

1995-2003



SERVICE MANUAL

TRX400FW

FOURTRAX

FOREMAN 400

IMPORTANT SAFETY NOTICE



WARNING

Indicates a strong possibility of severe personal injury or death if instructions are not followed.

CAUTION:

Indicates a possibility of equipment damage if instructions are not followed.

NOTE:

Gives helpful information.

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

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the TRX400 FOURTRAX.

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

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

Sections 1 and 3 apply to the whole vehicle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Section 4 through 21 describe parts of the vehicle, grouped according to location.

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

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

If you are not familiar with this motorcycle, read Technical Feature in section 22.

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

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HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE

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SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent).
	Use molybdenum disulfide grease (containing more than 3 % molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning, U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil Japan
	Use molybdenum disulfide grease (containing more than 3 % molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning, U.S.A. Honda Moly 60 (U.S.A only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a middle strength locking agent unless otherwise specified.
	Apply sealant.
	Use brake fluid, DOT 4. Use the recommended brake fluid, unless otherwise specified.
	Use Fork or Suspension Fluid.

1. GENERAL INFORMATION

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GENERAL SAFETY

CARBON MONOXIDE

If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.

⚠ WARNING

- *The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.*

Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

GASOLINE

Work in a well ventilated area. Keep cigarettes, flames or sparks away from the work area or where gasoline is stored.

⚠ WARNING

- *Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*

HOT COMPONENTS

⚠ WARNING

- *Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.*

USED ENGINE OIL

⚠ WARNING

- *Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.*

BRAKE DUST

Never use an air hose or dry brush to clean the brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.

⚠ WARNING

- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer.*

BRAKE FLUID

CAUTION

- *Spilling fluid on painted, plastic or rubber parts will damage them. Place a clean shop towel over these parts whenever the system is serviced. KEEP OUT OF REACH OF CHILDREN.*

GENERAL INFORMATION

BATTERY HYDROGEN GAS & ELECTROLYTE

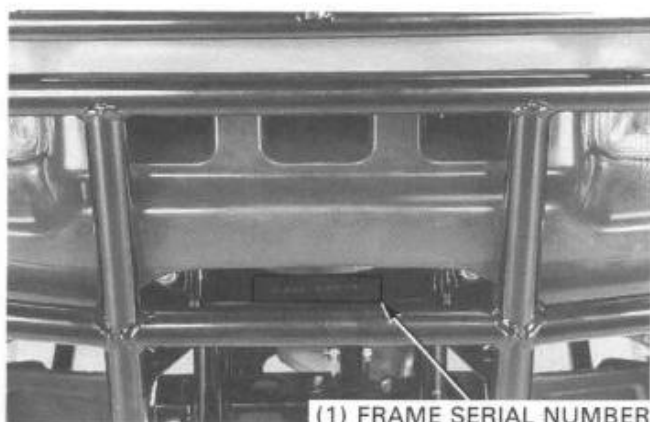
⚠ WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
 - *If electrolyte gets on your skin, flush with water.*
 - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.*
- *Electrolyte is poisonous.*
 - *If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call an physician. KEEP OUT OF REACH OF CHILDREN.*

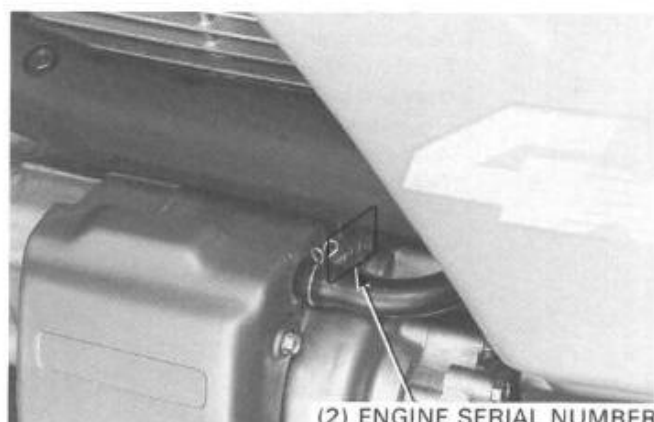
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the vehicle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the vehicle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally, in incremental steps unless a particular sequence is specified.
6. Clean parts in non-flammable or high flash point solvent upon disassembly.
7. Lubricate any sliding surfaces before reassembly. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show on pages 1-21 through 1-26, Cable and Harness Routing.

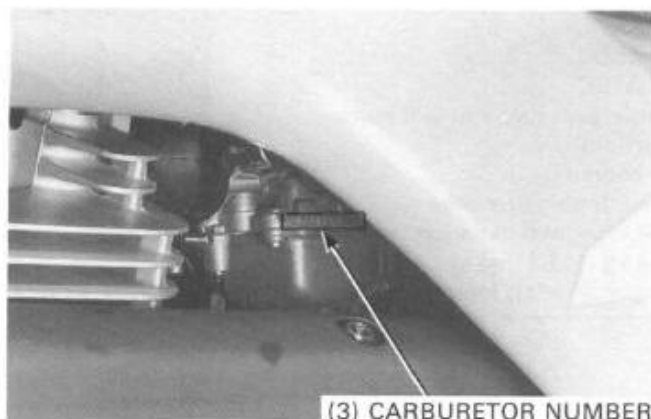
MODEL IDENTIFICATION



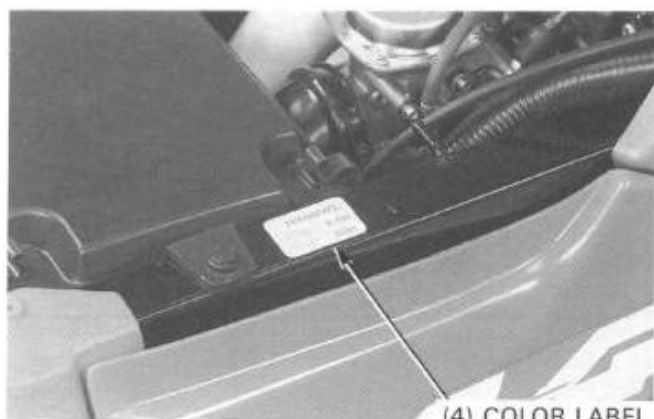
- (1) FRAME SERIAL NUMBER
- (1) The frame serial number is stamped on the front of the frame.



- (2) ENGINE SERIAL NUMBER
- (2) The engine serial number is stamped on the rear half of the upper crankcase, viewed from the left side.



- (3) CARBURETOR NUMBER
- (3) The carburetor identification numbers are stamped on the left side of the carburetor body as shown.



- (4) COLOR LABEL
- (4) The color label is attached to the frame under the seat as shown. When ordering color-coded parts, always specify the designated color code.

GENERAL INFORMATION

SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	1,944 mm (76.5 in)
	Overall width	1,156 mm (45.5 in)
	Overall height	1,080 mm (42.5 in)
	Wheelbase	1,240 mm (48.8 in)
	Front tread	850 mm (33.5 in)
	Rear tread	850 mm (33.5 in)
	Seat height	785 mm (30.9 in)
	Footpeg height	307 mm (12.1 in)
	Ground clearance	186 mm (7.3 in)
	Dry weight	249.5 kg (551 lbs)
	Curb weight	260 kg (574 lbs)
	Maximum weight capacity	220 kg (485 lbs)
FRAME	Frame type	Double cradle
	Front suspension	Double wish-bone
	Front wheel travel	110 mm (4.33 in)
	Front damper	Double tube
	Rear suspension	Swingarm
	Rear wheel travel	110 mm (4.33 in)
	Rear damper	Double tube
	Front tire size	AT24 X 8-11☆☆
	Rear tire size	AT24 X 10-11☆☆
	Front rim size	11 X 6.5AT
	Rear rim size	11 X 7.5AT
	Tire brand (Good year) FR/RR	TRACKER ATT
	Front brake	Hydraulic drum brake
	Rear brake	Mechanical drum brake
	Toe	Toe-out: 16 mm (5/8 in)
	Caster angle	2°
	Camber angle	0.1°
	Trail length	8 mm (5/16 in)
ENGINE	Fuel tank capacity	12.0 liter (3.18 US gal, 2.64 Imp gal)
	Fuel tank reserve capacity	2.7 liter (0.71 US gal, 0.59 Imp gal)
	Bore and stroke	86 X 68 mm (3.39 X 2.68 in)
	Displacement	394.9 cc (24.10 cu-in)
	Compression ratio	8.2 : 1
	Valve train	Overhead valve
	Intake valve opens	10° BTDC
	Intake valve closes	40° ABDC
	Exhaust valve opens	40° BBDC
	Exhaust valve closes	10° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Air cooled
	Air filtration	Oiled double urethane
	Crankshaft type	Unit type, two main journals
	Engine dry weight	50.4 kg (111.1 lbs)
	Cylinder arrangement	Single cylinder, longitudinally installed

GENERAL (Cont'd)

ITEM		SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	Vacuum piston (VE) 32 mm (1.3 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Secondary reduction Final reduction Front Rear Gear ratio SL (1st) 1 (2nd) 2 (3rd) 3 (4th) 4 (5th) Reverse Gearshift pattern	Centrifugal & multi-plate, wet Automatic Constant mesh, 5-speed with reverse 2.103 (61/29) 2.100 (42/20) 3.153 (41/13) 3.153 (41/13) 4.083 (49/12) 2.388 (43/18) 1.608 (37/23) 1.178 (33/28) 0.878 (29/33) 4.781 (34/12 X 27/16) Left foot operated return system R - N - SL - 1 - 2 - 3 - 4 (R - N - 1 - 2 - 3 - 4 - 5)
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	DC-CDI Starter motor and emergency recoil starter Triple phase output alternator SCR shorted/triple phase full wave rectification Battery

GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

LUBRICATION SYSTEM		SPECIFICATIONS	SERVICE LIMIT
ITEM			
Engine oil capacity	At draining	2.0 liter (2.10 US qt, 1.76 Imp qt)	—
	At disassembly	2.7 liter (2.84 US qt, 2.38 Imp qt)	—
	At oil filter change	2.1 liter (2.21 US qt, 1.85 Imp qt)	—
Recommended engine oil		HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.11 (0.004)

FUEL SYSTEM		
ITEM		SPECIFICATIONS
Carburetor identification number		VE92A
Main jet		#130
Slow jet		#45
Jet needle clip position		3rd groove from top
Pilot screw	Initial opening	2-1/4 turns out
	High altitude setting	3/4 turn in from initial opening
Float level		18.5 mm (0.73 in)
Idle speed		1,400 ± 100 rpm
Throttle lever free play		3 – 8 mm (1/8 – 5/16 in)
Starting enrichment (SE) valve distance		10 – 11mm (0.39 – 0.43 in)

Unit: mm (in)

Unit: mm (in)

CYLINDER HEAD/VALVES/CAMSHAFT				
ITEM			SPECIFICATIONS	SERVICE LIMIT
Cylinder compression	Decompressor effected		539 – 834 kPa (5.5 – 8.5 kg/cm ² , 78 – 121 psi) at 450 rpm	—
	Decompressor not effected		1,226 – 1,442 kPa (12.5 – 14.5 kg/cm ² , 178 – 206 psi) at 450 rpm	—
Cylinder head warpage			—	0.10 (0.004)
Valve and valve guide	Valve clearance	IN/EX	0.15 (0.006)	—
	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.45 (0.215)
		EX	5.455 – 5.470 (0.2148 – 0.2154)	5.43 (0.214)
	Valve guide I.D.	IN	5.500 – 5.512 (0.2165 – 0.2170)	5.525 (0.2177)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.525 (0.2177)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.12 (0.005)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.14(0.006)
	Valve seat width	IN/EX	1.2 (0.05)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	36.31 (1.430)	35.2 (1.39)
	Outer	IN/EX	41.34 (1.628)	40.0 (1.57)
Rocker arm	Rocker arm I.D.	IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
	Rocker arm shaft O.D.	IN/EX	11.964 – 11.984 (0.4710 – 0.4718)	11.92 (0.469)
	Rocker arm-to-shaft clearance		0.016 – 0.054 (0.0006 – 0.0021)	0.08 (0.003)
Camshaft and cam follower	Cam lobe height	IN	36.423 – 36.583 (0.4340 – 0.4402)	36.25 (1.427)
		EX	36.267 – 36.427 (0.2467 – 0.2530)	36.10(1.421)
	Cam follower O.D.	IN/EX	22.467 – 22.482 (0.8845 – 0.8851)	22.46 (0.884)
	Cam follower bore I.D.	IN/EX	22.510 – 22.526 (0.8862 – 0.8868)	22.54 (0.887)
	Cam follower-to-bore clearance		0.028 – 0.059 (0.0011 – 0.0023)	0.07 (0.003)

Unit: mm (in)

Unit: mm (in)

CYLINDER/PISTON			SPECIFICATIONS	SERVICE LIMIT
ITEM				
Cylinder	I.D.		86.000 – 86.010 (3.3858 – 3.3862)	86.10 (3.390)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.10 (0.004)
Piston, piston ring	Piston mark direction		"IN" mark toward the intake side	—
	Piston O.D.		85.965 – 85.985 (3.3844 – 3.3852)	85.90 (3.382)
	Piston O.D. measurement point		6 – 26 mm from bottom of the skirt	—
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.04 (0.750)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.96 (0.746)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.12 (0.039)
	Piston ring-to-ring groove clearance	Top	0.03 – 0.06 (0.001 – 0.002)	0.09 (0.004)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.09 (0.004)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.5 (0.02)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	—
Cylinder-to-piston clearance			0.015 – 0.045 (0.0006 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			19.020 – 19.041 (0.7488 – 0.7496)	19.07 (0.751)
Connecting rod-to-piston pin clearance			0.020 – 0.047 (0.0008 – 0.0019)	0.10 (0.004)

GENERAL INFORMATION

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE			
ITEM		SPECIFICATIONS	SERVICE LIMIT
Change clutch	Spring free length	32.1 (1.26)	31.0 (1.22)
	Disc thickness	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
	Plate warpage	—	0.20 (0.008)
	Clutch outer guide	O.D.	27.959 – 27.980 (1.1007 – 1.1016)
		I.D.	22.000 – 22.021 (0.8661 – 0.8670)
	Mainshaft O.D. at outer guide	21.972 – 21.993 (0.8650 – 0.8659)	21.93 (0.863)
Centrifugal clutch	Drum I.D.	140.0 – 140.2 (5.51 – 5.52)	140.4 (5.53)
	Weight lining thickness	3.0 (0.12)	2.0 (0.08)
	Clutch spring height	3.1 (0.12)	2.95 (0.116)
	Clutch weight spring free length	21.6 (0.85)	22.5 (0.89)
Primary drive gear	I.D.	27.000 – 27.021 (1.0630 – 1.0638)	27.05 (1.065)
	Crankshaft O.D. at drive gear	26.959 – 26.980 (1.0614 – 1.0622)	26.93 (1.060)

Unit: mm (in)

CRANKSHAFT/TRANSMISSION

ITEM				SPECIFICATIONS	SERVICE LIMIT
Crankshaft, connecting rod	Side clearance			0.05 – 0.65 (0.002 – 0.026)	0.80 (0.031)
	Radial clearance			0.006 – 0.018 (0.0002 – 0.0007)	0.05 (0.002)
	Runout			—	0.05 (0.002)
Transmission	Gear I.D.	M4		25.000 – 25.021 (0.9843 – 0.9851)	25.05 (0.986)
		M5		20.000 – 20.021 (0.7874 – 0.7882)	25.05 (0.986)
		C1, C2, C3		28.020 – 28.041 (1.1031 – 1.1040)	28.07 (1.105)
		CR		28.021 – 28.041 (1.1032 – 1.1040)	28.07 (1.105)
		Reverse idle		18.000 – 18.021 (0.7087 – 0.7095)	18.05 (0.711)
	Shaft O.D.	M4		21.959 – 21.980 (0.8645 – 0.8654)	21.93 (0.863)
		M5		16.983 – 16.994 (0.6686 – 0.6691)	16.95 (0.667)
		Reverse idle		13.966 – 13.984 (0.5498 – 0.5506)	13.93 (0.548)
	Gear bushing	C1 O.D.		27.984 – 28.005 (1.1017 – 1.1026)	27.93 (1.100)
		C2 O.D.		27.979 – 28.000 (1.1015 – 1.1024)	27.93 (1.100)
		CR O.D.		27.979 – 28.000 (1.1015 – 1.1024)	27.93 (1.100)
		M4	I.D.	22.000 – 22.021 (0.8661 – 0.8670)	22.05 (0.868)
			O.D.	24.959 – 24.980 (0.9826 – 0.9835)	24.93 (0.981)
		M5	I.D.	17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)
			O.D.	19.966 – 19.984 (0.7861 – 0.7868)	19.93 (0.785)
		R	I.D.	14.000 – 14.025 (0.5512 – 0.5522)	14.05 (0.553)
			O.D.	17.966 – 17.984 (0.7073 – 0.7080)	17.93 (0.706)
	Gear-to-bushing clearance	M4		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		M5		0.016 – 0.055 (0.0006 – 0.0022)	0.10 (0.004)
		C1		0.015 – 0.057 (0.0006 – 0.0022)	0.10 (0.004)
		C2		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		CR		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C3		0.015 – 0.057 (0.0006 – 0.0022)	0.10 (0.004)
		Reverse idle		0.016 – 0.055 (0.0006 – 0.0022)	0.10 (0.004)
	Bushing-to-shaft clearance	M4		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		M5		0.022 – 0.051 (0.0009 – 0.0020)	0.10 (0.004)
		Reverse idle		0.016 – 0.059 (0.0006 – 0.0023)	0.10 (0.004)
Shift fork, shaft	Fork	I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.04 (0.513)
		Claw thickness		4.93 – 5.00 (0.194 – 0.197)	4.50 (0.177)
	Fork shaft O.D.			12.966 – 12.984 (0.5105 – 0.5112)	12.96 (0.510)

GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING		SPECIFICATIONS	SERVICE LIMIT
ITEM			
Minimum tire tread depth		—	4.0 (0.16)
Cold tire pressure	Standard	0.25 kg/cm ² (3.6 psi)	—
	Minimum	0.22 kg/cm ² (3.2 psi)	—
	Maximum	0.28 kg/cm ² (4.0 psi)	—
Tie-rod distance between the ball joints		349.5 (13.76)	—
Toe		Toe-out: 16 (5/8)	—
Shock absorber spring free length		215.3 (8.48)	211.0 (8.31)

Unit: mm (in)

Unit: mm (in)

REAR WHEEL/SUSPENSION		SPECIFICATIONS	SERVICE LIMIT
ITEM			
Minimum tire tread depth		—	4.0 (0.16)
Cold tire pressure	Standard	0.25 kg/cm ² (3.6 psi)	—
	Minimum	0.22 kg/cm ² (3.2 psi)	—
	Maximum	0.28 kg/cm ² (4.0 psi)	—
Shock absorber spring free length		208.5 (8.21)	204.3 (8.04)

Unit: mm (in)

Unit: mm (in)

BRAKES			
ITEM		SPECIFICATIONS	SERVICE LIMIT
Front brake	Drum I.D.	160.0 (6.30)	161.0 (6.34)
	Lining thickness	4.0 (0.16)	2.0 (0.08)
	Brake panel warpage	—	0.4 (0.02)
	Brake panel seal lip wear	—	0.5 (0.02)
	Water seal lip length	22.0 (0.87)	20.0 (0.79)
	Master cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Wheel cylinder I.D.	17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Wheel cylinder piston O.D.	17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
Rear brake	Drum I.D.	160.0 (6.30)	161.0 (6.34)
	Lining thickness	5.0 (0.20)	To the indicator

Unit: mm (in)

Unit: mm (in)

FRONT DRIVING MECHANISM		SPECIFICATIONS	SERVICE LIMIT
ITEM			
Oil capacity	After draining	190 cc (6.43 US oz, 6.67 Imp oz)	—
	At disassembly	200 cc (6.76 US oz, 7.02 Imp oz)	—
Recommended oil		Hypoid gear oil SAE #80	—
Clutch spring free height		2.65 (0.104)	2.5 (0.10)
Clutch disc thickness	A	2.7 – 2.8 (0.106 – 0.110)	2.4 (0.09)
	B	2.3 – 2.4 (0.091 – 0.094)	2.1 (0.08)
Pinion gear I.D.		12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Pinion gear shaft O.D.		11.973 – 11.984 (0.4714 – 0.3718)	11.75 (0.463)
Slip torque		17 – 25 N•m (1.7 – 2.5 kg-m, 12 – 18 lb-ft)	—
Gear backlash		0.05 – 0.30 (0.002 – 0.012)	0.40 (0.016)

REAR DRIVING MECHANISM

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Rear axle runout			—	3.0 (0.12)
Rear final drive	Oil capacity	After draining	90 cc (3.04 US oz, 3.16 Imp oz)	—
		At disassembly	100 cc (3.38 US oz, 3.51 Imp oz)	—
	Recommended oil		Hypoid gear oil SAE #80	—
	Gear backlash		0.05 – 0.30 (0.002 – 0.012)	0.40 (0.016)

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 12AH
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
Alternator	Capacity		0.310 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω
Regulator/rectifier	Type		Triple phase/full-wave rectification
	Regulated voltage		14.7 – 15.5 V at 5,000 rpm

IGNITION SYSTEM

ITEM		SPECIFICATIONS	
Spark plug		NGK	NIPPONDENSO
	Standard	DPR7EA-9	X22EPR-U9
	For cold climate (below 5°C/41°F)	DPR6EA-9	X20EPR-U9
	For extended high speed riding	DPR8EA-9	X24EPR-U9
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)	
Ignition coil peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition coil resistance (20°C/68°F)	Primary	0.1 – 0.2 Ω	
	Secondary with spark plug cap	6.5 – 9.8 k Ω	
	Secondary without spark plug cap	2.7 – 3.5 k Ω	
Ignition pulse generator resistance (20°C/68°F)		290 – 360 Ω	
Ignition timing	"F" mark	10° BTDC at 1,400 rpm	
	Full advance	30° BTDC at 4,500 rpm	

ELECTRIC STARTER

Unit: mm (in)

ITEM	SPECIFICATIONS	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	9.0 (0.35)

GENERAL INFORMATION

LIGHTS/SWITCHES		
	ITEM	SPECIFICATIONS
Bulbs	Headlight	12V-25W X 2
	Assist headlight	12V-45W
	Taillight	12V-5W X 2
	Indicator (Oil/Reverse/Neutral)	12V-1.7W X 3
Fuse	Main fuse	30A
	Sub fuse	15A X 2, 10A X 2

TORQUE VALUES

FASTENER TYPE	TORQUE N•m (kg-m, lb-ft)	FASTENER TYPE	TORQUE N•m (kg-m, lb-ft)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head)	9 (0.9, 6.5)
10 mm hex bolt and nut	35 (3.5, 25)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
12 mm hex bolt and nut	55 (5.5, 40)	8 mm flange bolt and nut	27 (2.7, 20)
		10 mm flange bolt and nut	40 (4.0, 29)

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

NOTES: 1. Apply sealant to the threads.
 2. Apply a locking agent to the threads.
 3. Stake.
 4. Apply oil to the threads and flange surface.
 5. Apply clean engine oil to the O-ring.
 6. Apply grease to the threads and flange surface.
 7. ALOC bolt: replace with a new one.
 8. Do not reuse; replace with a new one.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N•m (kg-m, lb-ft)	REMARKS
Maintenance:				
Oil drain bolt	1	12	25 (2.5, 18)	
Oil filter cover flange bolt	3	6	10 (1.0, 7)	
Spark plug	1	12	18 (1.8, 13)	
Timing hole cap	1	14	10 (1.0, 7)	
Valve adjuster lock nut	2	6	17 (1.7, 12)	
Clutch adjusting screw lock nut	1	8	22 (2.2, 16)	
Lubrication System:				
Oil pump rotor side plate screw	1	5	4 (0.40, 2.9)	
Relief valve cap	1	14	19 (1.9, 14)	NOTE 2
Fuel System:				
Carburetor cover screw	1	5	3.5 (0.35, 2.5)	
Starting enrichment (SE) valve nut	1	14	2.5 (0.25, 1.8)	
Cylinder Head/Valves/Camshaft:				
Cylinder head flange cap nut	3	10	40 (4.0, 29)	NOTE 4
Camshaft bearing retainer bolt	1	8	27 (2.7, 20)	NOTE 2
Cam sprocket flange dowel bolt	2	7	20 (2.0, 14)	NOTE 2
Cam chain tensioner lifter sealing screw	1	6	4 (0.40, 2.9)	
Cam chain tensioner mounting bolt	2	6	12 (1.2, 9)	NOTE 2
Rocker arm holder flange cap nut	3	10	40 (4.0, 29)	NOTE 4
Rocker arm shaft flange bolt	1	6	7 (0.7, 5.1)	
Clutch/Gearshift Linkage:				
Gearshift return spring pin	1	8	22 (2.2, 16)	NOTE 2
Shift drum stopper arm bolt	1	6	12 (1.2, 9)	
Gearshift A arm bolt	1	8	25 (2.5, 18)	
Centrifugal clutch outer lock nut	1	20	120 (12.0, 87)	NOTE 3, 4
Clutch spring bolt	4	6	12 (1.2, 9)	
Change clutch center lock nut	1	18	110 (11.0, 80)	NOTE 3, 4

GENERAL INFORMATION

ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, lb-ft)	REMARKS
Recoil Starter:				
Recoil pulley flange bolt	1	12	110 (11.0, 80)	NOTE 4
Alternator/Starter Clutch:				
Starter one-way clutch socket bolt	6	8	31 (3.1, 22)	NOTE 2
Stator socket bolt	3	6	10 (1.0, 7)	
Ignition System:				
Ignition pulse generator socket bolt	2	5	6 (0.6, 4.3)	NOTE 2
Lights/Switches:				
Neutral/reverse switch mounting bolt	1	6	12 (1.2, 9)	NOTE 2
Oil thermo sensor	1	12	18 (1.8, 13)	

FRAME				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, lb-ft)	REMARKS
Frame/Body Panels/Exhaust System:				
Muffler band bolt	2	8	23 (2.3, 17)	
Exhaust pipe protector bolt	3	6	20 (2.0, 14)	
Heat protector bolt	2	6	20 (2.0, 14)	
Heat guard bolt	4	6	20 (2.0, 14)	
Step bar mounting bolt	4	8	33 (3.3, 24)	
Cooling fan shroud special bolt	4	6	18 (1.8, 13)	
Fuel tank rear bracket bolt	4	6	18 (1.8, 13)	
Carrier mounting bolt	14	8	33 (3.3, 24)	
Fuel System:				
Fuel valve mounting bolt	2	6	9 (0.9, 6.5)	
Fuel level gauge mounting bolt	2	6	12 (1.2, 9)	
By-starter cap special bolt	1	14	2.3 (0.23, 1.6)	
Clutch/Gearshift Linkage:				
Gearshift pedal bolt	1	6	16 (1.6, 12)	
Engine Mounting:				
Lower engine mounting bolt (right)	1	10	55 (5.5, 40)	
Lower engine mounting bolt (left)	1	10	55 (5.5, 40)	
Upper engine hanger bolt	1	10	55 (5.5, 40)	
Upper engine hanger bracket bolt	2	8	33 (3.3, 24)	
Lower engine hanger bracket bolt	2	8	33 (3.3, 24)	
Front Wheel/Suspension/Steering:				
Throttle case cover	3	4	3.5 (0.35, 2.5)	
Handlebar lower holder nut	2	10	40 (4.0, 29)	NOTE 8
Steering shaft U-nut	1	14	110 (11.0, 80)	NOTE 6
Ball joint self lock nut	4	12	55 (5.5, 40)	
Tie-rod nut	4	12	55 (5.5, 40)	
Steering shaft holder flange bolt	2	8	33 (3.3, 24)	
Upper/lower arm pivot self lock nut	8	10	45 (4.5, 33)	NOTE 8
Knuckle ball joint castle nut	4	12	30-36 (3.0-3.6, 22-26)	
Shock absorber upper mounting self lock nut	2	10	45 (4.5, 33)	NOTE 8
Shock absorber lower mounting self lock nut	2	10	45 (4.5, 33)	NOTE 8
Damper rod lock nut	2	10	38 (3.8, 27)	NOTE 2
Front wheel nut	8	10	65 (6.5, 47)	
Front wheel hub castle nut	2	16	80-100 (8.0-10.0, 58-72)	

FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, lb-ft)	REMARKS
Rear Wheel/Suspension:				
Rear axle castle nut	2	20	140-160 (14.0-16.0, 101-116)	
Rear wheel nut	8	10	65 (6.5, 47)	
Shock absorber lower mounting self lock nut	1	10	45 (4.5, 33)	NOTE 8
Shock absorber upper mounting self lock nut	2	10	40 (4.0, 29)	NOTE 8
Damper rod lock nut	2	10	38 (3.8, 27)	NOTE 2
Swingarm left pivot bolt	1	30	115 (11.5, 83)	
Swingarm right pivot bolt	1	30	4 (0.40, 2.9)	
Swingarm right pivot lock nut	1	30	115 (11.5, 83)	
Rear axle housing and swingarm nut	8	10	45 (4.5, 33)	NOTE 8
Skid plate flange bolt	3	8	33 (3.3, 24)	
Brakes:				
Rear brake arm pinch bolt/nut	1	8	20 (2.0, 14)	
Rear brake panel drain bolt	1	12	35 (3.5, 25)	
Master cylinder reservoir cap screw	2	4	2 (0.20, 1.4)	
Master cylinder holder SH bolt	2	6	12 (1.2, 9)	
Brake lever pivot bolt	1	6	1 (0.10, 0.7)	
Brake lever pivot lock nut	1	6	6 (0.6, 4.3)	
Brake hose oil bolt	4	10	35 (3.5, 25)	
Brake hose clamp flange bolt	2	6	12 (1.2, 9)	
Brake panel flange bolt	8	8	30 (3.0, 22)	NOTE 8
Wheel cylinder bolt/washer	4	6	8 (0.8, 5.8)	
Wheel cylinder nut	4	8	17 (1.7, 12)	
Wheel cylinder oil pipe	4	10	16 (1.6, 12)	
Brake bleeder valve	2	8	6 (0.6, 4.3)	
Breather tube clamp (knuckle)	2	8	33 (3.3, 24)	
Brake hose 2-way joint	2	8	15 (1.5, 11)	
Front Driving Mechanism:				
Differential case mounting bolt/nut, 10 mm	2	10	45 (4.5, 33)	
8 mm	1	8	22 (2.2, 16)	
Differential case cover flange bolt, 8 mm	6	8	26 (2.6, 19)	
10 mm	2	10	50 (5.0, 36)	NOTE 2
Pinion joint nut	1	16	110 (11.0, 80)	NOTE 2
Pinion bearing lock nut	1	64	100 (10.0, 72)	NOTE 3
Differential gear case drain bolt	1	8	12 (1.2, 9)	
Differential gear case cover oil cap	1	30	12 (1.2, 9)	
Differential case cap torx bolt	6	8	33 (3.3, 24)	NOTE 7
Differential case UBS bolt	6	8	50 (5.0, 36)	
Rear Driving Mechanism:				
Gear case cover flange bolt, 8 mm	6	8	26 (2.6, 19)	
10 mm	2	10	50 (5.0, 36)	NOTE 2
Pinion joint nut	1	16	110 (11.0, 80)	NOTE 2
Pinion bearing lock nut	1	64	100 (10.0, 72)	NOTE 3
Gear case drain bolt	1	8	12 (1.2, 9)	
Gear case cover oil check bolt	1	8	12 (1.2, 9)	
Gear case cover oil cap	1	30	12 (1.2, 9)	

GENERAL INFORMATION

TOOLS

- NOTES: 1. Newly designed tool.
 2. Equivalent commercially available in U.S.A.
 3. Not available in U.S.A.
 4. Alternative tool.

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Carburetor float level gauge	07401 - 0010000		5
Flywheel holder	07725 - 0040000	NOTE 2	10
Rotor puller	07733 - 0020001	NOTE 4: 07933 - 3950000 (U.S.A. only)	10
Remover weight	07741 - 0010201	NOTE 4: 07936 - 3710200	8, 13
Valve guide driver, 5.5 mm	07742 - 0010100		7
Attachment, 37 X 40 mm	07746 - 0010200		11, 12, 13
Attachment, 42 X 47 mm	07746 - 0010300		8, 11
Attachment, 52 X 55 mm	07746 - 0010400		10, 11, 12, 14.
			15, 16
Attachment, 62 X 68 mm	07746 - 0010500		14, 16
Attachment, 72 X 75 mm	07746 - 0010600		11
Attachment, 24 X 26 mm	07746 - 0010700		10, 11
Driver, 22 mm I.D.	07746 - 0020100		8
Attachment, 20 mm I.D.	07746 - 0020400		8
Driver, 40 mm I.D.	07746 - 0030100		15, 16
Attachment, 25 mm I.D.	07746 - 0030200		15, 16
Pilot, 10 mm	07746 - 0040100		10
Pilot, 17 mm	07746 - 0040400		8, 11, 13, 14
Pilot, 20 mm	07746 - 0040500		11
Pilot, 25 mm	07746 - 0040600		11
Pilot, 30 mm	07746 - 0040700		12
Pilot, 35 mm	07746 - 0040800		11
Pilot, 40 mm	07746 - 0040900		11
Pilot, 22 mm	07746 - 0041000		11
Pilot, 28 mm	07746 - 0041100		14
Driver	07749 - 0010000		8, 10, 11, 12, 13, 14, 15, 16
Valve spring compressor	07757 - 0010000		7
Valve seat cutter		NOTE 2	
Seat cutter, 29 mm (45° EX)	07780 - 0010300		7
Seat cutter, 35 mm (45° IN)	07780 - 0010400		7
Flat cutter, 30 mm (32° IN)	07780 - 0012200		7
Flat cutter, 35 mm (32° EX)	07780 - 0012300		7
Interior cutter, 30 mm (60° EX)	07780 - 0014000		7
Interior cutter, 37.5 mm (60° IN)	07780 - 0014100		7
Cutter holder, 5.5 mm	07781 - 0010101		7
Swingarm lock nut wrench	07908 - 4690003	NOTE 1	13
Snap ring pliers	07914 - 3230001		14
Lock nut wrench, 30 X 64 mm	07916 - MB00002	NOTE 1	15, 16
Bearing remover set	07936 - 3710001	NOTE 3	11
- Remover handle	07936 - 3710100		11
- Bearing remover, 20 mm	07936 - 3710600		11
- Remover weight	07741 - 0010201	NOTE 4: 07936 - 3710200	11
Remover handle	07936 - 3710100		8, 11, 13
Bearing remover, 17 mm	07936 - 3710300		8, 11, 13

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Bearing remover set, 10 mm	07936 - GE00000		10
- Remover shaft	07936 - GE00100		10
- Remover head	07936 - GE00200		10
- Remover weight	07741 - 0010201	NOTE 4: 07936 - 3710200	10
Attachment	07945 - 3330300	NOTE 4: 07746 - 0010400	12
Driver handle attachment	07949 - 3710001		12
Driver attachment	07965 - KE80200	NOTE 4: 07947 - KA50100	15, 16
Oil seal driver	07965 - MC70100		14
Assembly collar	07965 - VM00100		11
Assembly shaft	07965 - VM00200	NOTE 4: 07931 - ME4010A (U.S.A. only)	11
Threaded adapter	07965 - VM00300	NOTE 4: 07931 - KF00200 (U.S.A. only)	11
Base holder	07967 - KC10100		
Valve guide reamer, 5.5 mm	07984 - 2000001	NOTE 4: 07984 - 200000D (U.S.A. only)	7
Clutch holder	07GMB - HA70101	NOTE 1	8
Shock absorber compressor	07GME - 0010000		12, 13
Peak voltage adapter	07HGJ - 0020100	NOTE 4: Imrie diagnostic tester (model 625)	18
Pinion puller set	07HMC - MM80101	NOTE 3	15, 16
- Shaft puller	07931 - ME40000	NOTE 4: 07931 - ME4010B and 07931 - HB3020A (U.S.A. only)	15, 16
- Pinion puller base	07HMC - MM80110	NOTE 4: 07HMC - MM8011A (U.S.A. only)	15, 16
Oil seal driver attachment	07JAD - PH80101	NOTE 1	12
Clutch center holder	07JMB - MN50300	NOTE 4: 07HGB - 001000A (U.S.A. only)	8
Differential inspection tool	07KMK - HC50101	NOTE 4: 07KMK - HC5010A (U.S.A. only)	15
Ball joint remover, 28 mm	07MAC - SL00200		12
Recoil pulley holder	07SMB - HM70100	NOTE 1	10
Pinion holder	07SMB - HM70200	NOTE 1	15, 16
Universal bead breaker	GN-AH-958-BB1		12, 13

LUBRICATION & SEAL POINT

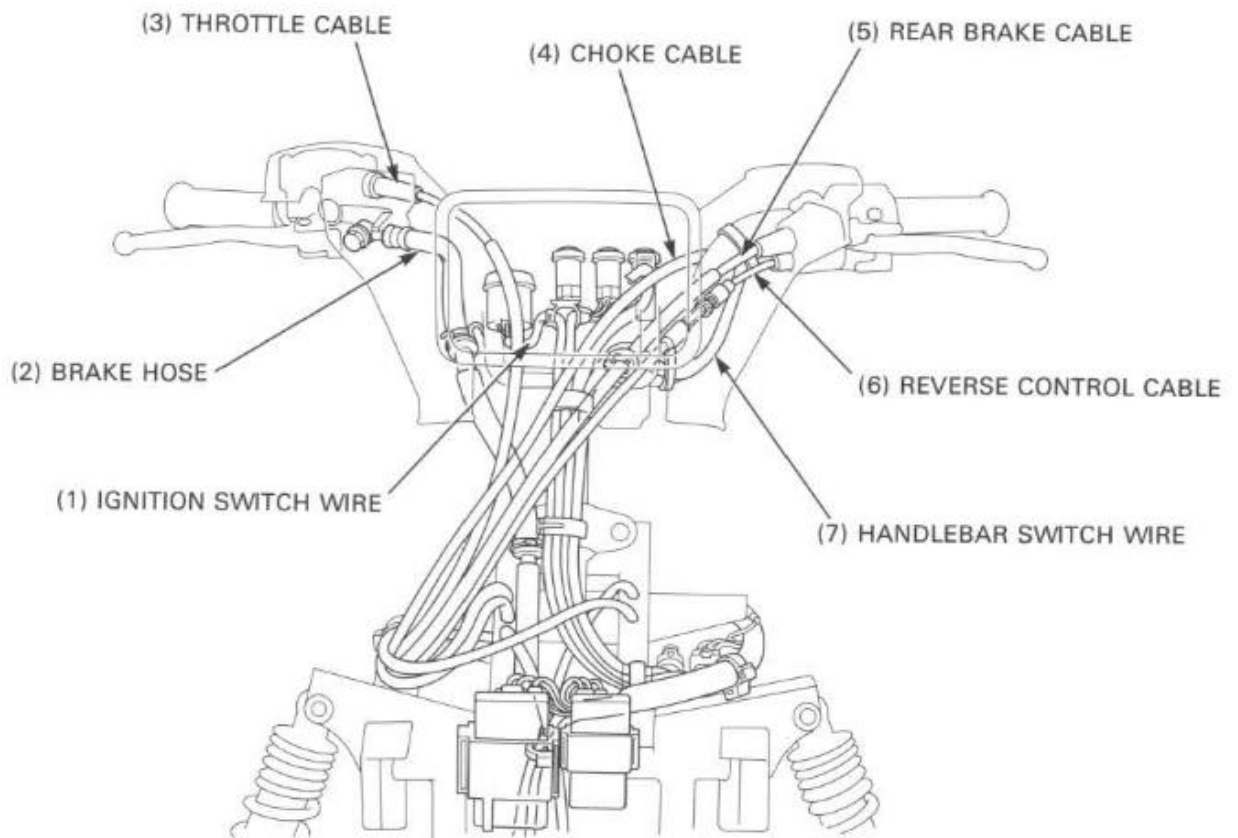
ENGINE	LOCATION	MATERIAL	REMARKS
	Oil filter cover inside Cylinder bore Cylinder stud bolt threads (at cap nut) Piston pin bore and piston outer surface Piston ring surface Connecting rod small end inner surface Centrifugal clutch outer lock nut threads Cam follower surface Cam chain surface Rocker arm both ends Clutch friction disc surface Clutch lifter plate outer surface Centrifugal clutch outer sliding surface Clutch drive plate one-way clutch sliding surface Transmission bearing and gear teeth surface Transmission bushing journal surface Main shaft and countershaft journal surface Change clutch center lock nut threads Shift fork shaft surface Shift drum grooves and surface Reverse stopper shaft journal surface Starter idle gear teeth Recoil pulley bolt threads Starter one-way clutch surface Each ball and needle bearing rolling area Each oil seal lip Crankshaft oil path	Engine oil	
	Piston pin outer surface Camshaft lobes Rocker arm shaft (rocker arm sliding surface) Valve stem sliding surface Clutch outer guide sliding surface Starter reduction shaft A surface Starter reduction shaft surface Starter motor pinion end	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
	Cam sprocket bolt threads Cam chain tensioner 6 mm flange bolt threads Camshaft bearing fixing plate 8 mm bolt threads Relief valve 14 mm cap threads Gearshift return spring pin threads Starter one-way clutch socket bolt threads Neutral/reverse switch 6 mm bolt threads Ignition pulse generator 5 mm socket bolt threads	Locking agent	
	Change switch grommet Alternator cord grommet Alternator cover gasket	Sealant	

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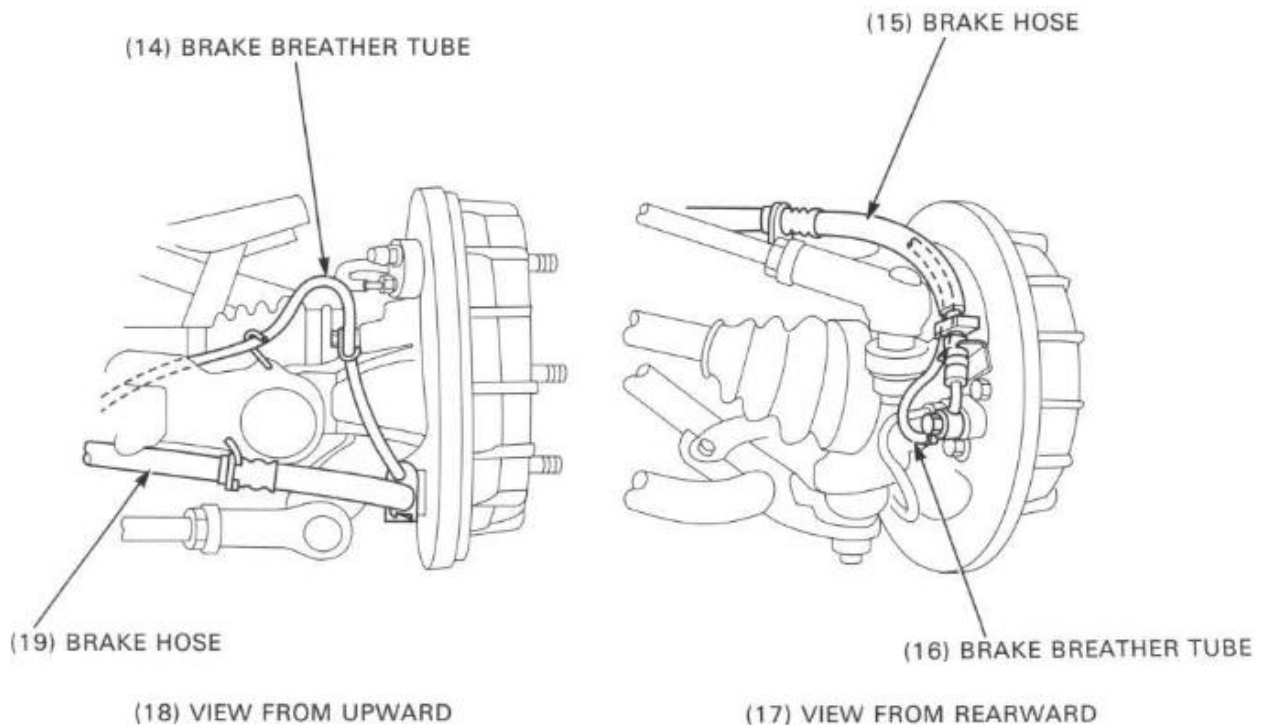
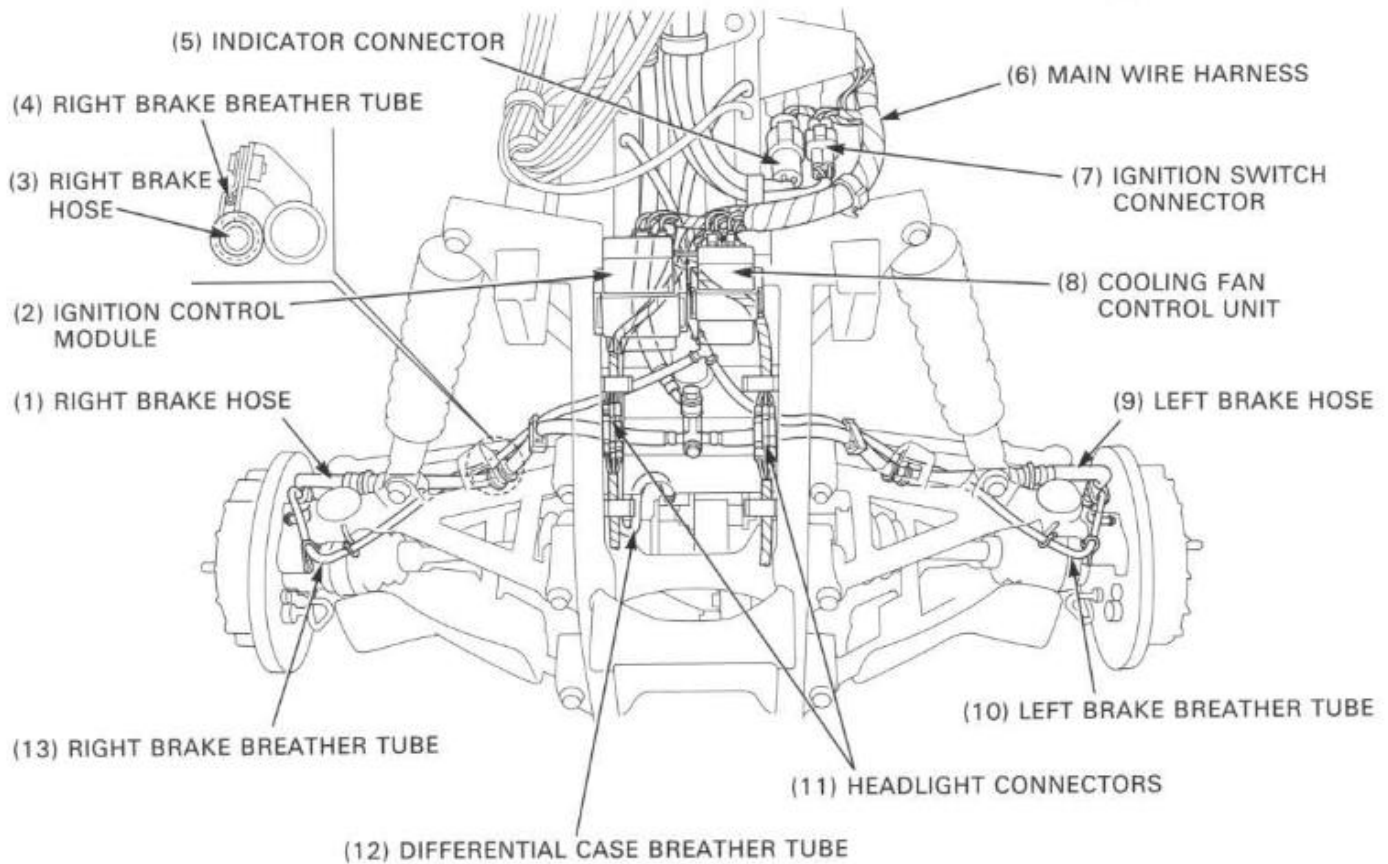
GENERAL INFORMATION

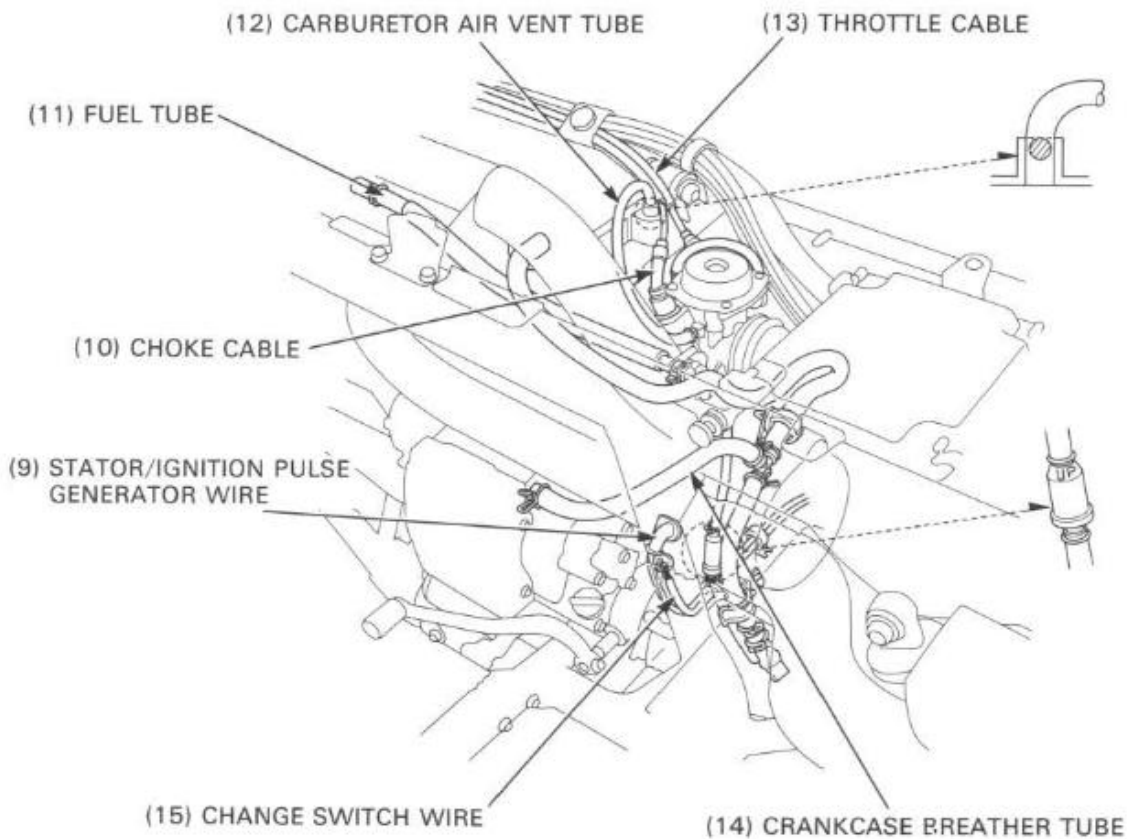
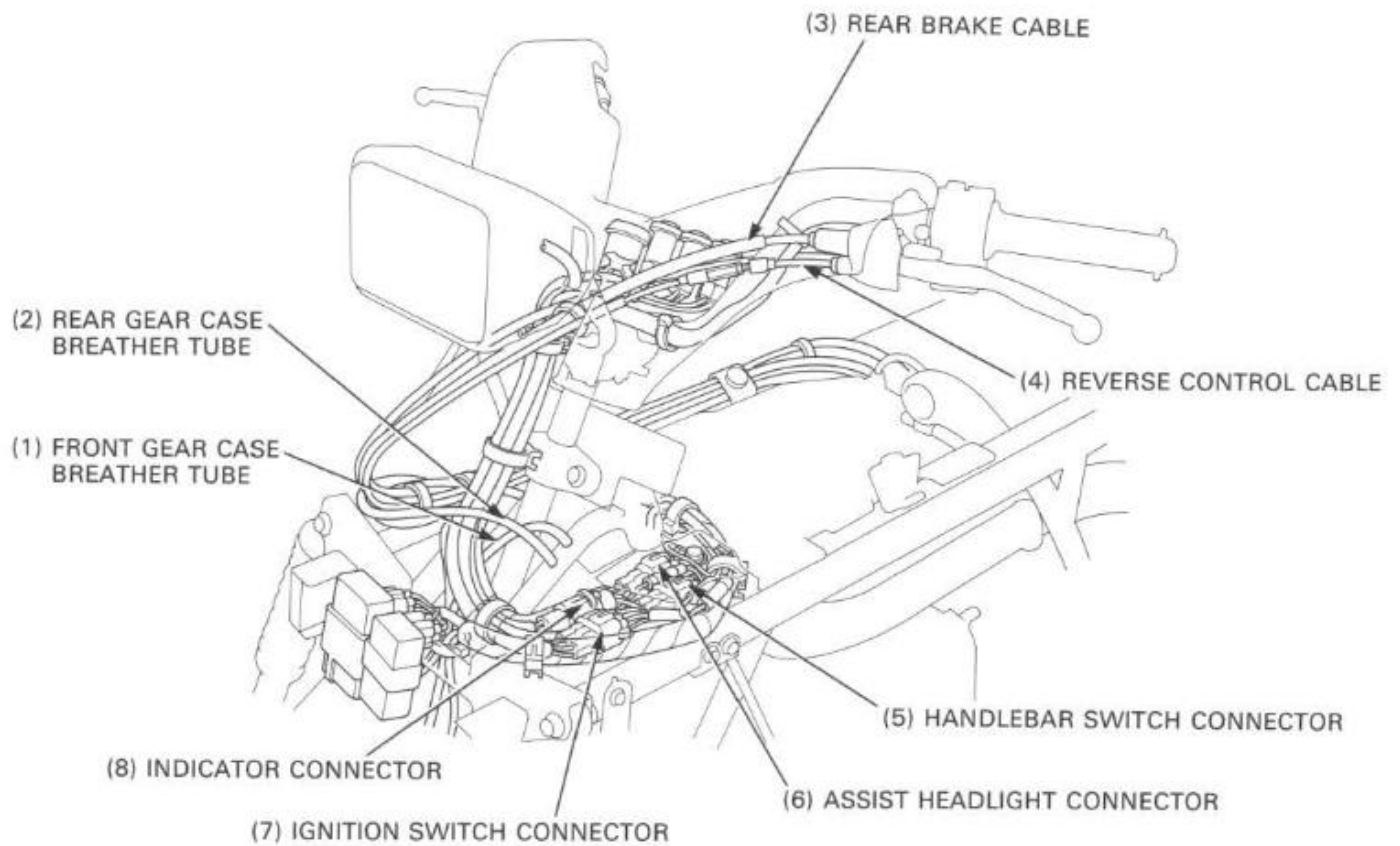
FRAME (Cont'd)		
LOCATION	MATERIAL	REMARKS
Rear brake inner cable Throttle inner cable Reverse assist inner cable Choke inner cable	Cable lubricant	
Front differential case Rear final drive case	Hypoid gear oil SAE #80	200 cc (6.76 oz) 100 cc (3.38 oz)
Front differential case mating surface Rear final drive case mating surface	Liquid sealant (Three-bond 1215 or equivalent)	
Handlebar grip rubber inside	Handa bond A or Cemedine #540	

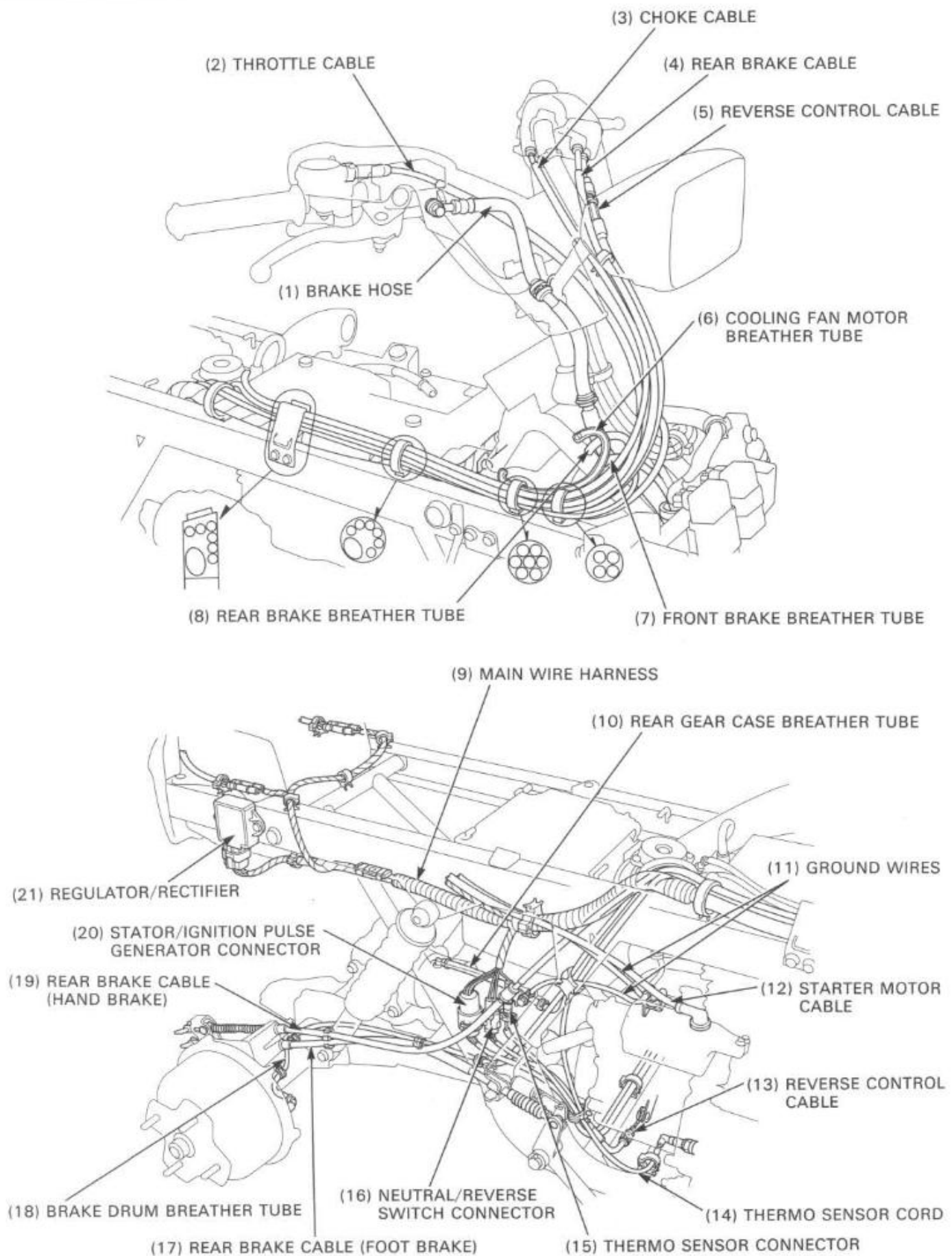
CABLE & HARNESS ROUTING

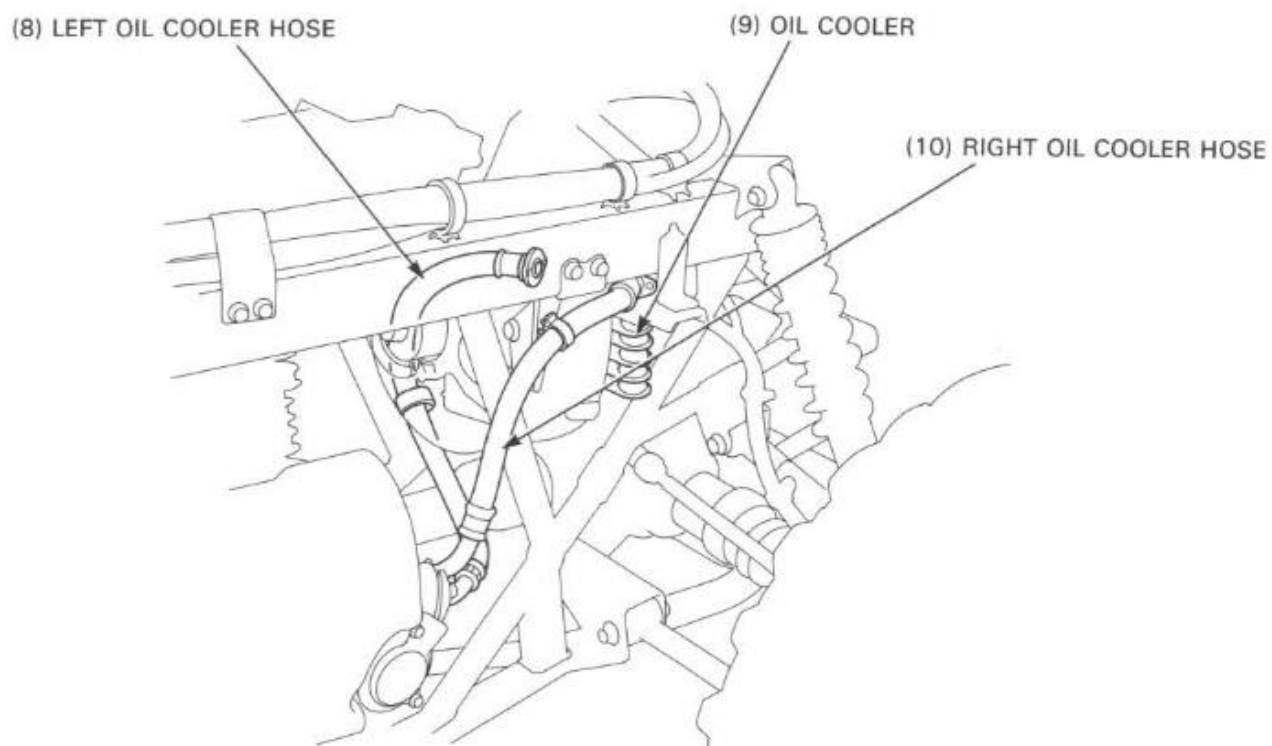
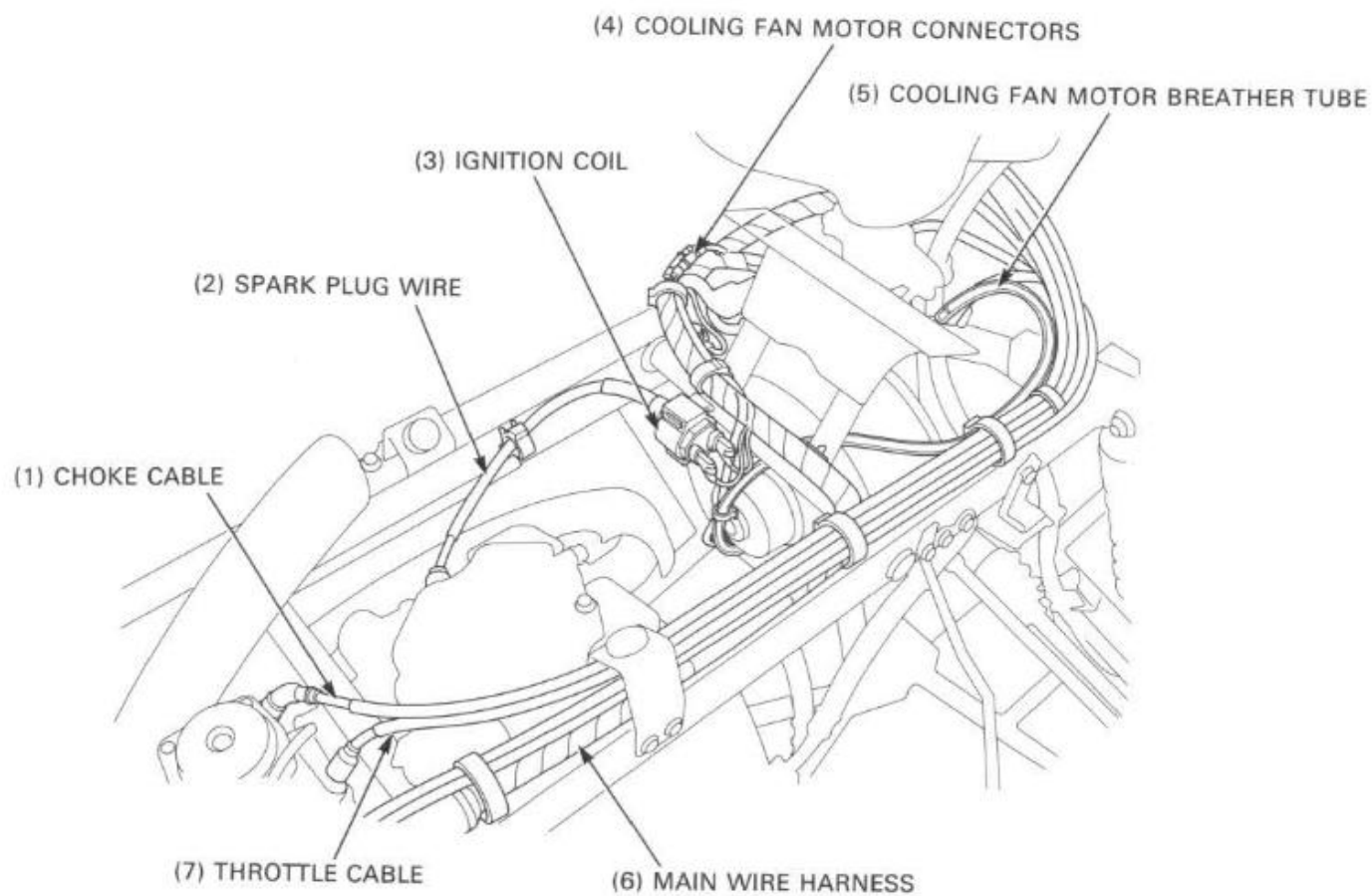


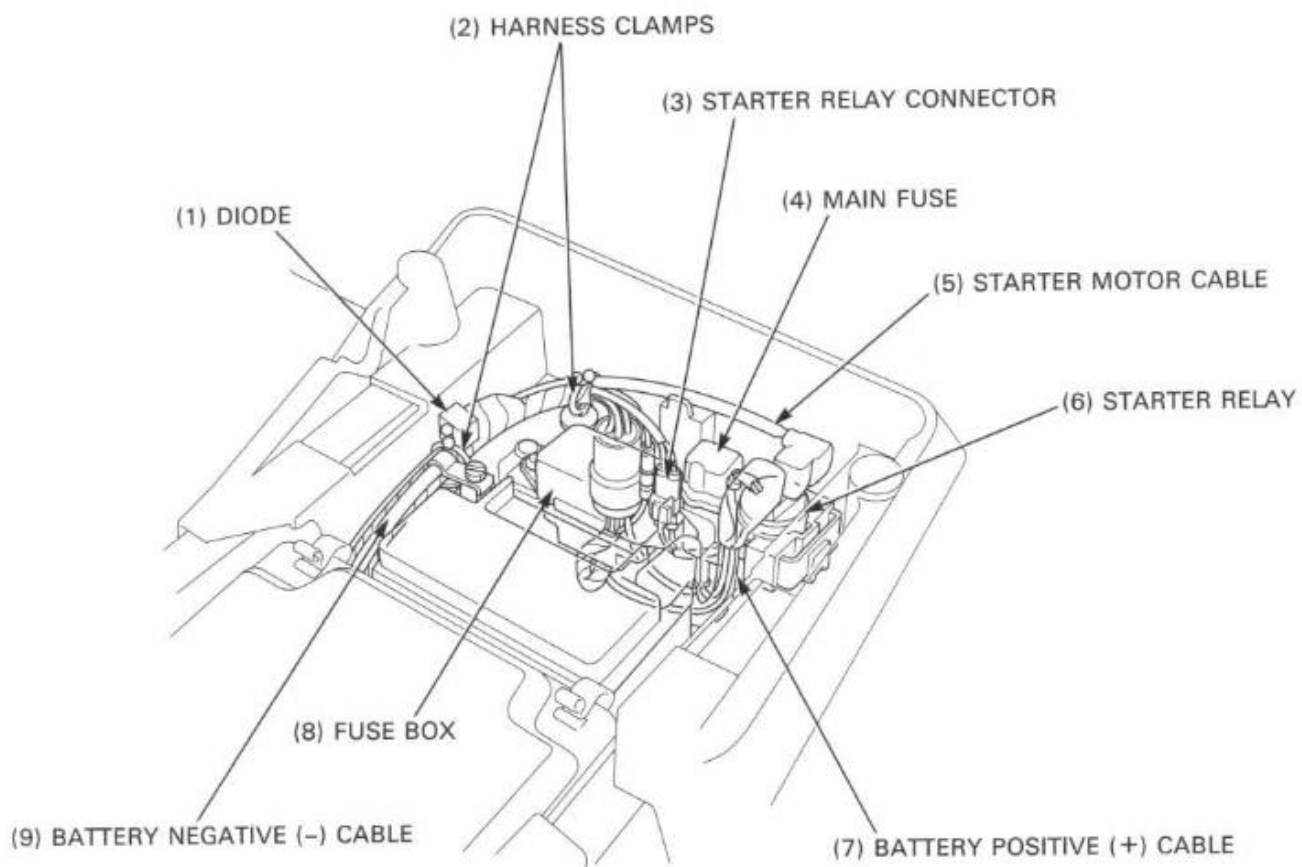
GENERAL INFORMATION











2.FRAME/BODY PANELS/EXHAUST SYSTEM

2

SERVICE INFORMATION	2-1	FRONT CARRIER/BUMPER/ FRONT FENDER	2-5
TROUBLESHOOTING	2-1		
BODY PANEL LOCATIONS	2-2	REAR CARRIER/REAR FENDER	2-9
SEAT/SIDE COVER	2-3	HANDLEBAR COVER	2-12
		EXHAUST SYSTEM	2-13

SERVICE INFORMATION

GENERAL

▲ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN.**
 - Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
-
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
 - This section covers removal and installation of the body panels, fuel tank and exhaust system.
 - Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
 - When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
 - Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Muffler band bolt	23 N•m (2.3 kg-m, 17 lb-ft)
Exhaust pipe protector bolt	20 N•m (2.0 kg-m, 14 lb-ft)
Muffler heat protector bolt	20 N•m (2.0 kg-m, 14 lb-ft)
Step bar mounting bolt	33 N•m (3.3 kg-m, 24 lb-ft)
Fuel tank rear bracket bolt	18 N•m (1.8 kg-m, 13 lb-ft)
Front and rear carrier mounting bolt	33 N•m (3.3 kg-m, 24 lb-ft)

TROUBLESHOOTING

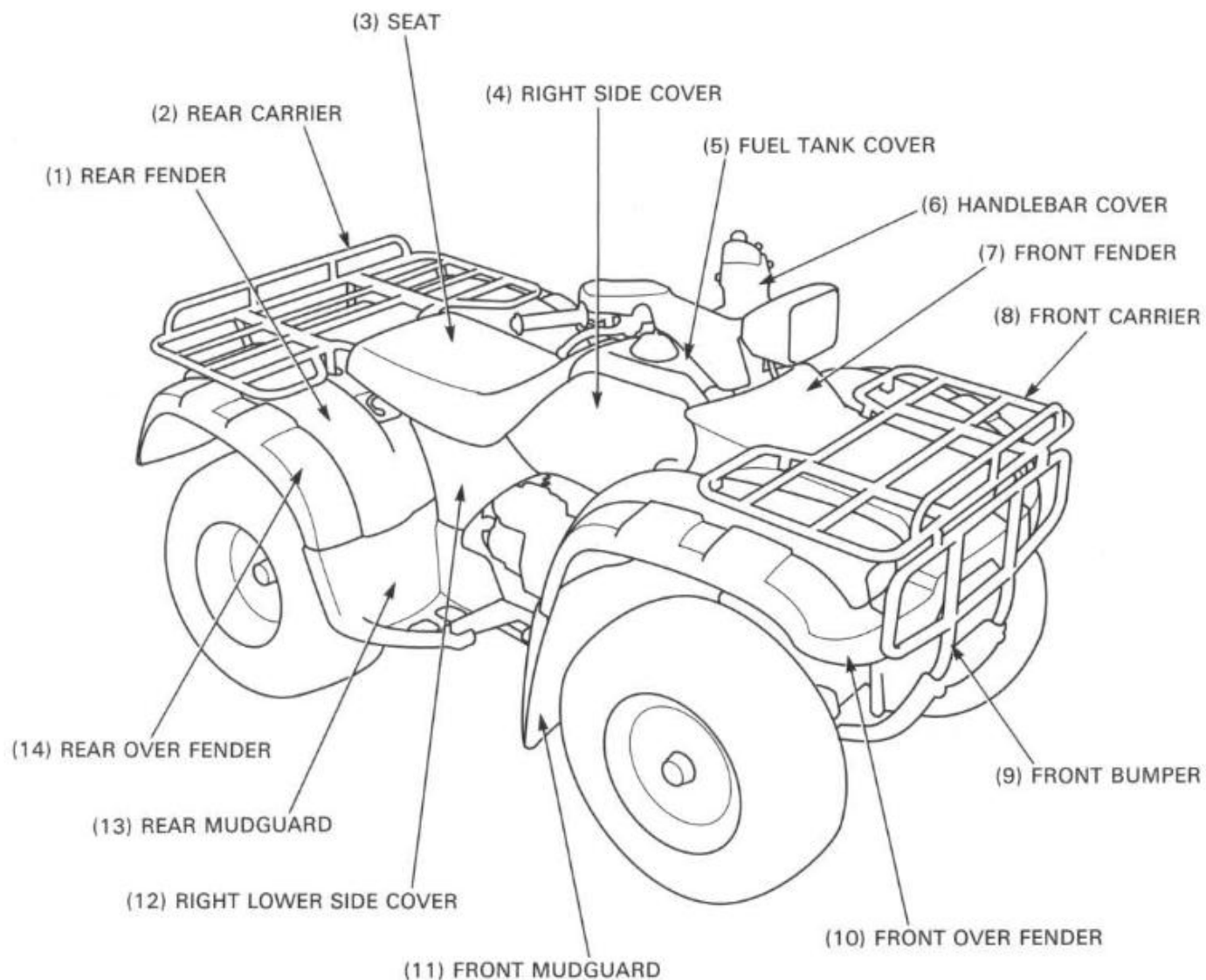
Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

BODY PANEL LOCATIONS



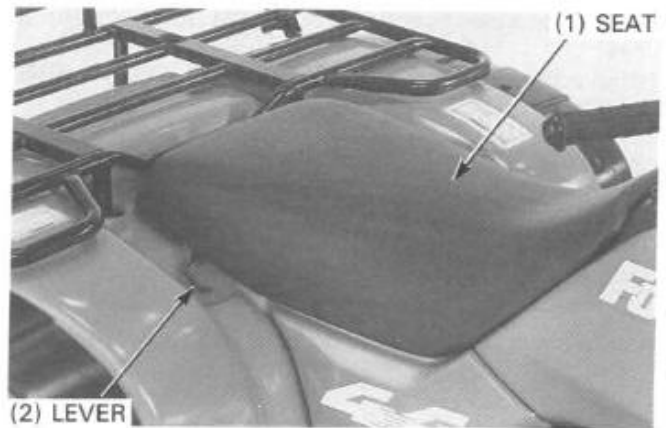
SEAT/SIDE COVER

REMOVAL

SEAT

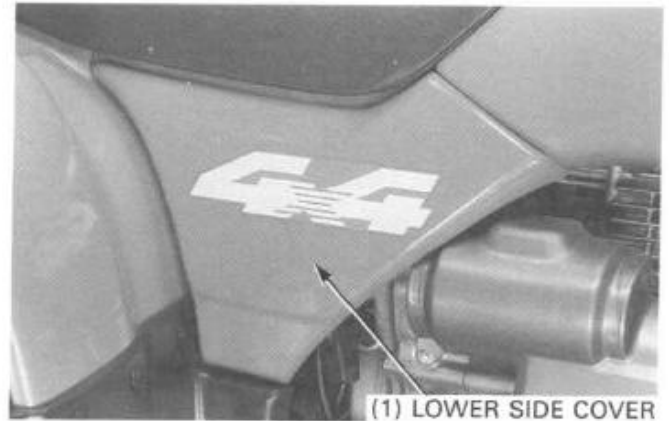
Release the seat lock lever by moving the lever upward.

Pull back and remove the seat.



SIDE COVERS AND FUEL TANK COVER

Remove the right lower side cover by releasing the tabs from the frame grommets.



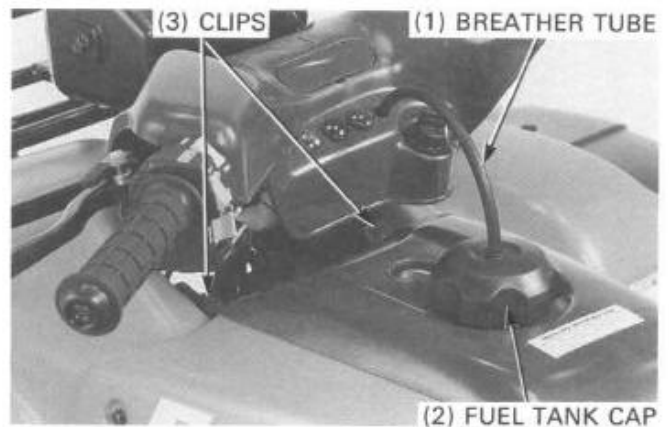
Remove the fuel tank breather tube from the handlebar cover.

⚠ WARNING

- *Gasoline is extremely flammable and explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*

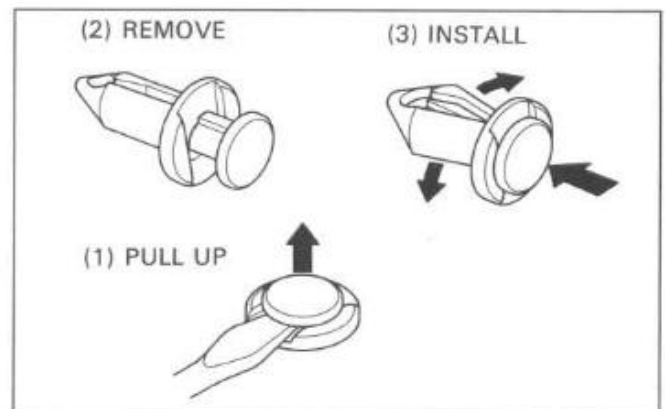
Remove the fuel tank cap by turning it counterclockwise.

Remove the two retaining clips.



Remove the retaining clips as follow:

- Pull up the clip center using a snap ring pliers, flat head screwdriver or equivalent.
- Remove the clip assembly.



FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the side cover and front fender joint bolts on both sides.

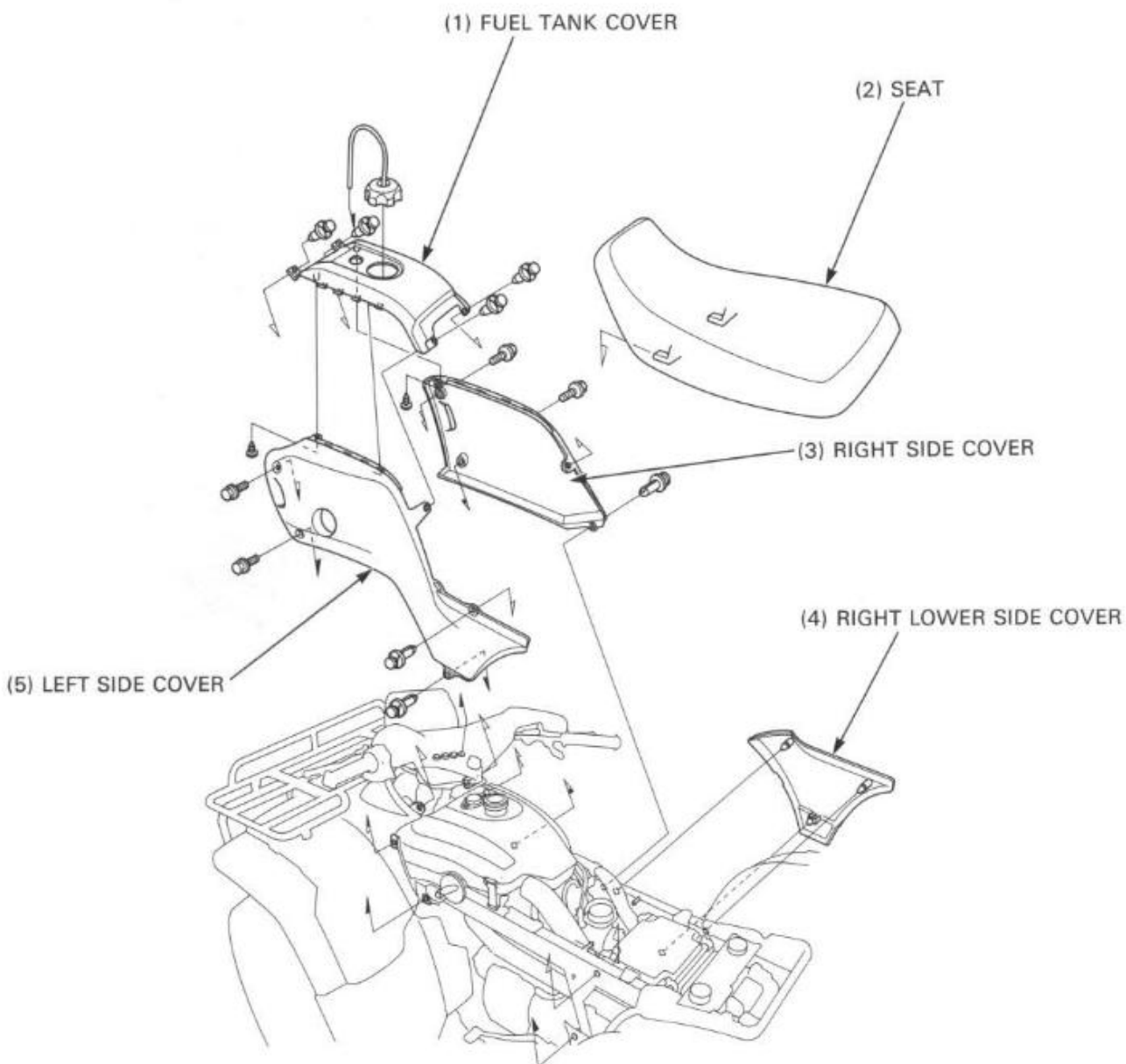
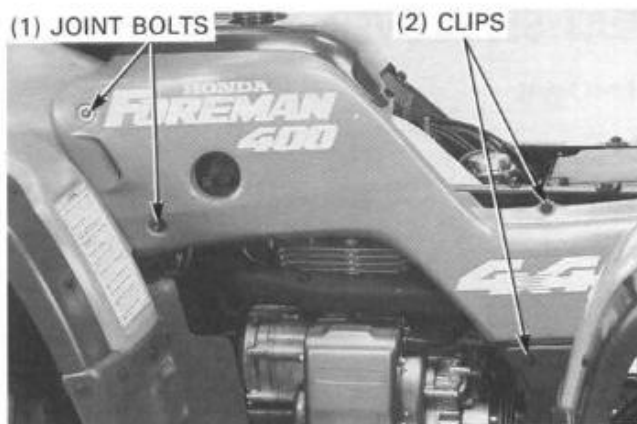
Remove the retaining clips and side/fuel tank cover as an assembly.

To separate the covers, remove the two screws from the underside, and the two clips.

Separate the covers.

INSTALLATION

Installation is in the reverse order of removal.

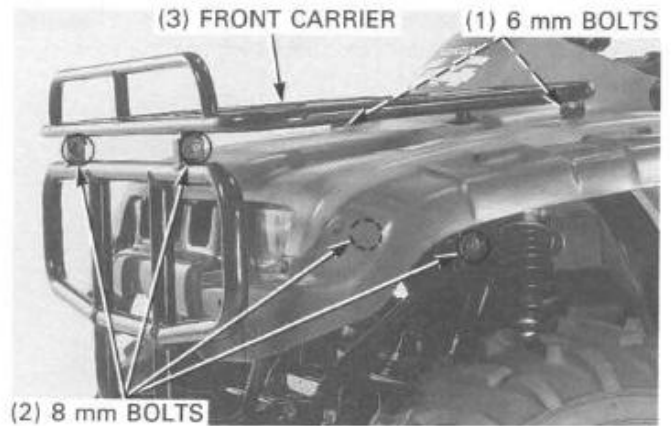


FRONT CARRIER/BUMPER/FRONT FENDER

REMOVAL

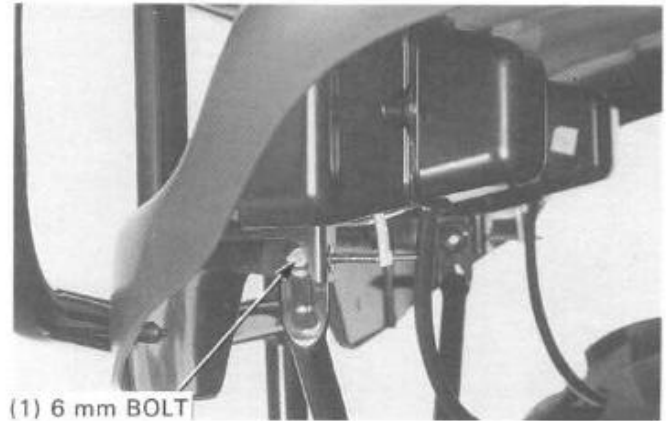
FRONT CARRIER

Remove the two 6 mm bolts and four 8 mm bolts, then remove the front carrier.

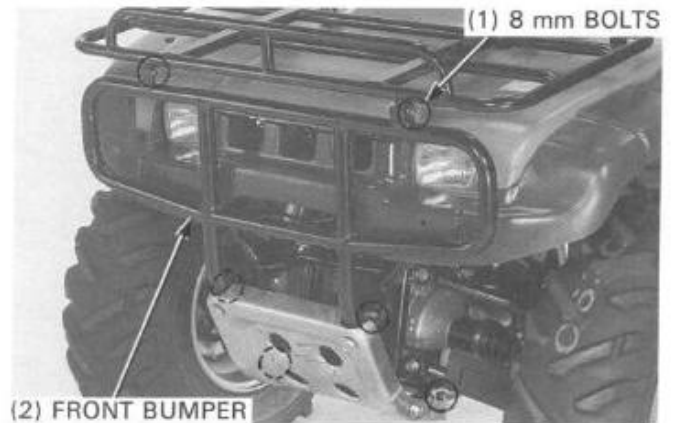


FRONT BUMPER

Remove the two 6 mm bolts.



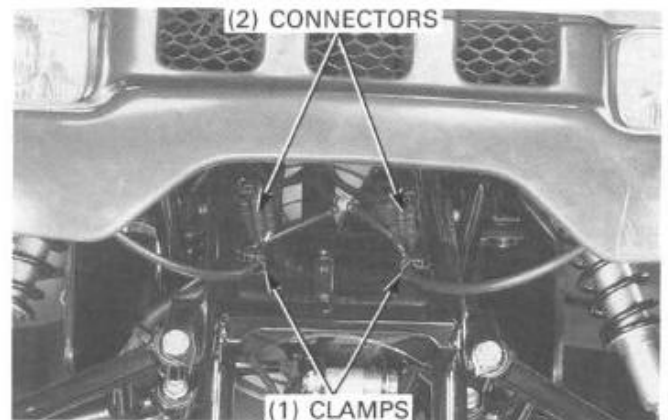
Remove the six 8 mm bolts and front bumper.



FRONT FENDER

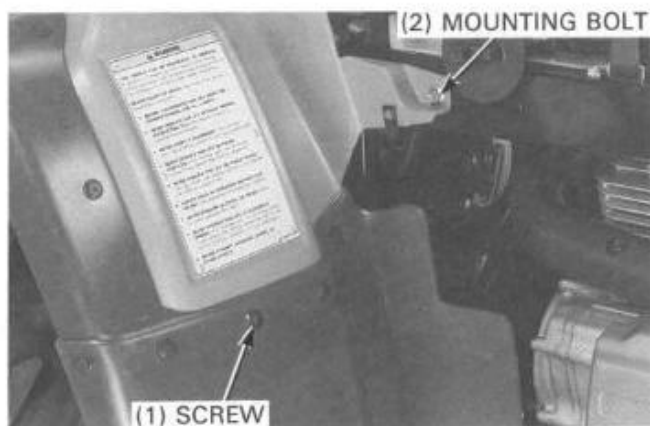
Remove the side/fuel tank cover assembly (page 2-4). Remove the front carrier and bumper.

Release the front two headlight wire clamps. Disconnect the headlight connectors.

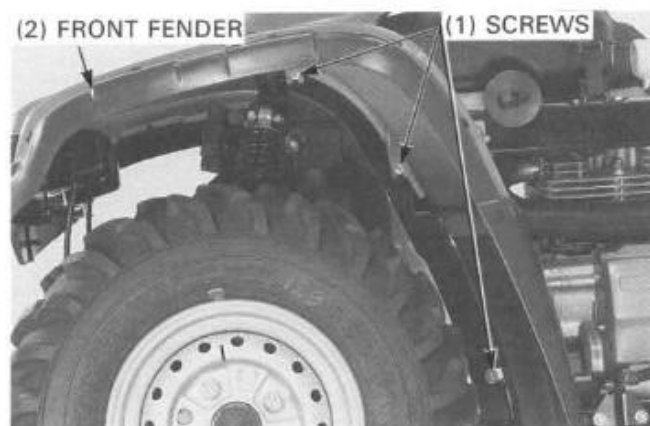


FRAME/BODY PANELS/EXHAUST SYSTEM

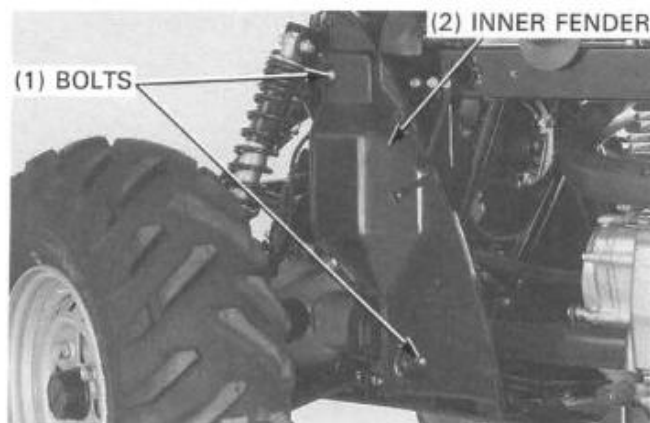
Remove the front fender/mud guard stay screw on each side.
Remove the front fender rear mounting bolt on each side.



Remove the three inner fender joint screws on each side.
Remove the front fender assembly.



Remove the two bolts and inner fender.

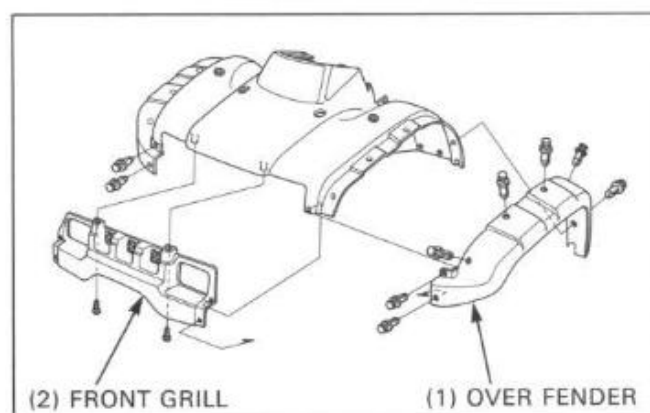


DISASSEMBLY

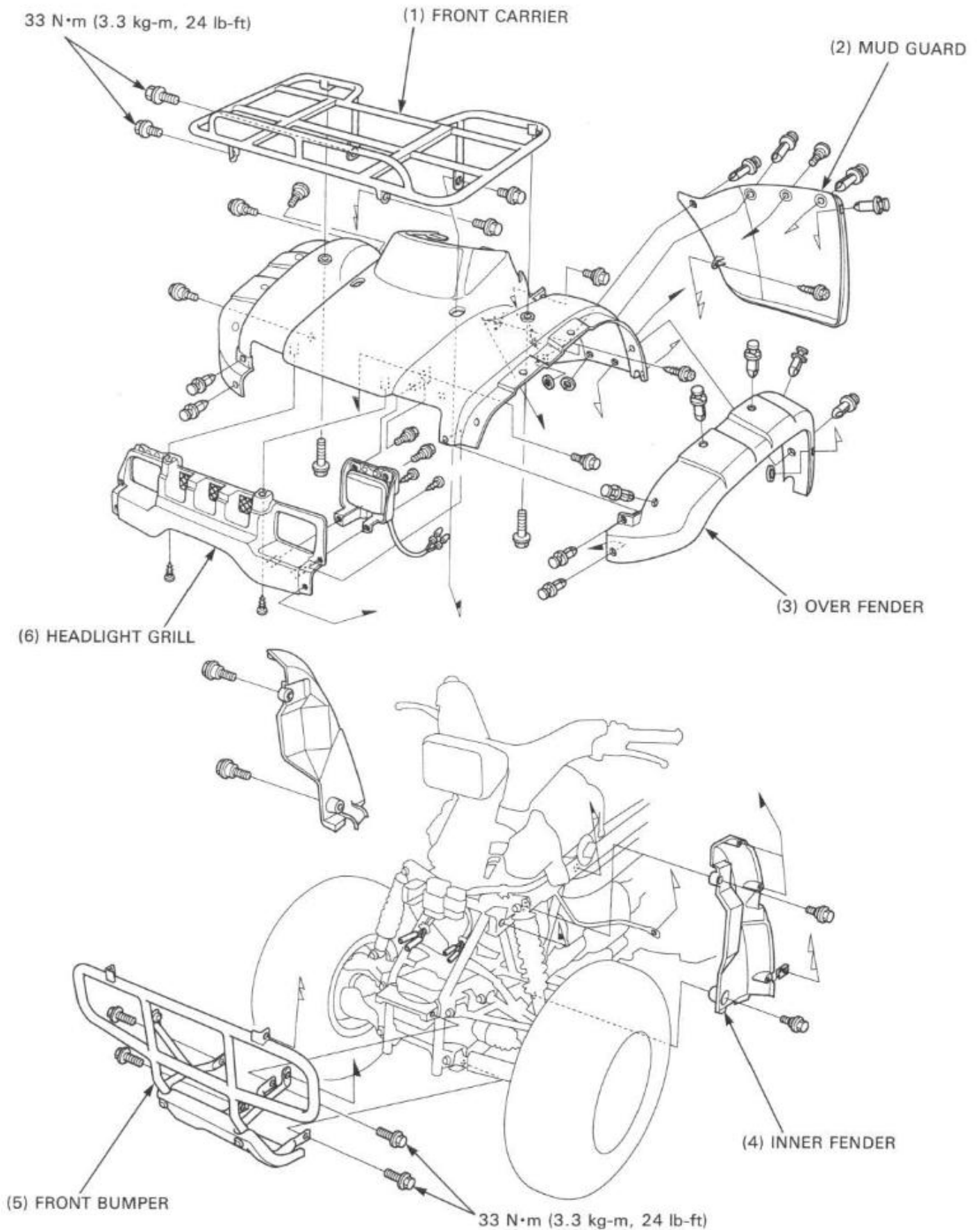
Remove the headlight unit (page 20-4).

Remove the retaining clips and both over fenders.
Remove the two screws and front grill.

Remove the retaining clips, washers, and mud guards.



INSTALLATION

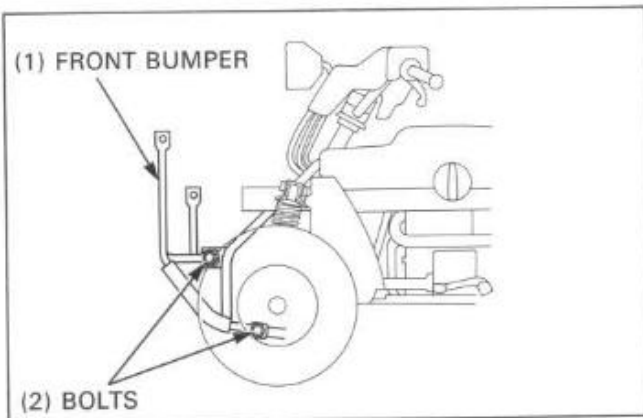


FRAME/BODY PANELS/EXHAUST SYSTEM

Install the front bumper and loosely tighten the mounting bolts.

NOTE

- Do not tighten them yet.

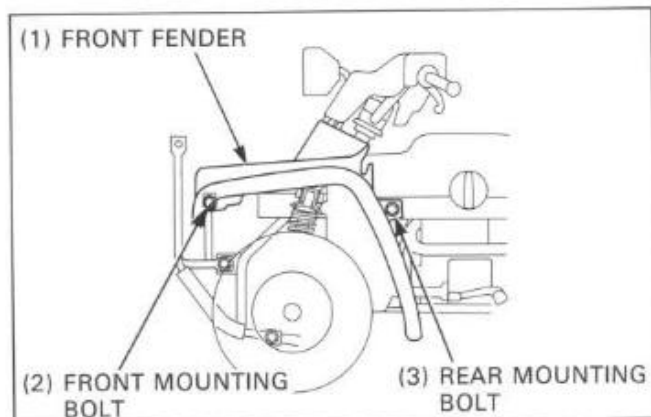


Install the front fender.

Install the front and rear mounting bolts, then tighten the rear mounting bolts.

NOTE

- Do not tighten the front bolts yet.

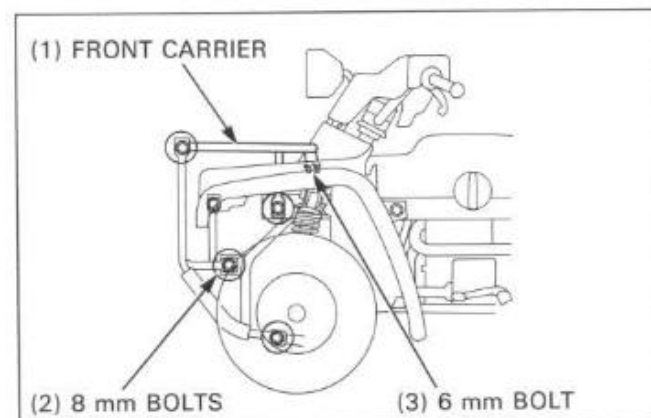


Install the front carrier and mounting bolts.

Tighten the front bumper and carrier 8 mm bolts to the specified torque.

TORQUE: 33 N·m (3.3 kg-m, 24 lb-ft)

Install and tighten the front carrier 6 mm bolts.



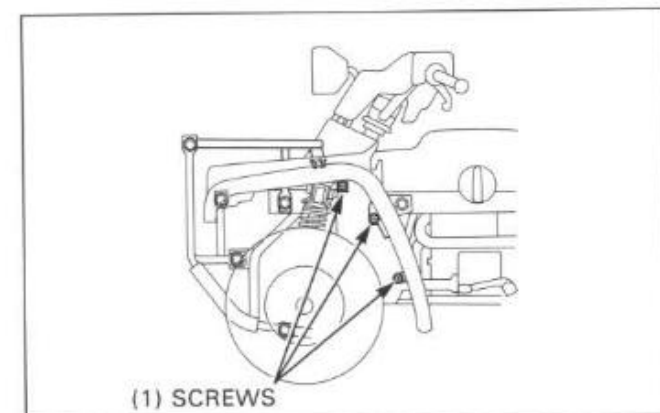
Tighten the front mounting bolts.

Install and tighten the inner fender joint screws.

Install and tighten the mud guard screws.

NOTE

- Note the washer locations when installing mud guard.



REAR CARRIER/REAR FENDER

REMOVAL

REAR CARRIER

Remove the two 6 mm bolts.
Remove the six 8 mm bolts and rear carrier.

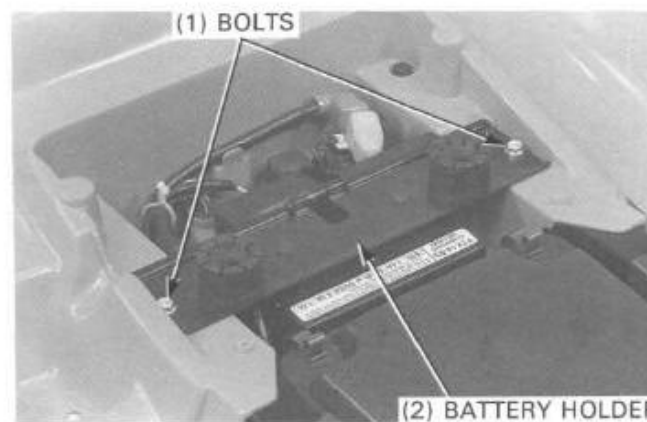
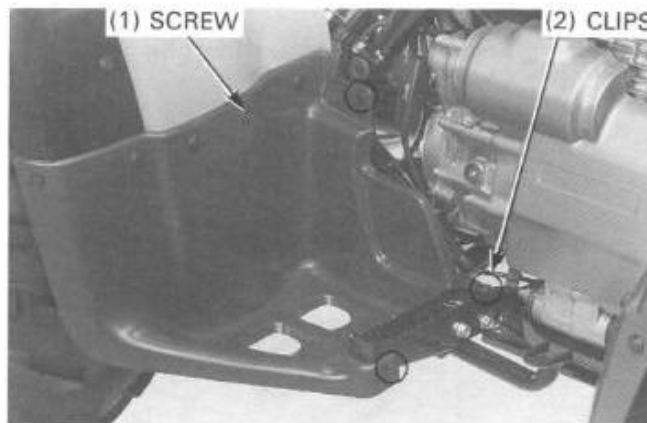
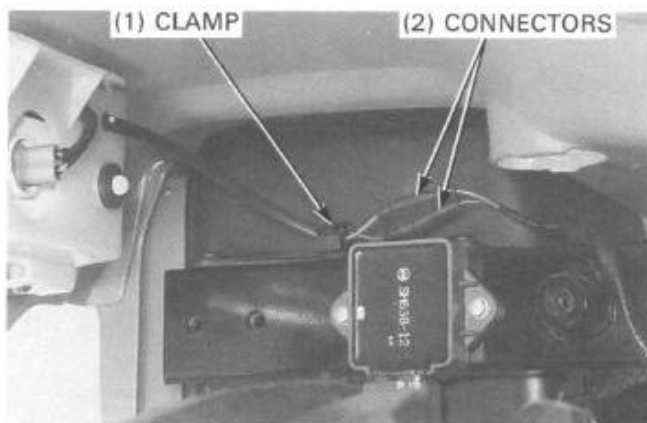
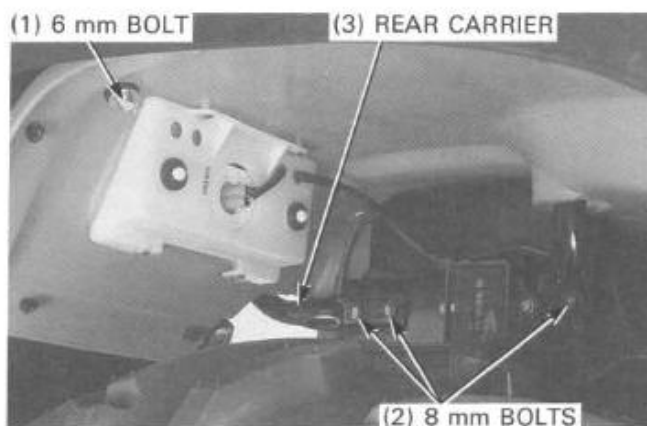
REAR FENDER

Remove the right lower side cover (page 2-3).
Remove the rear carrier.

Release the taillight wire clamps.
Disconnect the taillight connectors.

Remove the mud guard stay screw on each side.
Remove the retaining clips.

Remove the bolts and battery holder.



FRAME/BODY PANELS/EXHAUST SYSTEM

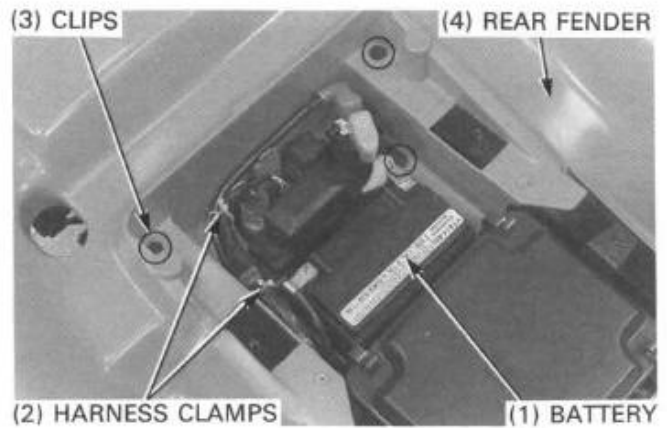
Remove the battery (page 17-4).

Release the wire harness clamps.

Remove the two outer retaining clips and harness bracket assembly.

Remove the two fender retaining clips.

Remove the rear fender assembly.

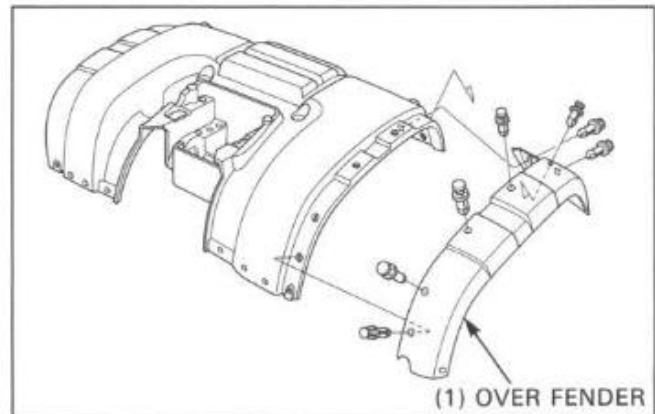


DISASSEMBLY

Remove the screws and taillight unit (page 20-5).

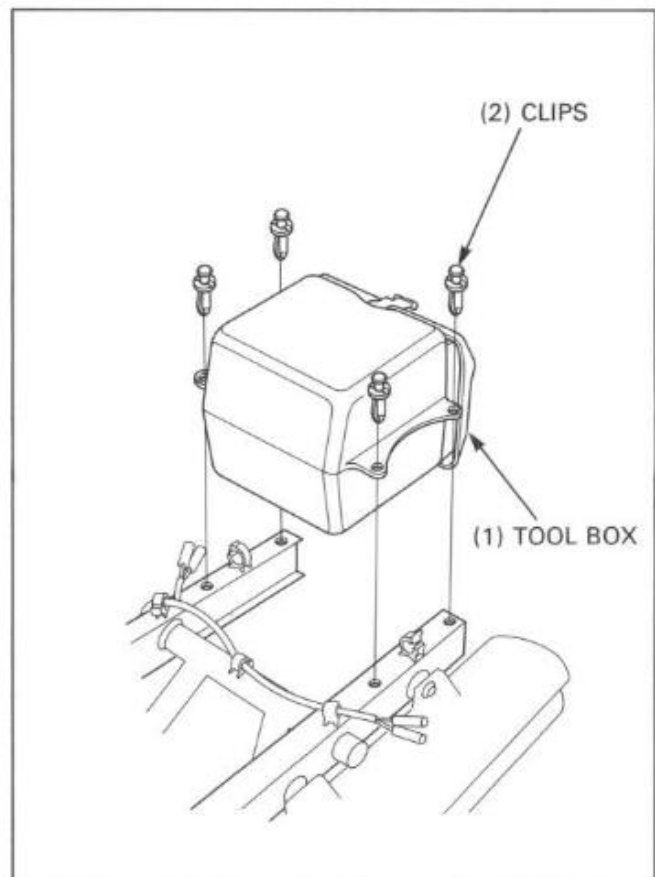
Remove the retaining clips and rear mud guard.

Remove the retaining clips and rear over fenders.



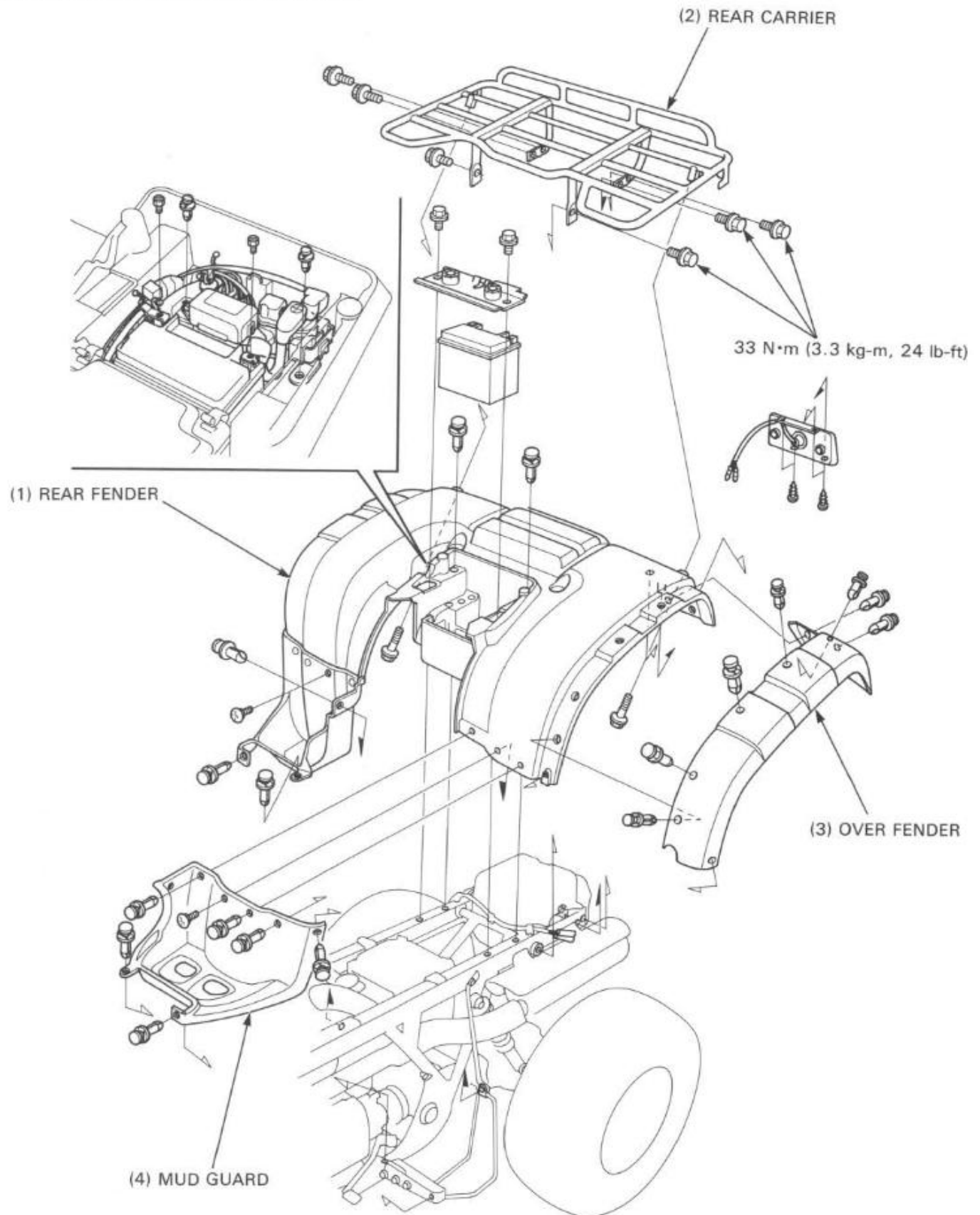
TOOL BOX

Remove the four retaining clips and tool box.



INSTALLATION

Installation is in the reverse order of removal.



HANDLEBAR COVER

REMOVAL

Disconnect the fuel tank breather tube from the handlebar cover.

Remove the side cover (page 2-3).

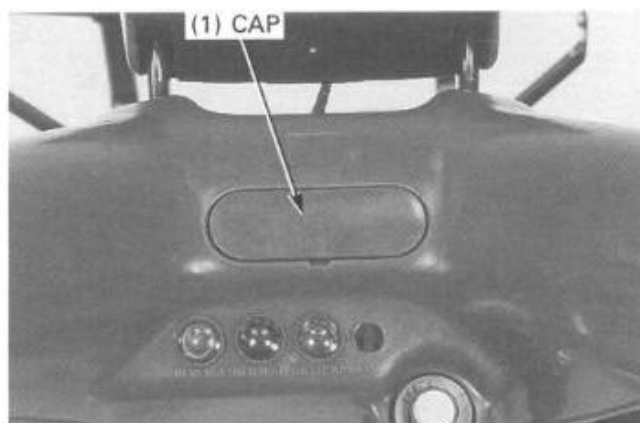
Remove the front fender (page 2-5).



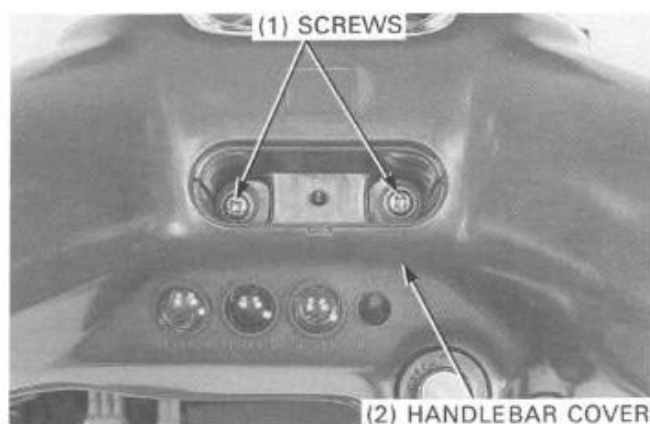
Disconnect the ignition switch and indicator connector.
Release the wire clamps.



Remove the handlebar cover cap.



Remove the handlebar cover mounting screws.
Release both ends of the cover from the handlebar, then
remove the handlebar cover.

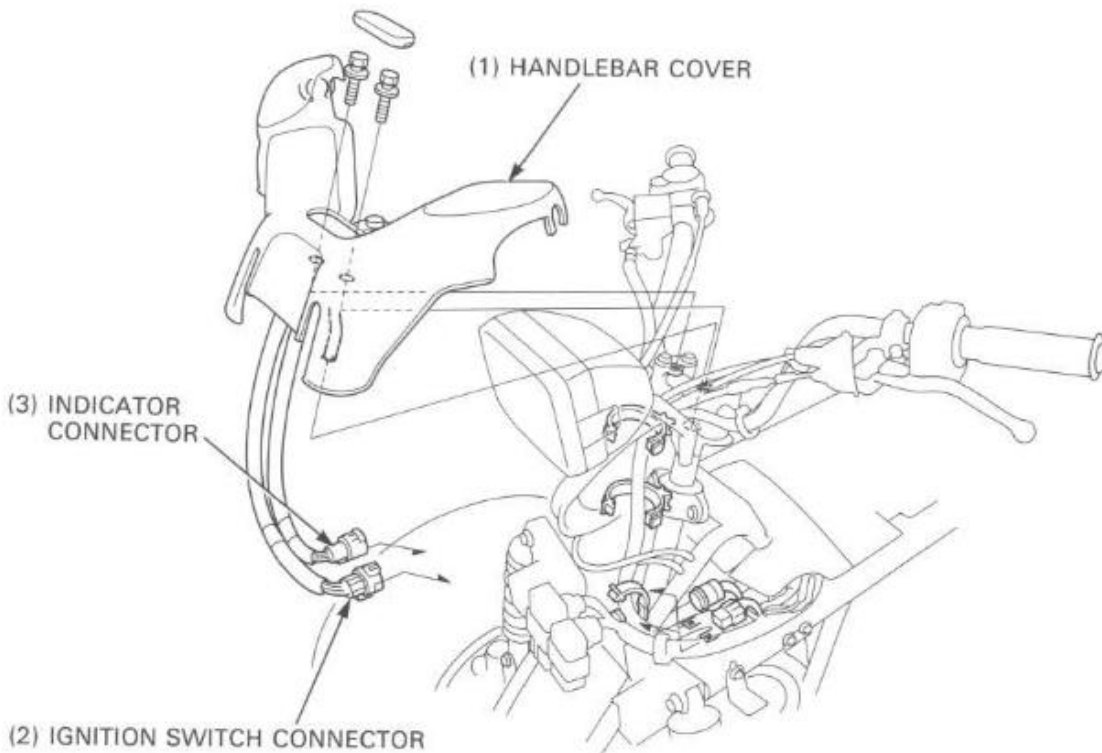


INSTALLATION

Installation is in the reverse order of removal.

NOTE

- At installation, install the fuel tank breather guide tube under the handlebar cover into the steering shaft hole.



EXHAUST SYSTEM

REMOVAL

⚠ WARNING

- Do not service the exhaust system while it is hot.

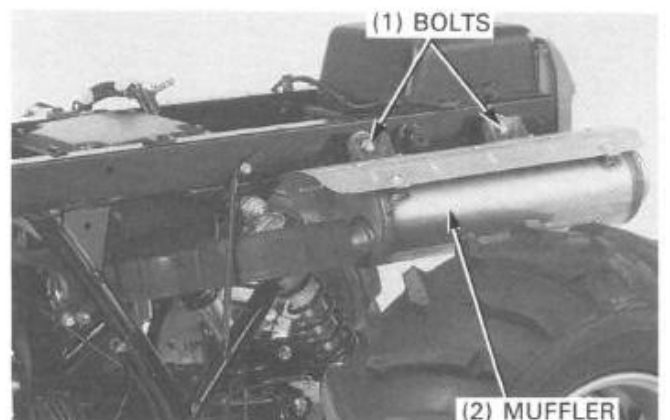
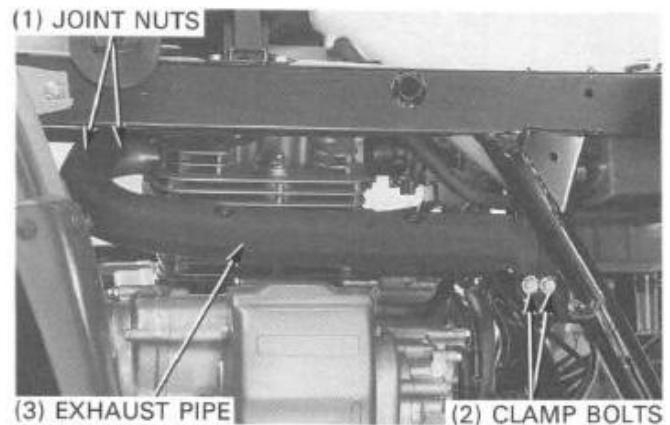
EXHAUST PIPE

Remove the side cover (page 2-3).
Remove the rear fender (page 2-9).

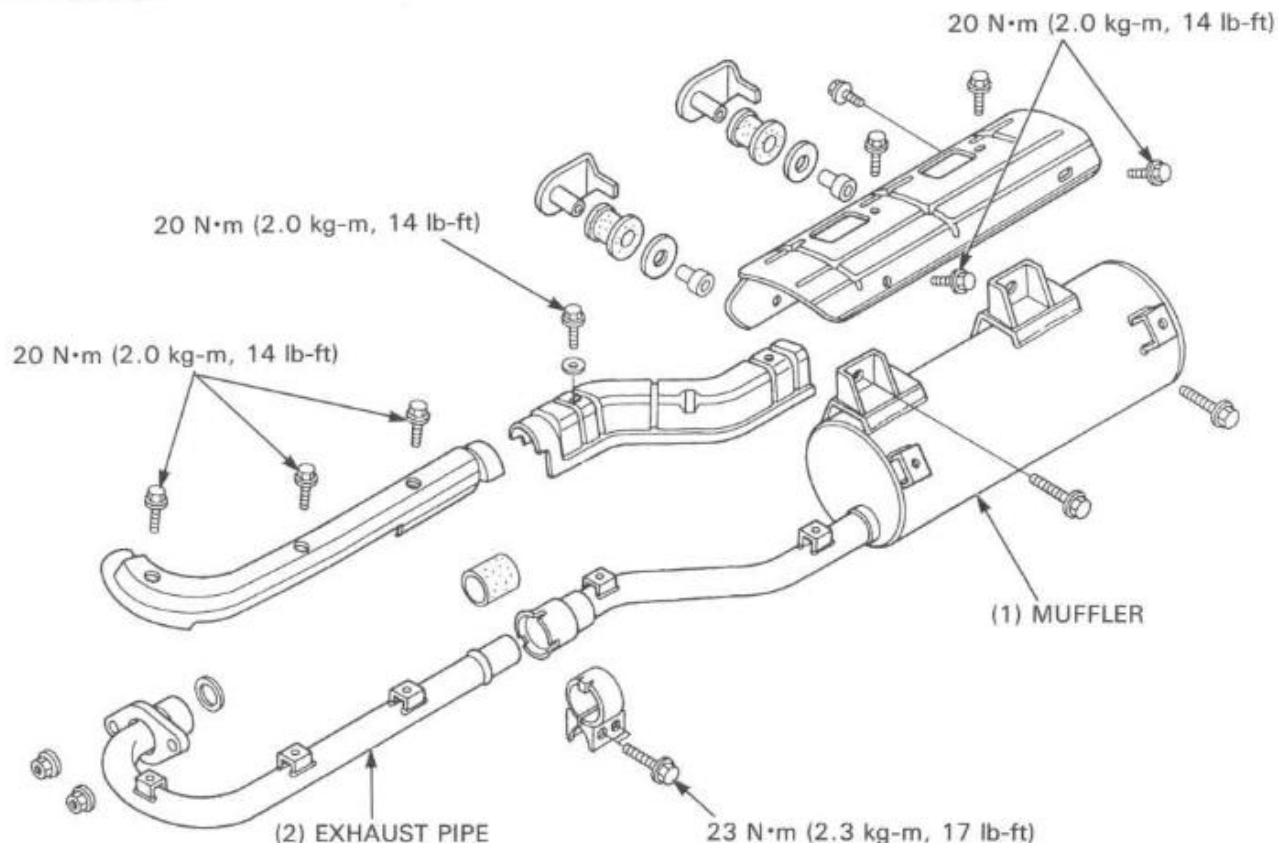
Remove the exhaust pipe joint flange nuts.
Loosen the exhaust joint clamp bolts, then remove the exhaust pipe and gaskets.

MUFFLER

Remove the exhaust muffler mounting bolts, spacers and washers.
Remove the muffler and exhaust pipe gasket.



INSTALLATION



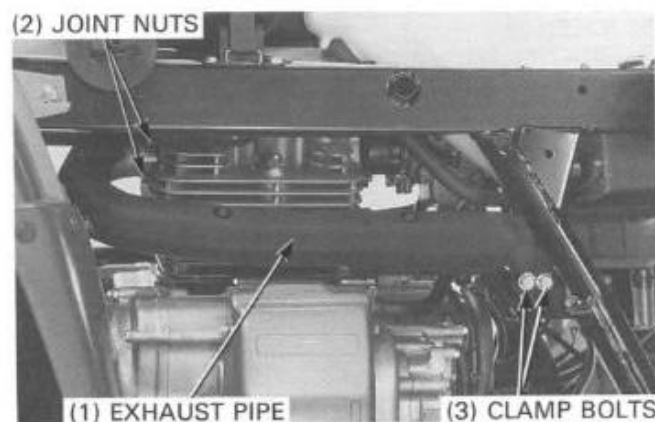
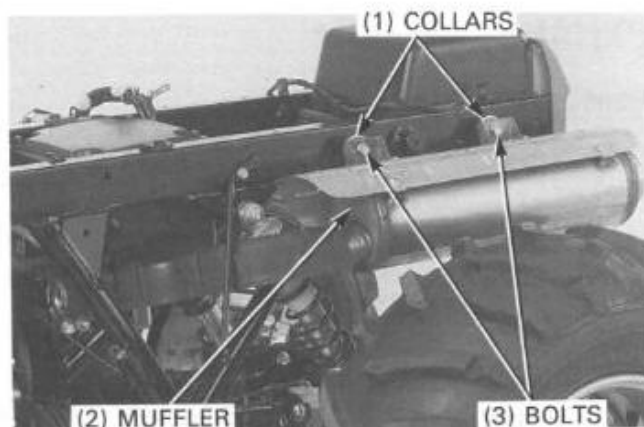
Install the muffler and exhaust pipe in the reverse order of removal.

NOTE

- Always replace the gaskets with new ones.
- Loosely install all of the exhaust pipe fasteners. Always tighten the exhaust pipe joint nuts first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.

TORQUE:

Muffler band bolt:	23 N·m (2.3 kg-m, 17 lb-ft)
Exhaust pipe protector bolt:	20 N·m (2.0 kg-m, 14 lb-ft)
Heat protector bolt:	20 N·m (2.0 kg-m, 14 lb-ft)



3.MAINTENANCE

3

SERVICE INFORMATION	3-1	BRAKE SHOE WEAR	3-14
MAINTENANCE SCHEDULE	3-3	BRAKE SYSTEM	3-15
FUEL LINE	3-4	REVERSE LOCK SYSTEM	3-16
THROTTLE OPERATION	3-4	SKID PLATES/ENGINE GUARD	3-17
CARBURETOR CHOKE	3-5	CLUTCH SYSTEM	3-17
AIR CLEANER	3-5	DRIVE SHAFT BOOTS	3-17
AIR CLEANER HOUSING DRAIN TUBE	3-6	SUSPENSION	3-18
SPARK PLUG	3-7	SPARK ARRESTER	3-18
VALVE CLEARANCE	3-8	NUTS, BOLTS, FASTENERS	3-19
ENGINE OIL & OIL FILTER	3-9	WHEELS/TIRES	3-19
ENGINE IDLE SPEED	3-11	STEERING SHAFT HOLDER BEARING	3-19
FINAL GEAR CASE OIL AND DIFFERENTIAL OIL	3-12	STEERING SYSTEM	3-20
BRAKE FLUID	3-14		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Place the vehicle on level ground before starting any work.
- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle lever free play		3 – 8 mm (1/8 – 5/16 in)	
Spark plug		NGK	NIPPONDENSO
	Standard	DPR7EA-9	X22EPR-U9
	For cold climate (below 5°C/41°F)	DPR6EA-9	X20EPR-U9
	For extended high speed riding	DPR8EA-9	X24EPR-U9
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)	
Valve clearance	IN	0.15 mm (0.006 in)	
	EX	0.15 mm (0.006 in)	

MAINTENANCE

ITEM			SPECIFICATIONS
Engine idle speed			1,400 ± 100 rpm
Engine oil capacity	At draining		2.0 liter (2.10 US qt, 1.76 Imp qt)
	At disassembly		2.7 liter (2.84 US qt, 2.38 Imp qt)
	At oil filter change		2.1 liter (2.21 US qt, 1.85 Imp qt)
Recommended engine oil			HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG
Front differential oil capacity at draining			200 cc (6.76 US oz, 7.02 Imp oz)
Recommended differential oil			Hypoid gear oil SAE #80
Final drive oil capacity at draining			100 cc (3.38 US oz, 3.51 Imp oz)
Recommended final drive oil			Hypoid gear oil SAE #80
Recommended brake fluid			DOT 3 or 4
Front brake lever free play			25 – 30 mm (1 – 1-1/4 in)
Rear (parking) brake lever free play			15 – 20 mm (5/8 – 3/4 in)
Brake pedal free play			15 – 20 mm (5/8 – 3/4 in)
Reverse selector lever free play			2 – 4 mm (1/16 – 1/8 in)
Tire size	Front		AT24 X 8 – 11☆☆
	Rear		AT24 X 10 – 11☆☆
Cold tire pressure	Front	Standard	0.25 kg/cm² (3.6 psi)
		Minimum	0.22 kg/cm² (3.2 psi)
		Maximum	0.28 kg/cm² (4.0 psi)
	Rear	Standard	0.25 kg/cm² (3.6 psi)
		Minimum	0.22 kg/cm² (3.2 psi)
		Maximum	0.28 kg/cm² (4.0 psi)
Toe			Toe - out: 16 mm (5/8 in)

TORQUE VALUES

Oil drain bolt	25 N•m (2.5 kg-m, 18 lb-ft)
Valve adjuster lock nut	17 N•m (1.7 kg-m, 12 lb-ft)
Spark plug	18 N•m (1.8 kg-m, 13 lb-ft)
Differential gear case drain bolt	12 N•m (1.2 kg-m, 9 lb-ft)
Differential gear case cover oil cap	12 N•m (1.2 kg-m, 9 lb-ft)
Final gear case drain bolt	12 N•m (1.2 kg-m, 9 lb-ft)
Final gear case oil cap	12 N•m (1.2 kg-m, 9 lb-ft)
Final gear case oil check bolt	12 N•m (1.2 kg-m, 9 lb-ft)
Clutch adjusting screw lock nut	22 N•m (2.2 kg-m, 16 lb-ft)
Tie-rod lock nut	55 N•m (5.5 kg-m, 40 lb-ft)

MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.

ITEMS	FREQUENCY	EVERY	SERVICE PERIOD		Refer to page
			INITIAL (First week of operation or 30 operating hours: NOTE 1)	REGULAR (Every 30 operating days or 100 operating hours: NOTE 1)	
* FUEL LINE		YEAR I			3-4
* THROTTLE OPERATION			I	I	3-4
* CARBURETOR CHOKE				I	3-5
AIR CLEANER		NOTE 2		C	3-5
AIR CLEANER HOUSING DRAIN TUBE		NOTE 3		I	3-6
SPARK PLUG				I	3-7
* VALVE CLEARANCE			I	I	3-8
ENGINE OIL			R	R	3-9
ENGINE OIL FILTER			R	R	3-9
* ENGINE IDLE SPEED			I	I	3-11
FINAL GEAR CASE OIL AND DIFFERENTIAL OIL		YEAR I 2 YEARS R			3-12
* BRAKE FLUID		NOTE 4		I	3-14
* BRAKE SHOE WEAR		YEAR I NOTE 3			3-14
BRAKE SYSTEM			I	I	3-15
* REVERSE LOCK SYSTEM			I	I	3-16
SKID PLATES/ENGINE GUARD				I	3-17
* CLUTCH SYSTEM			I	I	3-17
DRIVE SHAFT BOOTS				I	3-17
* SUSPENSION				I	3-18
* SPARK ARRESTER				C	3-18
* NUTS, BOLTS, FASTENERS			I	I	3-19
** WHEELS/TIRES			I	I	3-19
** STEERING SHAFT HOLDER BEARINGS		YEAR I			3-19
** STEERING SYSTEM		YEAR I			3-20

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

** In the interest of safety, we recommended these items be serviced only by an authorized HONDA dealer.

NOTES: 1. Whichever comes first.

2. Service more frequently when riding in dusty areas, sand or snow.

3. Service more frequently after riding in very wet or muddy conditions.

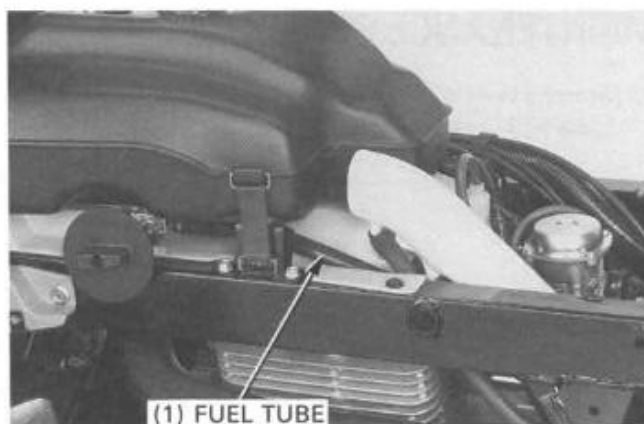
4. Replace every 2 years. Replacement requires mechanical skill.

FUEL LINE

Remove the side/fuel tank cover assembly (page 2-3).

Check the fuel line.

Replace it if it shows signs of deterioration, damage or leaking.



THROTTLE OPERATION

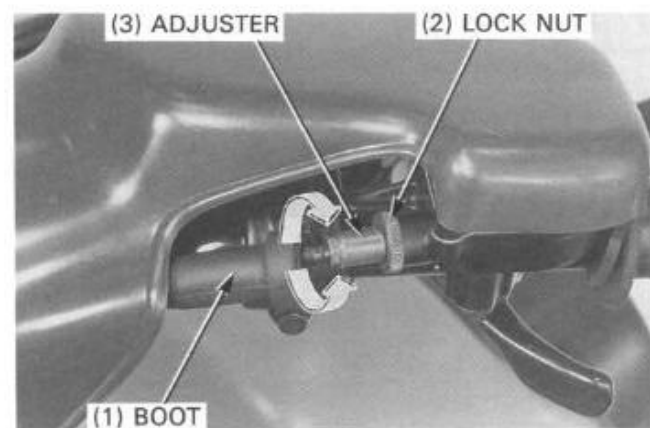
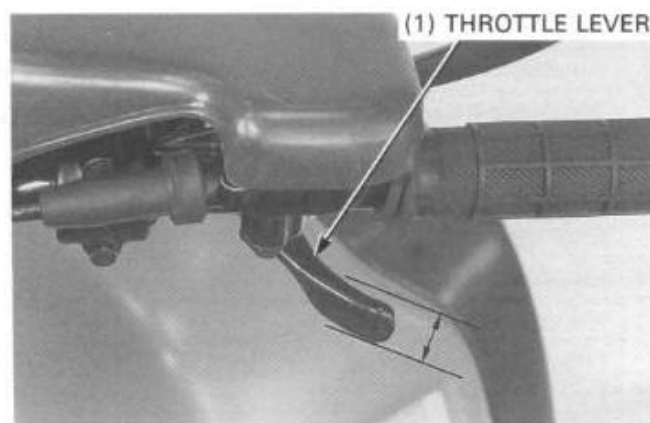
Check for smooth throttle lever operation with complete opening and automatic closing in all steering positions. Make sure there is no deterioration, damage or kinking in the throttle cable.

Replace any damaged parts.

Disconnect the throttle cable at the upper end (page 12-5). Thoroughly lubricate the cable and pivot point with a commercially available cable lubricant. Install the throttle cable in the reverse order of removal. Make sure the throttle lever free play is 3 – 8 mm (1/8 – 5/16 in) at the tip of the throttle lever.

Minor adjustments can be made at the upper adjuster. Slide the rubber boot off the cable adjuster. Loosen the lock nut and adjust the throttle cable free play by turning the cable adjuster.

After adjustment, tighten the lock nut and install the rubber boot securely.

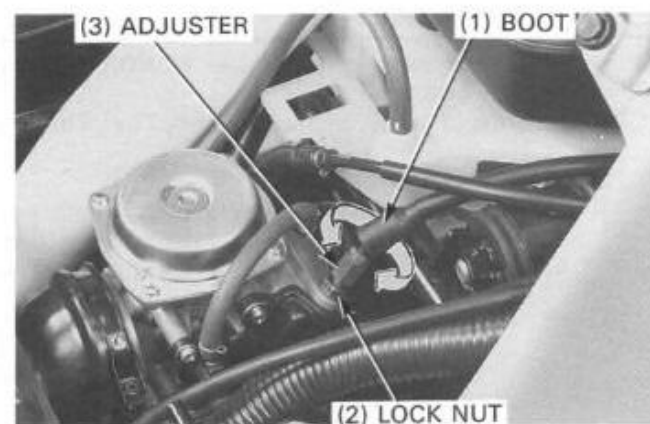


Major adjustments are made with the lower adjuster.

Remove the seat (page 2-3).

Slide the rubber boot off the cable adjuster. Adjust by loosening the lock nut and turning the adjuster.

After adjustment, tighten the lock nut and install the rubber boot securely. Check throttle operation. Install the seat (page 2-3).



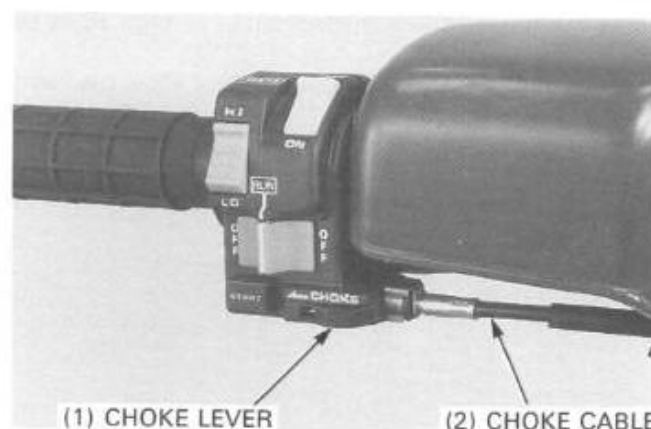
CARBURETOR CHOKE

The choke system uses a fuel enrichment circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enrichment circuit via a cable when the choke lever on the handlebar is moved to the left.

Check for smooth choke lever operation and lubricate the choke cable if required.

Inspect the cable for cracks which could allow moisture to enter.

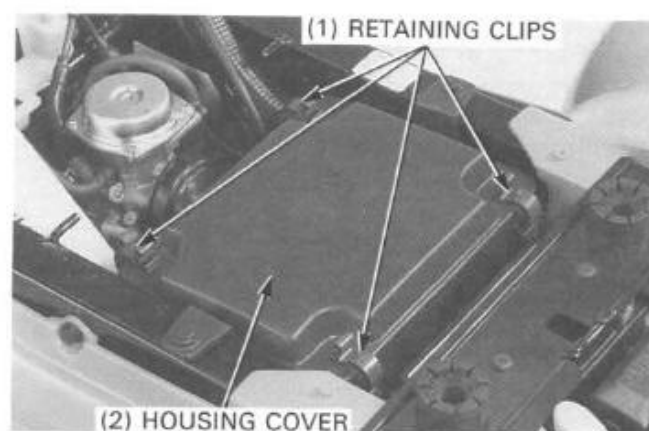
Replace the cable if necessary.



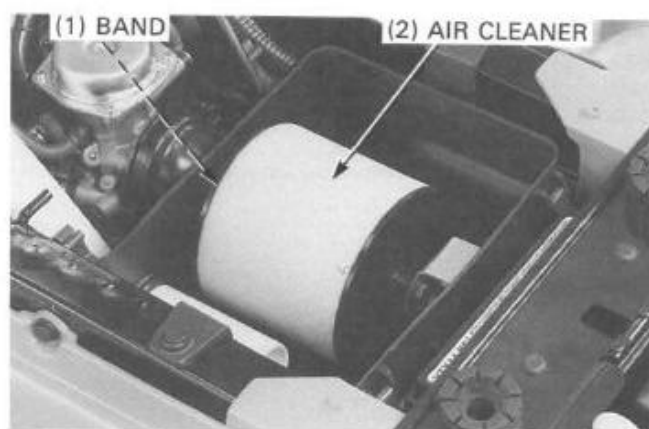
AIR CLEANER

Remove the seat (page 2-3).

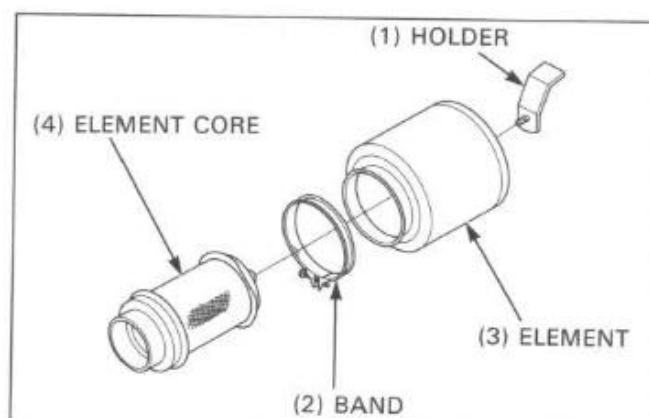
Release the retaining clips from the air cleaner housing cover and remove the cover.



Loosen the air cleaner element band screw. Remove the air cleaner element assembly from the housing.

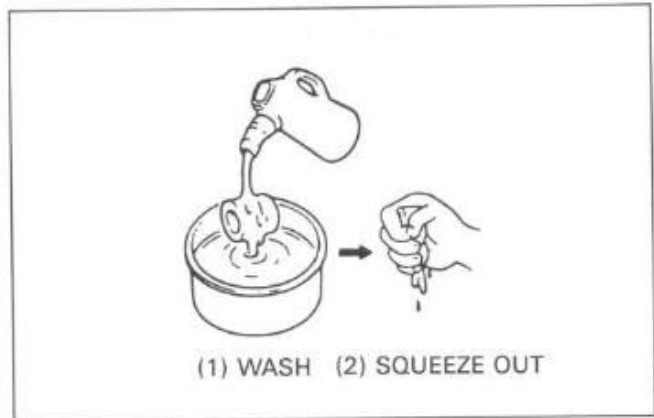


Remove the element holder by turning it counterclockwise. Remove the element band and separate the element from the element core.

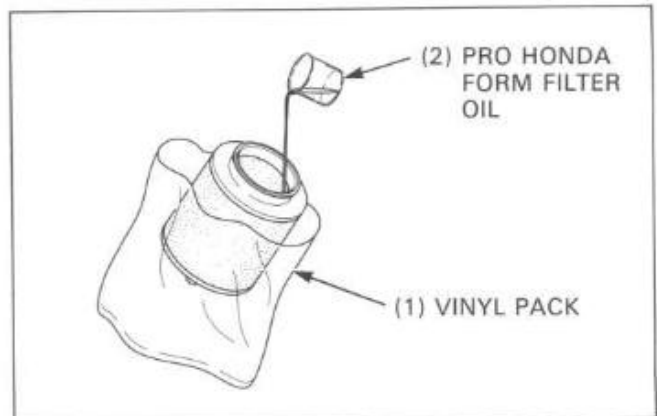


MAINTENANCE

Wash the element in non-flammable or high flash point solvent.
Squeeze out the solvent thoroughly, and allow the element to dry.

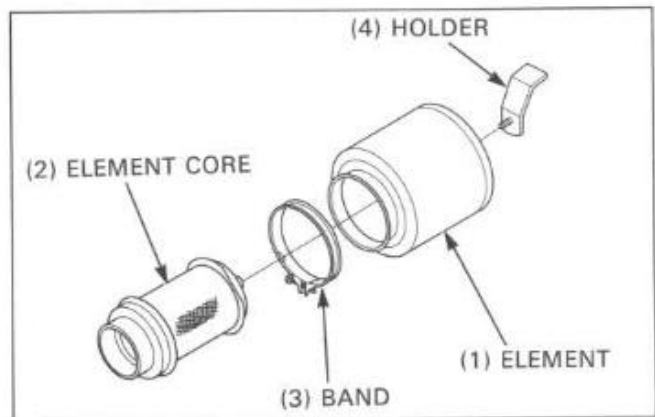


Apply approximately 32–37 cc (1.1–1.3 oz) of Pro Honda Foam Filter Oil or an equivalent oil from the inside of the element.
Place the element into a plastic bag and spread the oil evenly by hand.



Place the element onto the core and replace the element band and holder.

Install the element in the air cleaner housing, and tighten the band.
Install the air cleaner housing cover and secure with the clips.
Install the seat (page 2-3).



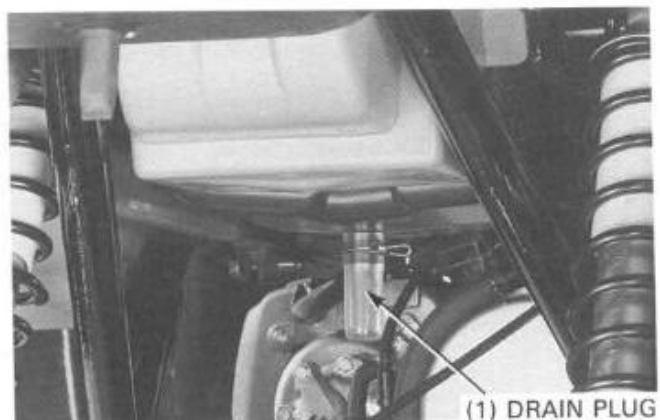
AIR CLEANER HOUSING DRAIN TUBE

Remove the drain plug from the air cleaner housing to empty any deposits.

Install the drain plug and clip.

NOTE

- Service more frequently when riding in wet or muddy areas.



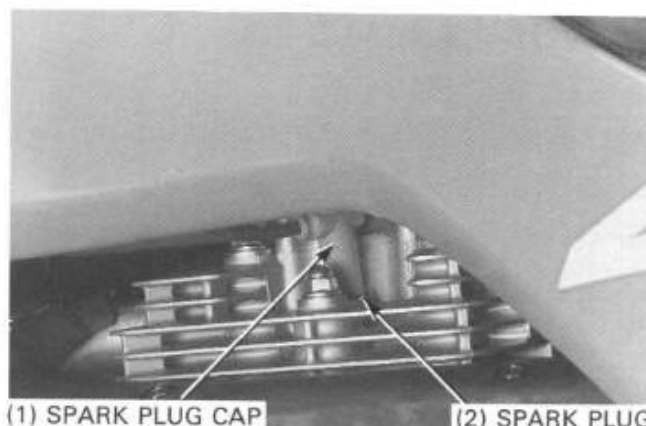
SPARK PLUG

Disconnect the spark plug cap and remove the spark plug.

NOTE

- Clean around the spark plug base with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plug and inspect or replace as described in the maintenance schedule.



(1) SPARK PLUG CAP (2) SPARK PLUG

INSPECTION

Check the following and replace if necessary (recommended spark plug: page 3-1)

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration;
 - dark to light brown indicates good condition.
 - excessive lightness indicates malfunctioning ignition system or lean mixture.
 - wet or black sooty deposit indicates over-rich mixture.

REUSING A SPARK PLUG

Clean the spark plug electrodes with a wire brush or special plug cleaner.

Check the gap between the center and side electrodes with a wire-type feeler gauge.

If necessary, adjust the gap by bending the side electrode carefully.

SPARK PLUG GAP: 0.8 – 0.9 mm (0.03 – 0.04 in)

CAUTION

- To prevent damage to the cylinder head, hand-tighten the spark plug before using a wrench to tighten to the specified torque.

Reinstall the spark plug in the cylinder head and hand tighten, then torque to specification.

TORQUE: 18 N·m (1.8 kg-m, 13 lb-ft)

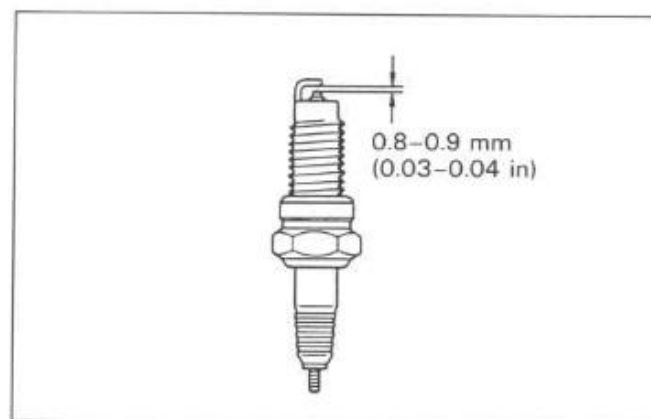
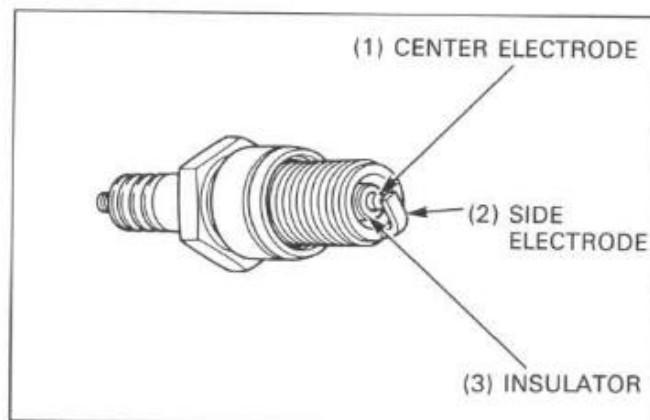
REPLACING A SPARK PLUG

Set the plug gap to specification with a wire-type feeler gauge (see above).

CAUTION

- Do not overtighten the spark plug.

Install and hand tighten the new spark plug, then tighten it about 1/2 of a turn after the sealing washer contacts the seat of the plug hole.



VALVE CLEARANCE

NOTE

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

Remove the fuel tank and heat guard (page 5-18).

Remove the bolts, cylinder head cover, gasket and O-ring. Remove the spark plug.

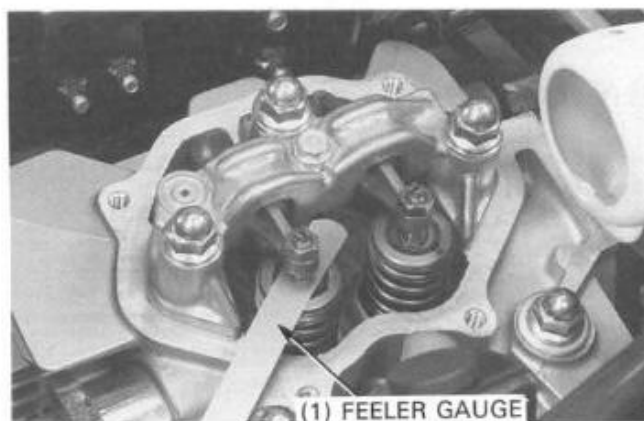
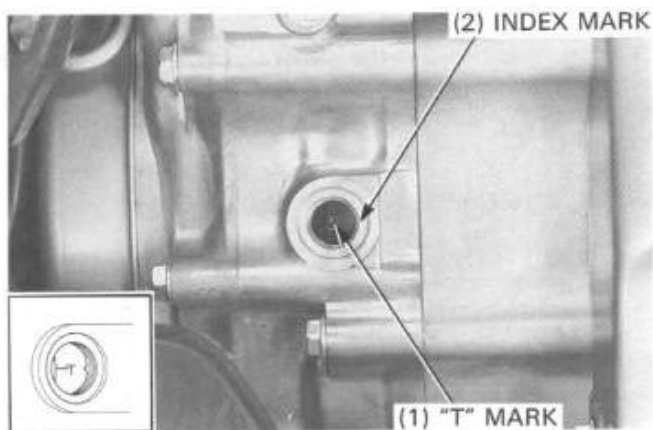
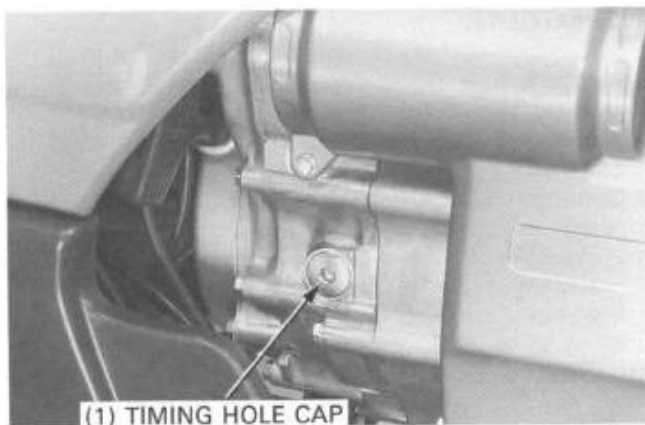
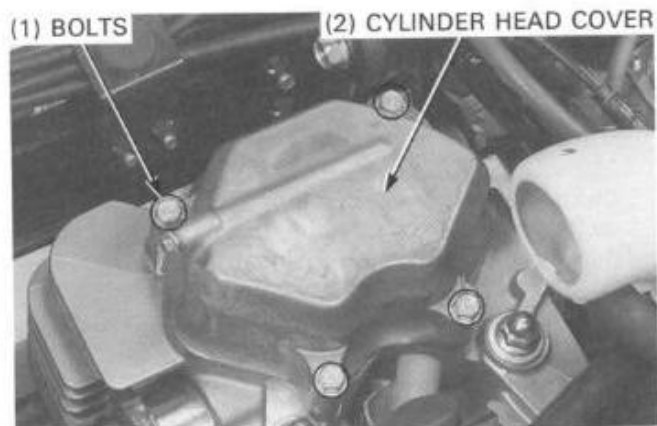
Remove the timing hole cap from the right side of the rear crankcase cover.

Turn the crankshaft clockwise using the recoil starter knob, and align the "T" mark on the flywheel with the index mark on the rear crankcase cover.

Make sure the piston is at TDC on the compression stroke. If not, rotate the crankshaft 360° (1 full turn) and align the "T" mark with the index mark.

Inspect the intake and exhaust valve clearances by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCE: IN/EX: 0.15 mm (0.006 in)

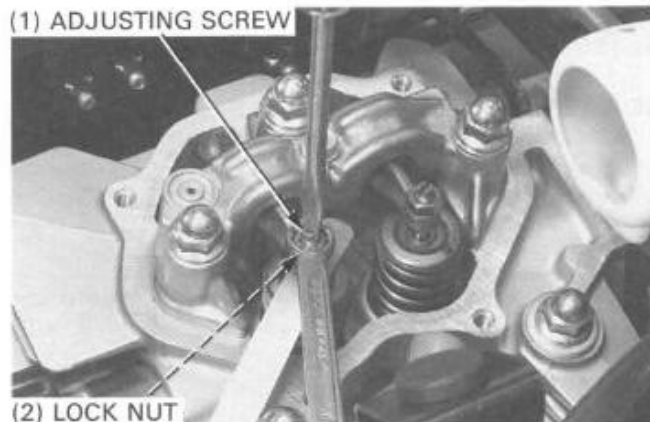


Adjust if necessary by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

Hold the adjusting screw and tighten the lock nut.

TORQUE: 17 N·m (1.7 kg-m, 12 lb-ft)

Recheck the valve clearance.



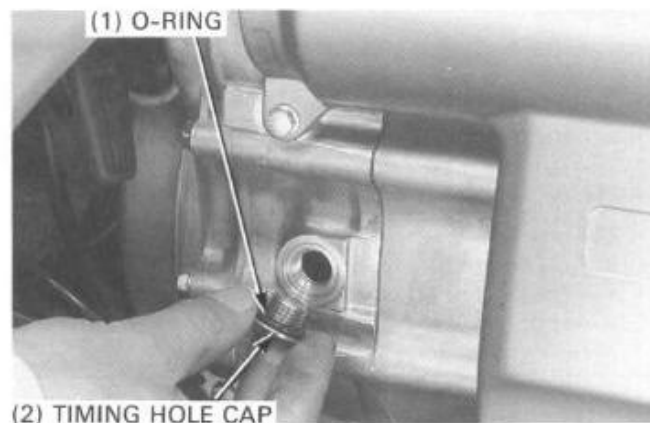
Inspect the condition of the cylinder head cover gasket and O-ring, replace them if necessary. Install the cylinder head cover and tighten the bolts.



Check that O-ring is in good condition, and install the timing hole cap.

TORQUE: 10 N·m (1.0 kg-m, 7 lb-ft)

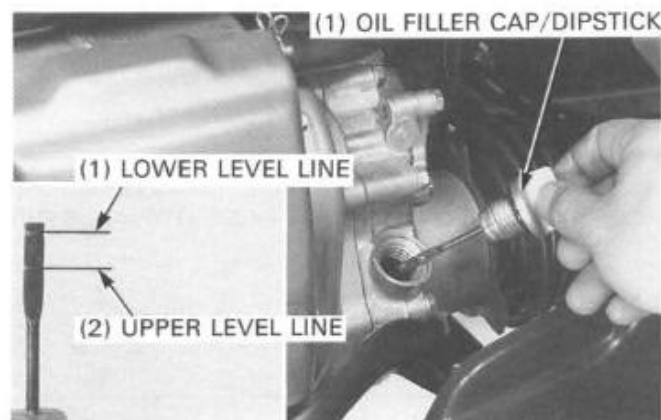
Install the removed parts in the reverse order of removal.



ENGINE OIL & OIL FILTER

OIL LEVEL INSPECTION

Place the vehicle on level ground. Check the oil level using the oil filler cap/dipstick by placing it into the filler hole without screwing it in.



MAINTENANCE

If the oil level is below or near the lower level line on the dipstick, add the recommended oil up to the upper level.

RECOMMENDED ENGINE OIL:

Honda GN4 4-stroke oil or equivalent

API service classification: SF or SG

Viscosity: 10W-40

NOTE

- Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

Reinstall the dipstick.

ENGINE OIL & FILTER CHANGE

⚠ WARNING

- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

Warm up the engine.

NOTE

- Change the engine oil with the engine warm and the vehicle on level ground to assure complete draining.

Remove the oil filler cap/dipstick and drain bolt.

Remove the bolts and oil filter cover.

Remove the oil filter and spring.

Discard the oil filter.

CAUTION

- Used engine oil may skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

Drain the oil completely.

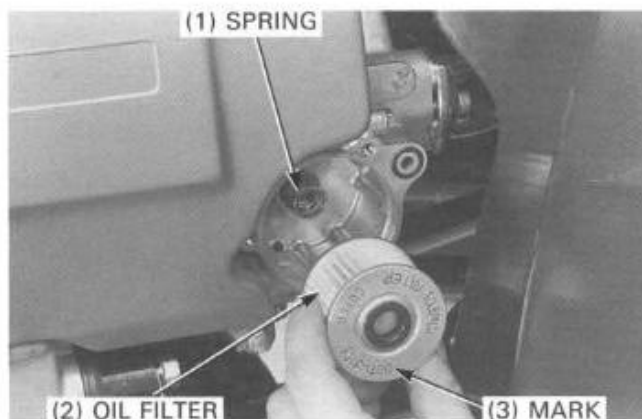
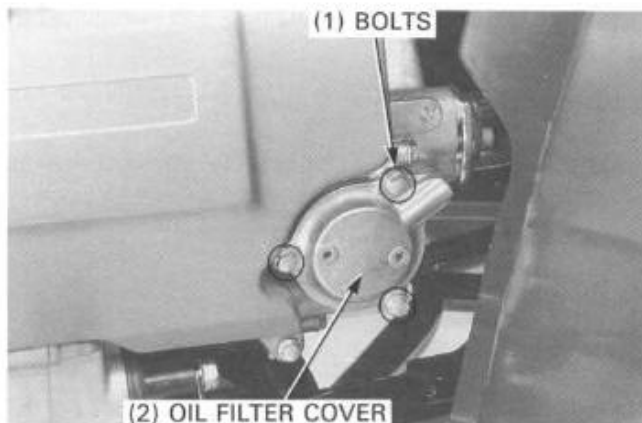
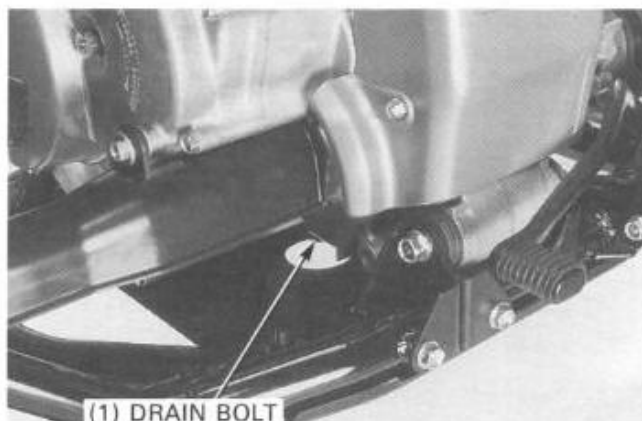
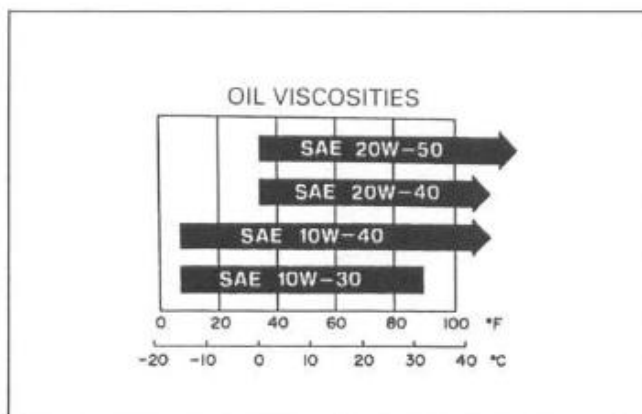
Check that the sealing washer on the drain bolt is in good condition, and replace if necessary.
Install and tighten the drain bolt.

TORQUE: 25 N·m (2.5 kg-m, 18 lb-ft)

Install the oil filter spring to the front crankcase cover.
Install a new oil filter with its "OUT-SIDE (TOWARDS FILTER COVER)" mark facing out.

