

1997-2004



SERVICE MANUAL

TRX250TE/TM

FOURTRAX®

RECON™

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 TRX250 TM/TE (Recon).

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the California Air Resources Board.

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.

Sections 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 do not know the source of the trouble, go to section 22, Troubleshooting.

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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 paste (containing more than 40% 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 DOT 3 or DOT 4 brake fluid. 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 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.

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.

GENERAL INFORMATION

BATTERY HYDROGEN GAS & ELECTROLYTE

▲WARNING

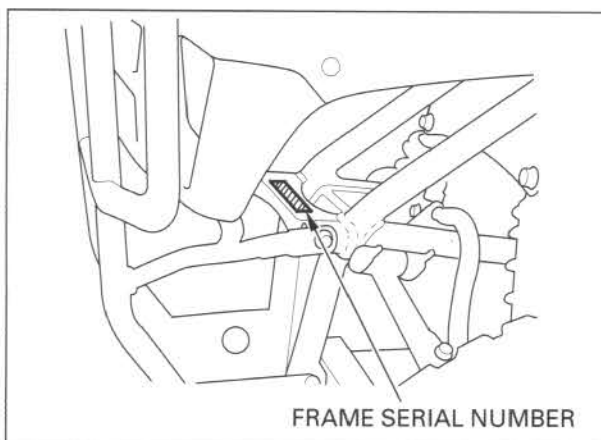
- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
 - *If electrolyte gets on 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 a physician. KEEP OUT OF REACH OF CHILDREN.*

SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that do not meet HONDA's design specifications may 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 cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all cable and harness routing as shown on pages 1-21 through 1-31 Cable and Harness Routing.

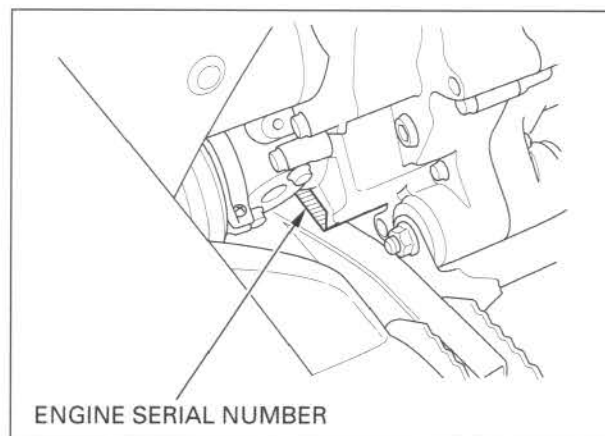
MODEL IDENTIFICATION

'97 SHOWN; AFTER '97 SIMILAR



FRAME SERIAL NUMBER

The frame serial number is stamped on the front of the frame.



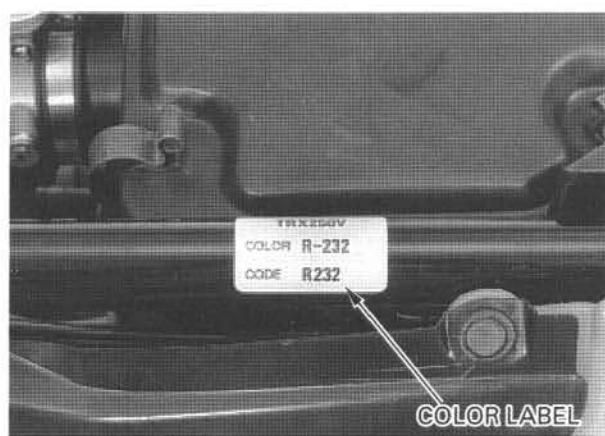
ENGINE SERIAL NUMBER

The engine serial number is stamped on the rear half of the lower crankcase, viewed from the right side.



CARBURETOR NUMBER

The carburetor identification numbers are stamped on the right side of the carburetor body as shown.



COLOR LABEL

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		SPECIFICATIONS
DIMENSIONS	Overall length	1,794 mm (70.6 in)
	Overall width	1,034 mm (40.7 in)
	Overall height	1,054 mm (41.5 in)
	Wheelbase	1,131 mm (44.5 in)
	Front tread	783 mm (30.8 in)
	Rear tread	780 mm (30.7 in)
	Seat height	777 mm (30.6 in)
	Footpeg height	'97 — 2001: 298 mm (11.7 in) After 2001: TM: 298 mm (11.7 in) / TE: 306 mm (12.0 in)
	Ground clearance	152 mm (6.0 in)
	Dry weight	'97 — 2001: 180 kg (397 lbs) After 2001: TM: 184 kg (406 lbs) / TE: 188 kg (414 lbs)
	Curb weight	'97 — 2001: 188 kg (414 lbs) After 2001: TM: 191 kg (421 lbs) / TE: 195 kg (430 lbs)
	Maximum weight capacity	175 kg (386 lbs)
FRAME	Frame type	Double cradle
	Front suspension	Double wish-bone
	Front wheel travel	130 mm (5.1 in)
	Front damper	Double tube
	Rear suspension	Swingarm
	Rear wheel travel	125 mm (4.9 in)
	Rear damper	Double tube
	Front tire size	AT22 × 7-11 ★
	Rear tire size	AT22 × 10-9 ★
	Front rim size	11 × 5.5 AT
	Rear rim size	9 × 8.0 AT
	Tire brand (Goodyear) FR/RR	TRACKER HP
	Front brake	Hydraulic drum brake
	Rear brake	Mechanical drum brake
	Toe	Toe-in: 8 mm (5/16 in)
	Caster angle	8°
	Camber angle	0.1°
	Trail length	42 mm (1-5/8 in)
ENGINE	Fuel tank capacity	9.1 l (2.40 US gal , 2.00 Imp gal)
	Fuel tank reserve capacity	2.4 l (0.63 US gal , 0.53 Imp gal)
	Bore and stroke	68.5 × 62.2 mm (2.70 × 2.45 in)
	Displacement	229 cm ³ (14.0 cu-in)
	Compression ratio	9.0 : 1
	Valve train	Overhead valve
	Intake valve opens	8° BTDC
	Intake valve closes	37° ABDC
	Exhaust valve opens	38° BBDC
	Exhaust valve closes	7° 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	'97 — 2001: 34.6 kg (76.3 lbs) After 2001: TM: 35.9 kg (79.1 lbs) / TE: 37.4 kg (82.5 lbs)
	Cylinder arrangement	Single cylinder, longitudinally installed

GENERAL (Cont'd)

ITEM		SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	Piston valve 20 mm (0.8 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio '97 – 2001: 1st 2nd 3rd 4th 5th Reverse After 2001: 1st 2nd 3rd 4th 5th Reverse Gearshift pattern	Centrifugal & multi-plate, wet Automatic Constant mesh, 5-speed with reverse 3.086 (71/23) 3.692 (48/13) 3.545 (39/11) 2.267 (34/15) 1.631 (31/19) 1.273 (28/22) 1.042 (25/24) 5.850 (39/20 × 33/11) 3.231 (42/13) 2.167 (39/18) 1.667 (35/21) 1.280 (32/25) 1.042 (25/24) 5.550 (39/20 × 37/13) Left foot operated return system ('97 – 2001/After 2001: TM) Electric shift (left hand operated) return system (After 2001: TE) R – N – 1 – 2 – 3 – 4 – 5
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	AC-CDI Starter motor and emergency recoil starter Single phase output alternator SCR shorted/single phase full wave rectification Battery

GENERAL INFORMATION

Unit: mm (in)

Unit: mm (in)

LUBRICATION SYSTEM				
ITEM			SPECIFICATIONS	SERVICE LIMIT
Engine oil capacity	At draining	'97 – 2001	1.6 ℓ (1.7 US qt , 1.4 Imp qt)	_____
		After 2001	1.5 ℓ (1.6 US qt , 1.3 Imp qt)	_____
	At disassembly	'97 – 2001	1.8 ℓ (1.9 US qt , 1.6 Imp qt)	_____
		After 2001	1.9 ℓ (2.0 US qt , 1.7 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		0.05 – 0.13 (0.002 – 0.005)	0.15 (0.006)

FUEL SYSTEM			
ITEM		SPECIFICATIONS	
Carburetor	'97 (except California type)	PDC1B	
identification number	'97 California type/'98 – 2001 All types	PDC1C	
	After 2001	PDC1E	
Main jet		# 95	
Slow jet		# 38	
Jet needle clip position	'97	3rd groove from top	
	After '97	2nd groove from top	
Pilot screw	Initial opening	'97 (except California type)	2-7/8 turns out
		'97 California type	2-3/4 turns out
		'98 – 2001	2-5/8 turns out
		After 2001	2 turns out
	High altitude setting		1/8 turns in from initial opening
Float level		14 mm (0.6 in)	
Idle speed		1,400 ± 100 rpm	
Throttle lever free play		3–8 mm (1/8 – 5/16 in)	

Unit: mm (in)

Unit: mm (in)

CYLINDER HEAD/CYLINDER/PISTON ITEM			SPECIFICATIONS	SERVICE LIMIT
Cylinder compression			1,275 kPa (13.0 kgf/cm ² , 185 psi) at 800 rpm	—————
Cylinder head warpage			—————	0.10 (0.004)
Valve and valve guide	Valve clearance	IN/EX	0.13 (0.005)	—————
	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 (0.2175)
		EX	5.500 — 5.512 (0.2165 — 0.2170)	5.525 (0.2175)
	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	36.95 (1.455)	35.7 (1.41)
	Outer	IN/EX	41.01 (1.615)	39.8 (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	35.393 — 35.552 (1.3934 — 1.3997)	35.2 (1.39)
		EX	35.190 — 35.350 (1.3854 — 1.3917)	35.0 (1.38)
	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)
Cylinder	I. D.		68.500 — 68.510 (2.6968 — 2.6972)	68.6 (2.70)
	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.		68.462 — 68.482 (2.6953 — 2.6961)	68.4 (2.69)
	Piston O. D. measurement point		6 — 18 (0.2 — 0.7) from bottom of the skirt	—————
	Piston pin bore I. D.		15.002 — 15.008 (0.5906 — 0.5909)	15.04 (0.592)
	Piston pin O. D.		14.994 — 15.000 (0.5903 — 0.5906)	14.96 (0.589)
	Piston-to-piston pin clearance		0.002 — 0.014 (0.0001 — 0.0006)	0.020 (0.0008)
	Piston ring-to-ring groove clearance	Top	0.015 — 0.045 (0.0006 — 0.0018)	0.09 (0.004)
		Second	0.015 — 0.045 (0.0006 — 0.0018)	0.09 (0.004)
	Piston ring end gap	Top	0.20 — 0.35 (0.008 — 0.014)	0.5 (0.02)
		Second	0.40 — 0.55 (0.016 — 0.022)	0.7 (0.03)
		Oil (side rail)	0.20 — 0.70 (0.008 — 0.028)	—————
Cylinder-to-piston clearance			0.018 — 0.048 (0.0007 — 0.0019)	0.10 (0.004)
Connecting rod small end I.D.			15.010 — 15.028 (0.5909 — 0.5917)	15.06 (0.593)
Connecting rod-to-piston pin clearance			0.010 — 0.034 (0.0004 — 0.0013)	0.10 (0.004)

GENERAL INFORMATION

Unit: mm (in)

CLUTCH			
	ITEM	SPECIFICATIONS	SERVICE LIMIT
Change clutch	Spring free length	35.2 (1.39)	34.5 (1.36)
	Disc thickness	2.9 – 3.0 (0.11 – 0.12)	2.6 (0.10)
	Plate warpage		0.20 (0.008)
	Clutch outer guide O. D.	27.959 – 27.980 (1.1007 – 1.1016)	27.92 (1.099)
	Clutch outer boss I. D.	28.000 – 28.021 (1.1024 – 1.1032)	28.05 (1.104)
Centrifugal clutch	Drum I. D.	116.00 – 116.20 (4.567 – 4.575)	116.5 (4.59)
	Weight lining thickness	2.0 (0.08)	1.2 (0.05)
	Clutch spring height	3.0 (0.12)	2.85 (0.112)
	Clutch weight spring free length	30.75 (1.211)	31.6 (1.24)
	Drum bushing I. D.	24.000 – 24.021 (0.9449 – 0.9457)	24.05 (0.947)
	Crankshaft O. D. at drive gear	23.959 – 23.980 (0.9433 – 0.9441)	23.93 (0.942)

Unit: mm (in)

Unit: mm (in)

CRANKSHAFT/TRANSMISSION					
ITEM			SPECIFICATIONS	SERVICE LIMIT	
Crankshaft, connecting rod	Side clearance		0.05—0.50 (0.002—0.020)	0.80 (0.031)	
	Radial clearance		0.004—0.012 (0.0002—0.0005)	0.05 (0.002)	
	Runout	Front	—	0.06 (0.002)	
		Rear	—	0.03 (0.001)	
Transmission	Gear I. D.	M4		23.000—23.021 (0.9055—0.9063)	23.04 (0.907)
		M5		18.000—18.021 (0.7087—0.7095)	18.04 (0.710)
		C1, C2, C3, CR		25.000—25.021 (0.9843—0.9851)	25.04 (0.986)
		Reverse idle		13.000—13.018 (0.5118—0.5125)	13.04 (0.513)
	Shaft O. D.	M4		19.959—19.980 (0.7858—0.7866)	19.93 (0.785)
		M5		14.966—14.984 (0.5892—0.5899)	14.94 (0.588)
		Reverse idle		12.966—12.984 (0.5105—0.5112)	12.94 (0.509)
	Gear bushing	C1, C2, CR O.D.		24.959—24.980 (0.9826—0.9835)	24.94 (0.982)
		M4	I. D.	20.000—20.021 (0.7874—0.7882)	20.04 (0.789)
			O. D.	22.959—22.979 (0.9039—0.9047)	22.94 (0.903)
		M5	I. D.	15.000—15.018 (0.5906—0.5913)	15.04 (0.592)
			O. D.	17.959—17.980 (0.7070—0.7079)	17.94 (0.706)
		C3	I. D.	22.000—22.021 (0.8661—0.8670)	22.04 (0.868)
			O. D.	24.959—24.980 (0.9826—0.9835)	24.94 (0.982)
		Gear-to-bushing clearance	M4		0.021—0.062 (0.0008—0.0024)
	M5		0.020—0.062 (0.0008—0.0024)	0.10 (0.004)	
	C1, C2, C3, CR		0.020—0.062 (0.0008—0.0024)	0.10 (0.004)	
	Gear-to-shaft clearance	Reverse idle		0.016—0.052 (0.0006—0.0020)	0.10 (0.004)
	Bushing-to-shaft clearance	M4		0.020—0.062 (0.0008—0.0024)	0.10 (0.004)
		M5		0.016—0.052 (0.0006—0.0020)	0.10 (0.004)
		C3		0.020—0.062 (0.0008—0.0024)	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)	4.60 (0.181)	
	Fork shaft O. D.		12.966—12.984 (0.5105—0.5112)	12.96 (0.510)	

GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING			Unit: mm (in)
ITEM		SPECIFICATIONS	SERVICE LIMIT
Minimum tire tread depth		—	4 (0.2)
Cold tire pressure	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
	Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)	—
	Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)	—
	With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
Tie-rod-distance between the ball joints		323 ± 1 (12.7 ± 0.4)	—
Toe		Toe-in: 8 ± 15 (5/16 ± 5/8)	—

REAR WHEEL/SUSPENSION			Unit: mm (in)
ITEM		SPECIFICATIONS	SERVICE LIMIT
Minimum tire tread depth		—	4 (0.2)
Cold tire pressure	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
	Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)	—
	Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)	—
	With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—

BRAKES			Unit: mm (in)
ITEM		SPECIFICATIONS	SERVICE LIMIT
Front brake	Drum I. D.	130.0 (5.12)	131.0 (5.16)
	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)
	Master cylinder I. D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O. D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Wheel cylinder I. D.	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Wheel cylinder piston O. D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
Rear brake	Drum I. D.	140.0 (5.51)	141.0 (5.55)
	Lining thickness	4.5 (0.18)	To the indicator

Unit: mm (in)

REAR DRIVING MECHANISM

ITEM			SPECIFICATION	SERVICE LIMIT
Rear axle runout				3.0 (0.12)
Rear final drive	Oil capacity	After draining	80 cm ³ (2.7 US oz, 2.8 Imp oz)	
		At disassembly	100 cm ³ (3.4 US oz, 3.5 Imp oz)	
	Recommended oil		Hypoid gear oil SAE # 80	
	Gear backlash		0.05 – 0.25 (0.002 – 0.010)	0.40 (0.016)

BATTERY/CHARGING SYSTEM

BATTERY/CHARGING SYSTEM				
ITEM			SPECIFICATION	
Battery	Capacity		12 V – 10 AH	
	Current leakage		1 mA max.	
	Voltage (20 °C/68 °F)	Fully charged	13.0 – 13.2 V	
		Needs charging	Below 12.3 V	
	Charging current	Normal	1.2 A/5 – 10 h	
		Quick	5.0 A/1.0 h	
Alternator	Capacity		0.13 kw/5,000 rpm	
	Charging coil resistance (20 °C/68 °F)		0.1 – 1.0 Ω	
Regulator/rectifier type			Single phase/full-wave rectification	

IGNITION SYSTEM

ITEM		SPECIFICATION	
Spark plug	Standard	DPR8EA-9 (NGK)	X24EPR-U9 (DENSO)
	For cold climate (below 5 °C/41 °F)	DPR7EA-9 (NGK)	X22EPR-U9 (DENSO)
	For extended high speed riding	DPR9EA-9 (NGK)	X27EPR-U9 (DENSO)
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	
Alternator exciter coil peak voltage		100 V minimum	
Ignition timing	"F" mark	10° BTDC at 1,400 rpm	
	Full advance	31° BTDC at 3,750 rpm	

ELECTRIC STARTER

Unit: mm (in)

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

GENERAL INFORMATION

LIGHTS/SWITCHES		SPECIFICATIONS
ITEM		
Bulbs	Headlight	12 V 25/25 W × 2
	Taillight	12 V – 5 W
	Indicator (Reverse/Neutral)	12 V – 1.7 W × 2
Fuse	Main fuse	15 A

TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·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	34 (3.5, 25)	6 mm flange bolt (10 mm head)	12 (1.2, 9)
12 mm hex bolt and nut	54 (5.5, 40)	and nut	
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

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

NOTES: 1. Apply a locking agent to the threads.
 2. Apply oil to the threads and flange surface.
 3. Do not reuse: replace with a new one.
 4. U-nut.
 5. Castle nut: Tighten to the specified torque then tighten to position suitable for cotter pin hole direction.
 6. Stake.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Maintenance:				
Oil drain bolt	1	12	25 (2.5, 18)	
Spark plug	1	12	18 (1.8, 13)	
Timing hole cap	1	14	10 (1.0, 7)	
Valve adjusting hole cap (After 2001)	2	30	20 (2.0, 14)	NOTE 2
Valve adjuster lock nut	2	6	17 (1.7, 12)	NOTE 2
Fuel System:				
Carburetor insulator stud bolt	2	6	10 (1.0, 7)	
Cylinder head/Cylinder/Piston:				
Cylinder head flange cap nut ('97 – 2001)	2	8	30 (3.1, 22)	NOTE 2
Cylinder head flange nut (After 2001)	4	8	30 (3.1, 22)	NOTE 2
Cylinder head stud bolt	2	8	6 (0.6, 4.3)	
Rocker arm holder flange cap nut ('97 – 2001)	2	8	30 (3.1, 22)	NOTE 2
Rocker arm holder flange bolt ('97 – 2001)	1	8	30 (3.1, 22)	NOTE 2
Rocker arm shaft flange bolt ('97 – 2001)	1	6	7 (0.7, 5.1)	NOTE 2
Cam chain tensioner arm pivot bolt	1	6	12 (1.2, 9)	NOTE 1
Push rod end piece	4	6	13 (1.3, 9)	
Clutch:				
Centrifugal clutch lock nut	1	18	88 (9.0, 65)	NOTE 2, 6
Change clutch spring bolt	4	6	12 (1.2, 9)	
Change clutch center lock nut	1	16	79 (8.1, 59)	NOTE 2, 6
Pressure relief valve cap	1	14	19 (1.9, 14)	
Gearshift Linkage:				
Gearshift return spring pin	1	8	22 (2.2, 16)	NOTE 1
Gearshift cam plate mounting bolt	1	6	16 (1.6, 12)	NOTE 1
Gearshift A arm bolt ('97 – 2001)	1	8	25 (2.5, 18)	
Gearshift spindle retaining bolt (After 2001)	1	6	12 (1.2, 9)	NOTE 1
Gearshift drum stopper arm bolt	1	6	12 (1.2, 9)	NOTE 1

GENERAL INFORMATION

ENGINE (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Alternator/Starter Clutch:				
Stator one-way clutch socket bolt	6	6	16 (1.6, 12)	NOTE 1
Recoil pulley flange bolt	1	10	74 (7.5, 54)	NOTE 2
Crankshaft/Transmission:				
Neutral switch rotor ('97 – 2001)	1	6	10 (1.0, 7)	NOTE 1
Front crankcase stud bolt	2	8	12 (1.2, 9)	
Rear crankcase stud bolt	2	8	12 (1.2, 9)	
Ignition System:				
Pulse generator	2	5	6 (0.6, 4.3)	NOTE 1
Lights/Switches:				
Neutral and reverse switches ('97 – 2001)	2	10	13 (1.3, 9)	
Gear position switch (After 2001)	1	6	12 (1.2, 9)	NOTE 1
Electric Shift Program (After 2001: TE model):				
Angle sensor	2	5	6 (0.6, 4.3)	NOTE 1
Reverse shift switch	1	10	13 (1.3, 9)	

FRAME		Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Frame/Body Panels/Exhaust system:					
Step bar mounting bolt (except After 2001 TE model)	4	8	32 (3.3, 24)		
Footpeg bracket bolt (After 2001 TE model)	8	8	32 (3.3, 24)		
Muffler band bolt	1	8	23 (2.3, 17)		
Exhaust pipe protector bolt	3	6	22 (2.2, 16)		
Clutch/Gearshift/Linkage:					
Gearshift pedal mounting bolt	1	6	18 (1.8, 13)		
Engine mounting:					
Lower engine mounting bolt/nut	2/2	10	54 (5.5, 40)		
Cylinder head cover mounting bolt	1	8	32 (3.3, 24)		
Front Wheel/Suspension/Steering:					
Handlebar lower holder nut	2	10	39 (4.0, 29)		NOTE 3
Steering shaft U-nut ('97)	1	14	108 (11.0, 80)		NOTE 4
Steering shaft flange nut (After '97)	1	14	108 (11.0, 80)		
Tie-rod ball joint self lock nut	4	12	54 (5.5, 40)		NOTE 3
Tie-rod lock nut	4	12	54 (5.5, 40)		
Steering shaft holder flange bolt	2	8	32 (3.3, 24)		
Upper/lower arm pivot self lock nut	8	10	30 (3.1, 22)		NOTE 3
Knuckle ball joint castle nut	4	12	29 (3.0, 22)		NOTE 5
Shock absorber upper mounting self lock nut	2	10	30 (3.1, 22)		NOTE 3
Shock absorber lower mounting self lock nut ('97)	2	10	54 (5.5, 40)		NOTE 3
(After '97)	2	10	49 (5.0, 36)		NOTE 3
Front wheel hub castle nut	2	16	78 (8.0, 58)		NOTE 5
Front wheel nut	8	10	64 (6.5, 47)		
Throttle case cover	2	4	4 (0.4, 2.9)		
Brakes:					
Rear brake arm pinch bolt/nut	1/1	6	18 (1.8, 13)		
Rear brake panel drain bolt	1	8	12 (1.2, 9)		
Master cylinder reservoir cap screw	2	4	2 (0.2, 1.4)		
Master cylinder holder SH bolt	2	6	12 (1.2, 9)		
Brake hose oil bolt	3	10	34 (3.5, 25)		
Brake pipe	4	10	17 (1.7, 12)		NOTE 2
Brake panel flange bolt	8	8	29 (3.0, 22)		
Brake hose clamp flange bolt (6 mm)	4	6	12 (1.2, 9)		
Brake hose clamp flange bolt (8 mm)	2	8	29 (3.0, 22)		
Brake lever pivot bolt	1	6	6 (0.6, 4.3)		
Brake lever pivot lock nut	1	6	6 (0.6, 4.3)		
Brake bleeder valve	2	8	6 (0.6, 4.3)		
Brake wheel cylinder bolt washer	4	6	8 (0.8, 5.8)		
Brake adjuster bolt washer	4	6	8 (0.8, 5.8)		
Rear Wheel/Suspension:					
Shock absorber upper mounting self lock nut	2	10	44 (4.5, 33)		NOTE 3
Shock absorber lower mounting bolt	2	10	54 (5.5, 40)		NOTE 3
Rear axle nut	1	32	39 (4.0, 29)		
Rear axle lock nut	1	32	127 (13.0, 94)		NOTE 1
Rear wheel hub nut	2	20	137 (14.0, 101)		NOTE 5
Rear wheel nut	8	10	64 (6.5, 47)		
Swingarm right pivot bolt	1	30	113 (11.5, 83)		
Swingarm left pivot bolt	1	30	4 (0.4, 2.9)		
Swingarm left pivot lock nut	1	30	113 (11.5, 83)		
Skid plate flange bolt	3	8	32 (3.3, 24)		
Rear Driving Mechanism:					
Gear case mounting bolt	8	10	54 (5.5, 40)		
Gear case cover flange bolt (8 mm)	6	8	25 (2.6, 19)		
Gear case cover flange bolt (10 mm)	2	10	49 (5.0, 36)		NOTE 1
Pinion joint nut	1	64	98 (10.0, 72)		NOTE 6
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	REMARK	REF. SEC.
Carburetor float level gauge	07401-0010000		5
Flywheel holder	07725-0040000	NOTE 2	10
Rotor puller	07733-0010000	NOTE 4: 07933-2000000	10
Remover weight	07741-0010201	NOTE 4: 07936-3710200 (U. S. A. only) 07936-371020A (U. S. A. only)	8, 11, 13
Valve guide driver, 5.5 mm	07742-0010100		7
Attachment, 32×35 mm	07746-0010100		8, 10, 11, 12
Attachment, 37×40 mm	07746-0010200		12, 13
Attachment, 42×47 mm	07746-0010300		11, 14
Attachment, 52×55 mm	07746-0010400		11, 15
Attachment, 62×68 mm	07746-0010500		13, 15
Attachment, 72×75 mm	07746-0010600		11
Attachment, 24×26 mm	07746-0010700		15
Driver, 22 mm I. D.	07746-0020100		12
Driver, 40 mm I. D.	07746-0030100	NOTE 4: 07945-3710101	12
Attachment, 35 mm I. D.	07746-0030400		12
Pilot, 15 mm	07746-0040300		8, 11
Pilot, 17 mm	07746-0040400		12, 13
Pilot, 20 mm	07746-0040500		11, 12, 14
Pilot, 25 mm	07746-0040600		11
Pilot, 35 mm	07746-0040800		11
Pilot, 40 mm	07746-0040900		15
Driver	07749-0010000		8, 10, 11, 12, 13, 14, 15
Attachment, 57 mm	07947-SD90101		13
Valve spring compressor	07757-0010000		7
Valve seat cutters		NOTE 2	7
Seat cutter, 29 mm (45° EX)	07780-0010300		
Seat cutter, 33 mm (45° IN)	07780-0010800		
Seat cutter, 30 mm (32° EX)	07780-0012200		
Seat cutter, 33 mm (32° IN)	07780-0012900		
Seat cutter, 30 mm (60° IN/EX)	07780-0014000		
Cutter holder, 5.5 mm	07781-0010100		
Pilot screw wrench	07908-4220201		5
Swingarm lock nut wrench	07908-4690003		13
Valve adjusting wrench	07708-0030400	NOTE 4: 07908-KE90200 (U. S. A. only)	3
Snap ring pliers	07914-3230001		14
Lock nut spanner, 41 mm	07916-9580200	NOTE 4: 07916-958020B (U. S. A. only) 07916-958020A (U. S. A. only)	14
Lock nut wrench set	07916-9580300	NOTE 3	14
— Lock nut wrench	07916-9580400	NOTE 4: 07916-958010A (U. S. A. only) 07916-958010B (U. S. A. only)	
— Lock nut wrench handle	07916-9580500	NOTE 3	

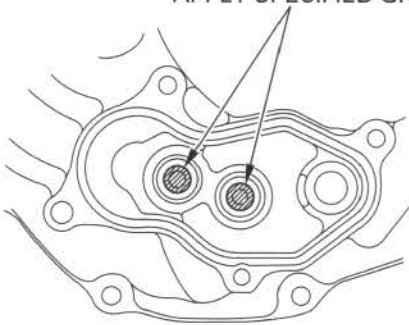
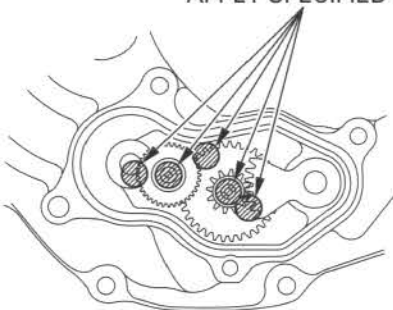
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Lock nut wrench, 30×64 mm	07916-MB00002		15
— Shaft puller	07931-ME40000	NOTE 4: 07931-ME4010B (U. S. A. only) 07931-HB3020A (U. S. A. only)	15
Bearing remover set	07936-3710001	NOTE 3	12, 13
— Remover weight	07741-0010201	NOTE 4: 07936-371020A (U. S. A. only) 07936-3710200 (U. S. A. only)	13
— Remover handle	07936-3710100		13
Bearing remover, 17 mm	07936-3710300		13
— Bearing remover, 20 mm	07936-3710600		11
Bearing remover set	07936-KC10000	NOTE 3	8, 11
Bearing remover set	07936-KC10500		8, 11
Oil seal driver	07947-SD90101		14
Attachment, 28×30 mm	07946-1870100		12
Driver handle attachment	07949-3710001		12
Driver attachment	07965-KE80200	NOTE 3, 4: 07947-KA50100 and 07746-0010400 and 07749-0010000	15
Ball joint remover/installer	07965-SB03000	NOTE 4: 07JAF-SH20200	12
Assembly collar	07965-VM00100		11
Assembly shaft	07965-VM00200	NOTE 4: 07931-ME4010B (U. S. A. only) and 07931-HB3020A (U. S. A. only)	11
Thread adapter	07965-KA30000	NOTE 1, 4: 07VMF-HM8010A (U. S. A. only)	11
Valve guide reamer, 5.5 mm	07984-2000001	NOTE 4: 07984-200000D (U. S. A. only)	7
Clutch center holder	07GMB-KT70101	NOTE 4: 07HGB-001010B (U. S. A. only) or 07HGB-001010A (U. S. A. only) and 07HGB-001020B (U. S. A. only) or 07HGB-001020A (U. S. A. only)	8
Clutch puller	07GMC-HB30100	NOTE 4: 07933-HB3000A (U. S. A. only)	8
Inspection adapter	07GMJ-ML80100		19
Peak voltage adapter	07HGJ-0020100	NOTE 4: Peak voltage tester (U. S. A. only)	17
Clutch holder	07HMB-HB70100	NOTE 4: 07923-HB3000B (U. S. A. only)	8
Pinion puller set	07HMC-MM80101	NOTE 3	15
— Pinion puller base	07HMC-MM80110	NOTE 4: 07HMC-MM8011A (U. S. A. only)	15
Oil seal driver	07JAD-PH80101		14
Ball joint remover/installer	07JMF-HC50110		12
Clutch spring compressor	07LAE-PX40100		8
Ball joint remover	07MAC-SL00200		12
Pilot, 32 mm	07MAD-PR90200		13, 14
Universal bead breaker	GN-AH-958-BB1		12

GENERAL INFORMATION

LUBRICATION & SEAL POINTS

ENGINE	LOCATION	MATERIAL	REMARKS
	Cylinder bore Connecting rod big end Centrifugal clutch outer lock nut threads Connecting rod small end inner surface Piston ring surface Piston pin surface Piston pin bore and piston outer surface Cylinder head stud bolt threads (at cap nut) Cylinder head special bolt threads Cylinder head flange bolt threads Cam chain surface Oil pump chain surface Centrifugal clutch sliding surface Change clutch ball retainer ball surface Change clutch cam plate surface and gear teeth Transmission bearing and gear teeth Transmission bushing journal surface Change clutch center lock nut threads Reverse stopper shaft bearing surface Shift fork and shift fork shaft surface Shift drum grooves and surface Gearshift spindle shaft surface and bearing Gearshift master arm Clutch lever surface One way clutch rolling surface of cam Starter gear teeth Starter driven gear teeth and bearing Recoil pulley flange bolt threads Each ball and needle bearing rolling surface Rocker arm (valve stem contact area and push rod contact area) Valve adjusting hole cap threads (After 2001) Each O-ring	Engine oil	
	Valve stem sliding surface Camshaft surface Rocker arm shaft surface Clutch outer guide sliding surface Starter idle shaft surface	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
	Recoil pulley oil seal Each oil seal rip	Multi-purpose grease NLGI NO3.	
	Camshaft bearing set plate flange bolt threads Mainshaft bearing set plate flange bolt threads Cam chain tensioner bolt threads Cam chain adjuster bolt threads Centrifugal oil filter cover flange bolt threads Gear shift drum stopper arm pivot bolt threads Gear shift return spring pin bolt threads Neutral/reverse switch rotor bolt threads ('97 – 2001) Gear shift drum shifter/guide plate bolt threads Starter one-way clutch socket bolt threads Gear position switch mounting bolt threads (After 2001) Ignition pulse generator 5 mm socket bolt threads	Locking agent	
	Alternator cord grommet Gear position switch cord grommet (After 2001)	Sealant	

ENGINE (Cont'd)

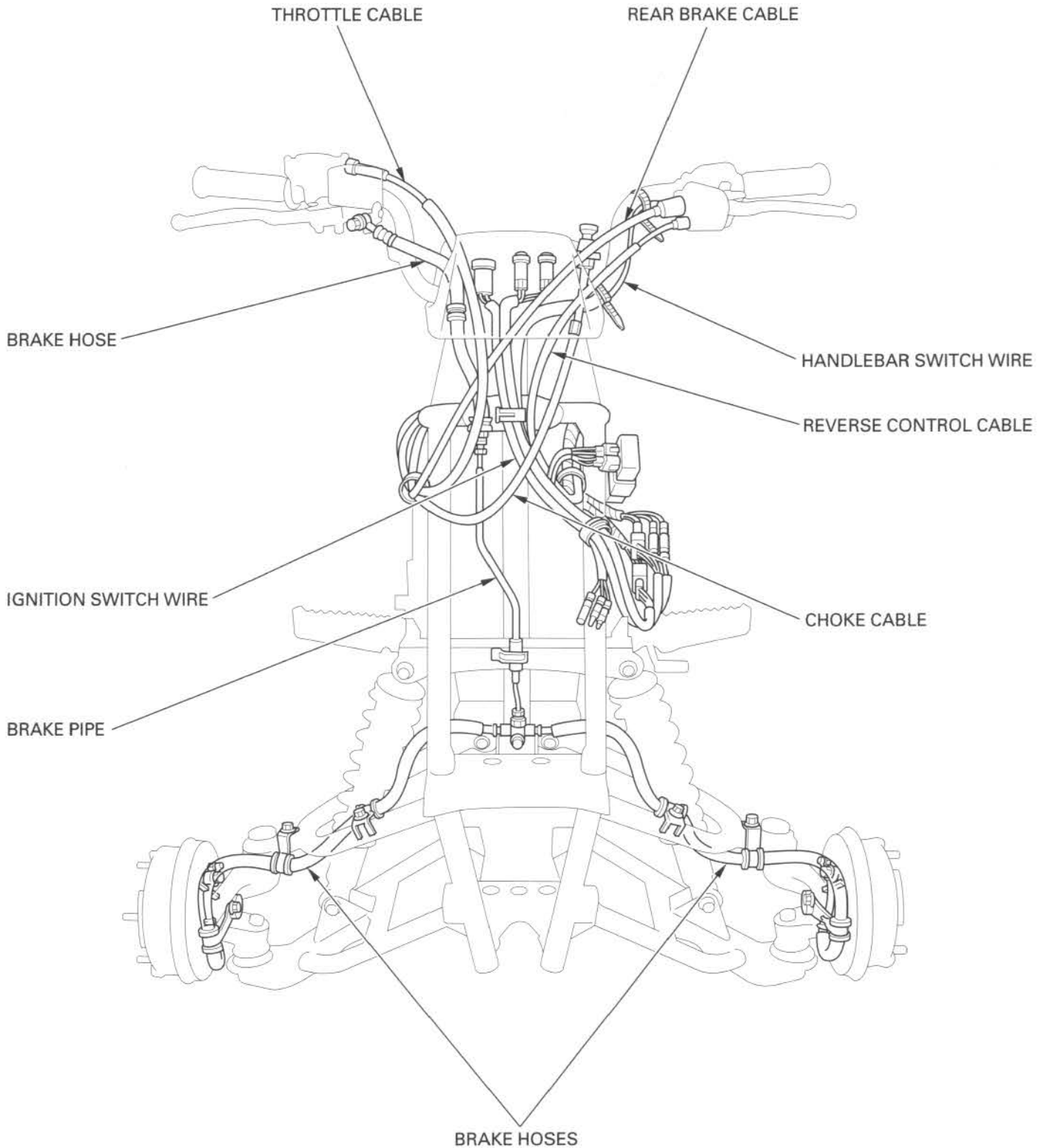
LOCATION	MATERIAL	REMARKS
Front cover shift reduction gears (After 2001 TE model only)	Templex N3 (ESSO) Unirex N2 (EXXON) or equivalent	Apply 3–5g of recommended grease
<div><div>APPLY SPECIFIED GREASE</div><div>APPLY SPECIFIED GREASE</div></div>		

GENERAL INFORMATION

FRAME		
LOCATION	MATERIAL	REMARKS
Steering shaft oil seal lip Steering shaft dust seal lip Front wheel hub dust seal surface/lip Rear brake cable end Rear brake cam shaft sliding surface Rear brake cam dust seal surface/lip Rear brake panel dust seal lip Rear brake shoe cam contact surface Rear brake shoe anchor pin contact surface Brake pedal shaft sliding surface Brake pedal dust seal lip Brake lever pivot sliding surface Brake lever parking arm pin sliding surface Rear brake panel O-ring Rear final drive pinion joint oil seal Rear final drive ring gear oil seal lip Rear final drive oil cap O-ring Swing arm bearing and grease holder Swing arm bearing dust seal lip Throttle cable end Throttle upper adjuster lock nut threads	Multi-purpose grease	
Steering bushing sliding surface	SHELL ALVANIA EP-LF-2 or equivalent	Apply 2 – 3 g
Brake master piston/piston cups Wheel cylinder piston/piston cups	DOT 3 or DOT 4 brake fluid	
Front brake 	Silicone grease	Apply to the sliding areas marked by “.” as shown
Brake pipe threads	Engine oil	
Rear brake inner cable Throttle inner cable Reverse assist inner cable Choke inner cable	Cable lubricant	
Rear axle shaft spline Rear final drive yoke joint spline	Molybdenum disulfide grease	
Rear axle lock nut threads	Locking agent	
Rear final drive case	Hypoid gear oil SAE # 80	
Rear final drive case mating surface	Liquid sealant (Three-bond 1215 or equivalent)	
Air cleaner element	Pro Honda Foam Air Filter Oil or equivalent	
Handlebar grip rubber inside	Honda Bond A or Honda Hand Grip Cement (U. S. A. only)	

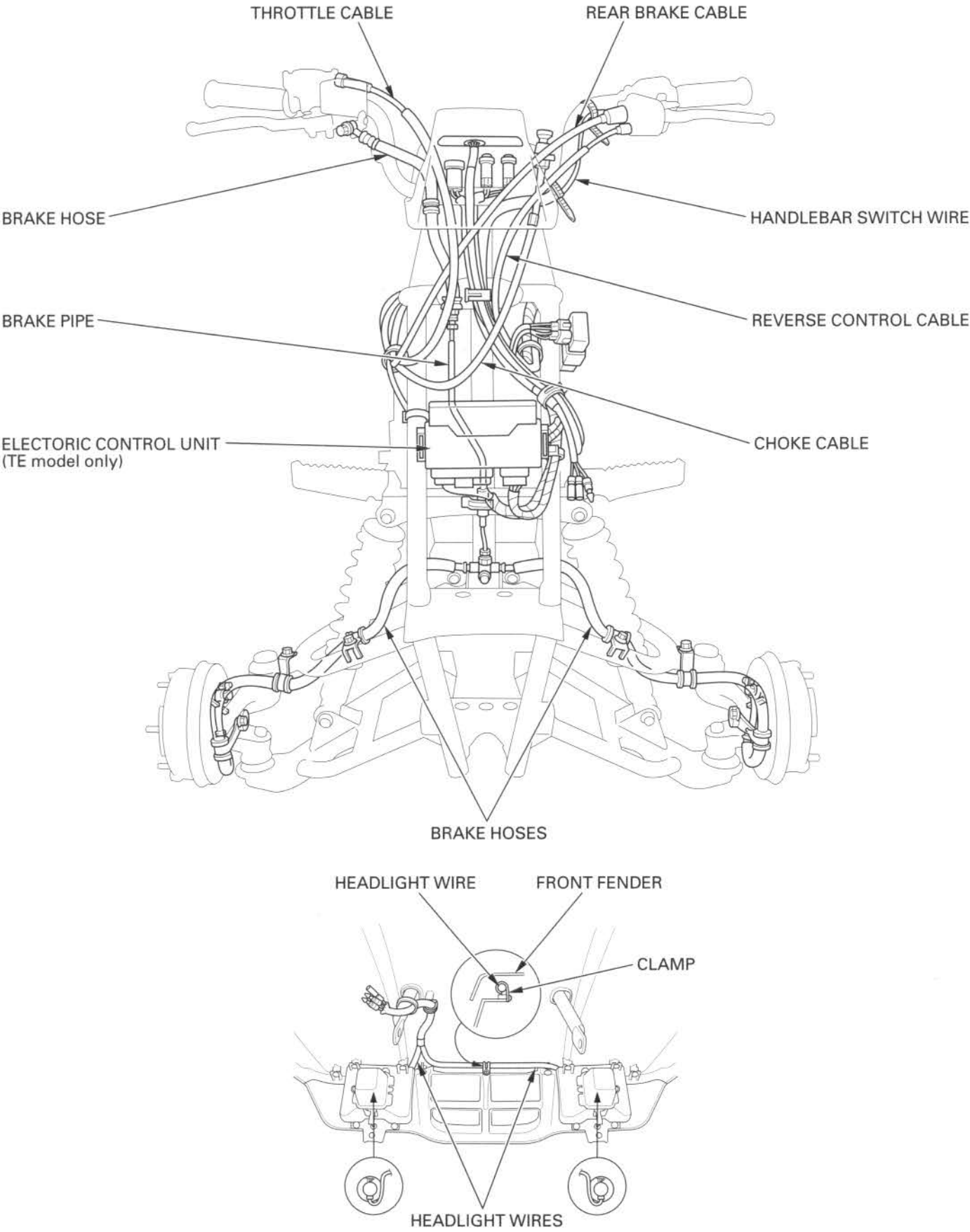
CABLE & HARNESS ROUTING

'97 – 2001:

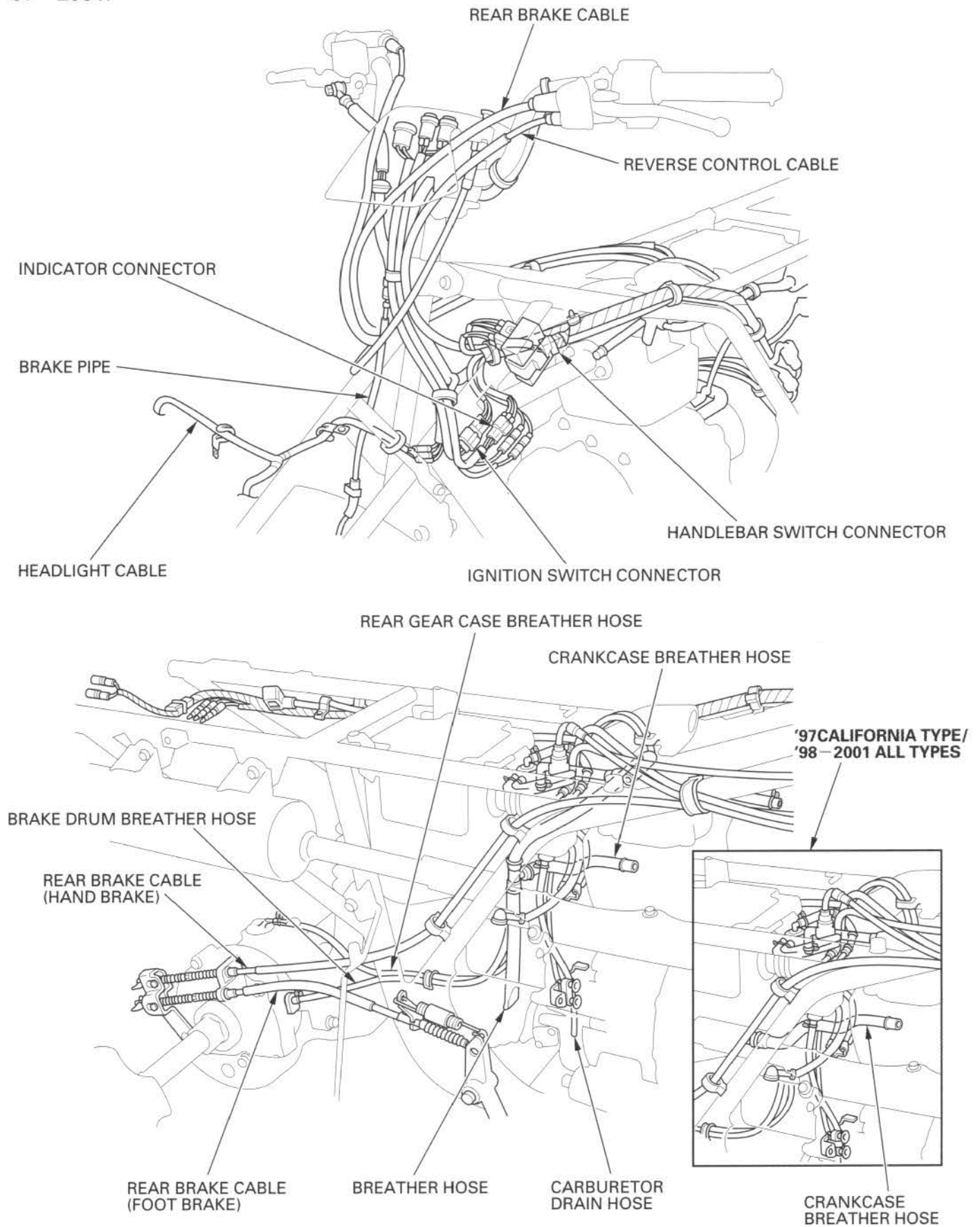


GENERAL INFORMATION

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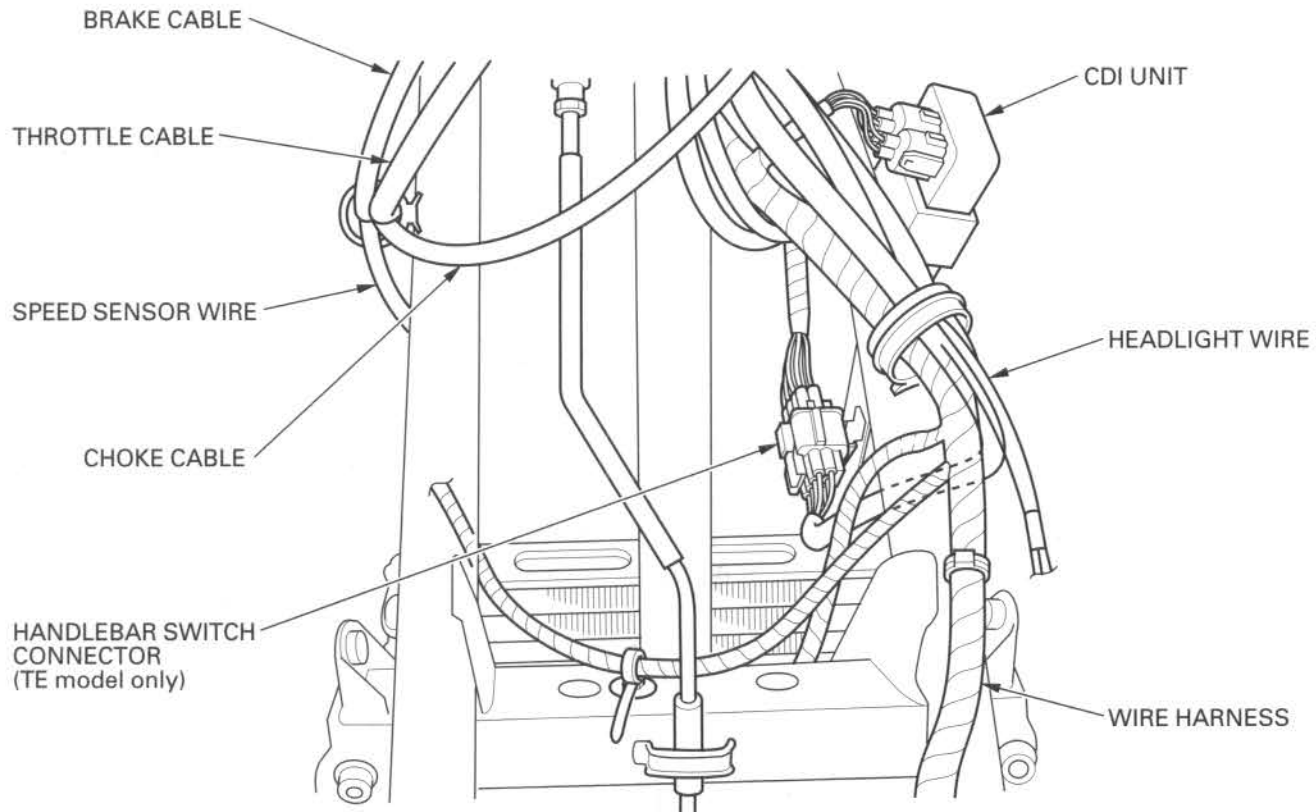
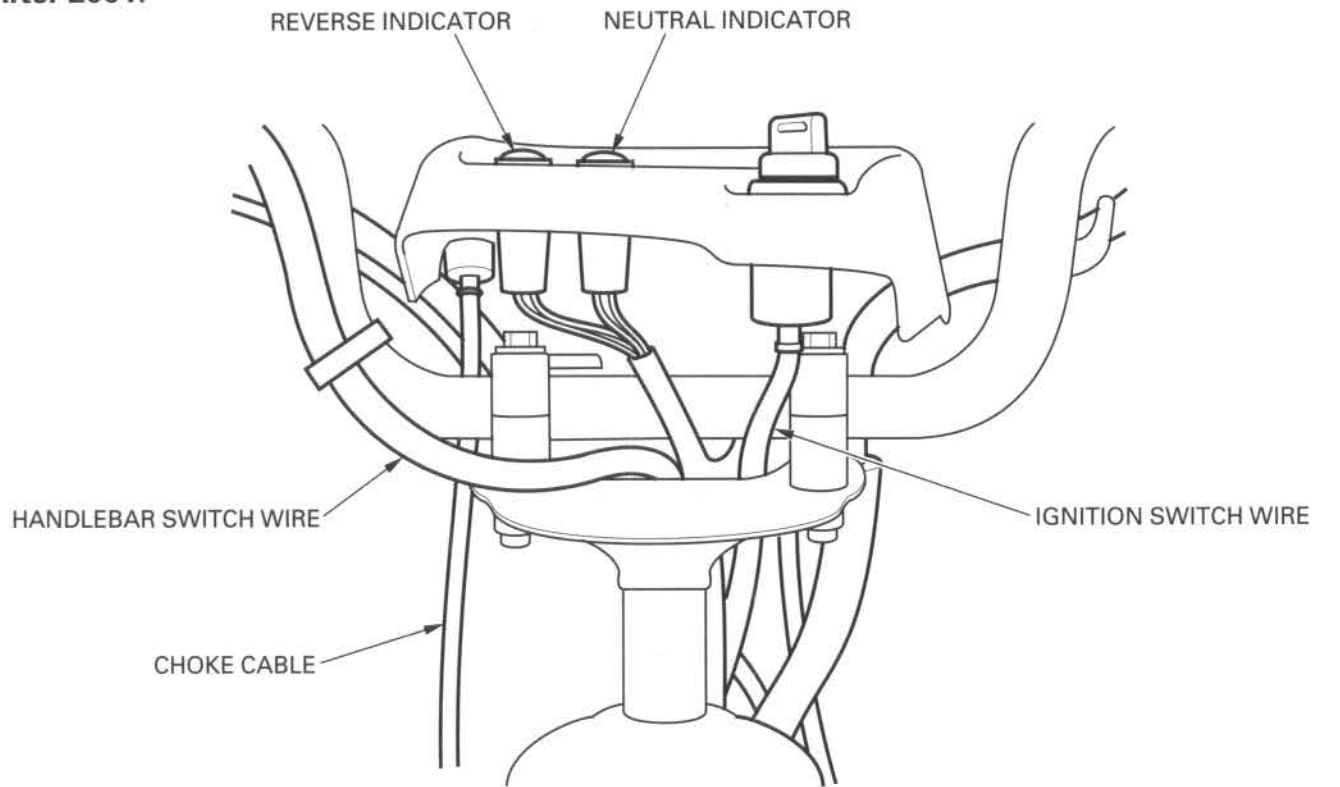


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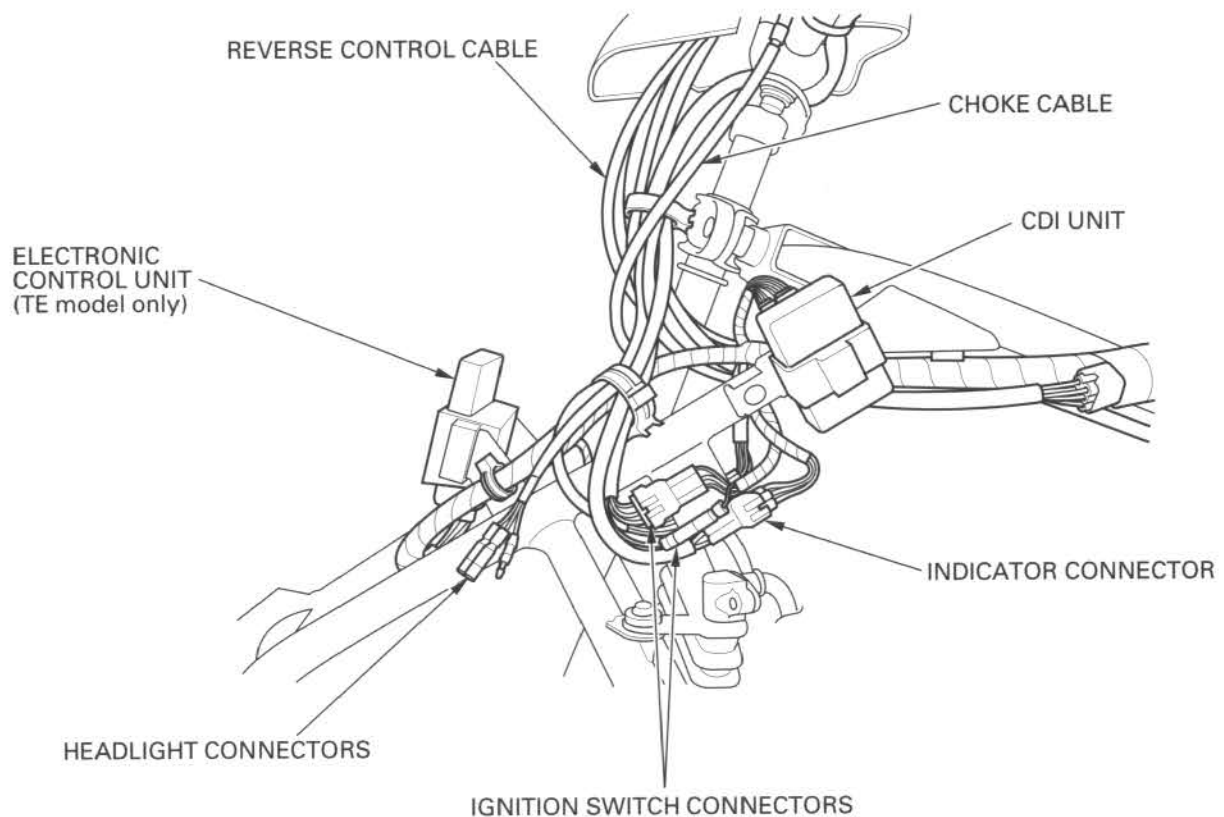
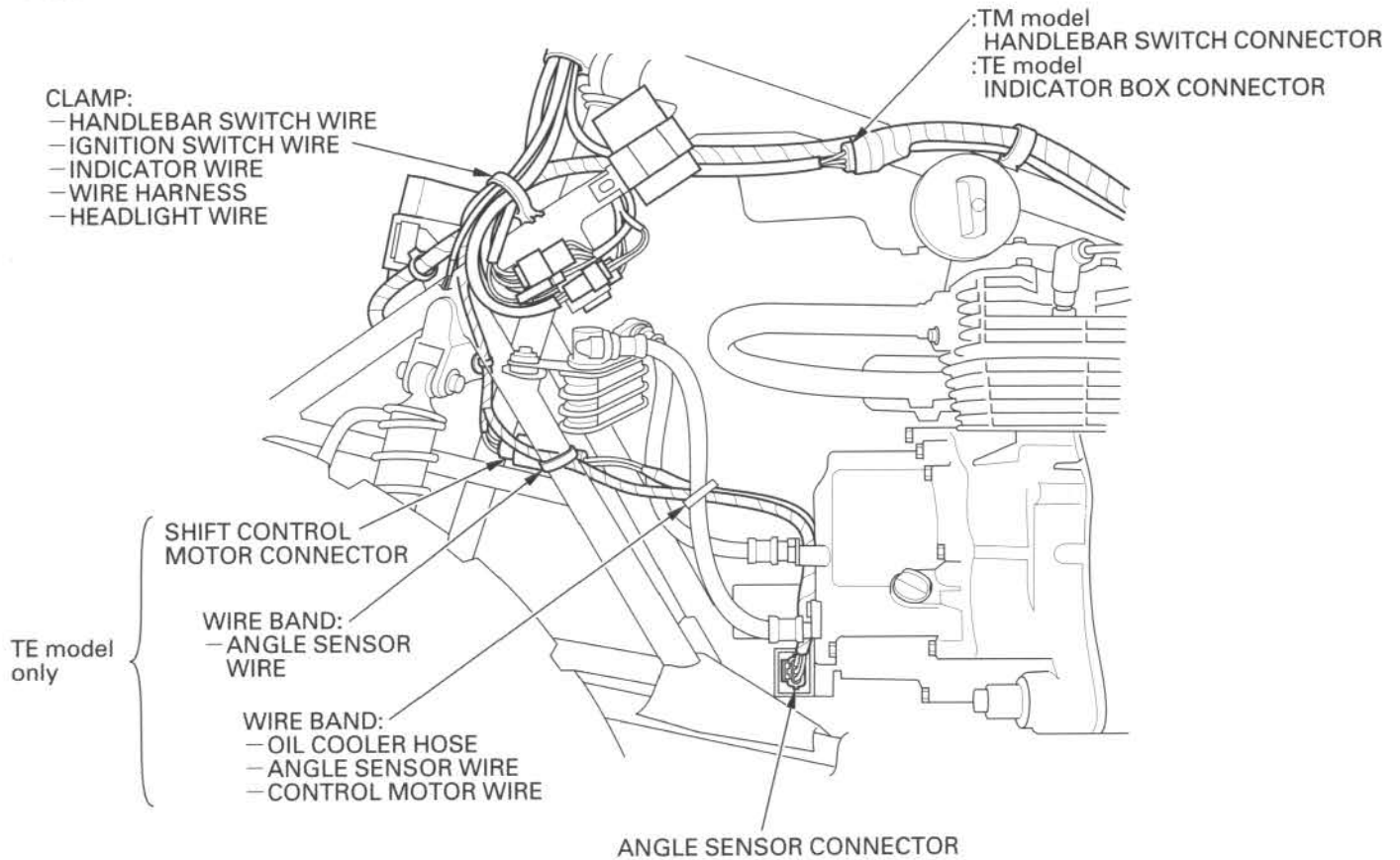


GENERAL INFORMATION

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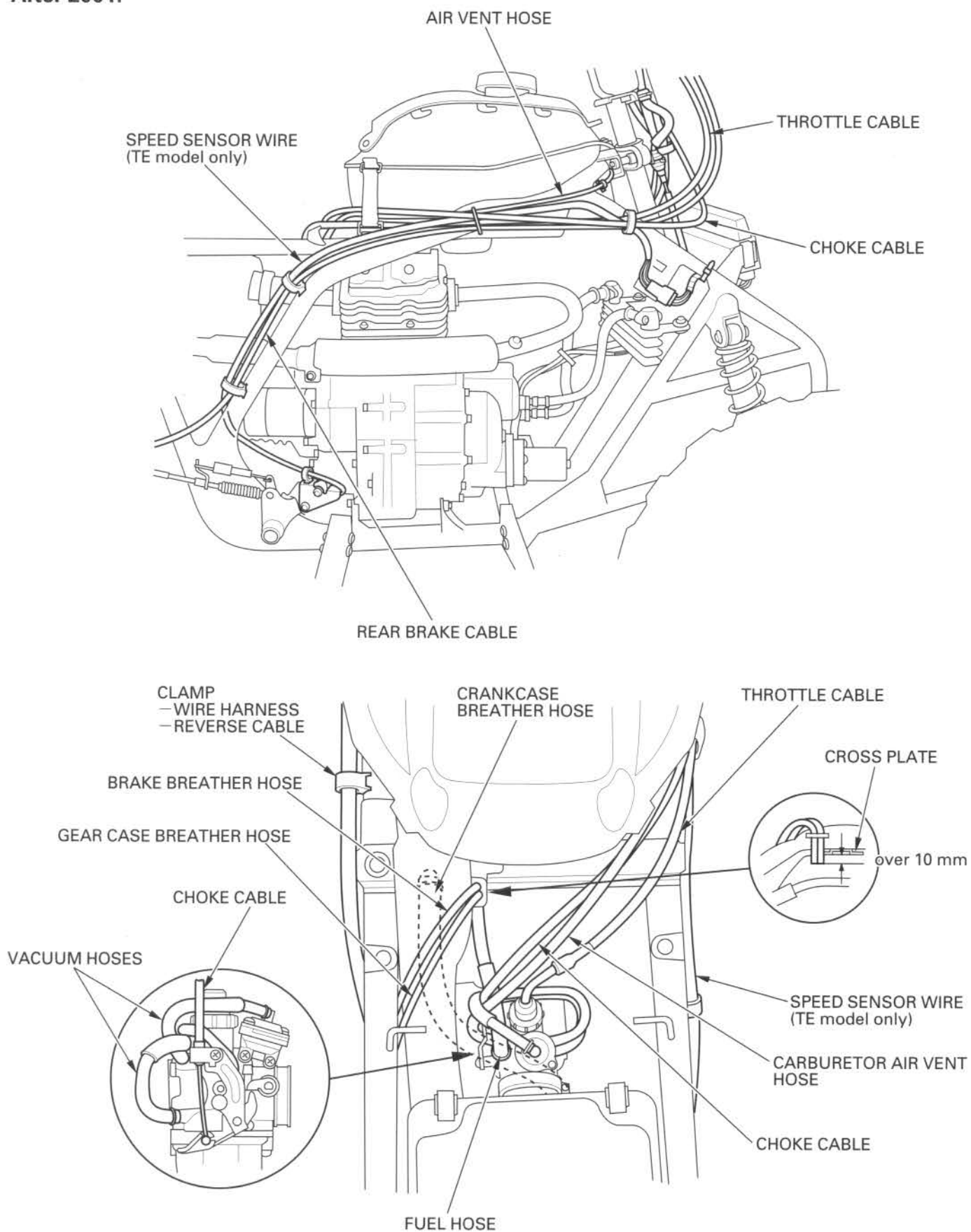


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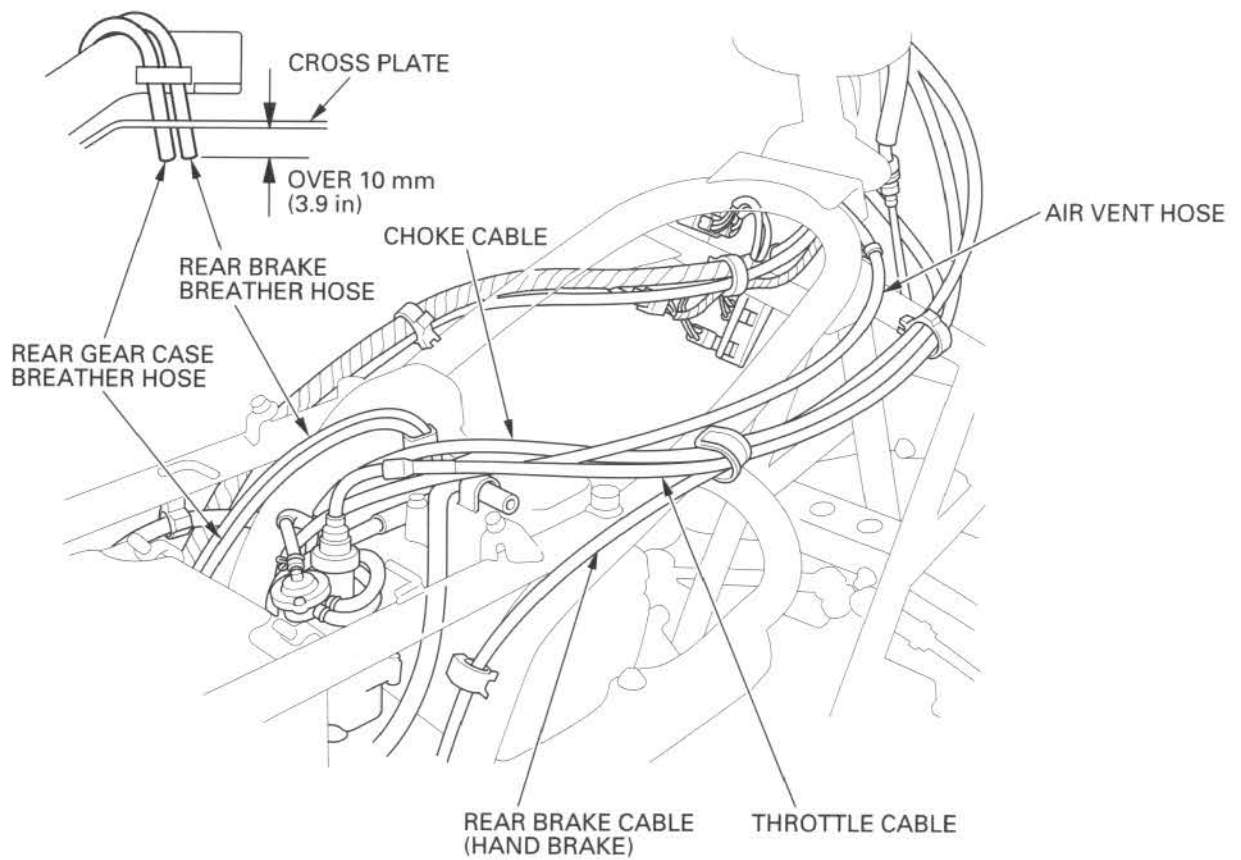
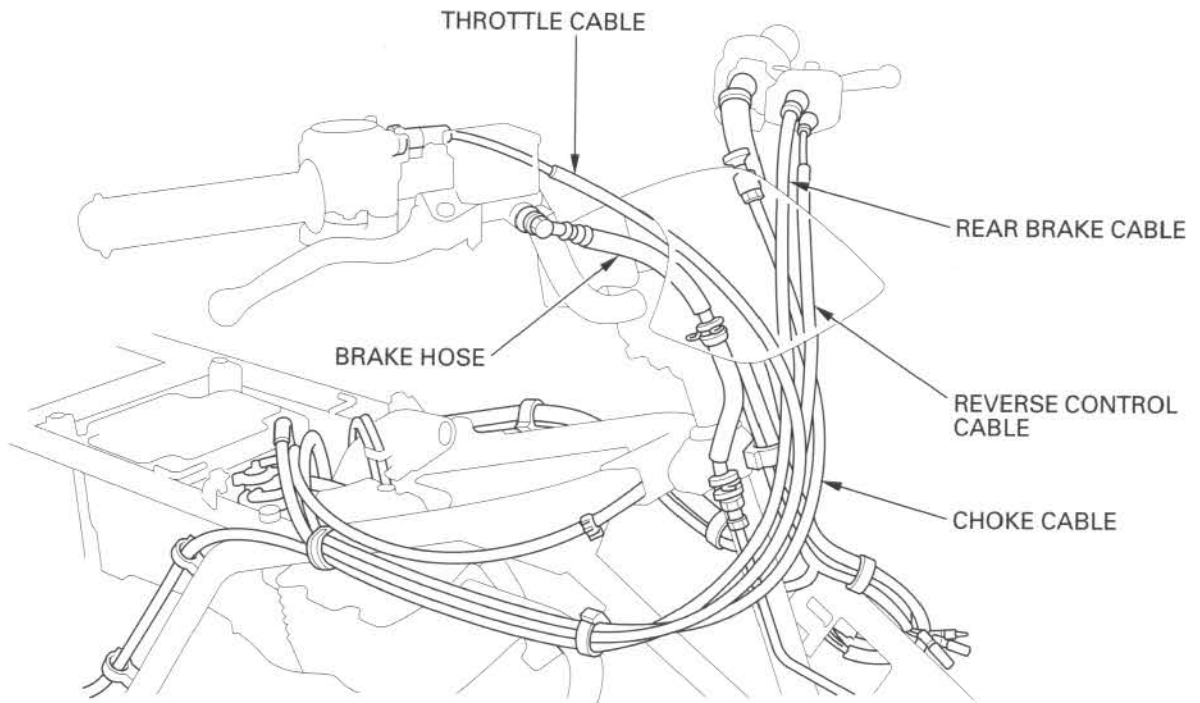


GENERAL INFORMATION

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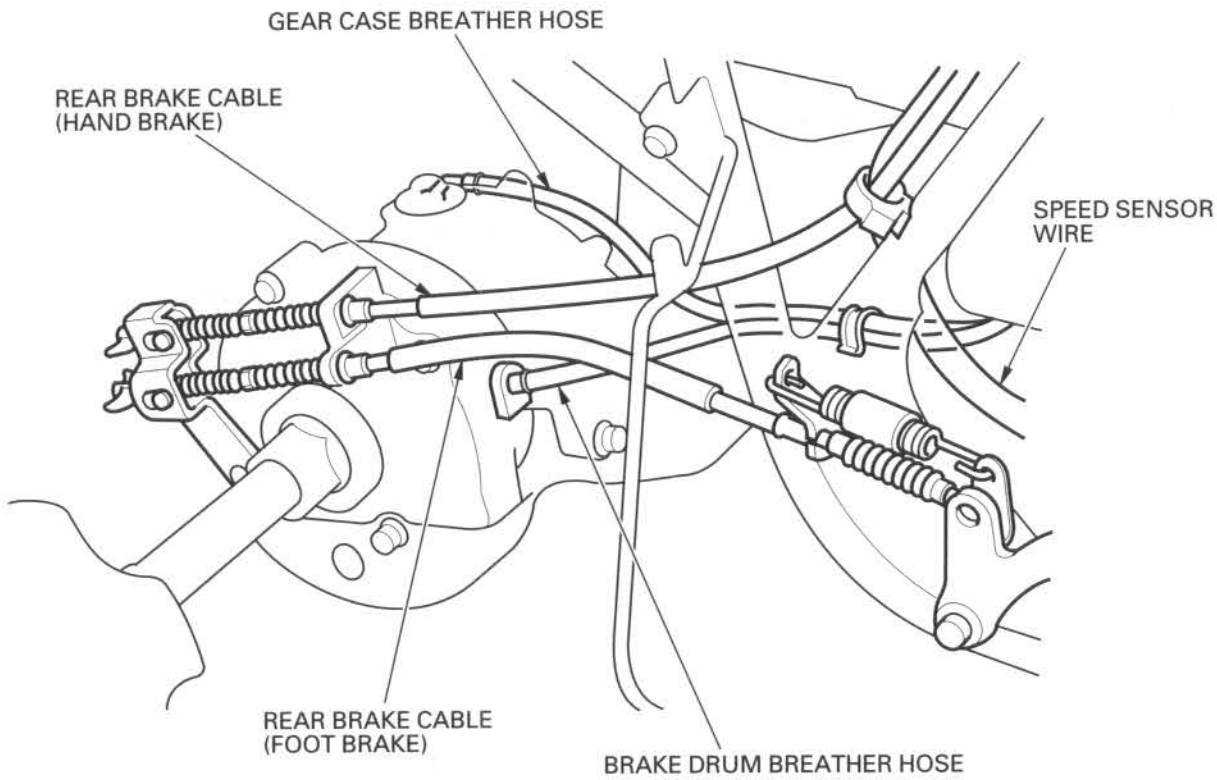
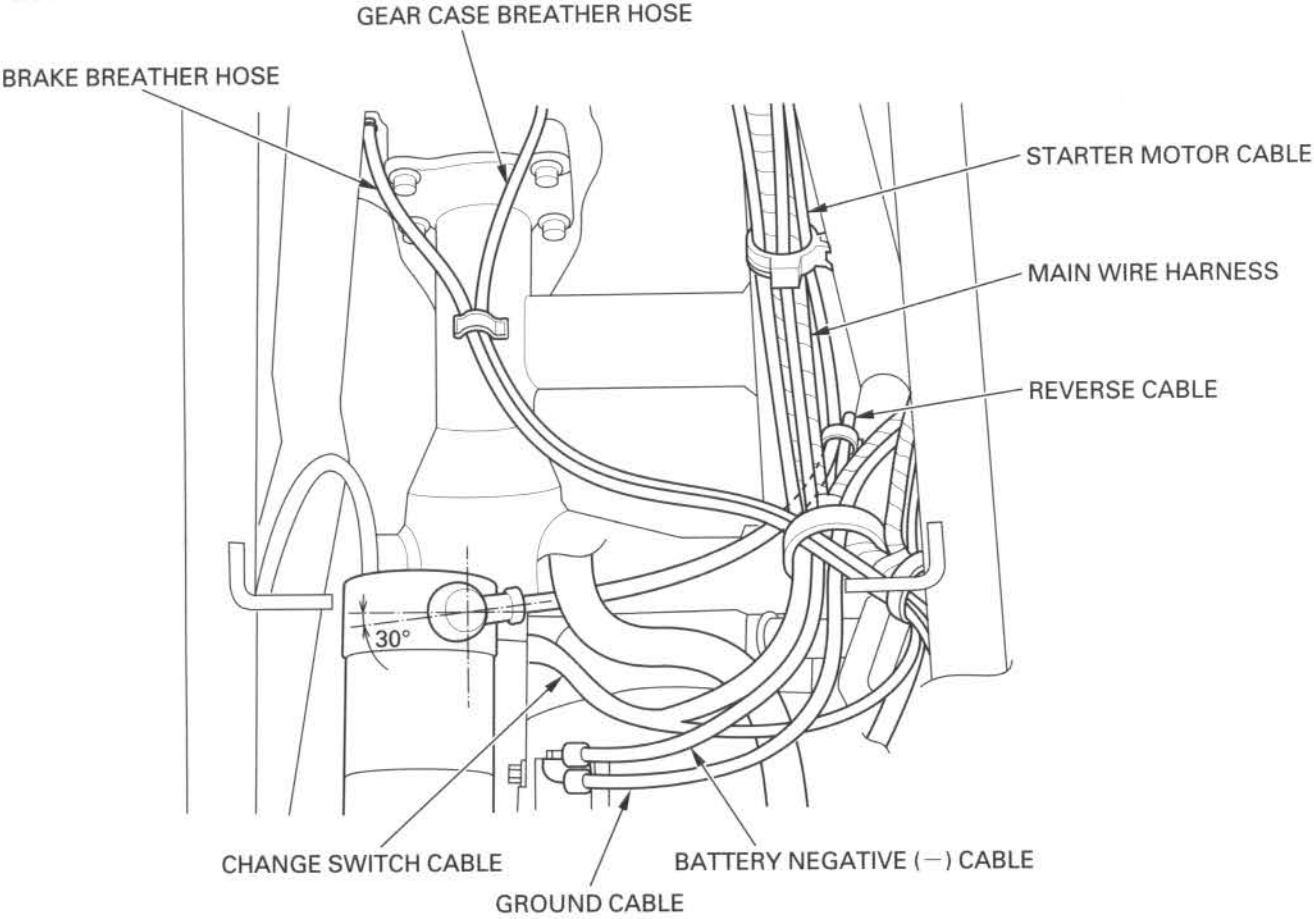


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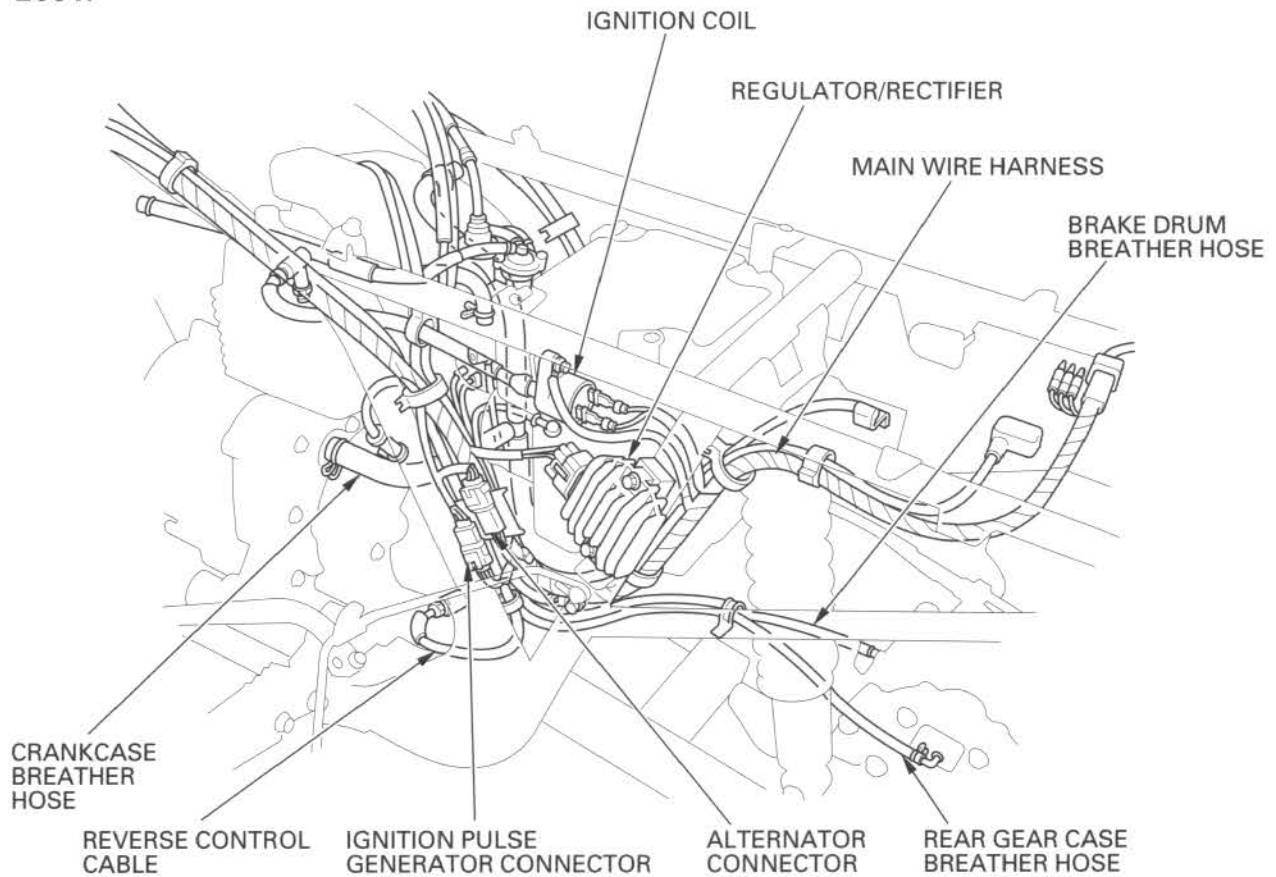


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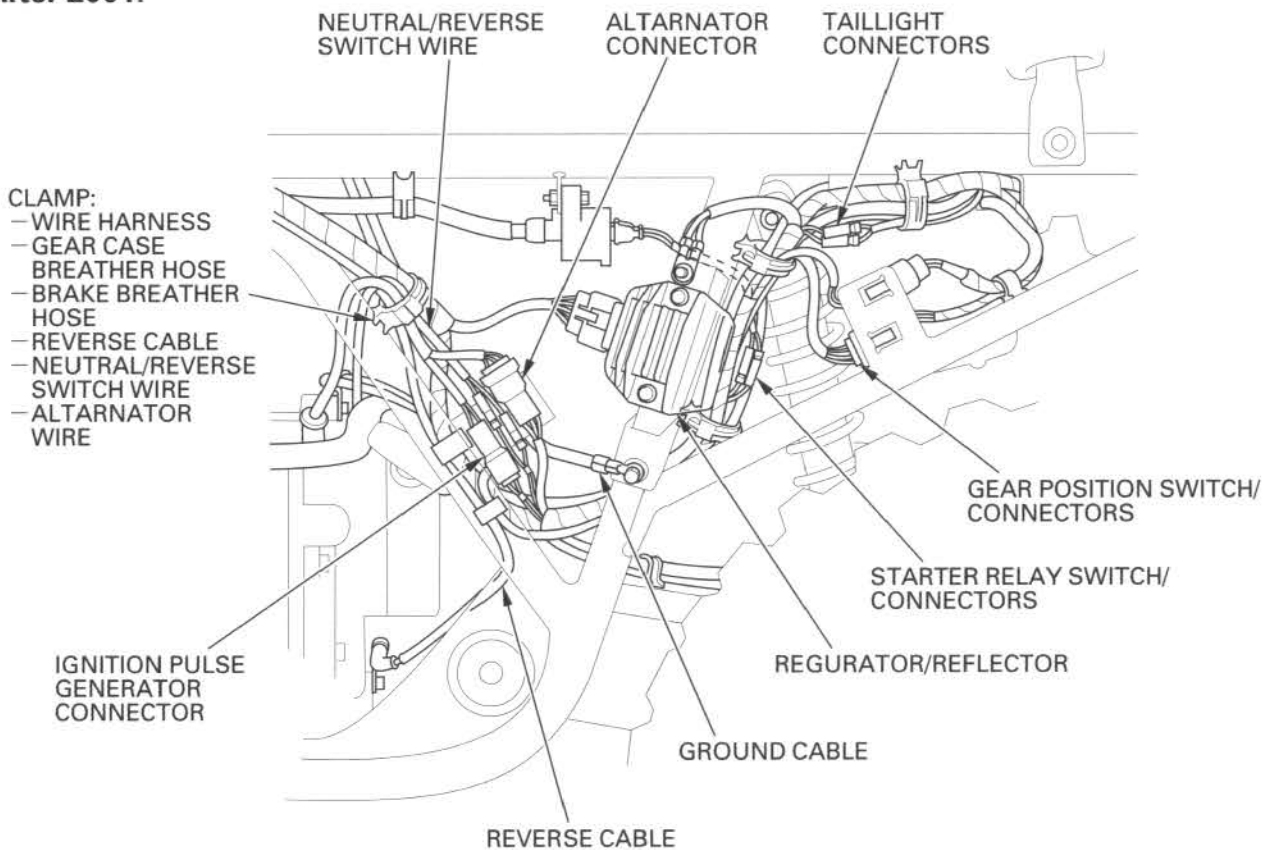
After 2001:



'97 – 2001:

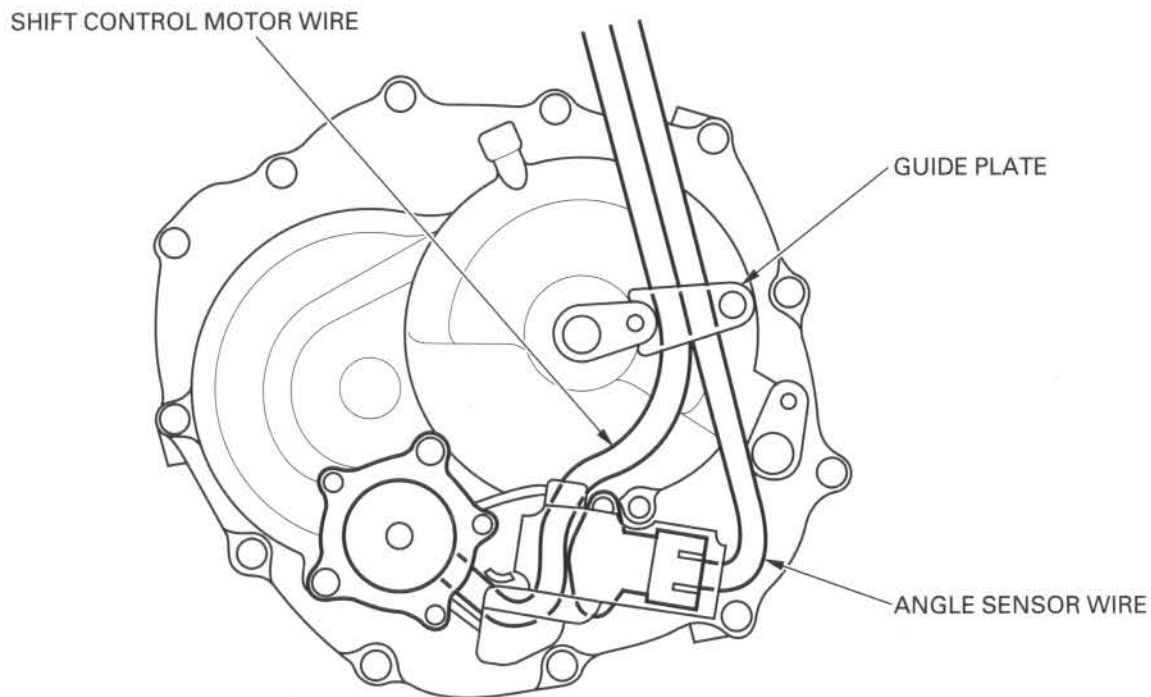


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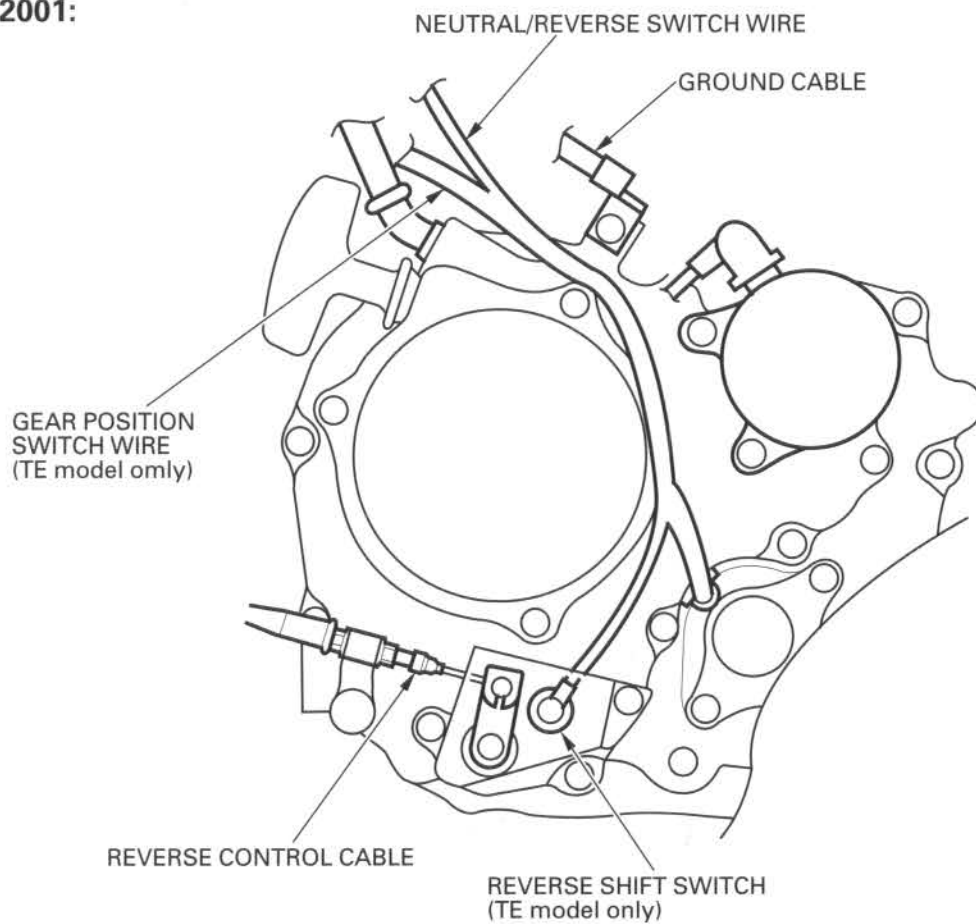


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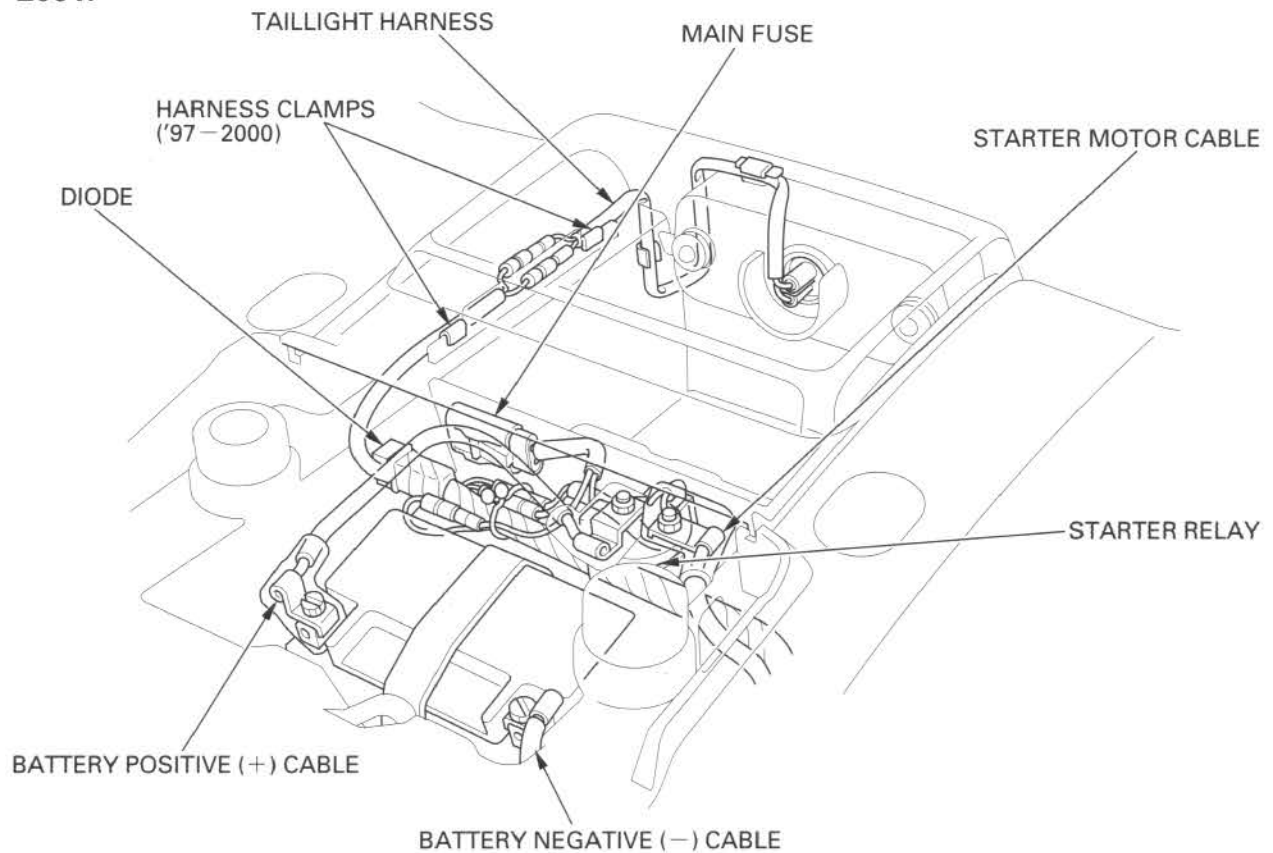
After 2001 TE model:



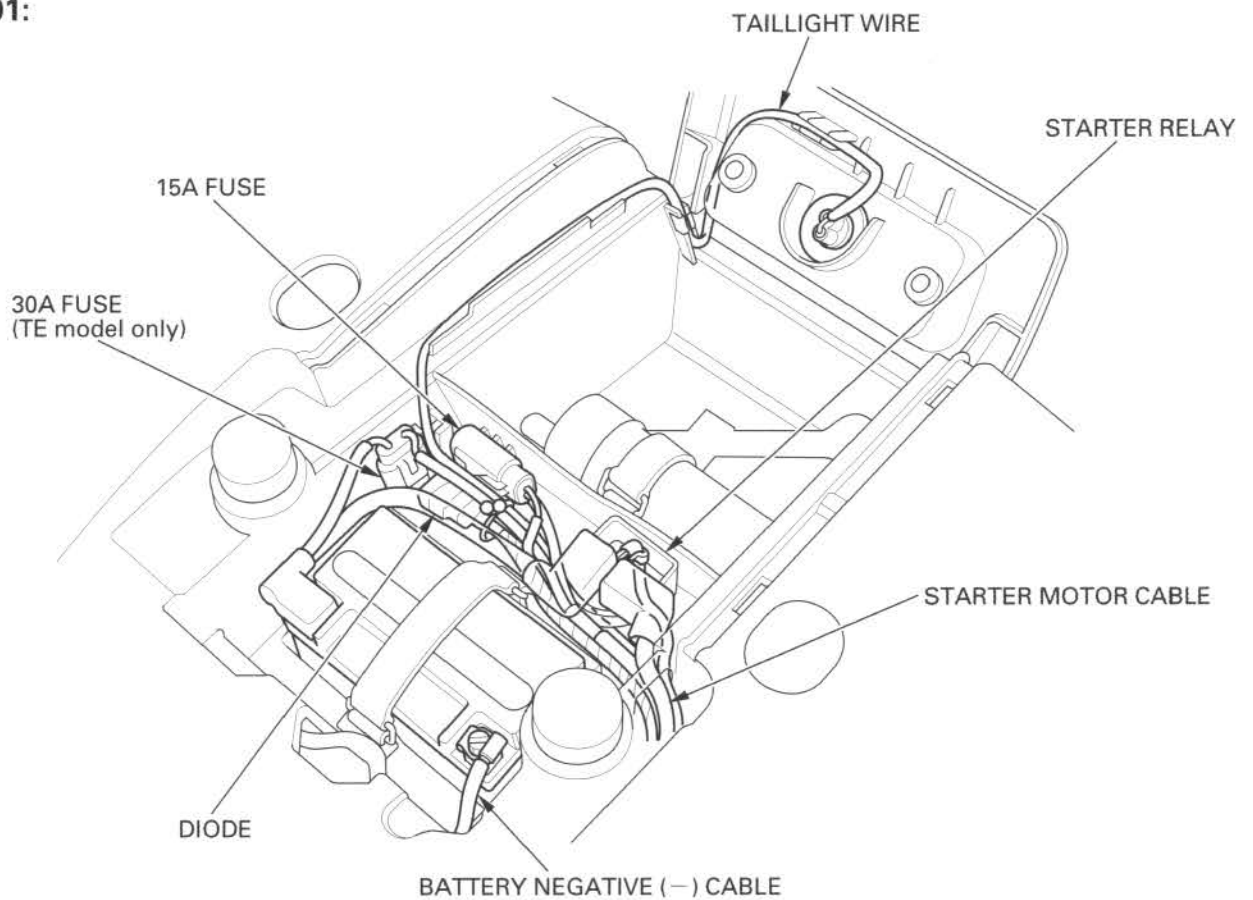
After 2001:



'97 – 2001:



After 2001:



EMISSION CONTROL SYSTEMS

The California Air Resources Board (CARB) requires manufacturers to certify that their ATVs comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided (California type only).

SOURCE OF EMISSIONS

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

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

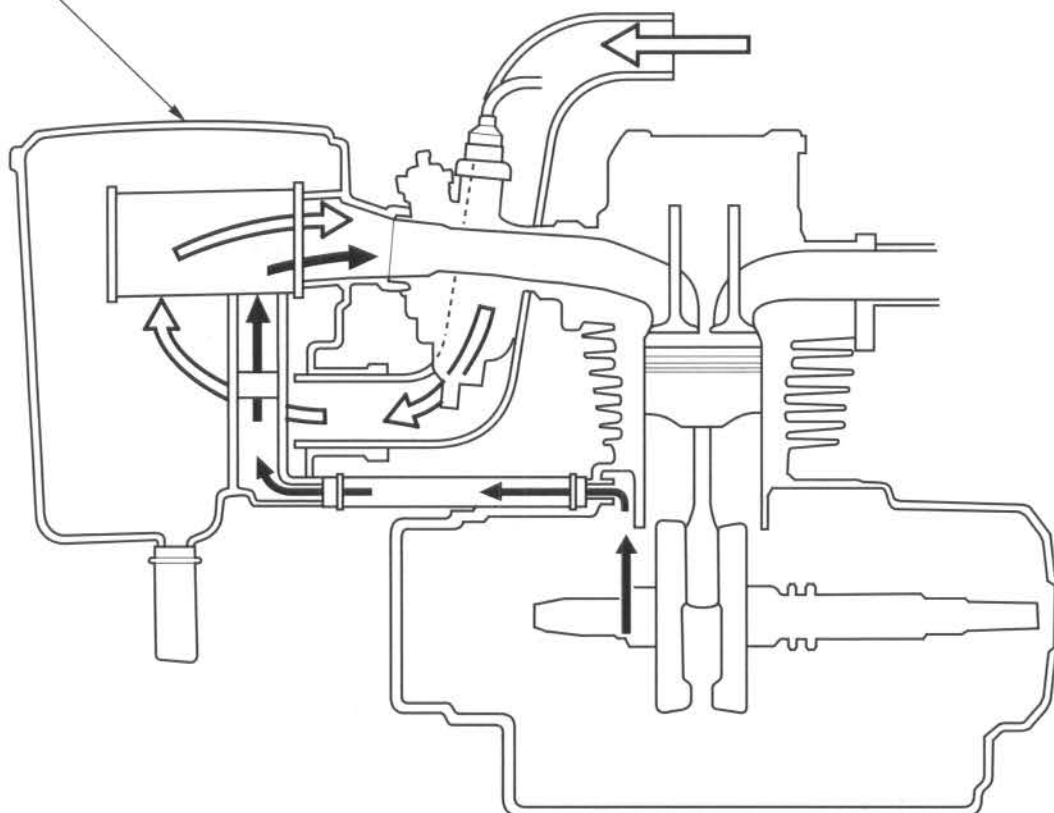
EXHAUST EMISSION CONTROL SYSTEM ('97 CALIFORNIA TYPE/AFTER '97 ALL TYPES)

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

CRANKCASE EMISSION CONTROL SYSTEM ('97 CALIFORNIA TYPE/AFTER '97 ALL TYPES)

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

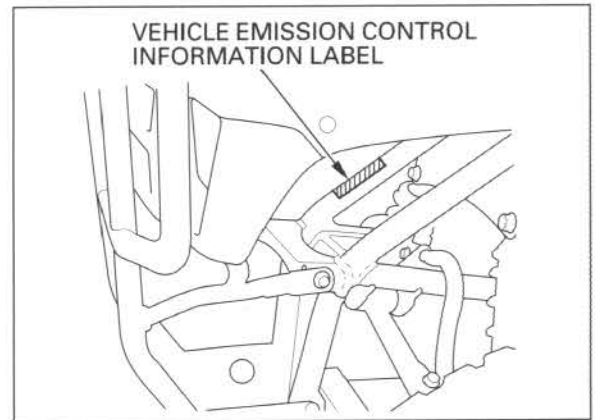
AIR CLEANER HOUSING



⇒ FRESH AIR
→ BLOW-BY GAS

EMISSION CONTROL INFORMATION LABEL ('97 CALIFORNIA TYPE/ AFTER '97 ALL TYPES)

The Vehicle Emission Control Information Label is attached on the right side of the frame below the front fender.



2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	FRONT MUDGUARD	2-6
TROUBLESHOOTING	2-1	REAR MUDGUARD	2-6
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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 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 kgf·m , 17 lbf·ft)
Exhaust pipe protector bolt	22 N·m (2.2 kgf·m , 16 lbf·ft)
Step bar mounting bolt (‘97 – 2001/After 2001 TM model)	32 N·m (3.3 kgf·m , 24 lbf·ft)
Footpeg bracket bolt (After 2001 TE model)	32 N·m (3.3 kgf·m , 24 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

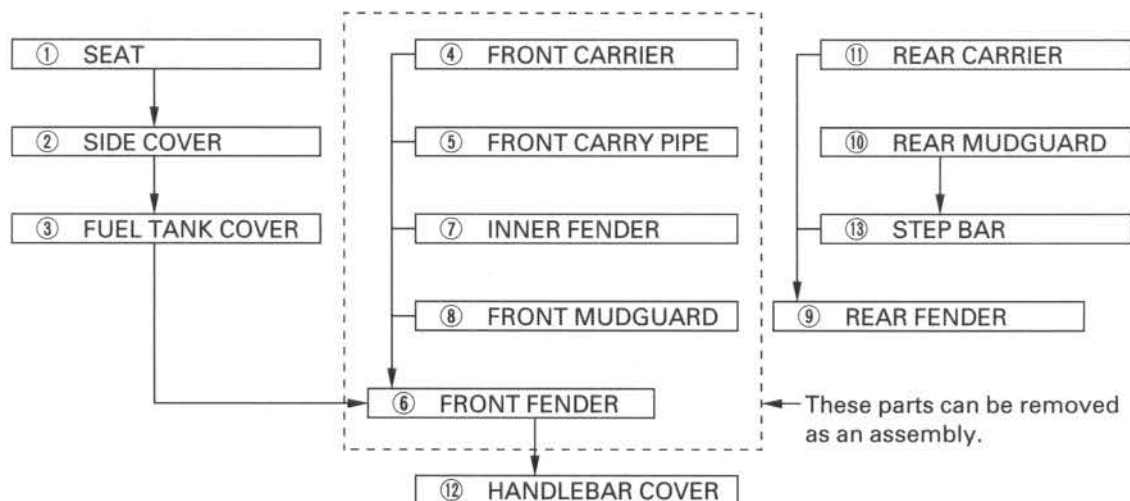
Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

BODY PANEL LOCATIONS



FRAME COVER REMOVAL CHART



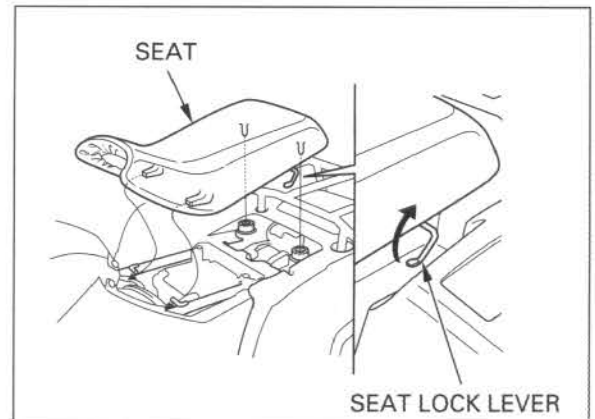
SEAT/SIDE COVER

REMOVAL

Seat

Release the seat lock lever by moving the lever upward.

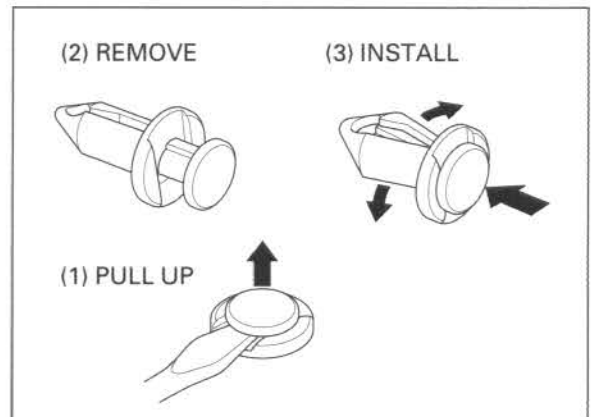
Pull back and remove the seat.



Retaining Clip

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



Side Cover

Loosen the bolt.

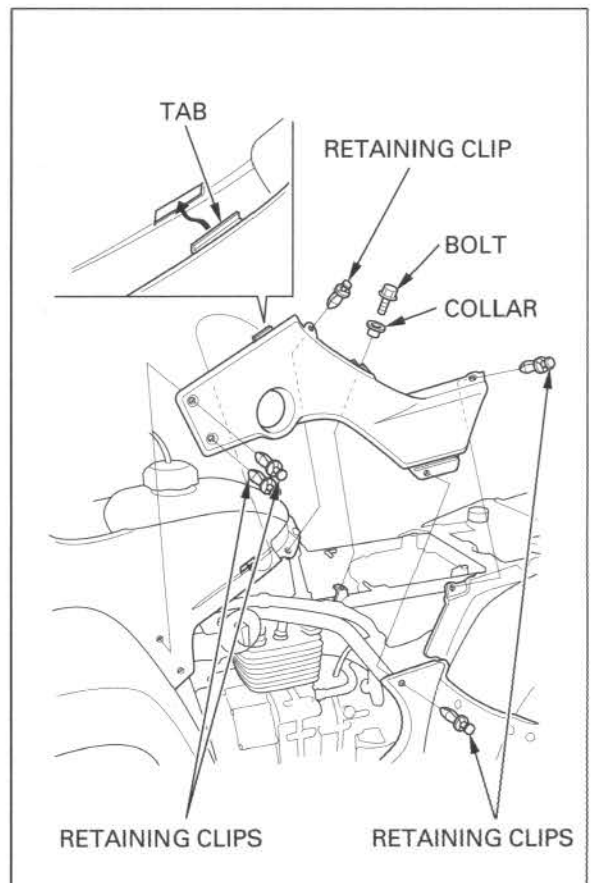
Remove the five retaining clips.

Release the side cover tab from the front fender.

Remove the side cover.

INSTALLATION

Installation is in the reverse order of removal.



FUEL TANK COVER

Remove the side cover (page 2-3).

Remove the fuel tank breather tube from the handlebar cover.

▲WARNING

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

Remove the fuel tank cap by turning it counterclockwise.

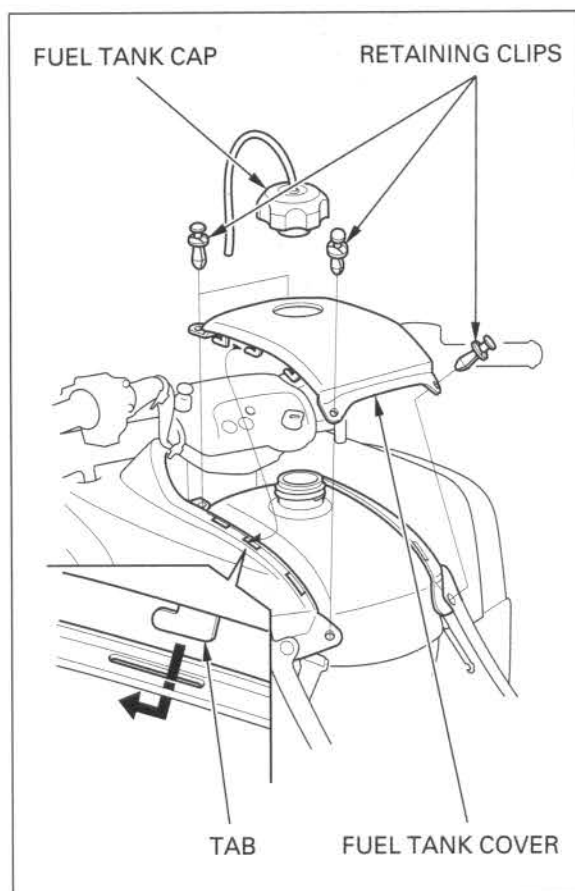
Remove the four retaining clips.

Be careful not to damage the tabs.

Release the six tabs from the front fender, then remove the fuel tank cover by sliding rearward and pulling up.

INSTALLATION

Installation is in the reverse order of removal.



FRONT CARRIER/CARRY PIPE

REMOVAL

Front Carrier

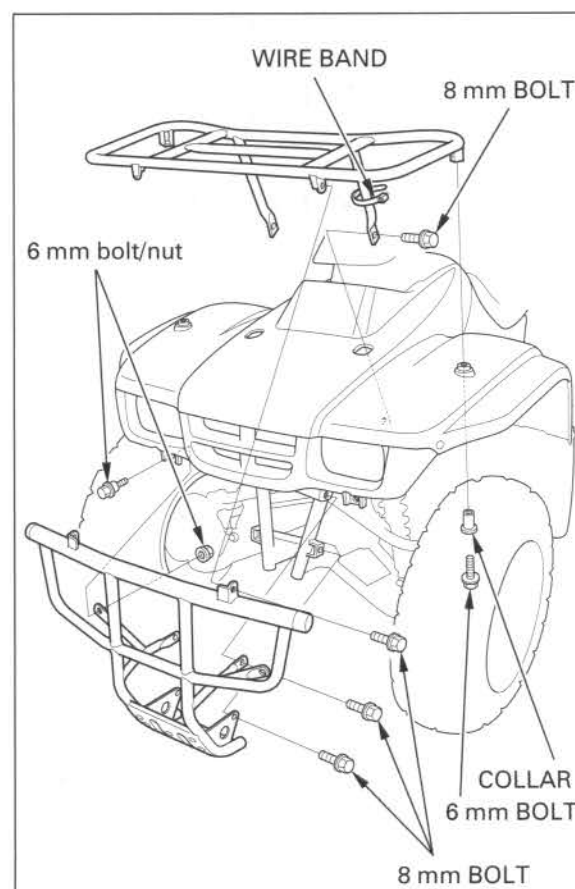
Remove the two 6 mm bolts and collar.
Remove the four 8 mm bolts and wire band, then remove the front carrier.

Carry Pipe

Remove the two 6 mm bolts/nuts.
Remove the four 8 mm bolts, then remove the Carry pipe.

INSTALLATION

Installation is in the reverse order of removal.



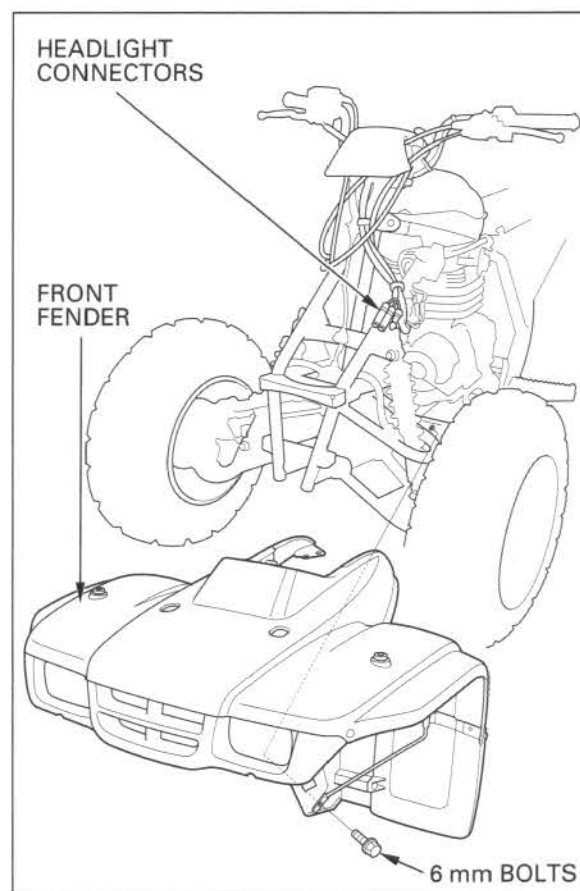
FRONT FENDER

REMOVAL

Remove the following:

- Seat/Side cover (page 2-3)
- Fuel tank cover (page 2-4)
- Front carrier and carry pipe (page 2-4)

Disconnect the headlight connectors.
Remove the two bolts, then remove the front fender.



DISASSEMBLY

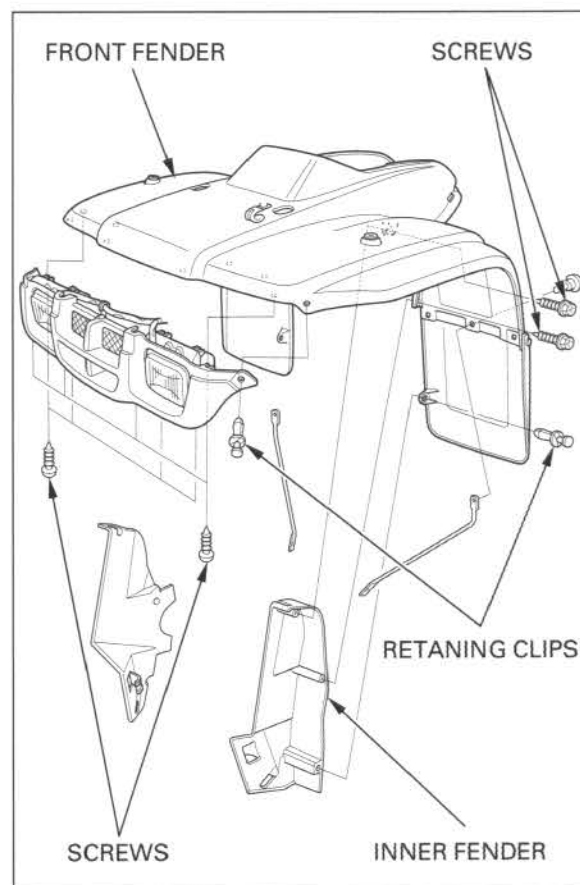
Remove the eight screws and two retaining clips, then remove the headlight grill.

Remove the two screws and retaining clip, then remove the inner fender.

Remove the front mudguard (page 2-6).

INSTALLATION

Installation is in the reverse order of removal.



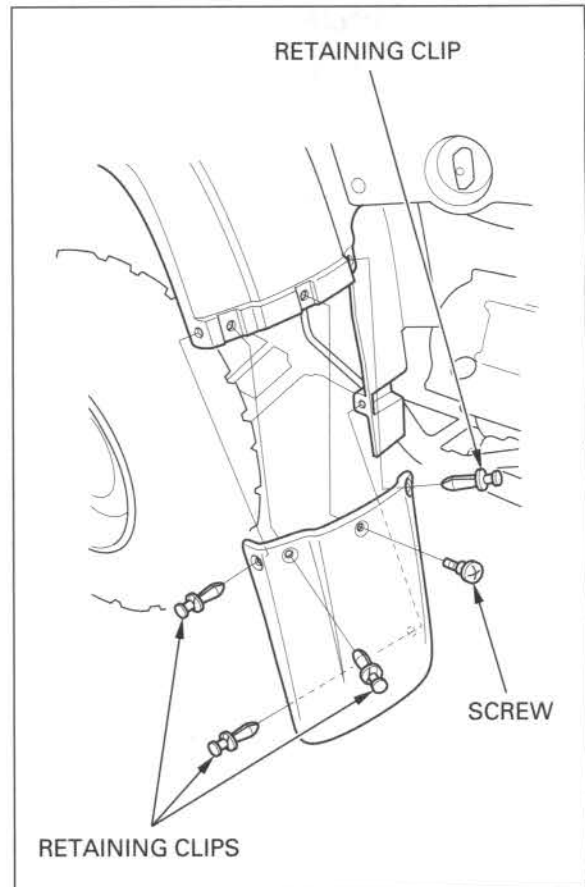
FRONT MUDGUARD

REMOVAL

Remove the screw.
Remove the four retaining clips and front mudguard.

INSTALLATION

Installation is in the reverse order of removal.



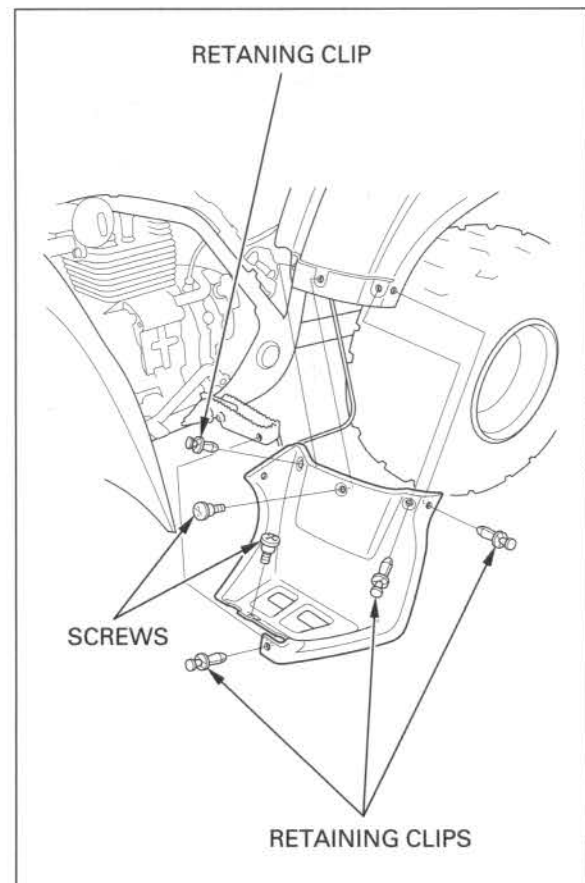
REAR MUDGUARD

REMOVAL

Remove the two screws.
Remove the four retaining clips (five, if side cover not removed) and rear mudguard.

INSTALLATION

Installation is in the reverse order of removal.



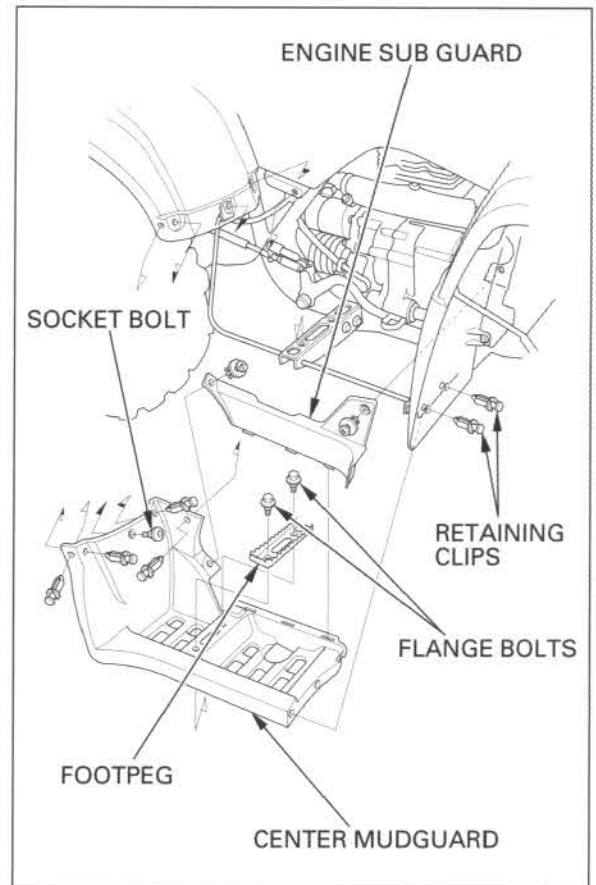
CENTER MUDGUARD (After 2001/TE model)

REMOVAL/INSTALLATION

Remove the retaining clips and engine sub guard (right side only).

Remove the six retaining clips and socket bolt.
Remove the two bolts and footpeg.
Remove the center mudguard.

Installation is in the reverse order of removal.



STEP BAR

REMOVAL

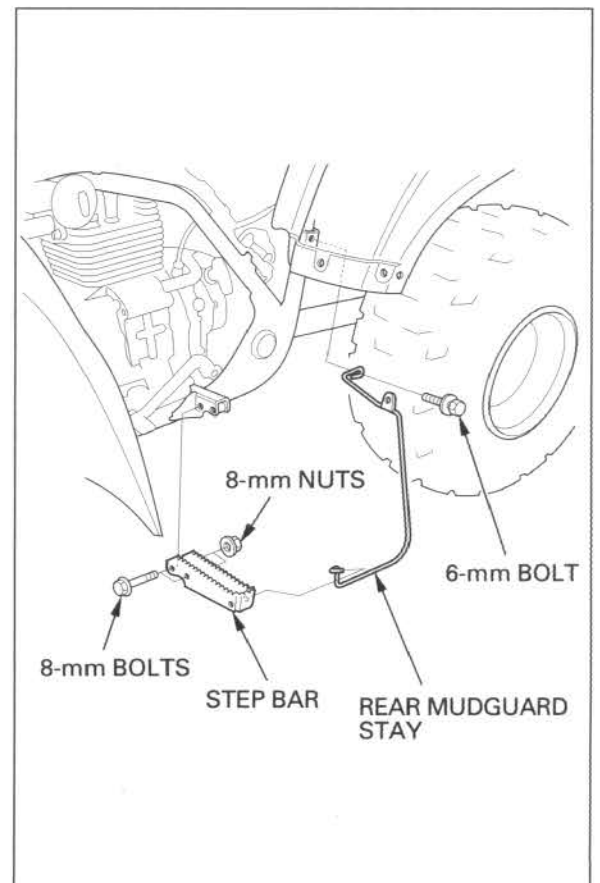
Remove the rear mudguard (page 2-6).
Remove the 6-mm bolt and rear mudguard stay.
Remove the two bolts/nuts and step bar.

INSTALLATION

Install the two bolts and step bar.
Tighten the two nuts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)

Install the rear mudguard stay and tighten the 6-mm bolt.



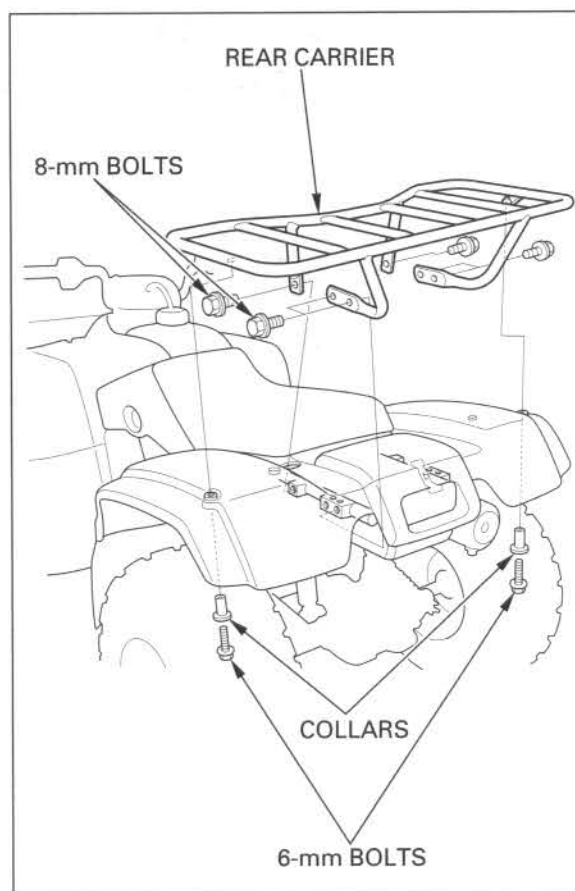
REAR CARRIER

REMOVAL

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

INSTALLATION

Installation is in the reverse order of removal.



REAR FENDER

REMOVAL

Remove the rear mudguard (page 2-6).
Remove the rear carrier (see above).
Remove the battery (page 16-5).

*Be careful not to
damage the tabs.*

Pull and remove the tool box cover.

Disconnect the starter relay connectors, main fuse
red connector and taillight connectors, then pull out
the main harness from the rear fender.

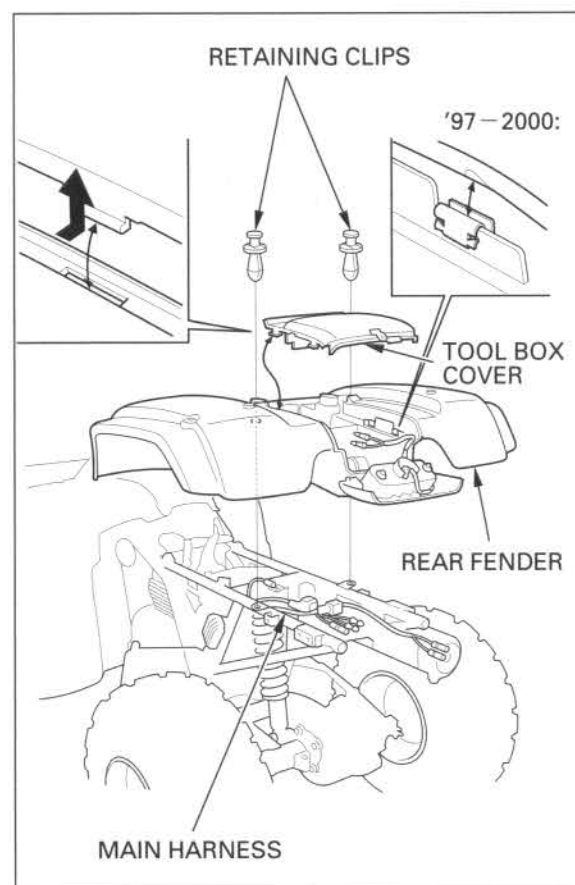
Remove the two retaining clips and rear fender.

INSTALLATION

Installation is in the reverse order of removal.

NOTE:

Route the wire harnesses properly (page 1-21).



HANDLEBAR COVER

REMOVAL

Remove the front fender (page 2-5).

Remove the fuel tank air vent hose.
Loosen the choke knob lock nut and remove the choke knob from the handlebar cover.

Disconnect the neutral/reverse indicator and ignition switch connectors.

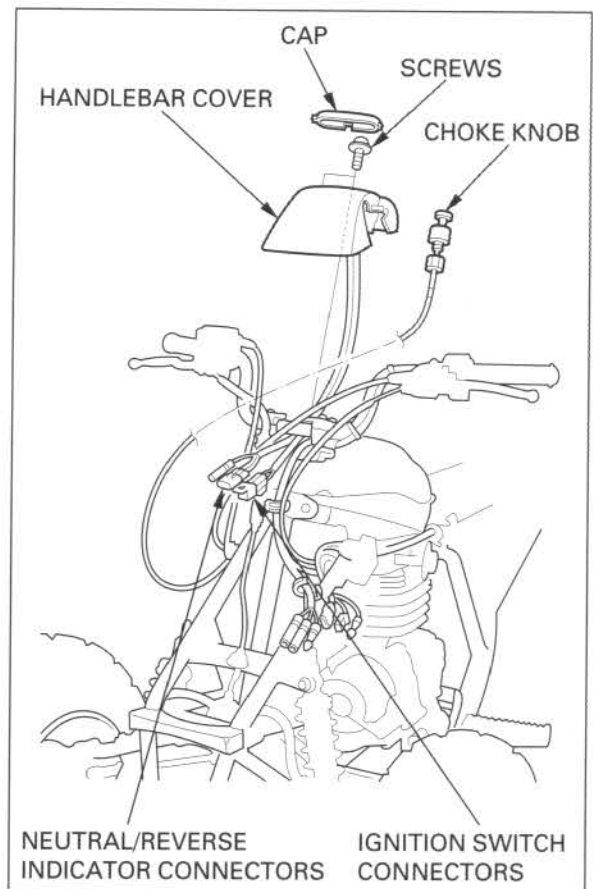
Remove the handlebar cover cap.
Remove the two screws and handlebar cover.

INSTALLATION

Installation is in the reverse order of removal.

NOTE:

Route the wire harnesses properly (page 1-21).



EXHAUST SYSTEM

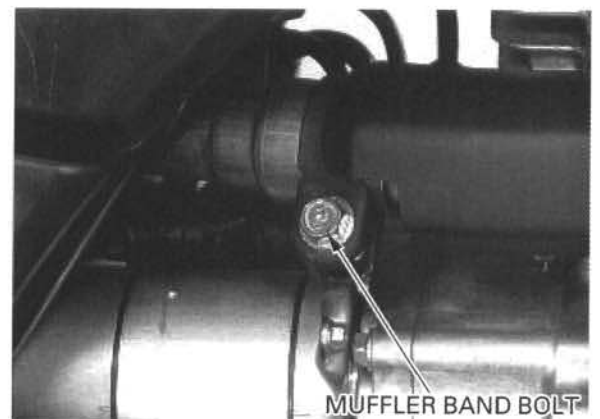
REMOVAL

⚠ WARNING

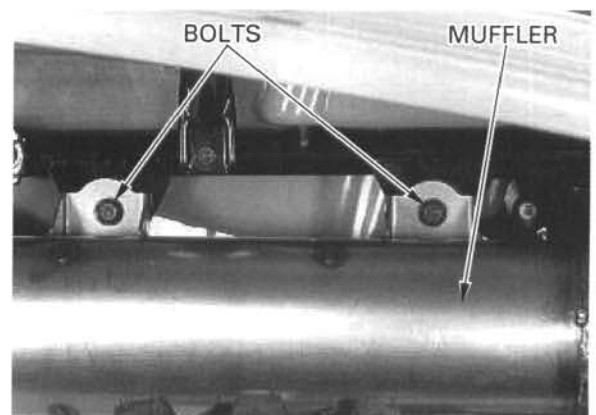
Do not service the exhaust system while it is hot.

Muffler

Loosen the muffler band bolt.

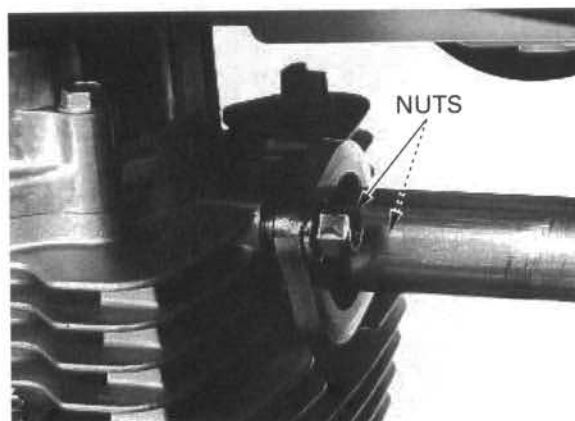


Remove the two flange bolts, muffler and gasket.

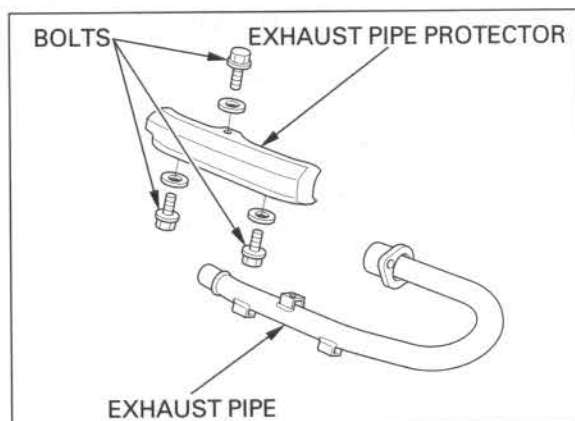


Exhaust Pipe

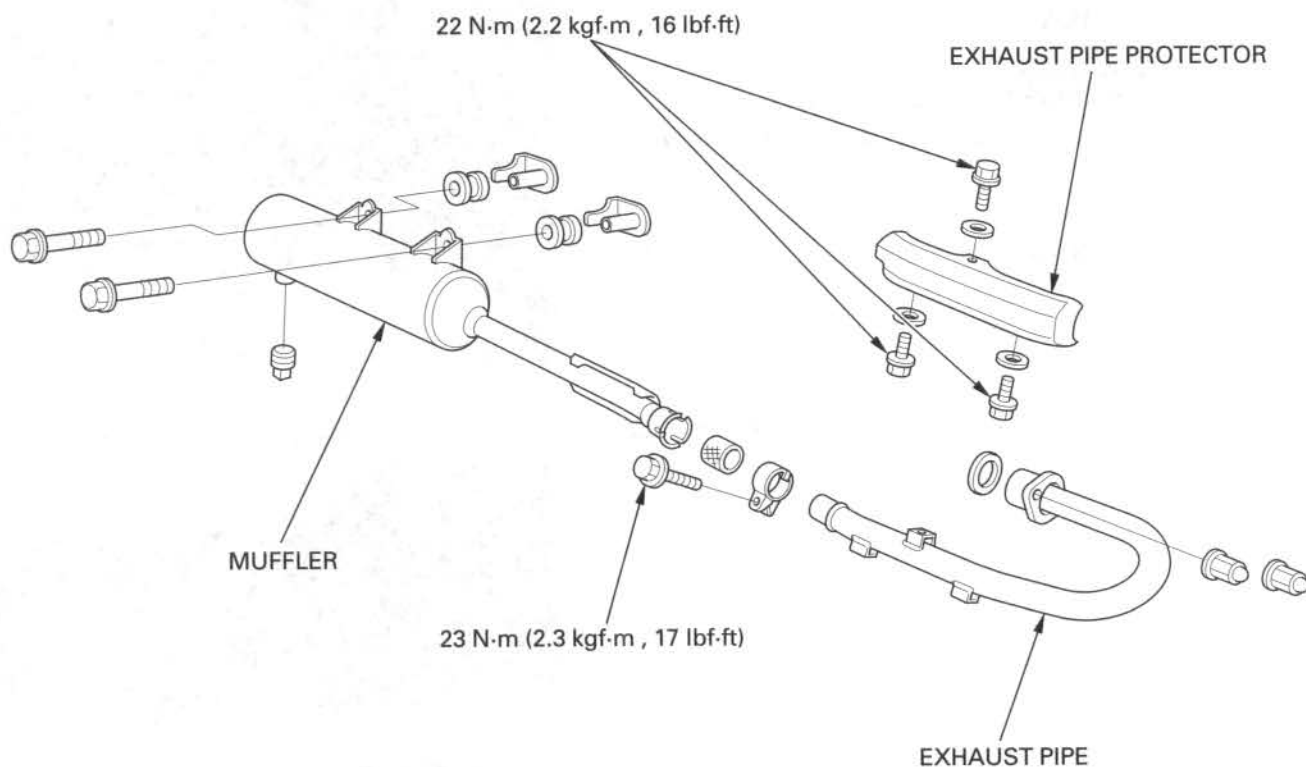
Remove the exhaust pipe joint flange nuts and exhaust pipe.



Remove the three bolts and the exhaust pipe protector.

