebar from the fork tube.

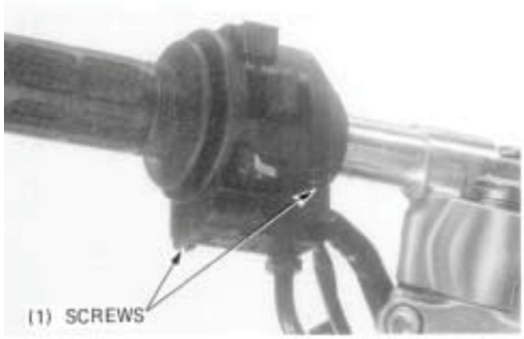


LEFT HANDLEBAR REMOVAL

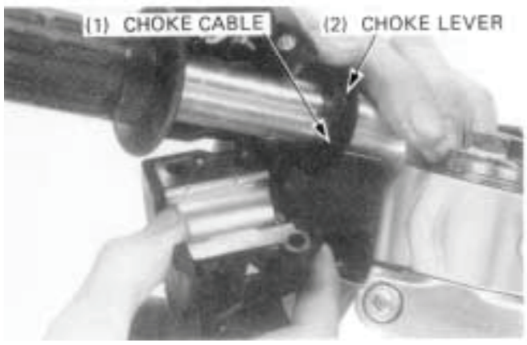
Disconnect the clutch switch wires from the switch.
Remove the clutch lever bracket from the left handlebar by removing the holder bolts.



Remove the left handlebar switch housing screws.



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

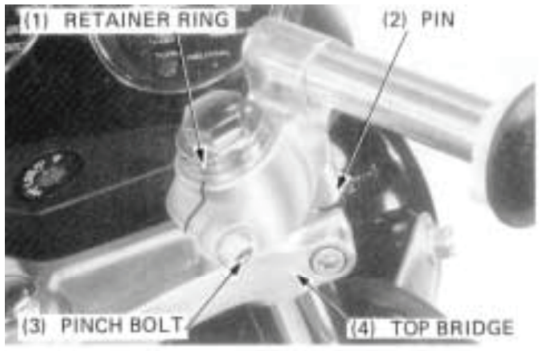


RIGHT HANDLEBAR INSTALLATION

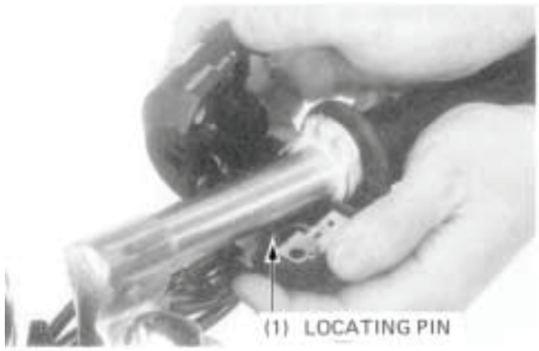
Install the right handlebar onto the fork tube and on the top bridge, aligning the pin on the bottom of the handlebar with the slit of the top bridge.
Put the pin of the handlebar to the rear surface of the slit and tighten the handlebar pinch bolt.

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

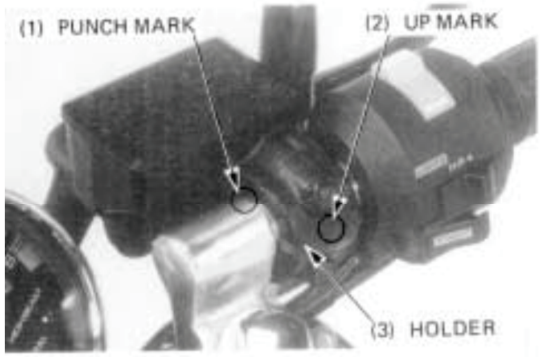
Install the handlebar retainer ring.
Install the handle weight and attaching screw to the handlebar. Hold the weight with pliers and shop towel, and tighten the attaching screw.



Connect the throttle cables and apply grease to the throttle cable ends.
Install the right handlebar switch housing, aligning the locating pin of the housing with the hole in the handlebar.
Tighten the forward screw first, then tighten the rear screw.

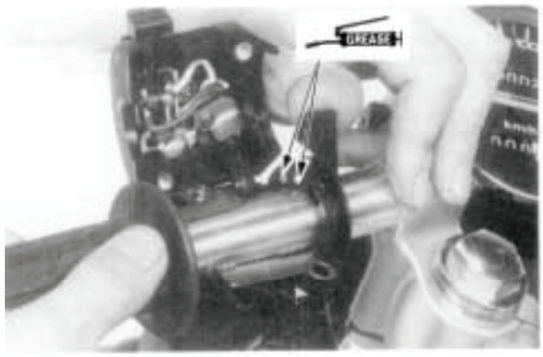


Place the front brake master cylinder on the handlebar and install the master cylinder holder with the UP mark facing up. Align the punch mark on the handlebar with the end of the holder, and tighten the upper bolt first then tighten the lower bolt.
Connect the front brake switch wires.

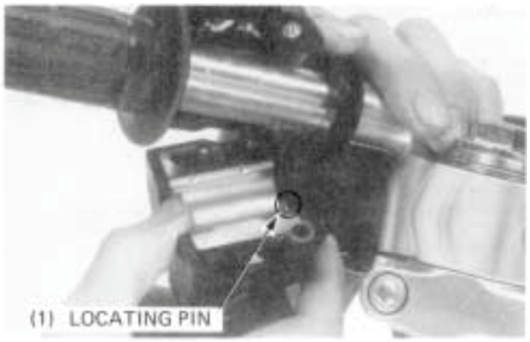


LEFT HANDLEBAR INSTALLATION

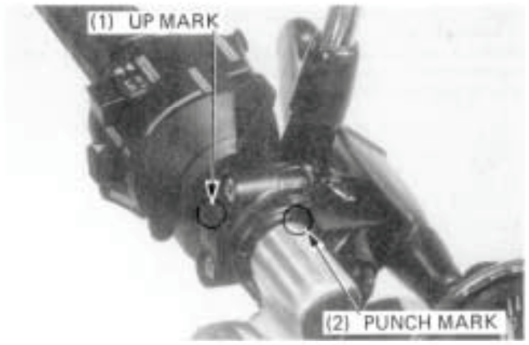
Install the left handlebar onto the fork tube in the same manner as right handlebar.
Connect the choke cable to the choke lever and apply grease to the choke cable end.



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



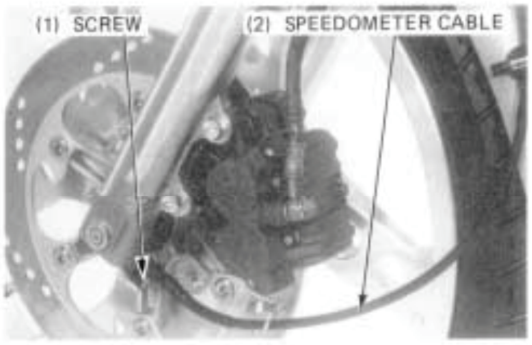
Install the clutch lever on the handlebar and install the master cylinder holder with the UP mark facing up.
Align the punch mark on the handlebar with the end of the holder, and tighten the upper bolt first then tighten the lower bolt.
Connect the clutch switch wires.



FRONT WHEEL

REMOVAL

Remove the speedometer cable set screw and the speedometer cable.

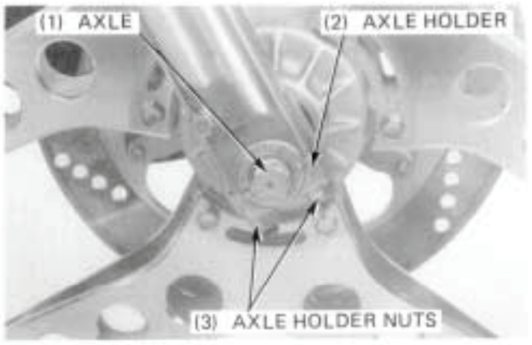


Loosen the axle holder nut and loosen the axle.

Raise the front wheel, pull out the axle and remove the front wheel.

NOTE

- Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in refitting the brake disc between the brake pads.

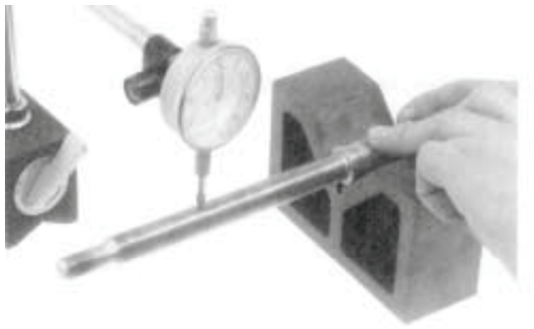


INSPECTION

AXLE

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

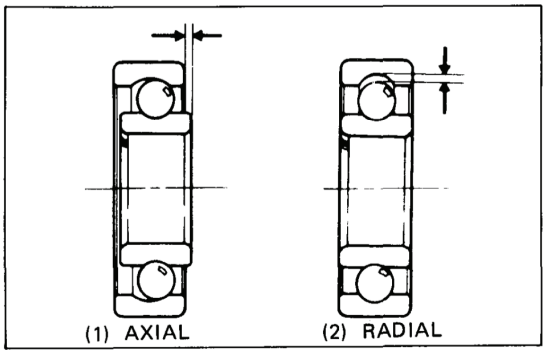
SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL BEARING

Check the wheel bearing play by placing the wheel on a truing stand and spinning the wheel by hand.

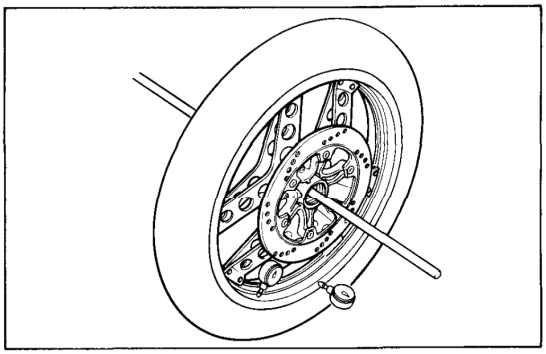
Replace the bearings with new ones if they are noisy or have excessive play.



WHEEL

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

SERVICE LIMIT: 2.0 mm (0.08 in)



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.*

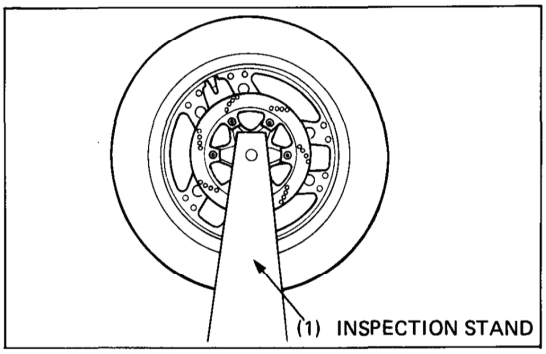
NOTE

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



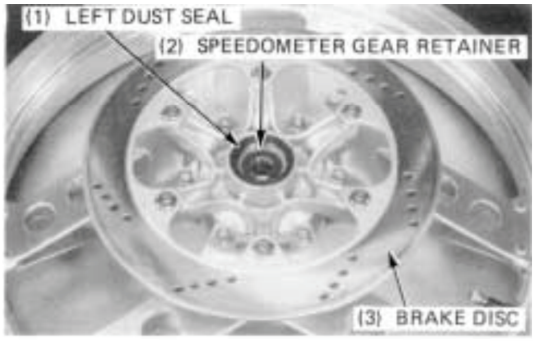
Mount the wheel, tire and brake disc assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

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



DISASSEMBLY

Remove the right and left dust seals and speedometer gear retainer.
Remove the brake disc mount bolts and disc.



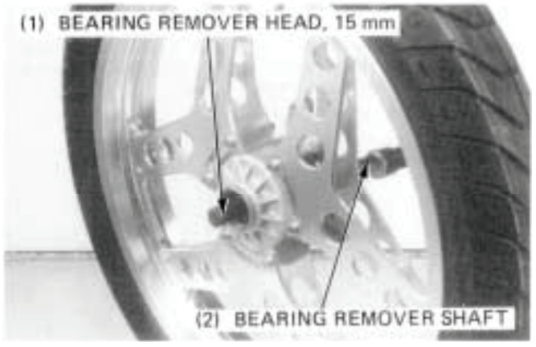
Remove the wheel bearings and distance collar from the hub.

NOTE

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

TOOLS:

Bearing remover head, 15 mm	**07746–0050400**
Bearing remover shaft	**07746–0050100**



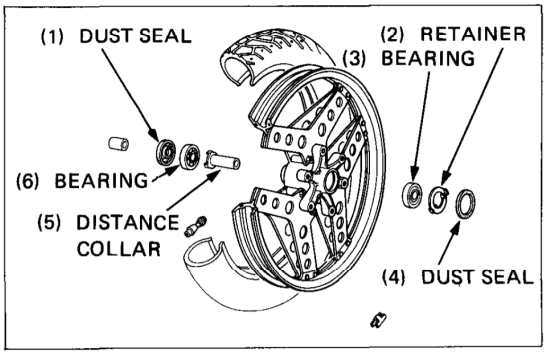
ASSEMBLY

WARNING

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

NOTE

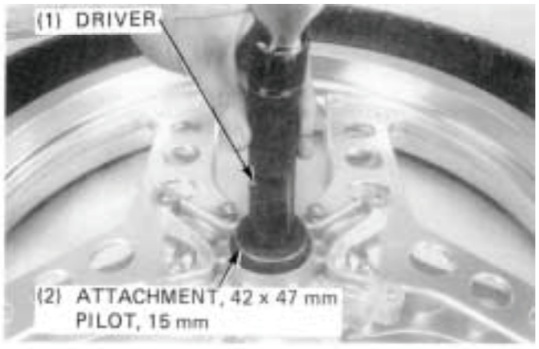
- The front wheel uses a tubeless tire.
  For tubeless tire repairs, refer to the Tubeless Tire Manual.



Drive in the left bearing.

TOOLS:

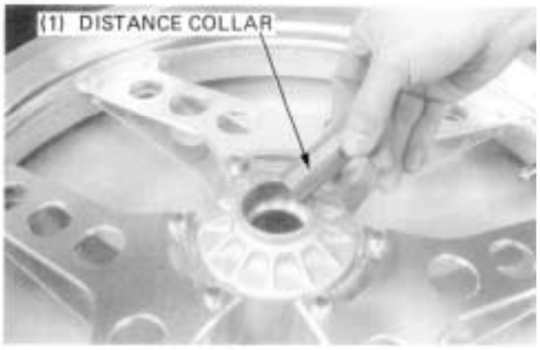
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 15 mm	**07746–0040300**



Install the distance collar and drive in the right bearing.

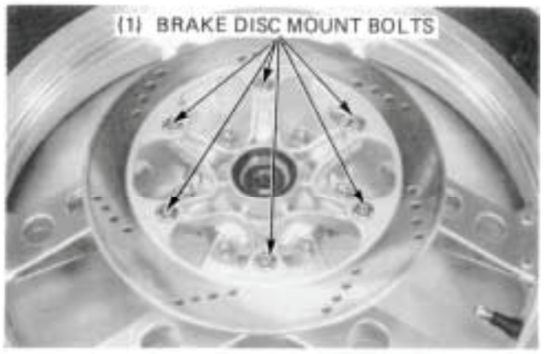
TOOLS:

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

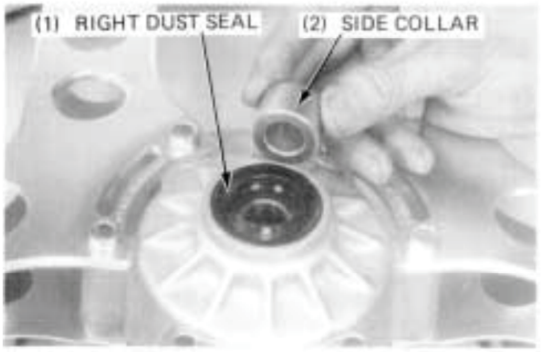


Install the speedometer gear retainer into the wheel hub, aligning the tangs with the slots.
Lubricate the inside of the dust seal and install it.
Install the brake disc onto the wheel hub.
Apply thread lock agent to the disc mount bolt threads.
Tighten the brake disc mount bolts.

TORQUE: 37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)



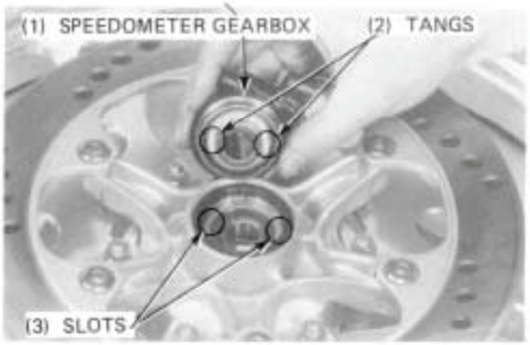
Apply grease to the inside of the dust seal.
Install the right dust seal and side collar.



Pack the speedometer gearbox with the grease and install the plain washers and drive gear.

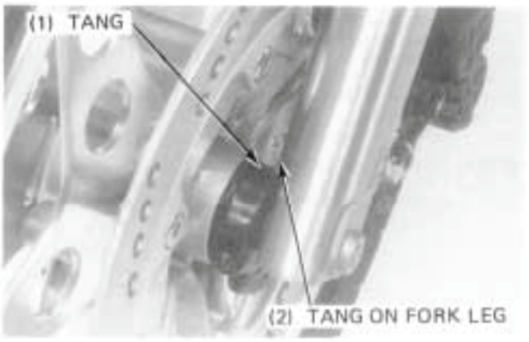


Install the speedometer gearbox in the wheel hub, aligning the tangs with the slots.
Clean the brake disc with a hight quality degreasing agent.



INSTALLATION

Fit the caliper over the disc, taking care not to damage the brake pads.
Position the tang on the speedometer gearbox against the lug on the left fork leg.
Insert the axle through the wheel hub.



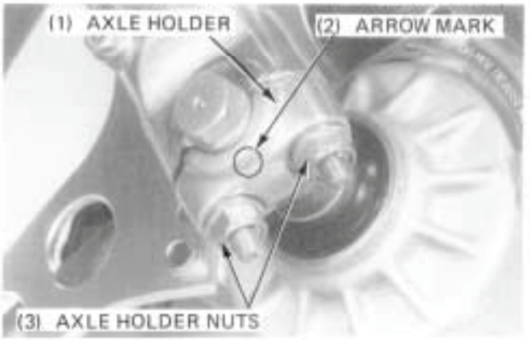
Install the axle holder with the arrow pointing forward.
Install the holder nuts and tighten the nuts lightly.

Tighten the axle to the specified torque.

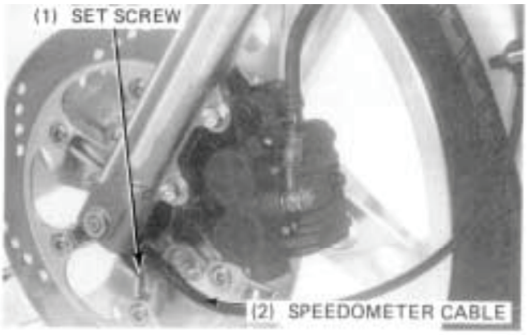
TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)

Tighten the axle holder nuts; the forward nut first, then the rear nut.

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



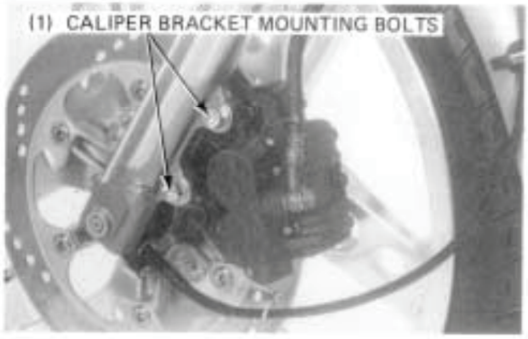
Connect the speedometer cable and secure it with the set screw.
With the front brake applied, pump the front forks up and down several times to seat the axle and check front brake operation.



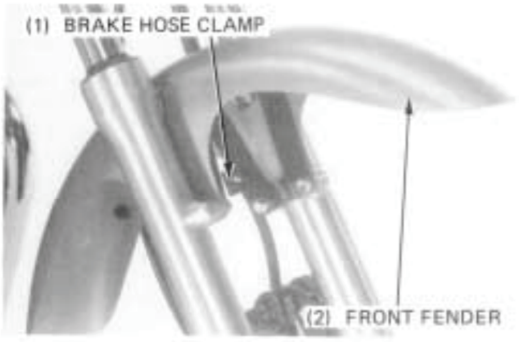
FRONT FORKS

REMOVAL

Remove the caliper bracket mounting bolts.
Remove the front wheel (page 12-6).



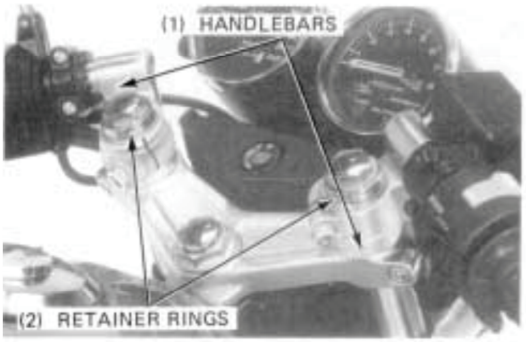
Remove the brake hose clamp.
Remove the front fender.



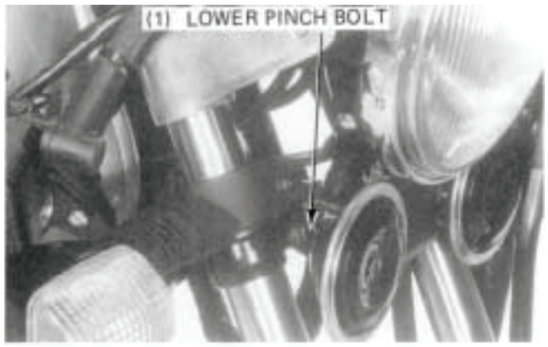
Remove the retainer rings and loosen the pinch bolts.
Remove the right and left handlebars from the fork tubes.

NOTE

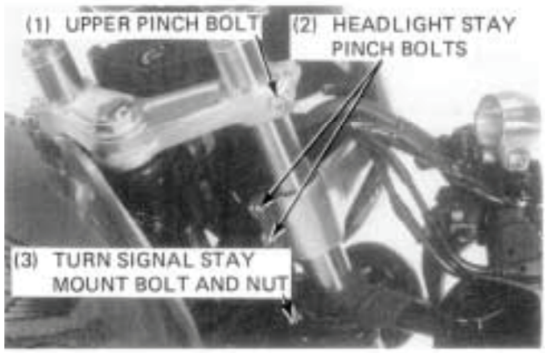
- After removing the right handlebar, place it so that the master cylinder is level.



Loosen the front fork lower pinch bolt.



Loosen the front fork upper pinch bolt and the headlight stay pinch bolts.
Remove the turn signal stay mount bolt and nut.
Remove the front fork, while rotating the fork tube by hand.



DISASSEMBLY

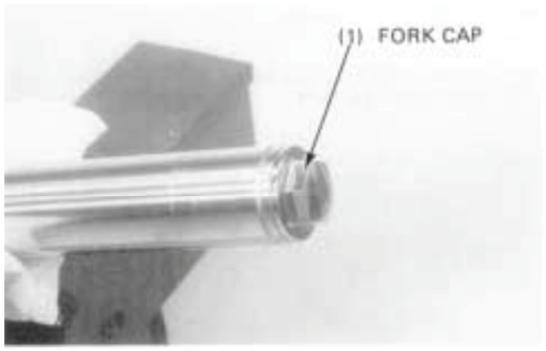
Hold the fork tube in a vise, with soft jaws or a shop towel and remove the fork cap.

CAUTION

- *Be careful not to damage the fork tube's sliding surface.*

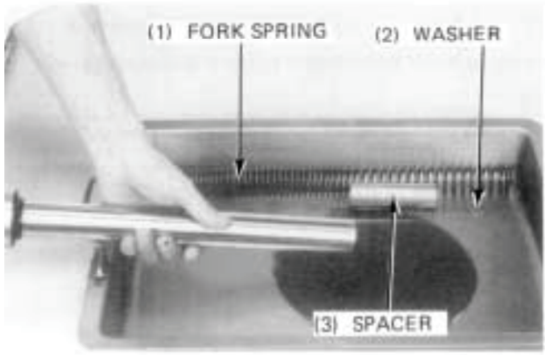
WARNING

- ***The cap is also under spring pressure. Use care when removing and wear eye and face protection.***



Remove the spacer, washer and fork spring.

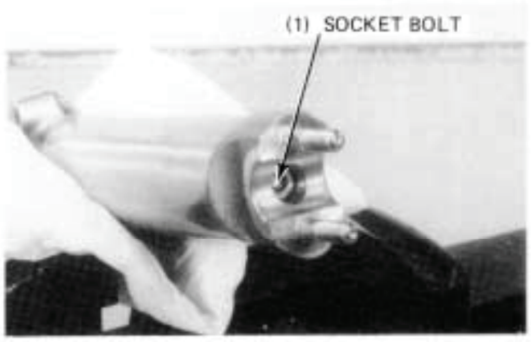
Pour out the fork fluid by pumping the fork up and down several times.



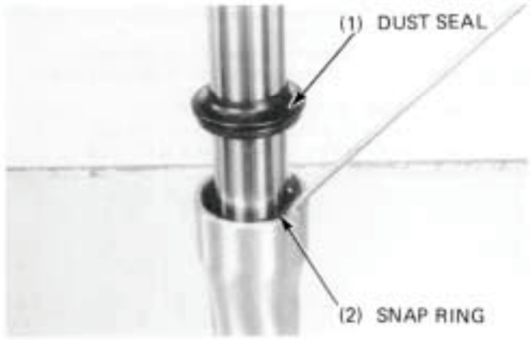
Hold the fork slider in a vise with soft jaws or a shop towel. Remove the socket bolt with a hex wrench.

NOTE

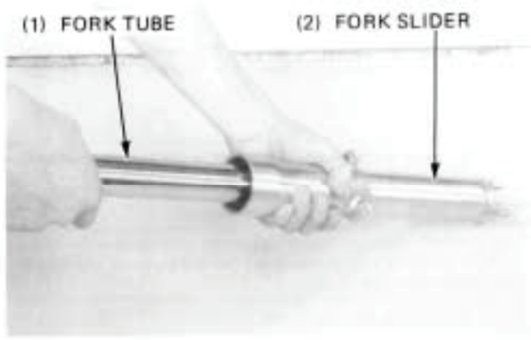
- Temporarily install the spring, spacer and fork cap if difficulty is encountered in removing the bolt.



Remove the dust seal and snap ring.



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

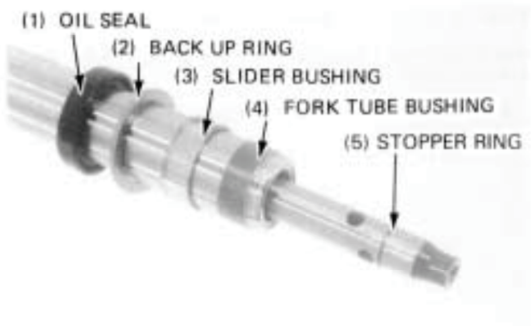


Remove the oil seal, back-up ring and slider bushing.

NOTE

- Don't remove the fork tube bushing if it does not require replacement.

Remove the oil lock piece and stopper ring from the piston. Remove the piston from the fork tube and the rebound spring from the piston.



INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMIT: 428 mm (16.9 in)

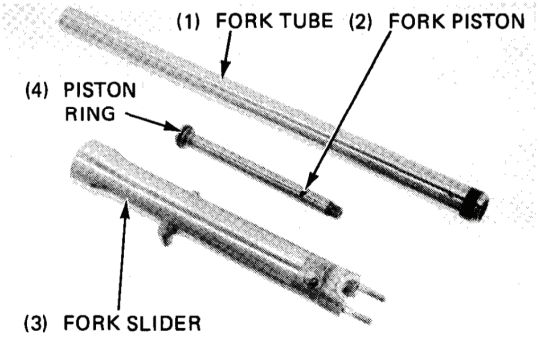
Replace the spring if it is shorter than the service limit.



FORK TUBE/FORK SLIDER/PISTON

Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear.
Replace any components which are worn or damaged.

