

2005-2011



SERVICE MANUAL

TRX250TE/TM

Recon®

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 emission levels are within the standards set by the California Air Resources Board (CARB).

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 20 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 procedures.

If you don't know the source of the trouble, go to Section 22, Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgement. You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle
- Safety Messages – preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

▲ DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

▲ WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

▲ CAUTION You CAN be HURT if you don't follow instructions.












- Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

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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® G-n Paste 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 medium strength locking agent unless otherwise specified.
	Use 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 INFORMATION

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 electrical wires as shown in the Cable & Harness routing (page 1-19).

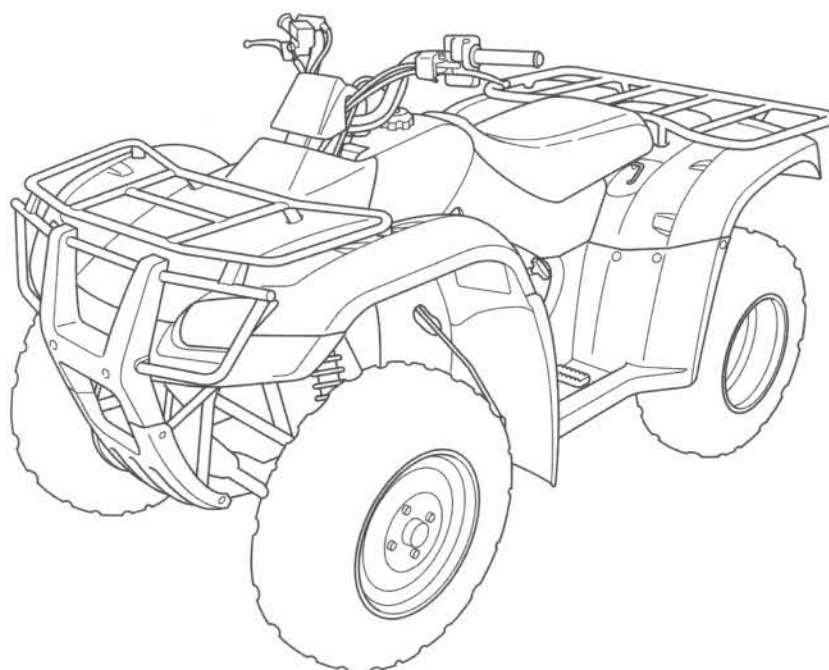
MODEL IDENTIFICATION

This manual covers 2 types of TRX250 models:

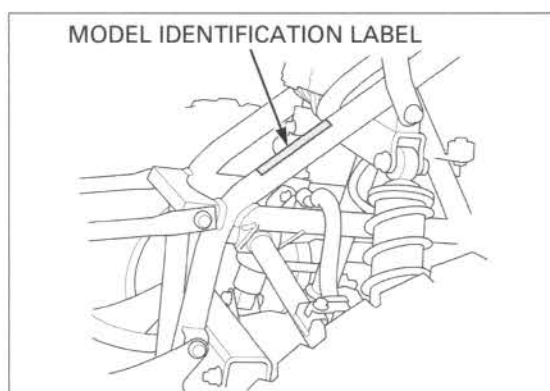
- TM – Left foot operated gearshift
- TE – Electric shift program (ESP)

Be sure to refer to the procedure that pertains to the appropriate version of the TRX250.

TRX250 TE shown:

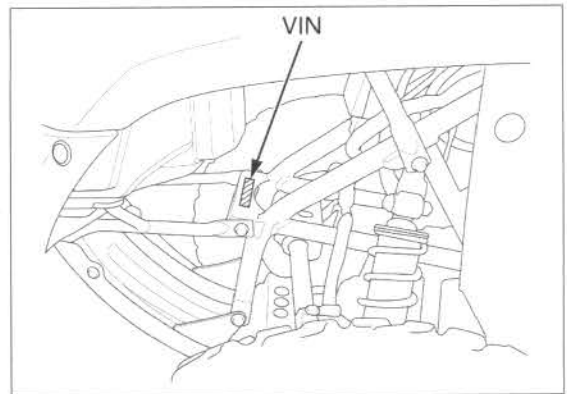


The Model Identification Label is located on the left side frame down pipe.

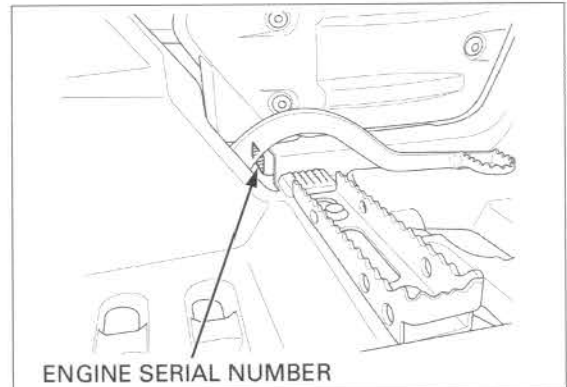


GENERAL INFORMATION

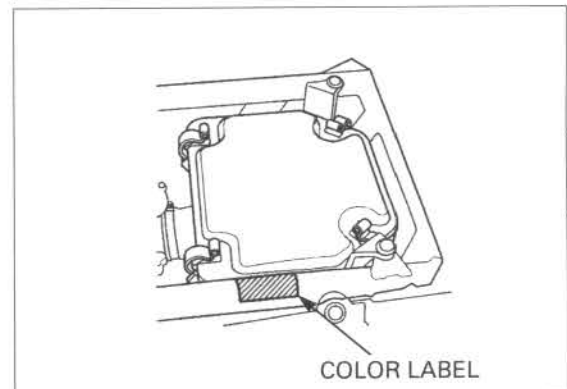
The vehicle identification number (VIN) is stamped on the front side of the frame.



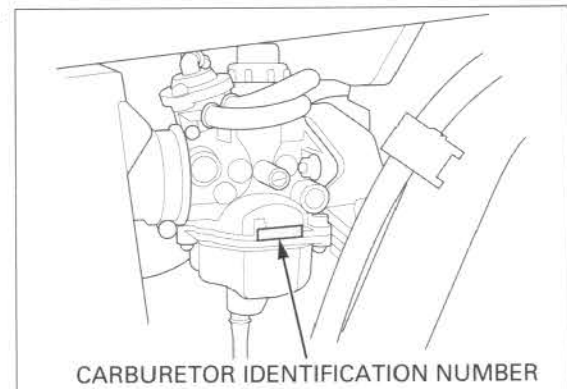
The engine serial number is stamped on the right side of the rear crankcase.



The color label is attached on the left frame pipe under the seat. When ordering color-coded parts, always specify the designated color code.



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



GENERAL INFORMATION

GENERAL SPECIFICATIONS

	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	1,905 mm (75.0 in)
	Overall width	1,035 mm (40.7 in)
	Overall height	1,065 mm (41.9 in)
	Wheelbase	1,130 mm (44.5 in)
	Front tread	785 mm (30.9 in)
	Rear tread	780 mm (30.7 in)
	Seat height	795 mm (31.3 in)
	Footpeg height	320 mm (12.6 in)
	Ground clearance	150 mm (5.9 in)
	Dry weight	TM: 190 kg (419 lbs) TE: 193 kg (425 lbs)
FRAME	Curb weight	TM: 197 kg (434 lbs) TE: 201 kg (443 lbs)
	Maximum weight capacity	175 kg (386 lbs)
	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 x 7-11 ★
ENGINE	Rear tire size	AT22 x 10-9 ★
	Front rim size	11 x 5.5 AT
	Rear rim size	9 x 8.0 AT
	Front tire brand	TRACKER HP (Goodyear)
	Rear tire brand	TRACKER HP (Goodyear)
	Front brake	Hydraulic drum brake
	Rear brake	Mechanical drum brake
	Caster angle	8°
	Trail length	42 mm (1-5/8 in)
	Camber angle	0.1°
CARBURETOR	Fuel tank capacity	9.1 liters (2.40 US gal, 2.00 Imp gal)
	Fuel tank reserve capacity	2.4 liters (0.63 US gal, 0.53 Imp gal)
	Cylinder arrangement	Single cylinder, longitudinally installed
	Bore and stroke	68.5 x 62.2 mm (2.70 x 2.45 in)
	Displacement	229.2 cm ³ (14.0 cu-in)
	Compression ratio	9.2 : 1
	Valve train	OHV
	Intake valve	5° BTDC (at 1 mm lift) 31° ABDC (at 1 mm lift)
	Exhaust valve	30° BBDC (at 1 mm lift) 3° ATDC (at 1 mm lift)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Air cooled (with oil cooler)
	Air filtration	Oiled double urethane foam
	Engine dry weight	TM: 35.9 kg (79.1 lbs)
	Engine dry weight	TE: 37.4 kg (82.5 lbs)
	Carburetor type	Piston valve
	Throttle bore	20 mm (0.8 in)

GENERAL INFORMATION

ITEM		SPECIFICATIONS
DRIVE TRAIN	Clutch system	Centrifugal and multi-plate, wet
	Clutch operation system	Automatic
	Transmission	Constant mesh, 5-speed with reverse
	Primary reduction	3.086 (71/23)
	Final reduction	3.692 (48/13)
	Gear ratio	3.231 (42/13)
	1st	2.167 (39/18)
	2nd	1.667 (35/21)
	3rd	1.280 (32/25)
	4th	1.042 (25/24)
ELECTRICAL	5th	5.550 (39/20 x 37/13)
	Reverse	R - N - 1 - 2 - 3 - 4 - 5
	Gearshift pattern	TM: Left foot operated return system
		TE: Electric shift (left hand operated) return system
	Ignition system	AC-CDI
	Starting system	Electric starter motor and emergency recoil starter
	Charging system	Single phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full wave rectification
	Lighting system	Battery

GENERAL INFORMATION

LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	1.5 liters (1.6 US qt, 1.3 Imp qt)	—
	After disassembly	1.9 liters (2.0 US qt, 1.7 Imp qt)	—
Recommended engine oil		Pro Honda GN4 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	—
		NEW	
Oil pump	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 SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		PDC1F
Main jet	Standard	#98
	High altitude	#92
Slow jet		#38
Pilot screw	Initial opening	1-1/2 turns out
	Final opening	5/8 turn out
	High altitude setting	1-1/4 turns out from seated
Float level		14 mm (0.55 in)
Idle speed		1,400 ± 100 rpm
Throttle lever freeplay		3 – 8 mm (1/8 – 5/16 in)

CYLINDER HEAD/CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 800 rpm			1,275 kPa (13.0 kgf/cm ² , 185 psi)	—
Valve clearance		IN/EX	0.13 (0.005)	—
Valve, valve guide	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/EX	5.500 – 5.512 (0.2165 – 0.2170)	5.52 (0.217)
	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	42.4 (1.67)	41.1 (1.62)
		Outer	44.2 (1.74)	42.9 (1.69)
Rocker arm	Arm I.D.	IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.05 (0.474)
	Shaft O.D.	IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.92 (0.469)
	Arm-to-shaft clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.08 (0.003)
Camshaft, cam follower	Cam lobe height	IN	35.2616 – 35.4216 (1.3882 – 1.3945)	35.2 (1.39)
		EX	35.0020 – 35.1620 (1.3780 – 1.3843)	35.0 (1.38)
	Cam follower O.D.	IN/EX	22.467 – 22.482 (0.8845 – 0.8851)	22.46 (0.884)
	Follower bore I.D.	IN/EX	22.510 – 22.526 (0.8862 – 0.8868)	22.54 (0.887)
	Follower-to-bore clearance	IN/EX	0.028 – 0.059 (0.0011 – 0.0023)	0.07 (0.003)
Cylinder head warpage			—	0.10 (0.004)
Cylinder	I.D.		68.500 – 68.510 (2.6968 – 2.6972)	68.60 (2.701)
	Out-of-round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.10 (0.004)
Piston, piston pin, piston ring	Piston O.D. at 15 (0.6) from bottom		68.462 – 68.482 (2.6953 – 2.6961)	68.40 (2.693)
	Piston pin hole 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)	0.02 (0.001)
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.5 (0.02)
		Sec- ond	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	—
	Piston ring-to-ring groove clearance	Top	0.015 – 0.045 (0.0006 – 0.0018)	0.09 (0.004)
		Sec- ond	0.015 – 0.045 (0.0006 – 0.0018)	0.09 (0.004)
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)

CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Change clutch	Spring free length	TM	35.2 (1.39)	34.5 (1.36)
		TE	37.0 (1.46)	36.3 (1.43)
	Disc thickness		2.9 – 3.0 (0.11 – 0.12)	2.6 (0.10)
	Plate warpage		—	0.20 (0.008)
	Outer I.D.		28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
	Outer guide O.D.		27.959 – 27.980 (1.1007 – 1.1016)	27.92 (1.099)
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)

GENERAL INFORMATION

CRANKSHAFT/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D.		13.000 – 13.018 (0.5118 – 0.5125)	13.04 (0.513)
	Claw thickness		4.93 – 5.00 (0.194 – 0.197)	4.5 (0.18)
	Shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.96 (0.510)
Transmission	Gear I.D.	M4	23.000 – 23.021 (0.9055 – 0.9063)	23.04 (0.907)
		M5	18.000 – 18.018 (0.7087 – 0.7094)	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)
	Gear bushing O.D.	M4	22.959 – 22.979 (0.9039 – 0.9047)	22.94 (0.903)
		M5	17.959 – 17.980 (0.7070 – 0.7079)	17.94 (0.706)
		C1, C2, C3, CR	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)	0.10 (0.004)
		M5, C1, C2, C3, CR	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Gear bushing I.D.	M4	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
		M5	15.000 – 15.018 (0.5906 – 0.5913)	15.04 (0.592)
		C3	22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
	Mainshaft O.D.	at M4	19.959 – 19.980 (0.7858 – 0.7866)	19.93 (0.785)
		at M5	14.966 – 14.984 (0.5892 – 0.5899)	14.94 (0.588)
	Countershaft O.D.	at C3	21.959 – 21.980 (0.8645 – 0.8654)	21.93 (0.863)
Reverse idle shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.94 (0.509)	
Bushing-to-shaft clearance	M4, C3	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)	
	Reverse idle gear-to-shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
Crankshaft	Runout	Front	–	0.06 (0.002)
		Rear	–	0.03 (0.001)
	Big end side clearance		0.05 – 0.50 (0.002 – 0.020)	0.80 (0.031)
	Big end radial clearance		0.004 – 0.012 (0.0002 – 0.0005)	0.05 (0.002)

FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	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 ± 0.04)	–
Toe			Toe-in: 8 ± 15 (5/16 ± 9/16)	–

REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	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)	–

BRAKE SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Recommended brake fluid	DOT 3 or DOT 4	–
	Drum I.D.	130.0 (5.12)	131.0 (5.16)
	Shoe lining thickness	4.0 (0.16)	1.0 (0.04)
	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)
Rear brake	Wheel cylinder I.D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Drum I.D.	140.0 (5.51)	141.0 (5.55)
	Shoe lining thickness	4.5 (0.18)	To the indicator

REAR DRIVING MECHANISM SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Axle runout			–	3.0 (0.12)
Rear final drive	Oil capacity	After draining	80 cm ³ (2.7 US oz, 2.8 Imp oz)	–
		After 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)
	Backlash difference		–	0.20 (0.008)
	Ring gear-to-stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	–

BATTERY/CHARGING SYSTEM 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 x 5 – 10 h
		Quick	5.0 A x 1.0 h
Alternator	Capacity		0.123 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

IGNITION SYSTEM 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 primary 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	14° BTDC at idle
	Full advance	31° BTDC at 3,750 rpm

GENERAL INFORMATION

ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

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

LIGHTS/SWITCHES SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight (high/low beam)		12 V --25/25 W x 2
	Taillight		LED x 3
	Neutral indicator		12 V - 1.7 W
	Reverse indicator		12 V - 1.7 W
Fuse	Main fuse	TM	15 A
		TE	15 A, 30 A

STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5 (0.5, 3.7)	5 mm screw	4 (0.4, 3.0)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.6)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	26 (2.7, 19)
		10 mm flange bolt and nut	39 (4.0, 29)

ENGINE & FRAME TORQUE VALUES

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

NOTE:

1. Apply locking agent to the threads.
2. Apply engine oil to the threads and seating surface.
3. Apply grease to the threads and seating surface.
4. Apply brake fluid to the threads.
5. ALOC bolt: replace with a new one.
6. Lock nut: replace with a new one.
7. Castle nut: tighten to the specified torque and further tighten until its groove aligns with the cotter pin hole.
8. Stake.

ENGINE

FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Exhaust pipe stud bolt	2	8	6 (0.6, 4.4)	

MAINTENANCE

ITEM	Q'TY	THR18 EAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	1	12	22 (2.2, 16)	
Valve adjusting screw lock nut	2	6	17 (1.7, 13)	NOTE 2
Valve adjusting hole cap	2	30	20 (2.0, 15)	NOTE 2
Timing hole cap	1	14	10 (1.0, 7)	
Engine oil drain bolt	1	12	25 (2.5, 18)	

LUBRICATION SYSTEM

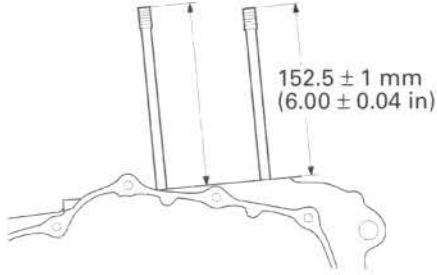
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Pressure relief valve cap	1	14	19 (1.9, 14)	

FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Carburetor insulator stud bolt	2	6	10 (1.0, 7)	

GENERAL INFORMATION

CYLINDER HEAD/CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head nut	4	8	30 (3.1, 22)	NOTE 2
Cam chain tensioner arm pivot bolt	1	6	12 (1.2, 9)	NOTE 1
Cylinder stud bolt	4	8	12 (1.2, 9)	
				
Push rod end piece	4	6	13 (1.3, 10)	

CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Change clutch center lock nut	1	16	79 (8.1, 58)	NOTE 2, 8
Change clutch spring bolt	4	6	12 (1.2, 9)	
Centrifugal clutch lock nut	1	18	88 (9.0, 65)	NOTE 2, 8

GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Gearshift return spring pin	1	8	22 (2.2, 16)	NOTE 1
Gearshift cam plate bolt	1	6	16 (1.6, 12)	NOTE 1
Gearshift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	NOTE 1
Gearshift arm retaining bolt	1	6	12 (1.2, 9)	NOTE 1

ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter one-way clutch bolt	6	6	16 (1.6, 12)	NOTE 1
Recoil starter driven pulley bolt	1	10	74 (7.5, 55)	NOTE 2
Ignition pulse generator bolt	2	5	6 (0.6, 4.4)	NOTE 1

ELECTRIC SHIFT PROGRAM (TE model)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Angle sensor bolt	2	5	6 (0.6, 4.4)	NOTE 1
Reverse shift switch	1	10	13 (1.3, 10)	

FRAME**FRAME/BODY PANELS/EXHAUST SYSTEM**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Center mudguard bracket nut	4	8	32 (3.3, 24)	
Front carry pipe bolt	4	8	37 (3.8, 27)	
Front carrier bolt	2	8	37 (3.8, 27)	
Rear carrier bolt	6	8	37 (3.8, 27)	
Muffler band bolt	1	8	23 (2.3, 17)	
Exhaust pipe protector bolt	3	6	22 (2.2, 16)	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Final gear case oil check bolt	1	8	12 (1.2, 9)	
Final gear case oil filler cap	1	30	12 (1.2, 9)	
Final gear case oil drain bolt	1	8	12 (1.2, 9)	
Tie-rod lock nut	4	12	54 (5.5, 40)	

ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Lower engine mounting nut (left and right)	2	10	54 (5.5, 40)	
Upper engine mounting bolt	1	8	32 (3.3, 24)	
Frame cross-member bolt	2	8	37 (3.8, 27)	

GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Gearshift pedal pinch bolt	1	6	20 (2.0, 15)	
Reverse stopper arm nut	1	6	7 (0.7, 5.1)	

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Handlebar lower holder nut	2	10	39 (4.0, 29)	NOTE 6
Throttle housing cover screw	3	4	3.4 (0.35, 2.5)	
Front wheel nut	8	10	64 (6.5, 47)	
Front wheel hub nut	2	18	78 (8.0, 58)	NOTE 7
Shock absorber upper mounting nut	2	10	30 (3.1, 22)	NOTE 6
Shock absorber lower mounting nut	2	10	49 (5.0, 36)	NOTE 6
Upper and lower arm pivot nut	8	10	30 (3.1, 22)	NOTE 6
Upper and lower arm ball joint nut	4	12	29 (3.0, 21)	NOTE 7
Brake hose clamp bolt (upper arm)	4	6	12 (1.2, 9)	
Brake hose clamp bolt (knuckle)	2	8	29 (3.0, 21)	
Tie-rod stud joint nut	4	12	54 (5.5, 40)	NOTE 6
Steering shaft end nut	1	14	108 (11.0, 80)	
Steering shaft holder bolt	2	8	32 (3.3, 24)	

REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear wheel nut	8	10	64 (6.5, 47)	
Shock absorber upper mounting nut	1	10	44 (4.5, 32)	NOTE 6
Shock absorber lower mounting bolt	1	10	54 (5.5, 40)	
Swingarm pivot bolt (right)	1	30	112 (11.4, 83)	
Swingarm pivot bolt (left)	1	30	3.9 (0.40, 2.9)	
Swingarm left pivot lock nut	1	30	112 (11.4, 83)	

GENERAL INFORMATION

BRAKE SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake hose oil bolt	3	10	34 (3.5, 25)	
Wheel cylinder bleed valve	2	8	5.4 (0.55, 4.0)	
Front master cylinder reservoir cap screw	2	4	2 (0.2, 1.5)	
Front brake lever pivot bolt	1	6	5.9 (0.60, 4.4)	
Front brake lever pivot nut	1	6	5.9 (0.60, 4.4)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake wheel cylinder bolt	4	6	7.4 (0.75, 5.5)	
Front brake adjuster mounting bolt	4	8	7.4 (0.75, 5.5)	
Front brake panel bolt	8	8	29 (3.0, 21)	
Rear axle nut	1	32	39 (4.0, 29)	
Rear axle lock nut	1	32	127 (13.0, 93)	NOTE 1
Rear wheel hub nut	2	20	137 (14.0, 101)	NOTE 7
Rear brake arm pinch bolt	1	6	12 (1.2, 9)	
Rear brake panel drain bolt	1	8	12 (1.2, 9)	
Skid plate bolt	3	8	32 (3.3, 24)	
Brake oil pipe joint nut	2	10	17 (1.7, 13)	NOTE 4

REAR DRIVING MECHANISM

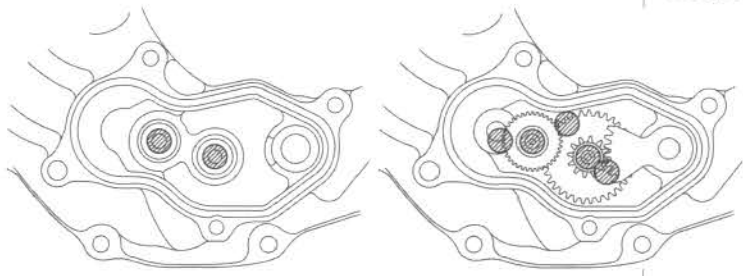
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Final gear case pinion bearing lock nut	1	64	98 (10.0, 72)	NOTE 8
Final gear case cover bolt	2	10	49 (5.0, 36)	NOTE 1
	6	8	25 (2.5, 18)	
Final gear case mounting bolt	8	10	54 (5.5, 40)	

OTHERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Trailer hitch (optional equipment) nut	2	10	44 (4.5, 32)	NOTE 6

LUBRICATION & SEAL POINTS

ENGINE

LOCATION	MATERIAL	REMARKS
Camshaft cam lobes Cam chain Cam chain tensioner arm pivot Rocker arm shaft sliding surface Valve stem (valve guide sliding surface) Change clutch outer guide inner and outer surfaces Starter reduction gear shaft (entire surface)	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Valve adjusting hole cap threads Rocker arm follower and adjusting screw tip Cam follower (entire surface) Cylinder head nut threads Connecting rod small end inner surface Piston outer surface and piston pin hole Piston pin outer surface Piston ring entire surface Cylinder bore Primary drive gear teeth (change clutch outer) Change clutch disc linings Change clutch center lock nut threads Change clutch ball retainer balls Change clutch lifter lever spindle and roller Centrifugal clutch drum bushings Centrifugal clutch shoe lining Centrifugal clutch lock nut threads Gearshift drum stopper arm pivot Gearshift spindle journals Gearshift master arm inner surface Sub-gearshift spindle arm roller Reverse stopper shaft journals Recoil starter driven pulley bolt threads Starter one-way clutch sprag Starter driven gear teeth and one-way clutch contacting area Starter reduction gear teeth Connecting rod big end area Transmission gear teeth and rotating surface Mainshaft splines and journals Countershaft splines and journals Shift fork inner surface, guide pin and pawls Shift fork shaft entire surface Shift drum guide grooves Each bearing rotating area Each O-ring	Engine oil	
Centrifugal clutch drive plate O-ring groove Each oil seal lips	Multi-purpose grease	
Electric shift reduction gear teeth and journals (front crankcase cover)	Unirex N2 grease (EXXON) or Templex N3 grease (ESSO)	TE model only: Apply 3 – 5 g (shadowed area)
		

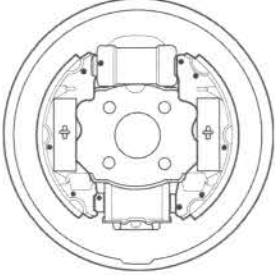
GENERAL INFORMATION

LOCATION	MATERIAL	REMARKS
Camshaft bearing retainer bolt threads Cam chain tensioner arm pivot bolt threads Cam chain tensioner adjuster bolt threads Centrifugal oil filter cover bolt threads Gearshift return spring pin threads Gearshift drum stopper arm pivot bolt threads Gearshift cam plate bolt threads Starter one-way clutch bolt threads Ignition pulse generator bolt threads Recoil starter mounting bolt threads Mainshaft bearing setting plate bolt threads Gear position switch bolt threads Angle sensor bolt threads	Locking agent	TE model only
Alternator/ignition pulse generator wire grommet seating area Gear position switch wire grommet seating area	Sealant	

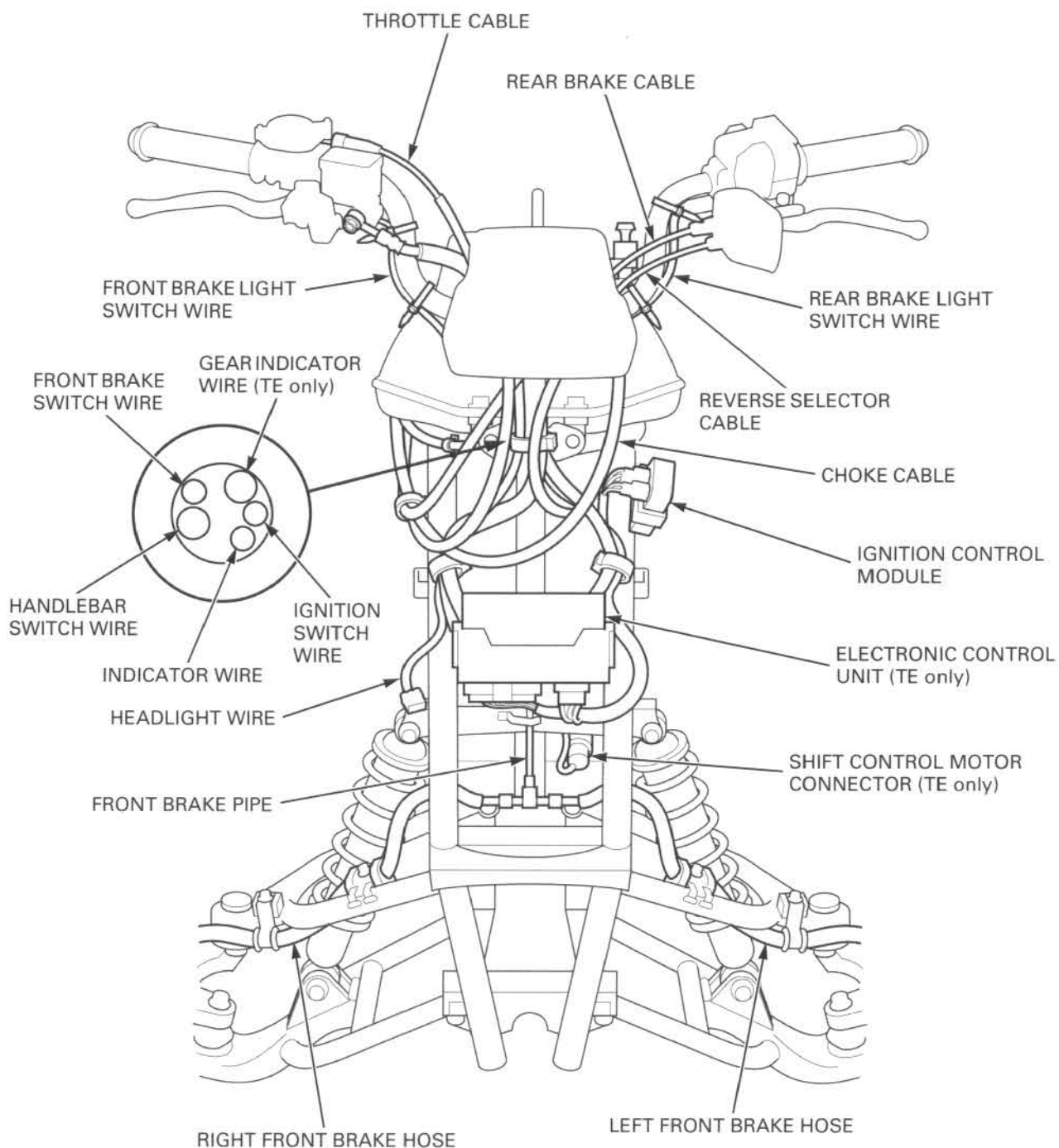
FRAME

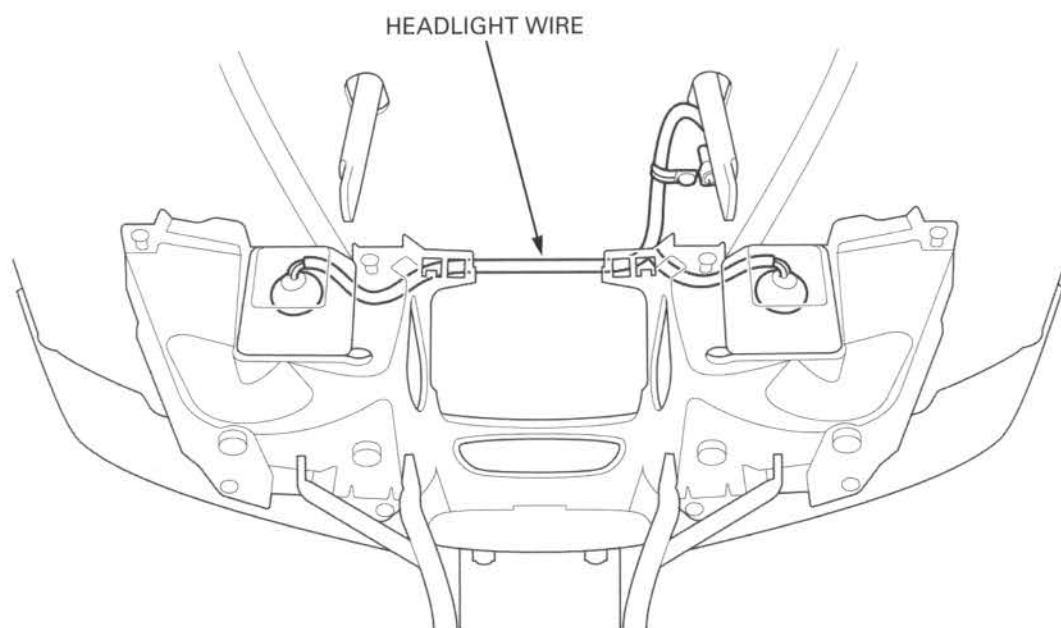
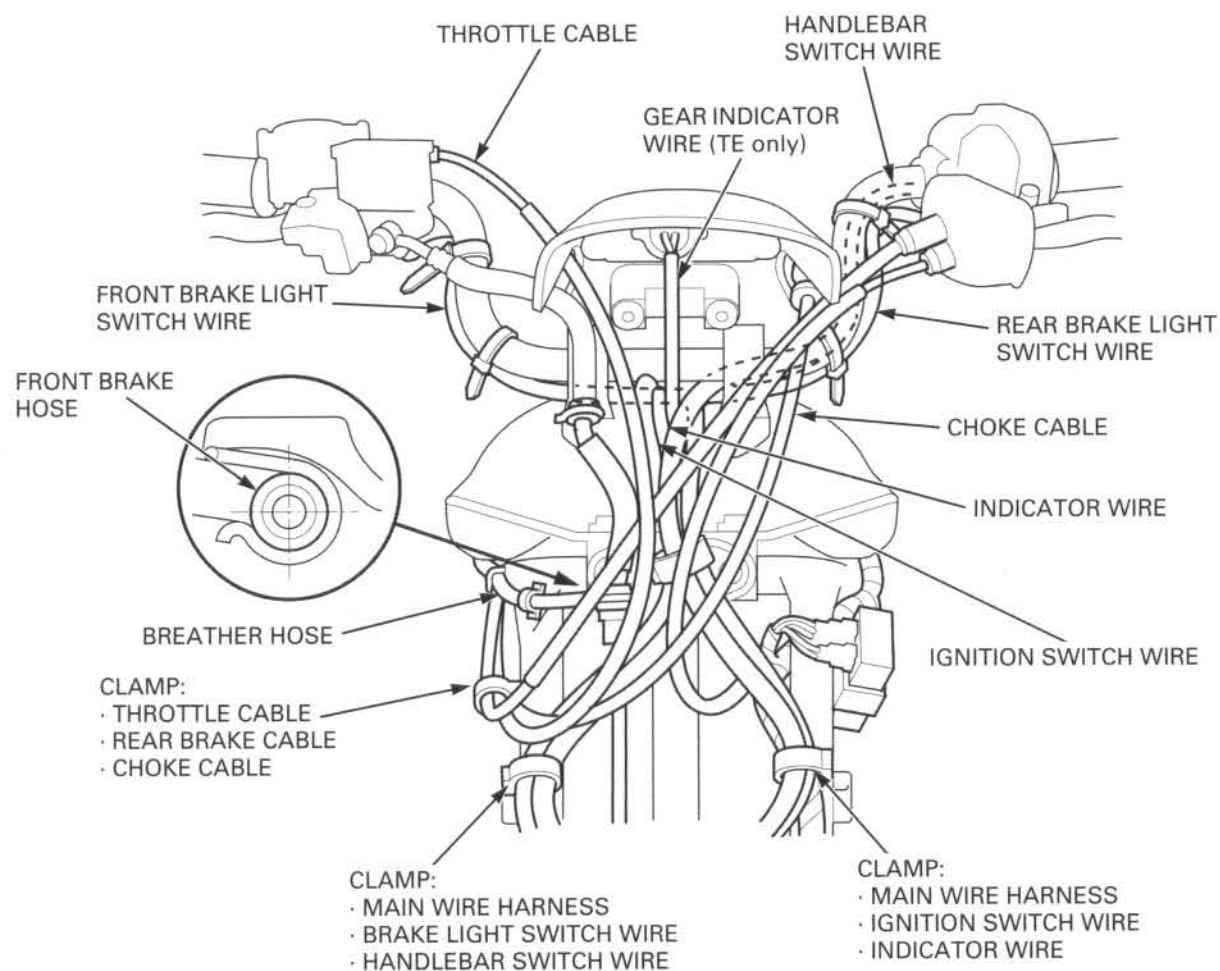
LOCATION	MATERIAL	REMARKS
Throttle cable end	Multi-purpose grease	
Throttle cable threads (lever side)		
Throttle lever pivot and dust seal lip		
Rear brake lever pivot		
Parking lock arm pivot (screw)		
Steering shaft bushing inner surface		2 – 3 g
Steering shaft dust seal lips		
Swingarm pivot bearing		3 g per each bearing
Swingarm pivot dust seal lips		
Front brake drum water proof seal lips		
Rear brake cam dust seal lips		
Rear brake cam spindle		0.5 – 1 g
Rear brake anchor pin sliding surface		0.5 – 1 g
Rear brake cam shoe sliding surfaces		0.5 – 1 g
Rear brake panel axle dust seal lips		2.5 – 3 g (side lip)
Rear brake pedal pivot		
Rear brake pedal pivot dust seal lips		
Rear brake cable (pedal) and parking brake cable (lever) ends		
Final gear case oil seal lips (ring gear and drive shaft)		
Final gear case axle dust seal		
Swingarm axle housing dust seal		
Each O-ring		
Rear axle splines (left, right and center)	Molybdenum disulfide grease	
Yoke joint splines		
Drive shaft splines		

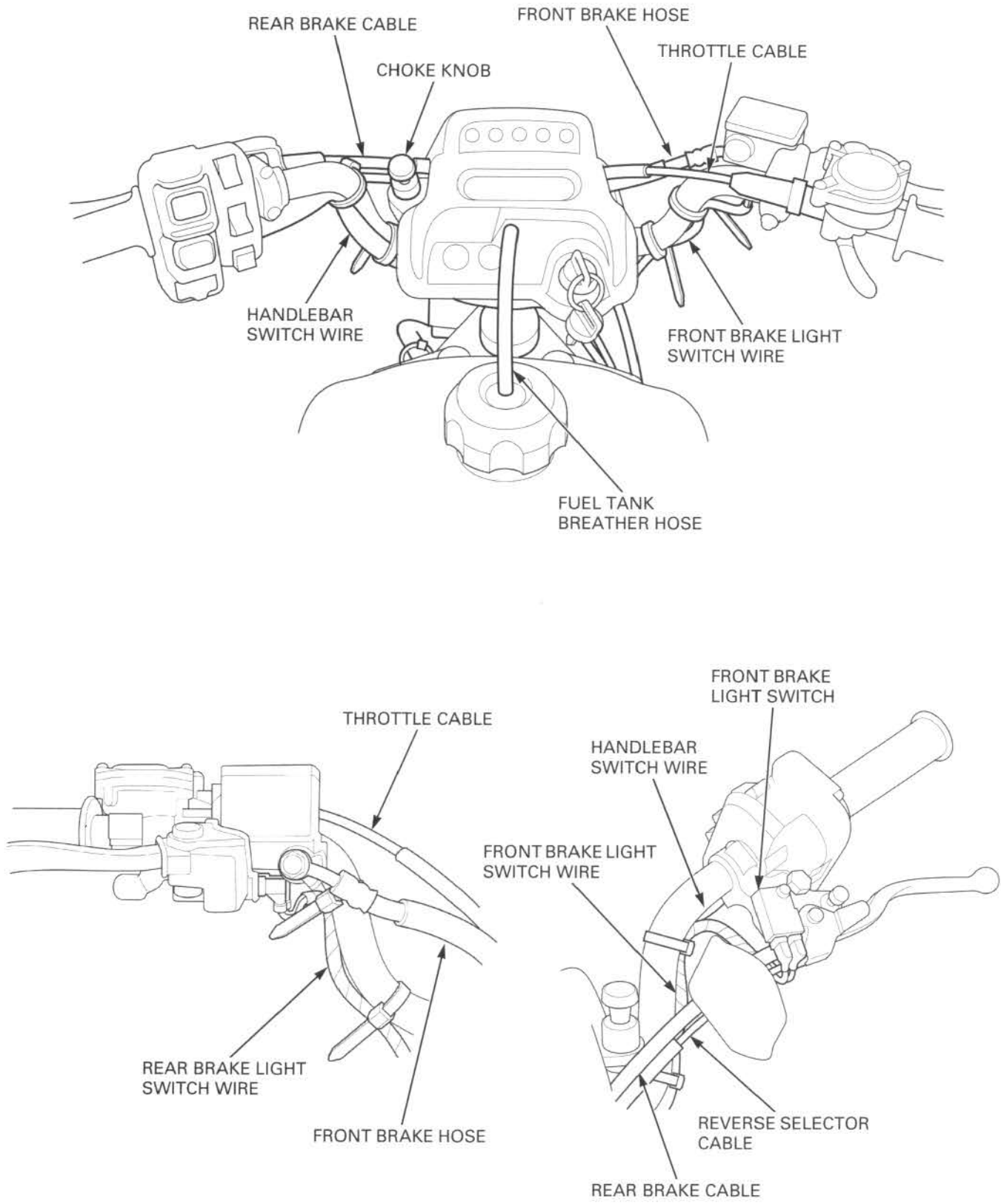
GENERAL INFORMATION

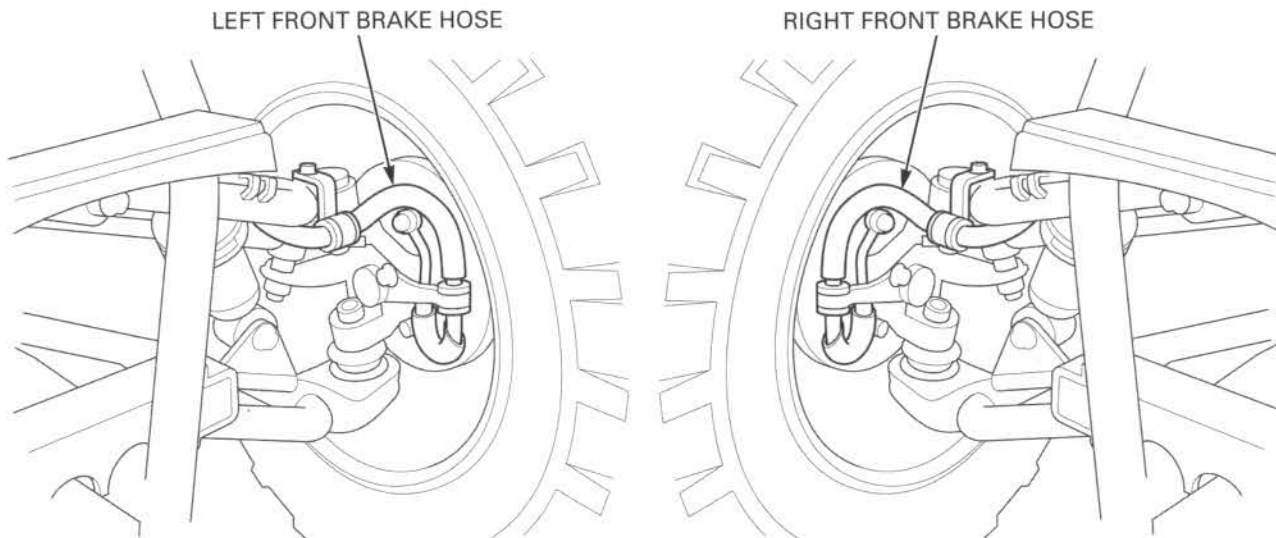
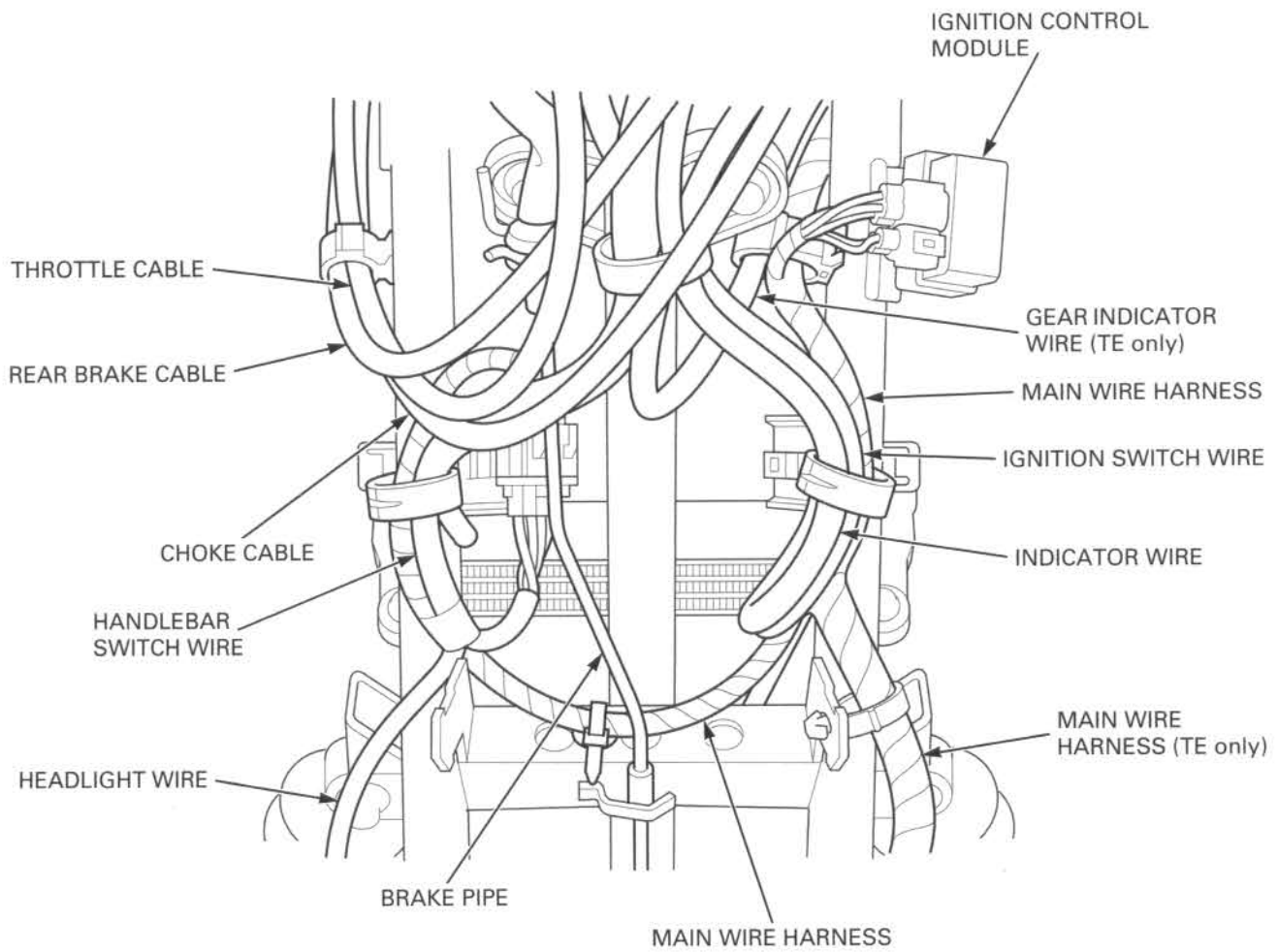
LOCATION	MATERIAL	REMARKS
Rear brake cam felt seal	Engine oil	
Throttle inner cable Choke inner cable Rear brake inner cable Reverse control inner cable	Cable lubricant	
Handlebar grip rubber inside Air cleaner case-to-connecting hose (carburetor and air intake duct) mating area	Honda Bond A or Honda Handgrip Cement (U.S.A. only)	
Front brake lever-to-master piston contacting area Front brake lever pivot Brake panel shoe metal contacting areas Brake shoe adjuster groove and wheel cylinder piston groove (shoe contacting grooves)  Brake shoe adjuster screw threads and adjuster nut spindle outer surface Wheel cylinder body boot groove and piston boot groove	Silicone grease	Indicated by ". " Indicated by ". "
Master cylinder piston and cups Wheel cylinder piston and cup Brake oil pipe joint nut threads	DOT 3 or DOT 4 brake fluid	
Rear final gear case cover mating surface	Sealant	

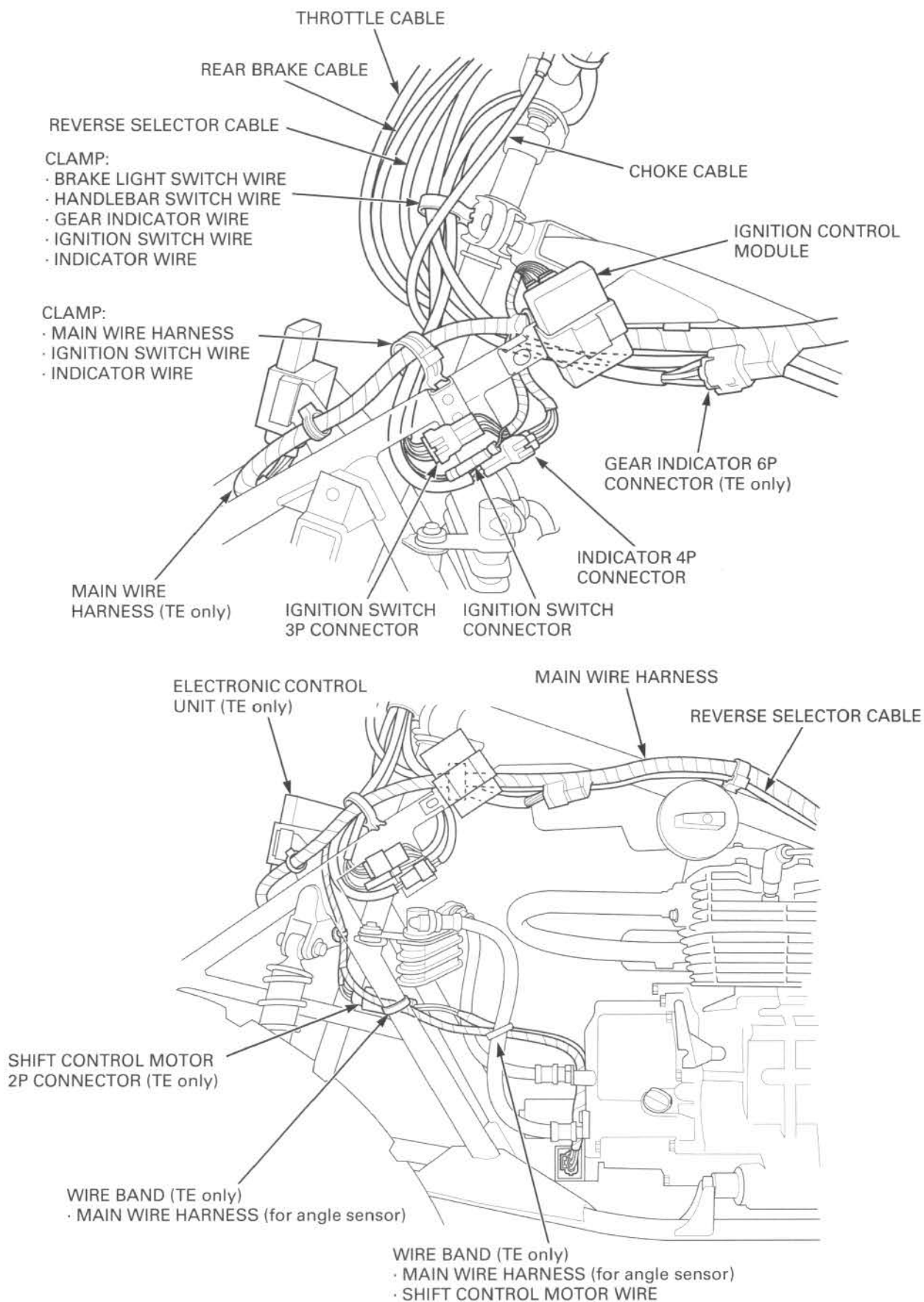
CABLE & HARNESS ROUTING



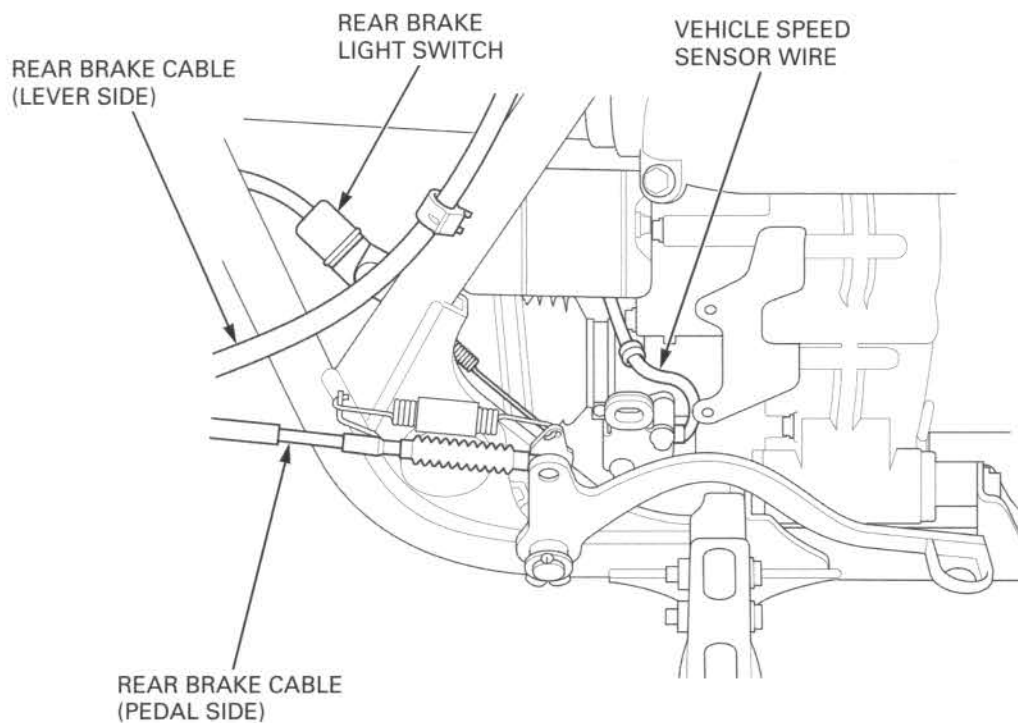
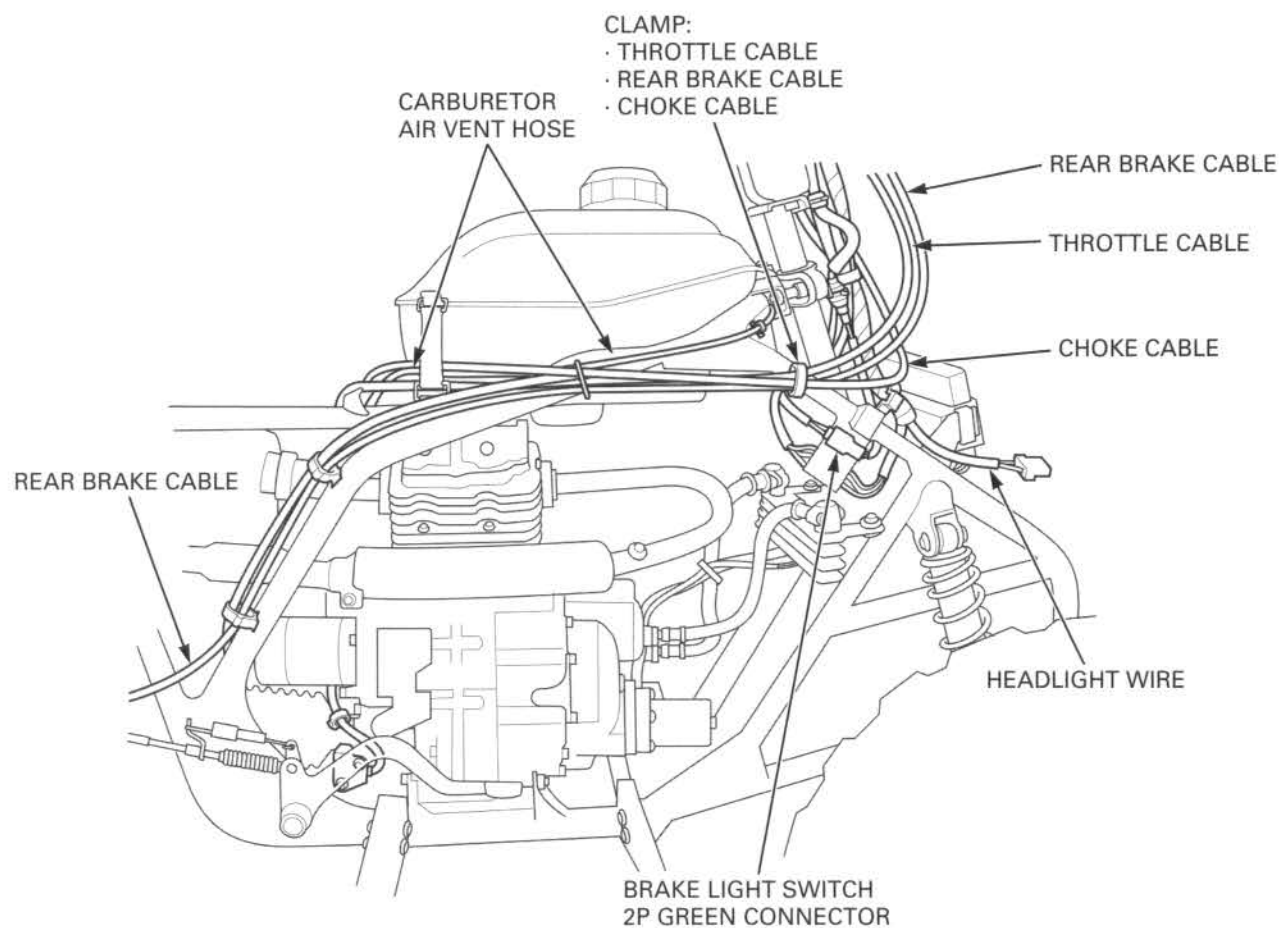


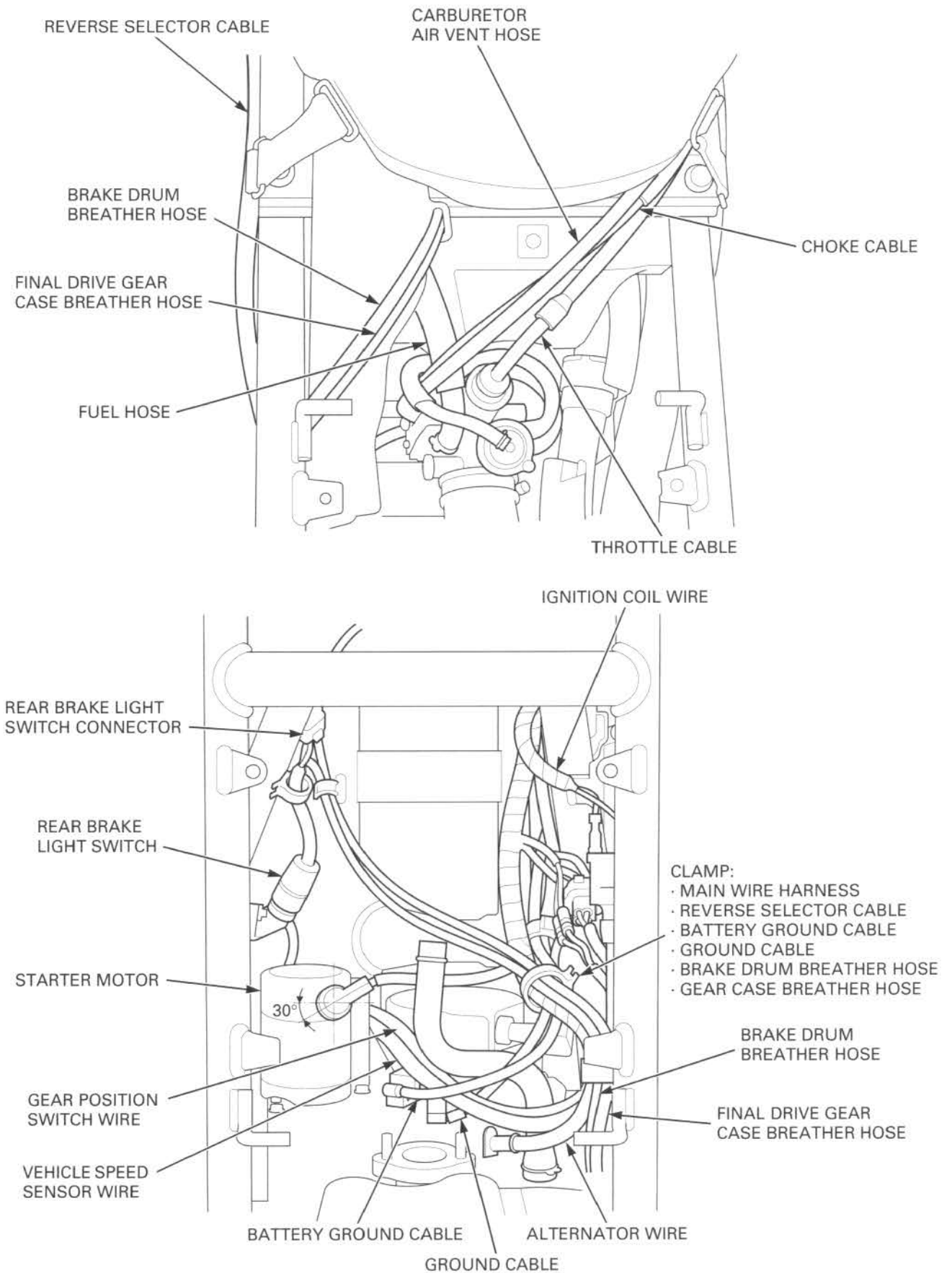






GENERAL INFORMATION

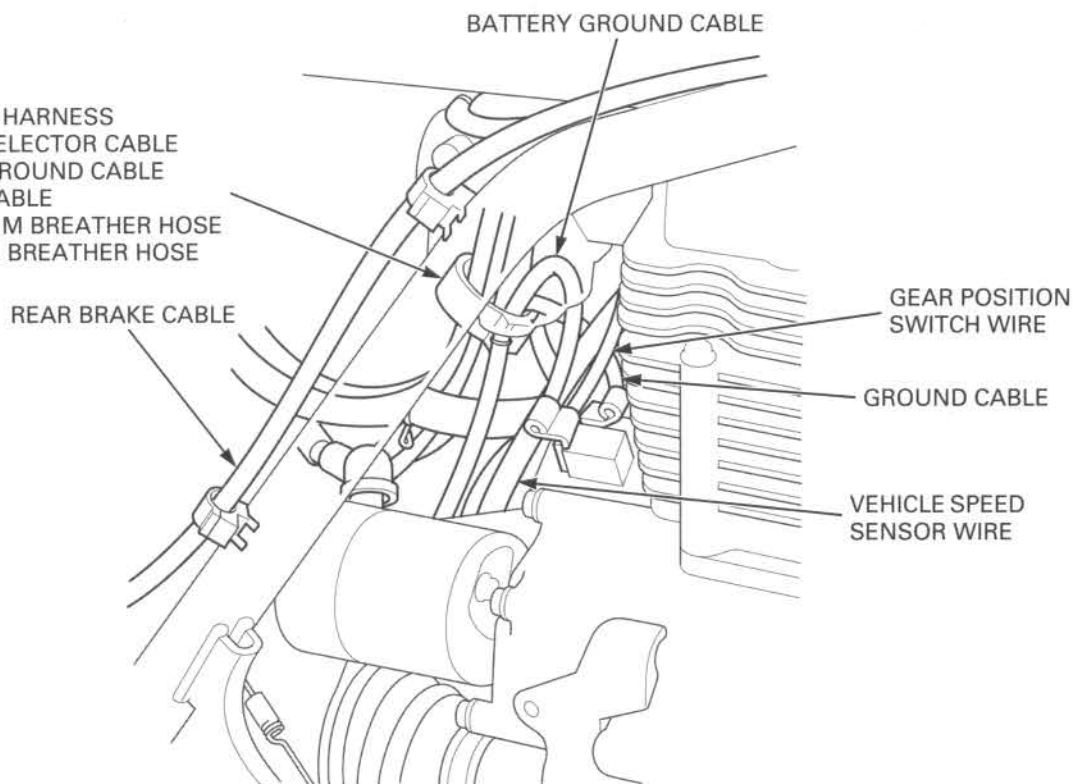




GENERAL INFORMATION

CLAMP:

- MAIN WIRE HARNESS
- REVERSE SELECTOR CABLE
- BATTERY GROUND CABLE
- GROUND CABLE
- BRAKE DRUM BREATHER HOSE
- GEAR CASE BREATHER HOSE



REGULATOR/
RECTIFIER

IGNITION COIL

ALTERNATOR 3P
RED CONNECTOR

CLAMP:

- MAIN WIRE HARNESS
- ALTERNATOR WIRE
- REVERSE SELECTOR CABLE
- GEAR CASE BREATHER HOSE
- BRAKE DRUM BREATHER HOSE
- VEHICLE SPEED SENSOR WIRE
- GEAR POSITION SWITCH WIRE

VEHICLE SPEED
SENSOR CONNECTOR

GEAR POSITION
SWITCH 6P
CONNECTOR

GEAR POSITION
SWITCH CONNECTORS

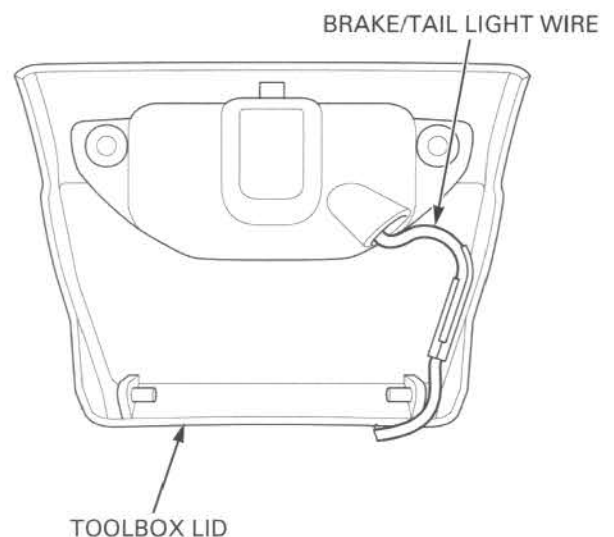
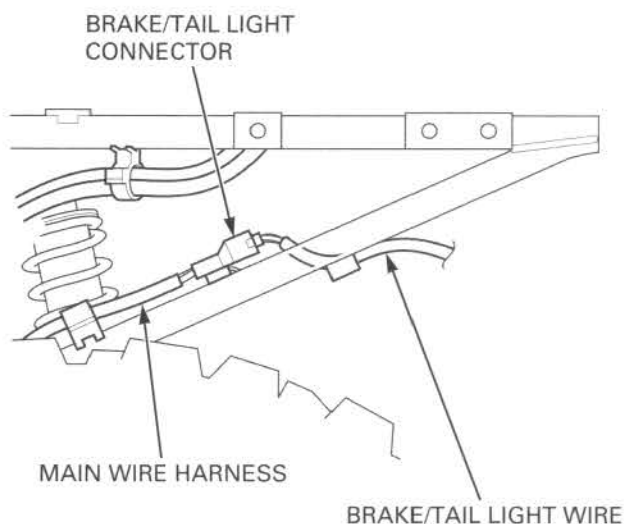
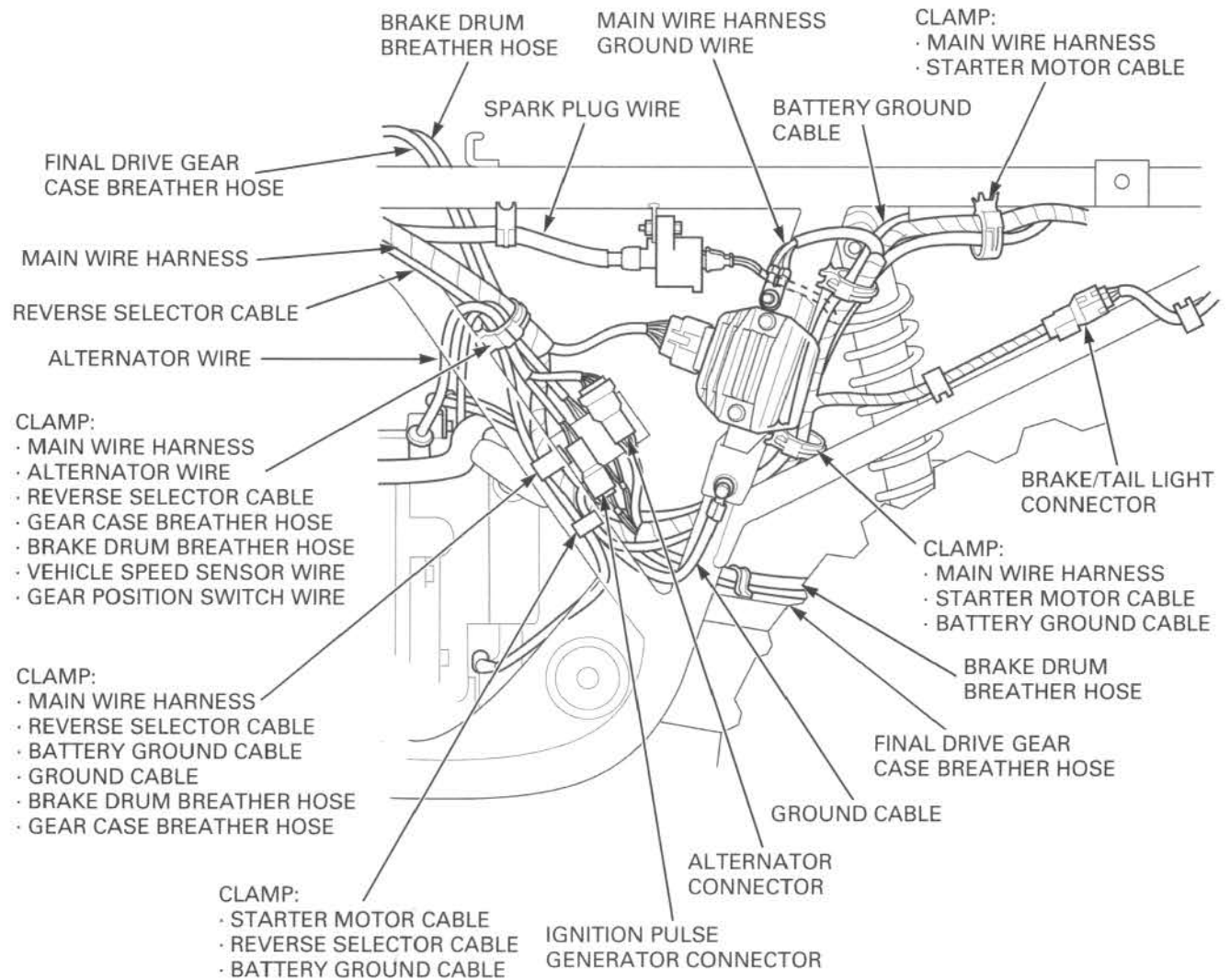
CLAMP:

- STARTER MOTOR CABLE
- REVERSE SELECTOR CABLE
- BATTERY GROUND CABLE

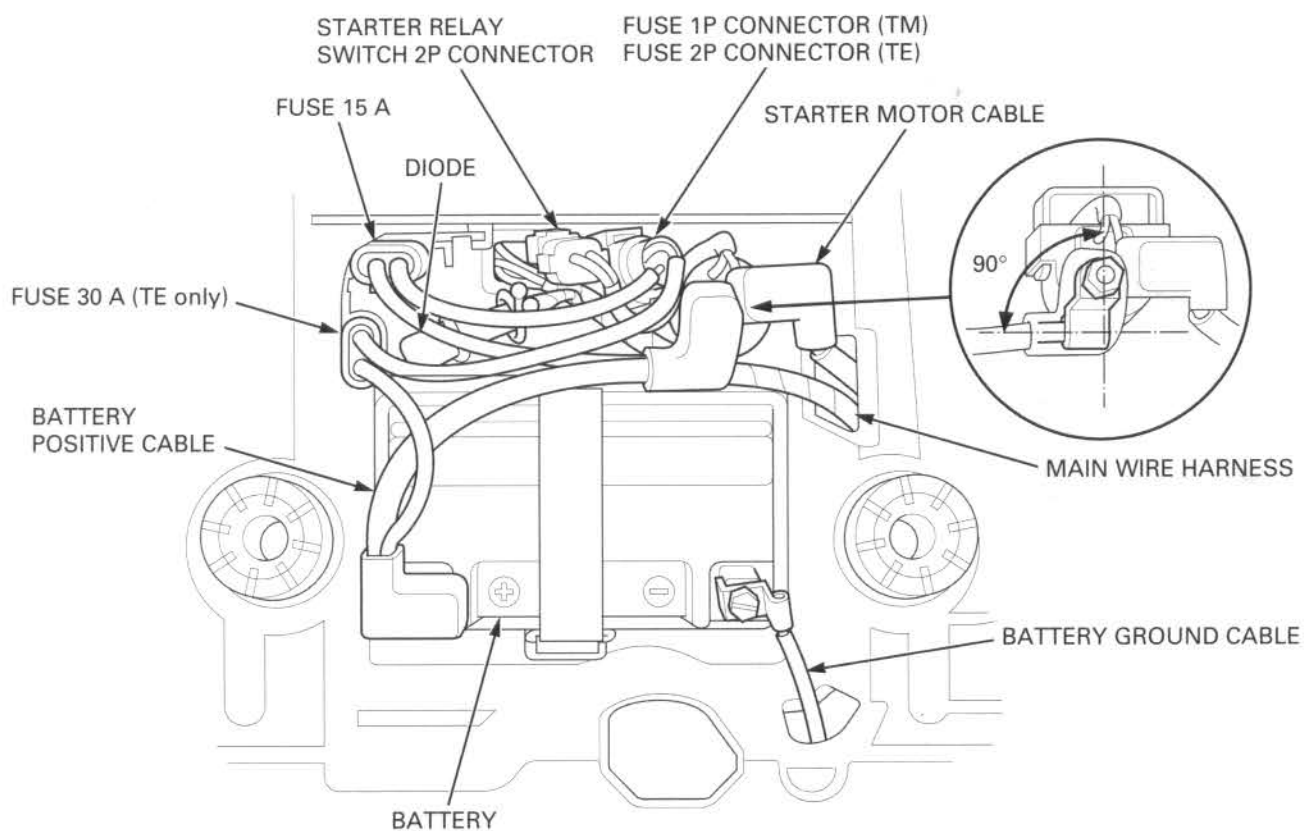
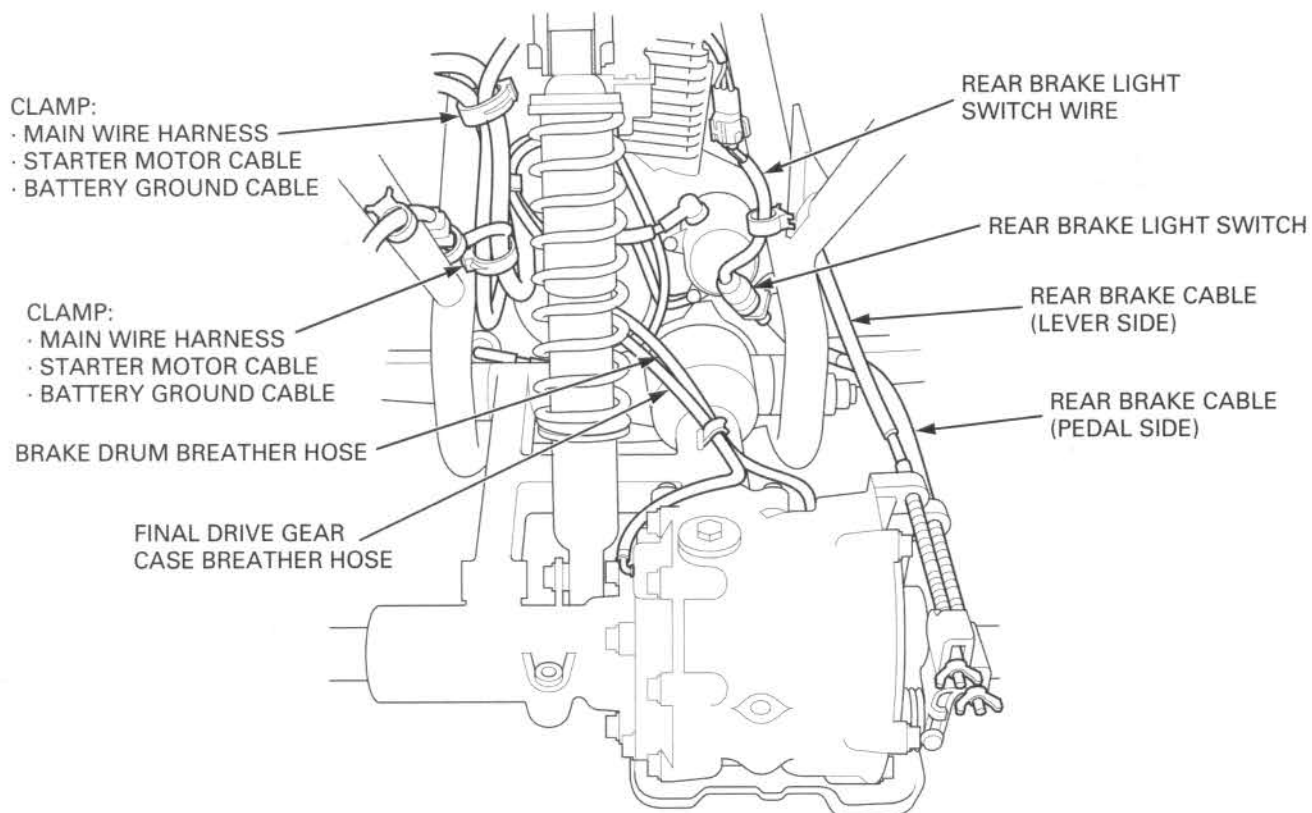
ALTERNATOR WIRE

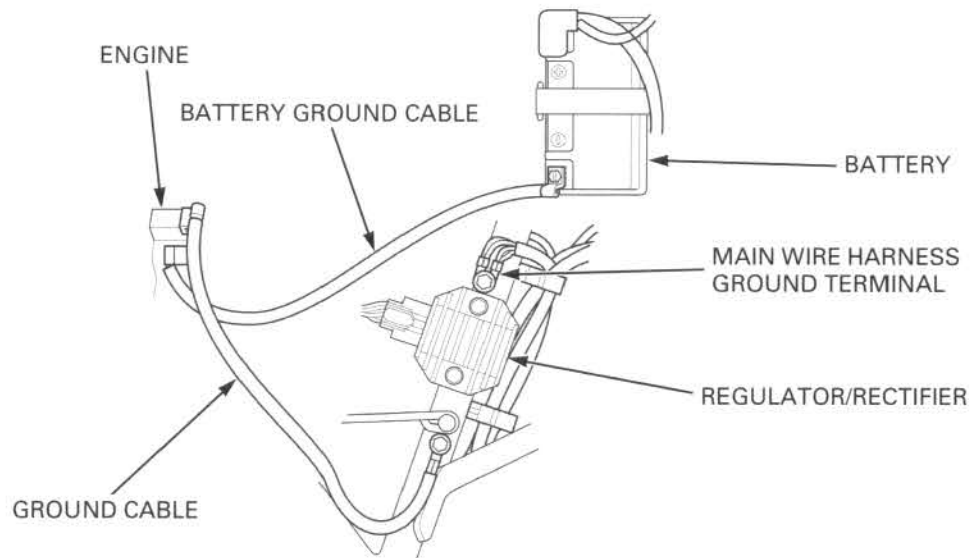
CLAMP:

- MAIN WIRE HARNESS
- REVERSE SELECTOR CABLE
- BATTERY GROUND CABLE
- GROUND CABLE
- BRAKE DRUM BREATHER HOSE
- GEAR CASE BREATHER HOSE

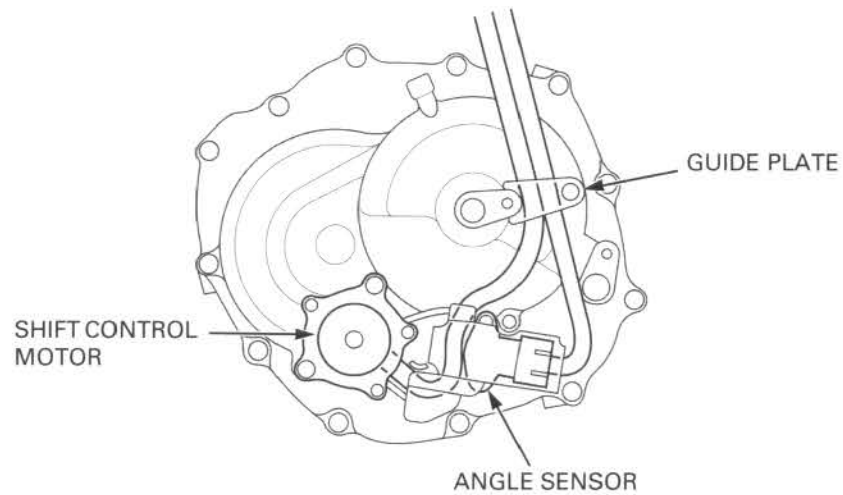


GENERAL INFORMATION

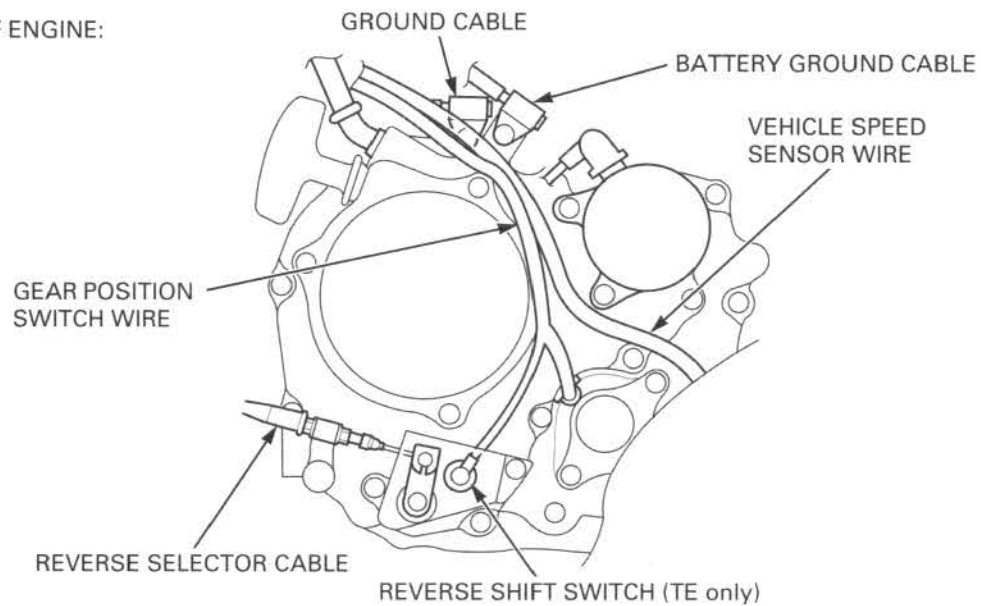




FRONT SIDE OF ENGINE (for TE):



REAR SIDE OF ENGINE:



GENERAL INFORMATION

EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) require that ATV comply with applicable exhaust emissions standards during its useful life, when operated and maintained according to the instruction provided.

SOURCE OF EMISSIONS

The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons. Control of hydrocarbons and oxides of nitrogen 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.

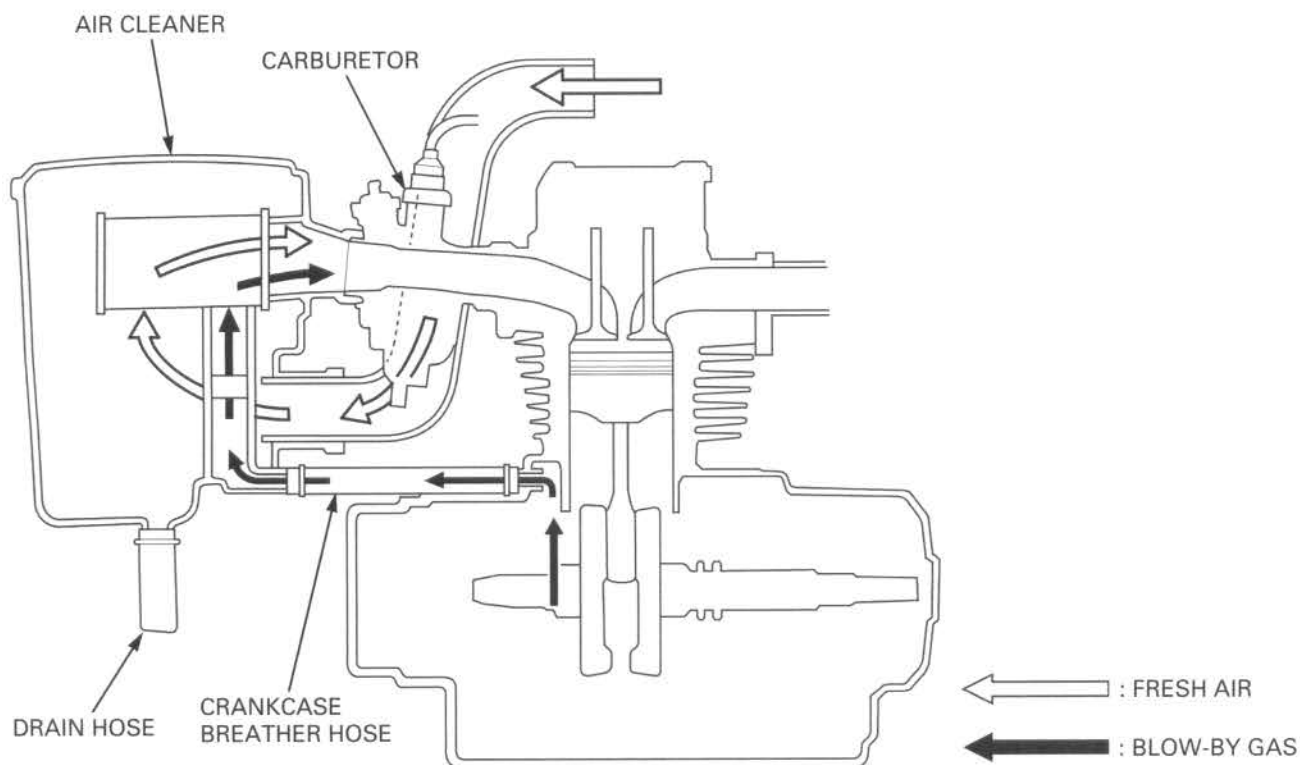
Honda Motor Co., Ltd. utilizes appropriate carburetor settings as well as other systems, to reduce oxides of nitrogen, carbon monoxide and hydrocarbons.

EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of an appropriate 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 systems.

CRANKCASE EMISSION CONTROL SYSTEM

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



SERVICING THE HONDA

U.S.A. only

Maintenance, replacement or repair of the emission control devices and system may be performed by any ATV repair establishment or individual using parts that are "certified" to EPA standards.

PROHIBITED ACTIONS

The following prohibitions apply to everyone with respect to the engine's emission control system.

You may not remove or disable any device or element of design that may affect an engine's emission levels. This restriction applies before and after the engine is placed in service.

NOISE EMISSION CONTROL SYSTEM (except U type)

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: State laws prohibit, or Canadian provincial laws may prohibit the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE FOLLOWING ACTS:

1. Removal of, or puncturing the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

NOISE EMISSION CONTROL SYSTEM (U type only)

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Laws may prohibit: (1) the removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

REBUILT ENGINE

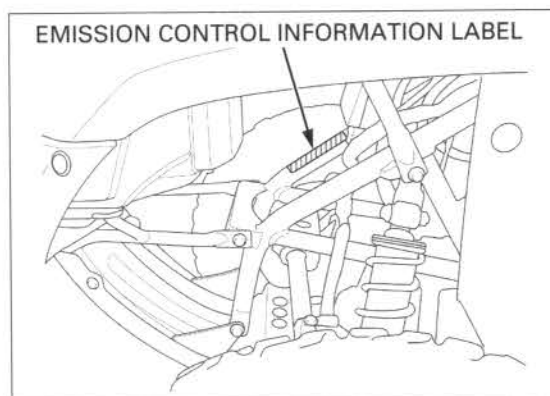
When you rebuild the engine including a major overhaul in which you replace the engine's piston or power assemblies or make other changes that significantly increase the service life of the engine, the vehicle will continue to comply with all emissions regulations if you:

- Make sure you are technically qualified to rebuild the engine and have the proper tools.
- Use only Genuine Honda parts or equivalents
- Make sure to maintain all specifications as described in this Service Manual.

GENERAL INFORMATION

EMISSION CONTROL INFORMATION LABEL (U.S.A. only)

The Vehicle Emission Control Information Label is attached on the right side frame down pipe.



2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-2	FRONT MUDGUARD.....	2-9
TROUBLESHOOTING	2-2	CENTER MUDGUARD.....	2-10
BODY PANEL LOCATIONS	2-3	STEP BAR.....	2-11
SEAT	2-4	REAR CARRIER	2-11
FUEL TANK COVER.....	2-5	REAR FENDER	2-12
SIDE COVERS	2-6	HANDLEBAR COVER	2-12
FRONT CARRIER/CARRY PIPE	2-7	EXHAUST SYSTEM.....	2-13
FRONT FENDER.....	2-8		

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the body panels and exhaust system.
- Always replace the gaskets when removing the exhaust system.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Muffler band bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)
Muffler cover bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Exhaust pipe cover bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Footpeg bolt (TM model)	32 N·m (3.3 kgf·m, 24 lbf·ft)
Footpeg bracket bolt (TE model)	32 N·m (3.3 kgf·m, 24 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

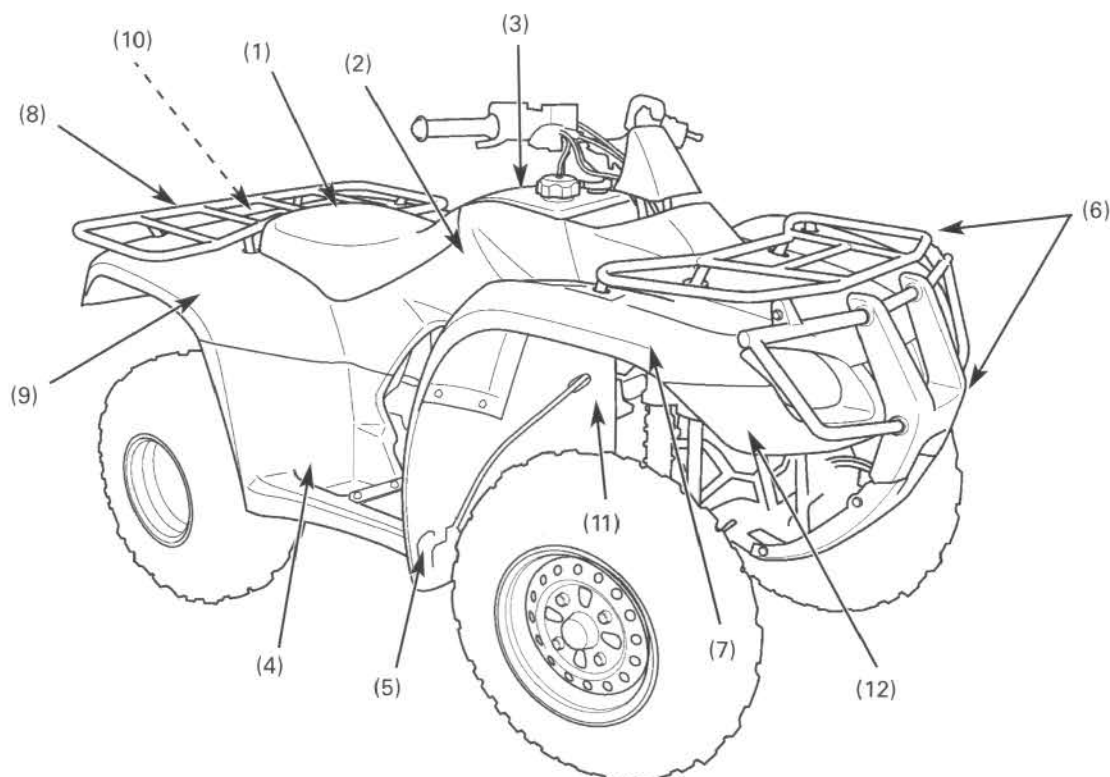
- Broken exhaust system
- Exhaust gas leaks

Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

BODY PANEL LOCATIONS

TRX250TE/TM



- (1) SEAT (page 2-4)
- (2) SIDE COVER (page 2-6)
- (3) FUEL TANK COVER (page 2-5)
- (4) CENTER MUDGUARD (page 2-10)
- (5) FRONT MUDGUARD (page 2-9)
- (6) FRONT CARRIER/CARRY PIPE (page 2-7)

- (7) FRONT FENDER (page 2-8)
- (8) REAR CARRIER (page 2-11)
- (9) REAR FENDER (page 2-12)
- (10) TOOLBOX (page 2-12)
- (11) INNER FENDER (page 2-8)
- (12) HEADLIGHT GRILL (page 2-8)

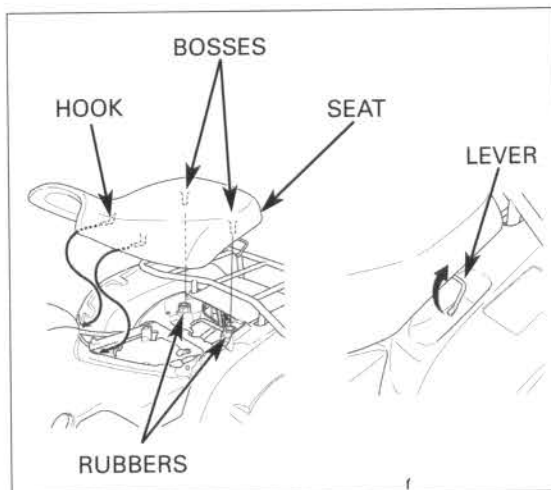
SEAT

REMOVAL

Unlock the seat by turning the release lever upward.
Pull the seat back and remove it.

INSTALLATION

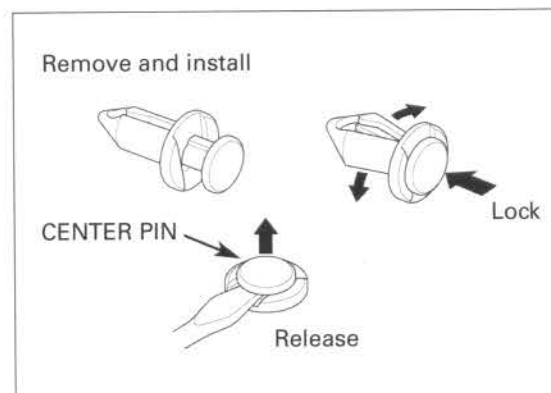
Install the seat by inserting the hooks into the seat retainers on the frame.
Push the seat forward and align the mounting bosses with the mounting rubbers, then press down to lock it.



Trim clip removal and retaining procedure:

When installing the trim clip, carefully align the clip holes to avoid damaging the clip.

- Release by pulling the center pin up using snap ring pliers or a flat blade screwdriver and remove the trim clip.
- Install the clip and lock it by pushing the center pin securely.



FUEL TANK COVER

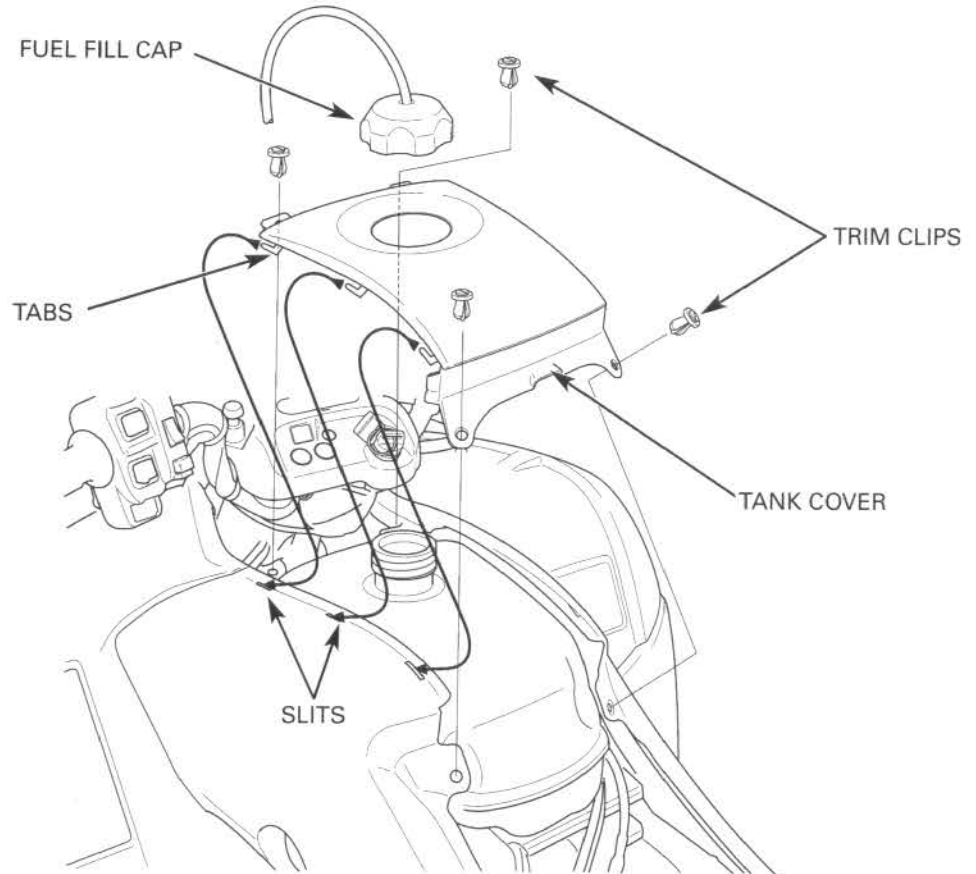
Remove the seat (page 2-4).

Remove the following:

- four trim clips
- fuel fill cap
- fuel tank cover (release six tabs by sliding cover rearward and pulling up)

Install the fuel fill cap.

Installation is in the reverse order of removal.



SIDE COVERS

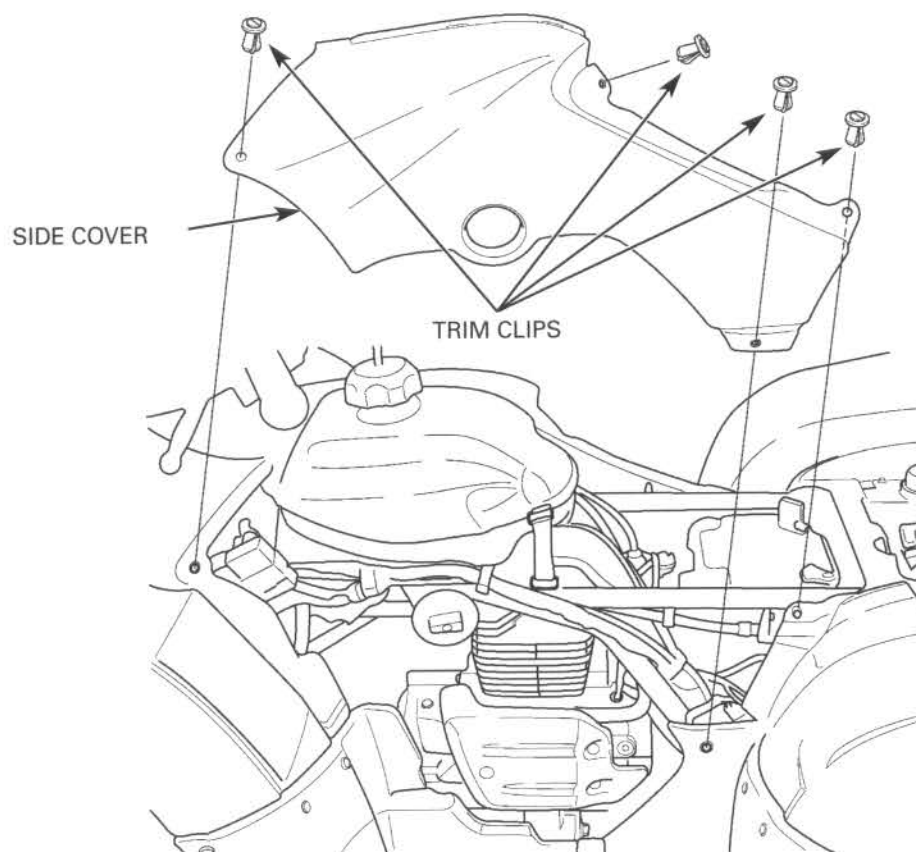
Remove the seat (page 2-4).

Remove the fuel tank cover (page 2-5).

Remove the following:

- four trim clips
- side cover

Installation is in the reverse order of removal.



FRONT CARRIER/CARRY PIPE

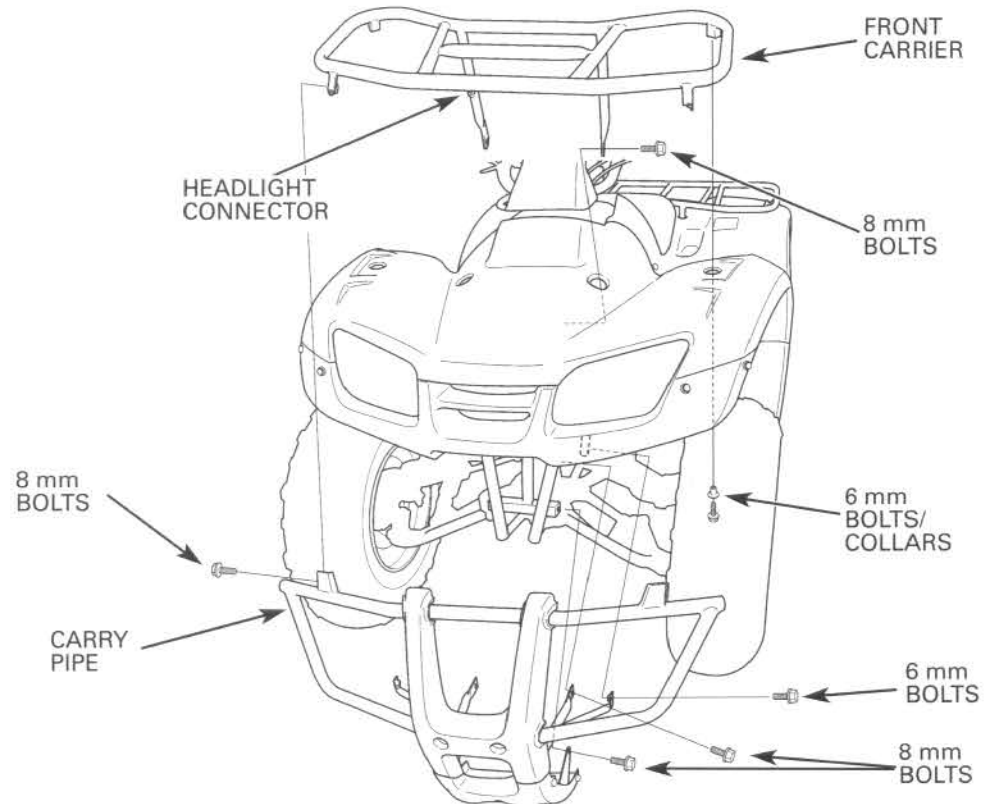
Remove the front headlight connector from the front carrier down pipe.

Be careful not to scratch the front fender.

Remove the following:

- two 6 mm bolts and collars
- four 8 mm bolts and front carrier
- two 6 mm bolts
- four 8 mm bolts and carry pipe

Installation is in the reverse order of removal.



FRONT FENDER

REMOVAL

Remove the following:

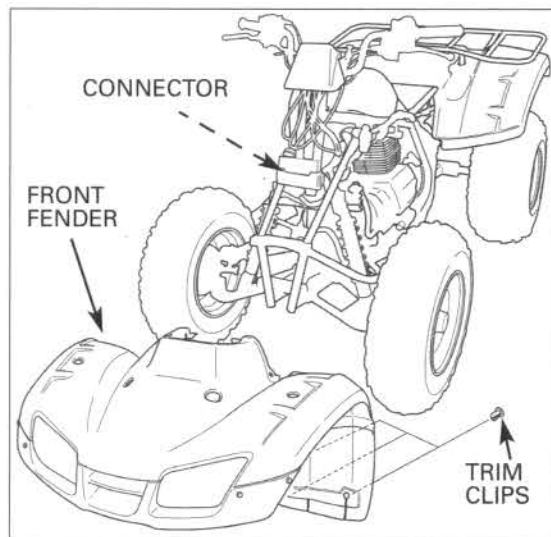
- seat (page 2-4)
- fuel tank cover (page 2-5)
- side covers (page 2-6)
- front carrier/front carry pipe (page 2-7)
- four trim clips

Disconnect the headlight connector.

Remove the four bolts, then remove the front fender stays.

Remove the front fender.

Installation is in the reverse order of removal.

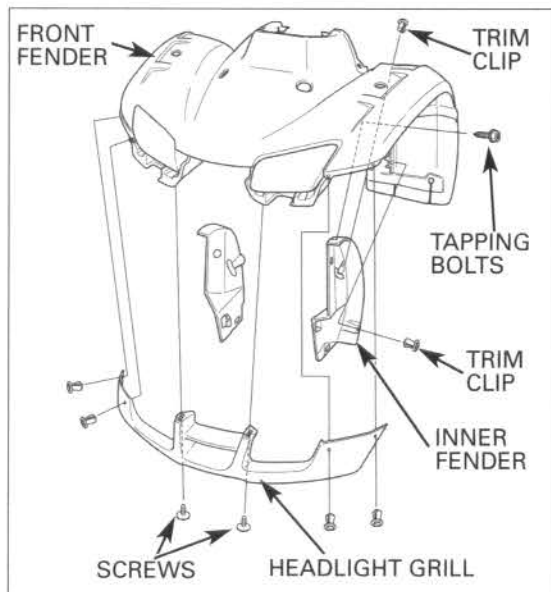


DISASSEMBLY

Remove the following:

- two screws
- four trim clips
- headlight grill
- two tapping bolts
- four trim clips
- inner fenders

Remove the front mudguard (page 2-9).

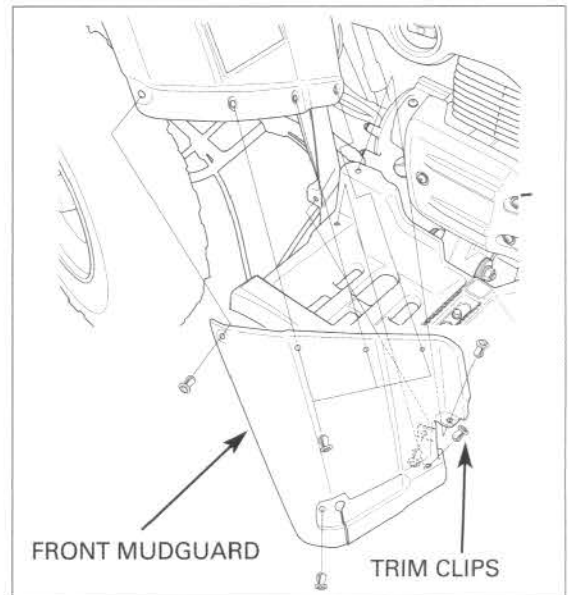


FRONT MUDGUARD

Remove the following:

- eight trim clips
- front mudguard

Installation is in the reverse order of removal.



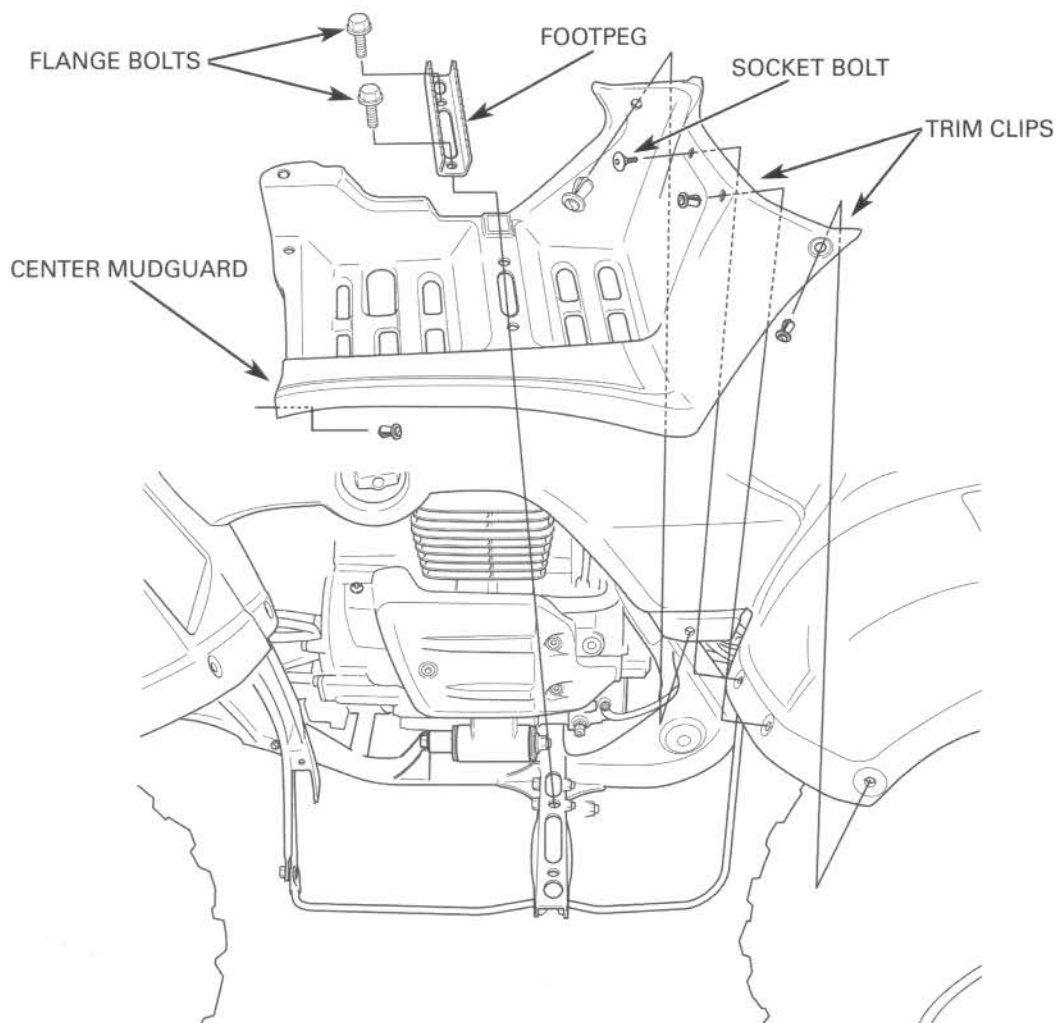
CENTER MUDGUARD

Remove the front mudguard (page 2-9).

Remove the following:

- four trim clips
- two flange bolts
- center mudguard

Installation is in the reverse order of removal.



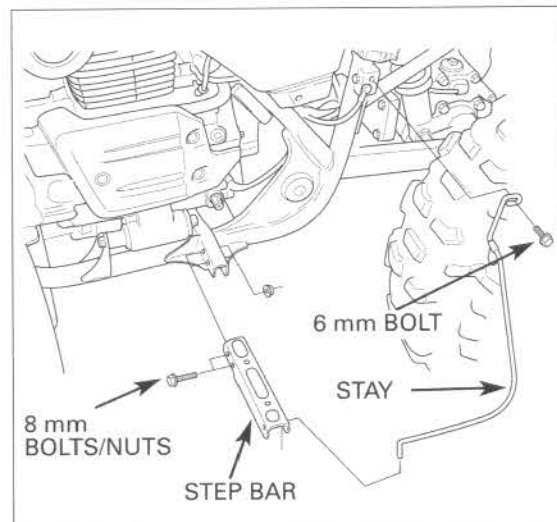
STEP BAR

Remove the center mudguard (page 2-10).

Remove the following:

- 6 mm bolt
- rear mudguard stay
- two 8 mm bolts/nuts
- step bar

Installation is in the reverse order of removal.

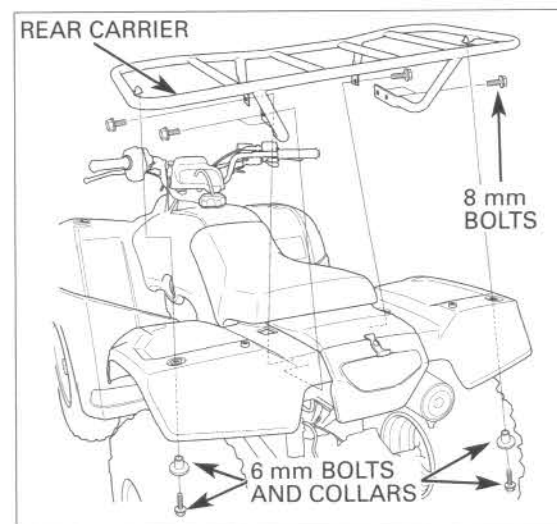


REAR CARRIER

Remove the following:

- two 6 mm bolts and collars
- six 8 mm bolts and rear carrier

Installation is in the reverse order of removal.



REAR FENDER

Do not allow the rear fender to contact the muffler when the exhaust system is hot.

Remove the following:

- seat (page 2-4)
- side covers (page 2-6)
- center mudguard (page 2-10)
- rear carrier (page 2-11)
- battery (page 16-6)

Pull and remove the toolbox cover.

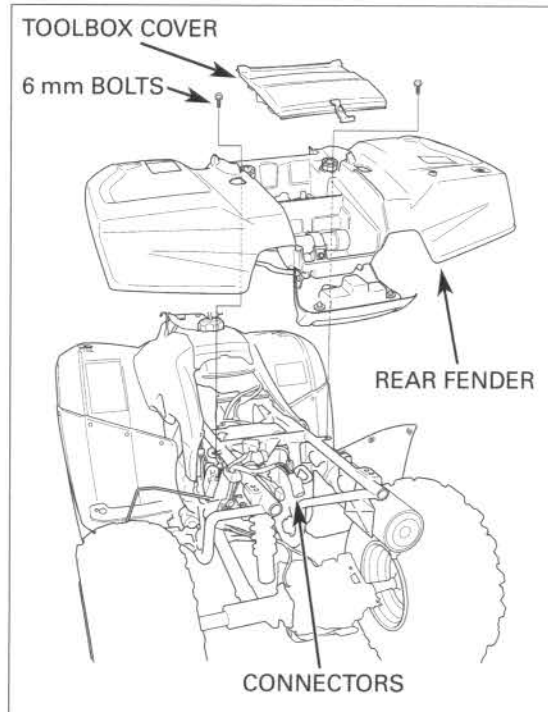
Disconnect the starter relay connector, main fuse-white connector and taillight connector.

Release the main wire harness from the clamp and pull it out of the rear fender.

Disconnect the starter cable from the starter relay switch.

Remove the two 6 mm bolts and the rear fender.

Installation is in the reverse order of removal.



HANDLEBAR COVER

Remove the front fender (page 2-8).

Remove the fuel tank air vent hose.

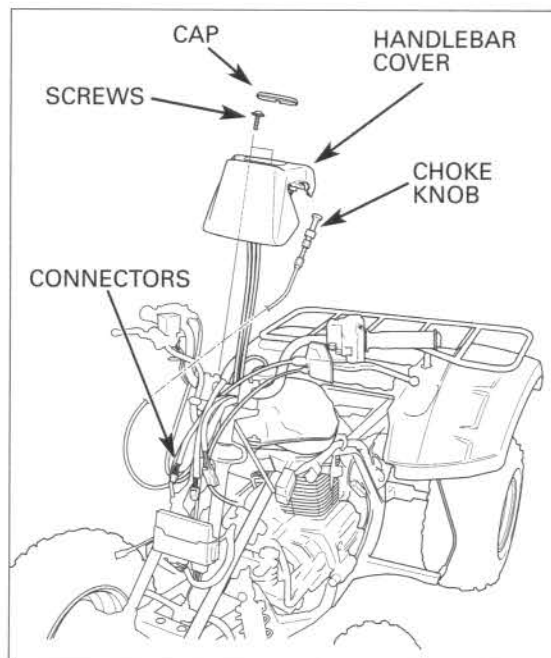
Loosen the choke knob lock nut and remove the choke knob from the handlebar cover.

Disconnect the neutral/reverse indicator, gear position indicator, and ignition switch connectors.

Remove the handlebar cover cap.

Remove the two screws and handlebar cover.