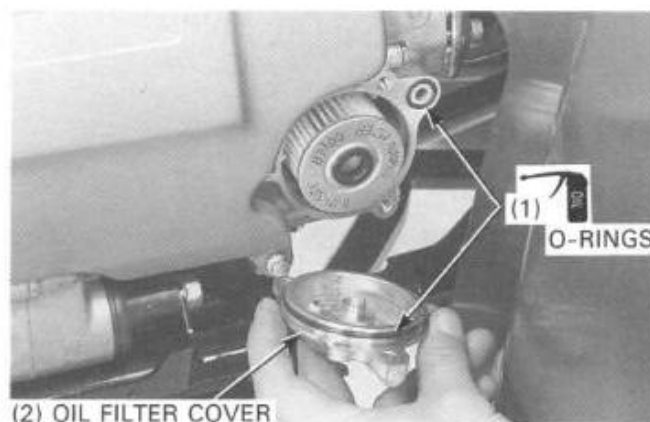
CAUTION

- Installing the oil filter backwards will result in severe engine damage.



Make sure that the O-rings are in good condition and replace if necessary.
Apply oil to the O-rings.
Install the oil filter cover and tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kg-m, 7 lb-ft)



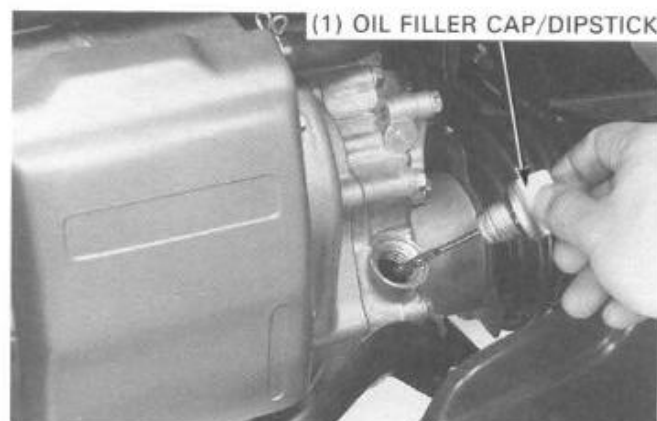
Fill the crankcase with the recommended engine oil.

OIL CAPACITY:

- 2.0 liter (2.10 US qt, 1.76 Imp qt) after draining
- 2.1 liter (2.21 US qt, 1.85 Imp qt) at oil filter change

Install the oil filler cap/dipstick.
Start the engine and let it idle for 2 to 3 minutes.

Stop the engine and check that the oil level is at the upper level line on the dipstick.
Make sure there are no oil leaks.



ENGINE IDLE SPEED

⚠ WARNING

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

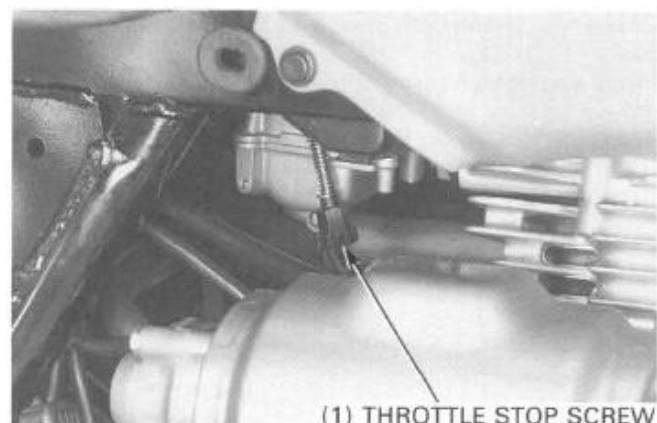
NOTE

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

Warm up the engine for about ten minutes.
Remove the right lower side cover (page 2-3).

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

IDLE SPEED: 1.400 ± 100 rpm

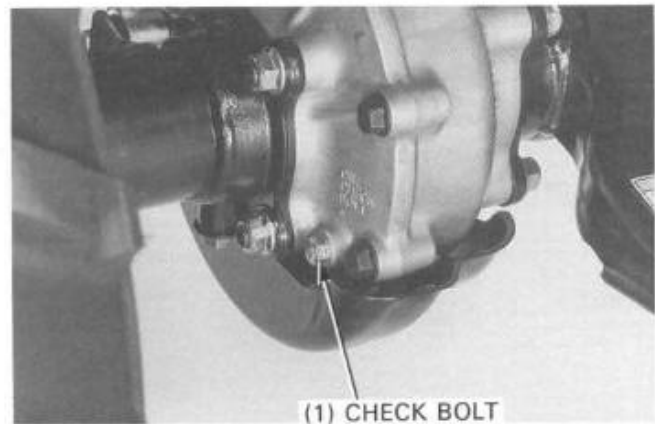


FINAL GEAR CASE OIL AND DIFFERENTIAL OIL

OIL LEVEL CHECK

FINAL GEAR CASE

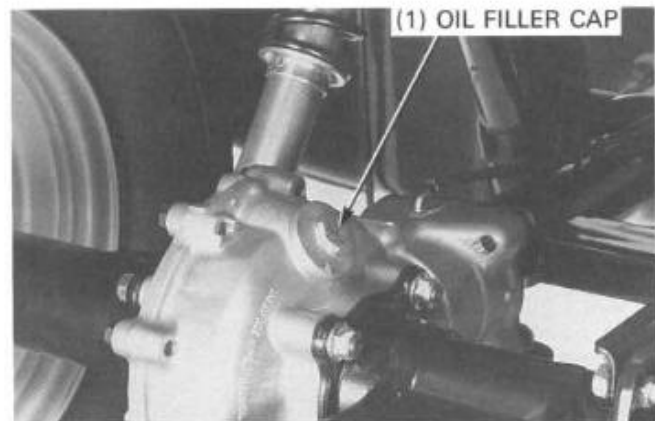
Remove the oil check bolt and check that the oil flows out of the check bolt hole.



If there is no oil flow, remove the oil filler cap and add oil slowly through the oil filler hole until the oil starts to flow out of the oil check bolt hole.

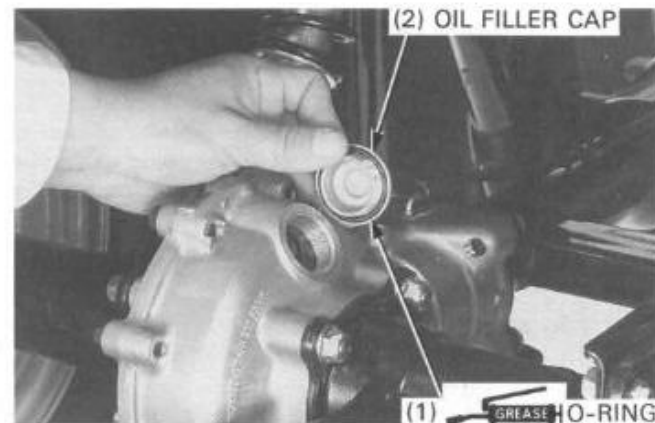
RECOMMENDED OIL: Hypoid gear oil SAE #80

Check for leak if the oil level was low.



Coat a new O-ring with grease and install it onto the oil filler cap. Install and tighten the oil filler cap.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)



FRONT DIFFERENTIAL

Remove the oil filler cap. Check that the oil level is up to lower edge of the oil filler hole.



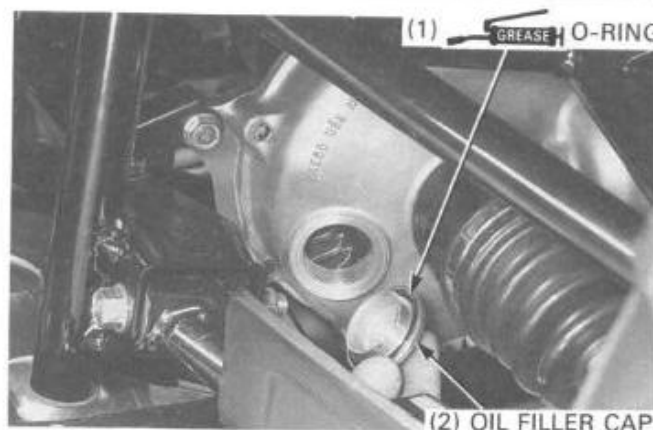
Check for leaks, if the oil level is low.
Pour recommended oil through the oil filler hole until it reaches the lower edge of the hole.

RECOMMENDED OIL: Hypoid gear oil SAE #80

Coat a new O-ring with grease and install it onto the oil filler cap.

Install and tighten the oil filler cap.

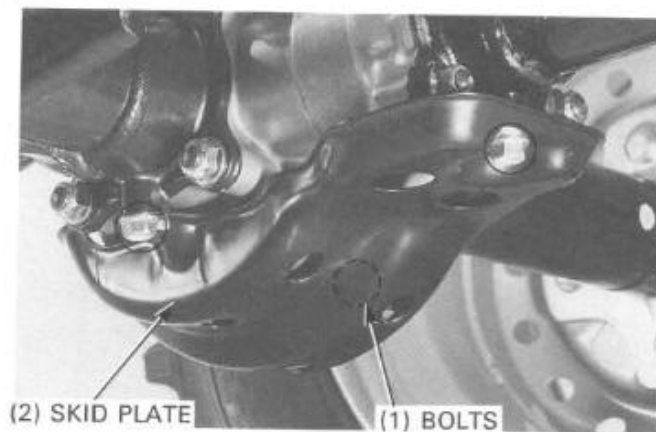
TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)



OIL CHANGE

FINAL GEAR CASE

Remove the bolts and final gear case skid plate.



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

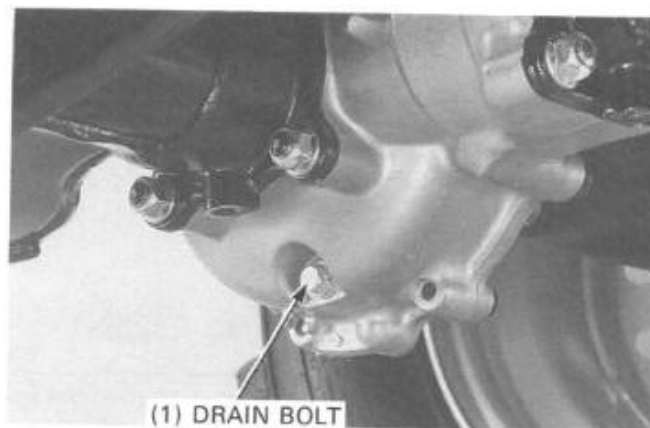
Check that the drain bolt sealing washer is in good condition, replace if necessary.

Tighten the drain bolt to the specified torque.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

Fill the final gear case with recommended oil.

OIL CAPACITY: 90 cc (3.04 US oz, 3.16 Imp oz) after draining



FRONT DIFFERENTIAL

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

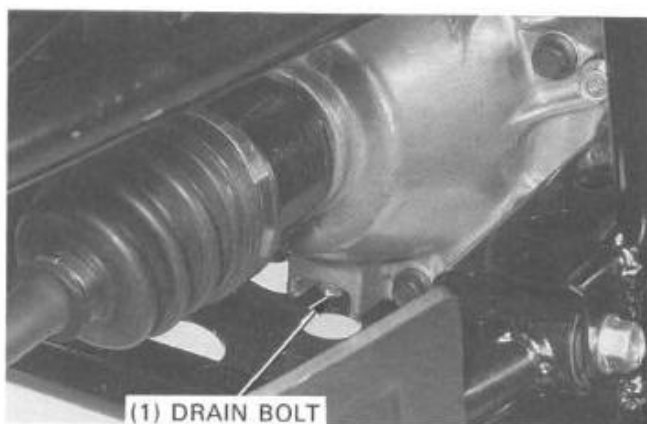
Check that the drain bolt sealing washer is in good condition, replace if necessary.

Tighten the drain bolt to the specified torque.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

Fill the differential case with the recommended oil.

OIL CAPACITY: 190 cc (6.43 US oz, 6.67 Imp oz) after draining



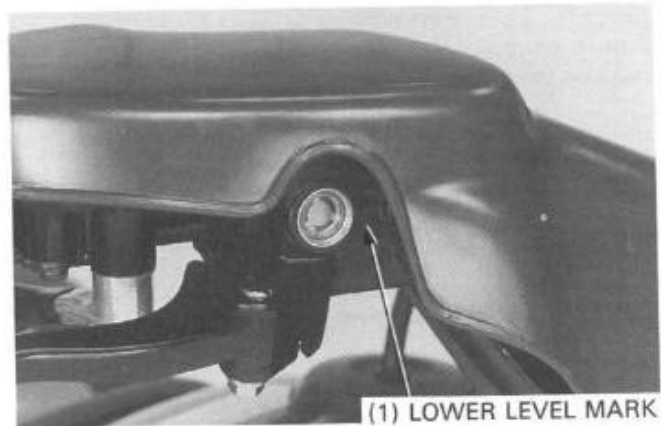
BRAKE FLUID

CAUTION

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

Check the brake reservoir level through the sight glass. If the level is near the lower level mark, check the brake shoe wear (see below).

Slightly pull up the handlebar cover by removing the screws without disconnecting the connectors (page 2-12).



BRAKE SHOE WEAR

FRONT BRAKE

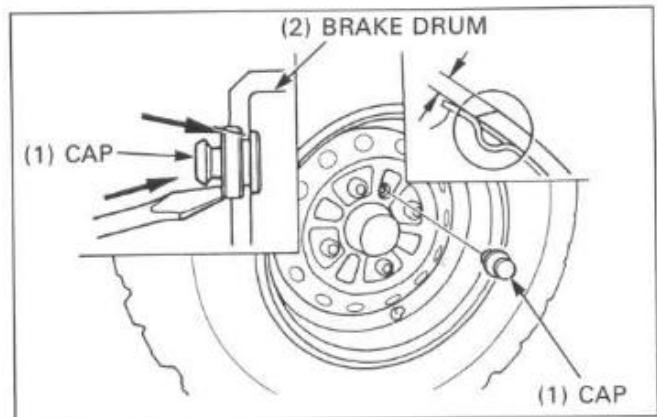
Remove the brake shoe lining inspection hole cap and inspect the lining thickness.

LINING THICKNESS:

STANDARD: 4.0 mm (0.16 in)
SERVICE LIMIT: 1.0 mm (0.04 in)

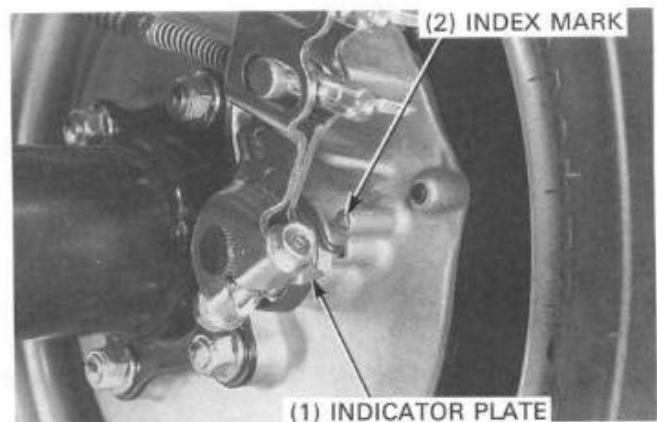
NOTE

- If either lining on one wheel is worn beyond the limit, both brake shoes for that wheel must be replaced.



REAR BRAKE

Replace the brake shoes if the indicator plate aligns with the brake panel index mark when the rear brake lever or pedal is applied.



BRAKE SYSTEM

FRONT BRAKE

Measure the distance the brake lever moves before the brake starts to take hold.

Free play, measured at the tip of the front brake lever, should be within standard.

FREE PLAY: 25 – 30 mm (1 – 1-1/4 in)

If the brake lever free play is excessive and the brake linings are not worn beyond the recommended limit, adjust the brake shoe lining-to-drum clearance.

Raise the front and rear wheels off the ground by placing a support block under the vehicle.

Remove the inspection hole cap and line up the hole with one of the brake adjusters and turn the brake shoe adjuster up with a screwdriver until the shoes lock, then back off three steps.

Spin the wheel manually to make sure the brake does not drag.

Line up the inspection hole with the second adjuster and repeat the procedure.

Adjust both wheels.

NOTE

- There are two adjusters on each front wheel.
- Adjust all four adjusters.

Recheck the brake lever free play.

If free play is still excessive after adjusting the brake lining clearance, there is probably air in the brake system and it must be bled out (section 14).

After checking, install the inspection hole cap securely in the drum while pushing the cap with a screwdriver.

REAR BRAKE

Check the cable, brake lever and brake pedal for loose connections, excessive play or other damage. Replace or repair if necessary.

Disconnect the brake cables at the brake lever or pedal ends.

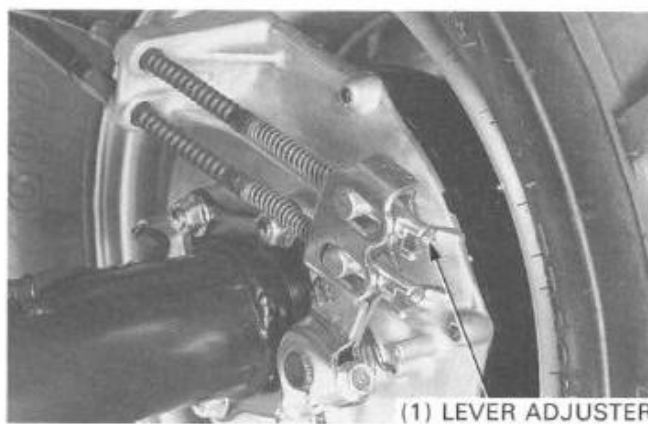
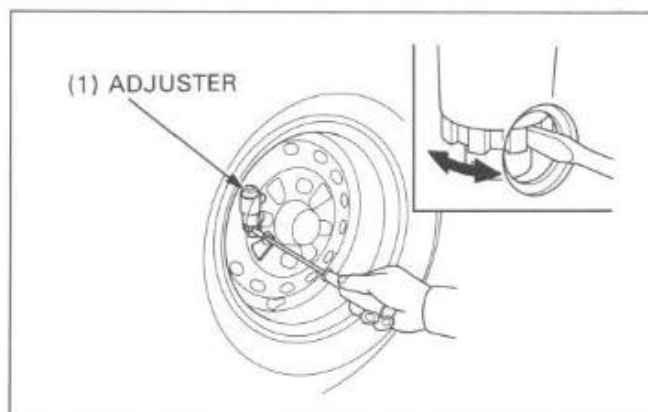
Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant.

Install the cables.

Measure the rear (parking) brake lever free play at the end of the brake lever.

FREE PLAY: 15 – 20 mm (5/8 – 3/4 in)

Adjustments should be made with the lower adjusting nut at the rear brake arm.



MAINTENANCE

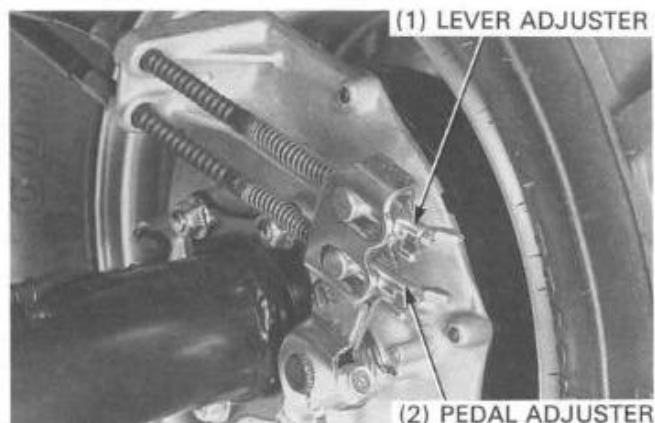
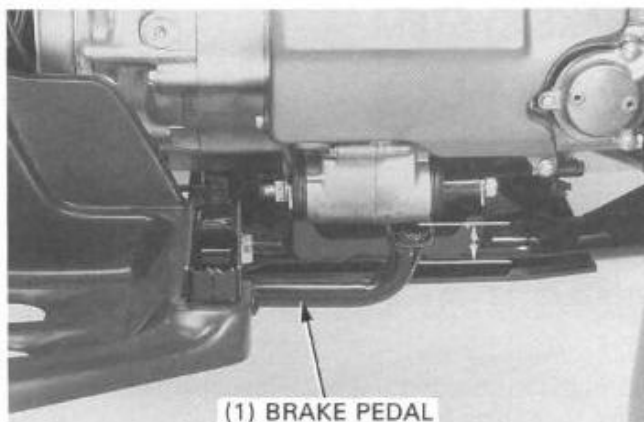
Measure the brake pedal free play at the end of the brake pedal and adjust as required.

BRAKE PEDAL FREE PLAY: 15 – 20 mm (5/8 – 3/4 in)

Adjust the rear brake lever and pedal free play by turning the adjusting nuts at the lower end of the cables.

NOTE

- Make sure the cut-out of each adjusting nut is seated on the brake arm pin.



REVERSE LOCK SYSTEM

Check the reverse selector cable and lever for a loose connection, excessive play or other damage. Replace or repair if necessary.

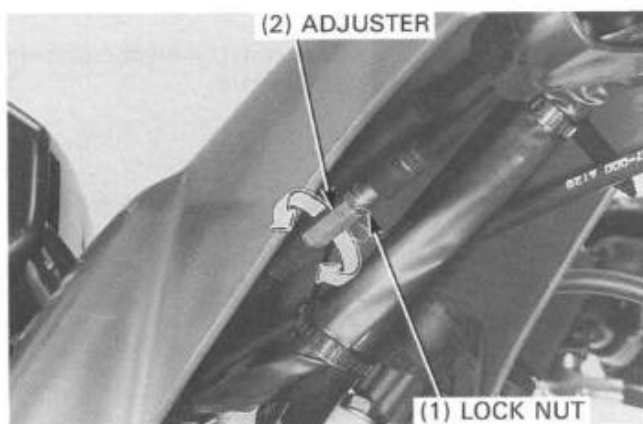
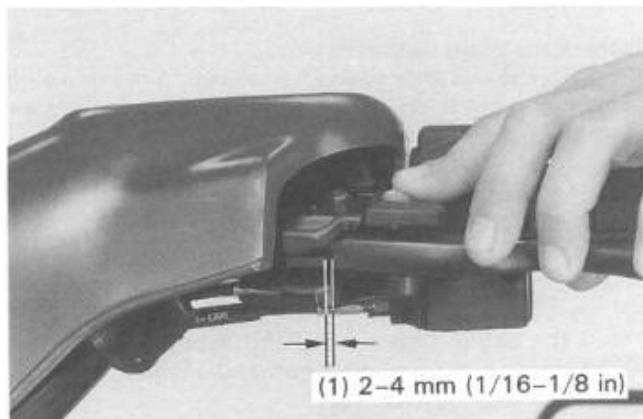
Measure the reverse selector lever free play at the lever end near the cable.

FREE PLAY: 2 – 4 mm (1/16 – 1/8 in)

NOTE

- If necessary, watch the reverse lever on the crankcase to see when it moves while determining free play.

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



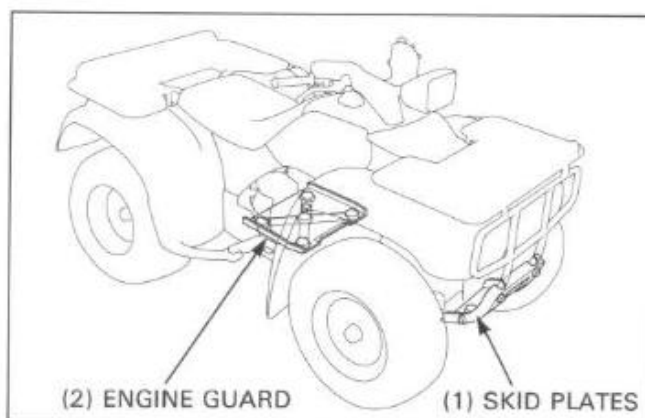
SKID PLATES/ENGINE GUARD

The skid plates and engine guard protected the rear final gear case and engine from rocks.

Check the skid plates and engine guard for cracks, damage or looseness at intervals shown in the Maintenance Schedule (page 3-3).

Replace the skid plates and engine guard if they are cracked or damaged.

If the plates and engine guard bolts are loose, tighten them.

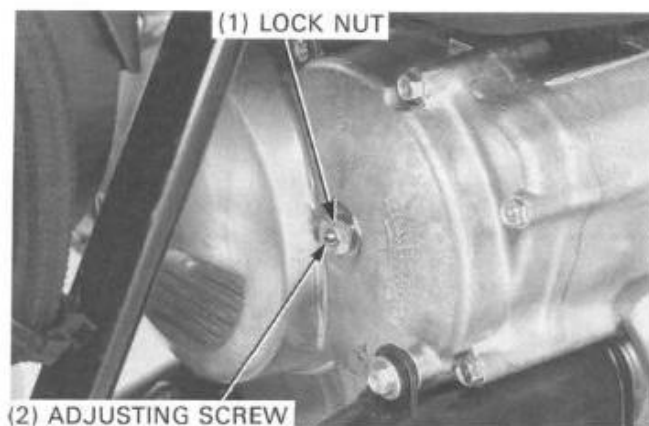


CLUTCH SYSTEM

⚠ WARNING

- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

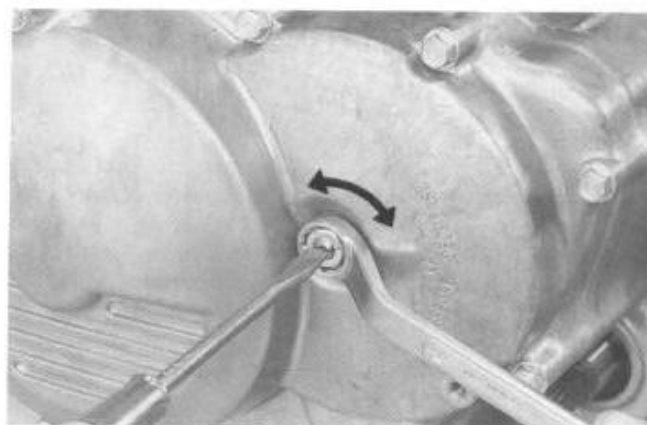
Loosen the clutch adjusting screw lock nut.



Slowly turn the adjusting screw counterclockwise until resistance is felt. Then turn the adjusting screw clockwise 1/4 turn, and tighten the lock nut.

TORQUE: 22 N·m (2.2 kg-m, 16 lb-ft)

After adjustment, start the engine and check for proper clutch operation.



DRIVE SHAFT BOOTS

INSPECTION

Check the drive shaft boots for cuts or other damage.

If the drive shaft boots are damaged, replace them. See page 15-3 for boot replacement.



SUSPENSION

▲ WARNING

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

Check the action of the front/rear shock absorber by compressing them several times.

Check the entire shock absorber assembly for leaks or damage.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

SWINGARM BEARINGS

Raise the rear wheels off the ground by placing a jack or block under the engine.

Move the rear axle sideways using moderate force to see if the wheel and swingarm bearings are worn.
Replace the bearings if there is any play (page 13-6).



SPARK ARRESTER

CLEANING

▲ WARNING

- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*
- *Do not touch exhaust components while the exhaust system is hot.*
- *Perform this operation in a well-ventilated area, free from fire hazards.*
- *Use adequate eye protection.*

Remove the bolt.

Block the end of the muffler with a shop towel.
Start the engine with the transmission in neutral, and purge accumulated carbon from the muffler by momentarily revving the engine several times.

Stop the engine and allow the exhaust system to cool.

Install the bolt and tighten it securely.



NUTS, BOLTS, FASTENERS

Tighten bolts, nuts and fasteners at the regular intervals shown in the Maintenance Schedule (page 3-3).

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-13 thru 15).

WHEELS/TIRES

NOTE

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

Check the tires for cuts, embedded nails, or other damage. Check the tire pressure. Adjust accordingly.

Tire pressure:

	FRONT	REAR
Standard	0.25 kg/cm ² (3.6 psi)	0.25 kg/cm ² (3.6 psi)
Minimum	0.22 kg/cm ² (3.2 psi)	0.22 kg/cm ² (3.2 psi)
Maximum	0.28 kg/cm ² (4.0 psi)	0.28 kg/cm ² (4.0 psi)
With cargo	0.25 kg/cm ² (3.6 psi)	0.25 kg/cm ² (3.6 psi)

Raise the wheel off the ground and check the hub or knuckle and axle bearings for excessive play or abnormal noise.

Replace any faulty parts (section 12 and 13).



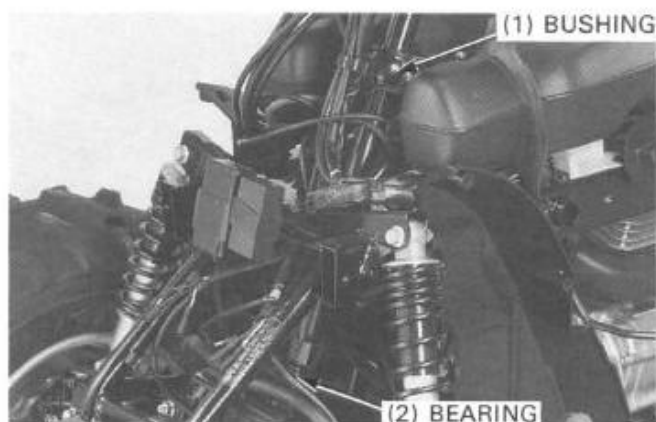
STEERING SHAFT HOLDER BEARING

NOTE

- Make sure the cables do not interfere with the rotation of the handlebar.

Raise the front wheels off the ground and make sure that the handlebar rotates freely.

If the handlebar moves unevenly, binds or has horizontal movement, check the steering shaft holder bushing and steering bearing, and replace them if necessary (page 12-21).



STEERING SYSTEM

TOE

Place the vehicle on level ground with the front wheels facing straight ahead.

Mark the centers of the tires with chalk to indicate the axle center height.

Align the gauge with the marks on the tires as shown. Check the readings on the gauge scales.

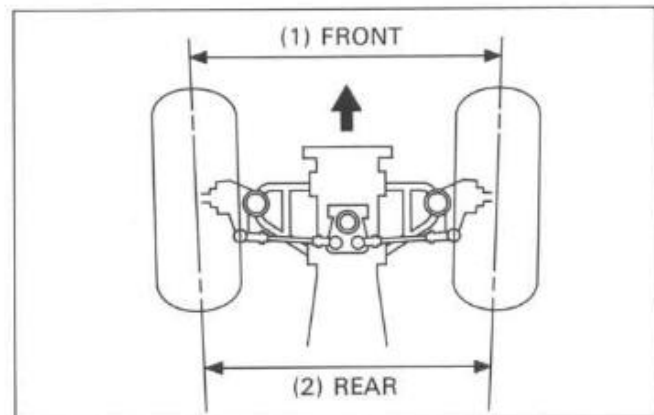
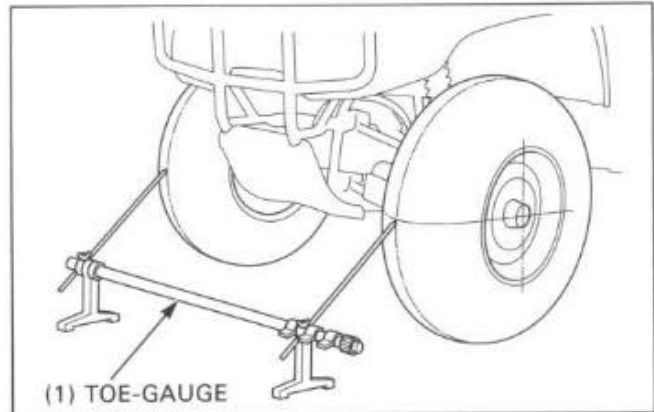
Slowly move the vehicle back until the wheels have turned 180° so the marks on the tires are aligned with the gauge height on the rear side.

Measure the toe on the rear part of the tires at the same points.

TOE-OUT: 16 mm (0.6 in)

NOTE

- Toe-out means the front measurement is greater than the rear measurement.

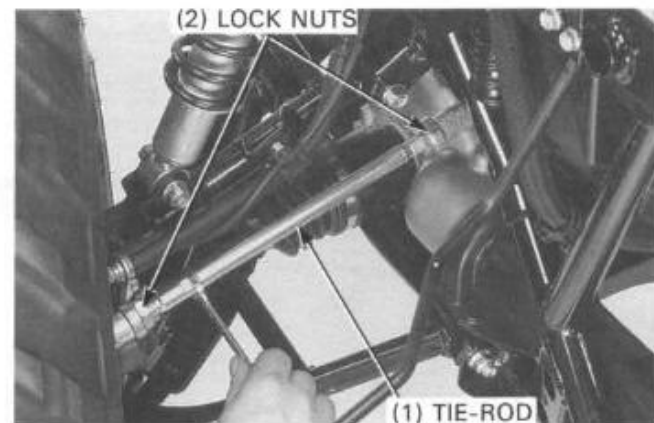


When the toe is out of specification, adjust it by changing the length of the tie-rods equally by loosening the lock nuts and turning the tie-rods while holding the ball joints.

After adjusting each tie-rod, rotate both the ball joints in the same direction with the tie-rod axis until they stop against the ball joint stud. Hold them in that position and tighten the tie-rod lock nuts.

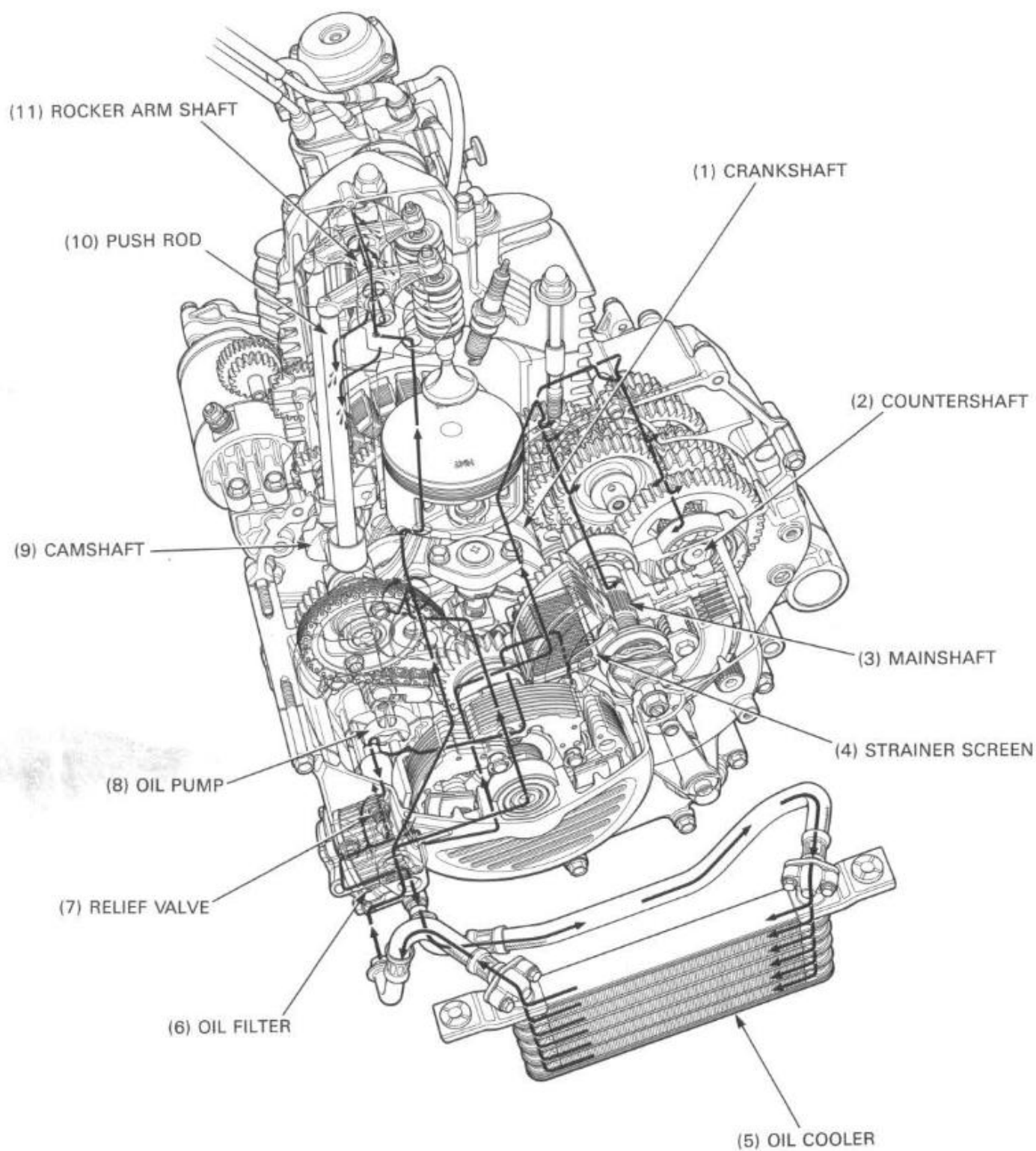
TORQUE: 55 N·m (5.5 kg-m, 40 lb-ft)

After finally tightening the lock nuts, make sure the ball joints operate properly by rotating the tie-rods, to make sure both ball joints have equal play.



MEMO

LUBRICATION SYSTEM DIAGRAM



4.LUBRICATION SYSTEM

SERVICE INFORMATION	4-1	OIL PUMP	4-8
TROUBLESHOOTING	4-1	RELIEF VALVE	4-11
OIL COOLER	4-2	OIL STRAINER SCREEN	4-12

SERVICE INFORMATION

GENERAL

⚠ WARNING

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.
- Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS	SERVICE LIMIT
Engine oil capacity	At draining	2.0 liter (2.10 US qt, 1.76 Imp qt)	—
	At disassembly	2.7 liter (2.84 US qt, 2.38 Imp qt)	—
	At oil filter change	2.1 liter (2.21 US qt, 1.85 Imp qt)	—
Recommended engine oil		Honda GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.11 (0.004)

TORQUE VALUES

Oil drain bolt	25 N•m (2.5 kg-m, 18 lb-ft)
Oil filter cover flange bolt	10 N•m (1.0 kg-m, 7 lb-ft)
Oil pump rotor side plate screw	4 N•m (0.40 kg-m, 2.9 lb-ft)
Relief valve cap	19 N•m (1.9 kg-m, 14 lb-ft)
Cooling fan shroud special bolt	18 N•m (1.8 kg-m, 13 lb-ft)

TROUBLESHOOTING

Engine oil level too low – high oil consumption

- External oil leaks
- Worn piston rings
- Oil not changed often enough
- Faulty head gasket

Engine oil contamination

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

OIL COOLER

REMOVAL

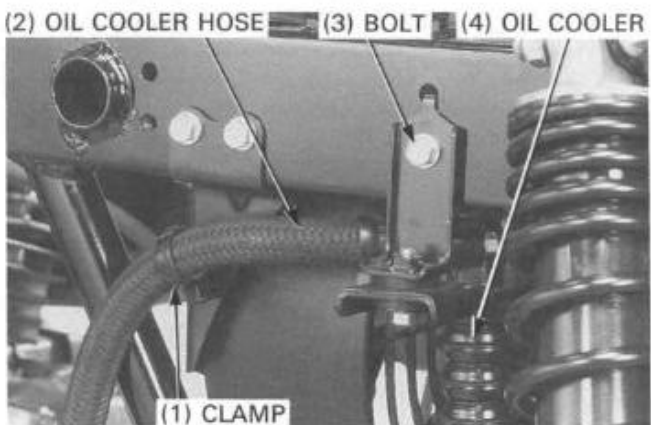
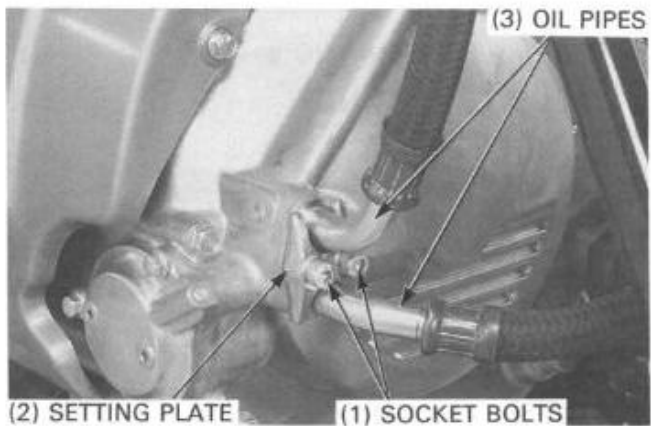
Drain the engine oil (page 3-9).
Remove the front fender (page 2-5).

Remove the socket bolts and oil pipe setting plate.

Disconnect the oil pipes and remove the O-rings from the front crankcase cover.

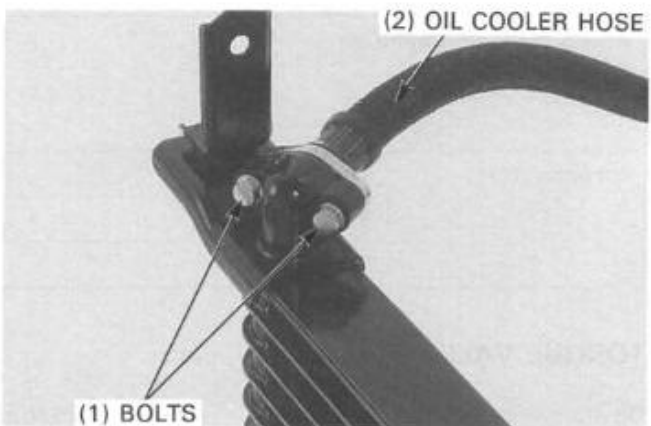
Release the oil cooler hose clamps.

Remove the oil cooler bracket mounting bolts and oil cooler assembly.



DISASSEMBLY

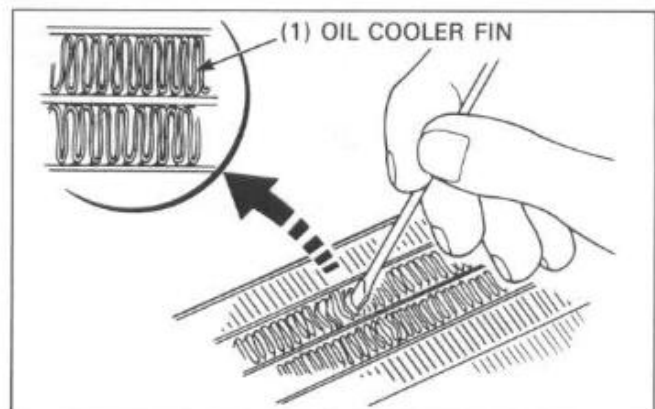
Remove the bolts, oil cooler hoses and O-rings from the oil cooler.



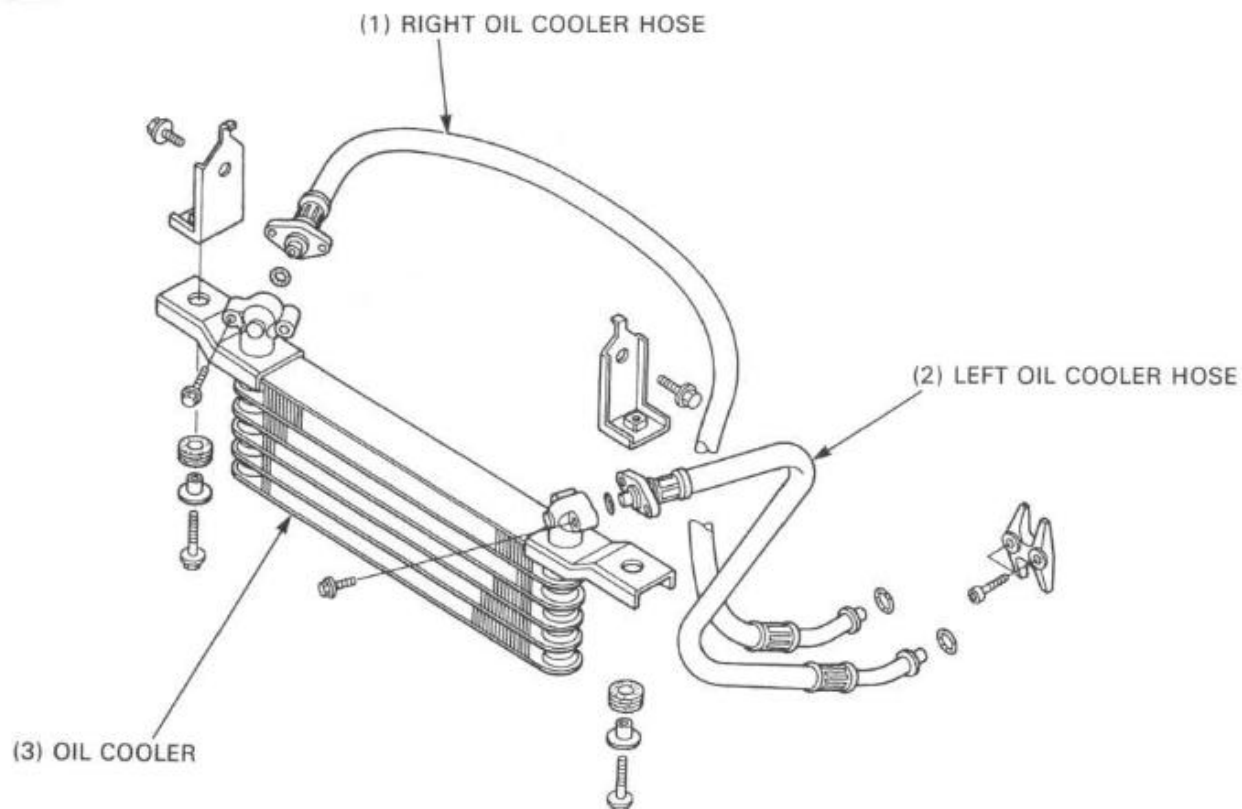
INSPECTION

Check the oil cooler air passage for clogging or damage. Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.

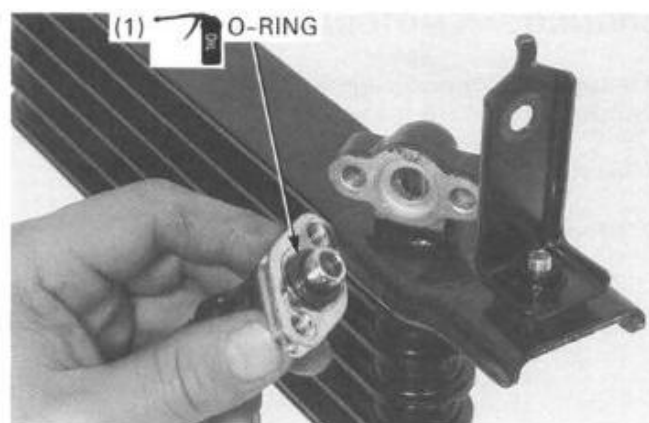
Check for any oil leakage from the oil cooler and hose.



ASSEMBLY



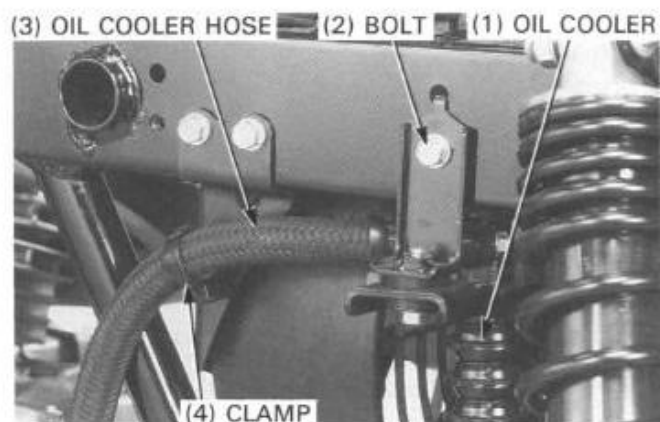
Apply clean engine oil to the new O-rings. Install the O-rings onto the oil cooler hose flange. Install the oil hoses and tighten the bolts securely.



OIL COOLER INSTALLATION

Install the oil cooler into the frame. Install and tighten the oil cooler bracket mounting bolts.

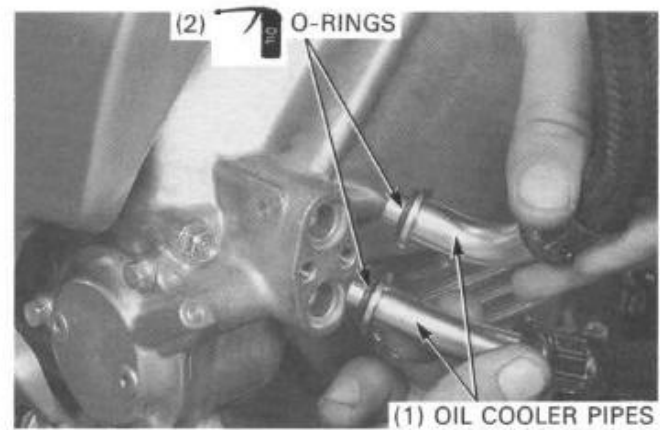
Route the oil cooler pipe properly and secure them with hose clamps.



LUBRICATION SYSTEM

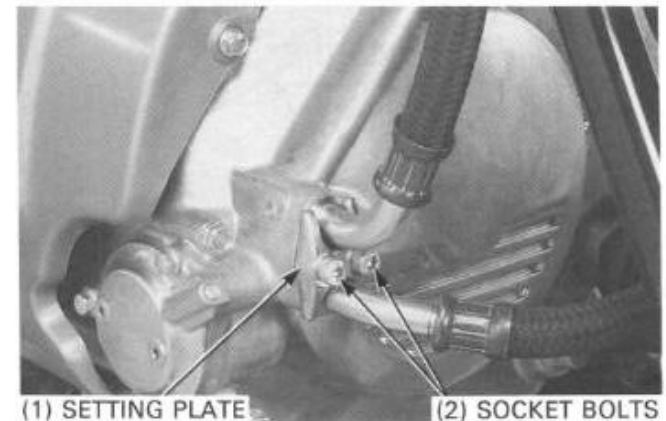
Apply clean engine oil to the new O-rings.
Install the O-rings onto the oil cooler pipe flanges.

Install the oil pipes into the front crankcase cover.



Install the oil cooler pipe setting plate and tighten the socket bolts securely.

Fill the recommended engine oil (page 3-9).

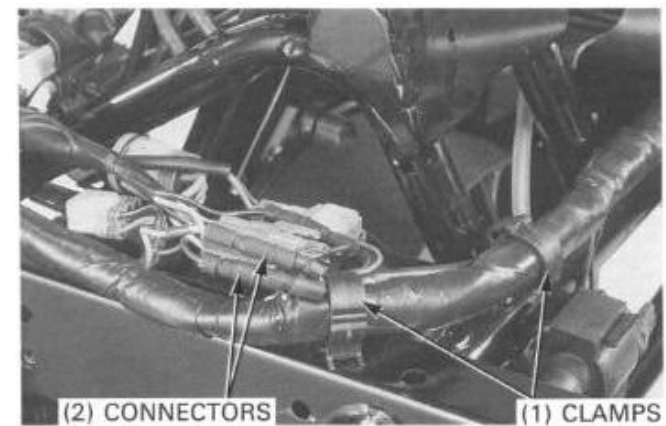


COOLING FAN MOTOR/SHROUD REMOVAL

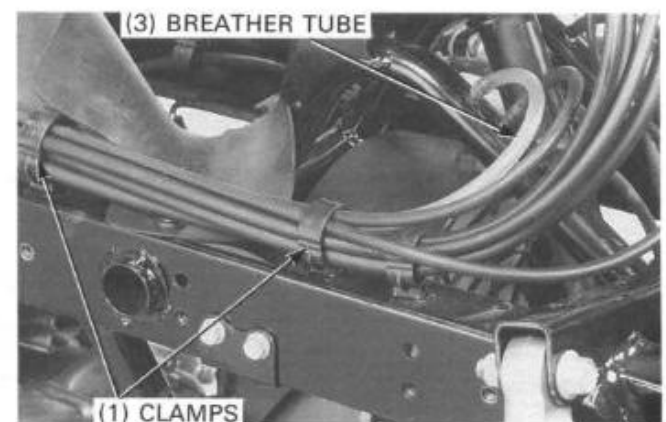
Remove the oil cooler (page 4-2).
Remove the fuel tank (page 5-18).

Release the cooling fan motor harness clamps.

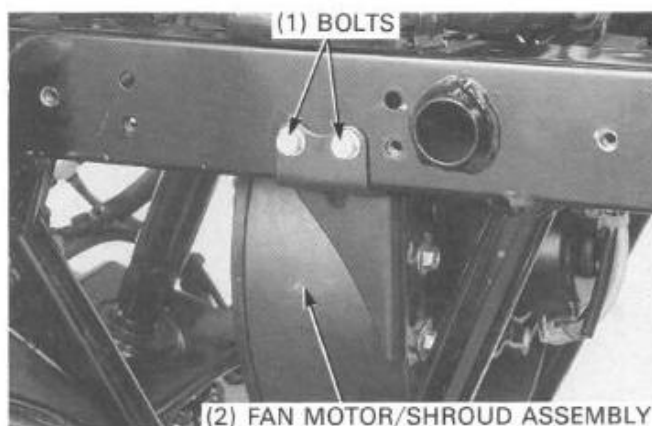
Disconnect the cooling fan motor connectors.



Release the breather tube clamp and disconnect the cooling fan breather tube.

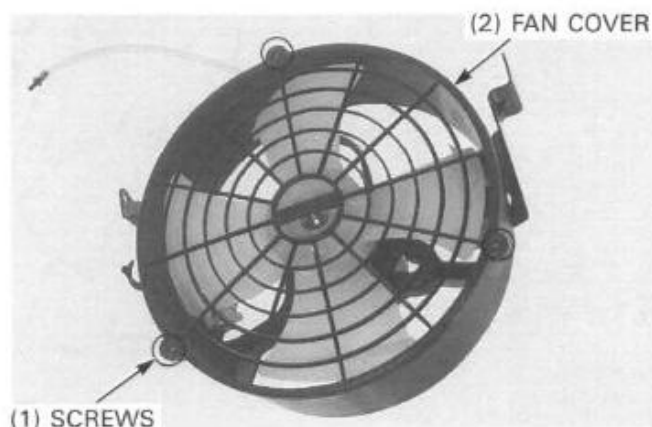


Remove the bracket bolts and cooling fan motor/shroud assembly from the left.

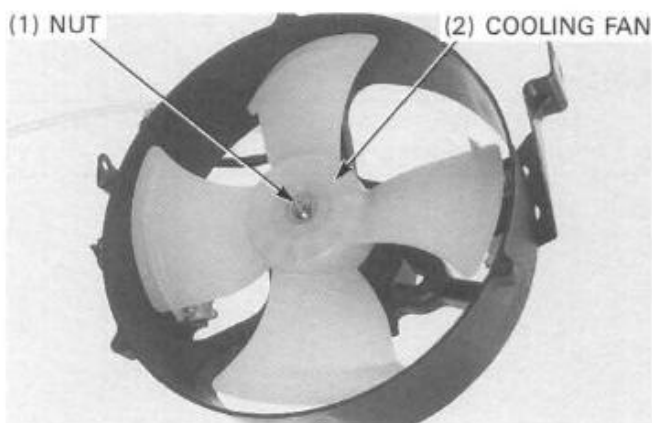


COOLING FAN MOTOR/SHROUD DISASSEMBLY

Remove the screws and cooling fan cover.

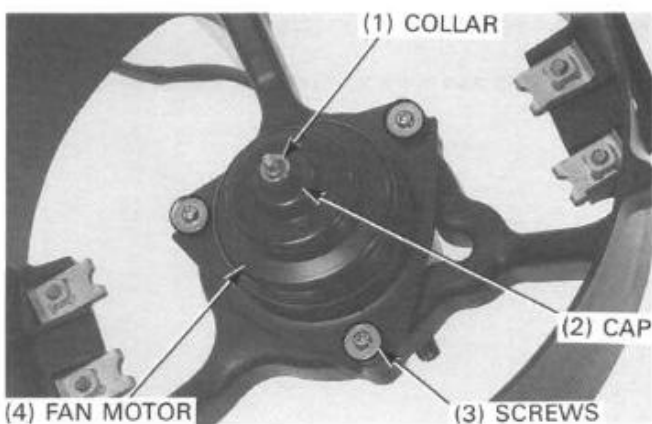


Remove the cooling fan nut and cooling fan.

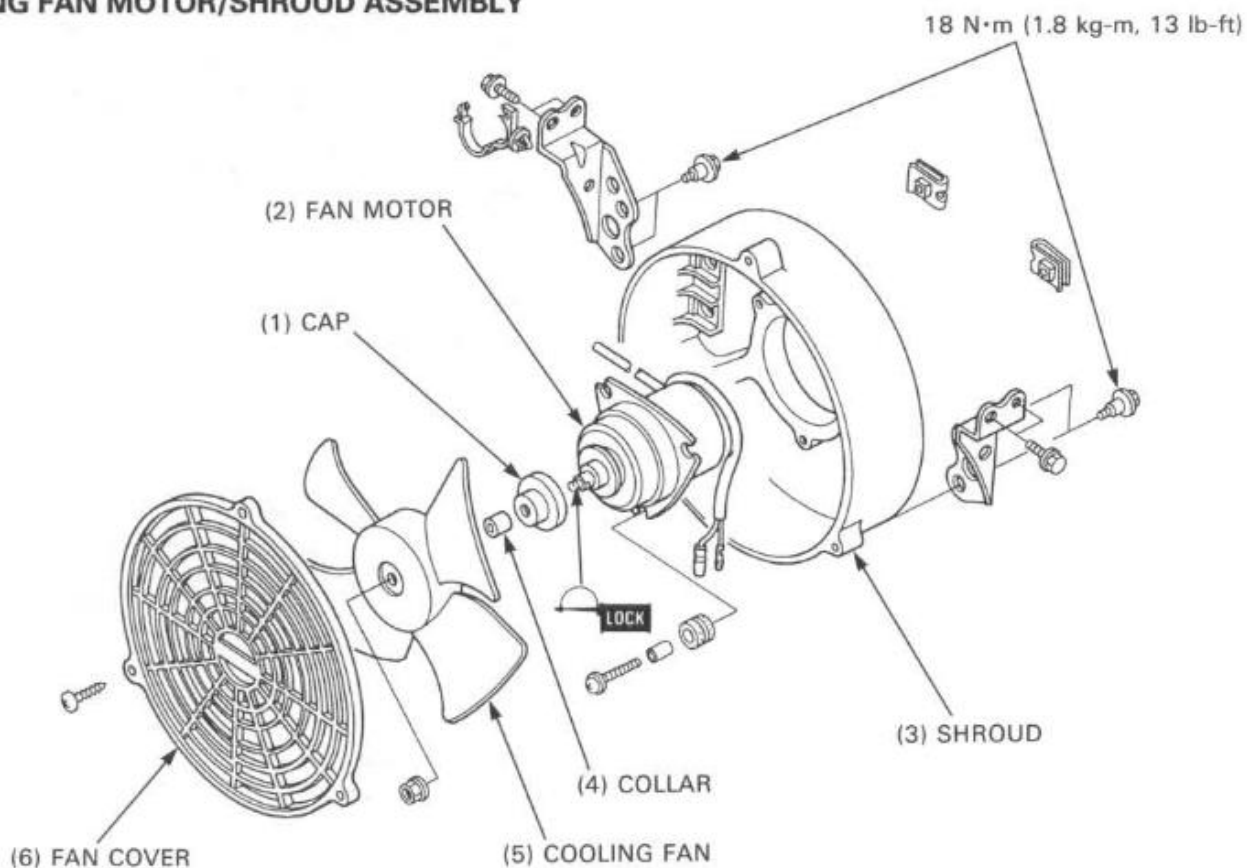


Remove the collar and cap.

Remove the screws, fan motor, collars and grommets.



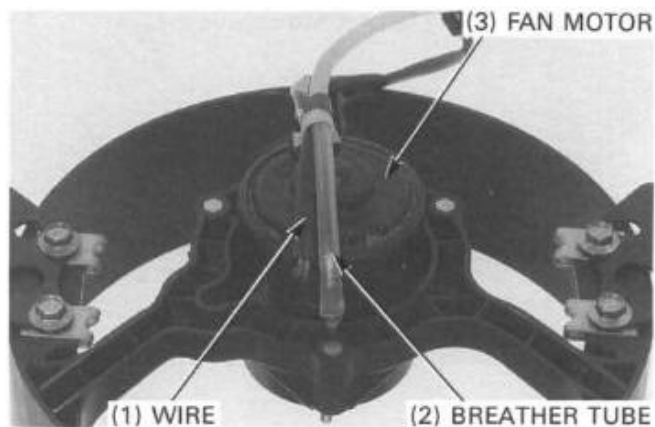
COOLING FAN MOTOR/SHROUD ASSEMBLY



Install the cooling fan motor.

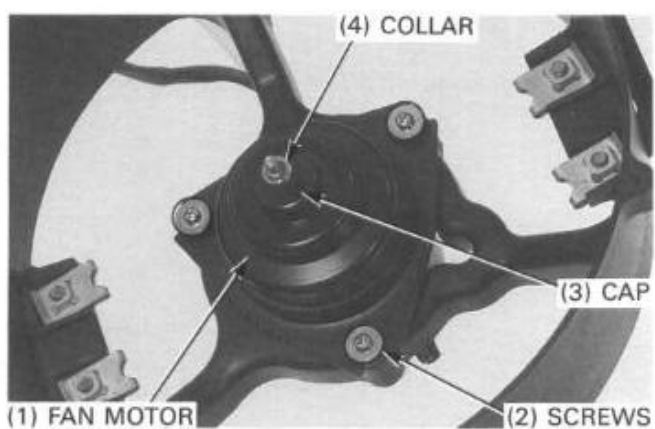
NOTE

- Install the fan motor with the fan motor wire and breather tube clamp facing up.

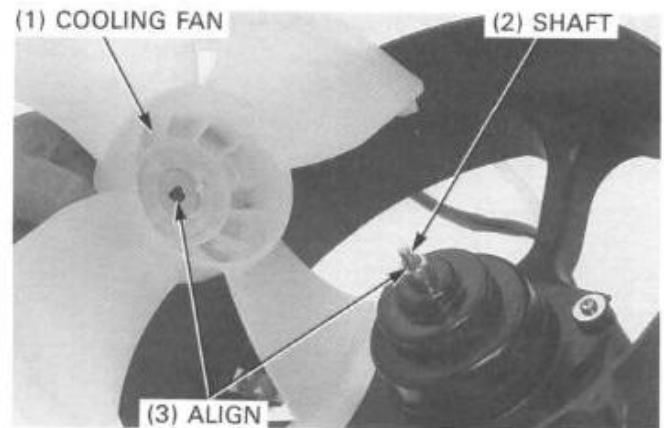


Install and tighten the fan motor screws.

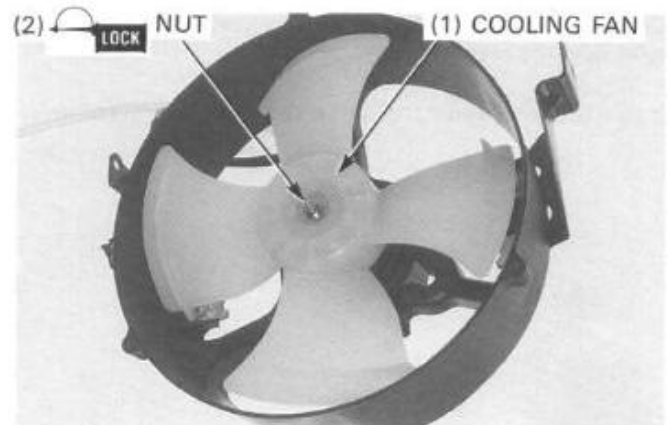
Install the cap and collar onto the fan motor shaft.



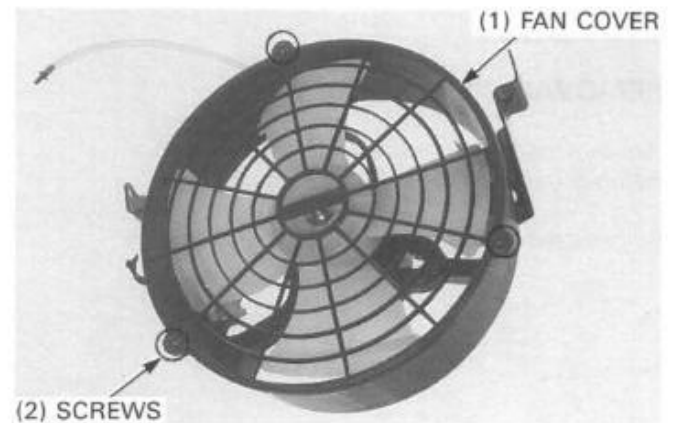
Align the fan motor groove with the fan motor shaft, then install the cooling fan.



Apply a locking agent to the cooling fan motor nut threads. Install and tighten the cooling fan nut.

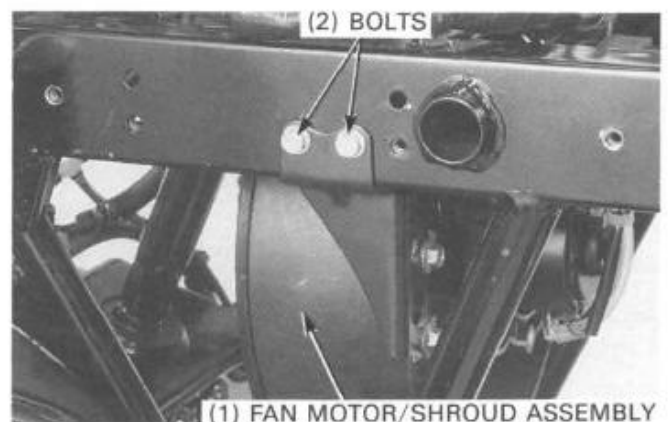


Install cooling fan cover and tighten the screws.



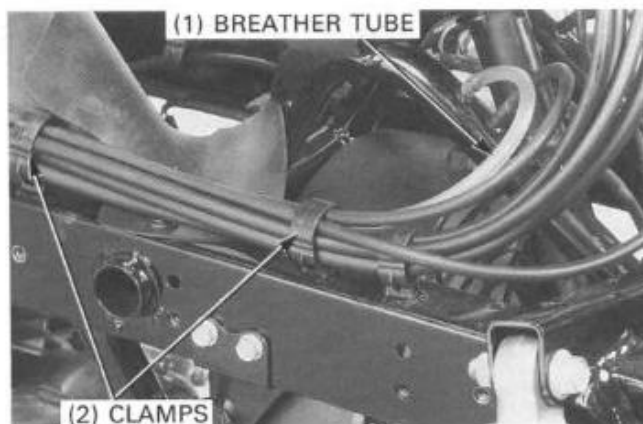
COOLING FAN MOTOR/SHROUD INSTALLATION

Install the cooling fan motor/shroud assembly into the frame.
Install and tighten the mounting bolts.



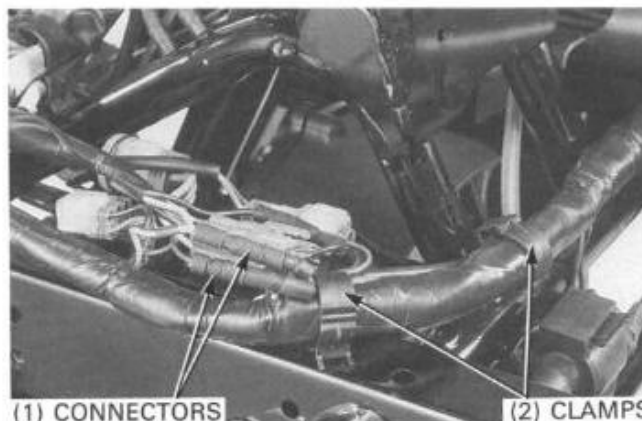
LUBRICATION SYSTEM

Route and install the breather tube properly and secure it with the clamps.



Connect the cooling fan motor connectors and secure the wire with the clamps.

Install the removed parts in the reverse order of removal.



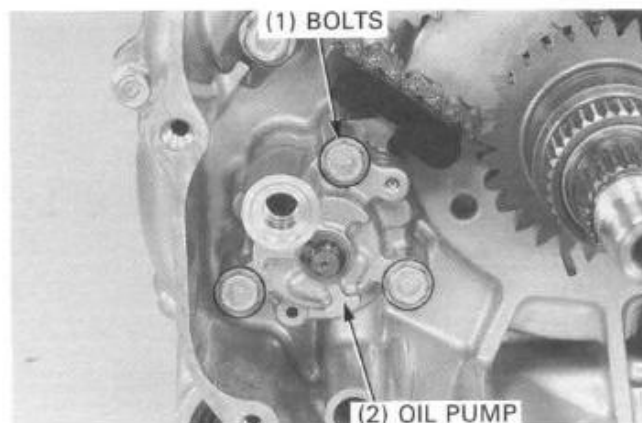
OIL PUMP

REMOVAL/DISASSEMBLY

Remove the front crankcase cover (page 8-3).

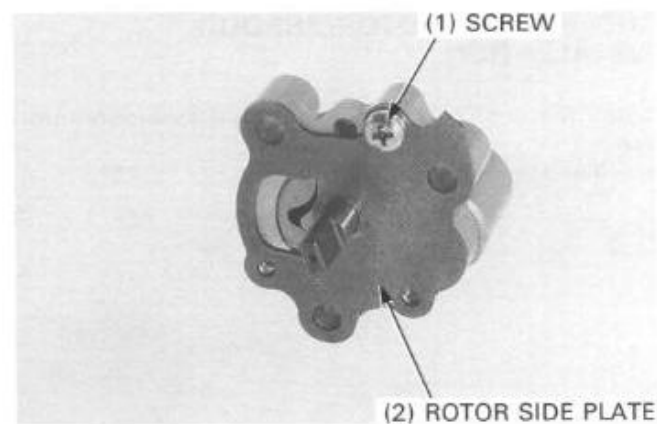
Remove the centrifugal clutch (page 8-4).

Remove the three bolts and oil pump assembly.

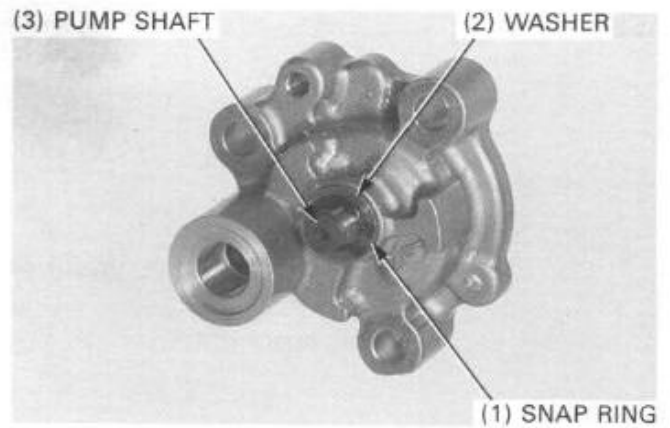


INSPECTION

Remove the screw and rotor side plate.



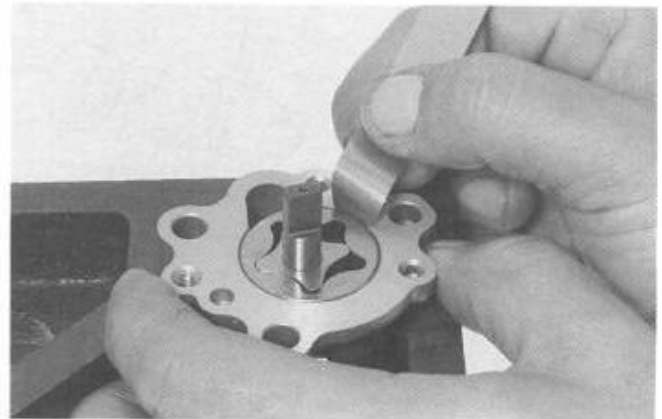
Remove the snap ring, washer and oil pump shaft.
Mark the rotors which side is up, so they can be reinstalled the same way.
Disassemble the oil pump.



Thoroughly clean all the components.
Install the outer and inner rotors into the pump body and temporarily insert the oil pump shaft.

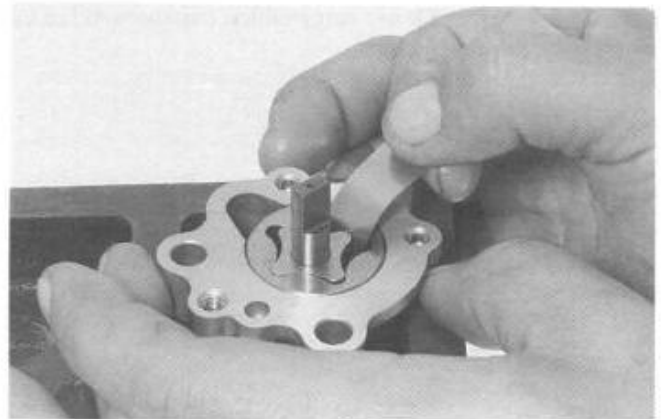
Measure the pump body clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)



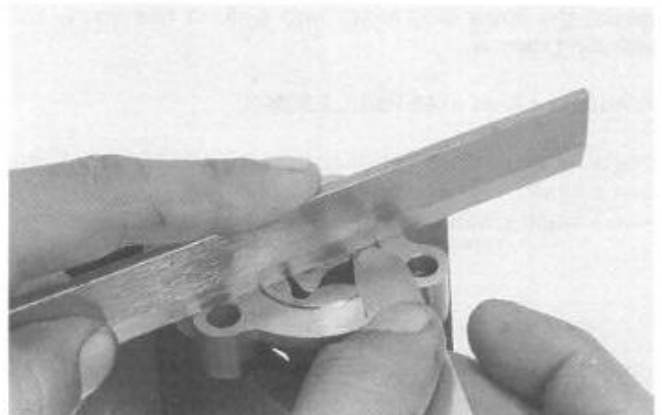
Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

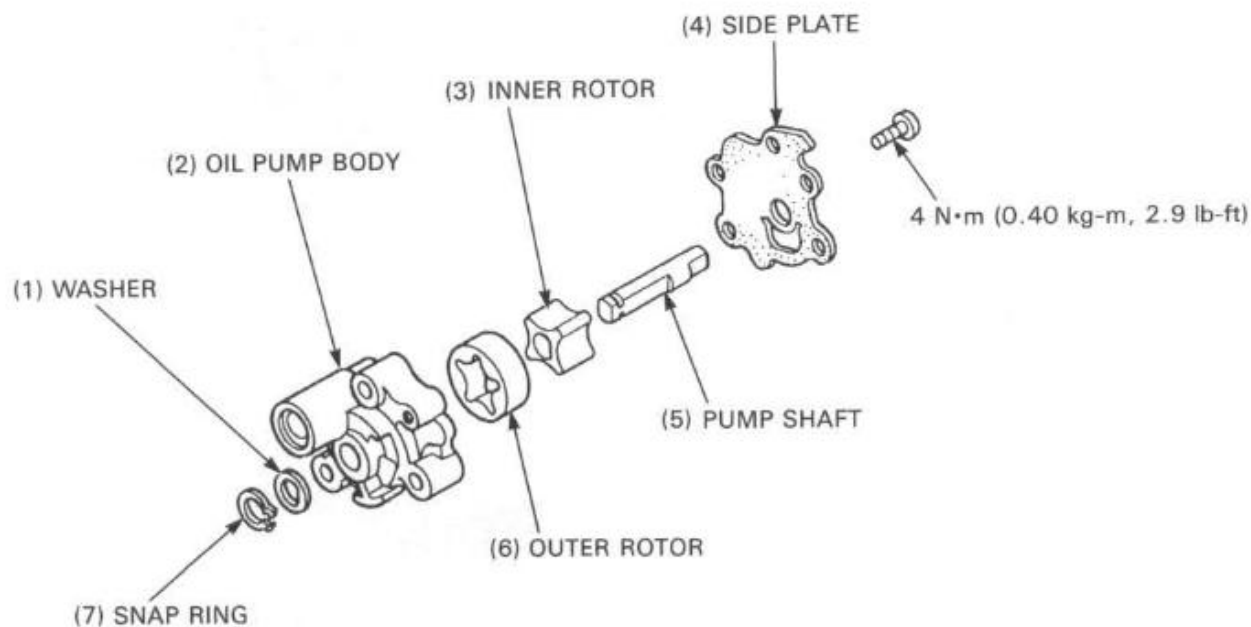


Remove the oil pump drive shaft from the oil pump body and measure the side clearance.

SERVICE LIMIT: 0.11 mm (0.004 in)



ASSEMBLY

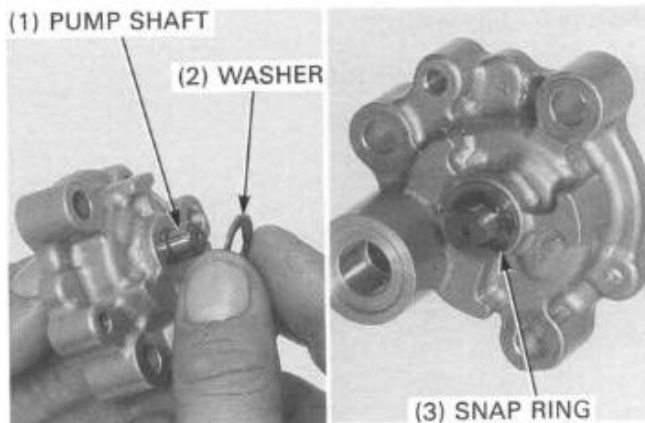


Install the outer and inner rotor which the same sides up as when they were removed.
Install the oil pump shaft.

Install the washer and snap ring.

NOTE

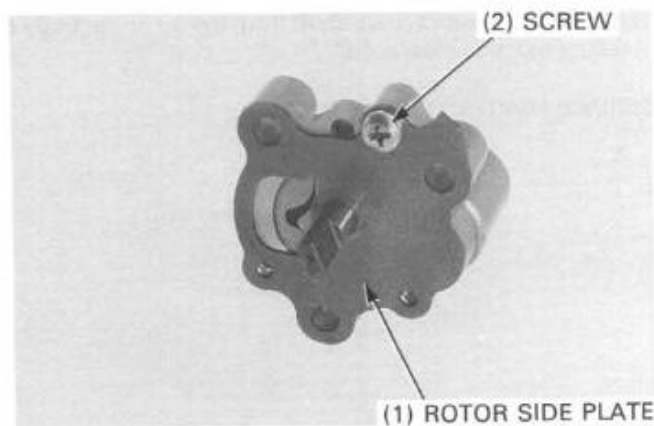
- Align the cut-outs between the pump shaft and washer.
- Install the snap ring with its chamfered side facing the washer.



Install the rotor side plate and tighten the screw to the specified torque.

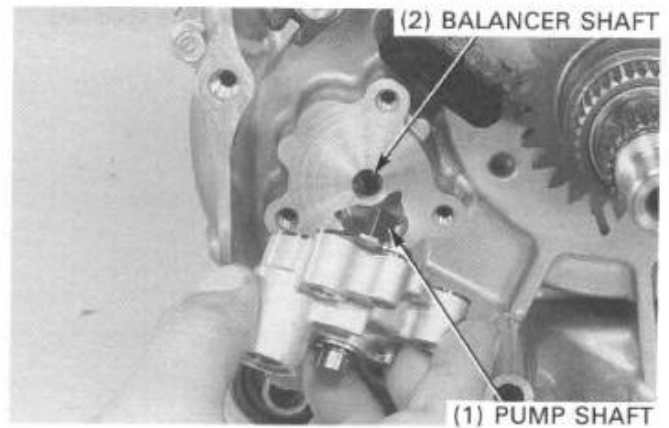
TORQUE: 4 N·m (0.40 kg-m, 2.9 lb-ft)

Check for smooth operation of the oil pump by turning the oil pump shaft.
Add a small amount of oil to the pump before installing.



INSTALLATION

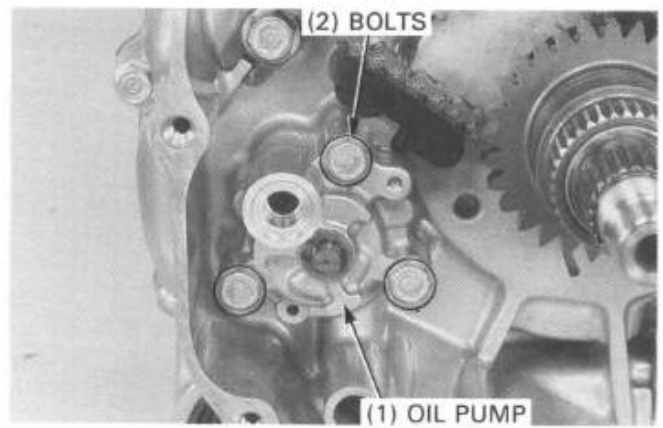
Verify the cam chain slipper is installed.
 Install the oil pump assembly aligning the pump drive shaft boss with the groove in the balancer shaft.
 Also align the side plate tab with the cam chain slipper groove.



Install and tighten the oil pump mounting bolts.

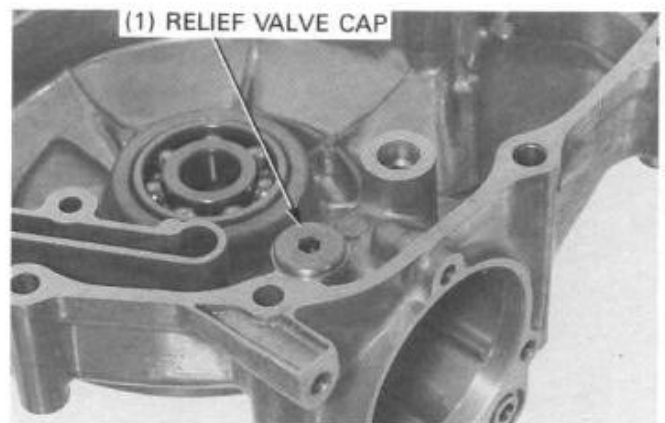
Recheck the oil pump by turning the pump shaft right and left.

Install the centrifugal clutch (page 8-10).
 Install the front crankcase cover (page 8-17).

**RELIEF VALVE****DISASSEMBLY**

Remove the front crankcase cover (page 8-3).

Remove the relief valve cap, spring and valve.

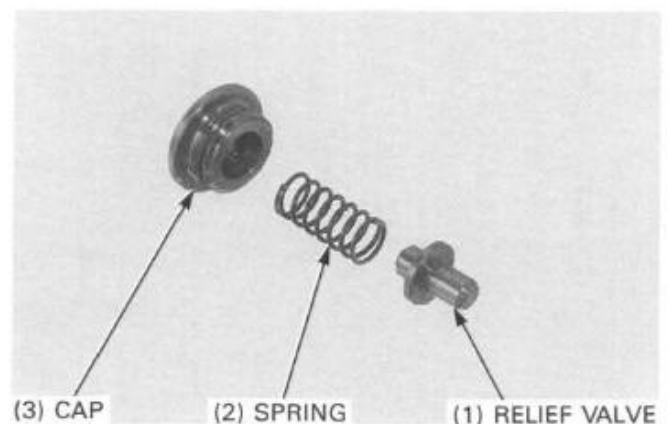
**INSPECTION**

Inspect the relief valve and spring for wear or damage.
 Replace the relief valve and spring if necessary.

ASSEMBLY

Install the relief valve with the long projection side facing in.
 Install the spring.

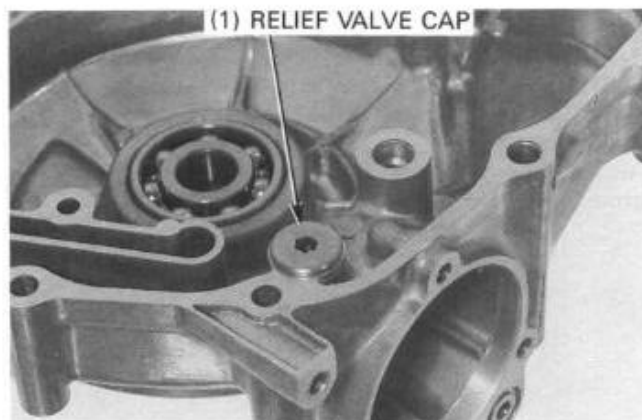
Apply a locking agent to the thread of the relief valve cap.



LUBRICATION SYSTEM

Install and tighten the relief valve cap to the specified torque.

TORQUE: 19 N·m (1.9 kg-m, 14 lb-ft)



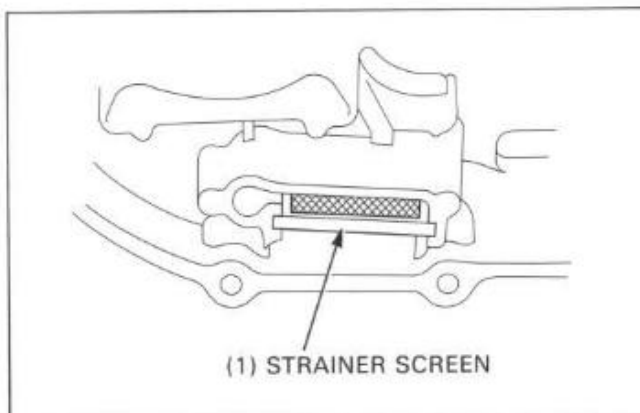
OIL STRAINER SCREEN

CLEANING

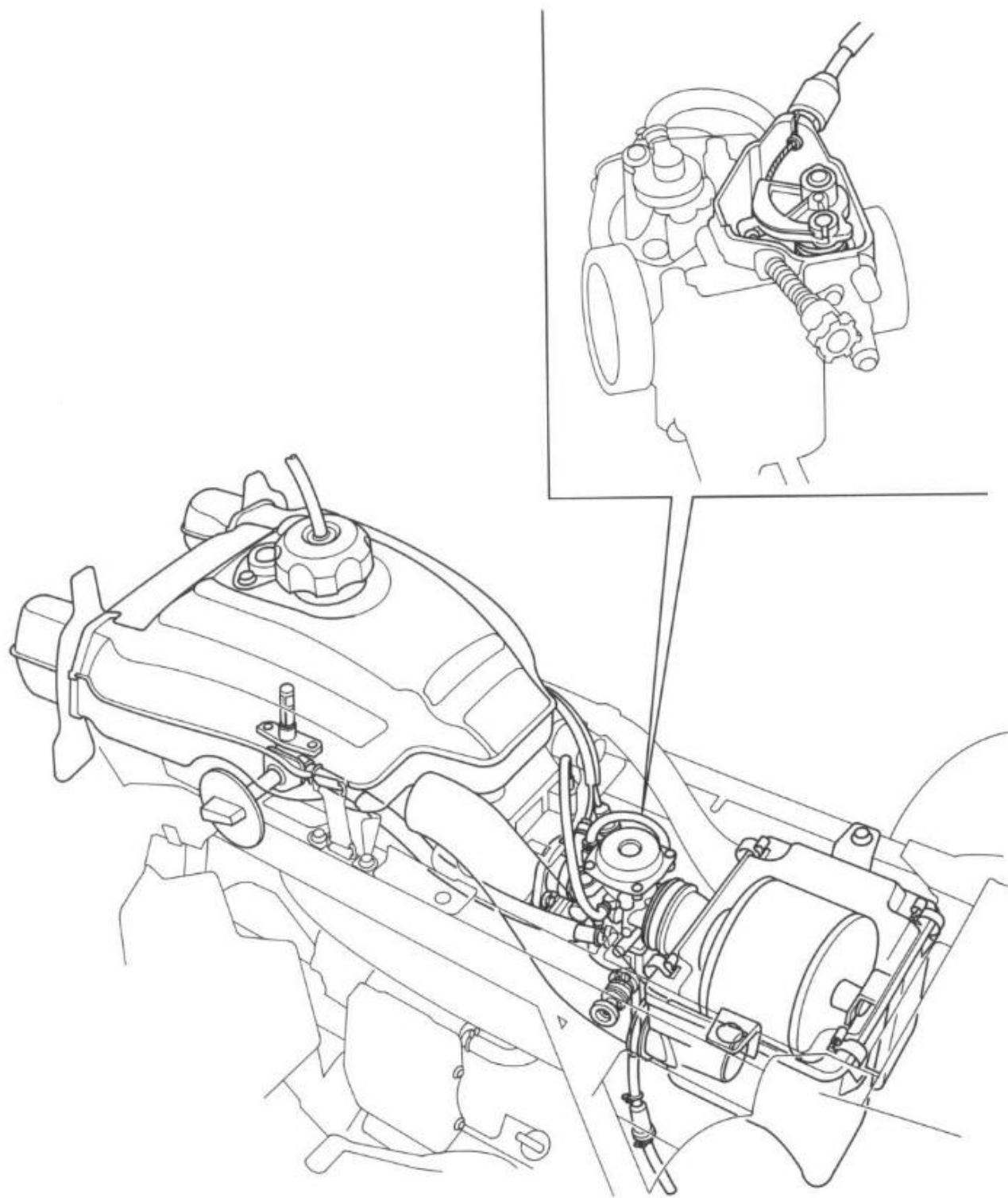
Separate the crankcase (page 11-4).

Remove the oil strainer screen and clean it.
Install the oil strainer screen.

Assemble the crankcase (page 11-15).



M E M O



5.FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR INSTALLATION	5-14
TROUBLESHOOTING	5-3	PILOT SCREW ADJUSTMENT	5-16
AIR CLEANER HOUSING	5-4	HIGH ALTITUDE ADJUSTMENT	5-17
CARBURETOR REMOVAL	5-5	FUEL TANK REMOVAL	5-18
CARBURETOR DISASSEMBLY	5-6	FUEL STRAINER SCREEN	5-18
CARBURETOR ASSEMBLY	5-10	FUEL TANK INSTALLATION	5-19

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN.**
- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

CAUTION

- Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragms might be damaged.

NOTE

- If the vehicle is to be stored for more than one month, drain the float chamber. Fuel left in the float chamber may cause clogged jets resulting in hard starting or poor driveability.
- Before disassembling the carburetor, place an approved gasoline container under the carburetor drain screw, loosen the screw and drain the carburetor.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- After removing the carburetor, wrap the intake port of the engine with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine. Be sure to remove the cover when reinstalling the carburetor.

FUEL SYSTEM

SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		VE92A
Main jet		#130
Slow jet		#45
Jet needle clip position		3rd groove from top
Pilot screw	Initial opening	2 – 1/4 turns out
	High altitude setting	3/4 turn in from initial opening
Float level		18.5 mm (0.73 in)
Idle speed		1,400 ± 100 rpm
Throttle lever free play		3 – 8 mm (1/8 – 5/16 in)
Starting enrichment (SE) valve distance		10 – 11 mm (0.39 – 0.43 in)

TORQUE VALUES

Carburetor cover screw	3.5 N•m (0.35 kg-m, 2.5 lb-ft)
Starting enrichment (SE) valve nut	2.5 N•m (0.25 kg-m, 1.8 lb-ft)
Fuel valve mounting bolt	9 N•m (0.9 kg-m, 6.5 lb-ft)
Fuel level gauge mounting bolt	12 N•m (1.2 kg-m, 9 lb-ft)

TOOL

Carburetor float level gauge	07401 – 0010000
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TROUBLESHOOTING

Engine cranks but won't start

- No fuel to carburetor
- Engine flooded with fuel
- No spark at plug (ignition system faulty)
- Clogged air cleaner
- Intake air leak
- Improper choke operation
- Improper throttle operation

Engine idles roughly, runs poorly or stalls

- Improper choke operation
- Ignition malfunction
- Fuel contaminated
- Intake air leak
- Incorrect idle speed
- Incorrect pilot screw adjustment
- Low cylinder compression
- Starting enrichment (SE) valve stuck open
- Damaged starting enrichment (SE) valve seat
- Rich mixture
- Lean mixture
- Clogged carburetor

Misfiring during acceleration

- Ignition system faulty
- Lean mixture

Afterburn during acceleration

- Ignition system faulty
- Lean mixture

Poor performance (driveability) and poor fuel economy

- Fuel system clogged
- Ignition system faulty
- Air cleaner clogged

Afterfiring

- Ignition system malfunction
- Carburetor malfunction
- Lean mixture
- Rich mixture

Lean mixture

- Clogged fuel jets
- Faulty float valve
- Float level too low
- Blocked fuel fill cap air vent hole
- Clogged fuel strainer screen
- Restricted fuel line
- Clogged air vent tube
- Intake air leak
- Vacuum piston stuck closed

Rich mixture

- Clogged air cleaner
- Worn jet needle or needle jet
- Faulty float valve
- Float level too high
- Starting enrichment (SE) valve stuck open
- Damaged starting enrichment (SE) valve seat
- Clogged air jet

Incorrect fast idle speed

- Incorrect choke cable free play
- Starting enrichment (SE) valve stuck or damaged

AIR CLEANER HOUSING

REMOVAL

Remove the seat and side/fuel tank cover (page 2-3).

Loosen the intake air duct band screw.

Remove the air cleaner housing retaining clips.



Remove the crankcase breather tube from the intake air duct. Free the intake duct from the frame.

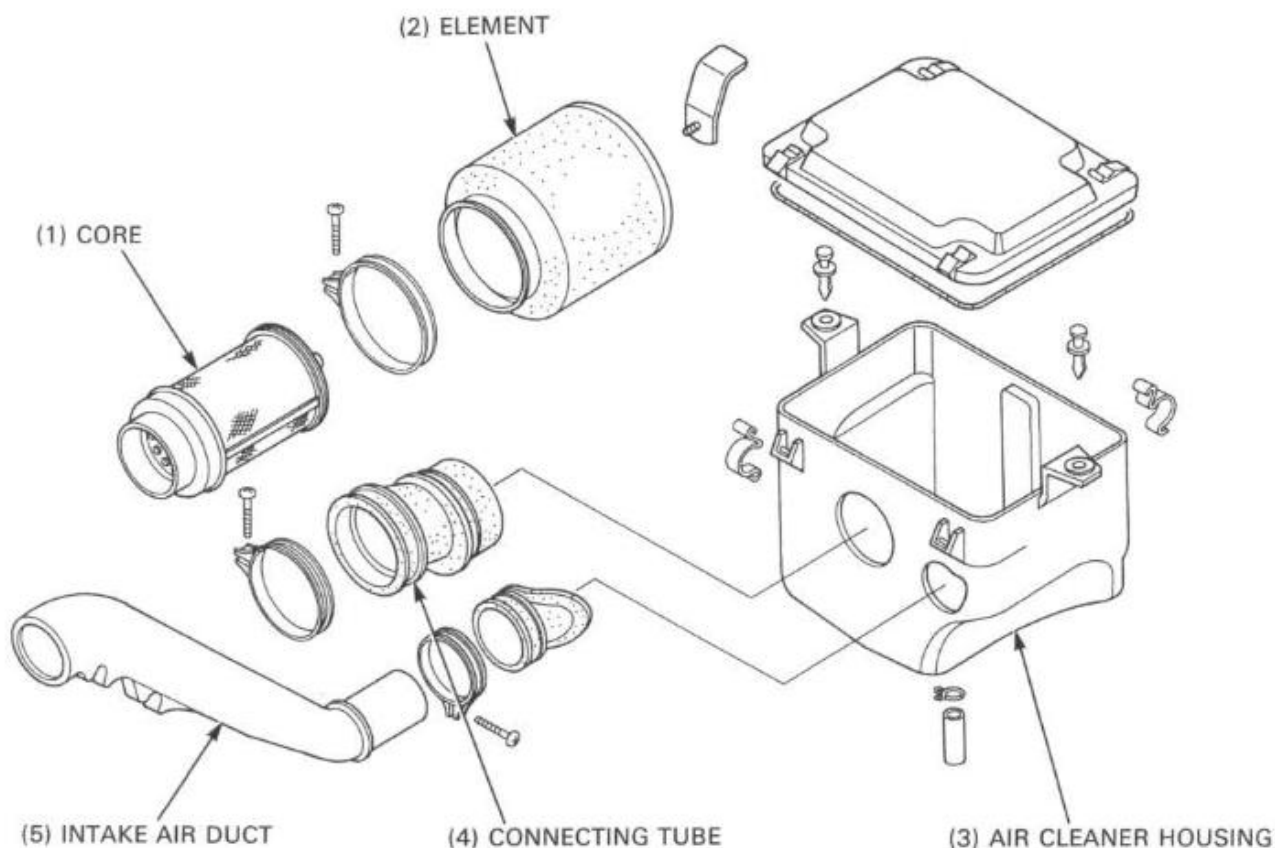
Remove the air cleaner housing.

Loosen the intake air duct band screw, then remove the intake air duct from the air cleaner housing.



INSTALLATION

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



CARBURETOR REMOVAL

Remove the seat and right lower side cover (page 2-3).

Loosen the connecting tube and insulator bands.



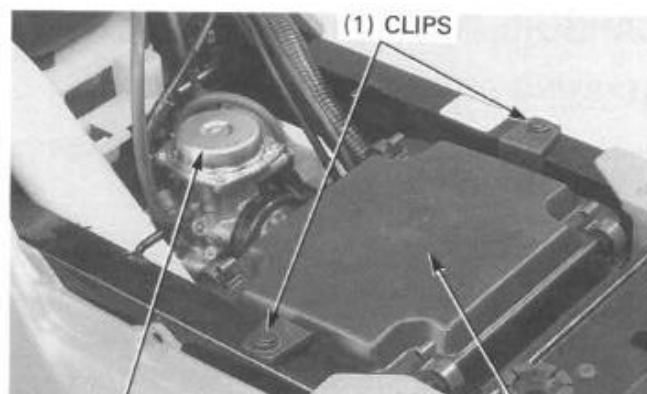
(1) CONNECTING TUBE BAND (2) INSULATOR BAND

Remove the air cleaner housing retaining clips.

Pull the carburetor upward.

CAUTION

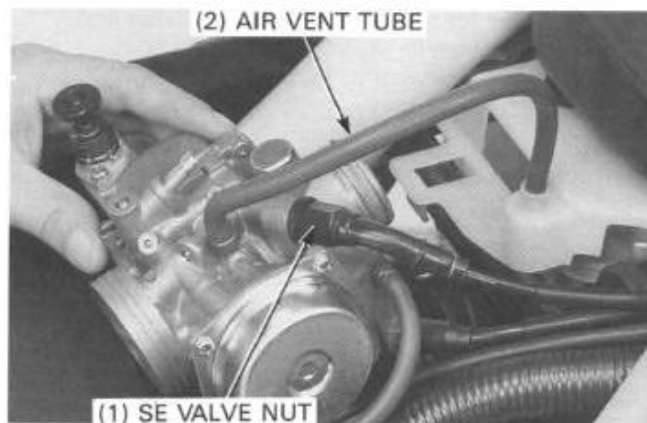
- Do not let dirt and dust enter the engine through the intake port, or the engine may be damaged.



(1) CARBURETOR (2) AIR CLEANER HOUSING

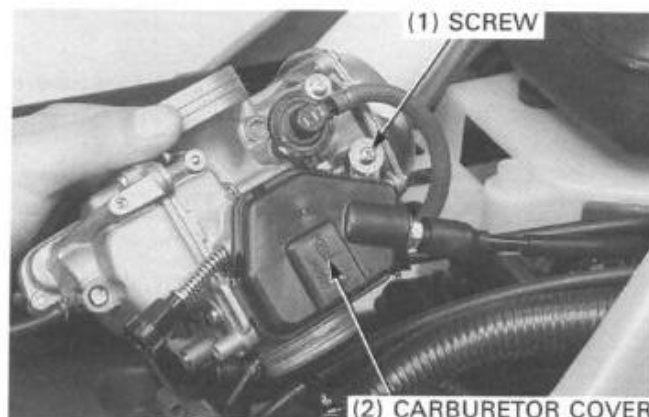
Loosen the starting enrichment (SE) valve nut and remove the SE valve from the carburetor.

Disconnect the air vent tube from the heat guard.



(1) SE VALVE NUT (2) AIR VENT TUBE

Remove the carburetor cover screw and the cover.



(1) SCREW (2) CARBURETOR COVER

FUEL SYSTEM

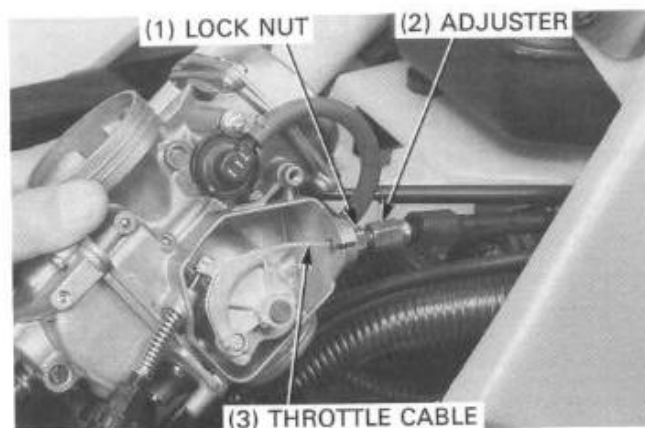
Disconnect the throttle cable end from the throttle drum.

Remove the throttle cable from the carburetor body by loosening the lock nut and turning the adjuster.

CAUTION

- Do not kink or twist the throttle cable. It will not operate smoothly and may stick if it is kinked or twisted.

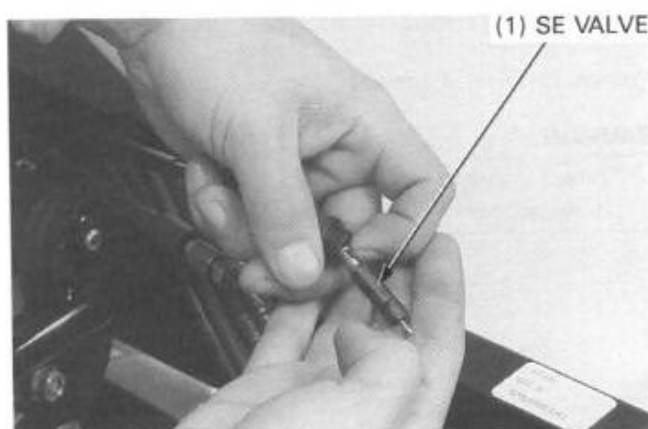
Remove the carburetor from the frame.



CARBURETOR DISASSEMBLY

STARTING ENRICHMENT (SE) VALVE

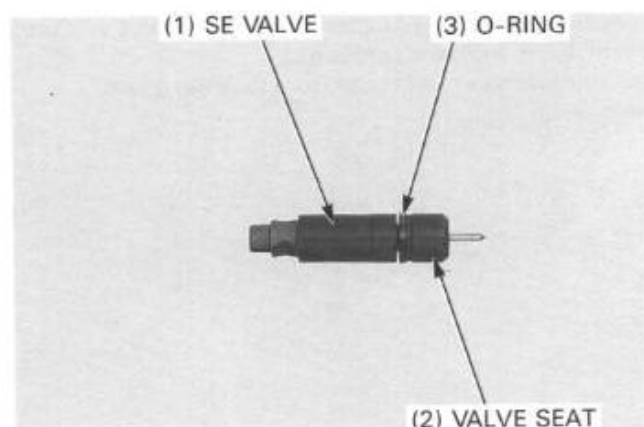
Disconnect the choke cable end from the SE valve and remove the valve spring.



Check the valve for nicks, grooves or other damage.
Check the valve seat for wear.
Check the O-ring for wear or damage.

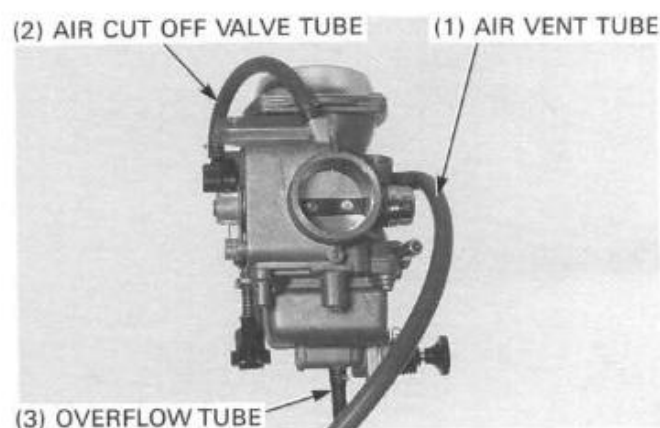
NOTE

- The SE valve and O-ring must be replaced as a set.

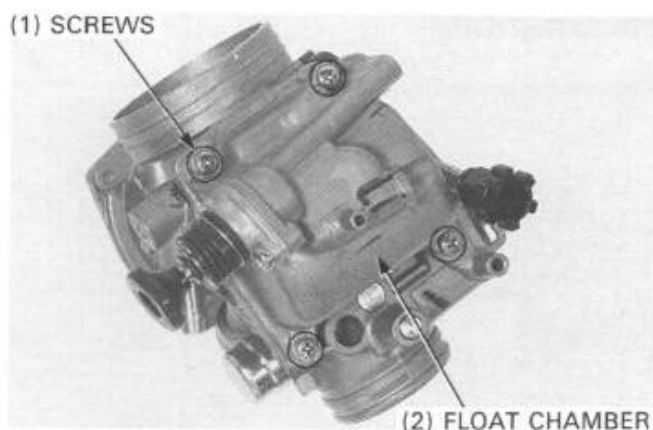


FLOAT AND JETS

Disconnect the air vent tube, air cut off valve tube and overflow tube from the carburetor body.

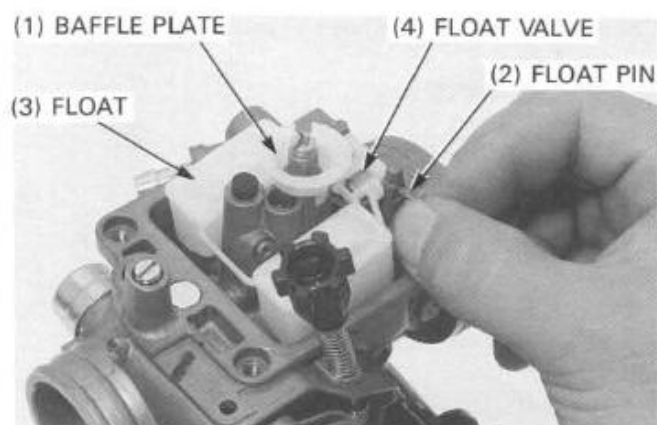


Remove the four screws and the float chamber.



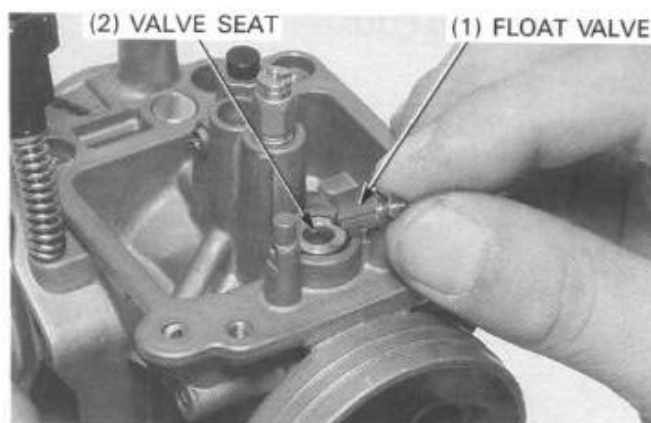
Remove the following:

- Baffle plate
- Float pin
- Float
- Float valve



Inspect the float valve for grooves and nicks, and replace if necessary.

Inspect the operation of the valve.



Remove the following:

- Main jet
- Needle jet holder
- Needle jet
- Slow jet
- Plug
- Starter jet

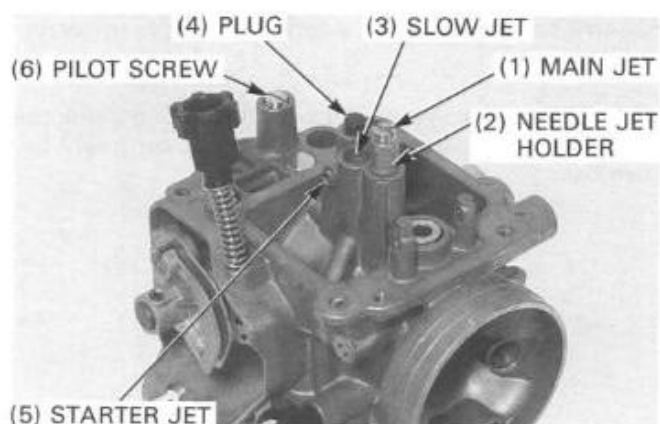
Turn the pilot screw in and record the number of turns before it seats lightly. Use this as a reference for reinstallation.

CAUTION

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

Remove the pilot screw.

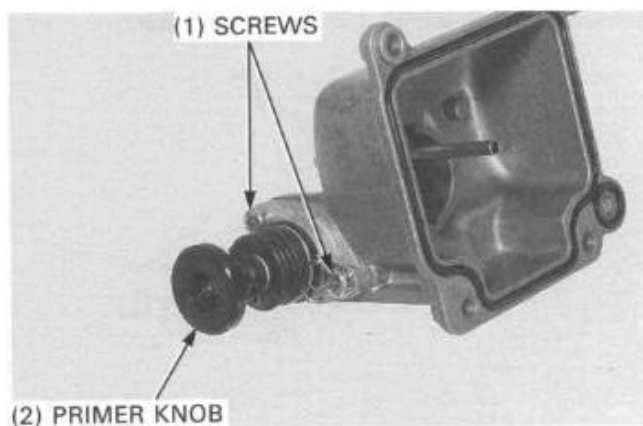
Inspect the pilot screw and each jet and replace them if they are worn or damaged.



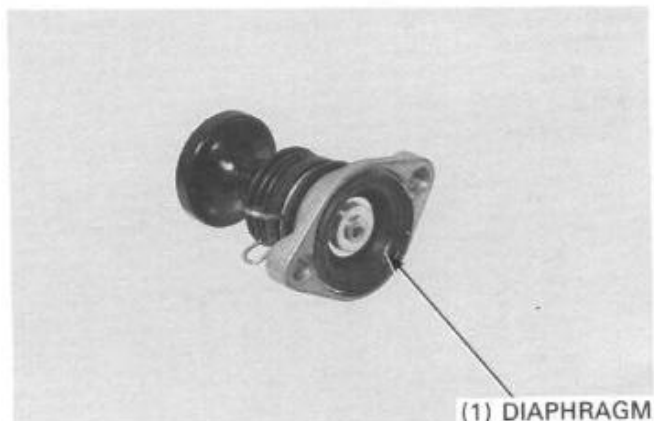
FUEL SYSTEM

PRIMER KNOB

Remove the screws, primer knob and spring.



Check the diaphragm for tears or other damage.

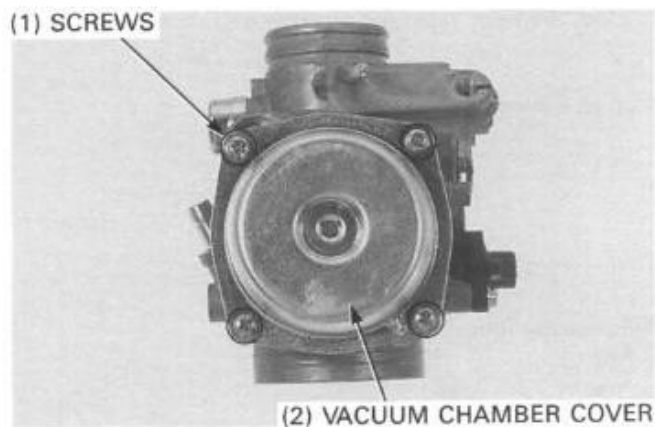


DIAPHRAGM/VACUUM PISTON

NOTE

- The diaphragm/vacuum piston can be removed without removing the float chamber.

Remove the vacuum chamber cover by removing the four screws.

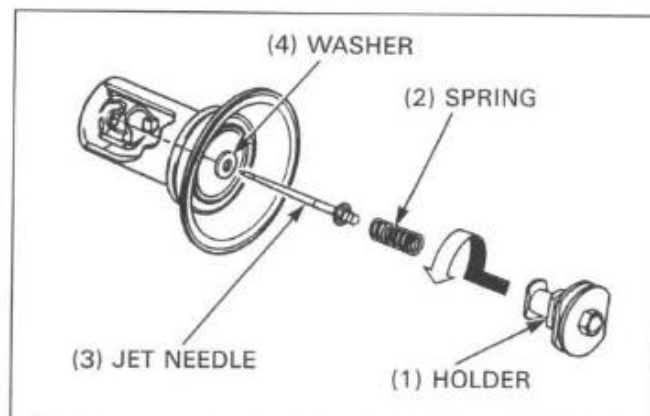


Remove the compression spring and diaphragm/vacuum piston.

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

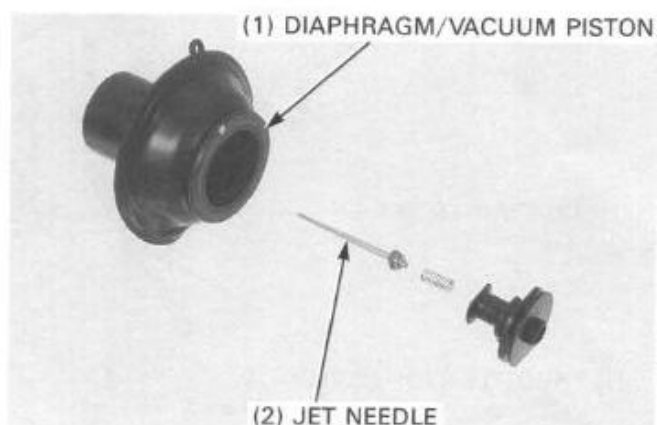


Push the jet needle holder down and turn it counterclockwise 90 degrees with a screwdriver. Then remove the needle holder, spring, jet needle and washer from the diaphragm/vacuum piston.



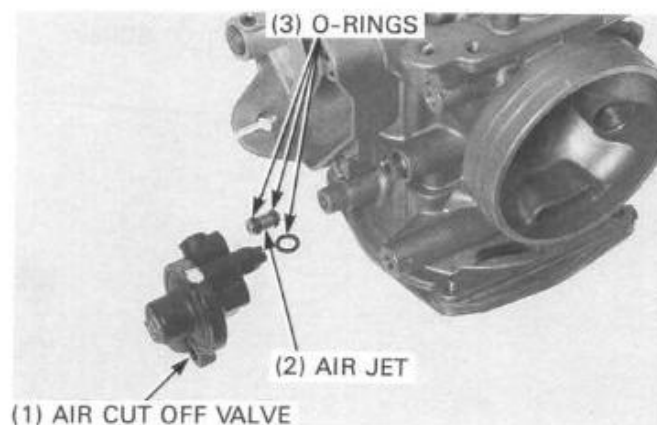
Inspect the jet needle for excessive wear at the tip or other damage.

Check for a torn diaphragm or other deterioration.



AIR CUT OFF VALVE

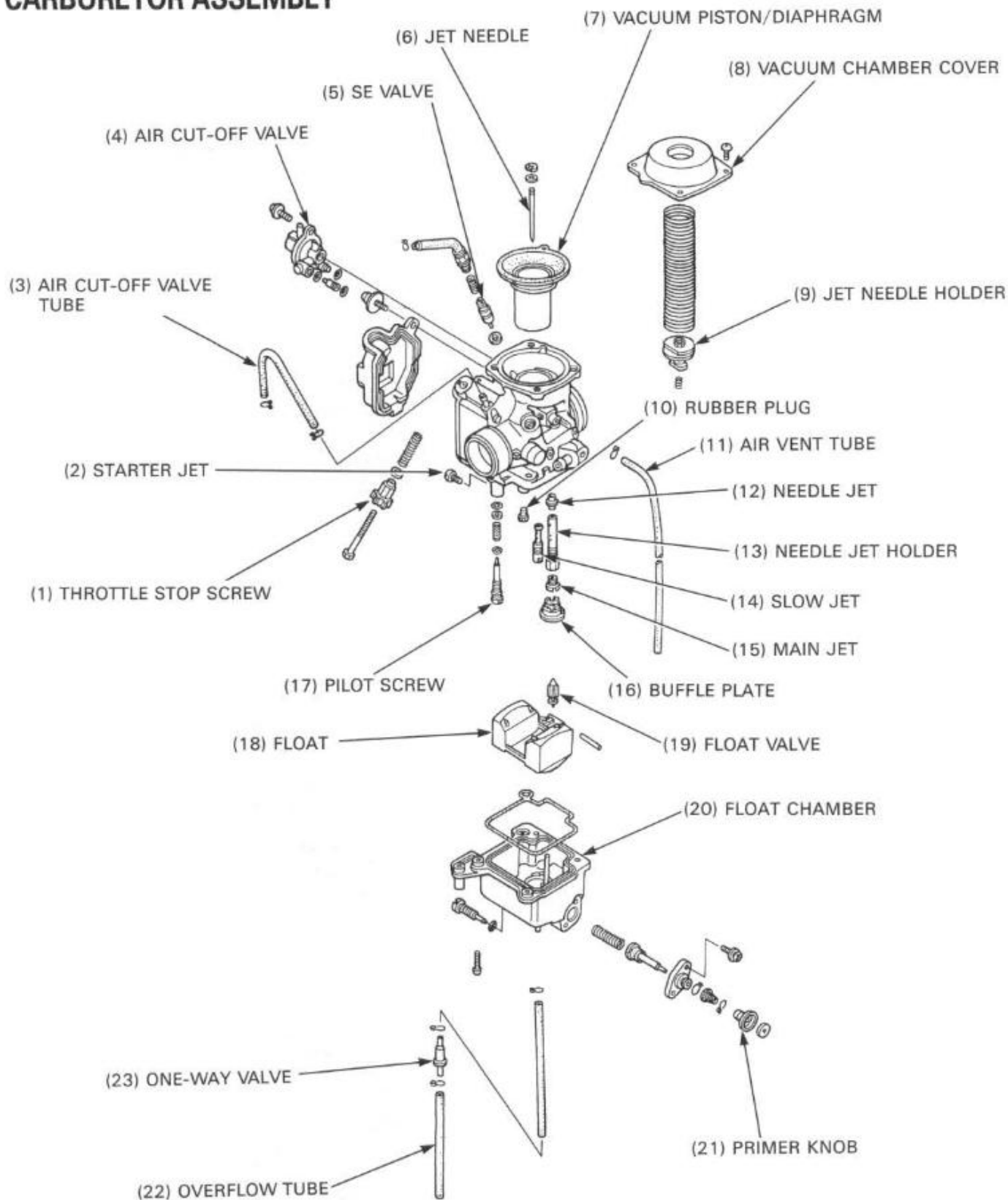
Remove the screw, air cut off valve, air jet and O-rings.



Blow open all carburetor body openings with compressed air.



CARBURETOR ASSEMBLY



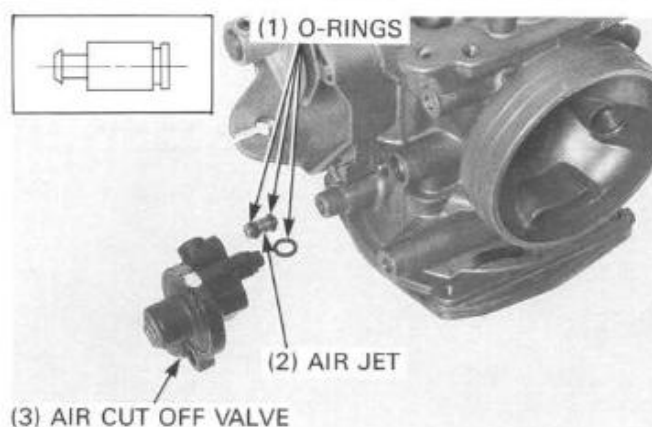
AIR CUT OFF VALVE

Install the O-rings, air jet and air cut off valve.

NOTE

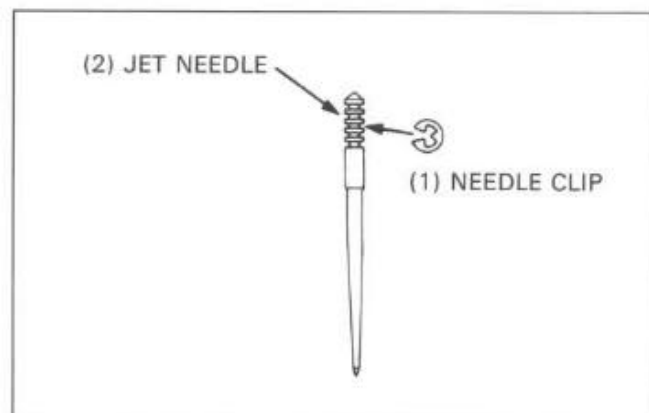
- Note the direction of the air jet as shown.

Install and tighten the screw securely.

**DIAPHRAGM/VACUUM PISTON**

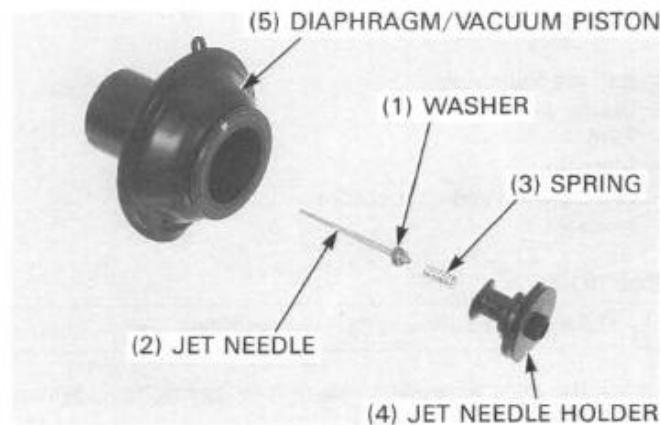
Install the needle clip on the jet needle.

STANDARD SETTING: 3rd groove from top



Install the washer, jet needle, spring and jet needle holder to the vacuum piston.

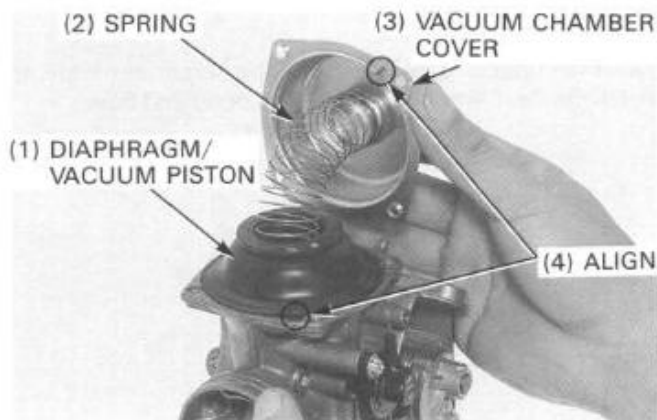
Push the jet needle holder in and turn it 90 degrees clockwise.



Install the diaphragm/vacuum piston in the carburetor body, aligning the diaphragm tab with the groove of the carburetor body.

Hold the vacuum piston up to almost full open so the diaphragm is not pinched by the chamber cover.

Install the chamber cover with the spring, aligning its tab with the hole in the carburetor, and secure with at least two screws before releasing the vacuum piston.



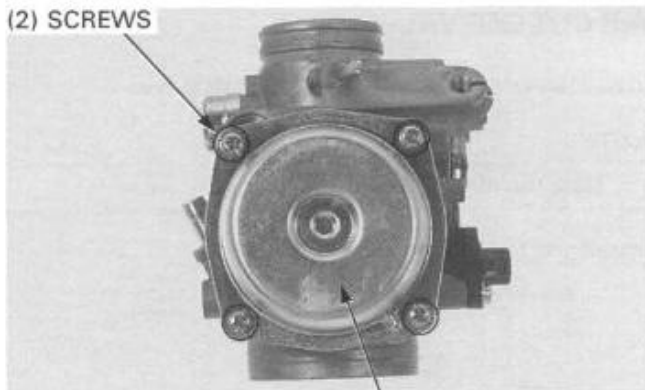
FUEL SYSTEM

Install the remaining vacuum chamber cover screws.

CAUTION

- Do not pinch the diaphragm under the chamber cover.

(2) SCREWS



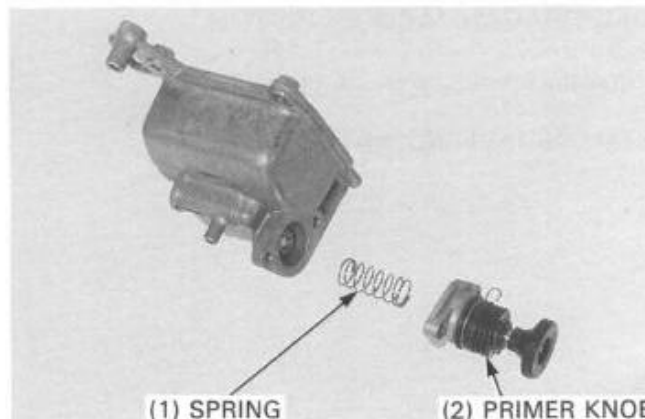
(1) VACUUM CHAMBER COVER

PRIMER KNOB

Install the primer knob with the spring into the float chamber.

Do not pinch the diaphragm when installing the screws.

Tighten the screws securely.



FLOAT AND JETS

Install the following:

- Starter jet
- Plug
- Slow jet
- Needle jet, needle jet holder
- Main jet

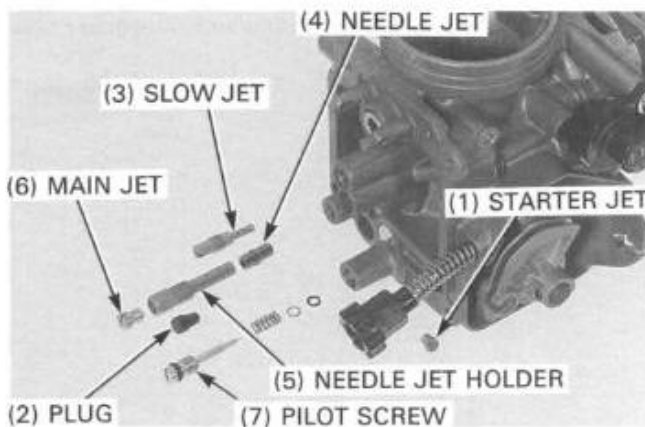
CAUTION

- Handle all jets with care. They can easily be scored or scratched.

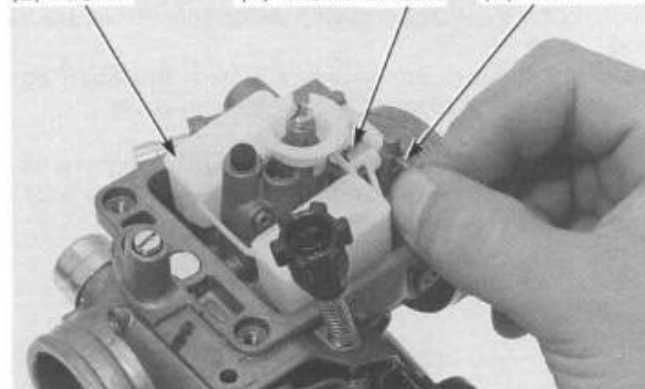
Install the pilot screw and return it to its original position as noted during removal.

Perform pilot screw adjustment if a new pilot screw is installed (page 5-16).

Install the float and float valve in the carburetor body, then install the float arm pin through the body and float.



(2) FLOAT (1) FLOAT VALVE (3) FLOAT PIN



FLOAT LEVEL INSPECTION

With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

FLOAT LEVEL: 18.5 mm (0.73 in)

TOOL:

Carburetor float level gauge

07401 - 0010000

The float cannot be adjusted.

Replace the float assembly if the float level is out of specification.

Install the baffle plate.

Install a new O-ring in the float chamber.

Install the float chamber, aligning the overflow pipe with the hole in the baffle as shown.

Install the four float chamber screws.

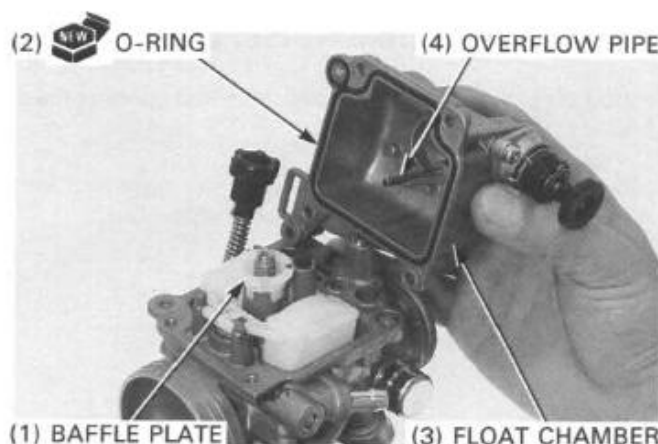
Install the overflow tube.

NOTE

- Note the direction of the one-way valve.



(1) FLOAT LEVEL GAUGE

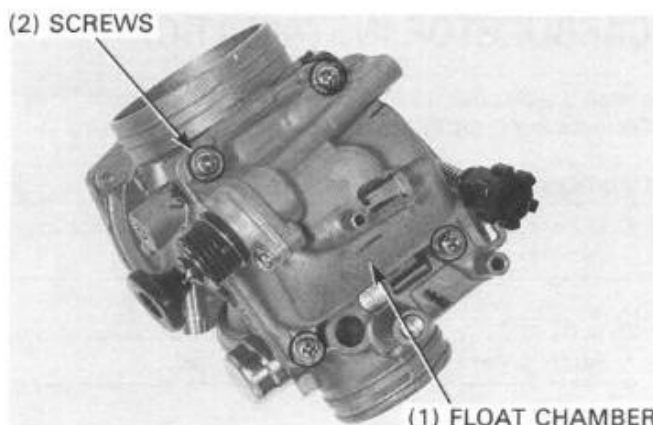


(2) O-RING

(4) OVERFLOW PIPE

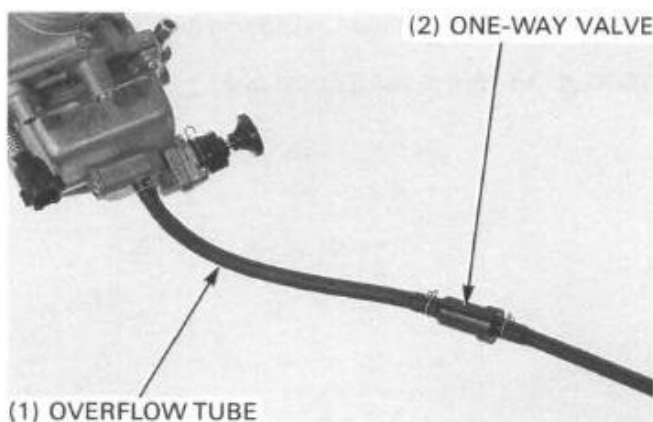
(1) BAFFLE PLATE

(3) FLOAT CHAMBER



(2) SCREWS

(1) FLOAT CHAMBER

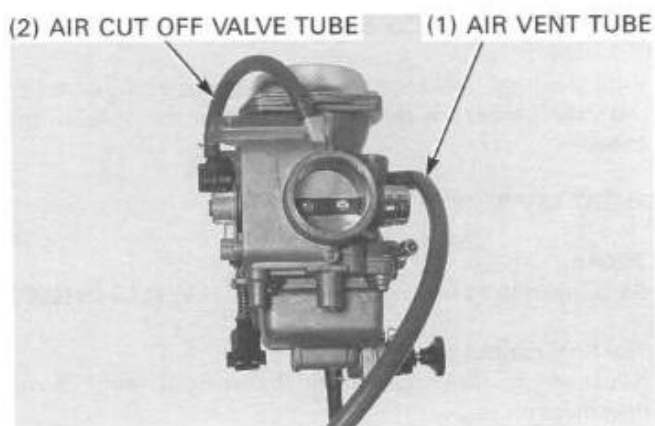


(2) ONE-WAY VALVE

(1) OVERFLOW TUBE

FUEL SYSTEM

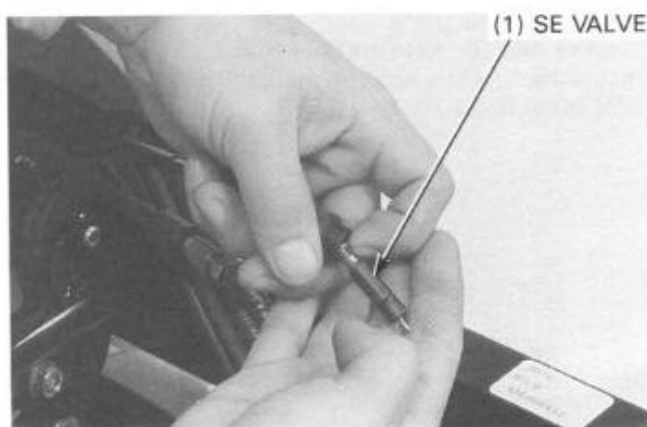
Install the air vent tube and air cut off valve tube.



STARTING ENRICHMENT (SE) VALVE

Install the spring over the choke cable and connect the cable end to the SE valve.

Move the choke lever all the way to the right and left and make sure that the SE valve operates properly.



CARBURETOR INSTALLATION

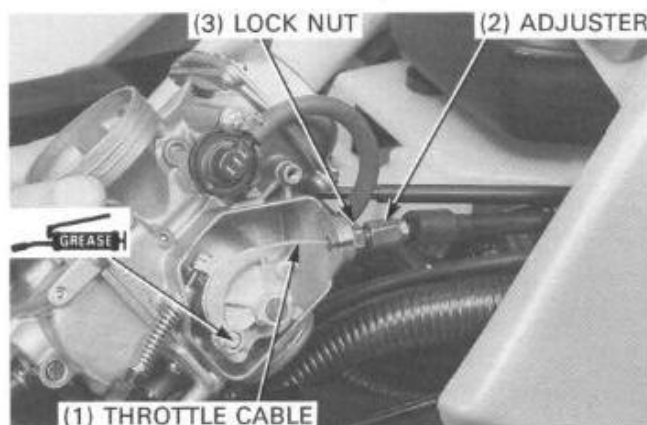
Install the throttle cable adjuster to the carburetor body. Connect the throttle cable end to the throttle drum.

CAUTION

- Do not kink or twist the throttle cable. It will not operate smoothly and may stick if it is kinked or twisted.

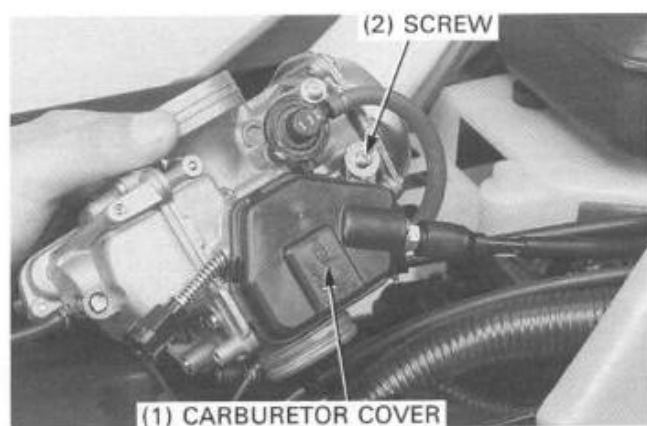
NOTE

- Apply grease to the throttle cable end.



Install the carburetor cover and tighten the screw.

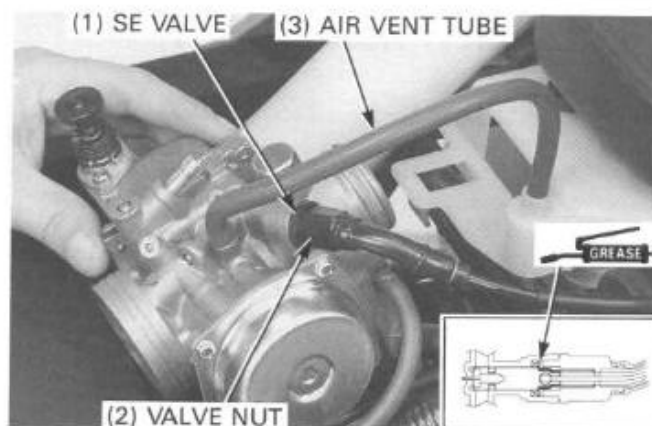
TORQUE: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)



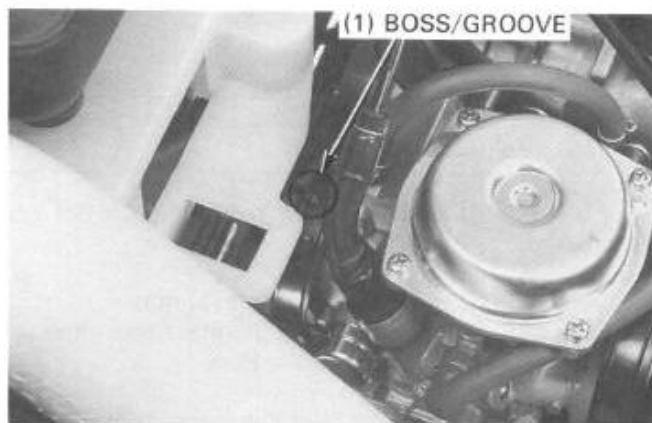
Apply multi-purpose grease to the SE valve end as shown.
Install the SE valve and tighten the valve nut.

TORQUE: 2.5 N·m (0.25 kg-m, 1.8 lb-ft)

Connect the air vent tube into the hole on the heat guard.

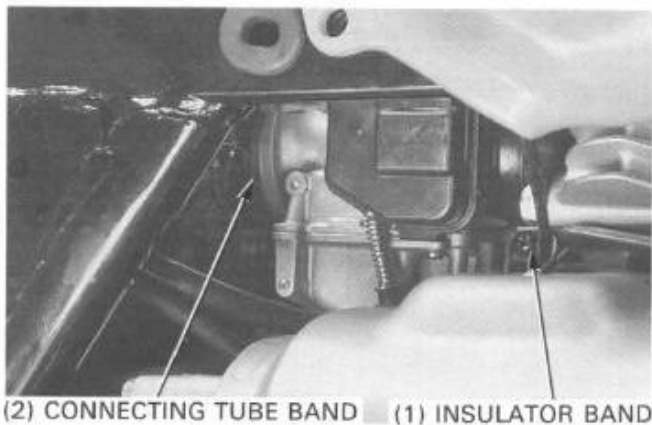


Install the carburetor by aligning its intake pipe boss with the insulator groove.
Set the pin of the insulator band in the groove of the insulator and install the band.



Tighten the insulator band screw.

Tighten the connecting tube band screw.



Route the drain tube correctly (page 1-23).
Adjust the throttle lever free play (page 3-4).

Install the removed parts in the reverse order of removal.



PILOT SCREW ADJUSTMENT

⚠ WARNING

- *If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

NOTE

- The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or a new pilot screw is installed.

Turn the pilot screw clockwise until it seats lightly and back it out 2-1/4 turns.

CAUTION

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

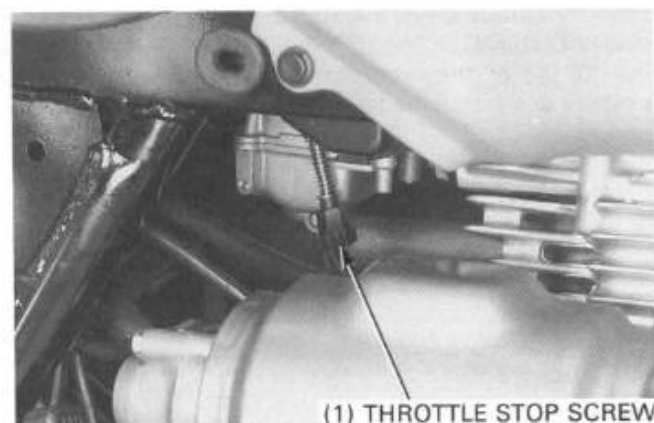
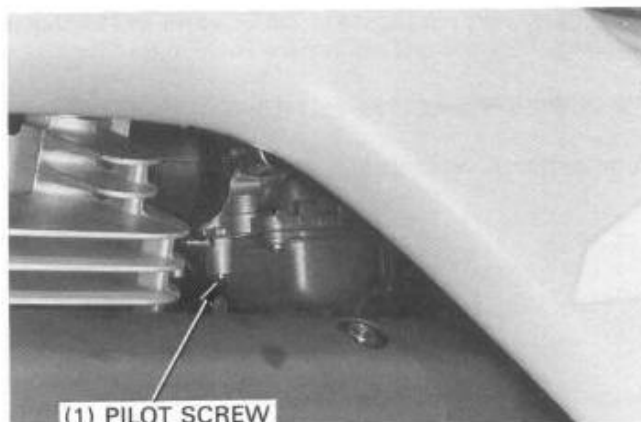
This is an initial setting prior to the final pilot screw adjustment.

Warm the engine up to operating temperature. Stop the engine and connect a tachometer according to the tachometer manufacturer's instructions.

Start the engine and adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,400 ± 100 rpm

Turn the pilot screw clockwise until you hear the engine miss or decrease in speed, then turn counterclockwise until the engine again misses or decreases in speed. Center the pilot screw exactly between these two extreme positions. If idle speed changes after adjustment the pilot screw, readjust the throttle stop screw.



HIGH ALTITUDE ADJUSTMENT

SPECIFICATIONS

	Below 5,000 ft (1,500 m)	Between 3,000 – 8,000 ft (1,000 – 2,500 m)
Main jet	# 130	# 125
Pilot screw opening	Factory preset	3/4 turn in from factory preset

The carburetor must be adjusted for high altitude riding (between 3,000 – 8,000 ft / 1,000 – 2,500 m).

STANDARD SETTING: Below 5,000 ft (1,500 m)

HIGH ALTITUDE SETTING: Between 3,000 – 8,000 ft (1,000 – 2,500 m)

The high altitude carburetor adjustment is performed as follow:

Remove the carburetor (page 5-5) and float chamber.

Replace the standard main jet with the high altitude type.

HIGH ALTITUDE MAIN JET: #125

Assemble and install the carburetor.

Turn-in the pilot screw the specified number of turns from the initial setting.

HIGH ALTITUDE PILOT SCREW OPENING: 3/4 turn in from initial setting

Start the engine and adjust the idle speed at high altitude to ensure proper high altitude operation.

⚠ WARNING

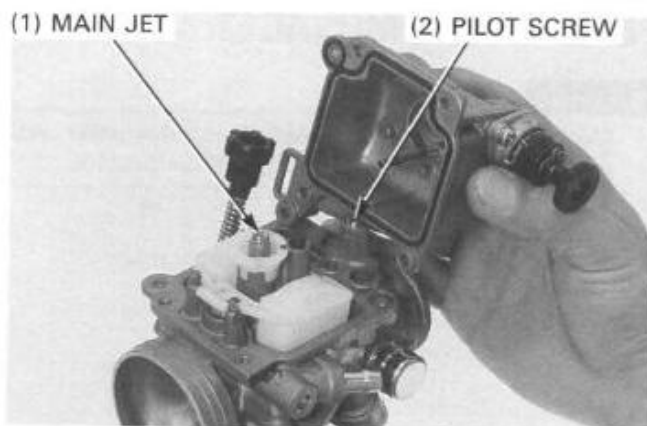
- *If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed are. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

CAUTION

- *Sustained operation below 5,000 feet (1,500 m) with the high altitude settings may cause engine overheating and engine damage. Install the standard main jet and screw out the pilot screw the specified number of turns, when riding below 5,000 feet (1,500 m).*

STANDARD MAIN JET: #130

Pilot screw change for low altitude: 3/4 turn out.



FUEL TANK REMOVAL

⚠ WARNING

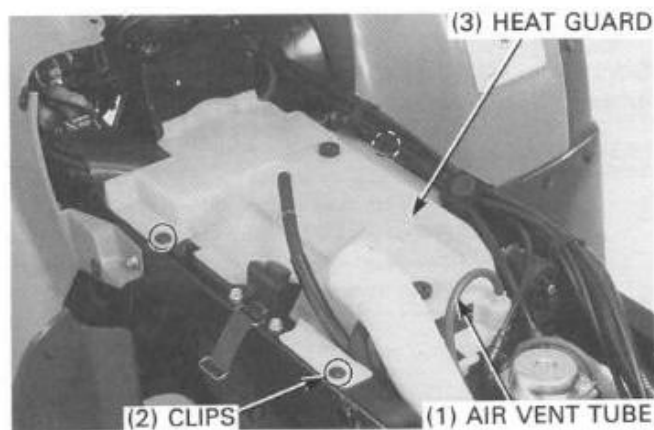
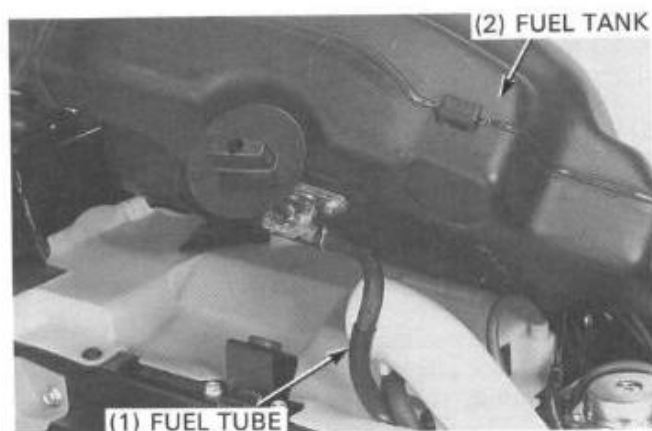
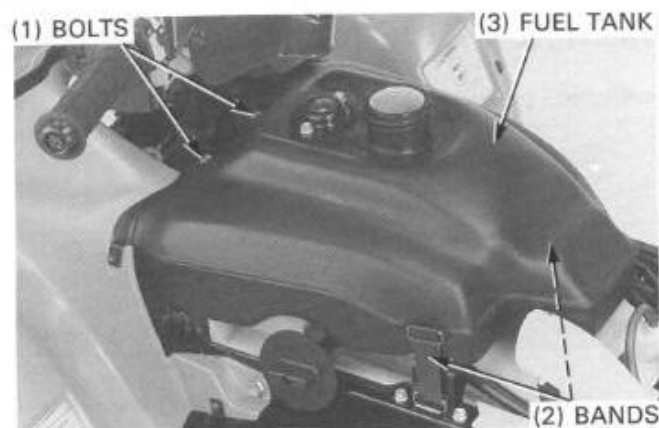
- Gasoline is extremely flammable and explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN.**

Turn the fuel valve off.
Remove the side/fuel tank cover assembly (page 2-3).

Remove the fuel tank mounting bolts.
Remove the fuel tank holder bands.

Slightly pull the fuel tank up, then disconnect the fuel tube from the fuel valve.
Remove the fuel tank.

Disconnect the carburetor air vent tube from the fuel tank heat guard.
Remove the three retaining clips and fuel tank heat guard.

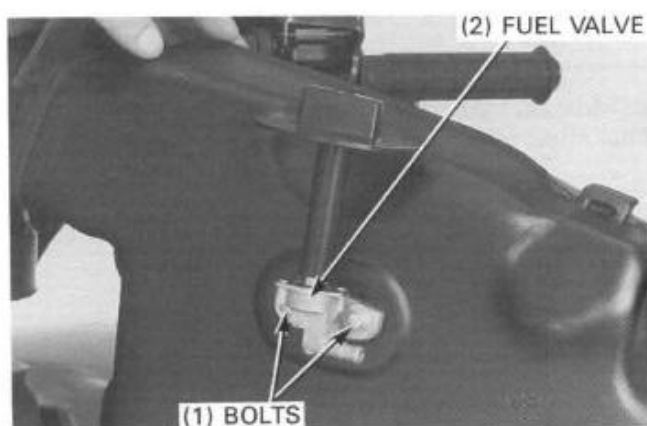


FUEL STRAINER SCREEN

Turn the fuel valve OFF.
Remove the fuel tank.
Remove the fuel valve mounting bolts and fuel valve, and drain the gasoline into an approved gasoline container.

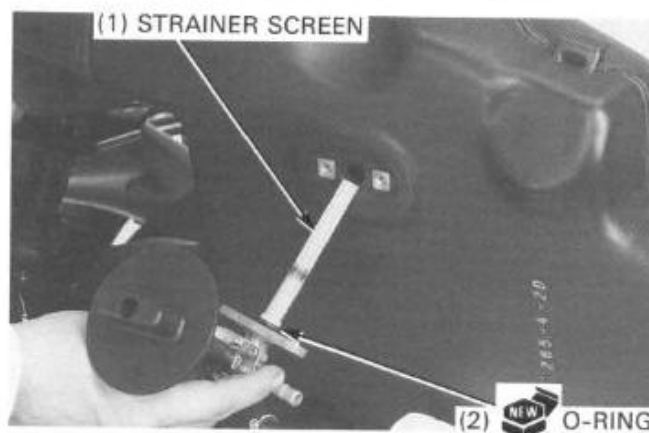
⚠ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. **Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your working area or where gasoline is stored.**
- **Wipe up spilled gasoline at once.**



Remove the O-ring and strainer screen.
Wash the strainer screen in clean non-flammable or high flush point solvent.

Reinstall the screen.
Install a new O-ring into the fuel valve body.

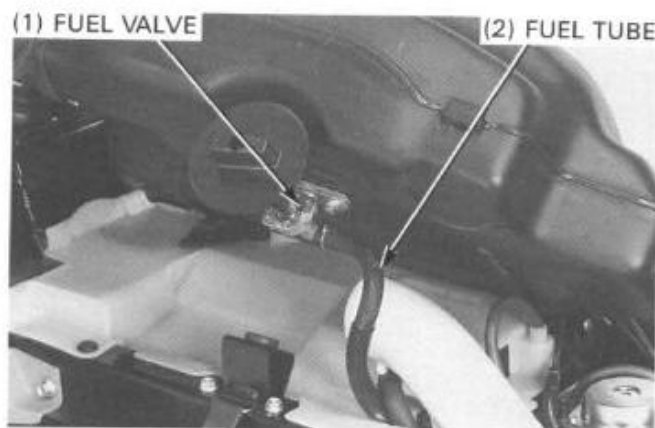


Reinstall the fuel valve and tighten the bolts.

TORQUE: 9 N·m (0.9 kg-m, 6.5 lb-ft)

Connect the fuel tube.

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



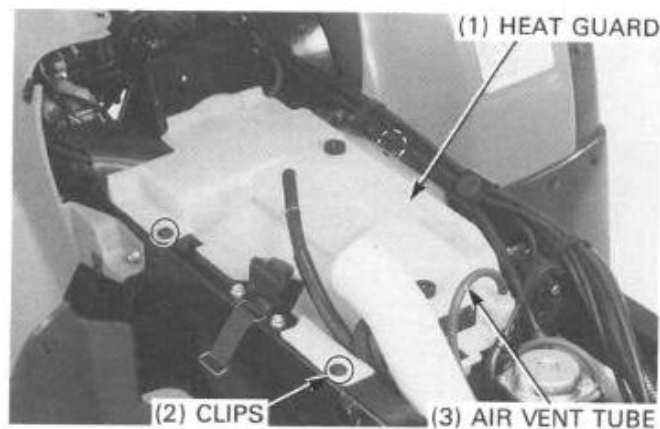
FUEL TANK INSTALLATION

Set the fuel tank heat guard onto the frame, then install the front section of the heat guard into the frame.
Install the retaining clips.

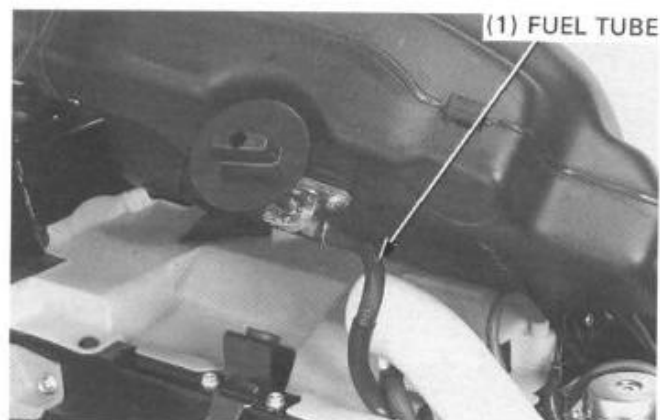
Connect the carburetor air vent tube.

NOTE

- During heat guard installation, route the fuel tube and carburetor air vent tube properly.



Connect the fuel tube to the fuel valve.

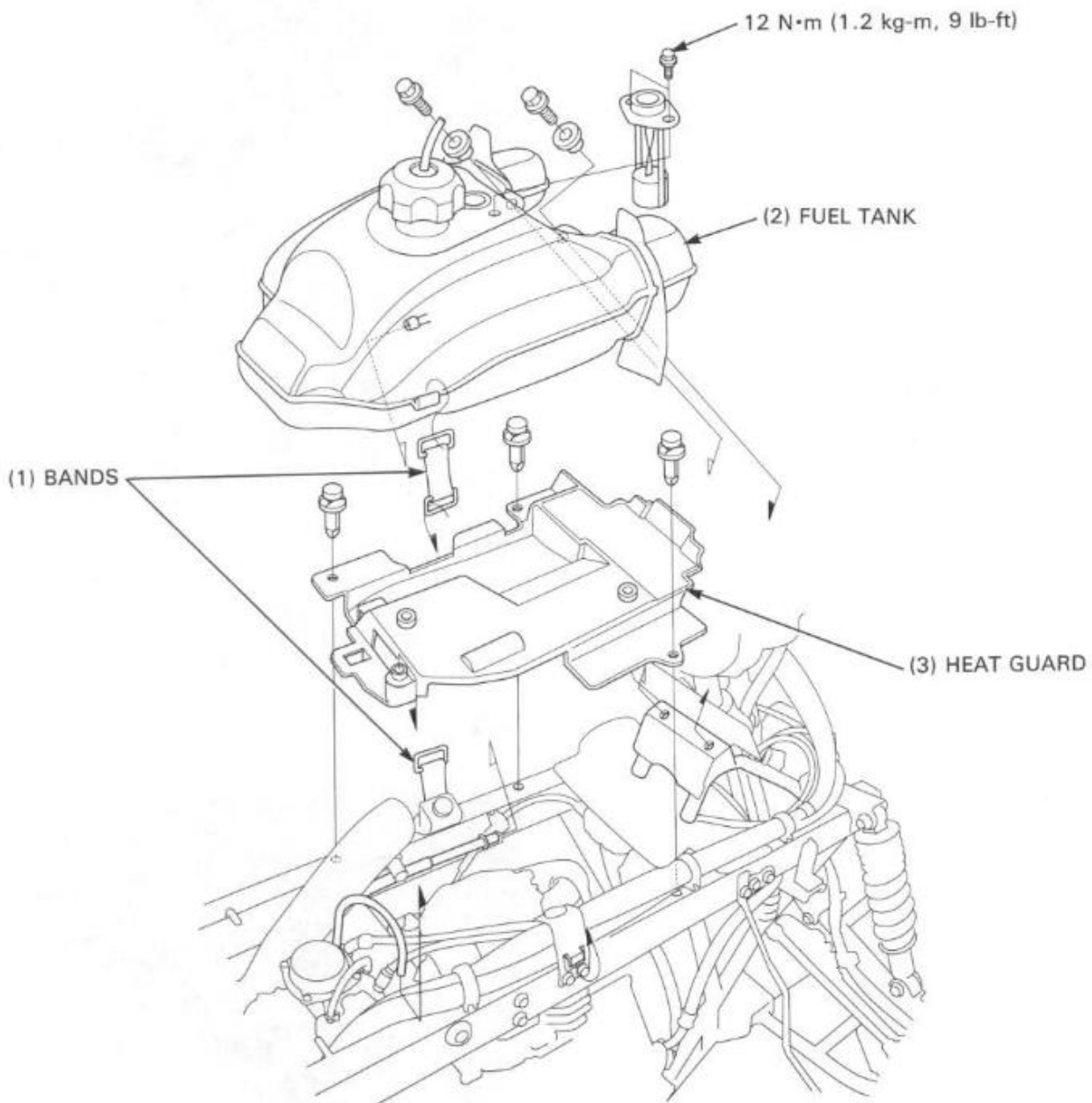
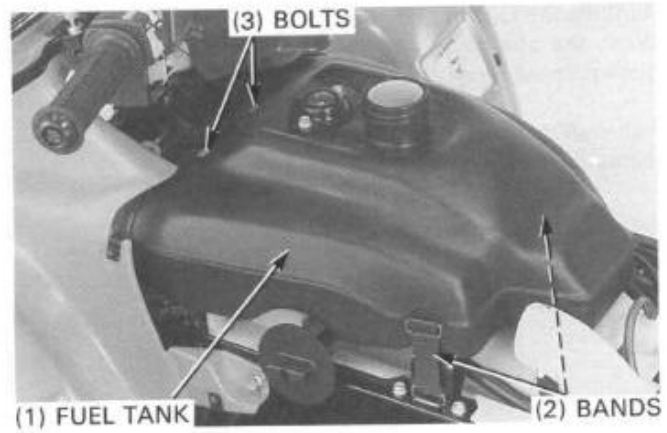


FUEL SYSTEM

Set the fuel tank onto the frame, install and tighten the mounting bolts.
Install the fuel tank holder bands.

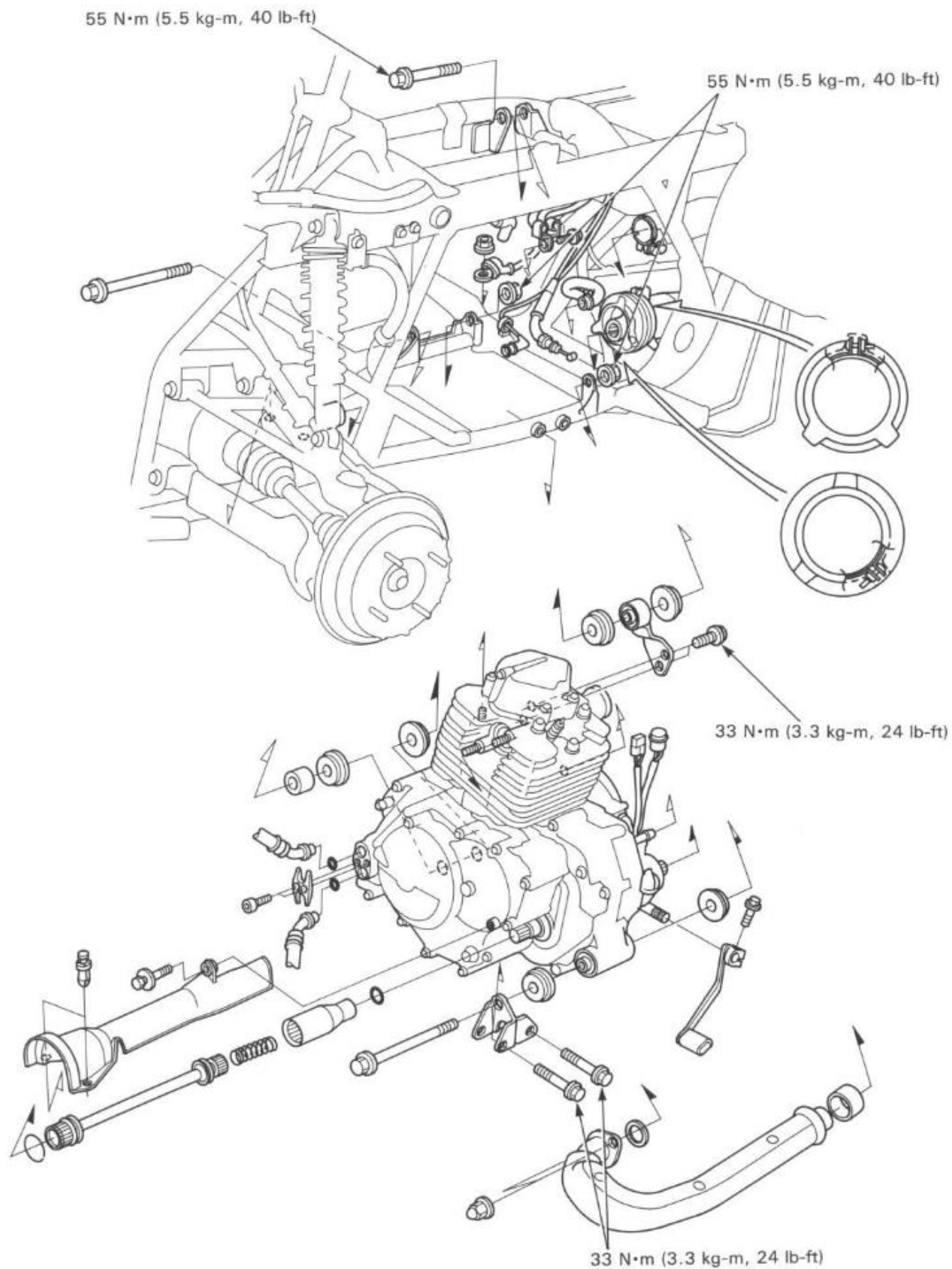
NOTE

- After installation, make sure there are no fuel leaks.