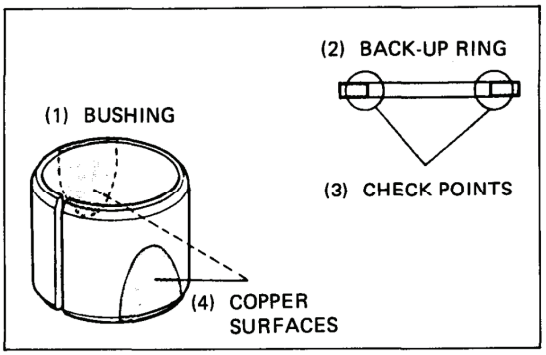
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



BUSHING/BACK-UP RING

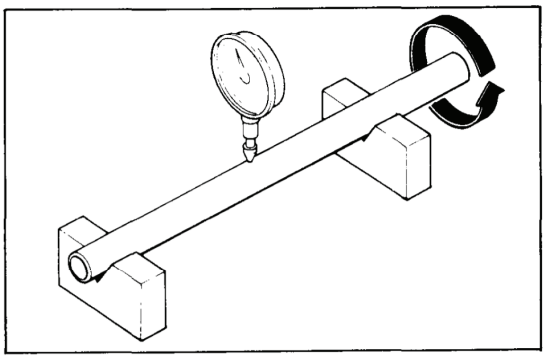
Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

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



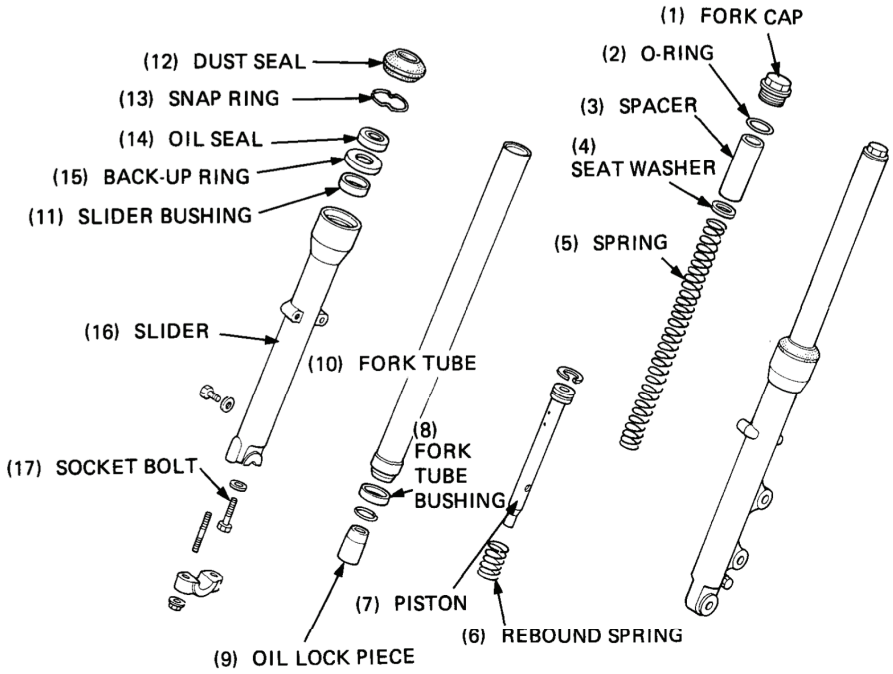
Set the fork tube on V-blocks and measure the runout.
Take 1/2 of the total indicator reading to determine the actual runout.

SERVICE LIMIT: 0.20 mm (0.008 in)

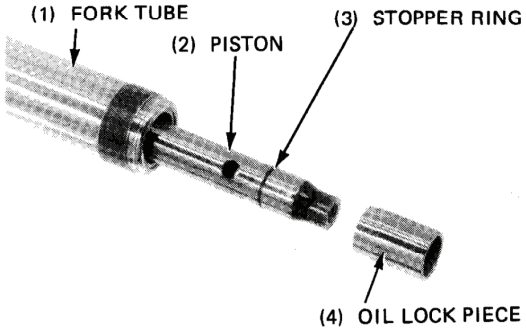


ASSEMBLY

Clean all parts with non-flammable or high flash point solvent.



Insert the rebound spring and piston into the fork tube.
Install the stopper ring and place the oil lock piece on the end of the piston.
Insert the fork tube into the slider.

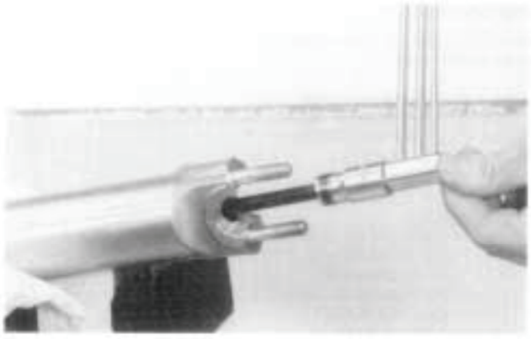


Apply a locking agent to the socket bolt threads and torque the bolt.

NOTE

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

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



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

TOOLS:

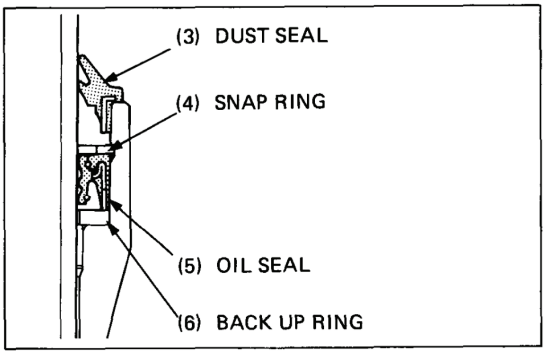
Fork seal driver	**07747–0010100**
Attachment	**07947–KA20200**



NOTE

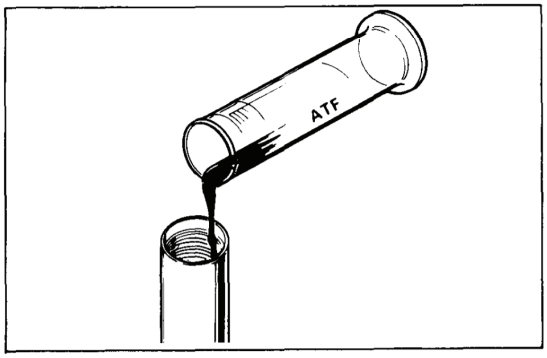
- Wrap the fork tube groove and top edge with vinyle tape to prevent damage to the oil seal lip, during installation.

Install the snap ring into the groove in the slider.
Install the dust seal.



Pour in the specified amount of ATF.

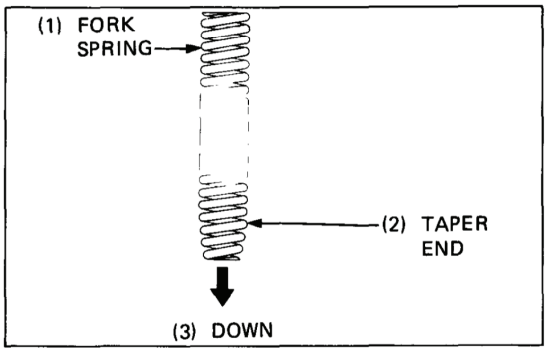
SPECIFIED FLUID: ATF
CAPACITY: 283 cc (9.6 ozs)



NOTE

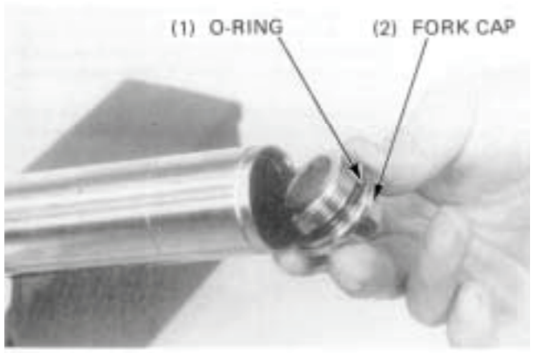
- Do not overfill or the suspension will be stiff.

Wipe oil off the spring thoroughly using a clean cloth.
Install the fork spring with the taper ends facing down.
Install the seat washer and spacer in the fork tube.



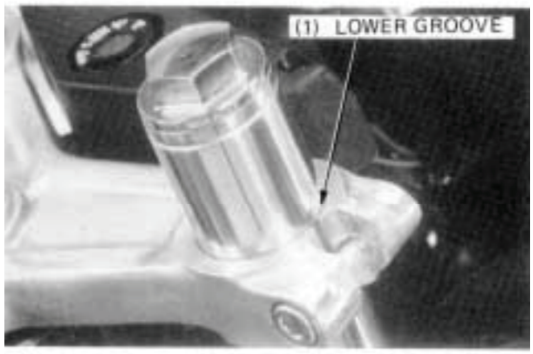
Install the O-ring onto the fork cap.
Install the fork cap onto the fork tube and tighten the cap to the specified torque.

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



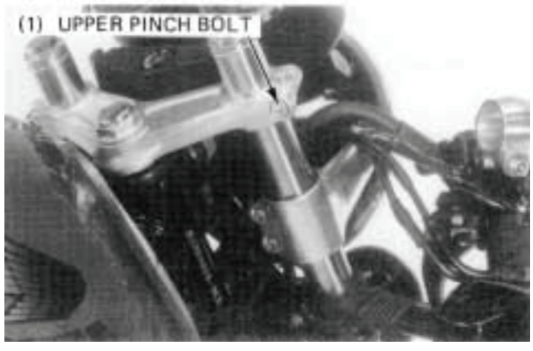
INSTALLATION

Slip the tube through the steering stem, turn signal stay, headlight stay and fork top bridge.
Align the lower groove of the fork tube with the top surface the fork top bridge.

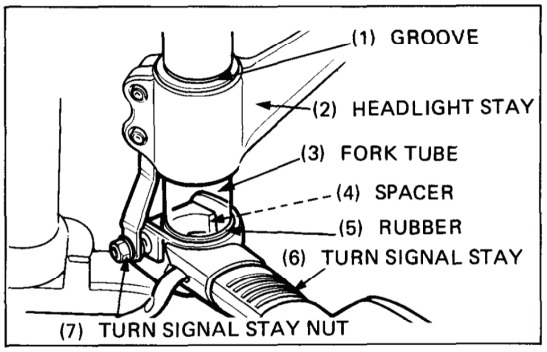


Tighten the front fork upper and lower pinch bolts.

TORQUE:
Upper: 9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)
Lower: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)



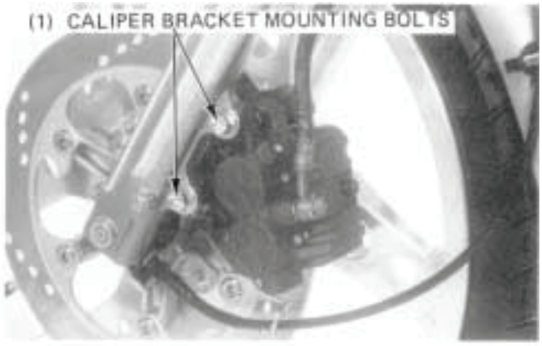
Align upper end of the headlight stay with the groove on the fork tube.
Tighten the headlight stay pinch bolts.
Install the turn signal stay as shown and tighten the nut.
Install the handlebars (page 12-5).



Install the front fender and route the speedometer cable through the clamps correctly.
Install the brake hose clamp and clamp the brake hose.
Install the brake caliper onto the left fork slider and tighten the caliper mounting bolts.

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

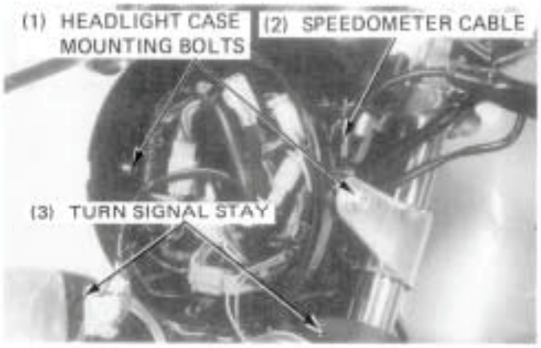
Install the front wheel (page 12-10).



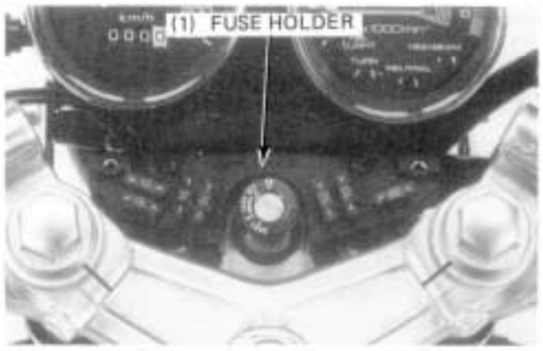
STEERING STEM

REMOVAL

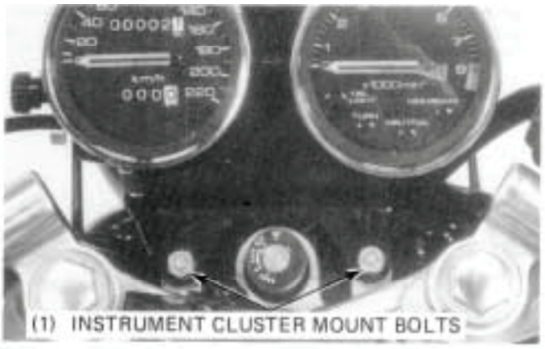
Remove the headlight (page 19-2).
Disconnect all couplers and connectors in the headlight case.
Remove the headlight case mounting bolts and remove the headlight case.
Remove the right and left turn signal stays.
Disconnect the speedometer cable.



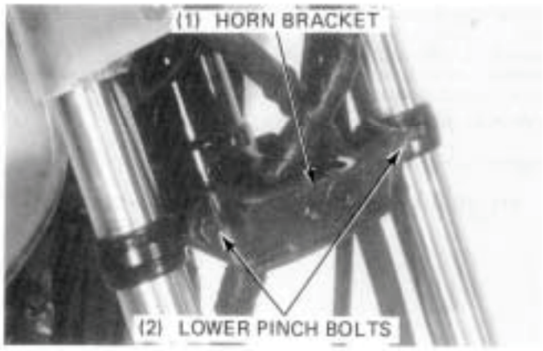
Remove the fuse holder cover mount screws and cover.
Remove the fuse holder mount screws and holder.



Remove the instrument cluster mount bolts and remove the instrument cluster.



Remove the right and left handlebars (page 12-5).
Remove the front wheel (page 12-6) and front fender (page 12-11).
Remove the horns and horn bracket by removing the front fork lower pinch bolts.



Remove the steering stem nut.
Remove the front forks (page 12-11).
Remove the front fork top bridge.

TOOL:
Lock nut wrench, 30 x 32 mm 07716–0020400



Remove the steering head bearing adjustment nut, upper bearing inner race, steel balls and steering stem.

NOTE

- Be careful not to drop and lose any of the steel balls.

TOOL:
Steering stem socket 07916–3710100



BEARING REPLACEMENT

Check the steel balls and bearing races for wear or damage.

NOTE

- Replace the steel balls and bearing races as a set.

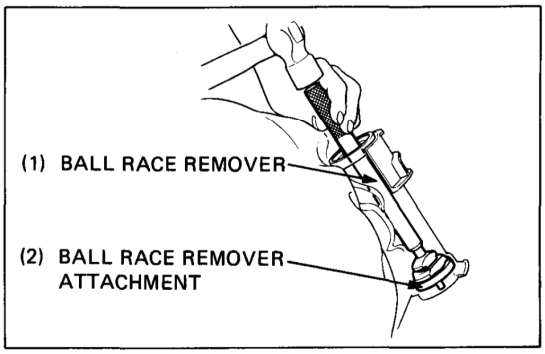
Remove the lower bearing inner race, dust seal and washer.



Remove the lower bearing outer race with special tools.

TOOLS:

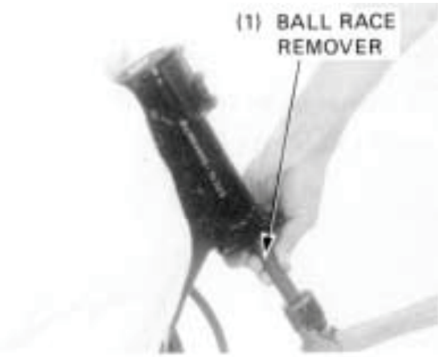
Ball race remover	**07953–3330000**
Ball race remover attachment	**07953–KM10100**



Remove the upper bearing outer race with a special tool.

TOOL:

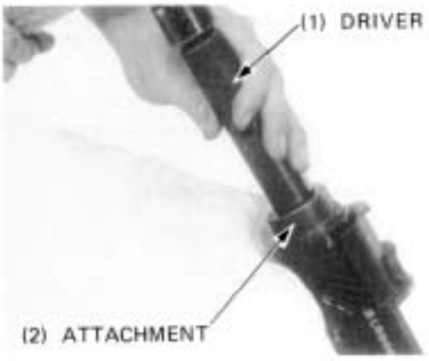
Ball race remover	**07953–3330000**



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

TOOLS:

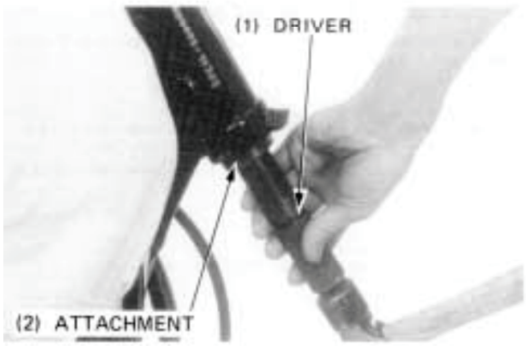
Driver	**07749–0010000**
Attachment	**07946–3290000**



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

TOOLS:

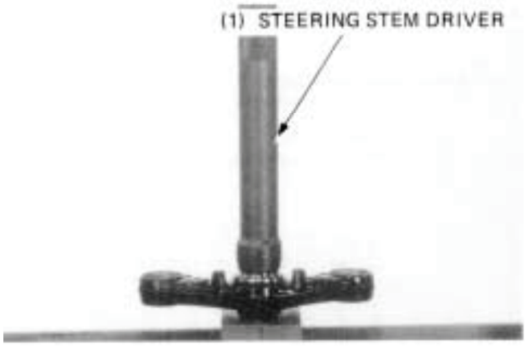
Driver	**07749–0010000**
Attachment	**07945–3330300**



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

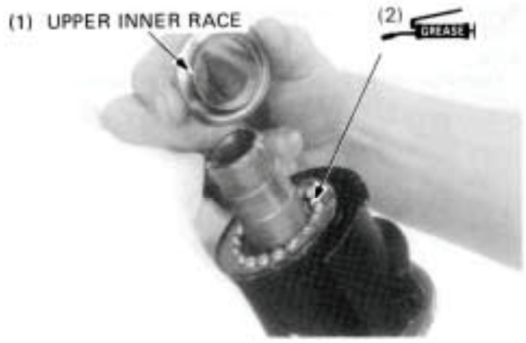
TOOL:

Steering stem driver	**07946–MB00000**



INSTALLATION

Pack the bearing cavities with bearing grease.
Install the 19 steel balls onto the lower bearing outer race.
Insert the steering stem into the steering head pipe.
Install the 18 steel balls onto the upper bearing outer race.
Install the upper bearing inner race and steering head bearing adjustment nut.

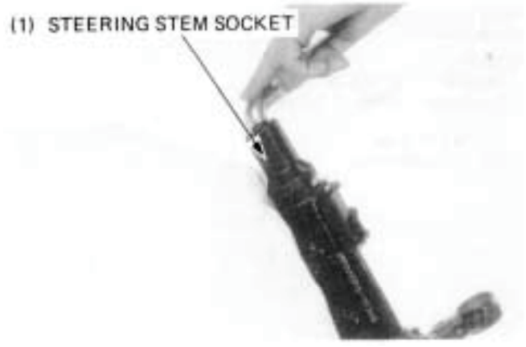


Tighten the steering stem head bearing adjustment nut to the initial torque.

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

TOOL:

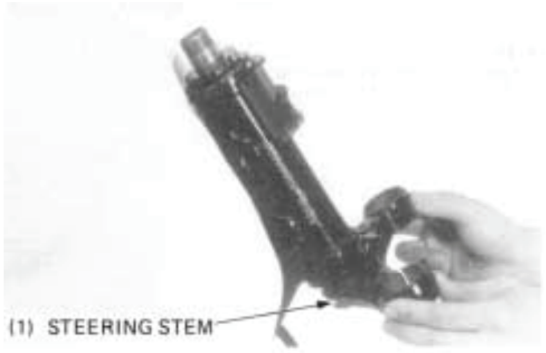
Steering stem socket	**07916–3710100**



Turn the steering stem lock-to-lock 5 times to seat the bearing.
Loosen the adjustment nut, then tighten it to the final torque.

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

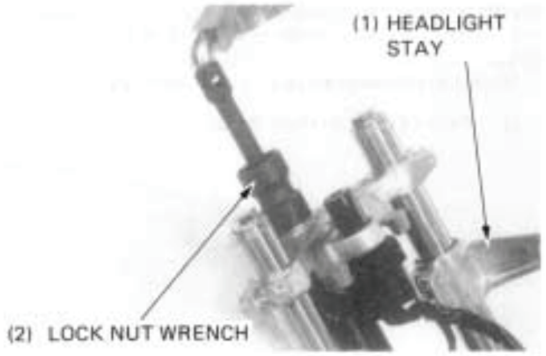
Then, back it out 1/8 turn. Make sure that there is no vertical movement and the stem rotates freely.



Install the fork top bridge and steering stem nut.
Temporarily install the front forks with headlight stays (page 12-17).
Tighten the steering stem nut.

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

TOOL:
Lock nut wrench, 30 x 32 mm 07716–0020400



Install the horn bracket.
Tighten the upper and lower front fork pinch bolts (page 12-17).
Install the front fender, brake caliper (page 12-18) and front wheel (page 12-10).
Check the steering head bearing preload (page 12-23).
Route the fuse holder wire harness and install the instrument cluster and fuse holder.

Install the right and left turn signal stays (page 12-18).
Install the headlight case.
Connect the color coded wires and the coupler.
For wire harness routing, see pages 1-11 to 12.
Align the index mark on the headlight case with the lower slit in the headlight stay.



NOTE

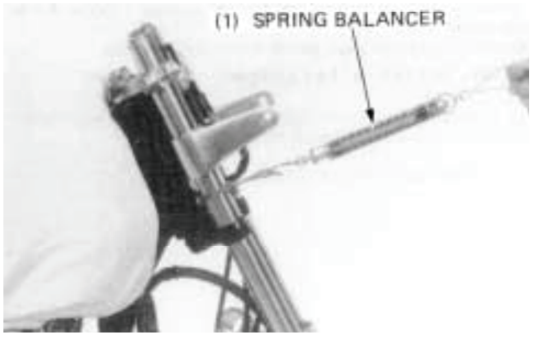
- When installing the headlight stay, align the upper end of the headlight stay with the groove on the fork tube.

Connect the speedometer cable and install the horns.
Install the right and left handlebars (page 12-3).
Install the fuse holder cover.
Install the headlight and adjust the headlight aim.



STEERING HEAD BEARING PRELOAD

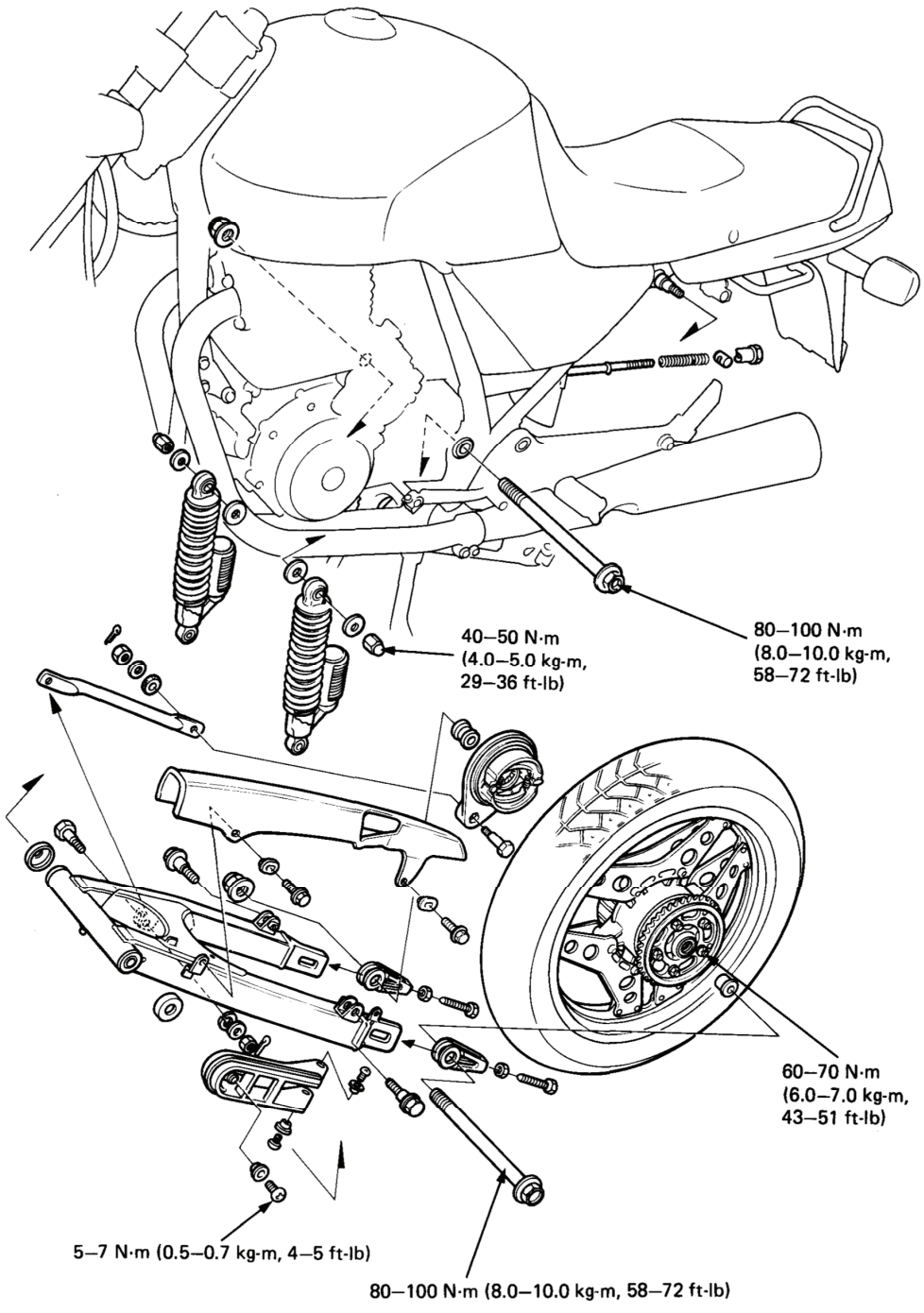
Install the front forks (page 12-11).
Install the front wheel (page 12-6).
Raise the front wheel off the ground and place a stand under the engine.
Position the steering stem straight ahead position.
Hook a spring balancer to the fork tube and measure the steering head bearing preload.



NOTE

- Make sure there is no cable and wire harness interference.

The preload should be within 1.1–1.7 kg (2.4–3.7 lbs) for right and left turns.
If the readings do not fall within the limits, lower the front wheel on the ground and adjust the bearing adjustment nut.
After making sure the bearing preload, install the removed parts in the reverse order of removal.


40–50 N·m
(4.0–5.0 kg-m,
29–36 ft-lb)
80–100 N·m
(8.0–10.0 kg-m,
58–72 ft-lb)
60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)
5–7 N·m (0.5–0.7 kg-m, 4–5 ft-lb)
80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

13. REAR WHEEL/BRAKE/SUSPENSION

SERVICE INFORMATION	13-1	BRAKE PEDAL	13-10
TROUBLESHOOTING	13-2	REAR SHOCK ABSORBERS	13-11
REAR WHEEL	13-3	SWING ARM	13-13
REAR BRAKE	13-8		

SERVICE INFORMATION

GENERAL

- A work stand or box is required to support the motorcycle.
- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the TUBELESS TIRE MANUAL.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Rear shock absorber spring free length		224.2 mm (8.83 in)	219.5 mm (8.64 in)
Rear wheel rim runout	Radial	—	2.0 mm (0.08 in)
	Axial	—	2.0 mm (0.08 in)
Rear axle runout		—	0.2 mm (0.01 in)
Rear brake drum I.D.		140 mm (5.5 in)	141 mm (5.6 in)
Rear brake lining thickness		5.0 mm (0.19 in)	2.0 mm (0.08 in)

TORQUE VALUES

Swing arm pivot bolt	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Rear axle nut	80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Rear shock absorber (upper)	40–50 N·m (4.0–5.0 kg-m, 22–29 ft-lb)
(lower)	40–50 N·m (4.0–5.0 kg-m, 22–29 ft-lb)
Final driven sprocket nut	60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)
Chain slider mounting screw	5–7 N·m (0.5–0.7 kg-m, 4–5 ft-lb)
Damper rod lock nut	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Footpeg bracket mount bolt	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Rear brake arm bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TOOLS

SPECIAL

Bearing remover set	07936–3710001
Remover spindle assembly	07936–3710600
Remover handle	07936–3710100
Remover weight	07741–0010201

COMMON

Driver	07749–001000
Attachment, 32 x 35 mm	07746–0010100
Attachment, 42 x 47 mm	07746–0010300
Pilot, 17 mm	07746–0040400
Pilot, 20 mm	07746–0040500
Bearing remover head, 17 mm	07746–0050500
Bearing remover shaft	07746–0050100
Shock absorber compressor	07959–3290001

TROUBLESHOOTING

Wobble or vibration in motorcycle
- Tire pressure incorrect
- Faulty tire
- Bent rim
- Loose wheel bearing
- Swingarm bushing worn

Soft suspension
- Weak spring
- Shock absorbers improperly adjusted

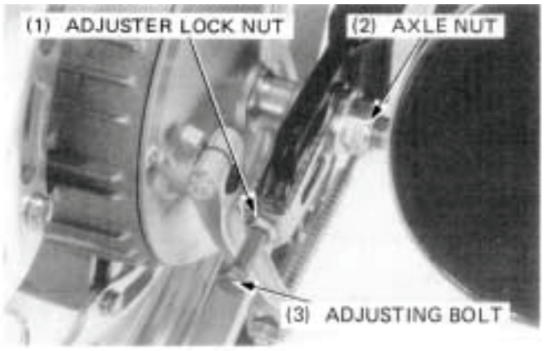
Hard suspension
- Shock absorbers improperly adjusted
- Bent shock absorber damper rod

Suspension noise
- Loose fasteners
- Worn shocks

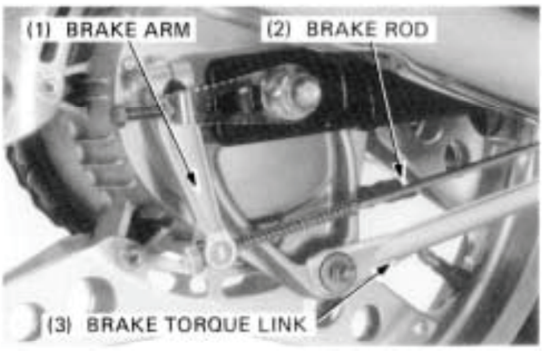
REAR WHEEL

REMOVAL

Raise the rear wheel off the ground by placing a jack or block under the engine.
Loosen the drive chain adjuster lock nuts and adjusting bolts on both sides.
Loosen the axle nut.