Installation is in the reverse order of removal.



EXHAUST SYSTEM

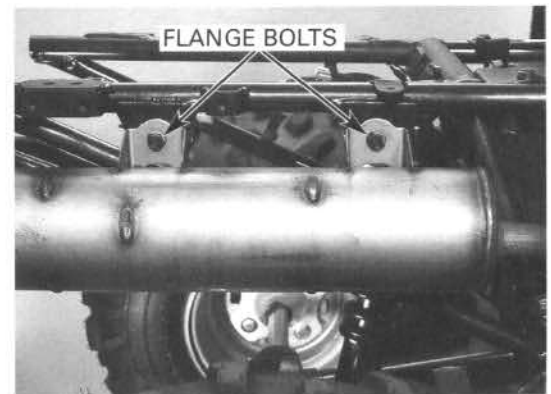
REMOVAL

MUFFLER

Loosen the muffler band bolt.

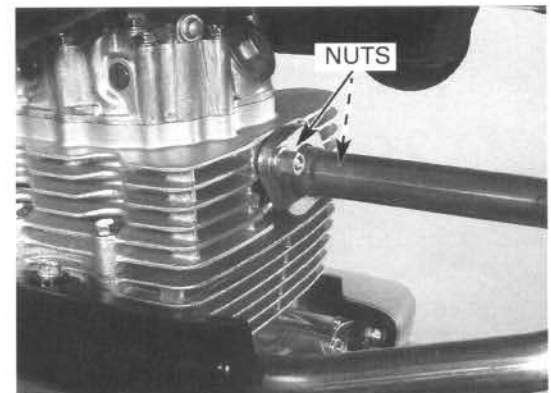


Remove the flange bolts, muffler, and gasket.



EXHAUST PIPE

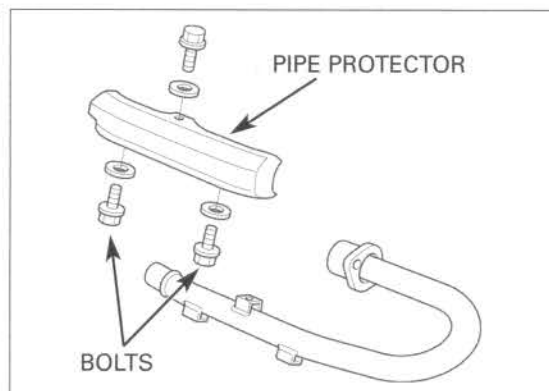
Remove the exhaust pipe joint flange nuts and exhaust pipe.



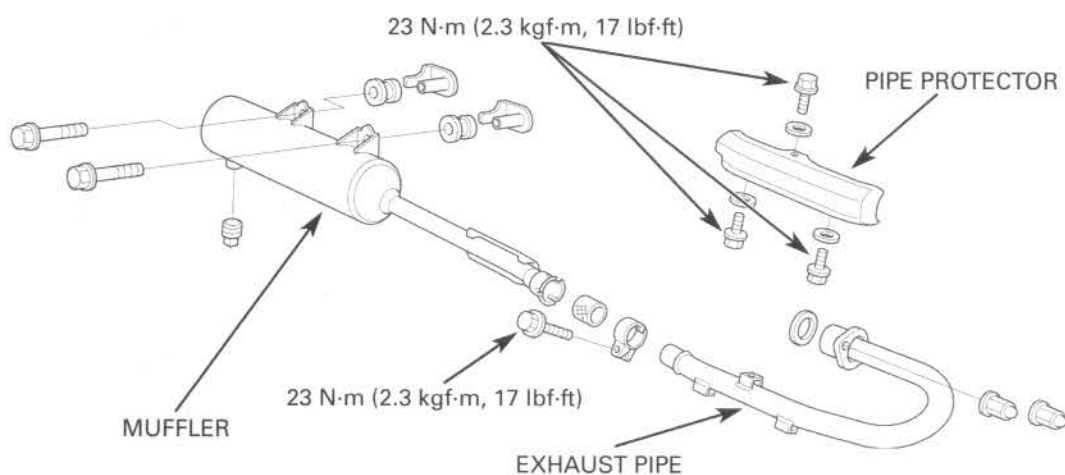
FRAME/BODY PANELS/EXHAUST SYSTEM

DISASSEMBLY

Remove the three bolts and the exhaust pipe protector.

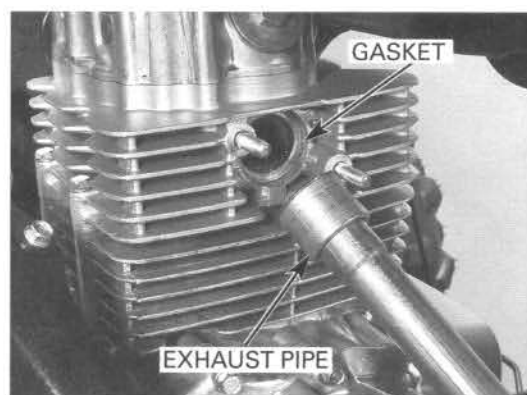


ASSEMBLY

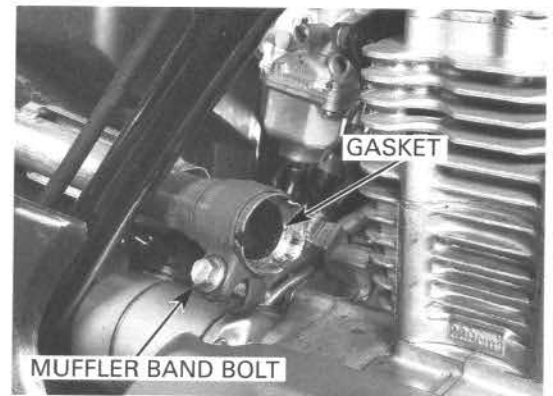


INSTALLATION

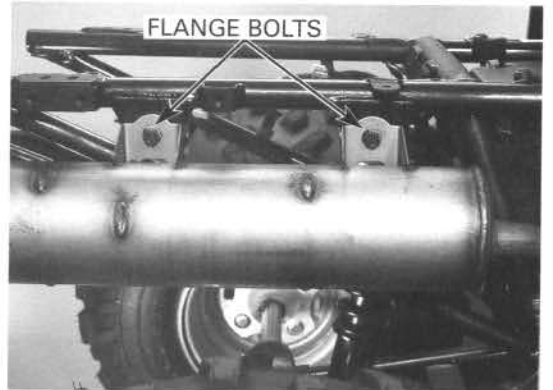
Install a new exhaust gasket into the cylinder head.
Install the exhaust pipe and loosely tighten the flange nuts.



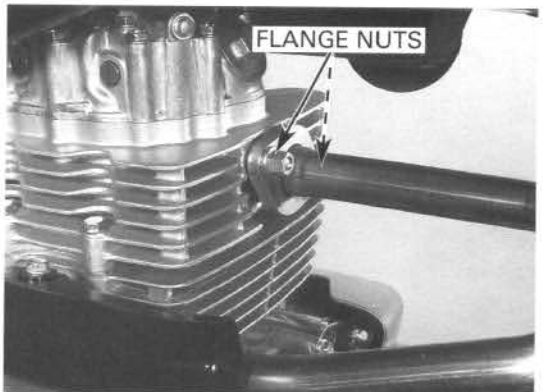
Install the new muffler gasket and loosely install the muffler band bolt.



Install the muffler and loosely install the two flange bolts.



Tighten the exhaust pipe flange nuts.



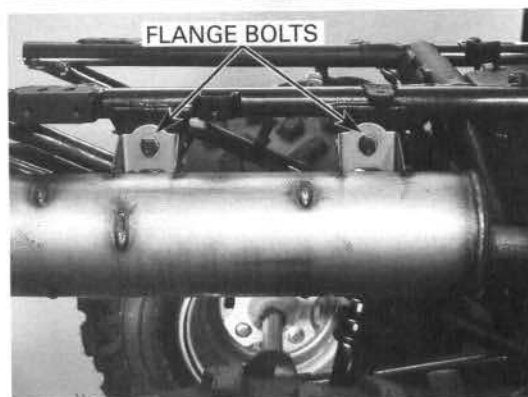
Tighten the muffler band bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



FRAME/BODY PANELS/EXHAUST SYSTEM

Tighten the two flange bolts holding the muffler to the frame.



SERVICE INFORMATION	3-2	BRAKE FLUID.....	3-16
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AIR CLEANER HOUSING DRAIN PLUG	3-8	CLUTCH SYSTEM.....	3-20
SPARK PLUG	3-8	SUSPENSION	3-21
VALVE CLEARANCE.....	3-9	SPARK ARRESTER	3-21
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ENGINE OIL CENTRIFUGAL FILTER.....	3-13	STEERING SHAFT HOLDER BEARING	3-22
ENGINE IDLE SPEED	3-14	STEERING SYSTEM	3-23
REAR FINAL GEAR CASE OIL	3-14		

MAINTENANCE

SERVICE INFORMATION

GENERAL

- 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 freeplay			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)
Engine idle speed			1,400 ± 100 rpm
Engine oil capacity	At draining		1.5 liters (1.6 US qt, 1.3 Imp qt)
	At disassembly		1.9 liters (2.0 US qt, 1.7 Imp qt)
Recommended engine oil			Pro Honda GN4 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
			NEW
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 freeplay			25 – 30 mm (1 – 1-1/4 in)
Rear (parking) brake lever freeplay			15 – 20 mm (5/8 – 3/4 in)
Brake pedal freeplay			15 – 20 mm (5/8 – 3/4 in)
Reverse selector lever freeplay			2 – 4 mm (1/16 – 1/8 in)
Tire size	Front		AT22 x 7-11 ★
	Rear		AT22 x 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

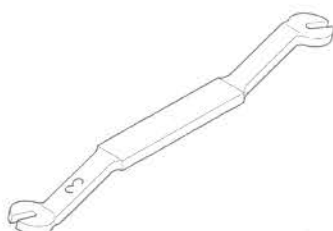
Oil drain bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)
Valve adjuster lock nut	17 N·m (1.7 kgf·m, 12 lbf·ft)
Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)
Final gear case oil drain bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Final gear case oil cap	12 N·m (1.2 kgf·m, 9 lbf·ft)
Final 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	20 N·m (2.0 kgf·m, 14 lbf·ft)

Apply oil to the threads.

Apply oil to the threads.

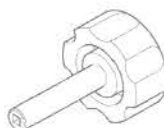
TOOLS

Valve adjusting wrench, 3 mm
07908-KE90200



(U.S.A. only) or

Valve adjusting wrench, 10 mm
07708-0030400




MAINTENANCE

MAINTENANCE SCHEDULE

TRX250 TM/TE:

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

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

ITEMS	FREQUENCY	WHICHEVER COMES FIRST  NOTE		INITIAL MAINTENANCE	REGULAR MAINTENANCE INTERVAL		REFER TO PAGE
					mi	1,200	
					km	2,000	
			HOURS		20	100	200
EMISSION RELATED ITEMS	* FUEL HOSE					I	3-5
	* THROTTLE OPERATION					I	3-5
	* CARBURETOR CHOKE					I	3-6
	AIR CLEANER	NOTE 1			C	C	3-6
	AIR CLEANER HOUSING	NOTE 2			I	I	3-8
	DRAIN HOSE				I	I	3-8
	SPARK PLUG				I	I	3-9
	* VALVE CLEARANCE			I	I	I	3-11
	ENGINE OIL			R	R	R	3-14
	* ENGINE IDLE SPEED			I	I	I	3-14
NON-EMISSION RELATED ITEMS	REAR FINAL GEAR CASE OIL				(R: Every 2 years)	I	3-14
	* BRAKE FLUID	NOTE 3			I	I	3-16
	* BRAKE SHOE WEAR	NOTE 1				I	3-16
	BRAKE LIGHT SWITCH			I	I	I	3-17
	BRAKE SYSTEM			I	I	I	3-17
	* REVERSE LOCK SYSTEM			I	I	I	3-19
	SKID PLATES				I	I	3-20
	* CLUTCH SYSTEM			I	I	I	3-20
	* SUSPENSION				I	I	3-21
	* SPARK ARRESTER				C	C	3-21
	* NUTS, BOLTS, FASTENERS			I		I	3-22
	** WHEELS/TIRES			I	I	I	3-22
	** STEERING SHAFT HOLDER BEARING					I	3-22
	** STEERING SYSTEM					I	3-23

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

** In the interest of safety, we recommend these items be serviced only by your Honda dealer.

NOTES:

1. Service more frequently if the ATV is ridden in dusty areas, sand or snow.
2. Service more frequently if the ATV is ridden in very wet or muddy conditions.
3. Replace every 2 years. Replacement requires mechanical skill.

FUEL HOSE

Remove the seat (page 2-4).

Check the fuel hose.

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 12-10).

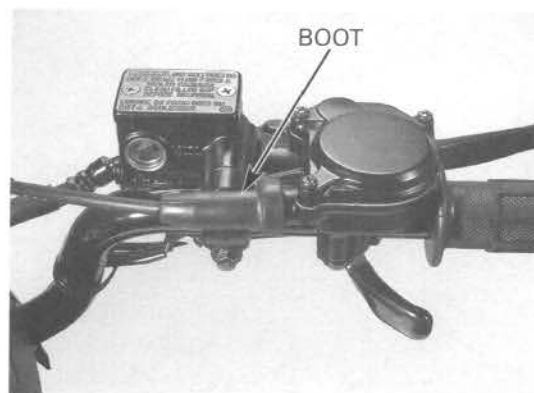
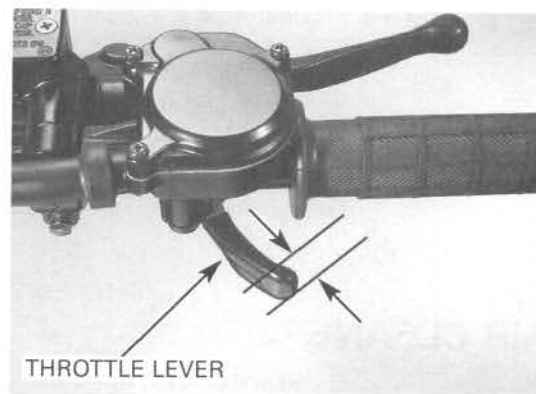
Thoroughly lubricate the cable and pivot point with a commercially available cable lubricant.

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.

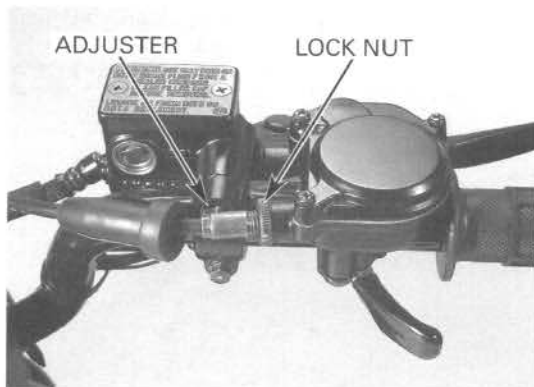
Throttle lever free play can be adjusted at throttle housing adjuster.

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.



MAINTENANCE

CARBURETOR CHOKE

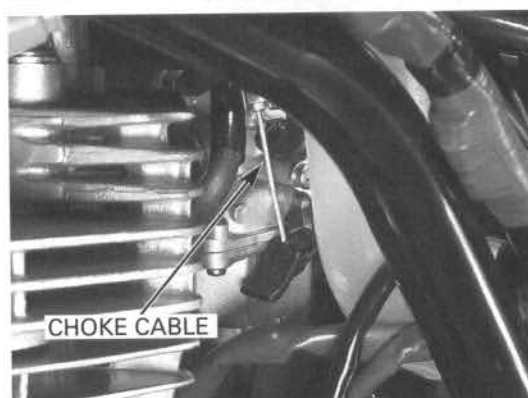
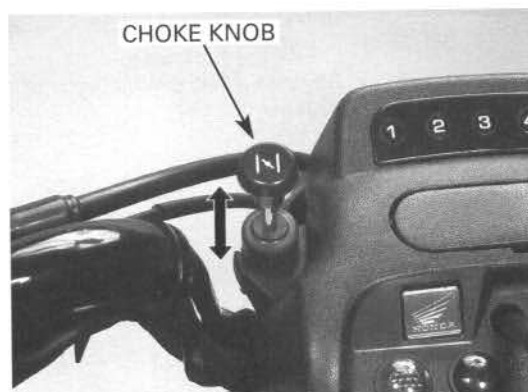
On a manual choke system, check to see if the choke knob can be opened and closed completely.

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.

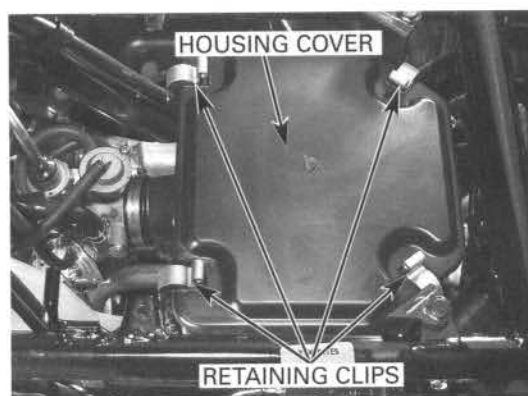
If the amount of free play is not sufficient, loosen the cable clamp screw and adjust the play of the inner cable by moving the position of the outer cable. Tighten the cable clamp securely when the adjustment is complete.



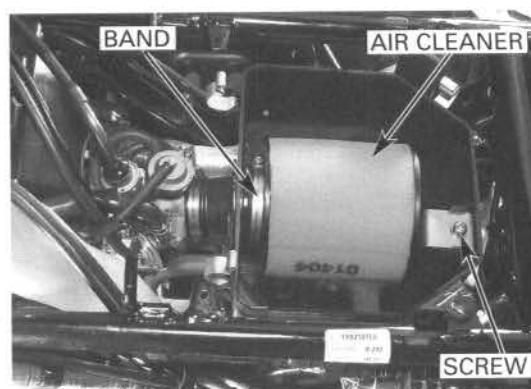
AIR CLEANER

Remove the seat (page 2-4).

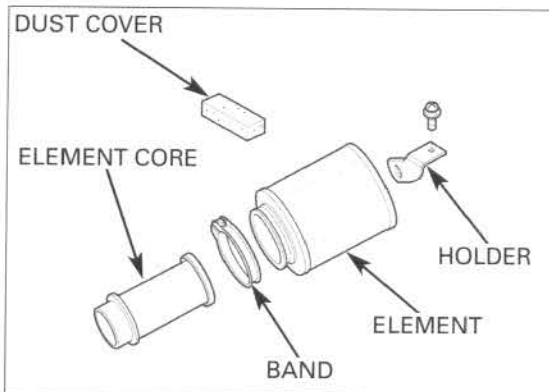
Release the retaining clips from the air cleaner housing cover and remove the cover.



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.

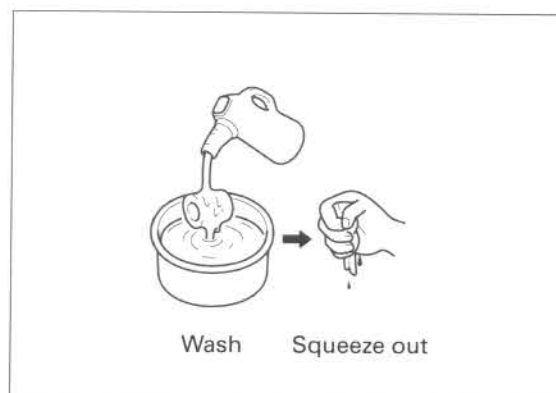


DUST COVER

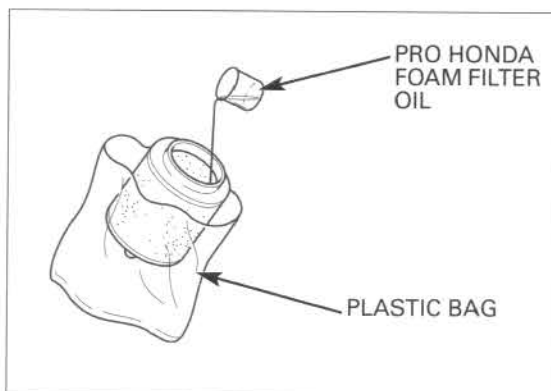
Do not crush the dust cover.

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

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



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

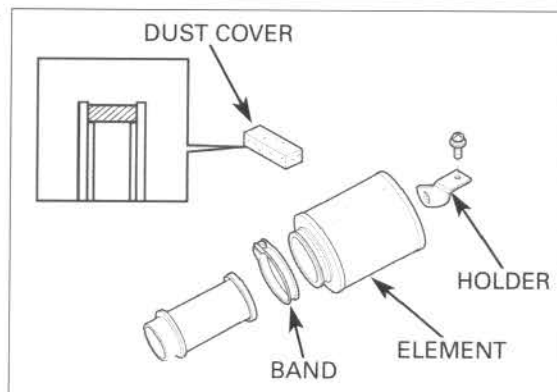


Place the element onto the core and replace the element band and holder.

Do not crush the dust cover.

Install the element in the air cleaner housing, and tighten the band.
Install the dust cover.

Install the air cleaner housing cover and secure with the clips.
Install the seat (page 2-4).



MAINTENANCE

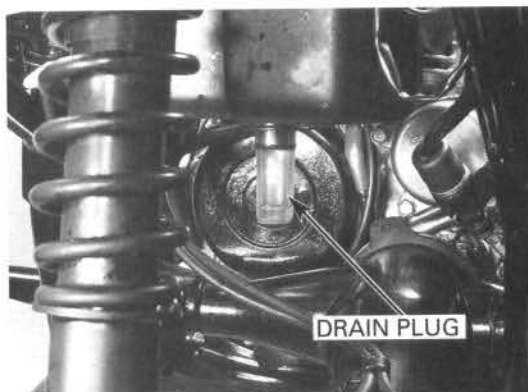
AIR CLEANER HOUSING DRAIN PLUG

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

Install the drain plug and clip.

NOTE:

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



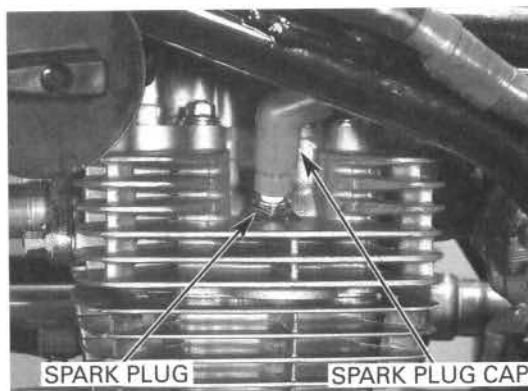
SPARK PLUG

Disconnect the spark plug cap and remove the spark plug.

NOTE:

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

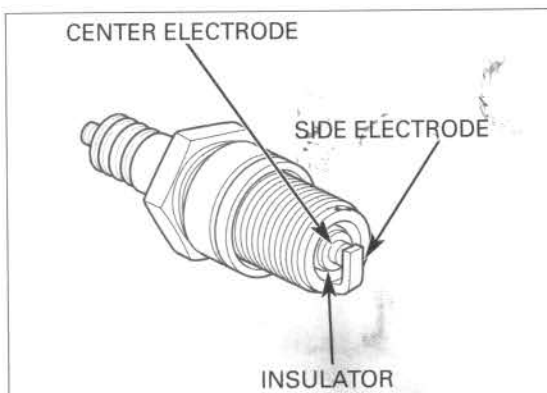
Remove the spark plug and inspect or replace as described in the maintenance schedule.



INSPECTION

Check the following and replace if necessary (recommended spark plug: page 3-2).

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



REUSING 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)

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)

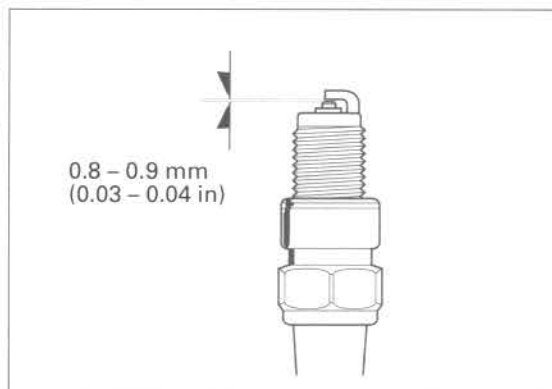
REPLACING A SPARK PLUG

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

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.

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

Do not overtighten the spark plug.

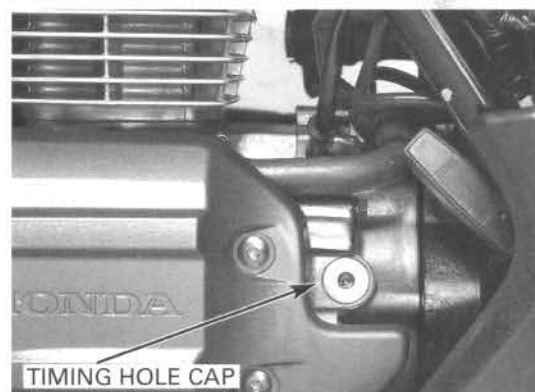
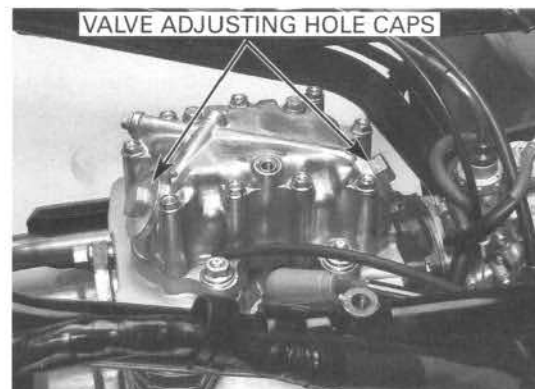


VALVE CLEARANCE

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

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.

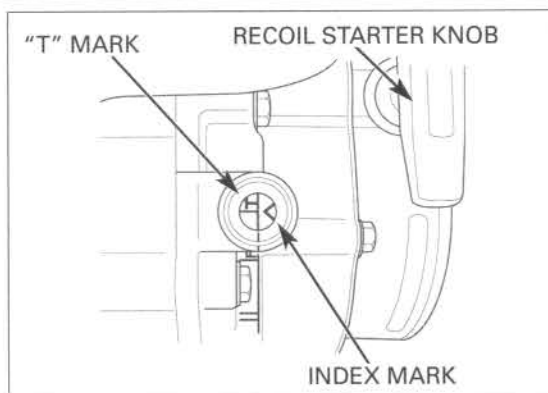


MAINTENANCE

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.

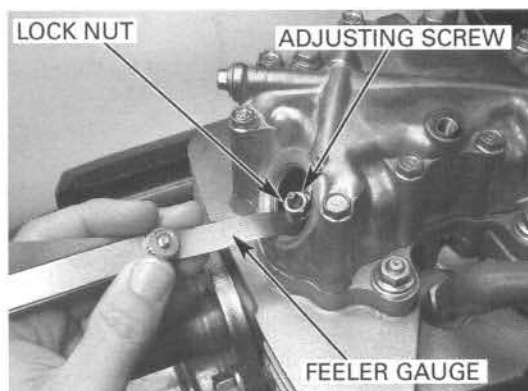
If the piston is not at TDC, rotate the crankshaft 360° (1 full turn) and align the "T" mark with the index mark.



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:

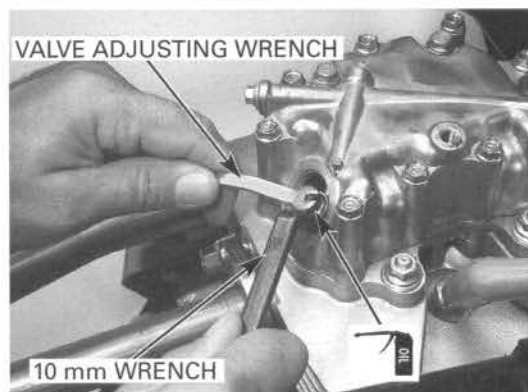
Valve adjusting wrench, 3 mm 07908-KE90200 (U.S.A. only) or

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

07708-0030400

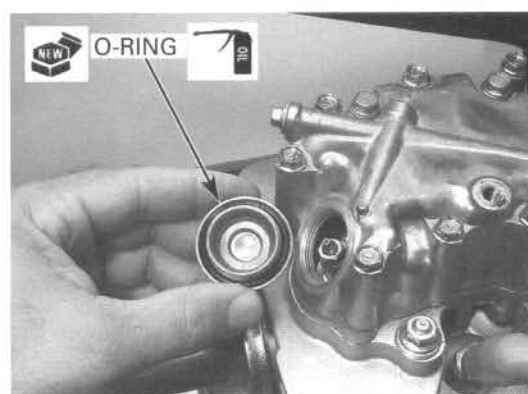
TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)

After tightening the lock nut, recheck the valve clearance.

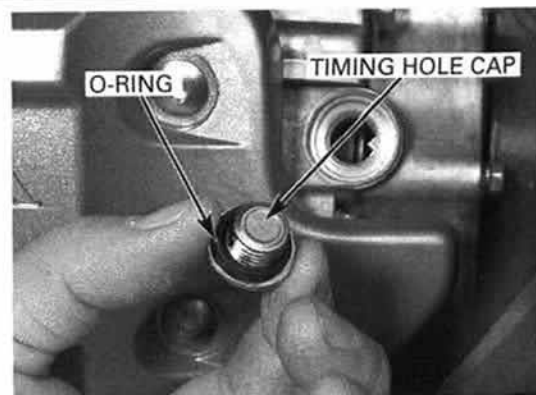


Coat the new O-rings with engine oil and install them onto the valve adjusting hole caps. Install the hole caps and tighten them to the specified torque.

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).

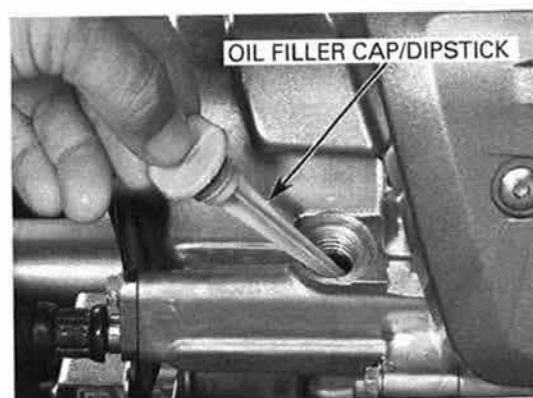


ENGINE OIL

OIL LEVEL INSPECTION

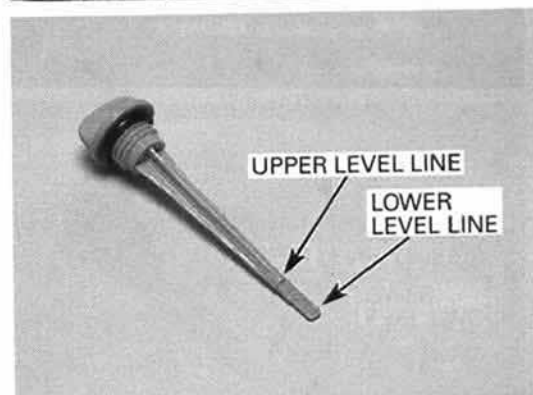
Place the vehicle on level ground.

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:

Pro Honda GN4 4-stroke oil or equivalent motor oil

API service classification: SG or Higher

JASO T 903 standard: MA

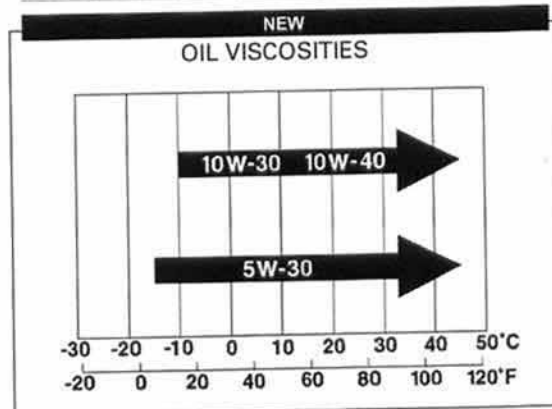
Viscosity: SAE 10W-30

NEW

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.



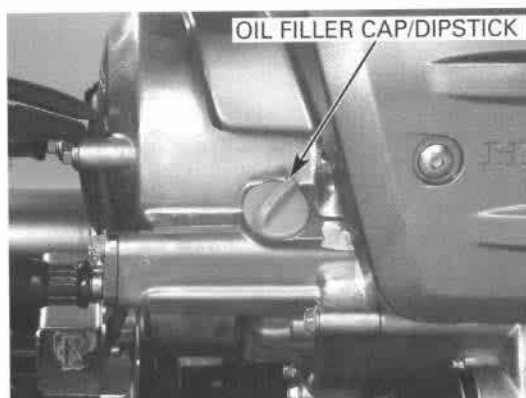
MAINTENANCE

ENGINE OIL CHANGE

Warm up the engine.

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.

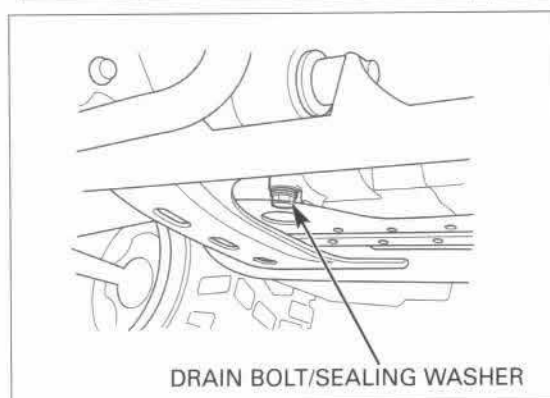


Check that the sealing washer on the drain bolt is in good condition, replace if necessary.
Install and tighten the drain bolt.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Fill the crankcase with the recommended engine oil.

OIL CAPACITY (at draining):
1.5 liter (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 leaks.



ENGINE OIL STRAINER SCREEN

Remove the front crankcase (Section 11).

Remove the oil strainer screen and clean it.

Remove the oil strainer screen and crankcase (Section 11).

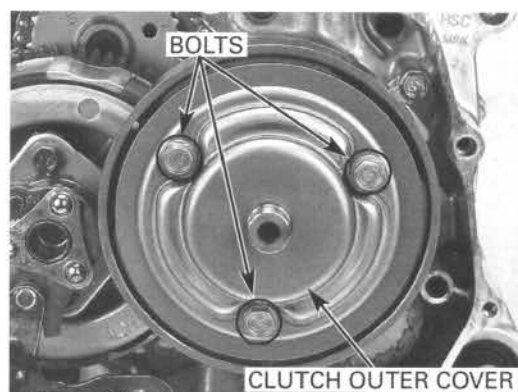
Fill the crankcase with the recommended engine oil (page 3-11).



ENGINE OIL CENTRIFUGAL FILTER CLEANING

Remove the front crankcase cover (page 9-6).

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.

NOTICE

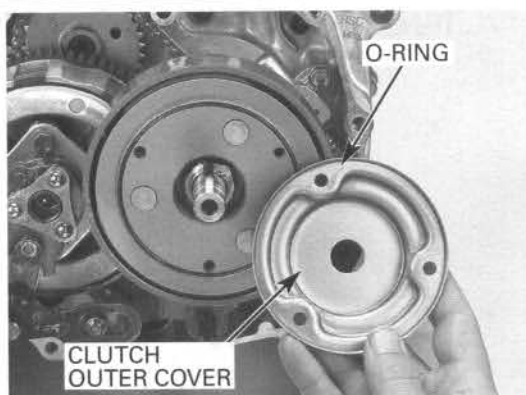
Do not allow dust and dirt to enter the crankshaft oil passage.

Do not use compressed air.



MAINTENANCE

Check that the 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

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 2-6).

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

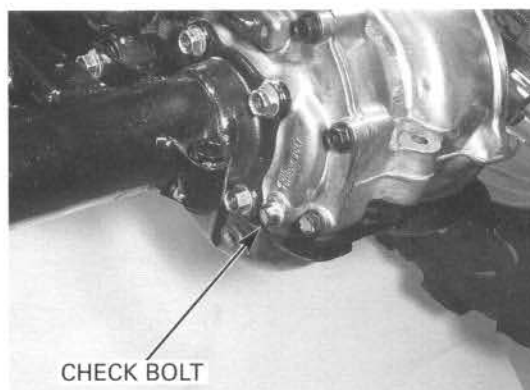
IDLE SPEED: $1,400 \pm 100$ rpm



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

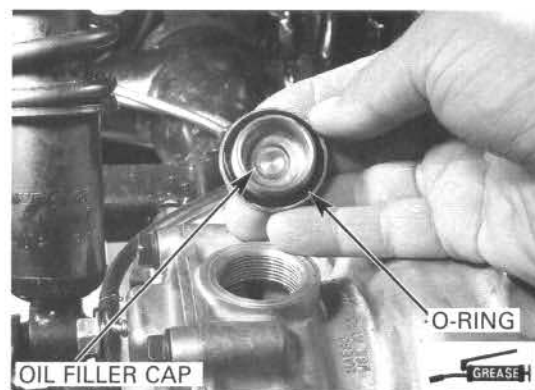
Check for leaks if the oil level was low.



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)



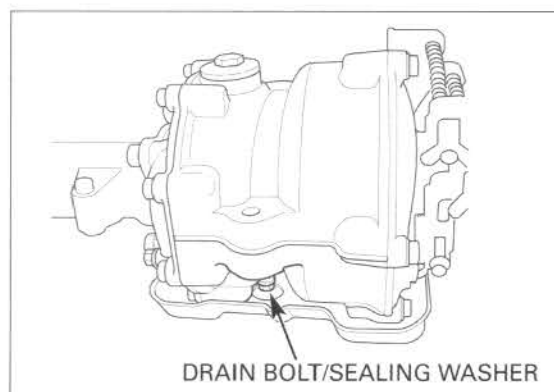
OIL CHANGE

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)

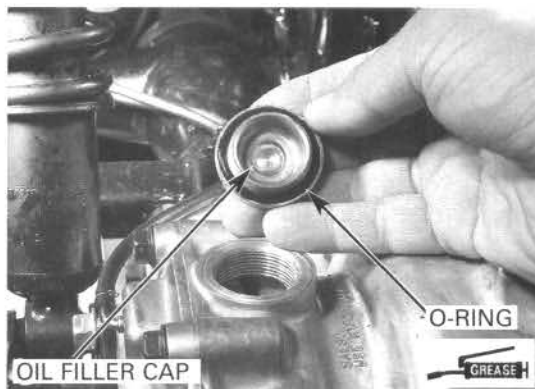


Fill the final gear case with the recommended oil.

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

NOTICE

- 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 mark, check the brake shoe wear (see below).



BRAKE SHOE WEAR

FRONT BRAKE

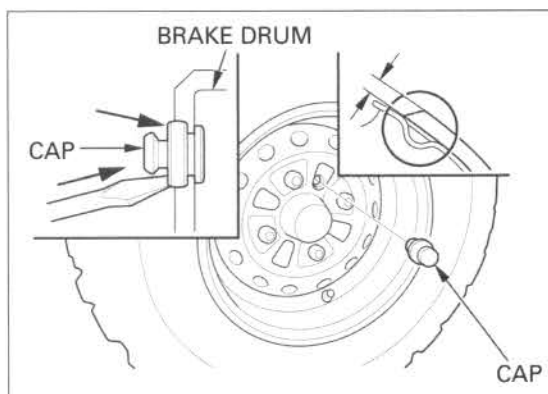
If either lining on one wheel is worn beyond the limit, both brake shoes for that wheel must be replaced.

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

LINING THICKNESS:

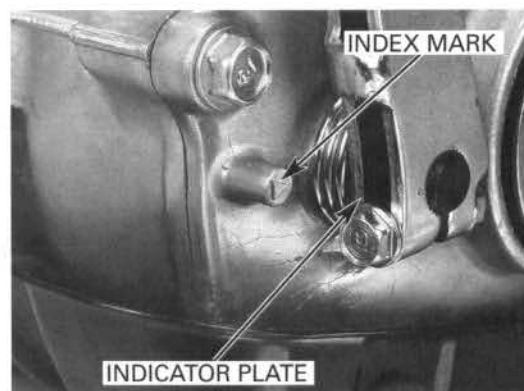
STANDARD: 4.0 mm (0.16 in)

SERVICE LIMIT: 2.0 mm (0.08 in)



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 LIGHT SWITCH

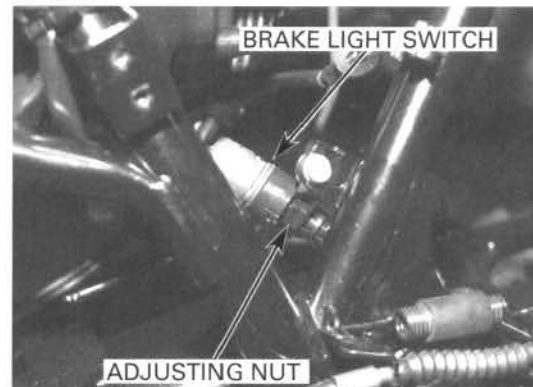
NOTE:

- The front brake light switch cannot be adjusted. If the front brake light switch actuation and brake engagement are out of synch, either replace the switch unit or the malfunctioning parts of the system.

Check that the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Hold the switch body and turn the adjusting nut. Do not turn the switch body.



BRAKE SYSTEM

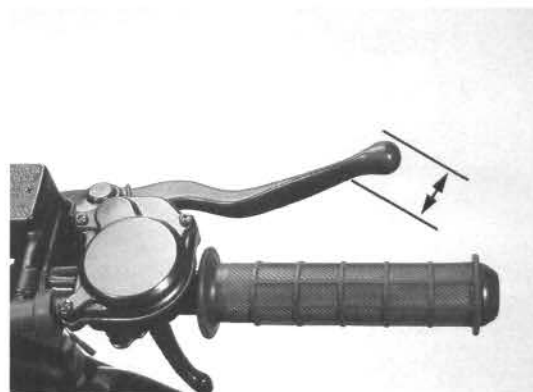
FRONT BRAKE

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.

There are two adjusting nuts on each front wheel.

Adjust all four adjusting nuts.

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.

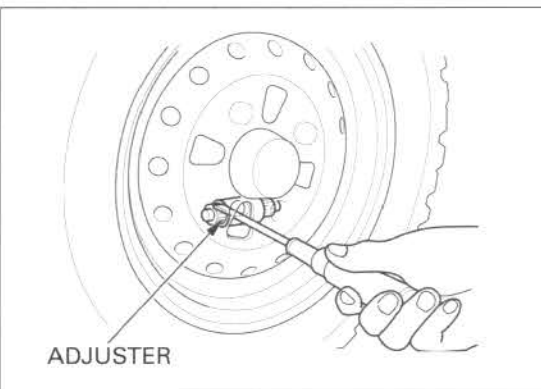
Line up the inspection hole with the second adjusting nuts and repeat the procedure.

Adjust both wheels.

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.

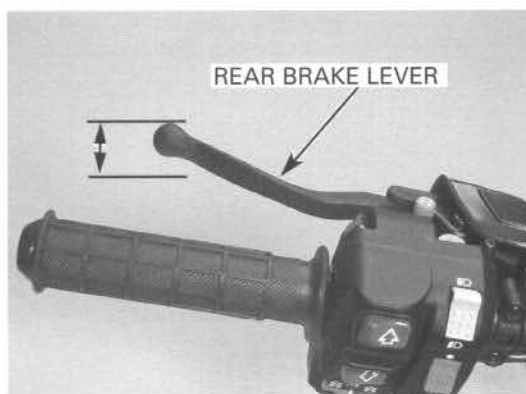
Disconnect the brake cables at the brake lever or pedal ends.

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 adjusting nut at the rear brake arm.



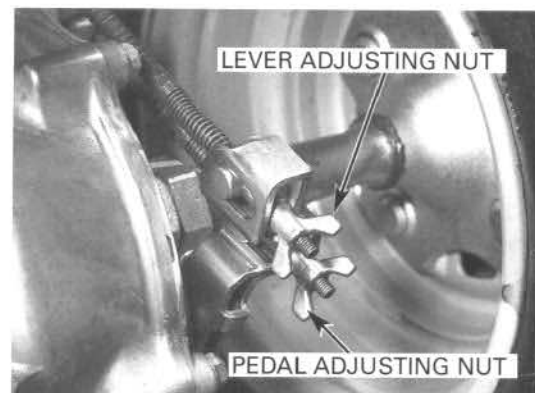
Measure the brake pedal free play at the end of the brake pedal and adjust as required.

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



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.



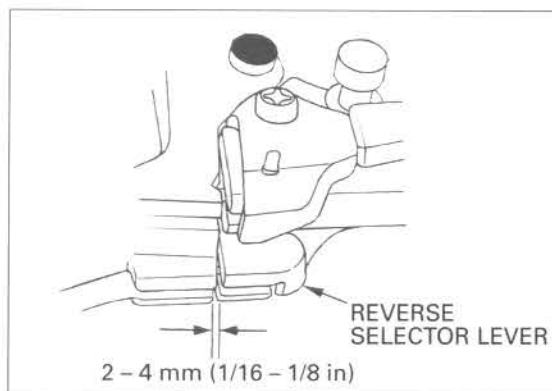
REVERSE LOCK SYSTEM

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

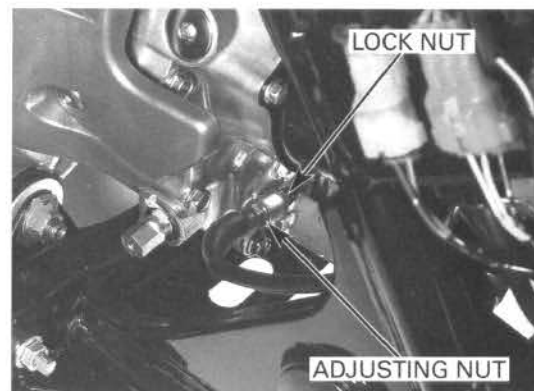
If necessary, watch the reverse lever on the crankcase to see when it moves while determining free play.

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

FREE PLAY: 2 – 4 mm (1/16 – 1/8 in)



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



MAINTENANCE

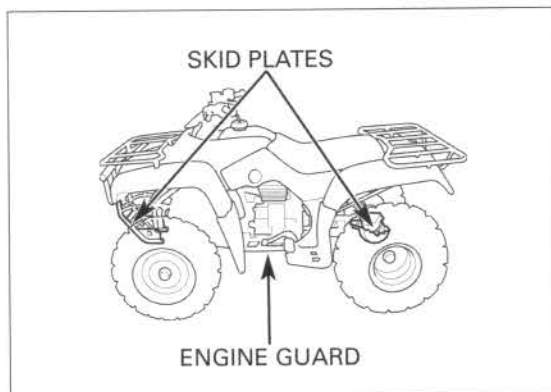
SKID PLATES/ENGINE GUARD

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 3-4).

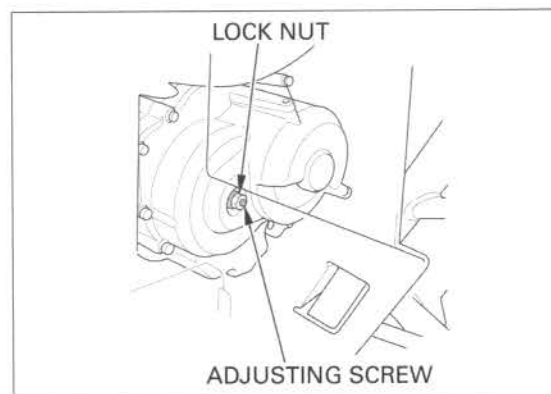
Replace the skid plates and engine guard if they are cracked or damaged.

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



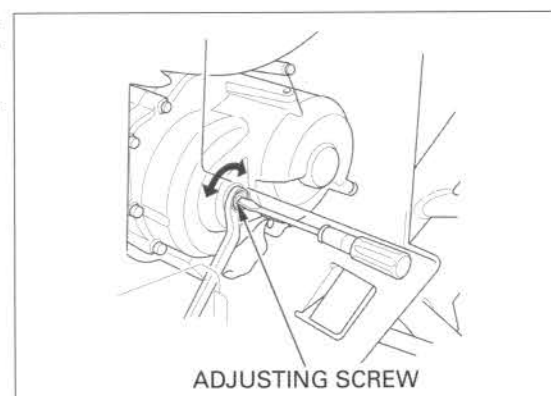
CLUTCH SYSTEM

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

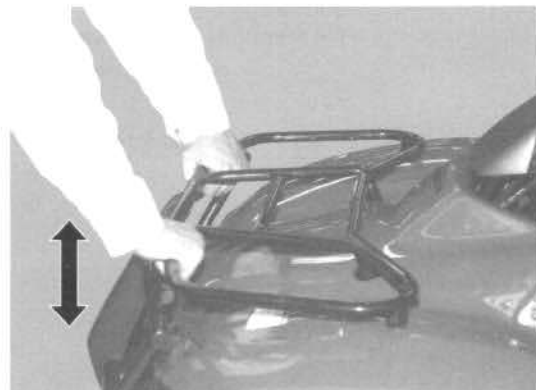
Loose, worn or damaged suspension parts impair vehicle stability and control.

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.

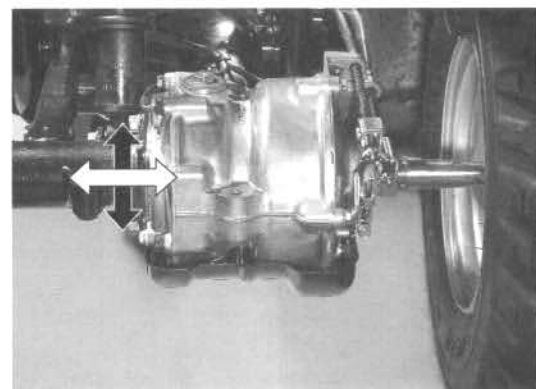


SWINGARM BEARINGS

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 13-11).



SPARK ARRESTER

CLEANING

Remove the bolt.



MAINTENANCE

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 3-4).

Check that all chassis nuts and bolts are tightened to
their correct torque values (page 1-11 through 1-14).

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 (Sections 12 and 13).

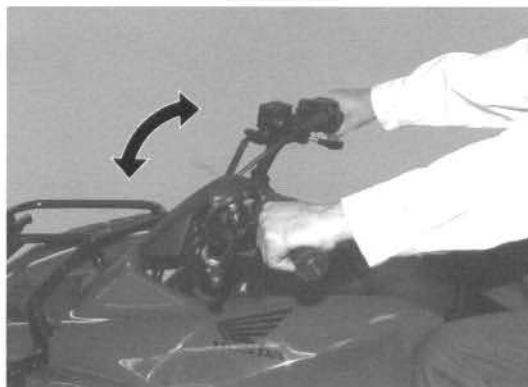


STEERING SHAFT HOLDER BEARING

*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 hori-
zontal movement, check the steering shaft holder
bushing and steering bearing, and replace them if
necessary (page 12-26).



STEERING SYSTEM

TOE

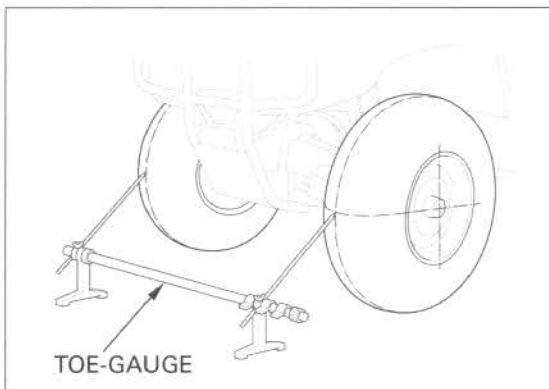
Place the vehicle on level ground with the front wheels facing straight ahead.

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.

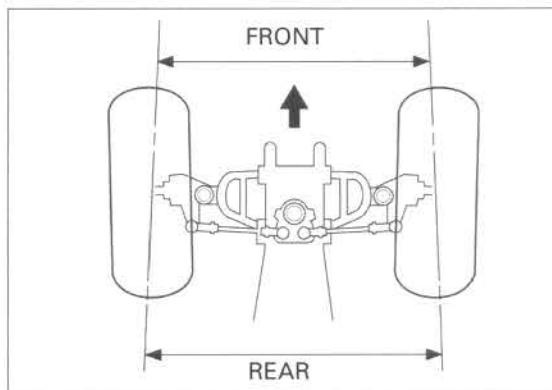
Slowly move the vehicle back until the wheels have turned 180° so the marks on the tires are aligned with the gauge height on the rear side.



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

TOE-IN: 8 ± 15 mm ($5/16 \pm 5/8$ in)

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

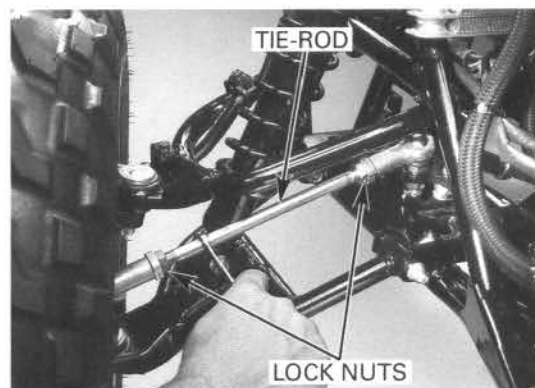


When the toe is out of specification, adjust it by changing the length of the tie-rods equally by loosening the lock nuts and turning the tie-rods while holding the ball joints.

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.

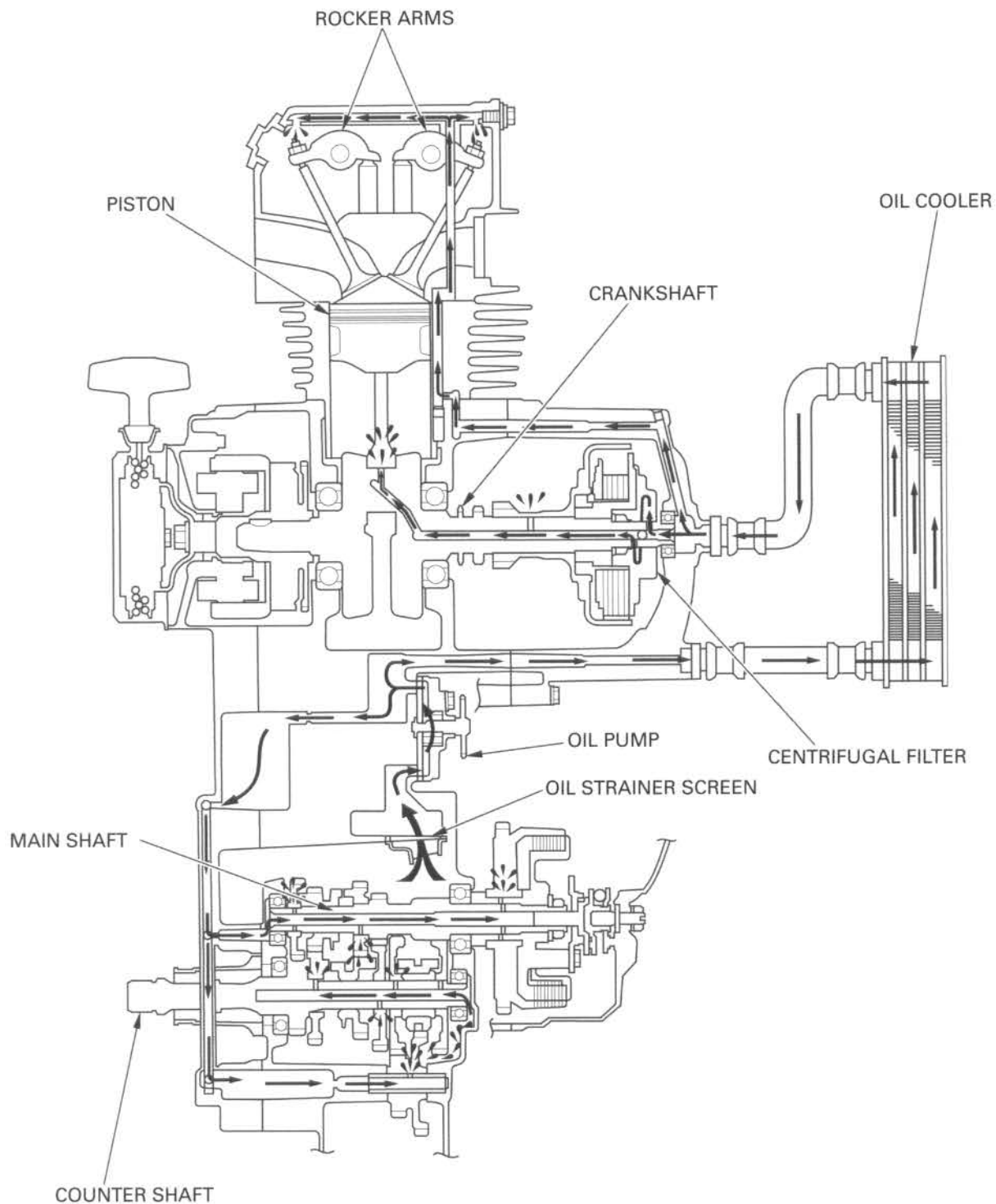


MEMO

4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-2	OIL PUMP.....	4-4
SERVICE INFORMATION	4-3	OIL COOLER.....	4-8
TROUBLESHOOTING	4-3		

LUBRICATION SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- 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	1.5 liters (1.6 US qt, 1.3 Imp qt)	–
	At disassembly	1.9 liters (2.0 US qt, 1.7 Imp qt)	–
Recommended engine oil		Pro Honda GN4 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
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

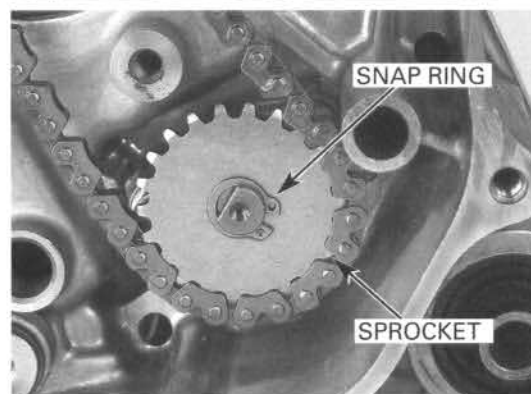
REMOVAL/DISASSEMBLY

Remove the front crankcase cover (page 9-6).
Remove the centrifugal clutch (page 9-7).

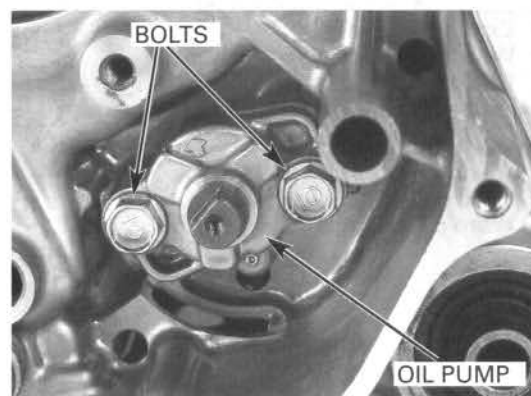
Remove the bolts and cam chain tensioner adjuster and tensioner arm.



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

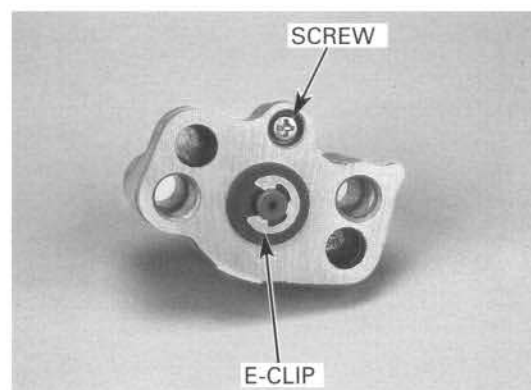


Remove the two bolts and oil pump assembly.
Remove the two dowel pins.



INSPECTION

Remove the screw and e-clip.



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.

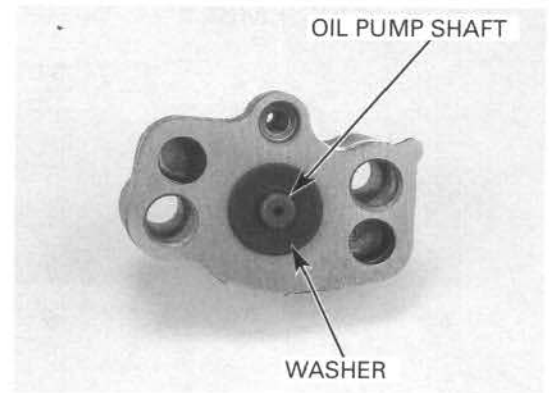
SERVICE LIMIT: 0.25 mm (0.010 in)

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)



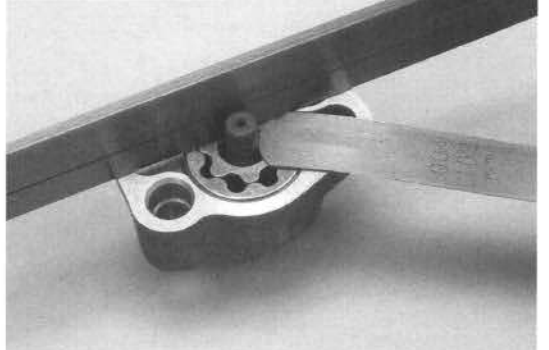
BODY CLEARANCE:



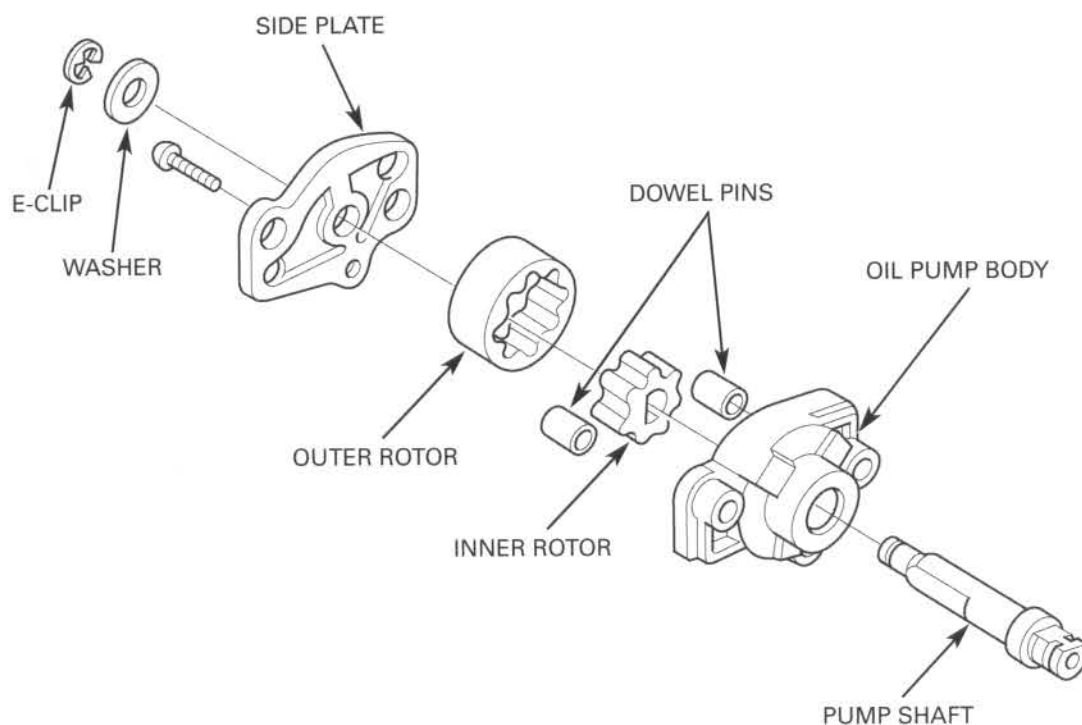
TIP CLEARANCE:



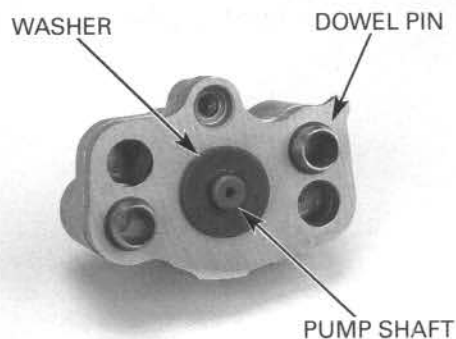
SIDE CLEARANCE:



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.

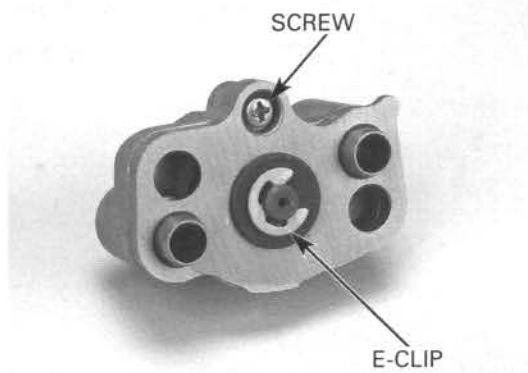


Tighten the screw.
Install the e-clip.

NOTE:

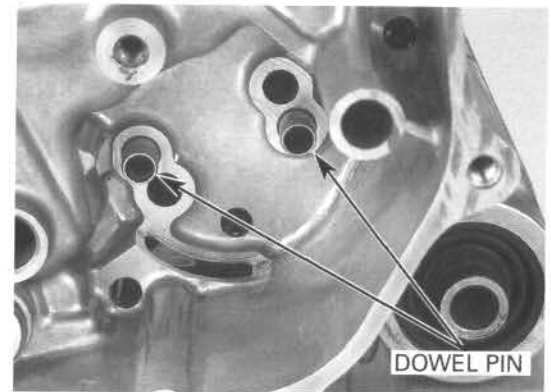
- Install the e-clip with its chamfered side facing the washer.

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.

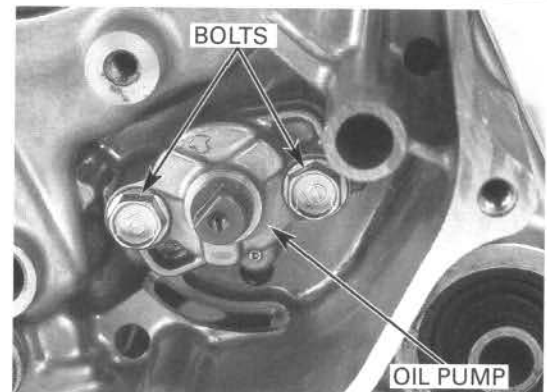


INSTALLATION

Install the two dowel pins.



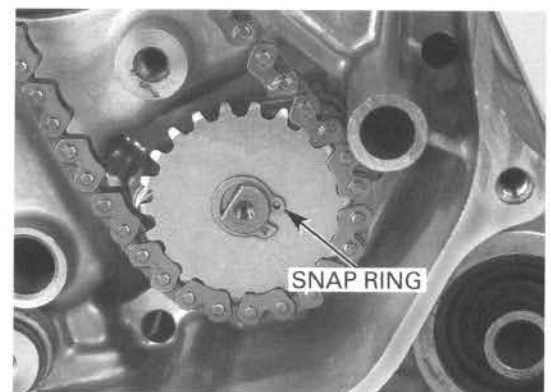
Install the oil pump assembly and tighten the two bolts.



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



Install the snap ring.

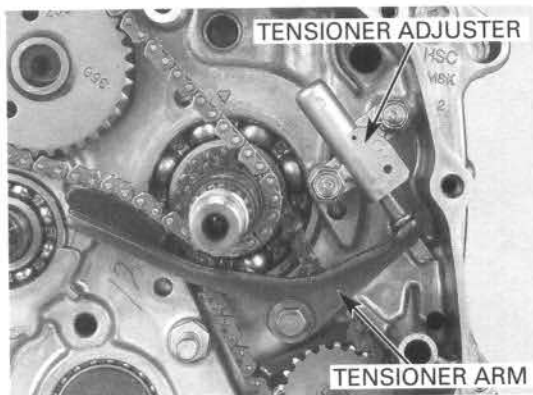


LUBRICATION SYSTEM

Install the cam chain tensioner arm and cam chain tensioner adjuster (page 8-14).

Install the following:

- centrifugal clutch (page 9-14)
- front crankcase cover (page 9-22)

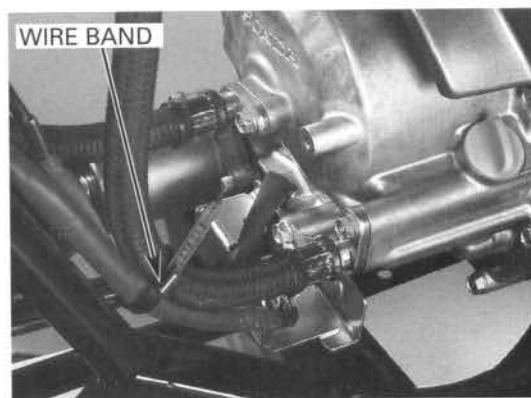


OIL COOLER

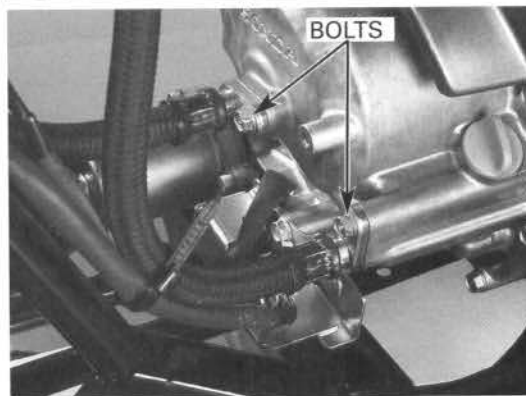
REMOVAL

Drain the engine oil (page 3-12).

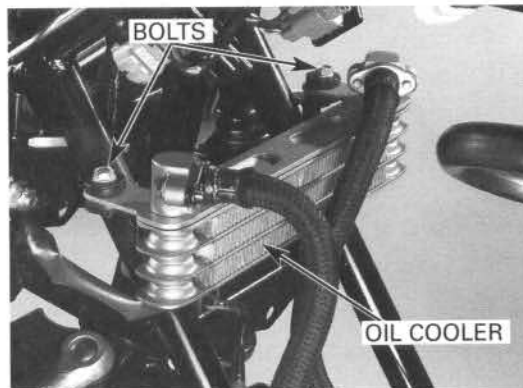
Remove the wire band from the oil cooler hose.



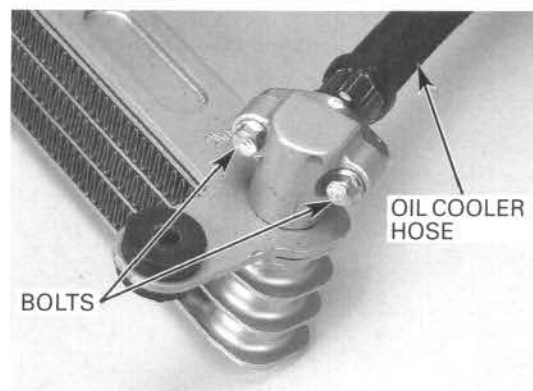
Remove the bolts and oil cooler hoses/O-rings from the front crankcase cover.



Remove the oil cooler mounting bolts and oil cooler assembly.



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

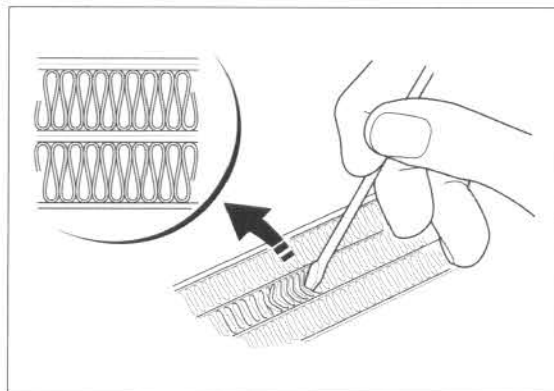


INSPECTION

Check the oil cooler air passage for clogs or damage.

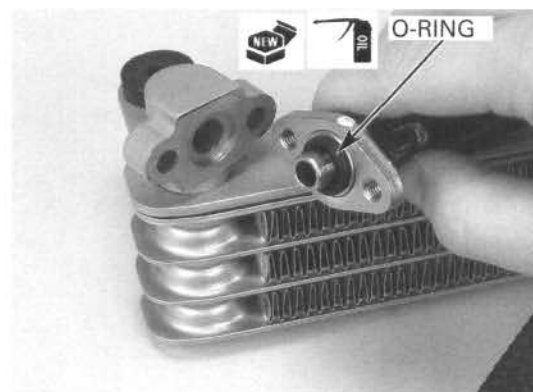
Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.

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

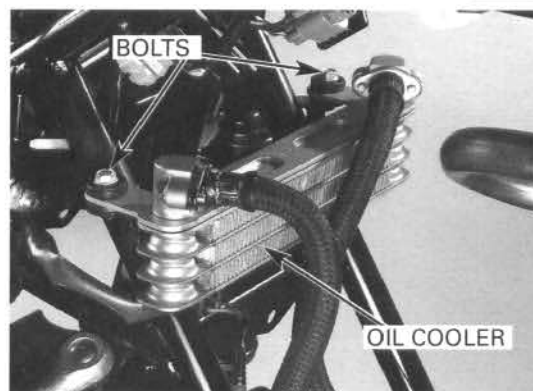


INSTALLATION

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.

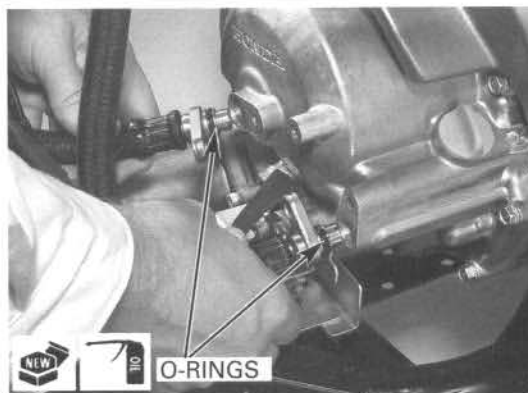


Install the oil cooler into the frame. Install and tighten the oil cooler mounting bolts.

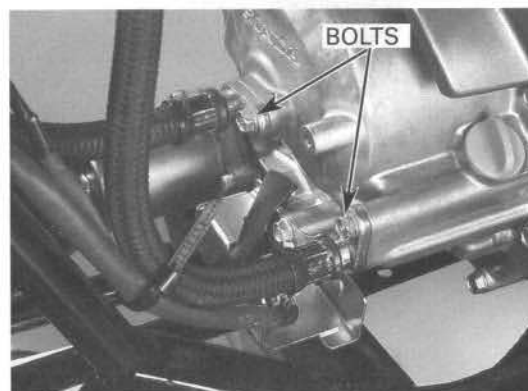


LUBRICATION SYSTEM

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.

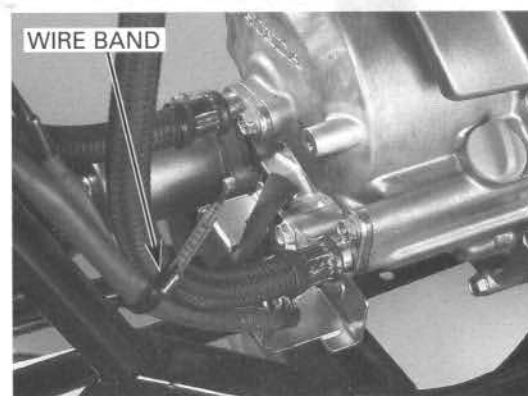


Install and tighten the bolts securely.



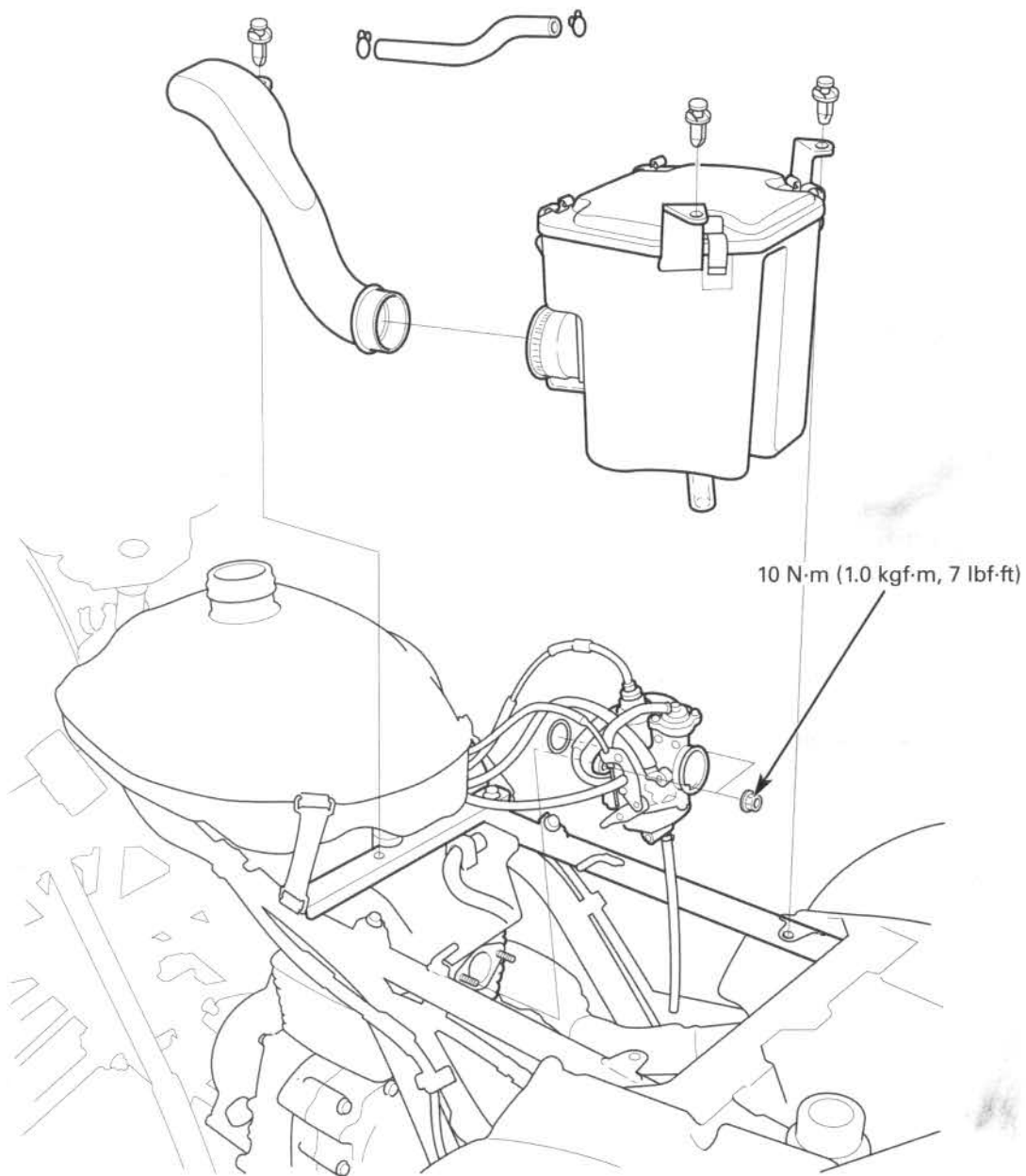
Secure the oil cooler hose, control motor wire and angle sensor wire with wire band.

Fill the crankcase with the recommended engine oil (page 3-11).



COMPONENT LOCATION	5-2	CARBURETOR INSTALLATION	5-14
SERVICE INFORMATION	5-3	PILOT SCREW ADJUSTMENT.....	5-16
TROUBLESHOOTING	5-4	HIGH ALTITUDE ADJUSTMENT	5-17
AIR CLEANER HOUSING	5-5	FUEL TANK REMOVAL	5-18
CARBURETOR REMOVAL.....	5-6	FUEL STRAINER SCREEN.....	5-19
CARBURETOR DISASSEMBLY.....	5-8	FUEL TANK INSTALLATION.....	5-20
CARBURETOR ASSEMBLY.....	5-11		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

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

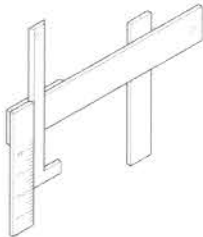

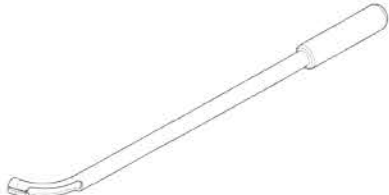
SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		PDC1F
High altitude		#92
Main jet		#98
Slow jet		#38
Pilot screw	Initial opening	1-1/2 turns out
	Final opening	5/8 turn out
	High altitude setting	1-1/4 turns out from seated
Float level		14 mm (0.6 in)
Idle speed		1,400 \pm 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 (D type) 07KMA-MS60101  or 07KMA-MN9A100 (U.S.A. only)	Pilot screw wrench guide 07PMA-MZ20110 
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FUEL SYSTEM

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 hose
- 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 2-4).

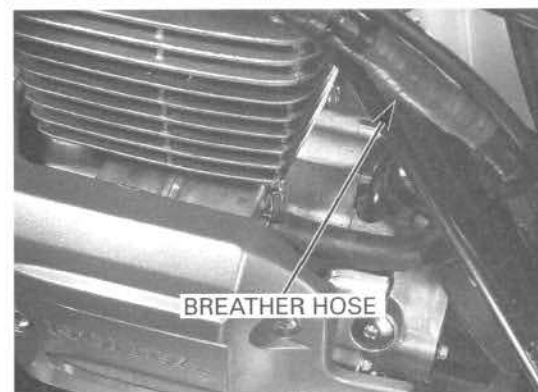
Loosen the intake air duct band screw.



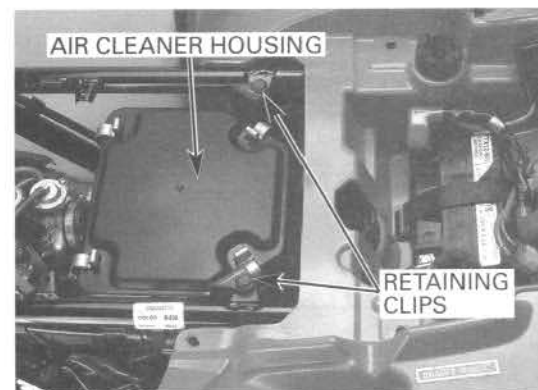
Loosen the connecting hose band screw.



Disconnect the breather hose from the crankcase.

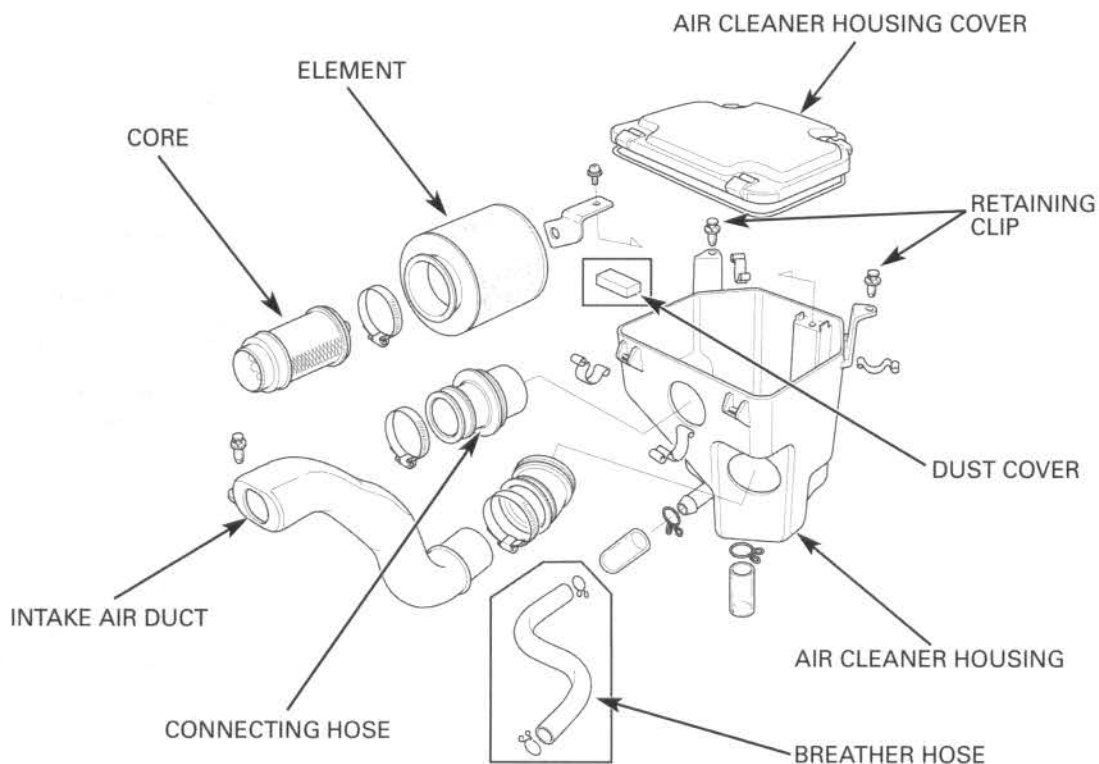


Remove the air cleaner housing retaining clips and air cleaner housing.



INSTALLATION

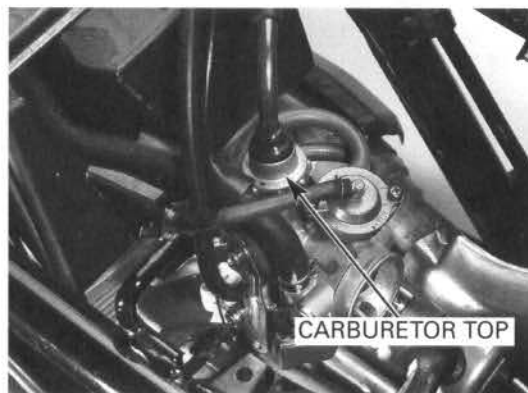
Install the air cleaner housing in the reverse order of removal.



CARBURETOR REMOVAL

THROTTLE VALVE

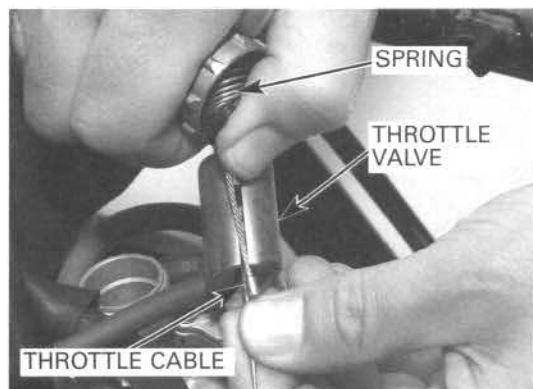
Remove the air cleaner housing (page 5-5).
Loosen the carburetor top.



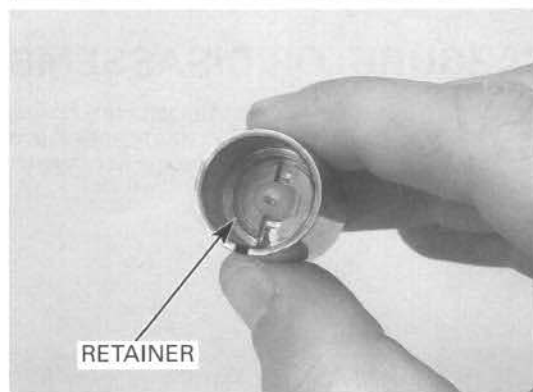
Remove the carburetor top and throttle valve from the carburetor.



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



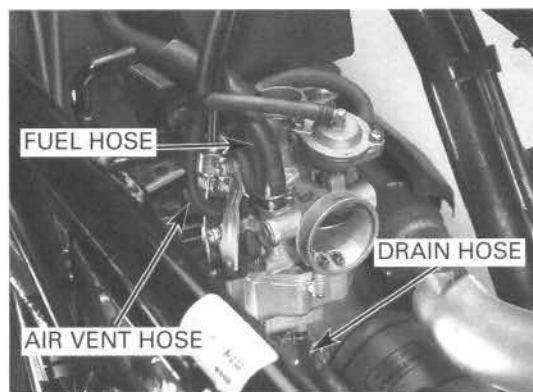
Remove the jet needle retainer and jet needle.
Check the throttle valve and jet needle for scratches, wear or damage.



CARBURETOR BODY

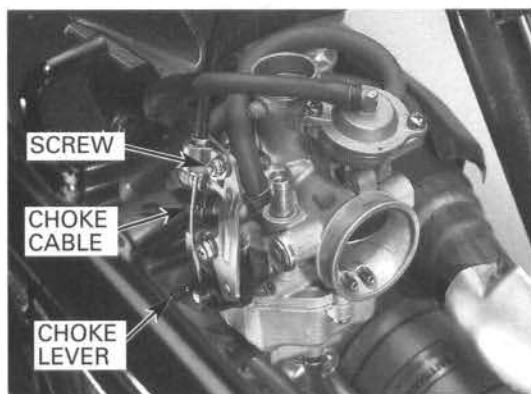
Loosen the drain screw and drain the fuel from float chamber into the approved gasoline container.

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



FUEL SYSTEM

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

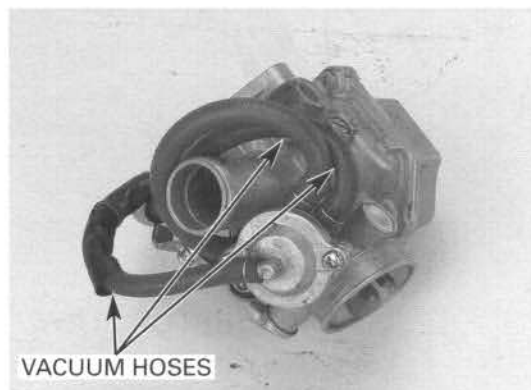


Remove the carburetor mounting nuts and carburetor.

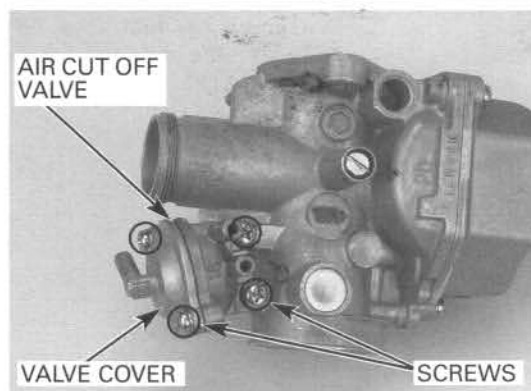


CARBURETOR DISASSEMBLY

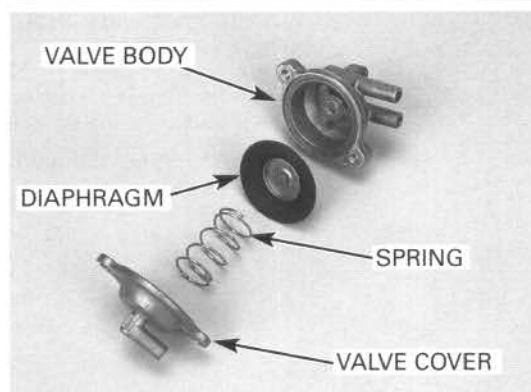
Disconnect the vacuum hoses. Check the vacuum hose for damage, clogging and wrinkles, replace if necessary.



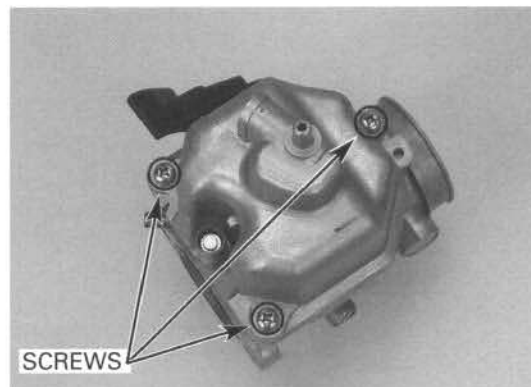
Remove the air cut off valve cover screws and cover, then remove the air cut off valve housing screws.



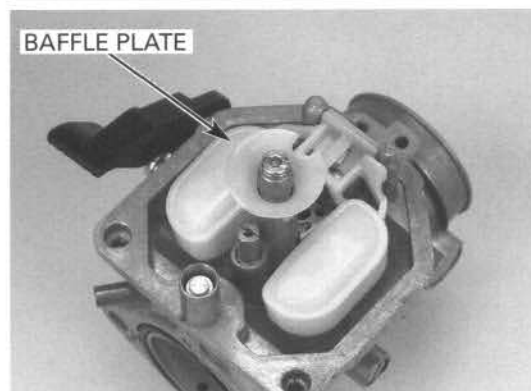
Disassemble the air cut off valve.
Blow open each air passage in the air cut off valve with compressed air.
Check the diaphragm for damage, pin holes, wrinkles and bends and replace if necessary.



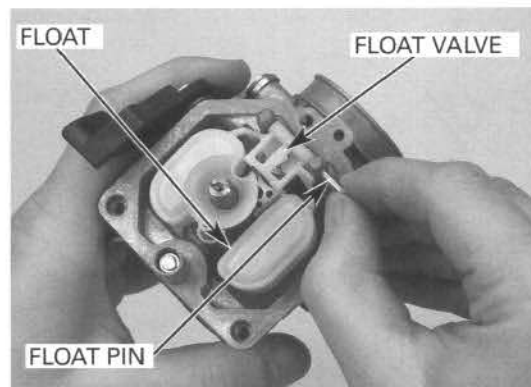
Remove the screws and float chamber.



Remove the baffle plate.

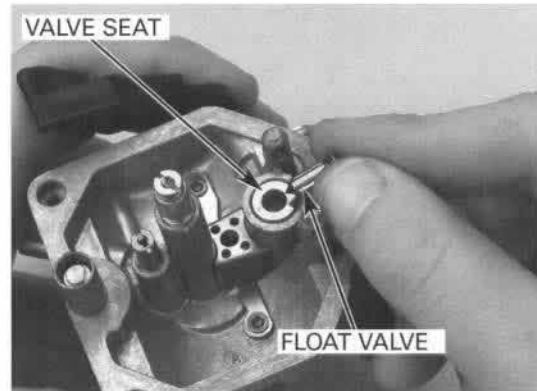


Remove the float pin, float and float valve.
Inspect the float for deformation or damage.



FUEL SYSTEM

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:

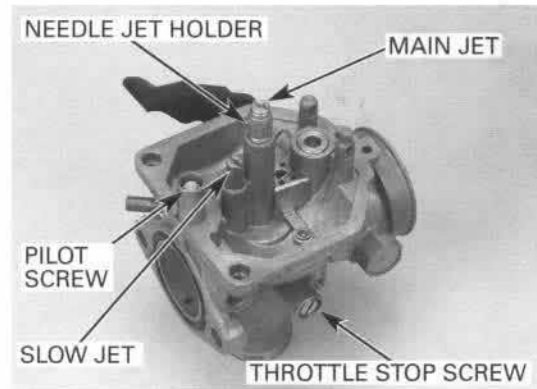
- main jet
- needle jet holder
- needle jet
- slow jet
- throttle stop screw/spring

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

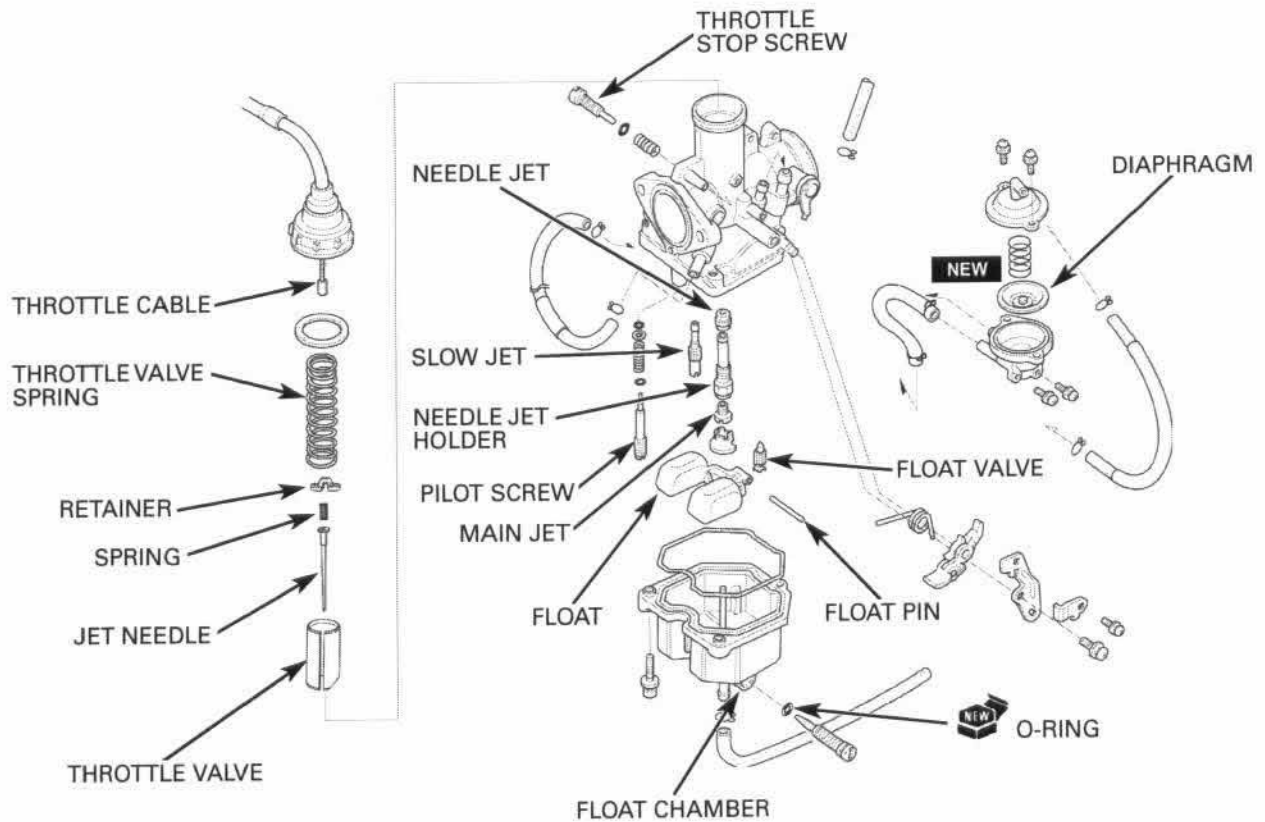
NOTICE

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.

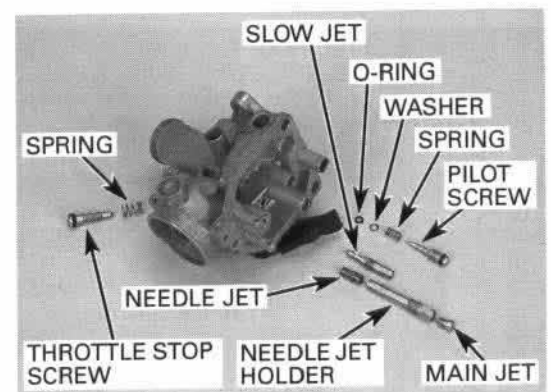


Install the following:

- throttle stop screw/spring
- slow jet
- needle jet
- needle jet holder
- main jet

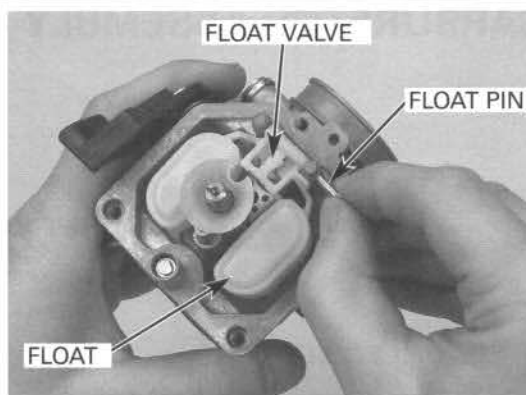
Handle all jets with care. They can easily be scored or scratched.

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 5-16).

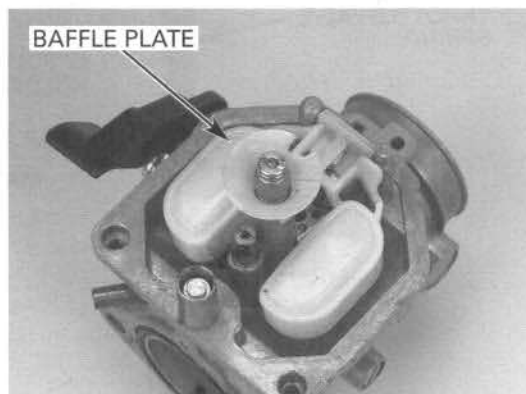


FUEL SYSTEM

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

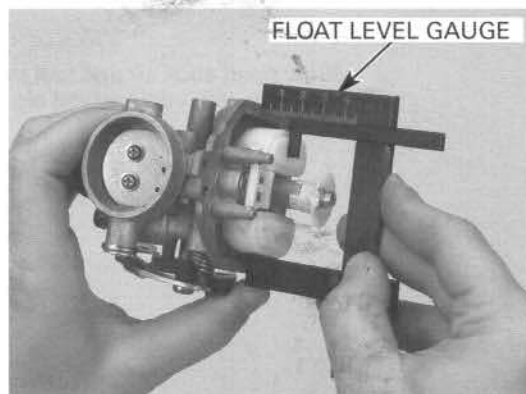
With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

FLOAT LEVEL: 14 mm (0.6 in)

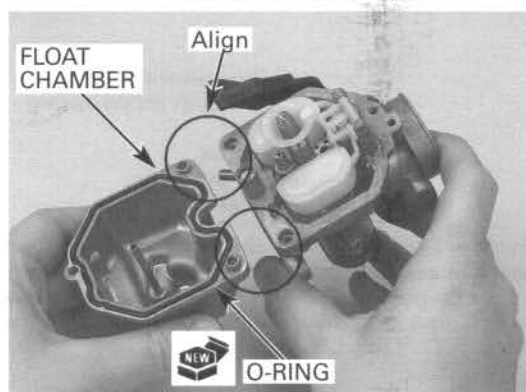
TOOL:

Carburetor float level gauge 07401-0010000

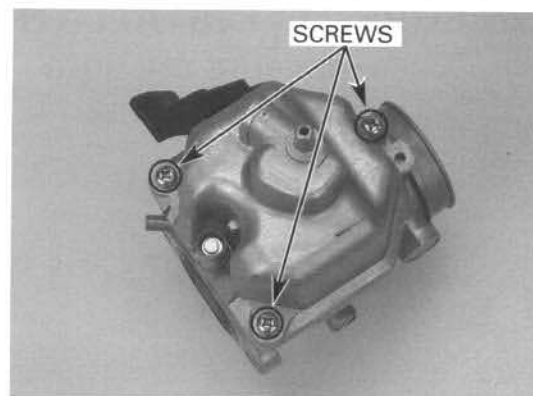
The float cannot be adjusted.
Replace the float assembly if the float level is out of specification.



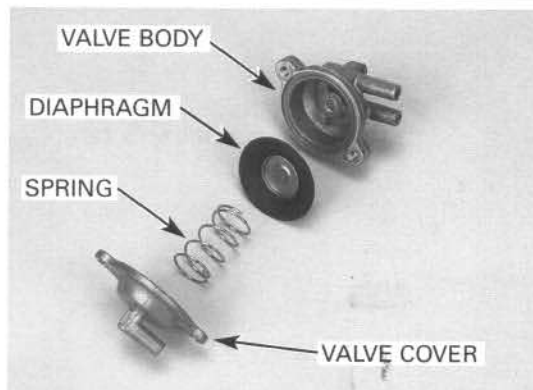
Install a new O-ring in the float chamber.
Install the float chamber.



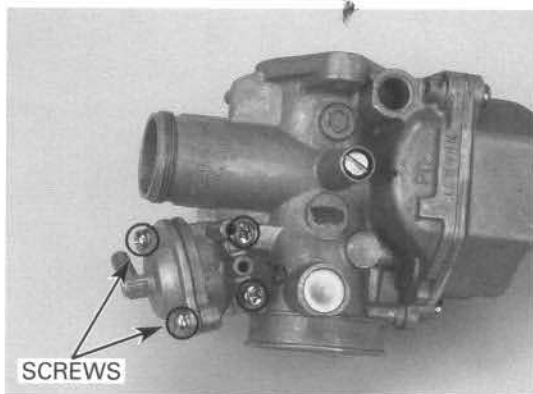
Install and tighten the float chamber screws.



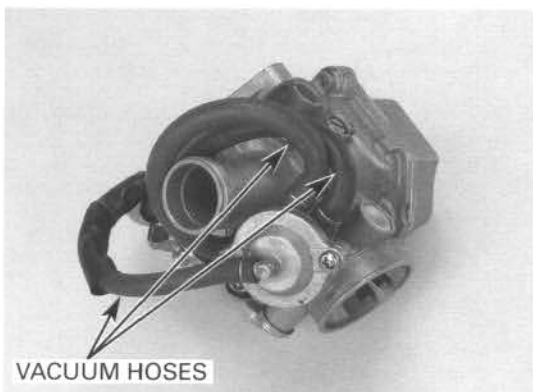
Assemble the air cut off valve.



Tighten the screws.



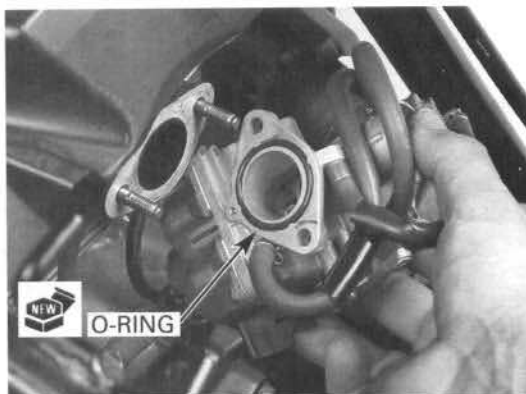
Connect the vacuum hoses as shown.



CARBURETOR INSTALLATION

CARBURETOR BODY

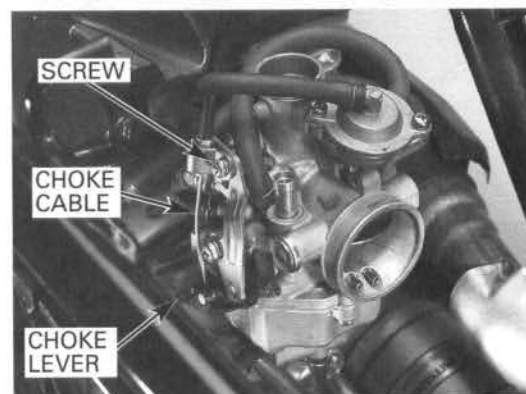
Install the new O-ring into the carburetor body groove.



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.

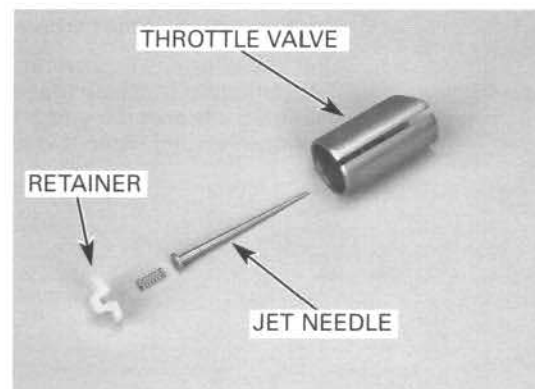


Install the fuel hose, drain hose and air vent hose.

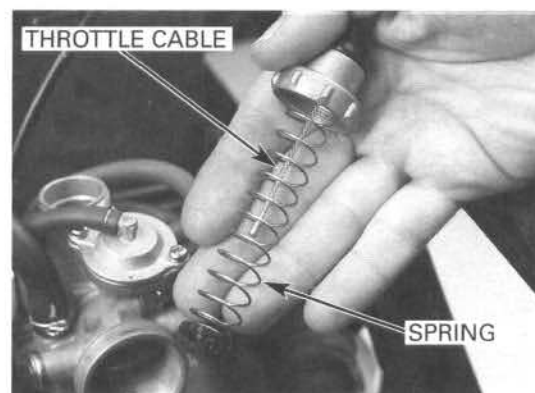


THROTTLE VALVE

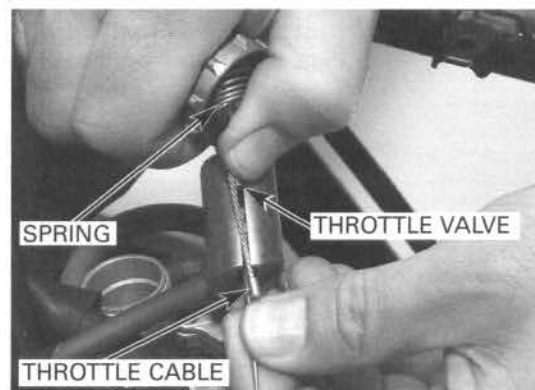
Install the jet needle into the throttle valve and secure it with a needle clip retainer.



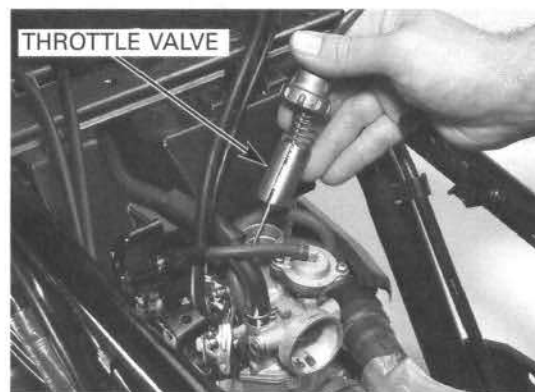
Install the throttle valve spring onto the throttle cable.



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



Install the throttle valve into the carburetor body, aligning its cutout with the throttle stop screw.

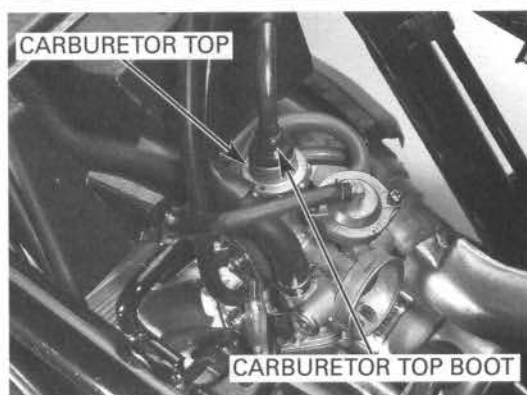


FUEL SYSTEM

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 3-5)
- engine idle speed (page 3-14)
- pilot screw adjustment (see below)



PILOT SCREW ADJUSTMENT

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.

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

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

TOOLS:

Pilot screw wrench (D type) 07KMA-MS60101 and
Pilot screw wrench guide 07PMA-MZ20110
or
07KMA-MN9A100
(U.S.A. only)

INITIAL OPENING: 1-1/2 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 \pm 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: 5/8 turn out

9. Readjust the idle speed with the throttle stop screw.



HIGH ALTITUDE ADJUSTMENT

SPECIFICATIONS

	Below 1,500 m (5,000 ft)	Between 1,000 – 2,500 m (3,000 – 8,000 ft)
Main jet	# 98	# 92
Pilot screw opening	Factory preset	1-1/4 turns out from seated

At high altitude, the standard carburetor air-fuel mixture will be too rich. Performance will decrease, and fuel consumption will increase. A very rich mixture will also foul the spark plug and cause hard starting. Operation at an altitude that differs from that at which this engine was certified, for extended periods of time, may increase emissions.

High altitude performance can be improved by specific modifications to the carburetor. If your customer always operates the ATV at altitudes above 2,000 meters (6,500 feet), you should perform this carburetor modification.

Even with carburetor modification, engine horsepower will decrease about 3.5% for each 300-meter (1,000-foot) increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modification is made.

The engine, when operated at high altitude with the carburetor modifications for high altitude use, will meet each emission standard throughout its useful life.

The high altitude carburetor adjustment is performed as follows:

Clean around the float chamber with compressed air before removing the chamber cap, and be sure that no debris is allowed to enter into the carburetor.

Disconnect the crankcase breather hose.
Remove the float chamber cap.

Replace the standard main jet with the high altitude type.

HIGH ALTITUDE MAIN JET: #92

Check that the O-ring on the chamber cap is in good condition and replace it with a new one if necessary. Install the chamber cap and tighten it.

Connect the crankcase breather hose.

Screw in the pilot screw the specified number of turns from the factory preset position.

TOOLS:

Pilot screw wrench (D type) 07KMA-MS60101 and
Pilot screw wrench guide 07PMA-MZ20110
or
07KMA-MN9A100
(U.S.A. only)

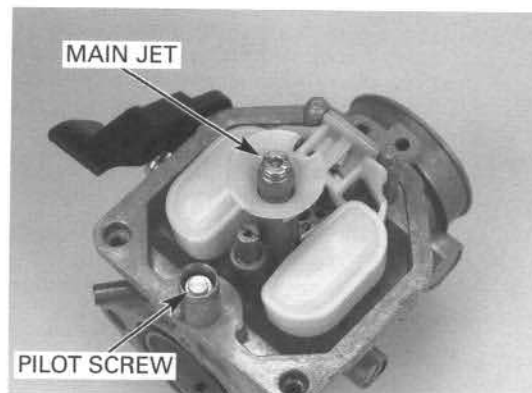
HIGH ALTITUDE PILOT SCREW OPENING:

1-1/4 turns out from seated

Start the engine and warm it up.

Adjust the idle speed at high altitude with the throttle stop screw to ensure proper high altitude operation.

IDLE SPEED: 1,400 ± 100 rpm (min⁻¹)



NOTICE

When the carburetor has been modified for high altitude operation, the air-fuel mixture will be too lean for low altitude use. Operation at altitudes below 1,500 m (5,000 feet) with a modified carburetor may cause the engine to overheat, resulting in serious engine damage and increased exhaust emissions.

For use at low altitudes, you should return the carburetor to original factory specifications.

Replace the high altitude main jet with the standard type and screw out the pilot screw the specified number of turns from the high altitude setting.

STANDARD MAIN JET: #98

LOW ALTITUDE PILOT SCREW OPENING:

See "PILOT SCREW ADJUSTMENT" (page 5-16)

TOOLS:

Pilot screw wrench (D type) 07KMA-MS60101 and
Pilot screw wrench guide 07PMA-MZ20110
or
07KMA-MN9A100
(U.S.A. only)

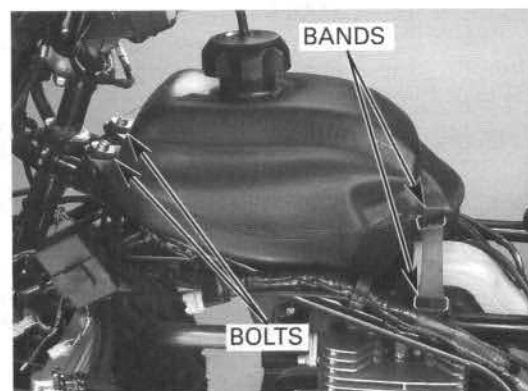
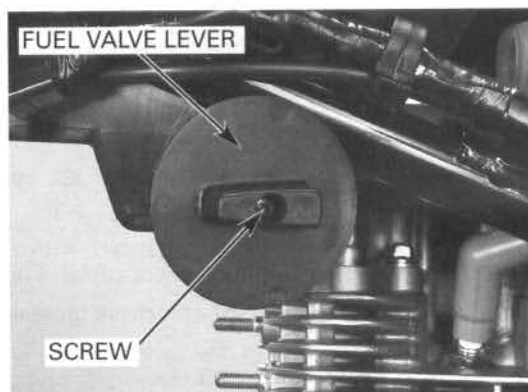
Warm up the engine and adjust the idle speed at low altitude with the throttle stop screw.

IDLE SPEED: $1,400 \pm 100$ rpm (min^{-1})

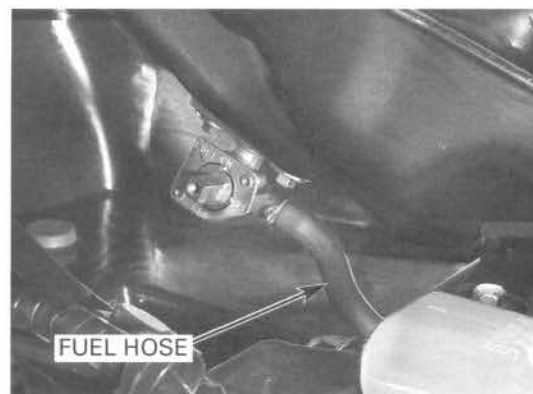
FUEL TANK REMOVAL

Turn the fuel valve OFF.
Remove the fuel tank cover (page 2-5).
Remove the side cover (page 2-6).
Remove the screw and fuel valve lever.