MEMO

ENGINE REMOVAL/INSTALLATION



6.ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

ENGINE REMOVAL

6-1

6-2

ENGINE INSTALLATION

6-4

SERVICE INFORMATION

GENERAL

- The following components require engine removal for service.
 - Crankshaft/balancer (Section 11)
 - Transmission (Section 11)
 - Gearshift linkage (Section 9)
- The following components can be serviced with engine installed in the frame.
 - Cylinder head/valves (Section 7)
 - Camshaft (Section 7)
 - Cylinder/piston (Section 7)
 - Clutch (Section 8)
 - Recoil starter/alternator/starter clutch (Section 10)
 - Carburetor (Section 5)
 - Oil pump (Section 4)

6

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine oil capacity	At draining	2.0 liter (2.10 US qt, 1.76 Imp qt)
	At disassembly	2.7 liter (2.84 US qt, 2.38 Imp qt)
Engine weight		50.4 kg (111.1 lbs)

TORQUE VALUES

Upper engine hanger bolt	55 N•m (5.5 kg-m, 40 lb-ft)
Upper engine hanger plate bolt	33 N•m (3.3 kg-m, 24 lb-ft)
Lower engine mounting bolt (right)	55 N•m (5.5 kg-m, 40 lb-ft)
Lower engine mounting bolt (left)	55 N•m (5.5 kg-m, 40 lb-ft)
Lower engine hanger mounting bolt	33 N•m (3.3 kg-m, 24 lb-ft)

ENGINE REMOVAL

Drain the engine oil (page 3-9).

Drain the front differential oil (page 3-12).

Remove the following:

- Fuel tank and fuel tank heat guard (page 5-18)
- Front fender assembly (page 2-5)
- Rear under mudguard (page 2-9)
- Carburetor (page 5-5)

Disconnect the spark plug cap.

Remove the bolts, collars and right engine side cover.

Remove the nut and starter motor cable.

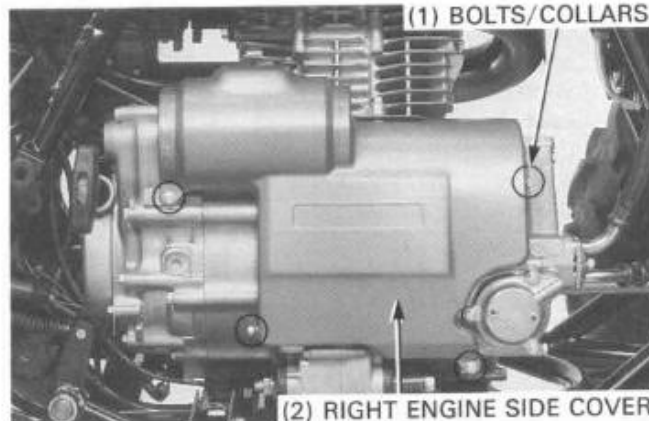
Remove the bolt and ground cable terminals.

Disconnect the alternator, ignition pulse generator and neutral reverse switch connectors.

(1) CARBURETOR (2) SPARK PLUG CAP

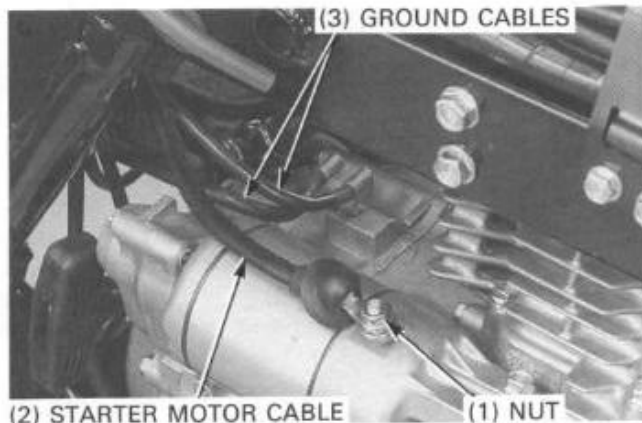


(1) BOLTS/COLLARS



(2) RIGHT ENGINE SIDE COVER

(3) GROUND CABLES



(2) STARTER MOTOR CABLE

(1) NUT

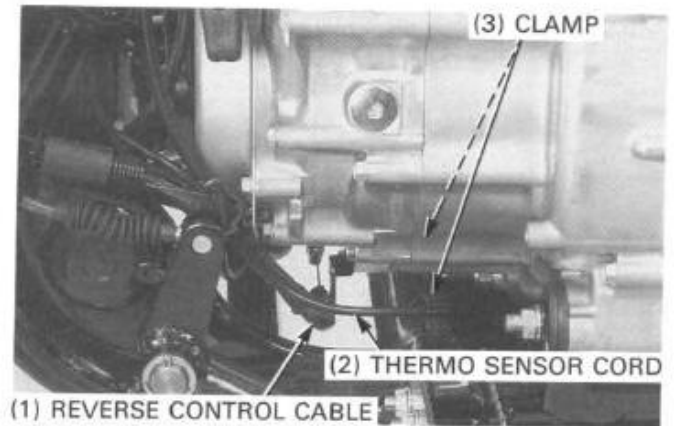
(1) ALTERNATOR/PULSE GENERATOR CONNECTOR



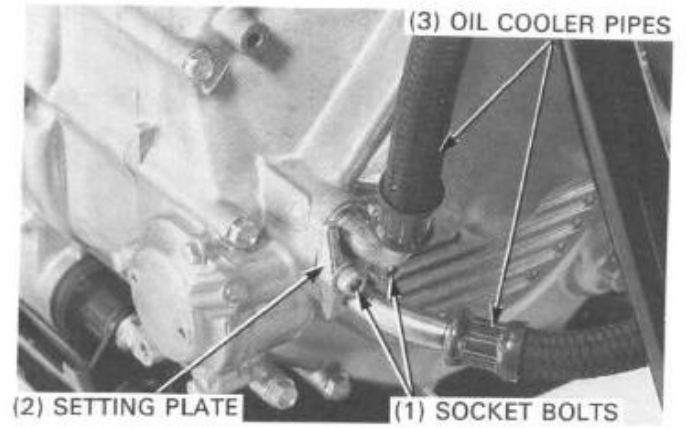
(2) NEUTRAL/REVERSE SWITCH CONNECTOR

Disconnect the reverse control cable end from the lever.

Disconnect the oil thermo sensor connector from the sensor. Release the thermo sensor and engine harness wire clamps. Remove the wire clamp from the recoil starter cover.

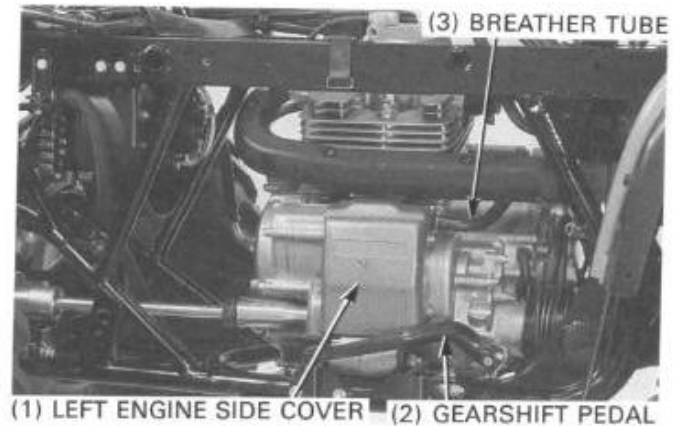


Remove the socket bolts, setting plate and oil cooler pipes.

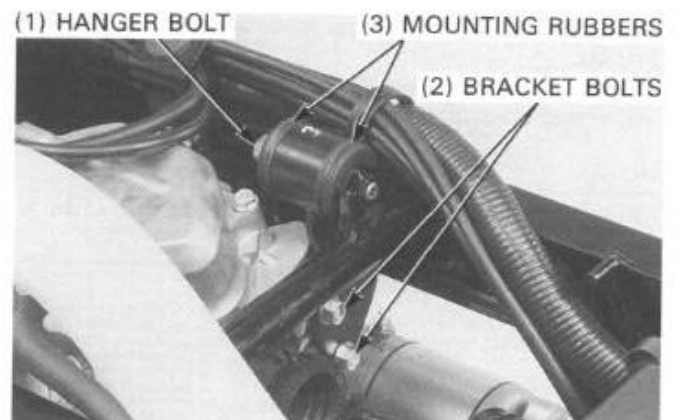


Remove the exhaust pipe (page 2-13). Remove the front differential mounting bolts. Move the front differential forward. Remove the front propeller shaft.

Remove the bolts, collars and left engine side cover. Remove the gearshift pedal. Disconnect the crankcase breather tube. Loosen the swingarm boot band screw.

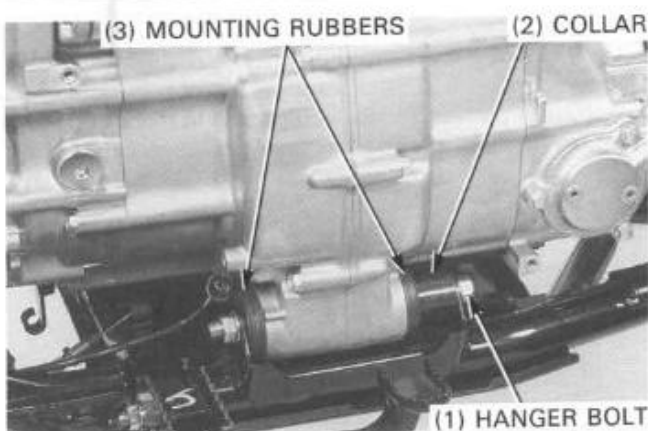


Remove the upper engine hanger bolt. Remove the hanger bracket bolts, upper hanger plate and mounting rubbers.



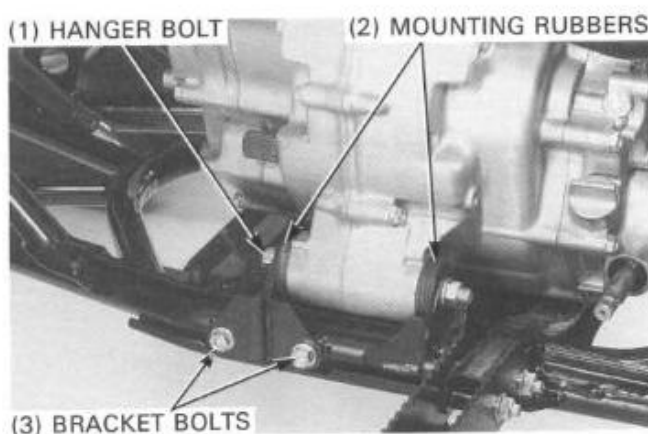
ENGINE REMOVAL/INSTALLATION

Remove the right lower engine hanger bolt/nut, collar and engine mounting rubbers.



Remove the left lower engine hanger bolt/nut, collar and engine mounting rubbers.

Remove the bolts and left lower engine hanger bracket.



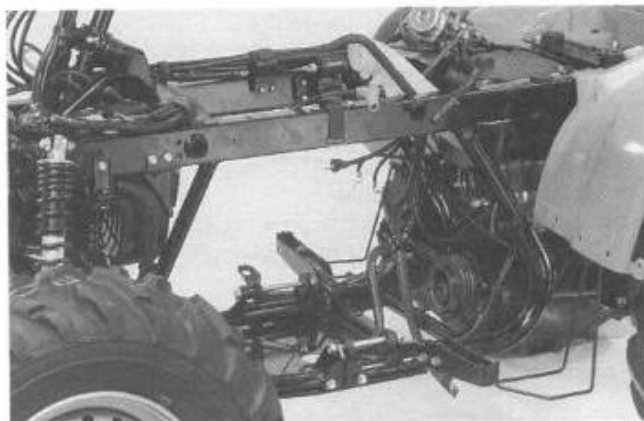
Move the engine forward, then disconnect the yoke joint from the final shaft.
Remove the engine from the left side of the frame.

ENGINE INSTALLATION

Apply molybdenum disulfide grease to the yoke joint splines.

Install the engine from the left side.

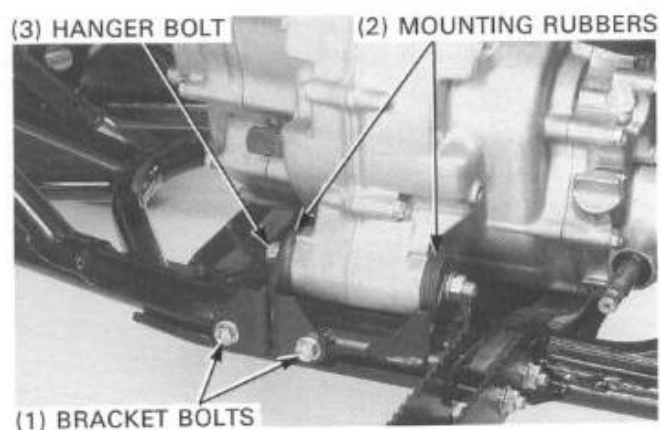
Move the engine rearward and connect the final shaft and yoke joint.



Install the mounting rubbers and lower left engine hanger bracket.

Install the bracket bolts.

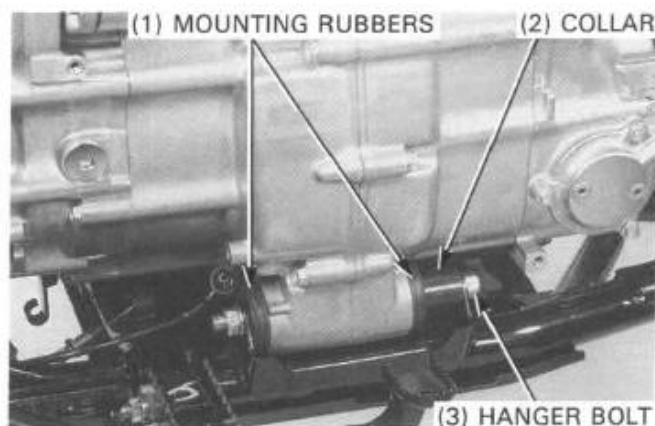
Install the lower left engine hanger bolts and nut.



NOTE

- Install the mounting rubbers with the wide side towards the engine.

Install the lower right engine hanger mounting rubbers, collar and hanger bolt/nut.



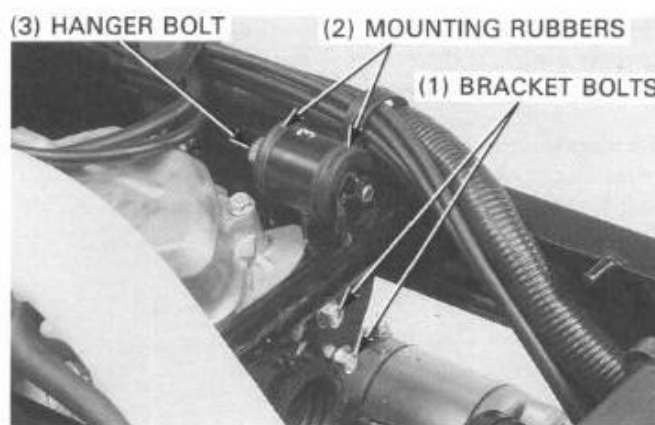
Install the upper engine hanger bracket, bracket bolts, mounting rubbers and hanger bolt.

First tighten the hanger bracket bolts to the specified torque.

TORQUE: 33 N·m (3.3 kg-m, 24 lb-ft)

Tighten the engine hanger bolts to the specified torque.

TORQUE: 55 N·m (5.5 kg-m, 40 lb-ft)

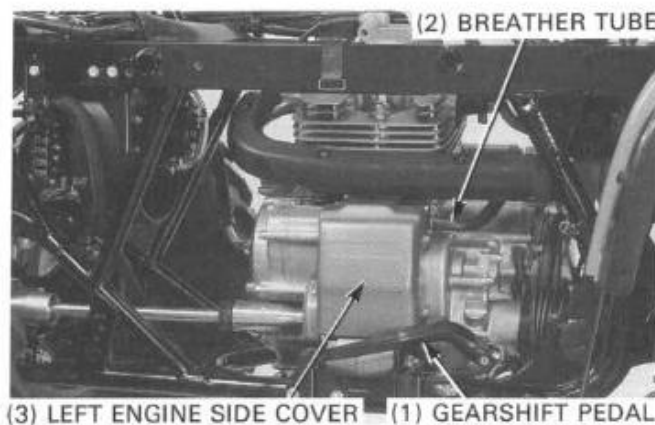


Install the following:

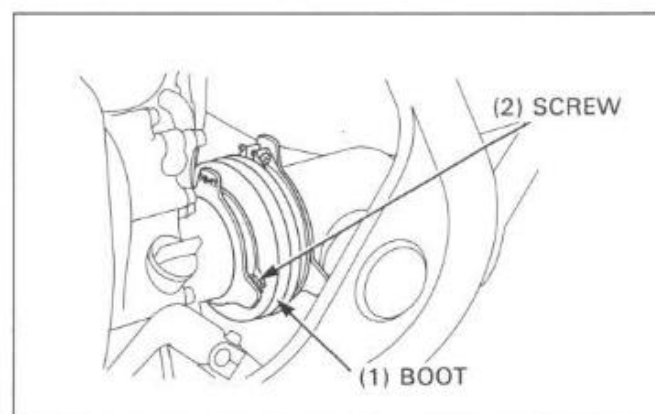
- Gearshift pedal (page 9-7)
- Front propeller shaft (page 15-24)
- Front differential (page 15-26)
- Exhaust pipe (page 2-14).

Route the crankcase breather tube properly (page 1-23), and connect to the engine.

Install the left engine side cover.

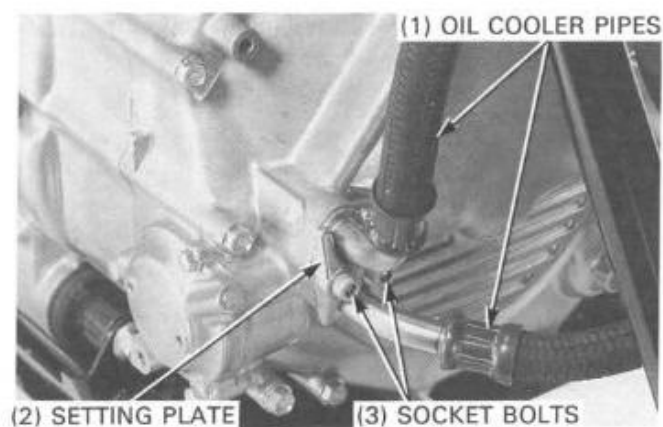


Set the swingarm boot on the rear crankcase cover properly and tighten the screw.



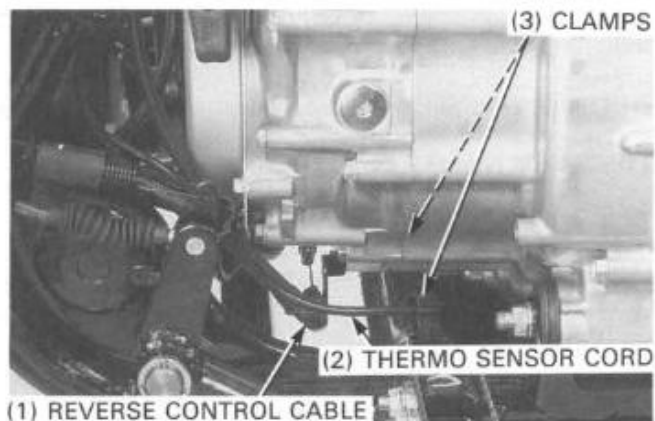
ENGINE REMOVAL/INSTALLATION

Connect the oil cooler pipes using new O-rings.
Install the setting plate and tighten the socket bolts.

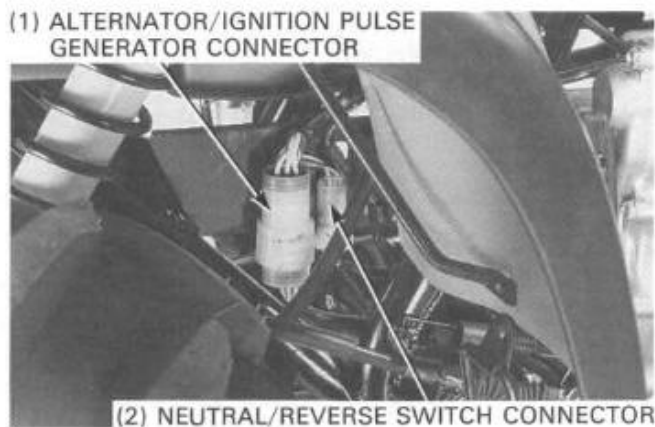


Route the alternator, ignition pulse generator, neutral/reverse switch and oil thermo sensor wire properly (page 1-23) and clamp them securely.

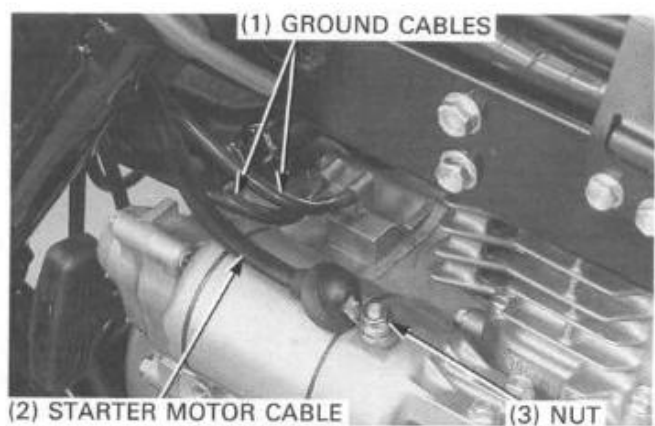
Connect the reverse control cable end to the reverse selector lever and hook the cable to the cable guide.
Connect the thermo sensor wire connector.



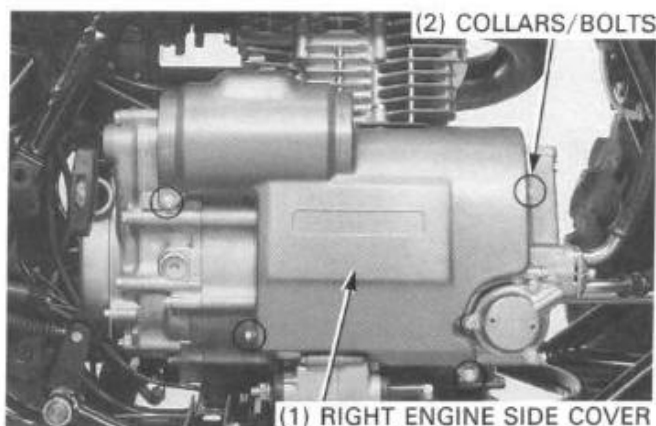
Connect the alternator, ignition pulse generator and neutral/reverse switch connectors.



Connect the engine ground cable terminals and tighten the bolts.
Connect the starter motor cable and tighten the nuts.



Install the right engine side cover and tighten the bolts.



Install the spark plug cap.

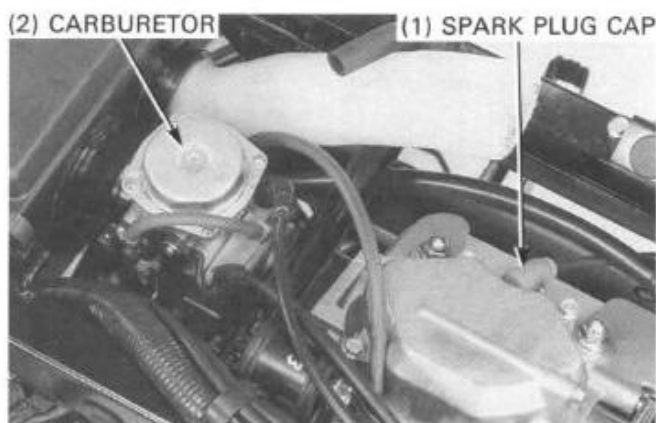
Install the carburetor (page 5-14).

Install the removed parts in the reverse order of removal.

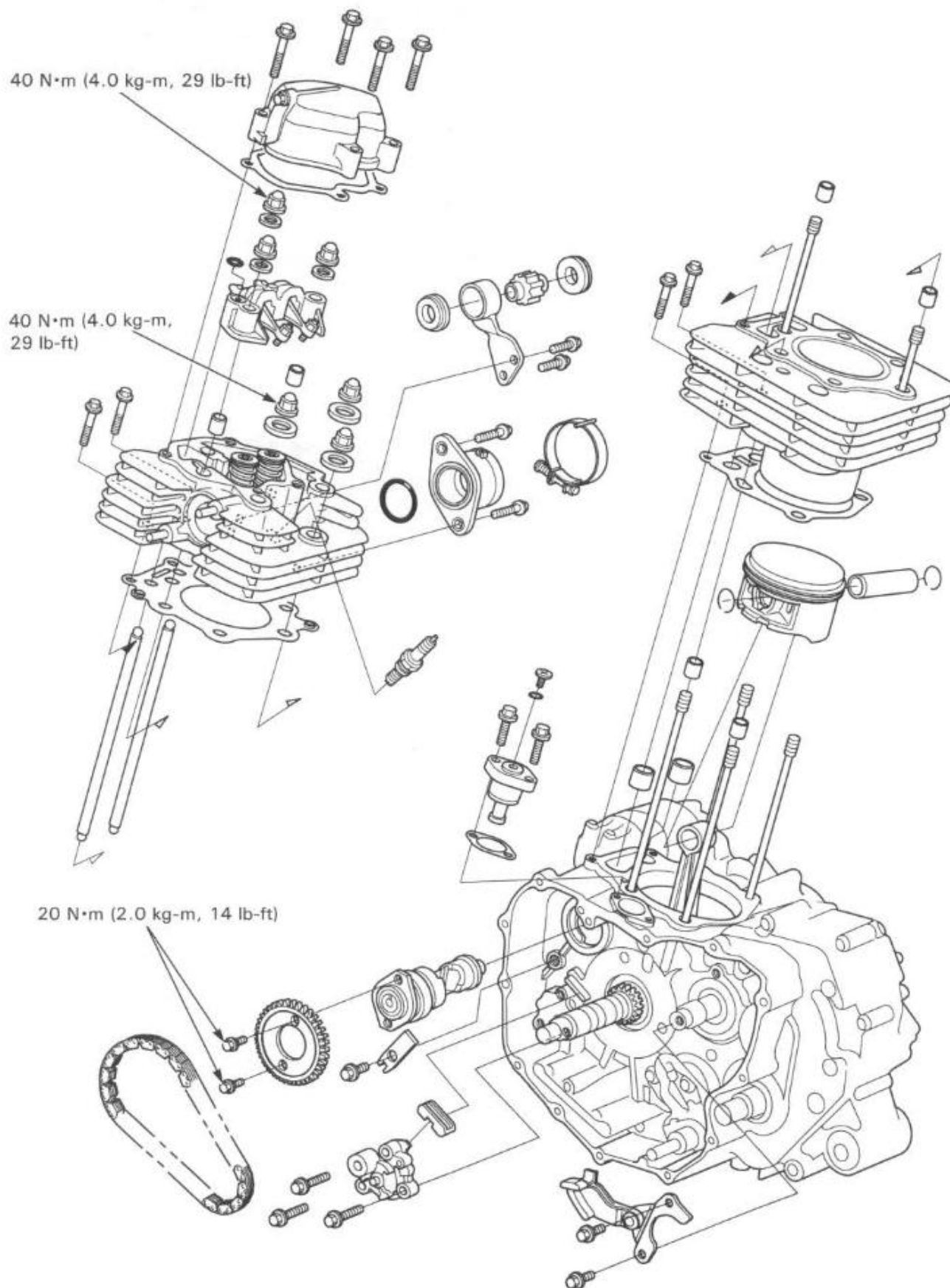
Fill the crankcase with recommended engine oil (page 3-9).
Fill the front differential with recommended gear oil (page 3-13).

Perform the following inspection and adjustment:

- Throttle operation (page 3-4)
- Reverse selector cable adjustment (page 3-16)



CYLINDER HEAD/CYLINDER/PISTON



7.CYLINDER HEAD/CYLINDER/PISTON

SERVICE INFORMATION	7-1	CYLINDER HEAD ASSEMBLY	7-12
TROUBLESHOOTING	7-3	CYLINDER HEAD INSTILLATION	7-13
CYLINDER COMPRESSION TEST	7-4	CYLINDER/PISTON REMOVAL	7-15
CYLINDER HEAD REMOVAL	7-4	CYLINDER/PISTON INSPECTION	7-16
CYLINDER HEAD DISASSEMBLY	7-7	CYLINDER/PISTON INSTALLATION	7-18
CYLINDER HEAD INSPECTION	7-7	CAMSHAFT/CAM CHAIN TENSIONER	7-20

SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, cylinder and piston. These service can be done with the engine installed in the frame.
- Camshaft servicing require front crankcase cover removal (section 8).
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Rocker arm lubricating oil is fed through oil passages in the cylinder head and head cover. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surface when removing the cylinder cover, cylinder head and cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Cylinder compression	Decompressor effected		539 – 834 kPa (5.5 – 8.5 kg/cm ² , 78 – 121 psi) at 450 rpm	—
	Decompressor not effected		1,226 – 1,442 kPa (12.5 – 14.5 kg/cm ² , 178 – 206 psi) at 450 rpm	—
Cylinder head warpage			—	0.10 (0.004)
Valve and valve guide	Valve clearance	IN	0.15 (0.006)	—
		EX	0.15 (0.006)	—
	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)	5.45 (0.215)
		EX	5.455 – 5.470 (0.2148 – 0.2154)	5.43 (0.214)
	Valve guide I.D.	IN	5.500 – 5.512 (0.2165 – 0.2170)	5.525 (0.2177)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.525 (0.2177)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.12 (0.005)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.14 (0.006)
Valve seat width		IN/EX	1.2 (0.05)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	36.31 (1.430)	35.2 (1.39)
	Outer	IN/EX	41.34 (1.628)	40.0 (1.57)
Rocker arm	Rocker arm I.D.	IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
	Rocker arm shaft O.D.	IN/EX	11.964 – 11.984 (0.4710 – 0.4718)	11.92 (0.469)
	Rocker arm-to-shaft clearance		0.016 – 0.054 (0.0006 – 0.0021)	0.08 (0.003)
Camshaft and cam follower	Cam lobe height	IN	36.423 – 36.583 (1.4340 – 1.4402)	36.25 (1.427)
		EX	6.2670 – 6.4270 (1.4278 – 1.4341)	36.10 (1.421)
	Cam follower O.D.	IN/EX	22.467 – 22.482 (0.8845 – 0.8851)	22.459 (0.8842)
	Cam follower bore I.D.	IN/EX	22.510 – 22.526 (0.8862 – 0.8868)	22.54 (0.887)
	Cam follower-to-bore clearance		0.028 – 0.059 (0.0011 – 0.0023)	0.07 (0.003)

CYLINDER HEAD/CYLINDER/PISTON

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Cylinder	I.D.		86.000 – 86.010 (3.3858 – 3.3862)	86.10 (3.390)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.10 (0.004)
Piston, piston ring	Piston mark direction		"IN" mark toward the intake side	—
	Piston O.D.		85.974 – 85.985 (3.3848 – 3.3852)	85.90 (3.382)
	Piston O.D. measurement point		6 – 26 mm from bottom of skirt	—
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.08 (0.751)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.96 (0.746)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.12 (0.039)
	Piston ring-to-ring groove clearance	Top	0.03 – 0.06 (0.001 – 0.002)	0.09 (0.004)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.09 (0.004)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.5 (0.02)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	—
Cylinder-to-piston clearance			0.015 – 0.045 (0.0006 – 0.0018)	0.10 (0.004)
Connecting rod small end I.D.			19.020 – 19.041 (0.7488 – 0.7490)	19.07 (0.751)
Connecting rod-to-piston pin clearance			0.020 – 0.047 (0.0008 – 0.0019)	0.10 (0.004)

TORQUE VALUES

Cylinder head flange cap nut	40 N•m (4.0 kg-m, 29 lb-ft)	Apply oil to the threads
Rocker arm holder flange cap nut	40 N•m (4.0 kg-m, 29 lb-ft)	Apply oil to the threads
Rocker arm shaft flange bolt	7 N•m (0.7 kg-m, 5.1 lb-ft)	
Cam chain tensioner lifter sealing screw	4 N•m (0.40 kg-m, 2.9 lb-ft)	
Cam chain tensioner mounting bolt	12 N•m (1.2 kg-m, 9 lb-ft)	Apply a locking agent
Cam sprocket flange dowel bolt	20 N•m (2.0 kg-m, 14 lb-ft)	Apply a locking agent
Camshaft bearing retainer bolt	27 N•m (2.7 kg-m, 20 lb-ft)	Apply a locking agent
Upper engine hanger bolt	55 N•m (5.5 kg-m, 40 lb-ft)	
Upper engine hanger bracket bolt	33 N•m (3.3 kg-m, 24 lb-ft)	

TOOLS

Valve guide driver, 5.5 mm	07742 – 0010100
Valve guide reamer, 5.5 mm	07984 – 2000001 or 07984 – 200000D (U.S.A. only)
Valve spring compressor	07757 – 0010000
Valve seat cutters	– these are commercially available in U.S.A.
Seat cutter, 35 mm (45° IN)	07780 – 0010400
Seat cutter, 29 mm (45° EX)	07780 – 0010300
Flat cutter, 35 mm (32° EX)	07780 – 0012300
Flat cutter, 30 mm (32° IN)	07780 – 0012200
Interior cutter, 37.5 mm (60° IN)	07780 – 0014100
Interior cutter, 30 mm (60° EX)	07780 – 0014000
Cutter holder, 5.5 mm	07781 – 0010101

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring.

Low compression

- Valves:
 - Incorrect valve adjustment
 - Burned or bent valve
 - Incorrect valve timing
 - Weak valve spring
- Cylinder head:
 - Leaking or damaged head gasket
 - Warped or cracked cylinder head
- Cylinder/piston
 - Worn cylinder or piston ring

High compression

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

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Excessive noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Worn or damaged push rod and/or cam follower
- Worn rocker arm and/or shaft

Rough idle

- Low cylinder compression
- Intake air leak

Overheating

- Excessive carbon build-up on the piston head or on combustion chamber

Knocking or abnormal noise

- Worn piston and cylinder
- Excessive carbon build-up

CYLINDER COMPRESSION TEST

⚠ WARNING

- *If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

Warm up the engine.

Stop the engine and remove the spark plug.

Install a compression gauge.

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

Compression pressure:

539 – 834 kPa (5.5 – 8.5 kg/cm², 78 – 121 psi) at 450 rpm

If compression is below than the standard, loosen the exhaust valve lock nut and turn the adjusting screw 1-1/2 turn and recheck the compression.

Compression pressure:

1,226 – 1,442 kPa (12.5 – 14.5 kg/cm², 178 – 206 psi)
at 450 rpm

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head



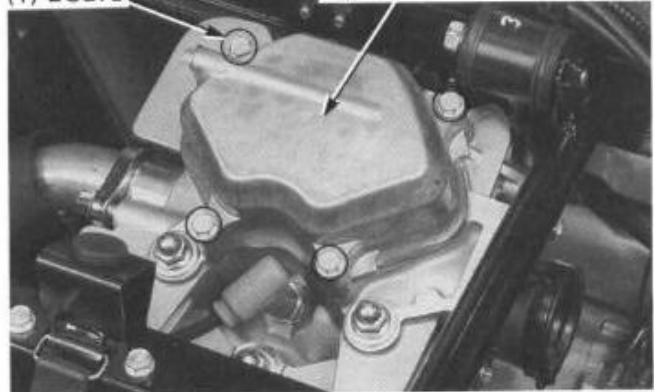
CYLINDER HEAD REMOVAL

CYLINDER HEAD COVER REMOVAL

Remove the fuel tank and fuel tank heat guard (page 5-18).

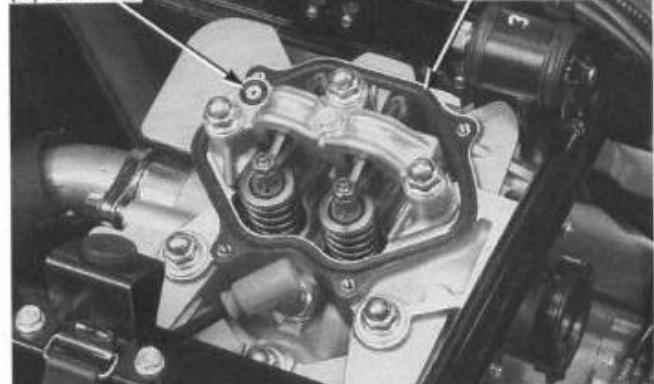
Remove the bolts and cylinder head cover.

(1) BOLTS (2) CYLINDER HEAD COVER



Remove the O-ring and cylinder head cover gasket.

(1) O-RING (2) GASKET



CYLINDER HEAD REMOVAL

Remove the timing hole cap.

Turn the crankshaft with the recoil starter and align the "T" mark on the flywheel with the index mark on the rear crankcase cover.

Make sure the piston at TDC of the compression stroke by moving the rocker arms. If the rocker arms are tight, turn the crankshaft one full turn and realign the "T" mark with the index mark.

Remove the following:

- Exhaust pipe (page 2-13)
- Carburetor (page 5-5)
- Spark plug cap

Remove the bolts and carburetor insulator.

Remove the upper engine hanger bolts, bracket bolts and engine hanger.

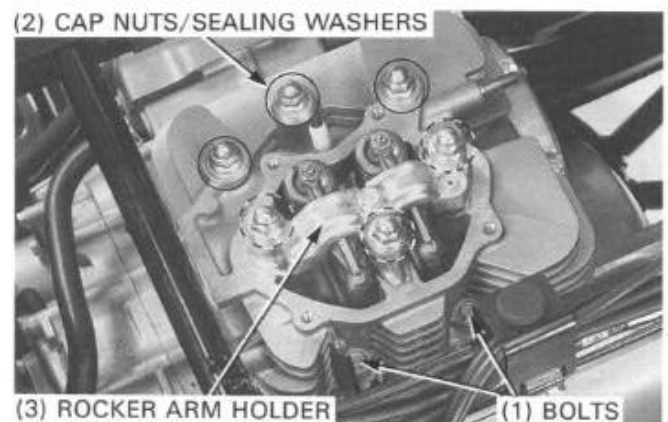
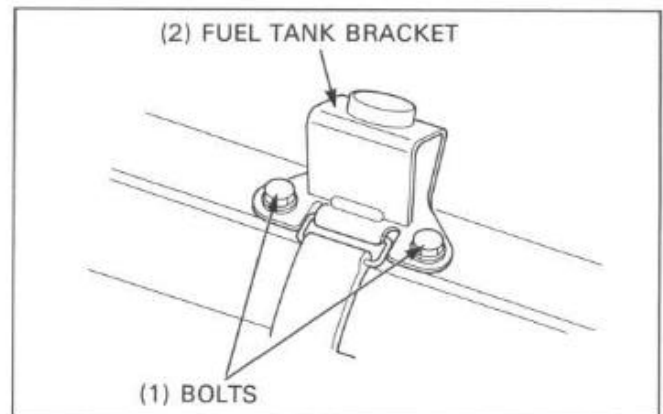
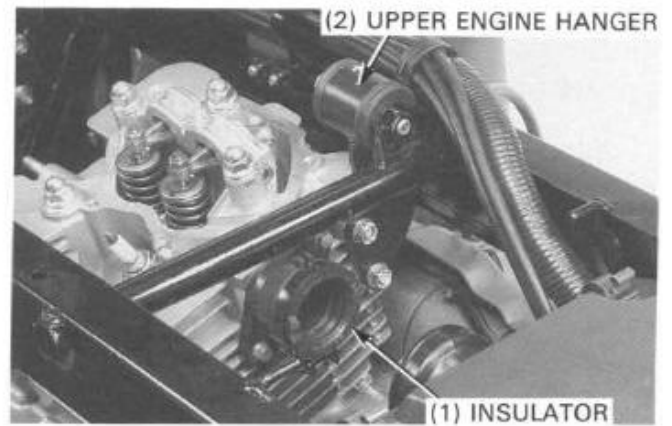
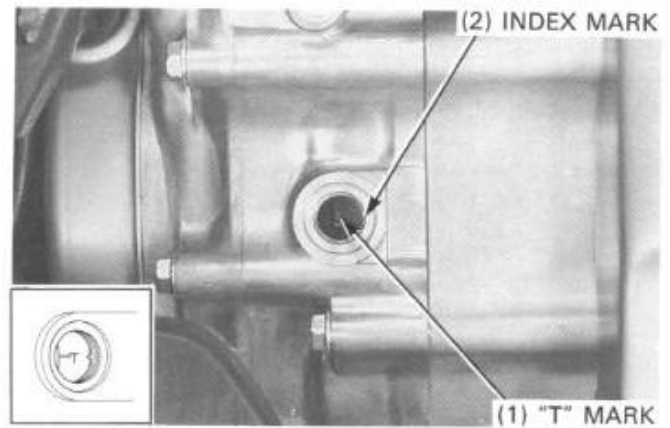
Remove the left fuel tank bracket mounting bolts and bracket.

Remove the cylinder head mounting bolts.

Loosen the six cylinder head cap nuts in a crisscross pattern in 2 or 3 steps.

Remove the washers.

Remove the rocker arm holder assembly.



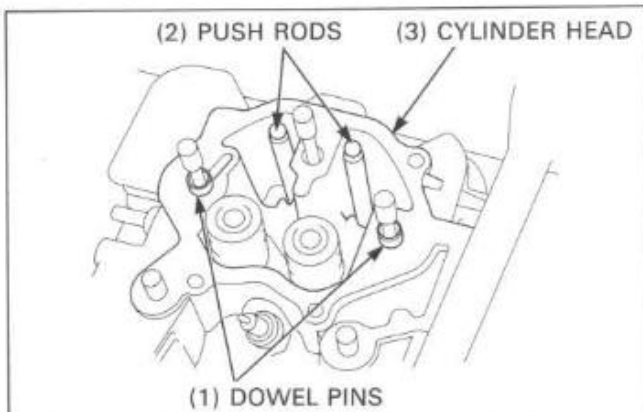
CYLINDER HEAD/CYLINDER/PISTON

Remove the dowel pins.

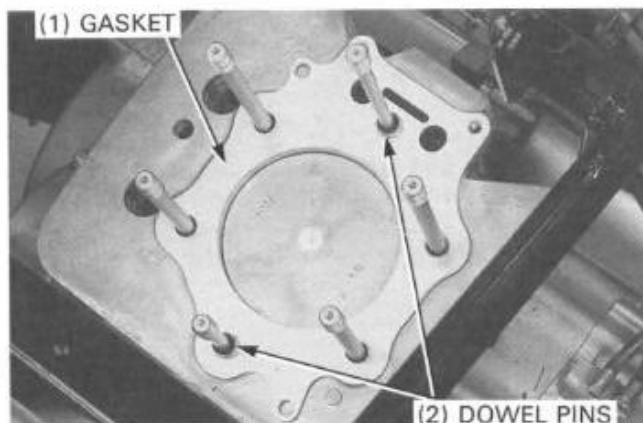
Mark the push rods so they can be reinstalled in their original position.

Remove the push rods.

Remove the cylinder head.



Remove the gasket and dowel pins.

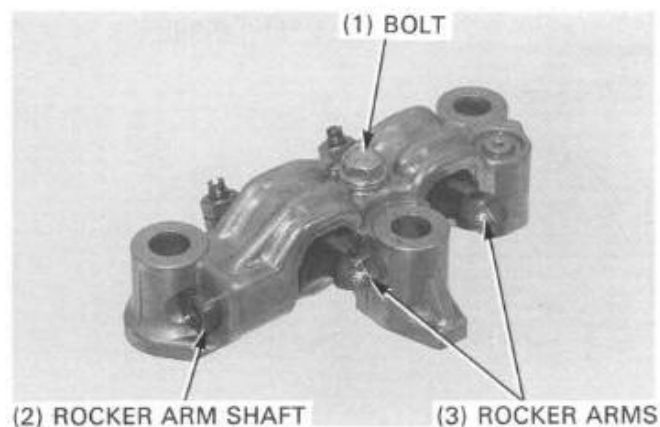


ROCKER ARM HOLDER DISASSEMBLY

Remove the rocker arm shaft retaining bolt.

Mark the rocker arms so they can be reinstalled in their original positions.

Remove the rocker arm shaft and rocker arms.



ROCKER ARM HOLDER INSPECTION

Inspect the rocker arms and shaft for wear or damage.

Measure the I.D. of each rocker arm.

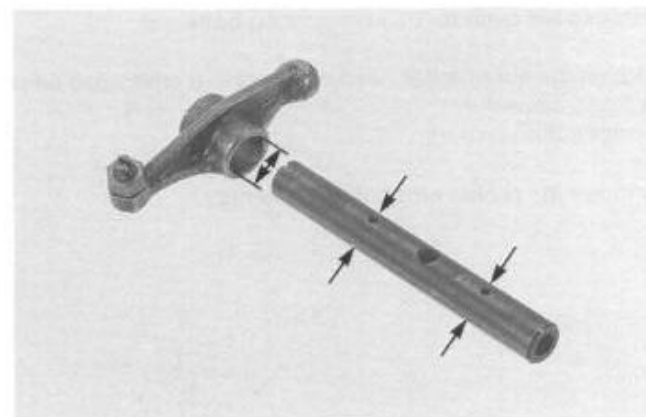
SERVICE LIMIT: 12.05 mm (0.474 in)

Measure the O.D. of rocker arm shaft.

SERVICE LIMIT: 11.92 mm (0.469 in)

Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.08 mm (0.003 in)



CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs and valves using the special tool as shown.

TOOL:

Valve spring compressor

07757 - 0010000

CAUTION

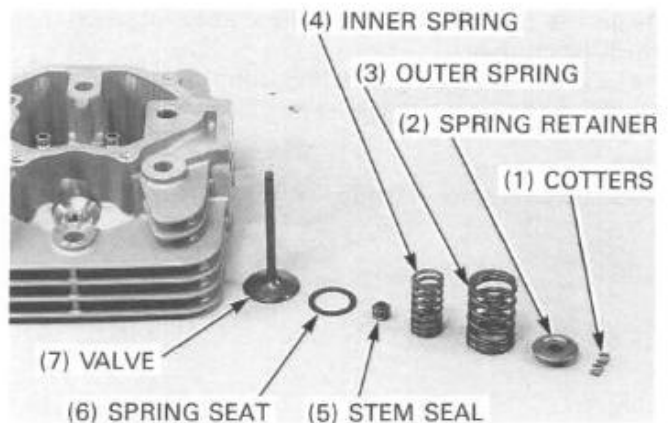
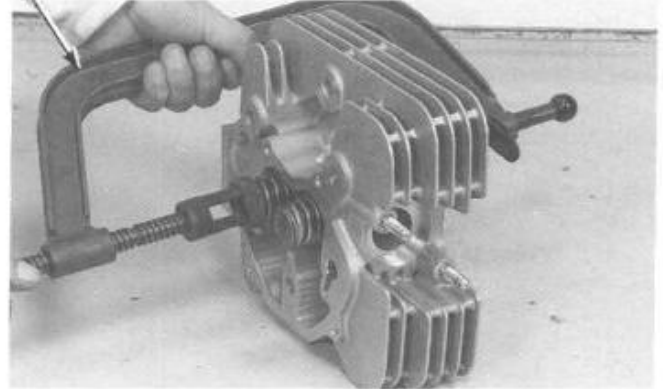
- To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

NOTE

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

Remove the valve stem seals and valve spring seats.

(1) VALVE SPRING COMPRESSOR



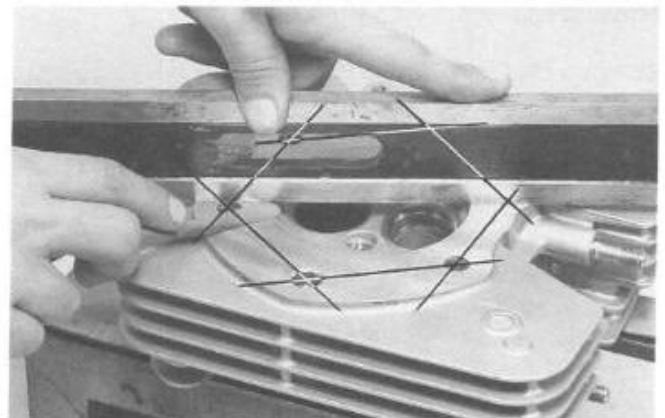
CYLINDER HEAD INSPECTION

CYLINDER HEAD

Remove carbon deposits from the combustion chamber. Check the spark plug hole and valve areas for cracks.

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

SERVICE LIMIT: 0.10 mm (0.004 in)



VALVE SPRING

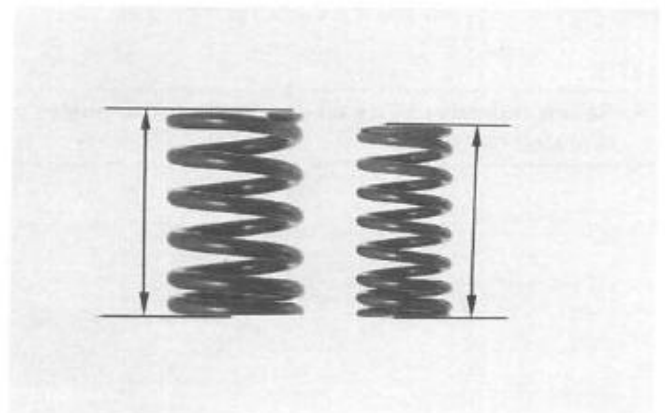
Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:

Inner: 35.2 mm (1.39 in)

Outer: 40.0 mm (1.57 in)

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



CYLINDER HEAD/CYLINDER/PISTON

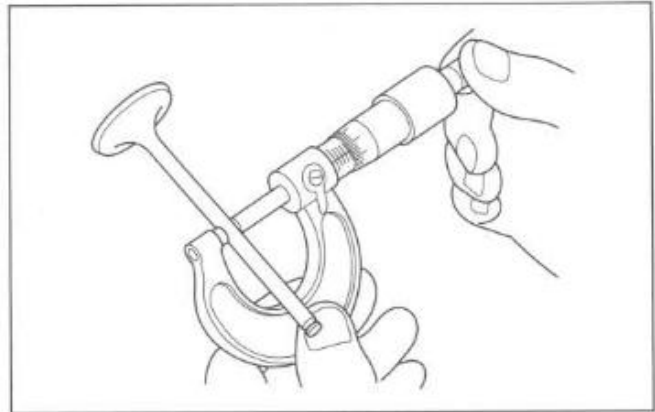
VALVE/VALVE GUIDE

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

SERVICE LIMITS:

IN: 5.45 mm (0.215 in)

EX: 5.43 mm (0.214 in)

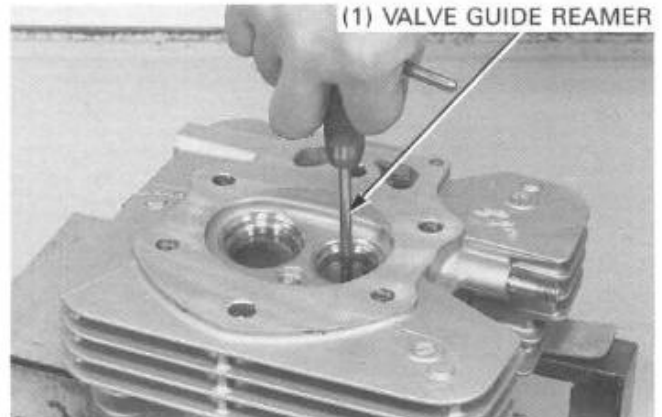


Ream the guides to remove any carbon deposits before checking clearances.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 5.5 mm

07984 - 2000001 or
07984 - 200000D
(U.S.A. only)



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 5.525 mm (0.2177 in)

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

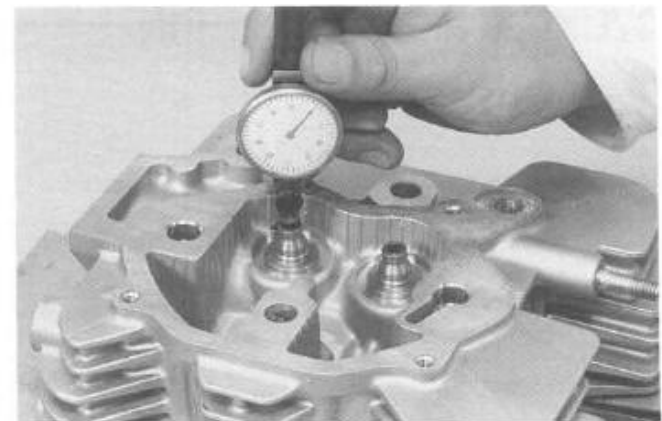
SERVICE LIMITS:

IN: 0.12 mm (0.005 in)

EX: 0.14 mm (0.006 in)

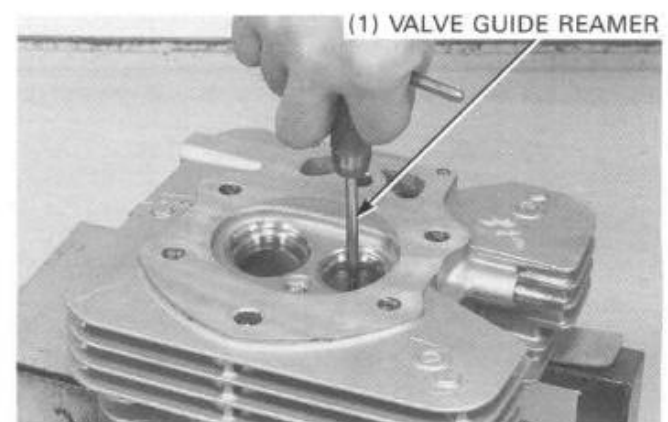
If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.

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



NOTE

- Reface the valve seats whenever the valve guides are replaced (page 7-9).



VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 100 – 150°C (212 – 300°F) with a hot plate or oven.

⚠ WARNING

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

CAUTION

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

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

TOOL:

Valve guide driver, 5.5 mm 07742 – 0010100

Replace a new O-ring on the new valve guide.
Drive in the guide from the top of the head.

TOOL:

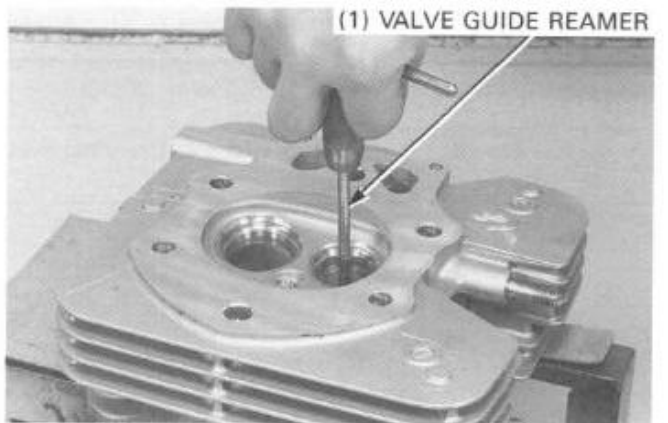
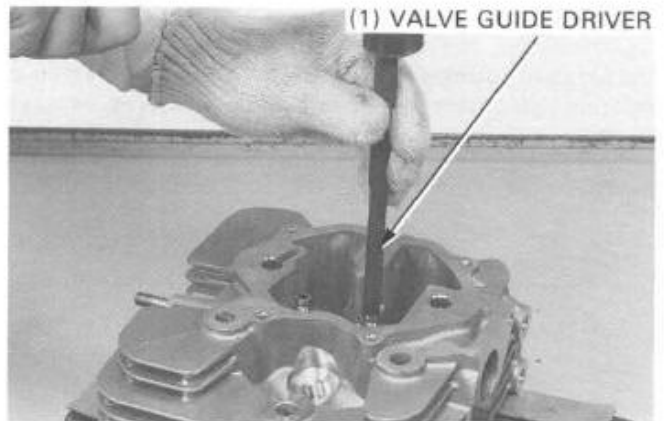
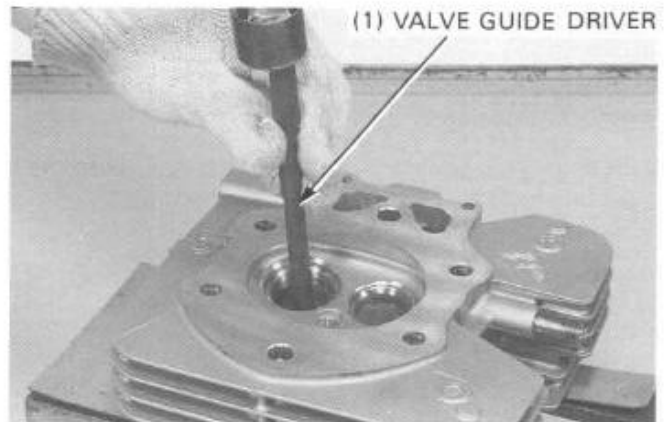
Valve guide driver, 5.5 mm 07742 – 0010100

Inspect the valve guide for damage.
Ream the new valve guide after installation.
Insert the reamer from the combustion chamber side of the head and also always rotate the reamer clockwise.

TOOL:

Valve guide reamer, 5.5 mm 07984 – 2000001 or
07984 – 200000D
(U.S.A. only)

Clean the cylinder head thoroughly to remove any metal particles.
Reface the valve seat (see below).

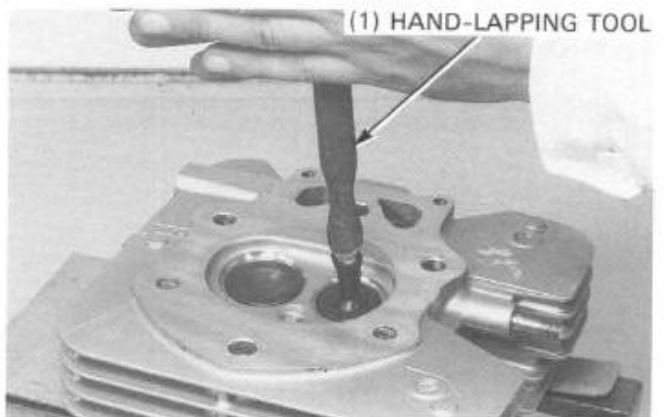


VALVE SEAT INSPECTION/REFACING

Clean the intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seats.
Lap the valves and seats using a rubber hose or other hand-lapping tool.
Remove and inspect the valves.

CAUTION

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



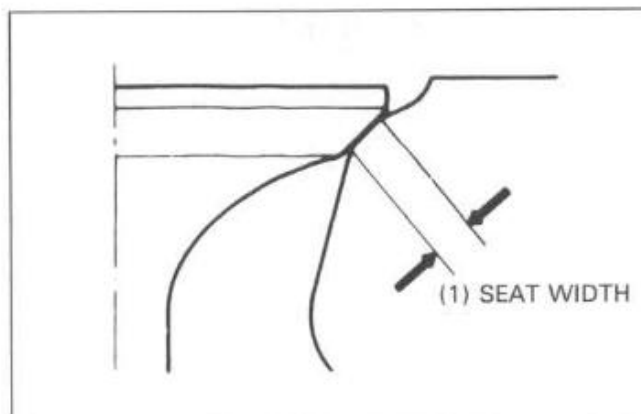
CYLINDER HEAD/CYLINDER/PISTON

Inspect the width of each valve seat.

STANDARD: 1.2 mm (0.05 in)

SERVICE LIMIT: 1.5 mm (0.06 in)

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

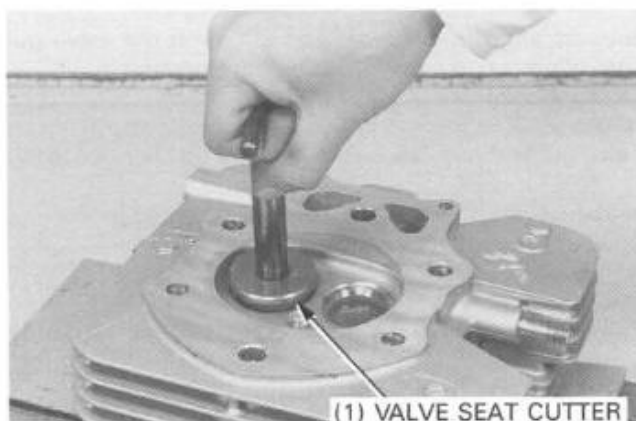


VALVE SEAT REFACING

Valve seat cutters/a grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.

NOTE

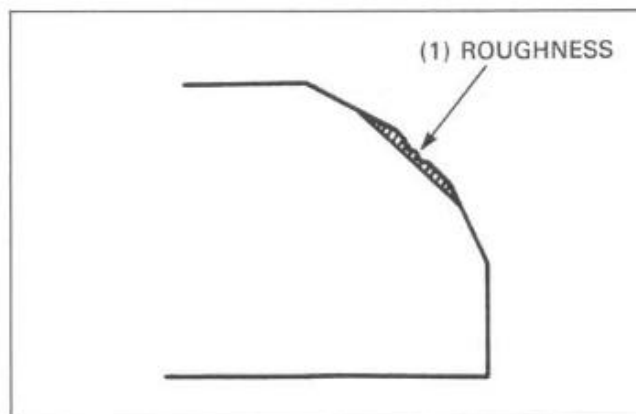
- Follow the refacing manufacturer's operating instructions.



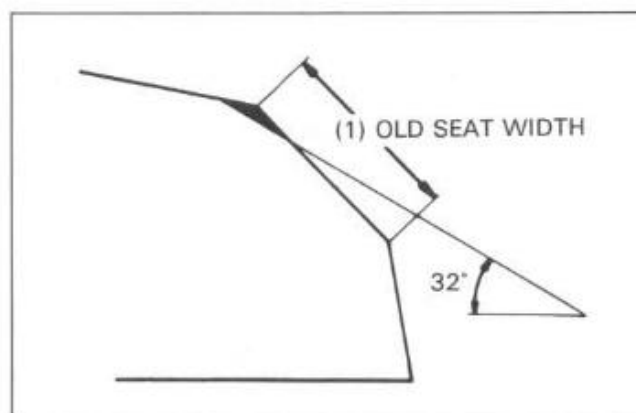
Use a 45 degrees cutter to remove any roughness or irregularities from the seat.

NOTE

- Reface the seat with a 45 degrees cutter whenever a valve guide is replaced.

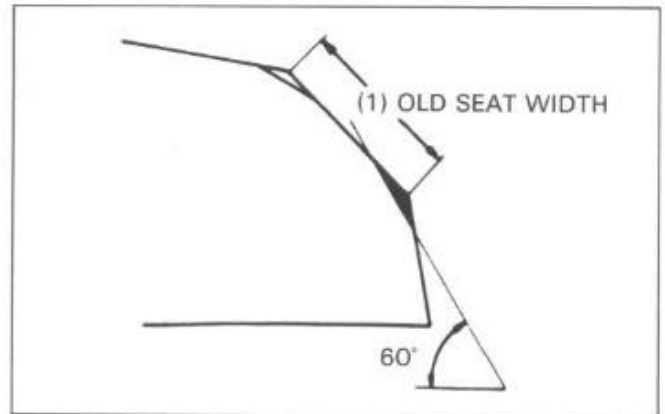


Use a 32 degrees cutter to remove the top 1/4 of the existing valve seat material.



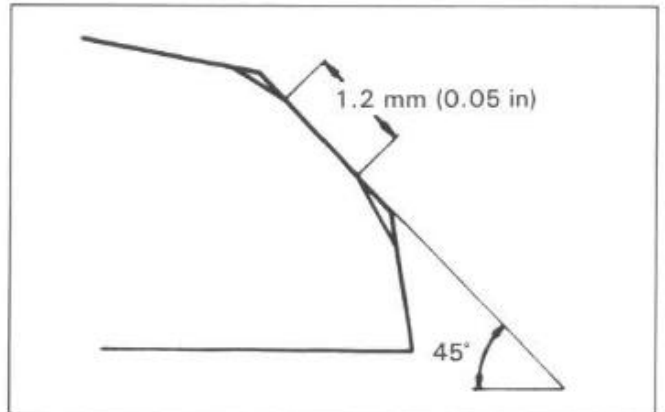
Use a 60 degrees cutter to remove the bottom 1/4 of the old seat.

Remove the cutter and inspect the area you have refaced.



Install a 45 degrees finish cutter and cut the seat to the proper width.

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

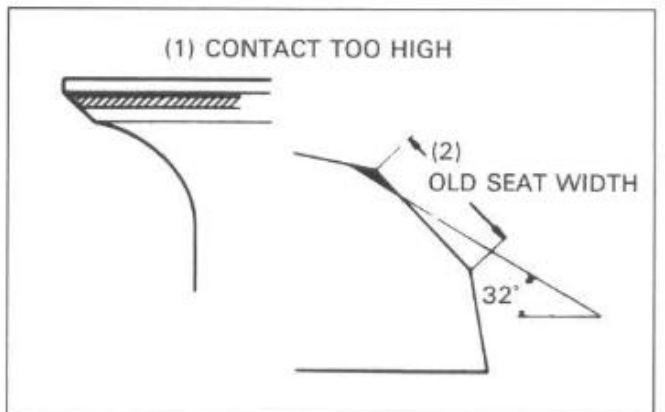


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

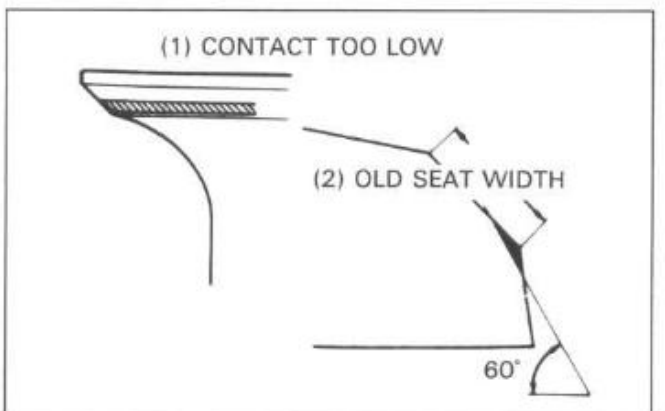
NOTE

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

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



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



CYLINDER HEAD/CYLINDER/PISTON

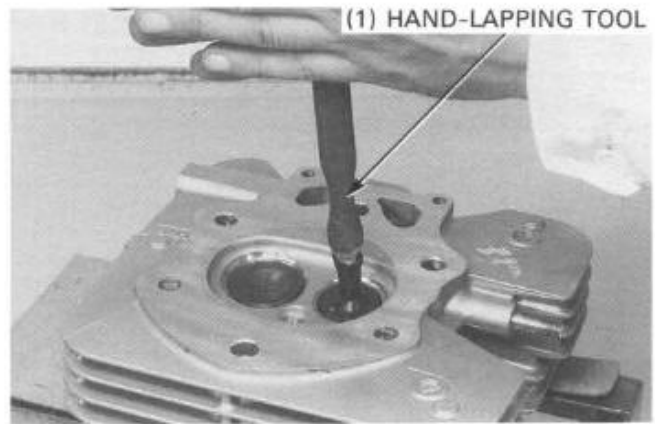
Refinish the seat to specifications, using a 45 degrees finish cutter.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

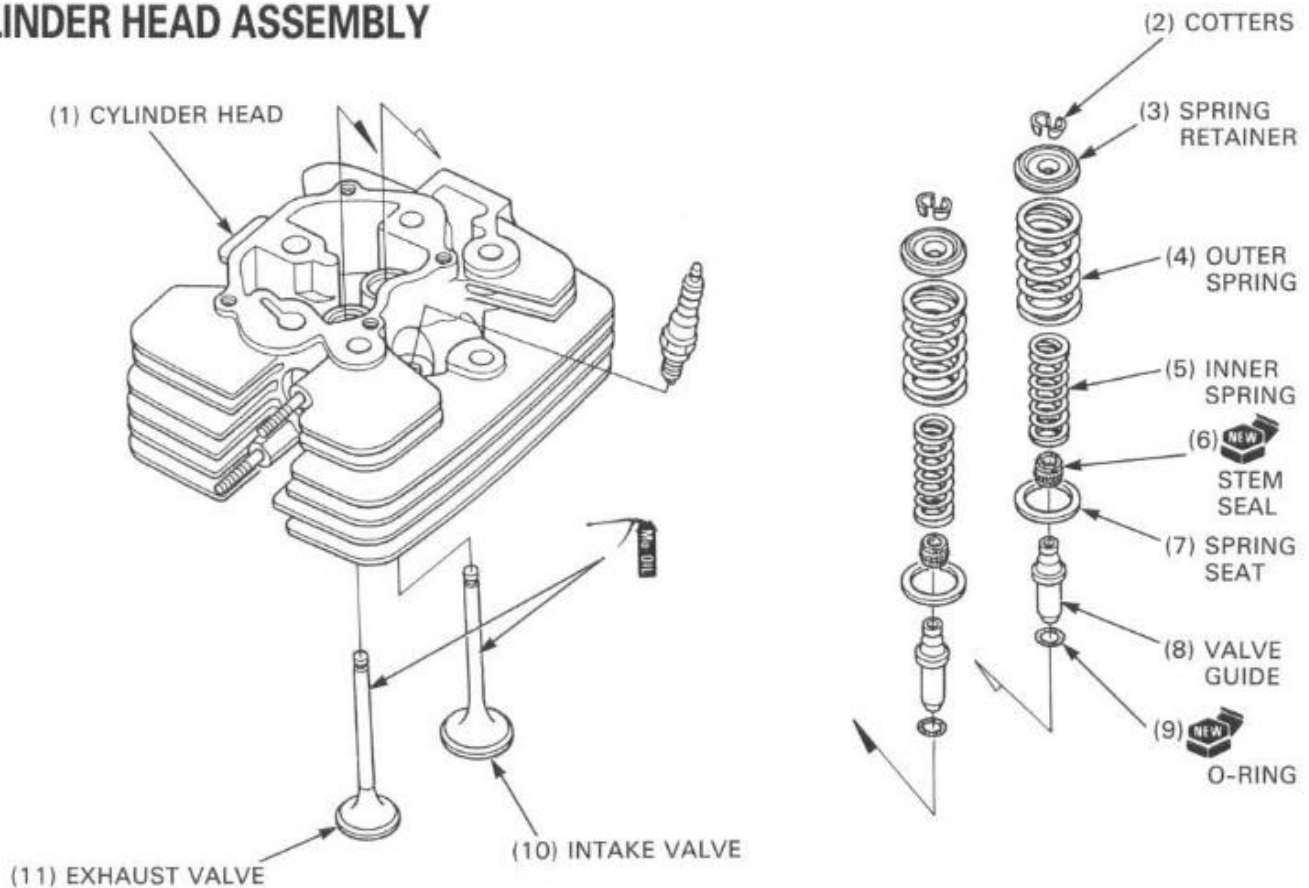
After lapping, wash all residual compound off the cylinder head and valve.

NOTE

- Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

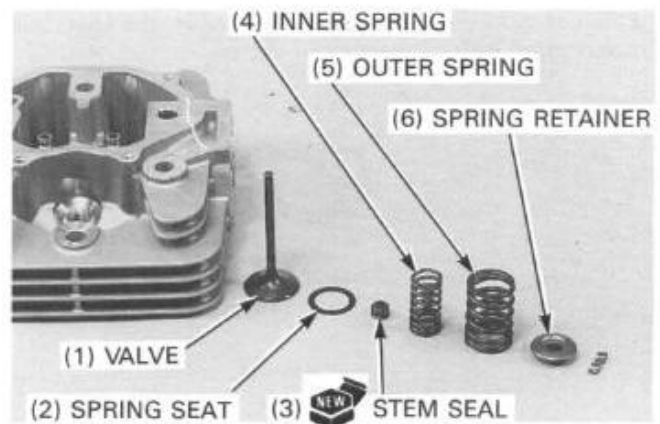


Install the valve spring seat and a new stem seal.

Lubricate the valve stems with molybdenum disulfide oil and insert the valve into the valve guide.

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

Install the valve springs with the tightly wound coils facing the combustion chamber.



Install the valve spring retainers and cotters using the special tool as shown.

To prevent loss of tension, do not compress the valve spring more than necessary.

TOOL:

Valve spring compressor

07757 - 0010000

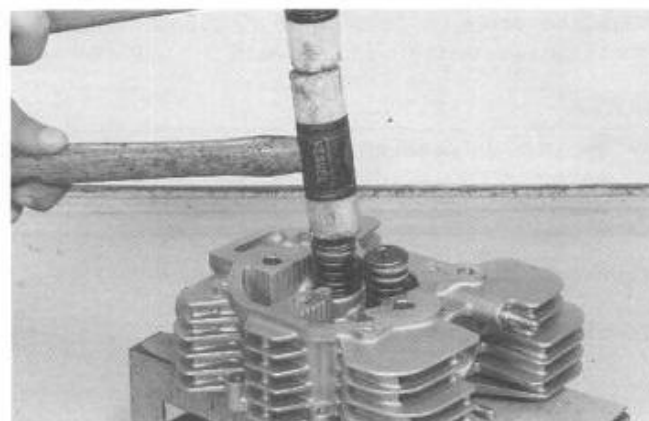
(1) VALVE SPRING COMPRESSOR



Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

CAUTION

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



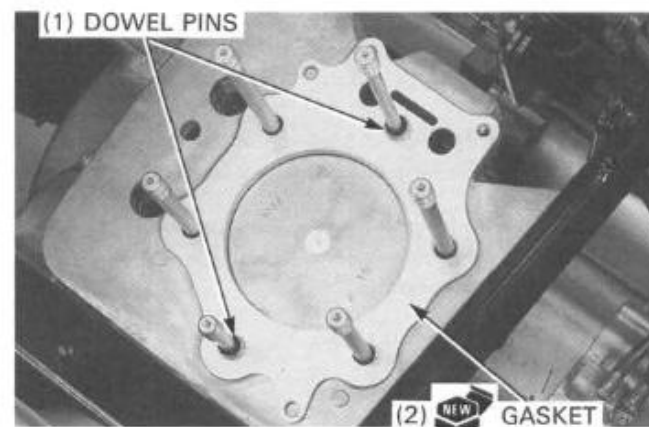
CYLINDER HEAD INSTALLATION

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

Install the cylinder head.

NOTE

- Do not install the gasket upside down. Install it as shown.



ROCKER ARM HOLDER ASSEMBLY

Lubricate the rocker arm and rocker arm shaft with molybdenum disulfide oil.

Place the rocker arms into the rocker arm holder, then insert the rocker arm shaft.

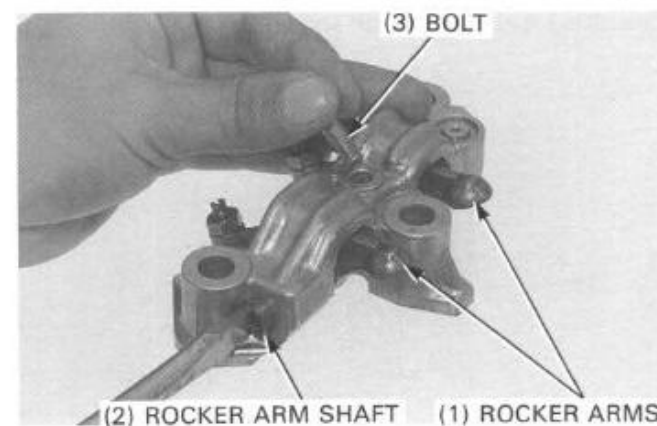
NOTE

- If reusing, install the rocker arms in their original locations as marked.

Turn the rocker arm shaft using a screwdriver to align the hole between the rocker arm holder and shaft.

Install and tighten the rocker arm holder bolt to the specified torque.

TORQUE: 7 N·m (0.7 kg-m, 5.1 lb-ft)



CYLINDER HEAD/CYLINDER/PISTON

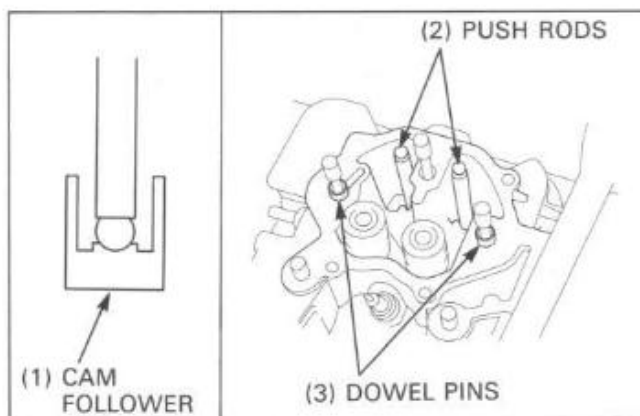
ROCKER ARM HOLDER INSTALLATION

Install the push rods into the center groove of the cam follower properly.

NOTE

- If reusing, install the push rods in their original locations as marked.

Install the two dowel pins.



Install the rocker arm holder onto the cylinder head.
Install the new washers and cap nuts.

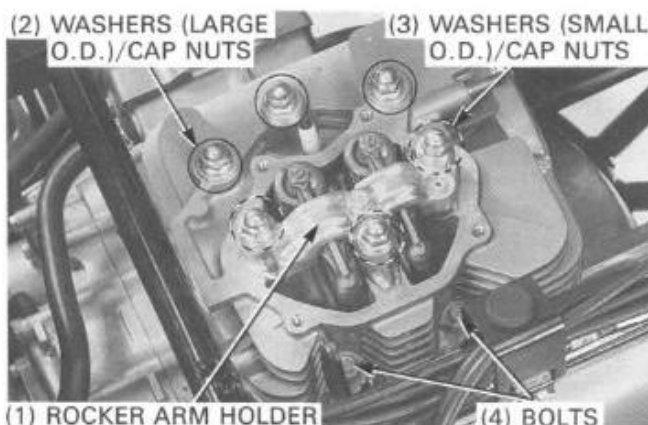
NOTE

- Install the three small O.D. washers onto the rocker arm holder and three large O.D. washers onto the cylinder head.

Tighten the cap nut in a crisscross pattern in 2 - 3 steps.

TORQUE: 40 N·m (4.0 kg-m, 29 lb-ft)

Install and tighten the cylinder head mounting 6 mm bolts.



Install the upper engine hanger bracket, and tighten bracket bolts and the hanger bolt.

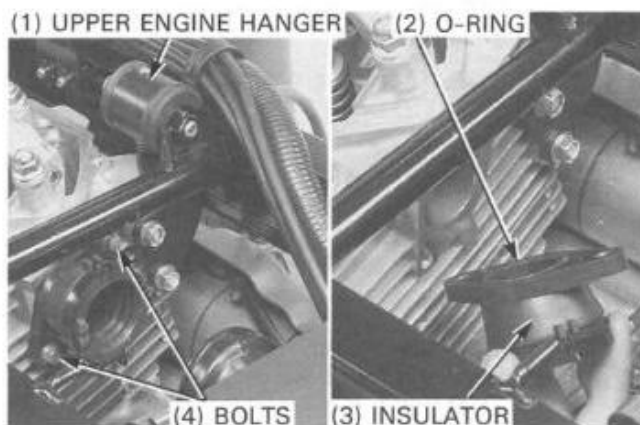
TORQUE:

Bracket bolt: 33 N·m (3.3 kg-m, 24 lb-ft)

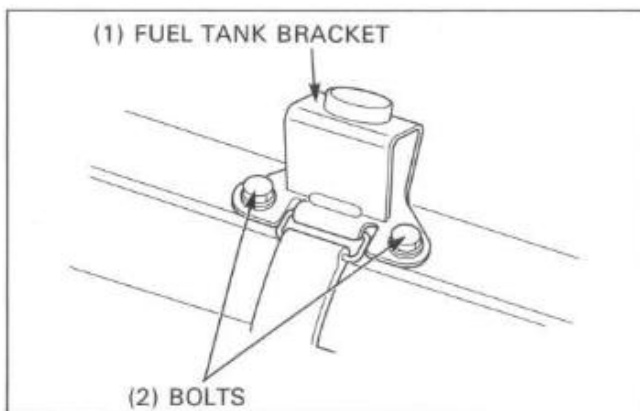
Hanger bolt: 55 N·m (5.5 kg-m, 40 lb-ft)

Check the O-ring is in good condition, install the carburetor insulator.

Tighten the insulator bolts.



Install the fuel tank bracket and tighten the bolts.

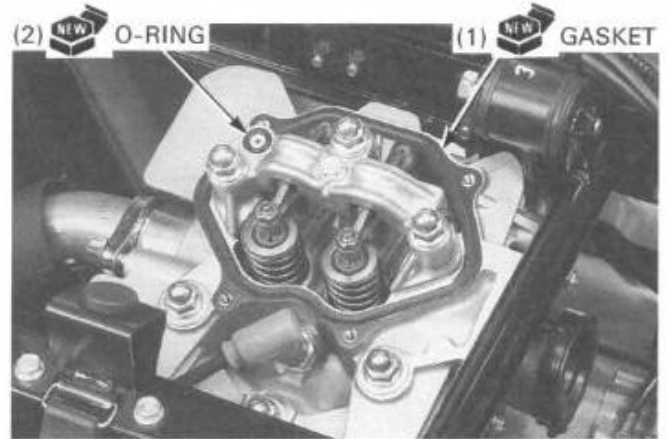


Install the following:

- Spark plug cap
- Carburetor (page 5-14)
- Exhaust pipe (page 2-14)

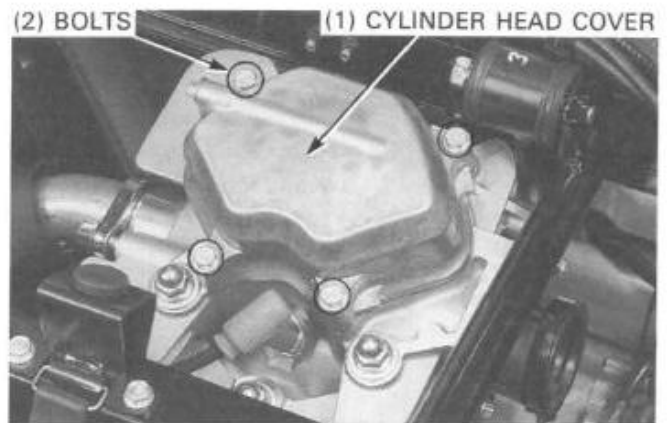
Install a new cylinder head cover gasket.

Install a new O-ring into the groove of the rocker arm holder.



Install the cylinder head cover and tighten the bolts.

Install the fuel tank heat insulator and fuel tank (page 5-19).

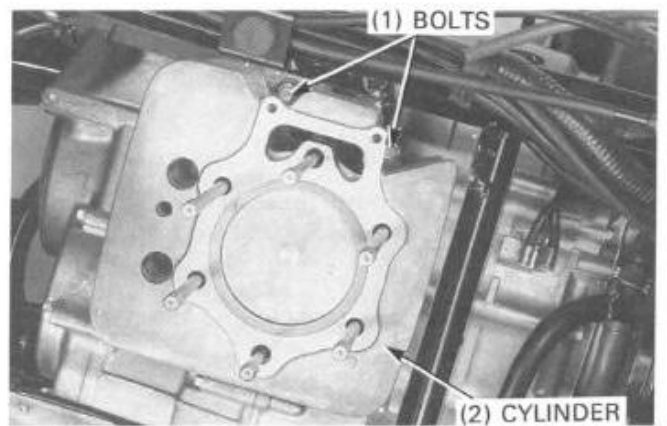


CYLINDER/PISTON REMOVAL

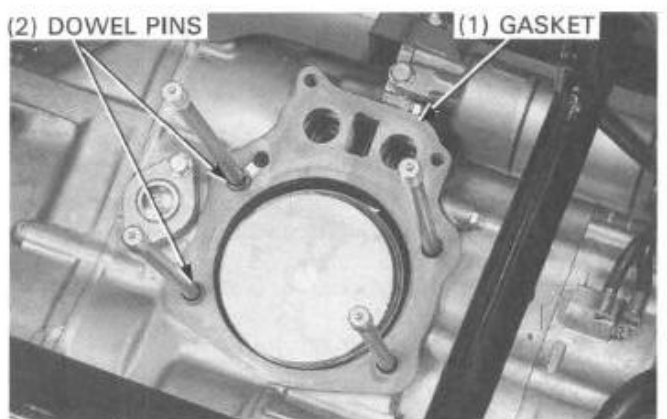
CYLINDER REMOVAL

Remove the cylinder head (page 7-4).

Remove the cylinder base bolts and cylinder.



Remove the cylinder gasket and dowel pins.



CYLINDER HEAD/CYLINDER/PISTON

PISTON REMOVAL

Remove a piston pin clip with pliers.

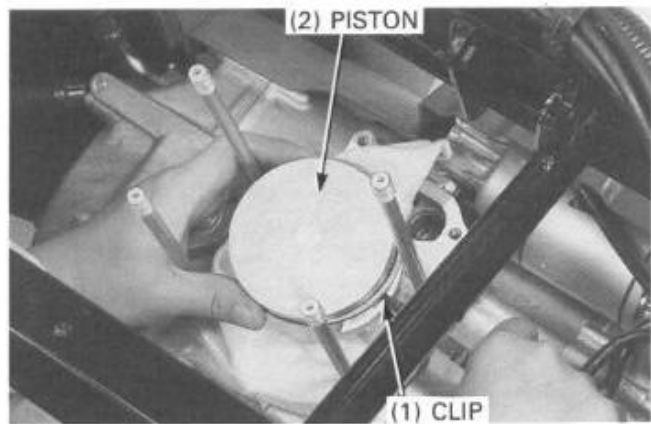
NOTE

- Do not let the clip fall into the crankcase.

Press the piston pin out of the piston and remove the piston.

CAUTION

- Always support the piston when pressing out the piston pin to prevent damage to the big-end bearing.

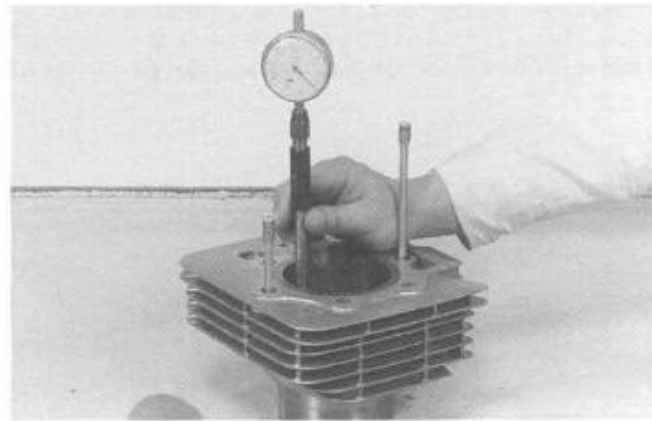


CYLINDER/PISTON INSPECTION

CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. in X and Y axis at three levels.
Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 86.10 mm (3.390 in)



Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.
Refer to page 7-18 for measurement of the piston O.D.

SERVICE LIMIT: 0.10 mm (0.004 in)

Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

SERVICE LIMITS:

Taper: 0.10 mm (0.004 in)

Out of round: 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:

0.25 mm (0.010 in)

0.50 mm (0.020 in)

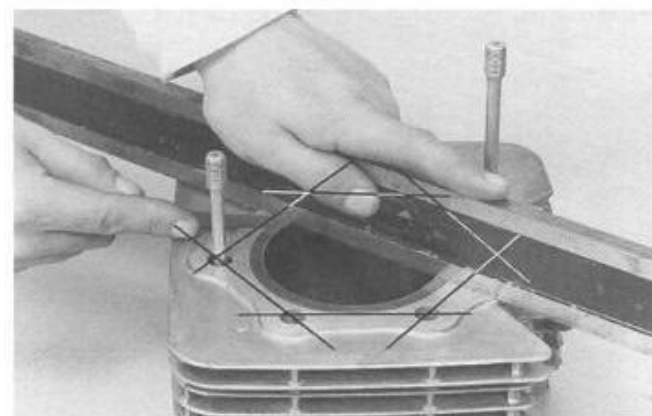
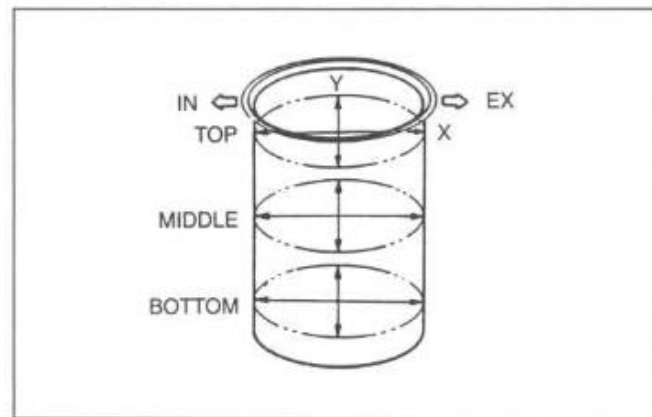
0.75 mm (0.030 in)

1.00 mm (0.039 in)

The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in)

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)

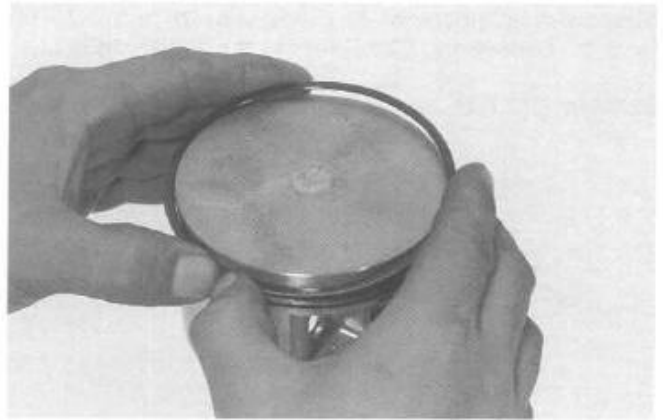


PISTON INSPECTION

Remove the piston rings.

NOTE

- Do not damage the piston rings during removal.



Remove any carbon deposits from the piston ring grooves, using an old piston ring as shown.



Temporarily install the piston rings to their proper position with the mark facing up.

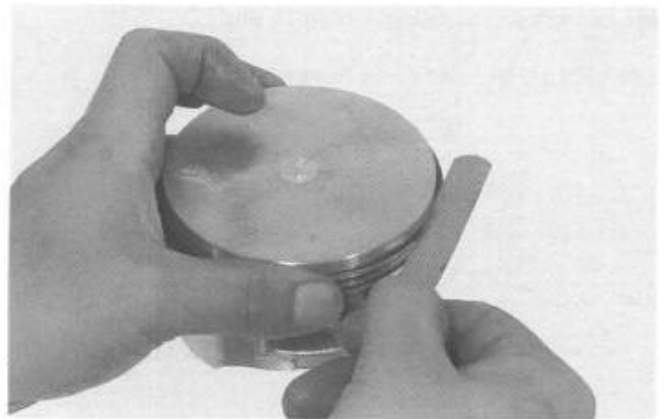
Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:

Top: 0.09 mm (0.004 in)

Second: 0.09 mm (0.004 in)

Inspect the piston for wear or damage.



Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

NOTE

- Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

SERVICE LIMITS:

Top: 0.5 mm (0.02 in)

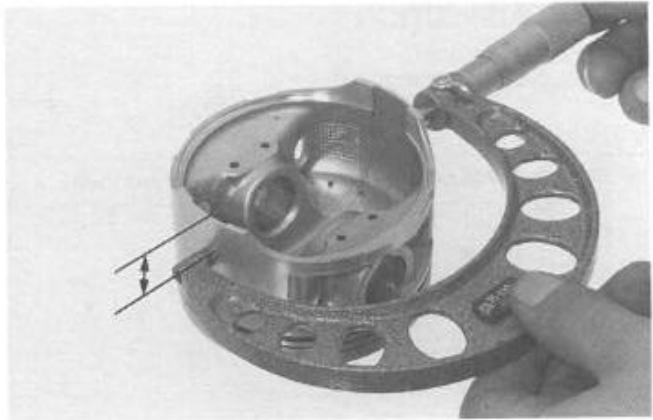
Second: 0.6 mm (0.02 in)



CYLINDER HEAD/CYLINDER/PISTON

Measure the diameter of the piston at 6 – 26 mm (0.2 – 1.0 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 85.90 mm (3.382 in)



Measure the piston pin bore.

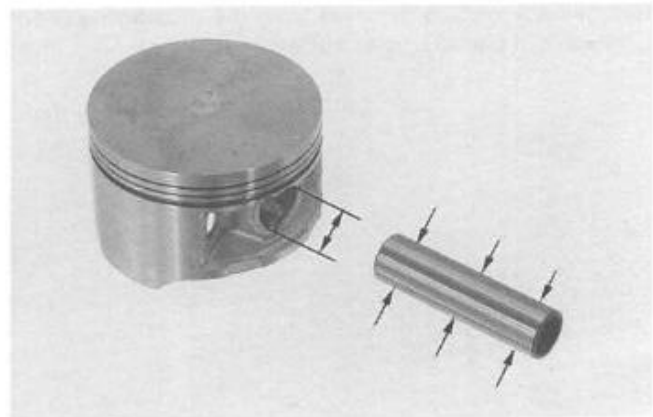
SERVICE LIMIT: 19.08 mm (0.751 in)

Measure the O.D. of the piston pin.

SERVICE LIMIT: 18.96 mm (0.746 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.12 mm (0.039 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 19.07 mm (0.751 in)



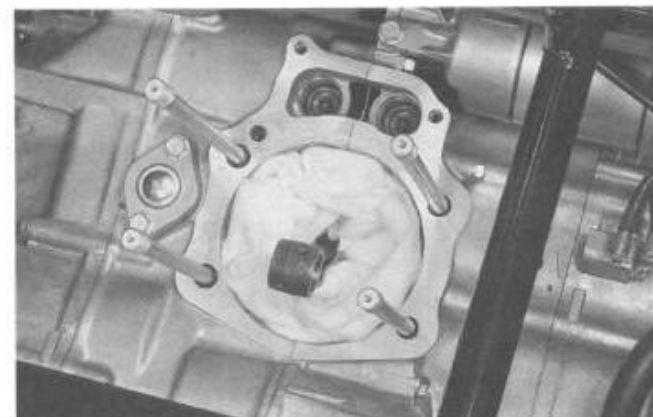
CYLINDER/PISTON INSTALLATION

PISTON INSTALLATION

Clean off any gasket material from the cylinder base and crankcase upper surface.

NOTE

- Be careful not to damage the gasket surface.



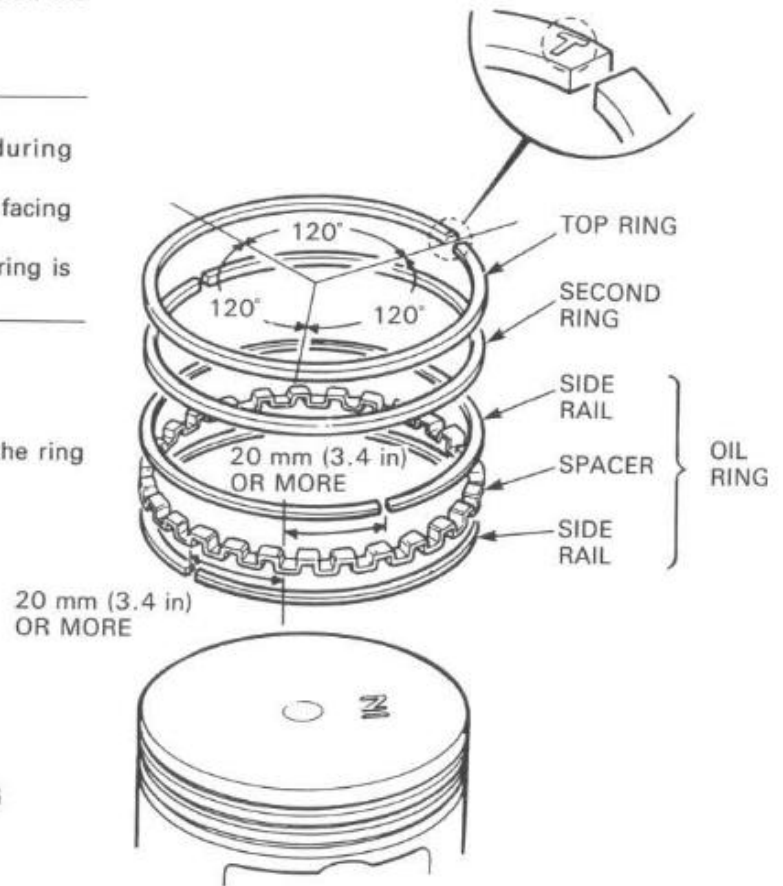
Clean the piston ring grooves thoroughly and install the piston rings.

NOTE

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (T or R) facing up.
- Do not mix the top and second rings; the top ring is narrower than the second ring in width.

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

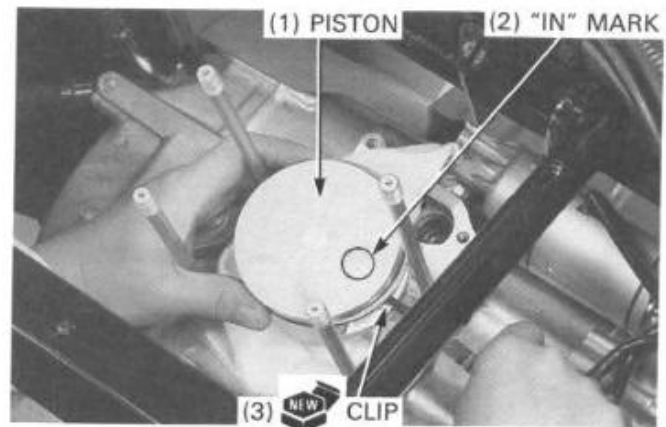
After installation, the rings should rotate freely in the ring grooves.



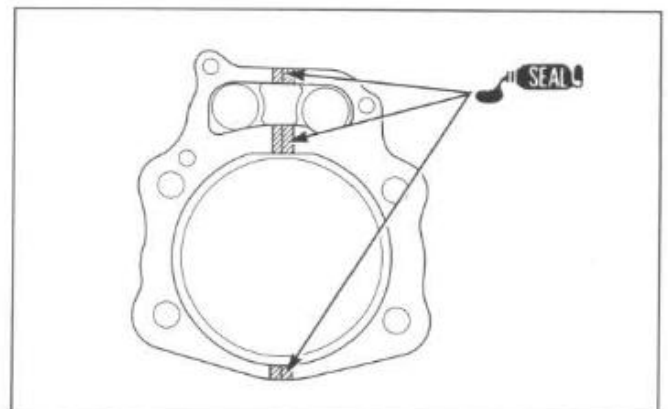
Apply molybdenum disulfide oil to the outer surface of the piston pin. Cover the opening into the crankcase with a rag. Install the piston and piston pin, using a new piston pin clip. Remove the rag.

NOTE

- Install the piston with its "IN" mark facing the intake side.
- Do not align the piston pin clips end gap with the piston cut-out.
- Do not let the clip fall into the crankcase.

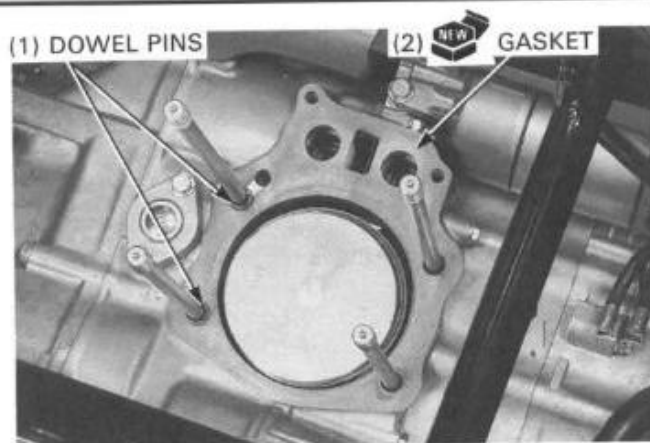


Apply liquid sealant to the crankcase mating surface.



CYLINDER HEAD/CYLINDER/PISTON

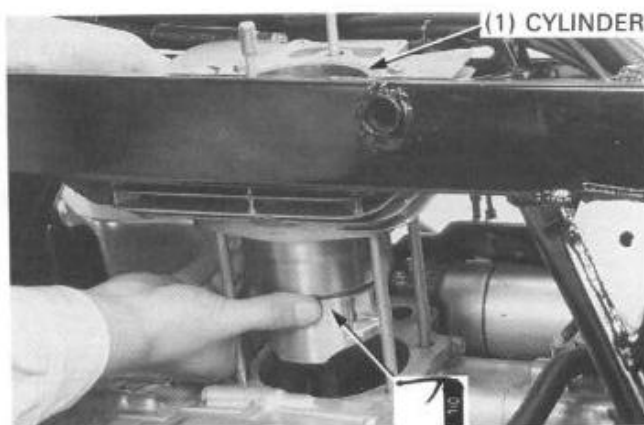
Install the dowel pins and a new gasket.



Coat the cylinder bore and piston with engine oil and install the cylinder.

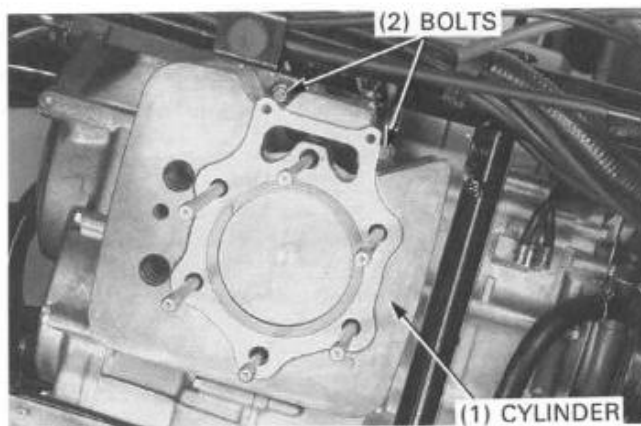
NOTE

- Avoid piston ring damage during installation.



Install and tighten the cylinder mounting bolts.

Install the cylinder head and push rods (page 7-13).



CAMSHAFT/CAM CHAIN TENSIONER

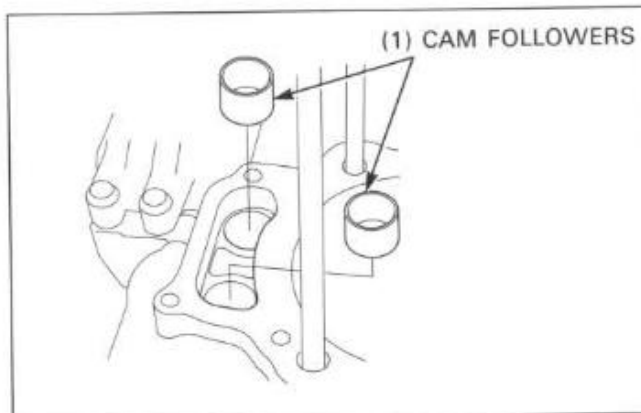
CAMSHAFT REMOVAL

Remove the following:

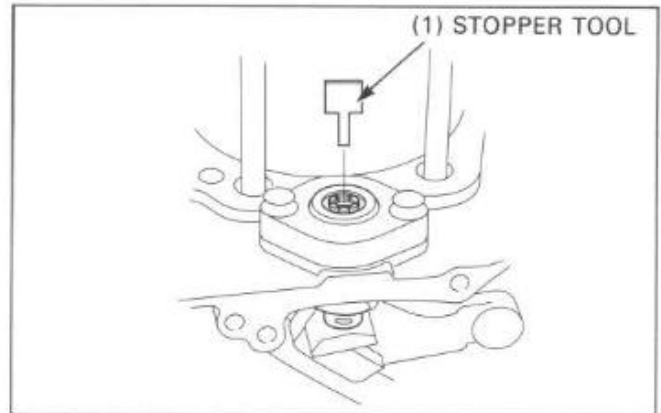
- Cylinder head (page 7-4)
- Cylinder (page 7-15)
- Centrifugal clutch and change clutch (section 8)

Remove the cam followers.

Mark the cam followers so they can be reinstalled in their original positions.



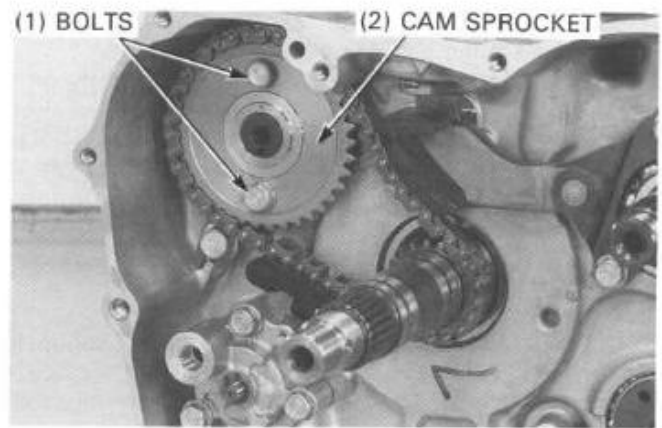
Remove the cam chain tensioner sealing bolt and O-ring. Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position. Refer to page 7-25 for stopper tool dimensions.



Remove the cam sprocket bolts, sprocket from the camshaft flange.

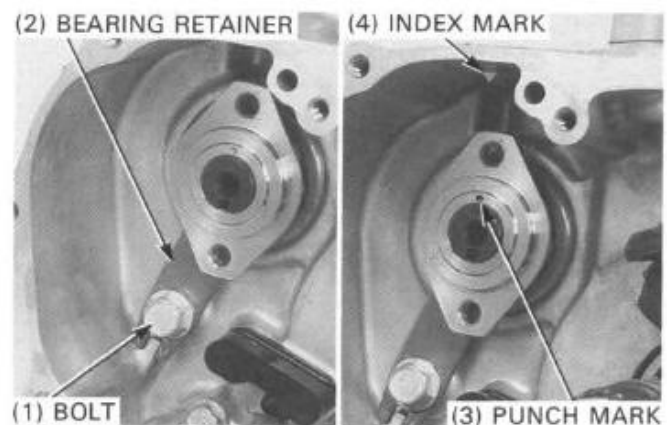
If necessary to remove the cam sprocket bolts, hold the end of the camshaft using a mainshaft holder (07JMB - MN50200).

Remove the cam sprocket and cam chain.



Remove the camshaft bearing retainer bolt and retainer.

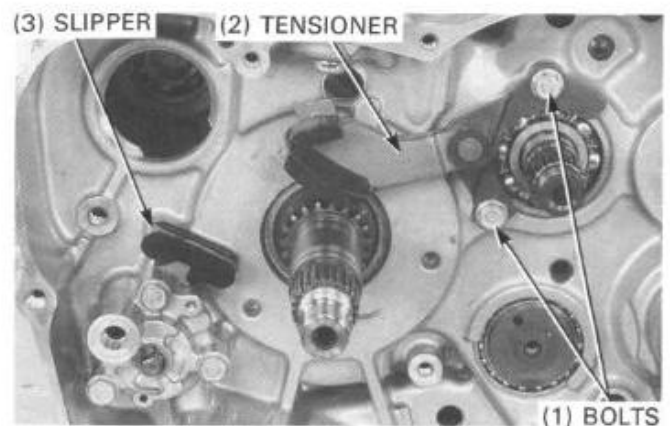
Align the punch mark on the camshaft with the index mark on the crankshaft, then remove the camshaft.



CAM CHAIN TENSIONER REMOVAL

Remove the mainshaft bearing retainer bolts and bearing retainer/cam chain tensioner assembly.

Remove the oil pump (page 4-8) and cam chain slipper.



CYLINDER HEAD/CYLINDER/PISTON

INSPECTION

Camshaft

Using a micrometer, measure the height of each cam lobe and inspect it for wear or damage.

SERVICE LIMITS:

IN: 36.25 mm (1.427 in)

EX: 36.10 mm (1.421 in)

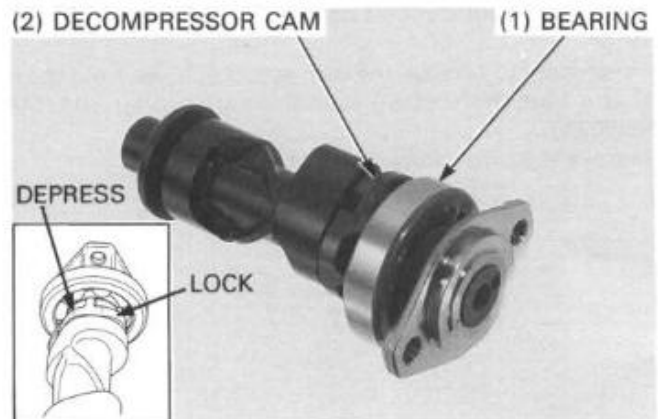


Turn the camshaft bearing outer race with your finger. The bearing should be turn smoothly and quietly. Also check that the bearing inner race fits tightly on the camshaft. Replace the camshaft as an assembly, if the races do not turn smoothly, quietly, or if they fit loosely on the camshaft.

Check the decompressor cam operation.

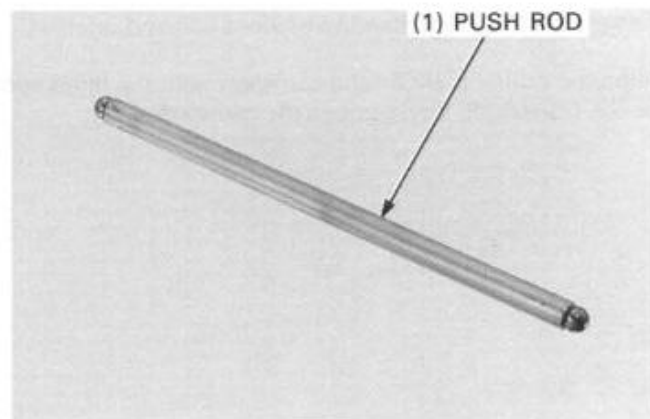
Look at the base of the exhaust lobe. Press on the decompressor cam as shown.

As you press on one side, the decompressor cam should lock above the exhaust base. As you press on the other side, the decompressor lobe should be depressed below the exhaust base.



Push rod

Check the push rods are not bent.

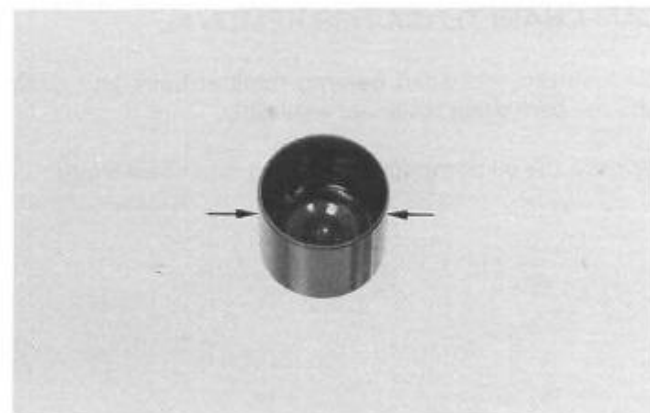


Cam follower

Check the cam follower for damage.

Measure the cam follower O.D.

SERVICE LIMIT: 22.459 mm (0.8842 in)

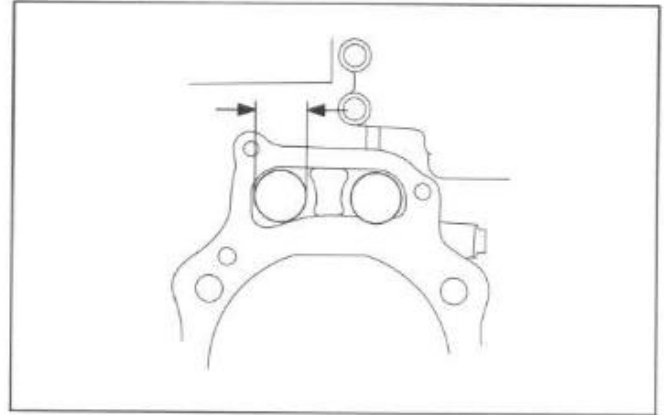


Measure the crankcase I.D. at the cam follower sliding surface.

SERVICE LIMIT: 22.54 mm (0.887 in)

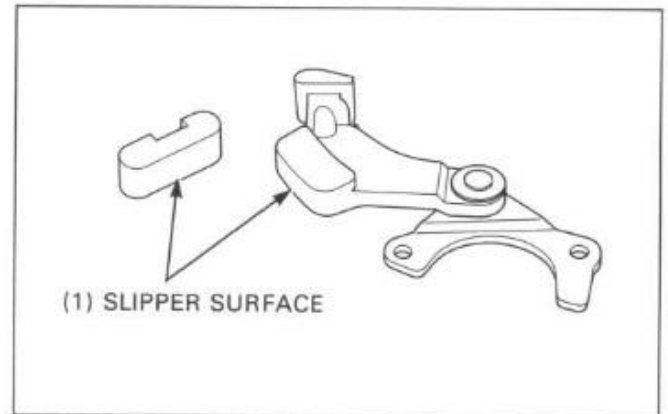
Calculate the clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)



Cam chain tensioner

Check the slipper surface of the cam chain tensioner for wear or damage.

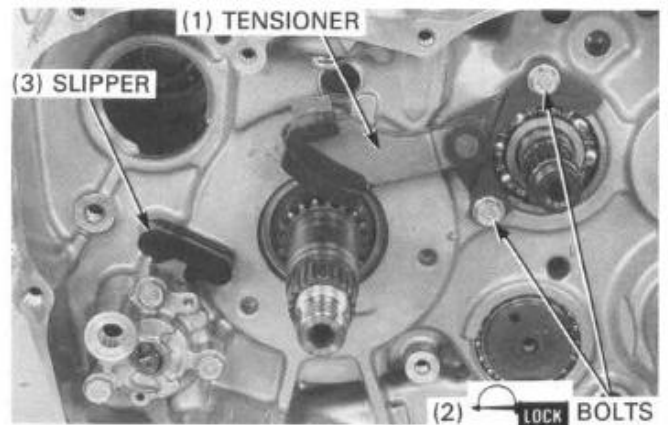


CAM CHAIN TENSIONER INSTALLATION

Apply a locking agent to the threads of the mainshaft bearing retainer bolts.

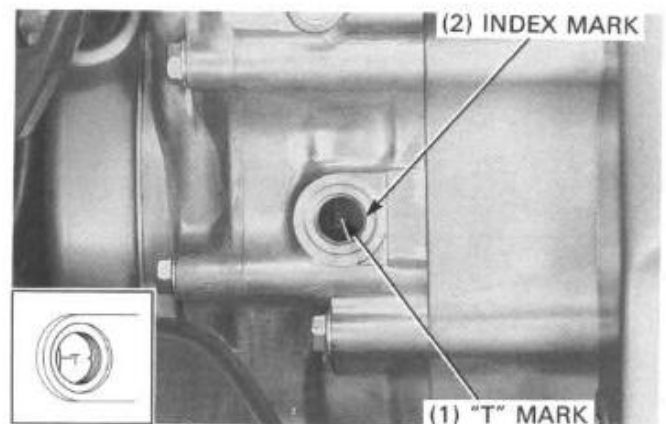
Install the mainshaft bearing retainer/cam chain tensioner, tighten the bolts.

Install the cam chain slipper and oil pump (page 4-11).



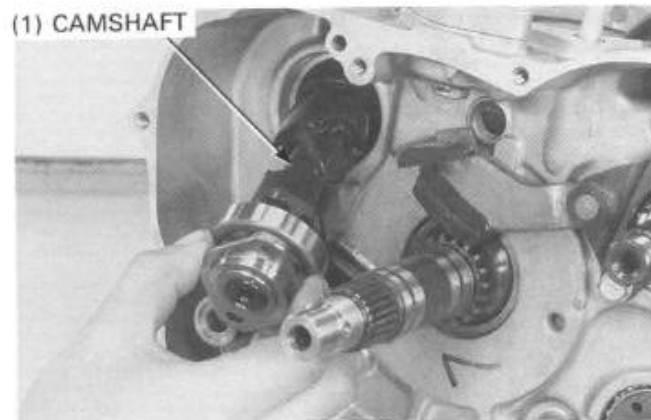
CAMSHAFT INSTALLATION

Align the "T" mark on the flywheel with the index mark on the rear crankcase cover by turning the recoil starter.

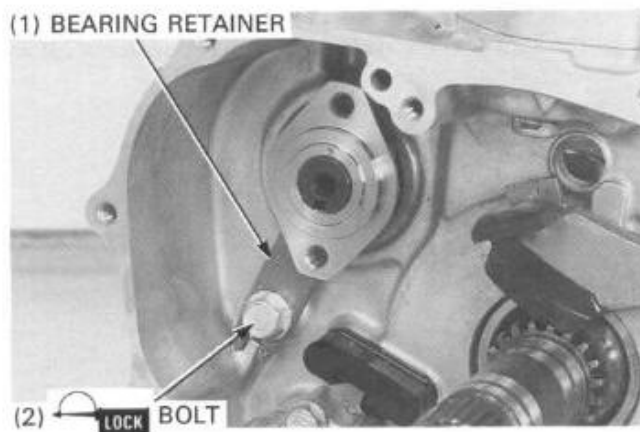


CYLINDER HEAD/CYLINDER/PISTON

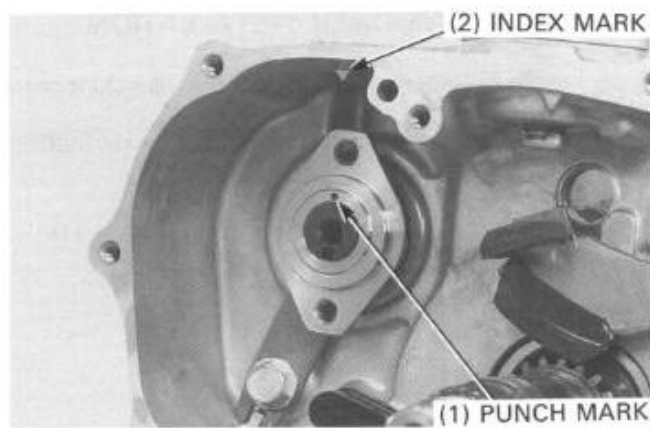
Apply molybdenum disulfide oil to the camshaft lobes and apply oil to the camshaft journal. Install the camshaft into the crankcase with its cam lobes facing down.



Install the camshaft bearing retainer aligning the groove of the retainer with the crankcase boss. Apply a locking agent to the retainer bolt threads. Install and tighten the bolts.



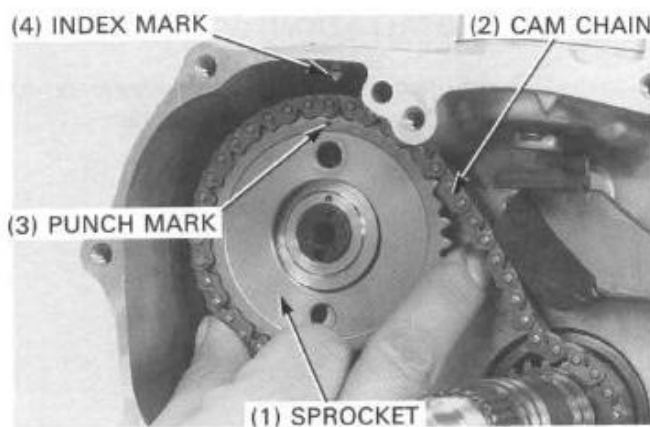
Align the punch mark on the camshaft flange with the index mark on the crankcase.



Align the punch mark on the cam sprocket with the index mark on the crankcase, then install the cam chain and cam sprocket onto the camshaft flange.

NOTE

- Do not turn the crankshaft while installing the cam sprocket.



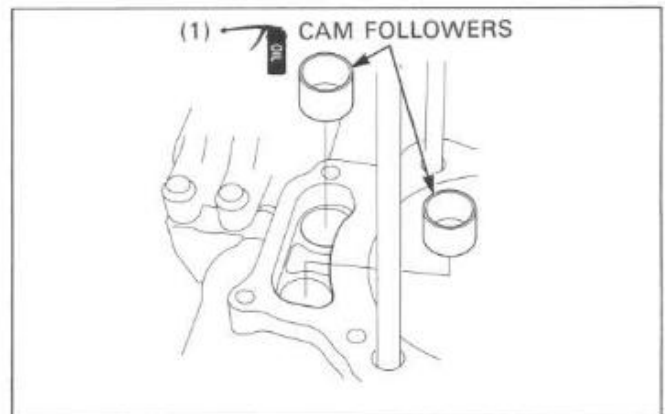
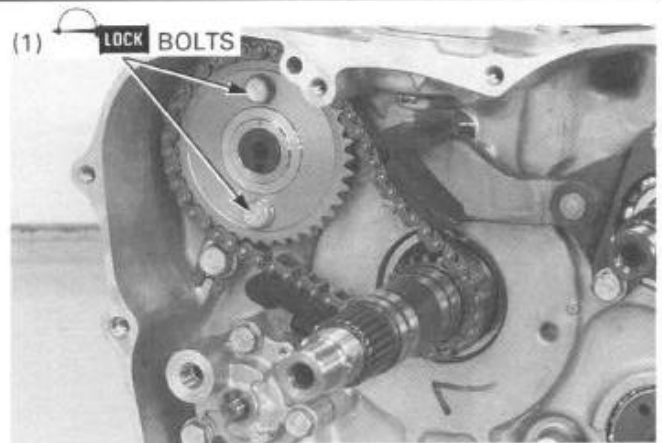
Apply a locking agent to the threads of the cam sprocket bolts.
Install the cam sprocket bolts.
Tighten the punch mark side bolt first then the other bolt.

NOTE

- Confirm that the "T" mark on the flywheel is aligned with the index mark on the rear crankcase cover, while the punch mark on the camshaft is aligned with the index mark on the front crankcase.

TORQUE: 20 N·m (2.0 kg-m, 14 lb-ft)

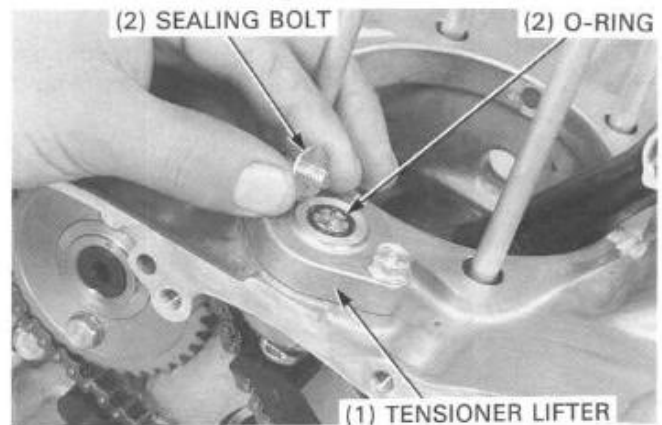
Apply clean engine oil to the outer and inner surface of the cam followers.
Install the cam follower into the crankcase.



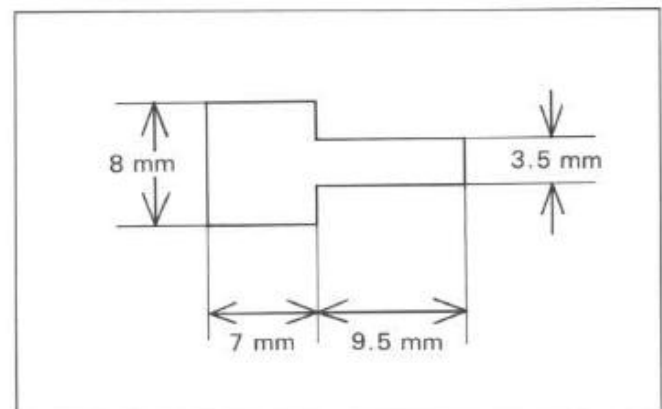
Remove the holder tool from the cam chain tensioner lifter. Check that O-ring is in good condition, and install the sealing bolt.

Install the following:

- Change clutch and centrifugal clutch (section 8)
- Cylinder (page 7-18)
- Cylinder head (page 7-13)

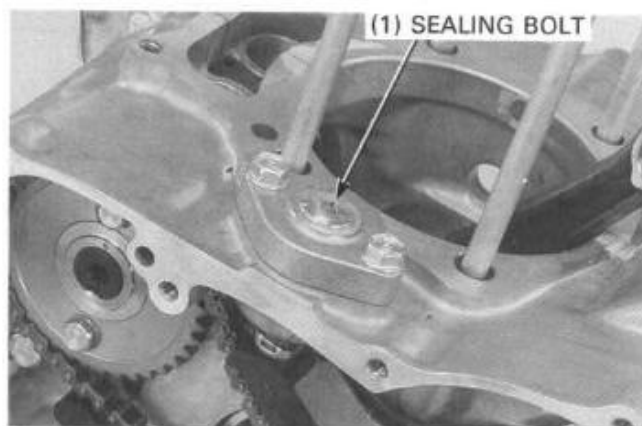
**CAM CHAIN TENSIONER LIFTER****REMOVAL**

Make a tensioner shaft stopper tool out of a thin piece of steel (1 mm thick) using the diagram.



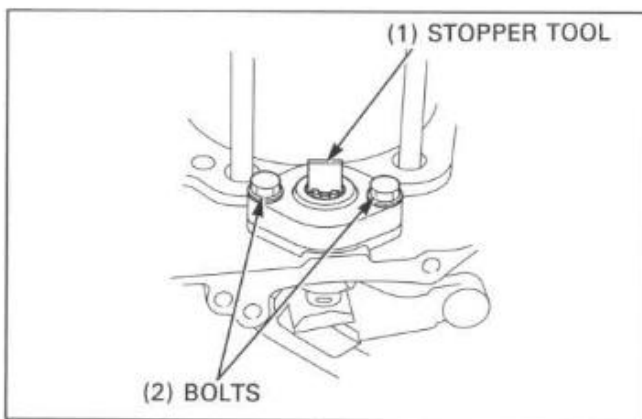
CYLINDER HEAD/CYLINDER/PISTON

Remove the sealing bolt and O-ring.



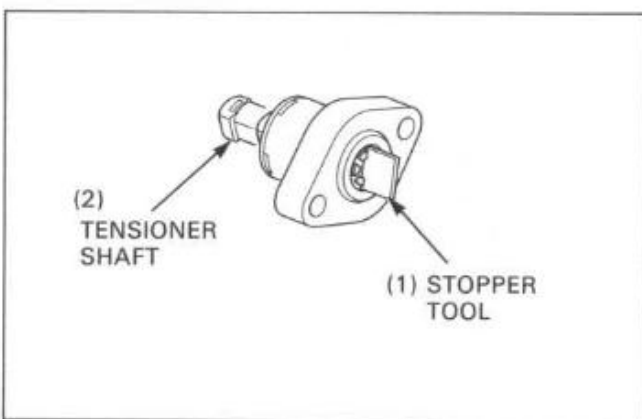
Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.

Remove the cam chain tensioner lifter mounting bolts and tensioner.

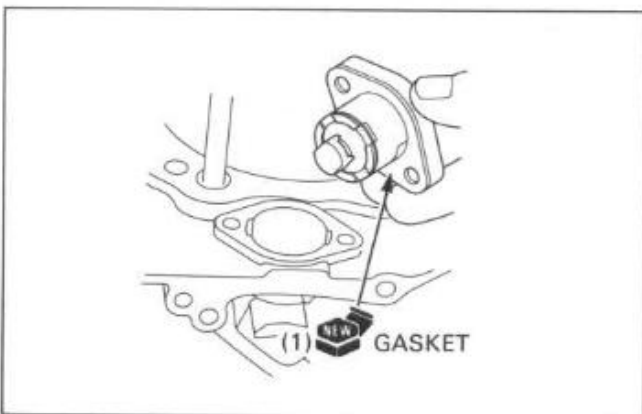


INSTALLATION

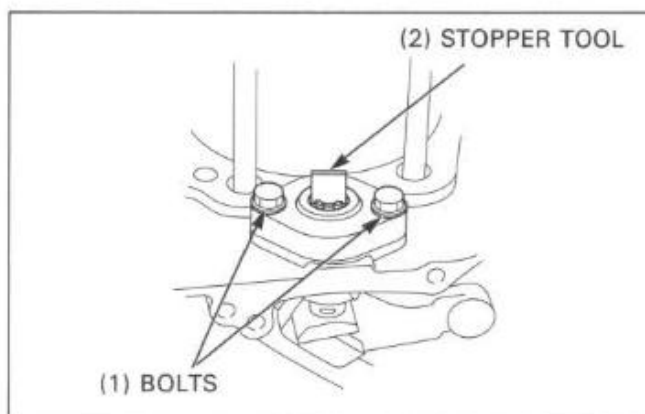
Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.



Install a new gasket on the cam chain tensioner lifter.



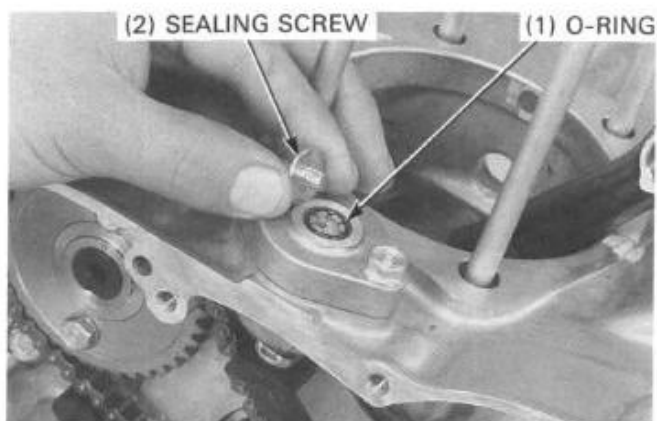
Install the cam chain tensioner lifter and tighten the bolts.

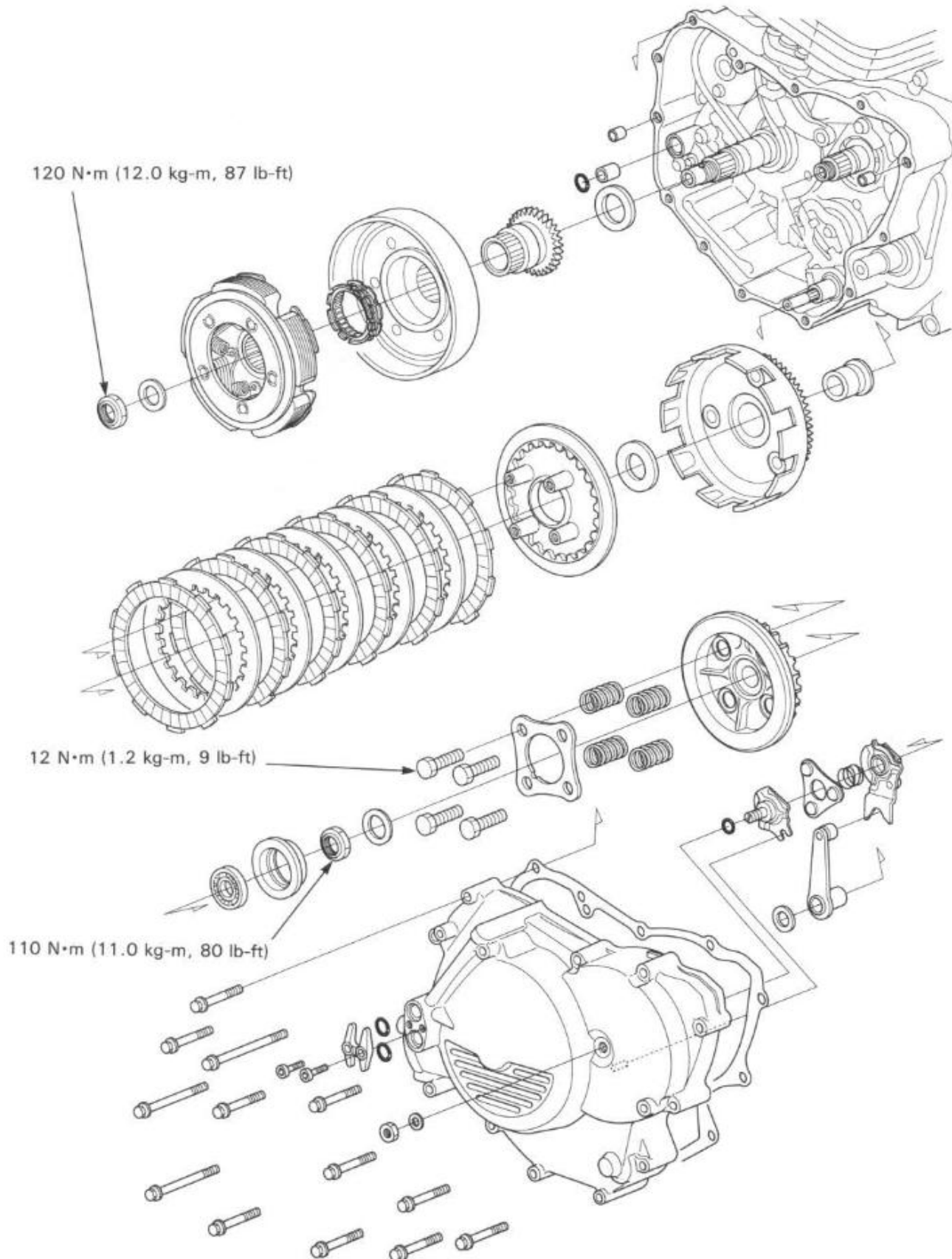


Remove the holder tool from the tensioner lifter.

Check the O-ring is in good condition, install the sealing screw.

TORQUE: 4 N·m (0.40 kg-m, 2.9 lb-ft)





8.CLUTCH

SERVICE INFORMATION	8-1	CHANGE CLUTCH	8-11
TROUBLESHOOTING	8-2	FRONT CRANKCASE COVER INSTALLATION	8-17
FRONT CRANKCASE COVER REMOVAL	8-3		
CENTRIFUGAL CLUTCH/PRIMARY DRIVE GEAR	8-4		

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the centrifugal clutch, change clutch.
- These parts can be serviced with the engine installed in the frame.

SPECIFICATIONS

Unit: mm (in)

8

ITEM		SPECIFICATIONS	SERVICE LIMIT
Change clutch	Spring free length	32.1 (1.26)	31.0 (1.22)
	Disc thickness	2.62 – 2.78 (0.103 – 0.109)	2.3 (0.09)
	Plate warpage	—	0.20 (0.008)
	Clutch outer guide	O.D.	27.959 – 27.980 (1.1007 – 1.1016)
		I.D.	22.000 – 22.021 (0.8661 – 0.8670)
	Mainshaft O.D. at outer guide	21.972 – 21.993 (0.8650 – 0.8659)	21.93 (0.863)
Centrifugal clutch	Drum I.D.	140.0 – 140.2 (5.51 – 5.52)	140.4 (5.53)
	Weight lining thickness	3.0 (0.12)	2.0 (0.08)
	Clutch spring height	3.1 (0.12)	2.95 (0.116)
	Clutch weight spring free length	21.6 (0.85)	22.5 (0.89)
Primary drive gear	I.D.	27.000 – 27.021 (1.0630 – 1.0638)	27.05 (1.065)
	Crankshaft O.D. at drive gear	26.959 – 26.980 (1.0614 – 1.0622)	26.93 (1.060)

TORQUE VALUES

Centrifugal clutch outer lock nut	120 N•m (12.0 kg-m, 87 lb-ft)	Apply oil to the threads
Clutch spring bolt	12 N•m (1.2 kg-m, 9 lb-ft)	
Change clutch center lock nut	110 N•m (11.0 kg-m, 80 lb-ft)	Apply oil to the threads

CLUTCH

TOOLS

Remover handle	07936 – 3710100	
Bearing remover, 17 mm	07936 – 3710300	
Remover weight	07741 – 0010201	or 07936-3710200
Clutch holder	07GMB – HA70101	
Clutch center holder	07JMB – MN50300	or 07HGB – 001000A (U.S.A. only)
Clutch puller	07933 – HB3000A	(U.S.A. only)
Driver	07749 – 0010000	
Attachment, 42 X 47 mm	07746 – 0010300	
Pilot, 17 mm	07746 – 0040400	
Driver, 22 mm I.D.	07746 – 0020100	
Attachment, 20 mm I.D.	07746 – 0020400	

TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch.

Clutch slips when accelerating

- Faulty clutch lifter
- Discs/plates worn
- Weak springs

Clutch will not disengage

- Faulty clutch lifter mechanism
- Plates warped

The vehicle creeps with clutch disengaged

- Faulty centrifugal clutch
- Plate warped

Clutch operating feels rough

- Outer drum slots rough
- Incorrect idle speed adjustment

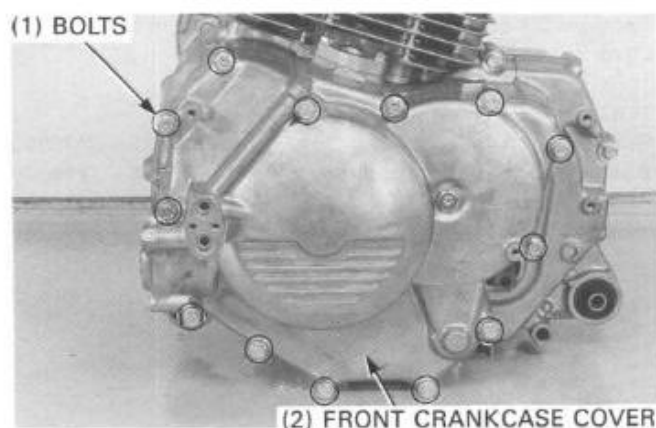
Hard to shift

- Incorrect clutch adjustment
- Faulty clutch lifter mechanism
- Shift drum cam plate damaged

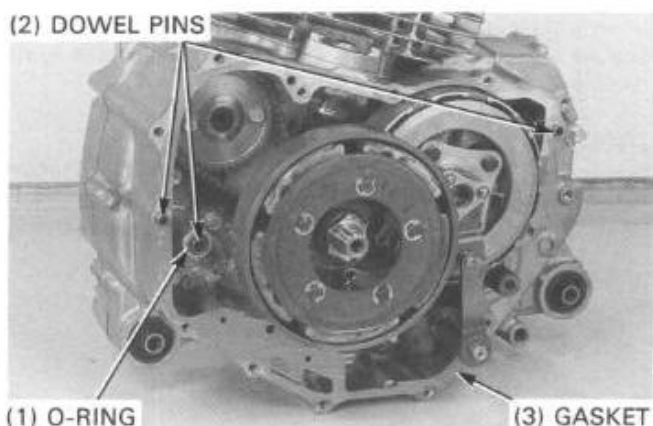
FRONT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-9).
Remove the oil cooler pipes (page 4-2).
Remove the right engine side cover.

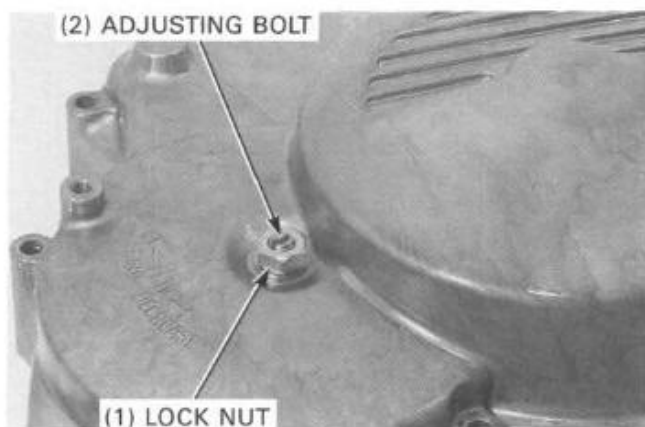
Remove the bolts and front crankcase cover.



Remove the gasket, O-ring and dowel pins.

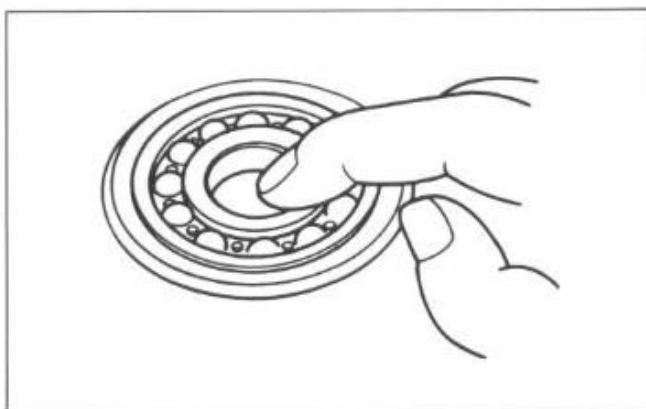


Remove the clutch adjusting bolt lock nut, then remove the clutch adjusting plate.



BEARING REPLACEMENT

Turn the crankshaft end bearing inner race with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the crankcase cover. Replace it if necessary.



CLUTCH

Remove the crankshaft end bearing from the front crankcase cover using the special tools as shown.

TOOLS :

Remover handle

07936 - 3710100

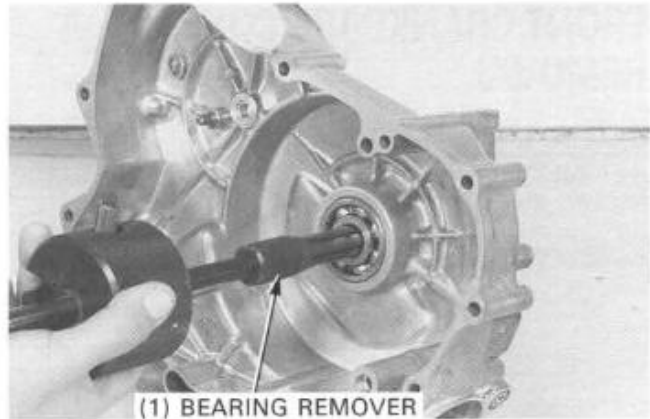
Bearing remover, 17 mm

07936 - 3710300

Remover weight

07741 - 0010201 or

07936 - 3710200



Drive a new crankshaft end bearing into the cover, with its sealed side facing the cover, using the special tools as shown.

TOOLS:

Driver

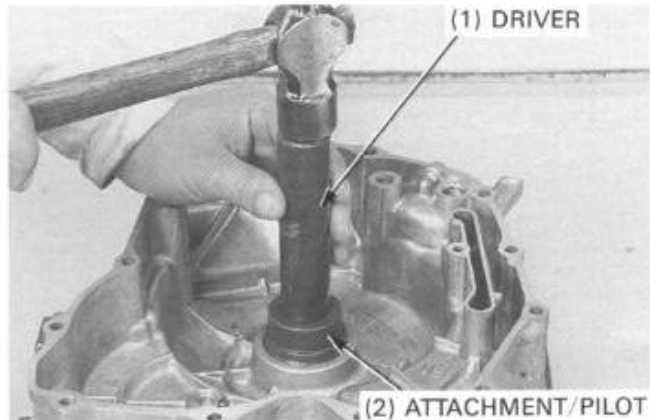
07749 - 0010000

Attachment, 42 X 47 mm

07746 - 0010300

Pilot, 17 mm

07746 - 0040400



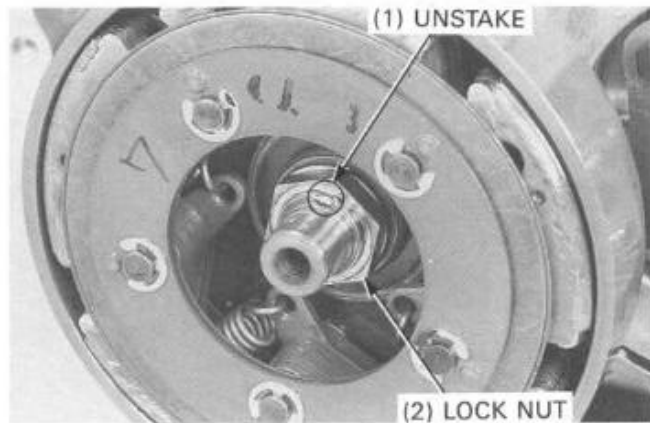
CENTRIFUGAL CLUTCH/PRIMARY DRIVE GEAR

REMOVAL

Remove the front crankcase cover (page 8-3).

Unstake the centrifugal clutch lock nut.

Be careful that metal particles do not enter the clutch and that the threads of the crankshaft are not damaged.



Hold the centrifugal clutch weight assembly with the special tool.

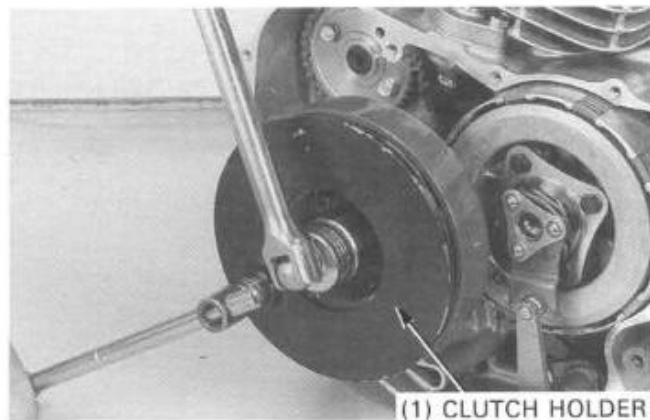
Turn the lock nut counterclockwise to loosen it then remove the lock nut.

TOOL:

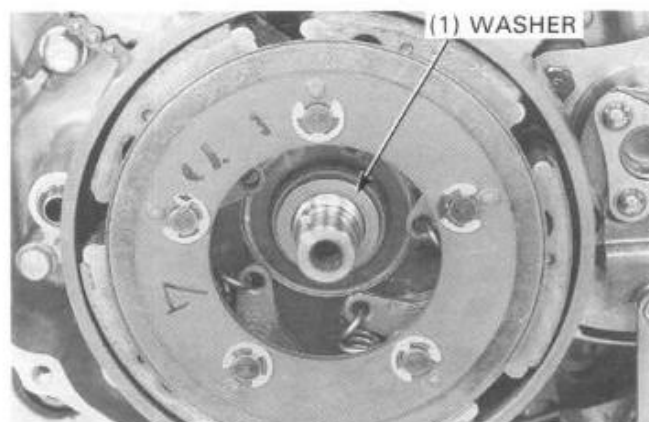
Clutch holder

07GMB - HA70101

Discard the lock nut.



Remove the washer.

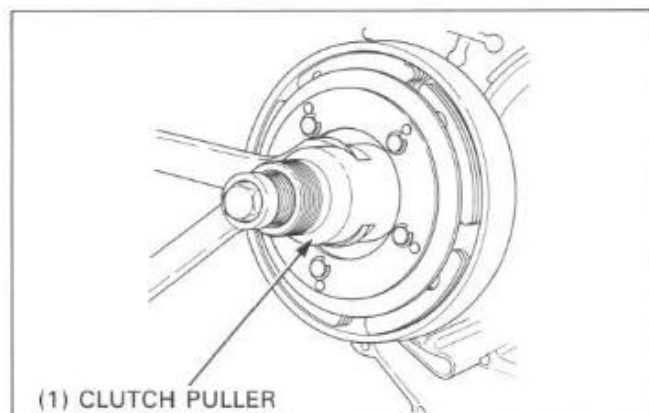


Remove the centrifugal clutch weight assembly and clutch drum using the special tool as shown.

TOOL:

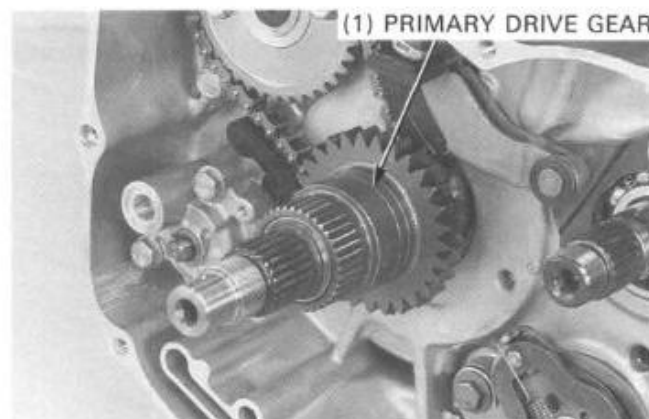
Clutch puller

07933 - HB3000A (U.S.A. only)



Remove the change clutch assembly (page 8-11).

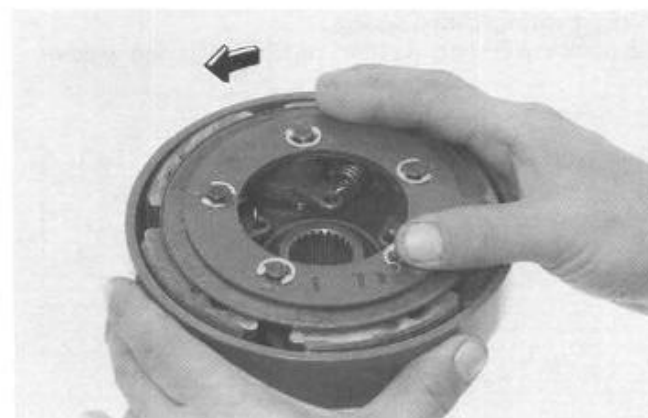
Remove the primary drive gear and washer.



INSPECTION

One-way clutch

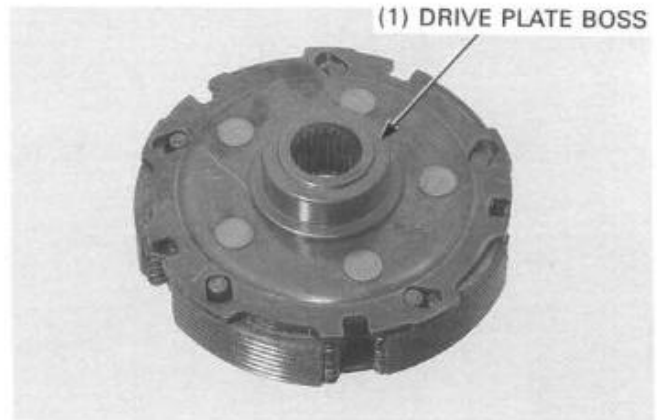
Hold the clutch drum and rotate the clutch weight assembly. You should only be able to turn it counterclockwise. Check the rollers for excessive wear. Remove the clutch weight assembly and one-way clutch from the clutch drum.



CLUTCH

Drive plate boss

Check the drive plate boss for excessive wear or damage.

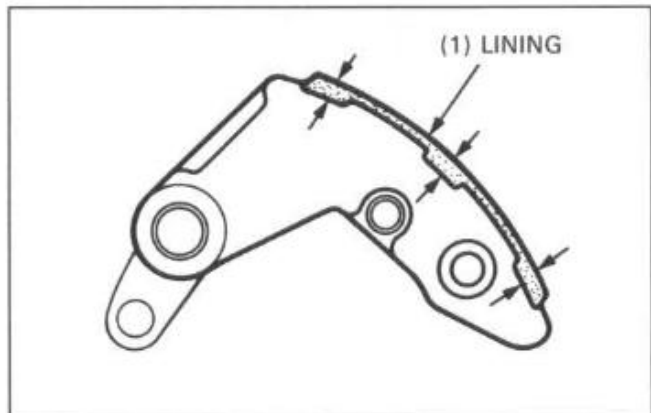


Weight lining

Measure the weight lining thickness as shown.

SERVICE LIMIT: 2.0 mm (0.08 in)

For replacement, see page 8-7.

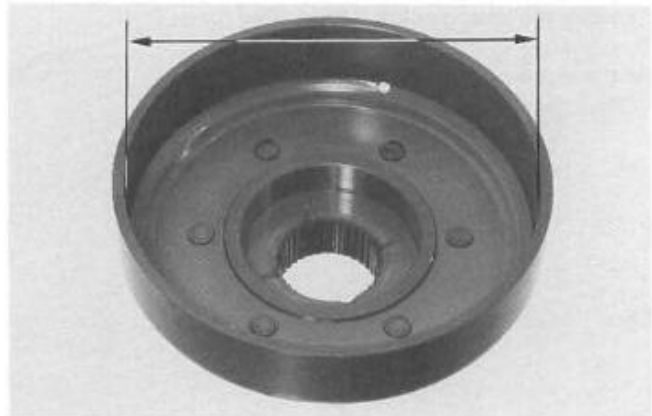


Clutch drum

Check the inside of the centrifugal clutch drum for scratches or excessive wear. Replace if necessary.

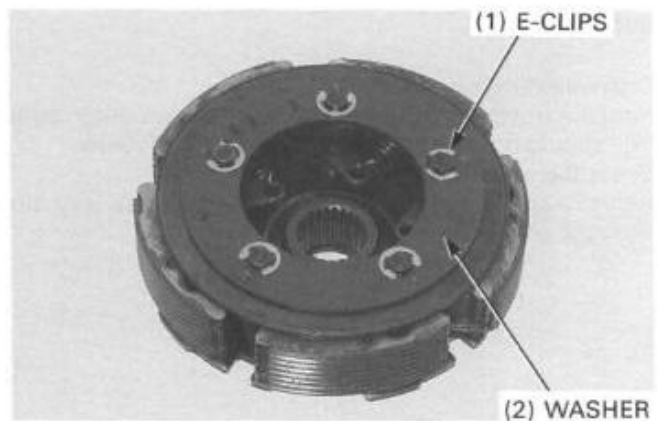
Measure the I.D. of the clutch drum.

SERVICE LIMIT: 140.4 mm (5.53 in)



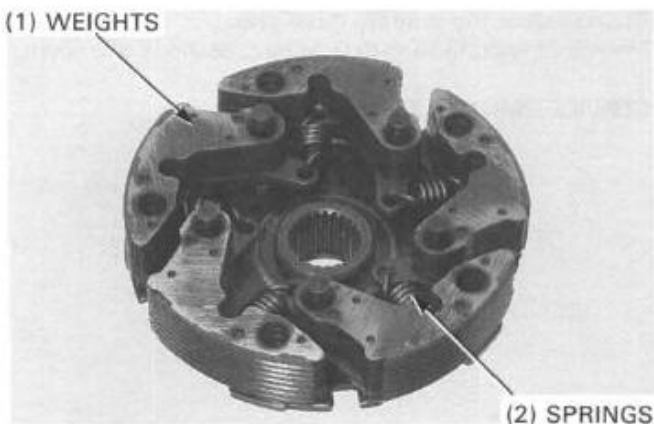
Weight spring/clutch spring

Remove the E-clips, washer, clutch spring and washer.



Remove the weight springs and clutch weights from the drive plate.

(1) WEIGHTS



(2) SPRINGS

Measure the height of the clutch spring.

SERVICE LIMIT: 2.95 mm (0.116 in)

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

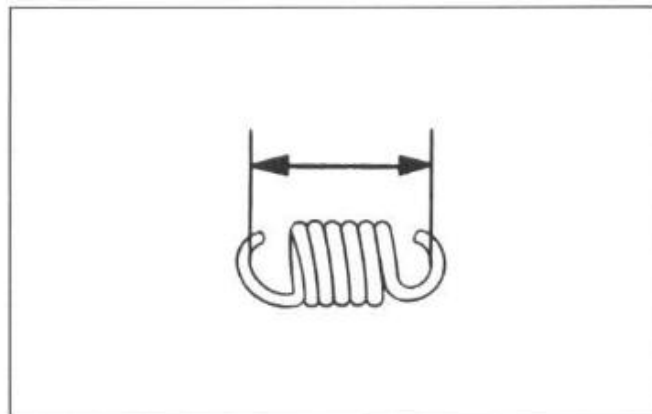


Check the weight springs for wear or damage, and replace if necessary.

Measure the length of the weight spring.

SERVICE LIMIT: 22.5 mm (0.89 in)

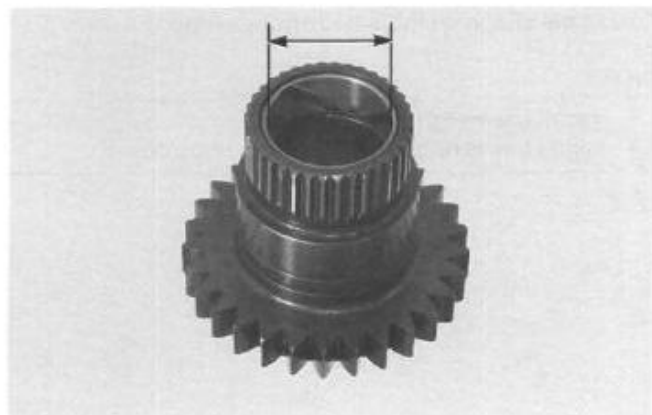
Replace the spring if they are longer than the service limit.



Primary drive gear

Inspect the primary drive gear for damage or excessive wear. Measure the primary drive gear I.D.

SERVICE LIMIT: 27.05 mm (1.065 in)

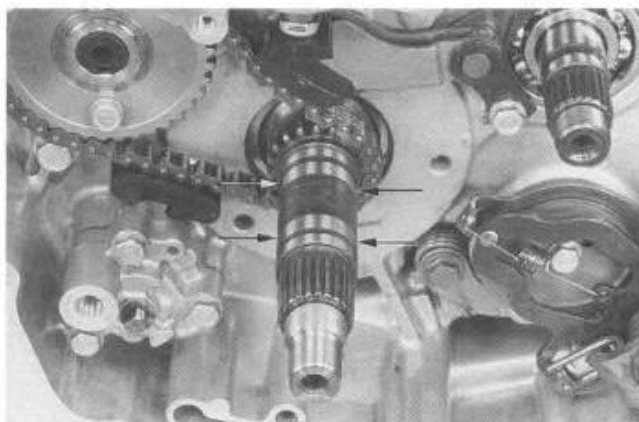


CLUTCH

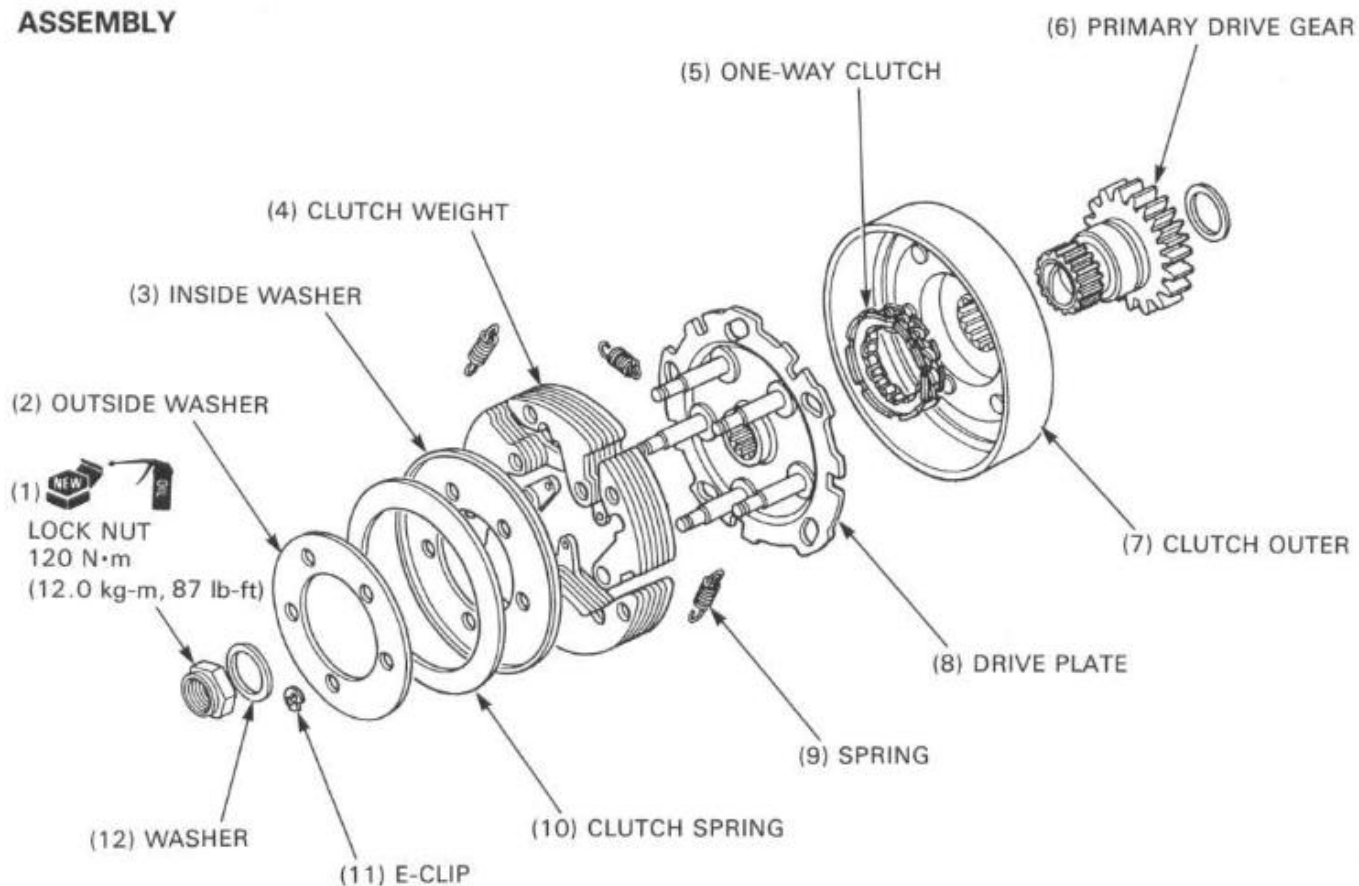
Crankshaft at the primary drive gear

Measure the crankshaft O.D. at two locations as shown.