Disconnect the brake rod from the brake arm by removing the brake adjusting nut.
Remove the brake torque link attaching bolt and nut, and disconnect the brake torque link from the brake panel.
Push the wheel forward and remove the drive chain from the driven sprocket.
Remove the axle nut and axle, and remove the rear wheel.

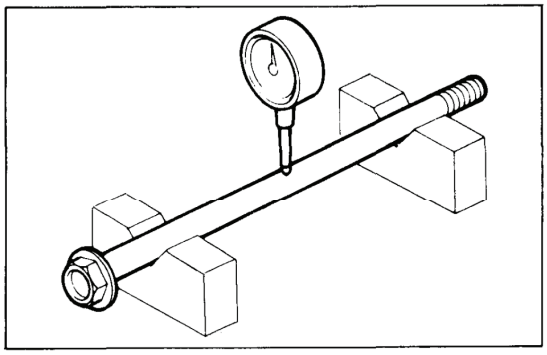


INSPECTION

AXLE

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

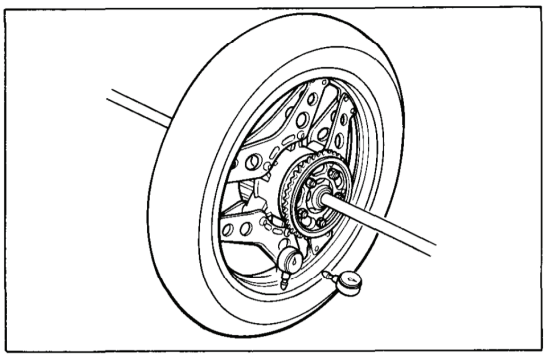
SERVICE LIMIT: 0.2 mm (0.01 in)



REAR WHEEL RIM RUNOUT

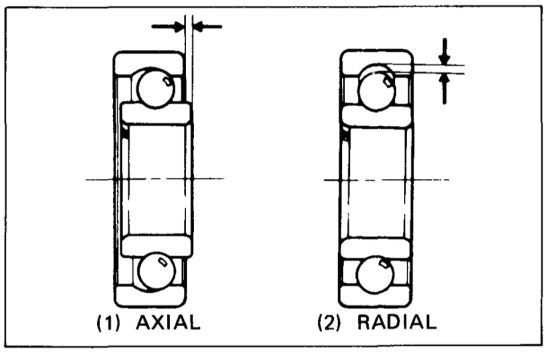
Check the rim runout by placing the wheel on a truing stand. Turn the wheel by hand and measure the runout using a dial indicator.

SERVICE LIMIT: 2.0 mm (0.08 in)

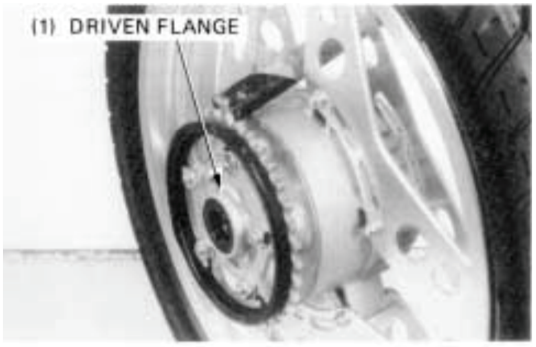


WHEEL BEARING PLAY

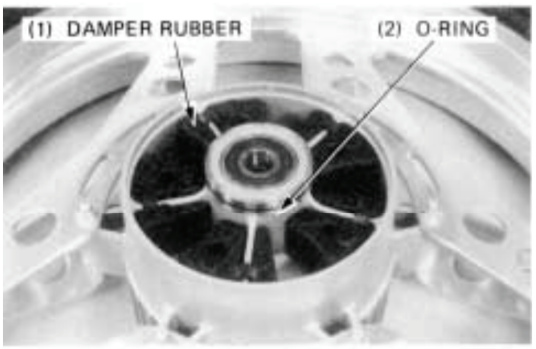
Check the wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand.
Replace the bearings with new ones if they are noisy or have excessive play.



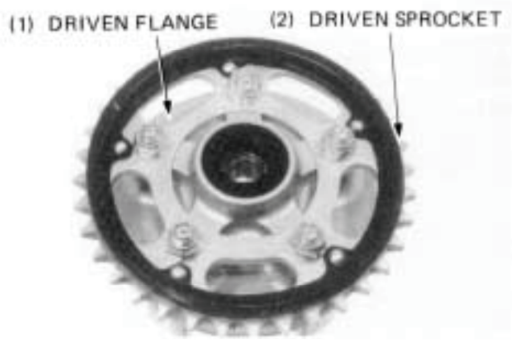
Remove the brake panel from the rear wheel (page 13-8).
Remove the driven flange from the wheel hub.



Replace the damper rubbers if they are damaged or deteriorated.
Remove the O-ring.



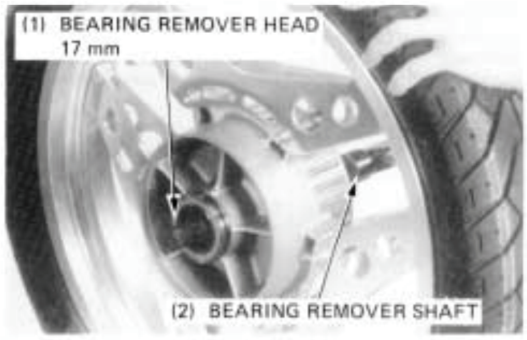
Do not separate the driven sprocket and driven flange, unless replacement of the driven sprocket or flange is necessary.
Check the condition of the final driven sprocket teeth (page 3-10).



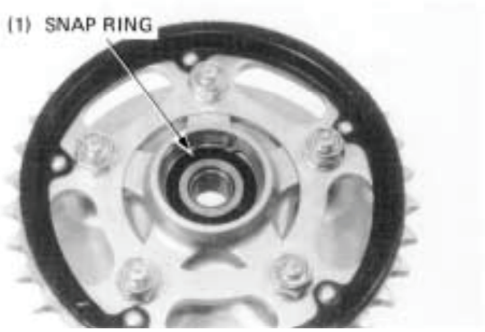
Drive out the wheel bearings with the special tools.

TOOLS:

Bearing remover head, 17 mm	**07746–0050500**
Bearing remover shaft	**07746–0050100**



Remove the dust seal from the driven flange.
Remove the snap ring and drive the driven flange bearing out of the flange.



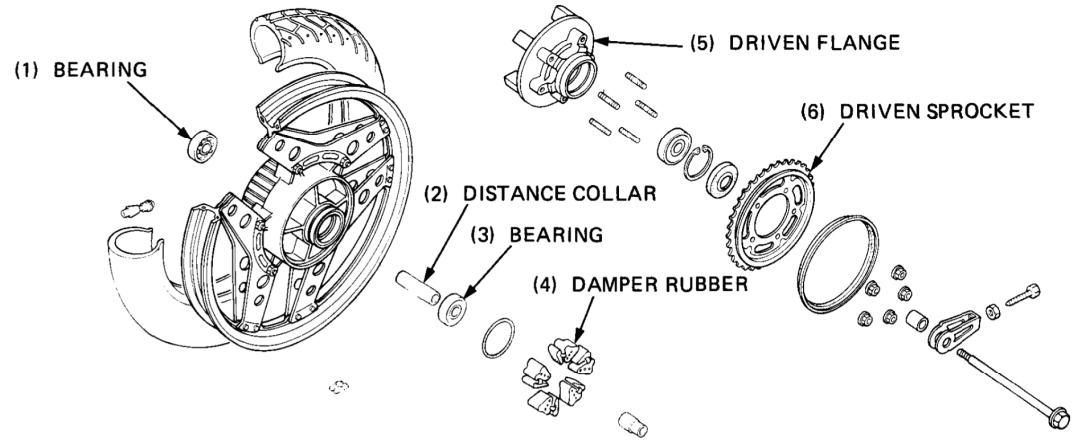
ASSEMBLY

WARNING

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

NOTE

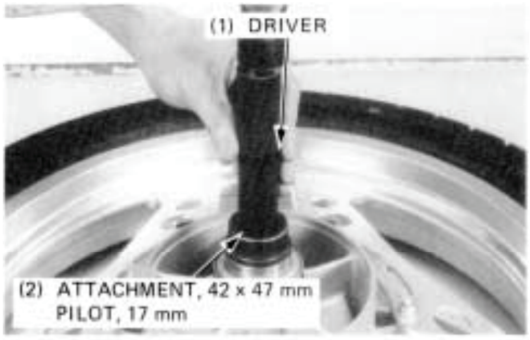
- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.



Drive in a new left bearing.

TOOLS:

Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 17 mm	**07746–0040400**



Install the distance collar and drive a new right bearing in.

TOOLS:

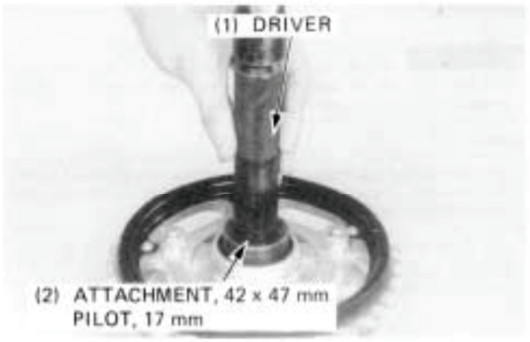
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 17 mm	**07746–0040400**



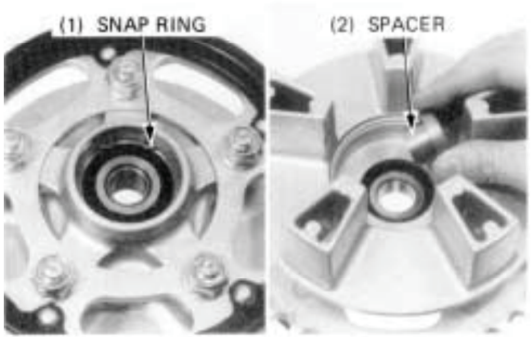
Place a new flange bearing with the plain sealed end facing out onto the flange hub.
Drive the driven flange bearing in the flange squarely.

TOOLS:

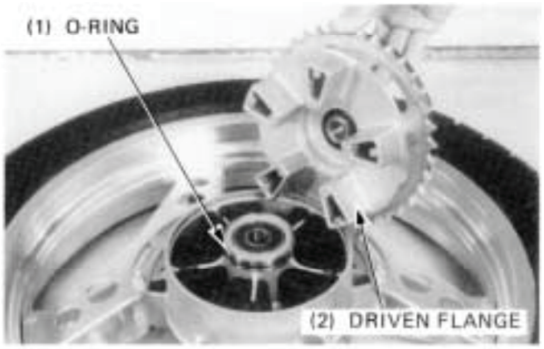
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 17 mm	**07746–0040400**



Install the snap ring, and the spacer from the right side.



Install the O-ring onto the left wheel hub.
Install the damper rubbers and the driven flange into the hub.



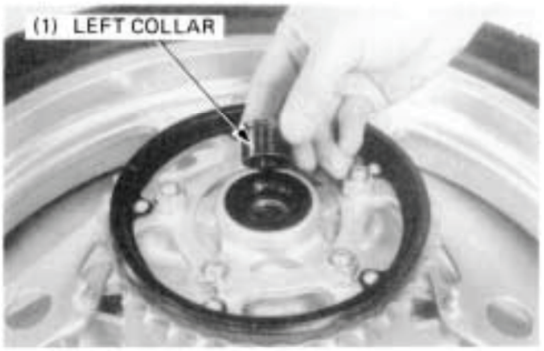
If the driven sprocket was removed from the flange, tighten the driven sprocket nuts.

TORQUE: 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)

Apply grease to the inside of the dust seal.

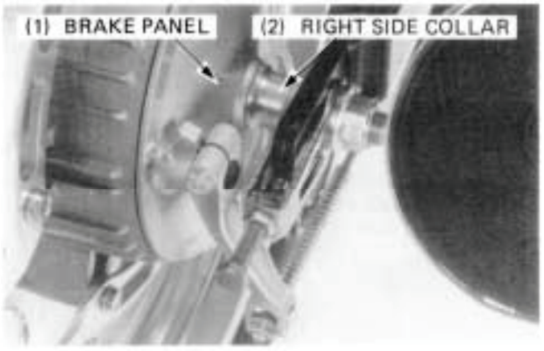
Install the dust seal and collar in the wheel hub left side.

Install the brake panel onto the right wheel hub.



INSTALLATION

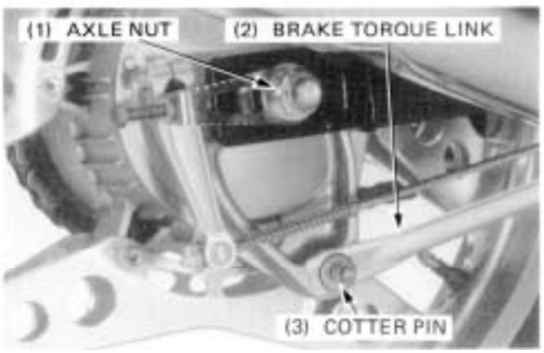
Position the rear wheel into the swing arm.
Install the drive chain on the driven sprocket.
Install the right collar onto the brake panel and the drive chain adjusters onto the swing arm.
Insert the axle from the left side.
Install the axle nut and tighten it lightly.



Connect the brake rod to the brake arm.
Install the brake torque link to the brake panel.
Tighten the nut and install the cotter pin.
Adjust the drive chain slack (page 3-9).
Tighten the axle nut to the specified torque.

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

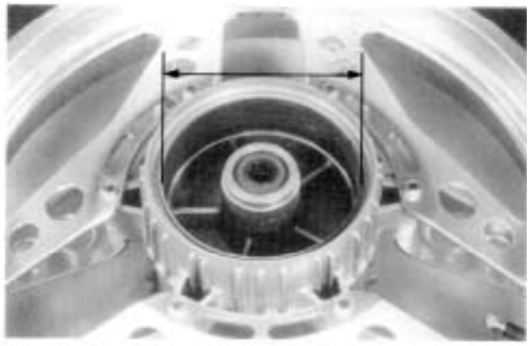
Adjust the rear brake (page 3-12).



REAR BRAKE

BRAKE PANEL REMOVAL

Remove the front wheel (page 13-3).
Remove the brake panel from the wheel hub.



INSPECTION

REAR BRAKE DRUM I.D.

Measure the rear brake drum I.D.

SERVICE LIMIT: 141 mm (5.6 in)

BRAKE LINING

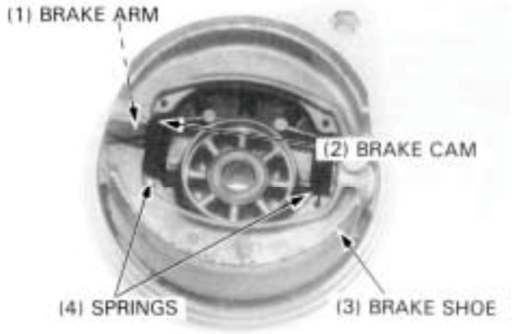
Measure the rear brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

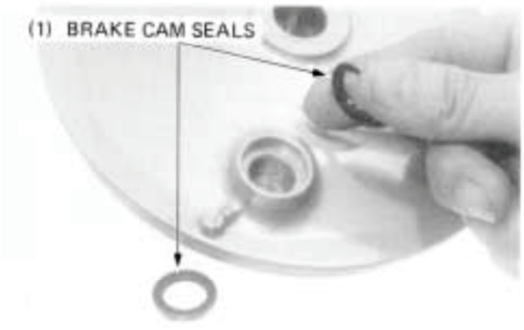


REAR BRAKE SHOE REPLACEMENT

Remove the brake arm, wear indicator plate and the brake shoes.
Remove the special washer and brake cam from the brake panel.



Check the brake cam seals for wear or damage and replace if necessary.

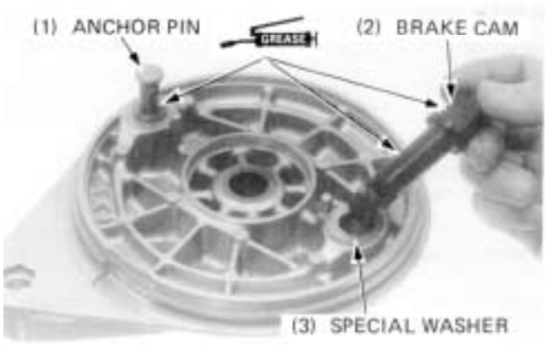


Install the special washer by aligning its groove with the tab on the brake panel.
Apply grease to the anchor pins and brake cam.

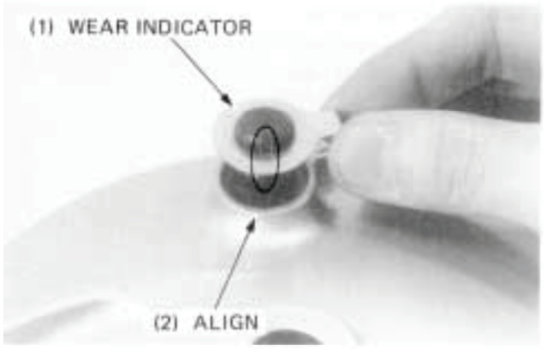
WARNING

- ***Contaminated brake linings reduce stopping power. Keep grease off the brake linings. Wipe any excess grease off the cam.***

Install the following
– brake cam.
– brake shoes and springs.

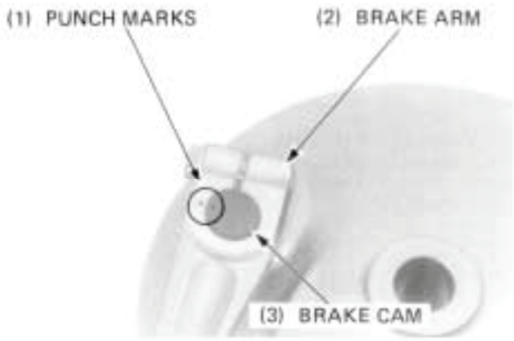


Align the wear indicator tab with the cut-out in the brake cam and install the indicator over the cam.



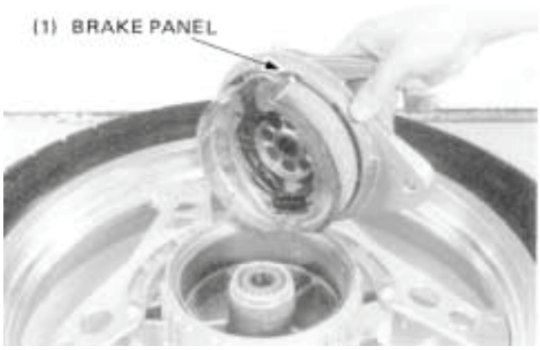
Install the brake arm aligning the punch mark with the cam punch mark.
Tighten the brake arm bolt.

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



BRAKE PANEL INSTALLATION

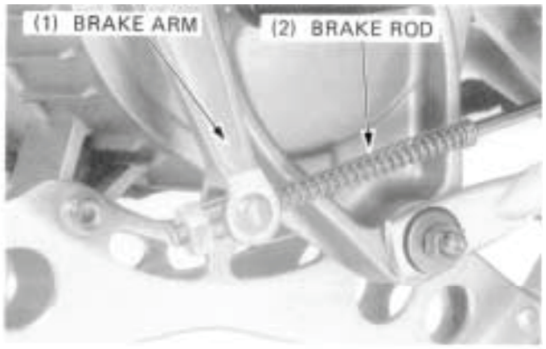
Install the brake panel.
Install the rear wheel (page 13-7).



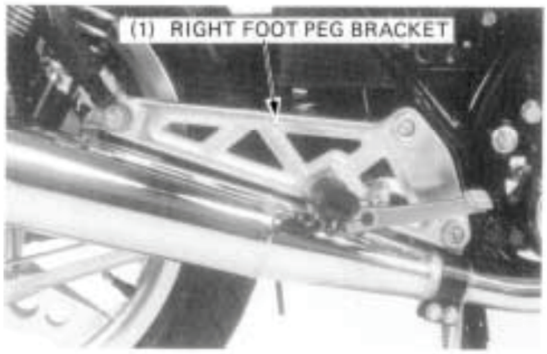
BRAKE PEDAL

REMOVAL

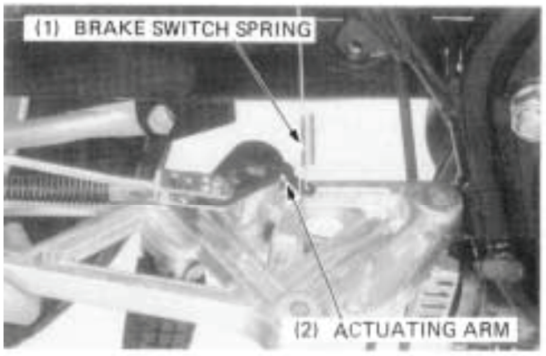
Disconnect the brake rod from the brake arm.



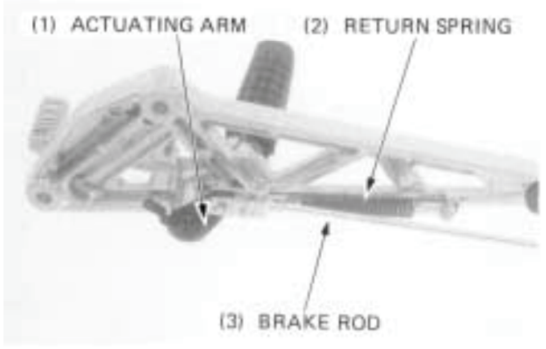
Remove the right foot peg bracket bolts.



Unhook the rear brake switch spring from the actuating arm.
Remove the right foot peg bracket.

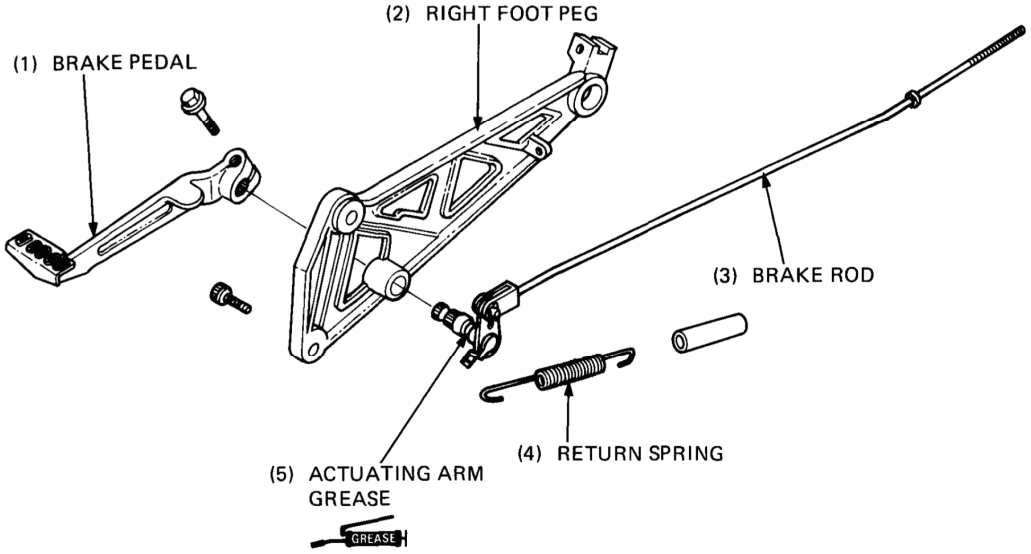


Unhook the rear return spring and remove the cotter pin, joint pin and brake rod.
Remove the rear brake pedal from the actuating arm.
Remove the actuating arm from the right foot peg.



INSTALLATION

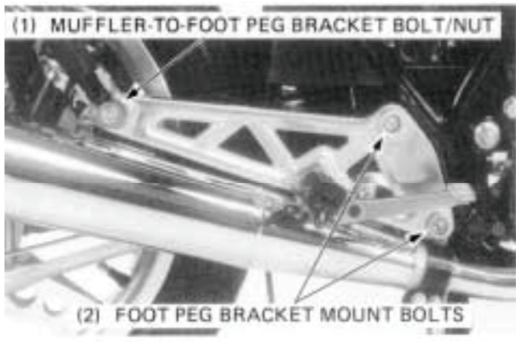
The installation sequence is essentially the reverse order of removal.



Hook the rear brake switch spring to the actuating arm.
Install the right foot peg bracket to the frame and tighten the mount bolts.

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

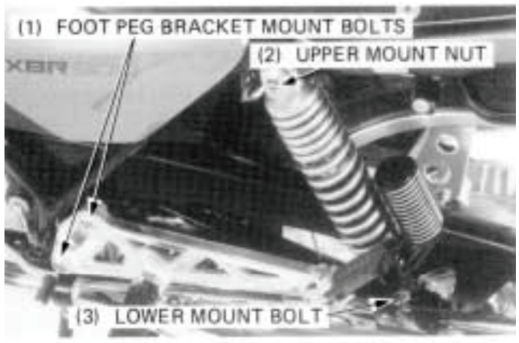
Install the muffler-to-foot peg bracket bolt and nut.
Install the rear brake pedal.
Adjust the rear brake.



REAR SHOCK ABSORBERS

REMOVAL

Loosen the foot peg bracket mount bolts.
Remove the shock absorber lower mount bolt and upper mount nut.
Remove the shock absorber.



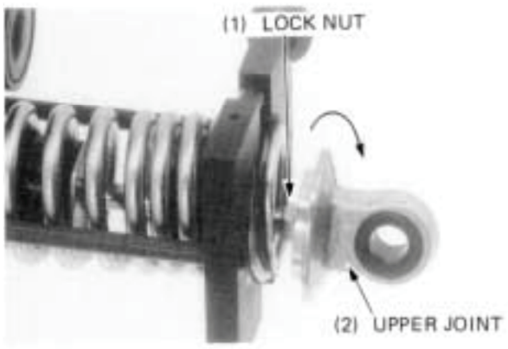
DISASSEMBLY

Set the shock in the compressor and compress the spring by turning the compressor handle.

TOOL:
Shock absorber compressor 07959–3290001



Place the upper joint in a vise and pull the damper rod out.
Separate the upper joint by rotating the damper rod lock nut in the direction as shown and remove the compressor.
Remove the spring, spring guide and spring adjuster.

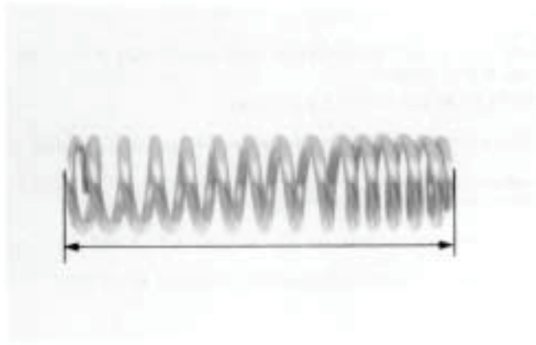


SHOCK ABSORBER SPRING INSPECTION

Measure the spring free length.

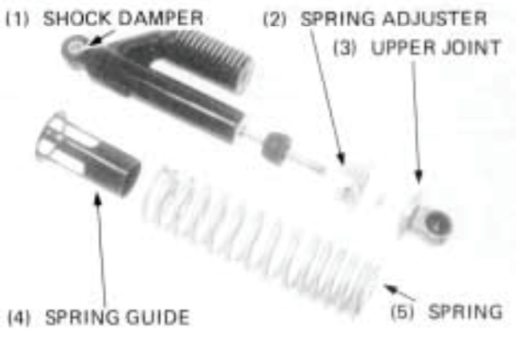
Replace the spring if it is shorter than the service limit.