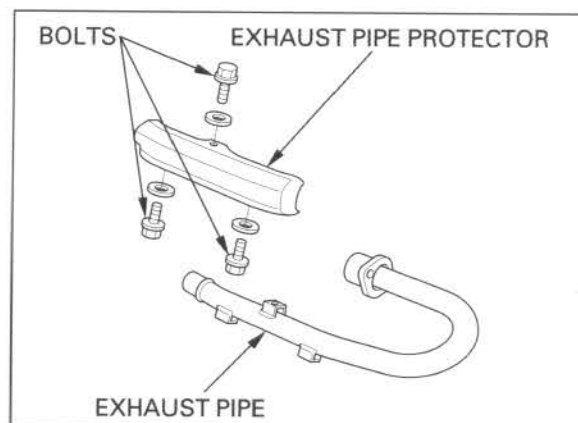


INSTALLATION



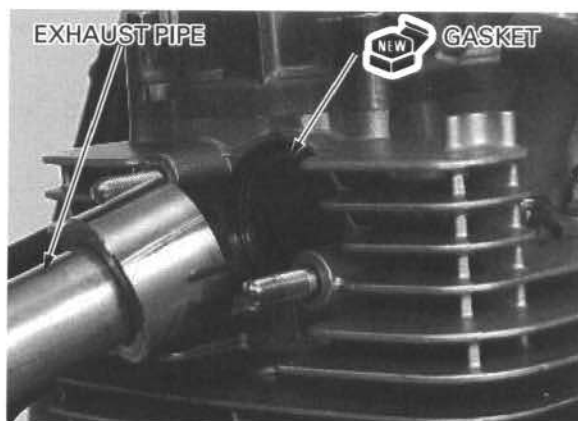
Install the exhaust pipe protector and tighten the three bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



Install the new gasket to the cylinder head.

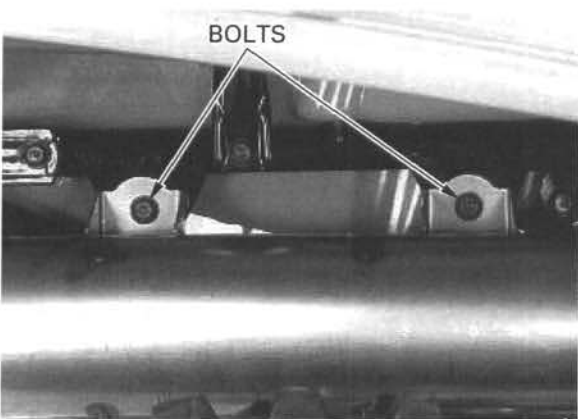
Install the exhaust pipe and tighten the flange nut loosely.



Install the new muffler gasket and flange bolt loosely.

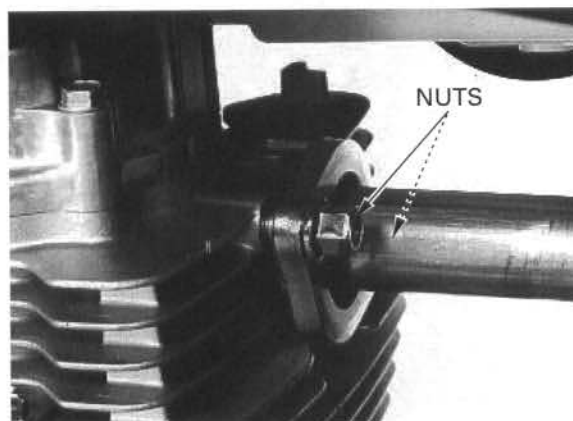


Install the two flange bolts loosely.



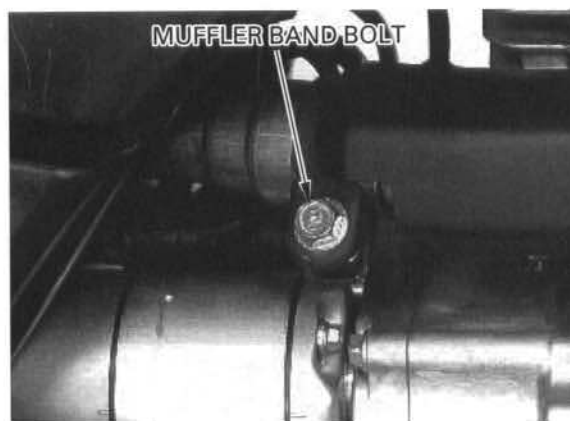
FRAME/BODY PANELS/EXHAUST SYSTEM

Tighten the exhaust pipe flange nuts securely.

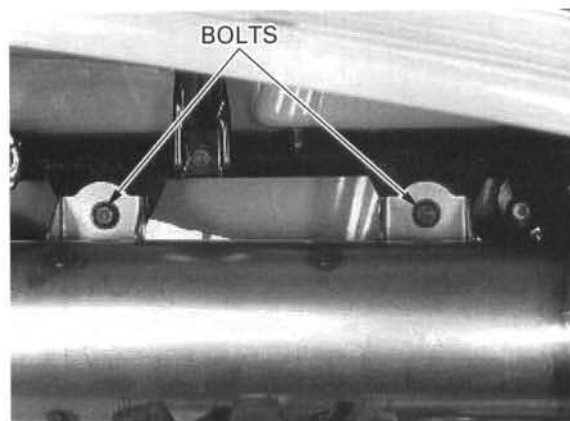


Tighten the muffler band bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m , 17 lbf·ft)



Tighten the two flange bolts securely.



3. MAINTENANCE

3

SERVICE INFORMATION	3-1	REAR FINAL GEAR CASE OIL	3-14
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ENGINE OIL STRAINER SCREEN	3-13	WHEELS/TIRES	3-21
ENGINE OIL CENTRIFUGAL FILTER	3-13	STEERING SHAFT HOLDER BEARING	3-21
ENGINE IDLE SPEED	3-14	STEERING SYSTEM	3-22

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	Standard	DPR8EA-9 (NGK)	X24EPR-U9 (DENSO)
	For cold climate (below 5 °C/41 °F)	DPR7EA-9 (NGK)	X22EPR-U9 (DENSO)
	For extended high speed riding	DPR9EA-9 (NGK)	X27EPR-U9 (DENSO)
Spark plug gap		0.8—0.9 mm (0.03—0.04 in)	
Valve clearance	IN	0.13 mm (0.005 in)	
	EX	0.13 mm (0.005 in)	

MAINTENANCE

ITEM			SPECIFICATIONS
			1,400 ± 100 rpm
Engine idle speed Engine oil capacity	At draining	'97 – 2001	1.6 ℓ (1.7 US qt , 1.4 Imp qt)
		After 2001	1.5 ℓ (1.6 US qt , 1.3 Imp qt)
	At disassembly	'97 – 2001	1.8 ℓ (1.9 US qt , 1.6 Imp qt)
		After 2001	1.9 ℓ (2.0 US qt , 1.7 Imp qt)
Recommended engine oil			HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG
Final drive oil capacity at draining			80 cm ³ (2.7 US oz, 2.8 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		AT22 × 7-11 ★
	Rear		AT22 × 10-9 ★
Cold tire pressure	Front	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)
		Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)
		Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)
		With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)
	Rear	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)
		Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)
		Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)
		With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)
Toe			Toe-in: 8 ± 15 mm (5/16 ± 5/8 in)

TORQUE VALUES

Oil drain bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Valve adjuster lock nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	Apply oil to the threads
Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Final gear case drain bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Final gear case oil cap	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Final gear case oil check bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch adjusting screw lock nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Tie-rod lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Valve adjusting hole cap (After 2001)	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply oil to the threads

TOOL

Valve adjusting wrench	07708-0030400 or 07908-KE90200 (U.S.A. only)
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MAINTENANCE SCHEDULE

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

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

		FREQUENCY ITEMS	Whichever comes first	INITIAL MAINTENANCE	REGULAR MAINTENANCE INTERVAL		Refer to page	
			⇒	mi	100	600		1200
				km	150	1000		2000
			NOTE	HOURS	20	100		200
EMISSION RELATED ITEM	*	FUEL LINE				I	3-4	
	*	THROTTLE OPERATION				I	3-4	
	*	CARBURETOR CHOKE				I	3-5	
		AIR CLEANER	(NOTE 1)		C	C	3-7	
		AIR CLEANER HOUSING DRAIN HOSE	(NOTE 2)		I	I	3-7	
		SPARK PLUG			I	I	3-7	
	*	VALVE CLEARANCE		I	I	I	3-8	
		ENGINE OIL		R	R	R	3-11	
	**	ENGINE OIL STRAINER SCREEN				C	3-13	
	**	ENGINE OIL CENTRIFUGAL FILTER				C	3-13	
*	ENGINE IDLE SPEED			I	I	I	3-14	
NON EMISSION RELATED ITEM		REAR FINAL GEAR CASE OIL			(R: EVERY 2YEARS)	I	3-14	
	*	BRAKE FLUID	(NOTE 3)		I	I	3-15	
	*	BRAKE SHOE WEAR	(NOTE 2)			I	3-16	
		BRAKE SYSTEM		I	I	I	3-16	
	*	REVERSE LOCK SYSTEM		I	I	I	3-18	
		SKID PLATES, ENGINE GUARD			I	I	3-19	
	*	CLUTCH SYSTEM		I	I	I	3-19	
	*	SUSPENSION			I	I	3-20	
	*	SPARK ARRESTER			C	C	3-20	
	*	NUTS, BOLTS, FASTENERS		I		I	3-21	
	**	WHEELS/TIRES		I	I	I	3-21	
	**	STEERING SHAFT HOLDER BEARING				I	3-21	
**	STEERING SYSTEM				I	3-22		

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

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

NOTES: 1. Service more frequently when riding in dusty areas, sand or snow.

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

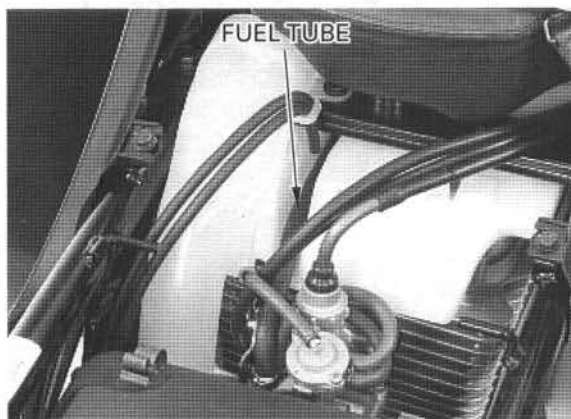
3. Replace every 2 years. Replacement requires mechanical skill.

FUEL LINE

Remove the seat. (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 12-6).

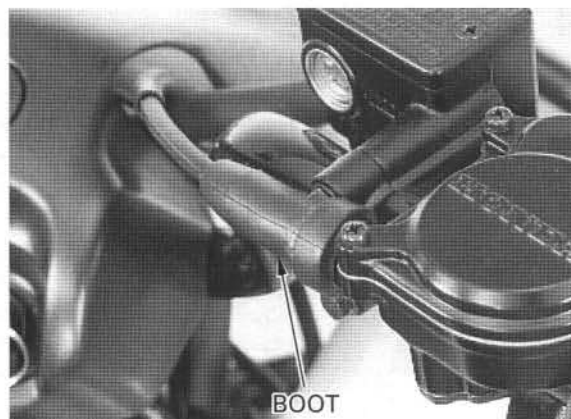
Thoroughly lubricate the cable and pivot point with a commercially available cable lubricant.

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.

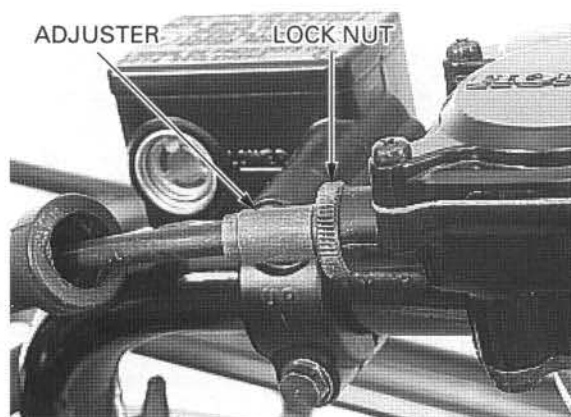
Throttle lever free play can be adjusted at throttle housing adjuster.

Slide the rubber boot off the cable adjuster.



Loosen the lock nut and adjust the throttle cable free play by turning the cable adjuster.

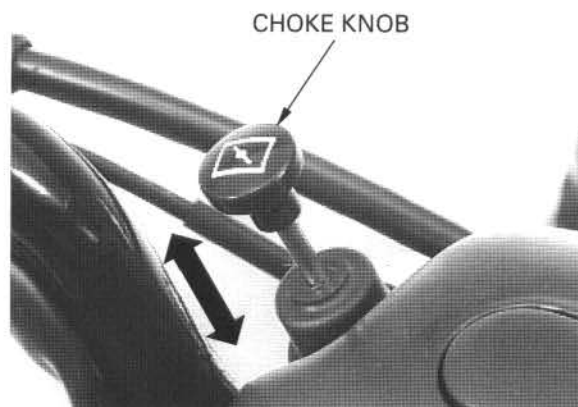
After adjustment, tighten the lock nut and install the rubber boot securely.



CARBURETOR CHOKE

On a manual choke system, check to see if the choke knob can be opened and closed completely.

Inspect the choke cable to see if it is bent, crimped or damaged in any way.



Check to be sure that cable movement is correct on machines with manually operated chokes.

Check by pushing with your finger to see if there is a maximum of 1–2 mm of free play in the inner choke cable when the choke knob is in its completely off position.

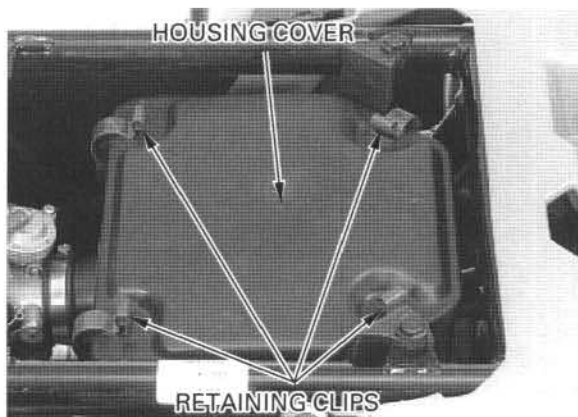
If the amount of free play is not sufficient, loosen the cable clamp screw and adjust the play of the inner cable by moving the position of the outer cable. Tighten the cable clamp securely when the adjustment is complete.



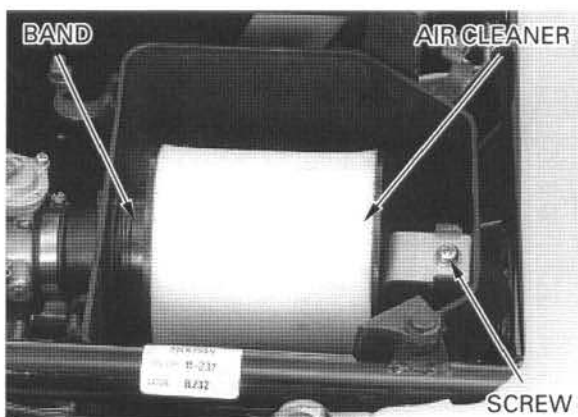
AIR CLEANER

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



Remove the element holder by turning it counter-clockwise.
Remove the element band and separate the element from the element core.

'97 California type
/After '97
All types:

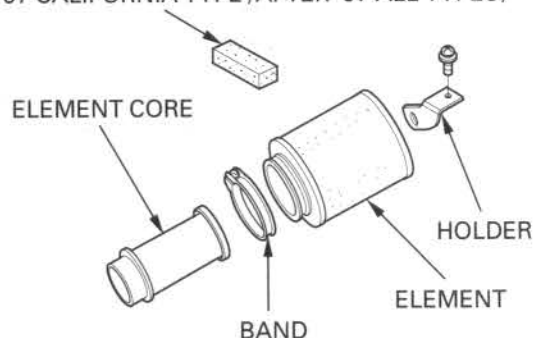
Dust Cover

If the dust cover is dirty, clean it by compressed air.

NOTE:

Do not shove the dust cover.

DUST COVER ('97 CALIFORNIA TYPE /AFTER '97 ALL TYPES)

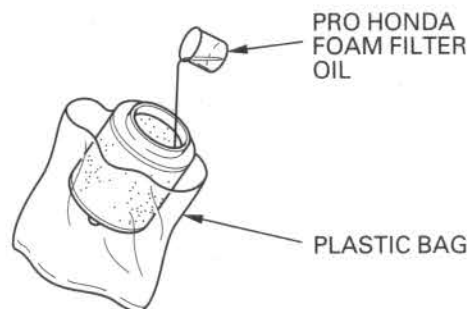


Wash the element in non-flammable or high flash point solvent.
Squeeze out the solvent thoroughly, and allow the element to dry.



WASH SQUEEZE OUT

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 dust cover.

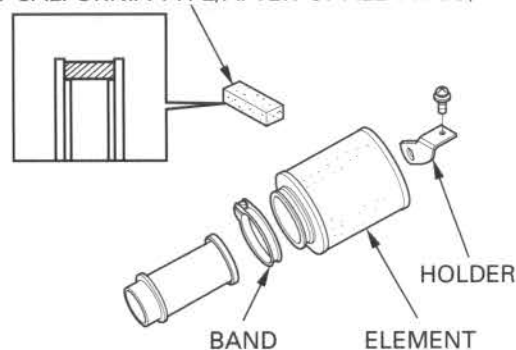
'97 California type
/After '97
All types:

NOTE:

Do not shove the dust cover.

Install the air cleaner housing cover and secure with the clips.
Install the seat (page 2-3).

DUST COVER ('97 CALIFORNIA TYPE /AFTER '97 ALL TYPES)



AIR CLEANER HOUSING DRAIN HOSE

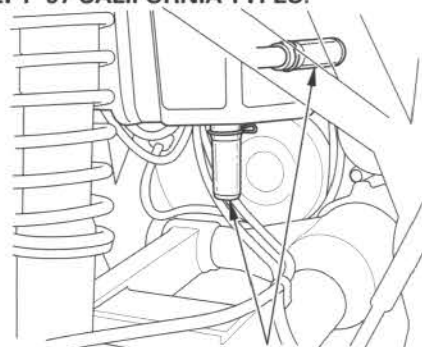
Except '97 California types: Remove the drain plugs from the air cleaner housing to empty any deposits.

Install the drain plugs and clips.

NOTE:

Service more frequently when riding in wet or muddy areas.

EXCEPT '97 CALIFORNIA TYPES:



DRAIN PLUGS

'97 California type / After '97: Remove the drain plug from the air cleaner housing to empty any deposits.

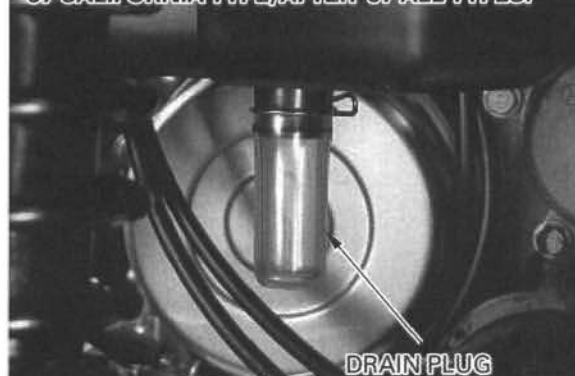
All types:

Install the drain plug and clip.

NOTE:

Service more frequently when riding in wet or muddy areas.

'97 CALIFORNIA TYPE/AFTER '97 ALL TYPES:



DRAIN PLUG

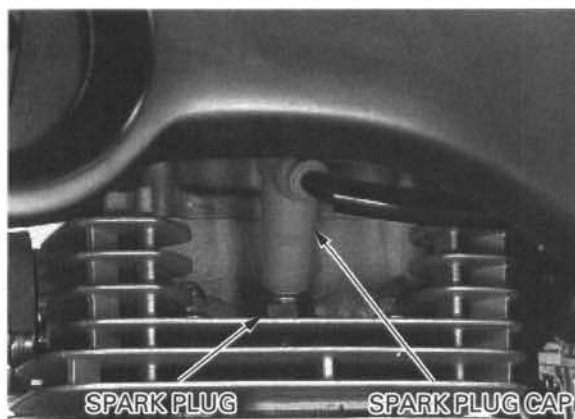
SPARK PLUG

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.



SPARK PLUG

SPARK PLUG CAP

INSPECTION

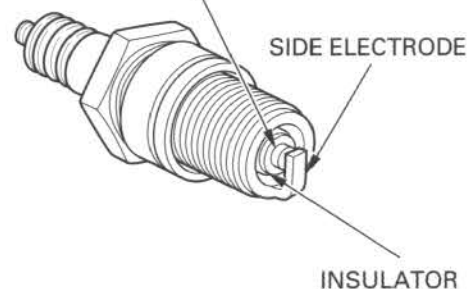
Check the following and replace if necessary (recommended spark plug: page 3-1).

- 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.

CENTER ELECTRODE

SIDE ELECTRODE

INSULATOR



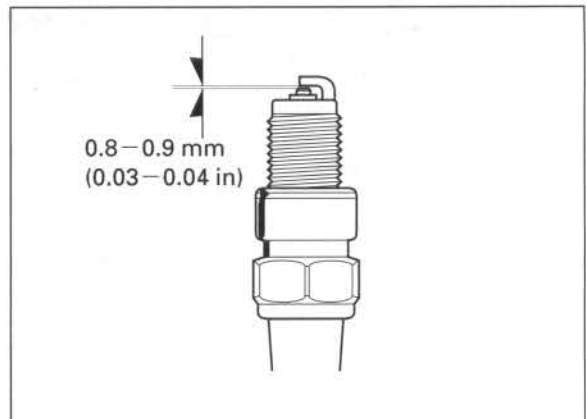
REUSING A SPARK PLUG

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 kgf·m, 13 lbf·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

'97–2001:

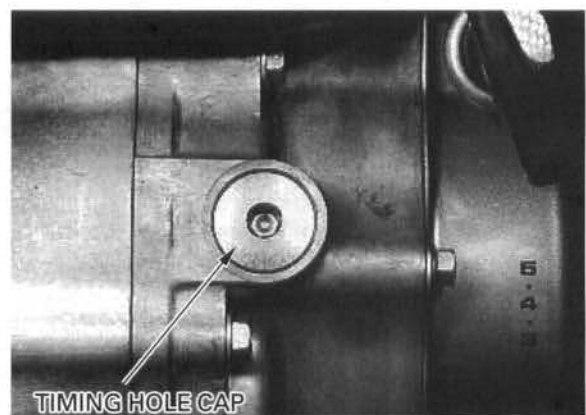
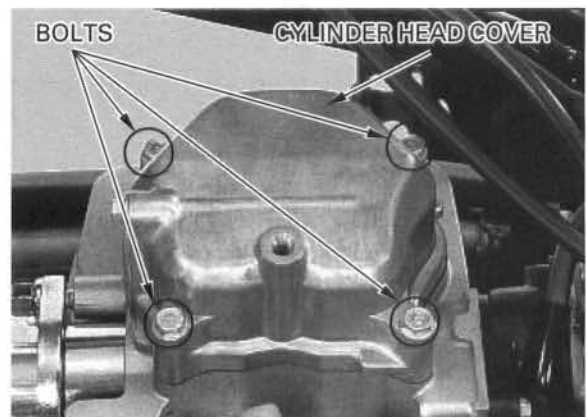
NOTE:

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

Remove the fuel tank and heat guard (page 5-17).

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

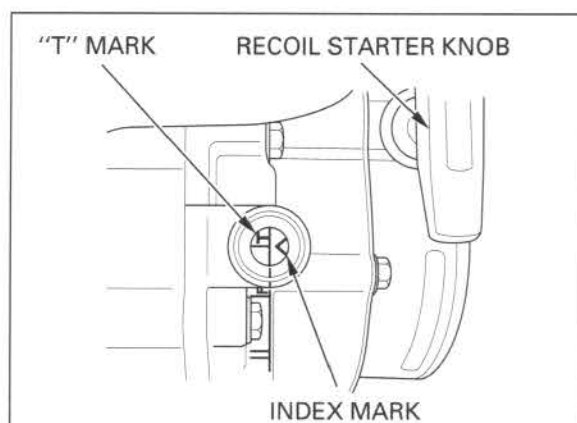
Remove the timing hole cap from the left side of the rear crankcase cover.



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

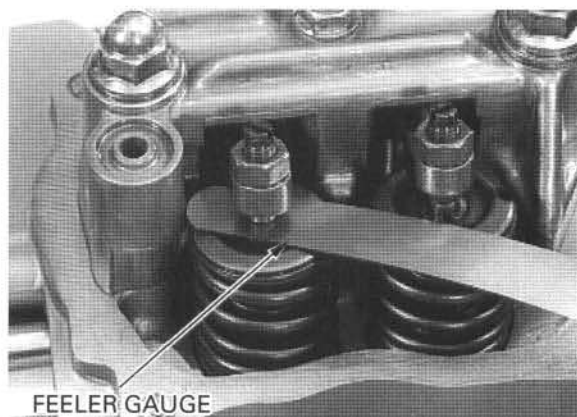
Make sure the piston is at TDC on the compression stroke.

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: 0.13 mm (0.005 in)

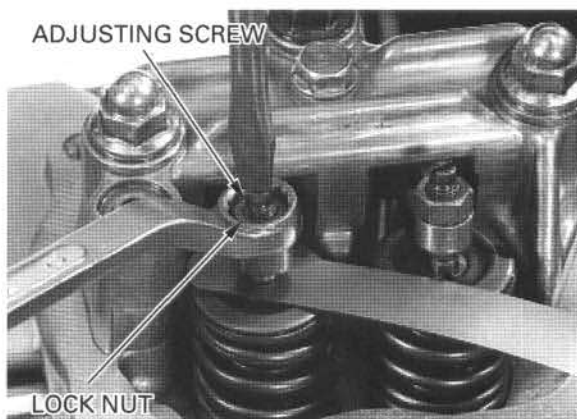


Adjust if necessary by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

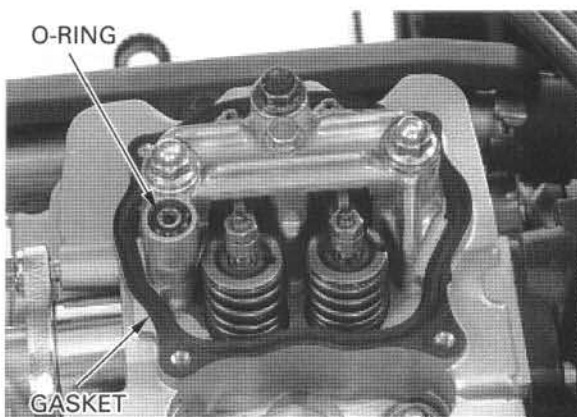
Hold the adjusting screw and tighten the lock nut.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Recheck the valve clearance.



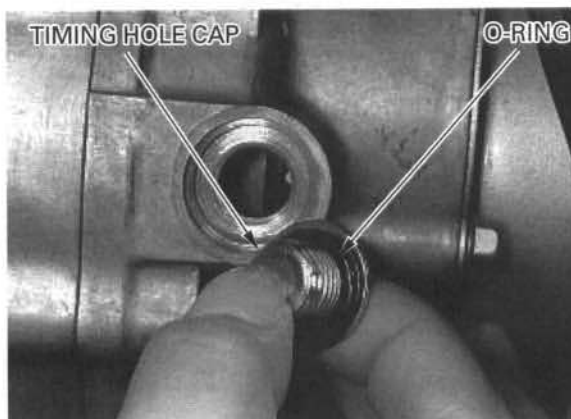
Inspect the condition of the cylinder head cover gasket and O-ring, replace them if necessary. Install the cylinder head cover and tighten the bolts.



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

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the removed parts in the reverse order of removal.



After 2001:

Remove the fuel tank and heat guard (page 5-7).

Remove the valve adjusting hole caps from the cylinder head cover.

Remove the timing hole cap from the left side of the rear crankcase cover (page 3-8).

Turn the crankshaft counterclockwise using the recoil starter knob, and align the "T" mark on the flywheel with the index mark on the rear crankcase cover (page 3-9).

Make sure the piston is at TDC on the compression stroke.

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

Check the clearance of each valve by inserting a feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCE: IN/EX: 0.13 mm (0.005 in)

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

Apply oil to the valve adjusting screw lock nut threads and seating surface.

Hold the adjusting screw and tighten the lock nut.

TOOLS:

Valve adjusting wrench, 3mm 07908-KE90200
(U.S.A. only) or
07708-0030400

**Valve adjusting wrench
10-mm offset box wrench
(commercially available)**

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

After tightening the lock nut, recheck the valve clearance.



Coat the new O-rings with engine oil and install them onto the valve adjusting hole caps. Install the hole caps and tighten them to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Check that the O-ring is in good condition, and install the timing hole cap (page 3-10).



ENGINE OIL

OIL LEVEL INSPECTION

Place the vehicle on level ground.

Remove the oil filler cap/dipstick and wipe it clean. Reinstall the oil filler cap/dipstick, but do not screw it in.



Remove the oil filler cap/dipstick and check the oil level.

If the level is below the lower mark on the dipstick, fill the crankcase with the recommended oil.



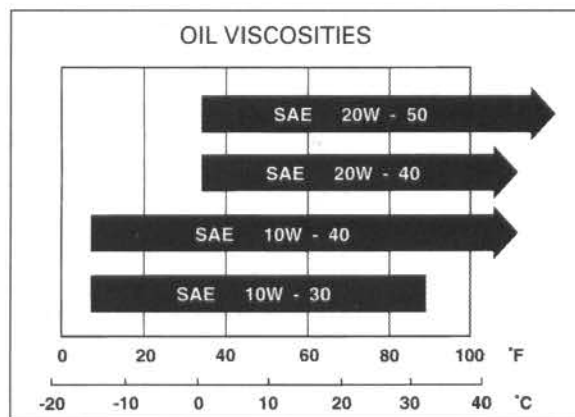
RECOMMENDED ENGINE OIL:

HONDA GN4 4-stroke oil or equivalent motor oil
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 oil filler cap/dipstick.



ENGINE OIL CHANGE

▲WARNING

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

Warm up the engine.

NOTE:

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

Stop the engine and remove the oil filler cap/dipstick and drain bolt.
Drain the oil completely.

CAUTION:

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.

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

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

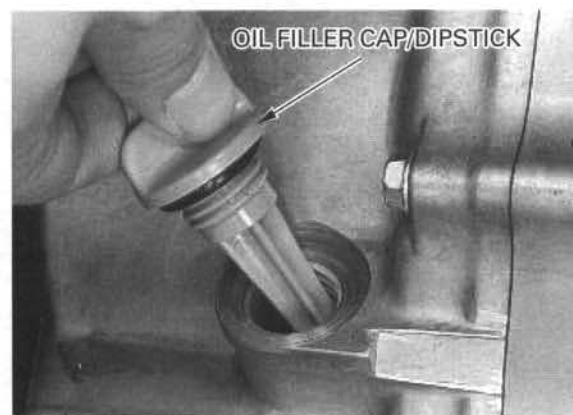
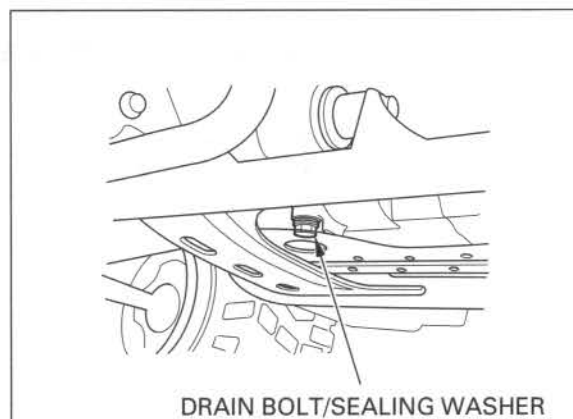
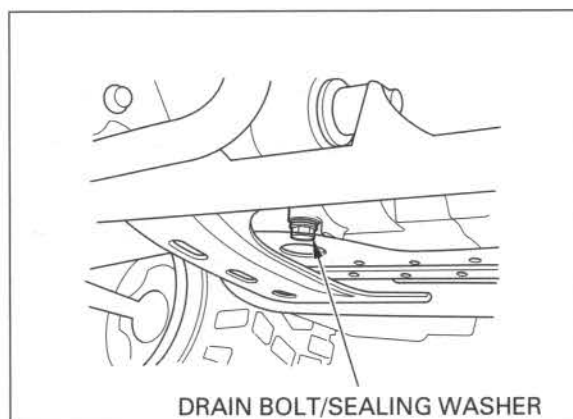
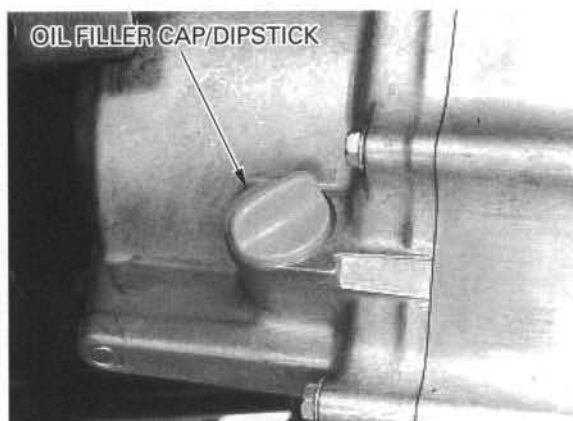
Fill the crankcase with the recommended engine oil.

OIL CAPACITY (at draining):

'97-2001: 1.6 l (1.7 US qt, 1.4 Imp qt)
After 2001: 1.5 l (1.6 US qt, 1.3 Imp qt)

Install the oil filler cap/dipstick.

Start the engine and let it idle for 2 to 3 minutes.
Stop the engine and recheck the oil level.
Make sure there are no oil leaks.



ENGINE OIL STRAINER SCREEN

Remove the front crankcase (section 11).

Remove the oil strainer screen and clean it.

Reinstall the oil strainer screen and crankcase (section 11).

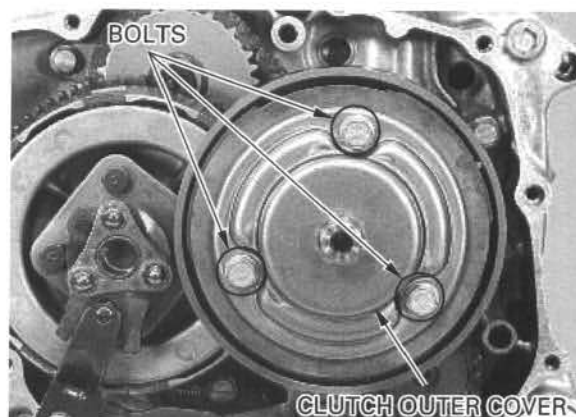
Fill the crankcase with the recommended engine oil (page 3-12).



ENGINE OIL CENTRIFUGAL FILTER CLEANING

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

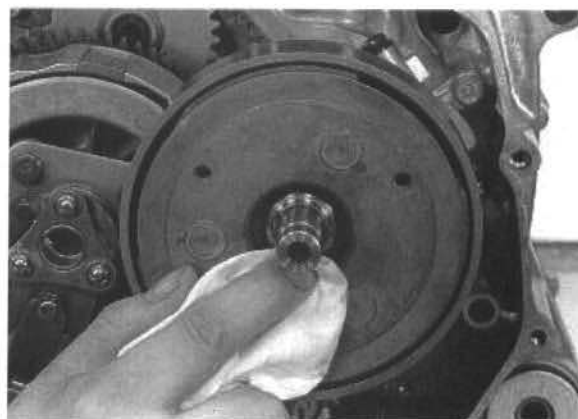
Remove the three bolts and clutch outer cover.



Clean the clutch outer cover and the inside of the clutch outer using a clean lint-free cloth.

CAUTION:

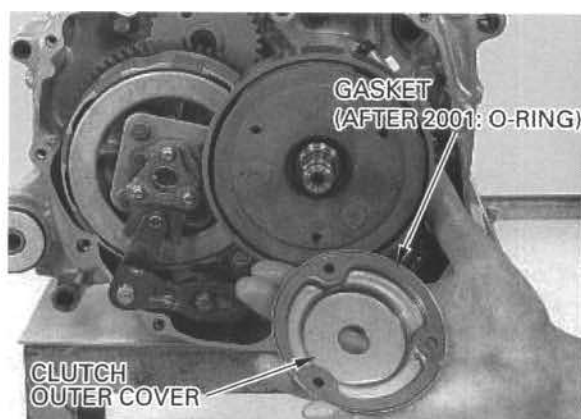
- *Do not allow dust and dirt to enter the crankshaft oil passage.*
- *Do not use compressed air.*



Check that the gasket (After 2001: O-ring) is in good condition, replace if necessary.

Apply a locking agent to the clutch outer cover bolt threads.

Reinstall the clutch outer cover and tighten the three bolts.



ENGINE IDLE SPEED

▲WARNING

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

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 10 minutes.
Remove the right side cover (page 2-3).

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

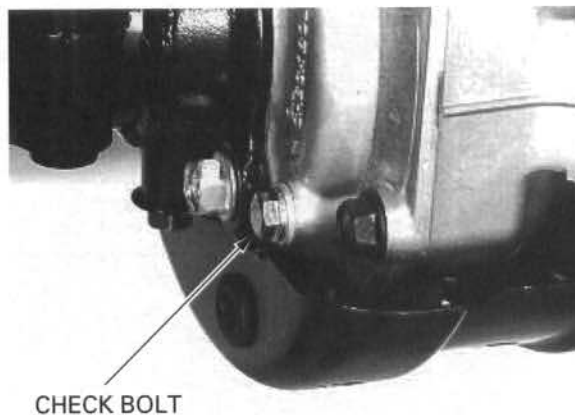
IDLE SPEED: 1,400 \pm 100 rpm



REAR FINAL GEAR CASE OIL

OIL LEVEL CHECK

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 leaks 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 kgf·m , 9 lbf·ft)

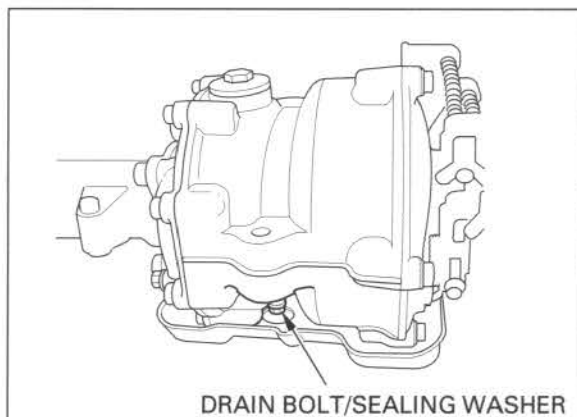


OIL CHANGE

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 kgf·m , 9 lbf·ft)



Fill the final gear case with the recommended oil.

OIL CAPACITY:

80 cm³ (2.7 US oz, 2.8 Imp oz) after draining

Check the oil level and add or drain oil if necessary (page 3-14).



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 (page 3-16).



BRAKE SHOE WEAR

FRONT BRAKE

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

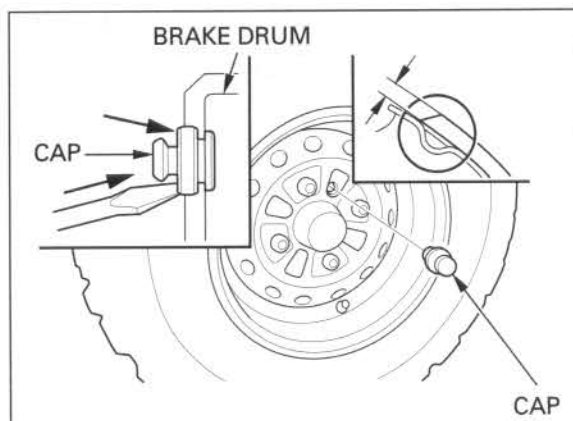
LINING THICKNESS:

STANDARD: 4.0 mm (0.16 in)

SERVICE LIMIT: 2.0 mm (0.08 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

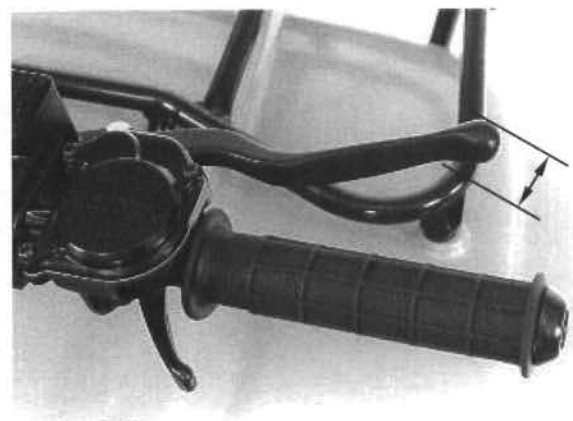
FRONT BRAKE

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 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 adjusting nuts and turn the brake shoe adjusting nuts 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 adjusting nuts and repeat the procedure.

Adjust both wheels.

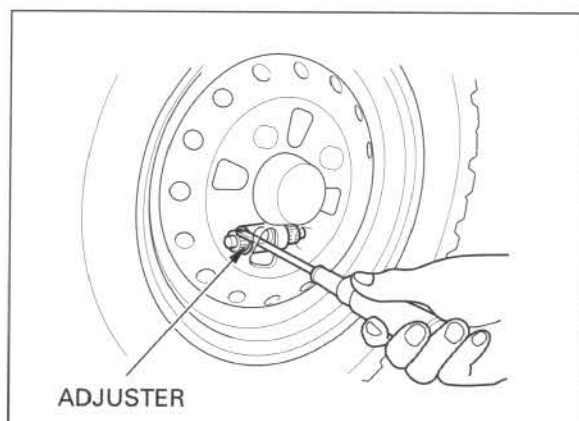
NOTE:

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

Recheck the brake lever free play.

If the 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.

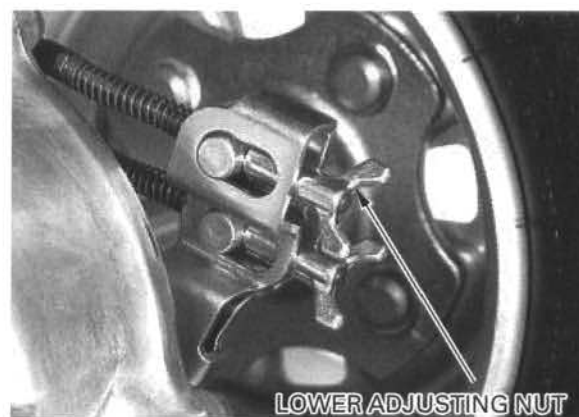
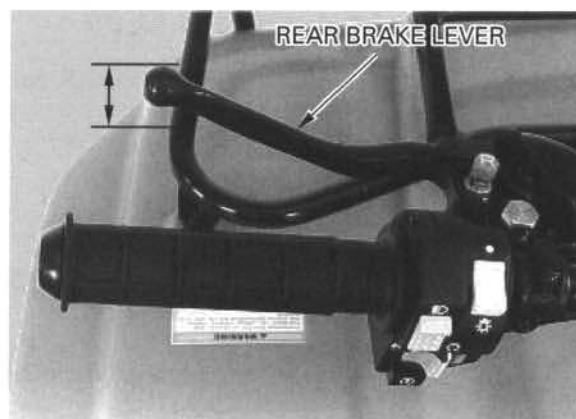
Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant.

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)

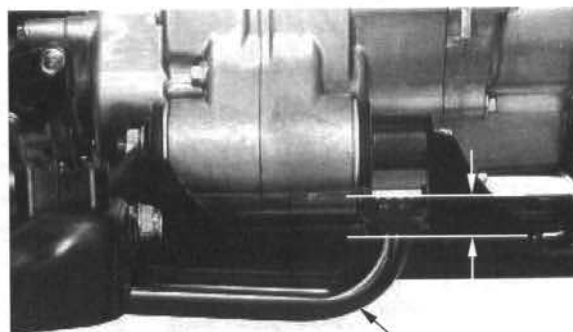
Adjustments should be made with the lower adjusting nut at the rear brake arm.



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)



BRAKE PEDAL

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

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



REVERSE LOCK SYSTEM

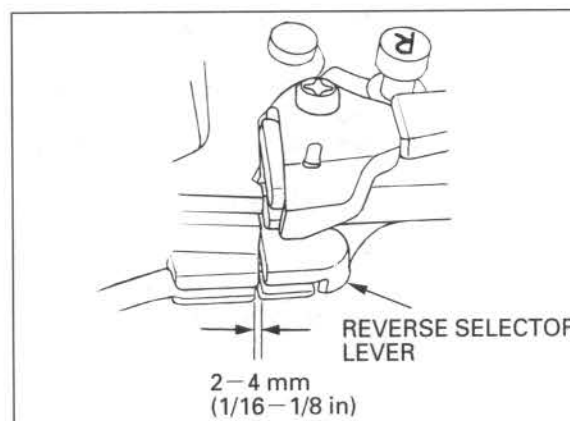
Check the reverse selector cable and lever for a loose connection, excessive play or other damage. Replace or repair if necessary.

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

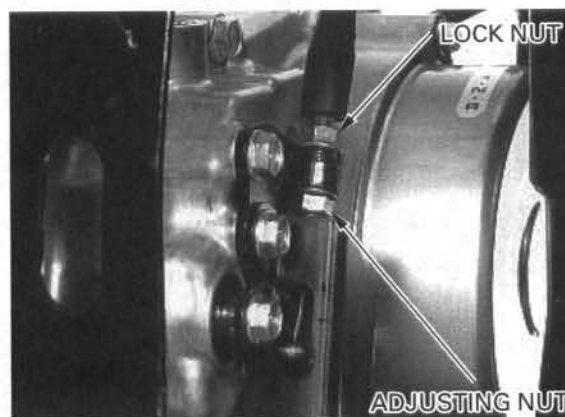
FREE PLAY: 2–4 mm (1/16–1/8 in)

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.



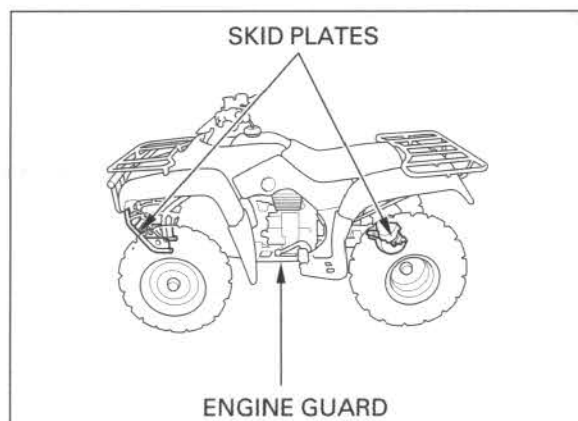
SKID PLATES/ENGINE GUARD

The skid plates and engine guard protect the rear final gear case and engine from rocks and other debris.

Check the skid plates and engine guard for cracks, damage or looseness at the 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.

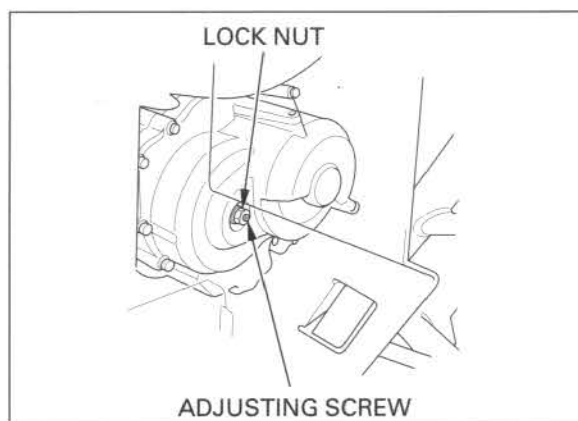


CLUTCH SYSTEM

⚠ WARNING

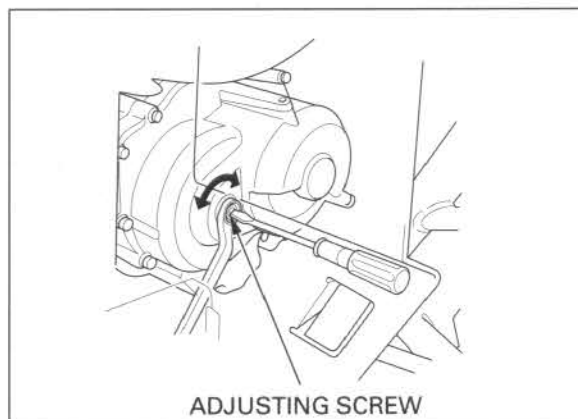
When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system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

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.

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



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

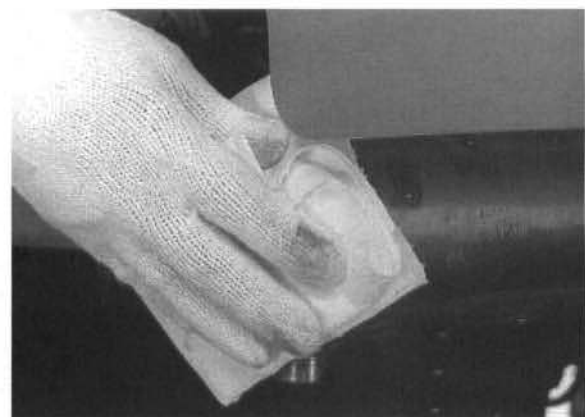
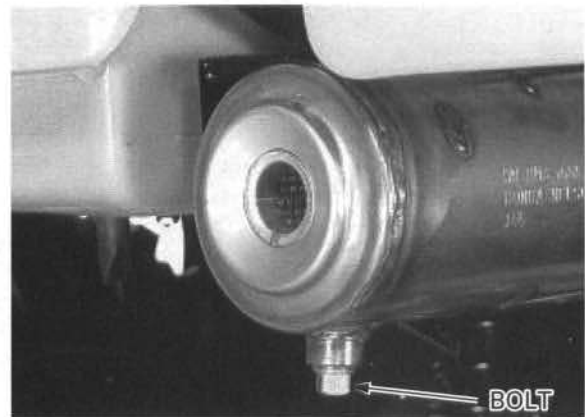
- *When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*
- *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 (pages 1-13 through 15).

WHEELS/TIRES

Tire pressure should be checked when the tires are cold. Check the tires for cuts, embedded nails, or other damage.
Check the tire pressure and adjust accordingly.

Tire pressure:

	FRONT/REAR
Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)
Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)
Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)
With cargo	20 kPa (0.20 kgf/cm ² , 2.9 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

Make sure the cables do not interfere with the rotation of the handlebar. Raise the front wheels off the ground and make sure 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 12-23).



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.

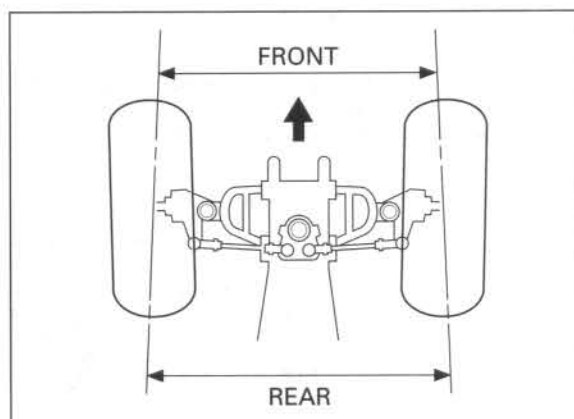
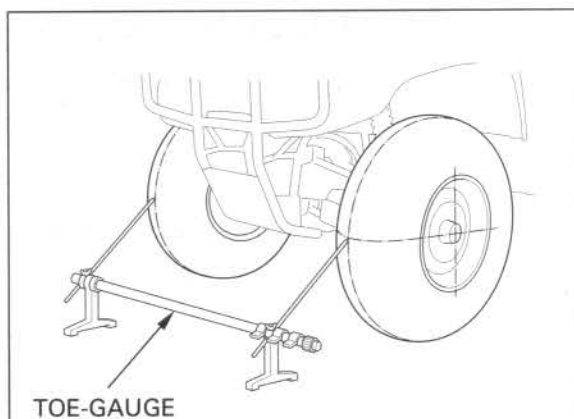
Slowly move the vehicle back until the wheels have turned 180° so the marks on the tires are aligned with the gauge height on the rear side.

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

TOE-IN: $8 \pm 15 \text{ mm}$ ($5/16 \pm 5/8 \text{ in}$)

NOTE:

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

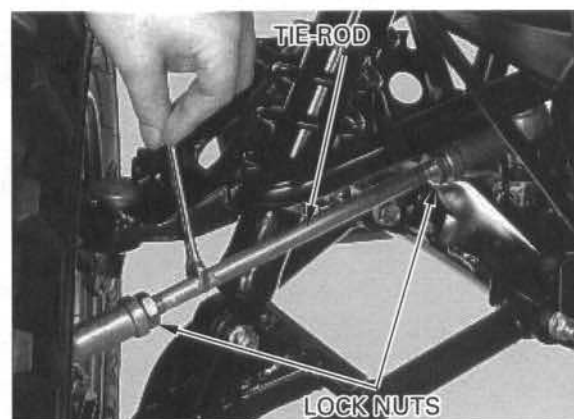


When the toe is out of specification, adjust it by changing the length of the tie-rods equally by loosening the lock nuts and turning the tie-rods while holding the ball joints.

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.

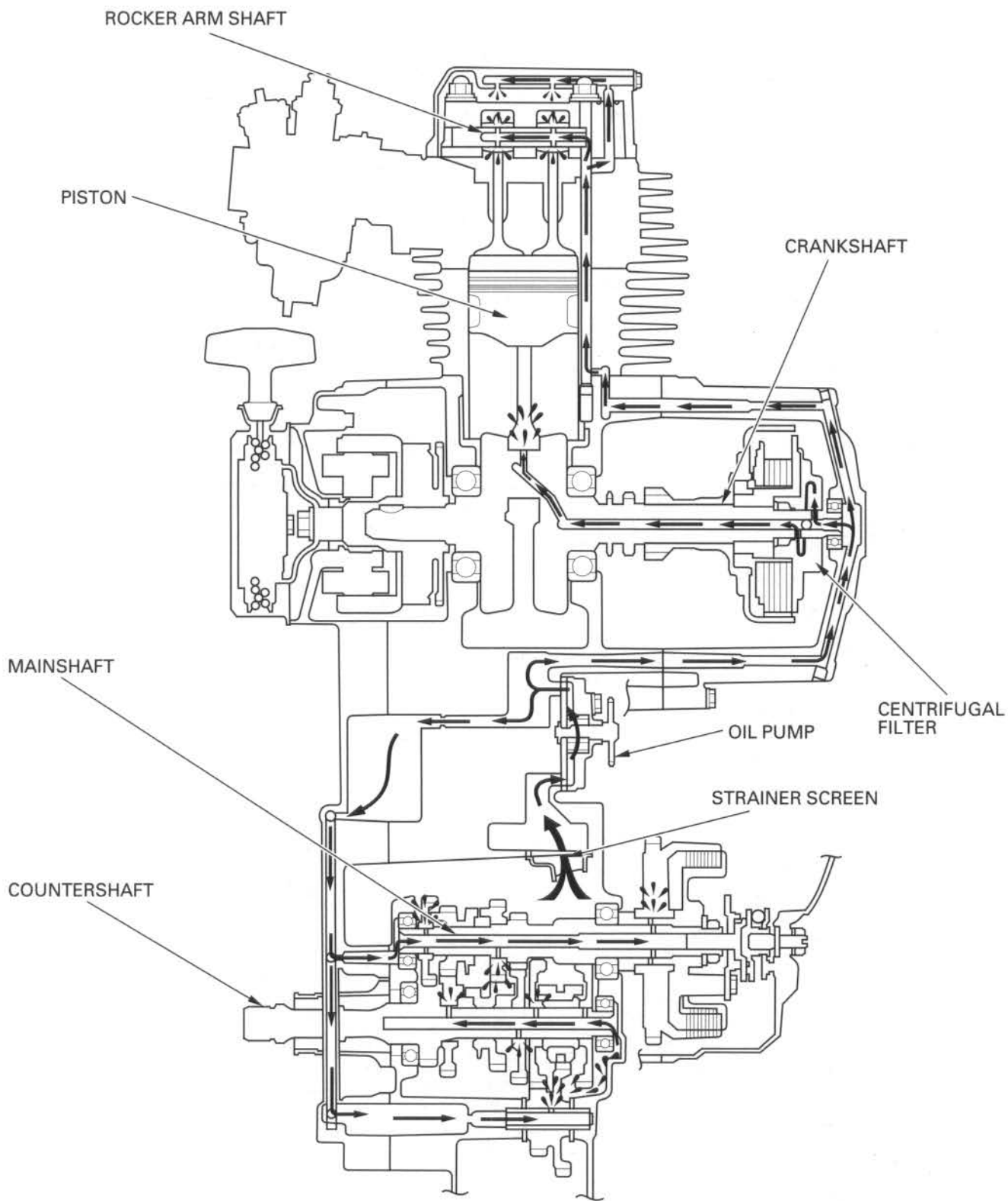
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)

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.



LUBRICATION SYSTEM DIAGRAM

'97 - 2001:



4. LUBRICATION SYSTEM

SERVICE INFORMATION

4-2

OIL PUMP

4-3

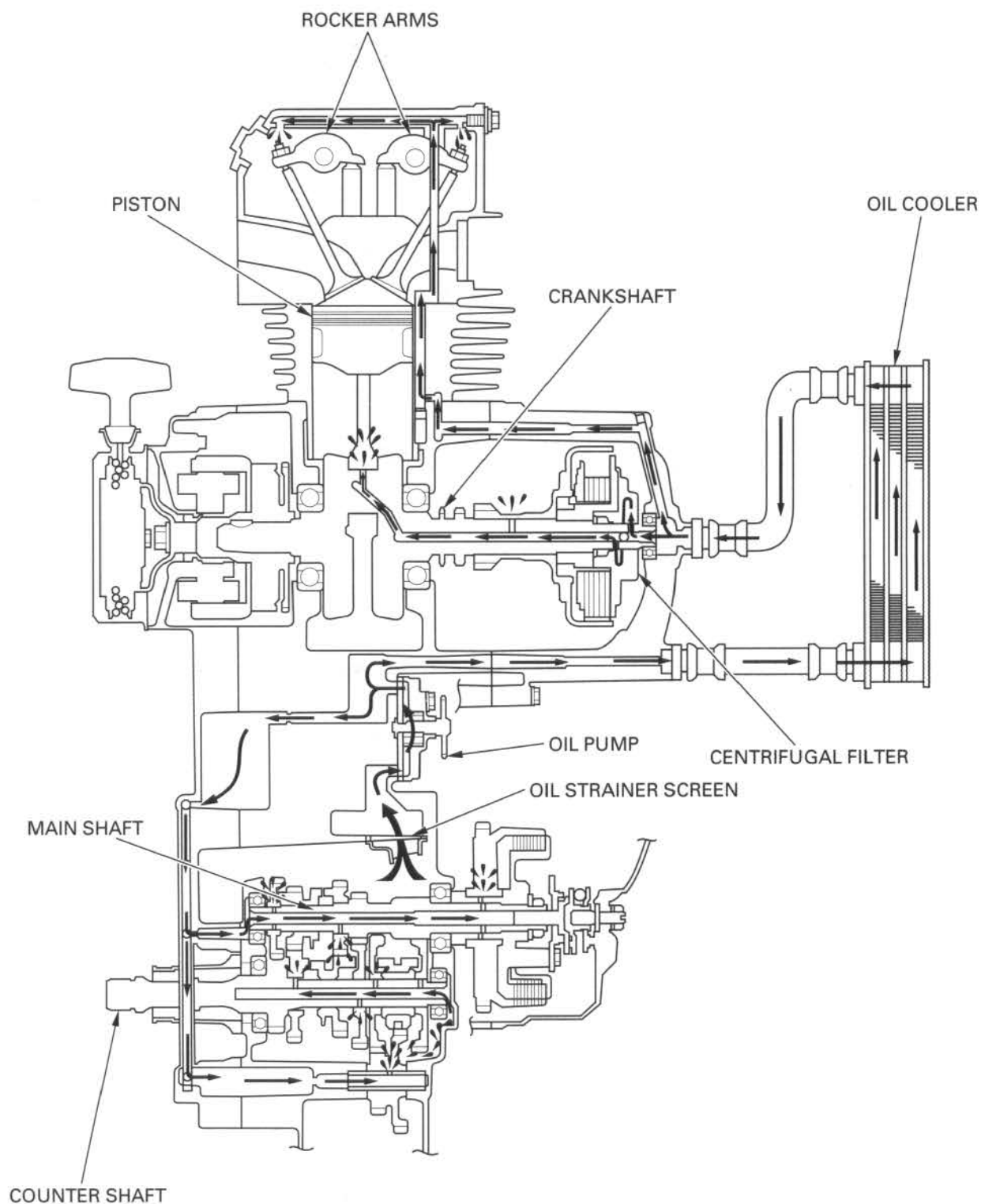
TROUBLESHOOTING

4-2

OIL COOLER (After 2001)

4-7

After 2001:



SERVICE INFORMATION

GENERAL

▲WARNING

- When 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. 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. **KEEP OUT OF REACH OF CHILDREN.**

SPECIFICATIONS

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Engine oil capacity	At draining	'97—2001	1.6 ℓ (1.7 US qt , 1.4 Imp qt)	————
		After 2001	1.5 ℓ (1.6 US qt , 1.3 Imp qt)	————
	At disassembly	'97—2001	1.8 ℓ (1.9 US qt , 1.6 Imp qt)	————
		After 2001	1.9 ℓ (2.0 US qt , 1.7 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		0.05—0.13 (0.002—0.005)	0.15 (0.006)

TORQUE VALUE

Oil drain bolt 25 N·m (2.5 kgf·m, 18 lbf·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 PUMP

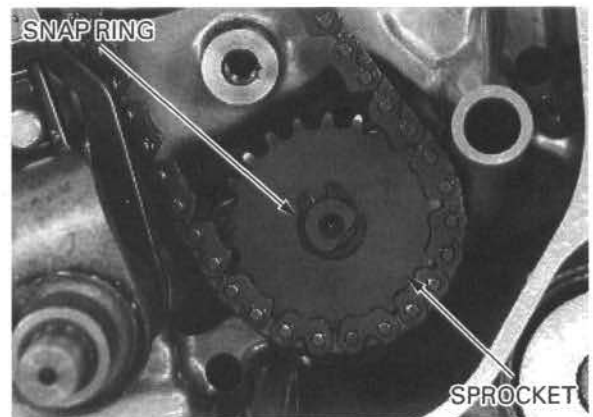
REMOVAL/DISASSEMBLY

Remove the front crankcase cover (page 8-3).
Remove the centrifugal clutch (page 8-4).

Remove the bolts and cam chain tensioner adjuster and tensioner arm.

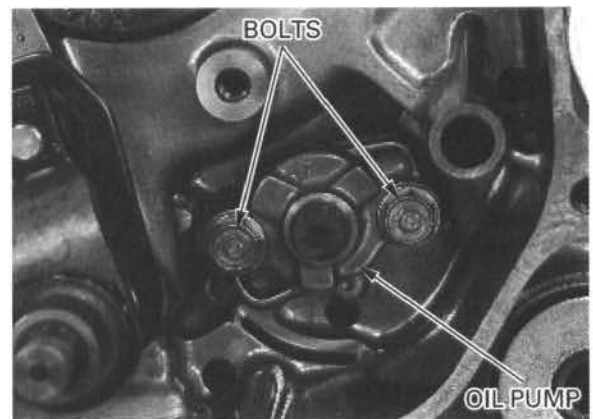


Remove the snap ring and sprocket from the oil pump shaft.



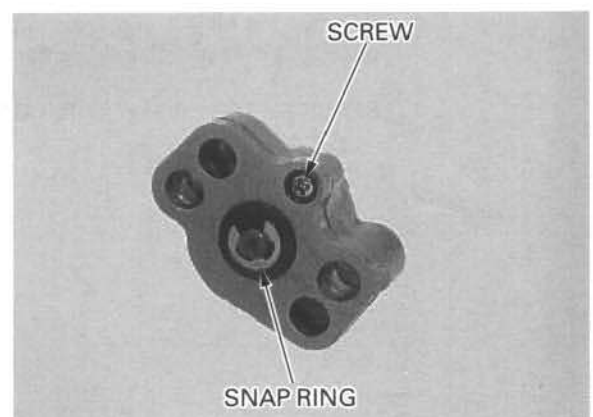
Remove the two bolts and oil pump assembly.

Remove the two dowel pins.



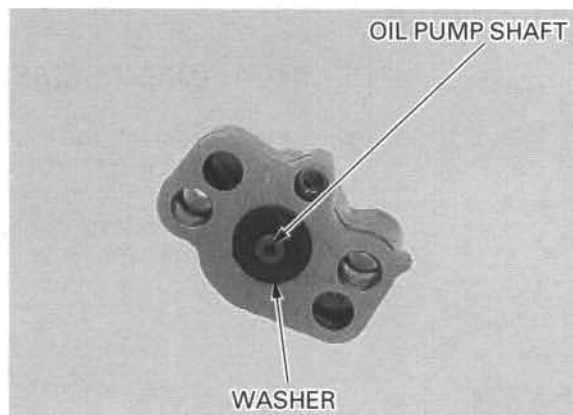
INSPECTION

Remove the screw and snap ring.



LUBRICATION SYSTEM

Remove the 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.

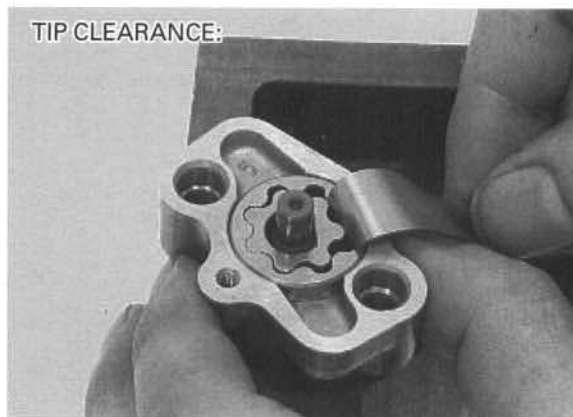
Measure the pump body clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)



Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)

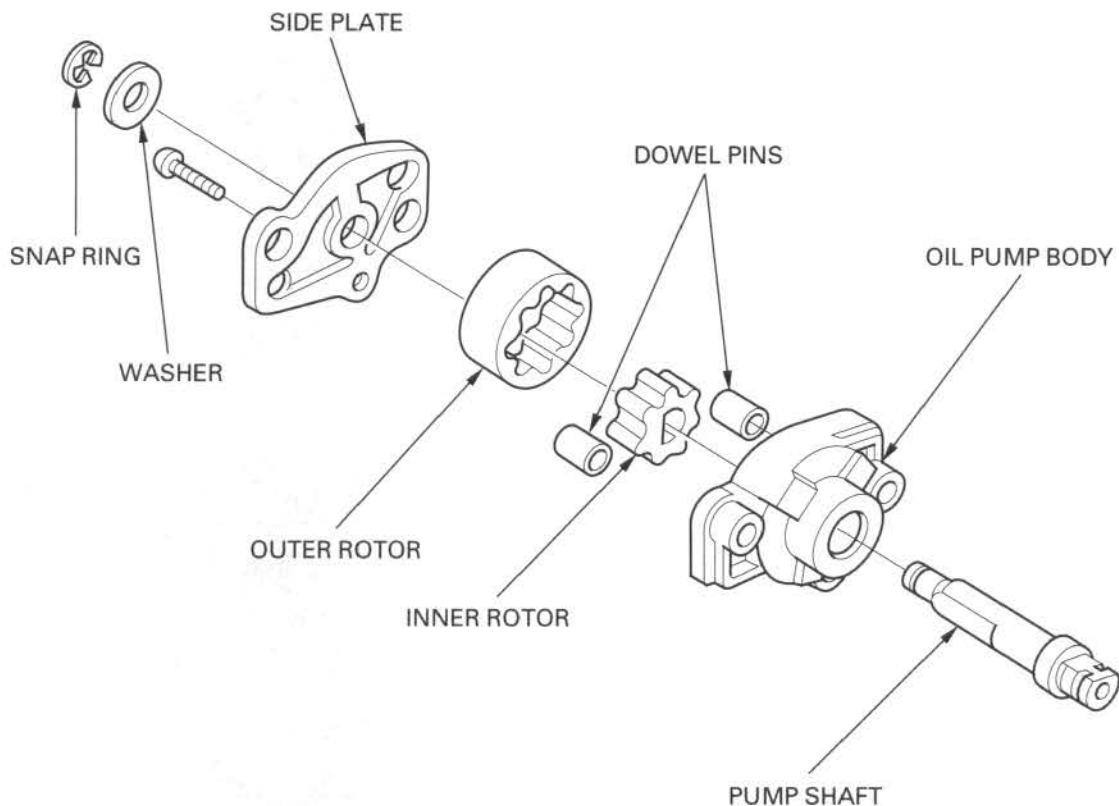


Remove the oil pump drive shaft from the oil pump body and measure the side clearance.

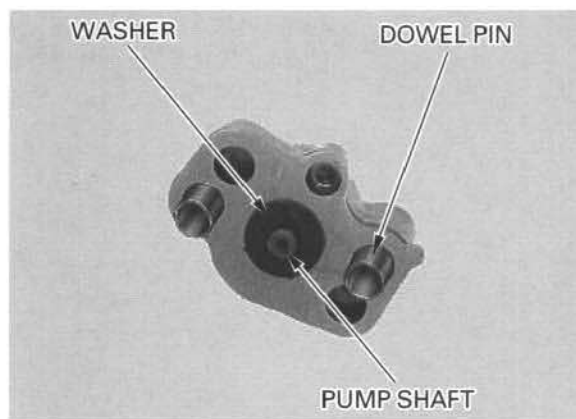
SERVICE LIMIT: 0.15 mm (0.006 in)



ASSEMBLY



Install the outer and inner rotor with the same sides up as when they were removed.
 Install the oil pump shaft.
 Install the dowel pins and side plate.
 Install the washer.

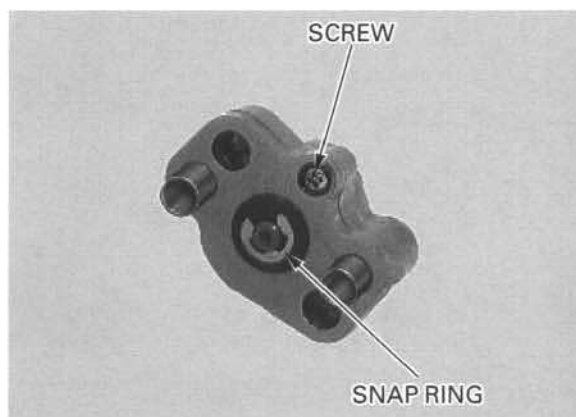


Tighten the screw.
 Install the snap ring.

NOTE:

Install the snap ring with its chamfered side facing the washer.

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.
 Remove the dowel pins from the oil pump.

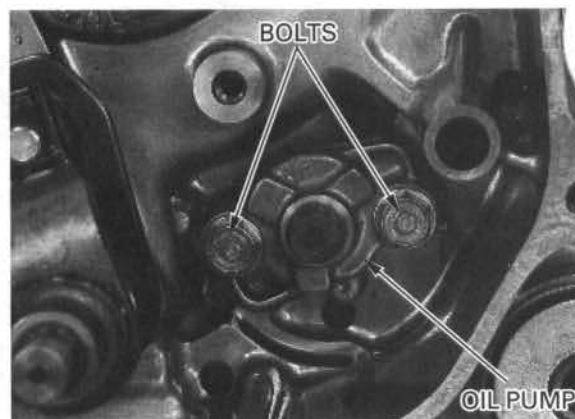


INSTALLATION

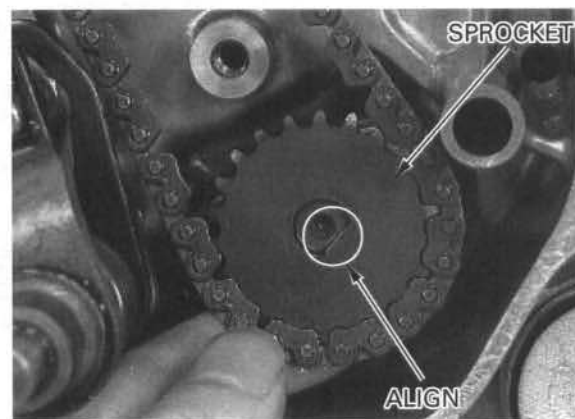
Install the two dowel pins.



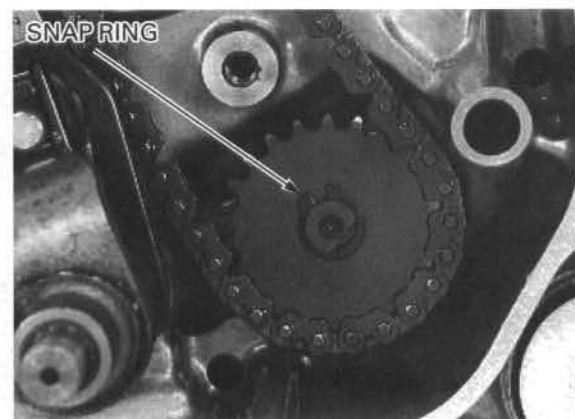
Install the oil pump assembly and tighten the two bolts.



Install the sprocket aligning the pump shaft boss with the groove in the sprocket.



Install the snap ring.



Install the cam chain tensioner arm and cam chain tensioner adjuster. (page 7-29).

Install the following:

- Centrifugal clutch (page 8-10)
- Front crankcase cover (page 8-18)



OIL COOLER (After 2001)

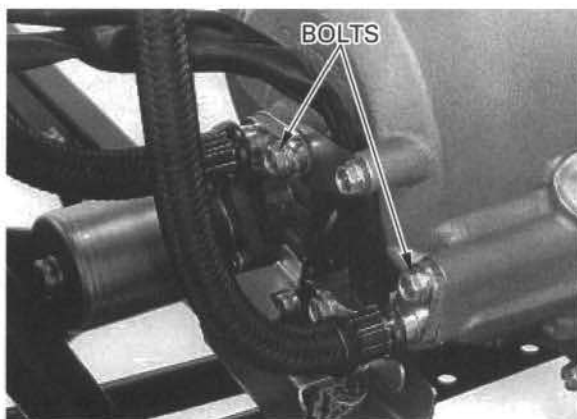
REMOVAL

Drain the engine oil (page 3-12).

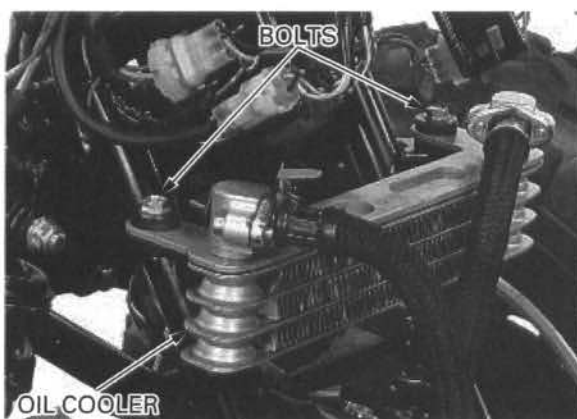
Remove the wire band from the oil cooler hose.



Remove the bolts and oil cooler hoses/O-rings from the front crankcase cover.

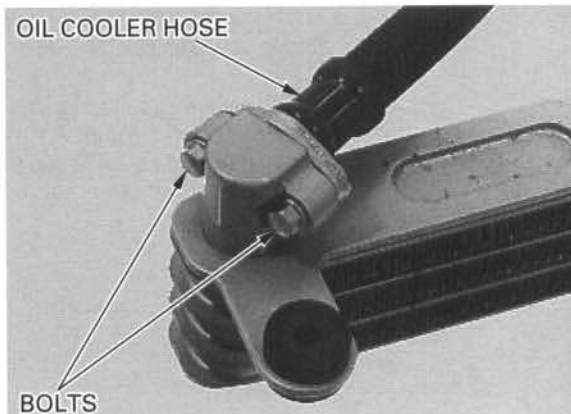


Remove the oil cooler mounting bolts and oil cooler assembly.



LUBRICATION SYSTEM

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

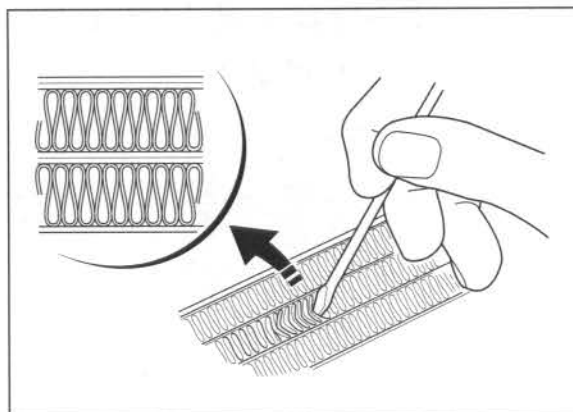


INSPECTION

Check the oil cooler air passage for clogs 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.

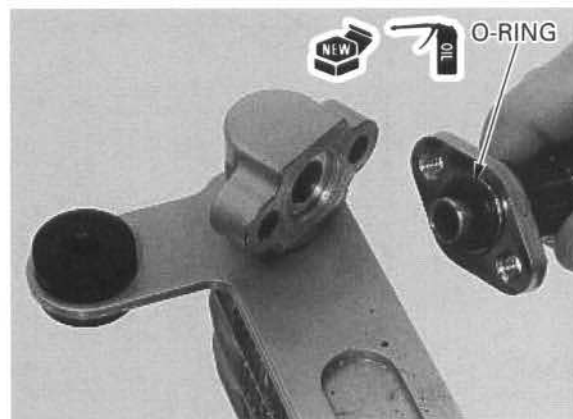


INSTALLATION

Apply clean engine oil to the new O-rings.

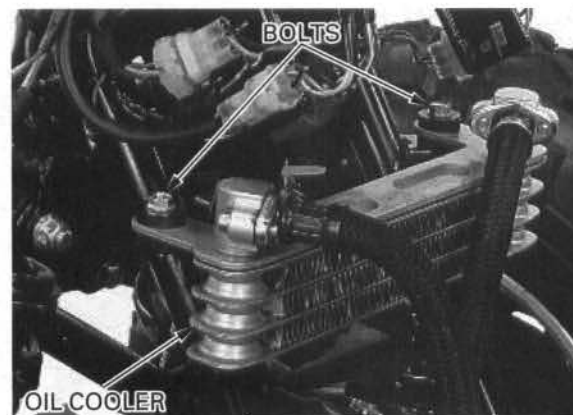
Install the O-rings onto the oil cooler hose flange.

Install the oil hoses and tighten the bolts securely.



Install the oil cooler into the frame.

Install and tighten the oil cooler mounting bolts.

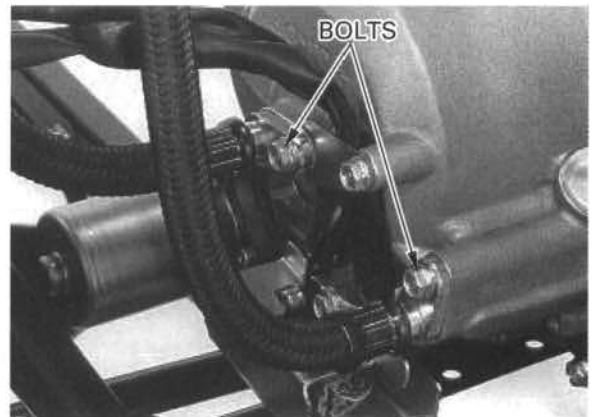


Apply clean engine oil to the new O-rings.
Install the O-rings onto the oil cooler hose flanges.

Install the oil hoses into the front crankcase cover.

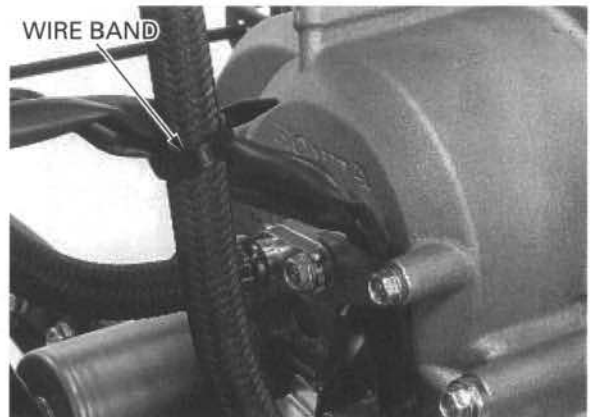


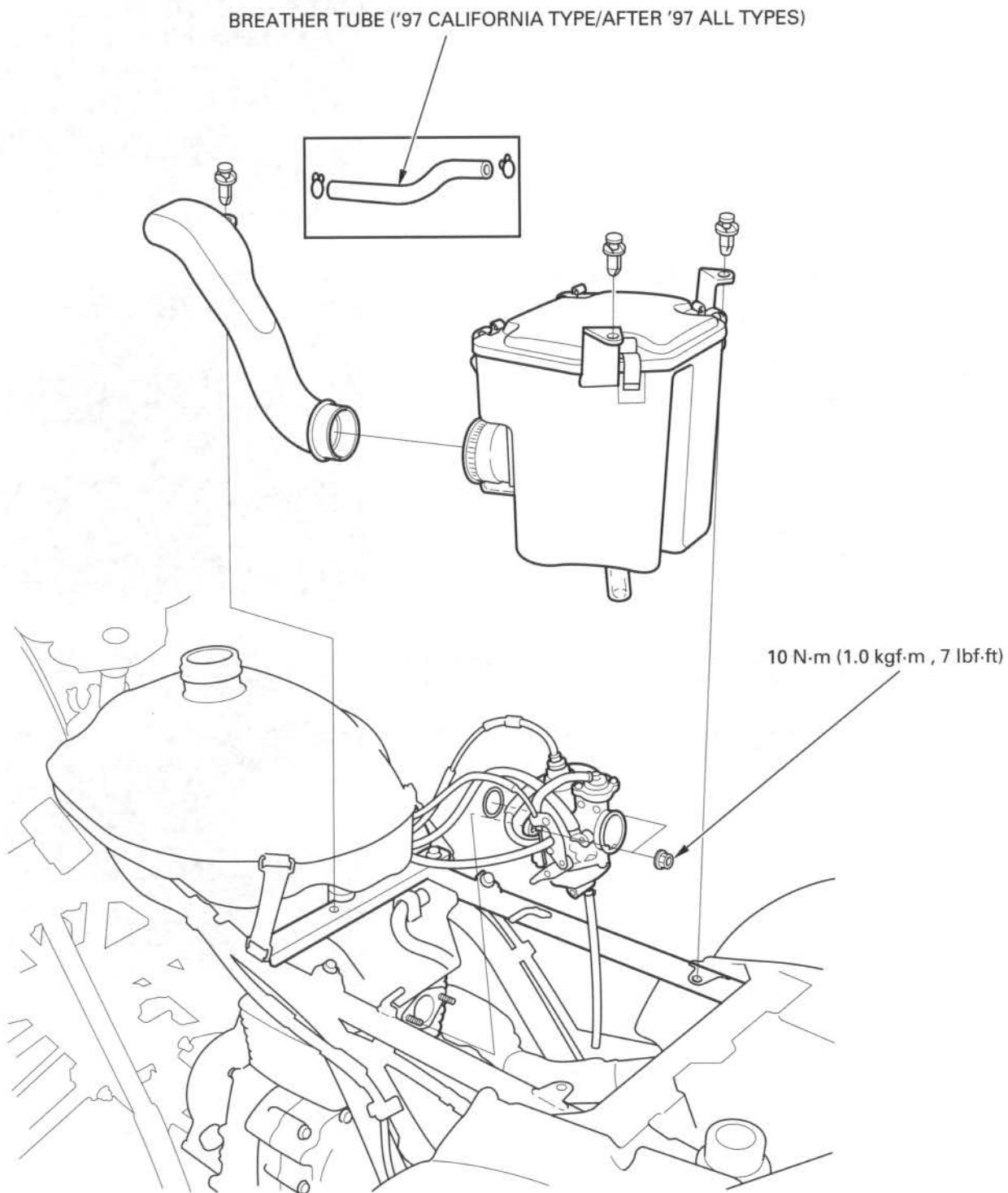
Install and tighten the bolts securely.



Secure the oil cooler hose, control motor wire and
angle sensor wire with wire band.

Fill the crankcase with the recommended engine oil
(page 3-12).





5. FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR INSTALLATION	5-12
TROUBLESHOOTING	5-3	PILOT SCREW ADJUSTMENT	5-14
AIR CLEANER HOUSING	5-4	HIGH ALTITUDE ADJUSTMENT	5-16
CARBURETOR REMOVAL	5-5	FUEL TANK REMOVAL	5-17
CARBURETOR DISASSEMBLY	5-7	FUEL STRAINER SCREEN	5-18
CARBURETOR ASSEMBLY	5-9	FUEL TANK INSTALLATION	5-18

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 may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in enclosed area.
- Bending or twisting the control cables will impair smooth operation and could cause the cable 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.

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	'97 (except California type)	PDC1B	
	'97 California type/'98 – 2001 All types	PDC1C	
	After 2001	PDC1E	
Main jet		# 95	
Slow jet		# 38	
Jet needle clip position	'97	3rd groove from top	
	After '97	2nd groove from top	
Pilot screw	Initial opening	'97 (except California type)	2-7/8 turns out
		'97 California type	2-3/4 turns out
		'98 – 2001	2-5/8 turns out
		After 2001	2 turns out
	High altitude setting		1/8 turns in from initial opening
Float level		14 mm (0.6 in)	
Idle speed		1,400 ± 100 rpm	
Throttle lever free play		3 – 8 mm (1/8 – 5/16 in)	

TORQUE VALUES

Carburetor insulator stud bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)
Cylinder head cover mounting bolt	32 N·m (3.3 kgf·m , 24 lbf·ft)

TOOLS

Carburetor float level gauge	07401-0010000
Pilot screw wrench	07908-4220201

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 stalls

- Improper choke operation
- Ignition malfunction
- Fuel contaminated
- Intake air leak
- Incorrect idle speed
- Incorrect pilot screw adjustment
- Low cylinder compression
- 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

Rich mixture

- Clogged air cleaner
- Worn jet needle or needle jet
- Faulty float valve
- Float level too high
- Clogged air jet

AIR CLEANER HOUSING

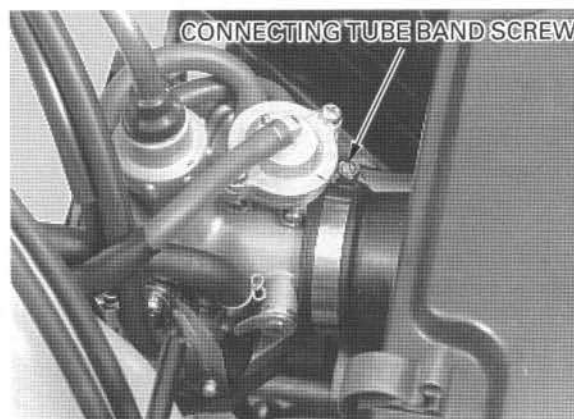
REMOVAL

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

Loosen the intake air duct band screw.

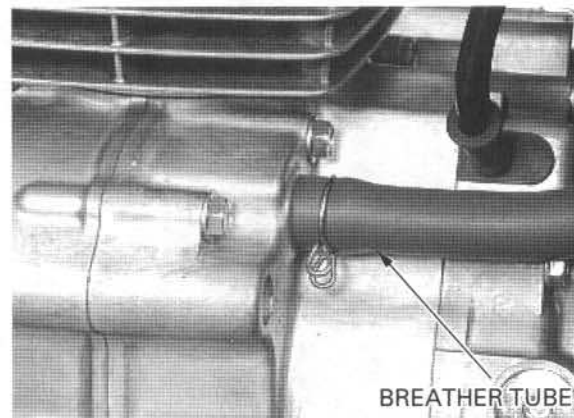


Loosen the connecting tube band screw.



'97 California type / After '97
All types:

Disconnect the breather tube from the crankcase.

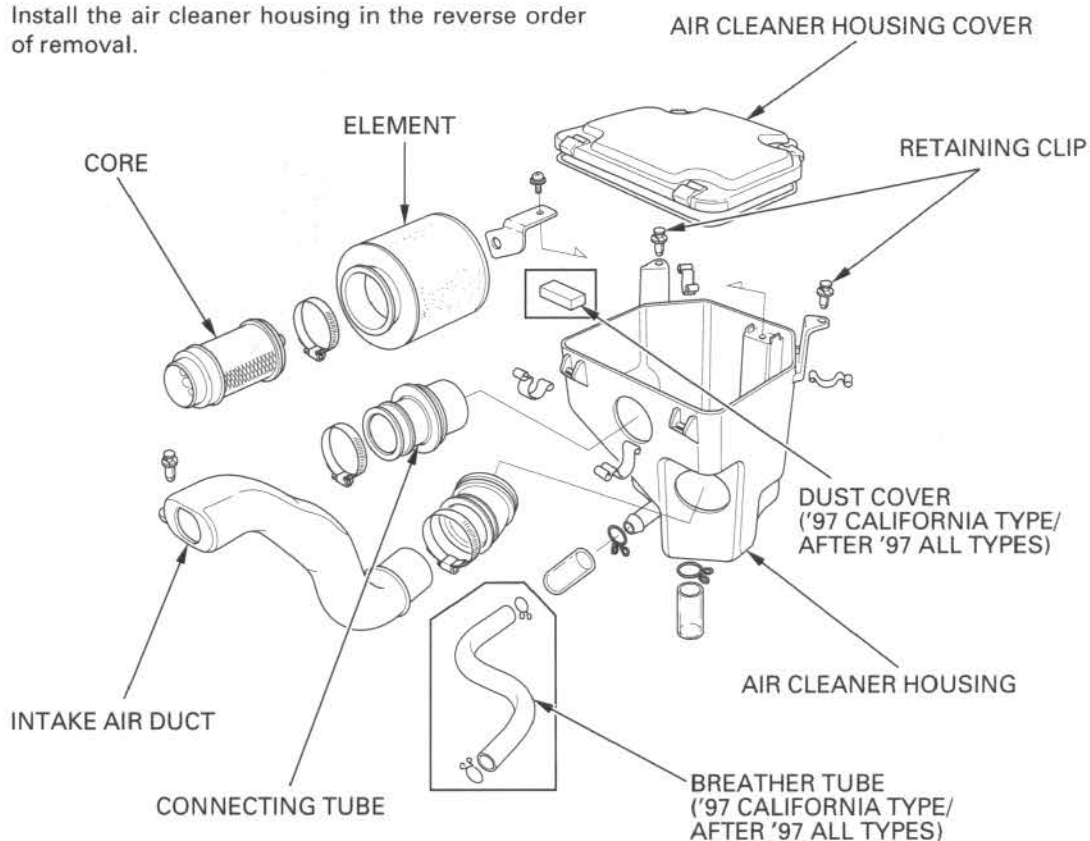


Remove the air cleaner housing retaining clips and air cleaner housing.



INSTALLATION

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



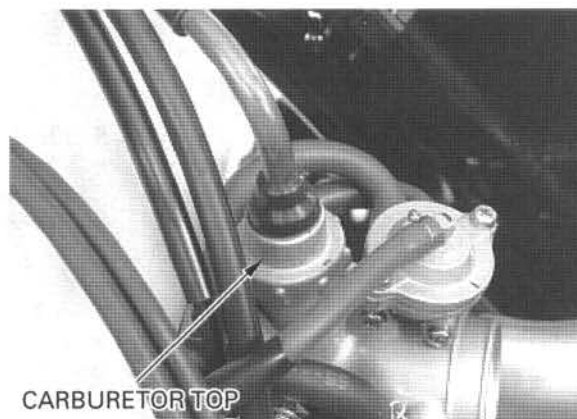
CARBURETOR REMOVAL

▲WARNING

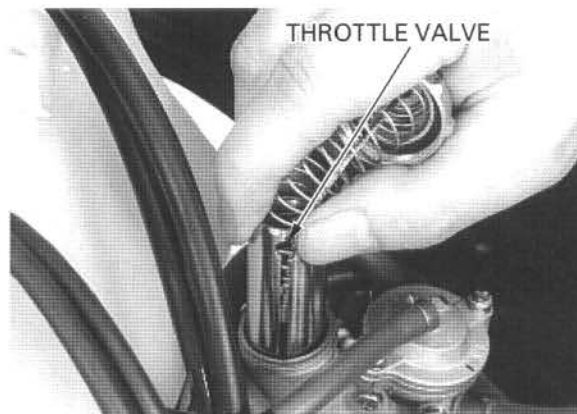
Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.

THROTTLE VALVE

Remove the air cleaner housing (page 5-4).
Loosen the carburetor top.

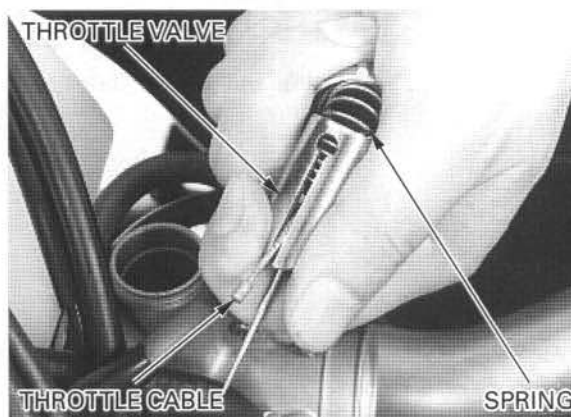


Remove the carburetor top and throttle valve from the carburetor.



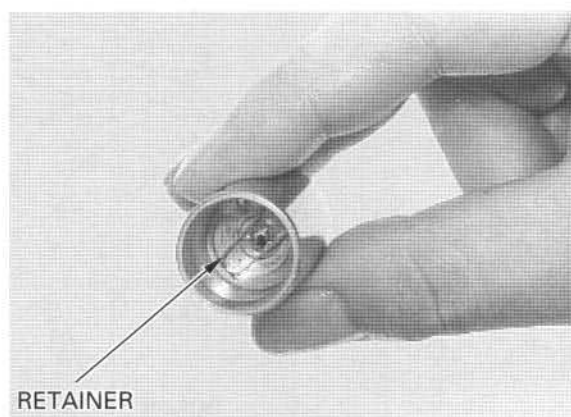
FUEL SYSTEM

Remove the throttle cable from the throttle valve while compressing the throttle valve spring.



Remove the jet needle retainer and jet needle.

Check the throttle valve and jet needle for scratches, wear or damage.



CARBURETOR BODY

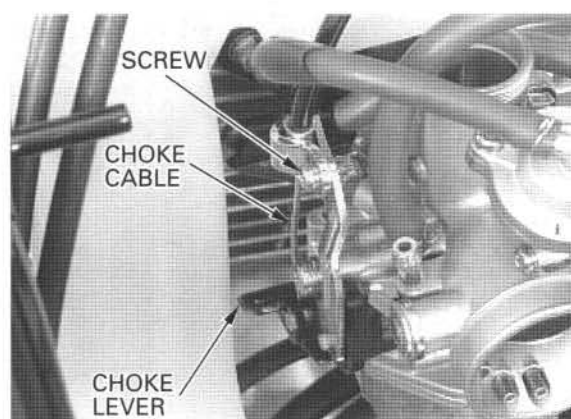
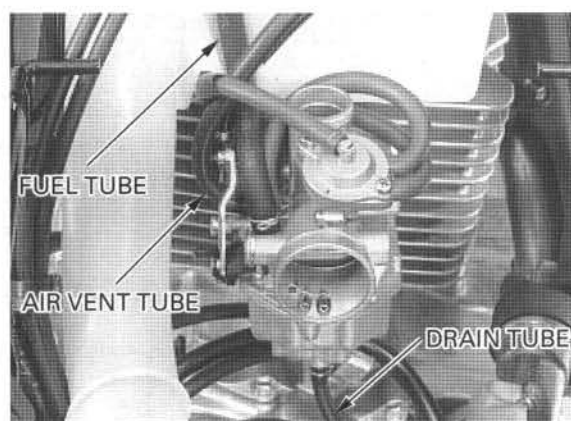
⚠ WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.

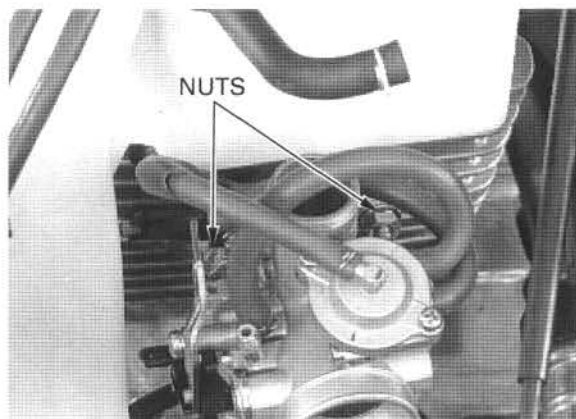
Loosen the drain screw and drain the fuel from float chamber into the approved gasoline container.

Disconnect the fuel tube, air vent tube and drain tube from the carburetor body.

Remove the screw and disconnect the choke cable from the choke lever.

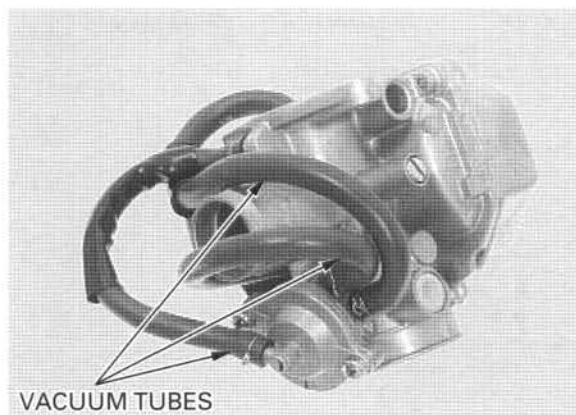


Remove the carburetor mounting nuts and carburetor.

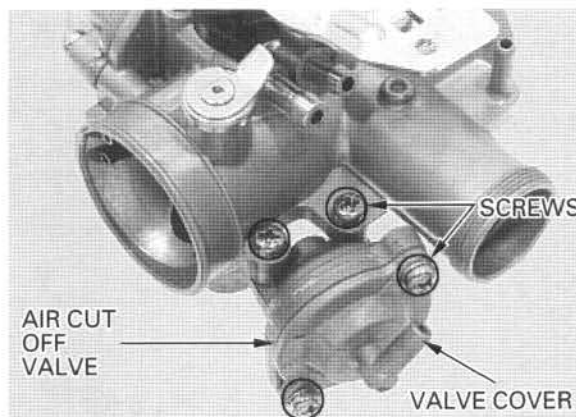


CARBURETOR DISASSEMBLY

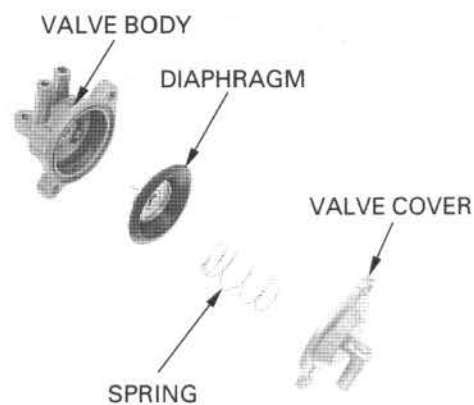
Disconnect the vacuum tubes.
Check the vacuum tube for damage, clogging and wrinkles, replace if necessary.



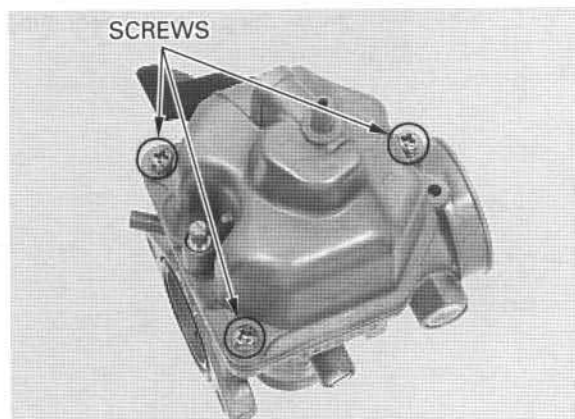
Remove the air cut off valve cover screws and cover, then remove the air cut off valve housing screws.



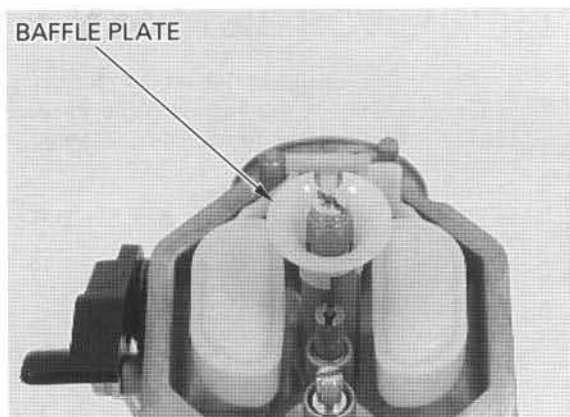
Disassemble the air cut off valve.
Blow open each air passage in the air cut off valve with compressed air.
Check the diaphragm for damage, pin holes, wrinkles and bends and replace if necessary.



Remove the screws and float chamber.

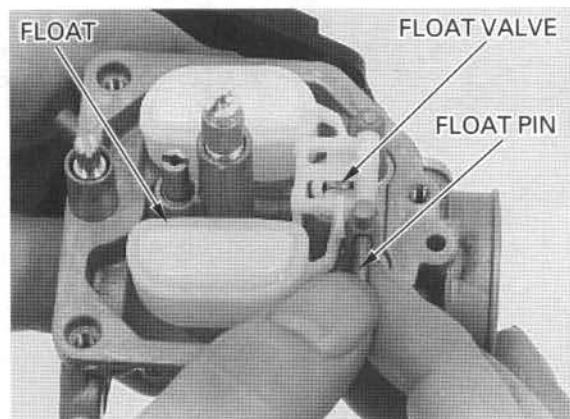


Remove the baffle plate.



Remove the float pin, float and float valve.

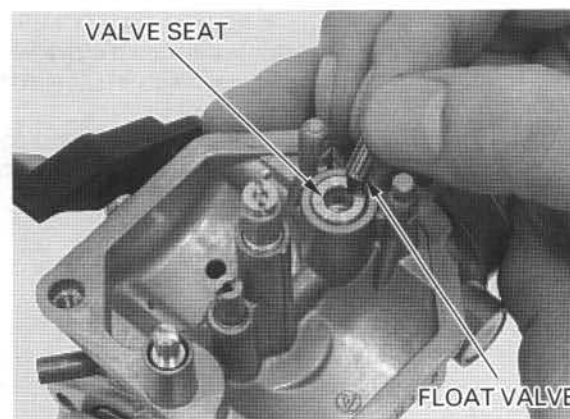
Inspect the float for deformation or damage.



Inspect the float valve seat for scores, scratches, clogging and damage.

Check the tip of the float valve where it contacts the valve seat for stepped wear or contamination.
Replace the valve if the tip is worn or contaminated.

Check the operation of the float valve.



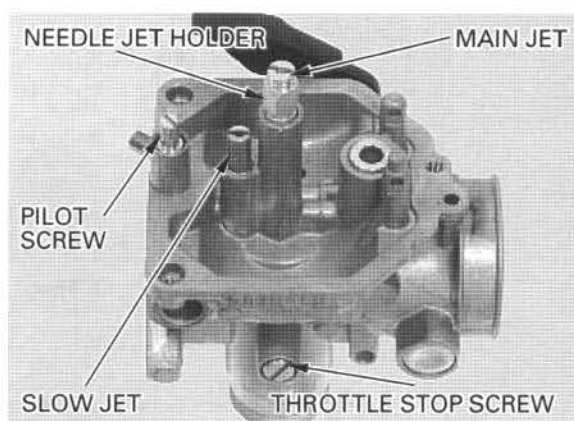
Remove the following:

- Main jet
- Needle jet holder
- Needle jet
- Slow jet
- Throttle stop screw/spring

Turn the pilot screw in and record the number of turns it takes before it seats lightly. Remove the pilot screw and spring.

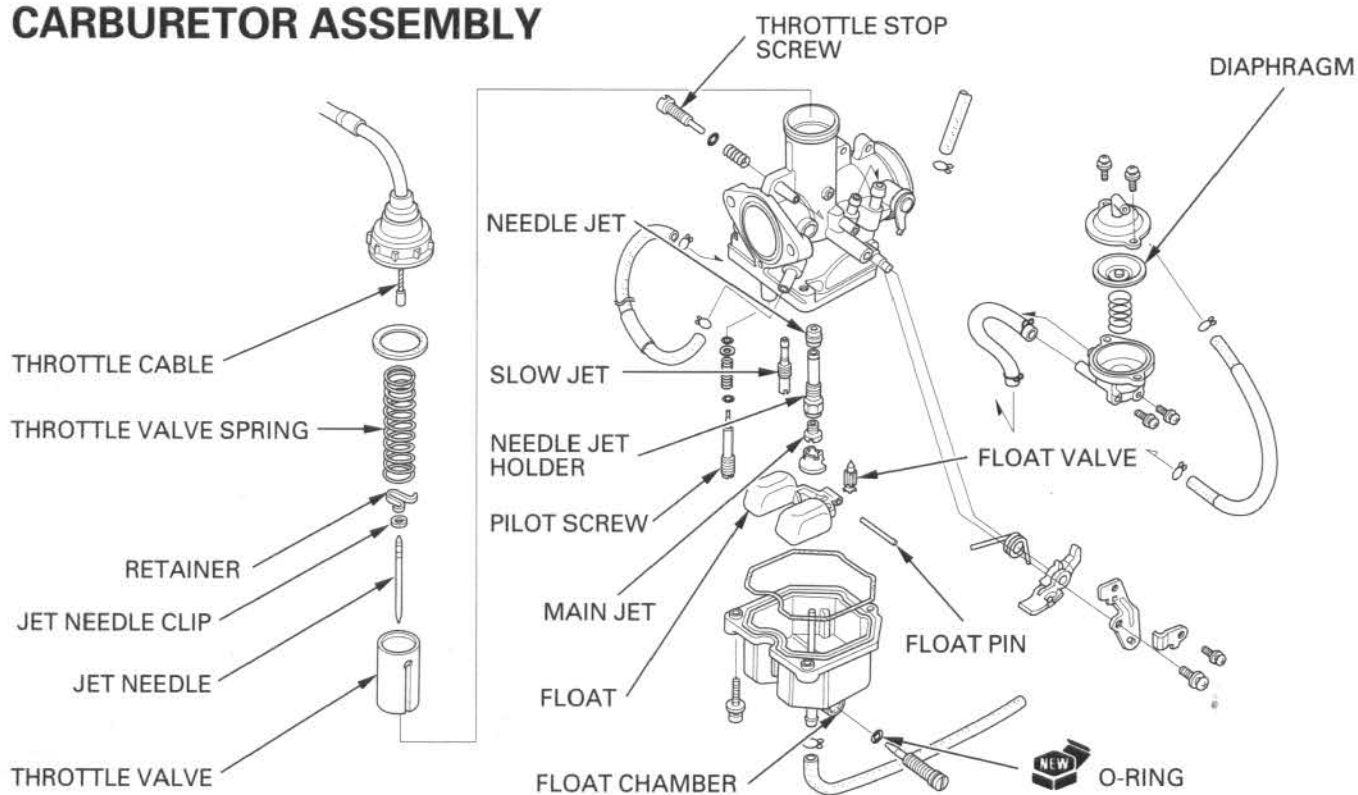
CAUTION:

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

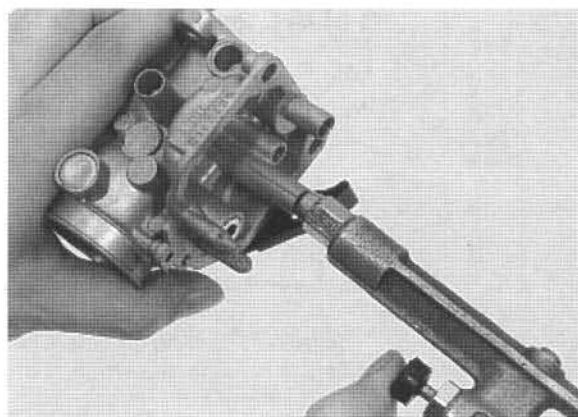


Inspect each jet for wear or damage and replace if necessary.

CARBURETOR ASSEMBLY



Blow open each air and fuel passage in the carburetor body with compressed air.



Install the following:

- Throttle stop screw/spring
- Slow jet
- Needle jet
- Needle jet holder
- Main jet

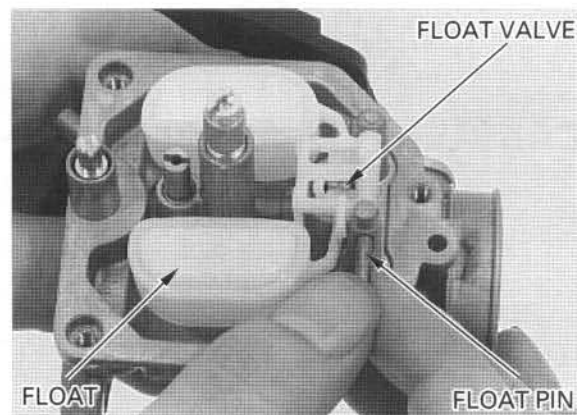
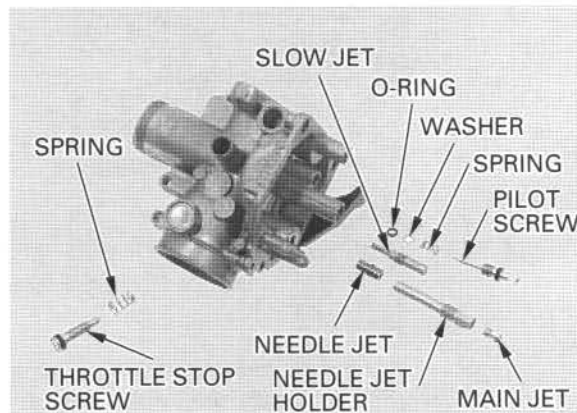
CAUTION:

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

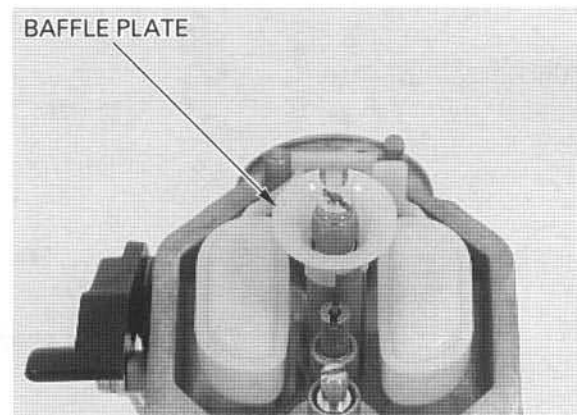
Install the pilot screw and return it to its original position as noted during removal.

Perform the pilot screw adjustment procedure if a new pilot screw is installed (page 5-14).

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



Install the baffle plate.



FLOAT LEVEL INSPECTION

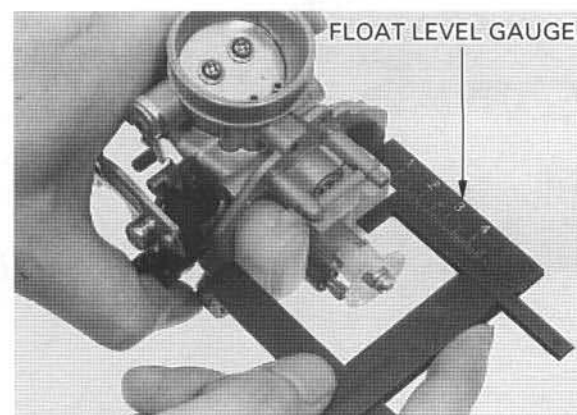
With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

FLOAT LEVEL: 14 mm (0.6 in)

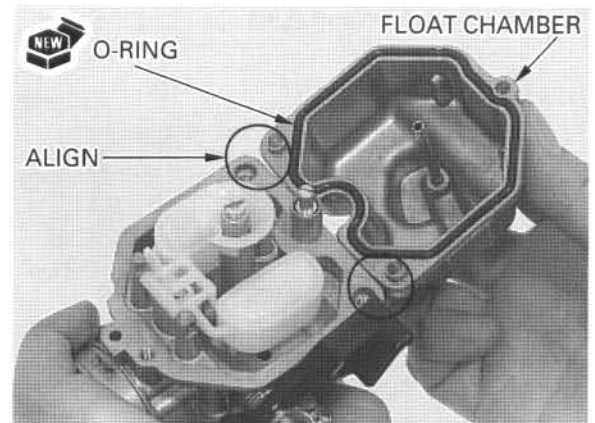
TOOL:

Carburetor float level gauge 07401-0010000

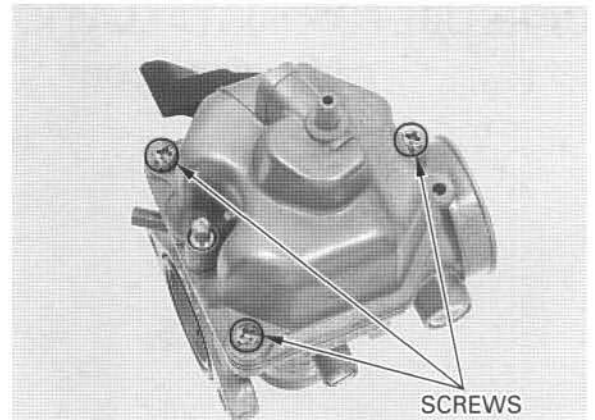
The float cannot be adjusted.
Replace the float assembly if the float level is out of specification.



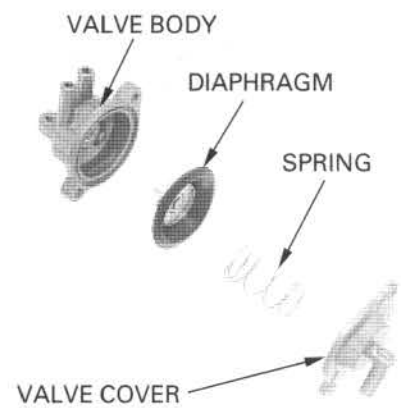
Install a new O-ring in the float chamber.
Install the float chamber.



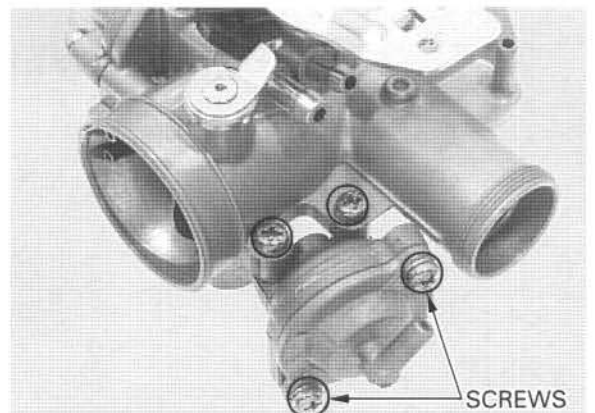
Install and tighten the float chamber screws.



Assemble the air cut off valve.

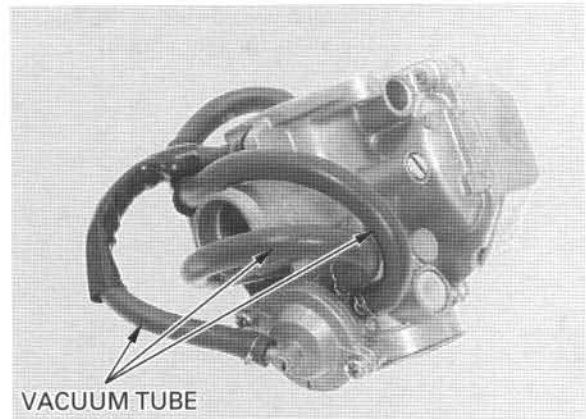


Tighten the screws.



FUEL SYSTEM

Connect the vacuum tube as shown.



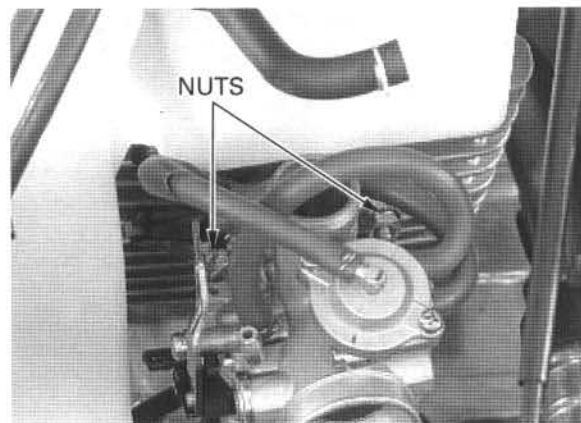
CARBURETOR INSTALLATION

CARBURETOR BODY

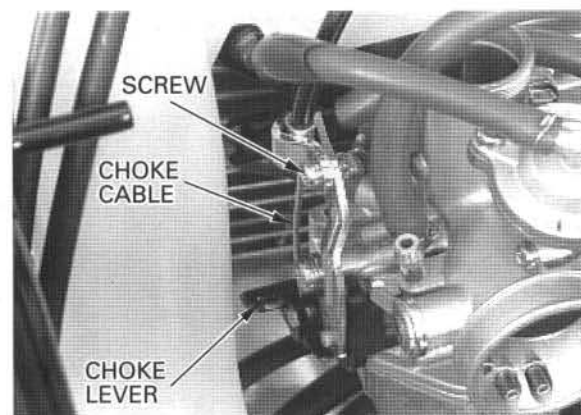
Install the new O-ring into the carburetor body groove.



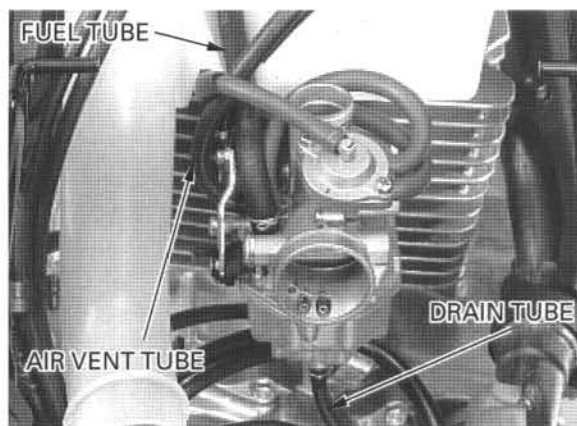
Install the carburetor body to the intake manifold and tighten the nuts securely.



Connect the choke cable end to the choke lever. Tighten the screw.



Install the fuel tube, drain tube and air vent tube.

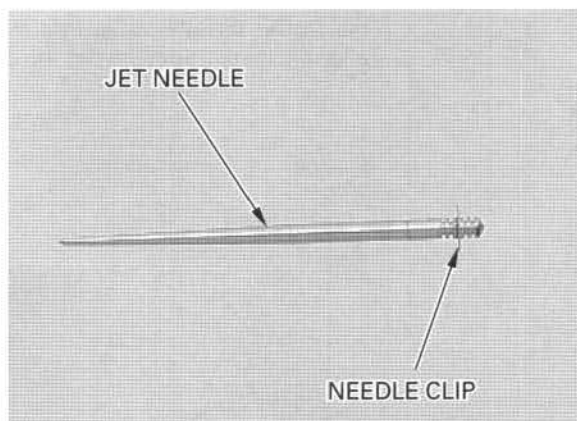


THROTTLE VALVE

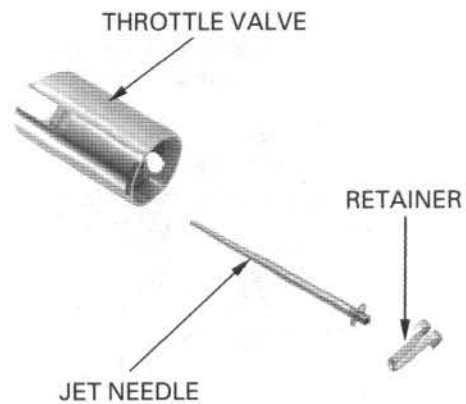
Install the needle clip on the jet needle.

STANDARD POSITION:

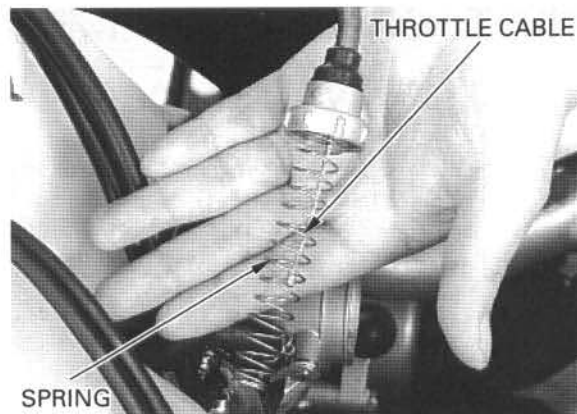
'97: 3rd groove from top
AFTER '97: 2nd groove from top



Install the jet needle into the throttle valve and secure it with a needle clip retainer.



Install the throttle valve spring onto the throttle cable.



FUEL SYSTEM

Connect the throttle cable to the throttle valve while compressing the throttle spring.



Install the throttle valve into the carburetor body, aligning its cut-out with the throttle stop screw.



Tighten the carburetor top securely.
Install the carburetor top boot, aligning the boot tab with the groove of the carburetor top.



After installing the carburetor, check the following:

- Throttle grip free play (page 3-4)
- Engine idle speed (page 3-14)
- Pilot screw adjustment (see below)

PILOT SCREW ADJUSTMENT

▲WARNING

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

NOTE:

- The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetors are overhauled or new pilot screws are installed.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

1. Turn the pilot screw clockwise until it seats lightly, then back it out to the specification given.

CAUTION:

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

TOOL:

Pilot screw wrench 07908-4220201

INITIAL OPENING:

'97 (except California type): 2-7/8 turns out
 '97 California type: 2-3/4 turns out
 '98–2001: 2-5/8 turns out
 After 2001: 2 turns out

2. Warm the engine up to operating temperature.
3. Stop the engine and connect a tachometer according to the tachometer manufacturer's instructions.
4. Start the engine and adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,400 ± 100 rpm

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Readjust the idle speed with the throttle stop screw.
7. Turn the pilot screw in gradually until the engine speed drops 100 rpm.

8. Turn the pilot screw counterclockwise the number of specified turns.

FINAL OPENING:

'97 (except California type): 3/4 turns out
 '97 California type/'98–2001: 7/8 turns out
 After 2001: 1/2 turns out

9. Readjust the idle speed with 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	# 95	# 92
Pilot screw opening	Factory preset	1/8 turns 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 follows:

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

Replace the standard main jet with the high altitude type.

HIGH ALTITUDE MAIN JET: # 92

Assemble and install the carburetor.

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

HIGH ALTITUDE PILOT SCREW OPENING:

1/8 turns in from initial opening

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

⚠ WARNING

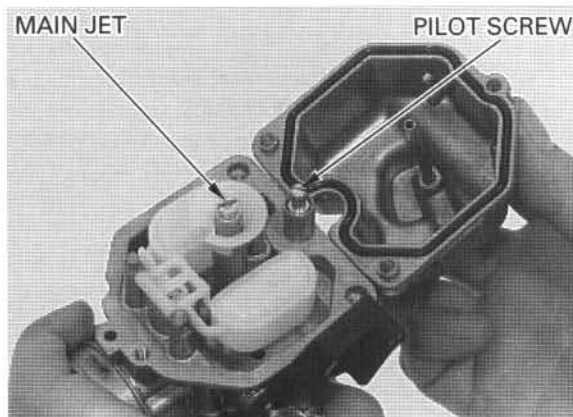
If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system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

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: # 95

Pilot screw change for low altitude: 1/8 turn out.



FUEL TANK REMOVAL

⚠ WARNING

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

Turn the fuel valve off.
Remove the front fender assembly (page 2-5).

Remove the screw and fuel valve lever.

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

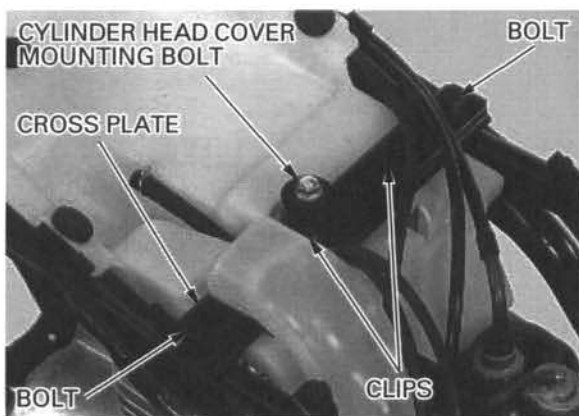
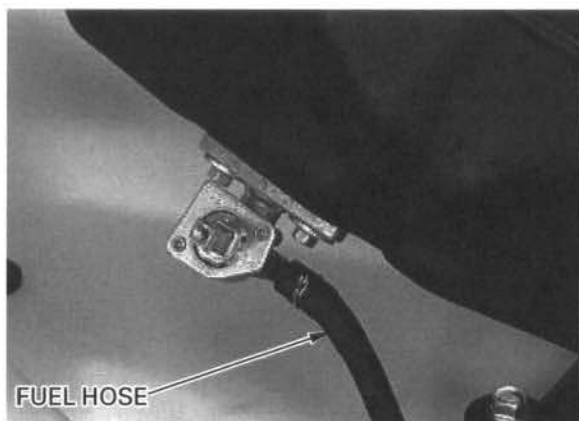
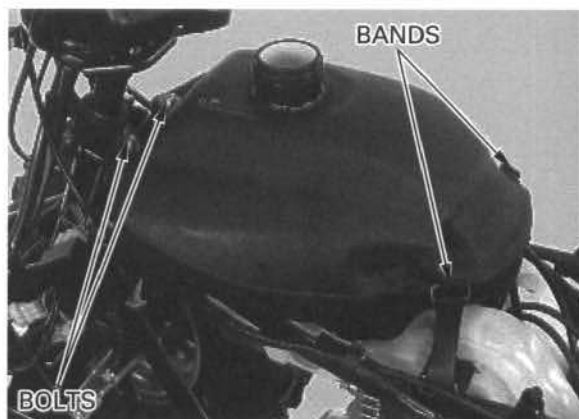
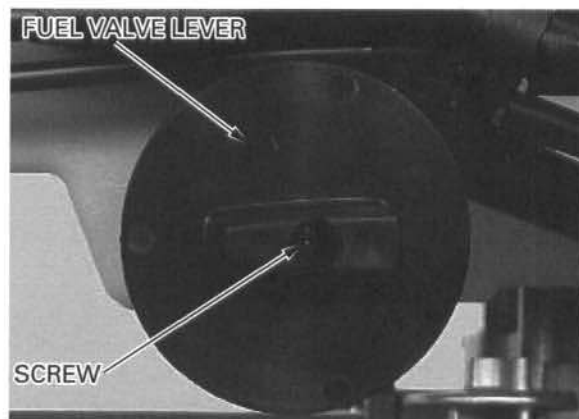
Slightly pull the fuel tank up, then disconnect the fuel hose from the fuel valve.
Remove the fuel tank.

Remove the two retaining clips and air duct hose.

Remove the cylinder head cover mounting bolt.

Remove the two bolts and cross plate.

Remove the 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.*

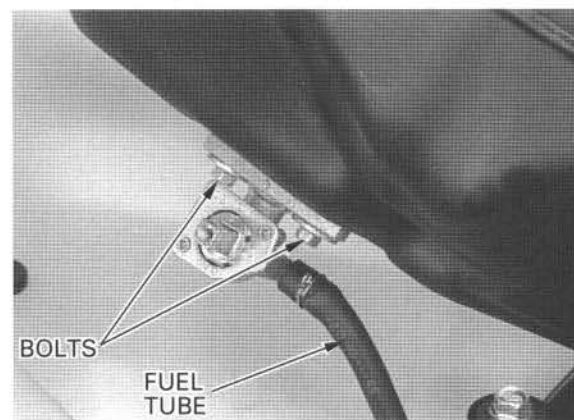
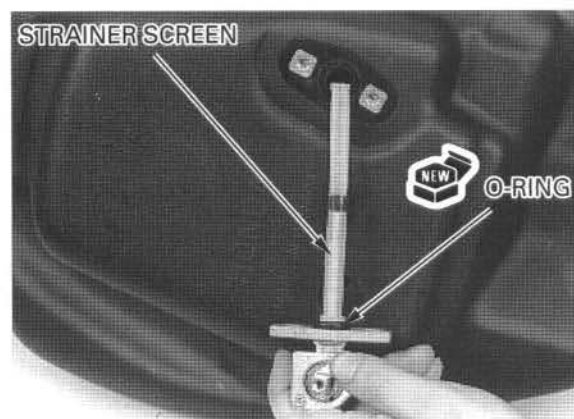
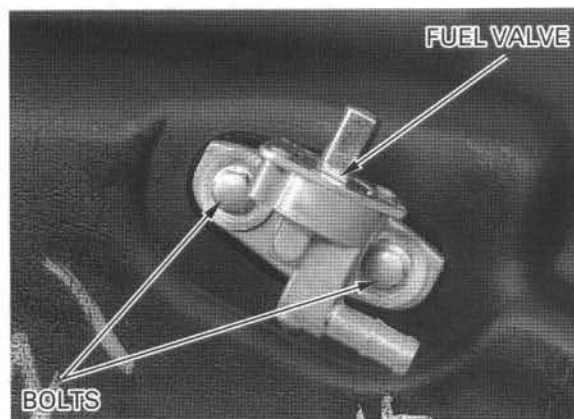
Remove the O-ring and strainer screen.
Wash the strainer screen in clean non-flammable or high flash point solvent.

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

Reinstall the fuel valve and tighten the bolts.

Connect the fuel tube.

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

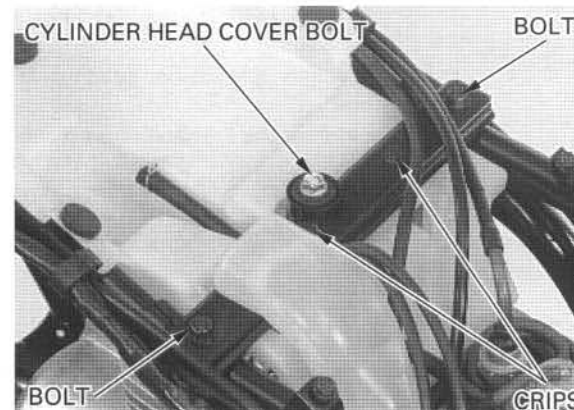


FUEL TANK INSTALLATION

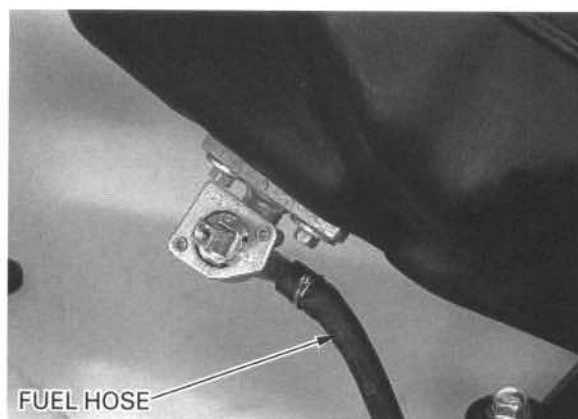
Set the fuel tank heat guard onto the frame.
Install the cross plate and tighten the two bolts.
Tighten the cylinder head cover mounting bolt to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

Install the air duct tube and two retaining clips.



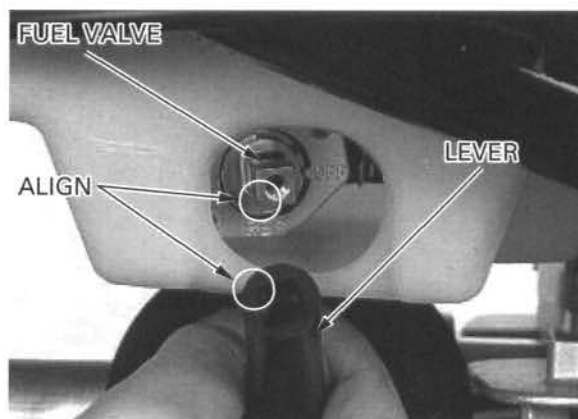
Connect the fuel hose to the fuel valve.



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



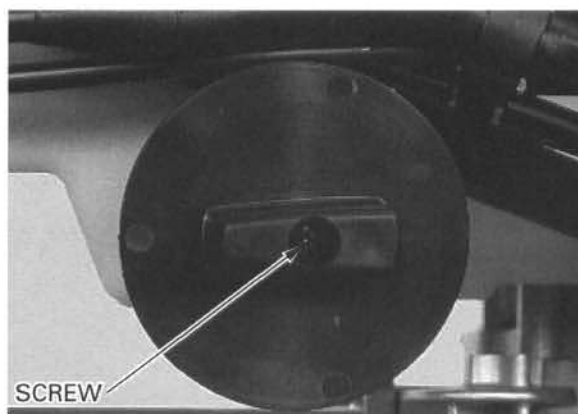
Install the fuel valve lever by aligning the rounded edge as shown.

