

2005-2009



**HONDA**



**SERVICE MANUAL**

**TRX400EX  
TRX400X**

## 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 practice, 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.

## HOW TO USE THIS MANUAL

This service manual describes the service procedures for the TRX400EX.

Follow the Maintenance Schedule (Section 4) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Environmental Protection Agency (EPA) and 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 4 apply to the whole vehicle. Section 3 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

Sections 5 through 19 describe parts of the vehicle, grouped according to location.

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

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

If you are not familiar with this vehicle, read Technical Feature in Section 2.

If you don't know the source of the trouble, go to section 21 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.

## CONTENTS

	GENERAL INFORMATION	1
	TECHNICAL FEATURE	2
	FRAME/BODY PANELS/EXHAUST SYSTEM	3
	MAINTENANCE	4
ENGINE	LUBRICATION SYSTEM	5
	FUEL SYSTEM	6
	ENGINE REMOVAL/INSTALLATION	7
	CYLINDER HEAD/VALVE	8
	CYLINDER/PISTON	9
	CLUTCH/GEARSHIFT LINKAGE	10
	ALTERNATOR/STARTER CLUTCH	11
	CRANKCASE/TRANSMISSION/CRANKSHAFT	12
CHASSIS	FRONT WHEEL/SUSPENSION/STEERING	13
	REAR WHEEL/SUSPENSION	14
	HYDRAULIC DISC BRAKE	15
ELECTRICAL	BATTERY/CHARGING SYSTEM	16
	IGNITION SYSTEM	17
	ELECTRIC STARTER	18
	LIGHTS/SWITCHES	19
	WIRING DIAGRAM	20
	TROUBLESHOOTING	21
	INDEX	22

## 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 the 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.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use fork or suspension fluid.

# 1. GENERAL INFORMATION

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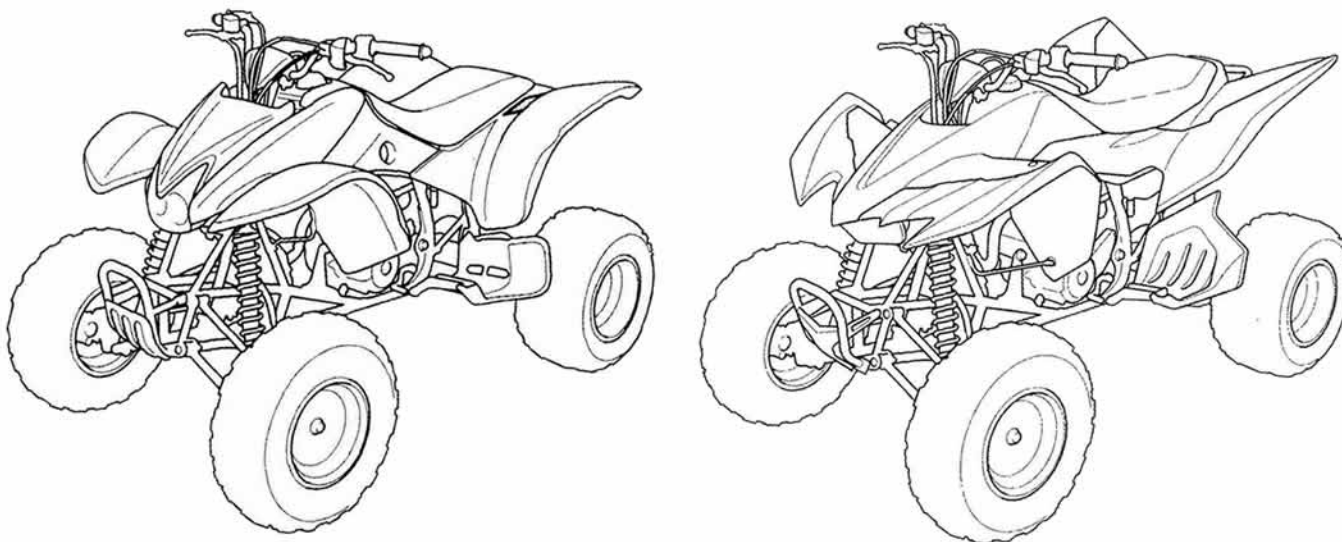
SERVICE RULES .....	1-2	REAR WHEEL/SUSPENSION SPECIFICATIONS.....	1-10
MODEL IDENTIFICATION.....	1-2	HYDRAULIC DISC BRAKE SPECIFICATIONS.....	1-10
GENERAL SPECIFICATIONS.....	1-5	BATTERY/CHARGING SYSTEM SPECIFICATIONS.....	1-10
LUBRICATION SYSTEM SPECIFICATIONS.....	1-7	IGNITION SYSTEM SPECIFICATIONS .....	1-10
FUEL SYSTEM SPECIFICATIONS.....	1-7	ELECTRIC STARTER SPECIFICATIONS .....	1-10
CYLINDER HEAD/VALVE SPECIFICATIONS.....	1-7	LIGHTS/SWITCHES SPECIFICATIONS .....	1-11
CYLINDER/PISTON SPECIFICATIONS .....	1-8	STANDARD TORQUE VALUES .....	1-12
CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS.....	1-8	ENGINE & FRAME TORQUE VALUES .....	1-12
ALTERNATOR/STARTER CLUTCH SPECIFICATIONS.....	1-8	LUBRICATION & SEAL POINTS .....	1-16
CRANKCASE/TRANSMISSION/CRANKSHAFT SPECIFICATIONS.....	1-9	CABLE & HARNESS ROUTING .....	1-18
FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS.....	1-9	EMISSION CONTROL SYSTEMS .....	1-28

## 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 and Harness Routing (page 1-18).

### MODEL IDENTIFICATION



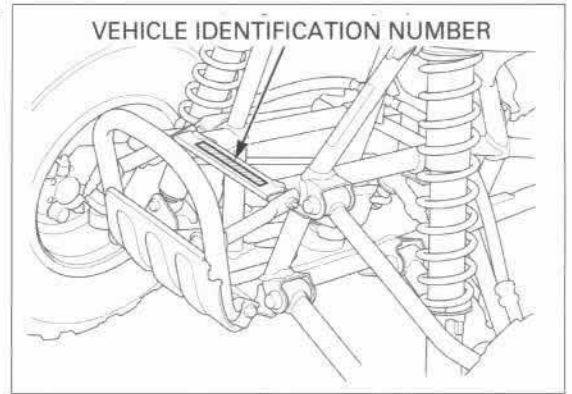
### DESTINATION CODES

Throughout this manual, the following are used to identify individual types for each region.

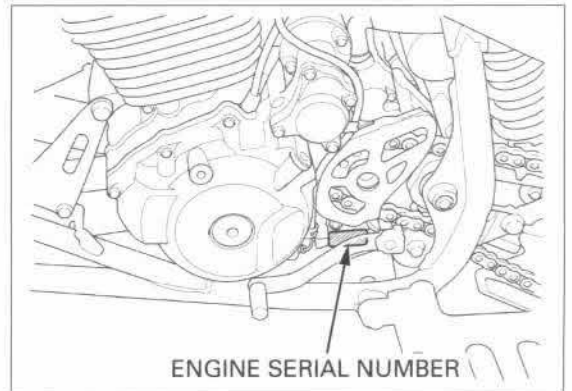
DESTINATION CODE	REGION
A	U.S.A.
CM	Canada
U	Australia (New Zealand, European Direct Sales)

## GENERAL INFORMATION

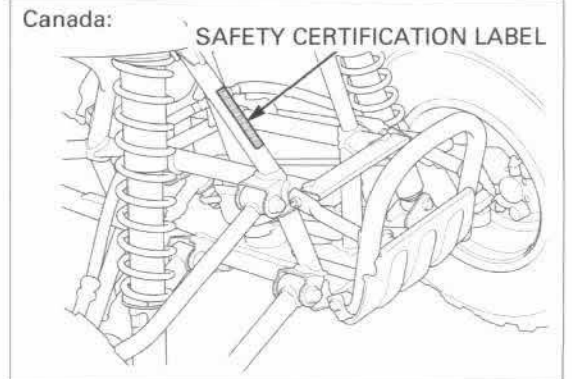
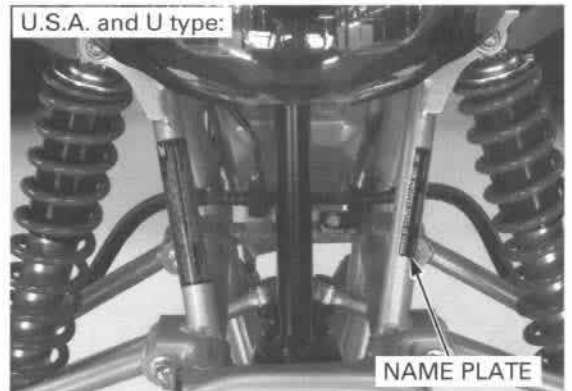
The Vehicle Identification Number (VIN) is stamped on the front of the frame.



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

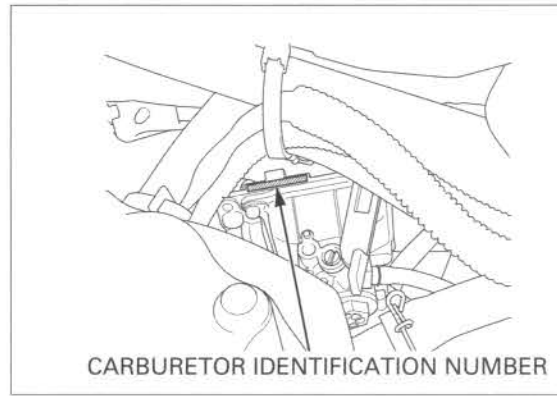


The name plate (U.S.A. and U type) or Safety Certification Label (Canada) is attached on the front frame pipe.



## GENERAL INFORMATION

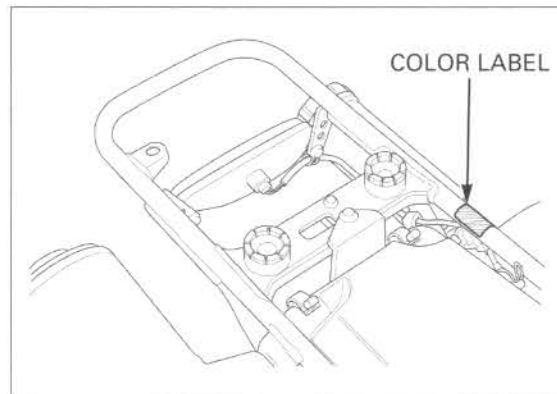
The carburetor identification number is stamped on the left side of the carburetor body.



The Vehicle Emission Information Label is attached on the right front frame pipe (U.S.A. only).



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





## GENERAL SPECIFICATIONS

	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	1,822 mm (71.7 in)
	Overall width	1,155 mm (45.5 in)
	Overall height	1,111 mm (43.7 in)
	Wheelbase	1,217 mm (47.9 in)
	Front tread	920 mm (36.2 in)
	Rear tread	900 mm (35.4 in)
	Seat height	808 mm (31.8 in)
	Footpeg height	348 mm (13.7 in)
	Ground clearance	105 mm (4.1 in)
	Dry weight	176 kg (388 lbs)
	Curb weight	184 kg (406 lbs)
	Maximum weight capacity	110 kg (243 lbs)
	FRAME	Frame type
Front suspension		Double wish-bone
Front wheel travel		209 mm (8.2 in)
Front damper		Double tube
Rear suspension		Swingarm
Rear wheel travel		230 mm (9.1 in)
Rear damper		Single tube
Front tire size		AT22 x 7-10 ★ ★
Rear tire size		AT20 x 10-9 ★ ★
Front rim size		10 x 5.5 AT
Rear rim size		9 x 8.0 AT
Front tire brand		M/R 101 (Ohtsu)
Rear tire brand		M/R 501 (Ohtsu)
Front brake		Hydraulic disc x 2
Rear brake		Hydraulic disc
Caster angle		7°
Trail length		32 mm (1.3 in)
Camber angle	-0.8°	
Fuel tank capacity	10 liters (2.6 US gal, 2.2 Imp gal)	
Fuel tank reserve capacity	1.6 liters (0.42 US gal, 0.35 Imp gal)	
ENGINE	Cylinder arrangement	Single cylinder, transversely installed
	Bore and stroke	85.0 x 70.0 mm (3.35 x 2.76 in)
	Displacement	397 cm <sup>3</sup> (24.2 cu-in)
	Compression ratio	9.1 : 1
	Valve train	Chain driven OHC with rocker arm
	Intake valve opens at 1 mm (0.04 in) lift	5° BTDC
	Intake valve closes at 1 mm (0.04 in) lift	40° ABDC
	Exhaust valve opens at 1 mm (0.04 in) lift	40° BBDC
	Exhaust valve closes at 1 mm (0.04 in) lift	5° ATDC
	Lubrication system	Forced pressure (dry sump)
	Oil pump type	Trochoid
	Cooling system	Air cooled
Air filtration	Oiled urethane foam	
Engine dry weight	42.5 kg (93.7 lbs)	
CARBURETOR	Carburetor type	Piston valve
	Throttle bore	38 mm (1.5 in)

## GENERAL INFORMATION

ITEM		SPECIFICATIONS
DRIVE TRAIN	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operated
	Transmission	Constant mesh, 5-speed + Reverse
	Primary reduction	2.826 (23/65)
	Final reduction	2.785 (14/39)
	Gear ratio	1st
		2nd
		3rd
		4th
		5th
	Reverse	2.428 (14/21 x 21/34)
	Gearshift pattern	Left foot operated return system, R-1-N-2-3-4-5
ELECTRICAL	Ignition system	AC-CDI
	Starting system	Electric starter motor
	Charging system	Single phase output alternator
	Regulator/rectifier	Single phase full-wave rectification
	Lighting system	Battery

## LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	1.8 liters (1.9 US qt, 1.6 Imp qt)	–
	After filter change	1.85 liters (1.95 US qt, 1.63 Imp qt)	–
	After disassembly	2.2 liters (2.3 US qt, 1.9 Imp qt)	–
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.25 (0.010)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

## FUEL SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		QB11A
Main jet		#148
Slow jet		#38
Pilot screw opening	Initial/final opening	See page 6-22
	High altitude adjustment	See page 6-23
Float level		15.9 mm (0.63 in)
Idle speed		1,400 ± 100 rpm (min <sup>-1</sup> )
Throttle grip free play		3 – 8 mm (1/8 – 5/16 in)

## CYLINDER HEAD/VALVE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder compression		686 – 883 kPa (7.0 – 9.0 kgf/cm <sup>2</sup> , 100 – 128 psi)	–
Valve clearance	IN	0.10 (0.004)	–
	EX	0.12 (0.005)	–
Camshaft	Cam lobe height	IN	30.673 – 30.773 (1.2076 – 1.2115)
		EX	30.468 – 30.568 (1.1995 – 1.2035)
	Runout	–	0.03 (0.001)
Rocker arm	Arm I.D.	IN/EX	11.500 – 11.518 (0.4528 – 0.4535)
	Shaft O.D.	IN/EX	11.466 – 11.484 (0.4514 – 0.4521)
	Arm-to-shaft clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)
Sub-rocker arm	Arm I.D.	IN/EX	7.000 – 7.015 (0.2756 – 0.2762)
	Shaft O.D.	IN/EX	6.972 – 6.987 (0.2745 – 0.2751)
	Arm-to-shaft clearance	IN/EX	0.013 – 0.043 (0.0005 – 0.0017)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)
		EX	5.455 – 5.470 (0.2148 – 0.2154)
	Valve guide I.D.	IN/EX	5.500 – 5.512 (0.2165 – 0.2170)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)
		EX	0.030 – 0.057 (0.0012 – 0.0022)
Valve spring	Free length	IN/EX	1.0– 1.1 (0.039 – 0.043)
		Inner	37.19 (1.464)
		Outer	44.20 (1.740)
Cylinder head warpage		–	0.10 (0.004)

## GENERAL INFORMATION

# CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	85.000 – 85.010 (3.3465 – 3.3468)	85.10 (3.350)	
	Out-of-round	–	0.05 (0.002)	
	Taper	–	0.05 (0.002)	
	Warpage	–	0.10 (0.004)	
Piston, piston pin, piston ring	Piston O.D. at 15 (0.6) from bottom	84.960 – 84.985 (3.3449 – 3.3459)	84.880 (3.3417)	
	Piston pin hole I.D.	20.002 – 20.008 (0.7875 – 0.7877)	20.060 (0.7898)	
	Piston pin O.D.	19.994 – 20.000 (0.7872 – 0.7874)	19.964 (0.7860)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.096 (0.0038)	
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.14 (0.006)
Second		0.015 – 0.050 (0.0006 – 0.0020)	0.12 (0.005)	
Cylinder-to-piston clearance		0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)	
Connecting rod small end I.D.		20.020 – 20.041 (0.7882 – 0.7890)	20.067 (0.7900)	
Connecting rod-to-piston pin clearance		0.020 – 0.047 (0.0008 – 0.0019)	0.103 (0.0041)	

# CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch	Lever free play	10 – 20 (3/8 – 3/4)	–
	Spring free length	52.64 (2.072)	50.0 (1.97)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.69 (0.106)
	Plate warpage	–	0.15 (0.006)
	Outer guide I.D.	22.000 – 22.021 (0.8661 – 0.8670)	22.05 (0.868)
Mainshaft O.D. at clutch outer guide		21.967 – 21.980 (0.8648 – 0.8654)	21.93 (0.863)

# ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.705 – 51.718 (2.0356 – 2.0361)	51.67 (2.034)

## CRANKCASE/TRANSMISSION/CRANKSHAFT SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Shift fork	Fork I.D.	13.000 – 13.018 (0.5118 – 0.5125)	13.04 (0.513)	
	Shaft O.D.	12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)	
	Fork claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.5 (0.22)	
Transmission	Gear I.D.	M4	25.020 – 25.041 (0.9850 – 0.9859)	25.08 (0.987)
		M5	25.000 – 25.021 (0.9843 – 0.9851)	25.06 (0.987)
		C1	23.000 – 23.021 (0.9055 – 0.9063)	23.07 (0.908)
		C2, C3, CR	28.020 – 28.041 (1.1031 – 1.1040)	28.08 (1.106)
		Reverse idle	17.000 – 17.018 (0.6693 – 0.6700)	17.04 (0.671)
	Gear bushing O.D.	M4	24.979 – 25.000 (0.9834 – 0.9843)	24.90 (0.980)
		M5	24.959 – 21.980 (0.8645 – 0.8654)	24.90 (0.980)
		C1	22.959 – 22.980 (0.9039 – 0.9047)	22.90 (0.902)
		C2, C3, CR	27.979 – 28.000 (1.1015 – 1.1024)	27.94 (1.100)
		Reverse idle	16.966 – 16.984 (0.6693 – 0.6700)	16.94 (0.667)
	Gear (mainshaft and counter shaft)-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0022)	0.10 (0.004)
	Reverse idle gear-to-bushing clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
	Gear bushing I.D.	M4	22.000 – 22.021 (0.8661 – 0.8670)	22.10 (0.870)
		C1	20.020 – 20.041 (0.7882 – 0.7890)	20.08 (0.791)
		C2, CR	25.000 – 25.021 (0.9843 – 0.9851)	25.06 (0.987)
		Reverse idle	13.000 – 13.018 (0.5118 – 0.5125)	13.04 (0.513)
	Mainshaft O.D.	at M4	21.959 – 21.980 (0.7866 – 0.7874)	21.92 (0.863)
	Countershaft O.D.	at C1	19.979 – 20.000 (1.1791 – 1.1801)	19.94 (0.785)
		at C2, CR	24.959 – 24.980 (0.9826 – 0.9835)	24.92 (0.981)
Reverse idle shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.94 (0.509)	
Bushing-to-shaft (mainshaft and countershaft) clearance		0.020 – 0.062 (0.0008 – 0.0022)	0.10 (0.004)	
Bushing-to-reverse idle shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)	
Crankshaft	Runout	–	0.12 (0.005)	
	Big end side clearance	0.05 – 0.45 (0.002 – 0.018)	0.6 (0.02)	
	Big end radial clearance	0.006 – 0.018 (0.0002 – 0.0007)	0.05 (0.002)	

## FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	4.0 (0.16)
Cold tire pressure	Standard	27 kPa (0.275 kgf/cm <sup>2</sup> , 4.0 psi)	–
	Minimum	23 kPa (0.235 kgf/cm <sup>2</sup> , 3.4 psi)	–
	Maximum	31 kPa (0.315 kgf/cm <sup>2</sup> , 4.6 psi)	–
Shock absorber spring adjuster standard position		2nd from softest position	–
Tie-rod distance between the ball joints		370.9 (14.60)	–
Toe		Toe-in: 11 ± 15 (2/5 ± 3/5)	–

## GENERAL INFORMATION

### REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			-	4.0 (0.16)
Cold tire pressure	Standard		27 kPa (0.275 kgf/cm <sup>2</sup> , 4.0 psi)	-
	Minimum		23 kPa (0.235 kgf/cm <sup>2</sup> , 3.4 psi)	-
	Maximum		31 kPa (0.315 kgf/cm <sup>2</sup> , 4.6 psi)	-
Axle runout			-	3.0 (0.12)
Drive chain	Slack		30 - 40 (1-1/4 - 1-5/8)	-
	Size/link	DID	520V6/94	-
		RK	520SMOZ10S/94	-
Shock absorber spring installed length			231.5 (9.11)	-
Compression damping adjuster standard position			2-1/2 turns out from full in	-
Rebound damping adjuster standard position			1-3/4 turns out from full in	-

### HYDRAULIC DISC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Recommended brake fluid			DOT 4	-
Brake disc thickness	Front		2.8 - 3.2 (0.11 - 0.13)	2.5 (0.10)
	Rear		3.8 - 4.2 (0.15 - 0.17)	3.5 (0.14)
Brake disc runout			-	0.30 (0.012)
Master cylinder I.D.			12.700 - 12.743 (0.5000 - 0.5017)	12.75 (0.502)
Master piston O.D.			12.657 - 12.684 (0.4983 - 0.4994)	12.65 (0.498)
Caliper cylinder I.D.			33.960 - 34.010 (1.3370 - 1.3390)	34.02 (1.340)
Caliper piston O.D.			33.895 - 33.928 (1.3344 - 1.3357)	33.87 (1.333)

### BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V - 8 Ah
	Voltage (20°C/68°F)	Fully charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 - 10 h
Quick		4.0 A/1 h	
Current leakage			0.1 mA max.
Alternator	Capacity		147 W/5,000 rpm (min <sup>-1</sup> )
	Charging coil resistance (20°C/68°F)		0.1 - 1.0 Ω

### IGNITION SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Spark plug	Standard		DPR8Z (NGK), X24GPR-U (DENSO)
	For extended high speed riding		DPR9Z (NGK), X27GPR-U (DENSO)
Spark plug gap			0.6 - 0.7 mm (0.024 - 0.028 in)
Ignition coil primary peak voltage			100 V minimum
Ignition pulse generator peak voltage			0.7 V minimum
Exciter coil peak voltage			100 V minimum
Ignition timing ("F" mark)			8° BTDC at idle

### ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	8.5 (0.33)

**LIGHTS/SWITCHES SPECIFICATIONS**

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12 V - 30/30 W
	Brake/taillight	LED
	Neutral indicator	12 V - 3 W
	Reverse indicator	12 V - 3.4 W
Fuse	Main fuse	15 A

## GENERAL INFORMATION

# STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE		FASTENER TYPE	TORQUE	
	N·m (kgf·m, lbf·ft)			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	27 (2.8, 20)	
			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. ALOC bolt: replace with a new one.
5. Lock nut: replace with a new one.
6. Castle nut: tighten to the specified torque and further tighten until its grooves aligns with the cotter pin hole.
7. Stake

## ENGINE

### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	1	12	18 (1.8, 13)	
Valve adjusting hole cap	4	36	15 (1.5, 11)	
Valve adjusting screw lock nut	4	7	24 (2.4, 18)	
Crankshaft hole cap	1	30	8 (0.8, 5.9)	
Timing hole cap	1	14	10 (1.0, 7)	
Engine oil drain bolt (crankcase)	1	12	25 (2.5, 18)	

### CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head nut	4	10	44 (4.5, 32)	Note 2
Cam sprocket bolt	2	7	20 (2.0, 15)	Note 1
Rocker arm shaft	2	14	27 (2.8, 20)	Note 1
Intake sub-rocker arm shaft	2	14	27 (2.8, 20)	Note 1
Exhaust sub-rocker arm shaft	2	12	27 (2.8, 20)	Note 1
Cylinder head cover bolt	1	8	22 (2.2, 16)	
Cam tensioner lifter plug screw	1	6	4 (0.4, 3.0)	

### CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder bolt	4	10	44 (4.5, 32)	Note 2
Cylinder stud bolt	4	10	20 (2.0, 15)	page 9-8

### CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch center lock nut	1	18	108 (11.0, 80)	Note 2, 5, 7
Primary drive gear nut	1	18	88 (9.0, 65)	Note 2
Gearshift stopper arm bolt	1	6	12 (1.2, 9)	



**ALTERNATOR/STARTER CLUTCH**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel bolt	1	12	128 (13.0, 94)	Note 2
Starter clutch outer bolt	6	8	30 (3.1, 22)	Note 1
Left crankcase cover stud bolt	1	6	10 (1.0, 7)	

**CRANKCASE/TRANSMISSION/CRANKSHAFT**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Mainshaft bearing setting plate bolt	2	6	12 (1.2, 9)	Note 1
Gearshift spindle return spring pin	1	8	24 (2.4, 18)	

**LIGHTS/SWITCHES**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Neutral switch	1	10	12 (1.2, 9)	
Reverse switch	1	10	12 (1.2, 9)	

## GENERAL INFORMATION

### FRAME

#### FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE		REMARKS
			N·m (kgf·m, lbf·ft)		
Footpeg bolt	4	10	42 (4.3, 31)		Note 4
Skid plate bolt	4	8	30 (3.1, 22)		
Exhaust pipe joint nut	4	8	27 (2.8, 20)		
Muffler mounting bolt	2	8	32 (3.3, 24)		
Muffler band bolt	2	8	23 (2.3, 17)		
Exhaust pipe protector bolt	2	6	20 (2.0, 15)		
Rear frame upper mounting bolt	2	8	42 (4.3, 31)		
Rear frame lower mounting bolt	2	10	54 (5.5, 40)		

### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE		REMARKS
			N·m (kgf·m, lbf·ft)		
Engine oil drain bolt (oil tank)	1	10	20 (2.0, 15)		
Engine oil strainer screen (oil tank)	1	27	54 (5.5, 40)		
Axle bearing holder pinch bolt	4	8	21 (2.1, 15)		
Front master cylinder reservoir cap screw	2	4	1.5 (0.15, 1.1)		
Parking brake arm lock nut	1	8	17.2 (1.75, 13)		
Rear master cylinder push rod lock nut	1	8	17.2 (1.75, 13)		
Tie-rod lock nut	4	12	54 (5.5, 40)		

### LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE		REMARKS
			N·m (kgf·m, lbf·ft)		
Oil pipe joint flare nut	2	16	20 (2.0, 15)		

### ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE		REMARKS
			N·m (kgf·m, lbf·ft)		
Upper engine hanger nut	1	10	74 (7.5, 55)		
Front engine hanger plate bolt	4	8	26 (2.7, 19)		
Front engine hanger nut	1	10	54 (5.5, 40)		
Lower engine hanger nut	1	10	74 (7.5, 55)		