SERVICE LIMIT: 219.5 mm (8.64 in)



ASSEMBLY

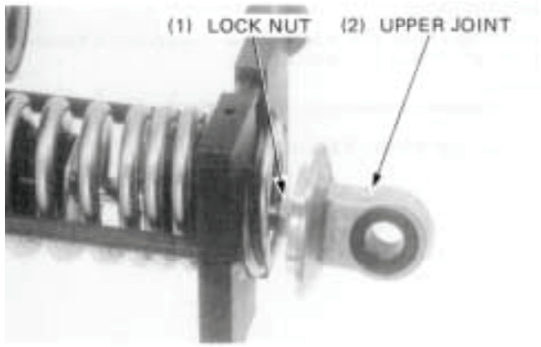
Place the spring adjuster, spring guide and spring onto the shock damper.
Set the shock in the compressor and compress the spring.



Apply a locking agent to the rod threads and install the lock nut and upper joint.
Tighten the damper rod lock nut to the specified torque.

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

Remove the shock compressor.

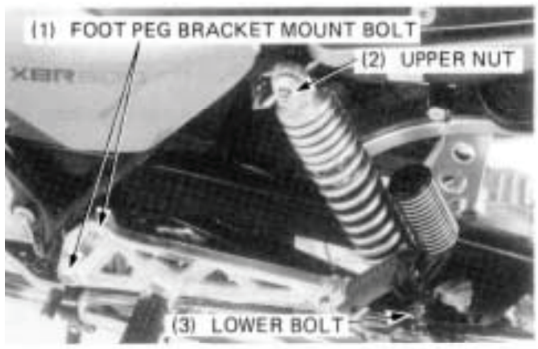


INSTALLATION

Install the shock absorber, lower mount bolt, upper nut and washer.
Tighten the nut and bolt.

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

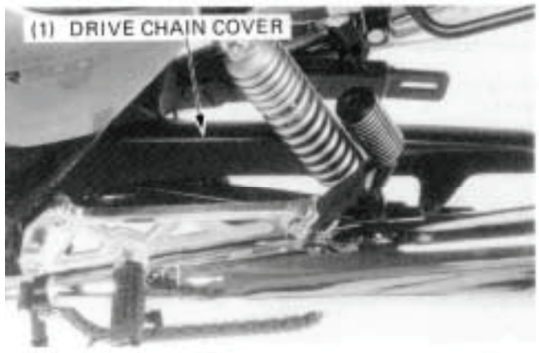
Tighten the foot peg bracket mount bolts (page 13-11).
Turn the each spring adjuster to the same position and check the operation of the rear suspension (page 3-15).



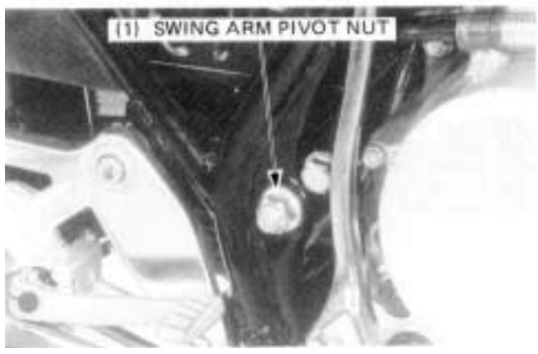
SWING ARM

REMOVAL

Raise the rear wheel off the ground with a jack or block under the engine.
Remove the following parts:
– rear wheel (page 13-3).
– rear shock absorber lower mount bolts from the swing arm.
– drive chain cover.



Remove the swing arm pivot nut and bolt, and remove the swing arm from the frame.

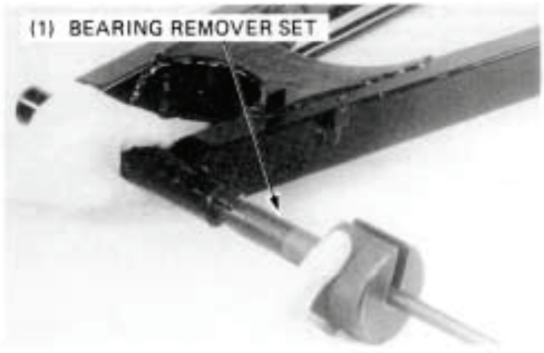


PIVOT BUSHING REPLACEMENT

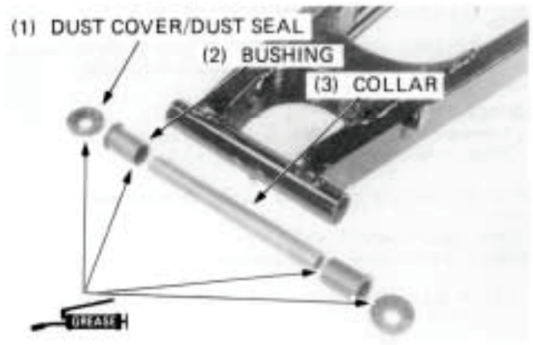
Remove the chain slider, dust covers and collar.
Remove the pivot bushings with the bearing remover set.

TOOLS:

Bearing remover set	**07936–3710001**
– Remover spindle assembly	**07936–3710600**
– Remover handle	**07936–3710100**
– Remover weight	**07741–0010201**



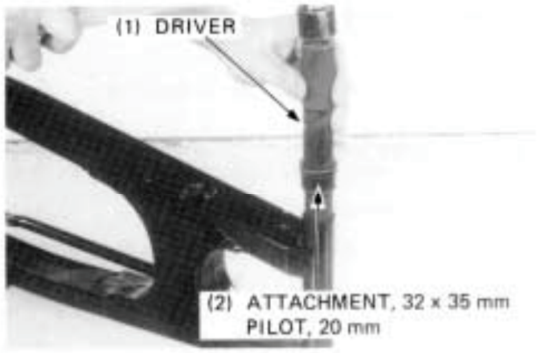
Check that the collar and bushings for abnormal wear.
Replace the chain slider if excessively worn.
Apply grease to the inside of the bushings and dust seal lips.



Drive the bushings into the swing arm.
Install the collar.

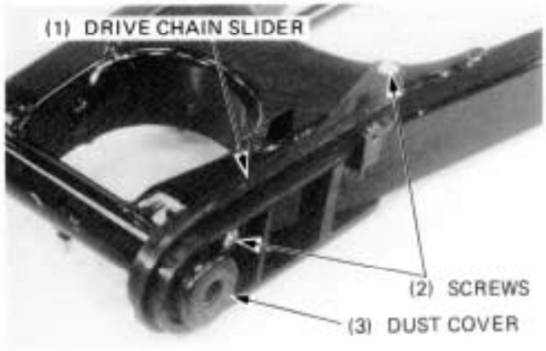
TOOLS:

Driver	**07749–0010000**
Attachment, 32 x 35 mm	**07746–0010100**
Pilot, 20 mm	**07746–0040500**



Install the chain slider and dust covers.
Tighten the chain slider mount screws.

TORQUE: 5–7 N·m (0.5–0.7 kg-m, 4–5 ft-lb)



INSTALLATION

Install the swing arm onto the frame and tighten the pivot nut.

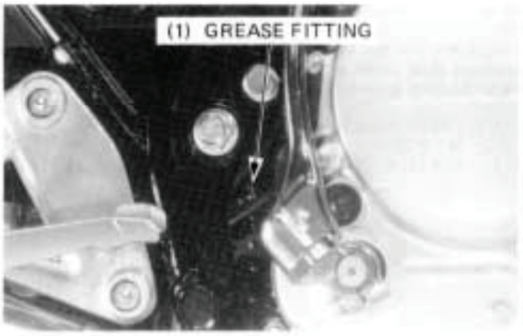
TORQUE: 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

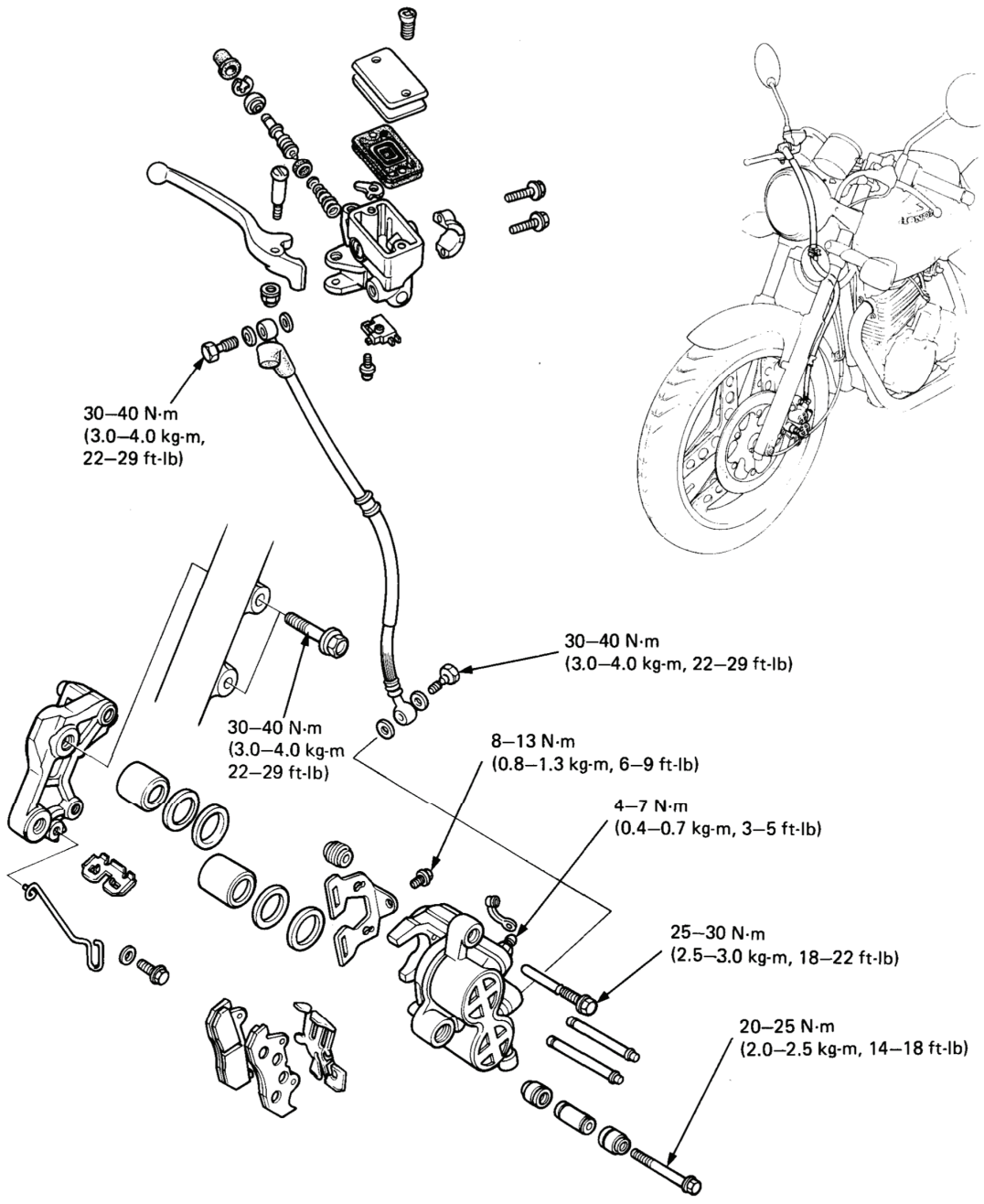
Check the swing arm for smooth operation.

Install the following parts:
– shock absorber (page 13-13).
– rear wheel (page 13-7).
– chain cover.



After installation, grease the swing arm pivot bushing through the grease fitting on the swing arm.




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)
30–40 N·m
(3.0–4.0 kg-m
22–29 ft-lb)
8–13 N·m
(0.8–1.3 kg-m, 6–9 ft-lb)
4–7 N·m
(0.4–0.7 kg-m, 3–5 ft-lb)
25–30 N·m
(2.5–3.0 kg-m, 18–22 ft-lb)
20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

14. HYDRAULIC BRAKE

SERVICE INFORMATION	14-1	BRAKE PAD/DISC	14-5
TROUBLESHOOTING	14-2	FRONT BRAKE MASTER CYLINDER	14-7
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	14-3	FRONT BRAKE CALIPER	14-10

SERVICE INFORMATION

GENERAL

- Use DOT 3 or 4 brake fluid.
- The front wheel can be removed without disconnecting the hydraulic system.
- Once the hydraulic systems have been opened, or if the brakes feel spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoirs.
- 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 rug. 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	5 mm (0.19 in)	4 mm (0.16 in)
Front disc runout	————	0.3 mm (0.01 in)
Front master cylinder I.D.	12.700–12.743 mm (0.4999–0.5017 in)	12.75 mm (0.512 in)
Front master piston O.D.	12.657–12.684 mm (0.4983–0.4994 in)	12.64 mm (0.498 in)
Front caliper piston O.D.	30.148–30.198 mm (1.1869–1.1889 in)	30.14 mm (1.187 in)
Front caliper cylinder I.D.	30.230–30.280 mm (1.1902–1.1921 in)	30.29 mm (1.193 in)

14

TORQUE VALUES

Hose bolt	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Caliper bleed valve	4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)
Pin retainer	8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)
Front brake disc	37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)
Front caliper bracket	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Front caliper mount bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Front caliper pivot bolt	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

TOOL

SPECIAL

Snapring pliers	07914–3230001

TROUBLESHOOTING

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

Brake lever too hard
- Sticking piston(s)
- Clogged hydraulic system
- Pads glazed or worn excessively

Brakes drag
- Hydraulic system sticking
- Clogged master cylinder
- Sticking piston(s)

Brakes grab or pull to one side
- Pads contaminated
- Disc or wheel misaligned

Brakes chatter or squeal
- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly
- Disc or wheel misaligned

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

Check the fluid level with the master cylinder parallel to the ground.

CAUTION

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*



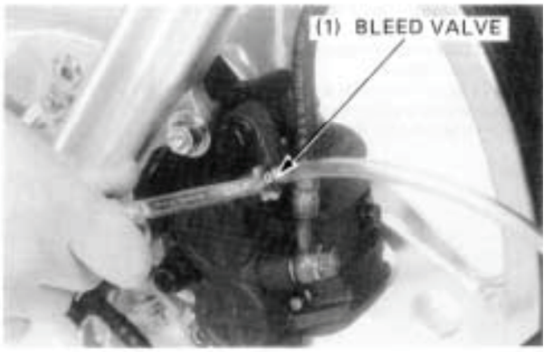
BRAKE FLUID DRAINING

Connect a bleed hose to the bleed valve.

Loosen the caliper bleed valve and pump the brake lever. Stop operating the lever when fluid stops flowing out of the bleed valve.

WARNING

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



BRAKE FLUID FILLING

Connect the commercially available brake bleeder to the 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 brakes to prevent air from being pumped into the system.
- Use only **DOT 3 or 4 brake fluid** from a sealed container.
- When using a brake bleeding tool, follow the manufacturer's operation 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. If it feels spongy, bleed the system by performing the AIR BLEEDING procedure (page 14-4).



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

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



AIR BLEEDING

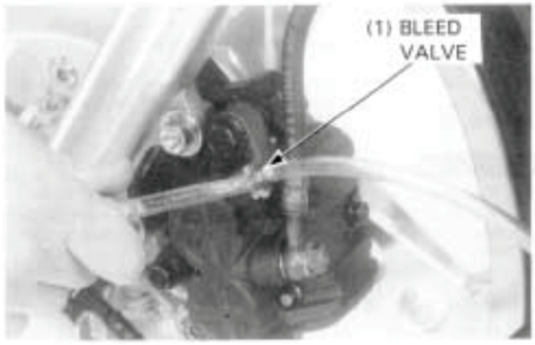
1) Squeeze the brake lever, then open the bleed valve 1/2 turn and close the valve.

NOTE

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

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

Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.



Tighten the bleed valve.

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

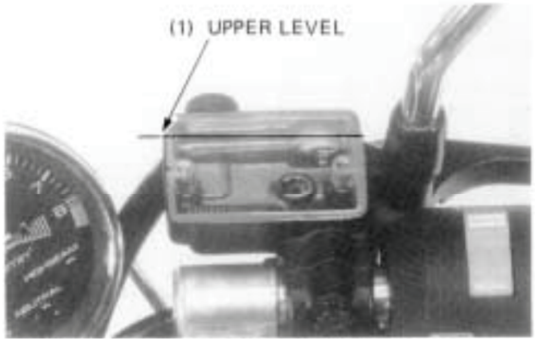
Fill the fluid reservoir to near full.

CAUTION

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

WARNING

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



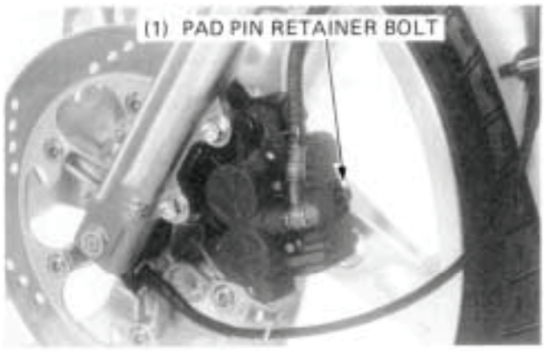
BRAKE PAD/DISC

PAD REPLACEMENT

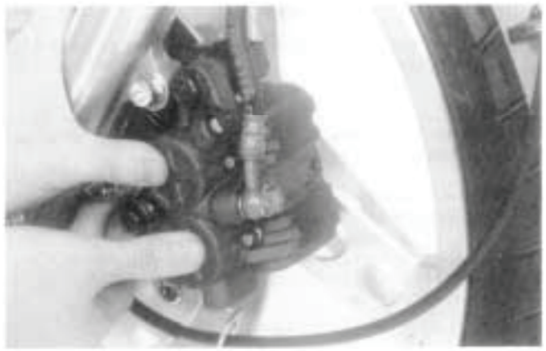
NOTE

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

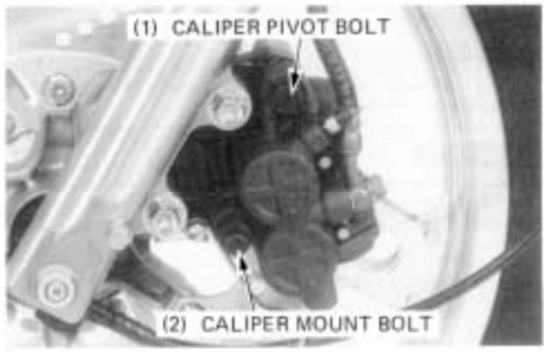
Remove the pad pin retainer bolt.



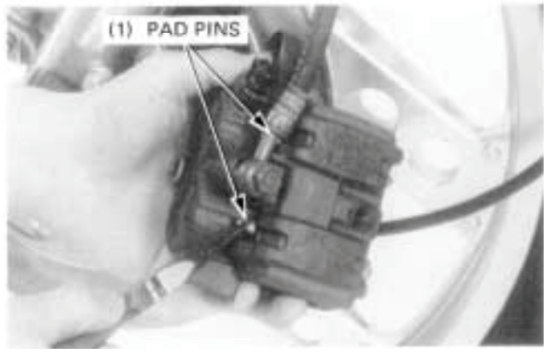
Press the caliper against the disc to push the pistons all the way into the caliper.



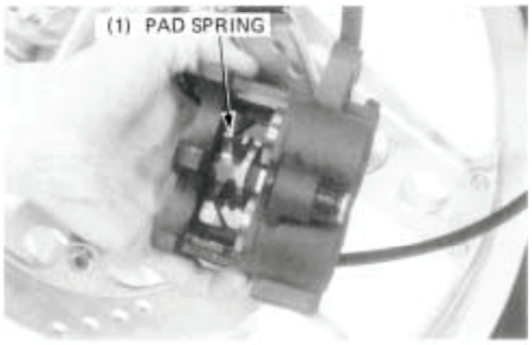
Remove the caliper mount bolt and caliper pivot bolt.
Lift the caliper up and remove the caliper from the bracket.



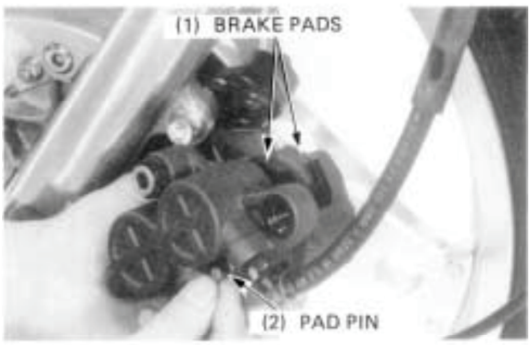
Pull the two retainer pad pins and remove the pads from the caliper.



Position the pad spring in the caliper as shown.
Push the caliper pistons in all the way.

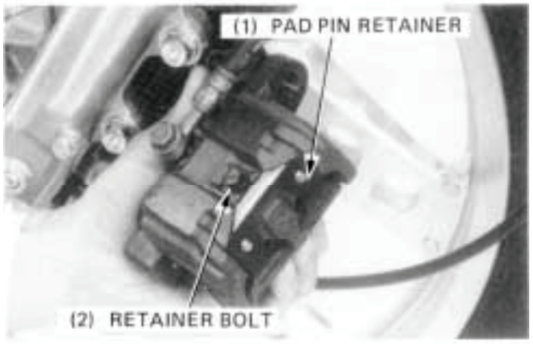


Install the new pads in the caliper.
Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



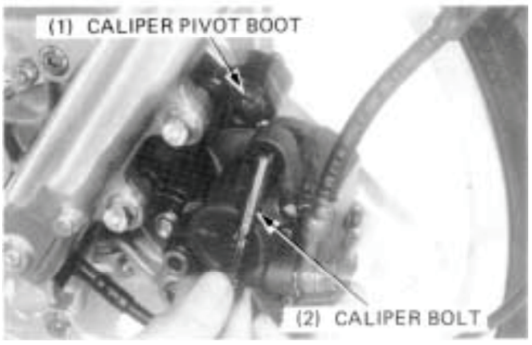
Place the pad pin retainer over the pad pins.
Push the retainer down to secure the pins.
Install the retainer bolt and tighten the bolt to the specified torque.

TORQUE: 8–13 N·m (0.8–1.3 kg-m, 6–9 ft-lb)



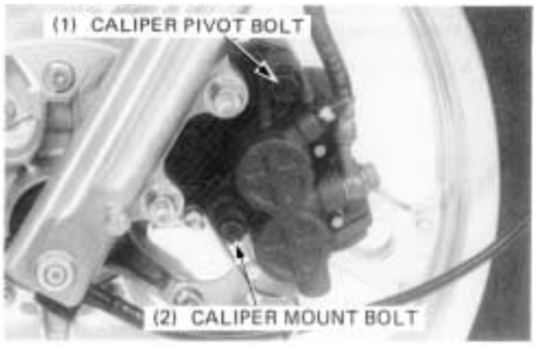
Apply silicone grease to the caliper pivot bolt and boot.

Make sure that the retainer clip is in position on the caliper bracket (page 14-12).



Install the caliper to the bracket so the disc is positioned between the pads, being careful not to damage the pads.
Tighten the caliper mount bolt and caliper pivot bolt.

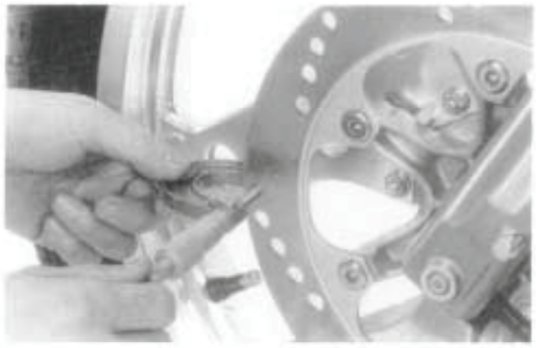
TORQUE:
CALIPER MOUNT BOLT:
20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
CALIPER PIVOT BOLT:
25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)



BRAKE DISC INSPECTION
DISC THICKNESS

Measure the thickness of the disc.

SERVICE LIMIT: 4.0 mm (0.16 in)



DISC WARPAGE

Remove the brake disc (page 12-8).
Set the brake disc on a surface plate and set up a dial indicator.
Measure the brake disc warpage.

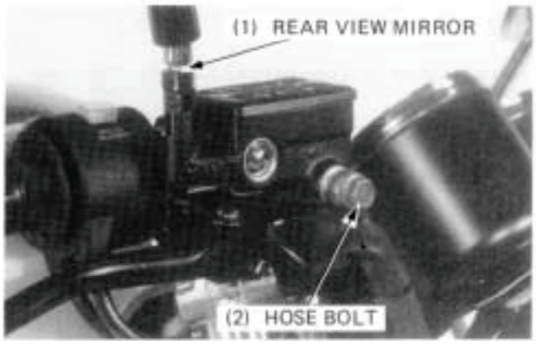
SERVICE LIMIT: 0.3 mm (0.01 in)



FRONT BRAKE MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system (page 14-3).
Remove the brake lever and rear view mirror from the master cylinder.
Disconnect the brake hose from the master cylinder by removing the oil bolt.

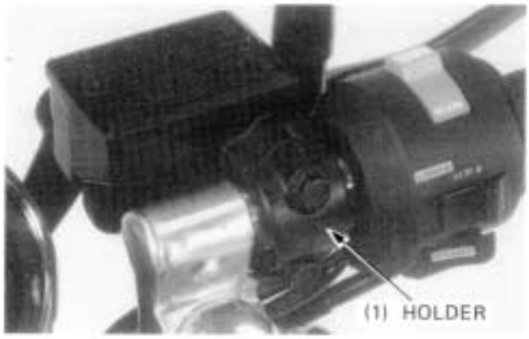


CAUTION

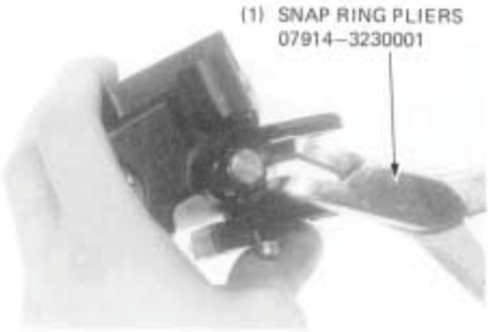
- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

NOTE

- When removing the brake hose bolt, cover the end of the hose to prevent contamination and secure the hose to prevent spilling fluid.

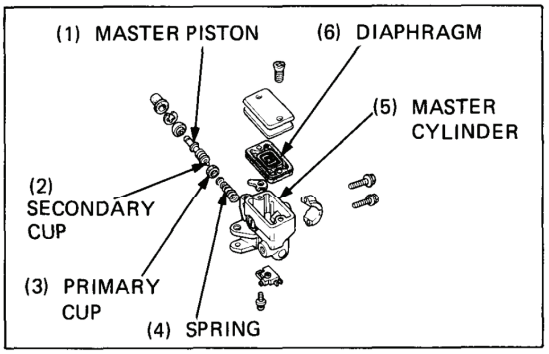


Remove the master cylinder from the handlebar by removing the holder.
Remove the boot from the piston.
Remove the circlip from the master cylinder body.



Remove the master piston, cups and spring.

Clean the master cylinder with brake fluid.



INSPECTION

MASTER CYLINDER I.D.

Check the master cylinder for scores, scratches or nicks.

Measure the master cylinder I.D.

SERVICE LIMIT: 12.75 mm (0.512 in)



MASTER PISTON O.D.

Measure the master piston O.D.

SERVICE LIMIT: 12.64 mm (0.498 in)

Check the primary and secondary cups for damage before assembly.



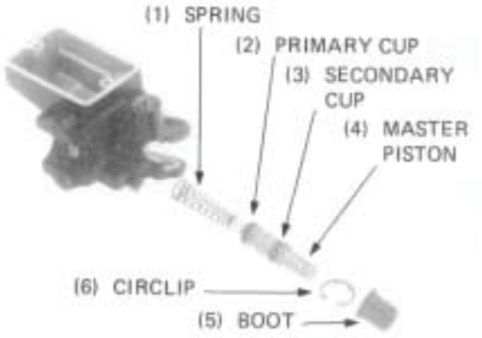
ASSEMBLY

CAUTION

- *Handle the master cylinder piston, cylinder and spring as a set.*
- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and valve together.

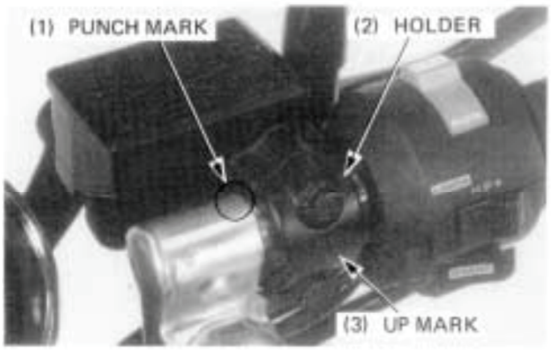
Dip the piston cup in brake fluid before assembly.



CAUTION

- *When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.*

Install the clip and boot.
Place the master cylinder on the handlebar and install the holder with "up mark" on the holder up.
Align the punch mark on the handlebar with the end of the holder.
Tighten the top bolt first, then the bottom bolt.

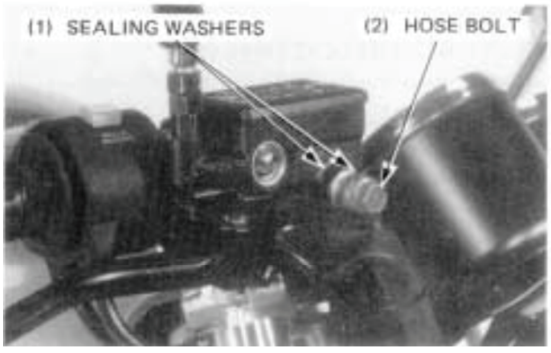


Install the brake lever and rear view mirror.