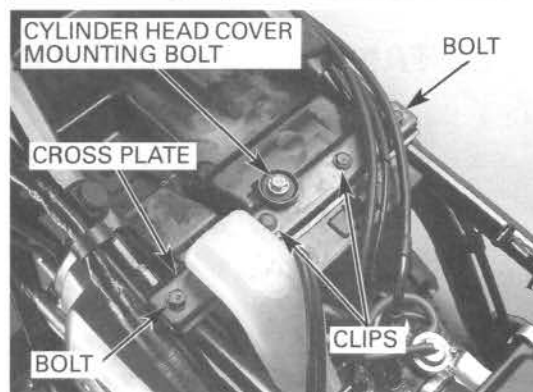
Remove the fuel tank mounting bolts.
Remove the fuel tank holder bands.



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

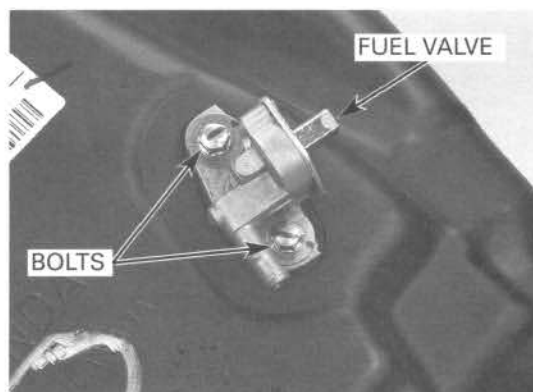


Remove the two retaining clips and air duct hose.
Remove the cylinder head cover mounting bolt.
Remove the two bolts and cross plate.
Remove the fuel tank heat guard.

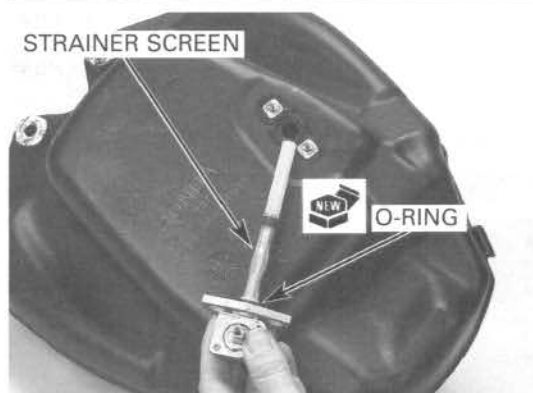


FUEL STRAINER SCREEN

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.



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.

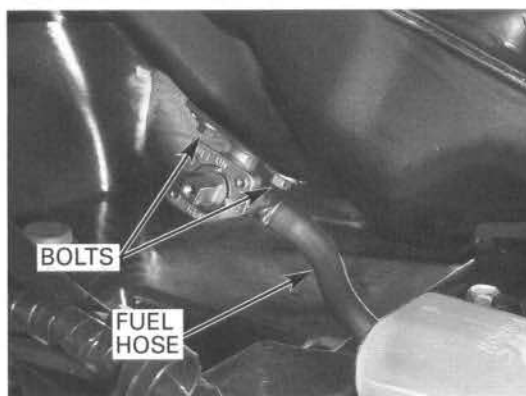


FUEL SYSTEM

Reinstall the fuel valve and tighten the bolts.

Connect the fuel hose.

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

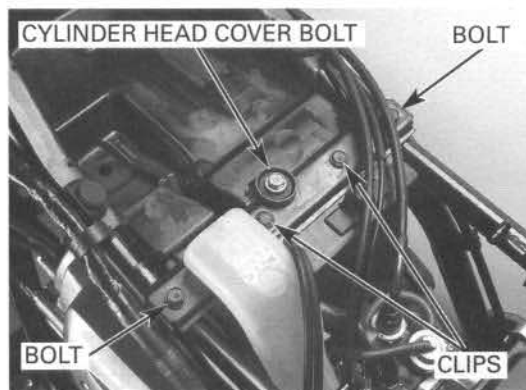


FUEL TANK INSTALLATION

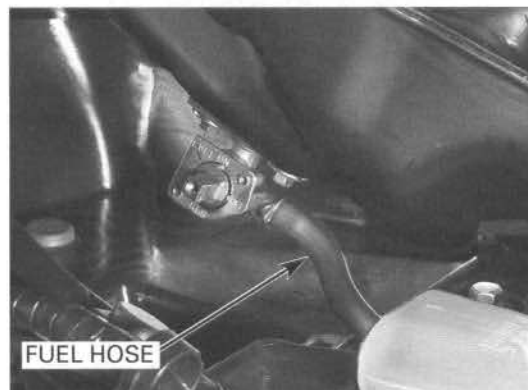
Set the fuel tank heat guard onto the frame.
Install the cross plate and tighten the two bolts.
Tighten the cylinder head cover mounting bolt to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

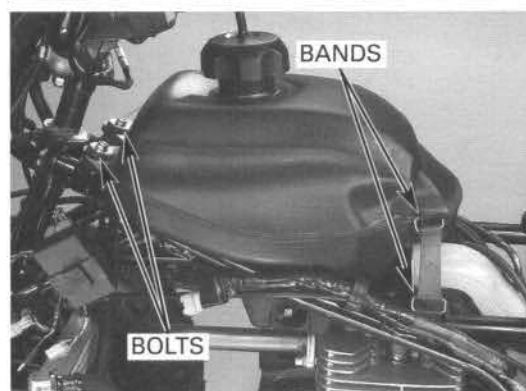
Install the air duct hose and two retaining clips.



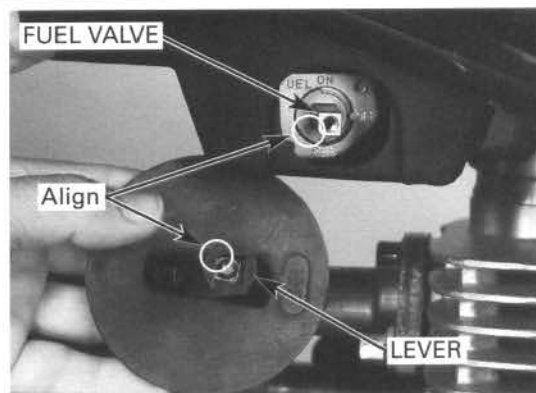
Connect the fuel hose to the fuel valve.



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



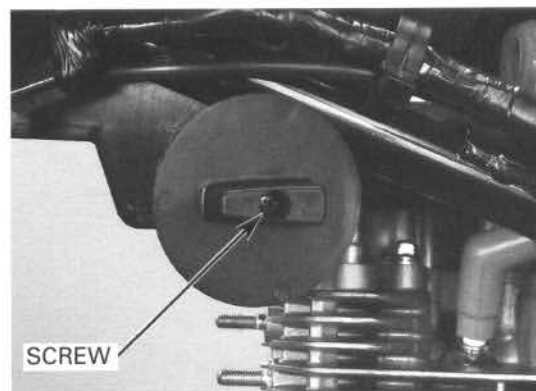
Install the fuel valve lever by aligning the rounded edge as shown.



Tighten the screw securely.

NOTE:

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



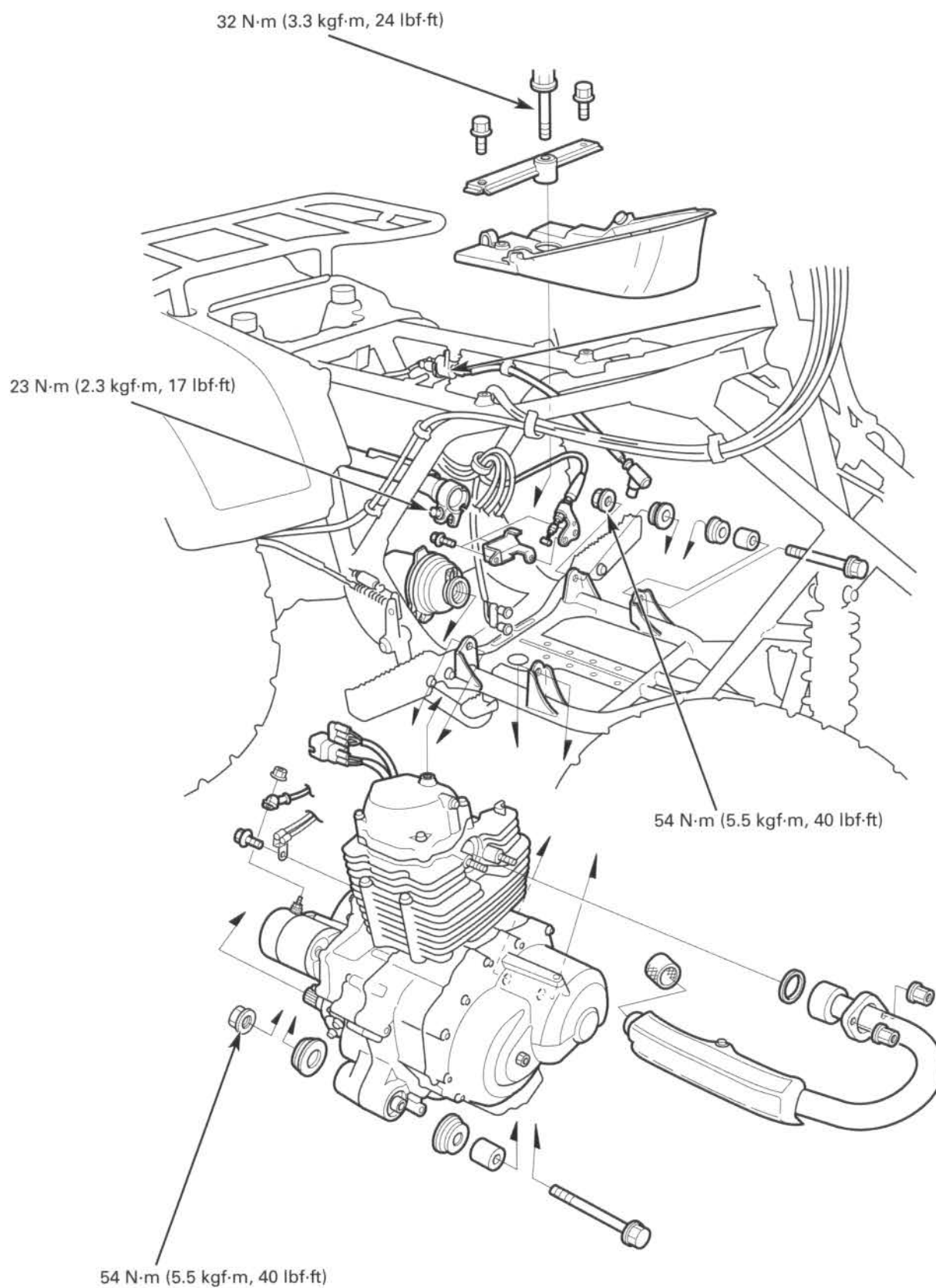
MEMO

6. ENGINE REMOVAL/INSTALLATION

6

COMPONENT LOCATION.....	6-2	ENGINE REMOVAL	6-4
SERVICE INFORMATION	6-3	ENGINE INSTALLATION.....	6-7

COMPONENT LOCATION



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 8)
 - Cylinder/piston (Section 8)
 - Clutch (Section 9)
 - Recoil starter/alternator/starter clutch (Section 10)
 - Carburetor (Section 5)
 - Oil pump (Section 4)

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine oil capacity	At draining	1.5 liters (1.6 US qt, 1.3 Imp qt)
	At disassembly	1.9 liters (2.0 US qt, 1.7 Imp qt)
Engine weight		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).

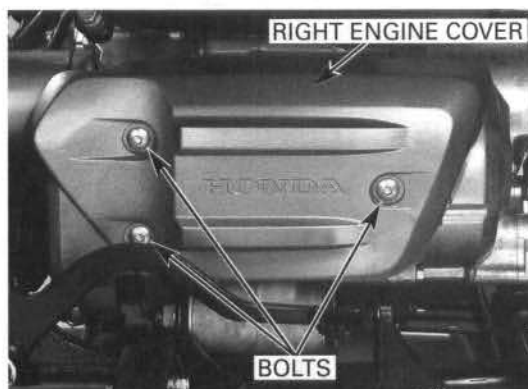
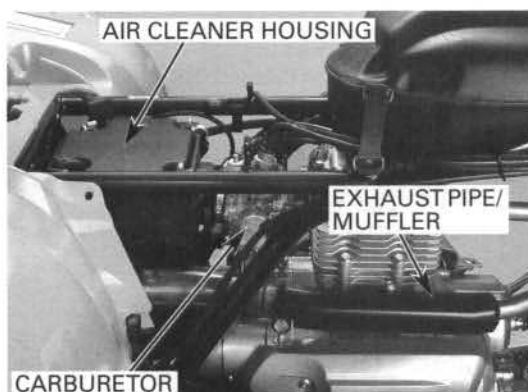
Remove the following:

- seat (page 2-4)
- fuel tank cover (page 2-5)
- side covers (page 2-6)
- center mudguards (page 2-10)
- exhaust pipe/muffler (page 2-13)
- front fender (page 2-8)
- air cleaner housing (page 5-5)
- VSS (TE model only: Section 19)
- carburetor (page 5-6)
- fuel tank (page 5-18)
- shift control motor and reduction gears (TE model only: Section 20)
- angle sensor (TE model only: Section 20)

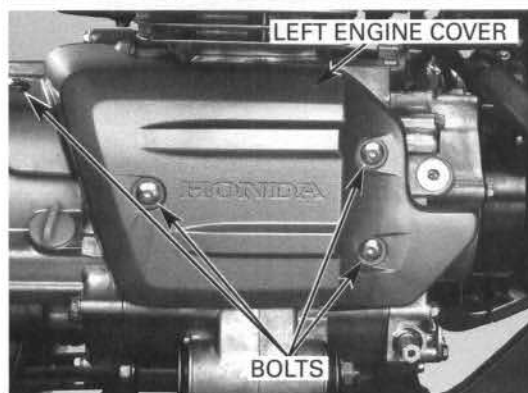
Disconnect the oil cooler hose from the front crankcase cover (page 4-8).

ENGINE GUARDS

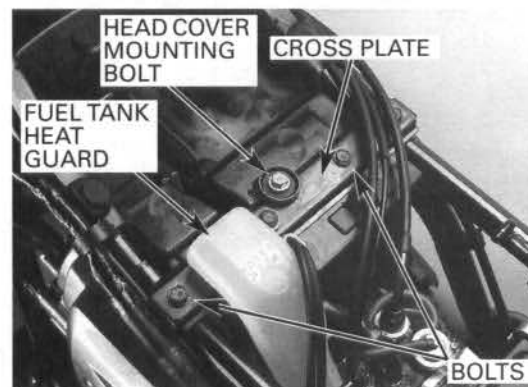
Remove the three bolts and the right engine cover.



Remove the four bolts and the left engine cover.



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

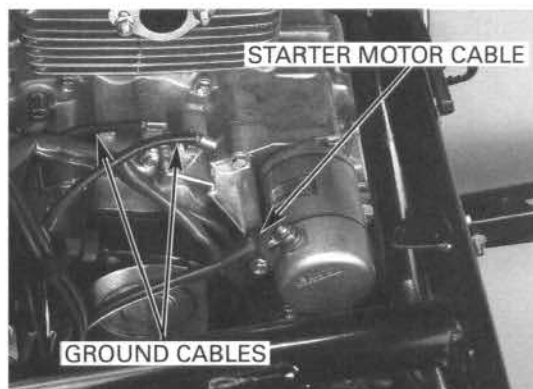


Disconnect the spark plug cap.

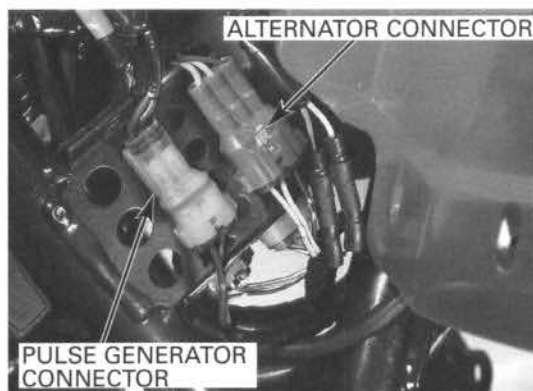


Remove the nut and starter motor cable.

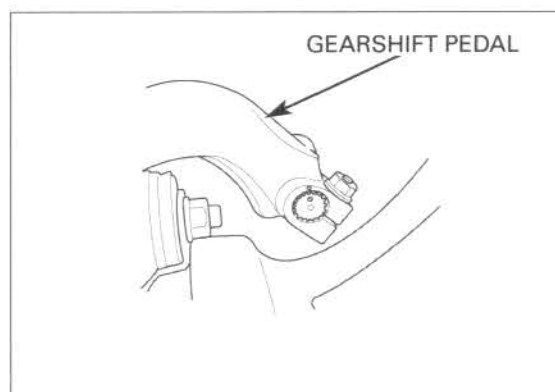
Remove the bolt and ground cable terminals.



Remove the alternator and ignition pulse generator connectors from the frame and disconnect the connectors.



TM model only: Remove the gearshift pedal.

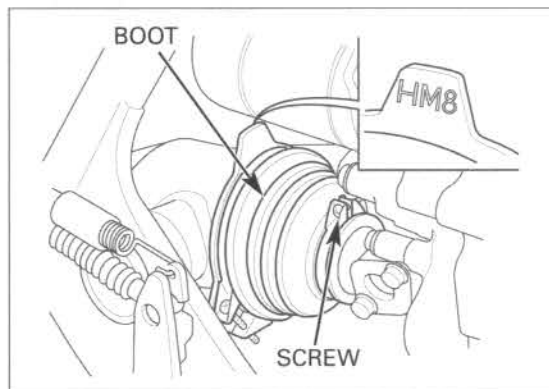


ENGINE REMOVAL/INSTALLATION

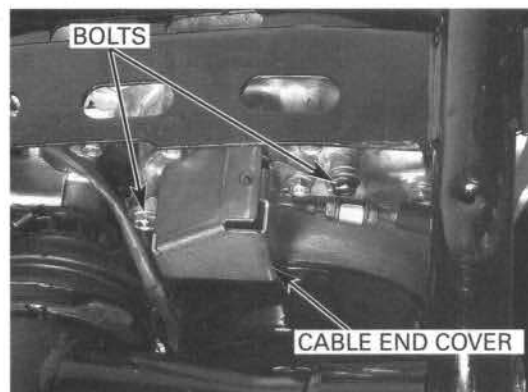
Disconnect the crankcase breather hose.



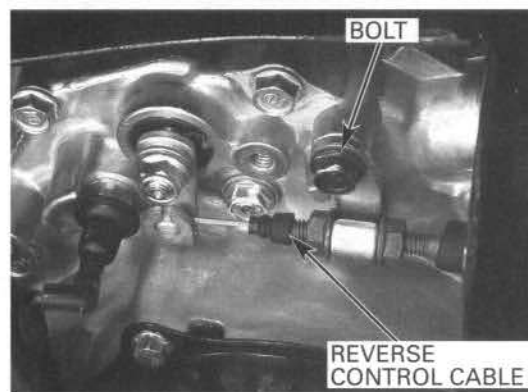
Loosen the swingarm boot band screw.



Remove the two bolts and cable end cover.

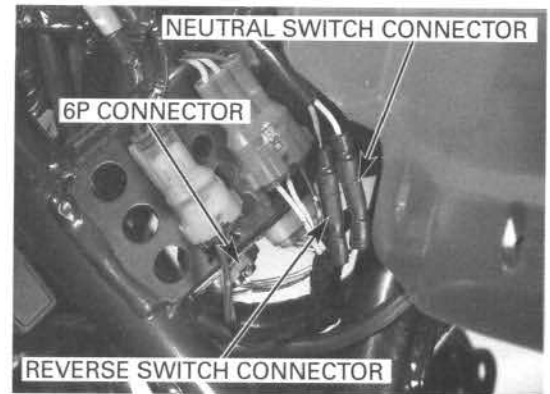


Remove the bolt and disconnect the reverse control cable end from the lever.

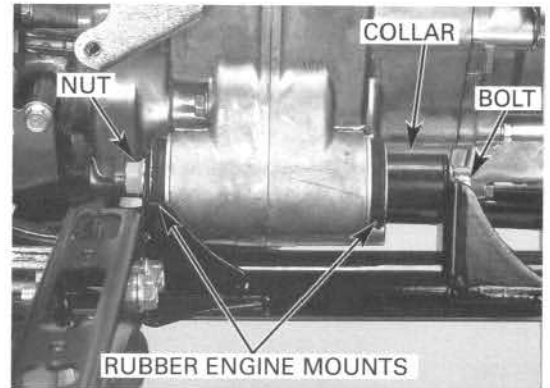


Disconnect the reverse switch and neutral switch connectors.

Remove the gear position switch 6P connector from the frame and disconnect the 6P connector.

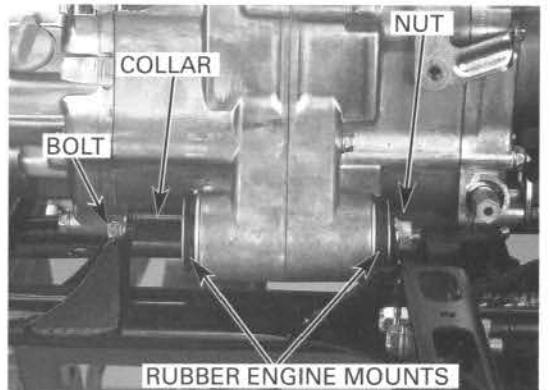


Remove the right lower engine hanger bolt/nut, collar and rubber engine mounts.



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.

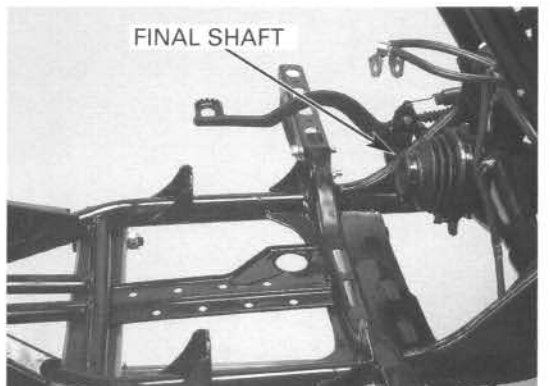


ENGINE INSTALLATION

Apply molybdenum disulfide grease to the yoke joint splines.

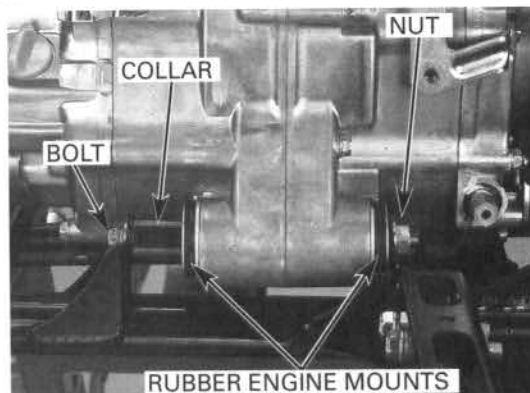
Install the engine from the left side.

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



ENGINE REMOVAL/INSTALLATION

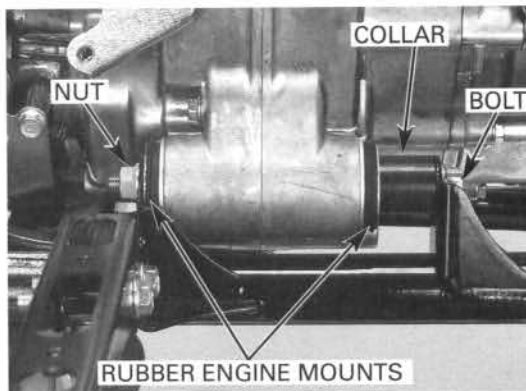
Install the lower left rubber engine mounts with the wide side towards the engine.
Install the collar and hanger bolt/nut.



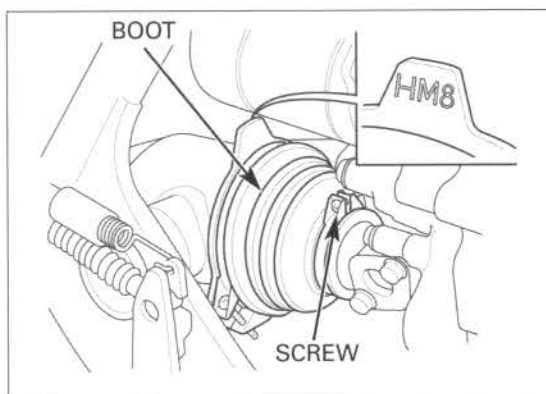
Install the lower right rubber engine mounts with the wide side towards the engine.
Install the collar and hanger bolt/nut.

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)



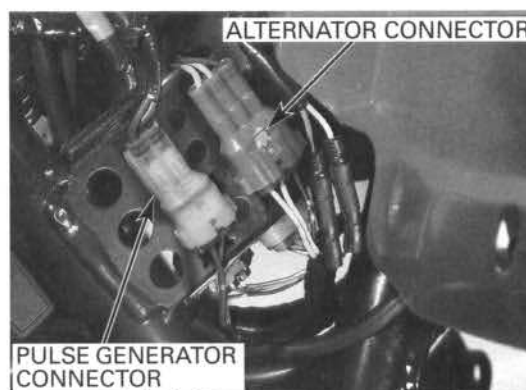
Set the swingarm boot on the rear crankcase cover properly and tighten the screw.



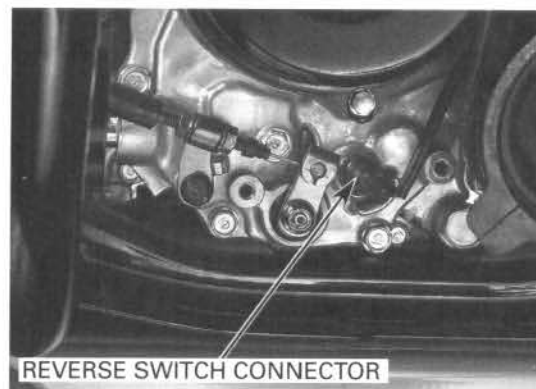
Route the alternator, ignition pulse generator and neutral/reverse switch wire properly (page 1-19) and clamp them securely.

Connect the alternator and ignition pulse generator switch connectors.

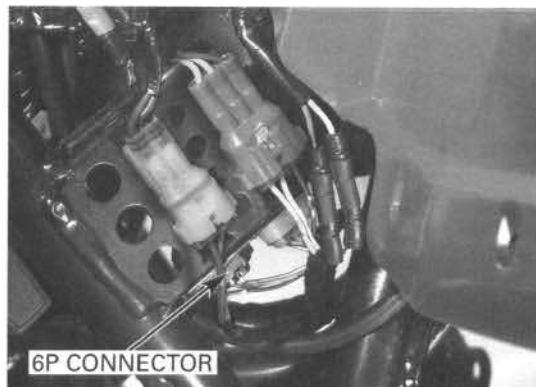
Connect the neutral and reverse switch connectors.



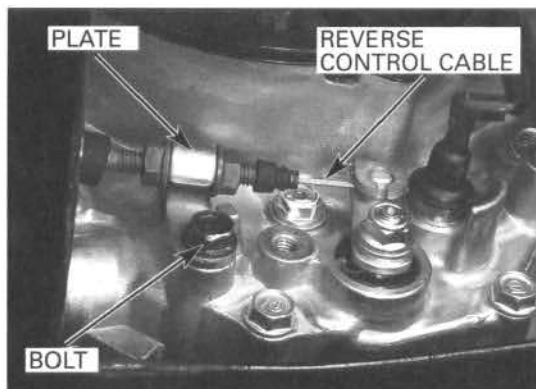
Connect the reverse switch.



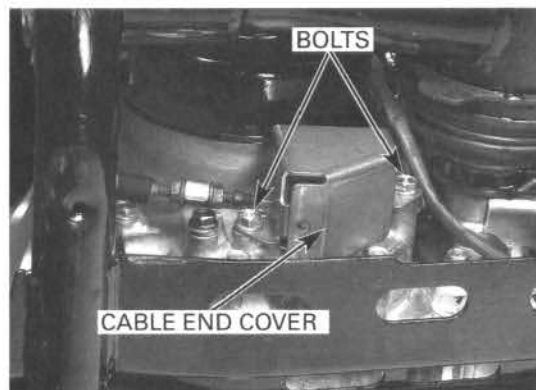
Connect the gear position switch 6P connector.



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.

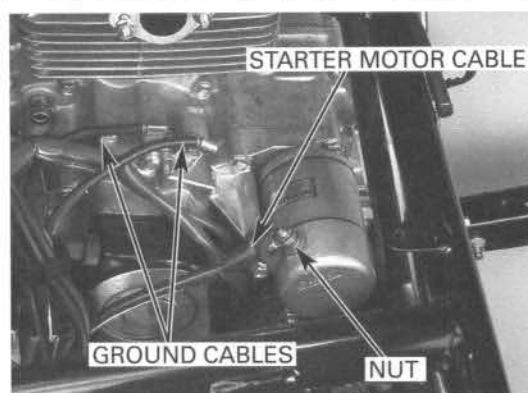


ENGINE REMOVAL/INSTALLATION

Connect the crankcase breather hose.

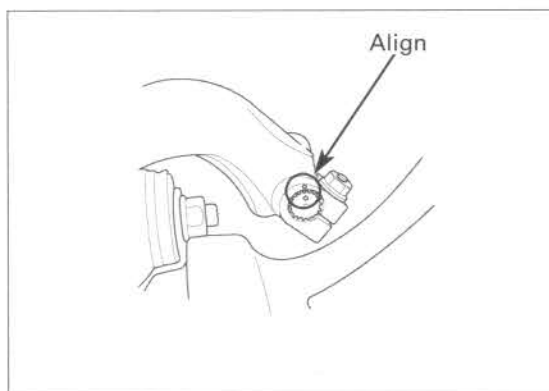


Connect the engine ground cable terminals and tighten the bolts.
Connect the starter motor cable and tighten the nut.

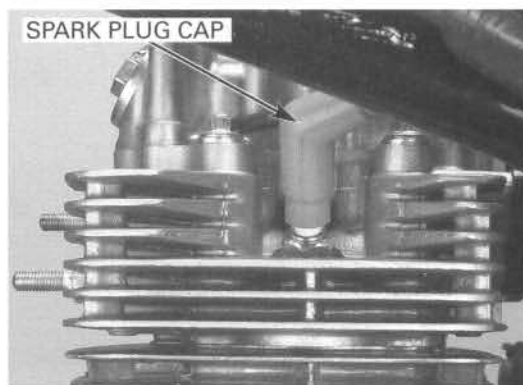


Except TE model: Install the gearshift pedal onto the gearshift spindle by aligning the punch marks.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



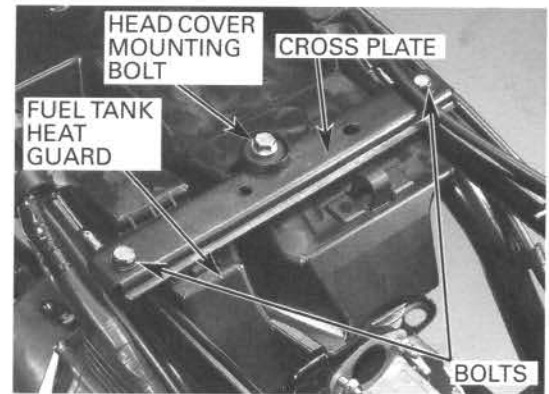
Connect the spark plug cap.



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 bolt to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

Tighten the two bolts securely.



Install the following:

- shift control motor and reduction gears (TE model only; Section 20)
- fuel tank (page 5-20)
- front fender (page 2-8)
- carburetor (page 5-14)
- VSS (TE model only) (page 19-9)
- air cleaner housing (page 5-6)
- exhaust pipe/muffler (page 2-14)
- side covers (page 2-6)
- fuel tank cover (page 2-5)
- seat (page 2-4)
- center mudguards (page 2-10)

Connect the oil cooler hose to the front crankcase cover (page 4-10).

Fill the crankcase with the recommended engine oil (page 3-11).

Perform the following inspection and adjustment:

- throttle operation (page 3-5)
- reverse selector cable adjustment (page 3-19)



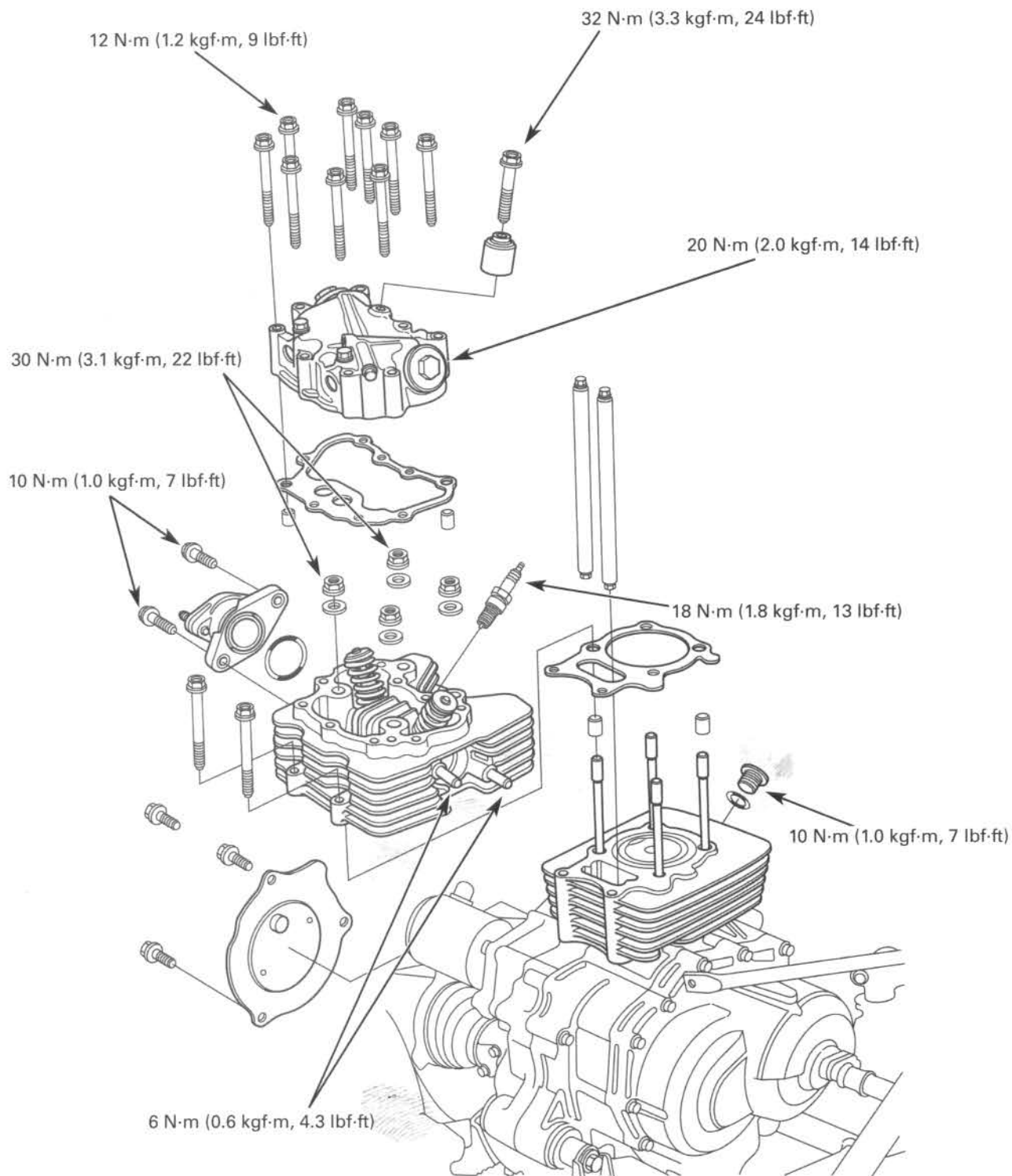
MEMO

RIDE RED

7. CYLINDER HEAD/VALVE

COMPONENT LOCATION	7-2	CYLINDER HEAD REMOVAL	7-11
SERVICE INFORMATION	7-3	VALVE GUIDE REPLACEMENT	7-14
TROUBLESHOOTING	7-5	VALVE SEAT INSPECTION/REFACING	7-15
CYLINDER COMPRESSION	7-6	CYLINDER HEAD ASSEMBLY	7-19
CYLINDER HEAD COVER	7-6	CYLINDER HEAD INSTALLATION	7-20

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head cover, rocker arms, cylinder head and valves. These parts can be serviced with the engine installed in the frame.
- 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 lubrication oil is fed through oil passages in the cylinder head and cylinder head cover. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the head cover and cylinder head too hard during removal.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	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)
Valvespring free length	Inner	IN/EX	42.4 (1.67)	41.1 (1.62)
	Outer	IN/EX	44.2 (1.74)	42.9 (1.69)
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	11.966 – 11.984 (0.4712 – 0.4718)	11.92 (0.469)
	Rocker arm-to-shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.08 (0.003)
Camshaft and cam follower	Cam lobe height	IN	35.2616 – 35.4216 (1.3882 – 1.3945)	35.2 (1.39)
		EX	35.0020 – 35.1620 (1.3780 – 1.3843)	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)

TORQUE VALUES

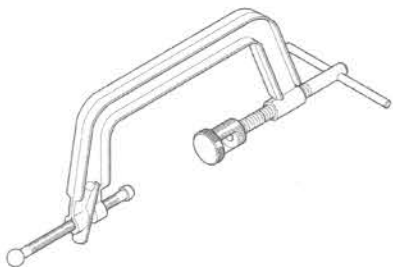
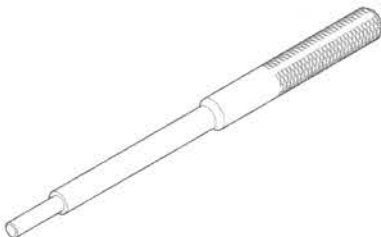

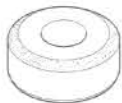




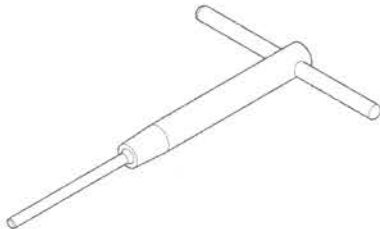
Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)
Valve adjusting hole cap	20 N·m (2.0 kgf·m, 14 lbf·ft)
Valve adjusting screw lock nut	17 N·m (1.7 kgf·m, 12 lbf·ft)
Cylinder head cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cylinder head flange nut	30 N·m (3.1 kgf·m, 22 lbf·ft)
Carburetor insulator mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Cylinder head 8 mm stud bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Cylinder head mounting rubber bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)

Apply oil to the threads and seating surface.

Apply oil to the threads and seating surface.

CYLINDER HEAD/VALVE

TOOLS

<p>Valve spring compressor 07757-0010000</p> 	<p>Valve guide driver, 5.5 mm (IN) 07742-0010100</p> 	<p>Valve guide reamer, 5.5 mm 07984-2000001</p>  <p>or 07984-200000D (U.S.A. only)</p>
<p>Seat cutter, 33 mm (IN 45°) 07780-0010800</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Seat cutter, 29 mm (EX 45°) 07780-0010300</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Flat cutter, 30 mm (IN 32°) 07780-0012200</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Flat cutter, 33 mm (EX 32°) 07780-0012900</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Interior cutter, 30 mm (IN/EX 60°) 07780-0014000</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Cutter holder, 5.5 mm (IN) 07781-0010101</p>  <p>or equivalent commercially available in U.S.A.</p>

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for a white smoke in the crankcase breather hose. If the hose is smoky, check for seized piston ring (Section 8).

Compression too low, hard starting or poor performance at low speed

- Valves
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
 - Uneven valve seating
 - Valve stuck open
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head
 - Loose spark plug
- Cylinder/piston (Section 8)

Compression too high

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

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (Section 8)

Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged rocker arm and/or shaft
- Worn rocker arm follower or valve stem end
- Cylinder/piston/camshaft problem (Section 8)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine, disconnect the spark plug cap and remove the spark plug.

Install the compression gauge with the gauge attachment into the spark plug hole.

Shift the transmission in neutral and open the choke lever (OFF).

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.

COMPRESSION PRESSURE:

1,275 kPa (13.0 kgf/cm², 185 psi)

NOTE:

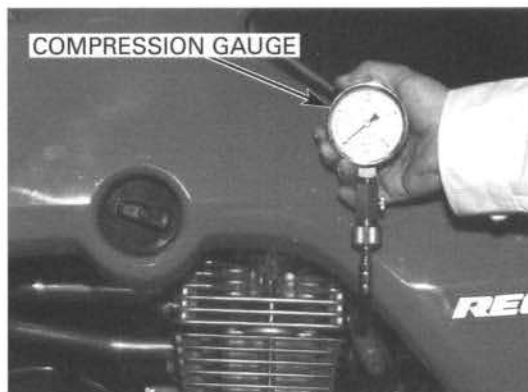
- Check that there is no leakage at the gauge connection.

Low compression can be caused by:

- blown cylinder head gasket
- improper valve adjustment
- valve leakage
- worn piston ring or cylinder (Section 8)

High compression can be caused by:

- carbon deposits in combustion chamber or on piston head

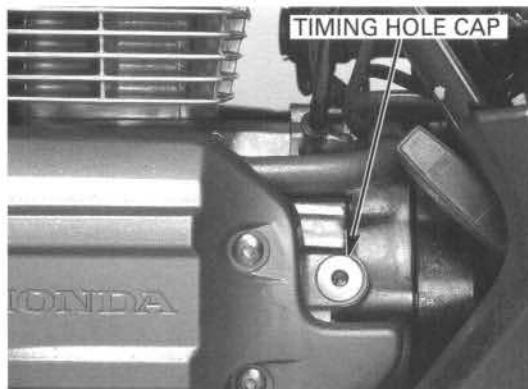


CYLINDER HEAD COVER

REMOVAL

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

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



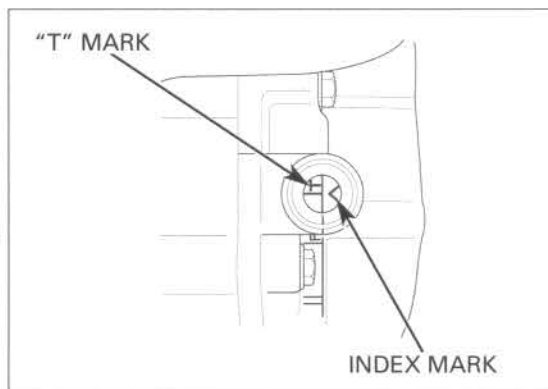
Rotate the crankshaft with the recoil starter and align the "T" mark on the flywheel with the index mark in the rear crankcase cover.

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

Make sure that the piston is at TDC (Top Dead Center) on the compression stroke.

The rocker arms should be loose.

If the rocker arms are tight, turn the crankshaft counterclockwise one full turn and realign the "T" mark with the index mark.

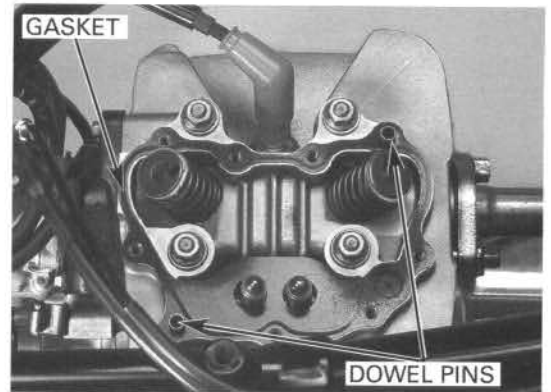
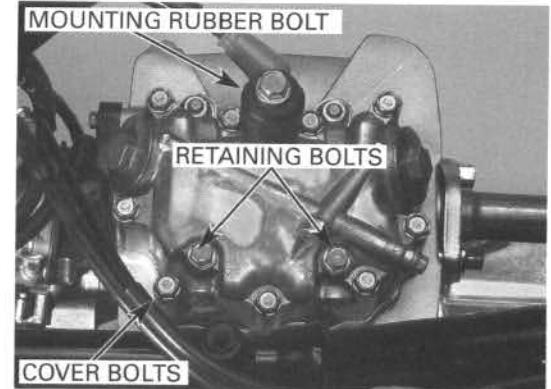


NOTE:

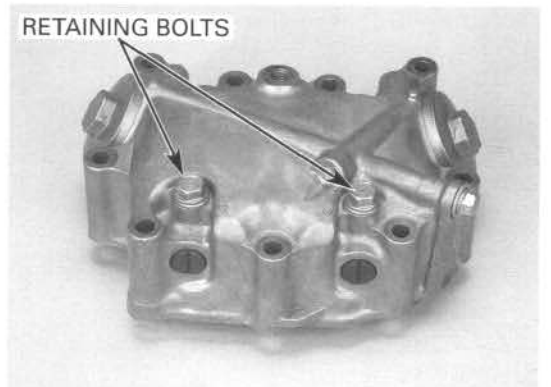
- When the cylinder head cover is ready to be disassembled, loosen the rocker arm shaft retaining bolts.

Remove 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.

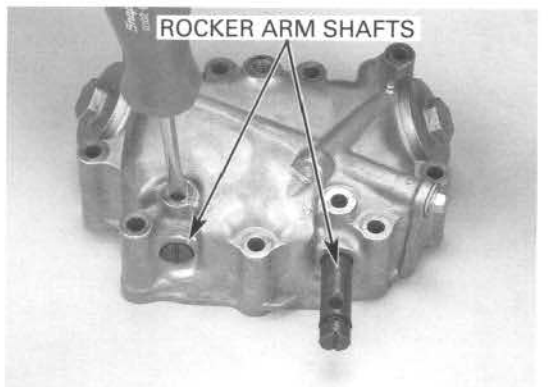
**DISASSEMBLY**

Remove the rocker arm shaft retaining bolts and sealing washers.



Pull out the rocker arm shaft from the cylinder head cover using a small flat blade screwdriver. Mark the rocker arm shafts so they can be reinstalled in their original positions.

Remove the O-ring from each rocker arm shaft.
Remove each rocker arm and the spring washers.



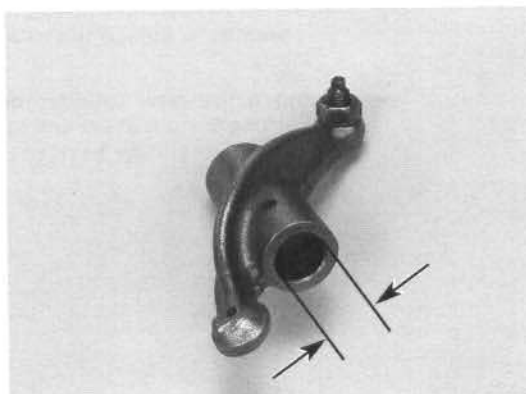
CYLINDER HEAD/VALVE

INSPECTION

Check the rocker arms for wear or damage.

Measure the rocker arm I.D.

SERVICE LIMIT: 12.05 mm (0.474 in)

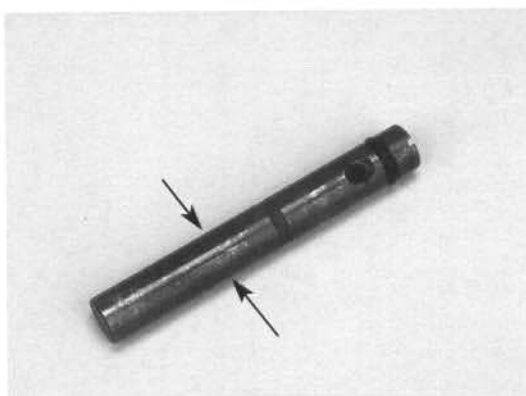


Measure the rocker arm shaft O.D.

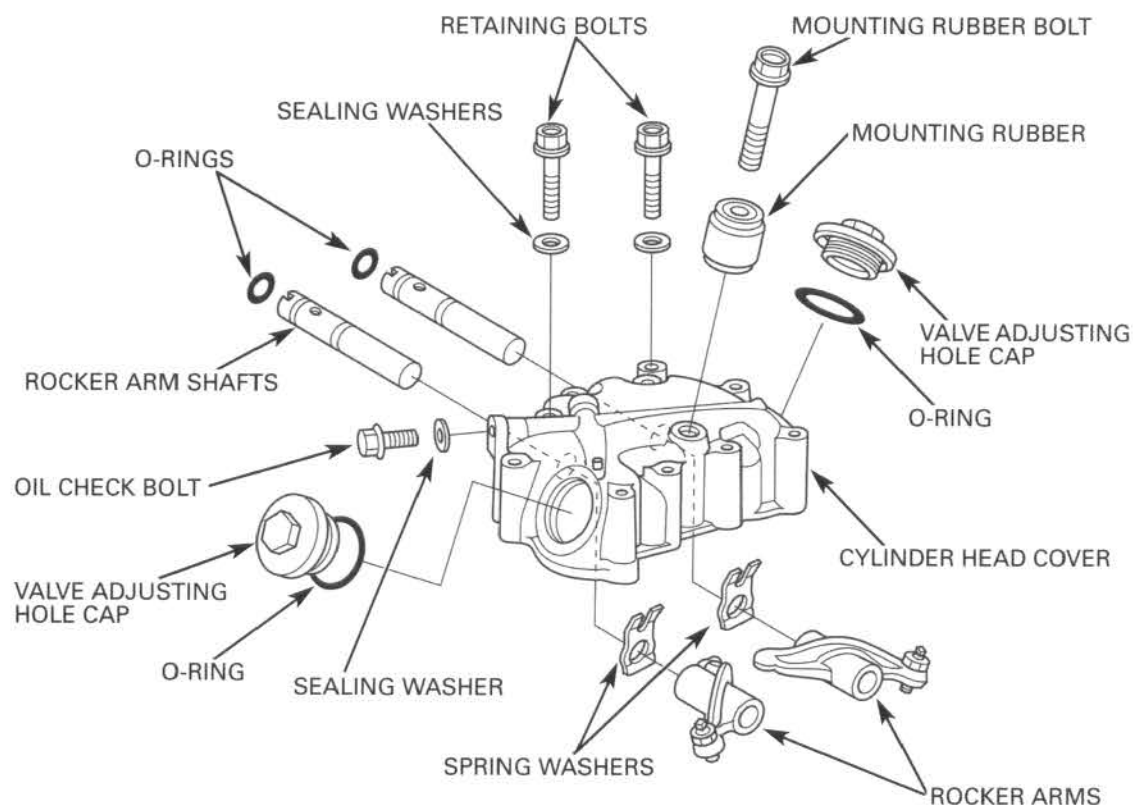
SERVICE LIMIT: 11.92 mm (0.469 in)

Subtract each rocker arm shaft O.D. from the corresponding rocker arm I.D. to obtain the rocker arm-to-shaft clearance.

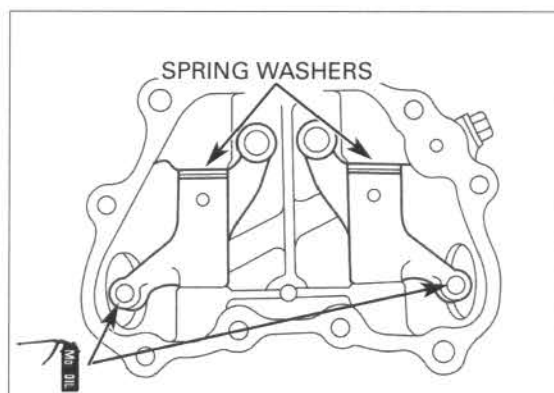
SERVICE LIMIT: 0.08 mm (0.003 in)



ASSEMBLY



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

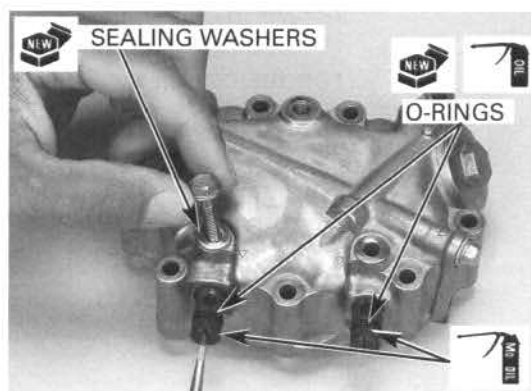


If reusing, install the rocker arm shafts in their original locations as marked.

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 shafts into the cylinder head cover.

Turn the rocker arm shaft using a screwdriver to align the hole between the cylinder head cover and shaft.

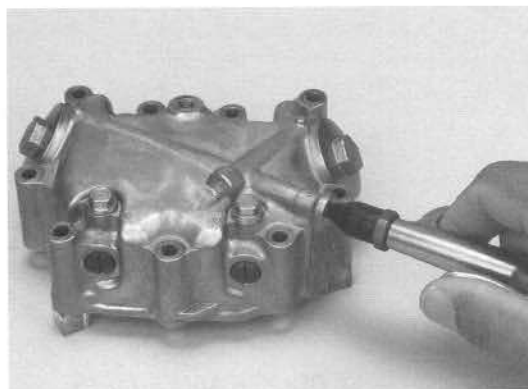
Install the rocker arm shaft retaining bolts with new sealing washers and loosely tighten them.



CYLINDER HEAD/VALVE

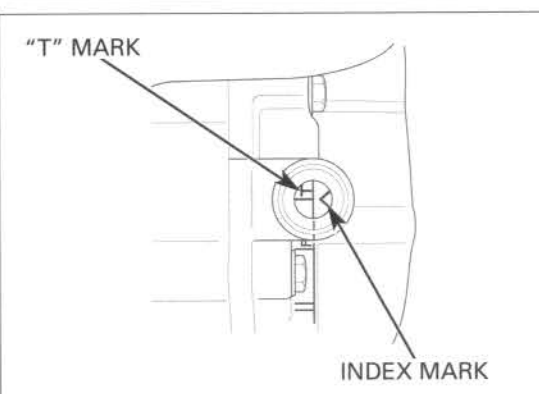
INSTALLATION

Remove the oil check bolt (6 mm bolt) and sealing washer from the cylinder head cover.
Blow open oil passages in the cylinder head cover with compressed air.
Reinstall the oil check bolt with new sealing washer and tighten the bolt.

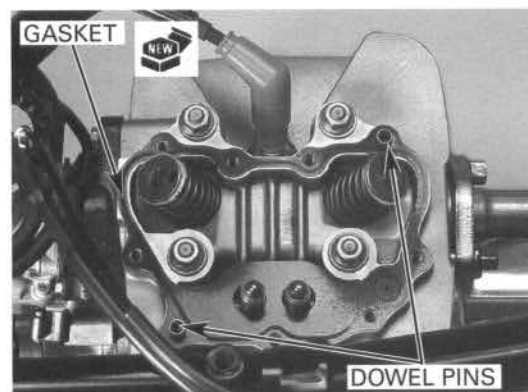


Turn the crankshaft counterclockwise and align the "T" mark on the flywheel with the index mark in the rear crankcase cover.

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



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 several steps to the specified torque.

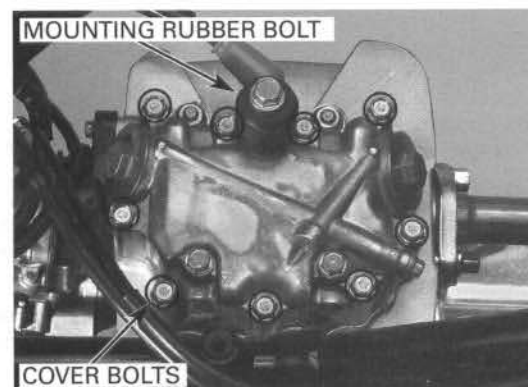
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

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

Install the cylinder head mounting rubber bolt and tighten it to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

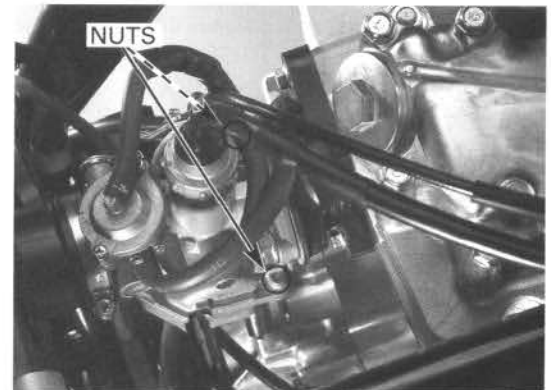
Adjust the valve clearance (page 3-9).



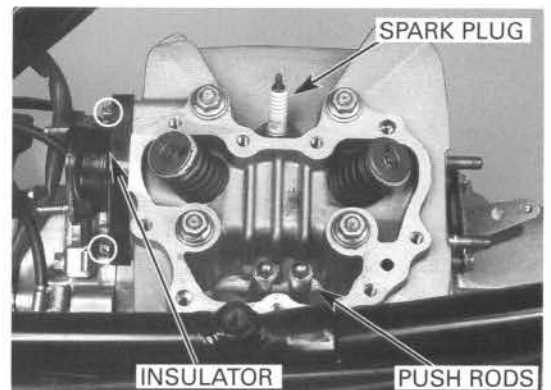
CYLINDER HEAD REMOVAL

Remove the exhaust pipe/muffler (page 2-13).
Remove the cylinder head cover (page 7-6).

Remove the two nuts and separate the carburetor from the insulator.
Remove the O-ring from the carburetor.



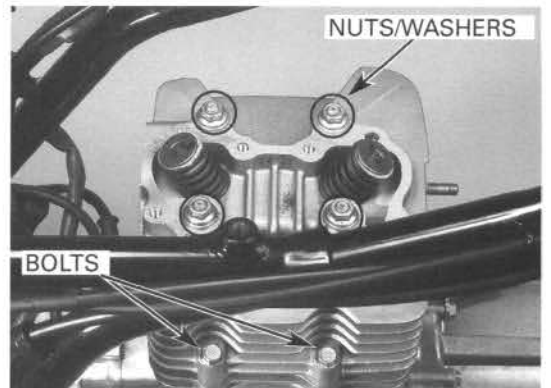
Disconnect the spark plug cap and remove the spark plug.
Remove the two bolts and the carburetor insulator from the cylinder head.
Remove the O-ring from the insulator.
Remove the push rods.



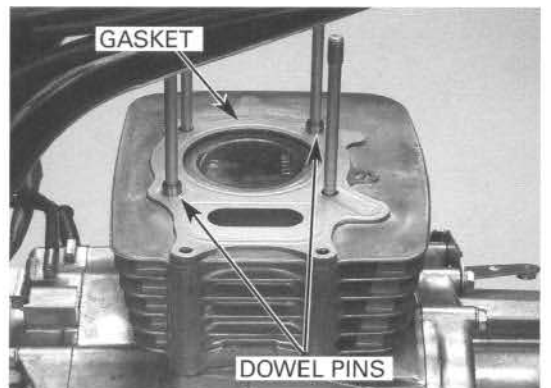
Remove the two cylinder head mounting bolts.
Loosen the four cylinder head flange nuts in a criss-cross pattern in several steps and remove the nuts and washers.

Do not strike the cylinder head too hard.

Remove the cylinder head.



Remove the gasket and dowel pins.



CYLINDER HEAD/VALVE

CYLINDER HEAD DISASSEMBLY/ INSPECTION

NOTE:

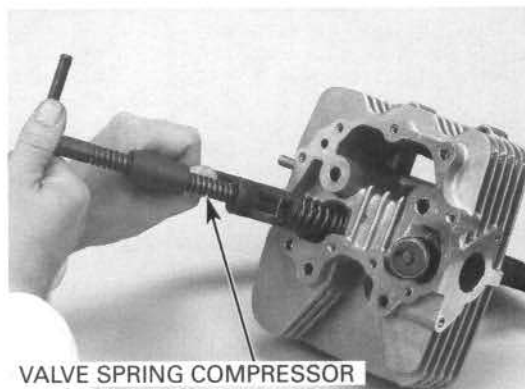
- Mark all parts during disassembly so they can be placed back in their original locations for installation later.

Compressing the valve springs more than necessary will cause loss of valve spring tension.

Remove the valve spring cotters using the valve spring compressor.

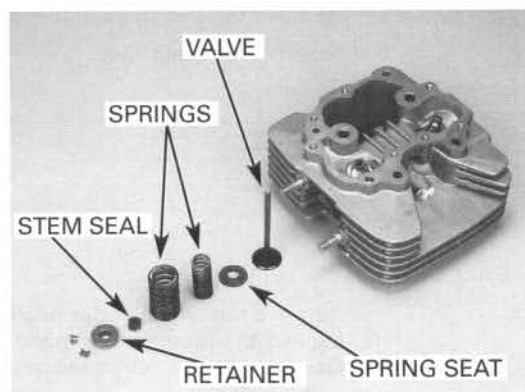
TOOL:

Valve spring compressor 07757-0010000



Remove the following:

- spring retainer
- outer spring
- inner spring
- valve
- stem seal
- spring seat

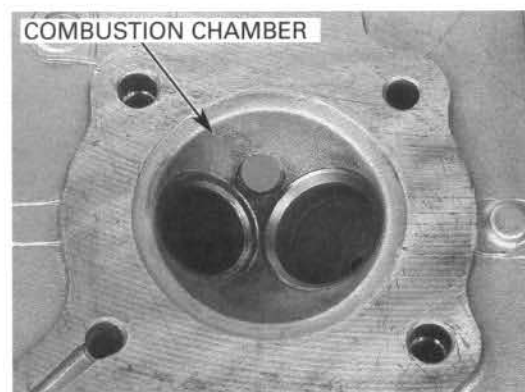


INSPECTION

CYLINDER HEAD

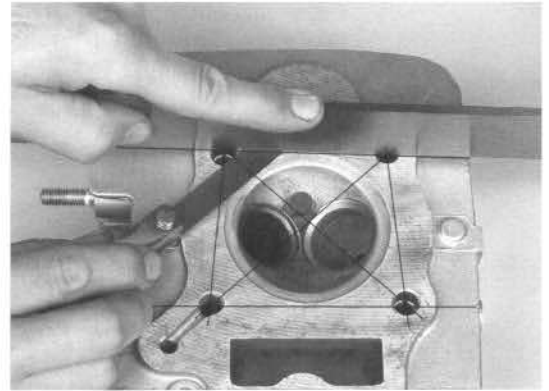
Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface.

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)

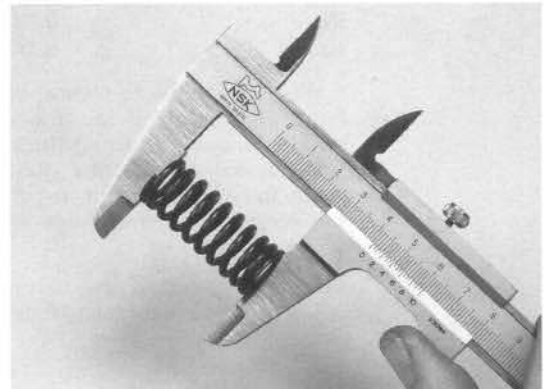


VALVE SPRING

Measure the valve spring free length.

SERVICE LIMITS:

Inner: 41.1 mm (1.62 in)
Outer: 42.9 mm (1.69 in)



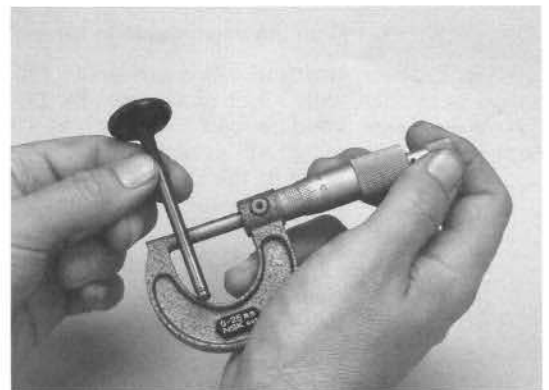
VALVE/VALVE GUIDE

Check the valve moves smoothly in the guide.
Check the valve for bending, burning or abnormal wear.

Measure each valve stem O.D. and record it.

SERVICE LIMITS:

IN: 5.45 mm (0.215 in)
EX: 5.43 mm (0.214 in)



CYLINDER HEAD/VALVE

Ream the valve guide to remove any carbon build-up before measuring the guide. Insert the reamer from the combustion chamber side of the cylinder head and always rotate the reamer clockwise.

TOOL:

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

Measure each valve guide I.D. and record it.

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:

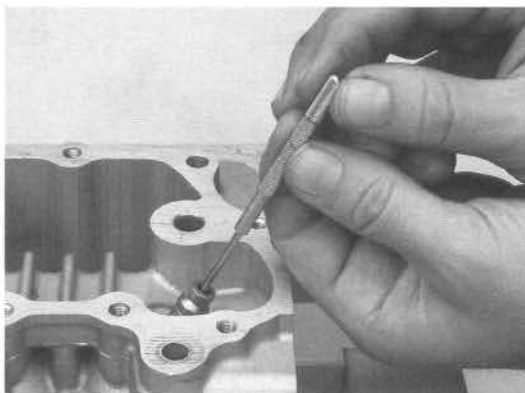
IN: 0.12 mm (0.005 in)

EX: 0.14 mm (0.006 in)

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

Inspect and reface the valve seats whenever the valve guides are replaced (see below).

VALVE GUIDE REAMER



VALVE GUIDE REPLACEMENT

Chill the valve guide in freezer for about an hour.

Wear insulated gloves to avoid burns when handling the heated cylinder head

Heat the cylinder head to 130 – 140°C (275 – 290°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (300°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

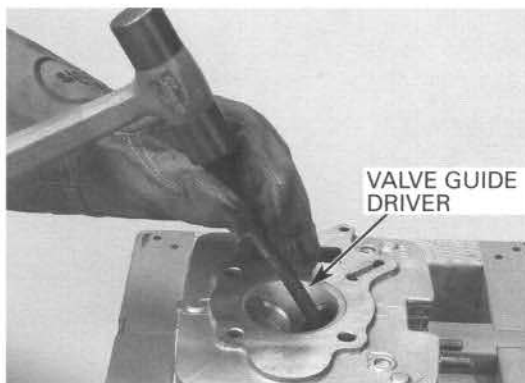
NOTICE

Using a torch to heat the cylinder head may cause warping.

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

TOOL:

Valve guide driver, 5.5 mm 07742-0010100



Install new O-rings onto the new valve guides. Drive the new valve guides in the cylinder head from the top of the cylinder head while the cylinder head is still heated.

TOOL:

Valve guide driver, 5.5 mm 07742-0010100

Let the cylinder head cool to room temperature.



Ream the new valve guides.

Insert the reamer from the combustion chamber side and always rotate the reamer clockwise.

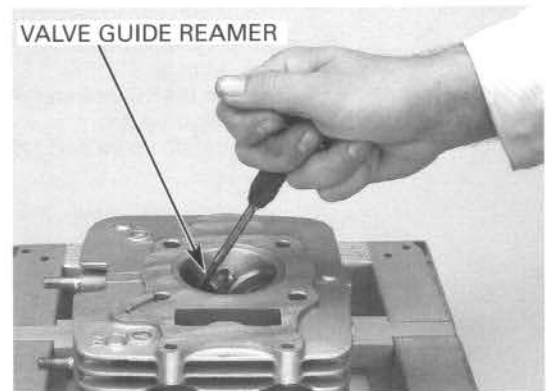
TOOL:

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

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming.
- Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat (page 7-16).



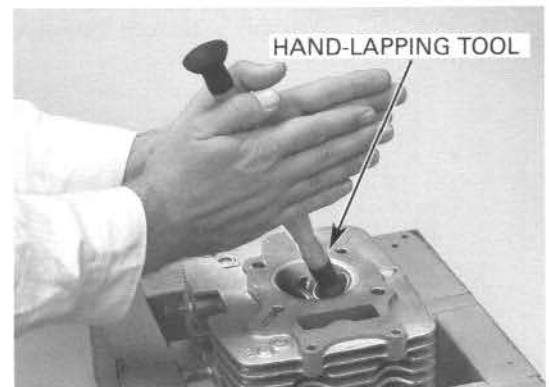
VALVE SEAT INSPECTION/REFACING

INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to each valve seat.

Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.



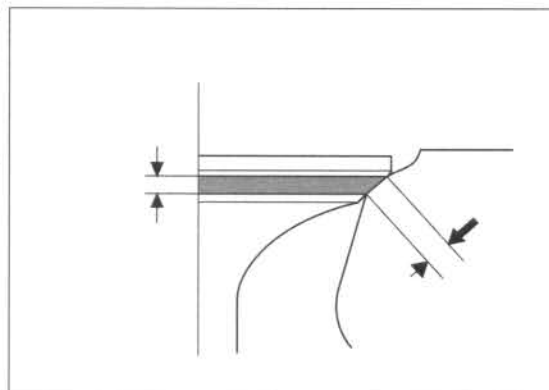
CYLINDER HEAD/VALVE

Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: 1.2 mm (0.05 in)

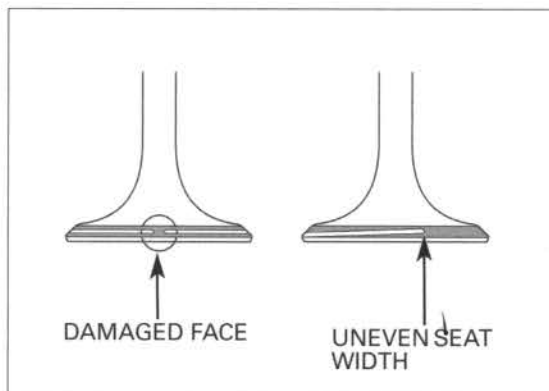
SERVICE LIMIT: 1.5 mm (0.06 in)

If the valve seat width is not within specification, reface the valve seat (see below).



Inspect the valve face for:

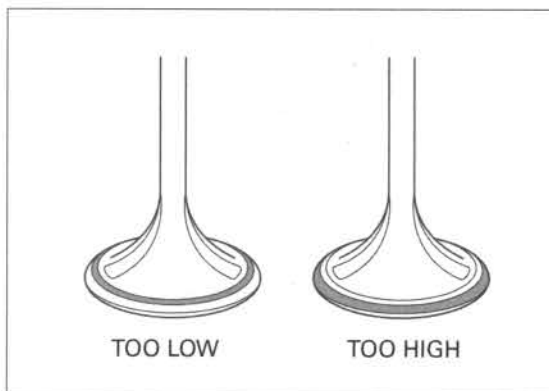
- Damaged face:
 - Replace the valve and reface the valve seat.
- Uneven seat width:
 - Replace the valve and reface the valve seat.



- Contact area (too high or too low)
 - Reface the valve seat.

NOTE:

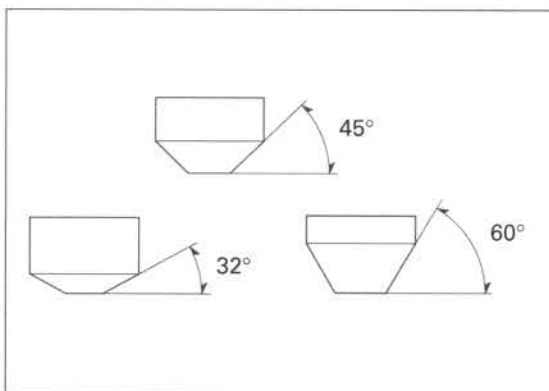
- The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



REFACING

NOTE:

- Follow the refacing manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.



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

TOOLS:

Flat cutter, 30 mm (32° IN) 07780-0012200

Flat cutter, 33 mm (32° EX) 07780-0012900

or equivalent commercially available in U.S.A.

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

TOOL:

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

or equivalent commercially available in U.S.A.

Using a 45° seat cutter, remove any roughness or irregularities from the seat.

TOOLS:

Seat cutter, 29 mm (45° IN) 07780-0010300

Seat cutter, 33 mm (45° EX) 07780-0010800

Cutter holder, 5.5 mm (IN) 07781-0010101

or equivalent commercially available in U.S.A.

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

TOOLS:

Flat cutter, 30 mm (32° IN) 07780-0012200

Flat cutter, 33 mm (32° EX) 07780-0012900

Cutter holder, 5.5 mm (IN) 07781-0010101

or equivalent commercially available in U.S.A.

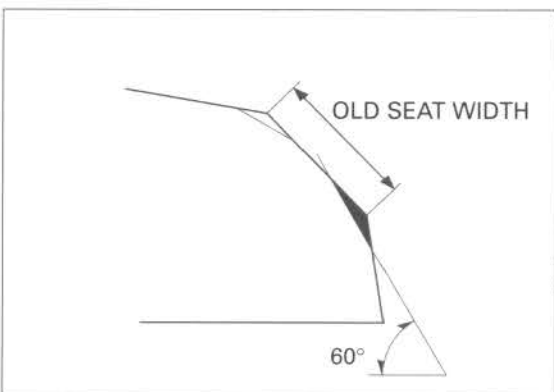
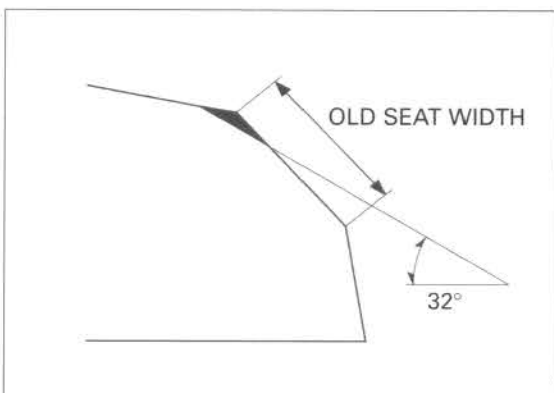
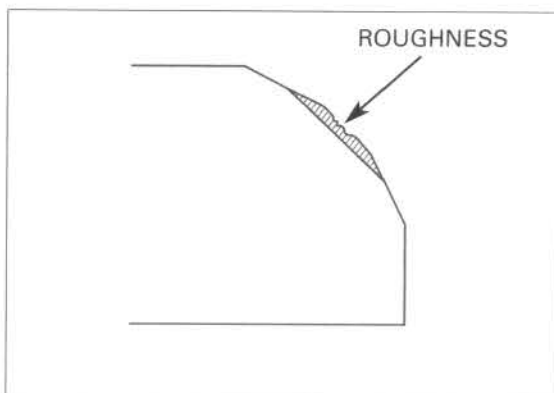
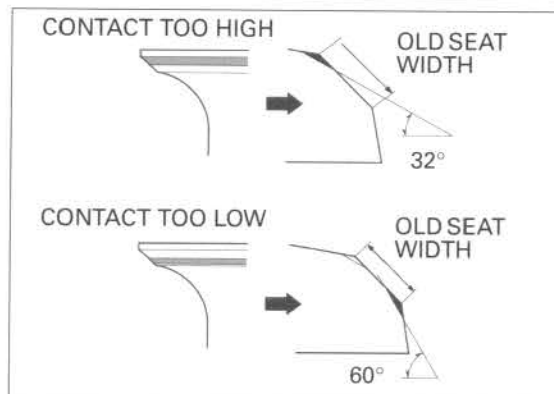
Using a 60° interior cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Interior cutter, 30 mm 07780-00140100
(60° IN/EX)

Cutter holder, 5.5 mm 07781-0010101

or equivalent commercially available in U.S.A.

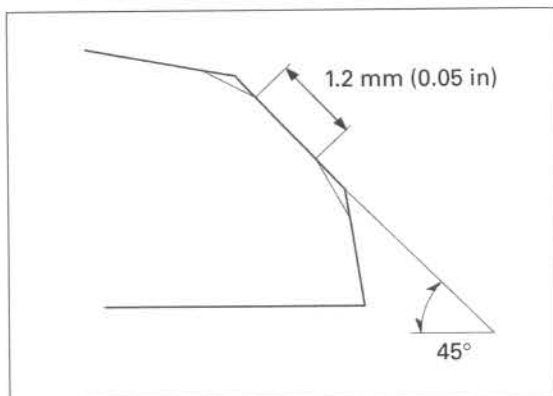


CYLINDER HEAD/VALVE

Using a 45° seat cutter, cut the seat to the proper width.

VALVE SEAT WIDTH: 1.2 mm (0.05 in)

Make sure all pitting and irregularities are removed.



NOTE:

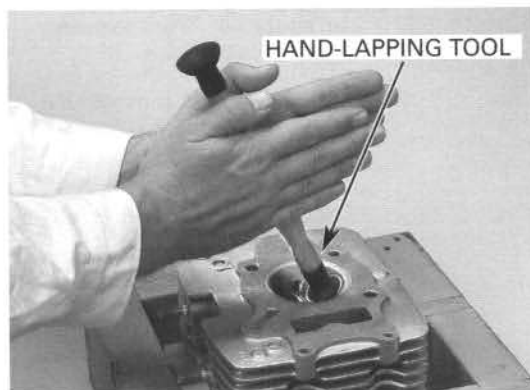
- Change the angle of lapping tool frequently to prevent uneven seat wear.

Lapping compound can cause damage if it gets between the valve stem and guide.

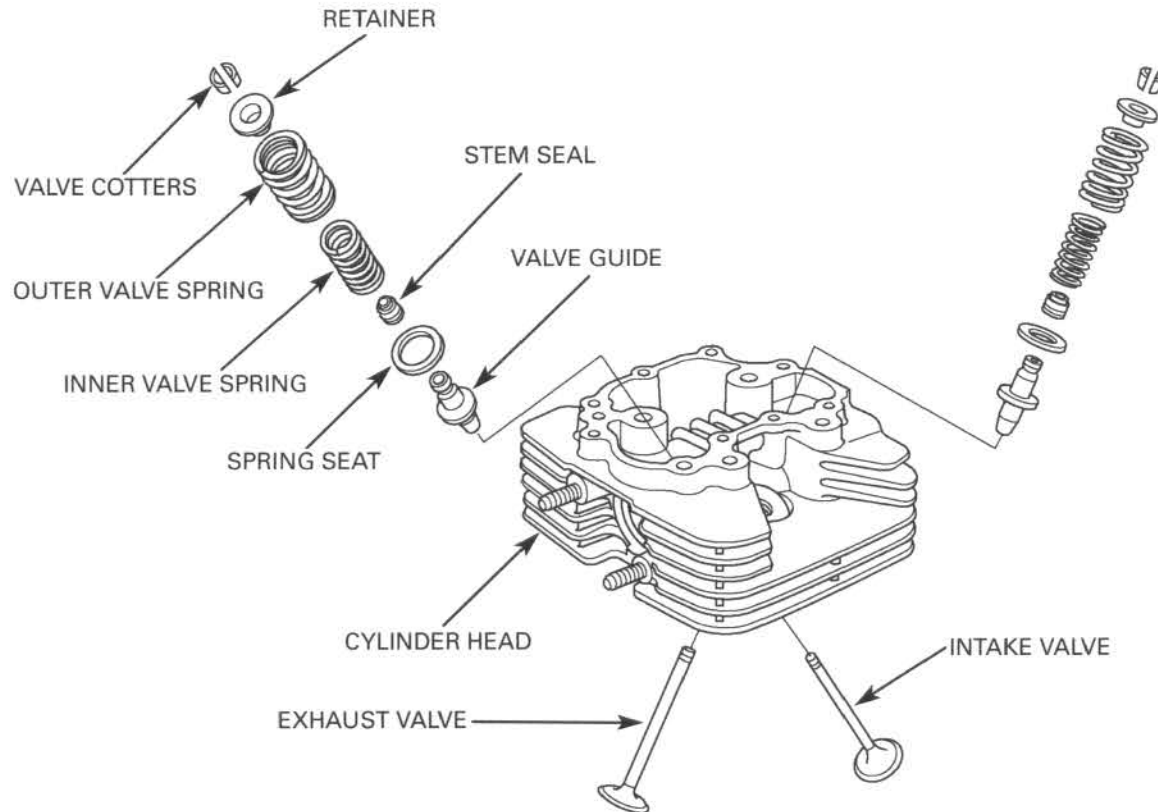
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

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

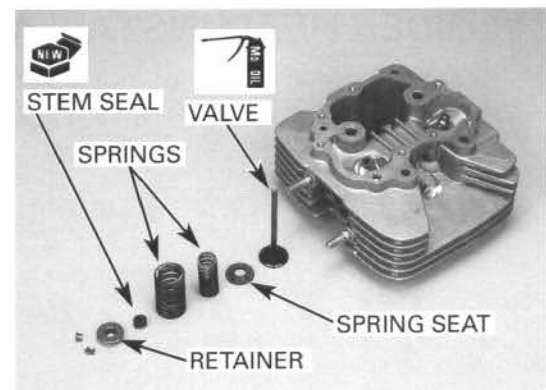
Recheck the seat contact after lapping.



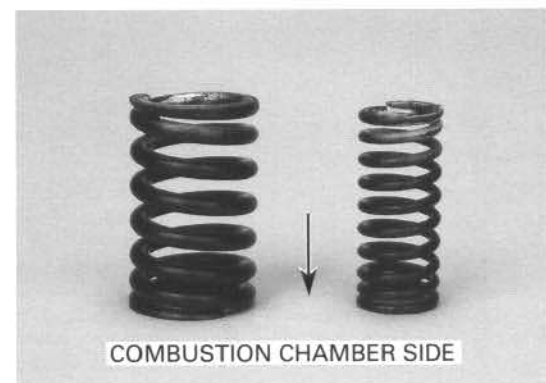
CYLINDER HEAD ASSEMBLY



Blow through the oil passage in the cylinder head with compressed air.
 Install the valve spring seats.
 Install new stem seals.
 Lubricate the valve stem sliding surface with molybdenum oil solution.
 Insert the valve into the guide while turning it slowly to avoid damage to the stem seal.



Install the inner and outer valve springs with the tightly wound coils facing the combustion chamber.
 Install the spring retainer.



CYLINDER HEAD/VALVE

NOTE:

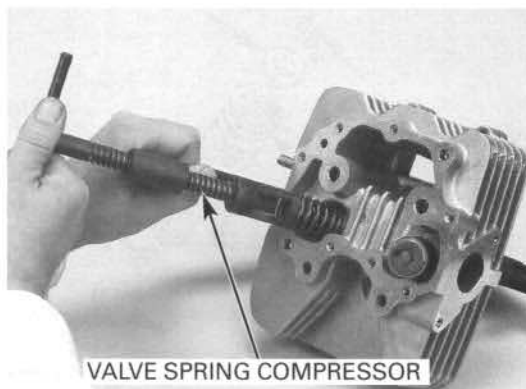
- To ease installation of the cotters, grease them first.

Compressing the valve spring more than necessary when installing the valve cotters may cause loss of valve spring tension.

Compress the valve spring with the valve spring compressor and install the valve cotters.

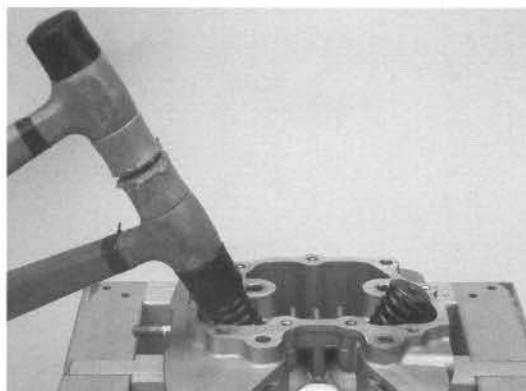
TOOL:

Valve spring compressor 07757-0010000



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

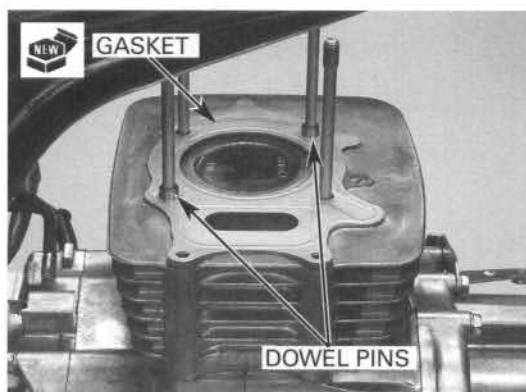
Tap the valve stems gently with a soft hammer to firmly seat the cotters.



CYLINDER HEAD INSTALLATION

Clean the cylinder mating surface.

Install the dowel pins and new gasket.



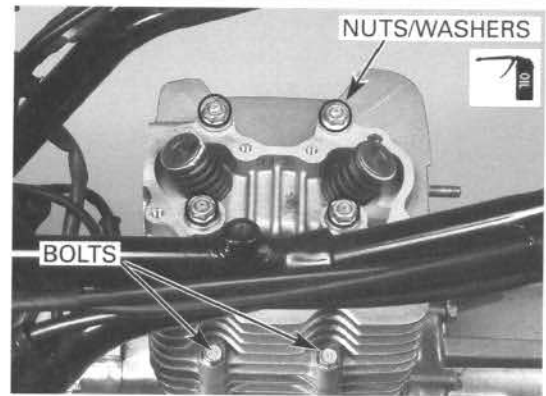
Install the cylinder head onto the cylinder.

Install the two cylinder head mounting bolts. Tighten the mounting bolts securely.

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 several steps to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



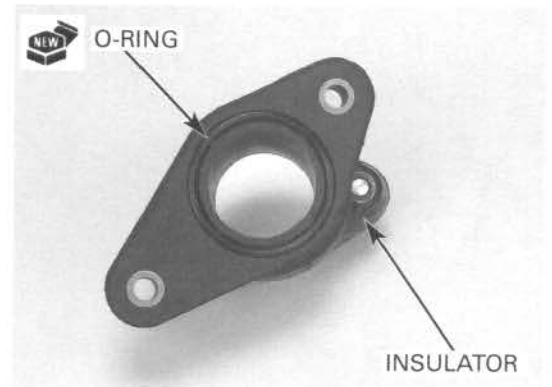
Install a new O-ring into the carburetor insulator groove.

Install the carburetor insulator onto the cylinder head with the mounting bolts and tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

NOTE:

- Install the insulator with its "HN6" mark facing up.

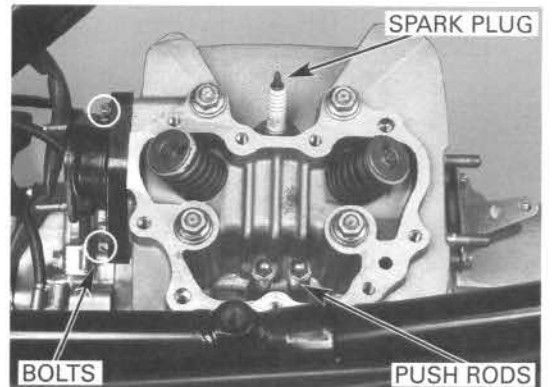


To prevent damage to the cylinder head, hand tighten the spark plug before using a wrench to tighten to the specified torque.

Install and tighten the spark plug to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the push rods.



Install a new O-ring into the carburetor groove. Install the carburetor onto the insulator with the mounting nuts and tighten the nuts securely.

Install the cylinder head cover (page 7-10).

Install the exhaust pipe/muffler (page 2-14).



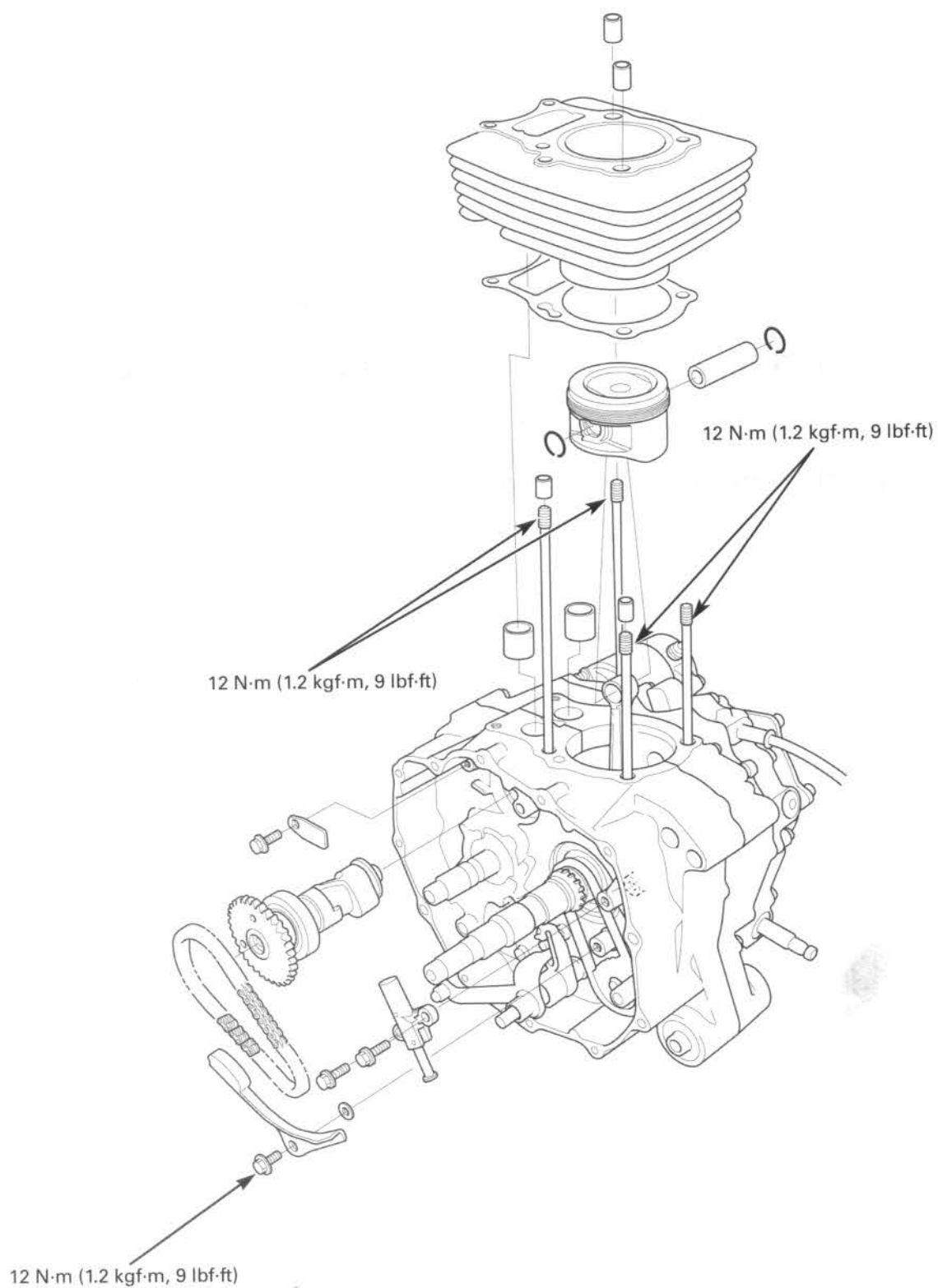
MEMO

RIDE RED

8. CYLINDER/PISTON/CAMSHAFT

COMPONENT LOCATION	8-2	CYLINDER/PISTON INSPECTION	8-6
SERVICE INFORMATION	8-3	CYLINDER/PISTON INSTALLATION	8-9
TROUBLESHOOTING	8-4	CAMSHAFT/CAM CHAIN TENSIONER	8-11
CYLINDER/PISTON REMOVAL	8-5		

CYLINDER/PISTON/CAMSHAFT COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, cylinder and piston. These services can be done with the engine installed in the frame.
- Camshaft servicing requires front crankcase cover removal (Section 9).
- 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			STANDARD	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)	
Valvespring free length	Inner	IN/EX	42.4 (1.67)	41.1 (1.62)
	Outer	IN/EX	44.2 (1.74)	42.9 (1.69)
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	11.966 – 11.984 (0.4712 – 0.4718)	11.92 (0.469)
	Rocker arm-to-shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.08 (0.003)
Camshaft and cam follower	Cam lobe height	IN	35.2616 – 35.4216 (1.3882 – 1.3945)	35.2 (1.39)
		EX	35.0020 – 35.1620 (1.3780 – 1.3843)	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		15 (0.6) 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)

CYLINDER/PISTON/CAMSHAFT

TORQUE VALUES

Cylinder head nut	30 N·m (3.1 kgf·m, 22 lbf·ft)
Cam chain tensioner arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Cylinder stud bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems 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 hose. If the hose 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 clearance
- Sticking valve or broken valve spring
- Worn or damaged push rod and/or cam follower
- Worn rocker arm and/or shaft
- Intake air leak

Rough idle

- Low cylinder compression

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

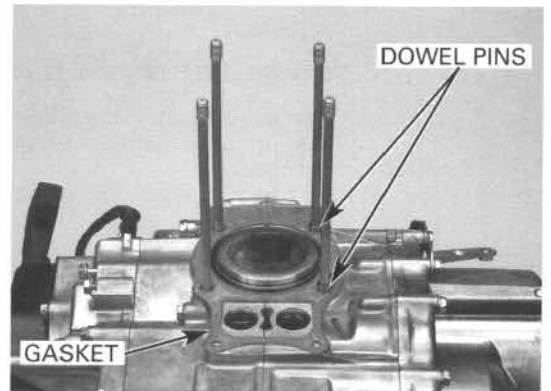
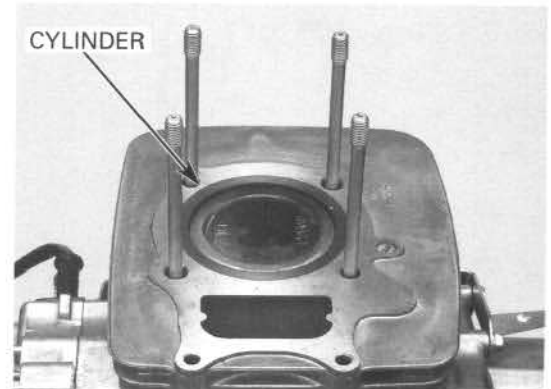
CYLINDER/PISTON REMOVAL

CYLINDER REMOVAL

Remove the cylinder head (page 7-11).

Remove the cylinder.

Remove the cylinder gasket and dowel pins.

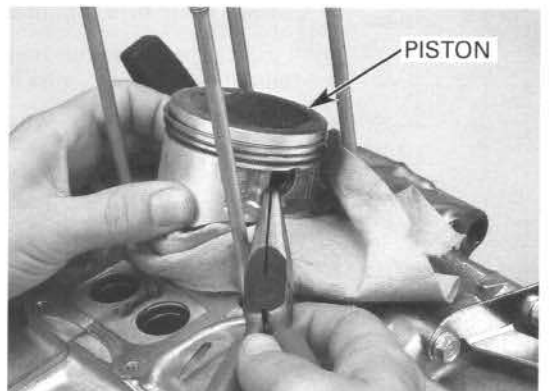


PISTON REMOVAL

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

Remove the piston pin clips with pliers.

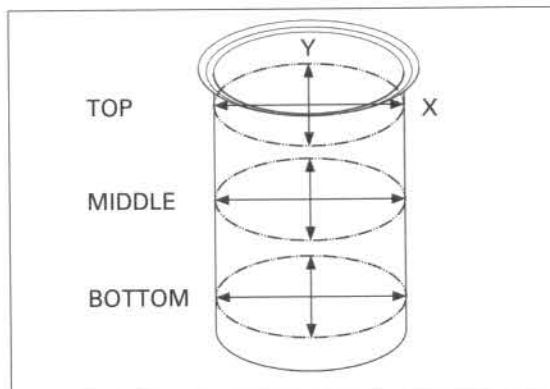
Press the piston pin out of the piston and remove the piston.



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 8-8) 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.

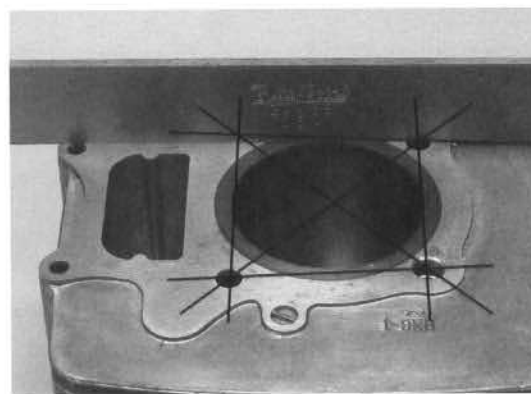
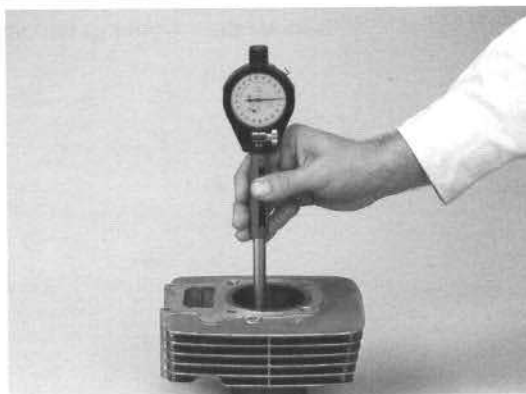
The following oversize pistons are available:

- 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).

Inspect the top of the cylinder for warpage.

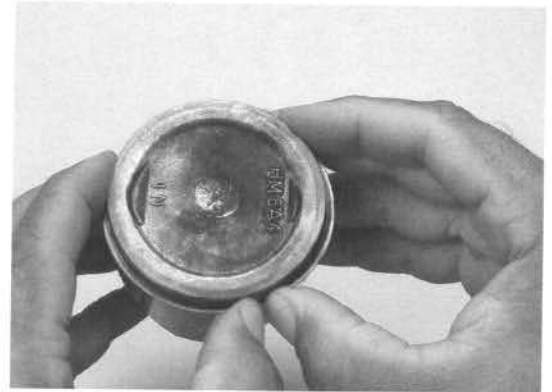
SERVICE LIMIT: 0.10 mm (0.004 in)



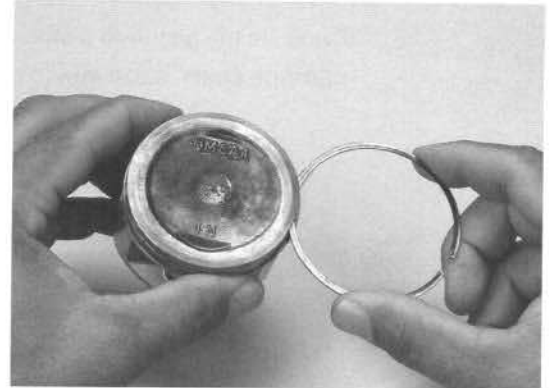
PISTON

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)

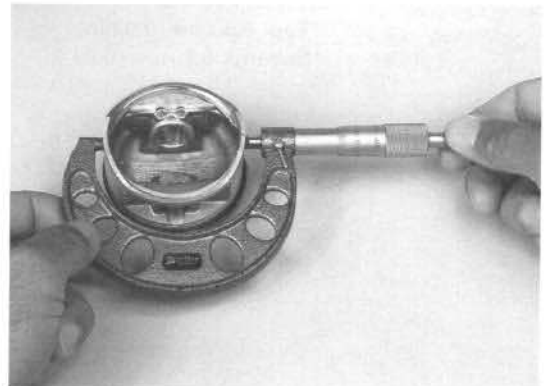
Second: 0.09 mm (0.004 in)



Inspect the piston for wear or damage.

Measure the diameter of the piston at 15 mm (0.6 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 68.4 mm (2.69 in)



CYLINDER/PISTON/CAMSHAFT

Measure the piston pin bore.

SERVICE LIMIT: 15.04 mm (0.592 in)

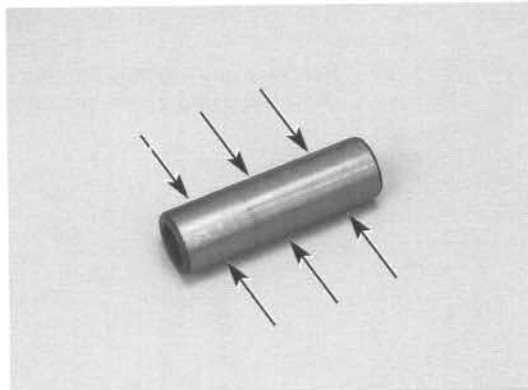


Measure the O.D. of the piston pin.

SERVICE LIMIT: 14.96 mm (0.589 in)

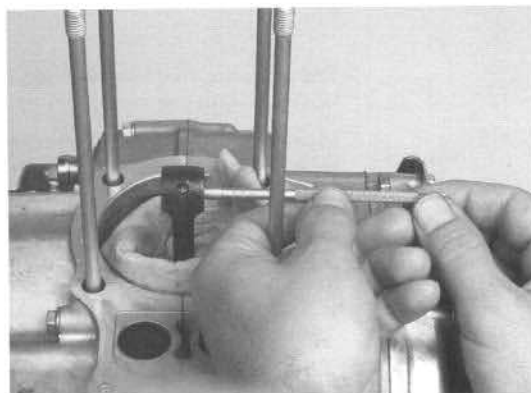
Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.020 mm (0.0008 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 15.06 mm (0.593 in)



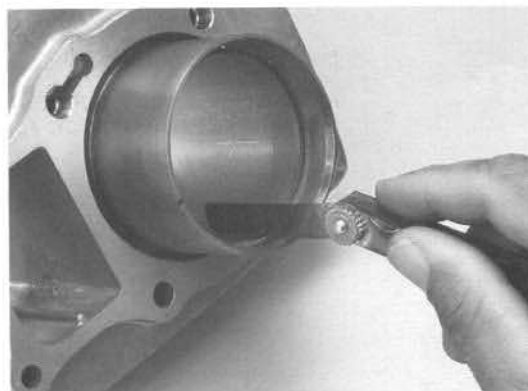
Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

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

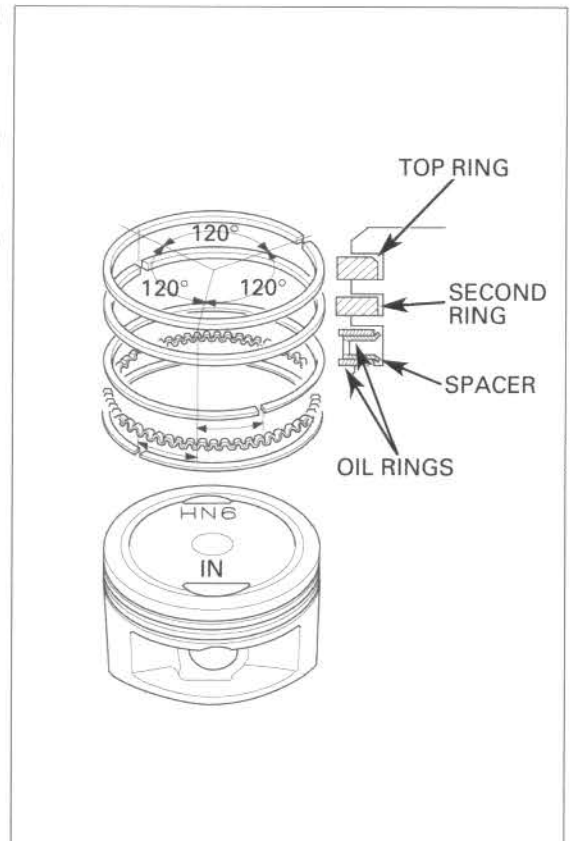
Clean the piston ring grooves thoroughly and install the piston rings.

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

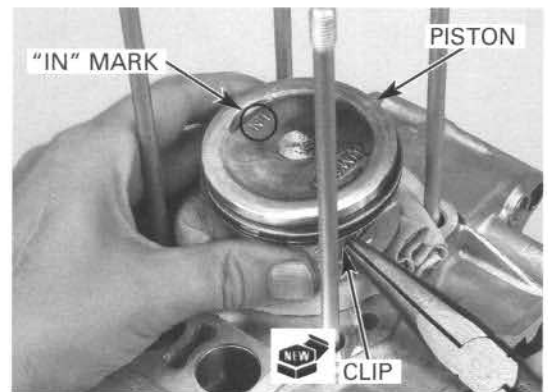
PISTON INSTALLATION

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:

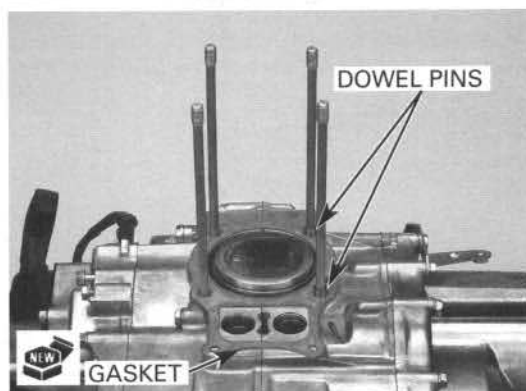
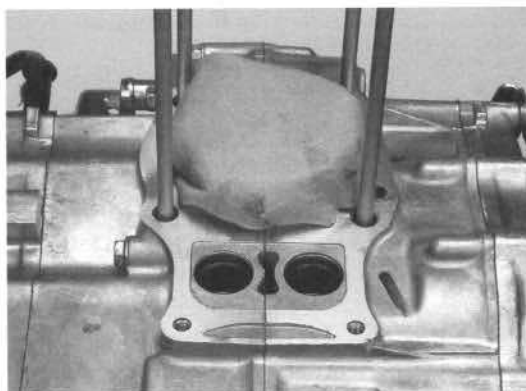
- Do not align the piston pin clip end gaps with the piston cutouts.
- Do not let the piston pin clips fall into the crankcase.



CYLINDER INSTALLATION

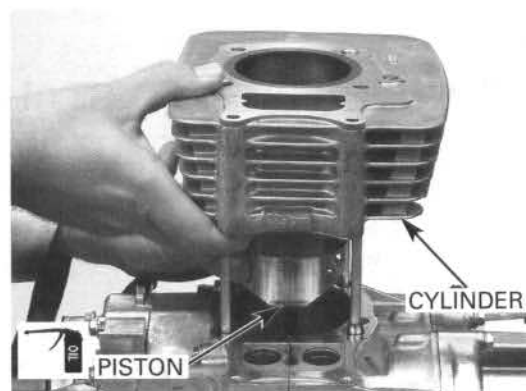
Clean off any gasket materials from the crankcase surface.

Install the dowel pins and a new gasket.

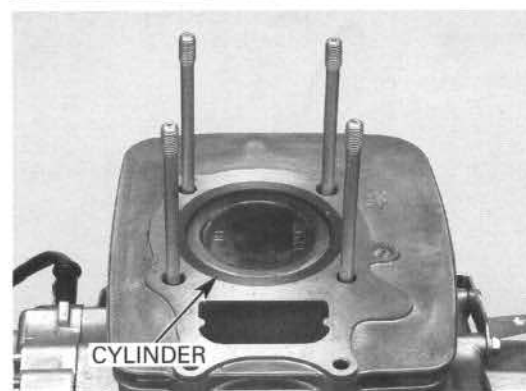


Avoid piston ring damage during installation.

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



Install the cylinder head and push rods (page 7-20).



CAMSHAFT/CAM CHAIN TENSIONER

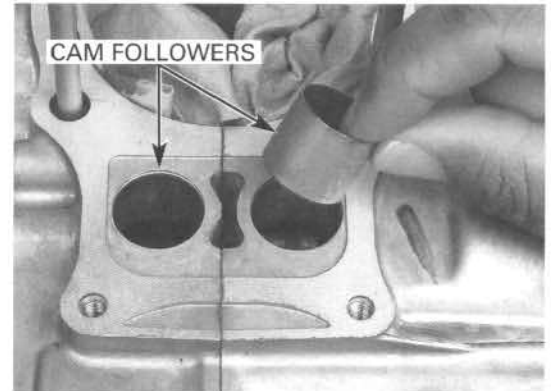
CAMSHAFT REMOVAL

Remove the following:

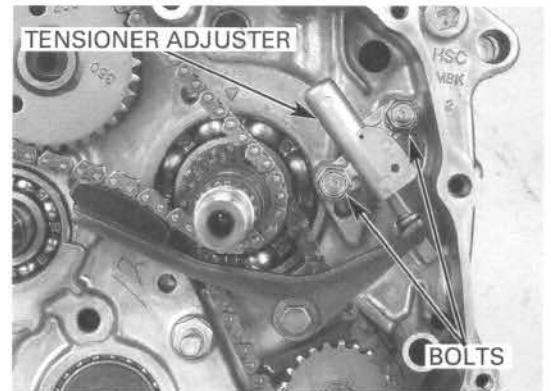
- cylinder head (page 7-11)
- cylinder (page 8-5)
- centrifugal clutch and change clutch (Section 9)

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.

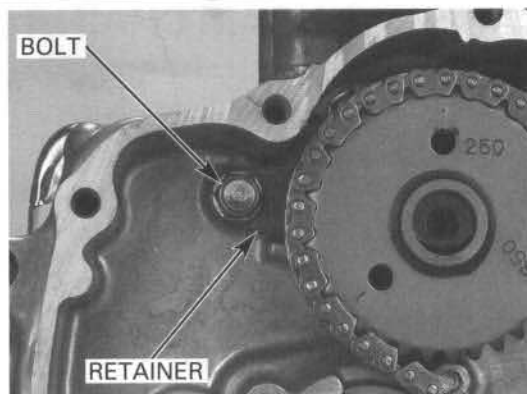


Remove the pivot bolt, washer and cam chain tensioner arm.

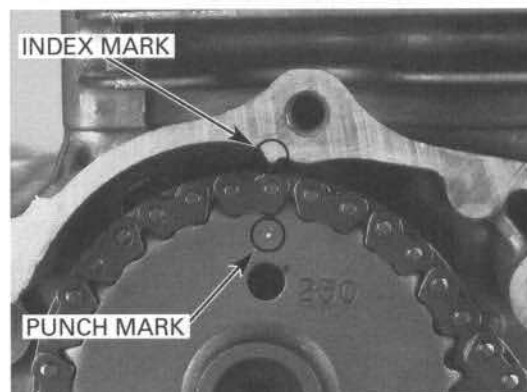


CYLINDER/PISTON/CAMSHAFT

Remove the camshaft bearing retainer bolt and retainer.



Align the "250" punch mark on the cam sprocket with the index mark on the crankcase, then remove the camshaft and cam chain.



INSPECTION

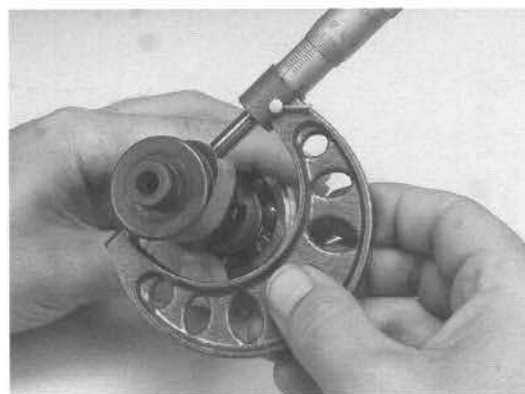
CAMSHAFT

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)

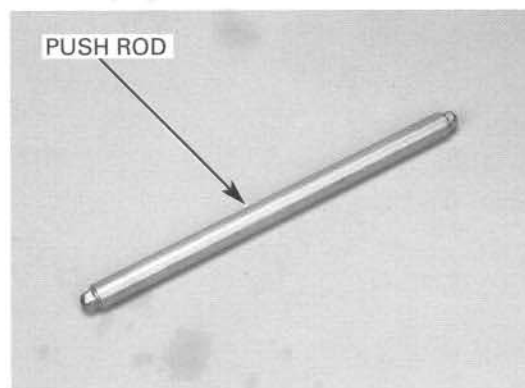


PUSH ROD

Check that the push rods are not bent.

NOTICE

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

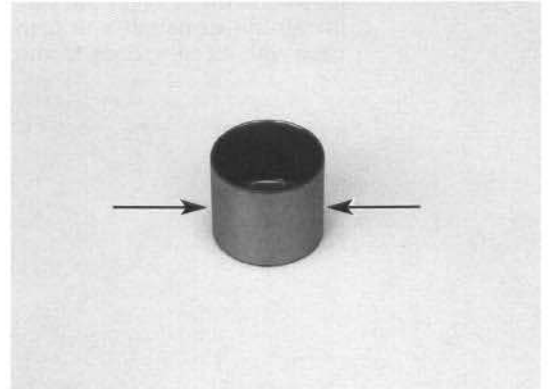


CAM FOLLOWER

Check the cam follower for damage.

Measure the cam follower O.D.

SERVICE LIMIT: 22.46 mm (0.884 in)

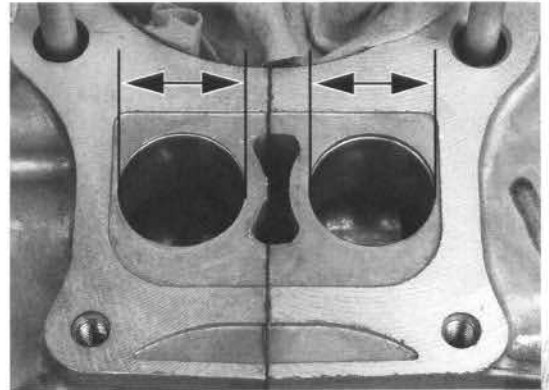


Measure the crankcase I.D. at the cam follower sliding surface.

SERVICE LIMIT: 22.54 mm (0.887 in)

Calculate the clearance.

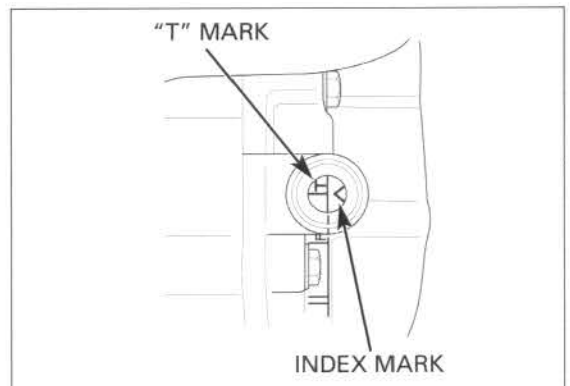
SERVICE LIMIT: 0.07 mm (0.003 in)

**CAM CHAIN TENSIONER**

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

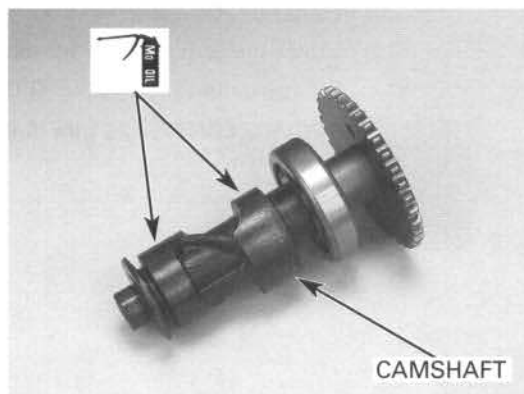
**CAMSHAFT INSTALLATION**

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



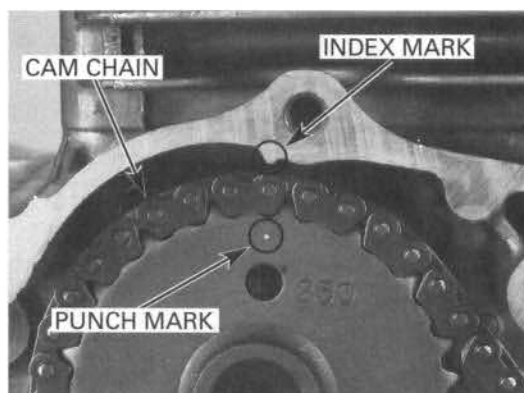
CYLINDER/PISTON/CAMSHAFT

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.

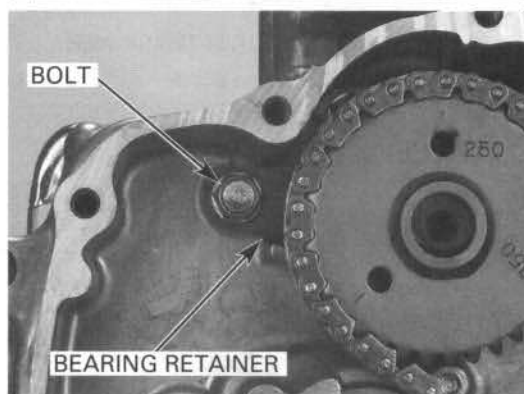


Do not turn the crankshaft while installing the cam sprocket.