### CLUTCH/GEARSHIFT LINKAGE

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

### FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE		REMARKS
			N·m (kgf·m, lbf·ft)		
Throttle lever pivot nut	1	6	7 (0.7, 5.2)		
Throttle housing cover screw	3	4	3.4 (0.35, 2.5)		
Handlebar switch housing screw	2	5	2 (0.2, 1.5)		
Front wheel nut	8	10	64 (6.5, 47)		
Front wheel hub nut	2	14	69 (7.0, 51)		
Front brake disc bolt	6	8	42 (4.3, 31)		
Brake disc cover bolt	2	6	12 (1.2, 9)		
Shock absorber mounting nut	4	10	44 (4.5, 32)		
Upper and lower arm pivot nut	8	10	39 (4.0, 29)		
Upper and lower arm ball joint nut	4	12	32 (3.3, 24)		
Tie-rod ball joint nut	4	10	44 (4.5, 32)		
Handlebar lower holder nut	2	10	39 (4.0, 29)		
Steering shaft end nut	1	14	69 (7.0, 51)		
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)	
Axle outer lock nut	1	48	88 (9.0, 65)	Note 1
Axle inner lock nut	1	48	128 (13.0, 94)	Note 1
Rear wheel hub nut	2	18	147 (15.0, 108)	Note 3, 6
Final driven sprocket nut	4	10	59 (6.0, 44)	
Rear brake disc bolt	4	8	42 (4.3, 31)	Note 4
Shock absorber mounting nut	2	10	59 (6.0, 44)	Note 5
Shock arm-to-frame nut	1	10	59 (6.0, 44)	Note 5
Shock link-to-swingarm nut	1	10	44 (4.5, 32)	Note 5
Shock arm-to-shock link nut	1	10	59 (6.0, 44)	Note 5
Swingarm pivot nut	1	14	108 (11.0, 80)	
Brake caliper stay stopper pin bolt	1	12	59 (6.0, 44)	Note 1

**HYDRAULIC DISC BRAKE**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Caliper bleed valve	3	8	5.4 (0.55, 4.0)	
Front brake caliper pad pin	4	10	17.2 (1.75, 13)	
Front brake caliper pad pin plug	4	10	2.4 (0.24, 1.8)	
Rear brake caliper pad pin	2	8	17.2 (1.75, 13)	
Brake hose oil bolt	5	10	34 (3.5, 25)	
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 brake light switch screw	1	4	1.2 (0.12, 0.9)	
Rear brake reservoir hose joint screw	1	4	1.5 (0.15, 1.1)	Note 1
Rear master cylinder mounting bolt	2	6	13 (1.3, 10)	
Front brake caliper slide pin	2	8	22 (2.2, 16)	Note 1
Front brake caliper bracket pin	2	8	17.2 (1.75, 13)	
Front brake caliper mounting bolt	4	8	30 (3.1, 22)	Note 4
Rear brake caliper slide pin	1	8	22 (2.2, 16)	Note 1
Rear brake caliper bracket pin	1	8	17.2 (1.75, 13)	Note 1
Rear brake caliper mounting bolt	2	8	30 (3.1, 22)	Note 4
Parking brake base bolt	2	8	22 (2.2, 16)	
Brake pedal pivot bolt	1	6	12 (1.2, 9)	Note 1
Front brake pipe joint nut	2	10	17 (1.7, 13)	

**LIGHTS/SWITCHES**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch switch retainer bolt	1	5	4 (0.4, 3.0)	Note 1

**OTHERS**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel valve mounting bolt	2	6	9 (0.9, 6.6)	
Fuel valve lever screw	1	5	4 (0.4, 3.0)	Note 1
Reverse assist cable drum screw	1	3	0.7 (0.07, 0.5)	
Reverse assist lever housing cover screw	1	3	0.38 (0.04, 0.3)	

## GENERAL INFORMATION

# LUBRICATION & SEAL POINTS

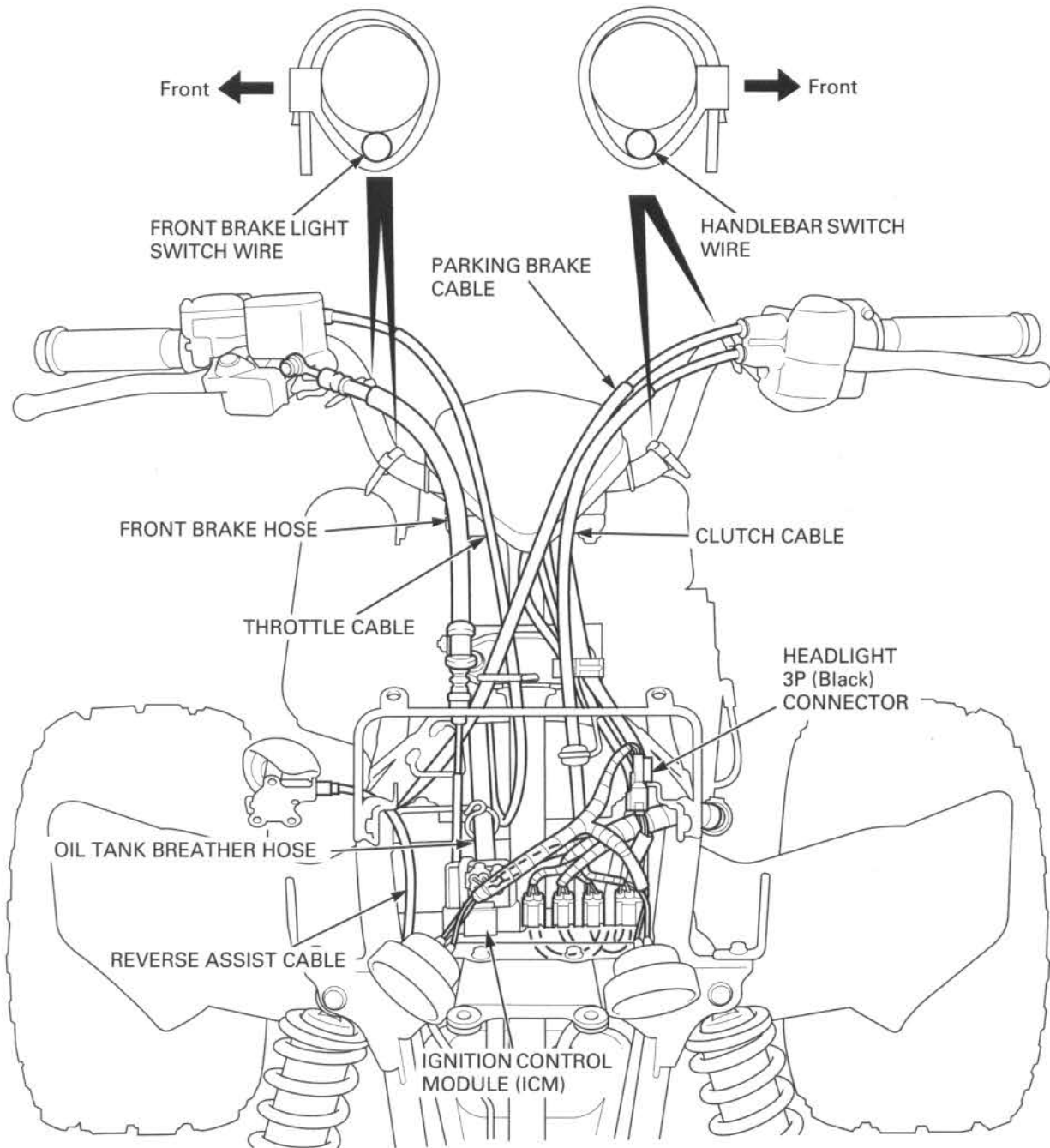
## ENGINE

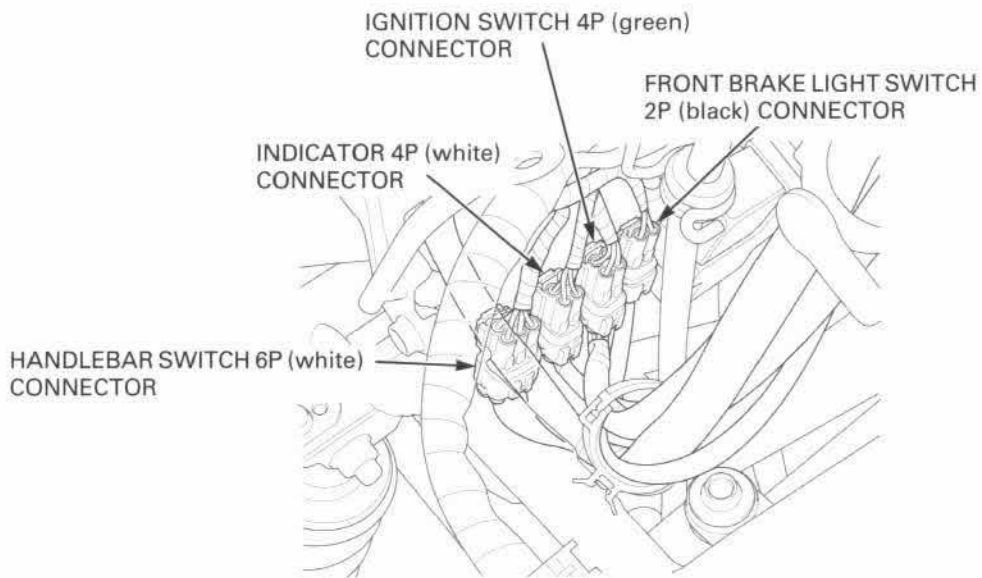
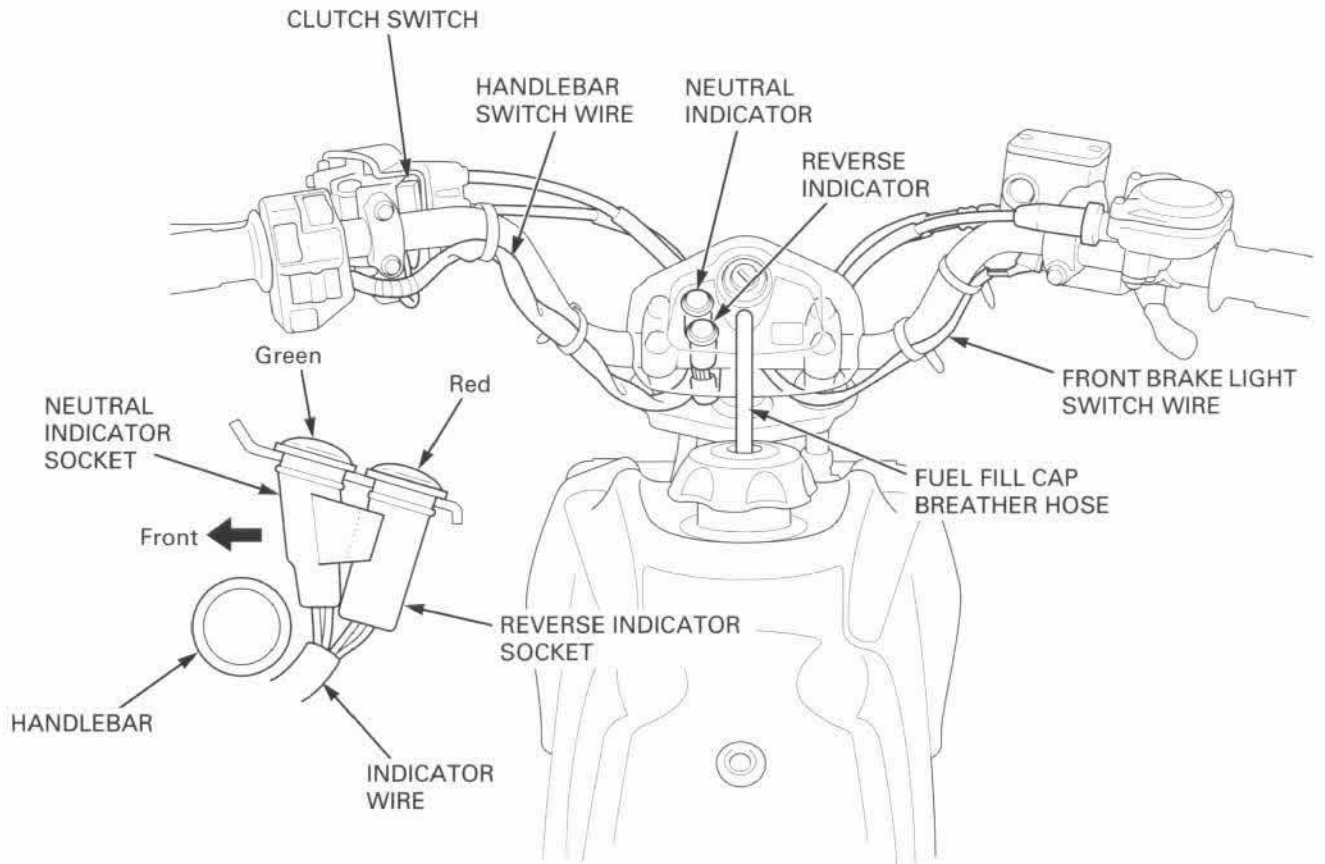
LOCATION	MATERIAL	REMARKS
Camshaft cam lobes and journals Rocker arm slipper surface Sub-rocker arm slipper surface Valve stem sliding surface Clutch outer guide inner and outer surfaces Piston pin outer surface Connecting rod piston pin hole Starter reduction gear teeth Starter reduction gear shaft outer surface Starter idle gear teeth Starter idle gear shaft outer surface Transmission gear rotating surface Connecting rod big end bearing	Molybdenum oil solution (a mixture of engine oil and molybdenum disul- fide grease in a ratio of 1:1)	
Rocker arm shaft arm sliding surface Sub-rocker arm shaft arm sliding surface Cam chain Cylinder head nut threads and seating surface Piston outer surface and piston pin holes Piston rings Cylinder bore Cylinder 10 mm bolt threads and seating surface Clutch lifter arm spindle Clutch lifter piece Clutch disc linings Clutch center lock nut threads and seating surface Primary drive gear nut threads and seating surface Reverse stopper shaft journals Flywheel bolt threads and seating surface Transmission gear teeth Transmission gear (M2/3, C4, C5) shifter groove Shift fork shaft outer surface Shift fork shaft guide pin and inner surface Shift drum guide grooves Each bearing rotating area Each oil seal outer surface Each O-ring	Engine oil	
Each oil seal lip	Multi-purpose grease	
Rocker arm shaft threads Sub-rocker arm shaft threads Cam sprocket bolt threads Gearshift cam plate bolt threads Left crankcase cover stud bolt threads Alternator wire clamp bolt threads Ignition pulse generator bolt threads Starter clutch outer bolt threads Mainshaft bearing setting plate bolt threads Cam chain tensioner bolt threads	Locking agent	Coating area: page 8-25 Coating area: page 8-25 Coating width: 5 mm from tip Coating width: 6.5 mm from tip Coating width: 6.5 mm from tip Coating width: 6.5 mm from tip Coating width: 6.5 mm from tip Coating width: 6.5 mm from tip Coating width: 6.5 mm from tip Coating width: 6.5 mm from tip
Alternator/ignition pulse generator wire grommet seating surface	Sealant	

FRAME

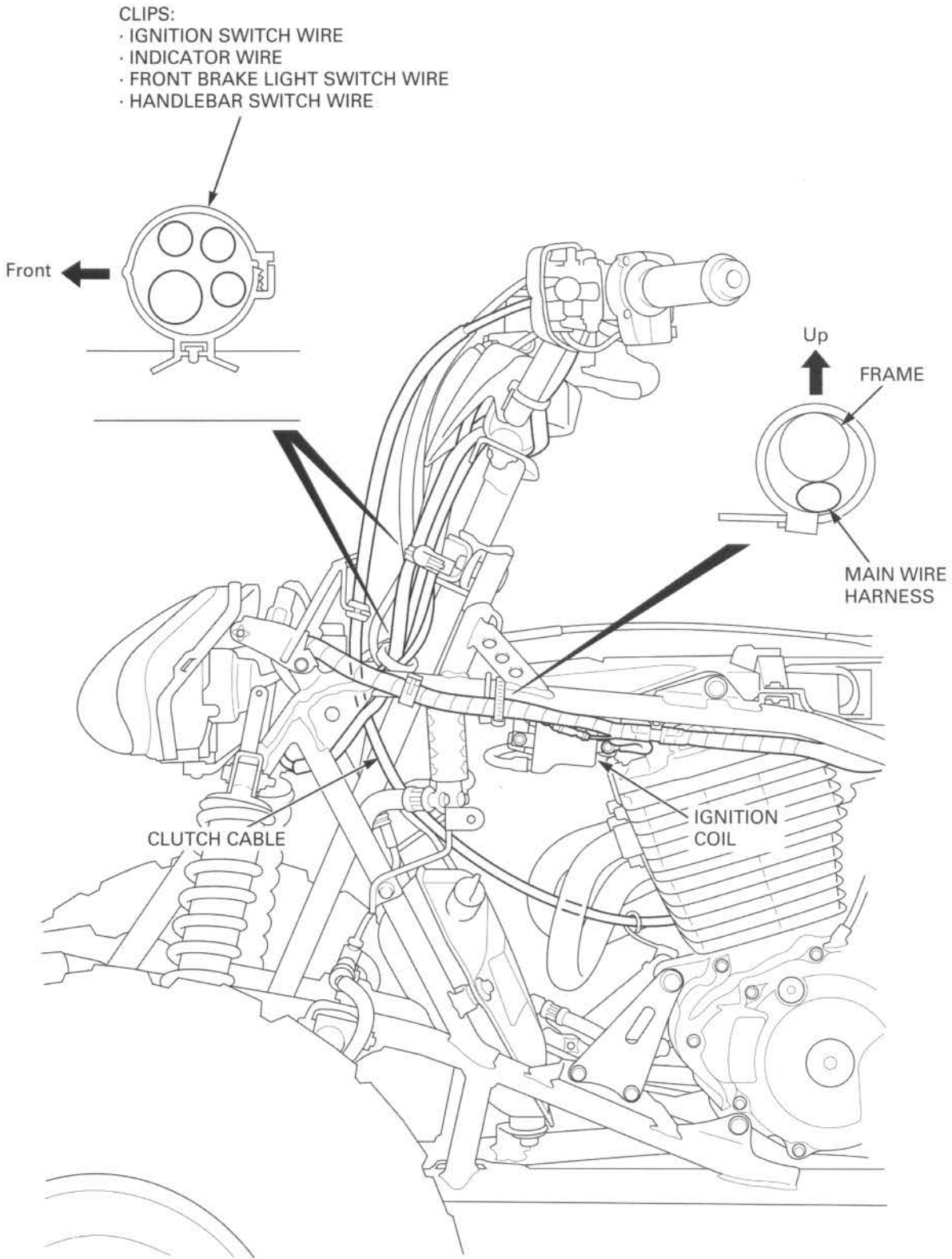
LOCATION	MATERIAL	REMARKS
Throttle cable end Throttle cable adjuster threads Throttle lever pivot and dust seal lips Parking brake cable end Parking lock arm pivot (screw) Reverse assist cable drum sliding area Front wheel hub dust seal lips Upper and lower arm pivot bearings Upper and lower arm dust seal lips Front shock absorber lower bearing Front shock absorber dust seal lips Steering shaft bushing inner surface Steering shaft dust seal lips Rear shock absorber upper bearing Rear shock absorber dust seal lips Shock arm and link bearings Shock arm and link dust seal lips Swingarm pivot bearings Swingarm pivot dust seal lips Rear axle bearing holder seating surface Rear axle bearing holder dust seal lips Rear brake caliper stay inner surface Rear axle splines (at brake disc seating area) Rear axle outer lock nut stopper ring Rear wheel hub nut threads and seating surface Brake pedal pivot (grease groove) Brake pedal pivot dust seal lips	Multi-purpose grease	Fill up 3 g per each bearing  Fill up 3 g per each bearing
Throttle inner cable Clutch inner cable	Cable lubricant	
Handlebar grip rubber inside Swingarm rubber plug mating groove	Honda bond A or Pro Honda Hand Grip Cement (U.S.A. only) or equivalent	
Front brake lever-to-master piston contacting area Front brake lever pivot Rear brake master piston-to-push rod contacting area Rear brake master cylinder push rod boot groove Brake caliper slide pin grease groove Brake caliper bracket pin boot inside Rear brake caliper parking brake shaft inner and outer threads, and boot groove	Silicone grease	
Brake master piston and cups Brake caliper piston and seals Rear brake reservoir hose joint O-ring Rear brake caliper piston rod O-ring	DOT4 brake fluid	
Rear axle inner and outer lock nuts threads Rear brake caliper stay stopper pin bolt threads Front brake caliper slide pin threads Rear brake reservoir hose joint screw threads Rear brake caliper slide pin threads Rear brake caliper bracket pin threads Brake pedal pivot bolt threads Fuel valve lever screw threads	Locking agent	

CABLE & HARNESS ROUTING

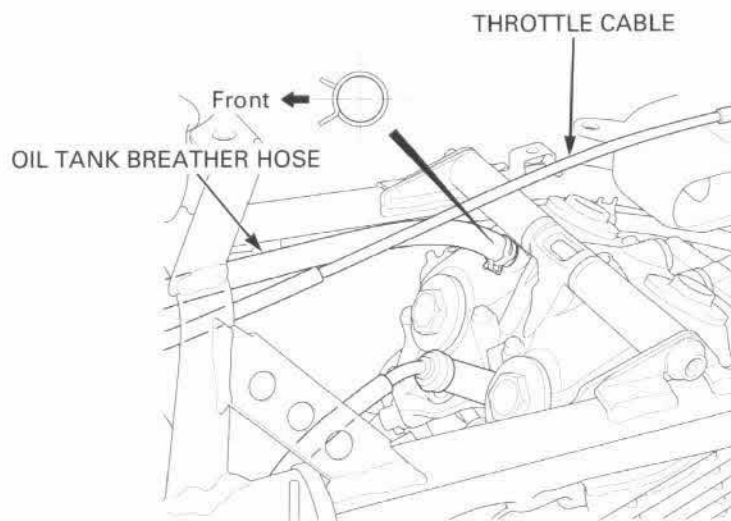
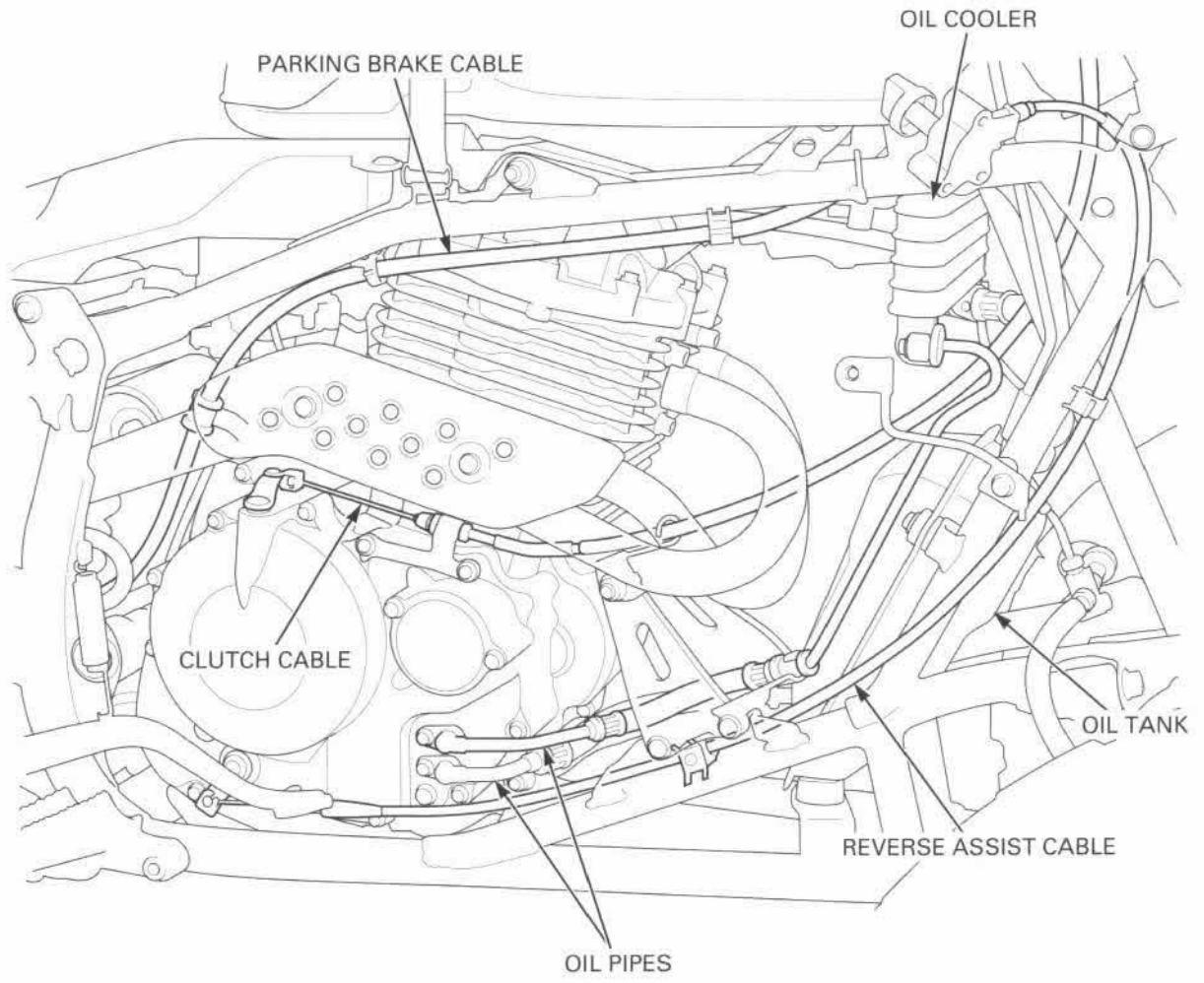