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

Tighten the hose bolt.

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

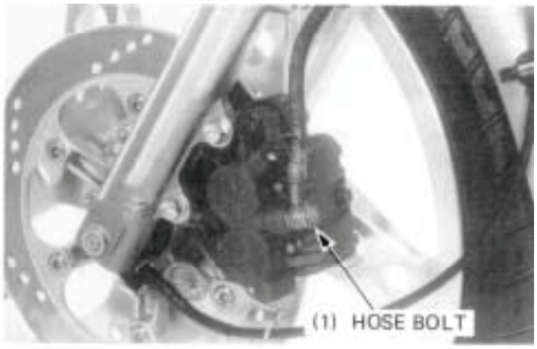


Fill the reservoir to the upper level mark and bleed the brake system according to page 14-3.

FRONT BRAKE CALIPER

DISASSEMBLY

Place a container under the caliper and remove the oil hose.
Remove the caliper pivot bolt and caliper mount bolt.
Remove the front caliper.

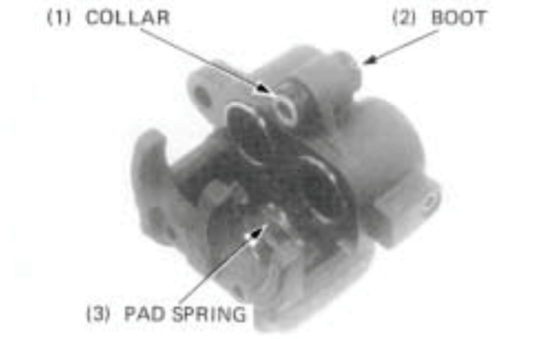


CAUTION

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Remove the caliper pads (page 14-5).

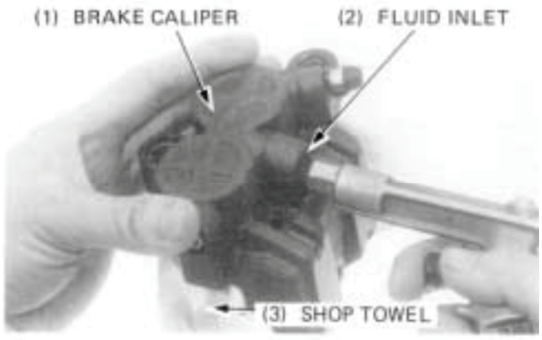
Remove the collar, boot and pad spring.



Remove the piston. If necessary, apply compressed air to the caliper fluid inlet to get the piston out.
Place a shop rag under the caliper to cushion the pistons when they are expelled. Use the air in short spurt.

WARNING

- *Do not bring the nozzle too close to the inlet.*



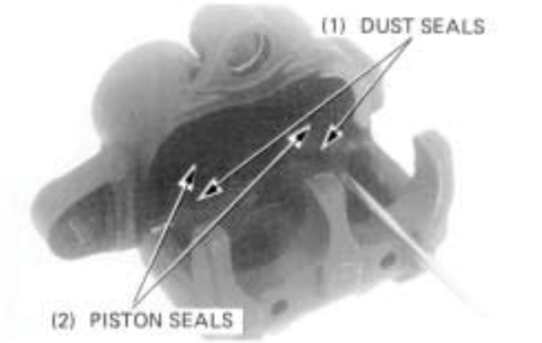
Remove the piston seal by first pushing it into the cylinder as shown.

CAUTION

- *Be careful not to damage the piston sliding surfaces when removing the seals.*

Examine the piston and cylinder for scoring or scratches and replace if necessary.

Clean the caliper grooves with brake fluid.



INSPECTION

CALIPER PISTON O.D.

Check the piston and the cylinder for scoring or scratches.

Measure the O.D. of the pistons.

SERVICE LIMIT: 30.14 mm (1.187 in)

CALIPER CYLINDER I.D.

Measure the I.D. of the caliper bores.

SERVICE LIMIT: 30.29 mm (1.193 in)

Replace the caliper if necessary.



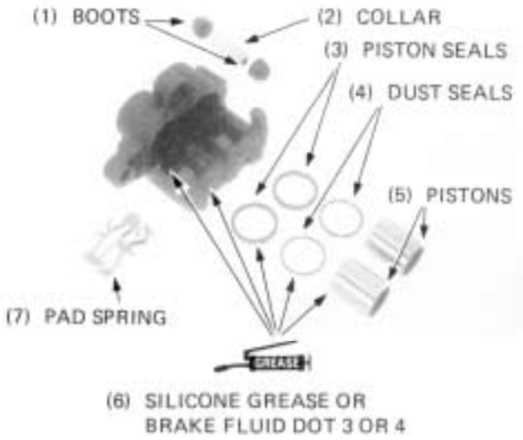
ASSEMBLY

WARNING

- ***A contaminated brake disc or pad reduces stopping power. Do not allow grease on the brake pads.***

CAUTION

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid; they are not compatible with each other.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*



Assemble the caliper in the reverse order of disassembly. The piston seals must be replaced with new one whenever removed. Lubricate the pistons and seals with a medium grade of Hi-Temperature silicone grease or brake fluid before assembly.

Be certain the piston seals are seated in the caliper groove. Place the pistons in the caliper with opening facing out.

Install the collar and its boots.

NOTE

- Fit the boot in the collar's groove properly.

Install the pad spring and the caliper pivot bolt.
Install the pads in the caliper and install the caliper.

Tighten the mount bolt.

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

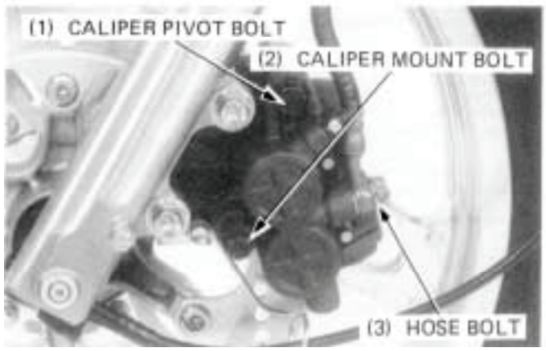
Tighten the caliper pivot bolt.

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

Install the brake hose with the bolt.

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

Fill the brake fluid reservoir and bleed the front brake system (page 14-4).



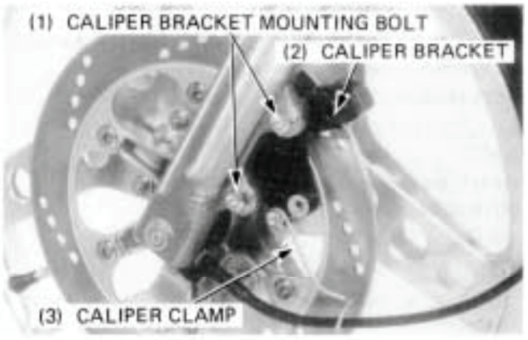
CALIPER BRACKET DISASSEMBLY

Remove the speedometer cable clamp.

Remove the caliper mount bolts and remove the caliper.

Remove the two caliper bracket mount bolts and remove the caliper bracket.

Remove the boot and the pad spring from the caliper bracket, making sure that they are in good condition.



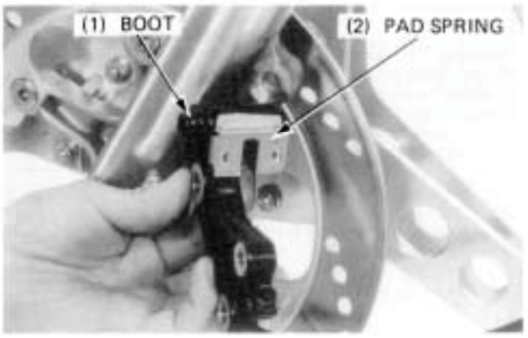
CALIPER BRACKET ASSEMBLY/INSTALLATION

Install the boot and the pad spring.

Attach the caliper bracket to the front fork.

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

Install the front caliper (page 14-11).



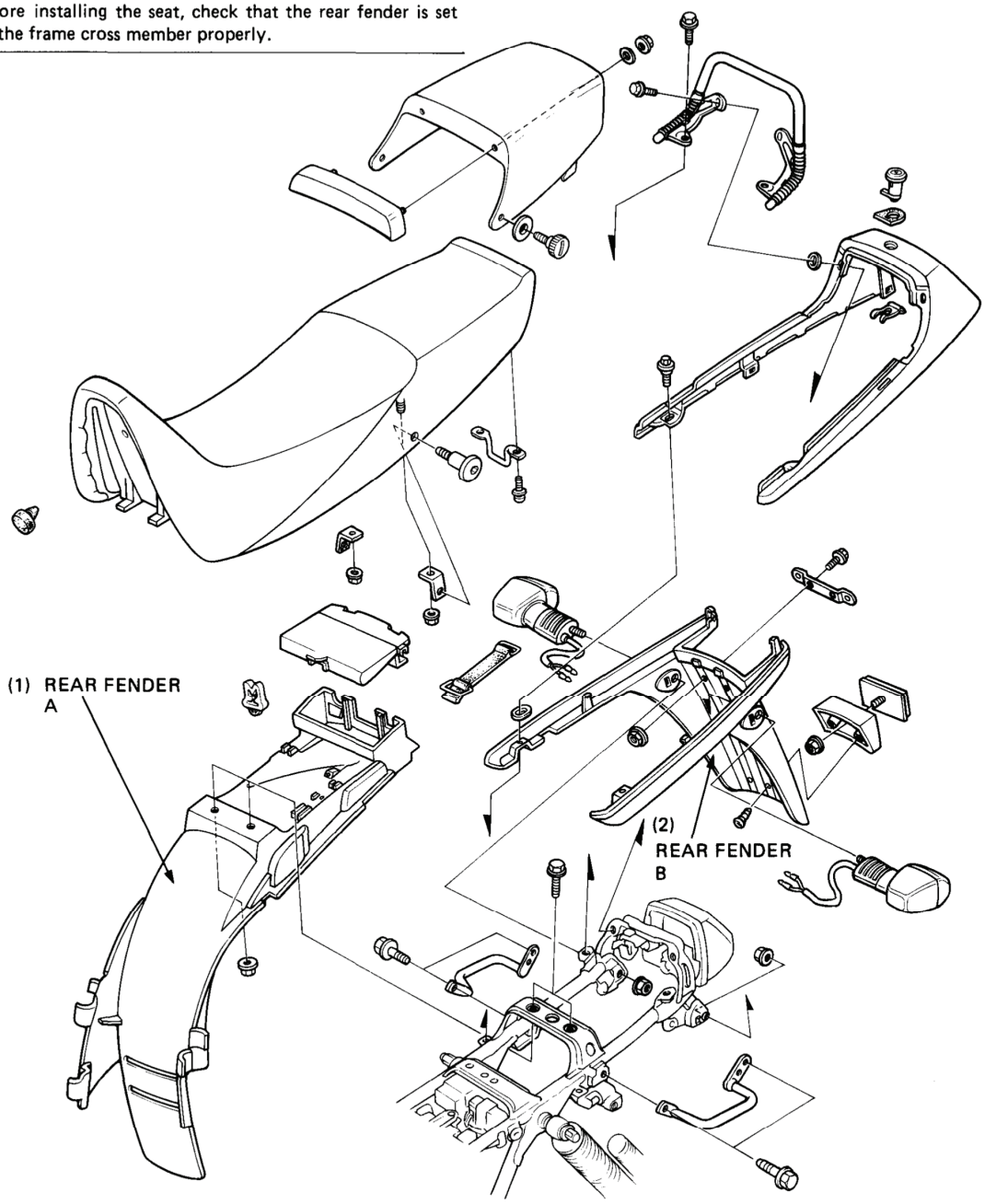
15. REAR FENDER/EXHAUST SYSTEM

REAR FENDER

Remove the mounting bolts. Slide the seat back and lift it off.
Remove the rear wheel (page 13-3).
Remove and separate rear fenders A and B.
Install in the revers order of removal.

NOTE

- Before installing the seat, check that the rear fender is set on the frame cross member properly.

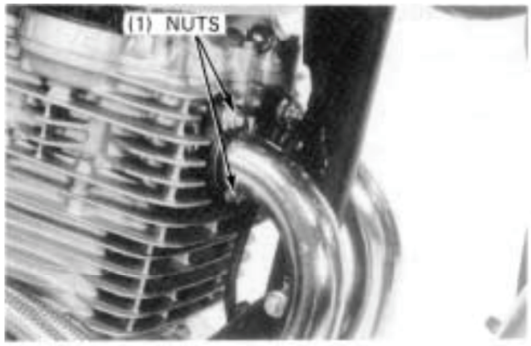


EXHAUST PIPE

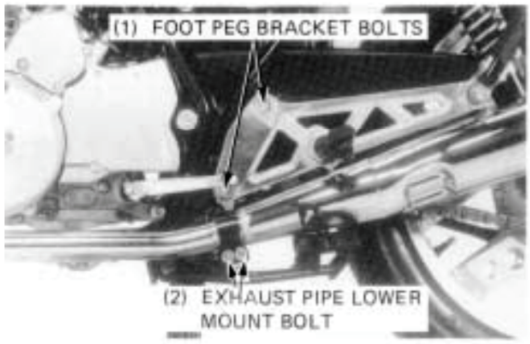
WARNING

- ***Do not service the exhaust pipe or muffler while they are hot.***

Remove the nuts attaching the pipe to the cylinder head.



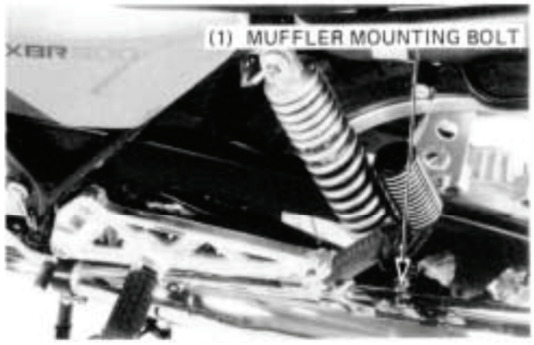
Remove the exhaust pipe lower mount bolt and loosen the foot peg bracket bolts.

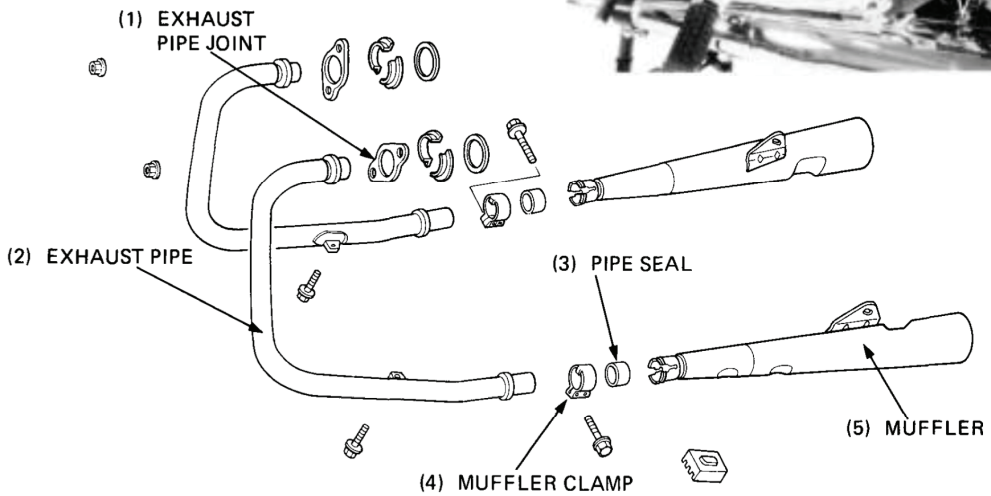


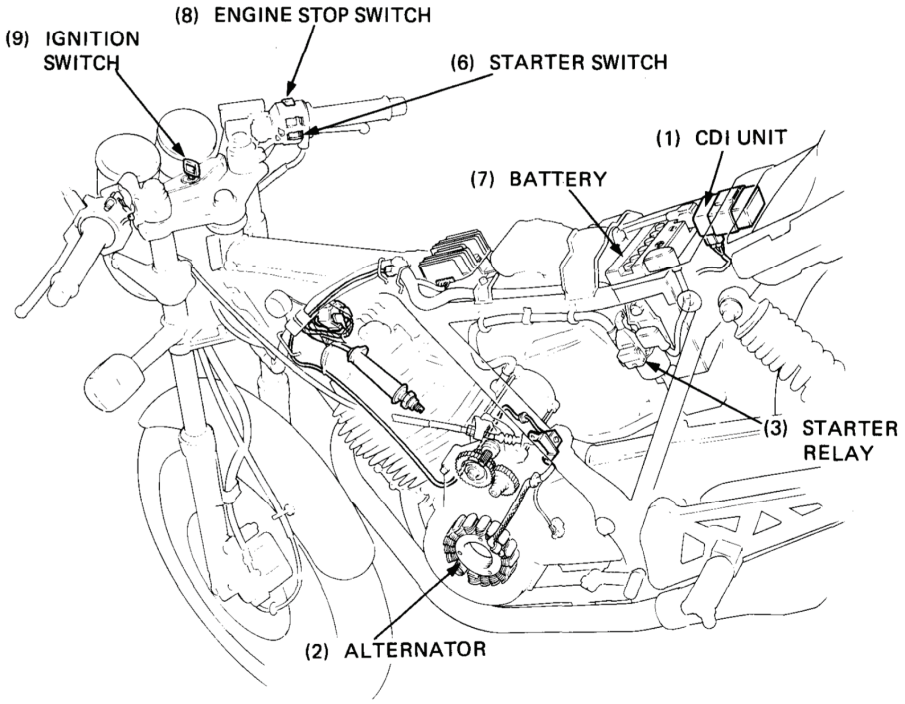
Remove the muffler mounting bolt and remove the exhaust pipe assembly.
Loosen the exhaust pipe and muffler clamp.
Separate the muffler from the exhaust pipe.
Install in the reverse order of removal.

NOTE

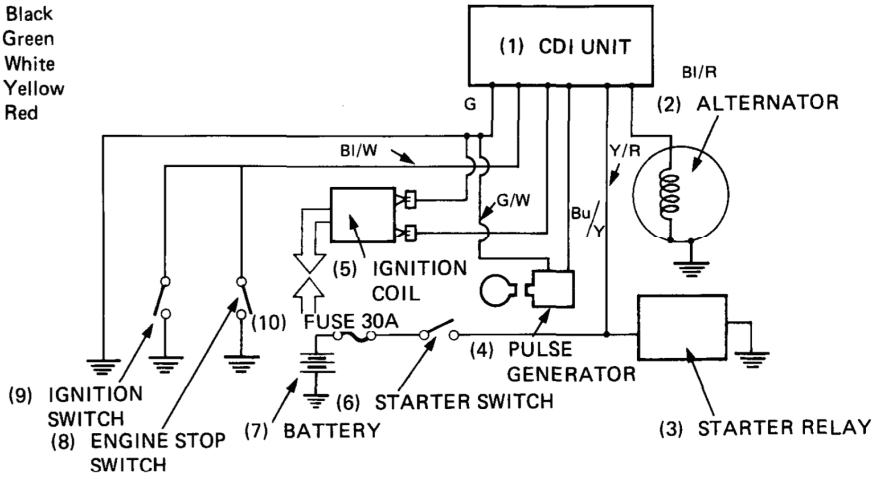
- After installing, make sure that there are no gas leaks.







(11) Bl: Black
(12) G: Green
(13) W: White
(14) Y: Yellow
(15) R: Red



16. IGNITION SYSTEM

SERVICE INFORMATION	16-1	ALTERNATOR EXCITER COIL	16-4
TROUBLESHOOTING	16-1	PULSE GENERATOR	16-4
IGNITION COIL	16-2	IGNITION TIMING	16-5
CDI UNIT	16-3		

SERVICE INFORMATION

GENERAL

- Ignition timing cannot be adjusted since the CDI (Capacitive Discharge Ignition) unit is non-adjustable. If ignition timing is incorrect, check the CDI unit, pulse generator and alternator and replace the faulty parts.
- For spark plug gap inspection and adjustment procedure, see page 3-7.
- For alternator removal and installation, see section 9.

SPECIFICATIONS

Spark plug:

DPR8EA-9 (NGK) or X24EPR-U9 (ND)	DPR9EA-9 (NGK) or X27EPR-U9 (ND) <G-II, SW types: DPR8EA-9 (NGK) or X24EPR-U9 (ND)>
DPR7EA-9 (NGK) or X22EPR-U9 (ND) <Except G-I, H types>	DPR8EA-9 (NGK) or X24EPR-U9 (ND) <G-II, SW types: DPR7EA-9 (NGK) or X22EPR-U9 (ND)>
DPR9EA-9 (NGK) or X27EPR-U9 (ND)	<G-II, SW types: DPR9EA-9 (NGK) or X27EPR-U9 (ND)>

Plug gap: 0.8–0.9 mm (0.031–0.035 in)

Ignition timing:	
Initial	8° ± 2° BTDC at 1,200 ± 100 min^{-1} (rpm)
Full advance	29° ± 2° BTDC at 5,000 min^{-1} (rpm)
Headlight	12V 60W/55W
Taillight	12V 21W/5W
Alternator	170 W/5,000 min^{-1} (rpm)

TROUBLESHOOTING

No spark at plug
- Engine stop switch "OFF"
- Poorly connected, broken or shorted wired
  - Between alternator and ignition coil
  - Between CDI unit and engine stop switch
  - Between CDI unit and ignition switch
  - Between ignition coil and plug
  - Between pulse generator and CDI unit
- Faulty ignition coil
- Faulty CDI unit
- Alternator faulty
- Faulty pulse generator
- Faulty ignition or engine stop switch

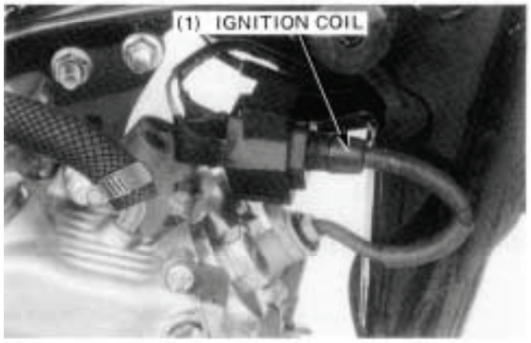
Engine starts but runs poorly
- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Faulty pulse generator
- Secondary circuit
  - Alternator faulty
  - CDI unit faulty
  - Faulty pulse generator

16

IGNITION COIL

REMOVAL

Remove the seat and fuel tank.
Disconnect the ignition coil primary wire and remove the ignition coil.

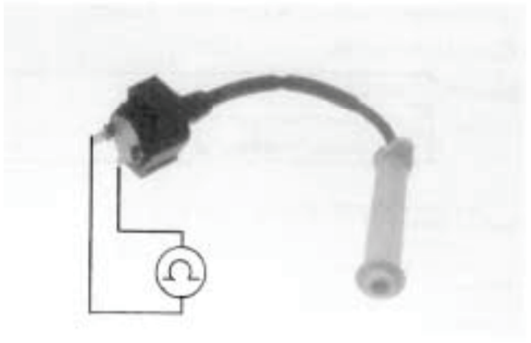


INSPECTION

CONTINUITY TEST

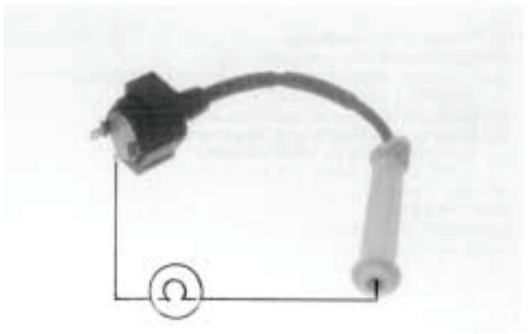
Measure the primary coil resistance.

RESISTANCE: 0.18 ± 0.02 ohm



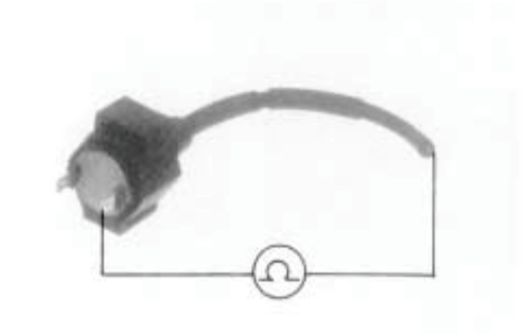
Measure the secondary coil resistance.

RESISTANCE: 5.18 ± 1.25 Kohm



Remove the spark plug cap from the wire and measure the secondary coil resistance.

RESISTANCE: 4.1 ± 0.4 Kohm



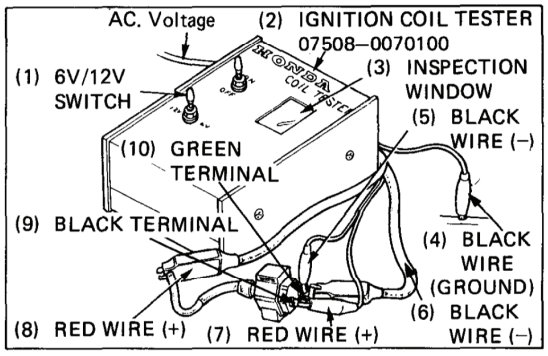
PERFORMANCE TEST

Check the ignition coil performance with the ignition coil tester (07508–0070100).

NOTE

- Follow the ignition coil tester manufacturer's instructions.

If sparks fail to jump across the electrodes in the tester inspection window, replace the ignition coil with a new one.



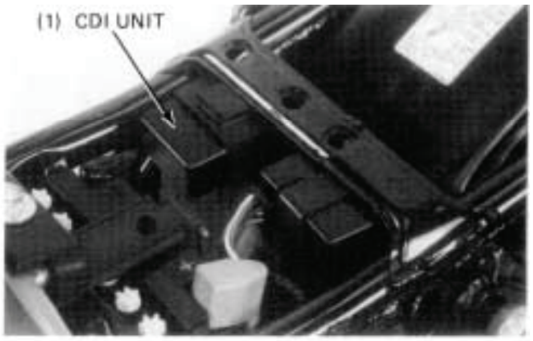
INSTALLATION

Install the ignition coil and connect the black/yellow wire connector to the black terminal of the coil and the green wire connector to the green terminal.

Install the spark plug cap.

CDI UNIT

Disconnect the CDI unit coupler and remove the CDI unit.



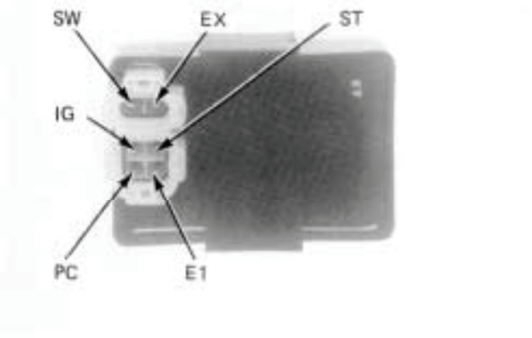
INSPECTION

CONTINUITY TEST

Replace the CDI unit if the readings are not within the limits shown in the table.

NOTE

- The CDI unit is fully transistorized. For accurate testing, it is necessary to use a specified electrical tester. Use of an improper tester may give false readings.
- Use Sanwa Electric Tester (07308–0020000), Kowa Tester (TH-5H-1) or Kowa Digital Multitester (07411–0020000).



Set the tester on the R x kΩ

Unit: kΩ

(+) / (–)	SW	EXT	PC	E	IGN	ST
SW		∞	∞	∞	∞	∞
EXT	0.1 ~ 20		∞	∞	∞	∞
PC	30 ~ 300	10 ~ 200		1 ~ 100	∞	∞
E	1 ~ 50	0.1 ~ 20	1 ~ 100		∞	∞
IGN	∞	∞	∞	∞		∞
ST			∞		∞	

PERFORMANCE TEST

Inspect the CDI unit with CDI tester.

NOTE

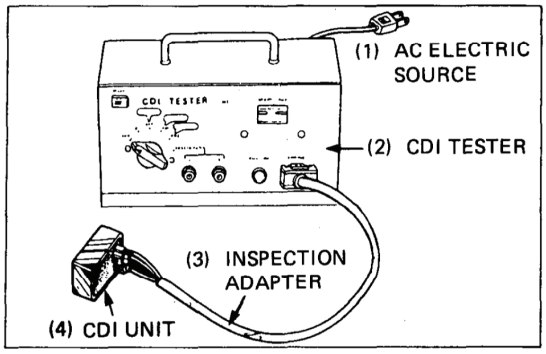
- Follow the CDI tester manufacturer's instructions.

TOOL:
Inspection adapter (Al) 07508–0012300

Connect the special adapter to the CDI unit and CDI tester.

TESTER SWITCH POSITION	CDI UNIT GOOD	CDI UNIT FAULTY
1. OFF	No spark	———
2. P		———
3. EXT		Sparks jump
4. ON1	Sparks jump	No spark
5. ON2		

Replace the CDI unit with a new one if necessary.