SERVICE LIMIT: 26.93 mm (1.060 in)



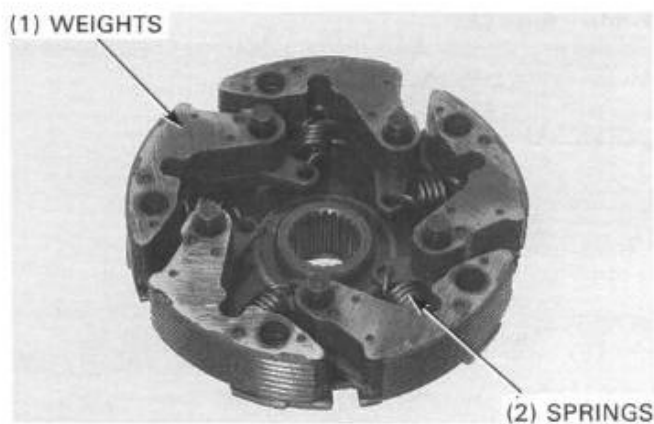
ASSEMBLY



Install the clutch weights and springs onto the drive plate.

NOTE

- Install the weights as shown.
- Install the springs with the open ends down.



Install the inside washer and clutch spring.

NOTE

- Install the spring with the dished face down towards the inside as shown.

Install the outside washer with the locating pins facing out.

Place the clutch weight assembly in a vise and tighten the jaws just enough to compress the clutch spring. Install the E-clips with their gaps aligned with the locating pins.

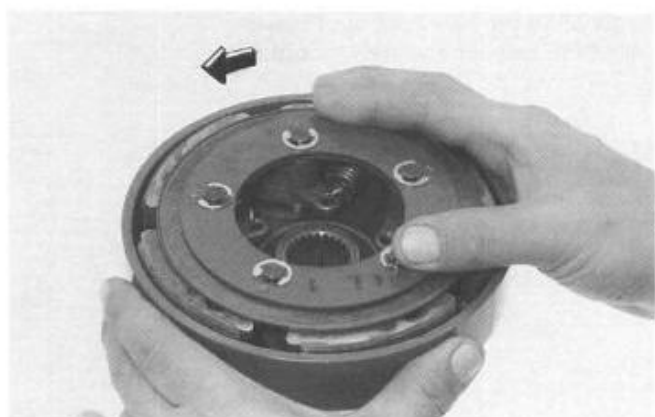
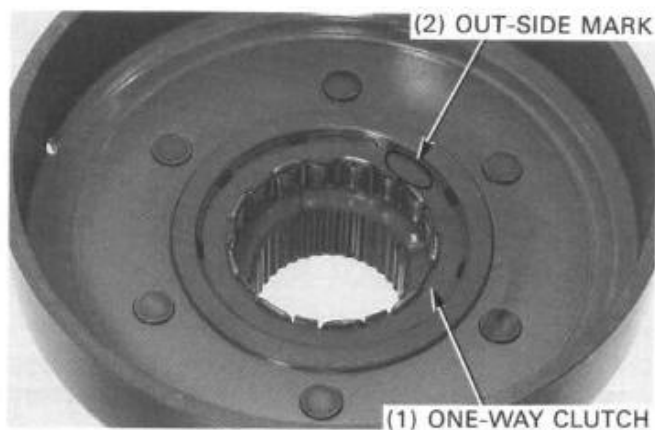
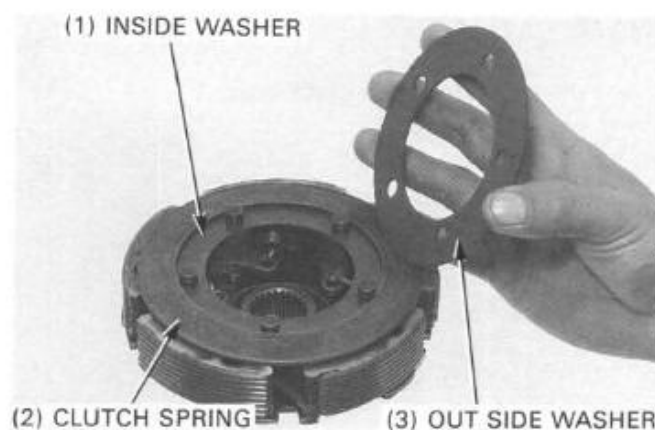
CAUTION

- When compressing the clutch spring, be careful not to damage the clutch weight assembly.

Inspect the one-way clutch for smooth operation and check the rollers for excessive wear.

Install the one-way clutch in the clutch drum with its "OUT-SIDE" mark facing out.

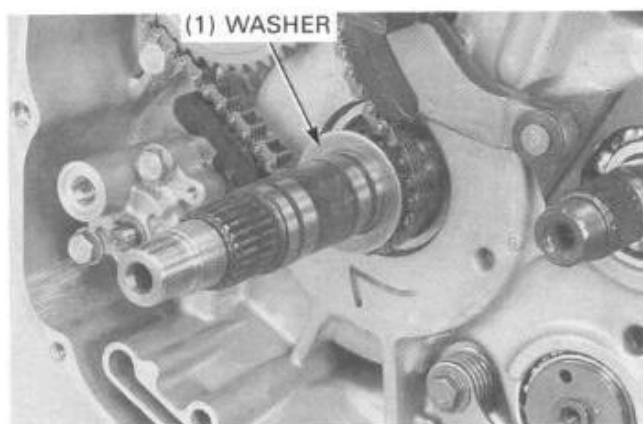
Install the centrifugal clutch weight assembly in the clutch drum, rotating the weight assembly counterclockwise.



CLUTCH

INSTALLATION

Install the washer onto the crankshaft.



Install the primary drive gear.

Install the change clutch (page 8-15).



Install the centrifugal clutch weight assembly and clutch drum to the crankshaft.

NOTE

- How to install: First align the splines of the drive plate and crankshaft; and then rotating the clutch outer, align the splines of the primary drive gear and clutch outer.

Tap the clutch drum lightly using the special tools.

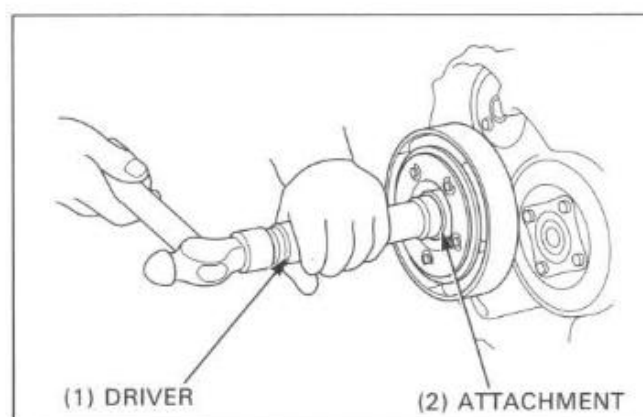
TOOLS:

Driver, 22 mm I.D.

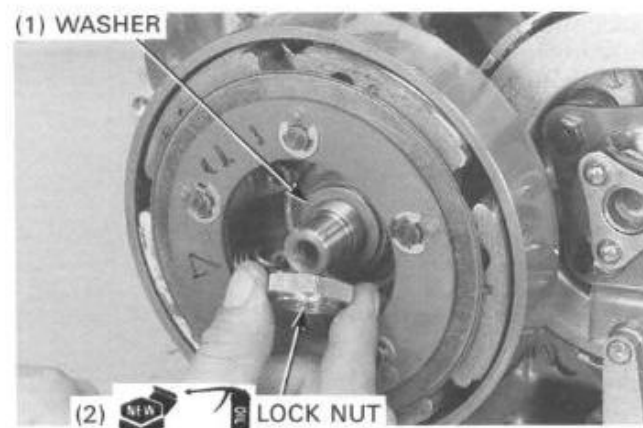
07746 - 0020100

Attachment, 20 mm I.D.

07746 - 0020400



Apply oil to the new lock nut threads.
Install the washer and new lock nut.



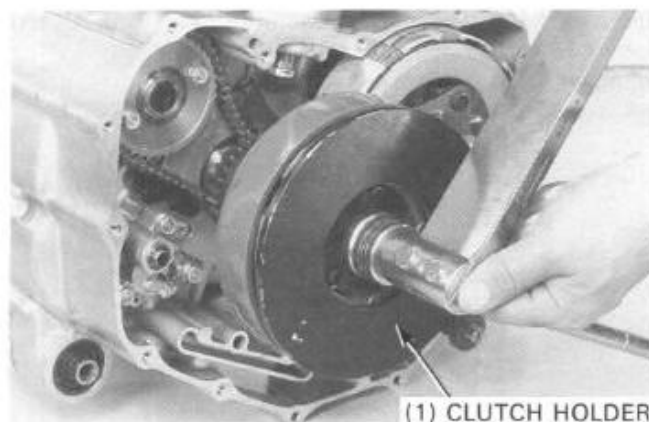
Hold the centrifugal clutch weight assembly with the special tool and tighten the lock nut to the specified torque.

TORQUE: 120 N·m (12.0 kg·m, 87 lb·ft)

TOOL:

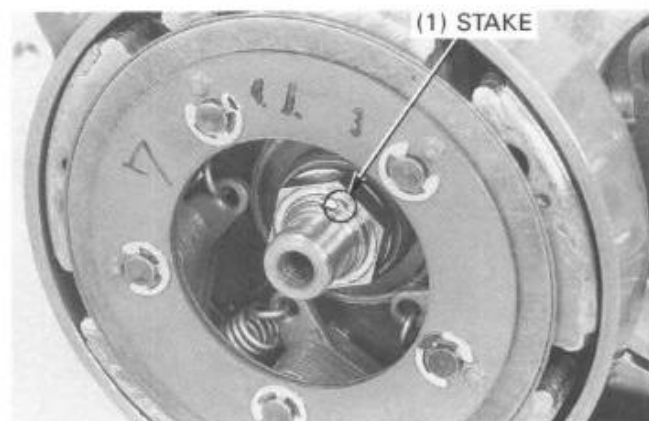
Clutch holder

07GMB – HA70101



Stake the lock nut.

Install the front crankcase cover (page 8-17).

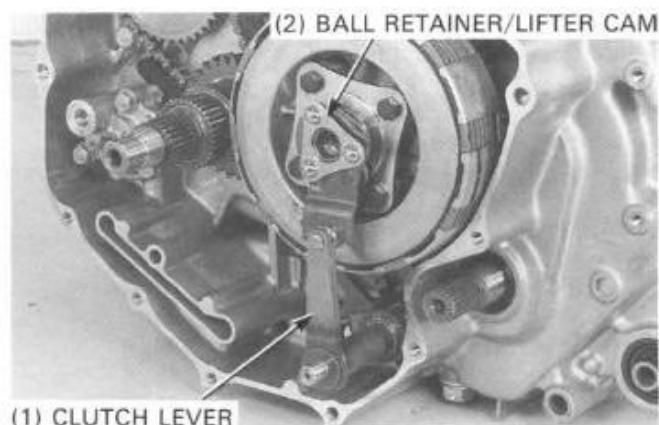


CHANGE CLUTCH

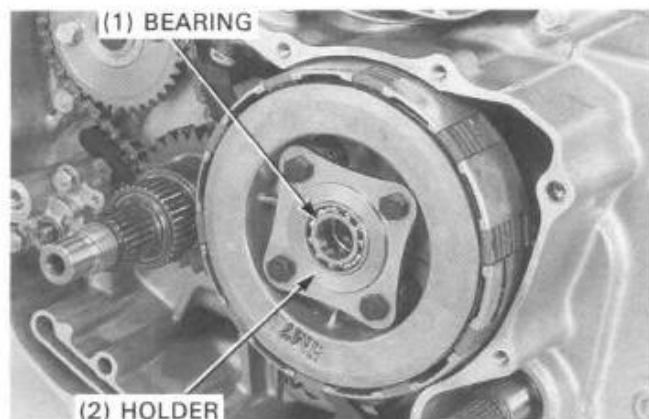
REMOVAL

Remove the following:

- Front crankcase cover (page 8-3)
- Centrifugal clutch (page 8-4)
- Clutch lever
- Ball retainer and spring
- Lifter cam

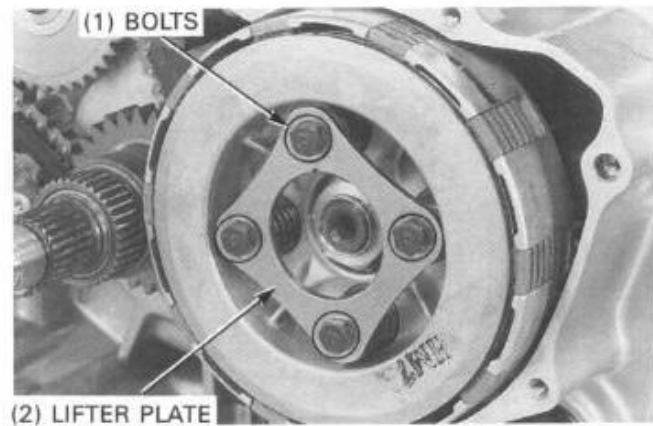


Remove the lifter bearing and bearing holder.

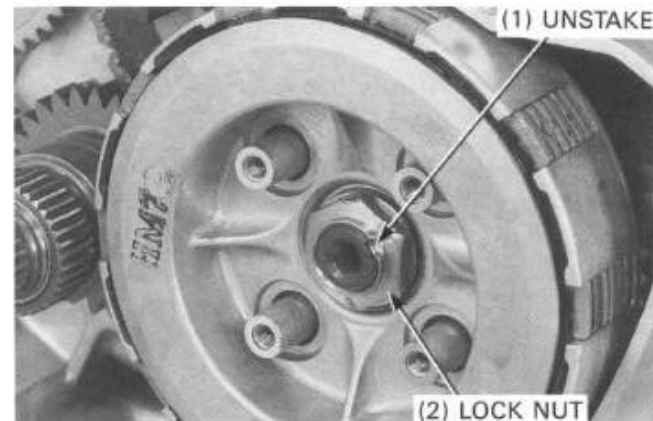


CLUTCH

Remove the clutch bolts, loosening them in a crisscross pattern in 2 or 3 steps.
Remove the lifter plate and clutch springs.



Unstake the clutch center lock nut.

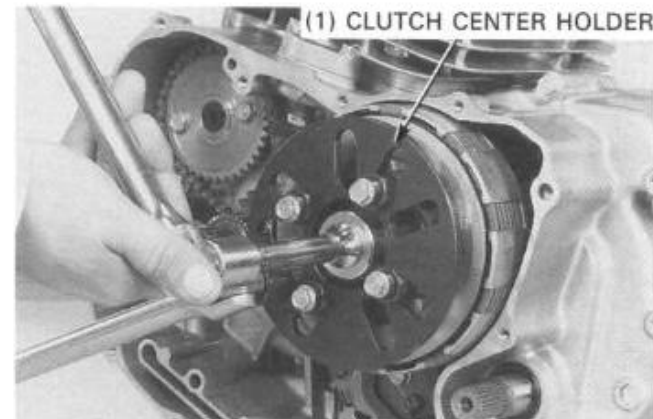


Install the special tool using four 6 X 55 mm bolts as shown, and remove the clutch lock nut.

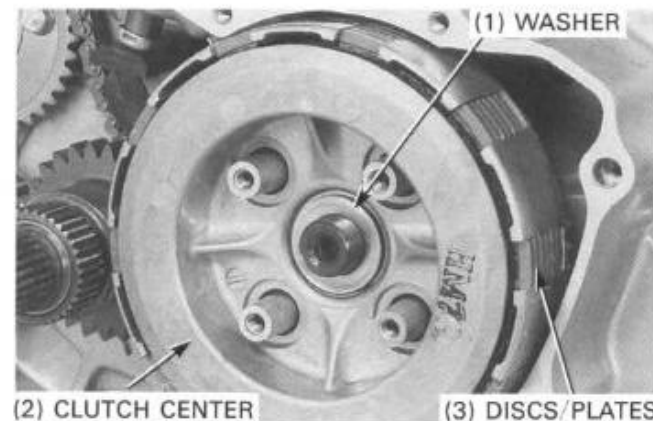
TOOL :

Clutch center holder 07JMB - MN50300 or
 07HGB - 001000A (U.S.A. only)

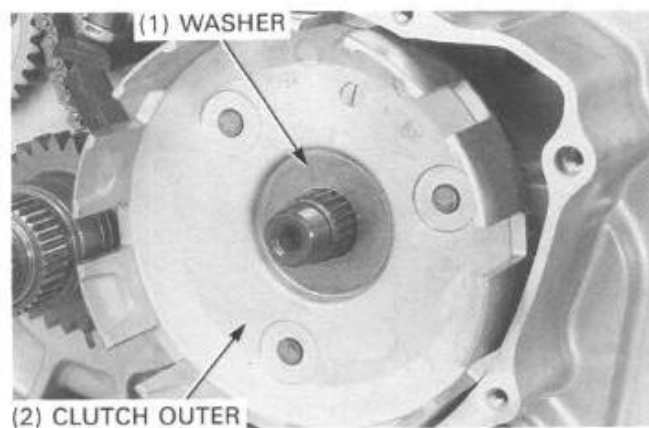
Discard the lock nut.



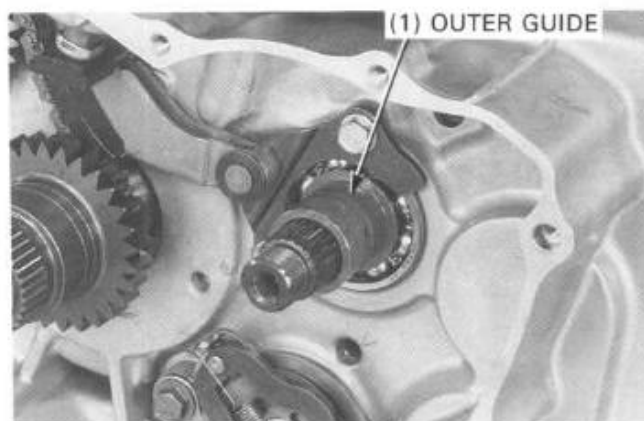
Remove the washer, clutch center, discs, plates and pressure plate as an assembly.



Remove the thrust washer and clutch outer.



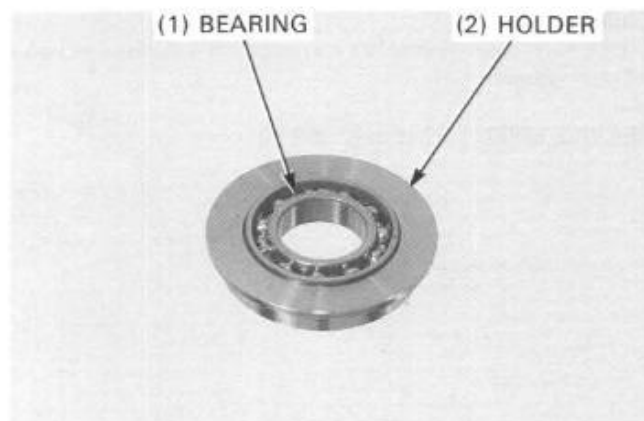
Remove the clutch outer guide from the mainshaft.



INSPECTION

Clutch lifter bearing

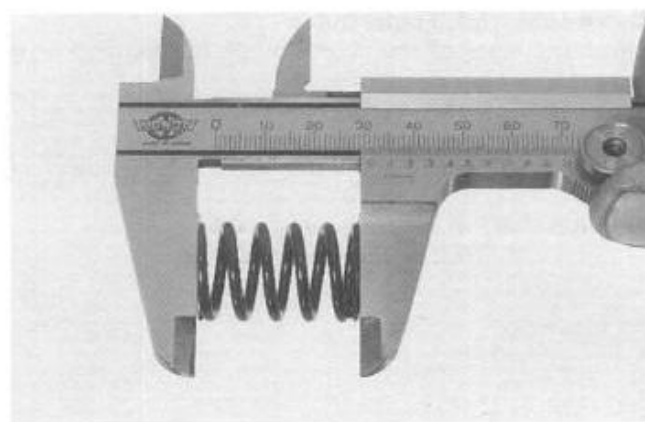
Turn the lifter bearing inner race with your finger. The bearing should turn smoothly and freely without excessive play. If necessary replace the bearing.



Clutch spring

Measure the clutch spring free length.

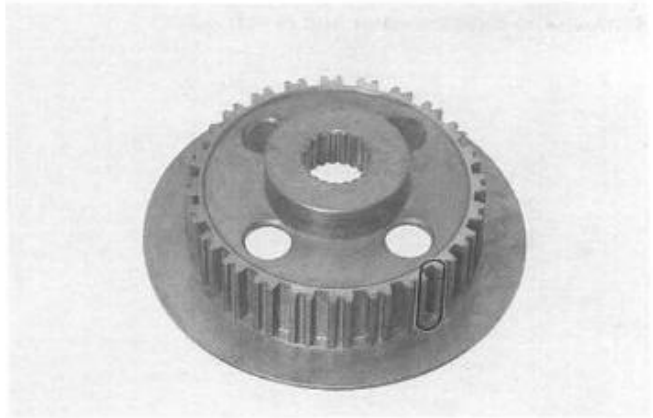
SERVICE LIMIT: 31.0 mm (1.22 in)



CLUTCH

Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates.
Replace if necessary.

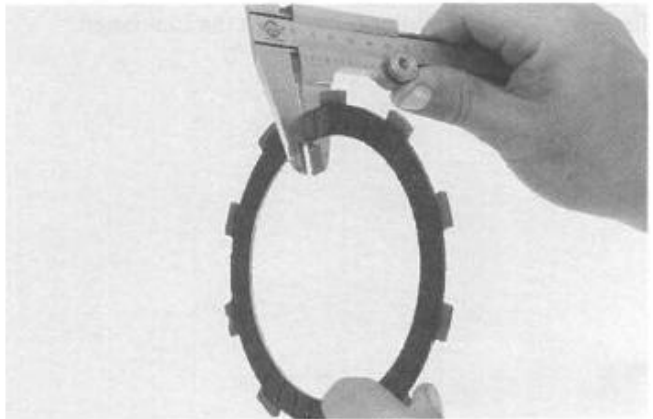


Clutch disc

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

Measure the thickness of each disc.

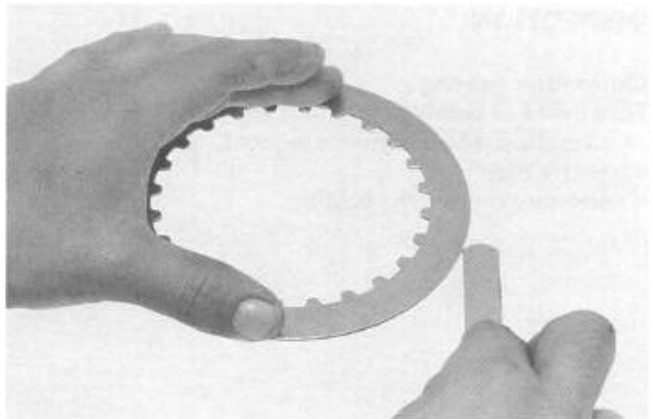
SERVICE LIMIT: 2.3 mm (0.09 in)



Clutch plate

Check each clutch plate for warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.20 mm (0.008 in)

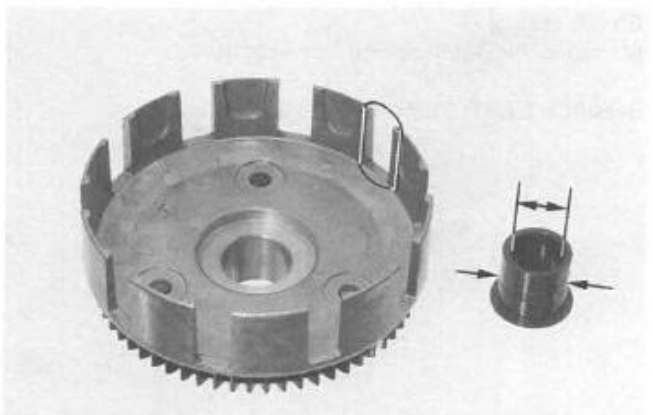


Clutch outer/clutch outer guide

Check the slots of the clutch outer for damage or wear caused by the clutch discs.
Replace if necessary.

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

SERVICE LIMIT: O.D.: 27.92 mm (1.099 in)
I.D.: 22.05 mm (0.868 in)

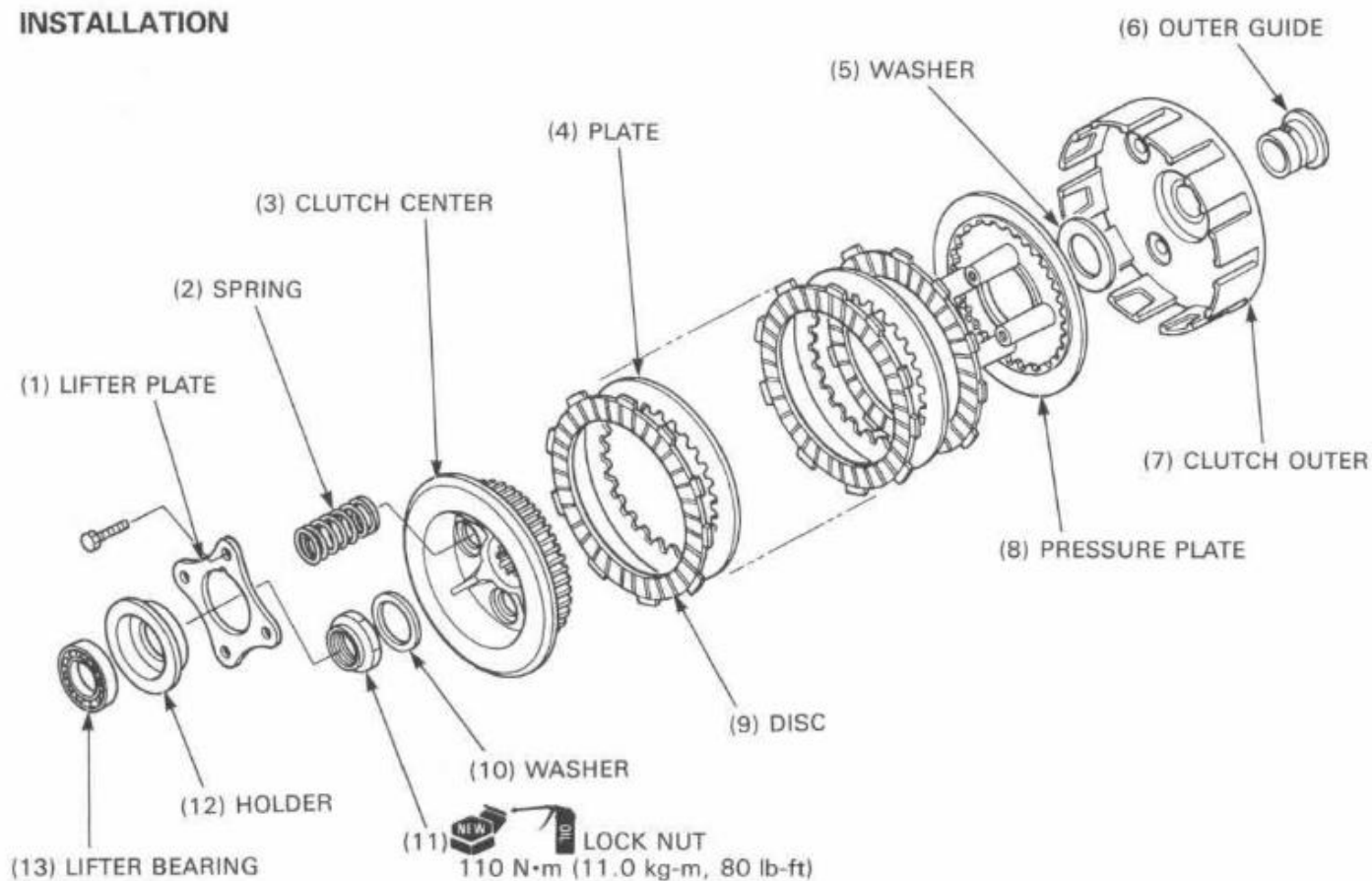


Mainshaft at the clutch outer guide
Measure the O.D. of the mainshaft.

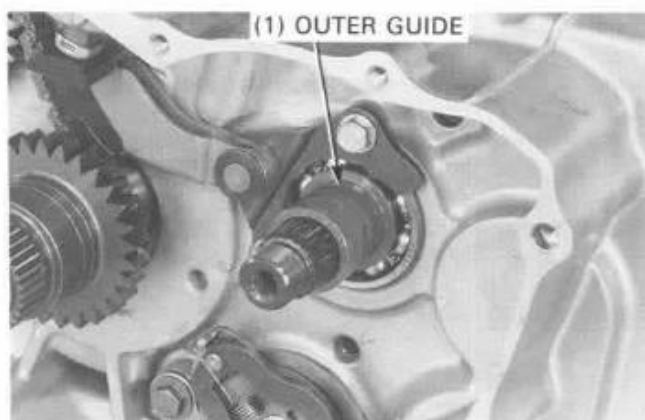
SERVICE LIMIT: 21.93 mm (0.863 in)



INSTALLATION



Apply molybdenum disulfide oil to the inner and outer surfaces of the clutch outer guide.
Install the clutch outer guide on the mainshaft.

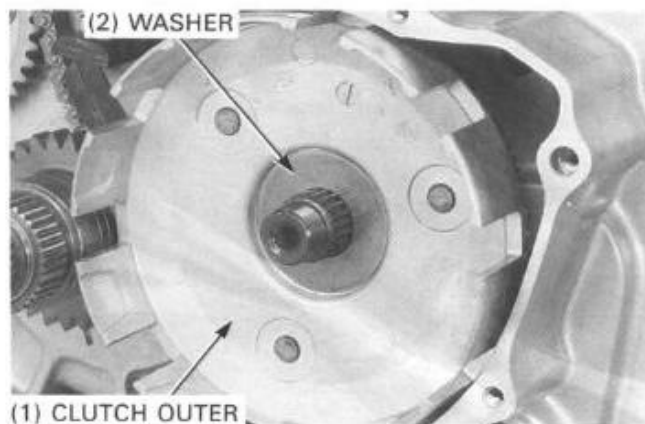


CLUTCH

Install the clutch outer and thrust washer.

NOTE

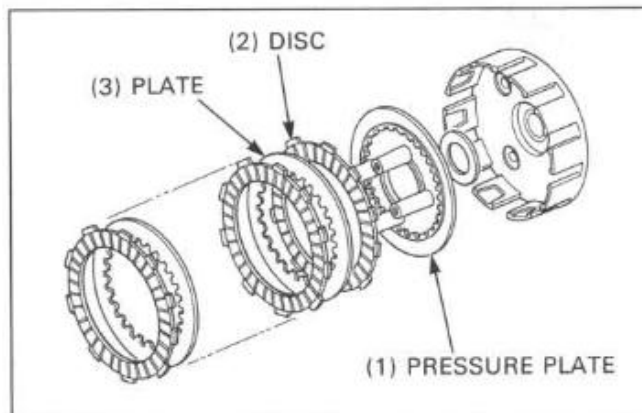
- Confirm that the primary drive gear and washer are installed.



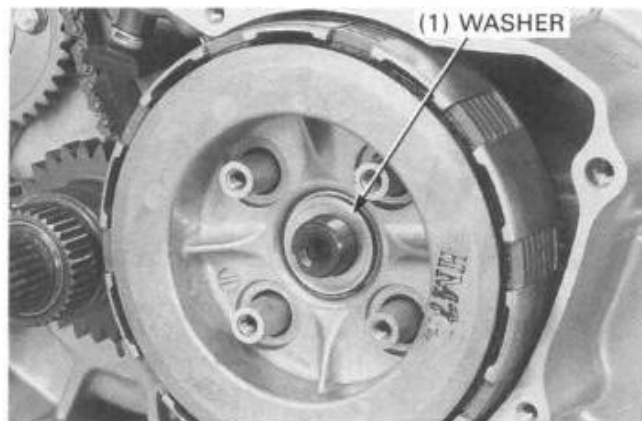
Assemble the clutch pressure plate, discs, plates and clutch center, and install them in the clutch outer. Coat new clutch discs with clean engine oil. Stack the discs and plates alternately.

NOTE

- Be sure the clutch center and pressure plate grooves are properly aligned, or the clutch will not operate properly.



Install the washer, on the mainshaft.

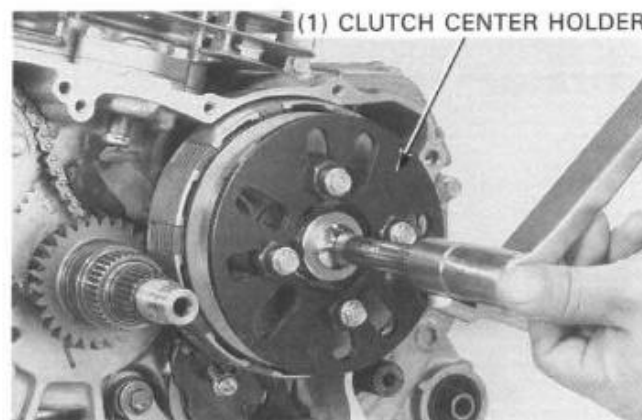


Apply oil to the new lock nut threads.
Install a new lock nut.
Hold the clutch center using the special tool and four 6 X 55 mm bolts.
Tighten the lock nut to the specified torque.

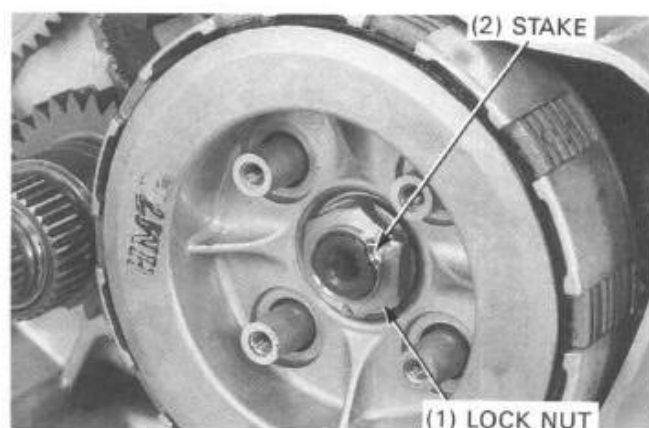
TOOL:

Clutch center holder 07JMB - MN50300 or
 07HGB - 001000A (U. S. A. only)

TORQUE: 110 N·m (11.0 kg-m, 80 lb-ft)

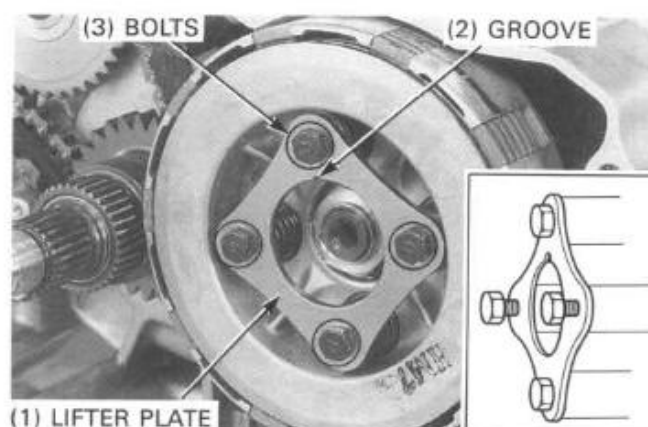


Stake the clutch center lock nut.



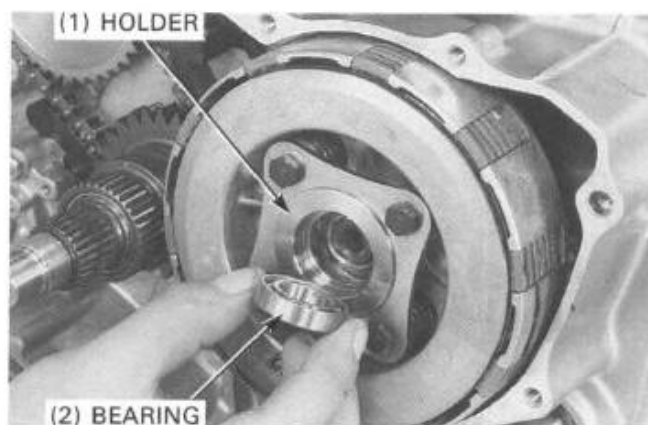
Install the clutch springs, lifter plate and bolts. Loosely tighten the clutch bolts. Then tighten the index groove side bolts first; to center the clutch lifter plate.

TORQUE: 12 N·m (1.2 kg·m, 9 lb·ft)



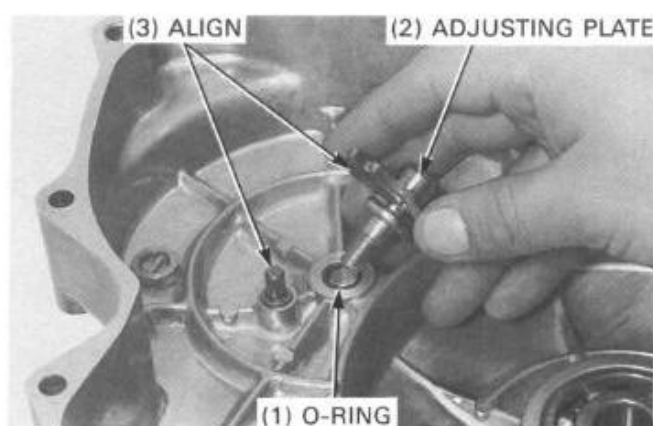
Install the following:

- Lifter bearing holder
- Lifter bearing
- Lifter cam
- Clutch lever aligning the wide splines and centering in the lifter cam
- Centrifugal clutch (page 8-10)
- Front crankcase cover



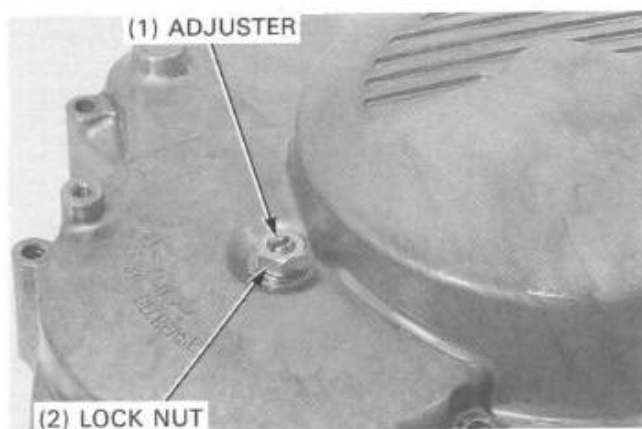
FRONT CRANKCASE COVER INSTALLATION

Install the O-ring and clutch adjusting plate by aligning its cut-out with the crankcase cover stopper pin.

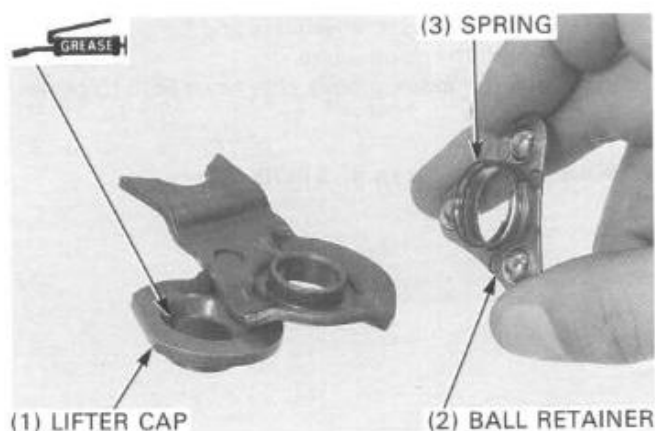


CLUTCH

Install the adjuster lock nut.



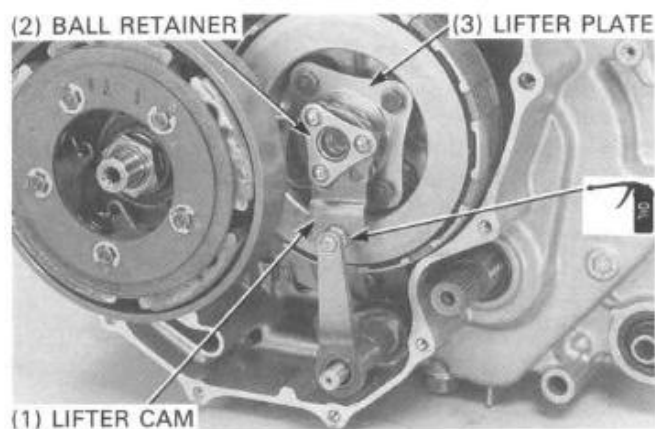
Apply grease to the clutch lifter cap.
Install the ball retainer and spring to the clutch lifter cam.



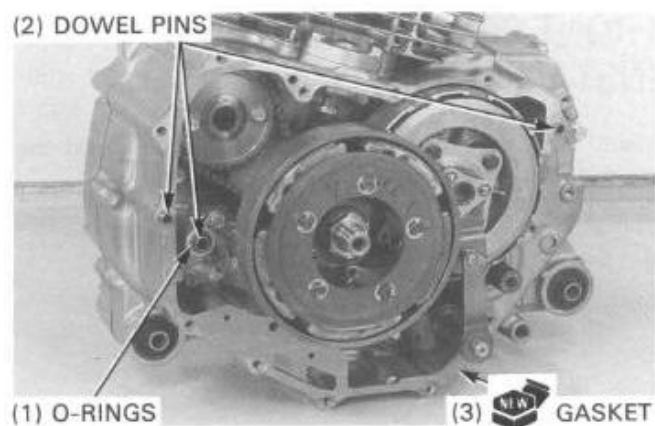
Apply oil to the clutch lever.
Install the clutch lifter cam and ball retainer to the clutch lifter plate as shown.

NOTE

- Make sure the clutch lever points toward the center of clutch as shown.



Install the O-ring and dowel pin onto the oil pump.
Install the dowel pins and new gasket.

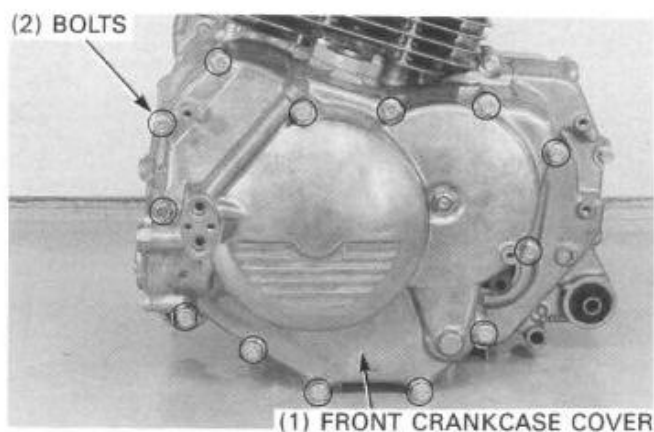


Install the front crankcase cover and tighten the bolts in 2 or 3 steps in a crisscross pattern.

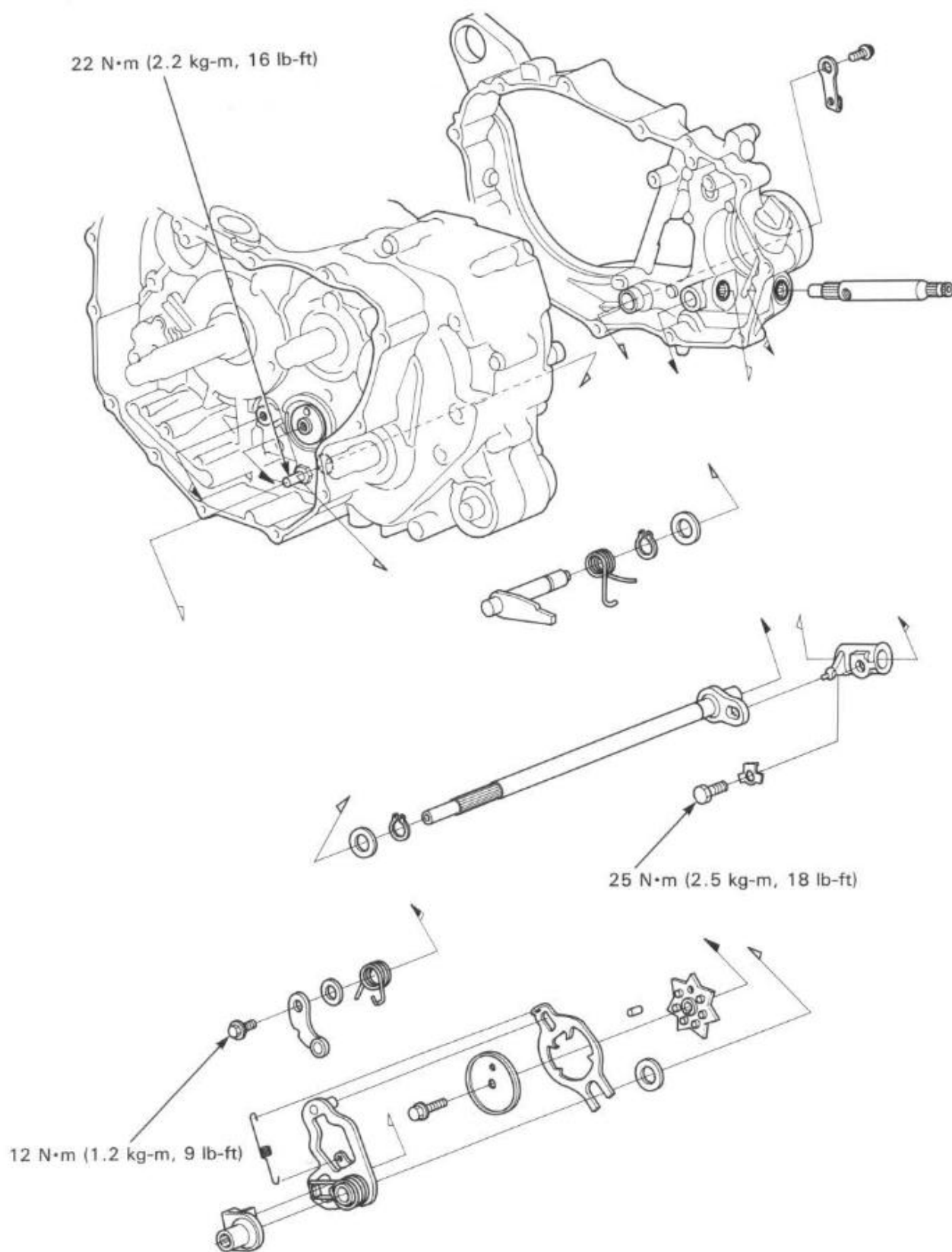
Install the right engine side cover.

Install the oil cooler pipe (page 4-3).
Pour recommended engine oil (page 3-10).
Make sure there are no oil leaks.

Adjust the clutch (page 3-17).



GEARSHIFT LINKAGE



9. GEARSHIFT LINKAGE

SERVICE INFORMATION	9-1	GEARSHIFT LINKAGE INSPECTION	9-4
TROUBLESHOOTING	9-1	GEARSHIFT LINKAGE INSTALLATION	9-4
GEARSHIFT LINKAGE REMOVAL	9-2	REVERSE STOPPER SHAFT	9-7

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the gearshift linkage.
- The engine must be removed from the frame before servicing the gearshift linkage.

TORQUE VALUES

Gearshift drum stopper arm bolt	12 N•m (1.2 kg-m, 9 lb-ft)
Gearshift return spring pin	22 N•m (2.2 kg-m, 16 lb-ft)
Gearshift A arm bolt	25 N•m (2.5 kg-m, 18 lb-ft)

TROUBLESHOOTING

Transmission jumps out of gear

- Shift drum stopper arm broken

Gearshift pedal will not return

- Weak or broken shift return spring
- Shift spindle binding with case

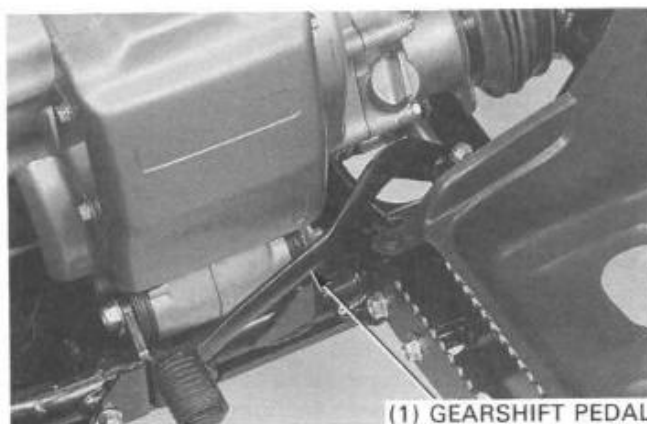
GEARSHIFT LINKAGE REMOVAL

Remove the following:

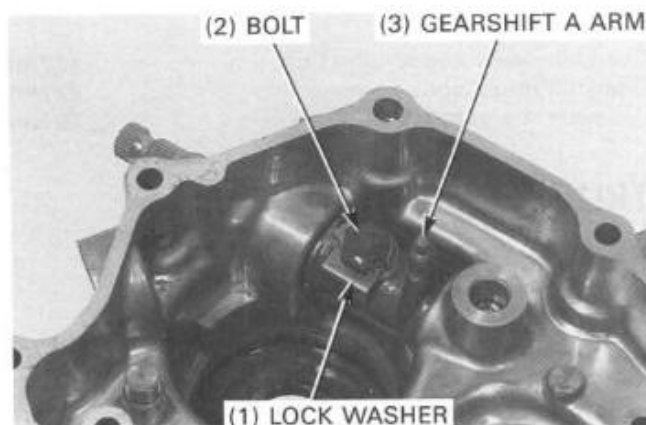
- Centrifugal clutch (page 8-4)
- Change clutch (page 8-11)

Remove the gearshift pedal.

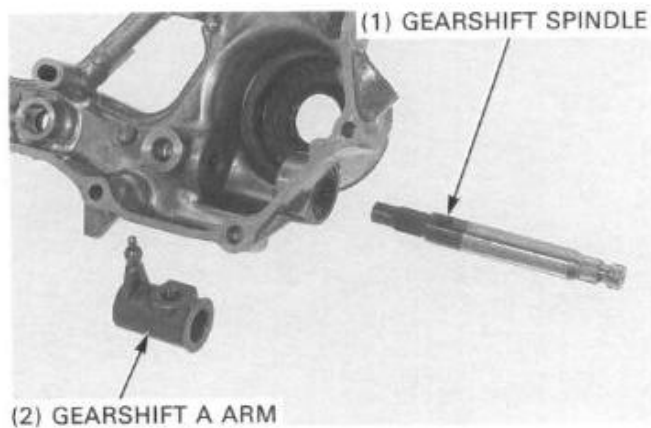
Remove the rear crankcase cover (page 10-7).



Bend down the tab of the lock washer of gearshift A arm.
Remove the bolt and lock washer.

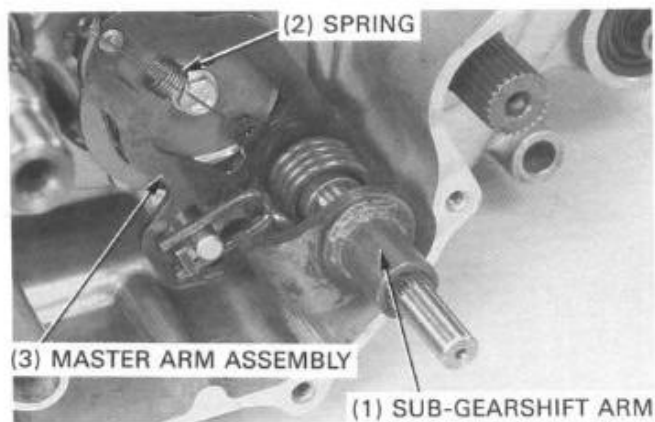


Remove the gearshift spindle and gearshift A arm.

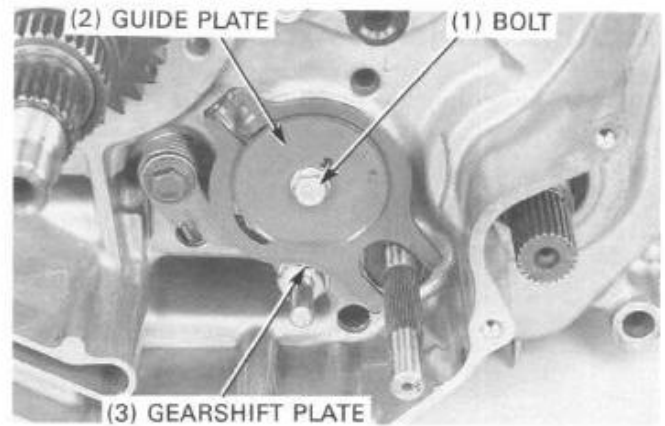


Remove the sub-gearshift arm.

Unhook the shift arm spring from the gearshift plate.
Remove the gearshift master arm assembly.

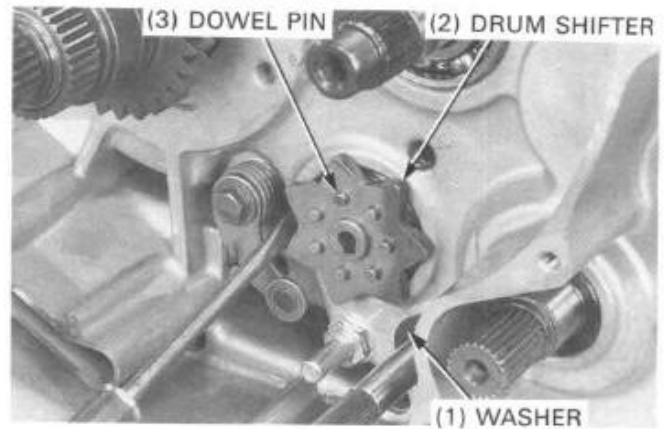


Remove the gearshift plate bolt.
Remove the shift guide plate and gearshift plate.

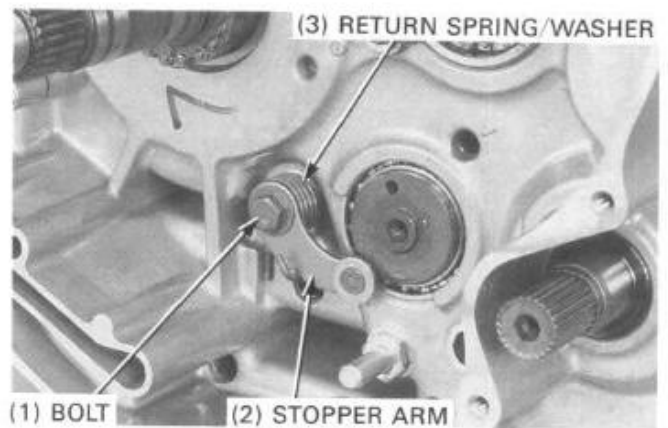


Remove the thrust washer from the sub-gearshift spindle.

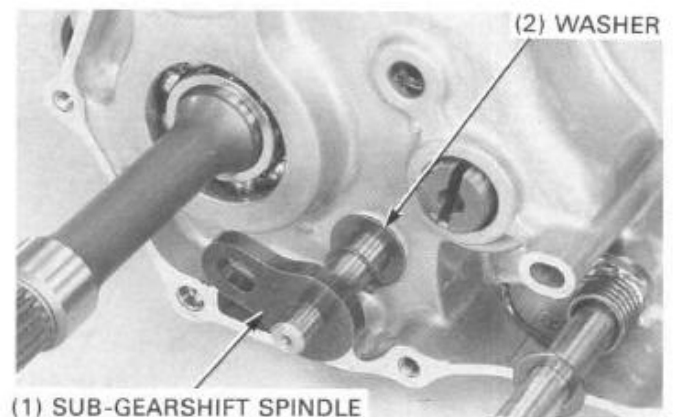
Remove the drum shifter while holding the stopper arm using a screwdriver.
Remove the dowel pin.



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

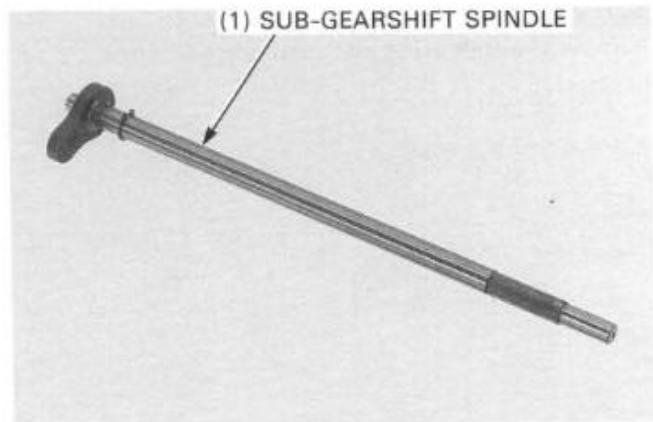


Remove the sub-gearshift spindle and thrust washer from the rear crankcase.

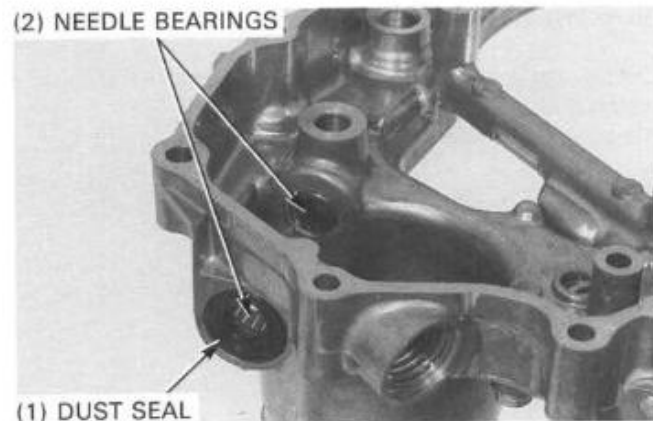


GEARSHIFT LINKAGE INSPECTION

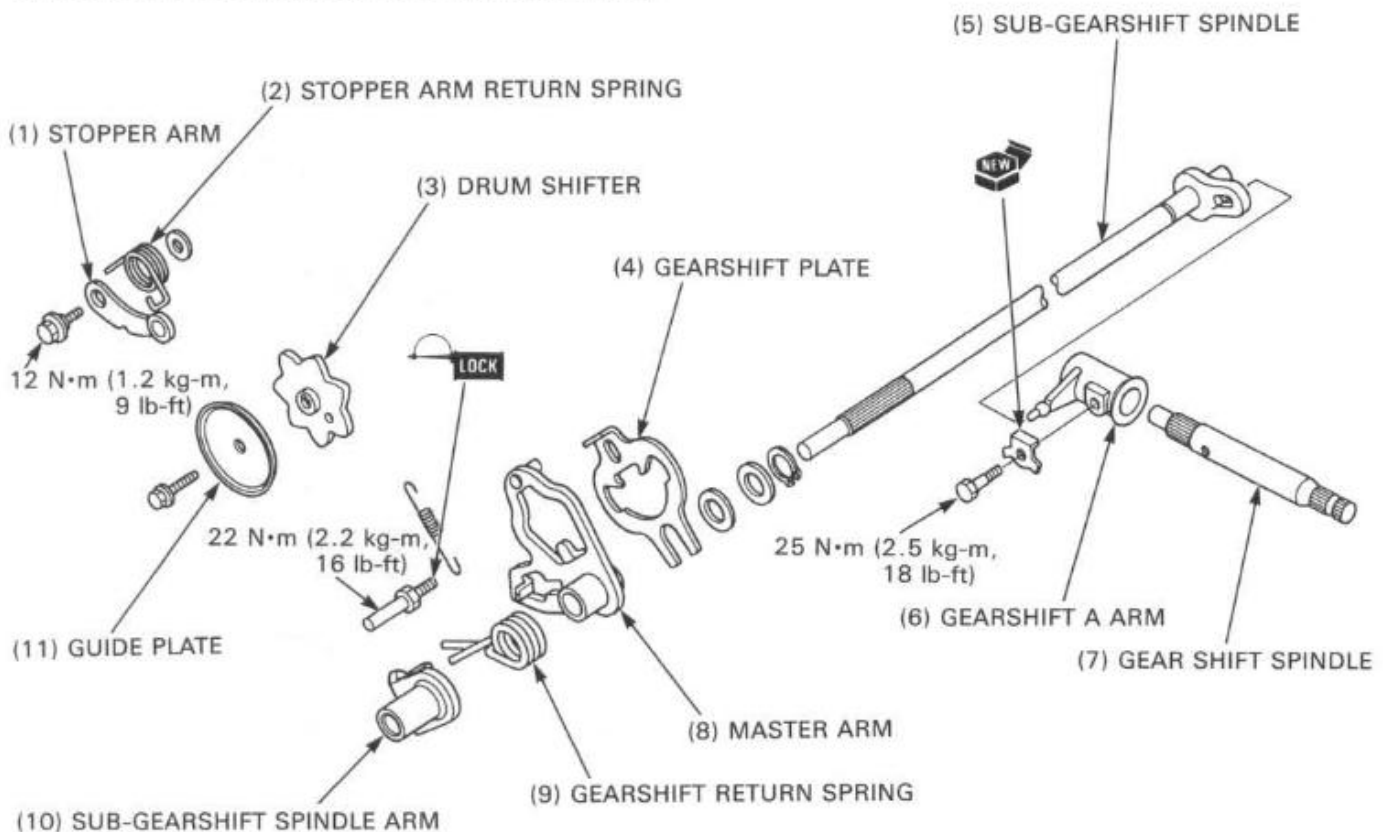
Inspect the sub-gearshift spindle for bending or other damage.



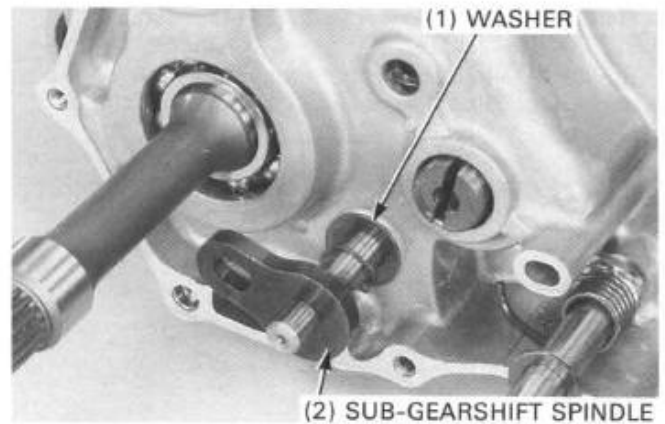
Inspect the gearshift spindle dust seal and needle bearings for wear or damage.



GEARSHIFT LINKAGE INSTALLATION



Install the sub-gearshift spindle and thrust washer from the rear crankcase.



Install the thrust washer onto the sub-gearshift spindle.

Install the return spring, washer and stopper arm into the crankcase.

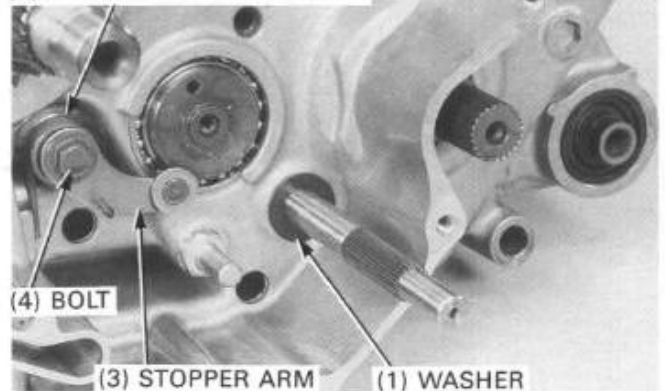
Install and tighten the stopper arm bolt.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

If the return spring pin was removed, apply a locking agent to the threads and install it.

TORQUE: 22 N·m (2.2 kg-m, 16 lb-ft)

(2) RETURN SPRING/WASHER

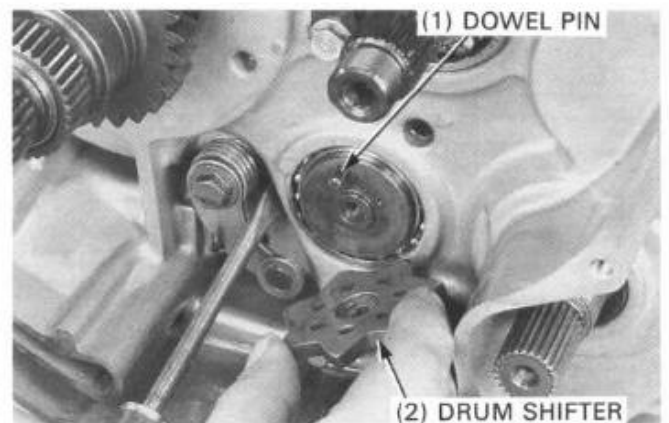


Install the dowel pin on the gearshift drum.

Install the drum shifter while holding the stopper arm using a screwdriver.

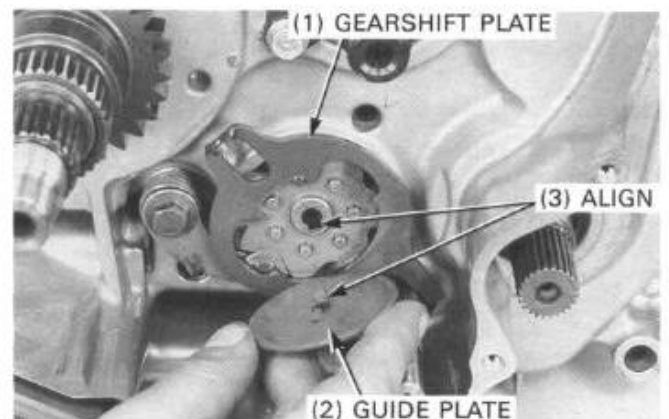
NOTE

- The transmission is in neutral when the dowel pin is aligned with the index mark on the crankcase.



Install the gearshift plate.

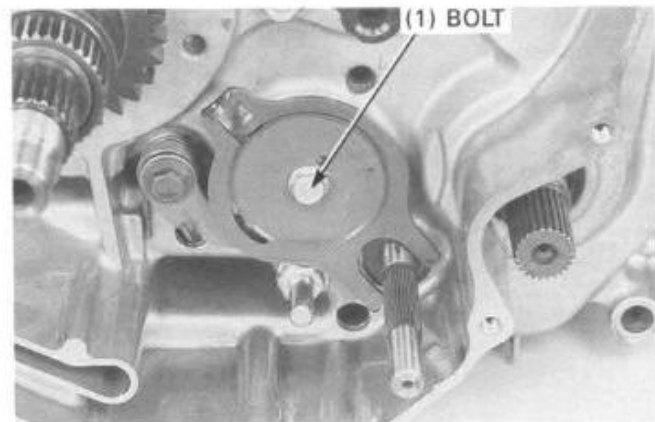
Install the shift guide plate aligning the boss with the gearshift cam groove.



GEARSHIFT LINKAGE

Install and tighten the gearshift cam plate bolt.

Align the hole in the plate with the index mark on the crank case to place the transmission in neutral.

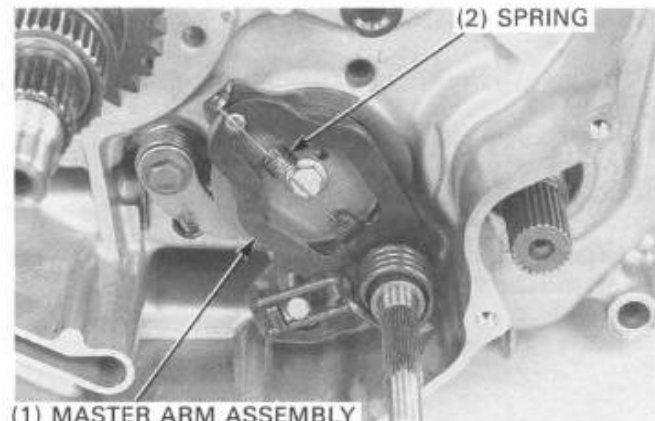


Install the gearshift master arm and return spring onto the sub-gearshift spindle.

NOTE

- Install the master arm aligning the return spring ends with the crankcase stopper pin.

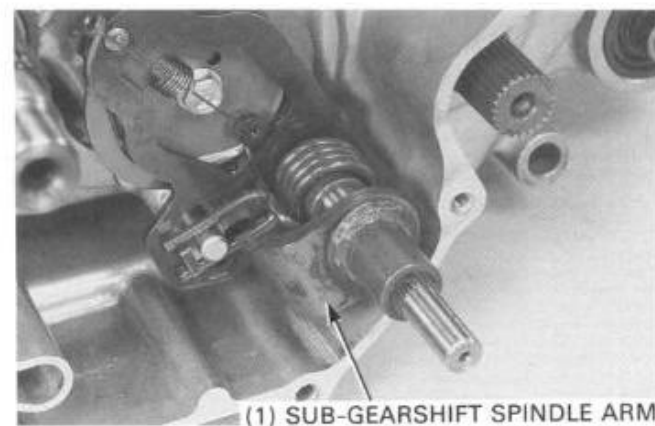
Hook the shift arm spring between the master arm and gearshift arm.



Install the sub-gearshift spindle arm onto the spindle.

NOTE

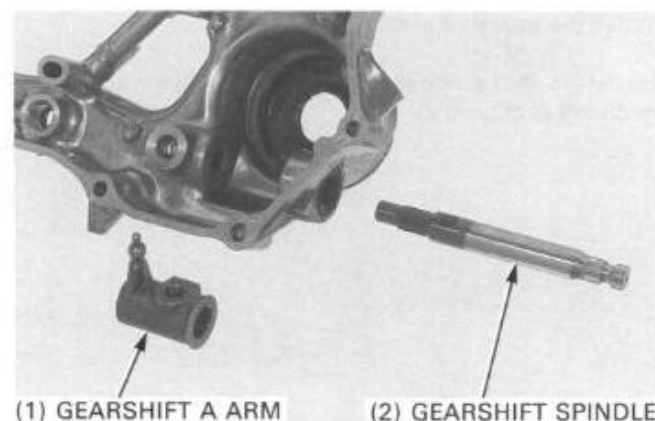
- Align the wide splines between the arm boss and sub-gearshift spindle.



Install the gearshift A arm into the rear crankcase cover groove, then install the gearshift spindle.

NOTE

- Align the wide splines between the gearshift arm A and spindle.

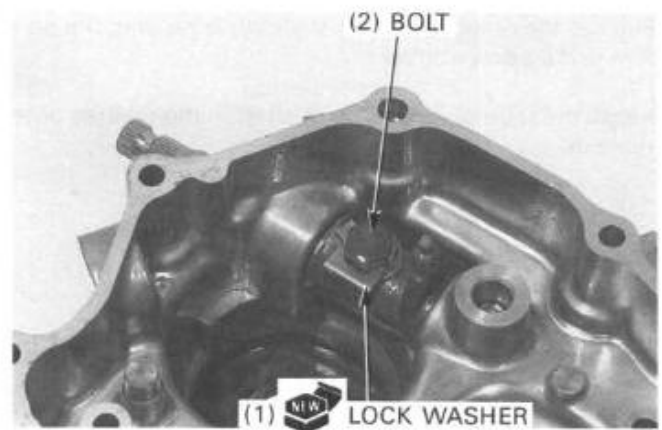


Install the new lock washer and bolt, then tighten the bolt to the specified torque.

TORQUE: 25 N·m (2.5 kg-m, 18 lb-ft)

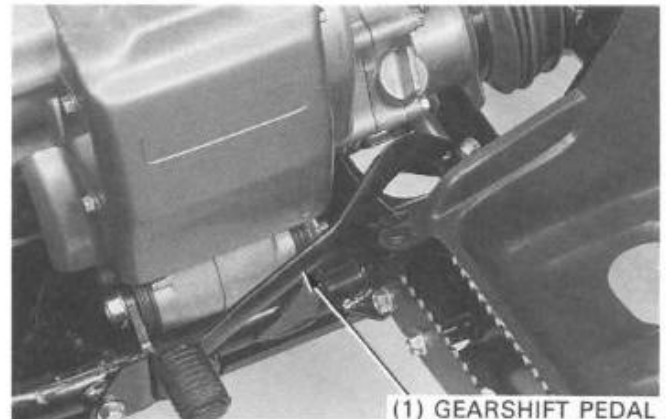
Bend the tab of the lock washer against the bolt.

Install the rear crankcase cover (page 10-11).



Install the gearshift pedal onto the gearshift spindle by aligning the punch marks.

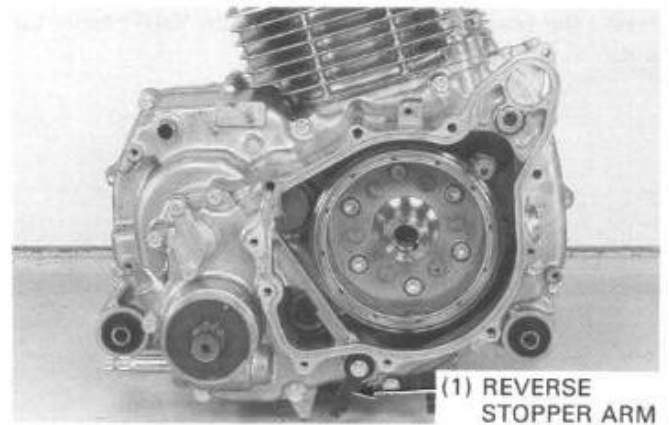
Install the removed parts in the reverse order of removal.



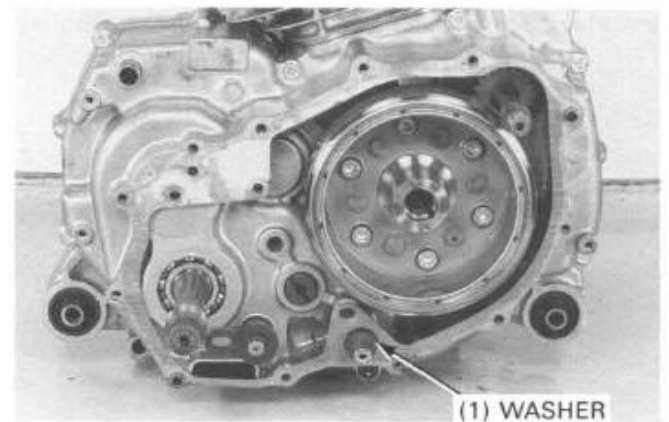
REVERSE STOPPER SHAFT

REMOVAL

Remove the bolt and reverse stopper arm.
Remove the rear crankcase cover (page 10-8).



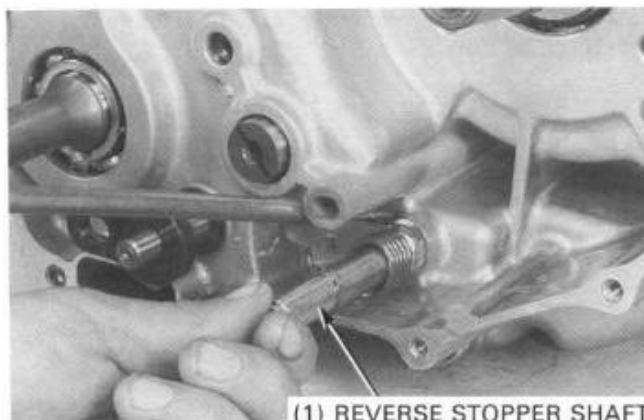
Remove the washer from the reverse stopper shaft.



GEARSHIFT LINKAGE

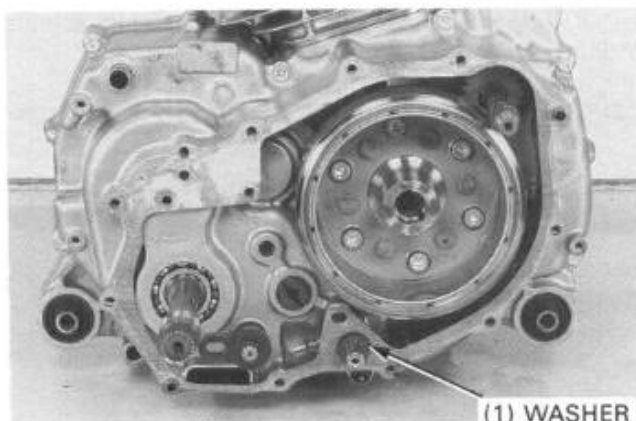
Pull out the reverse stopper shaft while holding the reverse arm using a screwdriver.

Install the reverse stopper arm shaft in the reverse order of removal.



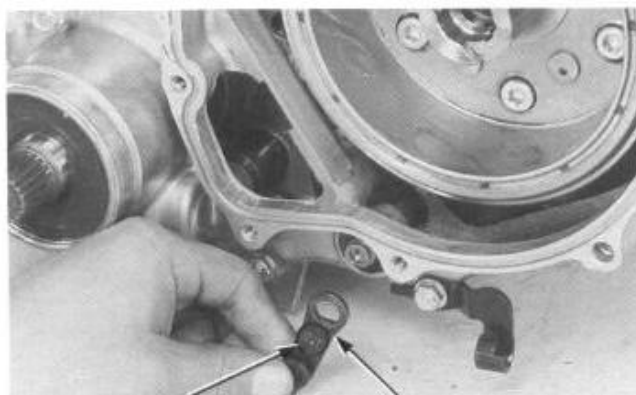
(1) REVERSE STOPPER SHAFT

Install the thrust washer onto the reverse stopper shaft. Install the rear crankcase cover (page 10-11).



(1) WASHER

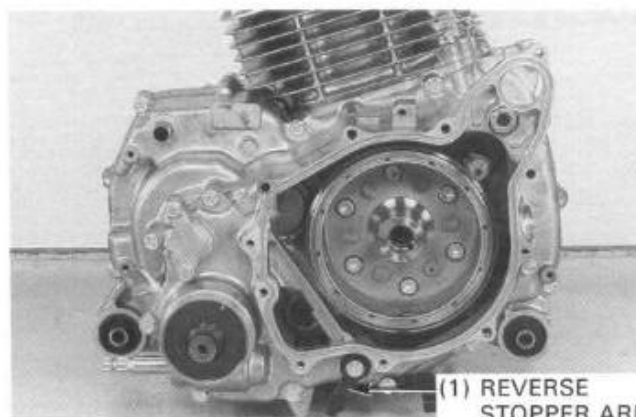
Install the reverse stopper arm with its "OUT" mark facing out.



(2) "OUT" MARK

(1) REVERSE STOPPER ARM

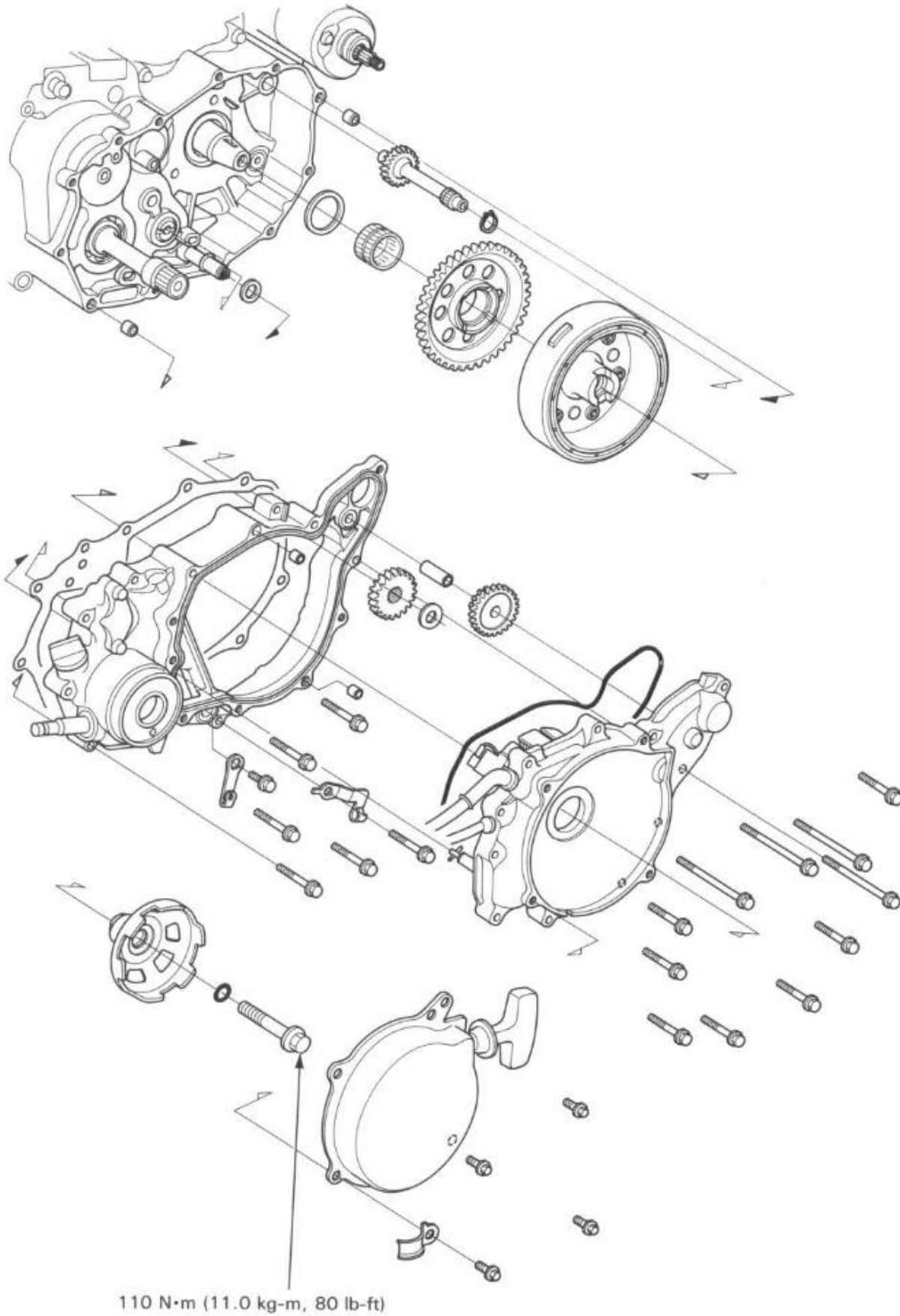
Install and tighten the reverse stopper arm bolt securely.



(1) REVERSE STOPPER ARM

MEMO

ALTERNATOR/STARTER CLUTCH



10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	ALTERNATOR REMOVAL	10-6
TROUBLESHOOTING	10-1	FLYWHEEL/STARTER CLUTCH	10-8
RECOIL STARTER	10-2	ALTERNATOR INSTALLATION	10-13

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the starter reduction gear, alternator, ignition pulse generator, flywheel and starter clutch.
- Refer to section 17 for alternator inspection, and to section 18 for ignition pulse generator inspection.
- These parts can be serviced with the engine in the frame.

TORQUE VALUES

Recoil pulley flange bolt	110 N•m (11.0 kg-m, 80 lb-ft)
Starter one-way clutch socket bolt	31 N•m (3.1 kg-m, 22 lb-ft)
Stator socket bolt	10 N•m (1.0 kg-m, 7 lb-ft)
Ignition pulse generator socket bolt	6 N•m (0.6 kg-m, 4.3 lb-ft)

TOOLS

Recoil pulley holder	07SMB – HM70100
Rotor puller	07733 – 0020001 or 07933-3950000 (U.S.A. only)
Flywheel holder	07725 – 0040000
Bearing remover set, 10 mm	07936 – GE00000
– Remover shaft	07936 – GE00100
– Remover head	07936 – GE00200
– Remover weight	07741 – 0010201
Driver	07749 – 0010000
Attachment, 24X26 mm	07746 – 0010700
Attachment, 52X55 mm	07746 – 0010400
Pilot, 10 mm	07746 – 0040100

10

TROUBLESHOOTING

Engine does not turn

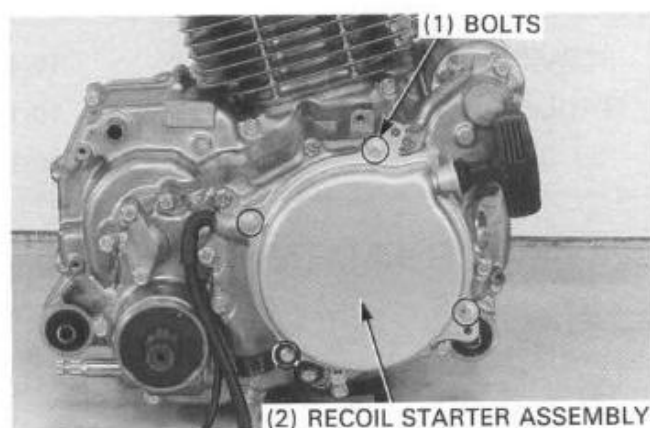
- Faulty one-way starter clutch
- Starter reduction gear broken

RECOIL STARTER

REMOVAL

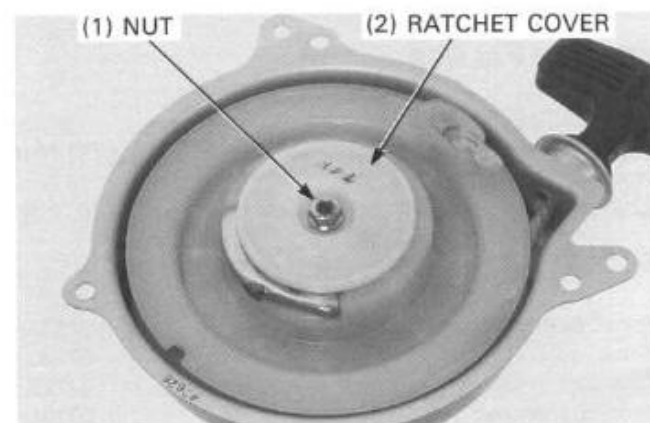
Remove the breather tube clamps from the recoil starter cover.

Remove the bolts and recoil starter assembly.



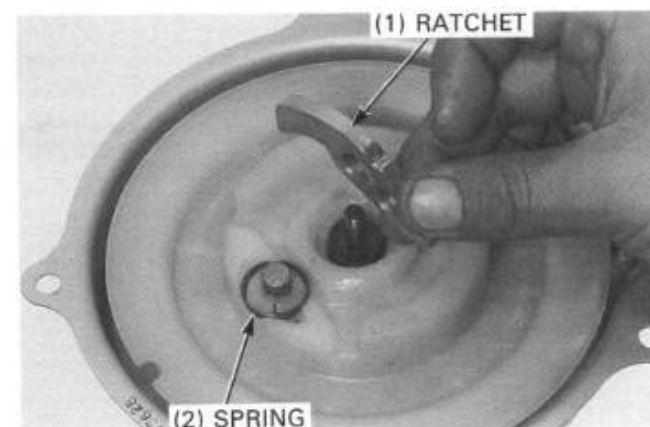
DISASSEMBLY

Remove the nut and the ratchet cover.



Remove the ratchet and spring.

Check each part for wear or damage.



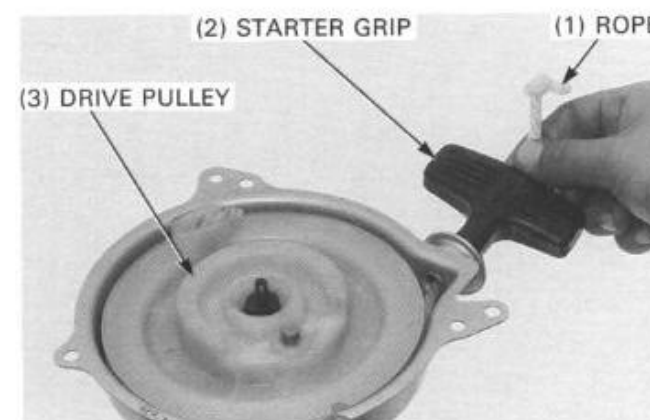
Untie the starter rope and remove the starter grip.

Release the starter rope slowly.

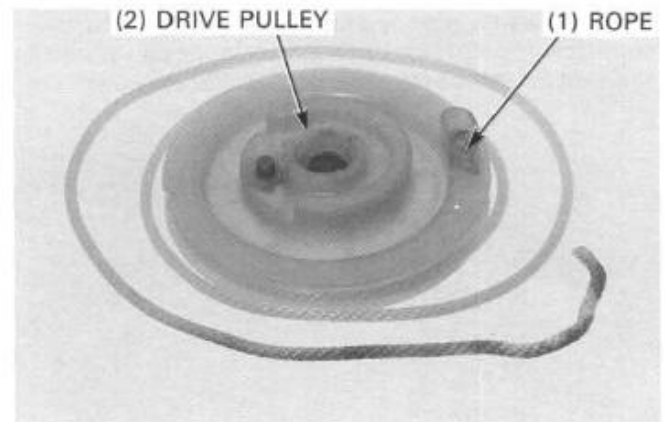
Remove the starter drive pulley.

CAUTION

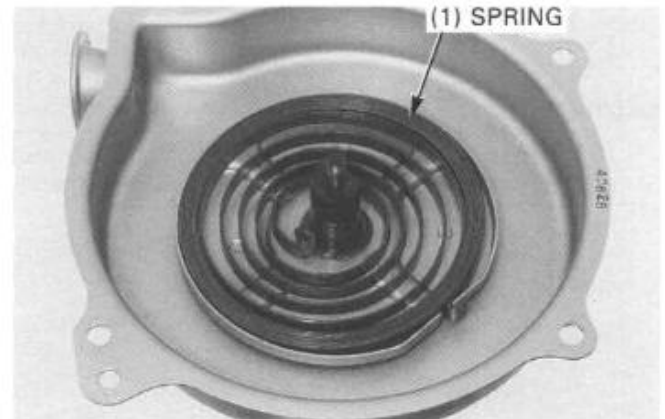
- Wear eye protection and use care when removing the drive pulley and starter spring. The spring can pop out of the housing if care is not used.



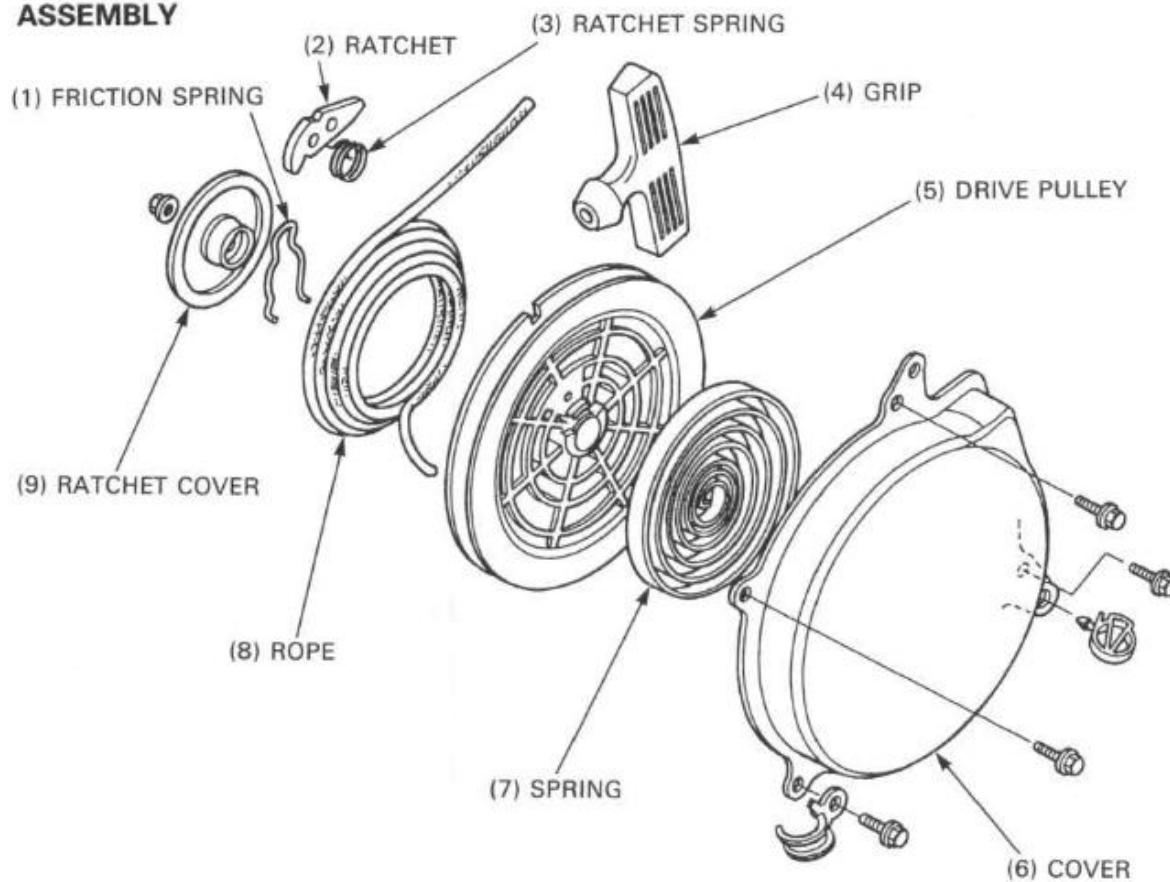
Remove the starter rope from the drive pulley.
Check the starter rope for wear or damage.



Check the recoil starter spring.
Remove the spring and replace it if it is broken.

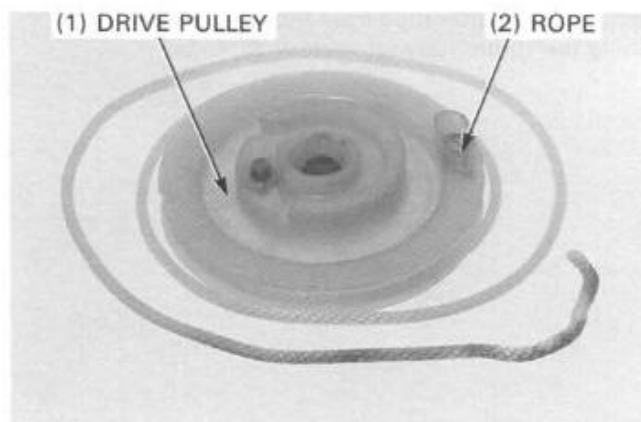


ASSEMBLY



ALTERNATOR/STARTER CLUTCH

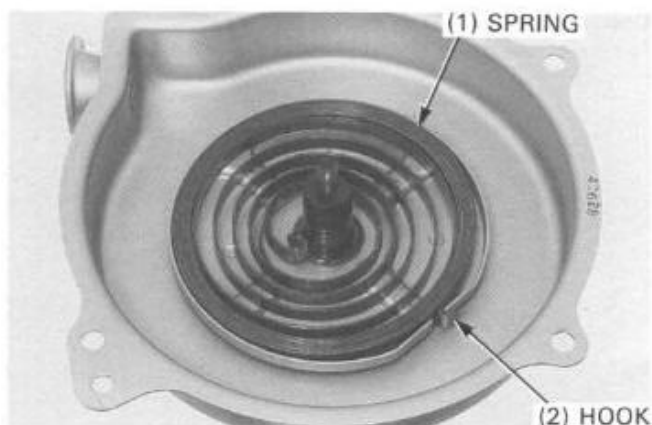
Install the starter rope and tie a square knot as shown. Wrap the rope around the starter pulley in a clockwise direction as viewed from the ratchet side as shown.



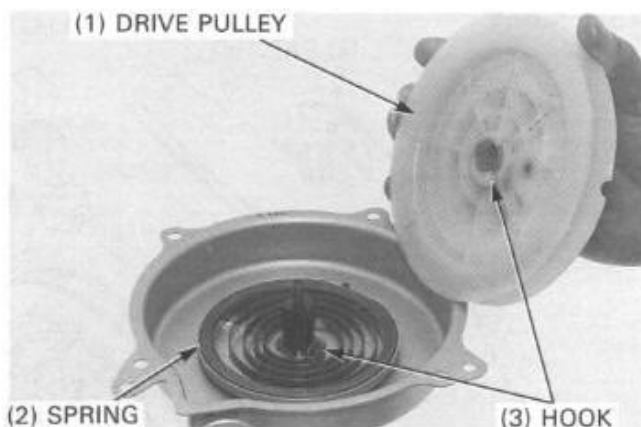
Install the spring by hooking the end on the starter housing hook.

CAUTION

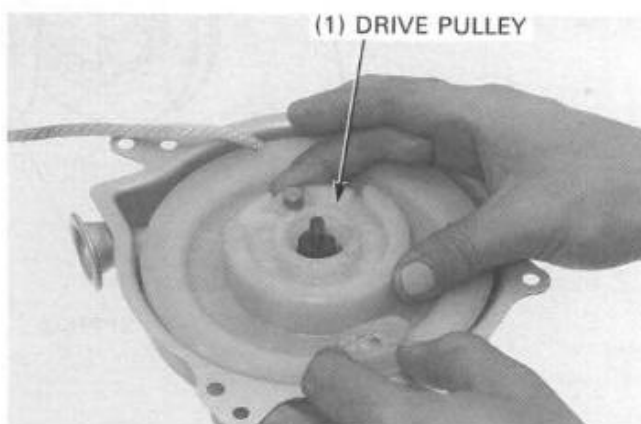
- *Wear eye protection and use care when installing the starter spring. The spring can pop out of the housing if care is not used.*



Grease the drive pulley shaft and install the pulley by hooking the end of the spring on the pulley shaft.

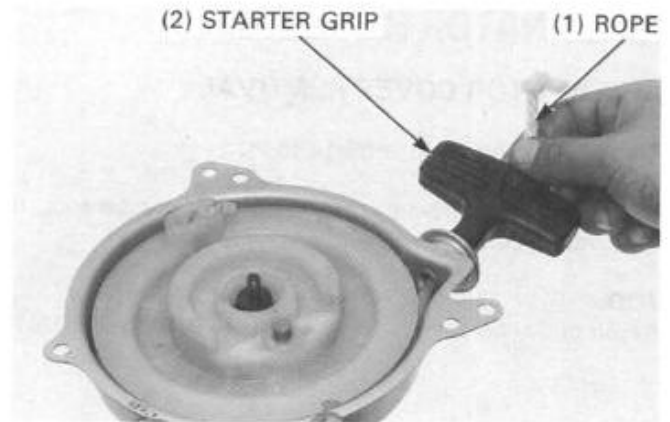


Reload the starter spring by turning the pulley 2-1/2 turns clockwise.

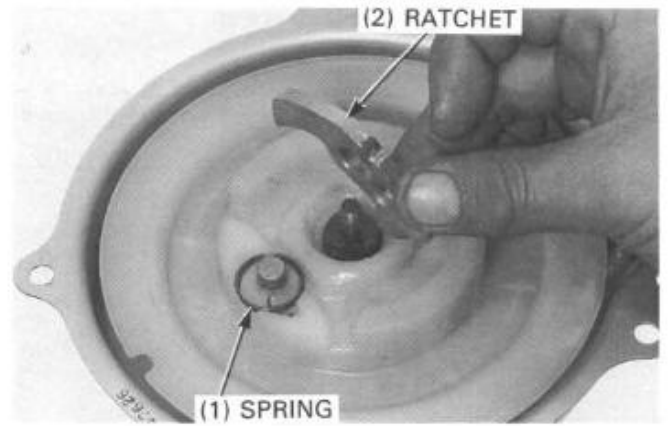


Route the rope end through the starter housing hole and install the grip.

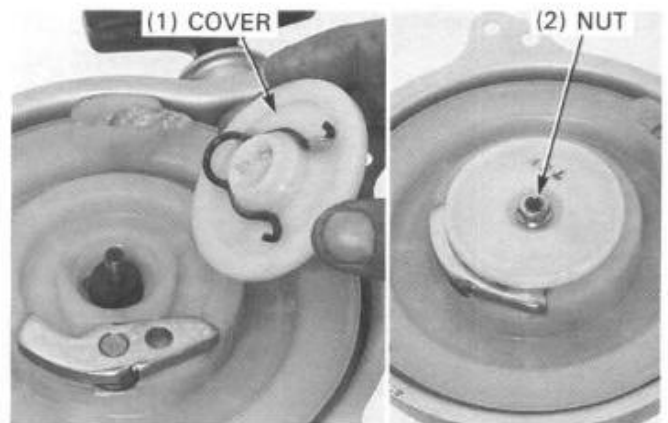
Tie the rope end in a square knot.



Grease the ratchet and install it with the spring.



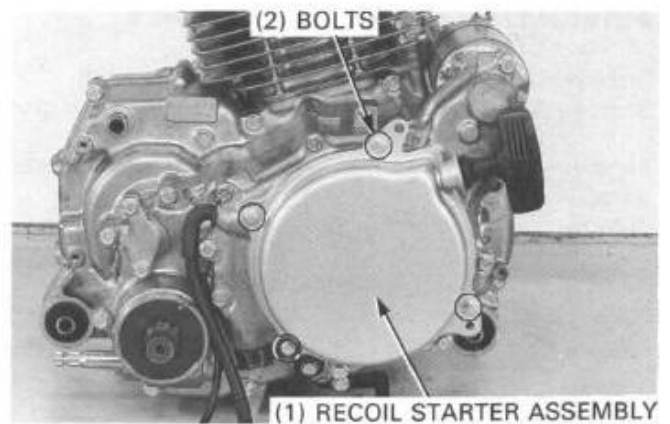
Install the clip to the ratchet cover.
Install the ratchet cover aligning the flats and tighten the nut.
Check the starter operation by pulling the starter grip.



INSTALLATION

Install the recoil starter assembly and tighten the bolts.

Route the wires and secure them with the clamps.



ALTERNATOR REMOVAL

ALTERNATOR COVER REMOVAL

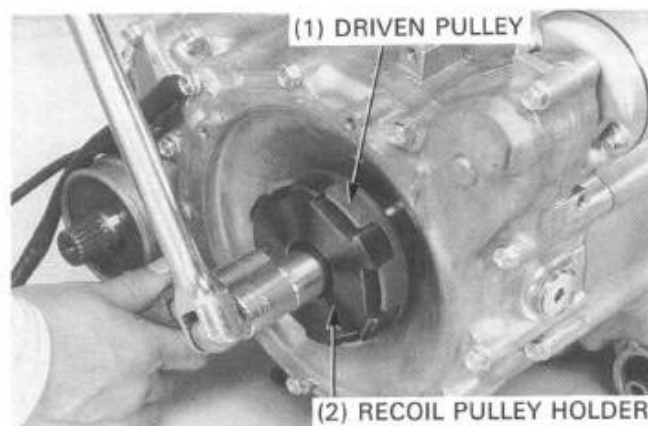
Remove the recoil starter (page 10-2).

Hold the starter driven pulley using the special tool, then remove the bolt.

TOOL:

Recoil pulley holder

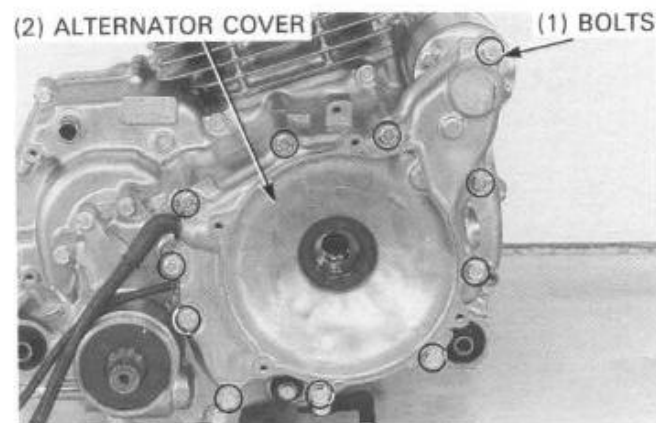
07SMB - HM70100



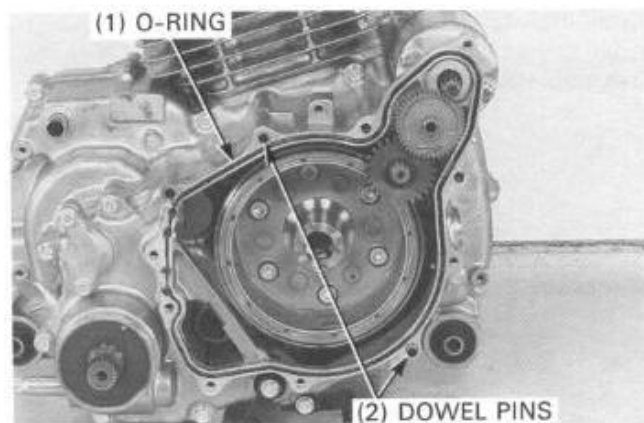
Remove the bolts and alternator cover.

NOTE

- The starter reduction gears may fall out as the cover is removed.



Remove the O-ring and dowel pins.

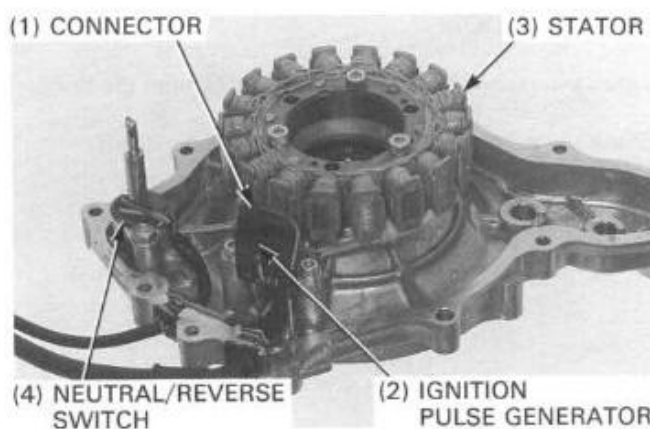


ALTERNATOR COVER DISASSEMBLY

Disconnect the ignition pulse generator connector.
Remove the wire grommet from the alternator cover groove.

Remove the ignition pulse generator and stator mounting bolts.
Remove the stator/ignition pulse generator assembly.

Remove the bolt and neutral/reverse switch.

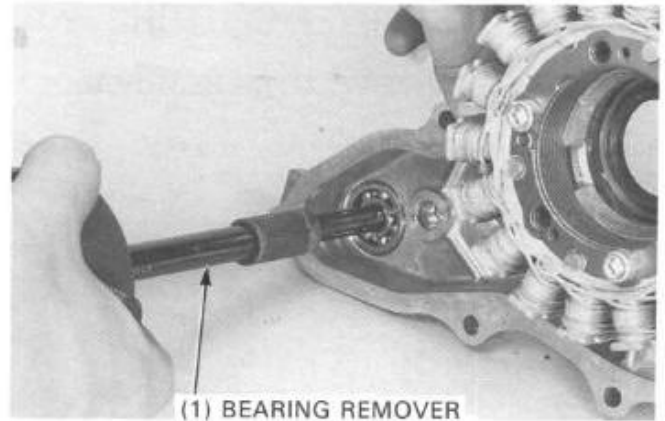


Turn the starter bearing inner race with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the alternator cover.

If you need to replace the bearing, remove the starter bearing using the special tools as shown.

TOOLS:

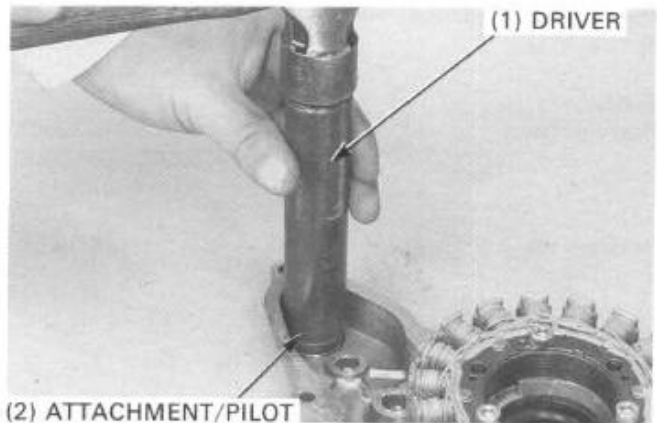
Bearing remover set, 10 mm	07936 - GE00000
Remover shaft	07936 - GE00100
Remover head	07936 - GE00200
Remover weight	07936 - 0010201



Drive the new bearing into the alternator cover.

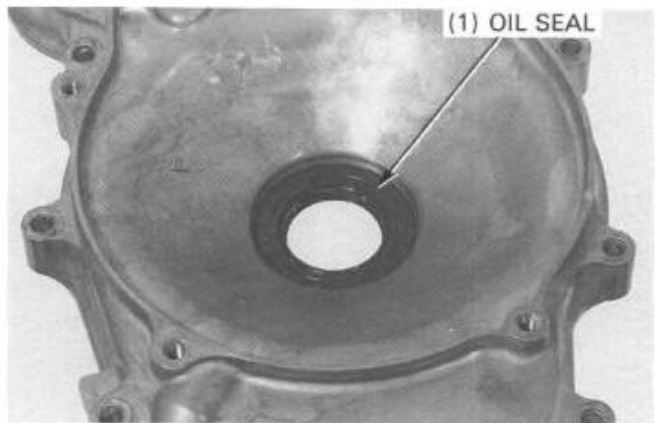
TOOLS:

Driver	07749 - 0010000
Attachment, 24 X 26 mm	07746 - 0010700
Pilot, 10 mm	07746 - 0040100



Inspect the alternator cover oil seal for wear or damage.

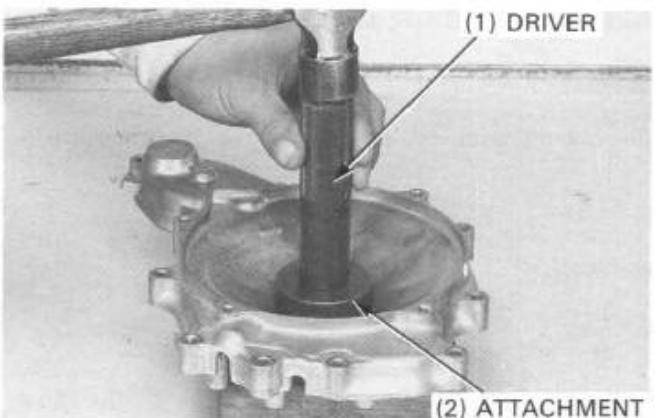
If replacement is required, remove the oil seal from the alternator cover.



Install the oil seal using the special tools as shown.

TOOLS:

Driver	07749 - 0010000
Attachment, 52 X 55 mm	07746 - 0010400



FLYWHEEL/STARTER CLUTCH

FLYWHEEL/STARTER CLUTCH REMOVAL

Remove the starter reduction gear A and shaft.
Remove the washer and reduction gear C.
Remove the starter motor (page 19-3).

Remove the flywheel and starter driven gear using the special tool.

TOOL:
Rotor puller

07733 - 0020001 or
07933 - 3950000
(U.S.A. only)

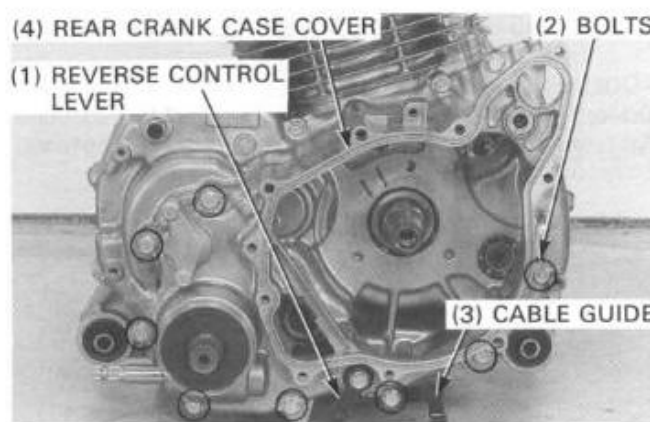
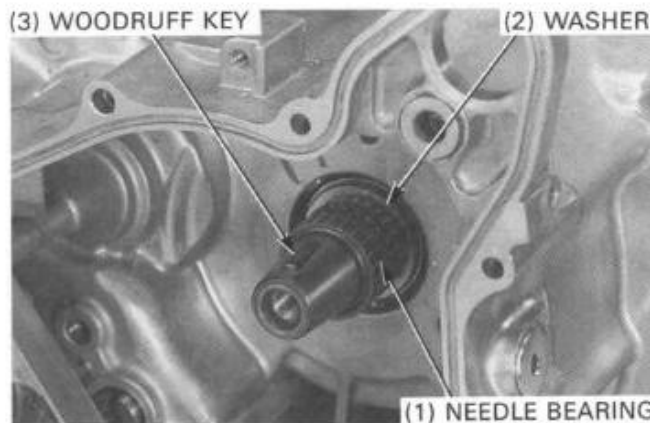
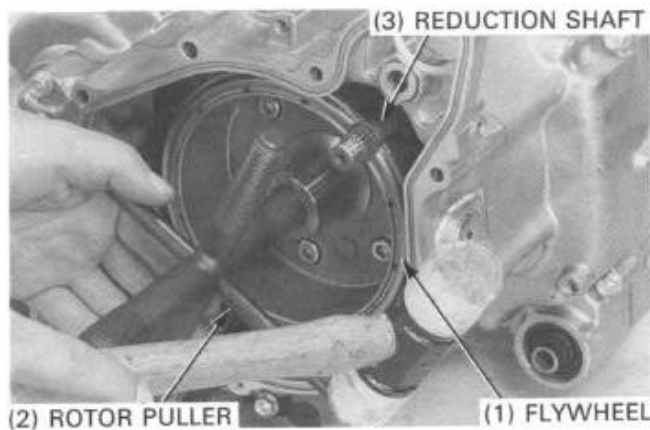
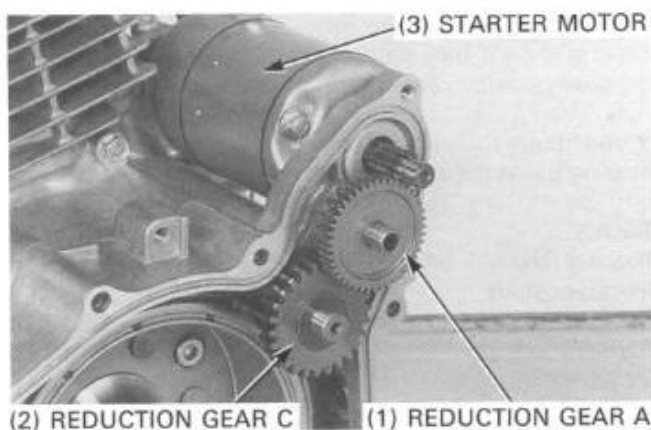
Remove the starter reduction shaft.

Remove the needle bearing, washer and woodruff key.

REAR CRANKCASE COVER REMOVAL

Remove the bolt and reverse control lever.

Remove the bolts, cable guide and rear crankcase cover.

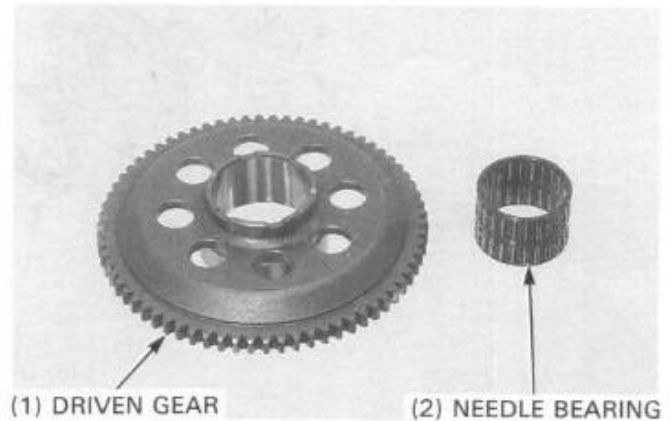


STARTER CLUTCH INSPECTION/DISASSEMBLY

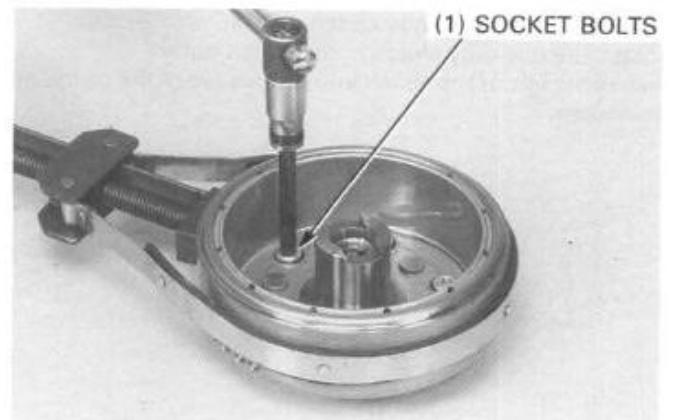
Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.



Inspect the starter driven gear teeth for damage or abnormal wear.
Check the needle bearing for damage.

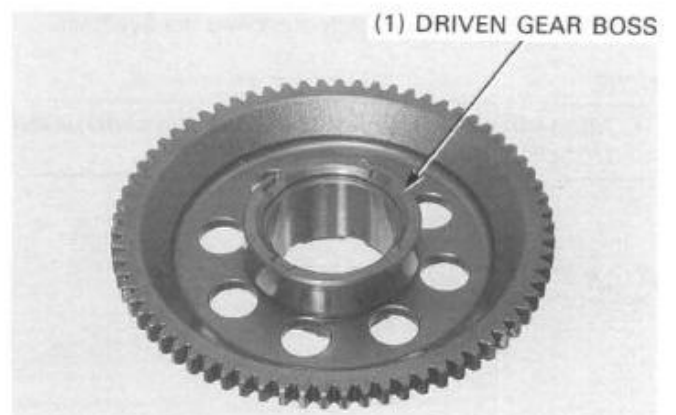


Remove the six socket bolts and remove the one-way clutch from the flywheel.



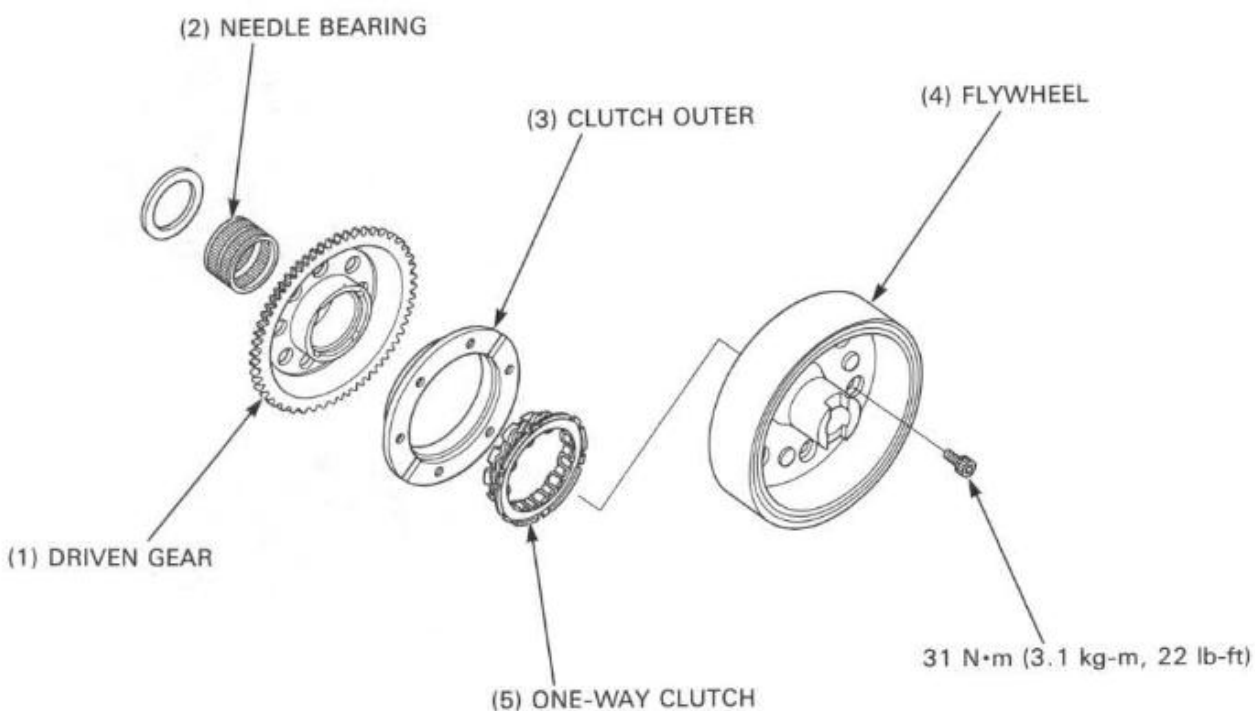
Check the one-way clutch rollers for wear or damage.

Check the starter driven gear boss for wear or damage.

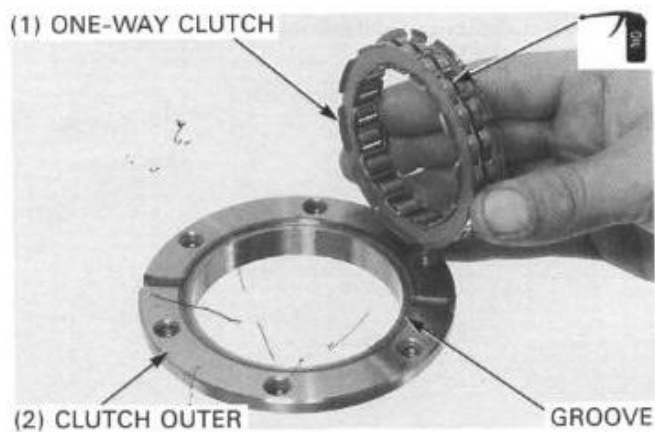


ALTERNATOR/STARTER CLUTCH

STARTER CLUTCH ASSEMBLY



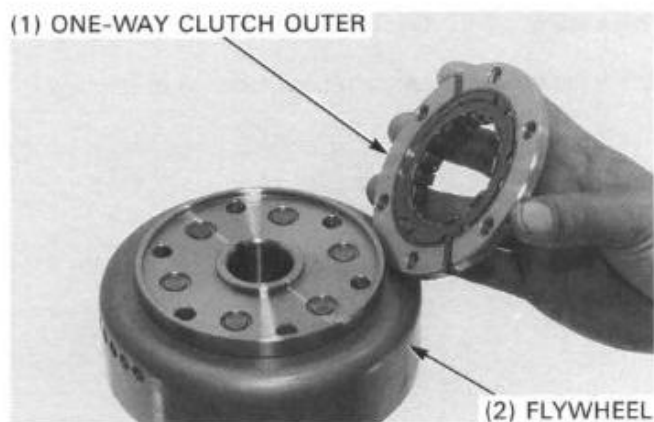
Apply oil to the one-way clutch rollers.
Install the one-way clutch in the clutch outer.
Install the lips of the clutch into the groove of the clutch outer as shown.



Assemble the one-way clutch outer and the flywheel.

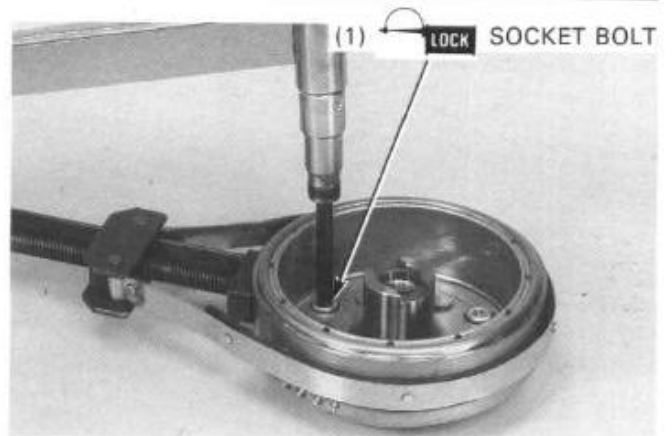
NOTE

- Make sure the flange side of the one-way clutch is faced to the flywheel.



Apply a locking agent to the threads of the socket bolt threads.
Hold the flywheel using a flywheel holder and install and tighten the six socket bolts.

TORQUE: 31 N·m (3.1 kg-m, 22 lb-ft)

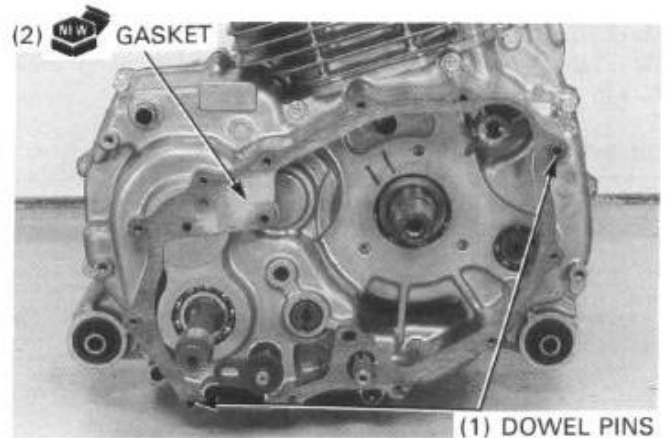


Install the starter driven gear into the one-way clutch by turning it clockwise.



REAR CRANKCASE COVER INSTALLATION

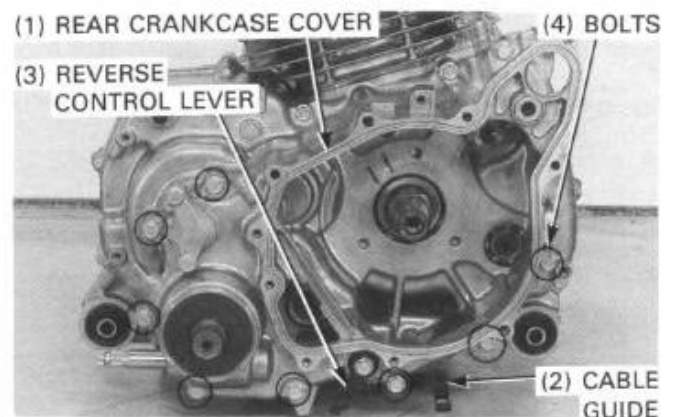
Install the dowel pins and new gasket.



Install the rear crankcase cover, reverse control cable guide and bolts.
Tighten the bolts in a crisscross pattern in 2 or 3 steps.

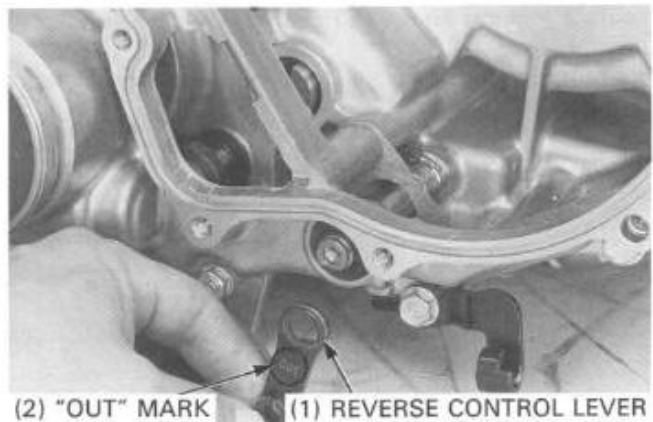
NOTE

- Align gearshift A arm with the sub-gearshift spindle as you install the cover.
- Make sure the washer is installed on the reverse spindle.



ALTERNATOR/STARTER CLUTCH

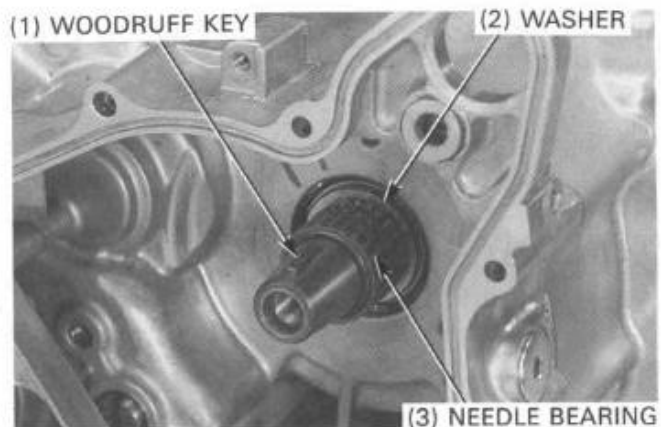
Install reverse stopper arm with its "OUT" mark facing out, then tighten the reverse stopper shaft bolts.



FLYWHEEL/STARTER CLUTCH INSTALLATION

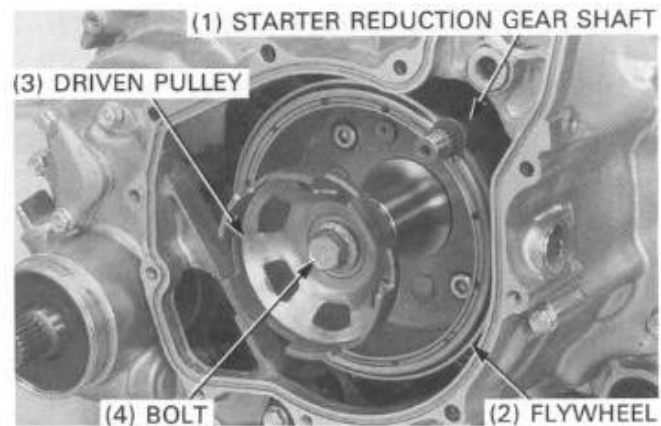
Clean any oil from the crankshaft taper.
Install the washer.

Install the needle bearing onto the crankshaft.
Install the woodruff key.



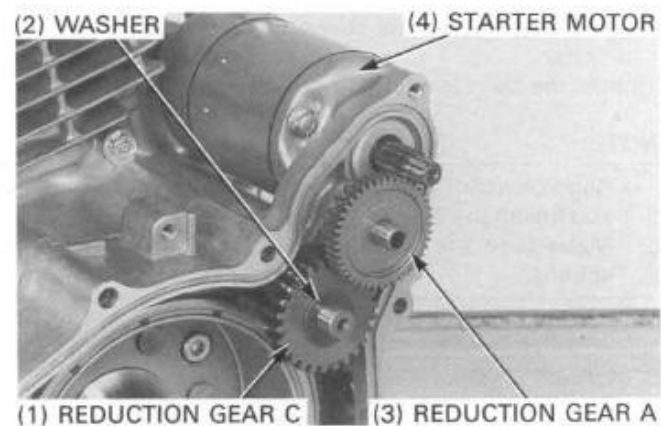
Make sure the starter reduction gear shaft is installed.
Install the flywheel/starter reduction gear aligning the key way in the flywheel with the key on the crankshaft.

For installation of the alternator cover, temporarily install the driven pulley and tighten the driven pulley bolt to seat the flywheel.



Install the starter reduction gear C and thrust washer.
Install the starter reduction shaft and reduction gear A.

Install the starter motor (page 19-7).



ALTERNATOR INSTALLATION

ALTERNATOR ASSEMBLY

Apply sealant to the grommets of the alternator/ignition pulse generator and neutral/reverse switch wire grommets. Install the neutral/reverse switch and alternator/ignition pulse generator assembly onto the alternator cover. Route the wires properly as shown and install the grommets into the groove of the alternator cover.

Apply a locking agent to the neutral/reverse switch mounting bolt threads.

Install the neutral/reverse switch and tighten the bolt.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

Install and tighten the stator mounting bolts.

TORQUE: 10 N·m (1.0 kg-m, 7 lb-ft)

Install and tighten the ignition pulse generator mounting bolts.

TORQUE: 6 N·m (0.6 kg-m, 4.3 lb-ft)

Connect the ignition pulse generator connector.

ALTERNATOR COVER INSTALLATION

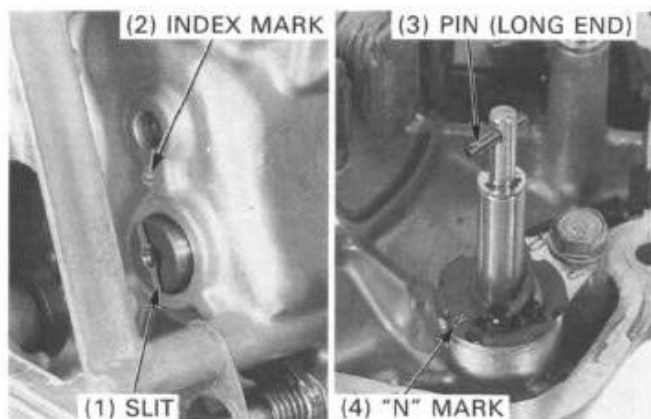
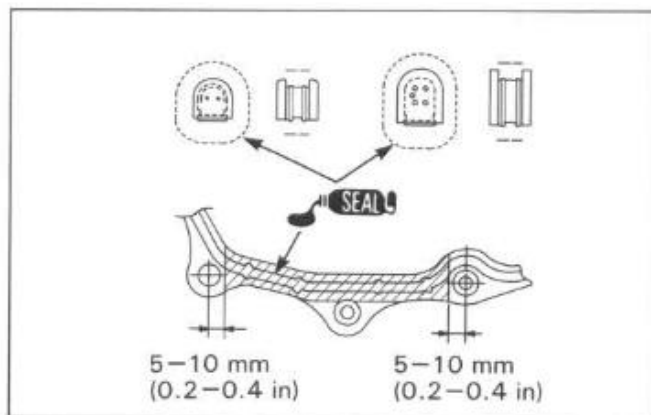
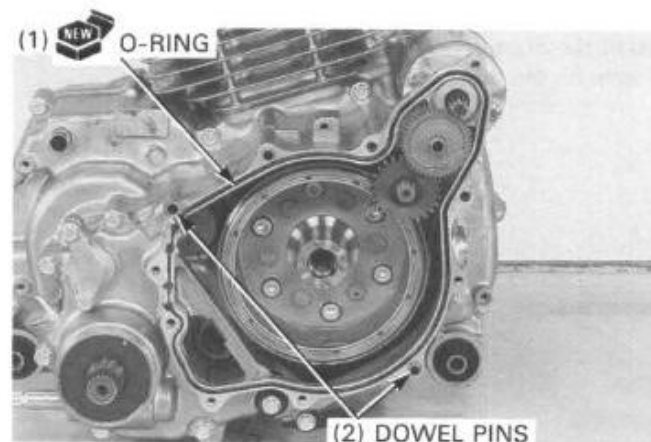
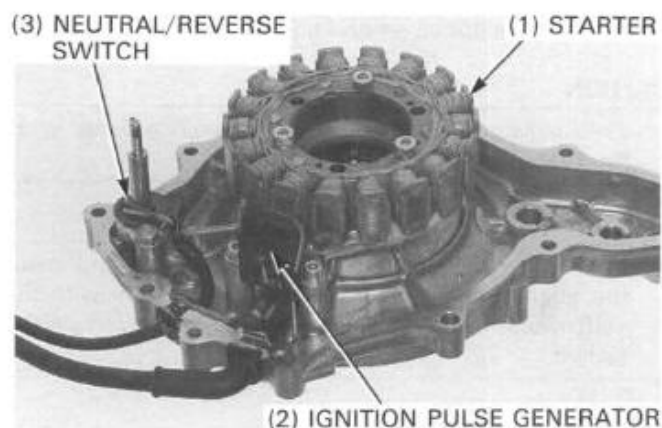
Install the new O-ring into the groove of the rear crankcase cover.

Install the dowel pins.

Apply sealant to the indicated area of the alternator cover as shown.

Shift the transmission into neutral, by aligning the slit of the shift drum with the index mark on the crank case as shown.

Align the long end of the neutral/reverse switch pin with the "N" mark on the switch as shown.



ALTERNATOR/STARTER CLUTCH

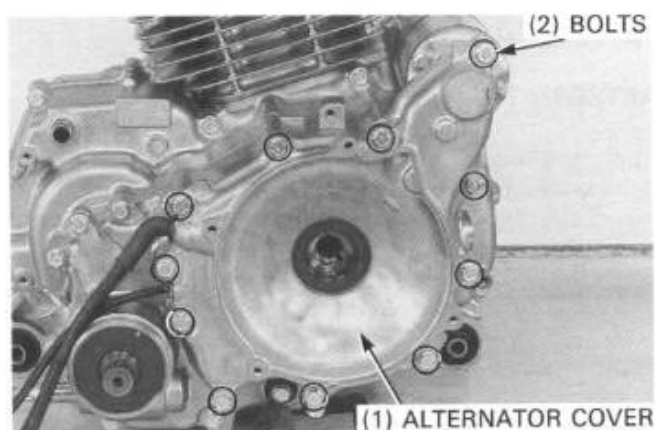
Install the alternator cover and tighten the bolts securely.

CAUTION

- The alternator cover (stator) is magnetically attached to the flywheel, be careful not to pinch your finger.

NOTE

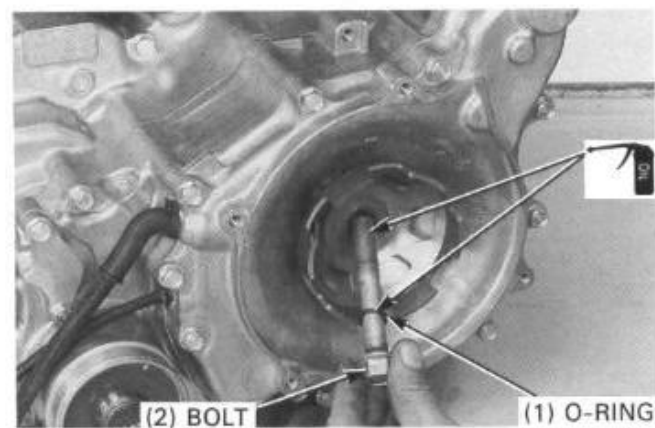
- If the cover doesn't install easily, remove it and check the alignment of the reverse/neutral switch with the shift drum. Be careful not to damage the pin on the switch.



Install the starter driven pulley aligning the boss with the groove on the flywheel.



Apply oil to the driven pulley bolt threads and O-ring. Install the driven pulley bolt with a O-ring.



Hold the starter driven pulley using the special tool, then tighten the bolt to the specified torque.

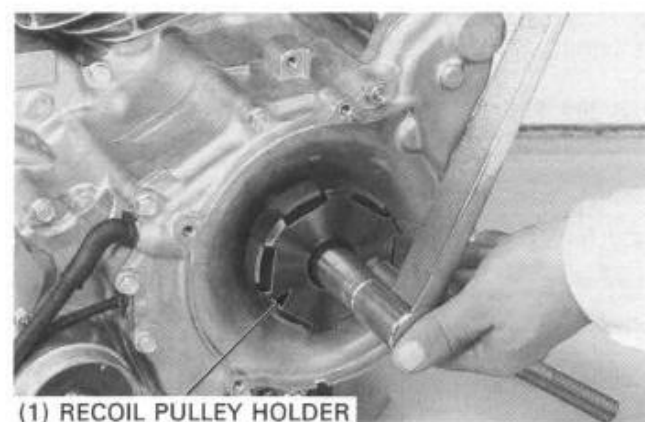
TOOL:

Recoil pulley holder

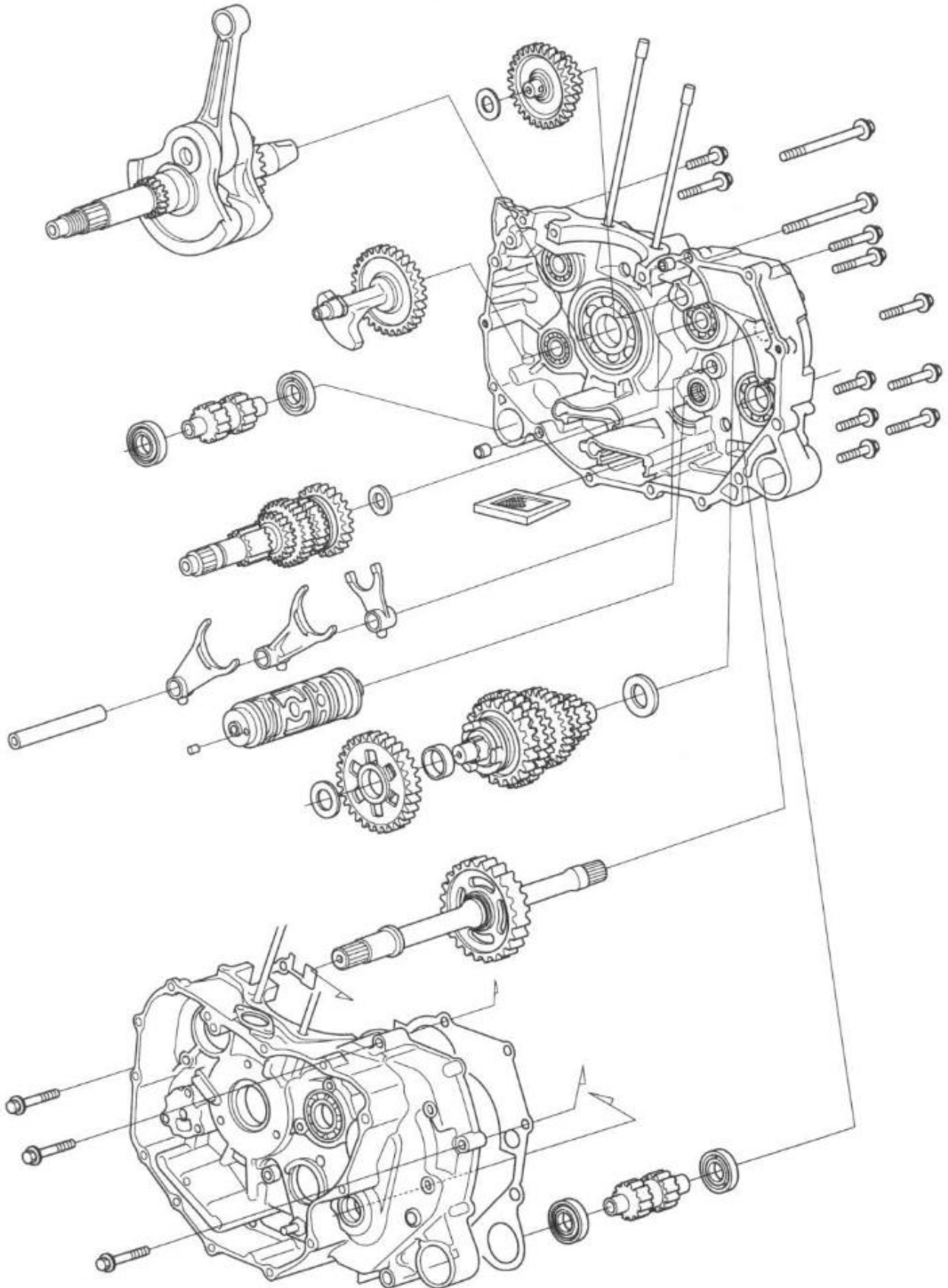
07SMB - HM70100

TORQUE: 110 N·m (11.0 kg-m, 80 lb-ft)

Install the recoil starter (page 10-5).



MEMO



11. CRANKSHAFT/BALANCER/TRANSMISSION

SERVICE INFORMATION	11-1	TRANSMISSION	11-4
TROUBLESHOOTING	11-3	CRANKSHAFT/BALANCER	11-12
CRANKCASE SEPARATION	11-4	CRANKCASE ASSEMBLY	11-15

SERVICE INFORMATION

GENERAL

- For crankshaft, balancer and transmission repair, the crankcase must be separated.
- The following components must be removed before separating the crankcase.
 - Alternator, starter clutch (Section 10)
 - Centrifugal clutch, change clutch (Section 8)
 - Cylinder head, cylinder, piston (Section 7)
 - Engine (Section 6)
 - Gearshift linkage (Section 9)
 - Oil pump (Section 4)

SPECIFICATIONS

Unit: mm (in)

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT	
Crankshaft, connecting rod	Side clearance		0.05 – 0.65 (0.002 – 0.026)	0.80 (0.031)	
	Radial clearance		0.006 – 0.018 (0.0002 – 0.0007)	0.05 (0.002)	
	Runout		—	0.05 (0.002)	
Transmission	Gear I.D.	M4	25.000 – 25.021 (0.9843 – 0.9851)	25.05 (0.986)	
		M5	20.000 – 20.021 (0.7874 – 0.7882)	25.05 (0.986)	
		C1, C2, C3	28.020 – 28.041 (1.1031 – 1.1040)	28.07 (1.105)	
		CR	28.021 – 28.042 (1.1032 – 1.1040)	28.07 (1.105)	
		Reverse idle	18.000 – 18.021 (0.7087 – 0.7095)	18.05 (0.711)	
	Shaft O.D.	M4	21.959 – 21.980 (0.8645 – 0.8654)	21.93 (0.863)	
		M5	16.983 – 16.994 (0.6686 – 0.6691)	16.95 (0.667)	
		Reverse idle	13.966 – 13.984 (0.5498 – 0.5506)	13.93 (0.548)	
	Gear bushing	C1 O.D.	27.984 – 28.005 (1.1017 – 1.1026)	27.93 (1.100)	
		C2 O.D.	27.979 – 28.000 (1.1015 – 1.1024)	27.93 (1.100)	
		CR O.D.	27.979 – 28.000 (1.1015 – 1.1024)	27.93 (1.100)	
		M4	I.D.	22.000 – 22.021 (0.8661 – 0.8670)	22.05 (0.868)
			O.D.	24.959 – 24.980 (0.9826 – 0.9835)	24.93 (0.981)
		M5	I.D.	17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)
			O.D.	19.966 – 19.984 (0.7861 – 0.7868)	19.93 (0.785)
		R	I.D.	14.000 – 14.025 (0.5512 – 0.5522)	14.05 (0.553)
			O.D.	17.966 – 17.984 (0.7073 – 0.7080)	17.93 (0.706)

CRANKSHAFT/BALANCER/TRANSMISSION

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Transmission	Gear-to-bushing clearance	M4	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		M5	0.016 – 0.055 (0.0006 – 0.0022)	0.10 (0.004)
		C1	0.015 – 0.057 (0.0006 – 0.0022)	0.10 (0.004)
		C2	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		CR	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C3	0.015 – 0.057 (0.0006 – 0.0022)	0.10 (0.004)
		Reverse idle	0.016 – 0.055 (0.0006 – 0.0022)	0.10 (0.004)
	Bushing-to-shaft clearance	M4	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		M5	0.022 – 0.051 (0.0009 – 0.0020)	0.10 (0.004)
		Reverse idle	0.016 – 0.059 (0.0006 – 0.0023)	0.10 (0.004)
Shift fork, shaft	Fork	I.D.	13.000 – 13.021 (0.5118 – 0.5126)	13.04 (0.513)
		Claw thickness	4.93 – 5.00 (0.194 – 0.197)	4.50 (0.177)
	Fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.96 (0.510)

TOOLS

Bearing remover set	07936 – 3710001	Not available in U.S.A.
– Remover handle	07936 – 3710100	
– Bearing remover, 20mm	07936 – 3710600	
– Remover weight	07741 – 0010201	or 07936 – 3710200
Remover handle	07936 – 3710100	
Bearing remover, 17mm	07936 – 3710300	
Remover weight	07741 – 0010201	
Assembly collar	07965 – VM00100	
Assembly shaft	07965 – VM00200	or 07931 – ME4010A (U.S.A. only)
Threaded adaptor	07965 – VM00300	or 07931 – KF00200 (U.S.A. only)
Driver	07749 – 0010000	
Attachment, 24X26 mm	07746 – 0010700	
Attachment, 37X40 mm	07746 – 0010200	
Attachment, 42X47 mm	07746 – 0010300	
Attachment, 52X55 mm	07746 – 0010400	
Attachment, 72X75 mm	07746 – 0010600	
Pilot, 22 mm	07746 – 0041000	
Pilot, 17 mm	07746 – 0040400	
Pilot, 20 mm	07746 – 0040500	
Pilot, 25 mm	07746 – 0040600	
Pilot, 35 mm	07746 – 0040800	
Pilot, 40 mm	07746 – 0040900	

TROUBLESHOOTING

Crankshaft noisy

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing

Transmission jumps out of gear

- Shift fork bent or damaged
- Shift fork shaft bent
- Shift fork claw bent
- Gear engagement dogs or slots worn

Hard to shift

- Incorrect clutch adjustment
- Shift fork bent or damaged
- Shift fork shaft bent

CRANKCASE SEPARATION

NOTE

- Refer to page 12-1 for the parts which must be removed before separating the crankcase.

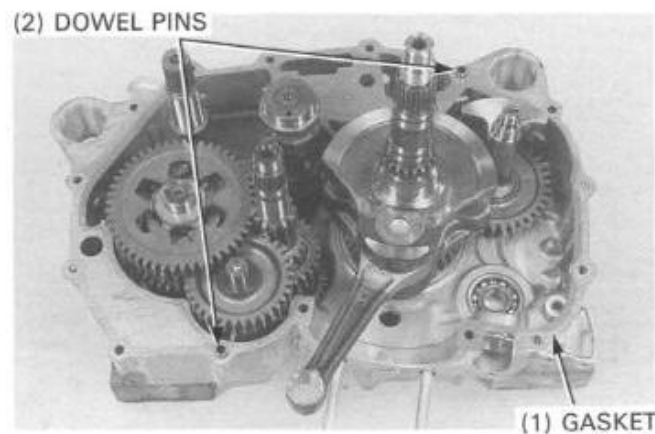
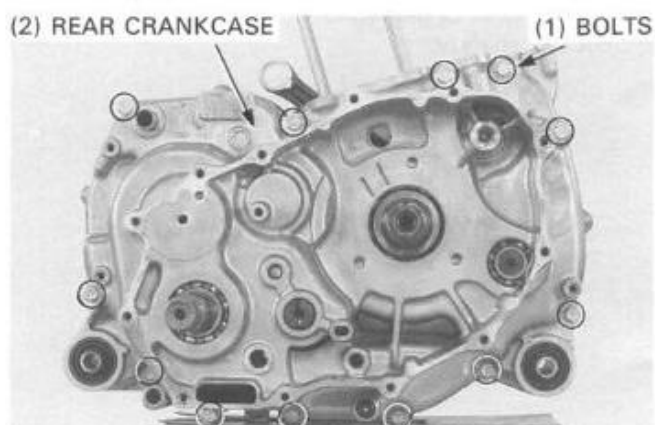
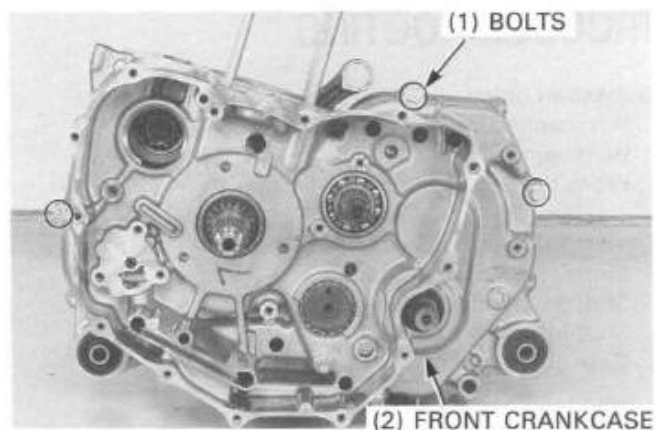
Remove the engine hanger bushing dust seals and drive out the hanger bushings.

Remove the three front crankcase bolts.

Loosen the twelve rear crankcase bolts in a crisscross pattern in 2 or 3 steps to prevent crankcase distortion. Remove the rear crankcase bolts.

Place the crankcase with the rear crankcase down and remove the front crankcase.

Remove the gasket and dowel pins.

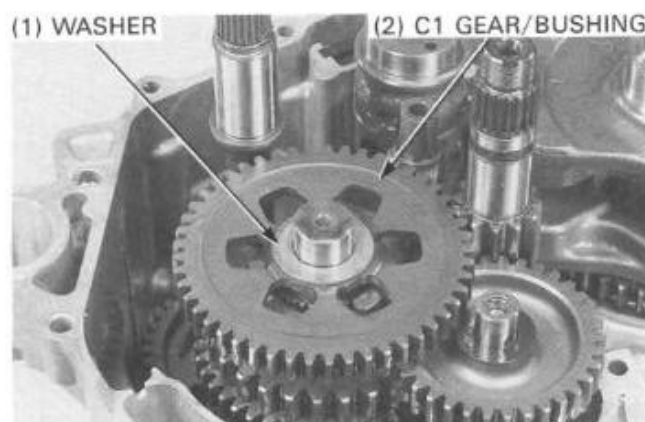


TRANSMISSION

REMOVAL/DISASSEMBLY

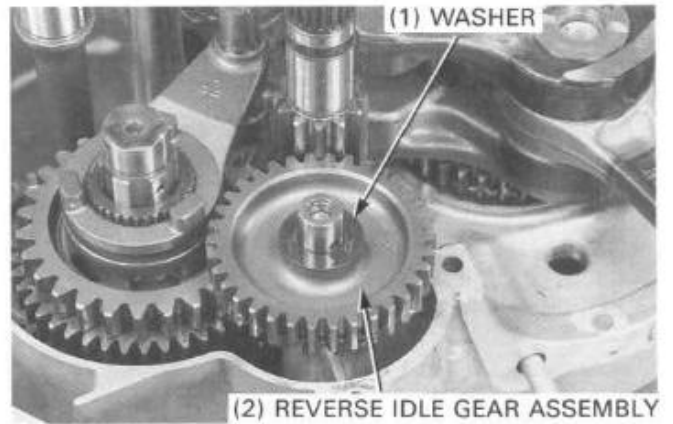
Remove the following:

- Copper washer
- C1 gear
- C1 gear bushing

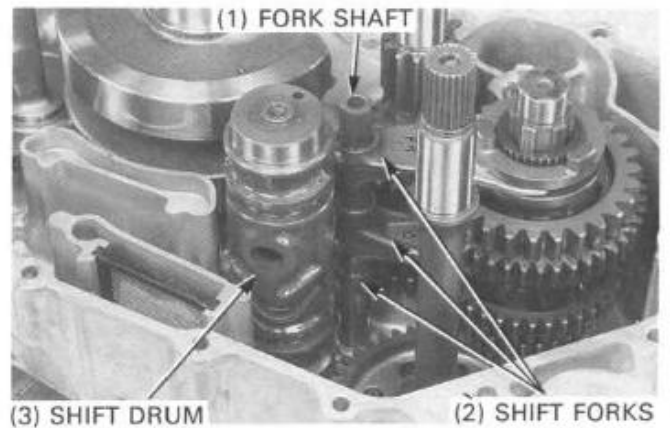


Remove the following:

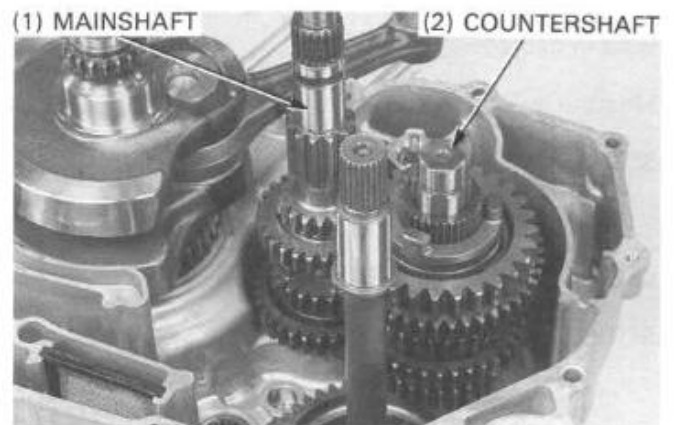
- Thrust washer
- Reverse idle gear assembly



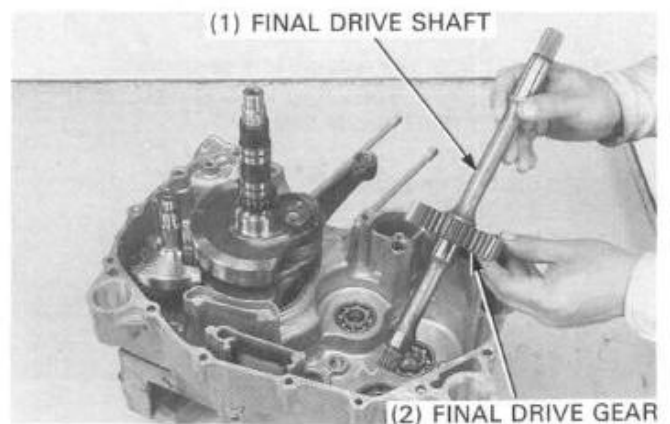
- Shift fork shaft
- Front shift fork
- Center shift fork
- Rear shift fork
- Shift drum



Remove the mainshaft and countershaft as an assembly.
Remove the mainshaft thrust washer.



Remove the final drive shaft and final drive gear.



CRANKSHAFT/BALANCER/TRANSMISSION

Disassemble the mainshaft and countershaft.

INSPECTION

Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.

Measure the I.D. of each gear.

SERVICE LIMITS:

C1, C2, C3, CR: 28.07 mm (1.105 in)
M4, M5 25.05 mm (0.986 in)

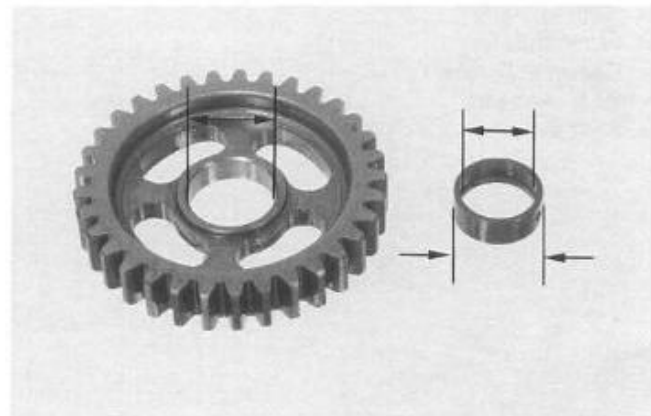
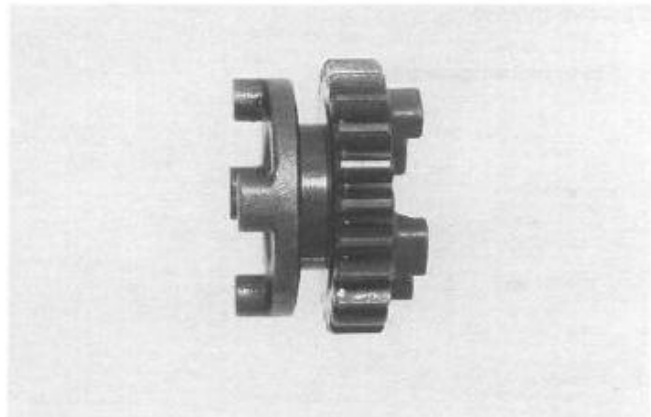
Measure the I.D. and O.D. of each gear bushing.

SERVICE LIMITS:

C1, C2, CR O.D.: 27.93 mm (1.100 in)
M4: O.D.: 24.93 mm (0.981 in)
I.D.: 22.05 mm (0.868 in)
M5: O.D.: 19.93 mm (0.785 in)
I.D.: 17.06 mm (0.672 in)

Calculate the gear-to-gear bushing clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



Check the shift fork groove of the shifter gear for excessive wear or damage.

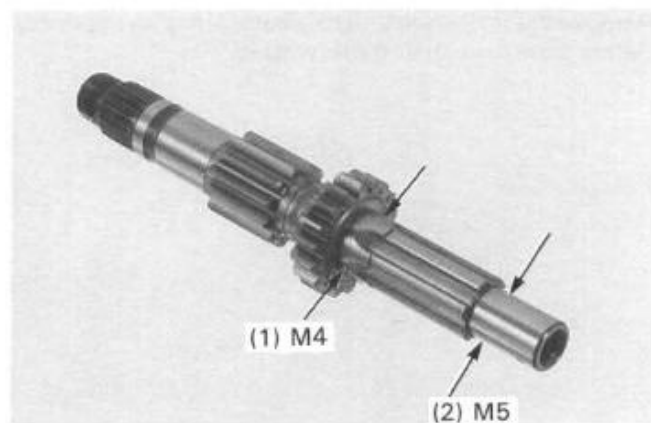
Measure the O.D. of the mainshaft.

SERVICE LIMITS:

M4: 21.93 mm (0.863 in)
M5: 16.95 mm (0.667 in)

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



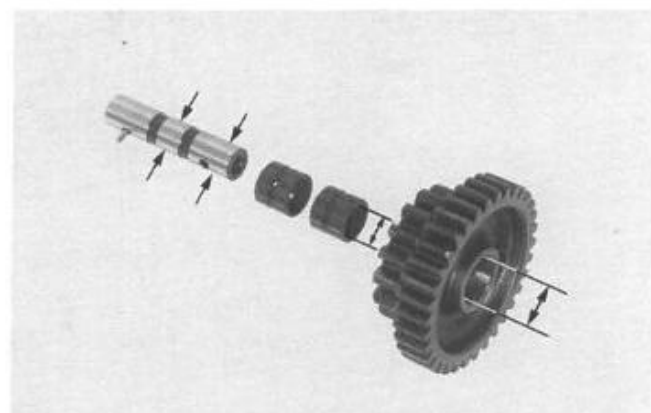
Disassemble the reverse idle gear assembly.