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

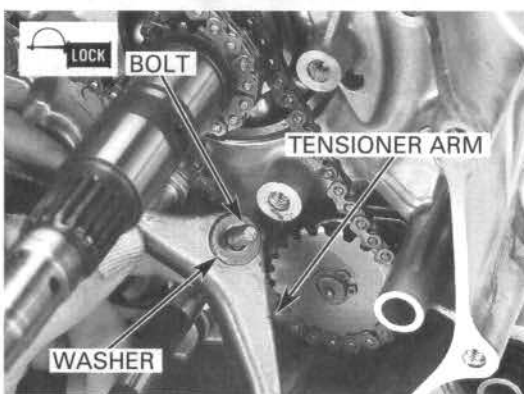


Install the camshaft bearing retainer, aligning the retainer with the crankcase boss. Install and tighten the bolts.

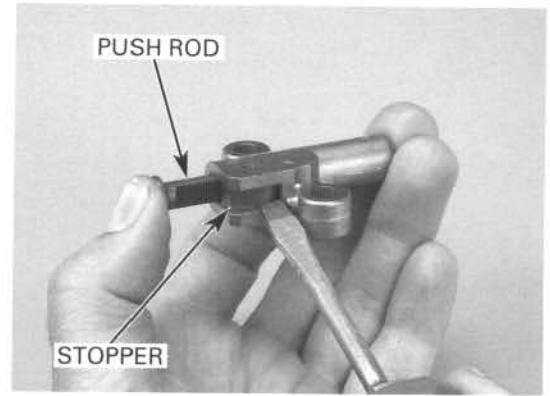


Apply a locking agent to the cam chain tensioner arm pivot bolt threads. Install the washer, cam chain tensioner arm and pivot bolt. Tighten the pivot bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



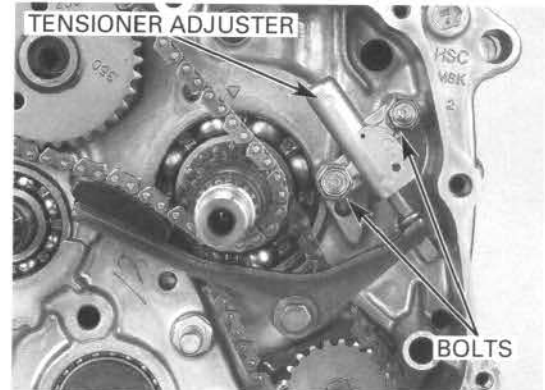
Push the stopper with the screwdriver, and press the push rod with your finger, then hold it in the fully retracted position.



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.

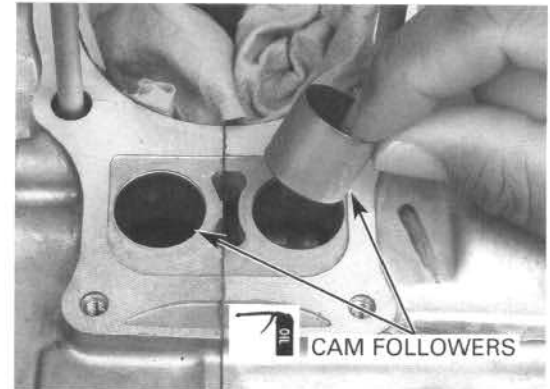


Apply clean engine oil to the outer and inner surface of the cam followers.

Install the cam followers into the crankcase.

Install the following:

- clutch and centrifugal clutch (Section 9)
- cylinder (page 8-9)
- cylinder head (page 7-20)



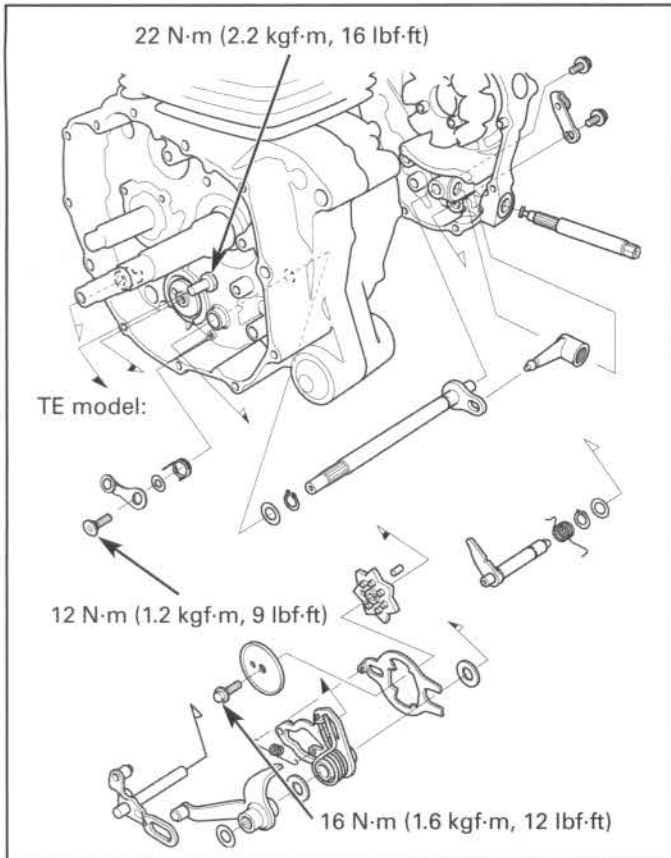
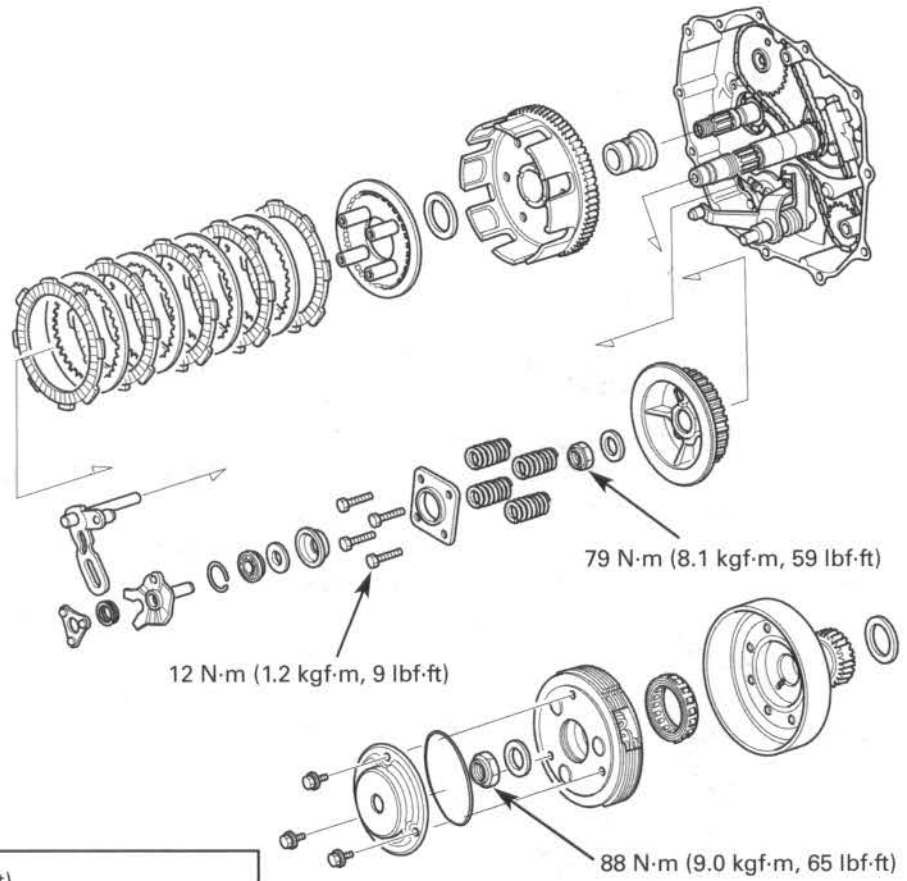
MEMO

RIDE RED

9. CLUTCH/GEARSHIFT LINKAGE

COMPONENT LOCATION	9-2	FRONT CRANKCASE COVER INSTALLATION.....	9-22
SERVICE INFORMATION	9-3	GEARSHIFT LINKAGE REMOVAL	9-24
TROUBLESHOOTING	9-5	GEARSHIFT LINKAGE INSPECTION	9-26
FRONT CRANKCASE COVER REMOVAL	9-6	GEARSHIFT LINKAGE INSTALLATION.....	9-27
CENTRIFUGAL CLUTCH.....	9-7	REVERSE STOPPER SHAFT	9-30
CHANGE CLUTCH	9-15		

CLUTCH/GEARSHIFT LINKAGE COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the centrifugal clutch, change clutch, and gearshift linkage.
- The centrifugal clutch and change clutch can be serviced from the engine installed in the frame.
- The engine must be removed from the frame before servicing the gearshift linkage except for gearshift plate mounting bolt adjustments.

SPECIFICATIONS

Unit: mm (in)

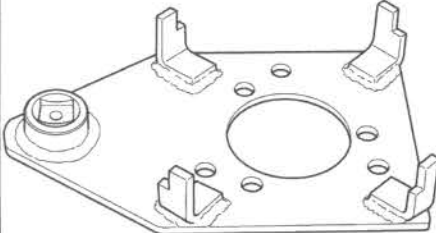

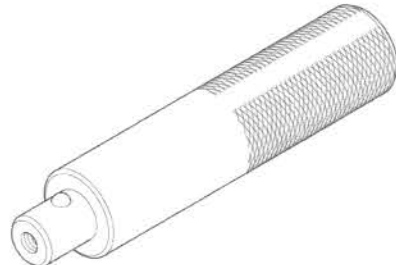

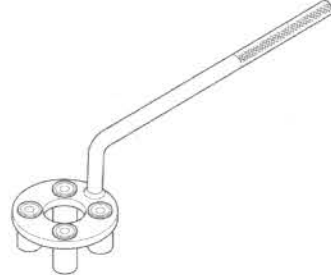

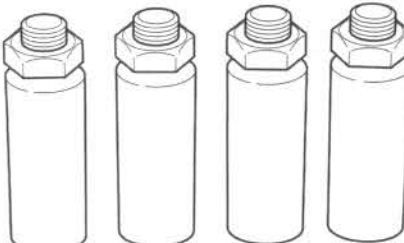

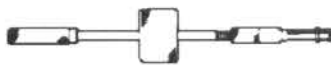
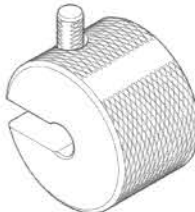
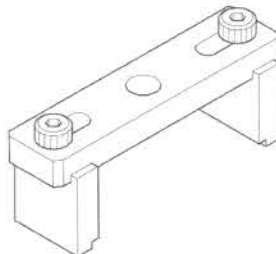

ITEM			SPECIFICATIONS	SERVICE LIMIT
Change clutch	Spring free length	TM	35.2 (1.39)	34.5 (1.36)
		TE	37.0 (1.46)	36.3 (1.43)
	Disc thickness		2.9 – 3.0 (0.11 – 0.12)	2.6 (0.10)
	Plate warpage		–	0.20 (0.008)
	Clutch outer guide O.D.		27.959 – 27.980 (1.1007 – 1.1016)	27.92 (1.099)
Centrifugal clutch	Clutch outer boss I.D.		28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
	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

Change clutch center 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.
Gearshift drum stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
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)	Apply a locking agent to the threads.
Gearshift pedal mounting bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	

CLUTCH/GEARSHIFT LINKAGE

TOOLS

<p>Clutch holder 07923-HB3000B (U.S.A. only)</p>  <p>or 07HMB-HA70100</p>	<p>Clutch puller 07GMC-HB30100</p>  <p>or 07933-HB3000A (U.S.A. only)</p>	<p>Driver 07749-0010000</p> 
<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Clutch center holder 07GMB-KT70101</p>  <p>(Not available in U.S.A.)</p>	<p>Holder plate 07HGB-001010A</p>  <p>or 07HGB-001010B (U.S.A. only) with Holder collar</p>
<p>Holder collar 07HGB-001020B</p>  <p>or 07HGB-001020A (U.S.A. only)</p>	<p>Pilot, 15 mm 07746-0040300</p> 	<p>Bearing remover set 07936-KC10000</p>  <p>(Not available in U.S.A.)</p>
<p>Remove weight 07741-0010201 (U.S.A. only)</p>  <p>or 07936-371020A (U.S.A. only)</p>	<p>Clutch spring compressor 07LAE-PX40100</p> 	<p>Bearing remover set 07936-KC10500</p> 

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
- Plates 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

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

FRONT CRANKCASE COVER REMOVAL

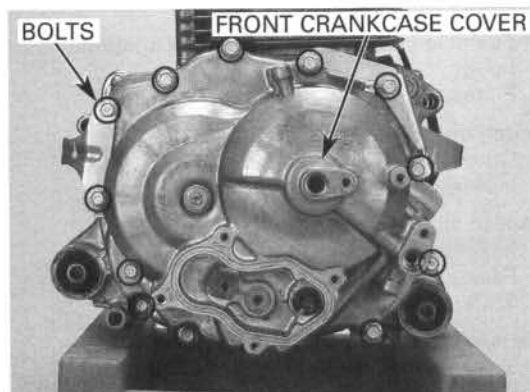
Drain the engine oil (page 3-12).

TE model: Disconnect the oil cooler hose from the front crankcase cover (page 4-8).
Remove the shift control motor and reduction gears (Section 20).

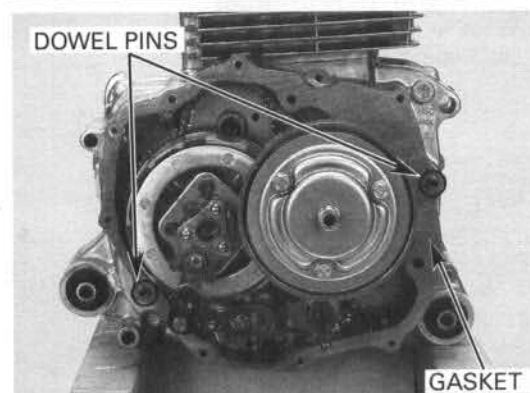
Remove the right engine side cover, being careful not to lose the washer and clutch lifter piece.

Remove the 12 bolts and front crankcase cover.

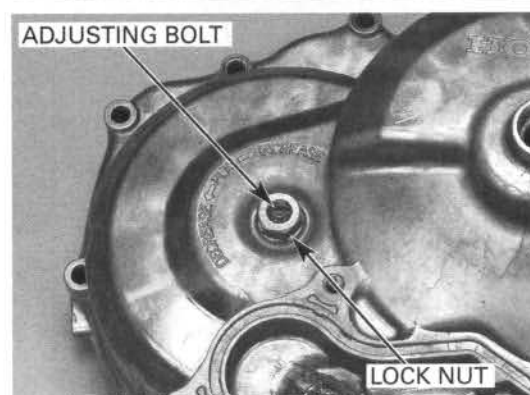
Remove the left and right engine cover brackets.



Remove the gasket and two dowel pins.

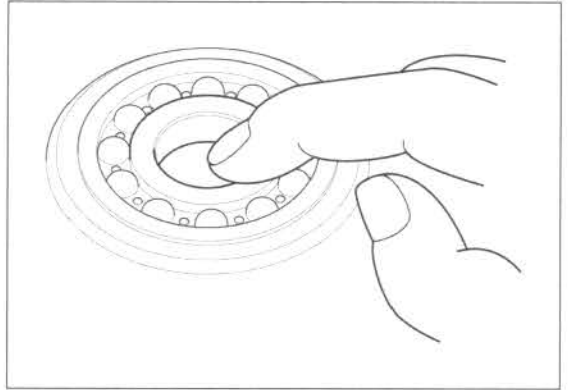


Remove the clutch adjusting bolt lock nut, then remove the clutch adjusting plate.



BEARING REPLACEMENT

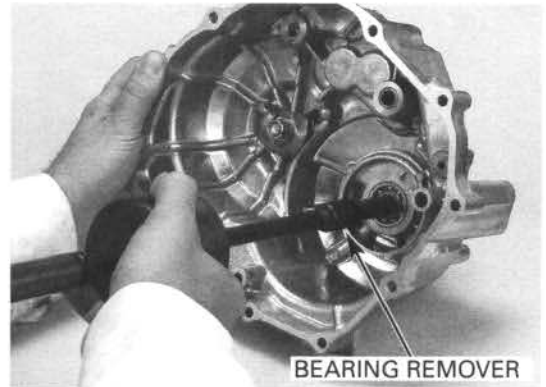
Turn the crankshaft end bearing inner race with your finger.
The bearing should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the crankcase cover.
Replace it if necessary.



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

TOOLS:

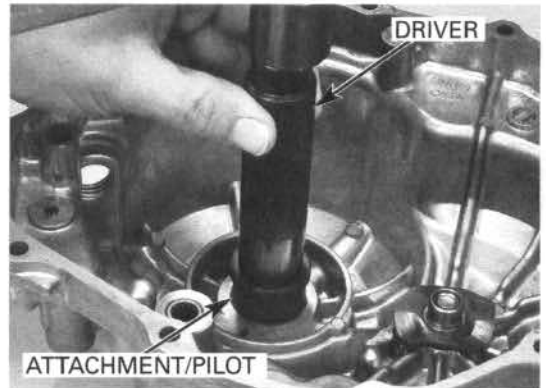
Bearing remover set	07936-KC10000 (Not available in U.S.A.)
Bearing remover set	07936-KC10500
Remover weight	07741-0010201 (U.S.A. only) or 07936-371020A (U.S.A. only)

**BEARING REMOVER**

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

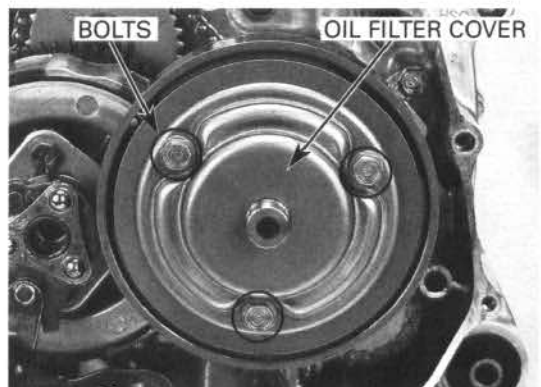
TOOLS:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300

**ATTACHMENT/PILOT****CENTRIFUGAL CLUTCH****REMOVAL**

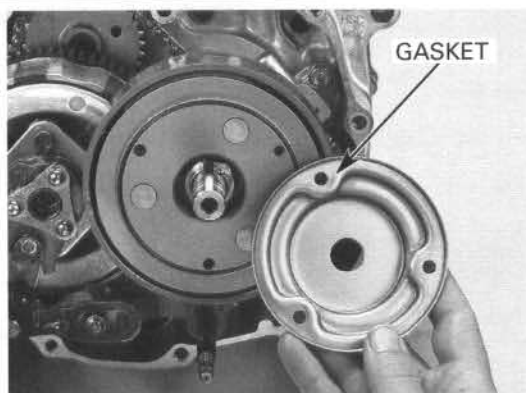
Remove the front crankcase cover (page 9-6).

Remove the three bolts and oil filter cover.

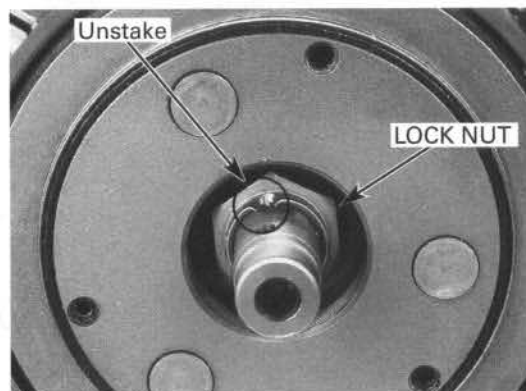
**BOLTS****OIL FILTER COVER**

CLUTCH/GEARSHIFT LINKAGE

Check that the gasket is in good condition, replace if necessary.



Unstake the lock nut.

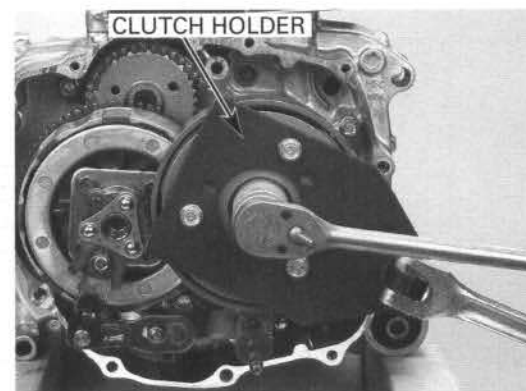


*The lock nut has left
hand threads.*

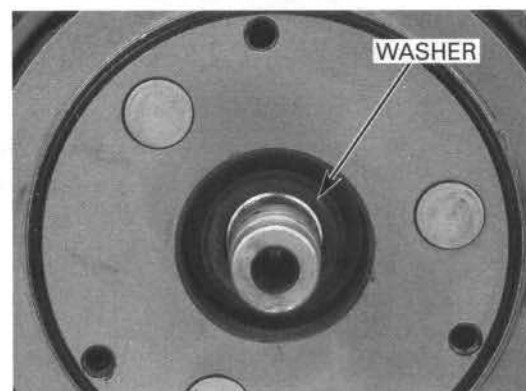
Hold the centrifugal clutch weight assembly with a clutch holder and remove the lock nut with a 24 mm deep socket wrench by turning the nut clockwise.

TOOL:
Clutch holder

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



Remove the washer.

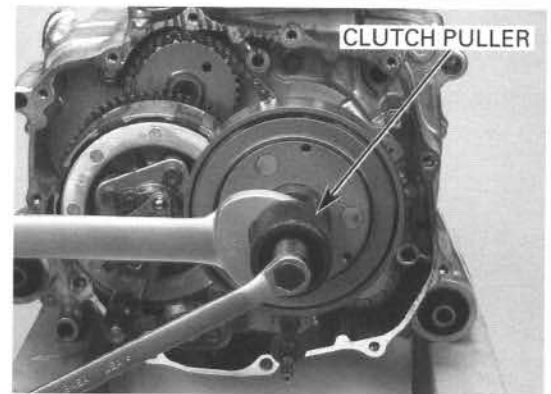


Remove the centrifugal clutch weight assembly using the special tool as shown.

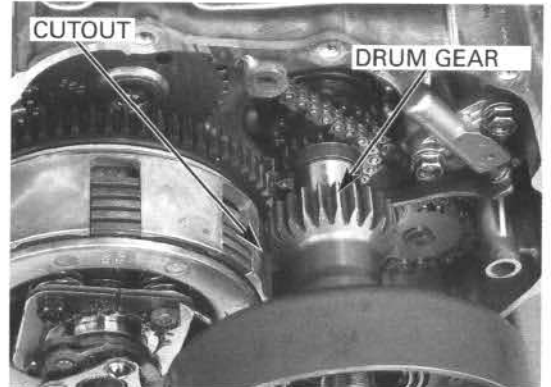
TOOL:

Clutch puller

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



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

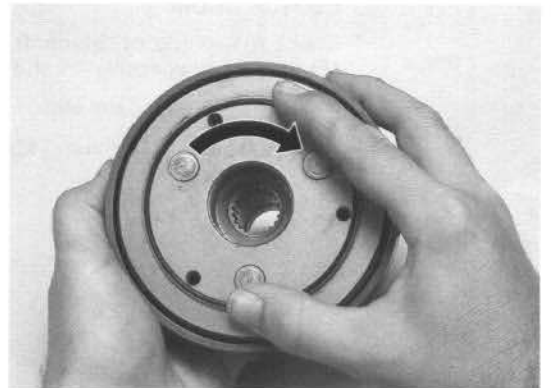


INSPECTION

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.

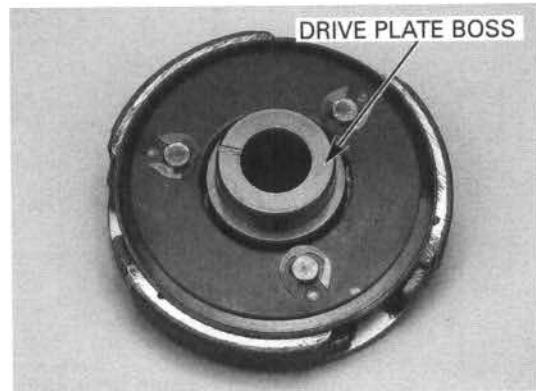
Inspect the one-way clutch for smooth operation and check the rollers for excessive wear.



CLUTCH/GEARSHIFT LINKAGE

DRIVE PLATE BOSS

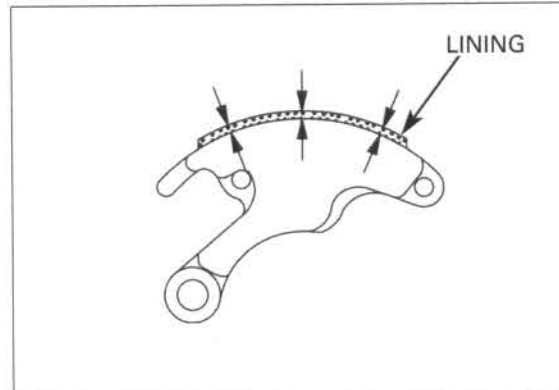
Check the drive plate boss for excessive wear or damage.



WEIGHT LINING

Measure the weight lining thickness as shown.

SERVICE LIMIT: 1.2 mm (0.05 in)

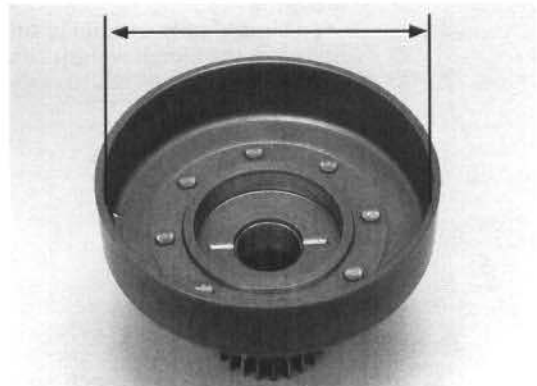


CLUTCH DRUM

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

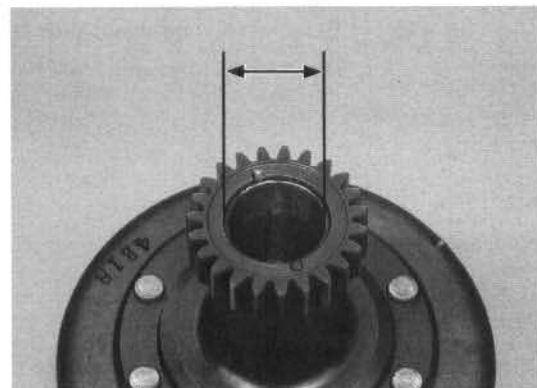
Measure the I.D. of the clutch drum.

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 a screwdriver.

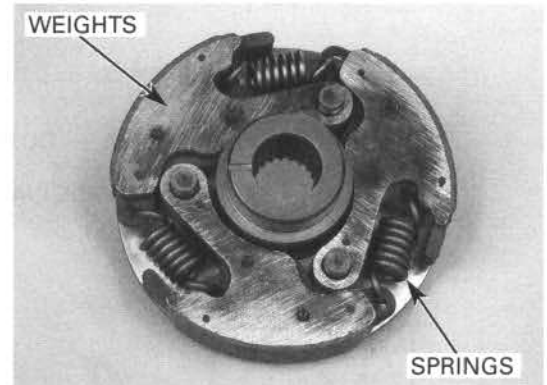
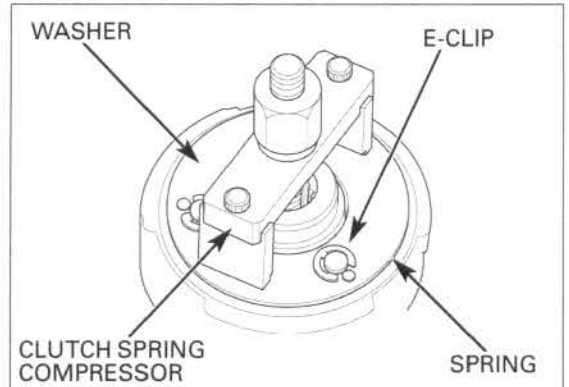
NOTICE

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

Remove the following:

- outside washer
- clutch spring
- inside washer

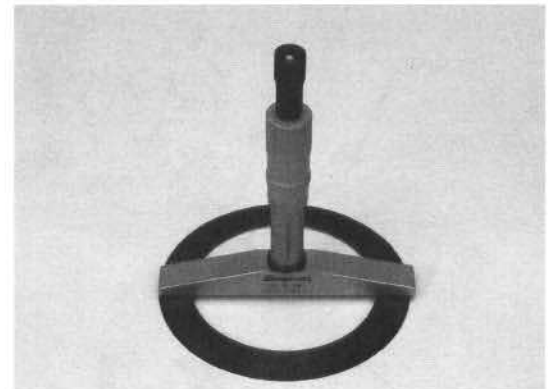
Remove the weight springs and clutch weights from the drive plate.



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.

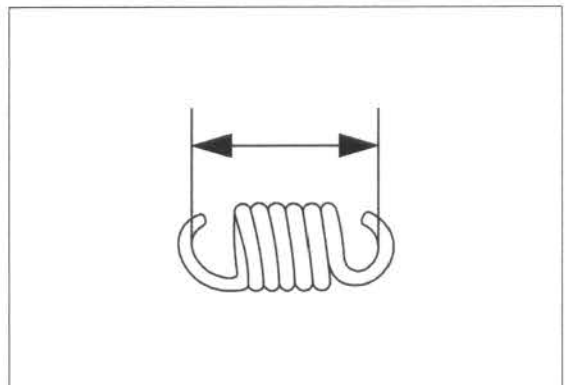


Check the weight springs for wear or damage, and replace if necessary.

Measure the length of the weight spring.

SERVICE LIMIT: 31.6 mm (1.24 in)

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

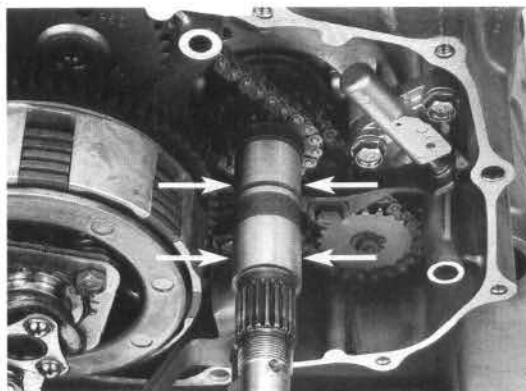


CLUTCH/GEARSHIFT LINKAGE

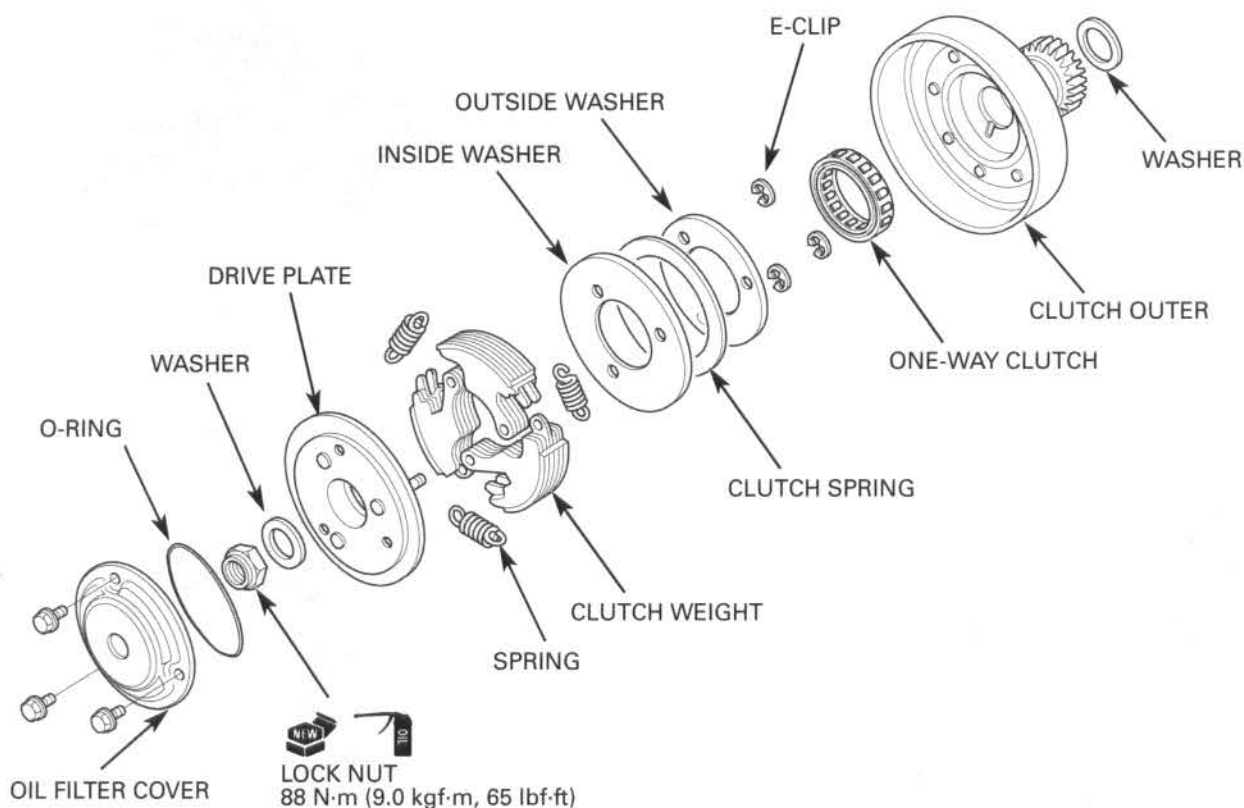
CRANKSHAFT AT THE PRIMARY DRIVE GEAR

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

SERVICE LIMIT: 23.93 mm (0.942 in)



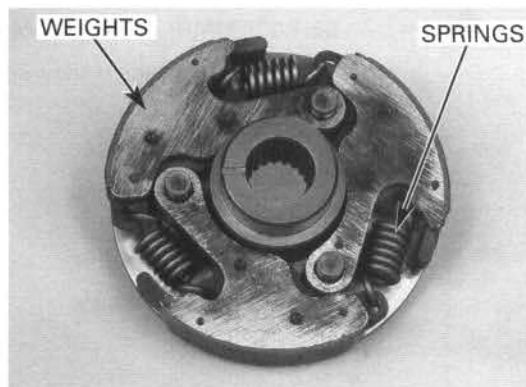
ASSEMBLY



Install the clutch weights and springs onto the drive plate.

NOTE:

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

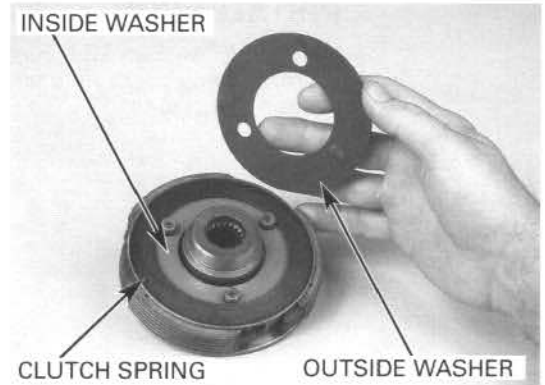


Install the inside washer and clutch spring.

NOTE:

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

Install the outside washer with the locating pins facing out.



Install the special tool and compress the clutch spring.

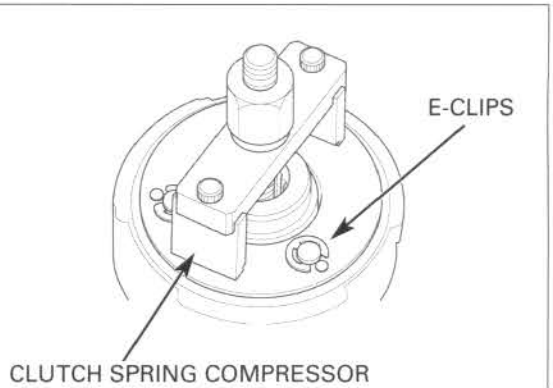
TOOL:

Clutch spring compressor 07LAE-PX40100

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

NOTICE

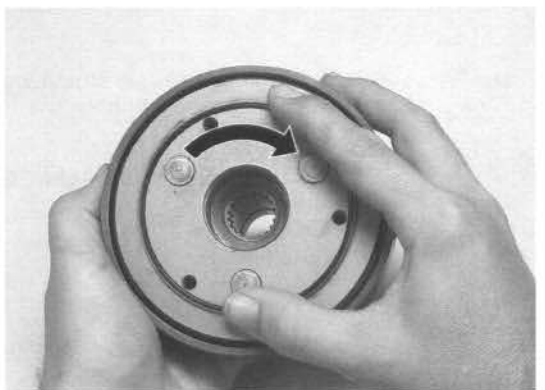
When compressing the clutch spring, be careful not to damage the clutch weight assembly.



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



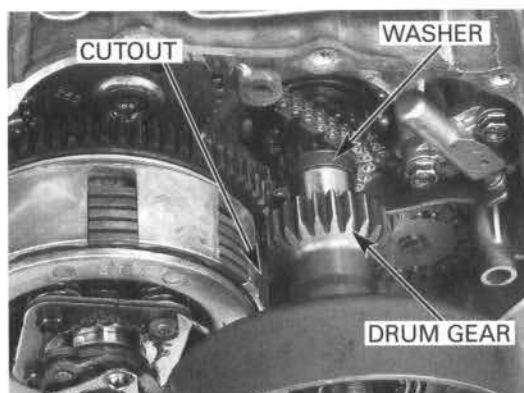
Install the centrifugal clutch weight assembly in the clutch drum, rotating the weight assembly clockwise.



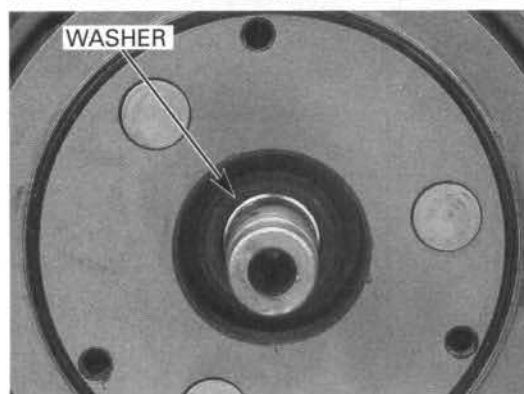
CLUTCH/GEARSHIFT LINKAGE

INSTALLATION

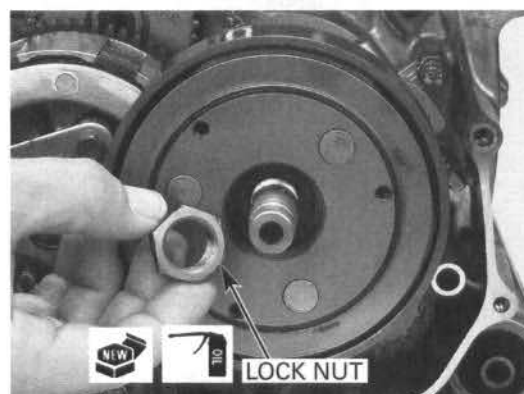
Install the washer and centrifugal clutch, clutch drum, aligning the drum gear with the cutout on the change clutch outer.



Install the washer.



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



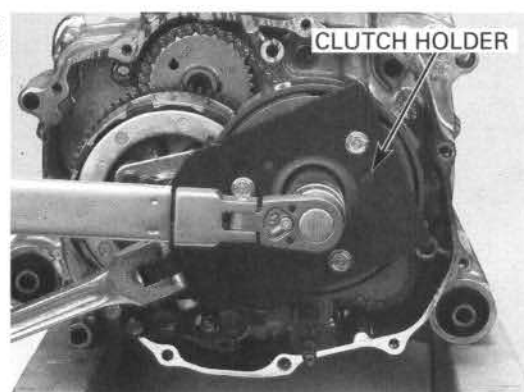
*Lock nut has left
hand threads.*

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

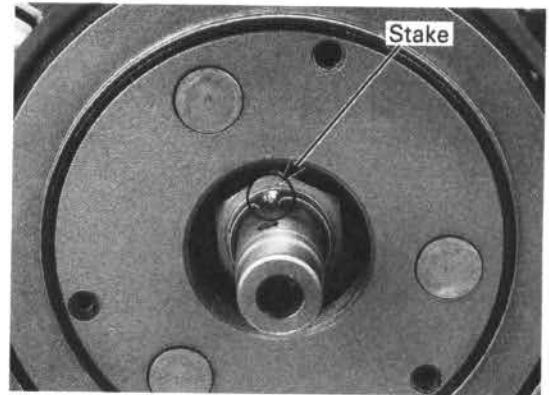
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)

TOOL:
Clutch holder

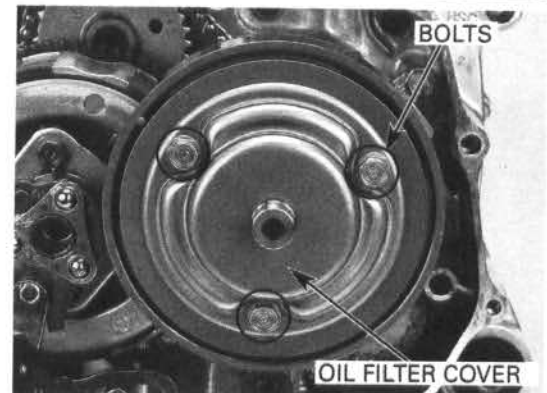
07HMB-HB70100 or
07923-HB3000B
(U.S.A. only)



Stake the lock nut.



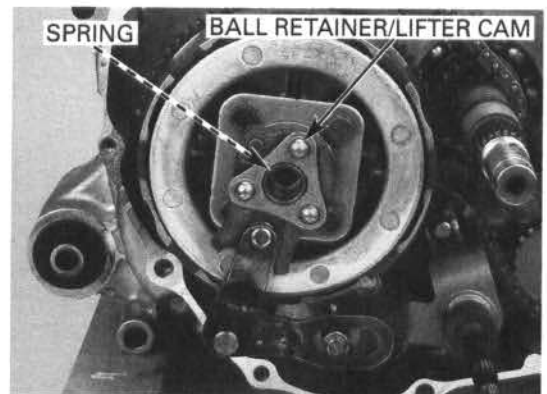
Install the oil filter cover/gasket and three bolts.



CHANGE CLUTCH REMOVAL

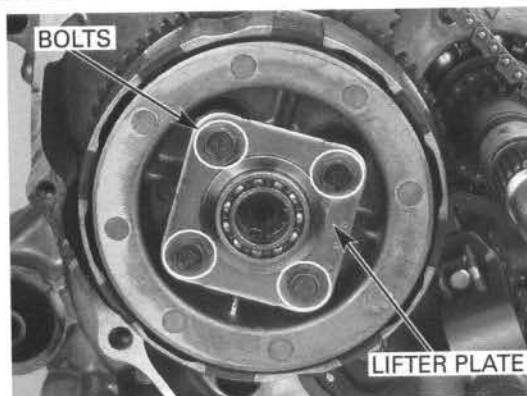
Remove the following:

- front crankcase cover (page 9-6)
- centrifugal clutch (page 9-7)
- clutch lever
- ball retainer and spring
- lifter cam

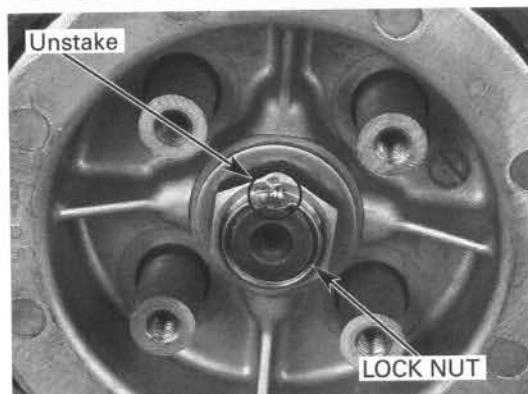


CLUTCH/GEARSHIFT LINKAGE

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.



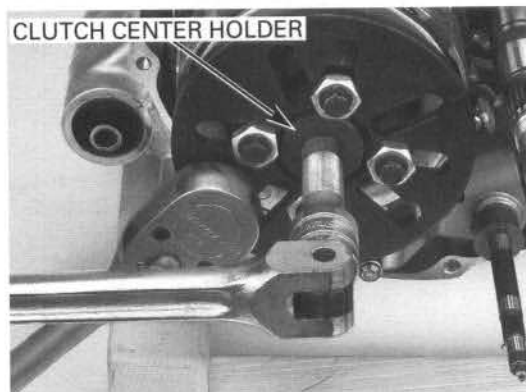
Install the special tool using four 6 x 55 mm bolts as shown, and remove the clutch lock nut.

TOOLS:

Clutch center holder
Holder plate

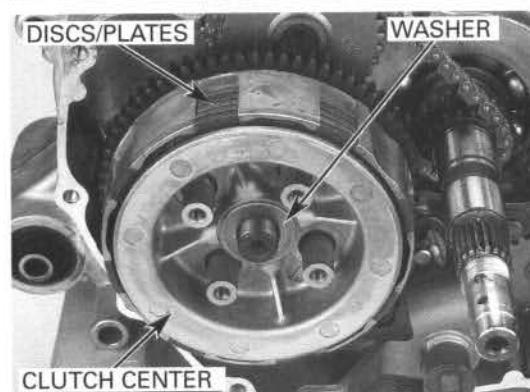
07GMB-KT70101 or
07HGB-001010A
(U.S.A. only) or
07HGB-001010B
(U.S.A. only)
07HGB-001020B
(U.S.A. only) or
07HGB-001020A
(U.S.A. only)

Holder collar

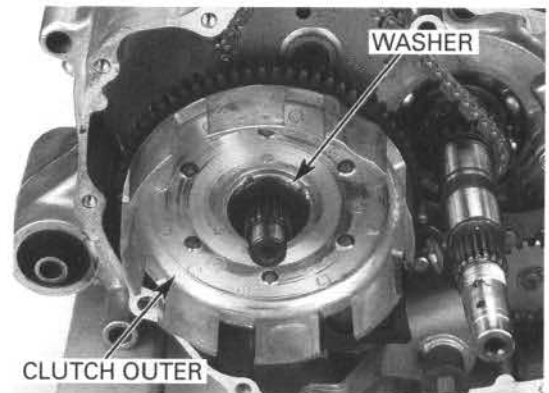


Discard the lock nut.

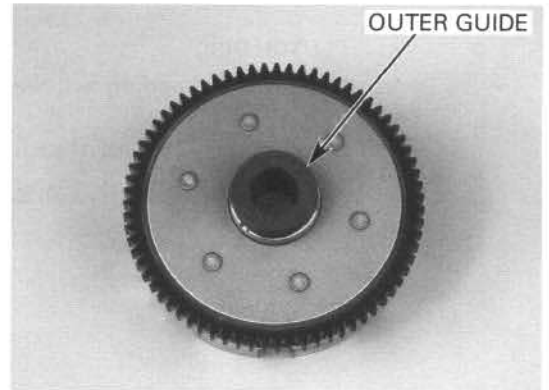
Remove the washer, clutch center, discs, plates and pressure plate as an assembly.



Remove the thrust washer and clutch outer.



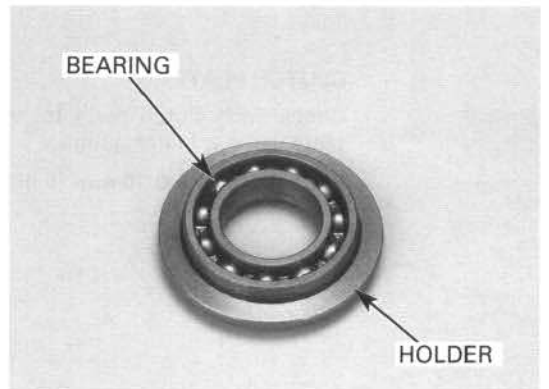
Remove the clutch outer guide from clutch outer.



INSPECTION

CLUTCH LIFTER BEARING

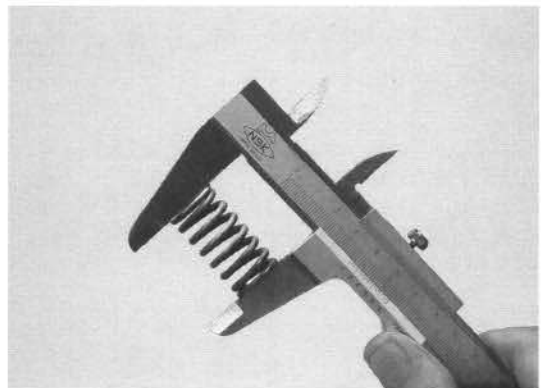
Turn the lifter bearing with your finger.
The bearing should turn smoothly and freely without excessive play.
If necessary replace the bearing.



CLUTCH SPRING

Measure the clutch spring free length.

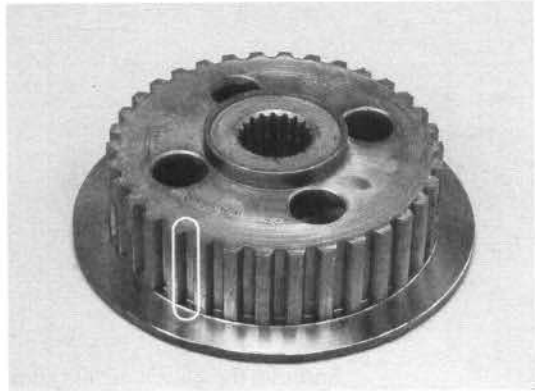
SERVICE LIMIT: TM 34.5 mm (1.36 in)
TE 36.3 mm (1.43 in)



CLUTCH/GEARSHIFT LINKAGE

CLUTCH CENTER

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

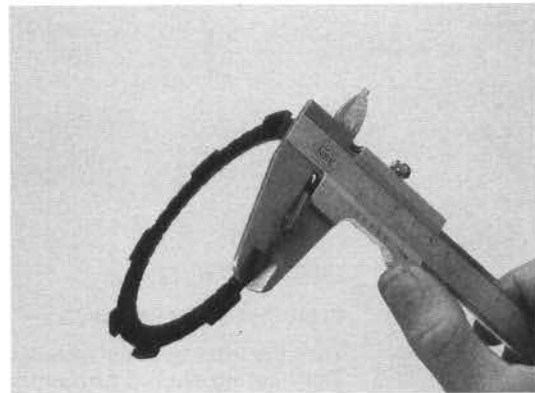


CLUTCH DISC

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

Measure the thickness of each disc.

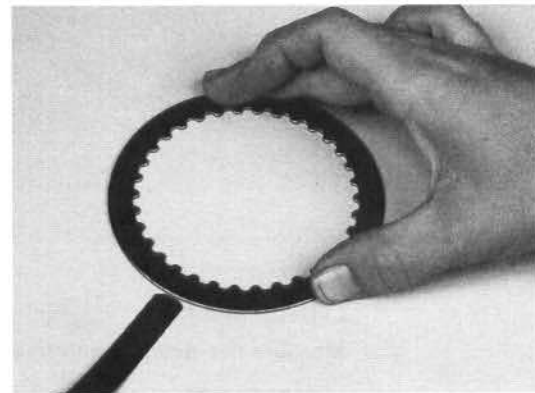
SERVICE LIMITS: 2.6 mm (0.10 in)



CLUTCH PLATE

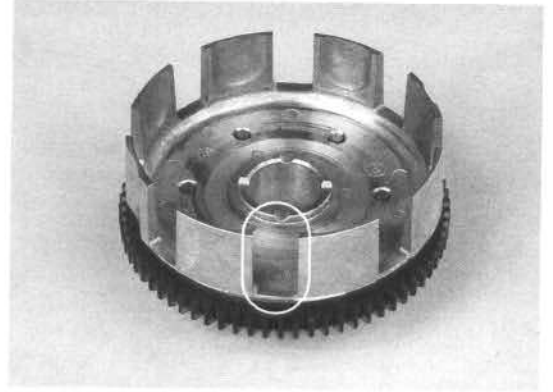
Check each clutch plate for warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.20 mm (0.008 in)



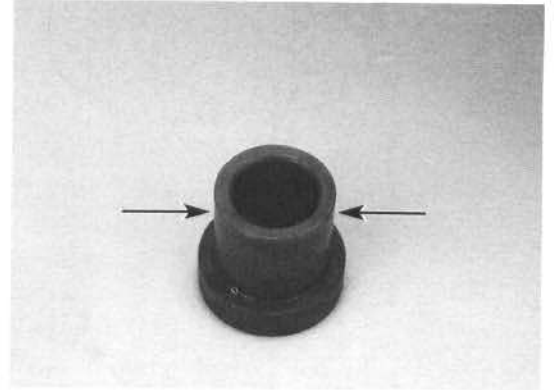
CLUTCH OUTER

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



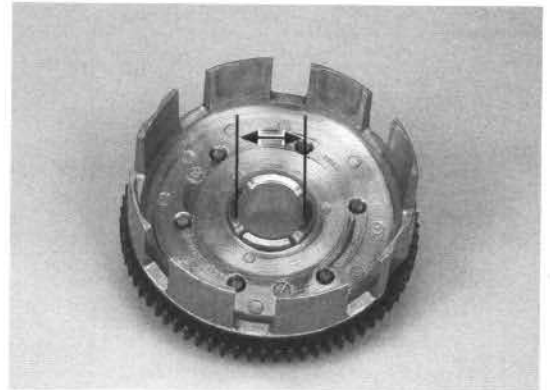
Measure the O.D. of the clutch outer guide.

SERVICE LIMIT: 27.92 mm (1.099 in)



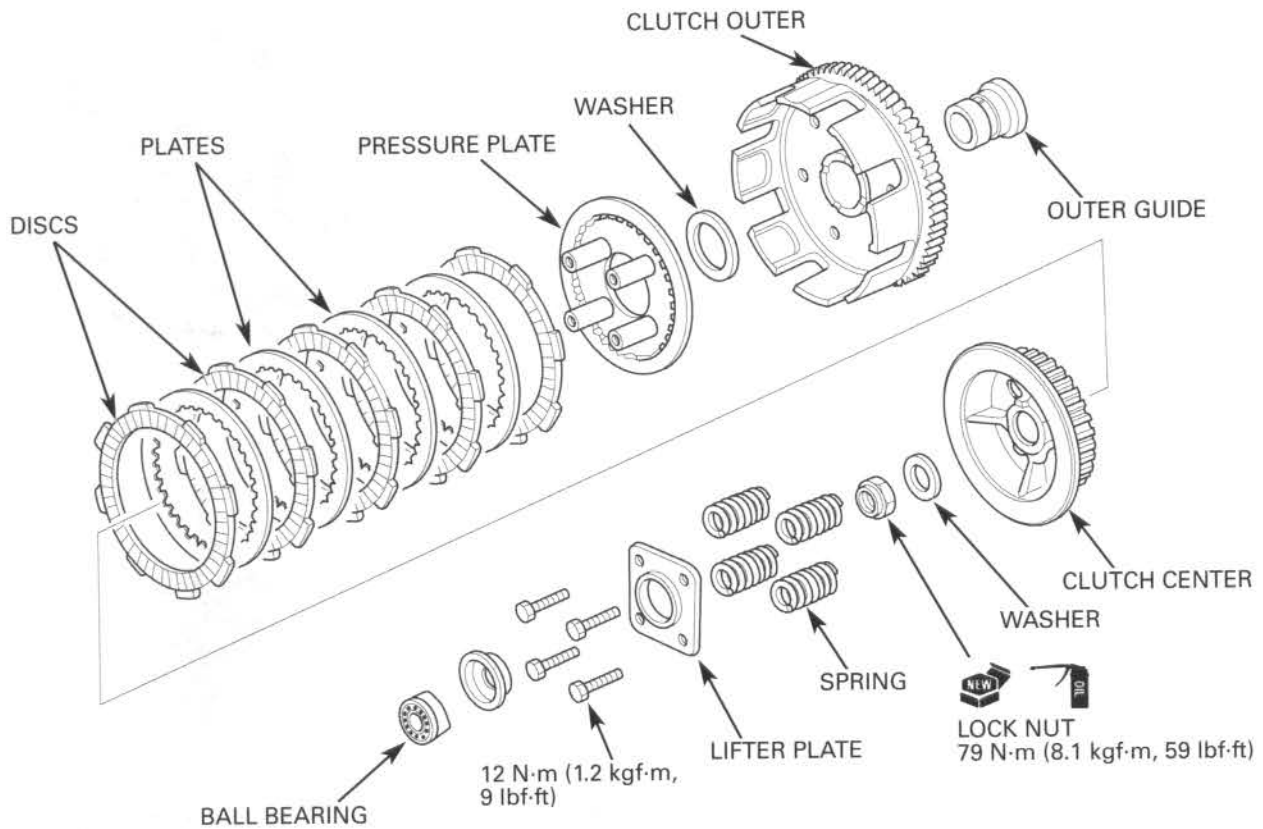
Measure the I.D. of the clutch outer guide boss.

SERVICE LIMIT: 28.04 mm (1.104 in)

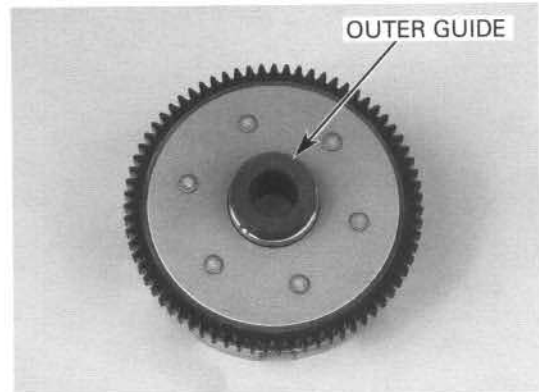


CLUTCH/GEARSHIFT LINKAGE

INSTALLATION



Install the clutch outer guide to the clutch outer.



Install the clutch outer and thrust washer.

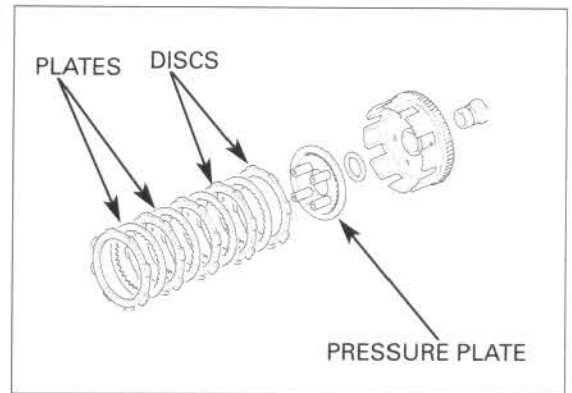
NOTE:

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



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

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



Install the washer on the mainshaft.



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

TOOL:

Clutch center holder

07GMB-KT70101 or

U.S.A. TOOLS:

Holder plate

07HGB-001010B or

07HGB-001010A and

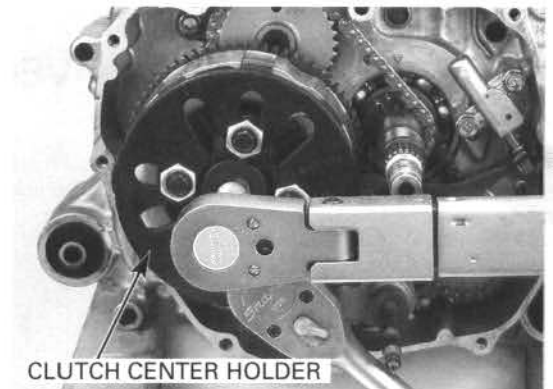
Holder collar

07HGB-001020B or

07HGB-001020A

TORQUE: 79 N·m (8.1 kgf·m, 59 lbf·ft)

Stake the clutch center lock nut.

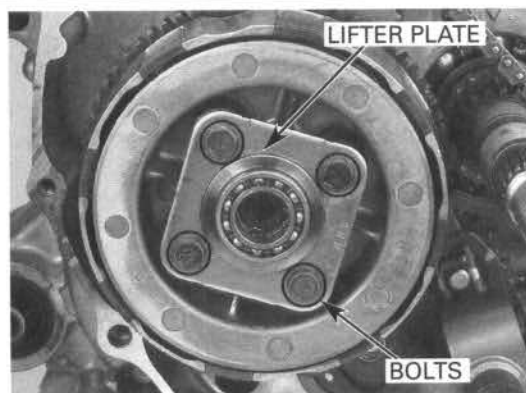


CLUTCH/GEARSHIFT LINKAGE

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)



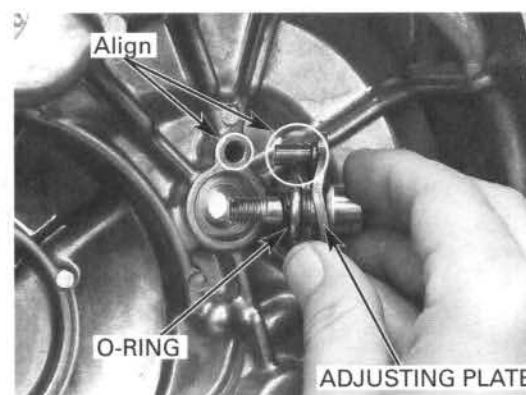
Install the following:

- lifter cam/ball retainer
- clutch lever/washer
- centrifugal clutch (page 9-14)
- front crankcase cover

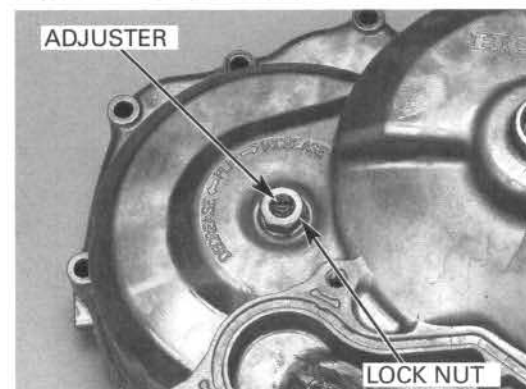


FRONT CRANKCASE COVER INSTALLATION

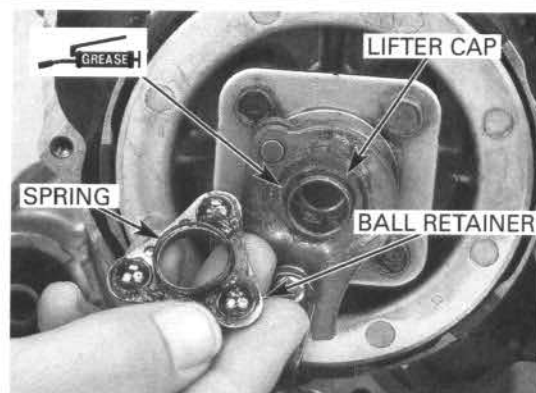
Install the O-ring and clutch adjusting plate by aligning its stopper pin with the crankcase cover hole.



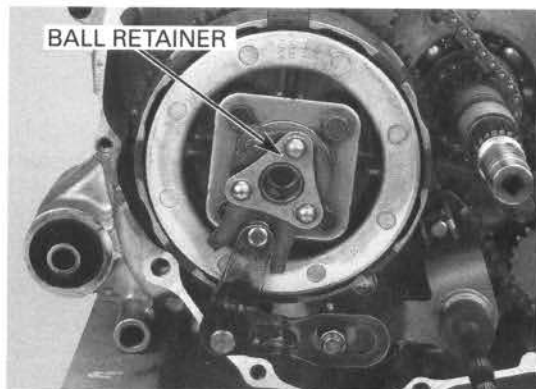
Install the washer and adjuster lock nut.



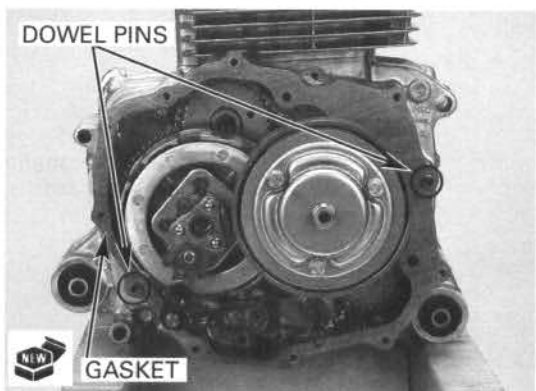
Apply grease to the clutch lifter cap.
Install the ball retainer and spring to the clutch lifter cam.



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.

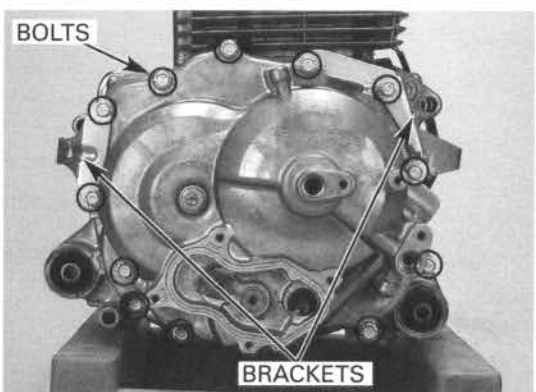


Install the left and right engine cover brackets.
Install the front crankcase cover and tighten the 12 bolts in two or three steps in a crisscross pattern.

TE model: Connect the oil cooler hose on the front crankcase cover (page 4-10).
Install the reduction gears and shift control motor (Section 20).

Add the recommended engine oil (page 3-11).
Make sure there are no oil leaks.

Adjust the clutch (page 3-20).

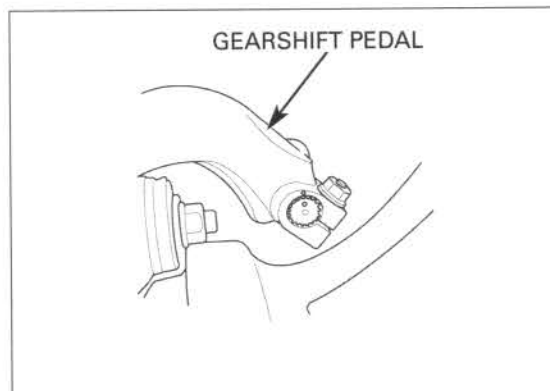


GEARSHIFT LINKAGE REMOVAL

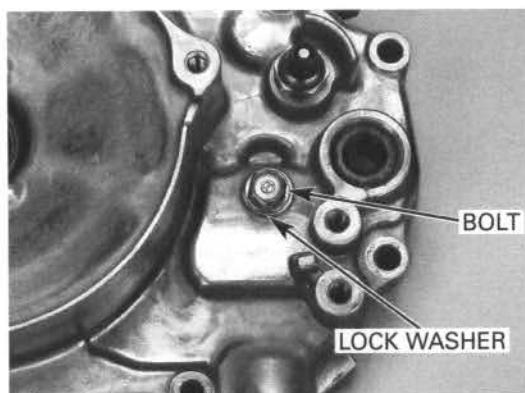
- Remove the following:
- centrifugal clutch (page 9-7)
 - clutch (page 9-15)

Except TE model: Remove the gearshift pedal.

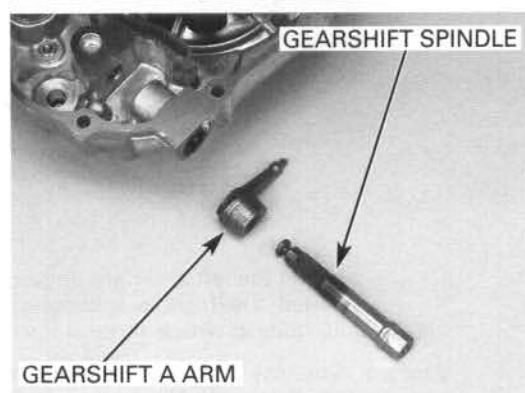
Remove the alternator cover (page 10-8).



Remove the gearshift spindle retaining bolt.



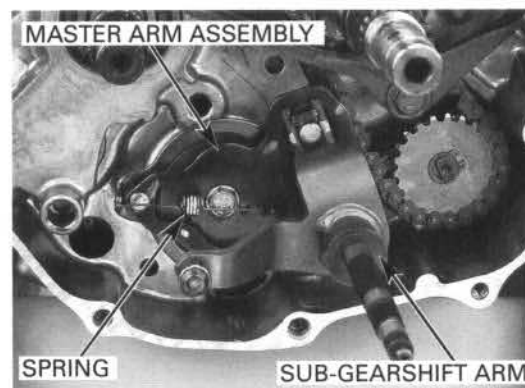
Remove the gearshift spindle, washers (except TE model) and gearshift A arm.



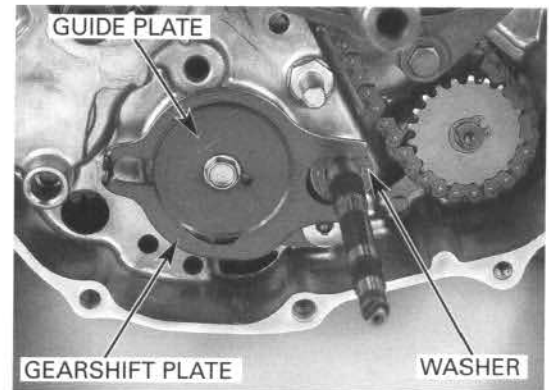
Remove the sub-gearshift arm and washer.

Unhook the shift arm spring from the gearshift plate.

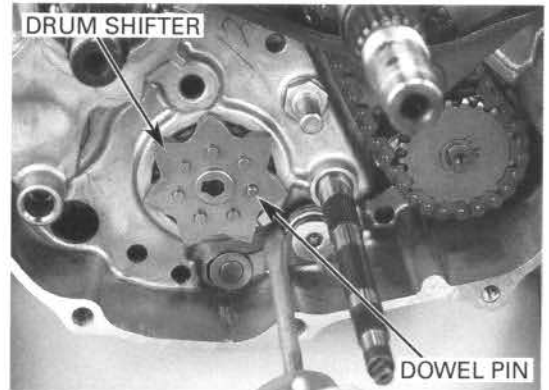
Remove the gearshift master arm assembly.



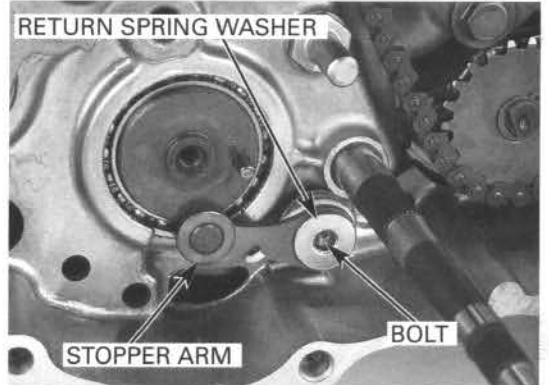
Remove the gearshift plate bolt.
Remove the shift guide plate and gearshift plate.
Remove the thrust washer from the sub-gearshift spindle.



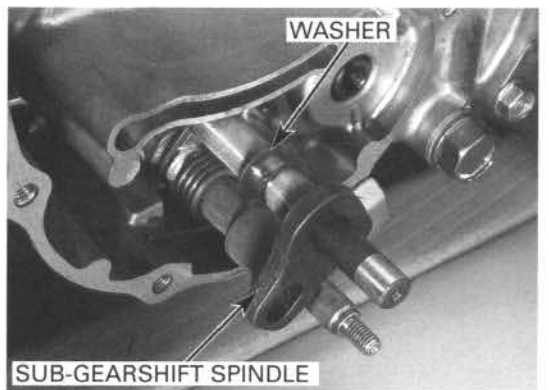
Remove the drum shifter while holding the stopper arm using a screwdriver.
Remove the dowel pin.



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



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

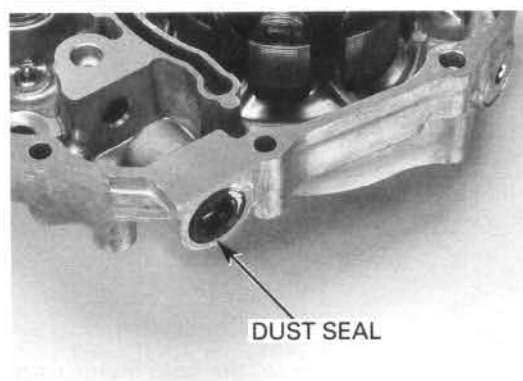


GEARSHIFT LINKAGE INSPECTION

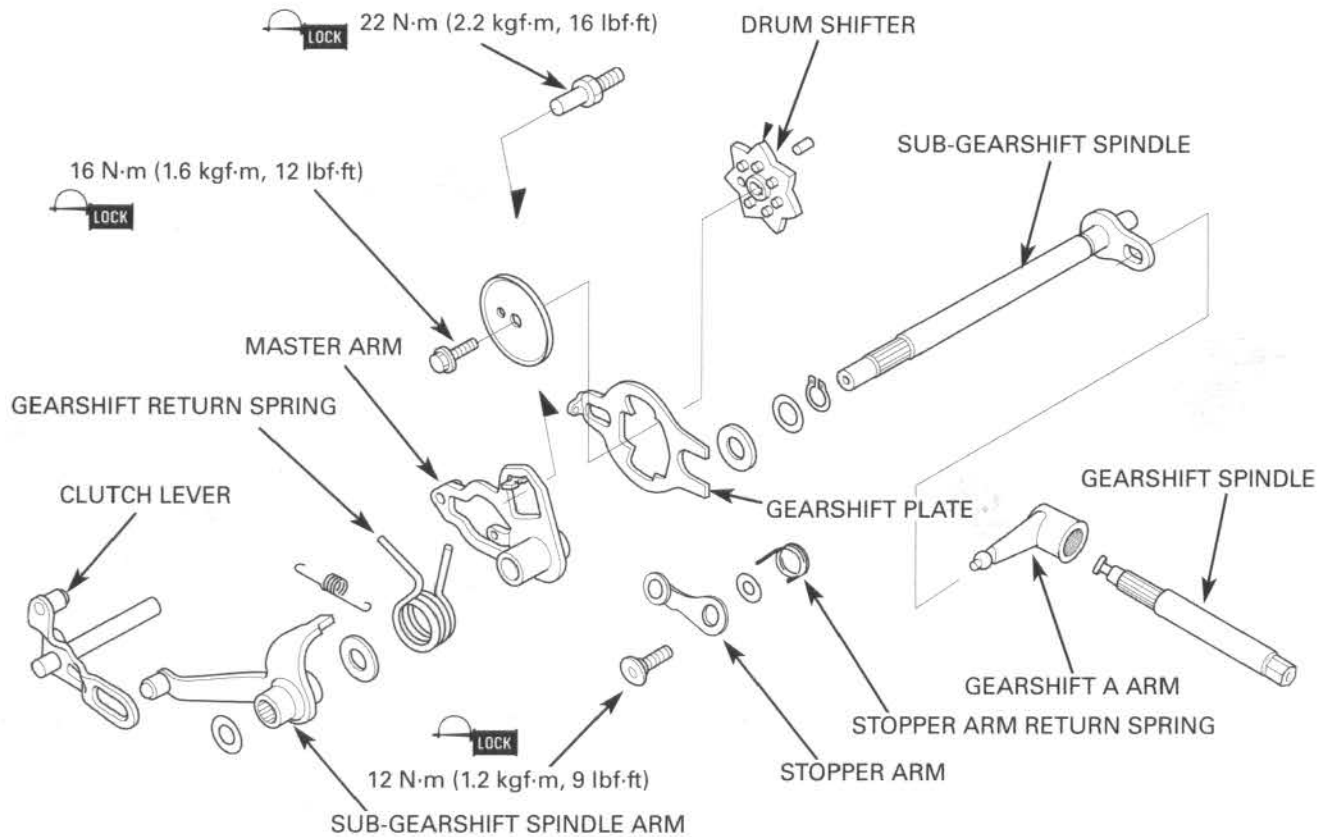
Inspect the sub-gearshift spindle for bending or other damage.



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 9-30).



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

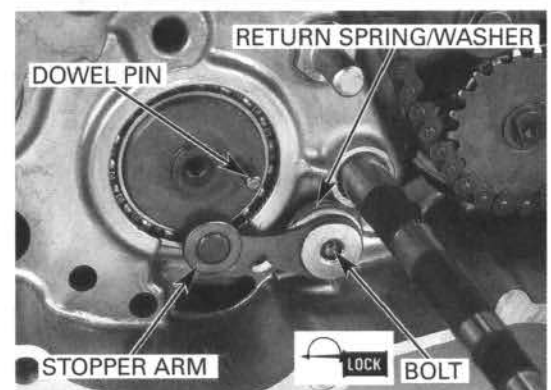
Apply a locking agent to the threads of stopper arm bolt.

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)



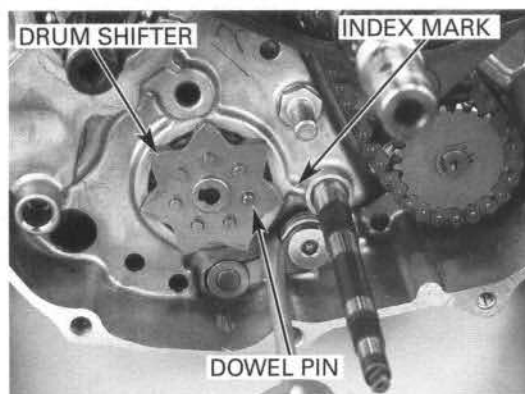
CLUTCH/GEARSHIFT LINKAGE

Install the dowel pin on the gearshift drum.

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

NOTE:

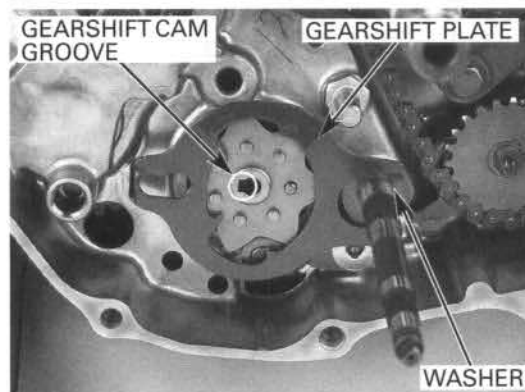
- The transmission is in neutral when the dowel pin is aligned with the index mark (boss) on the crankcase.



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.

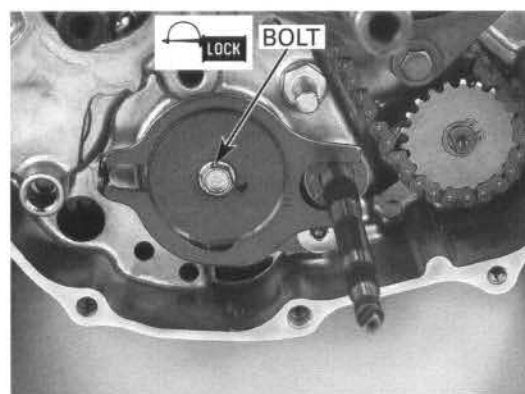


Apply a locking agent to the gearshift cam plate bolts threads.

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.

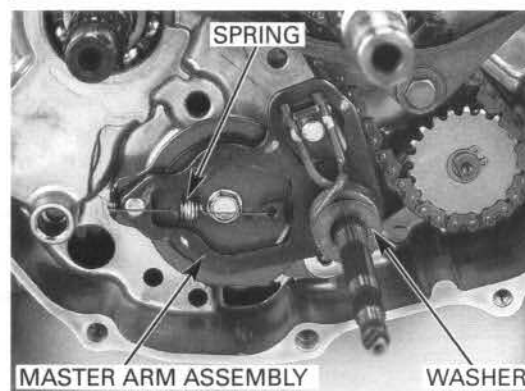


Install the gearshift master arm, return spring and washer onto the sub-gearshift spindle.

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.

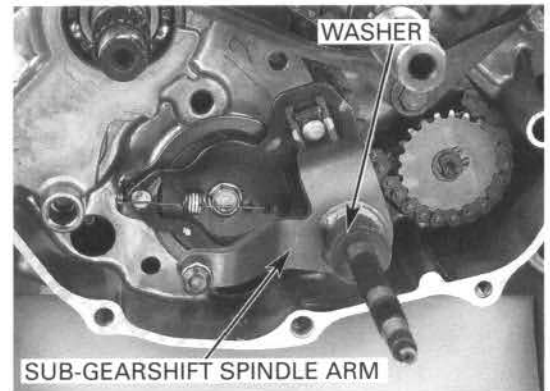


Install the sub-gearshift spindle arm onto the spindle.

NOTE:

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

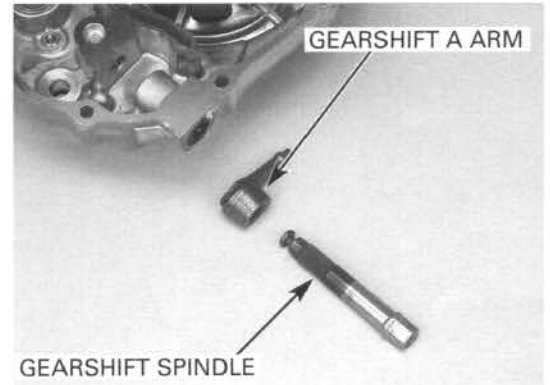
Install the clutch lever and washer.



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

NOTE:

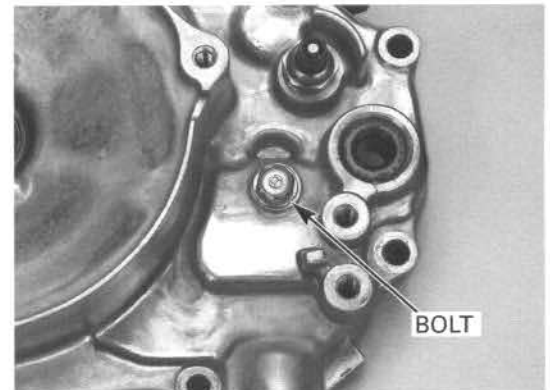
- Align the wide splines between the gearshift A arm and spindle.



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)

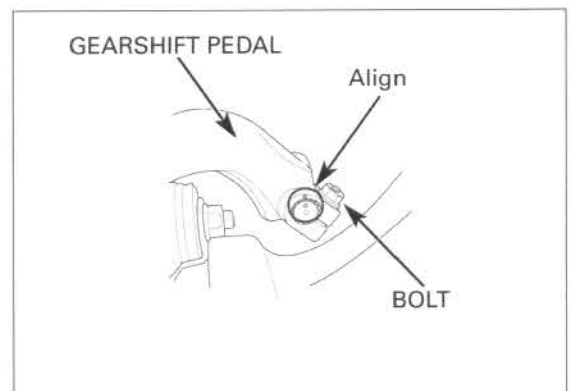
Install the alternator cover (page 10-15).



Except 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)

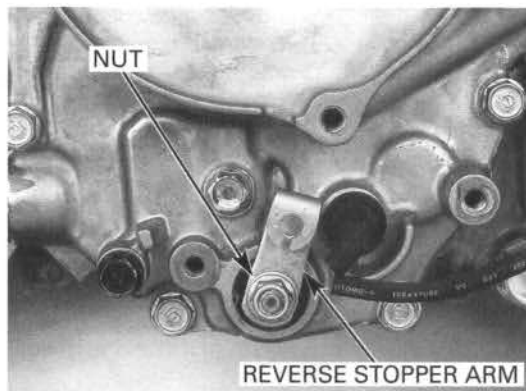
Install the removed parts in the reverse order of removal.



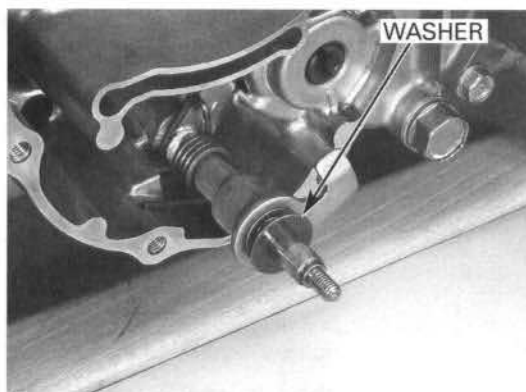
REVERSE STOPPER SHAFT

REMOVAL

Remove the nut and reverse stopper arm.
Remove the alternator cover (page 10-8).

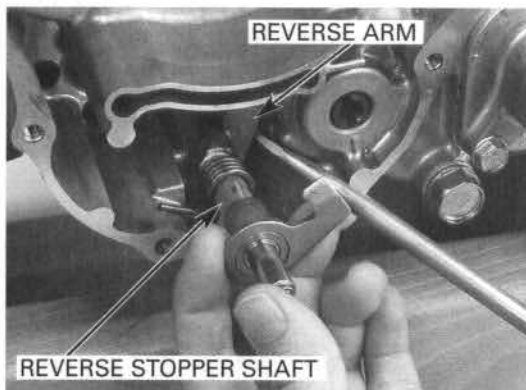


Remove the washer from the reverse stopper shaft.



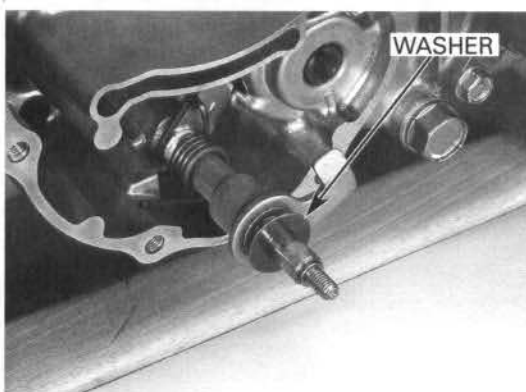
Pull out the reverse stopper shaft while holding the reverse arm using a screwdriver.

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

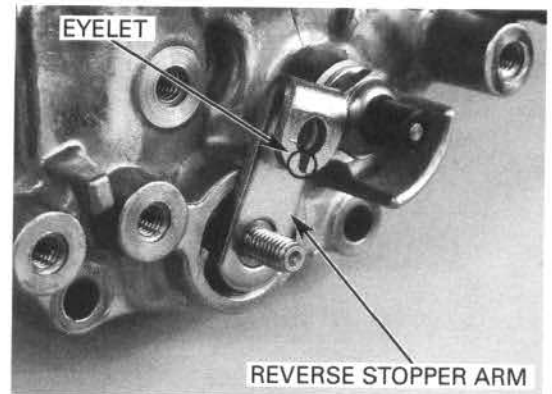


Install the thrust washer onto the reverse stopper shaft.

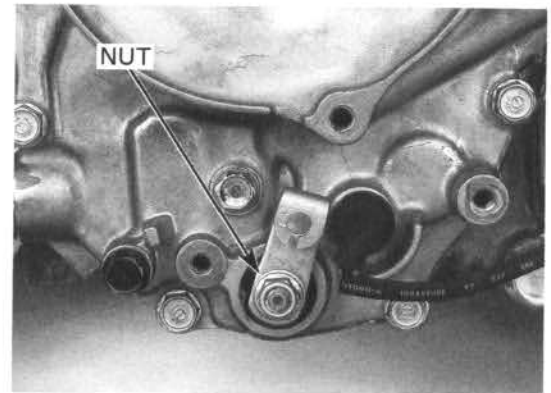
Install the alternator cover (page 10-15).



Install the reverse stopper arm with its eyelet up as shown.



Install and tighten the reverse stopper arm nut.



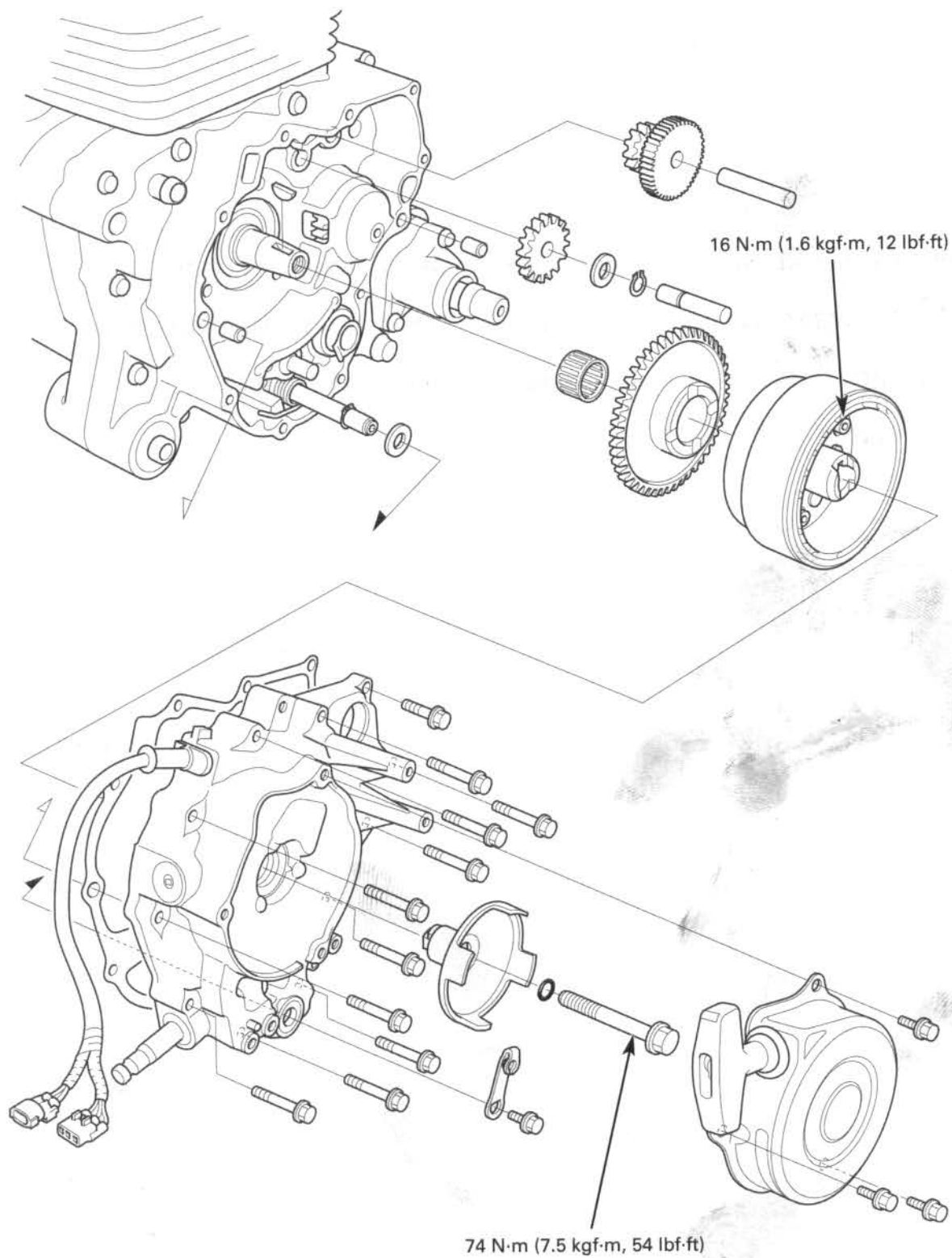
MEMO

RIDE RED

10. ALTERNATOR/STARTER CLUTCH

COMPONENT LOCATION	10-2	ALTERNATOR REMOVAL	10-8
SERVICE INFORMATION	10-3	FLYWHEEL/STARTER CLUTCH	10-11
TROUBLESHOOTING	10-3	ALTERNATOR INSTALLATION	10-15
RECOIL STARTER	10-4		

ALTERNATOR/STARTER CLUTCH COMPONENT LOCATION



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

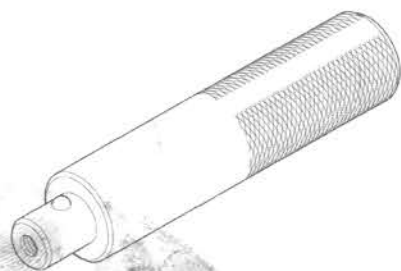
Recoil pulley flange bolt
Starter one-way clutch socket bolt
Ignition pulse generator socket bolt

74 N·m (7.5 kgf·m, 54 lbf·ft)
16 N·m (1.6 kgf·m, 12 lbf·ft)
6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Apply oil to the thread and flange surface.
Apply a locking agent to the threads.
Apply a locking agent to the threads.

TOOLS

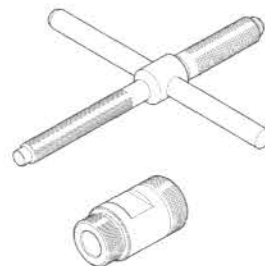
Driver
07749-0010000



Attachment, 32 x 35 mm
07746-0010100

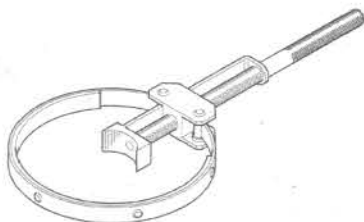


Rotor puller
07733-0010000



or 07933-2000000

Flywheel holder
07725-0040000



or equivalent commercially available in U.S.A.

TROUBLESHOOTING

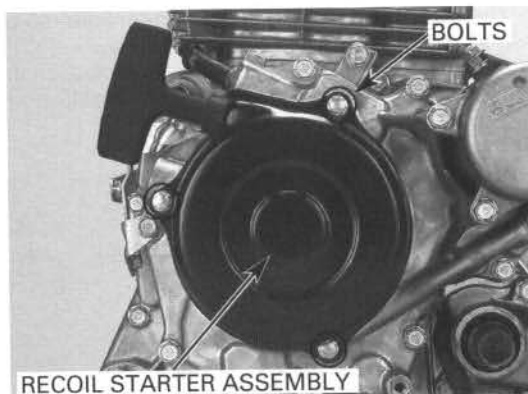
Engine does not turn

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

RECOIL STARTER

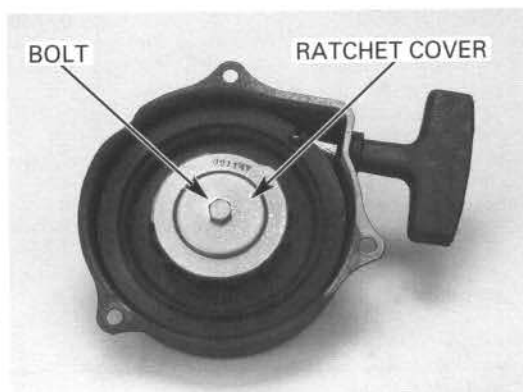
REMOVAL

Remove the bolts and recoil starter assembly.



DISASSEMBLY

Remove the bolt and the ratchet cover.

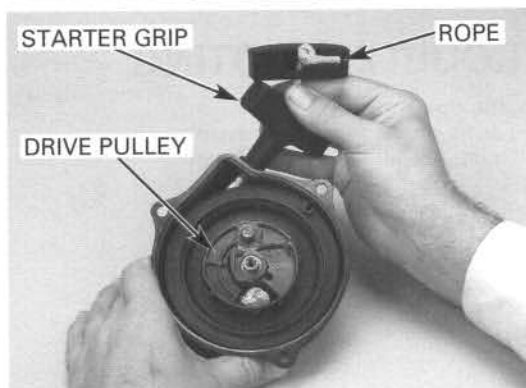


Remove the ratchet, ratchet guide and spring. Check each part for wear or damage.



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

Carefully remove the drive pulley from the starter spring and pulley shaft of the housing.



A Few Words About Safety

Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts – wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practices, we recommended that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

⚠ WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

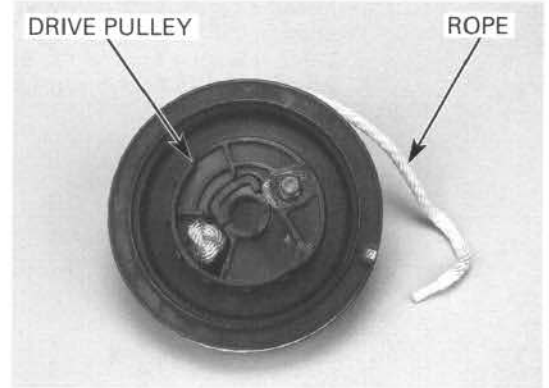
Follow the procedures and precautions in this manual and other service materials carefully.

⚠ WARNING

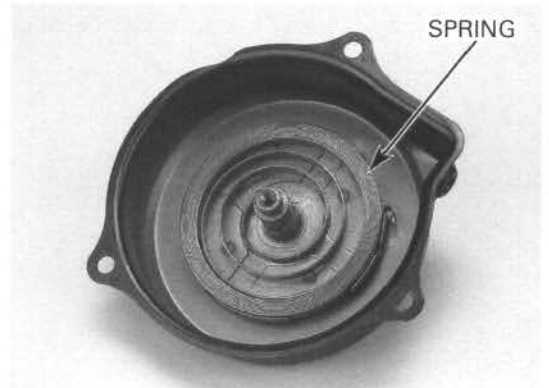
Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

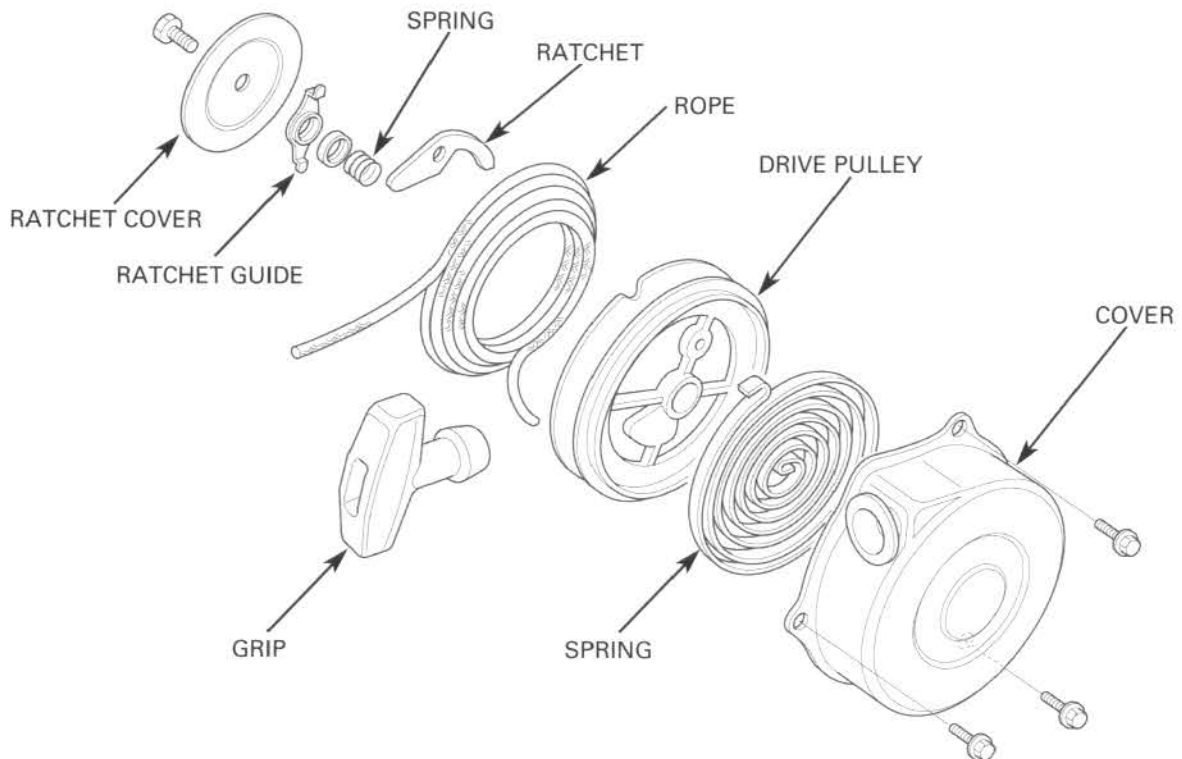
Remove the starter rope from the drive pulley.
Check the starter rope for wear or damage.



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

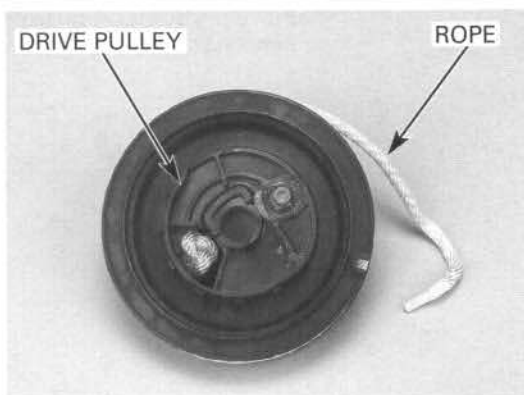


ASSEMBLY



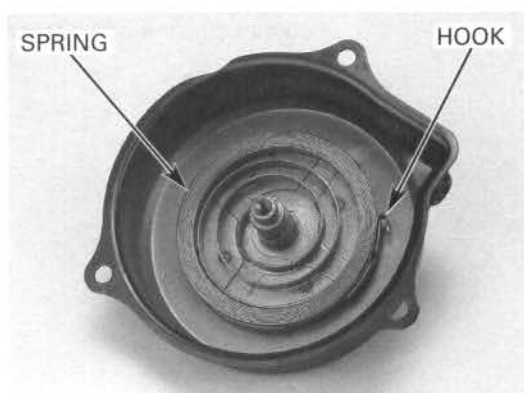
ALTERNATOR/STARTER CLUTCH

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.

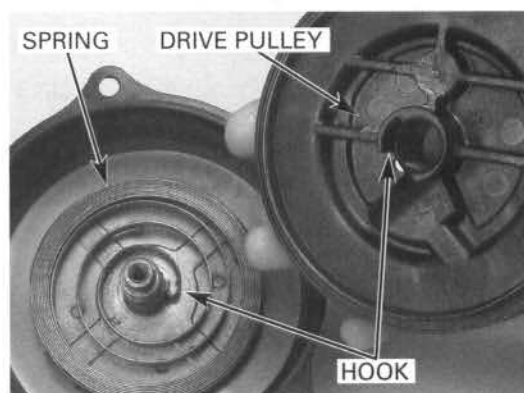


Ensure that the spring does not pop out of the housing during installation.

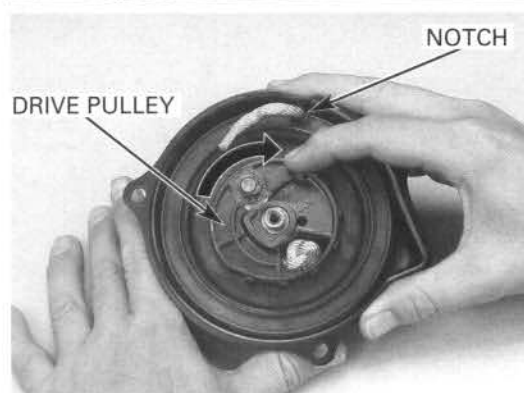
Install the spring by hooking the end on the starter housing hook.



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

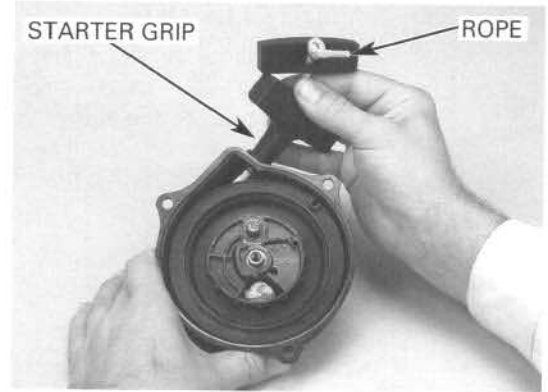


Place the free end of the rope into the notch.
Preload the starter spring by turning the pulley 4 turns clockwise.

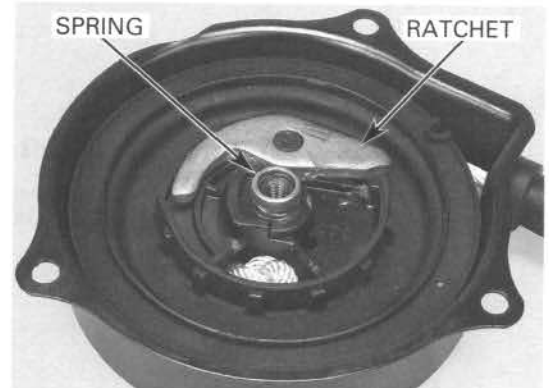


Route the rope end through the starter housing hole and install the grip.

Tie the rope end in a square knot.



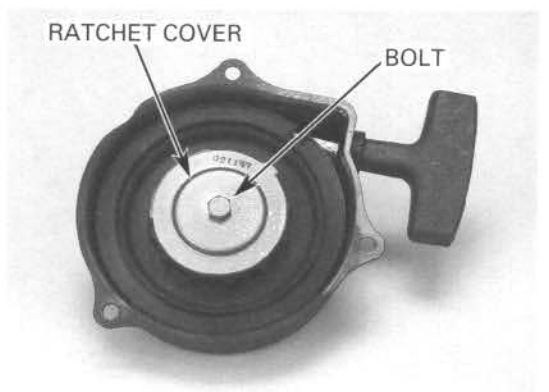
Apply grease to the ratchet.
Install the ratchet and spring.



Install the ratchet guide.



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

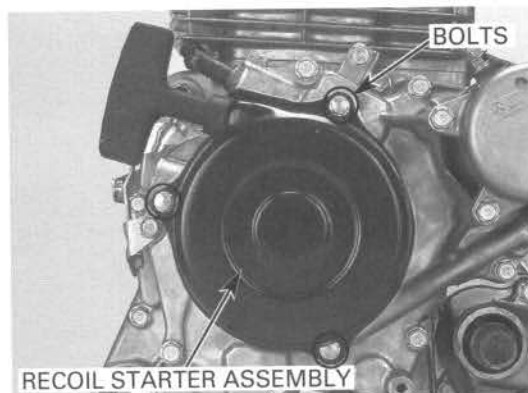


ALTERNATOR/STARTER CLUTCH

INSTALLATION

Install the recoil starter assembly and tighten the bolts.

Route the wires and secure them with the clamps.

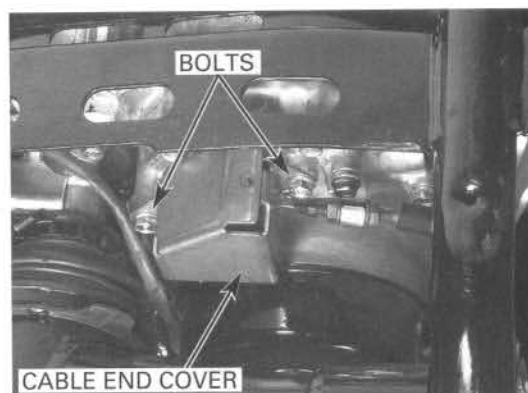


ALTERNATOR REMOVAL

ALTERNATOR COVER REMOVAL

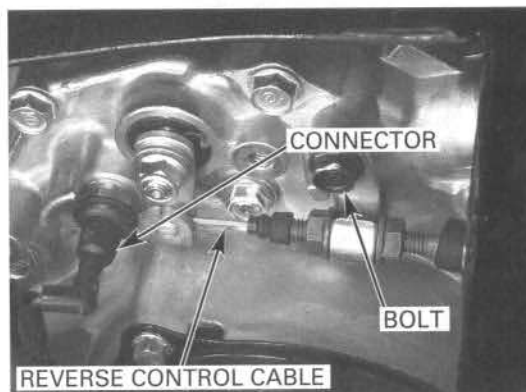
Stand the ATV up on the rear grab bar for access to the reverse control cable lever and cover.

Remove the recoil starter (page 10-4).
Remove the two bolts and cable end cover.

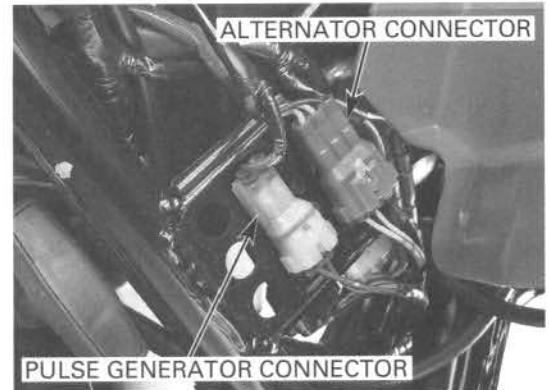


Remove the bolt and disconnect the reverse control cable end from the lever.

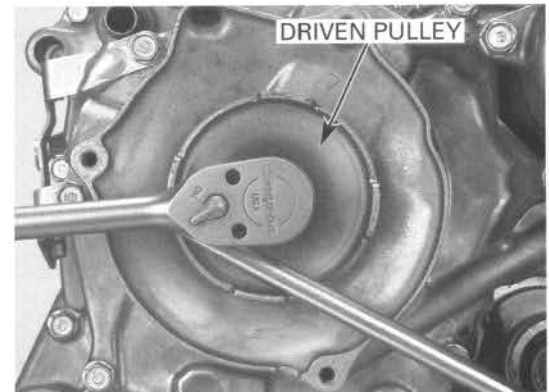
Disconnect the reverse switch connector.



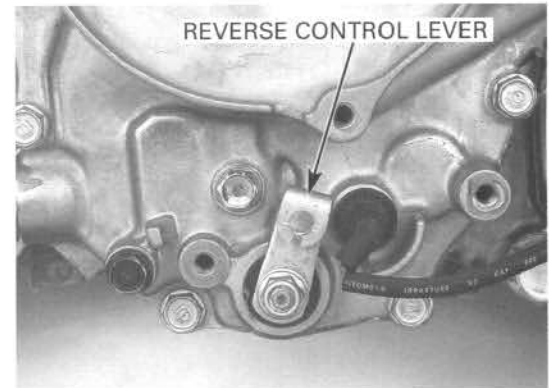
Disconnect the ignition pulse generator and alternator connectors.



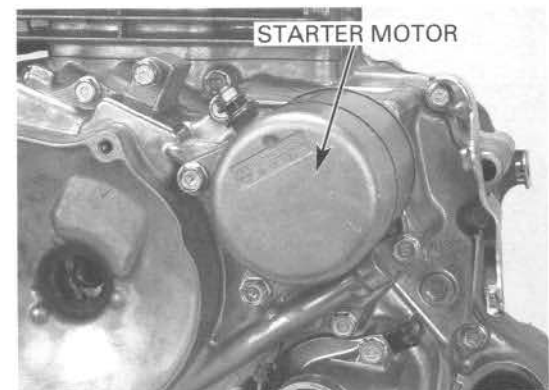
Hold the starter driven pulley using a screwdriver, then remove the bolt.



Remove the reverse control lever.



Remove the starter motor (page 18-5).

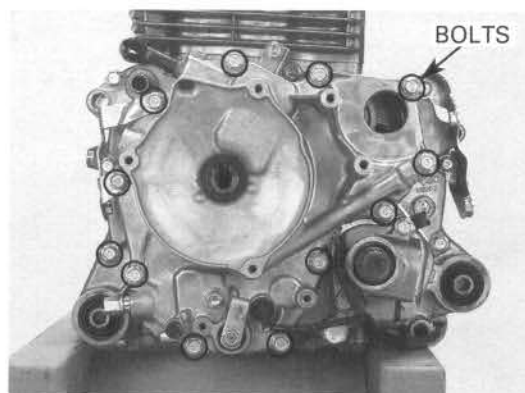


ALTERNATOR/STARTER CLUTCH

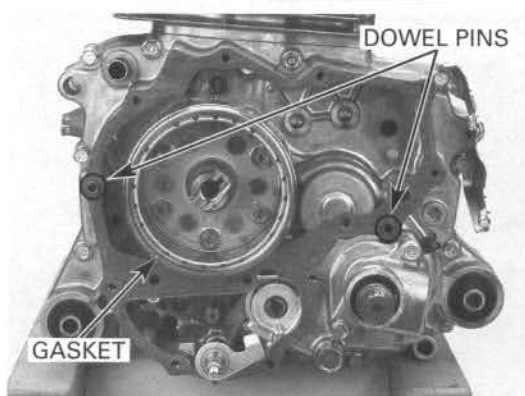
The starter reduction gears may fall out as the cover is removed.

Remove the eleven bolts and the left engine cover bracket.

Remove the alternator cover.



Remove the gasket and dowel pins.

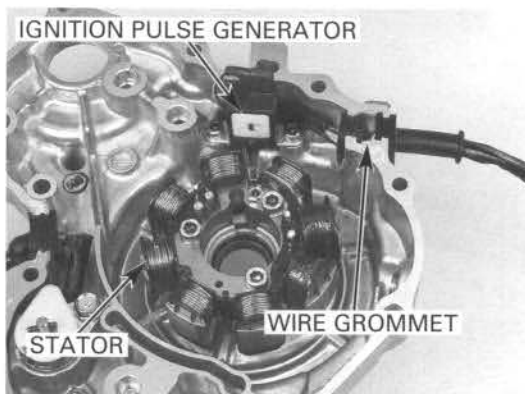


ALTERNATOR COVER DISASSEMBLY

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.

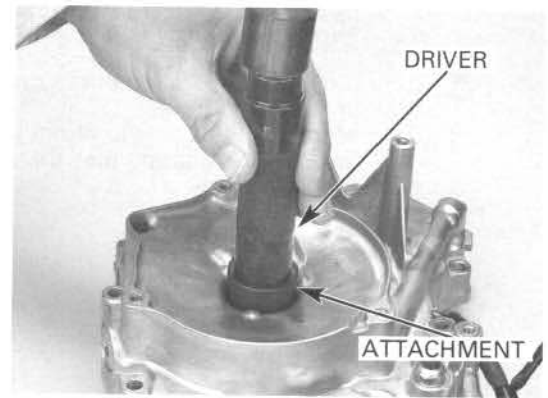


ALTERNATOR/STARTER CLUTCH

Install the oil seal using the special tools as shown.

TOOLS:

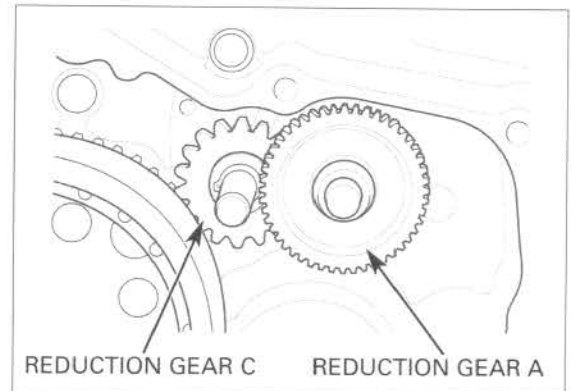
Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100



FLYWHEEL/STARTER CLUTCH

FLYWHEEL/STARTER CLUTCH REMOVAL

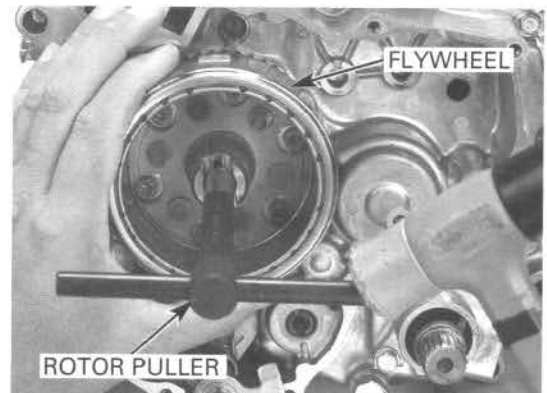
Remove the starter reduction gear A and shaft.
Remove the washer and reduction gear C.



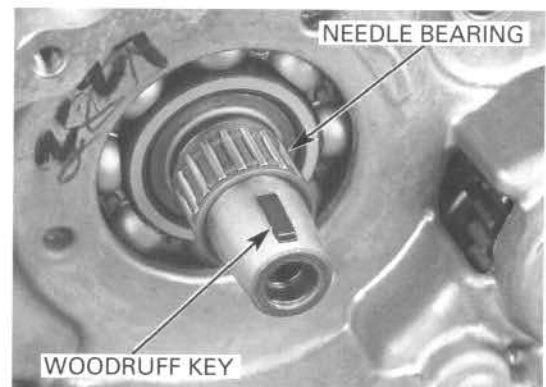
Remove the flywheel and starter driven gear using the special tool.

TOOL:

Rotor puller	07733-0010000 or 07933-2000000
--------------	-----------------------------------



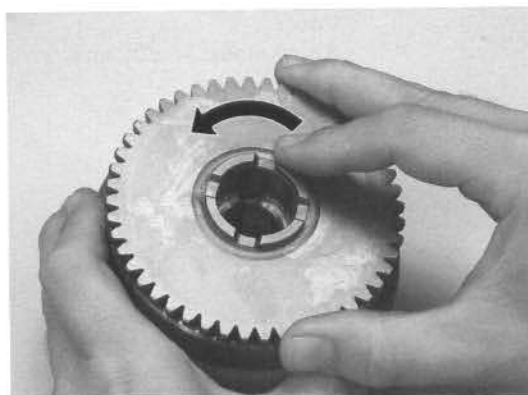
Remove the needle bearing and woodruff key.