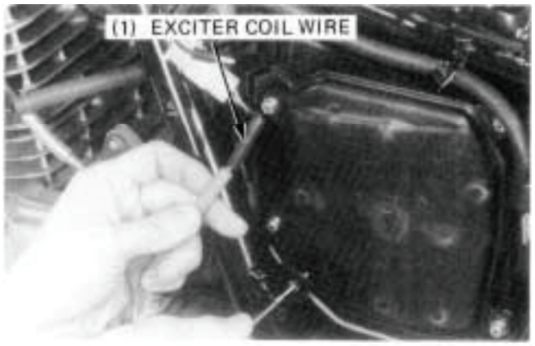
ALTERNATOR EXCITER COIL

NOTE

- It is not necessary to remove the stator coil to make this test.

Remove the seat and left side cover.
Disconnect the exciter coil wire.
The exciter coil is in good condition if there is continuity between the black/red wire terminal and ground.

RESISTANCE: 100–250 ohm

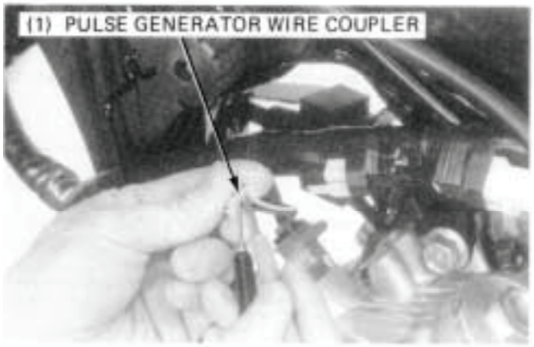


PULSE GENERATOR

INSPECTION

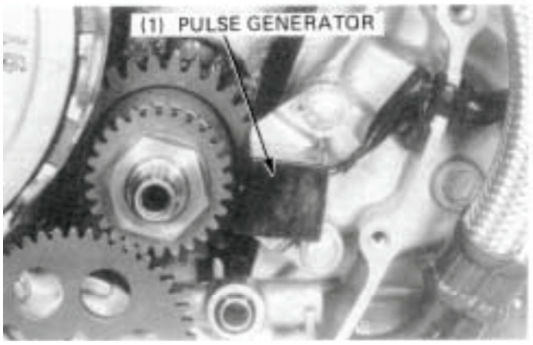
Remove the seat and fuel tank.
Disconnect the pulse generator wire coupler.
Measure the resistance between green/white and blue/yellow.

RESISTANCE: 470–570 ohm



REMOVAL

Remove the right crankcase cover (page 8-3).
Disconnect the pulse generator coupler.
Remove the two bolts attaching the pulse generator and the generator.



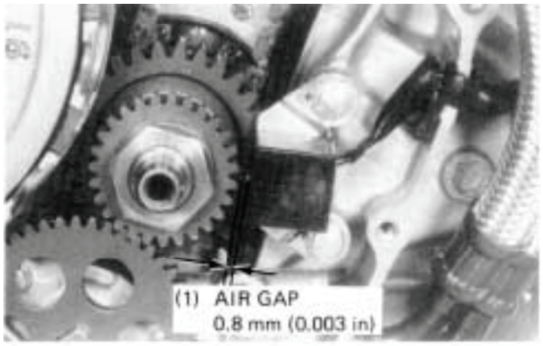
INSTALLATION

Install the pulse generator.
Install the wire grommet in the groove of the right crankcase securely.

Turn the crankshaft clockwise and align the pulse generator rotor tooth with the pulse generator pickup and measure the air gap with a feeler gauge.

AIR GAP: 0.8 mm (0.03 in)

Install the right crankcase cover (page 8-19).



IGNITION TIMING

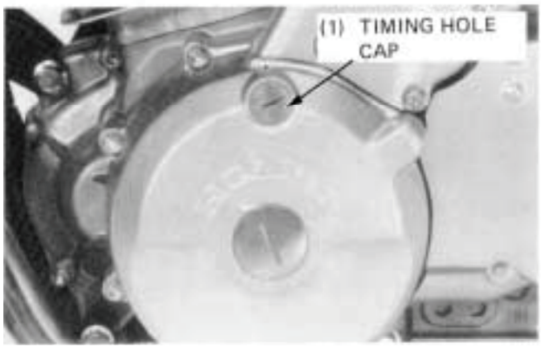
Remove the timing hole cap.
Connect a tachometer and a timing light.

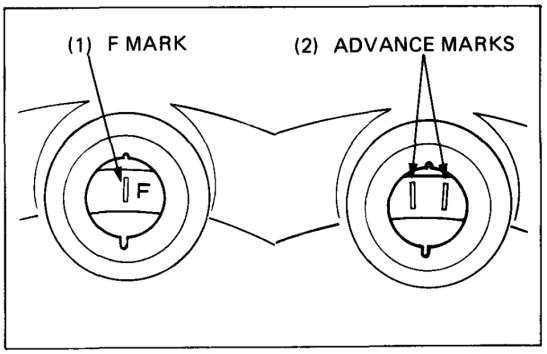
Start the engine and allow it to idle.

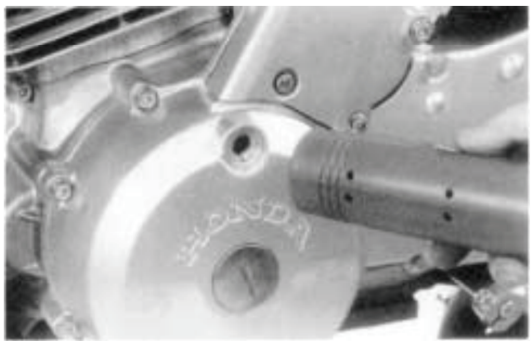
IDLE SPEED: 1,200 ± 100 min^{-1} (rpm)

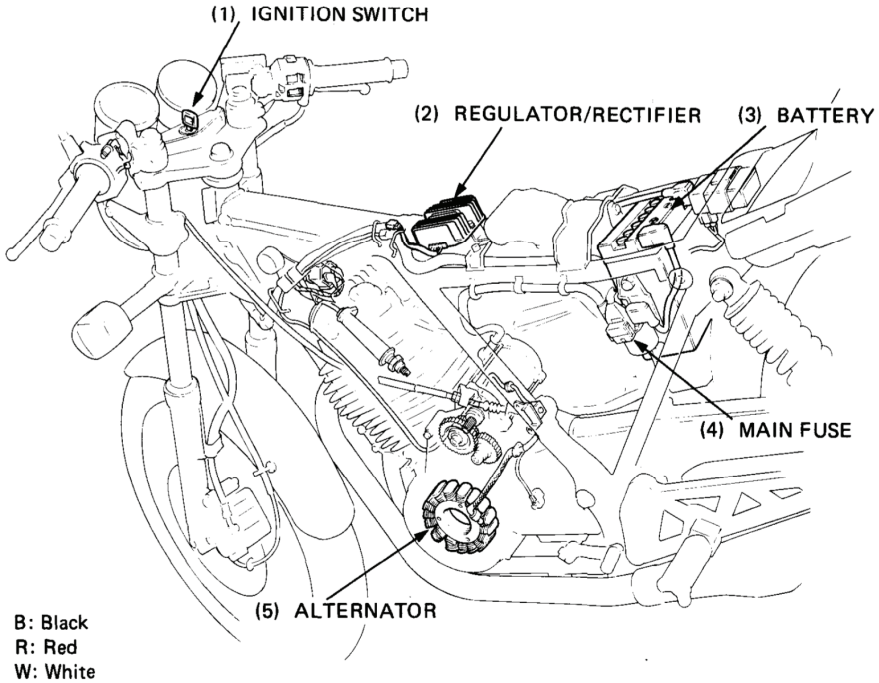
The timing is normal if the **F** mark aligns with the index notch.
Start the engine and let it run at 2,000–2,200 min^{-1} (rpm).
The F mark should move to the right.

The index notch should be between the advance marks at 6,000 min^{-1} (rpm).

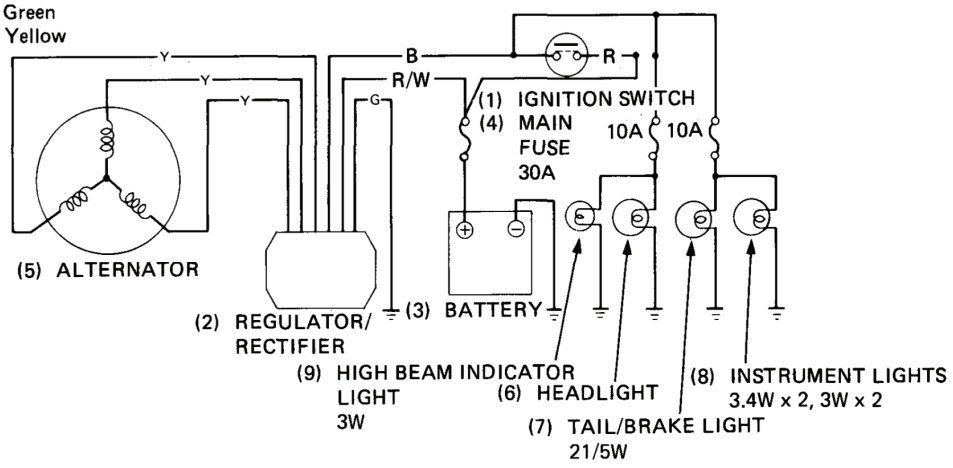








(10) B: Black
(11) R: Red
(12) W: White
(13) G: Green
(14) Y: Yellow



17. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	17-1	BATTERY CHARGING SYSTEM	17-3
TROUBLESHOOTING	17-1	ALTERNATOR	17-5
BATTERY	17-2	VOLTAGE REGULATOR/RECTIFIER	17-5

TROUBLESHOOTING

GENERAL

- The battery electrolyte level should be checked regularly. Fill with distilled water as necessary.
- Quick charge the 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 hove flames near a charging battery. The hydrogen gas produced by a battery is highly flammable and can explode.***

- For Alternator removal and installation, refer to Section 9.
- All charging system components can be tested on the motorcycle.

SPECIFICATIONS

Battery	Capacity		12V, 12 ampere-hours	
	Specific gravity at 20°C (68°F)	Fully charged	1.280	
		Normal charged	1.260	
		Need charging	1.200	
	Charging rate		1.2 amperes max.	
Alternator capacity			12V, 170W/5,000 min^{-1} (rpm)	
Regulator/rectifier	Type		Transistorized, non-adjustable	
	Regulated voltage		14–15V	
Charging current	Charging start rpm		1,000–1,200 min^{-1} (rpm)	
	At idle		(+) 8A/Above 14V	Light OFF
	At 3,000 min^{-1} (rpm)		(+) 12.5A/14–15V	
	At 8,000 min^{-1} (rpm)		(+) 13.5A/14–15V	

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

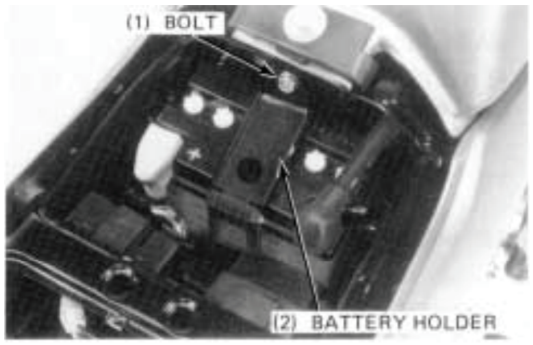
Low power – engine running
- Battery undercharged
  - Low fluid level
  - One or more dead cells
- Charging system failure

Intermittent power
- Loose battery connection
- Loose charging system connection
- Loose starting system connection
- Loose connection or short circuit in ignition system
- Loose connection or short circuit in lighting system

Charging system failure
- Loose, broken, or shorted wire or connection
- Faulty voltage regulator/rectifier
- Faulty alternator

BATTERY

REMOVAL



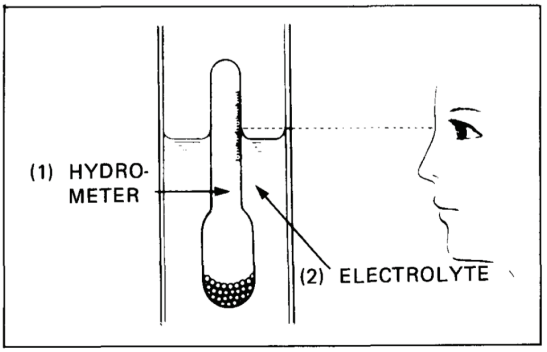
Remove the seat.
Remove the bolt and open the battery holder.
Disconnect the negative terminal, then positive terminal at the battery.
Remove the battery.

CAUTION

- *Make sure the positive cable is not forced against any metal parts, otherwise a short may occur.*

SPECIFIC GRAVITY TEST

Test each cell by drawing electrolyte into a hydrometer.

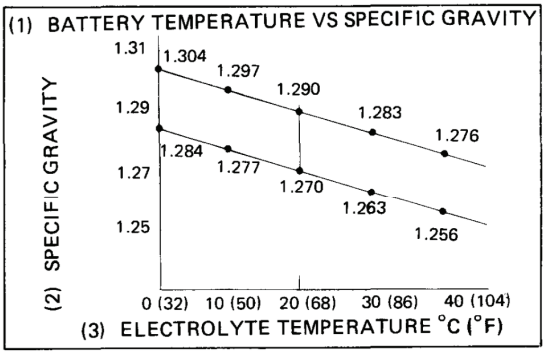


SPECIFIC GRAVITY (20°C/68°F)

1.280	**Fully charged**
1.260 or below	**Undercharged**

NOTE

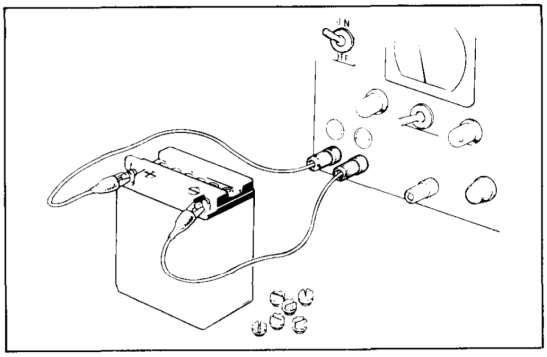
- The battery must be recharged if the specific gravity is below 1.20.
- The specific gravity varies with the temperature as shown.
- Replace the battery if sulfation is evident.
- The battery must be replaced if there is sediment on the bottom of the cell.



WARNING

- ***The battery electrolyte contains sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote: Flush with water and call a doctor if electrolyte gets in your eyes.***

When the specific gravity reading is low, the battery must be recharged. Slow-charge the battery; do not quick charge it.



Remove the battery cell caps.
Charge until specific gravity reaches 1.260–1.280.

CHARGING RATE: 1.2 ampers maximum

The reading should remain stable for at least one hour after charging.

Check electrolyte level periodically.
After charging, wash the battery with water.

WARNING

- ***Before charging a battery, remove the cap from each cell.***
- ***Keep fire and sparks away from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals.***
- ***Discontinue charging if the electrolyte temperature exceeds 45°C (117°F).***

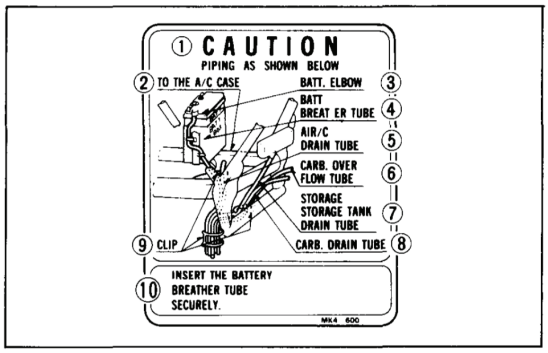
CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*

After installing the battery, coat the terminals with clean grease.

CAUTION

- *Route the breather tube as shown on the battery caution label.*



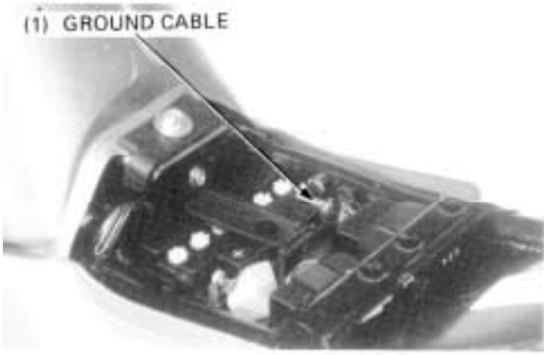
BATTERY CHARGING SYSTEM

LEAKAGE INSPECTION

Inspect the battery voltage leakage before charging system inspection.

Turn the ignition switch OFF. Remove the ground cable from the battery.
Connect the voltmeter between the ground cable and battery (−) terminal.

The voltmeter should indicates 0V with the ignition switch off.





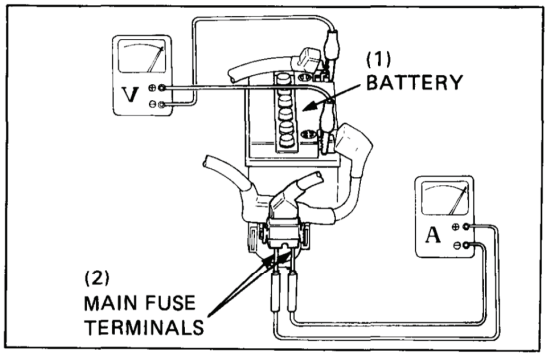
CHARGING SYSTEM INSPECTION

NOTE

- Use a fully charged 12V battery (electrolyte specific gravity above 1.260) to test the charging output. Use of a low battery will result in false readings.

Start the engine and warm it up to operating temperature.

Remove the main fuse; connect an ammeter to the positive (+) and negative (−) terminals of the fuse holder as shown.



NOTE

- Use an ammeter which can measure the rate of flow of current in both directions.
- Do not hook up an ammeter between the battery positive (+) terminal and the positive (+) cable of the battery. Failure to do so can lead to a broken ammeter.

Connect a voltmeter between the positive and negative terminals of the battery.

Start the engine and take the readings on the meters:

- Gradually raise the engine speed from the idle to find the speed at which the output is ±0A/14–15V.

CHARGING START: 1,000–1,200 min^{-1} (rpm)

If the ammeter shows discharging even when the engine speed is raised, the probabilities are:

- Short circuit (excessive current draw)
- Overcharged battery
- Faulty alternator
- Loose or poor contact between alternator and regulator/rectifier.

If the ammeter shows charging even when the engine speed is lowered, this is an indication of:

- Faulty voltage regulator/rectifier
- Discharged battery

If the output voltage is outside of 14–15V when the engine speed is increased, the likelihood is:

- Faulty voltage regulator/rectifier

ALTERNATOR OUTPUT TEST

NOTE

- Use a fully charged 12V battery (electrolyte specific gravity above 1.260) to test the charging output. Use of a low battery will result in false readings.

Warm up the engine.
Connect an ammeter and voltmeter in the same manner as the charging system inspection.
Disconnect the black wire from the regulator/rectifier coupler.
Start the engine and check the charging output at the speeds shown in the chart.

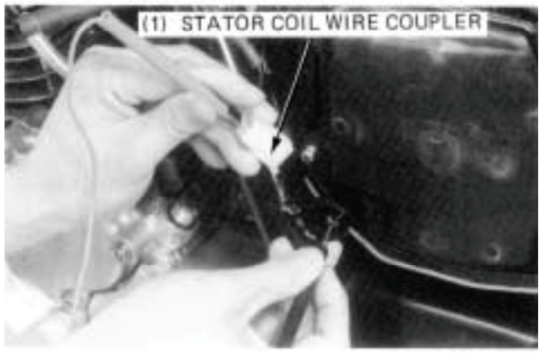
CHARGING OUTPUT SPECIFICATIONS (Light off)

ENGINE RPM	AMPERAGE	VOLTAGE
1,200 min^{-1} (rpm)	(+) 8A	ABOVE 12V
3,000 min^{-1} (rpm)	(+) 12.5A	14–15V
8,000 min^{-1} (rpm)	(+) 13.5A	14–15V

ALTERNATOR

STATOR COIL INSPECTION

Remove the left side cover.
Disconnect the alternator-to-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

Remove the seat and fuel tank.
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.



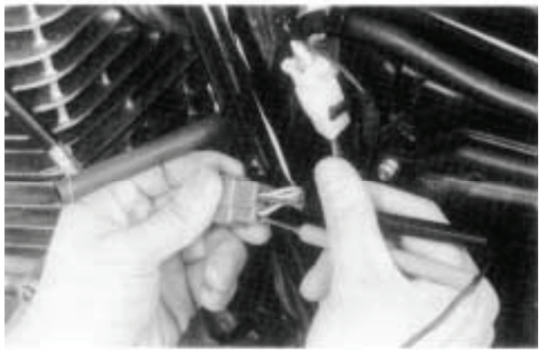
NORMAL DIRECTION: CONTINUITY

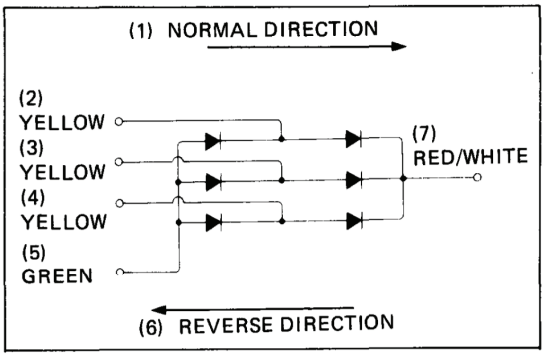
	+ probe	− probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

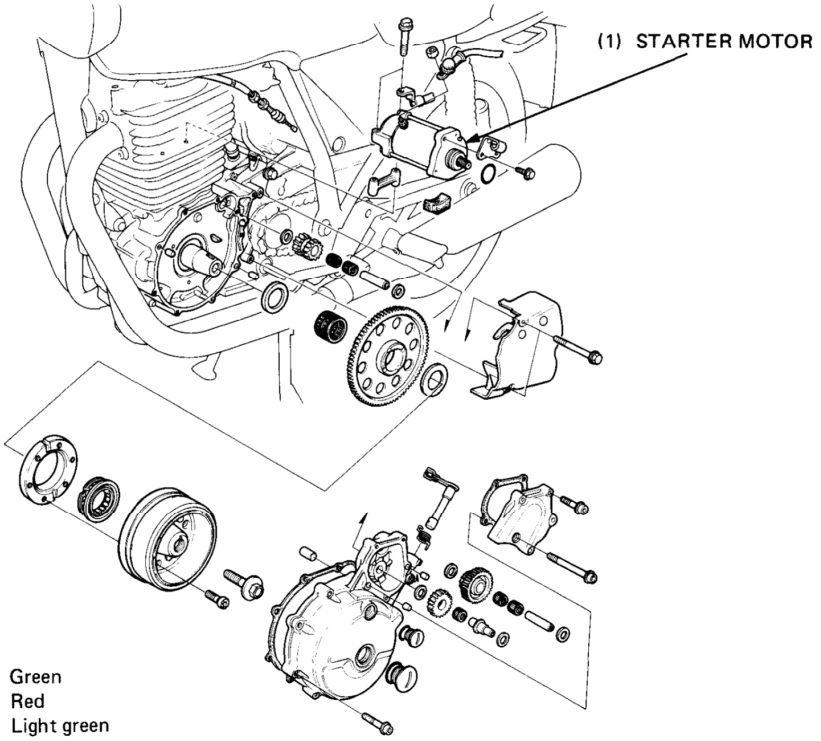
REVERSE DIRECTION: NO CONTINUITY

	+ probe	− probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE

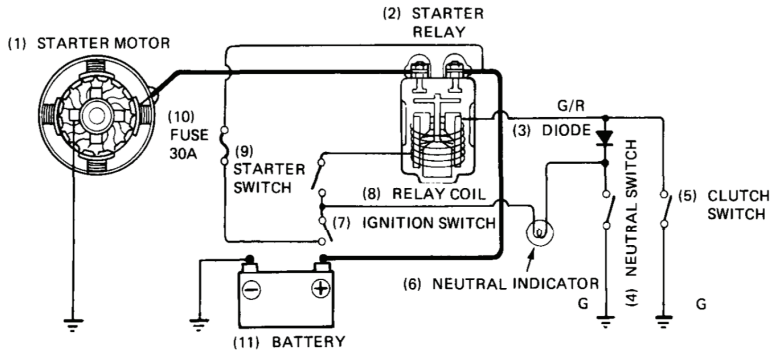
Remove the regulator/rectifier mounting bolts and the regulator/rectifier.
Replace the regulator/rectifier if necessary.







(12) G: Green
(13) R: Red
(14) Lg: Light green



18. ELECTRICAL STARTER SYSTEM

SERVICE INFORMATION	18-1	STARTER MOTOR	18-5
TROUBLESHOOTING	18-1	STARTER RELAY SWITCH	18-7
STARTER IDLE GEARS	18-2	CLUTCH SWITCH DIODE	18-7
STARTER CLUTCH/DRIVEN GEAR	18-2		

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	800 g (28.2 oz)	680 g (23.9 oz)
	Brush length	12 mm (0.47 in)	5.5 mm (0.22 in)

TORQUE

Starter clutch torx bolt	28–32 N·m (2.8–3.2 kg-m, 20–23 ft-lb)

TOOL

SPECIAL

Torx bit (40)	07703–0010100

TROUBLESHOOTING

Starter motor will not turn
- Dead battery
- Faulty ignition switch
- Faulty starter switch
- Faulty neutral switch
- Faulty starter relay switch
- Loose or disconnected wires
- Faulty clutch switch

Starter motor turns engine slowly
- Low battery
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns: but engine does not turn
- Faulty starter drive pinion
- Faulty starter idle gear

Starter motor and engine turn, but engine does not start
- Faulty ignition system
- Engine problem
- Faulty engine stop switch

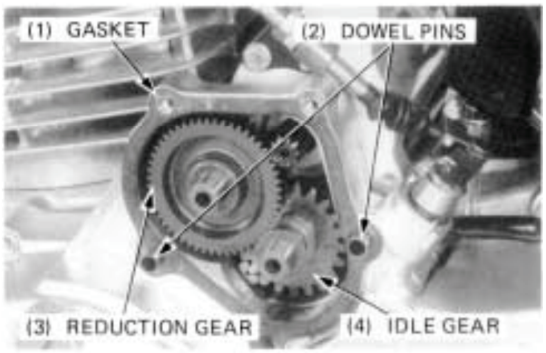
STARTER IDLE GEARS

REMOVAL

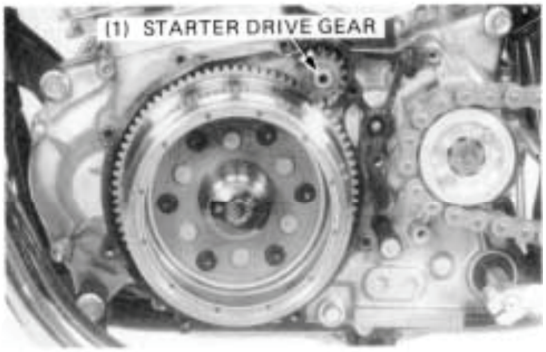
Remove the starter gear cover.



Remove the gasket and dowel pins.
Remove the washers, starter reduction and idle gears.
Then remove the needle bearings from the gear shafts.



Remove the left crankcase cover (page 9-2).
Remove the washer and starter drive gear.

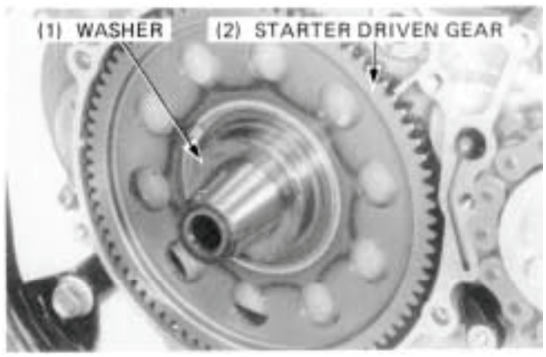


INSPECTION

Inspect the starter gears needle bearings for wear or damage.
Check the starter gears for excessive wear or damage.
Replace if necessary.

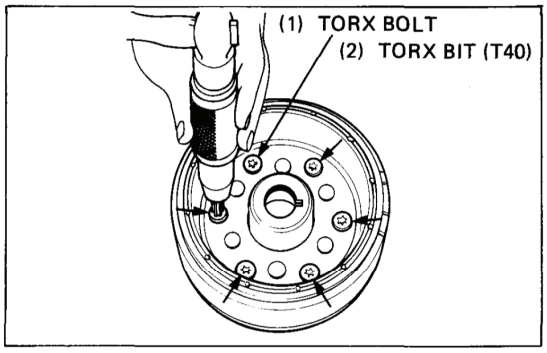
STARTER CLUTCH/DRIVEN GEAR

Remove the flywheel with the flywheel holder (page 9-3).
Remove the washer and starter driven gear.



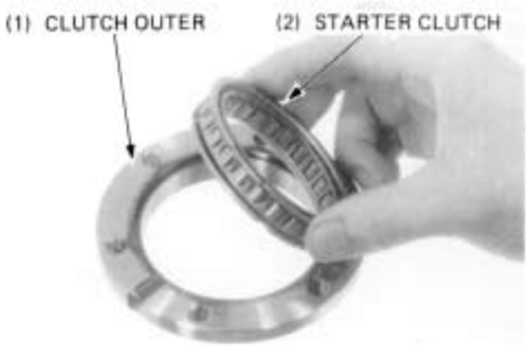
Remove the six torx bolts attaching the starter clutch to the flywheel and remove the starter clutch and clutch outer.