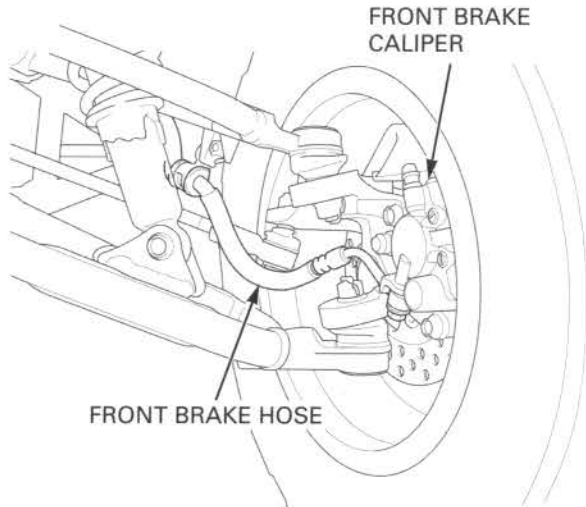
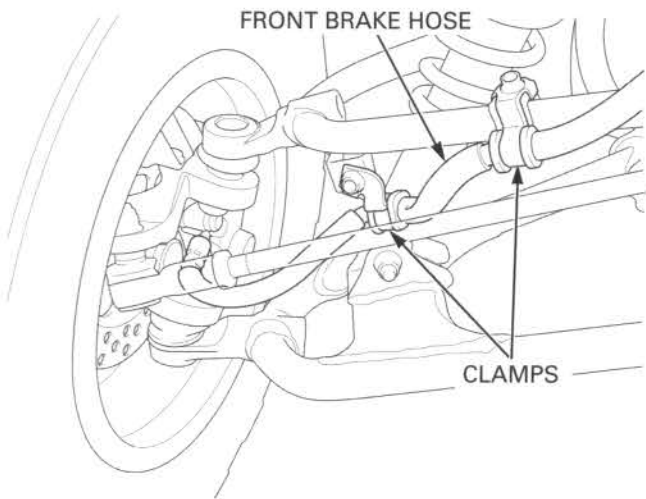
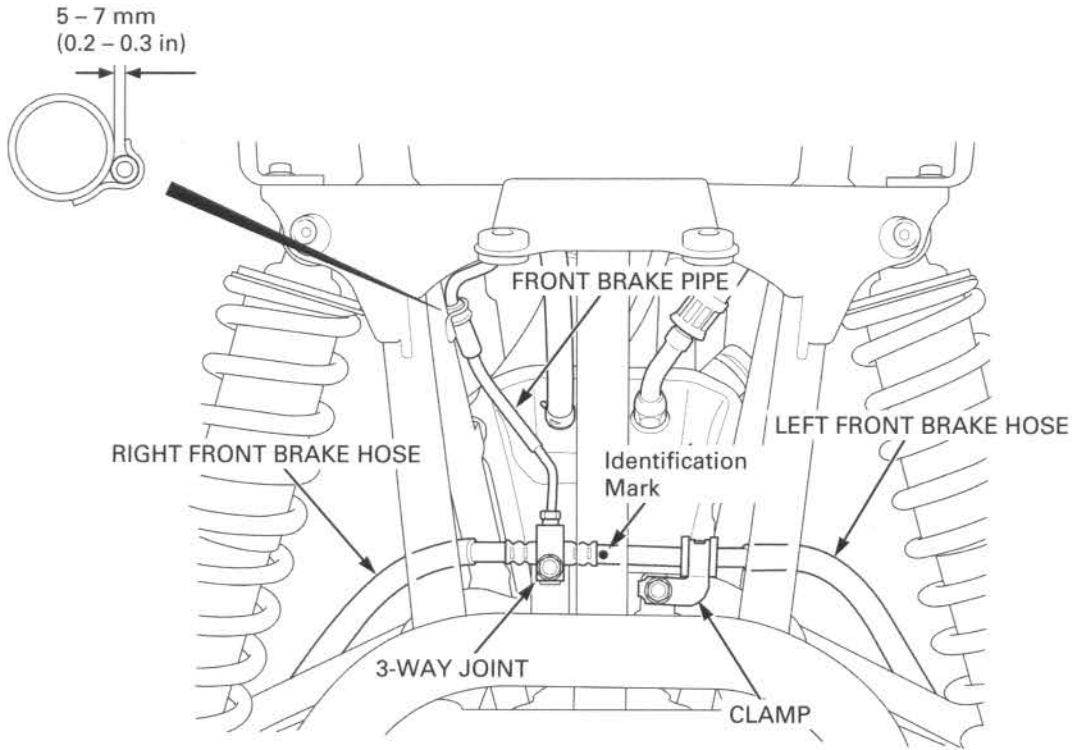
# GENERAL INFORMATION

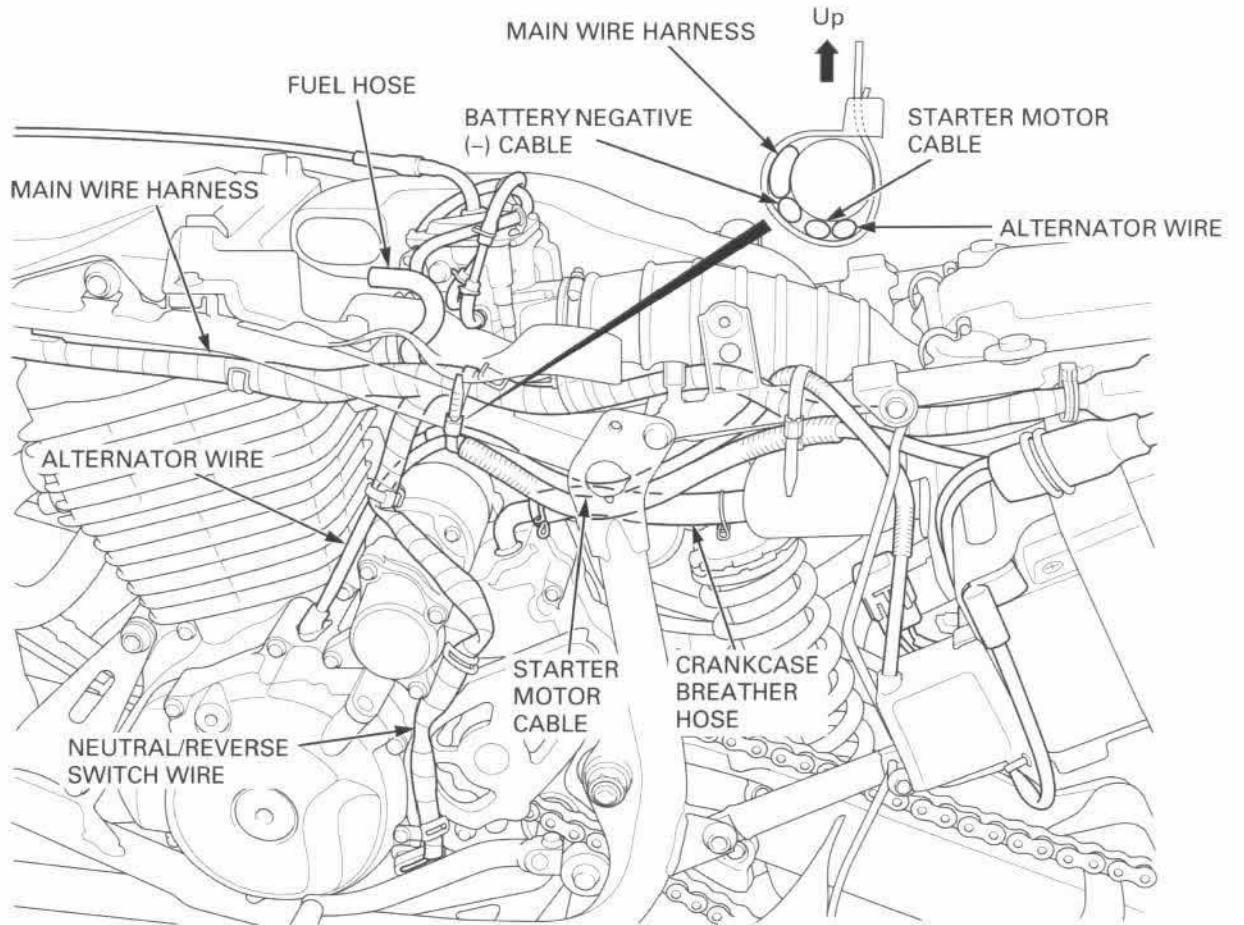




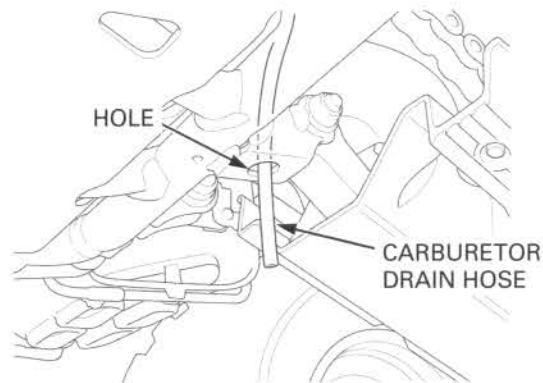
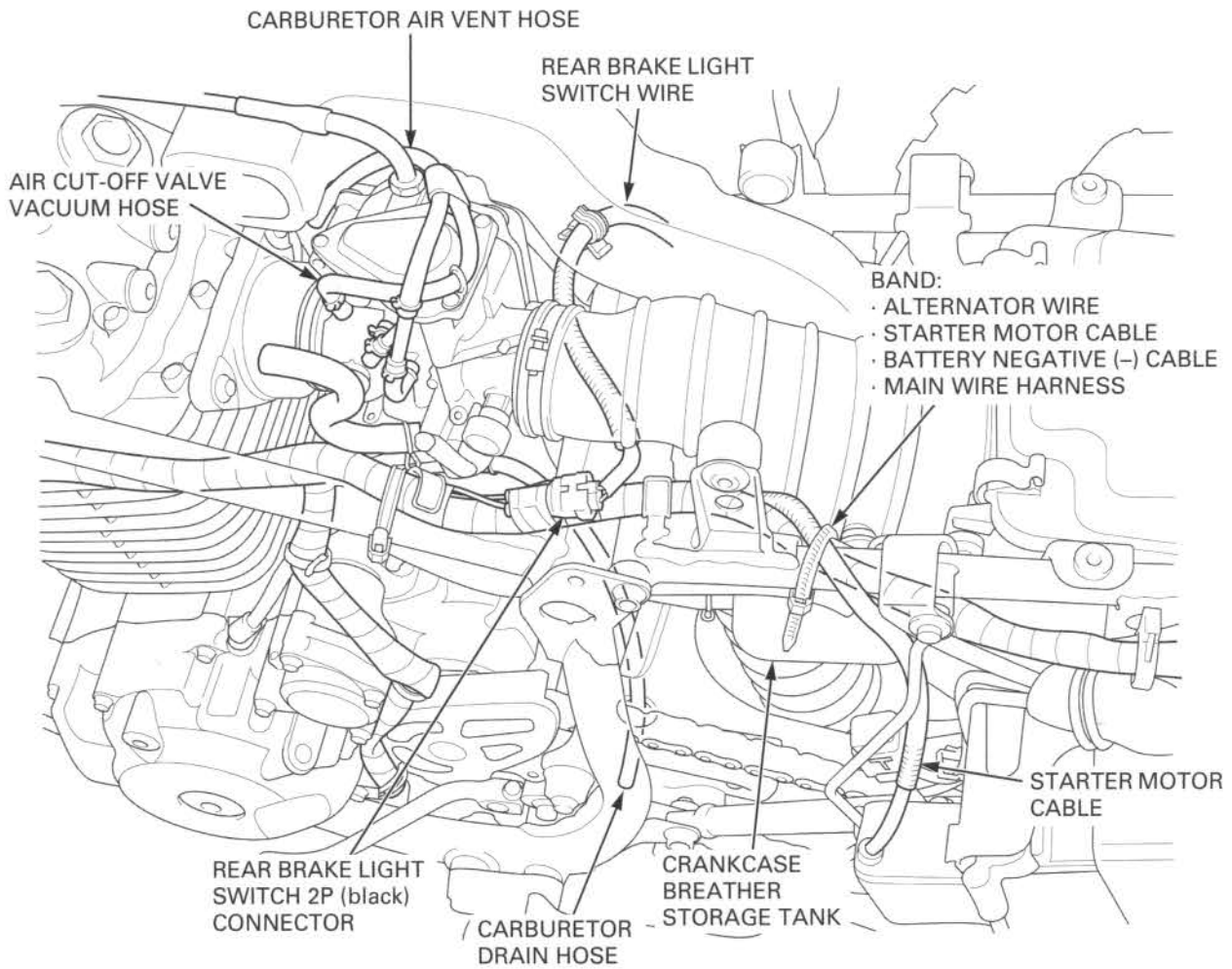


**GENERAL INFORMATION**



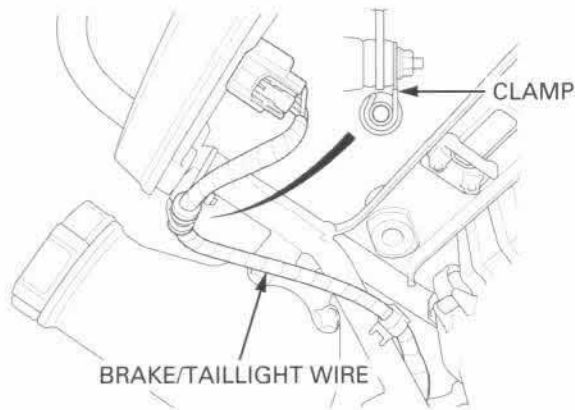
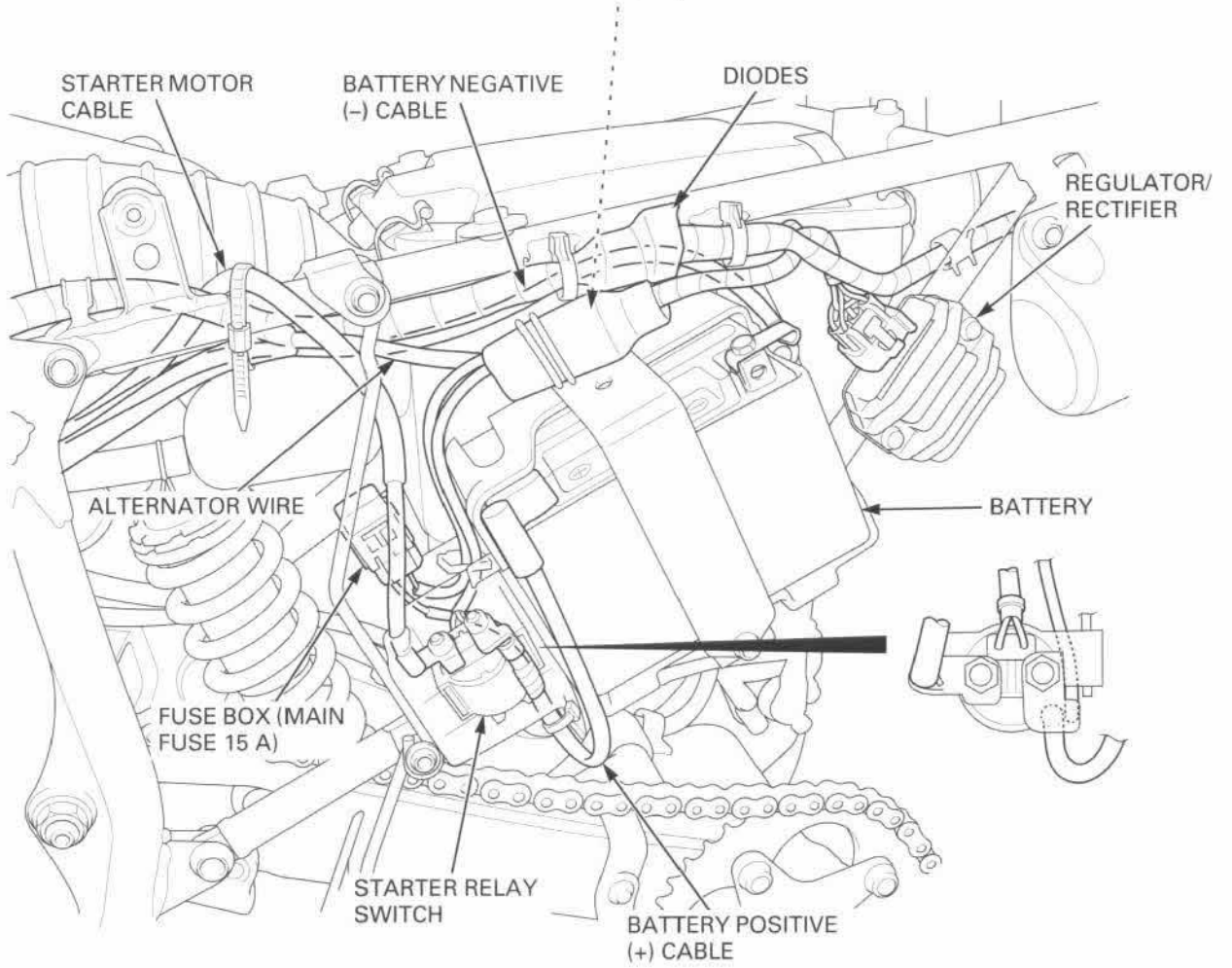


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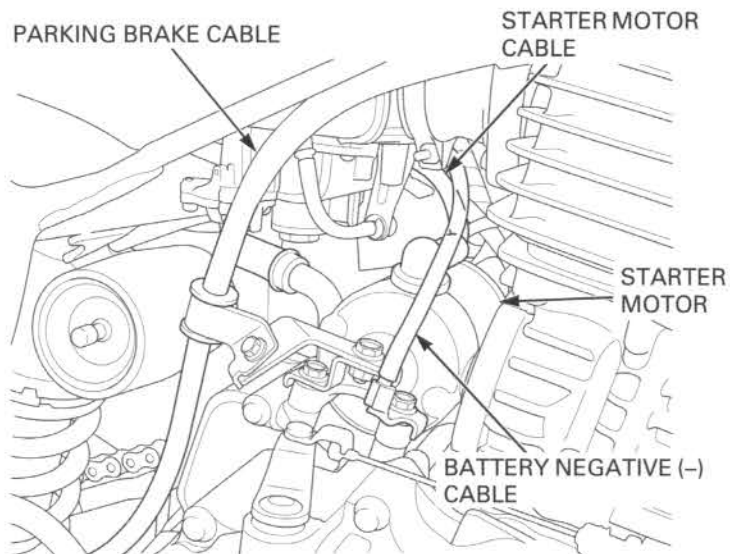
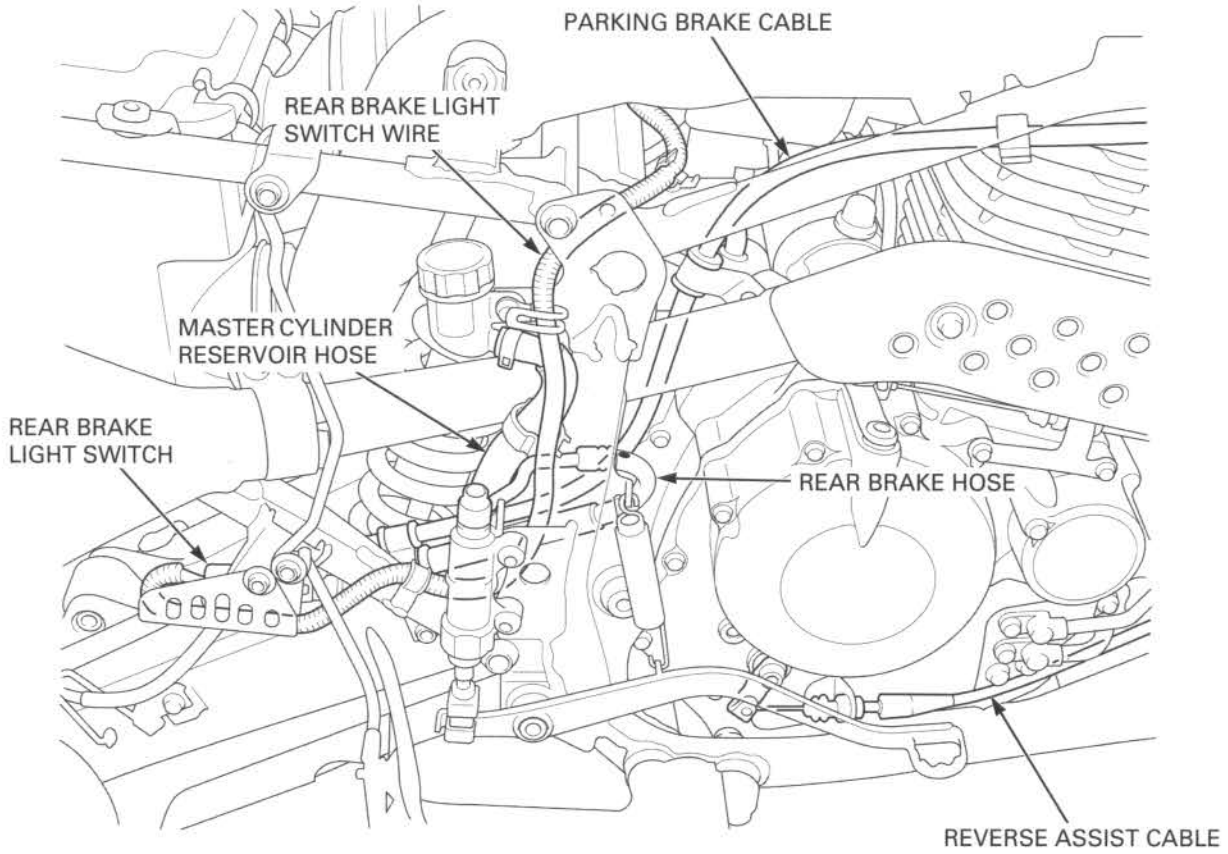


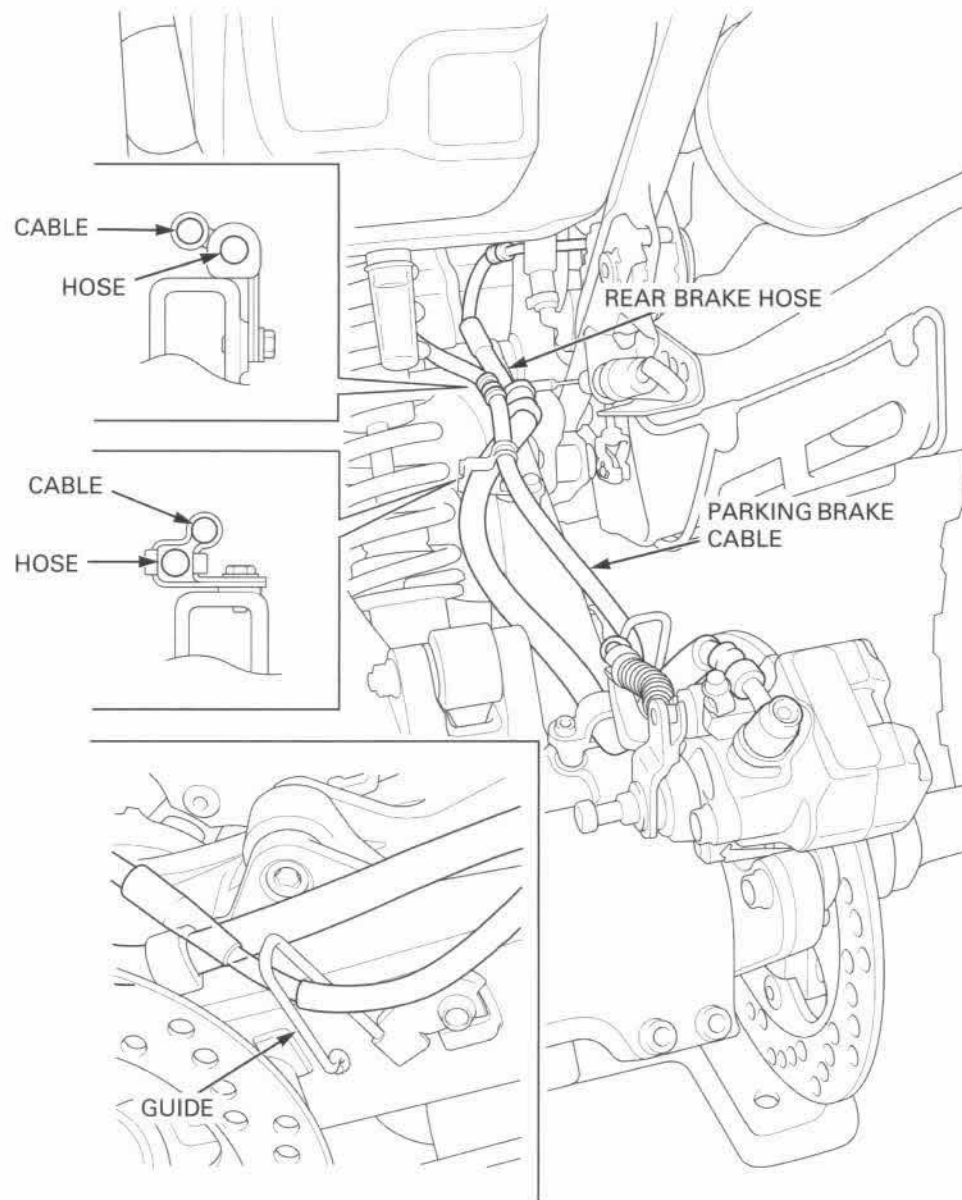
CONNECTORS:

- ALTERNATOR/IGNITION PULSE GENERATOR 4P (white) CONNECTOR
- EXCITER COIL CONNECTOR (Black/red)
- STARTER RELAY CONNECTORS (Yellow/red & Yellow green)
- FUSE BOX CONNECTOR (Red)



# GENERAL INFORMATION





## 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.

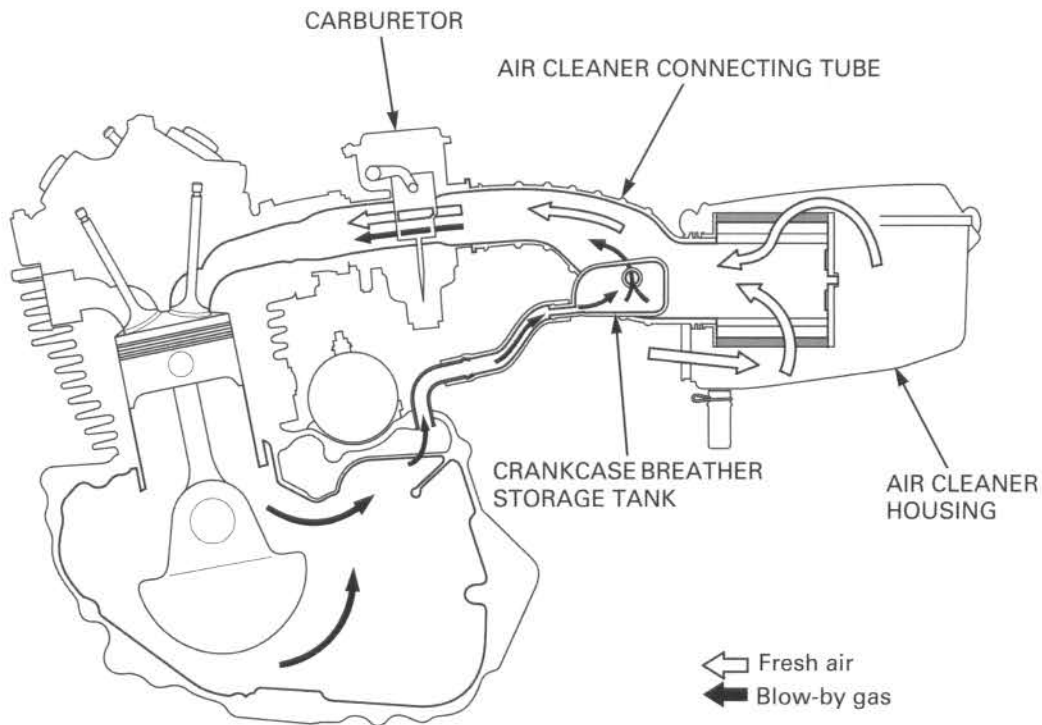
Honda Motor Co., Ltd. utilizes appropriate carburetor settings as well as other systems, to reduce oxides of nitrogen, carbon monoxide and hydrocarbons.

## EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of a 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

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**MEMO**



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**RIDE RED**

## 2. TECHNICAL FEATURE

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REVERSE SYSTEM..... 2-2

## TECHNICAL FEATURE

# REVERSE SYSTEM

The reverse system for this model consists of the reverse stopper shaft, reverse gears and reverse switch incorporated in the transmission.

## OPERATION

1. Stop of the vehicle and squeeze the clutch lever when the engine is running.
2. Turn the reverse assist lever to release the reverse inhibitor.
  - The reverse stopper plate on the stopper shaft is turned by the reverse assist cable.
  - The stopper plate releases the shift drum lock.
3. Shift the transmission down from the 1st to reverse position.
  - The reverse drive gear (on the mainshaft), reverse idle gear and reverse driven gear (on the countershaft) are engaged.
  - The reverse switch turns to ON. The reverse indicator comes on and the ignition control module (ICM) detects the reverse position.