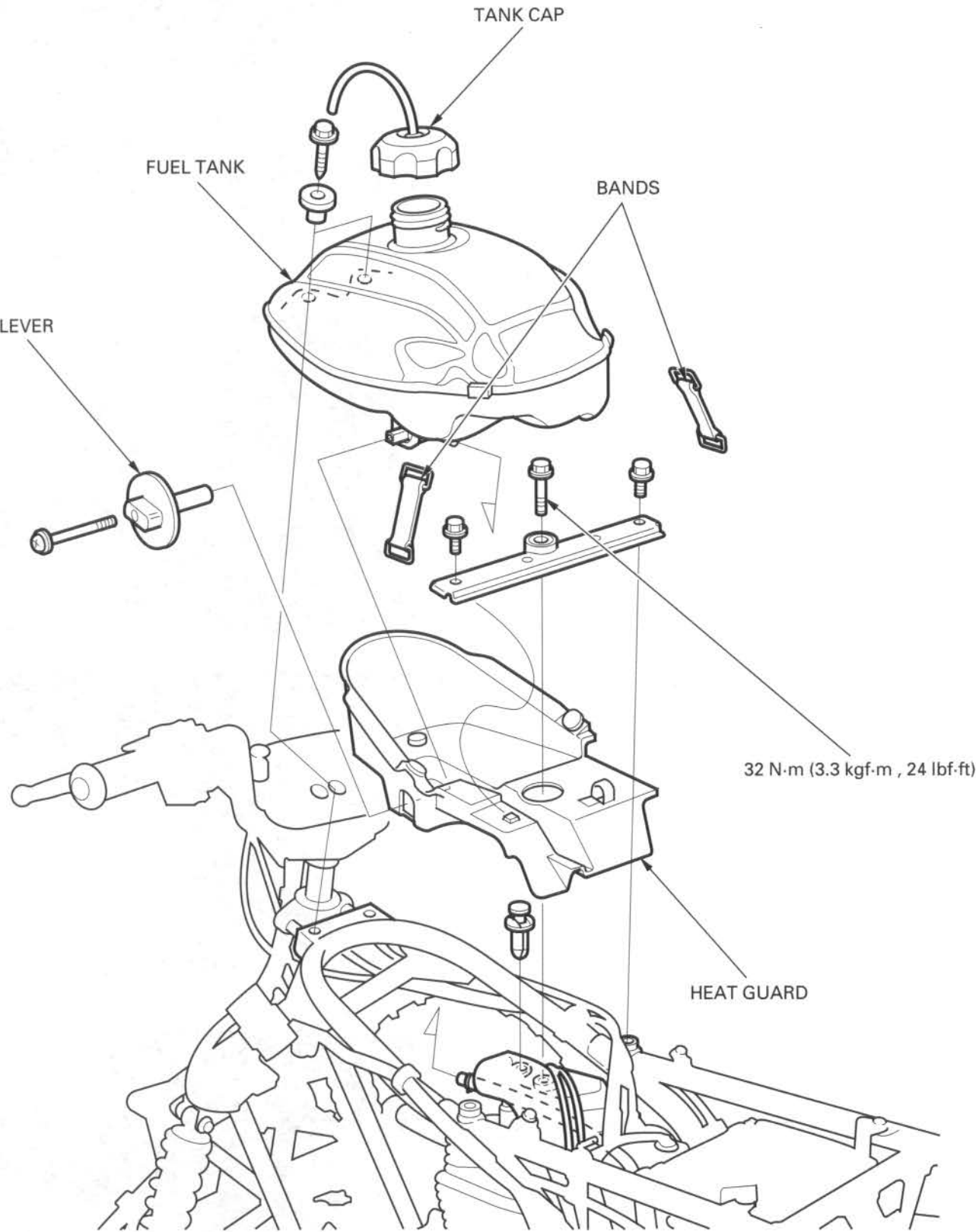


Tighten the screw securely.

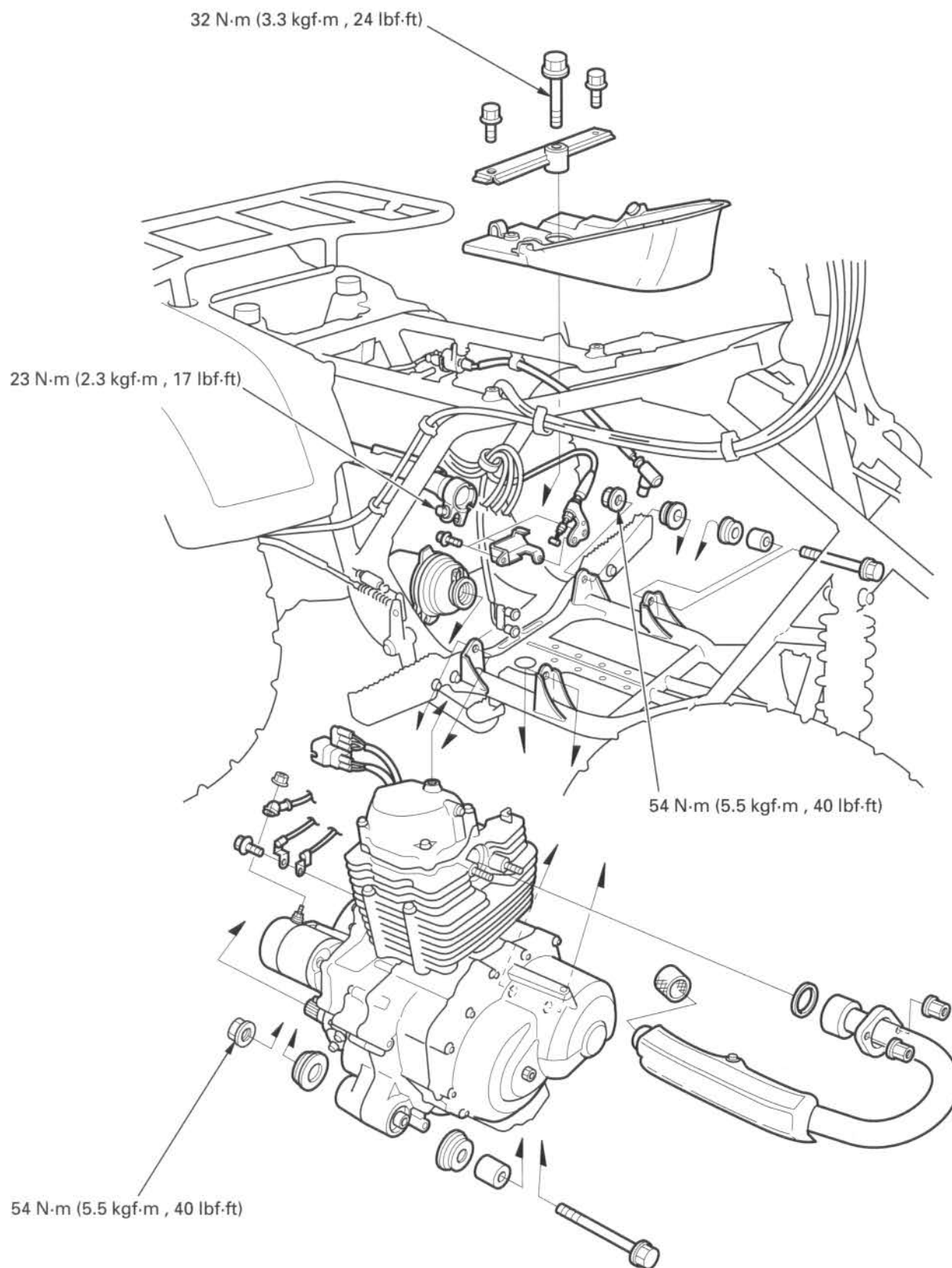
NOTE:

After installation, make sure there are no fuel leaks.





ENGINE REMOVAL/INSTALLATION



6. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

6-1

ENGINE INSTALLATION

6-5

ENGINE REMOVAL

6-2

SERVICE INFORMATION

GENERAL

- The following components require engine removal for service.
 - Crankshaft (Section 11)
 - Transmission (Section 11)
 - Gearshift linkage (Section 9)
- The following components can be serviced with the 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	'97—2001	1.6 ℓ (1.7 US qt, 1.4 Imp qt)
		After 2001	1.5 ℓ (1.6 US qt, 1.3 Imp qt)
	At disassembly	'97—2001	1.8 ℓ (1.9 US qt, 1.6 Imp qt)
		After 2001	1.9 ℓ (2.0 US qt, 1.7 Imp qt)
Engine weight		'97—2001	34.6 kg (76.3 lbs)
		After 2001	TM: 35.9 kg (79.1 lbs) /TE: 37.4 kg (82.5 lbs)

TORQUE VALUES

Cylinder head cover mounting bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)
Muffler band bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)
Lower engine mounting bolt/nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Gear shift pedal mounting bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)

ENGINE REMOVAL

Drain the engine oil (page 3-12).

Remove the following:

- Exhaust pipe/Muffler (page 2-9)
- Front fender (page 2-5)
- Air cleaner housing (page 5-4)
- Carburetor (page 5-12)
- Fuel tank (page 5-17)
- Shift control motor and reduction gears
(After 2001 TE model only: Section 20)

Disconnect the oil cooler hose from the front crankcase cover (page 4-7).

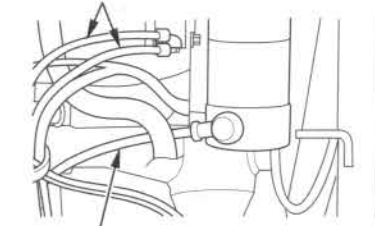
Remove the cylinder head cover mounting bolt.
Remove the two bolts and cross plate.
Remove the fuel tank heat guard.

Disconnect the spark plug cap.

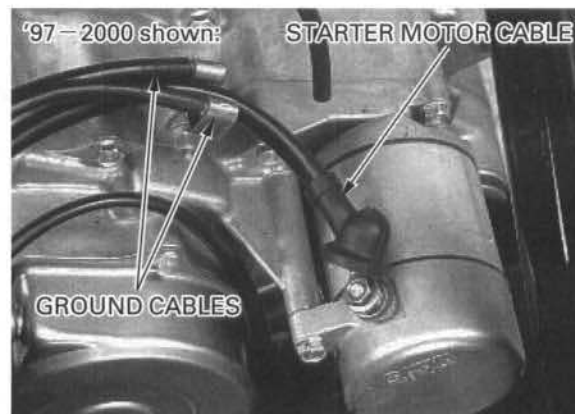
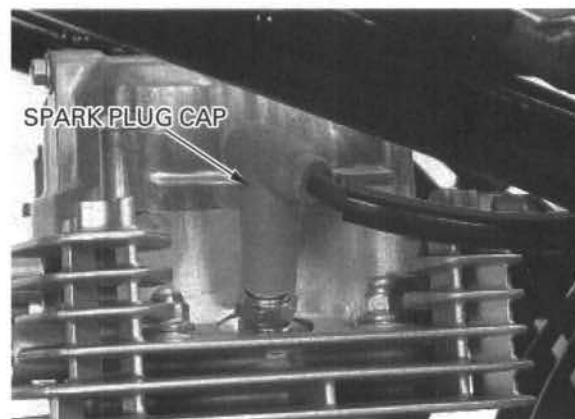
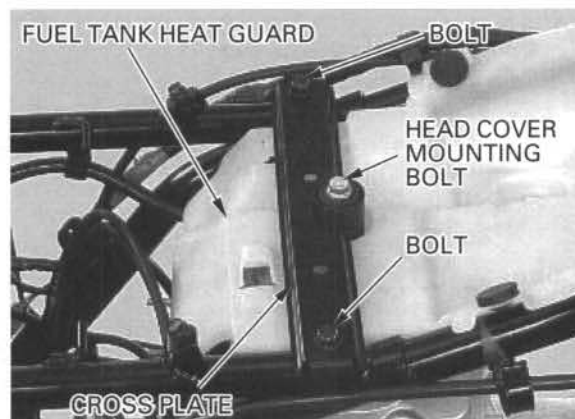
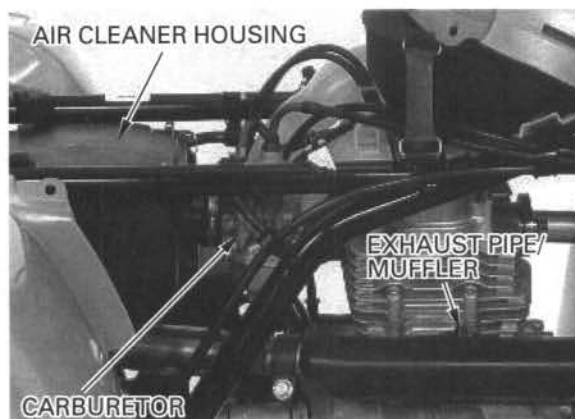
Remove the nut and starter motor cable.
Remove the bolt and ground cable terminals.

After 2001:

GROUND CABLES

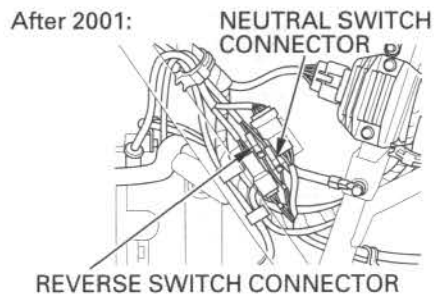


STARTER MOTOR CABLE

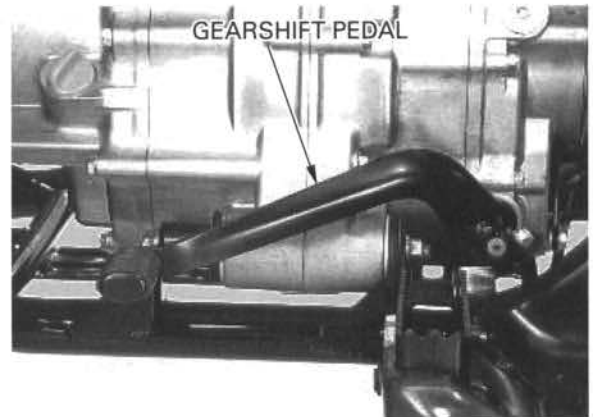
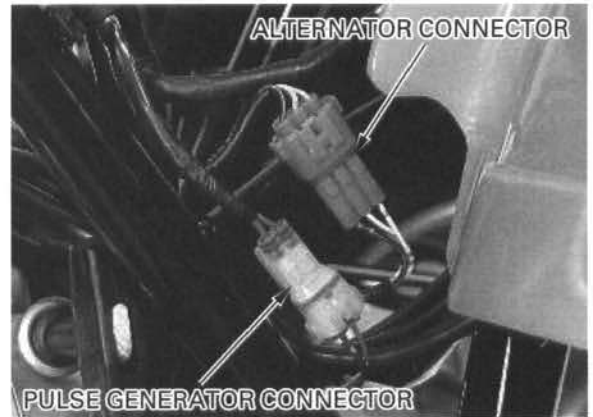


Disconnect the alternator and ignition pulse generator connectors.

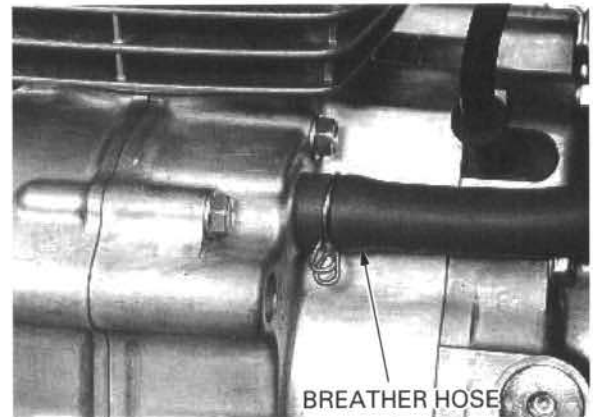
After 2001: Disconnect the neutral and reverse switch connectors.



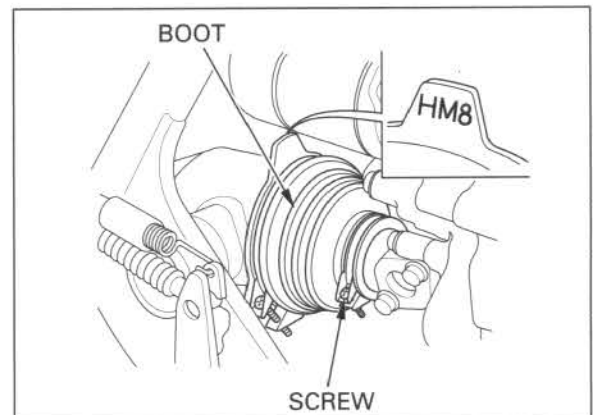
Except After 2001 TE model: Remove the gearshift pedal.



Disconnect the crankcase breather hose.

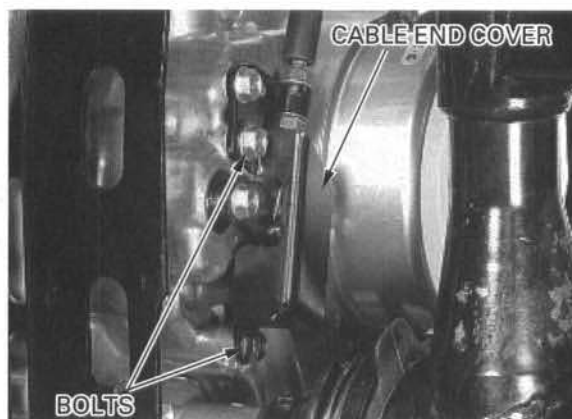


Loosen the swingarm boot band screw.

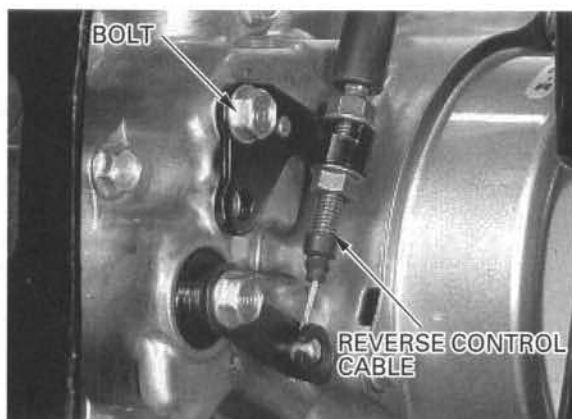


ENGINE REMOVAL/INSTALLATION

Remove the two bolts and cable end cover.



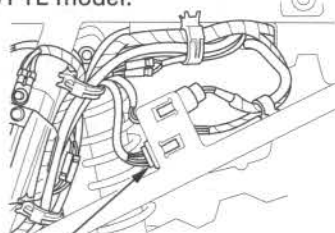
Remove the bolt and disconnect the reverse control cable end from the lever.



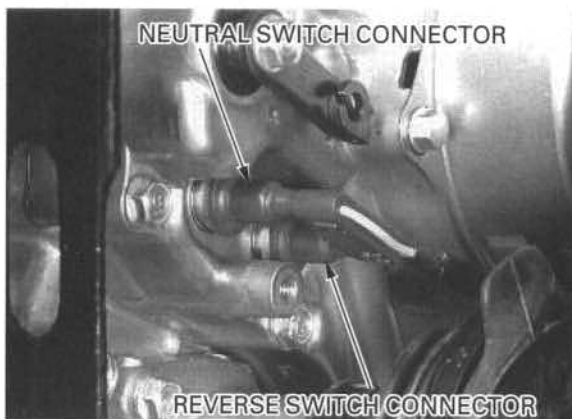
'97–2001: Disconnect the reverse switch and neutral switch connectors.

After 2001 TE model: Remove the gear position switch 6P connector from the frame and disconnect the 6P connector.

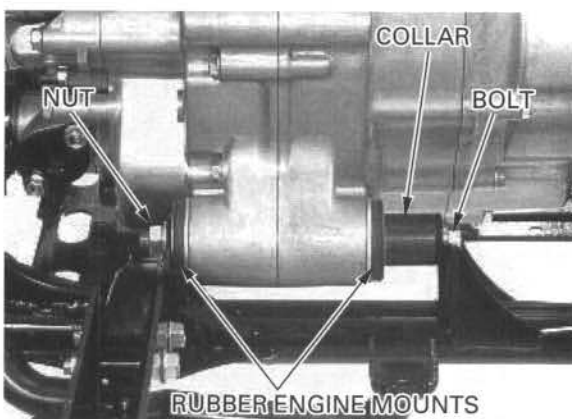
After 2001 TE model:



6P CONNECTOR



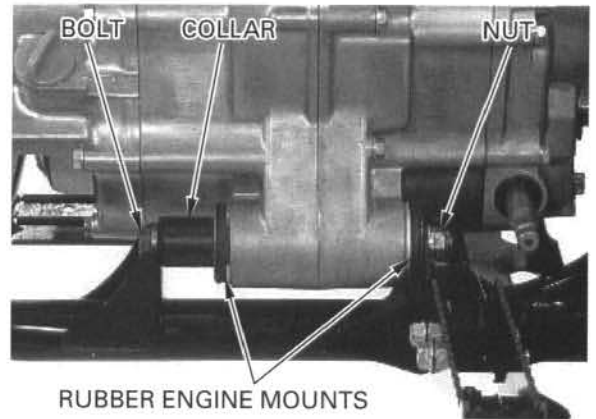
Remove the right lower engine hanger bolt/nut, collar and rubber engine mounts.



Remove the left lower engine hanger bolt/nut, collar and rubber engine mounts.

Move the engine forward, then disconnect the yoke joint from the final shaft.

Remove the engine from the left side of the frame.

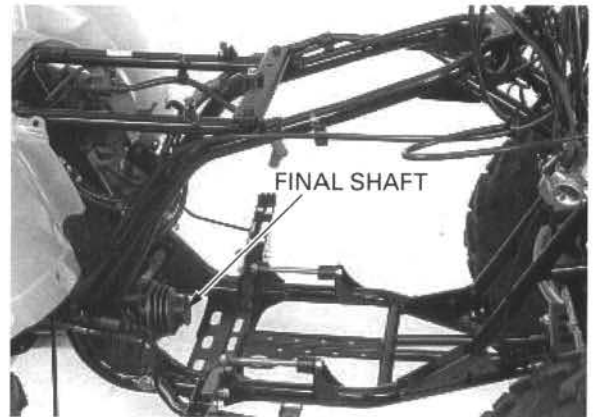


ENGINE INSTALLATION

Apply molybdenum disulfide grease to the yoke joint splines.

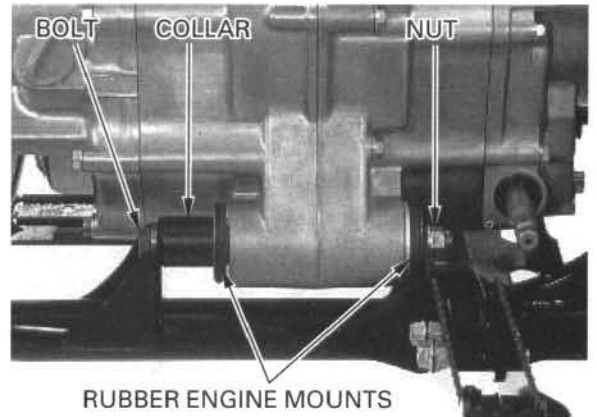
Install the engine from the left side.

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



Install the lower left rubber engine mounts with the wide side towards the engine.

Install the collar and hanger bolt/nut.

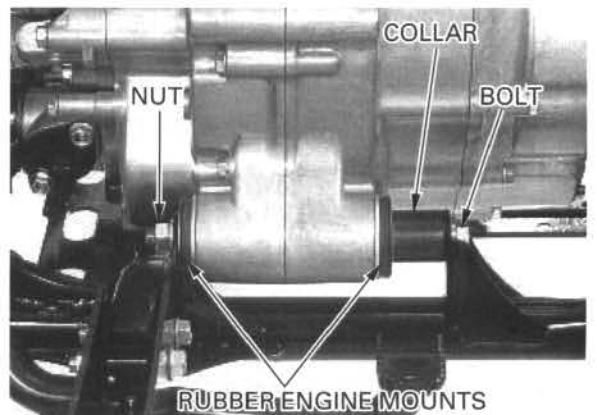


Install the lower right rubber engine mounts with it wide side towards the engine.

Install the collar and hanger bolt/nut.

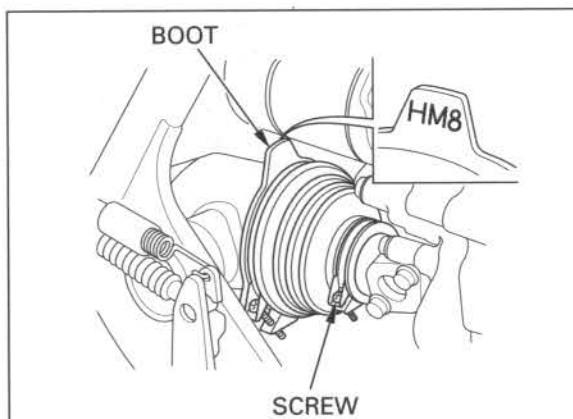
Tighten the right and left lower engine hanger bolts/nuts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



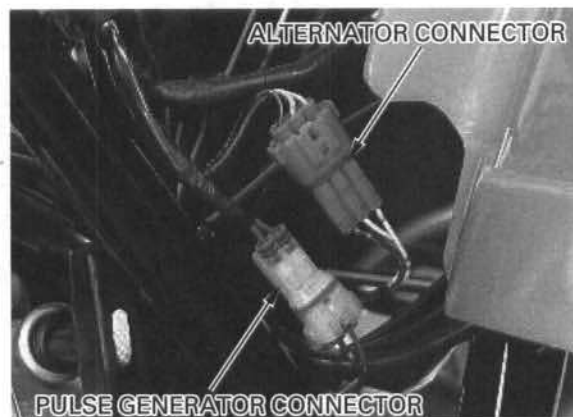
ENGINE REMOVAL/INSTALLATION

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



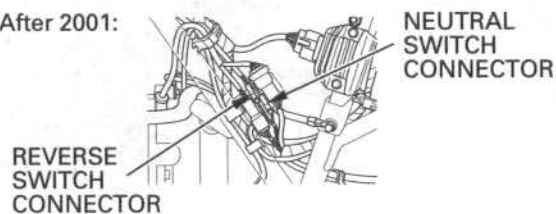
Route the alternator, ignition pulse generator and neutral/reverse switch wire properly (page 1-22) and clamp them securely.

Connect the alternator and ignition pulse generator switch connectors.



After 2001: Connect the neutral and reverse switch connectors.

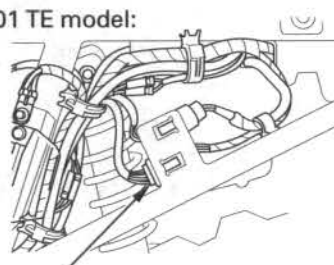
After 2001:



Connect the reverse switch and neutral switch connectors.

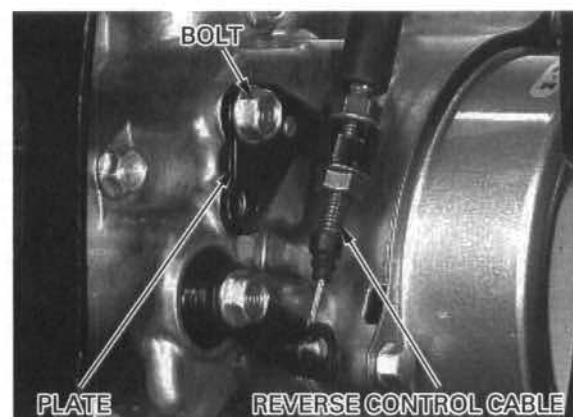
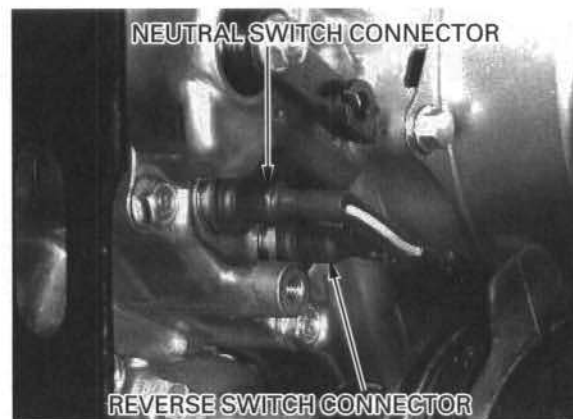
After 2001 TE model: Connect the gear position switch 6P connector and install it to the frame.

After 2001 TE model:

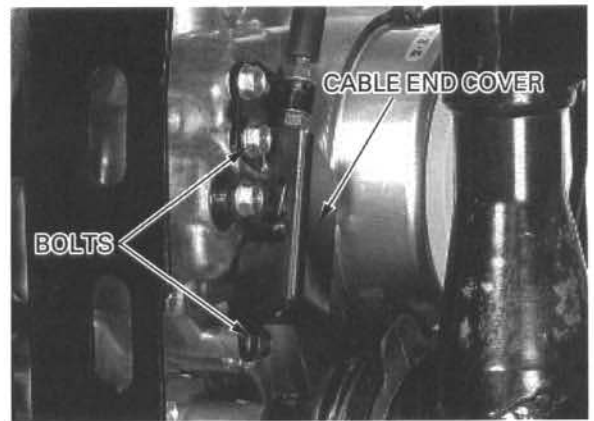


6P CONNECTOR

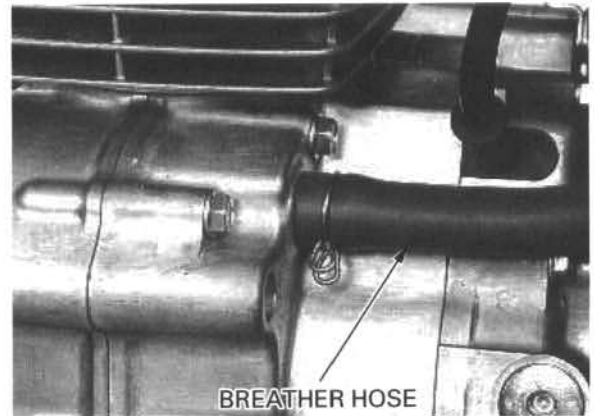
Connect the reverse control cable end to the lever. Install the plate and tighten the bolt.



Install the cable end cover and tighten the two bolts.

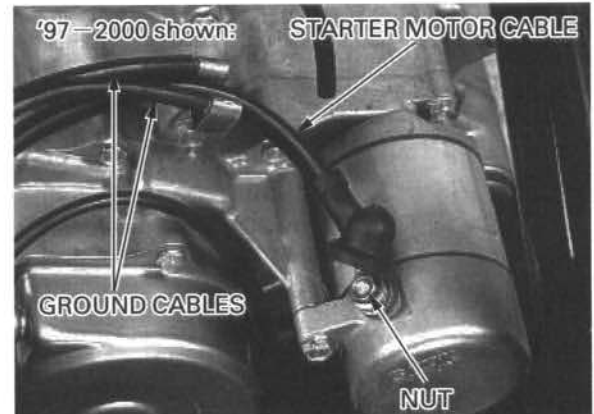
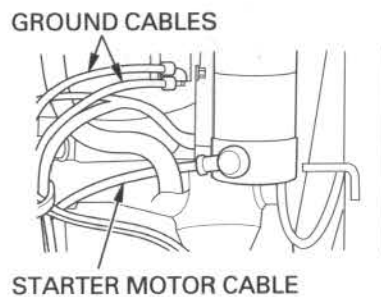


Connect the crankcase breather hose.



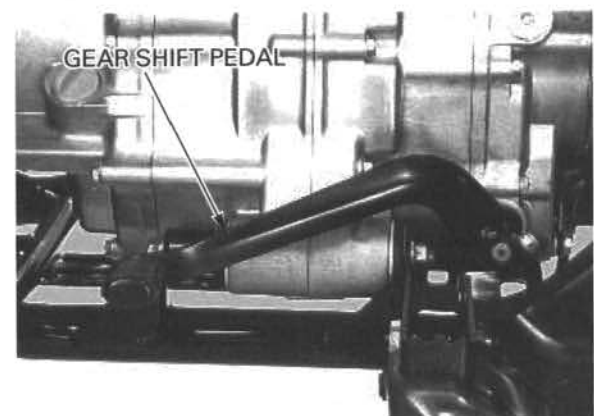
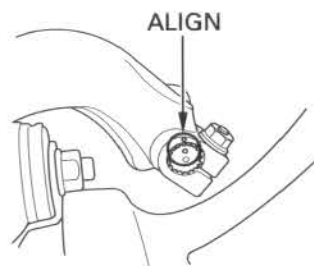
Connect the engine ground cable terminals and tighten the bolts.
Connect the starter motor cable and tighten the nut.

After 2001:



Except After 2001 Install the gearshift pedal on to the gearshift spindle by aligning the punch marks.
TE model:

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



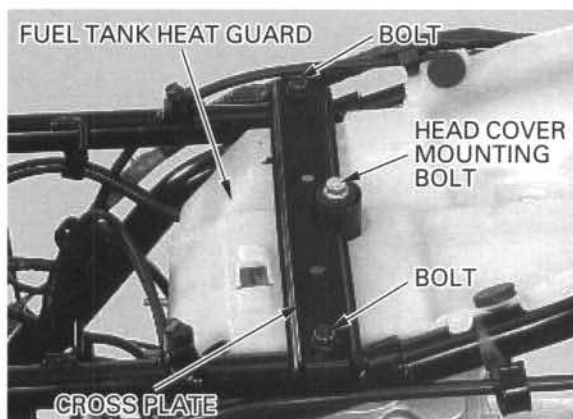
Connect the spark plug cap.



Set the fuel tank heat guard onto the frame.
Install the cross plate and tighten the two bolts loosely.
Tighten the cylinder head cover mounting bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

Tighten the two bolts securely.



Install the following:

- Fuel tank (page 5-18)
- Front fender (page 2-5)
- Carburetor (page 5-12)
- Air cleaner housing (page 5-4)
- Exhaust pipe/Muffler (page 2-9)
- Shift control motor and reduction gears
(After 2001 TE model only: Section 20)

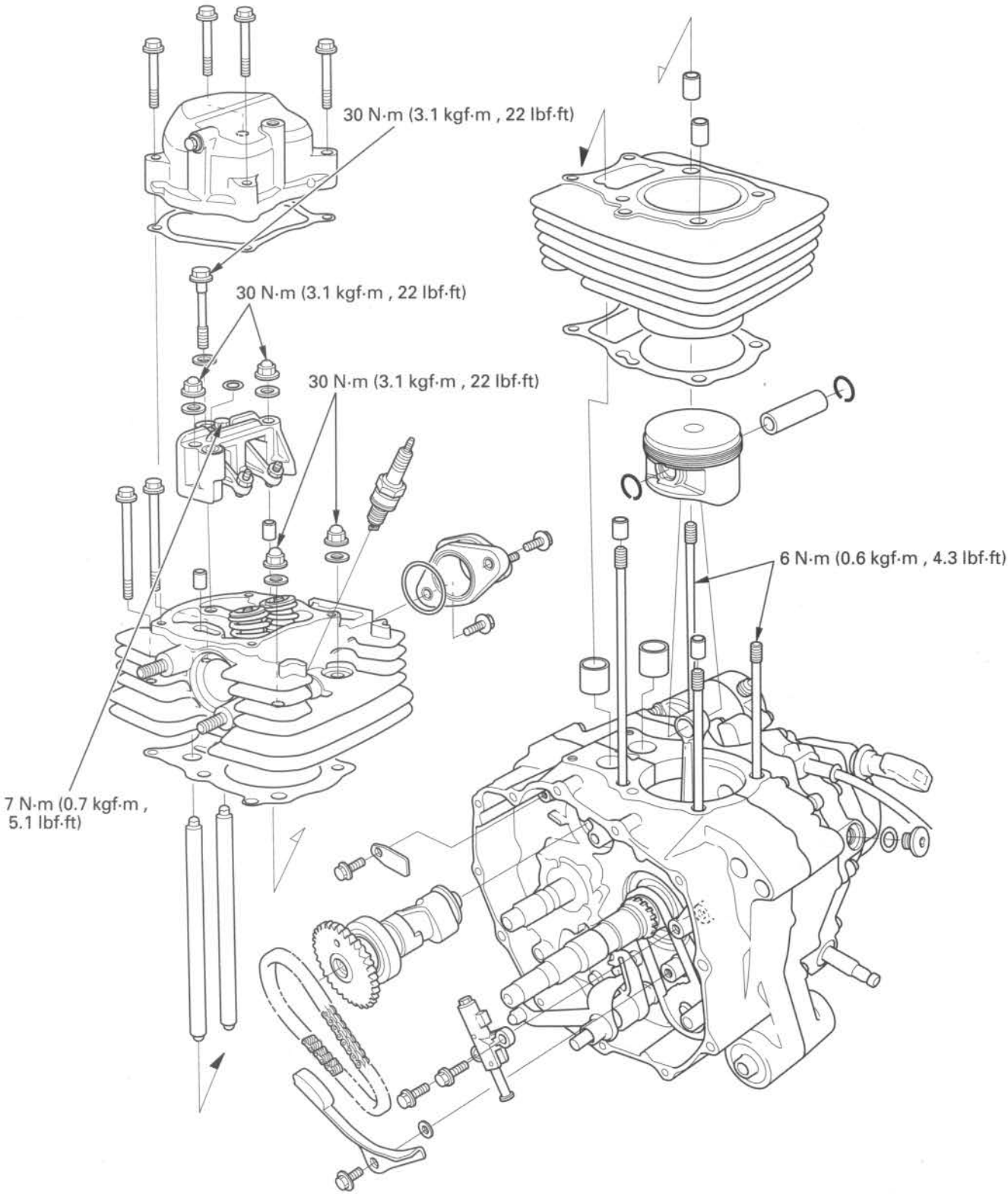
Connect the oil cooler hose to the front crankcase cover (page 4-9).

Fill the crankcase with the recommended engine oil (page 3-12).

Perform the following inspection and adjustment:

- Throttle operation (page 3-4)
- Reverse selector cable adjustment (page 3-18)





7. CYLINDER HEAD/CYLINDER/PISTON

SERVICE INFORMATION	7-1	CYLINDER HEAD ASSEMBLY	7-14
TROUBLESHOOTING	7-3	CYLINDER HEAD INSTALLATION	7-16
CYLINDER COMPRESSION TEST	7-4	CYLINDER/PISTON REMOVAL	7-20
CYLINDER HEAD REMOVAL	7-4	CYLINDER/PISTON INSPECTION	7-21
CYLINDER HEAD DISASSEMBLY	7-7	CYLINDER/PISTON INSTALLATION	7-24
CYLINDER HEAD INSPECTION	7-9	CAMSHAFT/CAM CHAIN TENSIONER	7-26

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 requires 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 the 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			1,275 kPa (13.0 kgf/cm ² , 185 psi) at 800 rpm	—
Cylinder head warpage			—	0.10 (0.004)
Valve and valve guide	Valve clearance	IN/EX	0.13 (0.005)	—
	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 (0.2175)
		EX	5.500 – 5.512 (0.2165 – 0.2170)	5.525 (0.2175)
	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 spring free length	Valve seat width	IN/EX	1.2 (0.05)	1.5 (0.06)
	Inner	IN/EX	36.95 (1.455)	35.7 (1.41)
Rocker arm	Outer	IN/EX	41.01 (1.615)	39.8 (1.57)
	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)
Camshaft and cam follower	Rocker arm-to-shaft clearance		0.016 – 0.054 (0.0006 – 0.0021)	0.08 (0.003)
	Cam lobe height	IN	35.393 – 35.552 (1.3934 – 1.3997)	35.2 (1.39)
		EX	35.190 – 35.350 (1.3854 – 1.3917)	35.0 (1.38)
	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)

CYLINDER HEAD/CYLINDER/PISTON

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Cylinder	I.D.		68.500—68.510 (2.6968—2.6972)	68.6 (2.70)
	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.		68.462—68.482 (2.6953—2.6961)	68.4 (2.69)
	Piston O.D. measurement point		6—18 (0.2—0.7) from bottom of the skirt	_____
	Piston pin bore I.D.		15.002—15.008 (0.5906—0.5909)	15.04 (0.592)
	Piston pin O.D.		14.994—15.000 (0.5903—0.5906)	14.96 (0.589)
	Piston-to-piston pin clearance		0.002—0.014 (0.0001—0.0006)	0.020 (0.0008)
	Piston ring-to-ring groove clearance	Top	0.015—0.045 (0.0006—0.0018)	0.09 (0.004)
		Second	0.015—0.045 (0.0006—0.0018)	0.09 (0.004)
	Piston ring end gap	Top	0.20—0.35 (0.008—0.014)	0.5 (0.02)
		Second	0.40—0.55 (0.016—0.022)	0.7 (0.03)
		Oil (side rail)	0.20—0.70 (0.008—0.028)	_____
Cylinder-to-piston clearance			0.018—0.048 (0.0007—0.0019)	0.10 (0.004)
Connecting rod small end I.D.			15.010—15.028 (0.5909—0.5917)	15.06 (0.593)
Connecting rod-to-piston pin clearance			0.010—0.034 (0.0004—0.0013)	0.10 (0.004)

TORQUE VALUES

Cylinder head flange cap nut ('97 – 2001)	30 N·m (3.1 kgf·m , 22 lbf·ft)	Apply oil to threads and flange surface
Cylinder head flange nut (After 2001)	30 N·m (3.1 kgf·m , 22 lbf·ft)	Apply oil to threads and flange surface
Cylinder head stud bolt	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Rocker arm holder flange cap nut ('97 – 2001)	30 N·m (3.1 kgf·m , 22 lbf·ft)	Apply oil to threads and flange surface
Rocker arm holder flange bolt ('97 – 2001)	30 N·m (3.1 kgf·m , 22 lbf·ft)	Apply oil to threads and flange surface
Rocker arm shaft flange bolt ('97 – 2001)	7 N·m (0.7 kgf·m , 5.1 lbf·ft)	Apply oil to threads and flange surface
Push rod end piece (After 2001)	13 N·m (1.3 kgf·m , 9 lbf·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	— commercially available in U.S.A.
Seat cutter, 33 mm (45° IN)	07780-0010800
Seat cutter, 29 mm (45° EX)	07780-0010300
Flat cutter, 33 mm (32° IN)	07780-0012900
Flat cutter, 30 mm (32° EX)	07780-0012200
Interior cutter, 30 mm (60° IN)	07780-0014000
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

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

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:

1,275 kPa (13.0 kgf/cm², 185 psi) at 800 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



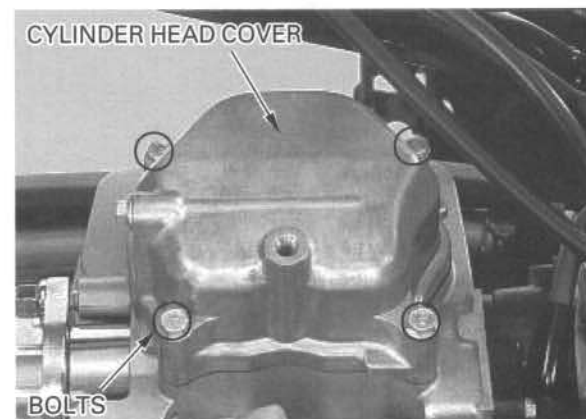
CYLINDER HEAD REMOVAL

CYLINDER HEAD COVER REMOVAL

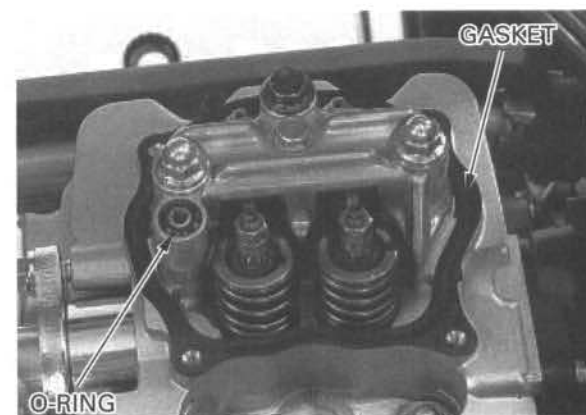
'97–2001:

Remove the fuel tank and fuel tank heat guard (page 5-17).

Remove the bolts and cylinder head cover.



Remove the O-ring and cylinder head cover gasket.



After 2001:

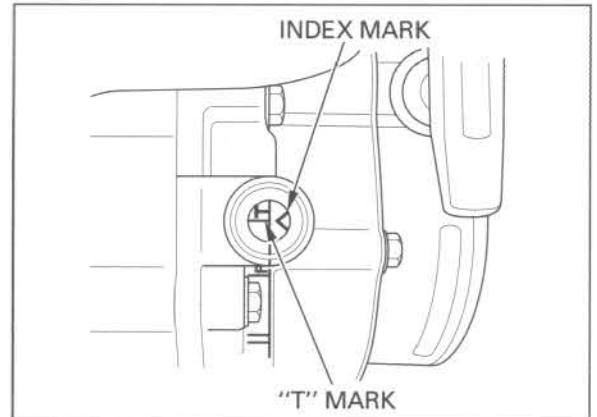
Remove the fuel tank and fuel tank heat guard (page 5-17).

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.

Remove the valve adjusting hole caps from the cylinder head cover.

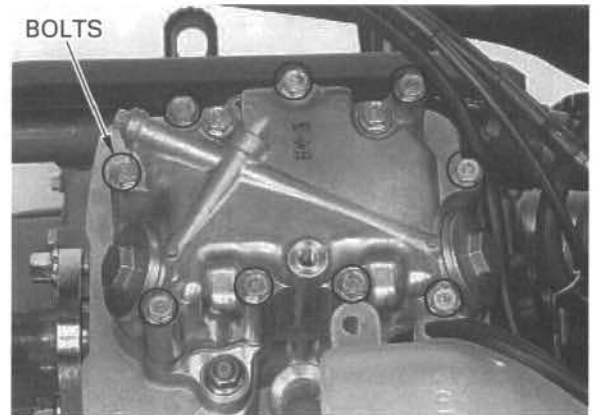
Make sure the piston is at TDC of the compression stroke by moving the rocker arms. If the rocker arms are tight, turn the crankshaft one full turn and realign the "T" mark with the index mark.



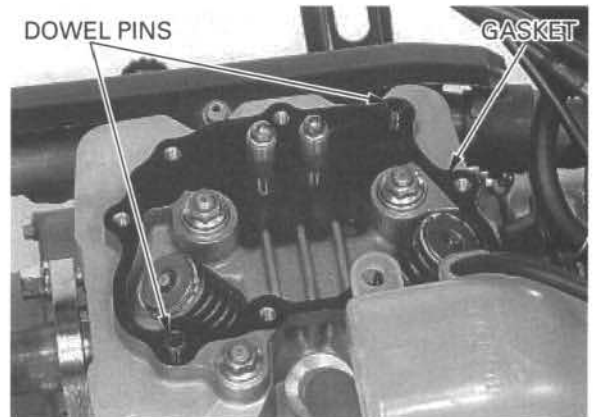
NOTE:

When the cylinder head cover is ready to be disassembled, loosen the rocker arm shaft retaining bolts.

Loosen the nine cylinder head cover bolts in a crisscross pattern in several steps.
Remove the cylinder head cover bolts.

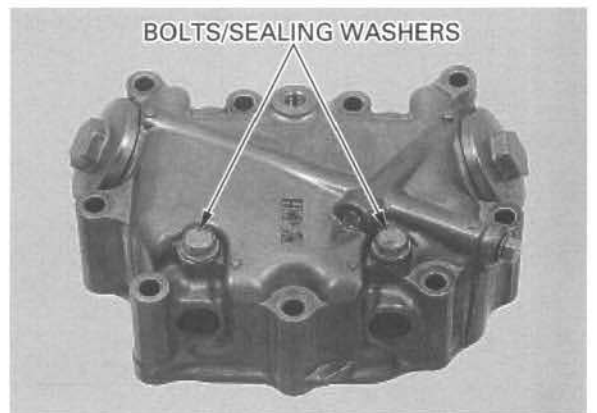


Remove the gasket and dowel pins.



**CYLINDER HEAD COVER DISASSEMBLY
(After 2001)**

Remove the rocker arm shaft retaining bolts and sealing washers.

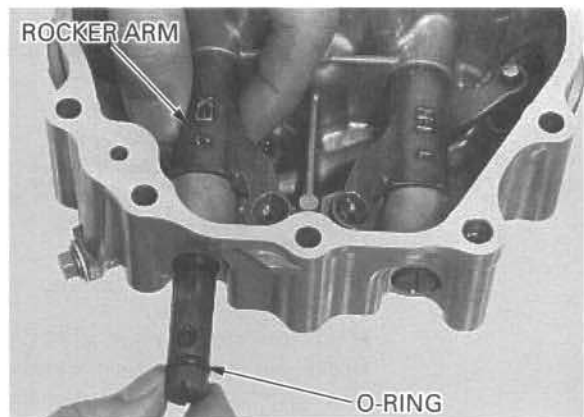


CYLINDER HEAD/CYLINDER/PISTON

Pull out the rocker arm shafts from the cylinder head cover using a small flat blade screwdriver. Remove each rocker arm and spring washer.

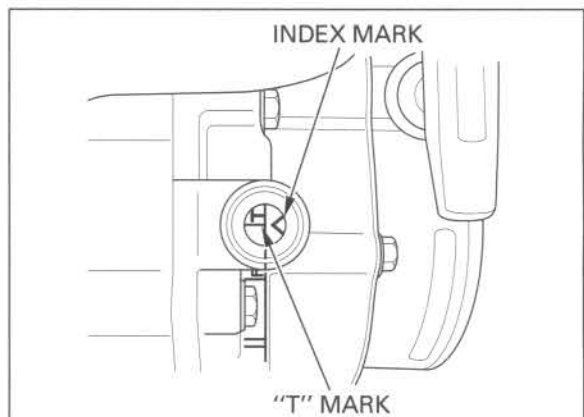
Mark the rocker arm shafts so they can be reinstalled in their original positions.

Remove the O-ring from each rocker arm shaft.



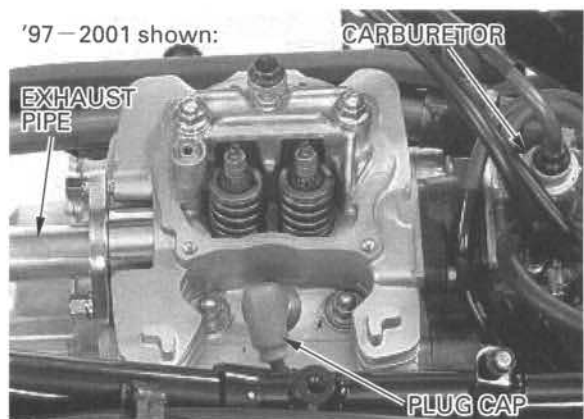
CYLINDER HEAD REMOVAL

'97—2001 only: 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 is 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.

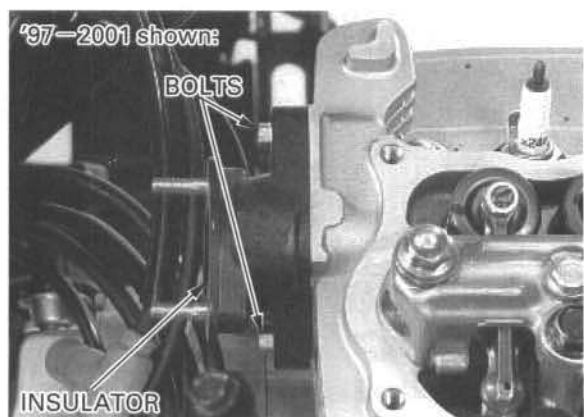


Remove the following:

- Exhaust pipe (page 2-9)
- Carburetor (page 5-5)
- Spark plug cap



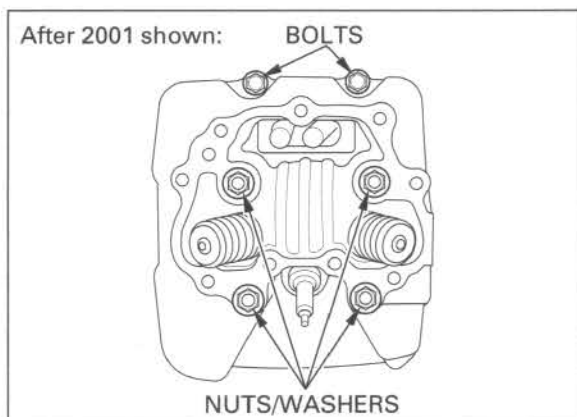
Remove the bolts and carburetor insulator.



'97–2001: Remove the 6-mm cylinder head mounting bolts. Loosen the four cylinder head cap nuts and flange bolt (8 mm) in a crisscross pattern in two or three steps. Remove the cap nuts/washers and flange bolt. Remove the rocker arm holder assembly.



After 2001: Remove the two cylinder head mounting bolts. Loosen the four cylinder head flange nuts in a crisscross pattern in two or three steps and remove the nuts and washers.



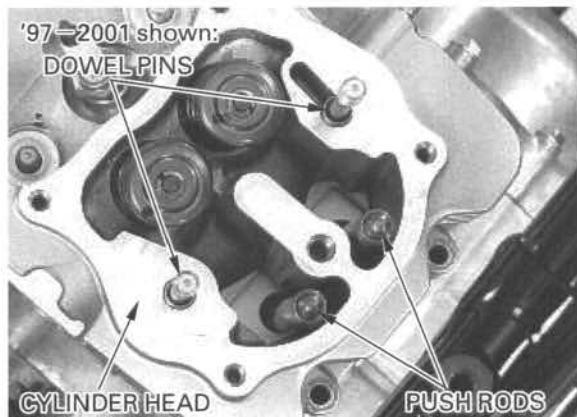
'97–2001: Remove the two dowel pins.

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

CAUTION:

Do not disassemble the push rods. The push rods must be replaced if they are disassembled.

Remove the cylinder head.

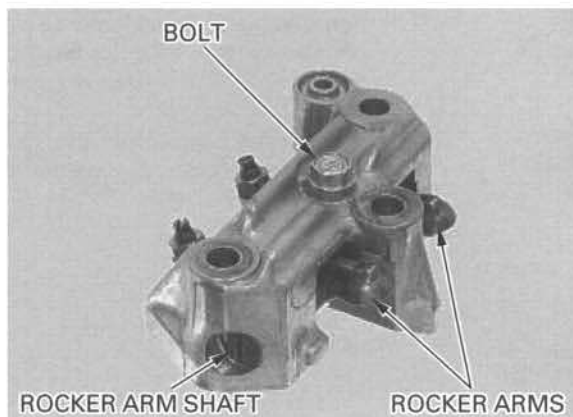


Remove the gasket and dowel pins.



ROCKER ARM HOLDER DISASSEMBLY ('97–2001)

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.

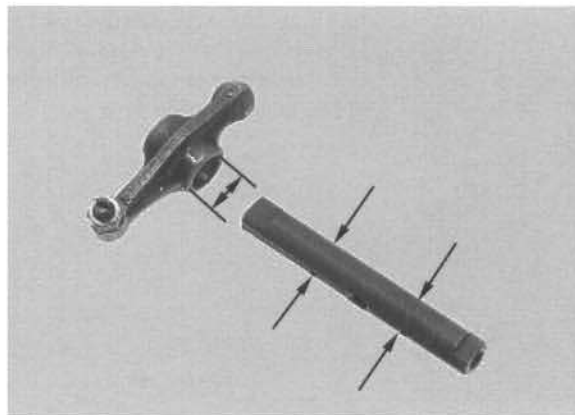
SERVICE LIMIT: 12.05 mm (0.474 in)

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

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

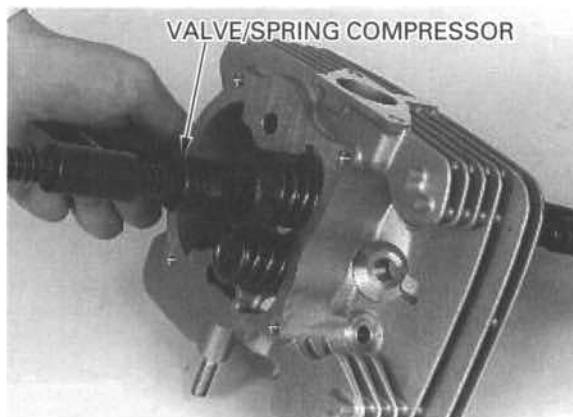
Remove the valve spring cotters, retainers, springs and valves using the special tool as shown.

TOOL:

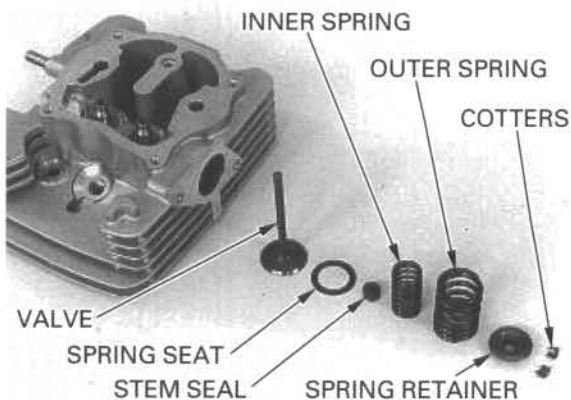
Valve spring compressor 07757-0010000

CAUTION:

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



Remove the valve stem seals and valve spring seats.



CYLINDER HEAD INSPECTION

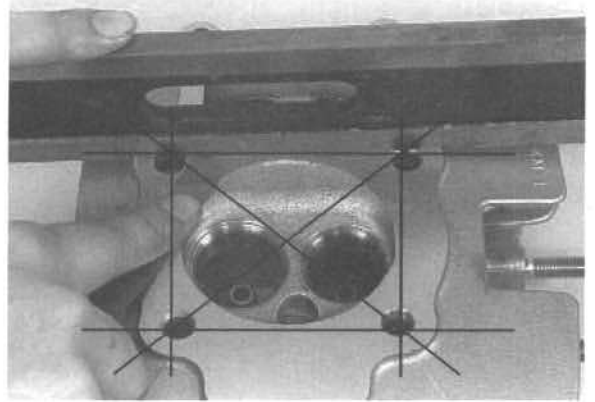
CYLINDER HEAD

Avoid damaging the gasket surface.

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

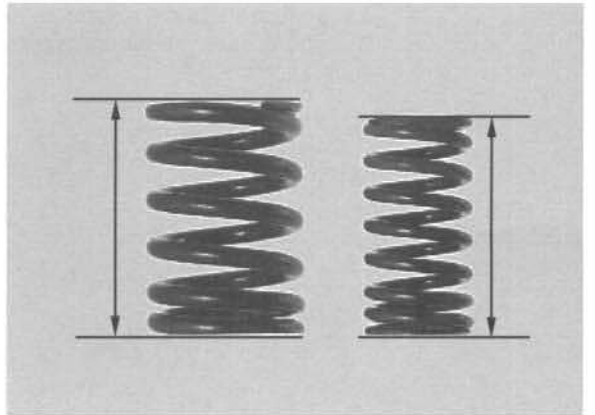
Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:

Inner: 35.7 mm (1.41 in)

Outer: 39.8 mm (1.57 in)

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



VALVE/VALVE GUIDE

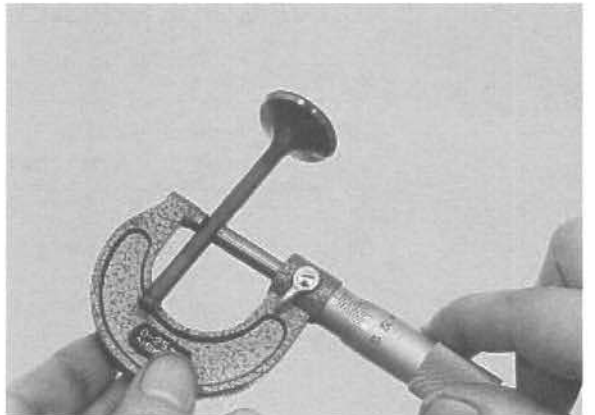
Inspect each valve for bends, burns or abnormal stem wear.

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)



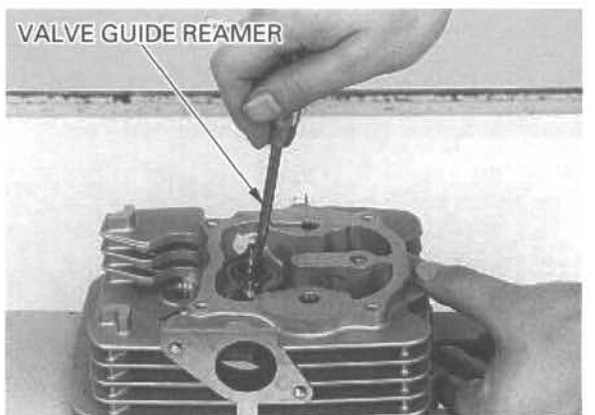
Ream the guides to remove any carbon deposits before checking clearances.

Insert the reamer from the camshaft 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)



CYLINDER HEAD/CYLINDER/PISTON

Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 5.525 mm (0.2175 in)

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

SERVICE LIMITS:

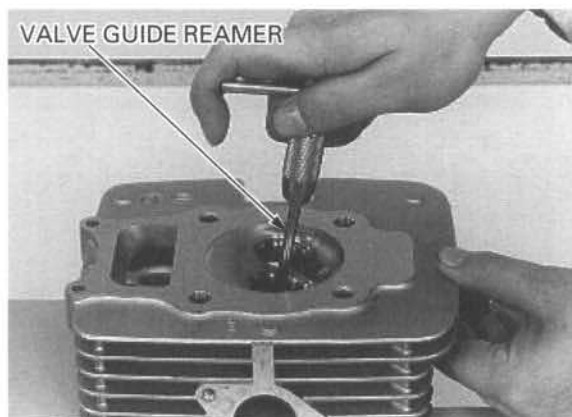
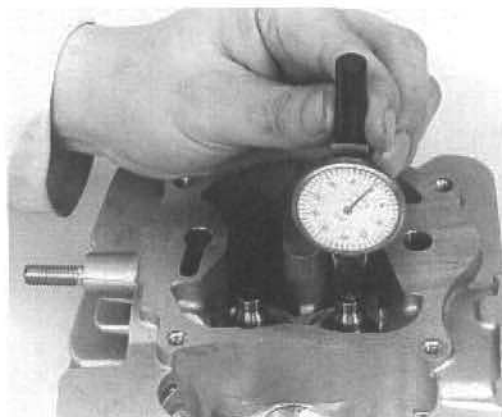
IN: 0.12 mm (0.005 in)

EX: 0.14 mm (0.006 in)

Reface the valve seats whenever the valve guides are replaced (page 7-11).

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.



VALVE GUIDE REPLACEMENT

NOTE:

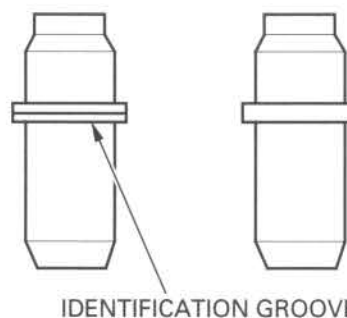
The intake valve guide has an identification groove on the flange (After 2001: groove above the clip).

Chill the replacement valve guides in a freezer for about 1 hour.

Heat the cylinder head to 100–150 °C (212–302 °F) with a hot plate or oven.

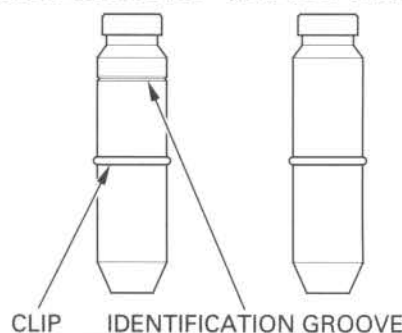
'97–2001:

INTAKE VALVE GUIDE EXHAUST VALVE GUIDE



After 2001:

INTAKE VALVE GUIDE EXHAUST VALVE GUIDE



▲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 warpage.

Support the cylinder head and drive out the valve guides from the combustion chamber side of the cylinder head using the special tool as shown.

TOOL:

Valve guide driver, 07742-0010100
5.5 mm

Replace a new O-ring on the new valve guide. Drive in the guide from the top of the head using the special tool as shown.

TOOL:

Valve guide driver, 07742-0010100
5.5 mm

Let the cylinder head cool to room temperature.

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

TOOL:

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

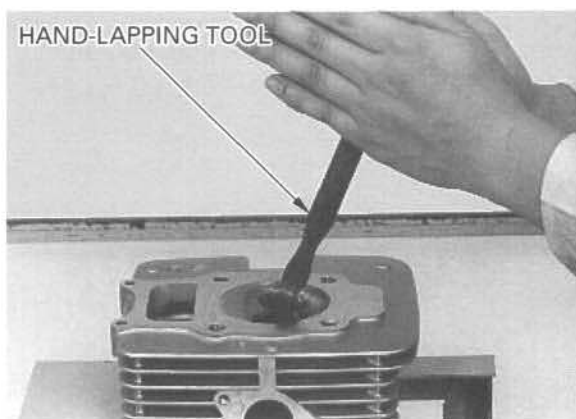
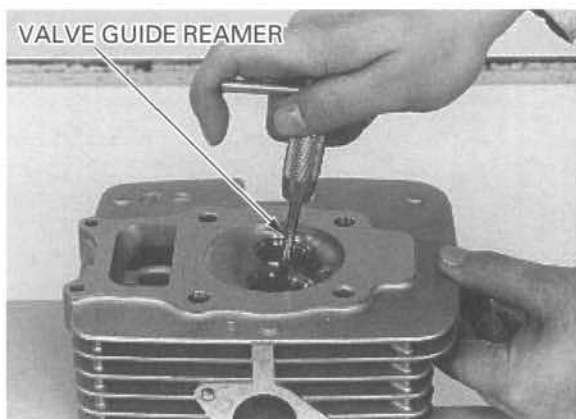
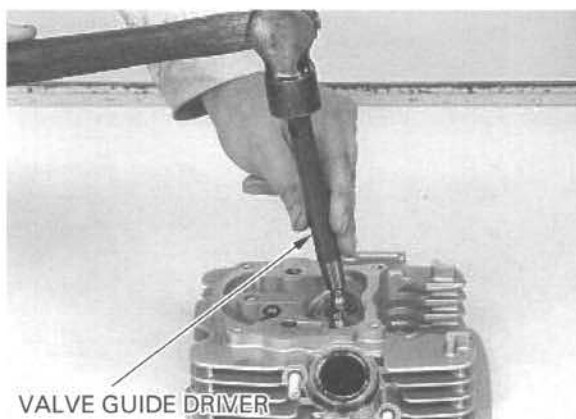
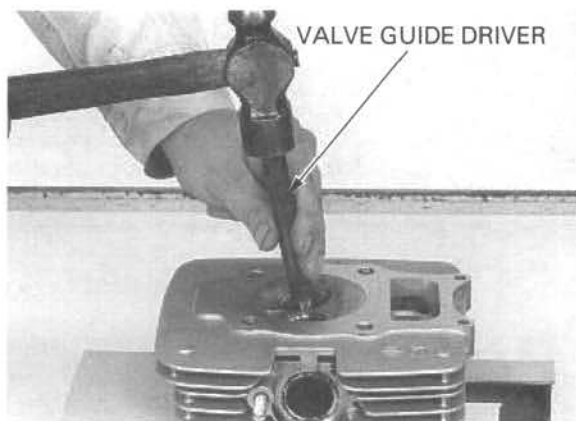
NOTE:

Use cutting oil on the reamer during this operation.

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

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. Tap 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.

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

NOTE:

- Follow the refacer manufacturer's operating instruction.
- Reface the valve seat whenever the valve guide has been replaced.
- Be careful not to grind the seat more than necessary.

TOOLS:

Valve seat cutter, 33 mm (32° IN) 07780-0012900

Valve seat cutter, 30 mm (32° EX) 07780-0012200

Valve seat cutter, 33 mm (45° IN) 07780-0010800

Valve seat cutter, 29 mm (45° EX) 07780-0010300

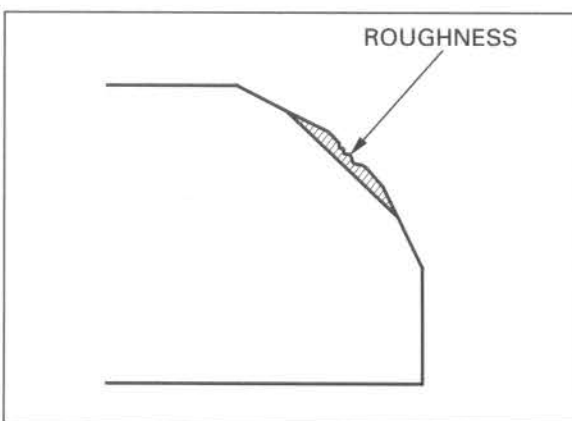
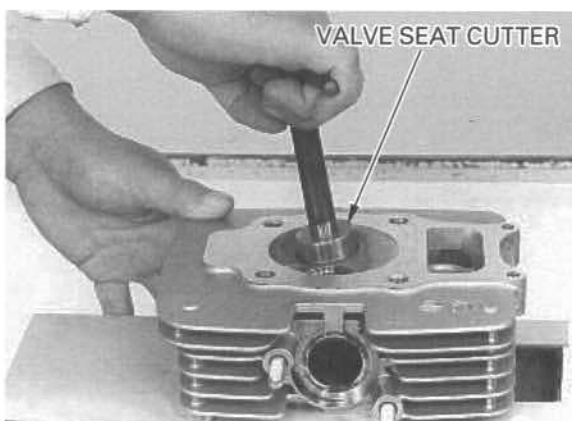
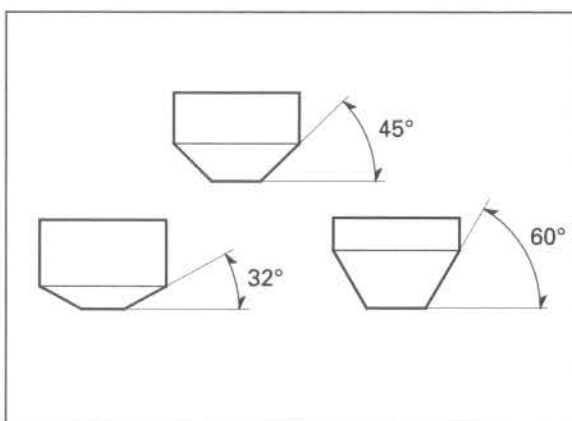
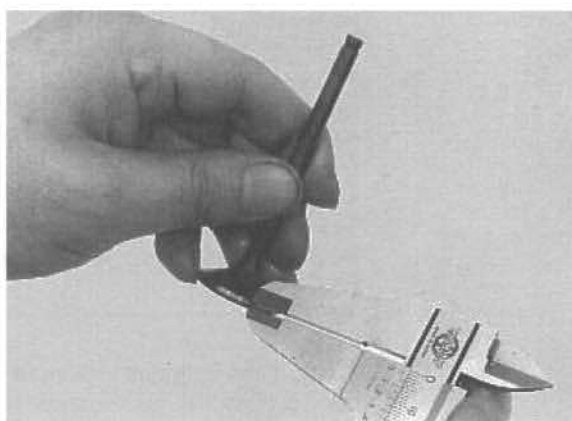
Valve seat cutter, 30 mm (60° IN/ EX) 07780-0014000

Valve seat cutter holder, 5.5 mm 07781-0010101

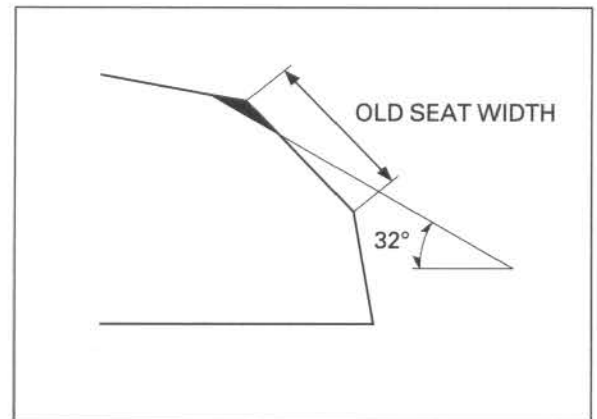
or equivalent commercially available in U. S. A.

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

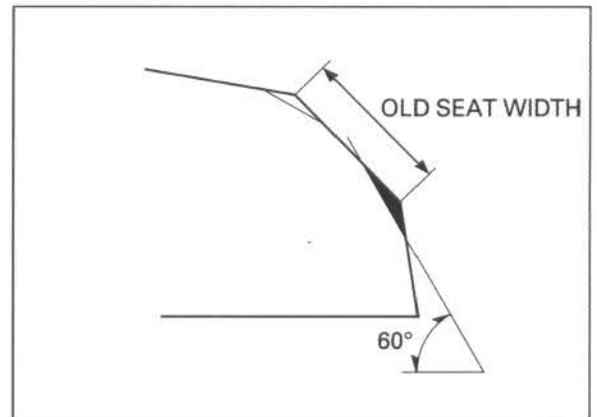
Use a 45-degree cutter to remove any roughness or irregularities from the seat.



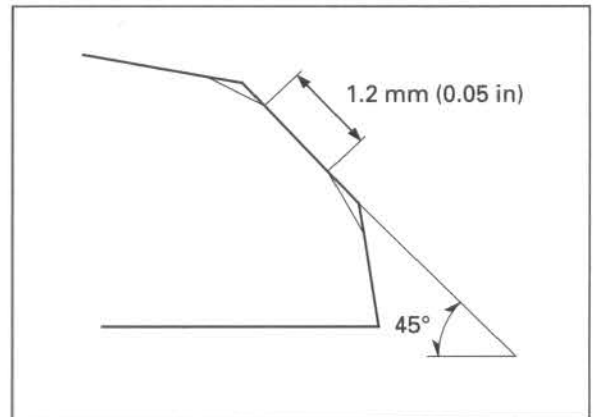
Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.



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



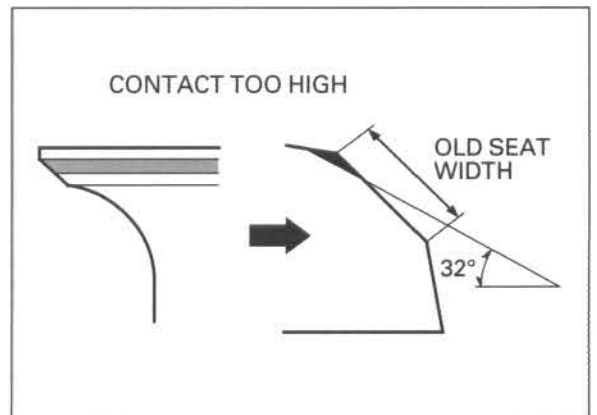
Install a 45-degree finish cutter and cut the seat to the proper width.
Make sure that all pitting and irregularities are removed.
Refinish if necessary.



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

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

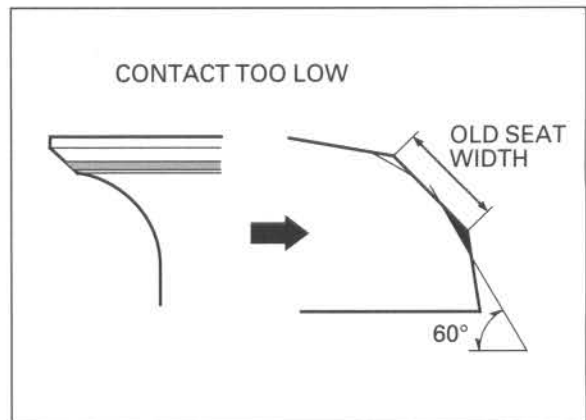
If the contact area is too high on the valve, the seat must be lowered using a 32-degree flat cutter.



CYLINDER HEAD/CYLINDER/PISTON

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

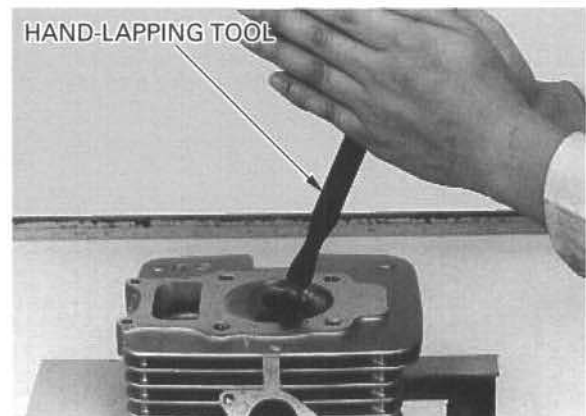
Refinish the seat to specifications, using a 45-degree finish cutter.



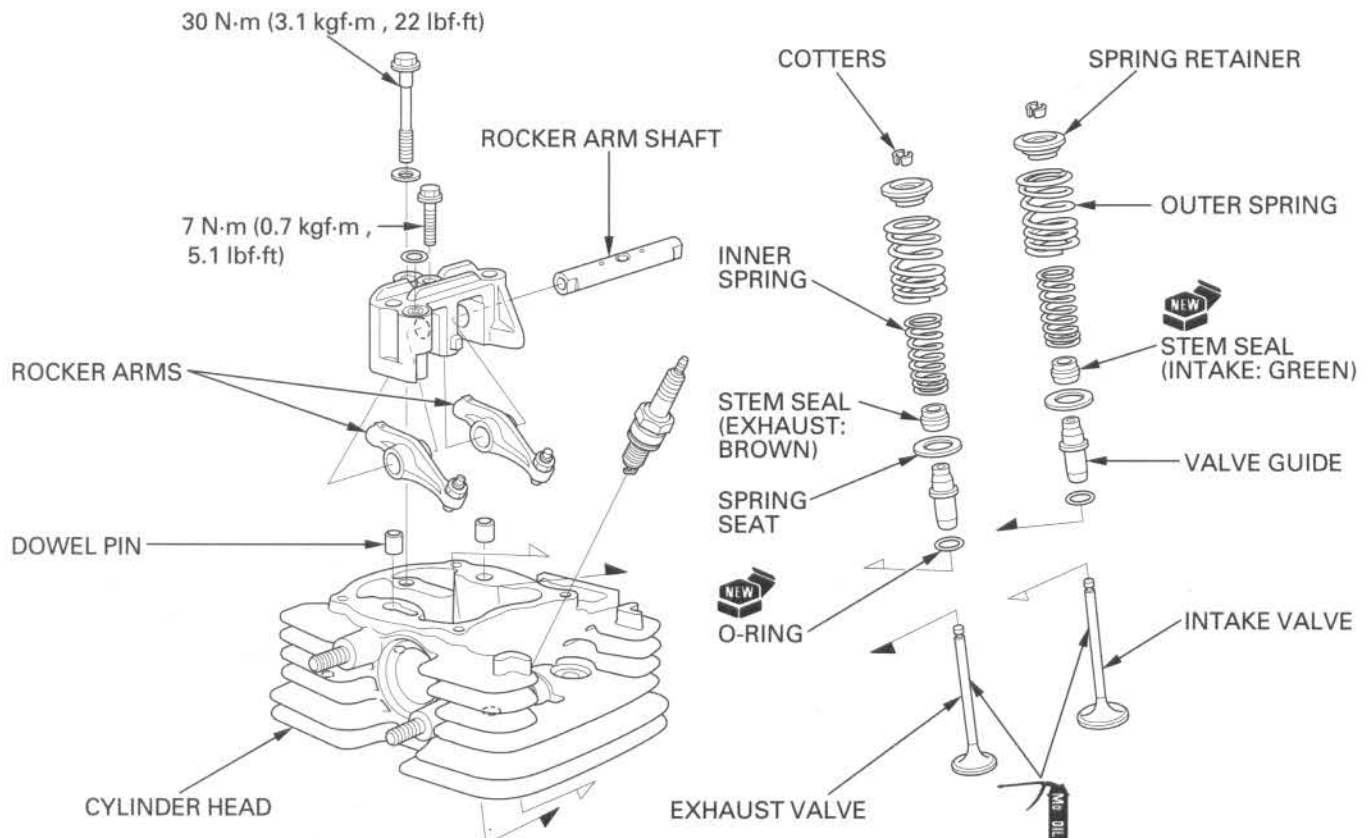
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

Do not allow lapping compound to enter the guides.

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



CYLINDER HEAD ASSEMBLY



Clean the cylinder head assembly with solvent and blow out all oil passages with compressed air.

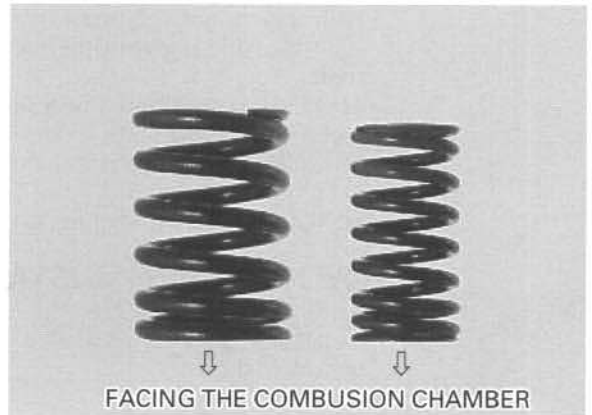
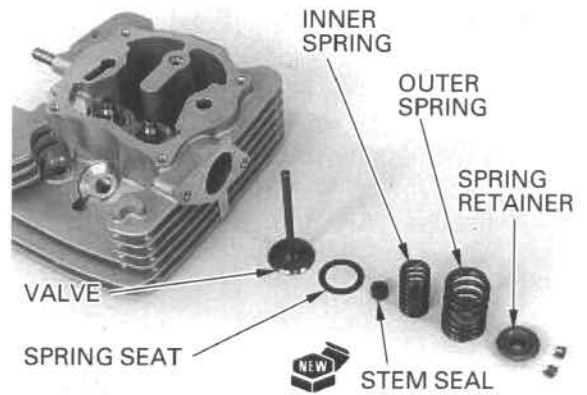
Install the valve spring seats.
Install the new stem seals.

'97-2001: **NOTE:**

Note that the intake valve stem seal is green and the exhaust valve stem seal is brown.

Lubricate the valve stems with engine 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 retainer.



Install the valve cotteners using the special tool as shown.

TOOL:

Valve spring compressor 07757-0010000

CAUTION:

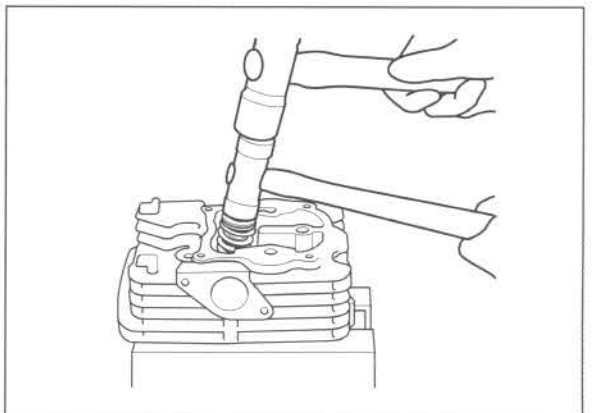
To prevent loss of tension, do not compress the valve spring more than necessary.



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

CAUTION:

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



CYLINDER HEAD INSTALLATION

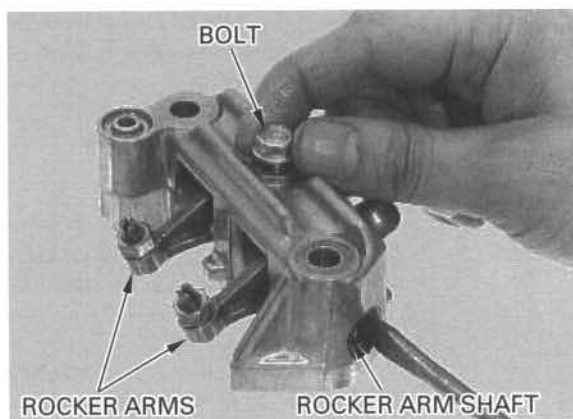
ROCKER ARM HOLDER ASSEMBLY ('97-2001)

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 the rocker arms, install them into their original locations as marked.



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

Apply oil to the thread and flange surface of the rocker arm holder bolt.

Install and tighten the bolt to the specified torque.

TORQUE: 7 N·m (0.7 kgf·m, 5.1 lbf·ft)

CYLINDER HEAD INSTALLATION

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

Install the cylinder head.



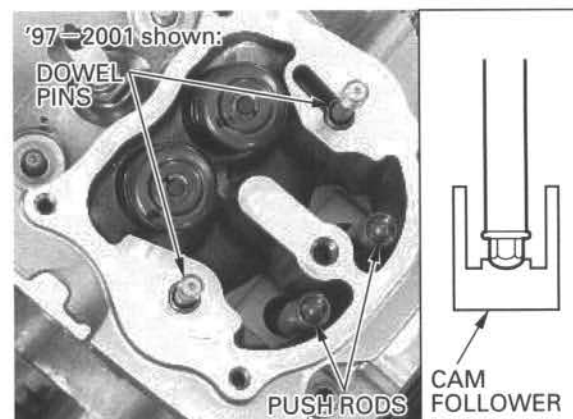
NOTE:

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

Properly install the push rods into the center groove of the cam follower.

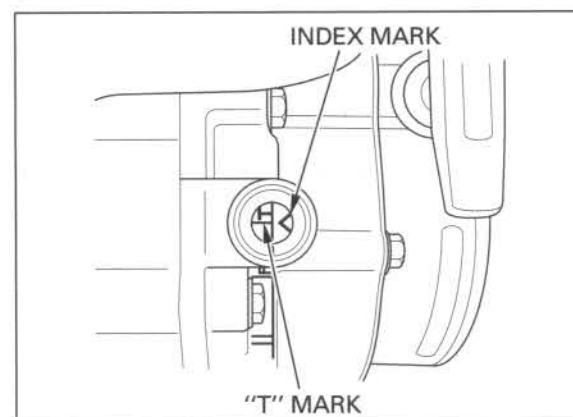
NOTE:

If reusing the push rods, install them into their original locations as marked.



'97-2001: Install the two dowel pins.

'97-2001: 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 is at TDC of the compression stroke. If not, turn the crankshaft one full turn and realign the "T" mark with the index mark.



'97–2001: Install the rocker arm holder onto the cylinder head. Install the new washers and cap nuts. Install the flange bolt (8 mm). Tighten the cap nut and flange bolt (8 mm), in a crisscross pattern in two or three steps.

TORQUE:

Rocker arm holder cap nut:

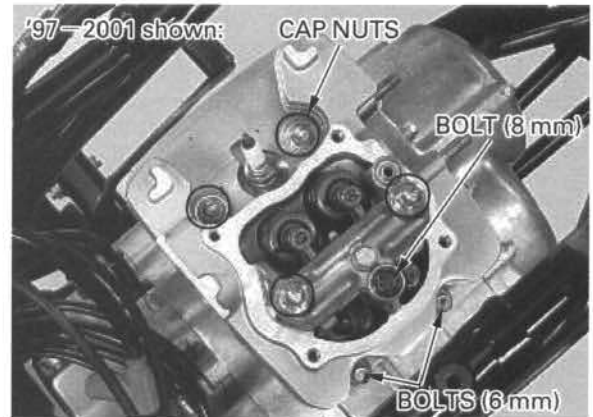
30 N·m (3.1 kgf·m , 22 lbf·ft)

Cylinder head cap nut:

30 N·m (3.1 kgf·m , 22 lbf·ft)

Rocker arm holder flange bolt:

30 N·m (3.1 kgf·m , 22 lbf·ft)

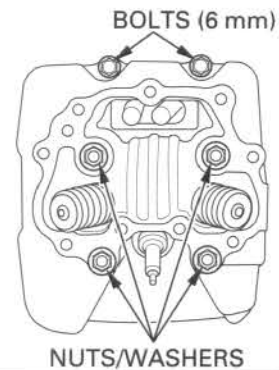


After 2001: Apply engine oil to the cylinder head flange nut threads and seating surfaces. Install the four washers and four cylinder head flange nuts and tighten the cylinder head flange nuts in a crisscross pattern in two or three steps to the specified torque.

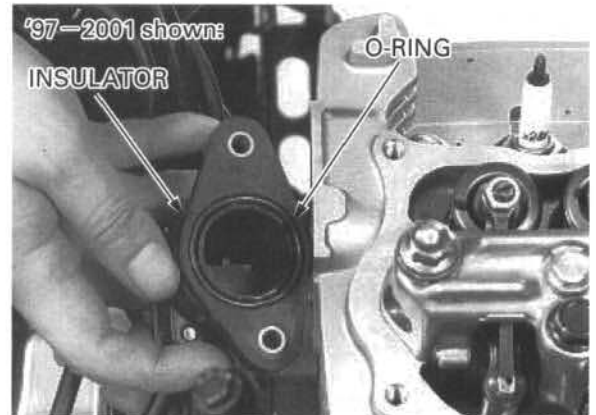
TORQUE: 30 N·m (3.1 kgf·m , 22 lbf·ft)

Install the two cylinder head mounting bolts (6 mm). Tighten the mounting bolts securely.

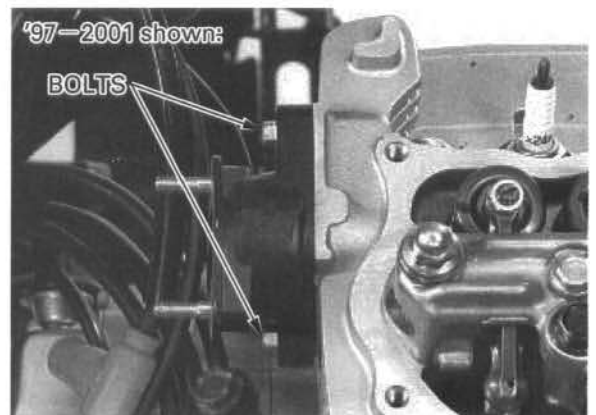
After 2001 shown:



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



Tighten the insulator bolts.



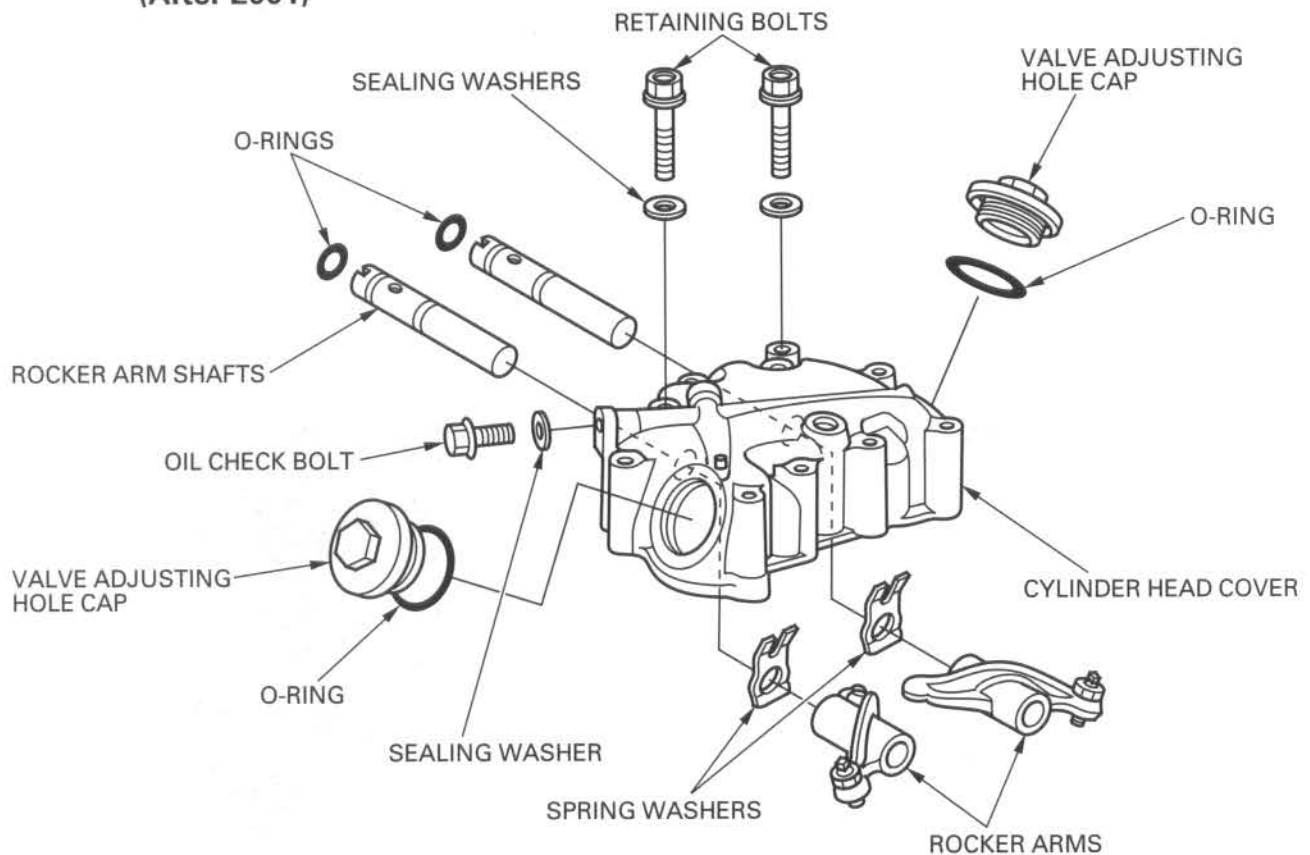
CYLINDER HEAD/CYLINDER/PISTON

Install the following:

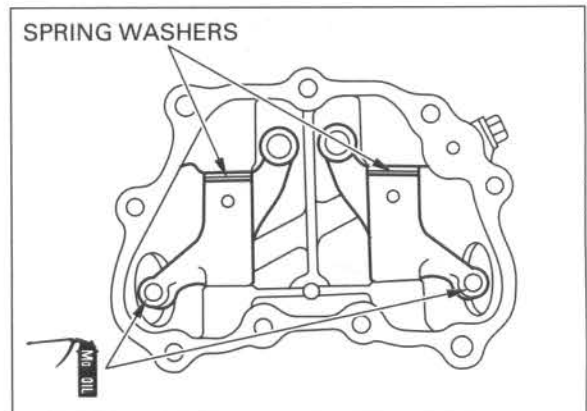
- Spark plug cap
- Carburetor (page 5-12)
- Exhaust pipe (page 2-10)



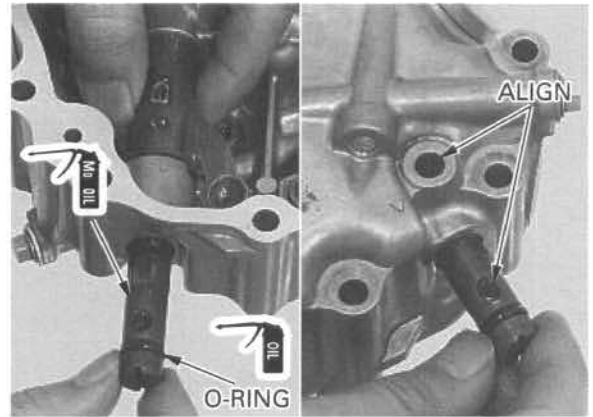
CYLINDER HEAD COVER ASSEMBLY (After 2001)



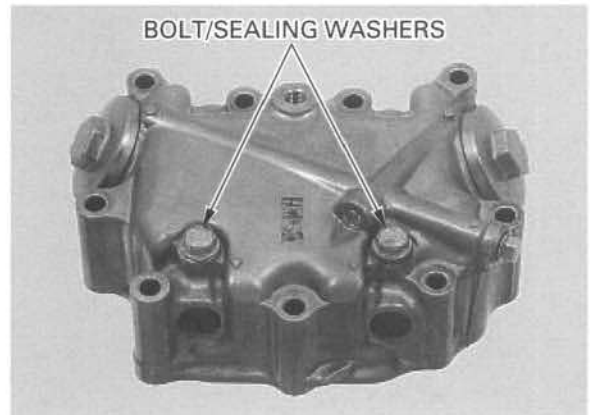
Lubricate the rocker arm slipper surface with molybdenum oil solution.
Install the spring washers and place the rocker arms into the cylinder head cover as shown.



Lubricate the rocker arm shaft outer surfaces with molybdenum oil solution.
Coat the new O-rings with engine oil and install them onto the rocker arm shaft grooves.
Insert the rocker arm shaft using a screwdriver to align the hole between the cylinder head cover and shaft.



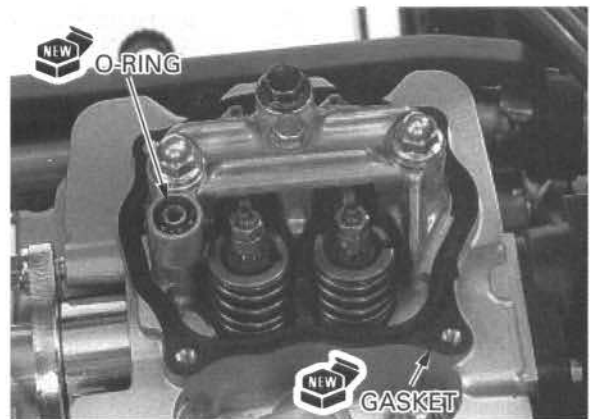
Install the rocker arm shaft retaining bolts with new sealing washers and loosely tighten them.



CYLINDER HEAD COVER INSTALLATION

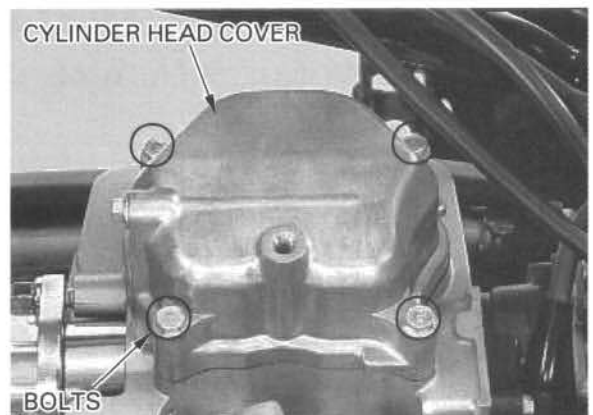
'97 – 2001:

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 5-18).

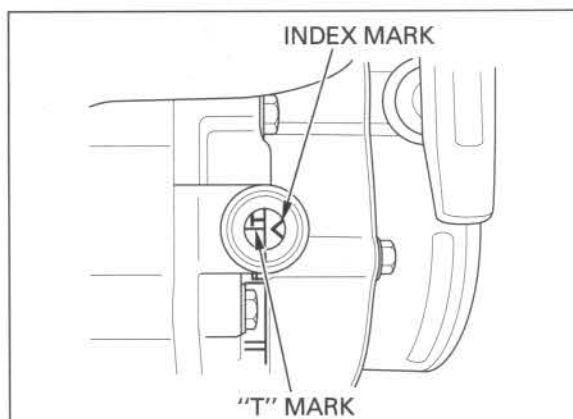


CYLINDER HEAD/CYLINDER/PISTON

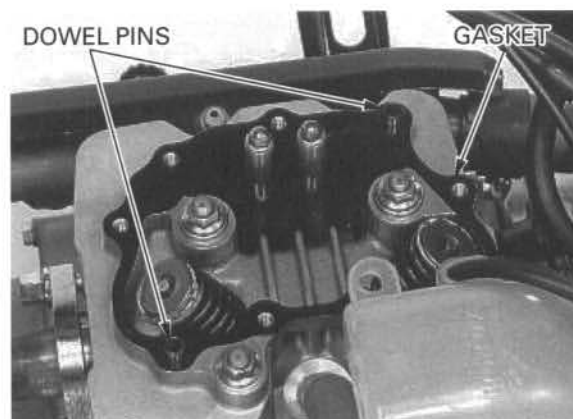
After 2001:

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 is at TDC of the compression stroke. If not, turn the crankshaft one full turn and realign the "T" mark with the index mark.



Install the dowel pins and new gasket.



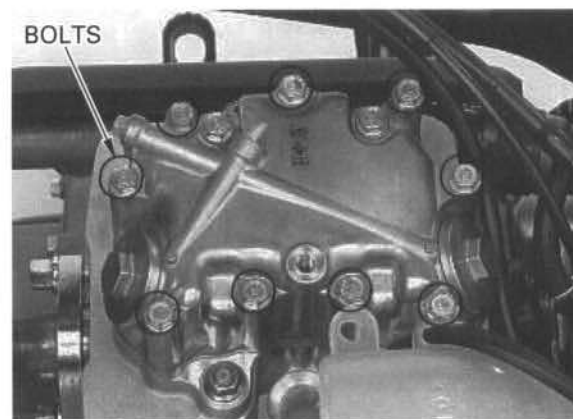
Install the cylinder head cover with the nine cover bolts.

Tighten the cover bolts in a crisscross pattern in two or three steps to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Tighten the rocker arm shaft retaining bolts securely if they were removed.

Adjust the valve clearance (page 3-10).



CYLINDER/PISTON REMOVAL

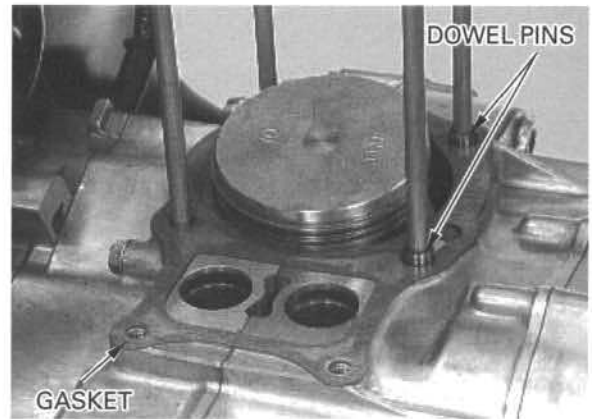
CYLINDER REMOVAL

Remove the cylinder head (page 7-4).

Remove the cylinder.



Remove the cylinder gasket and dowel pins.



PISTON REMOVAL

Do not let the piston pin clips fall into the crankcase.

Remove the piston pin clip with pliers.

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



CYLINDER/PISTON INSPECTION

CYLINDER

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

SERVICE LIMIT: 68.6 mm (2.70 in)

Calculate the piston-to-cylinder clearance. Take a maximum reading to determine the clearance. Refer to page 7-23 for measurement of the piston O.D.

SERVICE LIMIT: 68.4 mm (2.69 in)

Calculate the taper and out-of-round at three levels in the X and Y axes. Take the maximum reading to determine the measurements.

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:

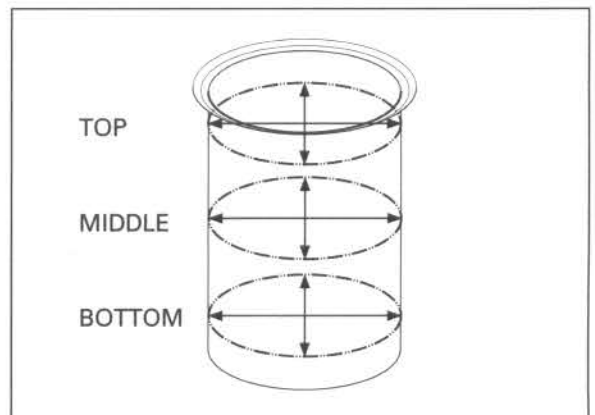
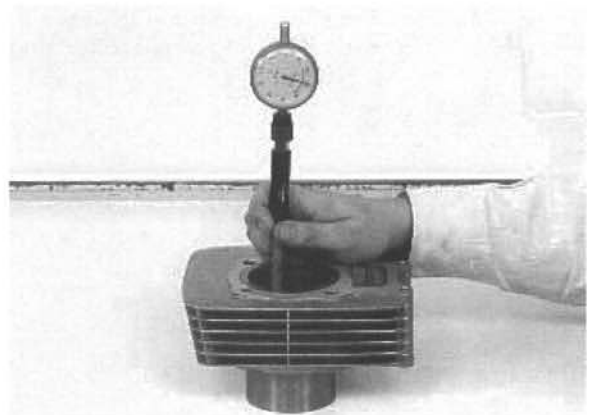
0.25 mm (0.010 in)

0.50 mm (0.020 in)

0.75 mm (0.030 in)

1.00 mm (0.039 in)

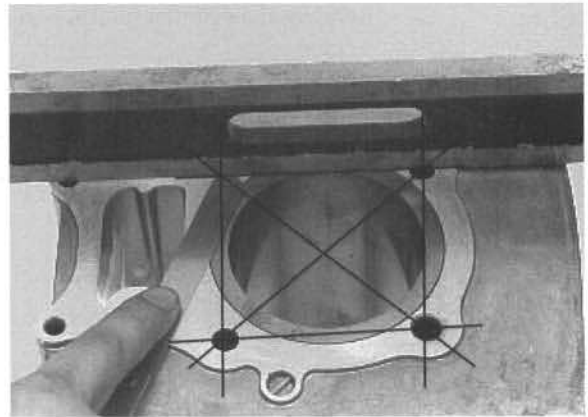
The piston-to-cylinder clearance for the oversize piston must be: 0.018–0.048 mm (0.0007–0.0019 in).



CYLINDER HEAD/CYLINDER/PISTON

Inspect the top of the cylinder for warpage.

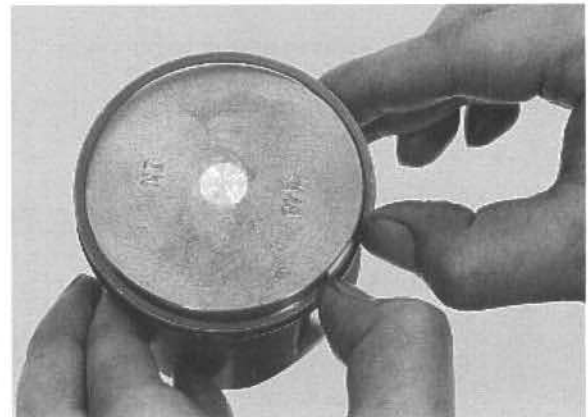
SERVICE LIMIT: 0.10 mm (0.004 in)



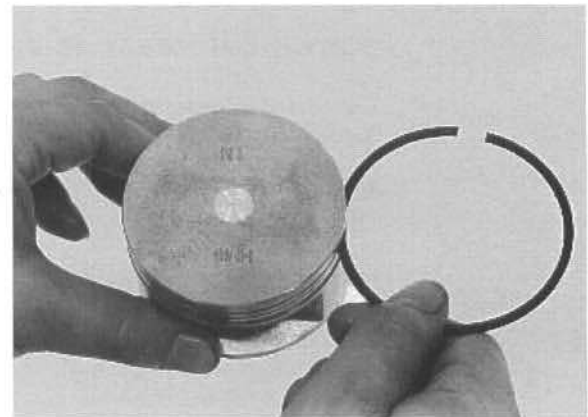
PISTON

Do not damage the piston rings during removal.

Remove the piston rings.



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



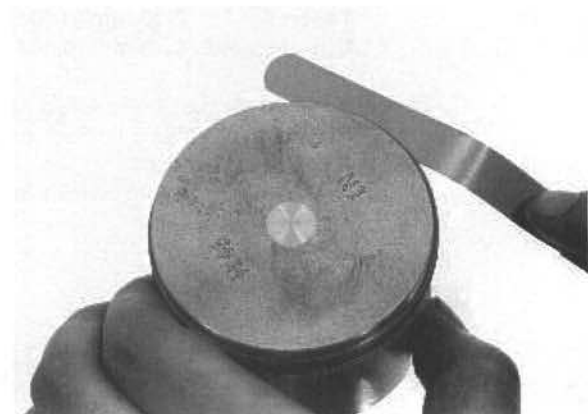
Temporarily install the piston rings to their proper position with the mark facing up.

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.

Measure the diameter of the piston at 6–18 mm (0.2–0.7 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 68.4 mm (2.69 in)



Measure the piston pin bore.

SERVICE LIMIT: 15.04 mm (0.592 in)

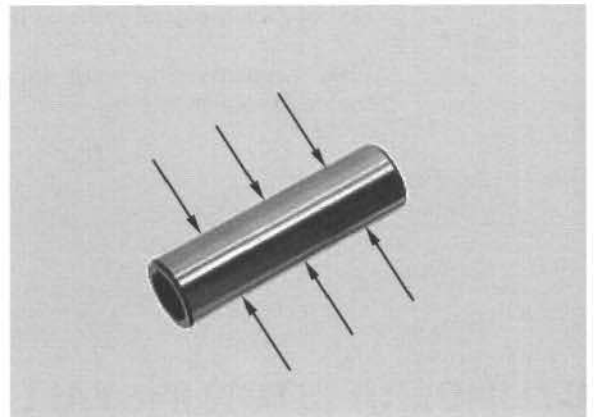


Measure the O.D. of the piston pin.

SERVICE LIMIT: 14.96 mm (0.589 in)

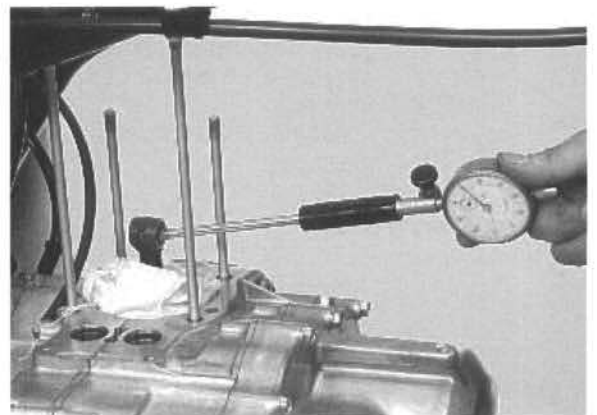
Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.020 mm (0.0008 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 15.06 mm (0.593 in)



CYLINDER HEAD/CYLINDER/PISTON

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

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

SERVICE LIMITS:

Top: 0.5 mm (0.02 in)

Second: 0.7 mm (0.03 in)



PISTON RING INSTALLATION

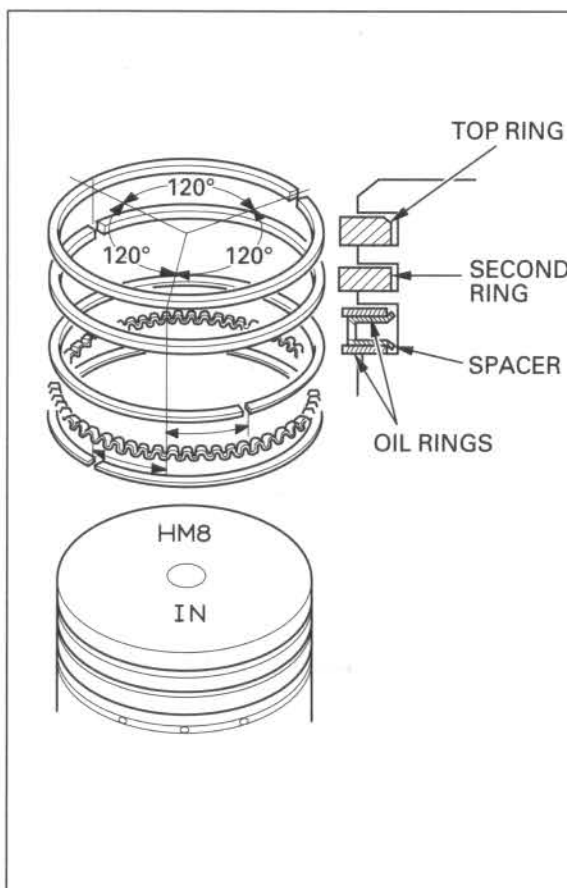
Clean the piston ring grooves thoroughly and install the piston rings.

NOTE:

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with their marking facing up.
- Do not switch 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.



CYLINDER/PISTON INSTALLATION

PISTON INSTALLATION

Apply oil to the piston pin outer surface. Install the piston with its "IN" mark facing the intake side. Install the piston pin and secure it with new piston pin clips.

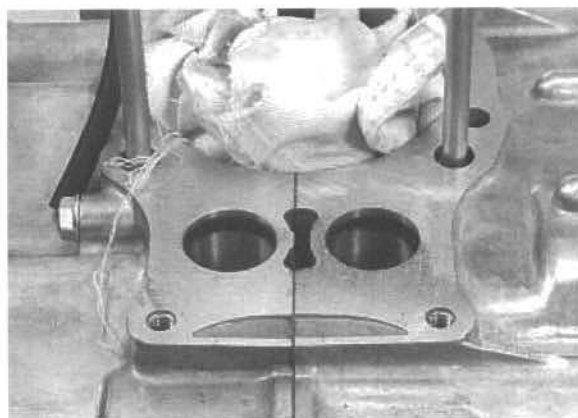
NOTE:

- Do not align the piston pin clip end gaps with the piston cut-outs.
- Do not let the piston pin clips fall into the crankcase.

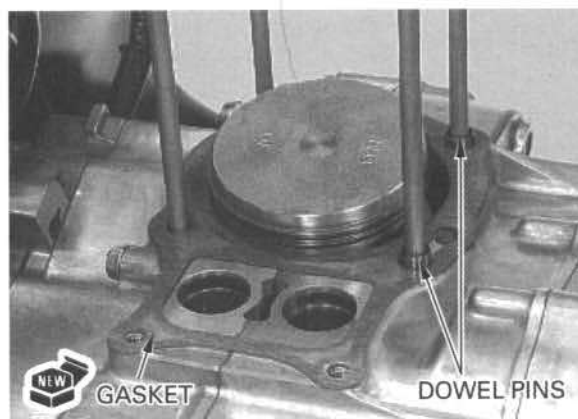


CYLINDER INSTALLATION

Clean off any gasket materials from the crankcase surface.

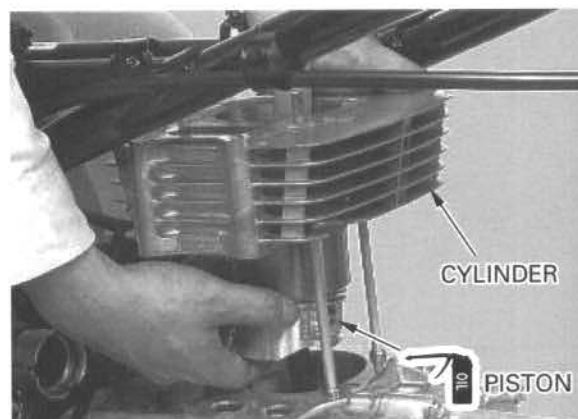


Install the dowel pins and a new gasket.



Avoid piston ring damage during installation.

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



Install the cylinder head and push rods (page 7-16).



CAMSHAFT/CAM CHAIN TENSIONER

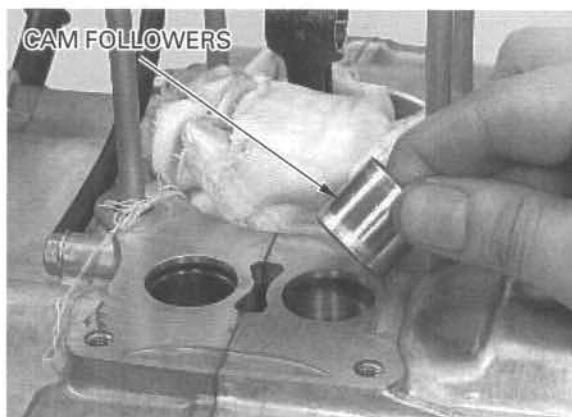
CAMSHAFT REMOVAL

Remove the following:

- Cylinder head (page 7-4)
- Cylinder (page 7-20)
- Centrifugal clutch and change clutch (section 8)

Remove the cam followers.

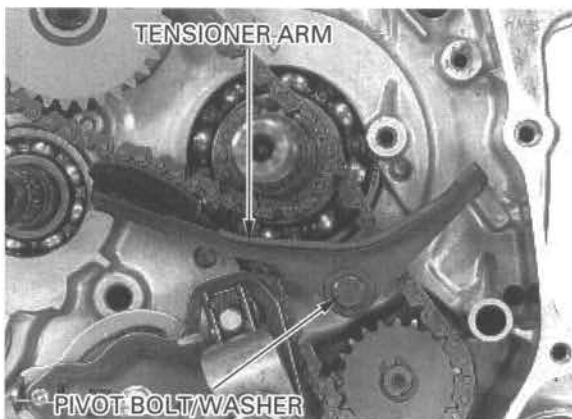
Mark the cam followers so they can be reinstalled in their original positions.



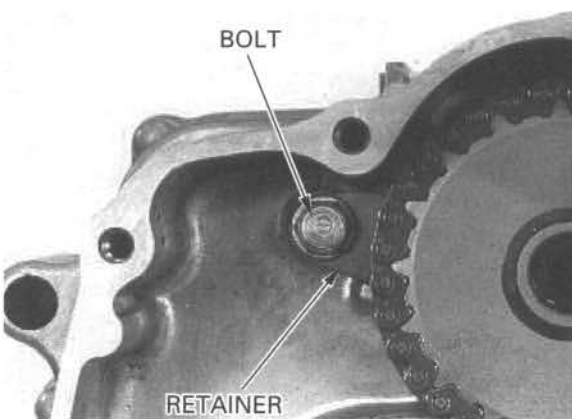
Remove the two bolts and cam chain tensioner adjuster.



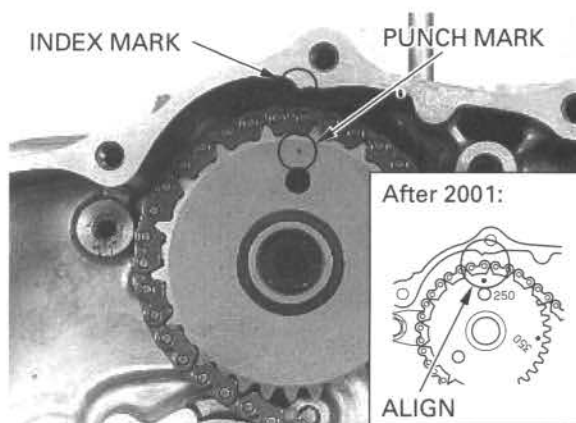
Remove the pivot bolt, washer and cam chain tensioner arm.



Remove the camshaft bearing retainer bolt and retainer.



Align the punch mark (After 2001: "250" mark) on the cam sprocket with the index mark on the crankcase, then remove the camshaft and cam chain.



INSPECTION

Camshaft

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

SERVICE LIMITS:

IN: 35.2 mm (1.39 in)

EX: 35.0 mm (1.38 in)

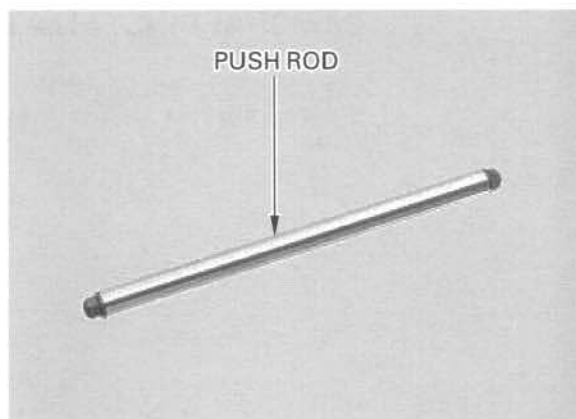


Push rod

Check that the push rods are not bent.

CAUTION:

Do not disassemble the push rods. The push rods must be replaced if they are disassembled.

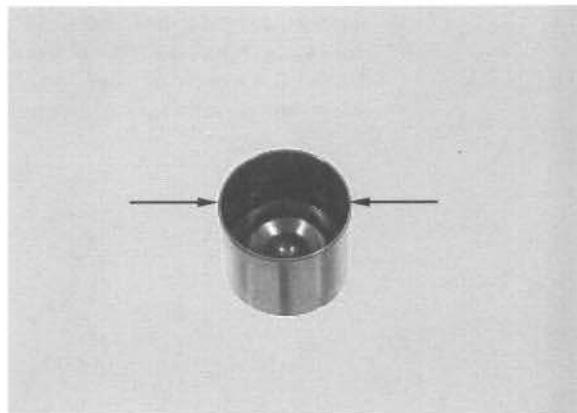


Cam follower

Check the cam follower for damage.

Measure the cam follower O.D.

SERVICE LIMIT: 22.46 mm (0.884 in)



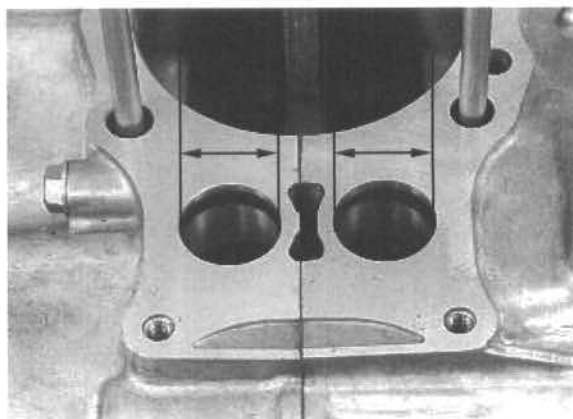
CYLINDER HEAD/CYLINDER/PISTON

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)



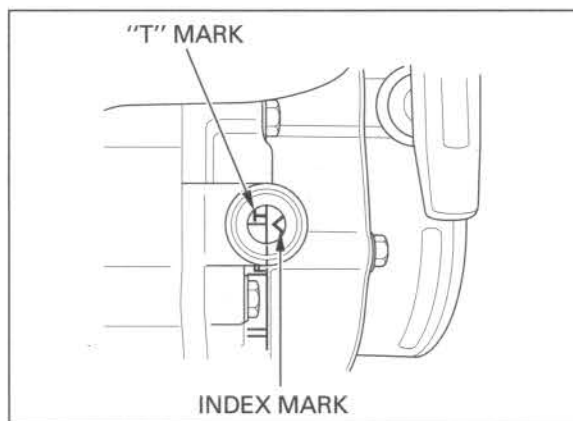
Cam chain tensioner

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

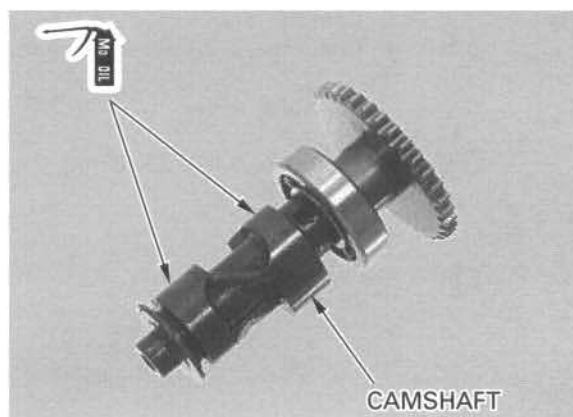


CAMSHAFT INSTALLATION

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



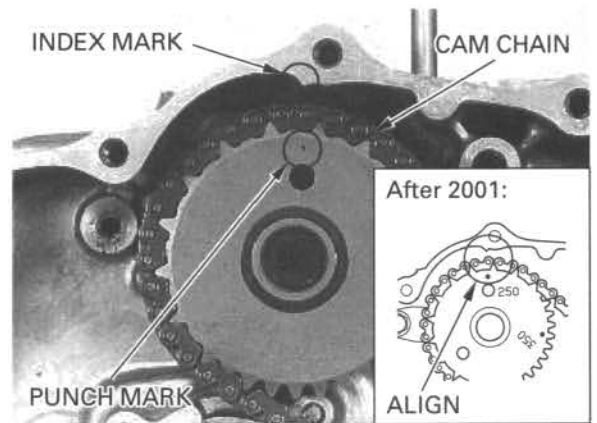
Apply molybdenum disulfide oil to the camshaft lobes and apply oil to the camshaft journal. Install the camshaft and cam chain into the crankcase with its cam lobes facing down.



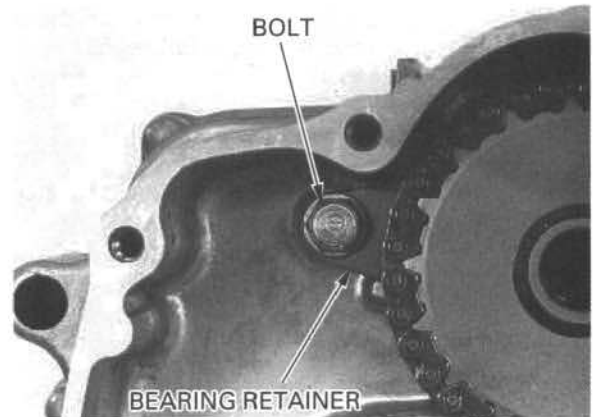
Install the cam chain on the cam sprocket and crankshaft sprocket then align the punch mark (After 2001: "250" mark) on the cam sprocket with the index mark on the crankcase.
Install the camshaft into the crankcase.

NOTE:

Do not turn the crankshaft while installing the cam sprocket.

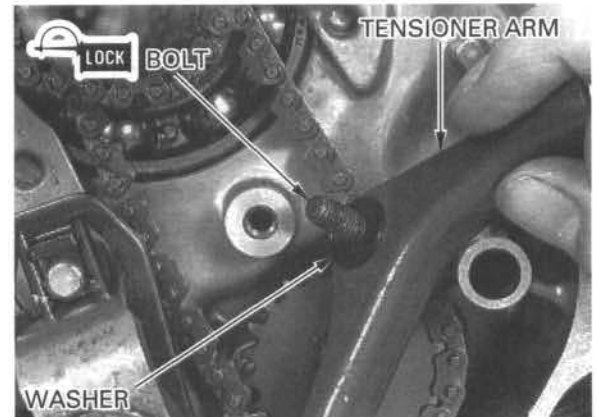


Install the camshaft bearing retainer, aligning the retainer with the crankcase boss.
Install and tighten the bolts.

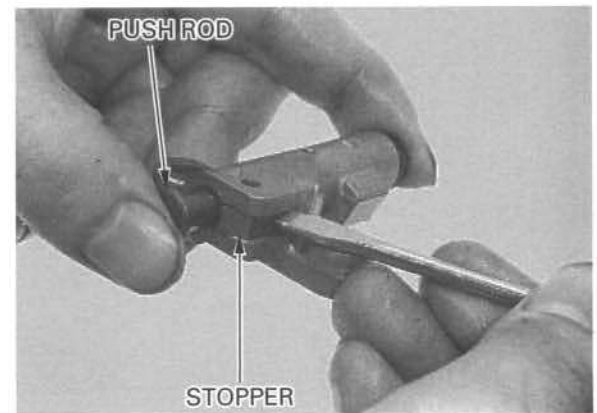


Apply a locking agent to the cam chain tensioner arm pivot bolt threads.
Install the washer, cam chain tensioner arm and pivot bolt.
Tighten the pivot bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Push the stopper with the screwdriver, and press the push rod with your finger, then hold it in the fully retracted position.



Install the cam chain tensioner adjuster and bolts.

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.

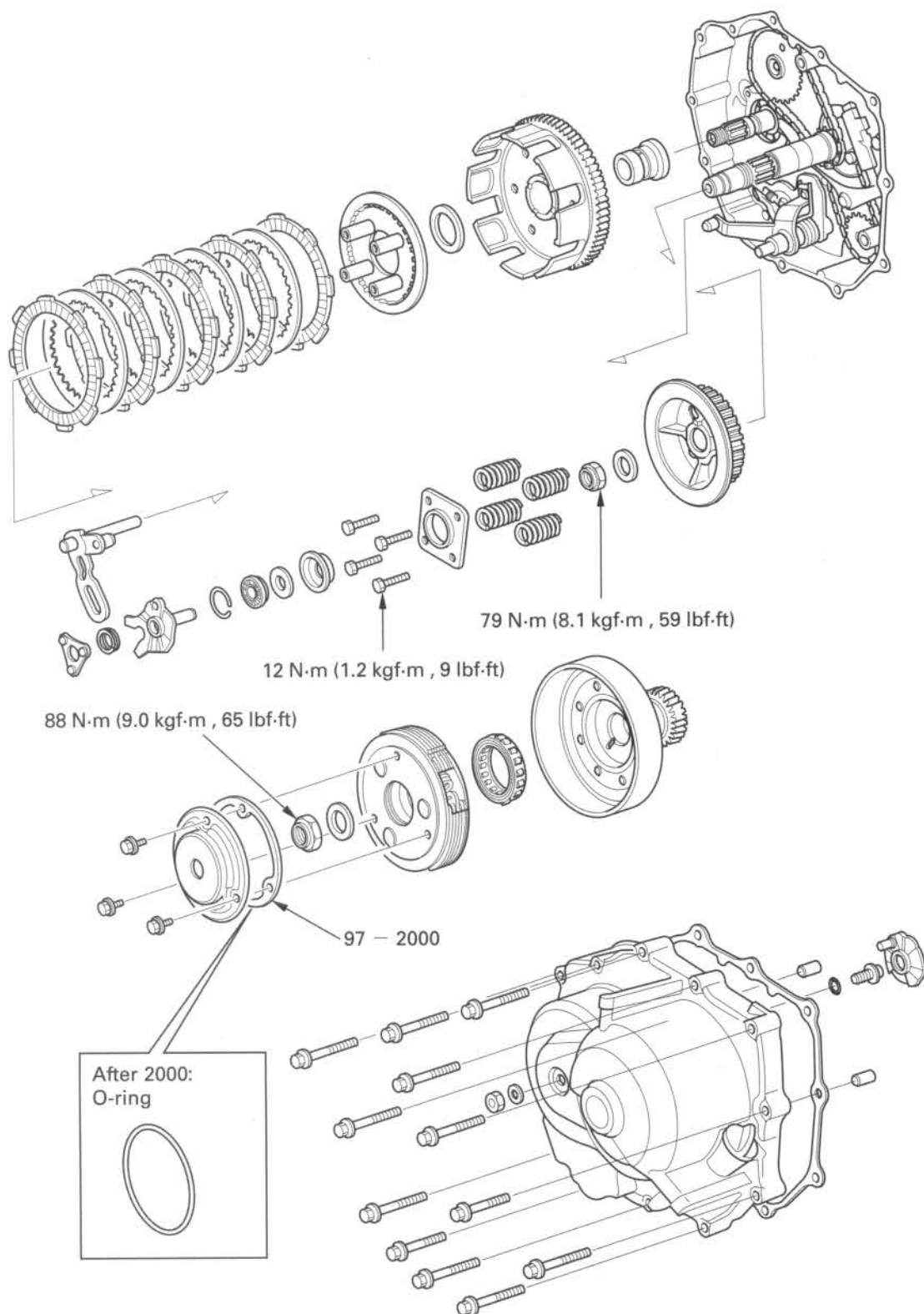


Apply clean engine oil to the outer and inner surface of the cam followers.
Install the cam follower into the crankcase.

Install the following:

- Clutch and centrifugal clutch (section 8)
- Cylinder (page 7-24)
- Cylinder head (page 7-16)





SERVICE INFORMATION	8-1	CHANGE CLUTCH	8-12
TROUBLESHOOTING	8-2	FRONT CRANKCASE COVER INSTALLATION	8-18
FRONT CRANKCASE COVER REMOVAL	8-3		
CENTRIFUGAL CLUTCH	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)	
ITEM	SPECIFICATIONS	SERVICE LIMIT	
Change clutch	Spring free length	35.2 (1.39)	34.5 (1.36)
	Disc thickness	2.9 – 3.0 (0.11 – 0.12)	2.6 (0.10)
	Plate warpage		0.20 (0.008)
	Clutch outer guide O. D.	27.959 – 27.980 (1.1007 – 1.1016)	27.92 (1.099)
	Clutch outer boss I. D.	28.000 – 28.021 (1.1024 – 1.1032)	28.05 (1.104)
Centrifugal clutch	Drum I. D.	116.00 – 116.20 (4.567 – 4.575)	116.5 (4.59)
	Weight lining thickness	2.0 (0.08)	1.2 (0.05)
	Clutch spring height	3.0 (0.12)	2.85 (0.112)
	Clutch weight spring free length	30.75 (1.211)	31.6 (1.24)
	Drum bushing I. D.	24.000 – 24.021 (0.9449 – 0.9457)	24.05 (0.947)
	Crankshaft O. D. at drive gear	23.959 – 23.980 (0.9433 – 0.9441)	23.93 (0.942)

TORQUE VALUES

Centrifugal clutch outer lock nut	88 N·m (9.0 kgf·m , 65 lbf·ft)	Apply oil to the threads
Change clutch spring bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Change clutch center lock nut	79 N·m (8.1 kgf·m , 59 lbf·ft)	Apply oil to the threads

CLUTCH

TOOLS

Bearing remover set	07936-KC10000 (Not available in U. S. A.)
Bearing remover set	07936-KC10500
Remover weight	07741-0010201 or 07936-371020A (U. S. A. only) or 07936-3710200 (U. S. A. only)
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300
Clutch holder	07HMB-HB70100 or 07923-HB3000B (U. S. A. only)
Clutch Spring Compressor	07LAE-PX40100
Clutch puller	07GMC-HB30100 or 07933-HB3000A (U. S. A. only)
Clutch center holder	07GMB-KT70101 or 07HGB-001010B or 07HGB-001010A and 07HGB-001020B or 07HGB-001020A

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 3-12).

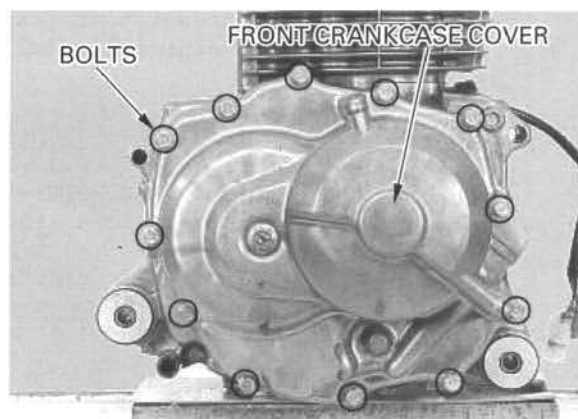
After 2001: Disconnect the oil cooler hose from the front crankcase cover (page 4-7).

After 2001 Remove the shift control motor and reduction gears (Section 20).

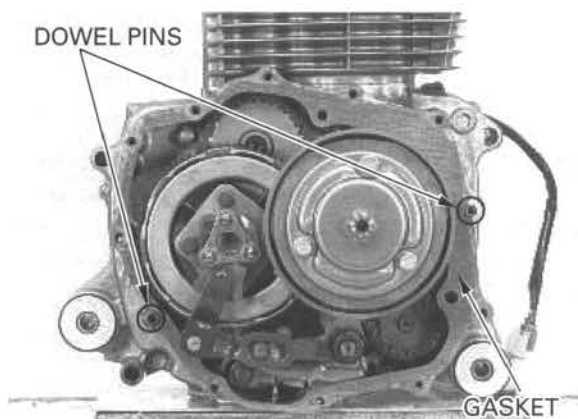
TE model:

Remove the right engine side cover, being careful not to lose the washer and clutch lifter piece.

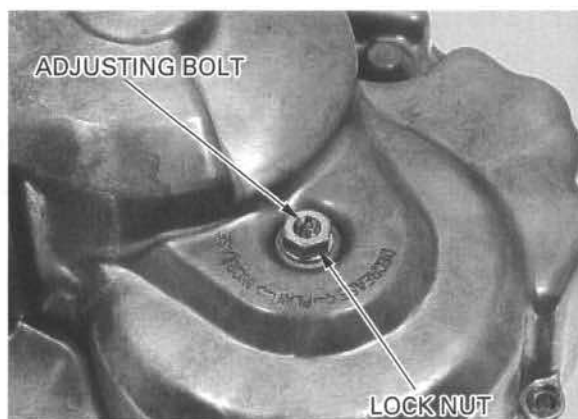
Remove the 12 bolts and front crankcase cover.



Remove the gasket and two dowel pins.