TOOL:
Torx bit (T40) **07703–0010100**



INSPECTION/ASSEMBLY

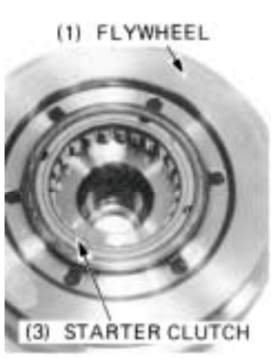
Inspect the starter clutch for smooth operation and the rollers for excessive wear or damage.
Install the starter clutch onto the clutch outer.

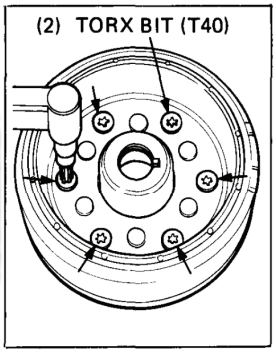


Install the starter clutch and clutch outer onto the flywheel. Apply a locking agent to the six torx bolt threads and tighten the bolts using the torx bit.

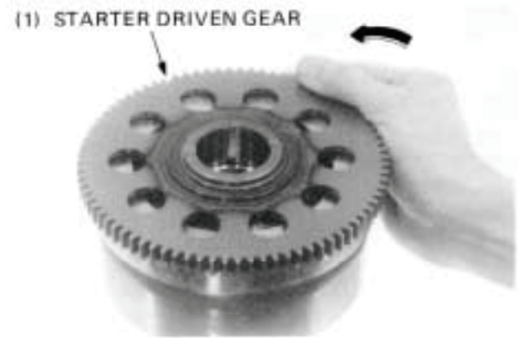
TORQUE: 28–32 N·m (2.8–3.2 kg-m, 20–23 ft-lb)

TOOL:
Torx bit (T40) **07703–0010100**



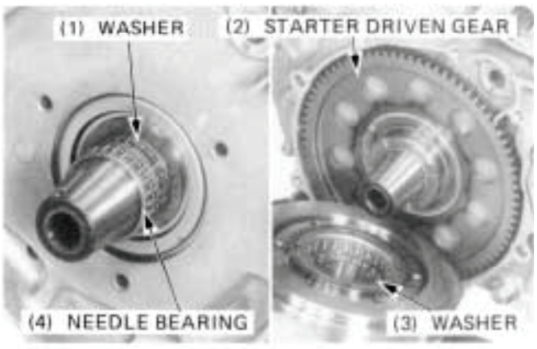


Install the starter driven gear onto the starter outer.
The starter driven gear should turn counterclockwise freely and should not turn clockwise.

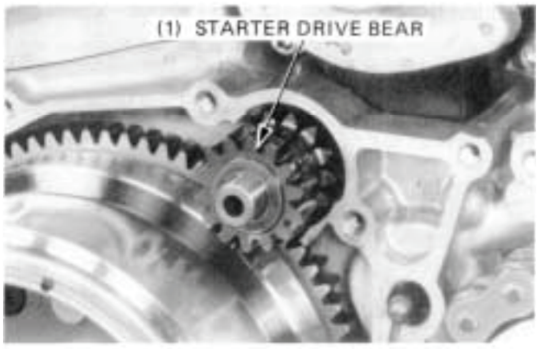


INSTALLATION

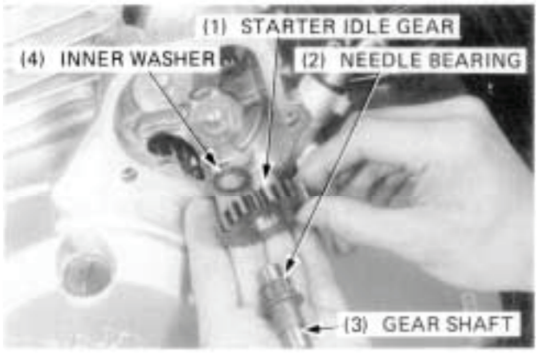
Install the inner washer and needle bearing onto the crankshaft.
Install the starter driven gear and outer washer.
Install the flywheel (page 9-4).



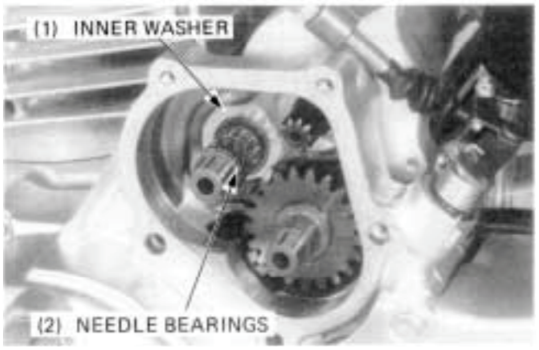
Assemble the needle bearings, drive gear and inner and outer washer onto the gear shaft.
Install them onto the left crankcase.
Install the left crankcase cover (page 9-4).



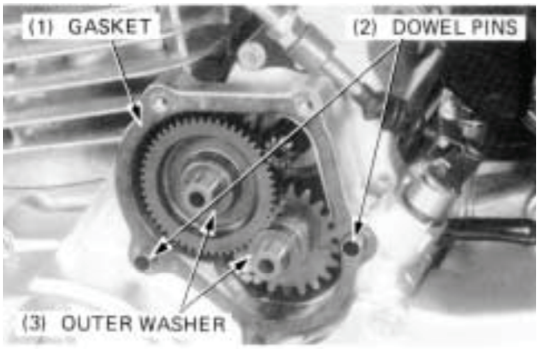
Assemble the needle bearing, starter idle gear and inner washer onto the gear shaft.
Install them onto the left crankcase cover.



Assemble the inner washer, needle bearing onto the gear shaft and install them to the left crankcase cover.
Install the starter reduction gear onto the gear shaft.



Install the outer washers onto the gear shafts.
Install the gasket and dowel pins.
Install the starter gear cover and bolts.
Tighten the bolts.



STARTER MOTOR

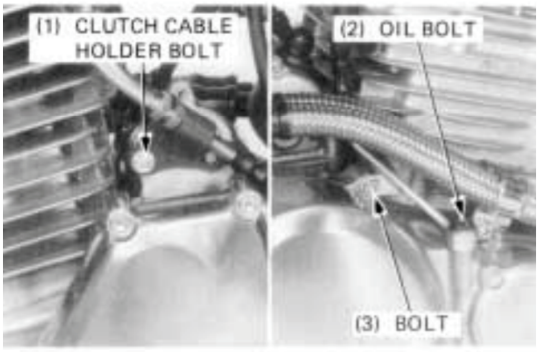
REMOVAL/DISASSEMBLY

Remove the clutch cable holder bolt.

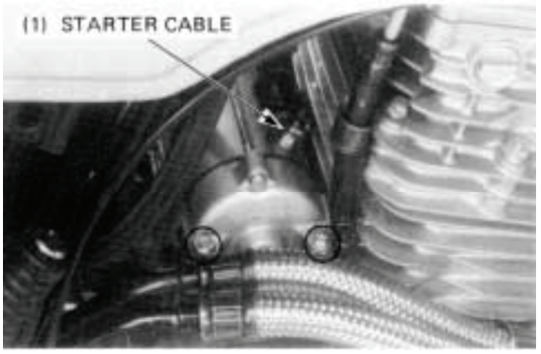
WARNING

- ***With the ignition switch off, remove the negative cable at the battery before servicing the starter motor.***

Remove the bolt, oil hose bolt, sealing washers and disconnect the oil hose from the right crankcase cover.

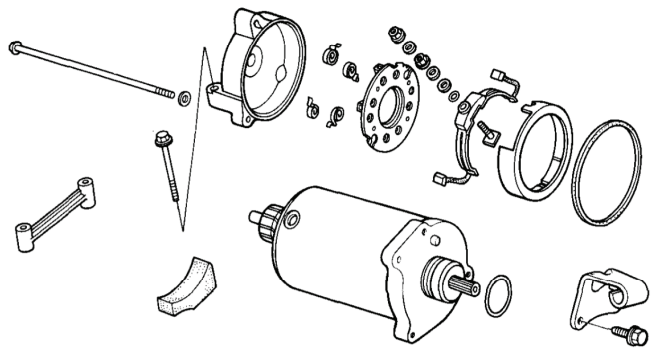


Disconnect the starter cable at the motor.
Remove the starter motor mounting bolts and mount base.
Remove the starter motor.



NOTE

- Record the location and number of the thrust washers and insulator washer.

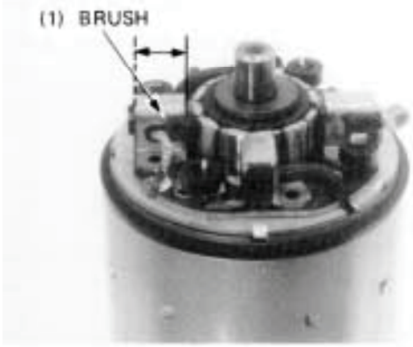


BRUSH INSPECTION

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length:	**5.5 mm (0.22 in)**
Brush spring tension:	**680 g (23.9 oz)**

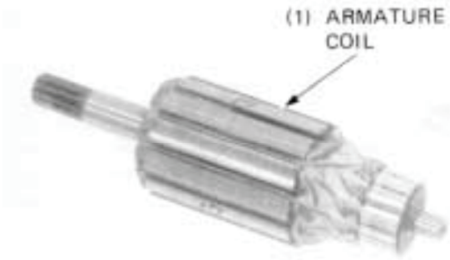


COMMUTATOR INSPECTION

Remove the starter motor case.
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.

NOTE

- Do not use emery or sand paper on the commutator.



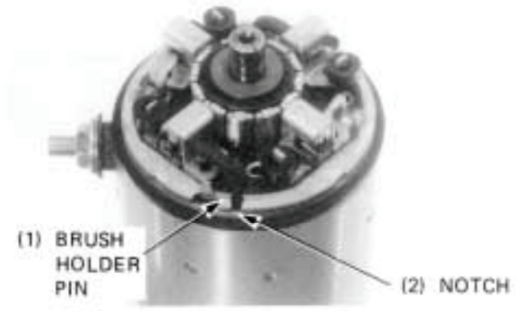
Check for continuity between pairs of commutator bars. Also, make a resistance check between individual commutator bars and the armature shaft.
There should be no continuity.



(1) CONTINUITY BETWEEN COMMUTATOR BAR PAIRS: NORMAL
(2) NO CONTINUITY BETWEEN COMMUTATOR BARS AND ARMATURE SHAFT: NORMAL

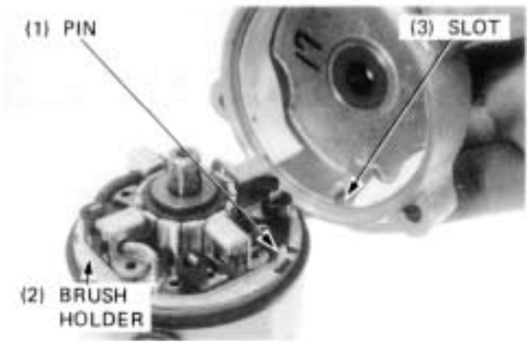
ASSEMBLY/INSTALLATION

Assemble the starter motor. Align the case notch with the brush holder pin.



Install the rear cover aligning its slot with the brush holder pin.

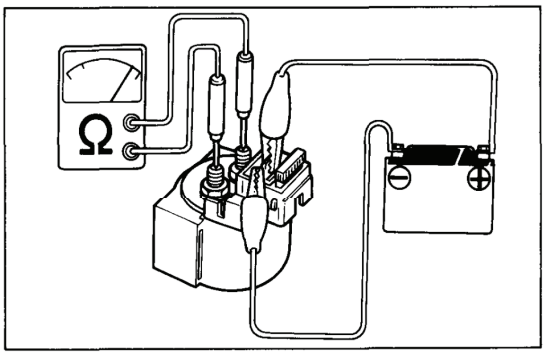
Install the starter motor in the reverse order of removal.



STARTER RELAY SWITCH

Connect an ohmmeter and 12V battery to the starter relay switch as shown.

The switch is normal if there is continuity with the battery connected and there is no continuity without the battery connected.



CLUTCH SWITCH DIODE

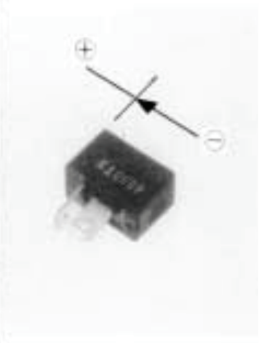
Remove the seat.
Remove the clutch diode from the wire harness.

INSPECTION

Check for continuity with an ohmmeter.

NORMAL DIRECTION: CONTINUITY
REVERSE DIRECTION: NO CONTINUITY





19. LIGHT/SWITCHES/INSTRUMENT

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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.
- Isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle – by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals or connections.

SPECIFICATIONS

Headlight	12V 60/55W
Brake and taillight	21/5W
Turn signal light	21W
Speedometer light	3.4W x 2
Tachometer light	3W x 2
Neutral indicator	3W
Turn signal indicator	3W
High beam indicator	3W

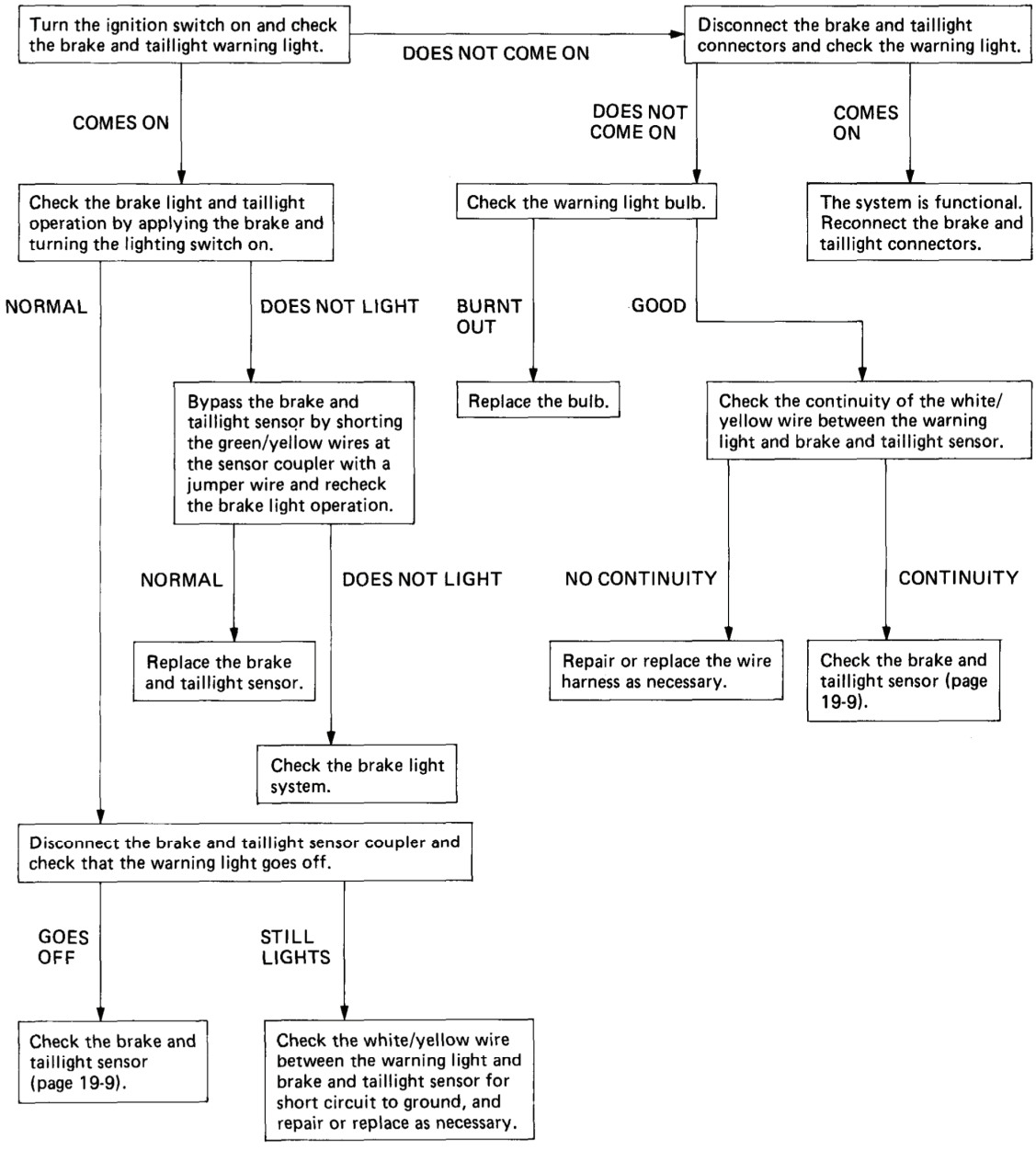
TROUBLESHOOTING

No lights come on when ignition switch is turned ON:
- Bulb at fault or burned out
- Faulty switch
- Wiring to that component has open circuit
- Fuse blown
- Wiring loose, broken, or at fault
- Battery dead or disconnected

All lights come on, but dimly, when ignition switch is turned ON:
- Battery voltage low
- Wiring or switch has excessive resistance

Headlight beam does not shift when HI-LO switch is operated:
- Beam filament burned out
- Faulty dimmer switch

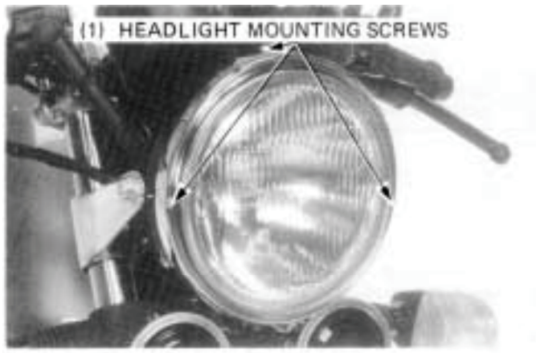
BRAKE AND TAILLIGHT WARNING SYSTEM



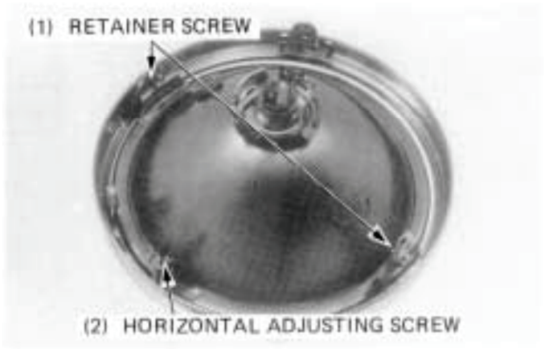
BULB REPLACEMENT

HEADLIGHT

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



Remove the retaining screws, horizontal adjusting screw and sealed beam unit from the rim.
Assemble the headlight in the reverse order of disassembly.
After installation, adjust the headlight aim.

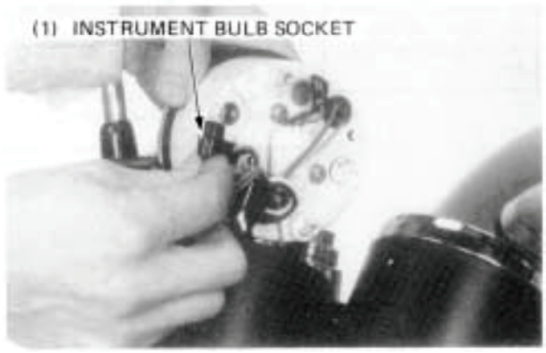


INSTRUMENTS

Remove the headlight case bolts.
Disconnect the speedometer cable and instrument cover screws.



Replace the instrument bulb sockets.
Replace any burnt out bulbs.
After installing a new bulb, check for continuity.
If the bulb does not light, inspect the wiring for an open or short circuit.
Remove the instrument, if necessary.



TAIL/BRAKE LIGHT

Remove the seat.
Remove the tool box cover and tool kit.
Remove the tail/brake light socket and bulb.
Disconnect the connectors, if necessary.



TURN SIGNAL

Remove the turn signal mounting screw and bulb socket.
Replace any burnt out bulb.



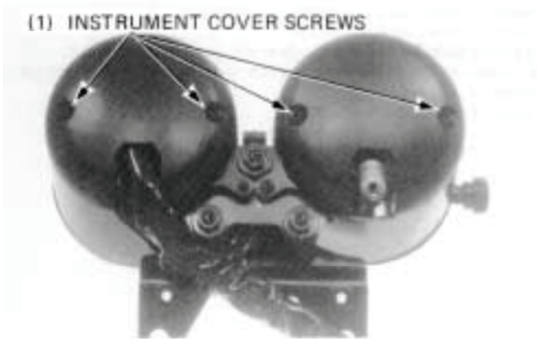
INSTRUMENTS

REMOVAL

Remove the headlight (page 19-2).
Disconnect the instrument wire couplers and speedometer cable.
Remove the fuse holder and instrument mounting bolts.
Remove the instruments.

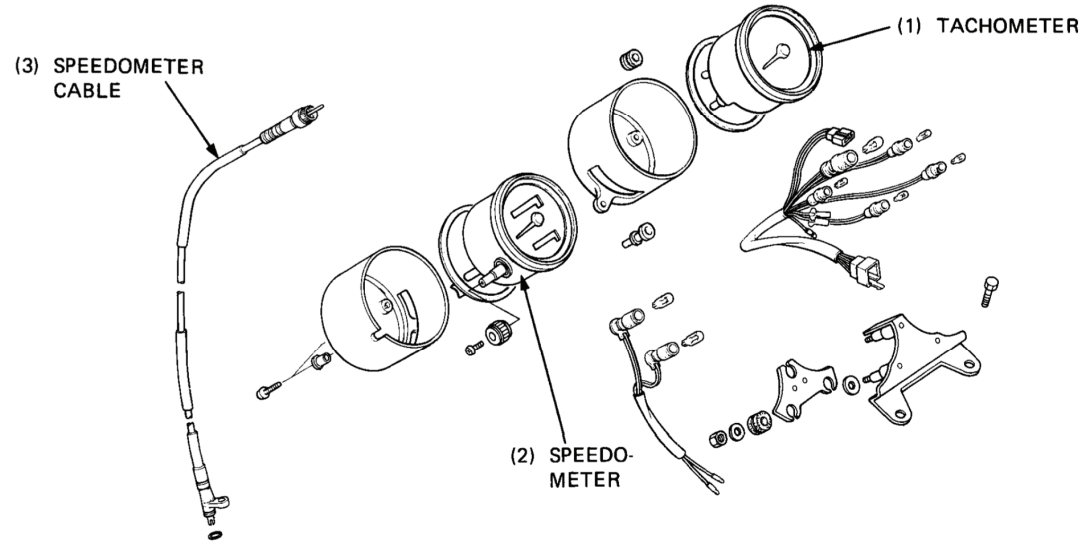


Remove the instrument cover screws.



ASSEMBLY/INSTALLATION

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



IGNITION SWITCH

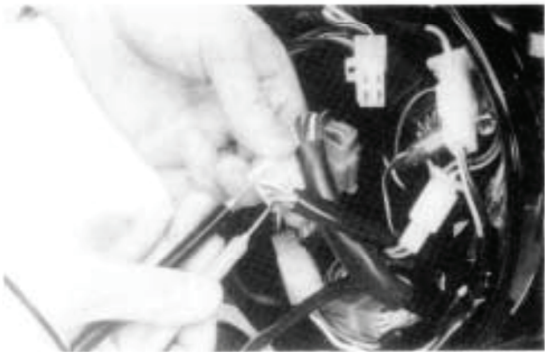
INSPECTION

Remove the headlight (page 19-2).
Disconnect the ignition switch coupler and check continuity of terminals on the ignition switch coupler in each switch position.

SWITCH POSITION
LOCK: No continuity
OFF: No continuity
ON: R to Bl, Br/W to Br – Continuity
PARK: Y/B to R – Continuity

Color / Position	Y/Bl	R	Bl	Br/W	Br	Bl/W	G
ON		○—○		○—○			
OFF						○—○	
P	○—○					○	○
LOCK						○—○	





REMOVAL/DISASSEMBLY

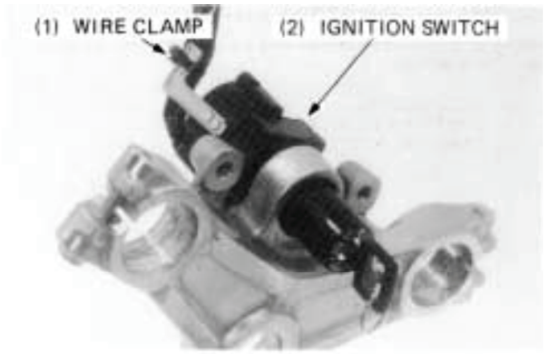
Remove the headlight (page 19-2).
Disconnect the ignition switch coupler.
Remove the fuse holder cover and fuse holder from the top bridge.
Remove the handlebar by removing the retainer rings and loosening the pinch bolts.
Remove the steering stem nut.
Loosen the front fork upper pinch bolts and remove the top bridge.
Remove the wire clamp from the switch.

Turn the ignition key so it is partway between the ON and OFF detent positions.
Remove the screws and push the lugs that are locked in the slots, then pull the contact base from the switch.

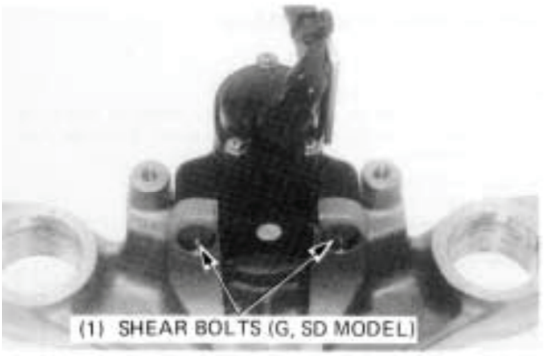
NOTE

- ON G, SD model, remove the shear bolts that attach the cylinder to the top bridge, using the drill to remove the ignition switch. Install a new cylinder and tighten the shear bolts until the bolt head twists off.

Install the contact base and top bridge in the reverse order of removal.

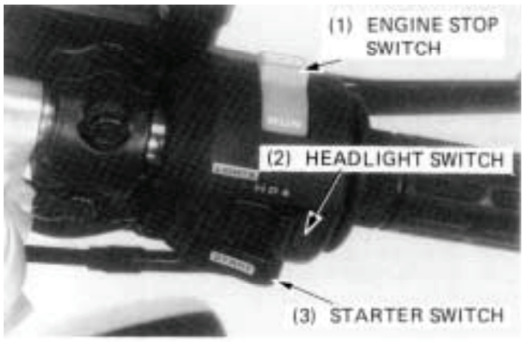


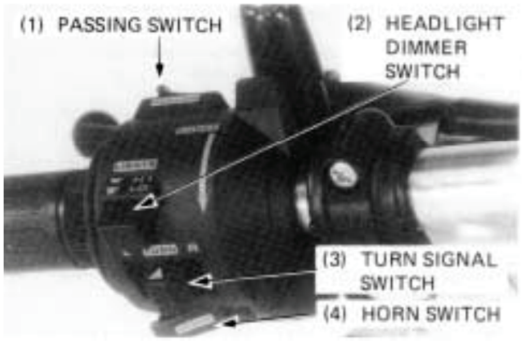




HANDLEBAR SWITCHES

The handlebar switch must be replaced as an assembly.
Remove the headlight and disconnect the handlebar switch couplers.
Continuity should exist between the color coded wires in each chart.





ENGINE STOP SWITCH

Color / Position	Bl/W	G
OFF	○——○	
RUN		

STARTER SWITCH

Color / Position	Bl/Br	Y/R
FREE		
PUSH	○——○	

LIGHTING SWITCH

Color / Position	Br/Bu	Br/W	Bu/W	Bl/R
OFF				
P	○——○			
HL	○——○		○——○	

TURN SIGNAL SWITCH

Color / Position	W	R	L
R	○——○		
N			
L	○———	———○	

HORN SWITCH

Color / Position	W/G	Lg
FREE		
PUSH	○——○	

PASSING SWITCH

Color / Position	W/G	Bu
FREE		
PUSH	O	O

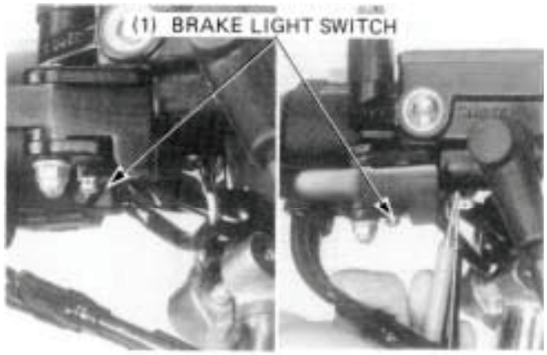
DIMMER SWITCH

Color / Position	Bu/W	W	Bu
Lo	O	O	
(N)	O	O	O
Hi	O		O

BRAKELIGHT SWITCHES

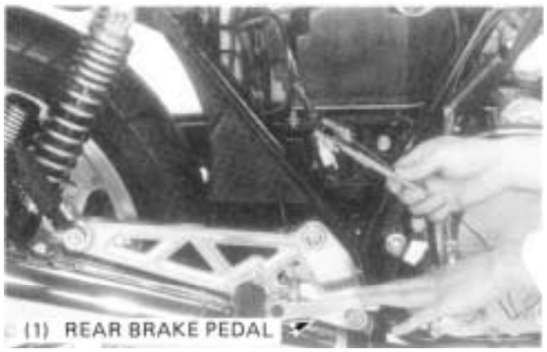
FRONT

Disconnect the front brake light switch wires from the switch. Check the front brake light switch for continuity with the front brake applied.
Replace the switches if necessary.