The transmission can be shifted from the reverse to 1st position without operating the reverse assist lever.

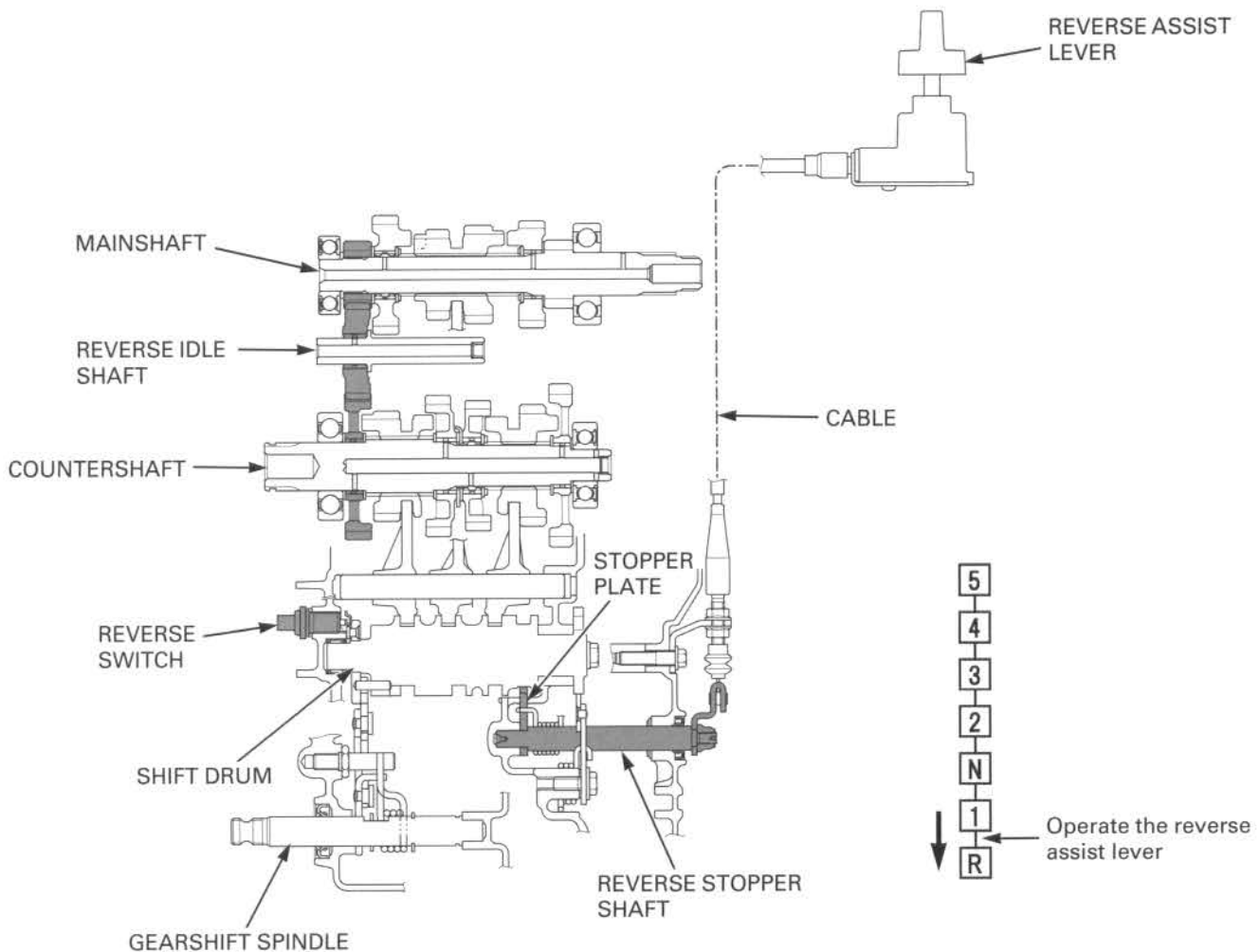
## IGNITION CONTROL

When the vehicle is driving in reverse, the ICM limits the engine speed to 4,000 rpm ( $\text{min}^{-1}$ ).

When the engine is stopped and the transmission is in the reverse position (the reverse switch is turned to ON), the ICM stops the ignition to prevent starting the engine.

## NOTE:

The reverse assist cable requires periodic inspection in accordance with the maintenance schedule (page 4-3). Misadjustment of the assist cable may cause incorrect operation of the reverse system.



# 3. FRAME/BODY PANELS/EXHAUST SYSTEM

---

SERVICE INFORMATION .....	3-2	FRONT FENDER.....	3-5
TROUBLESHOOTING .....	3-2	FUEL TANK .....	3-6
SEAT/REAR FENDER .....	3-3	HEAT GUARD PLATE .....	3-7
TOP COVER.....	3-3	SKID PLATE .....	3-7
SIDE COVER.....	3-4	MUD GUARD & FOOTPEG .....	3-8
FUEL TANK UPPER COVER.....	3-4	EXHAUST SYSTEM.....	3-9

## **SERVICE INFORMATION**

### **GENERAL**

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

### **TORQUE VALUES**

Footpeg bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)
Skid plate bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) ALOC bolt: replace with a new one.
Exhaust pipe joint nut	27 N·m (2.8 kgf·m, 20 lbf·ft)
Muffler 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)
Exhaust pipe protector bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)

## **TROUBLESHOOTING**

### **Excessive exhaust noise**

- Broken exhaust system
- Exhaust gas leak

### **Poor performance**

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## SEAT/REAR FENDER

**NOTE:**

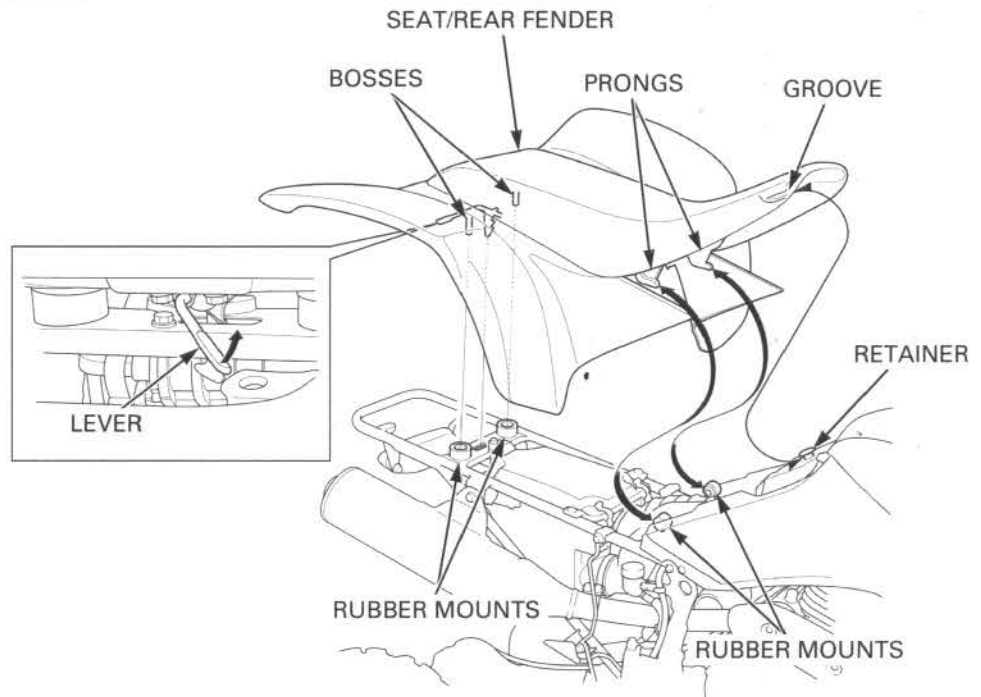
- Do not allow the assembly to contact the muffler when the exhaust system is hot.
- Take care not to scratch the side covers with the rear fender.

**REMOVAL**

Unlock the seat by pulling the release lever up. While spreading the front portion of the rear fender, pull the seat/rear fender assembly back and remove it.

**INSTALLATION**

Install the seat/rear fender assembly by inserting the groove under the retainer, and the prongs onto the front rubber mounts. Push the assembly forward and align the mounting bosses with the rear rubber mounts, then press down to lock it.

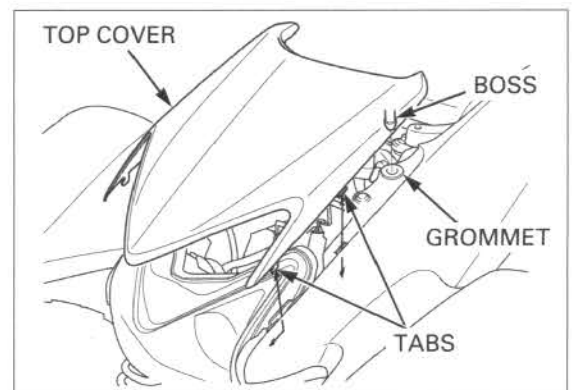


## TOP COVER

**REMOVAL/INSTALLATION**

Release the two bosses from the grommets and remove the top cover by releasing the four tabs.

Installation is in the reverse order of removal.



## SIDE COVER

### REMOVAL/INSTALLATION

Remove the seat/rear fender (page 3-3).

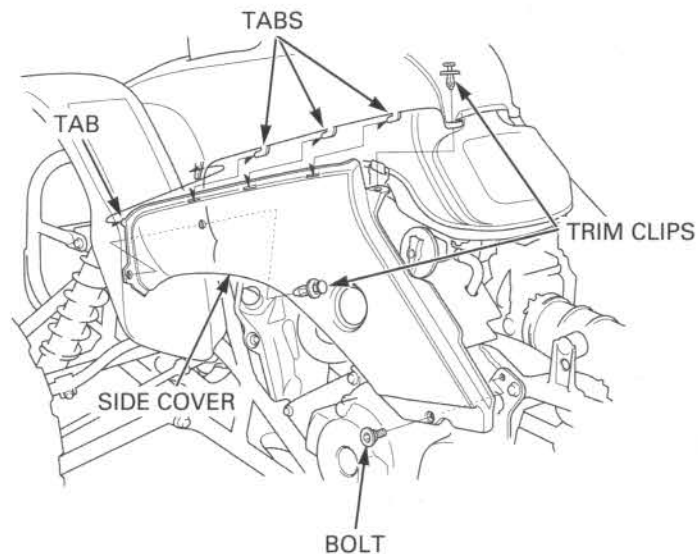
Remove the socket bolt.

Release the trim clip by pulling the center pin and remove them.

Release the front end tab from the fender.

Release the side cover from the three tabs by sliding it forward and remove the side cover.

Installation is in the reverse order of removal.



## FUEL TANK UPPER COVER

### REMOVAL/INSTALLATION

Remove the seat/rear fender (page 3-3).

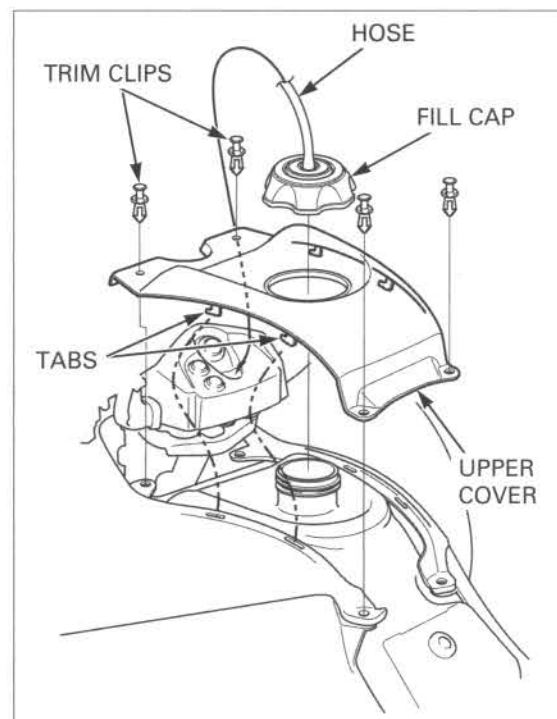
Release the trim clip by pulling the center pin and remove them.

Remove the breather hose and fuel fill cap.

Release the four tabs from the front fenders by sliding the upper cover rearward and remove it.

Install the fuel fill cap.

Installation is in the reverse order of removal.





## FRONT FENDER

### REMOVAL/INSTALLATION

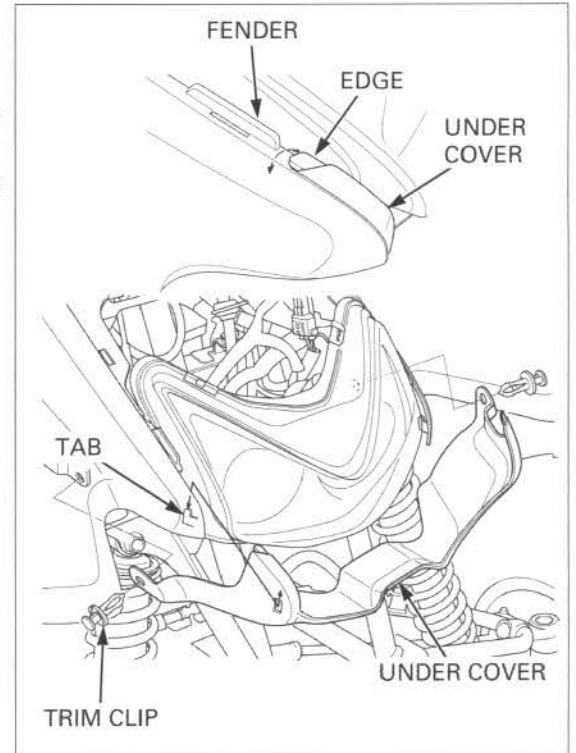
Remove the following:

- fuel tank upper cover (page 3-4)
- top cover (page 3-3)

Remove the two trim clips.

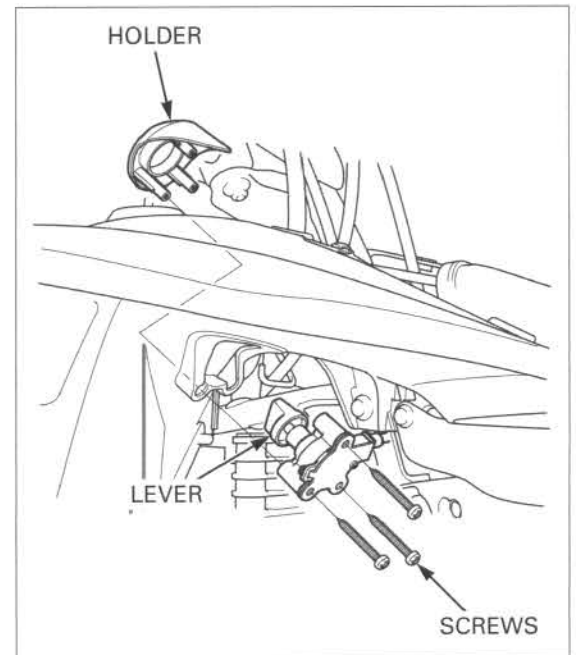
Set the upper edges of the headlight under cover behind the front fenders.

Release the under cover from the from the two tabs by sliding it upward and remove it.



*Right side only:* Remove the following from the right front fender:

- three screws
- lever holder
- reverse assist lever

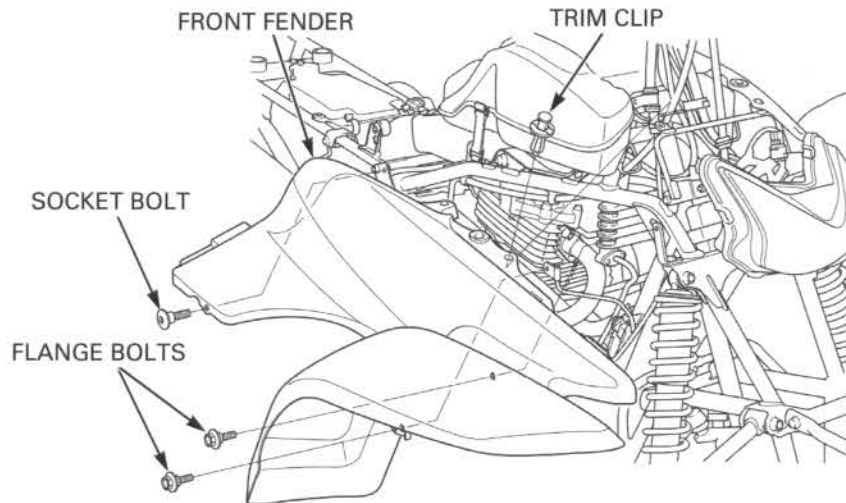


## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the following:

- trim clip
- socket bolt
- two flange bolts
- front fender

Installation is in the reverse order of removal.



## FUEL TANK

### REMOVAL/INSTALLATION

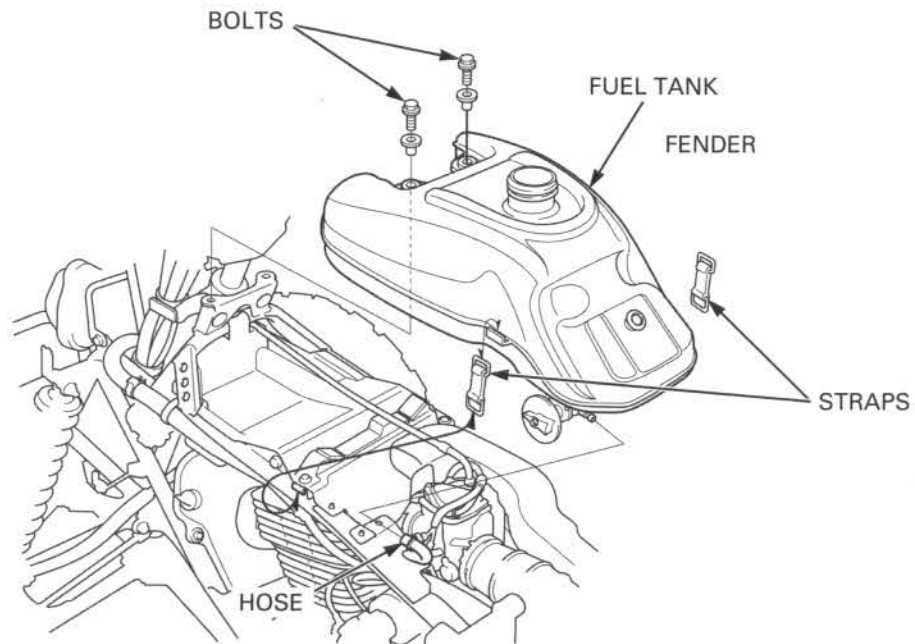
Remove the following:

- side covers (page 3-4)
- fuel tank upper cover (page 3-4)

Turn the fuel valve to OFF and remove the following:

- fuel hose (disconnect from the fuel tank)
- mounting straps
- two bolts
- fuel tank (while spreading the front fenders)

Installation is in the reverse order of removal.



## HEAT GUARD PLATE

### REMOVAL/INSTALLATION

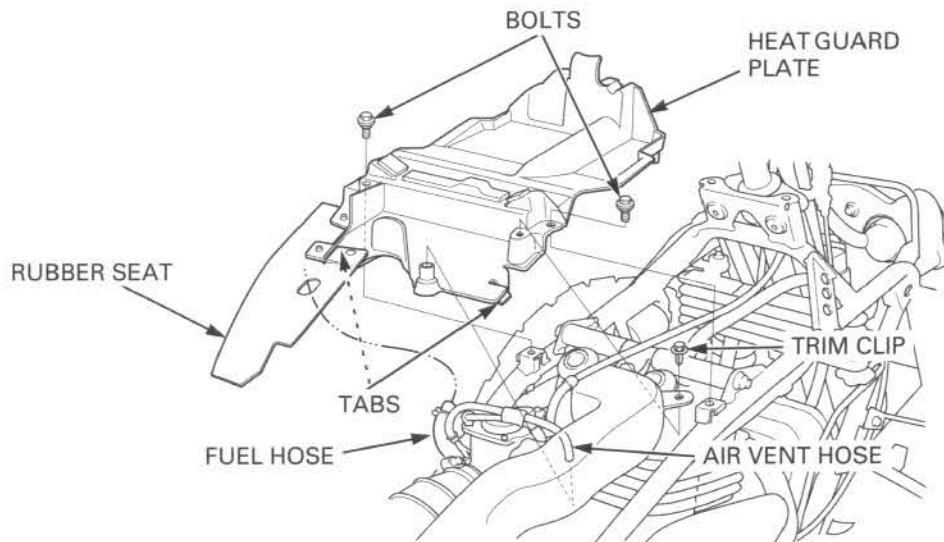
Remove the fuel tank (page 3-6).

Remove the following:

- carburetor air vent hose (from the hose holder of the heat guard plate)
- trim clip
- fuel hose (release from the rubber seat)
- two bolts

Release the two tabs of the rear side of the plate from the frame pipes. Pull the throttle cable aside and remove the heat guard plate.

Installation is in the reverse order of removal.



## SKID PLATE

### REMOVAL/INSTALLATION

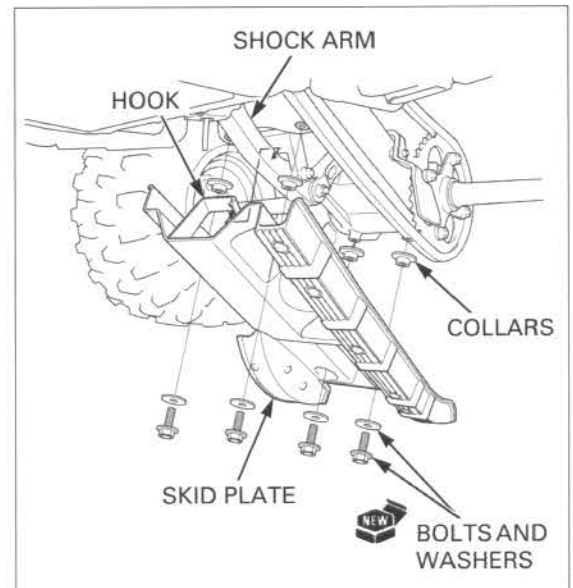
Remove the following:

- four bolts and washers
- skid plate (release the hook from the shock arm)
- four collars

*Always replace the ALOC bolts with new ones.*

Installation is in the reverse order of removal.

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



## MUD GUARD & FOOTPEG

### REMOVAL/INSTALLATION

#### MUD GUARD

Remove the following:

- four screws
- socket bolt and nut
- mud guard

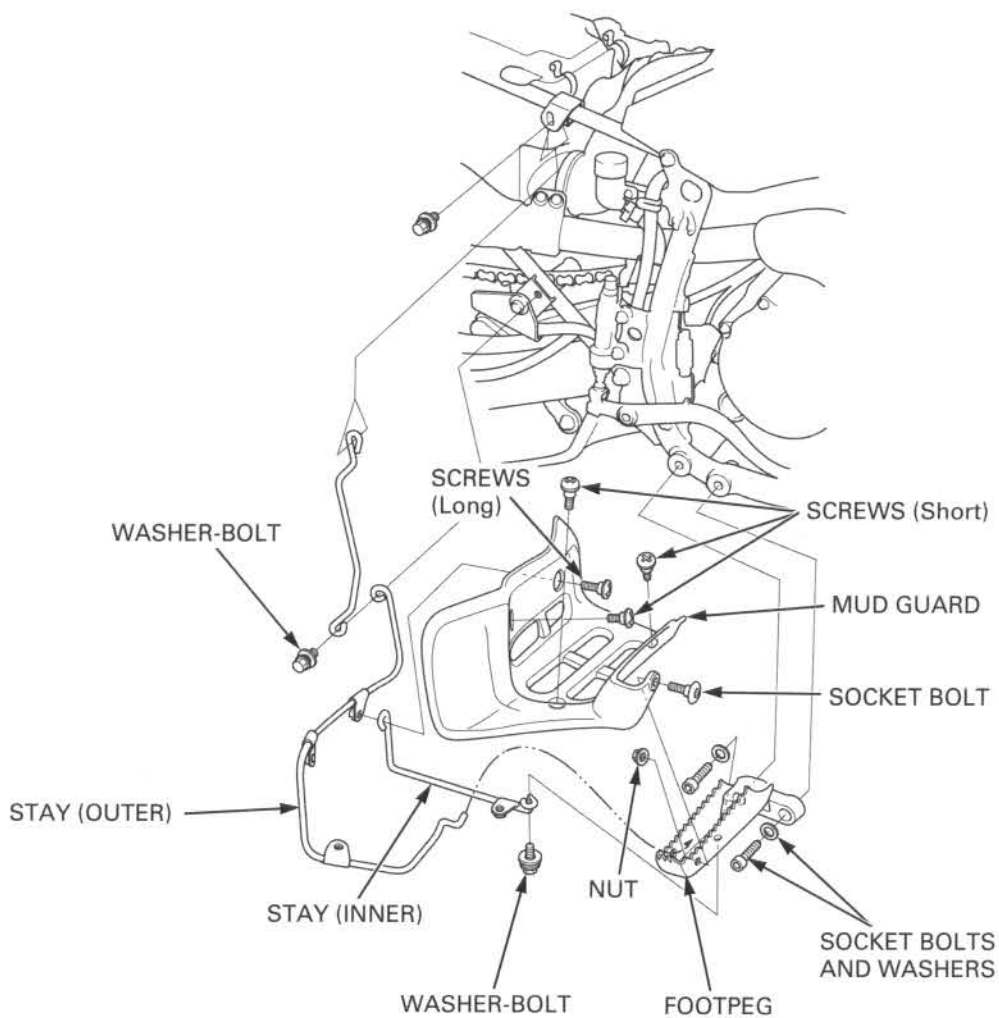
#### FOOTPEG AND STAY

Remove the following:

- washer-bolt (from bottom of the footpeg)
- inner mud guard stay
- washer-bolt (from the lower rear frame)
- outer mud guard stay
- two socket bolts and washers
- footpeg

Installation is in the reverse order of removal.

**TORQUE: Footpeg bolt: 42 N·m (4.3 kgf·m, 31 lbf·ft)**



# EXHAUST SYSTEM

## REMOVAL

Remove the seat/rear fender (page 3-3).  
Loosen the two muffler band bolts.

- Remove the following:
- two mounting bolts and washers (between the muffler and frame)
  - muffler
  - gasket
  - four joint nuts
  - exhaust pipe
  - gaskets

## INSTALLATION

Install new joint gaskets and muffler gasket.

*Note the installation direction of the exhaust pipe flange.*

- Loosely install the following:
- exhaust pipe (by setting the exhaust pipe flange as shown)
  - four joint nuts
  - muffler
  - two mounting bolts and washers

Tighten the joint nuts first, then tighten the mounting bolts.