Measure the O.D. of the reverse idle gear shaft.

SERVICE LIMIT: 13.93 mm (0.548 in)

Calculate the bushing-to-shaft clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



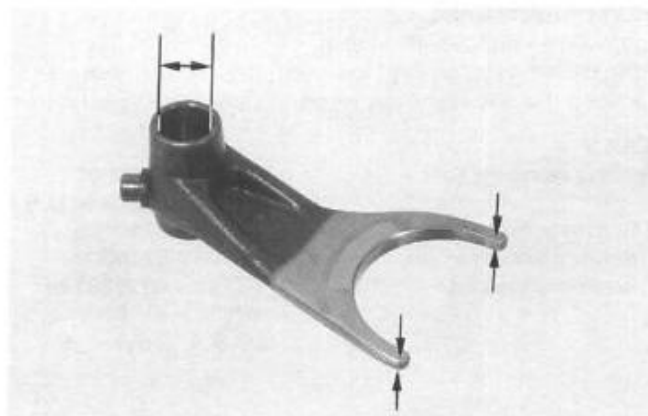
Check the shift fork and fork shaft for wear or damage.

Measure the I.D. of the shift fork.

SERVICE LIMIT: 13.04 mm (0.513 in)

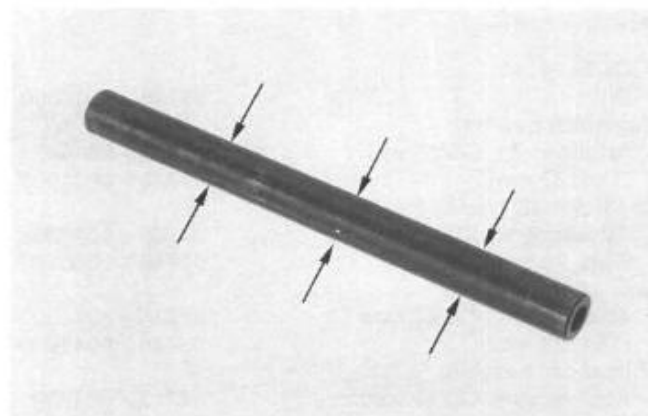
Measure the shift fork claw thickness.

SERVICE LIMIT: 4.50 mm (0.177 in)



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

SERVICE LIMIT: 12.96 mm (0.510 in)



Inspect the shift drum grooves for wear or damage.

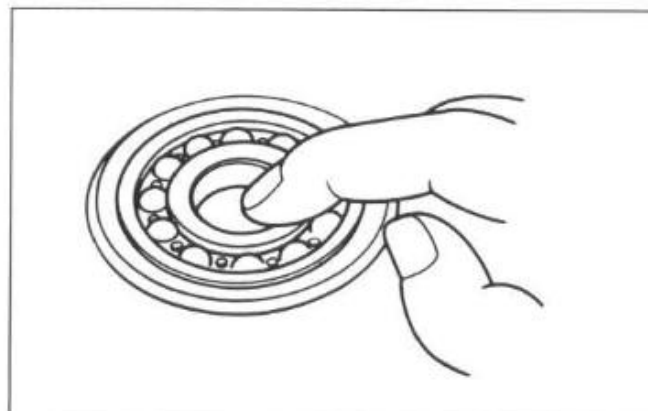


BEARING REPLACEMENT

NOTE

- For crankshaft and balancer bearing replacement, see page 11-14.

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the outer race of each bearing fits tightly in the crankcase.



CRANKSHAFT/BALANCER/TRANSMISSION

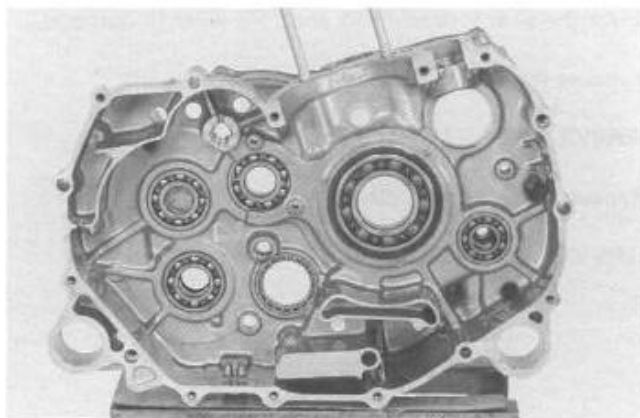
FRONT CRANKCASE

Remove the final shaft oil seal.

If the bearings need replacement, drive out the mainshaft,
Remove the countershaft bearing using the special tools.

TOOLS :

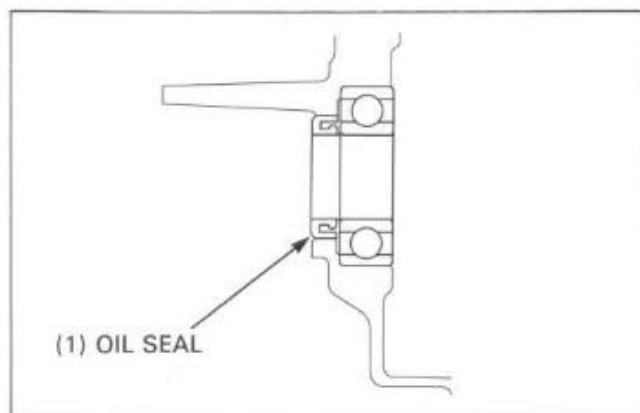
Bearing remover set	07936 - 3710001 (Not available in U.S.A.)
- Remover handle	07936 - 3710100
- Bearing remover set	07936 - 3710600
- Remover weight	07741 - 0010201 or 07936 - 3710200 (U.S.A. only)



Drive new bearings into the front crankcase using the special tools.

TOOLS:

Driver	07749 - 0010000
Mainshaft bearing:	
Attachment, 52X55 mm	07746 - 0010400
Pilot, 22 mm	07746 - 0041000
Countershaft bearing:	
Attachment, 42X47 mm	07746 - 0010300
Pilot, 20 mm	07746 - 0040500
Final shaft bearing:	
Attachment, 42X47 mm	07746 - 0010300
Pilot, 22 mm	07746 - 0041000
Shift drum bearing:	
Attachment, 42X47 mm	07746 - 0010300
Pilot, 35 mm	07746 - 0040800



Install the new final shaft oil seal.

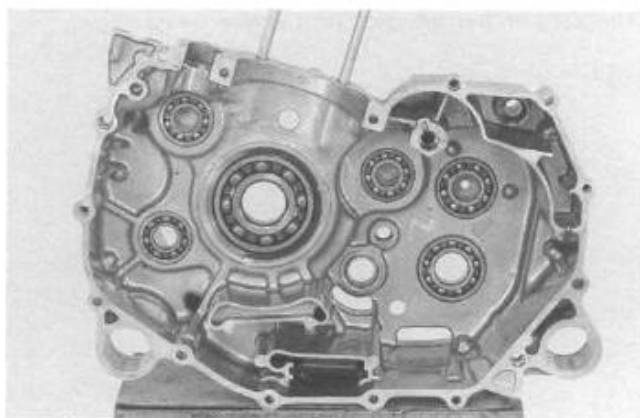
REAR CRANKCASE

Drive out the final shaft bearing from the rear crankcase.

Remove the rear crankcase bearings using the special tools.

TOOLS :

Mainshaft and camshaft beatings:	
Remover handle	07936 - 3710100
Bearing remover, 17 mm	07936 - 3710300
Remover weight	07741 - 0010201 or 07936 - 3710200 (U.S.A. only)
Countershaft bearing:	
Bearing remover set	07936 - 3710001
- Remover handle	07936 - 3710100
- Bearing remover, 20 mm	07936 - 3710600
- Remover weight	07741 - 0010201 or 07936 - 3710200 (U.S.A. only)

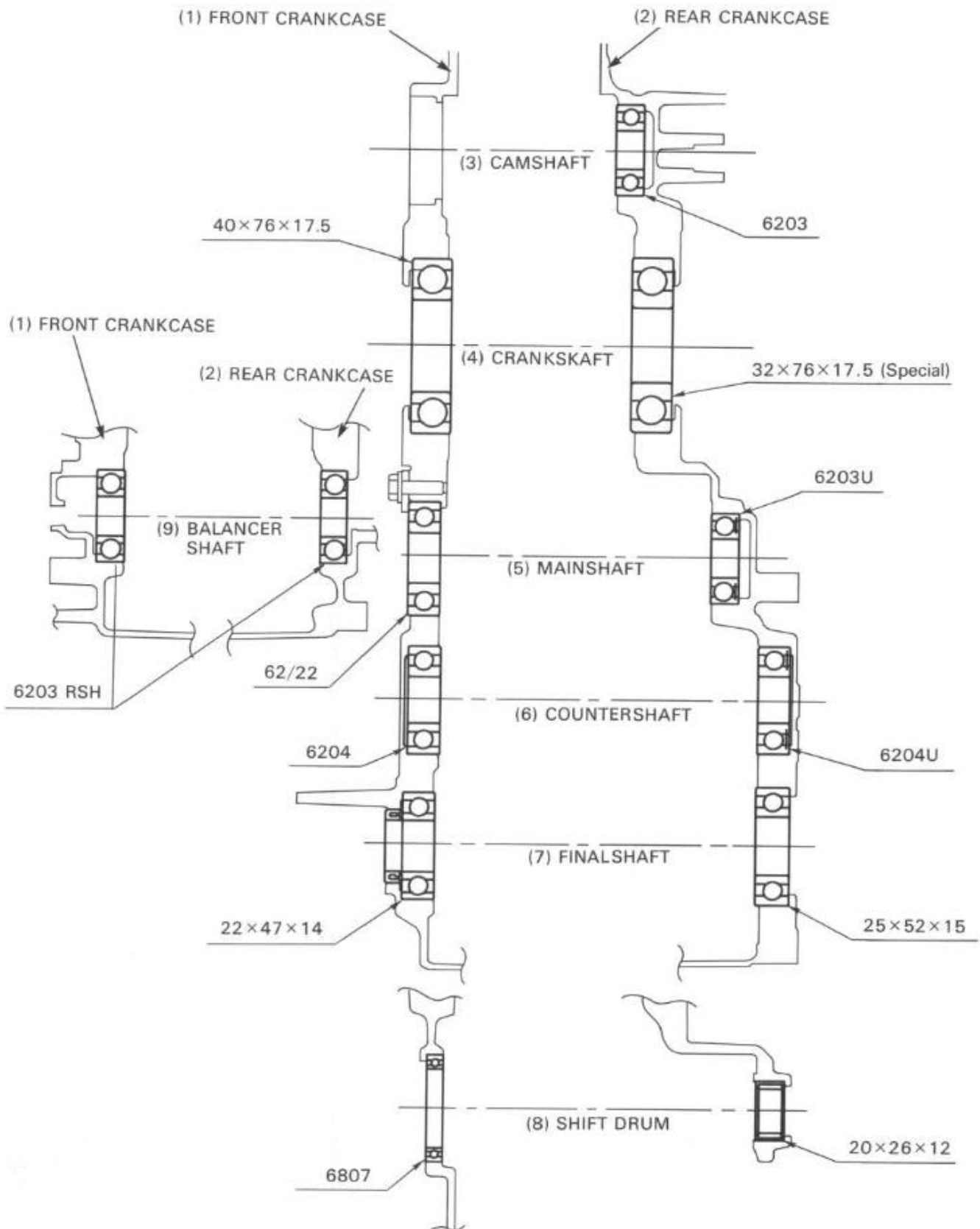


Drive new bearings into the rear crankcase.

TOOLS :

Driver	07749 - 0010000
Countershaft bearing:	
Attachment, 42X47 mm	07746 - 0010300
Pilot, 20 mm	07746 - 0040500
Mainshaft/camshaft bearing:	
Attachment, 37X40 mm	07746 - 0010200
Pilot, 17 mm	07746 - 0040400
Final shaft bearing:	
Attachment, 52X55 mm	07746 - 0010400
Pilot, 25 mm	07746 - 0040600

CRANKCASE BEARING LOCATIONS

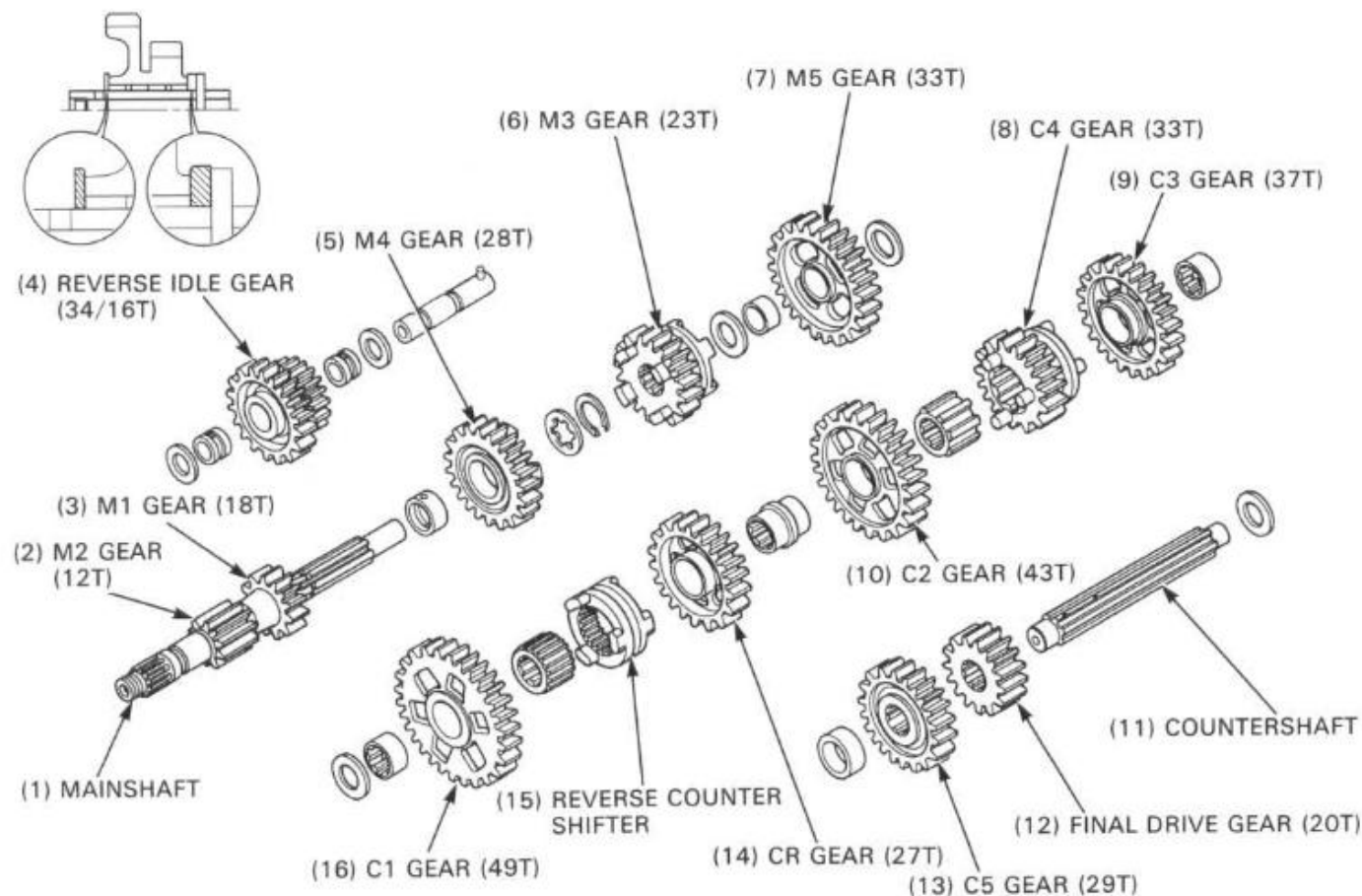


ASSEMBLY/INSTALLATION

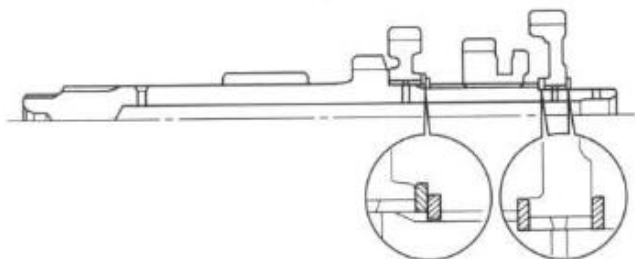
NOTE

- Apply oil to the shifter gear grooves.
- Always install the thrust washers and snap rings with the chamfered (rolled) edge facing away from the thrust load. After installing the snap ring, slightly open the ring and rotate it in its groove to be sure it is fully seated. Do not use worn snap ring which could easily spinning in the groove. They may be too loose to properly seat in the groove.
- Align the gap in the snap ring with the groove of spline.
- Align the oil holes on the shafts and bushings.
- The countershaft must be installed with the inside oil feed hole to the back, and the outside oil holes to the front as shown.
- The special washer on the back end of the countershaft is a press fit, to hold the gears on the shaft as it is installed.

REVERSE IDLE SHAFT:

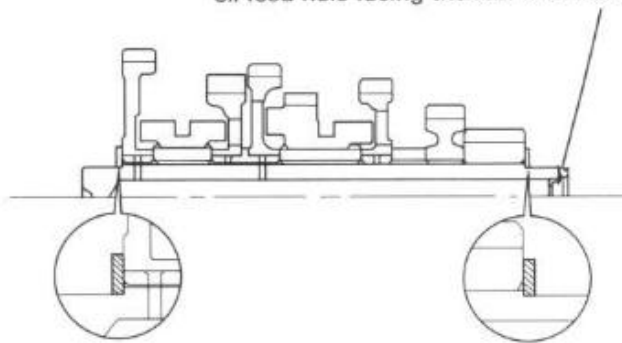


MAINSHAFT:

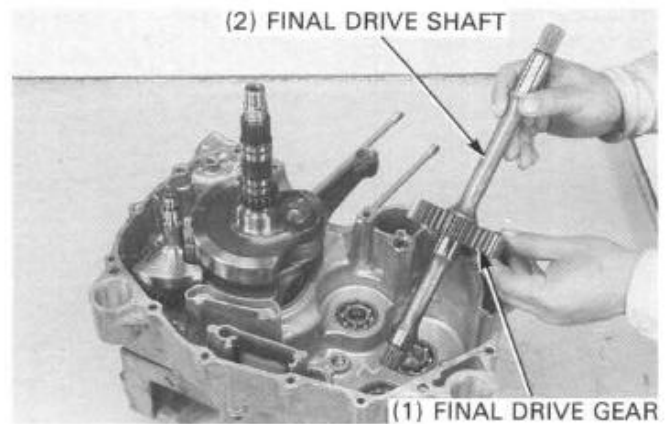


COUNTERSHAFT:

Install the countershaft with the inside oil feed hole facing the rear crankcase.



Assemble the final drive gear and shaft, and then install the drive shaft assembly into the rear crankcase.

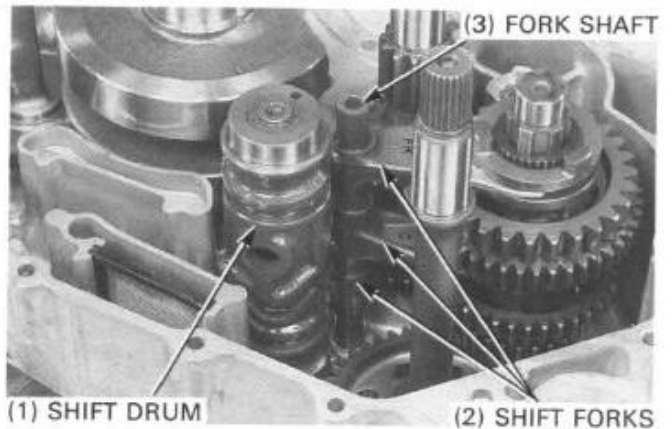


Install the mainshaft end washer into the crankcase. Install the mainshaft and countershaft as an assembly.



Verify that the top end of the countershaft does not have an oil feed hole.

Install the shift drum.



Install the rear shift fork into the M2 shifter gear groove with its "RR" mark facing up.

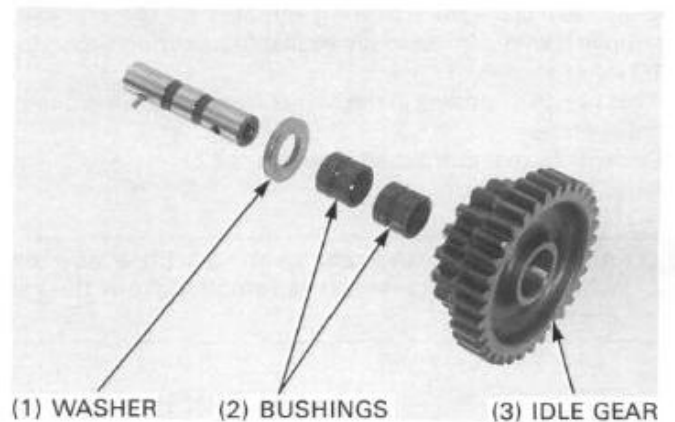
Install the center shift fork into the C3 shifter gear groove with its "C" mark facing up.

Install the front shift fork into the counter shifter groove with its "FR" mark facing up.

Make sure all of the shift fork pins are aligned with the grooves in the shift drum.

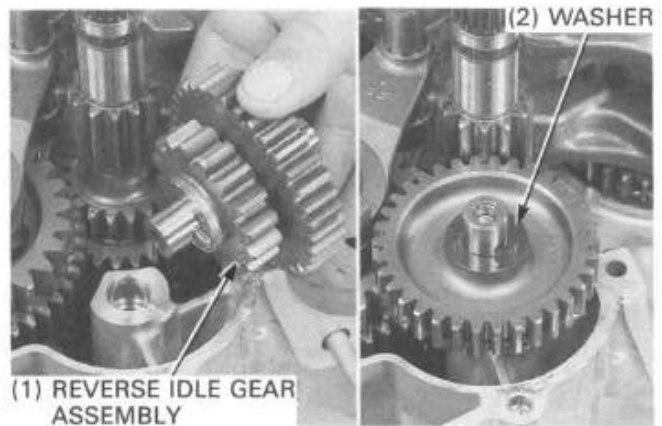
Install the shift fork shaft.

Assemble the reverse idle gear, bushings, washer and shaft.

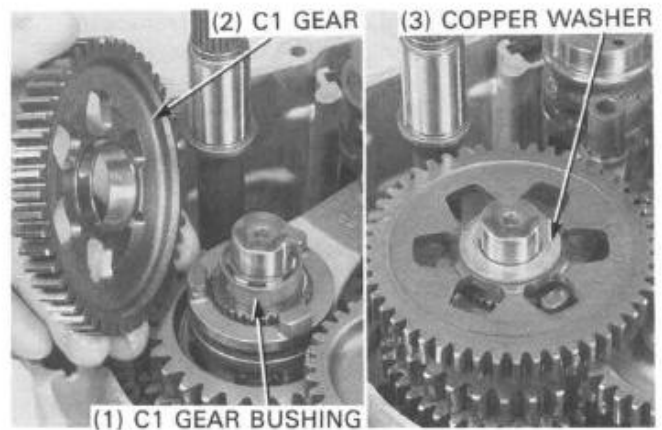


CRANKSHAFT/BALANCER/TRANSMISSION

Install the reverse idle gear aligning the pin on the shaft with the crankcase groove.
Install the washer.



Install the C1 gear bushing, C1 gear and copper washer.

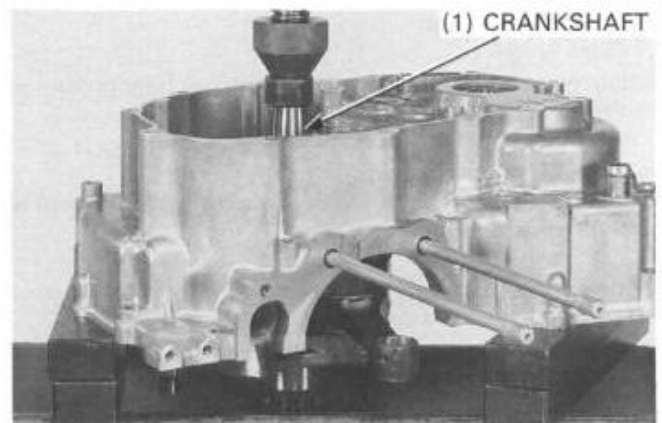


CRANKSHAFT/ BALANCER

REMOVAL

Remove the transmission (page 11-4).

Remove the crankshaft and balancer from the rear crankcase using a hydraulic press.



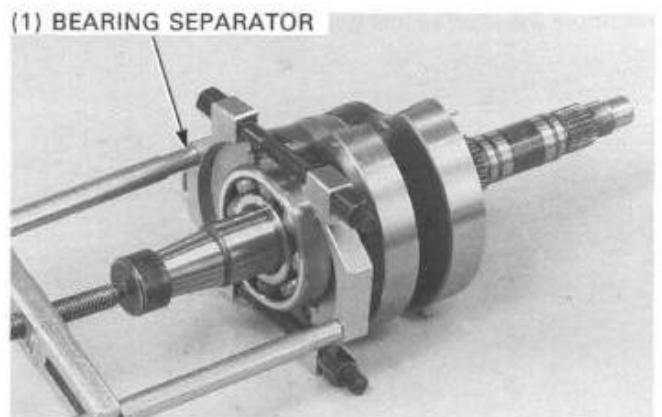
If the rear crankshaft bearing remains on the crankshaft, remove it with commercially available a bearing separator (4 1/2 in) as shown.

If the bearing remains in the rear crankcase, drive it out from the outside.

Discard the rear crankshaft bearing.

NOTE

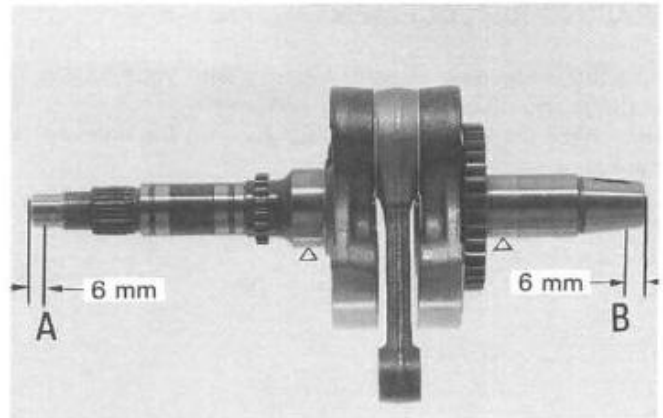
- Always replace the rear bearing with a new one whenever the crankshaft is removed from the rear crankcase.



INSPECTION

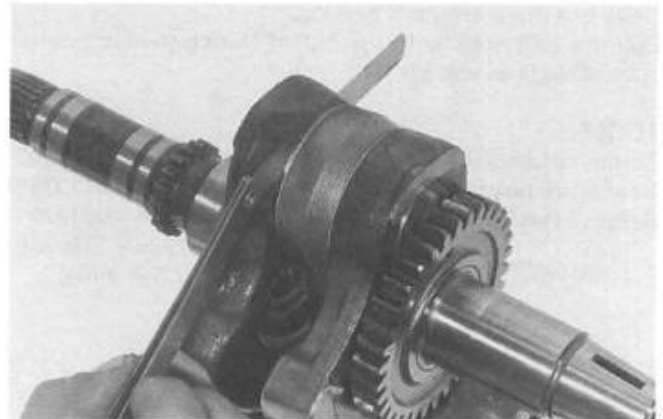
Set the crankshaft in a stand or V-blocks and read the runout using dial indicators at the A and B points as shown.

SERVICE LIMIT: 0.05 mm (0.002 in)



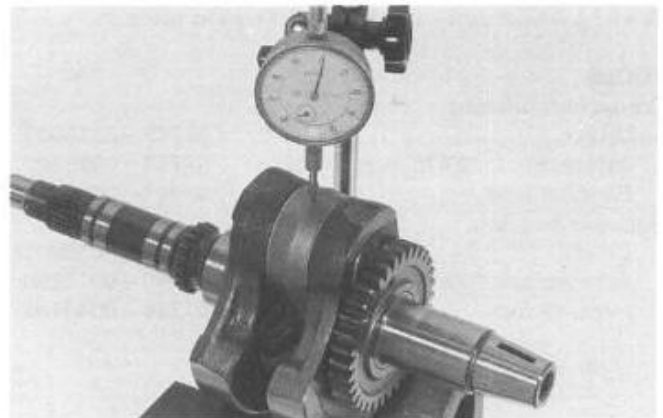
Measure the side clearance between the connecting rod big end and the crankshaft weight with a feeler gauge.

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)

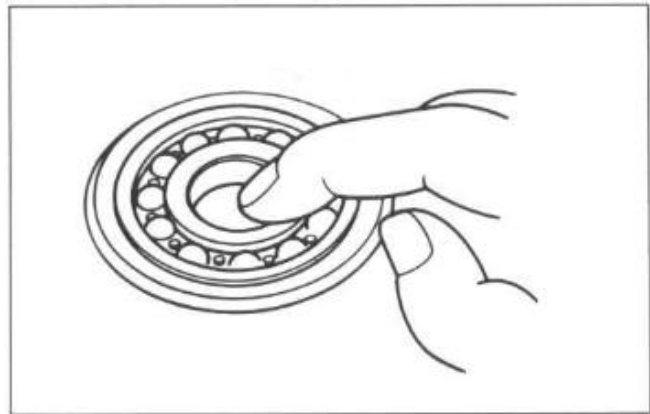


Check the balancer gear teeth for abnormal wear or damage.



BEARING REPLACEMENT

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check the outer race of each bearing fits tightly in the crankcase.

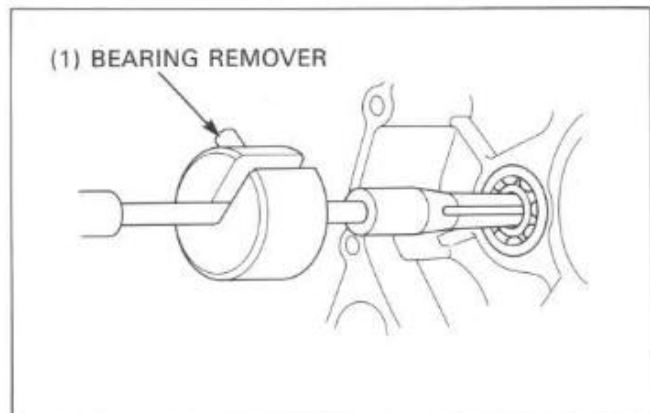


Drive out the crankshaft bearing. Pull the balancer bearings out of the crankcase using the special tools as shown.

TOOLS:

Remover handle
Bearing remover, 17 mm
Remover weight

07936 - 3710100
07936 - 3710300
07741 - 0010201 or
07936 - 3710200
(U.S.A. only)



Drive new bearings in using the following tools.

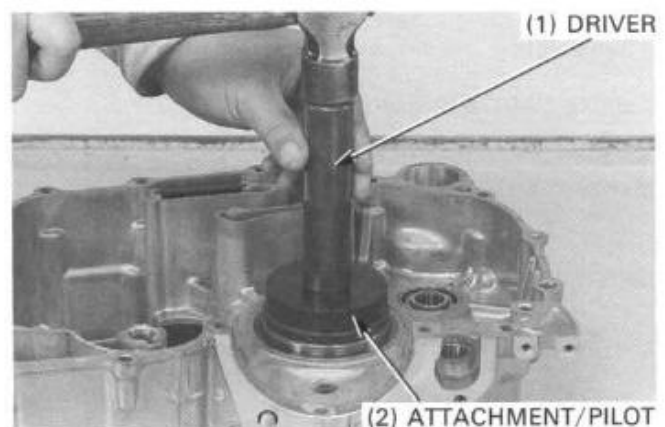
TOOLS :

Crankshaft bearing:

Driver	07749 - 0010000
Attachment, 72X75 mm	07746 - 0010600
Pilot, 40 mm	07746 - 0040900

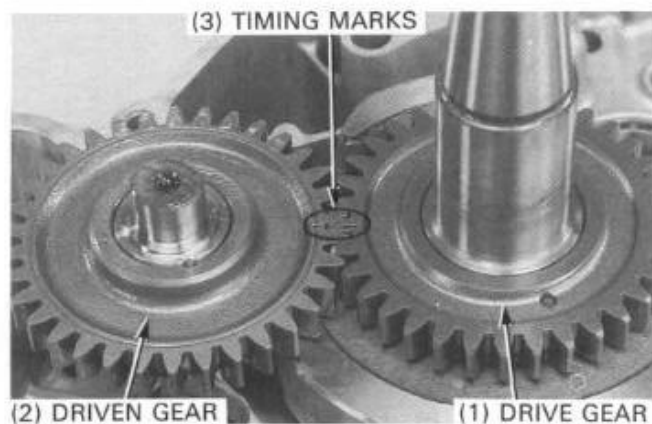
Balancer bearing:

Driver	07749 - 0010000
Attachment, 37X40 mm	07746 - 0010200
Pilot, 17 mm	07746 - 0040400



INSTALLATION

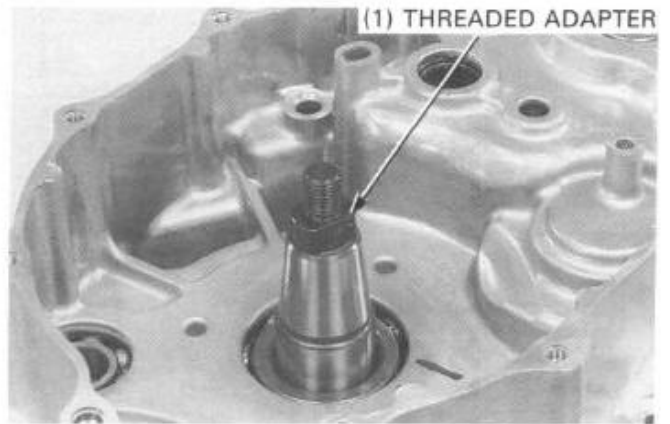
Temporarily install the balancer and crankshaft in the front crankcase and align their timing marks.



Install the rear crankcase on the front crankcase.
Install the threaded adapter on the crankshaft.

TOOL:
Threaded adapter

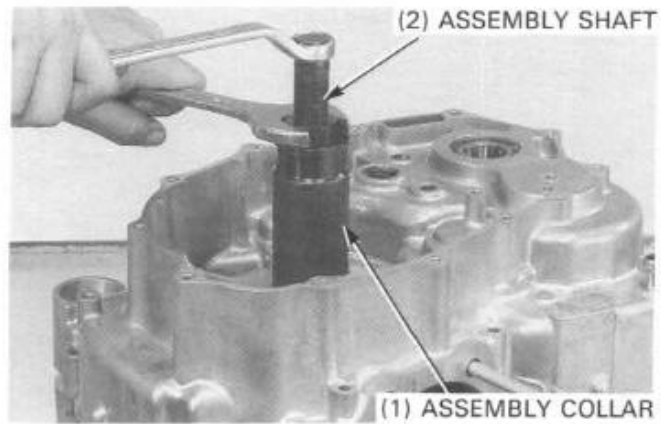
07965 - VM00300 or
07931 - KF00200
(U.S.A. only)



Draw the crankshaft into the rear crankcase using the special tools.

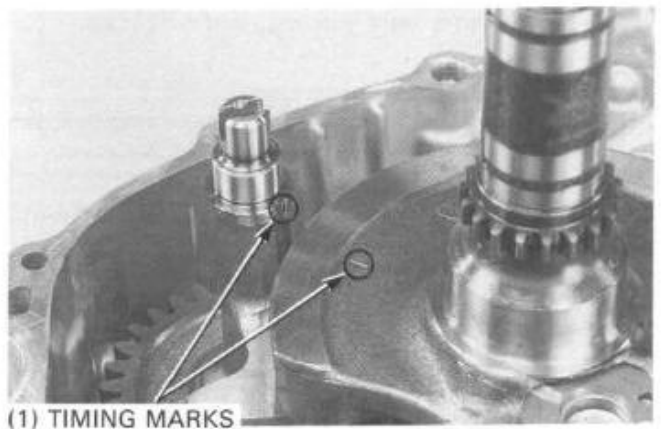
TOOLS:
Assembly collar
Assembly shaft

07965 - VM00100
07965 - VM00200 or
07931 - ME4010A
(U.S.A. only)



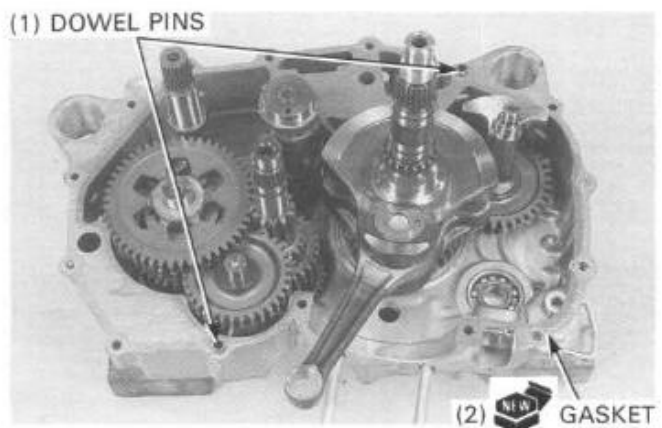
Remove the front crankcase and make sure the index marks on the balancer and crankshaft are aligned.

Install the transmission (page 11-11).



CRANKCASE ASSEMBLY

Install the dowel pins and new gasket.



CRANKSHAFT/BALANCER/TRANSMISSION

Install the front crankcase onto the rear crankcase.

NOTE

- Make sure that the gasket stays in place.
- Make sure the bearing holder/cam chain tensioner arm is on the correct side of the mainshaft. Refer to page 7-23 for proper positioning.

Install and tighten all the rear crankcase bolts in 2 or 3 steps in a crisscross pattern.

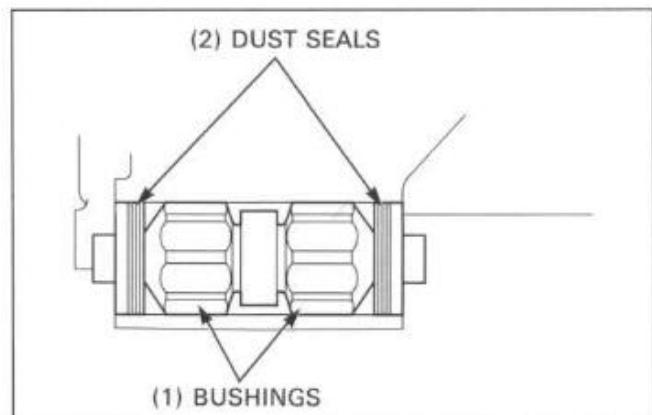
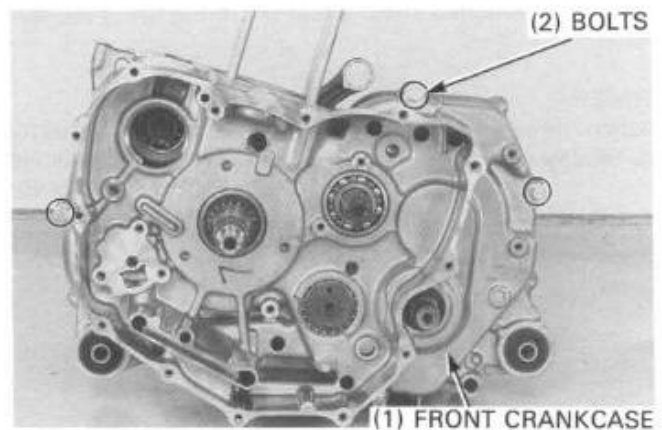
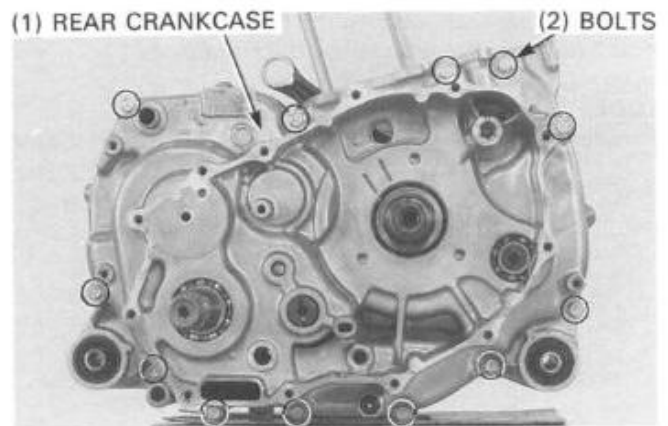
Tighten the front crankcase bolts.

Install the engine hanger bushings and dust seals.

NOTE

- When installing the engine hanger bushing dust seals, install the dust seal lips to the outside as shown.

Reinstall the removed parts in the reverse order of removal.



MEMO

12-0



12.FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	12-1	TIRES	12-7
TROUBLESHOOTING	12-2	TIE-ROD/KNUCKLE	12-11
HANDLEBAR	12-3	UPPER/LOWER ARMS	12-18
THROTTLE HOUSING	12-5	STEERING SHAFT	12-19
FRONT WHEEL	12-7	FRONT SHOCK ABSORBER	12-24

SERVICE INFORMATION

GENERAL

⚠ WARNING

- A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.

- A jack or other support is required to support the vehicle.
- Adjust toe whenever the tie-rod, knuckle or steering shaft are replaced or removed (page 3-20).
- Do not twist or bend the brake hoses and pipes when removing them from the knuckle or upper arm.

SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS	SERVICE LIMIT
Minimum tire tread depth		—	4.0 (0.16)
Cold tire pressure	Standard	0.25 kg/cm ² (3.6 psi)	—
	Minimum	0.22 kg/cm ² (3.2 psi)	—
	Maximum	0.28 kg/cm ² (4.0 psi)	—
Tie-rod distance between the ball joints		349.5 (13.76)	—
Toe		Toe-out: 16 (5/8)	—
Shock absorber spring free length		215.3 (8.48)	211.0 (8.31)

12

TORQUE VALUES

Throttle case cover screw	3.5 N•m (0.35 kg-m, 2.5 lb-ft)	
Handlebar lower holder nut	40 N•m (4.0 kg-m, 29 lb-ft)	Do not reuse
Steering shaft U-nut	110 N•m (11.0 kg-m, 80 lb-ft)	
Ball joint self lock nut	55 N•m (5.5 kg-m, 40 lb-ft)	
Tie-rod nut	55 N•m (5.5 kg-m, 40 lb-ft)	
Steering shaft holder flange bolt	33 N•m (3.3 kg-m, 24 lb-ft)	
Upper/lower arm pivot bolt/nut	45 N•m (4.5 kg-m, 33 lb-ft)	Do not reuse the nut
Knuckle ball joint nut	30 – 36 N•m (3.0 – 3.6 kg-m, 22 – 26 lb-ft)	
Brake panel bolt	30 N•m (3.0 kg-m, 22 lb-ft)	Do not reuse
Shock absorber upper mounting bolt/nut	45 N•m (4.5 kg-m, 33 lb-ft)	Do not reuse the nut
Shock absorber lower mounting bolt/nut	45 N•m (4.5 kg-m, 33 lb-ft)	Do not reuse the nut
Damper rod lock nut	38 N•m (3.8 kg-m, 27 lb-ft)	Apply a locking agent
Front wheel nut	65 N•m (6.5 kg-m, 47 lb-ft)	
Front wheel hub castle nut	80 – 100 N•m (8.0 – 10.0 kg-m, 58 – 72 lb-ft)	
Brake hose 2 way joint nut	15 N•m (1.5 kg-m, 11 lb-ft)	
Brake hose clamp bolt	12 N•m (1.2 kg-m, 9 lb-ft)	

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

Ball joint remover, 28 mm	07MAC – SL00200	
Oil seal driver attachment	07JAD – PH80101	
Driver handle attachment	07949 – 3710001	
Attachment	07945 – 3330300	or 07746 – 0010400
Driver	07749 – 0010000	
Attachment, 37X40 mm	07746 – 0010200	
Attachment, 52X55 mm	07746 – 0010400	
Pilot, 30 mm	07746 – 0040700	

TROUBLESHOOTING

Hard steering

- Damaged steering shaft bearing and holder bushing
- Steering shaft holder too tight
- Insufficient tire pressure

Steers to one side or does not track straight

- Bent tie-rod
- Insufficient tire pressure
- Bent suspension arm; frame or wheel installed incorrectly
- Incorrect wheel alignment
- Weak front shock absorber

Front wheel wobbling

- Bent rim
- Worn front drum bearing
- Faulty tire
- Axle nut not tightened properly

Soft suspension

- Weak spring

Hard suspension

- Bent shock absorber

Suspension noise

- Loose fasteners

HANDLEBAR

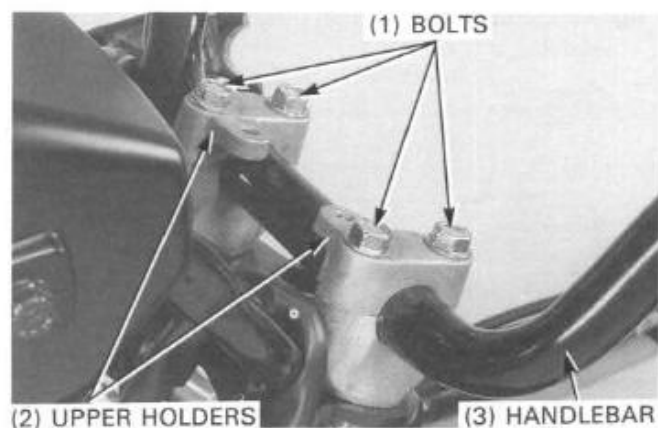
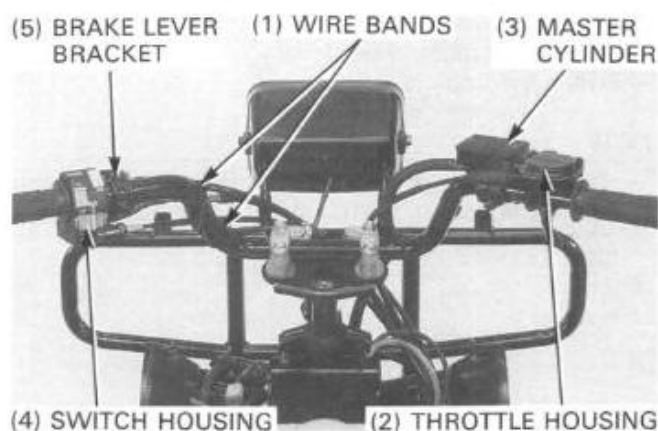
REMOVAL

Remove the front fender and handlebar cover (section 2).

Remove the following:

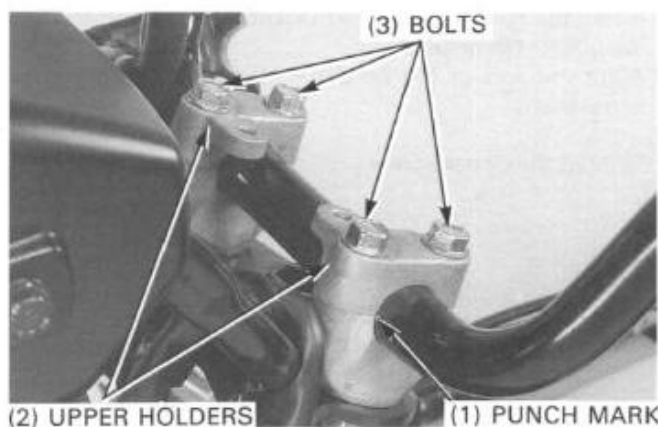
- Wire bands
- Throttle lever housing
- Master cylinder
- Switch housing (and disconnect the choke cable)
- Rear brake lever bracket

- Upper holder bolts
- Upper holders
- Handlebar



INSTALLATION

Place the handlebar on the lower holders.
Align the punch mark on the handlebar with the top of the lower holders.
Install the upper holders on the handlebar with their cover bosses forward.
Tighten the front bolts first, then tighten the rear bolts.



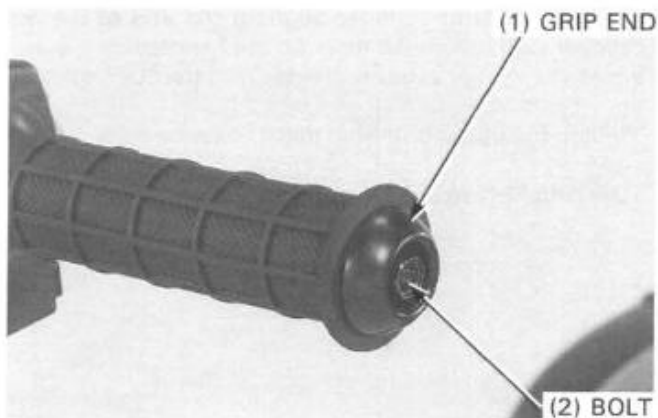
If the handlebar grips were removed, apply Honda Bond A or Honda Hand Grip Cement (U.S.A. only) to the inside of the grip and to the clean surfaces of the right and left handlebar.

Wait 3 - 5 minutes and install the grip.
Rotate the grip for even application of the adhesive.

NOTE

- Allow the adhesive to dry for an hour before using.

Install the grip end and tighten the bolt.



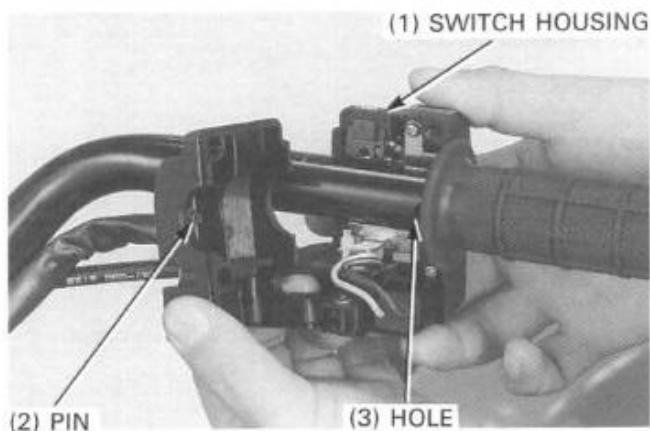
FRONT WHEEL/SUSPENSION/STEERING

Install the following:

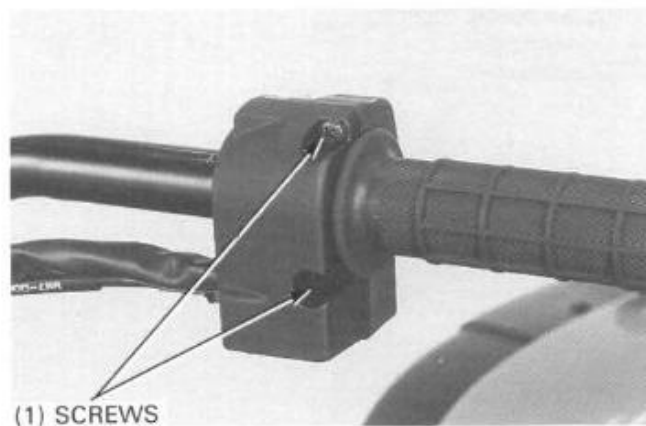
- Choke cable to the choke lever
- Switch housing

NOTE

- When installing the switch housing, place the locating pin in the hole on the handlebar.

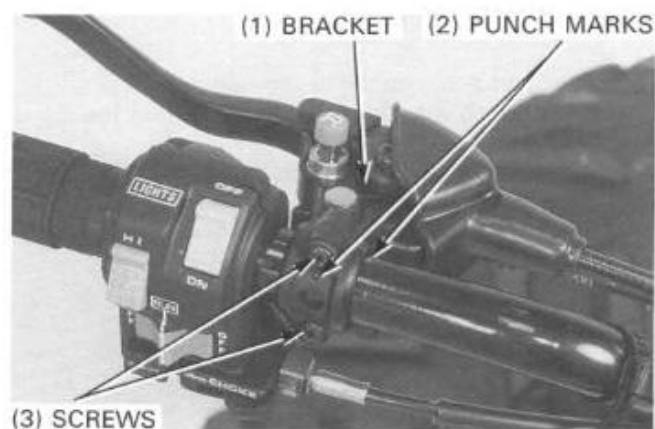


Tighten the upper screw first, then the lower screw.



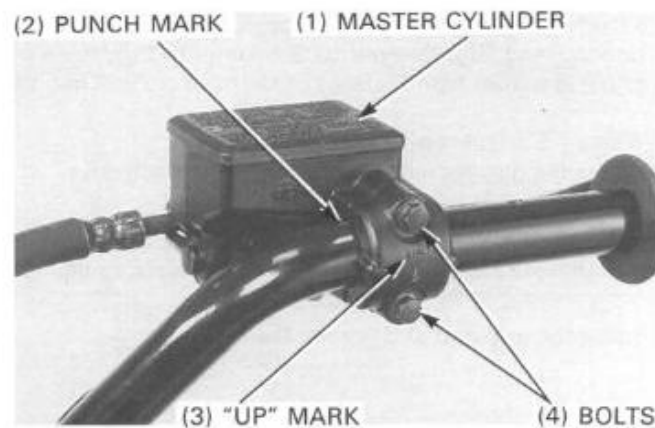
Install the rear brake lever bracket with the punch mark on the holder facing up.
Align the end of the holder with the punch mark on the handlebar.

Tighten the upper screw first, then the lower screw.

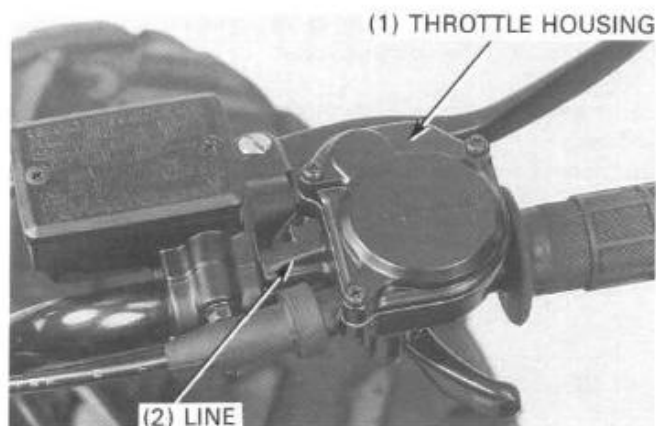


Install the master cylinder aligning the end of the master cylinder with the punch mark on the handlebar.
Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

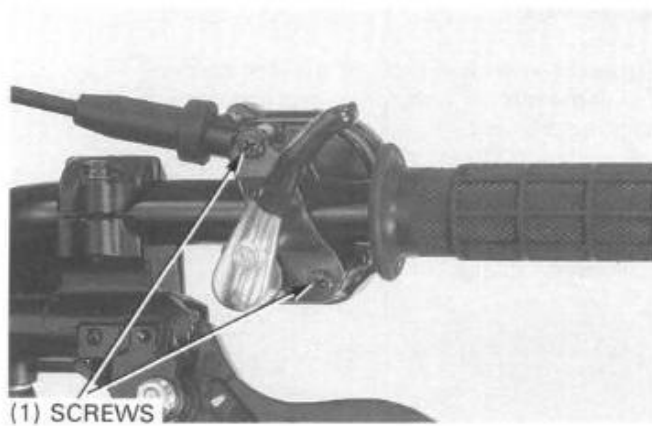
TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)



Install the throttle housing aligning the line on the throttle housing with the end of the master cylinder.

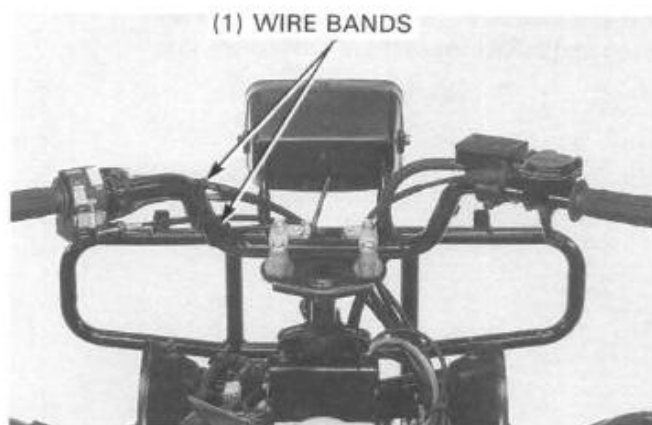


Tighten the throttle housing screws securely.



Secure the wire with the wire bands.

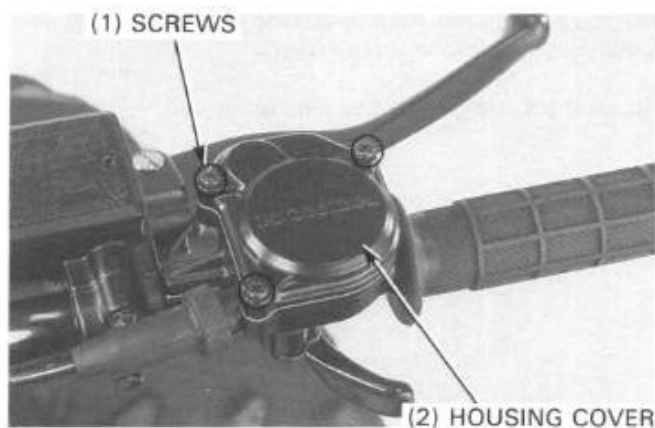
Install the handlebar cover and front fender (section 2).



THROTTLE HOUSING

DISASSEMBLY

Remove the three throttle housing cover screws and the cover.
Remove the gasket.

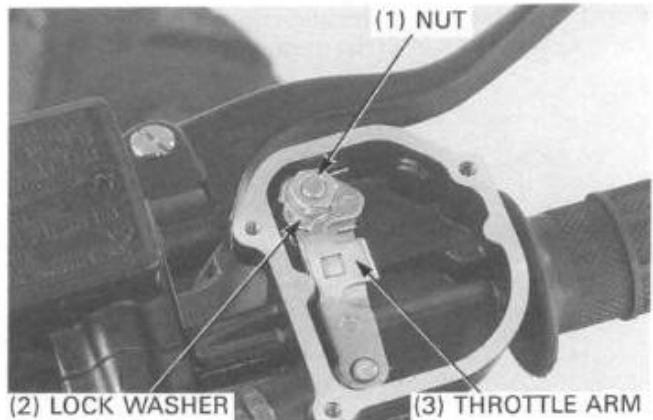


FRONT WHEEL/SUSPENSION/STEERING

Slide the rubber boot off the cable adjuster.
Loosen the throttle cable adjuster.

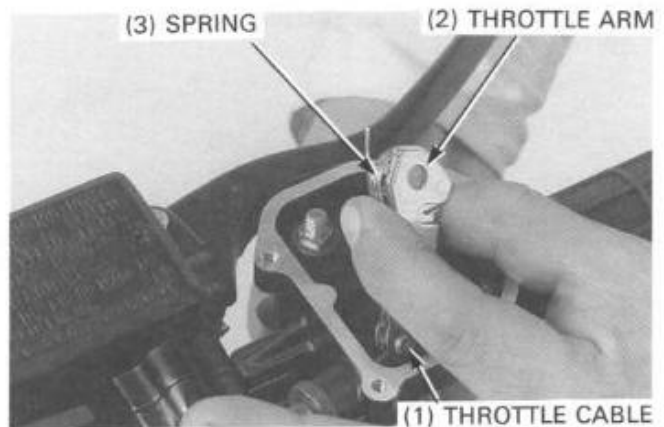
Bend down the lock washer tab and remove the nut and lock washer.

Disconnect the throttle cable from the throttle arm.
Remove the throttle arm, spring and throttle lever from the throttle housing.

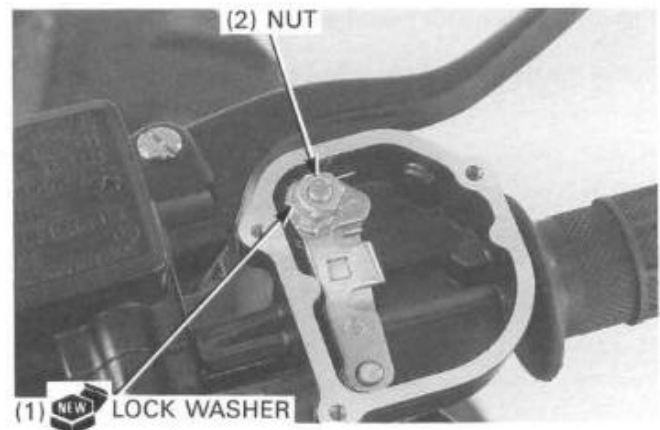


ASSEMBLY

Connect the throttle cable to the throttle arm.
Install the throttle arm spring and arm onto the throttle lever aligning the flats.

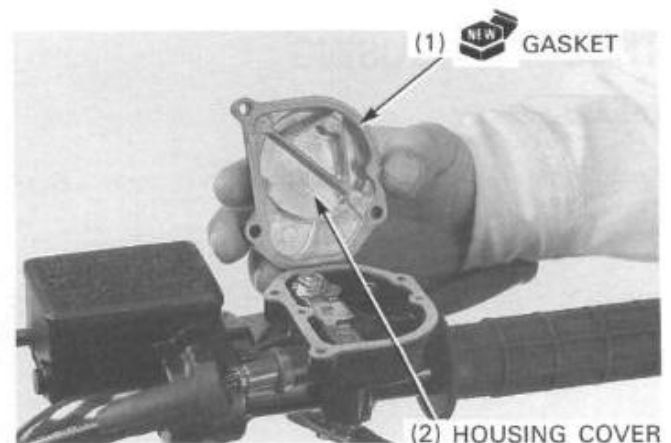


Install a new lock washer and tighten the nut.
Bend up the lock washer tab against the nut.



Install a new gasket, then install the throttle housing cover.
Install and tighten the three screws.

Adjust the throttle lever free play (page 3-4).



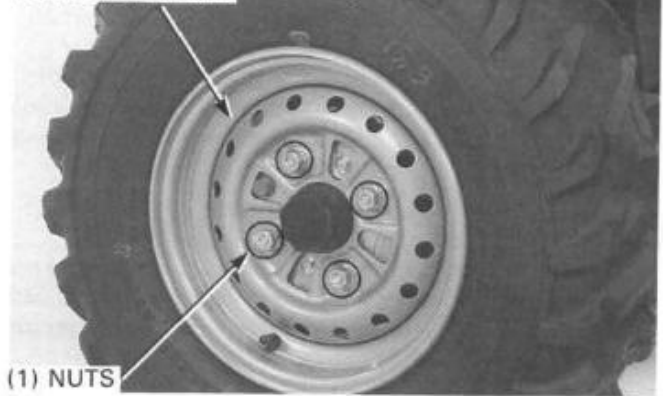
FRONT WHEEL

REMOVAL

Loosen the wheel nuts.
Place a support block under the engine to raise the front wheels off the ground.

Remove the wheel nuts and wheel.

(2) FRONT WHEEL



(1) NUTS

INSTALLATION

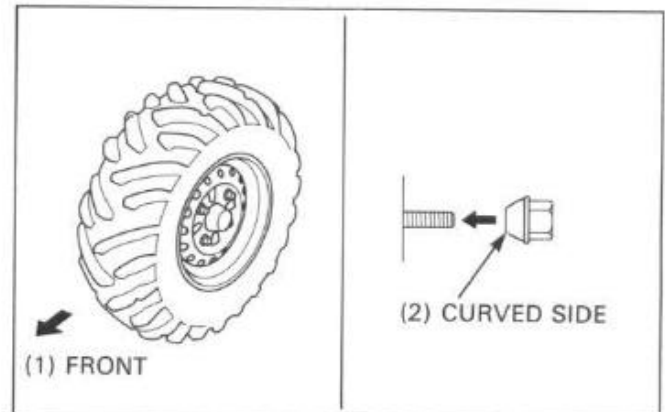
Install the front wheel.

NOTE

- Do not interchange the right and left tires.

Install the wheel nuts with their curved sides facing inward and tighten to the specified torque.

TORQUE: 65 N·m (6.5 kg·m, 47 lb·ft)



TIRES

REMOVAL

NOTE

- This service requires the Universal Bead Breaker (GN-AH-958-BB1).
- Remove and install tires from the rim side opposite the valve stem.

Remove the core from the valve stem.

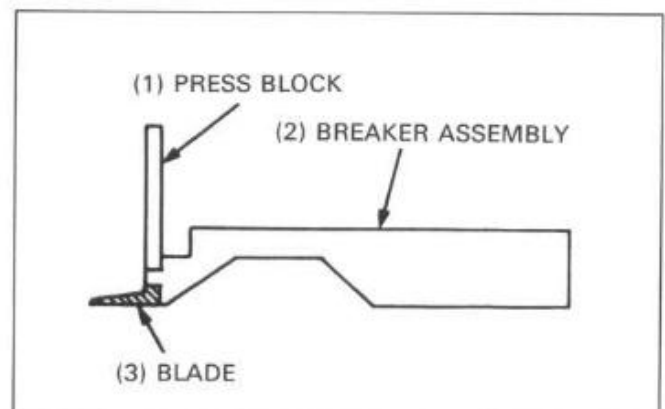
CAUTION

- Use of the bead breaker tool is required for tire removal.
- Do not damage the bead seating area of the rim.
- Use a Coats 220 Tire Changer or equivalent to remove the tire from the rim. If a tire changer is not available, rim protectors and tire irons may be used.

Install the blade for 9/11" rims onto the breaker arm assembly.

CAUTION

- Use of an improper size blade may result in damage to the rim, tire or blade.



FRONT WHEEL/SUSPENSION/STEERING

Place the proper size adapter onto the threaded shaft and then put the wheel over the threaded shaft and adapter.

Lube the bead area with water, pressing down on the tire sidewall/bead area in several places to allow the water to run into and around the bead. Also lube area where the breaker arm will contact the sidewall of the tire.

⚠ WARNING

- *Use only water as a lubricant when removing or mounting tires. Soap or some mounting lubricants may leave a slippery residue which can cause the tire to shift on the rim and lose air pressure during riding.*

While holding the breaker arm assembly at an approximate 45° position, insert the blade of the breaker arm between the tire and rim. Push the breaker arm inward and downward until it is in the horizontal position with its press block in contact with the rim.

With the breaker arm in the horizontal position, place the breaker press head assembly over the breaker arm press block. Make sure the press head bolt is backed out all the way and then position the nylon buttons on the press head against the inside edge of the rim.

Insert the threaded shaft through the appropriate hole in the breaker press head assembly and then tighten the lever nut until both ends of the breaker press head assembly are in firm contact with the rim.

Tighten the press head bolt until the reference mark on the press block is aligned with the top edge of the press head.

If the rest of the bead cannot be pushed down into the center of the rim by hand, loosen the press head bolt and the lever nut.

Rotate the breaker arm assembly and breaker press head assembly 1/8 to 1/4 the circumference of the rim.

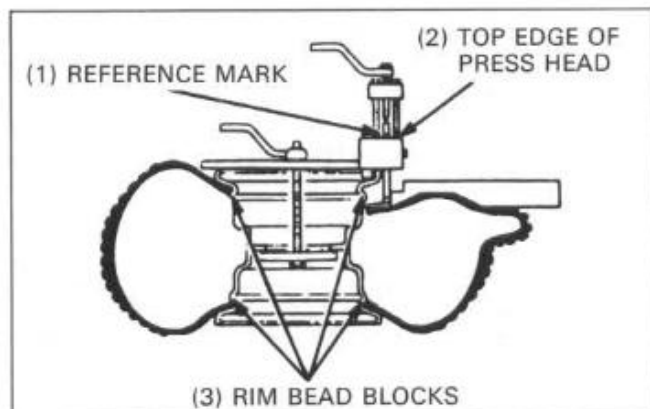
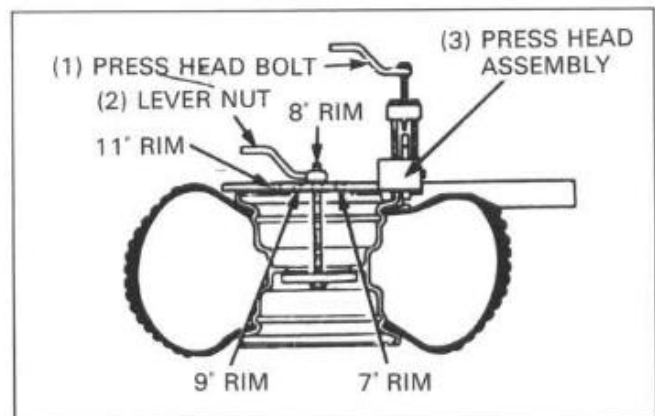
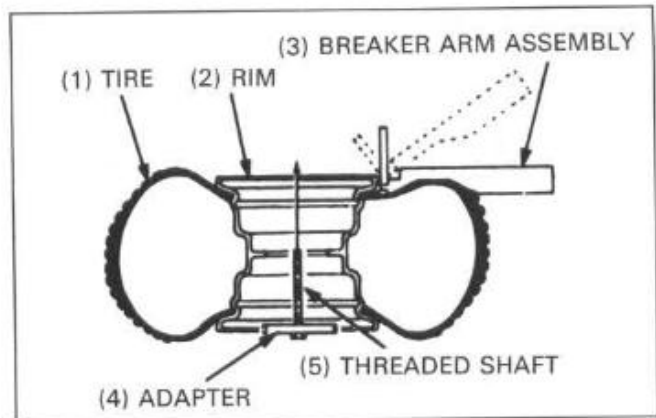
Tighten the lever nut and then tighten the press head bolt as described.

Repeat this procedure as necessary until the remainder of the bead can be pushed down into the center of the rim.

Assemble the Universal Bead Breaker on the other side of the wheel and break the bead following the same procedures.

Remove the tire from the rim using a tire changer machine or tire irons and rim protectors.

Remove tire from rim that has the smallest shoulder area to simplify removal.



TIRE REPAIR**NOTE**

- Use the manufacturer's instructions for the tire repair kit you are using. If your kit does not have instructions, use the procedures provided here.

Check the tire for puncturing objects.

Chalk mark the punctured area and remove the puncturing object.

Inspect and measure the injury.

Tire repairs for injuries larger than 15 mm (5/8 in) should be a section repair.

Section repairs should be done by a professional tire repair shop.

If the injury is smaller than 15mm (5/8 in), proceed with the repair as described here.

Install a rubber plug into the injury as follows:

Apply a cement to a plug inserting needle and work the needle into the injury to clean and lubricate it.

Do this three times.

Do not let the cement dry.

Insert and center a rubber plug through the eye of the inserting needle.

Apply cement to the rubber plug.

Push the inserting needle with plug into the injury until the plug is slightly above the tire.

Twist the needle and remove it from the tire; the plug will stay in the tire.

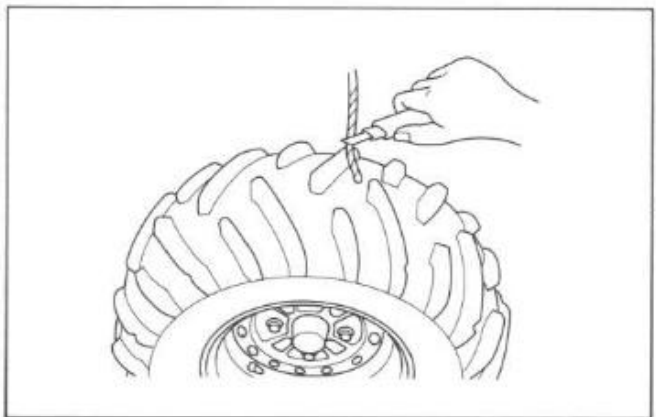
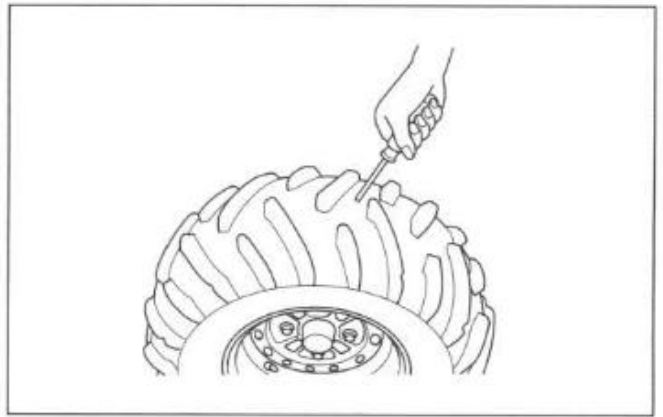
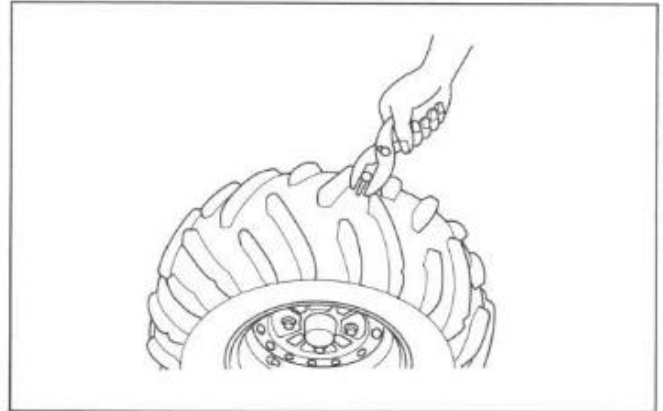
NOTE

- Be careful not to push the plug all the way into the tire to prevent it from falling inside.

Trim the plug 6 mm (1/4 in) above the tire surface.

Repeat the above procedure if the puncture is large.

Do not use more than two plugs per injury.



FRONT WHEEL/SUSPENSION/STEERING

Allow the repair to dry. Drying time will vary with air temperature. Refer to the tire repair kit manufacturer's recommendations.

Inflate the tire and test the seal by dabbing a small amount of cement around the plug. Escaping air will cause a bubble in the cement. If there is leakage, remove the tire (page 13-3) and apply a cold patch to the inside of the tire as described. If a plug has been inserted, rim it even with the inner tire surface.

Temporarily place a rubber patch that is at least twice the size of the puncture over the injury. Make a mark around the patch, slightly larger than the patch itself.

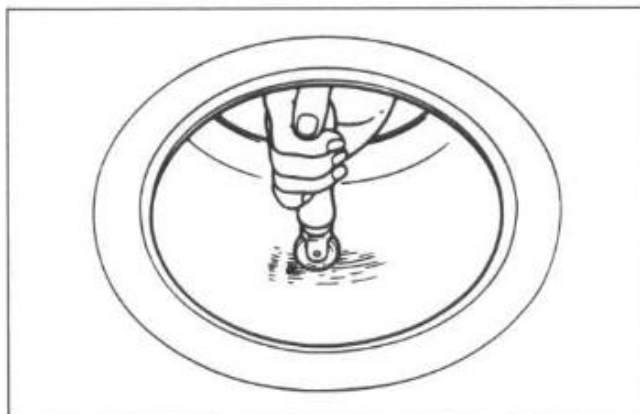
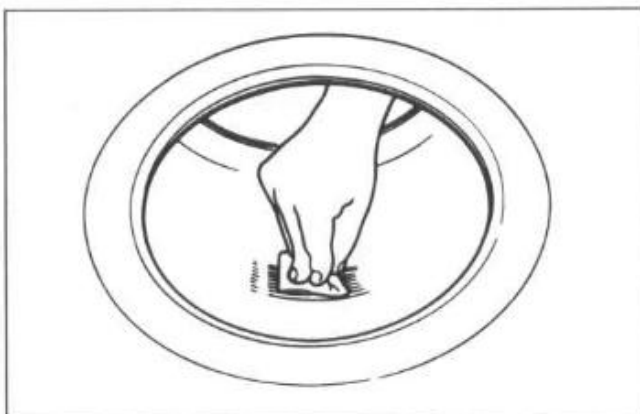
Roughen the area marked inside the tire with a tire buffer or a wire brush. Clean the rubber dust from the buffed area.

Apply cement over the area marked and allow it to dry. Remove the lining from the patch and center it over the injury.

Press the patch against the injury using a special roller.

NOTE

- Allow cement to dry until tacky before applying patch.
- Do not touch the cement with dirty or greasy hands.



ASSEMBLY

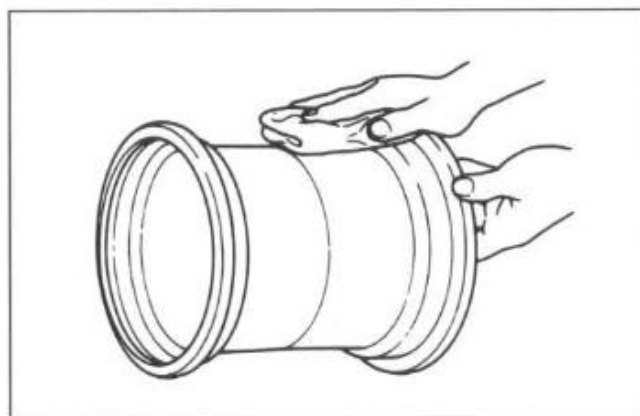
Install the tire onto the rim, where the rim shoulder width is the narrowest, to simplify installation.

Clean the rim bead seat and flanges.

Apply clean water to the rim flanges, bead seat and base.

WARNING

- Use only water as a lubricant when mounting tires. Soap or some mounting lubricants may leave a slippery residue which can cause the tire to shift on the rim and lose air pressure during riding.



Install the valve core in the valve stem.

Install the tire and inflate it to seat the tire bead.

Deflate the tire. Wait 1 hour and inflate the tire to the specified pressure.

	FRONT	REAR
Standard	0.25 kg/cm ² (3.6 psi)	0.25 kg/cm ² (3.6 psi)
Minimum	0.22 kg/cm ² (3.2 psi)	0.22 kg/cm ² (3.2 psi)
Maximum	0.28 kg/cm ² (4.0 psi)	0.28 kg/cm ² (4.0 psi)
With cargo	0.25 kg/cm ² (3.6 psi)	0.25 kg/cm ² (3.6 psi)

Check for air leaks and install the valve cap.

TIE-ROD/ KNUCKLE

REMOVAL

NOTE

- The tie-rod can be removed without removing the brake drum.

Remove the front wheel (page 12-7).

Remove the following:

- Cotter pin
- Axle nut

Remove the brake drum.

Remove the brake hose guide mounting nut.
Remove the breather tube from the tube guides.

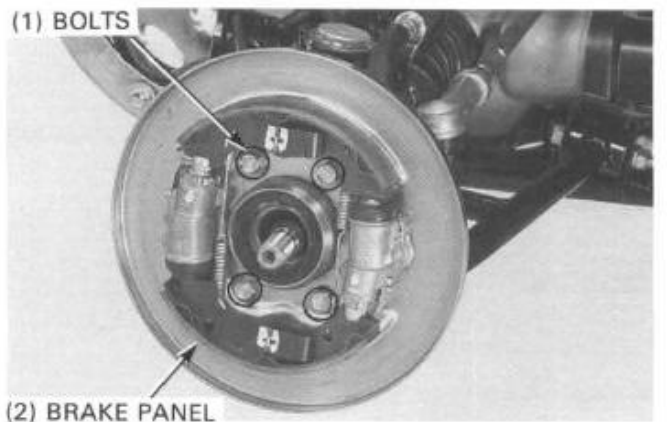
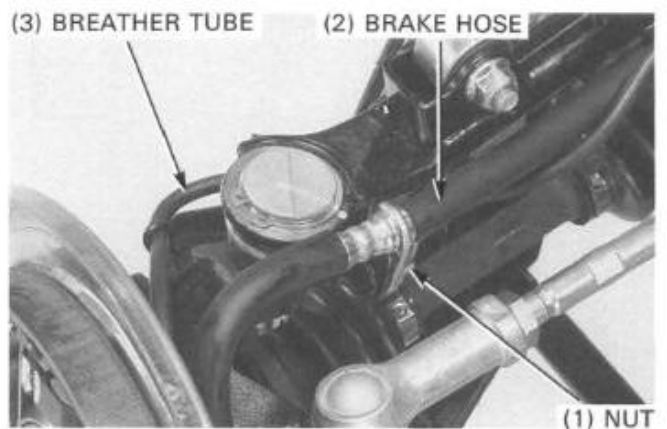
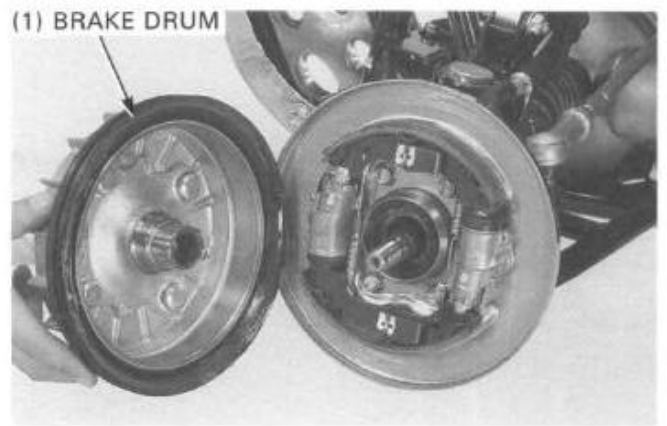
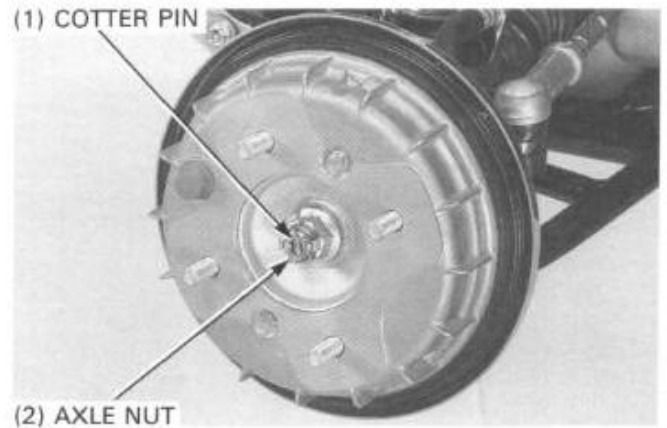
Remove the four bolts and brake panel from the knuckle.

NOTE

- Do not disconnect the brake hose from the brake panel. The brake system will have to be bled if the brake hose is disconnected.
- Do not operate the front brake lever after removing the brake panel. If you do, it will be difficult to refit the brake drum and shoes.

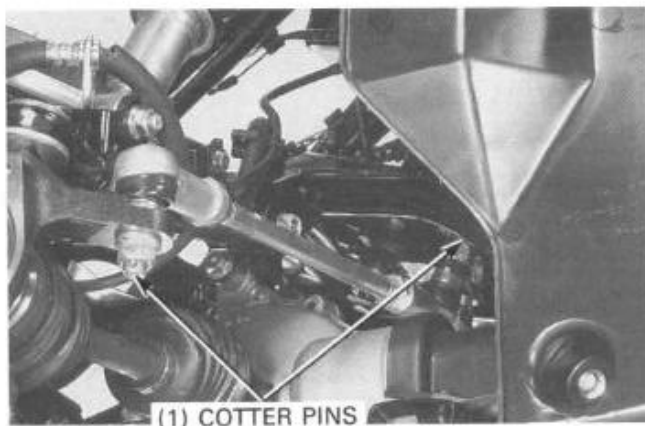
CAUTION

- Support the brake panel so that it does not hang from the brake hose. Do not twist the brake hose.



FRONT WHEEL/SUSPENSION/STEERING

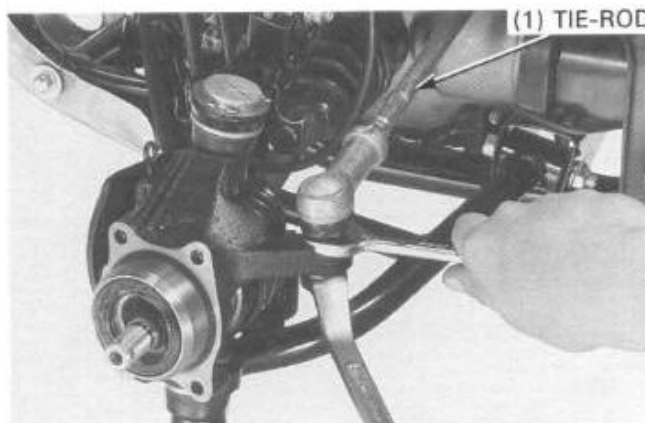
Remove the cotter pins.



(1) COTTER PINS

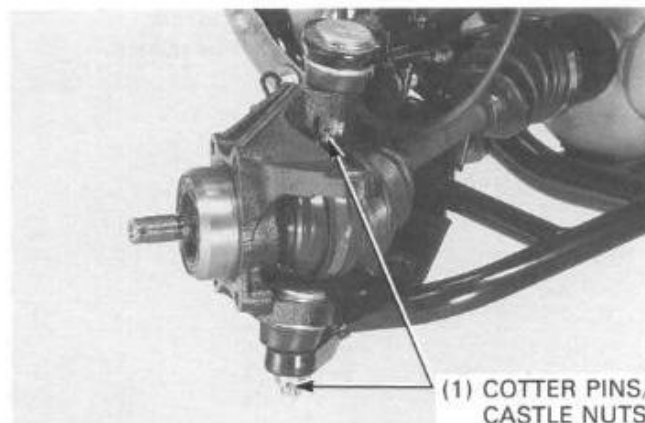
Hold the tie-rod joints and remove the nuts.

Remove the tie-rod.



(1) TIE-ROD

Remove the cotter pins and castle nuts.



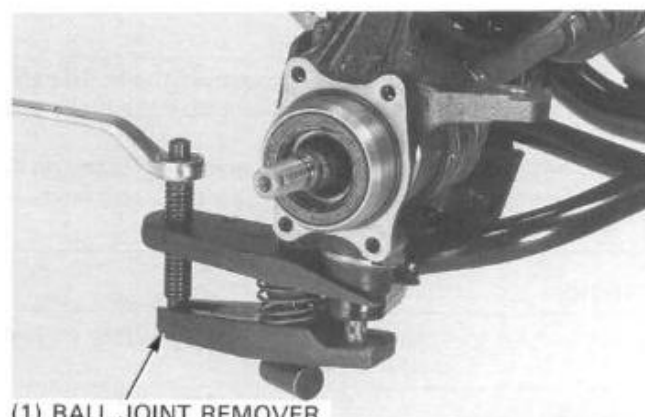
(1) COTTER PINS/
CASTLE NUTS

Remove the knuckle from the upper and lower arm, using the special tool according to the following instructions.

TOOL:

Ball joint remover, 28 mm

07MAC-SL00200



(1) BALL JOINT REMOVER

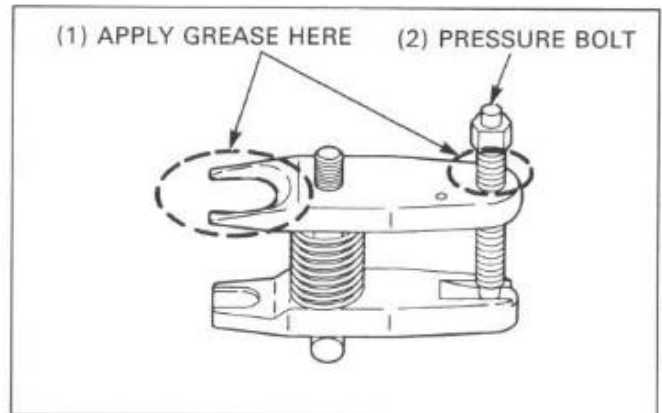
Apply grease to the ball joint puller on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.

Insert the jaws carefully, making sure that you do not damage the ball joint boot.

Adjust the jaw spacing by turning the pressure bolt.

NOTE

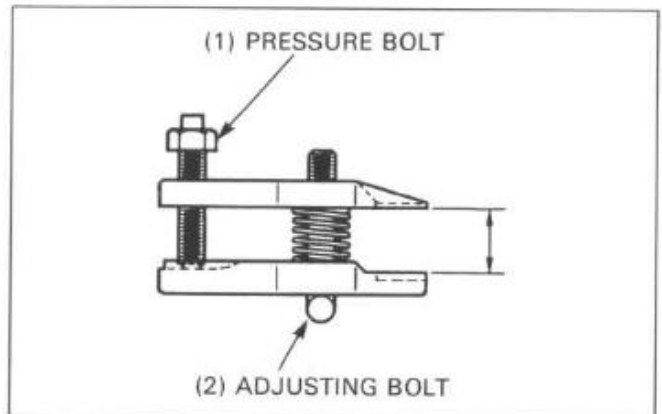
- If necessary, apply penetrating type lubricant to loosen the ball joint.



Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel.

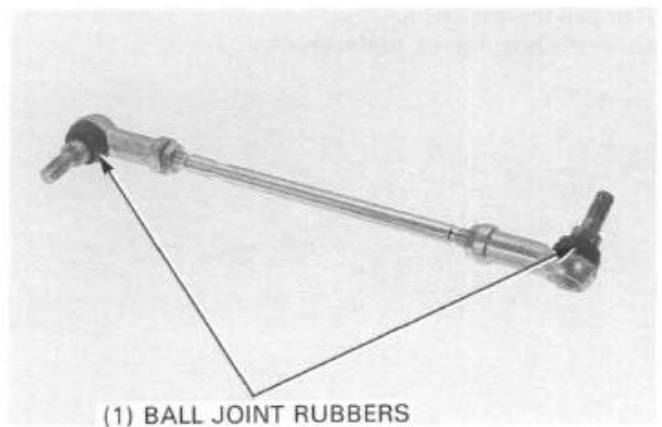
Then hand-tighten the pressure bolt and recheck the jaws to make sure they are still parallel.

Tighten the pressure bolt with a wrench until the ball joint shaft pops loose.



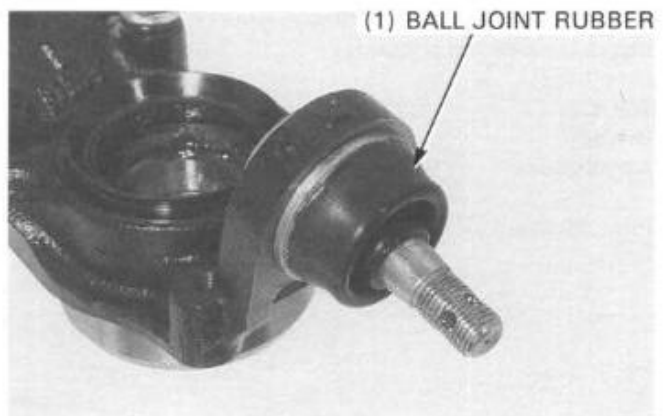
INSPECTION

Inspect the tie-rod for distortion or damage. Inspect the ball joint rubbers for tears or other damage by moving the ball joint ends. They should move freely and smoothly. Replace the ball joints if necessary.



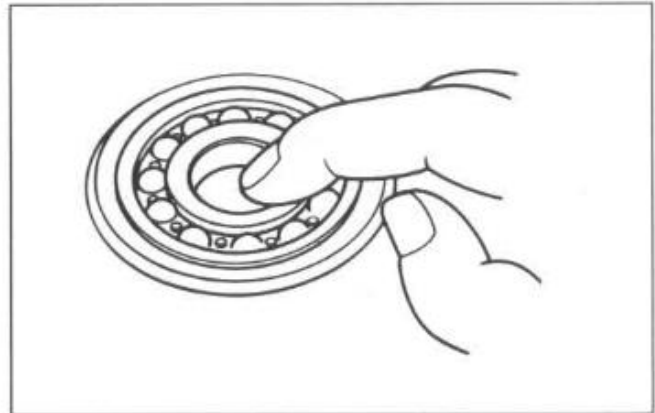
Inspect the knuckle for damage or cracking.

Inspect the knuckle ball joint rubber for tears or other damage by moving the ball joint end. It should move freely and smoothly. Replace the knuckle if necessary.

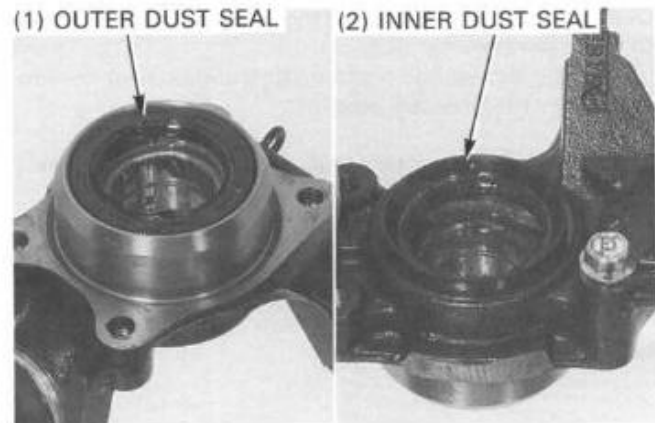


KNUCKLE BEARING INSPECTION/REPLACEMENT

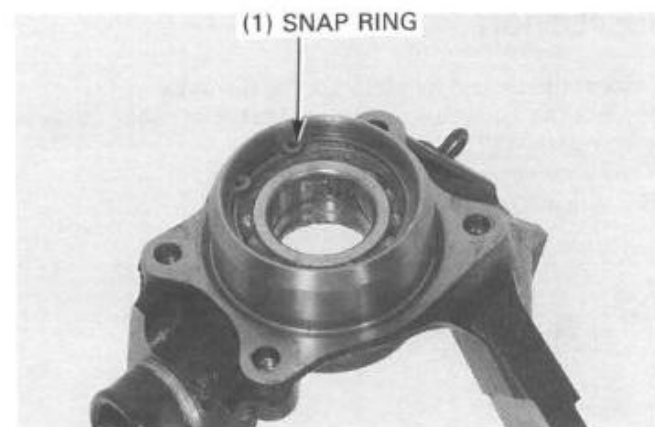
Turn the inner race of the knuckle bearing with your finger. The bearing should turn quietly. Also check that the bearing outer race fits tightly in the knuckle. Remove and discard the bearing if the race does not turn smoothly and quietly or if it fits loosely in the knuckle.



Remove both dust seals from the knuckle.



Remove the snap ring.
Drive the bearing out of the knuckle.



Pack the new bearing cavity with grease.
Install the bearing squarely.

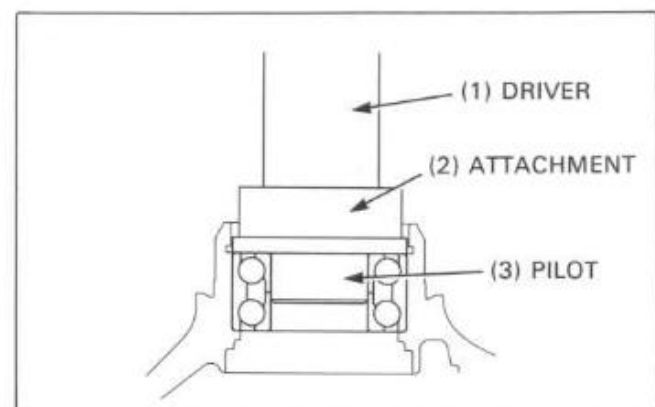
TOOLS :

Driver

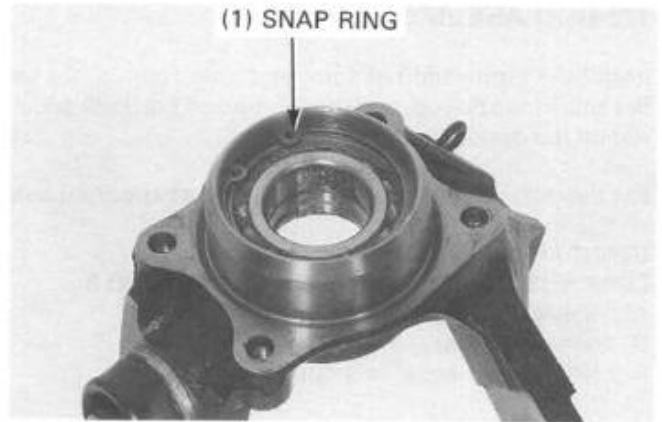
Attachment

Pilot, 30 mm

07749 - 0010000
07945 - 3330300 or
07746 - 0010400
07746 - 0040700



Install a snap ring securely in the knuckle groove.



Install new outer dust seals using the special tools.
Apply grease to the dust seal lips.

TOOLS:

Driver

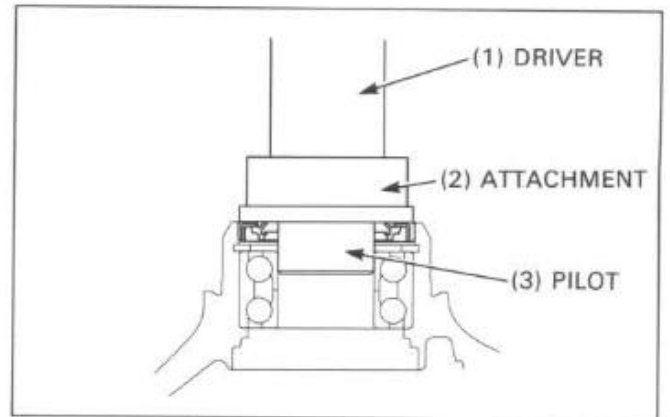
Attachment, 52X55 mm

Pilot, 30 mm

07749 - 0010000

07746 - 0010400

07746 - 0040700



Install new inner dust seals using the special tools.
Apply grease to the dust seal lips.

TOOLS :

Driver

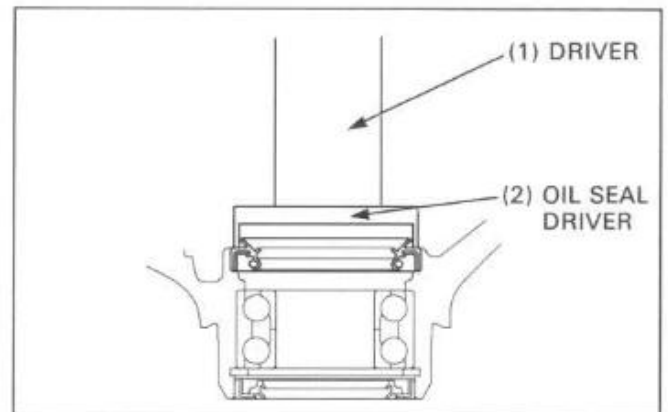
Oil seal driver

Pilot, 30 mm

07749 - 0010000

07JAD - PH80101

07746 - 0040700



KNUCKLE INSTALLATION

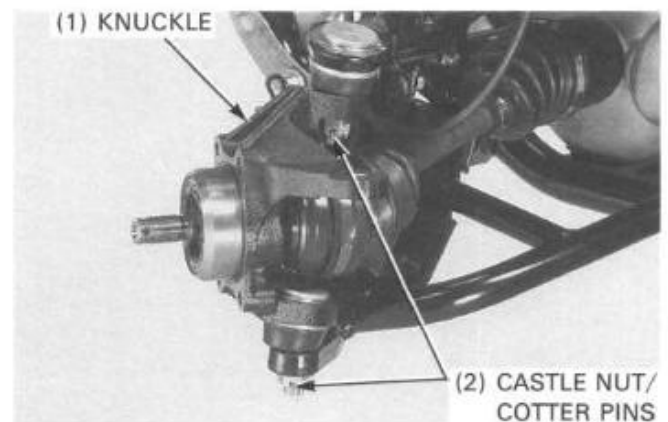
Connect the knuckle to the upper arm.
Install the castle nut.

Raise the upper arm and insert the drive shaft into the knuckle.
Connect the knuckle to the lower arm.
Install the castle nut.

Tighten the castle nuts to the specified torque.

TORQUE: 30 - 36 N·m (3.0 - 3.6 kg·m, 22 - 26 lb·ft)

Install the new cotter pins.



TIE-ROD ASSEMBLY

Install the unmarked ball joint and gold colored nut on the flat side of the tie-rod, and the "L" marked ball joint and silver nut on the opposite side.

Set the distance between the ball joints as specified below

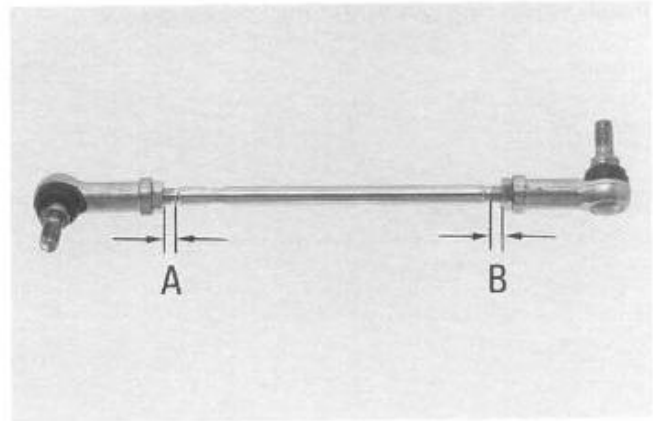
STANDARD SETTING:

LOCK NUT-TO-THREAD END DISTANCE A AND B:

A: 3.5 mm (0.14 in)

B: 3.5 mm (0.14 in)

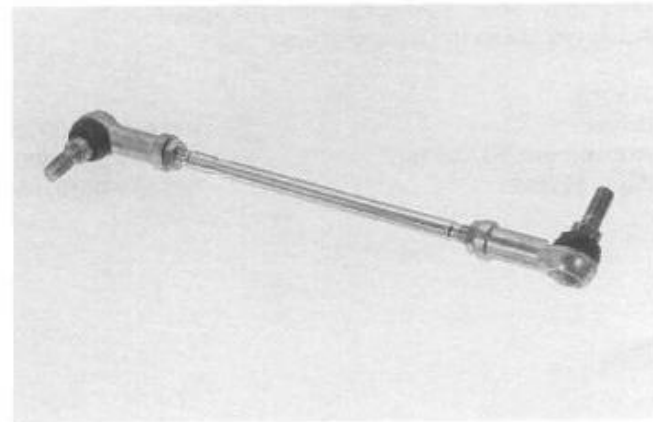
A-B less than or equal to 3 mm (0.1 in)



NOTE

- Position the ball joints 180 degrees from each other.

Tighten the lock nuts securely.

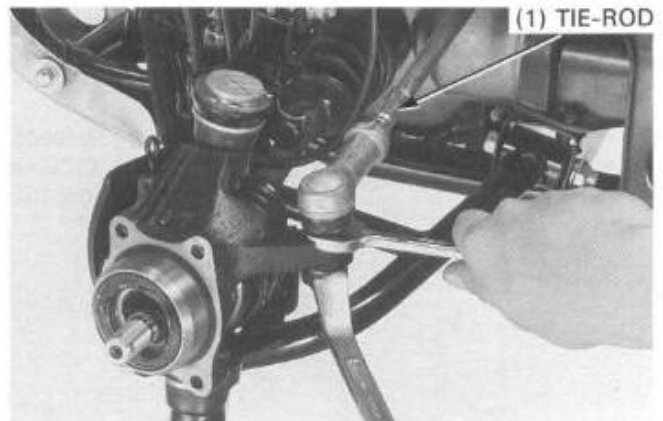


TIE-ROD INSTALLATION

Install the tie-rod with its flat end at the knuckle.

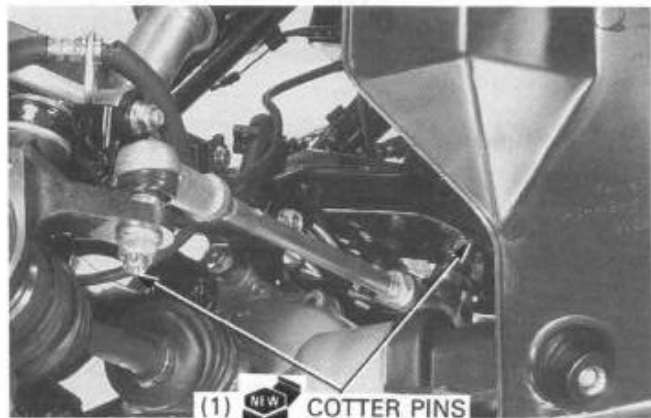
Hold the ball joint and tighten the ball joint nuts to the specified torque.

TORQUE: 55 N·m (5.5 kg-m, 40 lb-ft)



Install new cotter pins.

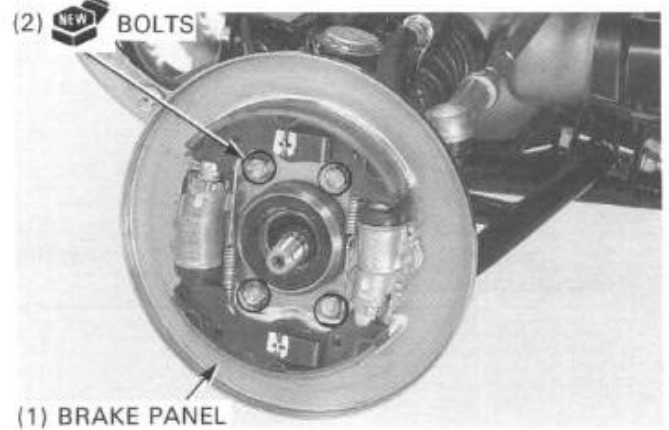
Adjust the toe (page 3-20).



If you removed the brake panel, install the brake panel onto the knuckle.

Install new brake panel mounting bolts and tighten them to the specified torque.
Do not reuse the bolts.

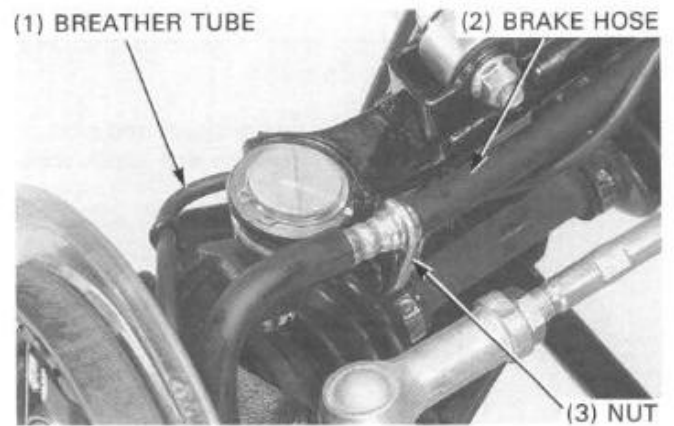
TORQUE: 30 N·m (3.0 kg-m, 22 lb-ft)



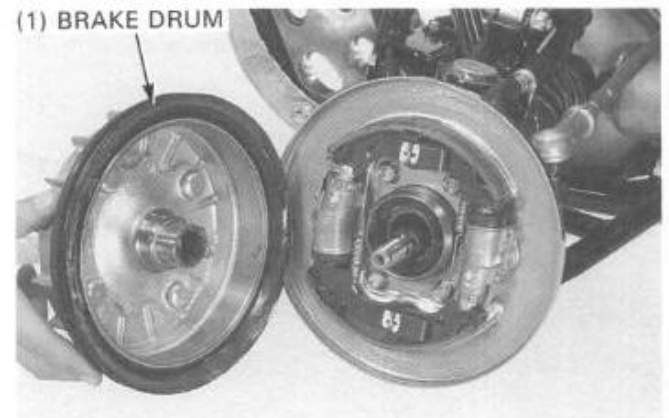
Clamp the breather tube into the clamps.

Install the brake hose clamps and tighten the nut.

TORQUE: 15 N·m (1.5 kg-m, 11 lb-ft)



Install the brake drum (page 14-15).



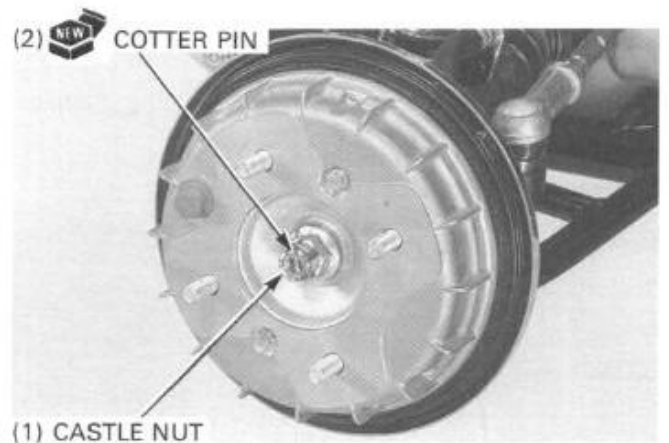
Apply grease to the castle nut flange and threads, then install the nut.
Tighten the axle nut to the specified torque.

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

Install a new cotter pin.

If you disconnect the brake line, bleed the system (page 14-3).

Install the front wheel (page 12-3).



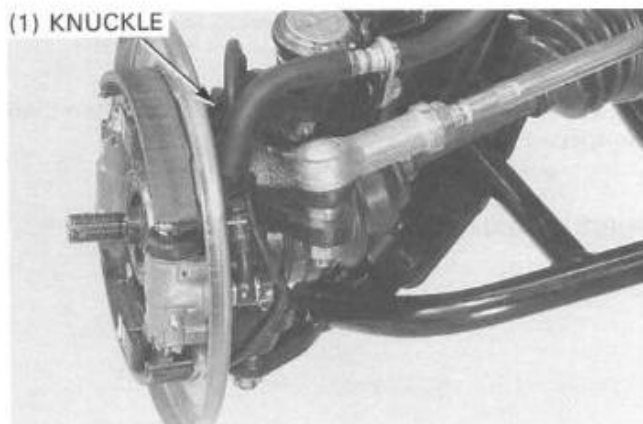
UPPER/LOWER ARMS

REMOVAL

Remove the knuckle (page 12-11).

NOTE

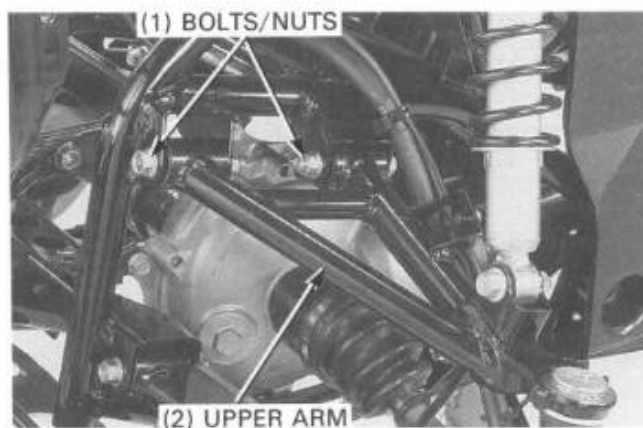
- The upper and lower arms can be removed without removing the tie-rod.



UPPER ARM

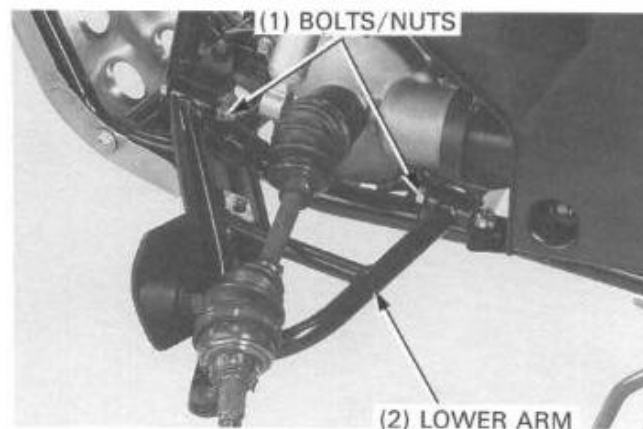
Remove the shock absorber lower mounting bolt, and the brake hose and breather tube clamp.

Remove the upper arm mounting bolts/nuts and arm. Discard the upper arm mounting nuts and shock absorber mounting nut.



LOWER ARM

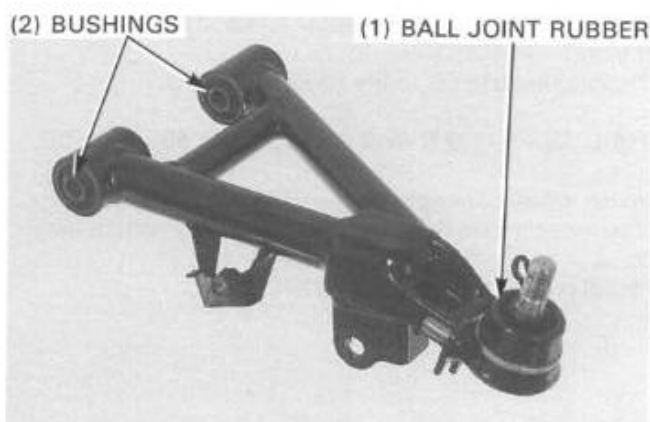
Remove the lower arm mounting bolts/nuts and arm. Discard the lower arm mounting nuts.



INSPECTION

Inspect the ball joint rubber for tears or other damage by moving the ball joint end. It should move freely and smoothly. Check the pivot bushing for damage.

Replace the upper arm assembly if necessary.



INSTALLATION

UPPER ARM

Install the upper arm, bolts and new nuts.
Install the front shock absorber lower mounting bolt and new nut and tighten it to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

Install the brake hose and breather tube clamp.
Tighten the clamp bolt to the specified torque.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

Install the brake hose clamp and tighten the nut.

TORQUE: 15 N·m (1.5 kg-m, 11 lb-ft)

Install the knuckle (page 12-15) and front wheel (page 12-3), then place the vehicle on level ground.
Tighten the upper arm mounting nuts to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

LOWER ARM

Install the lower arm, bolts and new nuts.
Install the knuckle (page 12-15) and front wheel (page 12-3), then place the vehicle on level ground.
Tighten the lower arm mounting nuts to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

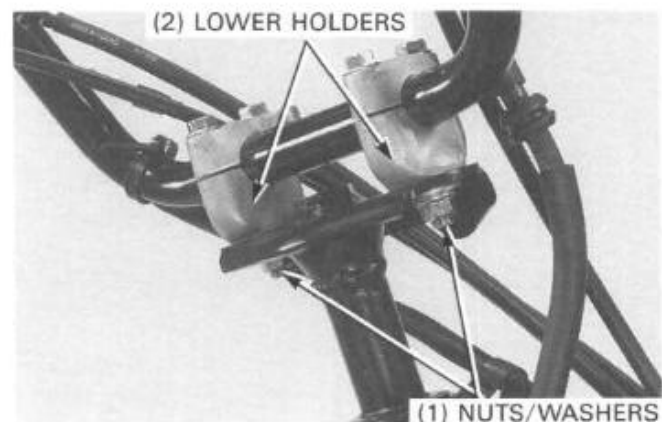
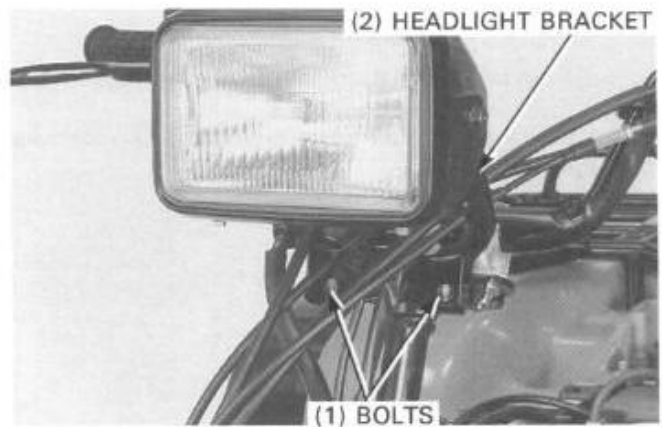
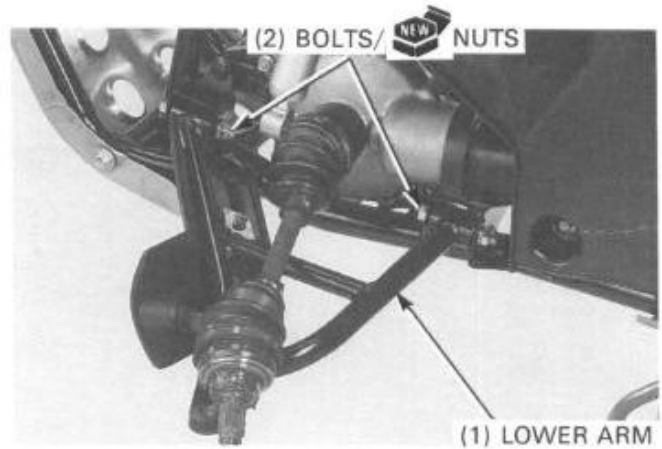
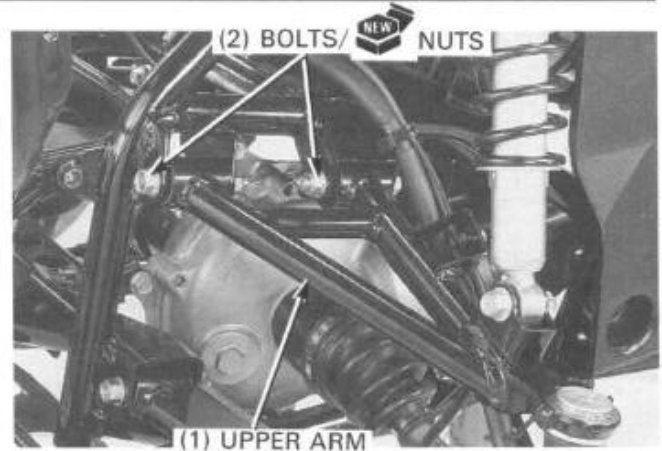
STEERING SHAFT

REMOVAL

Remove the front tender (page 2-5).

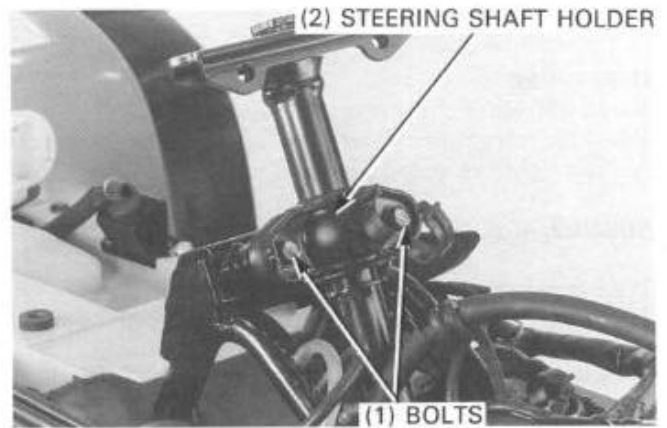
Remove the bolts and headlight bracket.

Remove the handlebar lower holder nuts, washers and handlebar assembly.
Discard the handlebar lower holder nuts.



FRONT WHEEL/SUSPENSION/STEERING

Remove the steering shaft holder bolts and holder.



Remove the following:

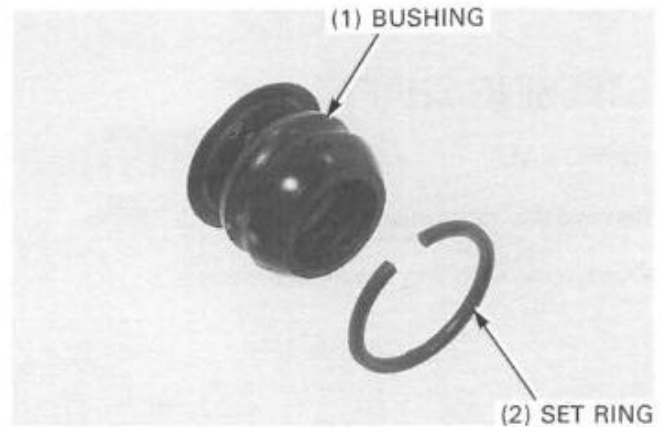
- Cotter pins
- Tie-rod ball joint nuts and steering shaft nut
- Steering arm
- Steering shaft



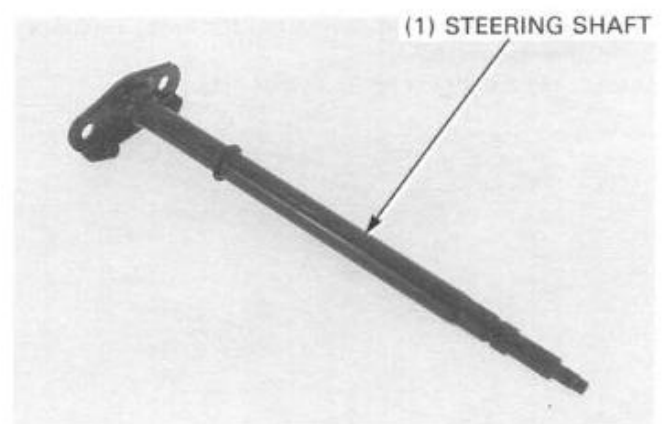
INSPECTION

Remove the set ring and steering shaft bushing.

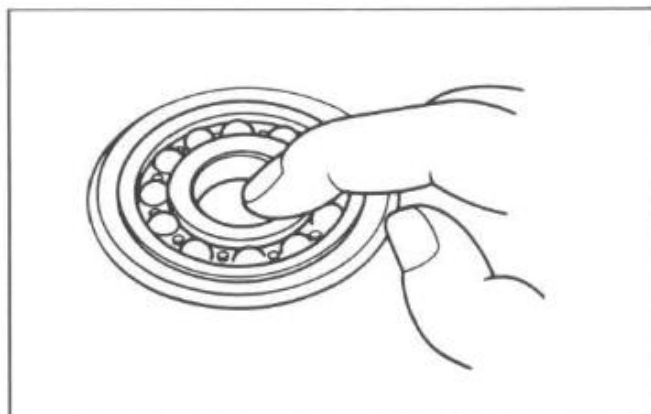
Check the steering shaft bushing and set ring for wear or damage.



Check the steering shaft distortion or damage.

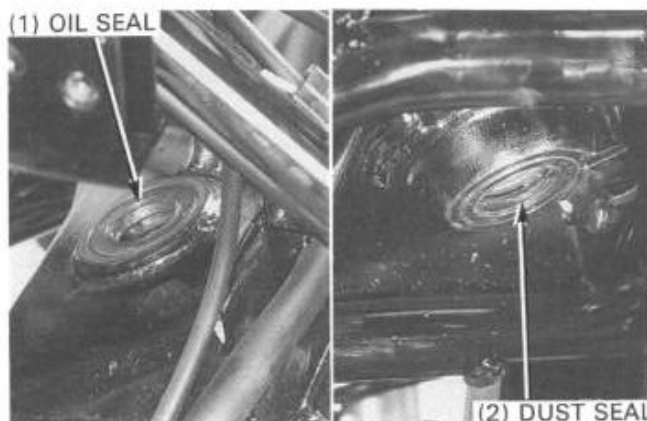


Turn the inner race of steering shaft bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the frame. Remove and discard the bearing if the race does not turn smoothly, quietly or if it fits loosely in the frame.



BEARING REPLACEMENT

Remove the oil seal and dust seal.



Remove the snap ring.

Remove the steering shaft bearing out from the top of the frame using the special tools.

TOOLS:

Bearing remover set
 - Bearing remover, 20 mm
 - Remover handle
 - Remover weight

07936 - 3710001
 07936 - 3710600
 07936 - 3710100
 07741 - 0010201 or
 07936 - 3710200



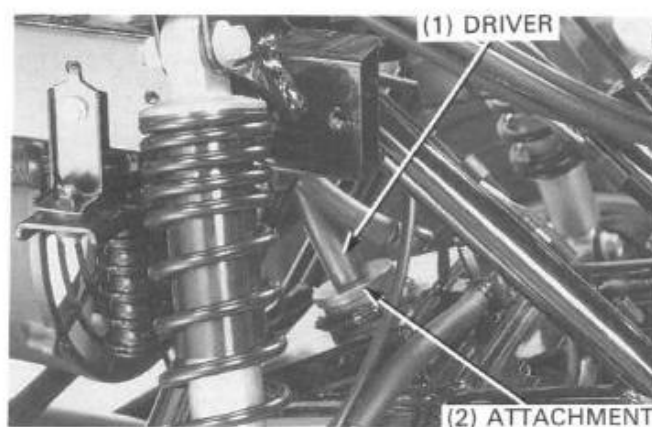
Pack the bearing cavity with grease.

Install the bearing with its sealed side up using the special tools.

TOOLS:

Driver handle attachment
 Attachment, 37X40 mm
 Pilot, 20 mm

07949 - 3710001
 07746 - 0010200
 07746 - 0040500

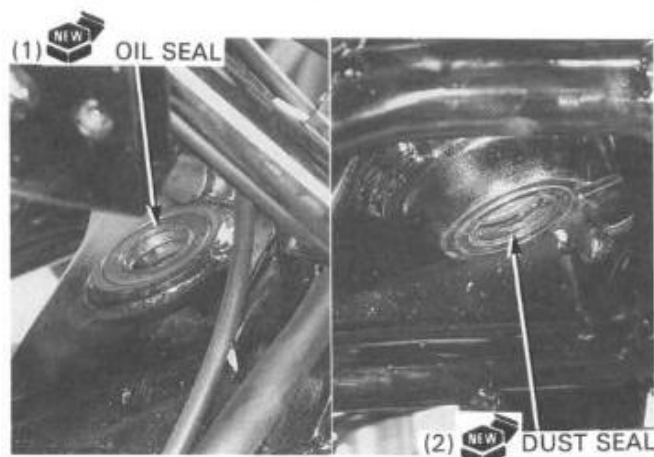


FRONT WHEEL/SUSPENSION/STEERING

Install the snap ring in the groove securely.

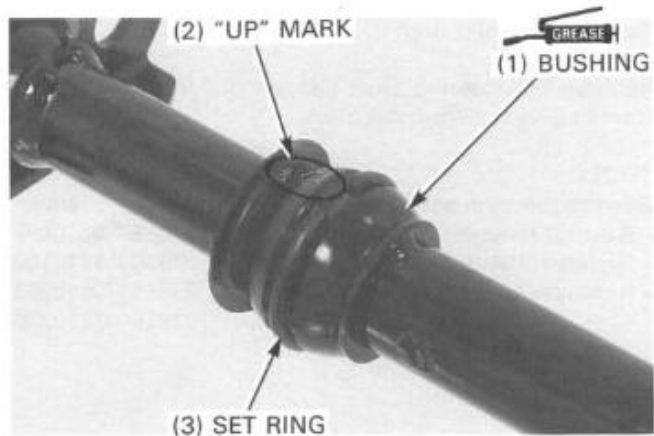


Apply grease to new dust seal and oil seal lips.
Install the dust seal and oil seal.



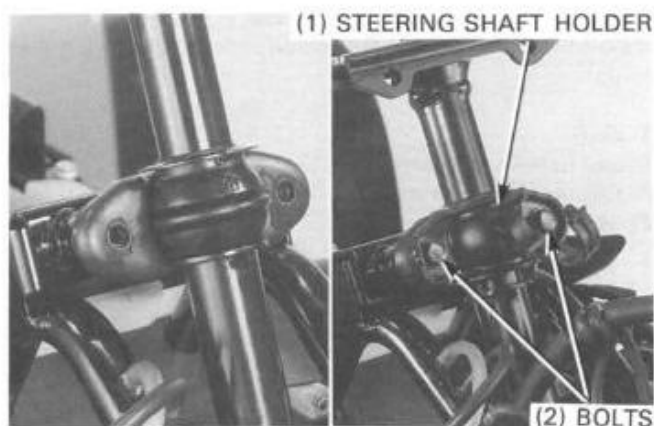
INSTALLATION

Apply grease to the steering shaft bushing cavities.
Install the bushing with its "UP" mark facing up.
Install the set ring into the groove securely.

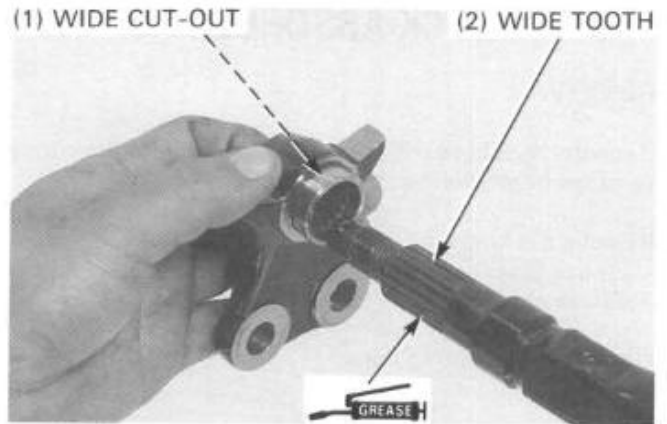


Install the steering shaft in the frame.
Install the steering shaft holder and tighten the holder bolts to the specified torque.

TORQUE: 33 N·m (3.3 kg-m, 24 lb-ft)



Apply grease to the steering shaft spline.
Assemble the steering shaft and steering arm by aligning the wide cut-out of the steering arm with the wide tooth of the steering shaft.



Apply grease to the flange and threads of the steering shaft nut.
Install the steering arm and tighten the steering shaft nut with the washer to the specified torque.

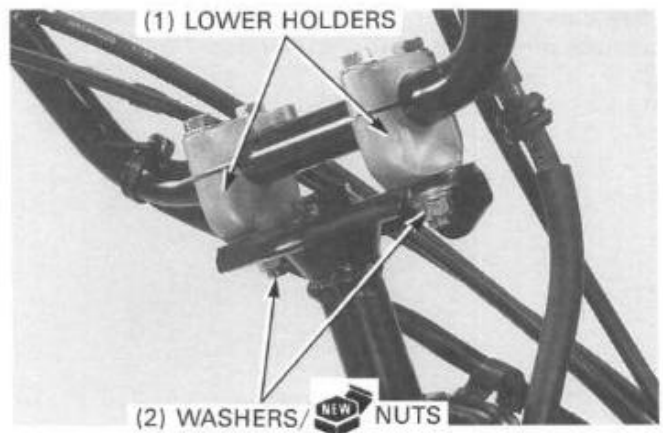
TORQUE: 110 N·m (11.0 kg·m, 80 lb·ft)

Install the tie-rod on the steering arm (page 12-16).
Install a new cotter pin.



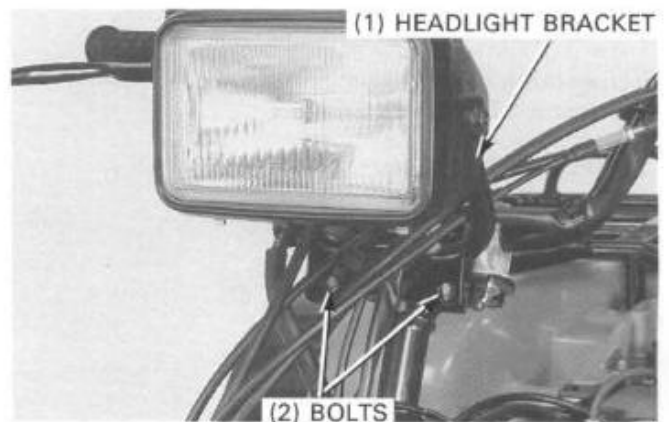
Install the handlebar assembly on the steering shaft and tighten the new lower holder nuts with washers to the specified torque.

TORQUE: 40 N·m (4.0 kg·m, 29 lb·ft)



Install the headlight bracket and tighten the bolts.

Adjust the toe (page 3-20).



FRONT SHOCK ABSORBER

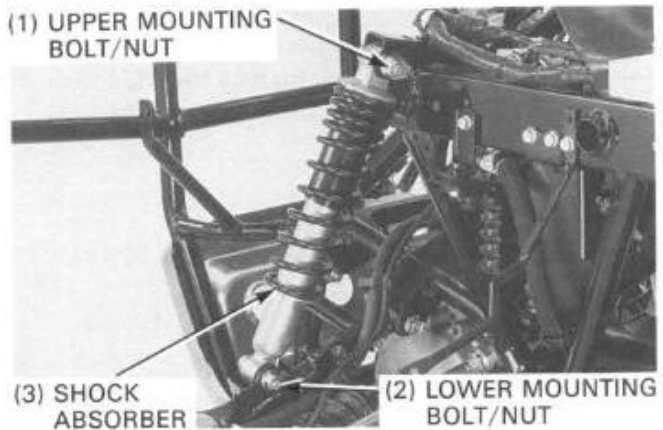
REMOVAL

Support the vehicle with a support block under the engine to raise the front wheels off the ground.

Remove the following:

- Shock absorber mounting bolts/nuts
- Shock absorber

Discard the mounting nuts.



DISASSEMBLY

Compress the shock absorber with the shock absorber compressor.

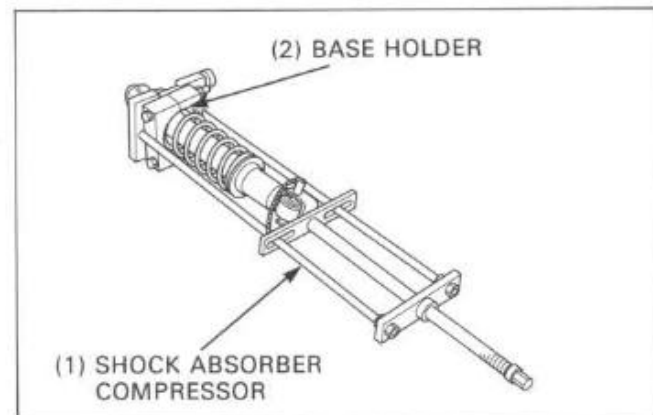
CAUTION

- Be careful that the upper end of the damper does not slip out of the compressor.

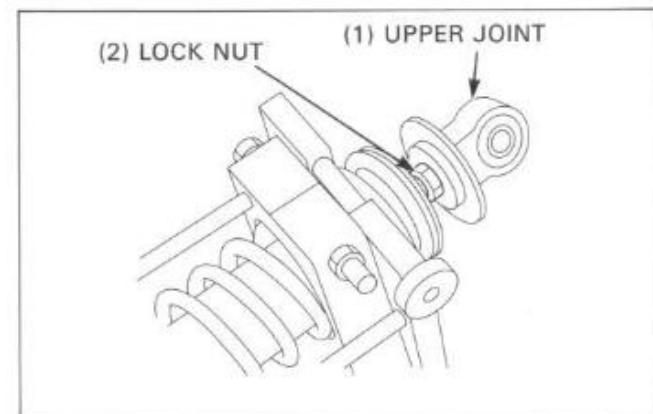
TOOLS:

Shock absorber compressor
Base holder

07GME - 0010000
07967 - KC101000



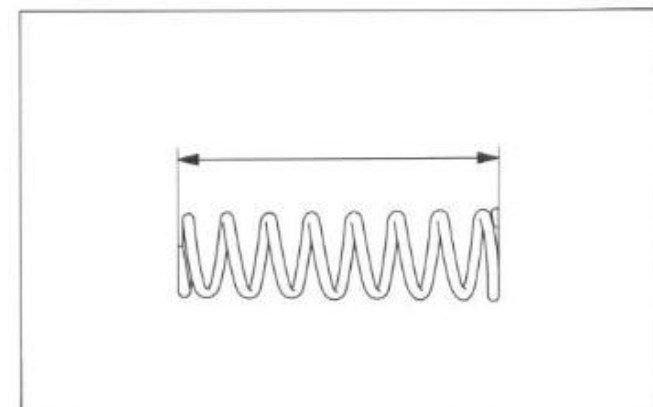
Separate the upper joint by loosening the lock nut and remove the shock absorber compressor.



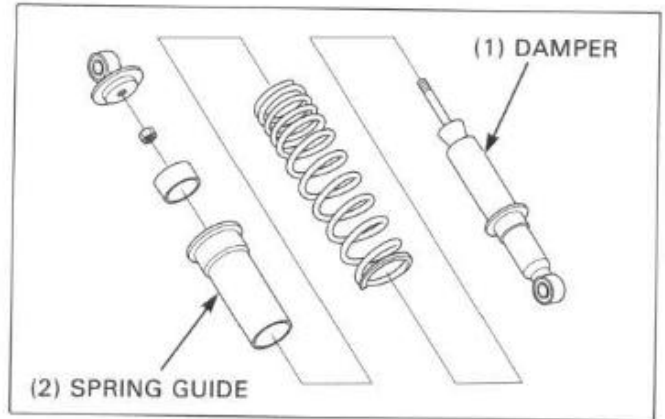
INSPECTION

Inspect the spring for damage.
Measure the spring free length.

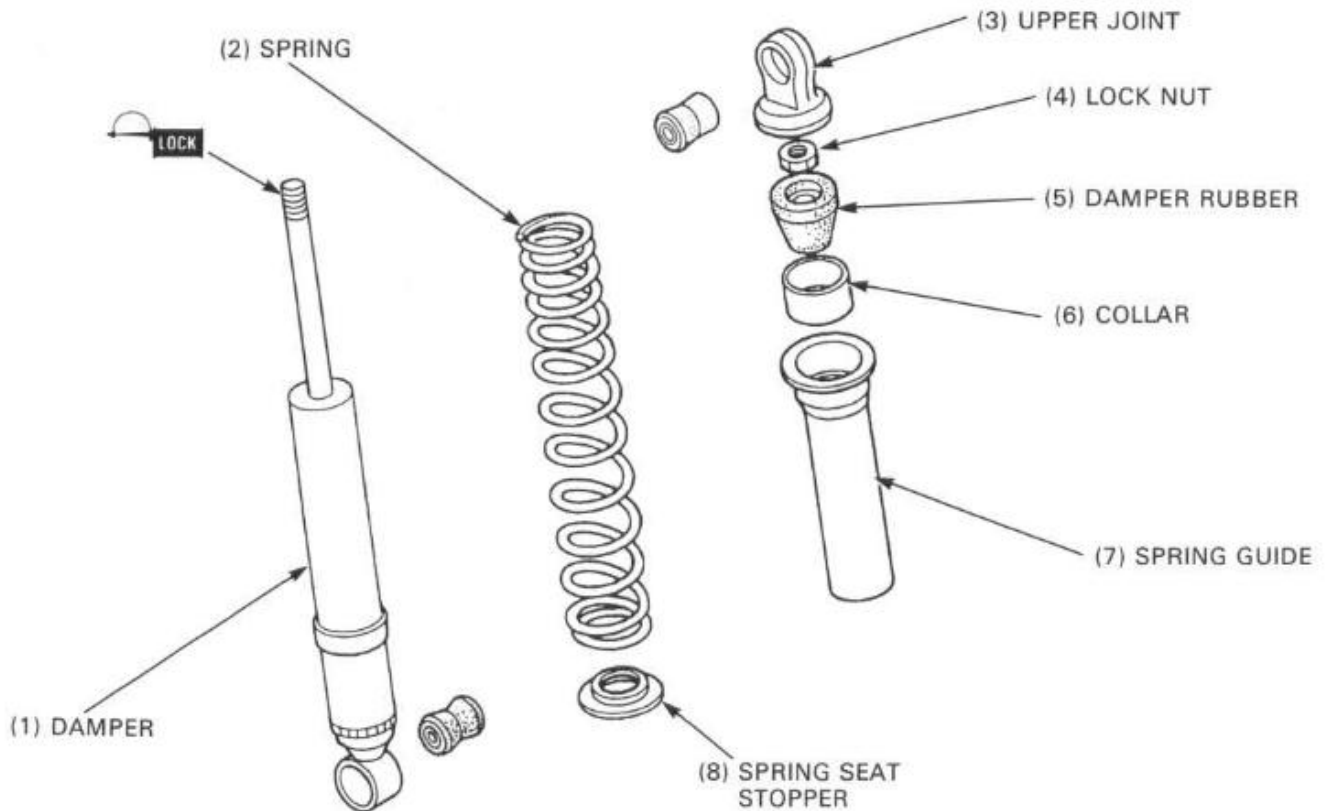
SERVICE LIMIT: 211.0mm (8.31 in)



Inspect the damper rod for distortion and signs of oil leakage.
Inspect the spring guide for damage.



ASSEMBLY



Install the spring seat stopper.

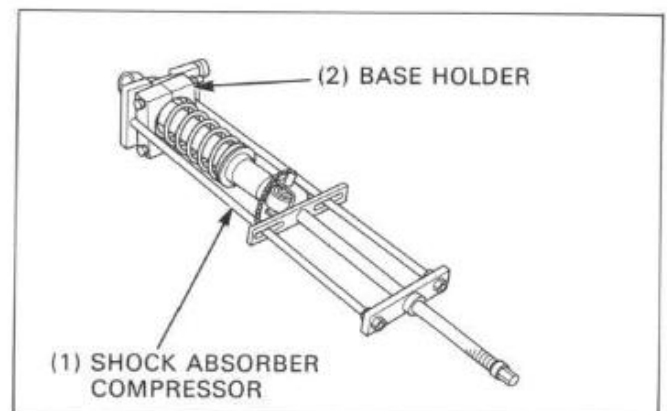
Install the spring with its tightly wound coil facing up.
Install the spring guide.

Compress the shock absorber with the shock absorber compressor.

TOOLS:

Shock absorber compressor
Base holder

07GME - 0010000
07967 - KC10100



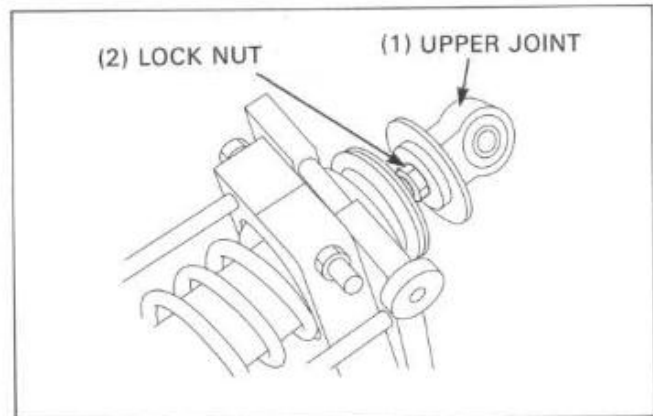
FRONT WHEEL/SUSPENSION/STEERING

Apply a locking agent to the threads of the rod nut and screw it on the damper rod.

Apply a locking agent to the damper rod threads and screw the upper joint.

Hold the upper joint and tighten the lock nut to the specified torque.

TORQUE: 38 N·m (3.8 kg-m, 27 lb-ft)



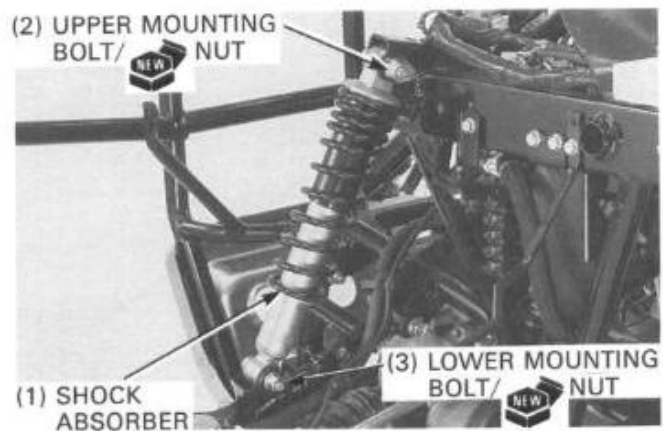
INSTALLATION

Install the shock absorber and tighten the mounting bolts and new nuts to the specified torque.
Do not reuse the nuts.

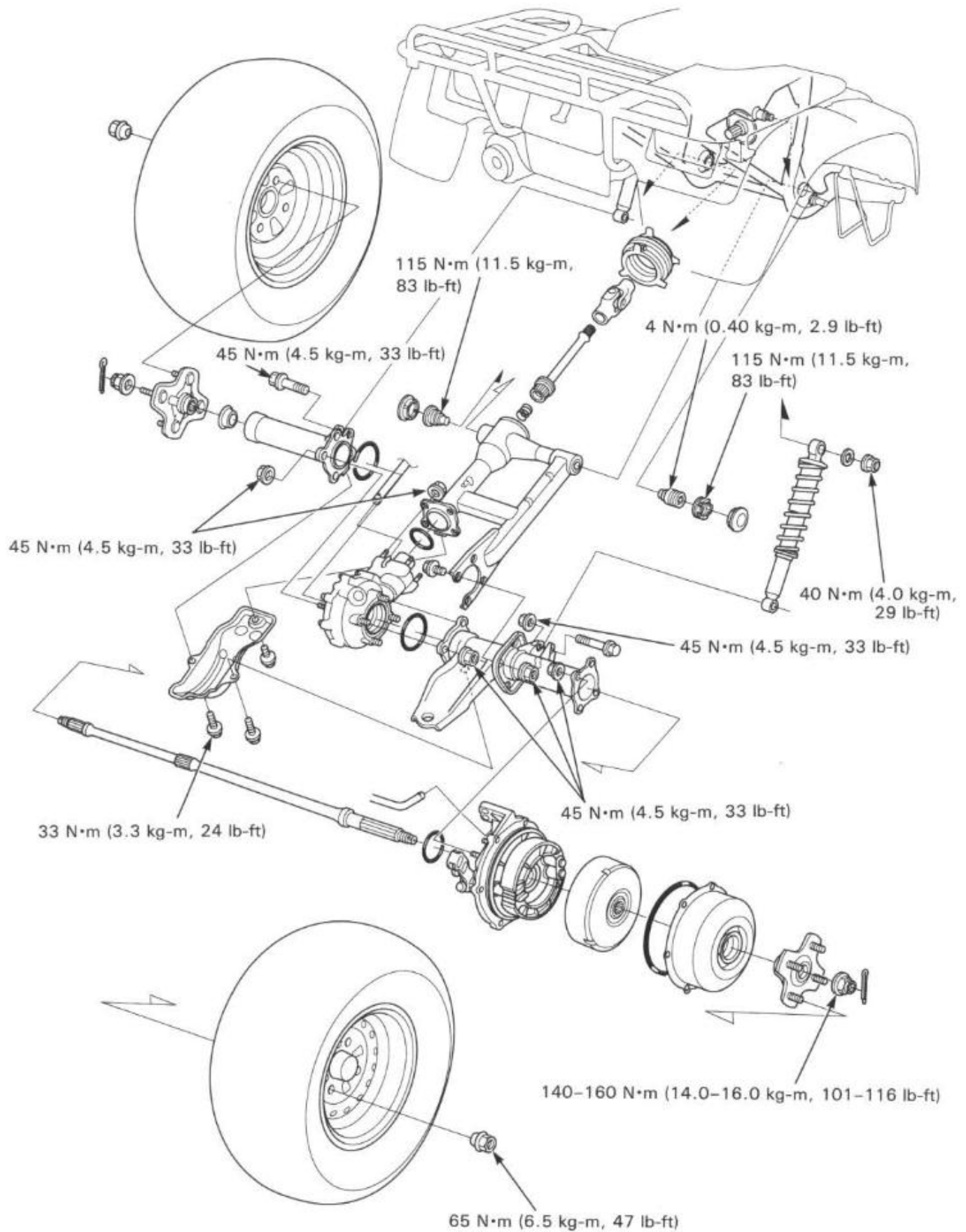
TORQUE:

Upper: 45 N·m (4.5 kg-m, 33 lb-ft)

Lower: 45 N·m (4.5 kg-m, 33 lb-ft)



MEMO



13. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	13-1	REAR SHOCK ABSORBER	13-3
TROUBLESHOOTING	13-2	SWINGARM	13-6
REAR WHEEL	13-3		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.
- A jack or other support is required to support the vehicle.

SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS	SERVICE LIMIT
Minimum tire tread depth		—	4.0 (0.16)
Cold tire pressure	Standard	0.25 kg/cm ² (3.6 psi)	—
	Minimum	0.22 kg/cm ² (3.2 psi)	—
	Maximum	0.28 kg/cm ² (4.0 psi)	—
Shock absorber spring free length		208.5 (8.21)	204.3 (8.04)

TORQUE VALUES

Rear axle castle nut	140 – 160 N•m (14.0 – 16.0 kg-m, 101 – 116 lb-ft)	
Rear wheel nut	65 N•m (6.5 kg-m, 47 lb-ft)	
Rear shock absorber lower mounting bolt/nut	45 N•m (4.5 kg-m, 33 lb-ft)	Do not reuse the nut
Rear shock absorber upper mounting nut	40 N•m (4.0 kg-m, 29 lb-ft)	Do not reuse
Damper rod lock nut	38 N•m (3.8 kg-m, 27 lb-ft)	Apply a locking agent
Swingarm left pivot bolt	115 N•m (11.5 kg-m, 83 lb-ft)	
Swingarm right pivot bolt	4 N•m (0.40 kg-m, 2.9 lb-ft)	
Swingarm right pivot bolt lock nut	115 N•m (11.5 kg-m, 83 lb-ft)	
Rear axle housing and swingarm nut	45 N•m (4.5 kg-m, 33 lb-ft)	
Skid plate flange bolt	33 N•m (3.3 kg-m, 24 lb-ft)	

TOOLS

Swingarm lock nut wrench	07908 – 4690003	
Remover handle	07936 – 3710100	
Bearing remover, 17 mm	07936 – 3710300	
Remover weight	07741 – 0010201	or 07936 – 3710200
Driver	07749 – 0010200	
Attachment, 37 X 40 mm	07746 – 0040400	
Pilot, 17 mm	07746 – 0040400	
Universal bead breaker	GN-AH-958-BB1	

TROUBLESHOOTING

Wobble or vibration in vehicle

- Bent rim
- Loose brake panel bearing
- Faulty tire
- Axle not tightened properly
- Swingarm bearings worn

Soft suspension

- Weak spring

Hard suspension

- Bent shock absorber
- Improperly tightened swingarm pivot
- Faulty pivot bearing

Suspension noise

- Rear shock absorber damper binding
- Loose fasteners

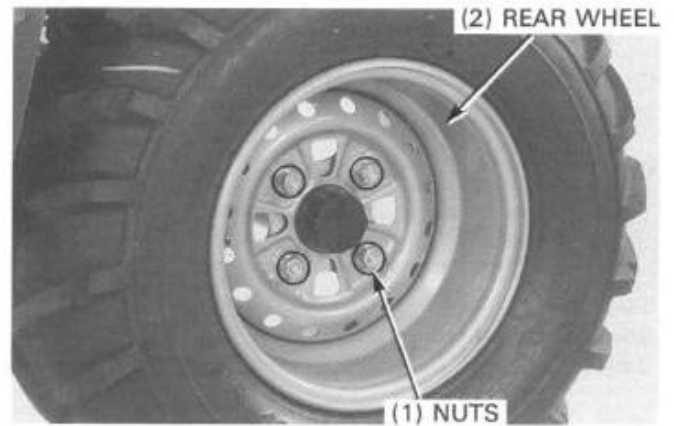
REAR WHEEL

REMOVAL

Loosen the wheel nuts.
Raise the rear wheels off the ground with a jack or block under the engine.

Remove the wheel nuts and wheel.

For tire removal, repair, and installation, refer to page 12-7.



INSTALLATION

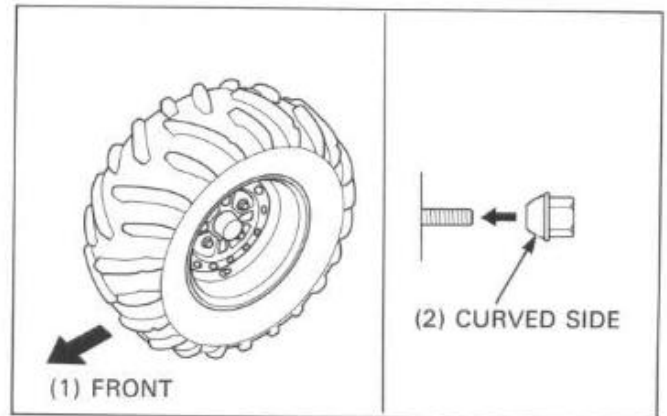
Install the rear wheel with the tire valve facing out so that the tires show a "V" pattern when viewed from front.

NOTE

- Do not interchange the right and left tires.

Install the wheel nuts with the curved sides facing inward and tighten to the specified torque.

TORQUE: 65 N·m (6.5 kg-m, 47 lb-ft)

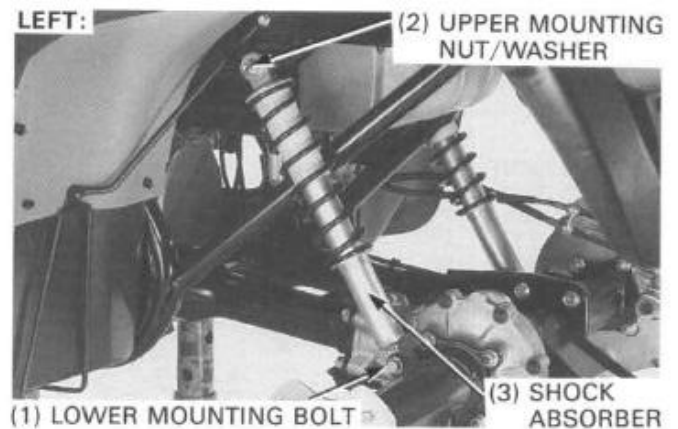


REAR SHOCK ABSORBER

REMOVAL

Raise the rear wheels off the ground by placing a jack or block under the engine.
For left shock absorber removal, remove the exhaust muffler (page 2-13).

Remove the rear shock absorber lower mounting bolt.
Remove the left shock absorber upper mounting nut and washer, and remove the shock absorber.
Discard the nuts.



Remove the right shock absorber lower mounting bolt and nut.
Remove the right shock absorber upper mounting nut and washer, and remove the shock absorber.
Discard the nuts.



REAR WHEEL/SUSPENSION

DISASSEMBLY

Compress the shock absorber with the shock absorber compressor.

CAUTION

- Be careful that the upper end of the damper does not slip out of the compressor.

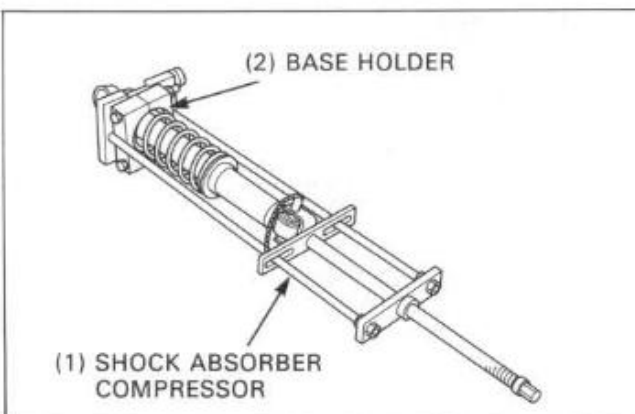
TOOLS:

Shock absorber compressor

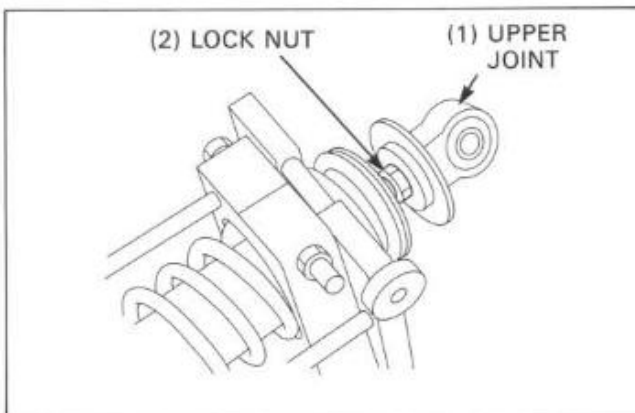
07GME - 0010000

Base holder

07967 - KC10100



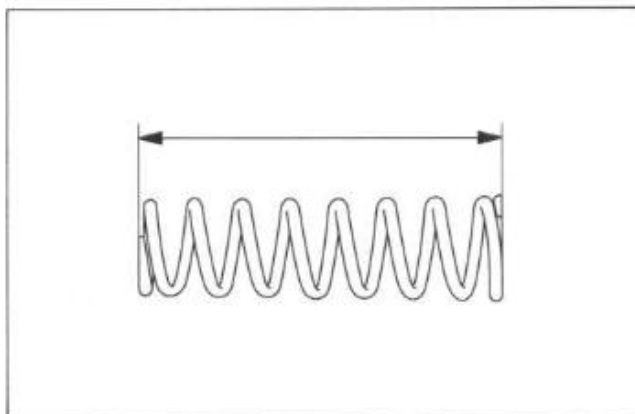
Separate the upper joint by loosening the lock nut and remove the shock absorber compressor.



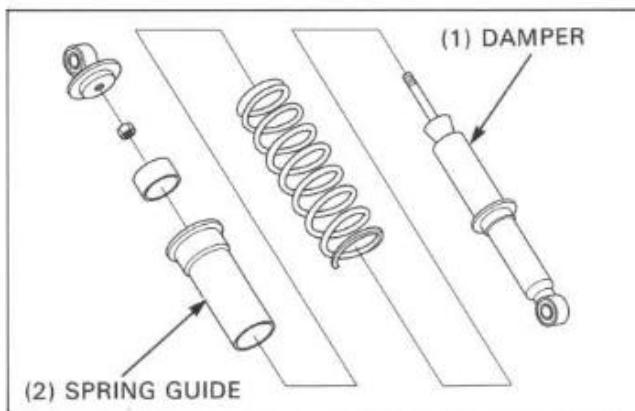
INSPECTION

Inspect the spring for damage.
Measure the spring free length.

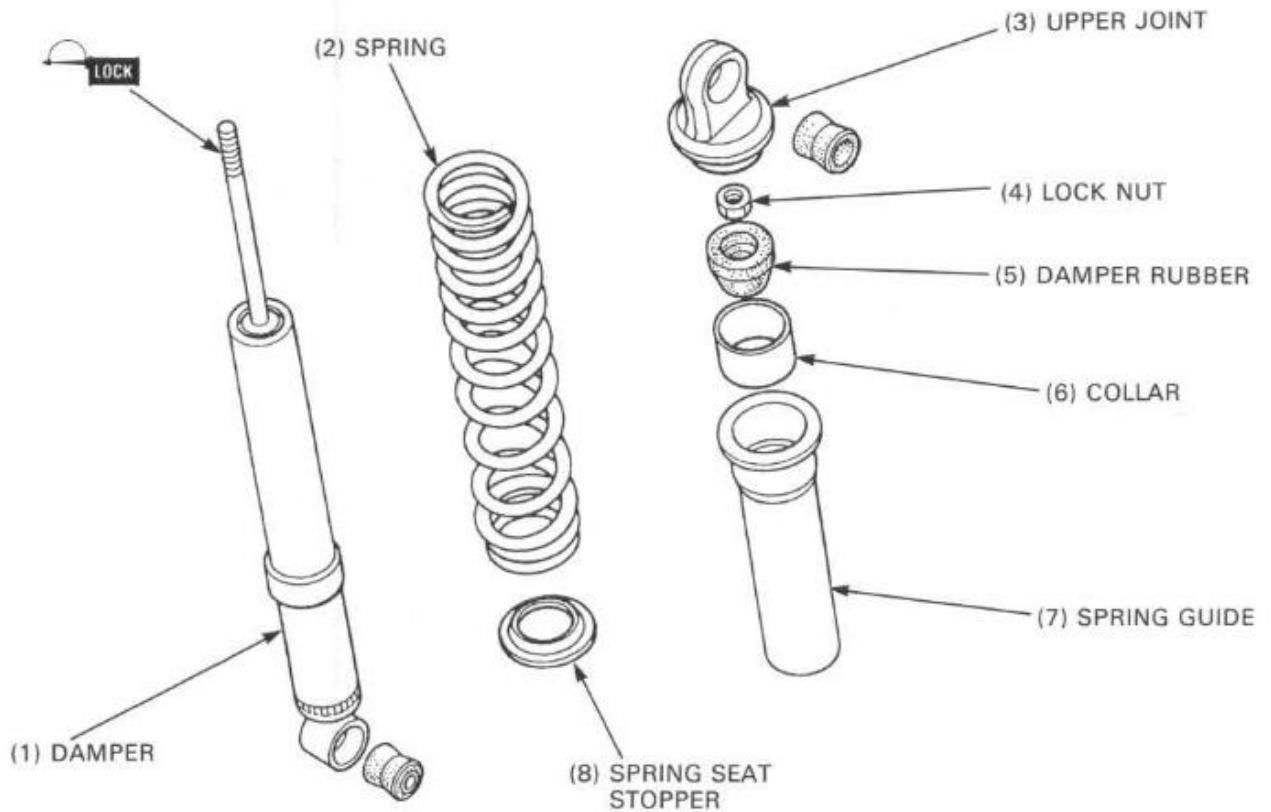
SERVICE LIMIT: 204.3 mm (8.04 in)



Inspect the damper rod for distortion and signs of oil leakage.
Inspect the spring guide for damage.



ASSEMBLY



Install the spring seat stopper.