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



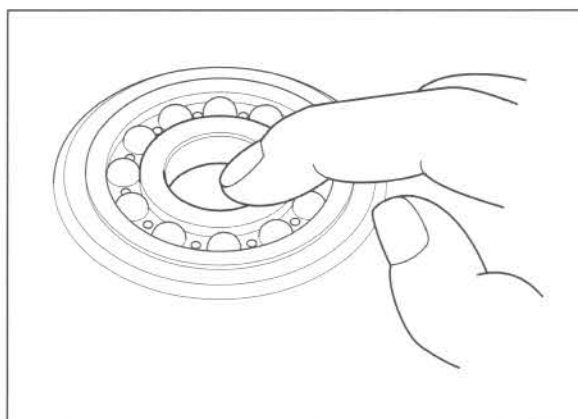
BEARING REPLACEMENT

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:

Bearing remover set	07936-KC10000 (Not available in U. S. A.)
Bearing remover set	07936-KC10500
Remover weight	07741-0010201 (U. S. A. only) or 07936-371020A (U. S. A. only)



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, 32 × 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300

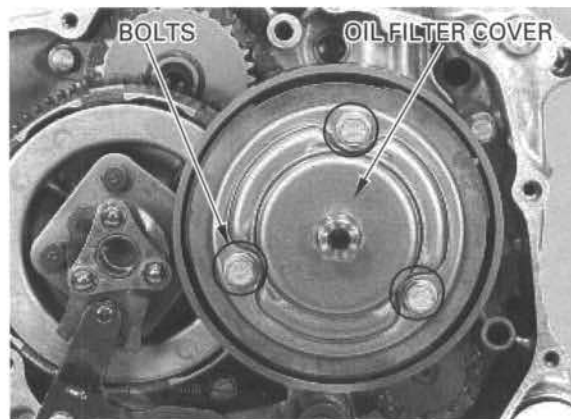


CENTRIFUGAL CLUTCH

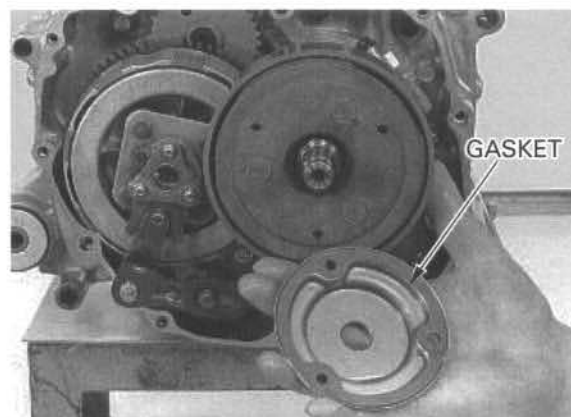
REMOVAL

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

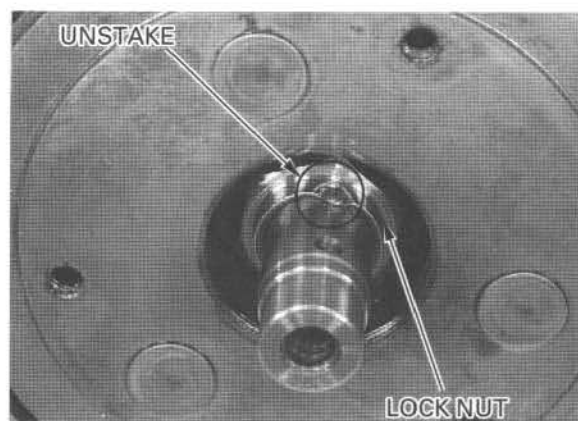
Remove the three bolts and oil filter cover.



After 2000: O-ring used. Also see page 8-0. Check the gasket is in good condition, replace if necessary.



Unstake the lock nut.



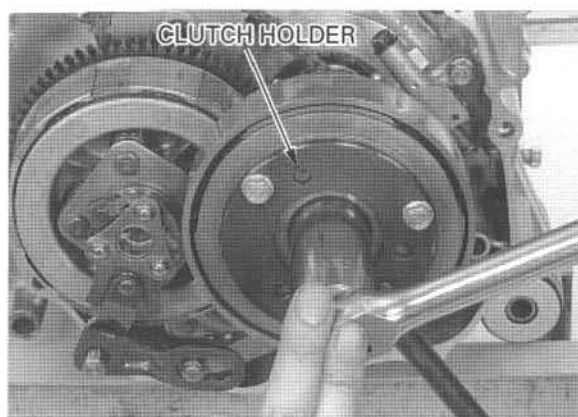
The lock nut has left hand threads.

Hold the centrifugal clutch weight assembly with a clutch holder and remove the lock nut with a long 24 mm socket wrench by turning the nut clockwise.

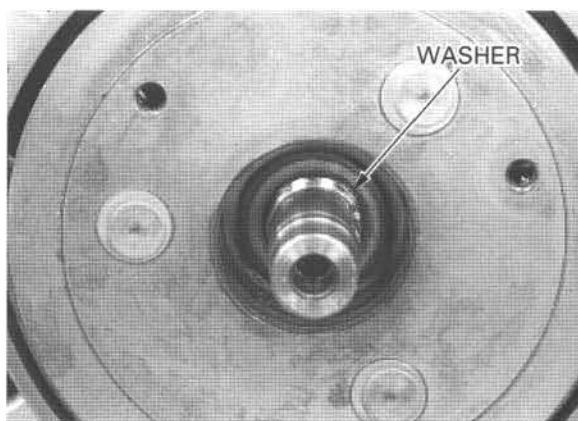
TOOL:

Clutch holder

07HMB-HB70100 or
07923-HB3000B
(U. S. A. only)



Remove the washer.

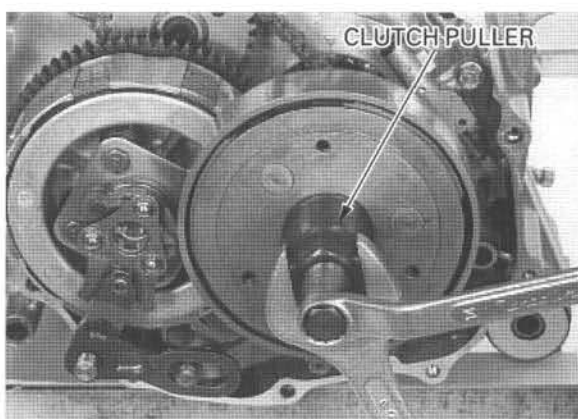


Remove the centrifugal clutch weight assembly using the special tool as shown.

TOOL:

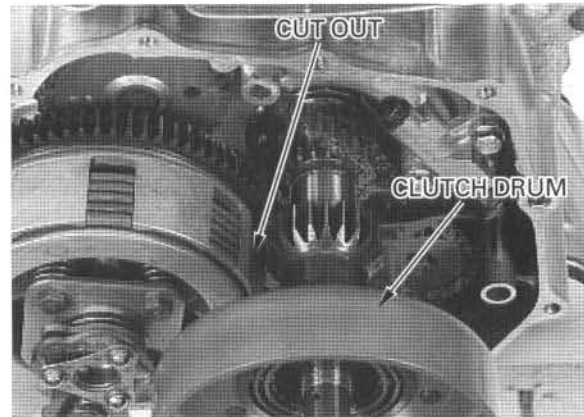
Clutch puller

07GMC-HB30100 or
07933-HB3000A
(U. S. A. only)



CLUTCH

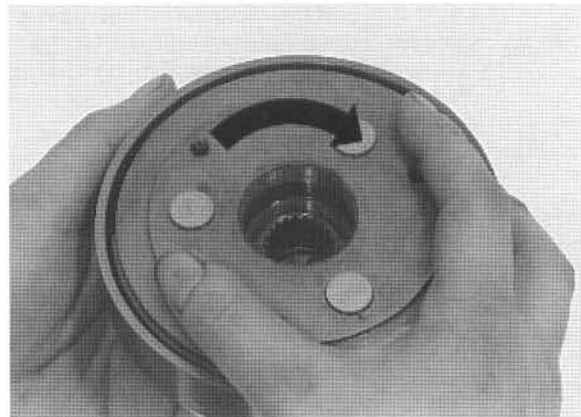
Remove the centrifugal clutch drum, aligning the drum gear with the cutout on the change clutch outer.



INSPECTION

One-way clutch

Hold the clutch drum and rotate the clutch weight assembly. You should only be able to turn it clockwise. Remove the clutch weight assembly.



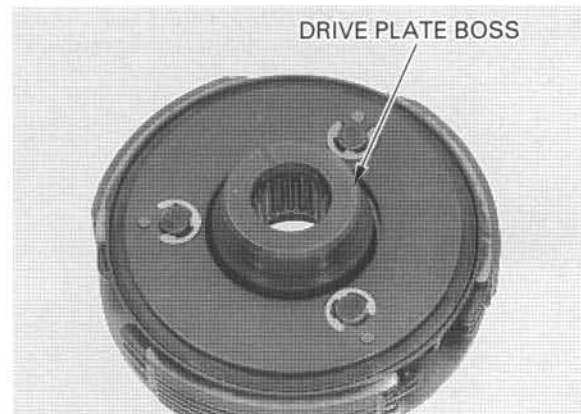
Mark the one-way clutch so it can be reinstalled in the original direction. Remove the one-way clutch from the clutch drum.

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



Drive plate boss

Check the drive plate boss for excessive wear or damage.

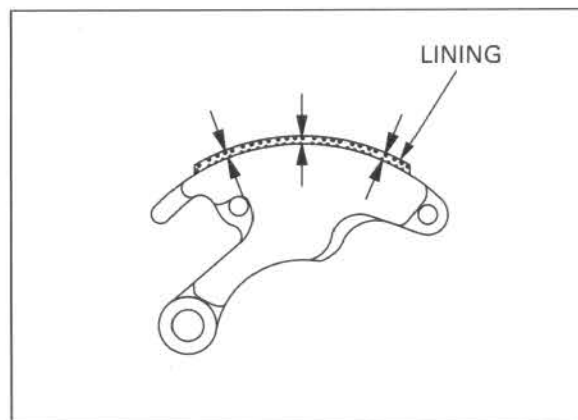


Weight lining

Measure the weight lining thickness as shown.

SERVICE LIMIT: 1.2 mm (0.05 in)

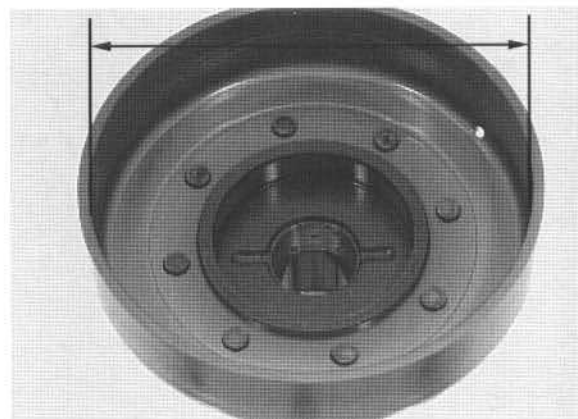
For replacement, see below.

**Clutch drum**

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

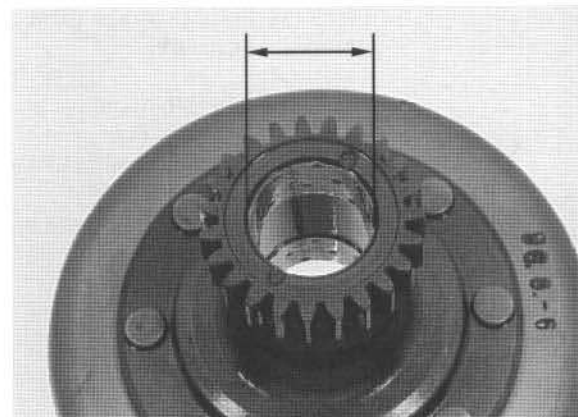
Measure the I. D. of the clutch drum.

SERVICE LIMIT: 116.5 mm (4.59 in)



Measure the I. D. of the clutch drum bushing.

SERVICE LIMIT: 24.05 mm (0.947 in)

**Weight spring/clutch spring**

Install the special tool and compress the clutch spring.

TOOL:

Clutch spring compressor 07LAE-PX40100

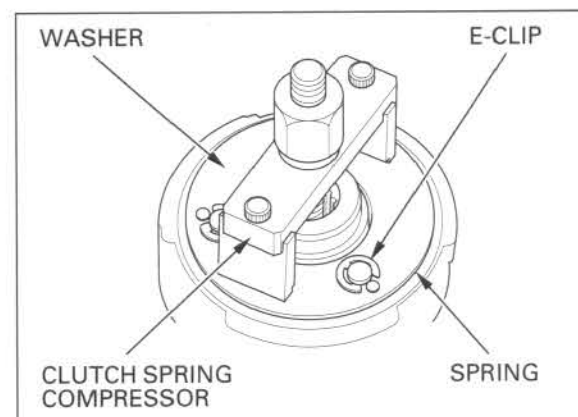
Remove the E-clips using screw driver.

CAUTION:

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

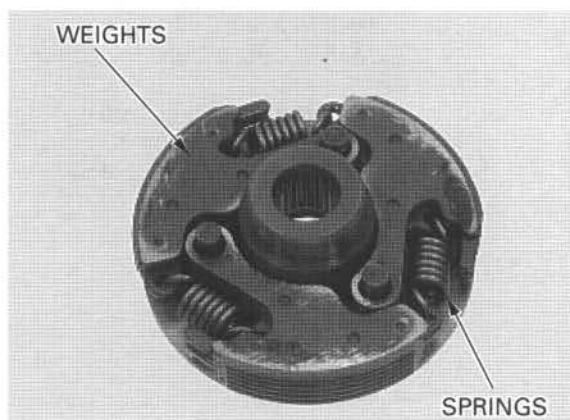
Remove the following:

- Out side washer
- Clutch spring
- Inside washer



CLUTCH

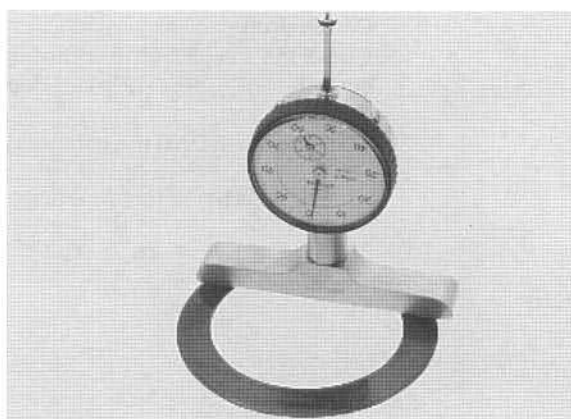
Remove the weight springs and clutch weights from the drive plate.



Measure the height of the clutch spring.

SERVICE LIMIT: 2.85 mm (0.112 in)

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

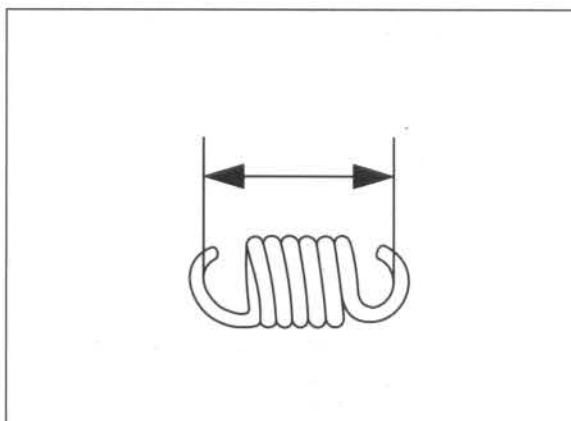


Check the weight springs for wear or damage, and replace if necessary.

Measure the length of the weight spring.

SERVICE LIMIT: 31.6 mm (1.24 in)

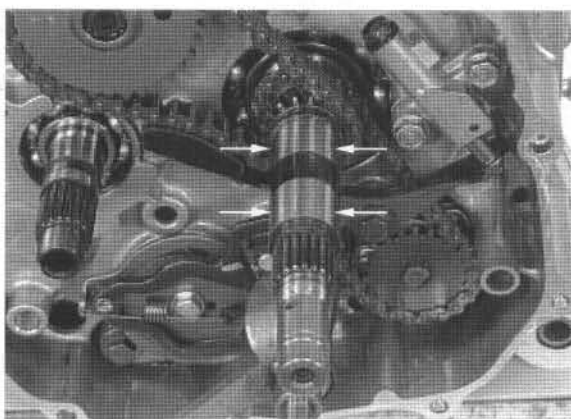
Replace the spring if they are longer than the service limit.



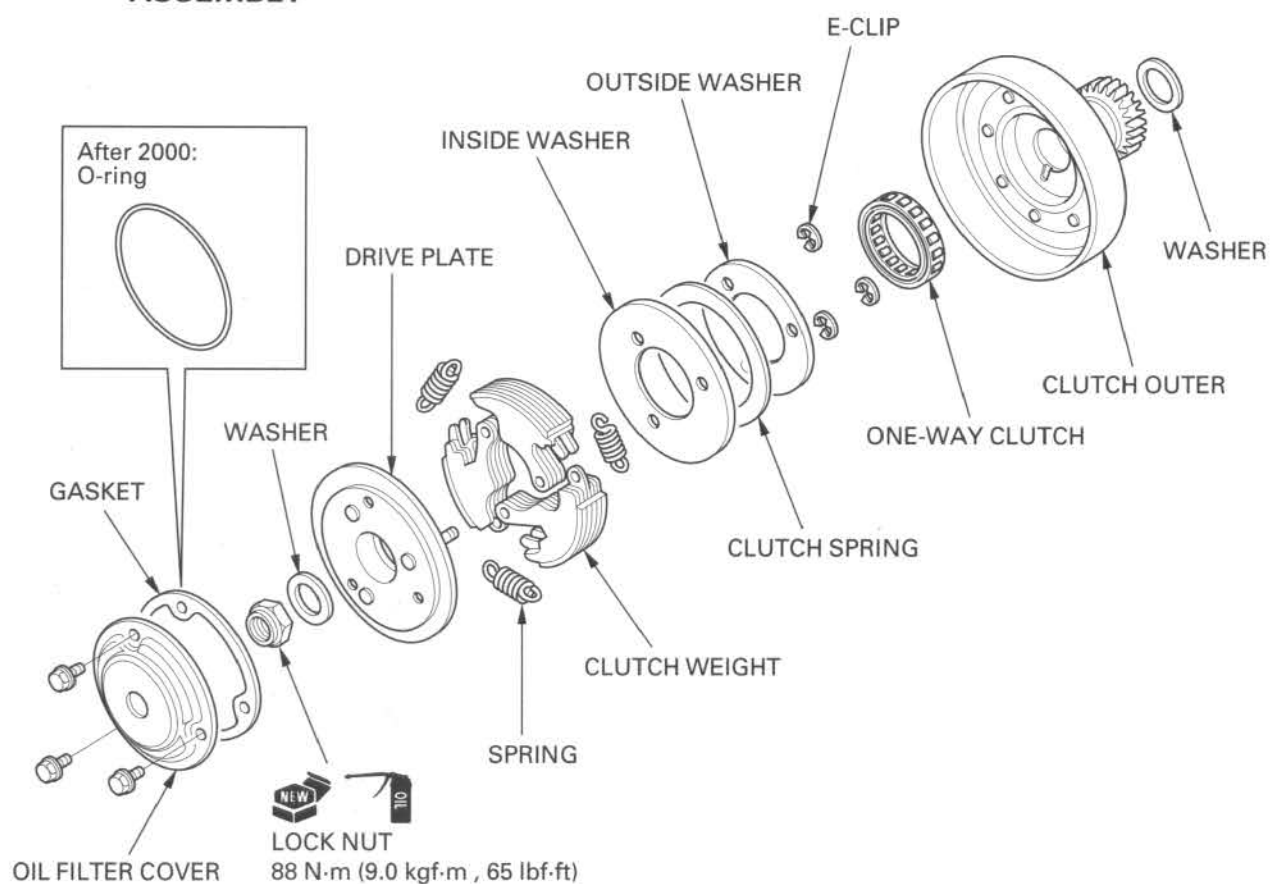
Crankshaft at the primary drive gear

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

SERVICE LIMIT: 23.93 mm (0.942 in)



ASSEMBLY



Install the clutch weights and springs onto the drive plate.

NOTE:

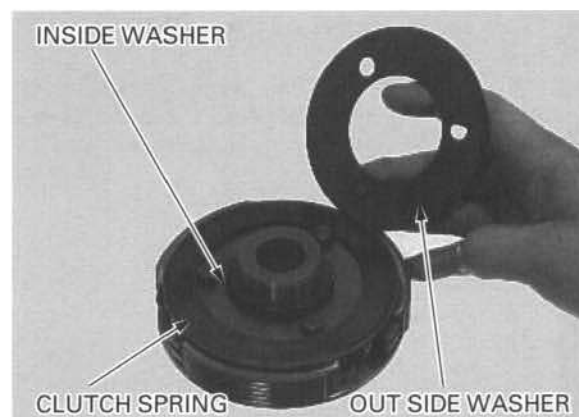
- Install the weights as shown.
- Install the springs with the open ends down.



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.

CLUTCH

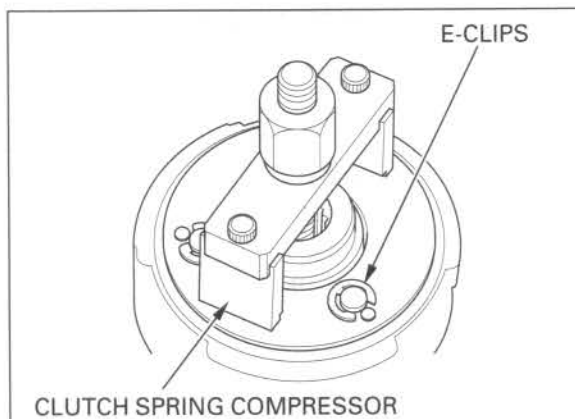
Install the special tool and compress the clutch spring.

TOOL:
Clutch spring compressor 07LAE-PX40100

Install the E-clips with their gaps aligned with the locating pins.

CAUTION:

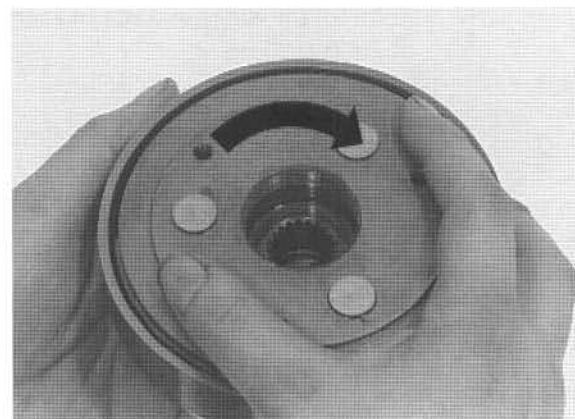
When compressing the clutch spring, be careful not to damage the clutch weight assembly.



Install the one-way clutch in the original direction as marked.

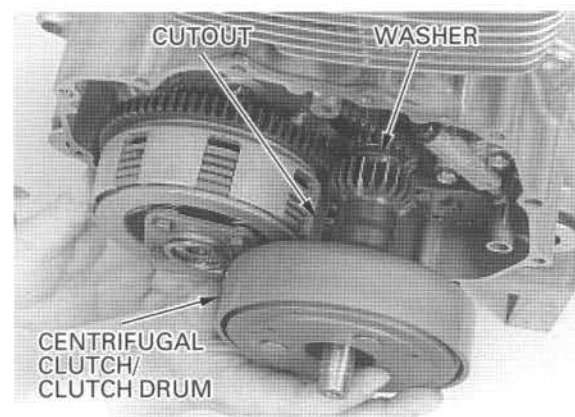


Install the centrifugal clutch weight assembly in the clutch drum, rotating the weight assembly clockwise.



INSTALLATION

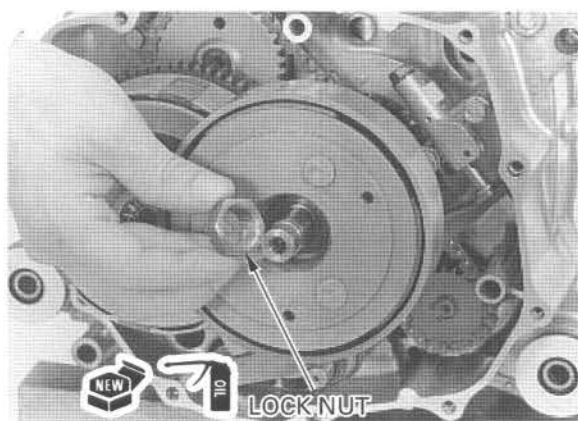
Install the washer and centrifugal clutch, clutch drum, aligning the drum gear with the cutout on the manual clutch outer.



Install the washer.



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



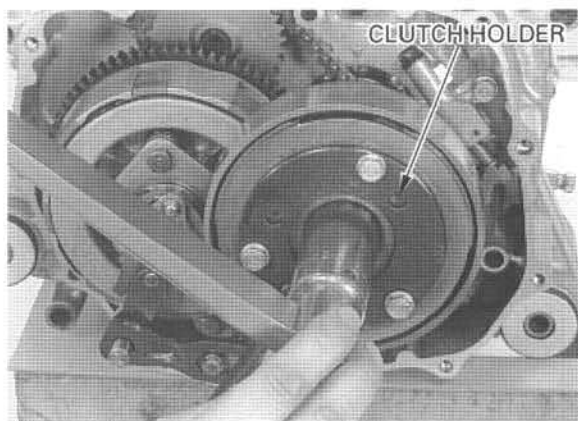
*Lock nut has left
hand threads.*

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

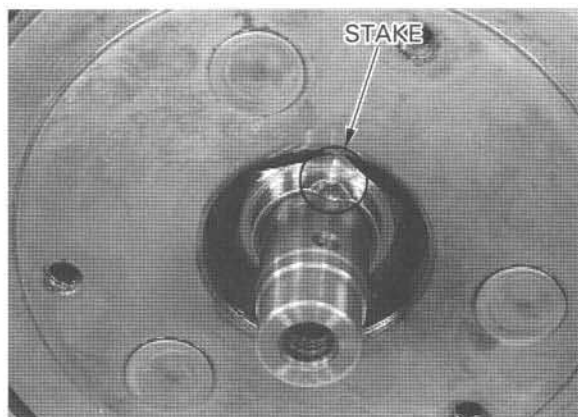
TORQUE: 88 N·m (9.0 kgf·m , 65 lbf·ft)

TOOL:
Clutch holder

07HMB-HB70100 or
07923-HB3000B
(U. S. A. only)



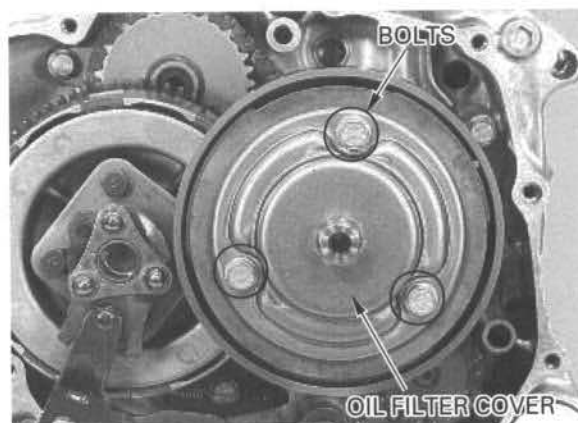
Stake the lock nut.



CLUTCH

After 2000: O-ring used. Also see page 8-0.

Install the oil filter cover/gasket and three bolts.

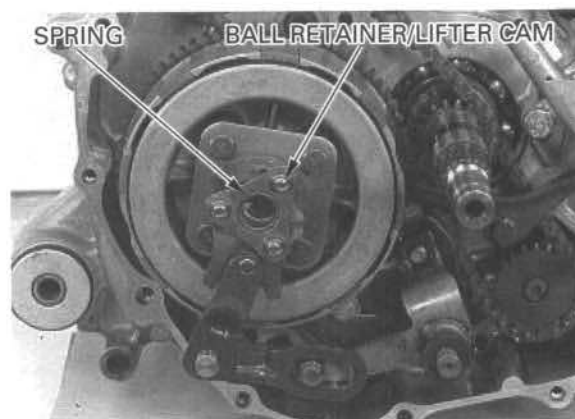


CHANGE CLUTCH

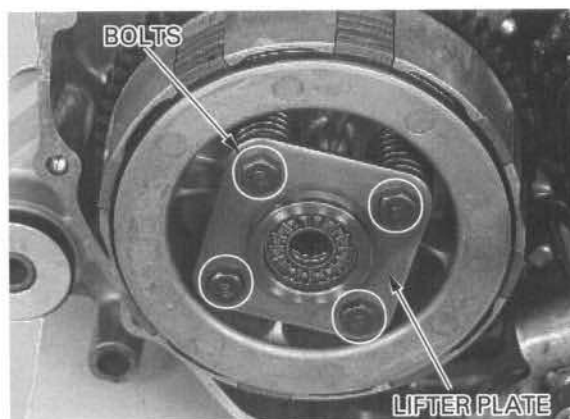
REMOVAL

Remove the following:

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



Remove the clutch bolts, loosening them in a criss-cross pattern in 2 or 3 steps.
Remove the lifter plate assembly and clutch springs.



Unstake the clutch center lock nut.



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

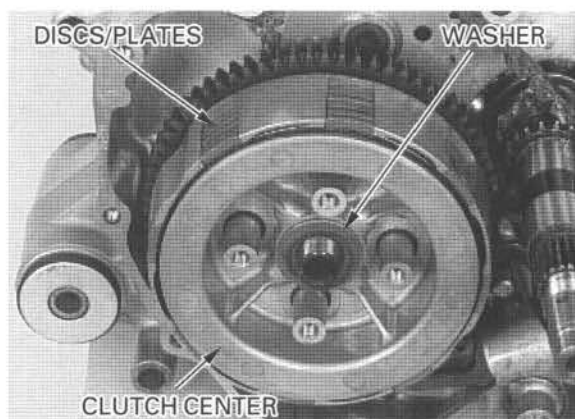
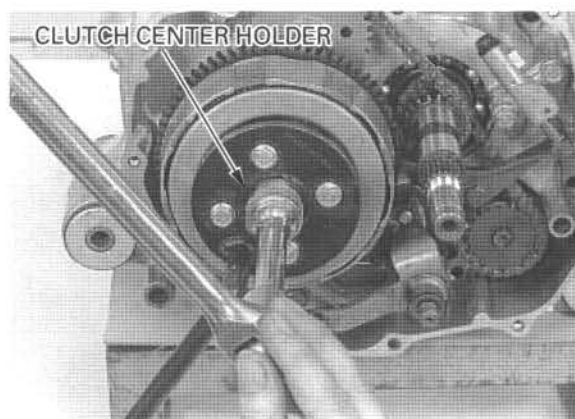
TOOL:

Clutch center holder
Holder plate

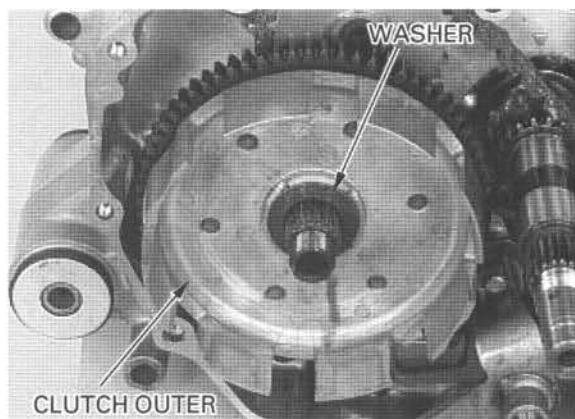
07GMB-KT70101 or
07HGB-001010B
(U. S. A. only) or
07HGB-001010A
(U. S. A. only)
Holder collar
07HGB-001020B
(U. S. A. only) or
07HGB-001020A
(U. S. A. only)

Discard the lock nut.

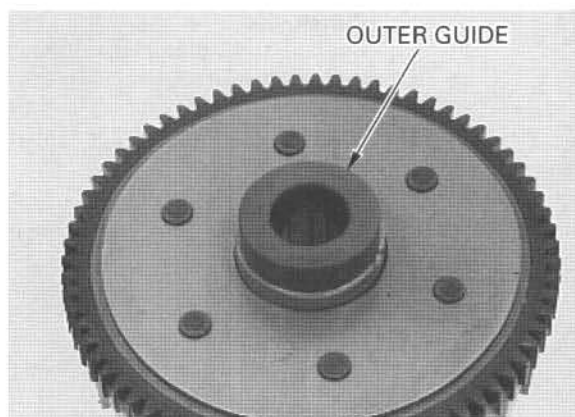
Remove the washer, clutch center, discs, plates and pressure plate as an assembly.



Remove the thrust washer and clutch outer.



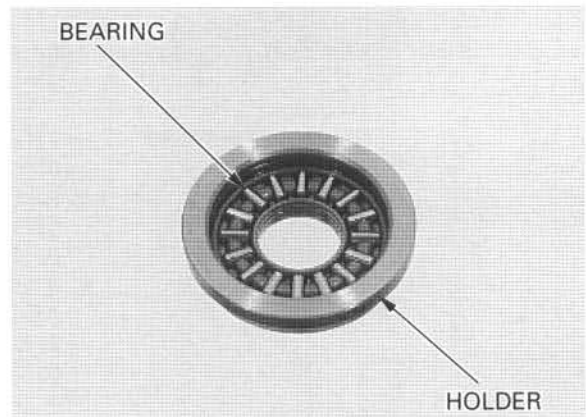
Remove the clutch outer guide from clutch outer.



INSPECTION

Clutch lifter bearing

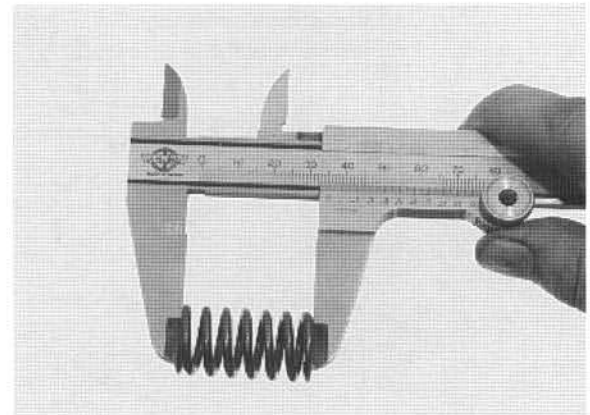
Turn the lifter bearing with your finger.
The bearing should turn smoothly and freely without excessive play.
If necessary replace the bearing.



Clutch spring

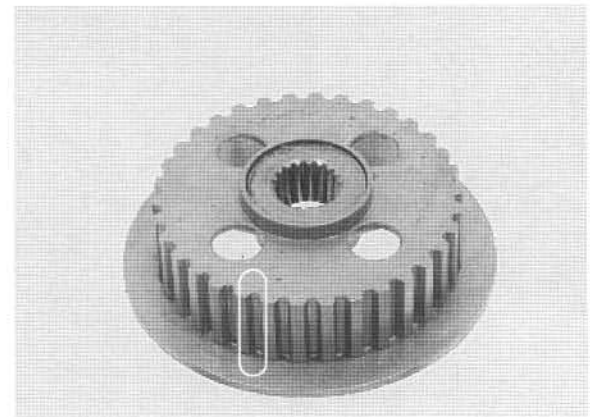
Measure the clutch spring free length.

SERVICE LIMIT: 34.5 mm (1.36 in)



Clutch center

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

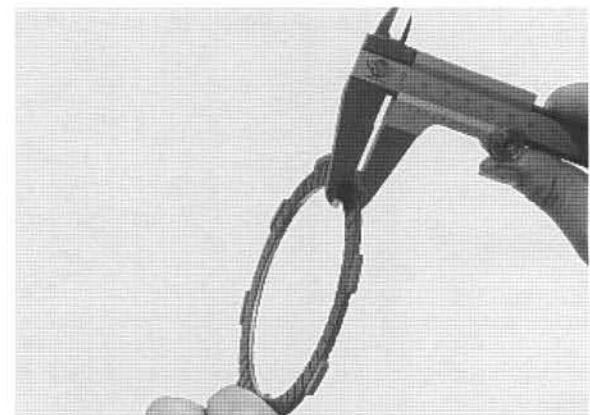


Clutch disc

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

Measure the thickness of each disc.

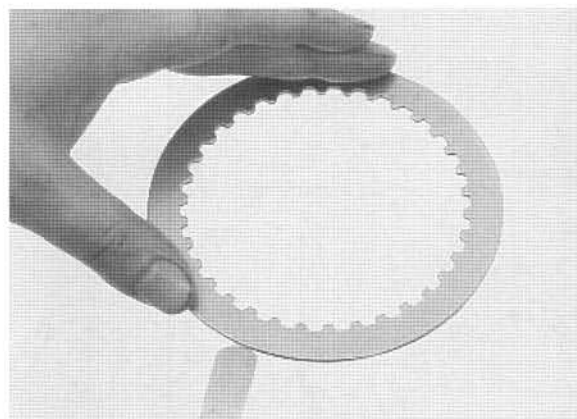
SERVICE LIMIT: 2.6 mm (0.10 in)



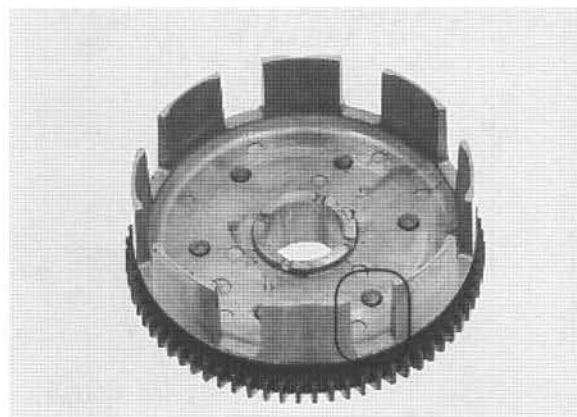
Clutch plate

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

SERVICE LIMIT: 0.20 mm (0.008 in)

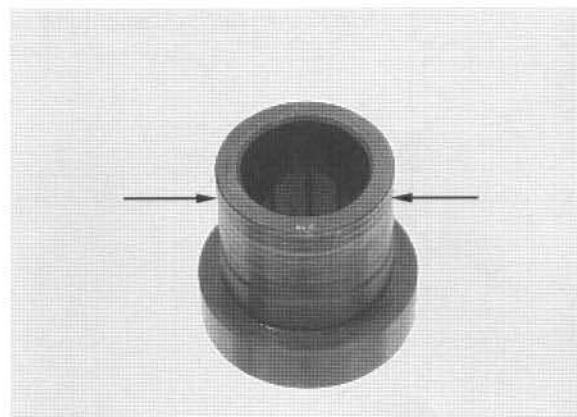
**Clutch outer**

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



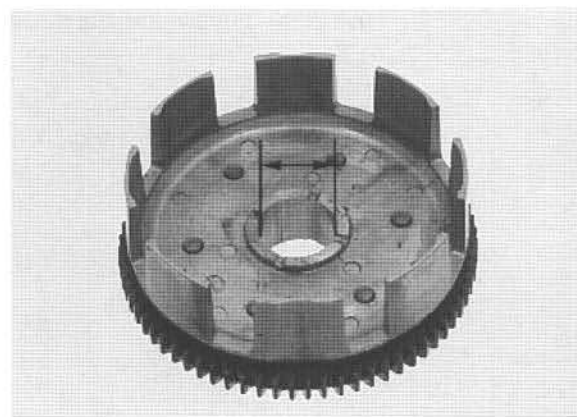
Measure the O. D. of the clutch outer guide.

SERVICE LIMIT: 27.92 mm (1.099 in)

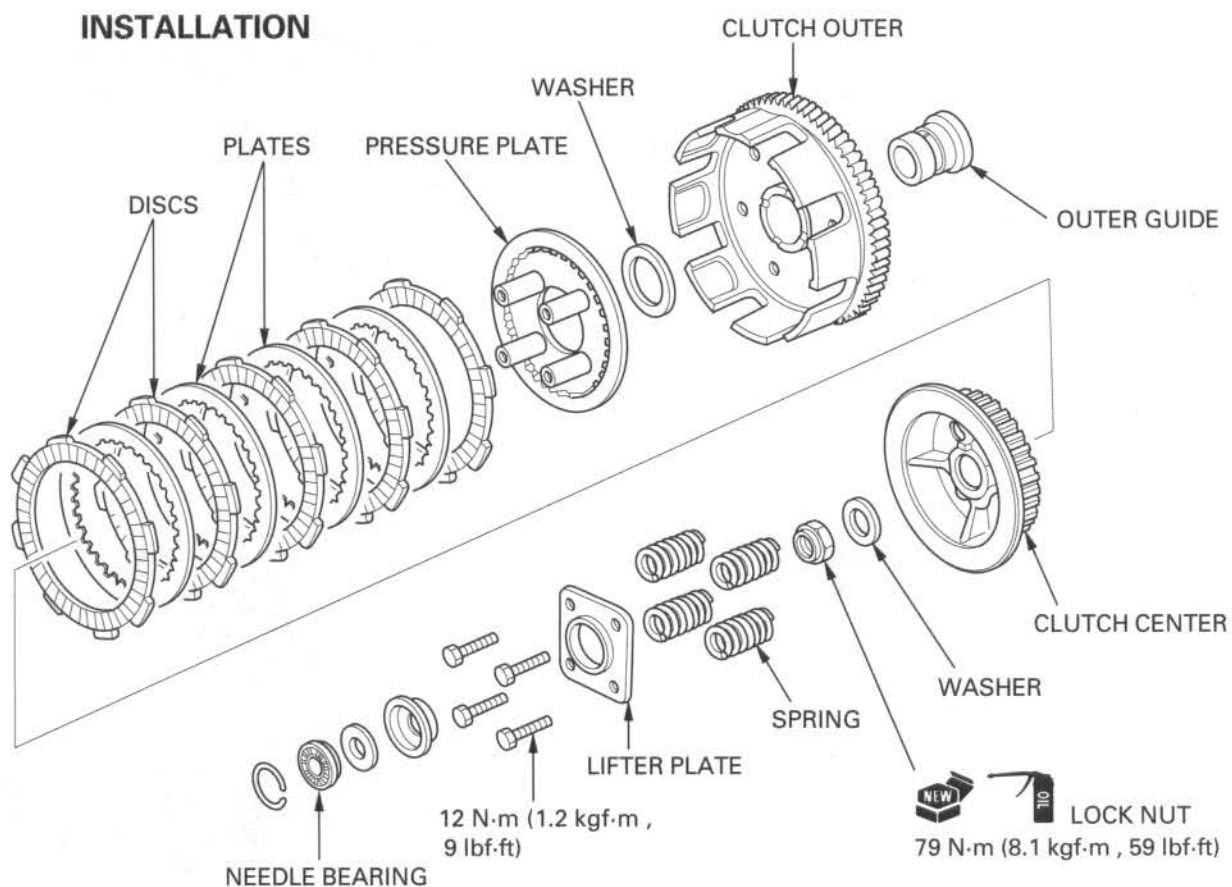


Measure the I. D. of the clutch outer guide boss.

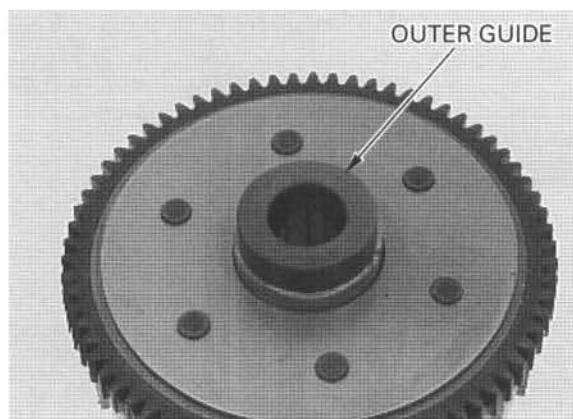
SERVICE LIMIT: 28.05 mm (1.104 in)



INSTALLATION



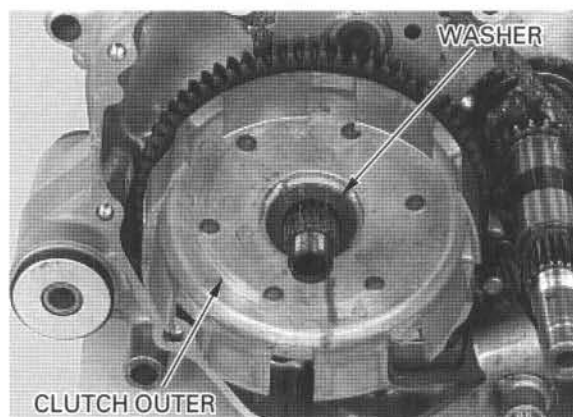
Install the clutch outer guide to the clutch outer.



Install the clutch outer and thrust washer.

NOTE:

Confirm that the primary drive gear and washer are installed.

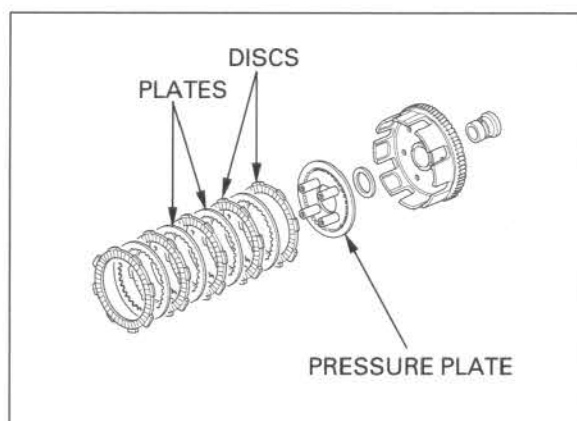


Assemble the clutch pressure plate, discs, plates and clutch center, and install them in the clutch outer.

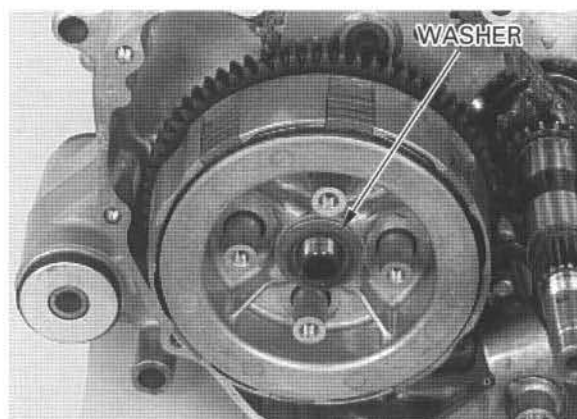
Coat new clutch discs with clean engine oil.
Stack the discs and plates alternately.

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.



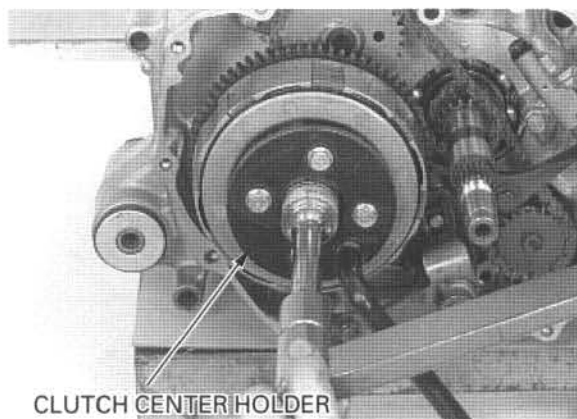
Apply oil to the new lock nut threads.
Install a new lock nut.
Hold the clutch center using the special tool and four 6 × 55 mm bolts.
Tighten the lock nut to the specified torque.

TOOL:

Clutch center holder 07GMB-KT70101 or
Holder plate 07HGB-001010B

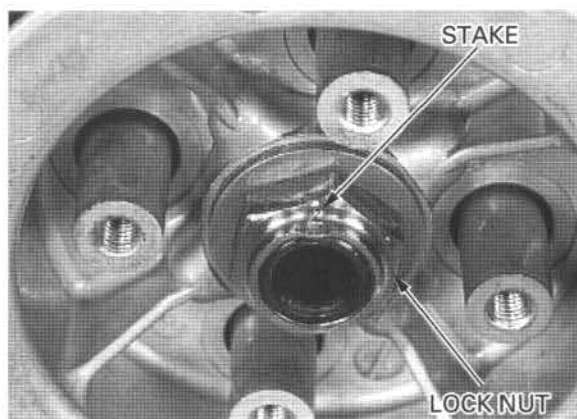
(U. S. A. only) or
07HGB-001010A
(U. S. A. only)

Holder collar 07HGB-001020B
(U. S. A. only) or
07HGB-001020A
(U. S. A. only)



TORQUE: 79 N·m (8.1 kgf·m , 59 lbf·ft)

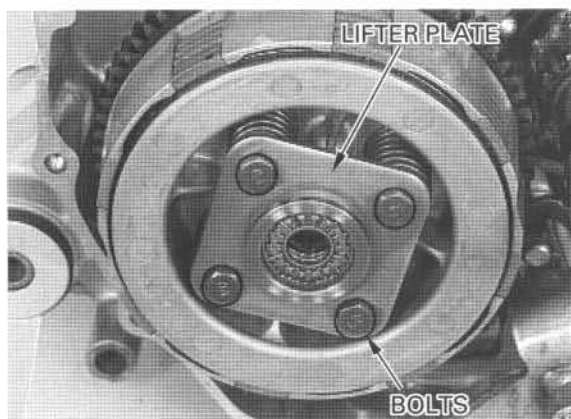
Stake the clutch center lock nut.



CLUTCH

Install the clutch springs, lifter plate assembly and bolts.
Tighten the bolts in a crisscross pattern in 2-3 steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



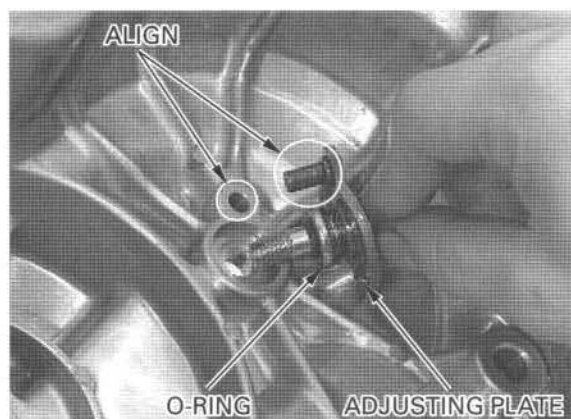
Install the following:

- Lifter cam/Ball retainer
- Clutch lever/Washer
- Centrifugal clutch (page 8-10)
- Front crankcase cover

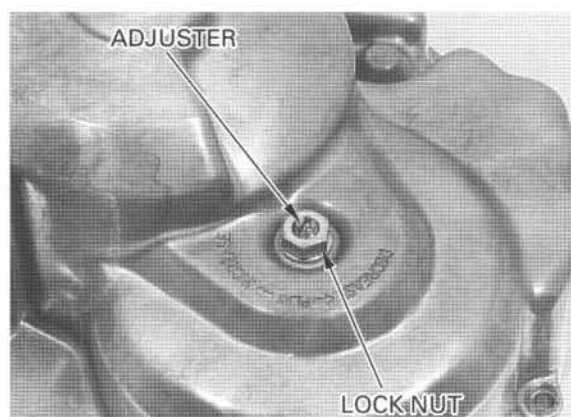


FRONT CRANKCASE COVER INSTALLATION

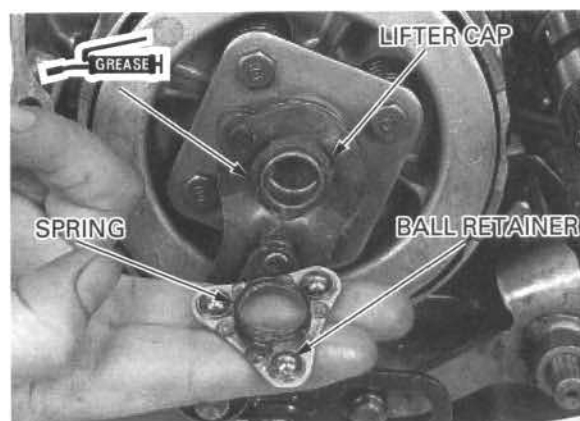
Install the O-ring and clutch adjusting plate by aligning its stopper pin with the crankcase cover hole.



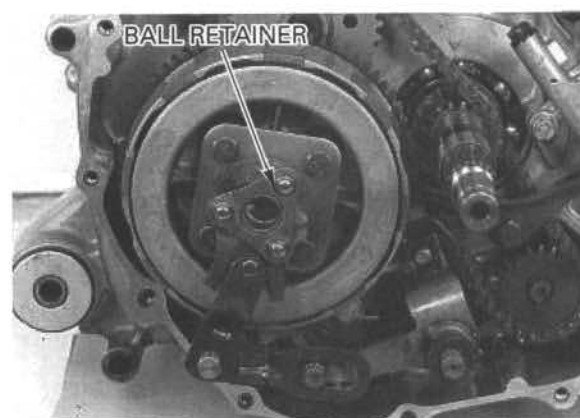
Install the washer and adjuster lock nut.



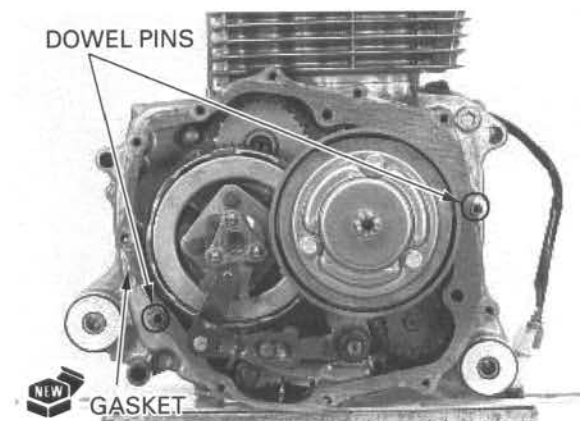
Apply grease to the clutch lifter cap.
Install the ball retainer and spring to the clutch lifter cam.



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



Install the dowel pins and new gasket.



Install the front crankcase cover and tighten the 12 bolts in two or three steps in a crisscross pattern.

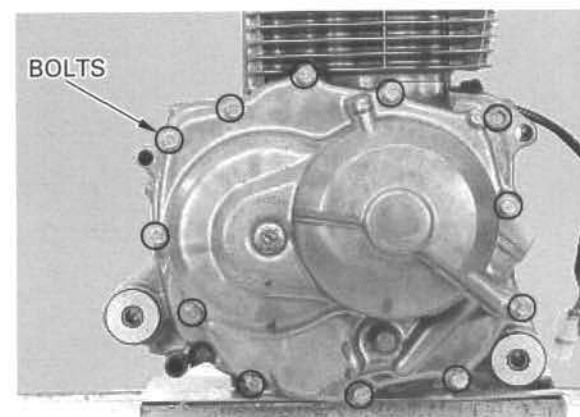
Install the right engine side cover.

After 2001: Connect the oil cooler hose on the front crankcase cover (page 4-9).

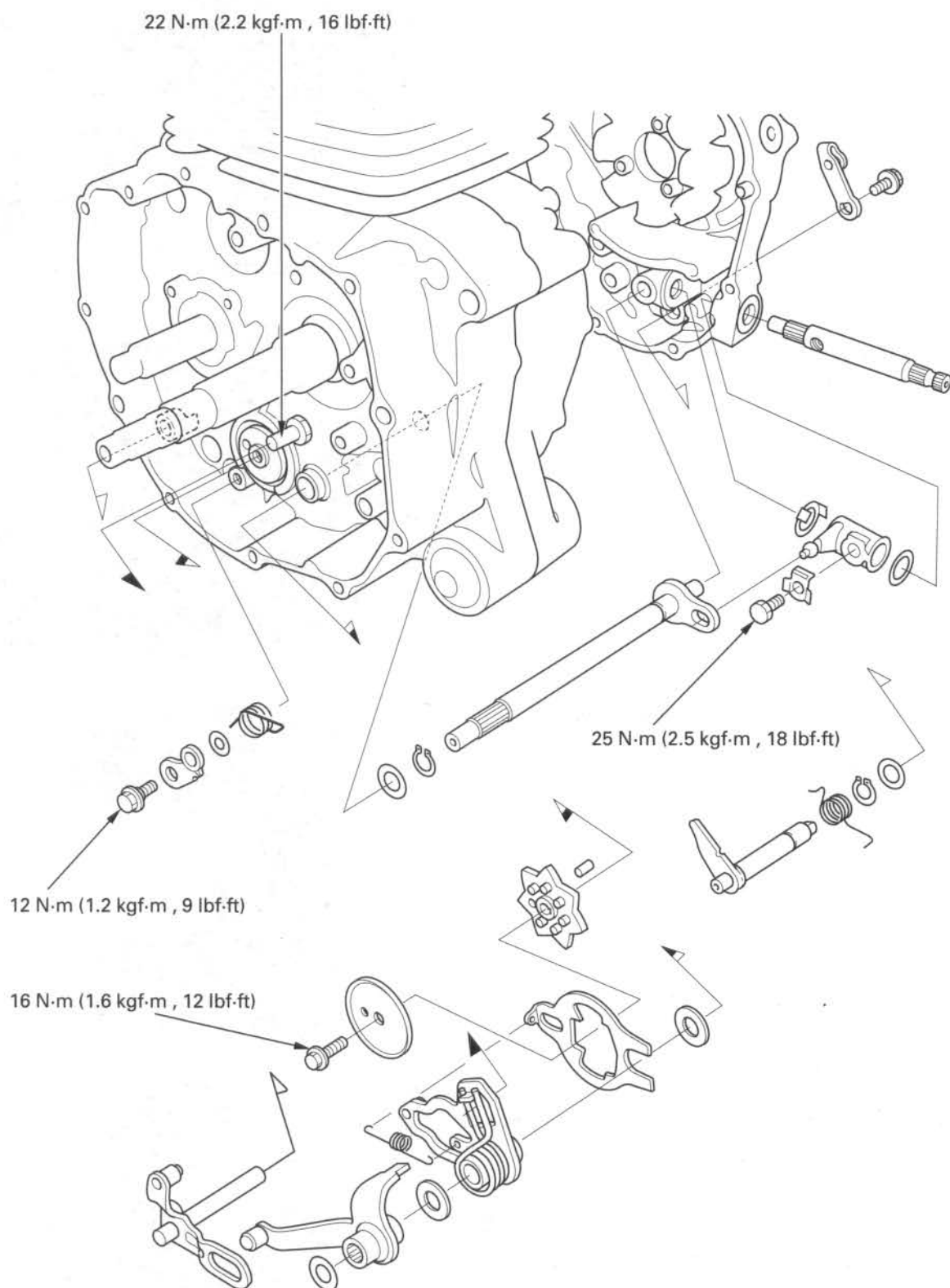
After 2001 TE model: Install the reduction gears and shift control motor (Section 20).

Add the recommended engine oil (page 3-12).
Make sure there are no oil leaks.

Adjust the clutch (page 3-19).



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 except for gearshift plate mounting bolt adjustment.

TORQUE VALUES

Gearshift drum stopper arm bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads.
Gearshift return spring pin	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Gearshift A arm bolt	25 N·m (2.5 kgf·m , 18 lbf·ft)	
Gearshift cam plate mounting bolt	16 N·m (1.6 kgf·m , 12 lbf·ft)	
Gearshift pedal mounting bolt	18 N·m (1.8 kgf·m , 13 lbf·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

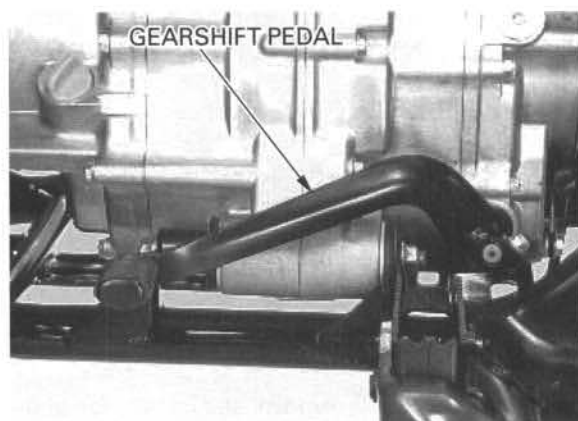
Remove the following:

- Centrifugal clutch (page 8-4)
- Clutch (page 8-12)

*Except After 2001
TE model:*

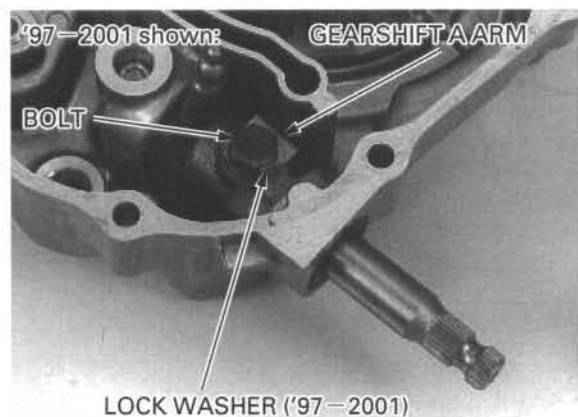
Remove the gearshift pedal.

Remove the alternator cover (page 10-6).

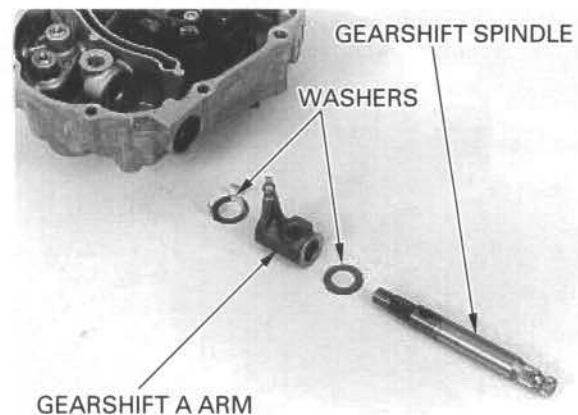


'97–2001: Bend down the tab of the lock washer of gearshift A arm.
Remove the bolt and lock washer.

After 2001: Remove the gearshift spindle retaining bolt.



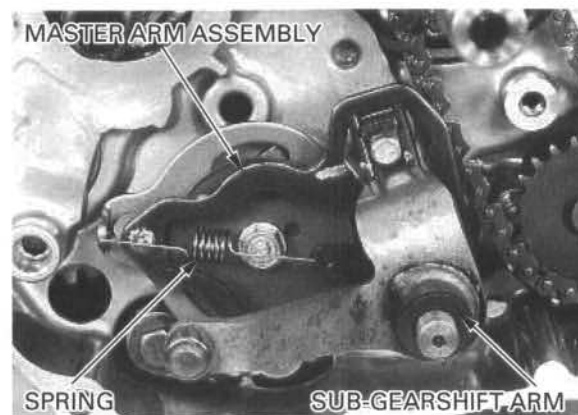
Remove the gearshift spindle, washers (except
After 2001 TE model) and gearshift A arm.



Remove the sub-gearshift arm and washer.

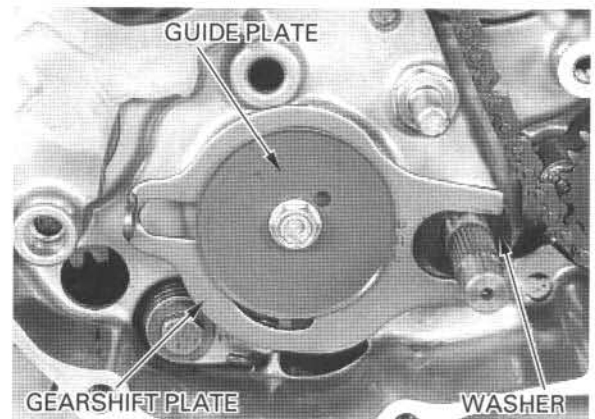
Unhook the shift arm spring from the gearshift
plate.

Remove the gearshift master arm assembly.

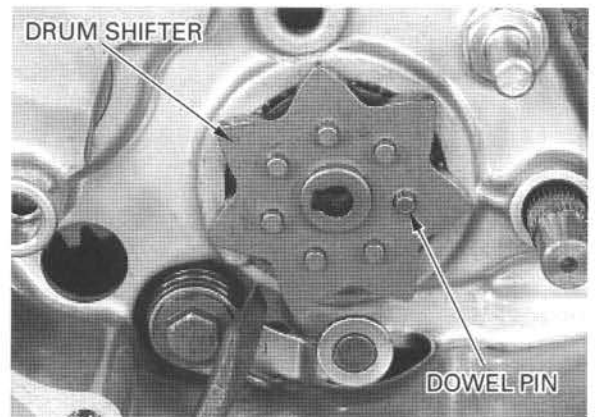


Remove the gearshift plate bolt.
Remove the shift guide plate and gearshift plate.

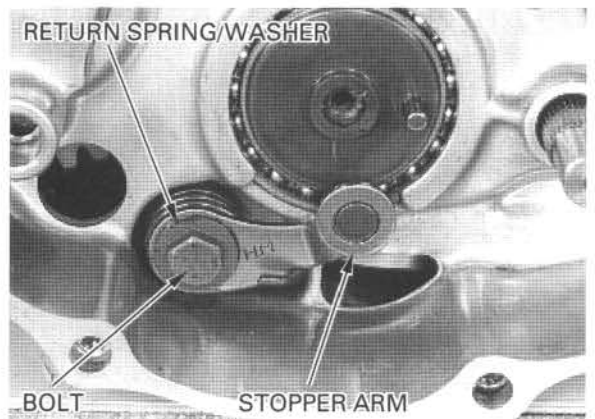
Remove the thrust washer from the sub-gearshift spindle.



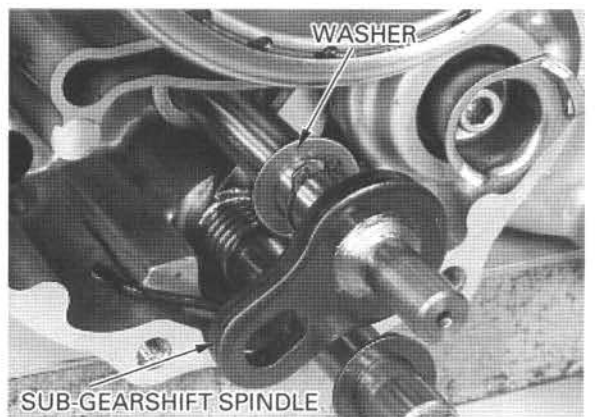
Remove the drum shifter while holding the stopper arm using a screwdriver.
Remove the dowel pin.



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

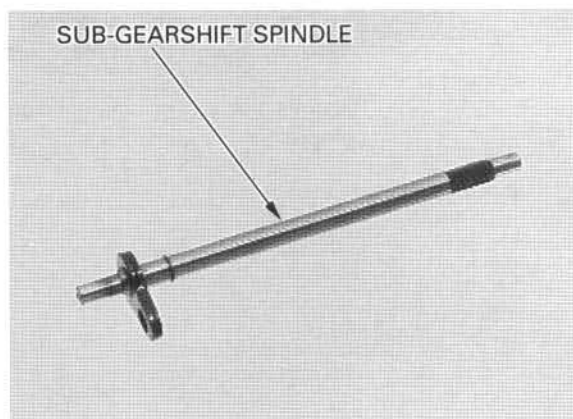


Remove the sub-gearshift spindle and thrust washer from the rear crankcase.

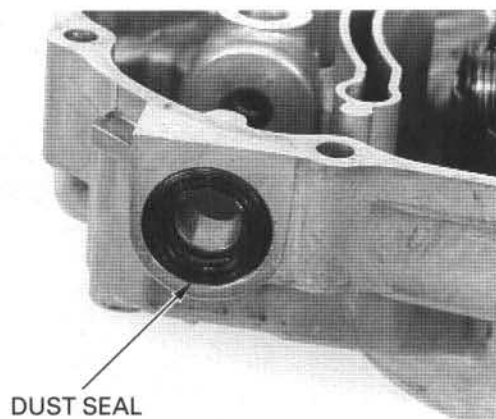


GEARSHIFT LINKAGE INSPECTION

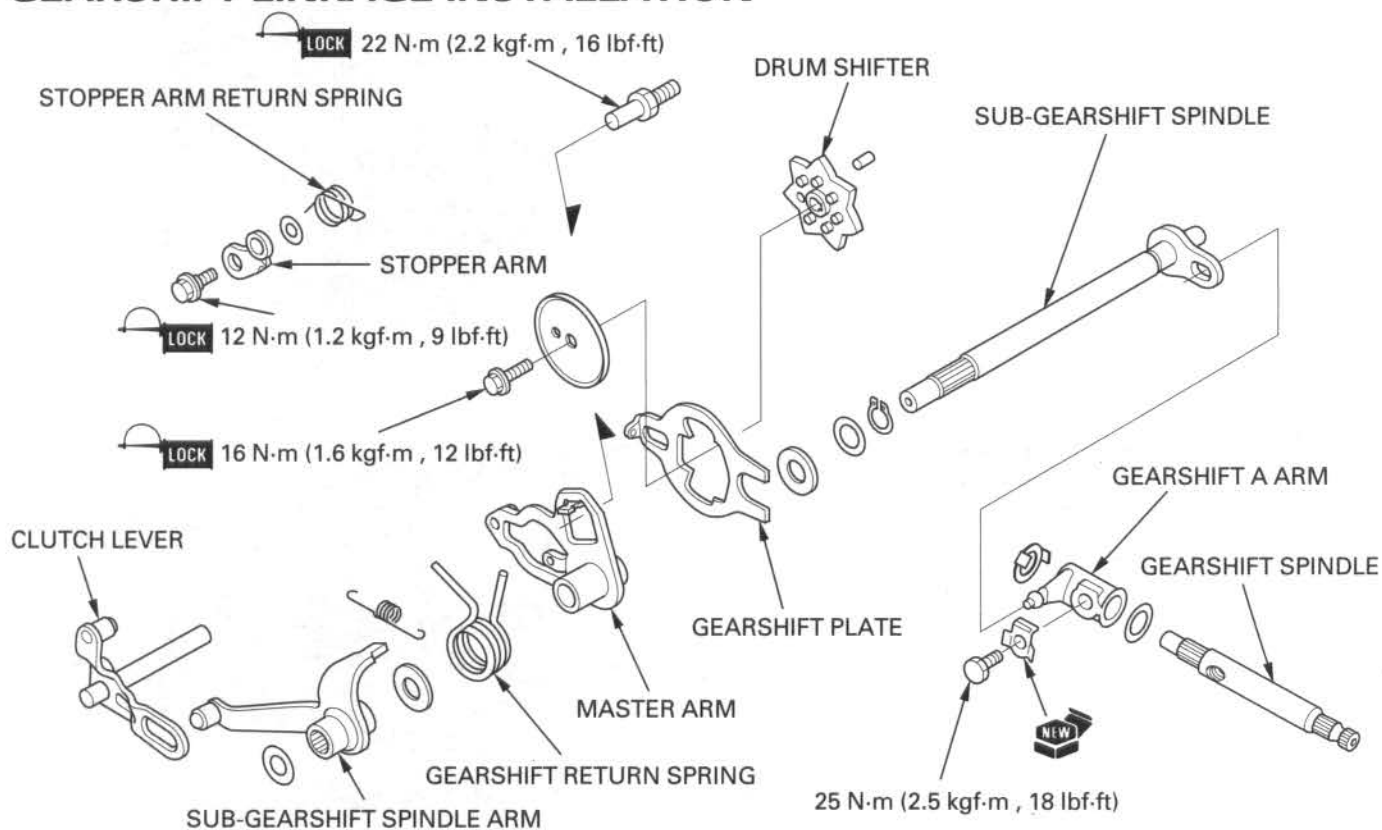
Inspect the sub-gearshift spindle for bending or other damage.



Inspect the gearshift spindle dust seal for wear or damage.

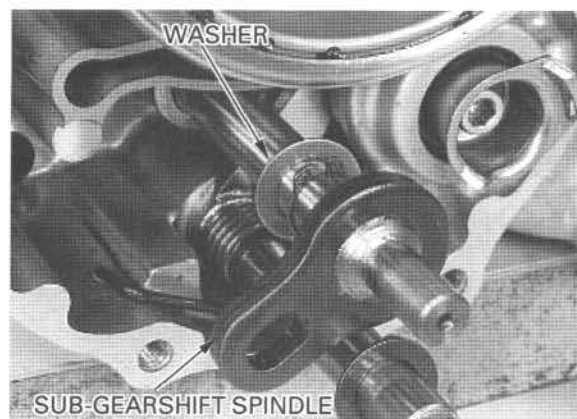


GEARSHIFT LINKAGE INSTALLATION



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

If reverse stopper arm was removed, it must be installed before sub-gearshift spindle (page 9-8).



Install the return spring, washer and stopper arm into the crankcase so that arm lies below bearing edge.

Apply a locking agent to the threads of stopper arm bolt.

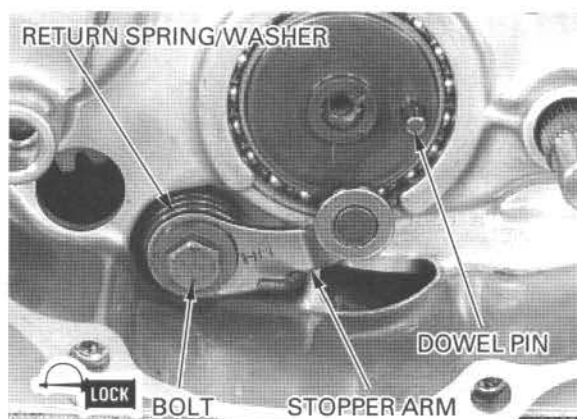
Install and tighten the stopper arm bolt.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

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

TORQUE: 22 N·m (2.2 kgf·m , 16 lbf·ft)

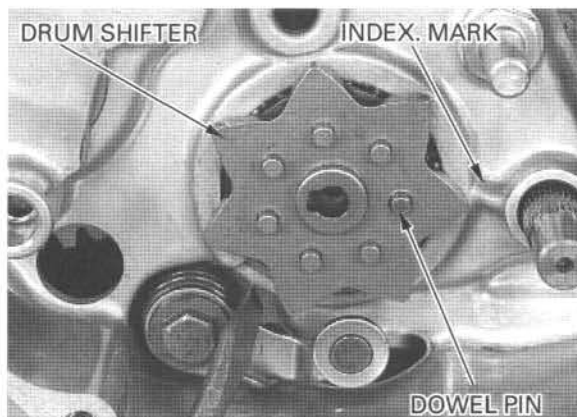
Install the dowel pin on the gearshift drum.



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

NOTE:

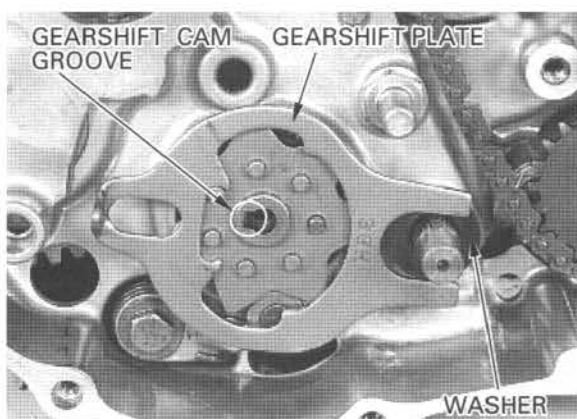
The transmission is in neutral when the dowel pin is aligned with the index mark (boss) on the crankcase.



Install the thrust washer onto the sub-gearshift spindle.

Install the gearshift plate.

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

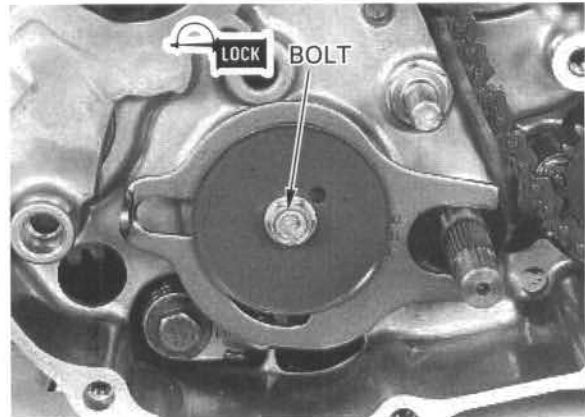


GEARSHIFT LINKAGE

Apply a locking agent to the gearshift cam plate bolt threads.
Install and tighten the gearshift cam plate bolt to the specified torque.

TORQUE: 16 N·m (1.6 kgf·m , 12 lbf·ft)

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

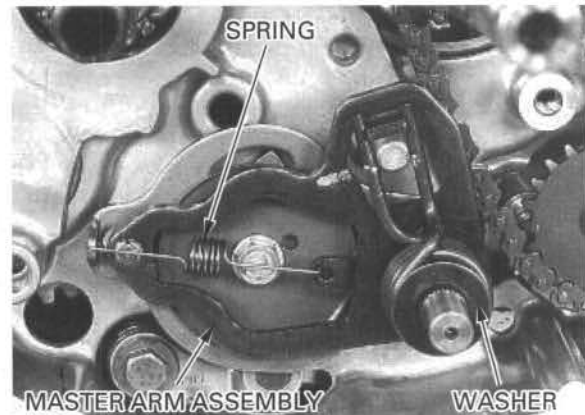


Install the gearshift master arm, return spring and washer onto the sub-gearshift spindle.

NOTE:

Install the master arm by 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.

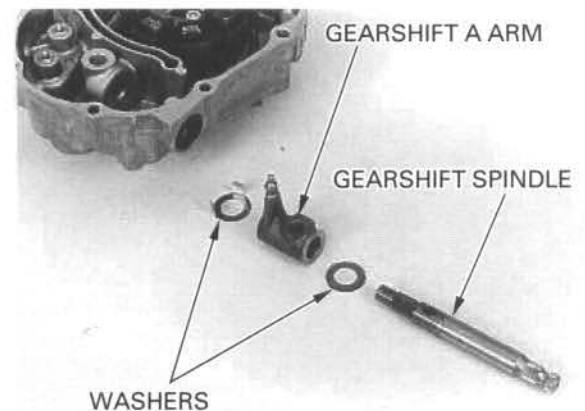
Install the clutch lever and washer.



Install the gearshift A arm and washers (except After 2001 TE model) into the alternator cover groove, then install the gearshift spindle.

NOTE:

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



'97–2001: Install the new lock washer and bolt, then tighten the bolt to the specified torque.

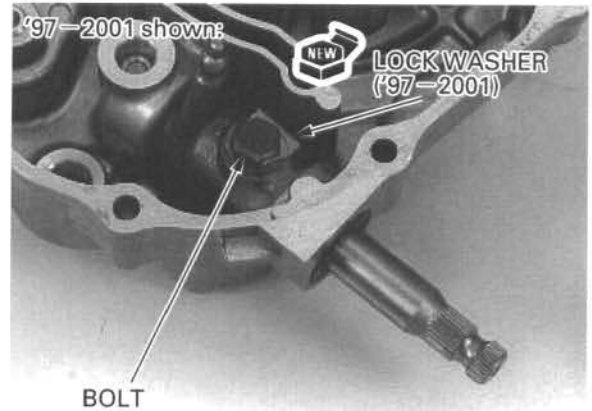
TORQUE: 25 N·m (2.5 kgf·m , 18 lbf·ft)

Bend the tab of the lock washer against the bolt.

After 2001: Install the gearshift spindle retaining bolt, then tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

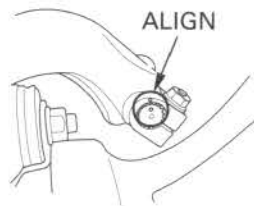
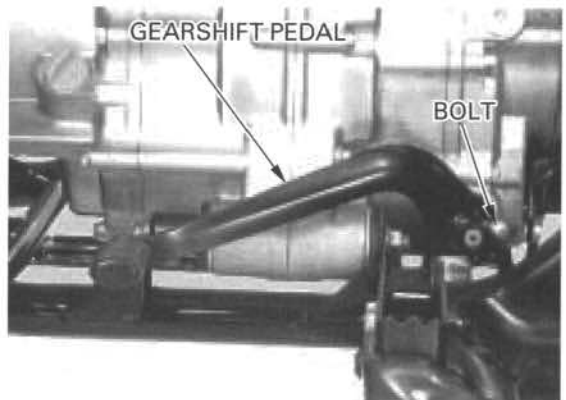
Install the alternator cover (page 10-13).



Except After 2001
TE model: Install the gearshift pedal onto the gearshift spindle by aligning the punch marks. Tighten the bolt to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)

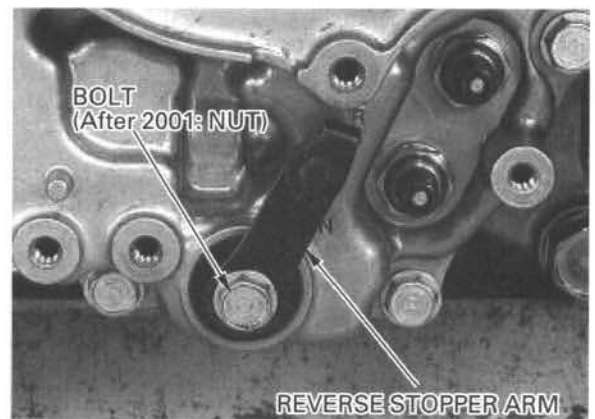
Install the removed parts in the reverse order of removal.



REVERSE STOPPER SHAFT

REMOVAL

Remove the bolt (After 2001: nut) and reverse stopper arm.
Remove the alternator cover (page 10-6).



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.

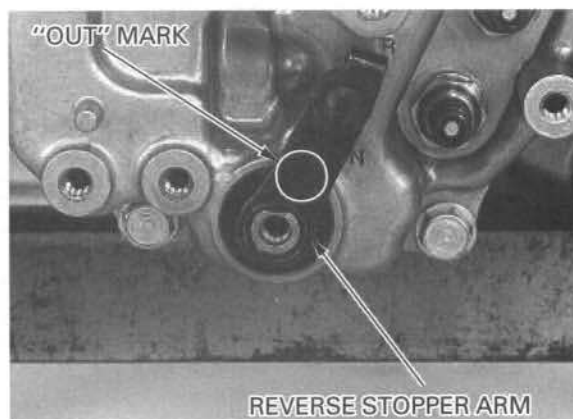


Install the thrust washer onto the reverse stopper shaft.

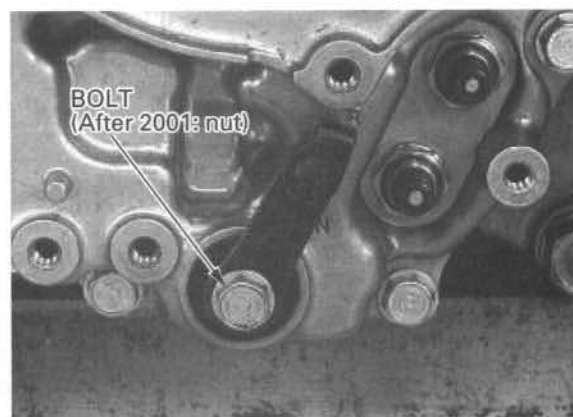
Install the alternator cover (page 10-13).



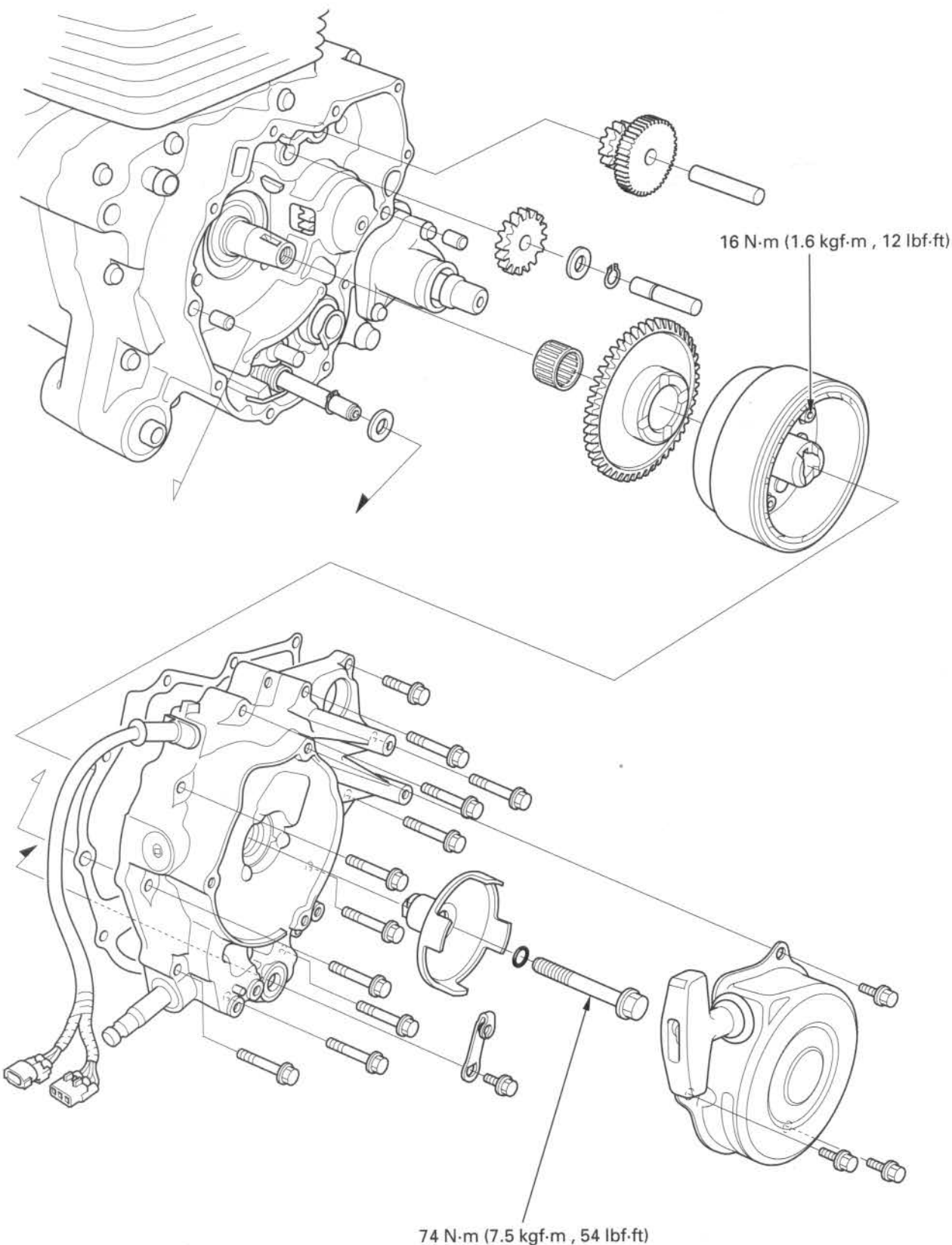
Install the reverse stopper arm with its "OUT" mark facing out.



Install and tighten the reverse stopper arm bolt (After 2001: nut) securely.



ALTERNATOR/STARTER CLUTCH



10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	ALTERNATOR REMOVAL	10-6
TROUBLESHOOTING	10-1	FLYWHEEL/STARTER CLUTCH	10-9
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 16 for alternator inspection, and to section 17 for ignition pulse generator inspection.
- These parts can be serviced with the engine in the frame.

TORQUE VALUES

Recoil pulley flange bolt	74 N·m (7.5 kgf·m , 54 lbf·ft)	Apply oil to the thread and flange surface.
Starter one-way clutch socket bolt	16 N·m (1.6 kgf·m , 12 lbf·ft)	Apply locking agent to the threads.
Ignition pulse generator socket bolt	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	Apply locking agent to the threads.

TOOLS

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Rotor puller	07733-0010000 or 07933-2000000
Flywheel holder	07725-0040000 or equivalent commercially available in U. S. A.

TROUBLESHOOTING

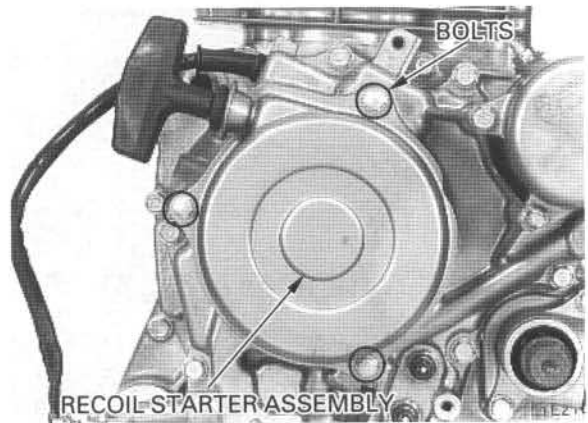
Engine does not turn

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

RECOIL STARTER

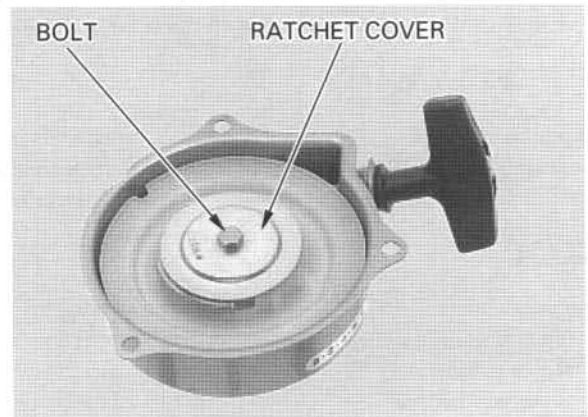
REMOVAL

Remove the bolts and recoil starter assembly.

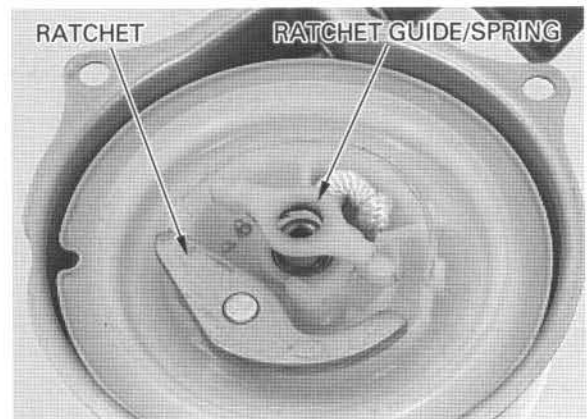


DISASSEMBLY

Remove the bolt and the ratchet cover.



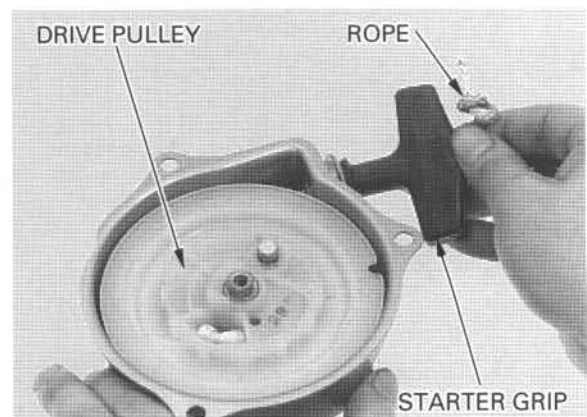
Remove the ratchet, ratchet guide and spring. Check each part for wear or damage.



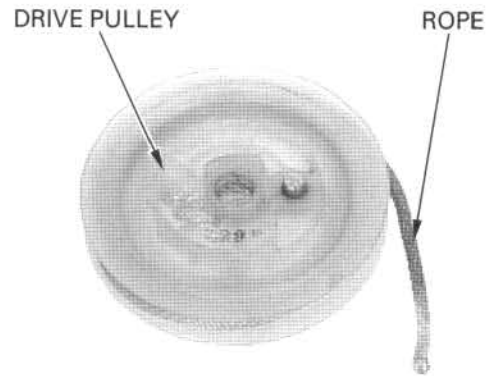
Untie the starter rope and remove the starter grip. Release the starter rope slowly. Remove the starter drive pulley.

CAUTION:

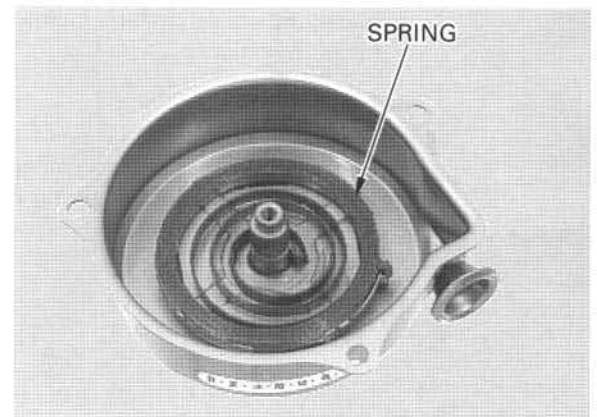
Wear eye protection and use care when removing the drive pulley and starter spring. The spring can pop out of the housing if care is not used.



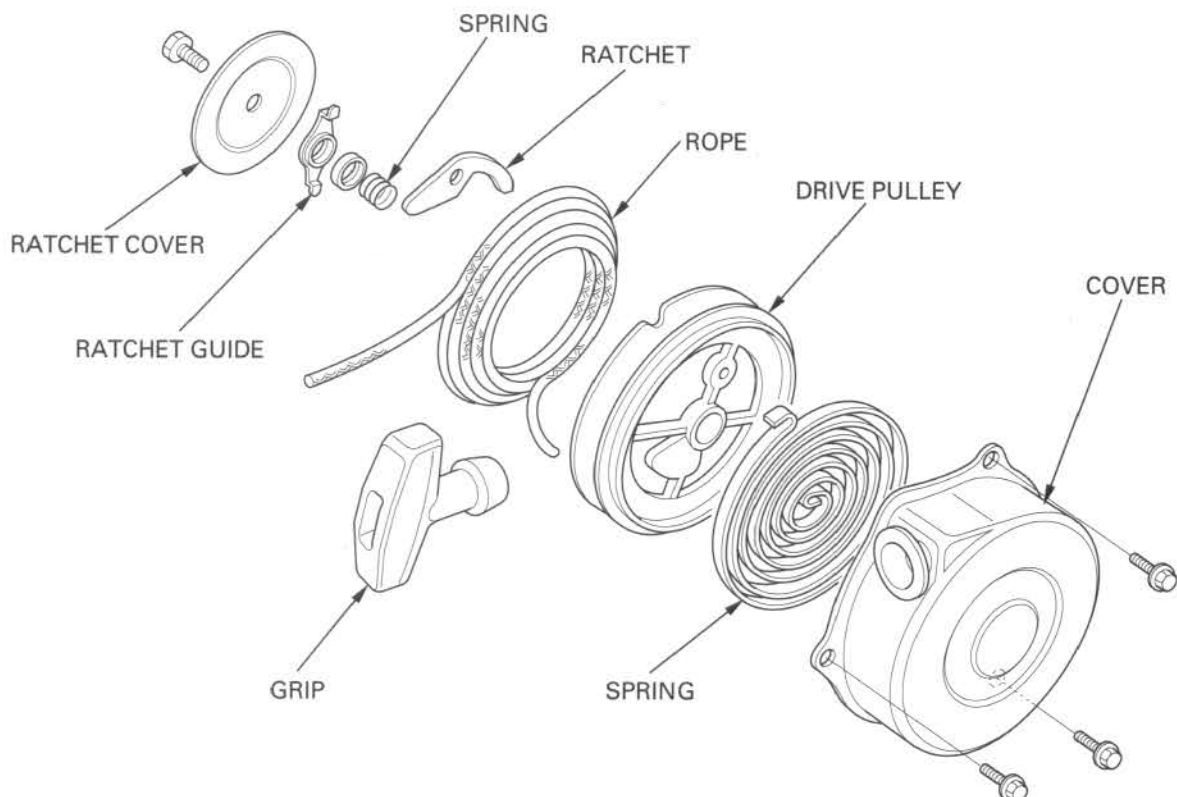
Remove the starter rope from the drive pulley.
Check the starter rope for wear or damage.



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



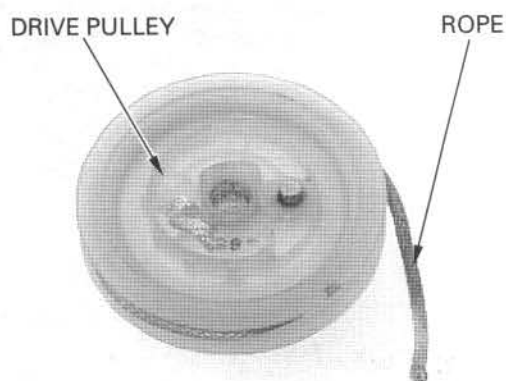
ASSEMBLY



ALTERNATOR/STARTER CLUTCH

Install the starter rope and tie a square knot as shown.

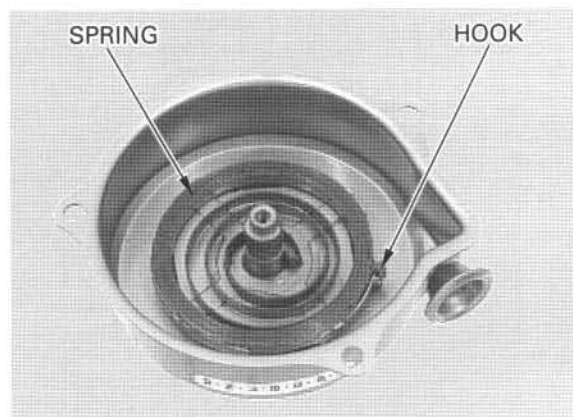
Wrap the rope around the starter pulley in a clockwise direction as viewed from the ratchet side as shown.



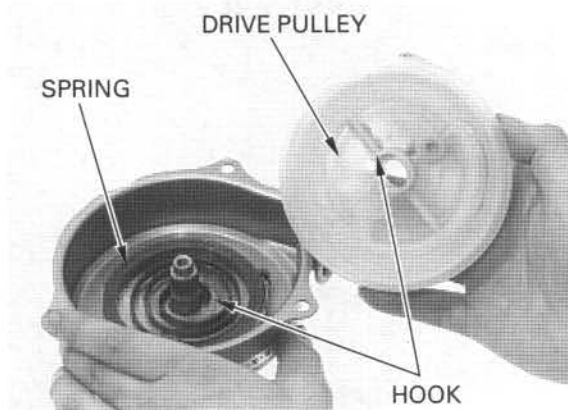
Install the spring by hooking the end on the starter housing hook.

CAUTION:

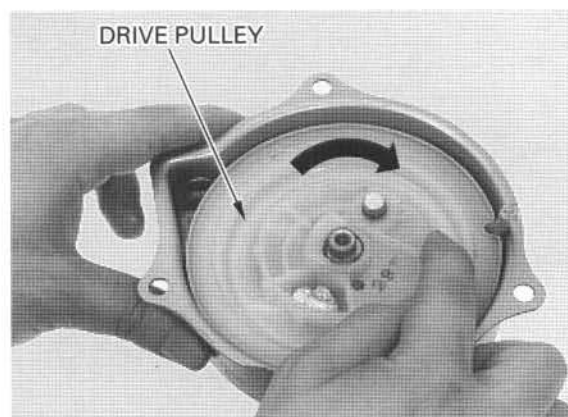
Wear eye protection and use care when installing the starter spring. The spring can pop out of the housing if care is not used.



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

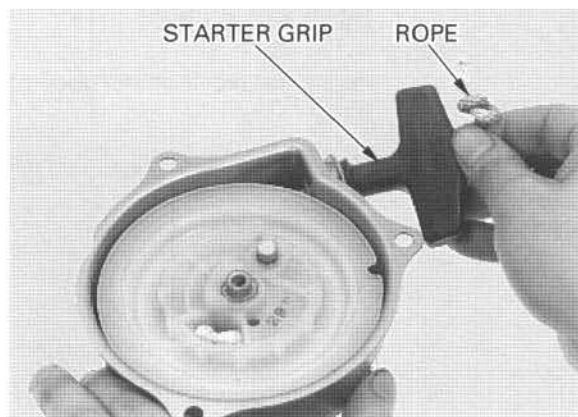


Reload the starter spring by turning the pulley 4 turns clockwise.

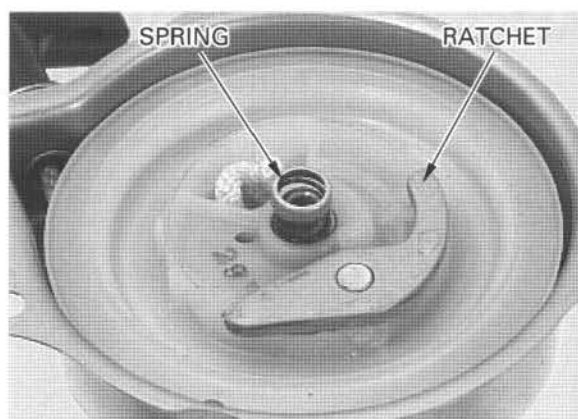


Route the rope end through the starter housing hole and install the grip.

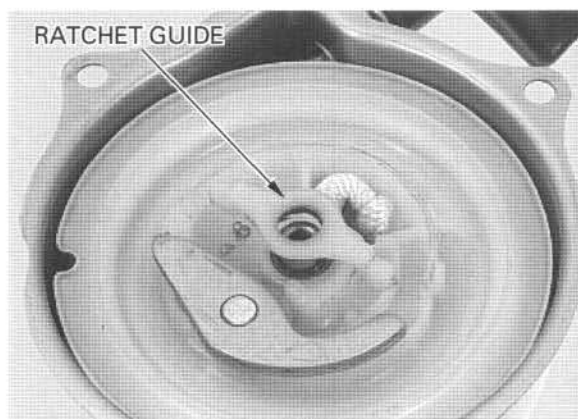
Tie the rope end in a square knot.



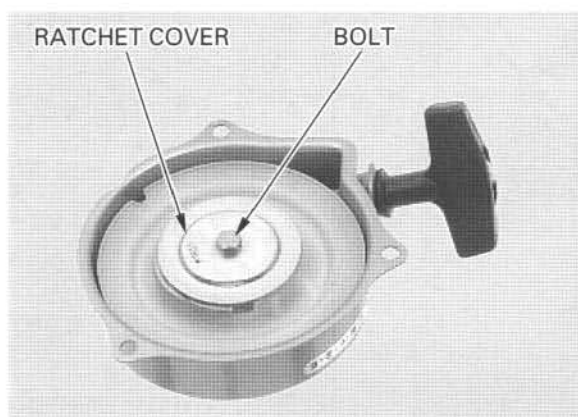
Apply grease to the ratchet.
Install the ratchet and spring.



Install the ratchet guide.



Install the ratchet cover and tighten the bolt.
Check the starter operation by pulling the starter grip.

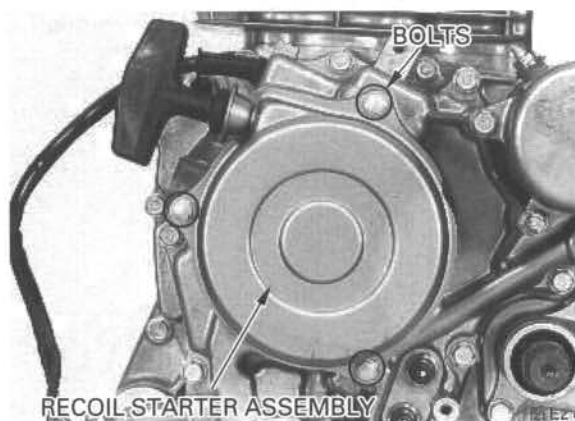


ALTERNATOR/STARTER CLUTCH

INSTALLATION

Install the recoil starter assembly and tighten the bolts.

Route the wires and secure them with the clamps.

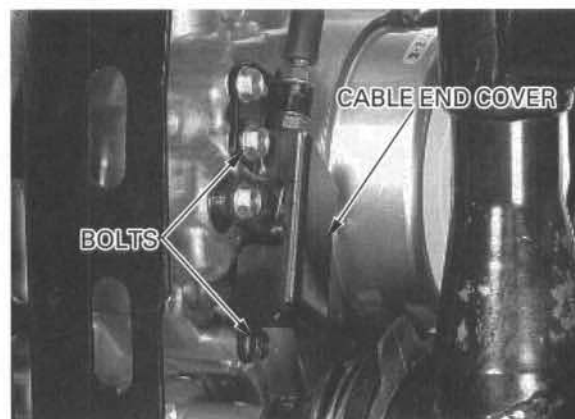


ALTERNATOR REMOVAL

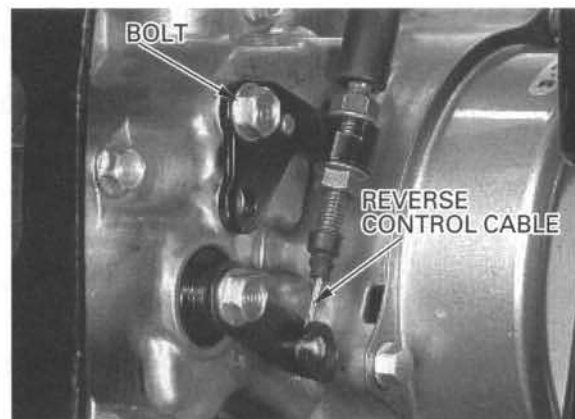
ALTERNATOR COVER REMOVAL

Remove the recoil starter (page 10-2).

Remove the two bolts and cable end cover.

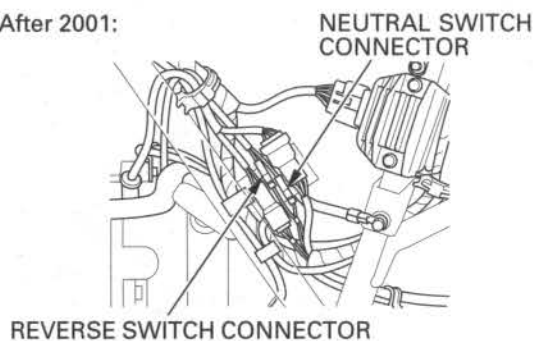


Remove the bolt and disconnect the reverse control cable end from the lever.

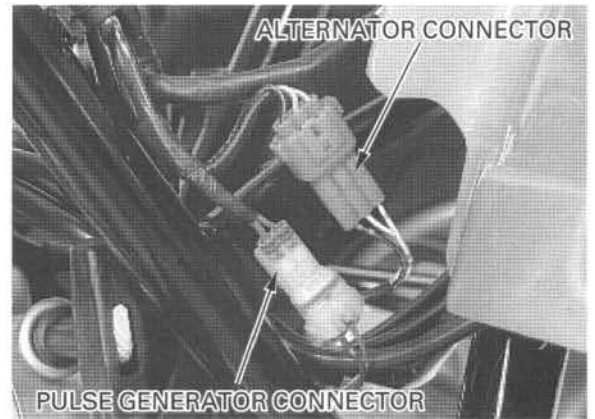


Disconnect the reverse switch and neutral switch connectors.

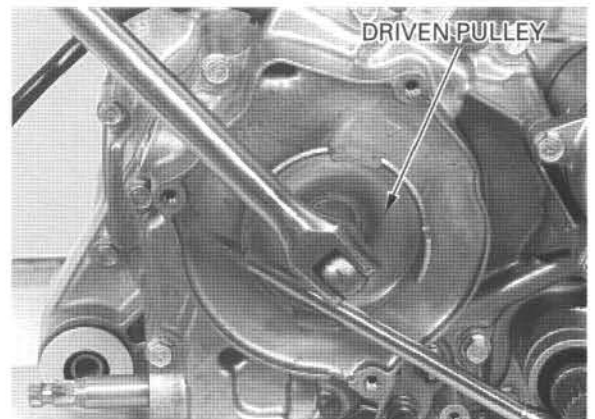
After 2001:



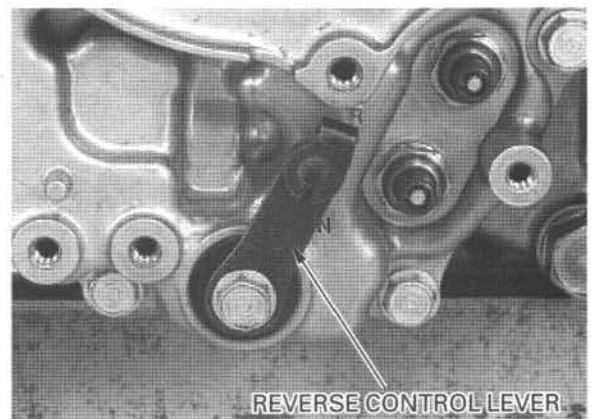
Disconnect the ignition pulse generator and alternator connectors.



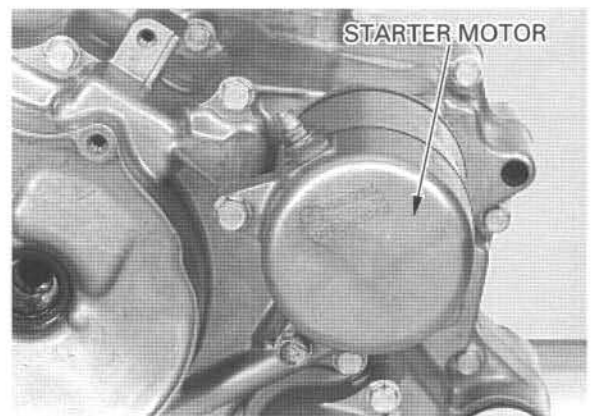
Hold the starter driven pulley using a screwdriver, then remove the bolt.



Remove the reverse control lever.



Remove the starter motor (page 18-3).

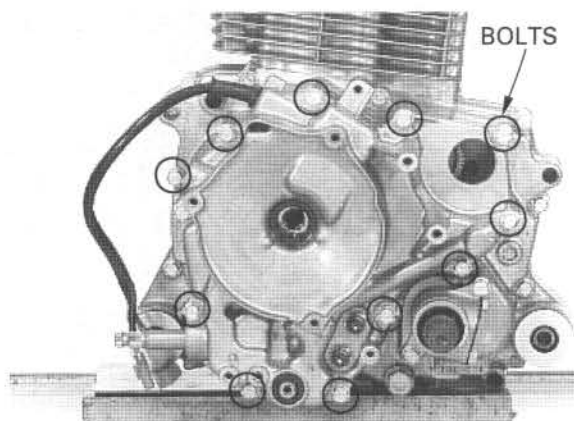


ALTERNATOR/STARTER CLUTCH

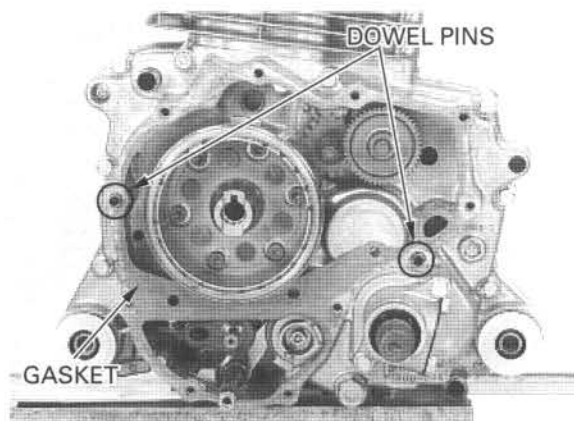
Remove the eleven bolts and alternator cover.

NOTE:

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



Remove the gasket and dowel pins.

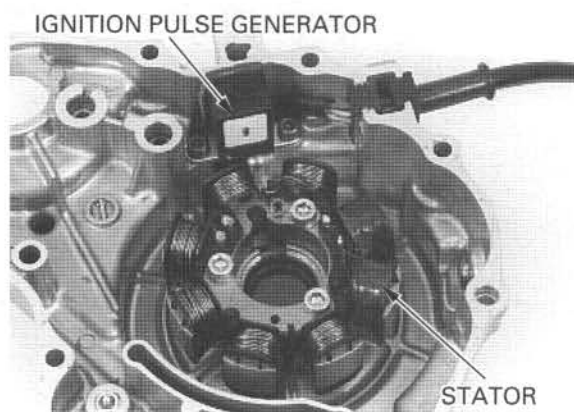


ALTERNATOR COVER DISASSEMBLY

Remove the wire grommet from the alternator cover groove.

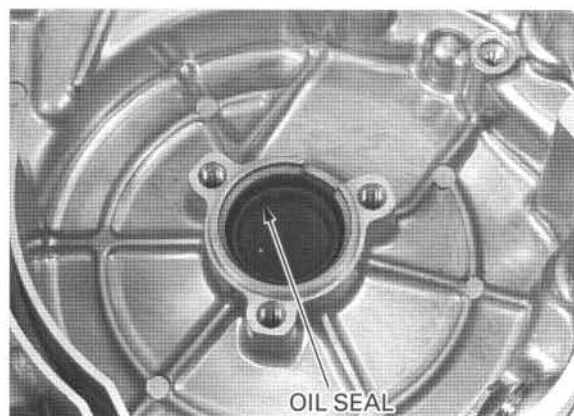
Remove the ignition pulse generator and stator mounting bolts.

Remove the stator/ignition pulse generator assembly.



Inspect the alternator cover oil seal for wear or damage.

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

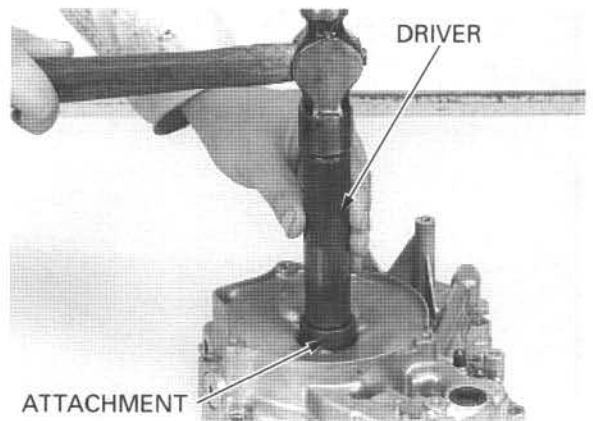


Install the oil seal using the special tools as shown.

TOOLS:

Driver 07749-0010000

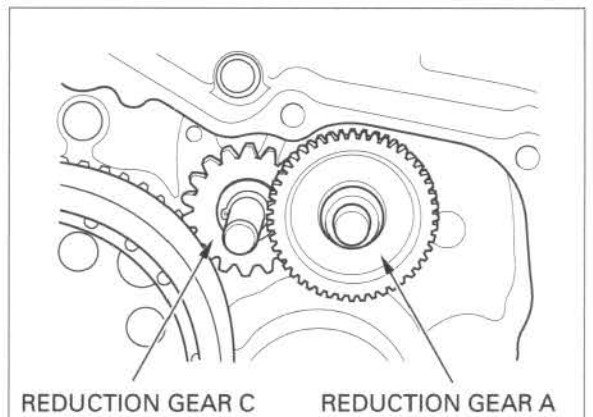
Attachment, 32 × 35 mm 07746-0010100



FLYWHEEL/STARTER CLUTCH

FLYWHEEL/STARTER CLUTCH REMOVAL

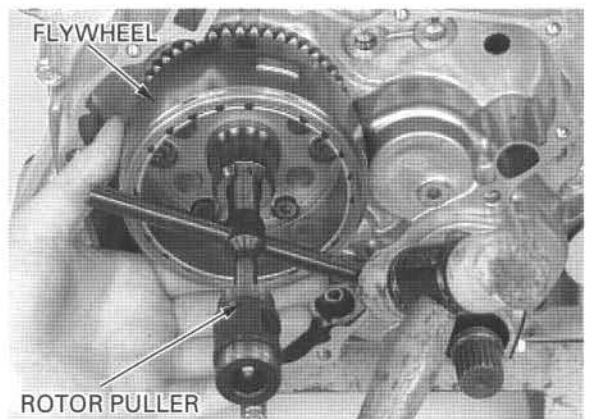
Remove the starter reduction gear A and shaft.
Remove the washer and reduction gear C.



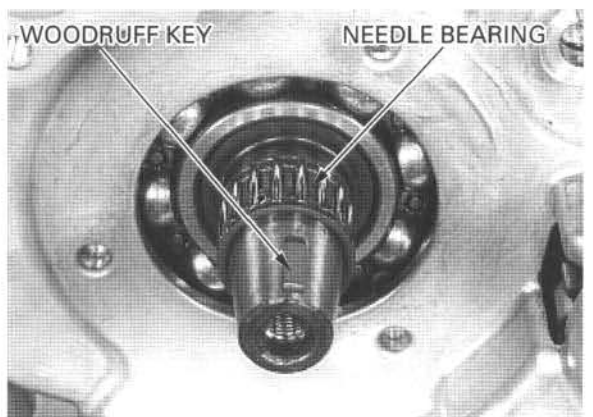
Remove the flywheel and starter driven gear using the special tool.

TOOL:

Rotor puller 07733-0010000 or 07933-2000000

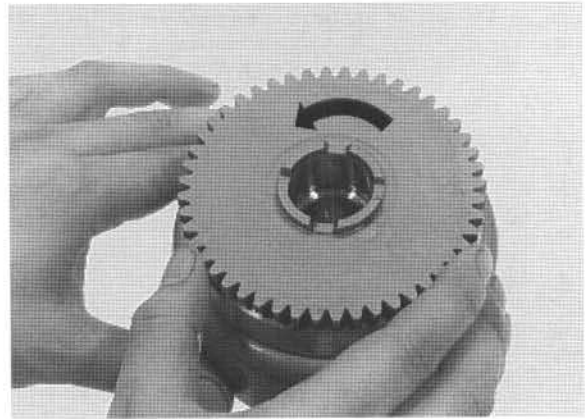


Remove the needle bearing and woodruff key.

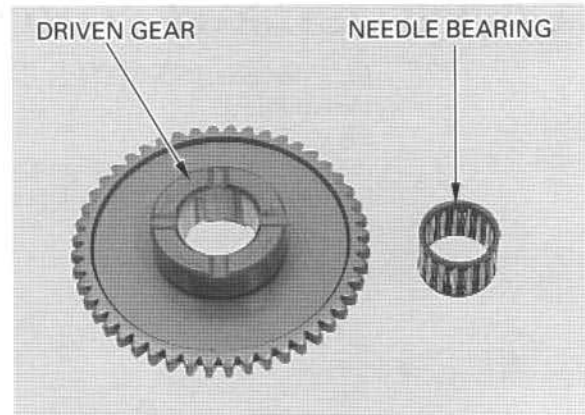


STARTER CLUTCH INSPECTION/ DISASSEMBLY

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



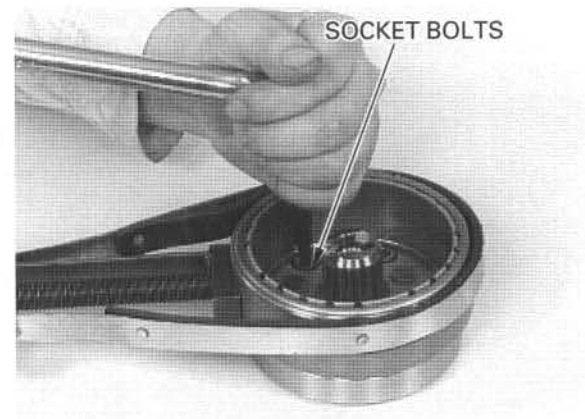
Inspect the starter driven gear teeth for damage or abnormal wear.
Check the needle bearing for damage.



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

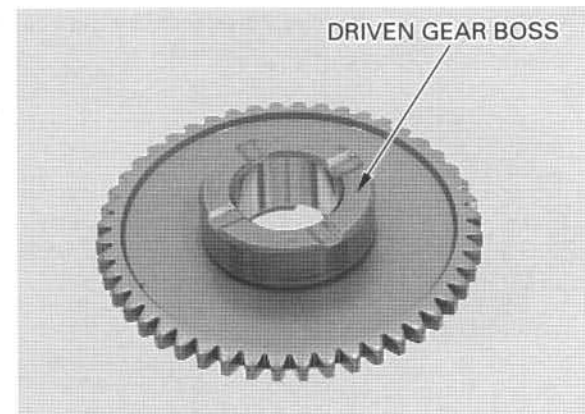
TOOL:
Flywheel holder

07725-0040000 or
equivalent commercially
available in U. S. A.

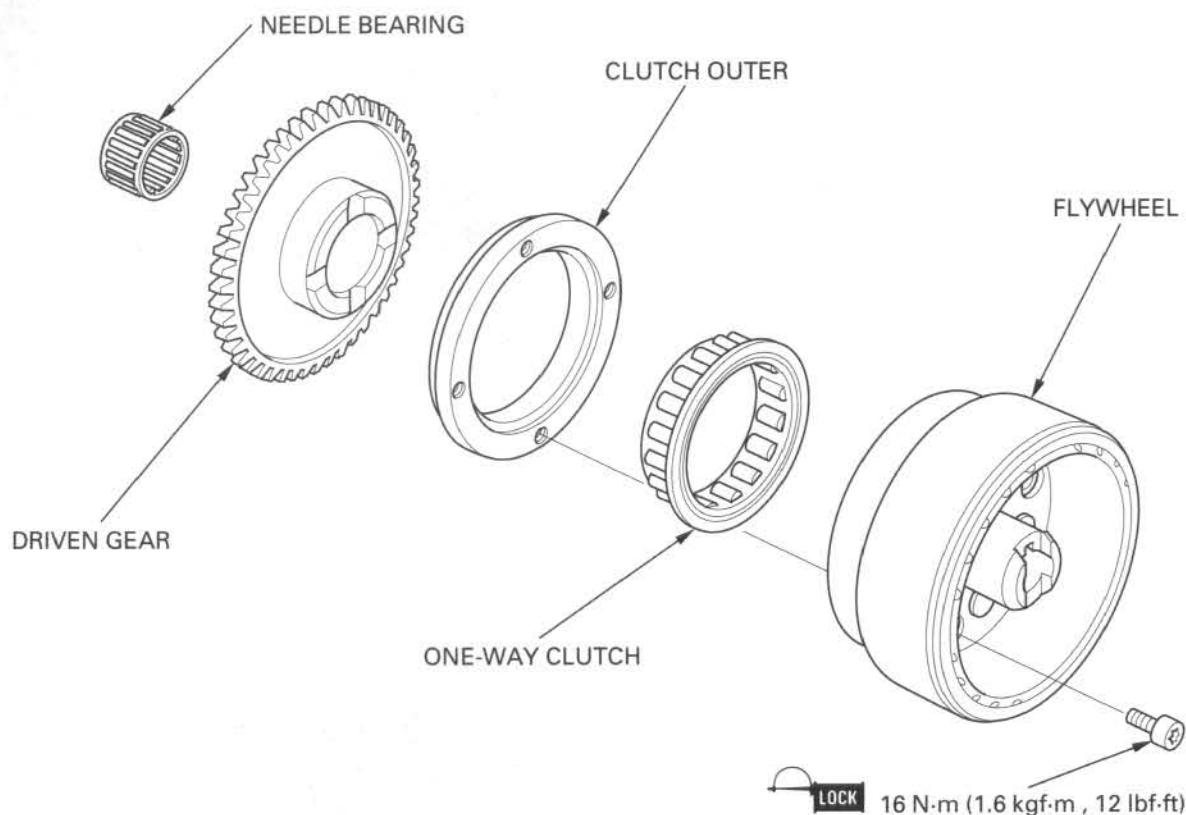


Check the one-way clutch rollers for wear or damage.

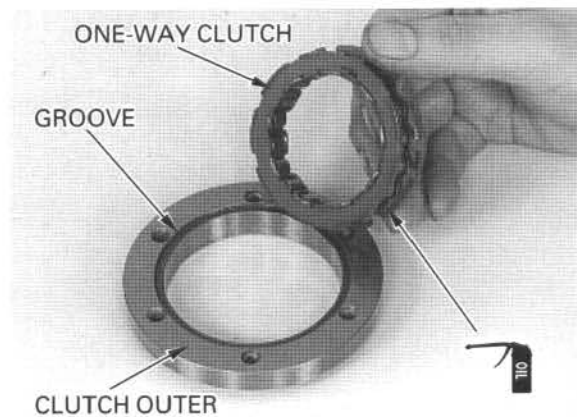
Check the starter driven gear boss for wear or damage.



STARTER CLUTCH ASSEMBLY



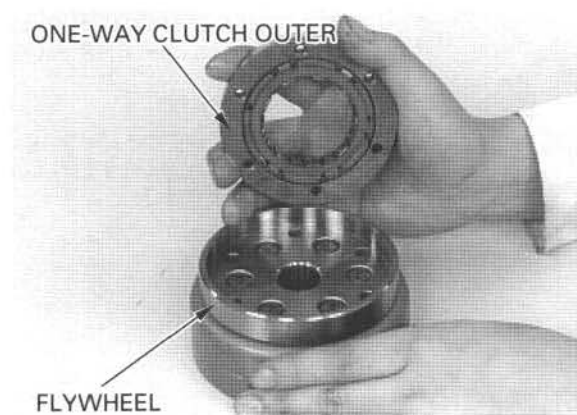
Apply oil to the one-way clutch rollers. Install the one-way clutch in the clutch outer. Install the lips of the clutch into the groove of the clutch outer as shown.



Assemble the one-way clutch outer and the flywheel.

NOTE:

Make sure the flange side of the one-way clutch faces toward the flywheel.



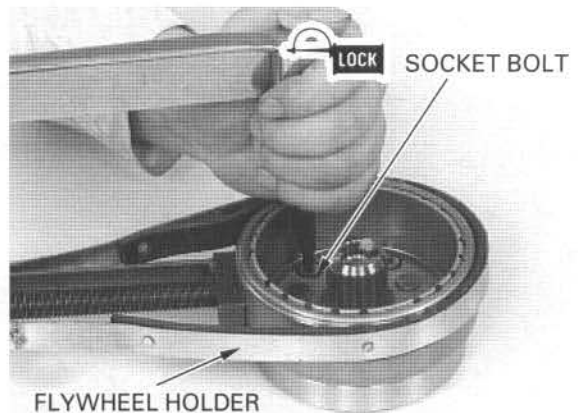
ALTERNATOR/STARTER CLUTCH

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

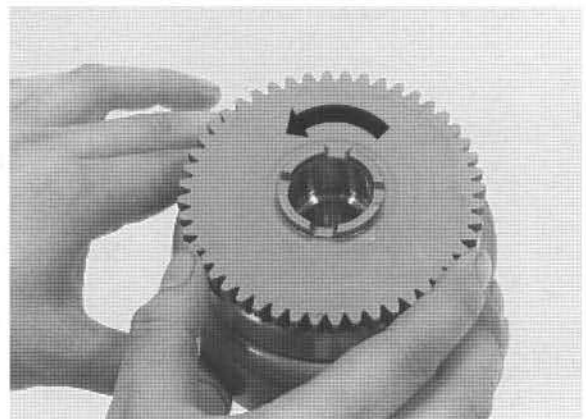
TORQUE: 16 N·m (1.6 kgf·m , 12 lbf·ft)

TOOL:

Flywheel holder 07725-0040000 or equivalent commercially available in U. S. A.



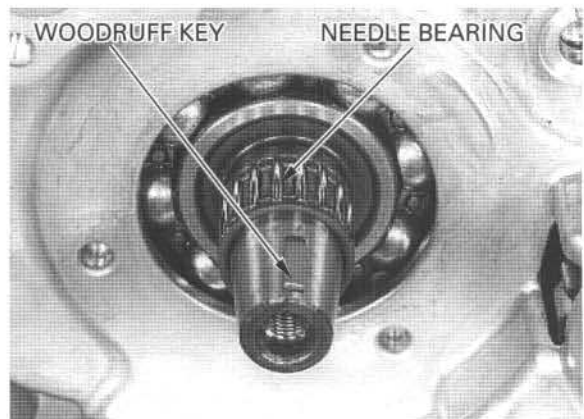
Install the stater driven gear into the one-way clutch by turning it counterclockwise.



FLYWHEEL/STARTER CLUTCH INSTALLATION

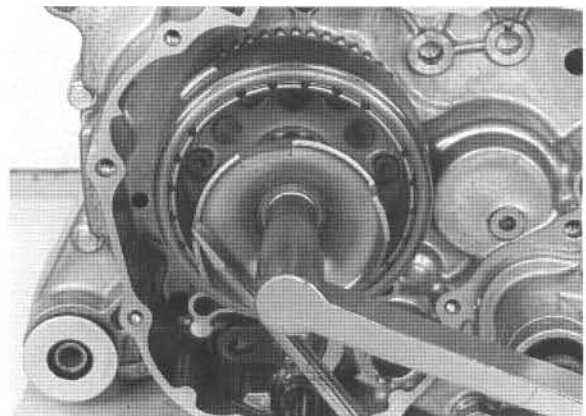
Clean any oil from the crankshaft taper.

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

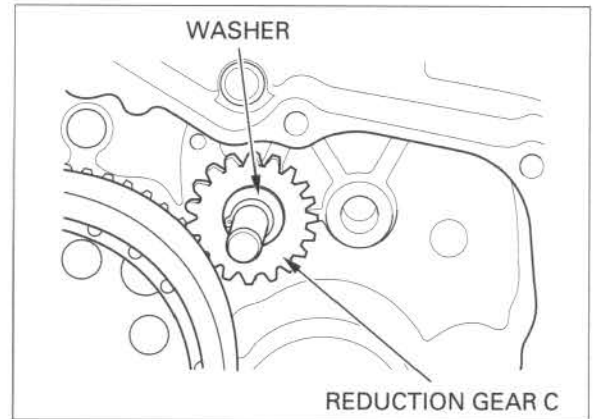


Install the flywheel/starter reduction gear aligning the key way in the flywheel with the key on the crankshaft.

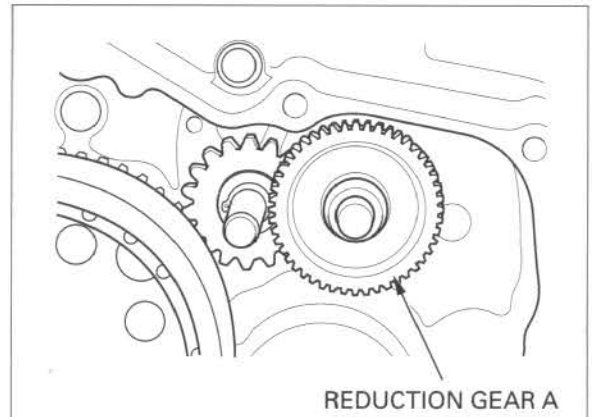
For installation of the alternator cover, temporarily install the driven pulley and tighten the driven pulley bolt to seat the flywheel.



Install the starter reduction gear C and thrust washer.



Install the starter reduction shaft and reduction gear A.

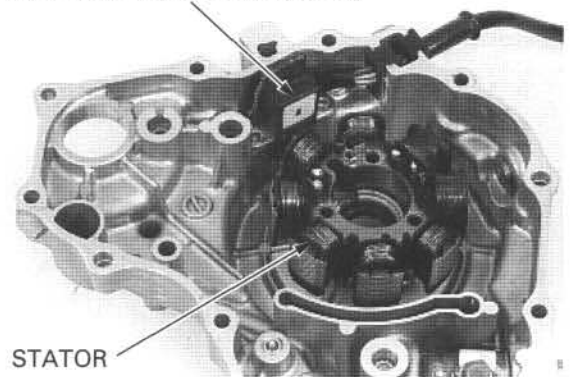


ALTERNATOR INSTALLATION

ALTERNATOR ASSEMBLY

Apply sealant to the grommets of the alternator/ignition pulse generator wire grommets. Install the 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.

IGNITION PULSE GENERATOR

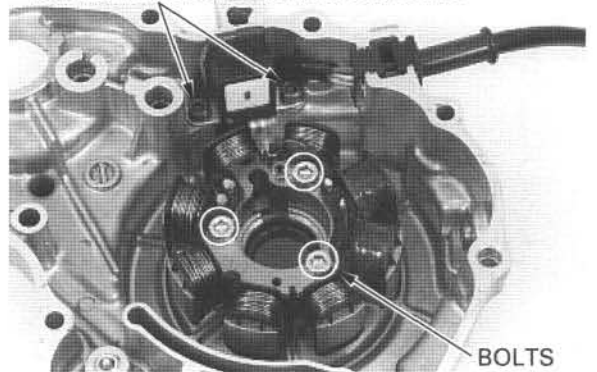


Install and tighten the stator mounting bolts.

Install and tighten the ignition pulse generator mounting bolts.

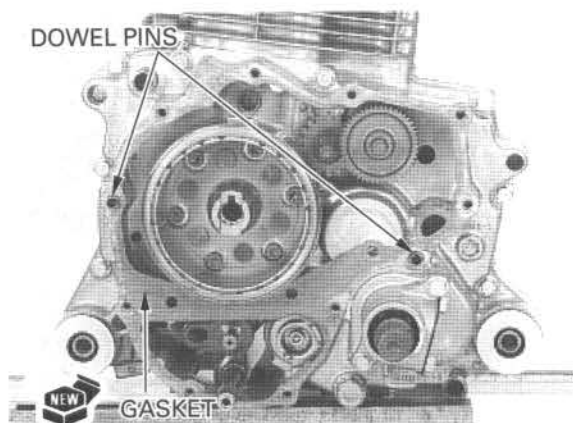
TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

IGNITION PULSE GENERATOR BOLTS



ALTERNATOR/STARTER CLUTCH

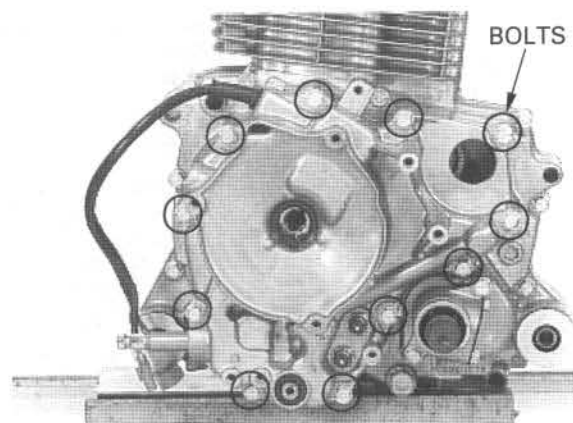
Install the dowel pins and new gasket.



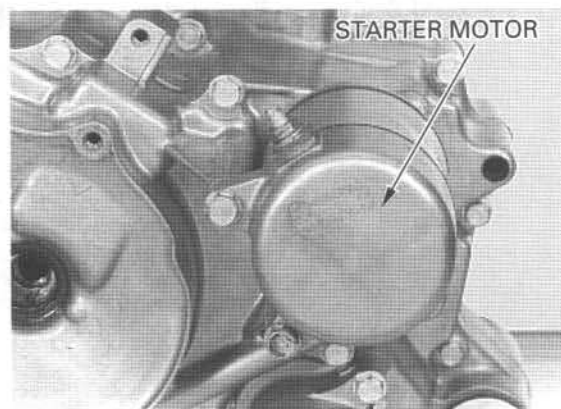
Install the alternator cover and tighten the eleven bolts securely.

CAUTION:

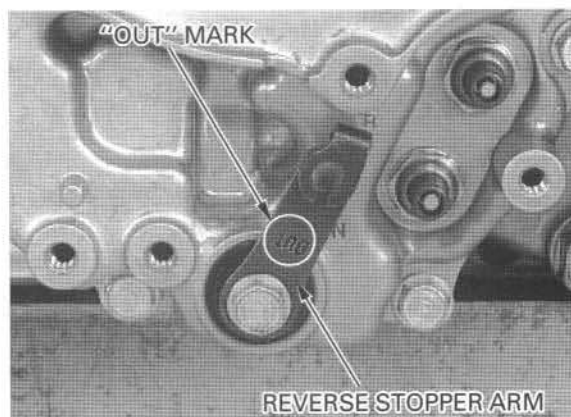
The alternator cover (stator) is magnetically attached to the flywheel, be careful not to pinch your finger.



Install the starter motor (page 18-7).



Install the reverse stopper arm with its "OUT" mark facing out. Install and tighten the reverse stopper arm bolt securely.



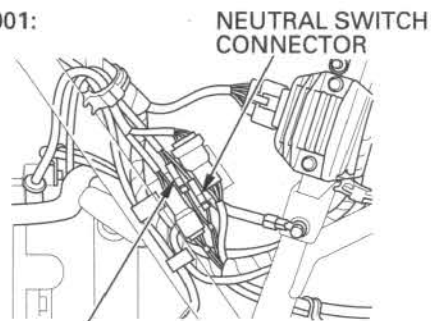
Route the alternator, ignition pulse generator and neutral/reverse switch wire properly (page 1-29) and clamp them securely.