### TORQUE:

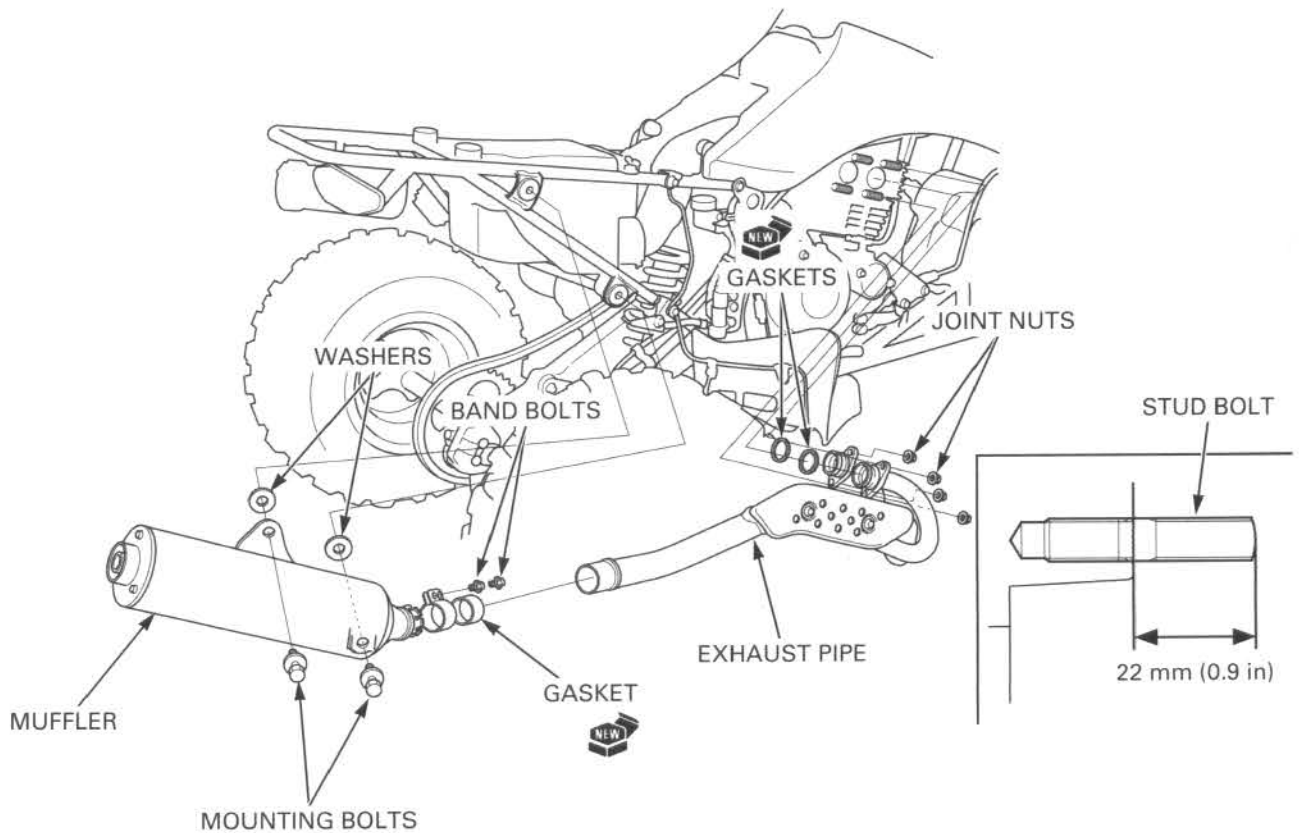
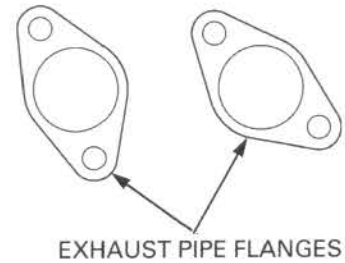
- Joint nut: 27 N·m (2.8 kgf·m, 20 lbf·ft)
- Mounting bolt: 32 N·m (3.3 kgf·m, 24 lbf·ft)

Tighten the muffler band bolts.

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

After installation, inspect the exhaust system for leaks.

View from front side:



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**MEMO**



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**RIDE RED**

SERVICE INFORMATION .....	4-2	DRIVE CHAIN SLIDER .....	4-17
MAINTENANCE SCHEDULE .....	4-3	BRAKE FLUID .....	4-18
FUEL LINE .....	4-4	BRAKE PADS WEAR .....	4-19
THROTTLE OPERATION .....	4-4	BRAKE LIGHT SWITCH .....	4-20
AIR CLEANER .....	4-5	BRAKE SYSTEM .....	4-20
AIR CLEANER HOUSING DRAIN TUBE .....	4-6	REVERSE LOCK SYSTEM .....	4-22
SPARK PLUG .....	4-7	SKID PLATE, ENGINE GUARD .....	4-22
VALVE CLEARANCE .....	4-8	CLUTCH SYSTEM .....	4-23
ENGINE OIL .....	4-10	SUSPENSION .....	4-24
ENGINE OIL FILTER .....	4-12	SPARK ARRESTER .....	4-25
ENGINE OIL STRAINER SCREEN IN OIL TANK .....	4-13	NUTS, BOLTS, FASTENERS .....	4-25
ENGINE IDLE SPEED .....	4-13	WHEELS/TIRES .....	4-25
DRIVE CHAIN .....	4-14	STEERING SHAFT HOLDER BEARING .....	4-26
		STEERING SYSTEM .....	4-26

## MAINTENANCE

# SERVICE INFORMATION

## GENERAL

- Place the vehicle on a level ground before starting any work.

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle lever free play		3 – 8 mm (1/8 – 5/16 in)
Spark plug	Standard	DPR8Z (NGK), X24GPR-U (DENSO)
	For extended high speed riding	DPR9Z (NGK), X27GPR-U (DENSO)
Spark plug gap		0.6 – 0.7 mm (0.024 – 0.028 in)
Valve clearance	IN	0.10 (0.004)
	EX	0.12 (0.005)
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40
Engine oil capacity	After draining	1.8 liters (1.9 US qt, 1.6 Imp qt)
	After draining/filter change	1.85 liters (1.95 US qt, 1.63 Imp qt)
	After disassembly	2.2 liters (2.3 US qt, 1.9 Imp qt)
Engine idle speed		1,400 ± 100 rpm (min <sup>-1</sup> )
Drive chain slack		30 – 40 (1-1/4 – 1-5/8)
Recommended brake fluid		DOT 4
Clutch lever free play		10 – 20 (3/8 – 3/4)
Cold tire pressure	Standard	27 kPa (0.275 kgf/cm <sup>2</sup> , 4.0 psi)
	Minimum	23 kPa (0.235 kgf/cm <sup>2</sup> , 3.4 psi)
	Maximum	31 kPa (0.315 kgf/cm <sup>2</sup> , 4.6 psi)
Tire size	Front	AT22 x 7-10 ★ ★
	Rear	AT20 x 10-9 ★ ★
Tire brand	Front	M/R 101 (Ohtsu)
	Rear	M/R 501 (Ohtsu)
Minimum tire tread depth (Front/Rear)		4.0 mm (0.16 in)
Toe		Toe-in: 11 ± 15 (2/5 ± 3/5)

## TORQUE VALUES

Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)
Valve adjusting hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)
Valve adjusting screw lock nut	24 N·m (2.4 kgf·m, 18 lbf·ft)
Crankshaft hole cap	8 N·m (0.8 kgf·m, 5.9 lbf·ft)
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)
Engine oil drain bolt (crankcase)	25 N·m (2.5 kgf·m, 18 lbf·ft)
Engine oil drain bolt (oil tank)	20 N·m (2.0 kgf·m, 15 lbf·ft)
Engine oil strainer screen (oil tank)	54 N·m (5.5 kgf·m, 40 lbf·ft)
Axle bearing holder pinch bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)
Front master cylinder reservoir cap screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)
Parking brake arm lock nut	17.2 N·m (1.75 kgf·m, 13 lbf·ft)
Rear master cylinder push rod lock nut	17.2 N·m (1.75 kgf·m, 13 lbf·ft)
Tie-rod lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)



# MAINTENANCE SCHEDULE

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

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

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ↓	→	REGULAR MAINTENANCE INTERVAL			Refer To Page
				INITIAL MAINTENANCE	600	1,200	
				mi	1,000	2,000	
				100	200		
				150			
				HOURS			
* FUEL LINE					I		4-4
* THROTTLE OPERATION					I		4-4
AIR CLEANER					C	C	4-5
AIR CLEANER HOUSING DRAIN TUBE		NOTE 1			I	I	4-6
SPARK PLUG		NOTE 2			I	I	4-7
* VALVE CLEARANCE				I	I	I	4-8
ENGINE OIL				R	R	R	4-10
ENGINE OIL FILTER				R	R	R	4-12
* ENGINE OIL STRAINER SCREEN IN OIL TANK						C	4-13
* ENGINE IDLE SPEED				I	I	I	4-13
DRIVE CHAIN		NOTE 1, 2		I, L	I, L: EVERY 300 mi (500 km) or 50 operating hours		4-14
DRIVE CHAIN SLIDER					I	I	4-17
* BRAKE FLUID		NOTE 3			I	I	4-18
* BRAKE PADS WEAR		NOTE 1, 2				I	4-19
* BRAKE LIGHT SWITCH				I	I	I	4-20
BRAKE SYSTEM				I	I	I	4-20
REVERSE LOCK SYSTEM				I	I	I	4-22
SKID PLATE, ENGINE GUARD					I	I	4-22
* CLUTCH SYSTEM				I	I	I	4-23
* SUSPENSION					I	I	4-24
* SPARK ARRESTER					C	C	4-25
* NUTS, BOLTS, FASTENERS				I		I	4-25
** WHEELS/TIRES				I	I	I	4-25
** STEERING SHAFT HOLDER BEARING						I	4-26
** STEERING SYSTEM						I	4-26

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

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

NOTES:

1. Service more frequently when riding in dusty areas, sand or snow.
2. Service more frequently after riding in very wet or muddy conditions.
3. Replace every 2 years. Replacement requires mechanical skill.

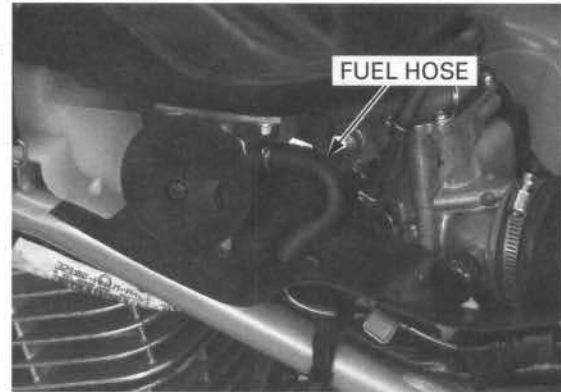
## MAINTENANCE

### FUEL LINE

Remove the left side cover (page 3-4).

Check the fuel hose for deterioration, damage or leakage.

Replace the fuel hose if necessary.



### THROTTLE OPERATION

Check for any deterioration or damage to the throttle cable. Check the throttle lever for smooth operation.

Check that the throttle opens and automatically closes in all steering positions.

If the throttle lever does not return properly, lubricate the throttle cable and overhaul and lubricate the throttle housing.

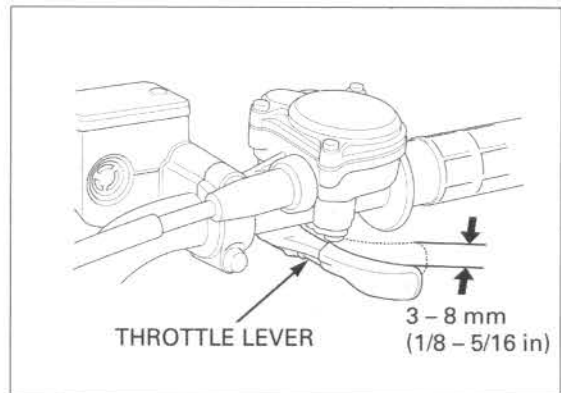
If the throttle lever still does not return properly, replace the throttle cable.

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle lever free play and the throttle cable connection.

Measure the throttle lever free play at the tip of the throttle lever.

#### THROTTLE LEVER FREE PLAY:

3 – 8 mm (1/8 – 5/16 in)

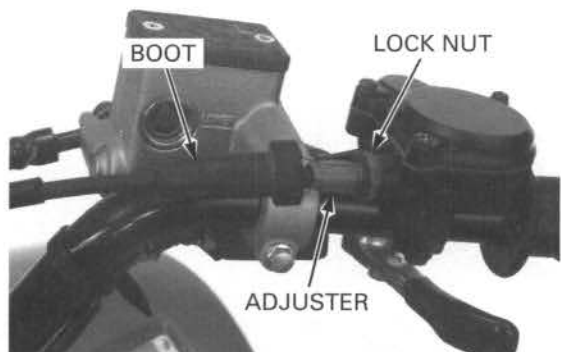


Throttle lever free play can be adjusted at upper end of the throttle cable.

Slide the rubber boot off the adjuster. Loosen the lock nut, turn the adjuster as required and tighten the lock nut.

Install the rubber boot securely.

Recheck the throttle operation.



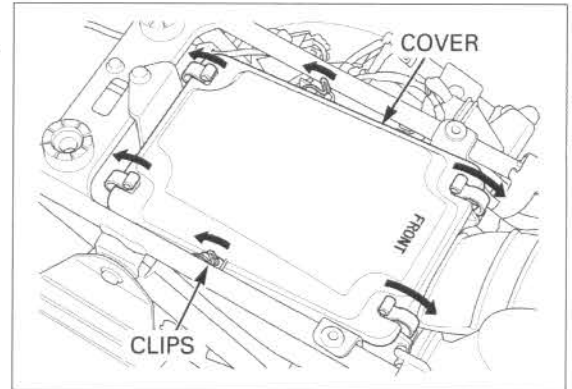
# AIR CLEANER

**NOTE:**

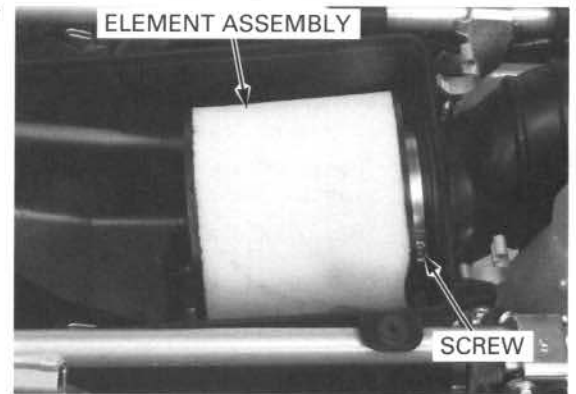
- If the vehicle is used in dusty areas, sand or snow, more frequent inspections are required.

Remove the seat/rear fender (page 3-3).

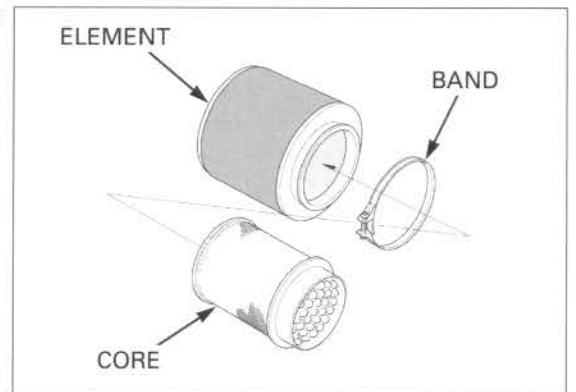
Release the six retaining clips from the air cleaner housing cover and remove the cover.



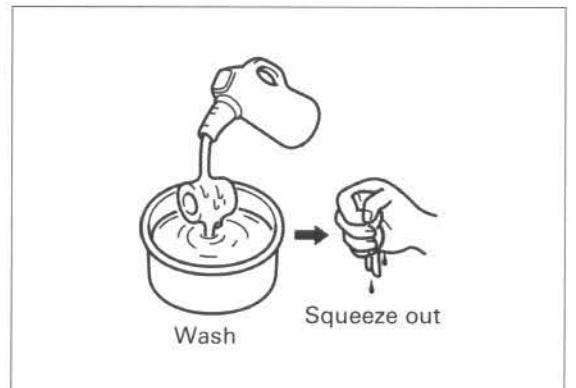
Loosen the band screw and remove the air cleaner element assembly.



Remove the element band and the element core from the air cleaner element.



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



## MAINTENANCE

Apply approximately 20 g (0.7 oz) of Pro Honda Form Filter Oil or equivalent oil from the inside of the element.  
Place the element into a plastic bag and spread the oil evenly by hand.



Install the core into the element and the band onto the element.

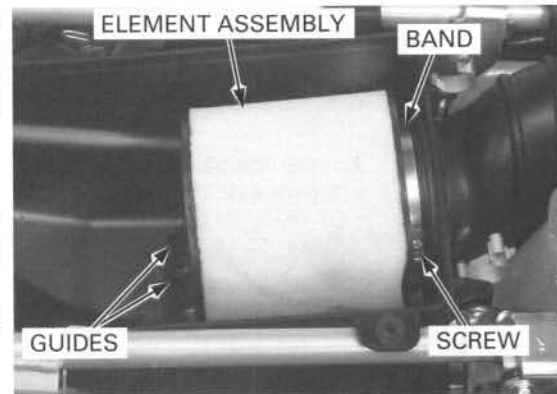
Install the element assembly over the connecting tube flange and onto the guides of the housing properly.  
Tighten the band screw.

**NOTE:**

- Failure to properly tighten the band screw will allow the air cleaner element to fall off and engine damage could result.

Install the air cleaner housing cover and secure it with the retaining clips.

Remove the seat/rear fender (page 3-3).



## AIR CLEANER HOUSING DRAIN TUBE

**NOTE:**

- If the vehicle is used in very wet or muddy conditions, more frequent inspections are required.

Remove the drain tube from bottom of the air cleaner housing to empty any deposits.

Install the drain tube securely.

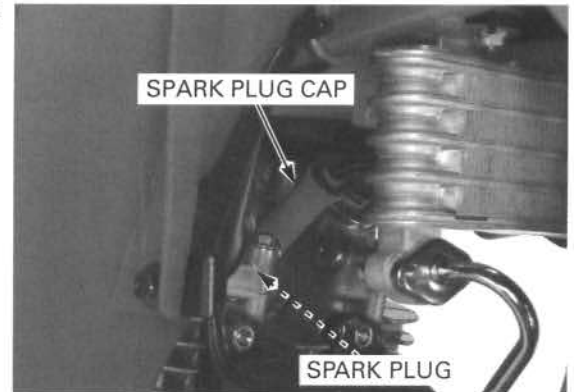


## SPARK PLUG

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

Disconnect the spark plug cap and clean around the spark plug base.

Remove the spark plug.



Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary.

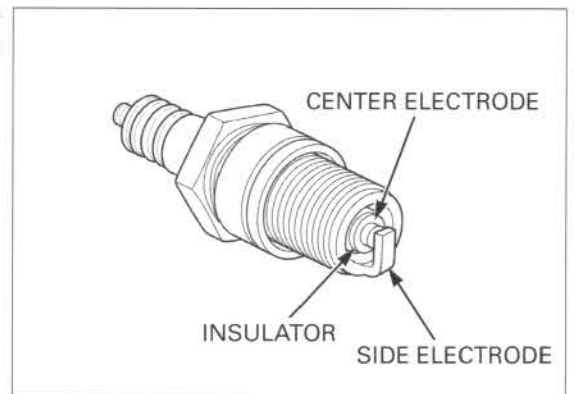
### RECOMMENDED SPARK PLUG:

**Standard:**

**DPR8Z (NGK), X24GPR-U (DENSO)**

**For extended high speed riding**

**DPR9Z (NGK), X27GPR-U (DENSO)**



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.

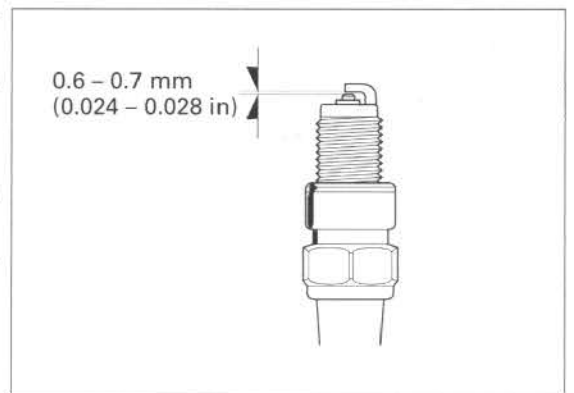
**SPARK PLUG GAP: 0.6 – 0.7 mm (0.024 – 0.028 in)**

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

Thread the spark plug in by hand to prevent cross-threading and tighten it with a spark plug wrench.

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

Connect the spark plug caps.



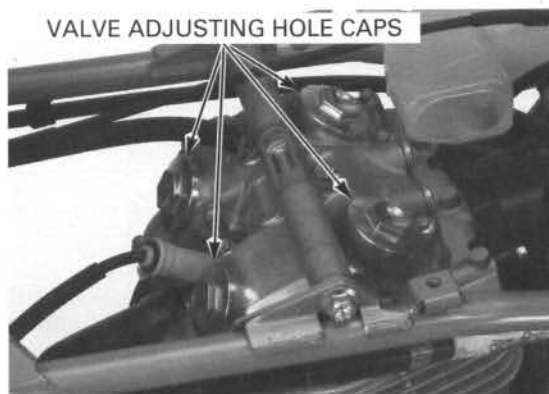
# VALVE CLEARANCE

**NOTE:**

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

Remove the heat guard plate (page 3-7).

Remove the valve adjusting hole caps.



Remove the timing hole and crankshaft hole caps.

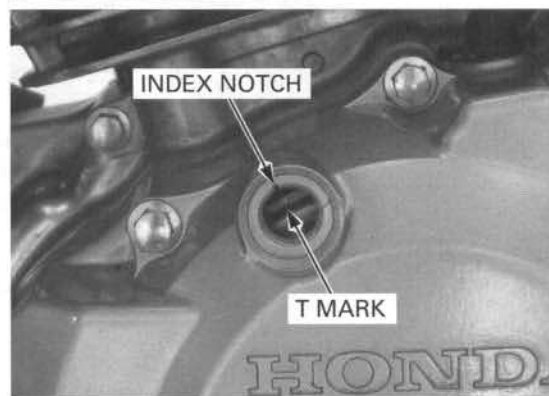


*If the T mark is passed when trying to align it with the index notch, rotate the crankshaft only counterclockwise again and align. This must be done to prevent the one-way decompressor system from functioning and to obtain the correct valve clearance.*

Rotate the crankshaft counterclockwise and align the T mark on the flywheel with the index notch in the crankcase cover.

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

This position can be confirmed by checking for slack in the rocker arms. If there is no slack, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and match up the T mark again.



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

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

**VALVE CLEARANCE:**

**IN: 0.10 mm (0.004 in)**

**EX: 0.12 mm (0.005 in)**

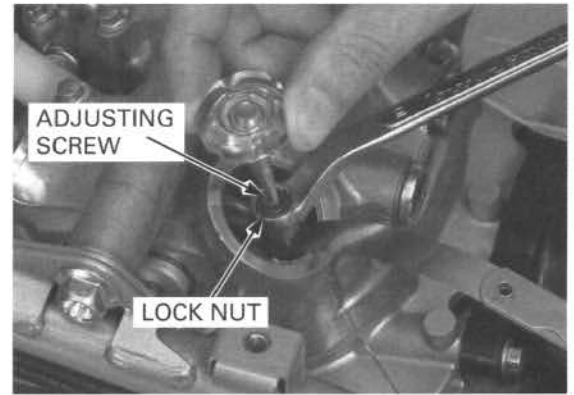


Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

Hold the adjusting screw and tighten the lock nut.

**TORQUE: 24 N·m (2.4 kgf·m, 18 lbf·ft)**

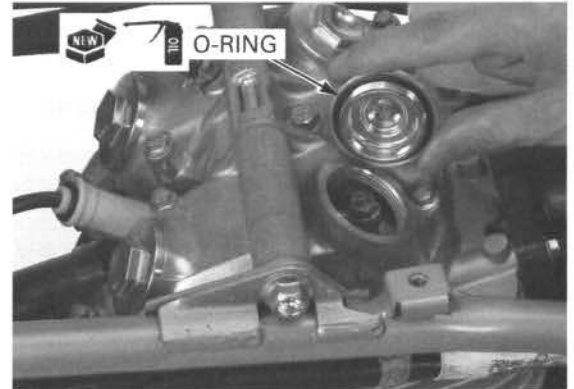
After tightening the lock nut, recheck the valve clearance.



Coat new O-rings with engine oil and install them into the adjusting hole cap grooves.

Install the adjusting hole caps and tighten them.

**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**



Coat new O-rings with engine oil and install them onto the crankshaft hole cap and timing hole cap.

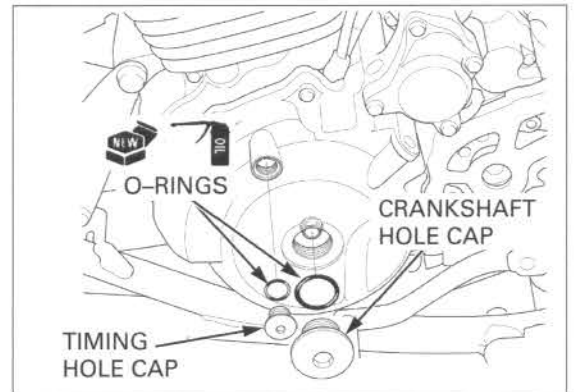
Install the caps and tighten them.

**TORQUE:**

**Crankshaft hole cap: 8 N·m (0.8 kgf·m, 5.9 lbf·ft)**

**Timing hole cap: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the head guard plate (page 3-7).



# ENGINE OIL

## OIL LEVEL CHECK

**NOTE:**

- Check the oil level after starting the engine and allowing the oil to circulate through the engine thoroughly. It is especially important on a dry sump engine, due to the comparatively large volume of oil.
- Do not snap the throttle while idling or the oil level reading will be inaccurate.

Place the vehicle on level ground.

Start the engine and let it idle for 5 minutes. If the air temperature is below 10°C (50°F), let the engine idle for an additional 5 minutes (a total of 10 minutes).

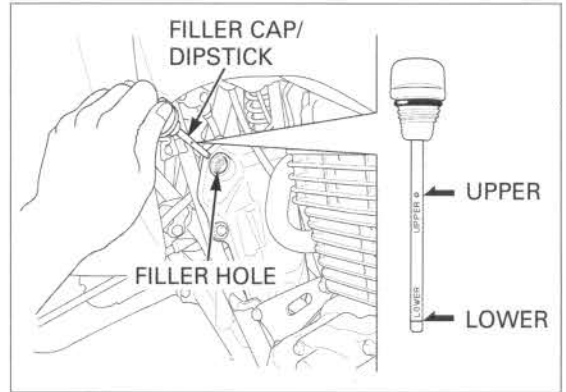
Stop the engine.

Remove the oil filler cap/dipstick from the oil tank and wipe it clean.

Check the oil level by inserting the filler cap/dipstick into the filler hole without screwing it in.

The engine contains a sufficient amount of oil if the oil level is between the upper and lower level marks on the dipstick.

If the oil level is near or below the lower level mark, add the recommended engine oil up to the upper level mark.

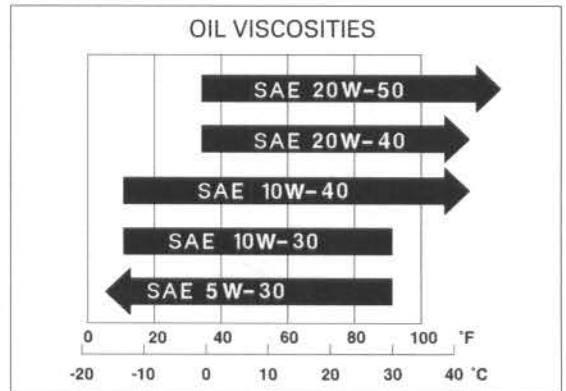


### RECOMMENDED ENGINE OIL:

- Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil
- API service classification: SG or higher
- JASO T 903 standard: MA
- Viscosity: SAE 10W-40

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

Install the filler cap/dipstick.





**AT CRANKCASE OIL CHECK BOLT**

**NOTE:**

- The crankcase oil check bolt is useful when checking the lubrication; the oil pump adjusts the oil level so that the crankcase is always kept at the proper level. If this check shows otherwise, some portion of the lubrication system is not working properly.
- Do not check the oil level immediately after the engine has been operated at high speeds. Make sure that vehicle is on firm level ground while idling. Allow the engine to idle for a few minutes to stabilize the oil levels.