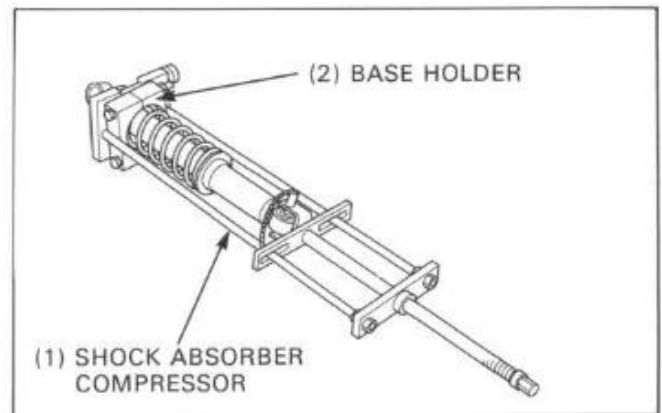
Install the spring with its tightly wound coil facing up.
Install the spring guide.

Compress the shock absorber with the shock absorber compressor.

TOOLS:

Shock absorber compressor
Base holder

07GME - 0010000
07967 - KC10100

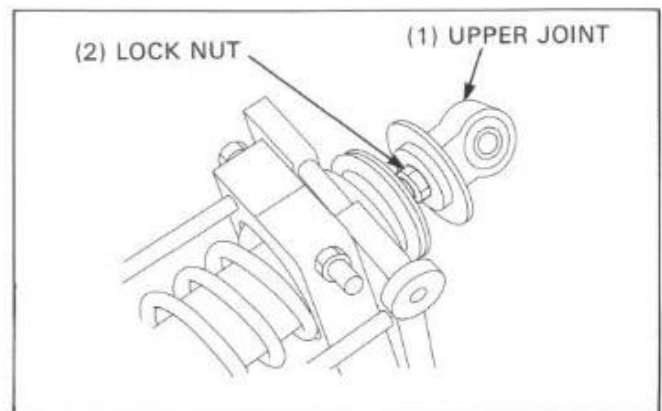


Apply a locking agent to the threads of the rod nut and screw it on the damper rod.

Apply a locking agent to the damper rod threads and screw the upper joint.

Hold the upper joint and tighten the lock nut to the specified torque.

TORQUE: 38 N·m (3.8 kg-m, 27 lb-ft)



REAR WHEEL/SUSPENSION

INSTALLATION

Position the rear shock absorber into the frame, and install washer and the new upper mounting nut. Tighten the new upper mounting nut to the specified torque. Do not reuse the nut.

TORQUE: 40 N·m (4.0 kg-m, 29 lb-ft)

Left shock absorber:

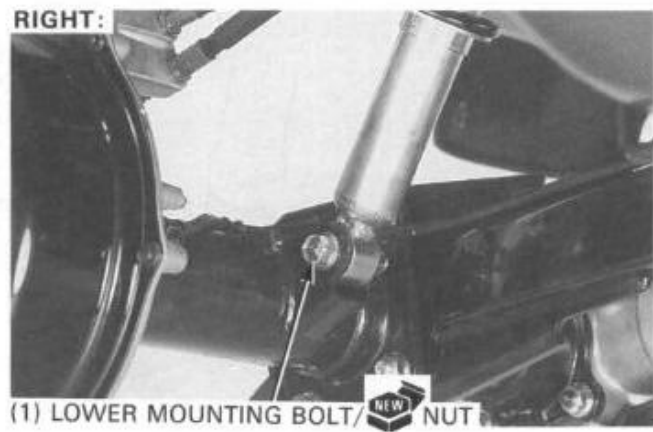
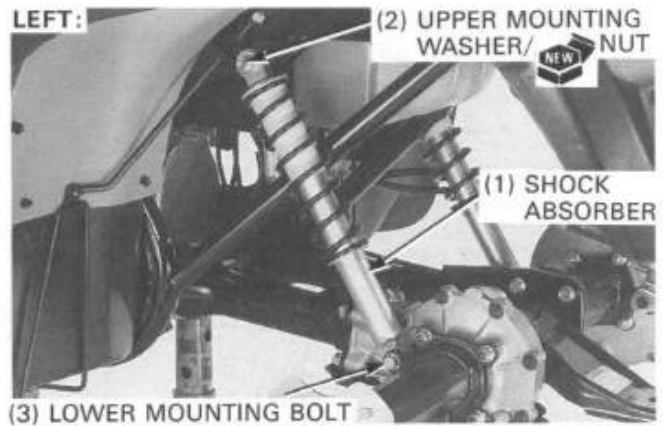
Install and tighten the lower mounting bolt.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

Right shock absorber:

Install the lower mounting bolt from the outside. Install and tighten the new lower mounting nut to the specified torque. Do not reuse the nuts.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)



SWINGARM

REMOVAL

NOTE

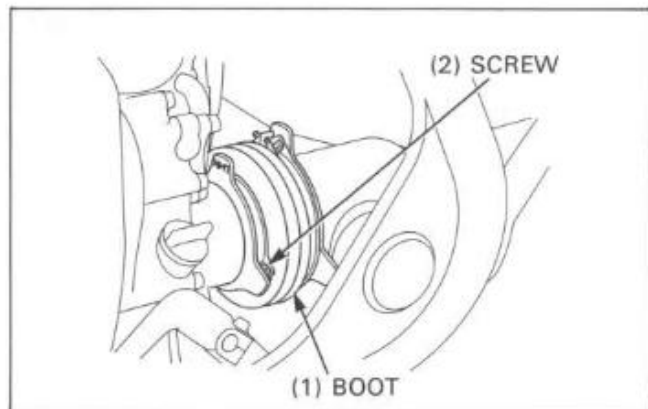
- To service the pivot bearings, dust seals, drive shaft or boot, you do not have to remove the brake, axle and final drive.

Remove the following:

- Rear wheels (page 13-3)
- Axle shaft, axle housings and final drive (section 16)

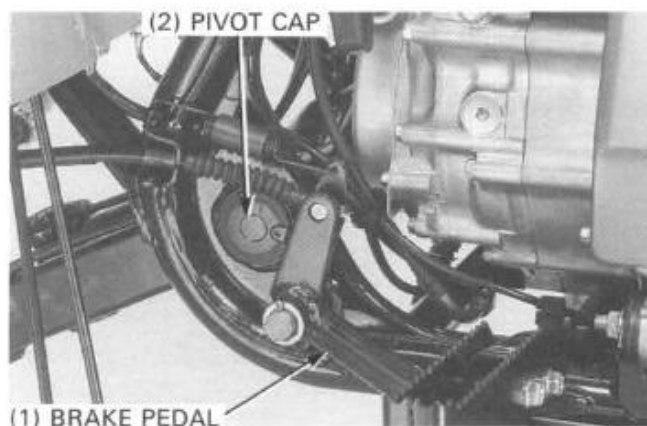
Remove the screws and retaining clips and rear mud guard.

Loosen the swingarm boot band screw.

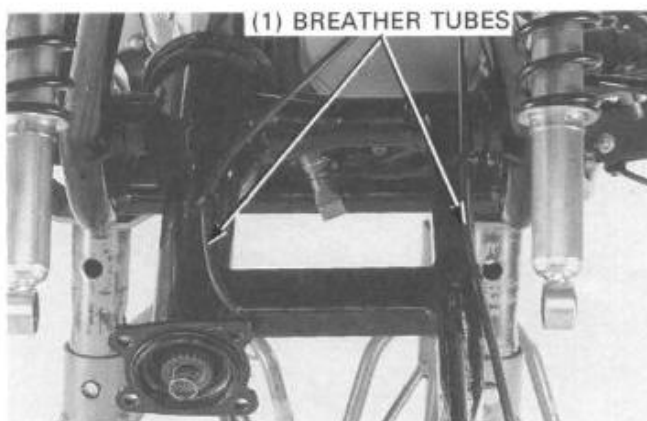


Remove the following:

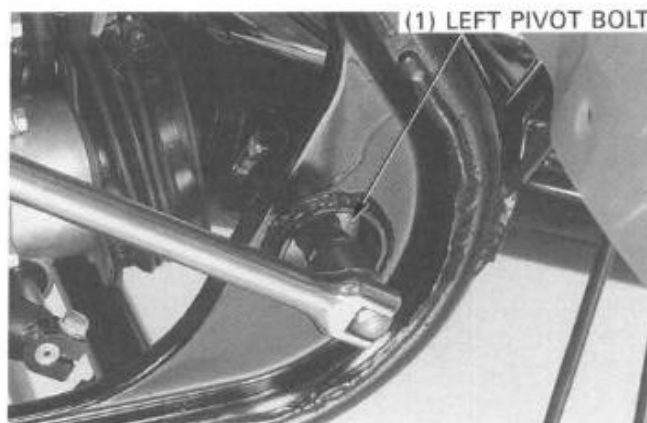
- Brake pedal (page 14-23)
- Swingarm pivot cap (each side)



Release the breather tubes from the swingarm clamps.



Remove the left pivot bolt using the commercially available tool as shown.



Remove the right pivot lock nut using the special tool as shown.

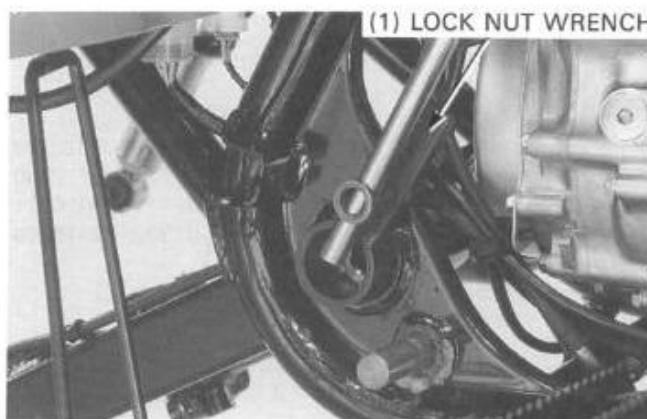
TOOL:

Swingarm lock nut wrench

07908-4690003

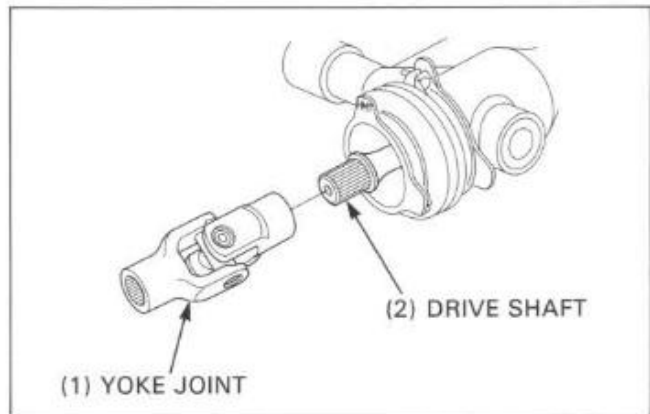
Remove the right pivot bolt using a commercially available tool.

Remove the swingarm from the frame.



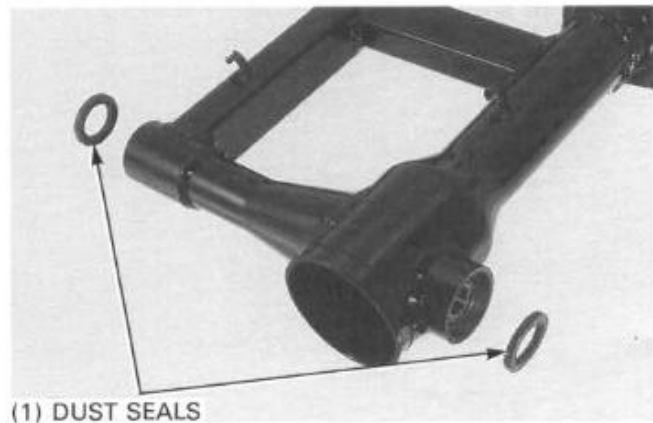
REAR WHEEL/SUSPENSION

Remove the yoke joint/drive shaft from the swingarm.

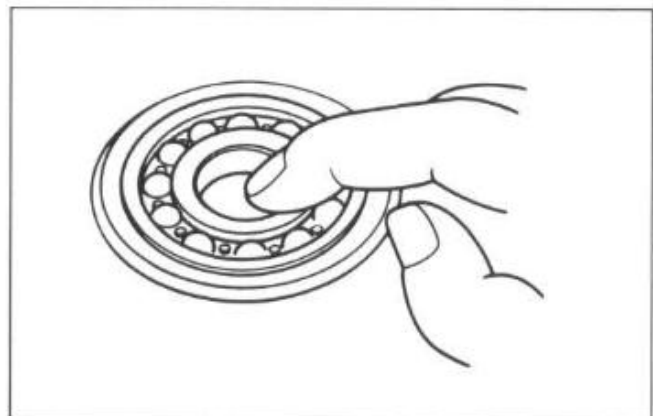


INSPECTION

Remove the dust seals from the swingarm.
Check the dust seals for wear or damage.



Turn the inner race of each pivot bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the outer race fits tightly in the swingarm pivot.
Replace them if necessary (see below).



PIVOT BEARING REPLACEMENT

Remove the swingarm pivot bearing using the special tools.

TOOLS:

Remover handle

07936 - 3710100

Bearing remover, 17 mm

07936 - 3710300

Remover weight

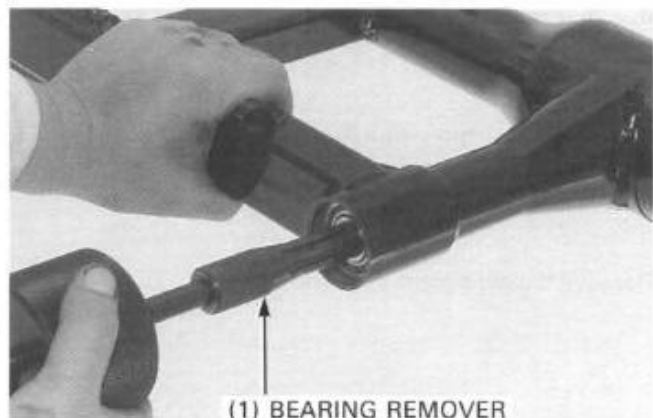
07741 - 0010201 or

07936 - 3710200

Remove the grease holder.

NOTE

- Replace the grease holder if it is damaged.



Install the grease holder in the swingarm pivot.
Install new pivot bearings using the special tools.

TOOLS:

Driver

07749 - 0010000

Attachment, 37X40 mm

07746 - 0010200

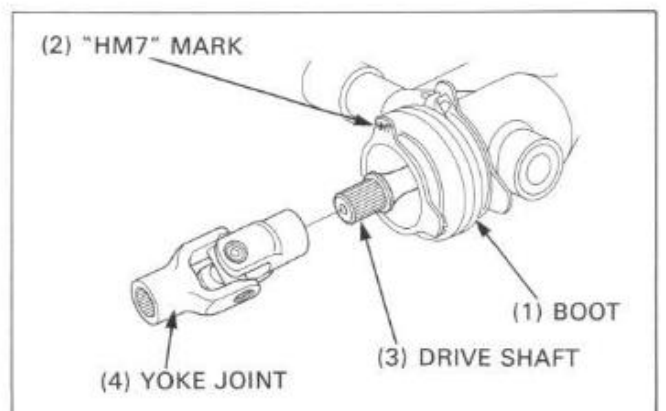
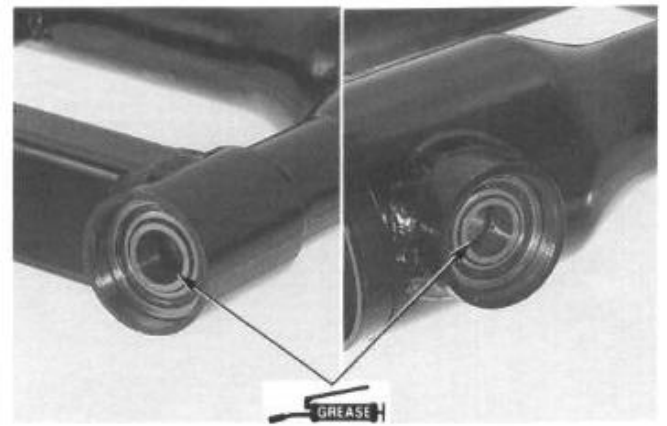
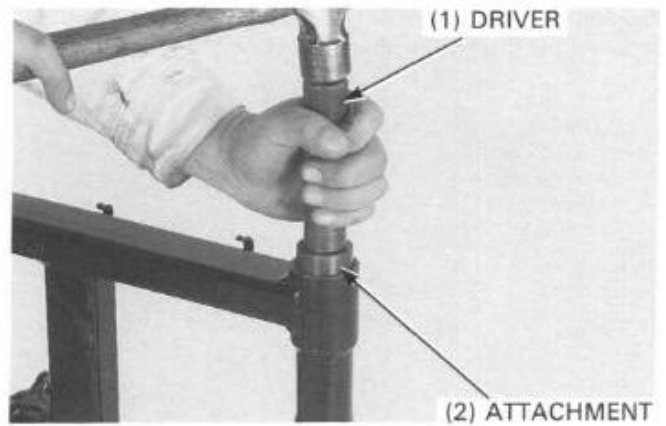
INSTALLATION

Pack the grease holders and bearing cavities with grease.

Apply grease to the dust seal lips, and install the dust seals in the swingarm.

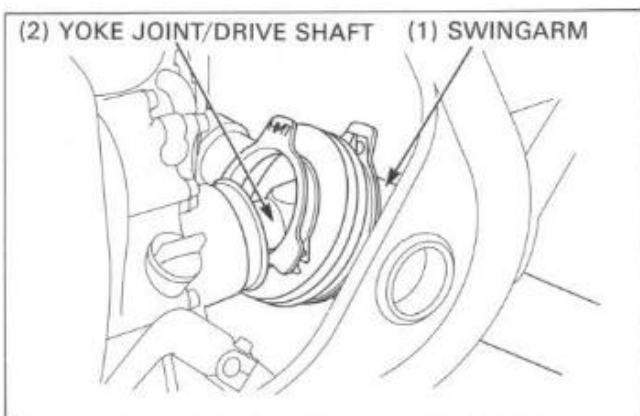
Install the swingarm boot securely with its "HM7" marked tab facing up.

Apply molybdenum disulfide grease to the drive shaft splines and install the yoke joint/drive shaft into the swingarm.



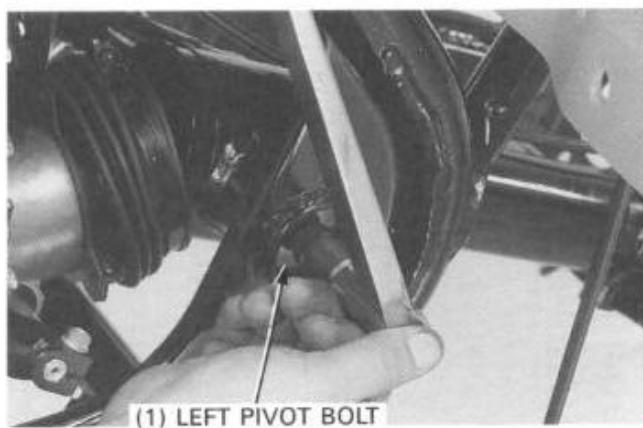
REAR WHEEL/SUSPENSION

Position the swingarm in the frame by aligning the spline between the final drive shaft and yoke joint.



Install and tighten the left pivot bolt using a commercially available tool as shown.

TORQUE: 115 N·m (11.5 kg-m, 83 lb-ft)



Install and tighten the right pivot bolt using a commercially available tool.

TORQUE: 4 N·m (0.40 kg-m, 2.9 lb-ft)

Move the swingarm up and down several times.
Retighten the right pivot bolt to the specified torque (see above).
Tighten the right pivot lock nut while holding the pivot bolt using the special tools as shown.

TORQUE: 115 N·m (11.5 kg-m, 83 lb-ft)

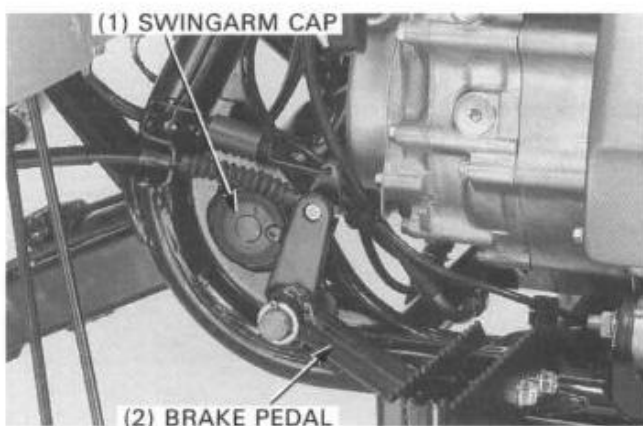
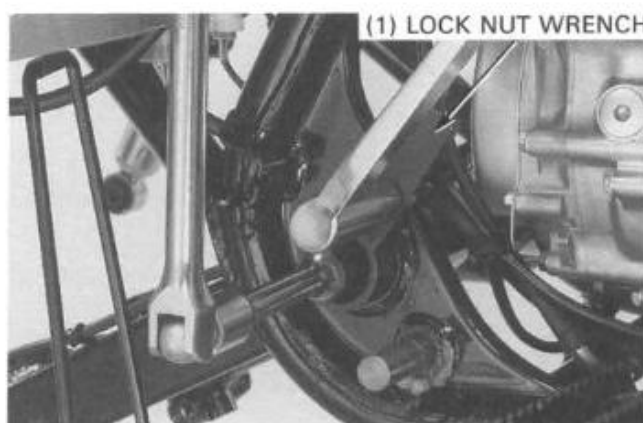
Torque wrench scale reading:
105 N·m (10.5 kg-m, 76 lb-ft), using a 50 cm (20 in) long torque wrench

TOOL:

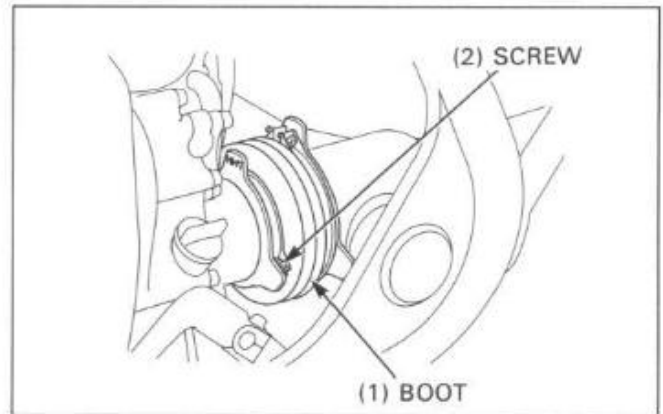
Swingarm lock nut wrench

07908 - 4690003

Install the swingarm caps.
Install the brake pedal (page 14-23).



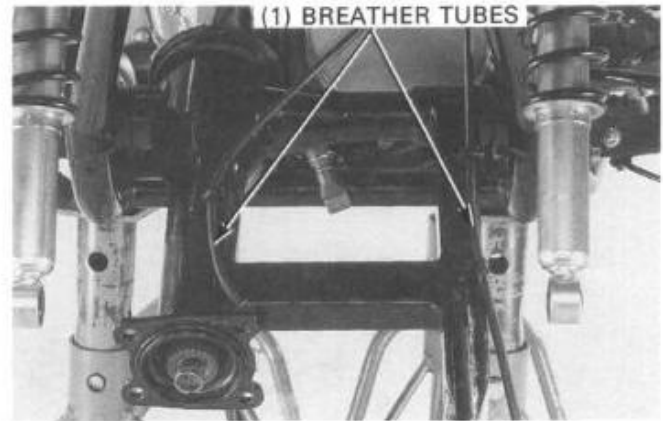
Attach the swingarm boot to the engine and tighten the boot clamp screw securely.



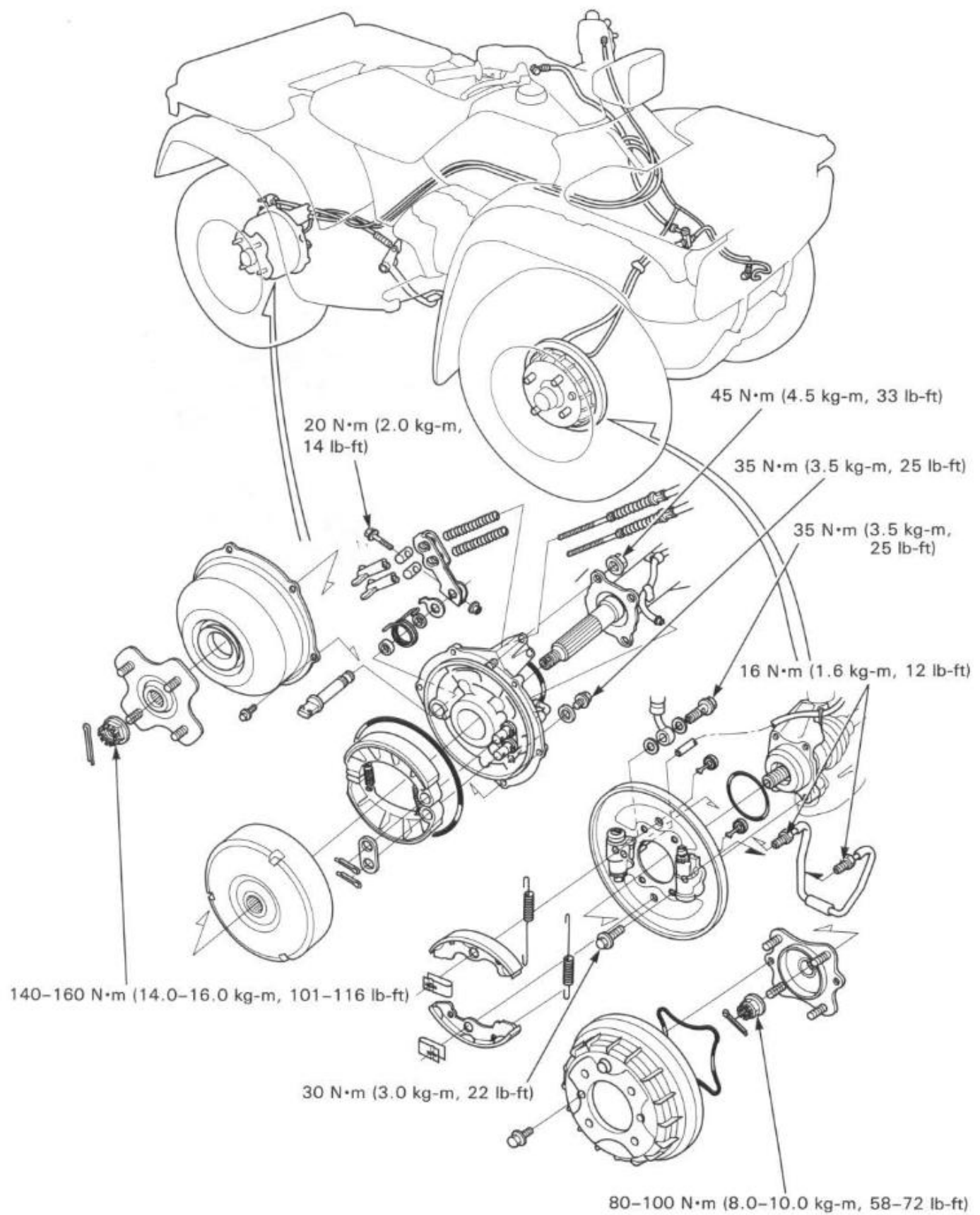
Route the breather tubes and clamp them on the swingarm clamps.

Install the following:

- Final drive, axle housings and axle (page 16-16)
- Rear wheel (page 13-3)



BRAKE SYSTEM



14.BRAKE SYSTEM

SERVICE INFORMATION	14-1	BRAKE SHOES/WHEEL CYLINDER/ADJUSTER	14-7
TROUBLESHOOTING	14-2	REAR BRAKE	14-15
BRAKE FLUID REPLACEMENT/AIR BLEEDING	14-3	BRAKE PEDAL	14-23
MASTER CYLINDER	14-5		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.

CAUTION

- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.
- This section covers maintenance of the front hydraulic brake and rear drum brake systems.
- A jack or other support is required to support the vehicle.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoir.
- Always use fresh DOT 3 or 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check the brake operation before riding the vehicle.
- Apply multipurpose grease (NLGI No.3) to the front brake waterproof seal lip.

SPECIFICATIONS

Unit: mm (in)

14

ITEM		SPECIFICATIONS	SERVICE LIMIT
Front brake	Drum I.D.	160.0 (6.30)	161.0 (6.34)
	Lining thickness	4.0 (0.16)	2.0 (0.08)
	Brake panel warpage	—	0.4 (0.02)
	Brake panel seal lip wear	—	0.5 (0.02)
	Water seal lip length	22.0 (0.87)	20.0 (0.79)
	Master cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Wheel cylinder I.D.	17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Wheel cylinder piston O.D.	17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
Rear brake	Drum I.D.	160.0 (6.30)	161.0 (6.34)
	Lining thickness	5.0 (0.20)	To the indicator

BRAKE SYSTEM

TORQUE VALUES

Rear brake arm pinch bolt/nut	20 N•m (2.0 kg-m, 14 lb-ft)	
Rear brake drain bolt	35 N•m (3.5 kg-m, 25 lb-ft)	
Master cylinder reservoir cap screw	2 N•m (0.20kg-m, 1.4 lb-ft)	
Master cylinder holder SH bolt	12 N•m (1.2 kg-m, 9 lb-ft)	
Brake lever pivot bolt	1 N•m (0.10 kg-m, 0.7 lb-ft)	
Brake lever pivot lock nut	6 N•m (0.6 kg-m, 4.3 lb-ft)	
Brake hose oil bolt	35 N•m (3.5 kg-m, 25 lb-ft)	
Brake hose clamp flange bolt	12 N•m (1.2 kg-m, 9 lb-ft)	
Brake panel flange bolt	30 N•m (3.0 kg-m, 22 lb-ft)	Do not reuse
Wheel cylinder bolt/washer	8 N•m (0.8 kg-m, 5.8 lb-ft)	
Wheel cylinder nut	17 N•m (1.7 kg-m, 12 lb-ft)	
Wheel cylinder oil pipe	16 N•m (1.6 kg-m, 12 lb-ft)	
Brake bleeder valve	6 N•m (0.6 kg-m, 4.3 lb-ft)	
Brake breather tube clamp	33 N•m (3.3 kg-m, 24 lb-ft)	
Brake hose 2-way joint	15 N•m (1.5 kg-m, 11 lb-ft)	

TOOLS

Snap ring pliers	07914-3230001
Oil seal driver	07965-MC70100
Driver	07749-0010000
Attachment, 52X55 mm	07746-0010400
Pilot, 28 mm	07746-0041100
Attachment, 62X68mm	07746-0010500

TROUBLESHOOTING

Front wheel wobbling and noise

- Worn brake shoe

Poor brake performance

- Brake not adjusted properly
- Worn brake shoes
- Brake fluid leak
- Water in the front brake drum
- Incorrectly installed rear brake arm
- Contaminated brake shoe
- Worn rear brake cam
- Worn rear brake drum

Possible causes for water entering a front brake drum

- Faulty waterproof seal installation
- Warped or worn brake panel
- Damaged tension pin, tension pin seal or seal cap
- Unsealed wheel cylinder assembly
- Unsealed adjuster assembly
- Damaged or loose wheel cylinder or adjuster mounting bolt
- Damaged or loose brake panel bolt
- Disconnected or damaged breather tube
- Faulty breather tube routing
- Faulty inspection hole cap installation
- Loosened axle nut by uninstalled cotter pin
- Loose bolt attaching the drum to the hub
- Faulty hub O-ring
- Faulty brake panel O-ring
- Unsealed or damaged wheel bolt
- Faulty wheel hub dust seal
- Faulty brake drum dust seal
- Faulty brake hub
- Faulty brake drum
- Faulty knuckle axle seal

BRAKE FLUID REPLACEMENT/AIR BLEEDING

BRAKE FLUID DRAINING

CAUTION

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

With the fluid reservoir parallel to the ground, remove the reservoir cover and diaphragm.

Connect a bleed hose to the bleed valve. Loosen the bleed valve and pump the brake lever. Stop pumping the lever when no more fluid flows out of the bleed valve.



BRAKE FLUID FILLING

Fill the reservoir with DOT 3 or 4 brake fluid from a sealed container.

CAUTION

- Do not mix different types of fluid. There are not compatible.

Connect a commercially available brake bleeder to the bleed valve.

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

NOTE

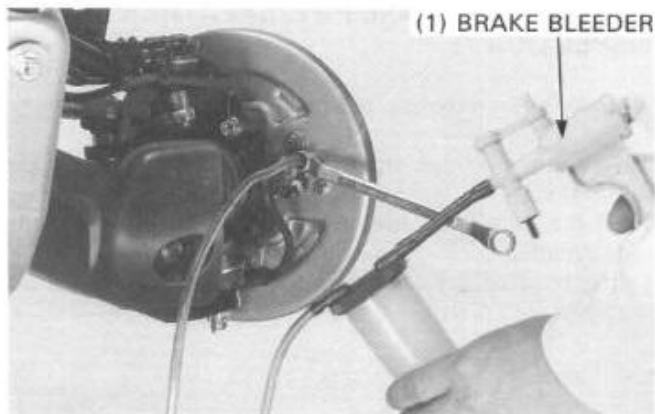
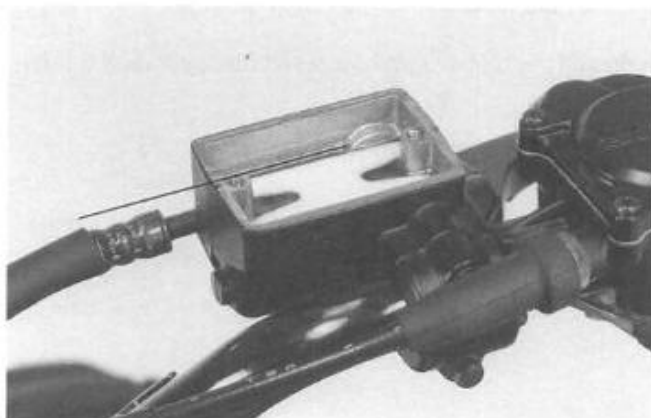
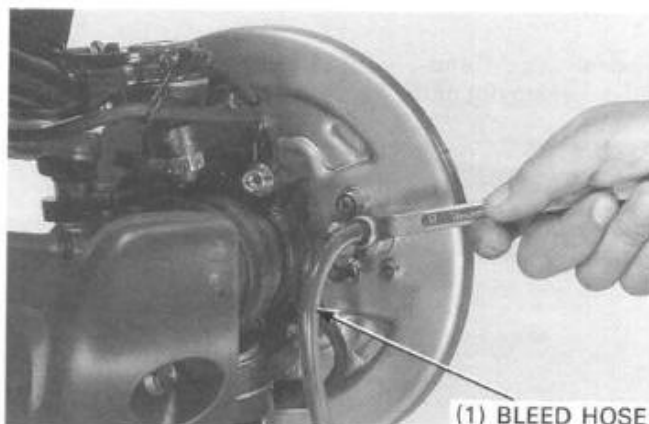
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

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

NOTE

- If air is entering the bleeder from around the bleed valve threads, seal the threads with Teflon tape.
- If a brake bleeder is not available, fill the master cylinder and operate the brake lever to fill the system.

Close the bleed valve. Next, perform the available BLEEDING procedure (page 14-4).



BRAKE SYSTEM

BRAKE BLEEDING

Connect a clear bleed hose to the bleed valve. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the master cylinder and lever resistance is felt.

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

NOTE

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

2. Release the brake lever until the bleed valve has been closed.

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

Fill the fluid reservoir to the upper level.

Reinstall the diaphragm and reservoir cover, and tighten the screws.

TORQUE: 2 N·m (0.20 kg-m, 1.4 lb-ft)

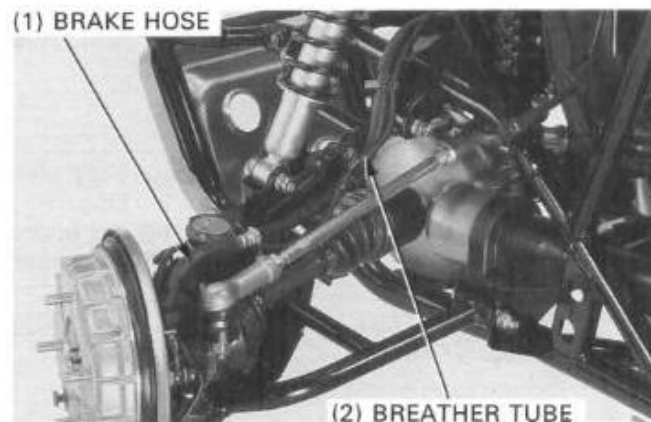
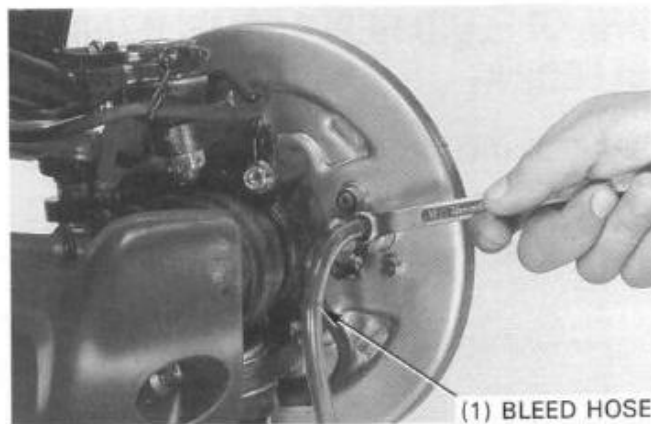
BRAKE HOSE/BRAKE PIPE/BREATHER TUBE INSPECTION

Remove the front fender (page 2-5).

Check the brake hose and brake pipe for damage and brake fluid leaks.

Check the front brake breather tubes for secure connectings and damage.

A disconnected breather means that the front brake drum can flood with water.



MASTER CYLINDER

DISASSEMBLY

Remove the reservoir cover, diaphragm and float, and soak up the brake fluid from the reservoir.

Disconnect the brake hose from the master cylinder by removing the bolt/two sealing washers.

Fix the brake hose to prevent the fluid flowing out.

CAUTION

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

Remove the front brake lever nut, pivot bolt and lever.

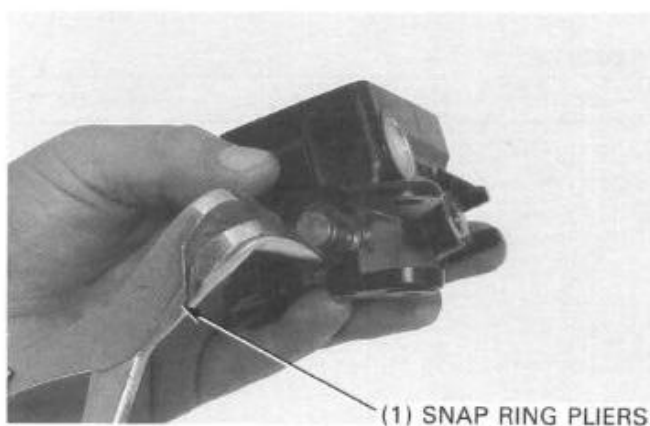
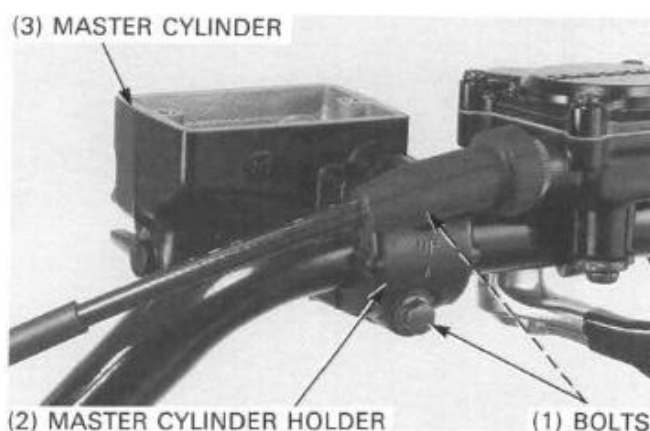
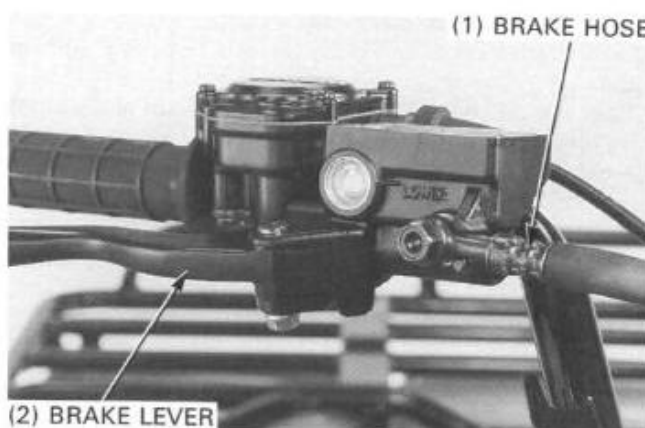
Remove the bolts from the master cylinder holder and remove the master cylinder.

Remove the boot.

Remove the snap ring from the master cylinder body, using the special tool as shown.

TOOL:
Snap ring pliers

07914-3230001



BRAKE SYSTEM

Remove the oil seal, piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

Check the oil seal, piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.

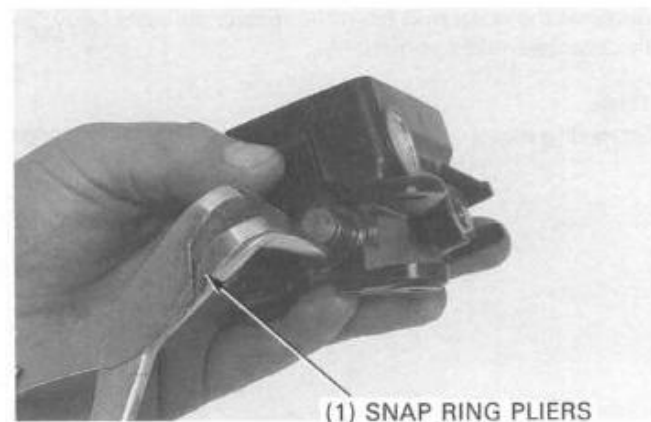
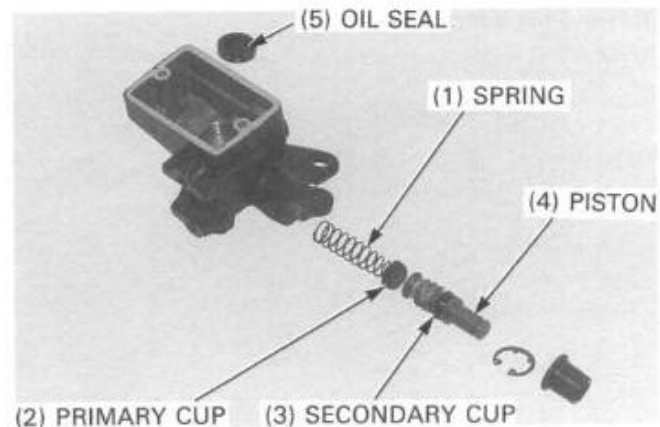
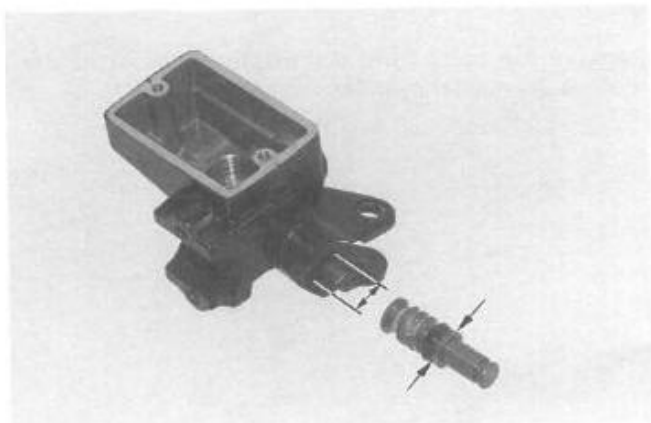
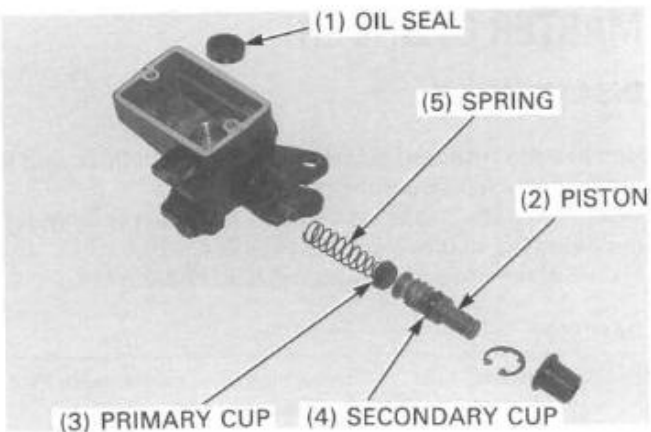
INSPECTION

Measure the master cylinder I.D.

SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master cylinder piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



ASSEMBLY

CAUTION

- Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly. Dip the secondary cup in brake fluid.

Install the primary cups and spring to the piston.

Install the oil seal and piston assembly

CAUTION

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

Install the snap ring.

CAUTION

- Be certain the snap ring is firmly seated in the groove.

Install the boot.



Place the master cylinder on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then tighten the lower bolt loosely.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

Align the end of the master cylinder with the punch mark on the handlebar.
Tighten the lower bolt.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)

Install the brake hose between the stoppers with the bolt and new sealing washers.

TORQUE: 35 N·m (3.5 kg-m, 25 lb-ft)

Install the brake lever.
Install and tighten the pivot bolt.

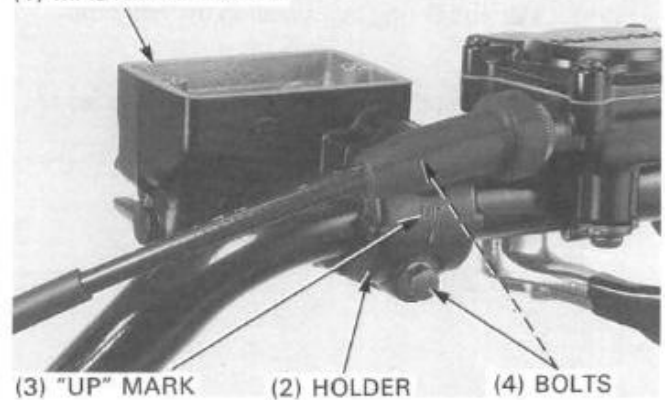
TORQUE: 1 N·m (0.10 kg-m, 0.7 lb-ft)

Hold the pivot bolt and tighten the nut.

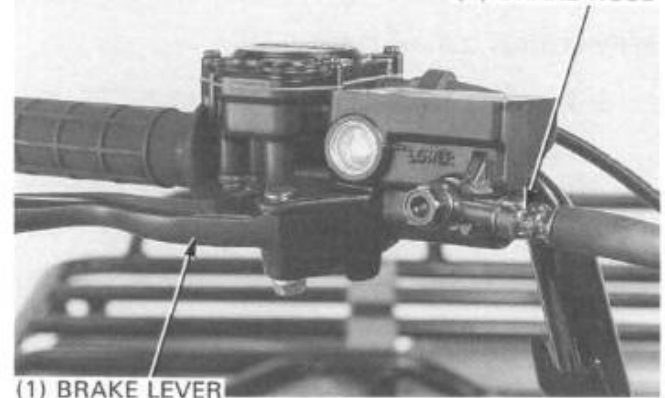
TORQUE: 6 N·m (0.6 kg-m, 4.3 lb-ft)

Fill the reservoir to the upper level and bleed the brake system (page 14-3).

(1) MASTER CYLINDER



(2) BRAKE HOSE



(1) BRAKE LEVER

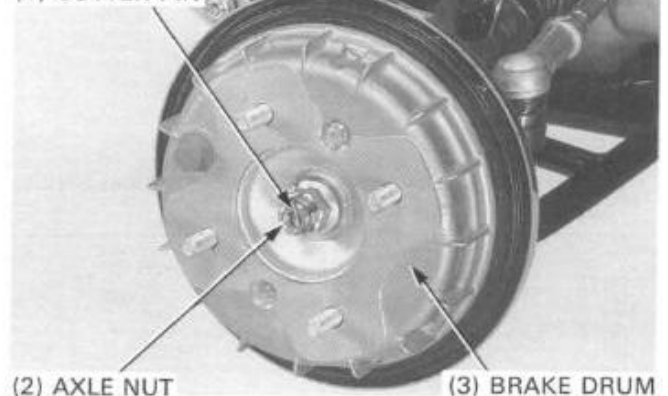
BRAKE SHOES/WHEEL CYLINDER/ADJUSTER

DISASSEMBLY

Remove the following:

- Front wheel (page 12-3)
- Cotter pin
- Axle nut
- Brake drum

(1) COTTER PIN



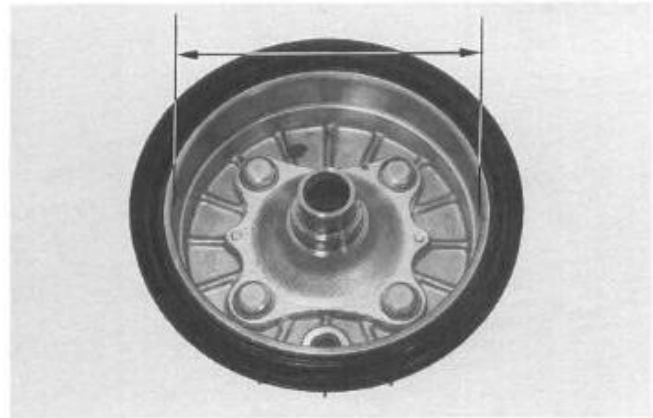
(2) AXLE NUT

(3) BRAKE DRUM

BRAKE SYSTEM

Measure the brake drum I.D.

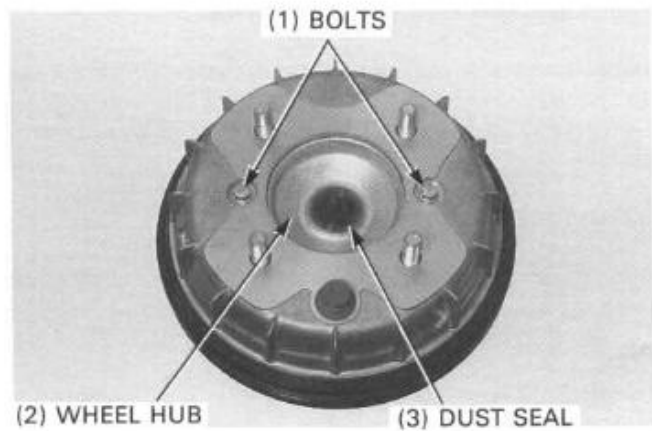
SERVICE LIMIT: 161 mm (6.34 in)



Remove the following:

- Wheel hub and O-ring by removing the hub bolts
- Dust seal

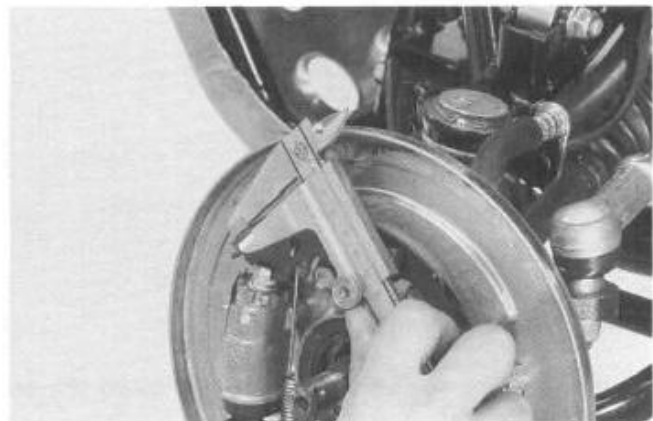
For front brake waterproof seal inspection/replacement, see page 14-11.



Measure the brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

For brake panel inspection, see page 14-13.

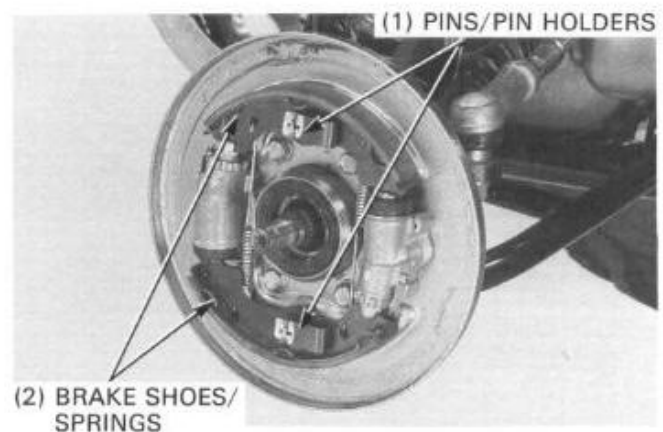


Remove the following:

- Pins
- Pin holders
- Brake shoe and shoe springs

NOTE

- Mark the brake shoes to indicate their original positions before removing them.



Drain the brake fluid (page 14-3).

Remove the following:

- Brake hose by removing the brake hose bolt
- Breather tube from brake panel

- Brake panel bolts and brake panel
- O-ring

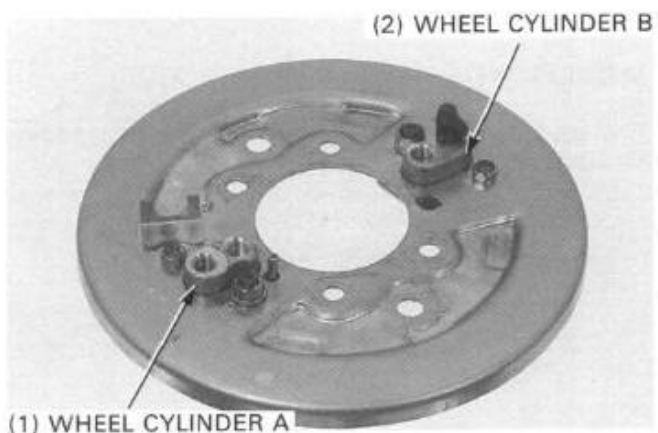
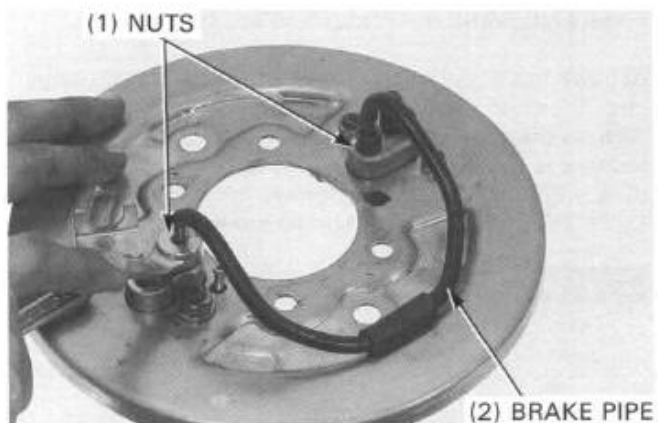
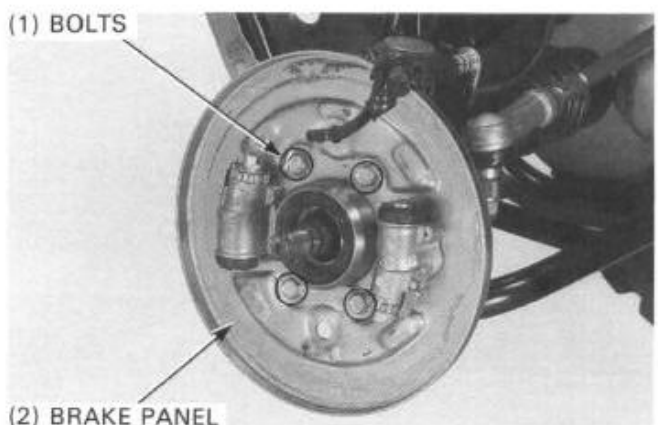
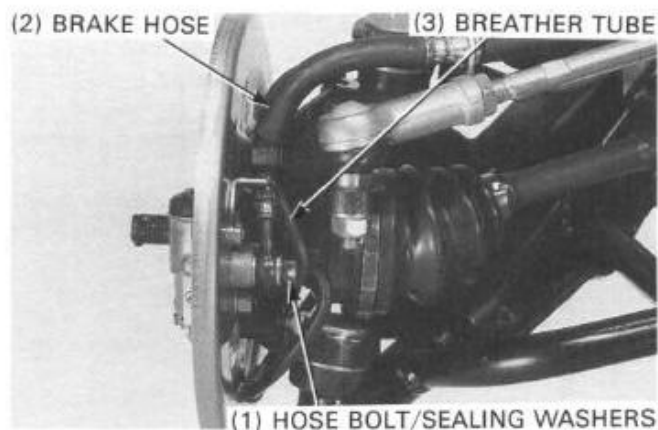
CAUTION

- *Discard the panel bolts. Do not reuse the panel bolts because their threads are specially dry-coated for waterproofing.*

Loosen the joint nuts and remove the brake pipe.

Remove the wheel cylinder assembly A and B by removing the bolts and nuts.

Clean any sealant material from the cylinders, bolts and brake panel.



BRAKE SYSTEM

WHEEL CYLINDER/ADJUSTER INSPECTION

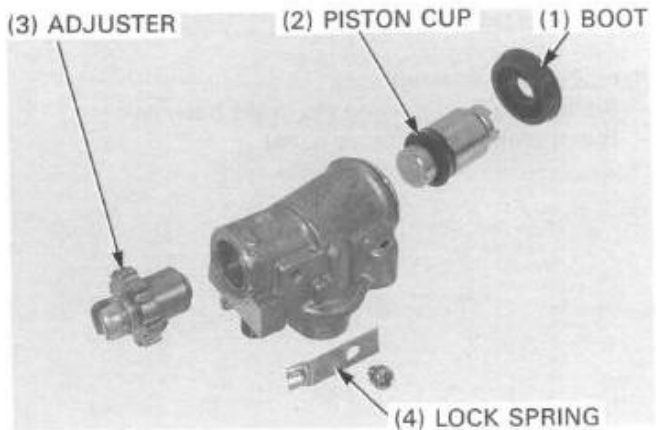
Disassemble the wheel cylinder assembly A and B.

Inspect the wheel cylinder bore and piston for scoring or grooving.

Inspect the piston cup and piston boot for wear or fatigue.

Inspect the adjuster body and adjuster nut for wear or damage.

Check the lock spring for fatigue or damage.

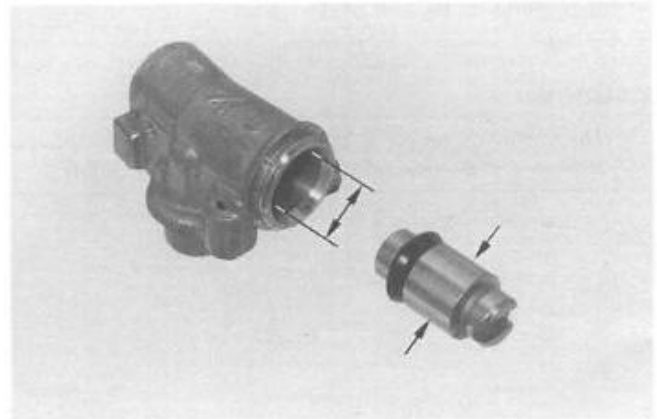


Measure the wheel cylinder I.D.

SERVICE LIMIT: 17.515 mm (0.6896 in)

Measure the wheel cylinder piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



FRONT BRAKE PANEL INSPECTION

Remove the wheel hub from the brake drum and temporarily install the hub on the axle shaft.

Tighten the axle nut securely.

Install a suitable steel plate to the wheel hub and tighten the plate with the wheel nut securely.

Clean any grease from the brake panel.

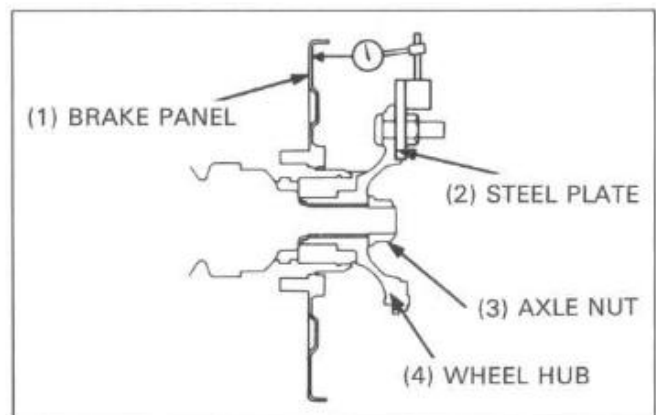
⚠ WARNING

- Grease on the brake linings reduces stopping power. Keep grease off the linings.

Measure the brake panel on the points attached to the waterproof seal lip for warpage as shown, using a dial indicator.

SERVICE LIMIT: 0.4 mm (0.02 in)

Replace the brake panel if warpage is greater than the service limit.

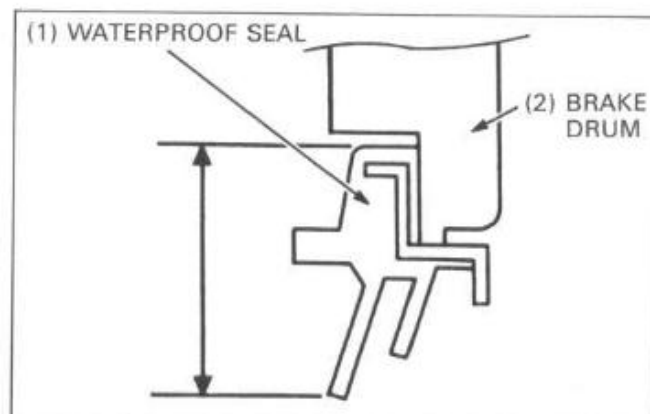


FRONT BRAKE WATERPROOF SEAL INSPECTION

Check the waterproof seal for damage, fatigue or faulty installation.

Measure the front brake waterproof seal lip length.

SERVICE LIMIT: 20.0 mm (0.79 in)



FRONT BRAKE WATERPROOF SEAL REPLACEMENT

Remove the waterproof seal from the brake drum by prying open the seal edge.

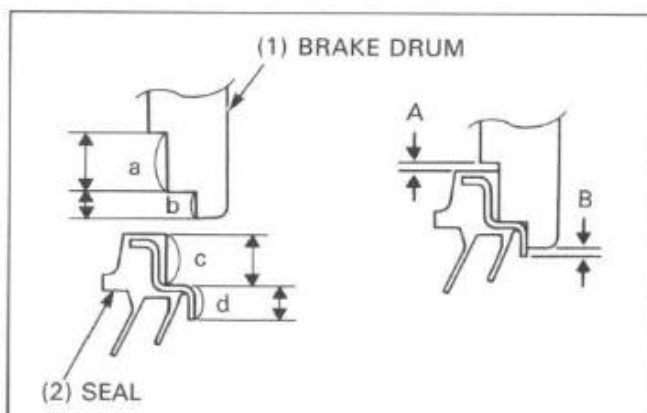
Remove the wheel hub.

CALCULATE THE CLEARANCES BETWEEN THE DRUM AND SEAL

Measure the drum and seal at a, b, c and d as shown.

Calculate the clearances A and B between the drum and seal.

$$A = a - c \quad B = d - b$$

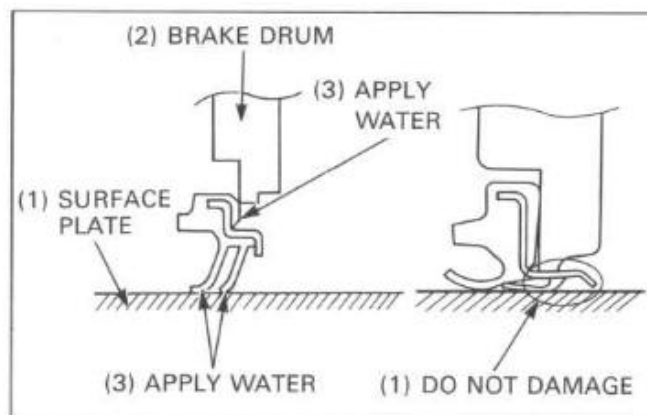


Apply water the entire new waterproof seal.

Place the waterproof seal on a clean surface plate, and press the brake drum into the waterproof seal, making sure that the clearances between the seal and drum will reach the calculated clearance (see previous step).

CAUTION

- Press the drum onto the seal evenly, so the lips will not be damaged. If the seal is damaged or mis-installed, remove it and try again with a new seal.
- Place a steel plate [about 140 mm (5.5 in) in diameter and more than 10 mm (0.4 in) in thickness] on the brake drum, or the brake drum will be warped or damaged.

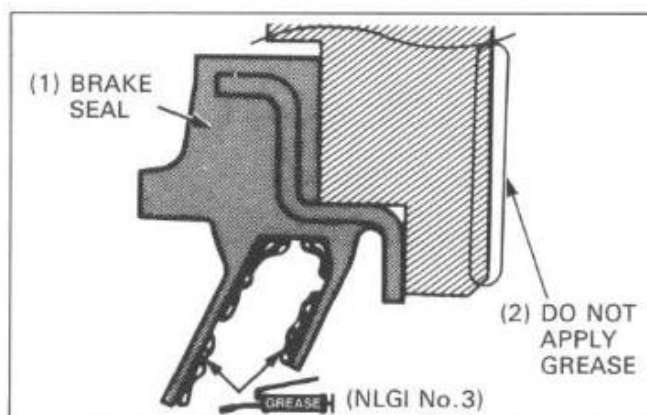


Dry the seal thoroughly and pack the lips cavity with multi-purpose grease (NLGI No.3) as shown.

AMOUNT OF GREASE: 14 – 16 g (0.5 – 0.6 oz)

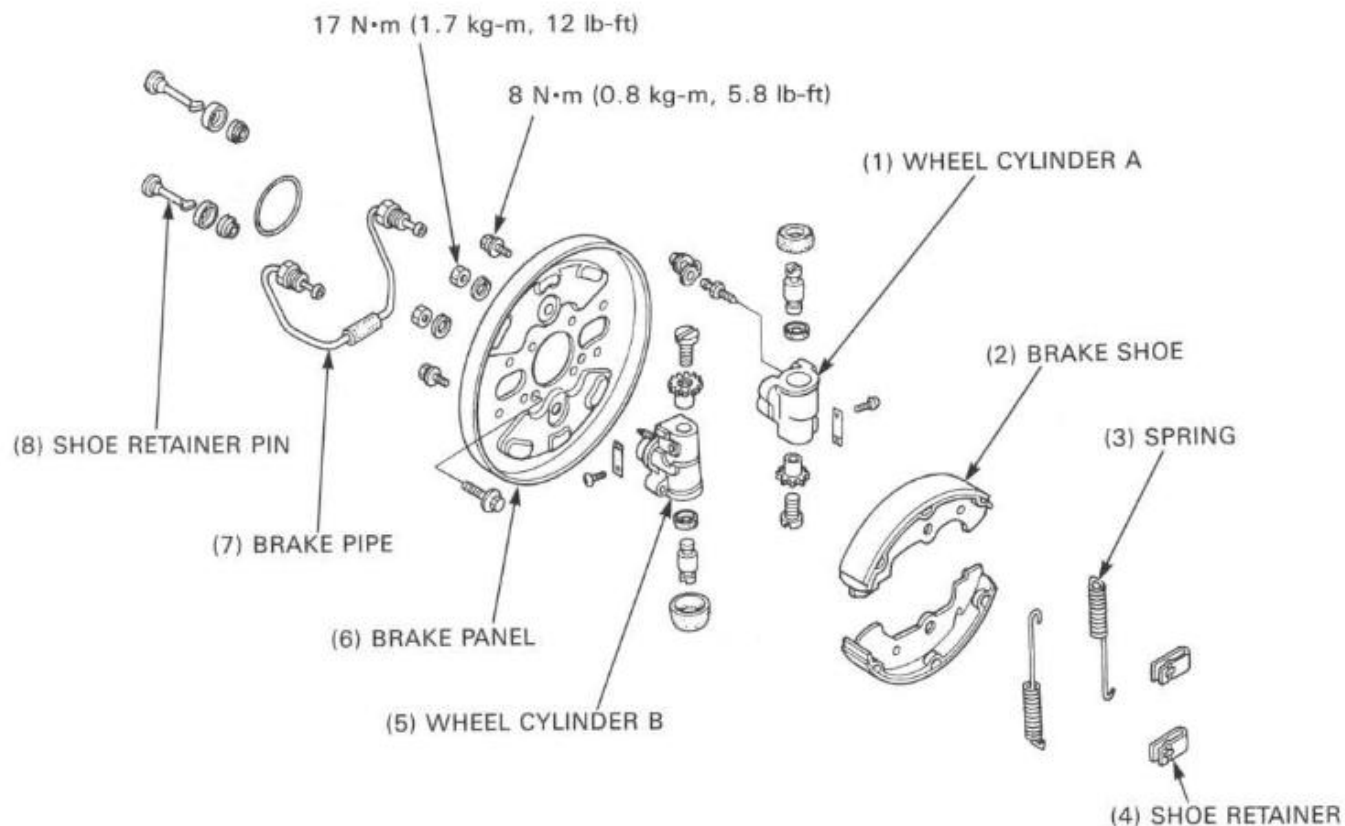
⚠ WARNING

- Do not apply grease to the inner surface of the brake drum. Grease on the inner surface of drum reduces stopping power. Keep grease off the drum.



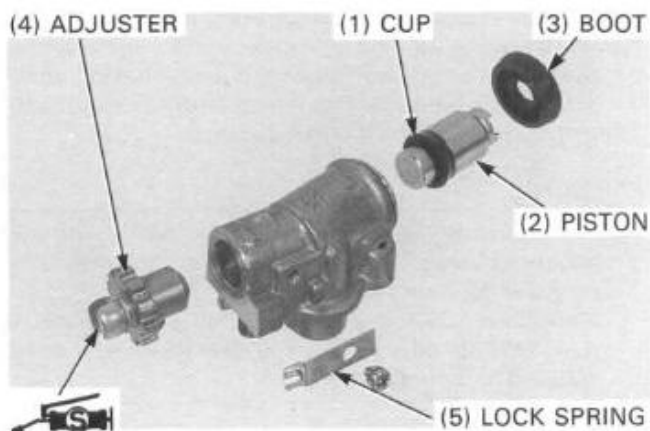
BRAKE SYSTEM

ASSEMBLY

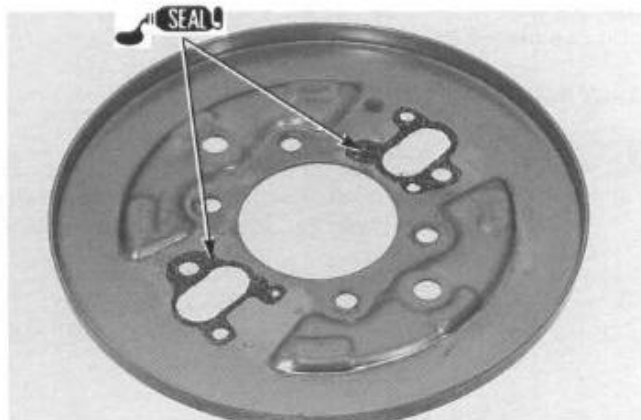


Clean all parts, except the boots, thoroughly with BRAKE FLUID only.
Blow out passages with compressed air.

Install the piston into the wheel cylinder body without allowing the lips to turn inside out.
Install the boot on the cylinder body.
Apply silicone grease to the adjuster nut.
Install the adjuster nut, screw and lock spring on the adjuster body.



Apply sealant to the cylinder's mounting locations on the brake panel.



Install the cylinder assembly A and B, and tighten the bolts, washers and nuts.

TORQUE:

6 mm bolt: 8 N·m (0.8 kg-m, 6 lb-ft)

8 mm nut: 17 N·m (1.7 kg-m, 12 lb-ft)

Install the brake pipe as shown by tightening the joint nuts.

TORQUE: 16 N·m (1.6 kg-m, 12 lb-ft)

Install a new O-ring on the knuckle.

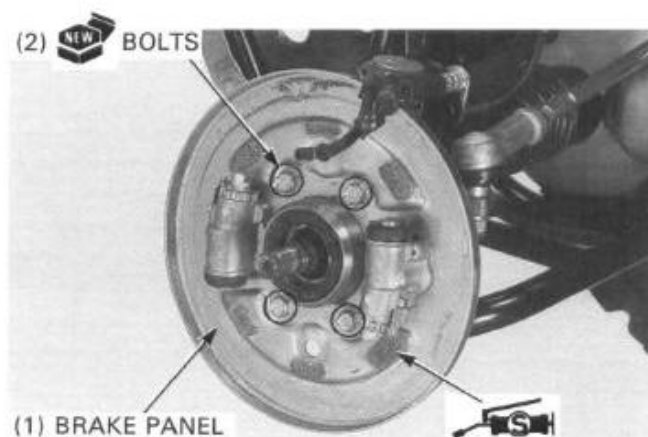
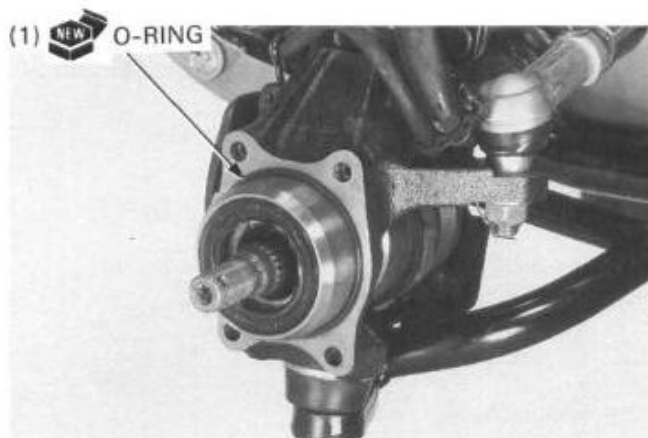
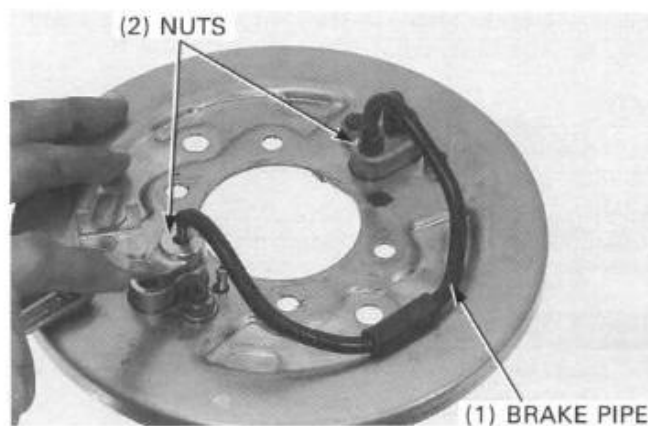
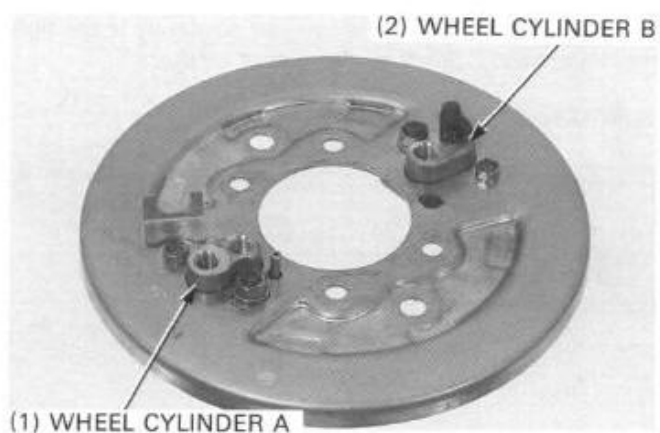
Install the front brake panel assembly and tighten the new brake panel bolts.

TORQUE: 30 N·m (3.0 kg-m, 22 lb-ft)

CAUTION

- Discard the used panel bolts. Do not reuse the panel bolts because their threads are specially dry-coated for waterproofing.

Apply silicone grease on the metal contact area indicated.



BRAKE SYSTEM

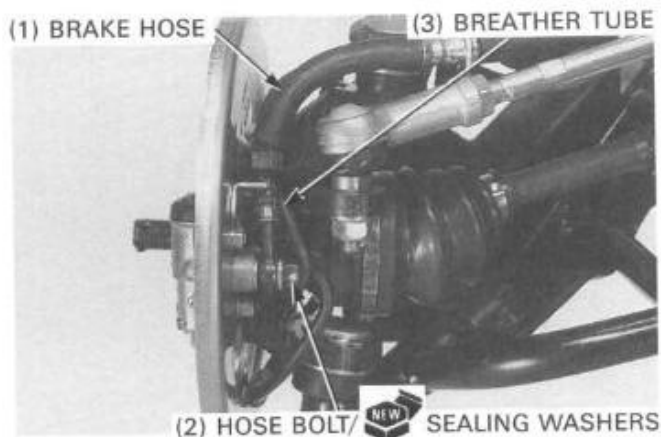
Install the brake hose to the cylinder assembly A and tighten the brake hose bolt with new sealing washers.

TORQUE: 35 N·m (3.5 kg-m, 25 lb-ft)

Securely install the breather tube to cylinder assembly A.

NOTE

- Route the brake hose between the stoppers.



Install the brake shoes in their original positions with the shoe springs as shown.

NOTE

- Face the flatter edges of the shoes to the cylinder.

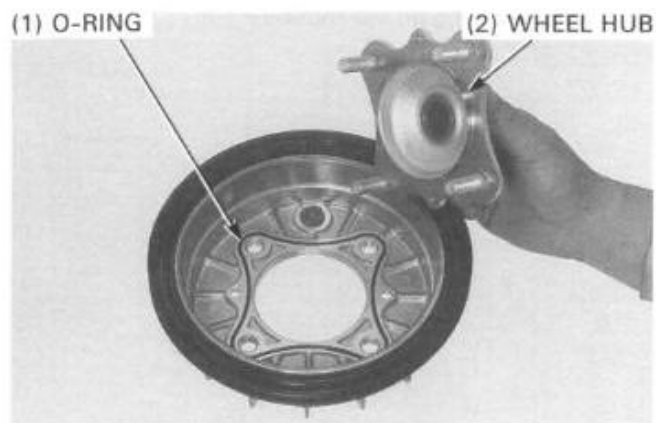
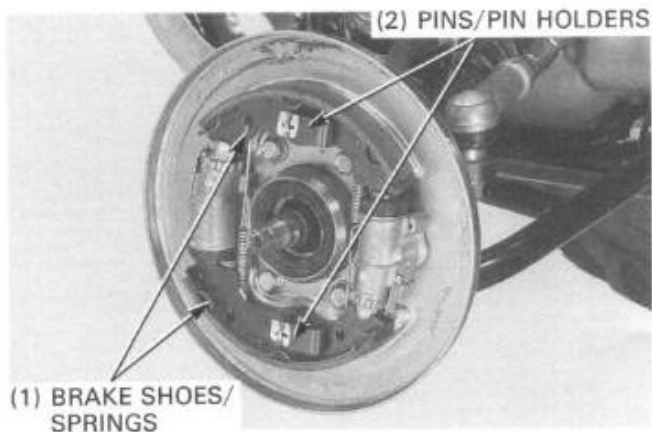
Apply oil to the tension pin seals.

Install the tension pins, tension pin seals, seal caps and pin holders.

⚠ WARNING

- *Do not get grease on the brake drum or shoes or stopping power will be reduced.*
- *Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.*

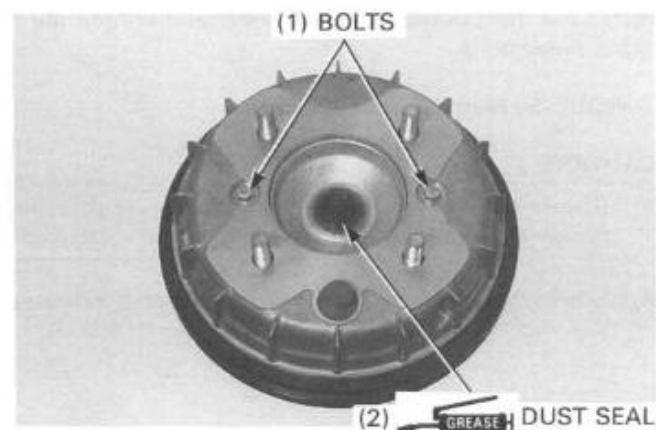
Seat an O-ring carefully in the brake drum, and install the wheel hub to the drum.



Install and tighten the wheel hub mounting bolts.

TORQUE: 10 N·m (1.0 kg-m, 7 lb-ft)

Apply grease to the dust seal and install it in the wheel hub.



Install the brake drum.

NOTE

- Make sure the waterproof seal lip is packed with multi-purpose grease (NLGI No.3) (see page 14-11).
- AMOUNT OF GREASE: 14 – 16 g (0.5 – 0.6 oz)

Make sure any grease is cleaned off the inside of the brake drum and brake shoe.

Install and tighten the axle nut.

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

Install a new cotter pin.

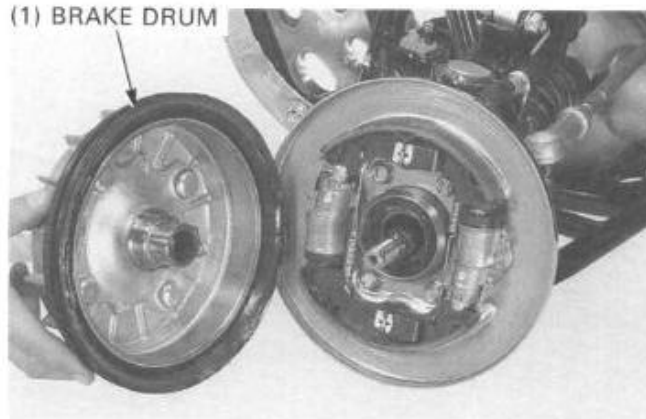
Fill the reservoir to the upper level with new brake fluid (page 14-3).

Bleed the brake system (page 14-4).

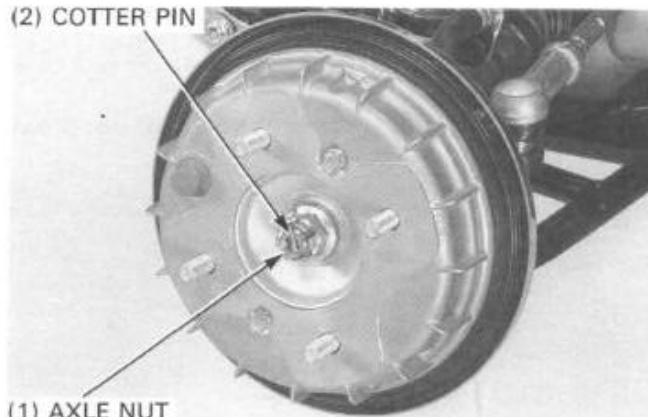
Install the front wheel (page 12-3).

Adjust the brake (page 3-15).

(1) BRAKE DRUM



(2) COTTER PIN



(1) AXLE NUT

REAR BRAKE

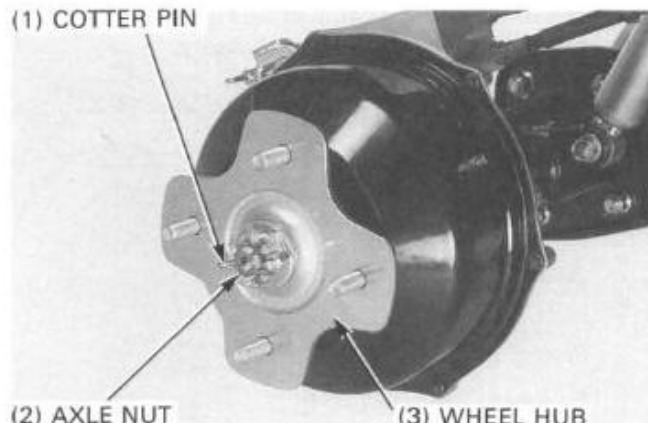
REMOVAL/DISASSEMBLY

Remove the following:

- Right rear wheel (page 13-3)
- Right rear axle nut and wheel hub (page 16-3)

Remove the bolts and brake drum cover.

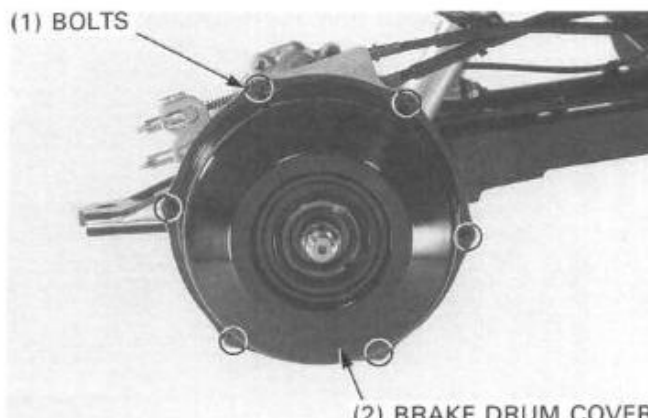
(1) COTTER PIN



(2) AXLE NUT

(3) WHEEL HUB

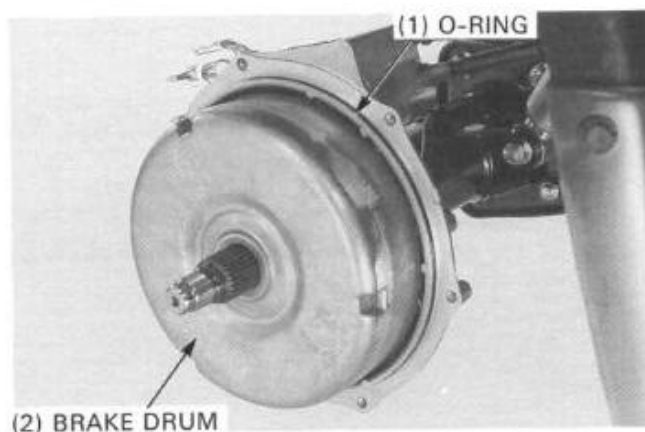
(1) BOLTS



(2) BRAKE DRUM COVER

BRAKE SYSTEM

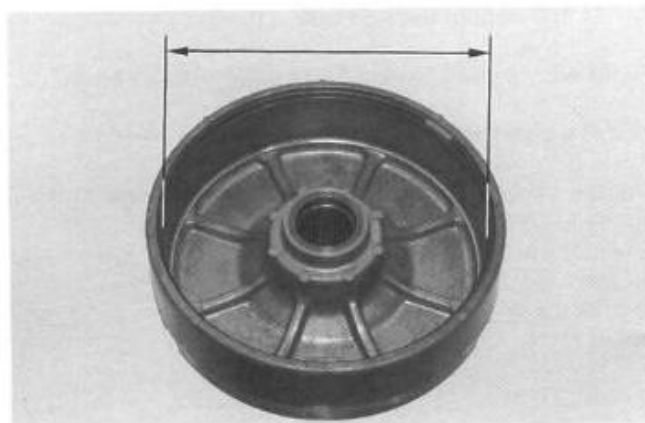
Remove the brake drum cover O-ring.
Remove the brake drum.



Measure the brake drum I.D.

SERVICE LIMIT: 161.0 mm (6.34 in)

Inspect the brake drum for scoring, cracks and out of roundness.

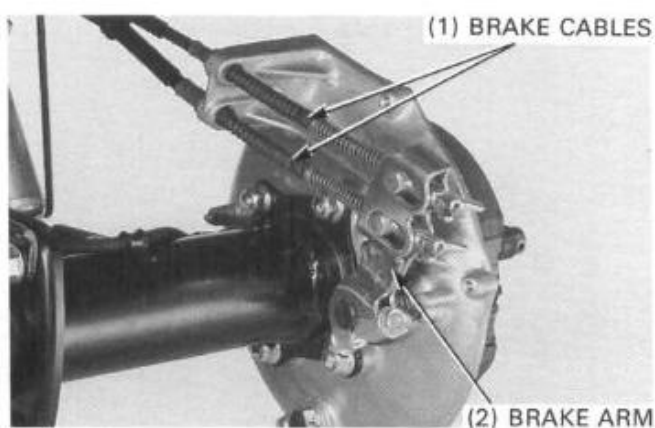


Check the brake drum cover dust seal for wear or damage.
Drive it out of the drum cover if necessary.

For the installation of the dust seal, see page 14-22.



Remove the brake cables from the brake arm.

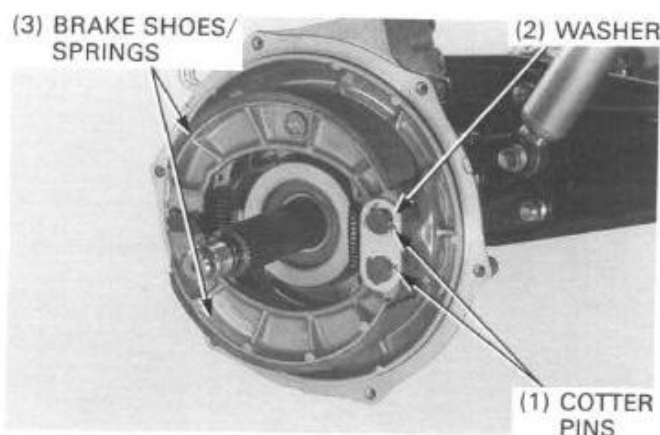


Remove the following:

- Cotter pin
- Washer
- Brake shoes and shoe springs

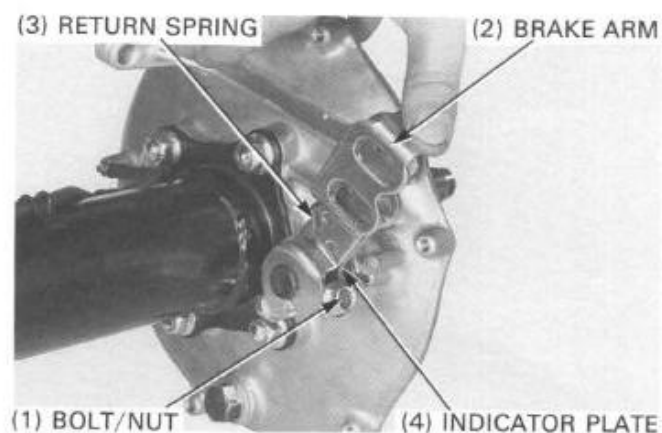
NOTE

- Mark the brake shoes to indicate their original positions before removing them.

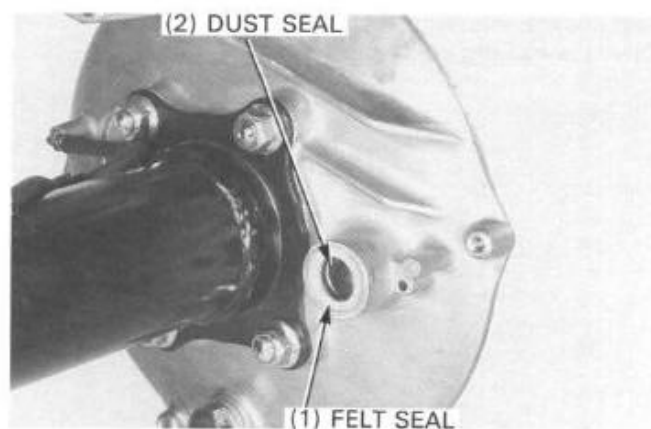


Remove the following:

- Brake arm pinch bolt/nut
- Brake arm
- Return spring
- Indicator plate
- Brake cam

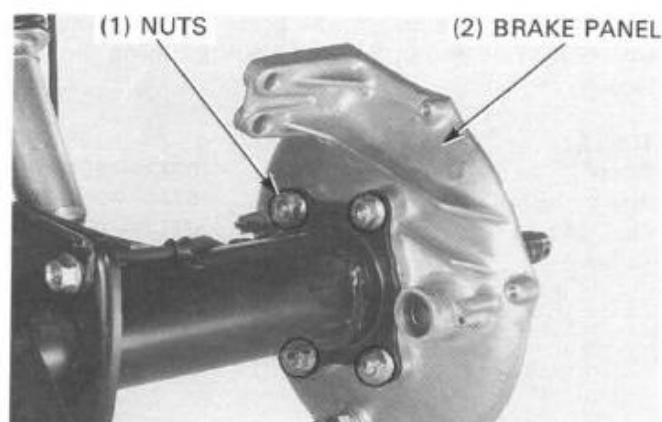


- Felt seal
- Dust seal



Remove the brake panel nuts and brake panel. Discard the brake panel nuts.

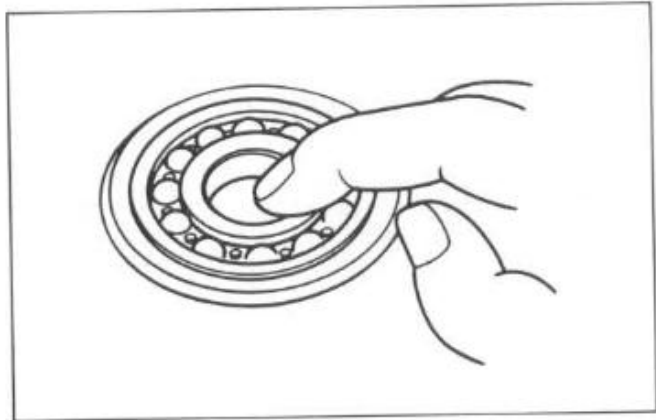
Remove the O-ring.



BRAKE SYSTEM

Turn the inner race of the bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the brake panel.
Replace if necessary.

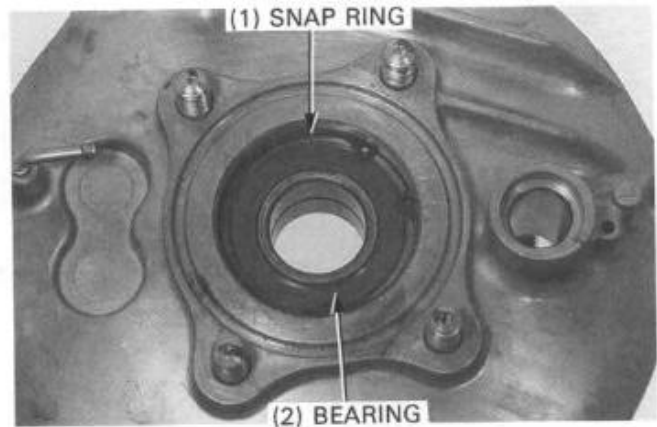
Check the dust seal for wear or damage.



Remove the dust seal.



Remove the snap ring.
Drive the bearing out of the brake panel.



Drive the new bearing into the brake panel with its sealed side facing out (facing the axle housing) using the special tools as shown.

TOOLS :

Driver

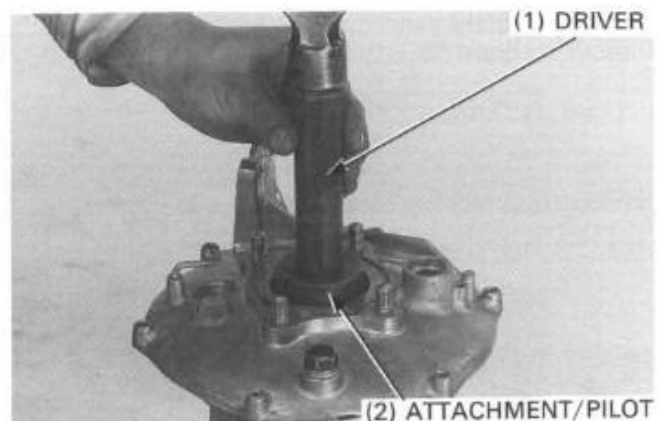
Attachment, 52X55 mm

Pilot, 28 mm

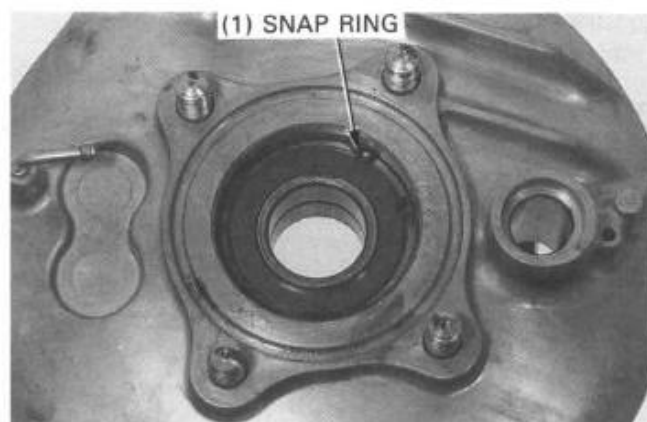
07749 - 0010000

07746 - 0010400

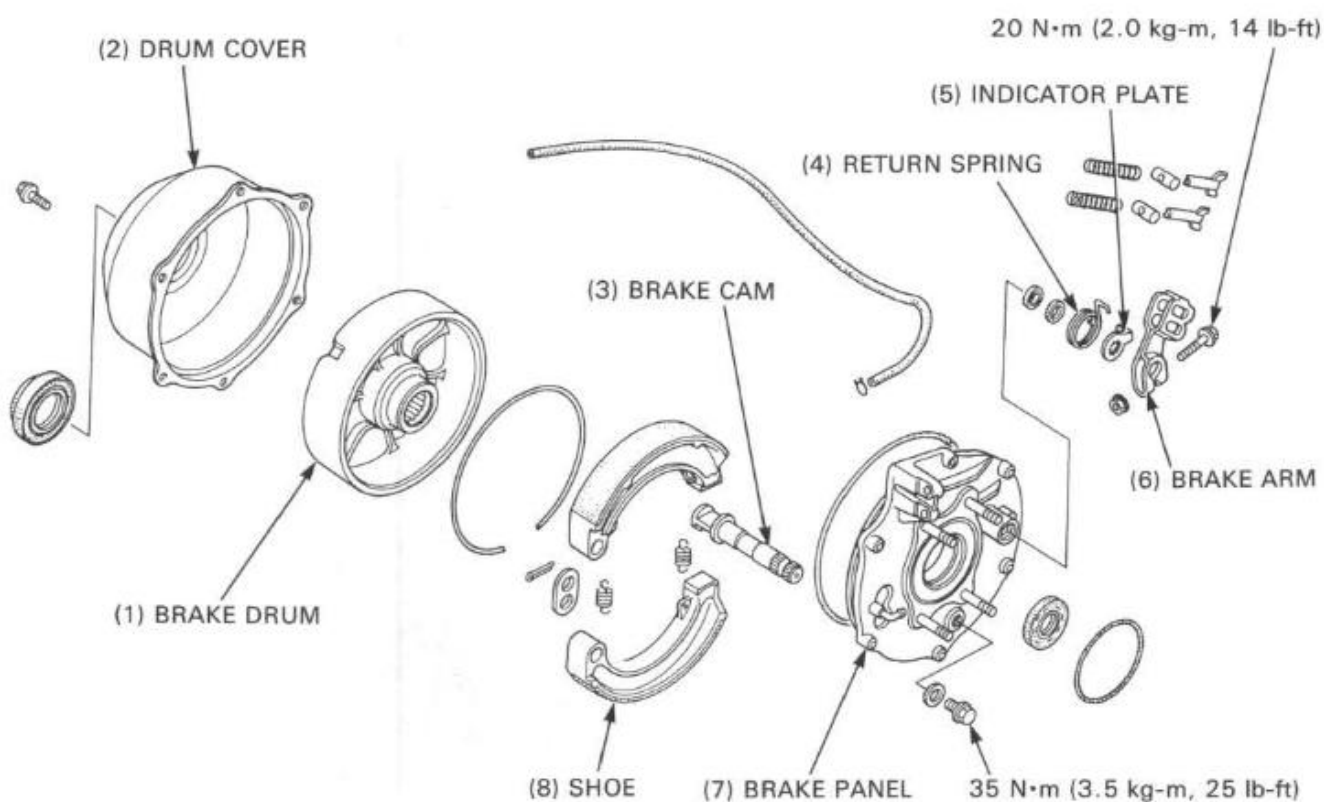
07746 - 0041100



Install the snap ring into the groove securely.



ASSEMBLY/INSTALLATION



Pack the dust seal lip with grease and install it in the panel with the lip facing up using the special tools. Align the upper surfaces of the dust seal and brake panel.

TOOLS:

Driver

Attachment, 62X68 mm

07749 - 0010000

07746 - 0010500

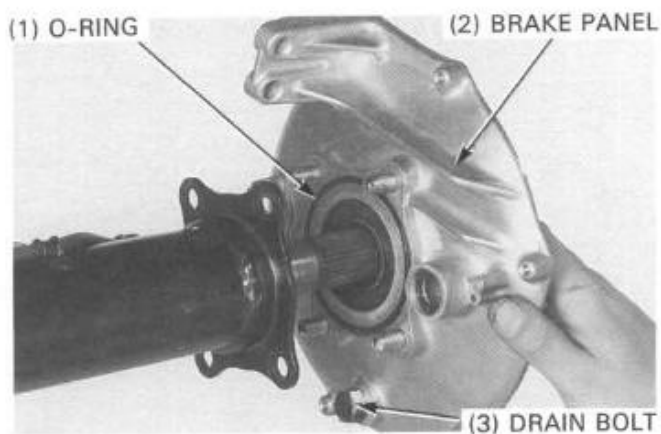


BRAKE SYSTEM

Install an O-ring in the brake panel groove securely.
Tighten the brake panel drain bolt if removed.

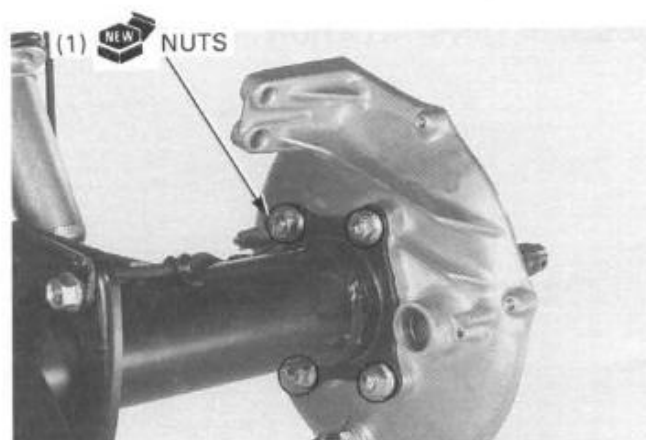
TORQUE: 35 N·m (3.5 kg-m, 25 lb-ft)

Install the brake panel onto the axle shaft.



Install and tighten the new nuts to the specified torque.
Do not reuse the nuts.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

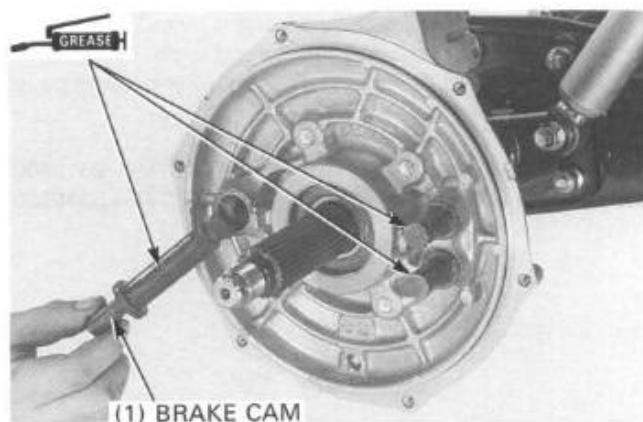


Apply grease to the dust seal.
Apply oil to the felt seal.

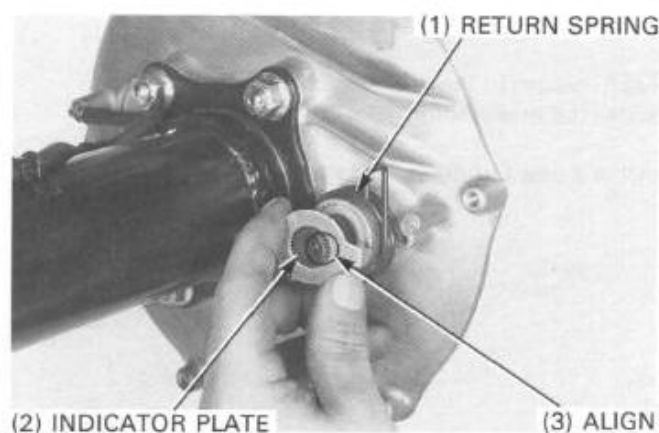
Install the dust seals and felt seal.



Apply grease to the anchor pin and brake cam.
Install the brake cam from the outside.



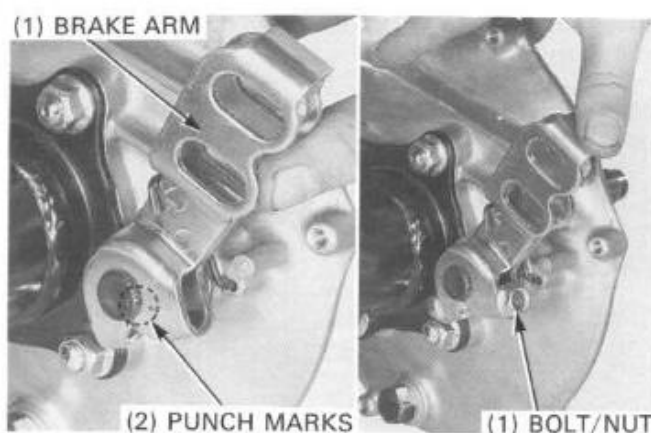
Install the return spring and then install the indicator plate, aligning the wide tooth on the plate with the wide groove on the brake cam.



Install the brake arm, aligning the punch marks on the brake arm and cam. Hook the return spring end onto the brake arm.

Tighten the brake arm bolt.

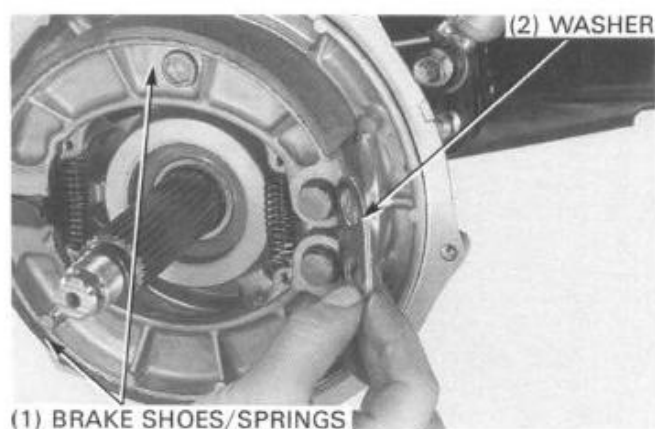
TORQUE: 20 N·m (2.0 kg-m, 14 lb-ft)



Install the brake shoes in their original positions with the spring as shown.

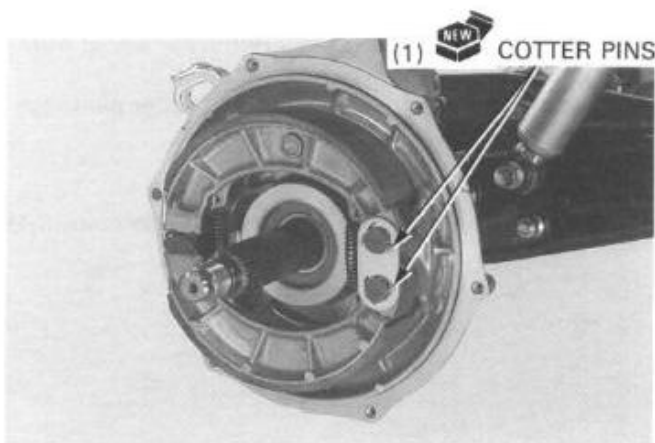
WARNING

- Contaminated brake linings reduce stopping power. Keep grease off the linings, wipe excess grease off the cam.



Install the anchor pin washer with its chamfered side (rolled edge side) facing in.

Install new cotter pins as shown.

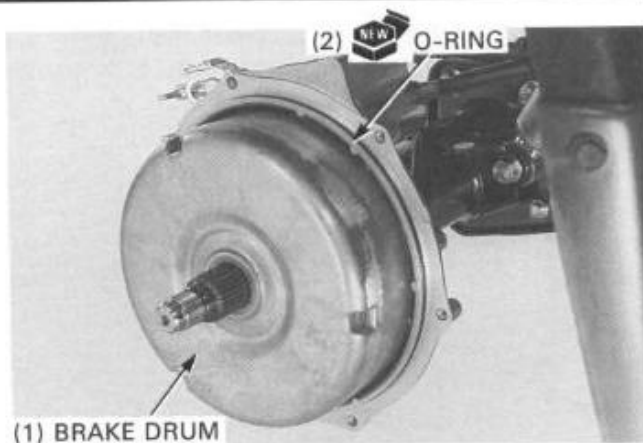


BRAKE SYSTEM

Install the brake cables to the brake arm.

Apply grease to the brake drum splines.
Install the brake drum.

Install a new O-ring onto the brake panel.

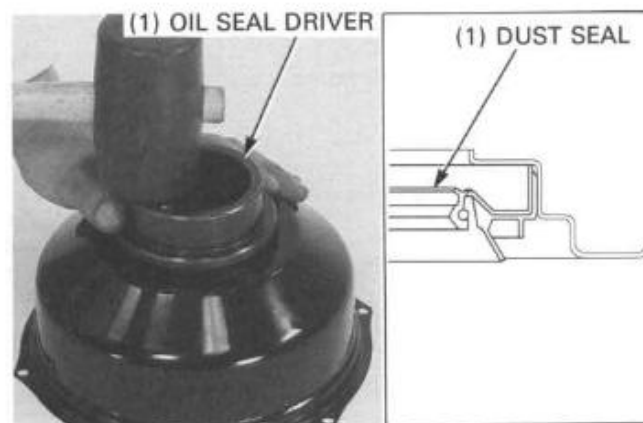


Install a new dust seal into the drum cover using the special tool as shown.

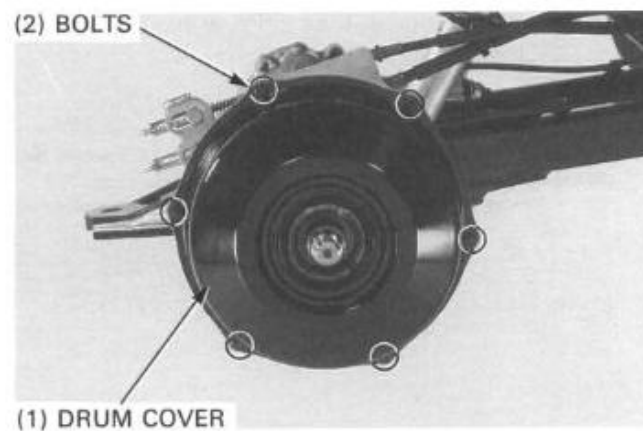
TOOL:

Oil seal driver

07965-MC70100



Install the drum cover and tighten the bolts.

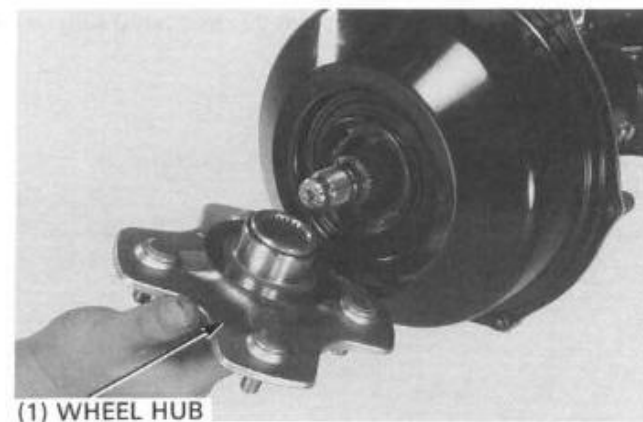


Clean the mating surface of the right rear wheel hub and brake cover dust seals.

Install the rear wheel hub, axle nut and cotter pin (page 16-18).

Install the right rear wheel (page 13-3).

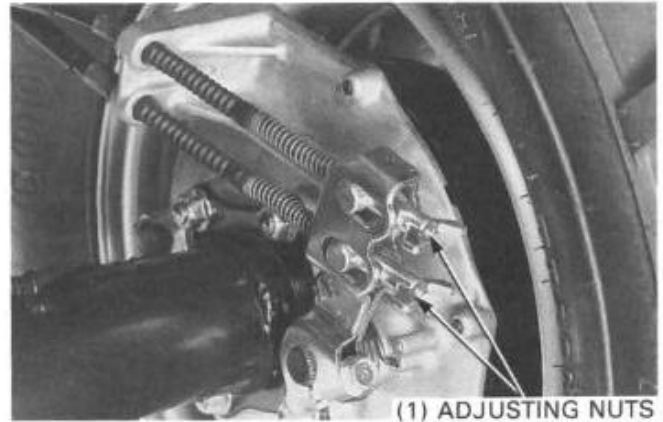
Adjust the rear brake lever and pedal free play (page 3-15).



BRAKE PEDAL

REMOVAL

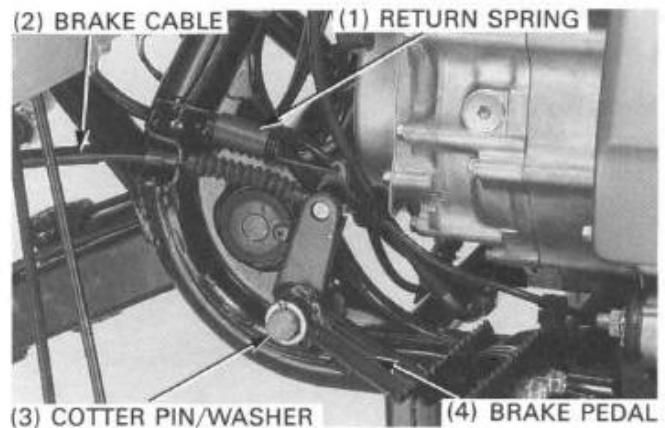
Loosen and remove the rear brake pedal adjusting nuts.



(1) ADJUSTING NUTS

Disconnect the brake cable from the bracket and unhook the return spring. Remove the cotter pin and washer from the pedal pivot shaft, and then remove the brake pedal from the shaft.

Unhook the brake cable from the brake pedal.



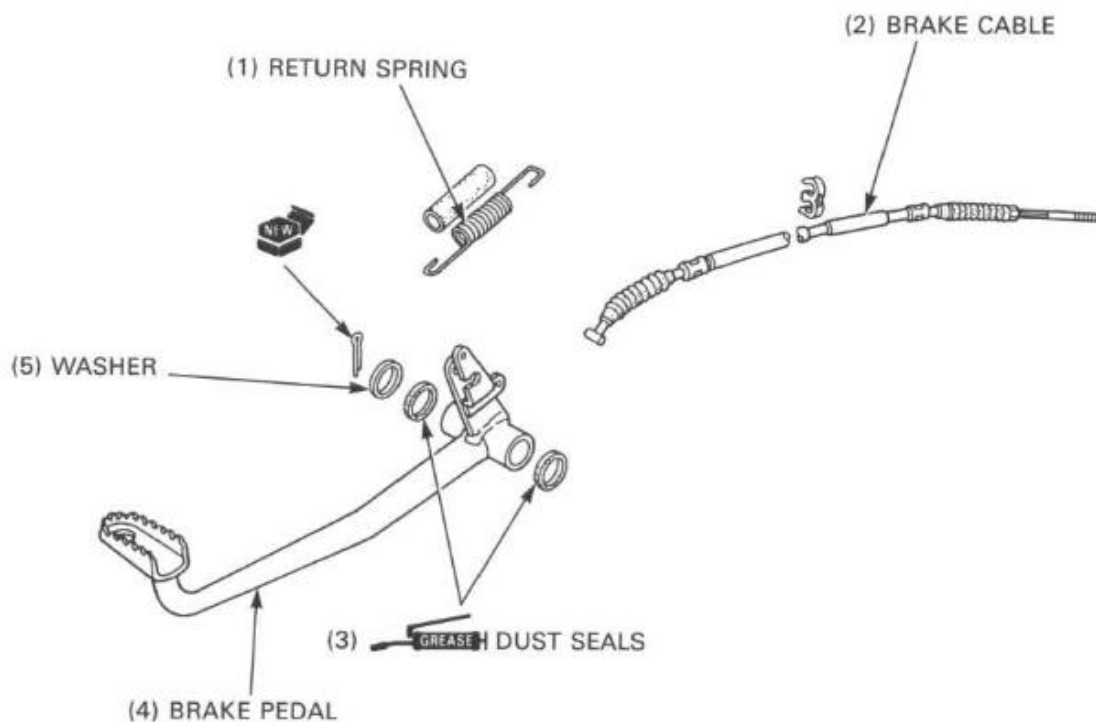
(2) BRAKE CABLE

(1) RETURN SPRING

(3) COTTER PIN/WASHER

(4) BRAKE PEDAL

INSTALLATION

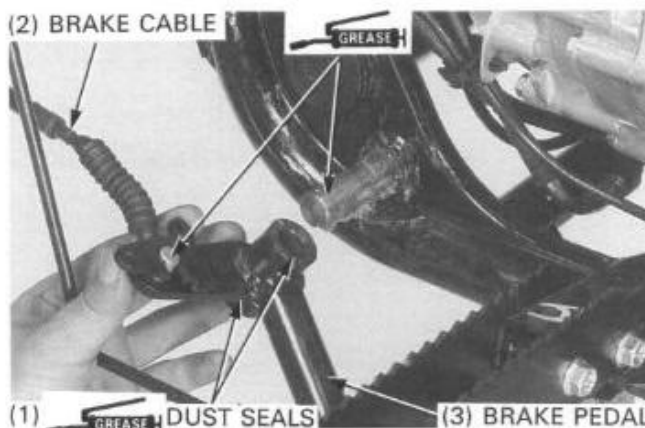


BRAKE SYSTEM

Apply grease to the brake pedal pivot shaft, dust seals and brake cable end.

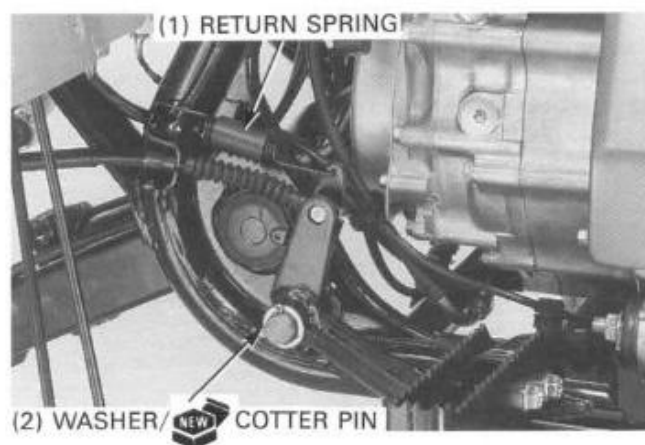
Connect the brake cable to the brake pedal.

Install the brake pedal onto the pivot.



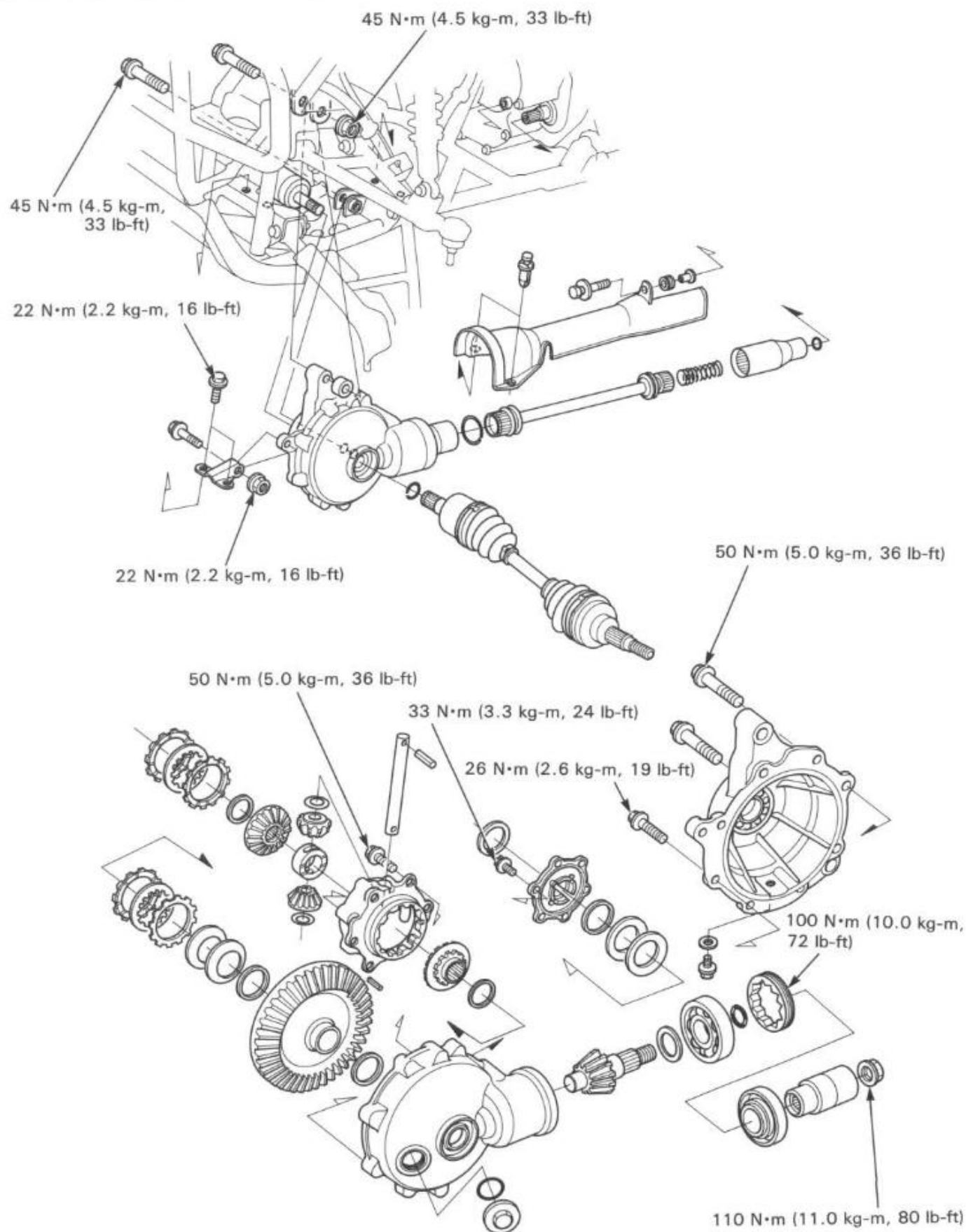
Connect the brake cable onto the bracket and hook the return spring.

Install the washer and new cotter pin.
Adjust the rear brake (page 3-15).



MEMO

FRONT DRIVING MECHANISM



15.FRONT DRIVING MECHANISM

SERVICE INFORMATION

15-1

FRONT DRIVE SHAFT

15-3

TROUBLESHOOTING

15-2

FRONT DIFFERENTIAL

15-9

SERVICE INFORMATION

GENERAL

- Replace all oil seals and O-rings whenever the front differential assembly is disassembled.
- Check the tooth contact pattern and gear backlash when the front differential bearing, gear set and/or gear case are replaced.

SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS	SERVICE LIMIT
Oil capacity	At draining	190 cc (6.43 US oz, 6.67 Imp oz)	—
	At disassembly	200 cc (6.76 US oz, 7.02 Imp oz)	—
Recommended oil		Hypoid gear oil SAE #80)	—
Clutch spring free height		2.65 (0.104)	2.5 (0.10)
Clutch disc thickness	A	2.7 – 2.8 (0.106 – 0.110)	2.4 (0.09)
	B	2.3 – 2.4 (0.091 – 0.094)	2.1 (0.08)
Pinion gear I.D.		12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
Pinion gear shaft O.D.		11.973 – 11.984 (0.4714 – 0.3718)	11.75 (0.463)
Slip torque		17 – 25 N•m (1.7 – 2.5 kg-m, 12 – 18 lb-ft)	—
Gear backlash		0.05 – 0.30 (0.002 – 0.012)	0.40 (0.016)

TORQUE VALUES

Differential case mounting bolt, 10 mm

45 N•m (4.5 kg-m, 33 lb-ft)

8 mm

22 N•m (2.2 kg-m, 16 lb-ft)

Differential case cover flange bolt, 8 mm

26 N•m (2.6 kg-m, 19 lb-ft)

10 mm

50 N•m (5.0 kg-m, 36 lb-ft)

Pinion joint nut

110 N•m (11.0 kg-m, 80 lb-ft)

Pinion bearing lock nut

100 N•m (10.0 kg-m, 72 lb-ft)

Differential gear case drain bolt

12 N•m (1.2 kg-m, 9 lb-ft)

Differential gear case cover oil cap

12 N•m (1.2 kg-m, 9 lb-ft)

Differential case cap torx bolt

33 N•m (3.3 kg-m, 24 lb-ft)

Differential case UBS bolt

50 N•m (5.0 kg-m, 36 lb-ft)

Apply a locking agent

Apply a locking agent

Replace with new ones

15

TOOLS

Differential inspection tool
Pinion holder
Lock nut wrench, 30X64 mm
Pinion puller set
– Shaft puller

– Pinion puller base
Driver attachment
Ball joint remover, 28 mm
Driver
Attachment, 52X55 mm
Pilot, 28 mm
Driver, 40 mm I.D.
Attachment, 25 mm I.D.

07KMK – HC50101
07SMB – HM70200
07916 – MB00002
07HMC – MM80101
07931 – ME40000

07HMC – MM80110
07965 – KE80200
07MAC – SL00200
07749 – 0010000
07746 – 0010400
07746 – 0041100
07746 – 0030100
07746 – 0030200

or 07KMK – HC5010A (U.S.A. only)

not available in U.S.A.

or 07931 – ME4010B and 07931 – HB3020A
(U.S.A. only)

or 07HMC – MM8011A (U.S.A. only)

TROUBLESHOOTING

Consistent noise during cruising

- Oil level too low
- Foreign matter contaminating gear oil
- Improper tooth contact between ring gear and drive pinion
- Worn or damaged ring gear bearing
- Worn or damaged ring gear and drive pinion
- Worn pinion shaft or pinion gear side washer
- Deformed ring gear or differential case
- Chipped or damaged gears

Gear noises while running

- Oil level too low
- Foreign matter contaminating gear oil
- Chipped or damaged gears
- Improper tooth contact between ring gear and drive pinion

Gear noises while coasting

- Damaged or chipped gears

Bearing noises while running and coasting

- Cracked or damaged drive pinion bearing or ring gear

Abnormal noises when turning

- Worn (excessive play) or damaged ring gear bearing
- Damaged side gear, pinion or pinion shaft
- Worn clutch disc/plate
- Worn clutch spring
- Worn or damaged slots of the differential housing

Abnormal noises at start or during acceleration

- Excessive backlash between ring gear and drive pinion
- Excessive pinion gear backlash
- Worn differential splines
- Loose pinion joint nut and other fasteners
- Worn clutch disc/plate
- Worn clutch spring

Oil leak

- Oil level too high
- Clogged breather hole or tube
- Worn or damaged oil seal
- Loose differential cover bolt

Overheating

- Oil level too low
- Insufficient backlash between ring gear and drive pinion

FRONT DRIVE SHAFT

REMOVAL

Remove the following:

- Front wheel (page 12-3)
- Front brake drum (page 14-7)
- Cotter pins and castle nuts

Separate the knuckle from the lower suspension arm.

TOOL:

Ball joint remover, 28 mm

07MAC-SL00200

Disconnect the breather tube from the brake panel.

Separate the knuckle/brake panel assembly from the drive shaft.

CAUTION

- Support the knuckle/brake panel assembly so that it does not hang from the brake hose. Do not twist the brake hose.

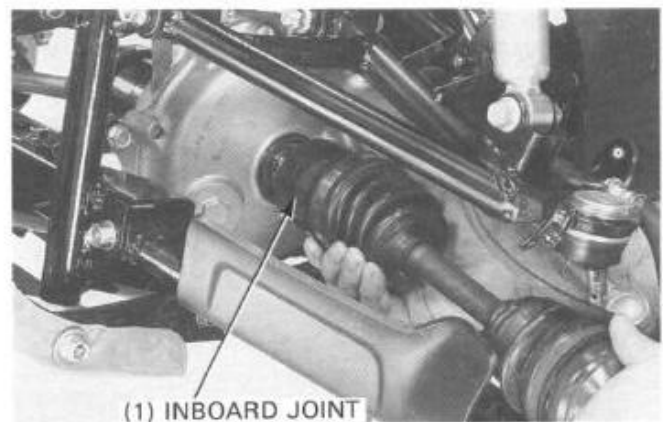
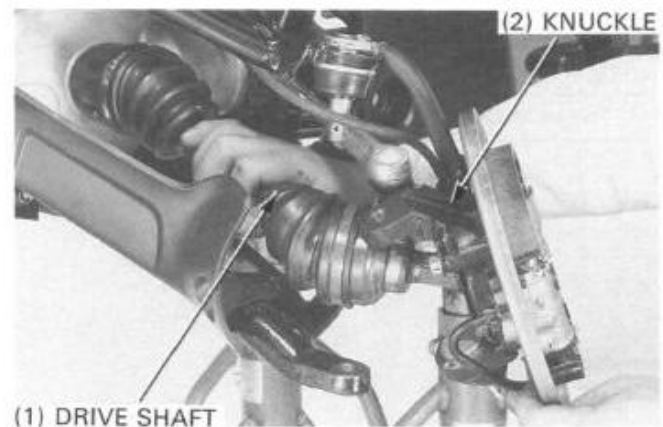
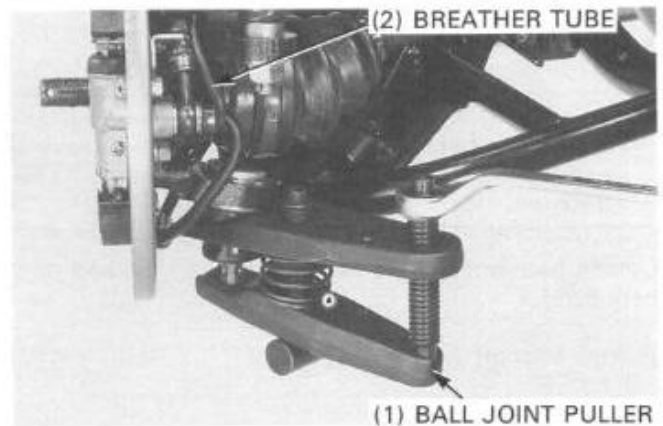
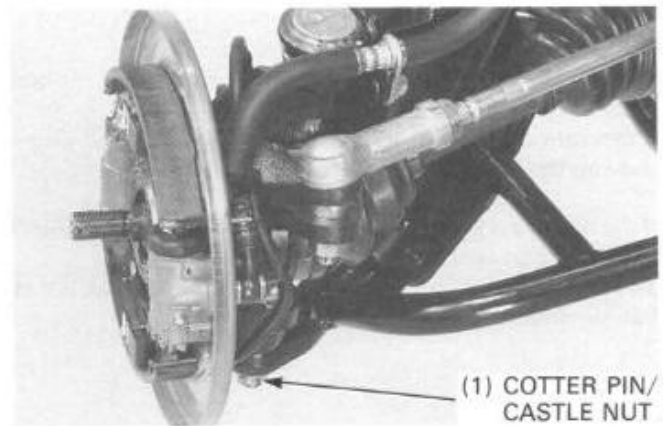
NOTE

- Do not operate the front brake lever after removing the knuckle/brake panel assembly. If you do, it will be difficult to refit the brake and brake shoes.

Hold the inboard joint as shown and pull the drive shaft out of the differential.

CAUTION

- To prevent damage to the differential oil seal, hold the inboard joint horizontal until the drive shaft is clear of the differential.



FRONT DRIVING MECHANISM

INSPECTION

Check the boot for cuts or other damage; replace if necessary.

Check the drive shaft joints for excessive play or noise by moving the joints in a circular direction.

If the outboard joint seems to be worn or damaged, the drive shaft must be replaced.

To service the inboard joint, follow the DISASSEMBLY steps below.

DISASSEMBLY

NOTE

- To replace the outboard boot, first remove the inboard boot as described in these steps. Then remove the bands and pull the outboard boot off the inboard end of the shaft.

Loosen both boot bands on the inboard side, and remove boot band A.

Pull the boot off the inboard joint.

Remove the stop ring and inboard joint.

NOTE

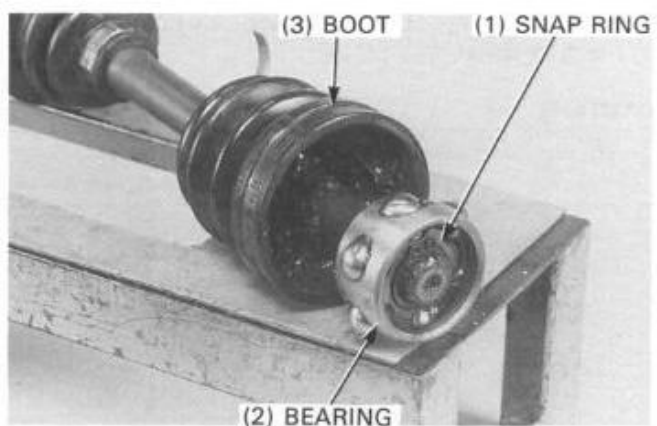
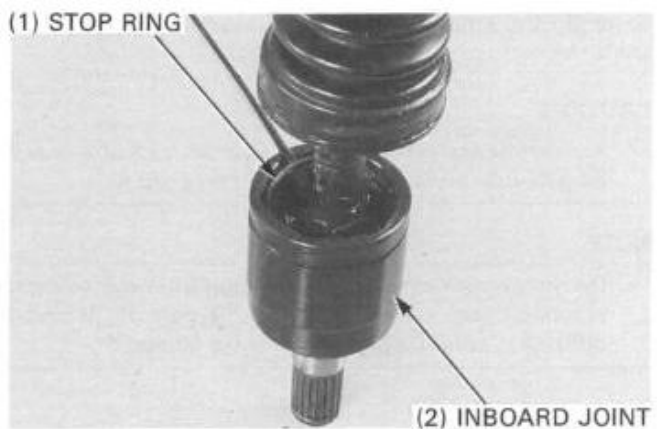
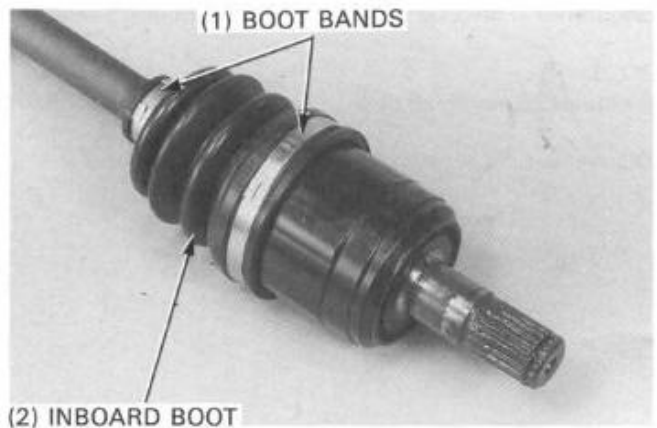
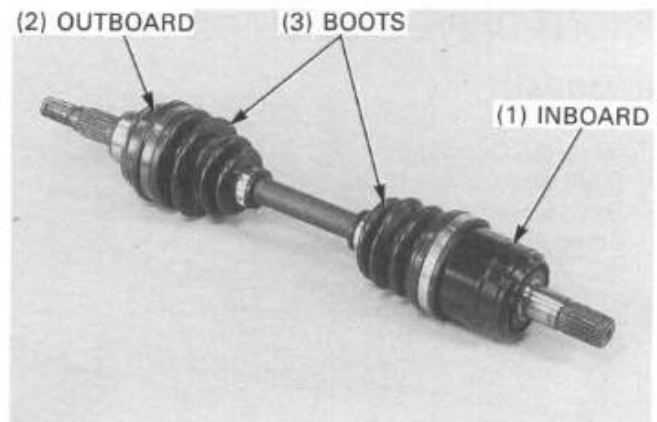
- The outboard joint cannot be disassembled.

Remove the snap ring and bearing.

Remove the boot band B and pull the boot off the drive shaft.

NOTE

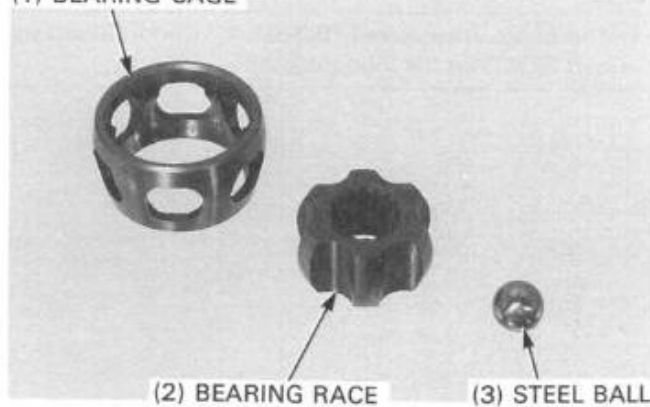
- Replace the bands with new ones whenever removing them.



Check the following for wear or damage.

- Bearing cage
- Bearing race
- Steel balls

(1) BEARING CAGE

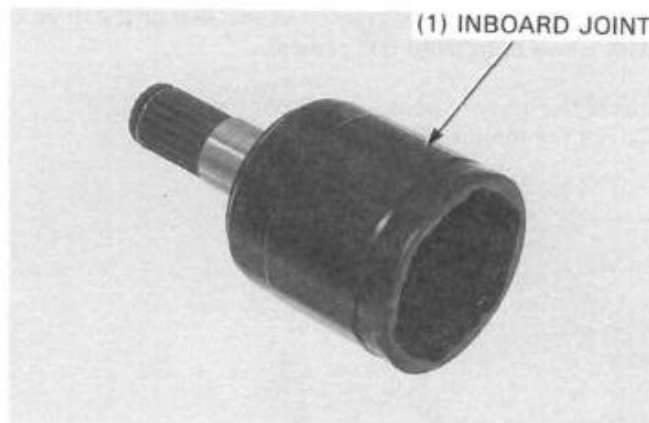


- Inboard joint

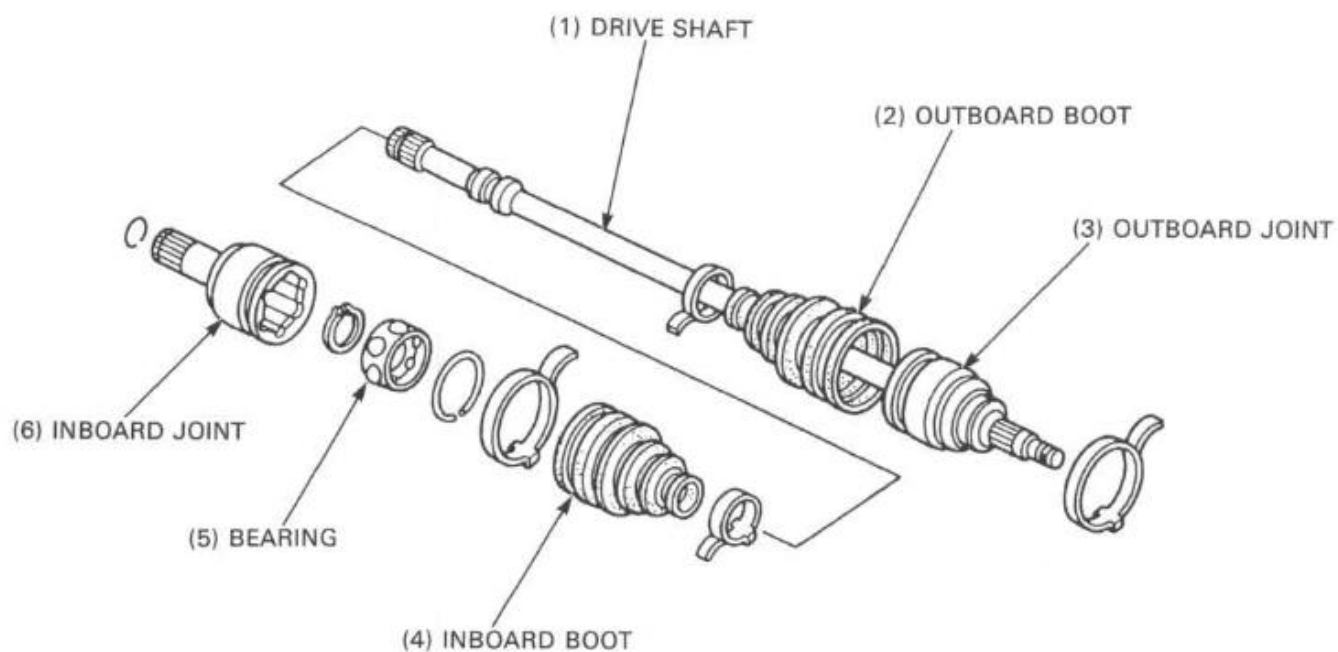
NOTE

- Replace the bearing cage, bearing race, steel balls and inboard joint as an assembly.

(1) INBOARD JOINT



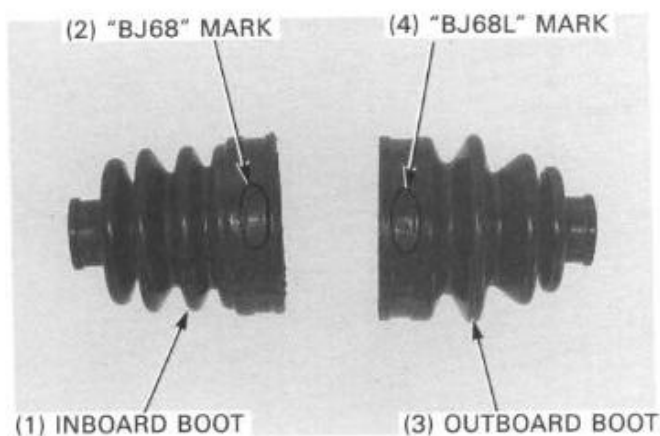
ASSEMBLY



FRONT DRIVING MECHANISM

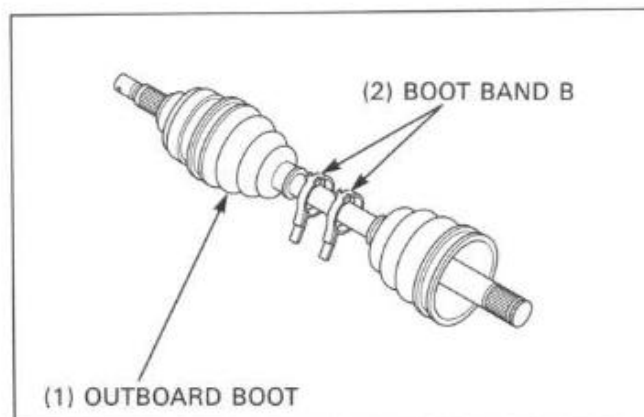
NOTE

- The boots are marked "BJ68L" for the outboard joint and "BJ68" for the inboard joint.



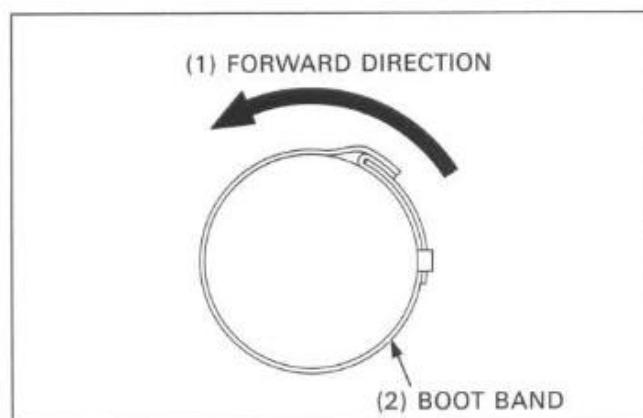
If the outboard boot was removed, install it on the drive shaft with a new boot band B (2 pieces).

Install the inboard boot with a boot band B.
Do not tighten the bands at this time.

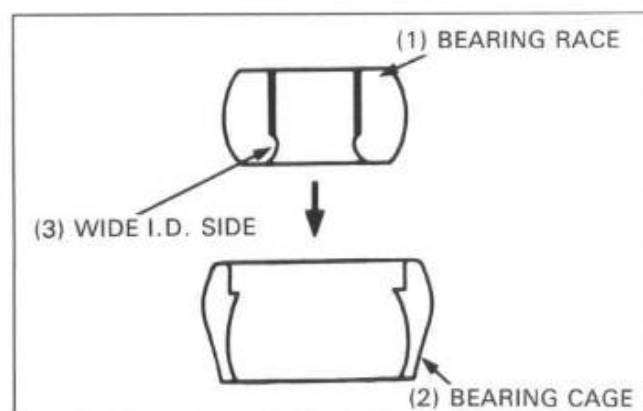


NOTE

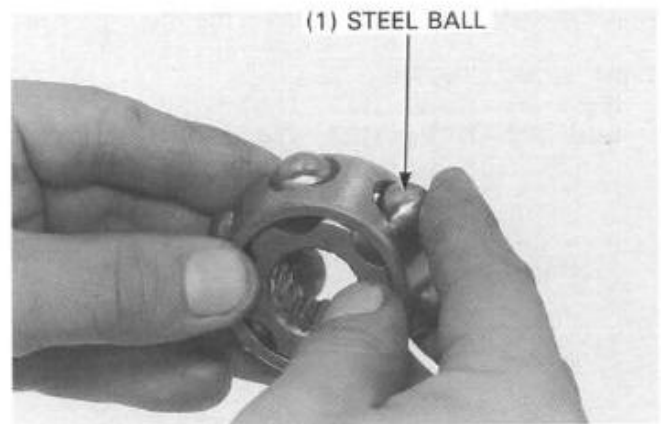
- Note the direction of the boot bands.



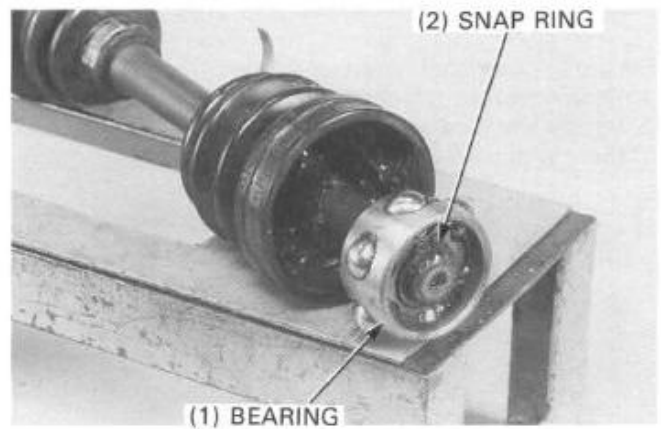
Install the bearing race in the bearing cage as shown.



Push the steel balls into the bearing cage.



Install the bearing on the drive shaft with the small end of the bearing facing the inside of the drive shaft.
Install the snap ring securely in the groove of the drive shaft.



Apply molybdenum disulfide grease to the bearing and inside of the inboard joint.

Install the inboard joint to the drive shaft.
Install the stop ring in the joint groove.

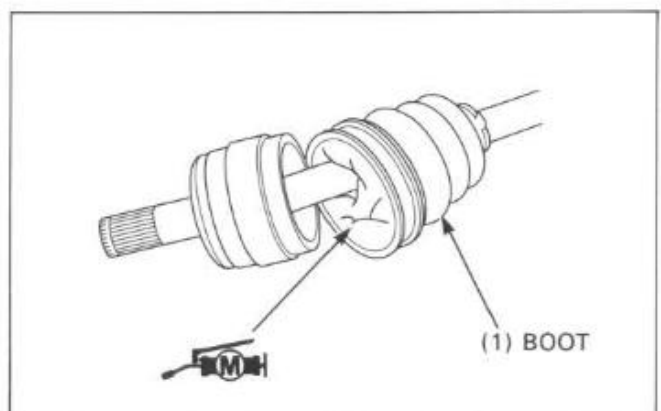


Pack the boots with molybdenum disulfide grease and pull them on the joints.

GREASE CAPACITY:

Inboard boot: 40 – 60 g (1.4 – 2.0 oz)

Outboard boot: 30 – 50 g (1.1 – 1.7 oz)



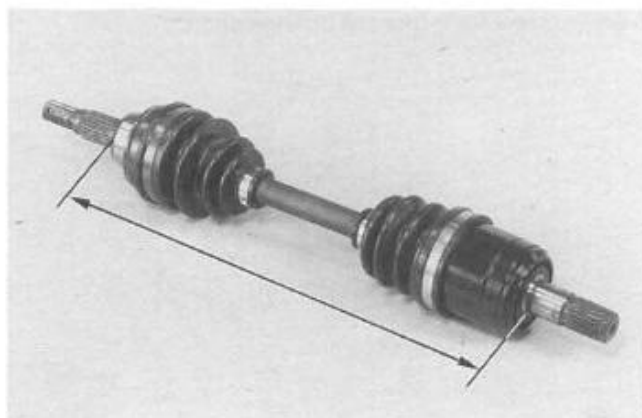
FRONT DRIVING MECHANISM

Adjust the length of the drive shaft to the figure given below.

DRIVE SHAFT LENGTH:

Right: 360 – 370 mm (14.2 – 14.6 in)

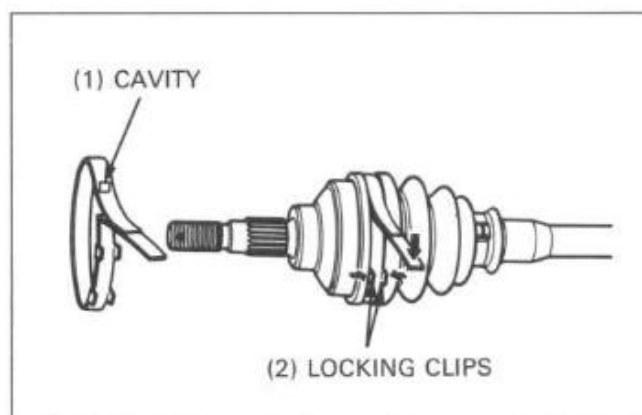
Left: 320 – 330 mm (12.6 – 13.0 in)



Install the bands with their tabs facing rearward.

Secure the new boot bands as follows:

1. Bend down the tab of the boot band.
2. Secure the bent down tab with the locking clips and tap them with a plastic hammer.



Install a new stop ring in the groove on the inboard joint.

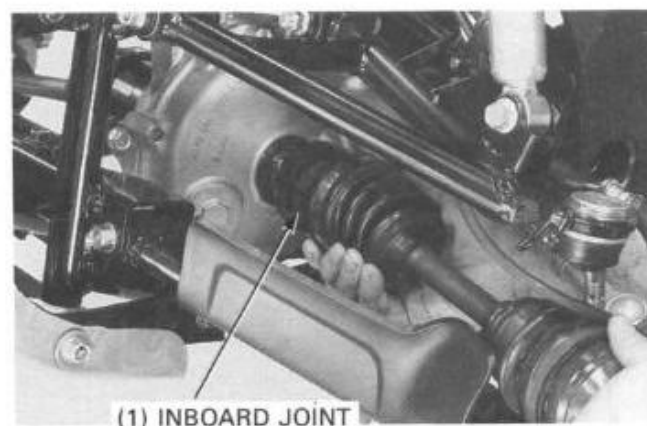
Apply molybdenum disulfide grease to the splines of the inboard joint.



INSTALLATION

Install the drive shaft in the differential while holding the inboard joint.

After installing, pull the joint a little to make sure that the stop ring is locked in the differential side gear groove.



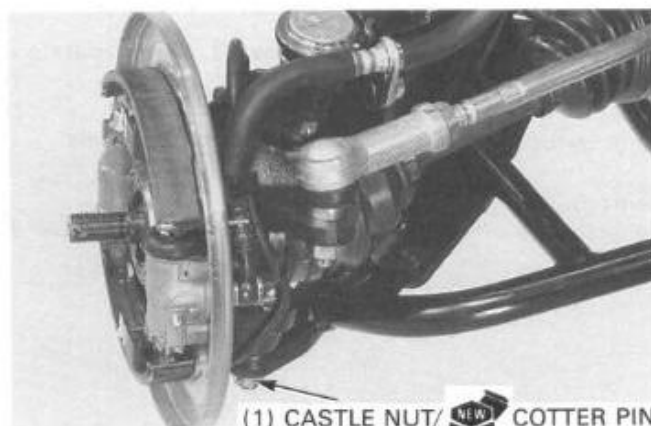
Install the knuckle/brake panel assembly.
Tighten the castle nut to the specified torque.

TORQUE: 30 – 36 N·m (3.0 – 3.6 kg·m, 22 – 26 lb·ft)

Install a new cotter pin.

Install the following:

- Front brake drum (page 14-15)
- Front wheel (page 12-3)



FRONT DIFFERENTIAL

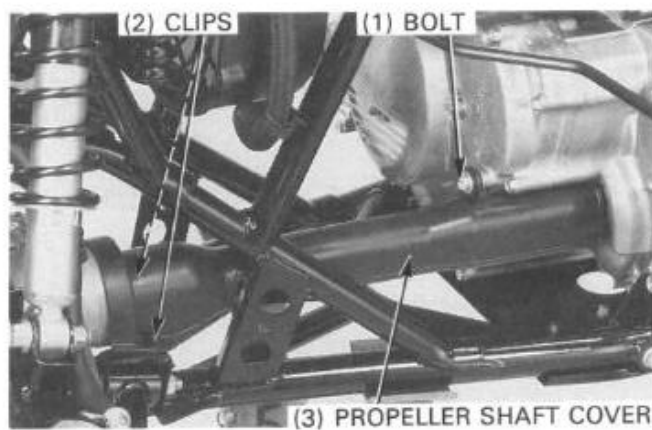
REMOVAL

Drain the front differential oil (page 3-13).

Remove the following:

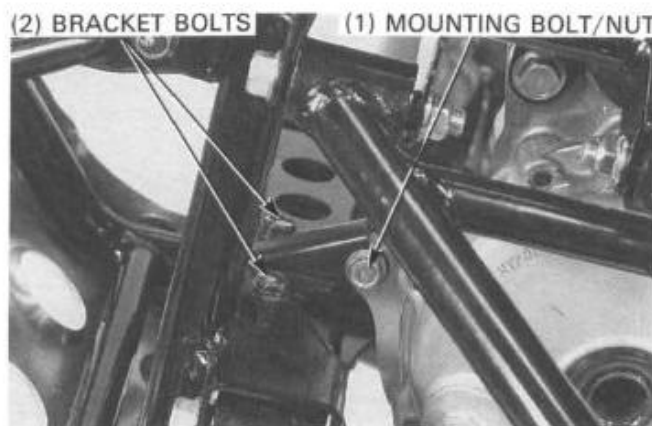
- Air vent tube
- One front drive shaft (page 15-3)
- Front fender (page 2-5)

Remove the bolt, retaining clips and propeller shaft cover.

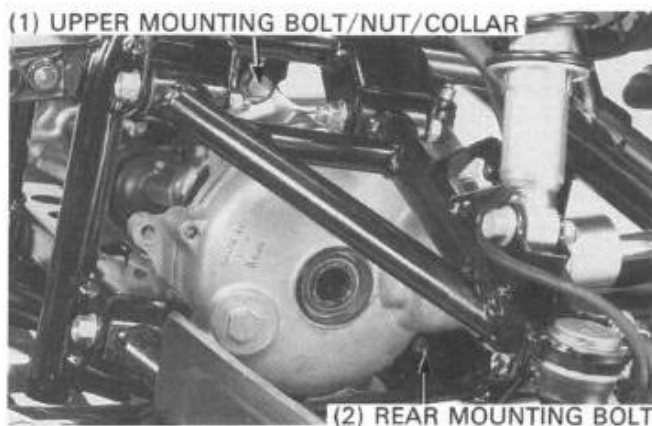


Remove the following:

- Front differential mounting bolt and nut
- Front differential mounting bracket bolts and bracket



- Upper mounting bolt, nut and collar
- Rear mounting bolt



FRONT DRIVING MECHANISM

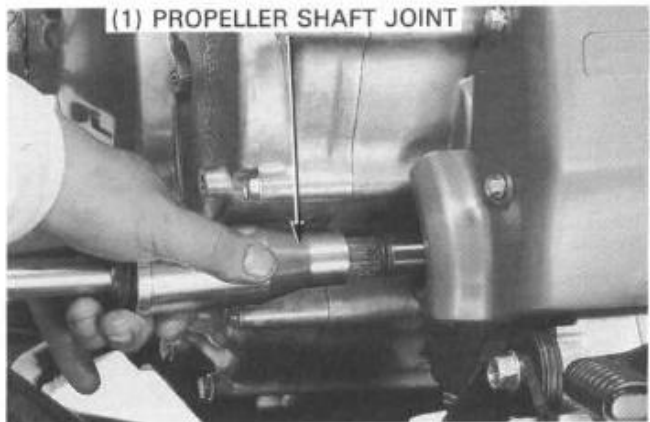
Push the front differential forward.

Pull the propeller shaft joint forward, then separate the propeller shaft from the engine.

Remove the propeller shaft from the front differential.

Remove the front differential.

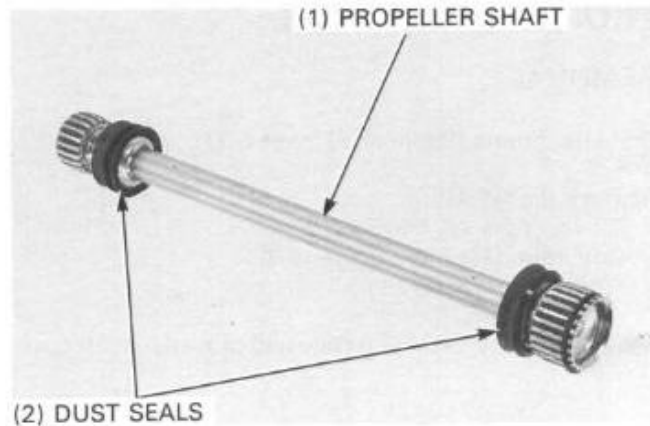
Separate the other drive shaft from the differential as you remove it.



INSPECTION

Check the propeller shaft for wear or damage.

Check the dust seals for wear or damage, replace if necessary.



Turn the differential drive pinion joint with your finger; it should turn smoothly and quietly.

Inspect the following if the drive pinion does not turn smoothly and quietly.

- Differential case
- Ring gear bearings
- Drive pinion
- Ring gear

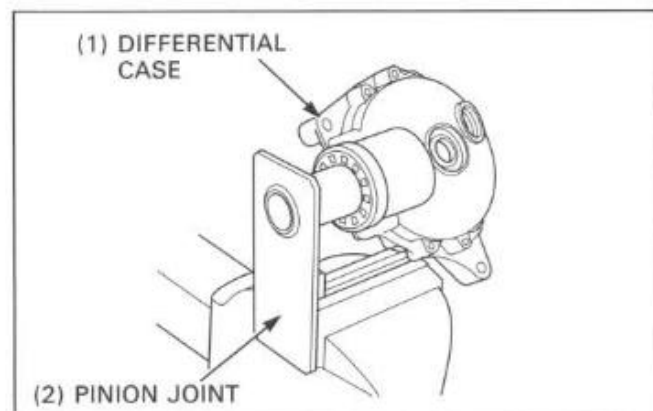
Proceed with the detailed inspection procedures that follow and replace faulty parts/assemblies as required.



BACKLASH INSPECTION

Remove the oil filler cap.

Set the differential case on the vise and hold the pinion joint as shown.



Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Install the differential inspection attachment into the right side of differential gear and rotate the differential assembly/ring gear by turning the differential inspection tool by hand until gear slack is taken up.

Turn the ring gear back and forth to read backlash.

STANDARD: 0.05 – 0.30 mm (0.002 – 0.012 in)

SERVICE LIMIT: 0.40 mm (0.016 in)

TOOL:

Differential inspection tool 07KMK – HC50101 or
07KMK – HC5010A (U.S.A. only)

Remove the dial indicator.

Turn the ring gear and measure the backlash.

Repeat this procedure once more.

Compare the difference of the three measurements.

DIFFERENCE OF MEASUREMENT

SERVICE LIMIT: 0.25 mm (0.010 in)

If the difference in measurements exceeds the limit it indicates that either the bearing is not installed squarely, or the case is deformed.

Inspect each bearing and case.