Connect the alternator and ignition pulse generator switch connectors.



Connect the reverse switch and neutral switch connectors.

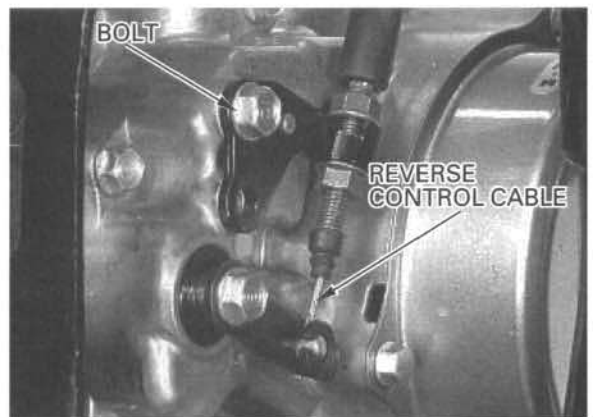
After 2001:



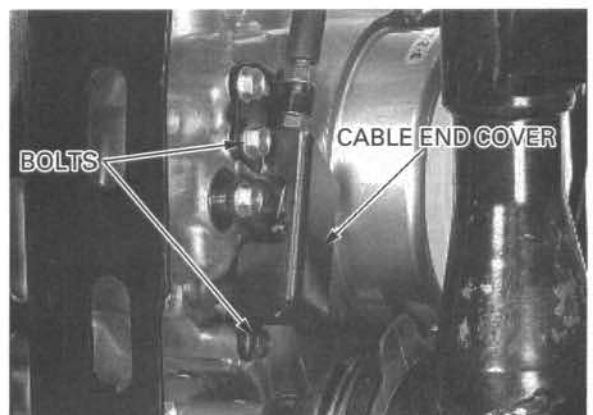
REVERSE SWITCH CONNECTOR



Connect the reverse control cable end to the lever. Install the plate and tighten the bolt.

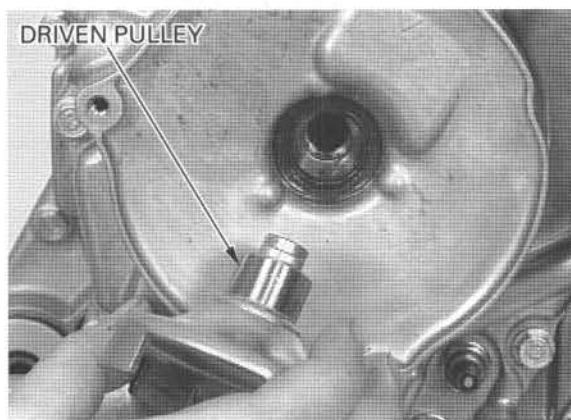


Install the cable end cover and tighten the two bolts.

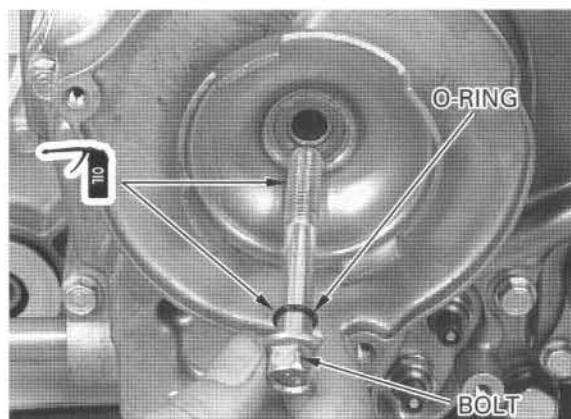


ALTERNATOR/STARTER CLUTCH

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



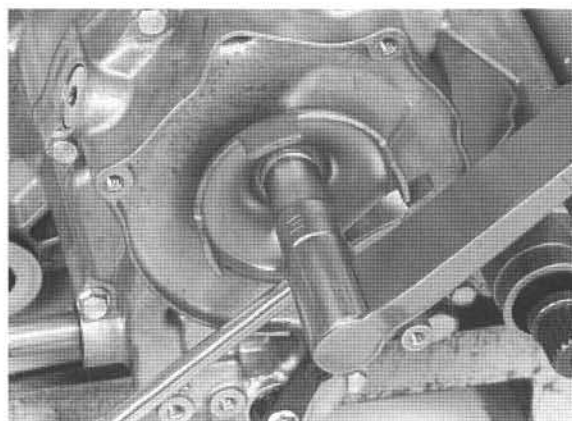
Apply oil to the driven pulley bolt threads and O-ring.
Install the driven pulley bolt with a O-ring.

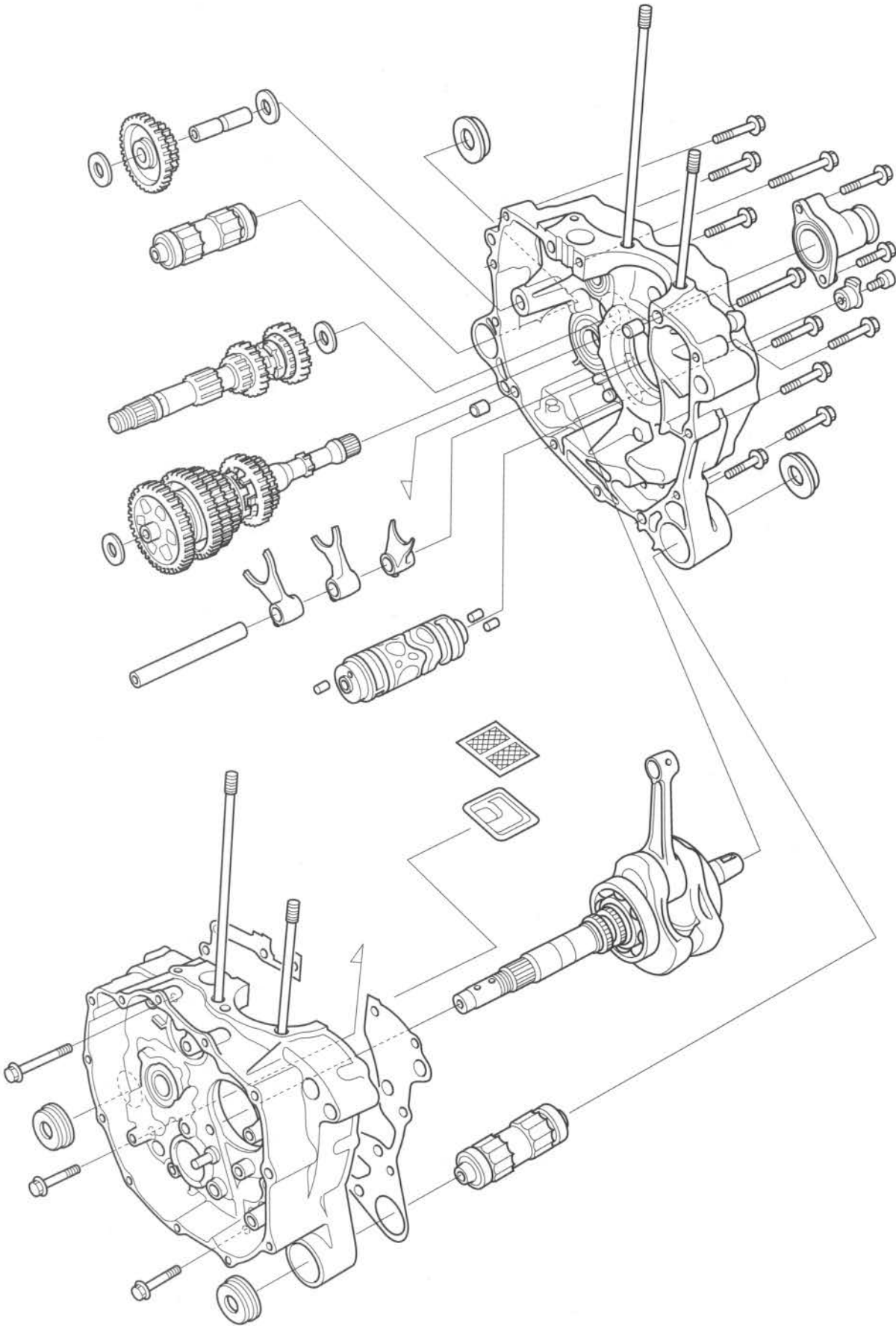


Hold the starter driven pulley using a screw driver, then tighten the bolt to the specified torque.

TORQUE: 74 N·m (7.5 kgf·m , 54 lbf·ft)

Install the recoil starter (page 10-5).





11. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	11-1	TRANSMISSION	11-4
TROUBLESHOOTING	11-3	CRANKSHAFT	11-13
CRANKCASE SEPARATION	11-4	CRANKCASE ASSEMBLY	11-15

SERVICE INFORMATION

GENERAL

- For crankshaft 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)

ITEM				SPECIFICATIONS	SERVICE LIMIT
Crankshaft, connecting rod	Side clearance		0.05 – 0.50 (0.002 – 0.020)		0.80 (0.031)
	Radial clearance		0.004 – 0.012 (0.0002 – 0.0005)		0.05 (0.002)
	Runout	Front	—————		0.06 (0.002)
		Rear	—————		0.03 (0.001)
Transmission	Gear I. D.	M4		23.000 – 23.021 (0.9055 – 0.9063)	23.04 (0.907)
		M5		18.000 – 18.021 (0.7087 – 0.7095)	18.04 (0.710)
		C1, C2, C3, CR		25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
		Reverse idle		13.000 – 13.018 (0.5118 – 0.5125)	13.04 (0.513)
	Shaft O. D.	M4		19.959 – 19.980 (0.7858 – 0.7866)	19.93 (0.785)
		M5		14.966 – 14.984 (0.5892 – 0.5899)	14.94 (0.588)
		Reverse idle		12.966 – 12.984 (0.5105 – 0.5112)	12.94 (0.509)
	Gear bushing	C1, C2, CR O. D.		24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
		M4	I. D.	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
			O. D.	22.959 – 22.979 (0.9039 – 0.9047)	22.94 (0.903)
		M5	I. D.	15.000 – 15.018 (0.5906 – 0.5913)	15.04 (0.592)
			O. D.	17.959 – 17.980 (0.7070 – 0.7079)	17.94 (0.706)
		C3	I. D.	22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
			O. D.	24.959 – 24.980 (0.9826 – 0.9835)	24.94 (0.982)
		Gear-to-bushing clearance	M4		0.021 – 0.062 (0.0008 – 0.0024)
	M5		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)	
	C1, C2, C3, CR		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)	
	Gear-to-shaft clearance	Reverse idle		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
	Bushing-to-shaft clearance	M4		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		M5		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
		C3		0.020 – 0.062 (0.0008 – 0.0024)	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)	4.60 (0.181)
	Fork shaft O. D.		12.966 – 12.984 (0.5105 – 0.5112)		12.96 (0.510)

CRANKSHAFT/TRANSMISSION

TORQUE VALUES

Front crank case stud bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)
Rear crank case stud bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)
Neutral switch rotor	10 N·m (1.0 kgf·m , 7 lbf·ft) Apply a locking agent to the threads.

TOOLS

Bearing remover set	07936-KC10000 (Not available in U. S. A.)
Bearing remover set	07936-KC10500
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300
Attachment, 42 × 47 mm	07746-0010300
Pilot, 15 mm	07746-0040300
Pilot, 35 mm	07746-0040800
Attachment, 52 × 55 mm	07746-0010400
Pilot, 25 mm	07746-0040600
Attachment, 72 × 75 mm	07746-0010600
Thread adapter	07965-KA30000 or 07VMF-HM8010A
Assembly collar	07965-VM00100
Assembly shaft	07965-VM00200 or 07931-ME4010B (U. S. A. only)
Special nut	07931-HB3020A (U. S. A. only)

TROUBLESHOOTING

Crankshaft noisy

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

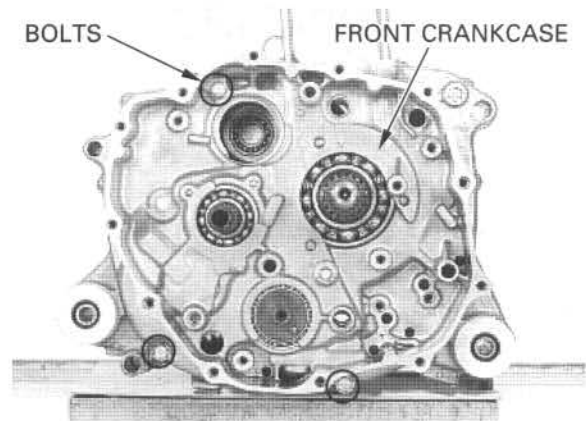
CRANKCASE SEPARATION

NOTE:

Refer to page 11-1 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.



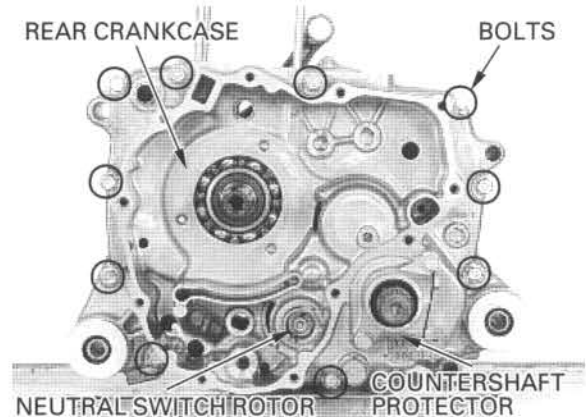
Loosen the ten rear crankcase bolts in a crisscross pattern in 2 or 3 steps to prevent crankcase distortion.

Remove the rear crankcase bolts.

Remove the two bolts.

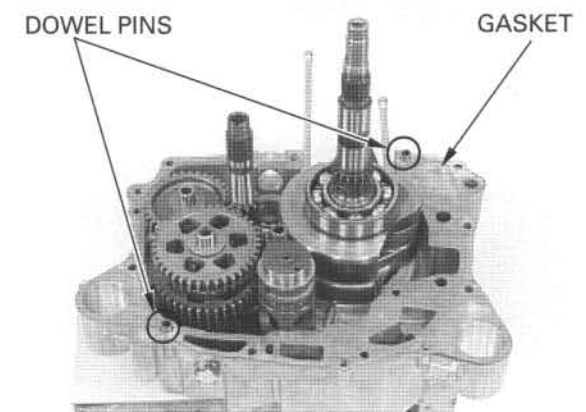
Remove the countershaft protector and O-ring.

Remove the neutral switch rotor.



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:

- Thrust washer
- C1 gear
- C1 gear bushing

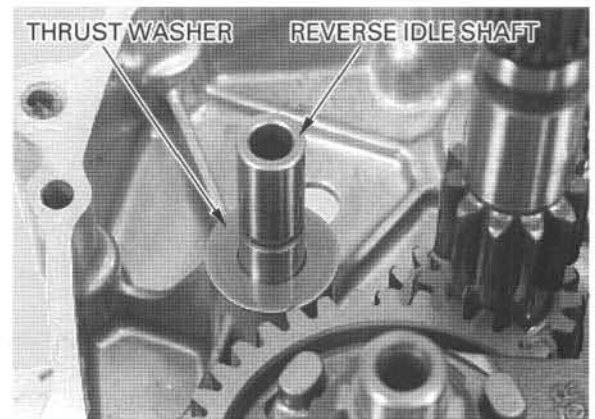


Remove the following:

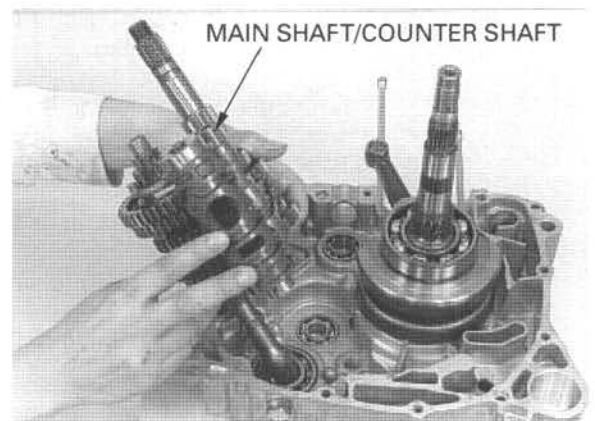
- Thrust washer
- Reverse idle gear



- Thrust washer
- Reverse idle shaft



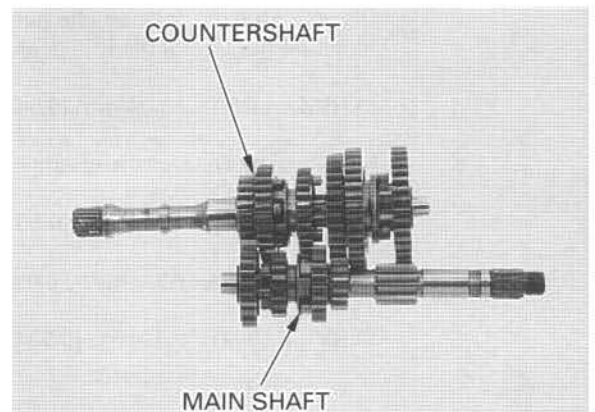
Remove the mainshaft, countershaft and shiftdrum as an assembly.
Remove the mainshaft thrust washer.



Disassemble the mainshaft and countershaft.

NOTE:

- Keep track of the disassembled parts (gears, bushings, washers, and snap rings) by stacking them on a tool or slipping them onto a piece of wire.
- Do not expand the snap ring more than necessary for removal. To remove a snap ring, expand the snap ring and pull it off using the gear behind it.

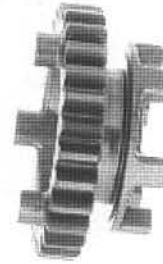


INSPECTION

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:	25.04 mm (0.986 in)
M4	23.04 mm (0.907 in)
M5	18.04 mm (0.710 in)



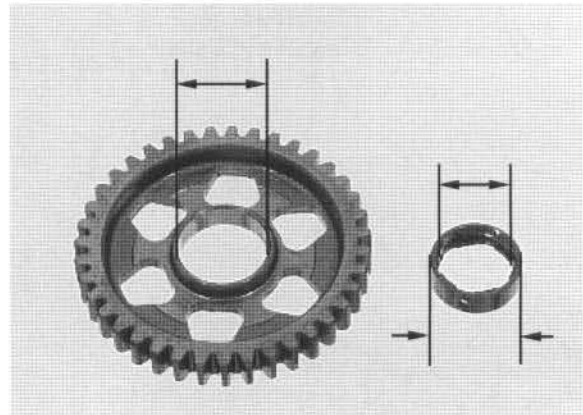
Measure the I. D. and O. D. of each gear bushing.

SERVICE LIMITS:

C1, C2, CR O. D. :	24.94 mm (0.982 in)
M4: O. D. :	22.94 mm (0.903 in)
I. D. :	20.04 mm (0.789 in)
M5: O. D. :	17.94 mm (0.706 in)
I. D. :	15.04 mm (0.592 in)
C3: O. D. :	24.94 mm (0.982 in)
I. D. :	22.04 mm (0.868 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.

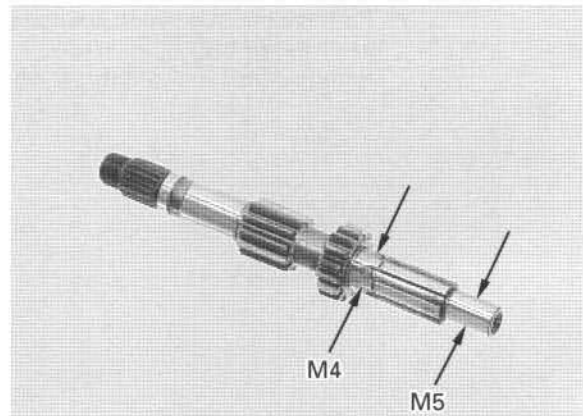
Measure the O. D. of the mainshaft.

SERVICE LIMITS:

M4:	19.93 mm (0.785 in)
M5:	14.94 mm (0.588 in)

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



Disassemble the reverse idle gear assembly.
Measure the I. D. of the idle gear.

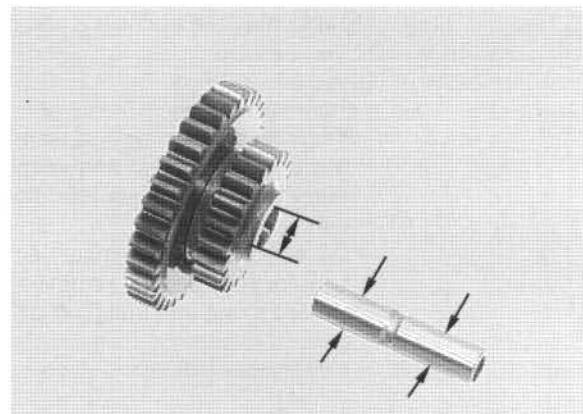
SERVICE LIMIT: 13.04 mm (0.513 in)

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

SERVICE LIMIT: 12.94 mm (0.509 in)

Calculate the gear-to-shaft clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)



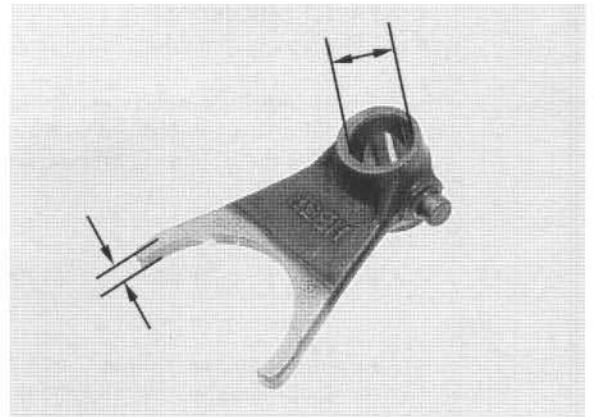
Check the shift fork and fork shaft for wear or damage.

Measure the I. D. of the shift fork.

SERVICE LIMIT: 13.04 mm (0.513 in)

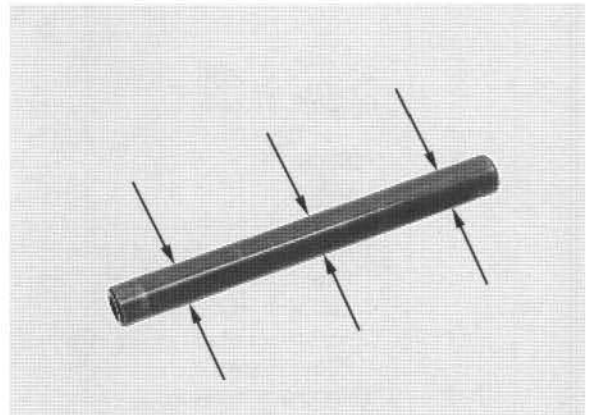
Measure the shift fork claw thickness.

SERVICE LIMIT: 4.60 mm (0.181 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.

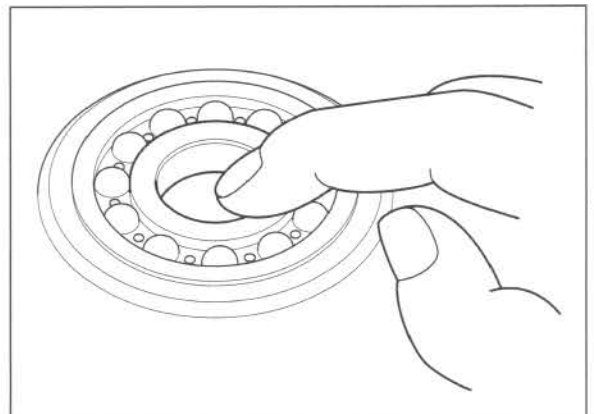


BEARING REPLACEMENT

NOTE:

For crankshaft bearing replacement, see page 11-13.

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.



FRONT CRANKCASE

Remove the mainshaft bearing set plate.

If the bearings need replacement, drive out the mainshaft and shift drum bearing.

Remove the countershaft bearing using the special tools.

TOOLS:

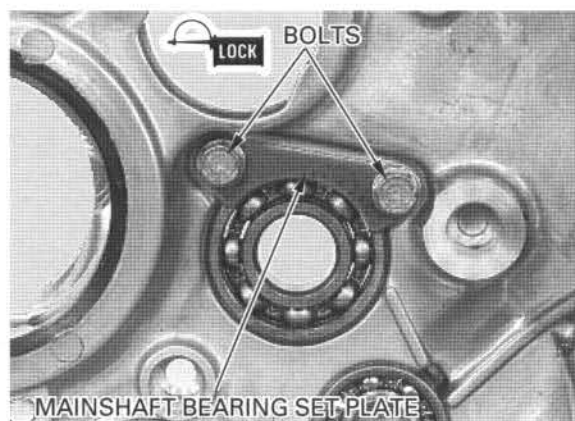
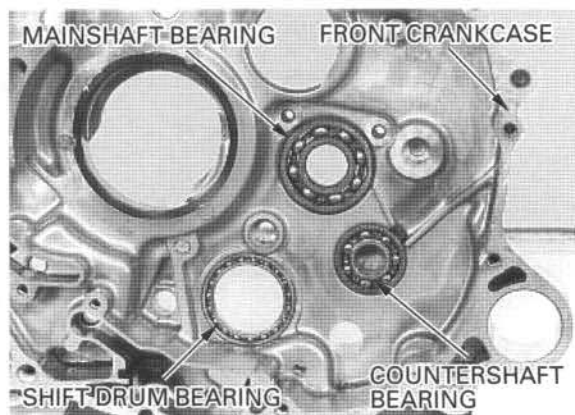
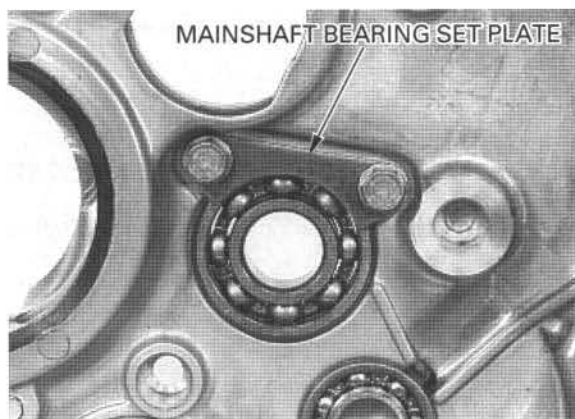
Bearing remover set	07936-KC10000 (Not available in U. S. A.) or
Bearing remover, 15 mm	07936-KC10500
Remover weight	07936-371020A (U. S. A. only) 07936-3710200 (U. S. A. only)

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

TOOLS:

Driver	07749-0010000
Mainshaft bearing:	
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500
Countershaft bearing:	
Attachment, 32 × 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300
Shift drum bearing:	
Attachment, 42 × 47 mm	07746-0010300
Pilot, 35 mm	07746-0040800

Apply a locking agent to the threads, then tighten the two bolts securely.



REAR CRANKCASE

Remove the countershaft oil seal.

Remove the rear crankcase bearings using the special tools.

TOOLS:

Mainshaft and camshaft bearings:

Bearing remover set	07936-KC10000 (Not available in U. S. A.) or
Bearing remover, 15 mm	07936-KC10500
Remover weight	07936-371020A (U. S. A. only) 07936-3710200 (U. S. A. only)



Drive new bearings into the rear crankcase.

TOOLS:

Driver

07749-0010000

Countershaft bearing:

Attachment, 52 × 55 mm

07746-0010400

Pilot, 25 mm

07746-0040600

Mainshaft/camshaft bearing:

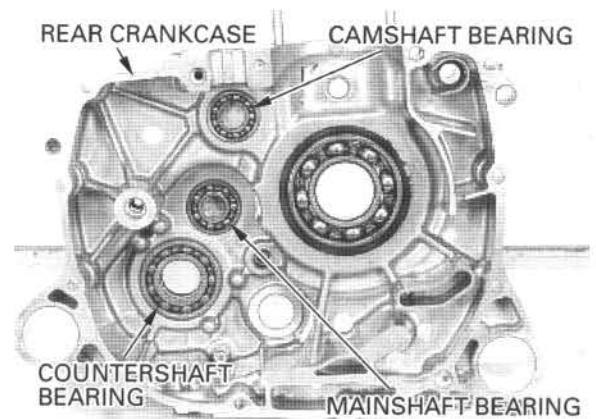
Attachment, 32 × 35 mm

07746-0010100

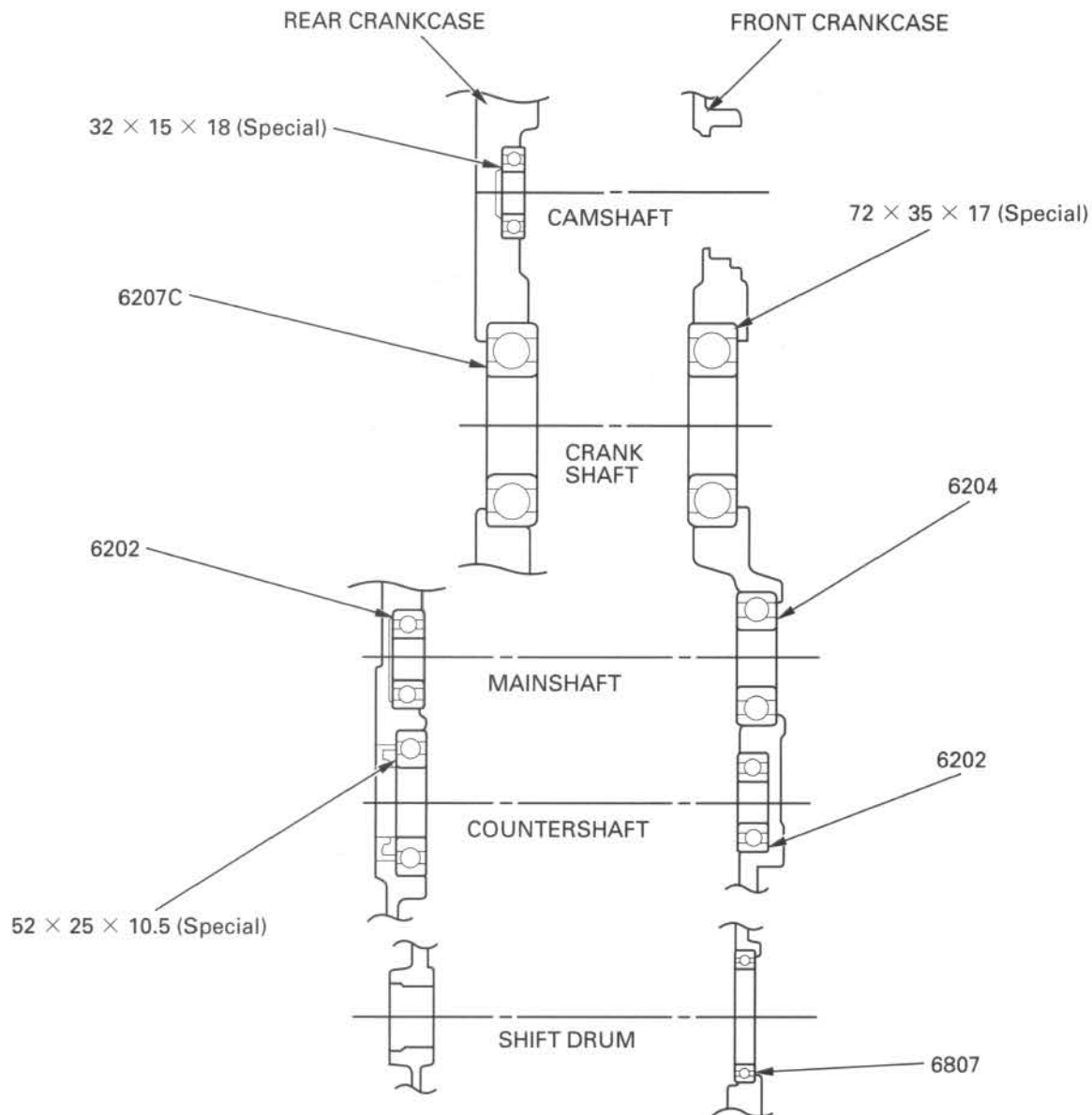
Pilot, 15 mm

07746-0040300

Install the countershaft oil seal.



CRANKCASE BEARING LOCATIONS

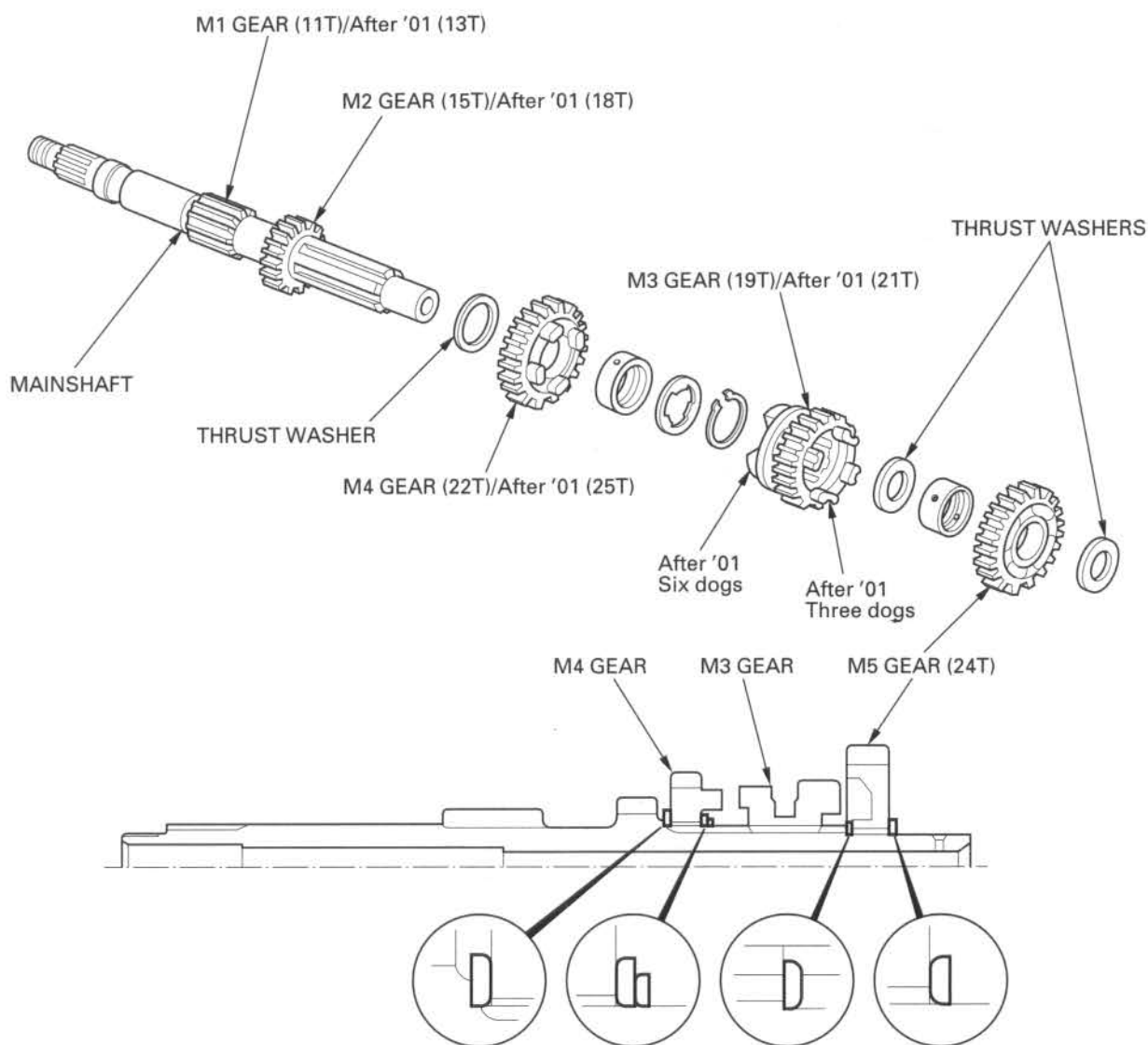


CRANKSHAFT/TRANSMISSION

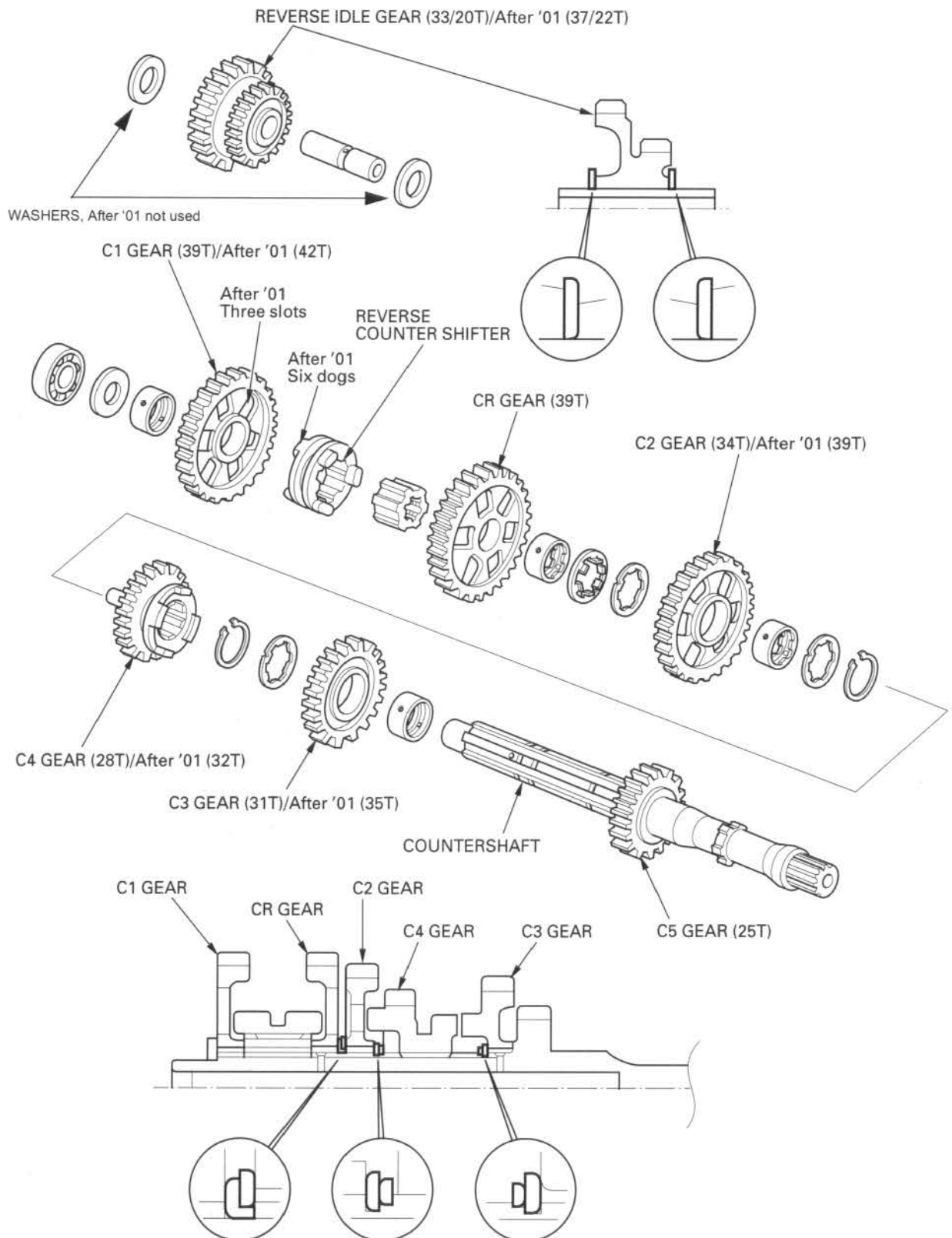
ASSEMBLY/INSTALLATION

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.



COUNTER SHAFT



CRANKSHAFT/TRANSMISSION

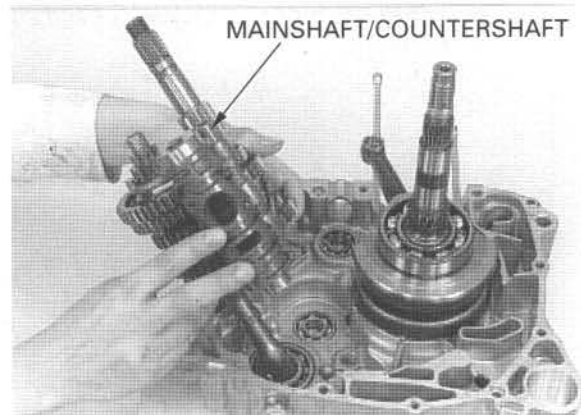
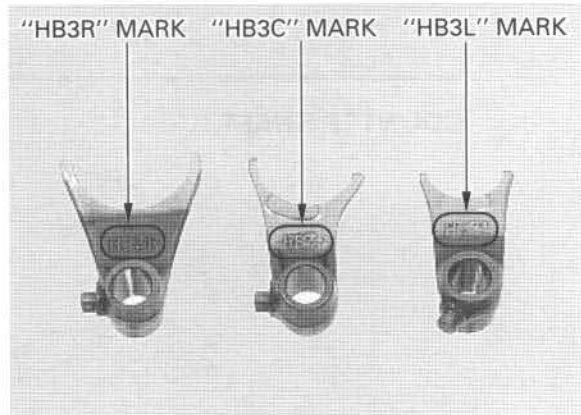
Install the rear shift fork into the M3 shifter gear groove with its "HB3L" mark facing up.
Install the center shift fork into the C4 shifter gear groove with its "HB3C" mark facing up.
Install the front shift fork into the counter shifter gear groove with its "HB3R" mark facing up.

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

Install the shift fork shaft.

Assemble the main shaft, countershaft and shift drum.

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



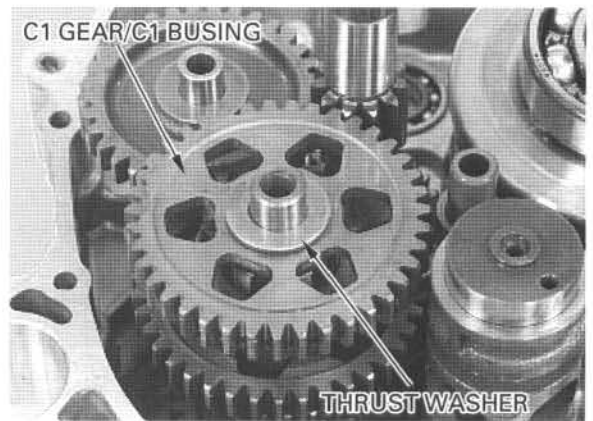
Install the reverse idle shaft and thrust washer.



Install the reverse idle gear and thrust washer.



Install the C1 gear, C1 bushing and thrust washer.



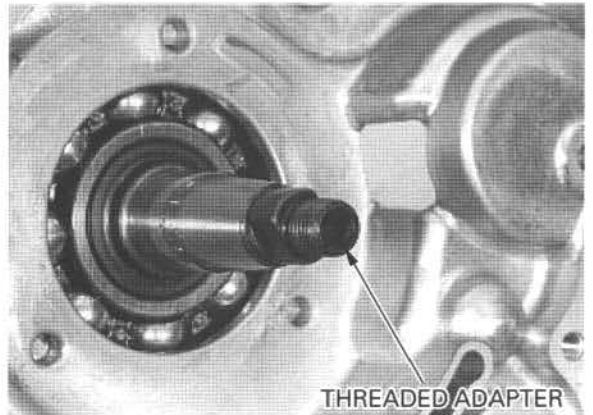
CRANKSHAFT

REMOVAL

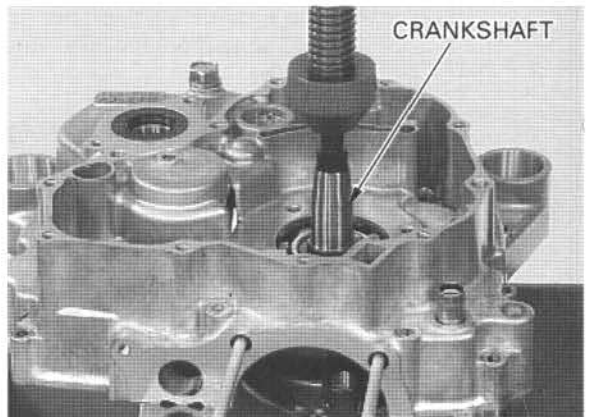
Remove the transmission (page 11-4).
Install the threaded adapter on the rear crankshaft.

TOOL:

Threaded adapter 07965-KA30000 or
07VMF-HM8010A
(U. S. A. only)



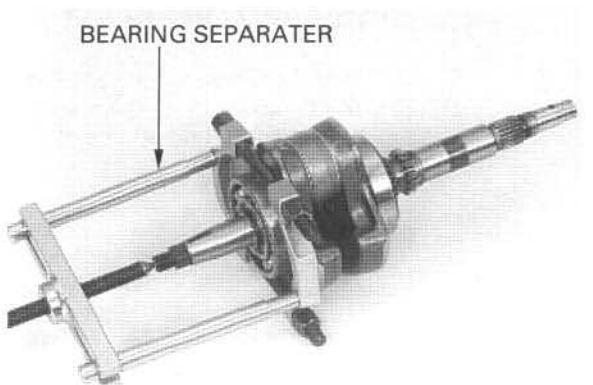
Remove the crankshaft from the rear crankcase using a hydraulic press.



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



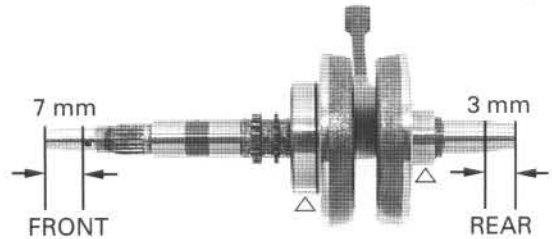
INSPECTION

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

SERVICE LIMIT:

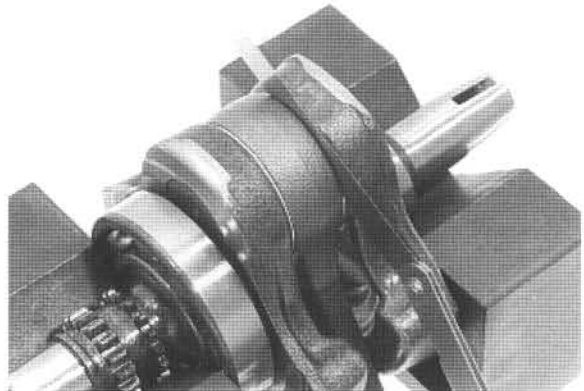
FRONT: 0.06 mm (0.002 in)

REAR: 0.03 mm (0.001 in)



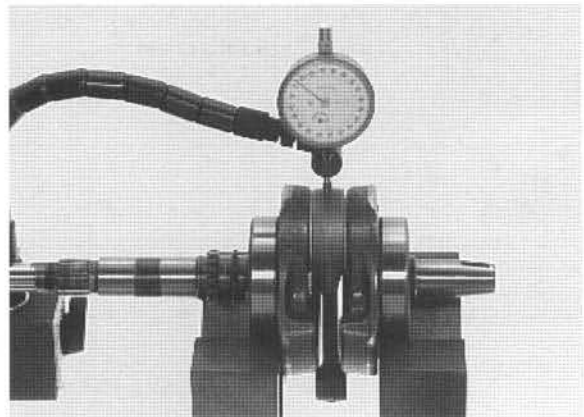
Measure the side clearance between the connecting rod big end and the crankshaft weight with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)



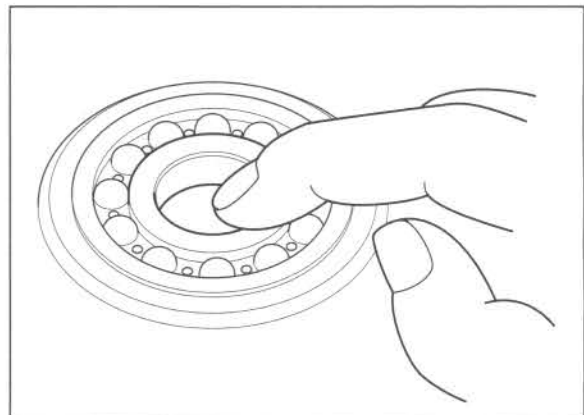
Measure the radial clearance at the connecting rod big end, at two points in the directions indicated by the arrows.

SERVICE LIMIT: 0.05 mm (0.002 in)



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.

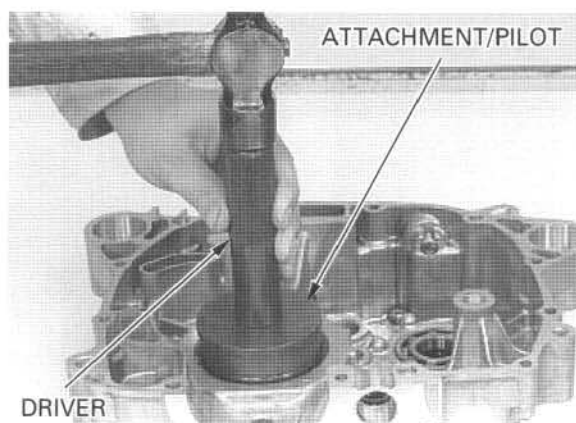


Drive new bearings in using the following tools.

TOOLS:

Crankshaft bearing:

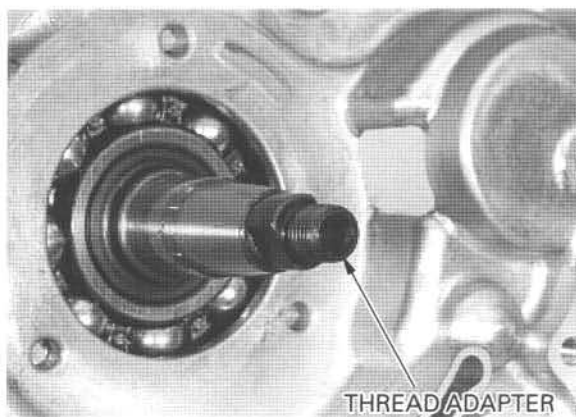
Driver	07749-0010000
Attachment, 72 × 75 mm	07746-0010600
Pilot, 35 mm	07746-0040800



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

TOOL:

Threaded adapter	07965-KA30000 or 07VMF-HM8010A (U. S. A. only)
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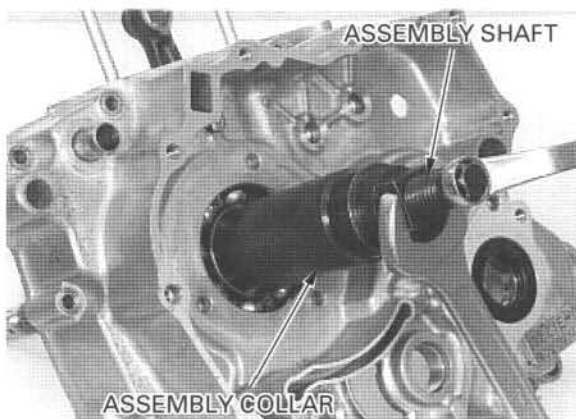


Draw the crankshaft into the rear crankcase using the special tools.

TOOLS:

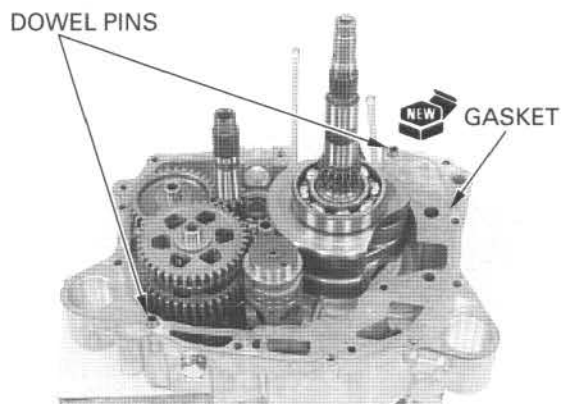
Assembly collar	07965-VM00100
Assembly shaft	07965-VM00200 or 07931-ME4010B (U. S. A. only) and 07931-HB3020A
Special nut	

Install the transmission (page 11-12).



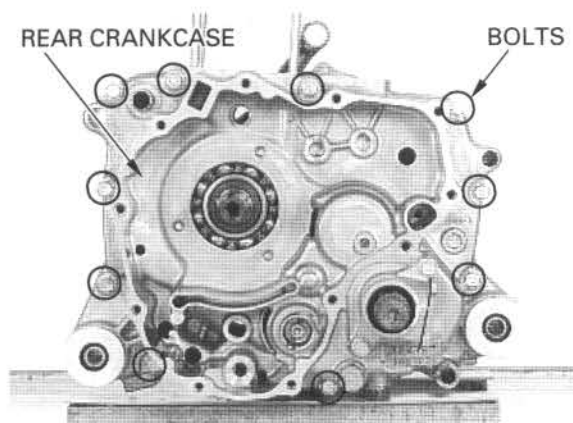
CRANKCASE ASSEMBLY

Install the dowel pins and new gasket.

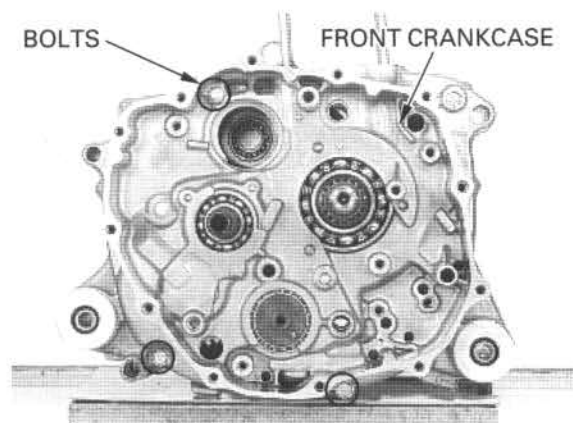


CRANKSHAFT/TRANSMISSION

- Make sure that the gasket stays in place.*
- Install the front crankcase onto the rear crankcase.
 - Install and tighten the ten rear crankcase bolts in 2 or 3 steps in a crisscross pattern.



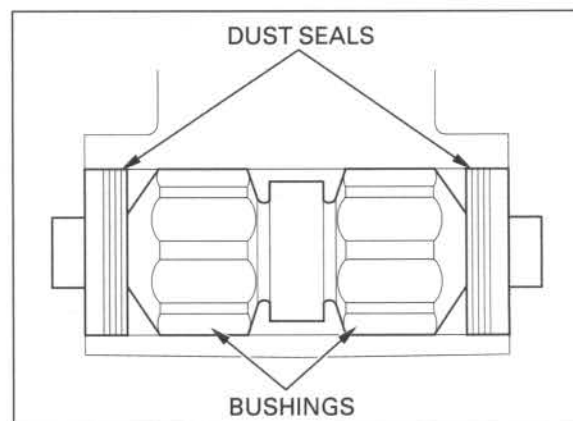
- Tighten the three front crankcase bolts.



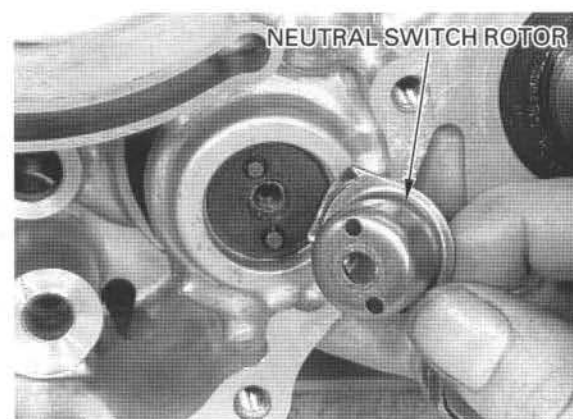
- Install the engine hanger bushings and dust seals.

NOTE:

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

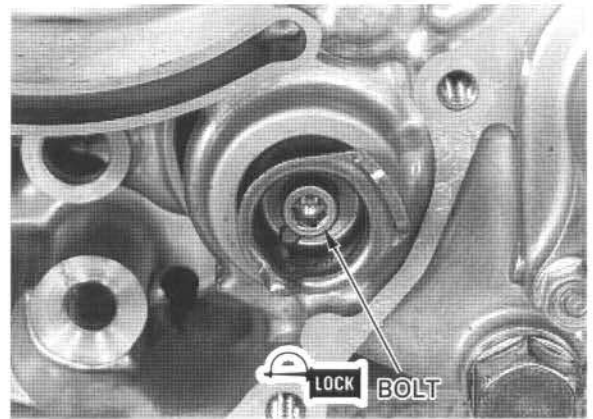


- Install the neutral switch rotor aligning the hole with the drum pin.

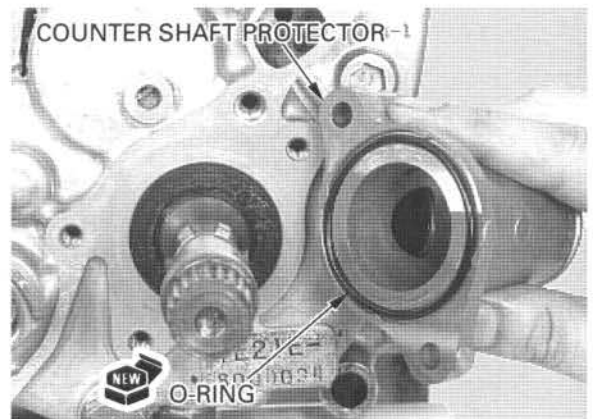


Apply a locking agent to the threads of the neutral switch rotor bolt and tighten it to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

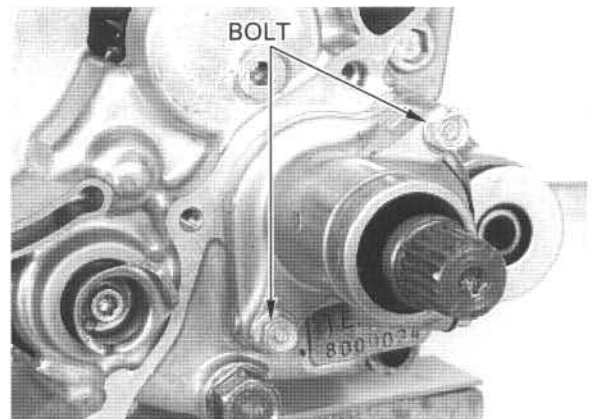


Install the new O-ring and counter shaft protector.

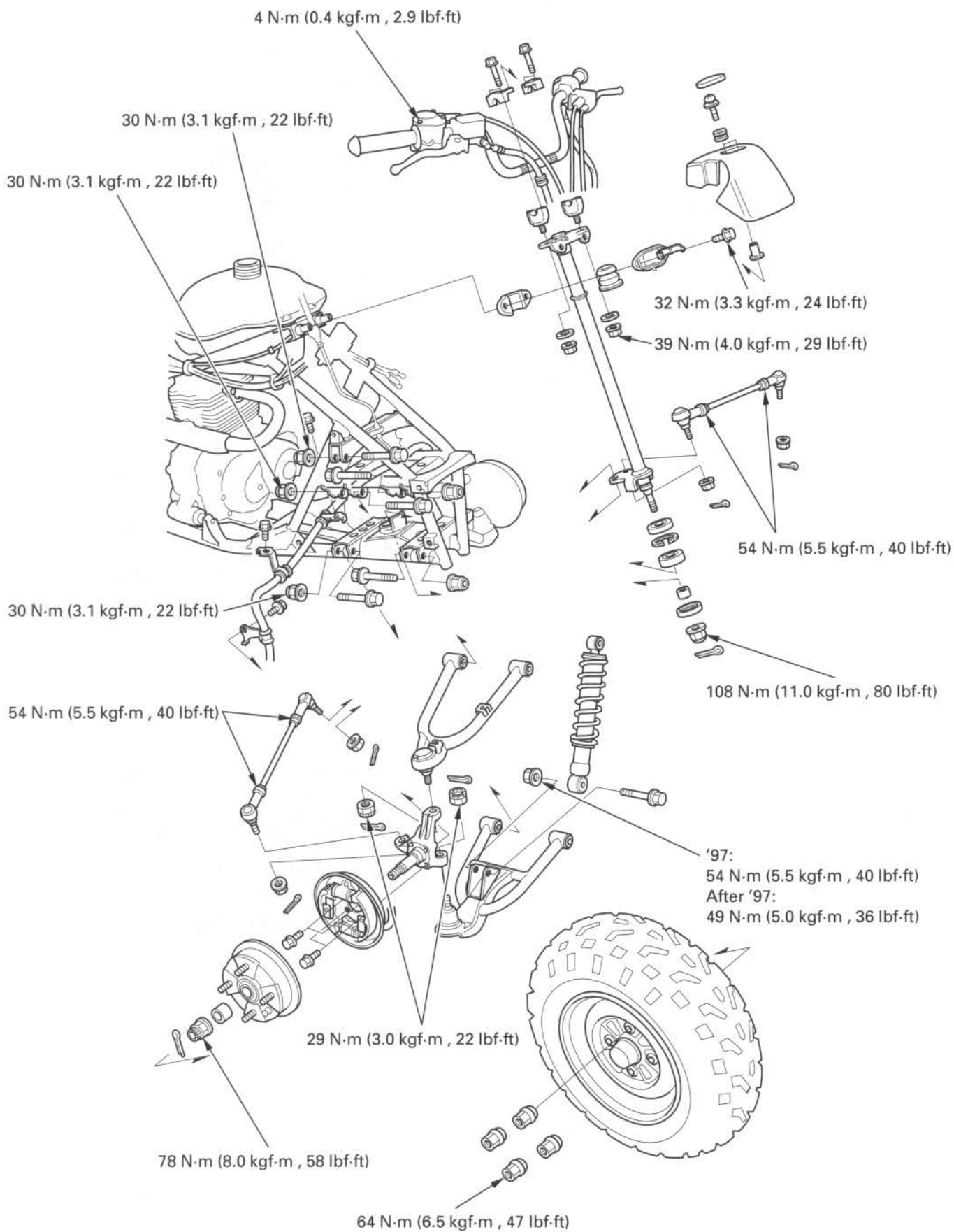


Install and tighten the two bolts.

Reinstall the removed parts in the reverse order of removal.



FRONT WHEEL/SUSPENSION/STEERING



12. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	12-1	TIRES	12-8
TROUBLESHOOTING	12-2	TIE-ROD/KNUCKLE	12-12
HANDLEBAR	12-3	UPPER/LOWER ARMS	12-17
THROTTLE HOUSING	12-6	STEERING SHAFT	12-22
FRONT WHEEL	12-8	FRONT SHOCK ABSORBER	12-26

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 3-22).
- 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 (0.2)
Cold tire pressure	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)	
	Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)	
	Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)	
	With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)	
Tie-rod distance between the ball joints		323 ± 1 (12.7 ± 0.4)	
Toe		Toe-in: 8 ± 15 (5/16 ± 5/8)	

TORQUE VALUES

Handlebar lower holder nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	Do not reuse; replace with a new one
Steering shaft U-nut ('97)	108 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut
Steering shaft flange nut (After '97)	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Tie-rod ball joint self lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	Do not reuse; replace with a new one
Tie-rod lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Steering shaft holder flange bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	
Upper/lower arm pivot self lock nut	30 N·m (3.1 kgf·m, 22 lbf·ft)	Do not reuse; replace with a new one
Knuckle ball joint castle nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	Castle nut
Shock absorber upper mounting self lock nut	30 N·m (3.1 kgf·m, 22 lbf·ft)	Do not reuse; replace with a new one
Shock absorber lower mounting self lock nut ('97)	54 N·m (5.5 kgf·m, 40 lbf·ft)	Do not reuse; replace with a new one
(After '97)	49 N·m (5.0 kgf·m, 36 lbf·ft)	Do not reuse; replace with a new one
Front wheel hub castle nut	78 N·m (8.0 kgf·m, 58 lbf·ft)	Castle nut
Front wheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Throttle case cover	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

Universal bead breaker	GN-AH-958-BB1
Ball joint remover	07MAC-SL00200
Attachment, 32 × 35 mm	07746-0010100
Attachment, 37 × 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400
Ball joint remover/installer	07974-6790000 or 07JMF-HC50110(U. S. A. only)
Attachment, 28 × 30 mm	07946-1870100
Driver	07749-0010000
Ball joint remover/installer	07965-SB00300 Not available in U.S.A. or 07JAF-SH20200
Driver, 22 mm I. D.	07746-0020100
Driver, 40 mm I. D.	07746-0030100
Attachment, 35 mm I. D.	07746-0030400

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

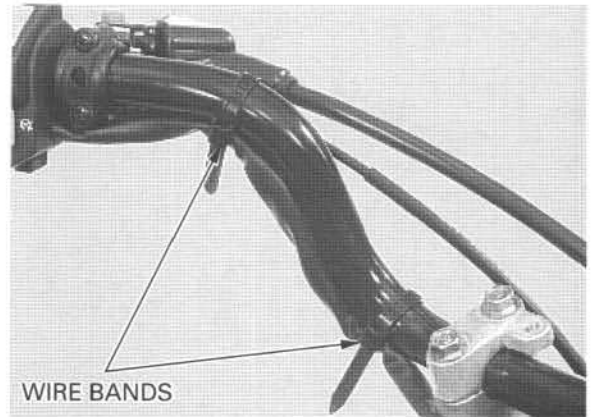
- Loose fasteners

HANDLEBAR

REMOVAL

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

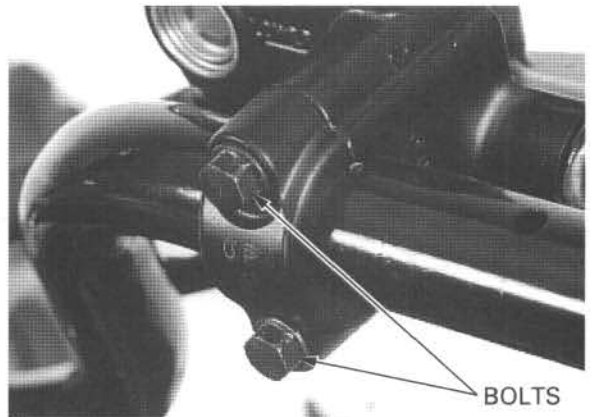
Remove the wire bands.



Remove the two screws and throttle housing.



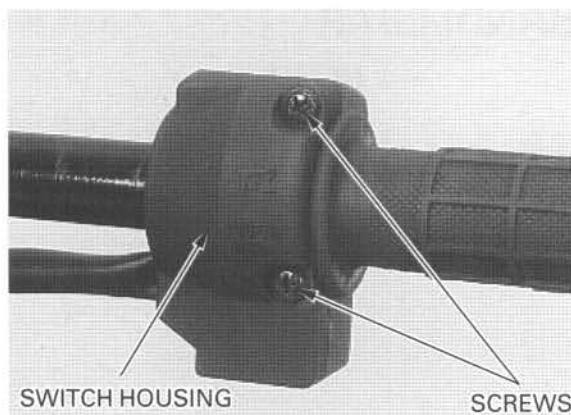
Remove the two bolts and master cylinder.



Remove the two screws and rear brake lever bracket.

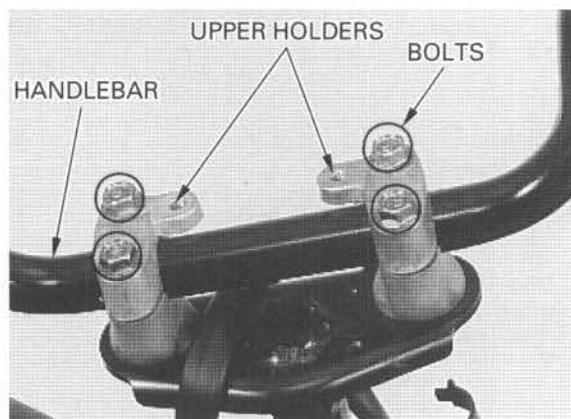


Remove the two screws and switch housing.



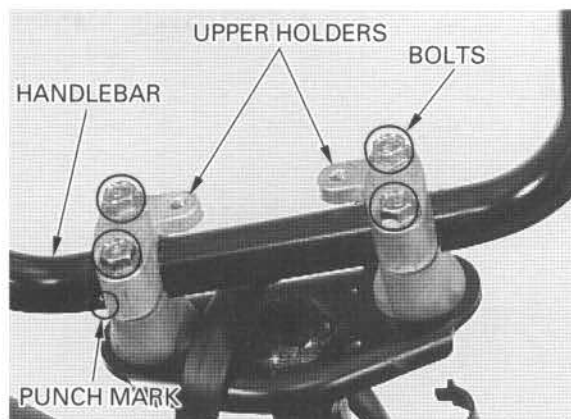
Remove the four bolts and upper holders.

Remove the handlebar.



INSTALLATION

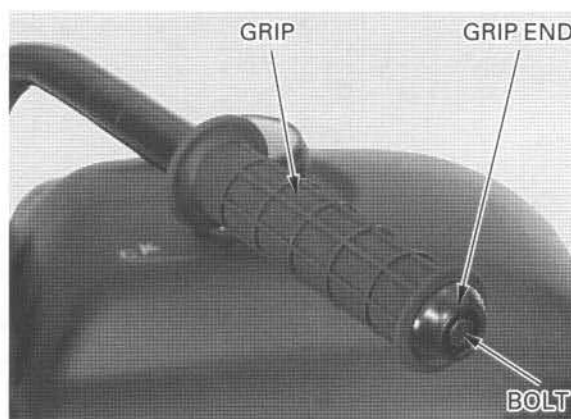
Place the handlebar on the lower holders.
Align the punch mark on the handlebar with the top of the lower holders.
Install the upper holders on the handlebar with their cover bosses forward.
Tighten the front bolts first, then tighten the rear bolts.



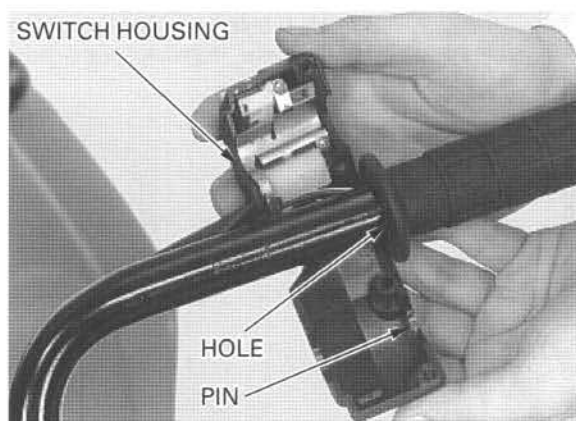
If the handlebar grips were removed, apply Honda Bond A or Honda Hand Grip Cement (U.S.A. only) to the inside of the grip and to the clean surfaces of the right and left handlebar.

Wait 3–5 minutes and install the grip.
Rotate the grip for even application of the adhesive.
Install the grip end and tighten the bolt.

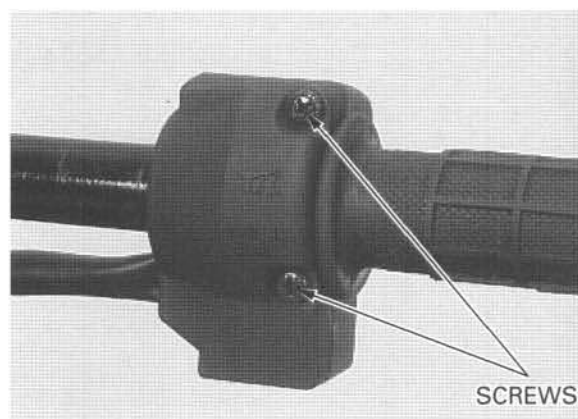
Allow the adhesive to dry for an hour before using.



Install the left handlebar switch by aligning its locating pin with the hole in the handlebar.

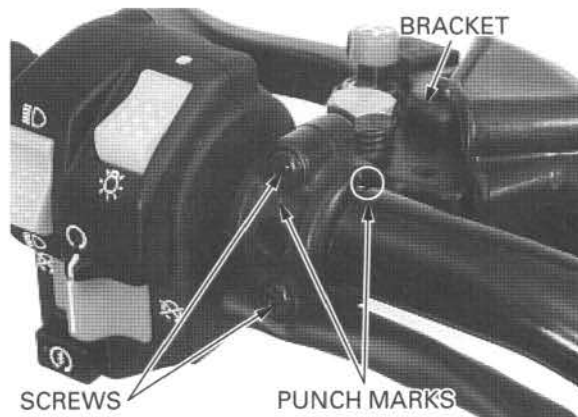


Tighten the upper screw first, then the lower screw.



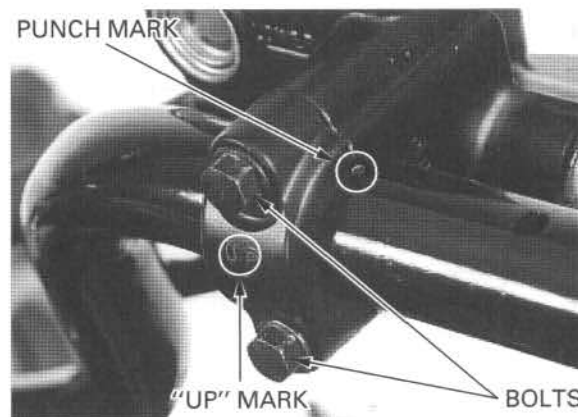
Install the rear brake lever bracket with the punch mark on the holder facing up. Align the end of the holder with the punch mark on the handlebar.

Tighten the upper screw first, then the lower screw.

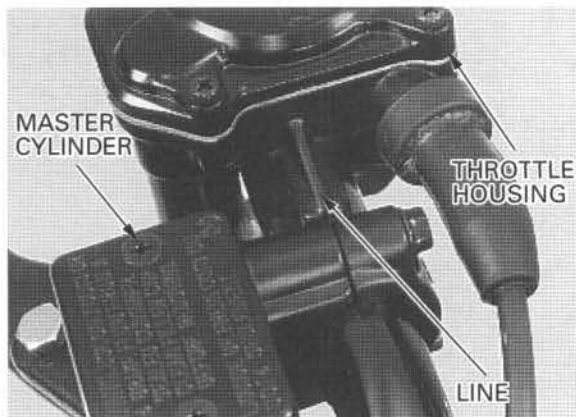


Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar. Install the master cylinder holder with the "UP" mark facing up. Tighten the upper bolt first, then the lower bolt.

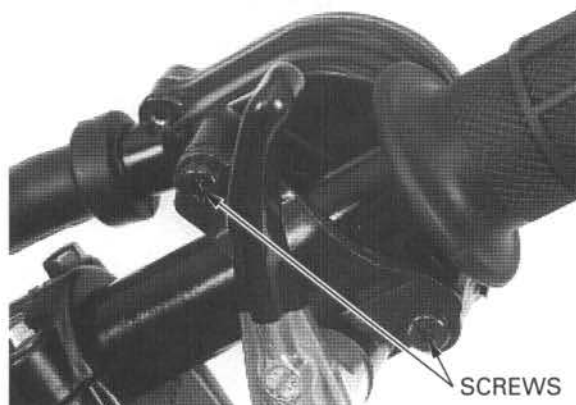
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



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

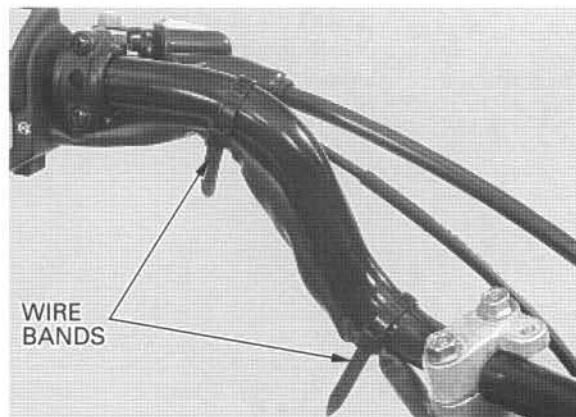


Tighten the throttle housing screws securely.



Secure the wire with the wire bands.

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



THROTTLE HOUSING

DISASSEMBLY

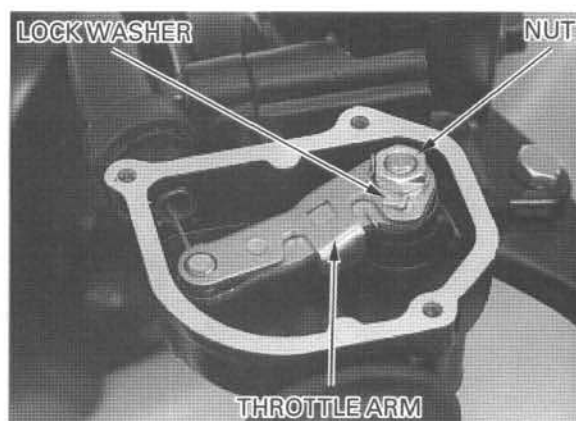
Remove the three throttle housing cover screws and the cover.
Remove the gasket.



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

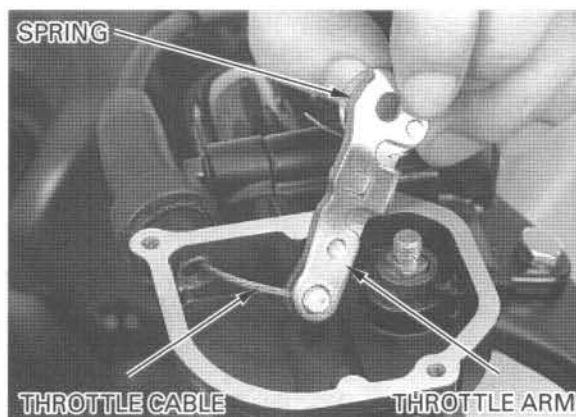
Bend down the lock washer tab and remove the nut and lock washer.

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 by aligning the slot.

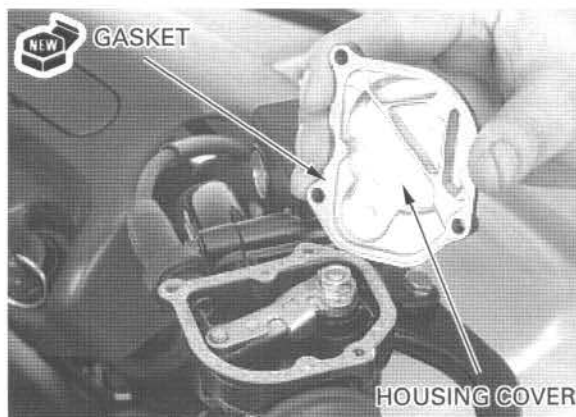


Install a new lock washer and tighten the nut.
Bend up the lock washer tab against the nut.



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).

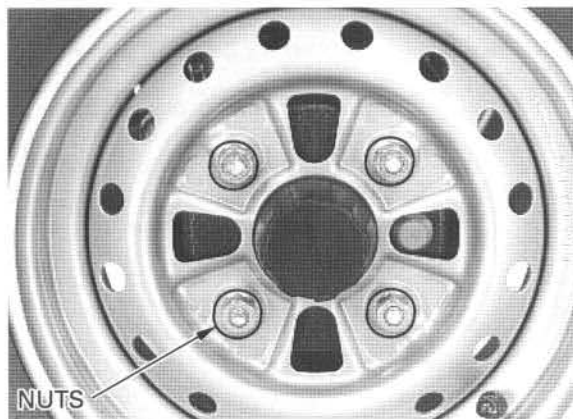


FRONT WHEEL

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.



INSTALLATION

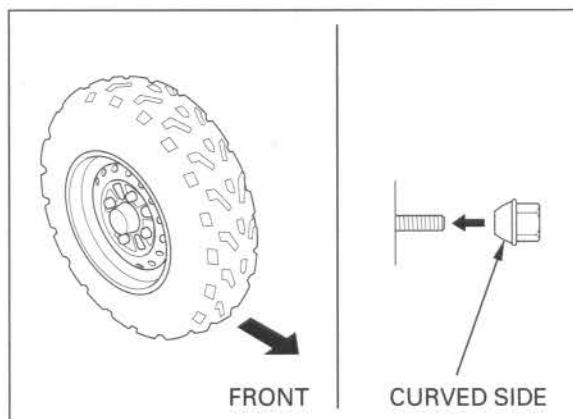
Install the front wheel.

NOTE:

Do not interchange the right and left tires.

Install the wheel nuts with their curved (tapered) sides facing inward and tighten to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m , 47 lbf·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.

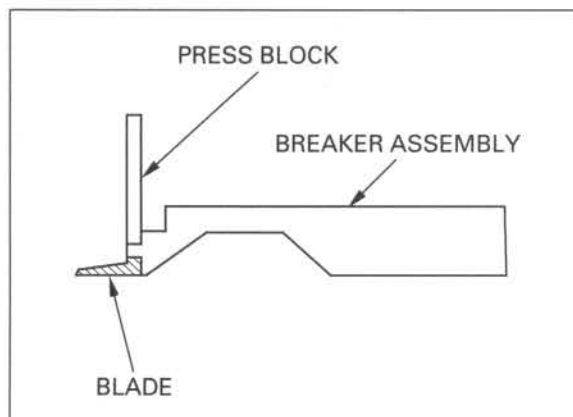
CAUTION:

- *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" (front) and 7/11" (rear) rims onto the breaker arm assembly.

CAUTION:

Use of an improper size blade may result in damage to the rim, tire or blade.



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 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.

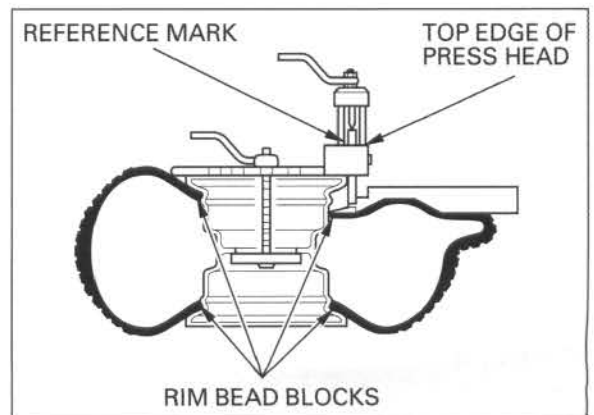
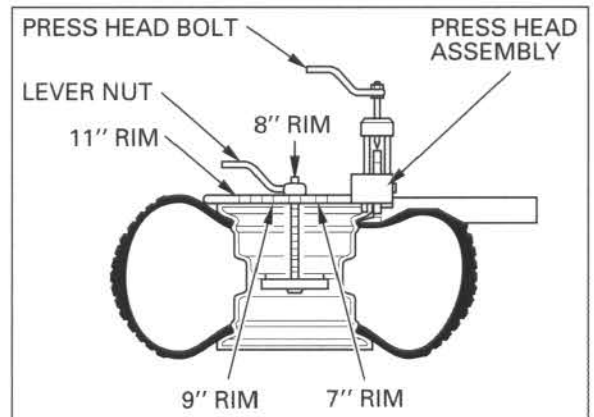
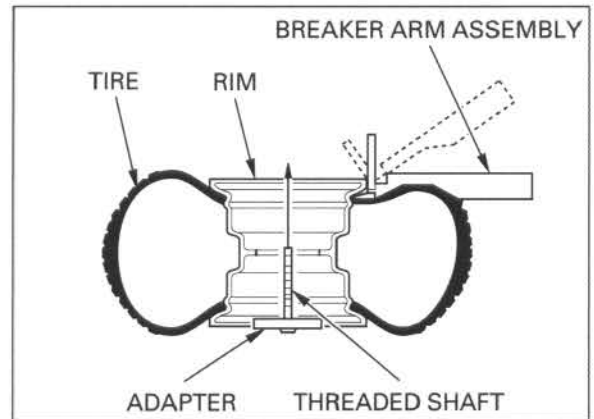
Tighten the lever nut and then tighten the press head bolt as described.

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 15 mm (5/8 in), proceed with the repair as described here.

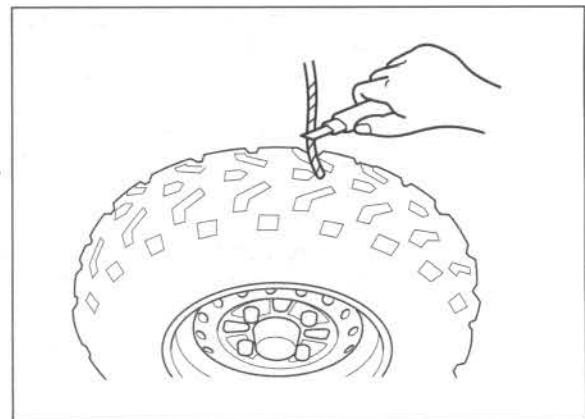
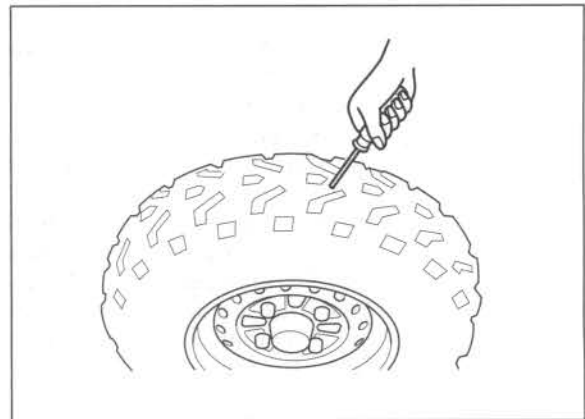
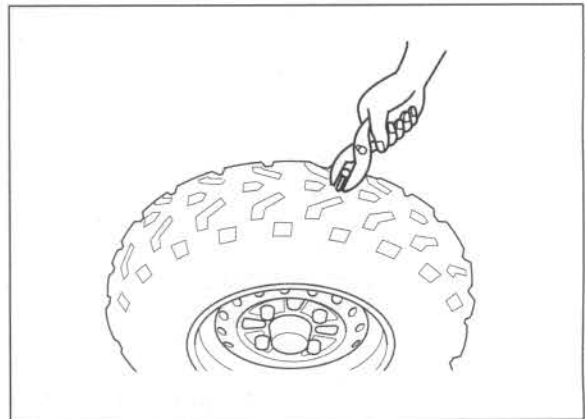
Install a rubber plug into the injury as follows:
Apply a cement to a plug inserting needle and work the needle into the injury to clean and lubricate it.
Do this three times.
Do not let the cement dry.

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.

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.

Be careful not to push the plug all the way into the tire to prevent it from falling inside.



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 12-9) and apply a cold patch to the inside of the tire as described. If a plug has been inserted, trim 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.

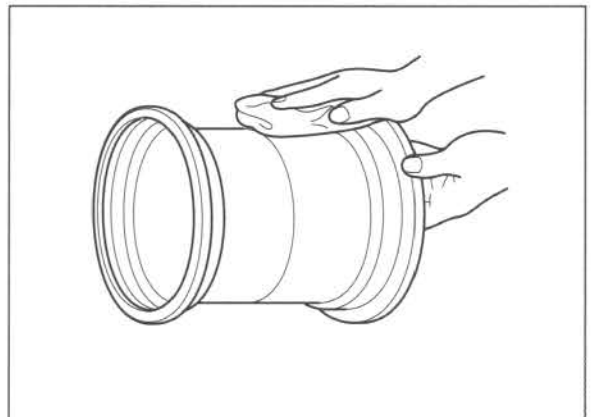
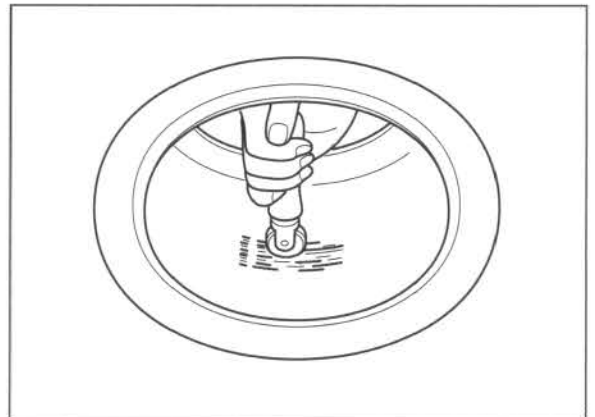
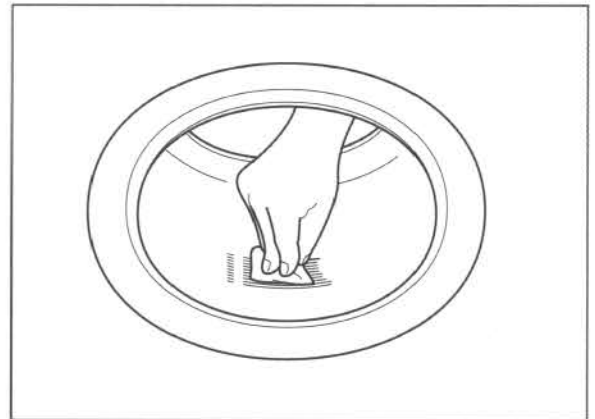
⚠ WARNING

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.

Check for air leaks and install the valve cap.



Tire pressure:

	FRONT/REAR
Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)
Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)
Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)
With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)

TIE-ROD/KNUCKLE

REMOVAL

NOTE:

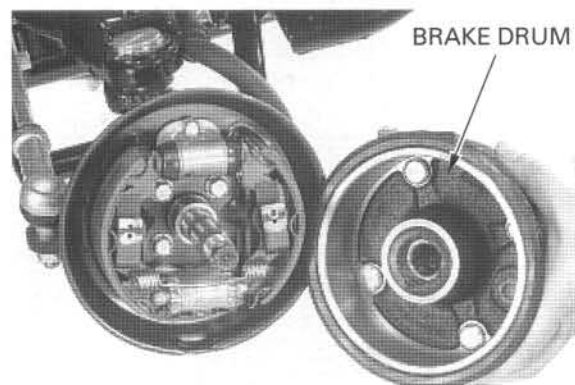
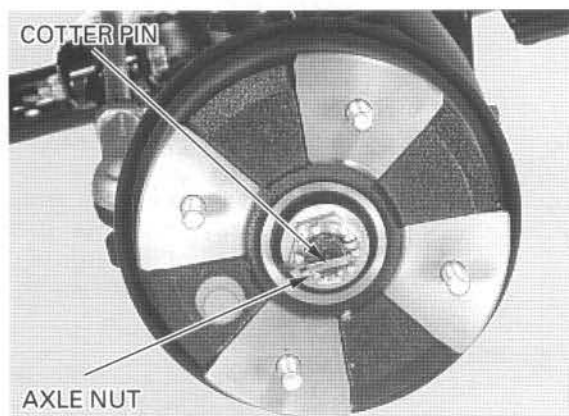
The tie-rod can be removed without removing the brake drum.

Remove the front wheel (page 12-8).

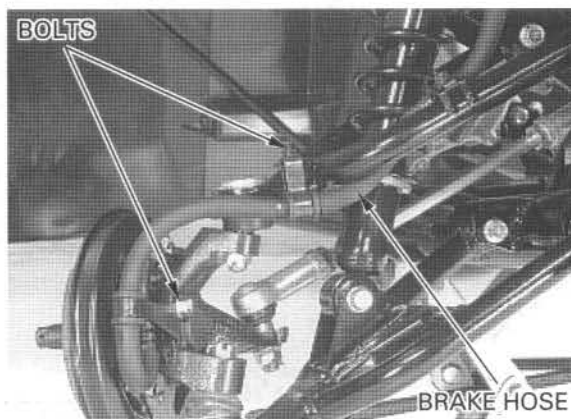
Remove the following:

- Cotter pin
- Axle nut

Remove the brake drum.



Remove the brake hose guide mounting bolts.



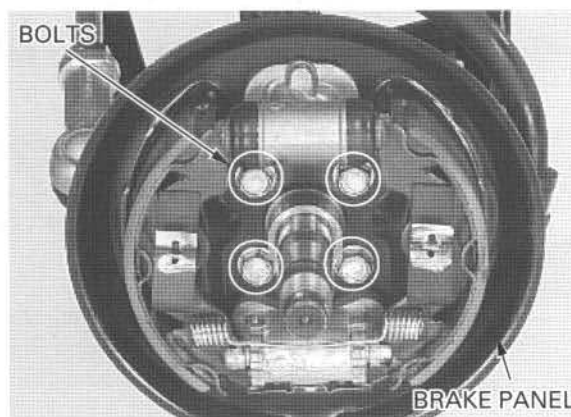
Remove the four bolts and brake panel from the knuckle.

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, the pistons are projected from the cylinder.

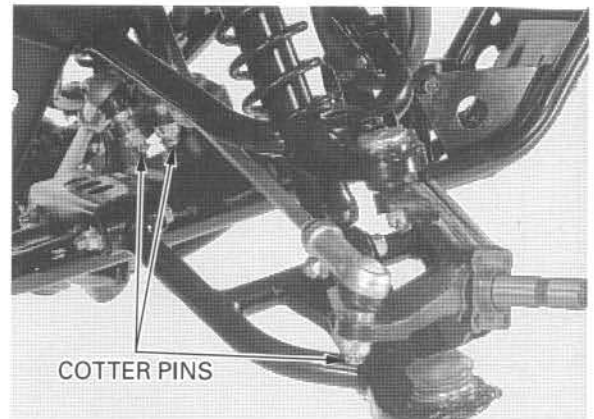
CAUTION:

Support the brake panel so that it does not hang from the brake hose. Do not twist the brake hose.



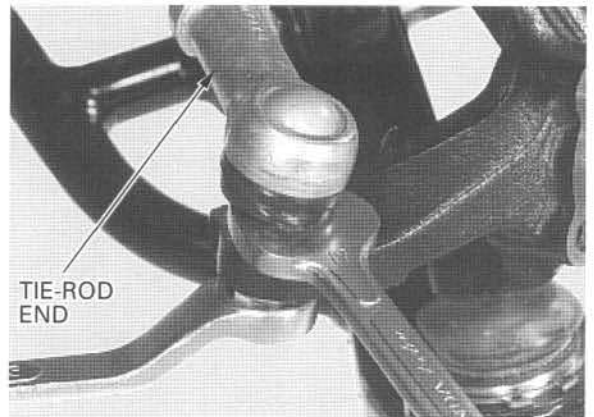
BRAKE PANEL

Remove the cotter pins.

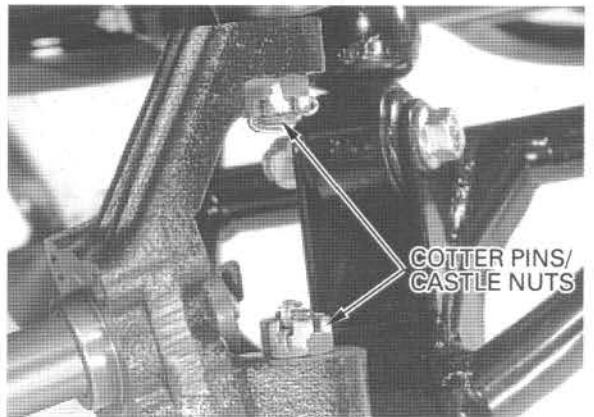


Hold the tie-rod joints and remove the nuts.

Remove the tie-rod.



Remove the cotter pins.
Loosen the castle nuts, but do not remove them.

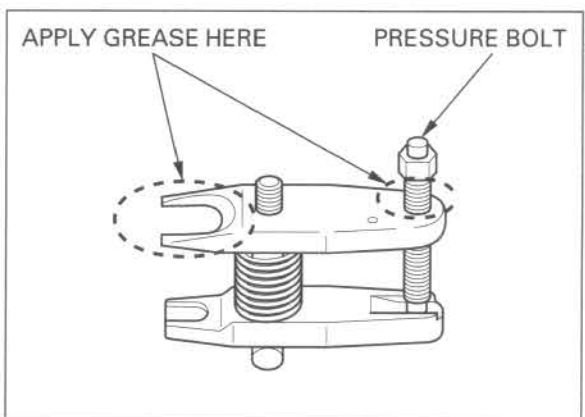


Apply grease to the ball joint puller on the are as shown.
This will ease installation of the tool and prevent damage to the pressure bolt threads.

Insert the jaws carefully, making sure that you do not damage the ball joint boot.
Adjust the jaw spacing by turning the pressure bolt.

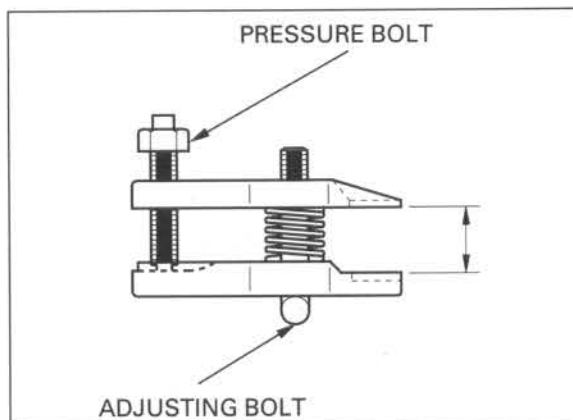
NOTE:

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.

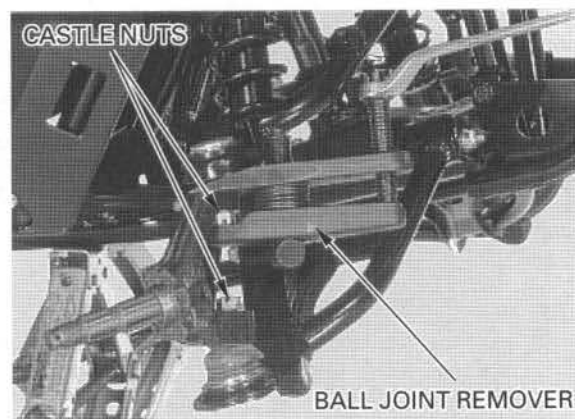


Remove the knuckle from the upper and lower arm, using the special tool according to the above instructions.

TOOL:

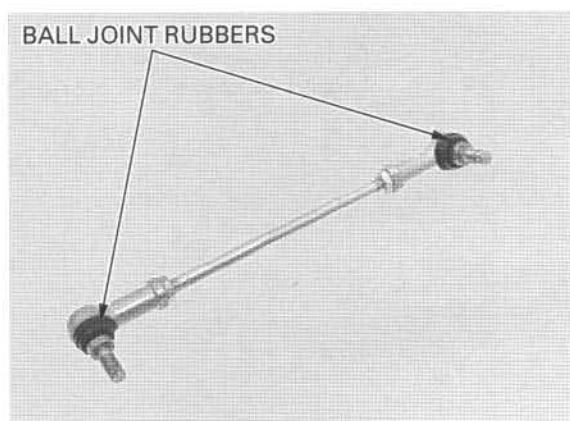
Ball joint remover, 28 mm 07MAC-SL00200

Remove the castle nuts.

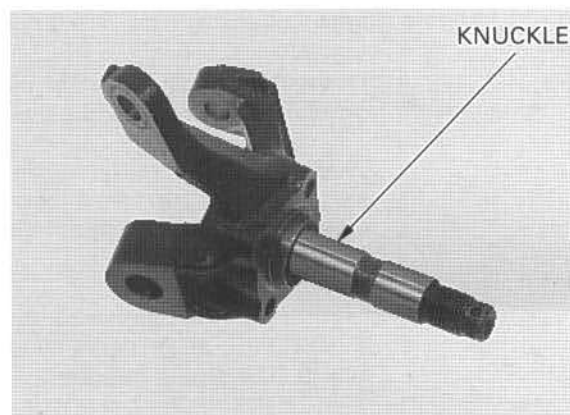


INSPECTION

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.



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:

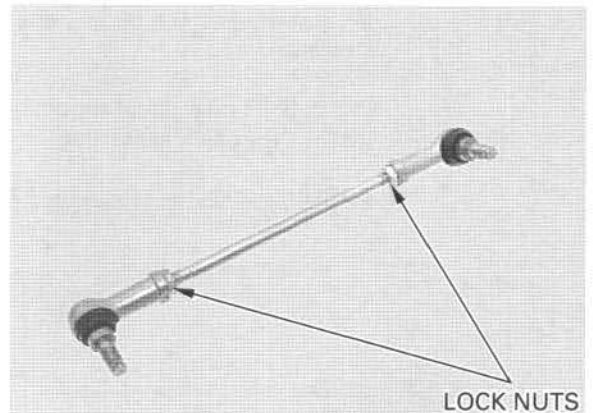
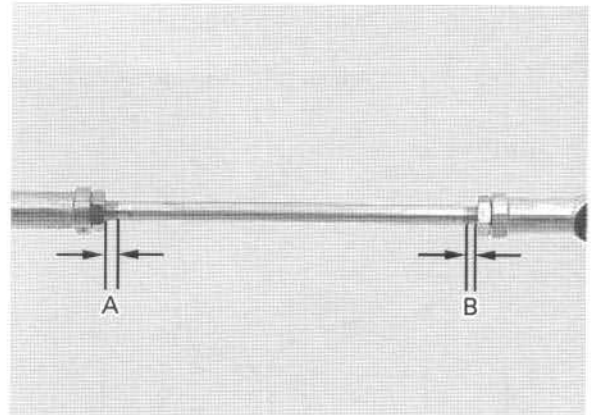
LOCK NUT-TO-THREAD END DISTANCE A AND B:

A: 5.5 mm (0.22 in)

B: 5.5 mm (0.22 in)

A-B less than or equal to 3 mm (0.1 in)

Tighten the lock nuts securely.



KNUCKLE INSTALLATION

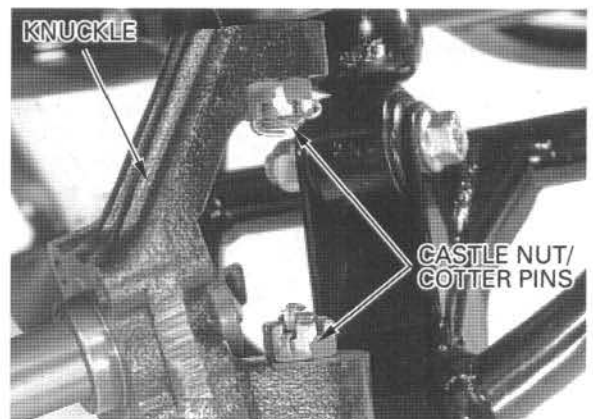
Connect the knuckle to the upper arm.
Install the castle nut.

Connect the knuckle to the lower arm.
Install the castle nut.

Tighten the castle nuts to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m , 22 lbf·ft)

Install the new cotter pins.

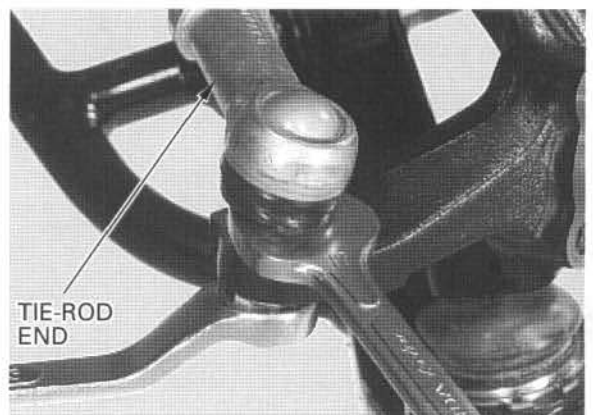


TIE-ROD INSTALLATION

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.

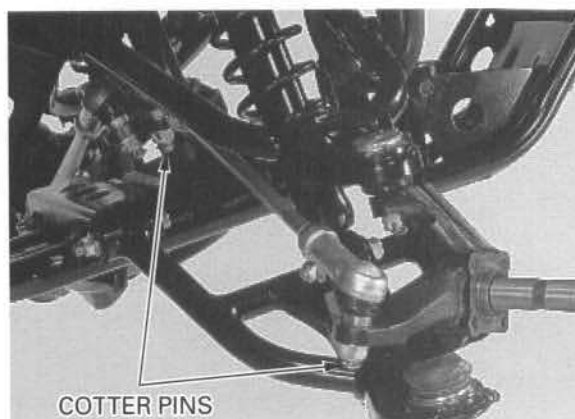
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



FRONT WHEEL/SUSPENSION/STEERING

Install new cotter pins.

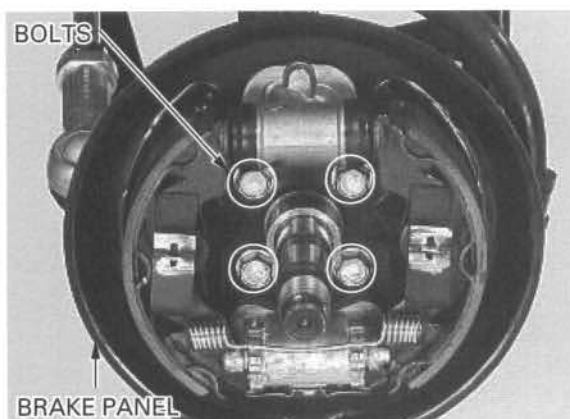
Adjust the toe (page 3-22).



If you removed the brake panel, install it onto the knuckle.

Install the brake panel mounting bolts and tighten them to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m , 22 lbf·ft)

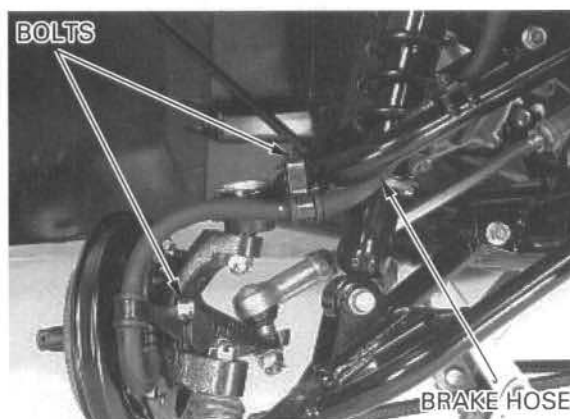


Install the brake hose clamps and tighten the bolts.

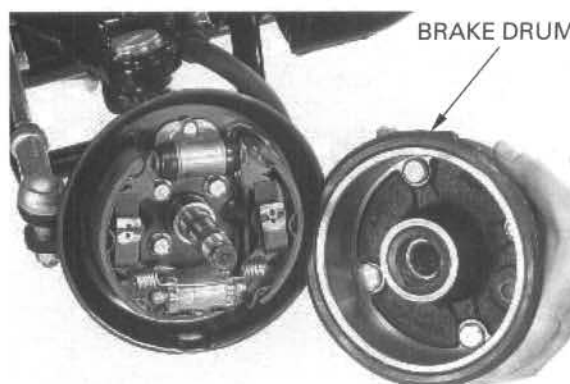
TORQUE:

8 mm bolt: 29 N·m (3.0 kgf·m , 22 lbf·ft)

6 mm bolt: 12 N·m (1.2 kgf·m , 9 lbf·ft)



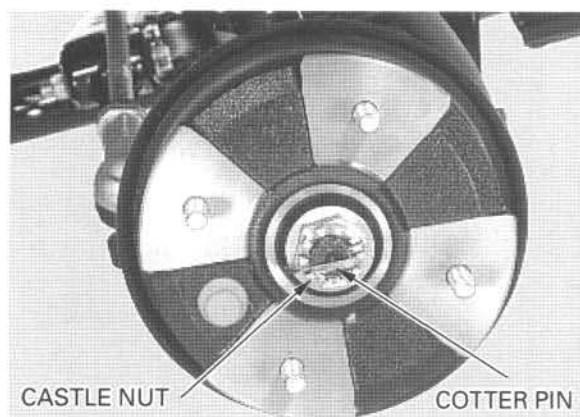
Install the brake drum (page 14-14).



Apply grease to the castle nut flange and threads, then install the nut.
Tighten the axle nut to the specified torque.

TORQUE: 78 N·m (8.0 kgf·m , 58 lbf·ft)

Install a new cotter pin.
If you disconnect the brake line, bleed the system (page 14-3).
Install the front wheel (page 12-8).



UPPER/LOWER ARMS

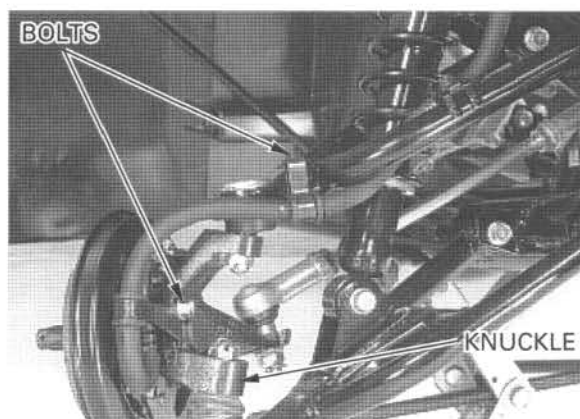
REMOVAL

The upper and lower arms can be removed without removing the tie-rod.

Remove the knuckle (page 12-12).

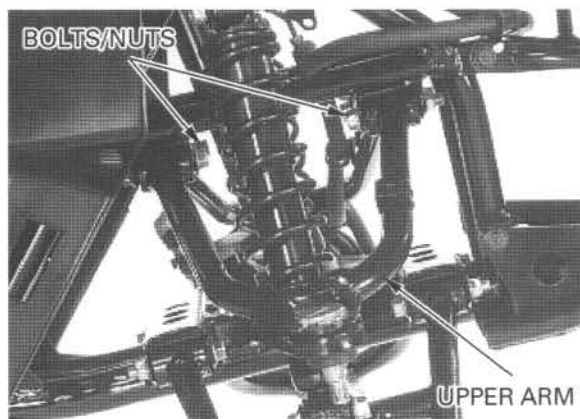
Upper Arm

Remove the brake hose clamps.



Remove the upper arm mounting bolts/nuts and arm.

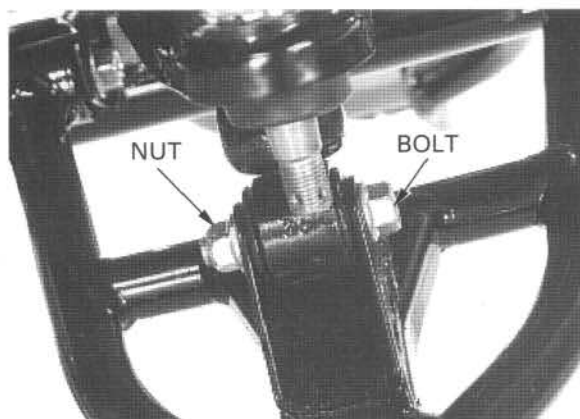
Discard the upper arm mounting nuts.



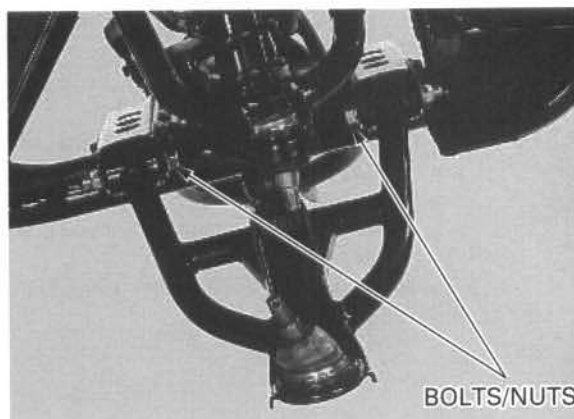
Lower Arm

Remove the shock absorber lower mounting bolt/nut.

Discard the shock absorber lower mounting nut.



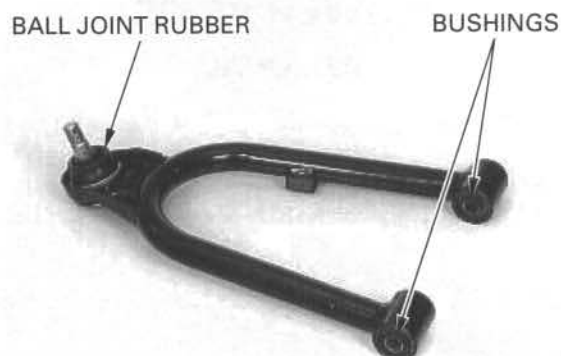
Remove the lower arm mounting bolts/nuts and arm.
Discard the lower arm mounting nuts.



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.

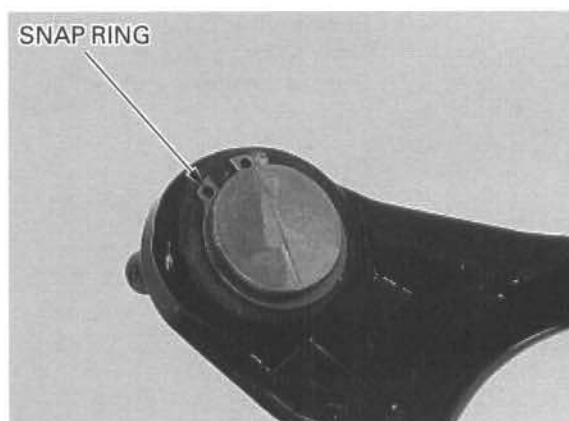
Replace the ball joint if necessary.



BALL JOINT REPLACEMENT

Upper Arm

Remove the snap ring.



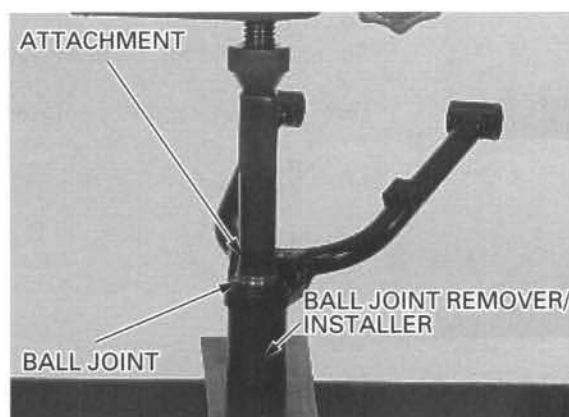
Set the upper arm and ball joint remover/installer with the "A" marked side on the tool faced to the ball joint, in a press as shown.

TOOL:

Ball joint remover/installer
Attachment, 28 × 30 mm
Driver

07JMF-HC50110
07946-1870100
07749-0010000

Press the ball joint out of the upper arm.



Set the upper arm, a new ball joint and ball joint remover/installer, in a press as shown.

TOOLS:

Ball joint remover/Installer

07974-6790000
(Not available in U.S.A.)

07JMF-HC50110
(U.S.A. only)

Attachment, 35 mm

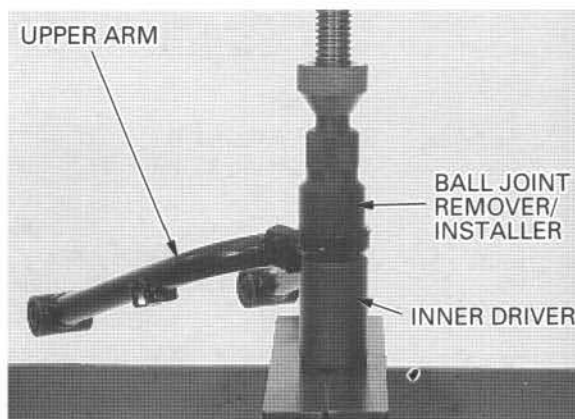
07746-0030400

Press the ball joint into the upper arm.

CAUTION:

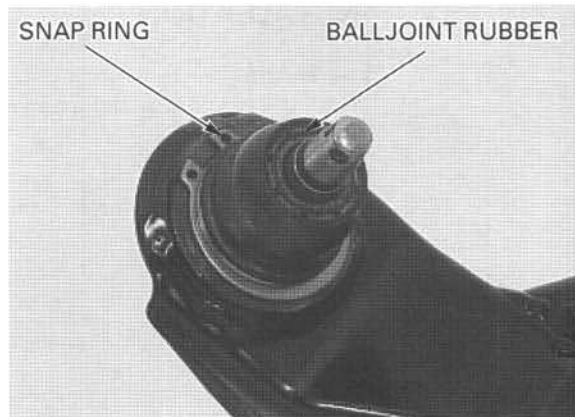
If you feel strong resistance when lowering the press, stop. Reset the attachment of the tool so that the ball joint head can go into the hollow of the attachment and try again.

Install the snap ring to the groove of the ball joint securely.



Lower Arm

Remove the snap ring.
Cut and remove the balljoint rubber.



Set the lower arm and special tools, with the "A" marked side on the tool faced to the ball joint, in a press as shown.

TOOLS:

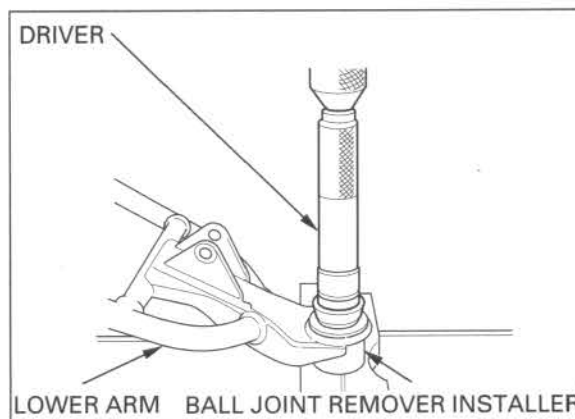
Ball joint remover/installer

07965-SB00300
(Not available in U.S.A.)

07JAF-SH20200
07746-0020100

Driver, 22 mm I. D.

Press the ball joint out of the lower arm.



FRONT WHEEL/SUSPENSION/STEERING

Set the lower arm, a new ball joint and special tools, in a press as shown.

TOOLS:

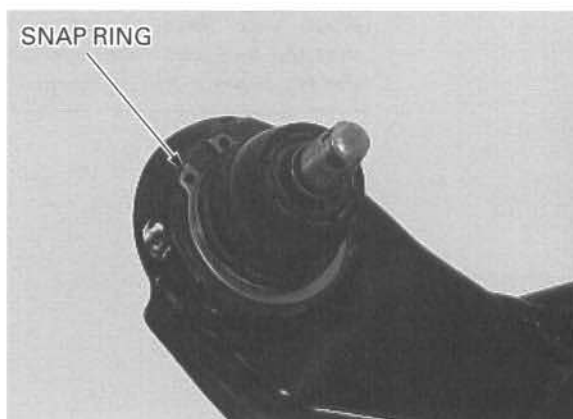
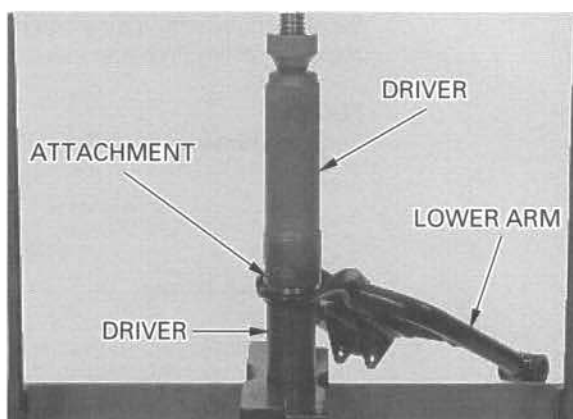
Driver, 40 mm I. D.	07746-0030100 and
Attachment, 35 mm I. D.	07746-0030400
Driver	07746-0030100 or 07945-3710101

Press the ball joint into the upper arm.

CAUTION:

If you feel strong resistance when lowering the press, stop. Reset the attachment of the tool so that the ball joint head can go into the hollow of the attachment and try again.

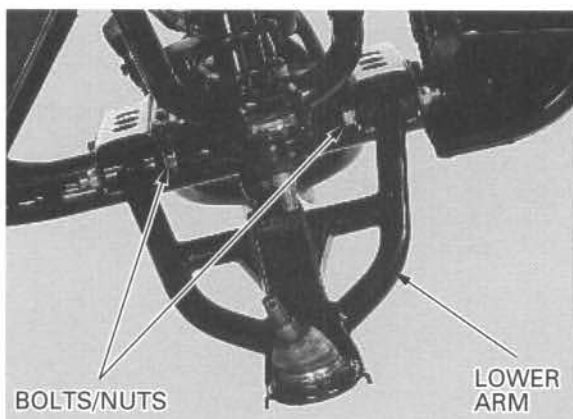
Install the snap ring to the groove of the ball joint securely.



INSTALLATION

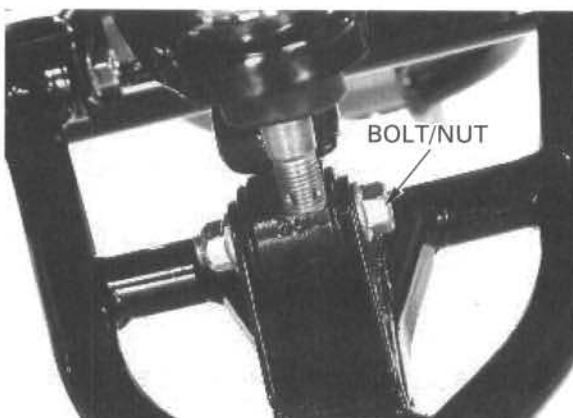
Lower Arm

Install the lower arm, bolts and new nuts.



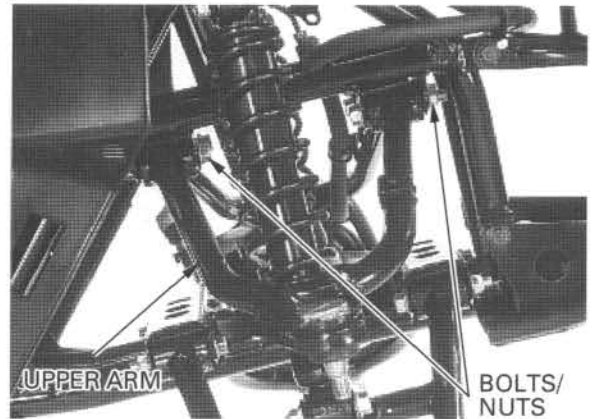
Install the shock absorber lower mounting bolt and new nut, then tighten it to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



Upper Arm

Install the upper arm, bolts and new nuts.



Install the knuckle (page 12-16).

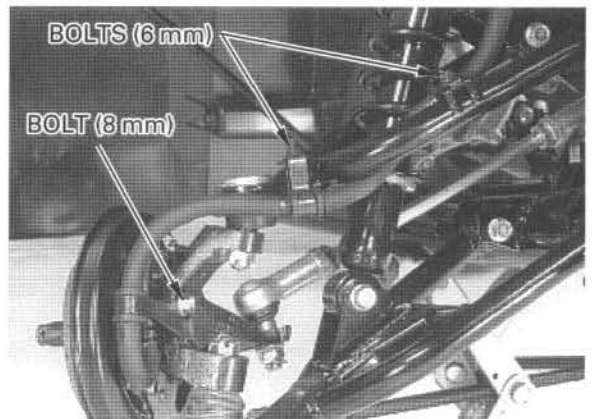
Install the brake hose clamps.

Tighten the clamp bolt (6 mm) to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the brake hose clamp and tighten the bolt (8 mm) to the specified torque.

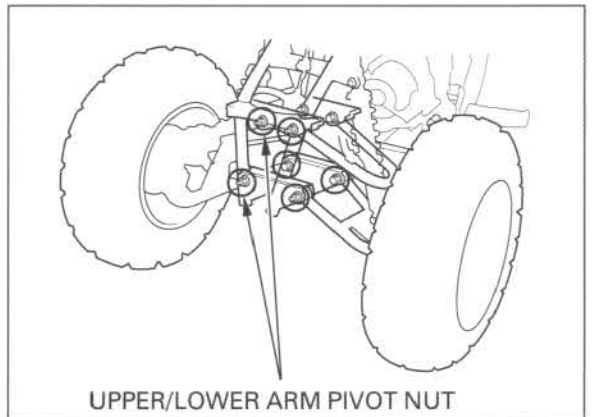
TORQUE: 29 N·m (3.0 kgf·m , 22 lbf·ft)



Install the front wheel (page 12-8), then place the vehicle on level ground.

Tighten the upper and lower arm mounting nuts to the specified torque.

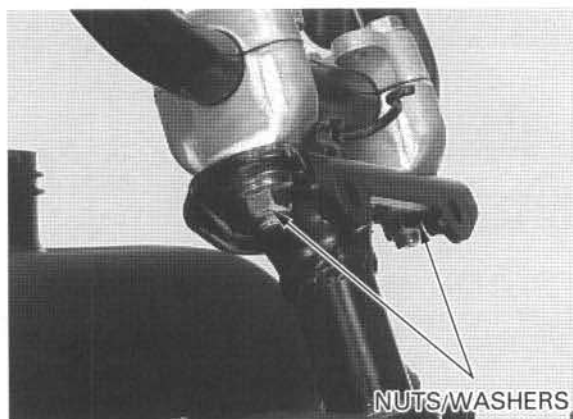
TORQUE: 30 N·m (3.1 kgf·m , 22 lbf·ft)



STEERING SHAFT

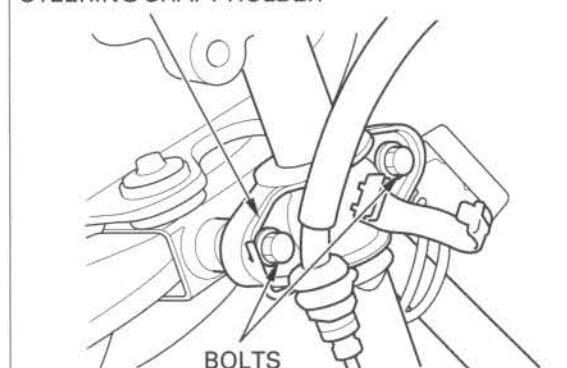
REMOVAL

Remove the front fender (page 2-5).
Remove the handlebar lower holder nuts, washers and handlebar assembly.
Discard the handlebar lower holder nuts.



Remove the steering shaft holder bolts and holder.

STEERING SHAFT HOLDER

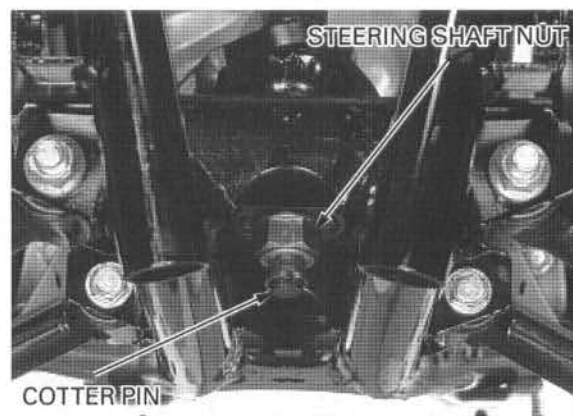


Remove the following:

- Cotter pins
- Tie-rod ball joint nuts
- Tie-rod

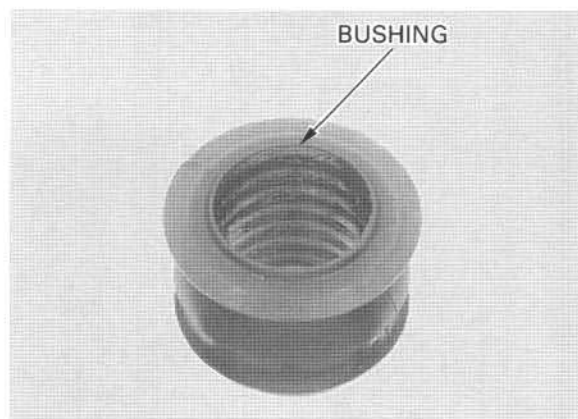


Remove the cotter pin and steering shaft U-nut.
Remove the steering shaft.

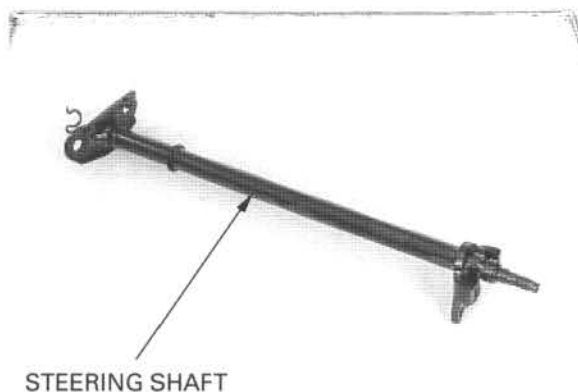


INSPECTION

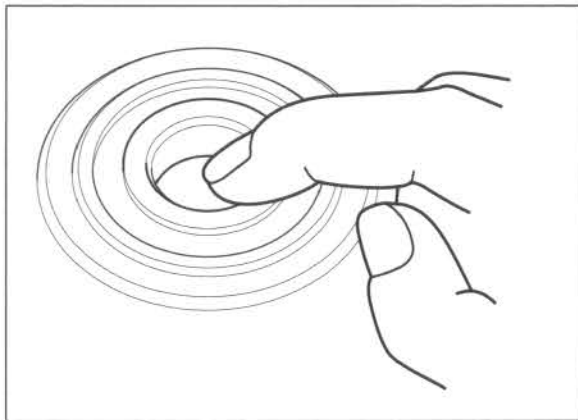
Check the steering shaft bushing for wear or damage.



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.



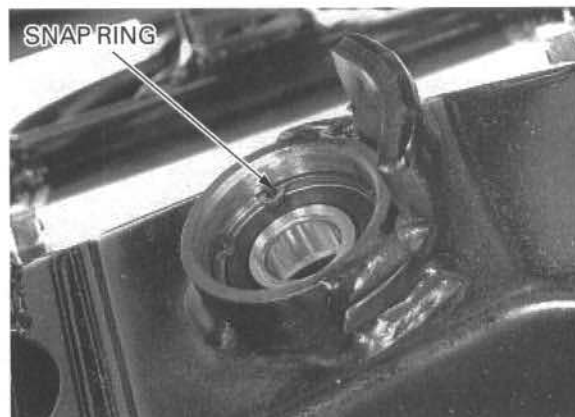
BEARING REPLACEMENT

Remove the dust seal.

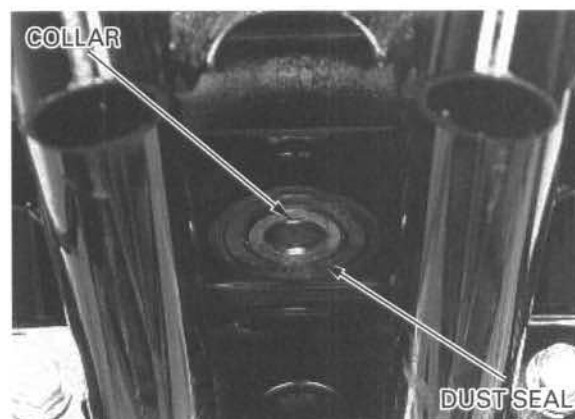


FRONT WHEEL/SUSPENSION/STEERING

Remove the snap ring.



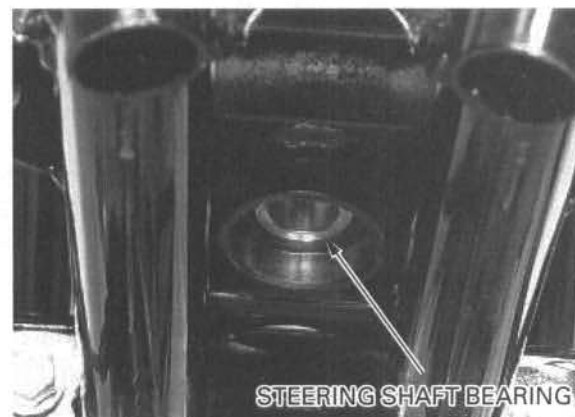
Remove the dust seal and collar.



Drive the steering shaft bearing out from the lower frame.

TOOLS:

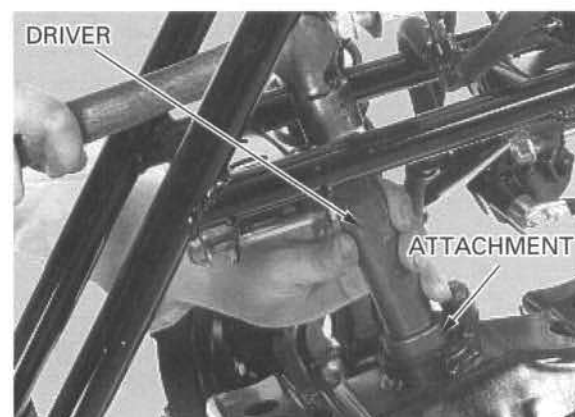
Driver	07749-0010000
Attachment, 32×35 mm	07746-0010100
Pilot, 17 mm	07746-0040400



Pack the bearing cavity with grease.
Install the bearing with its sealed side up using the special tools.

TOOLS:

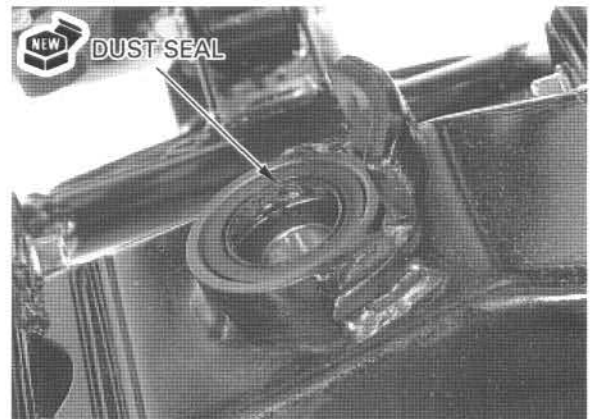
Driver	07749-0010000
Attachment, 37×40 mm	07746-0010200
Pilot, 17 mm	07746-0040400



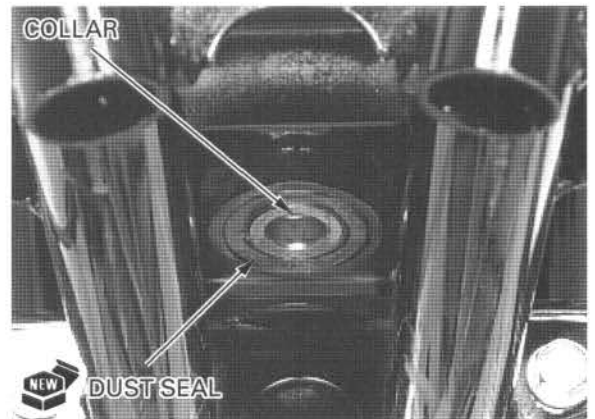
Install the snap ring in the groove securely.



Apply grease to new dust seal.
Install the dust seals.

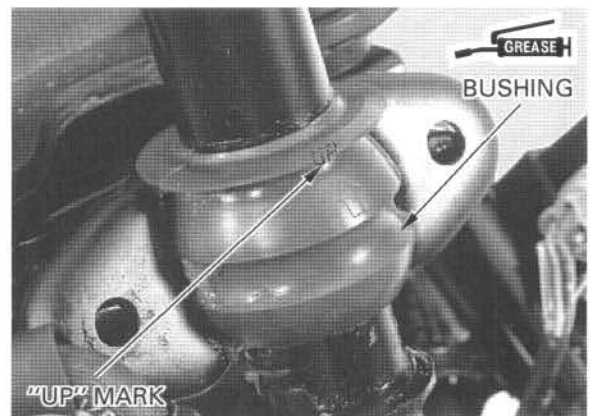


Apply grease to new dust seals.
Install the dust seal and collar.



INSTALLATION

Apply grease to the steering shaft bushing cavities.
Install the bushing with its "UP" mark facing up.
Install the steering shaft in the frame.