The crankcase oil level is correct if the oil is flush with the bottom of the check bolt hole.



**OIL CHANGE**

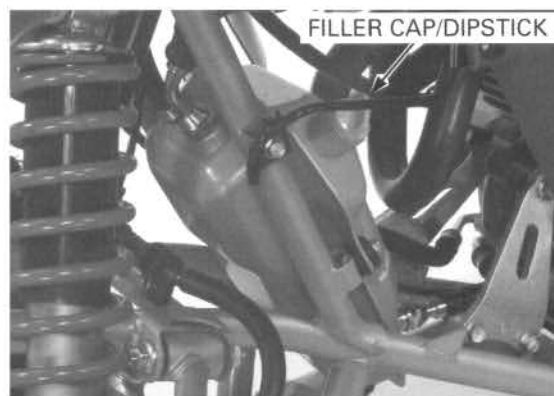
**NOTE:**

- Change the engine oil with the engine warm to assure complete and rapid draining.

Start the engine and let it idle for few minutes.

Stop the engine.

Remove the oil filler cap/dipstick from the oil tank.



Remove the two bolts and engine guard.

Remove the oil drain bolts and sealing washers from the oil tank and crankcase, and drain the engine oil.

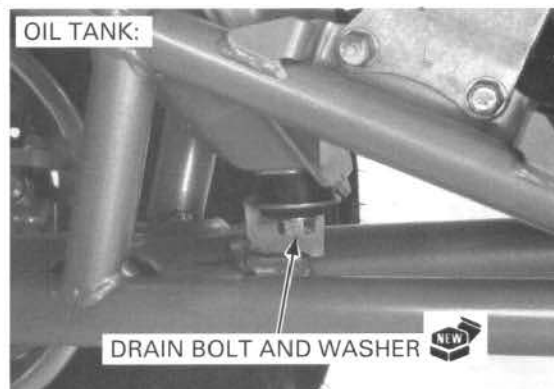
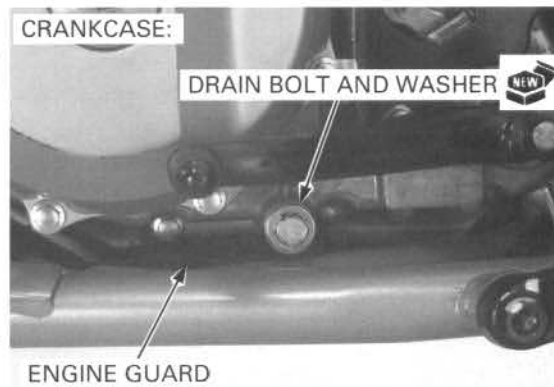
After the oil has drained, install the drain bolts with new sealing washers and tighten them.

**TORQUE:**

- Crankcase drain bolt: 25 N·m (2.5 kgf·m, 18 lbf·ft)**
- Oil tank drain bolt: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

**NOTE:**

- Pour the engine oil after replacing the oil filter (page 4-12).
- If the oil strainer cleaning is required, perform it before filling (page 4-13).



## MAINTENANCE

The engine takes about 1.85 liters at oil and filter change. Because only a portion of that oil is held in the oil tank, you cannot add the full amount initially.

Pour the recommended engine oil (page 4-10) into the oil tank up to the upper level mark on the dipstick.

### ENGINE OIL CAPACITY:

**1.8 liters (1.9 US qt, 1.6 Imp qt) at draining**

**1.85 liters (1.95 US qt, 1.63 Imp qt) at draining/filter change**

**2.2 liters (2.3 US qt, 1.9 Imp qt) at disassembly**

Install the filler cap/dipstick.

Place the vehicle on firm level ground.

Start the engine and let it idle for a few minutes without snapping the throttle.

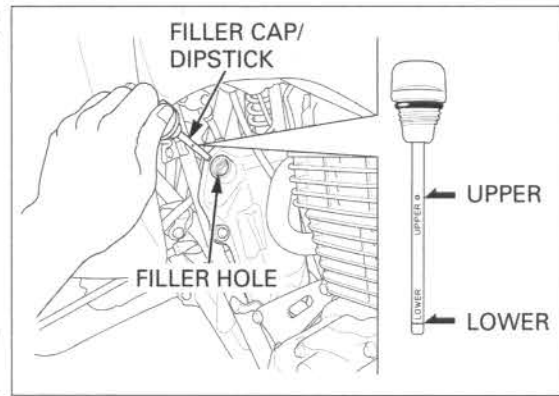
Stop the engine and add the recommended oil up to the upper level mark on the dipstick.

Install the filler cap/dipstick.

Check the oil level (page 4-10).

After replacing, make sure there are no oil leaks.

Install the engine guard and tighten the two bolts.

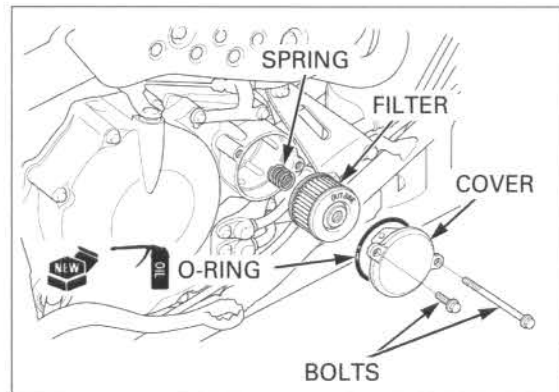


## ENGINE OIL FILTER

Drain the engine oil (page 4-11).

Remove the following:

- two bolts
- filter cover and O-ring
- oil filter
- spring

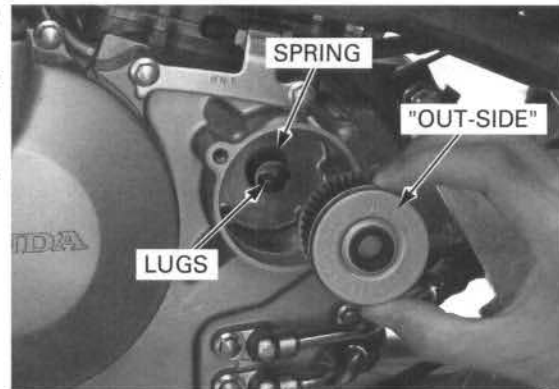


Coat a new O-ring with engine oil and install it into the filter cover groove.

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

Install the spring onto the lug and a new oil filter with the "OUT-SIDE" mark facing out, then install the cover and tighten the two bolts securely.

Fill the engine and oil tank with the engine oil (page 4-12).

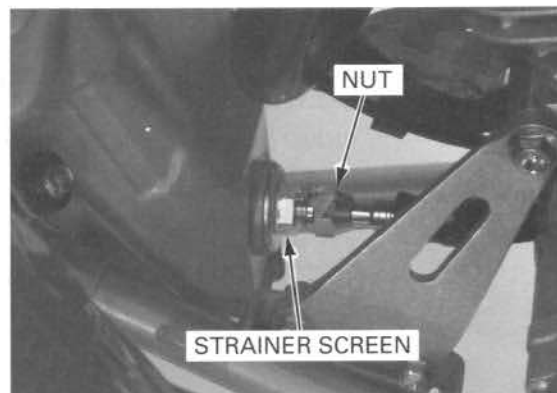


## ENGINE OIL STRAINER SCREEN IN OIL TANK

Drain the engine oil (page 4-11).

Disconnect the oil pipe from the lower side of the oil tank by loosening the flare nut.

Remove the oil strainer screen.



Wash the strainer screen thoroughly in non-flammable or high flash point solvent until all accumulated dirt has been removed.

Blow dry it with compressed air to clean completely.

Before installing the strainer, the screen mesh should be examined closely for damage.

Coat a new O-ring with engine oil and install it onto the strainer screen.

Install the strainer screen and tighten it.

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

Connect the oil pipe by screwing the flare nut. Tighten the flare nut.

**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

Fill the engine and oil tank with the engine oil (page 4-12).



## ENGINE IDLE SPEED

NOTE:

- Inspect and adjust idle speed after all other engine maintenance items have been performed and are within specifications.
- Engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine, shift the transmission into neutral and place the vehicle on a level surface.

Connect a tachometer.

Check the idle speed and adjust by turning the throttle stop screw as required.

**IDLE SPEED: 1,400 ± 100 rpm (min<sup>-1</sup>)**



## MAINTENANCE

### DRIVE CHAIN

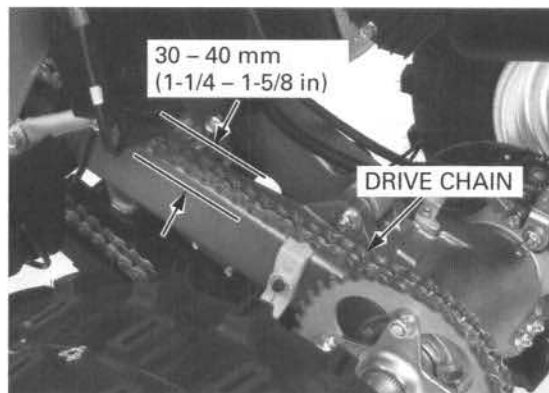
#### CHAIN SLACK INSPECTION

*Never inspect and adjust the drive chain while the engine is running.*

Turn the ignition switch to OFF and shift the transmission into neutral.

Check the chain slack in the drive chain upper run midway between the sprockets.

**CHAIN SLACK: 30 – 40 mm (1-1/4 – 1-5/8 in)**



#### ADJUSTMENT

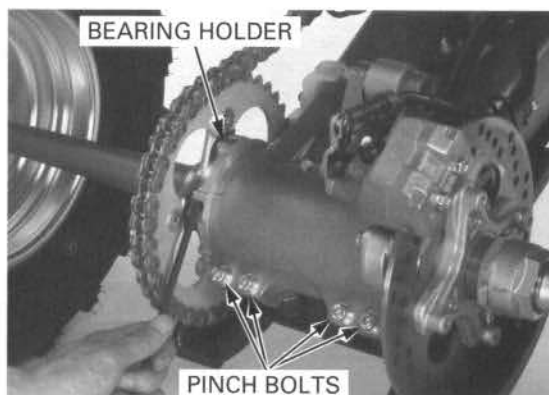
Loosen the axle bearing holder pinch bolts. Turn the bearing holder until the correct drive chain slack is obtained, using the hex wrench in the tool kit.

Tighten the pinch bolts.

**TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)**

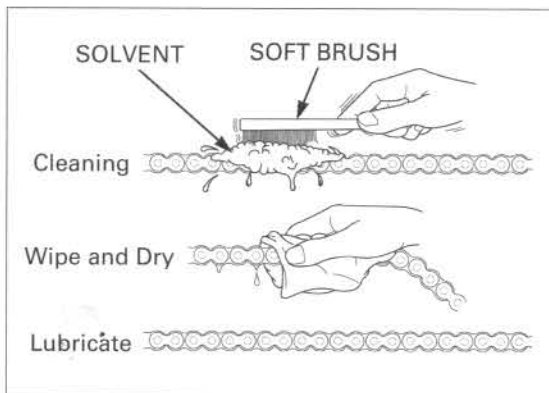
Recheck the drive chain slack and free wheel rotation.

If the chain slack is excessive when the bearing holder is turned fully rearward (the correct slack cannot be obtained), replace the drive chain with a new one (page 4-15).

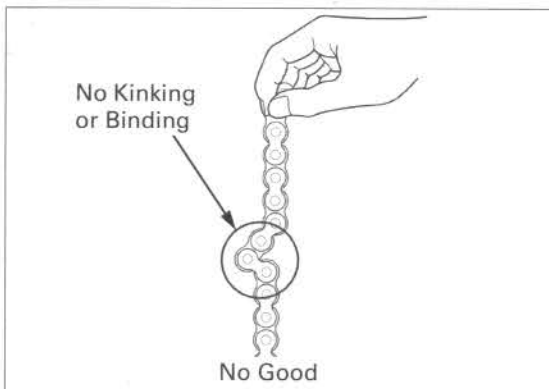


#### CLEANING AND INSPECTION

Clean the chain with a soft brush using a non-flammable or high flash point solvent and wipe it dry. Be sure the chain has dried completely before lubricating.

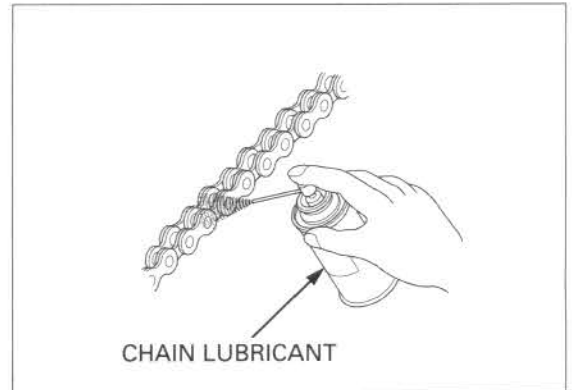


Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable. Installing a new chain on badly worn sprockets will cause the new chain to wear quickly. Inspect and replace sprocket as necessary (page 4-15).



**LUBRICATION**

Lubricate the drive chain with Pro Honda Chain Lube or equivalent chain lubricant designed specifically for use on O-ring chains. Some commercially available chain lubricant may contain solvents which could damage the O-rings. Wipe off the excess chain lube.

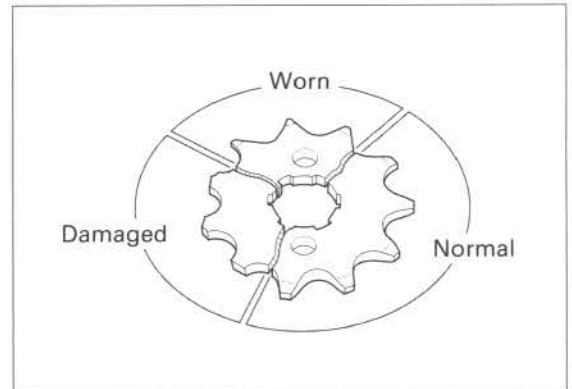


**SPROCKET INSPECTION**

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

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

Check the attaching bolts and nuts on the drive and driven sprockets. If any are loose, torque them.



**REPLACEMENT**

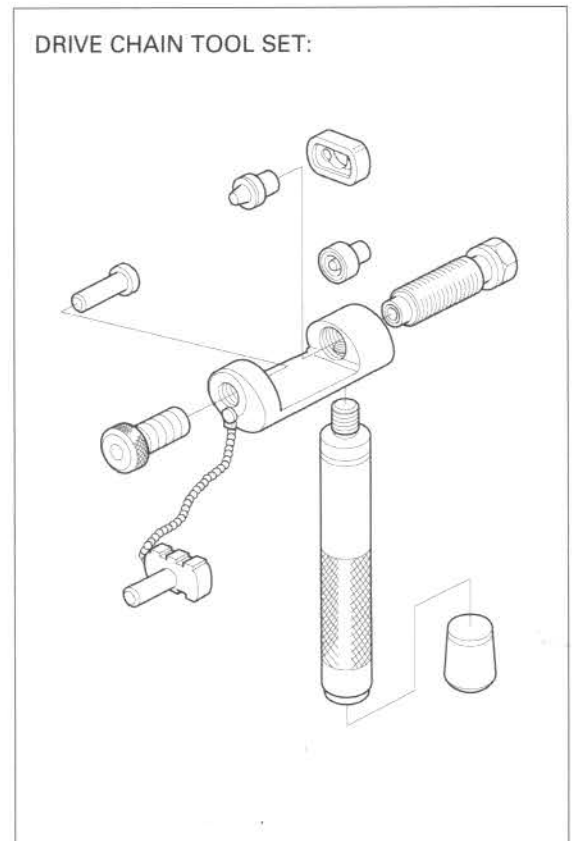
This vehicle uses a drive chain with a staked master link.

Remove the drive sprocket cover (page 7-5).  
Loosen the drive chain (page 4-14).

*When using the special tool, follow the manufacturer's instruction.*

Assemble the special tool as shown.

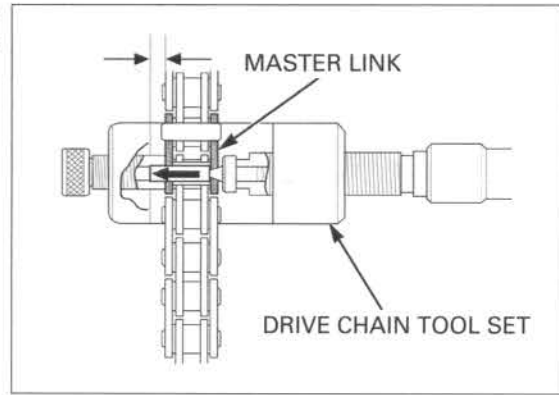
**TOOL:**  
**Drive chain tool set**      **07HMH-MR10103 or 07HMH-MR1010C (U.S.A. only)**



## MAINTENANCE

Locate the crimped pin ends of the master link from the outside of the chain and remove the link with the drive chain tool set.

Remove the drive chain.

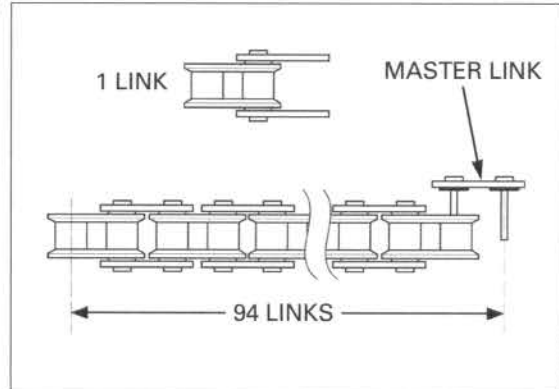


*Include the master link when you count the drive chain links.*

Remove the excess drive chain links from the new drive chain with the drive chain tool set.

**SPECIFIED LINKS: 94 links**

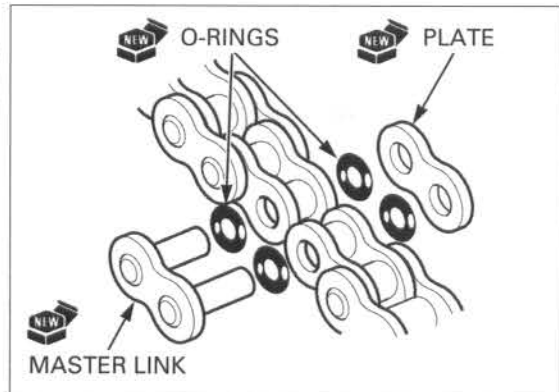
**REPLACEMENT CHAIN: DID: DID 520V6  
RK: RK520SMOZ10S**



*Never reuse the old drive chain, master link, master link plate and O-rings.*

Install the new drive chain over the sprockets.

Insert the new master link with new O-rings from the inside of the drive chain, and install the new plate and O-rings with the identification mark facing out.

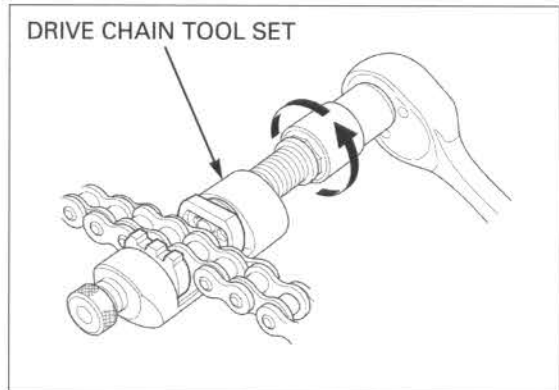


Assemble the part with the drive chain tool set.

**TOOL:**

**Drive chain tool set**

**07HMH-MR10103 or  
07HMH-MR1010C (U.S.A.  
only)**



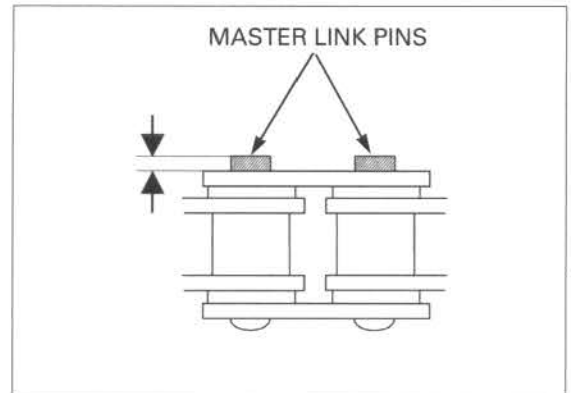
Make sure the master link pins are installed properly.  
Measure the master link pin length projected from the plate.

**STANDARD LENGTH:**

**DID:** 1.15 – 1.55 mm (0.045 – 0.061 in)

**RK:** 1.2 – 1.4 mm (0.05 – 0.06 in)

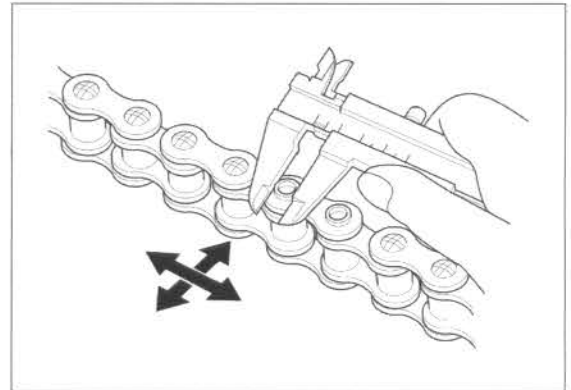
Stake the master link pins with the drive chain tool set.



Make sure the pins are staked properly by measuring the diameter of the staked area.

**DIAMETER OF THE STAKED AREA:**

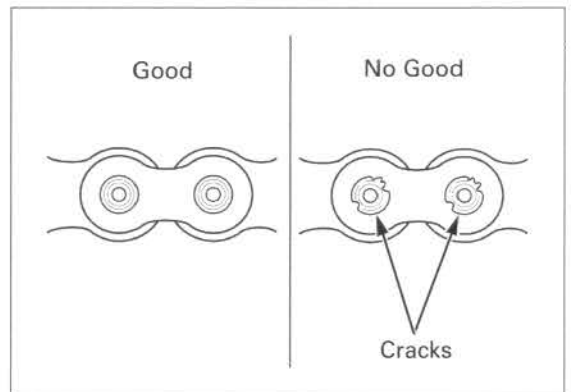
5.5 – 5.8 mm (0.22 – 0.23 in)



After staking, check the staked area of the master link for cracks.

*A drive chain with a clip-type master link must not be used.*

If there is any cracking, replace the master link, O-rings and plate.



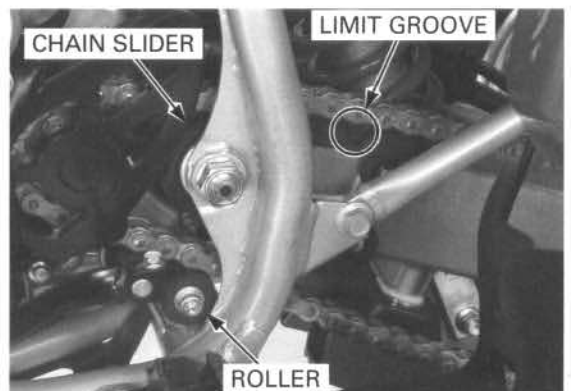
**DRIVE CHAIN SLIDER**

**DRIVE CHAIN SLIDER AND ROLLER**

Check the drive chain slider and roller for wear or damage.

Replace the chain slider if it is worn to the bottom of the wear limit groove.

Replace the chain roller if it is excessive worn or damage.

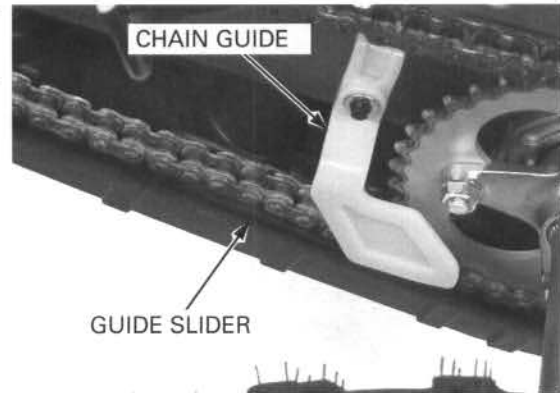


## MAINTENANCE

### DRIVE CHAIN GUIDE

Check the drive chain guide and the guide slider for wear or damage.

Replace the chain guide or guide slider if it is excessive wear or damage.



## BRAKE FLUID

### NOTICE

- *Spilling fluid can damage painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

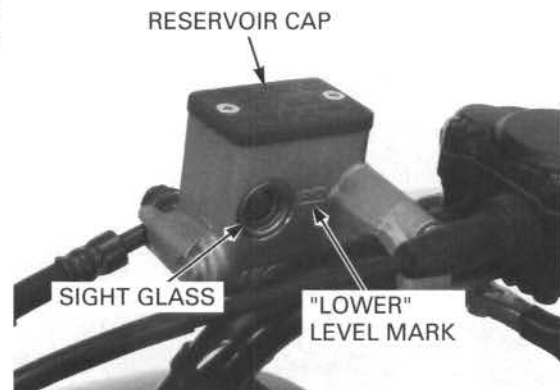
### NOTE:

- Do not mix different types of fluid, as they may not be compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.

When the fluid level is low, check the brake pads for wear (page 4-19). A low fluid level may be due to wear of the brake pads. If the brake pads are worn and the caliper pistons are pushed out, this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks (page 4-20).

### FRONT BRAKE

Turn the handlebar to the left side so the reservoir is level and check the fluid level through the sight glass.

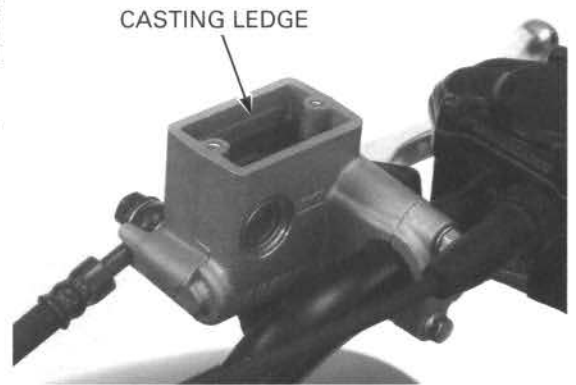




If the level is near the "LOWER" level mark, remove the reservoir cap, set plate and diaphragm and fill the reservoir with DOT 4 brake fluid from a sealed container to the casting ledge.

Install the diaphragm, set plate and reservoir cap, and tighten the cap screws.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



**REAR BRAKE**

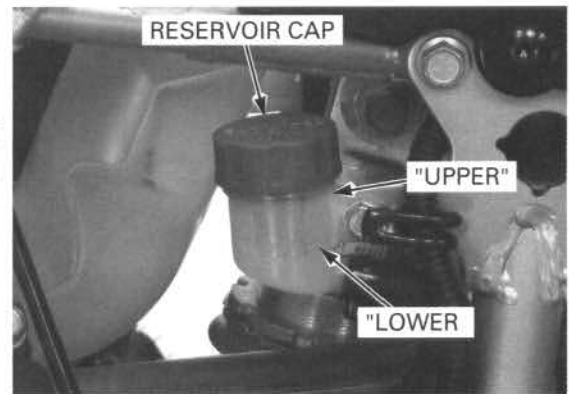
Place the vehicle on a level surface.

Remove the seat/rear fender (page 3-3).