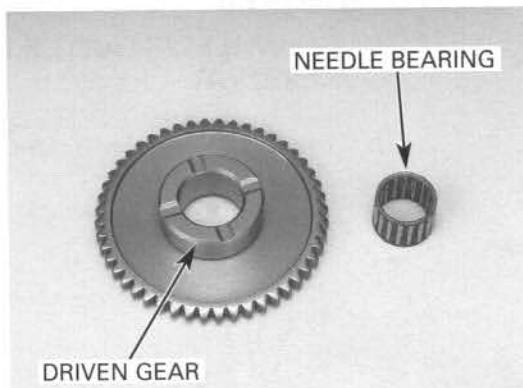
ALTERNATOR/STARTER CLUTCH

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.

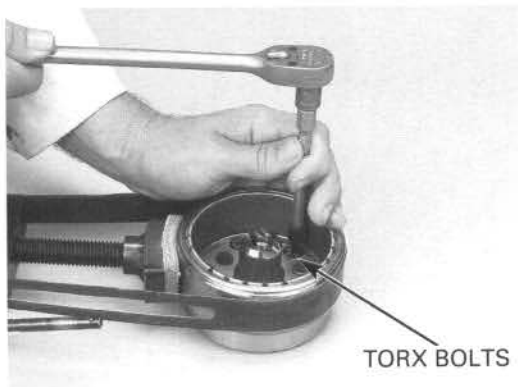


Remove the six torx bolts and remove the one-way clutch from the flywheel.

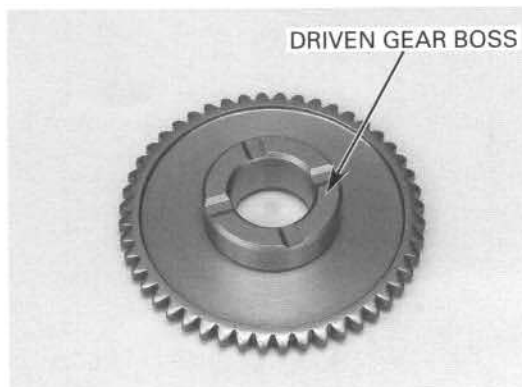
TOOL:
Flywheel holder

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

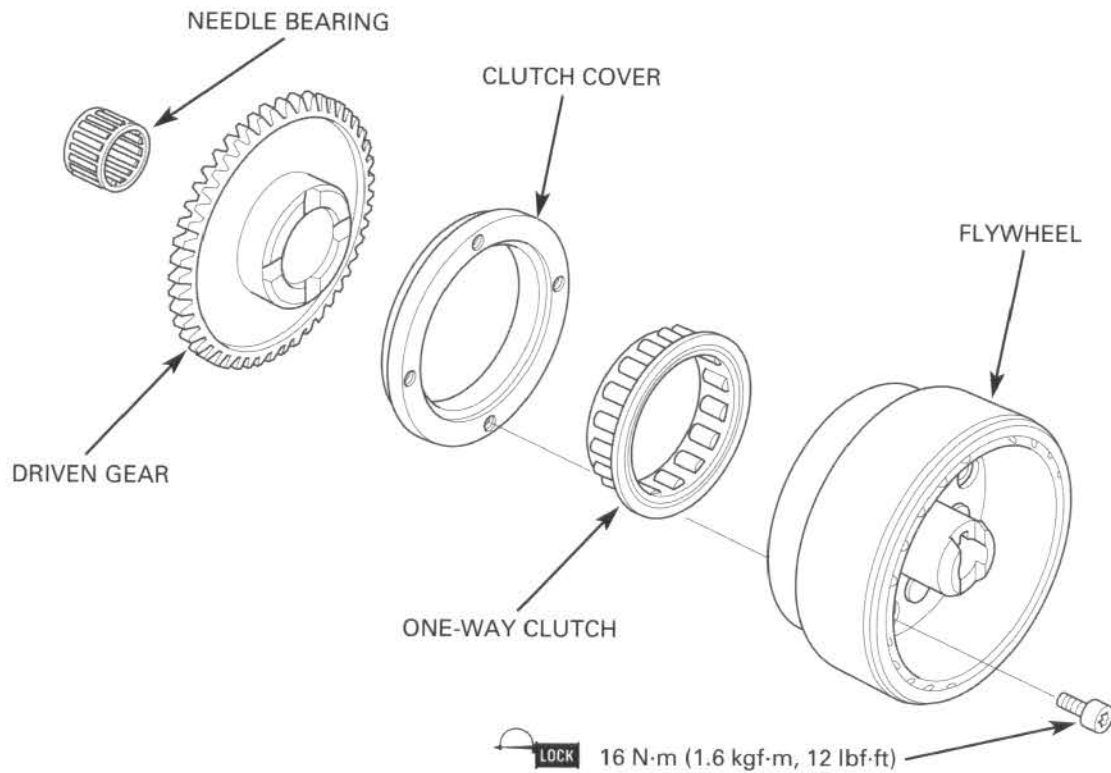
Check the one-way clutch rollers for wear or damage.



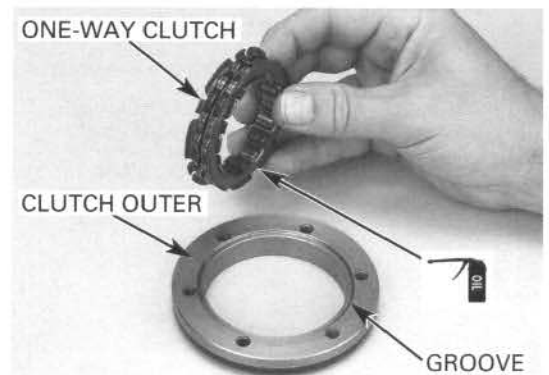
Check the starter driven gear boss for wear or damage.



STARTER CLUTCH ASSEMBLY



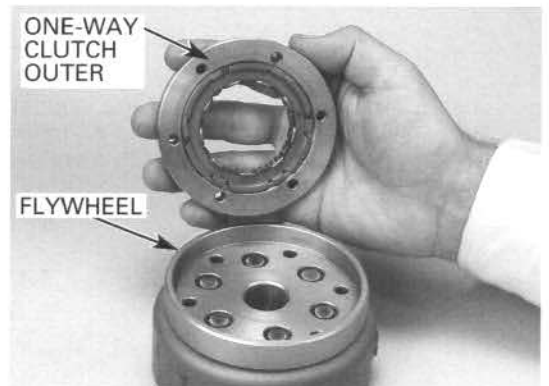
Apply oil to the one-way clutch rollers.
Install the one-way clutch in the clutch outer.
Install the lips of the clutch into the groove of the
clutch outer as shown.



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

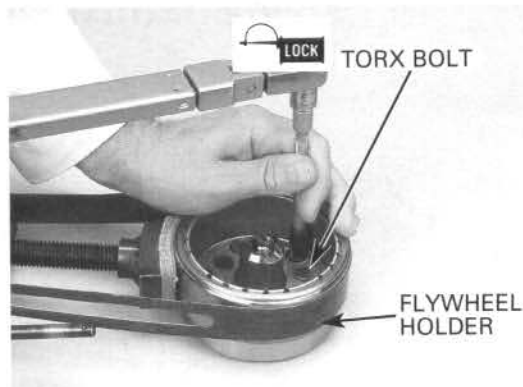
Apply a locking agent to the torx bolt threads.
Hold the flywheel using the special tool and install and tighten the six torx bolts.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)

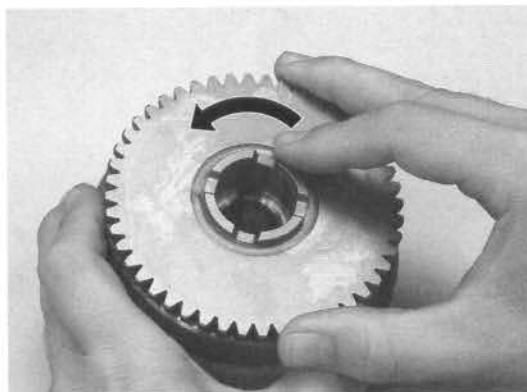
TOOL:

Flywheel holder

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



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

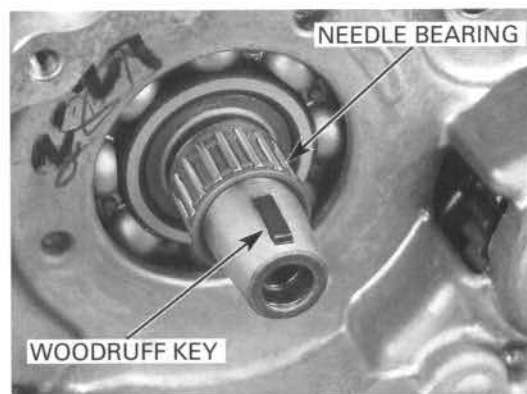


FLYWHEEL/STARTER CLUTCH INSTALLATION

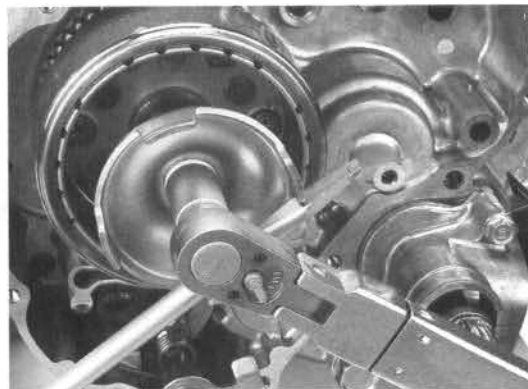
Clean any oil from the crankshaft taper.

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

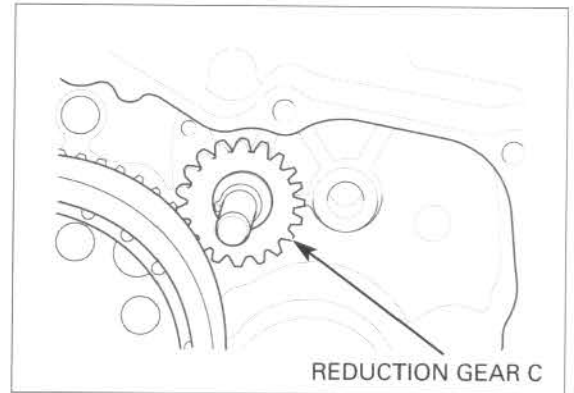
Install the flywheel/starter reduction gear aligning the key way in the flywheel with the key on the crankshaft.



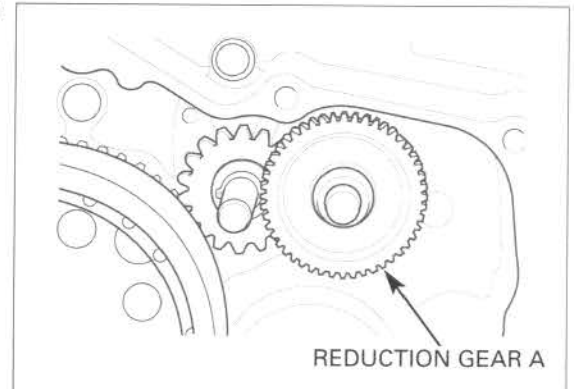
For installation of the alternator cover, temporarily install the driven pulley and tighten the driven pulley bolt to seat the flywheel.



Install the starter reduction gear C.



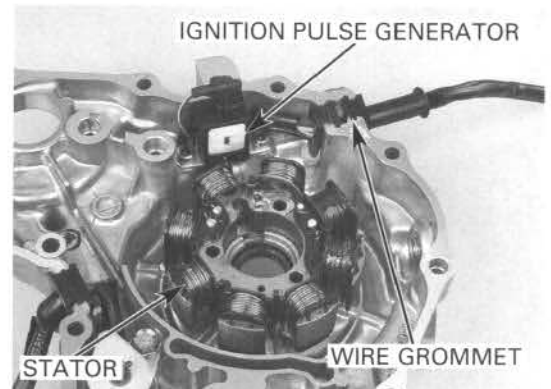
Install the starter reduction shaft and reduction gear A.



ALTERNATOR INSTALLATION

ALTERNATOR ASSEMBLY

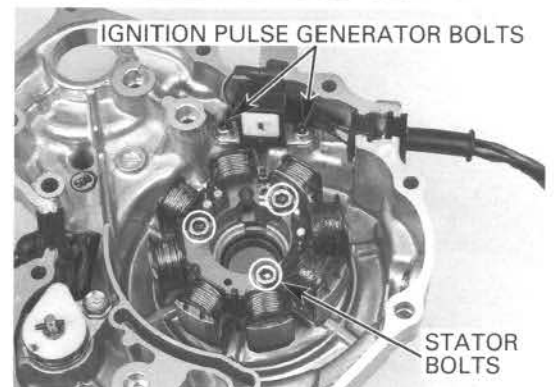
Apply sealant to the grommets of the alternator/ignition pulse generator wire grommets. Install the alternator/ignition pulse generator assembly onto the alternator cover. Route the wires properly as shown and install the grommets into the groove of the alternator cover.



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)



ALTERNATOR/STARTER CLUTCH

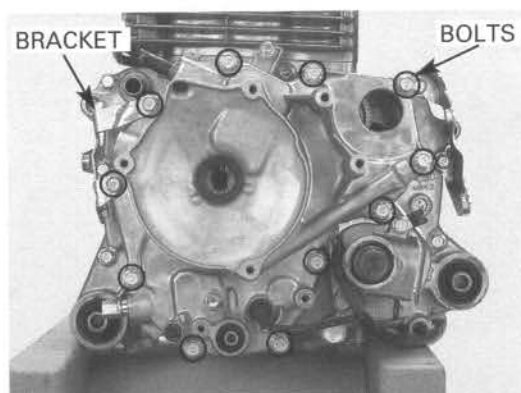
Install the dowel pins and new gasket.



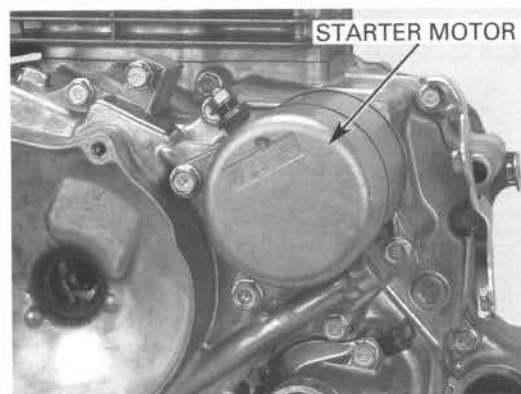
The alternator cover (stator) is magnetically attracted to the flywheel, be careful not to pinch your finger.

Install the left engine cover bracket.

Install the alternator cover and tighten the eleven bolts securely.



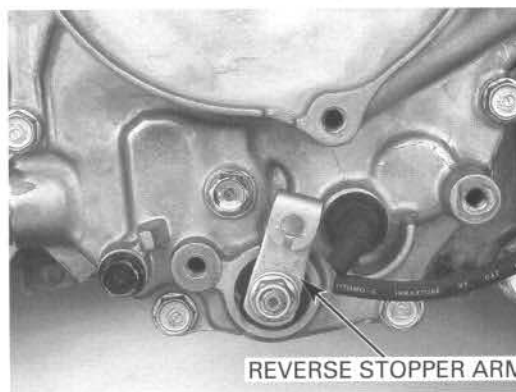
Install the starter motor (page 18-10).



Install the reverse stopper arm.

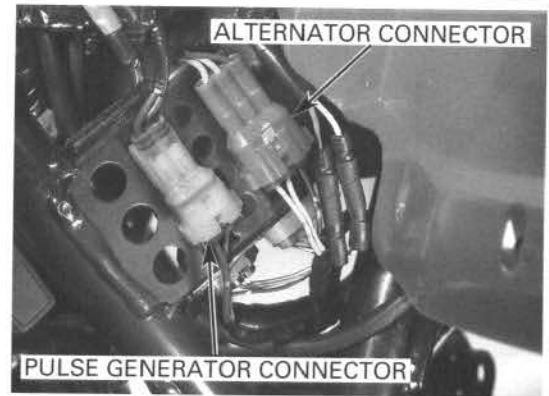
Install and tighten the reverse stopper arm nut securely.

Route the alternator, ignition pulse generator and neutral/reverse switch wire properly (page 1-19) and clamp them securely.

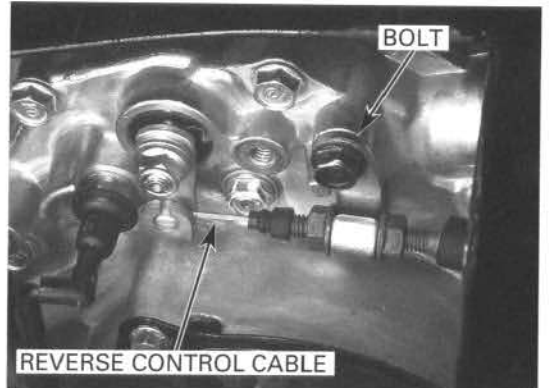


ALTERNATOR/STARTER CLUTCH

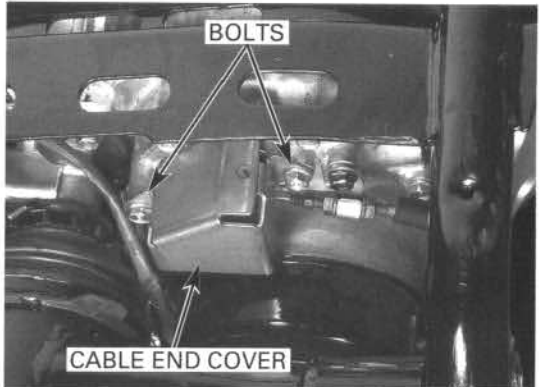
Connect the alternator and ignition pulse generator switch connectors.



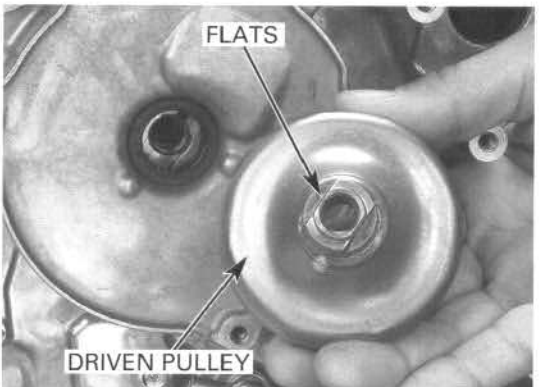
Connect the reverse control cable end to the lever. Install the plate and tighten the bolt.



Install the cable end cover and tighten the two bolts.

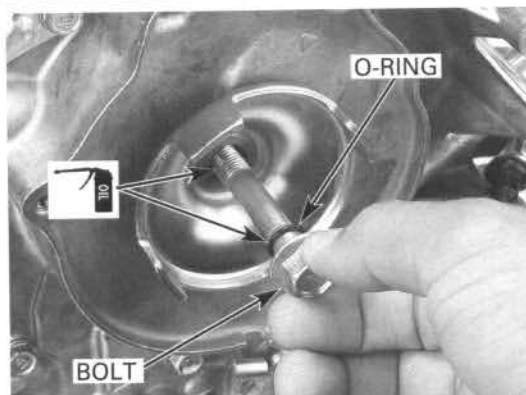


Install the starter driven pulley aligning the flats with the groove on the flywheel.



ALTERNATOR/STARTER CLUTCH

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



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

TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)

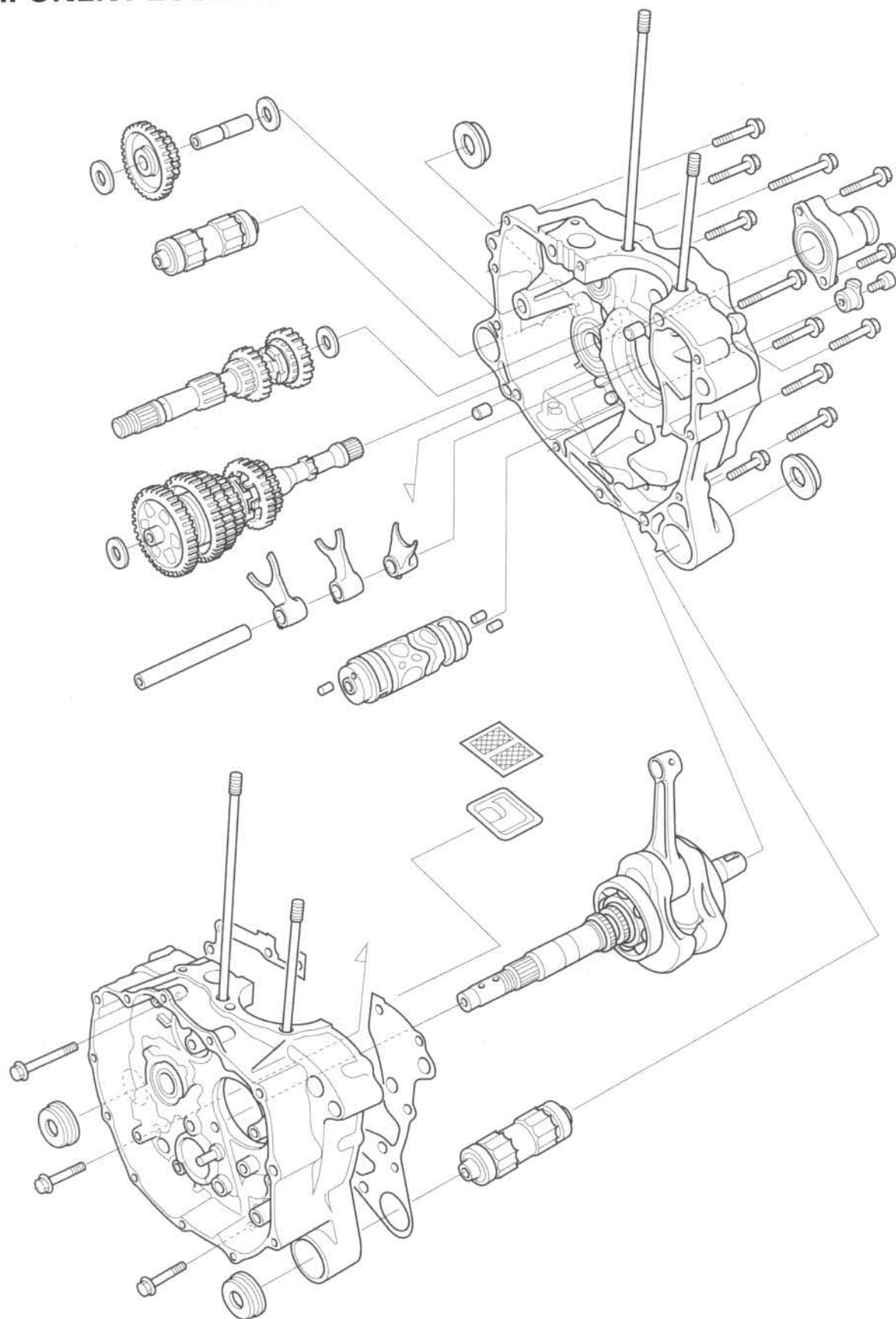
Install the recoil starter (page 10-8).



11. CRANKCASE/TRANSMISSION/CRANKSHAFT

COMPONENT LOCATION	11-2	TRANSMISSION.....	11-7
SERVICE INFORMATION	11-3	CRANKSHAFT.....	11-15
TROUBLESHOOTING	11-5	CRANKCASE ASSEMBLY	11-17
CRANKCASE SEPARATION.....	11-6		

COMPONENT LOCATION



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 9)
 - Cylinder head (Section 7)
 - Cylinder, piston, cam (Section 8)
 - Engine (Section 6)
 - Gearshift linkage (Section 9)
 - Oil pump (Section 4)

SPECIFICATIONS

Unit: mm (in)

Unit: mm (in)

ITEM			SPECIFICATIONS	SERVICE LIMIT	
Crankshaft, connecting rod	Side clearance		0.05 – 0.50 (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)	0.10 (0.004)
	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)

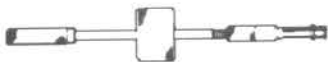

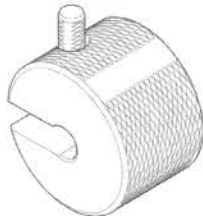
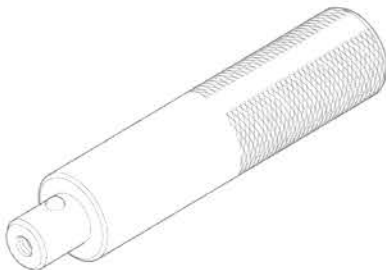







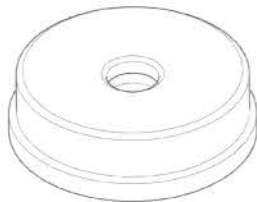
TORQUE VALUES

Front crankcase stud bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear crankcase 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.

CRANKCASE/TRANSMISSION/CRANKSHAFT

TOOLS

<p>Bearing remover set 07936-KC10000</p>  <p>(Not available in U.S.A.)</p>	<p>Bearing remover, 15 mm 07936-KC10500</p> 	<p>Remover weight 07936-371020A</p>  <p>or 07936-3710200 (U.S.A. only)</p>
<p>Driver 07749-0010000</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Pilot, 15 mm 07746-0040300</p> 
<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Pilot, 35 mm 07746-0040800</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 
<p>Pilot, 20 mm 07746-0040500</p> 	<p>Pilot, 25 mm 07746-0040600</p> 	<p>Attachment, 72 x 75 mm 07746-0010600</p> 

Thread adapter
07965-KA30000

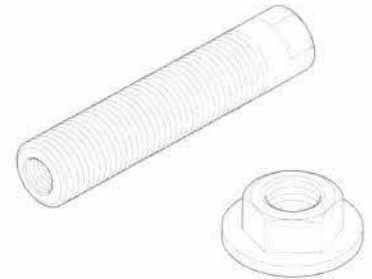


or 07VMF-HM8010A (U.S.A. only)

Assembly collar
07965-VM00100



Assembly shaft
07965-VM00200



or 07931-ME4010B and
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

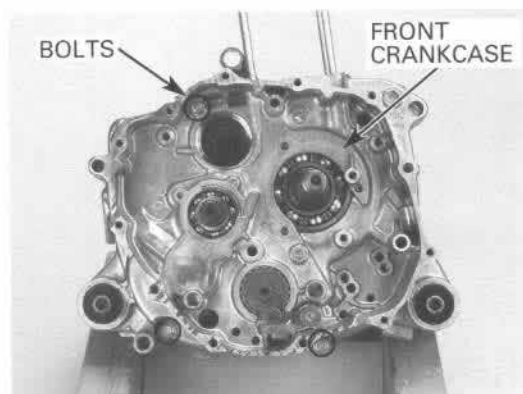
- Incorrect clutch adjustment
- Shift fork bent or damaged
- Shift fork shaft bent

CRANKCASE SEPARATION

Refer to page 11-3 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.



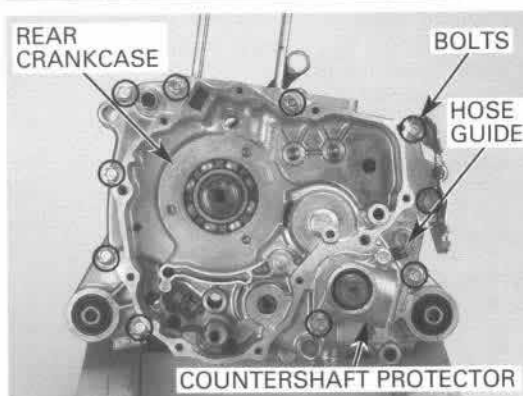
Loosen the ten rear crankcase bolts in a crisscross pattern in 2 or 3 steps to prevent crankcase distortion.

Remove the rear crankcase bolts.

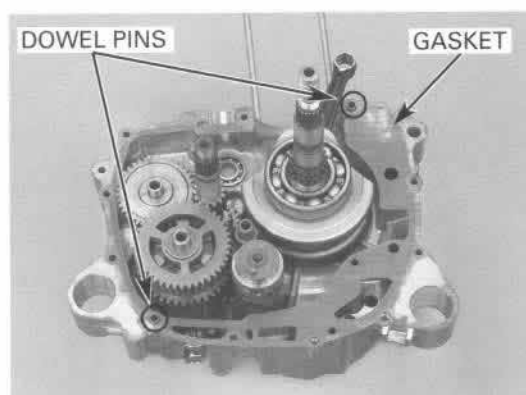
Remove the two bolts and hose guide.

Remove the countershaft protector and O-ring.

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



Remove the gasket and dowel pins.

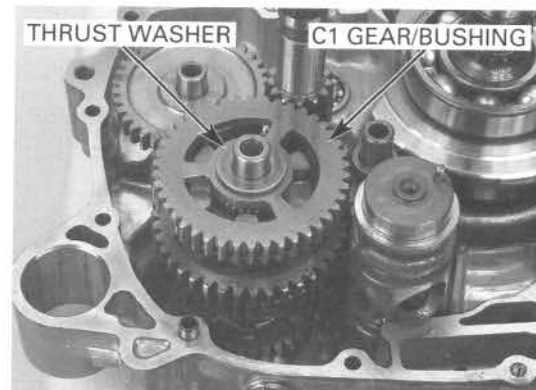


TRANSMISSION

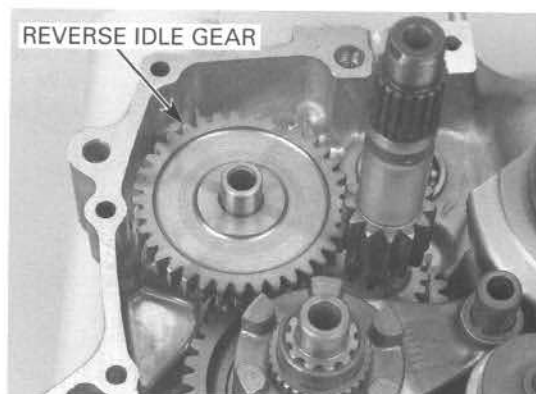
REMOVAL/DISASSEMBLY

Remove the following:

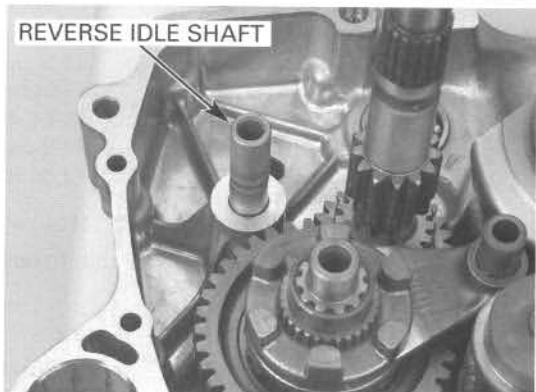
- thrust washer
- C1 gear
- C1 gear bushing



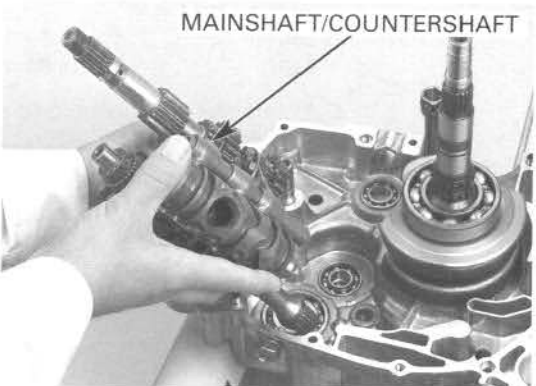
Remove the reverse idle gear.



Remove the reverse idle shaft.



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

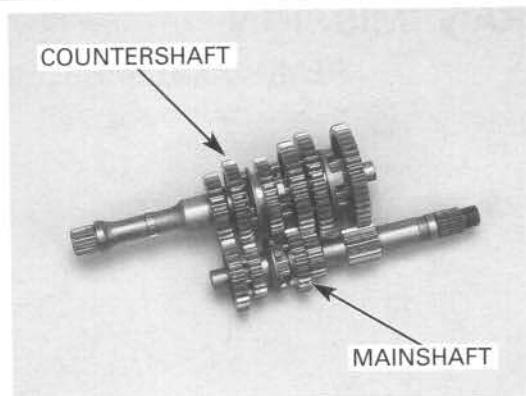


CRANKCASE/TRANSMISSION/CRANKSHAFT

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.

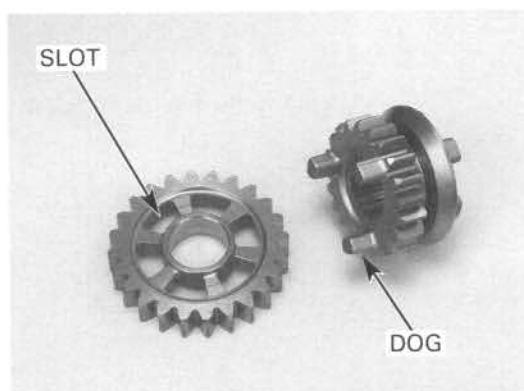


INSPECTION

Check the gear dogs, slots 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)
M4 I.D.:	20.04 mm (0.789 in)
M5 O.D.:	17.94 mm (0.706 in)
M5 I.D.:	15.04 mm (0.592 in)
C3 O.D.:	24.94 mm (0.982 in)
C3 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.

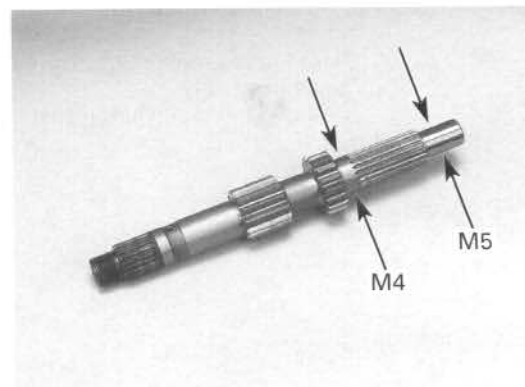
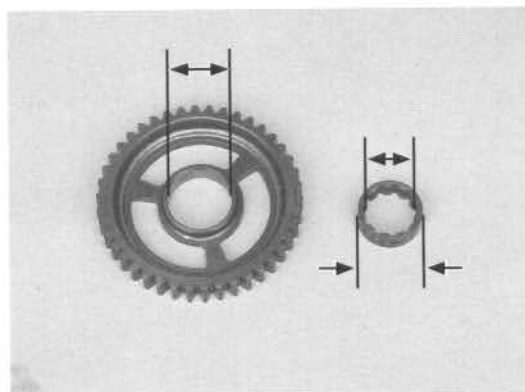
SERVICE LIMITS:

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)

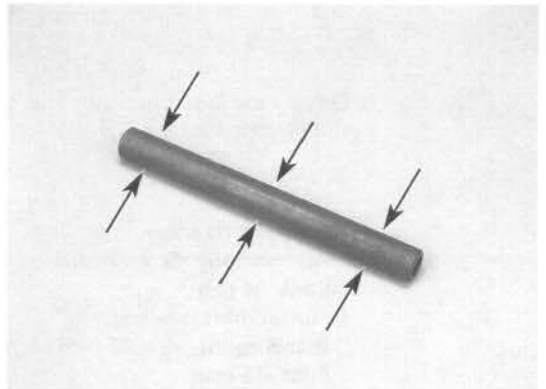
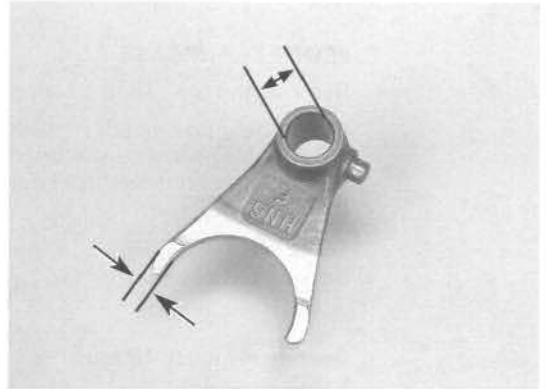
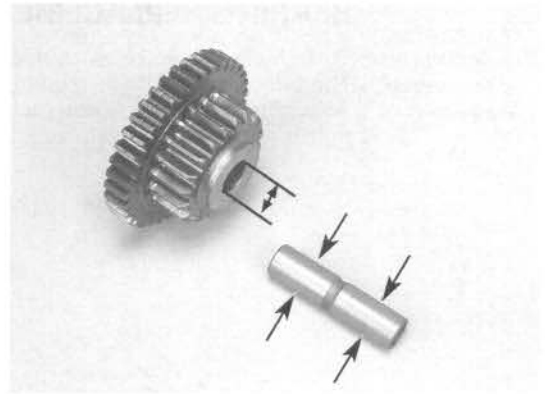
Measure the shift fork claw thickness.

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.

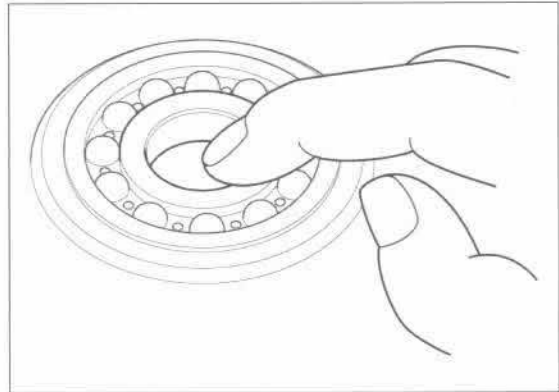


CRANKCASE/TRANSMISSION/CRANKSHAFT

BEARING REPLACEMENT

For crankshaft bearing replacement, see page 11-16.

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.



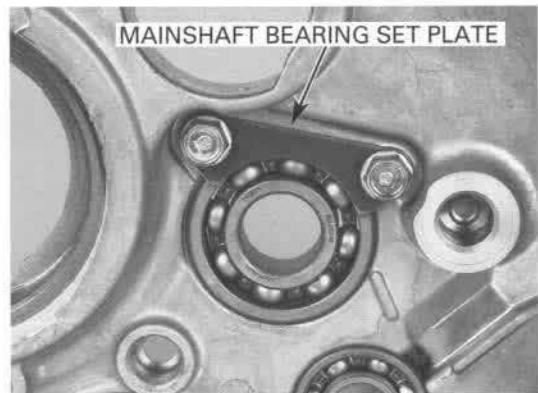
FRONT CRANKCASE

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:

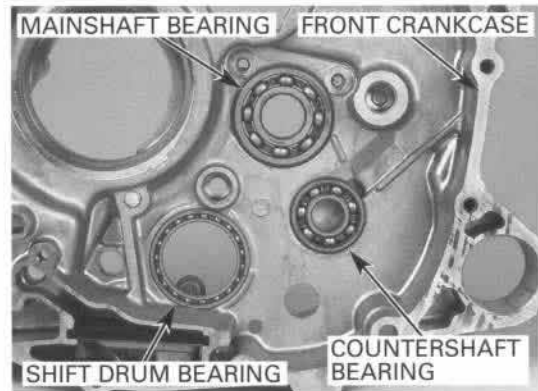
Bearing remover set	07936-KC10000 (Not available in U.S.A.) or
Bearing remover, 15 mm	07936-KC10500
Remover weight	07936-371020A (U.S.A. only)
	07936-3710200 (U.S.A. only)



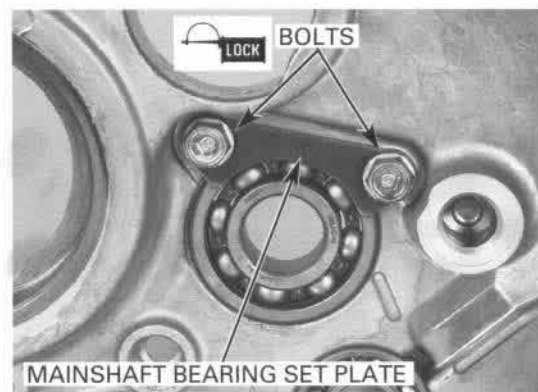
Drive new bearings into the front crankcase using the special tools.

TOOLS:

Driver	07749-0010000
Mainshaft bearing:	
Attachment, 42 x 47mm	07746-0010300
Pilot, 20 mm	07746-0040500
Countershaft bearing:	
Attachment, 32 x 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300
Shift drum bearing:	
Attachment, 42 x 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 07936-KC10500
Bearing remover, 15 mm	07936-371020A (U.S.A. only)
Remover weight	07936-3710200 (U.S.A. only)

Drive new bearings into the rear crankcase.

TOOLS:

Driver	07749-0010000
--------	---------------

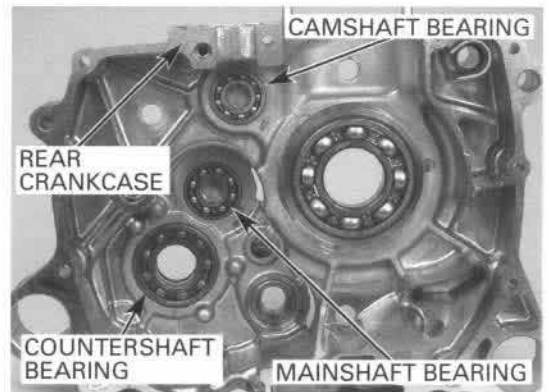
Countershaft bearing:

Attachment, 52 x 55 mm	07746-0010400
Pilot, 25 mm	07746-0040600

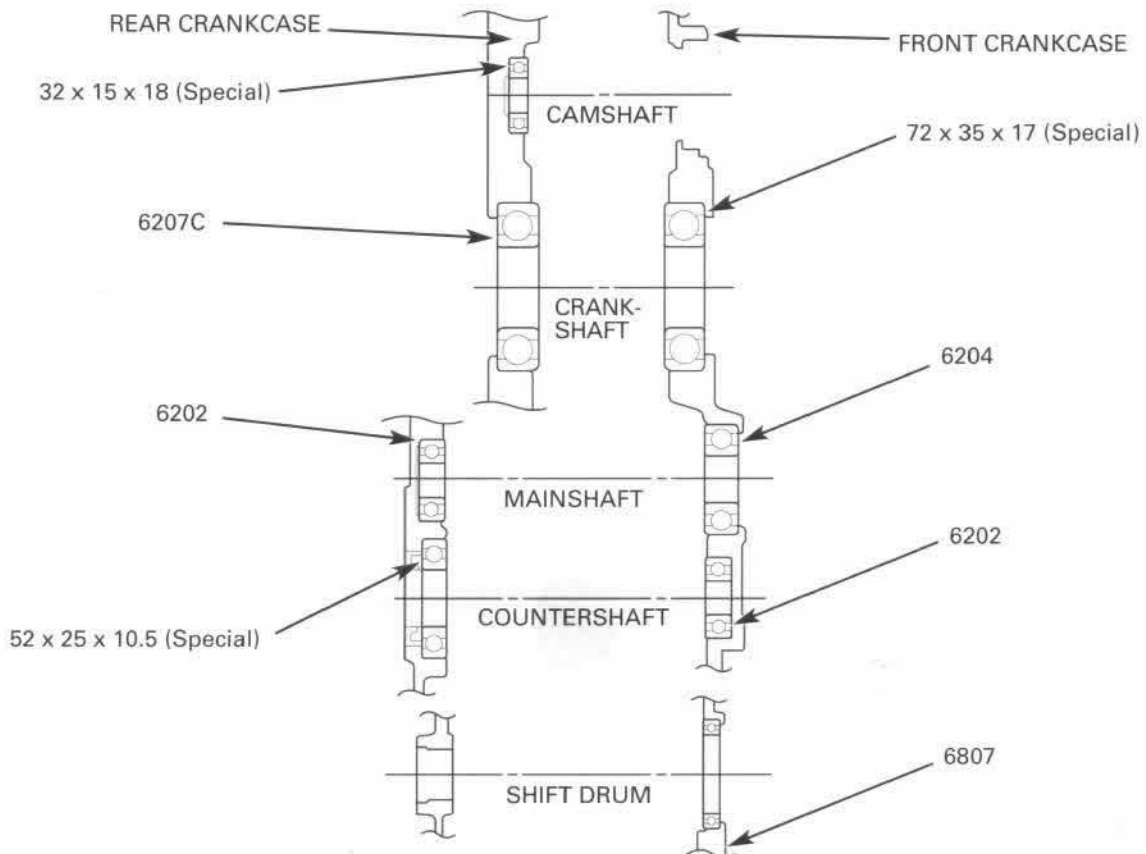
Mainshaft/camshaft bearing:

Attachment, 32 x 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300

Install the countershaft oil seal.



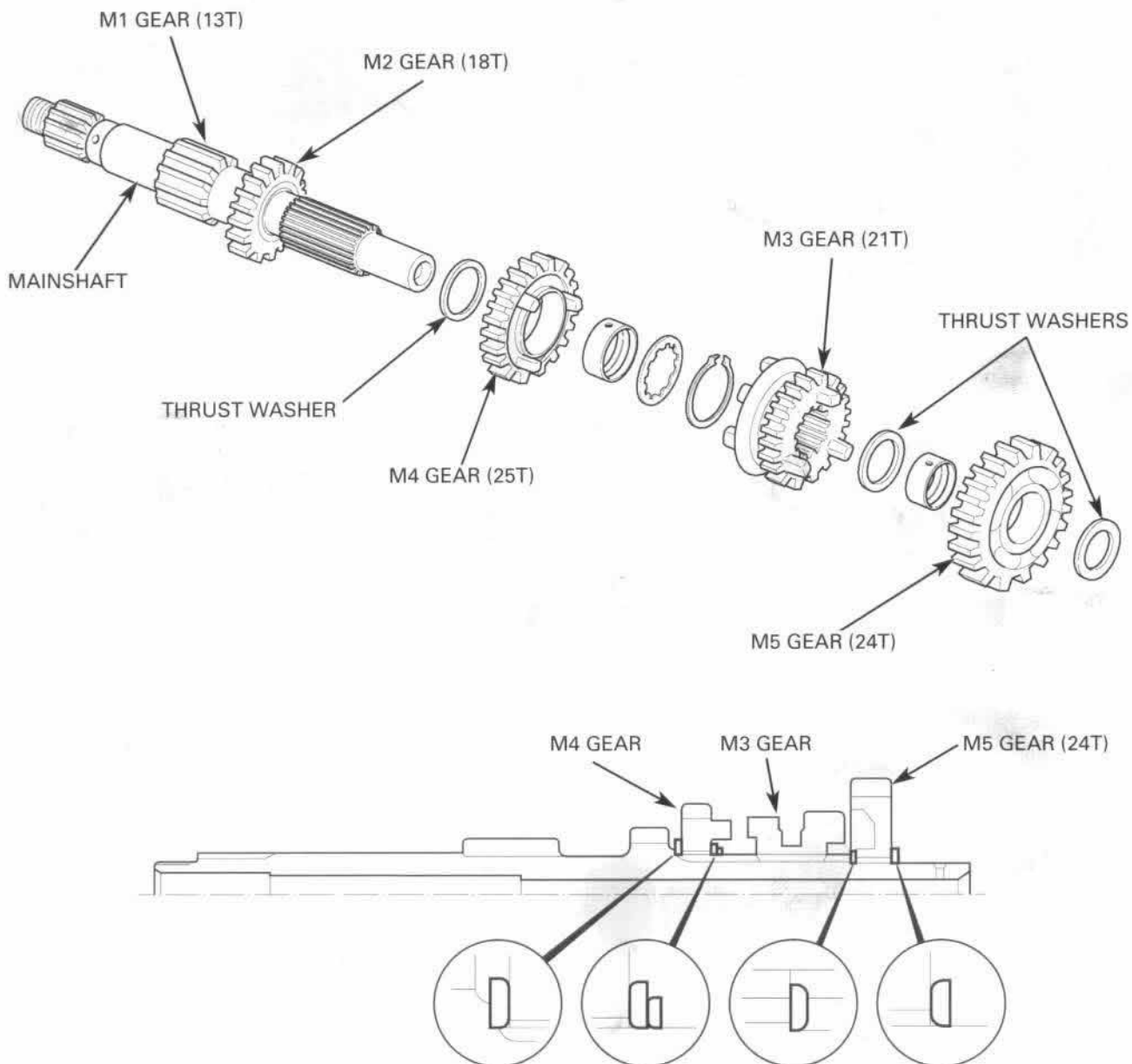
CRANKCASE BEARING LOCATIONS



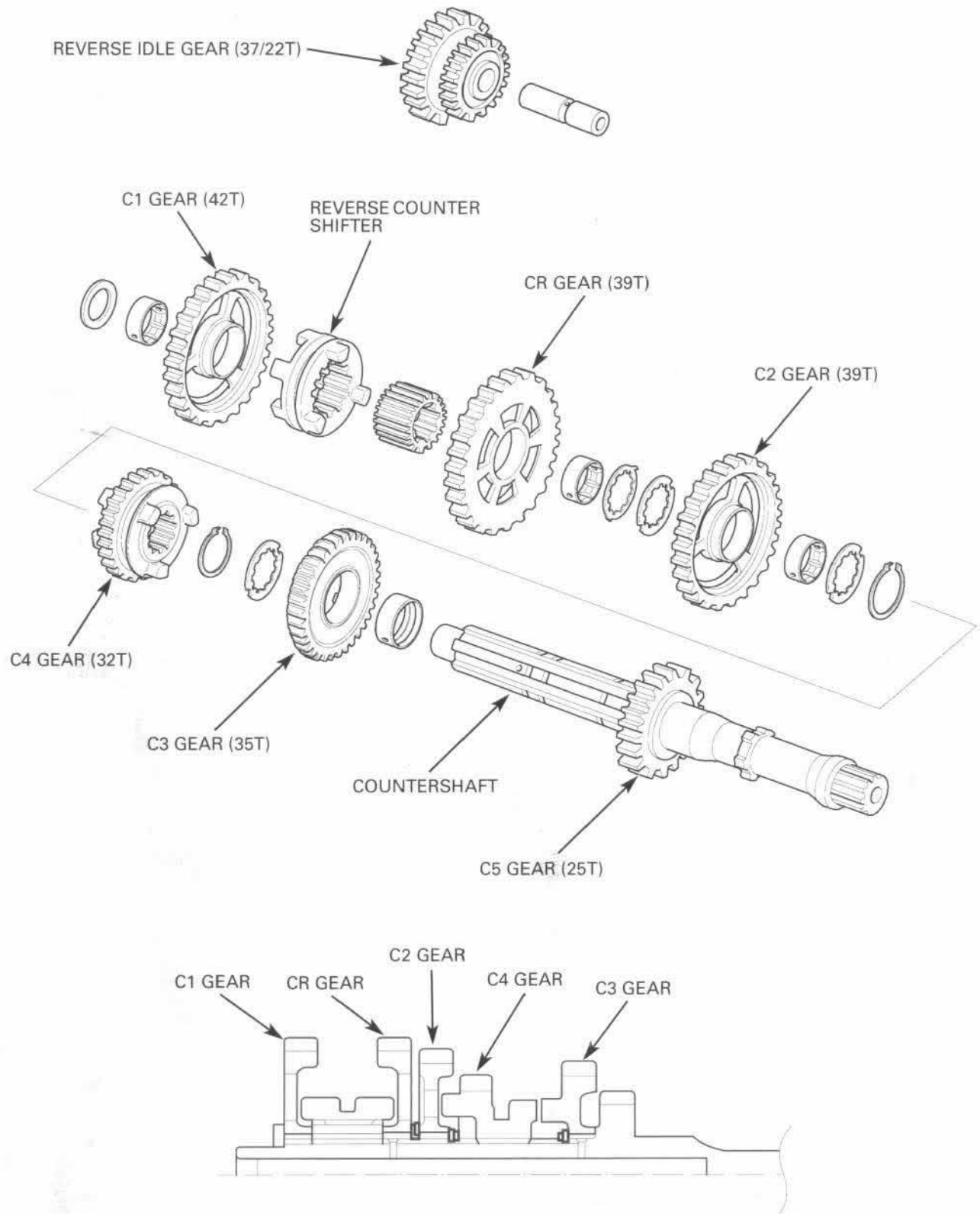
ASSEMBLY/INSTALLATION

NOTE:

- Apply oil to the shifter gear grooves.
 - Always install the thrust washers and snap rings with the chamfered (rolled) edge facing away from the thrust load.
- After installing the snap ring, slightly open the ring and rotate it in its groove to be sure it is fully seated. Do not use a worn snap ring which could easily spin in the groove. It 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.



COUNTERSHAFT



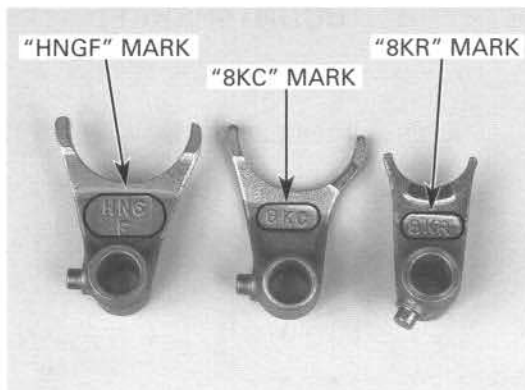
CRANKCASE/TRANSMISSION/CRANKSHAFT

Install the rear shift fork into the M3 shifter gear groove with its "8KR" mark facing up.
Install the center shift fork into the C4 shifter gear groove with its "8KC" mark facing up.
Install the front shift fork into the counter shifter groove with its "HNGF" mark facing up.

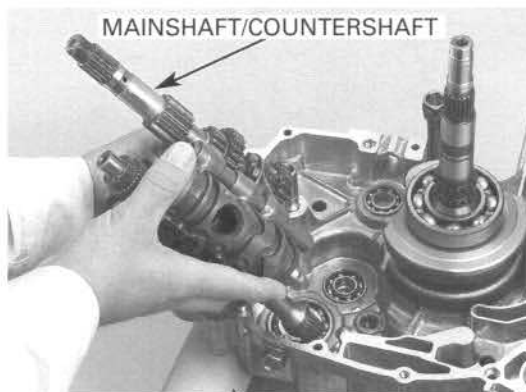
Make sure all of the shift fork pins are aligned with the grooves in the shift drum.

Install the shift fork shaft.

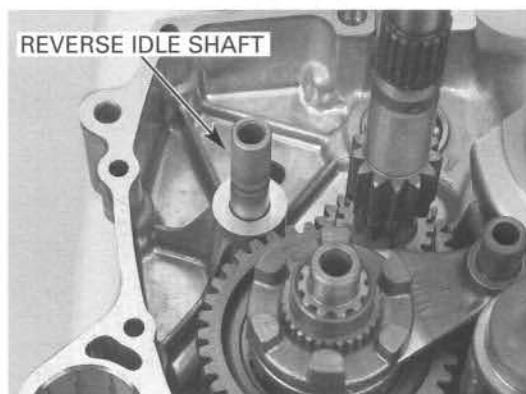
Assemble the main shaft, countershaft and shift drum.



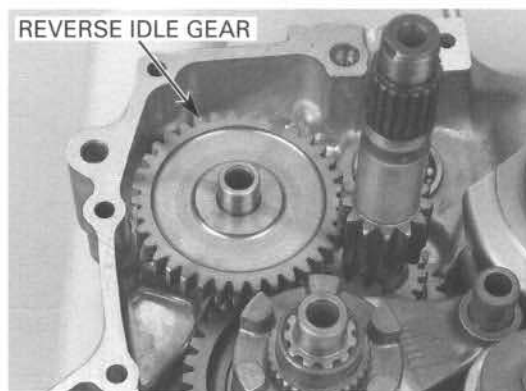
Install the mainshaft end washer into the crankcase.
Install the mainshaft, countershaft and shift drum as an assembly.



Install the reverse idle shaft.



Install the reverse idle gear.



Install the C1 gear, C1 bushing and thrust washer.



CRANKSHAFT

REMOVAL

Remove the transmission (page 11-7).
Install the threaded adapter on the rear crankshaft.

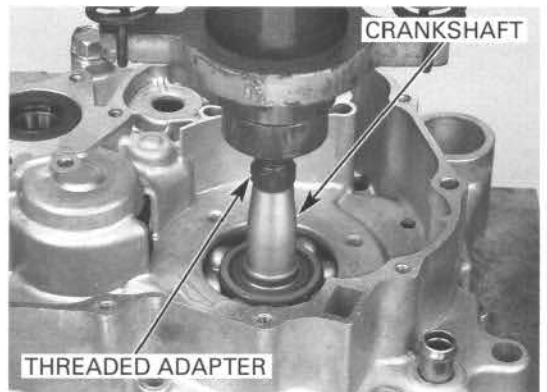
TOOL:

Threaded adapter

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

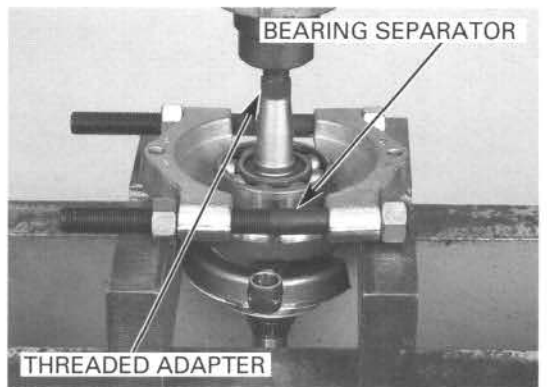


Remove the crankshaft from the rear crankcase using a hydraulic press.



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

If the rear crankshaft bearing remains on the crankshaft, remove it with a commercially available 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.



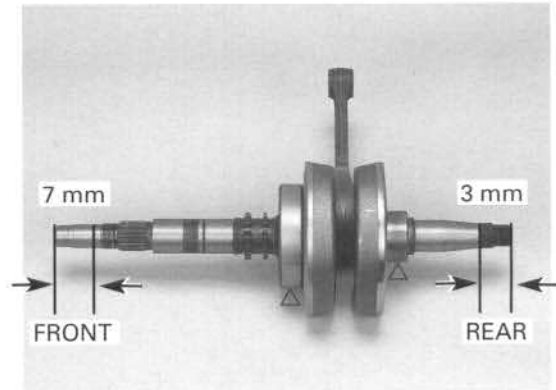
INSPECTION

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 LIMITS:

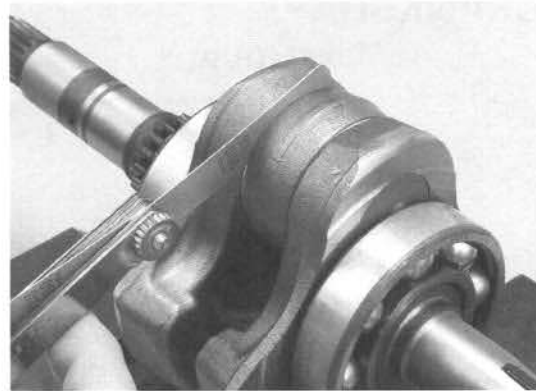
FRONT: 0.06 mm (0.002 in)

REAR: 0.03 mm (0.001 in)



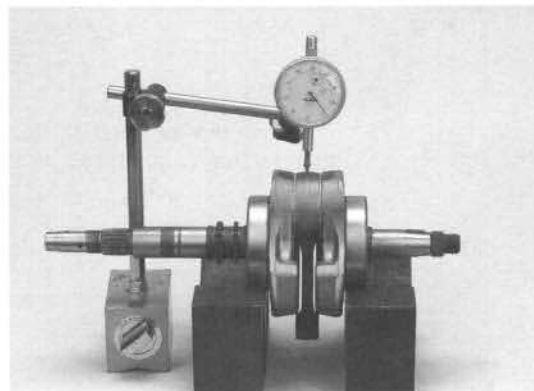
Measure the side clearance between the connecting rod big end and the crankshaft weight with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)



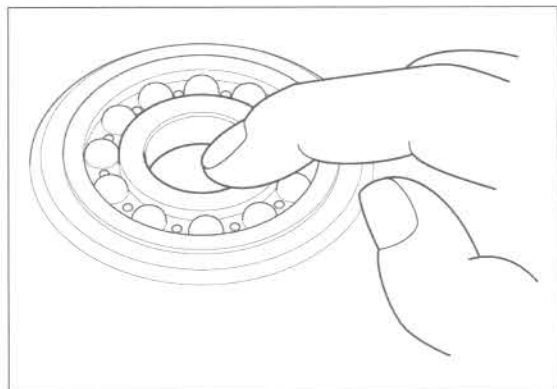
Measure the radial clearance at the connecting rod big end, at two points in the directions indicated by the arrows.

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 that the outer race of each bearing fits tightly in the crankcase.

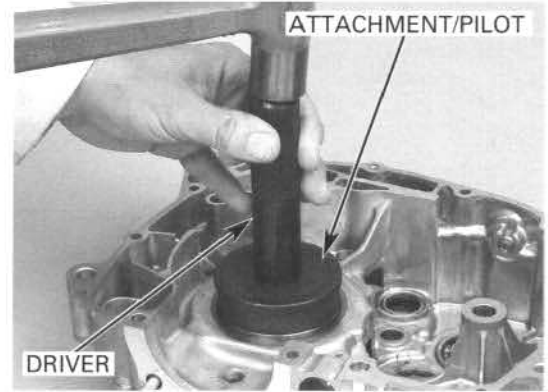


Drive new bearings in using the following tools.

TOOLS:

Crankshaft bearing:

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



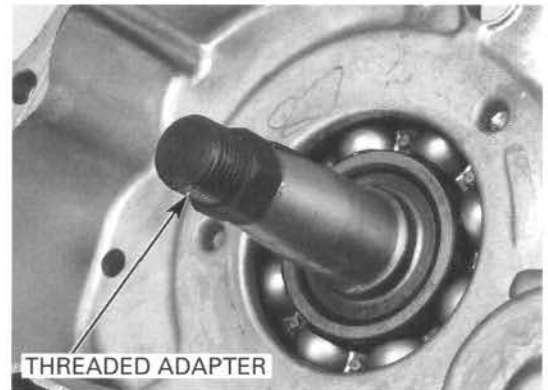
Install the rear crankcase on the front crankcase.
Install the threaded adapter on the rear crankshaft.

TOOL:

Threaded adapter 07965-KA30000

U.S.A. TOOL:

Threaded adapter 07VMF-HM8010A



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

TOOLS:

Assembly collar 07965-VM00100

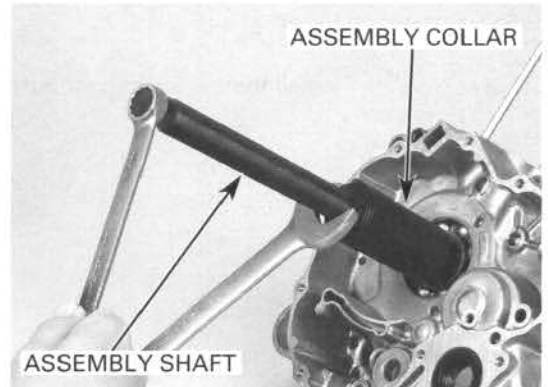
Assembly shaft 07965-VM00200

U.S.A. TOOLS:

Assembly shaft 07931-ME4010B and

Special nut 07931-HB3020A

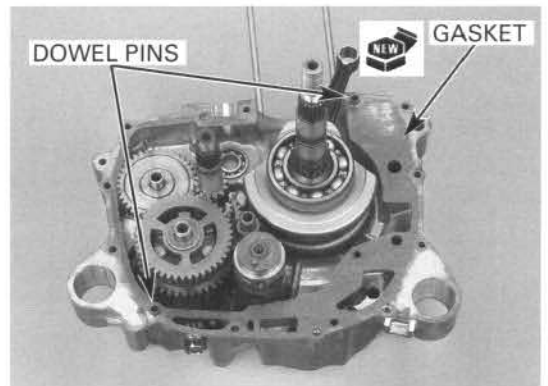
Assembly collar 07965-VM00100



Install the transmission (page 11-12).

CRANKCASE ASSEMBLY

Install the dowel pins and new gasket.



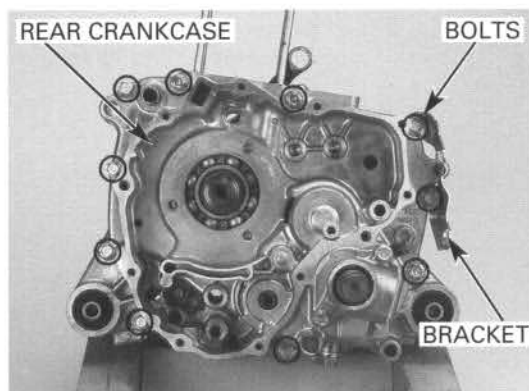
CRANKCASE/TRANSMISSION/CRANKSHAFT

Make sure that the gasket stays in place.

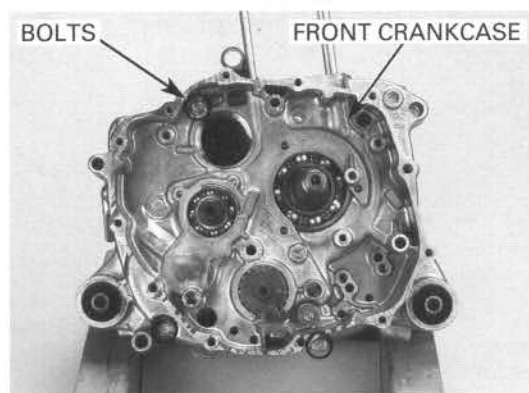
Install the front crankcase onto the rear crankcase.

Install the engine cover bracket.

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

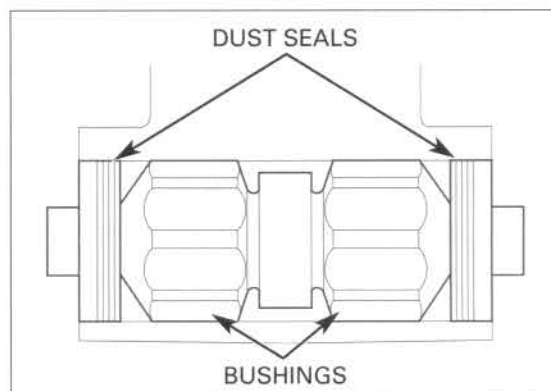


Tighten the three front crankcase bolts.

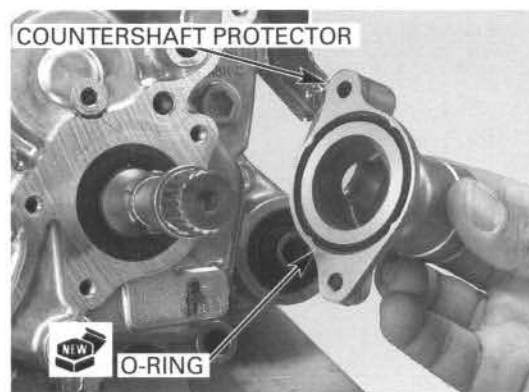


When installing the engine hanger bushing dust seals, install the dust seal lips to the outside as shown.

Install the engine hanger bushings and dust seals.

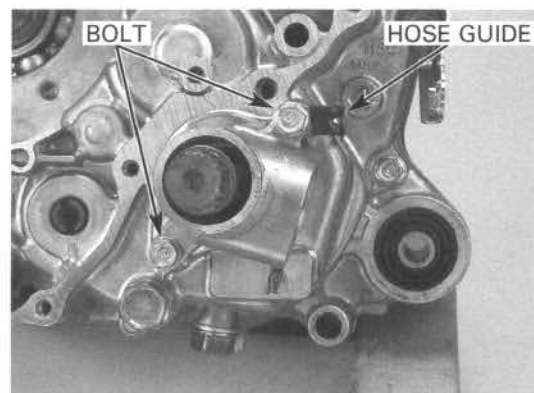


Install the new O-ring and countershaft protector.



Install the hose guide and tighten the two bolts.

Reinstall the removed parts in the reverse order of removal.

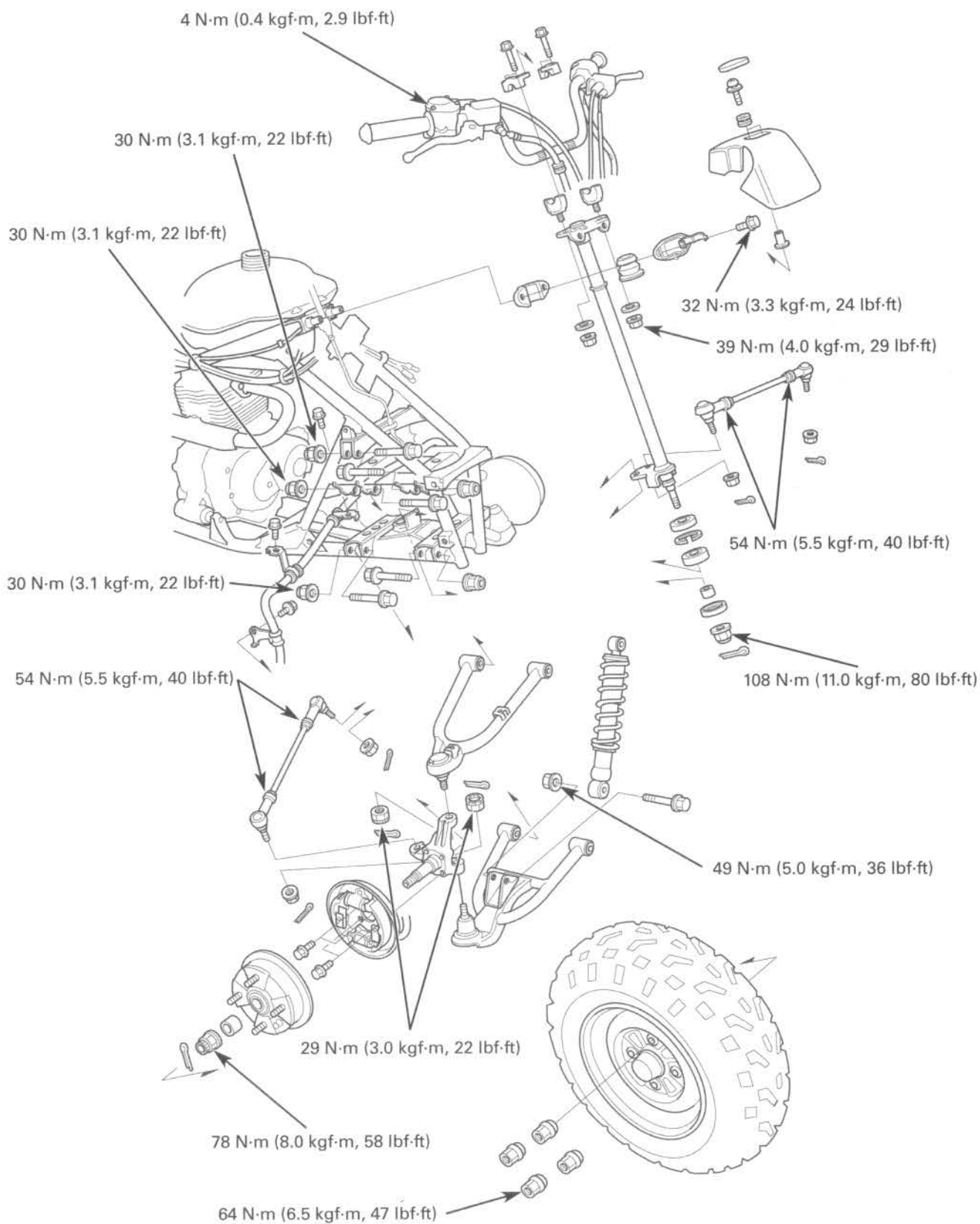


MEMO

12. FRONT WHEEL/SUSPENSION/STEERING

COMPONENT LOCATION	12-2	TIRES	12-11
SERVICE INFORMATION	12-3	TIE-ROD/KNUCKLE	12-15
TROUBLESHOOTING	12-5	UPPER/LOWER ARMS	12-20
HANDLEBAR	12-6	STEERING SHAFT	12-25
THROTTLE HOUSING	12-9	FRONT SHOCK ABSORBER	12-30
FRONT WHEEL	12-11		

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- 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 3-23).
- Do not twist or bend the brake hoses and pipes when removing them from the knuckle or upper arm.

SPECIFICATIONS

Unit: mm (in)


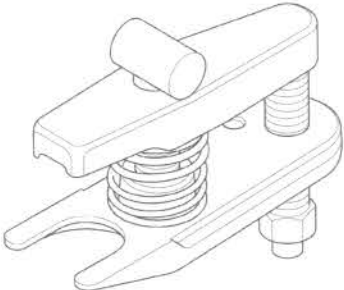



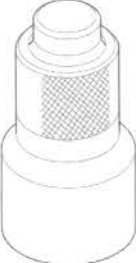

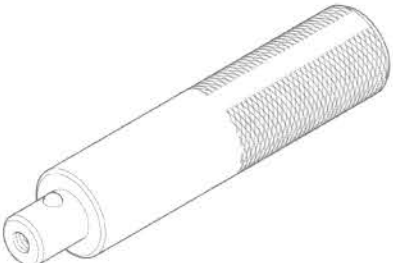

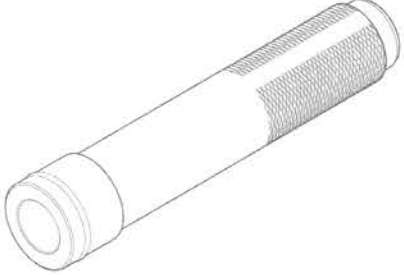
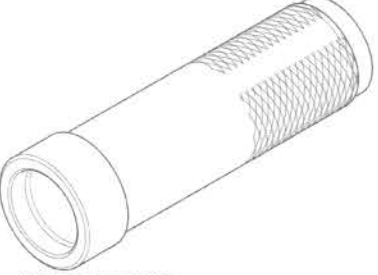

ITEM		SPECIFICATIONS	SERVICE LIMIT
Minimum tire tread depth		—	4 (0.2)
Cold tire pressure	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
	Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)	—
	Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)	—
	With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
Tie-rod distance between the ball 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

<p>Ball joint remover/installer 07JMF-HC50110</p> 	<p>Ball joint remover, 28 mm 07MAC-SL00200</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 
<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Pilot, 17 mm 07746-0040400</p> 	<p>Ball joint remover/installer 07974-6790000</p>  <p>(Not available in U.S.A.) or 07JMF-HC50110 (U.S.A. only)</p>
<p>Attachment, 28 x 30 mm 07946-1870100</p> 	<p>Driver 07749-0010000</p> 	<p>Ball joint remover/installer 07965-SB00300</p>  <p>Not available in U.S.A or 07JAF-SH20200</p>
<p>Driver, 22 mm I.D. 07746-0020100</p> 	<p>Driver, 40 mm I.D. 07746-0030100</p>  <p>or 07945-3710101</p>	<p>Attachment, 35 mm I.D. 07746-0030400</p> 

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

Stiff suspension

- Bent shock absorber

Suspension noise

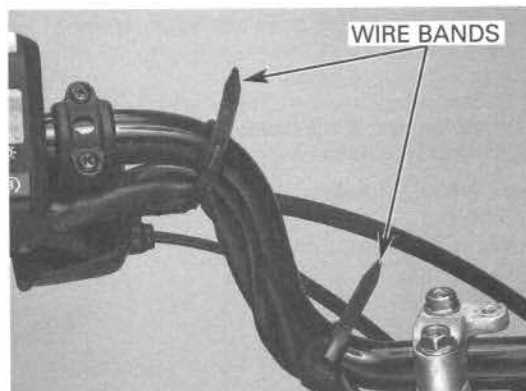
- Loose fasteners
- Front shock binding

HANDLEBAR

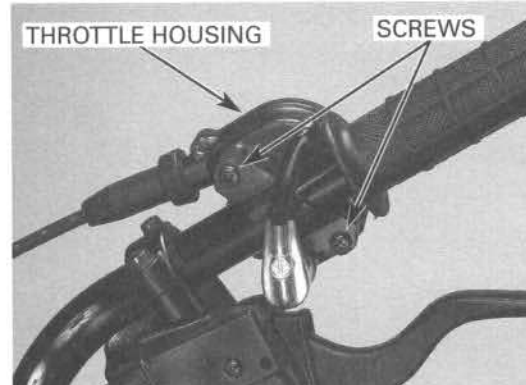
REMOVAL

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

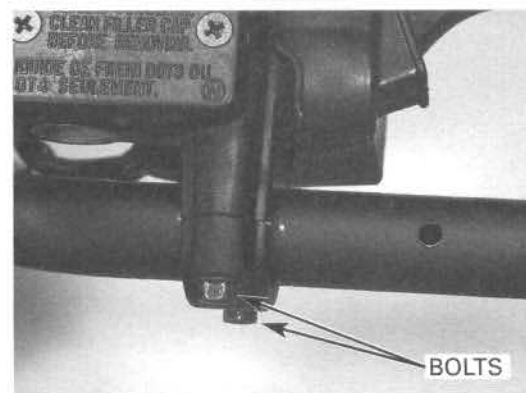
Remove the wire bands.



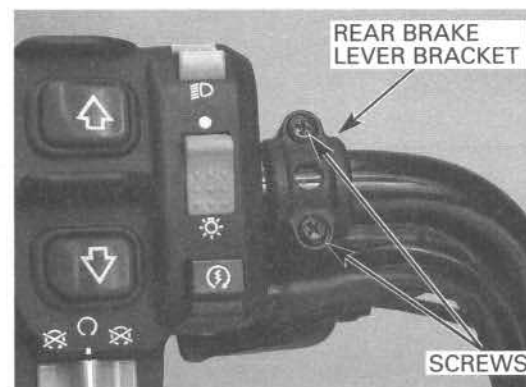
Remove the two screws and throttle housing.



Remove the two bolts and master cylinder.



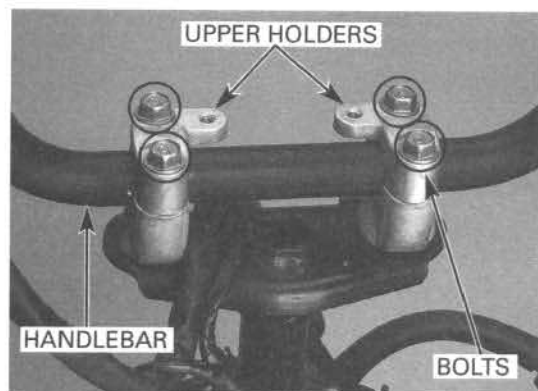
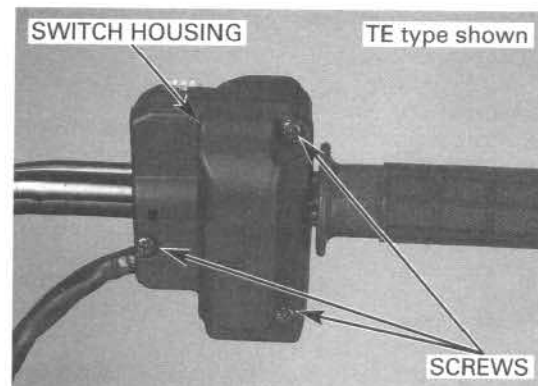
Remove the two screws and rear brake lever bracket.



TM type: Remove the two screws and switch housing.

TE type: Remove the three screws and switch housing.

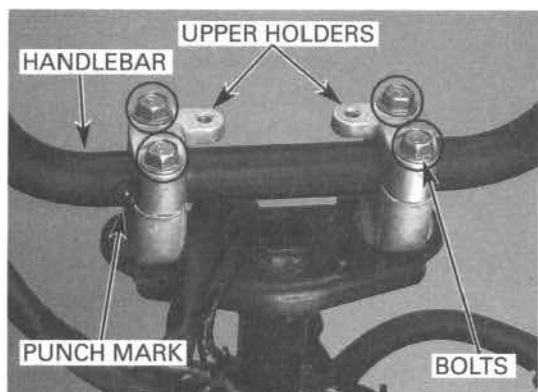
Remove the four bolts and upper holders.
Remove the handlebar.



INSTALLATION

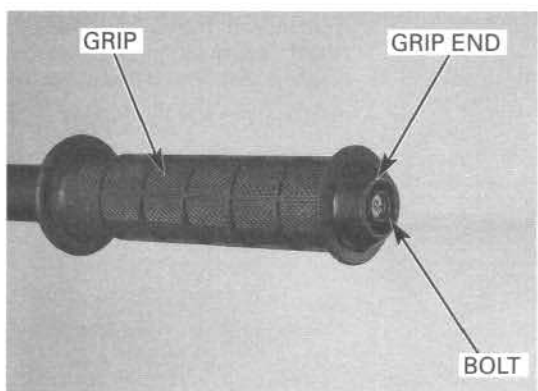
Place the handlebar on the lower holders.
Align the punch mark on the handlebar with the top of the lower holders.
Install the upper holders on the handlebar with their cover bosses forward.
Tighten the front bolts first, then tighten the rear bolts.

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



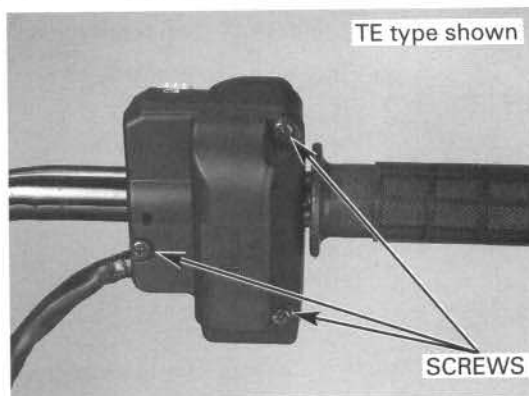
Wait 3 – 5 minutes and install the grip.
Rotate the grip for even application of the adhesive.
Install the grip end and tighten the bolt.

Allow the adhesive to dry for an hour before using.



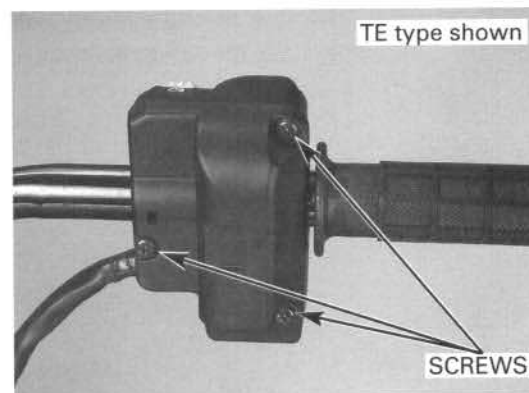
FRONT WHEEL/SUSPENSION/STEERING

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



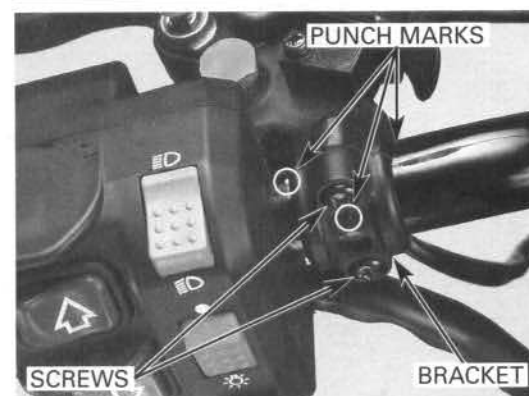
TM type: Tighten the upper screw first, then the lower screw.

TE type: Tighten the upper screw first, then the lower screws.



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.

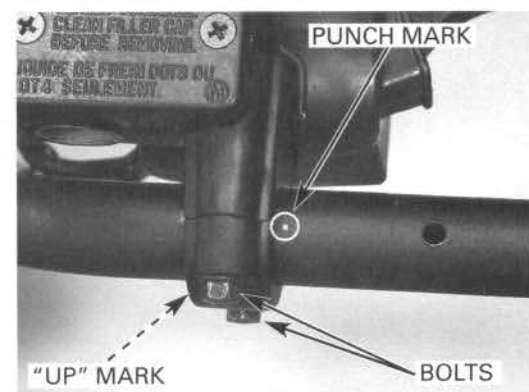


Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.

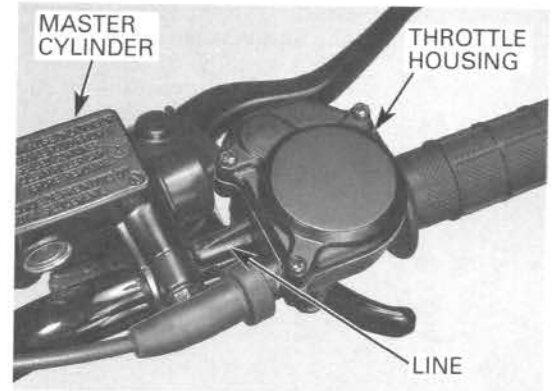
Install the master cylinder holder with the "UP" mark facing up.

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.

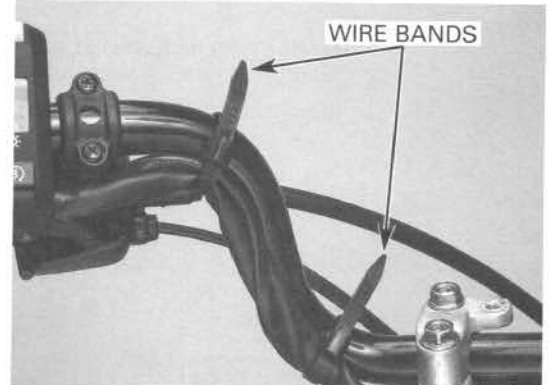


Tighten the throttle housing screws securely.



Secure the wire with the wire bands.

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

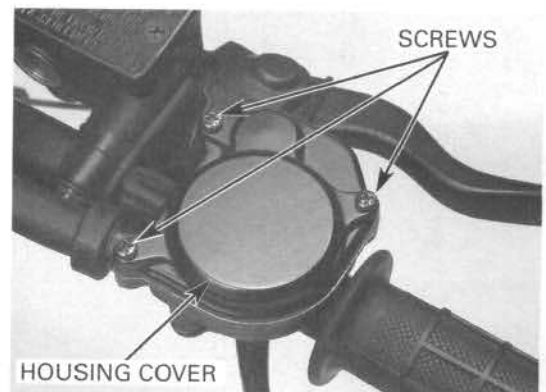


THROTTLE HOUSING

DISASSEMBLY

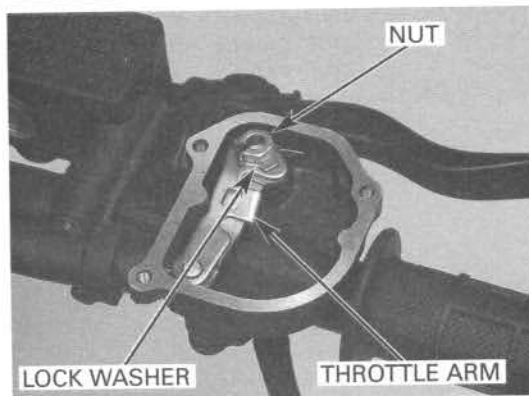
Remove the three throttle housing cover screws and the cover.
Remove the gasket.

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



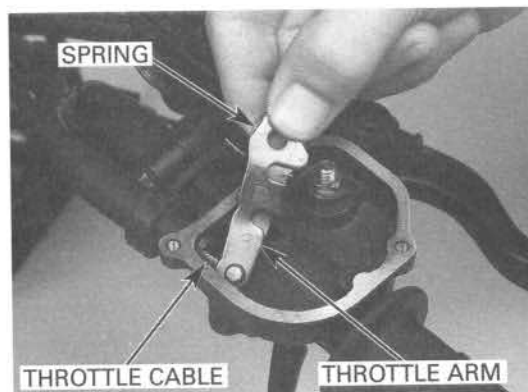
FRONT WHEEL/SUSPENSION/STEERING

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.

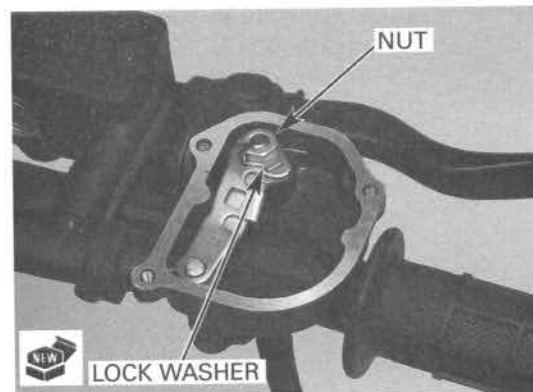


ASSEMBLY

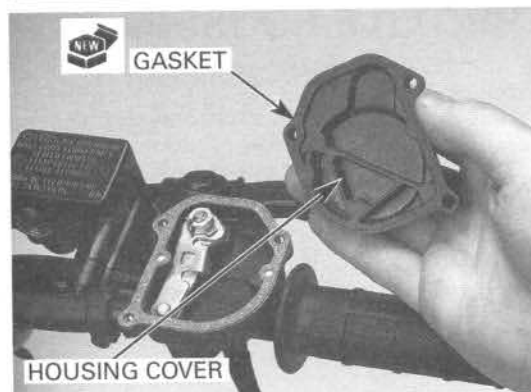
Connect the throttle cable to the throttle arm.
Install the throttle arm spring and arm onto the throttle lever by aligning the slot.



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 3-5).

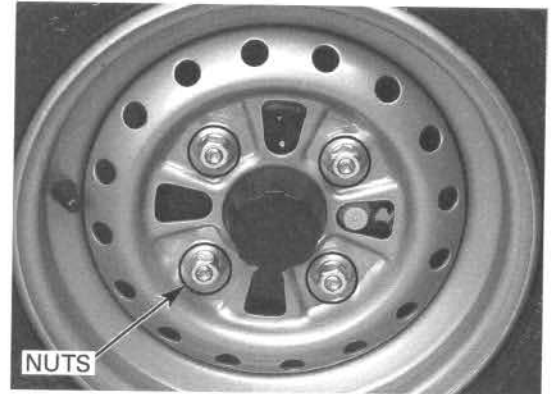


FRONT WHEEL

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

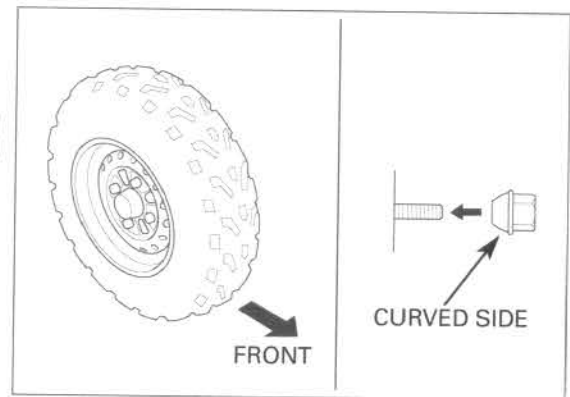
Install the front wheel.

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 ATV Bead Buster (KLS379024).
- Remove and install the tire from the rim side opposite the valve stem.

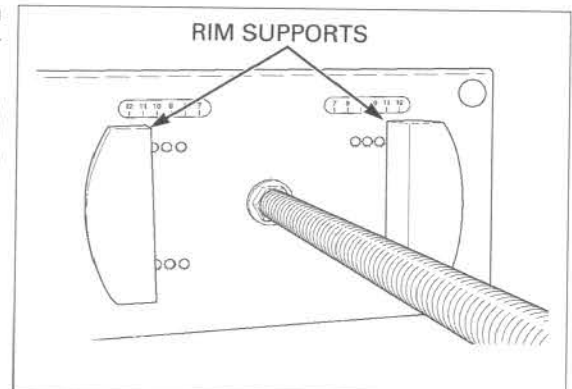
Remove the core from the valve stem.

Use a pneumatic 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.

Adjust the bottom rim supports to the proper rim size. Align the flat side of the support with the corresponding rim size indicator.

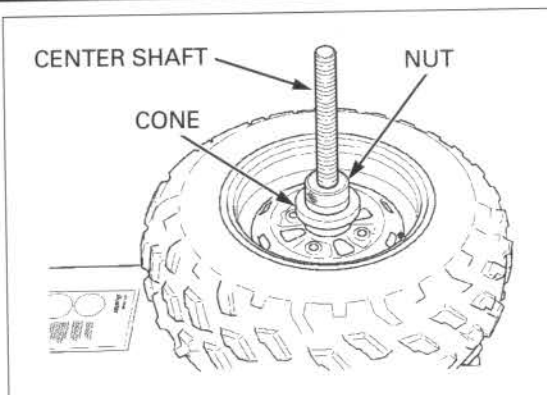
Use only water as a lubricant when removing or mounting tires. Soap or some mounting lubricants may leave a slippery residue which can cause the tire to shift on the rim and lose tire pressure during riding.

Lube the bead area of the tire with water, pressing down on the tire sidewall/bead area in several places to allow the water to run into and around the bead.

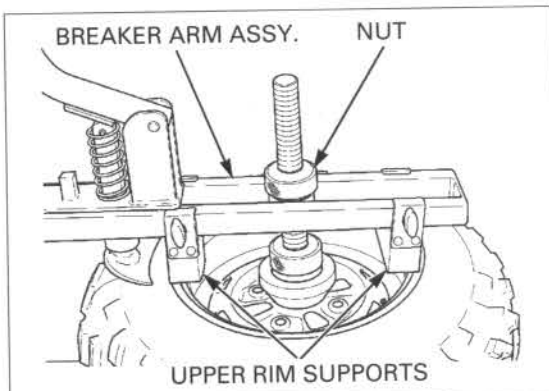


FRONT WHEEL/SUSPENSION/STEERING

Place the wheel assembly over the center shaft and use the correct size cone to keep the wheel centered during operation. Install the bottom hold down nut, bearing side down, and finger tighten it so the wheel can rotate freely during operation.

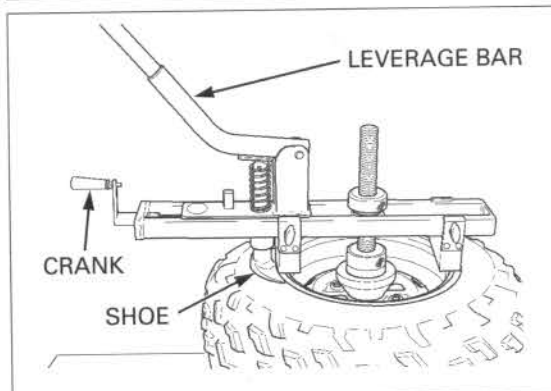


Install the breaker arm assembly over the center shaft and adjust the upper rim supports to fit the outside rim diameter. Install the top hold down nut and tighten it finger tight.



Failure to back out the breaker shoe two turns will cause the shoe to scratch the bead lock, which may cause the tire to leak.

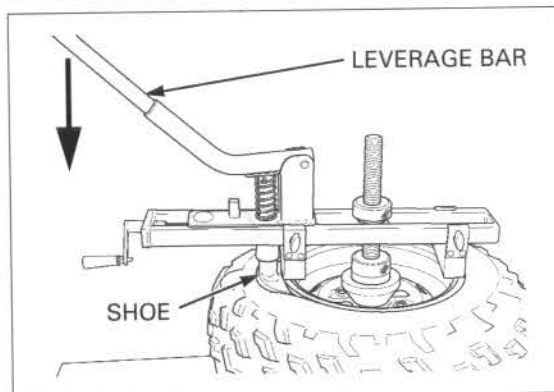
Pull the leverage bar down so the breaker shoe is just below the rim lip. Turn the crank to fully push the breaker shoe between the tire bead and rim. Once the shoe contacts the rim, back the crank out two turns to allow the shoe to clear the rim's bead lock.



Push down on the leverage bar to push the tire bead over the bead lock. Use only short strokes on the handle. While the shoe is still engaged, turn the wheel as far as it will go between strokes as you break the bead around the rim.

Remove the breaker arm assembly and flip the wheel over. Install the breaker arm assembly, adjust the shoe properly and break the other bead by following the above procedures.

Remove the tire from the rim using a tire changing machine or tire irons and rim protectors.



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.

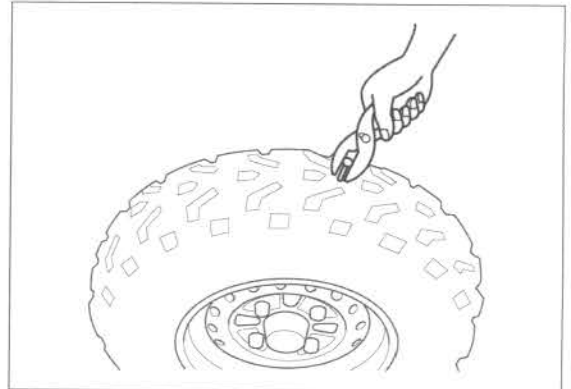
Chalk mark the punctured area and remove the puncturing object.

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.

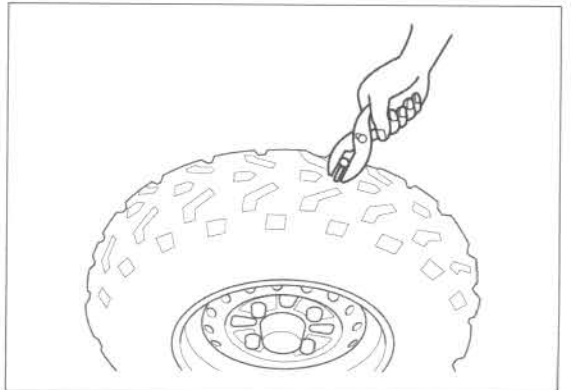


Install a rubber plug into the injury as follows:

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.

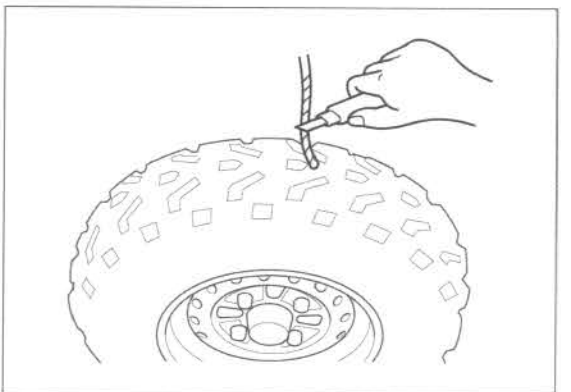
Push the inserting needle with plug into the injury until the plug is slightly above the tire.

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.

Allow the repair to dry. Drying time will vary with air temperature. Refer to the tire repair kit manufacturer's recommendations.



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

FRONT WHEEL/SUSPENSION/STEERING

Inflate the tire and test the seal by dabbing a small amount of cement around the plug. Escaping air will cause a bubble in the cement. If there is leakage, remove the tire (page 13-6) 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.

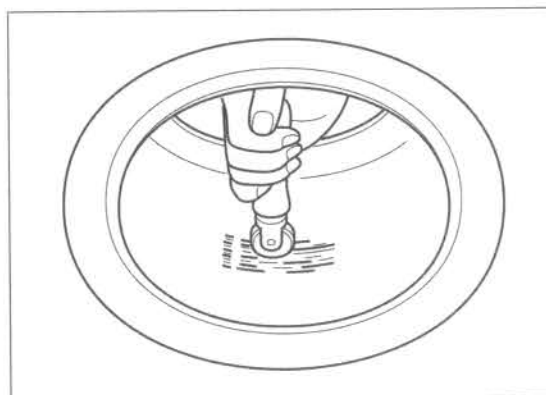
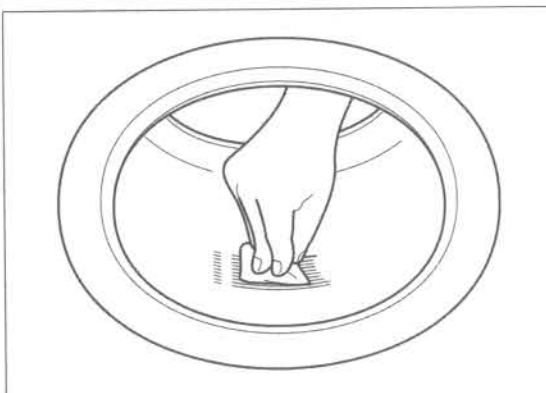
Temporarily place a rubber patch that is at least twice the size of the puncture over the injury. Make a mark around the patch, slightly larger than the patch itself.

Rough 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 until tacky.

Do not touch the cement with dirty or greasy hands. Remove the lining from the patch and center it over the injury.

Press the patch against the injury using a special roller.



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.

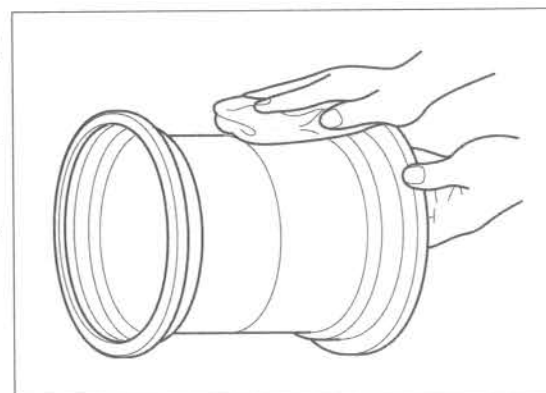
Install the valve core in the valve stem.

Install the tire with the arrow mark facing in the normal rotating direction.

Inflate the tire to seat the tire bead.

Deflate the tire. Wait 1 hour and inflate the tire to the specified pressure (page 3-22).

Check for air leaks and install the valve cap.



Use only water as a lubricant when removing or mounting tires. Soap or some mounting lubricants may leave a slippery residue which can cause the tire to shift on the rim and lose air pressure during riding.

TIE-ROD/KNUCKLE

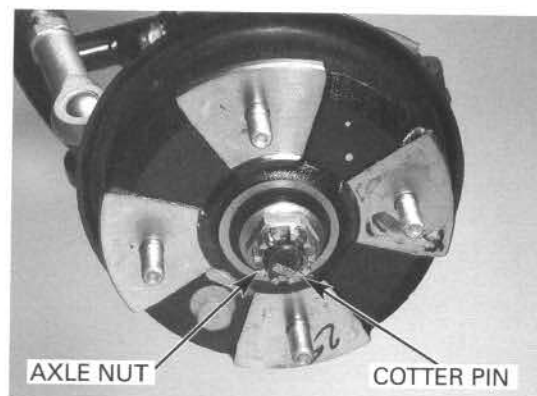
REMOVAL

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

Remove the front wheel (page 12-11).

Remove the following:

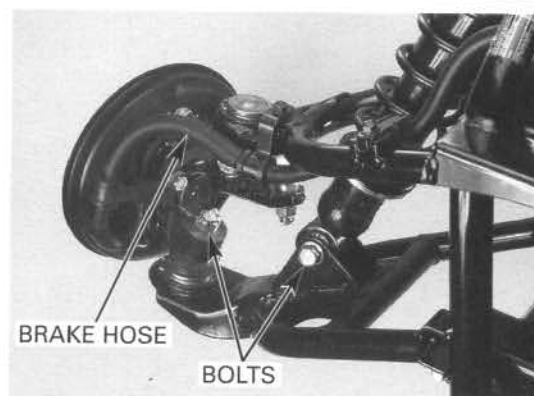
- cotter pin
- axle nut



Remove the brake drum.



Remove the brake hose guide mounting bolts.



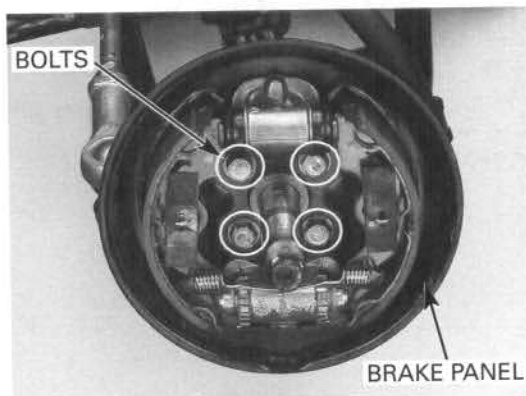
FRONT WHEEL/SUSPENSION/STEERING

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

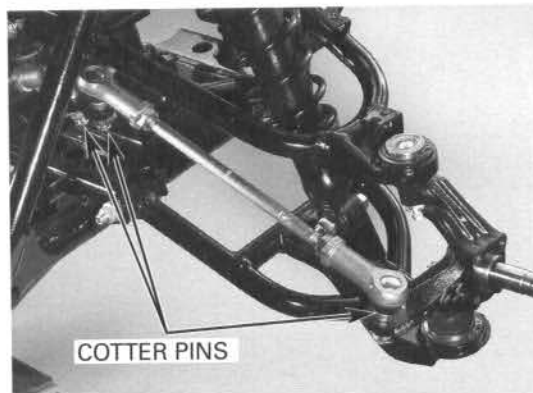
Remove the four bolts and brake panel from the knuckle.

NOTE:

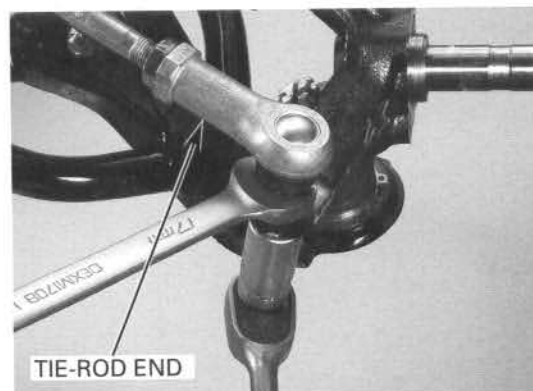
- Do not disconnect the brake hose from the brake panel. The brake system will have to be bled if the brake hose is disconnected.
- Do not operate the front brake lever after removing the brake panel. If you do it, the pistons are projected from the cylinder.



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 remover on the area shown.

TOOL:

Ball joint remover 07MAC-SL00200

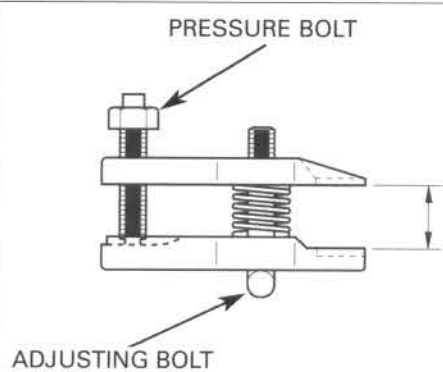
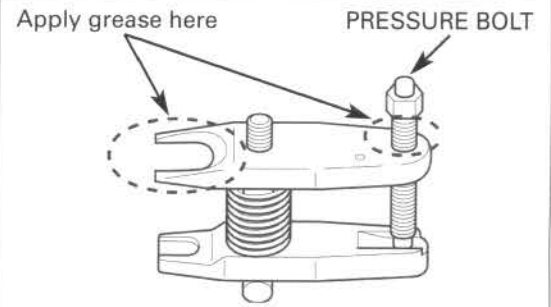
This will ease installation of the tool and prevent damage to the pressure bolt threads.

If necessary, apply penetrating type lubricant to loosen the ball joint.

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

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.

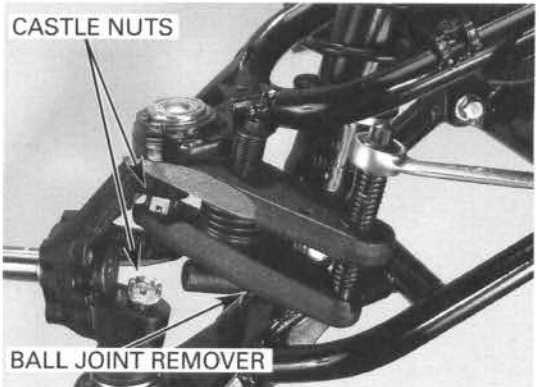


Remove the knuckle from the upper and lower arm, using the special tool according to the above instructions.

TOOL:

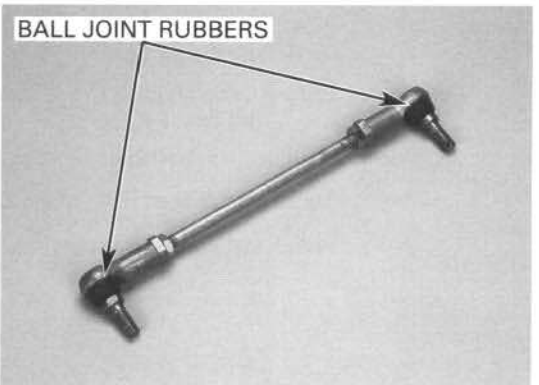
Ball joint remover, 28 mm 07MAC-SL00200

Remove the castle nuts.



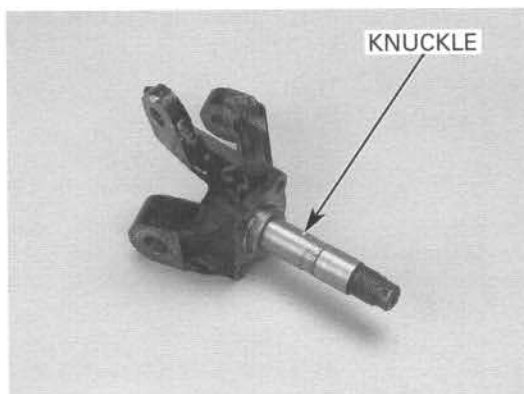
INSPECTION

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.



FRONT WHEEL/SUSPENSION/STEERING

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:

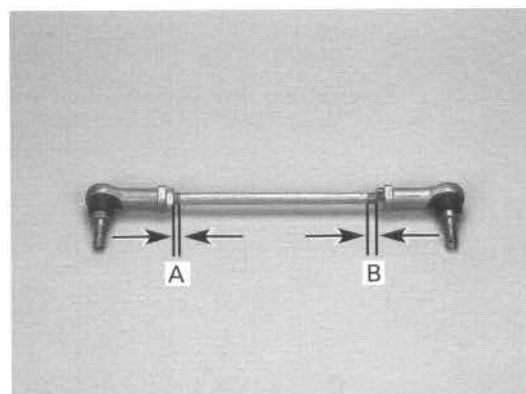
STANDARD SETTING:

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

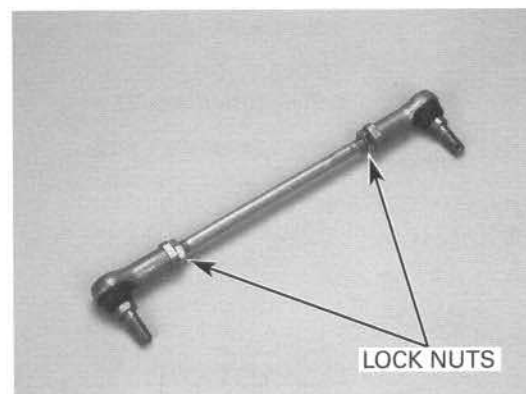
A: 5.5 mm (0.22 in)

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

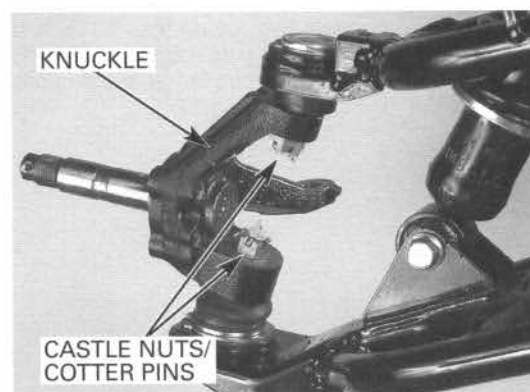
Connect the knuckle to the upper arm.
Install the castle nut.

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.

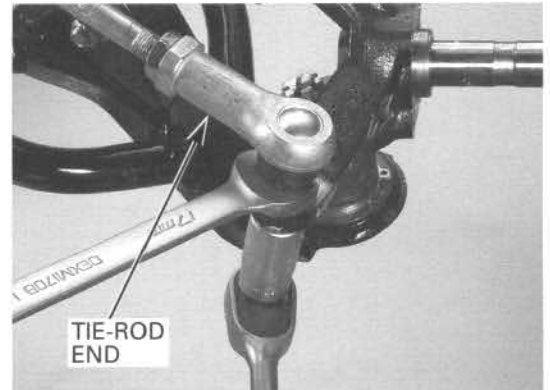


TIE-ROD INSTALLATION

Install the tie-rod with its flat end at the knuckle.

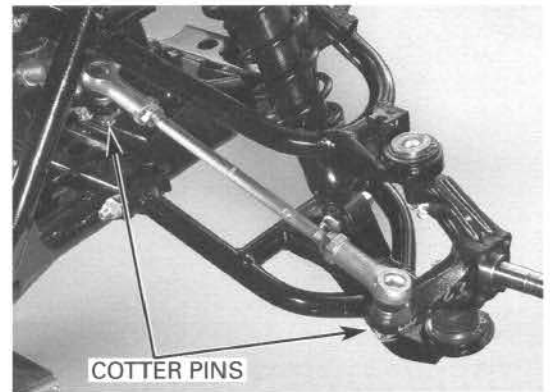
Hold the ball joint and tighten the ball joint nuts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



Install new cotter pins.

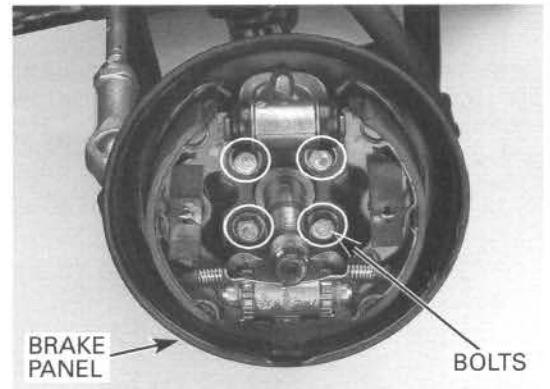
Adjust the toe (page 3-23).



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)

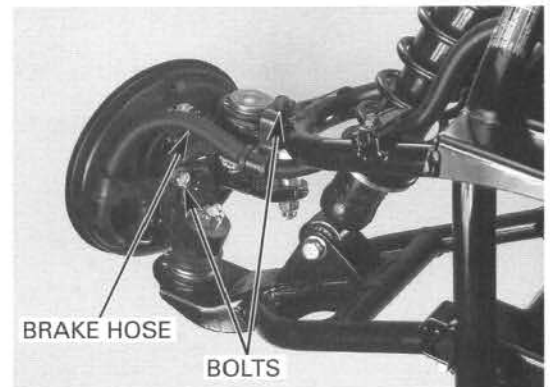


Install the brake hose clamps and tighten the bolts.

TORQUE:

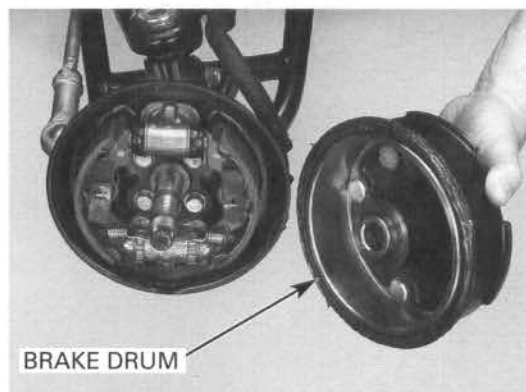
8 mm bolt: 29 N·m (3.0 kgf·m, 22 lbf·ft)

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



FRONT WHEEL/SUSPENSION/STEERING

Install the brake drum (page 14-19).



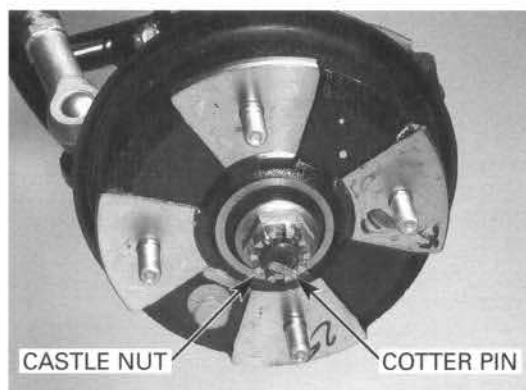
Apply grease to the castle nut flange and threads, then install the nut. Tighten the axle nut to the specified torque.

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 14-6).

Install the front wheel (page 12-11).



UPPER/LOWER ARMS

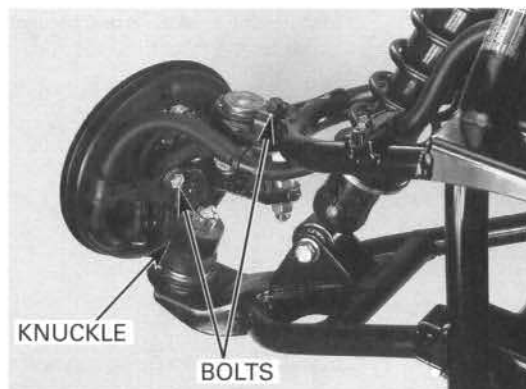
REMOVAL

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

Remove the knuckle (page 12-15).