REAR

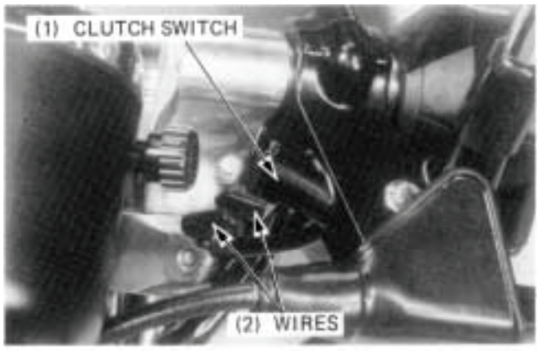
Check the rear brake light switch for continuity with the rear brake applied.



CLUTCH SWITCH

Check continuity of the clutch lever switch with the clutch released and applied.
Replace the switch if necessary.

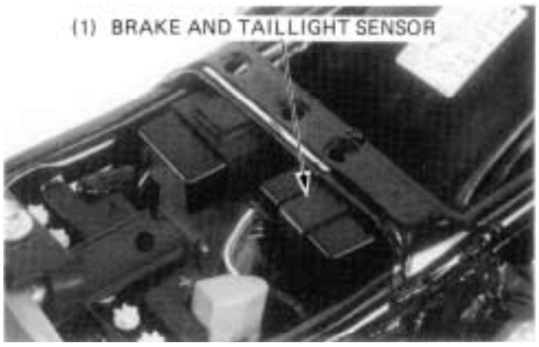
CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASED: NO CONTINUITY

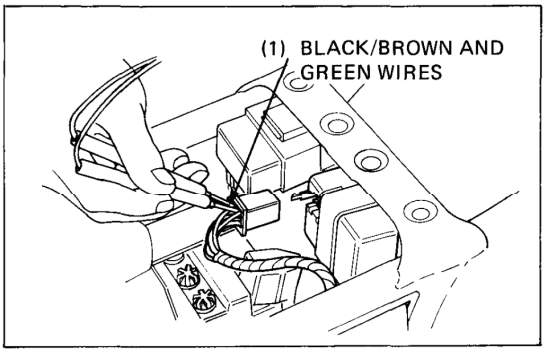


BRAKE AND TAILLIGHT SENSOR

INSPECTION

Refer to the troubleshooting (page 19-2) for brake and taillight warning system inspection.
Disconnect the coupler from the sensor.
Connect a voltmeter between the Black/Brown wire terminal and the Green wire terminal.
There should be battery voltage when the ignition switch on.
If there is battery voltage, replace the sensor with a new one.





20. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START	20-1	POOR PERFORMANCE AT HIGH SPEED	20-4
ENGINE LACKS POWER	20-2	POOR HANDLING	20-4
POOR PERFORMANCE AT LOW AND IDLE SPEEDS	20-3		

ENGINE DOES NOT START OR IS HARD TO START

		Probable Cause:
1. Check if fuel is getting to the carburetor	NOT GETTING TO CARBURETOR →	(1) No fuel in fuel tank (2) Clogged fuel tube or fuel strainer (3) Clogged float valve (4) Clogged fuel tank cap breather hole
GETTING TO CARBURETOR ↓		
2. Try spark test	WEAK OR NO SPARK →	(1) Faulty spark plug (2) Fouled spark plug (3) Faulty CDI unit (4) Faulty ignition coil (5) Faulty alternator (6) Faulty ignition switch (7) Faulty engine stop switch (8) Faulty pulse generator (9) Poorly connected, broken or shorted wires
SPARKS JUMP ↓		
3. TEST CYLINDER COMPRESSION	LOW COMPRESSION →	(1) Insufficient valve clearance (2) Worn or damaged valve seat (3) Worn cylinder piston rings (4) Damaged cylinder head gasket (5) Improper valve timing (6) Improperly adjusted decompression mechanism (7) Seized valve (8) Warped or clacked cylinder head mating surfaces
COMPRESSION NORMAL ↓		
4. Start by following normal starting procedure	ENGINE FIRES BUT SOON STOPS →	(1) Choke excessively open (2) Carburetor incorrectly adjusted (3) Air leaking past intake manifold (4) Improper ignition timing (CDI unit or pulse generator faulty)
ENGINE DOES NOT FIRE ↓		
5. Remove spark plug	WET PLUG →	(1) Carburetor flooded (2) Carburetor choke excessively closed (3) Clogged air cleaner (4) Worn or damaged choke valve seat (5) Incorrect carburetor float level (6) Faulty float valve seat
DRY ↓		
6. START WITH CHOKE APPLIED		

ENGINE LACKS POWER

		Probable Cause:
1. Raise wheels off ground and spin by hand	WHEEL DOES NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearing (3) Wheel bearing needs lubrication (4) Drive chain too tight (5) Rear axle nut excessively tightened
WHEEL SPINS FREELY ↓		
2. Check tire pressure with tire gauge	PRESSURE TOO LOW →	(1) Punctured tire (2) Faulty tire valve
PRESSURE NORMAL ↓		
3. Check clutch slipping	CLUTCH SLIPS →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate
CLUTCH ENGAGED PROPERLY ↓		
4. Lightly accelerate engine	ENGINE SPEED DOES NOT INCREASE SUFFICIENTLY →	(1) Carburetor choke closed (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged fuel tank breather hole (5) Clogged muffler
ENGINE SPEED INCREASE ↓		
5. Check ignition timing	INCORRECT →	(1) Faulty CDI unit (2) Faulty pulse generator
CORRECT ↓		
6. Check valve clearance	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
CORRECT ↓		
7. Test cylinder compression using compression gauge	TOOL LOW →	(1) Worn or damaged valve seat (2) Worn cylinder or piston rings (3) Damaged cylinder head gasket (4) Improper valve timing (5) Improperly adjusted decompression mechanism (6) Seized valve (7) Warped or clacked cylinder head mating surfaces
NORMAL ↓		
8. Check carburetor for clogging	CLOGGED →	(1) Carburetor not serviced frequently enough
NOT CLOGGED ↓		
9. Remove spark plug	FOULED OR DISCOLORED →	(1) Plug not replaced frequently enough (2) Use of plug with improper heat range
NOT FOULED OR DISCOLORED ↓		

10. Remove oil level gauge and check oil level. CORRECT ↓	OIL LEVEL INCORRECT →	(1) Oil level too high (2) Oil level too low
11. Accelerate or run at high speed ENGINE DOES NOT KNOCK ↓	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Fuel/air mixture too lean (3) Use of improper grade of fuel (4) Excessive carbon build-up in combustion chamber (5) Ignition timing too advanced (Faulty CDI unit)
12. Check if engine overheats NORMAL ↓	OVERHEATED →	(1) Excessive carbon build-up in combustion chamber (2) Improper quality fuel (3) Clutch slipping (4) Fuel air mixture too lean
13. Remove cylinder head cover and inspect lubrication VALVE TRAIN LUBRICATED PROPERLY	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil control orifice (3) Contaminated oil

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		Probable Cause:
1. Check ignition timing and valve clearance CORRECT ↓	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty CDI unit)
2. Check carburetor pilot screw adjustment CORRECT ↓	INCORRECT →	(1) Fuel-air mixture too lean (To correct, screw out) (2) Fuel-air mixture too rich (To correct, screw in)
3. Check if air is leaking past manifold NOT LEAKING ↓	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor
4. Try spark test GOOD SPARK	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty CDI unit (3) Alternator faulty (4) Faulty ignition coil (5) Faulty pulse generator (6) Poorly connected, broken or shorted wire

POOR PERFORMANCE AT HIGH SPEED

		Probable Cause:
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Faulty CDI unit (3) Faulty pulse generator
CORRECT ↓		
2. Disconnect fuel line at carburetor	FUEL FLOW RESTRICTED →	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank breather tube (4) Clogged fuel valve
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet(s)	CLOGGED →	(1) Clean
NOT CLOGGED ↓		
4. Check valve timing	INCORRECT →	(1) Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	(1) Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire pressure

	Probable Cause:
1. If steering is heavy →	(1) Steering head adjuster too tight (2) Damaged steering bearing(s)
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Bent rim (3) Improperly laced wheel hub (4) Swing arm pivot bushing excessively worn (5) Bent frame (6) Loose swing arm pivot bolt
3. If the motorcycle pulls to one side →	(1) Front and rear wheels not aligned (2) Bent front fork (3) Bent swing arm (4) Bent frame

HOW TO USE THIS MANUAL

This addendum contains information for the XBR500. Refer to the XBR500: SHOP MANUAL (No. 67MK400) for service procedures and data not included in this addendum.

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

CODE	AREA (TYPE)
ED	Europe
E	U.K.
G-I	Germany
G-II	Germany
SW	Switzerland
U	Australia

G-I : Full power type
G-II: Limited power type

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IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

Detalied 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.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
DIMENSIONS	Overall length	2,120 mm (83.5 in) <SW: 2,155 mm (84.8 in)>	
	Overall width	685 mm (27.0 in)	
	Overall height	1,055 mm (41.5 in)	
	Wheelbase	1,400 mm (55.1 in)	
	Ground clearance	160 mm (6.3 in)	
	Dry weight	157 kg (346 lb)	
FRAME	Type	Semi double cradle	
	Front suspension, travel	Telescopic, 140 mm (5.5 in)	
	Rear suspension, travel	Swing arm, 100 mm (3.9 in)	
		Front	Rear
	Tire size	100/90–18 56S	110/90–18 61S
	Driver only	200 kPa (2.00 kg/cm², 28 psi)	200 kPa (2.00 kg/cm², 28 psi)
	Driver and one passenger	200 kPa (2.00 kg/cm², 28 psi)	250 kPa (2.50 kg/cm², 36 psi)
	Front brake, lining swept area	Disc brake, 452 cm² (70.06 sq in)	
	Rear brake, lining swept area	Drum brake, 132 cm² (20.46 sq in)	
	Fuel capacity	19 lit (5.0 US gal, 4.2 Imp gal)	
	Fuel reserve capacity	3.3 lit (1.0 US gal, 0.9 Imp gal)	
	Caster	29° 30′	
	Trail	115 mm (4.5 in)	
	Front fork oil capacity	283 cm³ (9.6 oz)	
ENGINE	Type	Air-cooled 4-stroke SOHC	
	Cylinder arrangement	Vertical single	
	Bore x stroke	92.0 x 75.0 mm (3.62 x 2.95 in)	
	Displacement	498 cm³ (30.4 cu, in)	
	Compression ratio	8.9 : 1	
	Valve train	4-valve, silent chain driven SOHC	
	Engine oil capacity	2.4 lit (2.5 US qt, 2.1 Imp qt) at engine assembly	
		1.6 lit (1.7 US qt, 1.4 Imp qt) at oil change	
	Lubrication system	Forced pressure and dry sump	
	Air filtration system	Paper element	
	Cylinder compression	1,250 ± 150 kPa (12.5 ± 1.5 kg/cm², 172 ± 21 psi)	
	Valve timing (at 1 mm lift)		
	Intake Opens	5° BTDC <G-II: 5° ATDC>	
	Closes	40° ABDC <G-II: 30° ABDC>	
	Exhaust Opens	45° BBDC <G-II: 35° BBDC>	
	Closes	5° ATDC <G-II: 5° BTDC>	
	Valve clearance Intake	0.10 mm (0.004 in)	
	Exhaust	0.12 mm (0.005 in)	
CARBURETOR	Type	Constant vacuum	
	Identification number	VE10A <G-II: VE10B, SW: VE10C>	
	Main jet	#152 <G-II, SW: #158>	
	Slow jet	#48	
	Pilot screw initial opening	2-¾ <G-II: 2-¼, SW: 1-⅝>	
	Float level	18.5 mm (0.73 in)	
	Idle speed	1,200±100 min⁻¹ (rpm)	

ITEM			SPECIFICATIONS
DRIVE TRAIN	Clutch type		Wet multi-plate
	Transmission		5-speed constant mesh
	Primary reduction		2.482 (72/29)
	Gear ratio I		2.384 (31/13)
	Gear ratio II		1.555 (28/18)
	Gear ratio III		1.200 (24/20)
	Gear ratio IV		1.000 (23/23)
	Gear ratio V		0.875 (21/24)
	Final reduction		2.400 (36/15) <G-II : 2.571>
	Gearshift pattern		Left foot operated return system (1-N-2-3-4-5)
ELECTRICAL	Ignition		CDI
	Ignition timing	Initial	8 ± 2° BTDC at 1,200 ± 100 min^{-1} (rpm) (F mark)
		Full advance	29 ± 2° BTDC at 5,000 min^{-1} (rpm)
	Alternator		170 W/5,000 min^{-1} (rpm)
	Battery capacity		12V–12 AH
	Spark plug	Standard	DPR9EA-9 (NGK), X27EPR-U9 (ND) <G-II, SW: DPR8EA-9 (NGK), X24EPR-U9 (ND)>
		For cold climate (Below 5°C, 41°F)	DPR8EA-9 (NGK), X24EPR-U9 (ND) <G-II, SW: DPR7EA-9 (NGK), X22EPR-U9 (ND)>
		For extended high speed riding	<G-II, SW: DPR9EA-9 (NGK), X27EPR-U9 (ND)>
	Spark plug gap		0.8–0.9 mm (0.031–0.035 in)
	Headlight, Hight/Low		60/55 W
	Brake and taillight		21/5 W
	Turn signal light, Front/Rear		21/21 W
	Speedometer light		3.4 W x 2
	Tachometer light		3 W x 2
	Neutral indicator		3 W
	Turn signal indicator		3 W
	Hight beam indicator		3 W

TOOLS

SPECIAL

*: These tools are newly designed and have not been used before.

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Pilot screw wrench	07908–4220201		4-9
Cylinder compression gauge attachment	07908–KK60000		3-16
Snap ring pliers	07914–3230001		14-8
Steering stem socket	07916–3710100		12-19, 21
Crankcase assembly tool	07931–KF00000		11-5
Threaded adaptor	07931–KF00200		11-5
Puller shaft	07931–ME40000		11-5
Assembly coller	07931–KF00100		11-5
Crankshaft puller	07935–KF00001		11-2
Bearing remover set	07936–3710001		13-14
Remover spindle assembly	07936–3710600		13-14
Remover handle	07936–3710100		13-14
Knock pin puller set	07936–MA70000	Decompressor lifter lever dowel pin	6-5
Sliding shaft	07936–MA70100		6-5
Remover weight	07741–0010201		6-5, 13-14
Attachment	07945–3330300	Ball race lower	12-21
Steering stem driver	07946–MB00000		12-21
Attachment	07946–6790200	Left crankcase bearing	11-4
Attachment	07946–3290000	Ball race upper	12-20
Fork seal driver attachment	07947–KA20200		12-16
Ball race remover	07953–3330000	Ball race upper	12-20
Attachment	07953–KM10100	Ball race lower	12-20
Valve guide reamer	07984–5510000		6-12
Tensioner setting holder	07973–MG30002		6-6, 8, 16
Bearing puller	07931–MK20100	Left crankcase bearing	11-2
Universal bearing puller	07631–0010000		11-2
Attachment	07960–1870100		11-2
Torx bit (T40)	07703–0010100		18-3
* Torque limiter attachment	07998–MG80000		21-8

COMMON

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Float level gauge	07401–0010000		4-7
Wrench, 10 x 12 mm	07708–0030200	Valve clearance	3-8
Adjusting wrench A	07708–0030300	Valve clearance	3-8
Lock nut wrench, 30 x 32 mm	07716–0020400		12-19, 12-22
Clutch center holder	07724–0050000	Clutch	8-5, 18
Flywheel holder	07725–0040000		9-3, 4
Rotor puller	07733–0020001		9-3
Valve guide remover, 6.6 mm	07742–0010200		6-11, 6-12
Driver pin, 2.5 mm	07744–0010100	Oil pump	8-10
Attachment, 24 x 26 mm	07746–0010700		8-4
Attachment, 32 x 35 mm	07746–0010100		13-14
Attachment, 37 x 40 mm	07746–0010200		12-9, 13-6
Attachment, 42 x 47 mm	07746–0010300		12-9, 13-6
Attachment, 72 x 75 mm	07746–0010600		11-4
Attachment, 35 mm I.D.	07746–0030400	Crankshaft	11-5
Pilot, 15 mm	07746–0040300		12-9
Pilot, 17 mm	07746–0040400		13-6
Pilot, 20 mm	07746–0040500		8-4, 13-14
Pilot, 35 mm	07746–0040800		11-4
Pilot, 40 mm	07746–0040900		11-4
Fork seal driver	07747–0010100		12-16
Driver	07749–0010000		—
Shock absorber compressor	07959–3290001		13-12
Valve spring compressor	07757–0010000		6-10, 6-15
Gear holder	07724–0010100	Primary drive gear	10-3, 10-12
Bearing remover head, 15 mm	07746–0050400		12-8
Bearing remover shaft	07746–0050100		12-8
Bearing remover head, 17mm	07746–0050500		13-5

VALVE SEAT CUTTERS

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Valve seat cutter, 35 mm	07780–0010400	45° EX	6-13, 6-14
Valve seat cutter, 40 mm	07780–0010500	45° IN	6-13, 6-14
Valve seat cutter, 35 mm	07780–0012900	32° EX	6-13, 6-14
Valve seat cutter, 38.5 mm	07780–0012400	32° IN	6-13, 6-14
Valve seat cutter, 37.5 mm	07780–0014100	60° IN/EX	6-13, 6-14
Cutter holder, 6.6 mm	07781–0010201		6-13, 6-14

MAINTENANCE SCHEDULE

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

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

	ITEM / FREQUENCY	WCHICHEVER 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 LINE				I		I		I	3-4
*	FUEL STRAINER SCREEN			C	C	C	C	C	C	3-4
*	THROTTLE OPERATION				I		I		I	3-4
*	CARBURETOR CHOKE				I		I		I	3-5
	AIR CLEANER	(NOTE 1)				R			R	3-6, 21-6
	CRANKCASE BREATHER	(NOTE 2)		C	C	C	C	C	C	3-6
	SPARK PLUG			I	R	I	R	I	R	3-7
*	VALVE CLEARANCE		I	I	I	I	I	I	I	3-7
	ENGINE OIL		R	R	R	R	R	R	R	2-2
	ENGINE OIL FILTER		R		R		R		R	2-4
*	DECOMPRESS SYSTEM		I	I	I	I	I	I	I	3-8
*	CARBURETOR IDLE SPEED		I	I	I	I	I	I	I	3-8
	DRIVE CHAIN		EVERY 1,000 km (600 mi) I, L							3-9
	BATTERY			I	I	I	I	I	I	3-10
	BRAKE FLUID	2 YEARS *R		I	I	*R	I	I	*R	3-11
	BRAKE SHOE/PAD WEAR			I	I	I	I	I	I	3-11
	BRAKE SYSTEM		I		I		I		I	3-12
*	BRAKE LIGHT SWITCH				I		I		I	3-13
*	HEADLIGHT AIM				I		I		I	3-13
	CLUTCH SYSTEM		I	I	I	I	I	I	I	3-13
	SIDE STAND				I		I		I	3-14
*	SUSPENSION				I		I		I	3-14
*	NUT, BOLT, FASTENER		I		I		I		I	3-15
**	WHEEL				I		I		I	3-15
**	STEERING HEAD BEARING		I		I		I		I	3-15

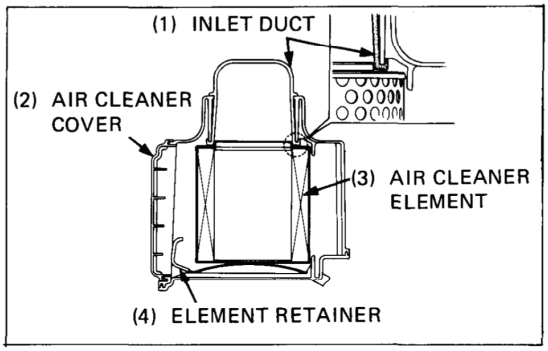
* Should be serviced by an authorized HONDA dealer, unless the owner has proper tools and service data and is mechanically qualified. Refer to the official HONDA shop manual.
** In the interest of safety, we recommend these items be serviced ONLY by an authorized HONDA dealer.

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 reading, repeat at the frequency interval established here.

MAINTENANCE

AIR CLEANER

Remove the left side cover and air cleaner cover.
Pull out the element retainer. Remove and discard the air cleaner element.
Insert the top plate of the element into the air cleaner inlet duct as shown.
Install the element retainer.
Install the air cleaner cover and left side cover.



CAMSHAFT

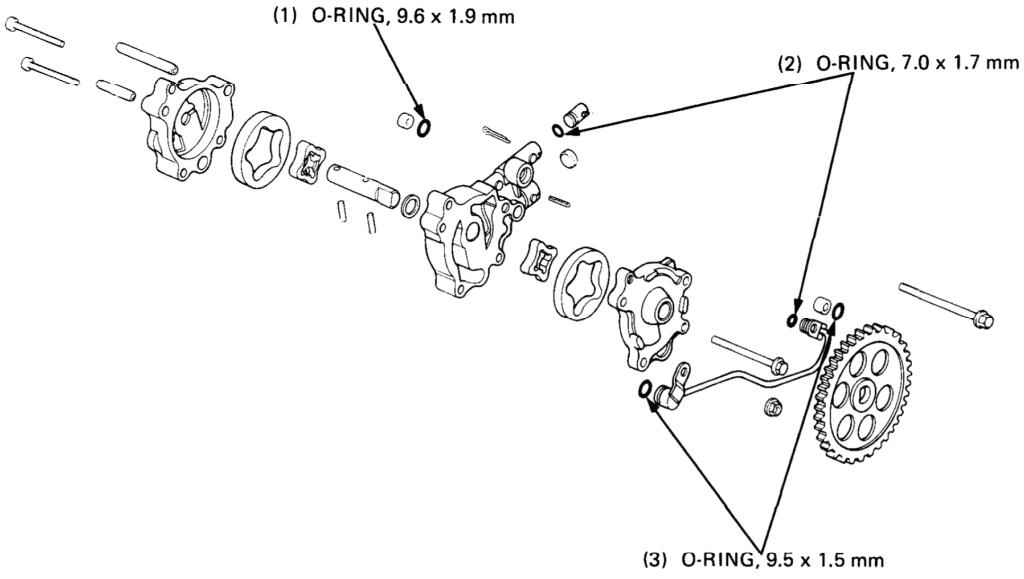
SPECIFICATION

<>: G-II type

ITEM		STANDARD	SERVICE LIMIT
Cam lobe height	IN	30.959–31.119 mm (1.2189–1.2252 in) <28.588–28.478 mm (1.1255–1.1212 in)>	30.87 mm (1.215 in) <28.36 mm (1.117 in)>
	EX	30.920–31.080 mm (1.2173–1.2236 in) <28.614–28.774 mm (1.1265–1.1328 in)>	30.83 mm (1.214 in) <28.53 mm (1.123 in)

OIL PUMP

Note the position of the O-rings.



STARTER REDUCTION

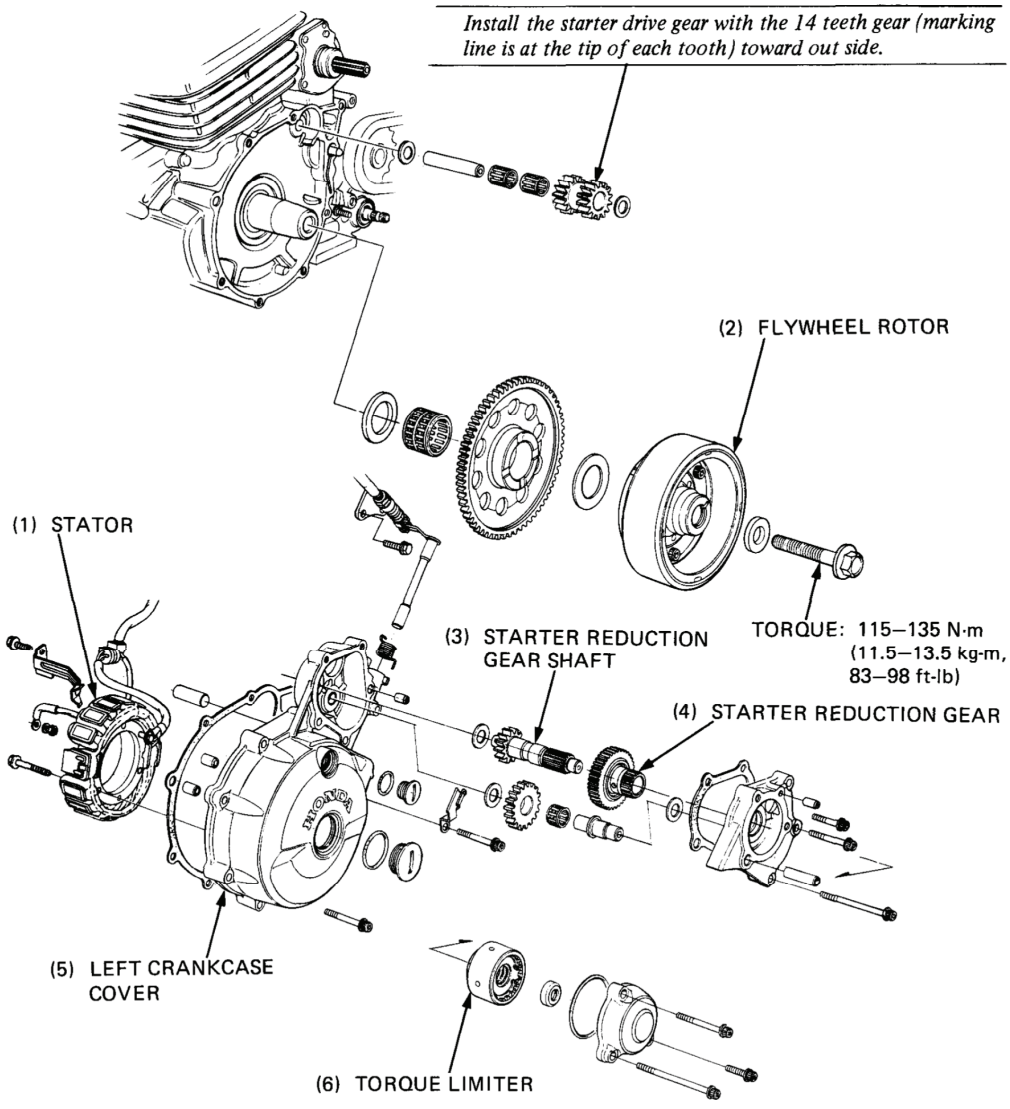
SPECIFICATION

ITEM	STANDARD	SERVICE LIMIT
Starter reduction gear I.D.	18.000–18.018 mm (0.7087–0.7094 in)	18.10 mm (0.713 in)
Starter reduction gear shaft O.D.	17.966–17.984 mm (0.7083–0.7080 in)	18.07 mm (0.711 in)
Torque limiter slip torque	35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)	———

DISASSEMBLY/ASSEMBLY

CAUTION :

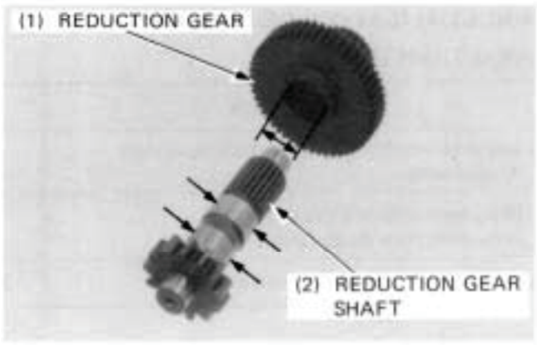
Install the starter drive gear with the 14 teeth gear (marking line is at the tip of each tooth) toward out side.



INSPECTION

Reduction gear
Check the starter reduction gear and shaft for wear or damage.
Measure the gear I.D. and shaft O.D.

SERVICE LIMITS:
Gear I.D. : 18.10 mm (0.713 mm)
Shaft O.D. : 18.07 mm (0.711 mm)



Torque limiter
NOTE:

- Do not try to disassemble the torque limiter.

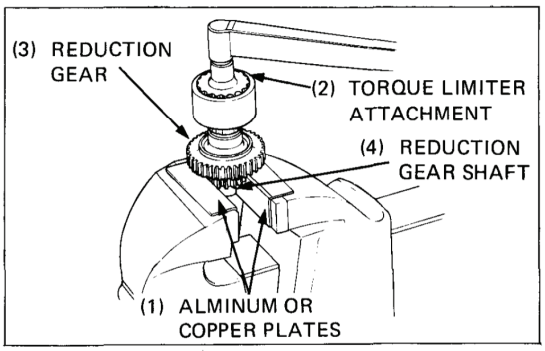
Install the reduction gear and reduction gear shaft into the torque limiter.
Hold the gear of the reduction gear shaft in a vise with alminum or copper plates.

CAUTION:

- *Excessive vise pressure can damage the gear.*

Measure the torque limiter slip torque with special tool and torque wrench.

SLIP TORQUE: 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)
TOOL: Torque limiter attachment 07998–MG80000



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