If backlash is too small, replace the ring gear left side spacer with a thicker one.

Backlash is changed by about 0.06 mm (0.002 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACERS:

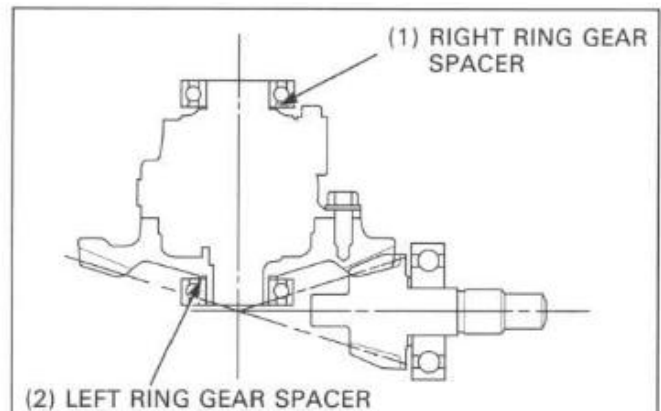
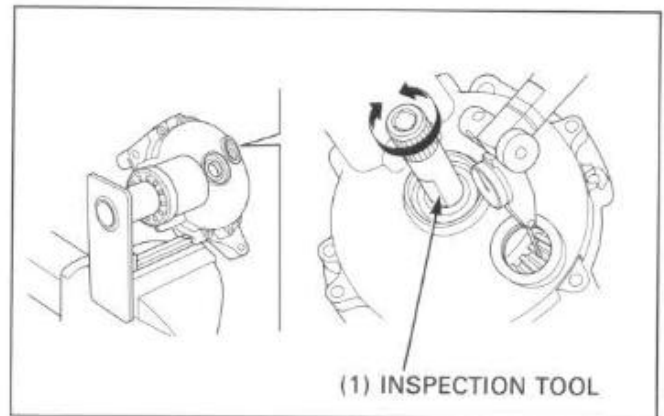
Twenty-three spacers (from A to W), are available in thickness intervals of 0.05 mm.

- Standard: 1.00 mm (0.039 in)
- Thinnest: 0.50 mm (0.020 in)
- Thickest: 1.60 mm (0.063 in)

Change the right side spacer and equal thickness and opposite amount of what the left side spacer was changed; if the left spacer was replaced with a 0.10 mm (0.004 in) thicker spacer, replace the right spacer with one that is 0.10 mm (0.004 in) thinner.

DIFFERENTIAL CASE DISASSEMBLY

Remove the cover bolts in 2 - 3 steps in a crisscross pattern to prevent differential case warpage.



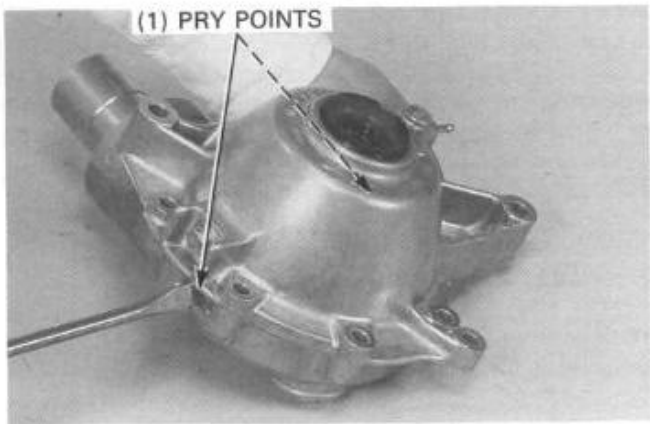
(1) 10mm BOLTS



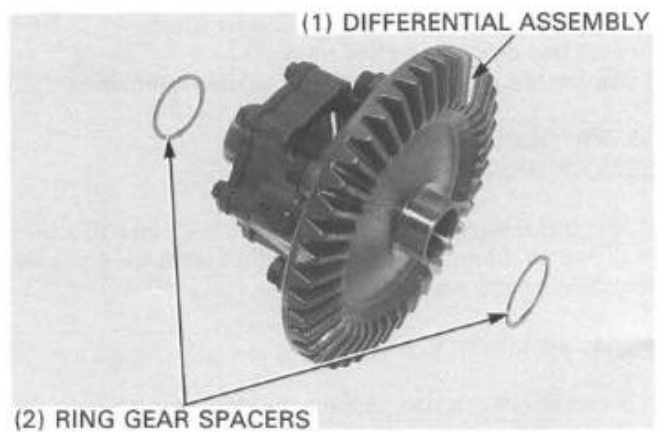
(2) 8 mm BOLTS

FRONT DRIVING MECHANISM

Carefully pry the cover off the case using a screwdriver at the pry points as shown.



Remove the differential assembly and the adjustment spacers from the differential case.



BEARING INSPECTION

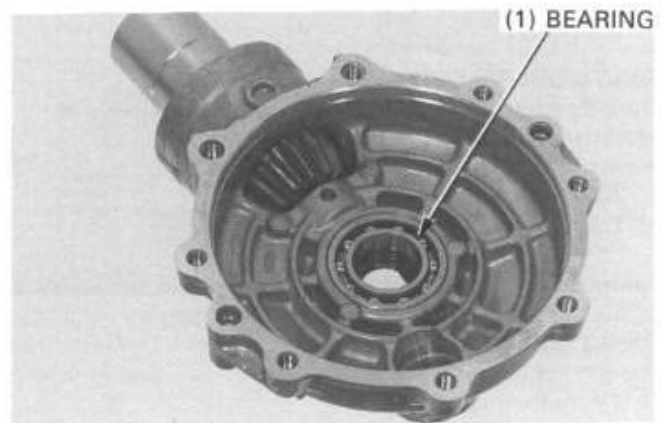
Turn the inner race of each ring gear bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the outer race fit tightly in the case and cover. Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the case or cover.

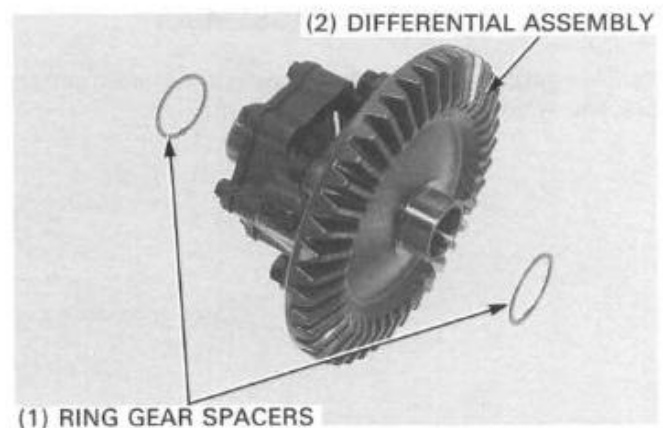
For ring gear bearing replacement, go to page 15-19.

For drive pinion removal and disassembly, go to page 15-17.

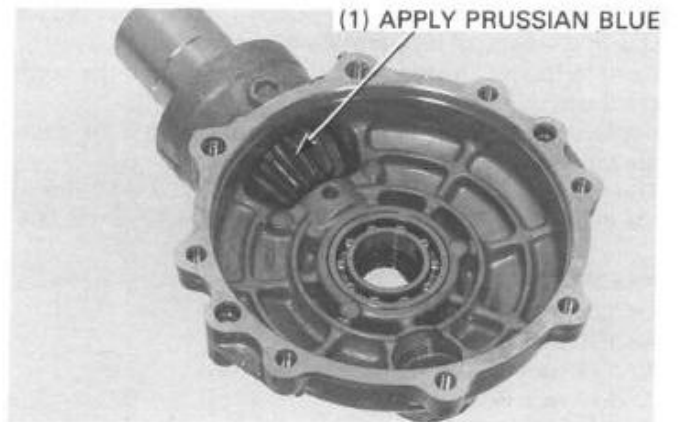


GEAR TOOTH CONTACT PATTERN CHECK

Install the original ring gear spacers onto the differential assembly.



Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check.

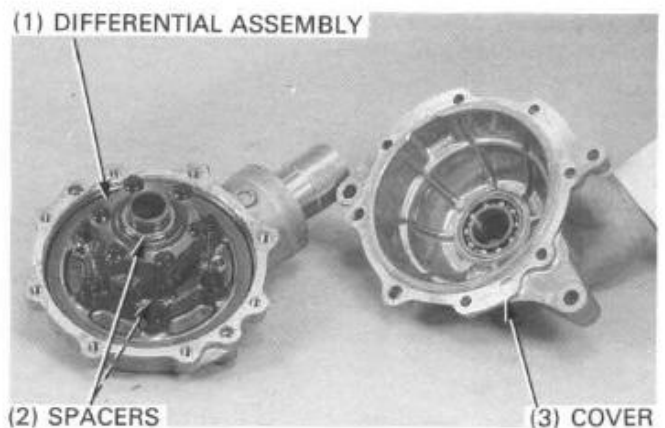


Clean all sealing material off the mating surfaces of the differential case and cover.

NOTE

- Keep dust and dirt out of the differential case.
- Be careful not to damage the mating surface.

Install the differential assembly with the spacers into the differential case.



Tighten the cover bolts in 2 or 3 steps until the cover evenly touches the gear case. Then, while rotating the drive pinion, tighten the bolts to the specified torque in 2 - 3 steps in a crisscross pattern.

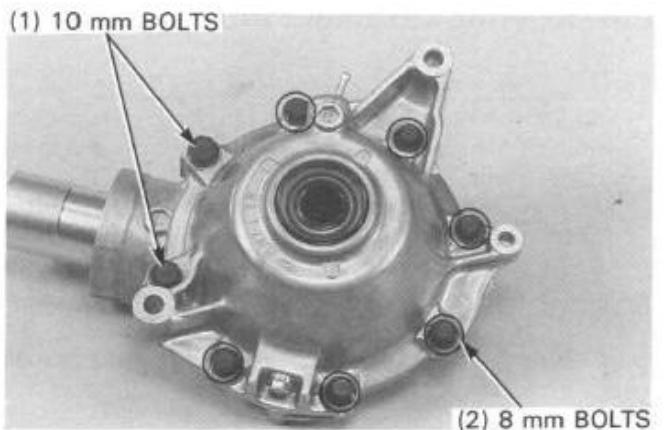
TORQUE:

10mm bolt: 50 N·m (5.0 kg-m, 36 lb-ft)

8 mm bolt: 26 N·m (2.6 kg-m, 19 lb-ft)

CAUTION

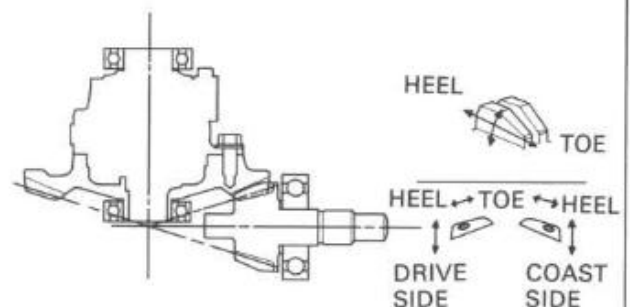
- It is important to turn the pinion while tightening the bolts. If the ring gear spacer is too thick, the gears will lock after only light tightening.



Remove the oil filler cap from the differential case. Rotate the ring gear several times in both directions of rotation. Check the gear tooth contact pattern through the oil filler hole. The pattern is indicated by the Prussian Blue applied to the pinion before assembly.

Contact is normal if the Prussian Blue is transferred to the approximate center but slightly to the heel side of each tooth and to the flank side.

NORMAL:



FRONT DRIVING MECHANISM

If the patterns are not correct, remove and replace the pinion spacer with one of an alternate thickness.

Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.

Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side.

The pattern will shift about 0.5 – 1.0 mm (0.02 – 0.04 in) when the thickness of the spacer is changed by 0.12 mm (0.005 in).

PINION SPACERS:

L: 1.64 mm (0.064 in)

M: 1.70 mm (0.067 in)

N: 1.76 mm (0.069 in)

A: 1.82 mm (0.072 in)

B: 1.88 mm (0.074 in)

C: 1.94 mm (0.076 in)

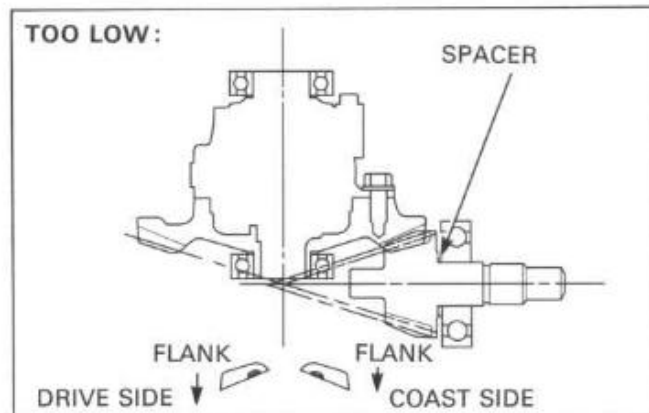
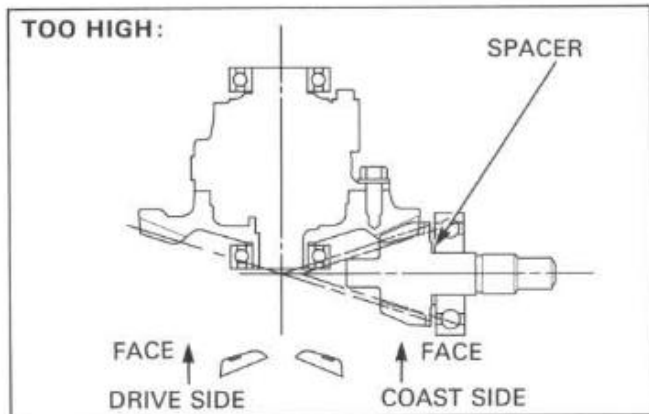
D: 2.00 mm (0.079 in)

E: 2.06 mm (0.081 in)

F: 2.12 mm (0.083 in)

G: 2.18 mm (0.086 in)

For pinion spacer replacement, go to page 15-17.



DIFFERENTIAL ASSEMBLY INSPECTION

NOTE

- This inspection is to be done for one clutch pack at a time. The inspection must be done for each clutch pack (plate, discs, springs and seat).
- Always install each clutch pack assembly in its original location in the differential.
- Do not interchange components between the two clutch pack assemblies.

Remove one of the differential caps and remove one of the clutch pack assemblies (page 15-15).

Inspect the clutch pack assembly (page 15-16).

Then, install the differential cap, leaving out the clutch pack you removed.

Install the differential inspection tools to both sides of the differential.

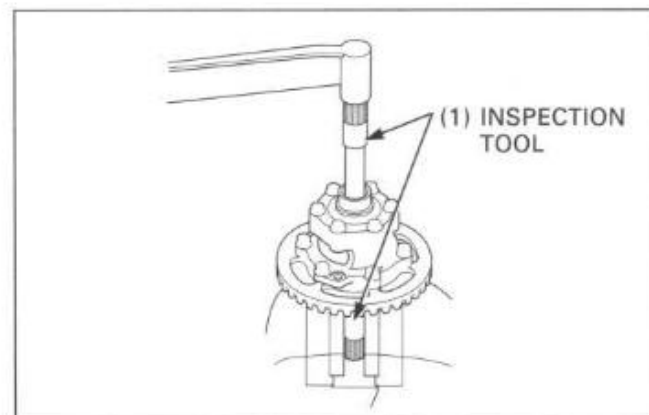
TOOL:

Differential inspection tool 07KMK-HC50101 or
07KMK-HC5010A (U.S.A. only)

Hold the chamfered side with a bench vise as shown.

Place a torque wrench on the other tool and measure the limited slip torque, using the special tool.

SLIP TORQUE: 17 – 25 N·m (1.7 – 2.5 kg-m, 12 – 18 lb-ft)



If the slip torque is out of specification, the clutch spring seat is worn.

Remove the inspection tools.

Remove the differential cap and the clutch pack from the differential.

Select a clutch spring seat of the required thickness.

If the slip torque is below specification, replace the spring seat with a thicker one.

If the slip torque is above specification, replace the spring seat with a thinner one.

Select the clutch spring seat from the list below.

A: 1.0 mm (0.039 in)

B: 1.2 mm (0.047 in)

C: 1.4 mm (0.055 in)

D: 1.6 mm (0.063 in)

E: 1.8 mm (0.071 in)

Recheck the slip torque.

Next, inspect the remaining clutch pack assembly in the same way.

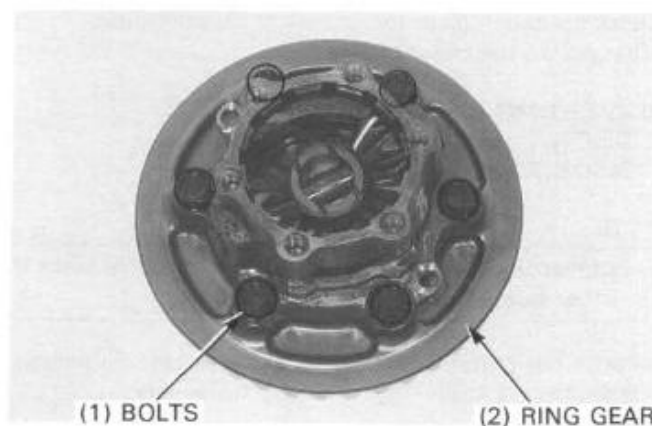
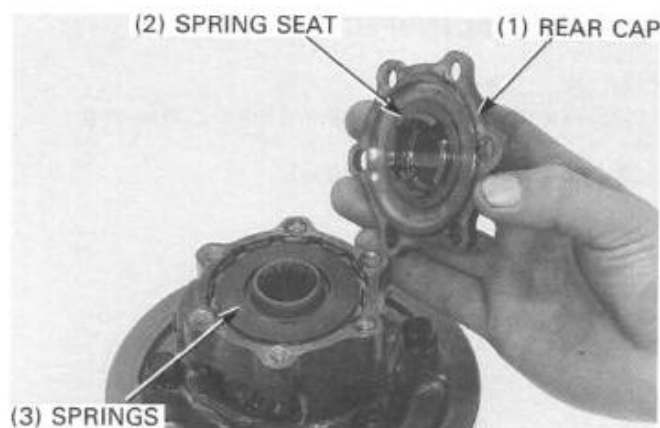
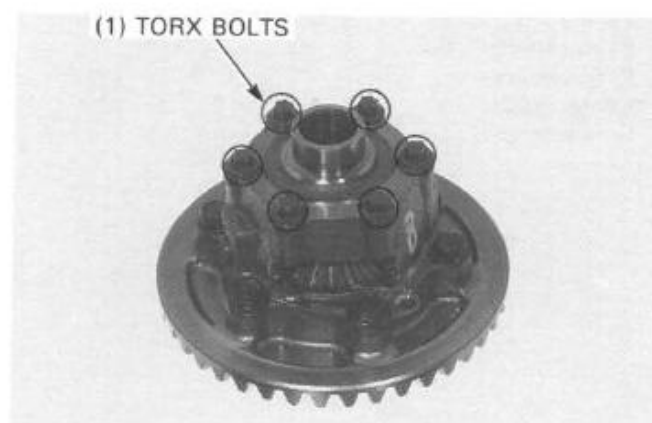
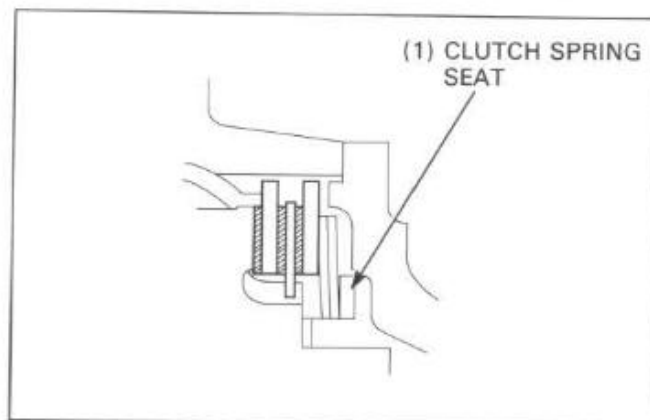
DIFFERENTIAL DISASSEMBLY

Remove the following:

- Torx bolts

- Differential case rear cap
- Clutch pack (spring seat, springs, discs and plate)
- Side gear
- Washer

- Bolts
- Ring gear

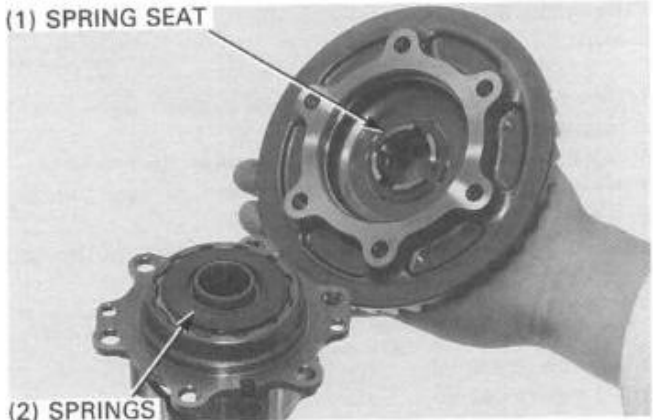


FRONT DRIVING MECHANISM

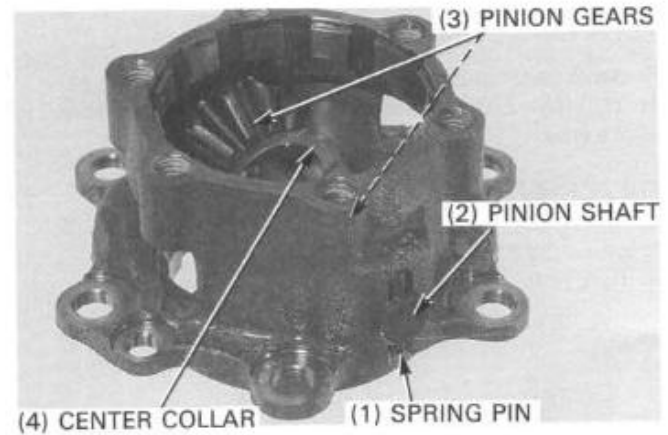
- Clutch pack (spring seat, springs, discs and plate)
- Side gear
- Washer

- Spring pin
- Pinion shaft
- Pinion gears
- Center collar
- Side washers

(1) SPRING SEAT



(2) SPRINGS

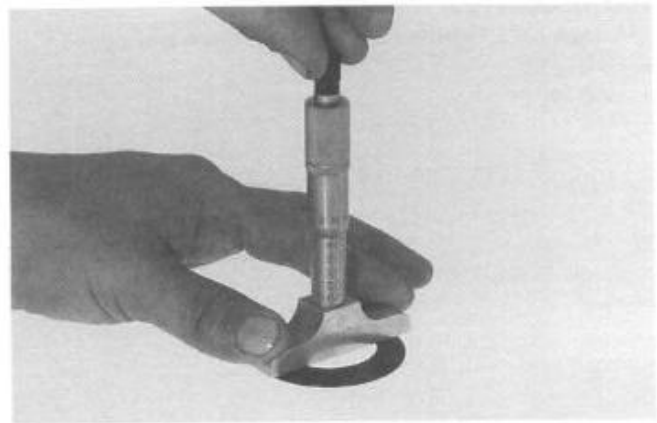


DIFFERENTIAL INSPECTION

CLUTCH

Measure and record the height of the clutch spring.

SERVICE LIMIT: 2.5 mm (0.10 in)



Check the clutch discs for scoring or discoloration.
Measure the thickness of each disc.

SERVICE LIMITS:

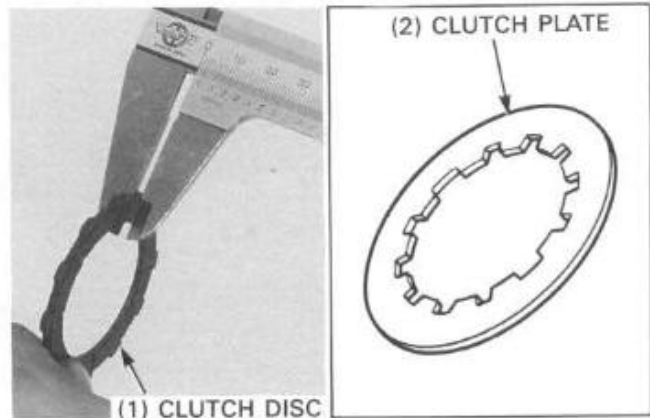
DISC A: 2.4 mm (0.09 in)

DISC B: 2.1 mm (0.08 in)

NOTE

- Clutch disc B has two faces: one side is a steel plate, the other side is a friction surface disc.

Inspect the clutch plate surface for excessive scores or discoloration (purple) and replace if necessary.



PINION

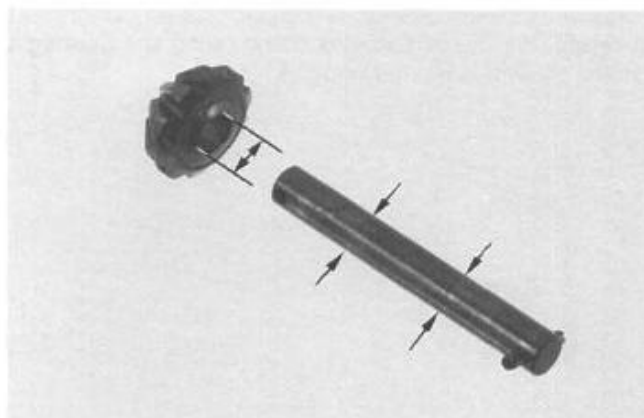
Measure the pinion gear I.D. and pinion shaft O.D.

SERVICE LIMITS:

PINION GEAR I.D.: 12.05 mm (0.474 in)

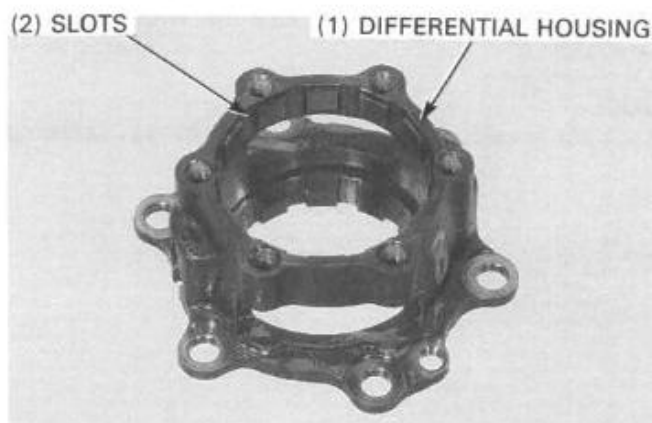
PINION SHAFT O.D.: 11.75 mm (0.463 in)

Check the side washer for wear or damage.



DIFFERENTIAL HOUSING

Check the slots for wear or damage.



DRIVE PINION REMOVAL

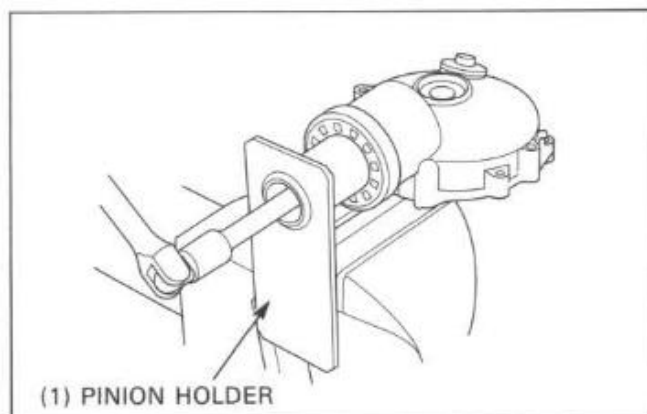
Install the pinion holder on the pinion joint and secure in a vise as shown.

TOOL:

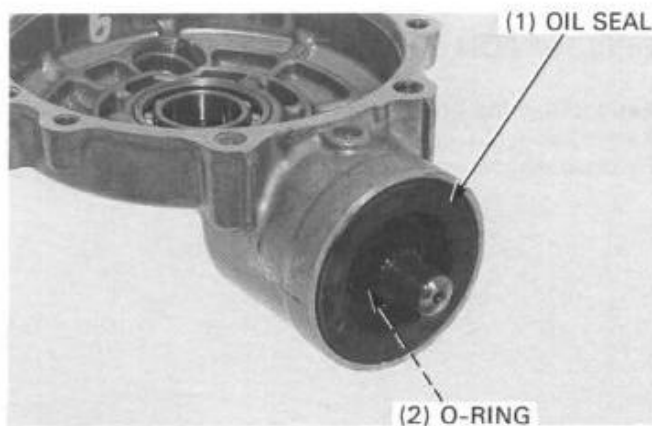
Pinion holder

07SMB - HM70200

Remove the pinion joint nut, then remove the pinion holder and pinion joint.

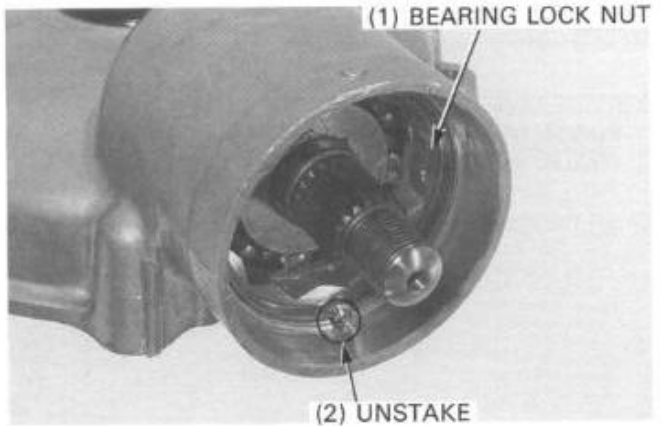


Remove the oil seal and O-ring.



FRONT DRIVING MECHANISM

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

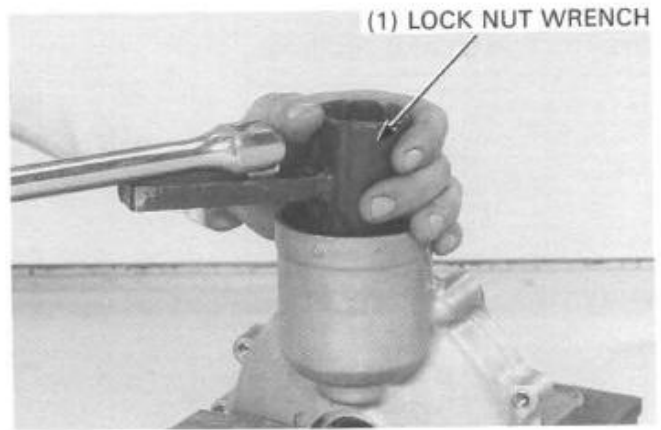


Remove the pinion bearing lock nut with the lock nut wrench.

TOOL :

Lock nut wrench, 30X64 mm

07916 - MB00002



Install the pinion puller attachment tool onto the differential case.

Screw the shaft puller onto the threads of the drive pinion. Turn the 23 mm special nut counterclockwise with a 23 mm wrench while holding the shaft with a 17 mm wrench to remove the drive pinion from its housing. Remove the drive pinion assembly using the special tools.

TOOLS:

Pinion puller set

07HMC - MM80101

- Shaft puller

07931 - ME40000

- Pinion puller base

07HMC - MM80110

or U.S.A. only:

Shaft puller

07931 - ME4010B

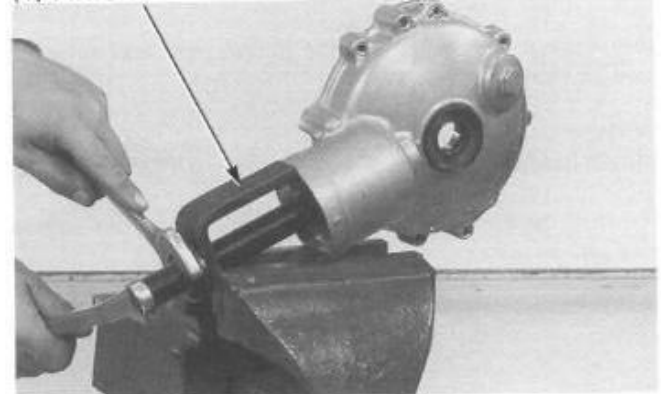
Special nut

07931 - HB3020A

Pinion puller base "A"

07HMC - MM8011A

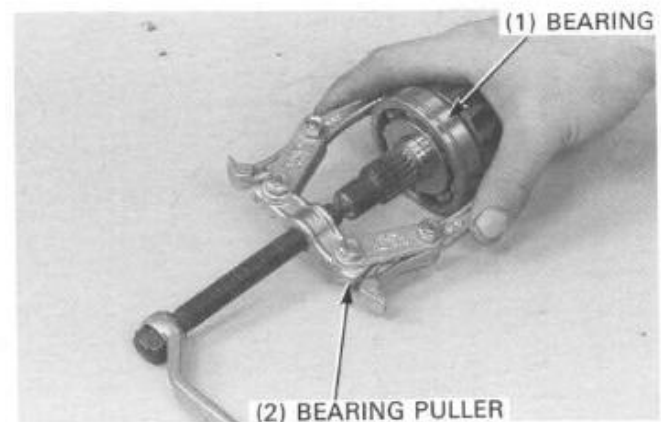
(1) PINION PULLER SET



DRIVE PINION DISASSEMBLY/ASSEMBLY

Pull the bearing off the shaft with a commercially available bearing puller.

Remove the pinion adjustment spacer.



To reassemble, first install the pinion spacer.

NOTE

- When the gear set, pinion bearing and/or differential case has been replaced, use a 2.0 mm (0.08 in) thick spacer.

Apply #80 gear oil to the bearing.

Press the bearing onto the drive pinion with its groove side facing out using the special tools as shown.

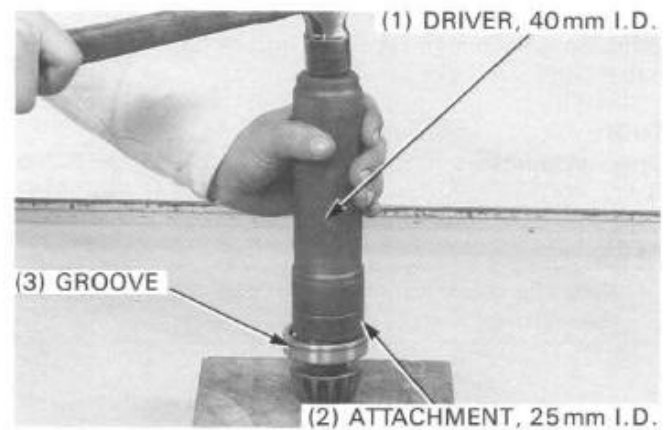
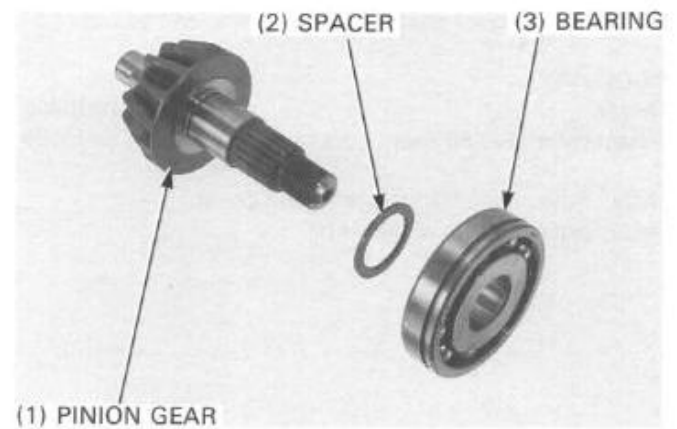
TOOLS:

Driver, 40 mm I.D.

07746 - 0030100

Attachment, 25 mm I.D.

07746 - 0030200



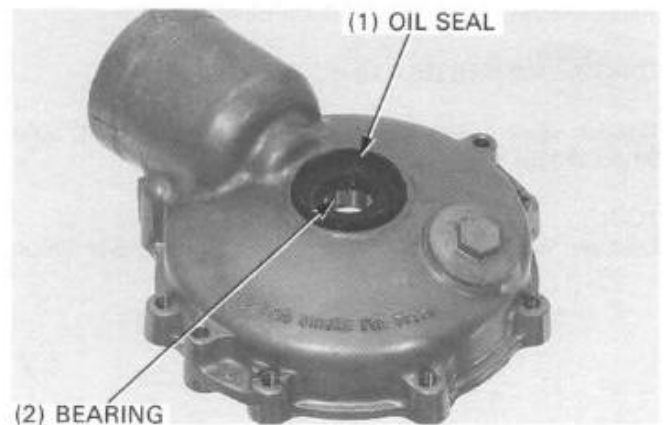
CASE BEARING REPLACEMENT

NOTE

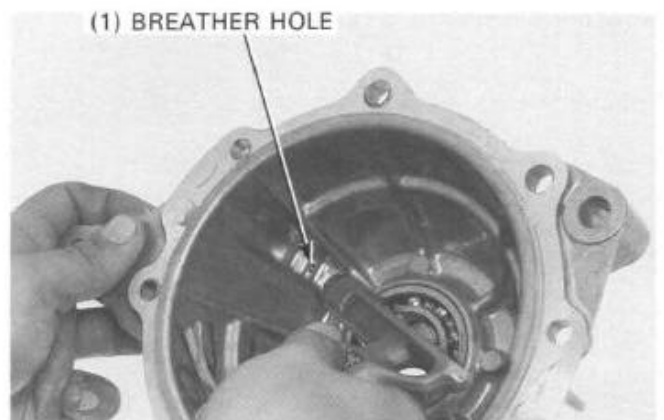
- The drive pinion needle bearing cannot be removed. Replace the differential case if the bearing is damaged.

Remove the oil seal.

Drive the ring gear bearing out of the case and cover.



Blow compressed air through the breather hole in the differential cover.



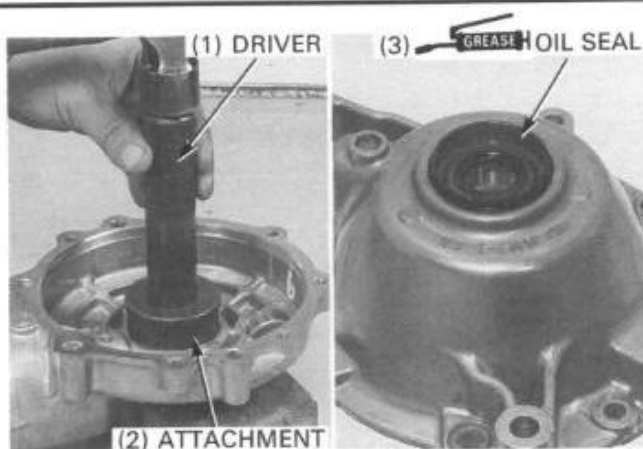
FRONT DRIVING MECHANISM

Drive the ring gear bearing into the case and cover.

TOOLS :

Driver 07749 - 0010000
Attachment, 52X55 mm 07746 - 0010400

Install new oil seals in the case and cover.
Apply grease to the oil seal lips.



DRIVE PINION INSTALLATION

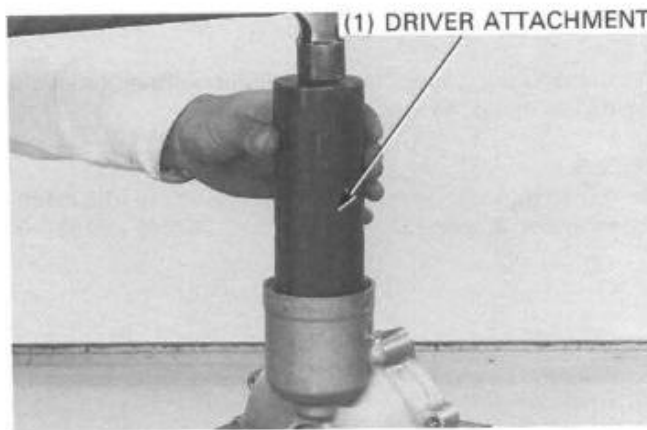
Place the drive pinion assembly into its housing and drive it into the differential case.

TOOL:

Driver attachment 07965 - KE80200 or
07947 - KA50100

NOTE

- Keep the driver centered with the bearing outer race during installation.



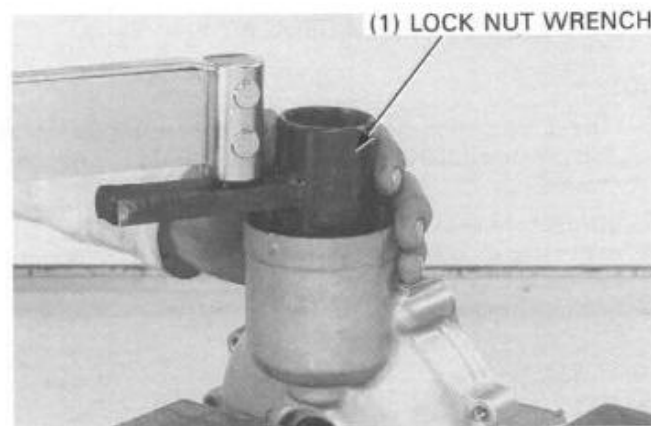
Install and tighten the new pinion bearing lock nut.

TORQUE: 100 N·m (10.0 kg-m, 72 lb-ft)

Wrench scale reading: 91 N·m (9.1 kg-m, 66 lb-ft) using a 50 cm (20 in) long torque wrench

TOOL :

Lock nut wrench, 30X64 mm 07916-MB00002

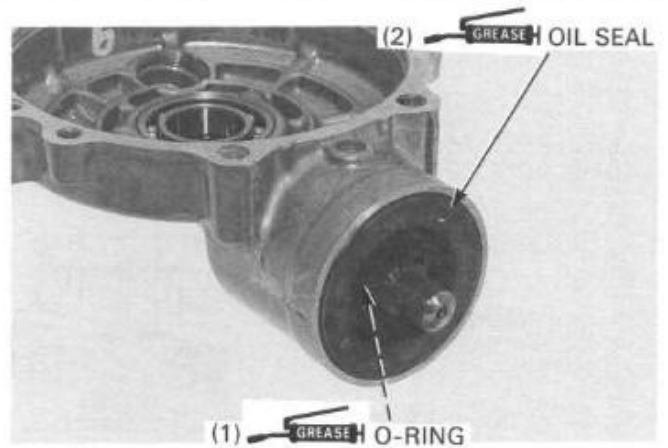


Stake the pinion bearing lock nut.



Apply grease and install the O-ring onto the pinion shaft.

Apply grease to the new drive pinion oil seal lips.
Install the new drive pinion oil seal on the case.



Apply a locking agent to the pinion threads.
Install the pinion joint and joint nut.

Attach the pinion holder on the pinion joint and secure in a vise.

Tighten the pinion joint nut to the specified torque.

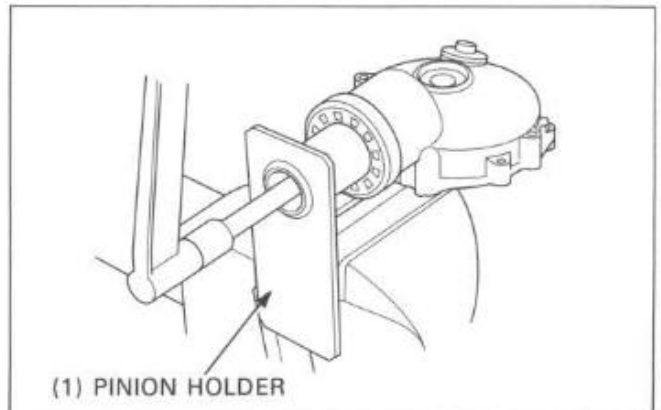
TOOL:

Pinion holder

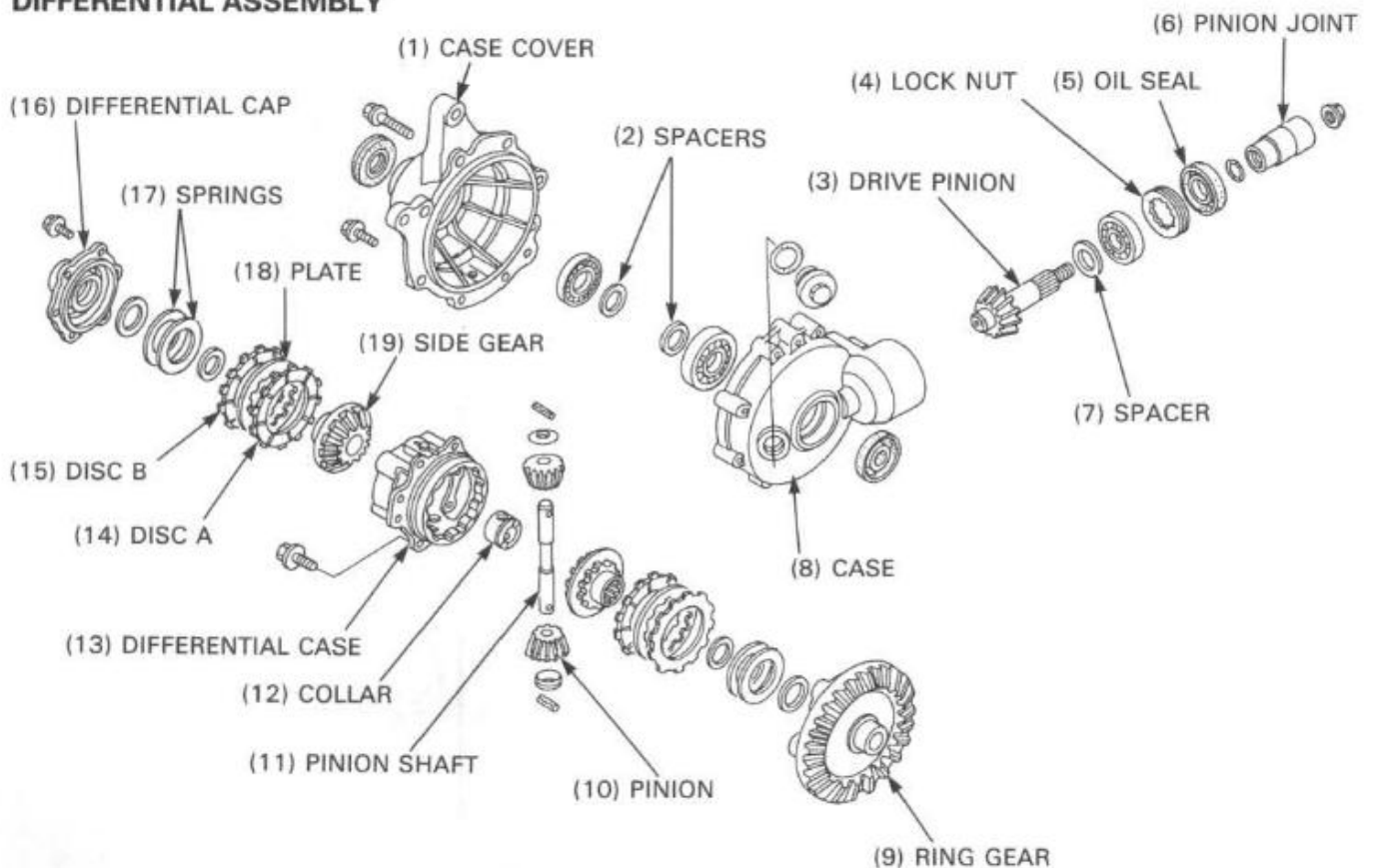
07SMB - HM70200

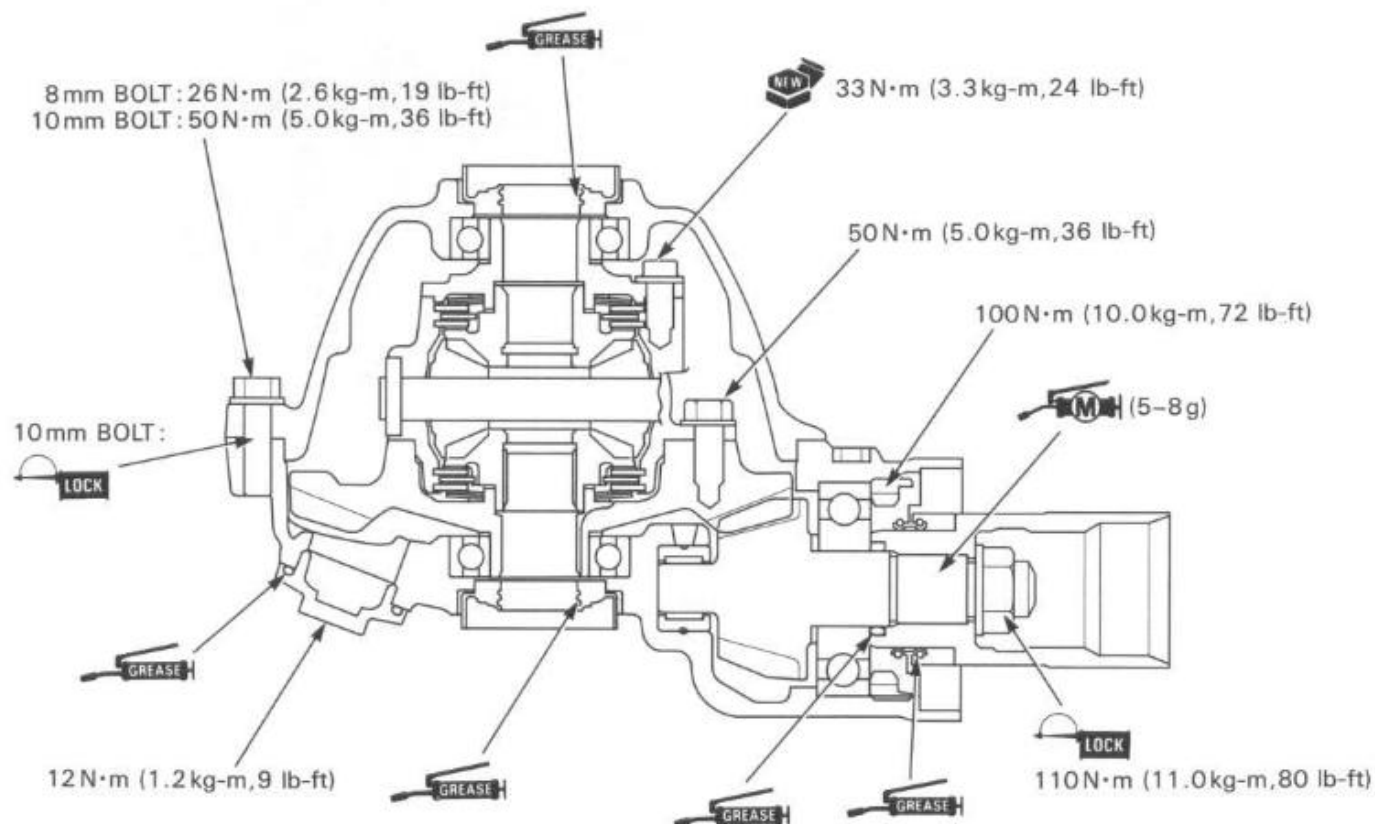
TORQUE: 110 N·m (11.0 kg-m, 80 lb-ft)

Remove the pinion holder.



DIFFERENTIAL ASSEMBLY

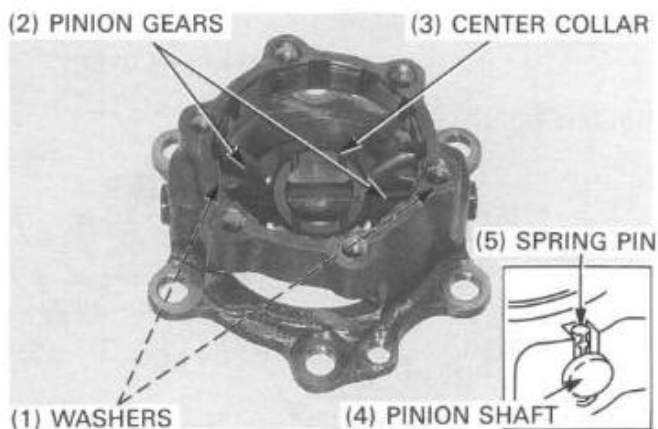




Install a new spring pin into the pinion shaft.

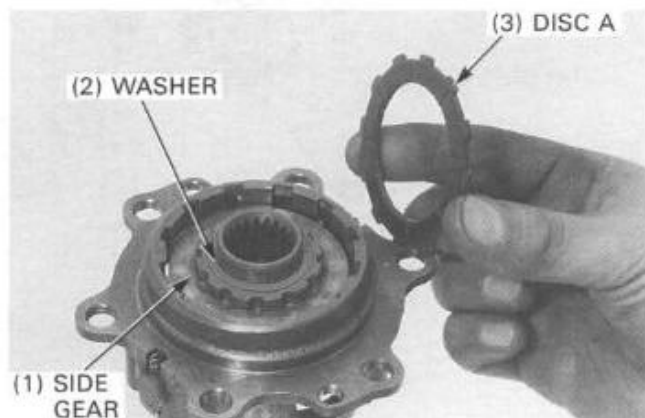
Install the washers, pinion gears and center collar into the housing.

Insert the pinion shaft and install a new spring pin securely.



Install the following:

- Side gear
- Washer
- Clutch disc A



Install the following:

- Clutch plate
- Clutch disc B

NOTE

- Install the clutch disc B with the friction surface lining facing inside.

- Clutch springs
- Spring seat
- Ring gear

Loosely install the bolts.

Install the outer clutch pack in the same manner.

Install the front differential cap.

Temporarily install the drive shaft to center the side gear, and differential cap.

Install the new torx bolts.

Tighten the bolts to the specified torque.

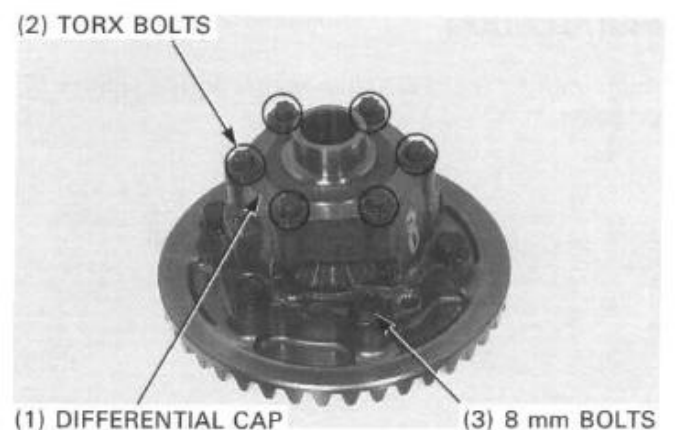
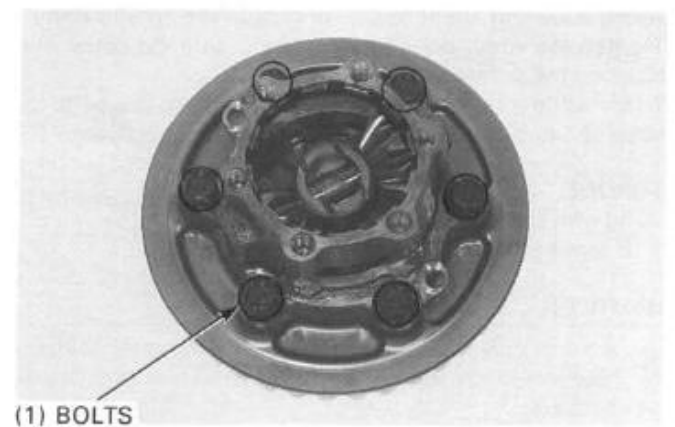
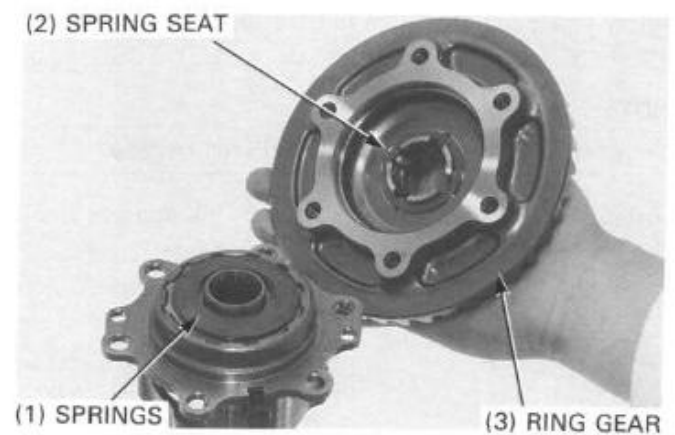
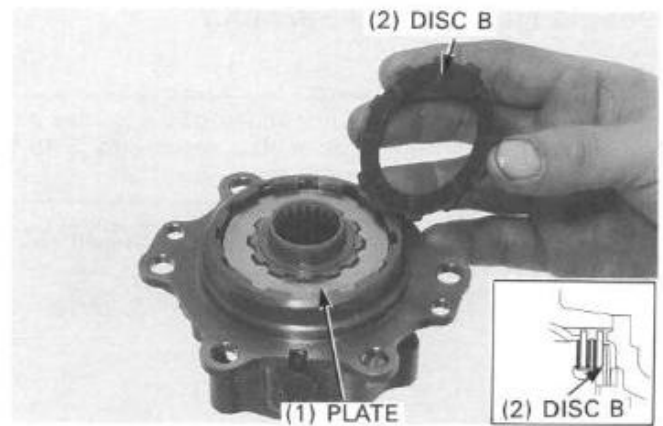
TORQUE:

Torx bolt: 33 N·m (3.3 kg-m, 24 lb-ft)

8 mm bolt: 50 N·m (5.0 kg-m, 36 lb-ft)

NOTE

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



FRONT DRIVING MECHANISM

DIFFERENTIAL CASE ASSEMBLY

NOTE

- When the bearing, gear set and/or gear case has been replaced, check the tooth contact pattern (page 15-12) and gear backlash (page 15-10).

Install the proper ring gear spacers onto the differential assembly.

Apply liquid sealant to the mating surface of the gear case cover.

NOTE

- Keep dust and dirt out of the differential case.

Install the differential assembly with the spacers into the differential case.

Apply a locking agent to the threads of the 10 mm bolts. Tighten the cover bolts in 2 – 3 steps until the cover evenly touches the differential case. Then, while rotating the drive pinion, tighten the bolts to the specified torque in 2 – 3 steps in a crisscross pattern.

TORQUE:

10 mm bolt: 50 N·m (5.0 kg-m, 36 lb-ft)

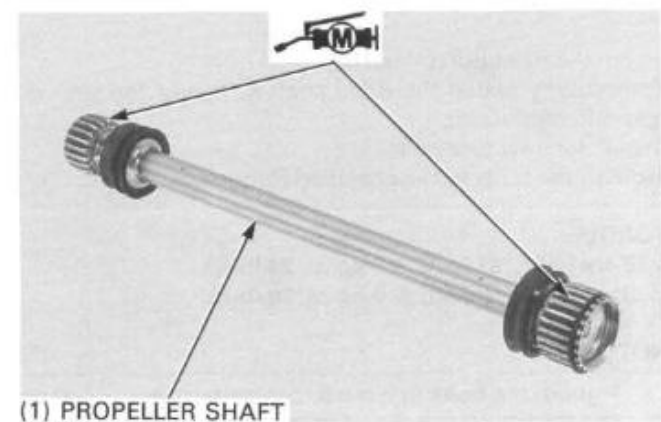
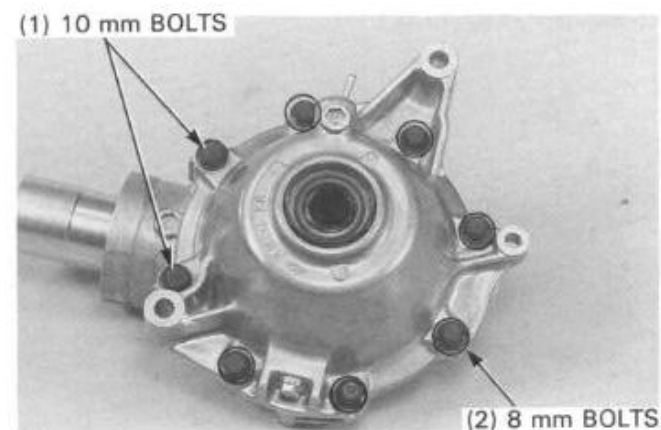
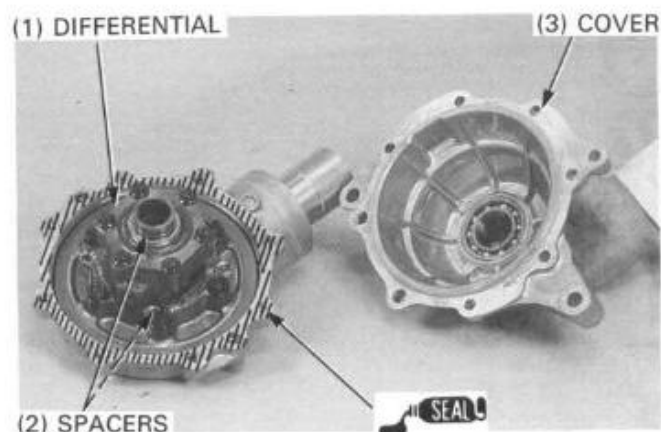
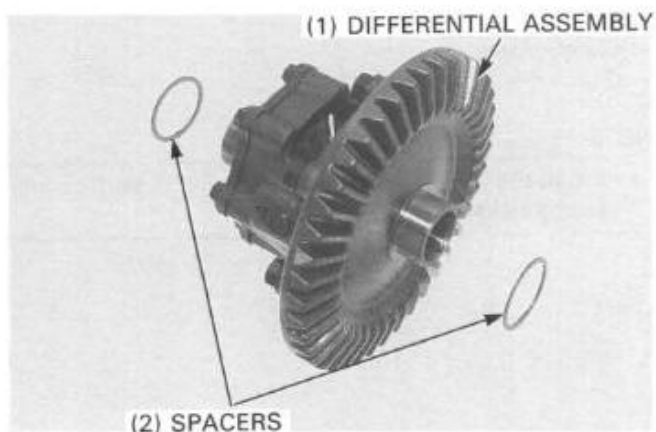
8 mm bolt: 26 N·m (2.6 kg-m, 19 lb-ft)

CAUTION

- It is important to turn the pinion while tightening the bolts. If the ring gear spacer is too thick, the gears will lock after only light tightening.

INSTALLATION

Apply molybdenum disulfide grease to the splines of the propeller shaft.

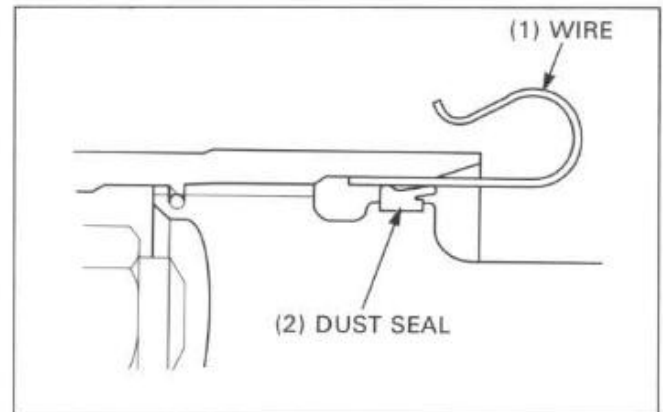
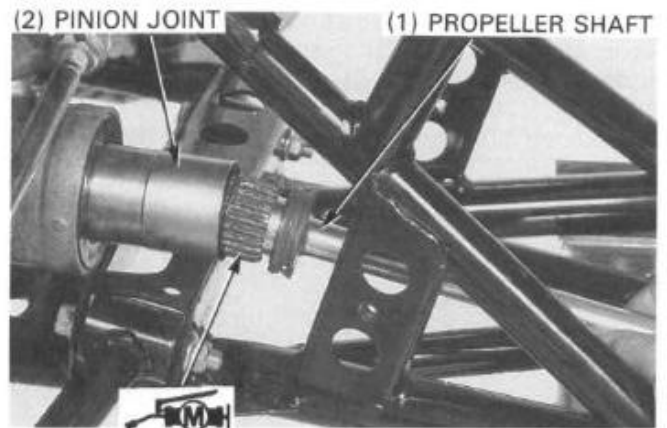


Position the front differential forward in the chassis.
Do not install the mounting bolts.

Apply 5 - 8 g of molybdenum disulfide grease to the pinion joint spline.
Install the propeller shaft into the pinion joint.

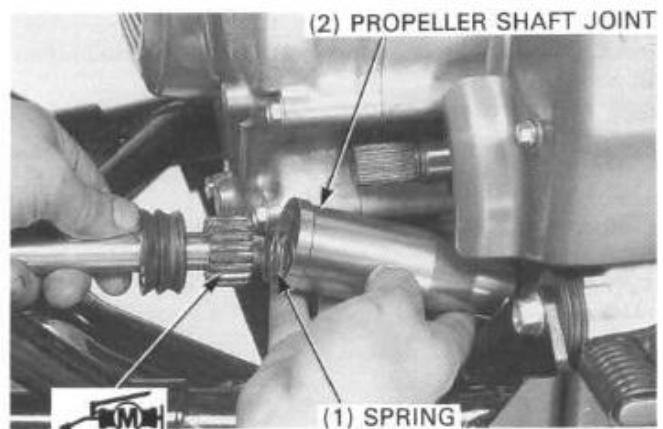
NOTE

- While installing the shaft, release the air from the pinion joint using a piece of wire as shown.
- Do not damage the dust seal when inserting the wire and shaft.
- Do not remove the wire until after installing the front differential mounting bolts.

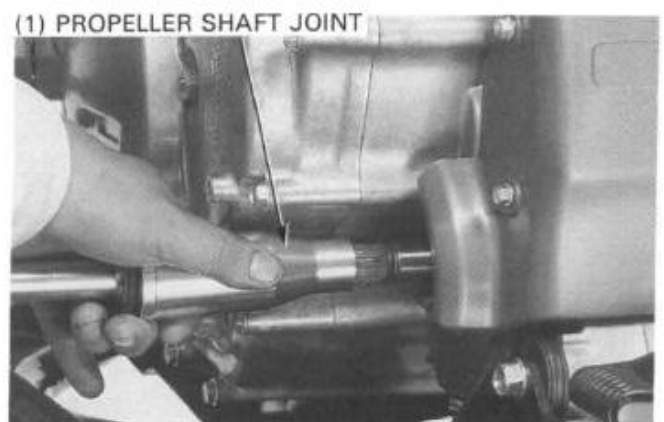


Install the O-ring on the final shaft.
Apply 5 - 8 g of molybdenum disulfide grease to the propeller shaft joint spline.
Push the front differential and propeller shaft slightly forward.

Install the spring and propeller shaft joint onto the shaft.



Connect the propeller shaft to the engine while pulling back the propeller shaft joint.
Rotate the shaft slightly if necessary to align the splines.

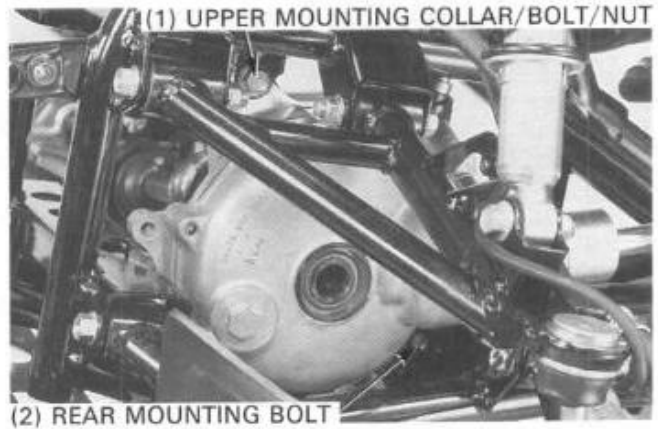


FRONT DRIVING MECHANISM

Install the upper mounting bolts with the upper mounting collar and nut in the location shown.
Install the rear mounting bolt.

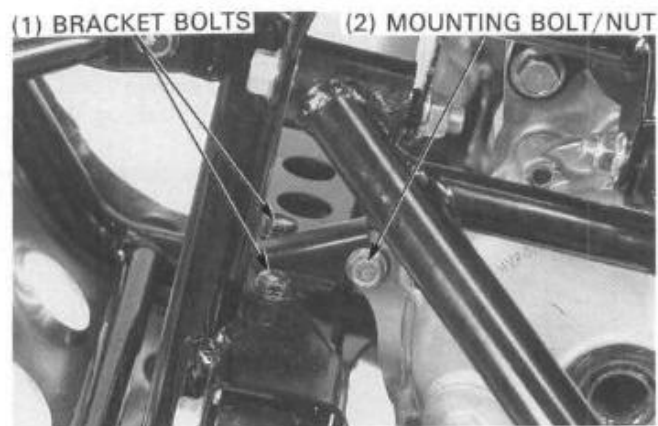
Tighten the differential mounting bolt and nuts.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)



Install the front mounting bracket and tighten the bracket bolts.
Install the front mounting bolt and nut.

TORQUE: 22 N·m (2.2 kg-m, 16 lb-ft)

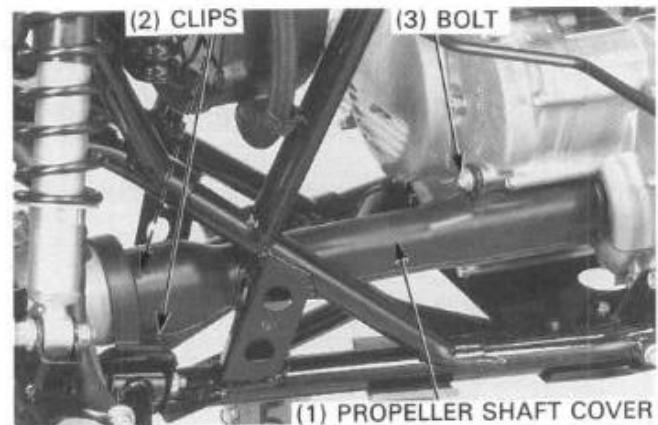


Install the propeller shaft cover.
Install the retaining clips and mounting bolt, then tighten the bolt securely.

Install the following:

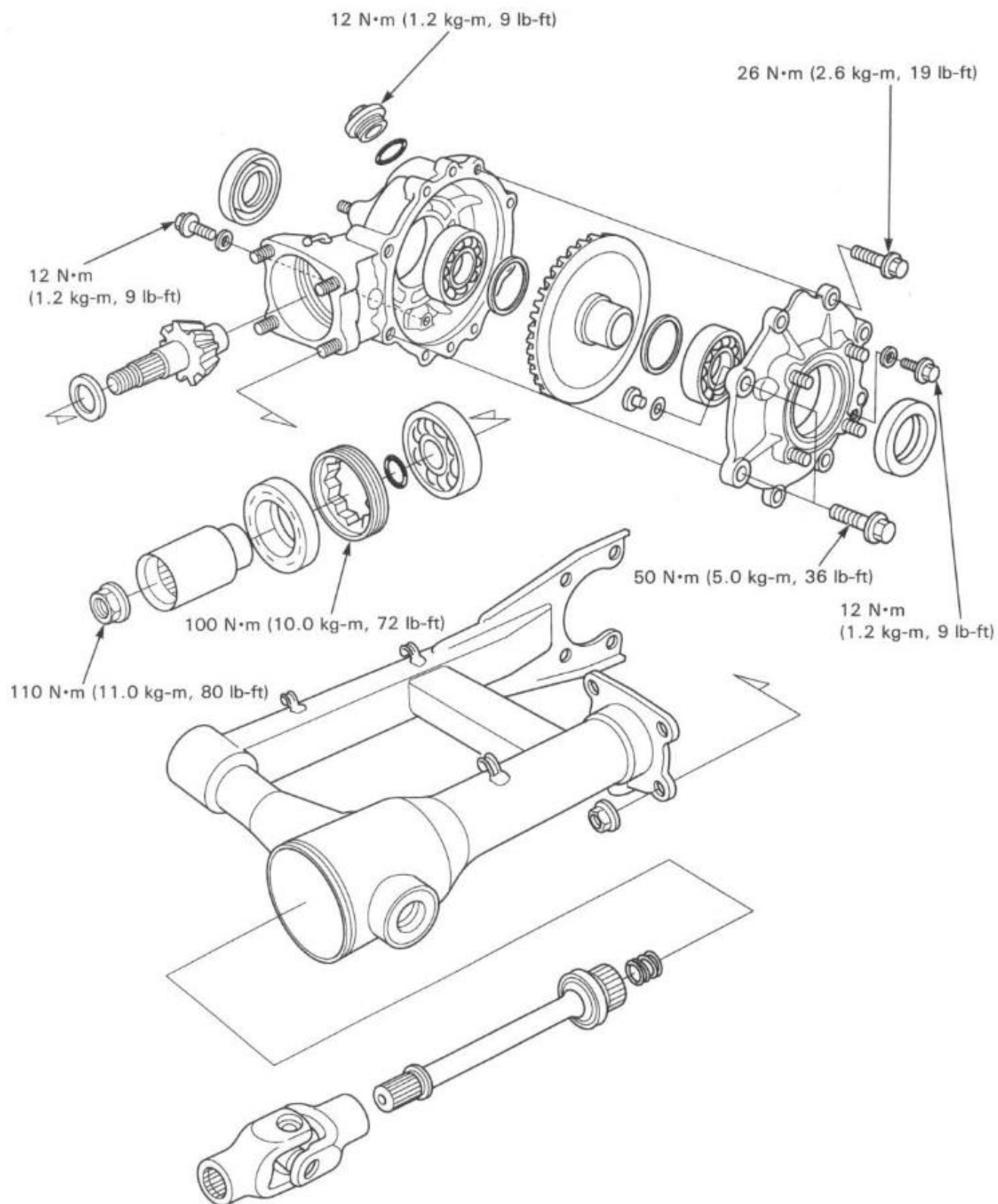
- Front drive shaft if removed
- Front fender (page 2-7)

Fill the front differential with the recommended oil (page 3-13).



MEMO

REAR DRIVING MECHANISM



16. REAR DRIVING MECHANISM

SERVICE INFORMATION	16-1	REAR FINAL DRIVE	16-6
TROUBLESHOOTING	16-2	REAR AXLE INSTALLATION	16-17
REAR AXLE REMOVAL	16-3		

SERVICE INFORMATION

GENERAL

- Replace all oil seals and O-rings whenever the rear differential assembly is disassembled.
- Check the tooth contact pattern and gear backlash when the rear differential bearing, gear set and/or gear case are replaced.

SPECIFICATIONS

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Rear axle runout			—	0.3 (0.12)
Rear final drive	Oil capacity	After draining	90 cc (3.04 US oz, 3.16 Imp oz)	—
		At disassembly	100 cc (3.38 US oz, 3.51 Imp oz)	—
	Recommended oil		Hypoid gear oil SAE #80	—
	Gear backlash		0.05 – 0.30 (0.002 – 0.012)	0.40 (0.016)

TORQUE VALUES

Gear case cover flange bolt, 8 mm	26 N•m (2.6 kg-m, 19 lb-ft)
10 mm	50 N•m (5.0 kg-m, 36 lb-ft)
Pinion joint nut	110 N•m (11.0 kg-m, 80 lb-ft)
Pinion bearing lock nut	100 N•m (10.0 kg-m, 72 lb-ft)
Gear case drain bolt	12 N•m (1.2 kg-m, 9 lb-ft)
Gear case cover oil cap	12 N•m (1.2 kg-m, 9 lb-ft)
Gear case cover oil check bolt	12 N•m (1.2 kg-m, 9 lb-ft)

TOOLS

Pinion holder	07SMB – HM70200	
Lock nut wrench, 30X64 mm	07916 – MB00002	
Pinion puller set	07HMC – MM80101	Not available in U.S.A.
– Shaft puller	07931 – ME40000	or 07931 – ME4010B and 07931 – HB3020A (U.S.A. only)
– Pinion puller base	07HMC – MM80110	or 07HMC – MM8011A (U.S.A. only)
Driver attachment	07965 – KE80200	or 07947 – KA50100 (U.S.A. only)
Driver	07749 – 0010000	
Attachment, 52 X 55 mm	07746 – 0010400	
Attachment, 62 X 68 mm	07746 – 0010500	
Pilot, 28 mm	07746 – 0041100	
Driver, 40 mm I.D.	07746 – 0030100	
Attachment, 25 mm I.D.	07746 – 0030200	

TROUBLESHOOTING

REAR FINAL DRIVE

Excessive noise

- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gear
- Oil level too low

REAR AXLE

Wobble or vibration in vehicle

- Axle not tightened properly
- Bent axle

Oil leak

- Oil level too high
- Clogged breather hole or tube
- Worn or damaged oil seal
- Loose gear case cover bolt

REAR AXLE REMOVAL

NOTE

- It is not necessary to disassemble the brake panel.

Remove the right and left rear wheels (page 13-3).

Remove the cotter pin, axle nut and left rear wheel hub.

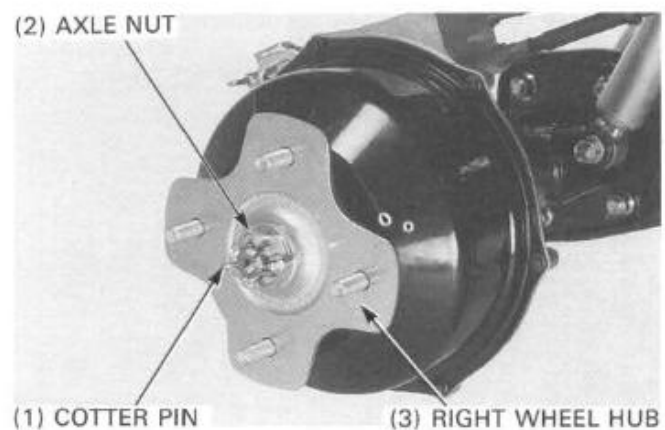
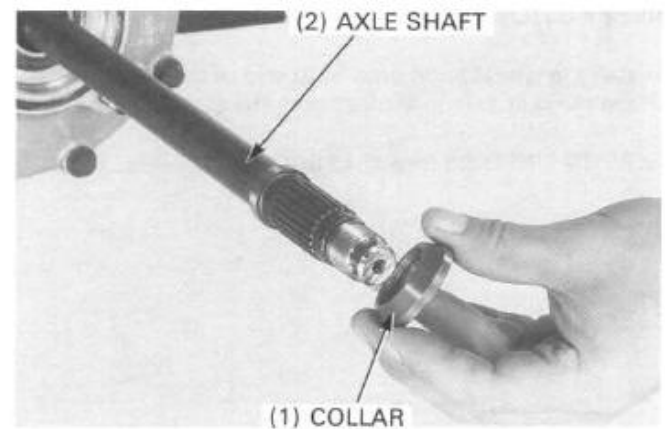
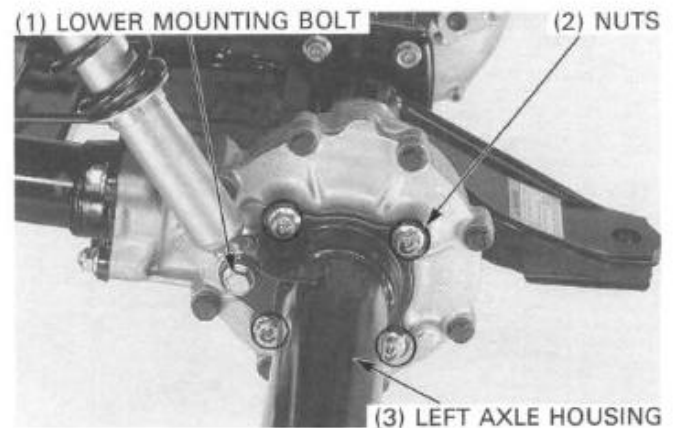
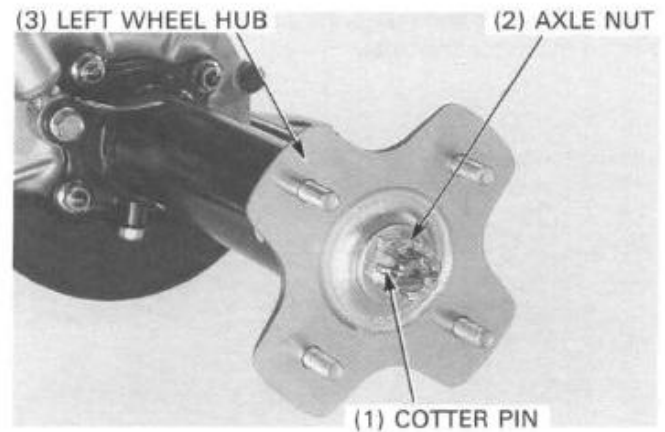
Remove the left shock absorber lower mounting bolt.

Remove the nuts and left rear axle housing and O-ring. Discard the mounting nuts.

Remove the collar from the axle shaft.

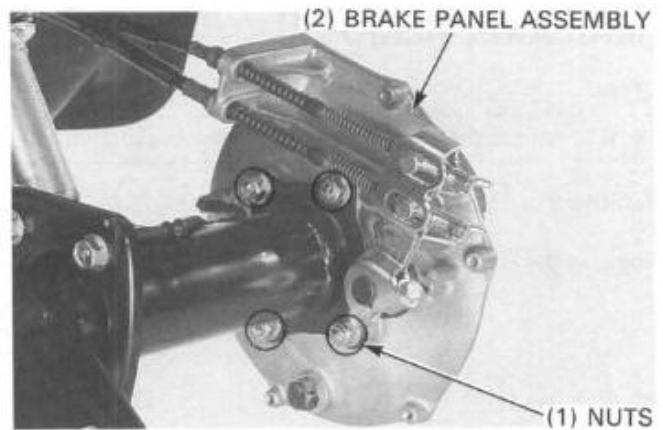
Remove the cotter pin, axle nut and right rear wheel hub.

Remove the brake drum cover and brake drum (page 14-15).

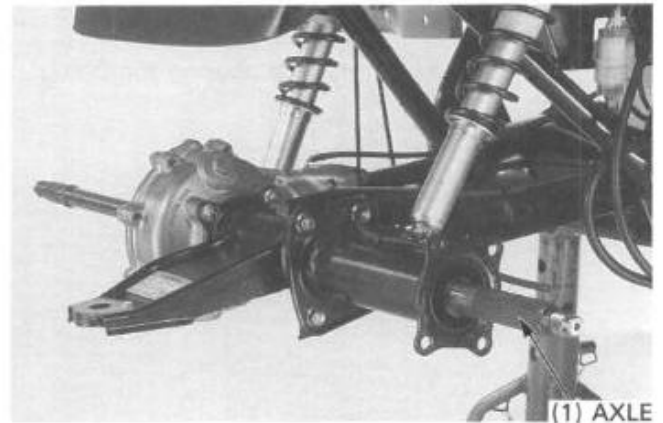


REAR DRIVING MECHANISM

Remove the nuts and rear brake panel assembly.
Discard the mounting nuts.



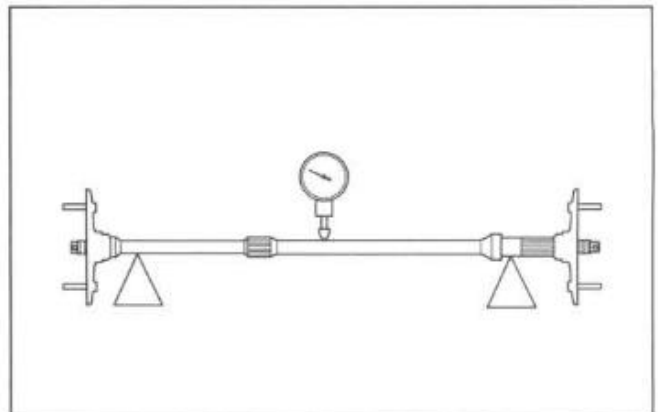
Drive the axle out from the left side with a rubber hammer.



INSPECTION

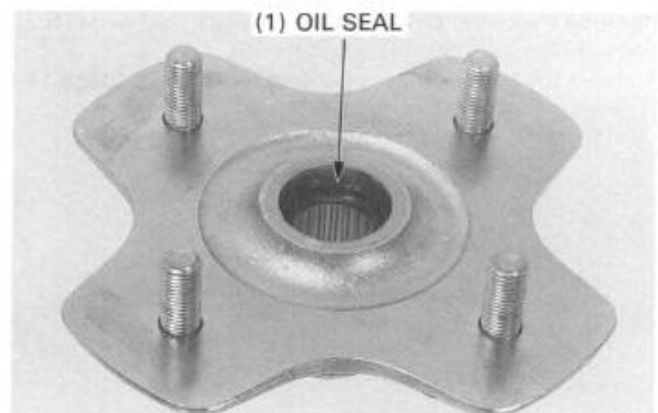
Install the wheel hubs onto both end of the axle.
Place the rear axle in V-block and measure the runout.

SERVICE LIMIT: 3.0 mm (0.12 in)

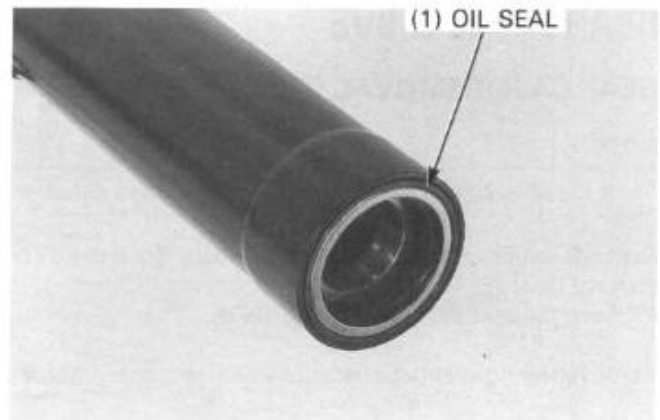


Inspect the wheel hub oil seal for damage.

Replace the oil seal if necessary.

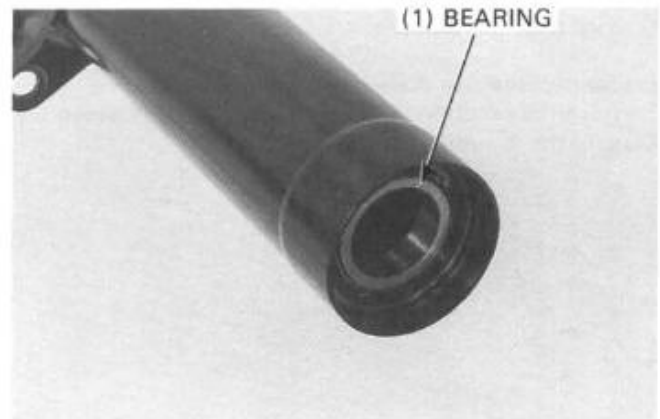


Inspect the left final drive housing oil seal for damage.



Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the outer race fit tightly in the housing. Remove and discard the bearing if the races do not turn smoothly and quietly, or if they fit loosely in the housing.

Replace the oil seal and bearing if necessary.



BEARING REPLACEMENT

Remove the oil seal.

Drive out the bearing out of the left axle housing.

Drive the bearing into the housing with its sealed end facing in using the special tools to the specified depth.

BEARING DEPTH: 11.0 – 11.5 mm (0.43 – 0.45 in)

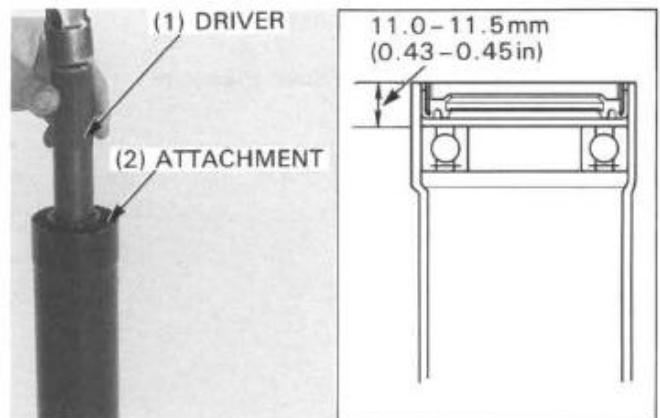
TOOLS:

Driver

07749 – 0010000

Attachment, 52X55 mm

07746 – 0010400



Drive the oil seal into the housing using the special tools.

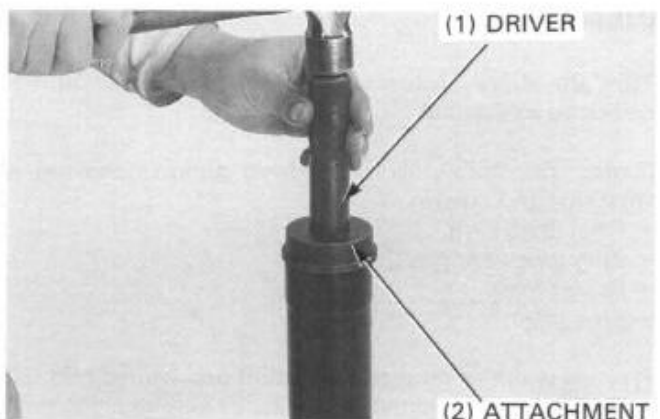
TOOLS:

Driver

07749-0010000

Attachment, 62X68 mm

07746-0010500



REAR FINAL DRIVE

GEAR CASE REMOVAL

NOTE

- It is not necessary to disassemble the brake panel.

Remove the final drive case skid plate and drain the oil from the rear final drive (page 3-13).

Remove the rear axle shaft (page 16-3).

Remove the right shock absorber lower mounting bolt/nut.

Remove the right rear axle housing mounting bolts, nuts and rear axle housing.

Discard the right differential case mounting nuts.

Disconnect the rear final case breather tube.

Remove the mounting nuts and rear final case assembly.

Discard the mounting nuts.

Remove the O-ring from the final drive case.

Remove the spring from the drive shaft joint.

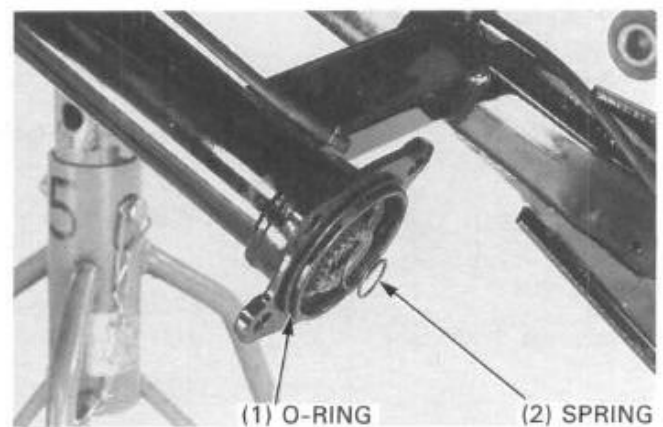
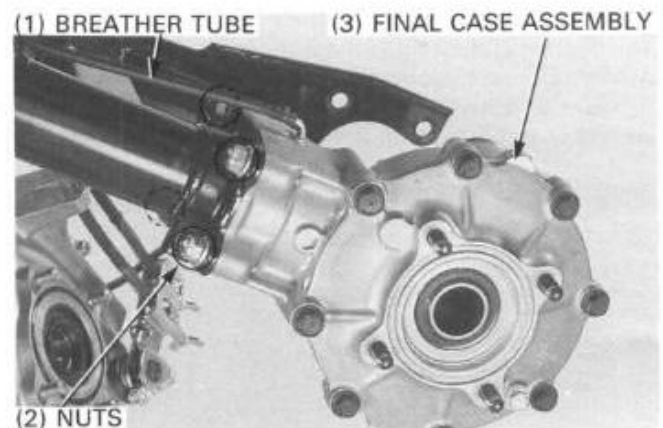
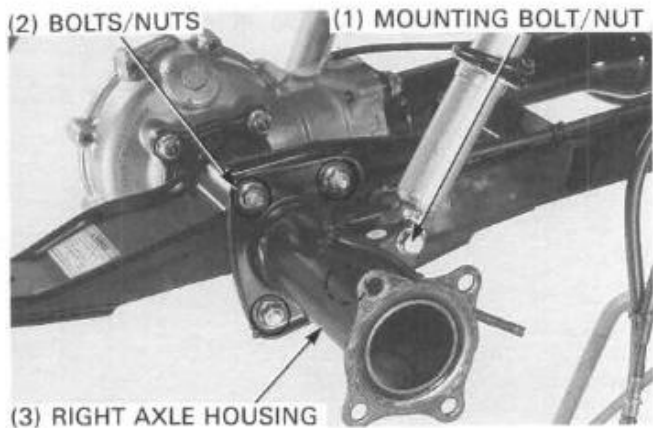
INSPECTION

Turn the drive pinion with your finger; it should turn smoothly and quietly.

Inspect the following if the drive pinion does not turn smoothly and quietly.

- Final drive case
- Ring gear bearings
- Drive pinion
- Ring gear

Proceed with the detailed inspection procedures that follow and replace faulty parts/assemblies as required.



BACKLASH INSPECTION

Remove the oil filler cap.
Set the gear case on the vise and hold the pinion joint as shown.

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Rotate the ring gear by hand until gear slack is taken up.
Turn the ring gear back and forth to read backlash.

STANDARD: 0.05 – 0.30 mm (0.002 – 0.012 in)

SERVICE LIMIT: 0.40 mm (0.016 in)

Remove the dial indicator.
Turn the ring gear and measure the backlash.
Repeat this procedure once more.
Compare the difference of the three measurements.

DIFFERENCE OF MEASUREMENT

SERVICE LIMIT: 0.25 mm (0.010 in)

If the difference in measurements exceeds the limit, it indicates that either the bearing is not installed squarely, or the case is deformed.

Inspect each bearing and case.

If backlash is too small, replace the ring gear left side spacer with a thicker one.

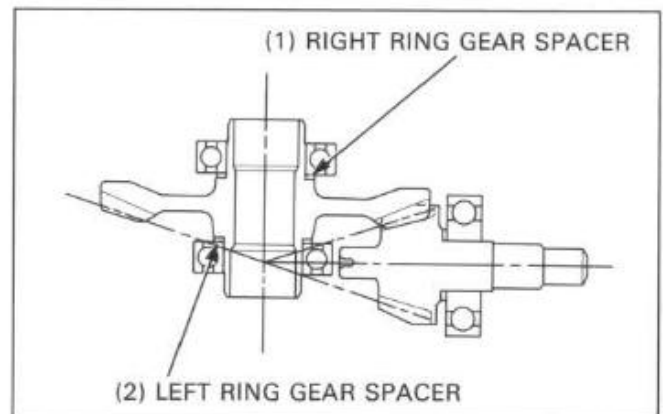
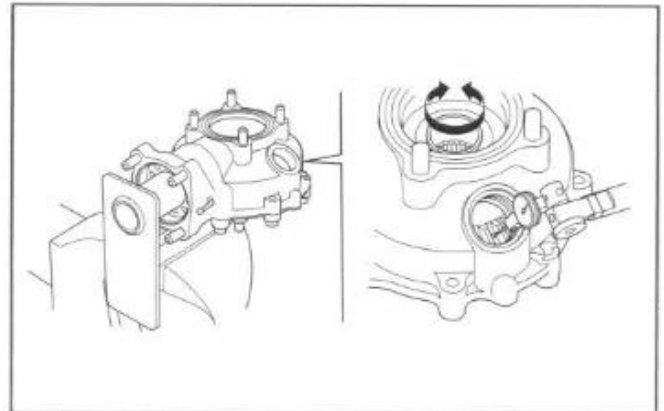
Backlash is changed by about 0.06 mm (0.002 in) when thickness of the spacer is changed by 0.12 mm (0.005 in).

RING GEAR SPACERS:

Nine spacers (from A to I) are available in thickness intervals of 0.06 mm.

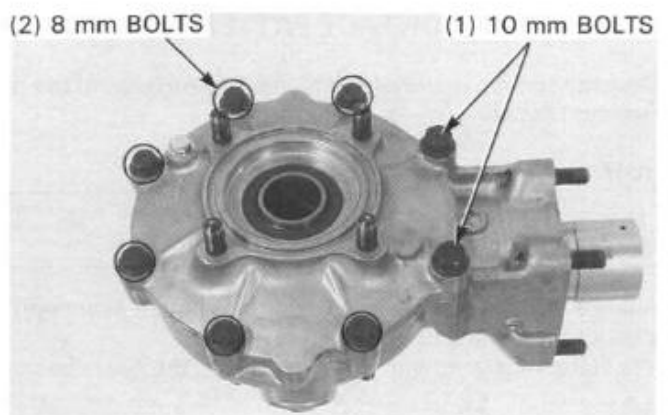
- **Standard:** 2.00 mm (0.079 in)
- **Thinnest:** 1.82 mm (0.072 in)
- **Thickest:** 2.30 mm (0.091 in)

Change the right side spacer and equal thickness and opposite amount of what the left side spacer was changed; if the left spacer was replaced with a 0.12 mm (0.005 in) thicker spacer, replace the right spacer with one that is 0.12 mm (0.005 in) thinner.



GEAR CASE DISASSEMBLY

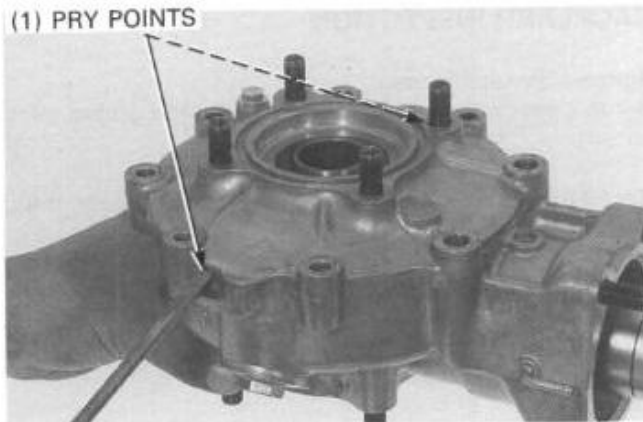
Remove the cover bolts in 2 - 3 steps in a crisscross pattern to prevent gear case warpage.



REAR DRIVING MECHANISM

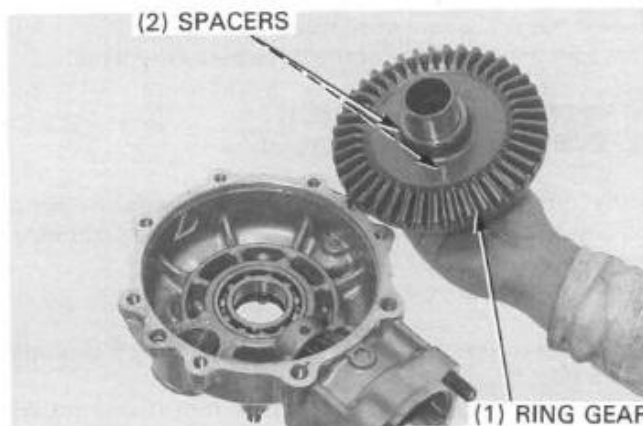
Carefully pry the cover off the case using a screwdriver at the pry points as shown.

(1) PRY POINTS



Remove the ring gear and spacers.

(2) SPACERS



(1) RING GEAR

BEARING INSPECTION

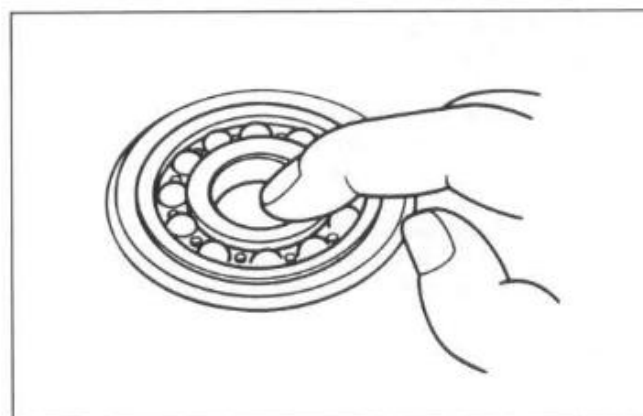
Turn the inner race of each ring gear bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the outer race fit tightly in the case and cover. Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the case or cover.

For ring gear bearing replacement, go to page 16-12.

For drive pinion removal and disassembly, go to page 16-10.



GEAR TOOTH CONTACT PATTERN CHECK

Clean all sealing material off the mating surfaces of the gear case and cover.

NOTE

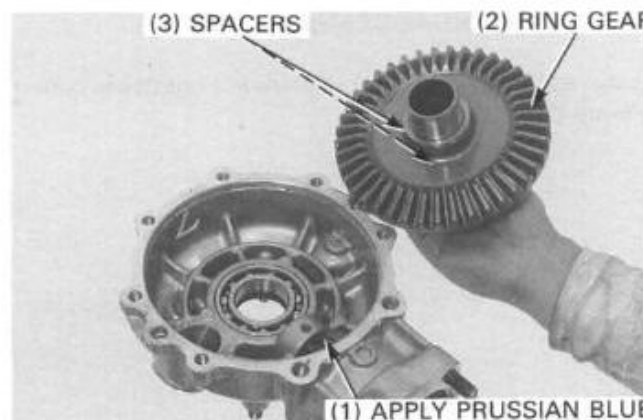
- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surface.

Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check.

Install the ring gear with the spacers into the gear case.

(3) SPACERS

(2) RING GEAR



(1) APPLY PRUSSIAN BLUE

Tighten the cover bolts in 2 or 3 steps until the cover evenly touches the gear case.
Then, while rotating the drive pinion, tighten the bolts to the specified torque in 2 – 3 steps in a crisscross pattern.

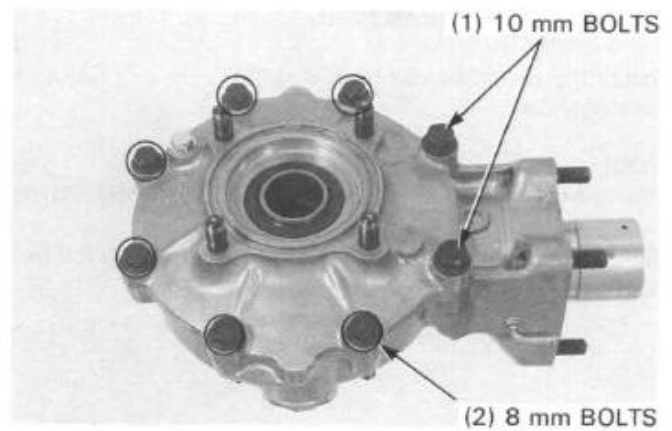
TORQUE:

10 mm bolt: 50 N·m (5.0 kg-m, 36 lb-ft)

8 mm bolt: 26 N·m (2.6 kg-m, 19 lb-ft)

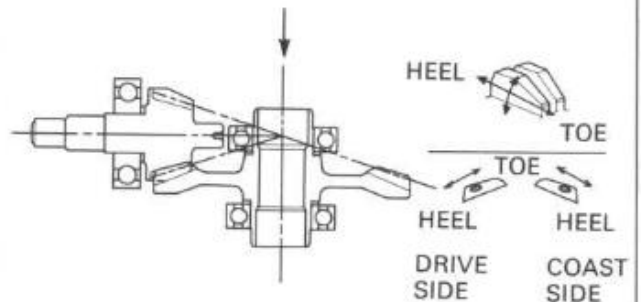
CAUTION

- It is important to turn the pinion while tightening the bolts. If the ring gear spacer is too thick, the gears will lock after only light tightening.



Remove the oil filler cap from the gear case.
Rotate the ring gear several times in both directions of rotation.
Check the gear tooth contact pattern through the oil filler hole.
The pattern is indicated by the Prussian Blue applied to the pinion before assembly.
Contact is normal if the Prussian Blue is transferred to the approximate center but slightly to the heel side of each tooth and to the flank side.

NORMAL:



If the patterns are not correct, remove and replace the pinion spacer with one of an alternate thickness.
Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.
Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side.
The pattern will shift about 0.5 – 1.0 mm (0.02 – 0.04 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACERS:

L: 1.64 mm (0.064 in)

M: 1.70 mm (0.067 in)

N: 1.76 mm (0.069 in)

A: 1.82 mm (0.072 in)

B: 1.88 mm (0.074 in)

C: 1.94 mm (0.076 in)

D: 2.00 mm (0.079 in)

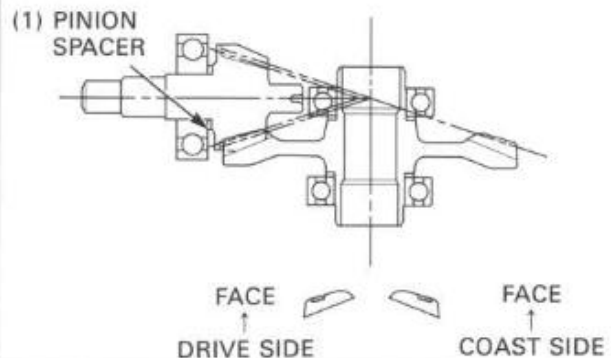
E: 2.06 mm (0.081 in)

F: 2.12 mm (0.083 in)

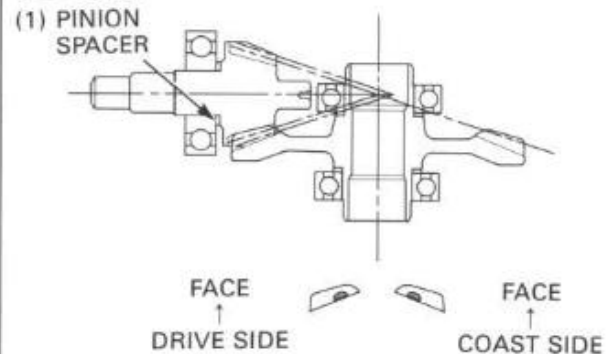
G: 2.18 mm (0.086 in)

For pinion spacer replacement, go to page 16-10.

TOO HIGH:



TOO LOW:



REAR DRIVING MECHANISM

DRIVE PINION REMOVAL

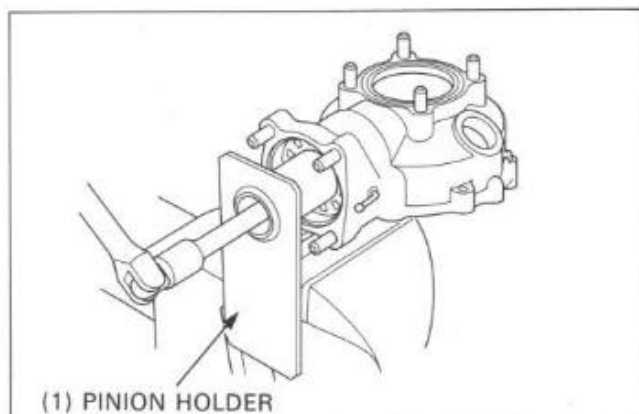
Install the pinion holder on the pinion joint and secure in a vise as shown.

TOOL:

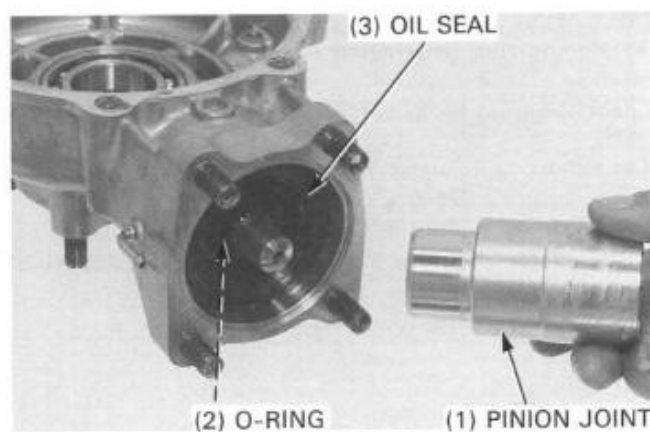
Pinion holder

07SMB-HM70200

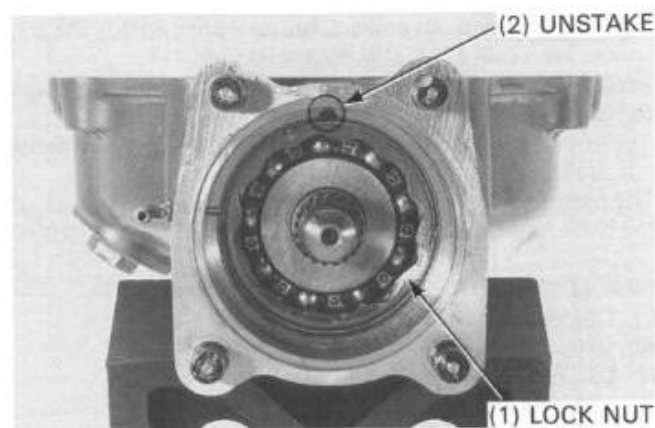
Remove the pinion joint nut, then remove the pinion holder and pinion joint.



Remove the pinion joint and O-ring.
Remove the oil seal.



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

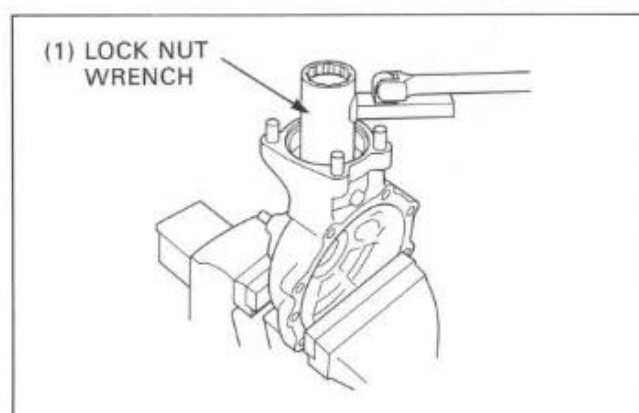


Remove the pinion bearing lock nut using the special tool as shown.

TOOL:

Lock nut wrench, 30X64 mm

07916 - MB00002

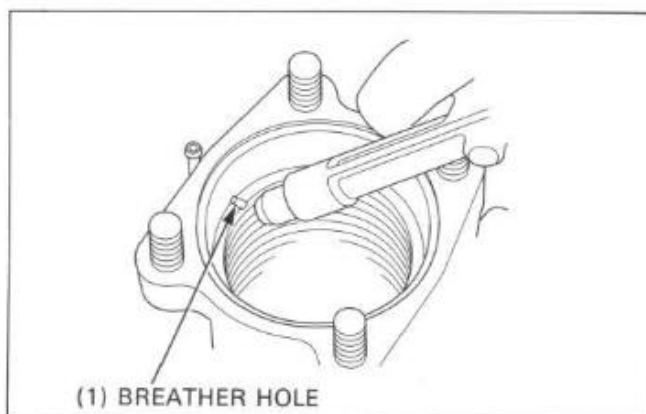
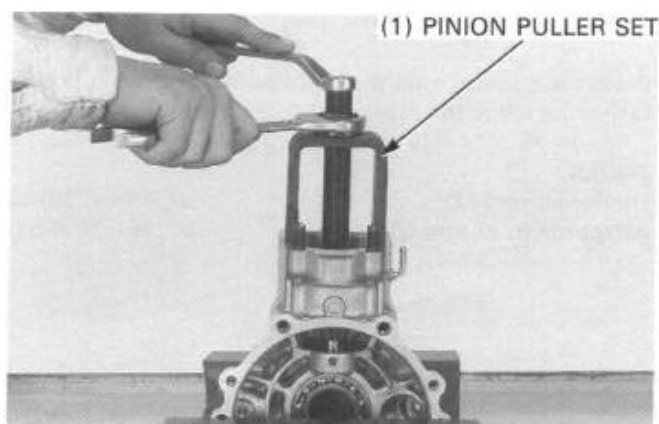


Install the pinion puller attachment tool onto the gear case. Screw the shaft puller onto the threads of the drive pinion. Turn the 23 mm special nut counterclockwise with a 23 mm wrench while holding the shaft with a 17 mm wrench to remove the drive pinion from its housing. Pull the drive pinion assembly off with the shaft puller.

TOOLS :

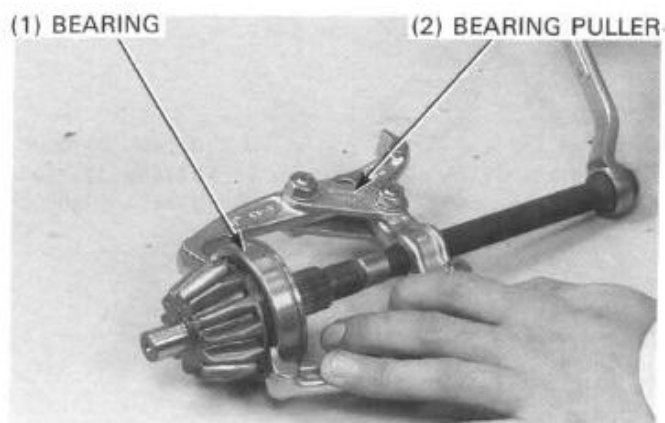
Pinion puller set	07HMC - MM80101
- Shaft puller	07931 - ME40000
- Pinion puller base	07HMC - MM80110
or U.S.A. only:	
Shaft puller	07931 - ME4010B
Special nut	07931 - HB3020A
Pinion puller base "A"	07HMC - MM8011A

Blow compressed air through the breather hole in the gear case.



DRIVE PINION DISASSEMBLY/ASSEMBLY

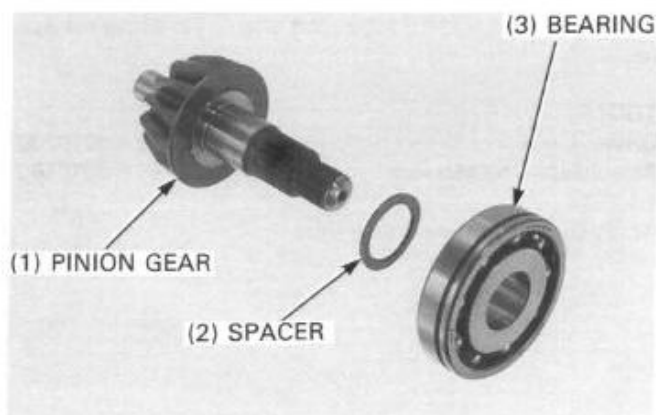
Pull the bearing off the shaft with a bearing puller. Remove the pinion adjustment spacer.



To reassemble, first install the pinion spacer.

NOTE

- When the gear set, pinion bearing and/or gear case has been replaced, use a 2.0 mm (0.08 in) thick spacer.



REAR DRIVING MECHANISM

Apply #80 gear oil to the bearing.

Press the bearing onto the drive pinion with its groove side facing out using the special tools as shown.

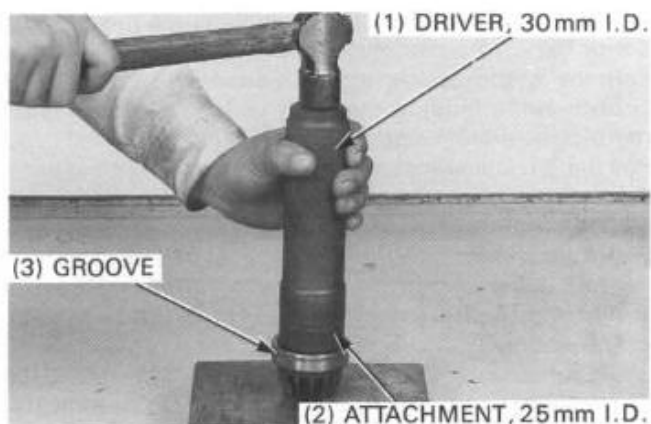
TOOLS :

Driver, 40 mm I.D.

07746 - 0030100

Attachment, 25 mm I.D.

07746 - 0030200



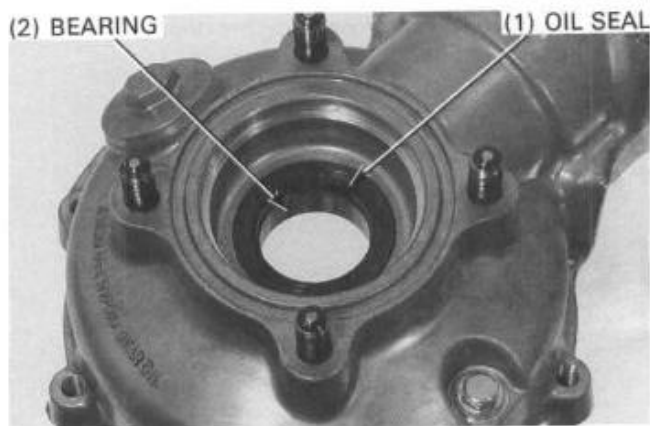
CASE BEARING REPLACEMENT

NOTE

- The drive pinion bearing cannot be removed.
Replace the gear case if the bearing is damaged.

Remove the oil seal.

Drive the ring gear bearing out of the case and cover.



Drive the ring gear bearing into the case and cover using the special tool as shown.

TOOLS:

Driver

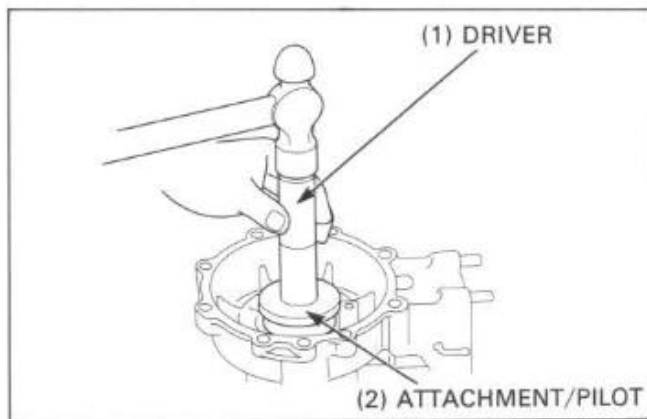
07749 - 0010000

Attachment, 62X68 mm

07746 - 0010500

Pilot, 35 mm

07746 - 0040800



Drive a new oil seal into the case and cover using the special tools.

TOOLS:

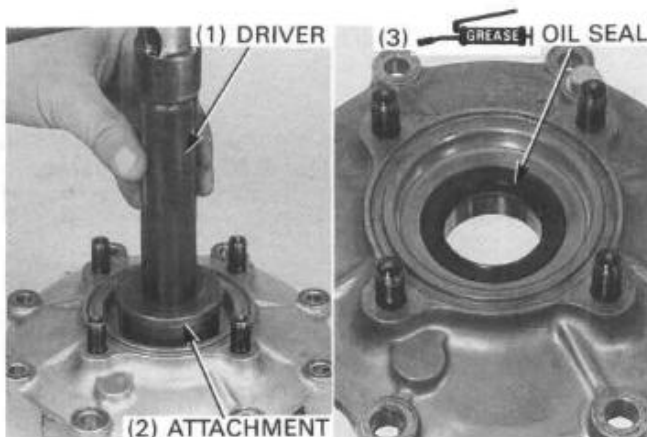
Driver

07749 - 0010000

Attachment, 52X55 mm

07746 - 0010400

Apply grease to the oil seal lips.



Install the ring gear with the spacer into the cover.
Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE: 0.30 – 0.60 mm (0.012 – 0.024 in)

Remove the ring gear.

If the clearance exceeds the standard, heat the cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

WARNING

- Always wear gloves when handling the cover after it has been heated to prevent burning your hands.

CAUTION

- Do not use a torch to heat the cover, it may cause warping.

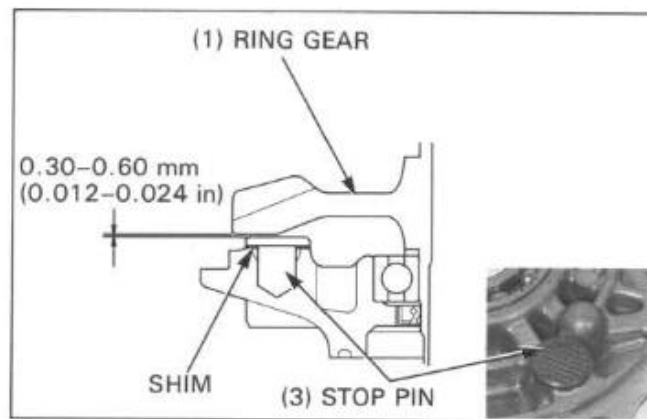
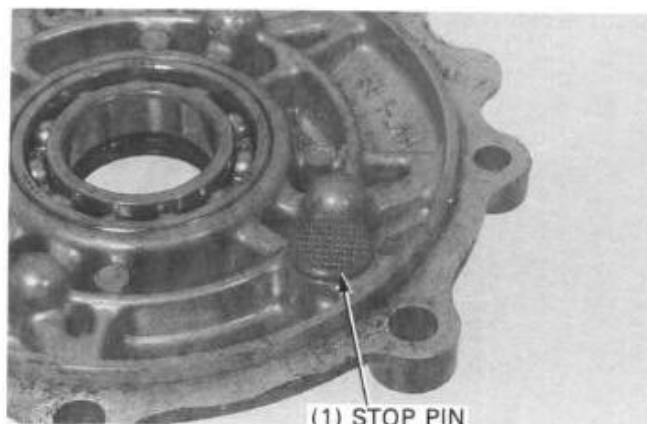
Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS:

A: 0.10 mm (0.004 in)

B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the cover.



DRIVE PINION INSTALLATION

Place the drive pinion assembly into its housing and drive it into the gear case.

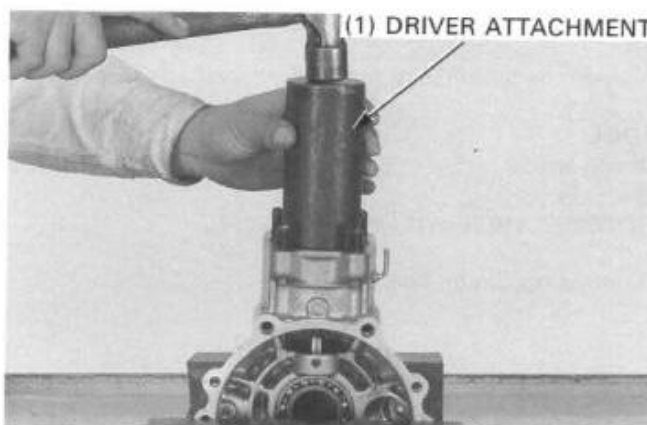
TOOL:

Driver attachment

**07965 – KE80200 or
07947 – KA50100**

NOTE

- Keep the driver centered with the bearing outer race during installation.



Install and tighten the pinion bearing lock nut using the special tools as shown.

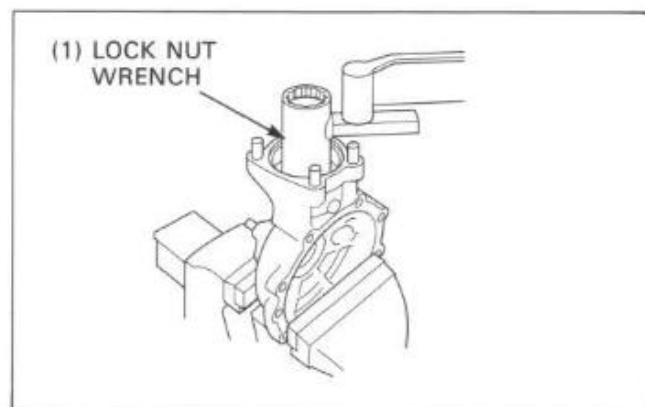
TORQUE: 100 N·m (10.0 kg·m, 72 lb·ft)

Wrench scale reading: 91 N·m (9.1 kg·m, 66 lb·ft) using a 50 cm (20 in) long torque wrench

TOOL:

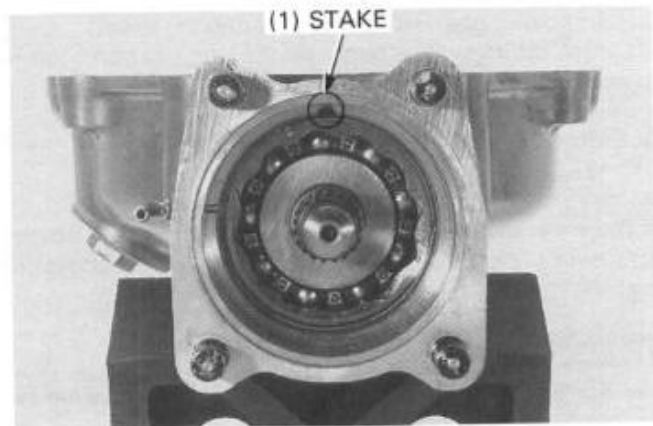
Lock nut wrench, 30X64 mm

07916 – MB00002



REAR DRIVING MECHANISM

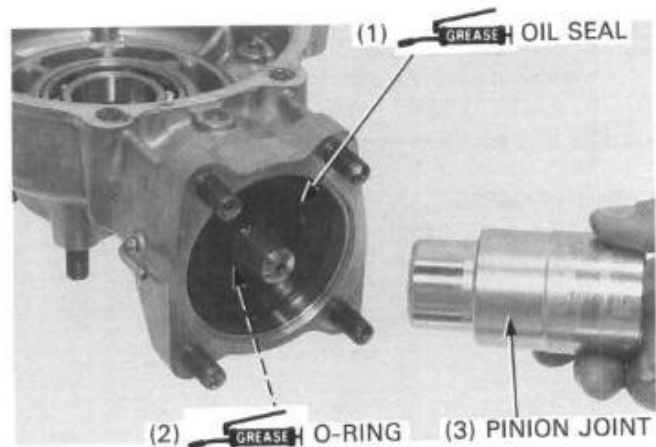
Stake the pinion bearing lock nut.



Apply grease to the new drive pinion oil seal lips.
Install the new drive pinion oil seal on the case.

Install the O-ring onto the pinion shaft.

Apply a locking agent to the pinion threads.
Install the pinion joint and joint nut.



Attach the pinion holder on the pinion joint and secure in a vise.
Tighten the pinion joint nut to the specified torque.

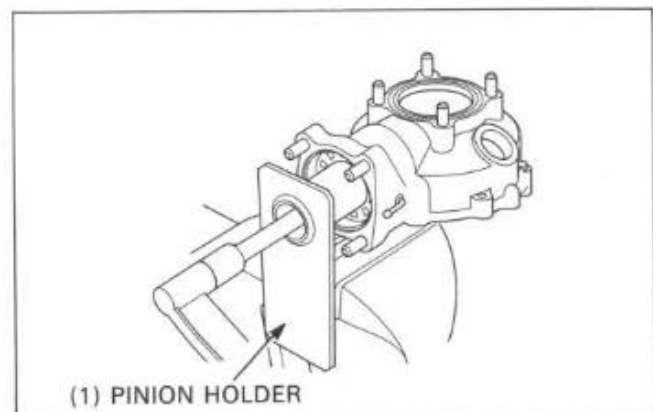
TOOL:

Pinion holder

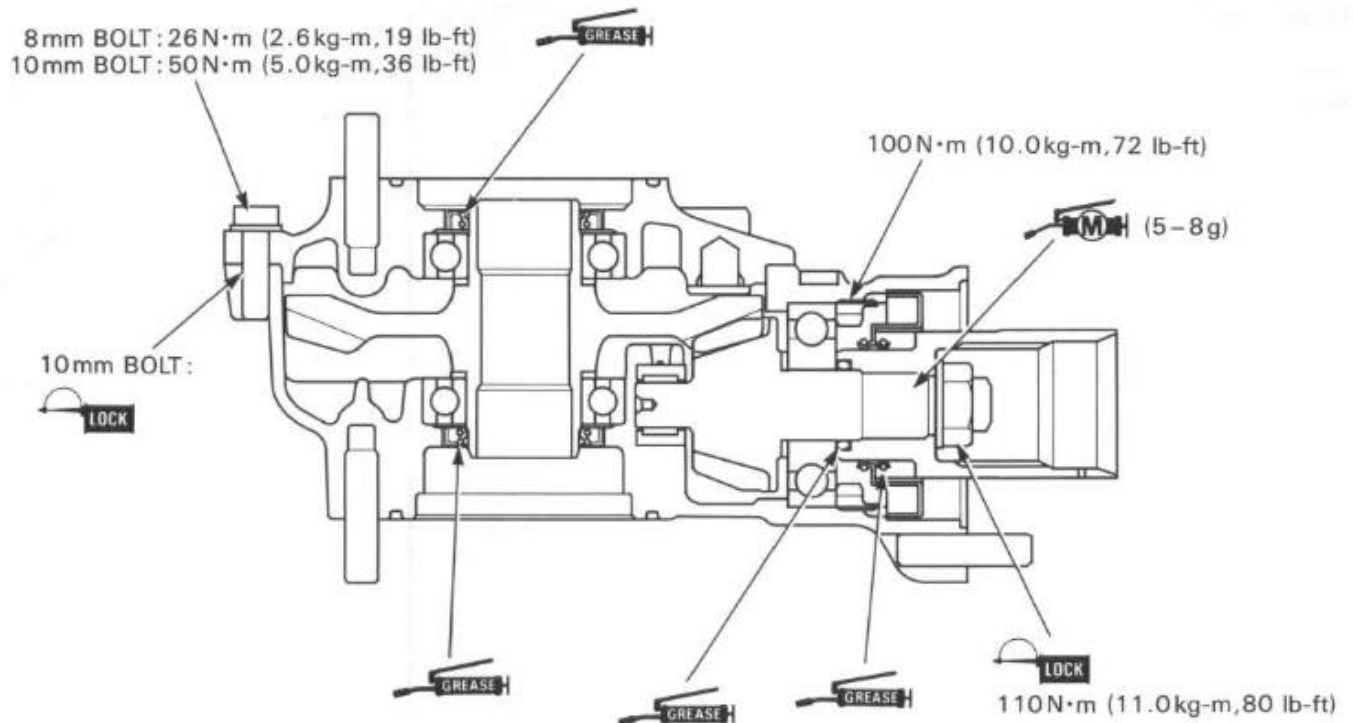
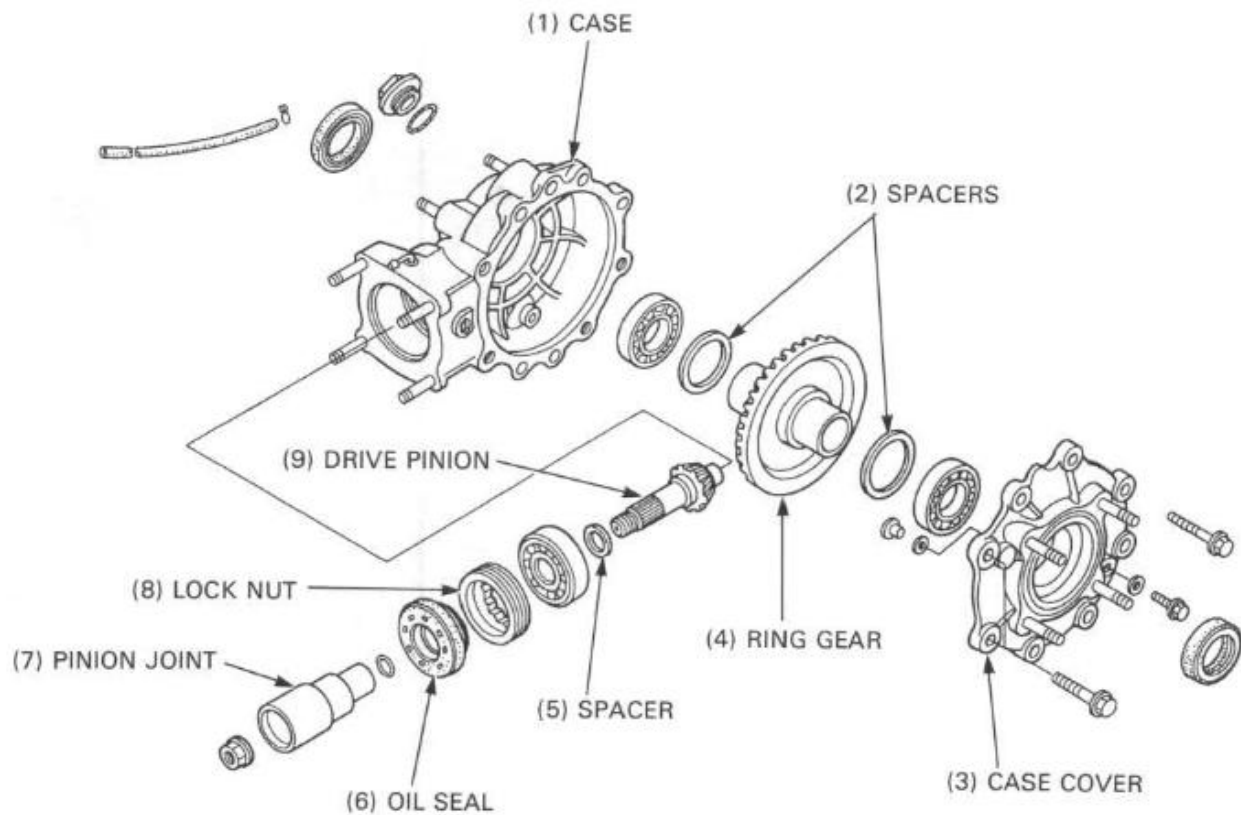
07SMB - HM70200

TORQUE: 110 N·m (11.0 kg-m, 80 lb-ft)

Remove the pinion holder.



GEAR CASE ASSEMBLY



REAR DRIVING MECHANISM

NOTE

- When the bearing, gear set and/or gear case has been replaced, check the tooth contact pattern (page 16-9) and gear backlash (page 16-7).

Install the ring gear spacers onto the ring gear.
Install the ring gear, with the spacers, into the final drive case.

Apply liquid sealant to the mating surface of the gear case cover.

NOTE

- Keep dust and dirt out of the gear case.

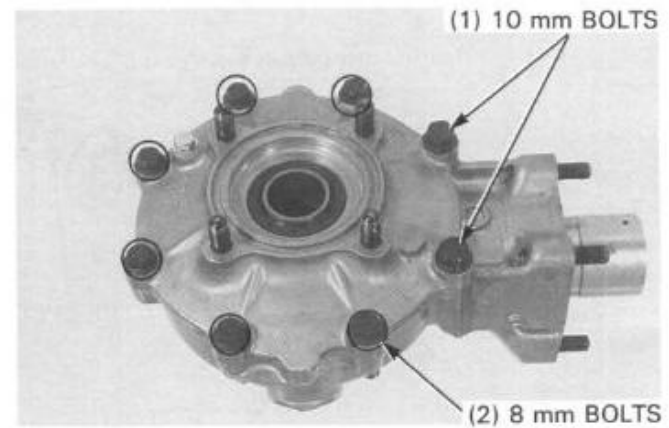
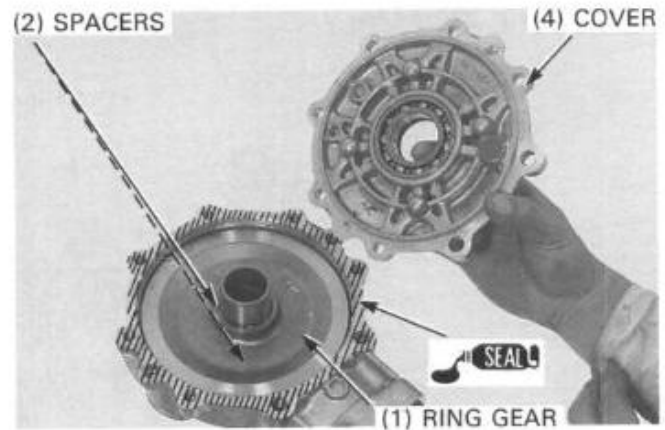
Apply a locking agent to the threads of the 10 mm bolts.
Tighten the cover bolts in 2 – 3 steps until the cover evenly touches the gear case.
Then, while rotating the drive pinion, tighten the bolts to the specified torque in 2 – 3 steps in a crisscross pattern.

TORQUE:

10 mm bolt: 50 N·m (5.0 kg-m, 36 lb-ft)
8 mm bolt: 26 N·m (2.6 kg-m, 19 lb-ft)

CAUTION

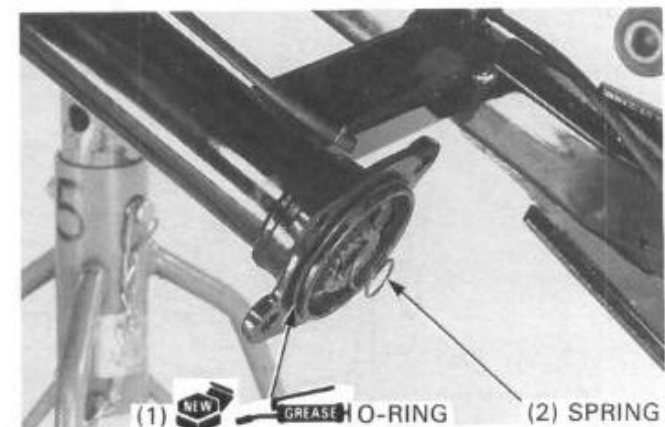
- It is important to turn the pinion while tightening the bolts. If the ring gear spacer is too thick, the gears will lock after only light tightening.



GEAR CASE INSTALLATION

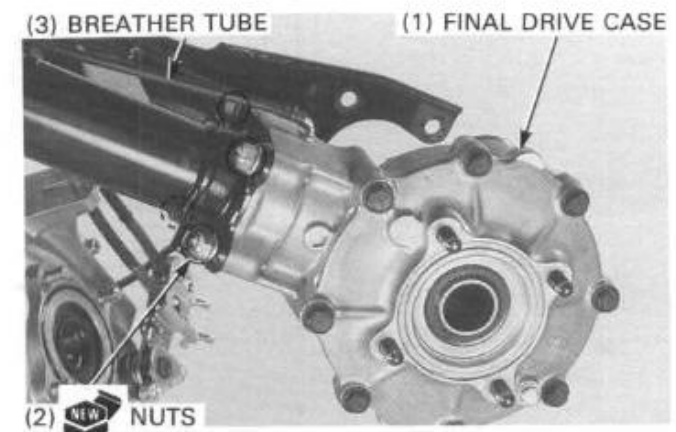
Install a new O-ring on the swingarm.
Apply grease to the O-ring.

Install the spring in the drive shaft joint.



Apply 5 – 8 g of molybdenum disulfide grease to the pinion joint spline.
Install the final drive case to the swingarm.
Loosely install the new nuts.
Do not reuse the nuts.

Connect the breather tube to the case.



Install a new O-ring on the final drive case.
Apply grease to the O-ring.



Install the right axle housing to the final drive case and install the mounting bolts and new nuts.

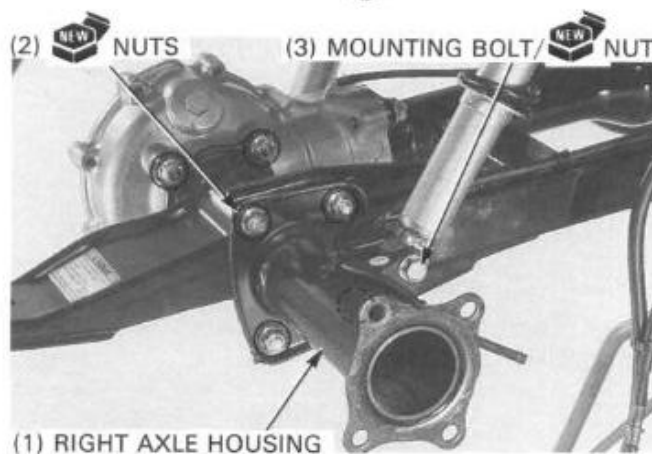
Tighten the final drive case joint nuts and axle housing nuts to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

Install the right rear shock absorber lower mounting bolt and new nut.

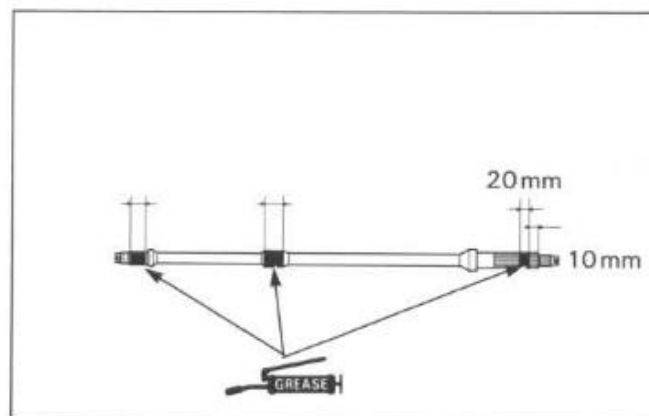
Tighten the nut to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

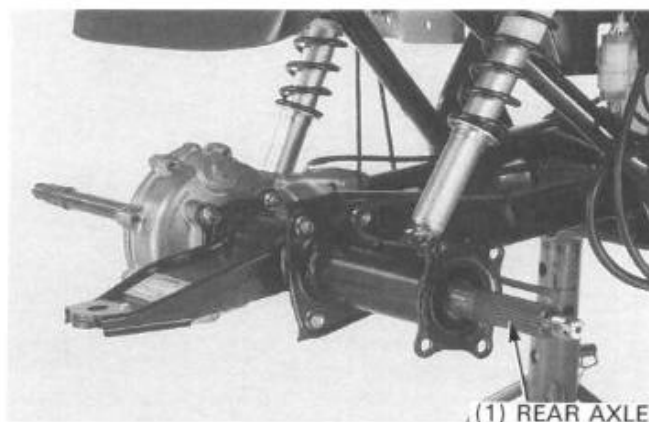


REAR AXLE INSTALLATION

Apply grease to the axle splines.

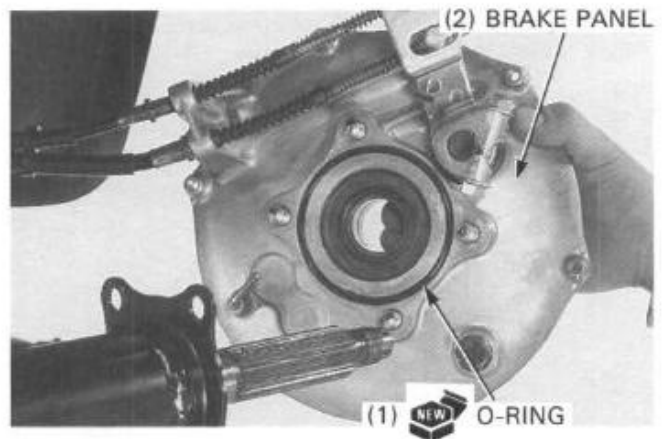


Install the rear axle from the right side while aligning the splines of the final drive.



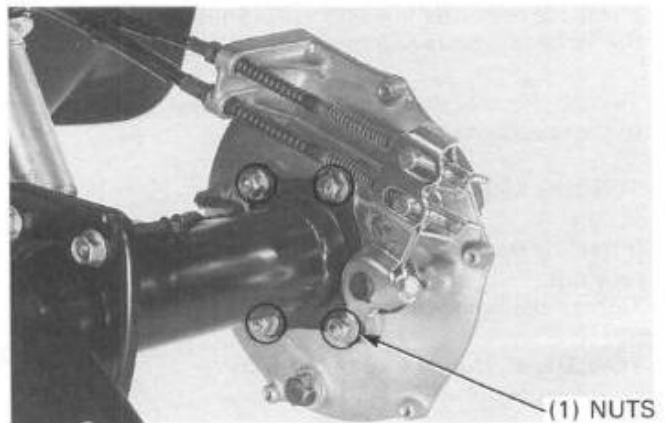
REAR DRIVING MECHANISM

Install a new O-ring on the brake panel.
Apply grease to the O-ring.



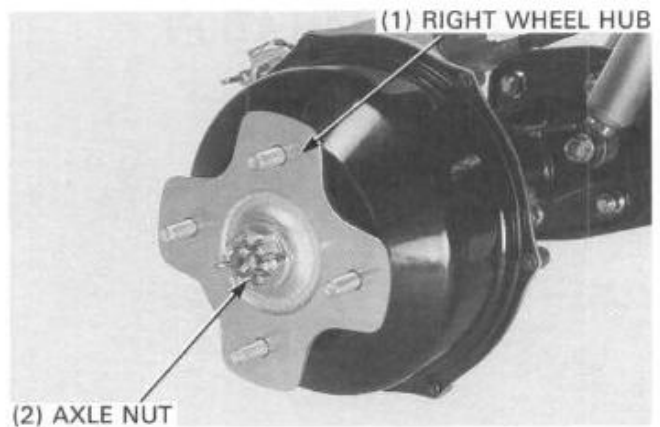
Install and tighten the new brake panel mounting nuts to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

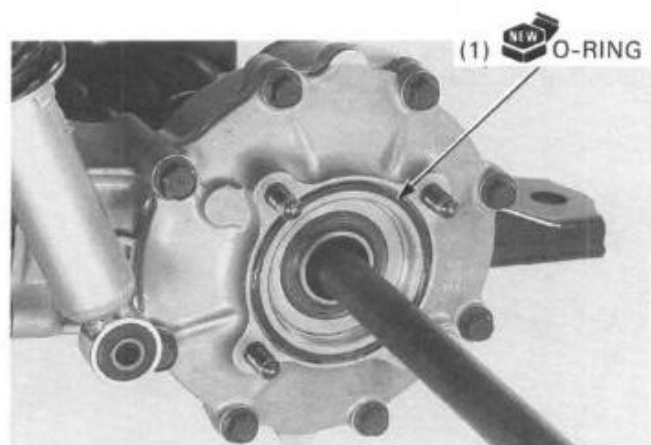


Install the brake drum and drum cover (page 14-22).

Clean the dust seal mating surface of the wheel hub.
Apply grease to the axle shaft spline.
Install the right wheel hub.
Temporarily tighten the right axle nut.



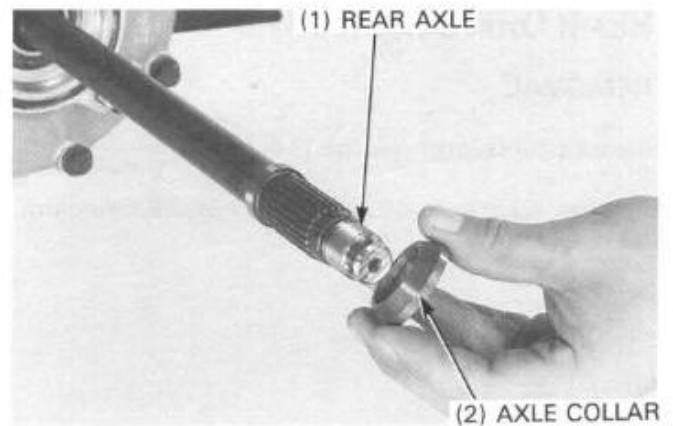
Install a new O-ring on the final drive case.
Apply grease to the O-ring.



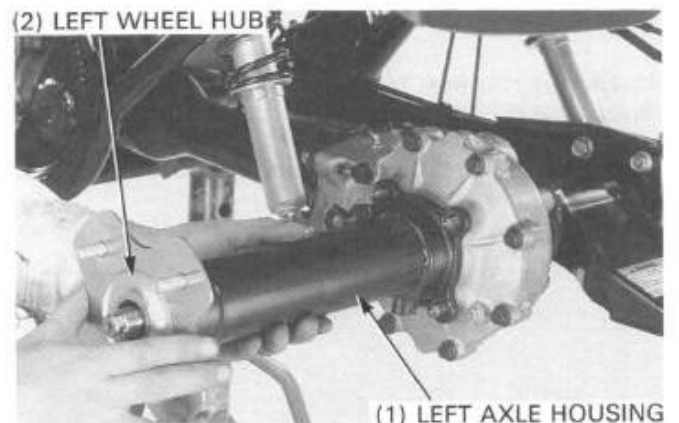
Install the collar onto the rear axle.

NOTE

- Note the direction of the collar.



Install the left axle housing.
Install the left wheel hub and nut, while centering the axle shaft.

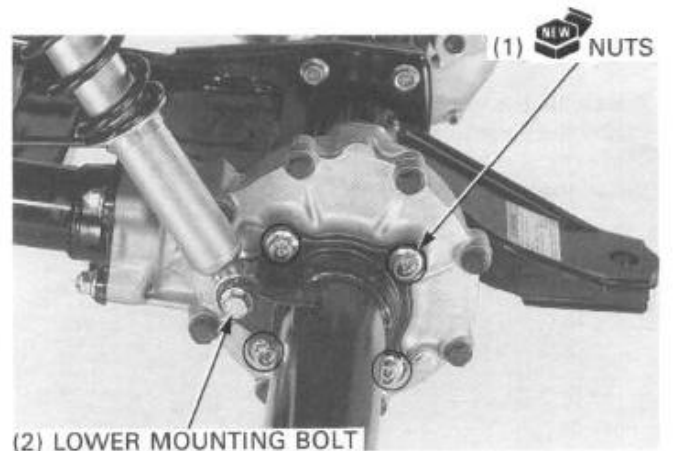


Install and tighten the new left axle housing mounting nuts to the specified torque.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)

Install and tighten the left rear shock absorber lower mounting bolt.

TORQUE: 45 N·m (4.5 kg-m, 33 lb-ft)



Tighten the axle nuts to the specified torque.

TORQUE: 140 – 160 N·m (14.0 – 16.0 kg-m, 101 – 116 lb-ft)

NOTE

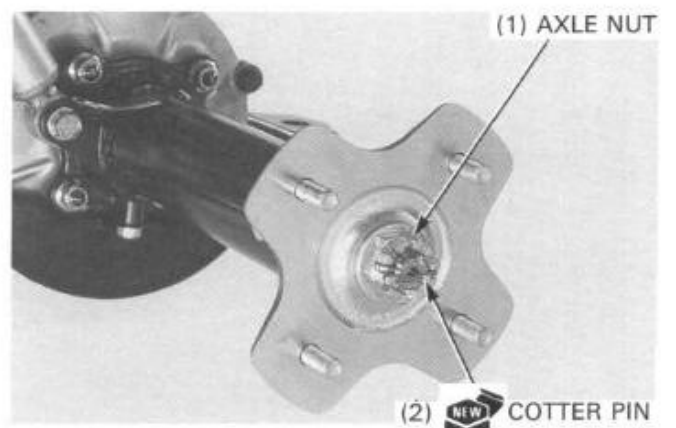
- If cotter pins cannot be installed after torquing nuts due to alignment of axle hole, tighten nut further until cotter pin can be installed. Do not loosen the axle nuts after torquing them to install cotter pins as shown.

Install the new cotter pins.

Install the rear wheels (page 13-3).

Install the skid plate (page 3-13).

Fill the final drive with the recommended oil (page 3-13).

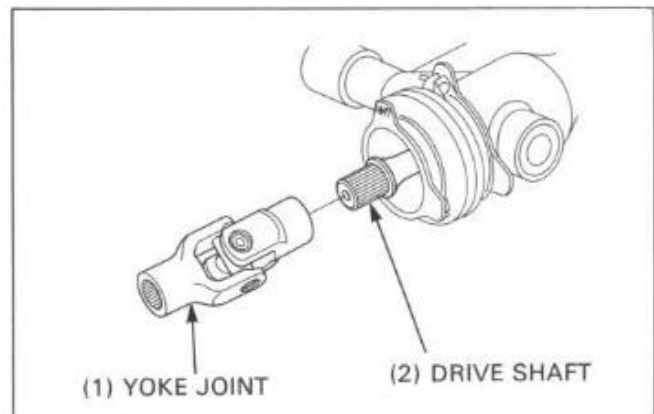


REAR DRIVE SHAFT

REMOVAL

Remove the swingarm (page 13-6).

Pull the yoke joint /drive shaft out of the swingarm and disassemble it.

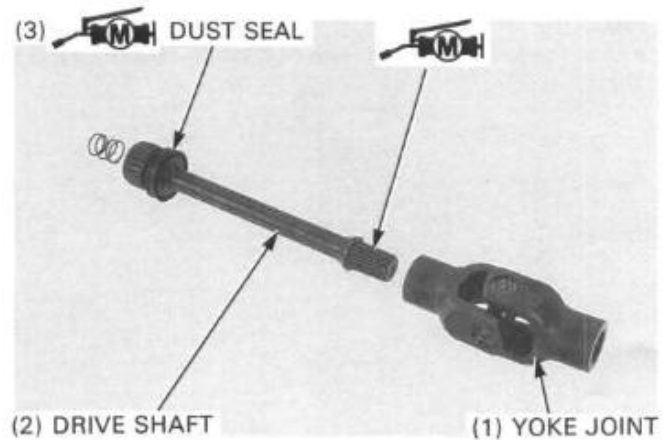


INSPECTION

Inspect the yoke joint bearings for excessive play or damage. Inspect the dust seal is in good condition.

Apply molybdenum disulfide grease to the dust seal lips.

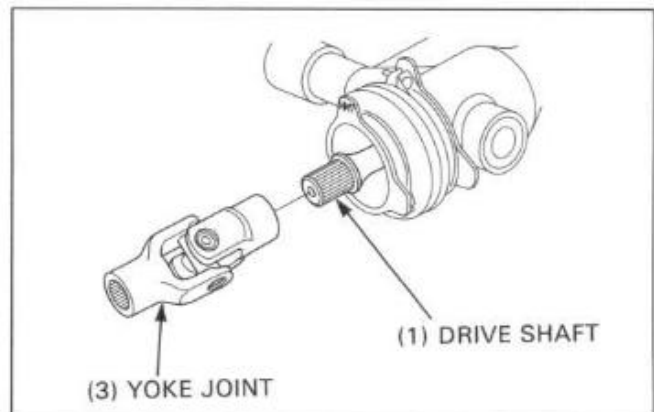
Apply 5 – 8 g of molybdenum disulfide grease to the spline.



INSTALLATION

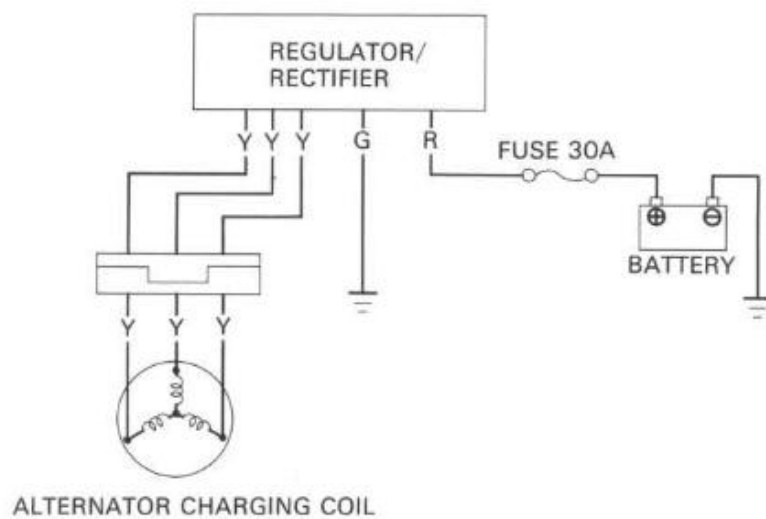
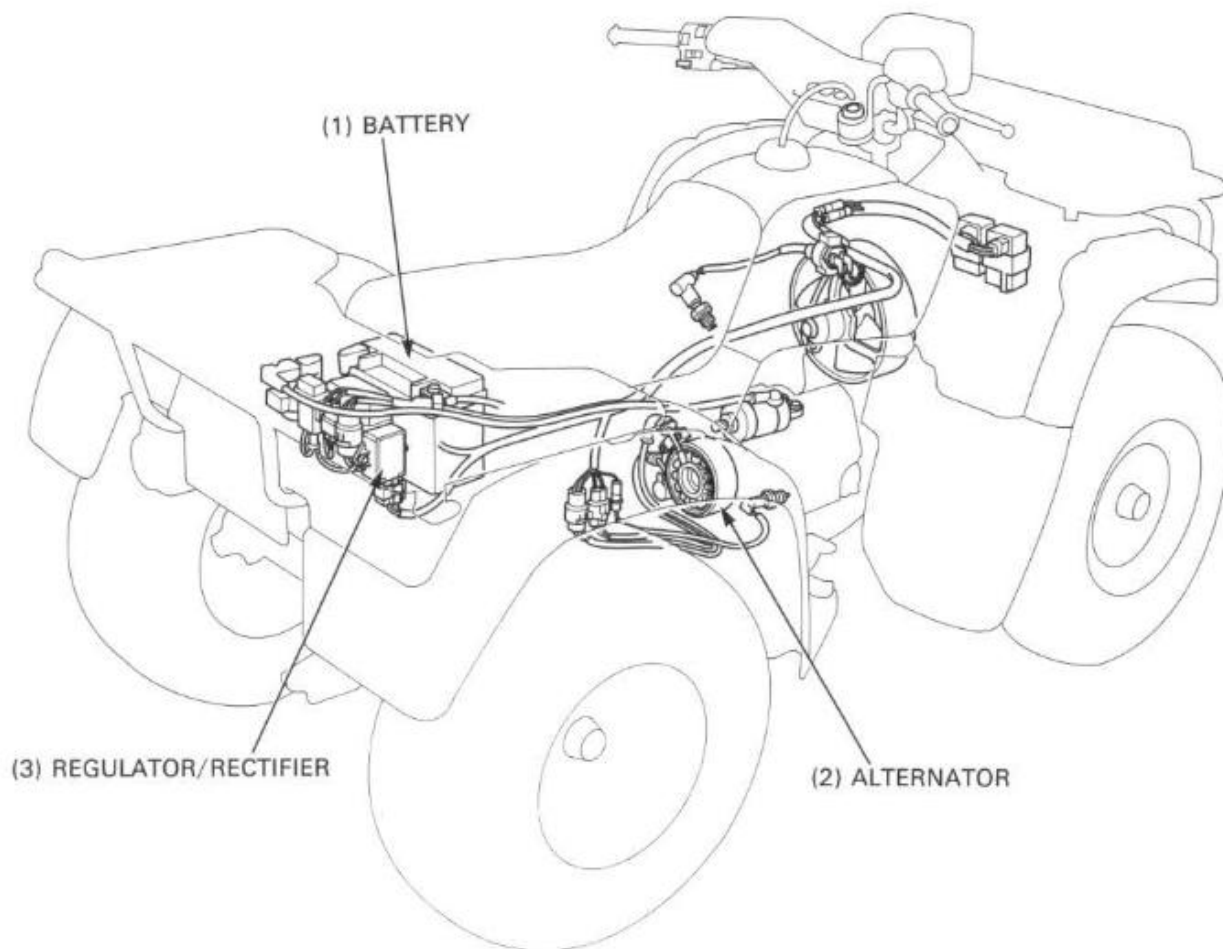
Assemble the yoke joint and drive shaft. Install the yoke joint/drive shaft into the swingarm.

Install the swingarm (page 13-9).



MEMO

BATTERY/CHARGING SYSTEM



17.BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	17-1	CHARGING SYSTEM	17-7
TROUBLESHOOTING	17-3	ALTERNATOR CHARGING COIL	17-8
BATTERY	17-4	REGULATOR/RECTIFIER	17-8

SERVICE INFORMATION

GENERAL

⚠ WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
 - *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
 - *If electrolyte gets on your skin, flush with water.*
 - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician.*
 - *Electrolyte is poisonous.*
 - *If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.*
 - *If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*
-
- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on the next page.
 - Alternator removal is shown in section 9.

Battery charging

This model comes with a maintenance-free (MF) battery. Remember the following about MF batteries.

- Use only the electrolyte that comes with the battery
- Use all of the electrolyte
- Seal the battery properly
- Never open the seals again

CAUTION

- *For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.*

After activation, maintenance-free batteries must be charged at the appropriate ampere-hour rating for the proper length of time.

Set the battery Amp. Hr. Selector Switch on the Christie battery charger (MC1012/2) for the size of the battery being charged. Set the Timer to the NEW BATT position and connect the battery clamps. When the time reaches the "trickle" position, the charging cycle is complete.

After charging, test the condition of the new battery using the Honda Battery Tester (07GMJ-0010000) – refer to the Operation Manual for complete details.

BATTERY/CHARGING SYSTEM

Battery charging/testing equipment

Refer to the instruction in the Operation Manual for the Honda Battery Tester and Christie Battery Charger for detailed battery charging steps.

The Christie Battery Charger (MC1012/2) is a constant current (amperage) type designed to produce current at a constant rate for the duration of the charge, even if the voltage varies.

The Honda Battery Tester (07GMJ-0010000) puts a "load" on the battery so that the actual battery condition at the time of the load can be measured. This provides an accurate determination of the battery condition - good (gree), fair(yellow), or poor (red).