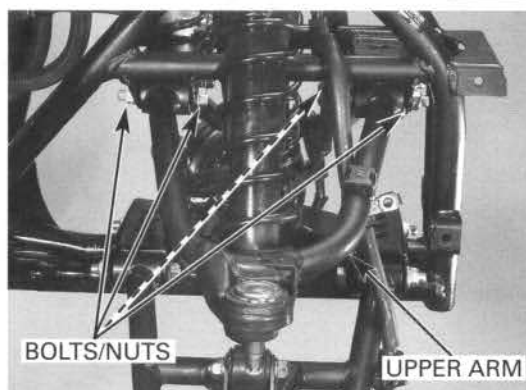
UPPER ARM

Remove the brake hose clamps.



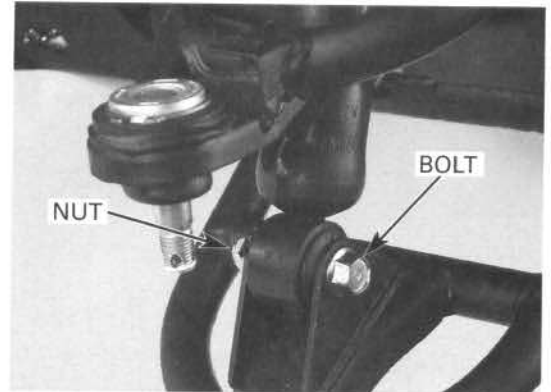
Remove the upper arm mounting bolts/nuts and arm.

Discard the upper arm mounting nuts.

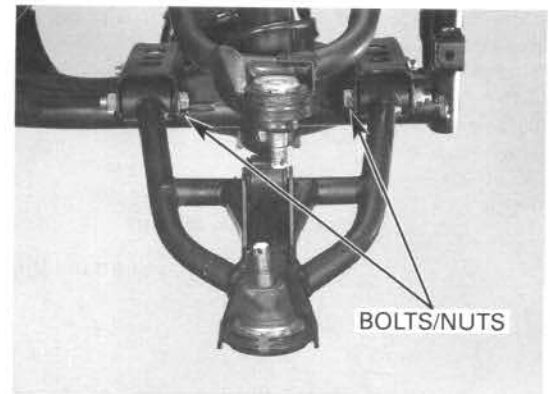


LOWER ARM

Remove the shock absorber lower mounting bolt/nut.
Discard the shock absorber lower mounting nut.

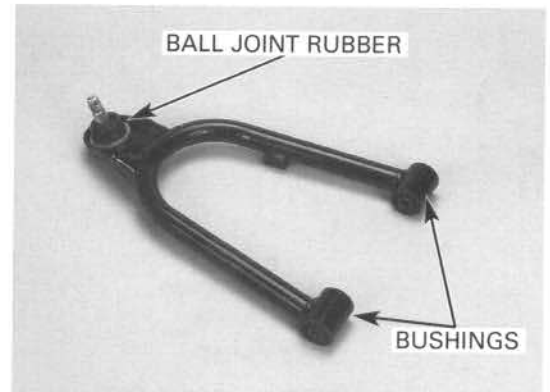


Remove the lower arm mounting bolts/nuts and arm.
Discard the lower arm mounting nuts.



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.



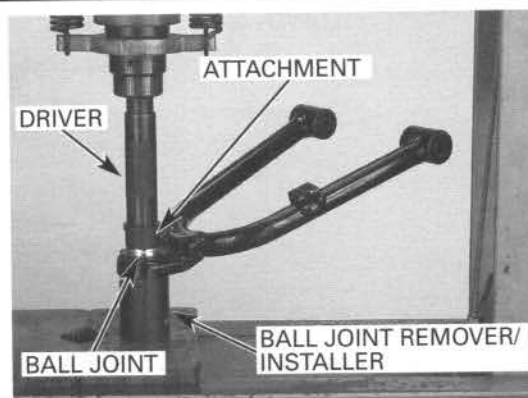
FRONT WHEEL/SUSPENSION/STEERING

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.

TOOLS:

Ball joint remover/installer	07JMF-HC50110
Attachment, 28 x 30 mm	07946-1870100
Driver	07749-0010000

Press the ball joint out of the upper arm.



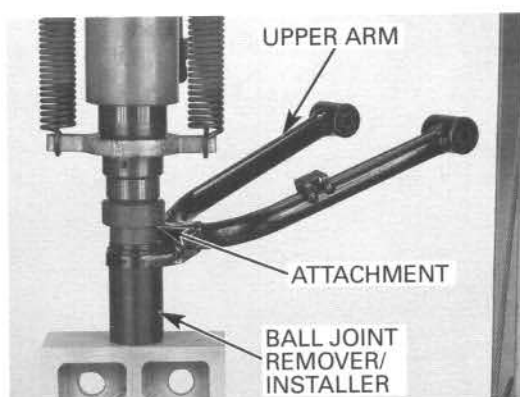
If you feel strong resistance when lowering the press, stop. Reset the attachment of the tool so that the ball joint head can go into the hollow of the attachment and try again.

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

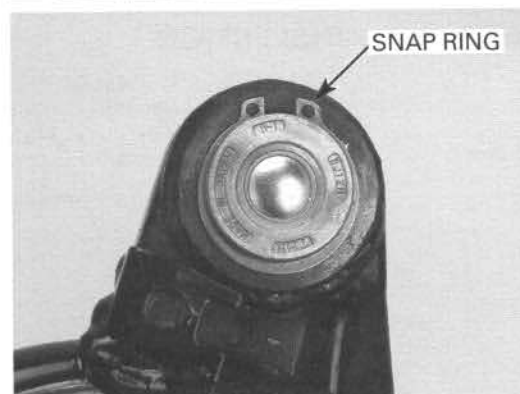
TOOLS:

Ball joint remover/installer	07974-6790000 (Not available in U.S.A.) 07JFM-HC50110 (U.S.A. only)
Attachment, 35 mm	07746-0030400

Press the ball joint into the upper arm.

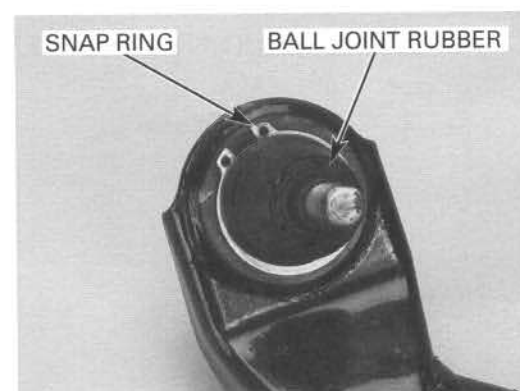


Install the snap ring to the groove of the ball joint securely.



LOWER ARM

Remove the snap ring.
Cut and remove the ball joint rubber.

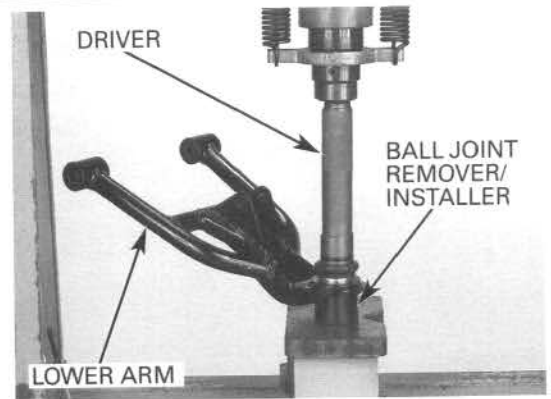


Set the lower arm and special tools, with the "A" marked side on the tool faced to the ball joint, in a press as shown.

TOOLS:

Ball joint remover/installer 07965-SB00300
(Not available in U.S.A.) or
07JAF-SH20200
Driver, 22 mm I.D. 07746-0020100

Press the ball joint out of the lower arm.



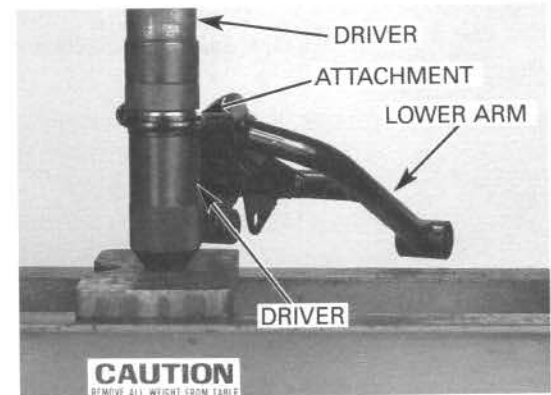
If you feel strong resistance when lowering the press, stop. Reset the attachment of the tool so that the ball joint head can go into the hollow of the attachment and try again.

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

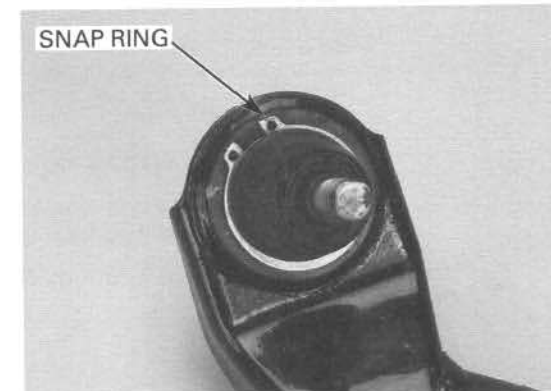
TOOLS:

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.



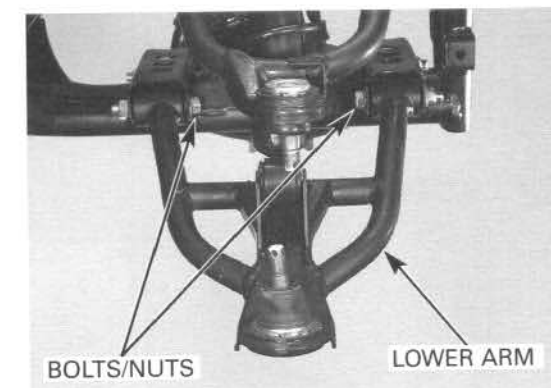
Install the snap ring to the groove of the ball joint securely.



INSTALLATION

LOWER ARM

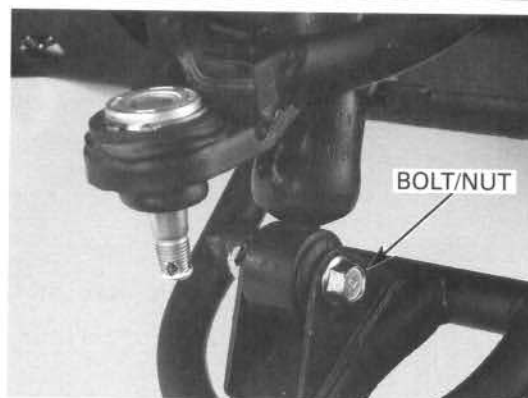
Install the lower arm, bolts and new nuts.



FRONT WHEEL/SUSPENSION/STEERING

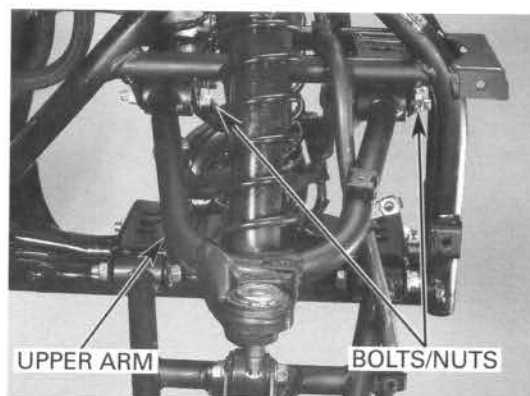
Install the shock absorber lower mounting bolt and new nut, then tighten it to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



UPPER ARM

Install the upper arm, bolts and new nuts.

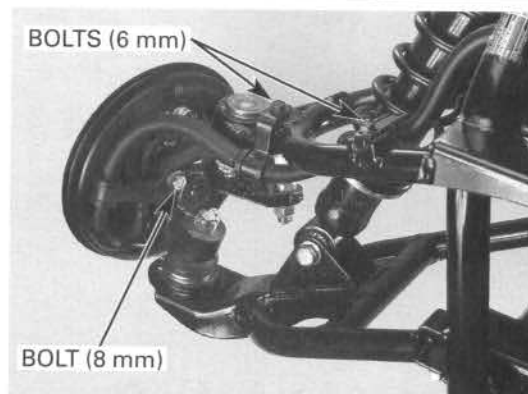


Install the knuckle (page 12-18).
Install the brake hose clamps.
Tighten the clamp bolt (6 mm) to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

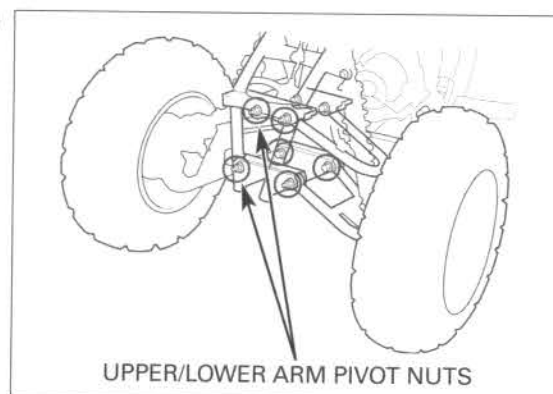
Install the brake hose clamp and tighten the bolt (8 mm) to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)



Install the front wheel (page 12-11), 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)



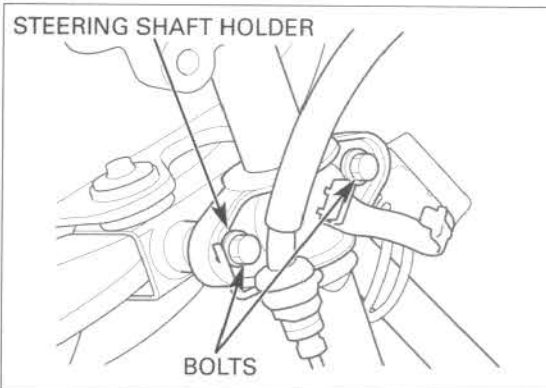
STEERING SHAFT

REMOVAL

Remove the front fender (page 2-8).
Remove the handlebar lower holder nuts, washers and handlebar assembly.
Discard the handlebar lower holder nuts.

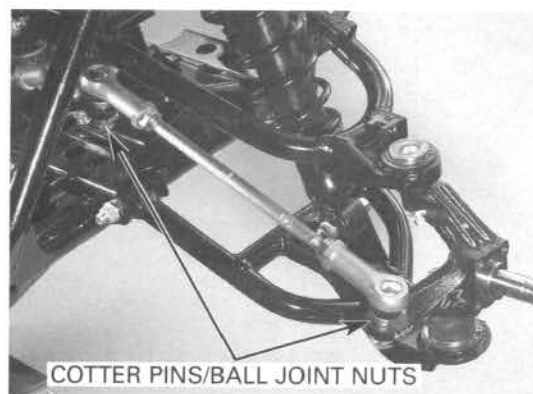


Remove the steering shaft holder bolts and holder.

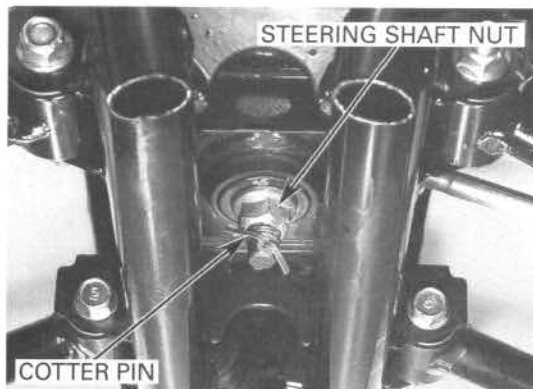


Remove the following:

- cotter pins
- tie-rod ball joint nuts
- tie-rod

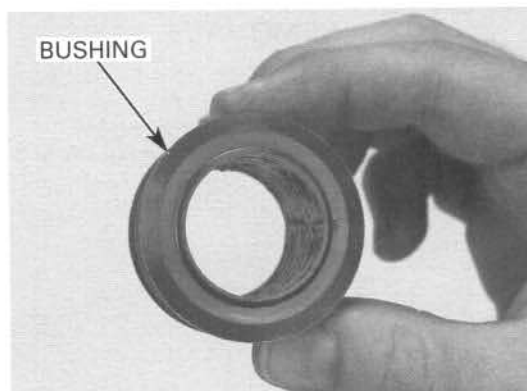


Remove the cotter pin and steering shaft U-nut.
Remove the steering shaft.

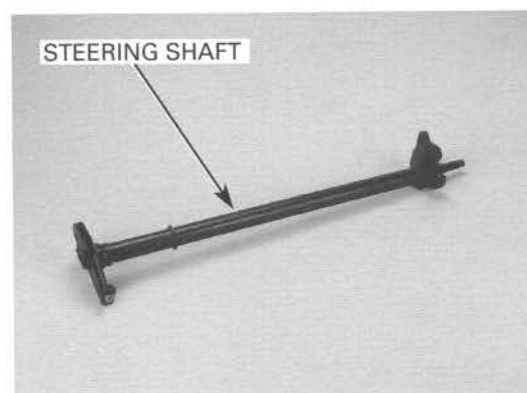


INSPECTION

Check the steering shaft bushing for wear or damage.



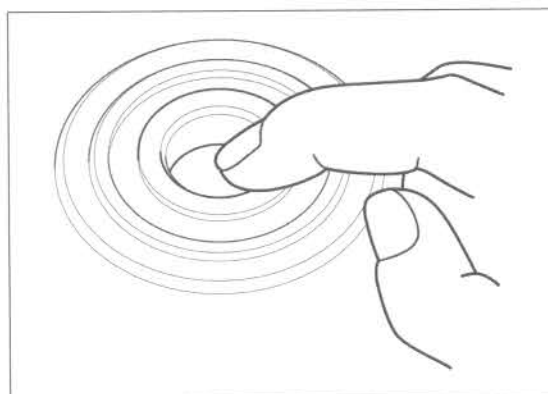
Check the steering shaft for distortion or damage.



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 and quietly or if it fits loosely in the frame.



BEARING REPLACEMENT

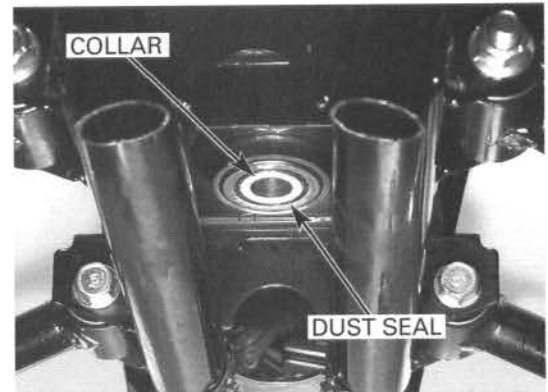
Remove the dust seal.



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 x 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 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400



FRONT WHEEL/SUSPENSION/STEERING

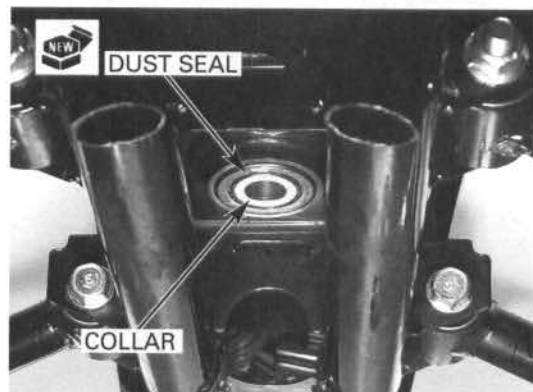
Install the snap ring in the groove securely.



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

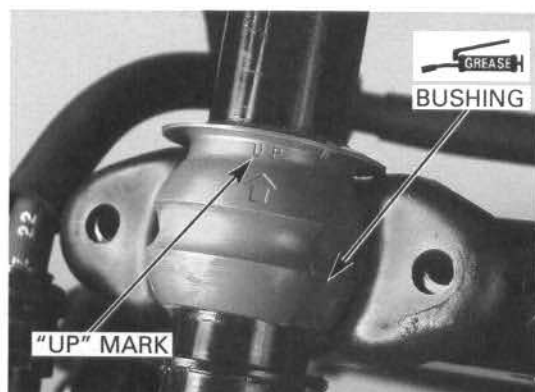


Apply grease to new dust seal.
Install the dust seal and collar.



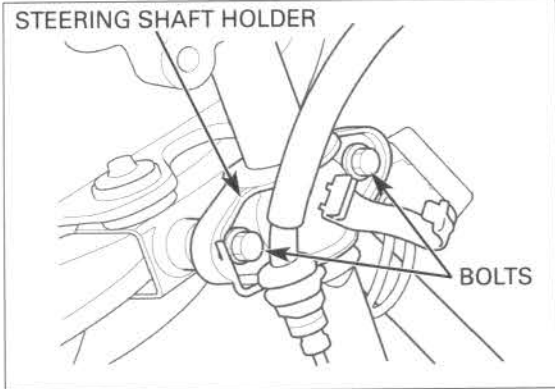
INSTALLATION

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



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

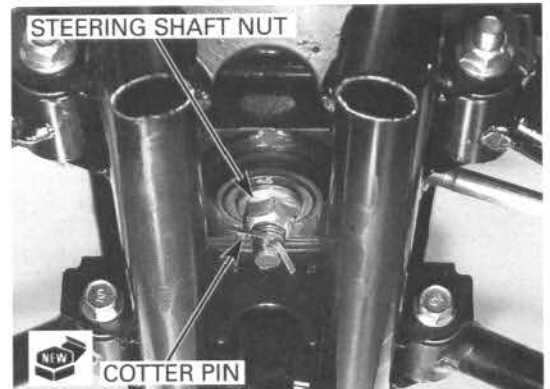
TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



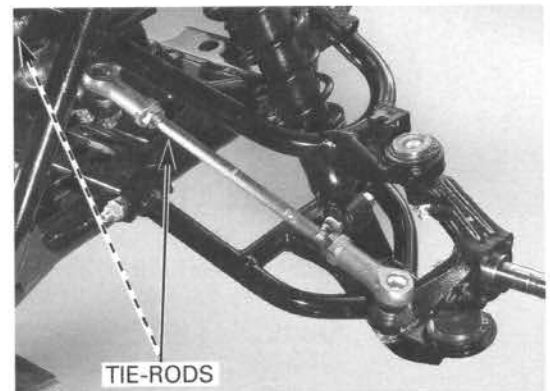
Apply grease to the flange and threads of the steering shaft nut.
Install the steering shaft and tighten the steering shaft nut to the specified torque.

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

Install a new cotter pin.



Install the tie-rods on the steering shaft (page 12-19).



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 3-23).

Install the front fender (page 2-8).



FRONT SHOCK ABSORBER

REMOVAL

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

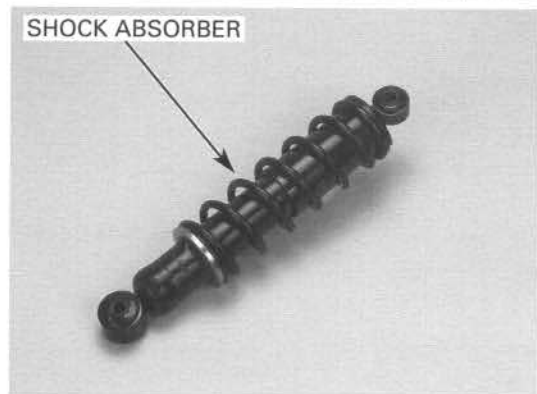
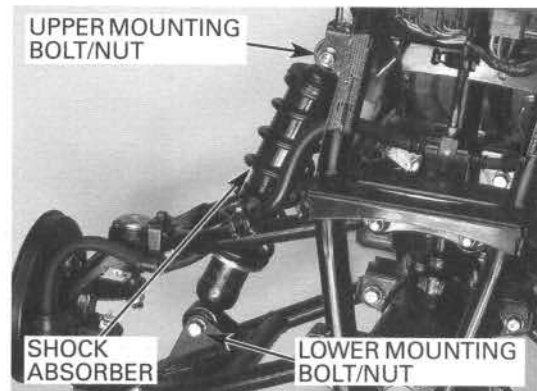
Remove the following:

- 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.

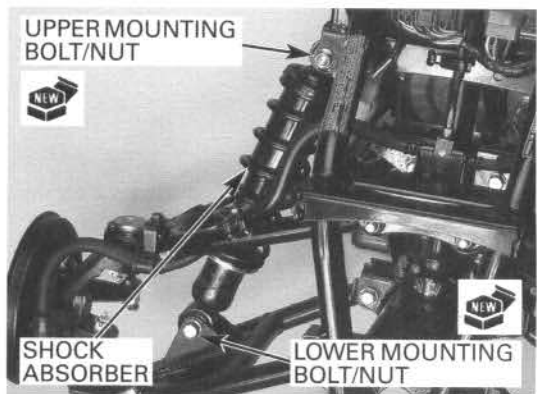


INSTALLATION

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

TORQUE:

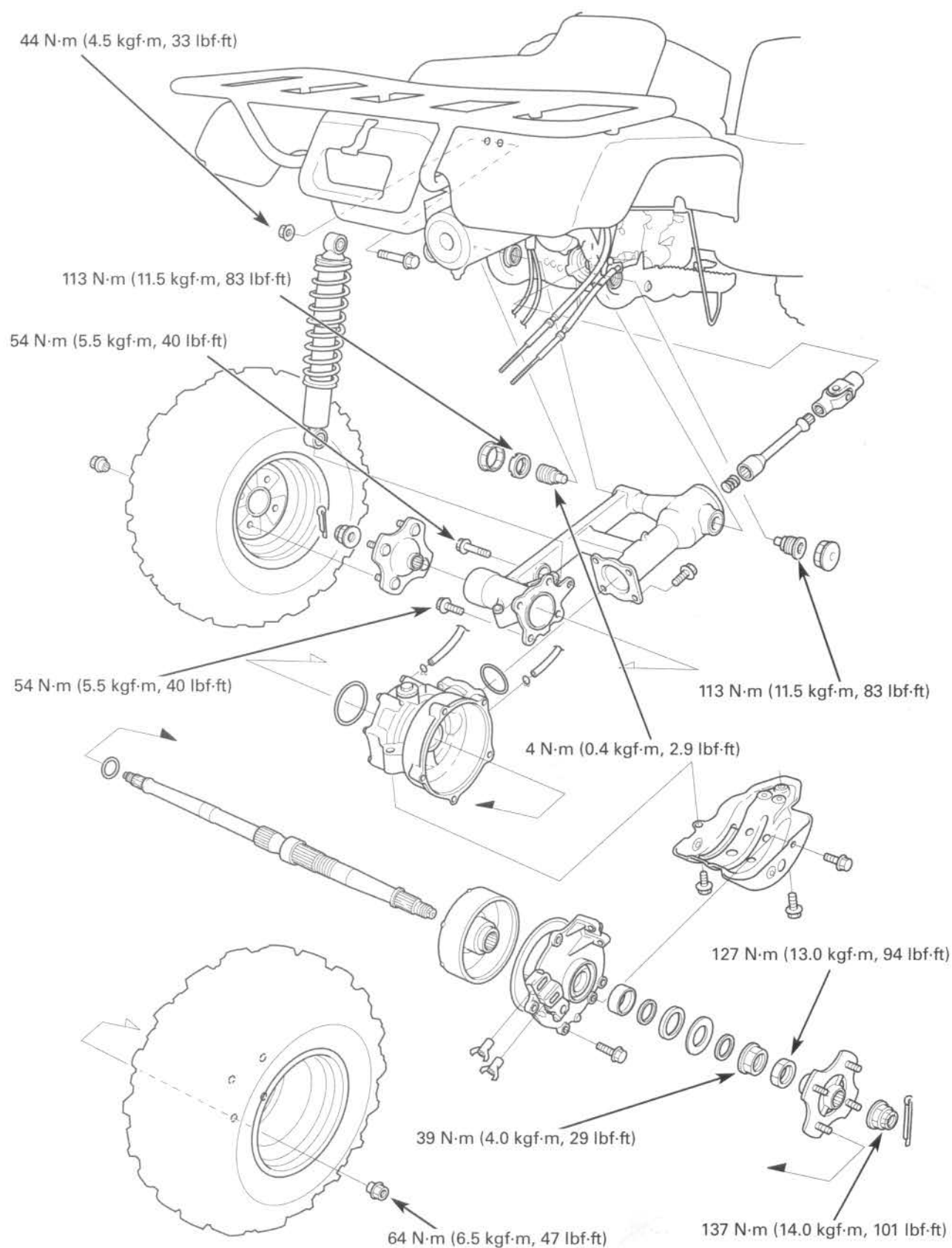
Upper:	30 N·m (3.1 kgf·m, 22 lbf·ft)
Lower:	49 N·m (5.0 kgf·m, 36 lbf·ft)



13. REAR WHEEL/SUSPENSION

COMPONENT LOCATION	13-2	REAR WHEEL AND HUB	13-6
SERVICE INFORMATION	13-3	REAR SHOCK ABSORBER	13-8
TROUBLESHOOTING	13-5	SWINGARM	13-9

REAR WHEEL/SUSPENSION COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

- 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)

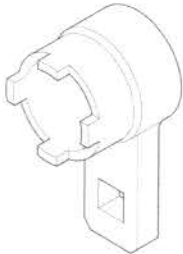
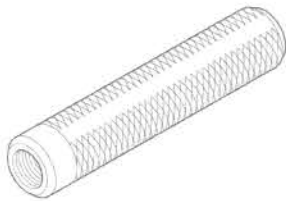

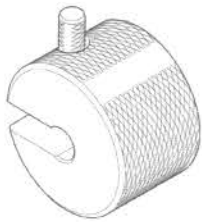
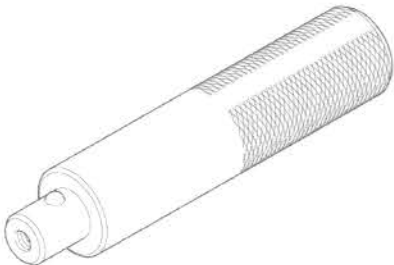





ITEM		SPECIFICATIONS	SERVICE LIMIT
Minimum tire tread depth		—	4 (0.2)
Cold tire pressure	Standard	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—
	Minimum	17 kPa (0.17 kgf/cm ² , 2.5 psi)	—
	Maximum	23 kPa (0.23 kgf/cm ² , 3.3 psi)	—
	With cargo	20 kPa (0.20 kgf/cm ² , 2.9 psi)	—

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)	

REAR WHEEL/SUSPENSION

TOOLS

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

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

Stiff suspension

- Bent shock absorber
- Improperly tightened swingarm pivot
- Faulty pivot bearing

Suspension noise

- Rear shock absorber damper binding
- Loose fasteners

REAR WHEEL AND HUB

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 12-11.



WHEEL INSTALLATION

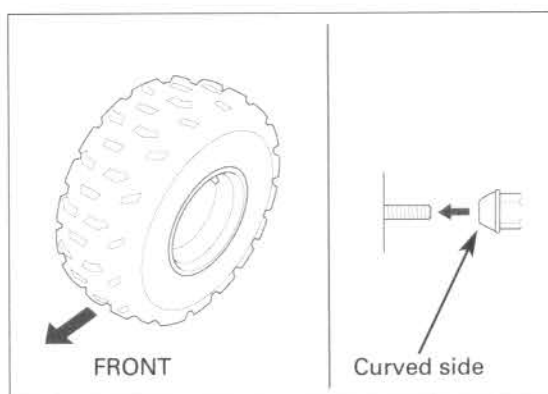
Install the rear wheel with the tire valve facing out so that the tires show a "V" pattern when viewed from front.

NOTE:

- Do not interchange the right and left tires.

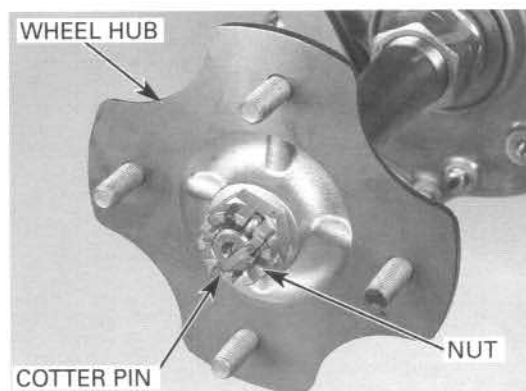
Install the wheel nuts with the curved (tapered) sides facing inward and tighten to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



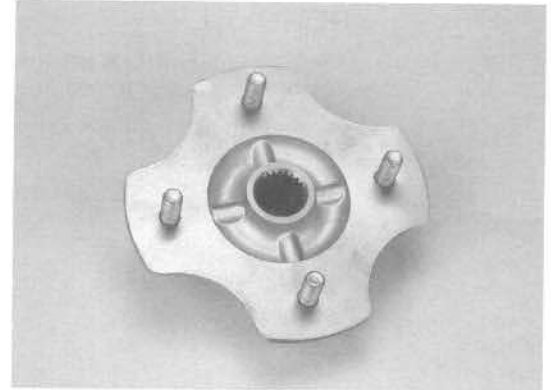
HUB REMOVAL

- Remove the following:
- rear wheel (see above)
 - cotter pin
 - rear wheel hub nut
 - rear wheel hub



WHEEL HUB INSPECTION

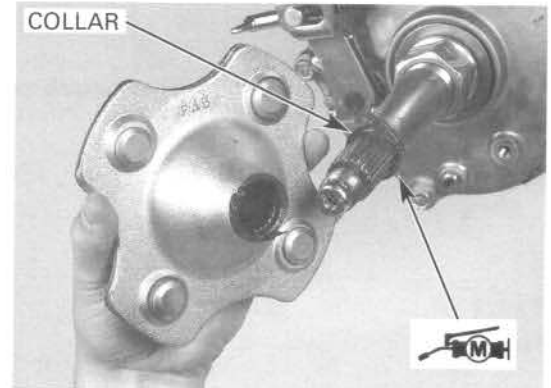
Check the rear wheel hub splines for wear or damage.



HUB INSTALLATION

Apply molybdenum disulfide grease to 15 mm (0.6 in) width from axle shaft spline end (out side), so the spline groove is filled with grease.

Install the collar.

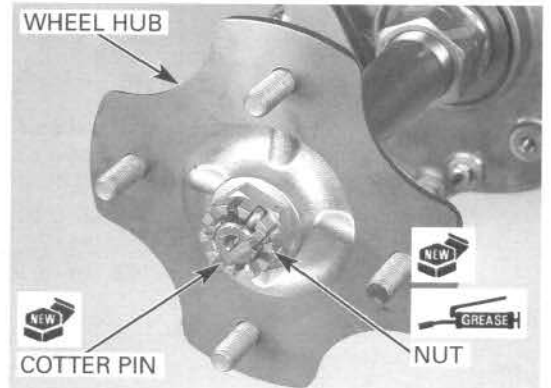


Apply grease to the new rear wheel hub nut threads and setting surfaces. Install the rear wheel hub and hub nut onto the axle. Tighten the hub nut to the specified torque and further tighten it until its grooves align with the cotter pin hole.

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)

Install new cotter pin.

Install the rear wheel (see previous page).

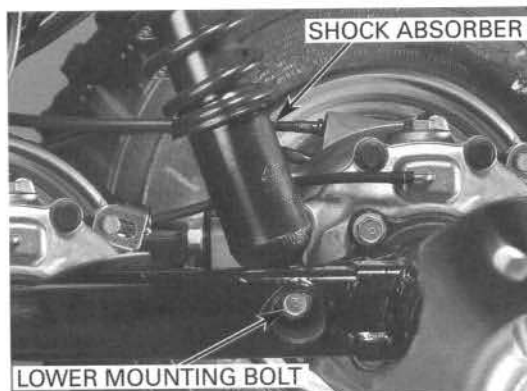


REAR SHOCK ABSORBER

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.

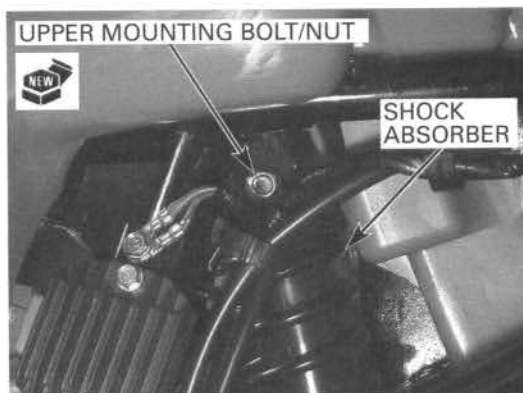


INSTALLATION

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.

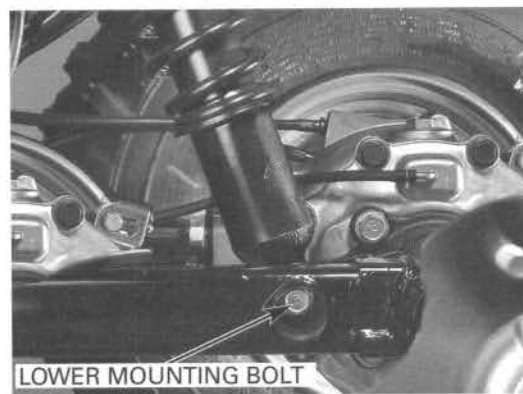
Do not reuse the nut.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



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

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



SWINGARM

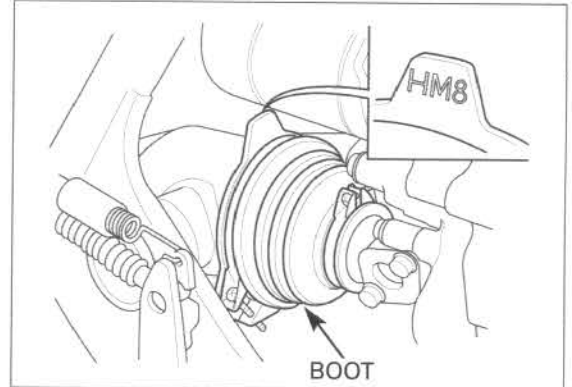
REMOVAL

Remove the following:

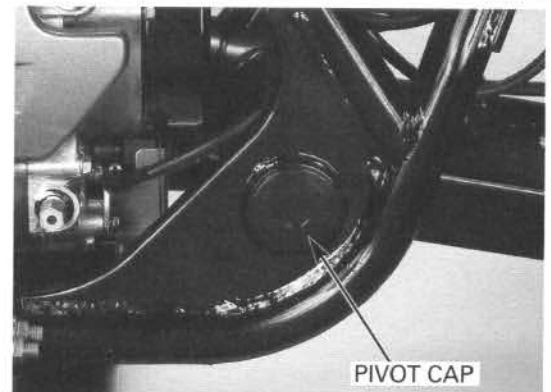
- rear wheels (page 13-6)
- rear brake (page 14-19)
- axle shaft, axle housings and final drive (Section 15)

Remove the screws and retaining clips and center mudguards (page 2-10).

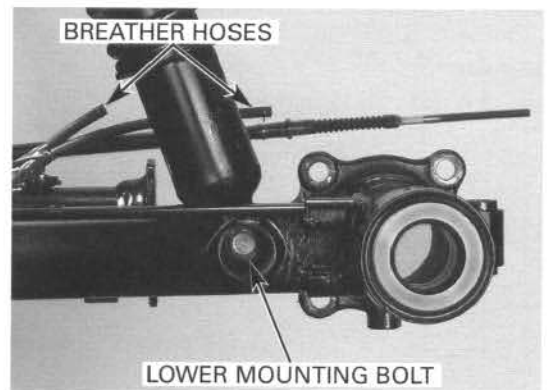
Loosen the swingarm boot band screw.



Remove the swingarm pivot cap (each side).

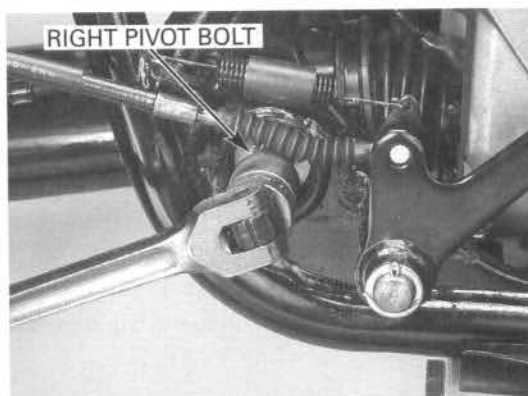


Release the breather hoses from the swingarm clamps.
Remove the rear shock absorber lower mounting bolt.



REAR WHEEL/SUSPENSION

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



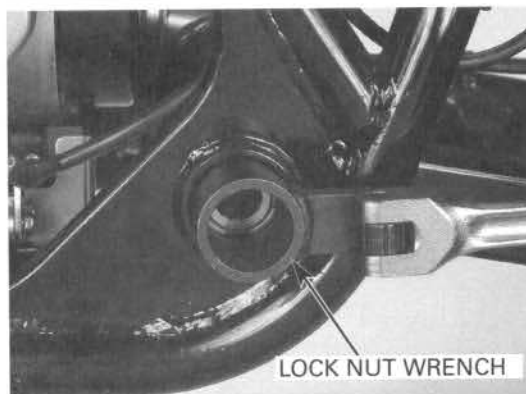
Remove the left pivot lock nut using the special tool as shown.

TOOL:

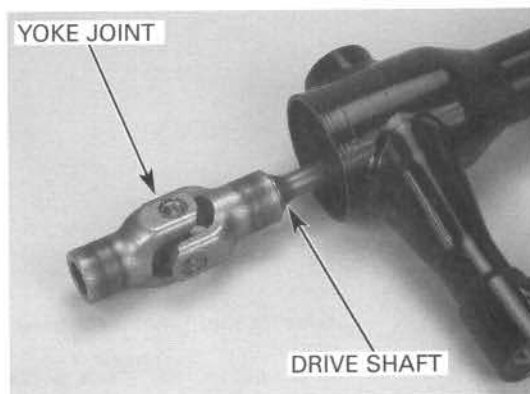
Swingarm lock nut wrench 07908-4690003

Remove the left pivot bolt using a commercially available tool.

Remove the swingarm from the frame.

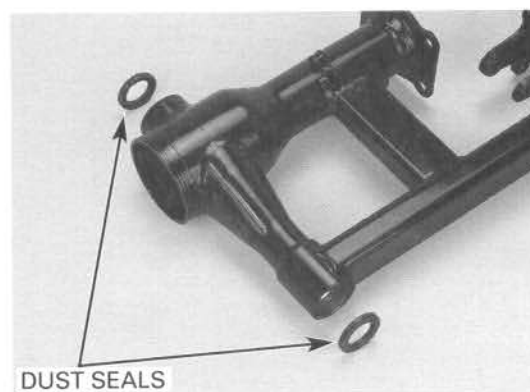


Remove the yoke joint/drive shaft from the swingarm.

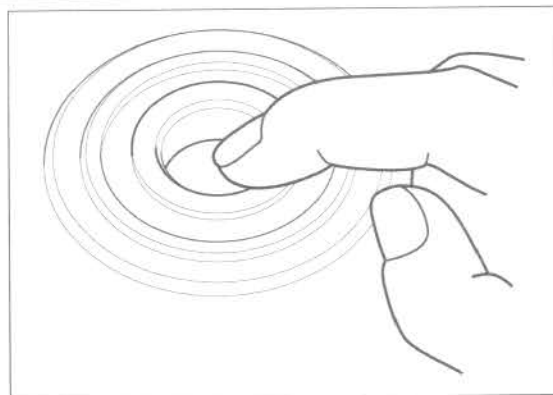


INSPECTION

Remove the dust seals from the swingarm.
Check the dust seals for wear or damage.



Turn the inner race of each pivot bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the outer race fits tightly in the swingarm pivot.
Replace them if necessary (see below).



PIVOT BEARING/REAR AXLE BEARING REPLACEMENT

PIVOT BEARING

Remove the swingarm pivot bearing using the special tool.

TOOLS:

Remover handle
Bearing remover, 17 mm

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

Remover weight

Remove the grease holder.

Replace the grease holder if it is damaged.

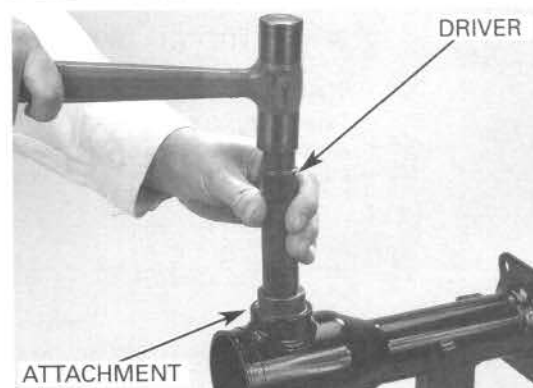
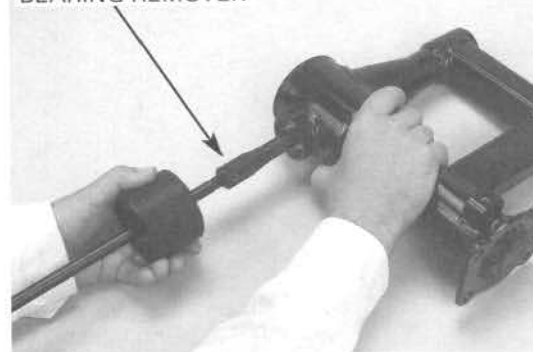
Install the grease holder in the swingarm pivot.
Install new pivot bearings using the special tools.

TOOLS:

Driver
Attachment, 37 x 40 mm
Pilot, 17 mm

07749-0010000
07746-0010200
07746-0040400

BEARING REMOVER



REAR AXLE BEARING

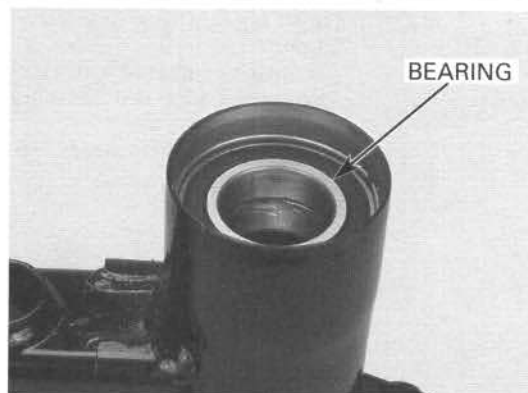
Inspect the left final drive housing oil seal for damage.



REAR WHEEL/SUSPENSION

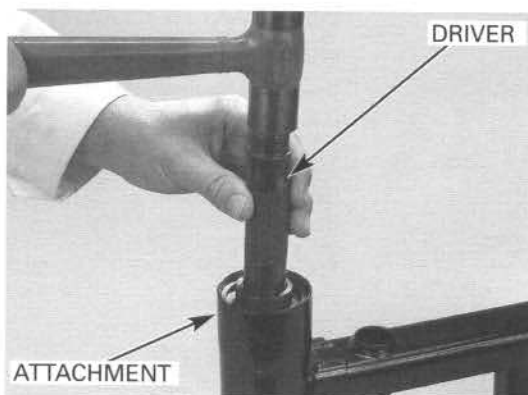
Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the outer race fits tightly in the housing. Remove and discard the bearing if the races do not turn smoothly and quietly, or if they fit loosely in the housing.

Replace the oil seal and bearing stopper ring if necessary.



BEARING REPLACEMENT

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

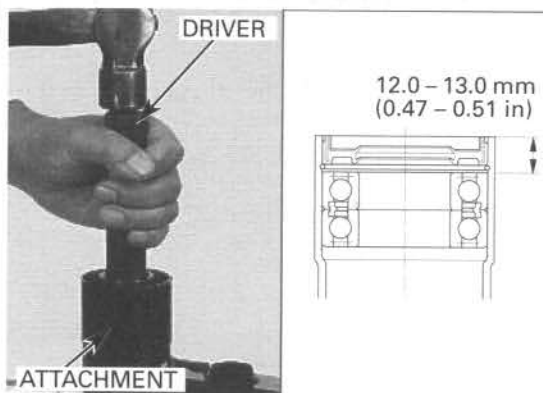


Drive the bearing into the housing with its sealed end facing in using the special tools to the specified depth. Use the flat side of the attachment.

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

TOOLS:

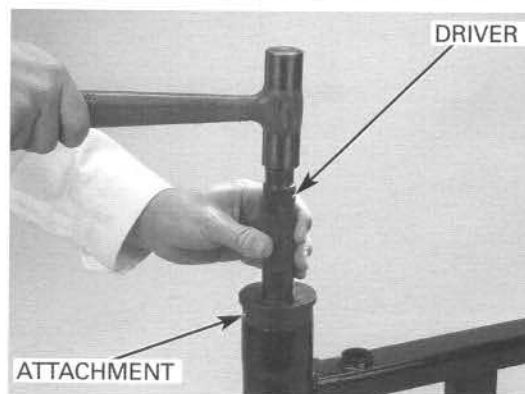
Driver	07749-0010000
Attachment, 57 mm	07947-SD90101
Pilot, 32 x 35 mm	07MAD-PR90200



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

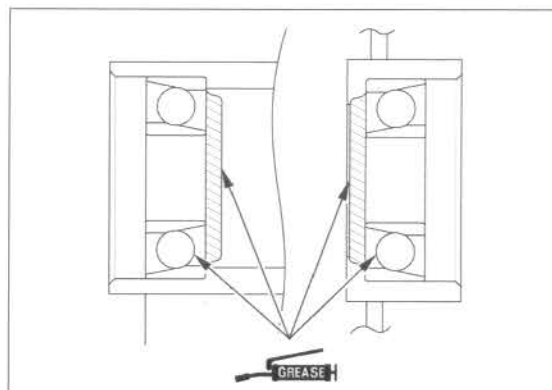
TOOLS:

Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500
Pilot, 32 x 50 mm	07MAD-PR90200

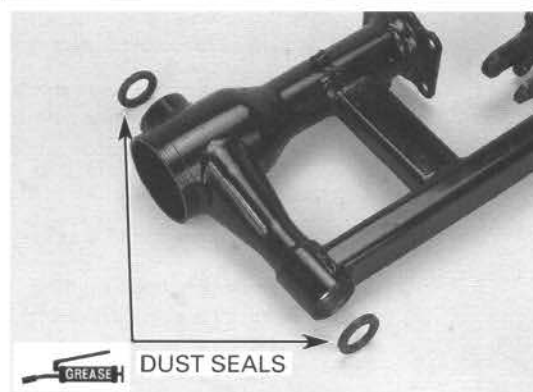


INSTALLATION

Pack the grease holders and bearing cavities with grease.

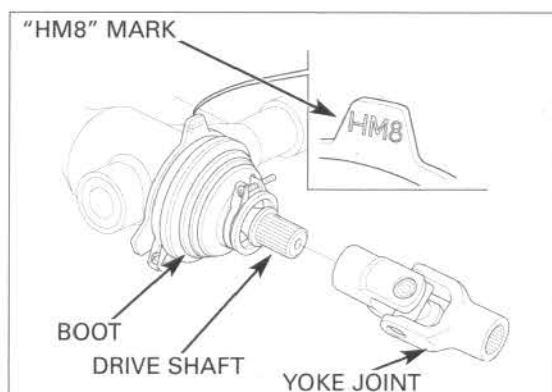


Apply grease to the dust seal lips, and install the dust seals in the swingarm.

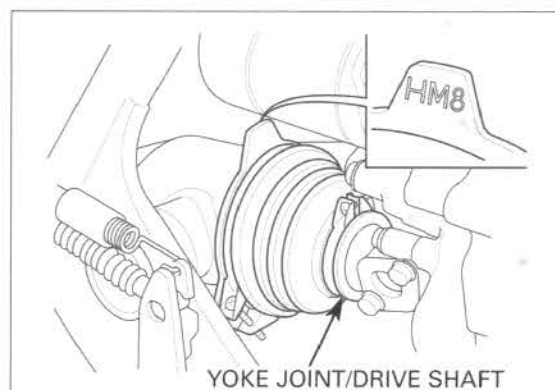


Install the swingarm boot securely with its "HM8" marked tab facing up.

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



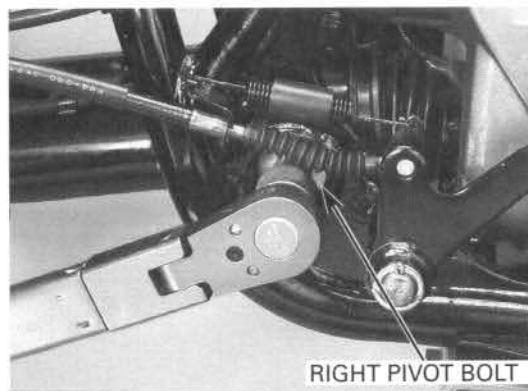
Position the swingarm in the frame by aligning the spline between the final drive shaft and yoke joint.



REAR WHEEL/SUSPENSION

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)

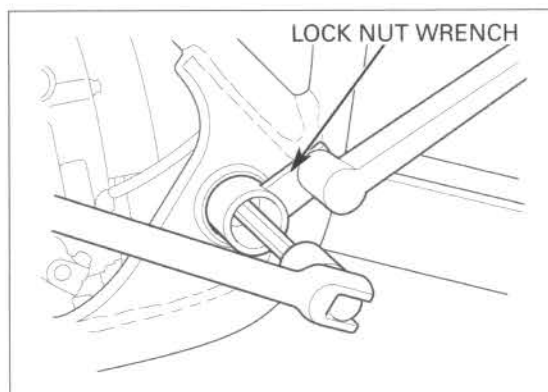
Move the swingarm up and down several times. Retighten the left pivot bolt to the specified torque (see above).

Tighten the right pivot lock nut while holding the pivot bolt using the special tool as shown.

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

Torque wrench scale reading:

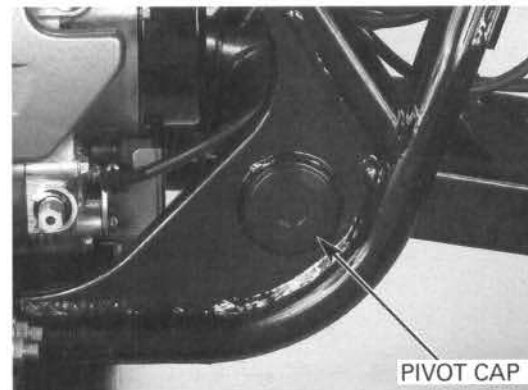
103 N·m (10.5 kgf·m, 76 lbf·ft), using a 50 cm (20 in) long torque wrench



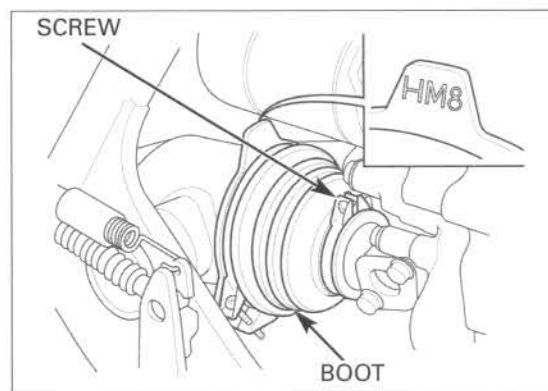
TOOL:

Swingarm lock nut wrench 07908-4690003

Install the swingarm pivot caps.



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



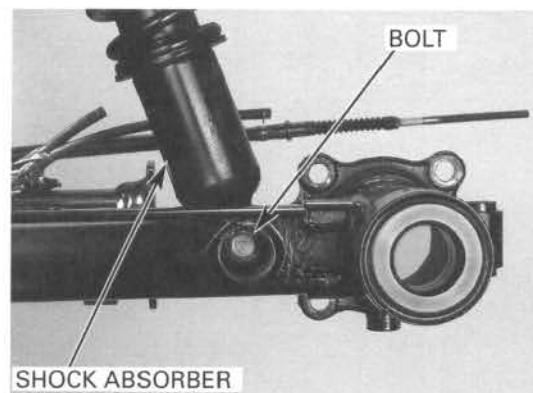
Tighten the rear shock absorber lower mounting bolt to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

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

Install the following:

- final drive, axle housings and axle (page 15-21)
- rear brake (page 14-24)
- rear wheels (page 13-6)

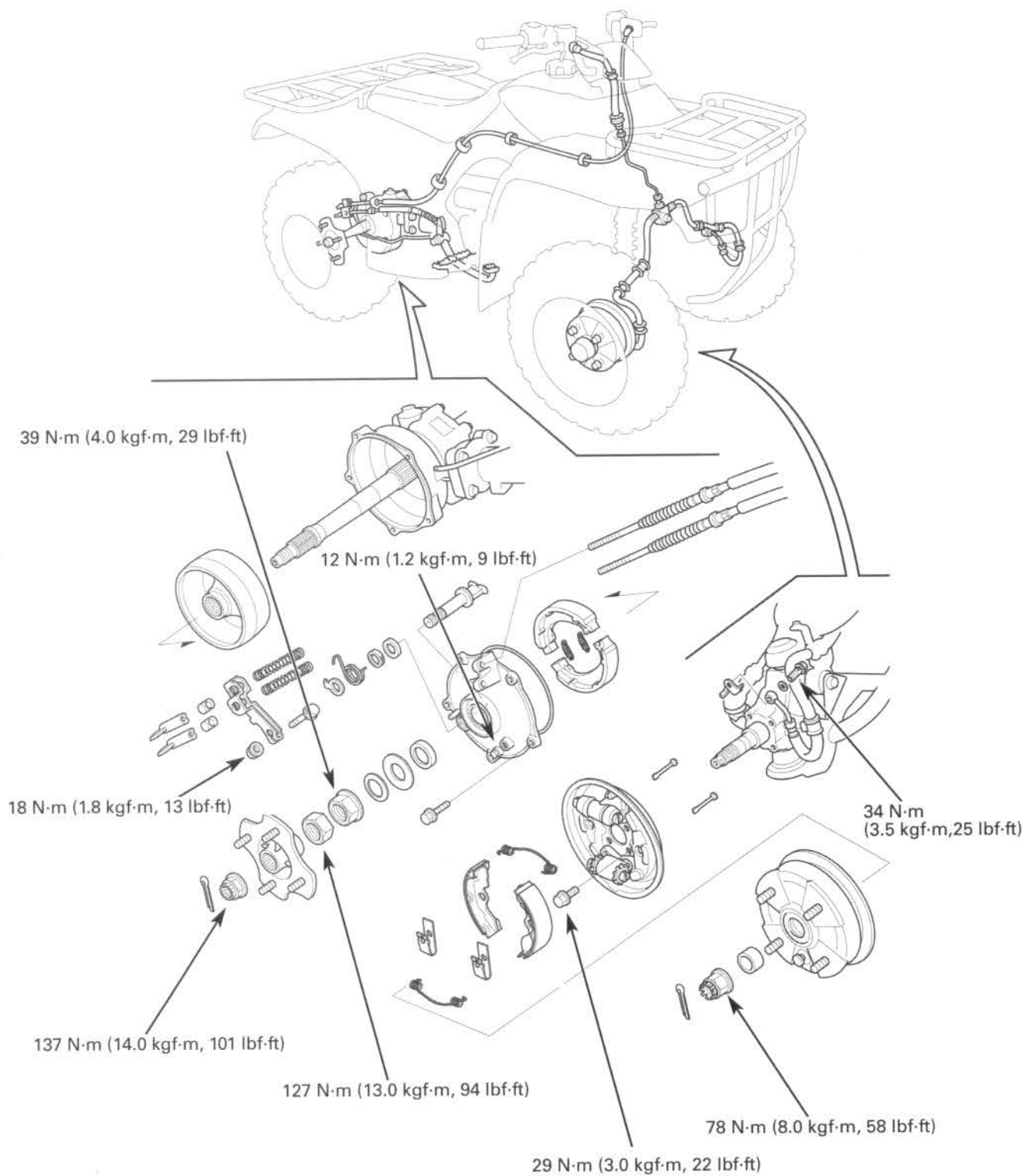


MEMO

14. BRAKE SYSTEM

COMPONENT LOCATION	14-2	MASTER CYLINDER	14-8
SERVICE INFORMATION	14-3	BRAKE SHOES/WHEEL CYLINDER/ ADJUSTER	14-12
TROUBLESHOOTING	14-5	REAR BRAKE	14-19
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	14-6	BRAKE PEDAL	14-29

COMPONENT LOCATION



SERVICE INFORMATION

GENERAL

⚠ CAUTION

Frequent inhalation of brake lining dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.
- A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.
- This section covers maintenance of the front hydraulic brake and rear drum brake systems.
- A jack or other support is required to support the vehicle.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoir.
- Always use fresh DOT 3 or 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check the brake operation before riding the vehicle.
- Apply multipurpose grease (NLGI No. 3) to the front brake waterproof seal lip.

SPECIFICATIONS

Unit: mm (in)

	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

TORQUE VALUES

Rear brake arm pinch bolt/nut	12 N·m (1.2 kgf·m, 9 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)	
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.

Apply oil to threads and flange surface.

Castle nut

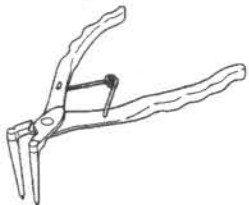
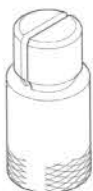
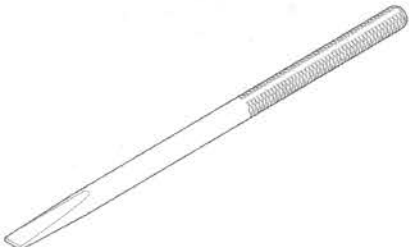
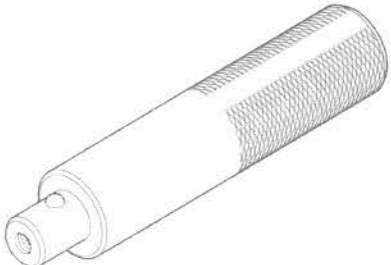


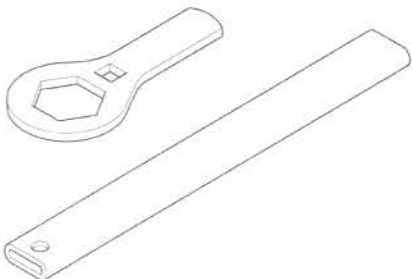
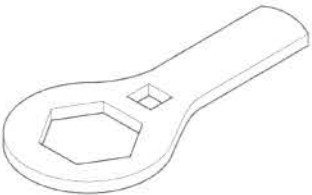
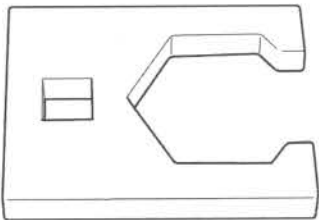
Castle nut

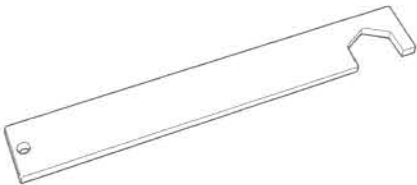

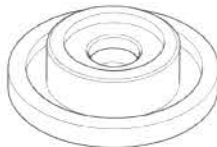

Apply a locking agent to the threads.

Apply a locking agent to the threads.

BRAKE SYSTEM

TOOLS

<p>Snap ring pliers 07914-3230001</p> 	<p>Bearing remover head, 20 mm 07746-0050600</p> 	<p>Remover shaft 07746-0050100</p> 
<p>Driver 07749-0010000</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Lock nut wrench set 07916-9580300</p>  <p>(Not available in U.S.A.)</p>	<p>Lock nut wrench, 41 mm 07916-9580400</p>  <p>(Not available in U.S.A.)</p>	<p>Axle nut torque wr. adapter, 41 mm 07916-958010B (U.S.A. only)</p>  <p>or 07916-958010A</p>

<p>Axle nut holder wrench, 41 mm 07916-958020B (U.S.A. only)</p>  <p>or 079160-958020A</p>	<p>Oil seal driver 07JAD-PH80101</p> 	<p>Oil seal driver 07947-SD90101</p> 
<p>Pilot, 32 x 50 mm 07MAD-PR90200</p> 		

TROUBLESHOOTING

Front wheel wobbling and noisy

- 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 SYSTEM

BRAKE FLUID REPLACEMENT/AIR BLEEDING

BRAKE FLUID DRAINING

NOTICE

- Do not allow foreign material to enter the system when filling the reservoir.
- Spilled brake fluid can damage 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

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

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

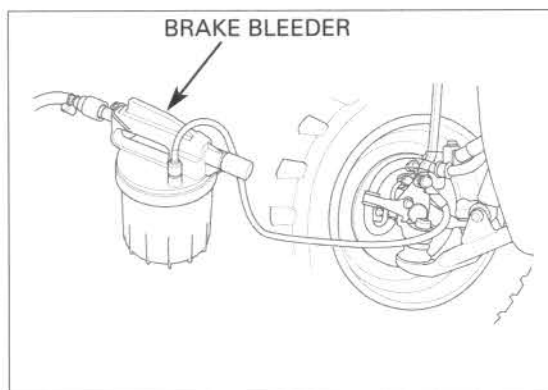
Connect a commercially available brake bleeder to the bleed valve.

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.



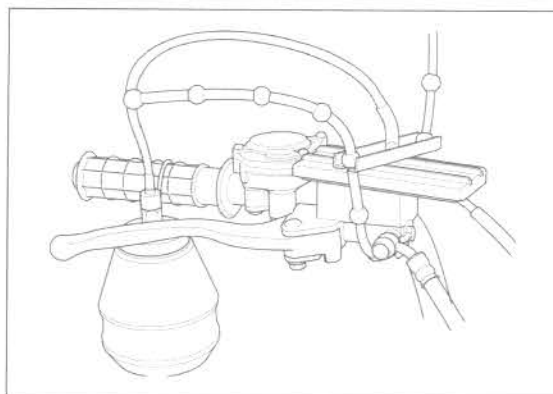
Perform the bleeding procedure until the system is completely flushed/bled.

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.



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 slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until bubbles cease to appear in the fluid 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)

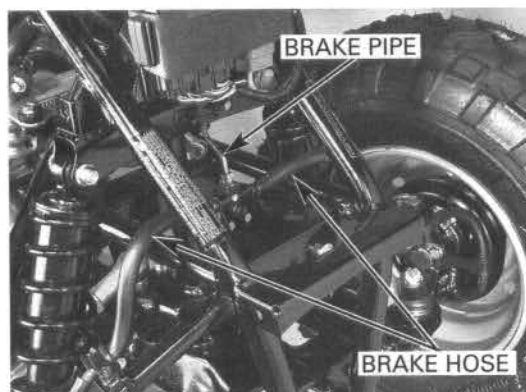


BRAKE SYSTEM

BRAKE HOSE/BRAKE PIPE INSPECTION

Remove the front fender (page 2-8).

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



MASTER CYLINDER

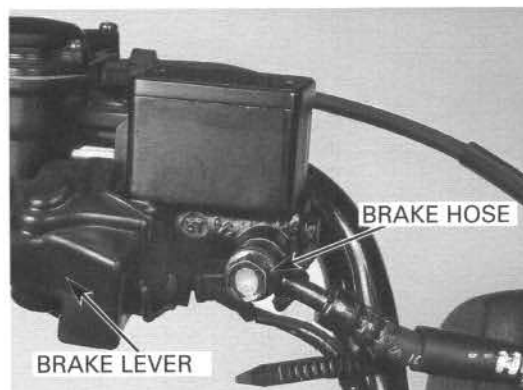
DISASSEMBLY

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.

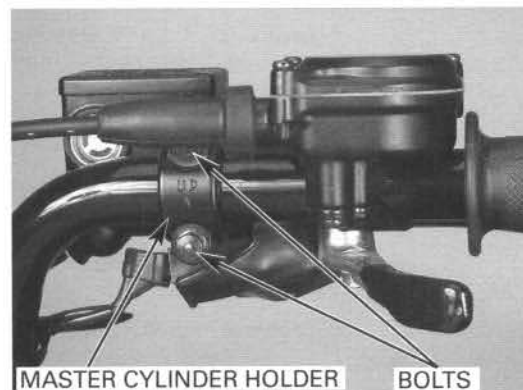
NOTICE

Spilled brake fluid can damage 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.

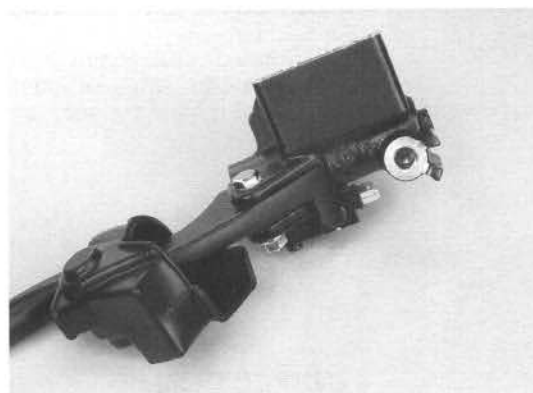


Remove the bolts from the master cylinder holder and remove the master cylinder.

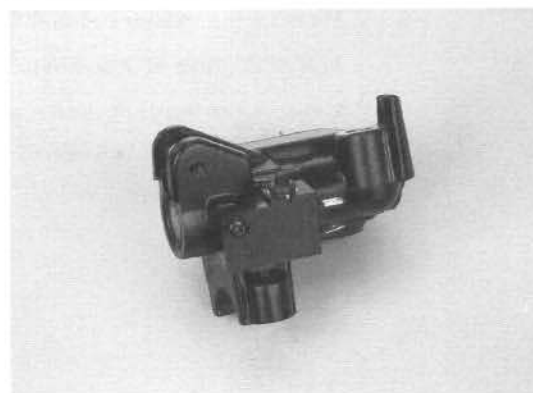


Remove the brake lever boot.

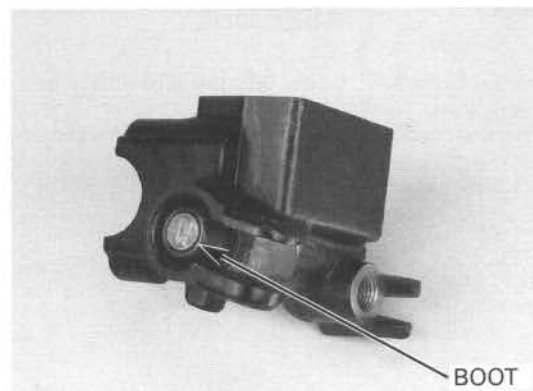
Remove the brake lever nut, pivot bolt, and brake lever.



Remove the screw and brake switch.



Remove the boot.

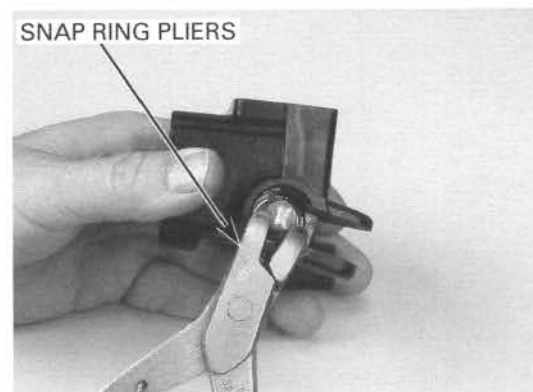


Depress the piston and remove the snap ring from the master cylinder body, using the special tool as shown.

TOOL:

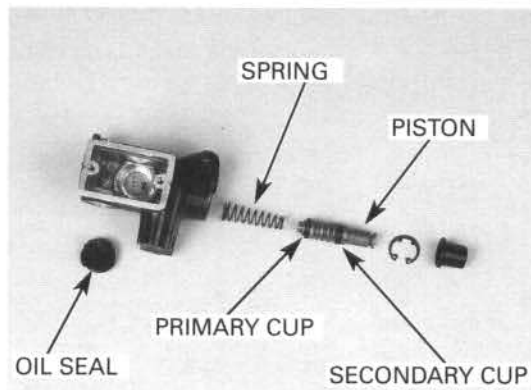
Snap ring pliers

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.



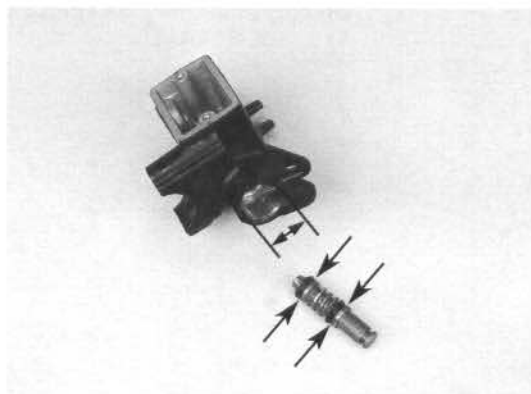
INSPECTION

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

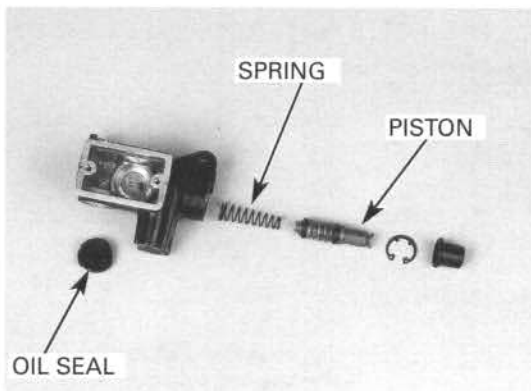
Replace the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.

Install the spring to the piston.

Install the oil seal and piston assembly.

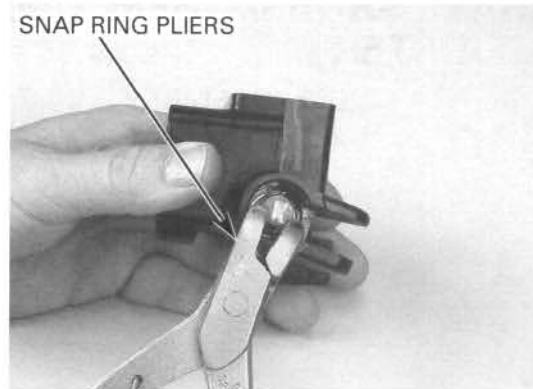
When installing the cups, do not allow the lips to turn inside out.



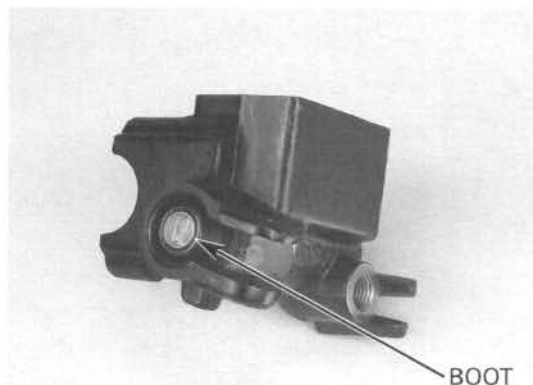
Be certain the snap ring is firmly seated in the groove.

Install the snap ring.

SNAP RING PLIERS



Install the boot.



Place the master cylinder on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

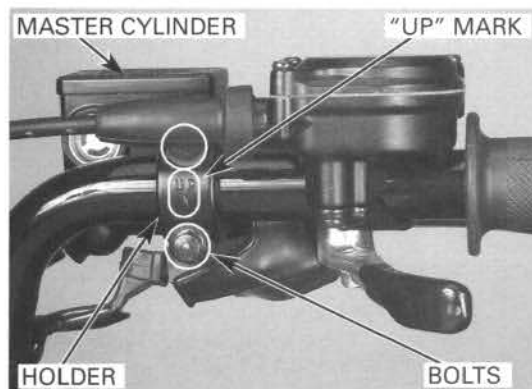
Tighten the upper bolt first, then tighten the lower bolt loosely.

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.

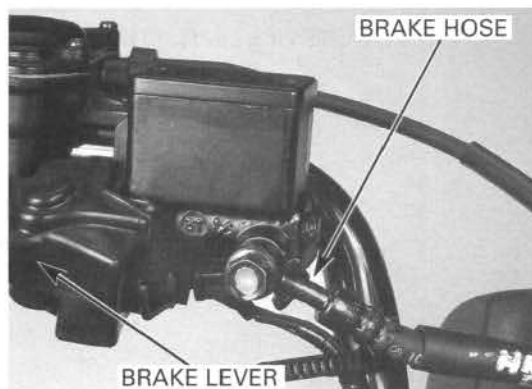
Install and tighten the pivot bolt.

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 14-6).



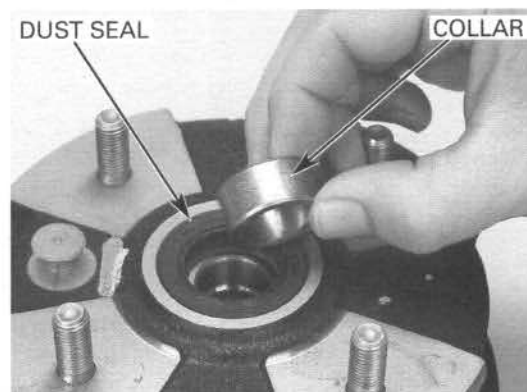
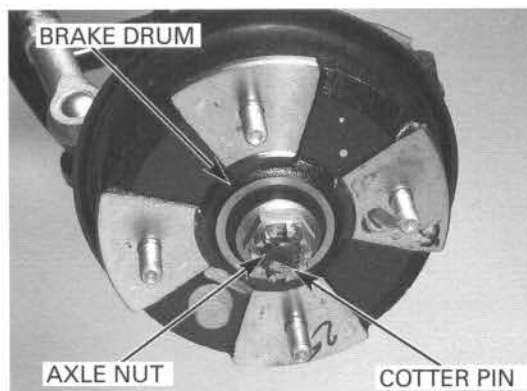
BRAKE SHOES/WHEEL CYLINDER/ ADJUSTER

DISASSEMBLY

Remove the following:

- front wheel (page 12-11)
- cotter pin
- axle nut
- brake drum

Remove the collar and dust seal.



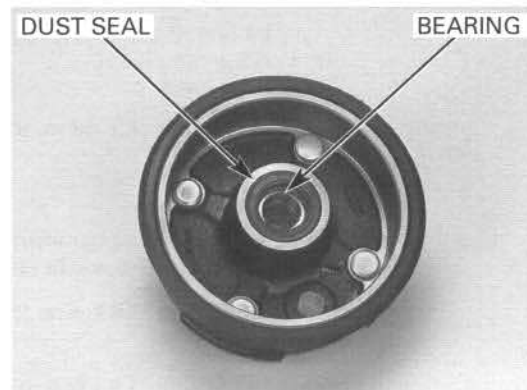
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the outer race of each bearing fits tightly in the brake drum.

For bearing replacement, see page 14-14.

For front brake waterproof seal inspection, see page 14-16.

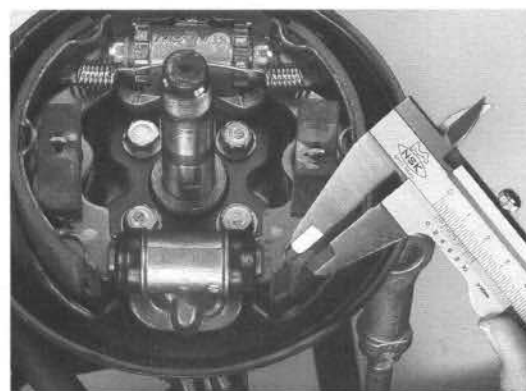
Measure the brake drum I.D.

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 14-15.

Mark the brake shoes to indicate their original positions.

Remove the following:

- pins
- pin holders
- brake shoes and shoe springs

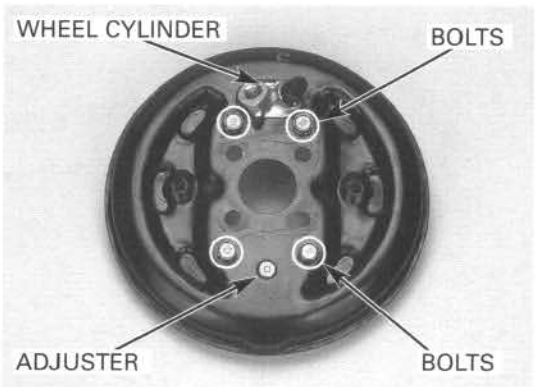
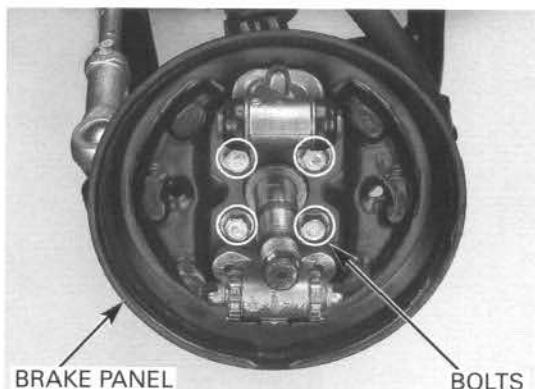
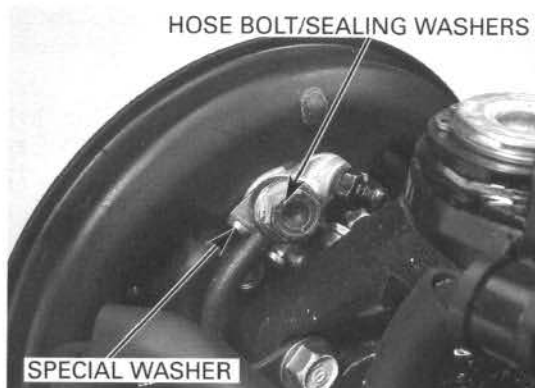
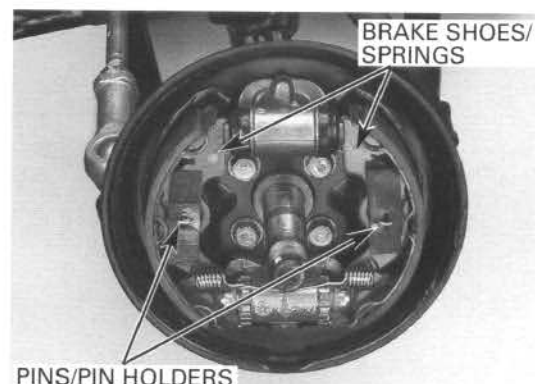
Drain the brake fluid (page 14-6).

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.



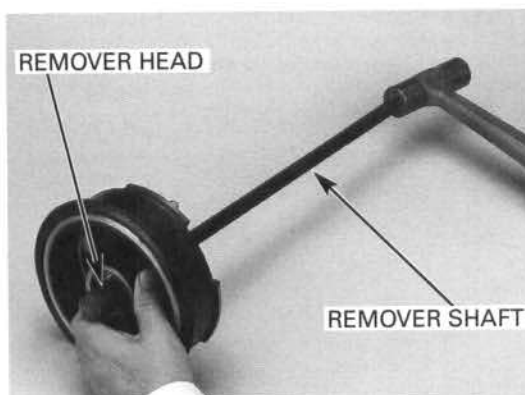
BRAKE DRUM BEARING REPLACEMENT

Remove the brake drum bearing using the special tools.

TOOLS:

Bearing remover head, 20 mm 07746-0050600

Remover shaft 07746-0050100



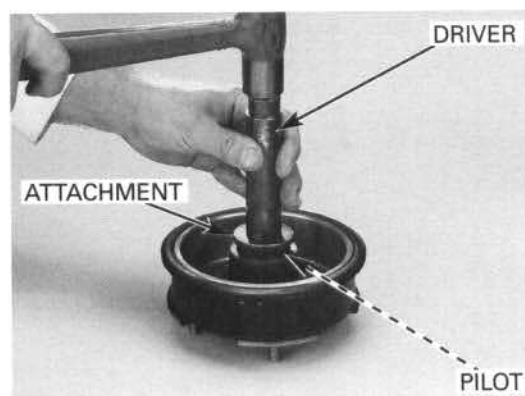
Pack the bearing cavities with grease.
Drive the new bearings into the brake drum.

TOOLS:

Driver 07749-0010000

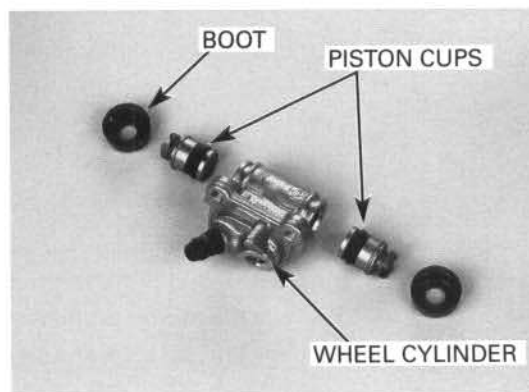
Attachment, 42 x 47 mm 07746-0010300

Pilot, 20 mm 07746-0040500

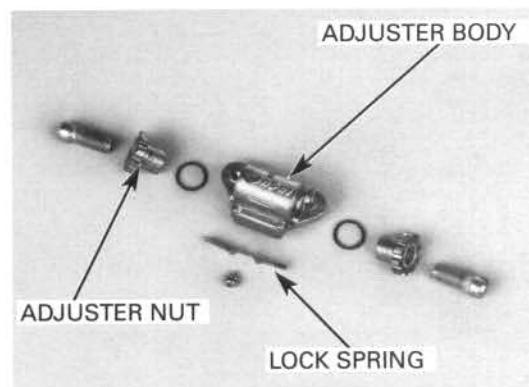


WHEEL CYLINDER/ADJUSTER INSPECTION

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.

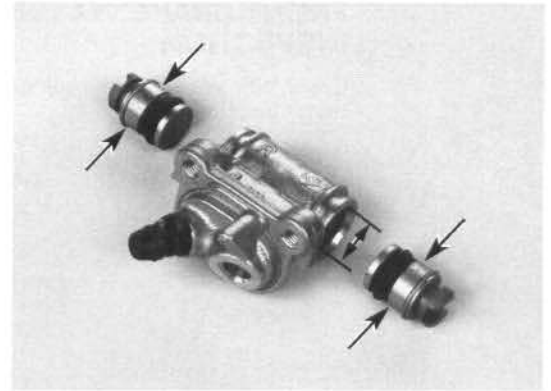


Measure the wheel cylinder I.D.

SERVICE LIMIT: 15.925 mm (0.6270 in)

Measure the wheel cylinder piston O.D.

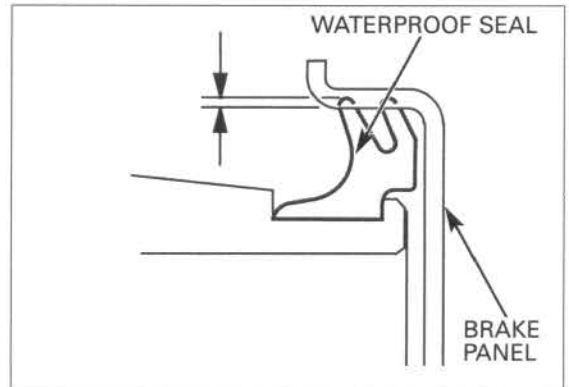
SERVICE LIMIT: 15.815 mm (0.6226 in)



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.

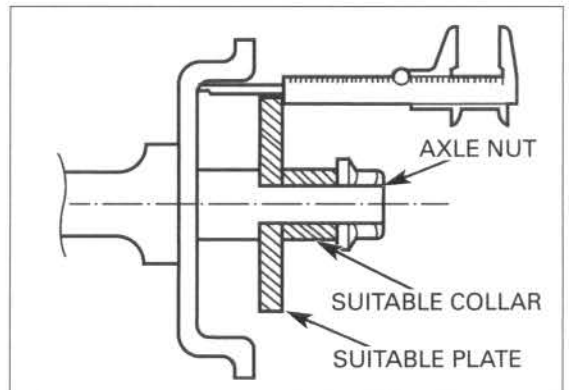
Grease on the brake linings reduces stopping power. Keep grease off the linings.

Clean any grease from the brake panel.

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.



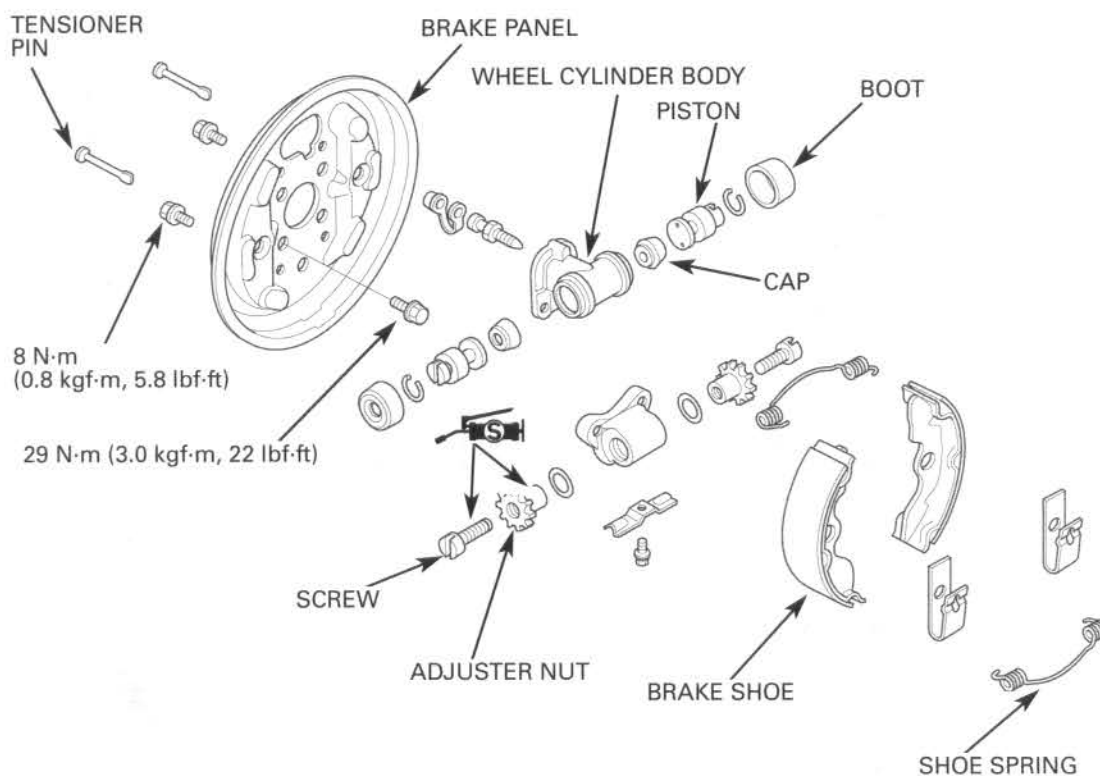
BRAKE SYSTEM

FRONT BRAKE WATERPROOF SEAL INSPECTION

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



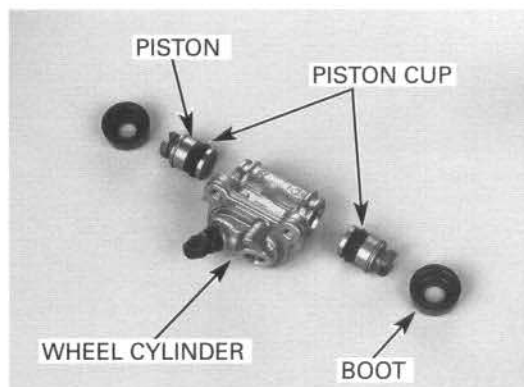
ASSEMBLY



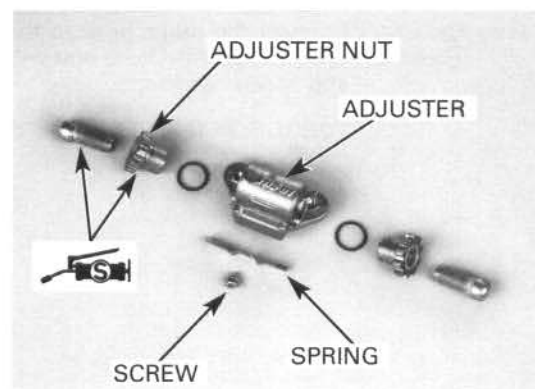
Clean all parts, excluding the boots, thoroughly with brake fluid only.
Blow out passages with compressed air.

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

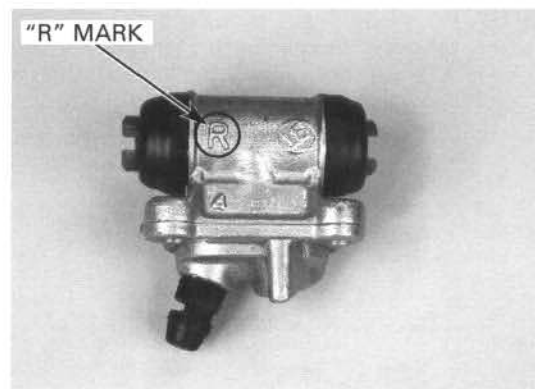
Install the boots on the cylinder body.



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

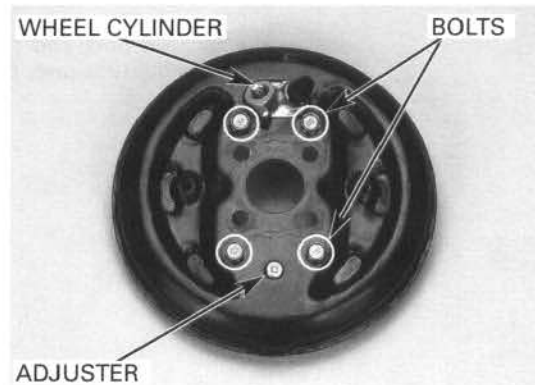


Note that the wheel cylinders are marked.
L: for the left brake panel
R: for the right brake panel



Install the wheel cylinder and adjuster and tighten the bolts.

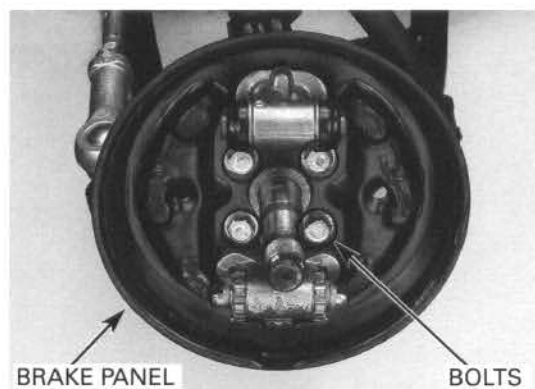
TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)



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.



BRAKE SYSTEM

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)

HOSE BOLT/SEALING WASHER

SPECIAL WASHER



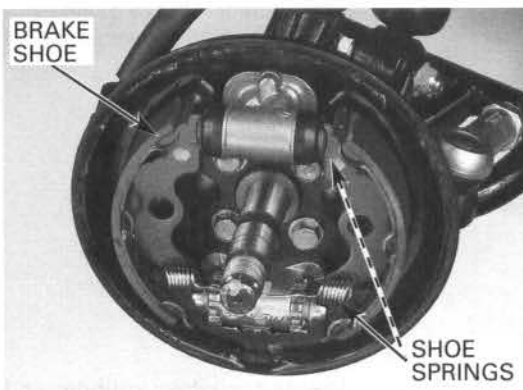
Face the flatter edges of the shoes to the wheel cylinder.

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.

BRAKE SHOE

SHOE SPRINGS



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

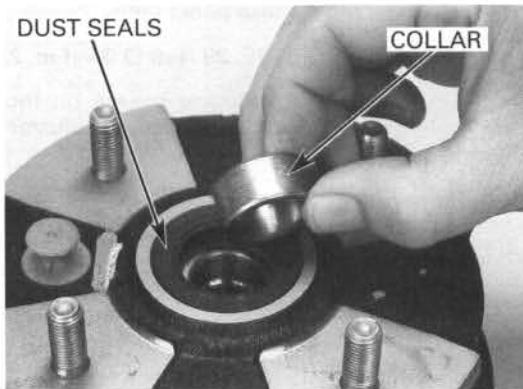
Install the tension pins and pin holders as shown and lock them with tensioner pins.



Install the dust seals and apply grease to the lips. Install the collar.

DUST SEALS

COLLAR

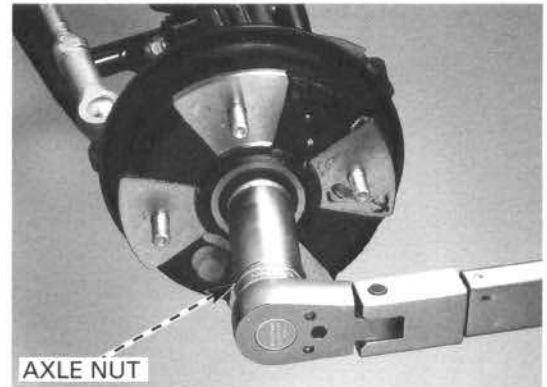


Make sure the inside of the brake drum and the brake shoes are completely free of grease, then install the drum.



Install and tighten the axle nut.

TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)



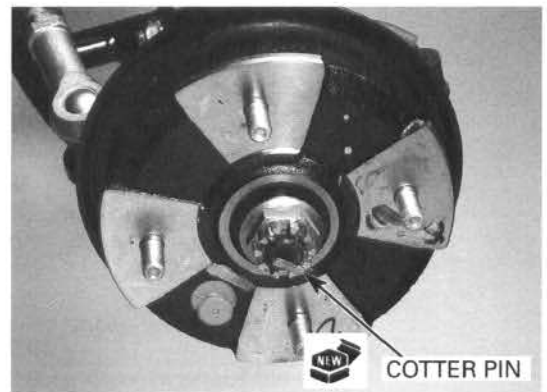
Install a new cotter pin.

Fill the reservoir to the upper level with new brake fluid (page 14-6).

Bleed the brake system (page 14-6).

Install the front wheel (page 12-11).

Adjust the brake (page 3-17).

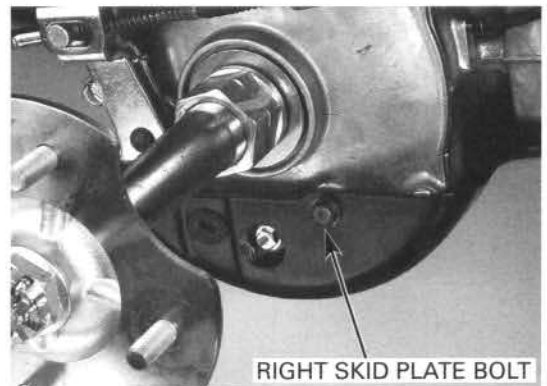


REAR BRAKE

REMOVAL/DISASSEMBLY

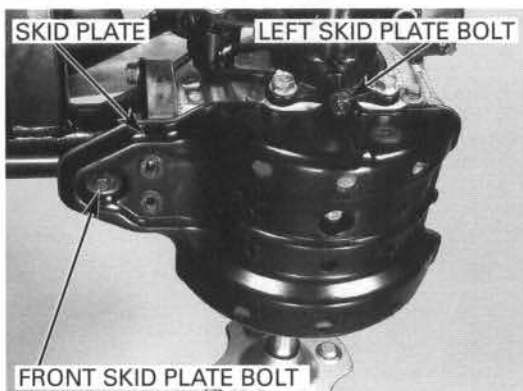
Remove the right rear wheel (page 13-6).

Remove the right skid plate bolt.



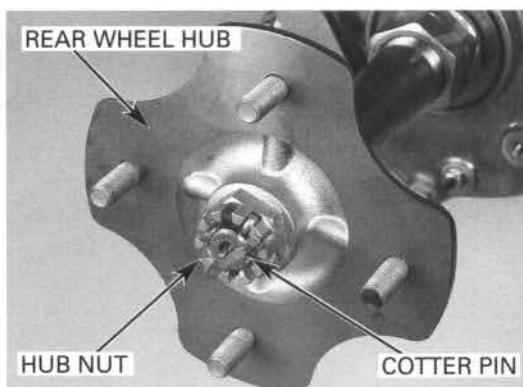
BRAKE SYSTEM

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



Remove the following:

- cotter pin
- rear wheel hub nut
- rear wheel hub



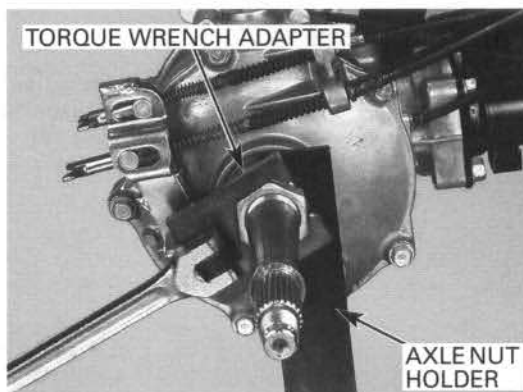
Set the parking brake.
Loosen and remove the rear axle lock nut using the special tools.

TOOLS:

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

U.S.A. TOOLS:

- Axle nut torque wr. adapter, 07916-958010B or 41 mm 07916-958010A
- Axle nut holder wrench, 07916-958020B or 41 mm 07916-958020A



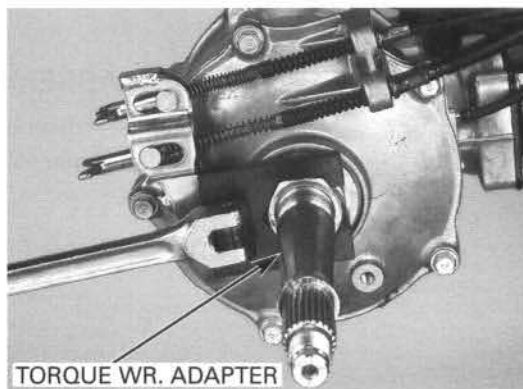
Loosen and remove the rear axle nut using the special tools.

TOOLS:

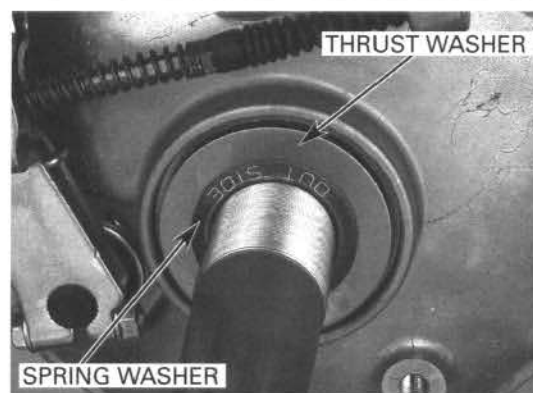
- Lock nut wrench set 07916-9580300
(Not available in U.S.A.)
- Lock nut wrench, 41 mm 07916-9580400

U.S.A. TOOL:

- Axle nut torque wr. adapter, 07916-958010B or 41 mm 07916-958010A

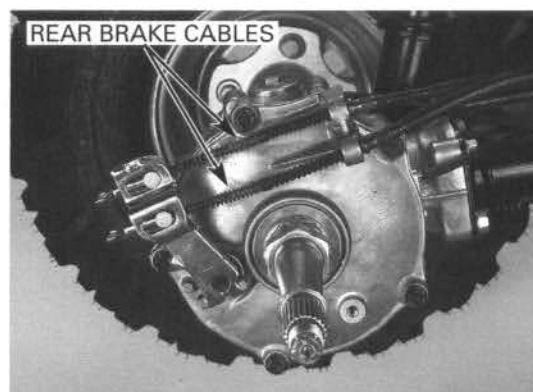


Remove the spring washer and thrust washer.

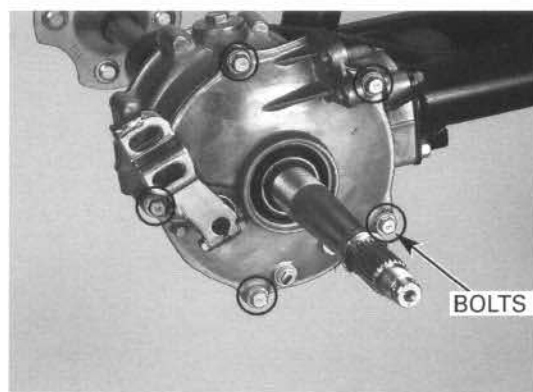


Unlock the parking brake.

Disconnect the rear brake cables from the brake arm.

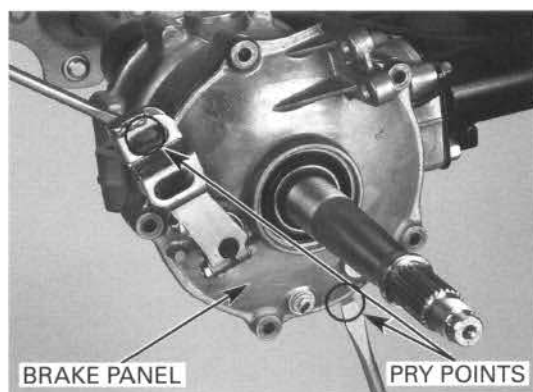


Remove the five bolts.



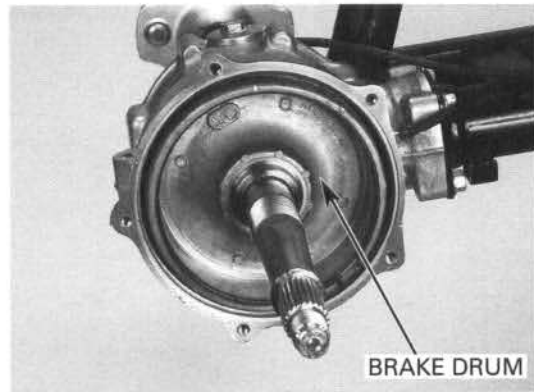
Carefully pry the brake panel using a screwdriver at the pry points as shown.

Remove the brake panel.



BRAKE SYSTEM

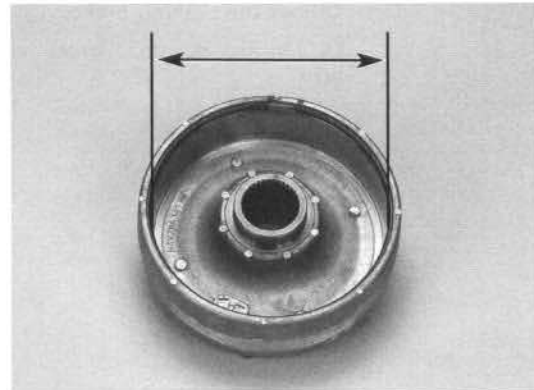
Remove the brake drum.



Measure the brake drum I.D.

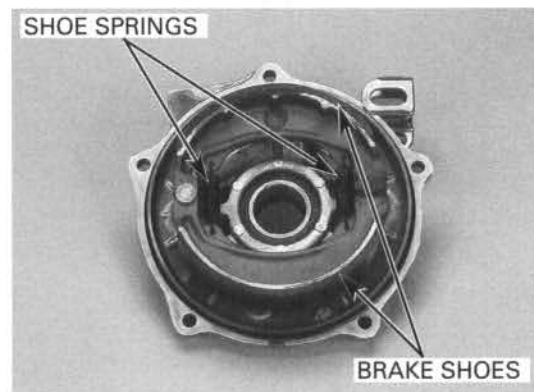
SERVICE LIMIT: 141.0 mm (5.55 in)

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



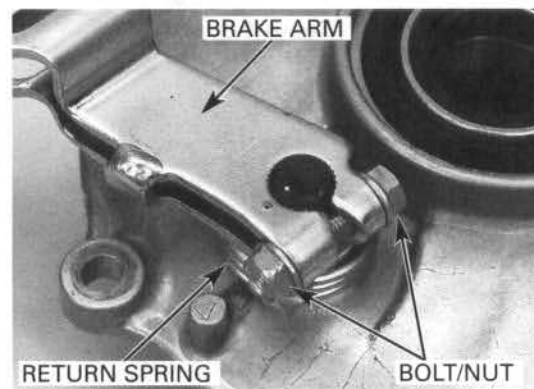
Mark the brake shoes to indicate their original positions.

Remove the brake shoes and shoe springs.



Remove the following:

- brake arm pinch bolt/nut
- brake arm
- return spring
- indicator plate
- brake cam

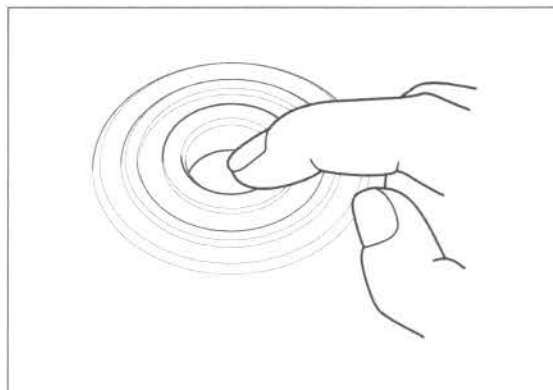


- felt seal
- dust seal



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.

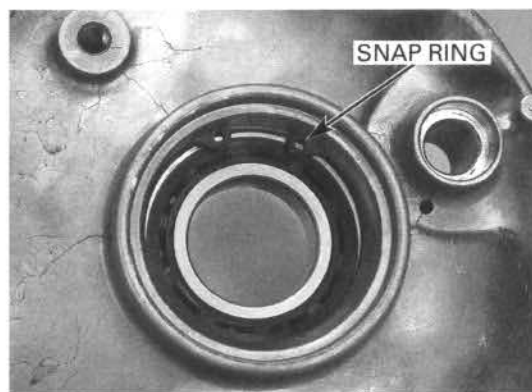
Check the dust seal for wear or damage.



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



Remove the snap ring.



BRAKE SYSTEM

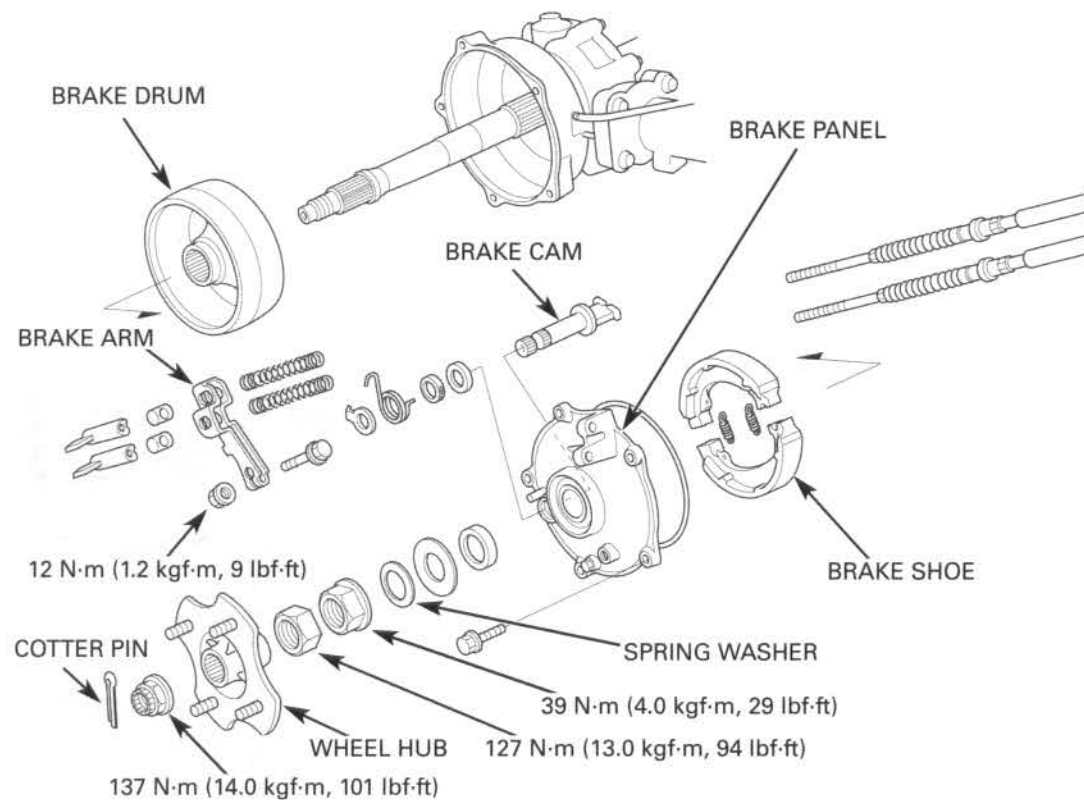
Drive the bearing out of the brake panel. Use the following special tools, if necessary.

TOOLS:

Driver	07749-0010000
Attachment	07746-0010300
Pilot, 32 x 50 mm	07MAD-PR9020B



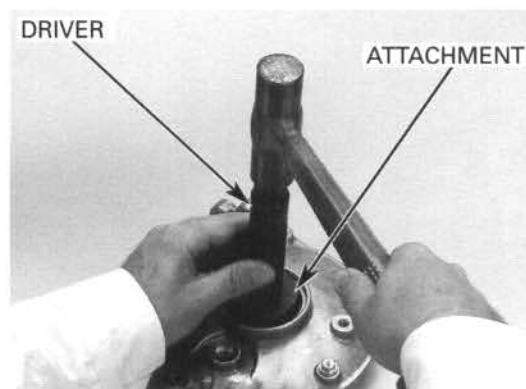
ASSEMBLY/INSTALLATION



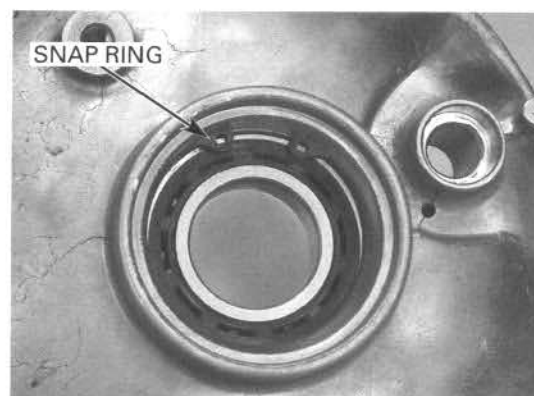
Drive the new bearing into the brake panel using the special tools as shown. Place the flat side of the attachment against the bearing.

TOOLS:

Driver	07749-0010000
Oil seal driver	07947-SD90101
Pilot, 32 x 50 mm	07MAD-PR9020B



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

07749-0010000

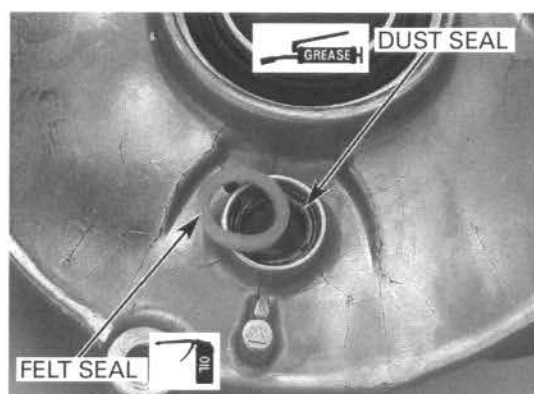
Oil seal driver

07JAD-PH80101

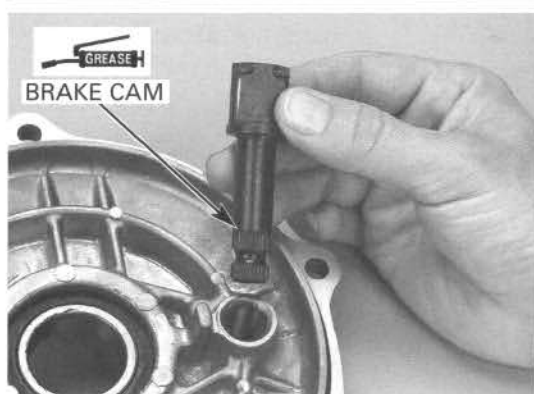


Apply grease to the dust seals.
Apply oil to the felt seal.

Install the dust seals and felt seal.

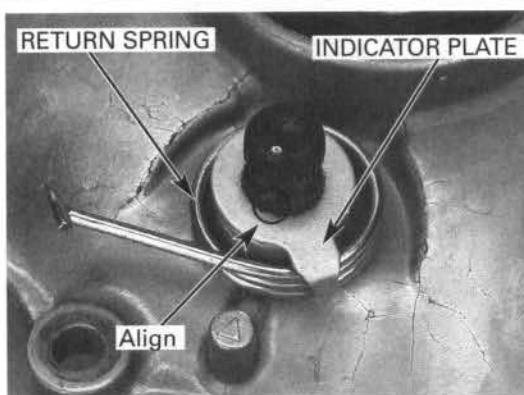


Apply grease to the anchor pin and brake cam.
Install the brake cam from the brake shoe side.