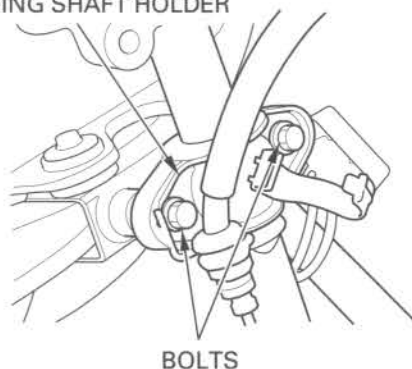


FRONT WHEEL/SUSPENSION/STEERING

Install the steering shaft holder and tighten the holder bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)

STEERING SHAFT HOLDER



BOLTS

Apply grease to the flange and threads of the steering shaft nut.

Install the steering shaft and tighten the steering shaft nut to the specified torque.

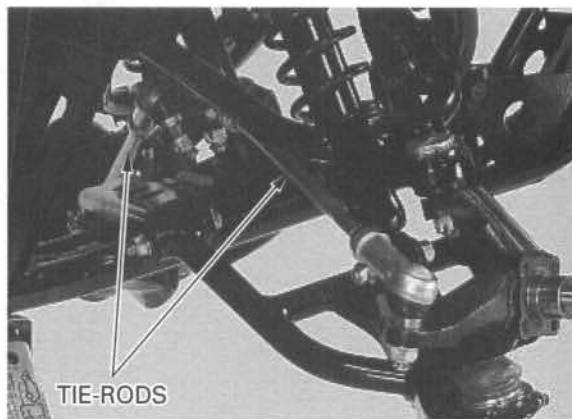
TORQUE: 108 N·m (11.0 kgf·m , 80 lbf·ft)

Install a new cotter pin.

STEERING SHAFT NUT



Install the tie-rods on the steering shaft (page 12-15).



Install the handlebar assembly onto the steering shaft and tighten the new lower holder nuts with washers to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m , 29 lbf·ft)

Adjust the toe (page 3-22).

Install the front fender (page 2-5).



FRONT SHOCK ABSORBER

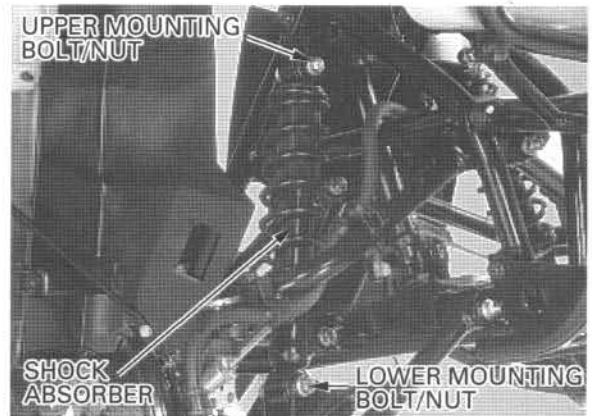
REMOVAL

Support the vehicle with a support block under the engine to raise the front wheels off the ground.

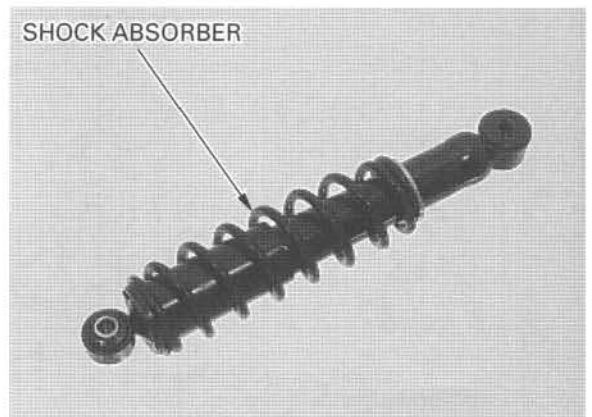
Remove the following:

- Shock absorber mounting bolts/nuts
- Shock absorber

Discard the mounting nuts.



Inspect the damper rod for distortion and signs of oil leakage.
Inspect the spring and spring guide for damage.



INSTALLATION

Install the shock absorber and tighten the mounting bolts and new nuts to the specified torque.
Do not reuse the nuts.

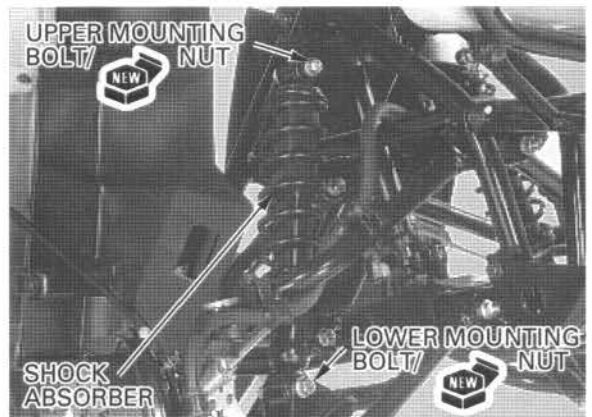
TORQUE:

Upper: 30 N·m (3.1 kgf·m , 22 lbf·ft)

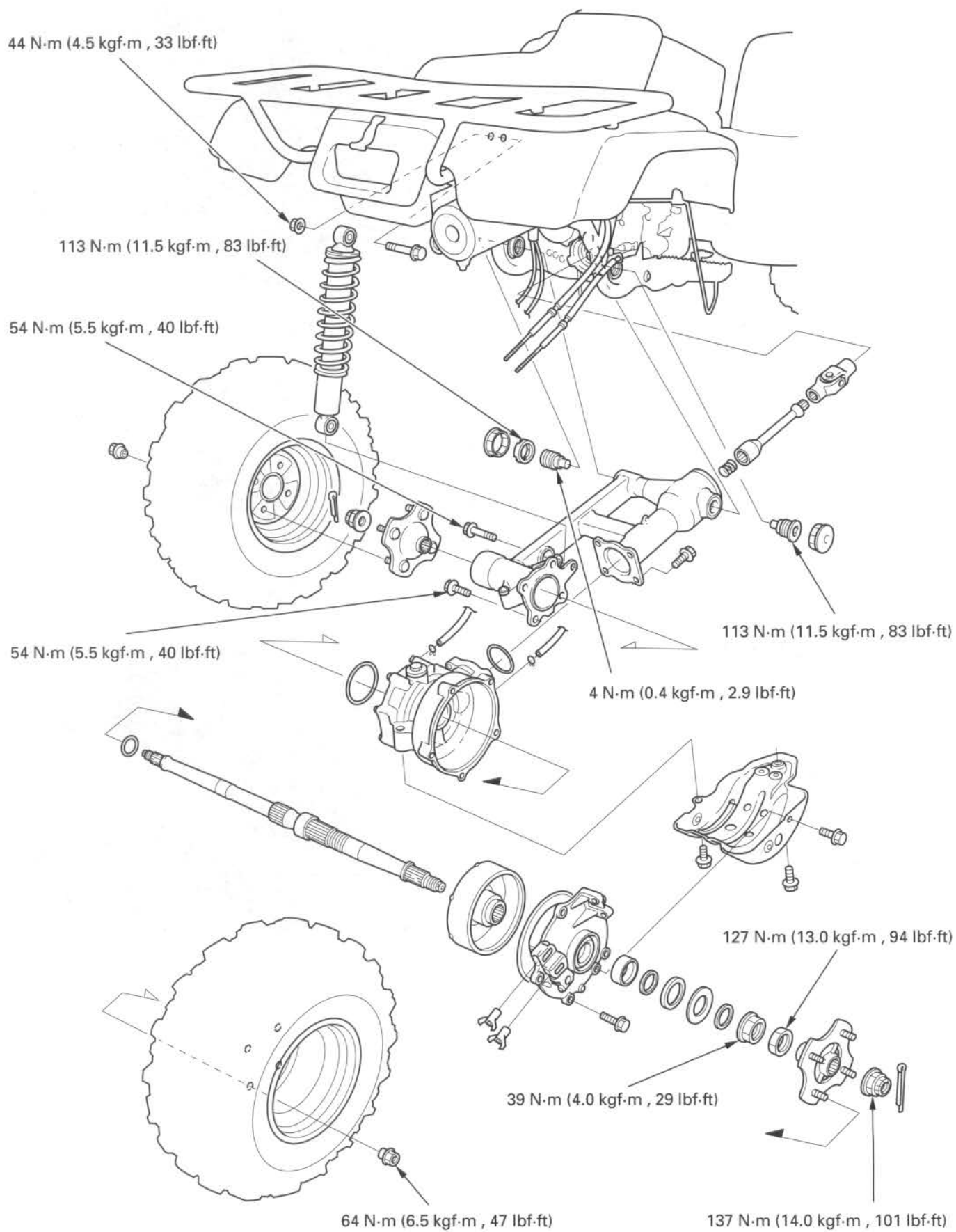
Lower:

'97: 54 N·m (5.5 kgf·m , 40 lbf·ft)

After '97: 49 N·m (5.0 kgf·m , 36 lbf·ft)



REAR WHEEL/SUSPENSION



13. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	13-1	REAR SHOCK ABSORBER	13-3
TROUBLESHOOTING	13-2	SWINGARM	13-4
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 (0.2)
Cold tire pressure	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
	Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)	—
	Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)	—
	With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—

TORQUE VALUES

Shock absorber upper mounting self lock nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	Do not reuse; replace with a new one
Shock absorber lower mounting bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Rear axle nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Rear axle lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	Apply a locking agent to the threads
Rear Wheel hub nut	137 N·m (14.0 kgf·m, 101 lbf·ft)	Castle nut
Rear Wheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Swingarm right pivot bolt	113 N·m (11.5 kgf·m, 83 lbf·ft)	
Swingarm left pivot bolt	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Swingarm left pivot lock nut	113 N·m (11.5 kgf·m, 83 lbf·ft)	
Skid plate flange bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	
Gear case mounting bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	

TOOLS

Swingarm lock nut wrench	07908-4690003
Remover handle	07936-3710100
Bearing remover, 17 mm	07936-3710300
Remover weight	07741-0010201 or 07936-371020A (U. S. A. only) or 07936-3710200 (U. S. A. only)
Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Attachment, 57 mm	07947-SD90101
Attachment, 62 × 68 mm	07746-0010500
Pilot, 17 mm	07746-0040400
Pilot, 32 × 50 mm	07MAD-PR90200

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

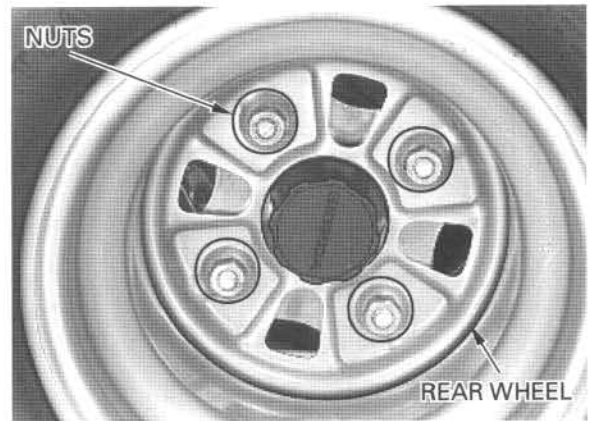
REAR WHEEL

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 12-8.



INSTALLATION

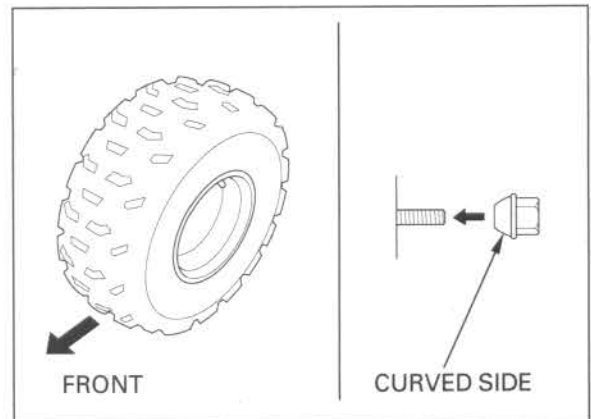
Install the rear wheel with the tire valve facing out so that the tires show a "V" pattern when viewed from front.

NOTE:

Do not interchange the right and left tires.

Install the wheel nuts with the curved (tapered) sides facing inward and tighten to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

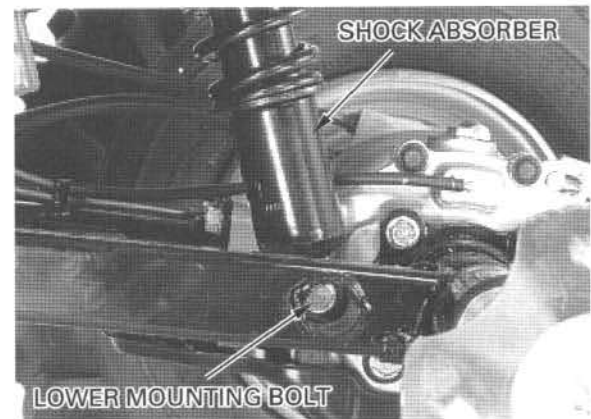


REAR SHOCK ABSORBER

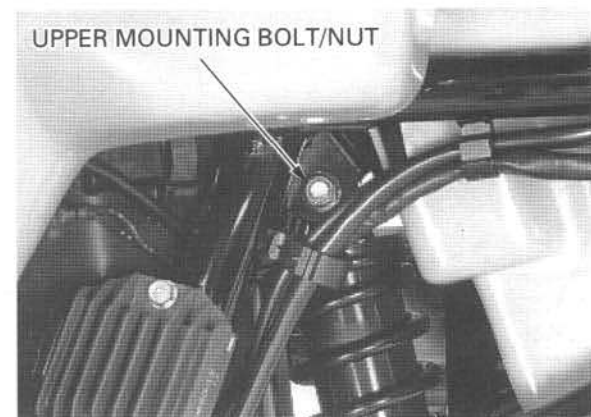
REMOVAL

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

Remove the rear shock absorber lower mounting bolt.



Remove the rear shock absorber upper mounting nut and bolt, and remove the shock absorber.
Discard the nut.



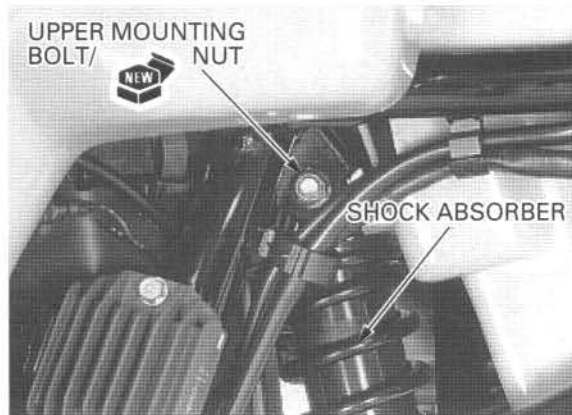
INSTALLATION

Position the rear shock absorber into the frame, and install the bolt and the new upper mounting nut.

Tighten the new upper mounting nut to the specified torque.

Do not reuse the nut.

TORQUE: 44 N·m (4.5 kgf·m , 33 lbf·ft)



Install the lower mounting bolt.

Install and tighten the lower mounting bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



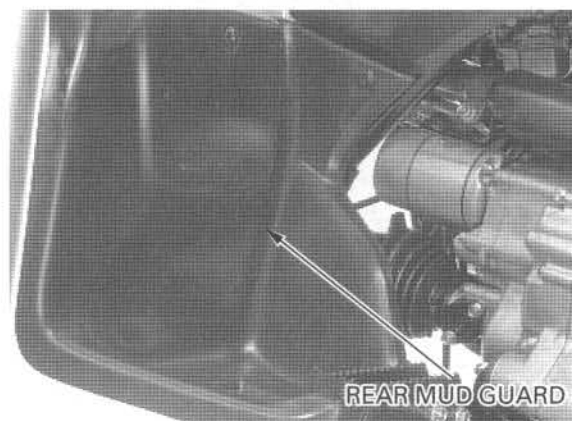
SWINGARM

REMOVAL

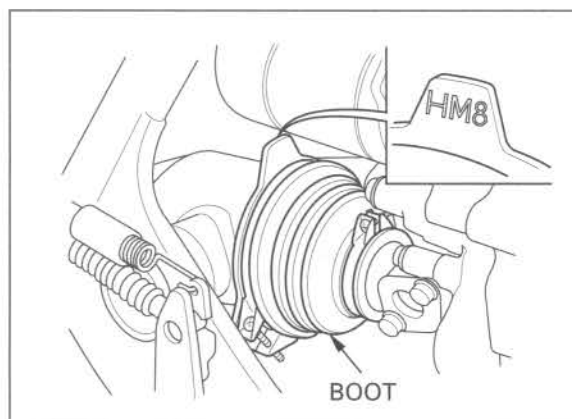
Remove the following:

- Rear wheels (page 13-3)
- Rear brake (page 14-14)
- Axle shaft, axle housings and final drive (section 15)

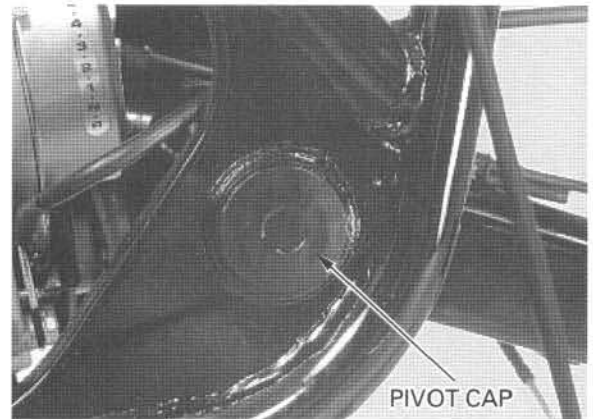
Remove the screws and retaining clips and rear mud guards (page 2-6).



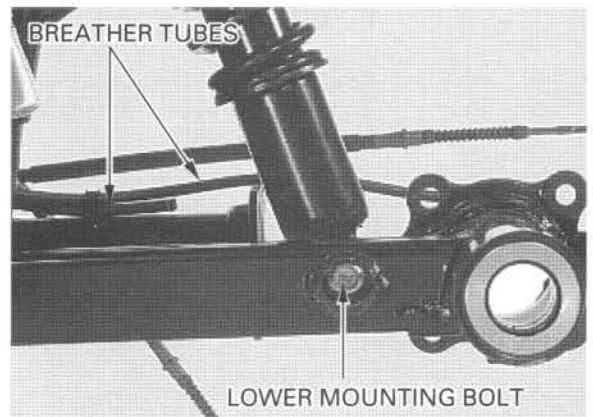
Loosen the swingarm boot band screw.



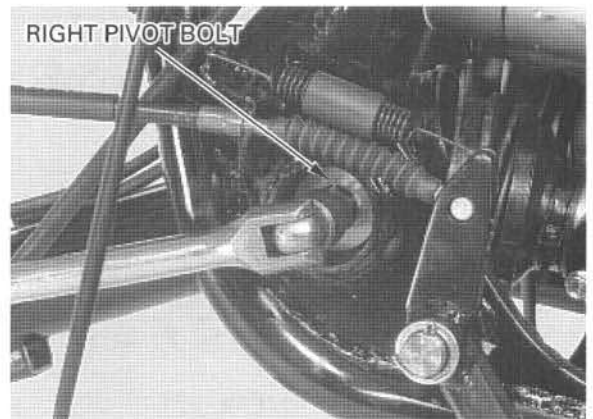
Remove the swingarm pivot cap (each side).



Release the breather tubes from the swingarm clamps.
Remove the rear shock absorber lower mounting bolt.



Remove the right pivot bolt using the commercially available tool as shown.

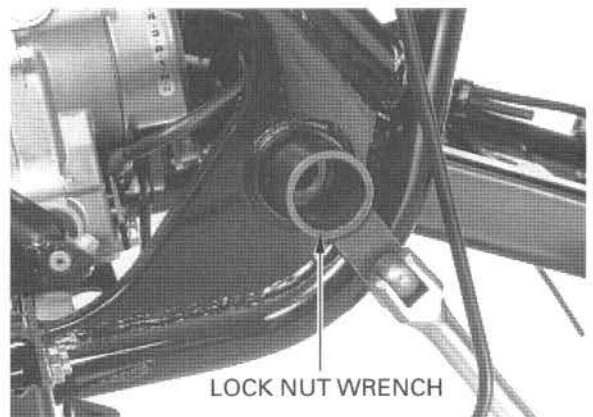


Remove the left pivot lock nut using the special tool as shown.

TOOL:
Swingarm lock nut wrench 07908-4690003

Remove the right pivot bolt using a commercially available tool.

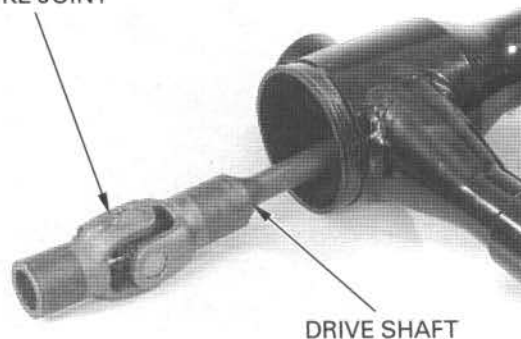
Remove the swingarm from the frame.



REAR WHEEL/SUSPENSION

Remove the yoke joint/drive shaft from the swing-arm.

YOKE JOINT



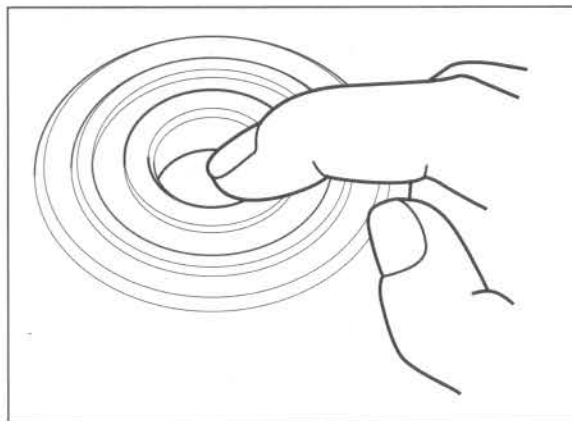
DRIVE SHAFT

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/REAR AXLE BEARING REPLACEMENT

Pivot Bearing

Remove the swingarm pivot bearing using the special tool.

TOOLS:

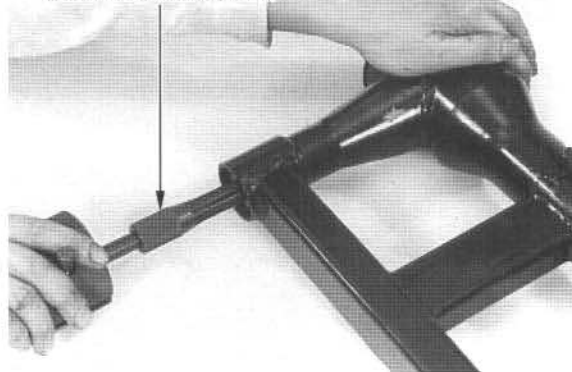
Remover handle

Bearing remover, 17 mm

Remover weight

07936-3710100
07936-3710300
07741-0010201 or
07936-371020A
(U. S. A. only) or
07936-3710200
(U. S. A. only)

BEARING REMOVER



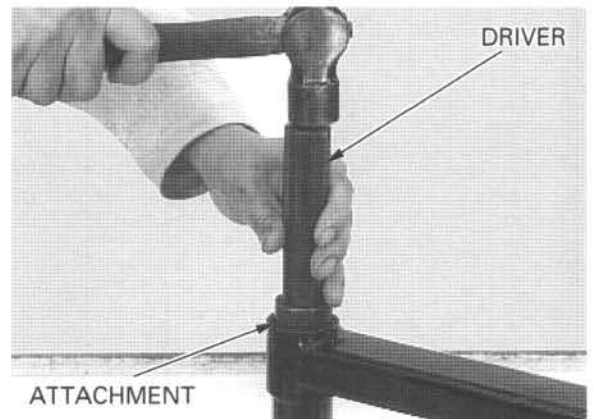
Replace the grease holder if it is damaged.

Remove the grease holder.

Install the grease holder in the swingarm pivot.
Install new pivot bearings using the special tools.

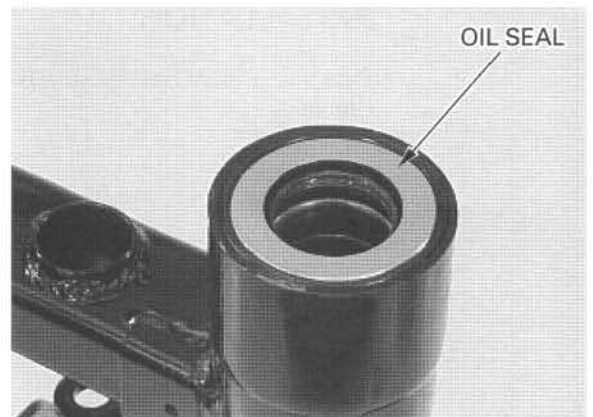
TOOLS:

Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400



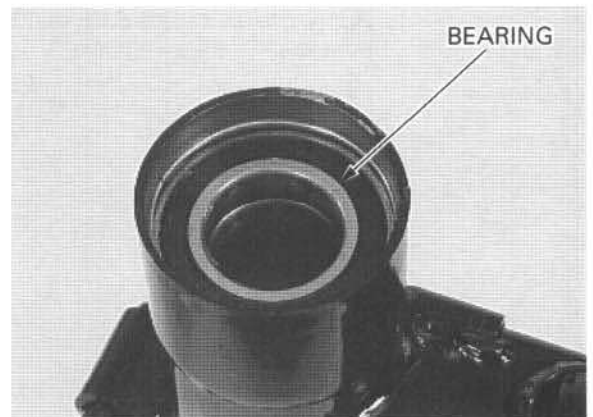
Rear Axle Bearing

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 fits 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 stopper ring if necessary.



BEARING REPLACEMENT

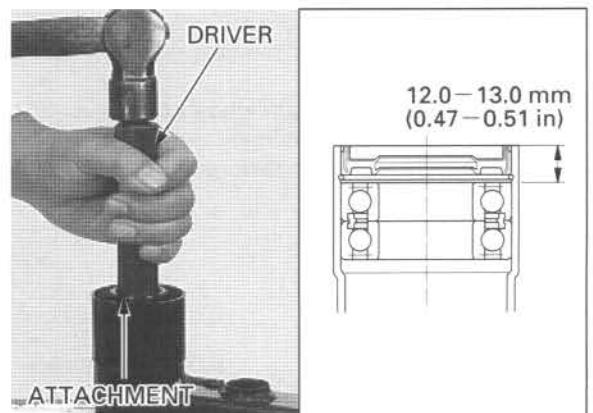
Remove the oil seal.
Drive out the bearing out of the left axle housing.

Drive the bearing into the housing with its sealed end facing in using the special tools to the specified depth. Use the flat side of the attachment.

BEARING DEPTH: 12.0 – 13.0 mm (0.47 – 0.51 in)

TOOLS:

Driver	07749-0010000
Attachment, 57 mm	07947-SD90101
Pilot, 32 × 35 mm	07MAD-PR90200



REAR WHEEL/SUSPENSION

Drive the oil seal into the housing using the special tools.

TOOLS:

Driver

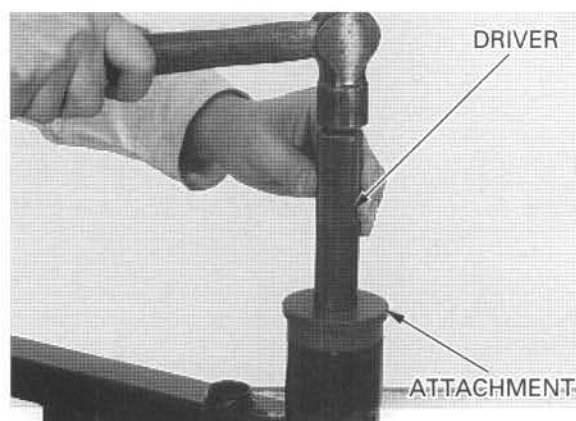
07749-0010000

Attachment, 62 × 68 mm

07746-0010500

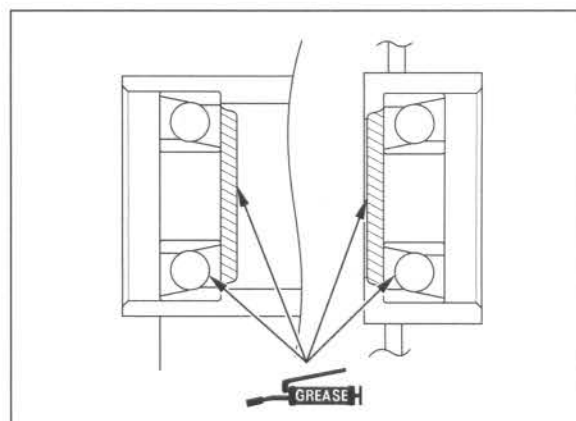
Pilot, 32 × 50 mm

07MAD-PR90200



INSTALLATION

Pack the grease holders and bearing cavities with grease.

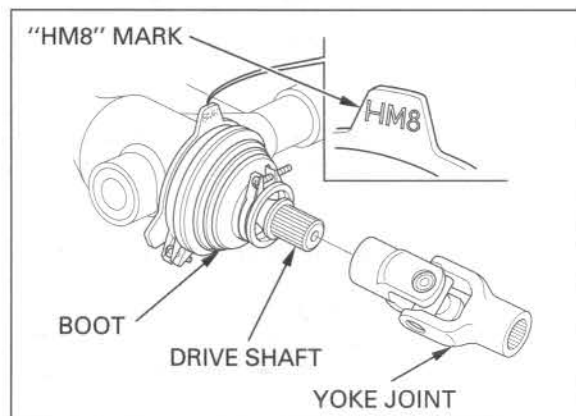


Apply grease to the dust seal lips, and install the dust seals in the swingarm.

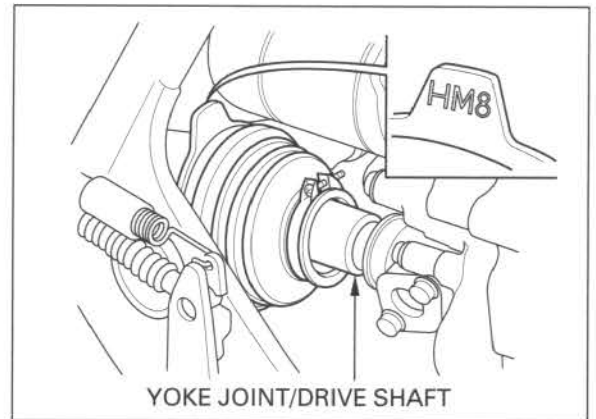


Install the swingarm boot securely with its "HM8" marked tab facing up.

Apply molybdenum disulfide grease to the drive shaft splines and install the yoke joint/drive shaft into the swingarm.

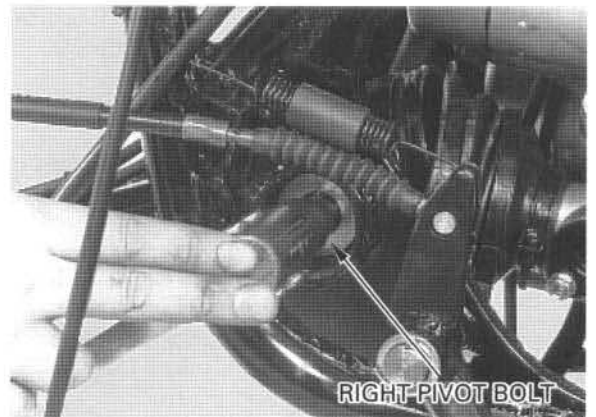


Position the swingarm in the frame by aligning the spline between the final drive shaft and yoke joint.



Install and tighten the right pivot bolt using a commercially available tool as shown.

TORQUE: 113 N·m (11.5 kgf·m , 83 lbf·ft)



Install and tighten the left pivot bolt using a commercially available tool.

TORQUE: 4 N·m (0.4 kgf·m , 2.9 lbf·ft)

Move the swingarm up and down several times. Retighten the left 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: 113 N·m (11.5 kgf·m , 83 lbf·ft)

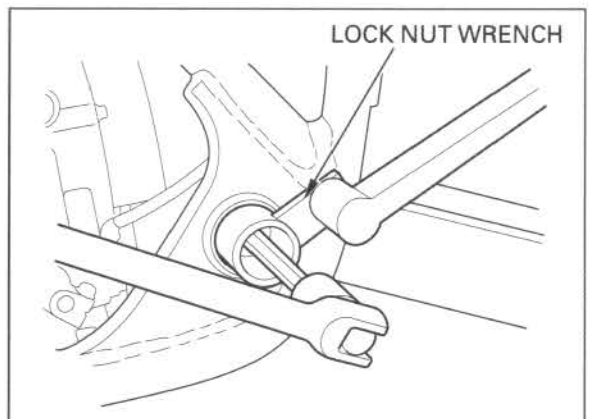
Torque wrench scale reading:

103 N·m (10.5 kgf·m, 76 lbf·ft), using a 50 cm (20 in) long torque wrench

TOOL:

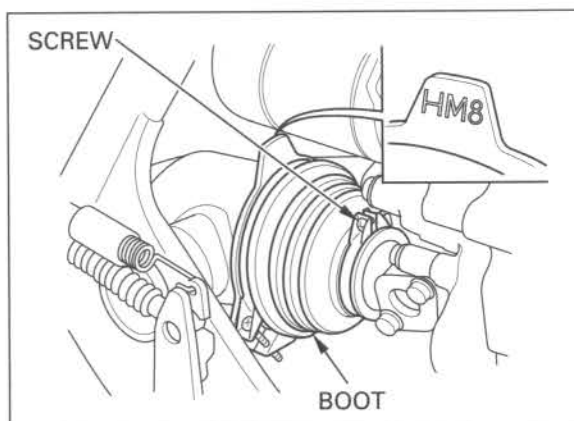
Swingarm lock nut wrench 07908-4690003

Install the swingarm pivot caps.



REAR WHEEL/SUSPENSION

Attach the swingarm boot to the engine and tighten the boot clamp screw securely.



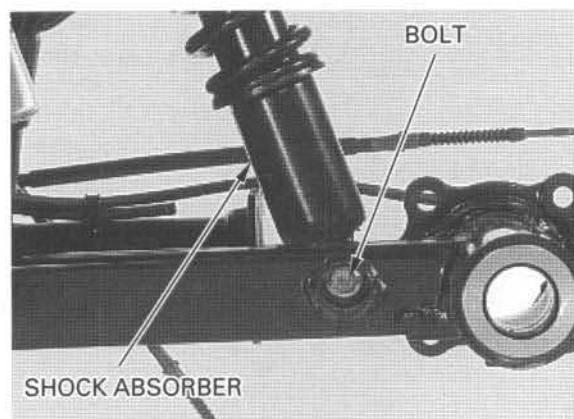
Tighten the rear shock absorber lower mounting bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)

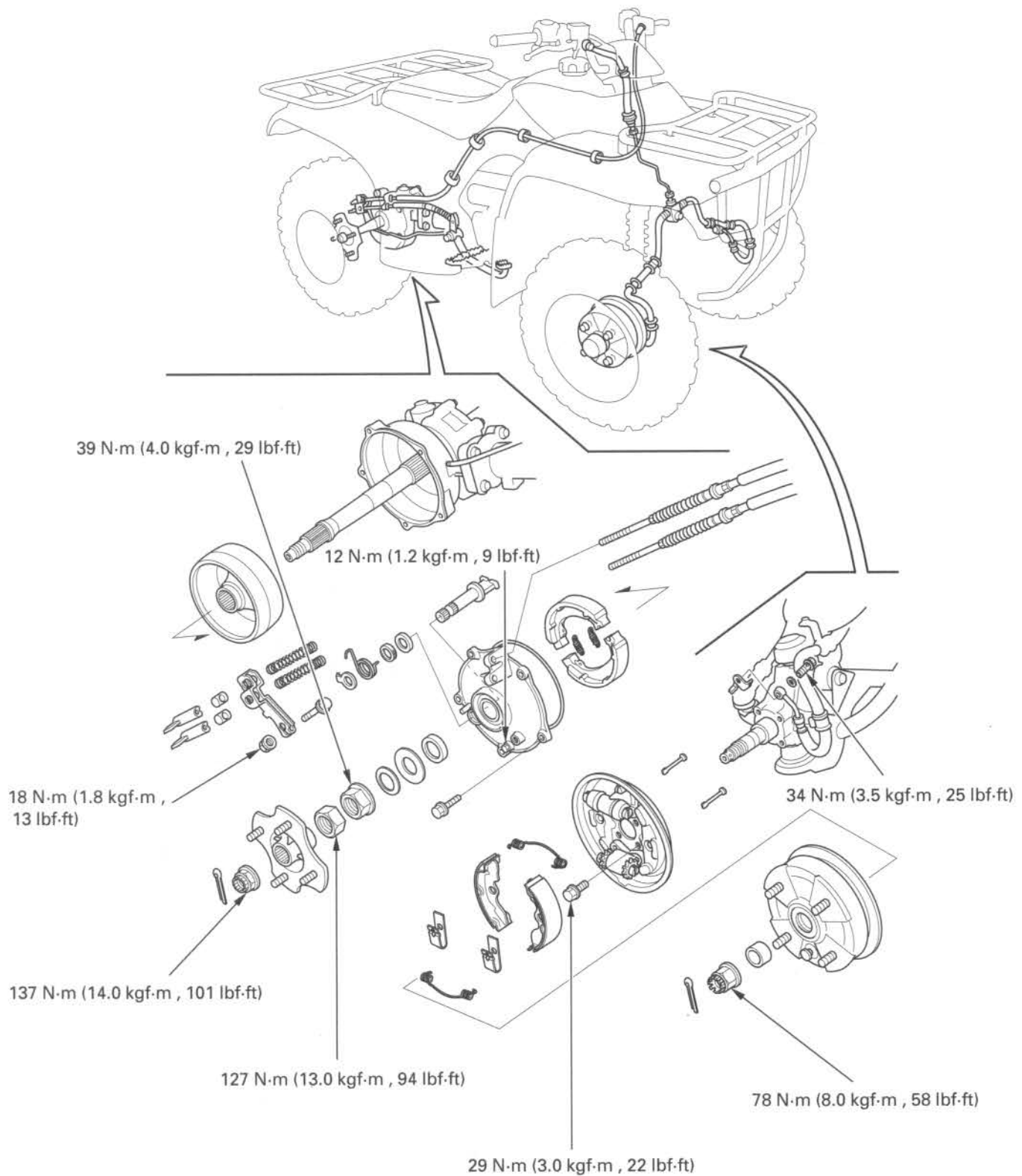
Route the breather tubes and clamp them on the swingarm clamps.

Install the following:

- Final drive, axle housings and axle (page 15-16)
- Rear brake (page 14-22)
- Rear mudguards (page 2-6)
- Rear wheels (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	14-25
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.

14

SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS	SERVICE LIMIT
Front brake	Drum I. D.	130.0 (5.12)	131.0 (5.16)
	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)
	Master cylinder I. D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O. D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Wheel cylinder I. D.	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Wheel cylinder piston O. D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
Rear brake	Drum I. D.	140.0 (5.51)	141.0 (5.55)
	Lining thickness	4.5 (0.18)	To the indicator

BRAKE SYSTEM

TORQUE VALUES

Rear brake arm pinch bolt/nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Rear brake panel drain bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Master cylinder reservoir cap screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Master cylinder holder SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Brake pipe	17 N·m (1.7 kgf·m , 12 lbf·ft)	Apply oil to threads and flange surface.
Brake panel flange bolt	29 N·m (3.0 kgf·m , 22 lbf·ft)	
Brake hose clamp flange bolt 6 mm	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Brake hose clamp flange bolt 8 mm	29 N·m (3.0 kgf·m , 22 lbf·ft)	
Brake lever pivot bolt	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Brake lever pivot lock nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Brake bleeder valve	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Brake wheel cylinder bolt washer	8 N·m (0.8 kgf·m , 5.8 lbf·ft)	
Brake adjuster bolt washer	8 N·m (0.8 kgf·m , 5.8 lbf·ft)	
Front wheel hub castle nut	78 N·m (8.0 kgf·m , 58 lbf·ft)	Castle nut
Rear wheel hub nut	137 N·m (14.0 kgf·m , 101 lbf·ft)	Castle nut
Rear axle nut	39 N·m (4.0 kgf·m , 29 lbf·ft)	Apply a locking agent to the threads.
Rear axle lock nut	127 N·m (13.0 kgf·m , 94 lbf·ft)	Apply a locking agent to the threads.

TOOLS

Snap ring pliers	07914-3230001
Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500
Lock nut spanner, 41 mm	07916-9580200 or 07916-958020A (U. S. A. only) or 07916-958020B (U. S. A. only)
Lock nut wrench set	07916-9580300 (Not available in U. S. A.)
— Lock nut wrench	07916-9580400 or 07916-958010A (U. S. A. only) or 07916-958020B (U. S. A. only)
— Lock nut wrench handle	07916-9580500 (Not available in U. S. A.)
Oil seal driver	07JAD-PH80101
Oil seal driver	07947-SD90101
Pilot, 32 mm	07MAD-PR90200

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

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.

Perform above procedure for other side bleed valve.

BRAKE FLUID FILLING/BLEEDING

Close the bleed valves.

Fill the reservoir with DOT 3 or 4 brake fluid from a sealed container.

CAUTION:

Do not mix different types of fluid. They are not compatible.

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

If not using an automatic refill system, add brake fluid when the fluid level in the 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.

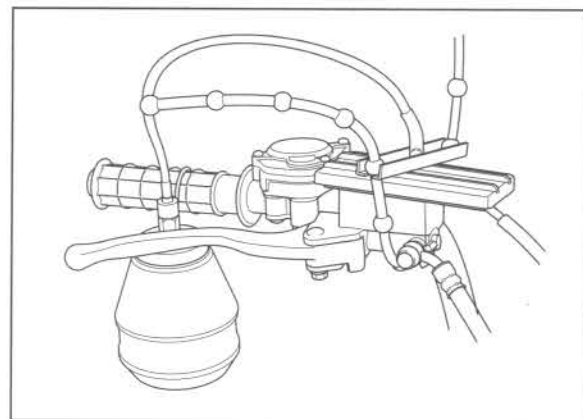
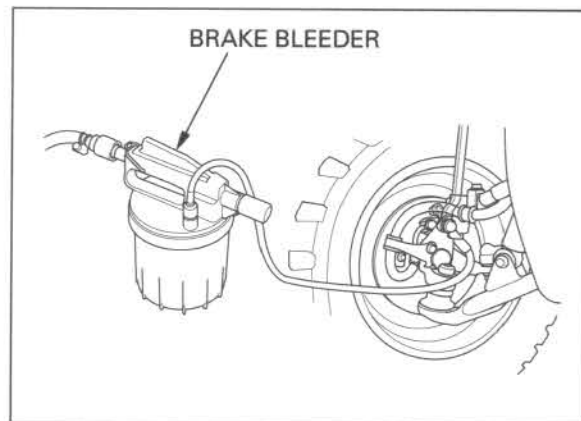
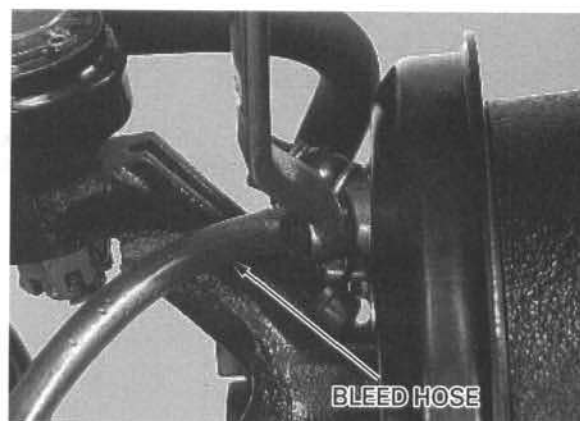
Perform the bleeding procedure until the system is completely flushed/bled.

NOTE:

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

Close the bleed valve and perform air bleeding for the other side bleed valve.

Close the bleed valve and operate the brake lever. If it still feels spongy, bleed the system again.



BRAKE SYSTEM

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

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.

Tighten the bleed valve.

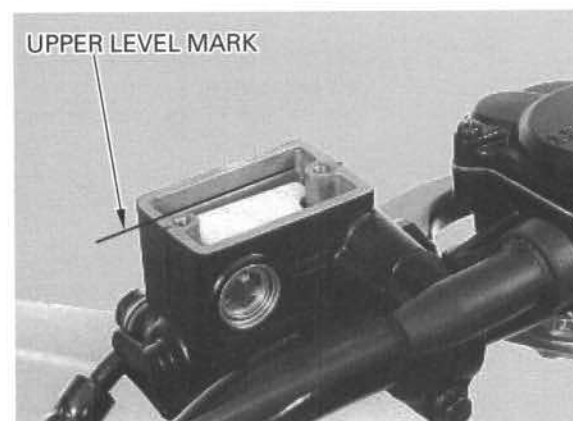
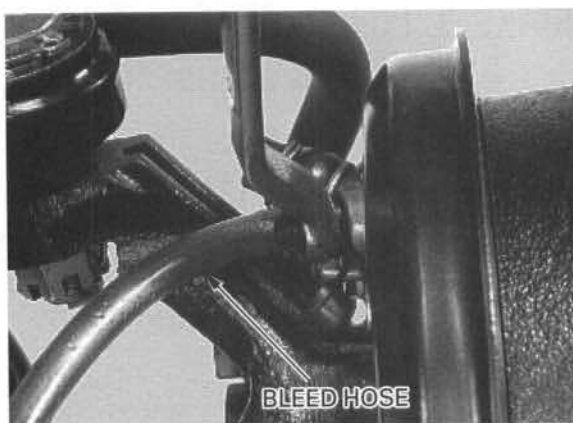
TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Perform air bleeding for the other side bleed valve.

Fill the fluid reservoir to the upper level.

Reinstall the diaphragm and reservoir cover, and tighten the screws.

TORQUE: 2 N·m (0.2 kgf·m , 1.4 lbf·ft)



BRAKE HOSE/BRAKE PIPE INSPECTION

Remove the front fender (page 2-5).

Check the brake hose and brake pipe for damage and brake fluid leaks.



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 from 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.

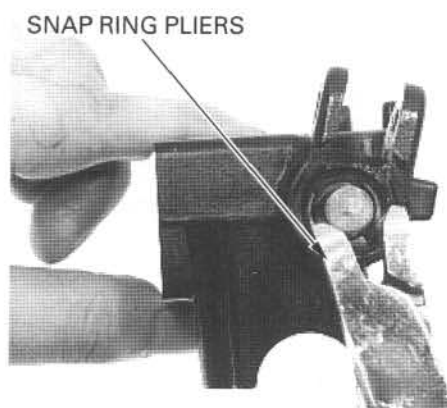
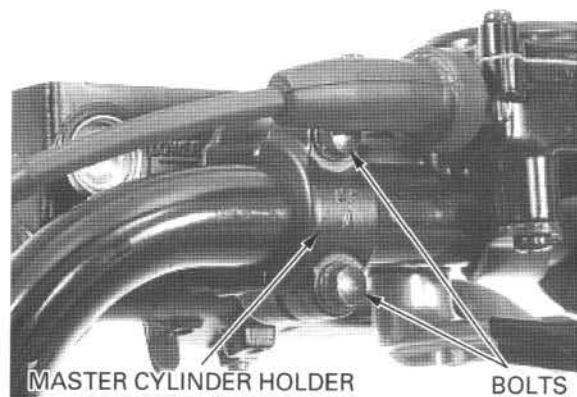
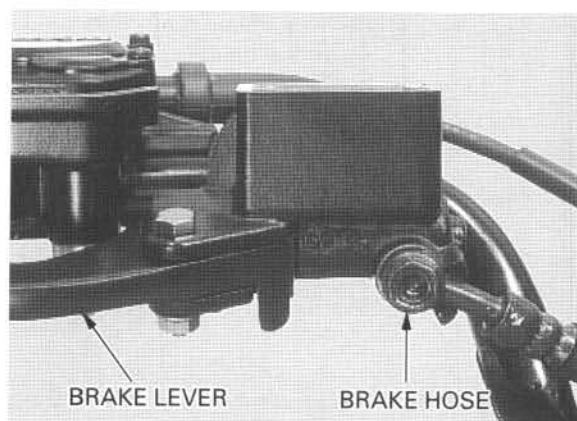
Remove the boot.

Depress the piston and remove the snap ring from the master cylinder body, using the special tool as shown.

TOOL:

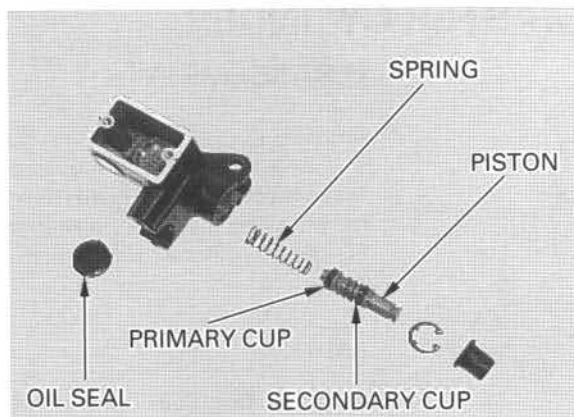
Snap ring pliers

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.



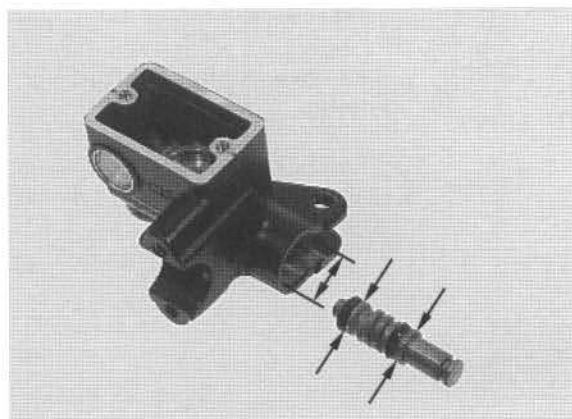
INSPECTION

Measure the master cylinder I. D.

SERVICE LIMIT: 12.755 mm (0.5022 in)

Measure the master cylinder piston O. D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



ASSEMBLY

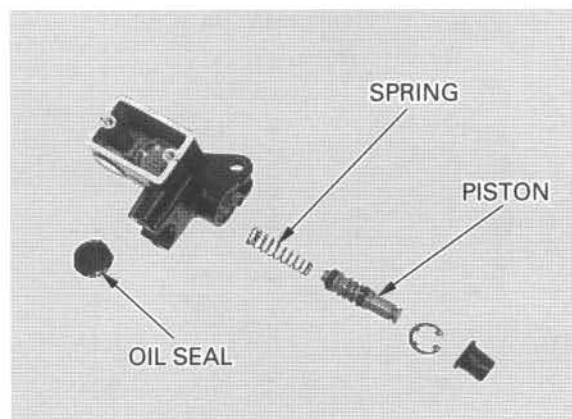
CAUTION:

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.

Install the 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.

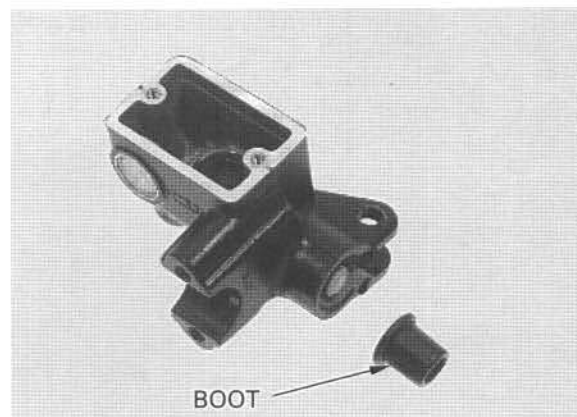
Install the snap ring.

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 kgf·m , 9 lbf·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 kgf·m , 9 lbf·ft)

Install the brake hose between the stoppers with the bolt and new sealing washers.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

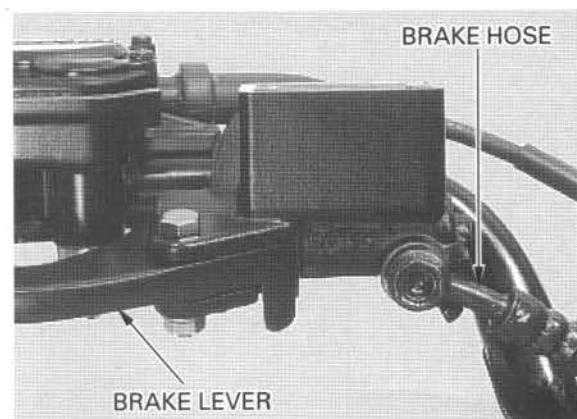
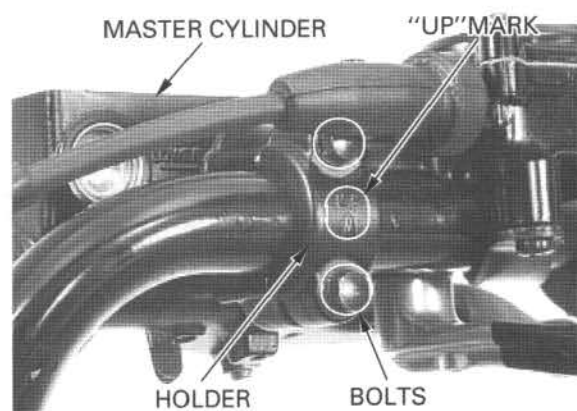
Install the brake lever.
Install and tighten the pivot bolt.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Hold the pivot bolt and tighten the nut.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

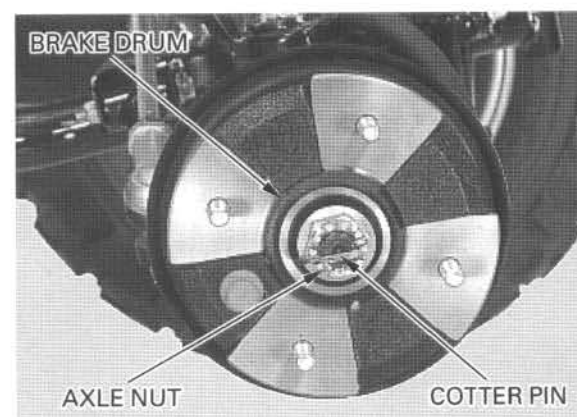
Fill the reservoir to the upper level and bleed the brake system (page 14-3).



BRAKE SHOES/WHEEL CYLINDER/ADJUSTER

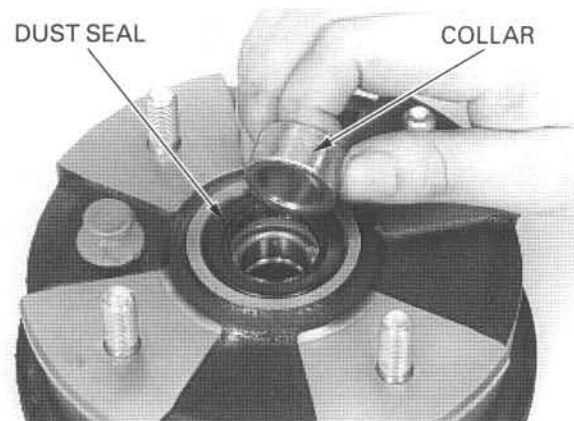
DISASSEMBLY

- Remove the following:
- Front wheel (page 12-3)
 - Cotter pin
 - Axle nut
 - Brake drum



BRAKE SYSTEM

Remove the collar and dust seal.

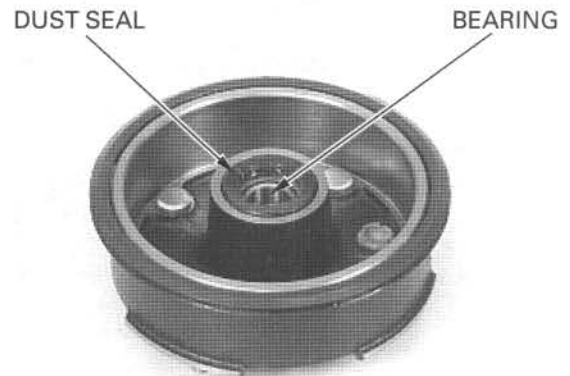


Remove the dust seal.
Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the outer race of each bearing fits tightly in the brake drum.

For bearing replacement, see page 14-9.
For front brake waterproof seal inspection see page 14-11.

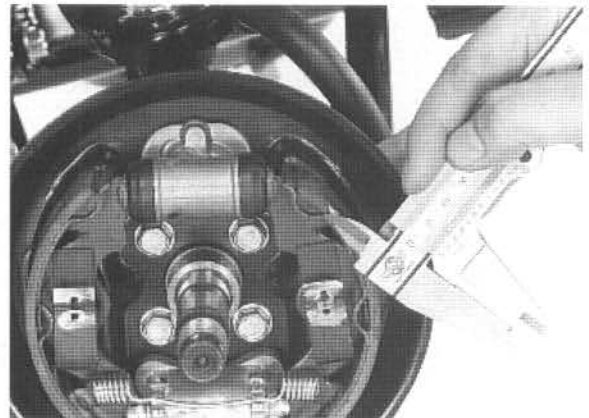
Measure the brake drum I. D.

SERVICE LIMIT: 131.0 mm (5.16 in)



Measure the brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

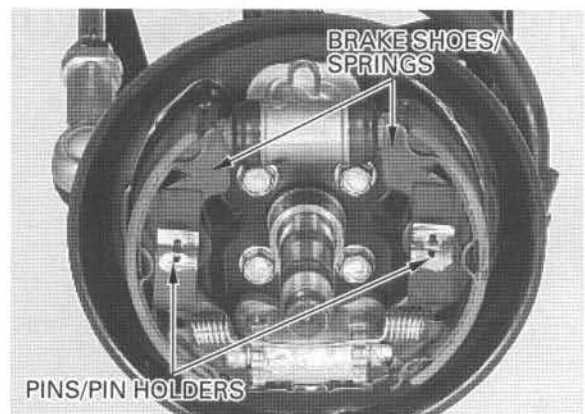


For brake panel inspection, see page 14-11.

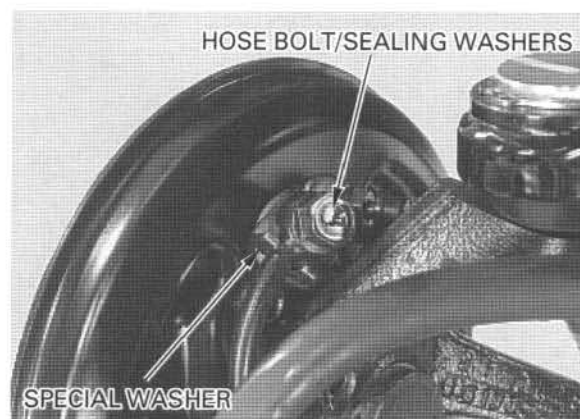
Remove the following:

- Pins
- Pin holders
- Brake shoes and shoe springs

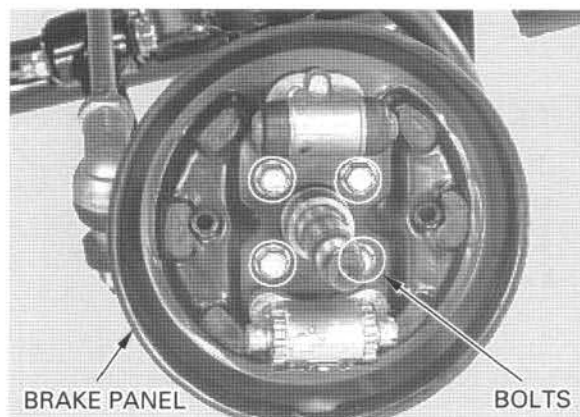
Mark the brake shoes to indicate their original positions.



Drain the brake fluid (page 14-3).
Remove the brake hose and special washer by removing the brake hose bolt.

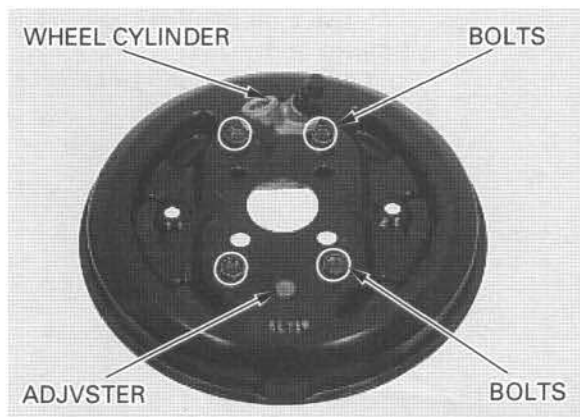


Remove the four bolts and brake panel.



Remove the two bolts and wheel cylinder.

Remove the two bolts and adjuster.

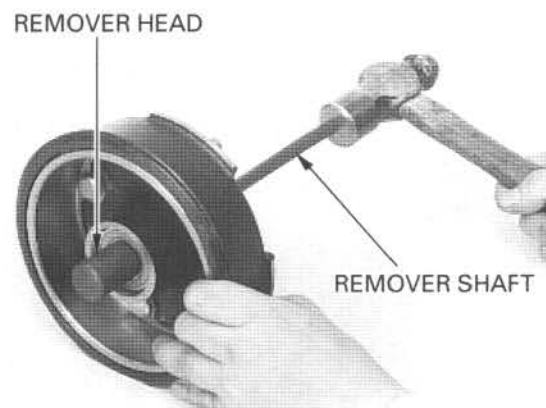


BRAKE DRUM BEARING REPLACEMENT

Remove the brake drum bearing using the special tools.

TOOLS:

Bearing remover head,	07746-0050600
20 mm	
Remover shaft	07746-0050100

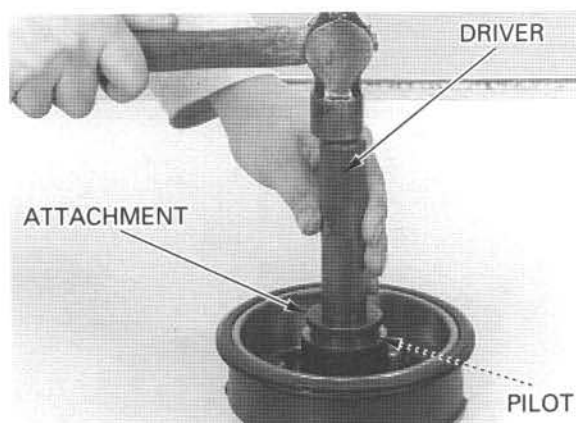


BRAKE SYSTEM

Pack the bearing cavities with grease.
Drive the new bearings into the brake drum.

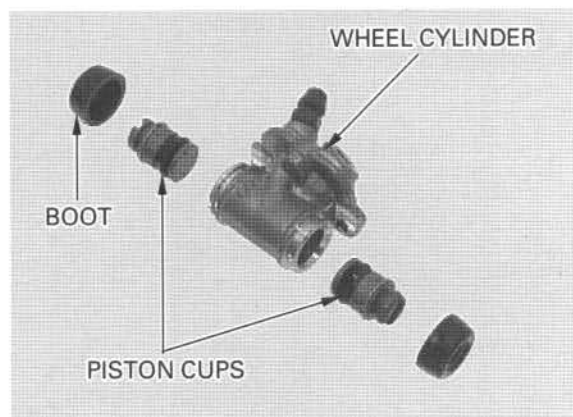
TOOLS:

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500

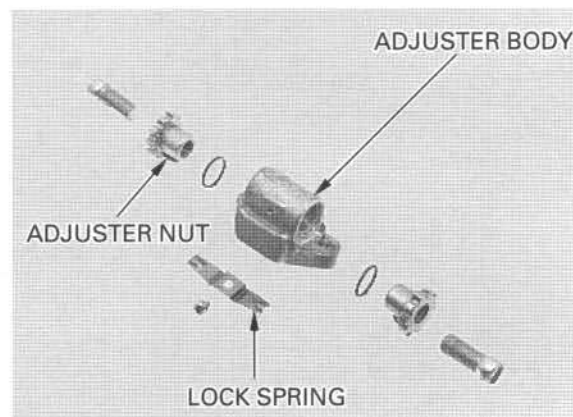


WHEEL CYLINDER/ADJUSTER INSPECTION

Inspect the wheel cylinder bore and pistons for scoring or grooving.
Inspect the piston cups and piston boots for wear or fatigue.



Inspect the adjuster body and adjuster nuts for wear or damage.
Check the lock spring for fatigue or damage.

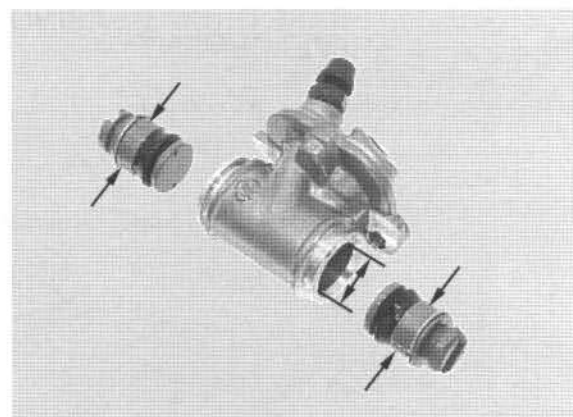


Measure the wheel cylinder I. D.

SERVICE LIMIT: 15.925 mm (0.6270 in)

Measure the wheel cylinder piston O. D.

SERVICE LIMIT: 15.815 mm (0.6226 in)



FRONT BRAKE PANEL INSPECTION

Check the brake panel at the waterproof seal lip contact area for abnormal scratches.
Check the brake panel for wear caused by the waterproof seal lip.

SERVICE LIMIT: 0.5 mm (0.02 in)

Install a suitable steel plate and collar onto the knuckle.

Install and tighten the axle nut securely.

Clean any grease from the brake panel.

⚠ WARNING

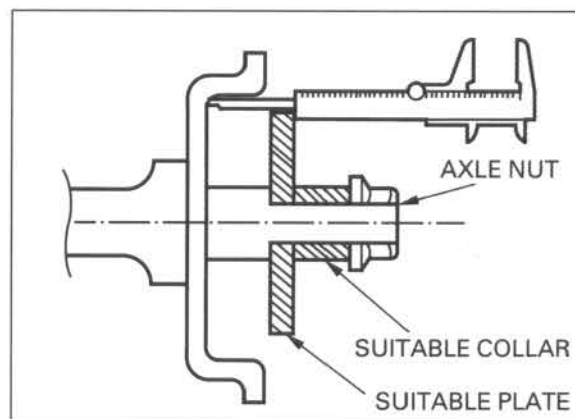
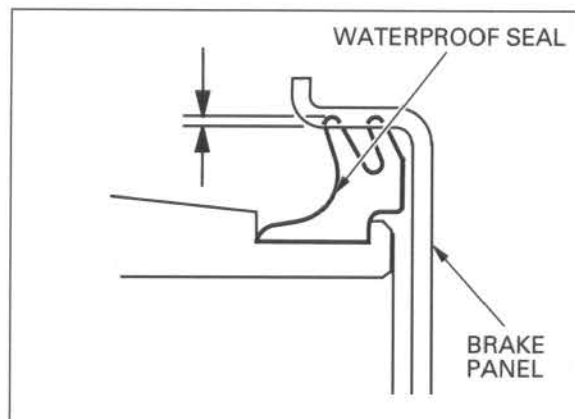
Grease on the brake linings reduces stopping power. Keep grease off the linings.

Using a vernier caliper as shown, measure the depth of the brake panel at several points on the seal lip contact area.

Calculate the warpage.

SERVICE LIMIT: 0.4 mm (0.02 in)

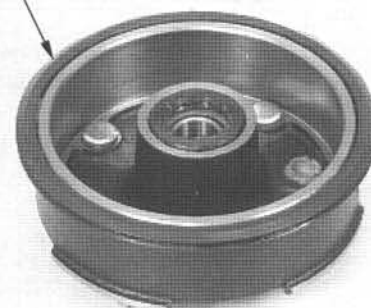
Replace the brake panel if warpage is greater than the service limit.



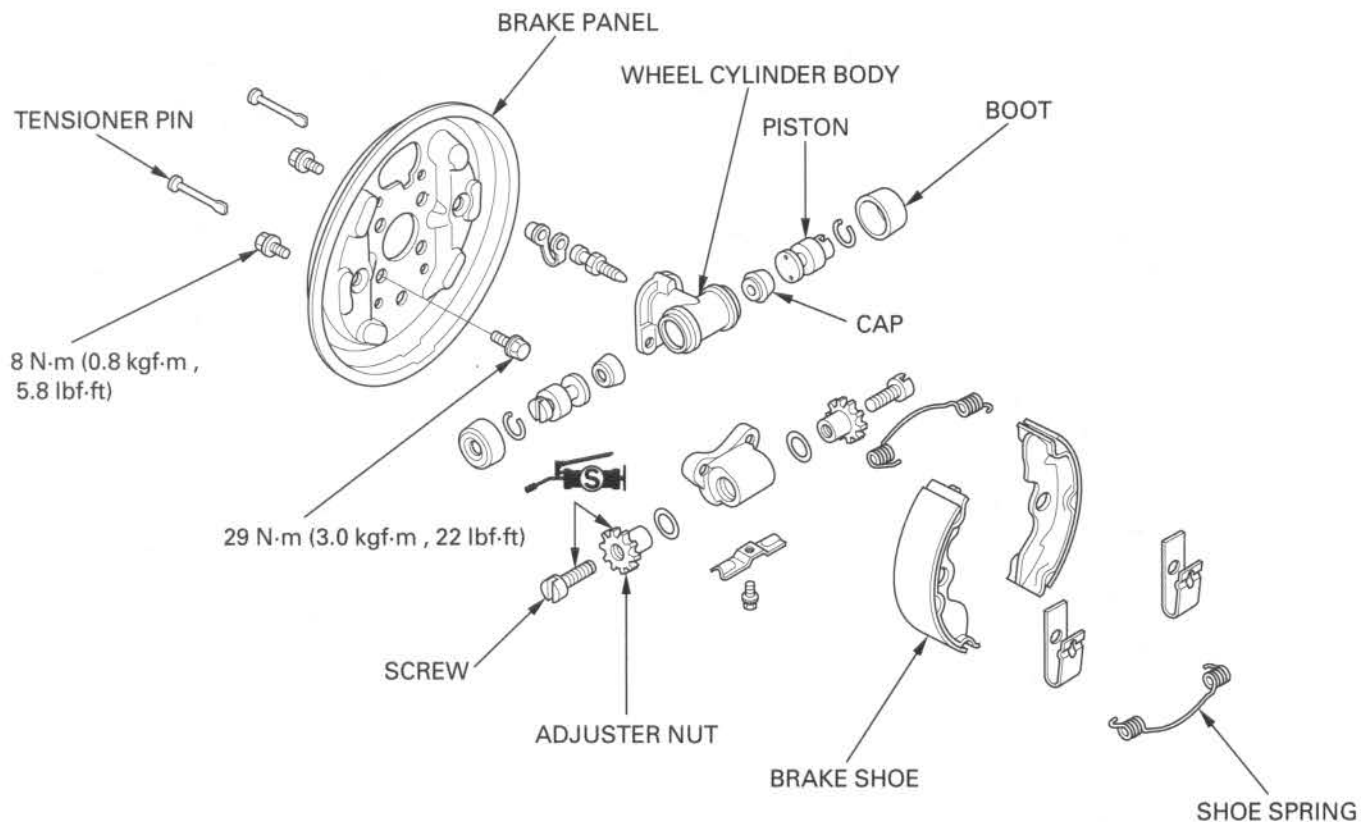
FRONT BRAKE WATERPROOF SEAL INSPECTION

Check the waterproof seal for damage, fatigue or faulty installation.

WATERPROOF SEAL



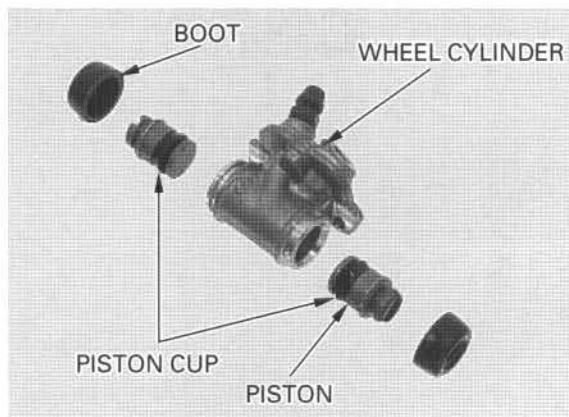
ASSEMBLY



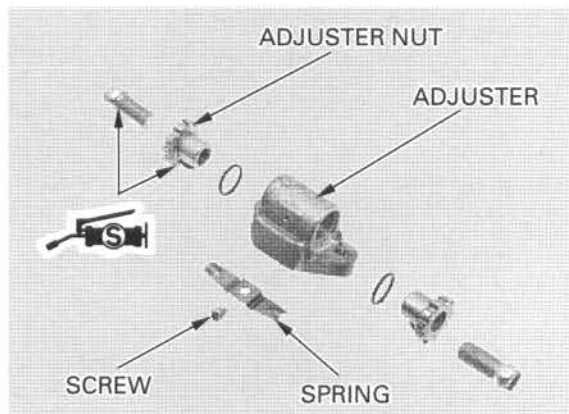
Clean all parts, excluding the boots, thoroughly with BRAKE FLUID only.
Blow out passages with compressed air.

Install the pistons into the wheel cylinder body without allowing the lips to turn inside out.

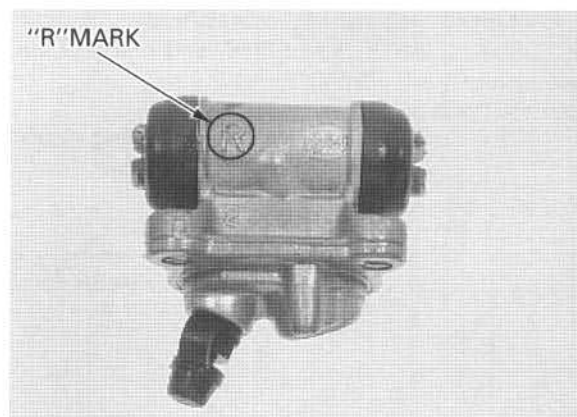
Install the boots on the cylinder body.



Apply silicone grease to the adjuster nuts.
Install the adjuster nuts, screws and lock spring on the adjuster body.

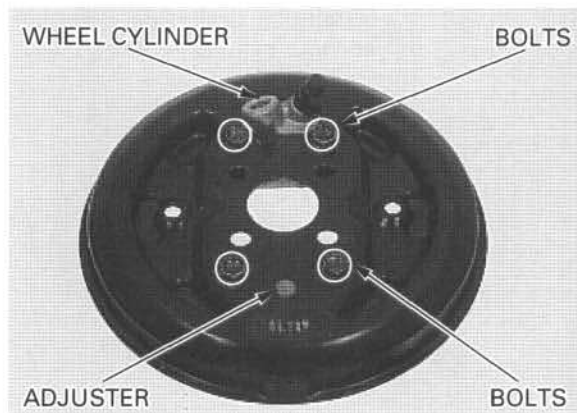


Note that the wheel cylinders are marked.
L: for the left brake panel
R: for the right brake panel



Install the wheel cylinder and adjuster and tighten the bolts.

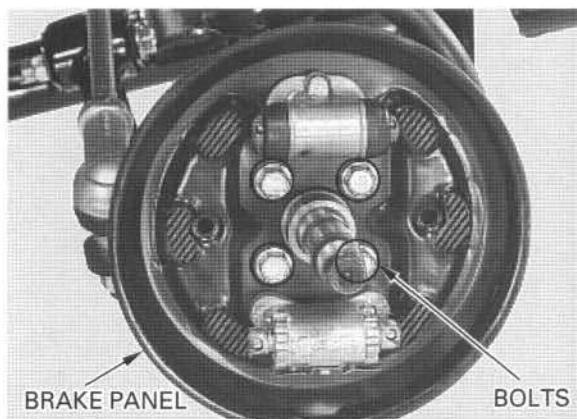
TORQUE: 8 N·m (0.8 kgf·m , 5.8 lbf·ft)



Install the front brake panel assembly and tighten the brake panel bolts.

TORQUE: 29 N·m (3.0 kgf·m , 22 lbf·ft)

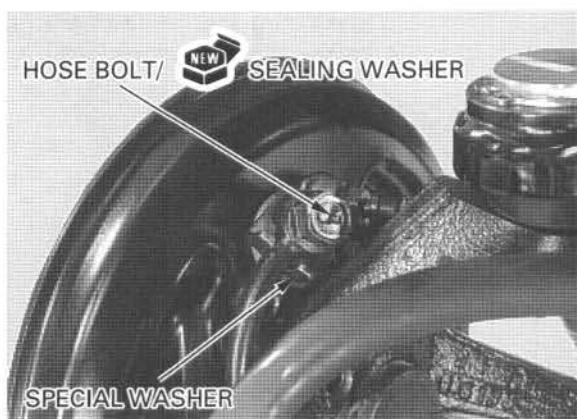
Apply silicone grease on the metal contact areas indicated and pistons/adjuster screws.



Hold the hose while tightening.

Connect the brake hose to the wheel cylinder, and tighten the brake hose bolt with new sealing washer and special washer.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)



BRAKE SYSTEM

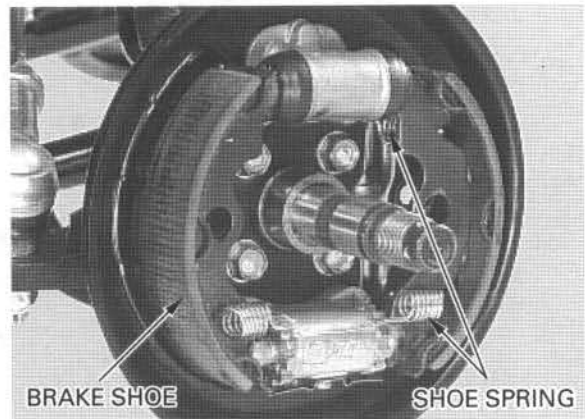
Face the flatter edges of the shoes to the wheel cylinder.

Install the brake shoes in their original positions, then install the shoe springs with their curved sides facing out.

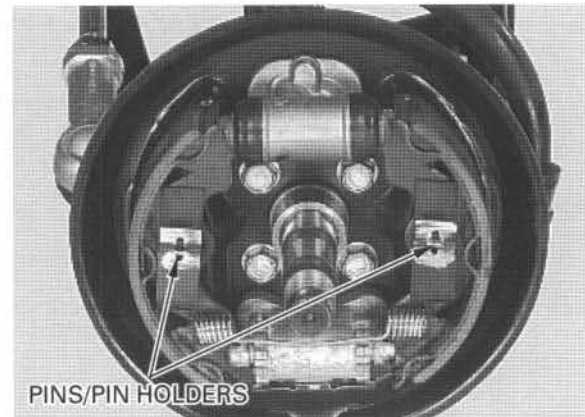
Install the upper spring from the inside; lower spring, from the outside.

▲WARNING

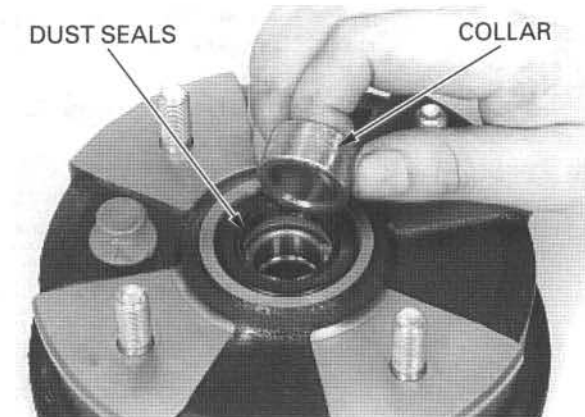
Do not get grease or oil on the brake lining surface.



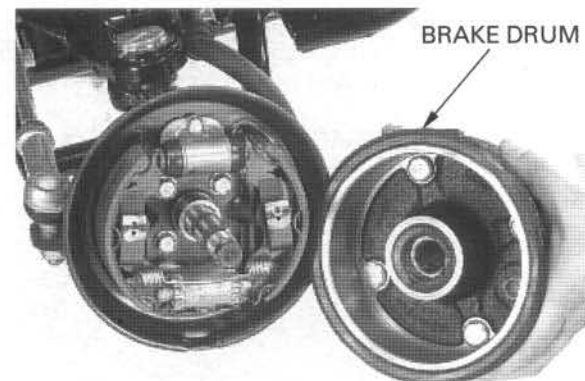
Install the tension pins and pin holders as shown and lock them by tensioner pins.



Install the dust seals and apply grease to its lip. Install the collar.

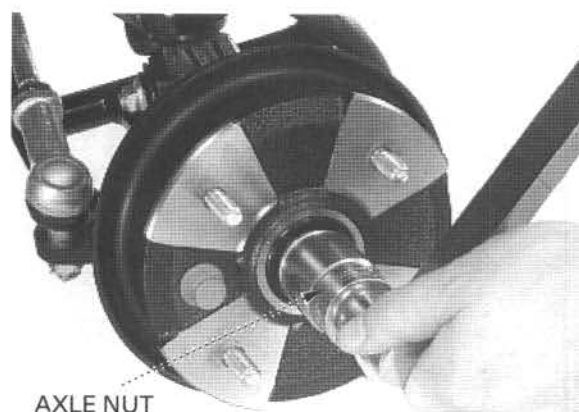


Make sure the inside of the brake drum and the brake shoes are completely free of grease, then install the drum.



Install and tighten the axle nut.

TORQUE: 78 N·m (8.0 kgf·m , 58 lbf·ft)



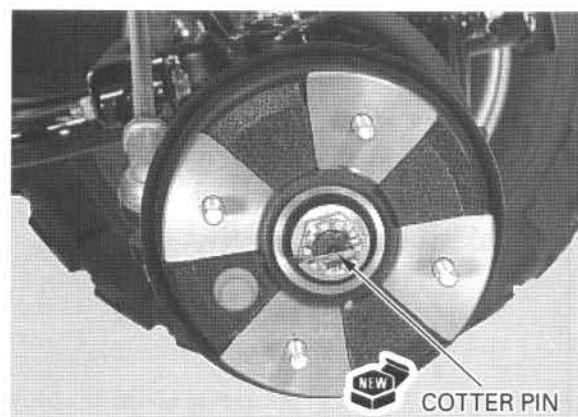
Install a new cotter pin.

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 12-8).

Adjust the brake (page 3-16).

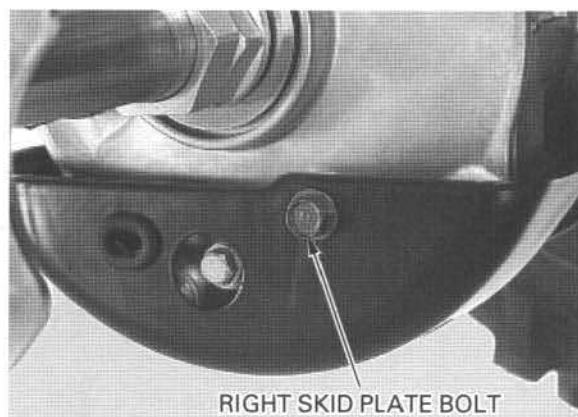


REAR BRAKE

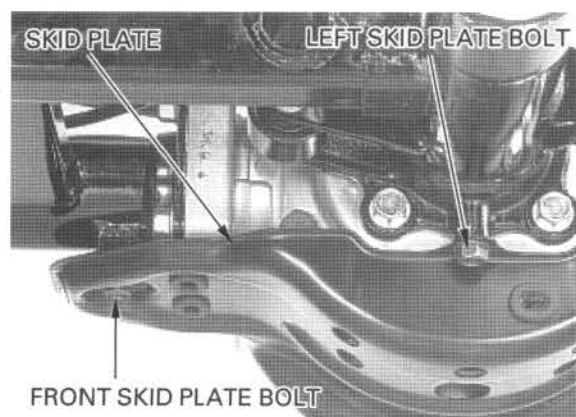
REMOVAL/DISASSEMBLY

Remove the right rear wheel (page 13-3).

Remove the right skid plate bolt.



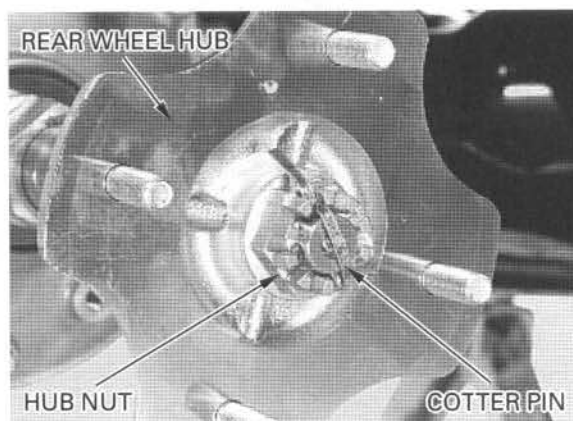
Remove the front and left skid plate bolts, then remove the skid plate.



BRAKE SYSTEM

Remove the following:

- Cotter pin
- Rear wheel hub nut
- Rear wheel hub

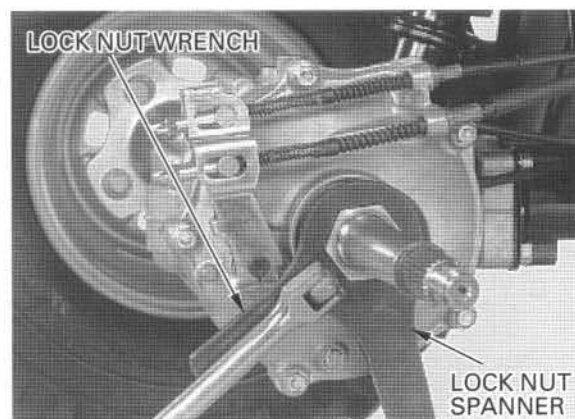


Set the parking brake.

Loosen and remove the rear axle lock nut using the special tools.

TOOLS:

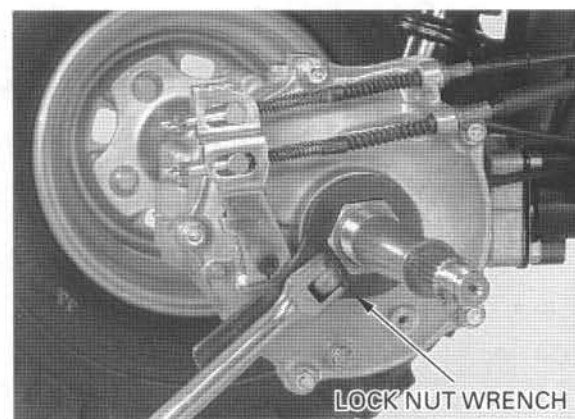
- Lock nut spanner, 41 mm** 07916-9580200 or
* 07916-958020A or
* 07916-958020B
- Lock nut wrench set** 07916-9580300
(Not available in U. S. A.)
- **Lock nut wrench, 41 mm** 07916-9580400 or
* 07916-958010A or
* 07916-958010B
- **Lock nut wrench handle** 07916-9580500
(Not available in U. S. A.)
* U. S. A. only



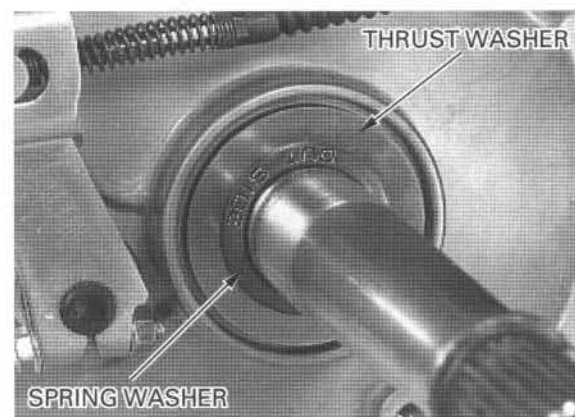
Loosen and remove the rear axle nut using the special tools.

TOOLS:

- Lock nut wrench set** 07916-9580300
(Not available in U. S. A.)
- **Lock nut wrench, 41 mm** 07916-9580400 or
* 07916-958010A or
* 07916-958010B
- **Lock nut wrench handle** 07916-9580500
(Not available in U. S. A.)
* U. S. A. only

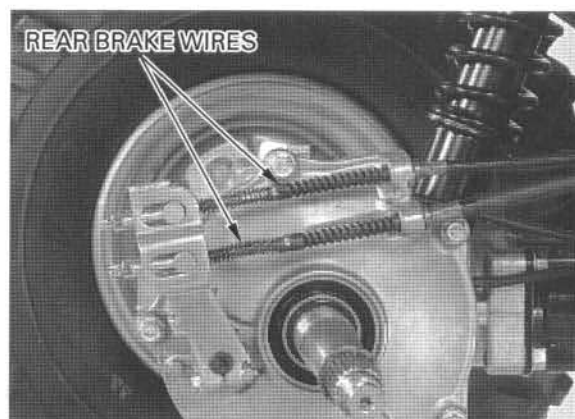


Remove the spring washer and thrust washer.

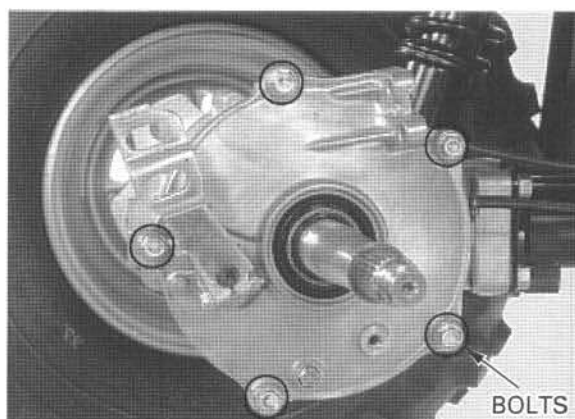


Unlock the parking brake.

Disconnect the rear brake wires from the brake arm.

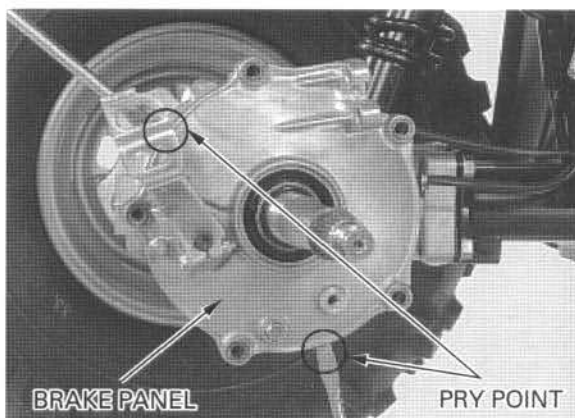


Remove the five bolts.

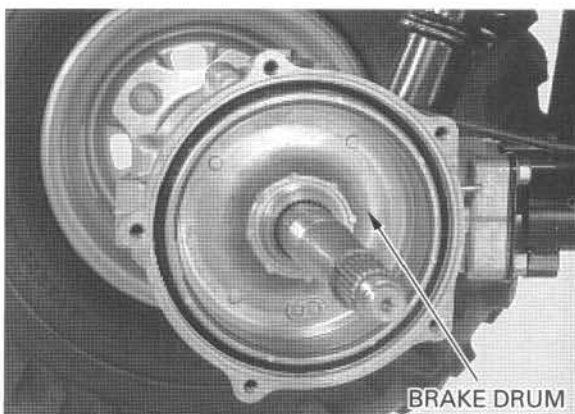


Carefully pry the brake panel using a screwdriver at the pry point as shown.

Remove the brake panel.



Remove the brake drum.

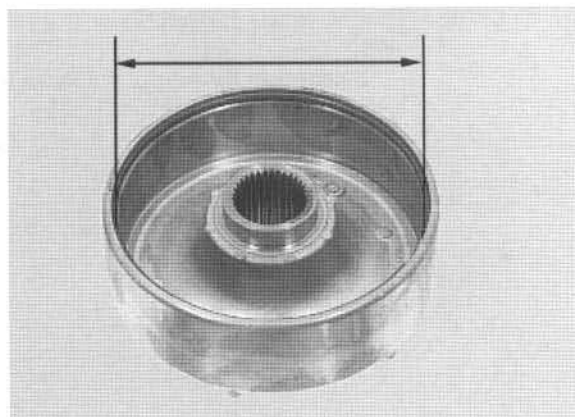


BRAKE SYSTEM

Measure the brake drum I. D.

SERVICE LIMIT: 141.0 mm (5.55 in)

Inspect the brake drum for scoring, cracks and out of roundness.

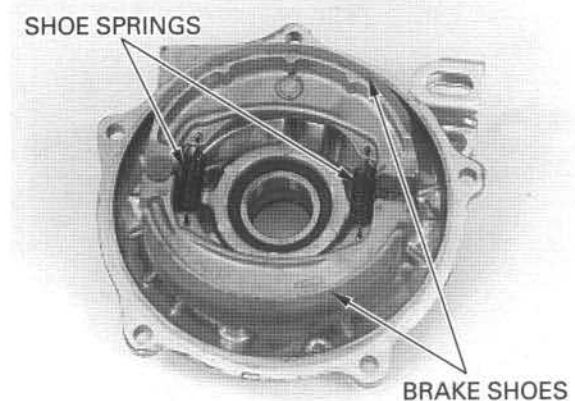


Mark the brake shoes to indicate their original positions.

Remove the following:

- Brake shoes and shoe springs

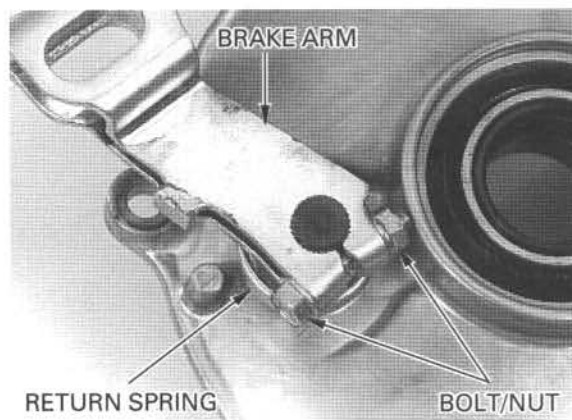
SHOE SPRINGS



BRAKE SHOES

Remove the following:

- Brake arm pinch bolt/nut
- Brake arm
- Return spring
- Indicator plate
- Brake cam

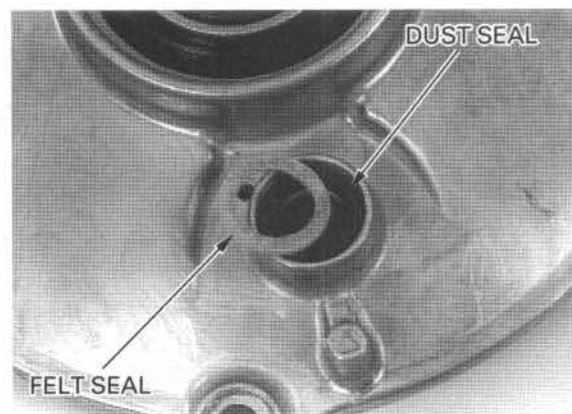


BRAKE ARM

RETURN SPRING

BOLT/NUT

- Felt seal
- Dust seal

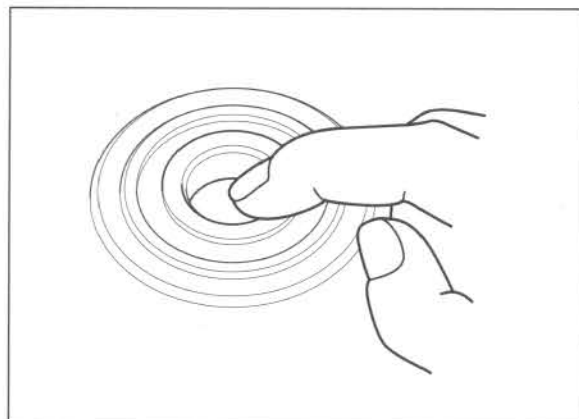


DUST SEAL

FELT SEAL

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.

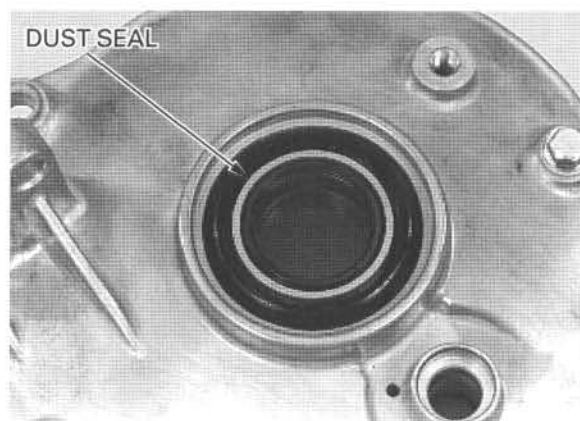
Check the dust seal for wear or damage.



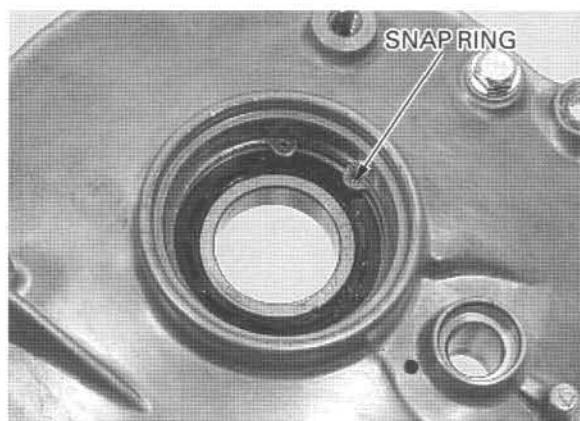
Remove the dust seal by making a hole in the seal and prying the seal out.

⚠ WARNING

Use adequate eye protection.



Remove the snap ring.



Drive the bearing out of the brake panel. Use the following special tools, if necessary.

TOOLS:

Driver

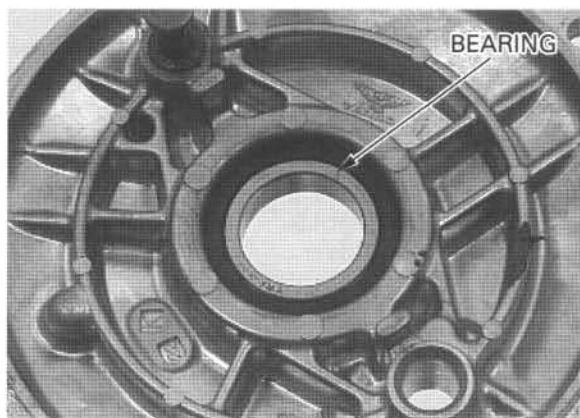
07749-0010000

Attachment

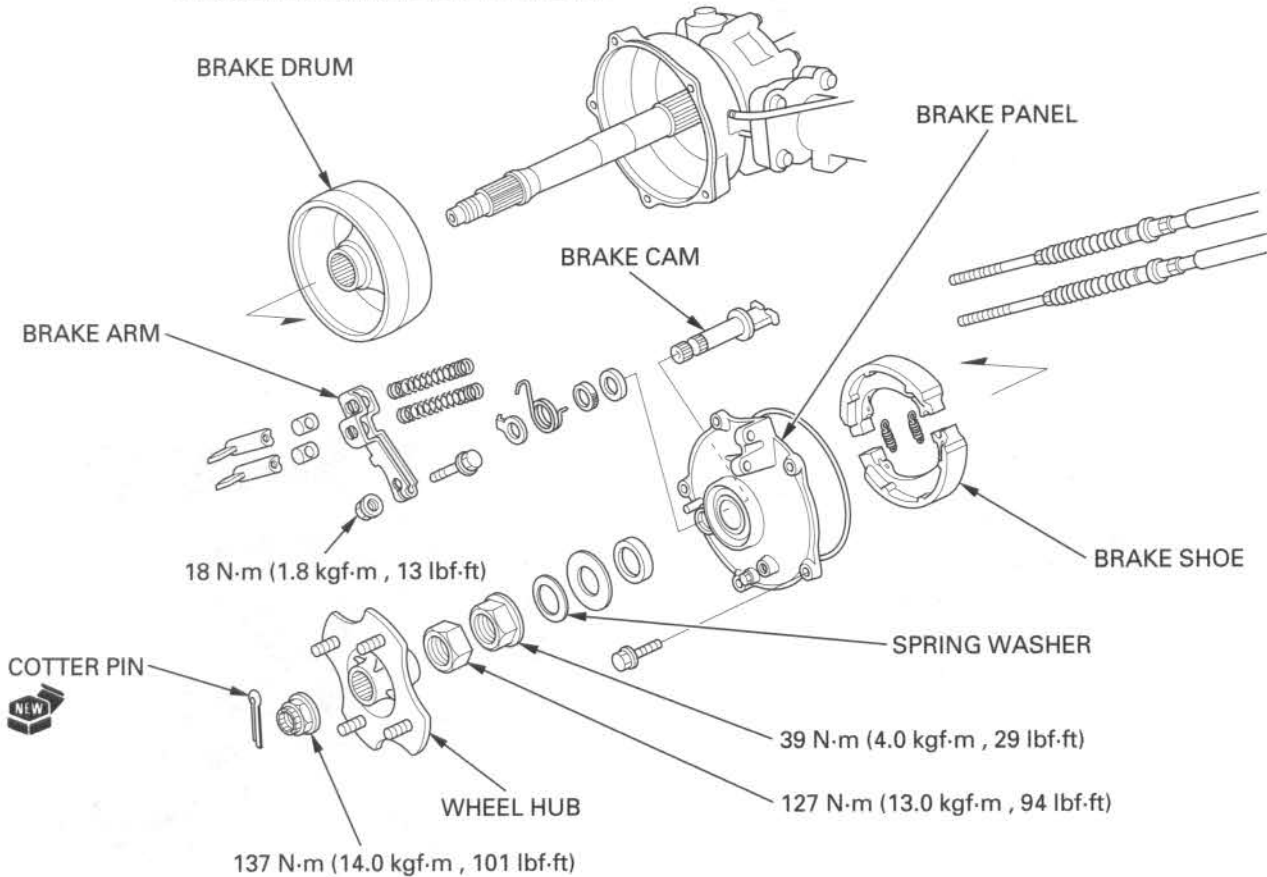
07746-0010300

Pilot, 32 × 50 mm

07MAD-PR9020B



ASSEMBLY/INSTALLATION



Drive the new bearing into the brake panel using the special tools as shown. Place the flat side of the attachment against the bearing.

TOOLS:

Driver

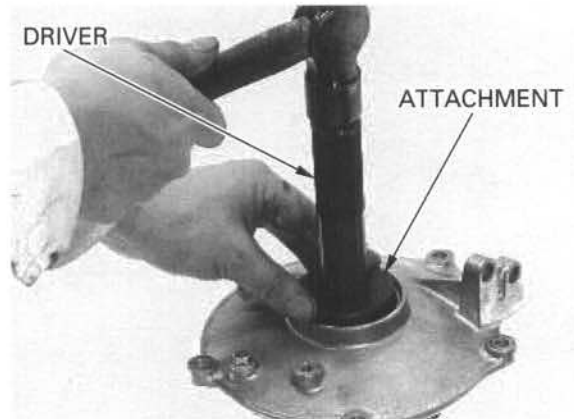
Oil seal driver

Pilot, 32 mm

07749-0010000

07947-SD90101

07MAD-PR90200



Install the snap ring.

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.

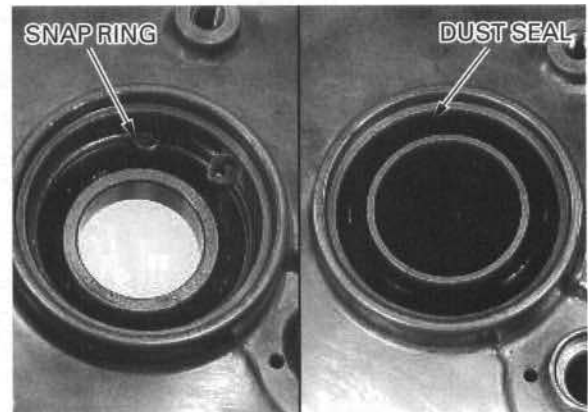
TOOLS:

Driver

Oil seal driver

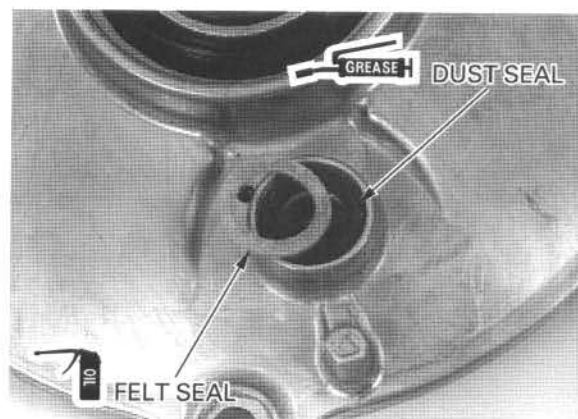
07749-0010000

07JAD-PH80101

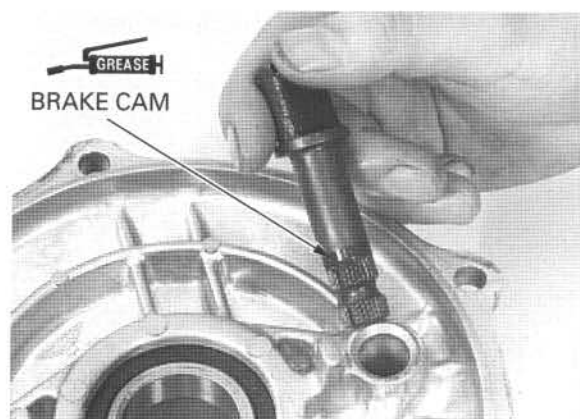


Apply grease to the dust seals.
Apply oil to the felt seal.

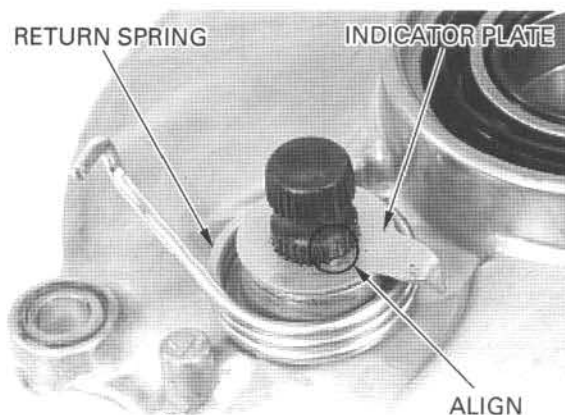
Install the dust seals and felt seal.



Apply grease to the anchor pin and brake cam.
Install the brake cam from the brake shoe side.



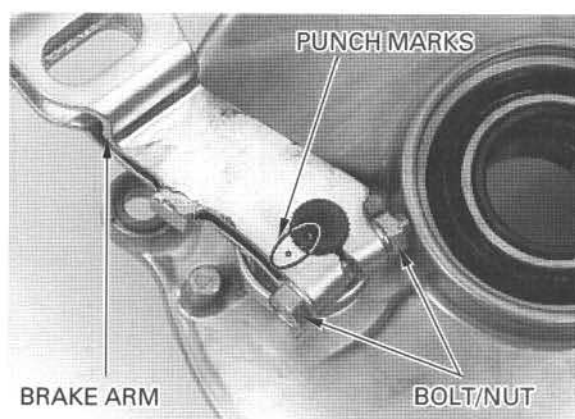
Install the return spring and then install the indicator plate, aligning the wide tooth on the plate with the wide groove on the brake cam.



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: 18 N·m (1.8 kgf·m , 13 lbf·ft)



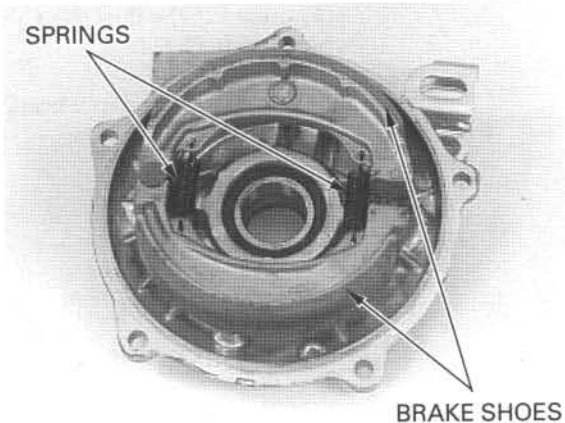
BRAKE SYSTEM

Install the brake shoes in their original positions with the spring as shown.

⚠ WARNING

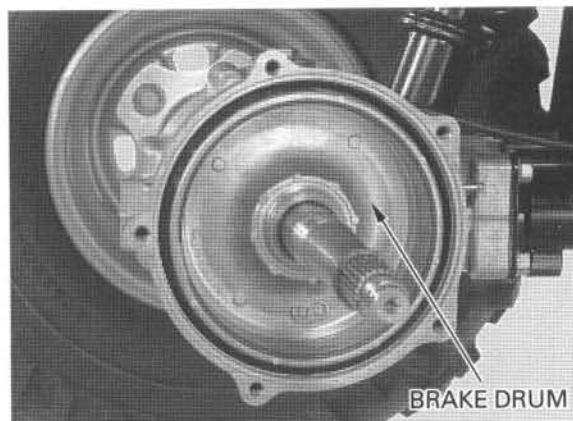
Contaminated brake linings reduce stopping power. Keep grease off the linings, wipe excess grease off the cam.

SPRINGS



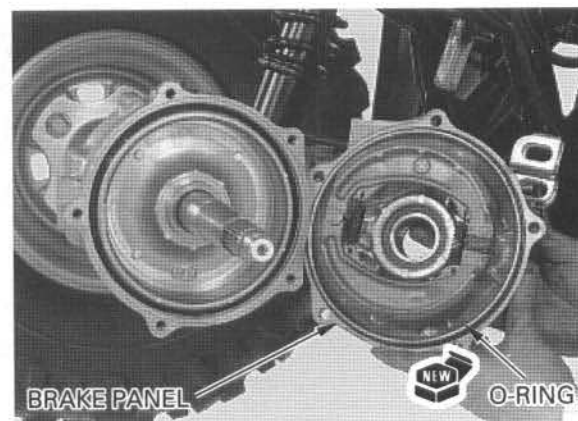
BRAKE SHOES

Install the rear brake drum.



BRAKE DRUM

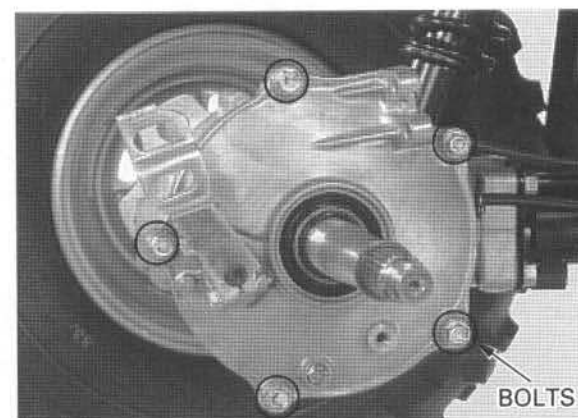
Install a new O-ring onto the brake panel, then install the brake panel.



BRAKE PANEL

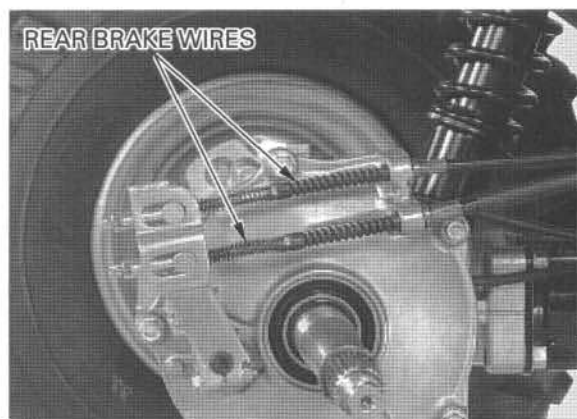
O-RING

Install and tighten the five bolts in 2 or 3 steps in a crisscross pattern.



BOLTS

Install the rear brake wires, then set the parking brake.



Install the thrust washer.
Install the spring washer with its "OUT SIDE" mark facing out.



Tighten the rear axle nut using the special tool.

TOOLS:

Lock nut wrench set 07916-9580300
(Not available in U. S. A.)
— **Lock nut wrench, 41 mm** 07916-9580400 or
07916-958010B
(U. S. A. only) or
07916-958010A
(U. S. A. only)

TORQUE: 39 N·m (4.0 kgf·m , 29 lbf·ft)

Wrench scale reading:

36 N·m (3.7 kgf·m, 27 lbf·ft) using a 50 cm (20 in) long torque wrench

Tighten the rear axle nut lock nut using the special tools.

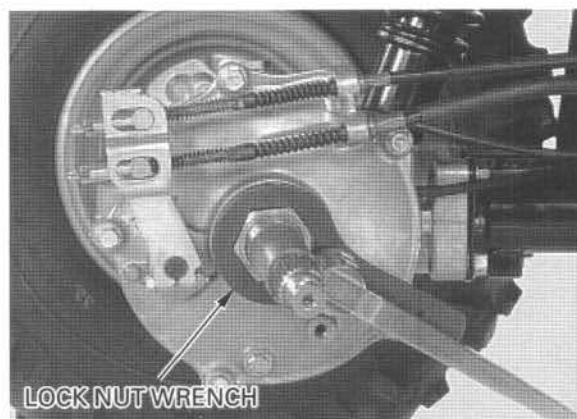
TOOLS:

Lock nut spanner, 41 mm 07916-9580200 or
* 07916-958020B or
* 07916-958020A
Lock nut wrench set 07916-9580300
(Not available in U. S. A.)
— **Lock nut wrench, 41 mm** 07916-9580400 or
* 07916-958010B or
* 07916-958010A
* U. S. A. only

TORQUE: 127 N·m (13.0 kgf·m , 94 lbf·ft)

Wrench scale reading:

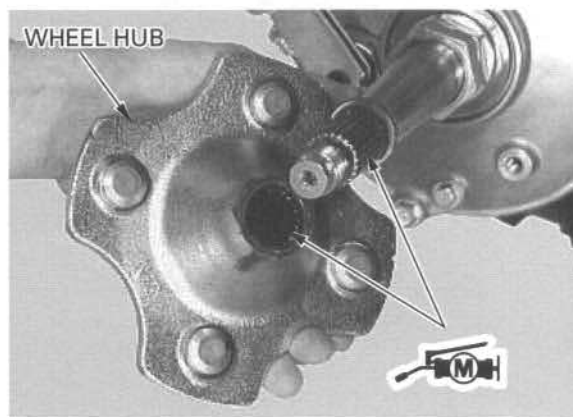
119 N·m (12.1 kg·m, 87.5 lbf·ft) using a 50 cm (20 in) long torque wrench



BRAKE SYSTEM

Apply molybdenum disulfide grease to the splines.

Install the right rear wheel hub.



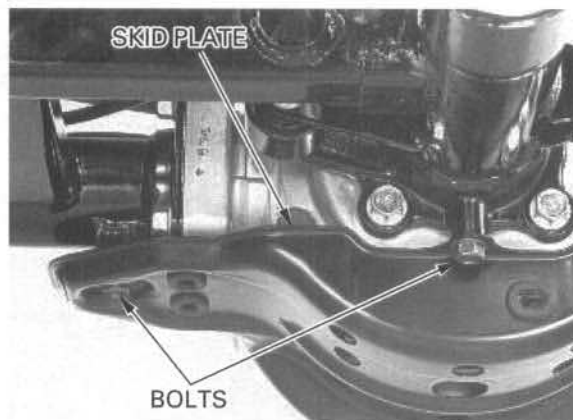
Install and tighten the right rear wheel hub nut to the specified torque.

TORQUE: 137 N·m (14.0 kgf·m , 101 lbf·ft)

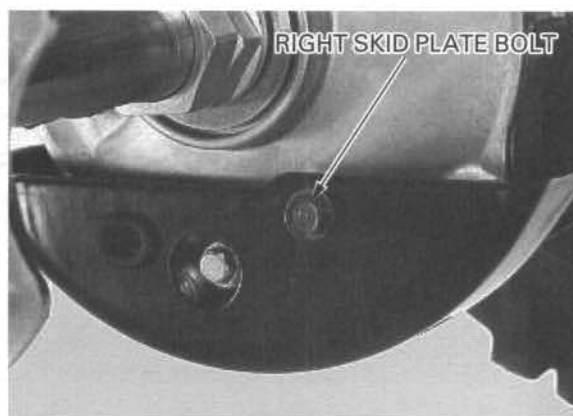
Install a new cotter pin.



Install the skid plate and tighten the two bolts.



Tighten the right skid plate bolt.
Install the right rear wheel (page 13-3).
Adjust the rear brake (page 3-17).



BRAKE PEDAL

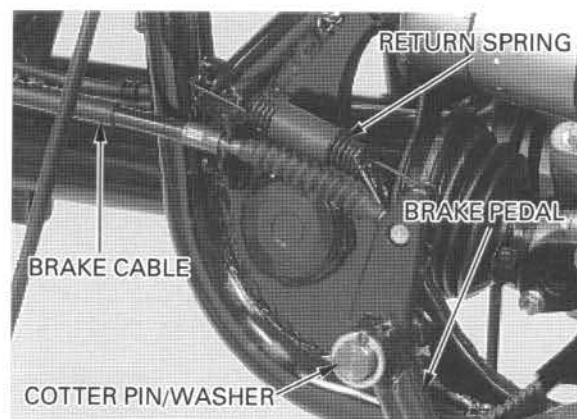
REMOVAL

Loosen and remove the rear brake pedal adjusting nuts.

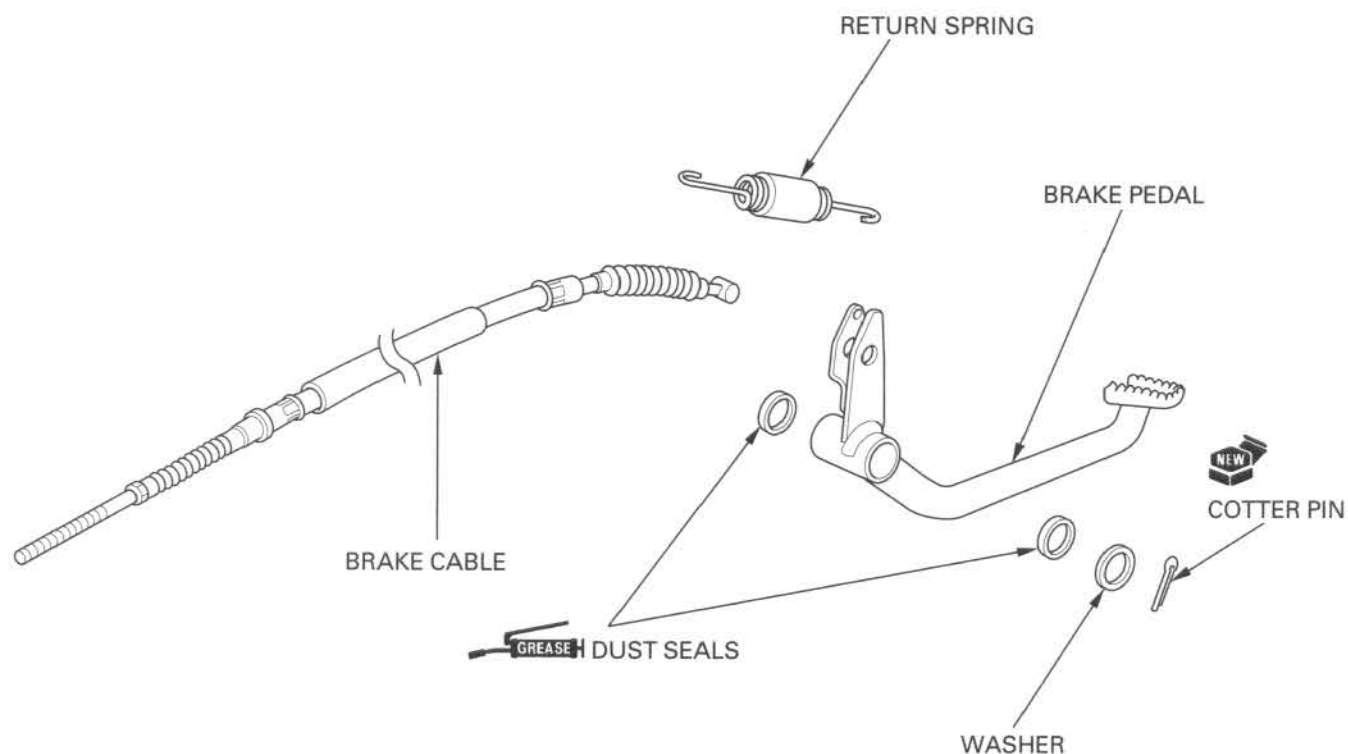


Disconnect the brake cable from the bracket and unhook the return spring. Remove the cotter pin and washer from the pedal pivot shaft, and then remove the brake pedal from the shaft.

Unhook the brake cable from the brake pedal.



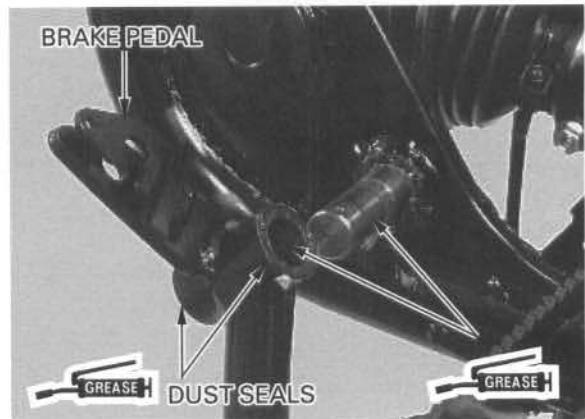
INSTALLATION



BRAKE SYSTEM

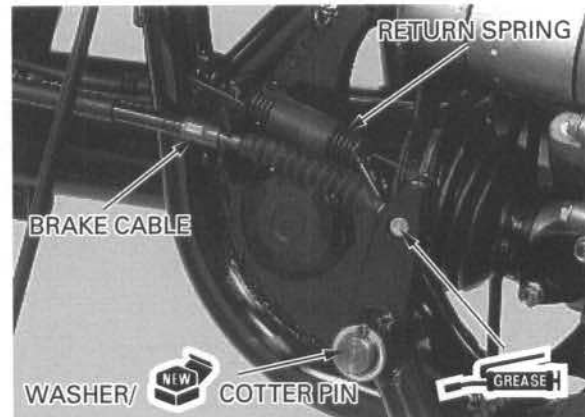
Apply grease to the brake pedal pivot shaft, dust seals and brake cable end.
Connect the brake cable to the brake pedal.

Install the brake pedal onto the pivot.

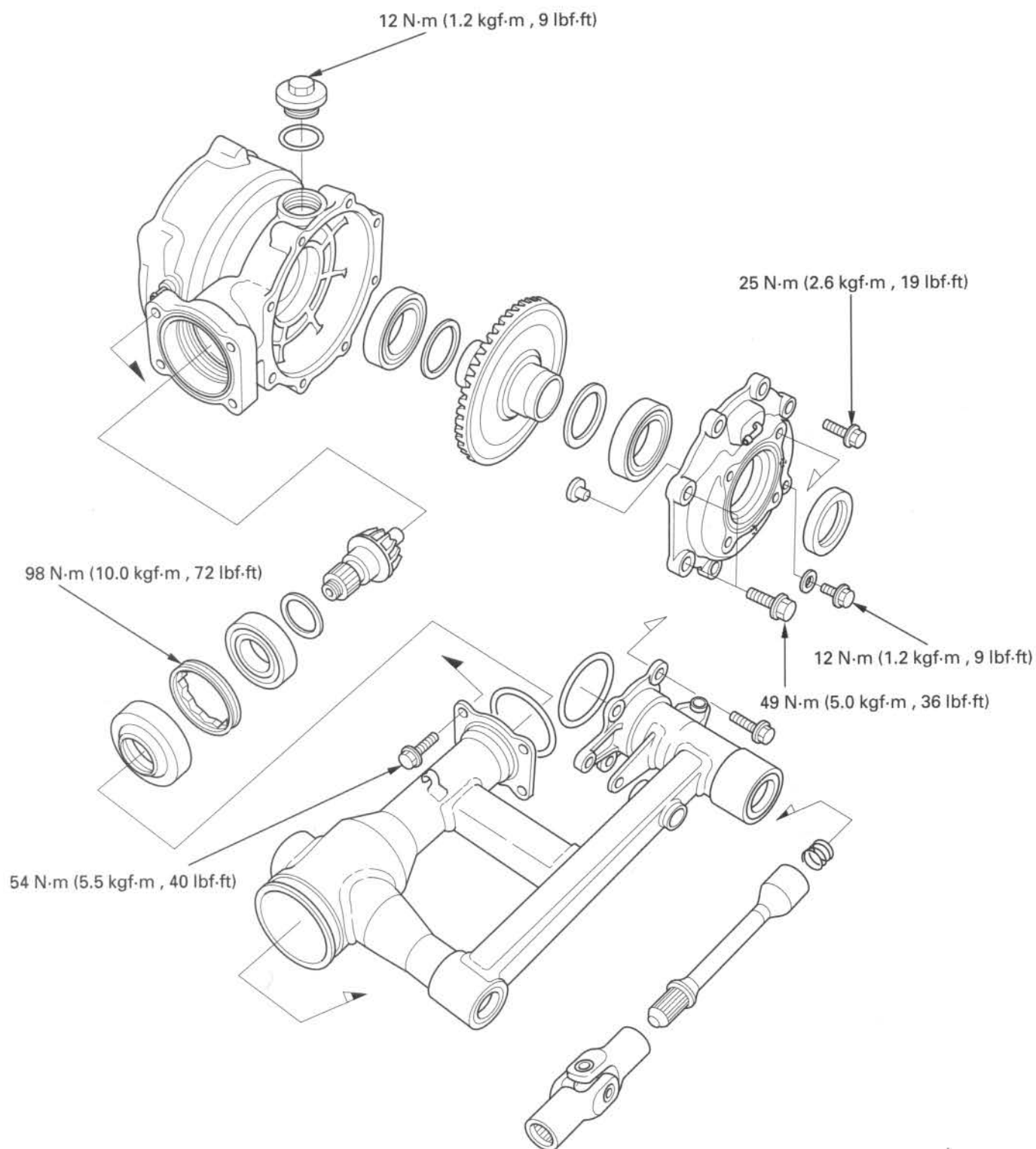


Connect the brake cable onto the bracket and hook the return spring.

Install the washer and new cotter pin.
Adjust the rear brake (page 3-17).



REAR DRIVING MECHANISM



15.REAR DRIVING MECHANISM

SERVICE INFORMATION	15-1	REAR FINAL DRIVE	15-4
TROUBLESHOOTING	15-2	REAR AXLE INSTALLATION	15-17
REAR AXLE REMOVAL	15-3	REAR DRIVE SHAFT	15-19

SERVICE INFORMATION

GENERAL

- Replace all oil seals and O-rings whenever the rear final drive assembly is disassembled.
- Check the tooth contact pattern and gear backlash when the rear final drive bearing, gear set and/or gear case are replaced.

SPECIFICATIONS

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT
Rear axle runout			—	3.0 (0.12)
Rear final drive	Oil capacity	After draining	90 cm ³ (3.0 US oz, 3.2 Imp oz)	—
		At disassembly	100 cm ³ (3.4 US oz, 3.5 Imp oz)	—
	Recommended oil		Hypoid gear oil SAE # 80	—
	Gear backlash		0.05 – 0.25 (0.002 – 0.010)	0.40 (0.016)

TORQUE VALUES

Gear case cover flange bolt, 8 mm	25 N·m (2.6 kgf·m , 19 lbf·ft)	Apply a locking agent to the threads Stake. Stake
Gear case cover flange bolt, 10 mm	49 N·m (5.0 kgf·m , 36 lbf·ft)	
Pinion joint nut	98 N·m (10.0 kgf·m , 72 lbf·ft)	
Gear case drain bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Gear case cover oil check bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Gear case cover oil cap	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Gear case mounting bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)	

TOOLS

Lock nut wrench, 30 × 64 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	07749-0010000
Attachment, 52 × 55 mm	07746-0010400
Attachment, 62 × 68 mm	07746-0010500
Attachment, 24 × 26 mm	07746-0010700
Driver attachment	07965-KE80200 (Not available in U.S.A.) or 07947-KA50100 and 07746-0010400 and 07749-0010000

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

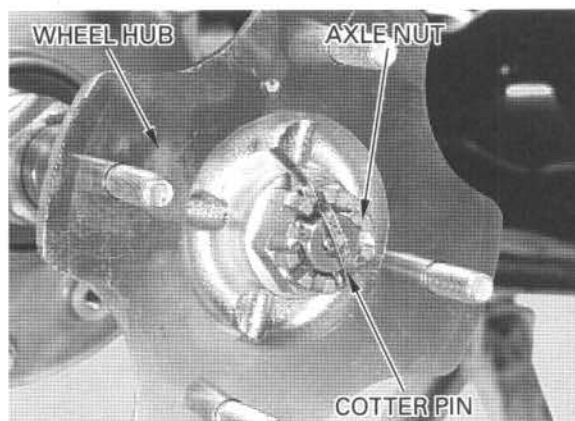
Oil leak

- Oil level too high
- Clogged breather hole or tube
- Worn or damaged oil seal
- Loose gear case cover bolt

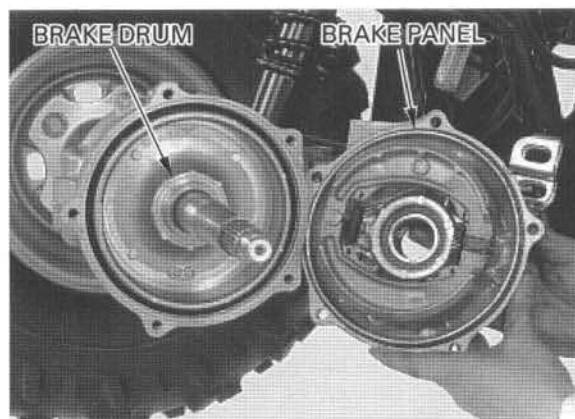
REAR AXLE REMOVAL

Remove the right and left rear wheels (page 13-3).

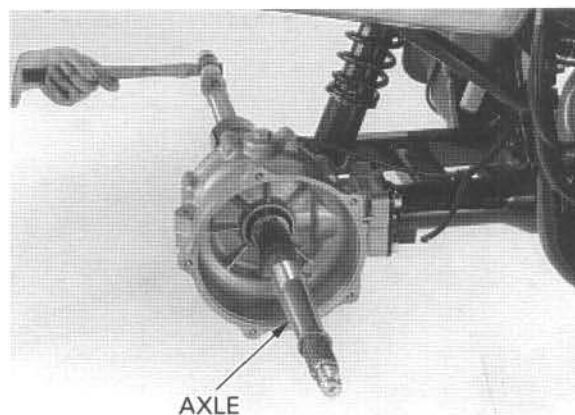
Remove the cotter pin, axle nut and rear wheel hubs.



Remove the rear brake panel and brake drum (page 14-14).



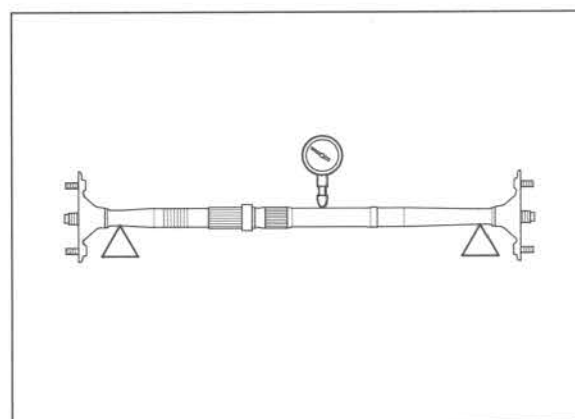
Drive the axle out from the left side with a rubber hammer.



INSPECTION

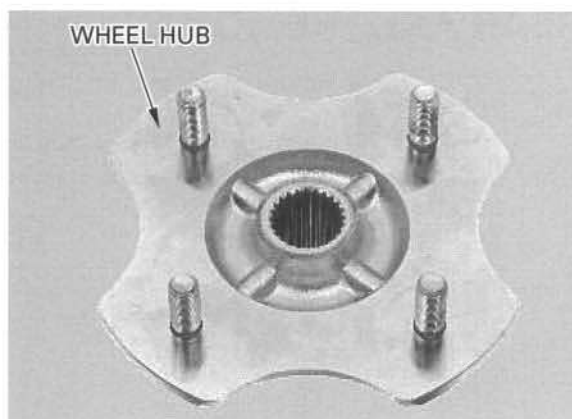
Install the wheel hubs onto both end of the axle. Place the rear axle in V-block and measure the runout.

SERVICE LIMIT: 3.0 mm (0.12 in)



REAR DRIVING MECHANISM

Inspect the wheel hub for damage.

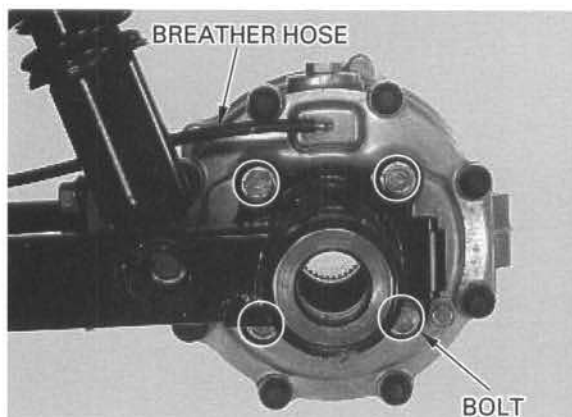


REAR FINAL DRIVE

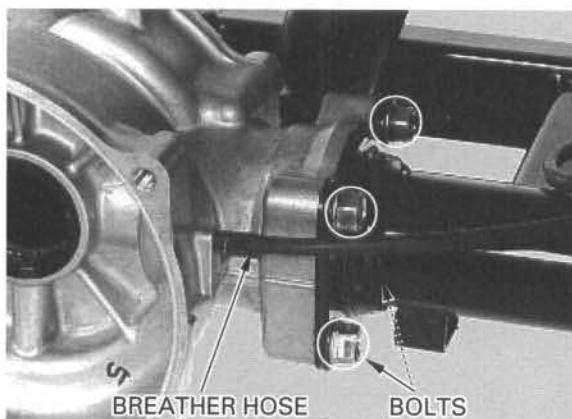
GEAR CASE REMOVAL

Drain the oil from the final drive (page 3-15).
Remove the rear axle shaft (page 15-3).