Check the fluid level in the rear brake reservoir. If the level is near the "LOWER" level line, remove reservoir cap and fill the reservoir with DOT 4 brake fluid from a sealed container to the "UPPER" level line.

Install the reservoir cap.

Install the seat/rear fender (page 3-3).

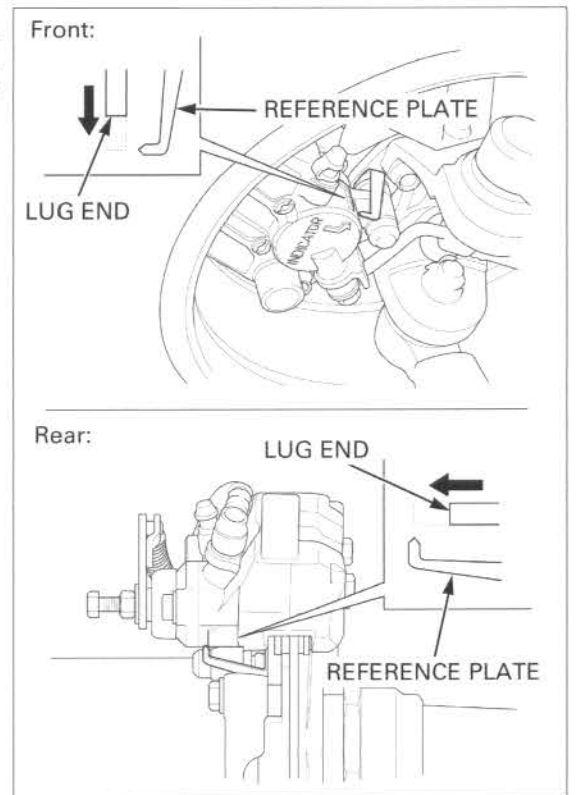


**BRAKE PADS WEAR**

Check the brake pads for wear.

Replace the brake pads if the wear limit indicator mark (lug end) on the caliper aligns with the reference plate on the caliper bracket when the brake is applied.

Refer to page 15-9 for brake pad replacement.



## BRAKE LIGHT SWITCH

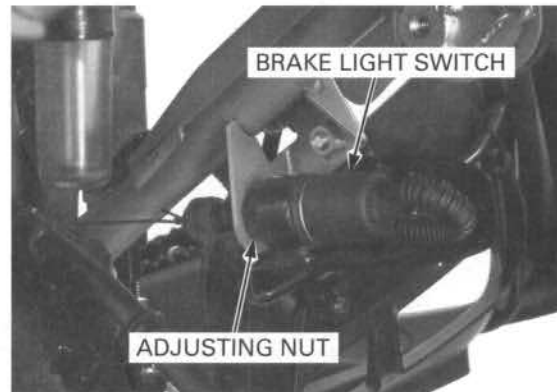
**NOTE:**

- The front brake light switch cannot be adjusted. If the front brake light switch actuation and brake engagement are off, 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 come on at the proper time.

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



## BRAKE SYSTEM

### HYDRAULIC SYSTEM INSPECTION

Firmly apply the brake lever or pedal and check that no air has entered the system.

If the brake lever or pedal feels soft or spongy when operated, bleed the system.

Refer to page 15-7 for air bleeding procedures.

Inspect the brake hoses and fittings for deterioration, cracks, damage or signs of leakage.

Tighten any loose fittings.

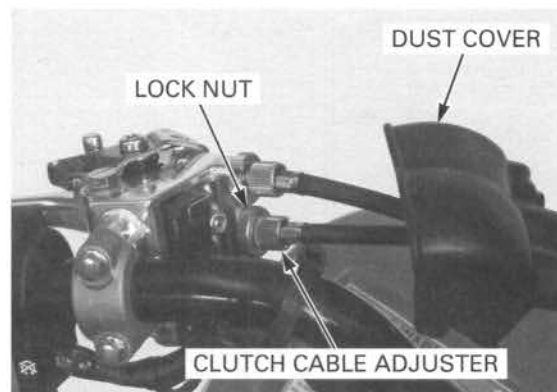
Replace hoses, pipes and fittings as required.



### PARKING BRAKE ADJUSTMENT

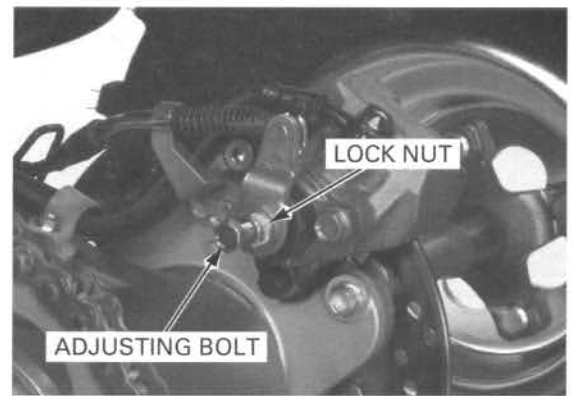
Slide the dust cover off the lever bracket.

To adjust the clutch lever free play to more than 30 mm (1-1/4 in), loosen the lock nut at the clutch lever and turn the adjuster all the way in.



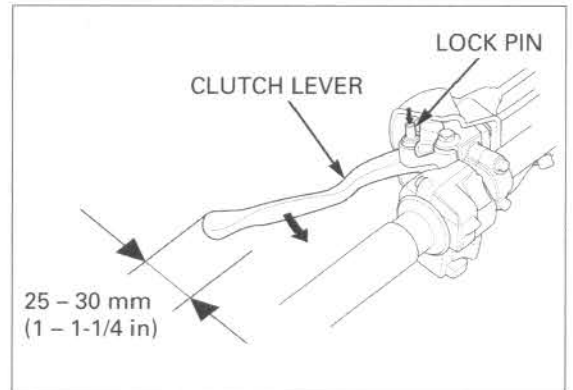
Loosen the lock nut at the parking brake arm and turn the adjusting bolt clockwise until bolt resistance is felt. Then turn the adjusting bolt 1/8 turn counterclockwise and tighten the lock nut while holding the adjusting bolt.

**TORQUE: 17.2 N·m (1.75 kgf·m, 13 lbf·ft)**



Squeeze the clutch lever while pushing the brake lock pin down until firm resistance is felt and measure the parking brake cable free play at the end of the clutch lever.

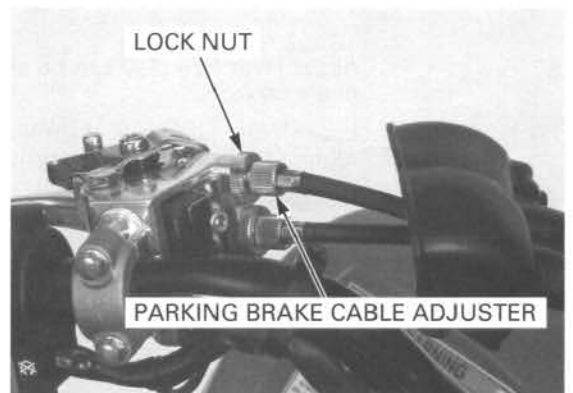
**FREE PLAY: 25 – 30 mm (1 – 1-1/4 in)**



To adjust the free play, loosen the lock nut and turn the adjuster at the parking brake arm on the clutch lever bracket.

Tighten the lock nut securely while holding the adjuster.

Adjust the clutch lever free play (page 4-23).

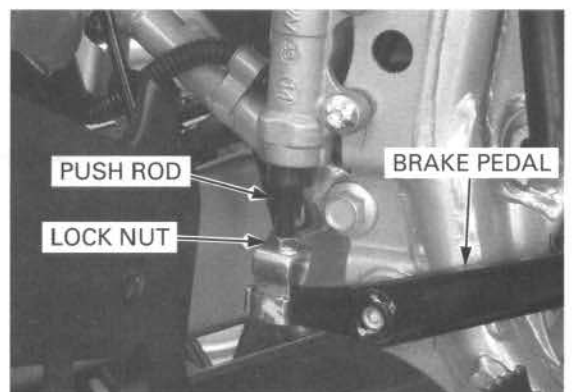


### BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the master cylinder push rod to obtain the desired pedal height.

Tighten the lock nut after adjustment.

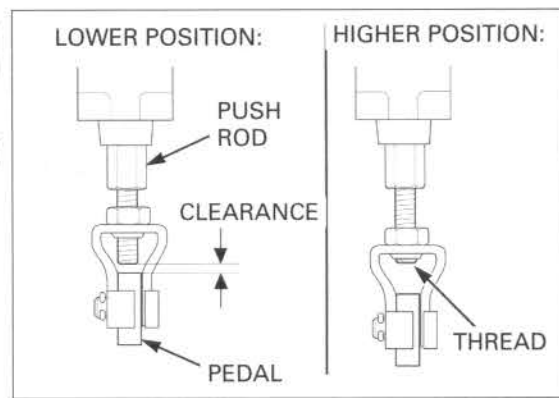
**TORQUE: 17.2 N·m (1.75 kgf·m, 13 lbf·ft)**



## MAINTENANCE

If the brake pedal is adjusted to the lower position, make sure that the clearance between the lower end of the push rod and the brake pedal does not fall below 1 mm (0.04 in).

If the brake pedal is adjusted to the higher position, make sure that the lower end of the push rod thread is visible inside the joint.



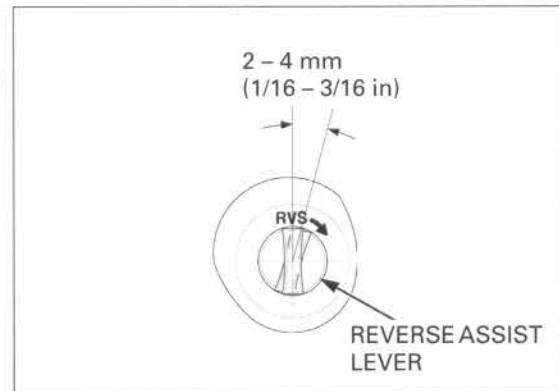
## REVERSE LOCK SYSTEM

Inspect the reverse assist cable for loose connections, kinks or damage.

Measure the reverse assist lever free play at the end of the lever.

### REVERSE ASSIST LEVER FREE PLAY:

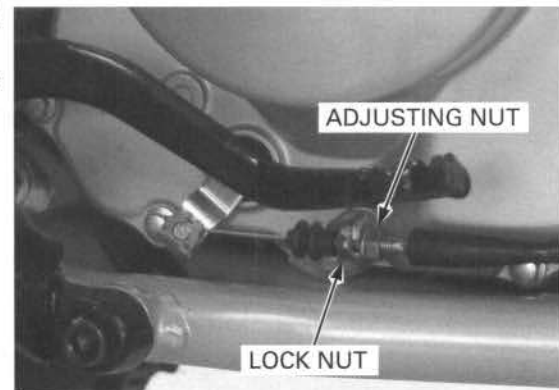
2 – 4 mm (1/16 – 3/16 in)



Assist lever free play can be adjusted at lower end of the cable.

Loosen the lock nut, turn the adjusting nut as required and tighten the lock nut.

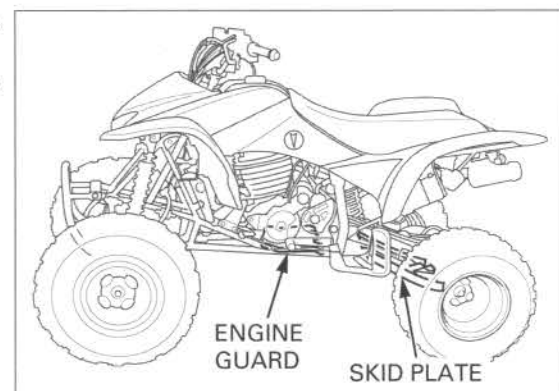
Recheck the lever operation.



## SKID PLATE, ENGINE GUARD

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

Tighten any loose fasteners. Replace the skid plate and engine guard as required.

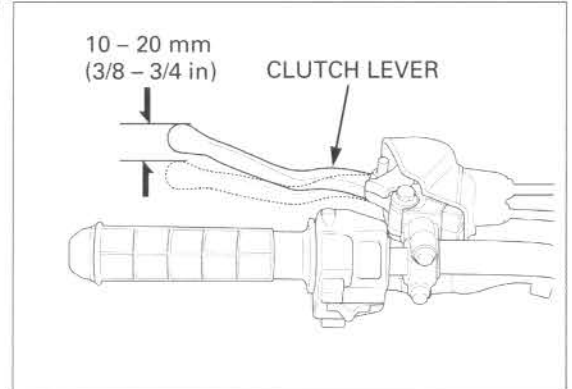


## CLUTCH SYSTEM

Inspect the clutch cable for kinks or damage, and lubricate the cable if necessary.

Measure the clutch lever free play at the lever end.

**FREE PLAY: 10 – 20 mm (3/8 – 3/4 in)**

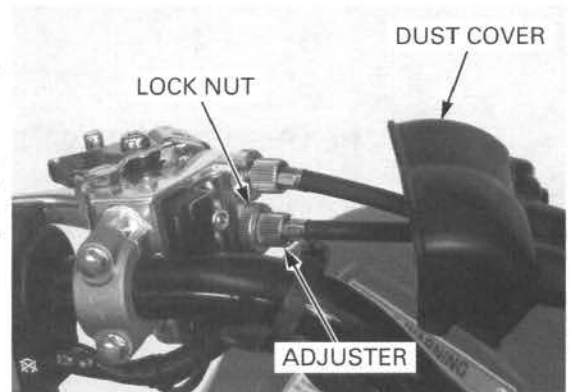


Minor adjustments are made at the clutch lever.

*The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.*

Slide the dust cover off the lever bracket, loosen the lock nut and turn the adjuster. Tighten the lock nut securely.

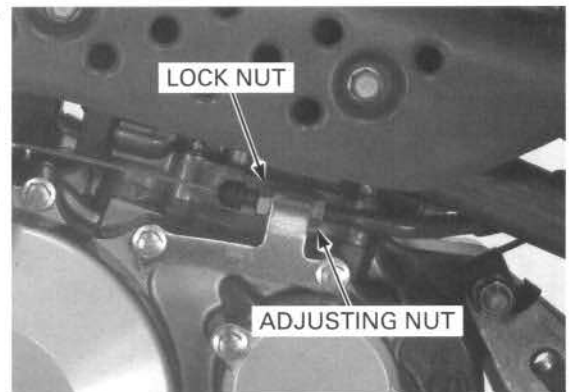
If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn. Tighten the lock nut securely, install the dust cover and make a major adjustment described below.



Major adjustments are made with the lower adjusting nut at the engine.

Loosen the lock nut and turn the adjusting nut. Tighten the lock nut securely while holding the adjusting nut.

Check the clutch operation. If the correct free play cannot be obtained or the clutch slips during test ride, disassemble and inspect the clutch (page 10-2).



## SUSPENSION

**NOTE:**

- For detailed instructions on adjusting pre-load and damping setting, see Owner's Manual.

### FRONT SUSPENSION INSPECTION

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

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

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 13 for front suspension service.



### REAR SUSPENSION INSPECTION

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

Check the action of the rear shock absorber by compressing it several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 14 for front suspension service.



Raise the rear wheels off the ground and support the vehicle securely.

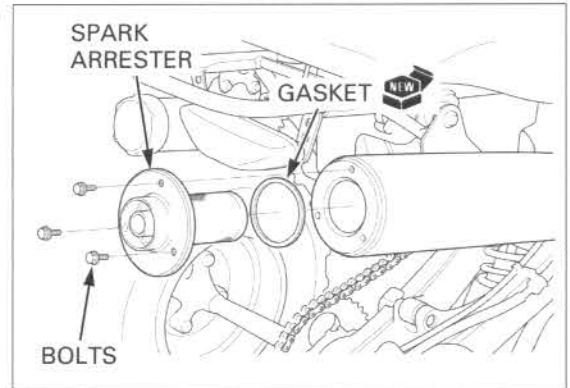
Check for worn swingarm bearings by grabbing the swingarm and attempting to move it to side to side.

Replace the bearings if any looseness is noted (page 14-19).



## SPARK ARRESTER

Remove the three bolts, and the spark arrester and gasket.



Use a brush to remove carbon deposits from the screen mesh, being careful not to damage the screen mesh.

The screen mesh must be free of breaks and holes. Replace the spark arrester if necessary.

Install the spark arrester with a new gasket and tighten the bolts securely.



## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).

Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

## WHEELS/TIRES

*Tire pressure should be checked when the tires are cold.*

Check the tire pressure with the tire pressure gauge.

### RECOMMENDED TIRE PRESSURE (Front/Rear):

**Standard:** 27 kPa (0.275 kg/cm<sup>2</sup>, 4.0 psi)

**Minimum:** 23 kPa (0.235 kg/cm<sup>2</sup>, 3.4 psi)

**Maximum:** 31 kPa (0.315 kg/cm<sup>2</sup>, 4.6 psi)

Check the tires for cuts, embedded nails, or other damage.

Measure the tread depth at the center of the tires. Replace the tires when the tread depth reaches the following limit.

### MINIMUM TREAD DEPTH (Front/Rear):

**4.0 mm (0.16 in)**



## STEERING SHAFT HOLDER BEARING

Raise the front wheels off the ground and support the vehicle securely.

Check that the handlebar moves freely from side to side.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering shaft holder bushing and bearings (page 13-24).

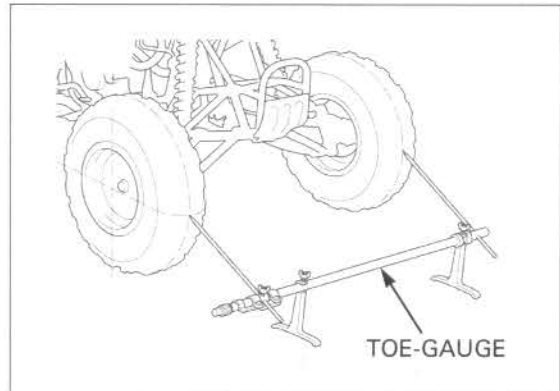


## STEERING SYSTEM

Place the vehicle on a level surface 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.



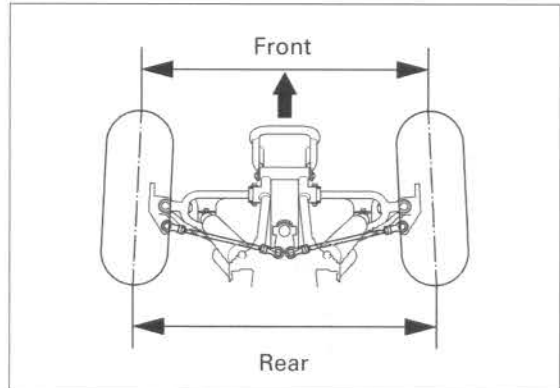
Slowly move the vehicle back until the wheels have turned 180° so the marks on the tires are aligned with the gauge height on the rear side.

Measure the toe on the rear part of the tires at the same points with no load on the vehicle.

**Toe-in: 11 ± 15 mm (2/5 ± 3/5 in)**

**NOTE:**

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

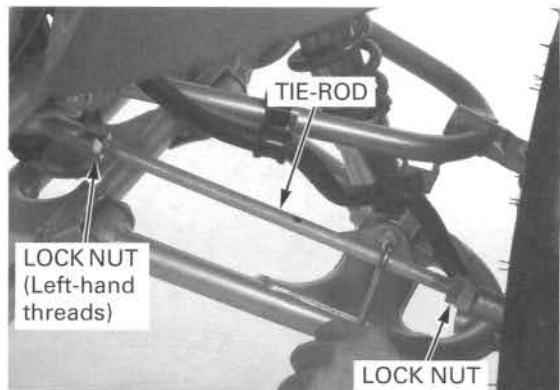


When the toe is out of specification, adjust it by changing the length of the tie-rods equally by loosening the lock nuts and turning the tie-rods while holding the ball joints.

After adjusting each tie-rod, rotate both 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 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.



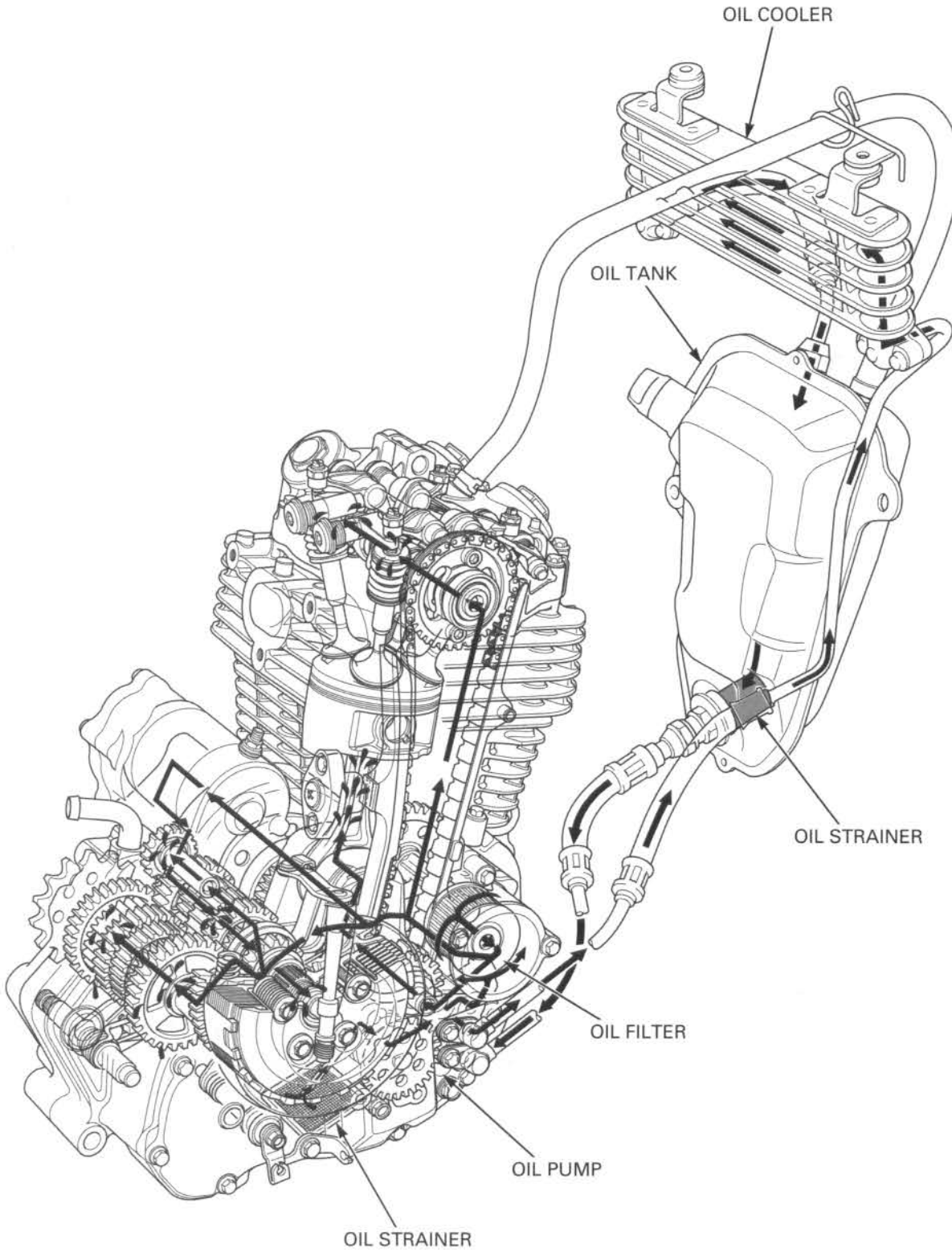


# 5. LUBRICATION SYSTEM

---

LUBRICATION SYSTEM DIAGRAM .....	5-2	OIL STRAINER .....	5-8
SERVICE INFORMATION .....	5-3	OIL COOLER.....	5-8
TROUBLESHOOTING.....	5-3	OIL TANK/OIL PIPE .....	5-9
OIL PUMP.....	5-4		

LUBRICATION SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

#### ⚠ CAUTION

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

- This section covers service of the oil pump, oil strainer (in the crankcase) and oil cooler. The service procedures in this section can be performed with the engine installed in the frame.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- After the oil pump, oil cooler and/or oil pipes has been installed, check that there are no oil leaks.
- Refer to page 4-10 for oil level check and oil change.
- Refer to page 4-12 for oil filter replacement.
- Refer to page 4-13 for oil strainer (in the oil tank) cleaning.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	1.8 liters (1.9 US qt, 1.6 Imp qt)	-
	After filter change	1.85 liters (1.95 US qt, 1.63 Imp qt)	-
	After disassembly	2.2 liters (2.3 US qt, 1.9 Imp qt)	-
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-40	-
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.25 (0.010)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

Unit: mm (in)

### TORQUE VALUES

Oil pipe joint flare nut                      20 N·m (2.0 kgf·m, 15 lbf·ft)

## TROUBLESHOOTING

#### Engine oil level too low, high oil consumption

- Normal oil consumption
- External oil leak
- Worn piston rings or incorrect piston ring installation
- Worn cylinder
- Worn valve guides or stem seals

#### Engine oil contamination

- Oil or filter not changed often enough
- Worn piston rings or incorrect piston ring installation
- Worn valve guides or stem seals
- Clogged oil strainer screen

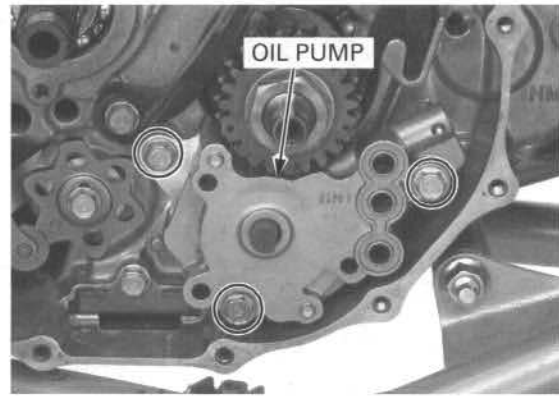
# OIL PUMP

## REMOVAL

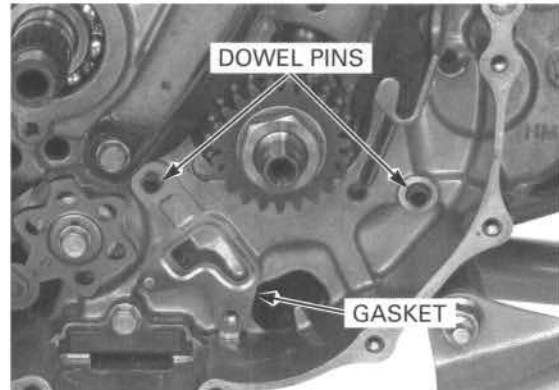
Remove the clutch outer (page 10-7).

Remove the following:

- three bolts
- oil pump



- gasket
- two dowel pins



## RELIEF VALVE CHECK

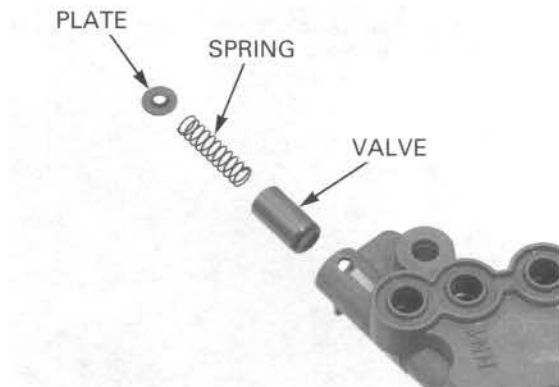
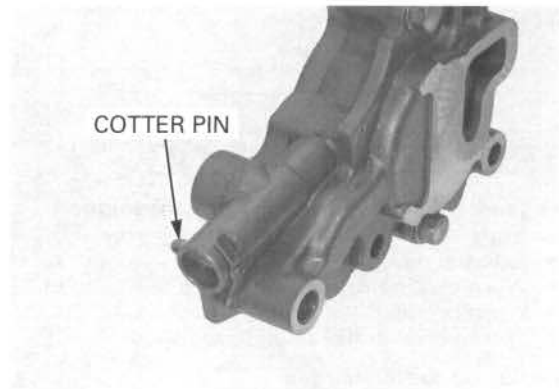
Remove the following:

- cotter pin
- stopper plate
- valve spring
- relief valve

Check the valve for wear, unsmooth movement or damage.