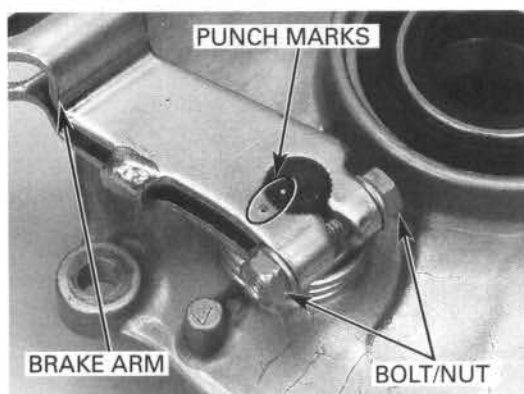
BRAKE SYSTEM

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.



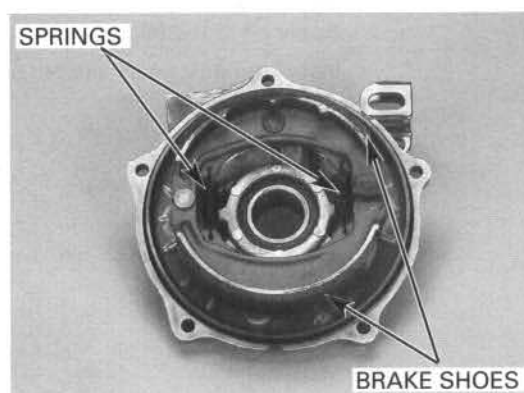
Install the brake arm, aligning the punch marks on the brake arm and cam.
Hook the return spring end onto the brake arm.
Tighten the brake arm bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

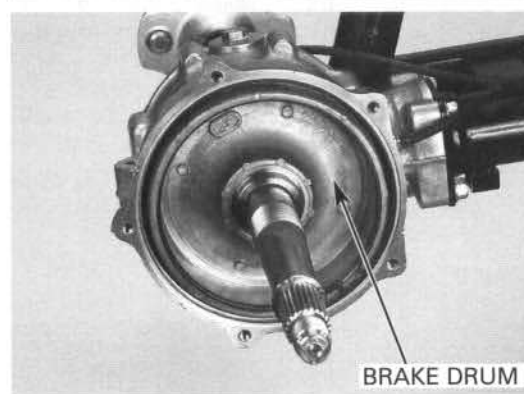


Contaminated brake linings reduce stopping power. Keep grease off the linings, wipe excess grease off the cam.

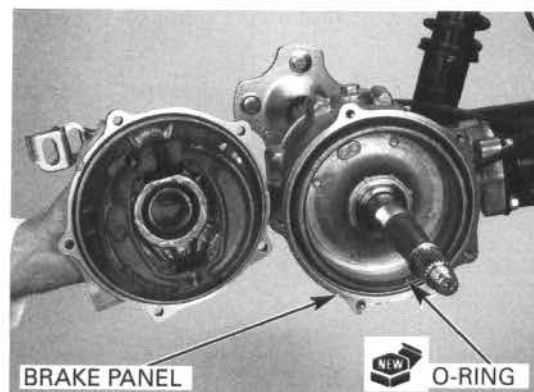
Install the brake shoes in their original positions with the springs as shown.



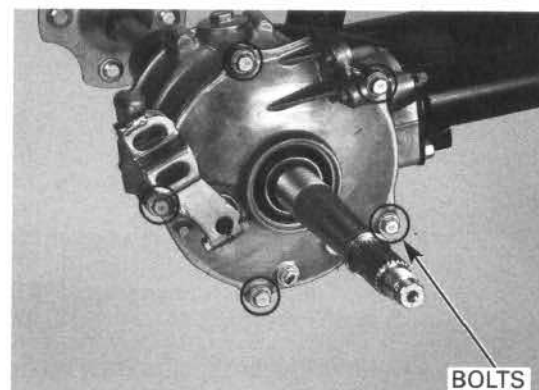
Install the rear brake drum.



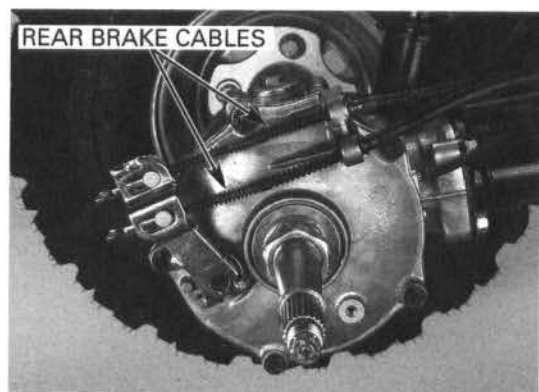
Install a new O-ring onto the brake panel, then install the brake panel.



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

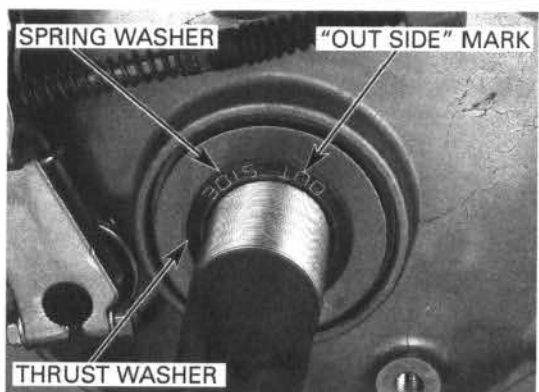


Install the rear brake cables, then set the parking brake.



Install the thrust washer.

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



BRAKE SYSTEM

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

U.S.A. TOOL:

Axle nut torque wr. adapter, 07916-958010B or
41 mm 07916-958010A

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 lock 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

U.S.A. TOOLS:

Axle nut torque wr. adapter, 07916-958010B or
41 mm 07916-958010A

Axle nut holder wrench, 07916-958020B or
41 mm 07916-958020A

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

Wrench scale reading:

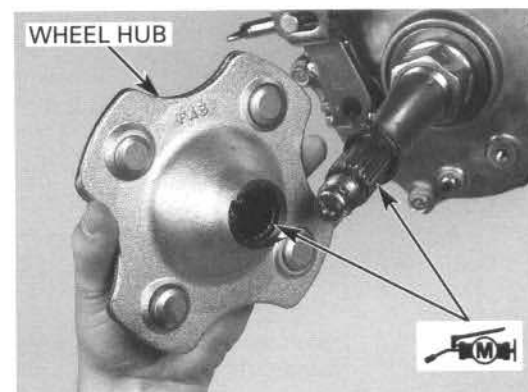
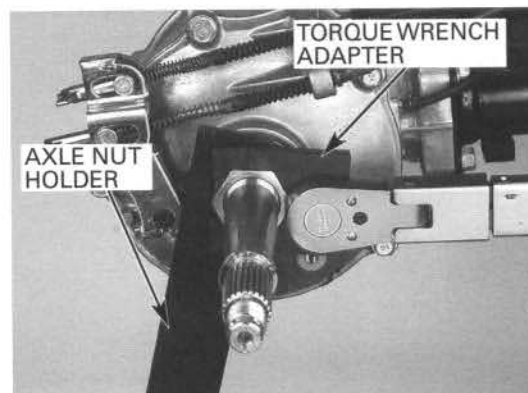
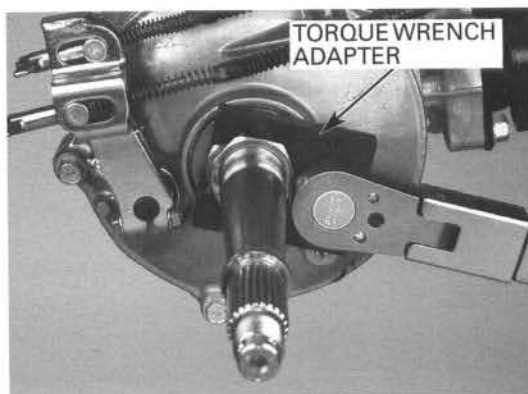
119 N·m (12.1 kgf·m, 87.5 lbf·ft) using a 50 cm
(20 in) long torque wrench

Apply molybdenum disulfide grease to the splines.
Install the right rear wheel hub.

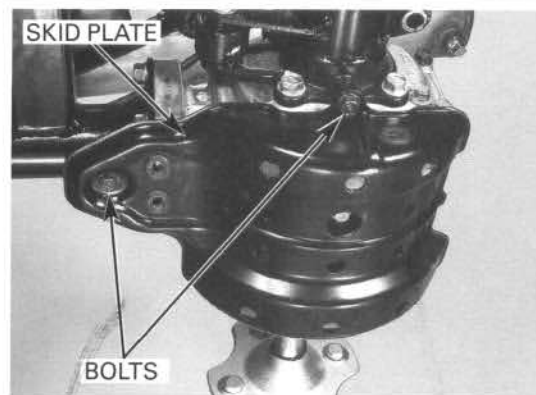
Install and tighten the right rear wheel hub nut to
the specified torque.

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)

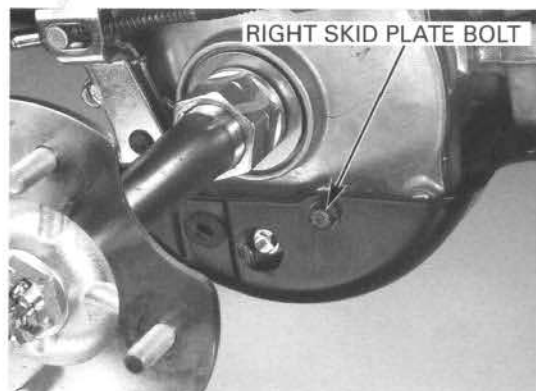
Install a new cotter pin.



Install the skid plate and tighten the two bolts.



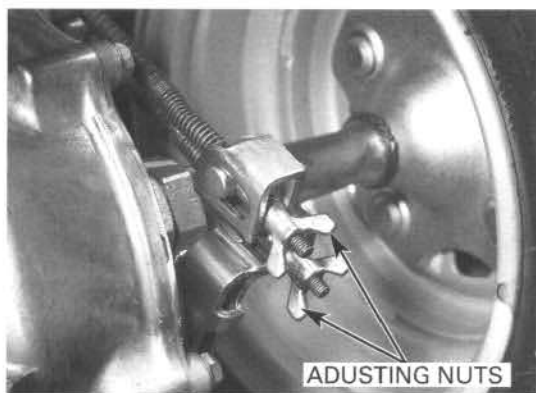
Tighten the right skid plate bolt.
Install the right rear wheel (page 13-6).
Adjust the rear brake (page 3-18).



BRAKE PEDAL

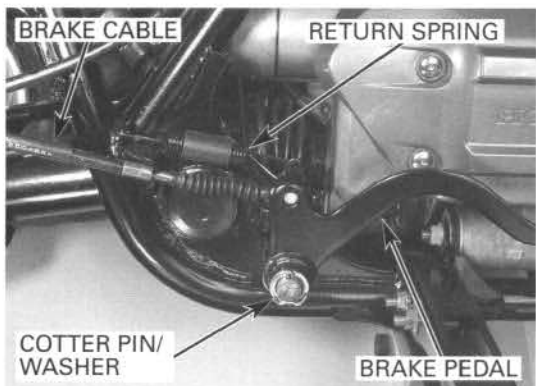
REMOVAL

Loosen and remove the rear brake pedal adjusting nuts.



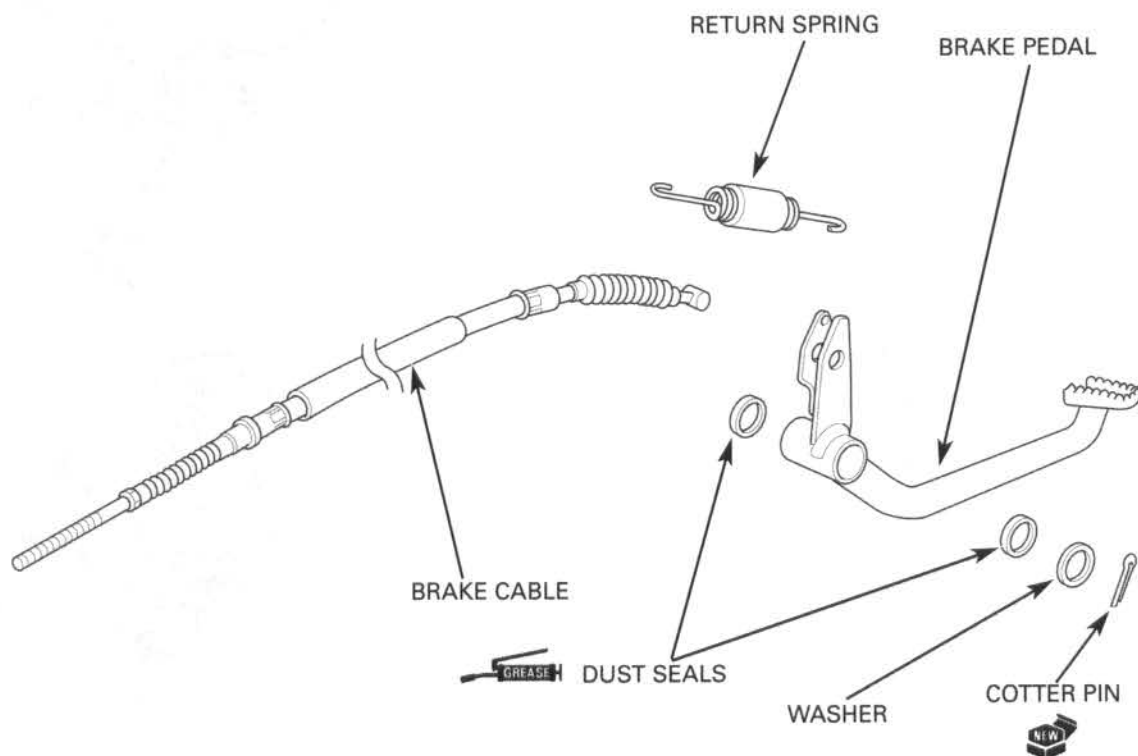
Disconnect the brake cable from the bracket and unhook the return spring.
Remove the cotter pin and washer from the pedal pivot shaft, and then remove the brake pedal from the shaft.

Unhook the brake cable from the brake pedal.

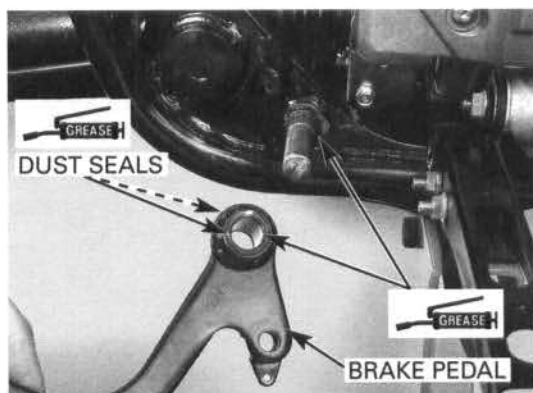


BRAKE SYSTEM

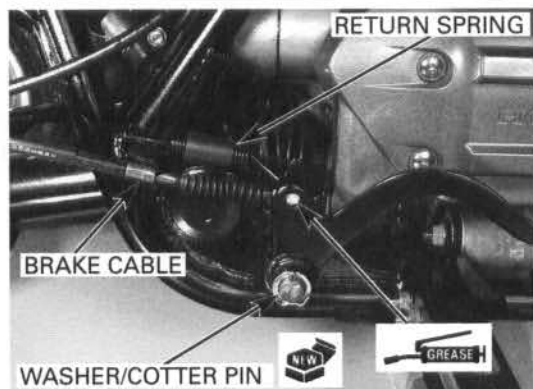
INSTALLATION



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 3-18).

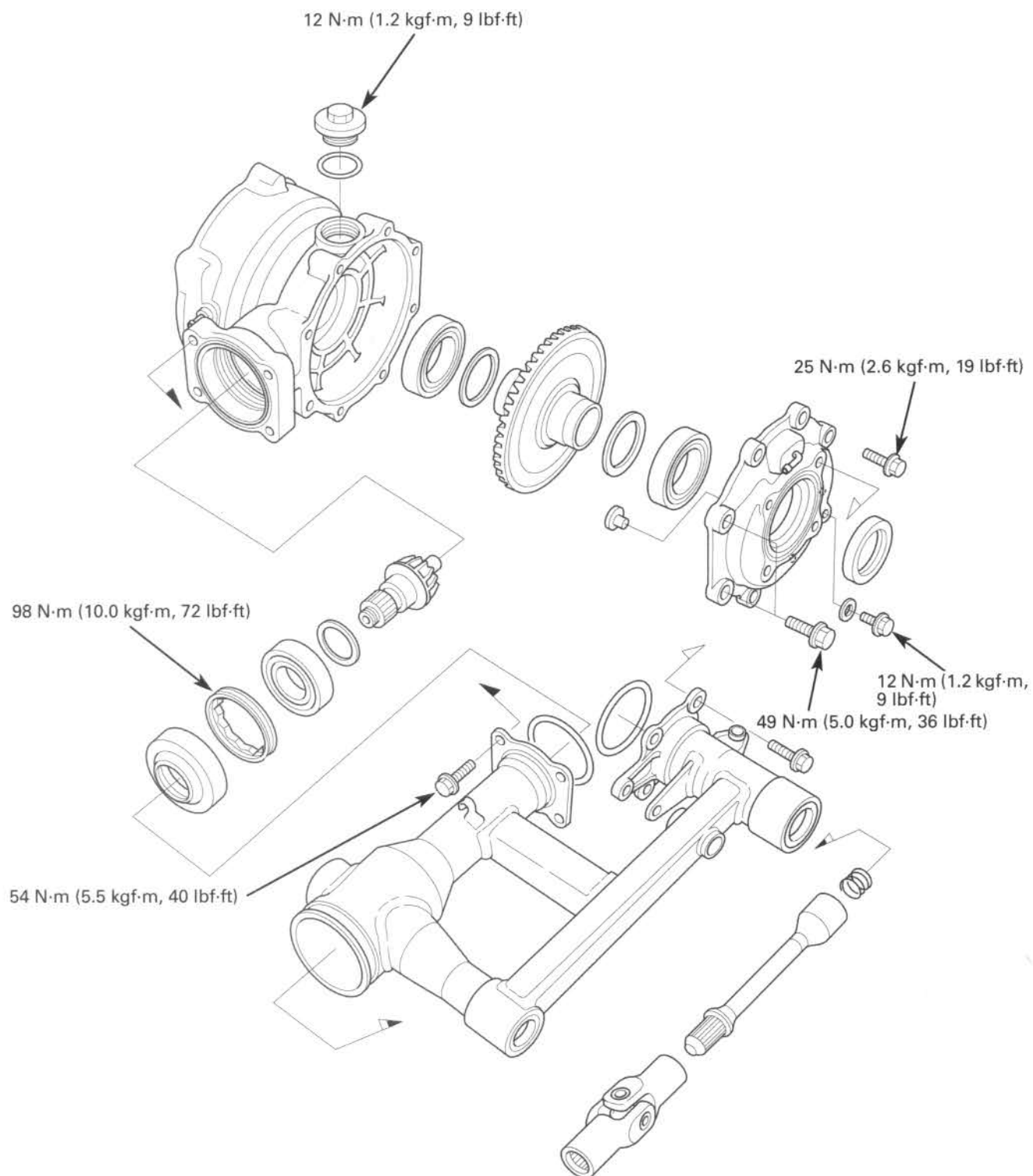


15. REAR DRIVING MECHANISM

COMPONENT LOCATION	15-2	FINAL DRIVE REMOVAL	15-8
SERVICE INFORMATION	15-3	FINAL DRIVE DISASSEMBLY/ INSPECTION	15-9
TROUBLESHOOTING	15-6	REAR DRIVE SHAFT	15-22
REAR AXLE	15-7		

REAR DRIVING MECHANISM

COMPONENT LOCATION



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)


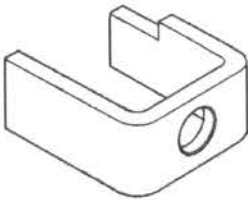
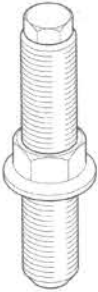
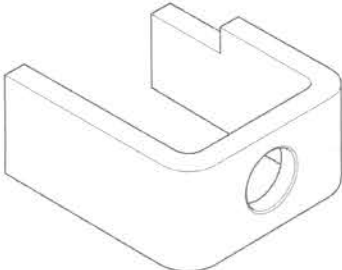
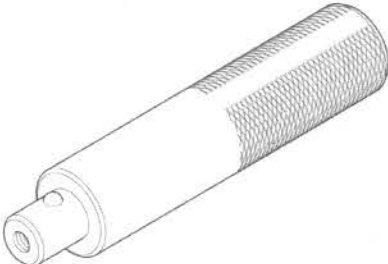

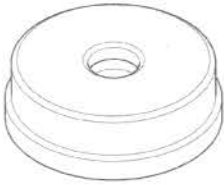
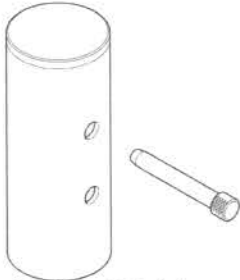
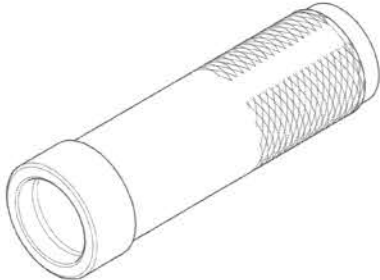

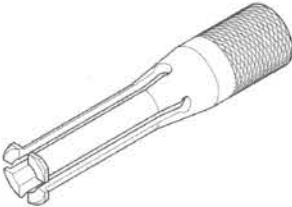

ITEM			SPECIFICATIONS	SERVICE LIMIT
Rear axle runout			—	3.0 (0.12)
Rear final drive	Oil capacity	After draining	80 cm ³ (2.7 US oz, 2.8 Imp oz)	—
		At disassembly	100 cm ³ (3.4 US oz, 3.5 Imp oz)	—
	Recommended oil		Hypoid gear oil SAE #80	—
	Gear backlash		0.05 – 0.25 (0.002 – 0.010)	0.40 (0.016)
	Backlash difference		—	0.20 (0.008)
	Ring gear to stop pin clearance		0.30 – 0.60 (0.012 – 0.024)	

TORQUE VALUES

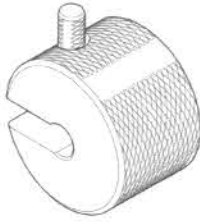
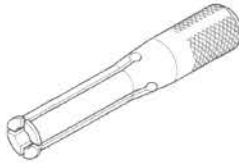
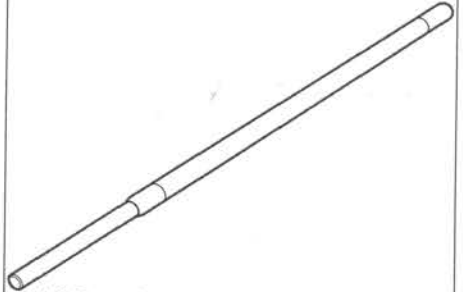
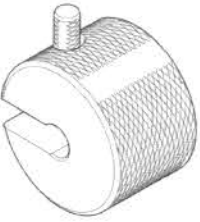
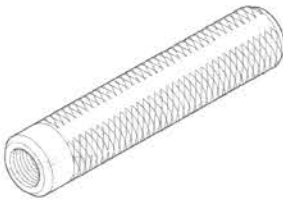
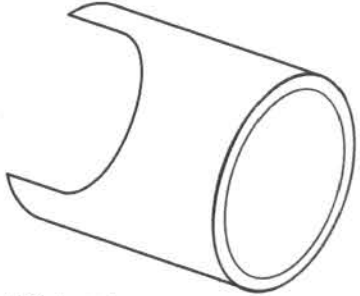



Gear case cover flange bolt, 8 mm	25 N·m (2.6 kgf·m, 19 lbf·ft)	Apply a locking agent to the threads. Stake.
Gear case cover flange bolt, 10 mm	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Pinion joint nut	98 N·m (10.0 kgf·m, 72 lbf·ft)	
Gear case drain bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gear case cover oil check 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)	

REAR DRIVING MECHANISM

TOOLS

<p>Lock nut wrench, 30 x 64 mm 07916-MB00002</p> 	<p>Pinion puller set 07HMC-MM80101</p>  <p>(Not available in U.S.A.)</p>	<p>Shaft puller 07931-ME40000</p>  <p>or 07931-ME4010B and 07931-HB3020A (U.S.A. only)</p>
<p>Pinion puller base 07HMC-MM80110</p>  <p>or 07HMC-MM8011A (U.S.A. only)</p>	<p>Driver 07749-0010000</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 
<p>Attachment, 62 x 68 mm 07746-0010500</p> 	<p>Driver attachment 07965-KE80200</p>  <p>(Not available in U.S.A.) or 07947-3710101</p>	<p>Driver, 40 mm 07746-0030100</p> 
<p>Attachment, 30 mm 07746-0030300</p> 	<p>Bearing remover, 14 mm 07WMC-KFG0100</p> 	<p>Remover shaft, 15 mm 07936-KC10100</p> 

REAR DRIVING MECHANISM

<p>Remover weight 07741-0010201</p> 	<p>Bearing remover, 15 mm 07936-KC10200</p>  <p>U.S.A. only</p>	<p>Remover shaft, 14 mm 07YMC-001010A</p>  <p>U.S.A. only</p>
<p>Remover weight 07741-0010201</p>  <p>U.S.A. only</p>	<p>Remover handle 07936-3710100</p>  <p>U.S.A. only</p>	<p>Differential bearing ring compressor 07YME-HN4010A</p>  <p>U.S.A. only</p>
<p>Attachment, 22 x 24 mm 07746-0010800</p> 	<p>Pilot, 14 mm 07746-0041200</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 

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

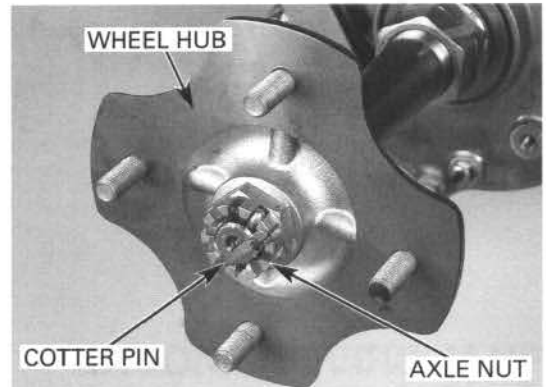
- Oil level too high
- Clogged breather hole or hose
- Worn or damaged oil seal
- Loose gear case cover bolt

REAR AXLE

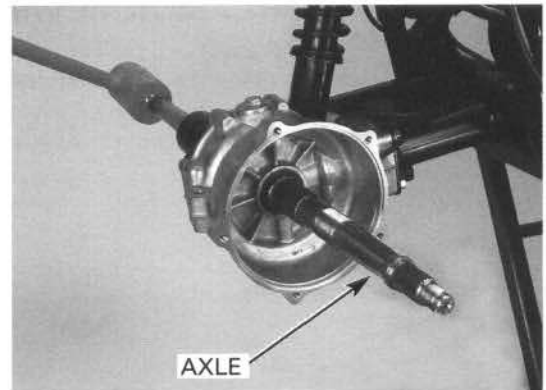
REMOVAL

Remove the right and left rear wheels and hubs (page 13-6).

Remove the rear brake panel and brake drum (page 14-21).



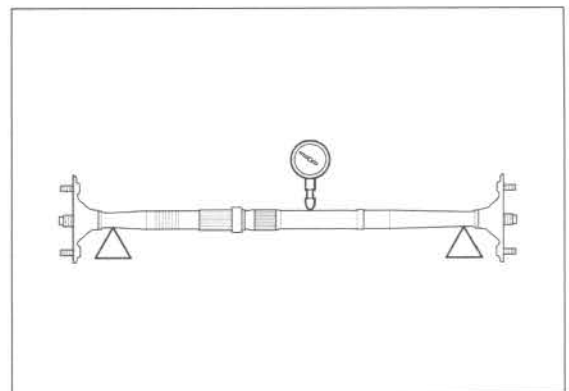
Drive the axle out from the left side with a rubber hammer.



INSPECTION

Place the rear axle in V-blocks and measure the runout.

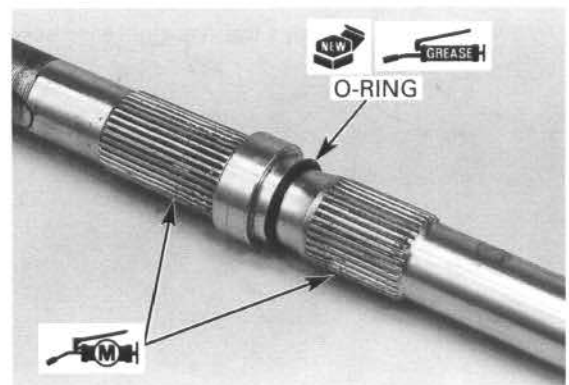
SERVICE LIMIT: 3.0 mm (0.12 in)



INSTALLATION

Coat new O-ring with grease and install onto the axle shaft.

Apply molybdenum disulfide grease to the center splines of the axle shaft.

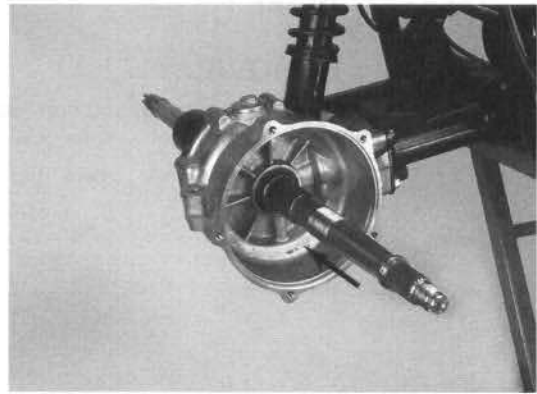


REAR DRIVING MECHANISM

Install the axle into the final gear case from right side until it is fully seated.

Install the following:

- rear brake housing (page 14-19)
- left and right rear wheel and hub (page 13-7)



FINAL DRIVE REMOVAL

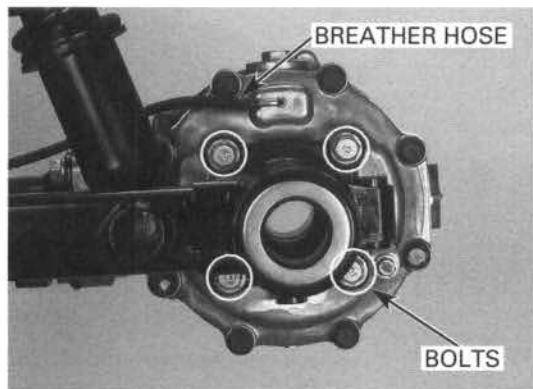
GEAR CASE REMOVAL

Drain the oil from the final drive (page 3-15).

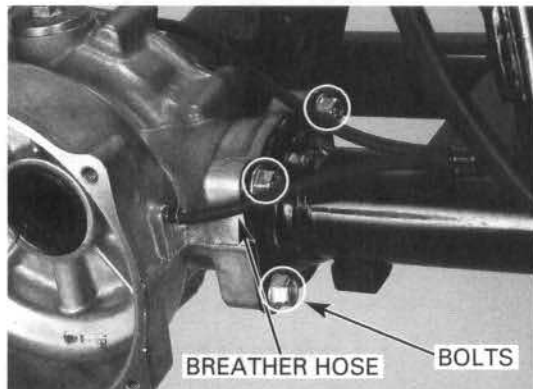
Remove the rear axle shaft (page 15-7).

Remove the left final drive case bolts.

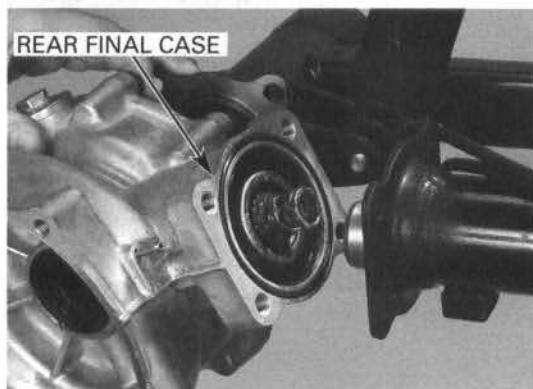
Disconnect the final drive case breather hoses.



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.



FINAL DRIVE DISASSEMBLY/INSPECTION

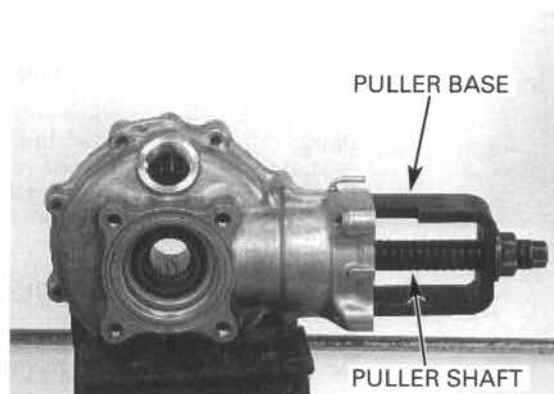
BACKLASH INSPECTION

Hold the pinion gear with the special tools.

TOOLS:

Pinion puller set	07HMC-MM80101
- shaft puller	07931-ME40000
- pinion puller base	07HMC-MM80110 or
U.S.A. only:	
Shaft puller	07931-ME4010B
Special nut	07931-HB3020A
Pinion puller base	07HMC-MM8011A

Set the differential case into a jig or vise with soft jaws.



Remove the oil filler cap and set a horizontal type dial indicator on the ring gear through the filler hole.

Turn the ring gear back and forth to read backlash.

STANDARD: 0.05 – 0.25 mm (0.002 – 0.010 in)

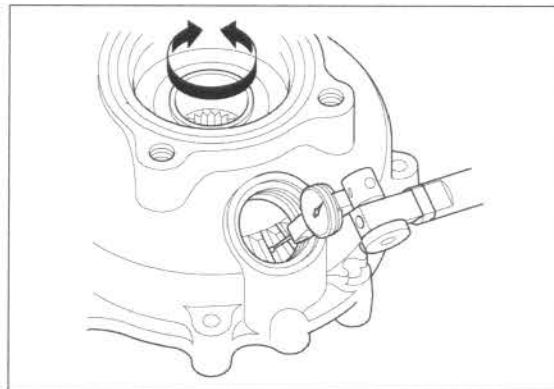
SERVICE LIMIT: 0.4 mm (0.02 in)

Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

SERVICE LIMIT: 0.2 mm (0.008 in)

If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed. Inspect the bearings and case.



REAR DRIVING MECHANISM

If the backlash is excessive, replace the ring gear right side shim with a thinner one.
If the backlash is too small, replace the ring gear right side shim with a thicker one.
Backlash changed by about 0.06 mm (0.002 in) when thickness of the shim is changed by 0.12 mm (0.005 in).

NOTE:

- Eleven different thickness right shims are available from the thinnest (1.26 mm thickness: A) shim to the thickest (1.86 mm thickness: K) in intervals of 0.06 mm.
- Nine different thickness left shims are available from the thinnest (1.82 mm thickness: A) shim to the thickest (2.30 mm thickness: I) in intervals of 0.06 mm.

Right ring gear shims:

A: (thinnest): 1.26 mm (0.050 in)

E: (standard): 1.50 mm (0.059 in)

K: (thickest): 1.86 mm (0.073 in)

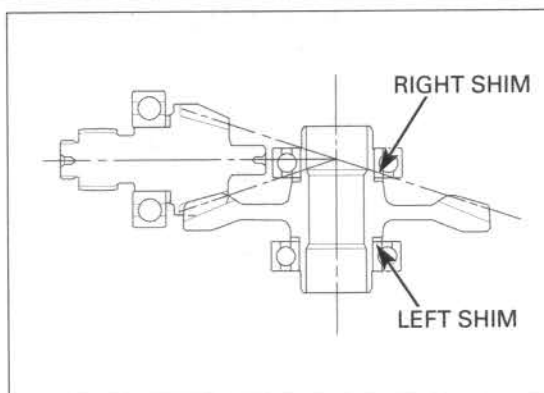
Left ring gear shims:

A: (thinnest): 1.82 mm (0.072 in)

D: (standard): 2.00 mm (0.079 in)

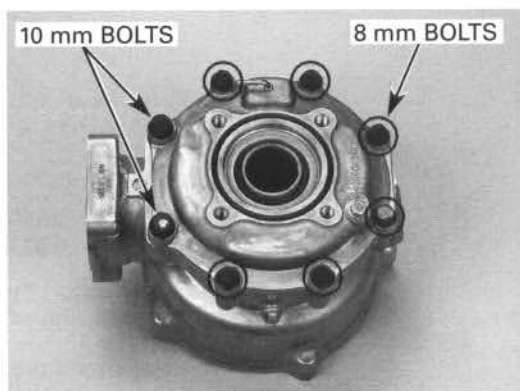
I: (thickest): 2.30 mm (0.091 in)

Change the left side shim and equal thickness and opposite amount of what the right side shim was changed; if the right shim was replaced with a 0.12 mm (0.005 in) thicker shim, replace the left shim with one that is 0.12 mm (0.005 in) thinner.

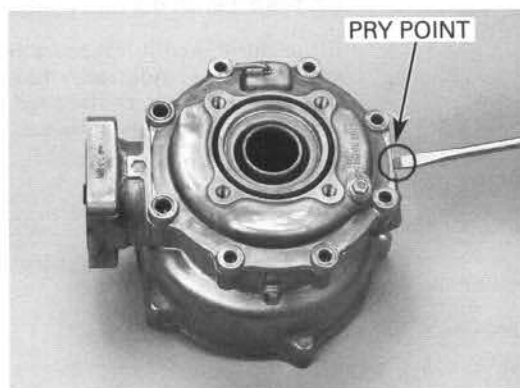


GEAR CASE DISASSEMBLY

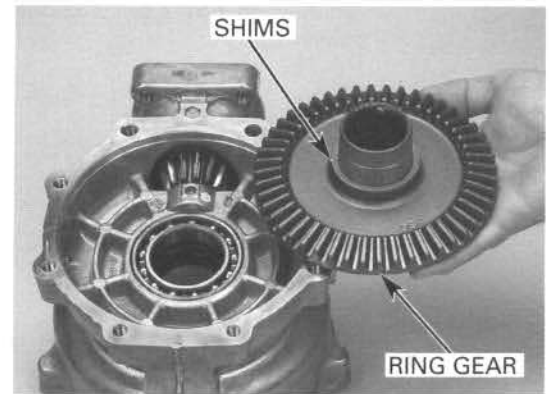
Remove the cover bolts in 2 – 3 steps in a crisscross pattern to prevent gear case warpage.



Carefully pry the cover off the case using a screwdriver at the pry point as shown.



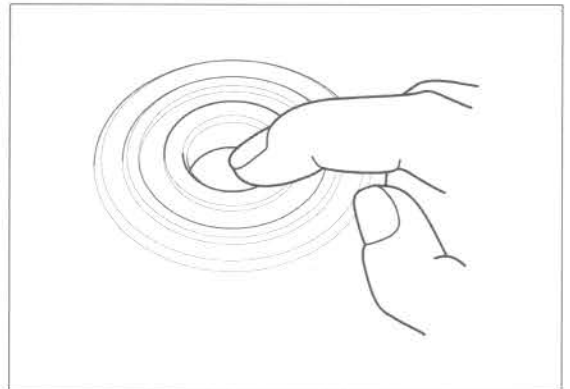
Remove the ring gear and shims.



BEARING INSPECTION

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

For ring gear bearing replacement, see page 15-16.
For pinion gear removal and bearing replacement, see page 15-15.



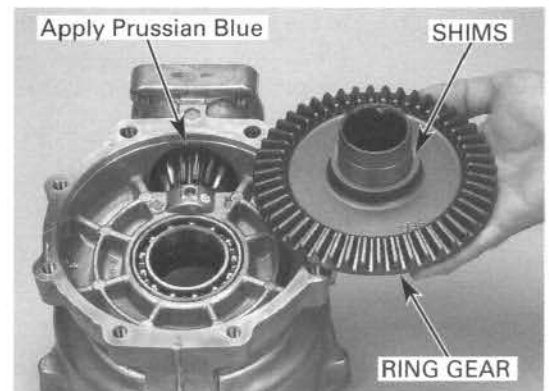
GEAR TOOTH CONTACT PATTERN CHECK

Keep dust and dirt out of the case and cover.

Clean sealing material off the mating surfaces of the gear case and cover, being careful not to damage them.

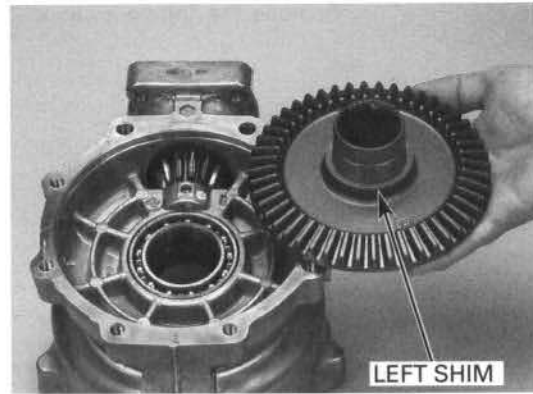
Apply thin coat of Prussian Blue to the pinion gear teeth for a tooth contact pattern check.

Install the ring gear shims onto the ring gear.



REAR DRIVING MECHANISM

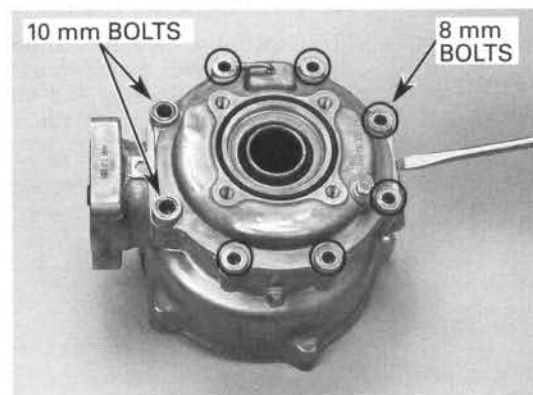
Install the ring gear with the shims into the gear case.



It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.

Install the case cover and tighten the bolts in several steps until the cover evenly touches the gear case. Then, while rotating the pinion gear, tighten the bolts to the specified torque in a crisscross pattern in several steps.

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)



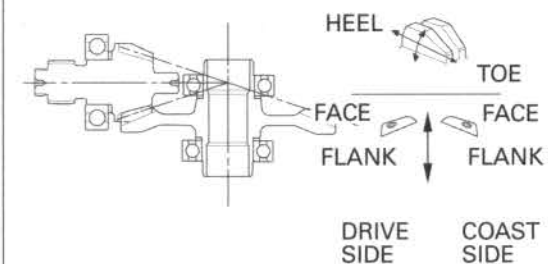
Remove the oil filler cap.
Rotate the ring gear several times in both directions of rotation.
Check the gear tooth contact pattern through the oil filler hole.

The pattern is indicated by the Prussian Blue applied to the pinion.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth, but slightly to the heel side and to the flank side.

If the patterns are not correct, remove and change the pinion shim with one of an alternate thickness.

NORMAL:



Replace the pinion shim with a thicker one if the contact pattern is too high, toward the face.

Replace the pinion shim with a thinner one if the contact pattern is too low, toward the flank.

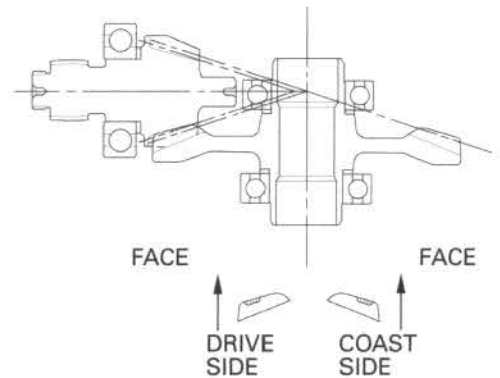
The pattern will shift about 0.5 – 1.0 mm (0.02 – 0.04 in) when the thickness of the shim is changed by 0.12 mm (0.005 in).

Pinion shims:

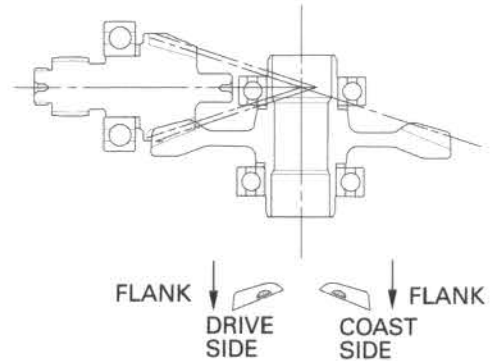
A: 1.64 mm (0.064 in)	F: 1.94 mm (0.076 in)
B: 1.70 mm (0.067 in)	G: 2.00 mm (0.079 in)
C: 1.76 mm (0.069 in)	H: 2.06 mm (0.081 in)
D: 1.82 mm (0.072 in)	I: 2.12 mm (0.083 in)
E: 1.88 mm (0.074 in)	J: 2.18 mm (0.086 in)

For pinion shim replacement, see page 15-14.

TOO HIGH:

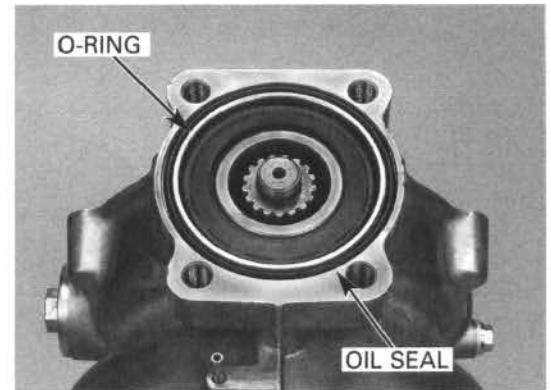


TOO LOW:

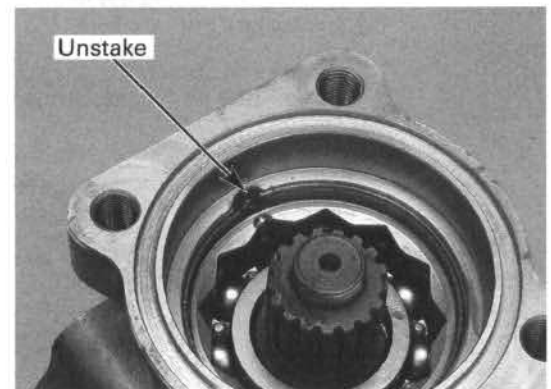


DRIVE PINION REMOVAL

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.

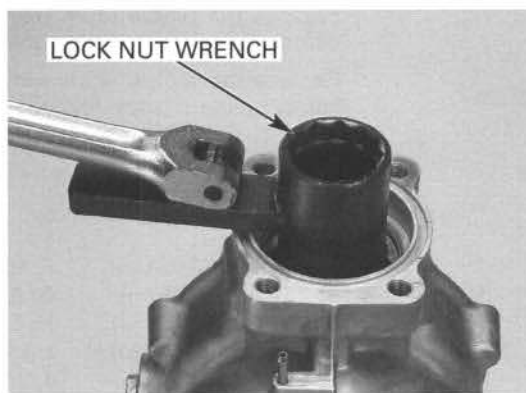


REAR DRIVING MECHANISM

Remove the pinion bearing lock nut using the special tool as shown.

TOOL:

Lock nut wrench, 30 x 64 mm 07916-MB00002

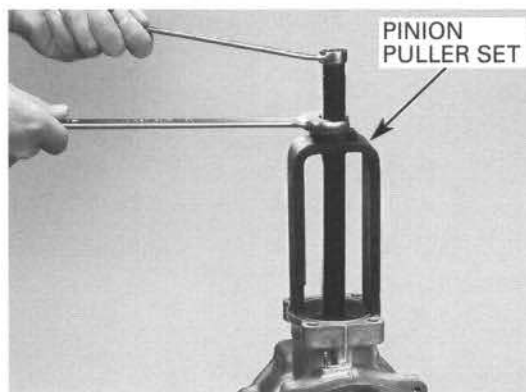


Install the pinion puller attachment tool onto the gear case.

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

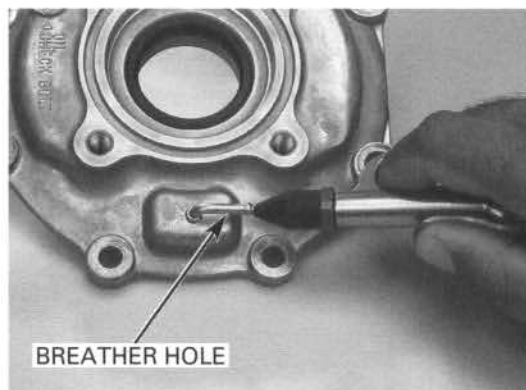
or U.S.A. only:

Shaft puller 07931-ME4010B

Special nut 07931-HB3020A

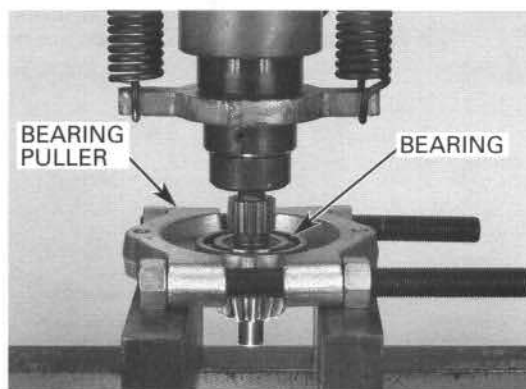
Pinion puller base "A" 07HMC-MM8011A

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.

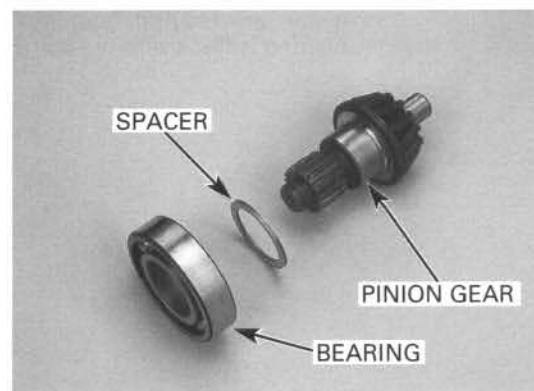


To reassemble, first install the pinion spacer.

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.

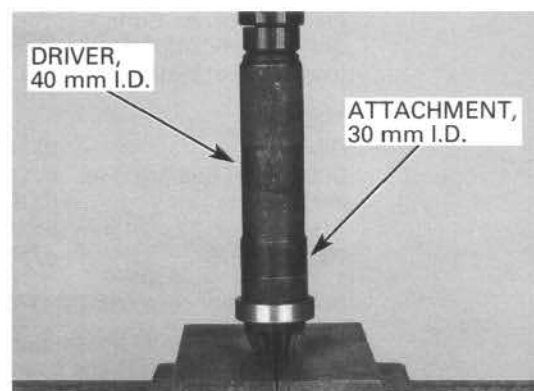
TOOLS:

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. Bend up the end of the ring with a screwdriver. Grasp the end of the ring with needle-nose pliers and pull the stopper ring out through the access hole.

Remove the filler cap.

Be sure to wear heavy gloves to avoid burns when handling the heated gear case. Using a torch to heat the gear case may cause warpage.

Heat the gear case to 80°C (176°F) and remove the needle bearing by using the special tools.

TOOLS:

Bearing remover, 14 mm 07WMC-KFG0100

Remover shaft, 15 mm 07936-KC10100

Remover weight 07741-0010201

U.S.A. only:

Bearing remover, 15 mm 07936-KC10200

Remover shaft, 14 mm 07YMC-001010A

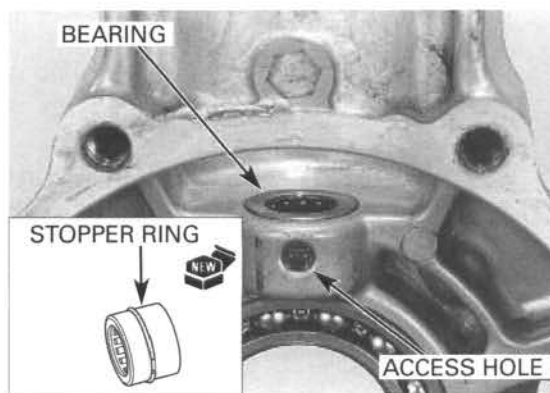
Remover weight 07741-0010201

Remover handle 07936-3710100

Remove the bearing cage and bearings from the inside of the pinion bearing to allow the special tool to grip the bearing.

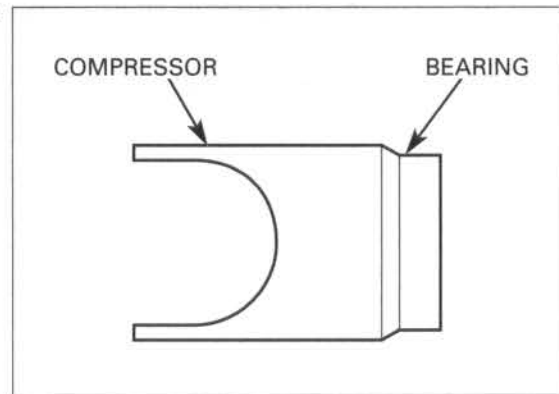
Make sure the ring stays in the groove.

Install the stopper ring into the groove in the bearing.



REAR DRIVING MECHANISM

Install the bearing into the compressor until the bearing is flush with the end of the tool.



Place the driver on top of the bearing and tape the driver to the compressor. Place the assembly into a freezer for at least 30 minutes.

TOOLS:

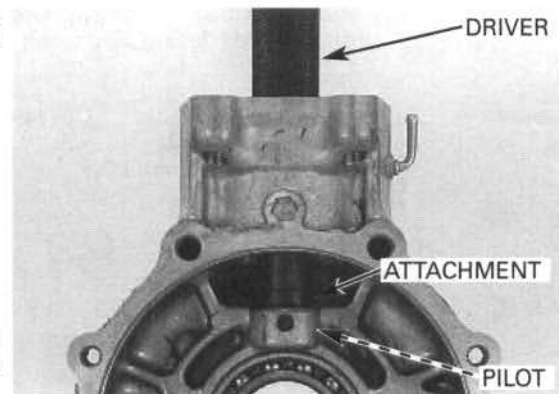
Driver	07749-0010000
Differential bearing ring compressor	07YME-HN4010A (U.S.A. only)
Attachment, 22 x 24 mm	07746-0010800
Pilot, 14 mm	07746-0041200

Heat the gear case to 80°C (176°F).

Remove the needle bearing and tool assembly from the freezer and drive the bearing into the gear case using the special tools.

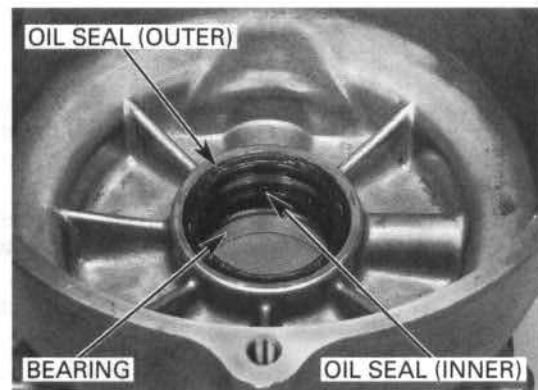
Only strike the driver once. If you strike it more than once, the ring may slip out of the groove. If this happens, remove the ring and bearing, and install a new one.

Make sure the stopper ring is securely set in the groove of the gear case.



CASE BEARING REPLACEMENT

Remove the outer and inner oil seals.
Drive the ring gear bearing out of the case.

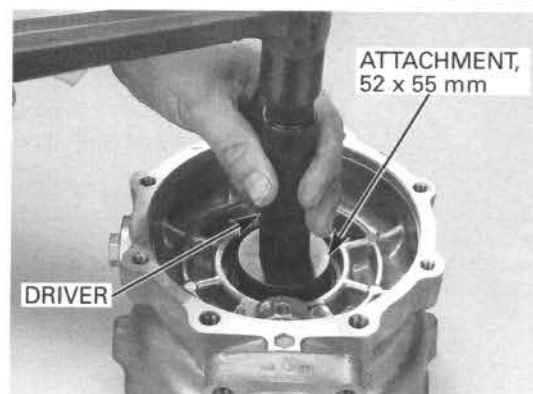


Drive a new oil seal (inner) into the case using the special tools.

TOOLS:

Driver 07749-0010000

Attachment, 52 x 55 mm 07746-0010400

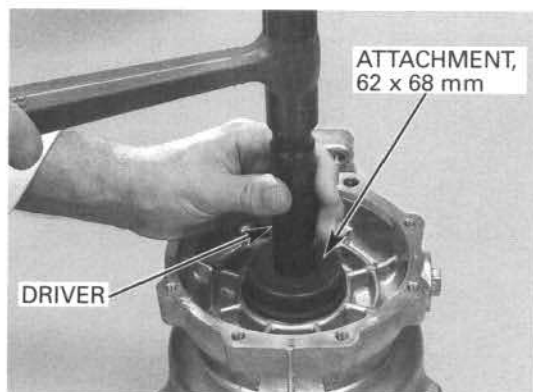


Drive the ring gear bearing into the case using the special tools as shown.

TOOLS:

Driver 07749-0010000

Attachment, 62 x 68 mm 07746-0010500

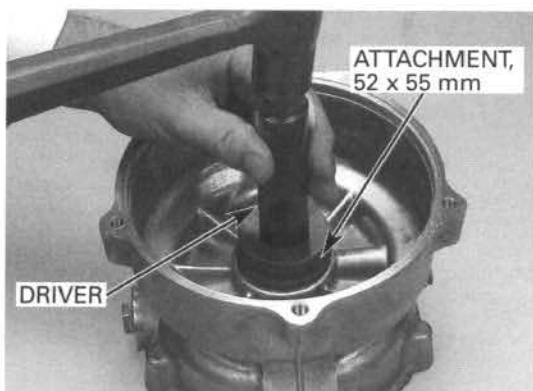


Drive a new oil seal (outer) into the case using the special tools.

TOOLS:

Driver 07749-0010000

Attachment, 52 x 55 mm 07746-0010400



Apply grease to the oil seal lips.



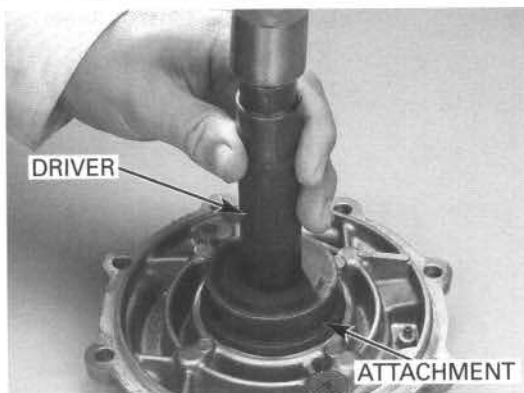
REAR DRIVING MECHANISM

Drive the ring gear bearing into the cover using the special tools as shown.

TOOLS:

Driver 07749-0010000

Attachment, 62 x 68 mm 07746-0010500



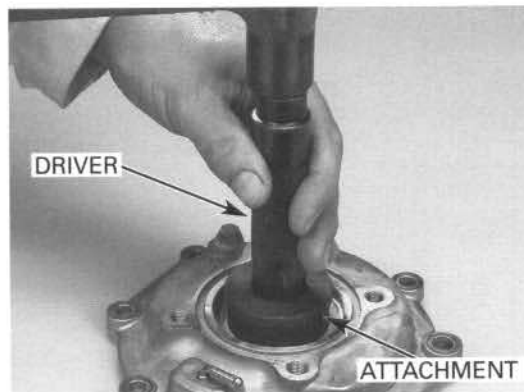
Drive a new oil seal into the cover using the special tools.

TOOLS:

Driver 07749-0010000

Attachment, 52 x 55 mm 07746-0010400

Apply grease to the oil seal lips.



Install the ring gear with the shim 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.

NOTICE

Do not use a torch to heat the cover, it may cause warping.

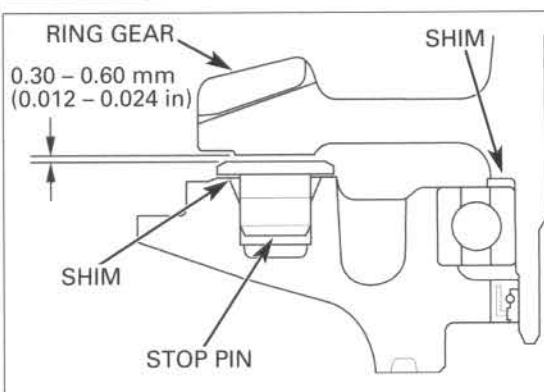
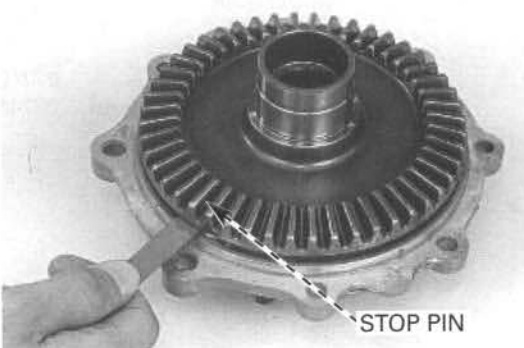
Install a stop pin shim to obtain the correct clearance.

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.



Always wear gloves when handling the cover after it has been heated to prevent burning your hands.

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 07947-3710101 and
Attachment, 42 x 47 mm 07746-0010300 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

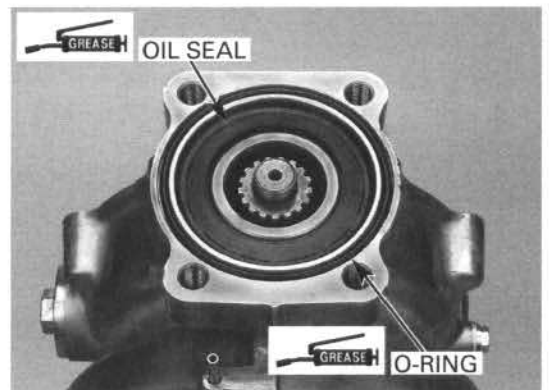
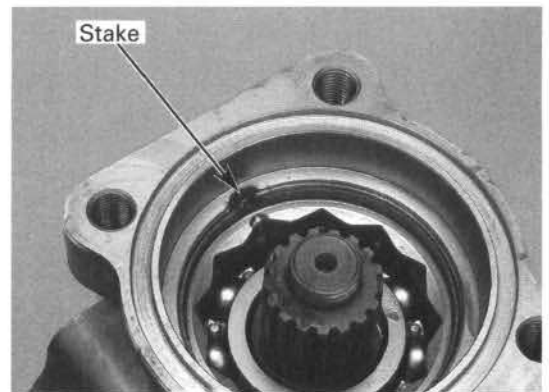
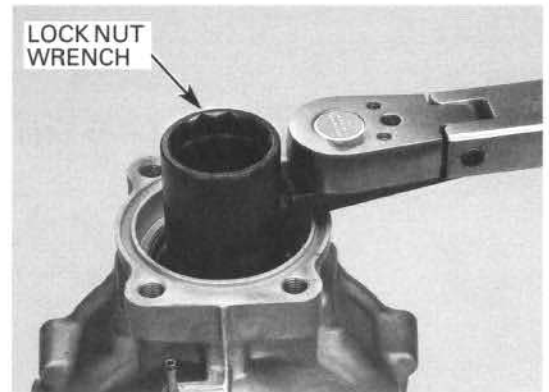
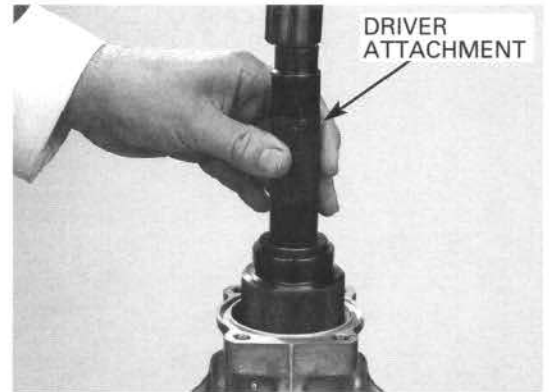
TOOL:

Lock nut wrench, 30 x 64 mm 07916-MB00002

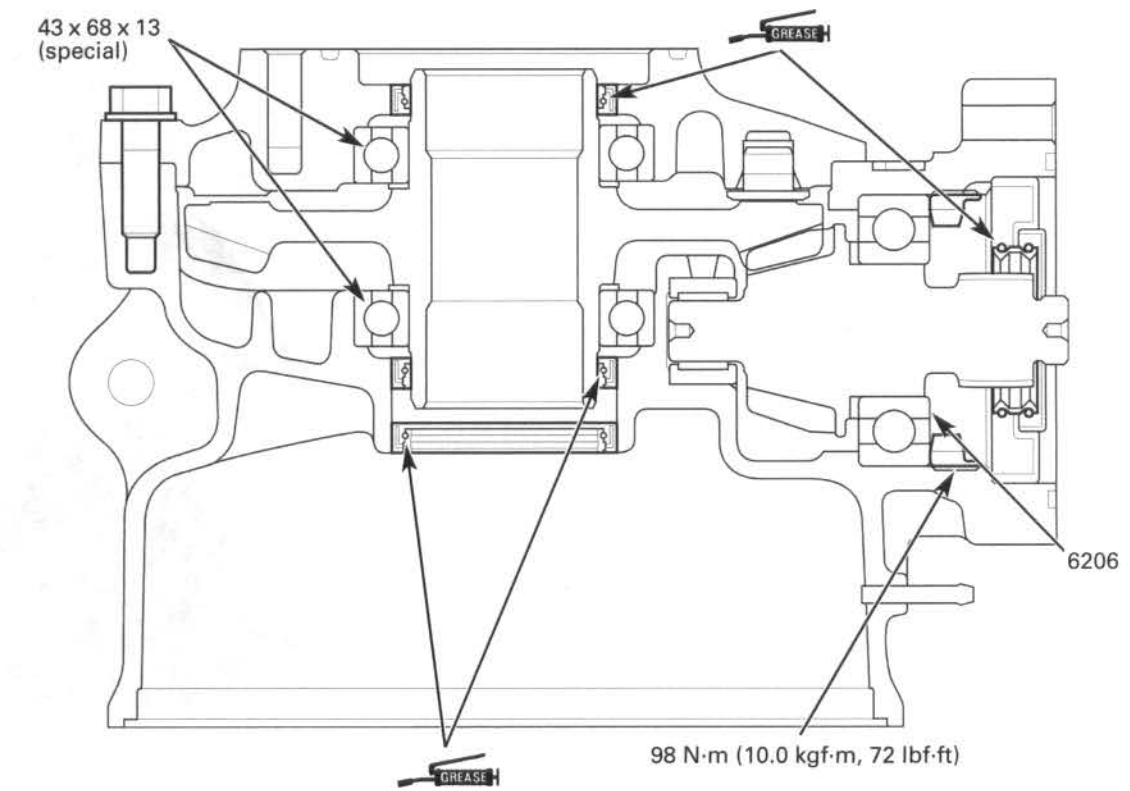
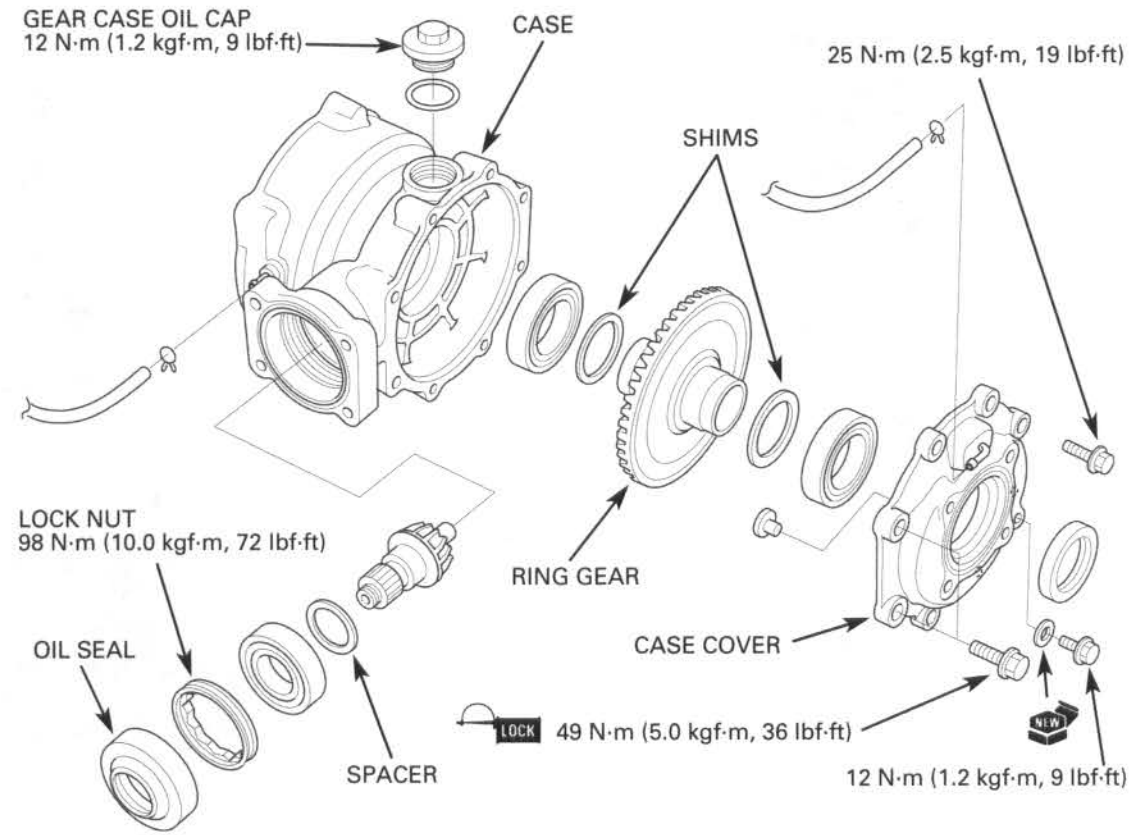
Stake the pinion bearing lock nut.

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



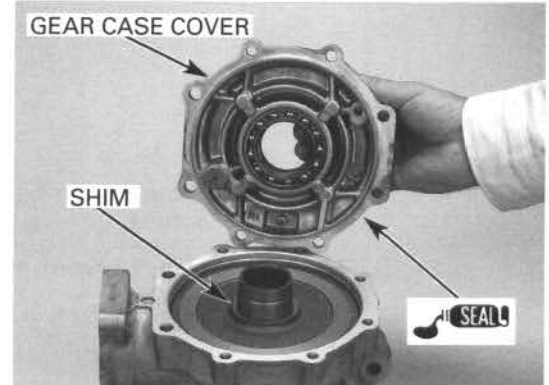
NOTE:

- When the bearing, gear set and/or gear case has been replaced, check the tooth contact pattern (page 15-11) and gear backlash (page 15-9).

Keep dust and dirt out of the gear case.

Install the ring gear shims onto the ring gear.
Install the ring gear, with the shims, 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:

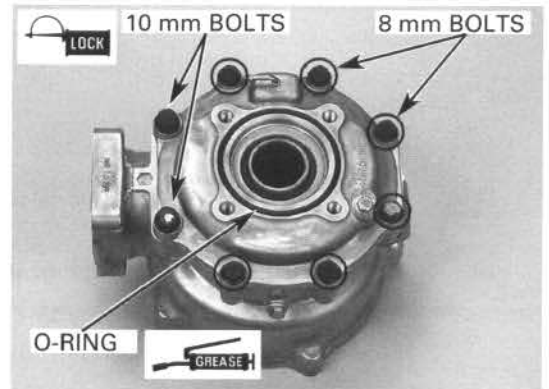
10 mm bolt: 49 N·m (5.0 kgf·m, 36 lbf·ft)

8 mm bolt: 25 N·m (2.6 kgf·m, 19 lbf·ft)

NOTICE

It is important to turn the pinion while tightening the bolts. If the ring gear shim is too thick, the gears will lock after only light tightening.

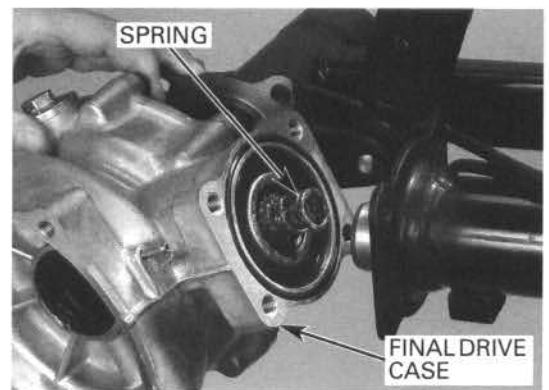
Apply grease to the O-ring.
Install the O-ring to the final drive case.



GEAR CASE INSTALLATION

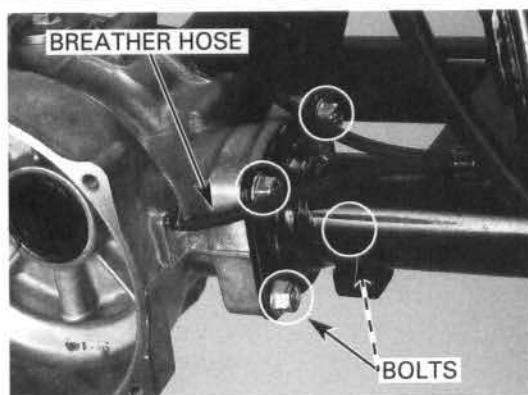
Install the spring in the drive shaft joint.

Install the final drive case to the swingarm.



REAR DRIVING MECHANISM

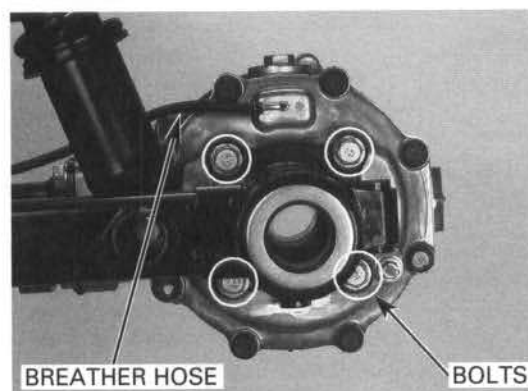
Loosely install the front final drive case bolts.
Connect the breather hoses.



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 hose.

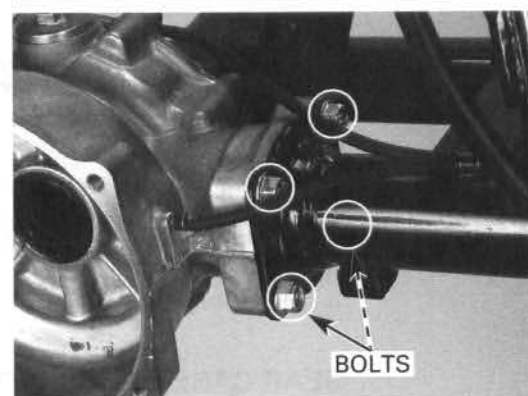


Tighten the front final drive case bolts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Install the rear axle (page 15-7).

Fill the final drive with the recommended oil (page 3-15).

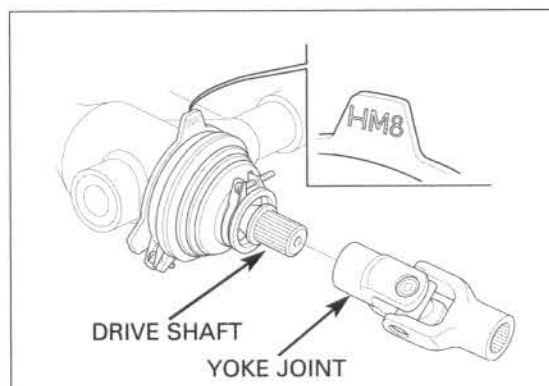


REAR DRIVE SHAFT

REMOVAL

Remove the swingarm (page 13-9).

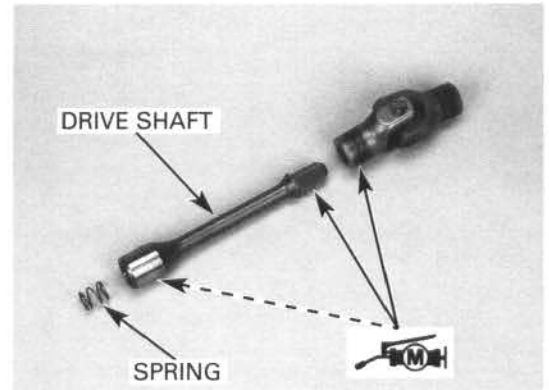
Pull the yoke joint/drive shaft out of the swingarm and disassemble it.



INSPECTION

Inspect the yoke joint bearings for excessive play or damage.

Apply molybdenum disulfide grease to the spline.

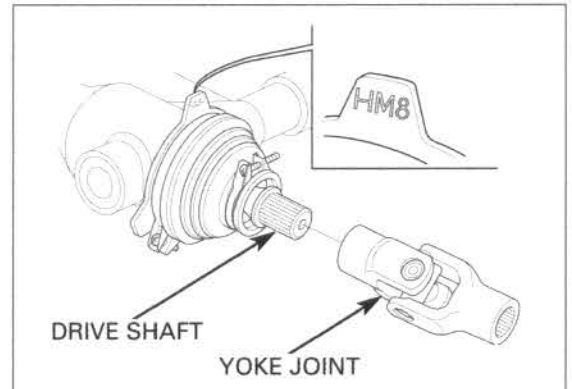


INSTALLATION

Assemble the yoke joint and drive shaft.

Install the yoke joint/drive shaft into the swingarm.

Install the swingarm (page 13-9).



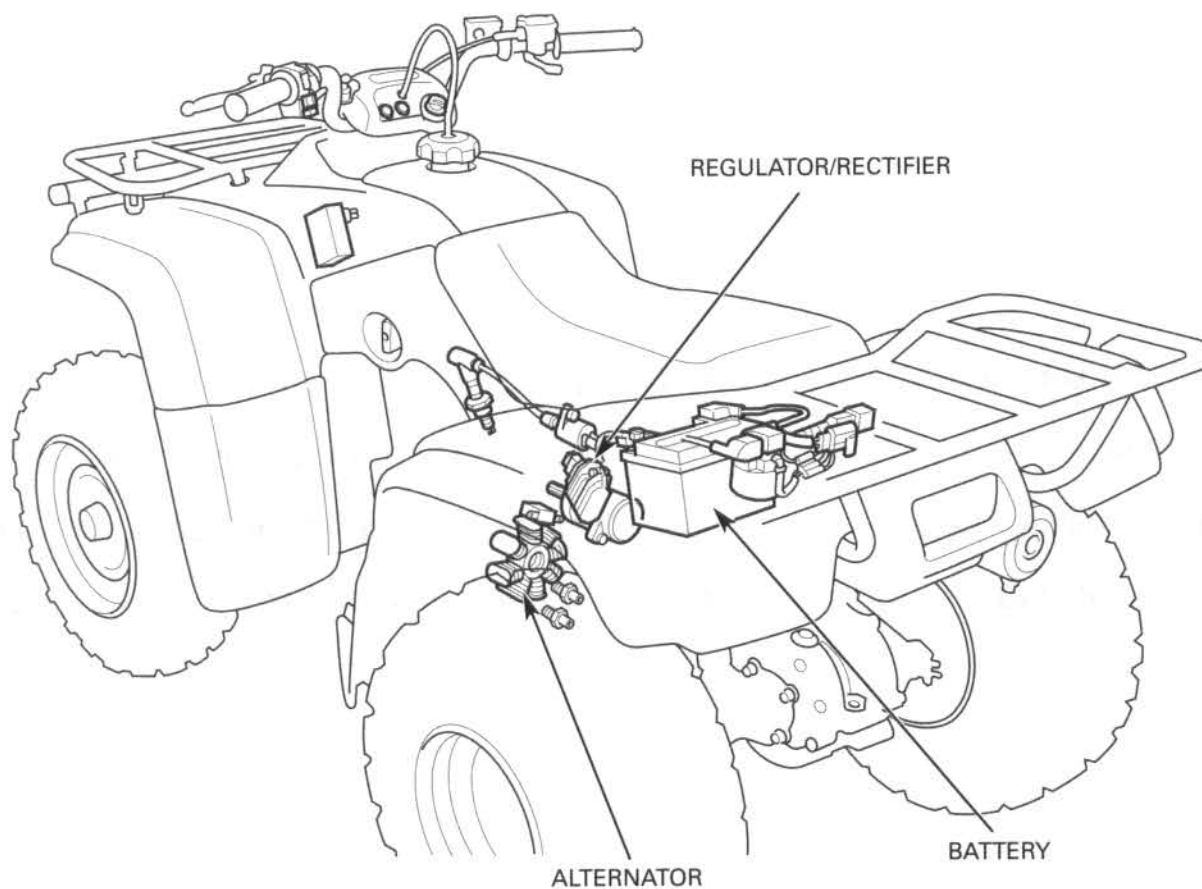
MEMO

16. BATTERY/CHARGING SYSTEM

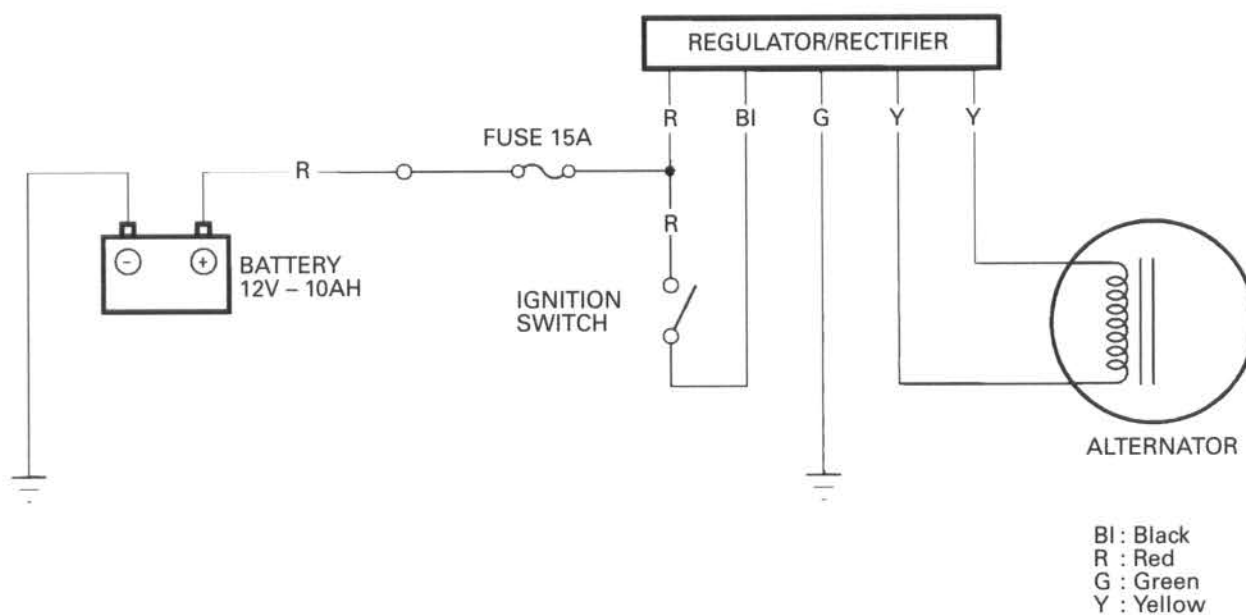
COMPONENT LOCATION.....	16-2	BATTERY.....	16-6
SYSTEM DIAGRAM.....	16-2	CHARGING VOLTAGE INSPECTION.....	16-8
SERVICE INFORMATION	16-3	ALTERNATOR CHARGING COIL	16-9
TROUBLESHOOTING	16-5	REGULATOR/RECTIFIER	16-10

BATTERY/CHARGING SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



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 call your local Poison Control Center or a physician immediately. **KEEP OUT OF REACH OF CHILDREN.**
-
- Always turn off the ignition switch before disconnecting any electrical component.
 - 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 place.
 - For a battery remaining in a stored vehicle, disconnect the negative battery cable from the battery.
 - The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
 - The maintenance free battery must be replaced when it reaches the end of its service life.
 - 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, the 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.
 - 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 section (page 16-5).
 - For alternator service, refer to Section 10.
 - 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 16-5).

BATTERY/CHARGING SYSTEM

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
- 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.

⚠ 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, 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**1. Battery Inspection**

Remove the battery (page 16-6).

Check the battery condition using the recommended battery tester.

RECOMMENDED BATTERY TESTER:

BM-210-AH, BM-210, or BATTERY MATE or equivalent

Does the battery test as good?

NO – Faulty battery

YES – GO TO STEP 2.

2. Battery Current Leakage Inspection

Install the battery (page 16-6).

Check the battery current leakage (Leak test; (page 16-9).

STANDARD:

1 mA max. (Equipped with meter)

0.1 mA max. (No meter model)

Does the battery test within the specified range?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. Battery Current Leakage Inspection with Regulator/Rectifier Disconnected

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

Does the battery test within the specified range?

NO – • Shorted wire harness
• Faulty ignition switch

YES – Faulty regulator/rectifier

4. Alternator Charging Coil Inspection

Check the alternator charging coil.

STANDARD: 0.1 – 1.0 Ω (20°C/68°F)

Is the resistance within the specified range?

NO – Faulty charging coil

YES – GO TO STEP 5.

5. Measure the Charging Voltage

Measure and record the battery voltage using a digital multimeter (page 16-8).

Measure the charging voltage (page 16-8).

Compare the measurements to result of the following calculation.

STANDARD:

MEASURED BV < MEASURED CV < 15.5 V @ 5,000 rpm

BV = Battery Voltage

CV = Charging Voltage

Is the charging voltage within the specified range?

NO – Faulty charging system

YES – GO TO STEP 6.

6. Regulator/Rectifier Inspection

Check the regulator/rectifier connector voltage and resistance (page 16-10).

Is the voltage and resistance within the specified ranges?

NO – • Open circuit in related wire
• Loose or poor contacts of related terminal
• Shorted wire harness

YES – Faulty regulator/rectifier

BATTERY

REMOVAL/INSTALLATION

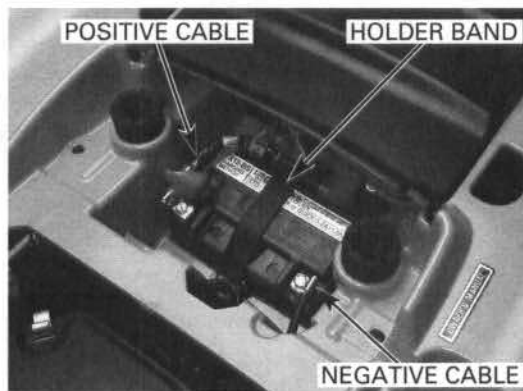
Remove the seat (page 2-4).

Remove the battery holder band.
Disconnect the negative cable and then the positive cable, and remove the battery.

Connect the positive terminal first and then the negative cable.

Install the battery in the reverse order of removal with the proper wiring as shown.

After installing the battery, coat the terminals with clean grease.
Reinstall the removed parts.



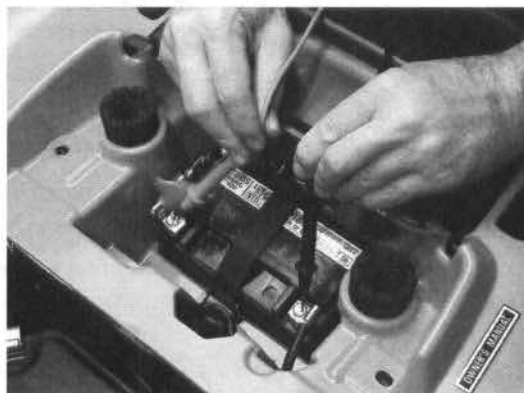
VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:

Fully charged: 13.0 – 13.2 V

Under charged: Below 12.3 V



BATTERY TESTING

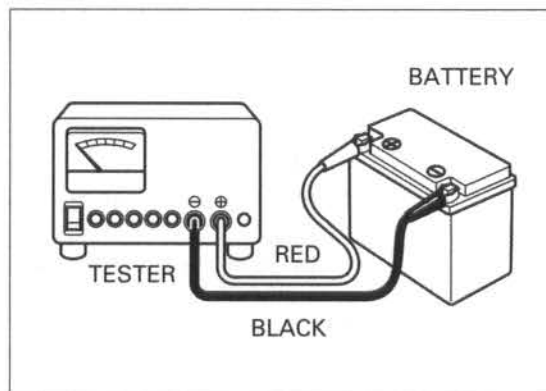
Remove the battery (page 16-6).

Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

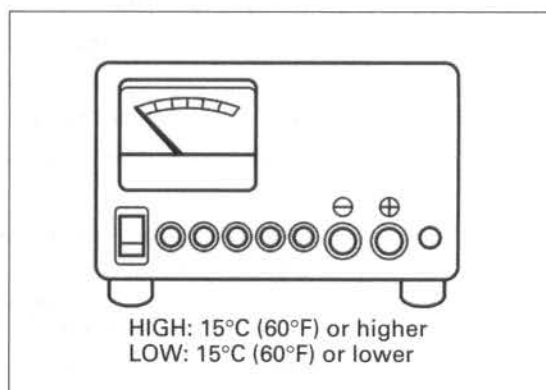
TOOL:

Battery tester BM-210-AH (U.S.A. only) or BM-210

For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.



Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



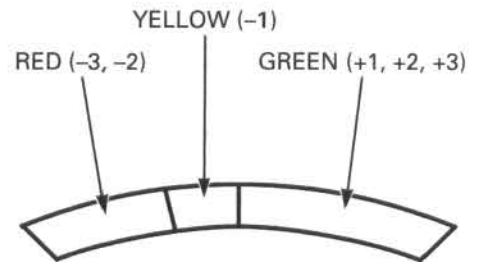
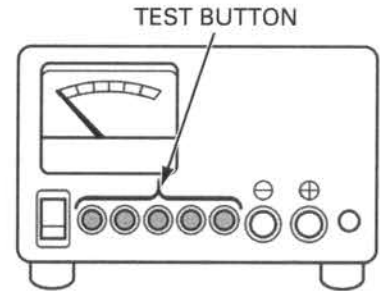
For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

NOTICE

- To avoid damaging the tester, only test batteries with an amperage rating of less than 30 Ah.
- Tester damage can result from overheating when:
 - The test button is pushed in for more than 3 seconds.
 - The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.
 - More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.

The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any battery reading in the green zone is OK. Batteries should only be charged if they register in the YELLOW or RED zone.



BATTERY CHARGING

Remove the battery (page 16-6).

NOTE:

- Make sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger – gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

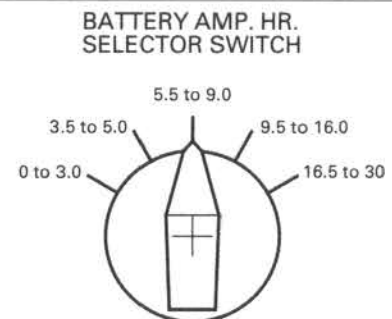
1. Turn the "POWER" switch to OFF.

TOOL:

Christie battery charger MC1012/2 (U.S.A. only)

Turn power ON/OFF at the charger, not at the battery terminal.

2. Set the "BATTERY AMP. HR. SELECTOR SWITCH" for the size of the battery being charged.



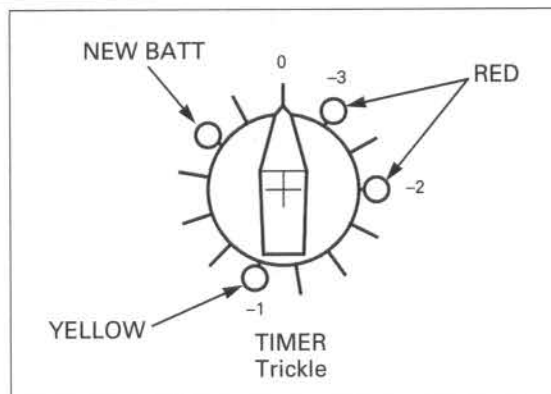
Set the appropriate amp. hour rating.

BATTERY/CHARGING SYSTEM

3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED -3, RED -2 or YELLOW -1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: red to positive, black to negative.

Connecting the cables with the POWER switch turned to ON can produce a spark which could ignite or explode the battery.

Connect the battery cables only when the "POWER" switch is turned to OFF.



5. Turn the "POWER" switch to ON.
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" switch to OFF and disconnect the clamps.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Retest the battery using the Honda Battery Tester and recharge if necessary using the above steps.

The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.

CHARGING VOLTAGE INSPECTION

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.

NOTICE

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 BV < Measured CV < 15.5 V @ 5,000 rpm



CURRENT LEAKAGE INSPECTION

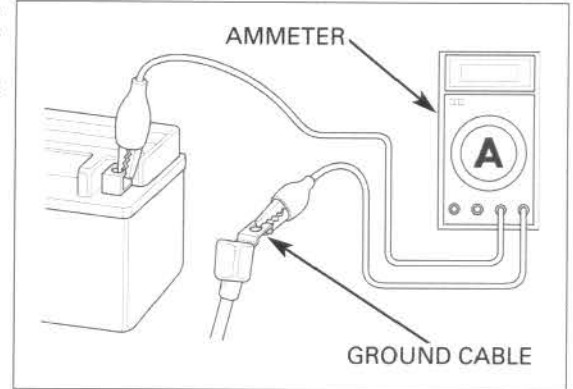
Turn the ignition switch off and disconnect the negative battery cable from the battery. Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal. With the ignition switch off, check for current leakage.

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.

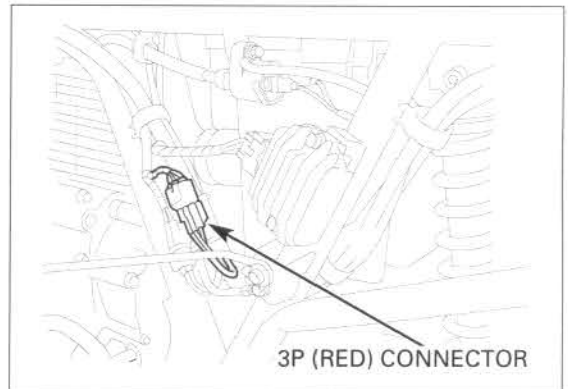
If current leakage exceeds the specified value, a shorted circuit is likely. Locate the short by disconnecting connections one by one and measuring the current.



ALTERNATOR CHARGING COIL

INSPECTION

Remove the seat and left side cover (Section 2).
Disconnect the alternator 3P (Red) connector.

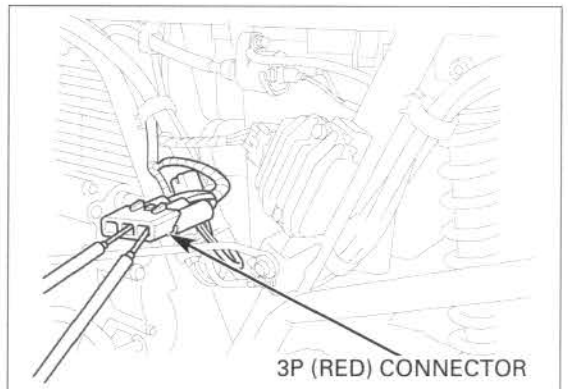


Check the resistance between Yellow terminals.

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 beyond the standard, or if any wire has continuity to ground, replace the alternator stator.
Refer to Section 10 for stator removal.

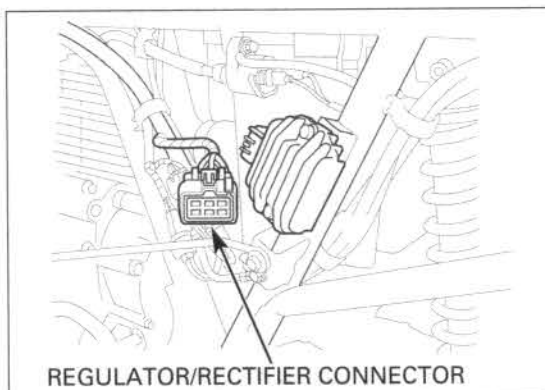


REGULATOR/RECTIFIER

SYSTEM INSPECTION

Remove the seat and left side cover (Section 2).

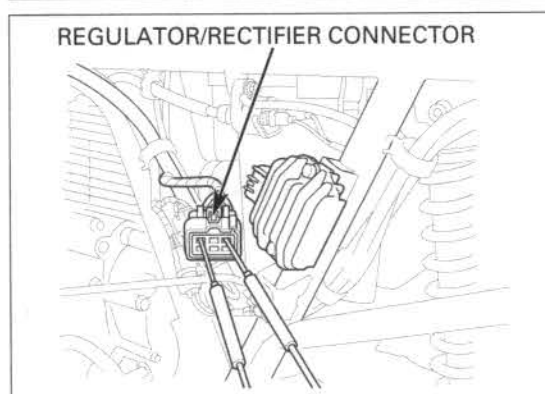
Disconnect the regulator/rectifier connector, and check it for loose contact or corroded terminals.



REGULATOR/RECTIFIER CONNECTOR

If the regulated voltage reading (see page 16-8) 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



REGULATOR/RECTIFIER CONNECTOR

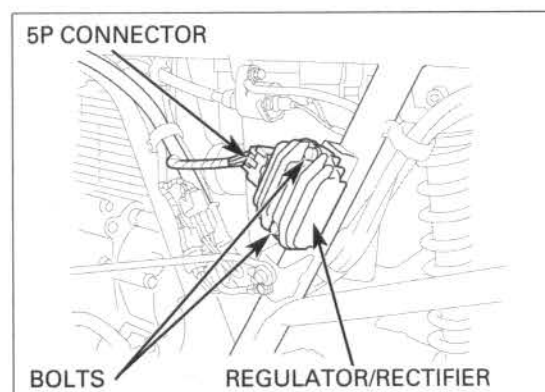
If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

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.



5P CONNECTOR

BOLTS

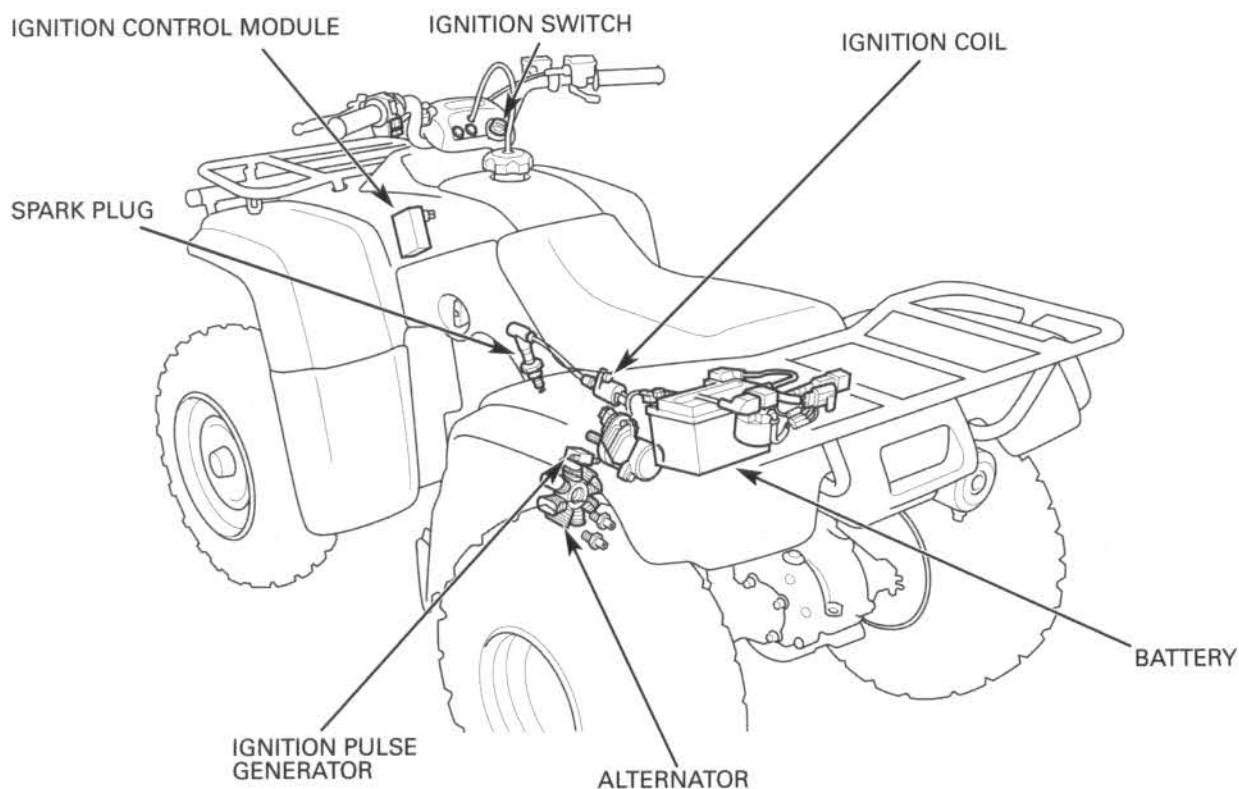
REGULATOR/RECTIFIER

17. IGNITION SYSTEM

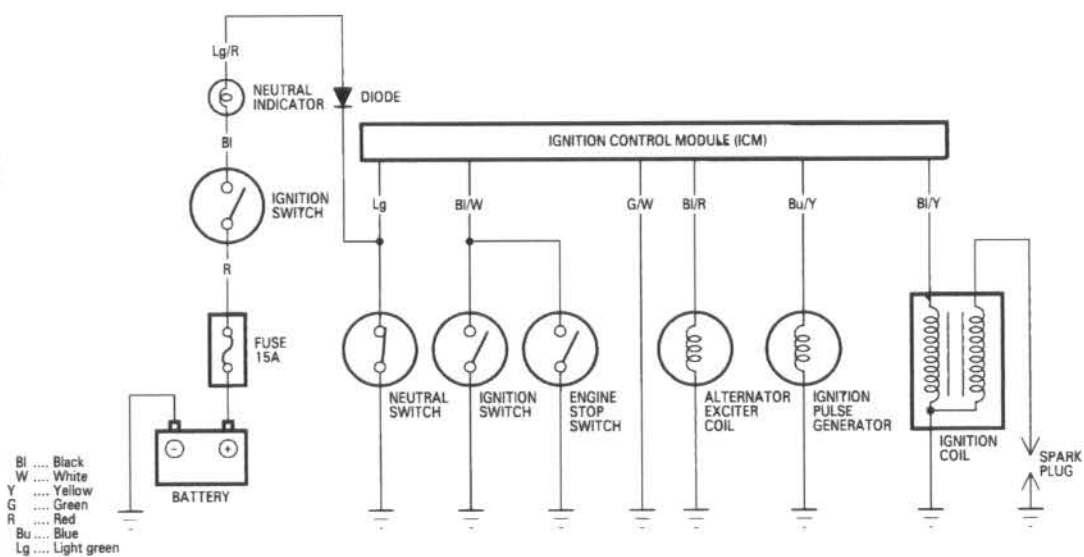
COMPONENT LOCATION	17-2	IGNITION SYSTEM INSPECTION	17-5
SYSTEM DIAGRAM	17-2	IGNITION COIL	17-7
SERVICE INFORMATION	17-3	IGNITION PULSE GENERATOR	17-8
TROUBLESHOOTING	17-4	IGNITION TIMING	17-8

IGNITION SYSTEM

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- 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 17-4.
- 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.

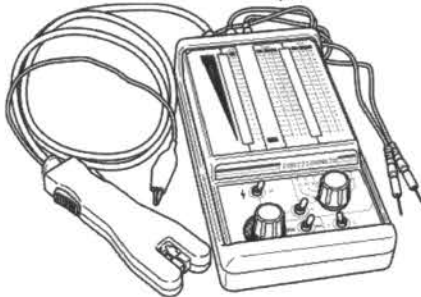
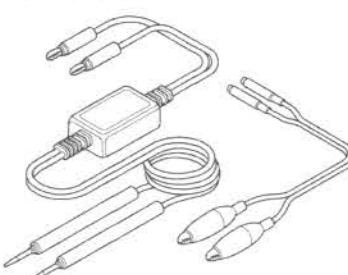
SPECIFICATIONS

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	14° BTDC at idle	
	Full advance	31° BTDC at 3,750 rpm	

TORQUE VALUE

Pulse generator 6 N·m (0.6 kgf·m, 4.3 lbf·ft) Apply a locking agent to the threads.

TOOLS

<p>Peak voltage tester MTP07-0286 (U.S.A. only)</p> 	<p>Peak voltage adaptor 07HGJ-0020100</p>  <p>(not available in U.S.A.) with commercially available digital multimeter (impedance 10 Ω/DCV minimum)</p>
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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 SPARK 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 MΩ/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 10MΩ/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:

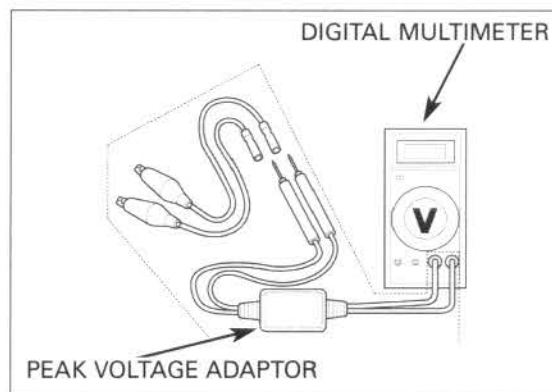
- If there is no spark at plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance 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:

Ignition Mate peak
voltage tester
Peak voltage adaptor

MTP07-0286 (U.S.A. only)
or
07HGJ-0020100 (not
available in U.S.A) with
commercially available
digital multimeter
(impedance 10 M Ω /DCV
minimum)



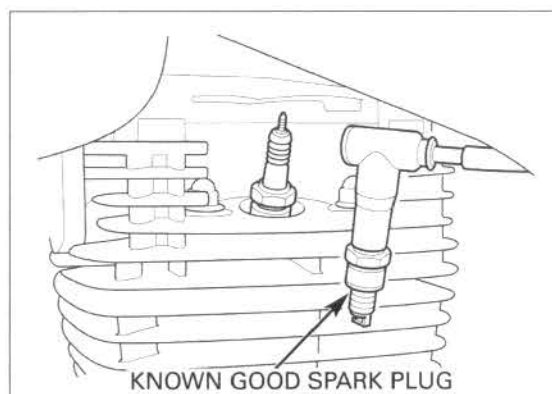
IGNITION COIL PRIMARY PEAK VOLTAGE

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.



IGNITION SYSTEM

With the ignition coil primary wire connected, connect the peak voltage adaptor or peak voltage tester to the ignition coil.

CONNECTION

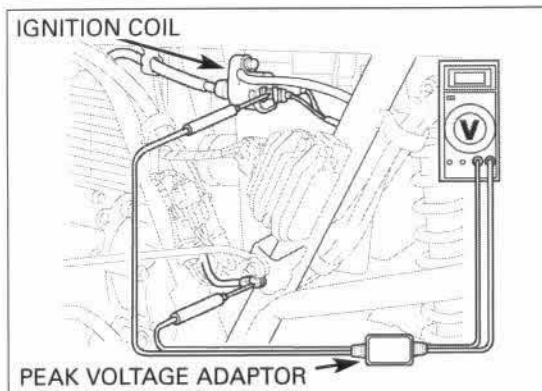
Black/yellow terminal (+) – Body ground (-)

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 no defects are found in the harness, refer to the troubleshooting chart on page 17-4.



IGNITION PULSE GENERATOR PEAK VOLTAGE

Check cylinder compression and check that the spark plug is installed correctly.

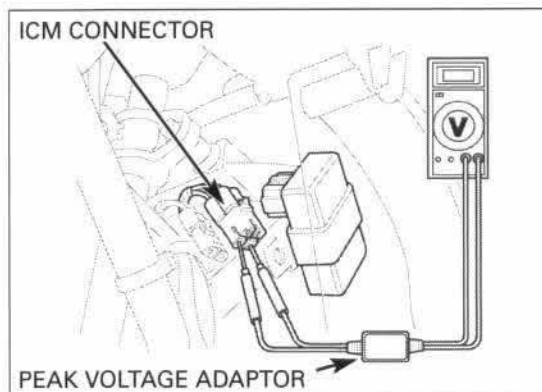
Disconnect the 4P connector from the ICM.

Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side.

TOOLS:

Ignition Mate peak voltage tester
Peak voltage adaptor

MTP07-0286 (U.S.A. only)
or
07HGJ-0020100 (not available in U.S.A) with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)



CONNECTION

Blue/yellow terminal (+) - Green/white (-)

Crank the engine with the starter motor and read the peak voltage.

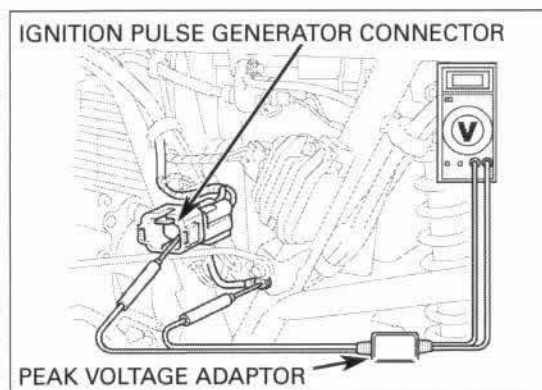
PEAK VOLTAGE: 0.7 V minimum

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 are abnormal, check each item in the troubleshooting chart on page 17-4. If all items are normal, the ignition pulse generator is faulty. See Section 10 for ignition pulse generator replacement.



ALTERNATOR EXCITER COIL PEAK VOLTAGE

Check cylinder compression and check that the spark plug is installed correctly.

Remove the seat and left side cover (Section 2).

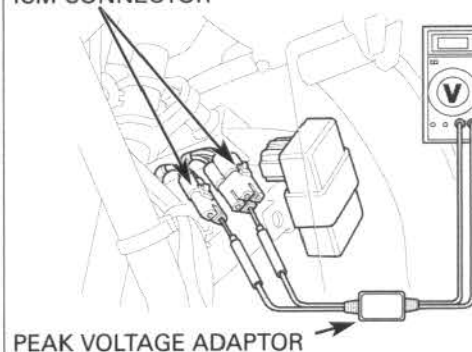
Disconnect the 4P and 2P connectors from the ICM. Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side.

TOOLS:

Ignition Mate peak voltage tester
Peak voltage adaptor

MTP07-0286 (U.S.A. only) or
07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)

ICM CONNECTOR



CONNECTION

Black/red terminal (+) - Green/white (-)

Crank the engine with starter motor and read the peak voltage.

PEAK VOLTAGE: 100 V minimum

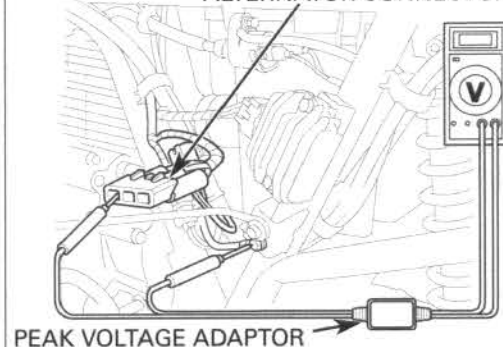
If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the alternator exciter coil connector.

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 are abnormal, check each item in the troubleshooting chart (page 17-4). If all items are normal, the alternator exciter coil is faulty. See Section 10 for stator replacement.

ALTERNATOR CONNECTOR



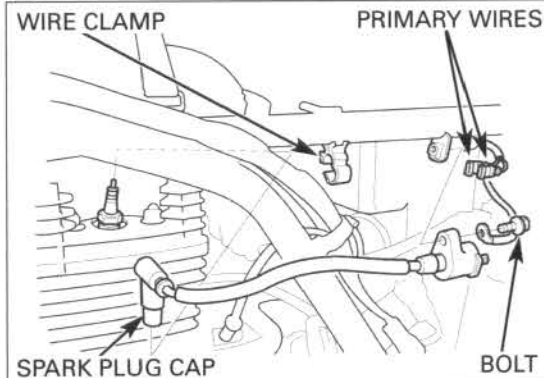
IGNITION COIL

REMOVAL/INSTALLATION

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

Disconnect the spark plug cap from the plug. Release the spark plug wire from the clamp. Disconnect the primary wires from the ignition coil. Remove the ignition coil.

Installation is in the reverse order of removal.



IGNITION SYSTEM

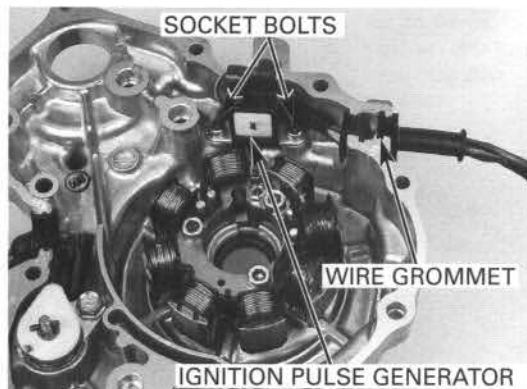
IGNITION PULSE GENERATOR

REMOVAL

Remove the alternator cover (page 10-8).

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.

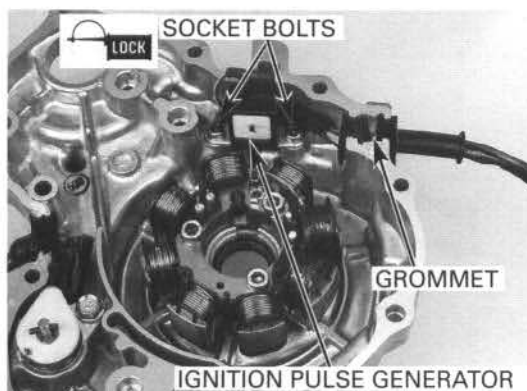
Install and tighten the socket bolts to the specified torque.

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 10-16).



IGNITION TIMING

Warm up the engine.

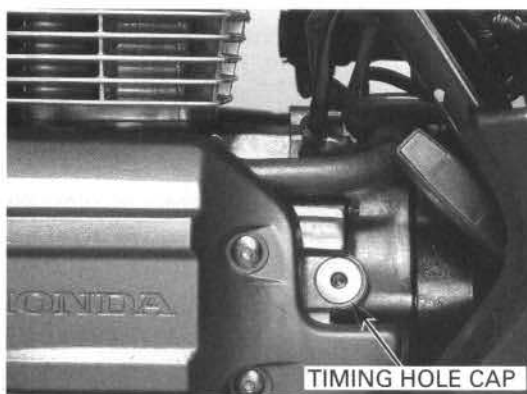
Stop the engine and remove the timing hole cap.

Connect the timing light to the spark plug wire.

Start the engine and let it idle.

IDLE SPEED: 1,400 ± 100 rpm

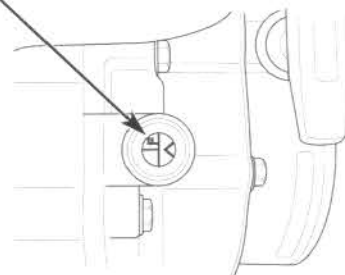
Read the instructions for timing light operation.



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.