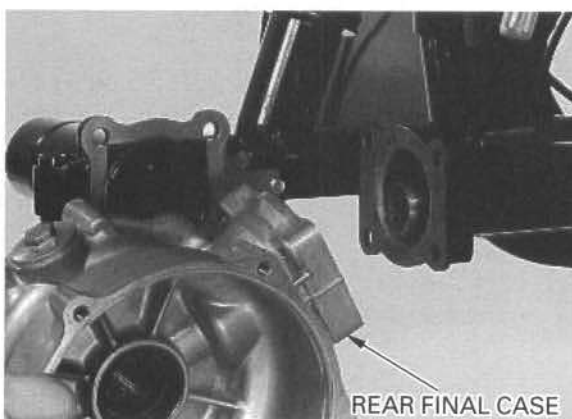
Remove the left final drive case bolts.
Disconnect the final drive case breather hoses.



Remove the front final drive case bolts.



Remove the rear final case assembly.



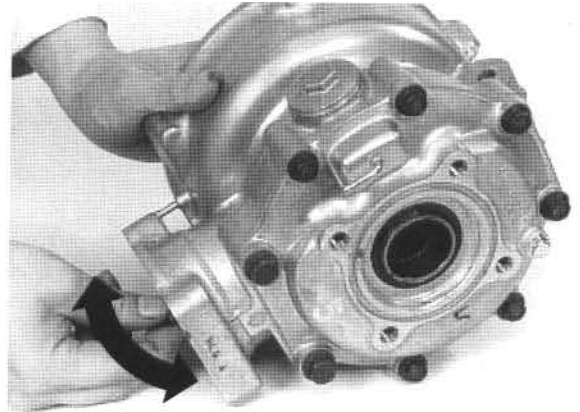
INSPECTION

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 using the special tools as shown.

TOOLS:

Pinion puller set

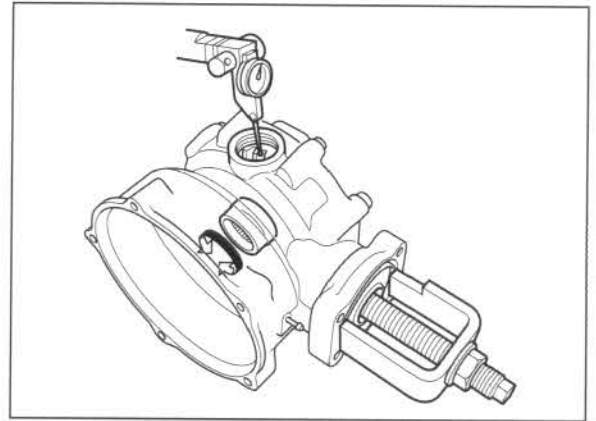
07HMC-MM80101
(Not available in U.S.A.)

— 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)



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—0.25 mm (0.002—0.010 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: 0.20 mm (0.008 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.

REAR DRIVING MECHANISM

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:

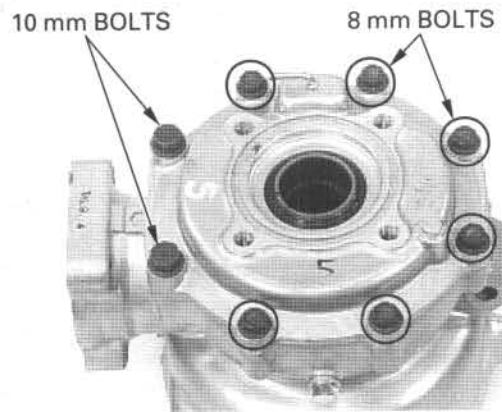
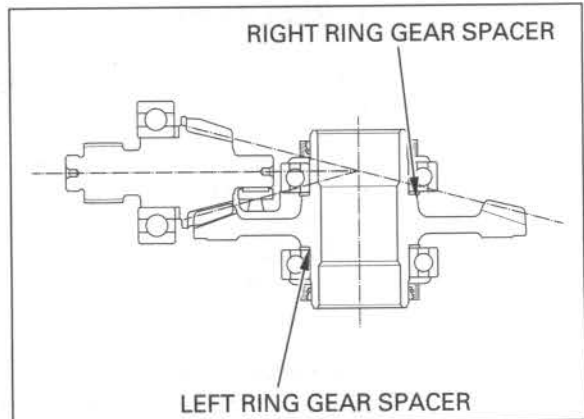
Eleven spacers (from A to K) are available in thickness intervals of 0.06 mm.

- **Standard:** 1.56 mm (0.061 in)
- **Thinnest:** 1.26 mm (0.050 in)
- **Thickest:** 1.86 mm (0.073 in)

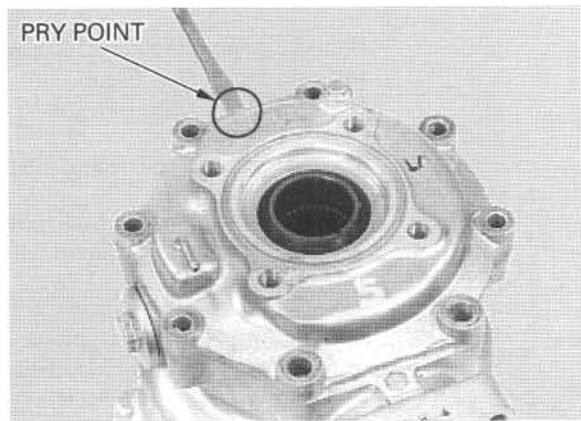
Change the left side spacer and equal thickness and opposite amount of what the right side spacer was changed; if the right spacer was replaced with a 0.12 mm (0.005 in) thicker spacer, replace the left spacer with one that is 0.12 mm (0.005 in) thinner.

GEAR CASE DISASSEMBLY

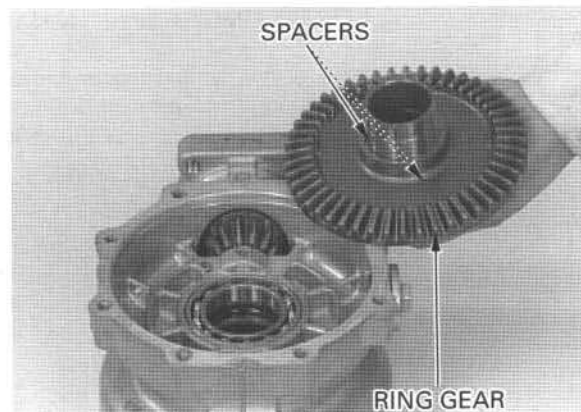
Remove the cover bolts in 2–3 steps in a crisscross pattern to prevent gear case warpage.



Carefully pry the cover off the case using a screwdriver at the pry point as shown.



Remove the ring gear and spacers.

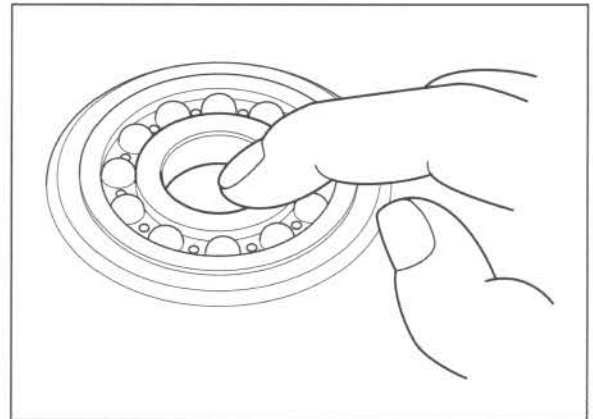


BEARING INSPECTION

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 fits 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 15-11.

For drive pinion removal and disassembly, go to page 15-9.



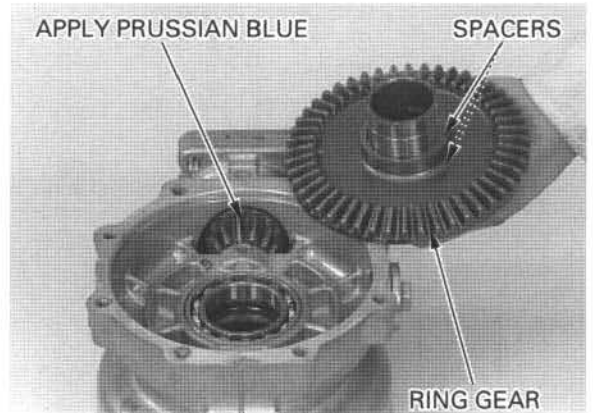
GEAR TOOTH CONTACT PATTERN CHECK

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.



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 criss-cross pattern.

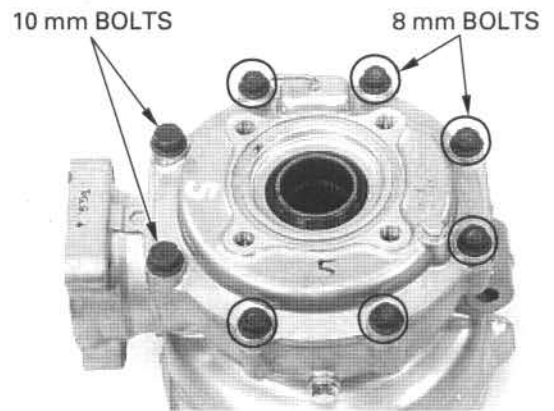
TORQUE:

10 mm bolt: 49 N·m (5.0 kgf·m, 36 lbf·ft)

8 mm bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)

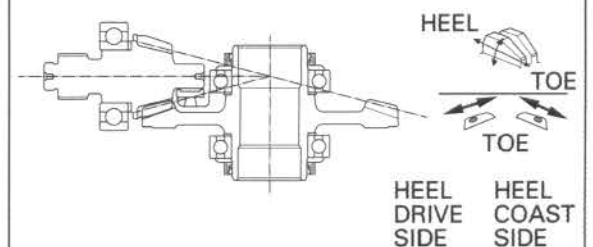
CAUTION:

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:



REAR DRIVING MECHANISM

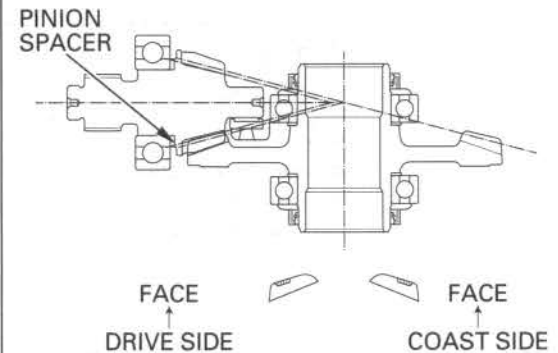
If the patterns are not correct, remove and replace the pinion spacer with one of an alternate thickness. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face. Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side. The pattern will shift about 0.5–1.0 mm (0.02–0.04 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACERS:

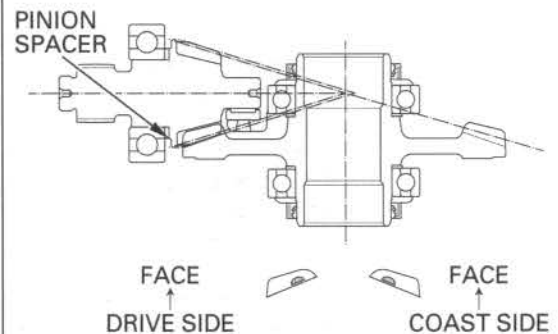
A: 1.64 mm (0.064 in)
B: 1.70 mm (0.067 in)
C: 1.76 mm (0.069 in)
D: 1.82 mm (0.072 in)
E: 1.88 mm (0.074 in)
F: 1.94 mm (0.076 in)
G: 2.00 mm (0.079 in)
H: 2.06 mm (0.081 in)
I: 2.12 mm (0.083 in)
J: 2.18 mm (0.086 in)

For pinion spacer replacement, go to page 15-9.

TOO HIGH:

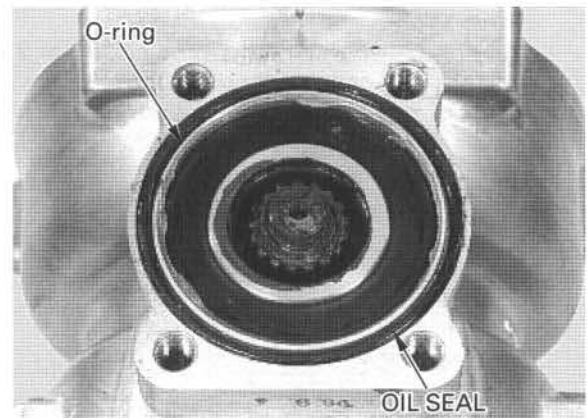


TOO LOW:

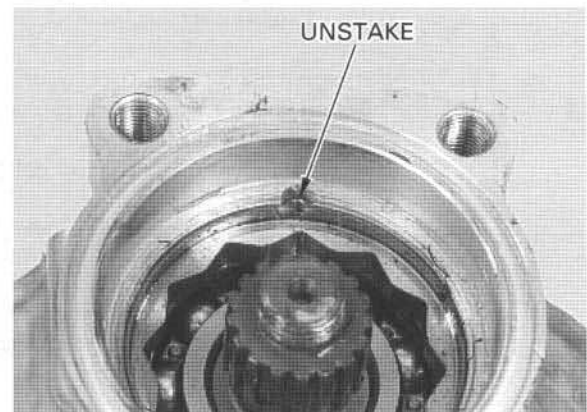


DRIVE PINION REMOVAL

Remove the O-ring.
Remove the oil seal.



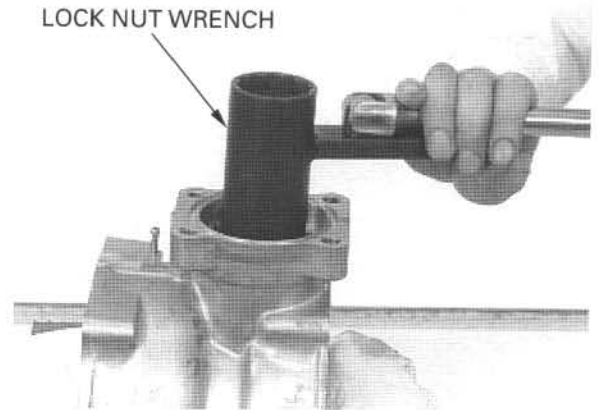
Unstake the pinion bearing lock nut with a drill or grinder.
Be careful that metal particles do not enter the bearing and that the threads are not damaged.



Remove the pinion bearing lock nut using the special tool as shown.

TOOL:

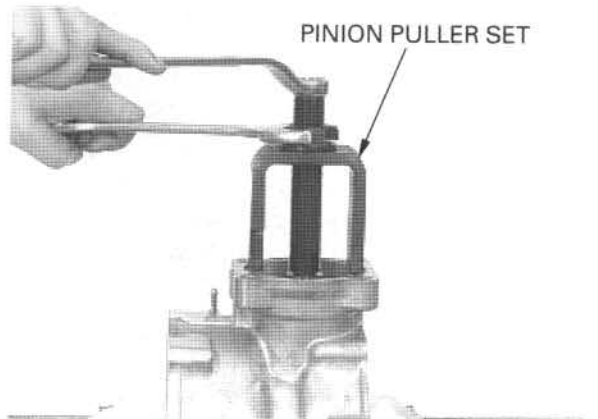
Lock nut wrench, 30 × 64 mm 07916-MB00002



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.



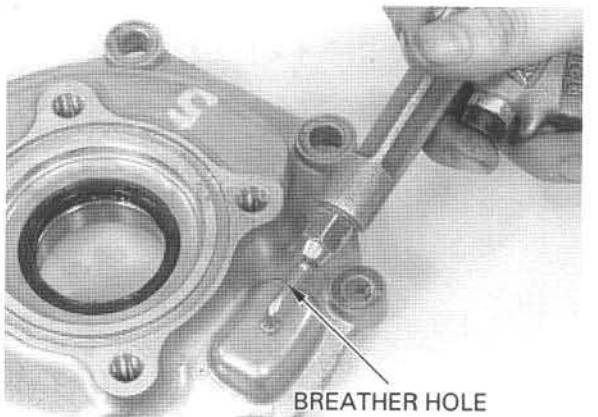
TOOLS:

Pinion puller set 07HMC-MM80101
 — **Shaft puller** 07931-ME40000
 — **Pinion puller base** 07HMC-MM80110

or U.S.A. only:

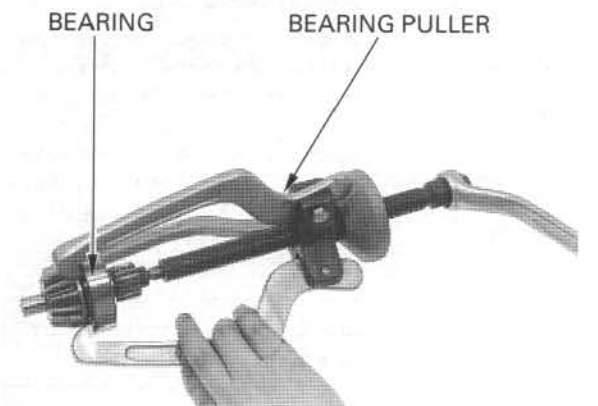
Shaft puller 07931-ME4010B
Special nut 07931-HB3020A
Pinion puller base "A" 07HMC-MM8011A

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.

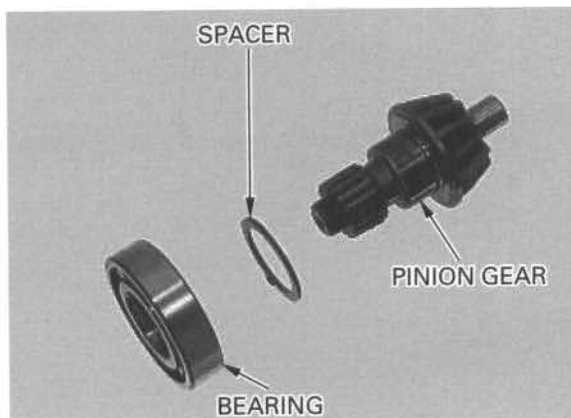


REAR DRIVING MECHANISM

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.



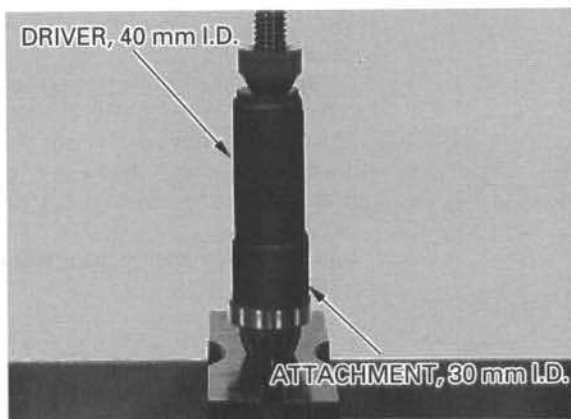
Apply # 80 gear oil to the bearing.

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, 30 mm I.D. 07746-0030300



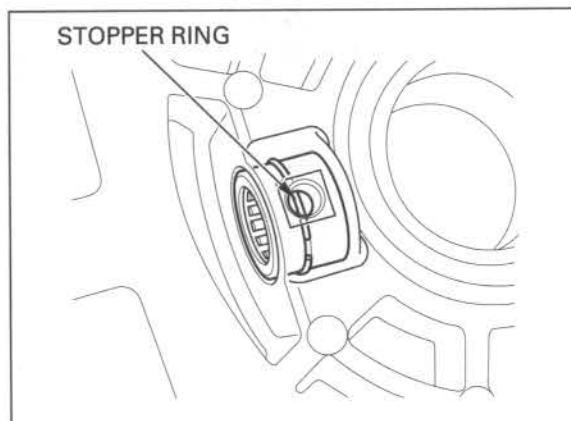
PINION NEEDLE BEARING REPLACEMENT

Remove the stopper ring by rotating it until the end of the stopper ring appears in the access hole. Strike gently near the end of the ring with a punch to bend the end upward. Grasp the end of the ring with needle-nosed pliers and pull the stopper ring out through the access hole.

Heat the final gearcase to 80 °C (176 °F) and remove the pinion needle bearing by using the special tool.

TOOL:

Bearing puller/slide hammer 07MGC-001010A
or commercially equivalent



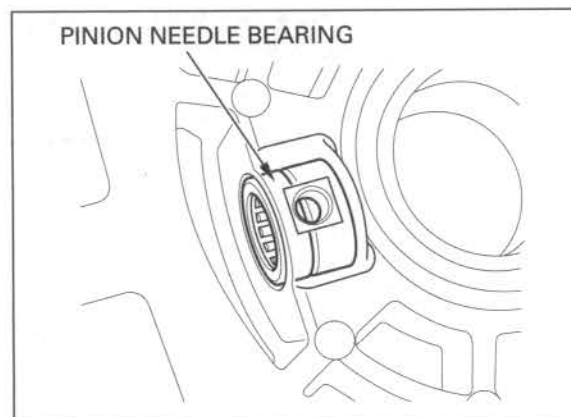
▲WARNING

Always wear gloves when handling the case after it has been heated to prevent burning your hands.

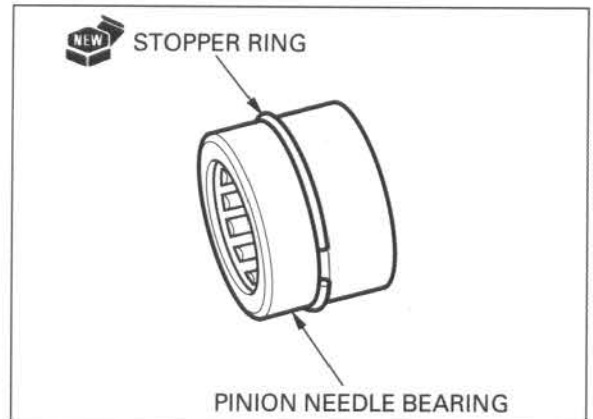
Remove the needle bearing cage and bearings from the inside of the pinion bearing to allow the special tool to grip the bearing.

CAUTION:

Do not use a torch to heat the case, it may cause warping.



Install the stopper ring into the groove securely.



Heat the final gearcase to 80°C (176°F) and freeze the pinion needle bearing on ice or in a freezer.

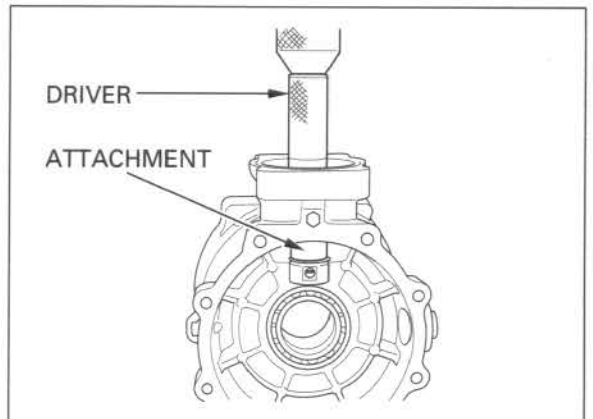
▲WARNING

Always wear gloves when handling the case after it has been heated to prevent burning your hands.

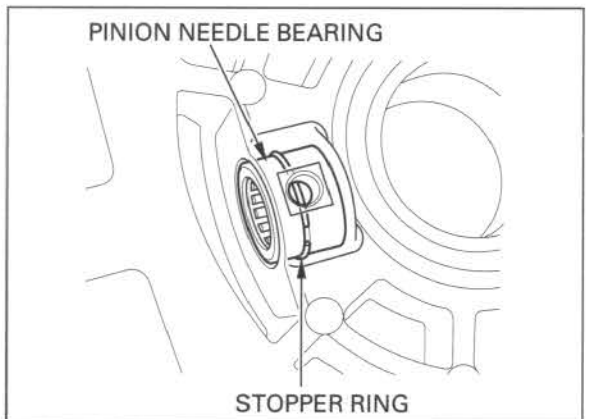
Drive the pinion needle bearing into the final gear case using the special tools.

TOOLS:

Driver 07749 - 0010000
Attachment, 24 × 26 mm 07746 - 0010700

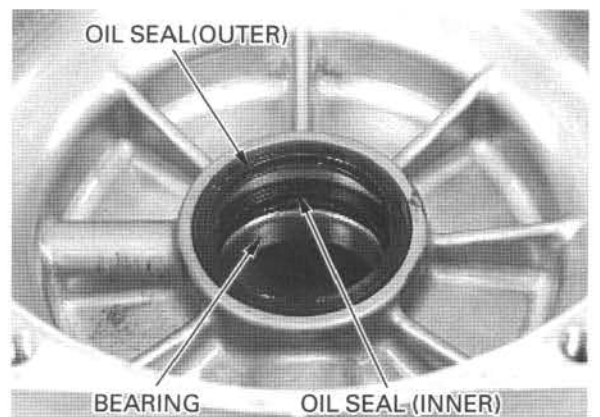


Make sure that stopper ring is securely set in groove of final gear case.



CASE BEARING REPLACEMENT

Remove the oil seal (outer).
 Drive the ring gear bearing out of the case, then remove the oil seal (inner).



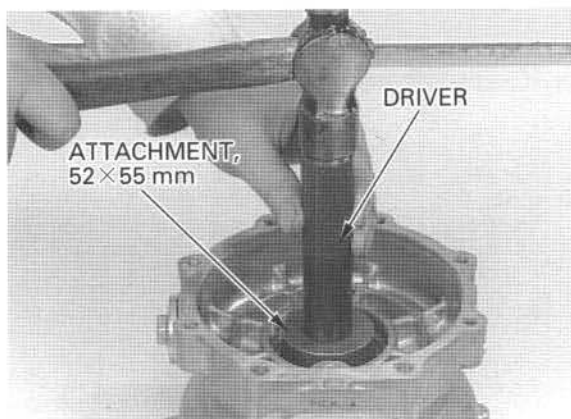
REAR DRIVING MECHANISM

Drive a new oil seal (inner) into the case using the special tools.

TOOLS:

Driver 07749-0010000

Attachment, 52 × 55 mm 07746-0010400

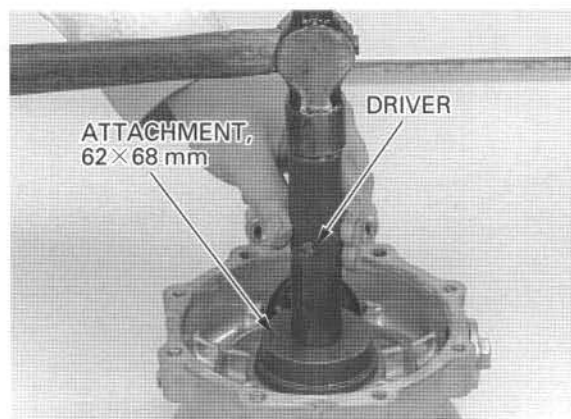


Drive the ring gear bearing into the case using the special tools as shown.

TOOLS:

Driver 07749-0010000

Attachment, 62 × 68 mm 07746-0010500

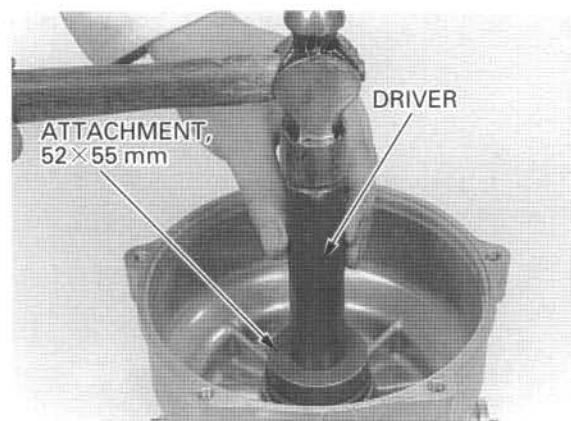


Drive a new oil seal (outer) into the case using the special tools.

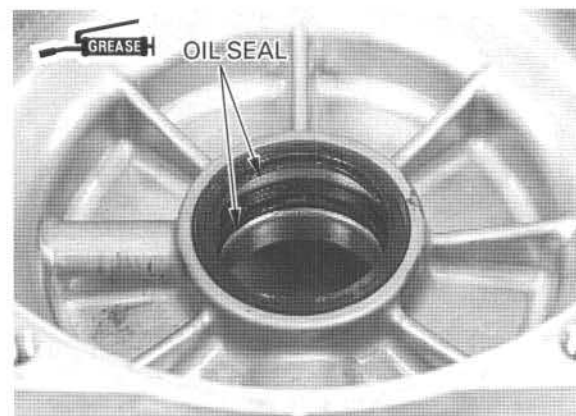
TOOLS:

Driver 07749-0010000

Attachment, 52 × 55 mm 07746-0010400



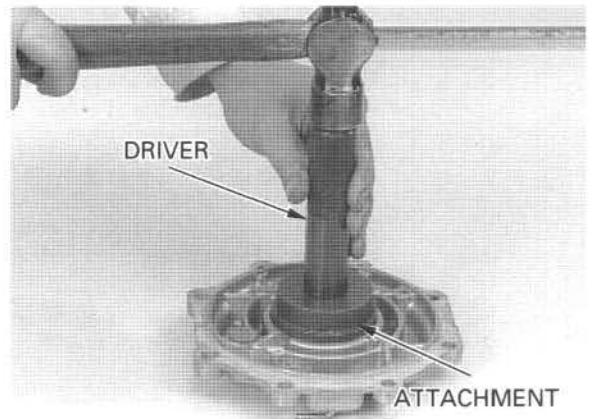
Apply grease to the oil seal lips.



Drive the ring gear bearing into the cover using the special tools as shown.

TOOLS:

Driver 07749-0010000
Attachment, 62 × 68 mm 07746-0010500

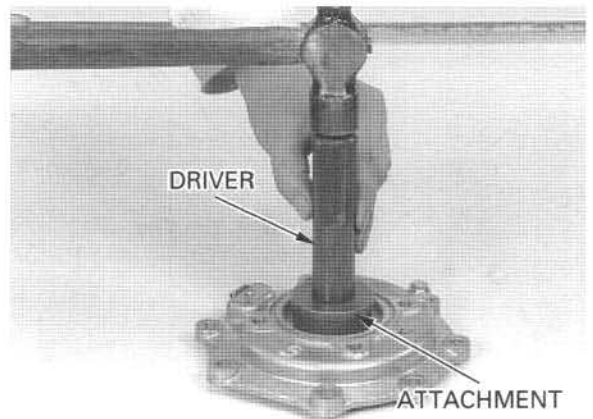


Drive a new oil seal into the cover using the special tools.

TOOLS:

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

Apply grease to the oil seal lips.

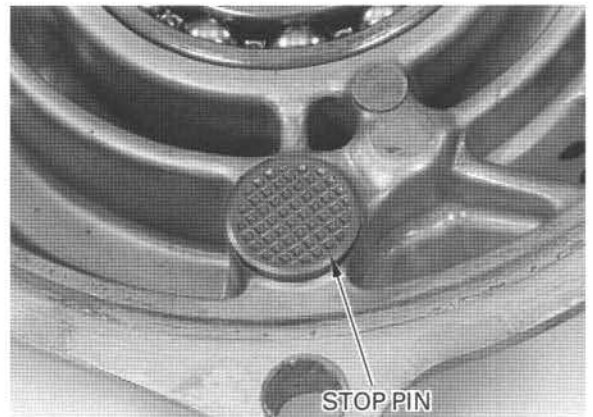


Install the ring gear with the spacer into the cover. Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

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:

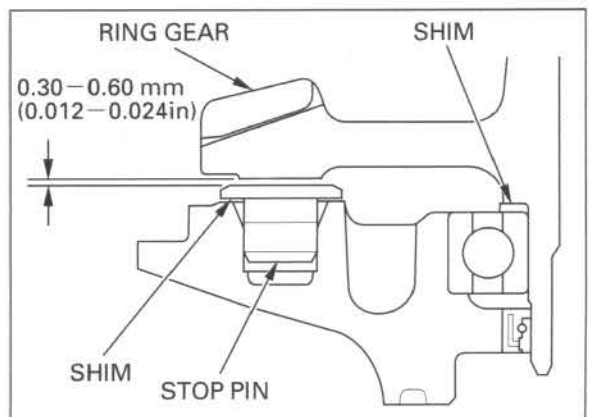
Do not use a torch to heat the cover, it may cause warping.

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.

TOOLS:

Driver attachment	07965-KE80200 (Not available in U.S.A.) or
Fork seal driver body	07947-KA50100 and
Attachment, 52 × 55 mm	07746-0010400 and
Driver	07749-0010000

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: 98 N·m (10.0 kgf·m, 72 lbf·ft)

Wrench scale reading: 89 N·m (9.1 kgf·m, 66 lbf·ft) using a 50 cm (20 in) long torque wrench

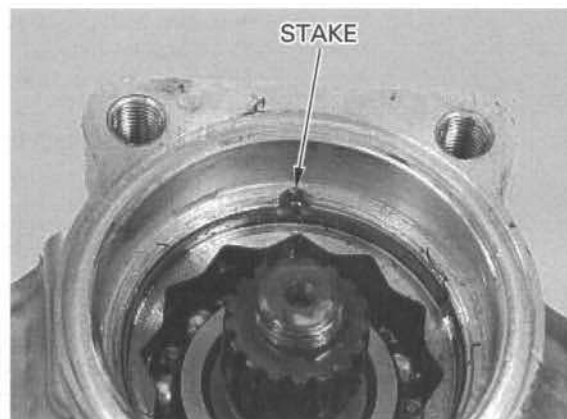
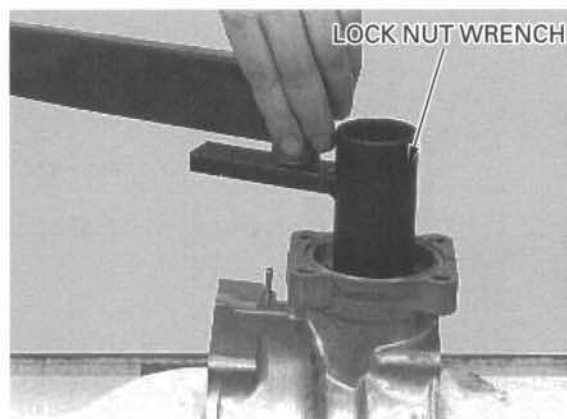
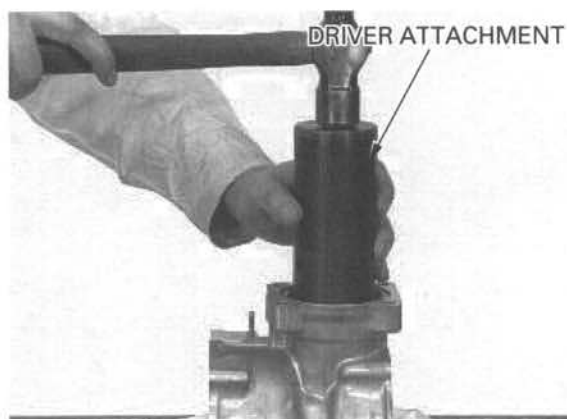
TOOL:

Lock nut wrench, 30 × 64 mm 07916-MB00002

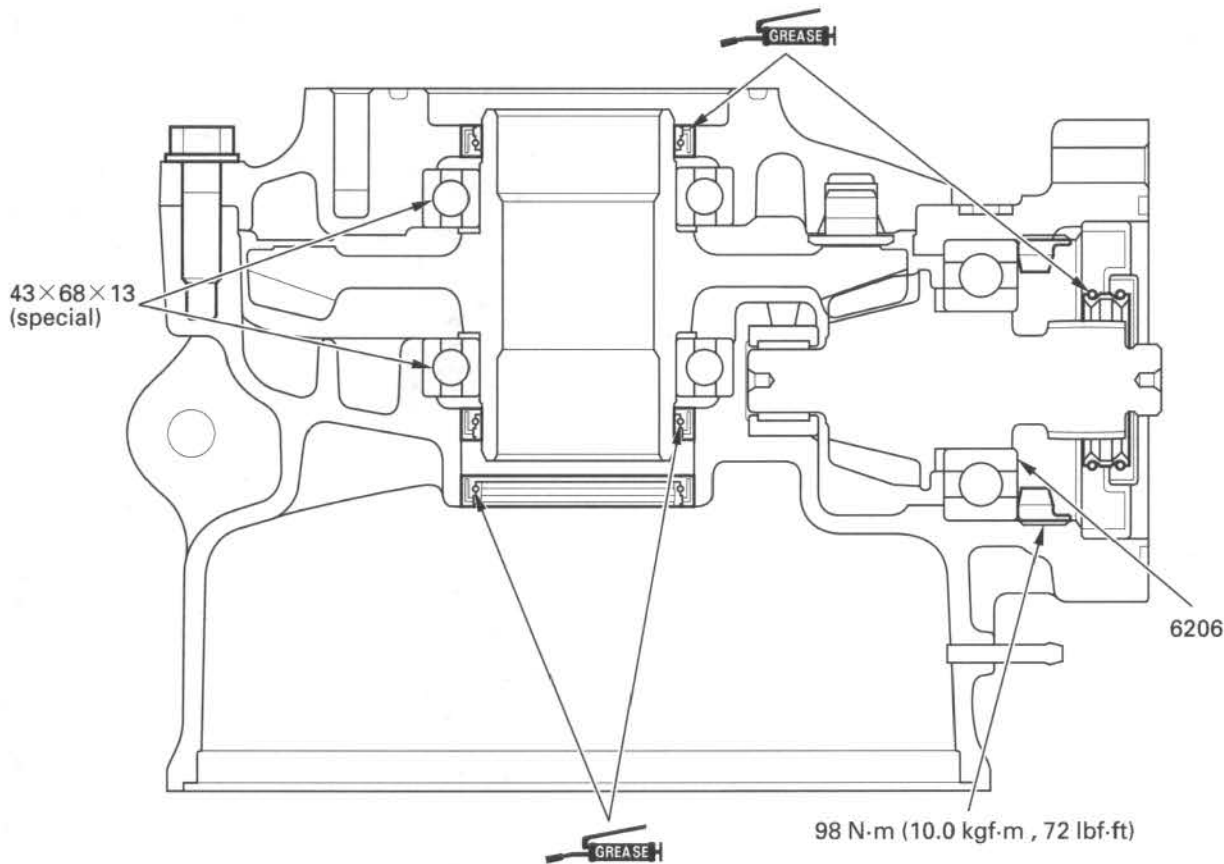
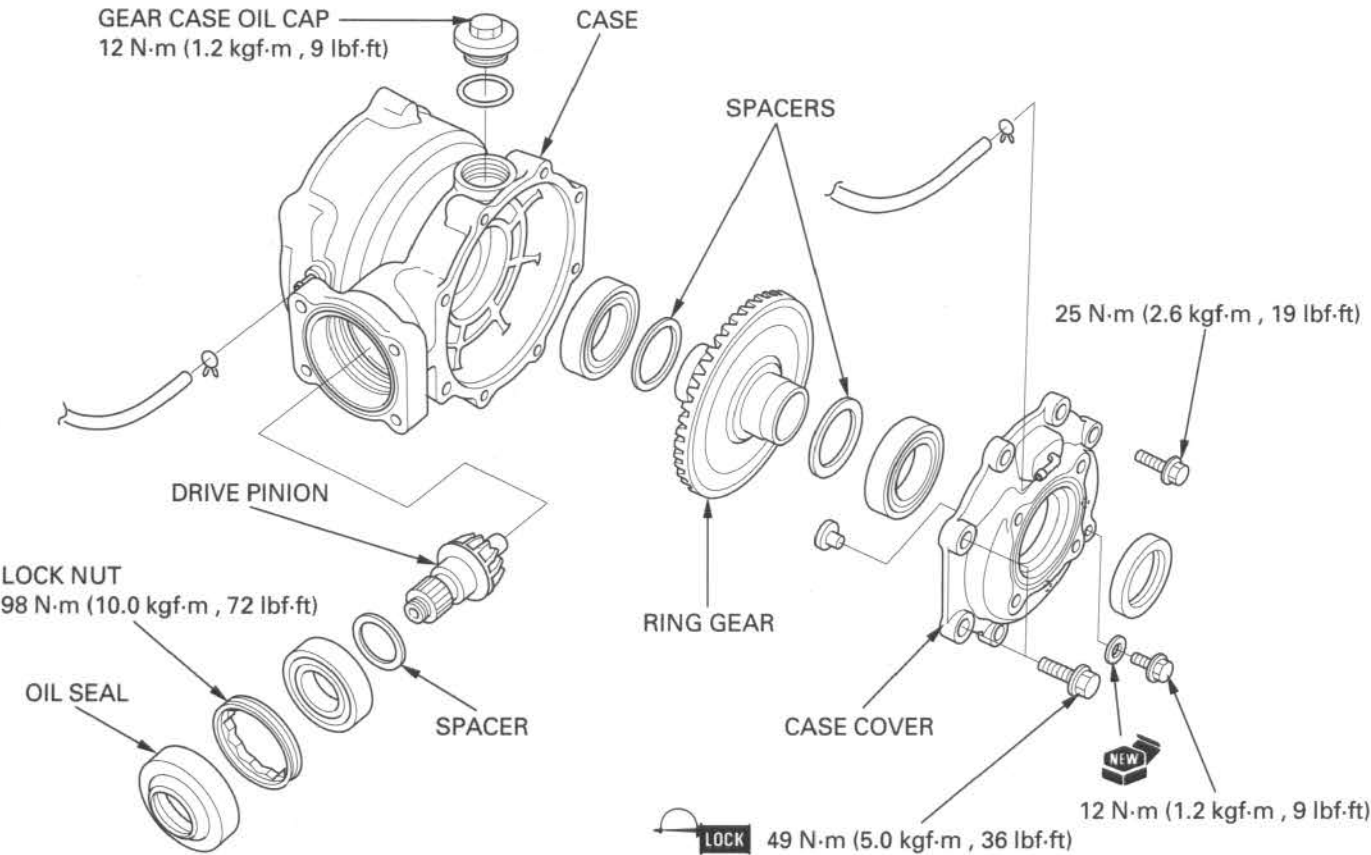
Stake the pinion bearing lock nut.

Apply grease to the new drive pinion oil seal lips. Install the new drive pinion oil seal on the case.

Apply grease to the O-ring. Install the O-ring on the final drive case.



GEAR CASE ASSEMBLY



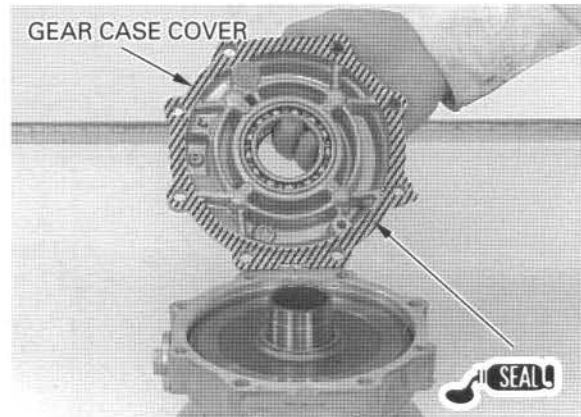
NOTE:

When the bearing, gear set and/or gear case has been replaced, check the tooth contact pattern (page 15-7) and gear backlash (page 15-5).

Keep dust and dirt out of the gear case.

Install the ring gear spacers onto the ring gear.
Install the ring gear, with the spacers, into the final drive case.

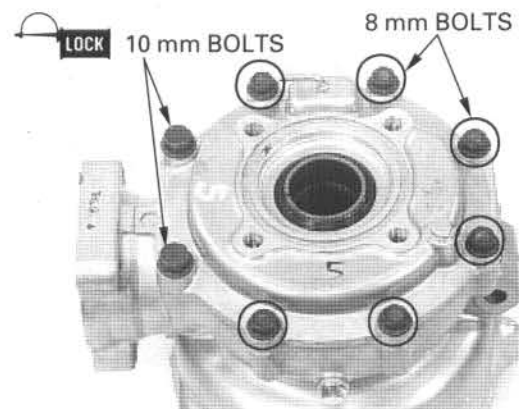
Apply liquid sealant to the mating surface of the gear case cover.



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 criss-cross pattern.



TORQUE:

10 mm bolt: 49 N·m (5.0 kgf·m, 36 lbf·ft)

8 mm bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)

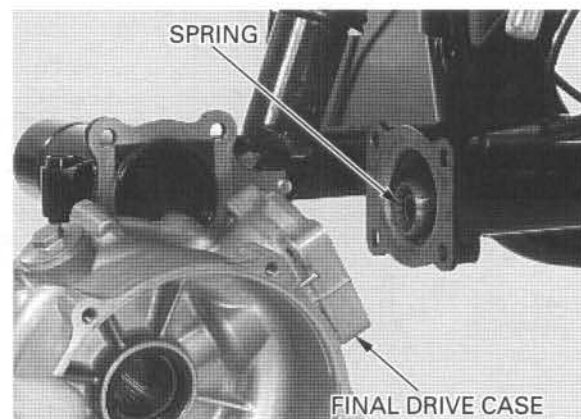
CAUTION:

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

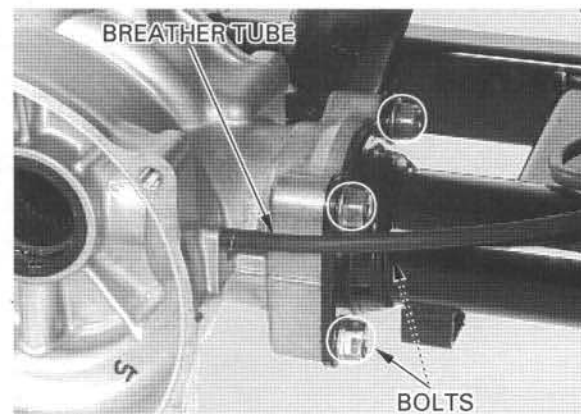
Install the spring in the drive shaft joint.

Install the final drive case to the swingarm.



Loosely install the front final drive case bolts.

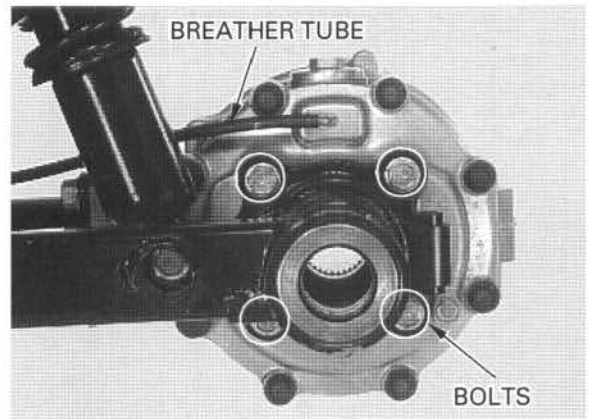
Connect the breather tubes.



Install and tighten the left final drive case bolts to the specified torque.

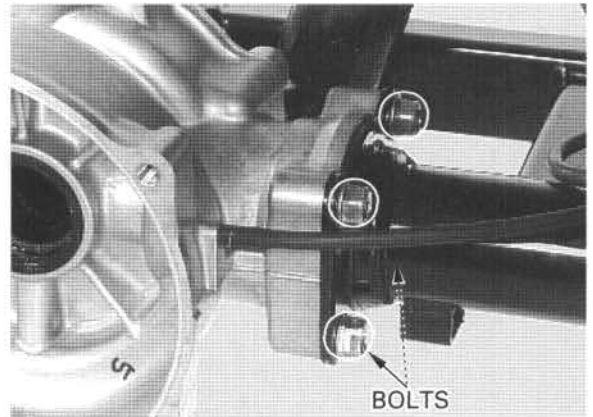
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)

Connect the breather tube.



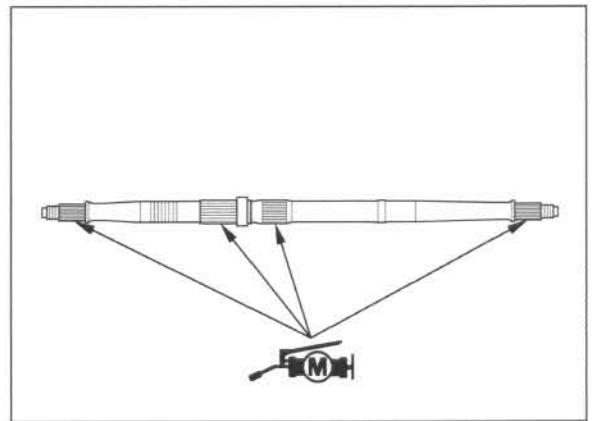
Tighten the front final drive case bolts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)

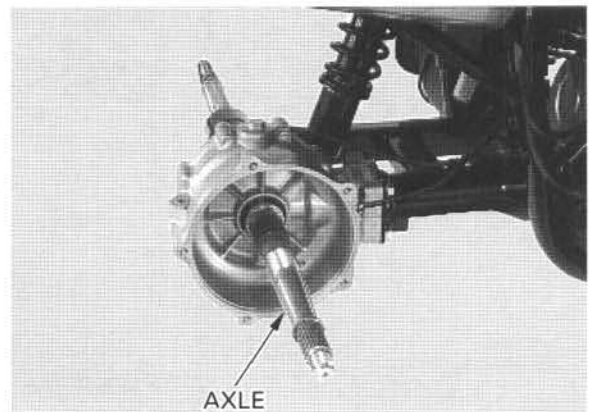


REAR AXLE INSTALLATION

Apply molybdenum disulfide grease to the axle splines.

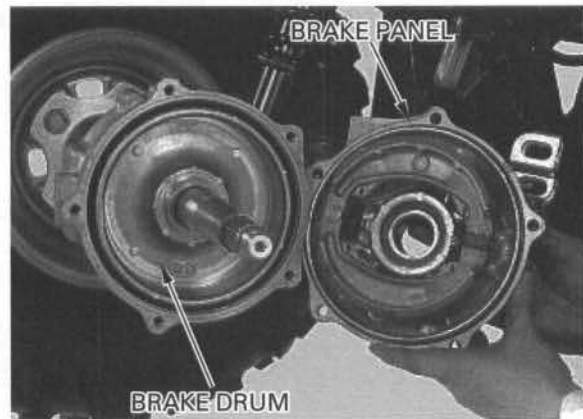


Install the rear axle from the right side while aligning the splines of the final drive.



REAR DRIVING MECHANISM

Install the rear brake drum and rear brake panel (page 14-20).



Apply molybdenum disulfide grease to the axle shaft spline.
Install the right and left wheel hubs.
Tighten the axle nut to the specified torque.

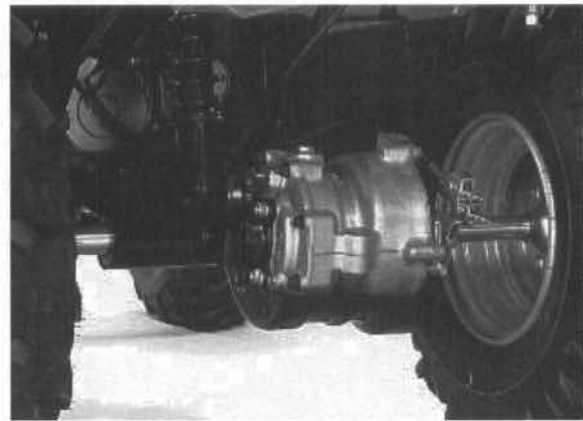
TORQUE: 137 N·m (14.0 kgf·m , 101 lbf·ft)

Install the new cotter pins.



Install the rear wheels (page 13-3).

Fill the final drive with the recommended oil (page 3-14).

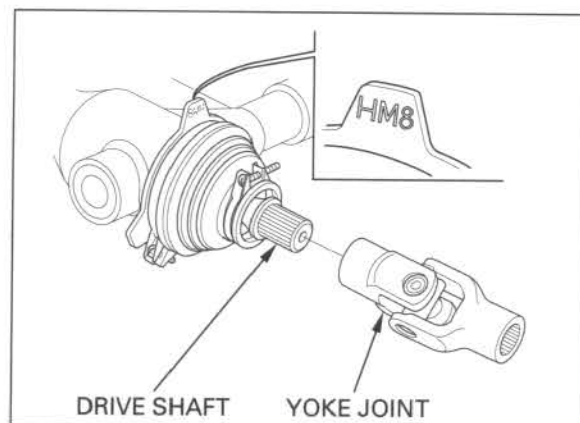


REAR DRIVE SHAFT

REMOVAL

Remove the swingarm (page 13-4).

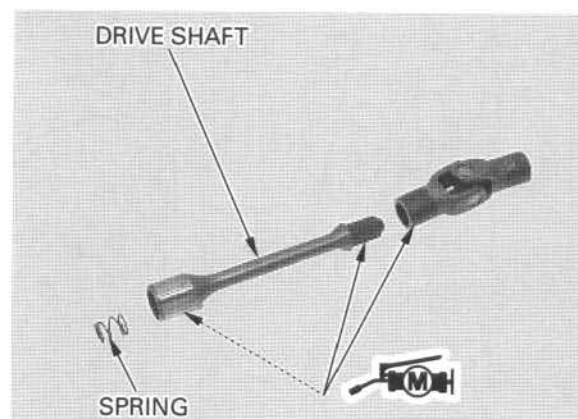
Pull the yoke joint/drive shaft out of the swingarm and disassemble it.



INSPECTION

Inspect the yoke joint bearings for excessive play or damage.

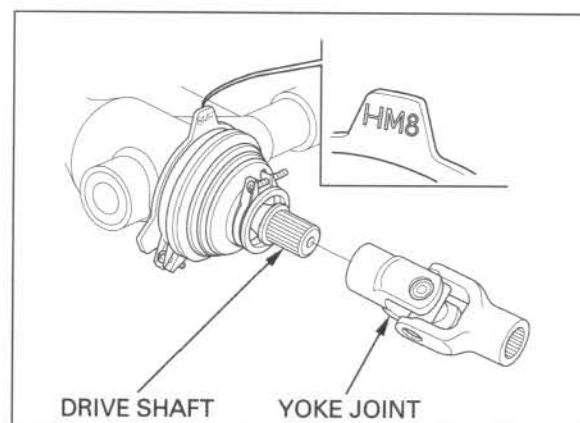
Apply molybdenum disulfide grease to the spline.

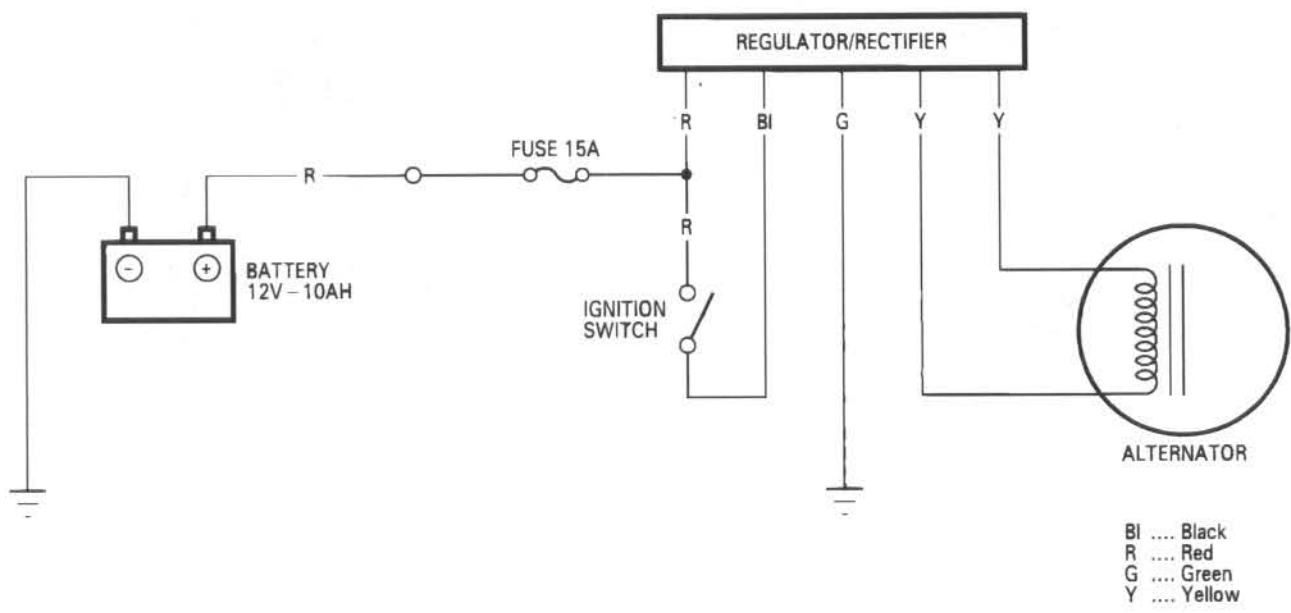
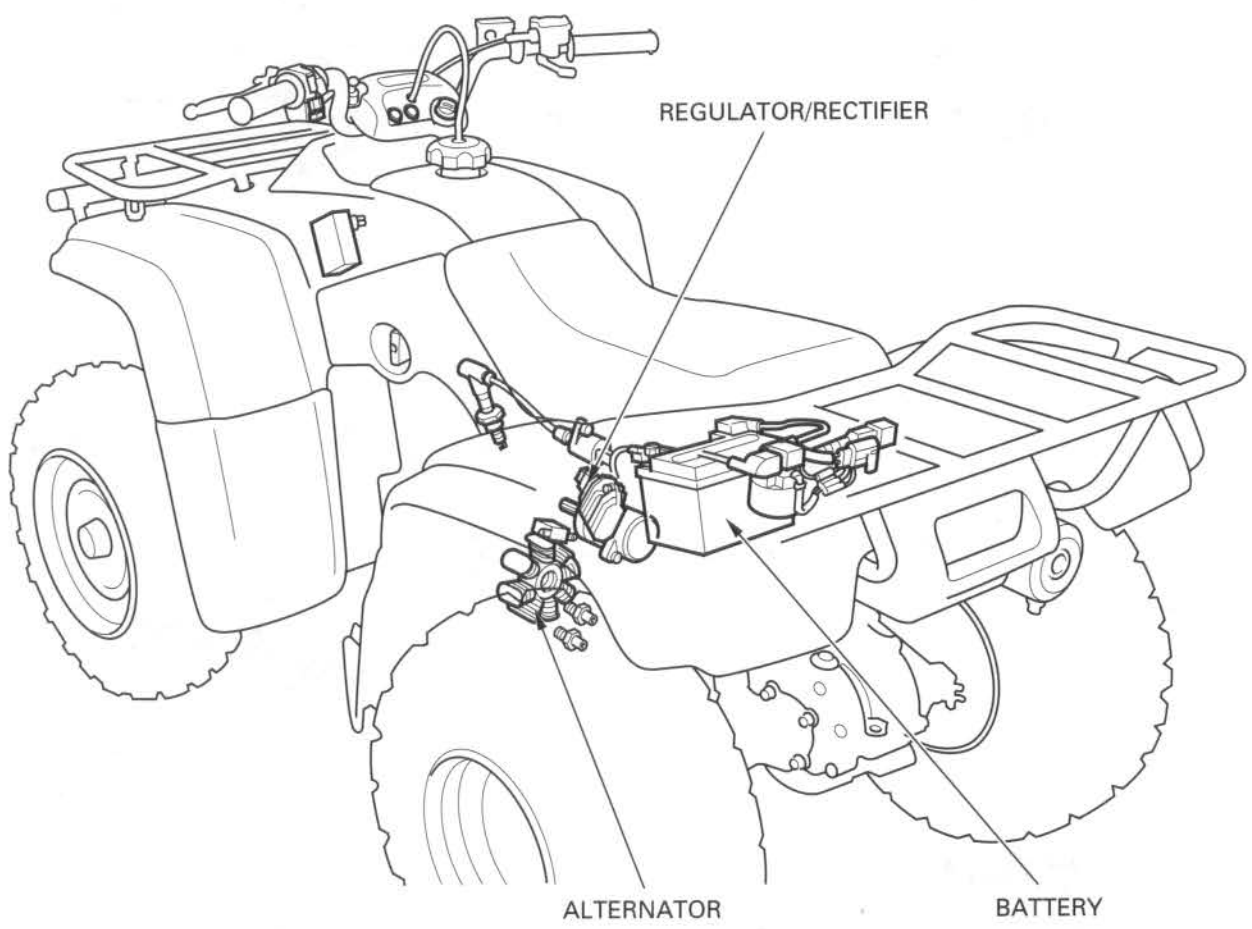


INSTALLATION

Assemble the yoke joint and drive shaft.
Install the yoke joint/drive shaft into the swingarm.

Install the swingarm (page 13-8).





16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM INSPECTION	16-6
SERVICE INFORMATION	16-1	ALTERNATOR CHARGING COIL	16-8
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-9
BATTERY	16-5		

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 immediately.
- 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. **KEEP OUT OF REACH OF CHILDREN.**

- Always turn off the ignition switch before disconnecting any electrical component.

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.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.

NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

CAUTION:

The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the vehicle.

BATTERY/CHARGING SYSTEM

- The battery will self-discharge when the vehicle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).

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.

BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester.

The recommended battery tester puts "load" on the battery so that the actual battery condition of the load can be measured.

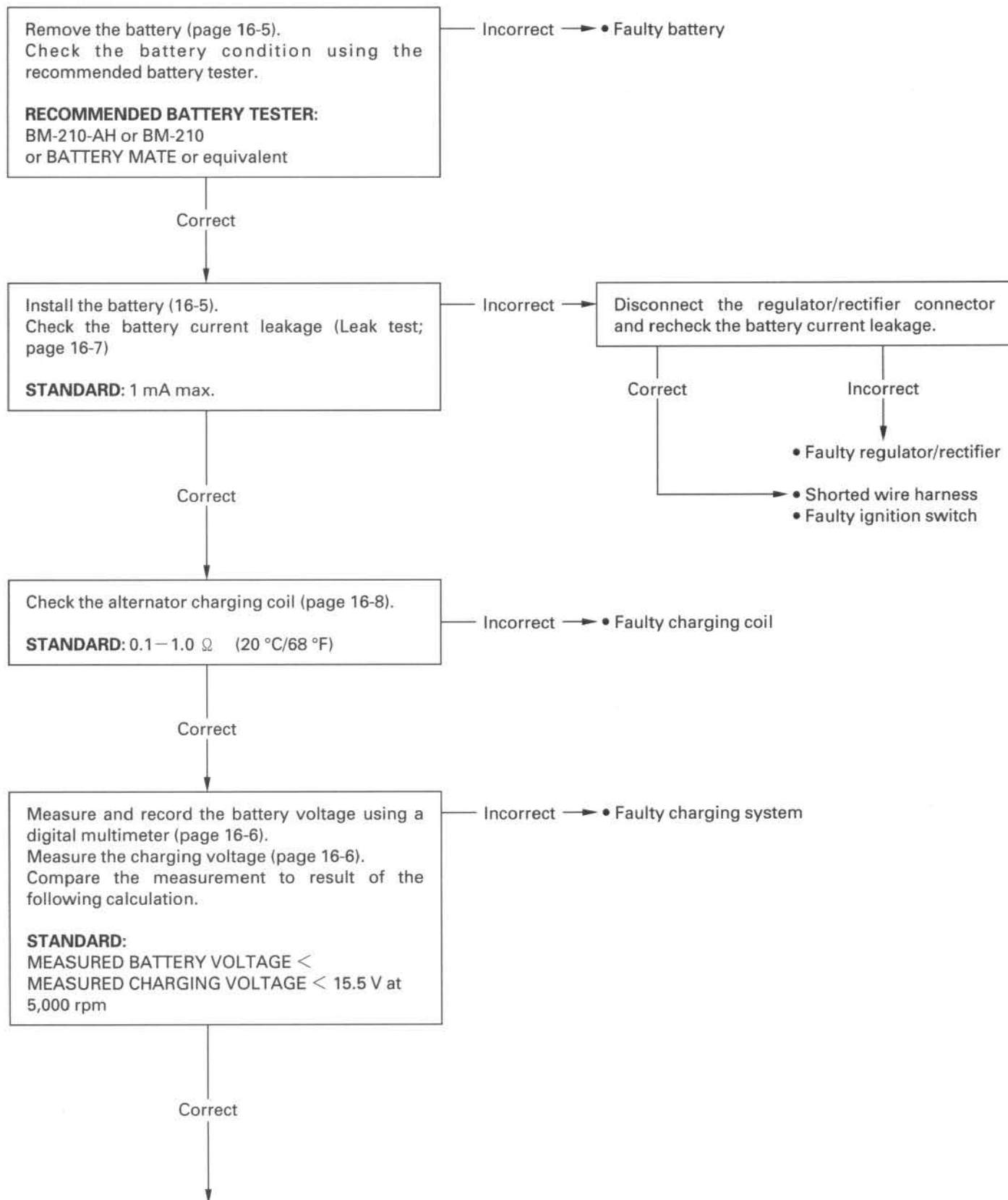
Recommended battery tester BM-210-AH or BM-210 BATTERY MATE or equivalent

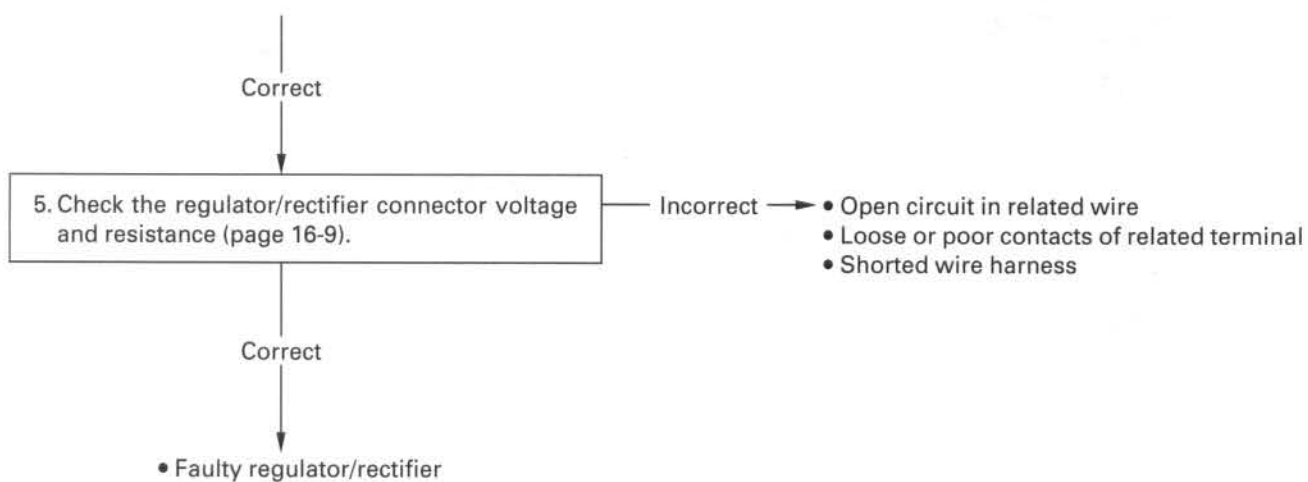
SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 10 AH
	Current leakage		1 mA max.
	Voltage (20°C/ 68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10 h
		Quick	5.0 A/1.0 h
Alternator	Capacity		0.13 kw/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK





BATTERY

REMOVAL/INSTALLATION

Remove the seat (page 2-3).

Remove the battery holder band.
Disconnect the negative cable and then the positive cable, and remove the battery.

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—13.2 V

Under charged: Below 12.3 V

TOOL:

Digital multimeter Commercially available

BATTERY CHARGING

▲WARNING

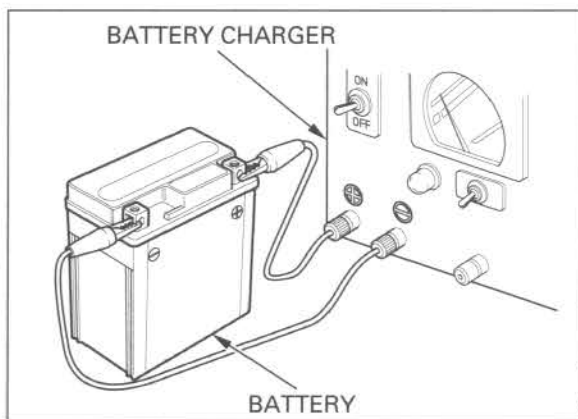
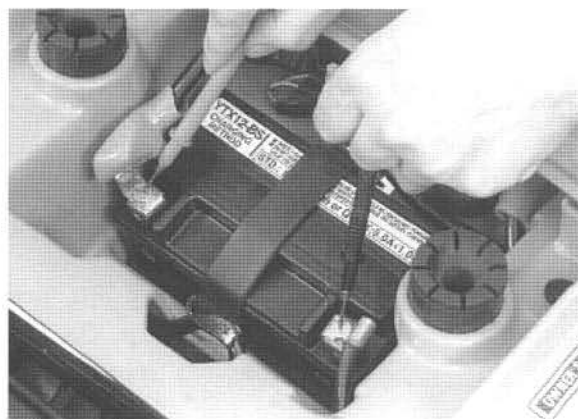
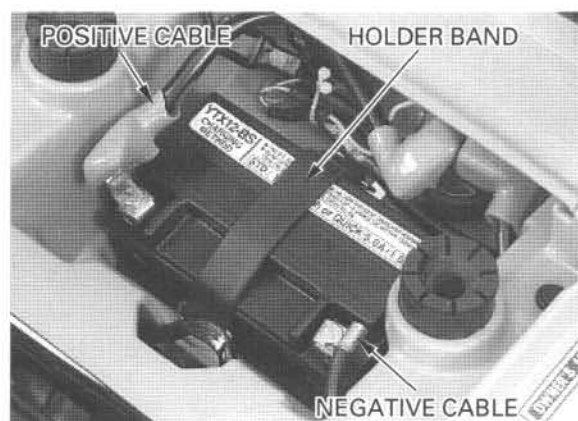
- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- Turn power ON/OFF at the charger, not at the battery terminal.

Remove the battery (see above).

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.

CAUTION:

- Quick-charging should only be done in an emergency; slow charging is preferred.
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.



CHARGING SYSTEM INSPECTION

NOTE:

- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on page 16-3.
- 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 highest capacity range first, then gradually lower the capacity ranges until you have the correct range.
- 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.

VOLTAGE INSPECTION

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

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 multimeter as shown.

CAUTION:

- *To prevent a short, make absolutely certain which are the positive and negative terminals or cable.*
- *Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

Restart the engine.

With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

Standard:

Measured battery voltage (page 16-5) <

Measured charging voltage (see above) < 15.5 V
at 5,000 rpm



CURRENT LEAKAGE INSPECTION

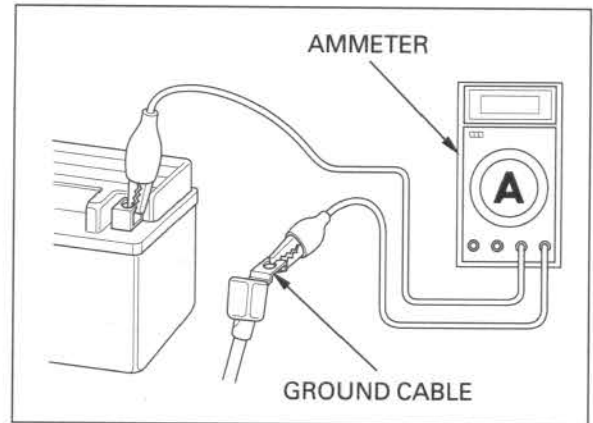
Turn the ignition switch off and disconnect the negative battery cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery(-) terminal.

With the ignition switch off, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

**SPECIFIED CURRENT LEAKAGE:** 1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

ALTERNATOR CHARGING COIL

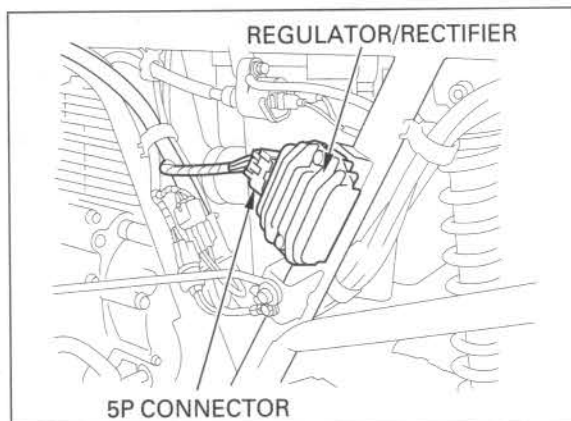
NOTE:

It is not necessary to remove the stator coil to make this test.

INSPECTION

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

Disconnect the regulator/rectifier 5P connector.

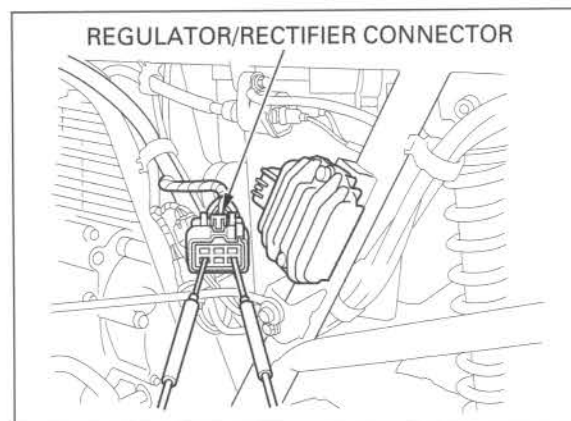


Check the resistance between Yellow terminals.

STANDARD: 0.1 – 1.0 Ω (20°C/68°F)

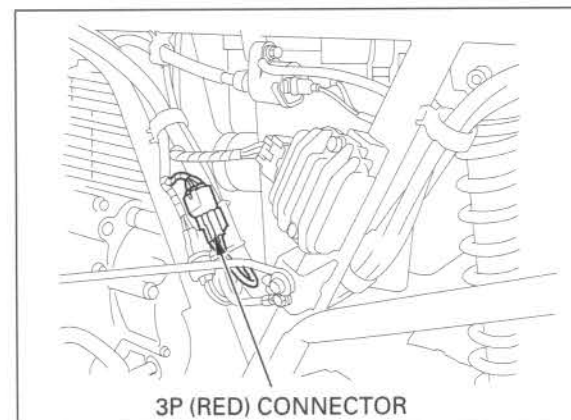
Check for continuity between Yellow terminals and Ground.

There should be no continuity.



If the reading is out of specification check the resistance at the alternator connector.

Disconnect the alternator 3P (Red) connector.



Check the resistance between Yellow terminals.

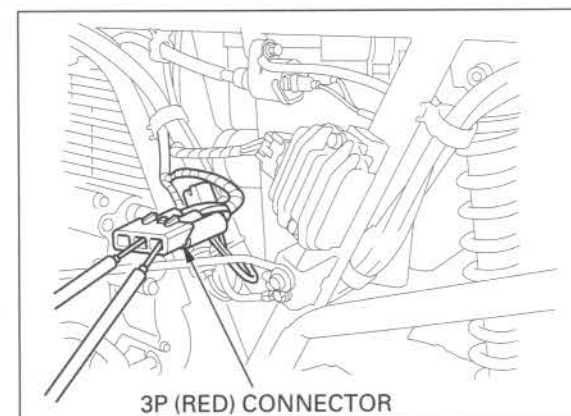
STANDARD: 0.1 – 1.0 Ω (20°C/68°F)

Check for continuity between Yellow terminals and Ground.

There should be no continuity.

If readings are still far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.

Refer to section 10 for stator removal.

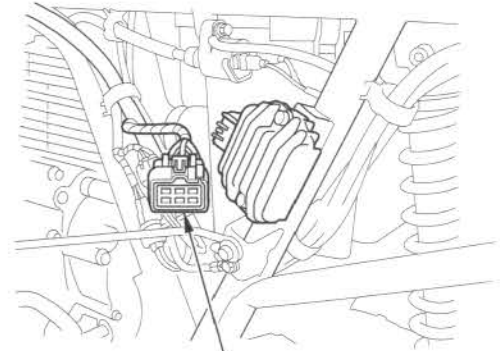


REGULATOR/RECTIFIER

SYSTEM INSPECTION

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

Disconnect the regulator/rectifier connector, and check it for loose contact or corroded terminals.



REGULATOR/RECTIFIER CONNECTOR

If the regulated voltage reading (see page 16-6) 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 (at 20°C/68°F)
Ground line	Green and ground	Continuity should exist

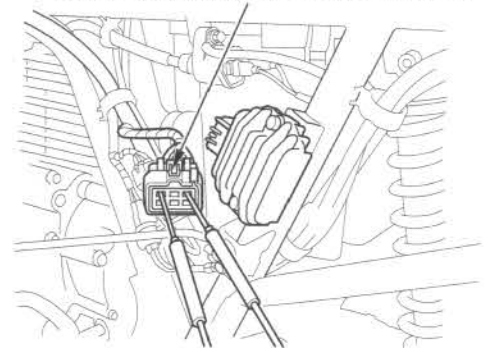
If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

REMOVAL/INSTALLATION

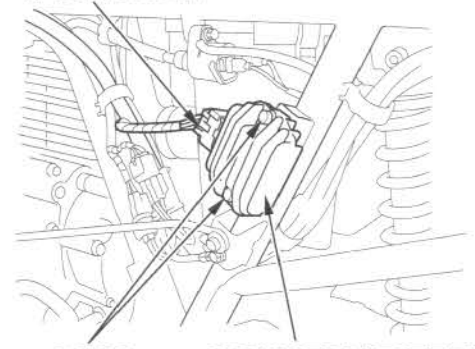
Disconnect the connector.
Remove the regulator/rectifier unit mounting bolts and regulator/rectifier.

Install the regulator/rectifier unit in the reverse order of removal.

REGULATOR/RECTIFIER CONNECTOR

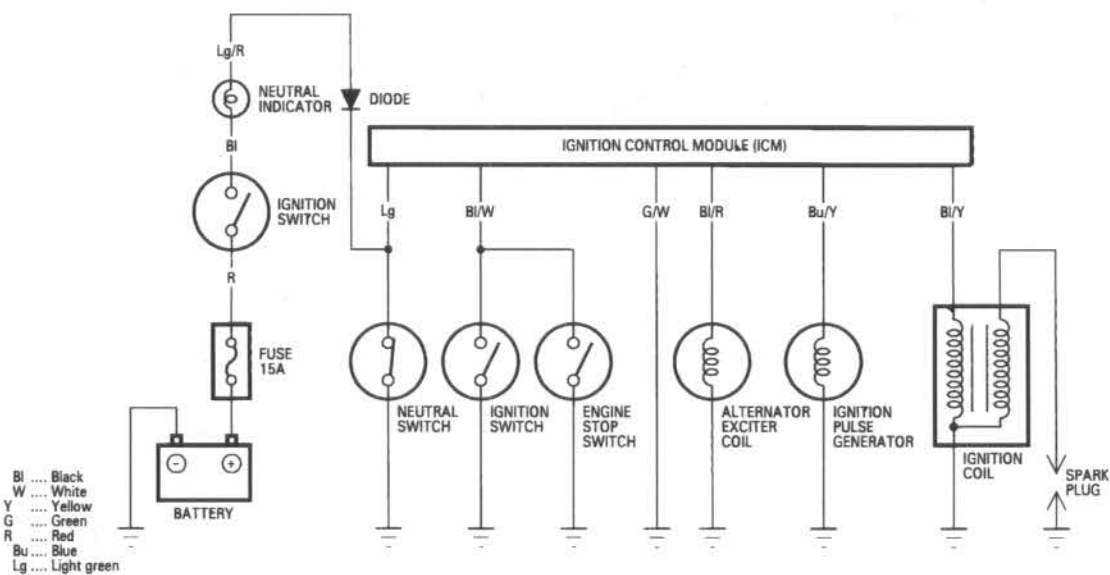
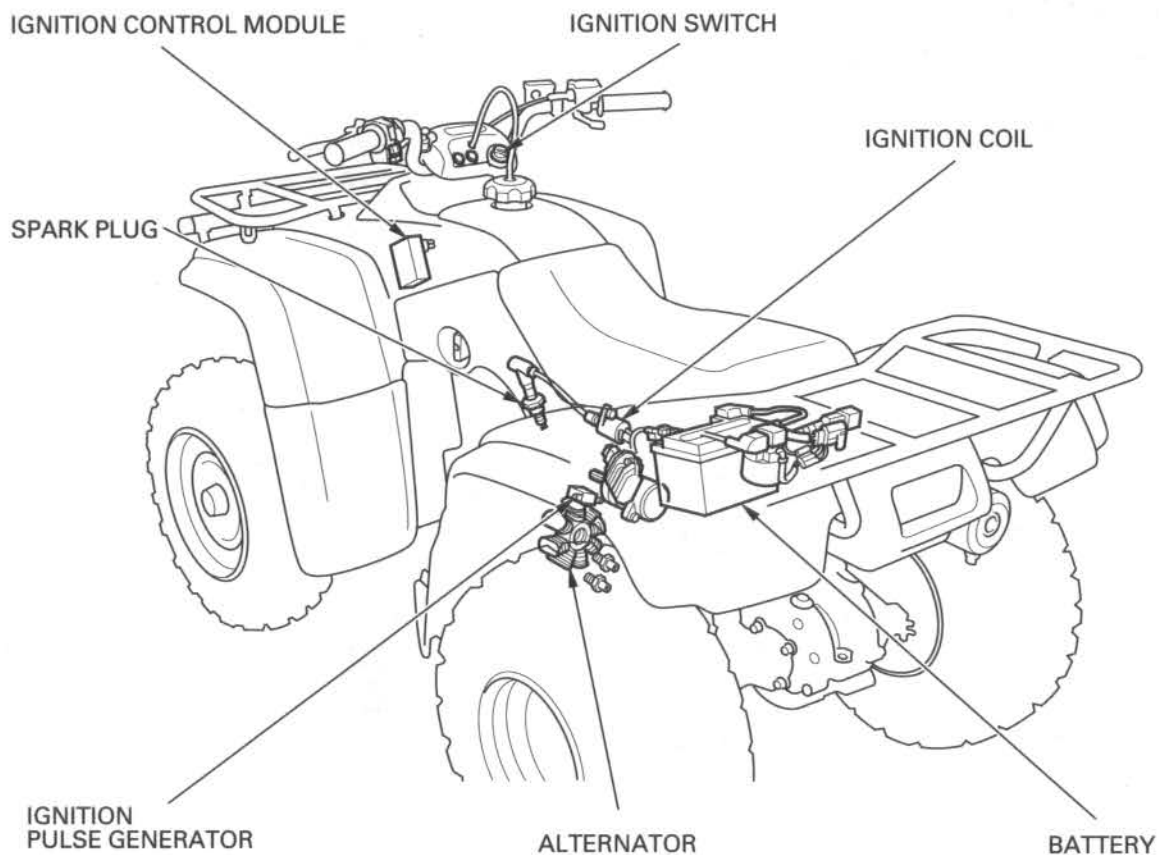


5P CONNECTOR



BOLTS REGULATOR/RECTIFIER

IGNITION SYSTEM



17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION COIL	17-7
SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-7
TROUBLESHOOTING	17-3	IGNITION TIMING	17-8
IGNITION SYSTEM INSPECTION	17-4		

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

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 17-3.
- The ignition timing does not normally need to be adjusted since the Ignition Control Module (ICM) is factory preset.
- The 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 engine stop switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Spark plug	Standard	DPR8EA-9 (NGK)	X24EPR-U9 (DENSO)
	For cold climate (below 5 °C/41 °F)	DPR7EA-9 (NGK)	X22EPR-U9 (DENSO)
	For extended high speed riding	DPR9EA-9 (NGK)	X27EPR-U9 (DENSO)
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	
Alternator exciter coil peak voltage		100 V minimum	
Ignition timing	"F" mark	10° BTDC at 1,400 rpm	
	Full advance	31° BTDC at 3,750 rpm	

IGNITION SYSTEM

TORQUE VALUE

Pulse generator 6 N·m (0.6 kgf·m , 4.3 lbf·ft) Apply a locking agent to the threads

TOOLS

Peak voltage tester (U. S. A. only) or 07HGJ-0020100 (not available in U. S. A.) with commercially available digital multi-
Peak voltage adaptor meter (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)

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. 3. The sampling time of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least one). 4. Poorly connected connector or an open circuit in ignition system. 5. Faulty ignition coil (Measure the peak voltage). 6. Faulty ICM (when above No. 1 – 5 are normal).
	No peak voltage	1. Incorrect peak voltage adaptor connections. 2. Faulty engine stop switch. 3. Loose or poorly connected ICM connector. 4. An open circuit or loose connection in Green wire. 5. Open circuit or poor connection in ground wire of the ICM. 6. Faulty peak voltage adaptor, or peak voltage tester. 7. Faulty exciter coil (measure the peak voltage). 8. Faulty ignition pulse generator (measure the peak voltage). 9. Faulty ICM (when above No. 1 – 8 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.
Exciter coil	Low peak voltage	1. The multimeter impedance is too low; below 10 M Ω /DCV. 2. Cranking speed is too low. 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 exciter coil (in case when above No. 1 – 3 are normal).
	No peak voltage	1. Faulty peak voltage adaptor or peak voltage tester. 2. Faulty exciter coil.
Ignition pulse generator	Low peak voltage	1. The multimeter impedance is too low; below 10M Ω /DCV. 2. Cranking speed is too low. 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 adaptor or peak voltage 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 recommended digital multimeter or 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 peak voltage tester (U. S. A. only), follow the manufacturer's instructions.

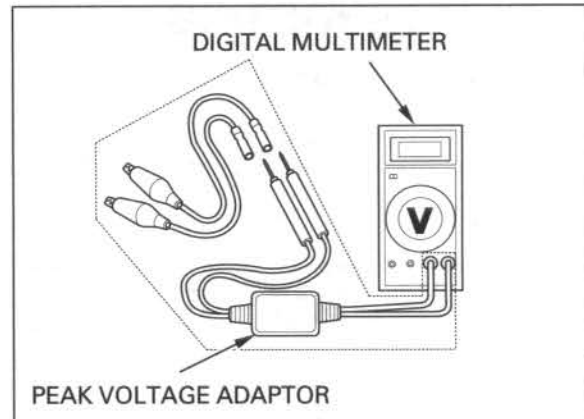
Connect the peak voltage adaptor to the digital multimeter, or use the peak voltage tester (U. S. A. only).

TOOLS:

Peak voltage tester (U. S. A. only) or

Peak voltage adaptor 07HGJ-0020100

(not available in U. S. A.) with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)



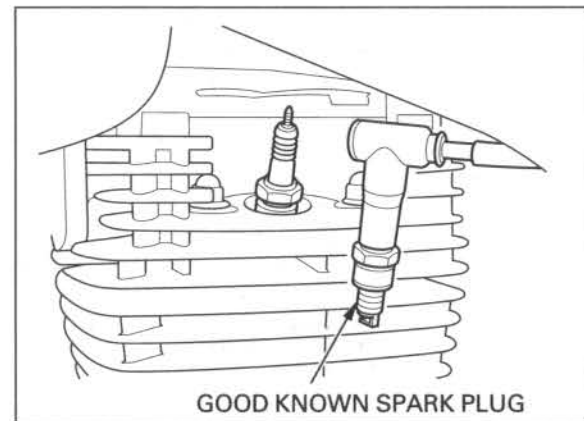
IGNITION COIL PRIMARY PEAK VOLTAGE

⚠ WARNING

Avoid touching the spark plug and tester probes to prevent electric shock.

NOTE:

- Check all system 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 and disconnect the spark plug cap from the spark plug. Connect a known good spark plug to the spark plug cap and ground the spark plug to the cylinder as done in a spark test.

With the ignition coil primary wire connected, connect the peak voltage adaptor or peak voltage tester to the ignition coil.

CONNECTION:

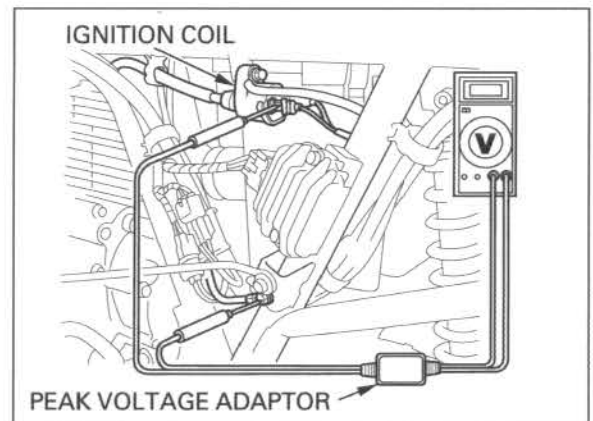
Black/Yellow terminal (+) – Body ground (–)

Turn the engine stop switch to "RUN".

Crank the engine with the starter motor and read ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Black/Yellow wire. If not defects are found in the harness, refer to the troubleshooting chart on page 17-3.



IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

Check cylinder compression and check that the spark plug is installed correctly.

Disconnect the 4P connector from the ICM. Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side.

TOOLS:

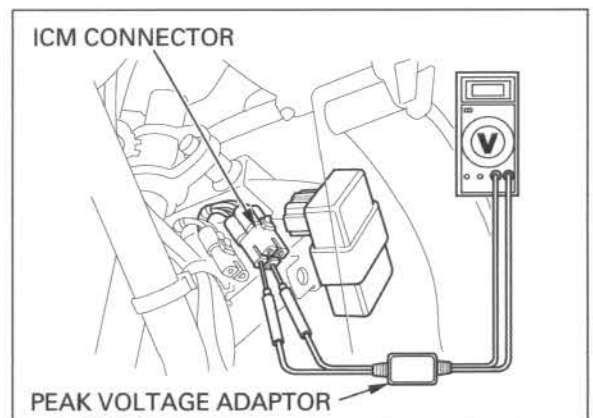
Peak voltage tester (U. S. A. only) or
Peak voltage adaptor 07HGJ-0020100
(not available in U. S. A.) with commercially available digital multimeter (impedance 10 Ω /DCV minimum)

CONNECTION:

Black/Yellow terminal (+) – Green/White (–)

Crank the engine with the starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum



IGNITION SYSTEM

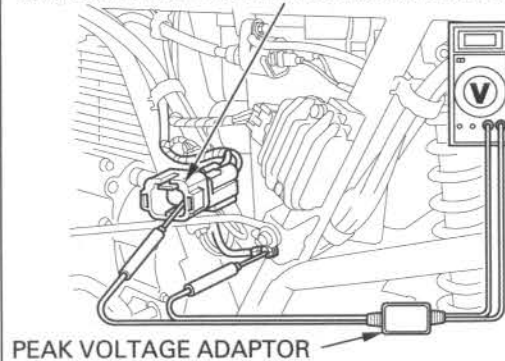
If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the pulse generator connector.

Disconnect the ignition pulse generator connector and connect the tester probes to the terminal (Blue/Yellow and Ground).

In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure are abnormal, check each item in the troubleshooting chart on page 17-3. If all items are normal, the ignition pulse generator is faulty. See section 10 for ignition pulse generator replacement.

IGNITION PULSE GENERATOR CONNECTOR



ALTERNATOR EXCITER COIL PEAK VOLTAGE

NOTE:

Check cylinder compression and check that the spark plug is installed correctly.

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

Disconnect the 4P and 2P connectors from the ICM. Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side.

TOOLS:

Peak voltage tester (U. S. A. only) or
Peak voltage adaptor 07HGJ-0020100
(not available in U. S. A.) with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)

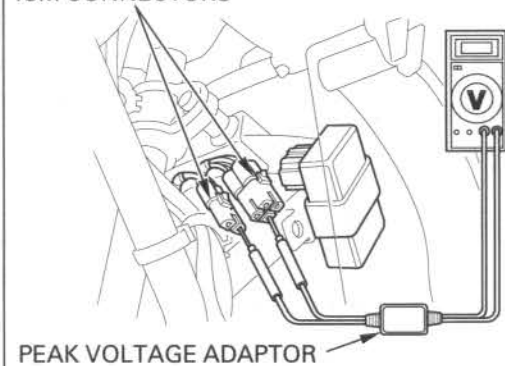
CONNECTION:

Black/Red terminal (+) – Green/White (–)

Crank the engine with starter motor and read the peak voltage.

PEAK VOLTAGE: 100 V minimum

ICM CONNECTORS

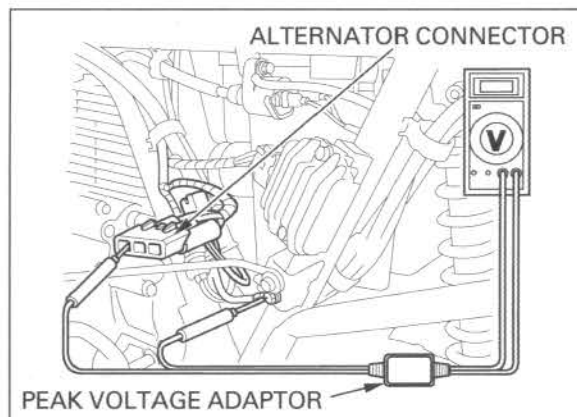


If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the alternator exciter coil connector.

Disconnect the alternator exciter coil connector and connect the tester probe to the Black/Red terminal and Ground.

In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the alternator exciter coil is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure are abnormal, check each item in the troubleshooting chart (page 17-3). If all items are normal, the alternator exciter coil is faulty. See section 10 for stator replacement.



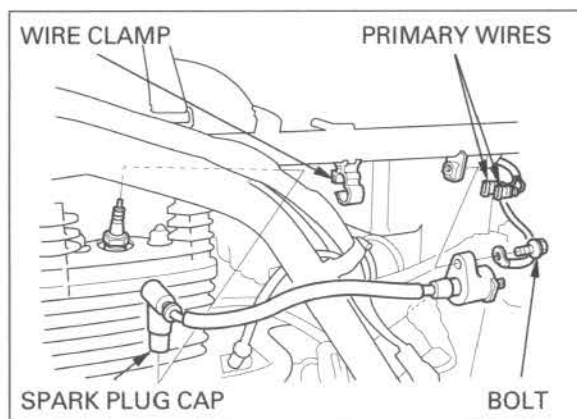
IGNITION COIL

REMOVAL/INSTALLATION

Remove the fuel tank and heat guard (page 5-15).

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.

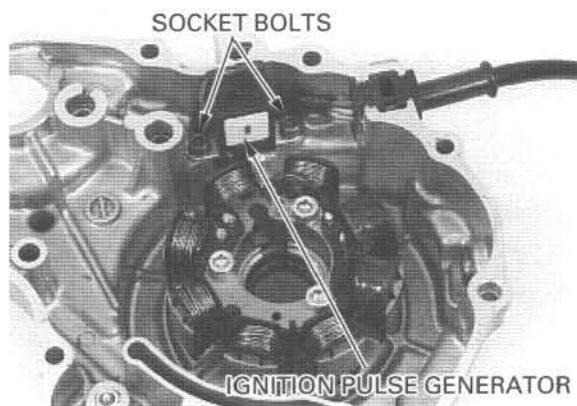


IGNITION PULSE GENERATOR

REMOVAL

Remove the alternator cover (page 10-6).

Remove the wire grommet from the alternator cover 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.

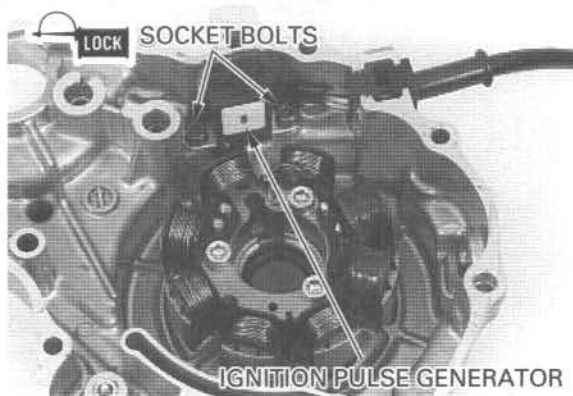
Install and tighten the socket bolts to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·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 10-12).



IGNITION TIMING

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

Warm up the engine.

Stop the engine and remove the timing hole cap.

Read the instructions for timing light operation.

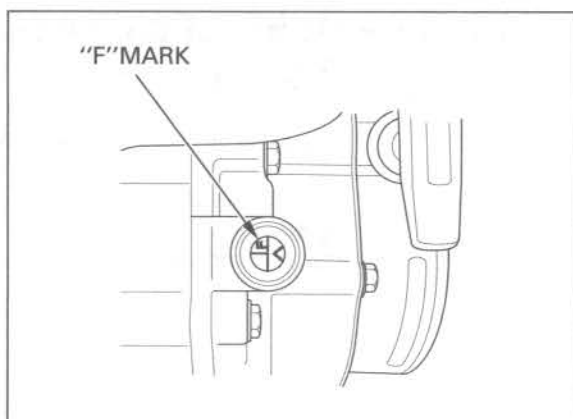
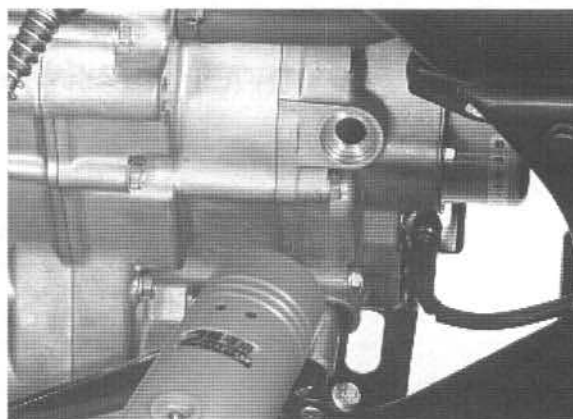
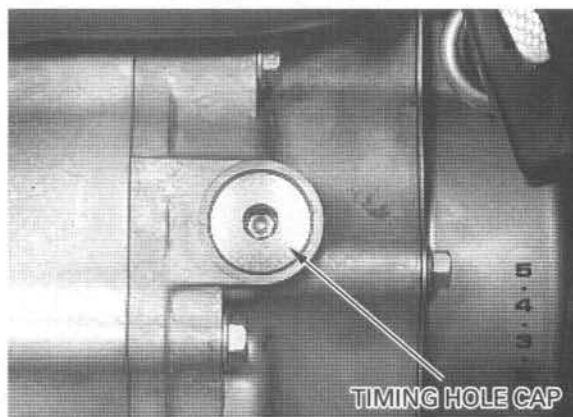
Connect the timing light to the spark plug wire.

Start the engine and let it idle.

IDLE SPEED: 1,400 ± 100 rpm

The ignition timing is correct if the "F" mark aligns with the index notch on the left crankcase.

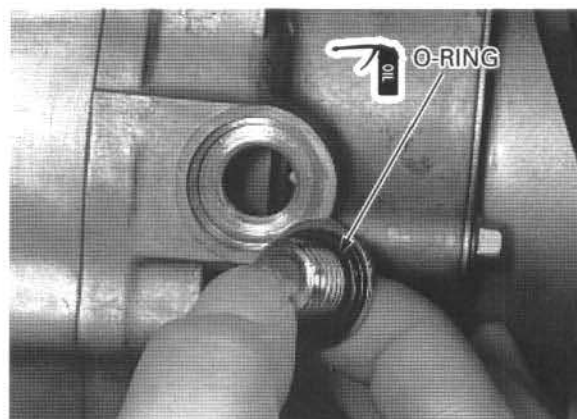
Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move clockwise.



Check that the O-ring is in good condition, replace if necessary.

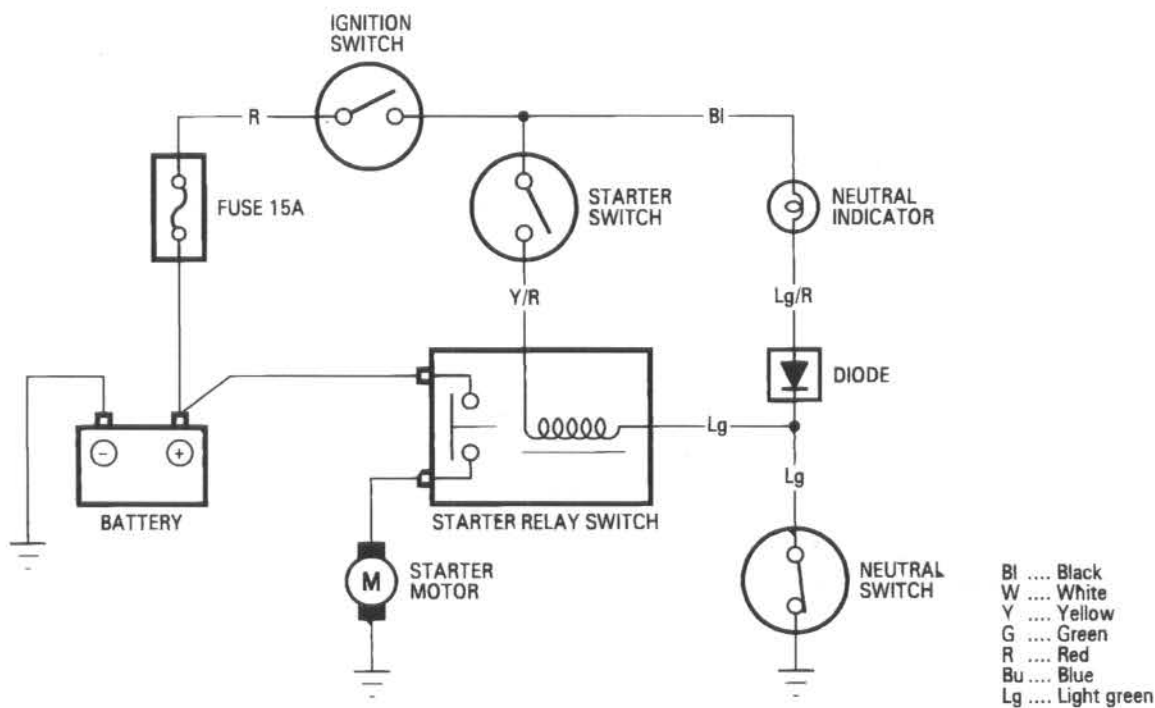
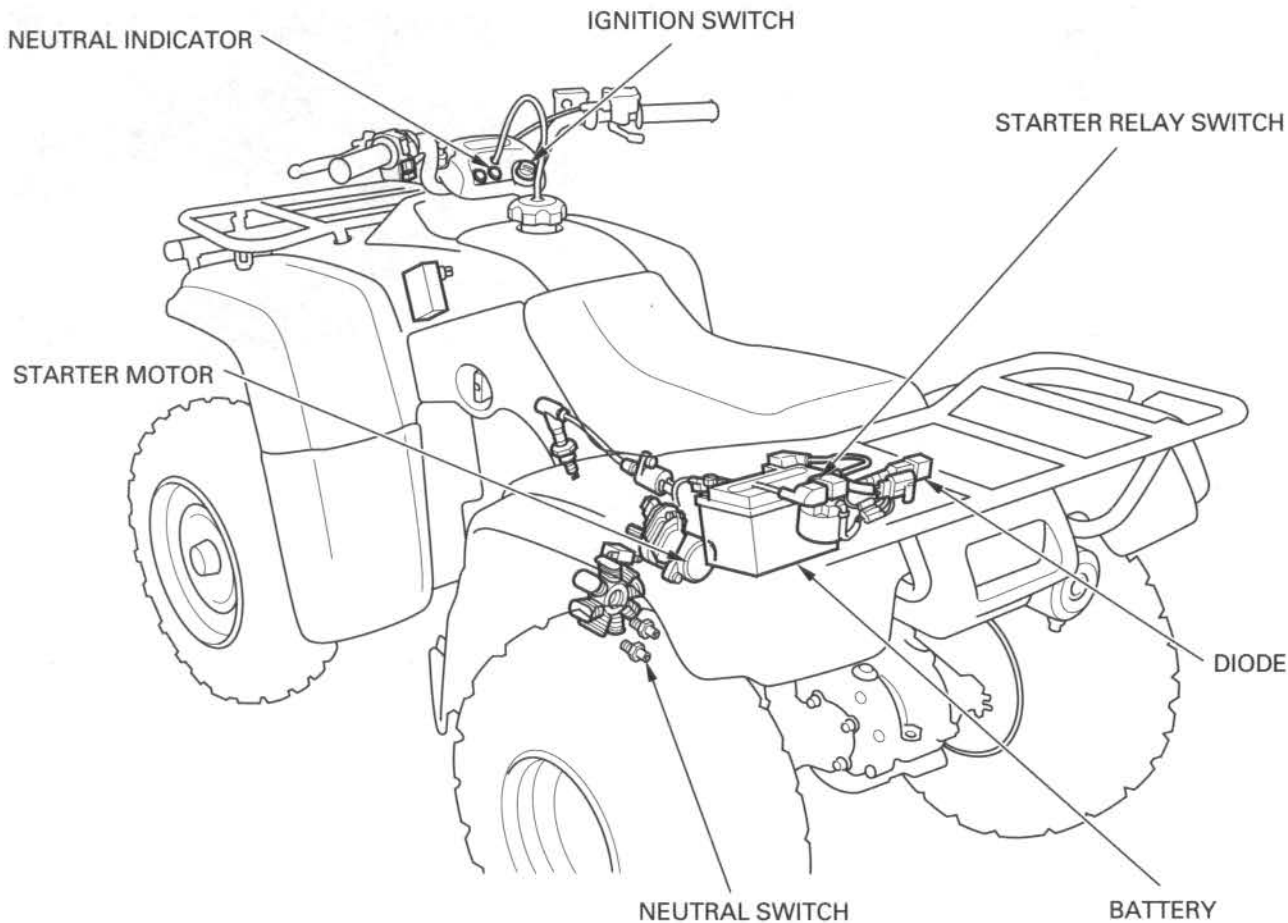
Apply oil to the O-ring and install and tighten the timing hole cap.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



ELECTRIC STARTER

SYSTEM DIAGRAM



18. ELECTRIC STARTER

SYSTEM DIAGRAM	18-0	STARTER MOTOR	18-3
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-7
TROUBLESHOOTING	18-2	DIODE	18-8

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)

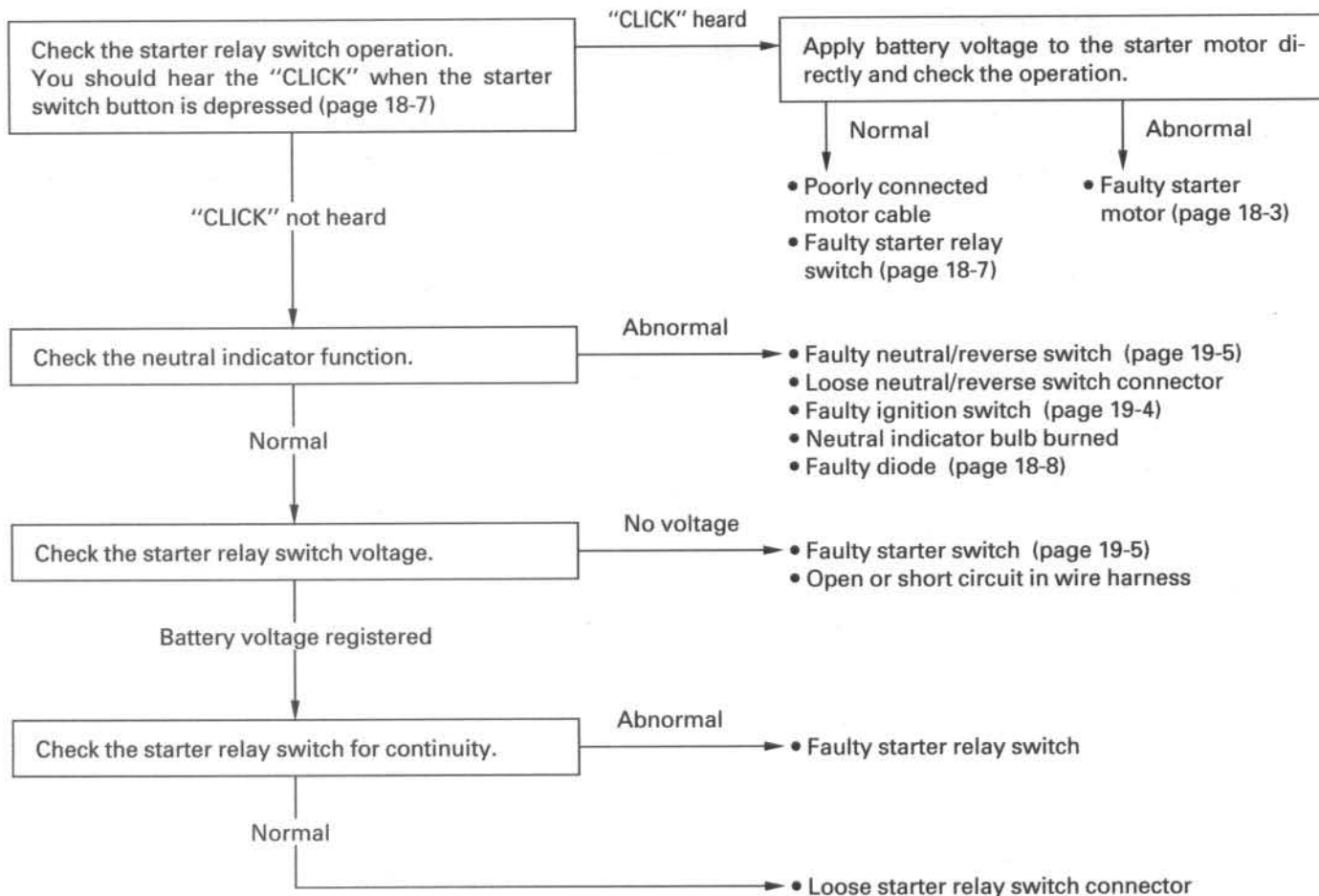
ITEM	SPECIFICATIONS	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	9.0 (0.35)

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 17)
- Engine problems (see section 3, 7)
 - Low compression
 - Fouled spark plug

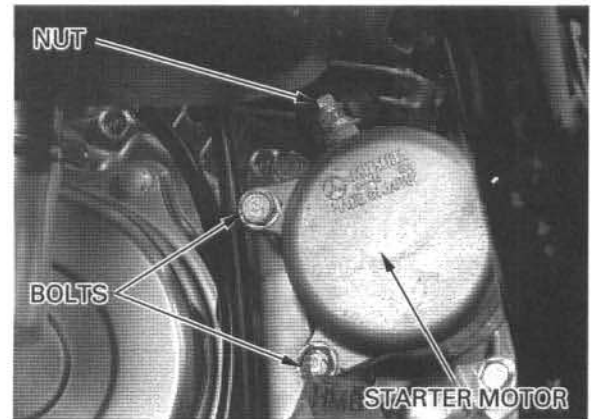
STARTER MOTOR

REMOVAL

⚠ WARNING

When the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

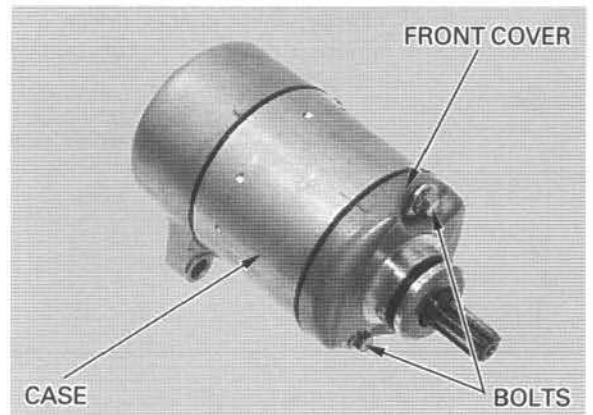
Disconnect the starter cable from the starter motor. Remove the two mounting bolts and the starter motor.



DISASSEMBLY

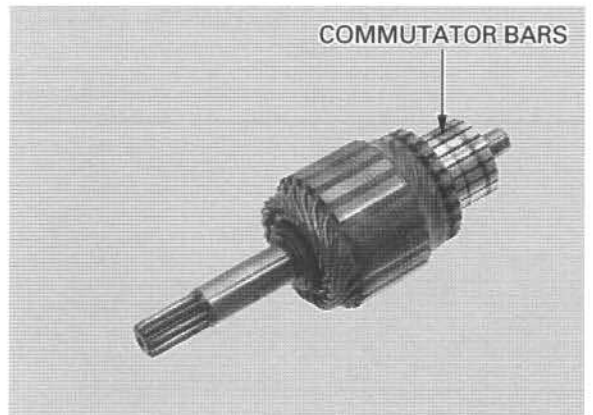
Remove the two starter motor case bolts and remove the front cover, motor case and armature coil.

Record the number and location of shims for correct assembly.

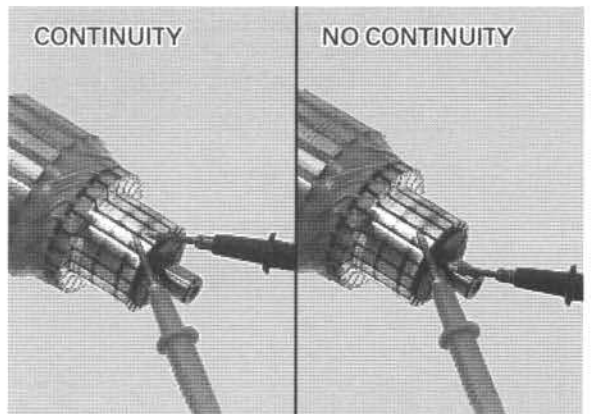


INSPECTION

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.



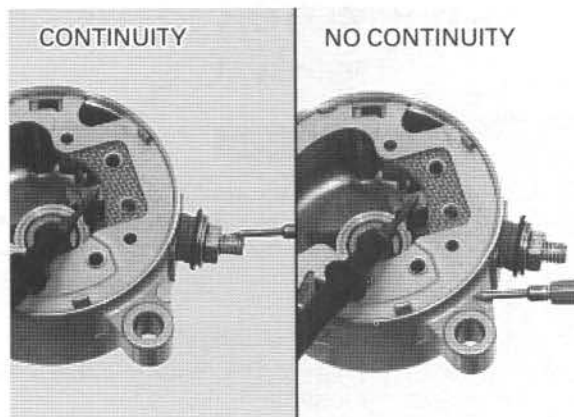
ELECTRIC STARTER

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).

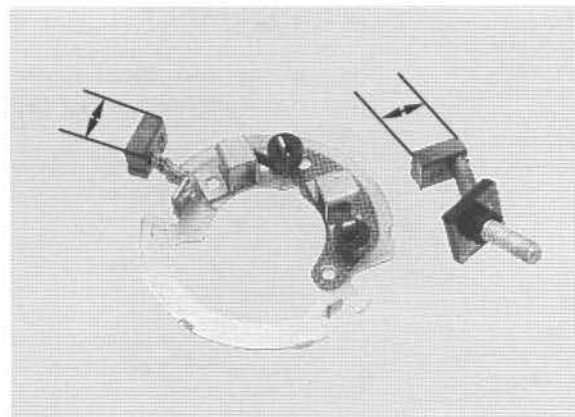
There should be no continuity.



Disassemble the rear cover.

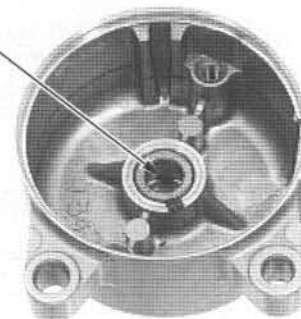
Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 9.0 mm (0.35 in)



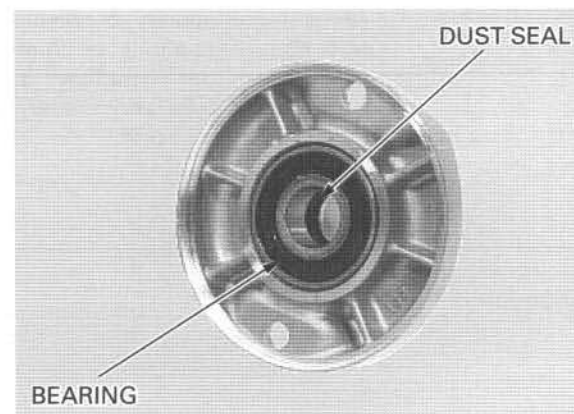
Check the bushing of the rear cover for wear or damage.

BUSHING

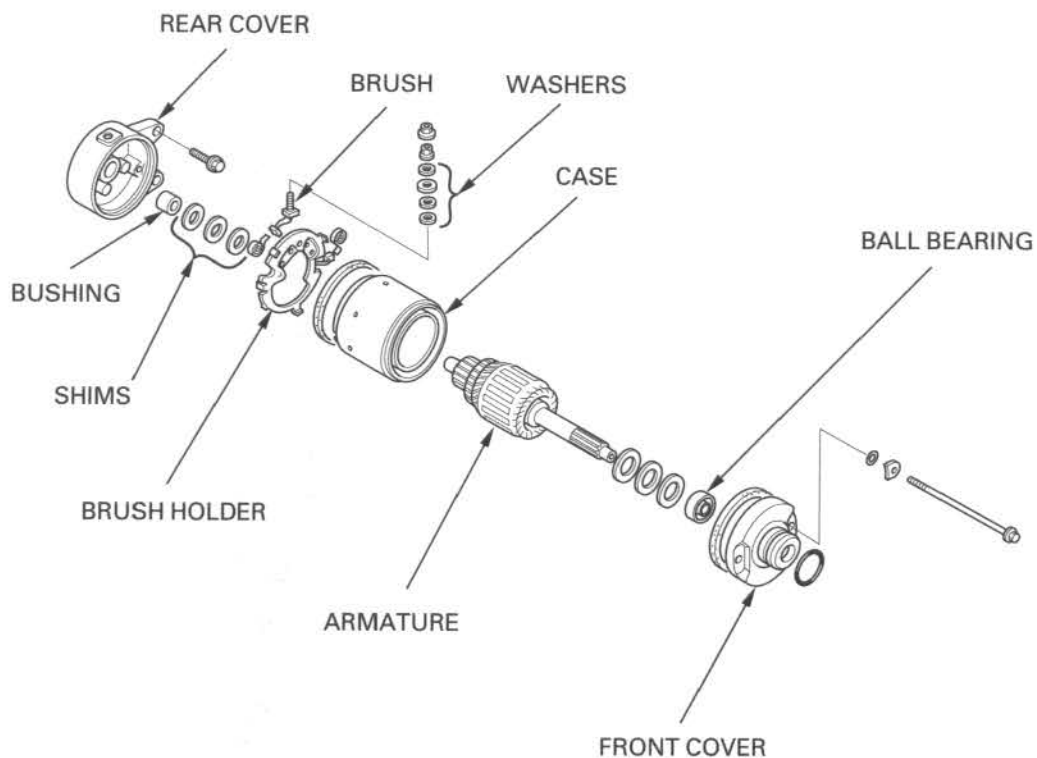


Check the ball bearing of the front cover for smooth rotation.

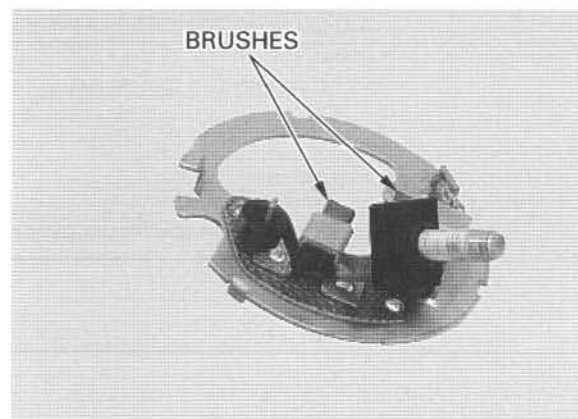
Check the dust seal for wear or damage.



ASSEMBLY

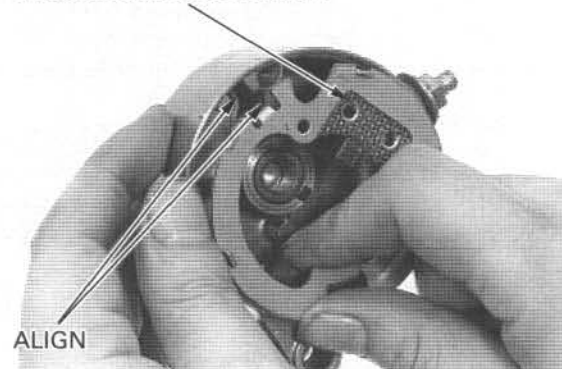


Install the brushes in the brush holders as shown.



Install the brush holder assembly to the rear cover, aligning the tab of the holder with the groove of the rear cover.

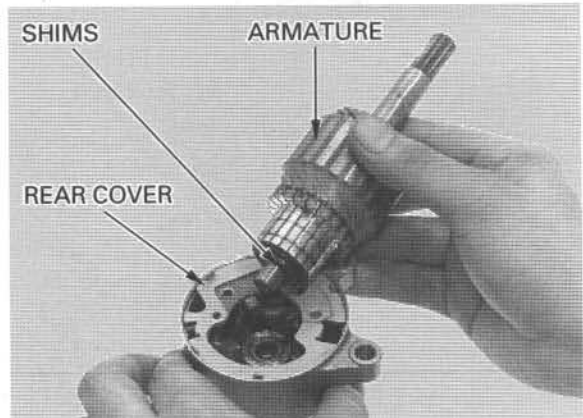
BRUSH HOLDER ASSEMBLY



ELECTRIC STARTER

Install the shims to the terminal and armature coil in the correct positions as recorded.

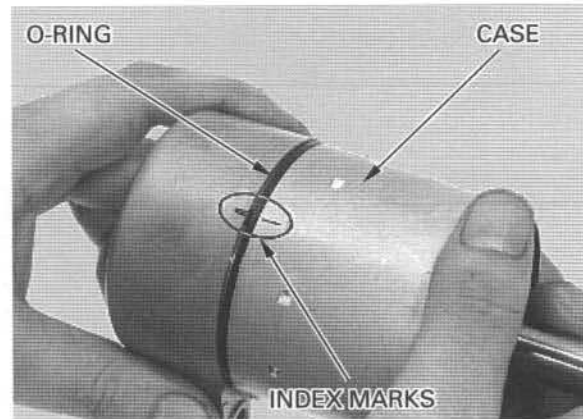
Install the armature in the rear cover.



Install the O-ring on the motor case.
Assemble the motor case and rear cover, aligning the index marks.

NOTE:

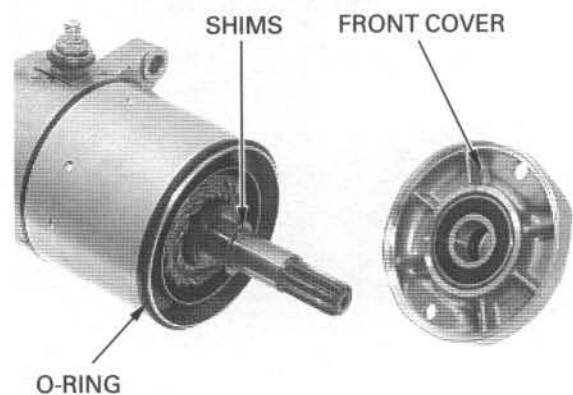
Hold the armature coil shaft, or armature might be drawn out by the magnetic field.



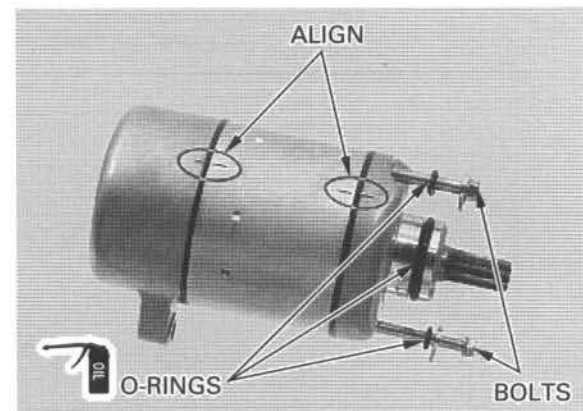
Apply grease to the dust seal of the front cover.
Install the shims to the shaft in the correct positions as recorded, and O-ring to the case.

CAUTION:

Do not damage the front cover dust seal.

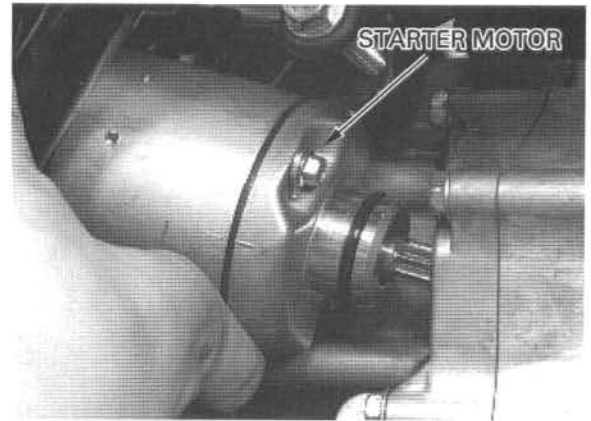


Align the index marks of the front cover, motor case and rear cover.
Tighten the bolts securely.
Apply oil to the O-ring and install it on the front cover.



INSTALLATION

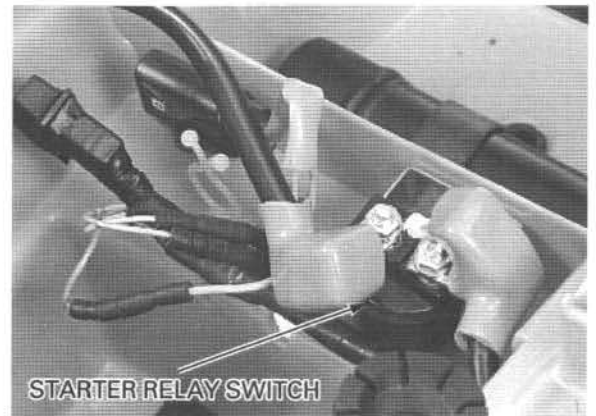
Install the starter motor with the two mounting bolts.
Tighten the upper bolt first, then tighten the lower bolt.
Connect the starter cable to the motor.

**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.

**VOLTAGE INSPECTION**

If the switch "CLICK" is not heard, disconnect the relay connector.

Measure the voltage between the Yellow/Red (+) and Light green (-) 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.

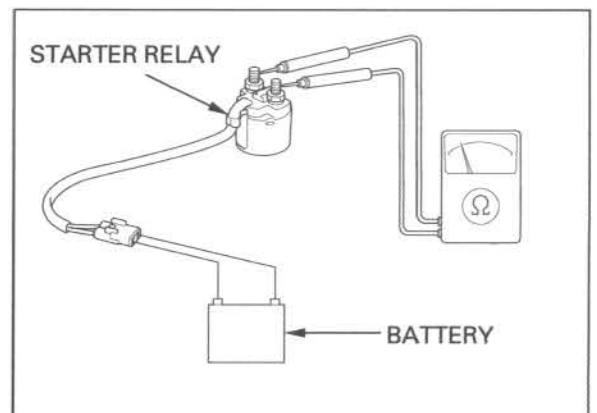
**CONTINUITY INSPECTION**

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 Light green).

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.

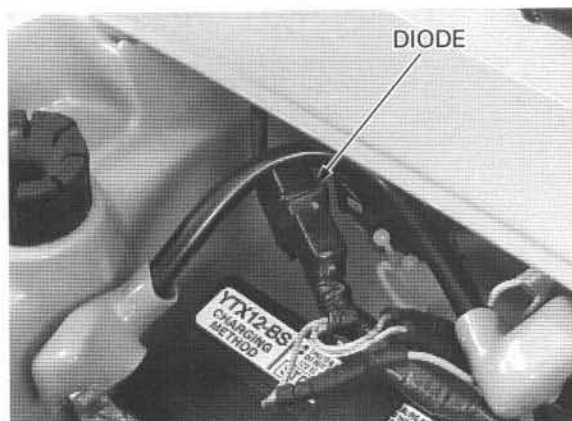


DIODE

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

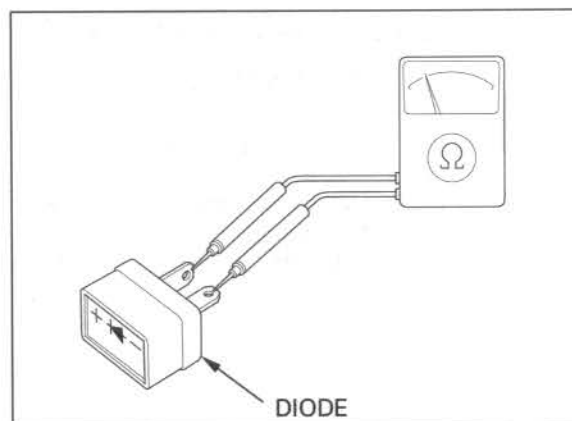
Reverse direction: No continuity

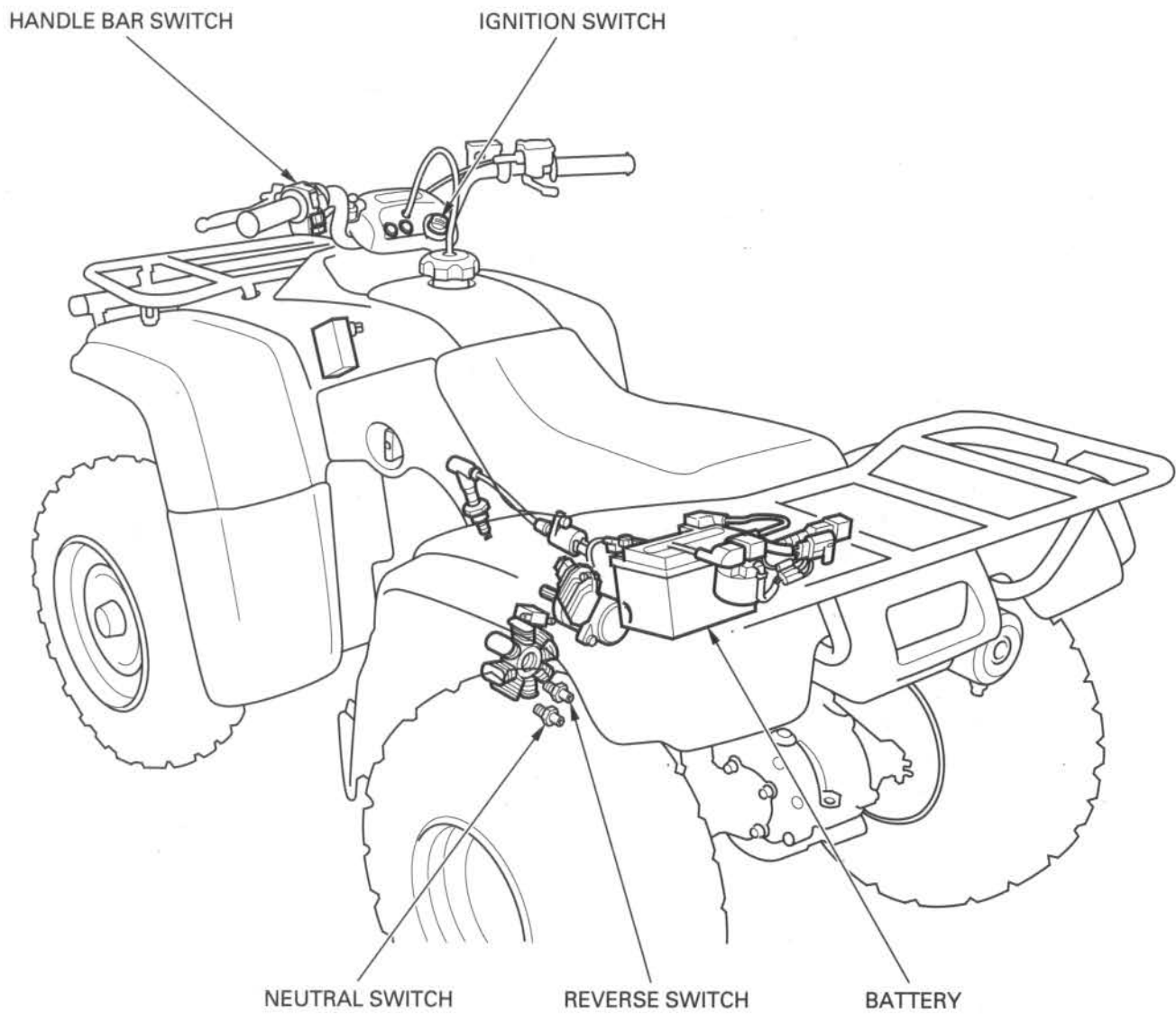
INSTALLATION

Install the diode.

Tape the diode to the harness

Install the seat (page 2-3).





19. LIGHTS/SWITCHES

SERVICE INFORMATION	19-1	IGNITION SWITCH	19-4
TROUBLESHOOTING	19-1	HANDLEBAR SWITCHES	19-5
HEADLIGHT	19-2	NEUTRAL/REVERSE SWITCH	19-5
TAILLIGHT	19-3	GEAR POSITION SWITCH (After 2001)	19-7
INDICATOR LAMPS	19-4	SPEED SENSOR (After 2001: TE model)	19-8

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.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight	12 V 25/25 W × 2
	Taillight	12 V—5 W
	Indicator (Reverse/Neutral)	12 V—1.7 W × 2
Fuse	Main fuse	15 A

TORQUE VALUE

Neutral and reverse switches ('97—2001) 13 N·m (1.3 kgf·m, 9 lbf·ft)

TOOL

Inspection adapter 07GMJ-ML80100

TROUBLESHOOTING

Light does not come on when the light switch is turned on

- Bulb burned out
- Faulty switch
- Wiring to that component has open circuit

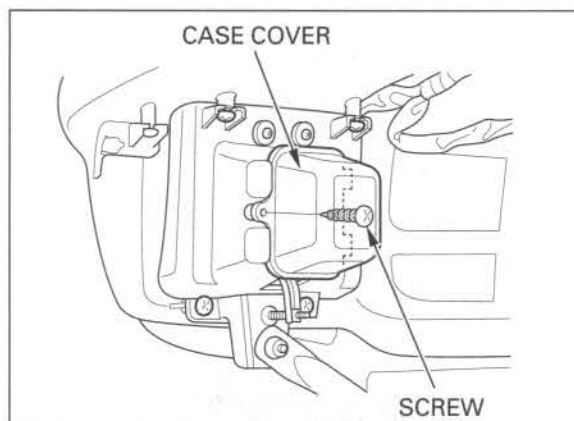
Headlight beams do not shift when the dimmer switch is operated

- Faulty dimmer switch
- Bulb burned out
- Wiring to that component has an open circuit

HEADLIGHT

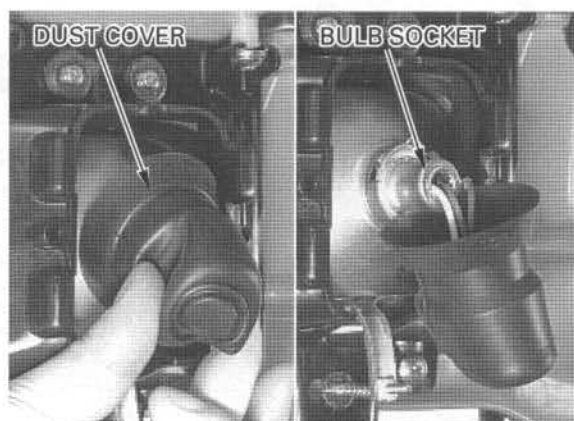
BULB REPLACEMENT

Remove the screw and headlight case cover.



Remove the dust cover.