- Slow charge the battery whenever possible, quick charging should be an emergency procedure only.
- Remove the battery from the vehicle for charging.
- The battery on this vehicle is a maintenance - free type. Do not try to remove the filler hole caps even during charging. Do not use a conventional battery as a replacement.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V-12AH
	Current leakage		1 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
Alternator	Capacity		0.310 kW/5.000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω
Regulator/rectifier	Type		Tripple phase/full-wave rectification
	Regulated voltage		14.7 – 15.5 V at 5,000 rpm

TOOLS

Digital multimeter
Christie battery charger
Battery tester

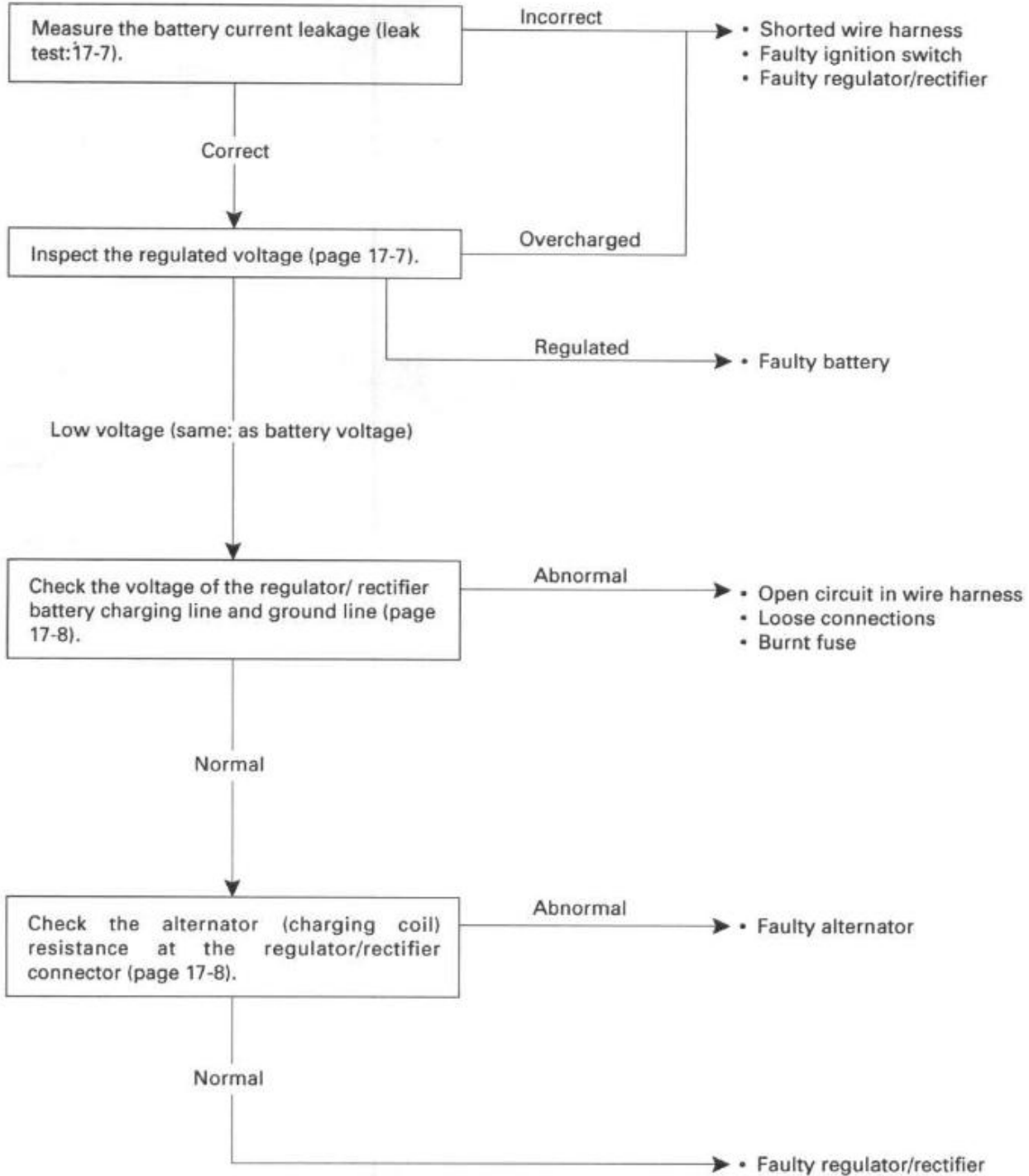
Commercially available
MC1012/2
07GMJ-0010000

TROUBLESHOOTING

Battery overcharged

- Faulty regulator/rectifier

Battery undercharged



BATTERY

REMOVAL

Remove the seat (page 2-3).
Remove the two bolts and battery holder bracket.
Disconnect the negative cable and then the positive cable,
and remove the battery.

INSTALLATION

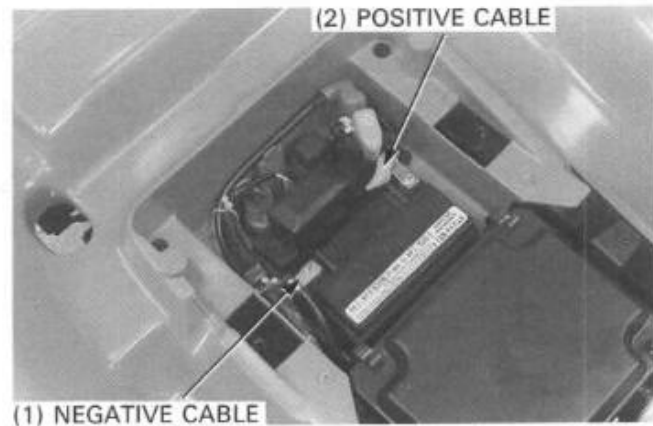
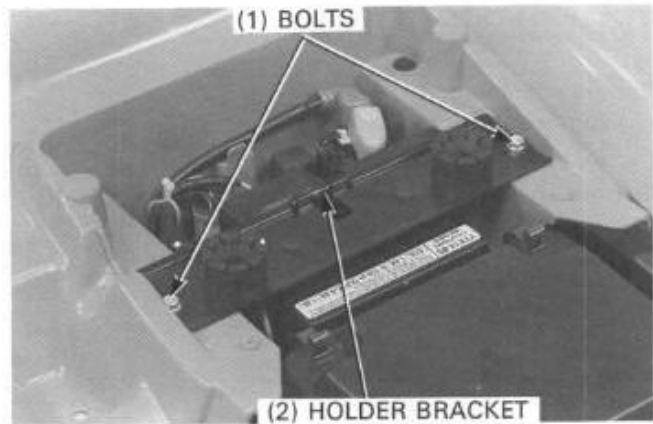
Install the battery in the reverse order of removal with the proper wiring as shown.

NOTE

- Connect the positive terminal first and then the negative cable.

After installing the battery, coat the terminals with clean grease.

Reinstall the removed parts.



VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE: Fully charged: 13.0 – 13.2V
Under charged: Below 12.3V

TOOL:

Digital multimeter

Commercially
available

BATTERY TESTING

NOTE

- Always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels when operating the tester, the heat generated by the tester may cause a fire.

Remove the battery.

TOOL:

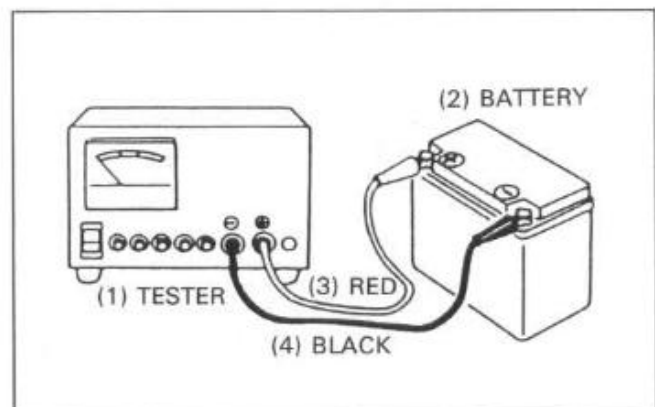
Battery tester

07GMJ – 0010000

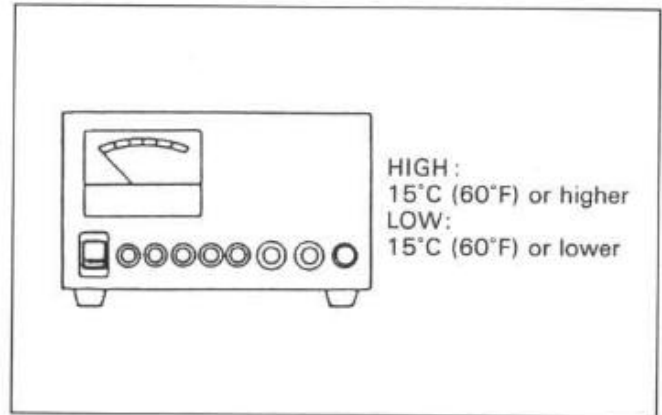
Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

NOTE

- For accurate test result, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.



Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



Push in the appropriate test button for three seconds and read the condition of the battery on the meter.

NOTE

- For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

CAUTION

- To avoid damaging the tester, only test batteries with an amperage rating of less than 30A.
- Tester damage can result from overheating when:
 - The test button is pushed in for more than three seconds.
 - The tester is used without being allowed to cool for at least one minute when testing more than one battery.
 - More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.

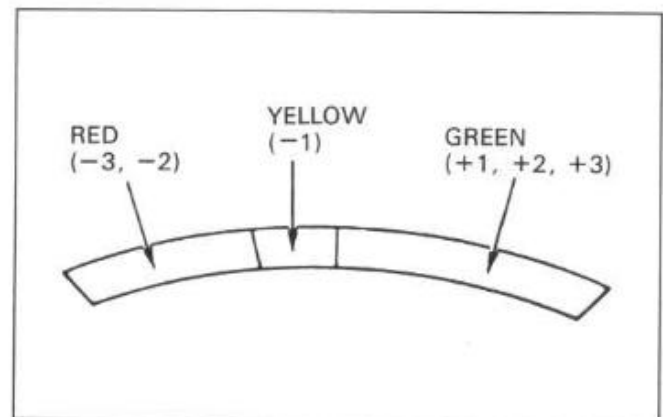
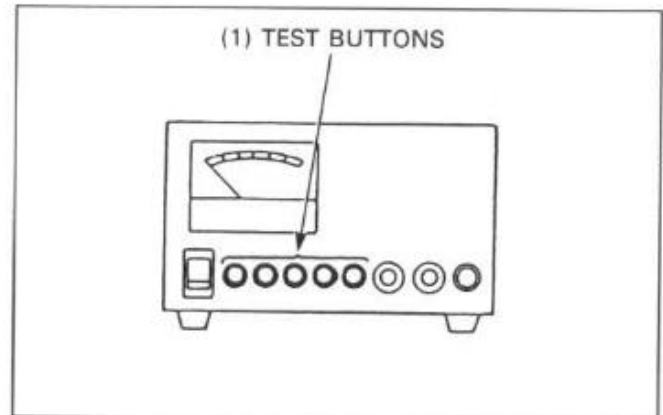
NOTE

- The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any BATTERY READING IN THE GREEN ZONE IS OK. Batteries should only be charged if they register in the YELLOW or RED zone.

BATTERY CHARGING

⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.
- Turn power ON/OFF at the charger, not at the battery terminals.



BATTERY/CHARGING SYSTEM

NOTE

- Be sure that the area around the charger is well-ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as faraway from the charger as the leads will permit.
- Do not place batteries below the charger; gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

TOOL:

Christie battery charger

MC1012/2

1. Turn the Power Switch to the OFF position.
2. Set the battery Amp. Hr. Selector Switch for the size of the battery being charged.
3. Set the Timer to the position indicated by the Honda Battery Tester; RED-3, RED-2 or YELLOW-1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: RED to Positive, BLACK to Negative.

Connect the battery cables only when the Power Switch is OFF.

⚠ WARNING

- *Connecting the cables with the Power Switch ON can produce a spark which could ignite or explode the battery.*

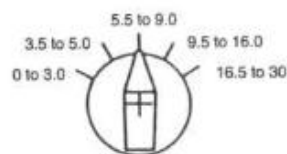
5. Turn the Power Switch to the ON position.
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the Power Switch OFF and disconnect the clamps.

NOTE

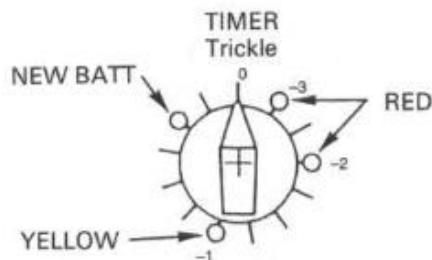
- The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.

7. Let the battery cool for at least ten minutes or until gassing subsides after charging.
8. Retest the battery using the Honda Battery Tester and recharge if necessary using the above steps.

BATTERY AMP HR. SELECTION SWITCH



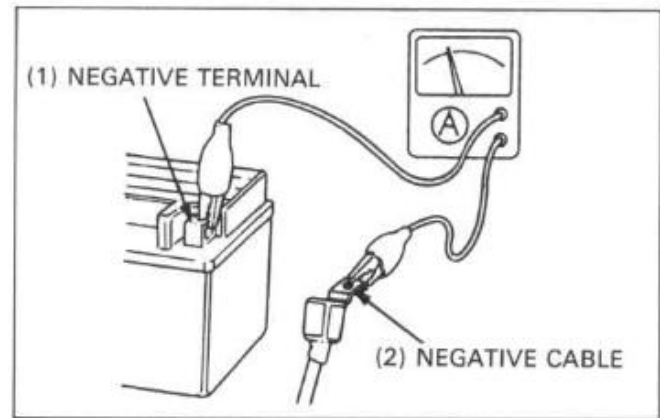
Set the appropriate amp. hour rating.



CHARGING SYSTEM

NOTE

- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on page 17-3.
- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the high capacity range first, then gradually down to low capacity ranges until you have the correct range so you do not damage the tester.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.



LEAKAGE INSPECTION

Check the battery ampere leakage before making the regulated ampere inspection.

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

Connect the tester between the negative cable and the negative terminal.

The ammeter should indicate less than 0.1 mA with the ignition switch off.

LEAKAGE AMPERE: 1 mA max.

REGULATED VOLTAGE INSPECTION

⚠ WARNING

- *If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

NOTE

- Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature. Stop the engine, and connect the voltmeter as shown. Connect the tachometer and restart the engine.

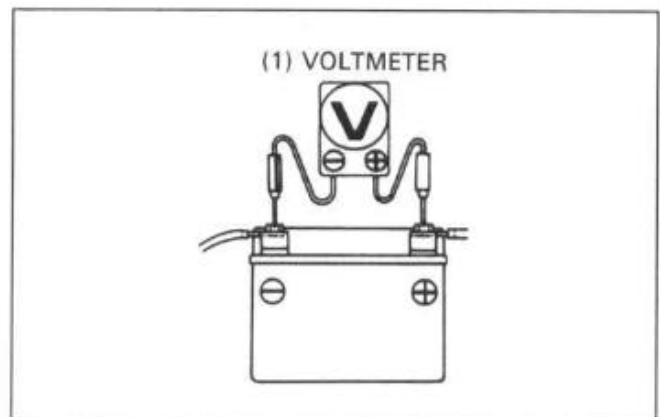
Allow the engine to idle, and increase the engine speed gradually.

The voltage should be controlled as specified.

STANDARD: 14.7 – 15.5 V at 5,000 rpm

CAUTION

- *Be careful not to allow the battery positive cable to touch the frame while testing.*



ALTERNATOR CHARGING COIL

NOTE

- It is not necessary to remove the stator coil to make this test.

INSPECTION

Disconnect the regulator/rectifier (alternator) 5P connector. Check the resistance between all three Yellow terminals.

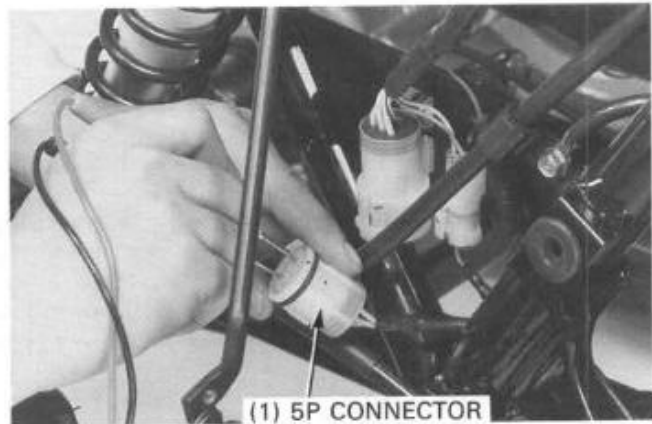
STANDARD: 0.1 – 1.0 Ω (20°C/68°F)

Check for continuity between all three Yellow terminals and Ground.

There should be no continuity.

Replace the alternator stator if readings are far beyond the standard, or if any wire has continuity to ground.

Refer to section 10 for stator removal.



REGULATOR/RECTIFIER

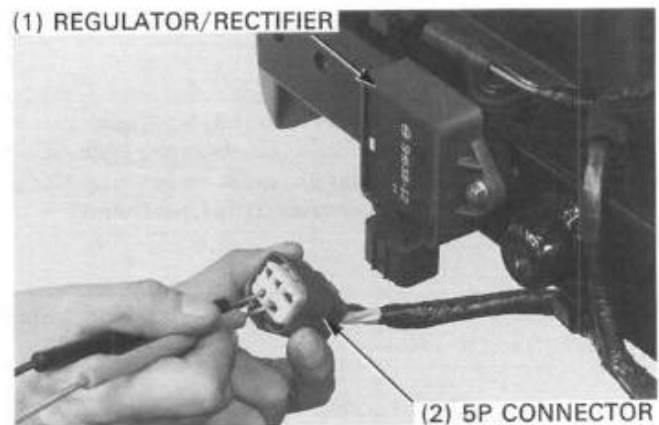
VOLTAGE INSPECTION

Disconnect the regulator/rectifier 5P connector, and check it for loose contact or corroded terminals.

If the regulated voltage reading (see page 17-7) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 – 1.0 Ω (20°C/68°F)
Ground line	Green and ground	Continuity should exist

If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connector, replace the regulator/rectifier unit.

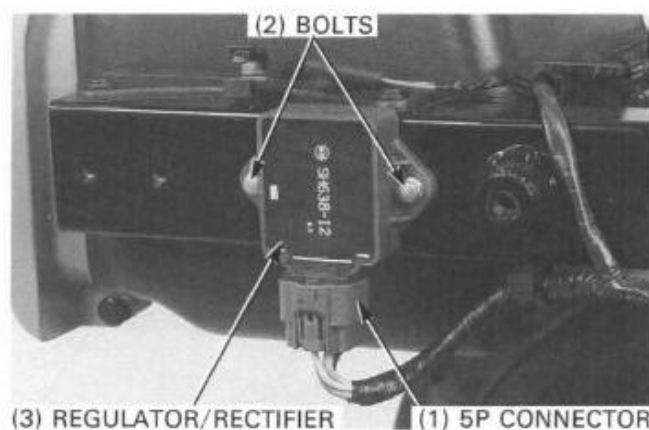


REPLACEMENT

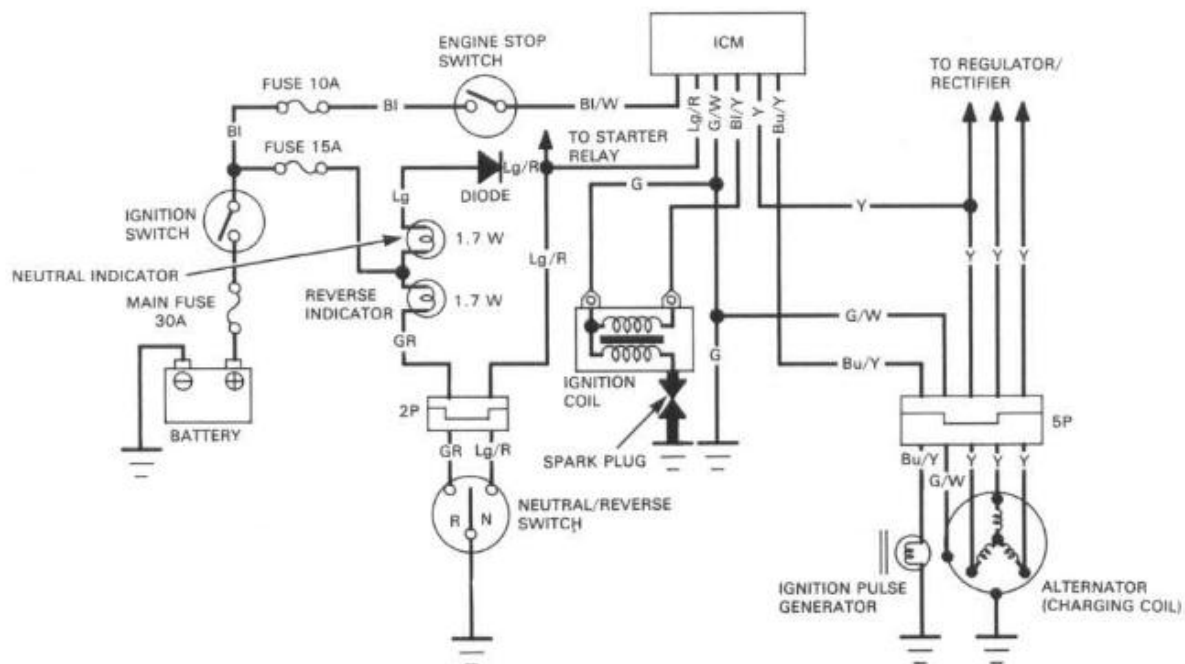
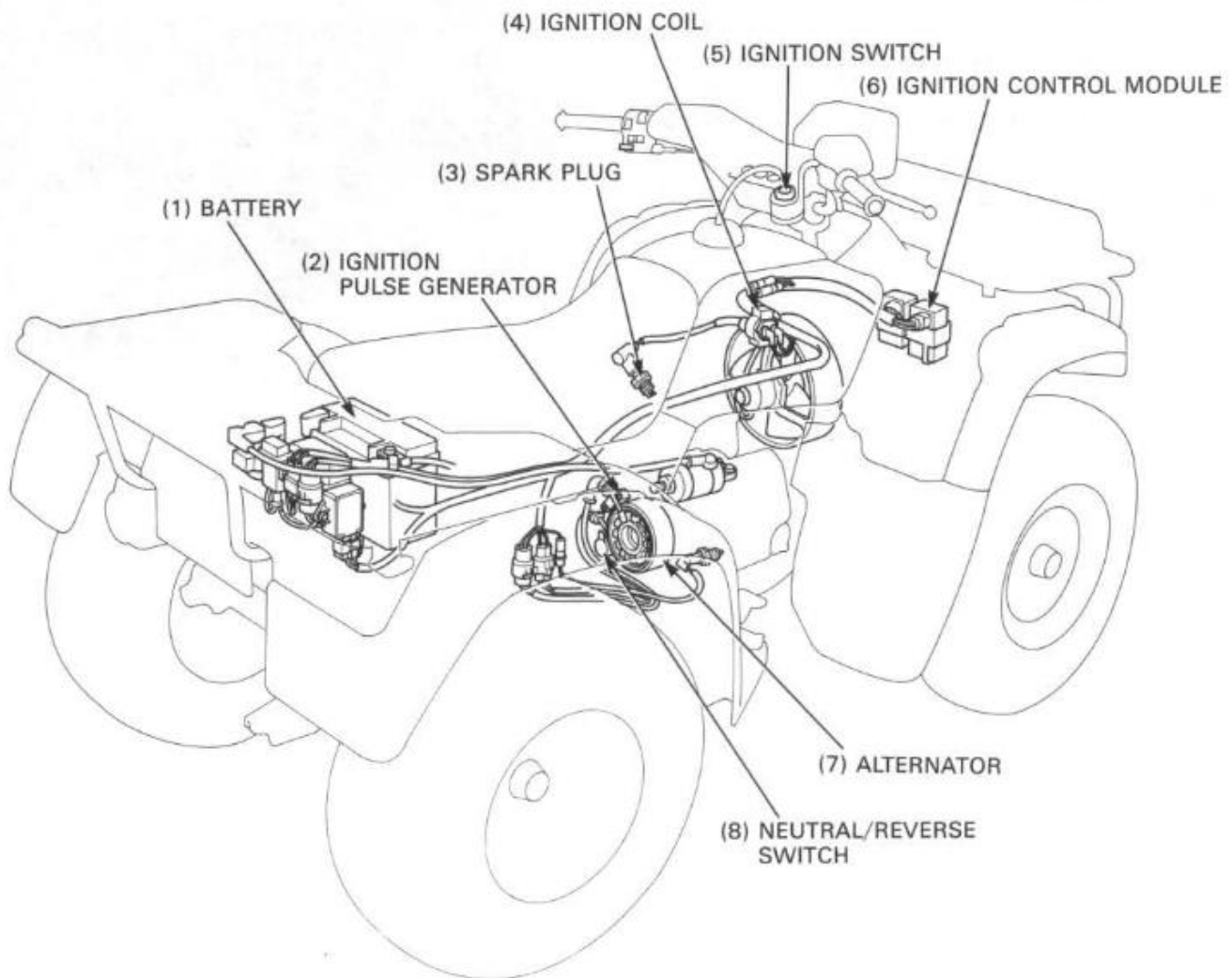
Disconnect the regulator/rectifier 5P connector.

Remove the regulator/rectifier mounting bolts and regulator/rectifier.

Install the regulator/rectifier in the reverse order of removal.



IGNITION SYSTEM



18.IGNITION SYSTEM

SERVICE INFORMATION	18-1	IGNITION COIL	18-6
TROUBLESHOOTING	18-3	IGNITION PULSE GENERATOR	18-7
IGNITION SYSTEM INSPECTION	18-4	IGNITION TIMING	18-8
AC SENSOR LINE	18-6		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.

CAUTION

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 18-3.
- The ignition timing cannot be adjusted since the Ignition Control Module (ICM) is factory preset.
- The Ignition Control Module (ICM) may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check all connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- This unit has a DC-CDI system with an AC sensor wire. Don't forget to verify battery condition and check the AC sensor wire from the alternator to the ICM when troubleshooting.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Spark plug		NGK	NIPPONDENSO
	Standard	DPR7EA-9	X22EPR-U9
	For cold climate (below 5°C/41°F)	DPR6EA-9	X20EPR-U9
	For extended high speed riding	DPR8EA-9	X24EPR-U9
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)	
Ignition coil peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition coil resistance (20°C/68°F)	Primary	0.1 – 0.2 Ω	
	Secondary with spark plug cap	6.5 – 9.8 kΩ	
	Secondary without spark plug cap	2.7 – 3.5 kΩ	
Ignition pulse generator resistance		290 – 360 Ω	
Ignition timing	"F" mark	10° BTDC at 1,400 rpm	
	Full advance	30° BTDC at 4,500 rpm	

IGNITION SYSTEM

TORQUE VALUES

Spark plug	18 N•m (1.8 kg-m, 13 lb-ft)	
Timing hole cap	10 N•m (1.0 kg-m, 7 lb-ft)	
Ignition pulse generator socket bolt	6 N•m (0.6 kg-m, 4.3 lb-ft)	Apply a locking agent

TOOLS

Imrie diagnostic tester (model 625) or Peak voltage adapter	07HGJ-0020100 with Commercially available digital multimeter (impedance 10 M Ω /DCV minimum)
--	---

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water got into the spark plug cap (leaking the ignition coil secondary voltage)
- Temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- Before starting troubleshooting, disconnect the alternator 5P connector, and check continuity between Yellow (ICM connector on the wire harness side) and Yellow on the wire harness side of the alternator connector.

No spark at plug

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	Low peak voltage.	1. The multimeter impedance is too low. 2. Cranking speed is too low. • Battery under-charged. 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once). 4. Poorly connected connectors or an open circuit in ignition system. 5. Faulty ICM (in case when above No. 1 – 4 are normal).
	No peak voltage.	1. Incorrect peak voltage adapter connections (does not apply to Imrie tester). 2. Short circuit in engine stop switch wire. 3. Faulty ignition switch or engine stop switch. 4. Loose or poor connected ICM connectors. 5. Open circuit or poor connection in ground wire of the ICM. 6. Faulty peak voltage adapter or Imrie tester. 7. Faulty ignition pulse generator. 8. Faulty ICM (in case when above No. 1 – 7 are normal).
	Peak voltage is normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current. 2. Faulty ignition coil.
Ignition pulse generator	Low peak voltage.	1. The multimeter impedance is too low. 2. Cranking speed is too low. • Battery under-charged. 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once). 4. Faulty ignition pulse generator (in case when above No. 1 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adapter or Imrie tester. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

NOTE

- If there is no spark at plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adapter to the digital multimeter, or use the Imrie diagnostic tester.

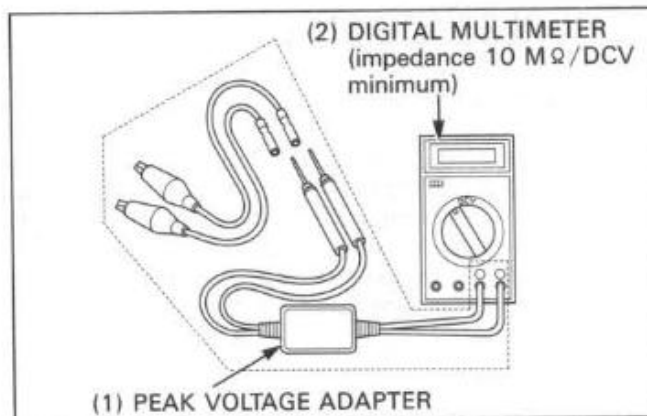
TOOLS:

Imrie diagnostic tester (model 625) or

Peak voltage adapter

07HGJ - 0020100 with

Commercially available digital multimeter (impedance 10 M Ω /DCV minimum)



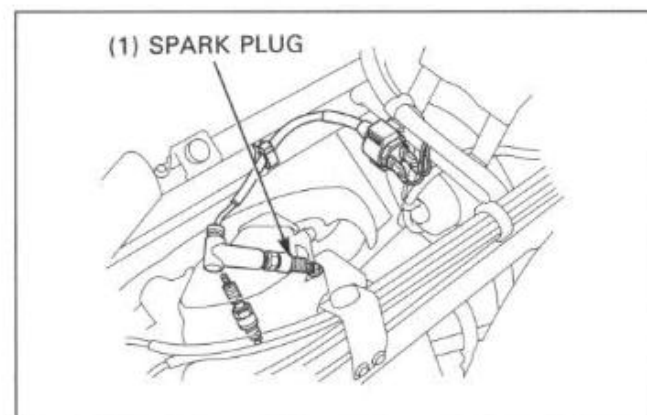
IGNITION PRIMARY PEAK VOLTAGE

NOTE

- Check all connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plug is installed correctly.

Shift the transmission into neutral, disconnect the spark plug cap from the spark plug.

Connect a good known spark plug to spark plug cap and ground the spark plug to the cylinder as done in a spark test.



Connect the peak voltage adapter or Imrie tester to the ignition coil.

NOTE

- Do not disconnect the ignition coil primary wires.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adapter 07HGJ - 0020100 with
Commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

Connection:

Black/Yellow terminal (+) - Body ground (-)

Turn the ignition switch "ON" and engine stop switch to "RUN".

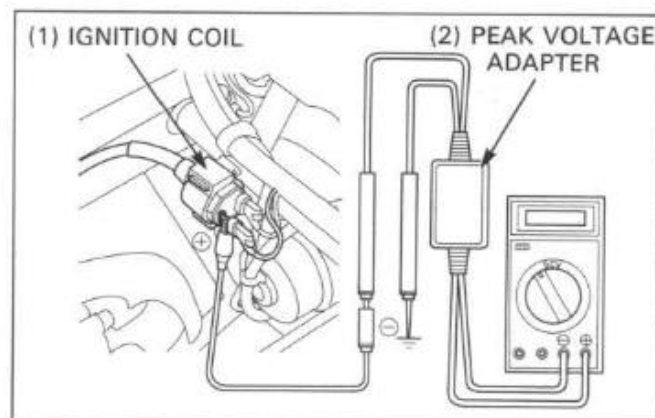
Crank the engine with the starter motor and read ignition coil primary peak voltage.

PEAK VOLTAGE: 100V minimum

⚠ WARNING

- Avoid touching the spark plug and tester probes to prevent electric shock.

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting on page 18-3.



IGNITION PULSE GENERATOR PEAK VOLTAGE

Disconnect the ignition pulse generator 5P connector and connect the peak voltage adapter or Imrie tester probes to the connector terminals of the ignition pulse generator side.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adapter 07HGJ-0020100 with
Commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

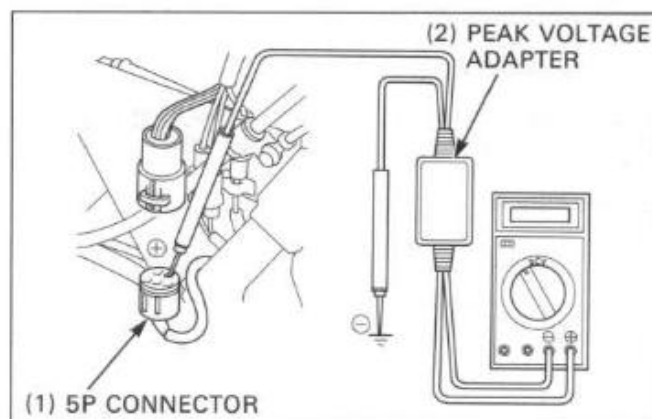
Connection:

Blue/Yellow terminal (+) - Body ground (-)

Crank the engine with the starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting on page 18-3.



AC SENSOR LINE

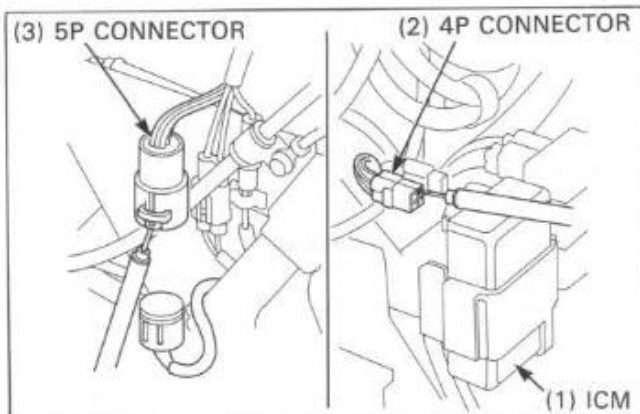
INSPECTION

NOTE

- It is not necessary to remove the stator coil to make this test.

Disconnect the ICM 4P connector and alternator 5P connector.
Check for continuity between connector terminals as below.

	ICM 4P connector Yellow terminal
Alternator 5P connector Yellow terminal	Continuity
Alternator 5P connector Green terminal	No continuity



IGNITION COIL

INSPECTION

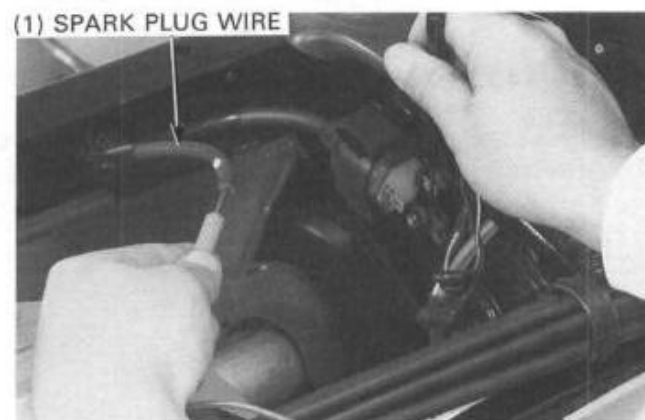
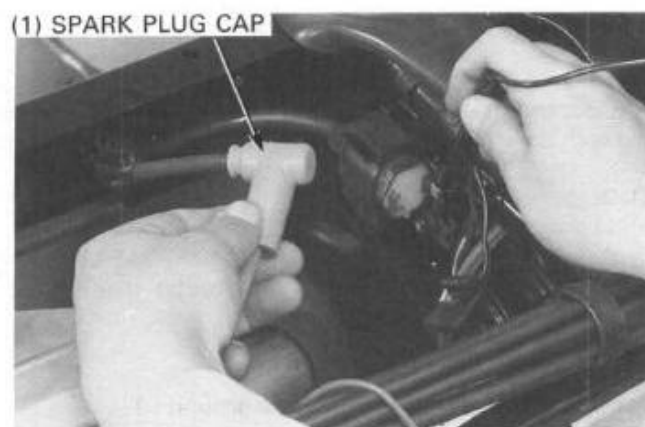
Remove the fuel tank and heat guard (page 5-18).

Disconnect the ignition coil primary wires and measure the primary coil resistance.

STANDARD: 0.1 – 1.0 Ω (20°C/68°F)

Disconnect the spark plug cap from the plug and measure the secondary coil resistance between the spark plug cap.

STANDARD: 6.5 – 9.8 k Ω (20°C/68°F)



If the resistance is out of the range, remove the spark plug cap from the spark plug wire.
Measure the secondary coil resistance between the spark plug wire.

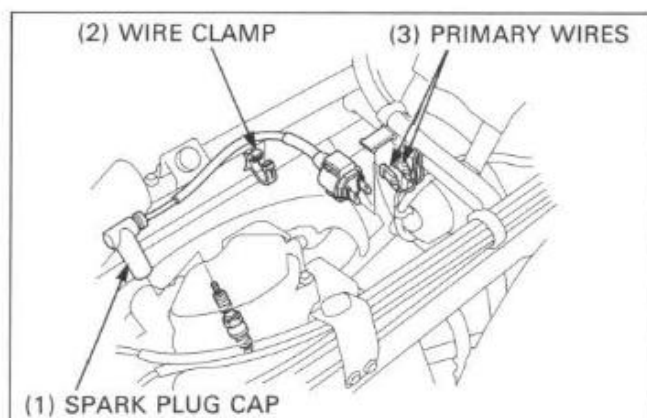
STANDARD: 2.7 – 3.5 k Ω (20°C/68°F)

REMOVAL/INSTALLATION

Remove the fuel tank and heat guard (page 5-18).

Disconnect the spark plug cap from the plug.
Release the spark plug wire from the clamp.
Disconnect the primary wires from the ignition coil.
Remove the ignition coil.

Installation is in the reverse order of removal.



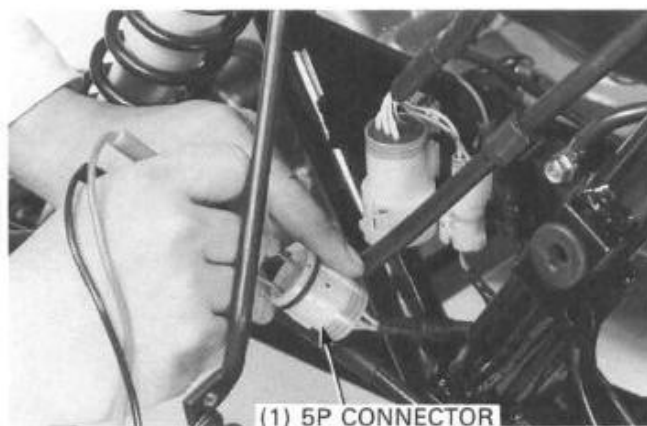
IGNITION PULSE GENERATOR

INSPECTION

Disconnect the ignition pulse generator 5P connector.

Measure the resistance between the Blue/Yellow terminal and Ground.

STANDARD: 290 – 360 Ω (20°C/68°F)

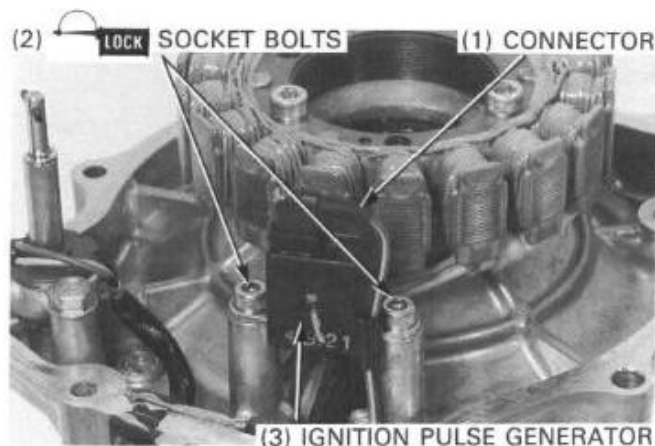


REMOVAL

Remove the alternator cover (page 10-6).

Disconnect the ignition pulse generator connector and release the code from the ignition pulse generator body groove.

Remove the socket bolts and ignition pulse generator.



INSTALLATION

Install the ignition pulse generator onto the alternator cover.

Apply a locking agent to the ignition pulse generator socket bolt threads.

Install and tighten the socket bolts to the specified torque.

TORQUE: 6 N·m (0.6 kg·m, 4.3 lb·ft)

Apply sealant to the ignition pulse generator grommet.

Install the ignition pulse generator grommet into the groove of the body securely.

Install the alternator cover (page 10-13).

IGNITION TIMING

NOTE

- Read the manufacturer's instructions for timing light operation.

Warm up the engine.

Stop the engine and remove the timing hole cap.

Connect the timing light to the spark plug wire.
Start the engine and let it idle.

IDLE SPEED: 1.400 ± 100 rpm

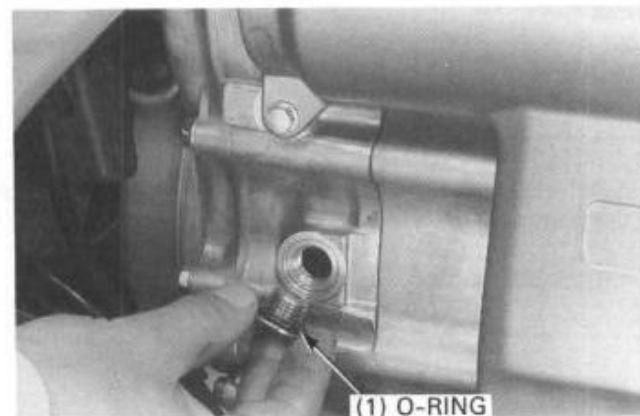
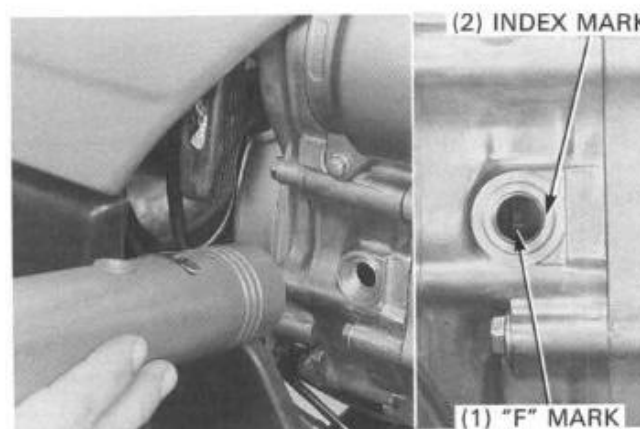
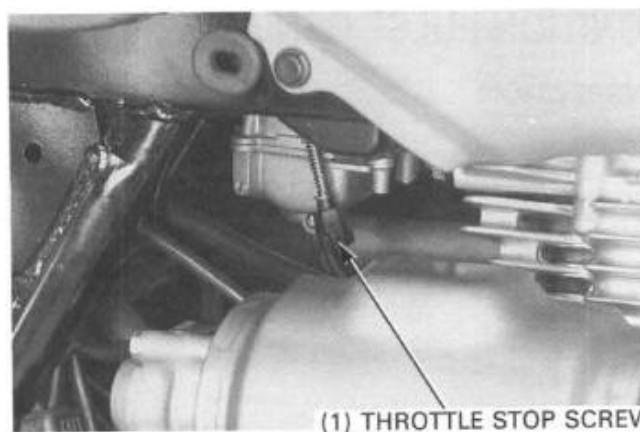
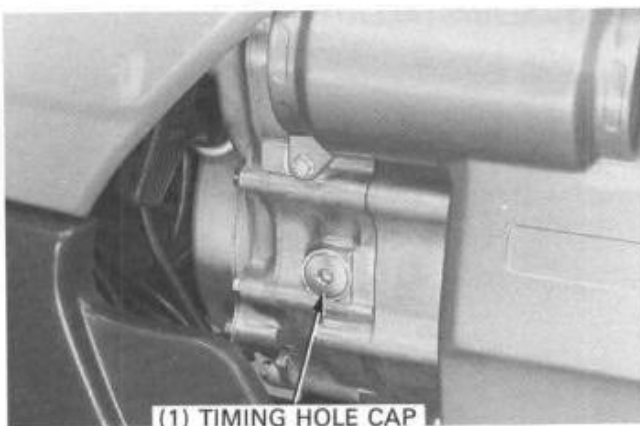
If necessary, adjust the idle speed with the throttle stop screw.

The ignition timing is correct if the "F" mark aligns with the index mark on the rear crankcase cover.

Check that the O-ring is in good condition. replace if necessary.

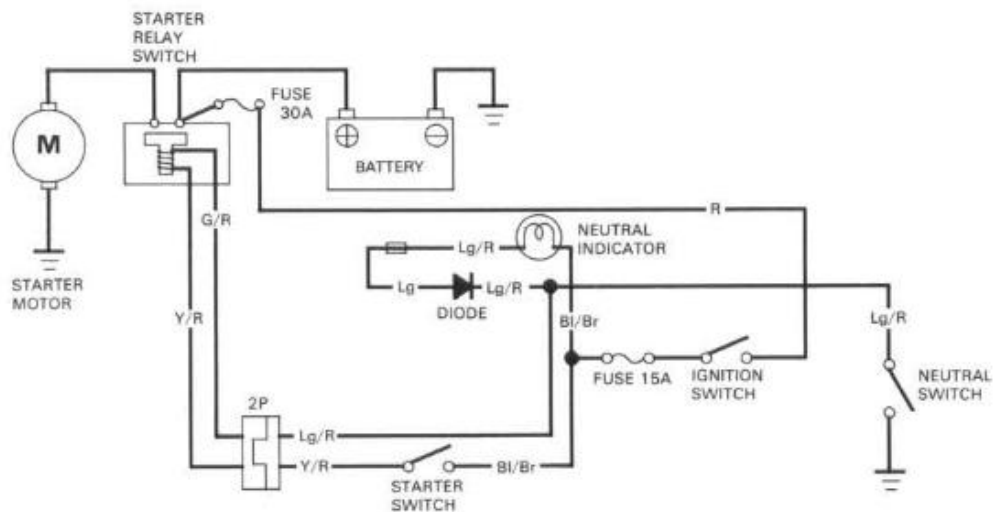
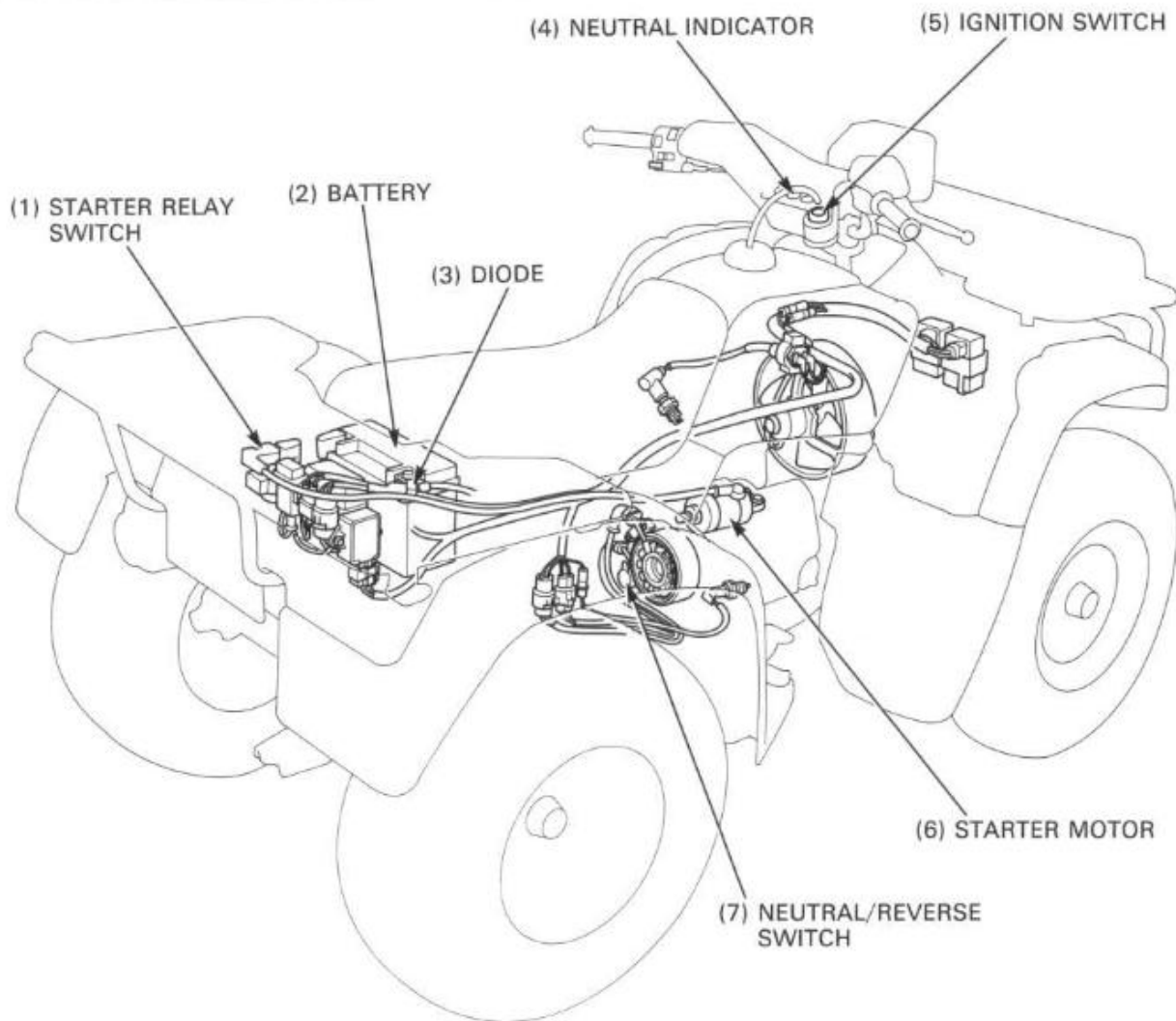
Apply oil to the O-ring and install and tighten the timing hole cap.

TORQUE: 10 N·m (1.0 kg-m, 7 lb-ft)



MEMO

ELECTRIC STARTER



19.ELECTRIC STARTER

SERVICE INFORMATION	19-1	STARTER RELAY SWITCH	19-7
TROUBLESHOOTING	19-2	DIODE	19-8
STARTER MOTOR	19-3		

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.
- For the starter reduction gear removal/installation, see section 10.

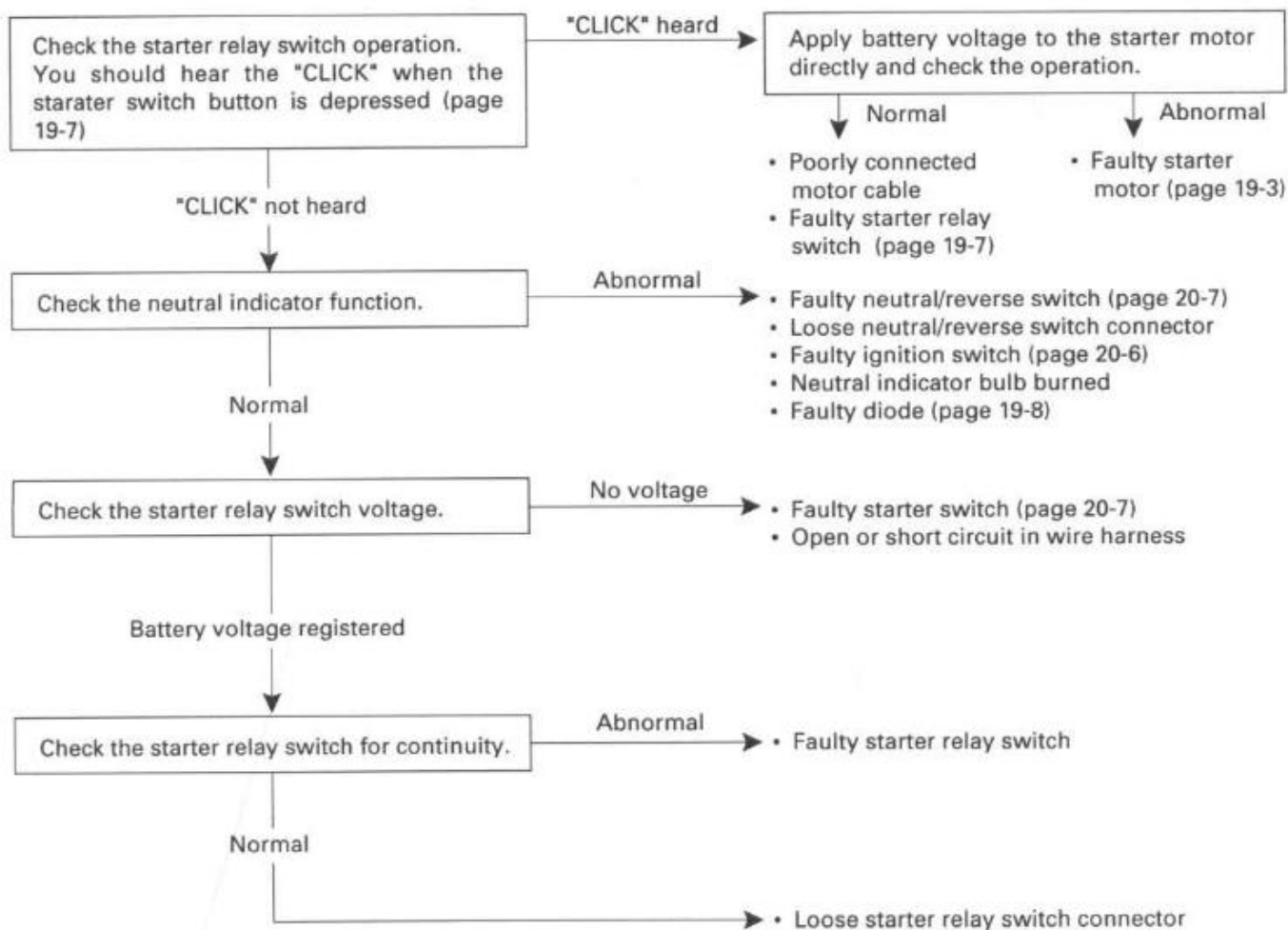
Unit: mm (in)

ITEM	SPECIFICATIONS	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	9.0 (0.35)

TROUBLESHOOTING

NOTE

- The starter motor should operate only when the transmission is in neutral.
- Check the following items before troubleshooting the system.
 - Blown fuse (15A)
 - Battery and starter motor cables for loose connection
 - Battery discharged

Starter motor does not turn**Starter motor turns engine slowly**

- Low battery voltage
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns, but engine does not turn

- Faulty starter clutch (see section 10)
- Faulty starter reduction gears (see section 10)

Starter motor and engine turns, but engine does not start

- Faulty ignition system (see section 18)
- Engine problems (see section 3, 7)
 - Low compression
 - Fouled spark plug

STARTER MOTOR

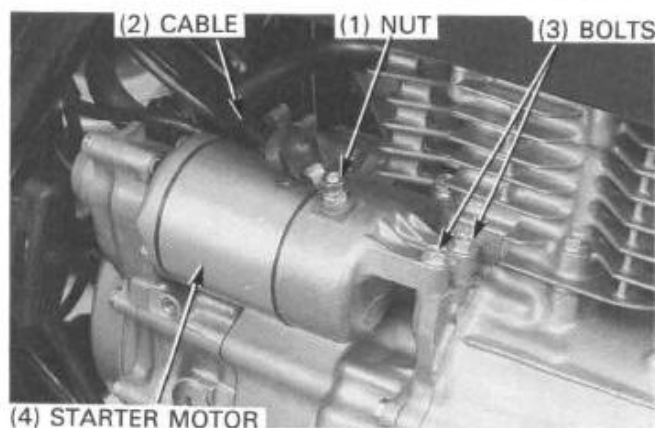
REMOVAL

⚠ WARNING

- When the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the right engine side cover (page 6-2).

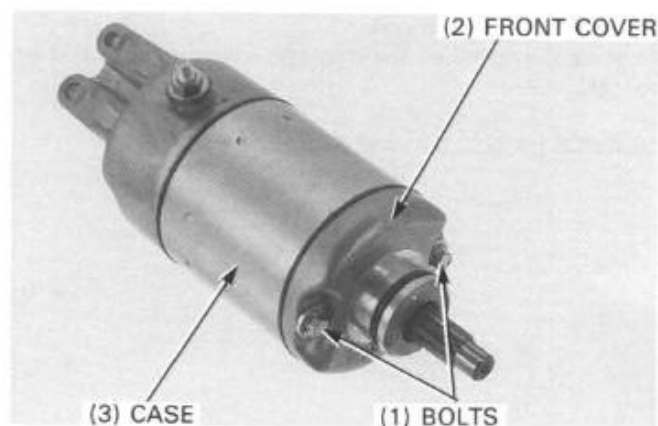
Disconnect the starter cable from the starter motor.
Remove the two mounting bolts and the starter motor.



DISASSEMBLY

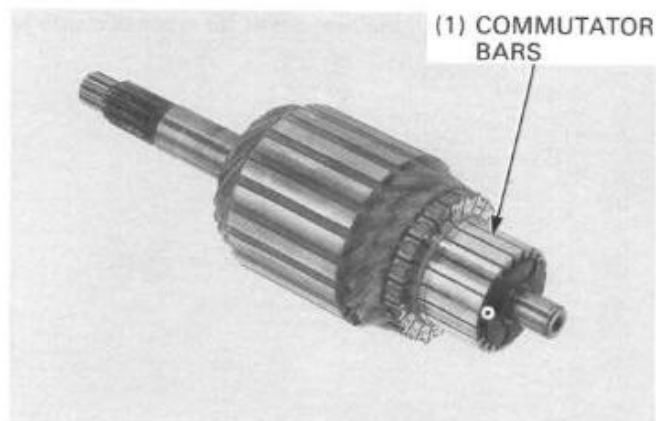
Remove the two starter motor case bolts and remove the front cover, motor case and armature coil.

Record the number and location of shims for correct assembly.

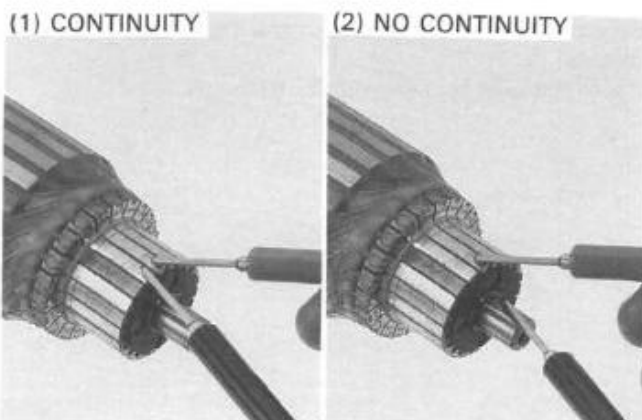


INSPECTION

Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.



Check for continuity between individual commutator bars; there should be continuity. Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.



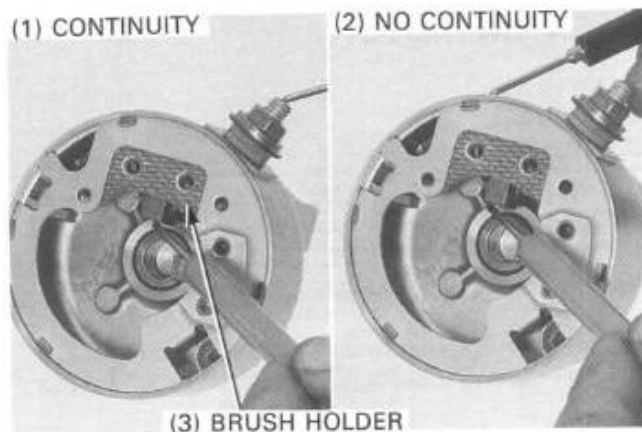
ELECTRIC STARTER

Check for continuity between the cable terminal and the brush wire (the indigo colored wire or the insulated brush holder).

There should be continuity.

Check for continuity between the rear cover and the brush wire (the indigo cover wire or the insulated brush holder).

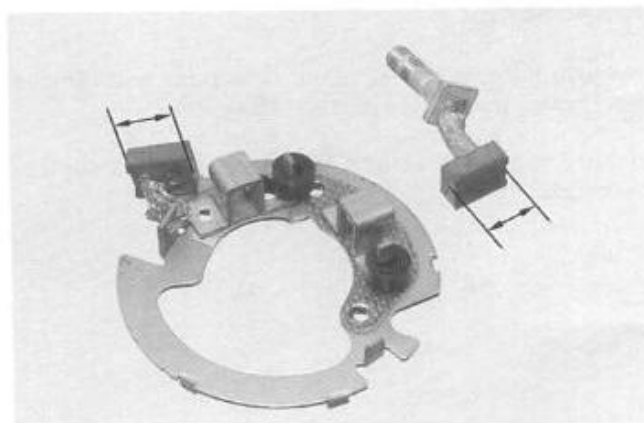
There should be no continuity.



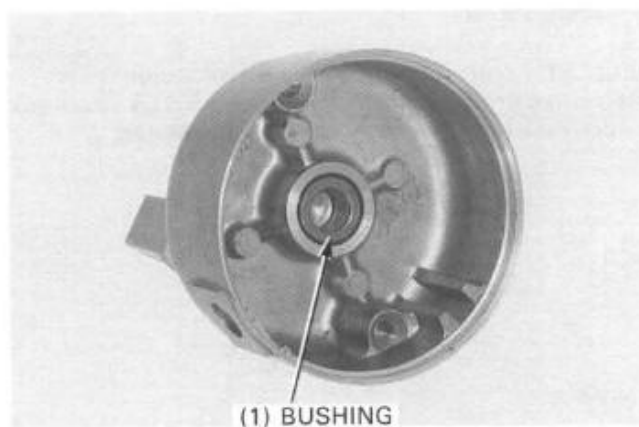
Disassemble the rear cover.

Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 9.0 mm (0.35 in)

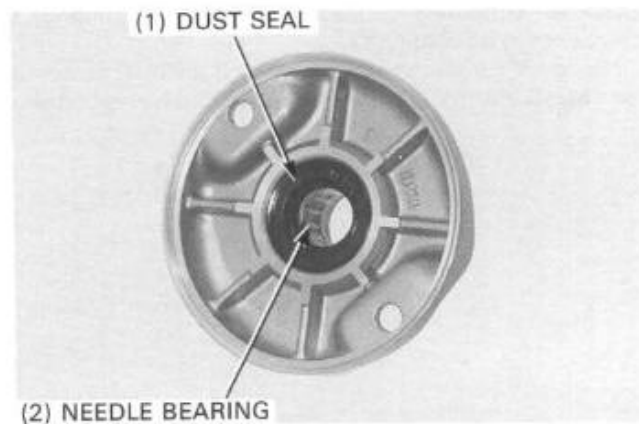


Check the bushing of the rear cover for wear or damage.

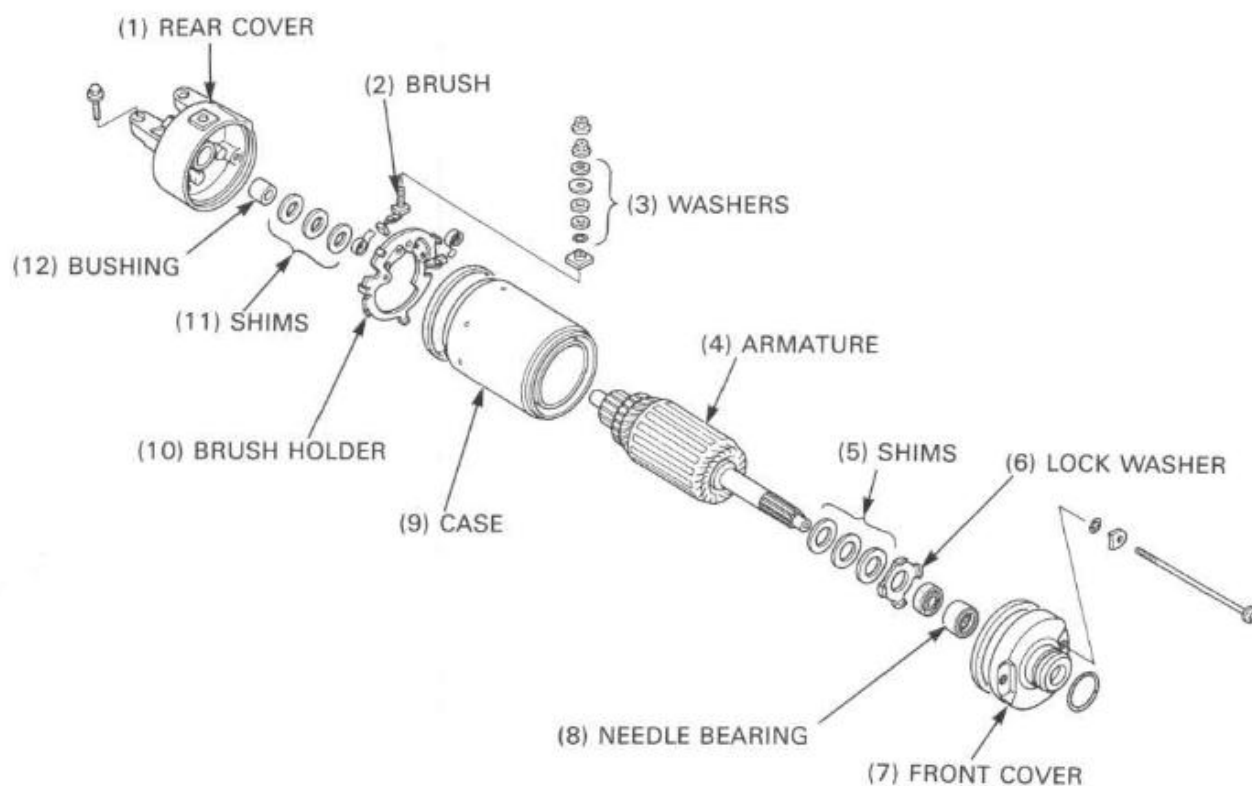


Check the needle bearing of the front cover for smooth rotation.

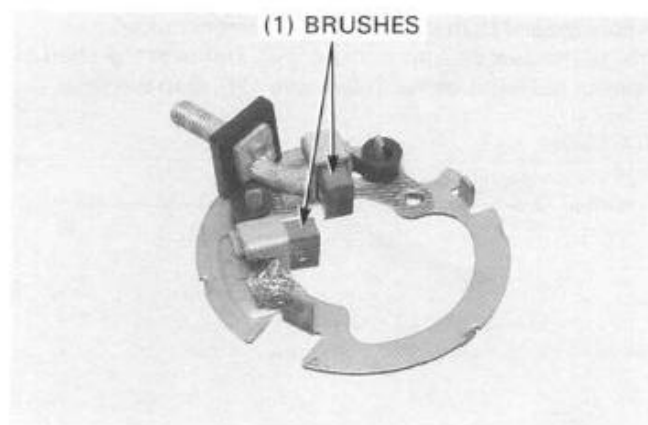
Check the dust seal for wear or damage.



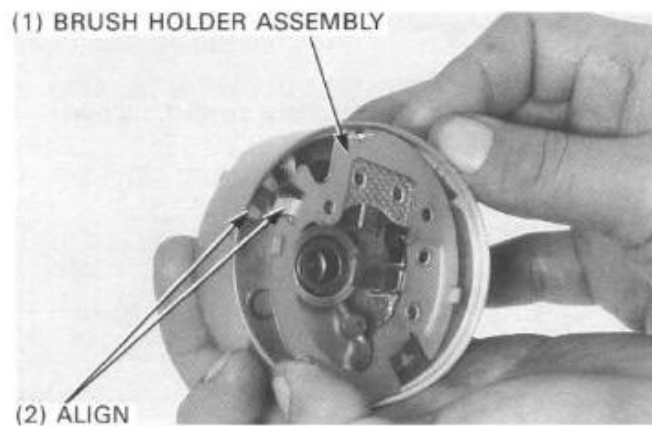
ASSEMBLY



Install the brushes in the brush holders as shown.



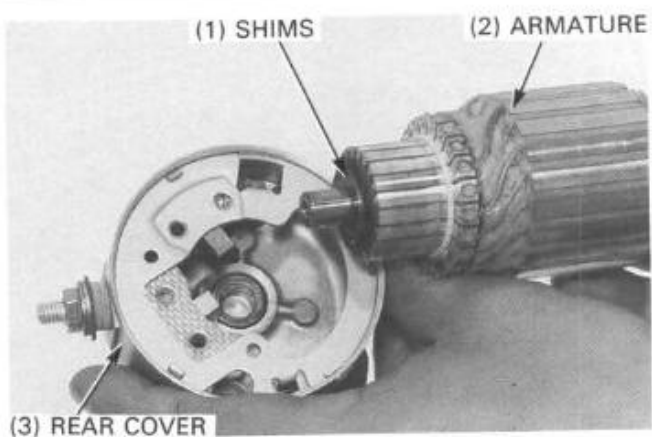
Install the brush holder assembly to the rear cover, aligning the tab of the holder with the groove of the rear cover.



ELECTRIC STARTER

Install the shims to the terminal and armature coil in the correct positions as recorded.

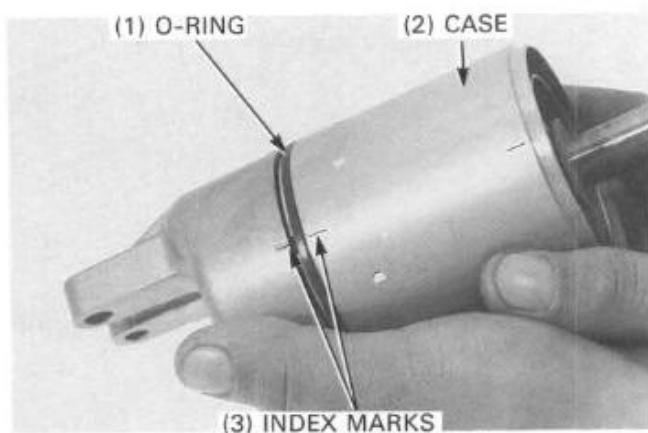
Install the armature in the rear cover.



Install the O-ring on the motor case.
Assemble the motor case and rear cover, aligning the index marks.

NOTE

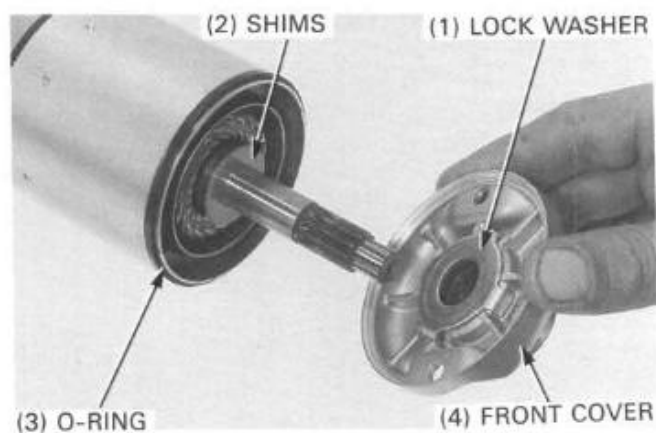
- Hold the armature coil shaft, or armature might be drawn out by the magnetic field.



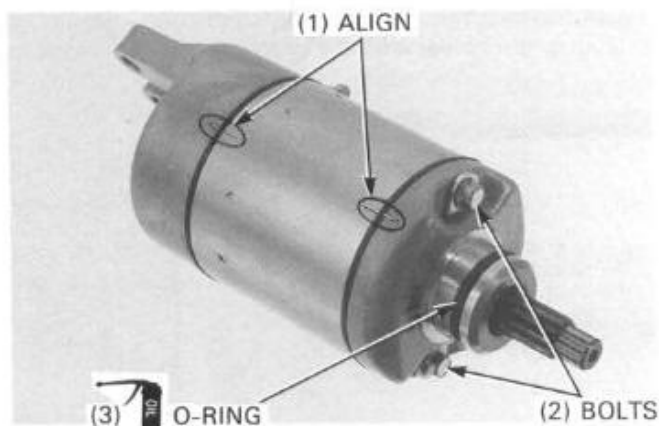
Apply grease to the dust seal of the front cover.
Install the lock washer to the cover, shims to the shaft in the correct positions as recorded, and O-ring to the case.

CAUTION

- Do not damage the front cover dust seal.



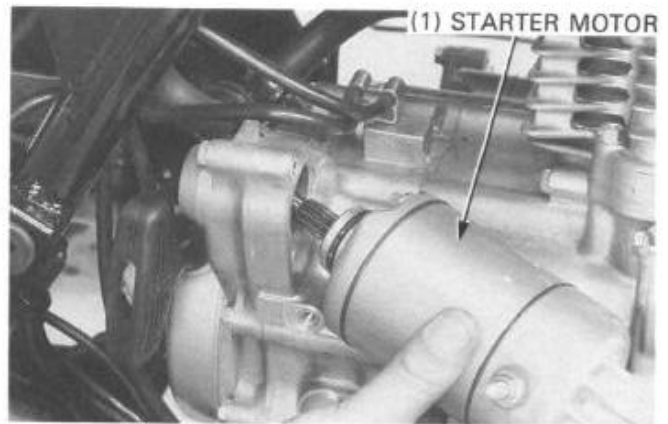
Align the index marks of the front cover, motor case and rear cover.
Install the bolts securely.
Apply oil to the O-ring and install it on the front cover.



INSTALLATION

Install the starter motor with the two mounting bolts.
Connect the starter cable to the motor.

Install the right engine side cover (page 6-7).



STARTER RELAY SWITCH

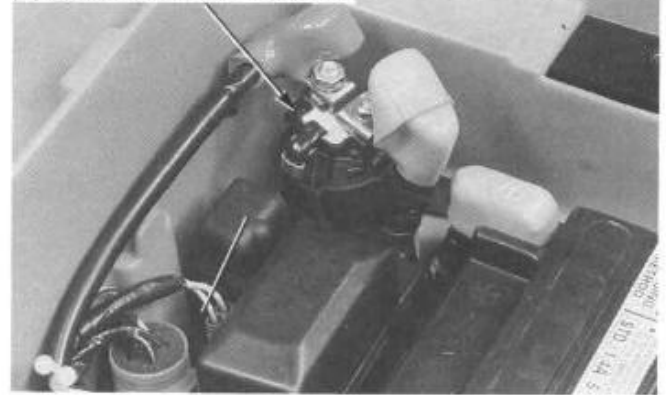
OPERATION INSPECTION

Remove the seat and battery holder bracket.

Depress the starter switch button with the ignition switch ON.

The coil is normal if the starter relay switch clicks.

(1) STARTER RELAY SWITCH

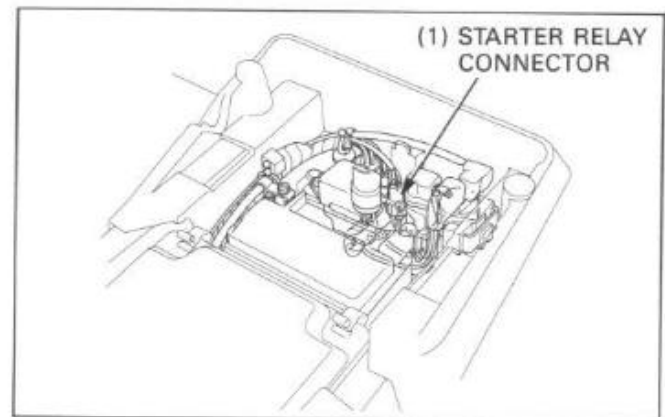


VOLTAGE INSPECTION

If the switch "CLICK" is not heard, disconnect the relay connector.

Measure the voltage between the Yellow/Red (+) and Green/Red (-) wire terminals of the wire harness side.

The battery should be indicated when the starter switch button is depressed with the ignition switch ON and the transmission in neutral.



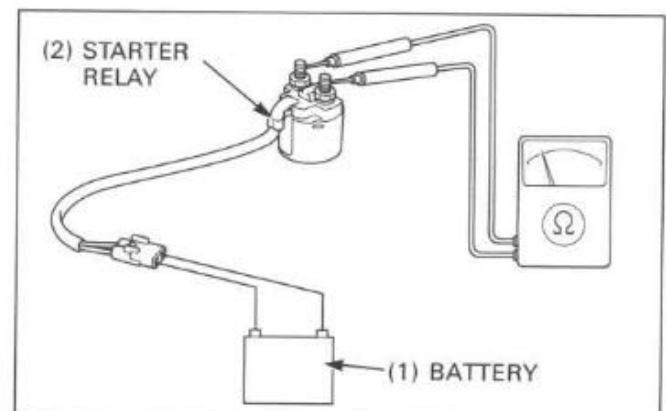
CONTINUITY INSPECTION

Connect an ohmmeter to the starter relay switch large terminals.

Connect a fully charged 12V battery to the starter relay switch connector terminals (Yellow/Red and Green/Red).

Check for continuity between the starter relay switch terminals.

There should be continuity while 12V battery is connected to the starter relay switch connector terminals and should be no continuity when the battery is disconnected.

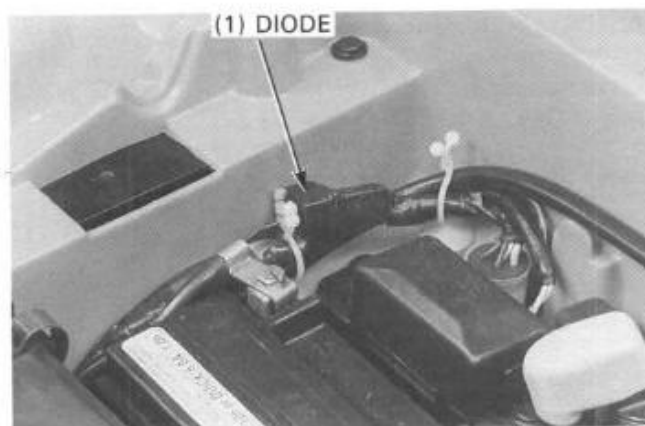


DIODE

REMOVAL

Remove the seat (page 2-3).

Unwrap the tape and remove the diode from the wire harness.



INSPECTION

Check for continuity with an ohmmeter.

Normal direction: Continuity

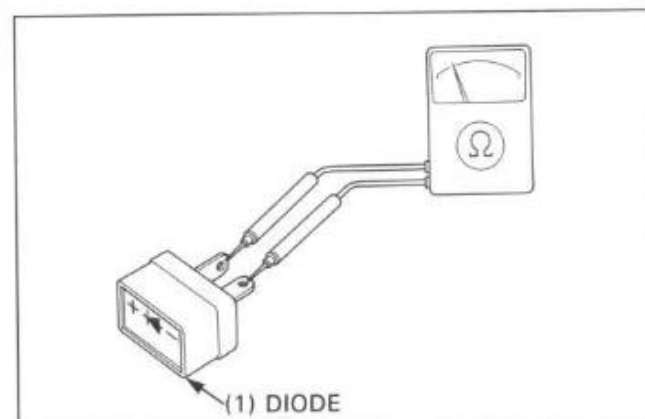
Reverse direction: No continuity

INSTALLATION

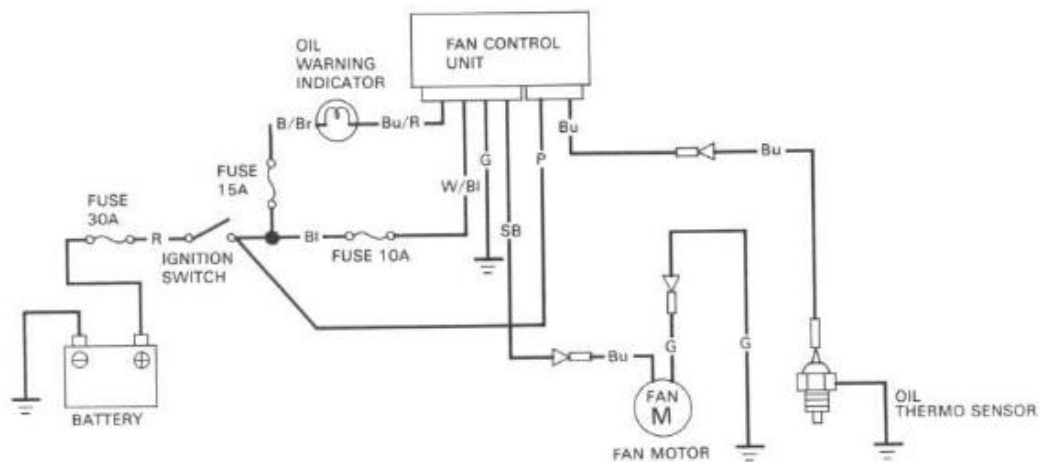
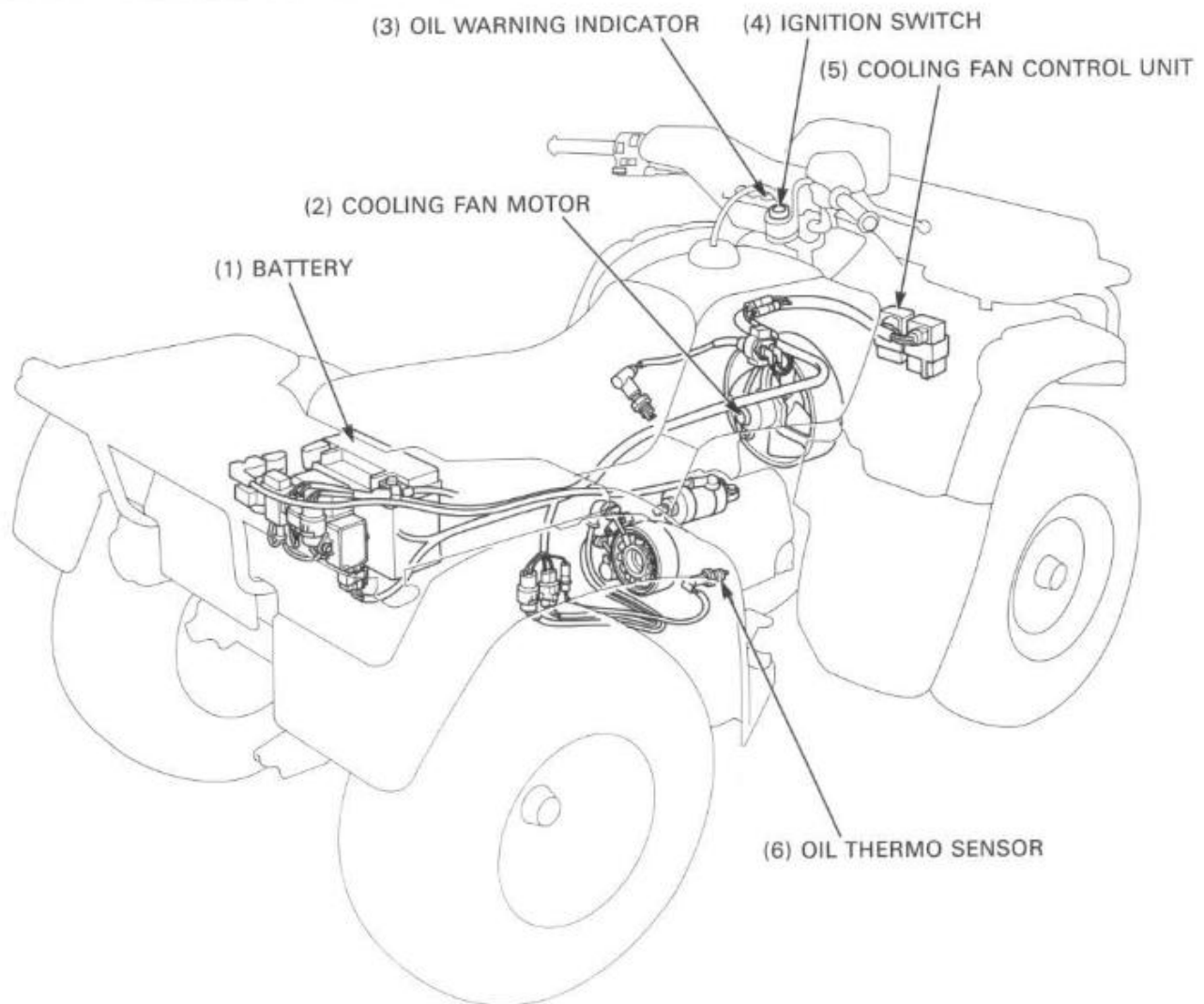
Install the diode.

Tape the diode to the harness

Install the seat (page 2-4).



MEMO



20.LIGHTS/SWITCHES

SERVICE INFORMATION	20-1	IGNITION SWITCH	20-6
TROUBLESHOOTING	20-1	HANDLEBAR SWITCHES	20-7
HEADLIGHT	20-3	NEUTRAL/REVERSE SWITCH	20-7
ASSIST HEADLIGHT	20-4	COOLING FAN CONTROL UNIT	20-8
TAILLIGHT	20-5	OIL THERMO SENSOR	20-9
INDICATOR LAMPS	20-6		

SERVICE INFORMATION

GENERAL

- A continuity check can usually be made without removing the part from the vehicle by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals.
- When inspecting the oil warning system, check the system components and lines step-by-step, according to the troubleshooting on the next page.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlights	12V-25W X 2
	Assist headlight	12V-45W
	Taillights	12V-5W X 2
	Indicators (Oil/Reverse/Neutral)	12V-1.7W X 3
Fuse	Main fuse	30A
	Sub fuses	15A X 2, 10A X 2

TORQUE VALUES

Neutral/reverse switch mounting bolt	12 N•m (1.2 kg-m, 9 lb-ft)	Apply a locking agent
Oil thermo sensor	18 N•m (1.8 kg-m, 13 lb-ft)	

TROUBLESHOOTING

Light does not come on when light switch is turned on

- Bulb burned out
- Faulty switch
- Wiring to that component has open circuit

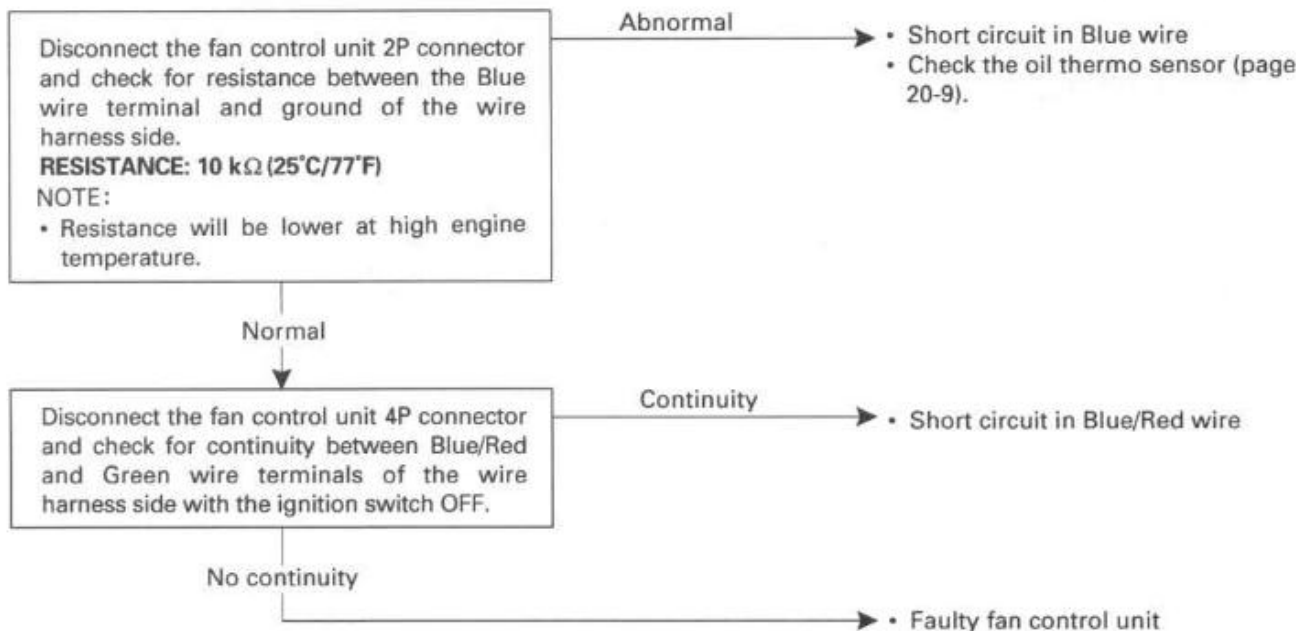
Headlight beams do not shift when dimmer switch is operated

- Faulty dimmer switch
- Bulb burned out
- Wiring to that component has open circuit

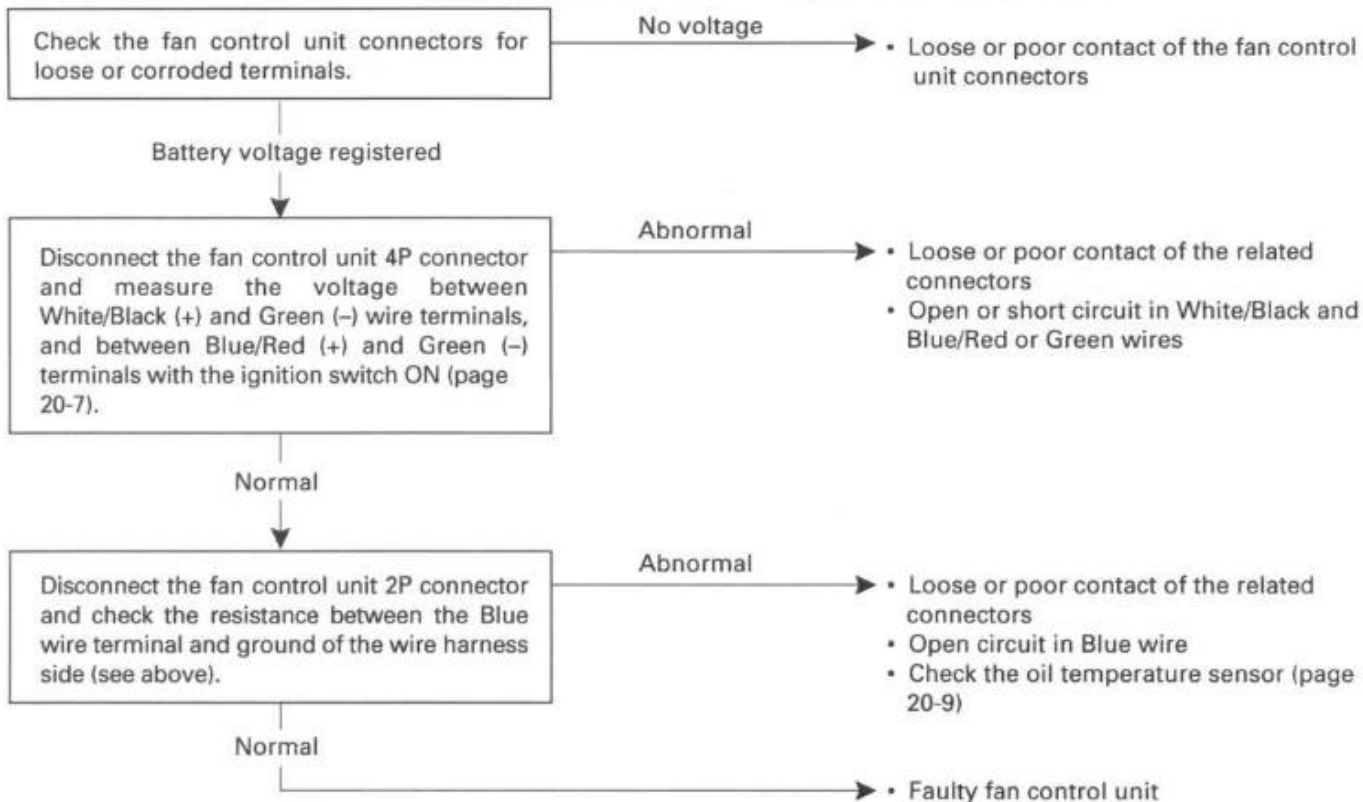
NOTE

- To check the cooling fan motor function, disconnect the cooling fan control unit 4P connector. The cooling fan motor should turn when directly connect the battery to the Sky blue (+) and Green (-) terminals of the wire harness side. Also connect the battery directly to the Blue (+) and Green (-) terminals of the wire harness side, check that the oil warning indicator bulb functions
- When the ignition switch is turned on, the oil warning indicator should come on for a few seconds then go off.

Oil warning indicator does not go off



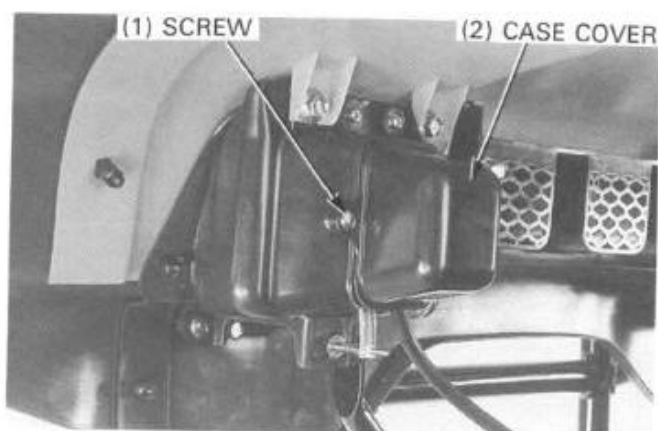
Oil warning indicator does not come on for a few seconds, when the ignition switch is turned on



HEADLIGHT

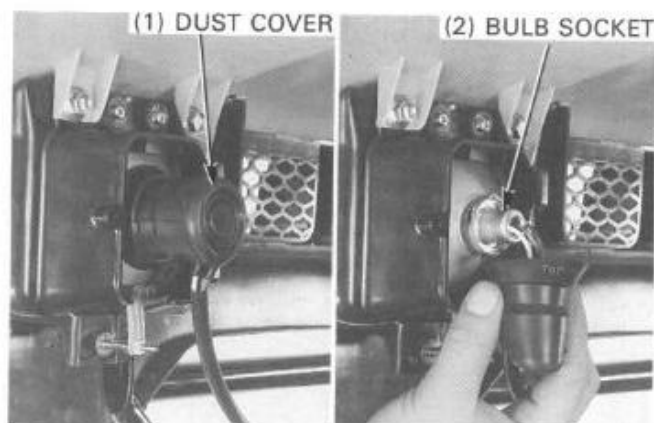
BULB REPLACEMENT

Remove the screw and headlight case cover.



Remove the dust cover.

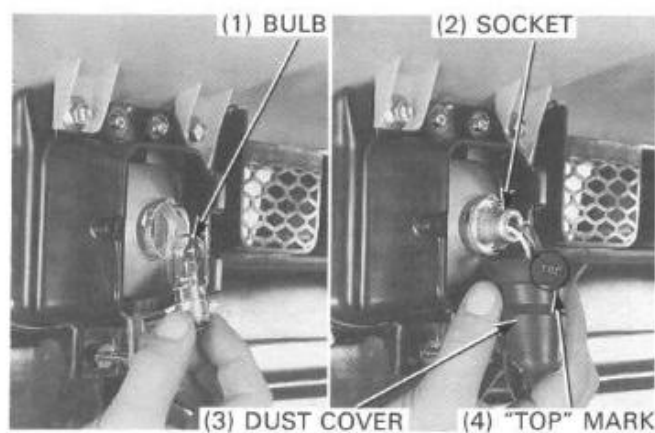
Remove the bulb socket and bulb.



Install a new bulb in the case, aligning the bulb tab with the case groove.

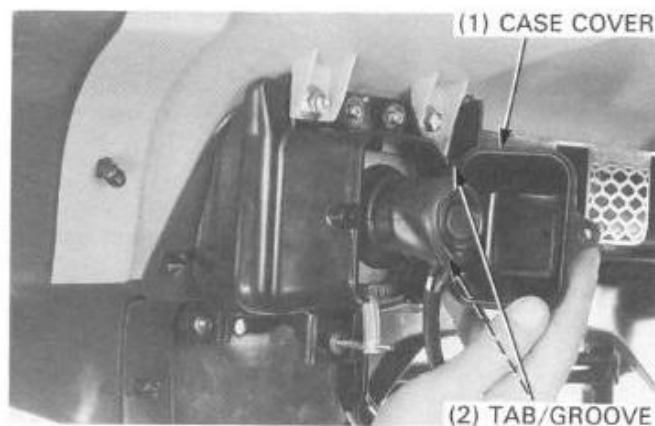
Install the bulb socket.

Install the dust cover with its "TOP" mark facing up.



Install the headlight case cover aligning its tab with the headlight unit groove.

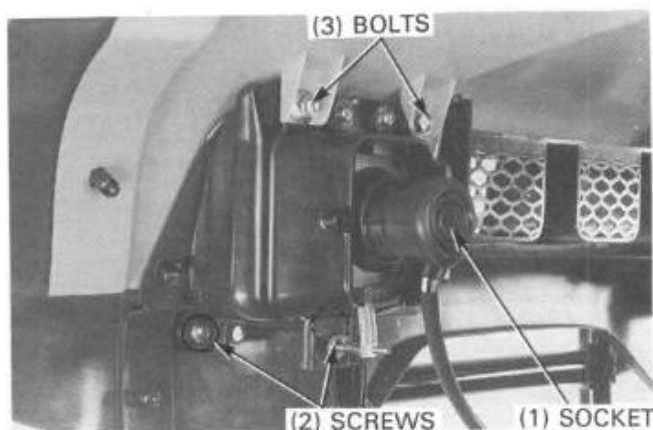
Install and tighten the screw.



REMOVAL/INSTALLATION

Remove the headlight socket.
Remove the bolts, screws and headlight.

Installation is in the reverse order of removal.
After installation, adjust the headlight aim.



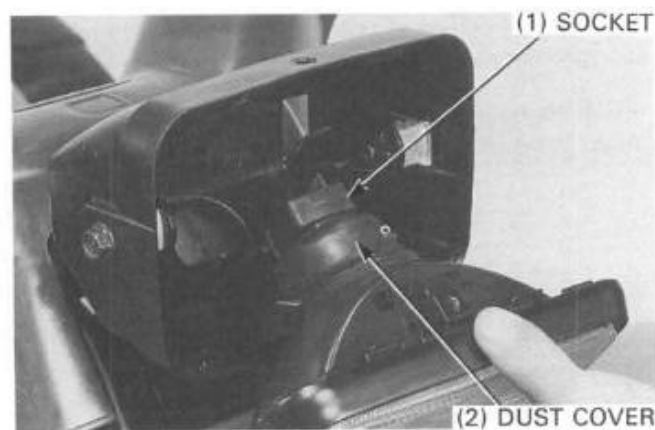
ASSIST HEADLIGHT

BULB REPLACEMENT

Remove the screws and assist headlight unit.



Disconnect the headlight socket.
Remove the dust cover.

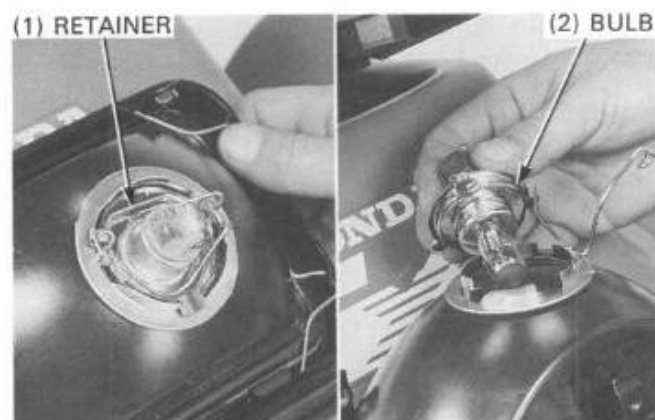


Release the bulb retainer and replace the bulb.

CAUTION

- Avoid touching halogen headlight bulbs. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.



Install the dust cover tightly against the headlight unit.

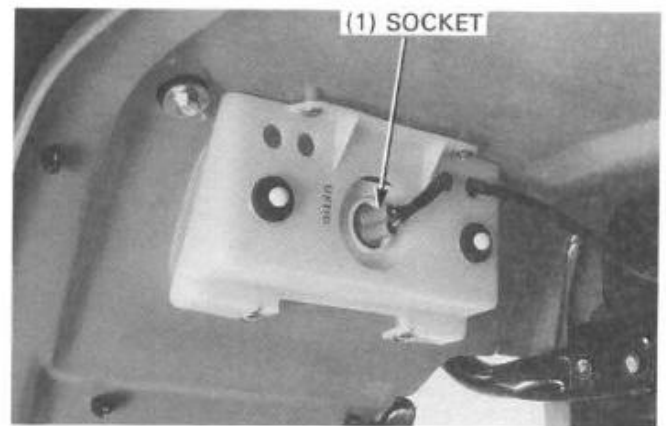
Install the headlight in the reverse order of removal.



TAILLIGHT

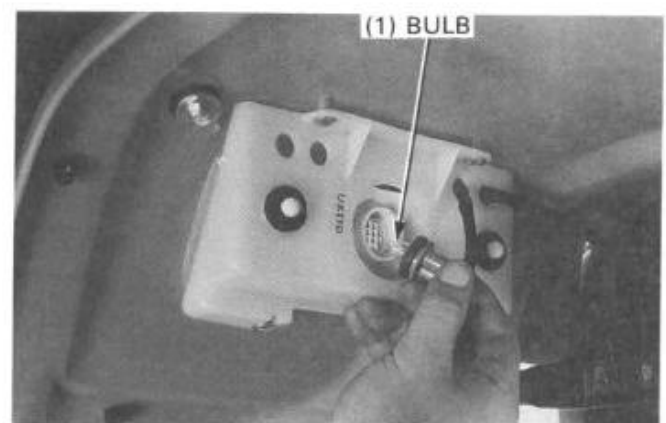
BULB REPLACEMENT

Turn the bulb socket counterclockwise and remove the bulb socket from the taillight case.



Remove the bulb from the socket and replace it with a new one.

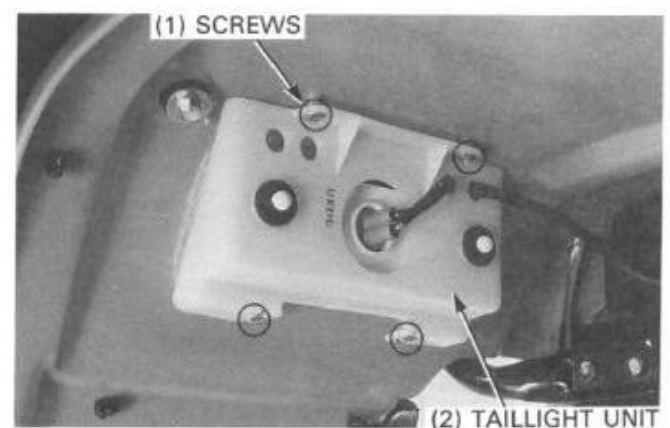
Install the bulb in the reverse order of removal.



REMOVAL/INSTALLATION

Disconnect the taillight connector.
Remove the screws and taillight unit.

Installation is in the reverse order of removal.



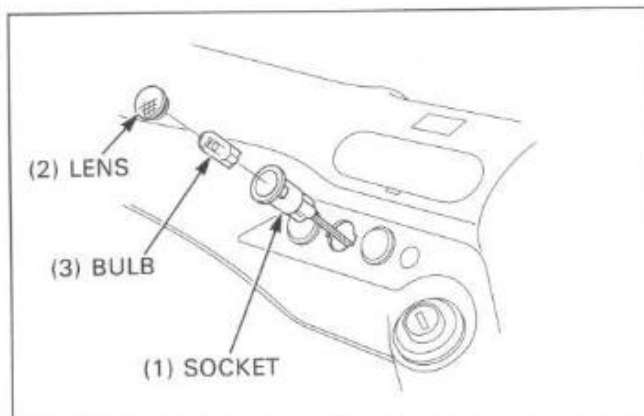
INDICATOR LAMPS

BULB REPLACEMENT

Pull the indicator lamp socket out of the handlebar cover.
Remove the indicator lens.
Remove the bulb from the socket and replace it with a new one.

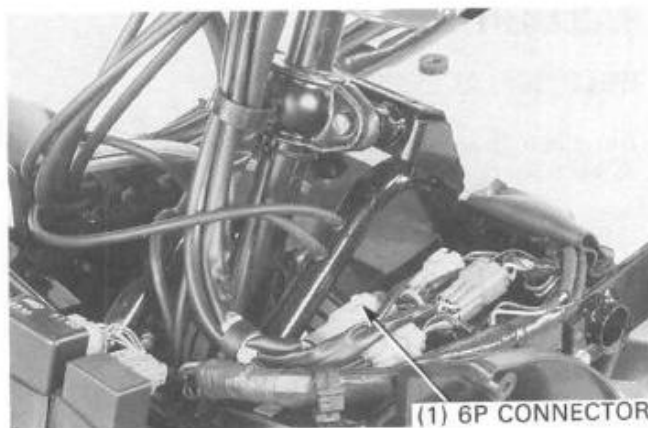
NOTE

- During socket installation, align the projection with the cutouts in the handlebar cover securely.



If you replace the bulb socket, remove the front fender (page 2-5).

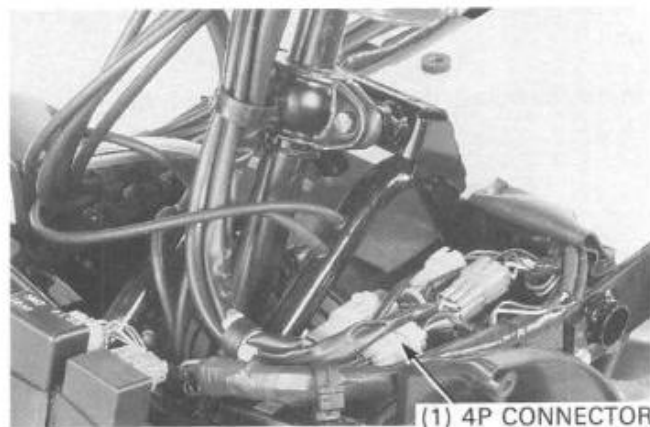
Disconnect the indicator wire connector, and replace the indicator wires as an assembly.



IGNITION SWITCH

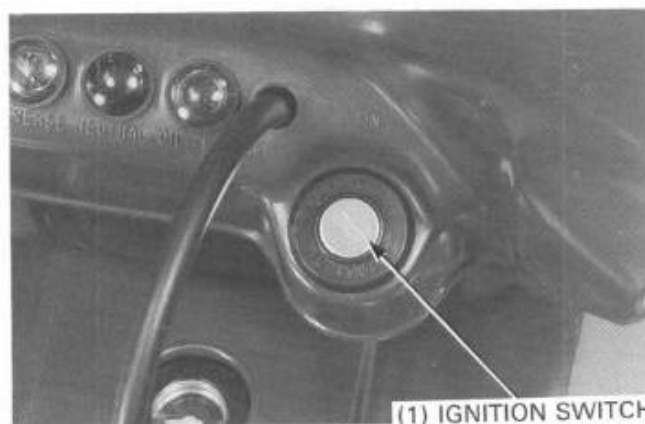
INSPECTION

Remove the front fender (page 2-5).
Disconnect the ignition switch wire connector.



Check for continuity between the wire terminals of the ignition switch connector in each switch position. Continuity should exist between the color coded wires as follows:

IGNITION SWITCH				
	BAT 2	DC	BAT 1	BAT
ON				
OFF				
COLOR	R/B	P	R	B



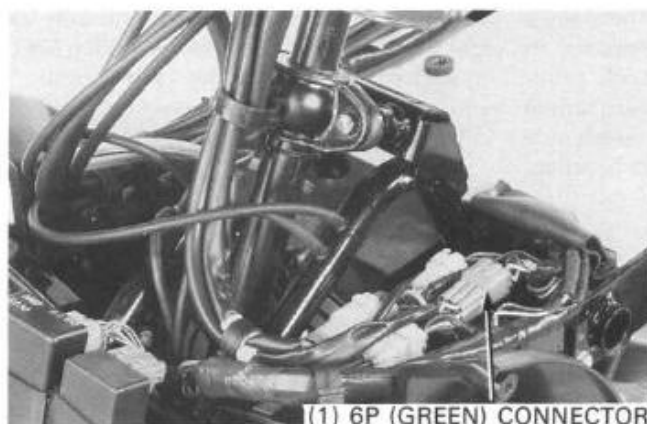
HANDLEBAR SWITCHES

NOTE

- The handlebar switches (lighting, dimmer, engine stop, starter switches) must be replaced as an assembly.

Remove the front fender (page 2-5).

Disconnect the handlebar switch connector.



(1) 6P (GREEN) CONNECTOR

Check for continuity between the wire terminals of the handlebar switch connector. Continuity should exist between the color coded wire terminals as follows:

LIGHTING SWITCH

	BAT 3	TL	(HL)
ON	○—○—○		
OFF			
CORD COLOR	B/BR	BR	●

DIMMER SWITCH

	(HL)	LO	HI
LO	○—○		
(N)	○—○—○		
HI	○—○		○
CORD COLOR	●	W	L/B



(1) HANDLEBAR SWITCH

ENGINE STOP SWITCH

	BAT 4	I G
OFF		
RUN	○—○	
OFF		
CORD COLOR	B/G	B/W

STARTER SWITCH

	BAT 3	ST
FREE		
PUSH	○—○	
CORD COLOR	B/BR	Y/R

NEUTRAL/REVERSE SWITCH

INSPECTION

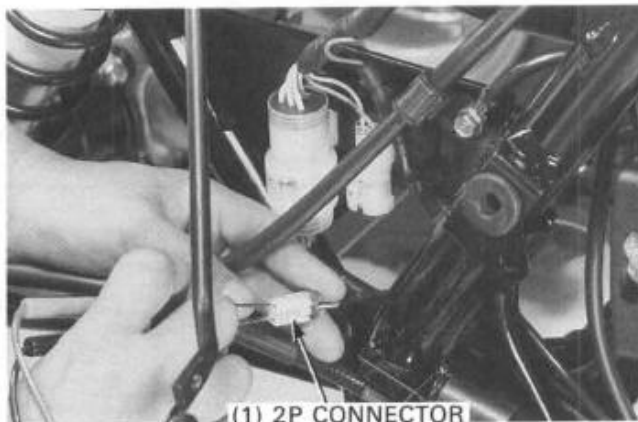
Disconnect the neutral/reverse switch 2P connector.



(1) 2P CONNECTOR

LIGHTS/SWITCHES

The neutral/reverse switch is functional if continuity exists between the Light Green wire terminal of the switch side and body ground only when the transmission is in neutral. Also continuity exists between the Gray wire terminal of the switch side and body ground only when the transmission is in reverse.



(1) 2P CONNECTOR

REMOVAL/INSTALLATION

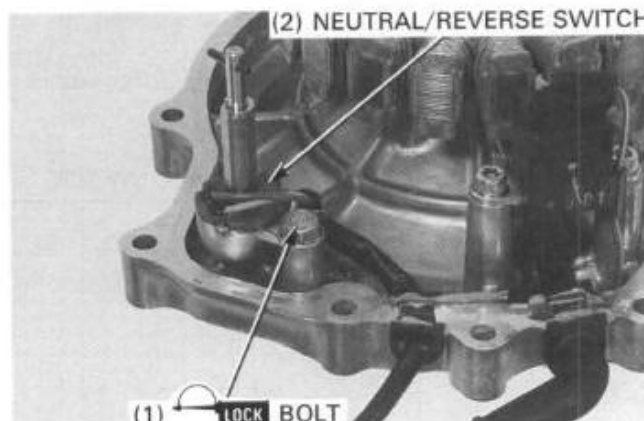
Remove the alternator cover (page 10-6).

Remove the bolt and neutral/reverse switch.

Installation is in the reverse order of removal.

NOTE

- Apply a locking agent to the neutral/reverse switch mounting bolt threads.
- At alternator cover installation, note the direction of the neutral/reverse switch pin.



(1) LOCK BOLT

COOLING FAN CONTROL UNIT

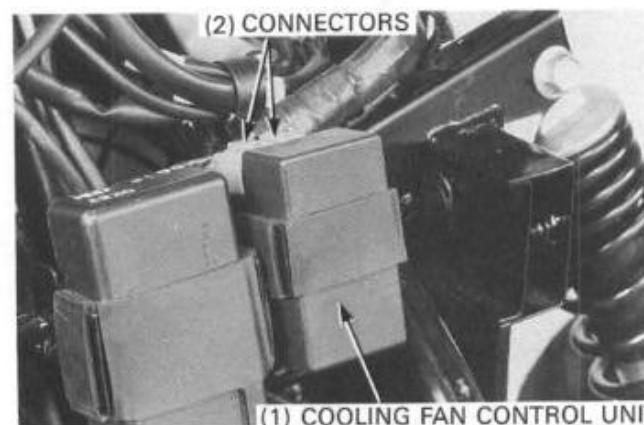
SYSTEM INSPECTION

NOTE

- Check the system components and lines step-by-step according to the troubleshooting on page 20-2.

Remove the front fender (page 2-5).

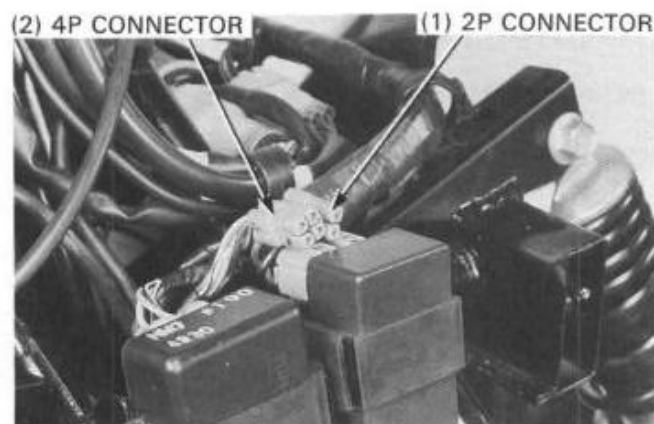
Disconnect the cooling fan control unit connectors and check them for loose contact or corroded terminals.



(1) COOLING FAN CONTROL UNIT

Check for voltage and continuity between the connector terminals of the wire harness side as follows:

TERMINAL	SPECIFICATION
Blue - Body ground	9.5 - 10.5 k Ω (25°C/77°F)
Sky blue - Body ground	Continuity
Green - Body ground	Continuity
White/Black - Body ground	Battery voltage should resister with the ignition switch ON
Blue/Red - Body ground	
Pink - Body ground	



OIL THERMO SENSOR

INSPECTION/REMOVAL

Disconnect the cooling fan control unit 2P (Green) connector. Check for resistance between Blue wire terminal of the switch side and body ground.

STANDARD: 9.5 – 10.5 k Ω (25°C/77°F)

If not, disconnect the wire from the oil thermo switch. Remove the engine guard. Drain the engine oil (page 3-10).

Remove the sensor from the rear crankcase.

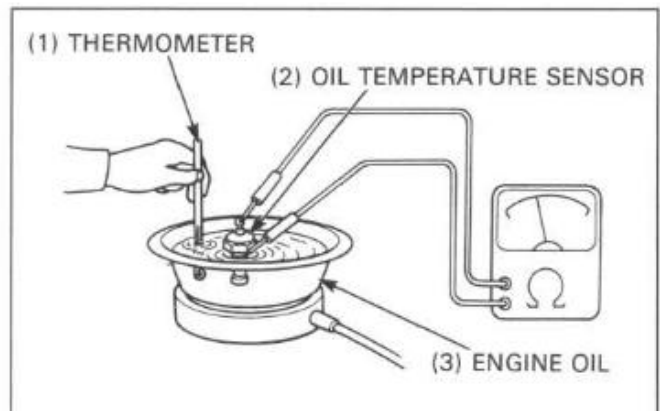


Suspend the oil temperature sensor in heated engine oil to check its operation.

Do not let the thermometer or sensor touch the pan, or false readings will result.

Connect ohmmeter probes across the terminals of the sensor and measure the resistance.

Replace the sensor if the readings are out of the ranges as shown.



INSTALLATION

Install the oil thermo sensor in the rear crankcase and tighten it to the specified torque.

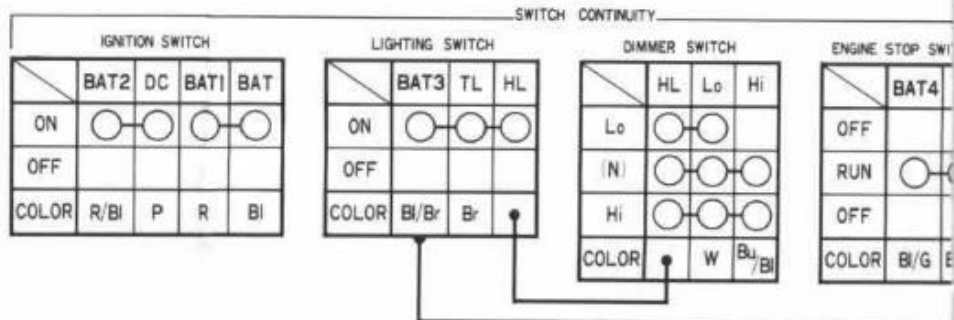
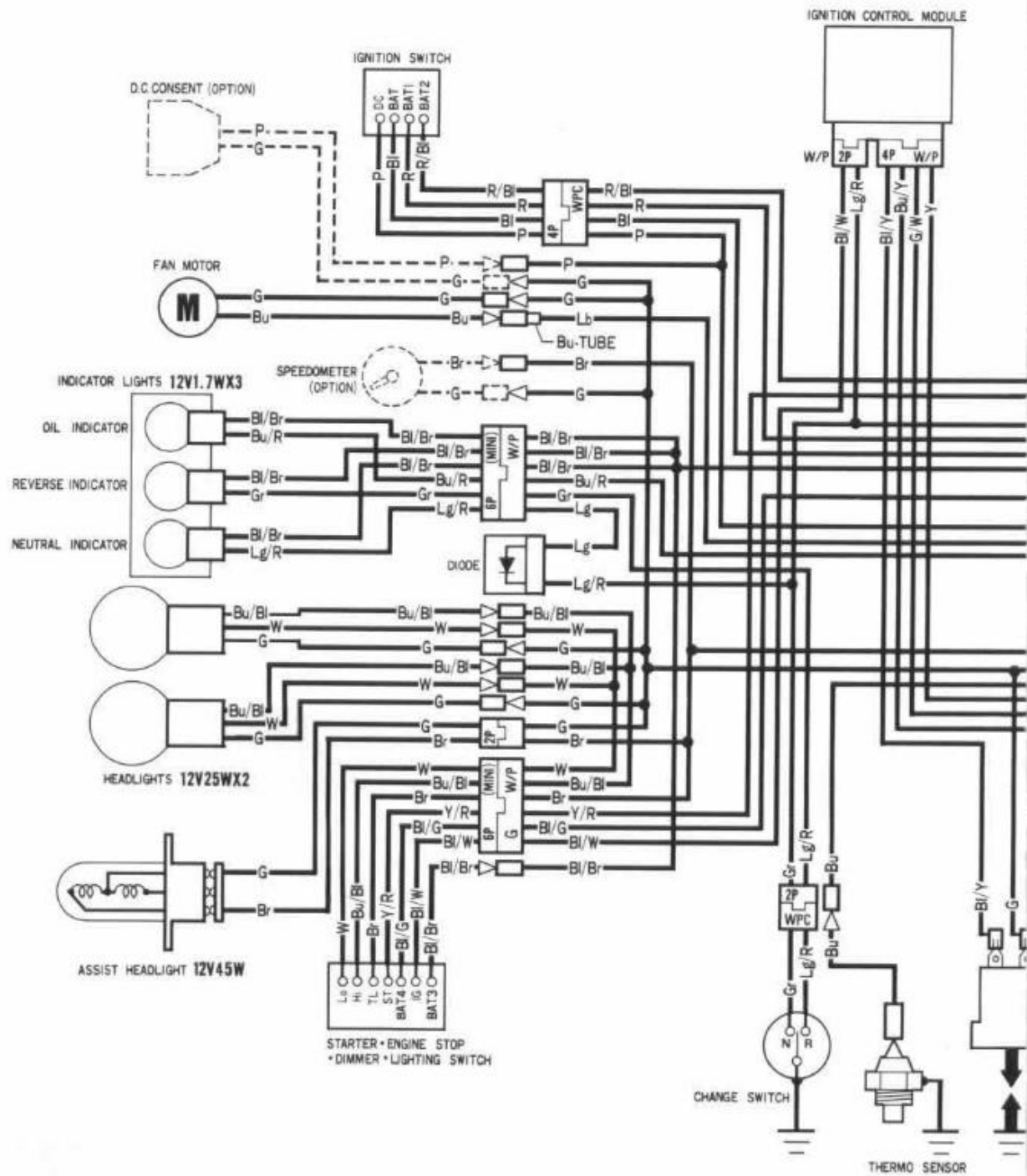
TORQUE: 18 N·m (1.8 kg·m, 13 lb·ft)

Connect the sensor wire.

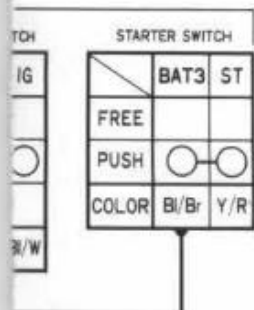
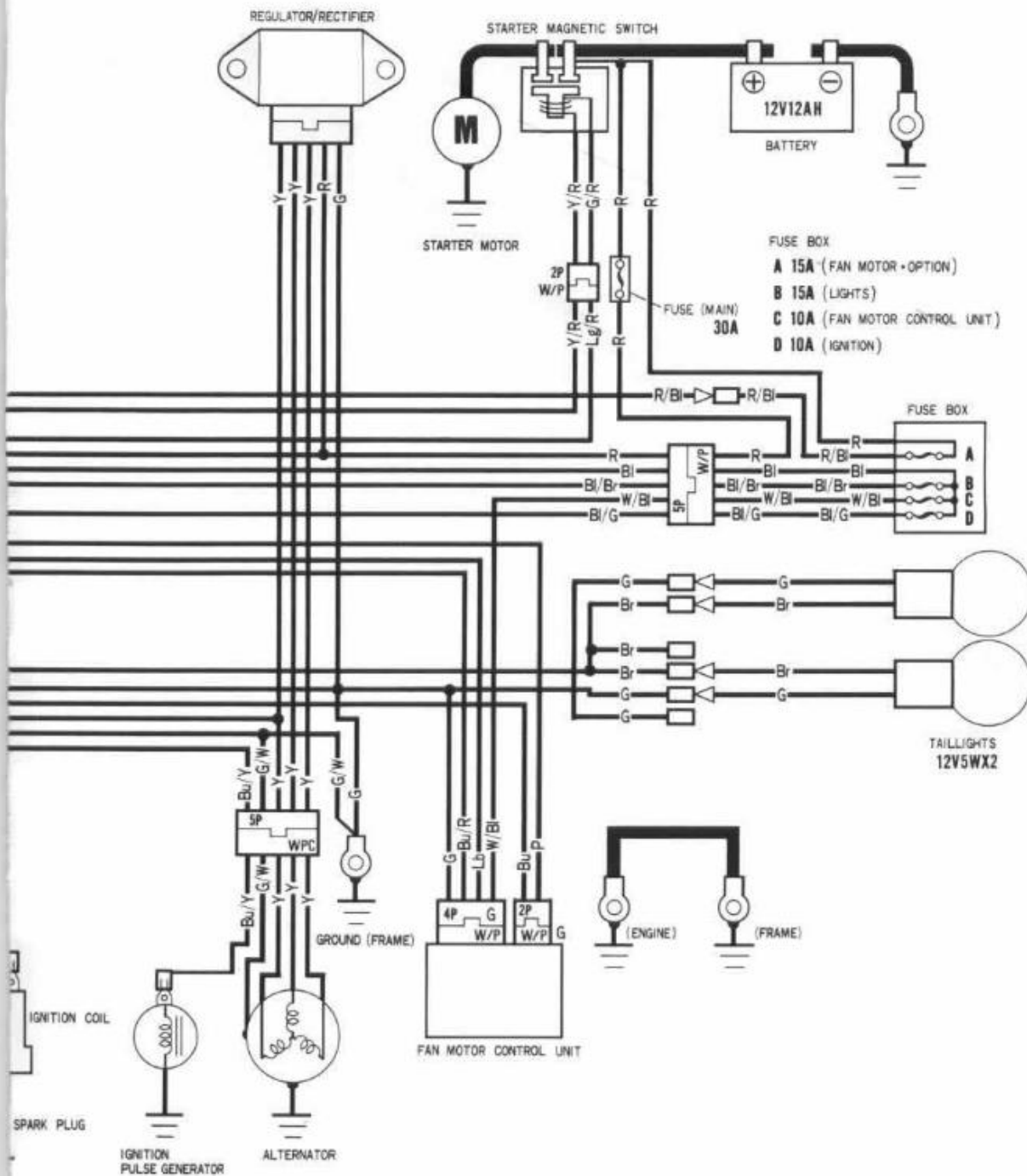
Fill the crankcase with the recommended oil (page 3-9).



MEMO



21.WIRING DIAGRAM



Bl BLACK
 Y YELLOW
 Bu BLUE
 G GREEN
 R RED
 W WHITE
 Br BROWN
 O ORANGE
 Lb LIGHT BLUE
 Lg LIGHT GREEN
 P PINK
 Gr GRAY

0030Z-HM7-6700

22. TECHNICAL FEATURE

POWER TRAIN

LIMITED SLIP DIFFERENTIAL

22-1

22-2

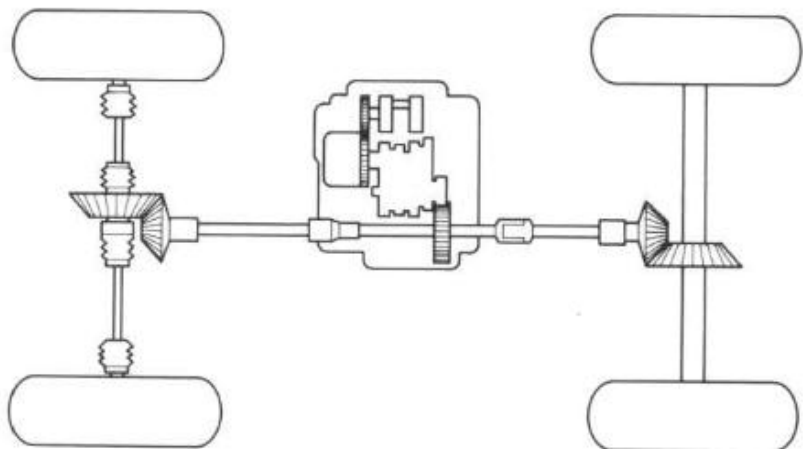
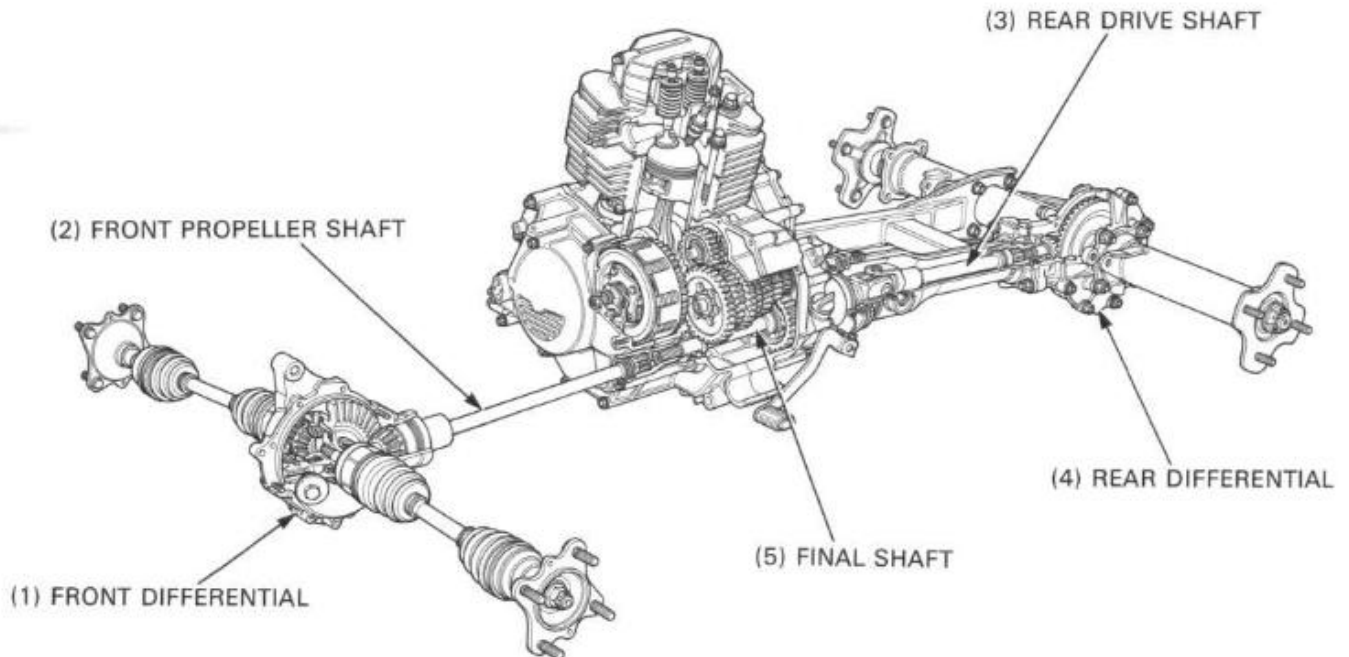
OHV VALVE TRAIN

GEARSHIFT MECHANISM

22-3

22-4

POWER TRAIN



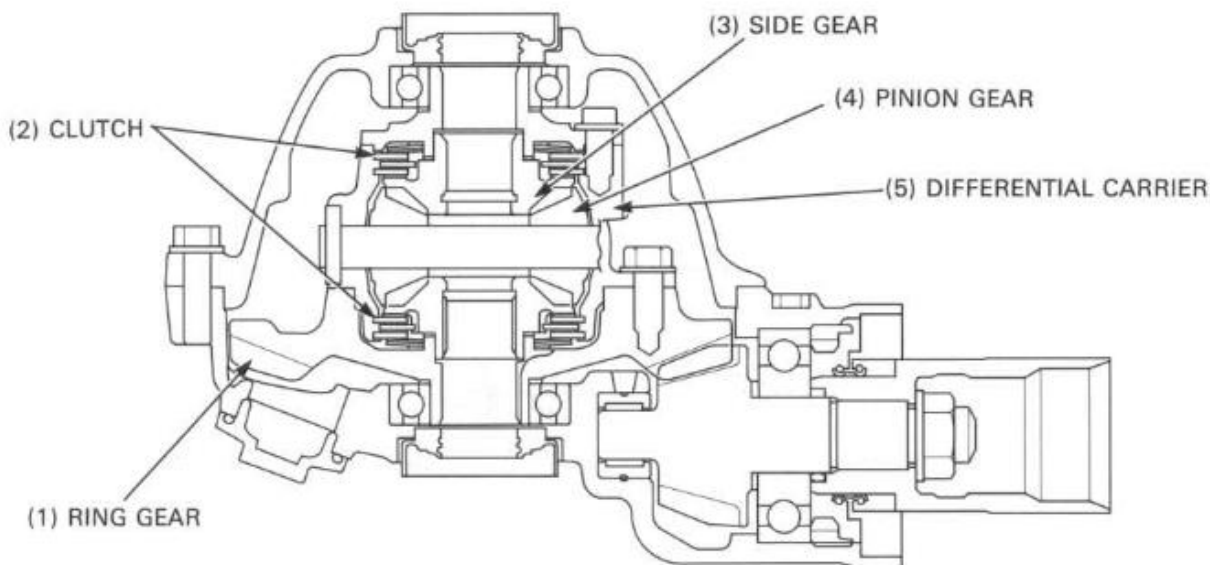
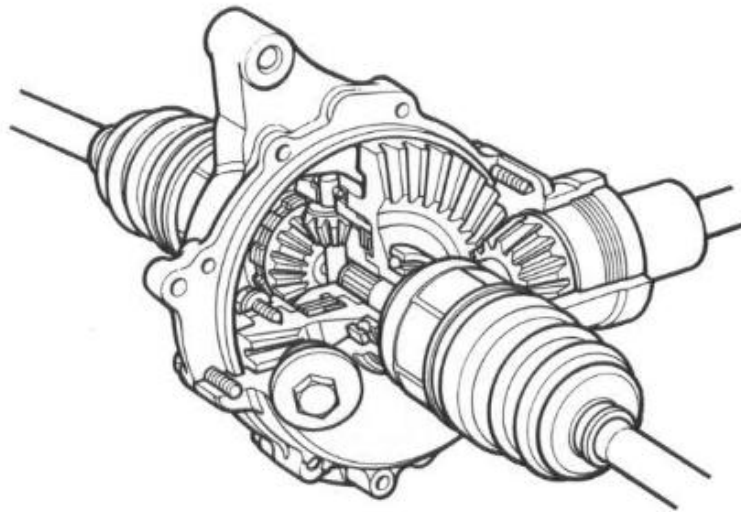
22

The engine uses a longitudinal crankshaft that runs the length of the engine so the engine power is transmitted directly to the front and rear differentials. Because there's no intermediate gearing, power from the engine is transmitted to the wheels with less friction loss. Another advantage of this design is fewer parts to service.

The engine power is converted from the final shaft, front and rear differential, and drive shafts to the wheels.

A limited slip differential is used for the front (see next page).

LIMITED SLIP DIFFERENTIAL



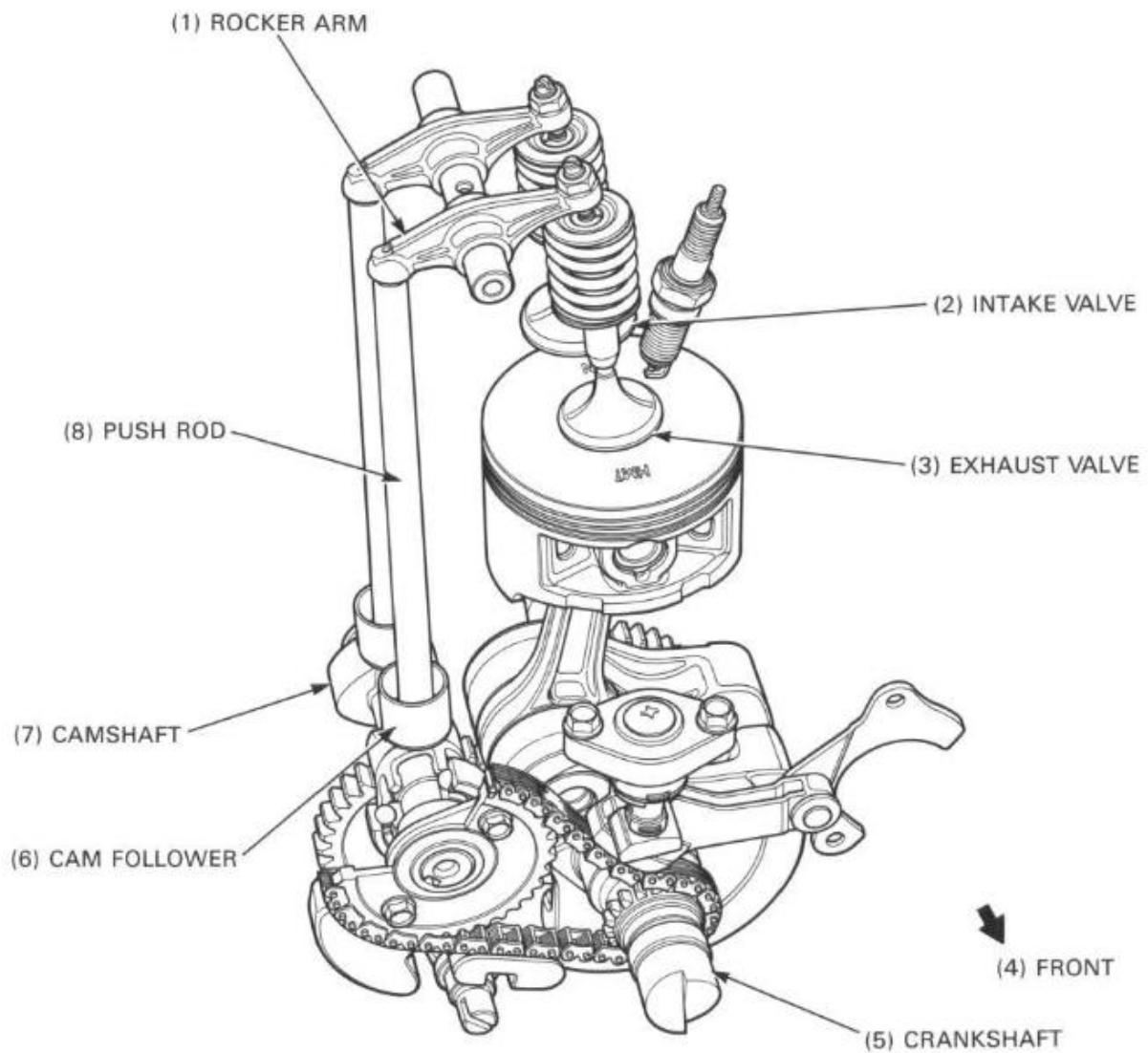
A limited slip mechanism is used in the front differential unit. This system is comprised of two sets of clutch discs and plates, each tensioned by its own spring, one set for each front wheel.

The use of a conventional front differential on four wheel drive vehicles tends to make them difficult to drive when one of the front wheel loses traction. This is because conventional differentials transmit driving power to the wheel that has lost traction, causing the vehicle to turn to one side.

With a limited slip differential, even though a wheel slips or is raised from the ground, the pinion gear and side gear are engaged by pressure from the friction plates. A certain portion of torque from the engine is transmitted to the other wheel, that still has traction, to prevent the slipping wheel from racing. This characteristic allows the speed of the raised or slipping wheel to be much the same as the wheel on the ground, which prevents the front of the vehicle from turning unintentionally.

Also, when a turn is initiated by the rider, the clutches slip moderately, causing differences in torque distributed to the inside and outside wheels, to decrease turning resistance.

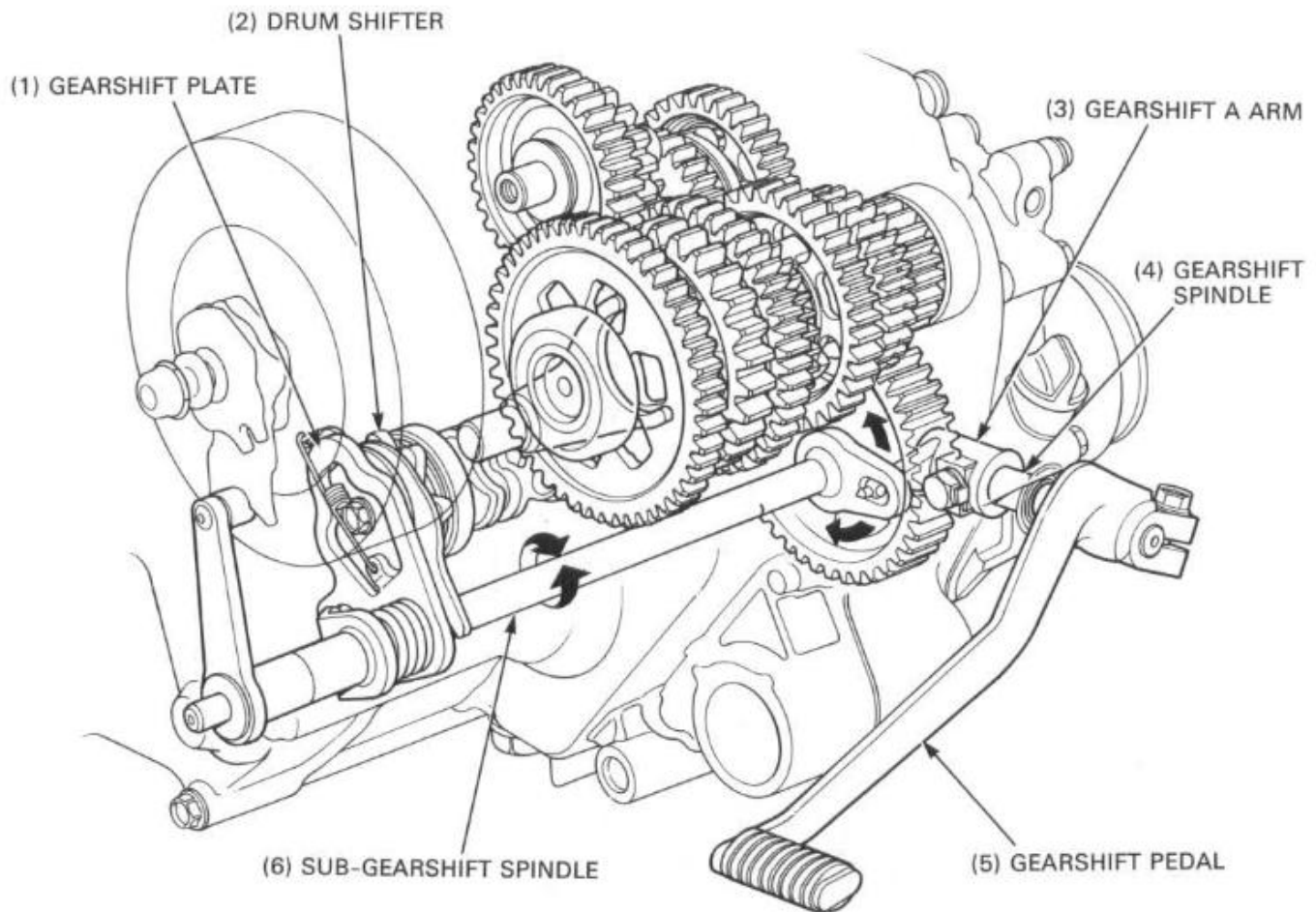
OHV VALVE TRAIN



Use of an OHV (overhead valve) drive train contributes to a compact cylinder head, and allows the optimum placement of intake and exhaust system parts.

The camshaft is located in the crankcase on the right side of the crankshaft and is driven by a short cam chain. As the camshaft turns, the push rods are moved up and down by means of the cam followers on the camshaft. The force of the push rods is then transmitted to the valves through the rocker arms which pivot on the rocker shaft in the cylinder head.

GEARSHIFT MECHANISM



Because the crankshaft is longitudinal the gearshift linkage has a 90 degree bend.

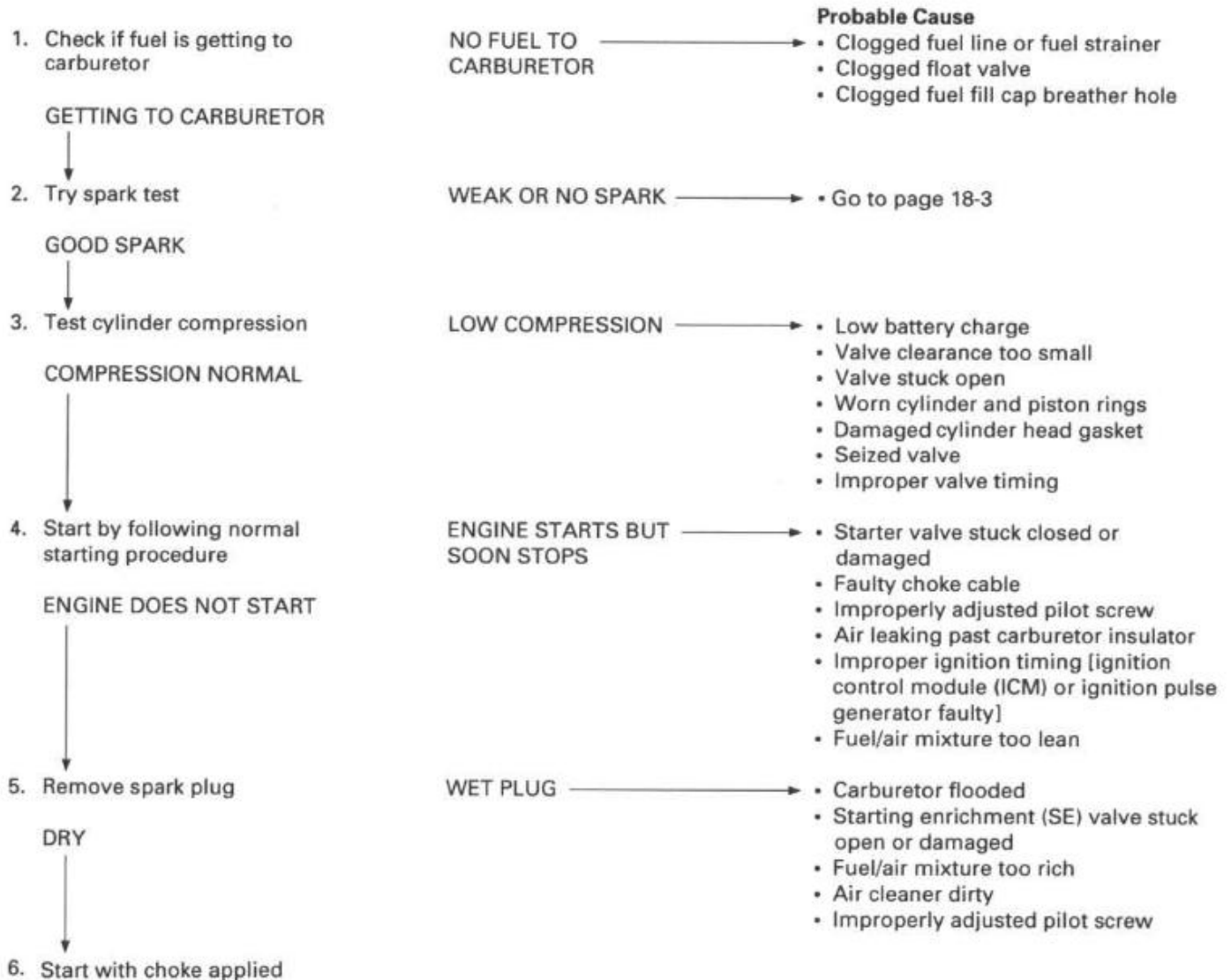
The system consists of the gearshift spindle, a gearshift arm, and a sub-gearshift spindle which is parallel with the crankshaft. As the gearshift pedal is operated, the gearshift spindle moves the arm. The gearshift arm makes a 90 degree bend to rotate the sub-gearshift spindle.

The sub-gearshift spindle operates the shift drum, and engages and disengages the clutch.

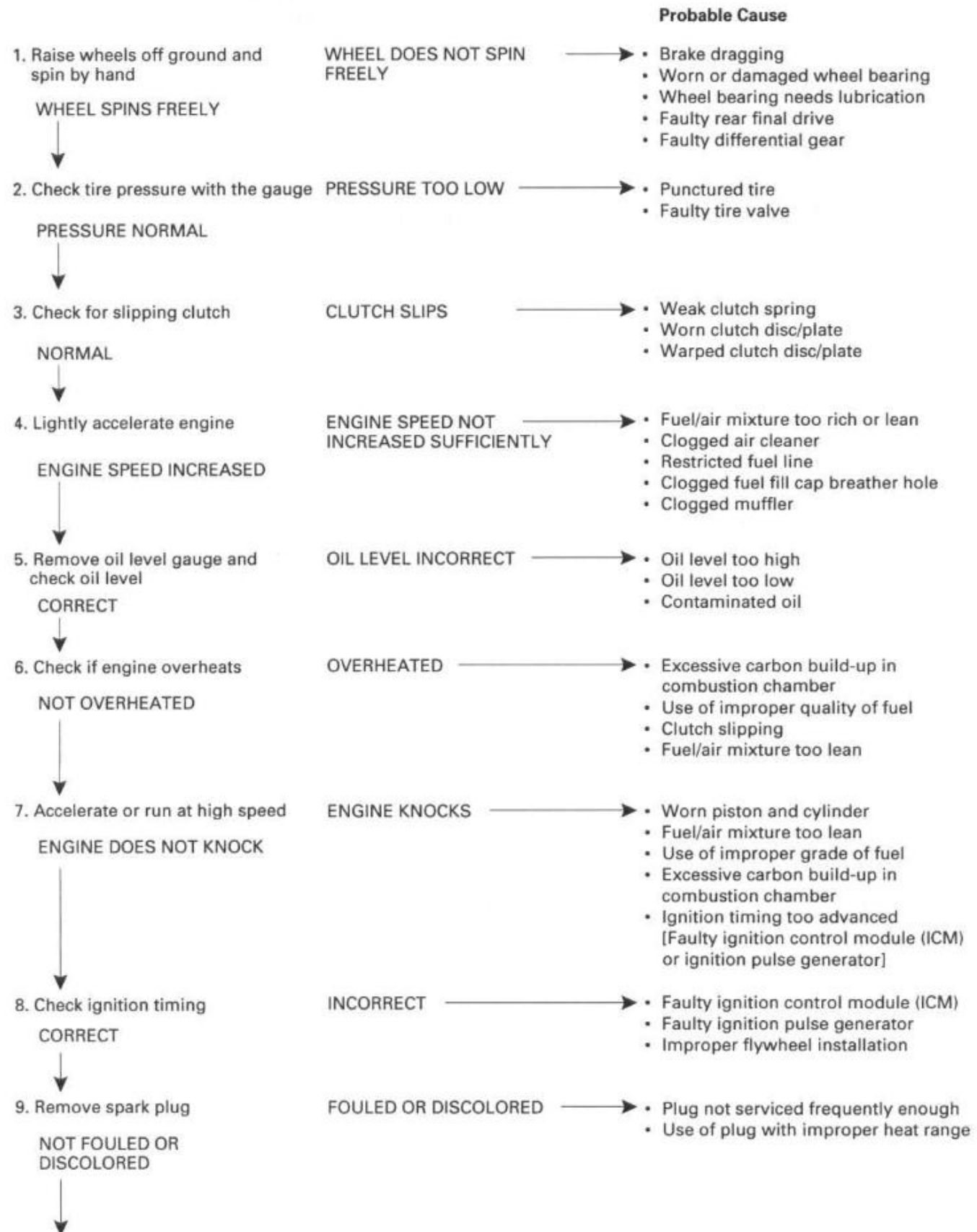
23.TROUBLESHOOTING

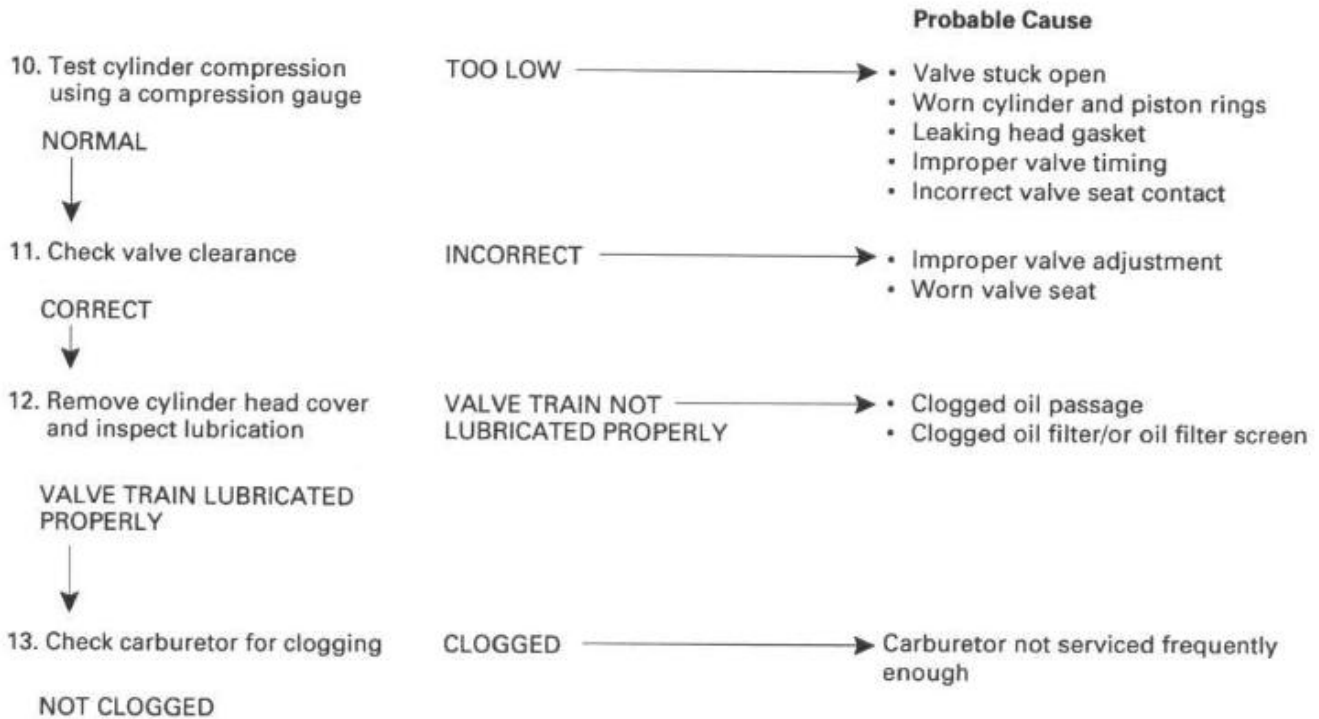
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ENGINE DOES NOT START OR IS HARD TO START

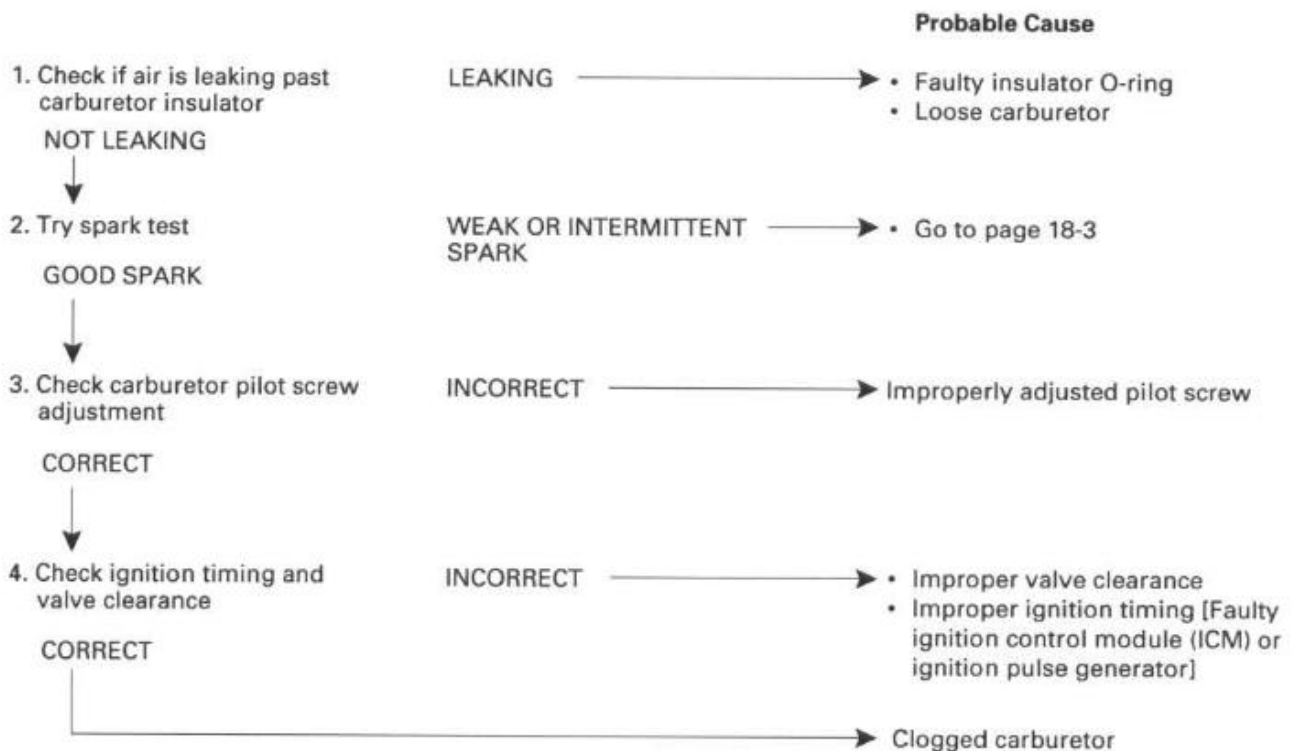


ENGINE LACKS POWER

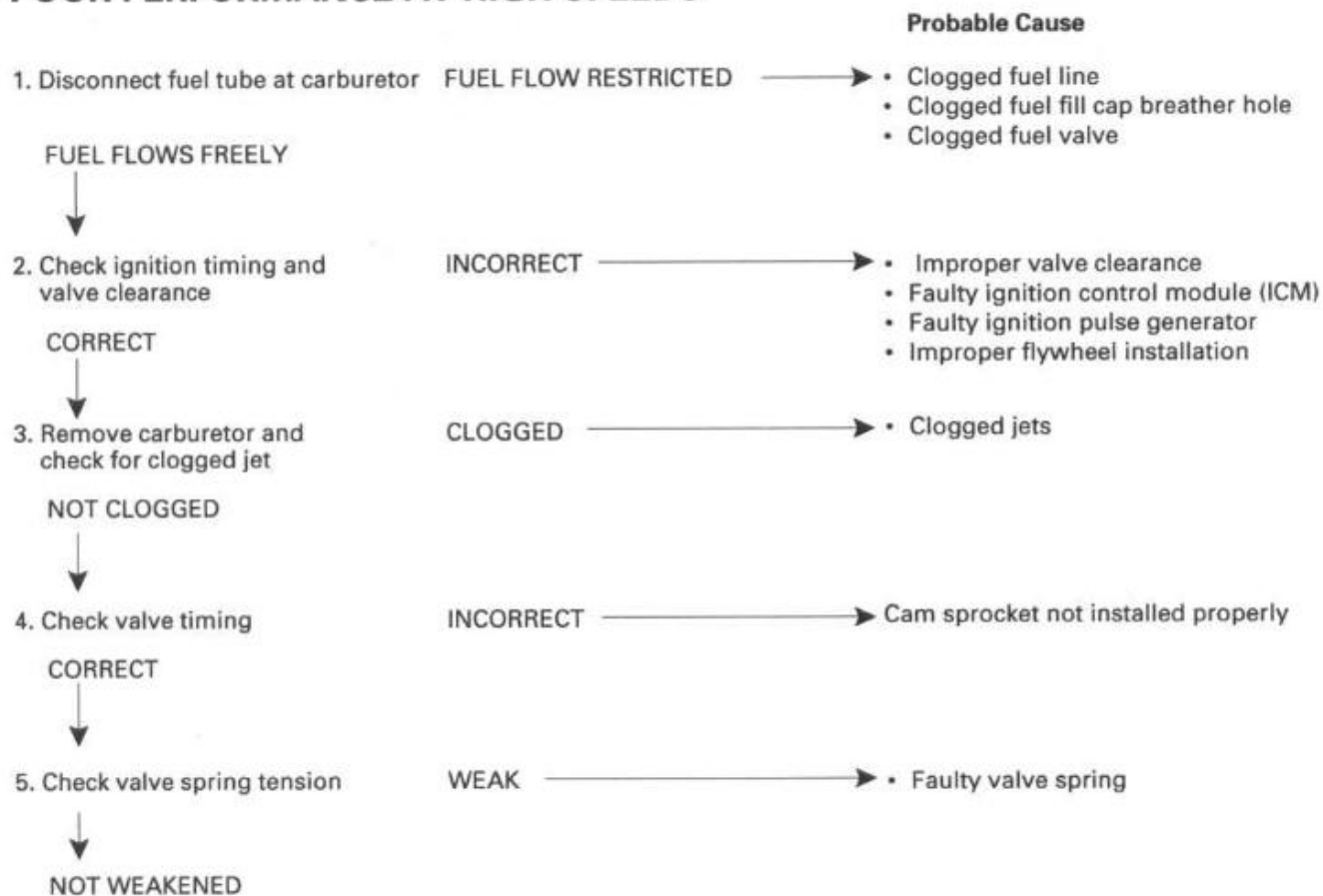




POOR PERFORMANCE AT LOW AND IDLE SPEEDS



POOR PERFORMANCE AT HIGH SPEEDS



POOR HANDLING —————→ Check tire pressure

	Probable Cause
1. If steering is heavy	• Steering shaft nut too tight • Damaged steering shaft bearing
2. If either wheel is wobbling	• Excessive wheel bearing play • Bent rim • Improperly installed wheel hub • Bent frame • Bent swingarm
3. If the vehicle pulls to one side	• Tire air pressure incorrect • Bent tie-rod • Incorrect tie-rod adjustment • Improper wheel alignment • Bent frame

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