"F" MARK



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)



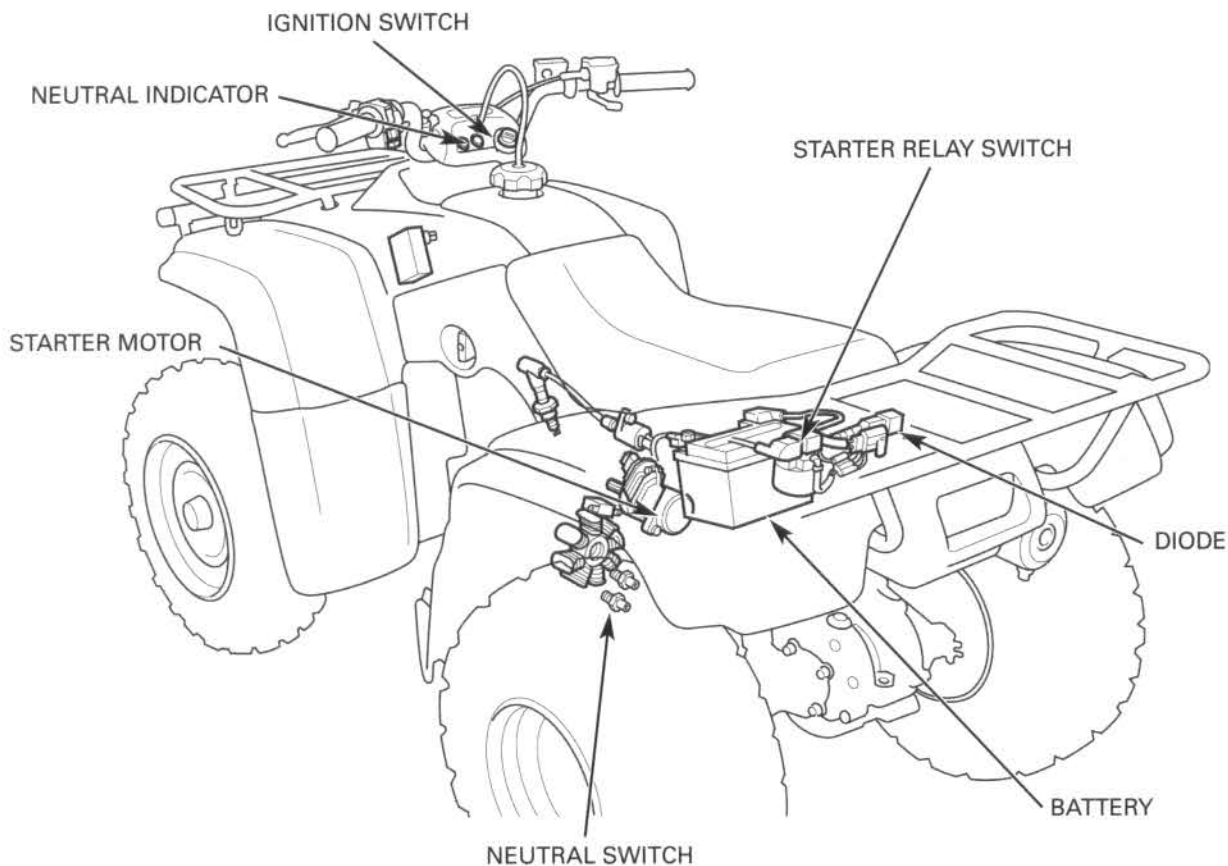
MEMO

18. ELECTRIC STARTER

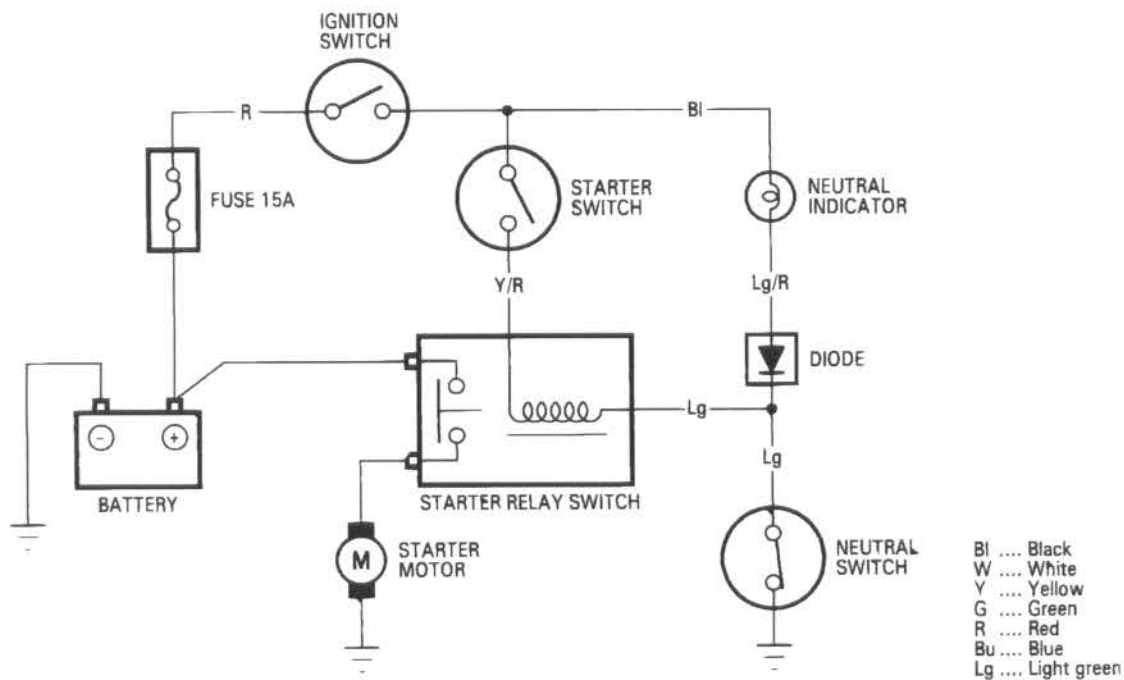
COMPONENT LOCATION	18-2	STARTER MOTOR	18-5
SYSTEM DIAGRAM	18-2	STARTER RELAY SWITCH	18-10
SERVICE INFORMATION	18-3	DIODE	18-11
TROUBLESHOOTING	18-4		

ELECTRIC STARTER

COMPONENT LOCATION



SYSTEM DIAGRAM



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.

SPECIFICATION

Unit: mm (in)

ITEM	SPECIFICATION	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 will not turn

1. Starter Relay Switch Circuit Inspection

With the ignition switch ON, momentarily push the starter switch button and listen for a "Click" sound from the starter relay switch (page 18-10).

Does the starter relay click?

YES – GO TO STEP 2.

NO – GO TO STEP 3.

2. Starter Motor Test

Check operation of the starter motor by temporarily connecting it directly to the vehicle battery.

Does the starter motor turn?

YES – • Poorly connected starter motor cable
• Faulty starter relay switch (page 18-10)

NO – Faulty starter motor (page 18-5)

3. Neutral Indicator Inspection

Check the function of the neutral indicator.

Does the neutral indicator function properly?

NO – • Faulty gear position switch (page 19-8)
• Loose neutral/reverse switch connector
• Faulty ignition switch (page 19-5)
• Neutral indicator bulb burned
• Faulty diode (page 18-11)

YES – GO TO STEP 4.

4. Starter Relay Switch Voltage Check

Check for presence of battery voltage at the starter relay switch.

Is battery voltage present?

NO – • Faulty starter switch (page 19-6)
• Open or short circuit in wire harness

YES – GO TO STEP 5.

5. Starter Relay Switch Continuity Check

Check the starter relay switch for continuity.

Is continuity presence when the starter relay switch is activated?

NO – Faulty starter relay switch (page 18-10)

YES – Loose starter relay switch connector

Starter motor turns slowly

- Low battery voltage
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns, but the engine does not turn

- Faulty starter clutch (see Section 10)
- Faulty starter reduction gears (see Section 10)

Starter motor and engine turn, but engine does not start

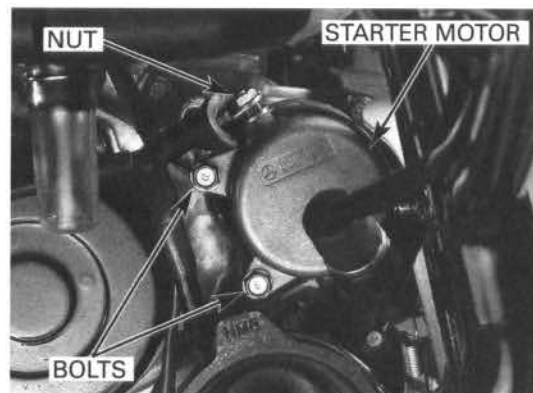
- Faulty ignition system (see Section 17)
- Engine problems (see Sections 3, 7)
 - Low compression
 - Fouled spark plug

STARTER MOTOR

REMOVAL

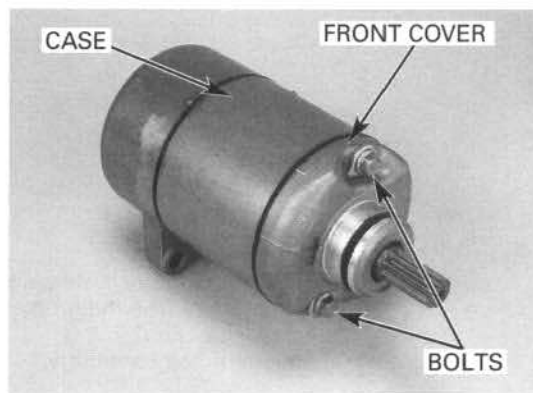
With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Disconnect the starter cable from the starter motor. Remove the two mounting bolts and the starter motor.

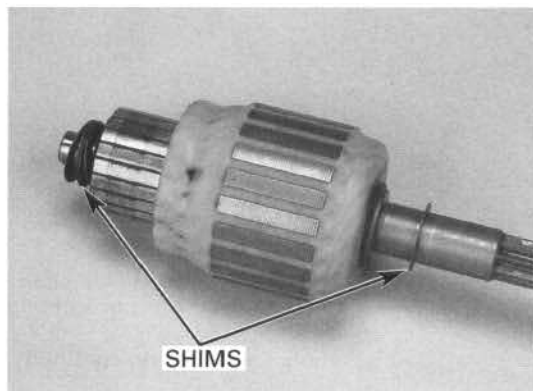


DISASSEMBLY

Remove the two starter motor case bolts and remove the front cover, motor case and armature coil.

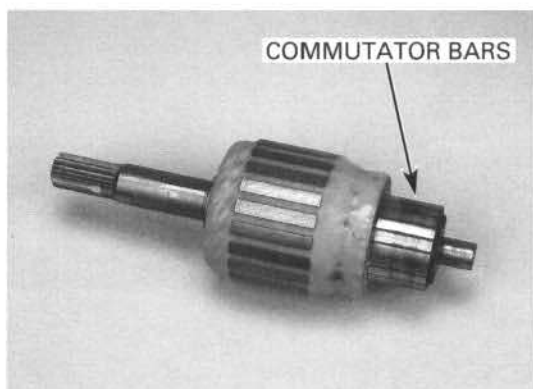


Record the number and location of shims for correct assembly.



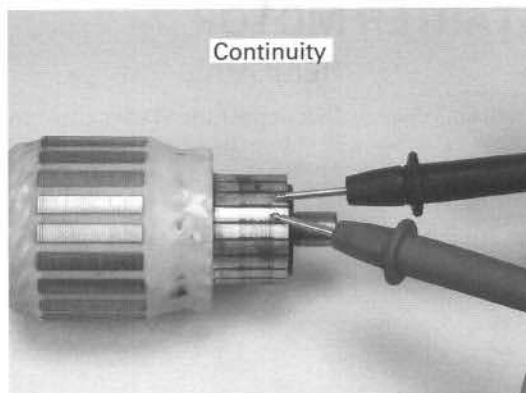
INSPECTION

Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

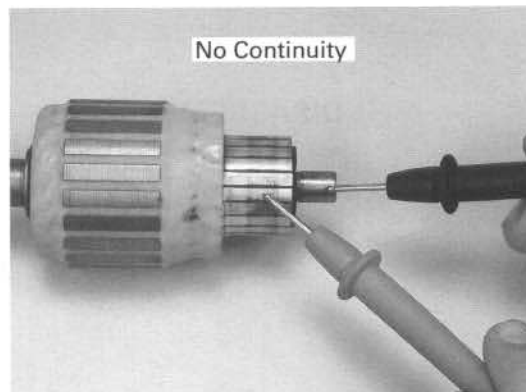


ELECTRIC STARTER

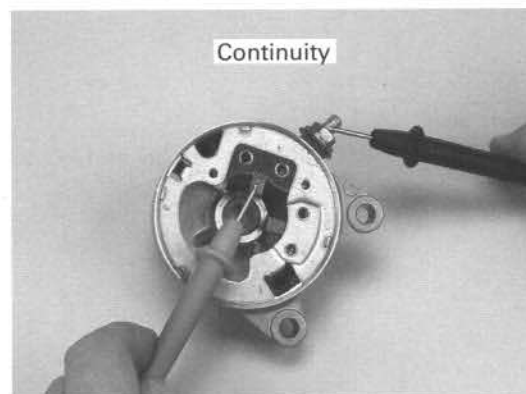
Check for continuity between individual commutator bars; there should be continuity.



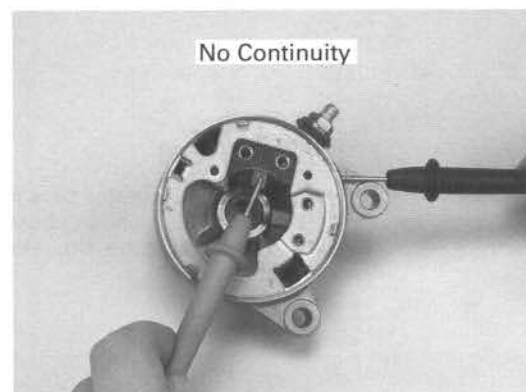
Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.



Check for continuity between the cable terminal and the brush wire (the indigo colored wire or the insulated brush holder). There should be continuity.

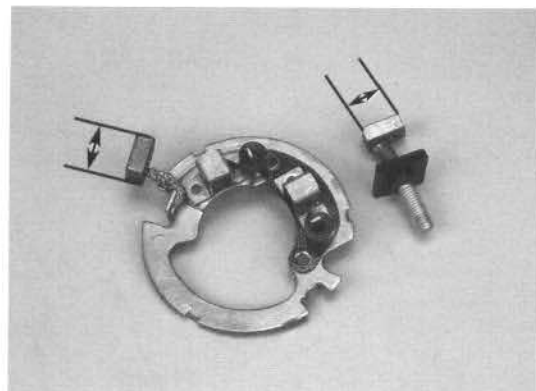


Check for continuity between the rear cover and the brush wire (the indigo colored wire or the insulated brush holder). There should be no continuity.

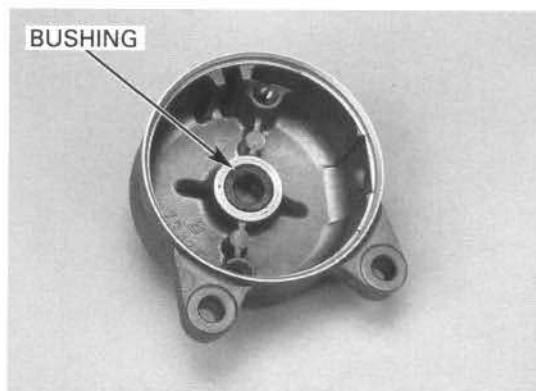


Disassemble the rear cover.
Inspect the brushes for damage and measure the brush length.

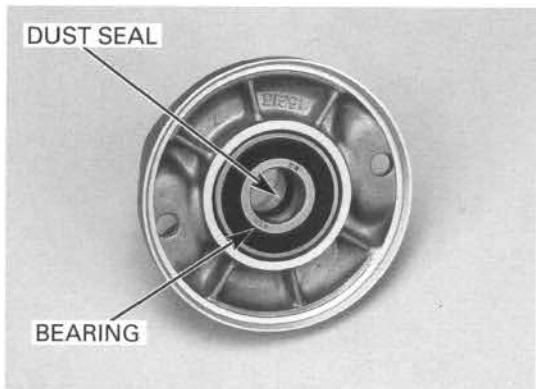
SERVICE LIMIT: 9.0 mm (0.35 in)



Check the bushing of the rear cover for wear or damage.

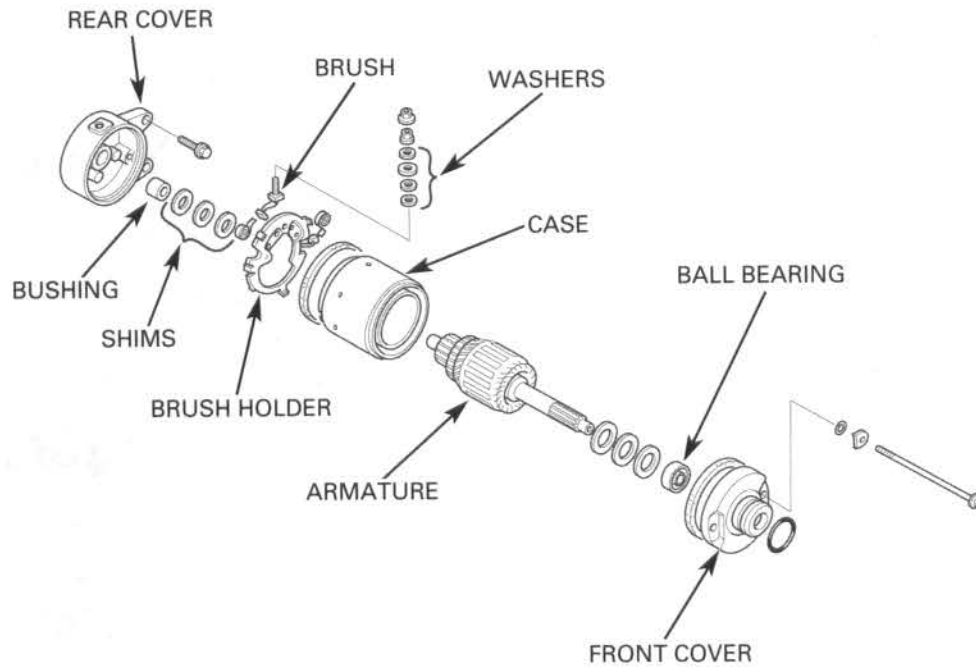


Check the ball bearing of the front cover for smooth rotation.
Check the dust seal for wear or damage.

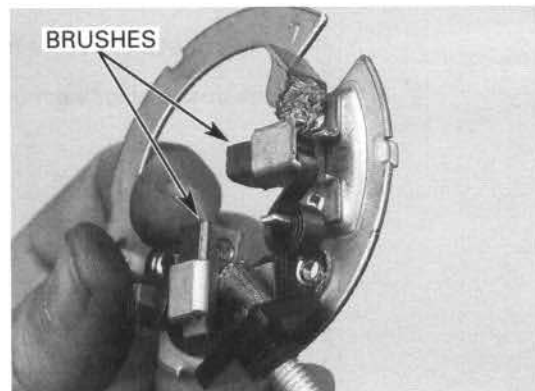


ELECTRIC STARTER

ASSEMBLY

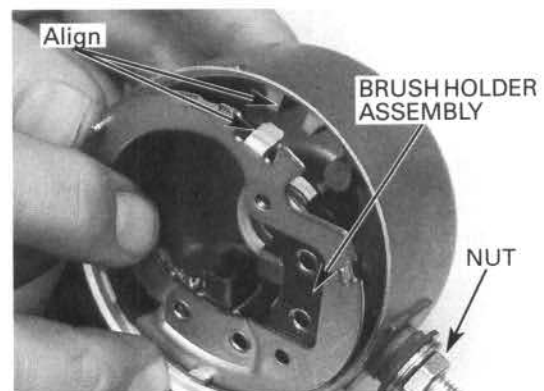


Install the brushes in the brush holders as shown.



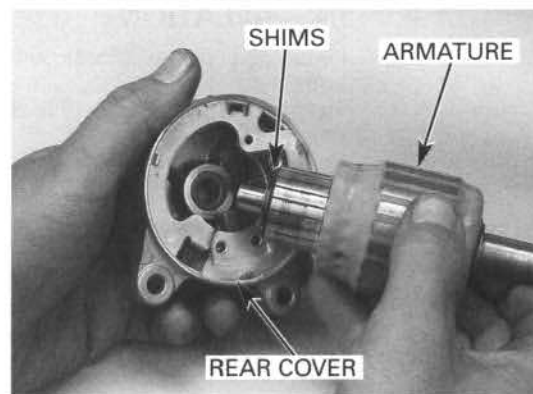
Install the brush holder assembly to the rear cover, aligning the tab of the holder with the groove of the rear cover.

Install the insulating washers and nut onto the terminal.
Tighten the nut.



Install the shims onto the armature coil in the correct positions as recorded.

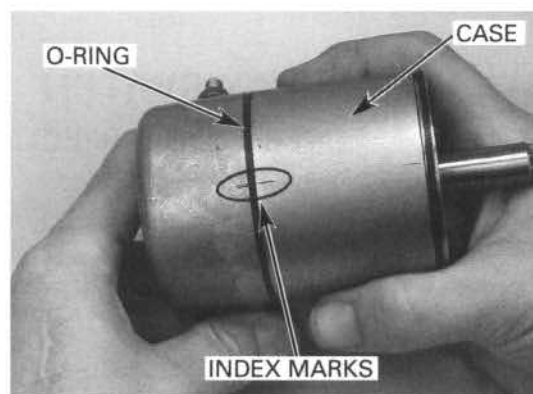
Install the armature in the rear cover.



Hold the armature coil shaft, or armature might be drawn out by the magnetic field.

Install the O-ring on the motor case.

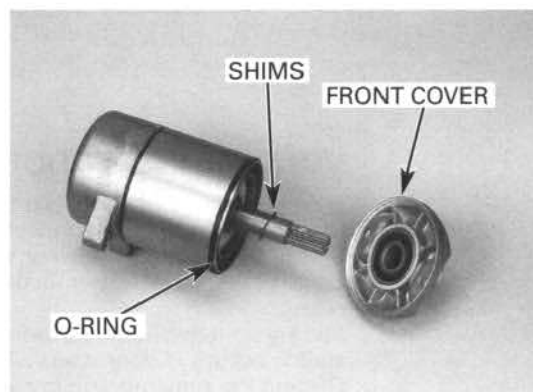
Assemble the motor case and rear cover, aligning the index marks.



Do not damage the front cover dust seal.

Apply grease to the dust seal of the front cover.

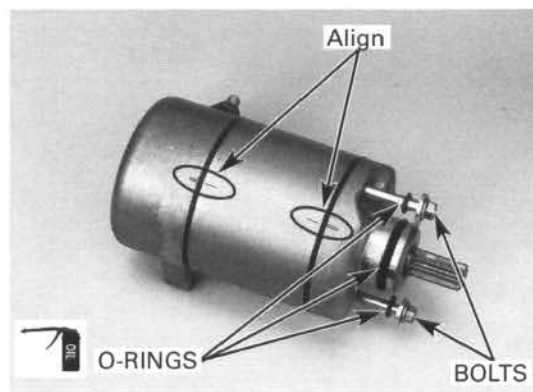
Install the shims to the shaft in the correct positions as recorded, and O-ring to the case.



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.



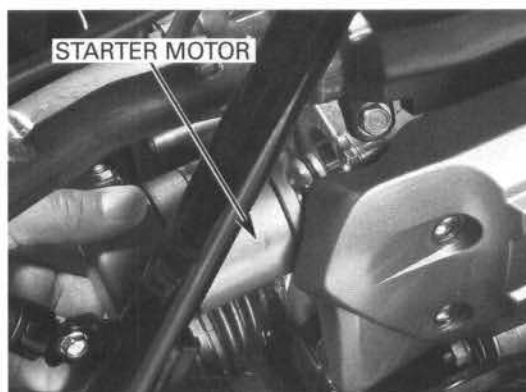
ELECTRIC STARTER

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

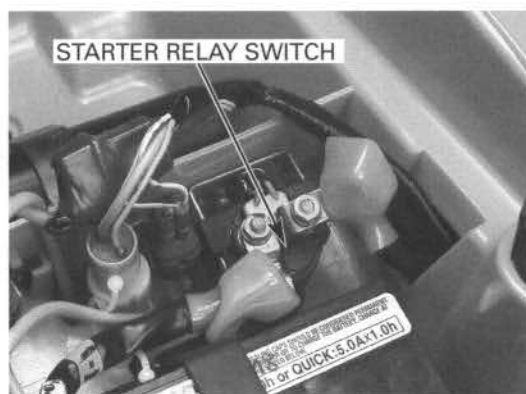
OPERATION INSPECTION

Remove the seat.

Remove the toolbox cover (page 2-12).

Depress the starter switch button with the ignition switch ON.

The coil is normal if the starter relay switch clicks.

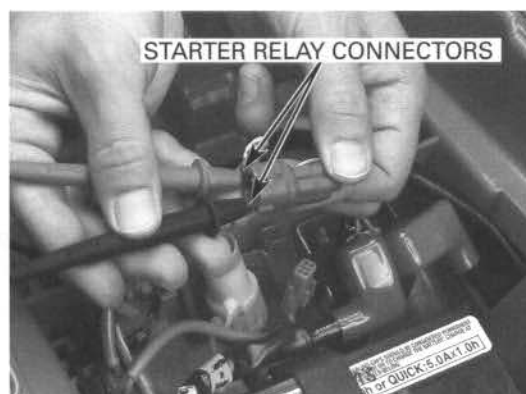


VOLTAGE INSPECTION

If the switch "CLICK" is not heard, disconnect the starter relay switch 2P connector.

Measure the voltage between the Yellow/red (+) and Light green (-) wire terminals of the wire harness side.

Battery voltage should be indicated when the starter switch button is depressed with the ignition switch ON and the transmission in neutral.



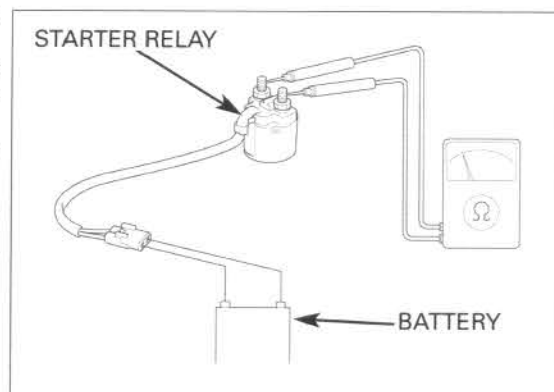
CONTINUITY INSPECTION

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 there should be no continuity when the battery is disconnected.



DIODE

REMOVAL

Remove the seat (page 2-4).

Remove the toolbox cover (page 2-12).

Unwrap the tape and remove the diode from the wire harness.



INSPECTION

Check for continuity with an ohmmeter.

Normal direction: Continuity

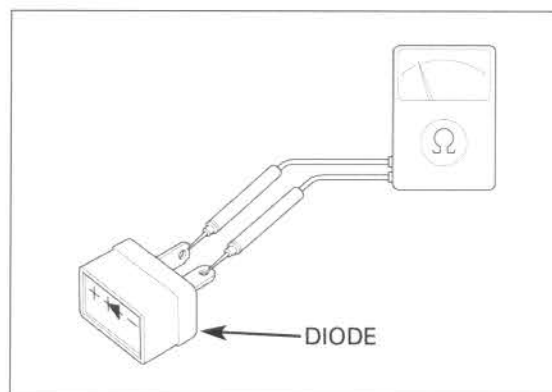
Reverse direction: No continuity

INSTALLATION

Install the diode.

Tape the diode to the harness.

Install the seat (page 2-4).



MEMO

RIDE RED

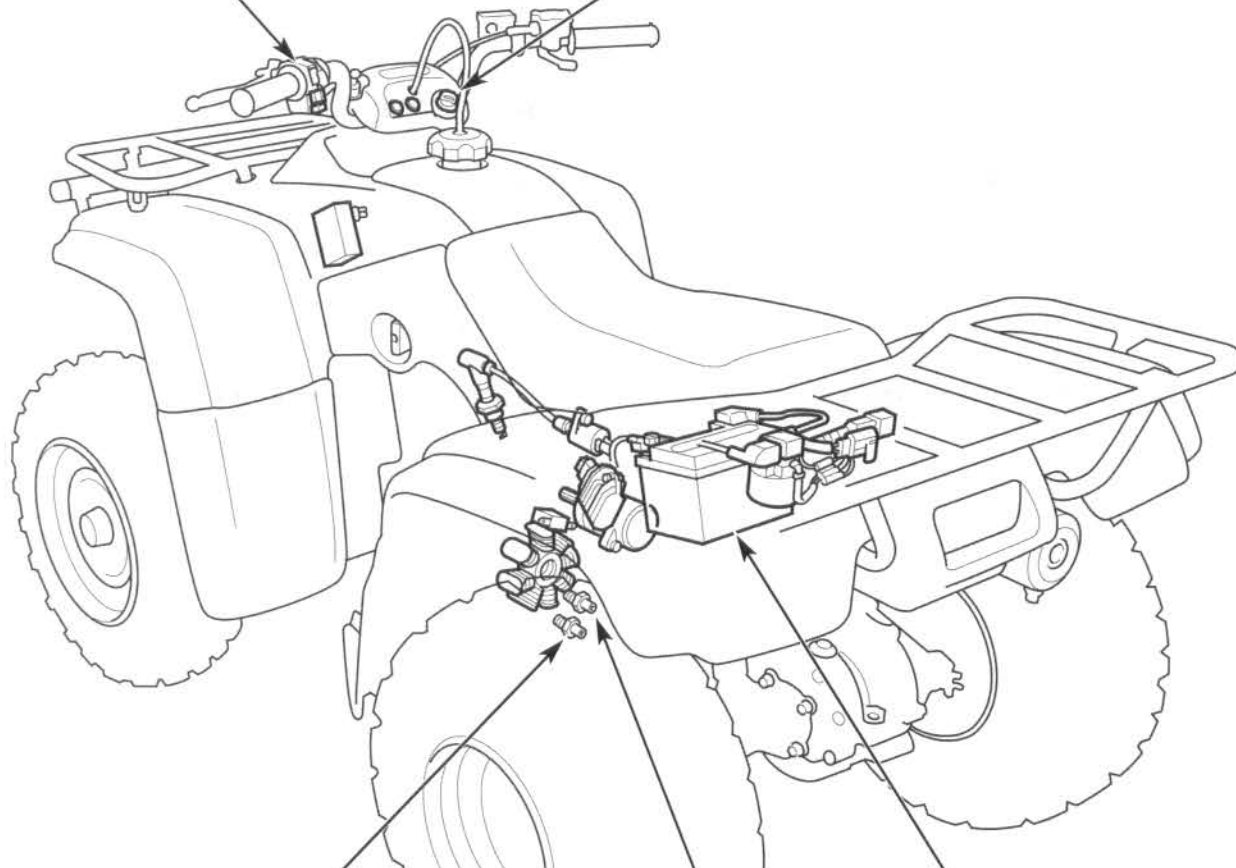
19. LIGHTS/SWITCHES

COMPONENT LOCATION	19-2	IGNITION SWITCH	19-5
SERVICE INFORMATION	19-3	HANDLEBAR SWITCHES	19-6
TROUBLESHOOTING	19-3	BRAKE LIGHT SWITCH	19-7
HEADLIGHT	19-4	GEAR POSITION SWITCH	19-8
TAIL/STOP LIGHT REPLACEMENT	19-4	VEHICLE SPEED SENSOR (TE model)	19-9
INDICATOR LAMPS	19-5		

COMPONENT LOCATION

HANDLEBAR SWITCH

IGNITION SWITCH



NEUTRAL SWITCH

REVERSE SWITCH

BATTERY

SERVICE INFORMATION

GENERAL

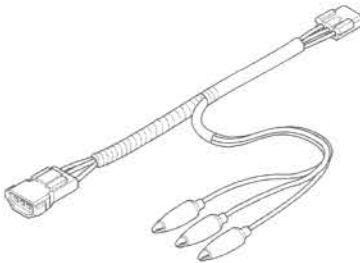
- A continuity check can usually be made without removing the part from the vehicle by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight		12 V 25/25 W x 2
	Tail light		LED x 3
	Indicator (Reverse/Neutral)		12 V – 1.7 W x 2
Fuse	Main fuse	TM	15 A
		TE	15 A, 30 A

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

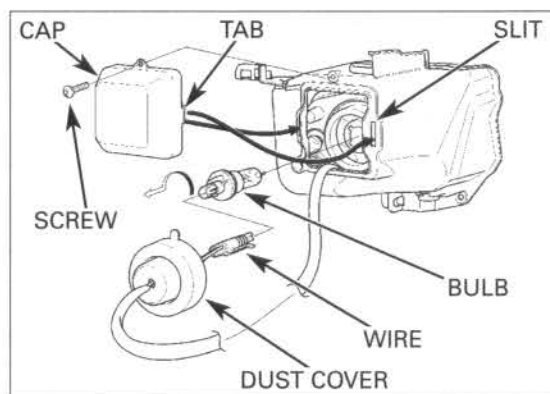
Remove the screw and headlight case cover.

Remove the screw and the cover cap by releasing the tabs from the slits in the headlight cover.

Remove the dust cover from the headlight.

Disconnect the headlight wire from the bulb.

Turn the bulb counterclockwise to remove it.



Align the bulb tab with the headlight groove. Install the dust cover tightly against the headlight with the "TOP" mark facing up.

TAIL/STOP LIGHT REPLACEMENT

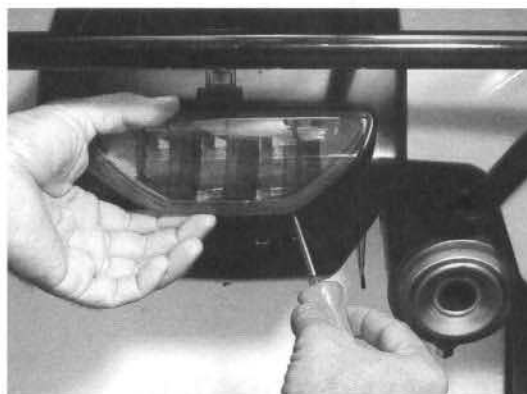
Pry the tail/stop light out of the toolbox lid with a screwdriver.

Disconnect the tail/stop light connector.

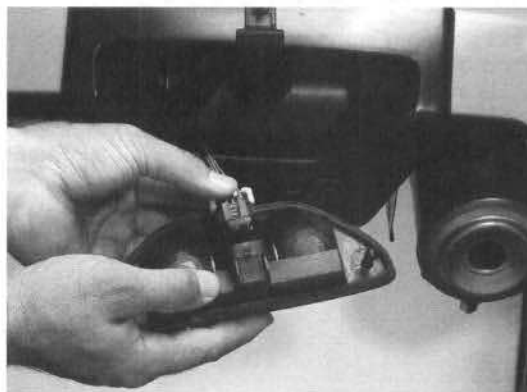
Replace the tail/stop light as an assembly.

Connect the tail/stop light connector.

The tail/stop light is an LED assembly and cannot be serviced.



Align the posts with the grommets and push the tail/stop light into the toolbox lid.



INDICATOR LAMPS

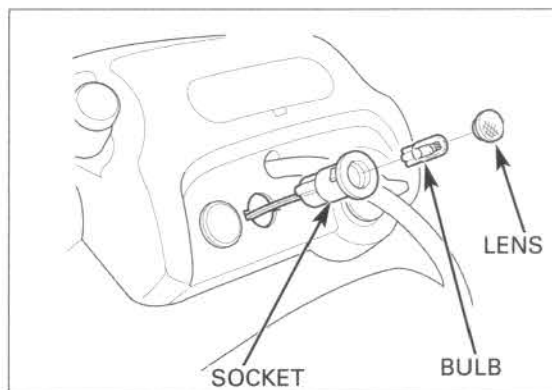
BULB REPLACEMENT

Pull the indicator lamp socket out of the handlebar cover.

Remove the indicator lens.

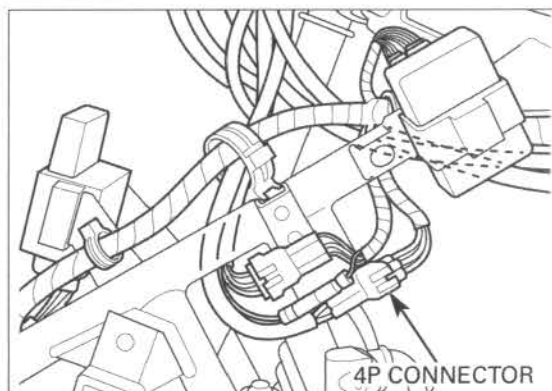
Remove the bulb from the socket and replace it with a new one.

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 2-8).

Disconnect the indicator wire (4P) connector, and replace the indicator wires as an assembly.

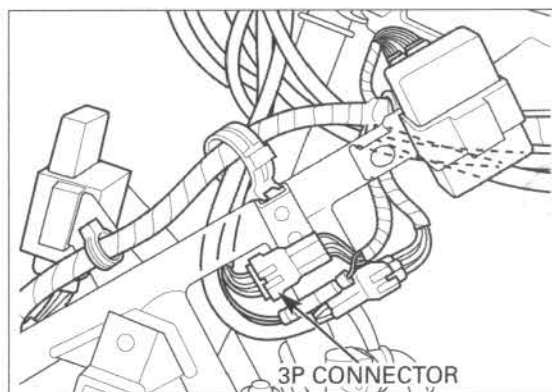


IGNITION SWITCH

INSPECTION

Remove the front fender (page 2-8).

Disconnect the ignition switch wire (3P) connector.

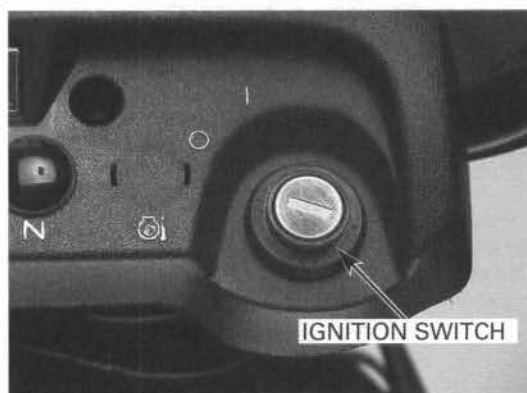


LIGHTS/SWITCHES

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:

	IG	E	BAT	HO
OFF	○	○		
ON			○	○
CORD COLOR	Black/white	Green	Red	Black



HANDLEBAR SWITCHES

The handlebar switches (lighting, dimmer, engine stop and starter) must be replaced as an assembly.

Remove the front fender (page 2-8).

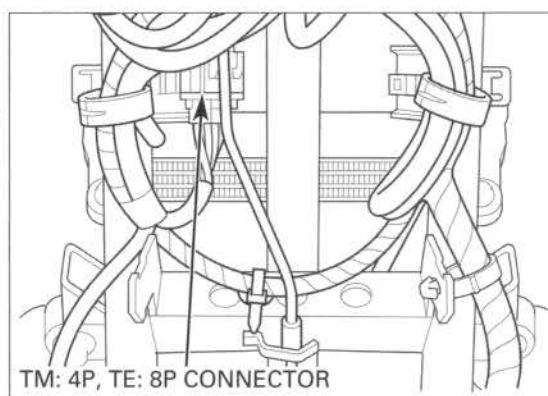
Disconnect the handlebar switch (TM model: 4P Red, TE model: 8P Gray) connector.

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			DIMMER SWITCH		
	C	TL (HL)		HI (HL)	LO
OFF			HI	○	○
ON	○	○	(N)	○	○
LEAD COLOR	Black	Brown	LO	○	○
			LEAD COLOR	Blue	White

CONNECTION OF SW

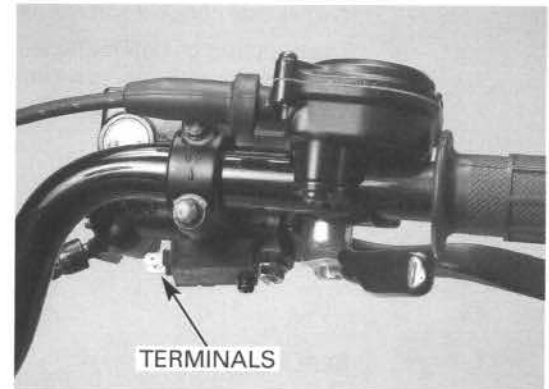
BRAKE LIGHT SWITCH

FRONT BRAKE LEVER

INSPECTION

Disconnect the front brake lever switch connectors and check for continuity between the switch terminals.

There should be continuity with the front brake lever squeezed and no continuity with the lever released.



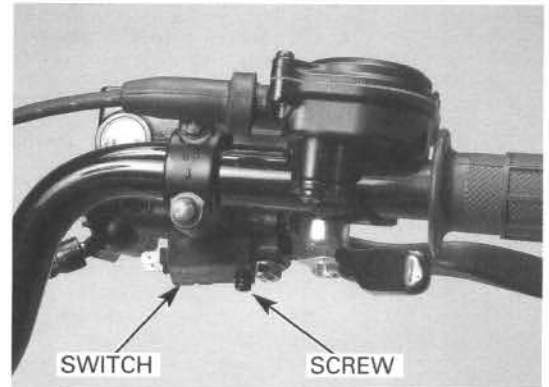
REPLACEMENT

Disconnect the brake light connectors from the switch.

Remove the rubber cover.

Remove the screw and brake light switch.

Install a new brake light switch in the reverse order of removal.



REAR BRAKE LEVER

INSPECTION

Disconnect the rear brake lever switch connectors and check for continuity between the switch terminals.

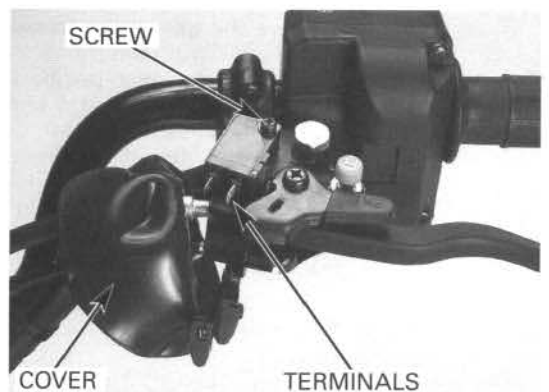
There should be continuity with the rear brake lever squeezed and no continuity with the lever released.

REPLACEMENT

Expose the brake light switch by pulling back the rubber cover.

Disconnect the brake light connectors from the switch.

Install a new brake light switch in the reverse order of removal.

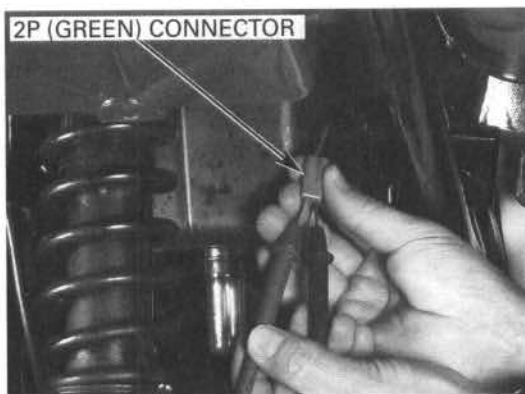


REAR BRAKE PEDAL

INSPECTION

Disconnect the rear brake pedal switch 2P (Green) connector and check for continuity between the switch side connector terminals.

There should be continuity with the rear brake pedal depressed and no continuity with the pedal released.



REPLACEMENT

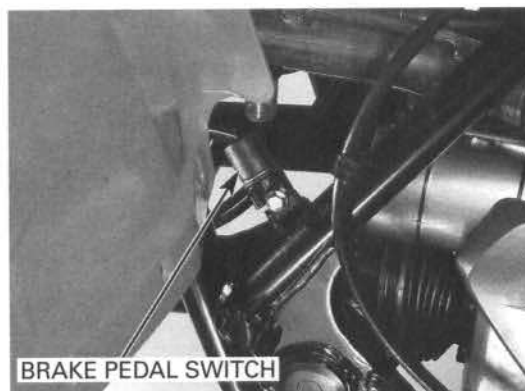
Remove the right side cover (page 2-6).

Remove the center mudguard.

Disconnect the rear brake pedal switch 2P (Green) connector.

Remove the two bolts and brake light switch.

Install a new brake light switch in the reverse order of removal.



GEAR POSITION SWITCH

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.

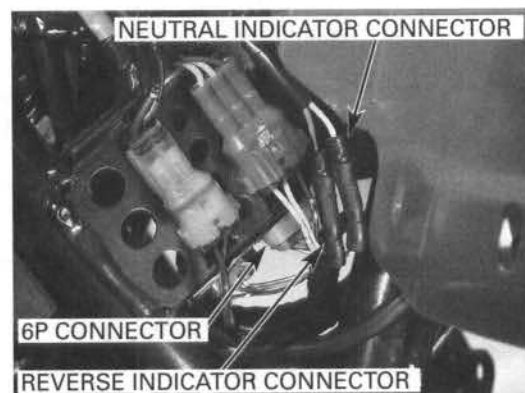
There should be continuity in each gear position as follows.

TM model:

- Neutral: Light green
- Reverse: Gray

TE model:

- Neutral: Light green
- Reverse: Gray
- 1st: White/gray
- 2nd: White/red
- 3rd: Blue
- 4th: Yellow
- 5th: Light blue/white



REPLACEMENT

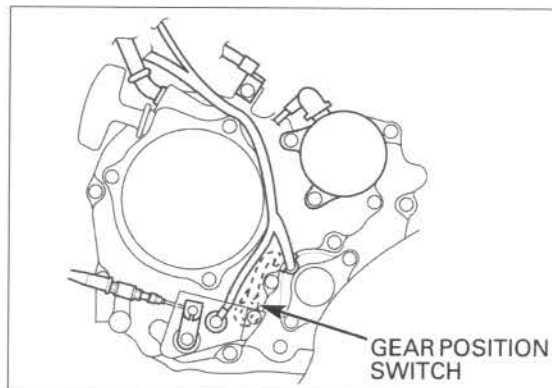
Remove the alternator cover (page 10-8).

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)

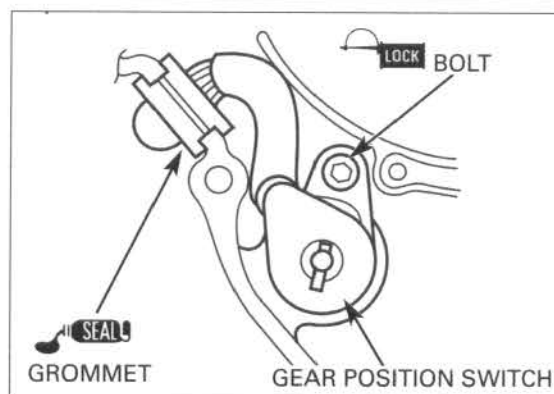
Be careful not to damage the switch pin and shaft during installation.



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 10-16).

**VEHICLE SPEED SENSOR (TE model)****INSPECTION**

Disconnect the vehicle 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.

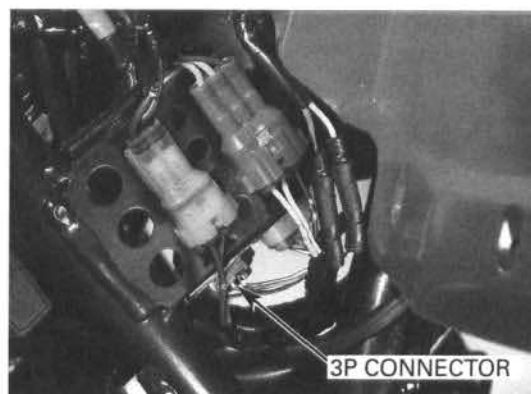
If there is no voltage, check for an open circuit in the related wires.

If there is voltage, check the sensor as follows.

Connect the inspection adapter to the sensor 3P connectors.

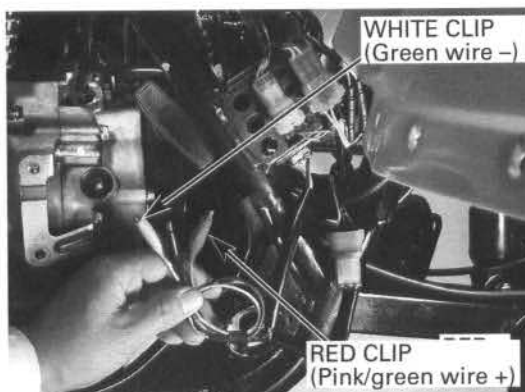
TOOL:

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 2-10).

Disconnect the speed sensor 3P connector and release the sensor wire from the clips.

Remove the following:

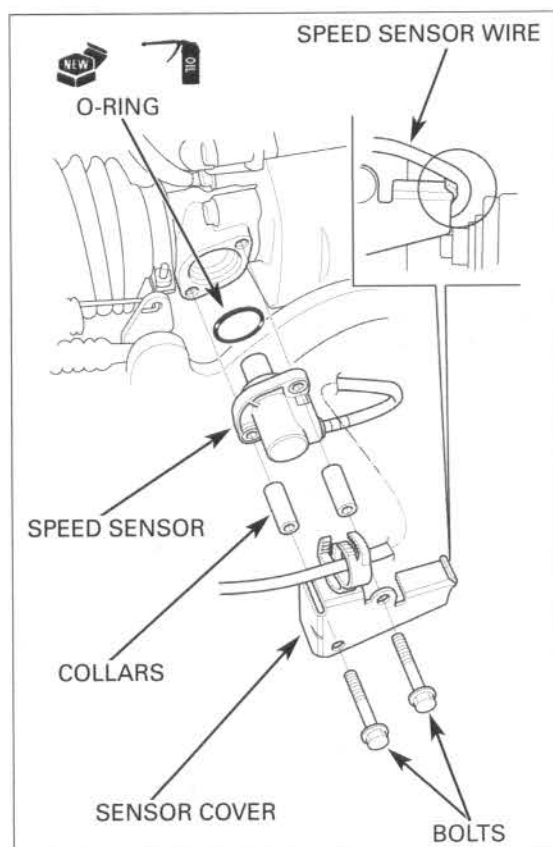
- two bolts
- speed sensor cover
- collars
- speed sensor
- O-ring

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 1-19).

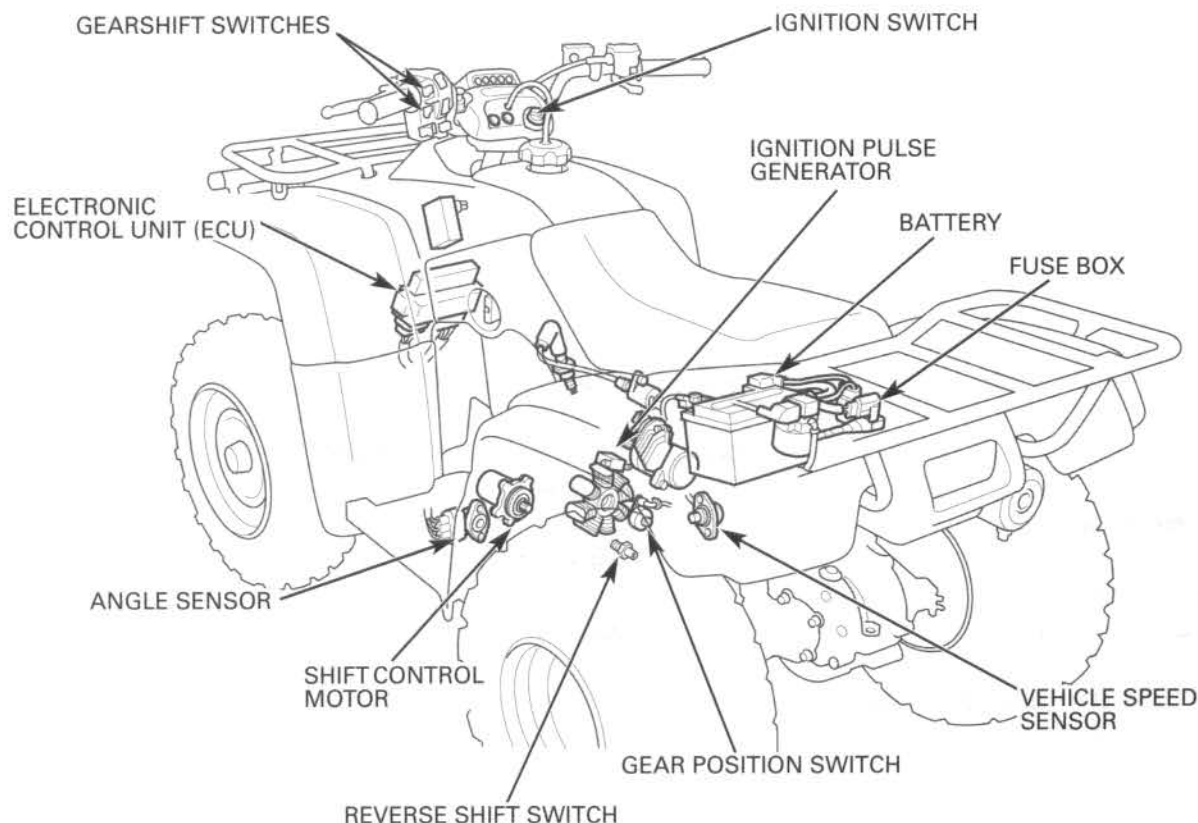
Install the right center mudguard (page 2-10).



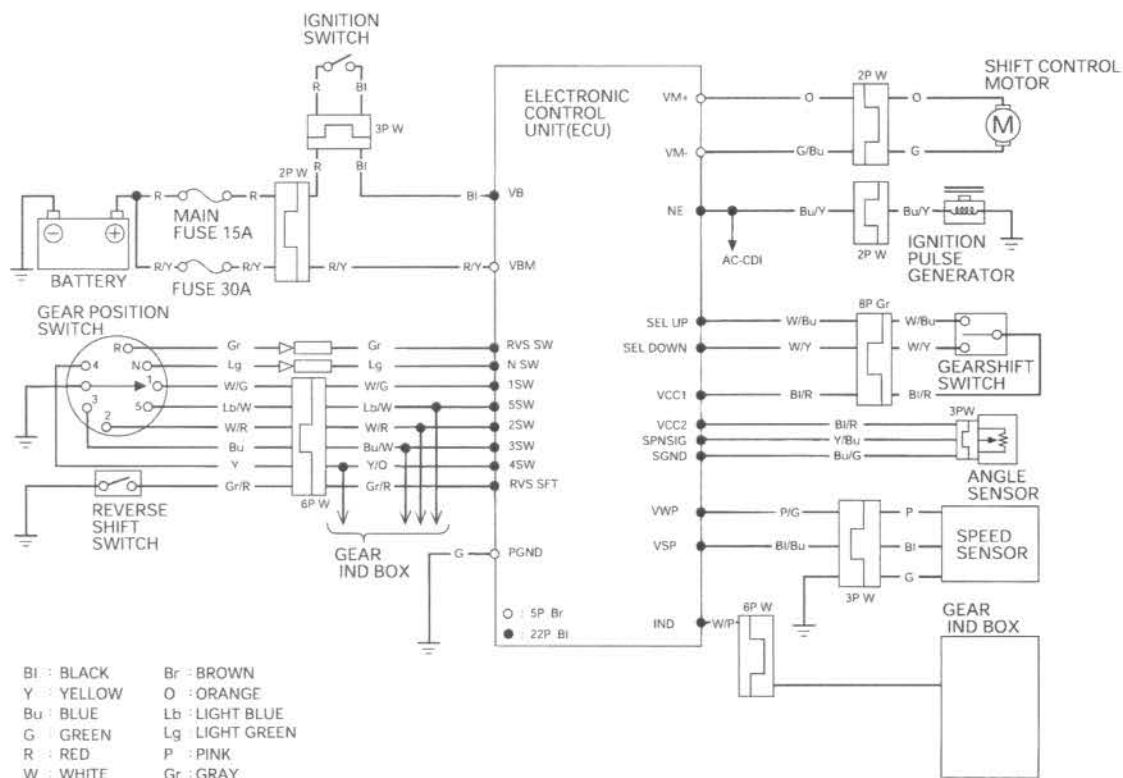
20. ELECTRIC SHIFT PROGRAM (ESP: TE model)

COMPONENT LOCATION	20-2	ANGLE SENSOR	20-17
SYSTEM DIAGRAM	20-2	CONTROL MOTOR AND REDUCTION GEARS	20-20
SERVICE INFORMATION	20-3	GEARSHIFT SWITCH	20-23
BEFORE STARTING TROUBLESHOOTING	20-4	REVERSE SHIFT SWITCH	20-24
DIAGNOSTIC TROUBLESHOOTING	20-6		

COMPONENT LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

- When checking the Electric Shift Program (ESP) system, always follow the steps in the troubleshooting flowchart (page 20-6).
- The ESP parts can be serviced with the engine installed in the frame.
- The 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 shift motor and ECU.
- Ensure that all connectors are clean, dry and free of corrosion (repack with dielectric grease).
- Use a digital tester for ESP system inspection.
- See page 19-9 for vehicle speed sensor and page 19-8 for gear position switch inspection.

TORQUE VALUES

Angle sensor bolt
Reverse shift switch

6 N·m (0.6 kgf·m, 4.3 lbf·ft) Apply locking agent to the threads
13 N·m (1.3 kgf·m, 9 lbf·ft)

BEFORE STARTING TROUBLESHOOTING

SELF DIAGNOSIS FUNCTION

When the Electric Control Unit (ECU) detects a system abnormality, it has a built-in self-diagnostic function that stops the Electric Shift (ES) system or resets the system 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 indicator blinks a designated number of times).

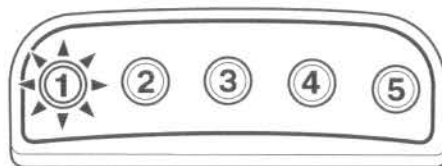
RETRIEVAL/ERASURE OF PROBLEM CODE

When the operator detects an abnormality, check the following before proceeding with the diagnosis:

1. Check the battery voltage (minimum spec. 12.4 V) and 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.

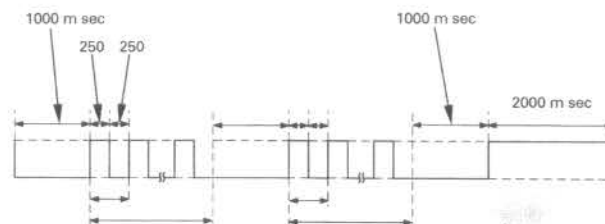
If no ES system failure occurs (the indicator "1st" gear indicator does not blink), perform the following:

1. Make sure the gear position indicator blinked codes to the user. Check the problem code as described below:
 - Turn the ignition switch to "OFF".
 - Place the transmission in neutral.
 - Apply the parking brake so the vehicle does not move.
 - Turn the ignition switch to "ON" while pushing both electric shift switches (UP and DOWN). Make sure the neutral indicator comes on to indicate that the transmission is in neutral.
 - 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 "1st" gear 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:
 - Electric shift does not operate (page 20-6) and/or
 - Faulty gear position 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:
 - Turn the ignition switch to "OFF".
 - Place the transmission in neutral.
 - Apply the parking brake so the vehicle does not move.
 - Push both the Upshift and Downshift switches to "ON".
 - Turn the ignition switch to "ON" while pushing both electric shift switches (UP and DOWN). Make sure the neutral indicator comes on to indicate that the transmission is in neutral.
 - Wait 5 seconds and then push both electric shift switches again, and hold them for at least 3 seconds.
 - 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.
 - Turn the ignition switch to "OFF".

1st GEAR INDICATOR BLINK DURATION



TROUBLESHOOTING CHART

1st gear indicator blinks	Check part and system	Troubleshooting reference page
0	No problem	—
1	ECU (writing and recording circuit)	20-8
2	ES shift switch system (up and down)	20-8
3	Angle sensor system	20-9
4	Gear position switch system	20-11
5	ECU motor driver circuit	20-13
6	ECU fail-safe relay circuit	20-15
7	ECU voltage convert circuit	20-15
8	Angle sensor system	20-9
9	Angle sensor system	20-9
10	Ignition pulse generator system	20-15
11	Vehicle speed sensor system (vehicle speed)	20-16
12	Gear position switch system	20-11

DIAGNOSTIC TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Make sure the battery is fully charged and in good condition
 - Make sure the clutch is adjusted properly
 - Blown main (30 A), motor (30 A) or sub fuse, ignition (10 A)

Electric Shift Does Not Operate

1. Gearshift Linkage Inspection

Turn the ignition switch "OFF".
Shift the gear manually using the gear change tool.

Can the gears be changed manually?

NO – Faulty transmission (page 11-5) or gearshift linkage (page 9-5)

YES – GO TO STEP 2.

2. Gear Position Indicator Inspection

Check gear position indicator

Does the gear position indicator show the correct gear position when the gear change tool is moved?

NO – Troubleshoot the gear position switch system (page 20-11)

YES – Troubleshoot the ES shift switch system (page 20-8)

Gear Position Indicator Problem

- No indication of gear problem
- Keeps indicating the same gear position
- Wrong gear is indicated

1. ECU, Combination Meter and Gear Position Switch Ground Harness Inspection

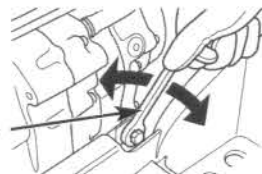
Make sure the ECU, gear position indicator, gear position switch and ground wires are properly connected.

Are all wires making proper contact?

NO – Loose or poor contact of related circuit

YES – GO TO STEP 2.

GEAR CHANGE TOOL



2. Gear Position Switch Inspection at ECU

Disconnect the ECU connector (22P/Brown).
Turn the ignition switch to "OFF". Check for continuity at the ECU connector of the wire harness side as follows:

Connections:

- **Light Green** – Body Ground, when shifting into neutral
- **White/green** – Body Ground, when shifting into 1st gear
- **White/red** – Body Ground, when shifting into 2nd gear
- **Blue/white** – Body Ground, when shifting into 3rd gear
- **Yellow/orange** – Body Ground, when shifting into 4th gear
- **Light Blue/white** – Body Ground, when shifting into 5th gear
- **Gray** – Body Ground, when shifting into reverse

Is there continuity?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. Gear Position Switch Inspection at Switch

Disconnect the gear position switch connector (8P). Check for continuity at the gear position switch connector as follows:

Connections:

- **Light Green** – Body Ground, when shifting into neutral
- **White/green** – Body Ground, when shifting into 1st gear
- **White/red** – Body Ground, when shifting into 2nd gear
- **Blue** – Body Ground, when shifting into 3rd gear
- **Yellow** – Body Ground, when shifting into 4th gear
- **Light Blue/white** – Body Ground, when shifting into 5th gear
- **Gray** – Body Ground, when shifting into reverse

Is there continuity?

NO – Faulty gear position switch

YES –

- Loose or poor contact of related circuit
- Open circuit of related circuit

4. Open Circuit Inspection Between ECU Connector and Gear Position Indicator

Disconnect gear position indicator connector (6P).

Check for continuity of the White/pink wire between the ECU connector and the gear position indicator connector terminals.

Is there continuity?

- NO** – • Open circuit in White/pink wire
• Loose or poor contact of related circuit

YES – GO TO STEP 5.



5. Gear Position Indicator Ground Circuit Continuity Inspection

Shift the transmission into neutral.

Check for continuity of the White/pink wire at the gear position indicator connector and body ground with the ignition switch "ON".

Is there continuity?

- YES** – Replace the ECU with a new one and troubleshoot again

NO – Faulty gear position indicator

Problem Code 1: ECU (writing and recording circuit)

1. ECU Inspection

Delete the problem code number.

Check the ES system failure (the "1st" gear indicator blinks) when turning the ignition switch from "OFF" to "ON".

Does the gear indicator blink?

- NO** – No problem (temporary failure)

YES – Replace the ECU with a new one and troubleshoot again

Problem Code 2: ES Switch System (Up and Down)

1. ECU and Gear Shift Switch Connection Inspection

Check the connections of the ECU and handlebar switch connectors.

Are all connections OK?

- NO** – Loose or poor connections in ECU or handlebar switch connectors

YES – GO TO STEP 2.

2. Shift Switch Inspection at ECU Connector

Disconnect the ECU connector (22P/Black).
Check for continuity at the wire harness side connector while pushing the shift switches up or down.

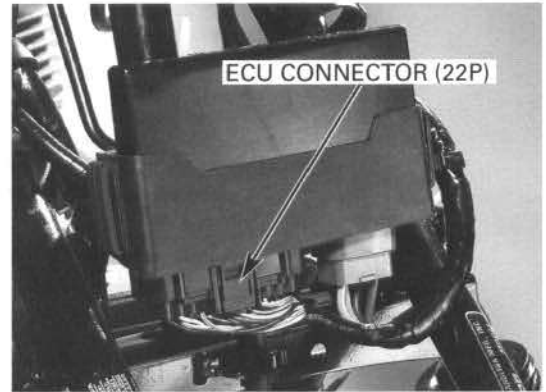
Connections:

- Shift up switch: Black/red – White/blue
- Shift down switch: Black/red – White/yellow

Is there continuity?

NO – GO TO STEP 3.

YES – GO TO STEP 5.

**3. Handlebar Switch Housing Inspection**

Check for mud or water in the left handlebar switch housing.

Is there water or mud in the handlebar switch housing?

NO – GO TO STEP 4.

YES – Clean the left handlebar switch housing

4. Shift Switch Inspection at Handlebar Switch Connector

Disconnect the left handlebar switch connector.
Check for continuity while pushing the shift switches up or down.

Connections:

- Shift up switch: Black/red – White/blue
- Shift down switch: Black/red – White/yellow

Is there continuity?

NO – Replace the left handlebar switch

YES –

- Loose or poor contact of ECU and/or handlebar switch connectors
- Open circuit in Black/red, White/blue, and/or White/yellow wire

5. ECU Inspection

Connect the handlebar switch and ECU connectors.

Check the ES system failure (the gear position indicator blinks) when turning the ignition switch from "OFF" to "ON".

Does the gear indicator blink?

NO – No problem (temporary failure)

YES – Replace the ECU with a new one and troubleshoot again

Problem Code 3, 8, 9: Angle Sensor System**1. ECU and Angle Switch Connection Inspection**

Check the connections of the ECU and angle sensor connectors.

Are all connections good?

NO – Loose or poor contact of related circuit

YES – GO TO STEP 2.

2. Angle Sensor Inspection at ECU Connector

Turn the ignition switch to "OFF".
Disconnect the ECU connector (22P/Black).
Measure the resistance between the Black/red and Blue/green terminals of the wire harness side.

STANDARD: 4k – 6k Ω (20°C/ 68°F)

Is the resistance within the specified range?

NO – GO TO STEP 3.

YES – GO TO STEP 4.



3. Wire Harness Inspection

Disconnect the angle sensor connector (3P).
Check for continuity between the ECU and angle sensor connectors.

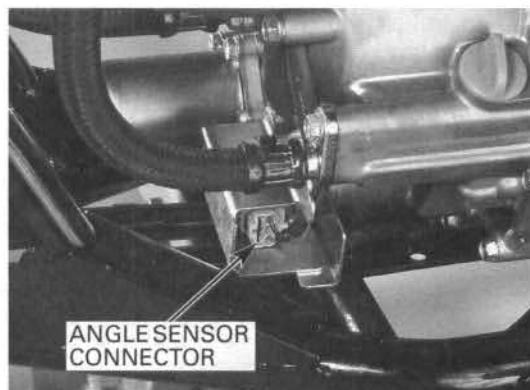
Connections:

- Black/red – Black/red
- Blue/green – Blue/green

Is there continuity?

NO – Open circuit in Black/red and/or Blue/green wire

YES – Faulty angle sensor



4. Angle Sensor Installation Inspection

Make sure the angle sensor is correctly installed to the engine (page 20-17).

Is the angle sensor correctly installed?

NO – Loosen the angle sensor mounting bolts

YES – GO TO STEP 5.

5. Angle Sensor Line Inspection

Disconnect the angle sensor connector (3P).
Check for continuity of the Yellow/blue wire between the ECU connector and the angle sensor connector.

Is there continuity?

NO – Open circuit in Yellow/blue wire

YES – GO TO STEP 6.

6. Angle Sensor Input Voltage Inspection

Connect the angle sensor connector (3P).
Connect the ECU test harnesses between the main wire harness and the ECU.

TOOL: ECU Test Harness, 22P 07YMZ-0010100

With the ignition switch turned to "ON", measure the voltage between the Black/red and the Blue/green terminals.

Connections:

- Black/red (+) – Blue/green (–)

STANDARD: 4.75 – 5.25V

Is the voltage within the specified range?

NO – Replace the ECU with a new one and troubleshoot again

YES – GO TO STEP 7.

7. Angle Sensor Inspection at ECU Connector

Turn the ignition switch "OFF".
Disconnect the ECU connector test harness.
Measure the resistance between the Yellow/blue and Blue/green terminals of the wire harness side of the ECU connector while shifting through all the gears (1st, 2nd, 3rd, 4th, 5th, Reverse).

STANDARD: 0 – 5Ω

Is the resistance within the specified range?

NO – Faulty angle sensor

YES – GO TO STEP 8.

8. ES System Failure Checking

Connect the ECU connector.
Check the ES system failure (the gear position indicator blinks) when turning the ignition switch from "OFF" to "ON".

Does the gear position indicator blink?

NO – No problem (temporary failure)

YES – Replace the ECU with a new one and troubleshoot again

Problem Codes 4 or 12: Gear Position Switch System**1. ECU and Gear Position Switch Connection Inspection**

Check the connections of the ECU and gear position switch.

Are all connections good?

NO – Loose or poor contact of ECU and/or gear position switch connectors

YES – GO TO STEP 2.

ELECTRIC SHIFT PROGRAM (ESP: TE model)

2. Gear Position Switch Inspection at ECU

Turn the ignition switch to "OFF".
Disconnect the ECU connector (22P/Black).
Check for continuity at the ECU connector of the wire harness side as follows:

Connections:

- Light Green – Body Ground, when shifting into neutral
- White/green – Body Ground, when shifting into 1st gear
- White/red – Body Ground, when shifting into 2nd gear
- Blue/white – Body Ground, when shifting into 3rd gear
- Yellow/orange – Body Ground, when shifting into 4th gear
- Light Blue/white – Body Ground, when shifting into 5th gear
- Gray – Body Ground, when shifting into reverse

Is there continuity?

NO – GO TO STEP 3.

YES – GO TO STEP 4.

3. Gear Position Switch Inspection

Disconnect the gear position switch connector (6P). Check for the continuity at the gear position switch connector as follows:

Connections:

- Light Green/red – Body Ground, when shifting into neutral
- White/green – Body Ground, when shifting into 1st gear
- White/red – Body Ground, when shifting into 2nd gear
- Blue – Body Ground, when shifting into 3rd gear
- Yellow – Body Ground, when shifting into 4th gear
- Light Blue/white – Body Ground, when shifting into 5th gear
- Gray – Body Ground, when shifting into reverse

Is there continuity?

NO – Faulty gear position switch

YES – Open circuit in related wire

4. ECU Inspection

Connect the ECU connector (22P/Black).
Disconnect the gear position switch connector (6P).

Turn the ignition switch to "ON".

Measure the voltage at the gear position switch connector of the wire harness side as follows:

Connections:

- Light Green/red (+) – Body Ground (-), when shifting into neutral
- White/green (+) – Body Ground (-), when shifting into 1st gear
- White/red (+) – Body Ground (-), when shifting into 2nd gear
- Yellow/white (+) – Body Ground (-), when shifting into 3rd gear
- Yellow/orange(+) – Body Ground (-), when shifting into 4th gear
- Light Blue/white (+) – Body Ground (-), when shifting into 5th gear
- Gray (+) – Body Ground (-), when shifting into reverse

STANDARD: 5V

Is the voltage within 5V?

NO – Replace the ECU unit with a new one and troubleshoot again

YES – GO TO STEP 5.

5. ES System Failure Checking

Check the ES system failure (the gear position indicator blinks) when turning the ignition switch from "OFF" to "ON".

Does the gear position indicator blink?

NO – No problem (temporary failure)

YES – Replace the ECU with a new one and troubleshoot again

Problem Code 5: ECU Motor Driver Circuit**1. ECU and Control Motor Connection Inspection**

Check the connections of the ECU and motor connectors.

Are all connections good?

NO – Loose or poor contact of the ECU and/or control motor connectors

YES – GO TO STEP 2.

ELECTRIC SHIFT PROGRAM (ESP: TE model)

2. ECU Input Voltage Inspection

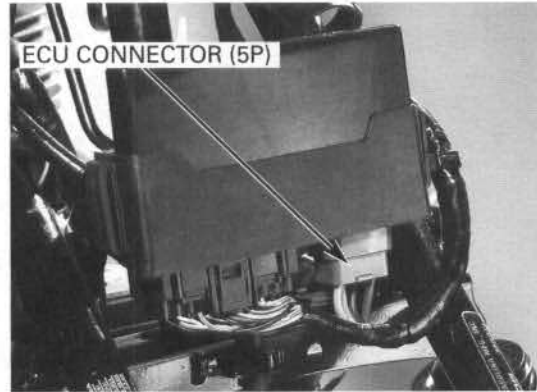
Disconnect the ECU connector (5P/Brown).
Measure the voltage between the Red/yellow terminal (+) and body ground (-).

STANDARD: 11V Minimum

Is the voltage within the specified range?

- NO** - • Loose or poor contact of related circuits
• Blown fuse
• Open circuit in Red/yellow wire

YES - GO TO STEP 3.



3. ECU Ground Circuit Inspection

Check for continuity between the Green terminal and body ground.

Is there continuity?

- NO** - • Loose or poor contact of ground terminal
• Open circuit in Green wire

YES - GO TO STEP 4.

4. ECU to Control Motor Harness Inspection

Disconnect the control motor connector (2P).
Check for continuity between the ECU connector and control motor connector.

Connections:

- Orange – Orange
- Green/blue – Green/blue

Is there continuity?

- NO** - Open circuit in Orange and/or Green/blue wire

YES - GO TO STEP 5.

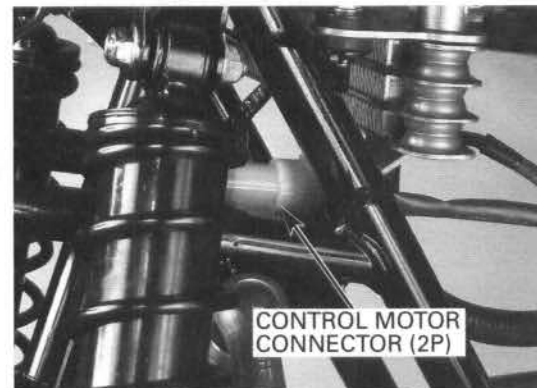
5. Control Motor Inspection

Connect a fully charged battery to the control motor 2P connector terminals.

Does the control motor turn?

- NO** - Faulty control motor

YES - GO TO STEP 6.



6. ES System Failure Checking

Connect the ECU and control motor connectors.
Check the ES system failure (the "1st" gear indicator blinks) when turning the ignition switch from "OFF" to "ON".

Does the gear indicator blink?

- NO** - No problem (temporary failure)

YES - Replace the ECU with a new one and troubleshoot again

**Problem Code 6: ECU Fail-Safe Circuit or Problem
Code 7: ECU Voltage Converter Circuit**

1. ES System Failure Checking

Check the ES system failure (the "1st" gear indicator blinks) when turning the ignition switch from "OFF" to "ON".

Does the gear indicator blink?

NO – No problem (temporary failure)

YES – GO TO STEP 2.

2. Check Problem Code

Check the number of blinks (problem code number).

Does the gear indicator blink other than 6 or 7 times?

NO – Replace the ECU with a new one and troubleshoot again

YES – Troubleshoot the problem code

Problem Code 10: Ignition Pulse Generator System

1. ECU and Ignition Pulse Generator Connection Inspection

Check the connection of the ECU and alternator connectors.

Are all connections good?

NO – Loose or poor contact of ECU and/or alternator connectors

YES – GO TO STEP 2.

2. Ground Cable Inspection

Check the connections of the ground cables.

Are all connections good?

NO – Loose or poor contact of related circuit

YES – GO TO STEP 3.

3. ECU to Ignition Pulse Generator Harness Inspection

Disconnect the ECU connector (22P/Black) and ignition pulse generator connector (2P). Check for continuity of the Blue/yellow wire between the ECU and alternator connector terminals.

Is there continuity?

NO – Open circuit in Blue/yellow wire

YES – GO TO STEP 4.

4. Ignition System Inspection

Check the ignition system (page 17-4).

Does the ignition system test OK?

NO – Ignition system failure

YES – GO TO STEP 5.



5. ES System Failure Checking

Check the number of gear indicator blinks while driving in 1st gear over 6 km/h (4 mi/h) for more than 6 seconds.

Does the gear indicator blink?

- NO** – No problem (temporary failure)
- YES** – Replace the ECU with a new one and troubleshoot again

Problem Code 11: Vehicle Speed Sensor System

1. Vehicle Speed Sensor Installation Inspection

Make sure the speed sensor is installed correctly (page 19-10).

Is the vehicle speed sensor installed correctly?

- NO** – Reinstall the speed sensor correctly (page 19-10)
- YES** – GO TO STEP 2.

2. Vehicle Speed Sensor Function Inspection

Check that the vehicle speed sensor functions properly (page 19-9) and the engine runs normally.

Is the Vehicle Speed Sensor functioning properly?

- NO** – Faulty vehicle speed sensor
- YES** – GO TO STEP 3.

3. ECU to Vehicle Speed Sensor Harness Inspection

Turn the ignition switch "OFF".
Disconnect the ECU connector (22P/Black) and speed sensor (3P Brown) connector.
Check for continuity in the Pink/green wire between the ECU and vehicle speed sensor connectors.

Is there continuity?

- NO** – Open circuit in Pink/green wire
- YES** – GO TO STEP 4.



4. ES System Failure Checking

Check the number of gear indicator blinks while driving in 1st gear over 6 km/h (4 mi/h) for more than 6 seconds.

Does the gear indicator blink?

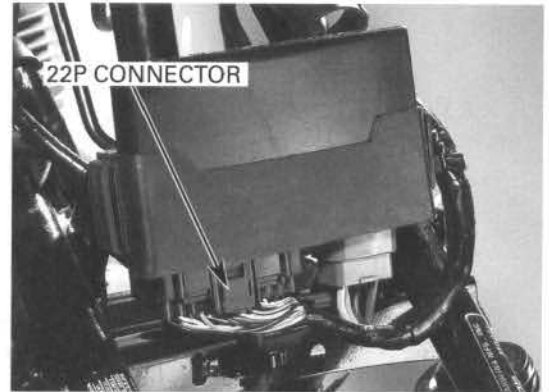
- NO** – No problem (temporary failure)
- YES** – Replace the ECU with a new one and troubleshoot again

ANGLE SENSOR

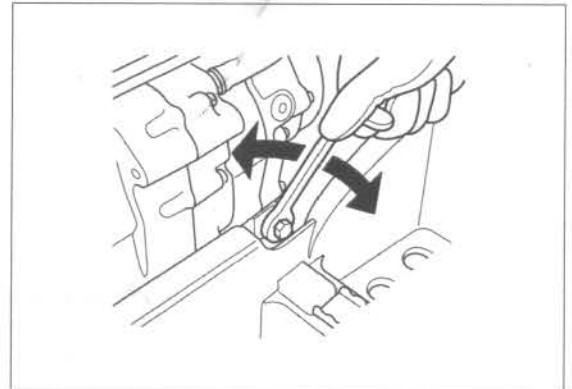
SYSTEM INSPECTION

1. Total resistance:
Turn the ignition switch to "OFF".
Disconnect the ECU (22P Black) connector.
Measure and record the resistance between the Black/red and Blue/green terminals of the harness side ECU connector.

STANDARD: 4 – 6 k Ω (20°C/68°F)

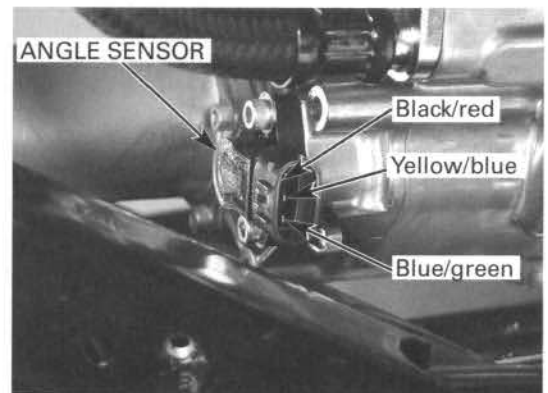


2. Shift-up resistance:
Measure and record the resistance between the Yellow/blue and Blue/green terminals while upshifting through all the gears manually by using the gear change tool.
3. Shift-down resistance:
Measure and record the resistance between the Yellow/blue and Blue/green terminals while down-shifting through all the gears in the same manner as at upshift.



If the measurement is abnormal, remove the angle sensor cover (page 20-18) 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.



ELECTRIC SHIFT PROGRAM (ESP: TE model)

Be careful not to damage the sensor shaft hole.

Remove the angle sensor.

Check the sensor shaft hole and gearshift spindle for wear or damage.

Check 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

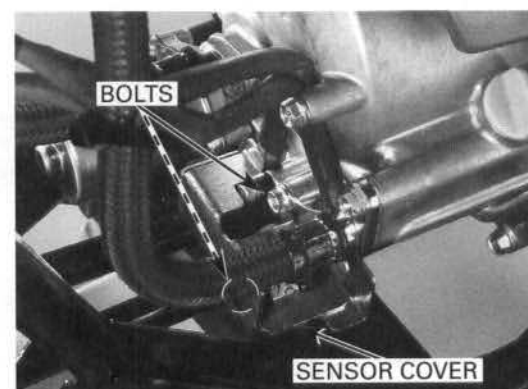
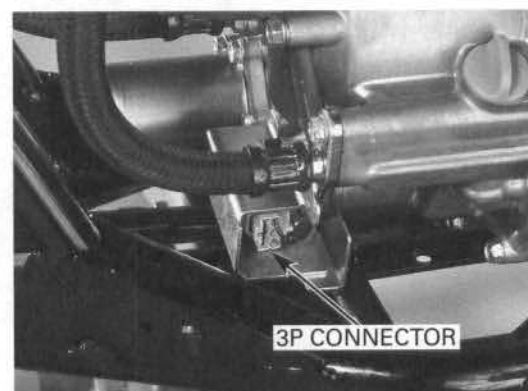
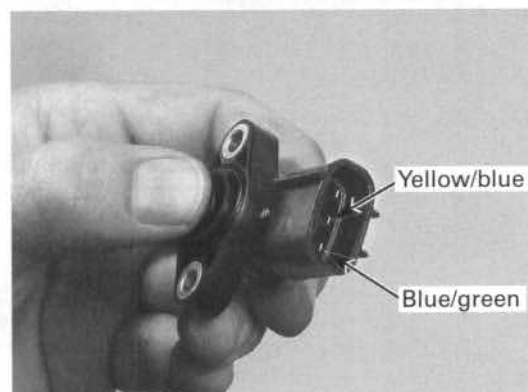
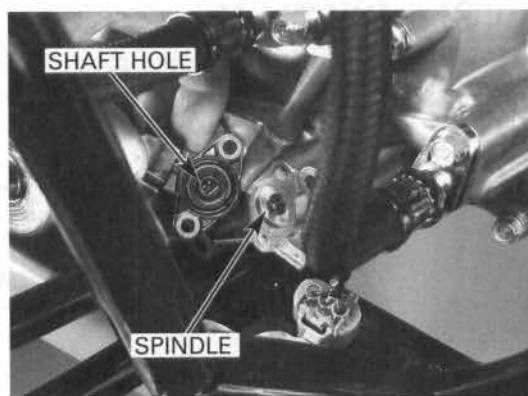
Connect the ECU (22P Black) connector.
Measure the input voltage between the Black/red (+) and Blue/green (-) terminals of the angle sensor 3P connector with the ignition switch turned to "ON".

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.

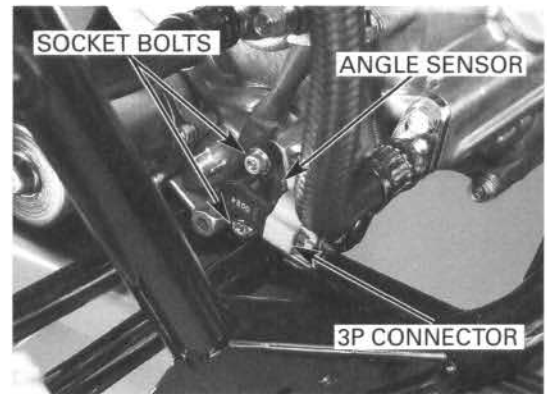
REMOVAL

Remove the two bolts and sensor cover.



Disconnect the 3P connector.

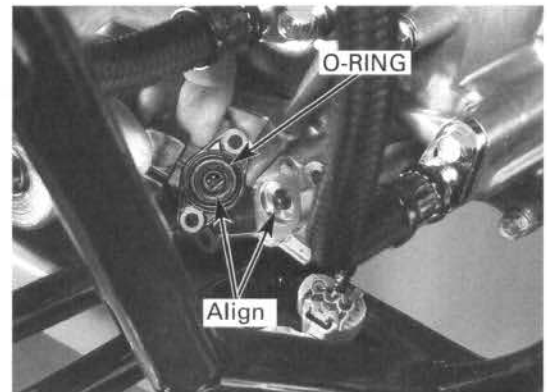
Remove the two socket bolts, washers and angle sensor.



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.

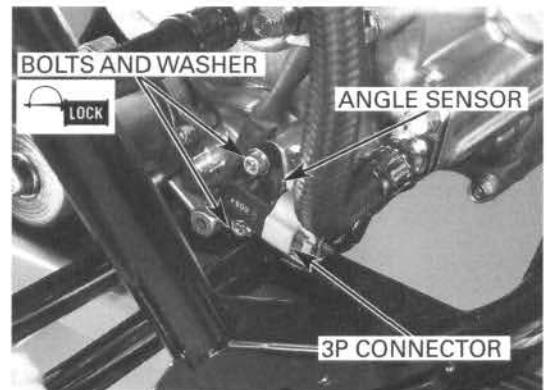


Apply locking agent to the socket bolt threads and install the socket bolts with the washers and tighten them.

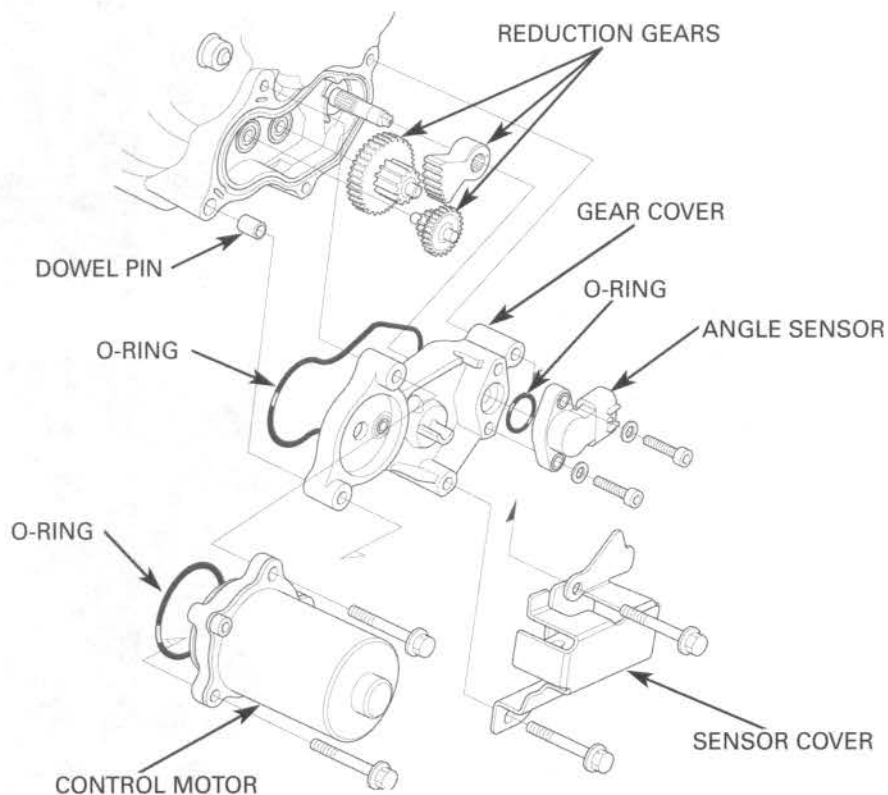
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Route the angle sensor wire properly.

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



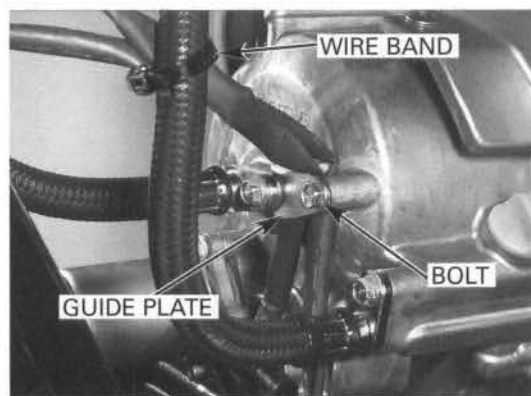
CONTROL MOTOR

Replace the control motor as an assembly.

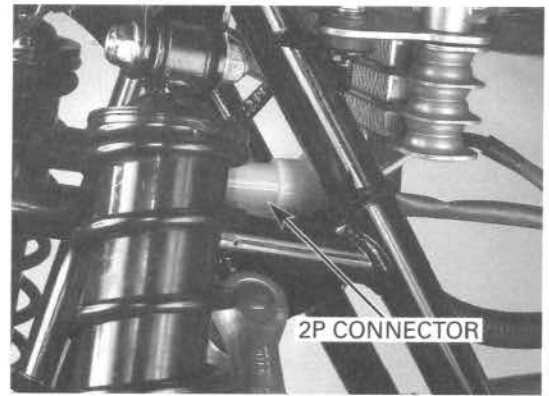
REMOVAL

Remove the sensor cover (page 20-18).

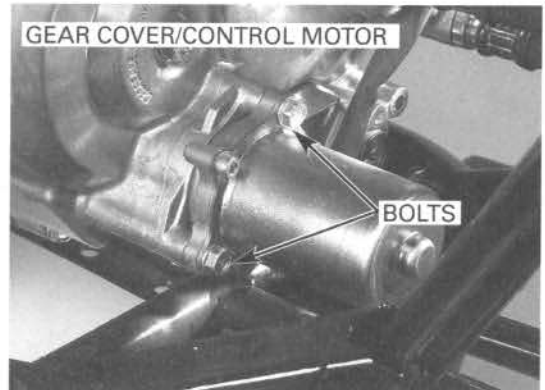
Remove the wire band, then remove the bolt and guide plate.



Disconnect the control motor 2P (white) connector.



Remove the two mounting bolts and control motor.
Remove the control motor from the gear cover.
Remove the O-ring from the control motor.



INSTALLATION

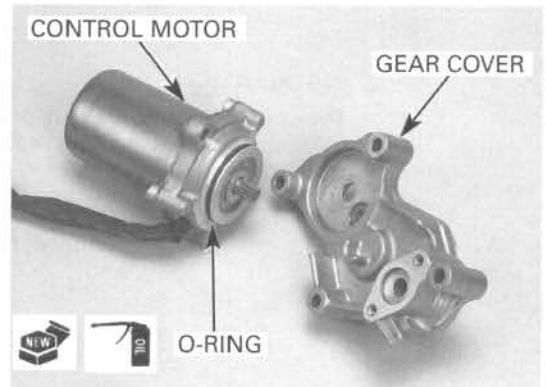
Coat a new O-ring with engine oil and install it into the groove in the control motor.

Install the control motor and tighten the mounting bolts.

Route the wires properly.

Connect the control motor 2P connector and secure the control motor and angle sensor wires with the wire bands.

Install the sensor cover (page 20-19).



REDUCTION GEARS

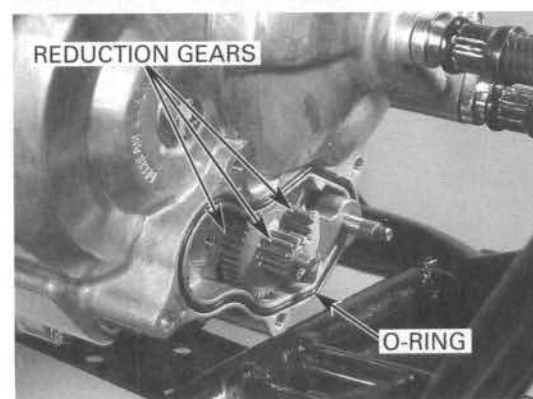
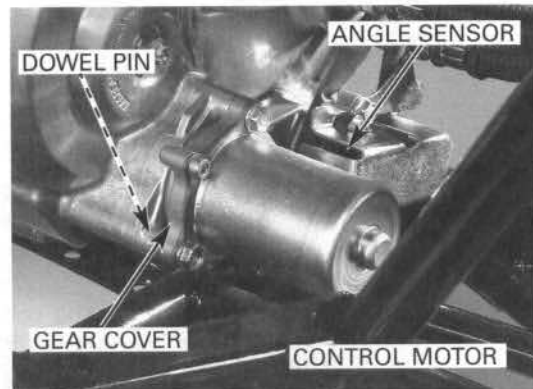
REMOVAL

The reduction gears can be serviced with the engine installed in the frame.

- Remove the following:
- angle sensor (page 20-18)
 - control motor (page 20-20)
 - gear cover
 - dowel pin

- O-ring
- reduction gears

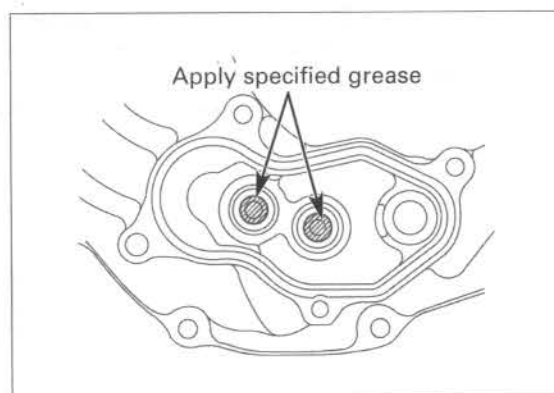
Check the gear teeth for abnormal wear or damage.



INSTALLATION

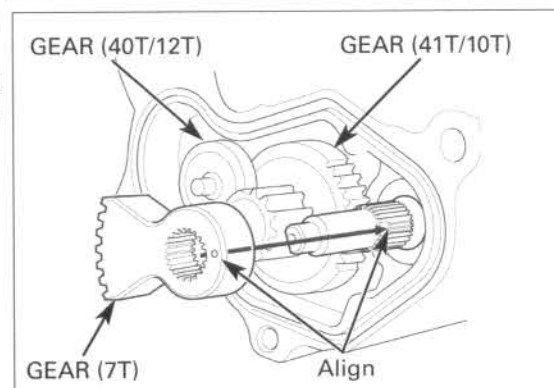
Thoroughly clean the gears and journals and apply the specified grease to the reduction gear shaft sliding surface as shown.

SPECIFIED GREASE: Unirex N2 grease (EXXON) or Templex N3 grease (EXXON)



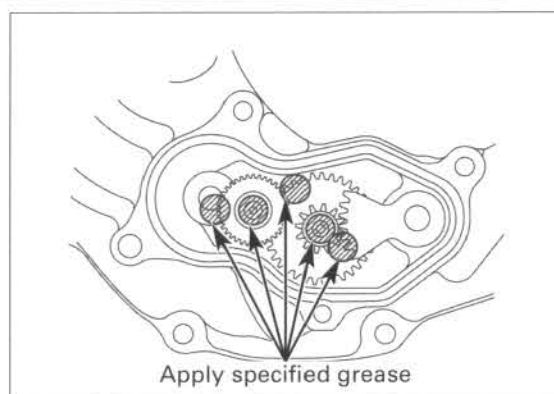
Install the reduction gears (41T/10T) and (40T/12T) into the crankcase cover.

Install the reduction gear (7T) by aligning its wide groove (indicated by punch mark) with the wide spline on the shift spindle.



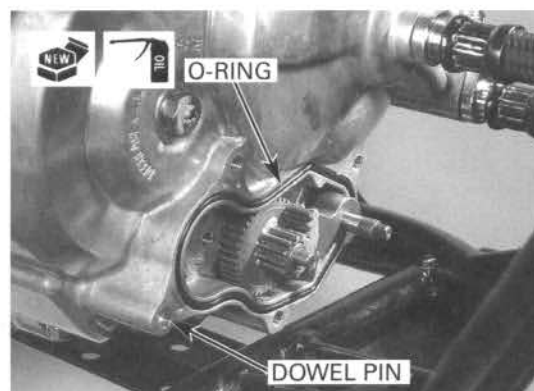
Apply the specified grease to the gear journals and gear teeth as shown (encircled areas) and install the gears.

SPECIFIED GREASE: Unirex N2 grease (EXXON) or
Templex N3 grease (EXXON)



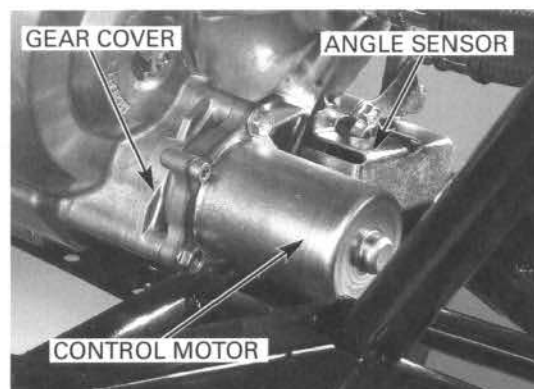
Coat a new O-ring with engine oil and install it into the groove in the crankcase cover.

Install the dowel pin.



Install the following:

- gear cover
- control motor (page 20-21)
- angle sensor (page 20-19)

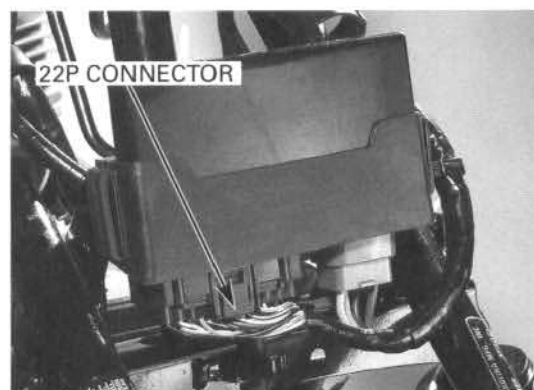


GEARSHIFT SWITCH

SYSTEM INSPECTION

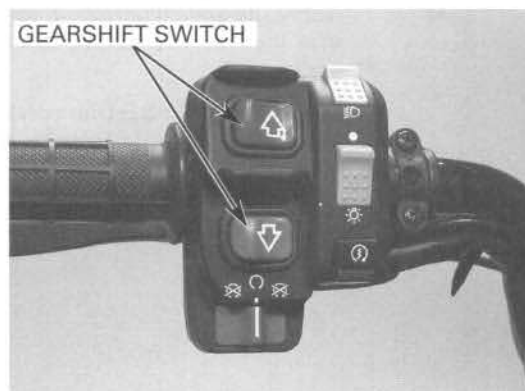
Disconnect the ECU 22P (Black) connector.
Check for continuity between the terminals of the connector in each switch position.
Continuity should exist between the color coded wires as follows:

Color Position	White/ blue	Black/ red	White/ yellow	Black/ red
Up	○	○		
Free				
Down			○	○



ELECTRIC SHIFT PROGRAM (ESP: TE model)

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 it.

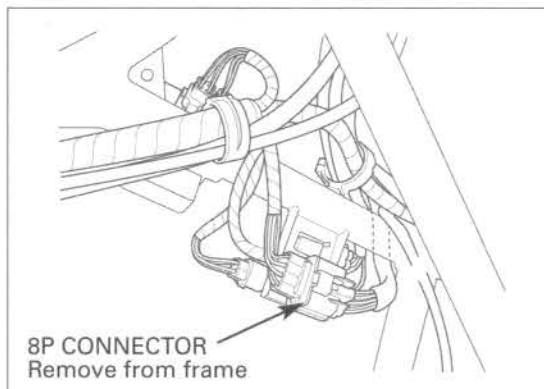
- If the continuity at the control unit is abnormal and the one at the 8P connector is normal, check for an open or short circuit, or loose or poor connector contact.
- If both continuities are abnormal, replace the gearshift switch.

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.



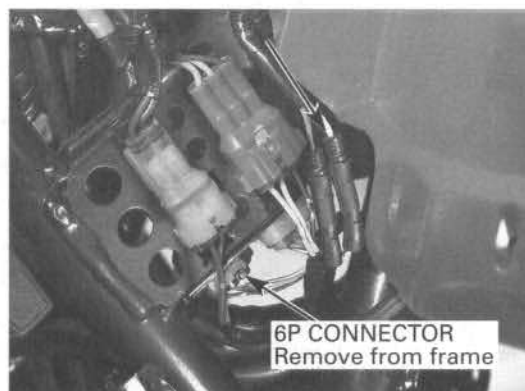
REVERSE SHIFT SWITCH

INSPECTION

Remove gear position/reverse shift switch 6P connector from the frame.

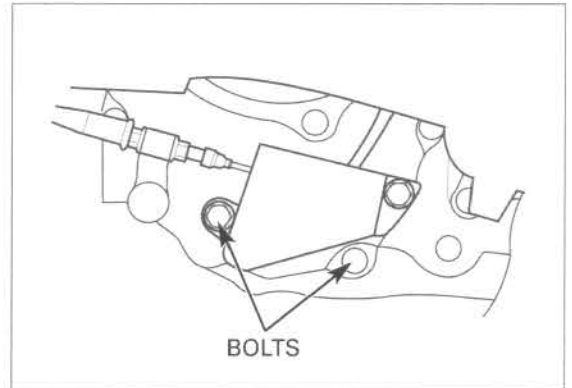
Disconnect the gear position/reverse shift switch 6P (Natural) connector and check for continuity between the Gray/red terminal of the switch side connector and ground.

There should be continuity with the reverse selector operated and no continuity with it released.



REMOVAL/INSTALLATION

Remove the bolts and switch cover.



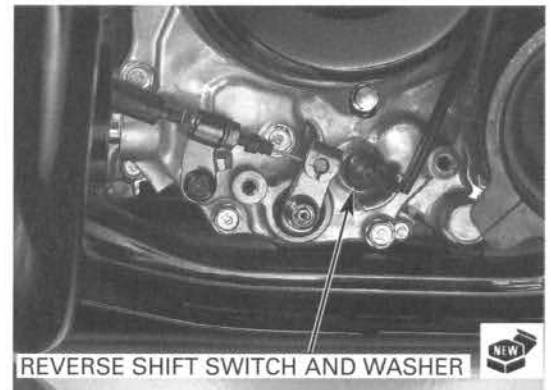
Disconnect the switch connector and remove the reverse shift switch.

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.



MEMO

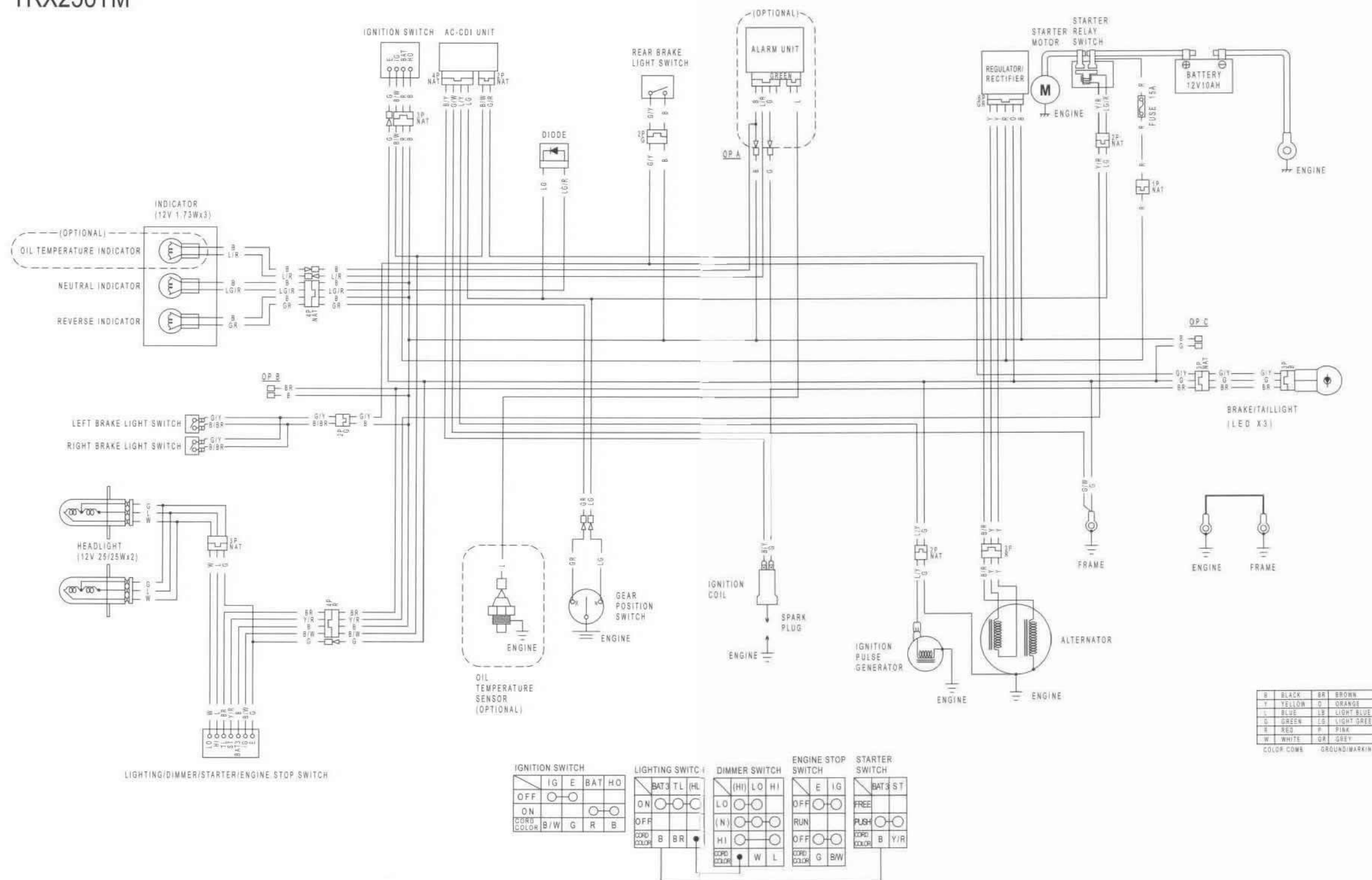
21. WIRING DIAGRAMS

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TE MODEL.....21-4

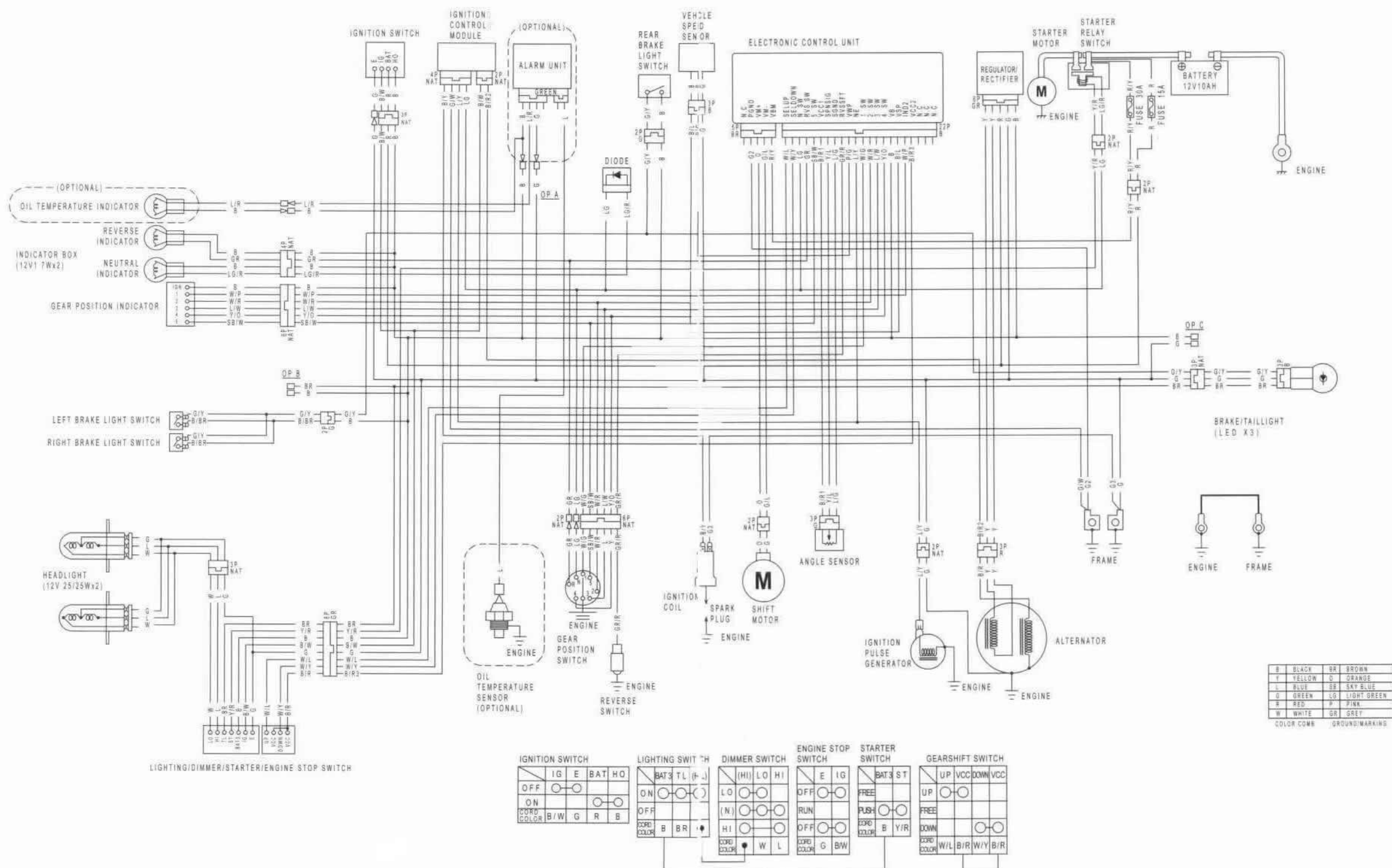
TM MODEL

TRX250TM



0030Z-HM8-B000

TRX250TE



0030Z-HM8-B100

22. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START	22-2	POOR PERFORMANCE AT HIGH SPEED	22-6
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ENGINE DOES NOT START OR IS HARD TO START

1. Fuel Flow Inspection

Check fuel flow to carburetor.

Is fuel reaching the carburetor?

- NO** – • Clogged fuel line and strainer
• Clogged fuel valve
• Clogged fuel tank breather hose

YES – GO TO STEP 3.

2. Spark Test

Perform spark test.

Is the spark quality good?

- NO** – • Faulty spark plug
• Fouled spark plug
• Faulty ignition control module
• Broken or shorted spark plug wire
• Faulty ignition switch
• Faulty ignition pulse generator
• Faulty exciter coil
• Faulty engine stop switch
• Loose or disconnected ignition system wires

YES – GO TO STEP 3.

3. Spark Plug Inspection

Remove and inspect spark plug.

Is the spark plug wet with fuel?

- YES** – • Flooded carburetor
• Choke valve close
• Throttle valve open
• Air cleaner dirty

NO – GO TO STEP 4.

4. Engine Start Condition

Start by following the normal procedure.

Does the engine start but stop?

- YES** – • Improper choke operation
• Carburetor incorrectly adjusted
• Intake pipe leaking
• Improper ignition timing (faulty ignition coil or ignition pulse generator)
• Fuel contaminated

NO – GO TO STEP 5.

5. Cylinder Compression Inspection

Test the cylinder compression.

Is the compression as specified?

- NO** – • Valve clearance too small
• Valve stuck open
• Worn cylinder and piston rings
• Damaged cylinder head gasket
• Seized valve
• Improper valve timing

ENGINE LACKS POWER

1. Drive Train Inspection

Raise wheel off the ground and spin by hand.

Does the wheel spin freely?

- NO – • Brake dragging
• Worn or damaged axle or wheel bearing

YES – GO TO STEP 2.

2. Tire Pressure Inspection

Check the tire pressure.

Are the tire pressures correct?

- NO – • Faulty tire valve
• Punctured tire

YES – GO TO STEP 3.

3. Clutch Inspection

Accelerate rapidly low to second.

Does the engine speed change accordingly when clutch is released?

- NO – • Clutch slipping
• Worn clutch discs/plates
• Warped clutch discs/plates
• Weak clutch spring
• Additive in engine oil

YES – GO TO STEP 4.

4. Engine Performance Inspection

Accelerate lightly.

Does the engine speed increase?

- NO – • Choke valve close
• Clogged air cleaner
• Restricted fuel flow
• Clogged muffler
• Pinched fuel fill cap breather hose

YES – GO TO STEP 5.

5. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing as specified?

- NO – • Faulty ignition control module
• Faulty ignition pulse generator

YES – GO TO STEP 6.

6. Cylinder Compression Inspection

Test the cylinder compression.

Is the compression as specified?

- NO – • Valve stuck open
• Worn cylinder and piston rings
• Leaking head gasket
• Improper valve timing

YES – GO TO STEP 7.

7. Carburetor Inspection

Check carburetor for clogging.

Are the carburetor passages clear?

- NO – Carburetor not serviced frequently enough

YES – GO TO STEP 8.

TROUBLESHOOTING

8. Spark Plug Inspection

Remove spark plugs and inspect for fouling or discoloration.

Are the spark plugs in good condition?

- NO** – • Plugs not serviced frequently enough
• Spark plugs are not the correct heat range

YES – GO TO STEP 9.

9. Engine Oil Inspection

Check the oil level and condition.

Is the engine oil at the correct level and in good condition?

- NO** – • Oil level too high
• Oil level too low
• Contaminated oil

YES – GO TO STEP 10.

10. Valve Train Lubrication Inspection

Remove the cylinder head cover and inspect lubrication.

Is the valve train properly lubricated?

- NO** – • Clogged oil passage
• Clogged oil orifice

YES – GO TO STEP 11.

11. Engine Knocking Inspection

Accelerate or run at high speed.

Is the engine knocking?

- YES** – • Worn piston and cylinder
• Wrong type of fuel
• Excessive carbon build-up in combustion chamber
• Ignition timing too advanced (faulty ignition control module)
• Lean fuel mixture

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Carburetor Pilot Screw Adjustment Inspection

Check carburetor pilot screw adjustment.

Is the pilot screw properly adjusted?

NO – Adjust the carburetor pilot screw (See Section 5)

YES – GO TO STEP 2.

2. Carburetor Intake Inspection

Check for leaking carburetor intake pipe.

Is the carburetor intake pipe leaking?

YES – • Faulty insulator O-ring
• Damaged insulator

NO – GO TO STEP 3.

3. Spark Test

Perform spark test, inspecting for weak or intermittent spark.

Is the spark quality good?

NO – • Faulty carbon or wet fouled spark plug
• Faulty ignition control module
• Faulty ignition coil
• Broken or shorted spark plug wire
• Faulty ignition stop switch
• Faulty ignition pulse generator
• Faulty exciter coil
• Faulty ignition switch
• Loose or disconnected ignition system wires

YES – GO TO STEP 4.

4. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing as specified?

NO – Improper ignition timing (faulty ignition control module)

POOR PERFORMANCE AT HIGH SPEED

1. Fuel Flow Inspection

Disconnect fuel hose at carburetor, and check fuel flow.

Does fuel flow freely?

- NO** – • Clogged fuel line
• Restricted fuel fill cap breather hose
• Faulty fuel valve
• Clogged fuel filter

YES – GO TO STEP 2.

2. Carburetor Inspection

Check carburetor for clogging.

Are the carburetor passages clear?

- NO** – Clean carburetor passages

YES – GO TO STEP 3.

3. Valve Timing Inspection

Check the valve timing.

Is the valve timing correct?

- NO** – Camshaft not installed properly

YES – GO TO STEP 4.

4. Ignition Timing Inspection

Check the ignition timing.

Is the ignition timing as specified?

- NO** – • Faulty ignition control module
• Faulty ignition pulse generator
• Faulty exciter coil

YES – GO TO STEP 5.

5. Valve Spring Inspection

Check the valve springs.

Is the valve spring free length as specified?

- NO** – Faulty valve spring

POOR HANDLING

If high steering effort is required, check for:

- Tight steering shaft
- Damaged steering shaft bearings
- Damaged steering shaft bushing

If either wheel is wobbling, check for:

- Excessive wheel bearing play
- Bent rim(s)
- Improperly installed wheel hub
- Excessive swingarm pivot bearing wear
- Bent frame

If the vehicle pulls to either side, check for:

- Incorrect tire air pressure
- Faulty shock absorber
- Bent tie-rod
- Incorrect tie-rod adjustment
- Bent swingarm
- Bent frame
- Improper wheel alignment

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