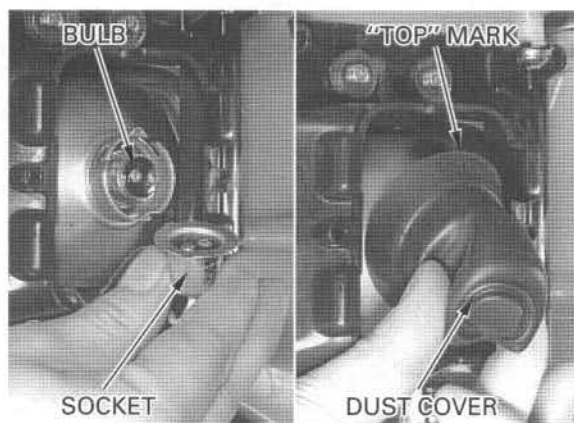
Remove the bulb socket and bulb.



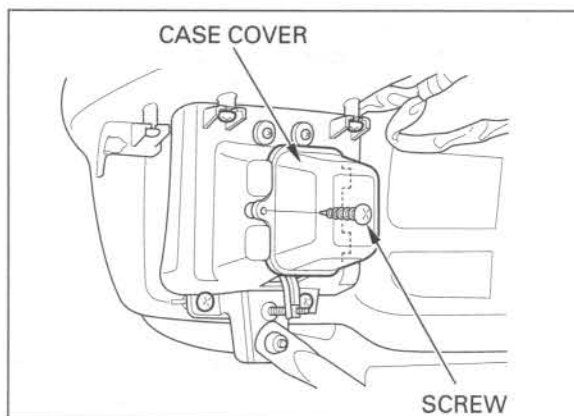
Install a new bulb in the case, by aligning the bulb tab with the case groove.

Install the bulb socket.

Install the dust cover with its "TOP" mark facing up.



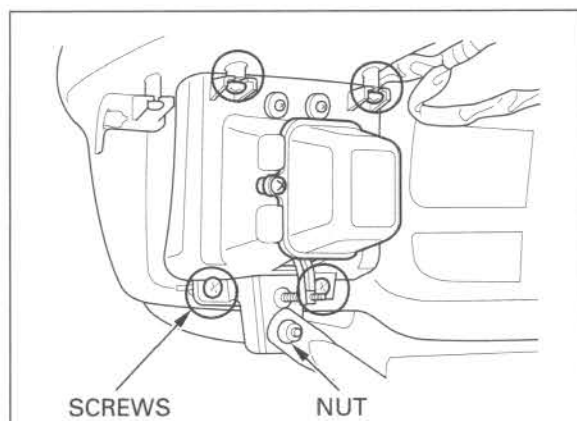
Install the headlight case cover by aligning its tab with the headlight unit groove.
Install and tighten the screw.



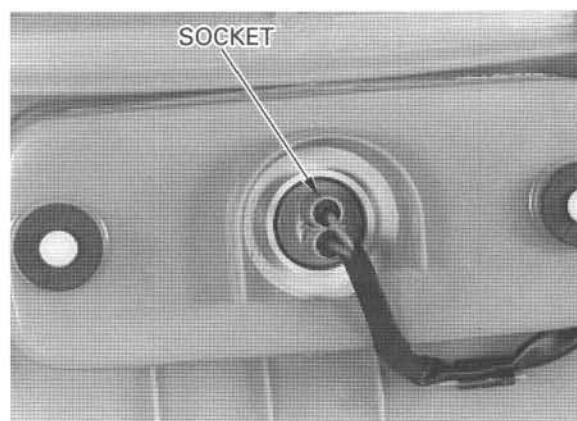
REMOVAL/INSTALLATION

Remove the headlight socket.
Remove the nut, screws and headlight.

Installation is in the reverse order of removal.
After installation, adjust the headlight aim.

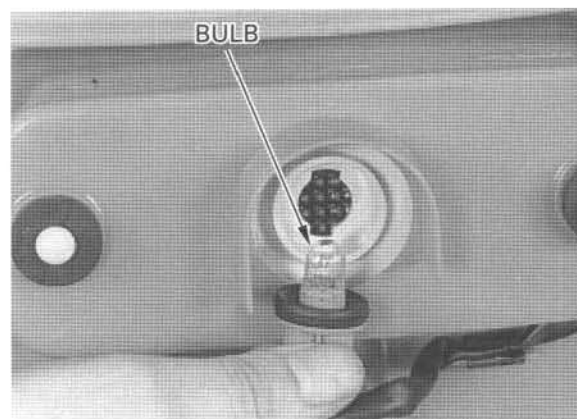
**TAILLIGHT****BULB REPLACEMENT**

Open the tool box lid.
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.



INDICATOR LAMPS

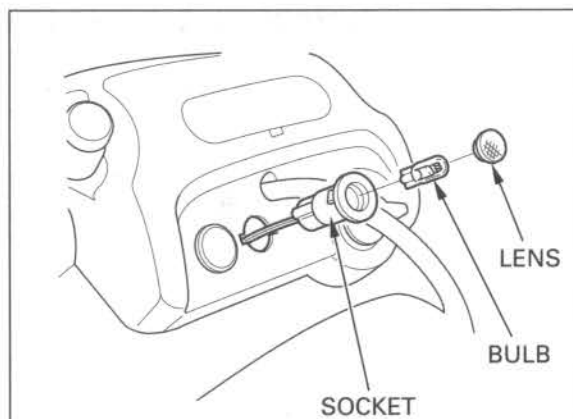
BULB REPLACEMENT

Pull the indicator lamp socket out of the handlebar cover.

Remove the indicator lens.

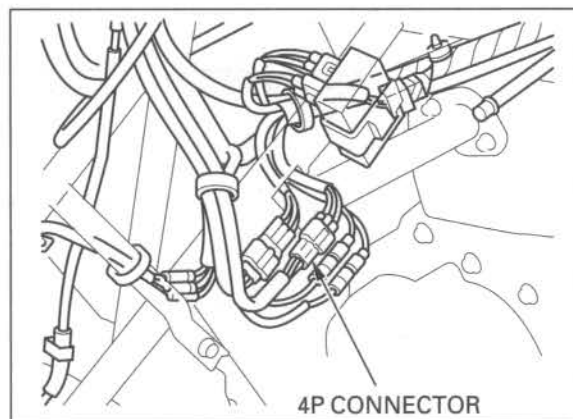
Remove the bulb from the socket and replace it with a new one.

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.

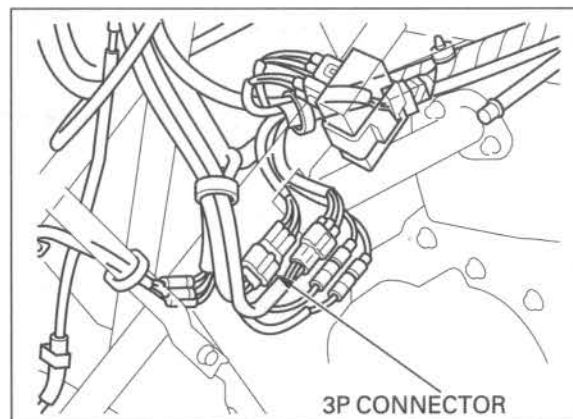


IGNITION SWITCH

INSPECTION

Remove the front fender (page 2-5).

Disconnect the ignition switch wire connector.

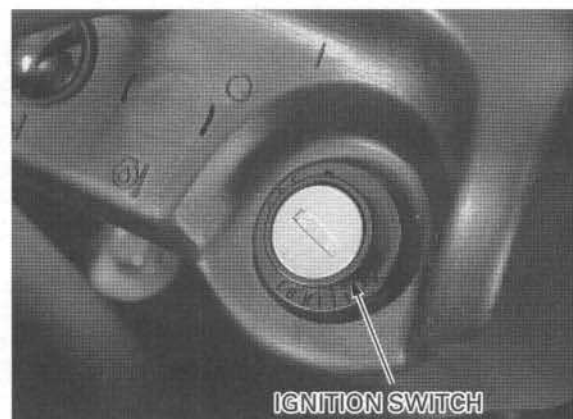


Check for continuity between the wire terminals of the ignition switch connector in each switch position.

Continuity should exist between the color coded wires as follows:

IGNITION SWITCH

	IG	E	BAT	HO
OFF	○	○		
ON			○	○
CORD COLOR	Black/White	Green	Red	Black



HANDLEBAR SWITCHES

NOTE:

The handlebar switches (lighting, dimmer, engine stop and starter) must be replaced as an assembly.

Remove the front fender (page 2-5).
Disconnect the handlebar switch connector.

Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:

STARTER SWITCH		
	BAT	ST
FREE		
PUSH	○	○
LEAD COLOR	Black	Yellow/Red

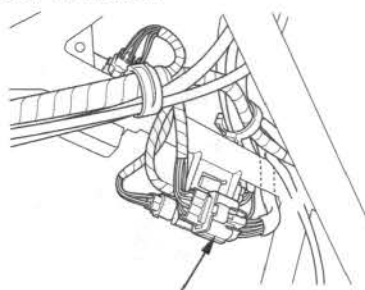
ENGINE STOP SWITCH		
	E	IG
OFF	○	○
RUN		
OFF	○	○
LEAD COLOR	Green	Black/White

LIGHTING SWITCH		
	C	TL (HL)
OFF		
ON	○	○
LEAD COLOR	Black	Brown

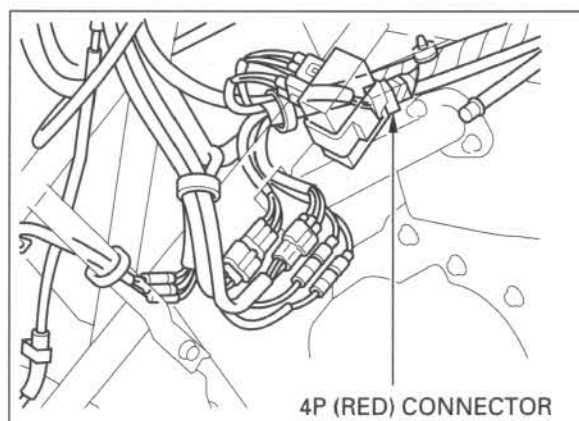
DIMMER SWITCH		
	HI	(HL) LO
HI	○	○
(N)	○	○
LO		○
LEAD COLOR	Blue	White

CONNECTION OF SW

After 2001 TE model:



8P (GRAY) CONNECTOR



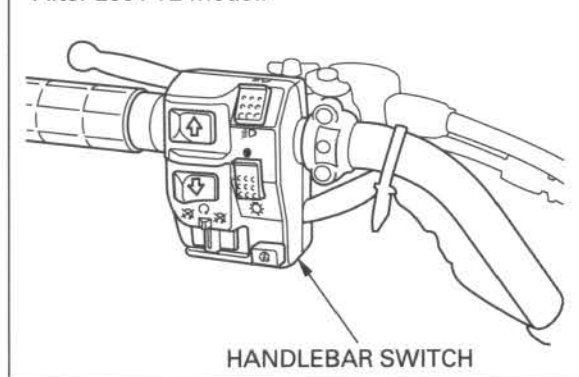
4P (RED) CONNECTOR

'97—2001/After 2001 TM model:



HANDLEBAR SWITCH

After 2001 TE model:

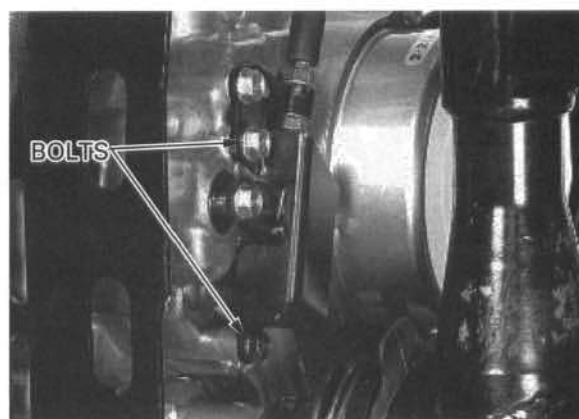


HANDLEBAR SWITCH

NEUTRAL/REVERSE SWITCH ('97—2001)

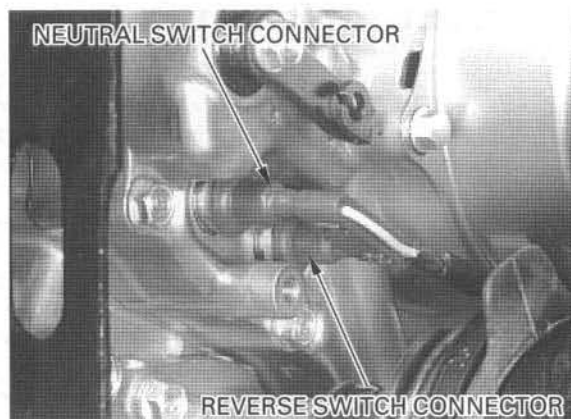
INSPECTION

Remove the two bolts and cable end cover.



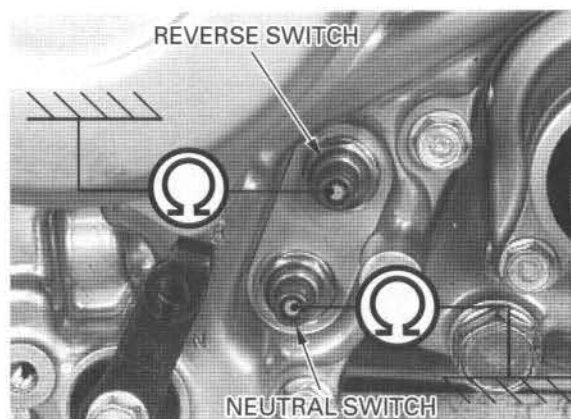
BOLTS

Disconnect the neutral and reverse switch connectors.



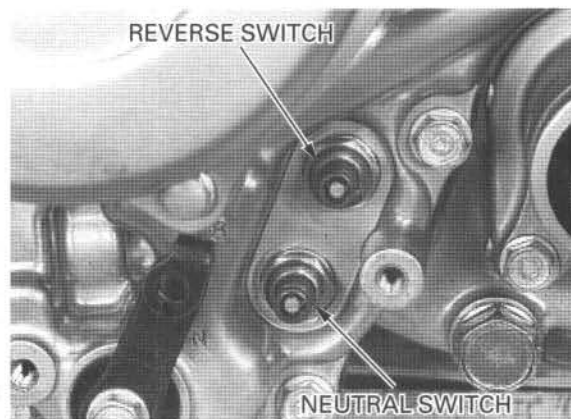
The neutral switch is functional if continuity exists between the neutral switch terminal and body ground only when the transmission is in neutral.

The reverse switch is functional if continuity exists between the reverse switch terminal and body ground only when the transmission is in reverse.



REMOVAL

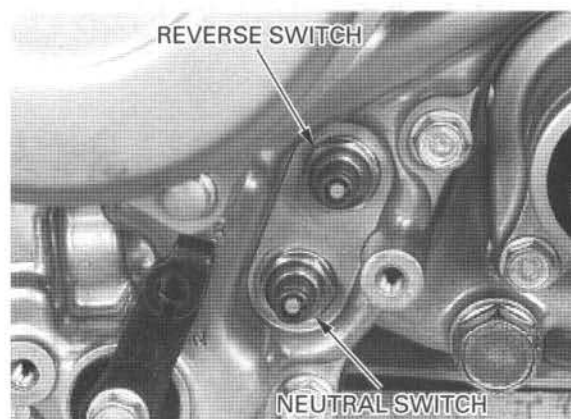
Remove the neutral and reverse switches.



INSTALLATION

Tighten the neutral and reverse switches to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m , 9 lbf·ft)



GEAR POSITION SWITCH (After 2001)

INSPECTION

Remove the gear position switch 6P connector (TE model only:) from the frame.

Disconnect the gear position switch 6P connector (TE model only:), neutral indicator connector and reverse indicator connector.

Check for continuity between each terminal of the switch side connector and ground.

There should be continuity in each gear position as follows.

TM model:

Neutral: Light green

Reverse: Gray

TE model:

Neutral: Light green

Reverse: Gray

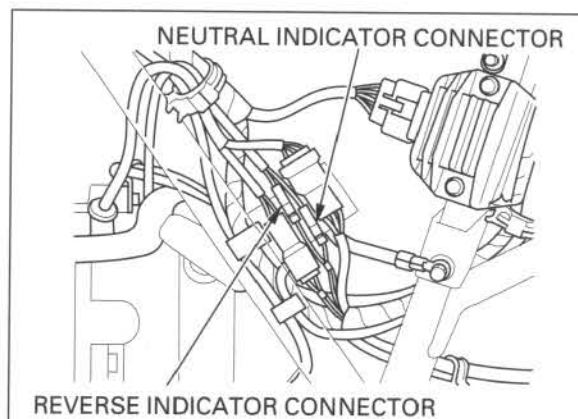
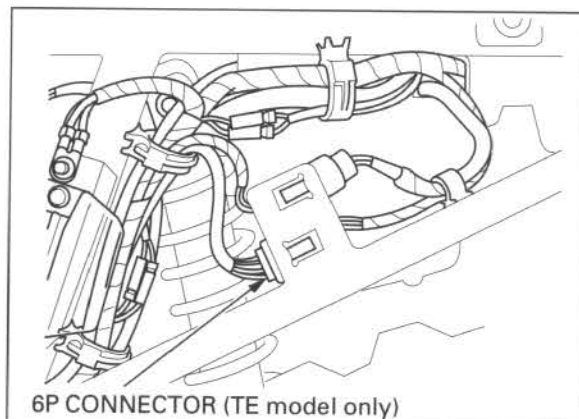
1st: White/Gray

2st: White/Red

3rd: Blue

4th: Yellow

5th: Light blue/White



REPLACEMENT

Remove the alternator cover (page 10-6).

Remove the wire grommet from the crankcase.

Remove the retaining bolt and the gear position switch.

Apply a locking agent to the retaining bolt threads. Install a new gear position switch into the crankcase and tighten the bolt.

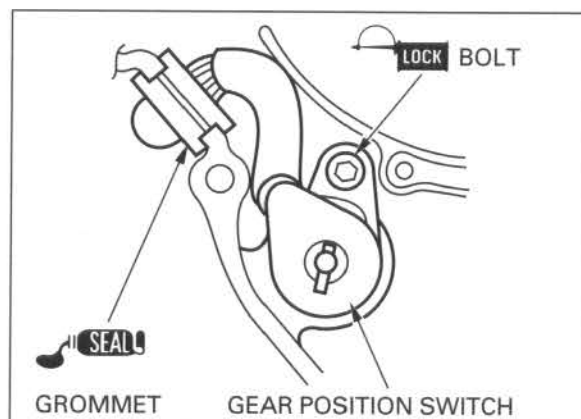
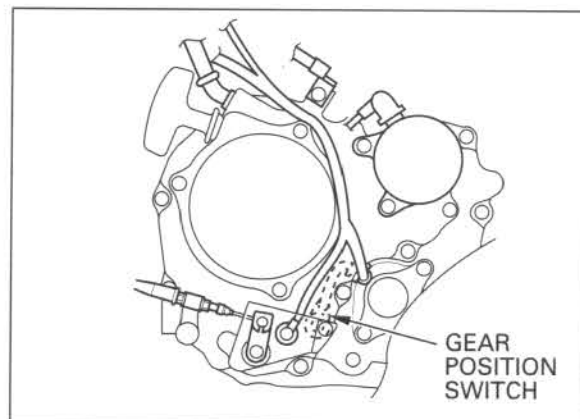
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply liquid sealant to the grommet outer surface and install the grommet into the crankcase groove securely.

Connect the reverse shift switch connector.

Install the alternator cover (page 10-13).

Be careful not to damage the switch pin and shaft during installation.



SPEED SENSOR (After 2001:TE model)

INSPECTION

Disconnect the speed sensor 3P connector.

Measure the voltage between the Black/Blue (+) and Green (-) wire terminals at the harness side 3P connector.

There should be battery voltage when the ignition switch is turned to "ON".

If there is no voltage, check for an open circuit in the related wires.

If there is voltage, check the sensor as follows.

Connect the inspection adapter to the sensor 3P connectors.

TOOL:

Inspection adapter 07GMJ-ML80100

Shift the transmission into neutral.

Raise the wheels off the ground and support the vehicle securely with a hoist or equivalent.

Measure the voltage between the Red clip (+) and White clip (-).

With the ignition switch turned to "ON", slowly turn the rear wheels by hand.

There should be 0 to 5 V pulse voltage.

If the pulse voltage does not appear, replace the speed sensor.

REMOVAL/INSTALLATION

Remove the right center mudguard (page 2-7).

Disconnect the speed sensor 3P connector and release the sensor wire from the clips.

Remove the following:

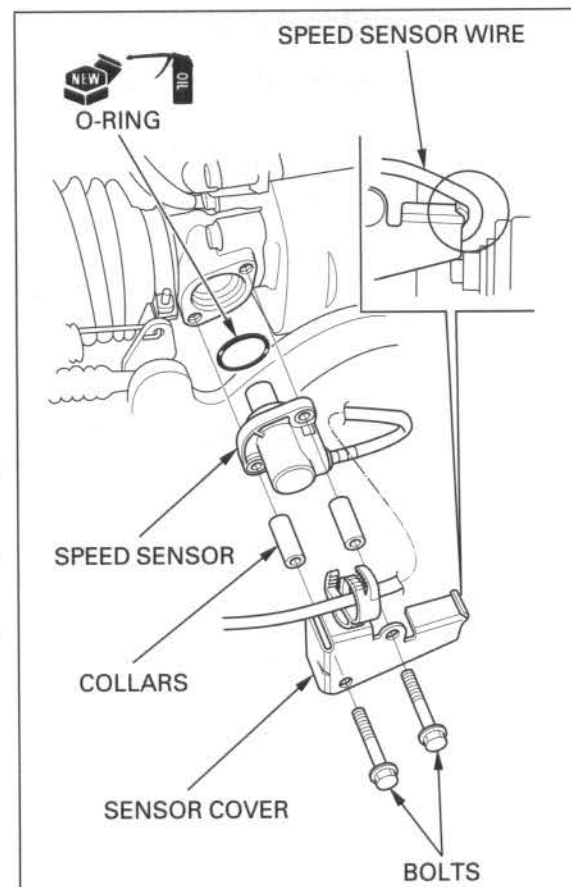
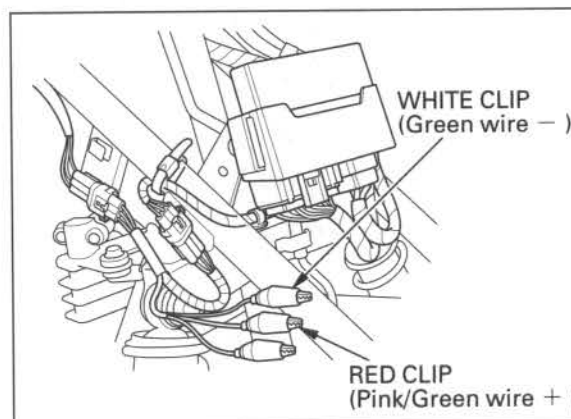
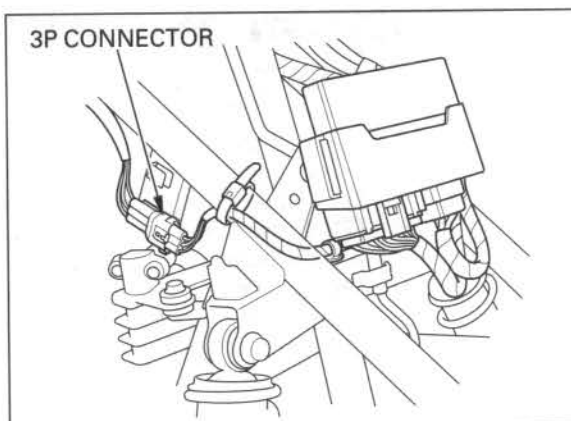
- two bolts
- speed sensor cover
- collars
- speed sensor
- O-ring

Coat a new O-ring with engine oil and install it onto the speed sensor.

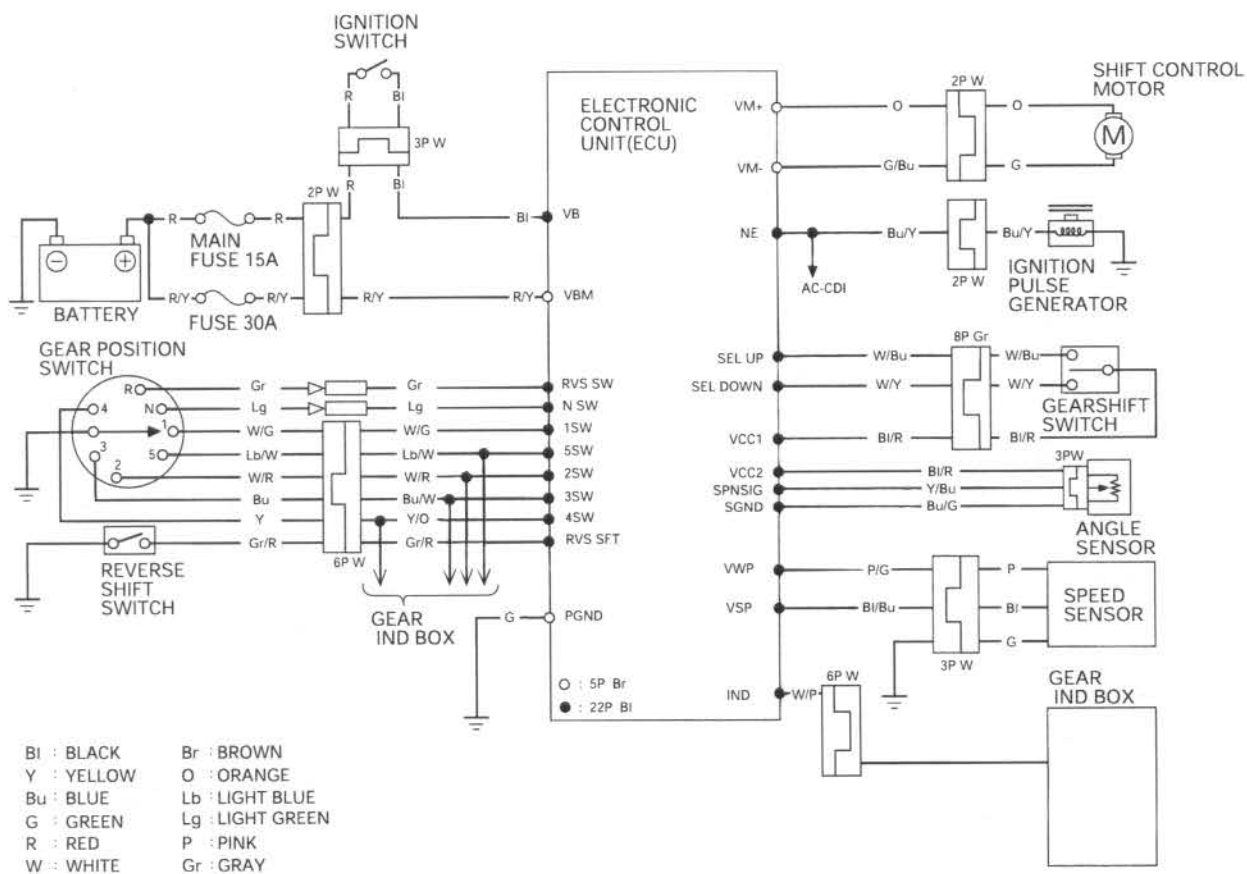
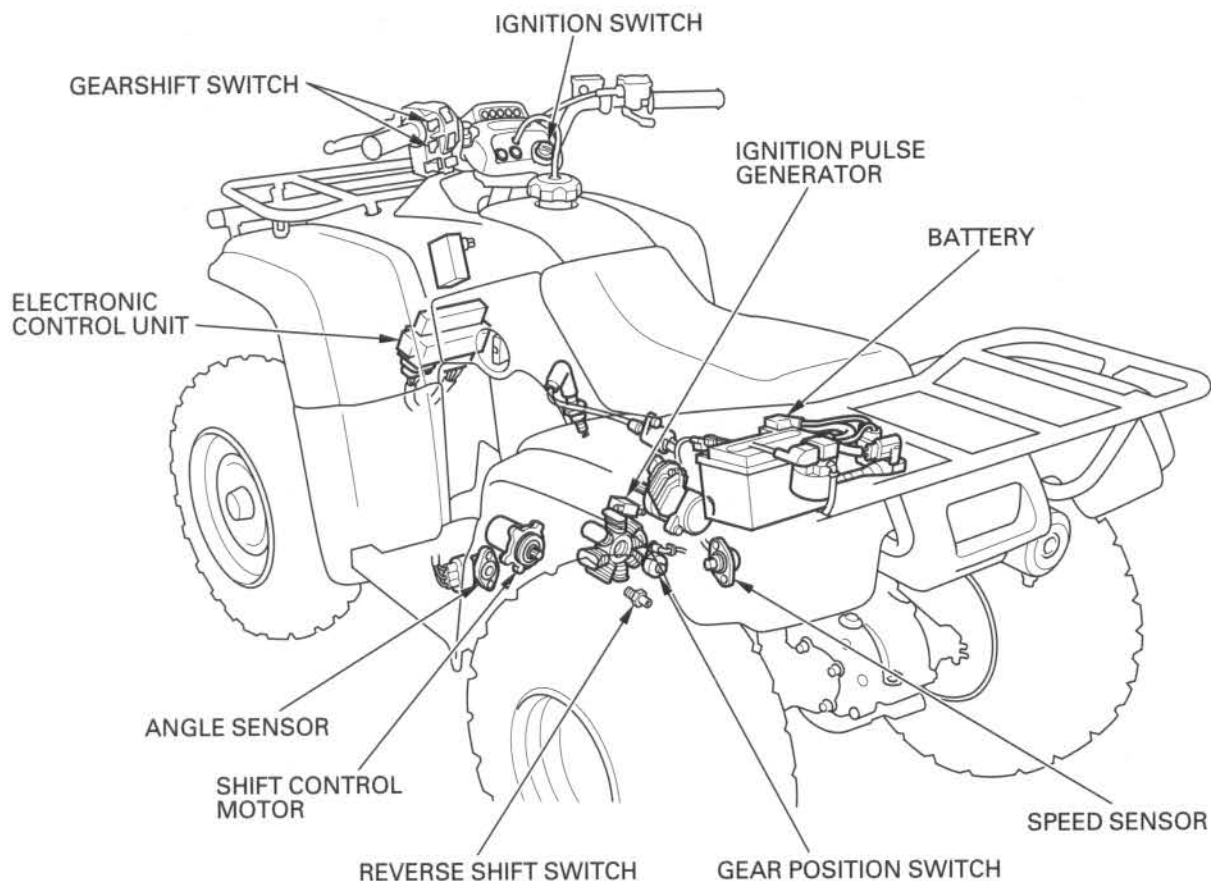
Install the speed sensor, collars and sensor cover, then tighten the two bolts.

Route the sensor wire properly and connect the 3P connector (page 1-26).

Install the right center mudguard (page 2-7).



ELECTRIC SHIFT PROGRAM (After 2001: TE model)



20. ELECTRIC SHIFT PROGRAM (After 2001: TE model)

SERVICE INFORMATION	20-1	CONTROL MOTOR AND REDUCTION GEARS	20-16
TROUBLESHOOTING	20-2	GEARSHIFT SWITCH	20-19
ANGLE SENSOR	20-14	REVERSE SHIFT SWITCH	20-20

SERVICE INFORMATION

GENERAL

- For Electric Shift Program (ESP) system location, see page 20-0.
- When checking the ESP system, always follow the steps in the troubleshooting flow chart (page 20-2).
- The ESP parts can be serviced with the engine installed in the frame.
- The Electronic Control Unit (ECU) may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ECU. Always turn off the ignition switch before disconnecting or connecting the connectors.
- Check for loose connectors, especially at the battery, shift motor, and ECU.
- Ensure that all battery and ESP system connectors are clean, dry and free of corrosion (repack with dielectric grease).
- Use a digital tester for ESP system inspection.
- For speed sensor and gear position switch inspection, see section 19.

TORQUE VALUES

Angle sensor bolt	6 N·m (0.6 kgf·m , 4.3 lbf·ft) Apply locking agent to the threads
Reverse shift switch	13 N·m (1.3 kgf·m , 9 lbf·ft)

ELECTRIC SHIFT PROGRAM (After 2001: TE model)

TROUBLESHOOTING

BEFORE TROUBLESHOOTING

When the Electronic Control Unit (ECU) detects a system abnormality, the ECU has a built-in self-diagnostic function that stops the Electric Shift (ES) system or resets the systems entirely (just as when the ignition switch is turned from "OFF" to "ON"). If the ECU detects an ES system failure, the ECU stops the ES system function and records a problem code. The ES system will not operate, even after the ignition switch is turned to "OFF".

To reset the ES system, turn the ignition switch from "ON" to "OFF" and back to "ON" again. However, if the ECU still detects a problem, it will continue to deactivate the ES system function. When this occurs, the "1st" gear position indicator will blink a certain number of times to indicate the appropriate problem code.

The ECU is able to record system failures and outputs these as problem codes that are shown on the indicator (i. e., the "1st" gear position indicator blinks a designated number of times).

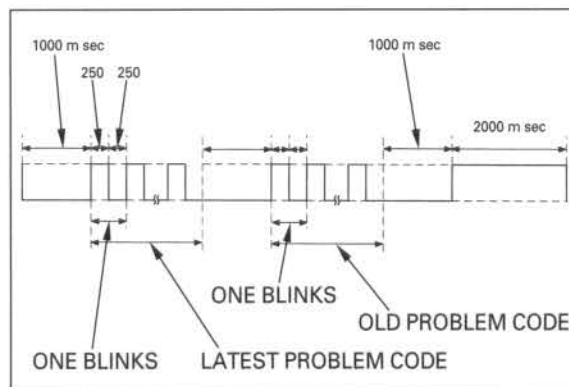
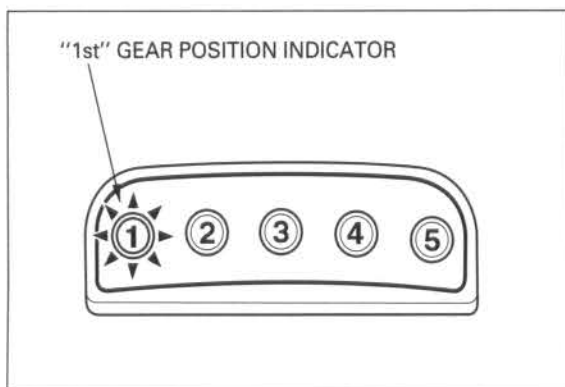
TROUBLESHOOTING PROCEDURE

When the operator detects an abnormality, check the following before proceeding with the diagnosis:

1. Check the battery voltage (minimum spec. 12.4V), all battery connections and for any blown fuses.
2. Turn the ignition switch to "ON". If the gear indicator blinks, record the number of blinks, since this indicates the type of failure. Then troubleshoot the indicated failure. Refer to the appropriate problem code within this chapter.

If no ES system failure occurs (the "1st" gear position indicator does not blink), perform the following:

1. Make sure the gear position indicator blinked codes to the user. Check the problem code as described below.
 - a) Turn the ignition switch to "OFF".
 - b) Place the transmission in neutral.
 - c) Apply the parking brake so the vehicle does not move.
 - d) Turn the ignition switch to "ON" while pushing both electric shift switches (UP and DOWN). Make sure the neutral indicator come on to indicate that the transmission is in neutral.
 - e) Wait 5 seconds and then push both electric shift switches again, and hold them for at least 3 seconds.
2. If the code number could not be checked (the indicator did not blink), repeat steps 2 and 4.
3. If a failure is still not indicated (i. e., the "1st" gear position indicator does not blink), the problem is as follows:
 - a) Electric shift does not operate (page 20-4) and/or
 - b) Faulty gear indicator (e. g., does not indicate the problem, keeps indicating the same gear position, indicates a different gear position than what the transmission is in).
4. After performing the above troubleshooting steps and repairing the problem, delete the codes as follows:
 - a) Turn the ignition switch to "OFF".
 - b) Place the transmission in neutral.
 - c) Apply the parking brake so the vehicle does not move.
 - d) Turn the ignition switch to "ON" while pushing both electric shift switches (UP and DOWN). Make sure the neutral indicator come on appears to indicate that the transmission is in neutral.
 - e) Wait 5 seconds and then push both electric shift switches again, and hold them for at least 3 seconds.
 - f) While the indicator is showing the problem code (i. e., blinking with the transmission in neutral), push both electric shift switches to delete the problem code number.
 - g) Turn the ignition switch to "OFF".

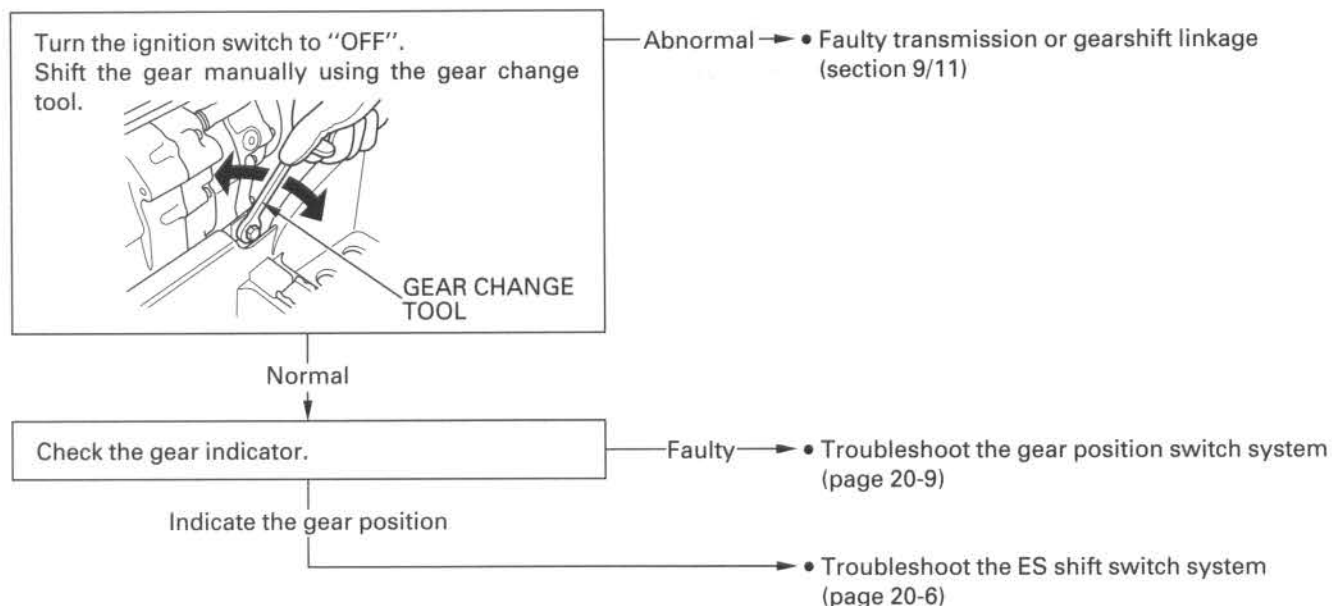


DIAGNOSIS TABLE

"1st" gear indicator blinks	Check part and system	Probable faulty part	Refer to page
0	No problem	No problem	—
1	ECU (writing and recording circuit)	ECU	20-6
2	ES shift switch system (up and down)	Shift switch or related wire harness or ECU	20-6
3	Angle sensor system	Angle sensor (abnormally installed) or related wire harness or ECU	20-7
4	Gear position switch system	Gear position switch or related wire harness or ECU	20-9
5	ECU motor driver circuit	ECU	20-10
6	ECU fail-safe relay circuit	ECU	20-11
7	ECU voltage converter circuit	ECU	20-11
8	Angle sensor system	Angle sensor or control motor or related wire harness or ECU	20-7
9	Angle sensor system	Angle sensor (short or open) or related wire harness or ECU	20-7
10	Ignition pulse generator system	Ignition pulse generator or related wire harness	20-12
11	Speed sensor system (vehicle speed)	Speed sensor or related wire harness or ECU	20-13
12	Gear position switch system	Gear position switch or related wire harness or ECU	20-9

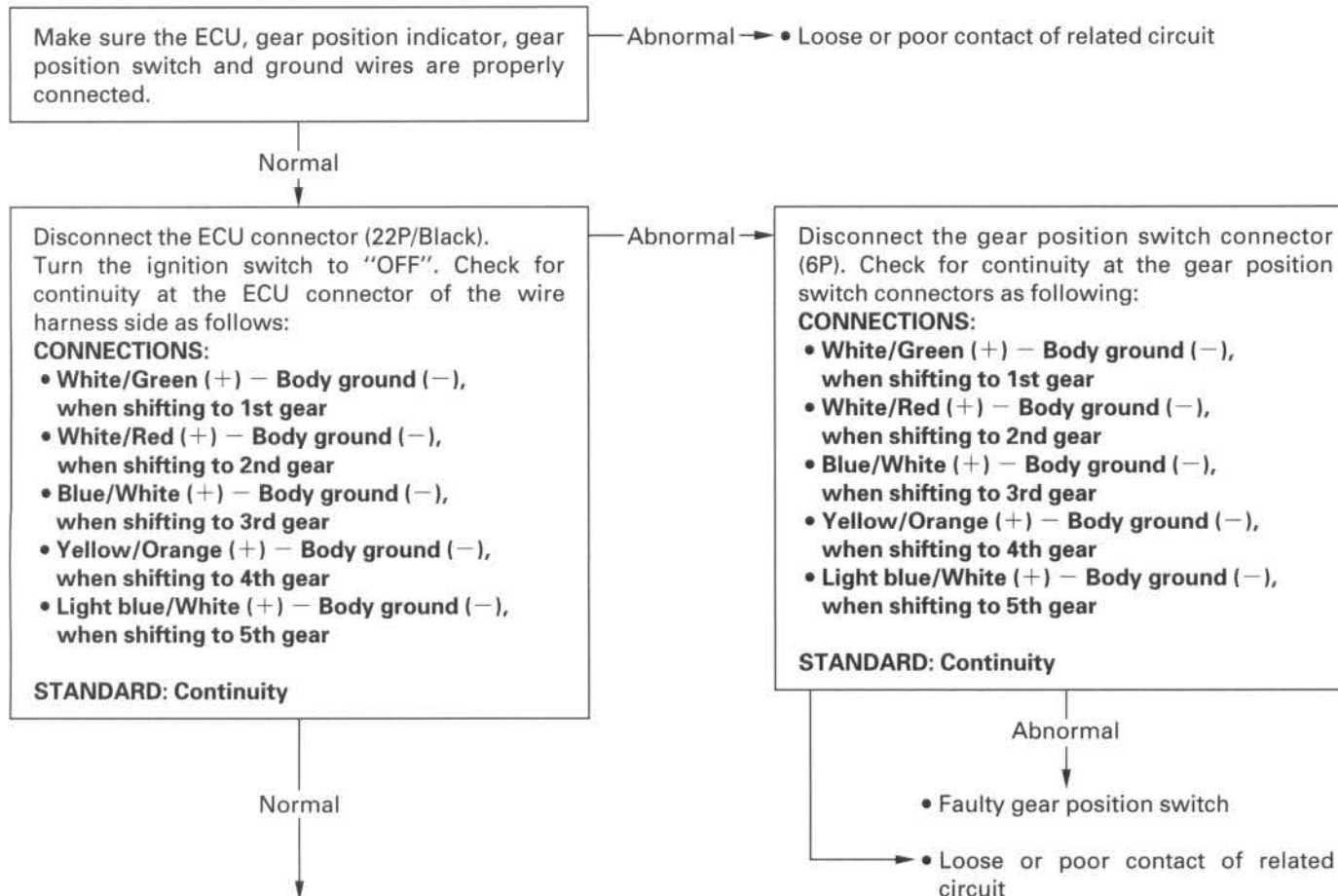
ELECTRIC SHIFT DOES NOT OPERATE

- Inspect the following before diagnosing the system.
 - Make sure the battery is fully charged and in good condition
 - Clutch adjustment
 - Blown fuse

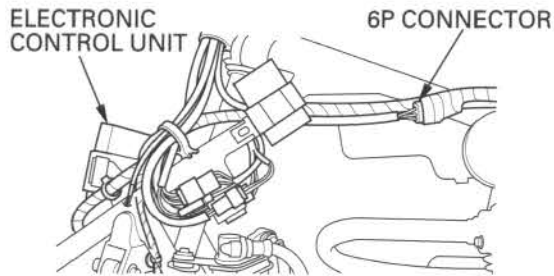


GEAR INDICATOR PROBLEM

- No indication of gear position
- Keeps indicating same gear position
- Different gear is indicated



Disconnect the gear position indicator connector (6P).
Check for continuity of the White/Pink wire between the ECU connector and the gear position indicator connector terminals.



CONNECTION: White/Pink (+) – White/Pink (–)
STANDARD: Continuity

No continuity →

- Open circuit in White/Pink wire
- Loose or poor contact of related circuit

Continuity

Shift the transmission into neutral.
Check for continuity between the White/Pink terminals of the gear position indicator and body ground with the ignition switch "ON".

No continuity →

- Faulty gear position indicator

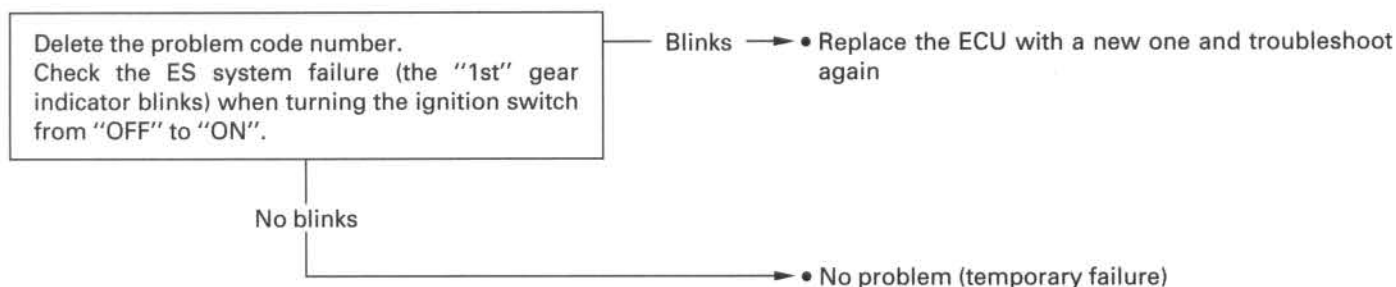
Continuity

→

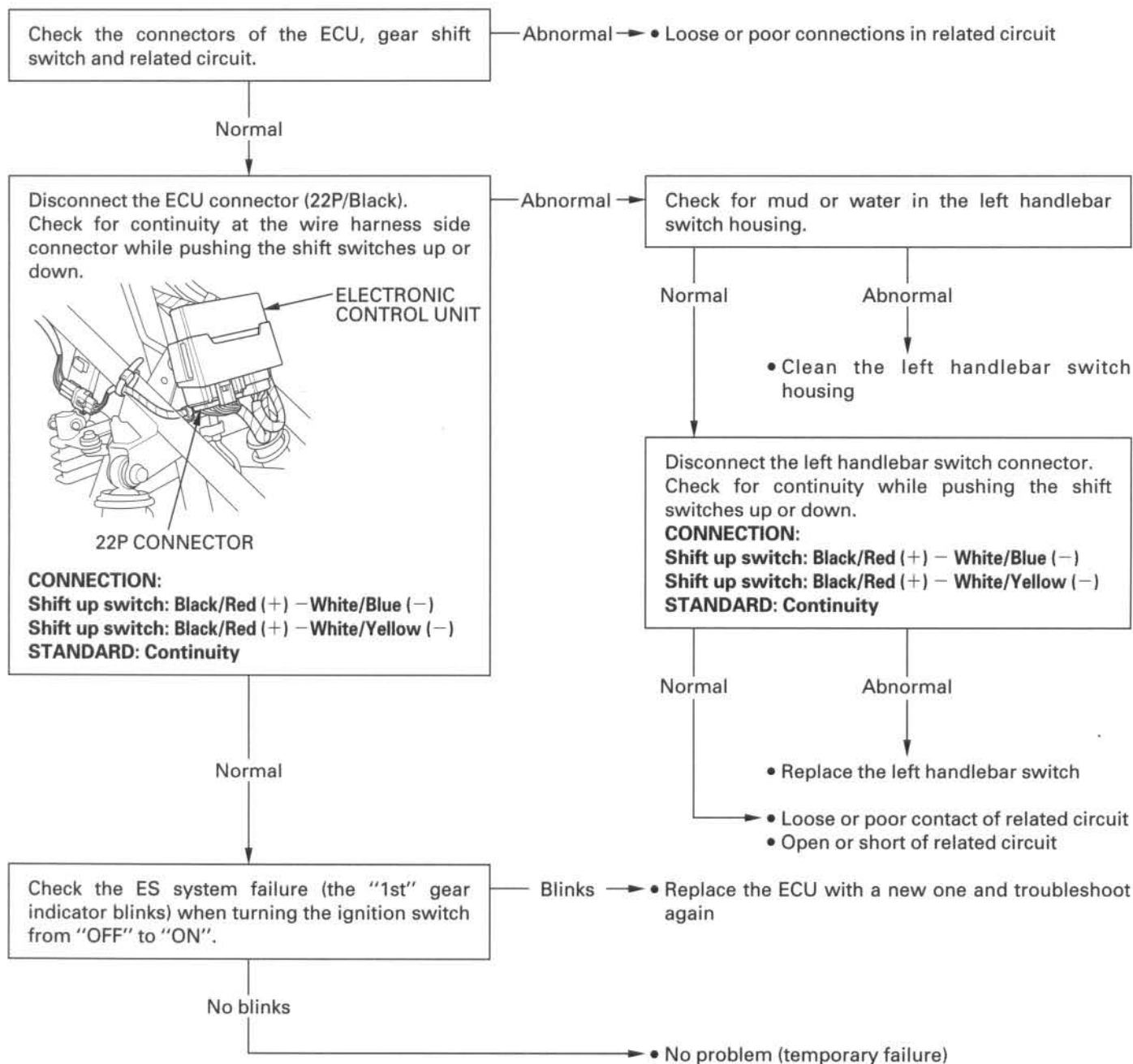
- Replace the ECU with a new one and troubleshoot again

ELECTRIC SHIFT PROGRAM (After 2001: TE model)

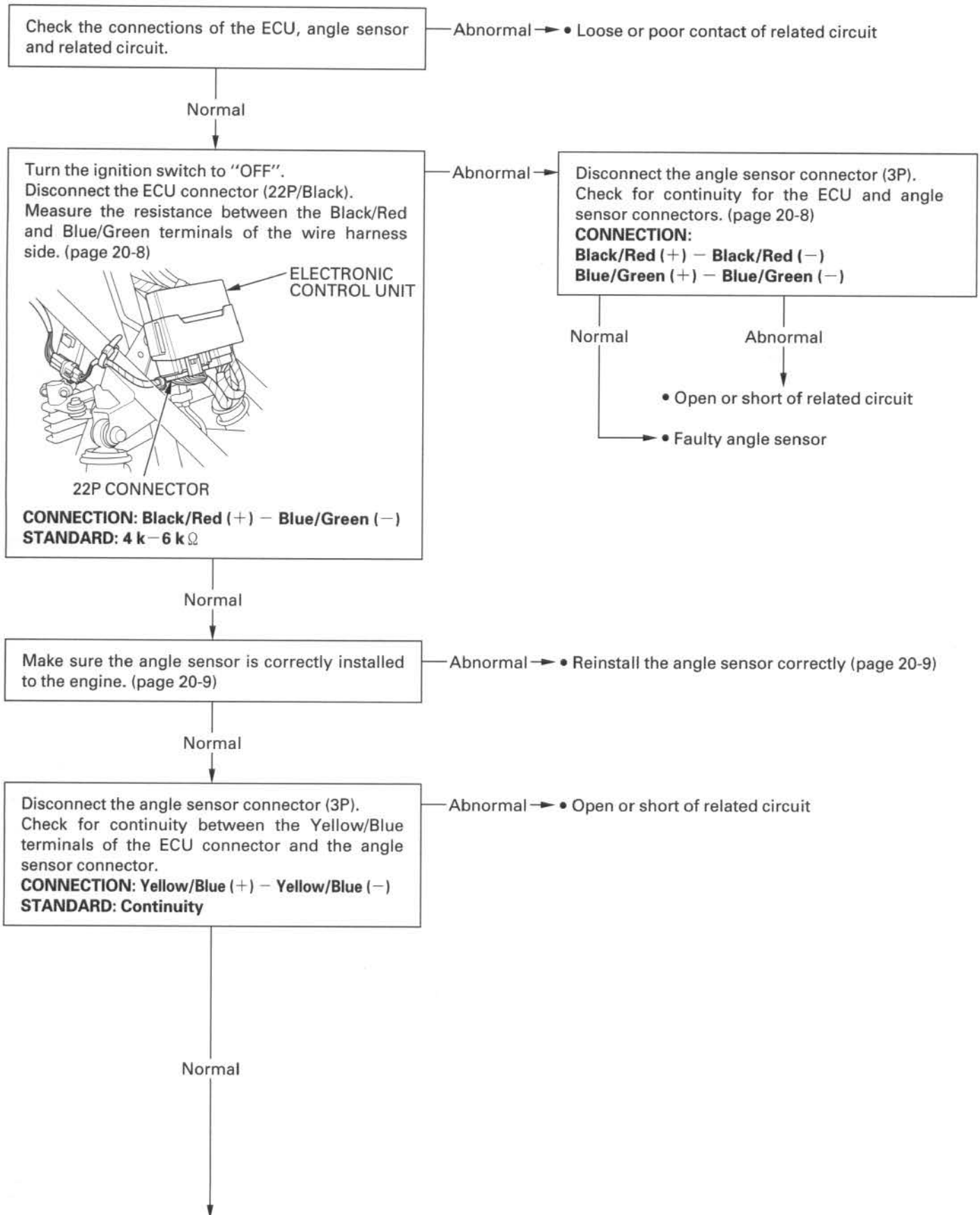
Problem Code 1: ECU (writing and recording circuit)



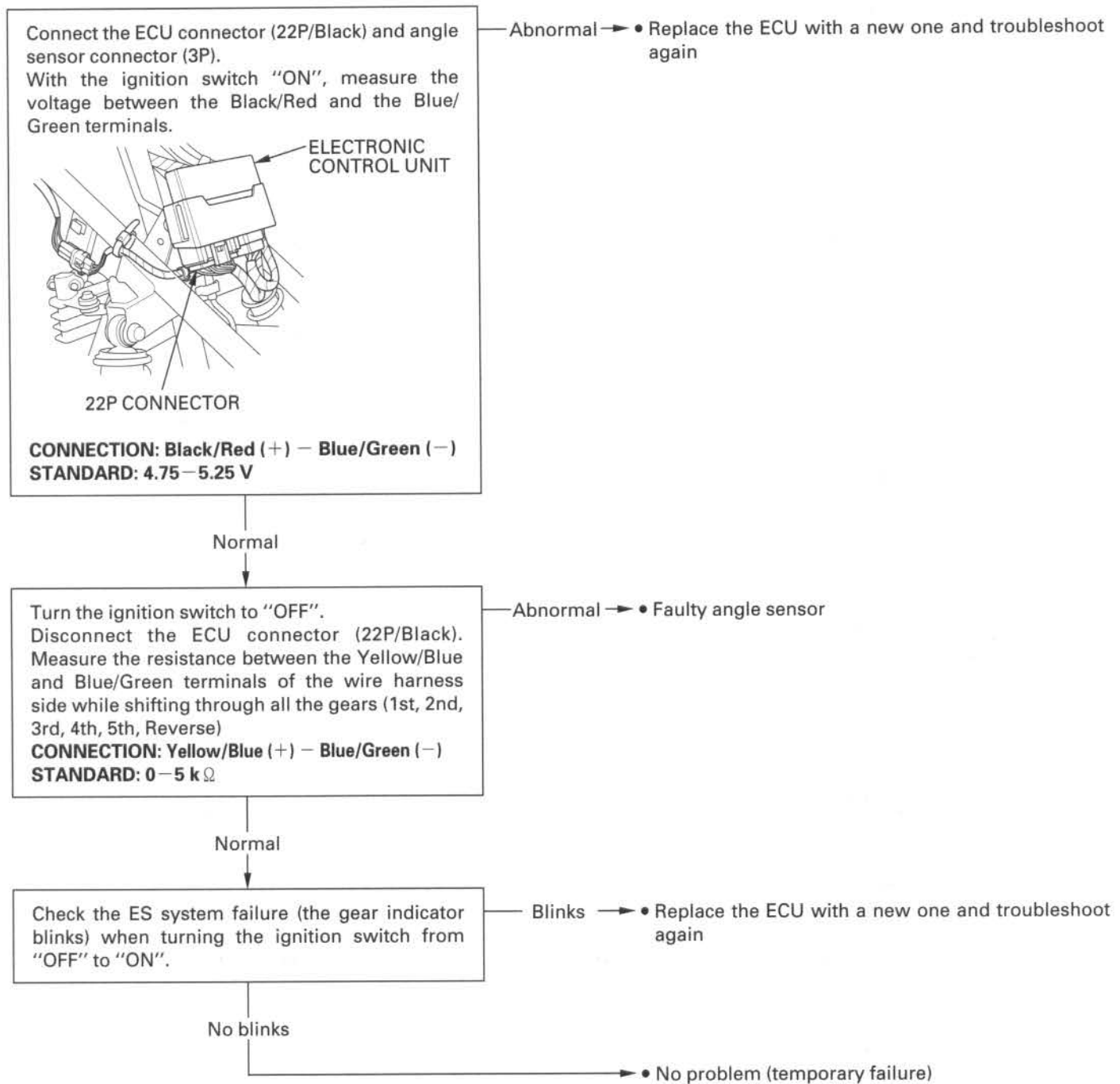
Problem Code 2: ES Shift Switch System (Up And Down)



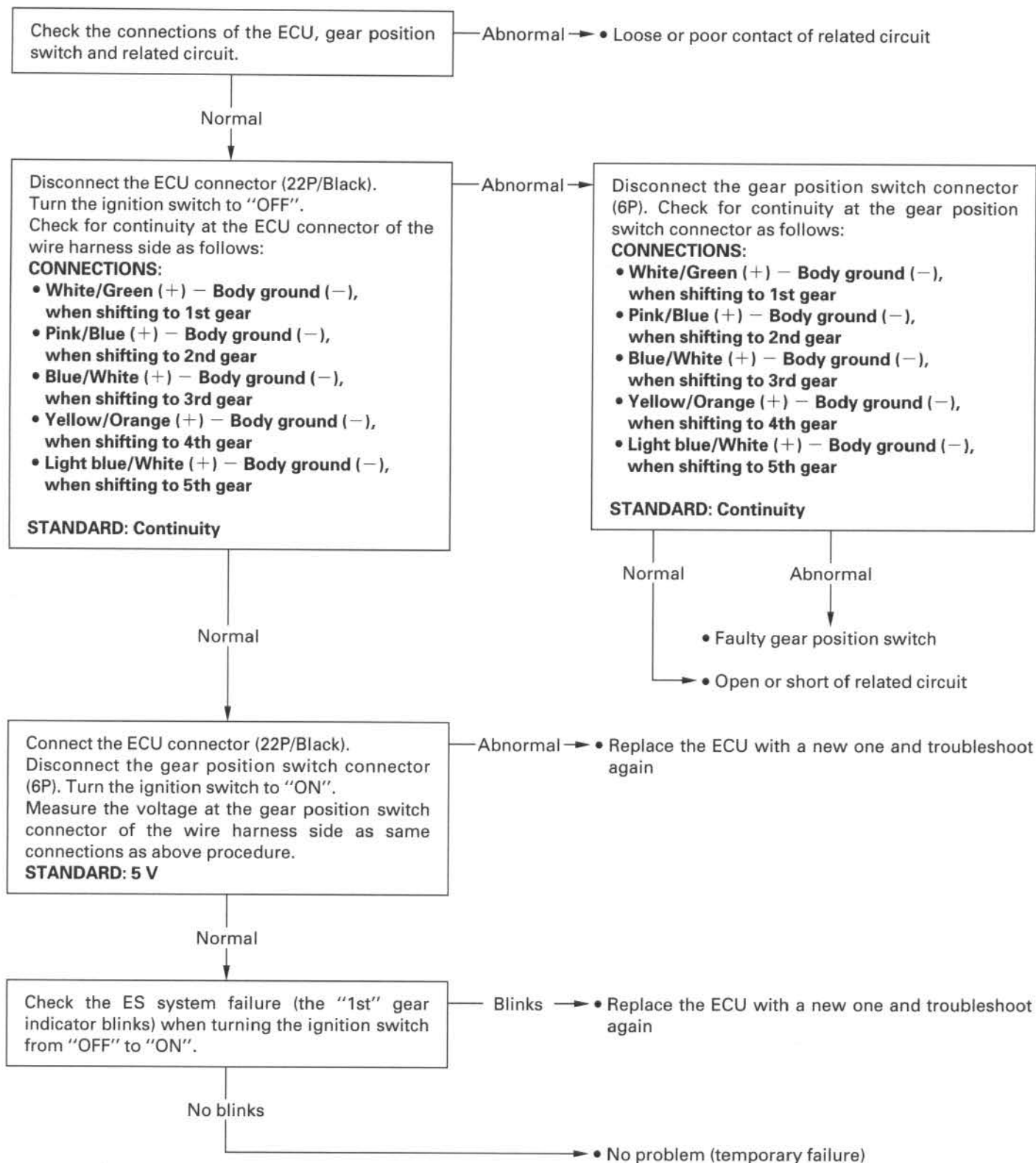
Problem Code 3, 8, 9: Angle Sensor System



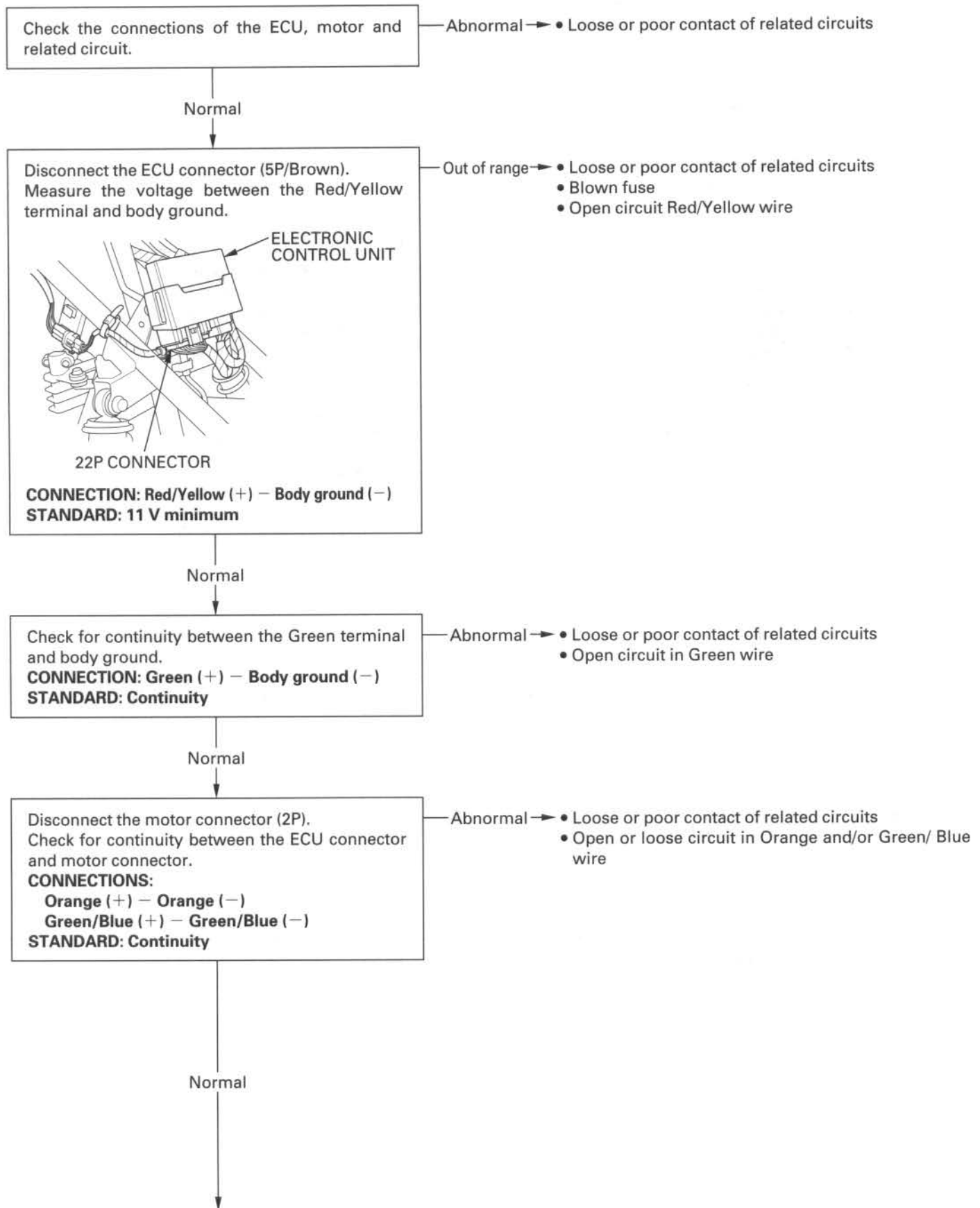
ELECTRIC SHIFT PROGRAM (After 2001: TE model)

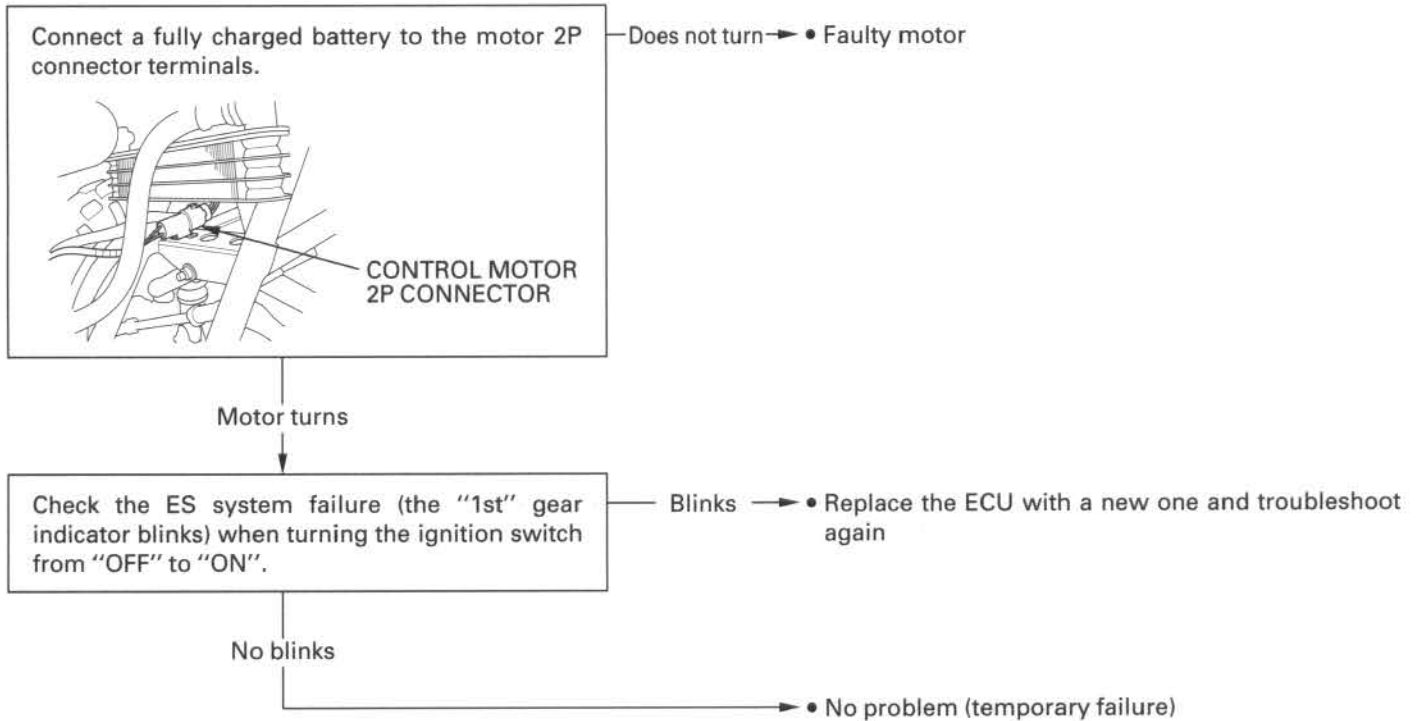


Problem Code 4 or 12: Gear Position Switch System

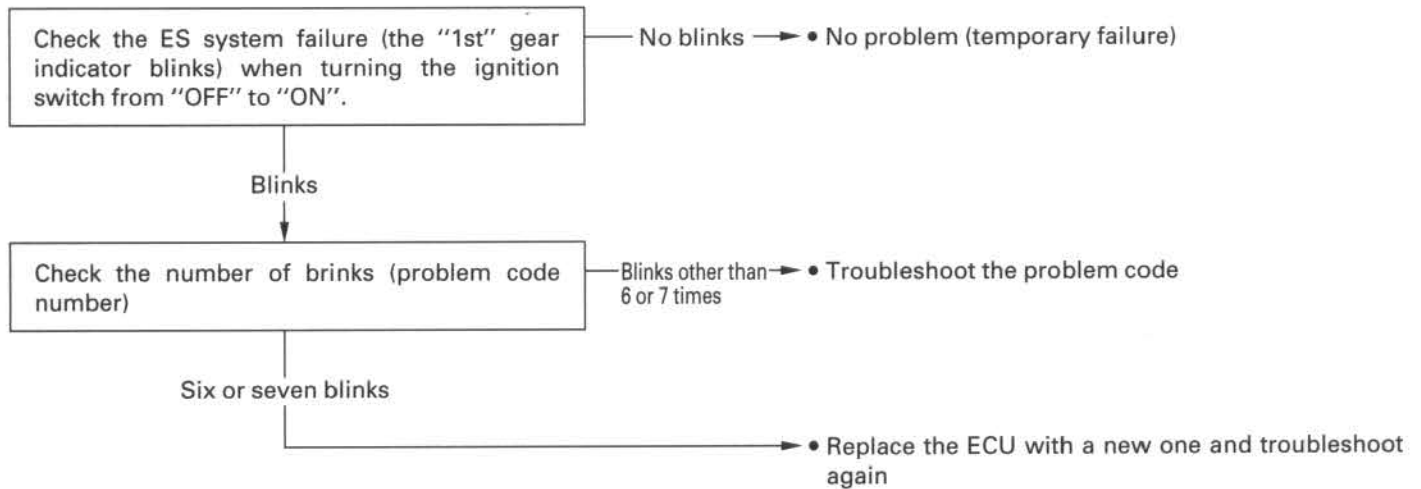


Problem Code 5: ECU Motor Driver Circuit

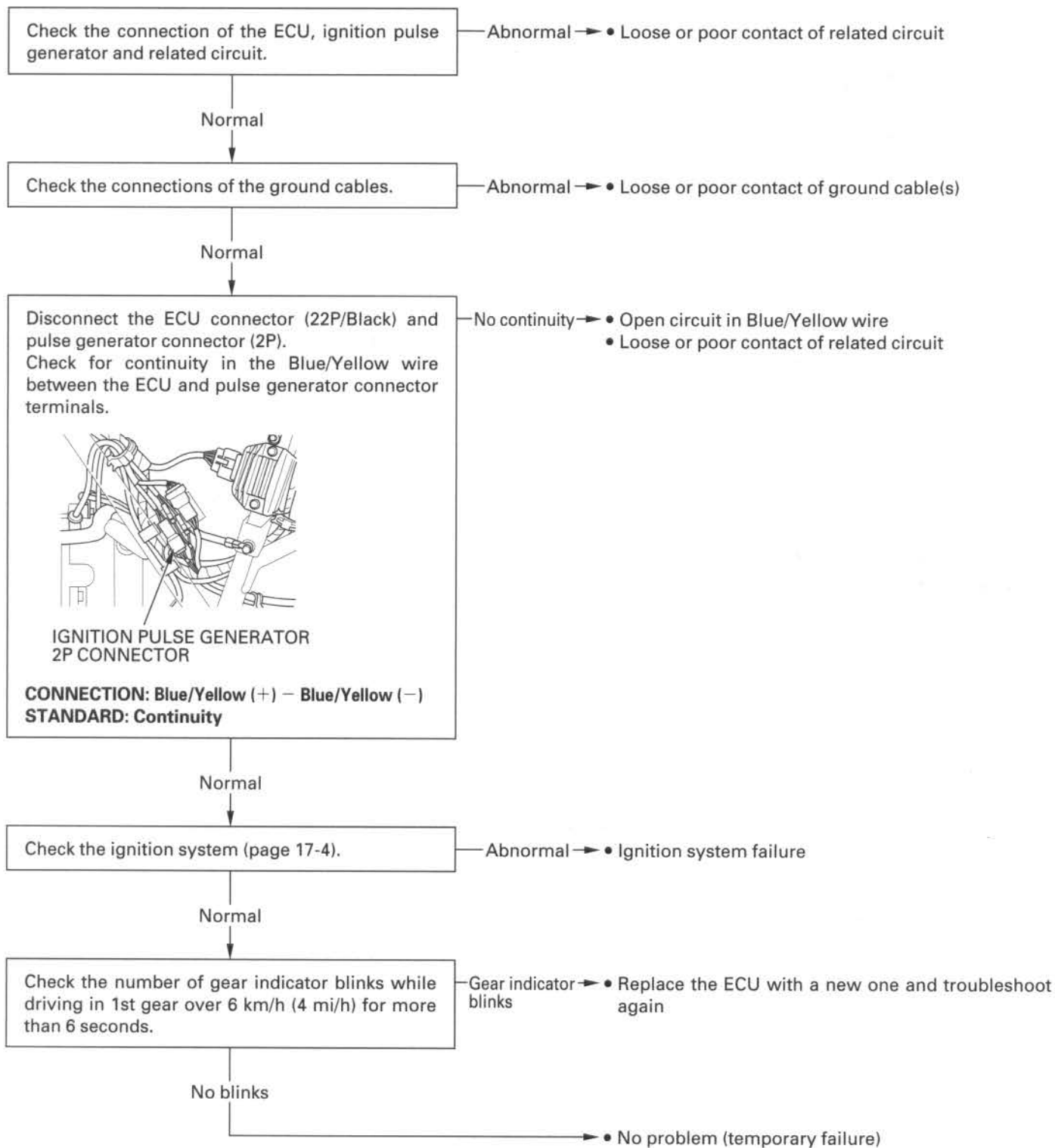


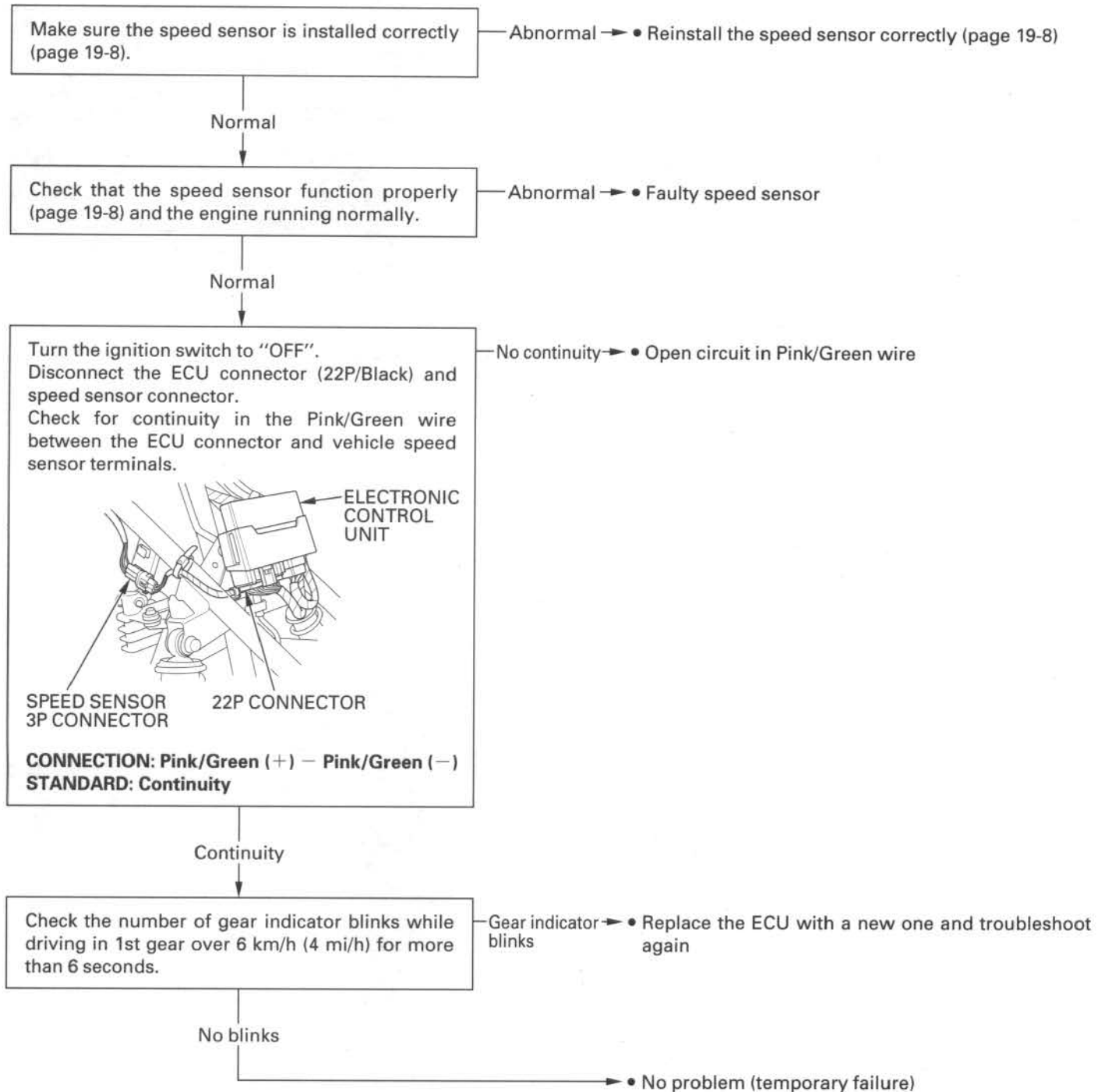


**Problem Code 6: ECU Fail-Safe Circuit or
Problem Code 7: ECU Voltage Converter Circuit**



Problem Code 10: Ignition Pulse Generator System



Problem Code 11: Speed Sensor System (Vehicle Speed)

ANGLE SENSOR

SYSTEM INSPECTION

1. Total resistance:

Turn the ignition switch OFF.

Disconnect the Electronic Control Unit 22P (Black) connector.

Measure and record the resistance between the Black/Red and Blue/Green terminals of the harness side control unit connector.

STANDARD: 4–6 k Ω (20 °C/68 °F)

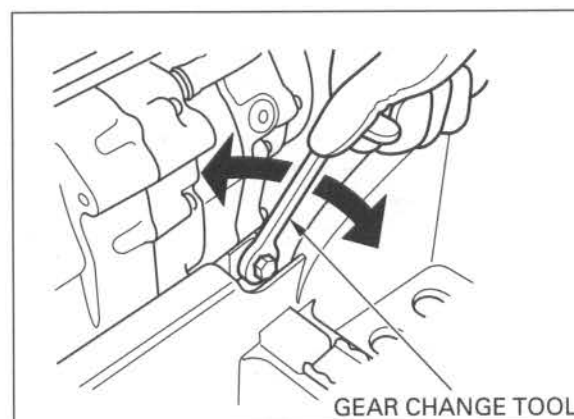
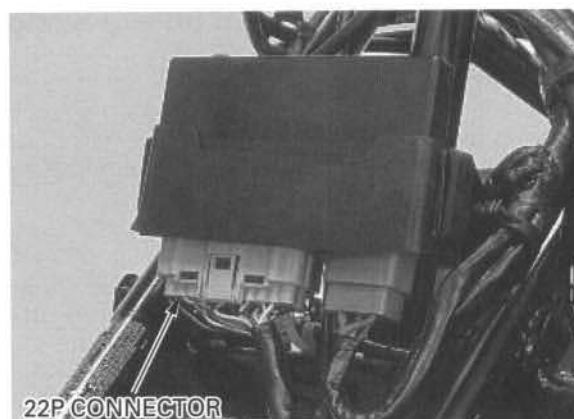
2. Shift-up/down resistance:

Turn the ignition switch to "OFF".

Disconnect the ECU 22P (Black) connector.

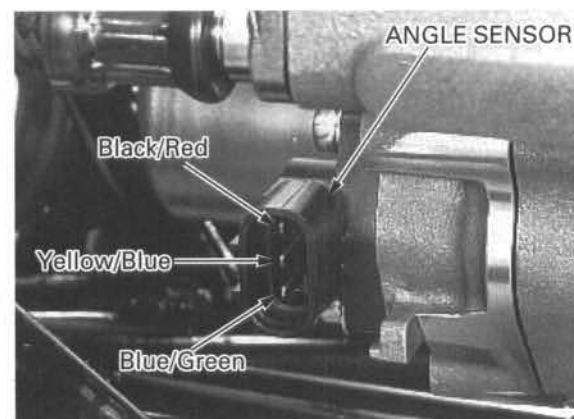
Measure the resistance between the Yellow/Blue and Blue/Green terminals of the wire harness side while shifting through all the gears (1st, 2nd, 3rd, 4th, 5th and Reverse).

STANDARD: 0–5 k Ω (20 °C/68 °F)



If the measured resistance is abnormal, remove the angle sensor cover (page 20-15) and disconnect the sensor 3P connector and perform the same inspection at the angle sensor terminals.

- If the measurement at the control unit is abnormal and the one at the angle sensor is normal, check for an open or short circuit, or loose or poor sensor connector contact.
- If the both measurements are abnormal, replace the angle sensor.



Remove the angle sensor (page 20-15).

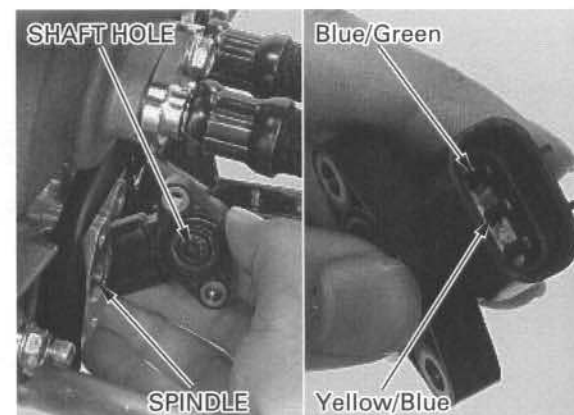
Check the sensor shaft hole and gearshift spindle for wear or damage.

Be careful not to damage the sensor shaft hole.

Check that the resistance between the Yellow/Blue and Blue/Green wire terminals of the angle sensor while turning the sensor shaft slowly.

Clockwise turn: Resistance decreases smoothly

Counterclockwise turn: Resistance increases smoothly



Connect the ECU 22P (Black) connector.
Measure the input voltage between the Black/Red (+) and Blue/Green (–) terminals of the angle sensor 3P connector with the ignition switch turned to "ON".

STANDARD: 4.7–5.3 V

If the input voltage is abnormal, or if there is no input voltage, check for an open or short circuit in the wire harness, or loose or poor connections in the wire harness.



REMOVAL

Remove the two bolts and sensor cover.

Disconnect the 3P connector.
Remove the two socket bolts, washers and angle sensor.

INSTALLATION

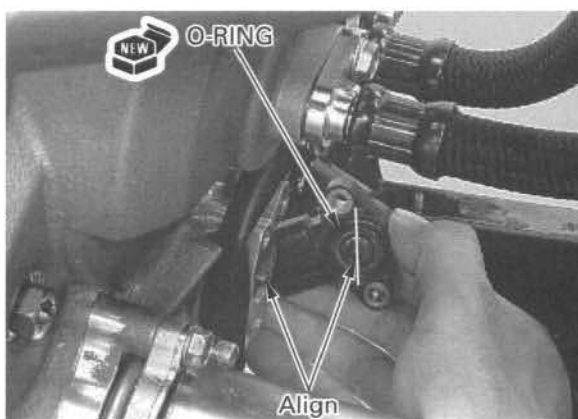
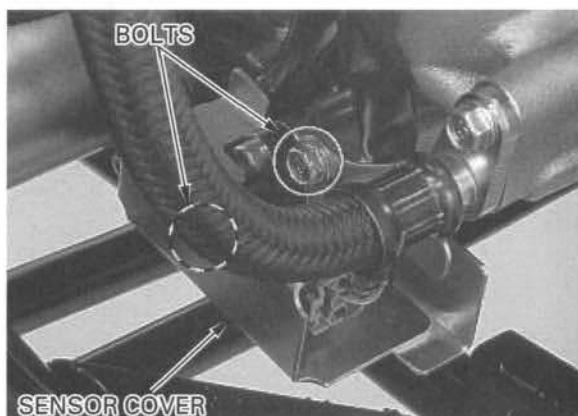
Install a new O-ring into the sensor groove.
Carefully install the angle sensor by aligning the flat surfaces of the sensor shaft hole and gearshift spindle end.

Apply a locking agent to the socket bolt threads and install the socket bolts with the washers and tighten them.

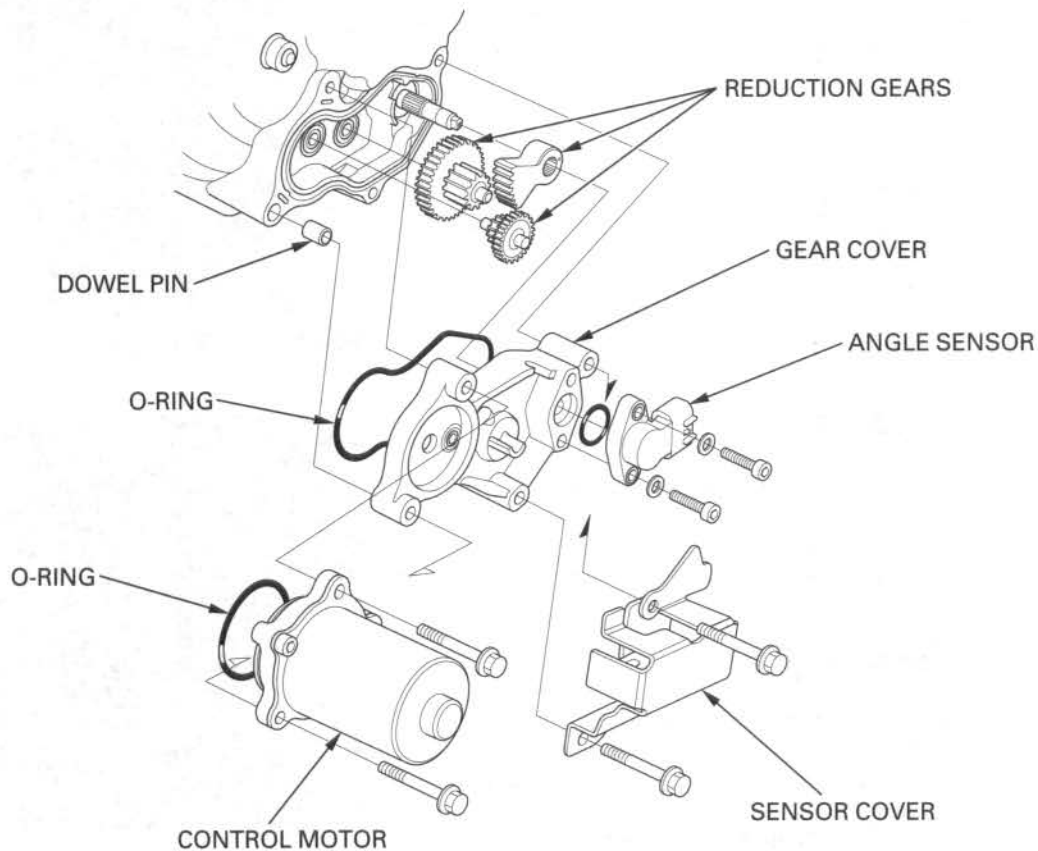
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Route the angle sensor wire properly (page 1-25).

Install the sensor cover by aligning its groove with the lug on the crankcase cover and tighten the two bolts.



CONTROL MOTOR AND REDUCTION GEARS

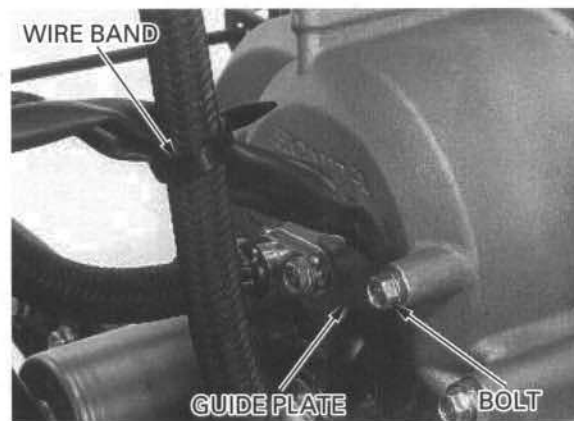


MOTOR

REMOVAL

Remove the sensor cover (page 20-15).

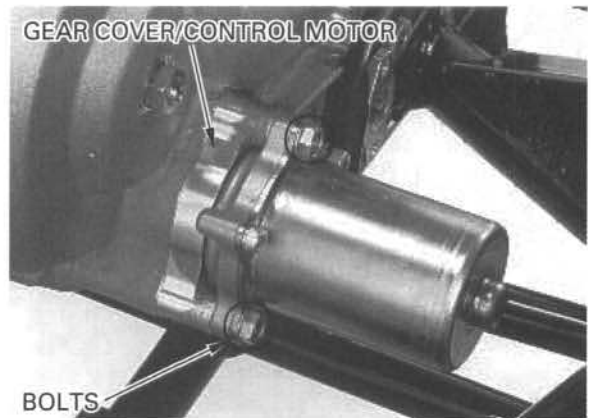
Remove the wire band, then remove the bolt and guide plate.



Remove the shift control motor 2P connector from the frame and disconnect the 2P connector.



Remove the bolts and gear cover/control motor.



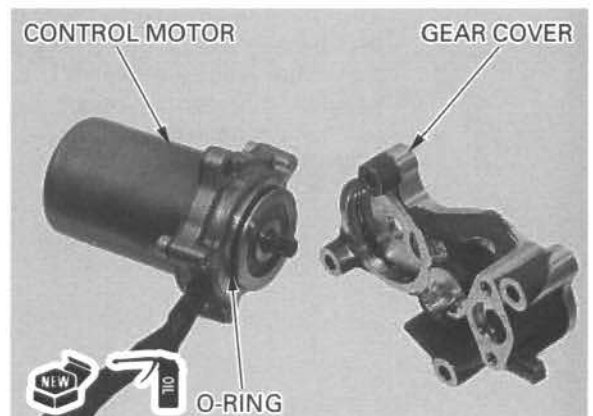
Remove the control motor from the gear cover.
Remove the O-ring from the control motor.

INSTALLATION

Coat a new O-ring with engine oil and install it into the groove in the motor.

*Route the wires properly
(page 1-25).*

Installation is in the reverse order of removal.

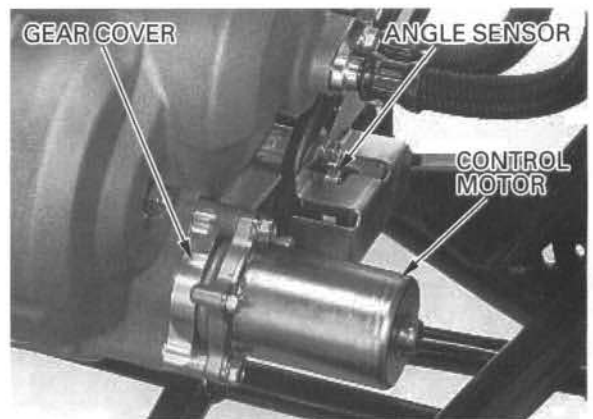


REDUCTION GEARS

REMOVAL

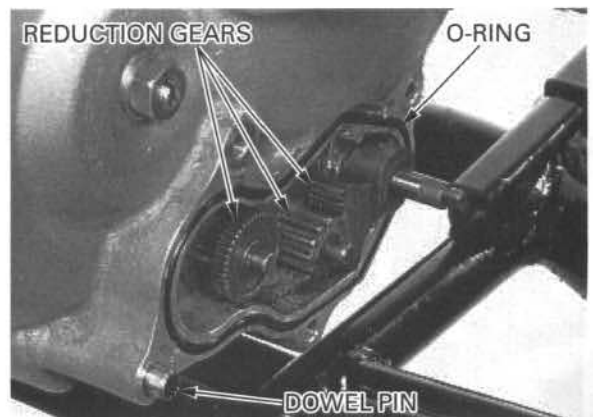
Remove the following:

- angle sensor (page 20-15)
- control motor and gear cover (page 20-16)



- dowel pin
- O-ring
- reduction gears

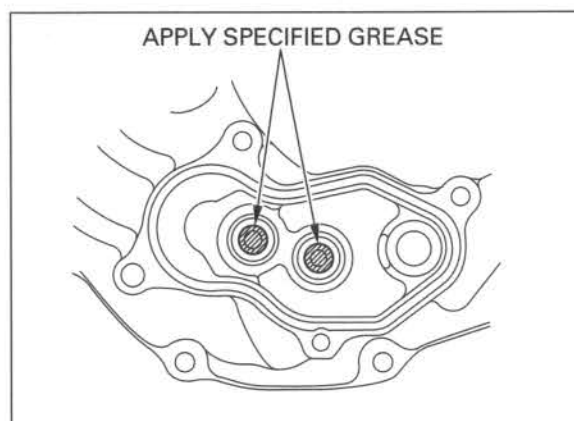
Check the gear teeth for abnormal wear or damage.



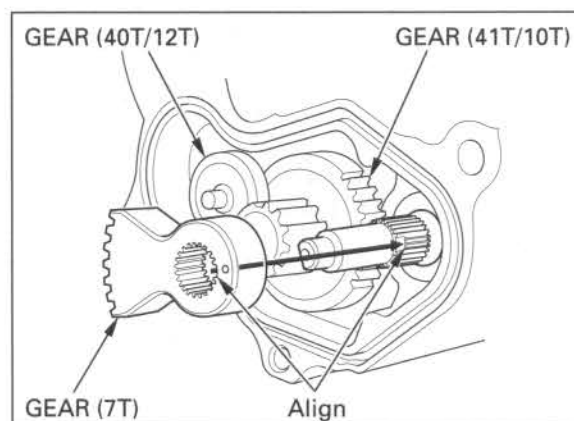
INSTALLATION

Thoroughly clean and apply the specified grease to the reduction gear shaft sliding surface as shown.

SPECIFIED GREASE: Templex N3 grease (ESSO) or Unirex N2 grease (EXXON)

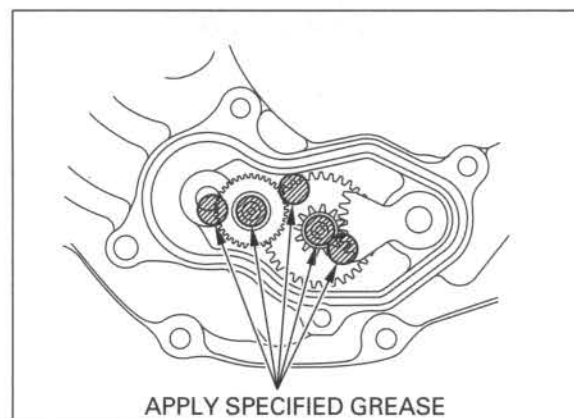


Thoroughly clean the gear teeth and journals. Install the reduction gears (41T/10T) and (40T/12T). Install the reduction gear (7T) by aligning its wide groove (indicated by punch mark) with the wide tooth of the gearshift spindle.

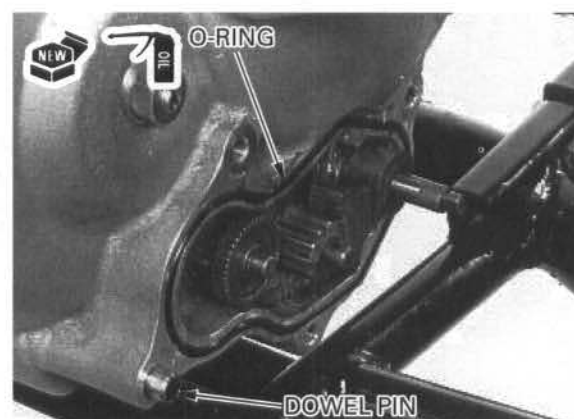


Apply the specified grease to the gear journals (both sides of the 41T/10T gear and 40T/12T gears) and gear teeth as shown.

SPECIFIED GREASE: Templex N3 grease (ESSO) or Unirex N2 grease (EXXON)

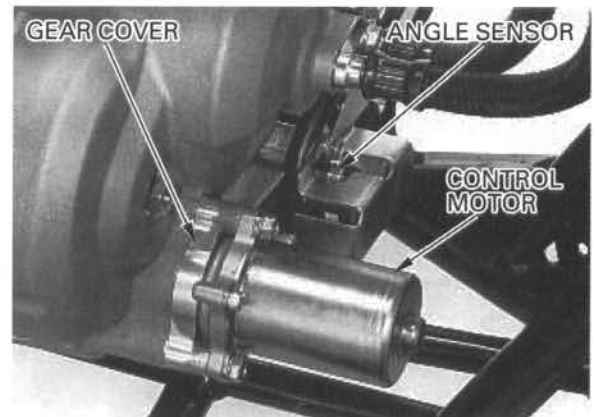


Coat a new O-ring with engine oil and install it into the groove in the crankcase cover. Install the dowel pin.



Install the following:

- gear cover and control motor
- angle sensor

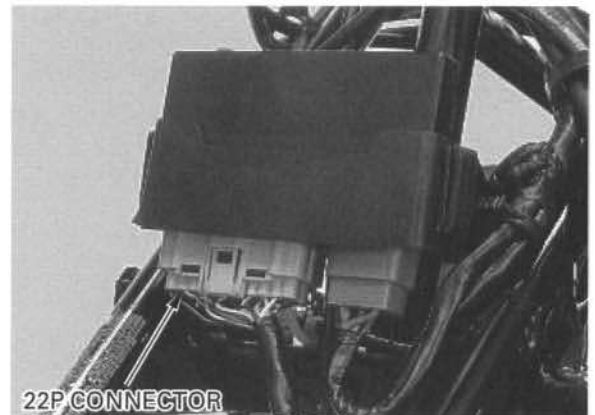


GEARSHIFT SWITCH

SYSTEM INSPECTION

Disconnect the ECU 22P (Black) connector.
Check for continuity between the terminals of the connector in each switch position.
Continuity should exist between the color coded wires as follows:

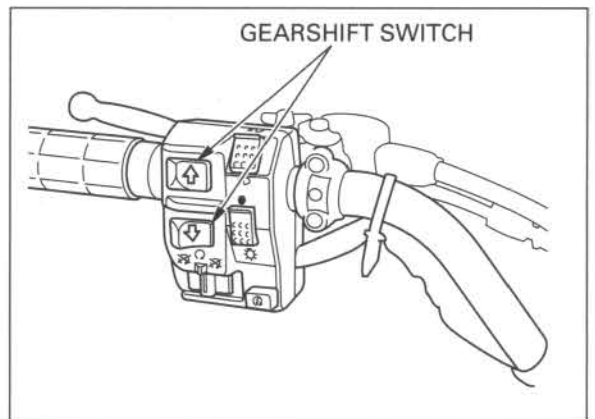
Position \ Color	White/Blue	Black/Red	White/Yellow	Black/Red
Up	○	○		
Free				
Down			○	○



If the continuity is abnormal, perform the same inspection at the handlebar switch 8P (Gray) connector.

Remove the handlebar switch 8P connector from the frame and disconnect the 8P connector:

- If the continuity at the control unit is abnormal and the one at the 8P connector is normal, check for an open or short circuit, or loose or poor connector contact.
- If both continuities are abnormal, replace the gearshift switch.

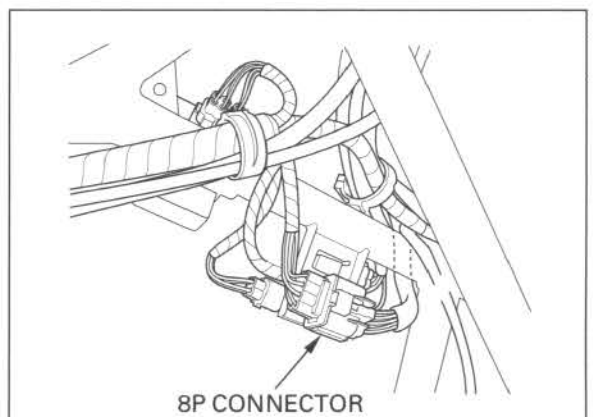


Connect the ECU 22P connector.

Measure the input voltage between the Black/Red (+) terminal of the harness side 8P (Gray) connector and ground (−) with the ignition switch turned to "ON".

STANDARD: 4.7 – 5.3 V

If the input voltage is abnormal, or if there is no input voltage, check for an open or short circuit in the wire harness, or loose or poor connections in the wire harness.



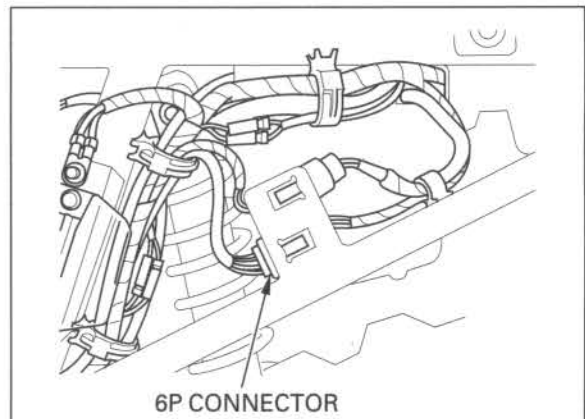
REVERSE SHIFT SWITCH

INSPECTION

Remove the gear position/reverse shift switch 6P connector from the frame.

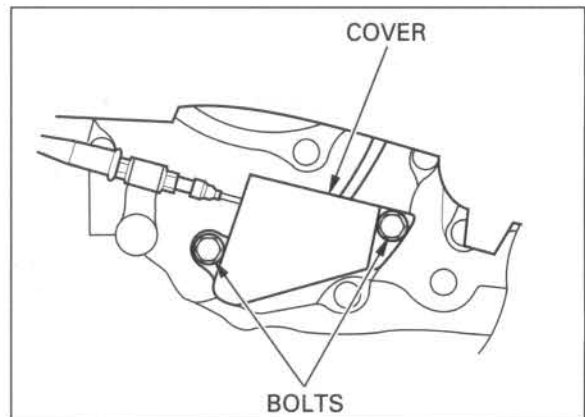
Disconnect the gear position/reverse shift switch 6P connector and check for continuity between the Gray/Red terminal of the switch side connector and ground.

There should be continuity with the reverse selector operated and no continuity with it released.



REMOVAL/INSTALLATION

Remove the bolts and switch cover.



Disconnect the switch connector and remove the reverse shift switch.

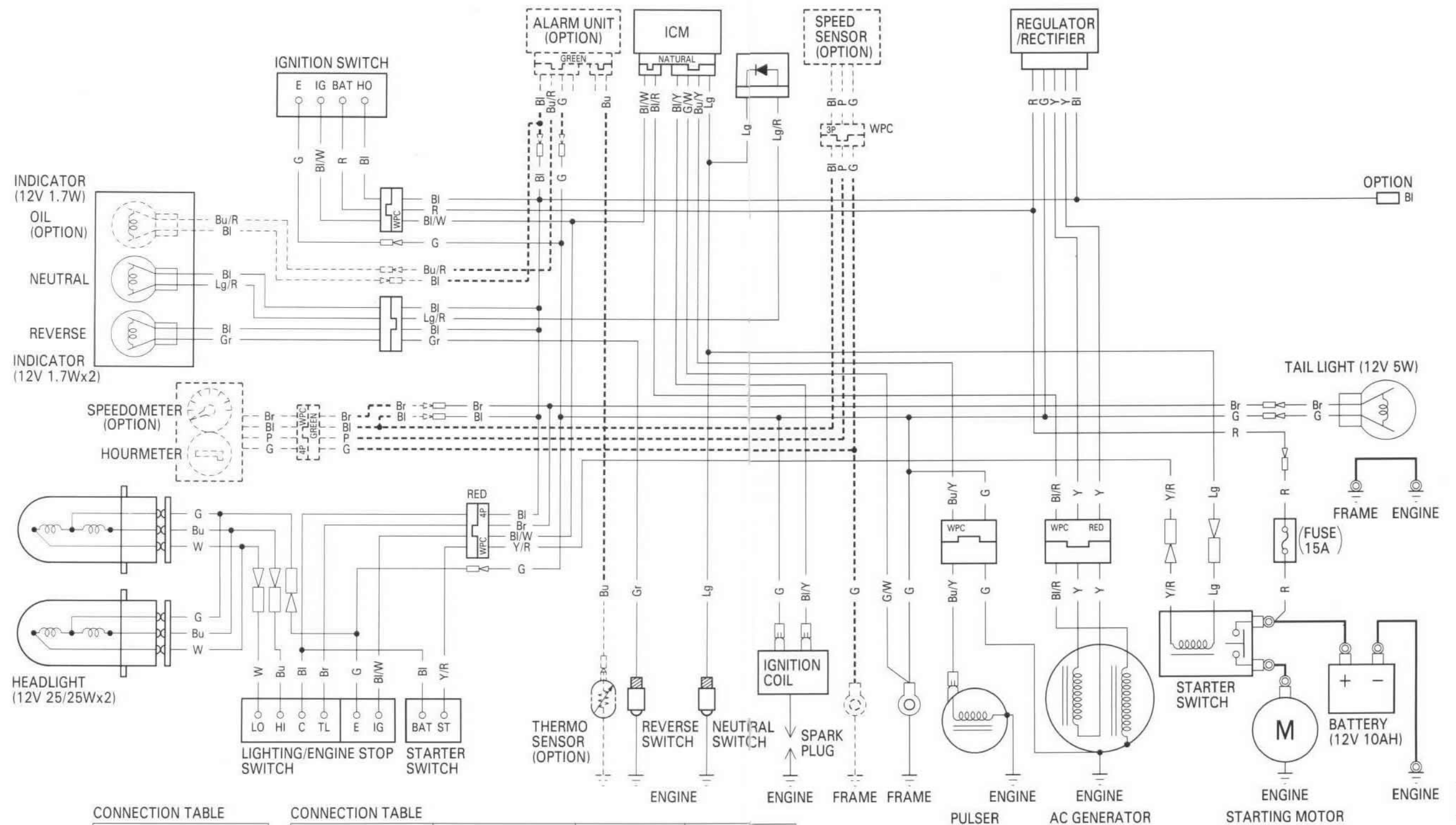
Install the switch with a new sealing washer and tighten it to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m , 9 lbf·ft)

Connect the switch connector securely.
Install the switch cover and tighten the bolts securely.



21. WIRING DIAGRAMS



CONNECTION TABLE

IGNITION SWITCH				
	IG	E	BAT	HO
OFF	○	○		
ON			○	○
CORD COLOR	BI/W	G	R	BI

CONNECTION TABLE

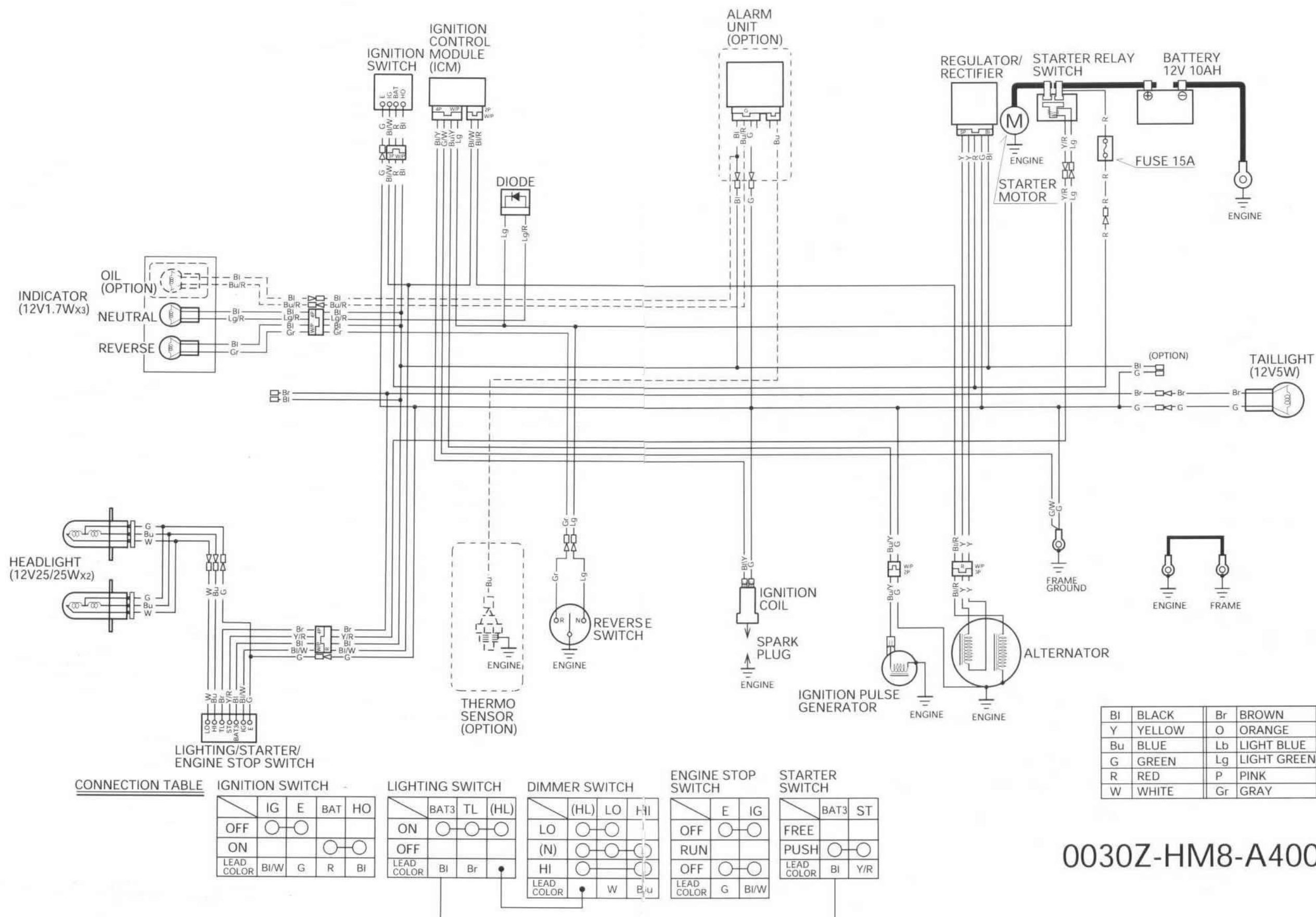
LIGHTING SWITCH				DIMMER SWITCH				ENGINE STOP SWITCH		STARTER SWITCH		
	C	TL	(HL)		HI	(HL)	LO		E	IG	BAT	ST
OFF				HI	○			OFF	○		FREE	
ON	○	○	○	(N)	○			RUN			PUSH	○
CORD COLOR	BI	Br		LO				OFF	○		CORD COLOR	BI
				CORD COLOR	Bu		W	CORD COLOR	G	BI/W		Y/R

CONNECTION OF SWITCH

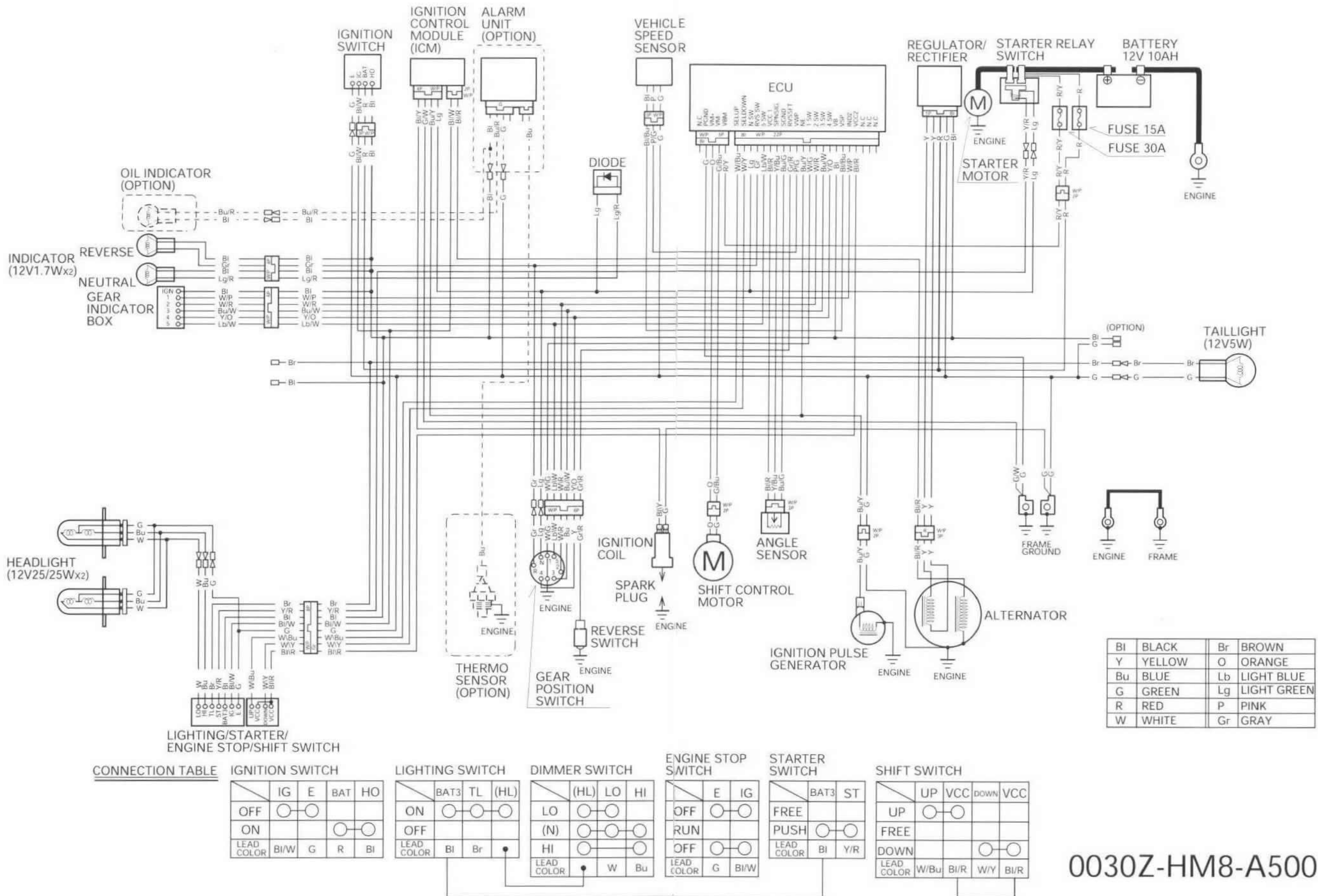
COLOR COMB : GROUND/MARKING

BI ... BLACK	Br ... BROWN
Y ... YELLOW	O ... ORANGE
Bu ... BLUE	Lb ... LIGHT BLUE
G ... GREEN	Lg ... LIGHT GREEN
R ... RED	P ... PINK
W ... WHITE	Gr ... GRAY

0030Z - HM8 - 0000



0030Z-HM8-A400



CONNECTION TABLE

IGNITION SWITCH				
	IG	E	BAT	HO
OFF	○	○		
ON			○	○
LEAD COLOR	BI/W	G	R	BI

LIGHTING SWITCH			
	BAT3	TL	(HL)
ON	○	○	○
OFF			
LEAD COLOR	BI	Br	

DIMMER SWITCH			
	(HL)	LO	HI
LO	○	○	
(N)		○	○
HI			○
LEAD COLOR		W	Bu

ENGINE STOP SWITCH		
	E	IG
OFF	○	○
RUN		
OFF	○	○
LEAD COLOR	G	BI/W

STARTER SWITCH		
	BAT3	ST
FREE		
PUSH	○	○
LEAD COLOR	BI	Y/R

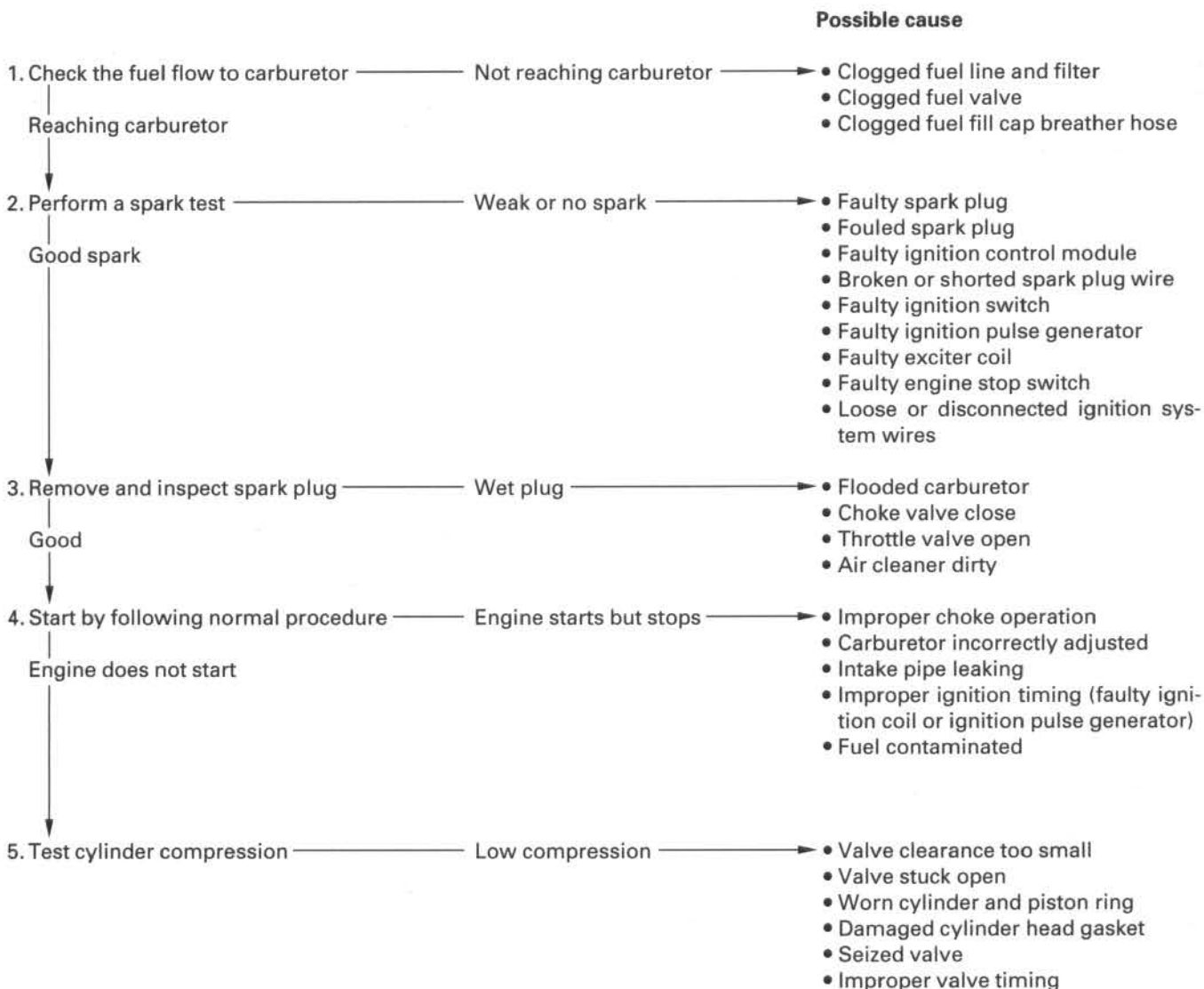
SHIFT SWITCH				
	UP	VCC	DOWN	VCC
UP	○	○		
FREE				
DOWN			○	○
LEAD COLOR	W/Bu	BI/R	W/Y	BI/R

0030Z-HM8-A500

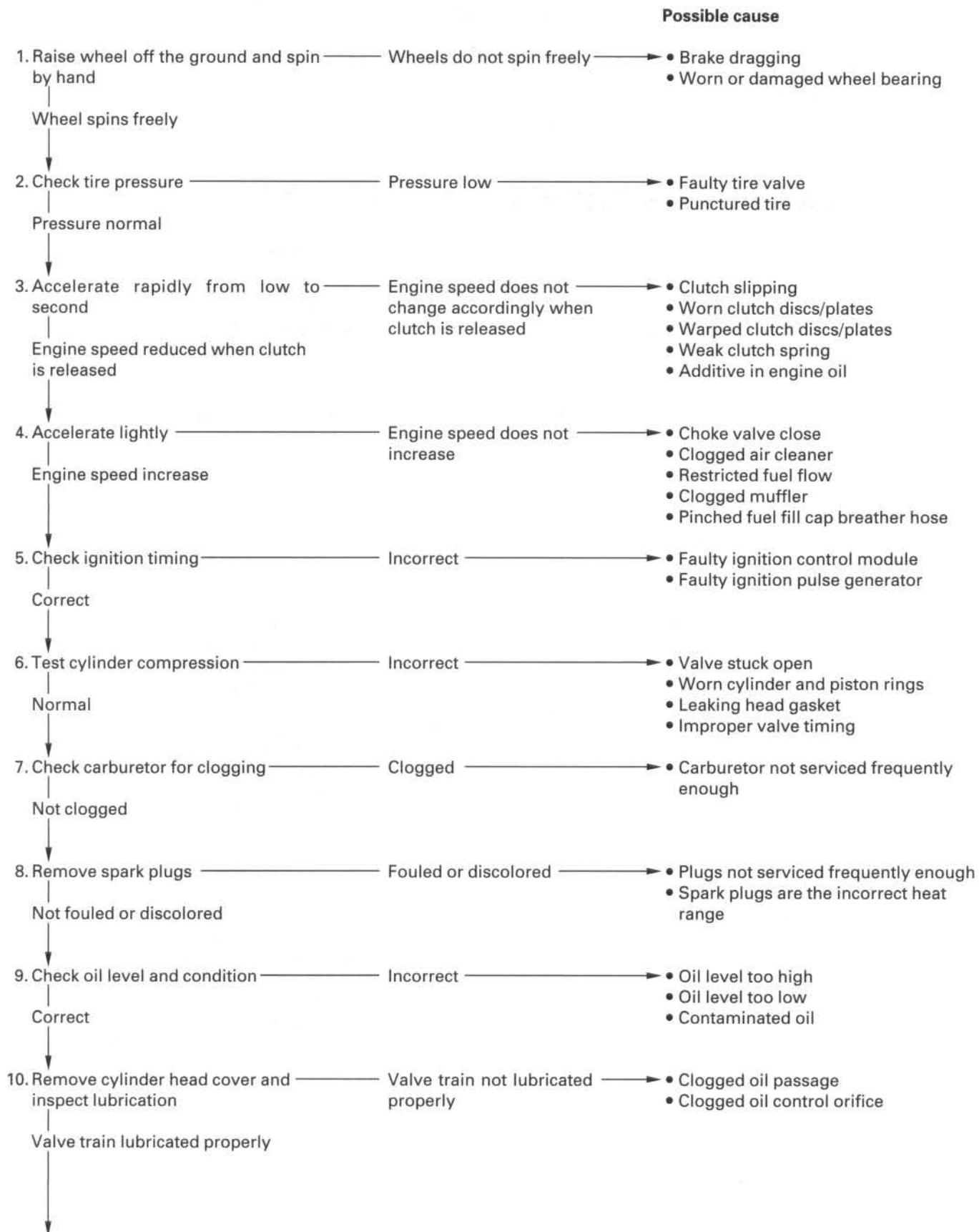
22. TROUBLESHOOTING

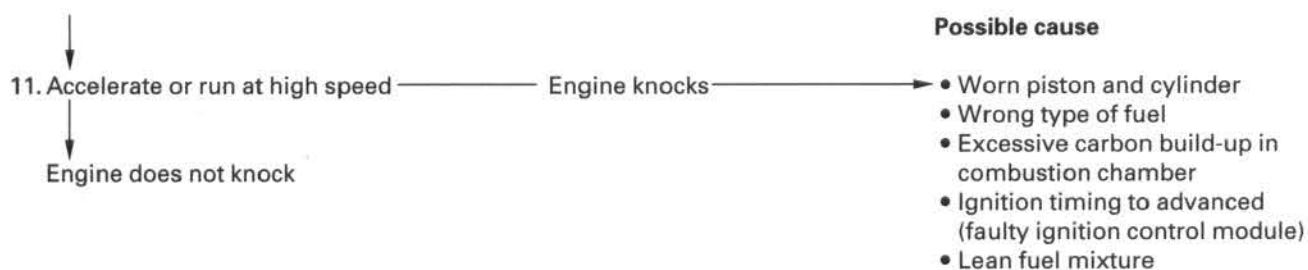
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ENGINE DOES NOT START OR IS HARD TO START

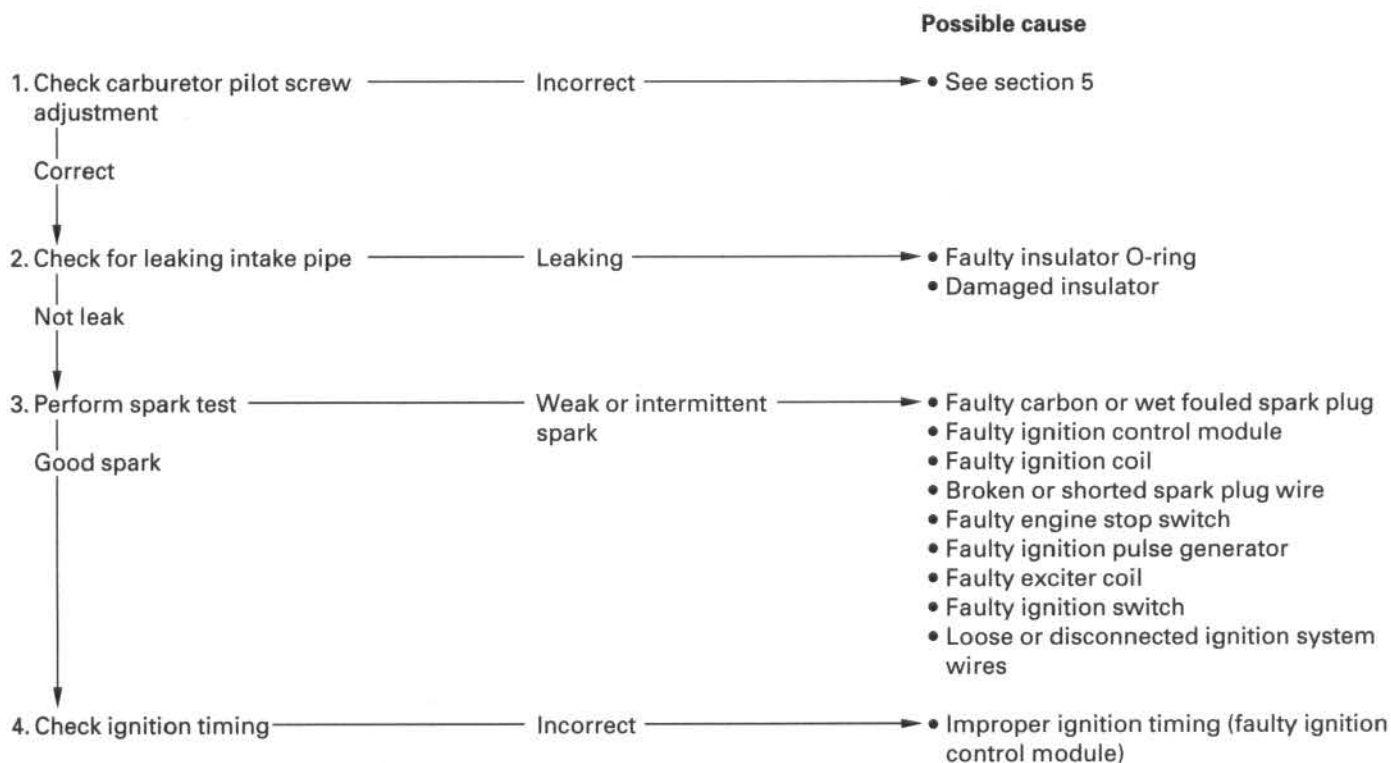


ENGINE LACKS POWER



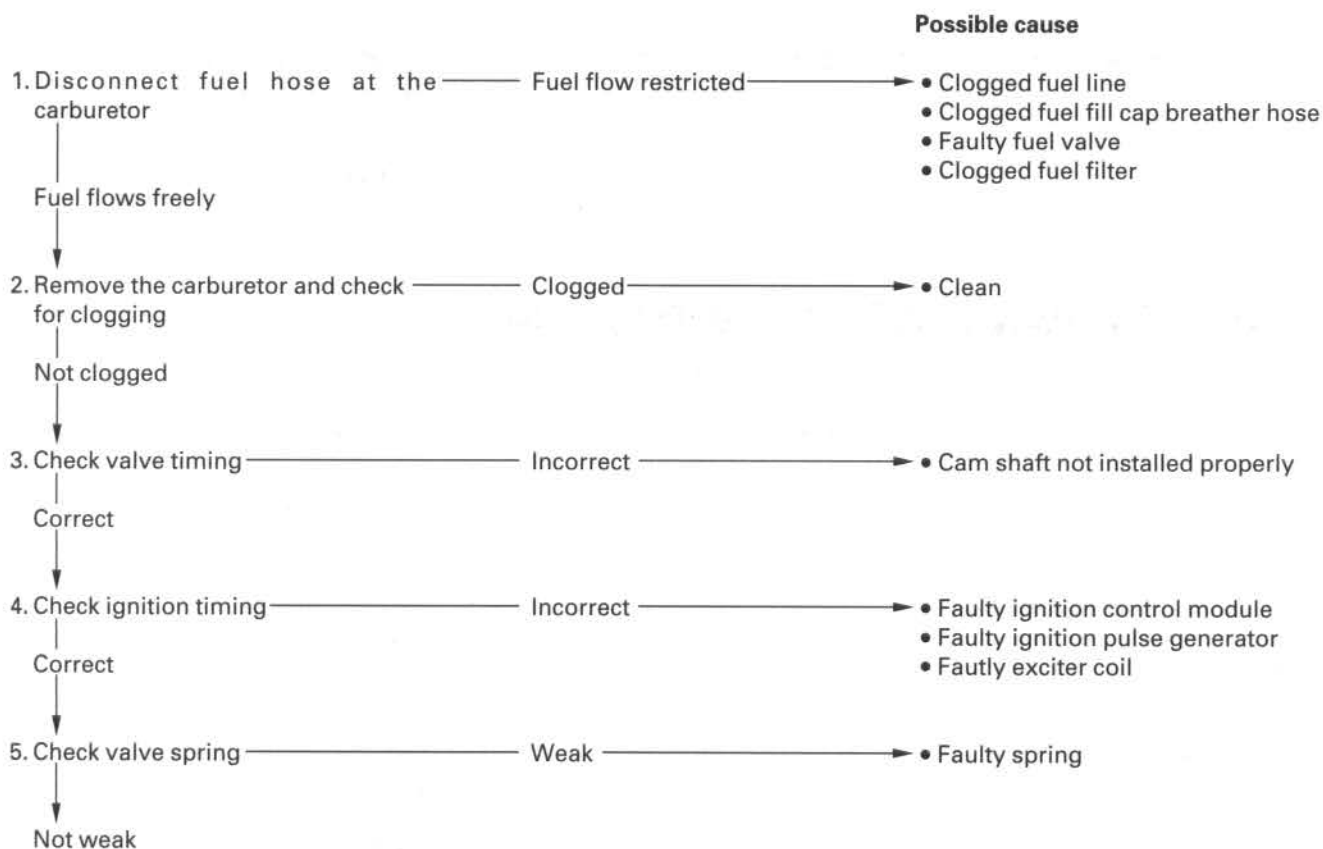


POOR PERFORMANCE AT LOW AND IDLE SPEED

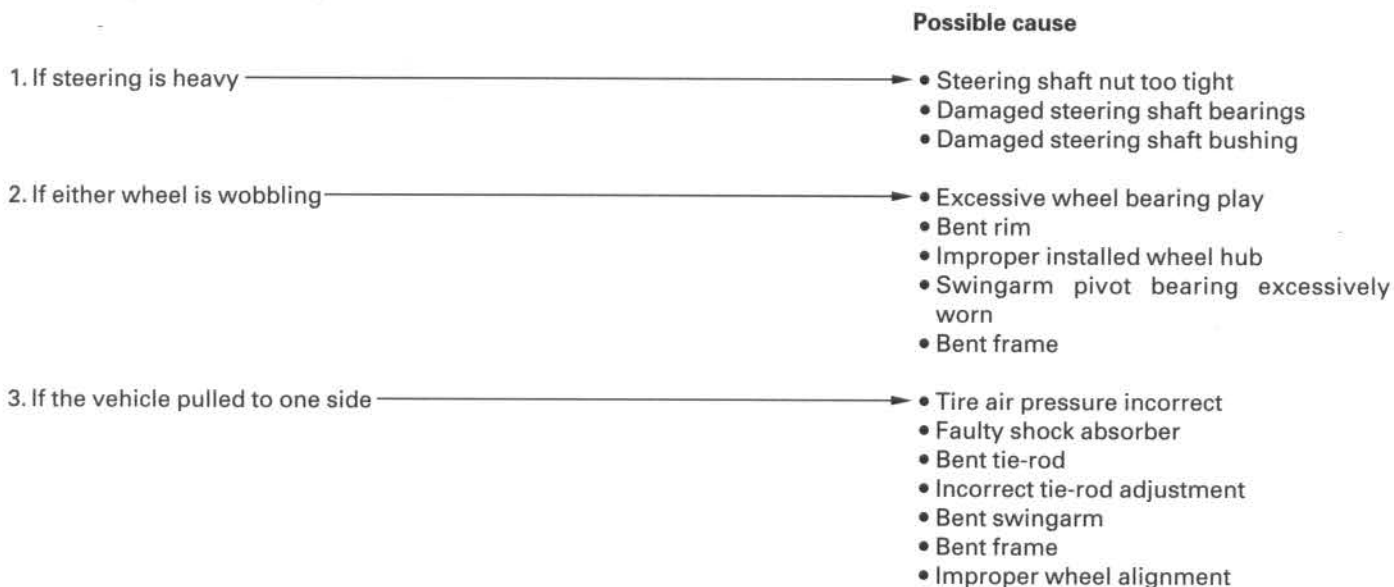


TROUBLESHOOTING

POOR PERFORMANCE AT HIGH SPEED



POOR HANDLING



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