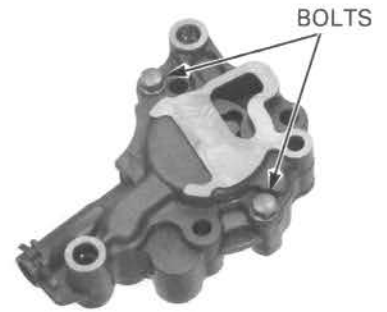
Check the spring for fatigue or damage.

Install the valve, spring and stopper plate into the oil pump, then insert a new cotter pin from the driven sprocket side and secure it.



**DISASSEMBLY**

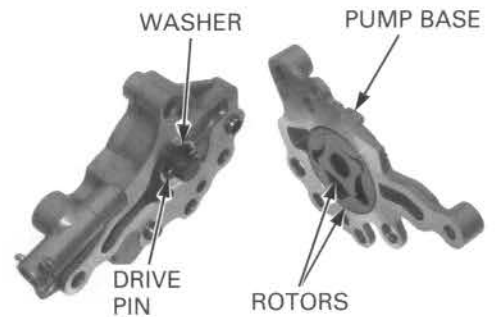
Remove the two bolts.



Separate the pump base from the pump spacer.

Remove the following:

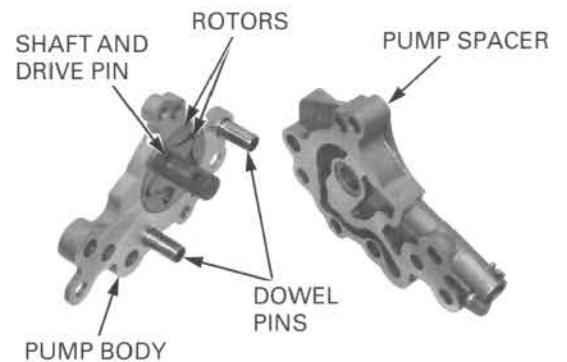
- inner rotor
- outer rotor
- drive pin
- thrust washer



Separate the pump body from the pump spacer.

Remove the following:

- pump shaft
- drive pin
- inner rotor
- outer rotor
- dowel pins



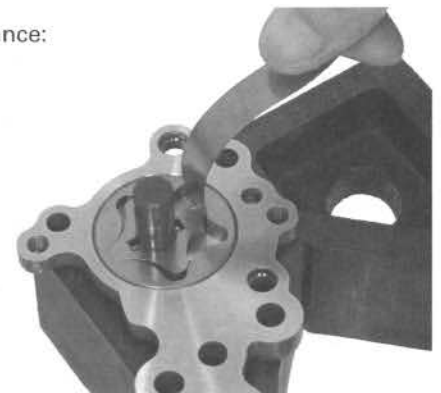
**INSPECTION**

Temporarily assemble the inner rotor, outer rotor, drive pin and pump shaft into the pump body or pump base.

Measure the rotor tip clearance.

**SERVICE LIMIT: 0.20 mm (0.008 in)**

Tip Clearance:

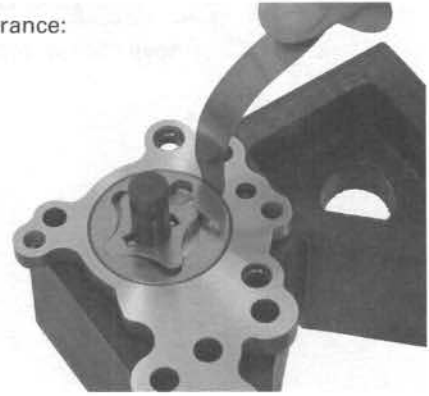


## LUBRICATION SYSTEM

Measure the pump body clearance.

**SERVICE LIMIT: 0.25 mm (0.010 in)**

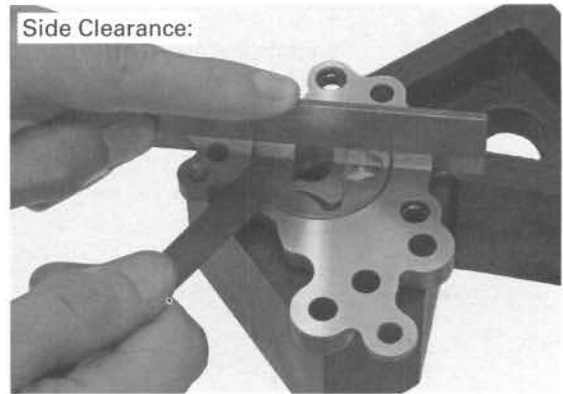
Body Clearance:



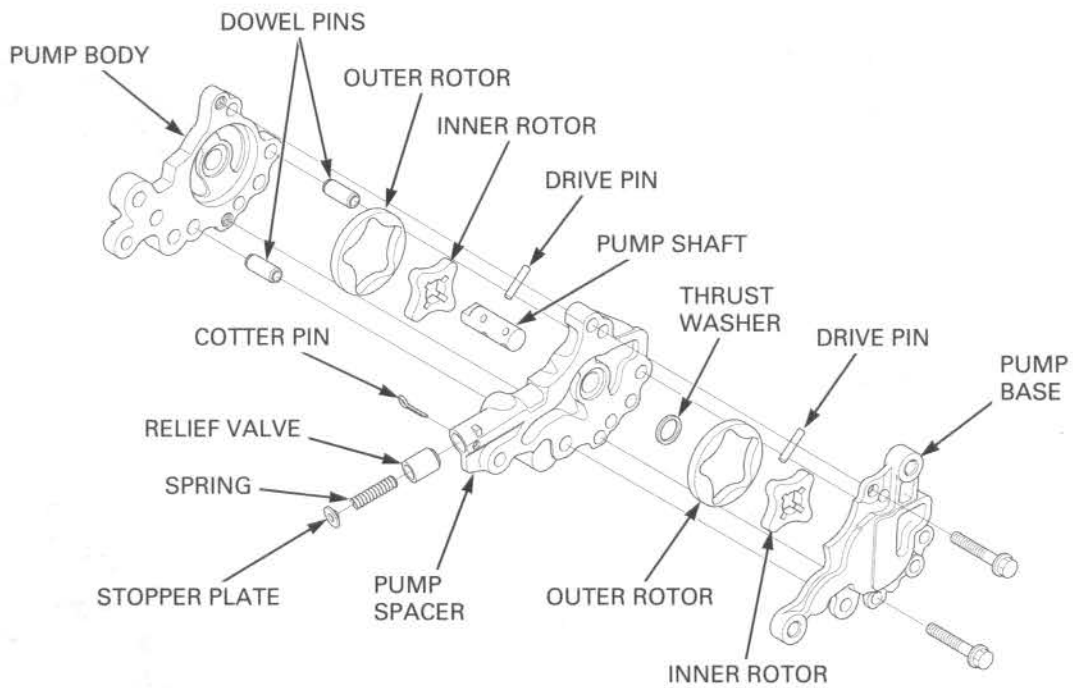
Measure the side clearance.

**SERVICE LIMIT: 0.12 mm (0.005 in)**

Side Clearance:



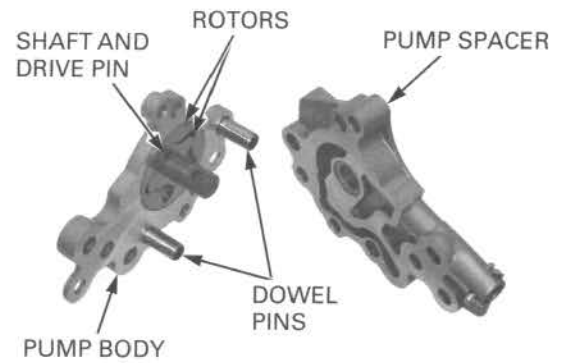
## ASSEMBLY



Install the following into the pump body:

- outer rotor
- inner rotor
- drive pin and pump shaft with the stepped side facing the pump body (aligning the drive pin with the grooves in the inner rotor)
- dowel pins

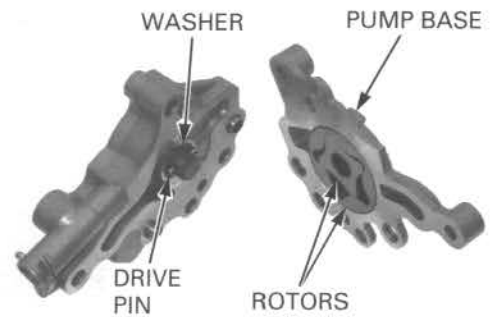
Assemble the pump body and pump spacer.



Install the following onto the pump shaft and into the pump base:

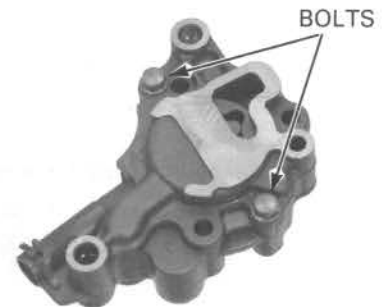
- thrust washer
- drive pin
- outer rotor
- inner rotor

Assemble the pump base and pump body/spacer, aligning the drive pin with the grooves in the inner rotor.



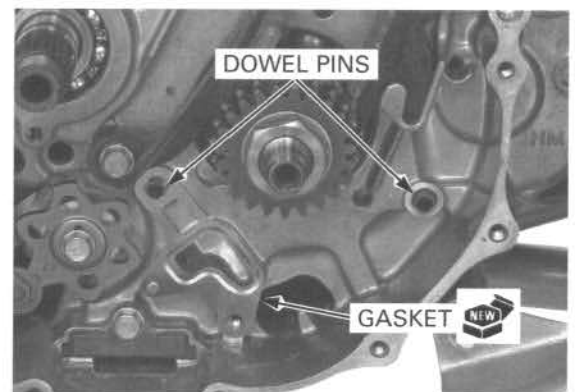
Be sure there are no clearance at the mating surfaces and tighten the bolts securely.

Check that the oil pump rotates smoothly.



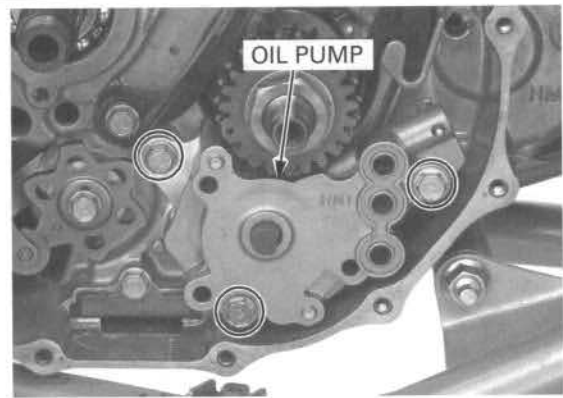
## INSTALLATION

Install the two dowel pins and a new gasket.



## LUBRICATION SYSTEM

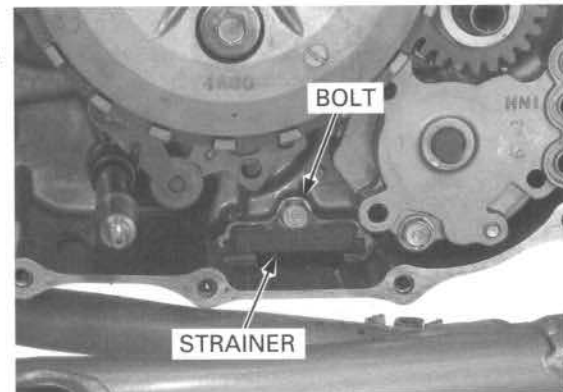
Install the oil pump and tighten the three bolts.  
Install the clutch assembly (page 10-10).



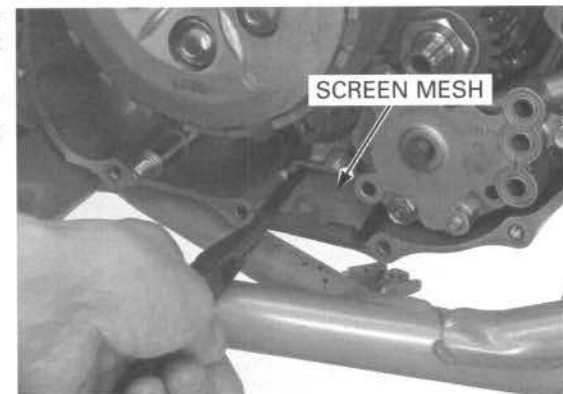
## OIL STRAINER

### CLEANING

Remove the right crankcase cover (page 10-5).  
Remove the bolt and pull the oil strainer out of the crankcase.



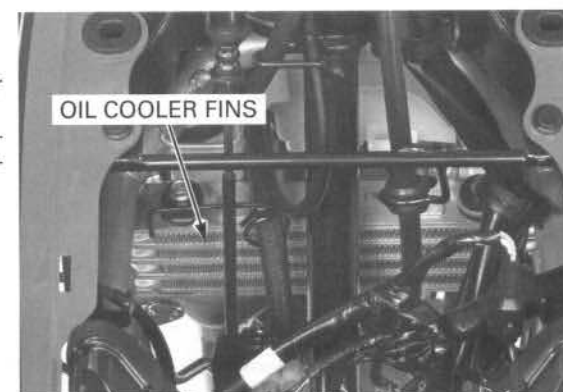
Wash the strainer thoroughly in non-flammable or high flash point solvent until all accumulated dirt has been removed.  
Blow dry it with compressed air to clean completely.  
Before installing the strainer, the screen mesh should be examined closely for damage.  
Install the strainer and tighten the bolt securely.  
Install the right crankcase cover (page 10-16).



## OIL COOLER

### INSPECTION

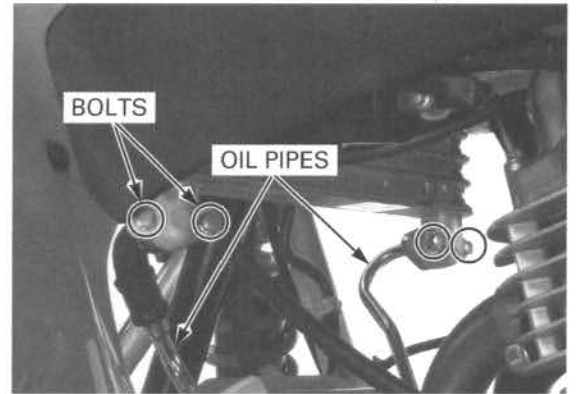
Remove the top cover (page 3-3).  
Check the oil pipe joints and seams for leaks.  
Check the oil cooler air passage for clogging or damage.  
Straighten bent fins using a small flat-blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.  
Install the top cover (page 3-3).





**REMOVAL**

Drain the engine oil (page 4-11).  
 Remove the top cover (page 3-3).  
 Disconnect the oil pipes by removing the joint bolts.  
 Remove the O-rings.

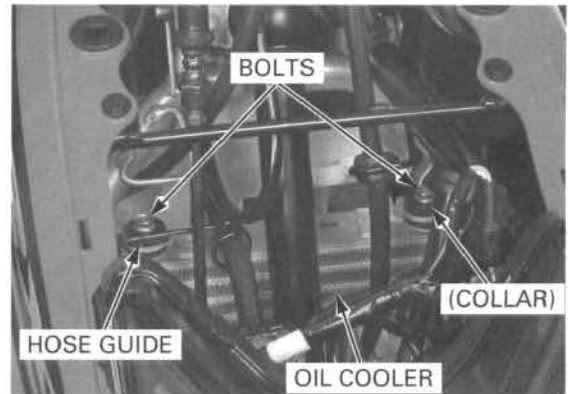


Remove the two mounting bolts and hose guide.  
 Remove the oil cooler out of the frame.

*Be careful not to damage the oil cooler fins.*

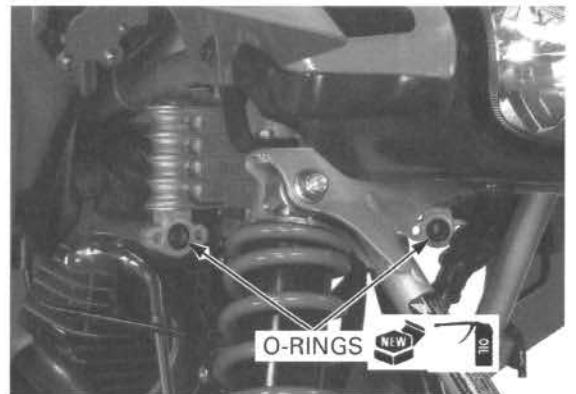
**INSTALLATION**

Install the oil cooler onto the frame.  
 Install the hose guide and mounting bolts, and tighten them securely.



*Take care not to pinch the O-ring between the pipe joint and oil cooler.*

Coat new O-rings with engine oil and install them onto the oil cooler.  
 Install the oil pipes and tighten the bolts securely.  
 Install the top cover (page 3-3).  
 Pour the engine oil (page 4-11).



**OIL TANK/OIL PIPE**

**REMOVAL/INSTALLATION**

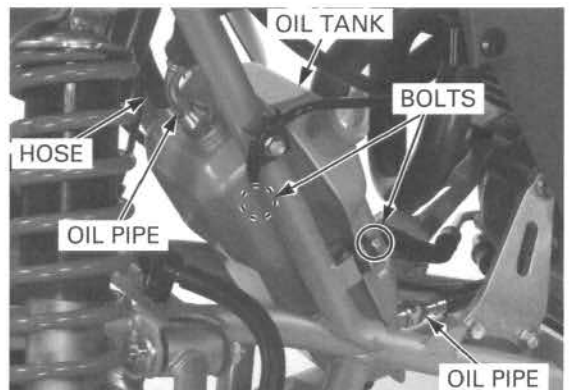
Drain the engine oil (page 4-11).

**OIL TANK**

- Remove the following:
- breather hose
  - oil pipes (by loosening the flare nuts)
  - two bolts
  - oil tank (from the rubber mount in the frame)

*Be careful not to cross-thread the flare nut.*

Installation is in the reverse order of removal.  
**TORQUE: Flare nut: 20 N·m (2.0 kgf·m, 15 lbf·ft)**



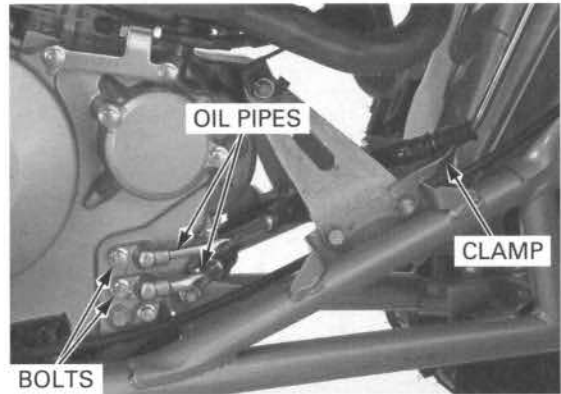
## LUBRICATION SYSTEM

### OIL PIPES

Disconnect the oil pipes from the oil tank (page 5-9) and oil cooler (page 5-9).

Remove the following:

- joint bolts
- oil pipes (remove the engine-to-oil cooler pipe from the clamp)

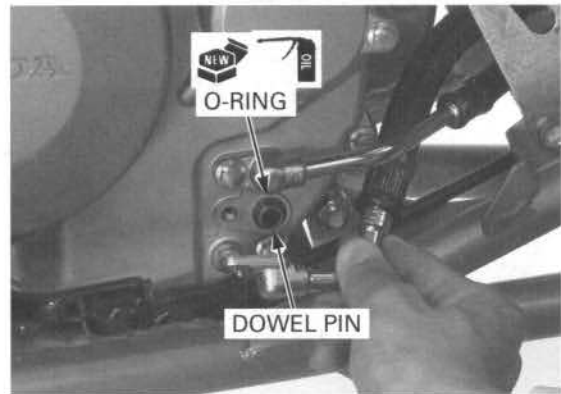


- O-rings
- dowel pins

*Replace the O-rings with new ones and coat them with engine oil.*

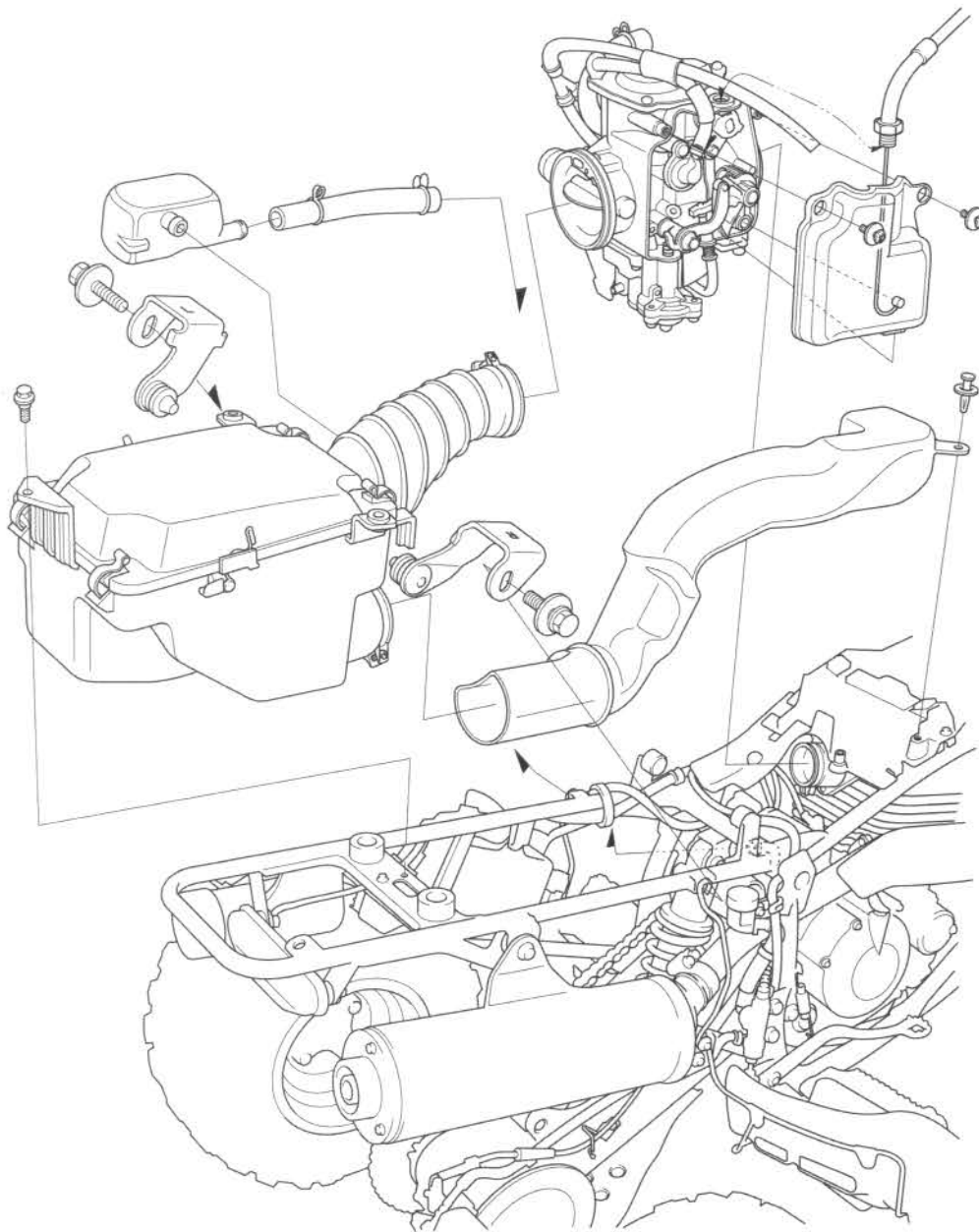
Install the oil pipes onto the engine in the reverse order of removal.

Connect the oil pipes to the oil tank (page 5-9) and oil cooler (page 5-9).



SYSTEM COMPONENTS .....	6-2	CARBURETOR DISASSEMBLY/ INSPECTION .....	6-8
SERVICE INFORMATION .....	6-3	CARBURETOR ASSEMBLY.....	6-14
TROUBLESHOOTING .....	6-4	CARBURETOR INSTALLATION .....	6-20
AIR CLEANER HOUSING .....	6-5	PILOT SCREW ADJUSTMENT.....	6-22
CARBURETOR REMOVAL.....	6-6	HIGH ALTITUDE ADJUSTMENT .....	6-23

SYSTEM COMPONENTS



## SERVICE INFORMATION

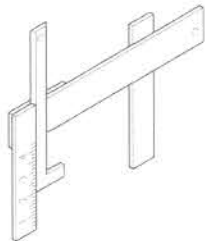

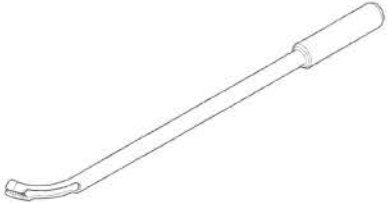
### GENERAL

- 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.
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.
- Before removing the carburetor, place an approved gasoline container under the carburetor drain hose, loosen the drain screw and drain the carburetor.
- After removing the carburetor, wrap the intake port of the cylinder head with a shop towel or cover it with pieces of tape to prevent any foreign material from dropping into the engine.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- If the vehicle is to be stored for more than 1 month, drain the float chamber. Fuel left in the float chamber may cause clogged jets, resulting in hard starting or poor driveability.
- Refer to page 3-6 for fuel tank removal and installation.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number		QB11A
Main jet		#148
Slow jet		#38
Pilot screw opening	Initial/final opening	See page 6-22
	High altitude adjustment	See page 6-23
Float level		15.9 mm (0.63 in)
Idle speed		1,400 ± 100 rpm (min <sup>-1</sup> )
Throttle grip free play		3 – 8 mm (1/8 – 5/16 in)

### TOOLS

<p>Carburetor float level gauge 07401-0010000</p> 	<p>Pilot screw wrench (D type) 07KMA-MS60101</p>  <p>or 07KMA-MN9A100 (U.S.A. only)</p>	<p>Pilot screw wrench guide 07PMA-MZ20110</p> 
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## FUEL SYSTEM

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### TROUBLESHOOTING

#### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
  - Clogged fuel strainer
  - Clogged fuel line
  - Clogged fuel tank breather hose
- Too much fuel getting to the engine
  - Clogged air cleaner
  - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
  - Clogged jets
- Improper choke operation
- Improper throttle operation
- No spark at plug (faulty ignition system – page 17-4)

#### Lean mixture

- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent hose
- Restricted fuel tank breather hose
- Intake air leak
- Faulty throttle valve

#### Rich mixture

- Choke valve closed (ON)
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Worn jet needle or needle jet

#### Engine stalls, hard to start, rough idling

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
  - Clogged jets
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Restricted fuel tank breather hose
- Dirty air cleaner
- Clogged slow circuit
- Faulty ignition system (page 17-4)

#### Afterburn when engine braking is used

- Lean mixture in slow circuit
- Faulty air cut-off valve
- Faulty ignition system (page 17-4)

#### Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (page 17-4)

#### Poor performance (driveability) and poor fuel economy

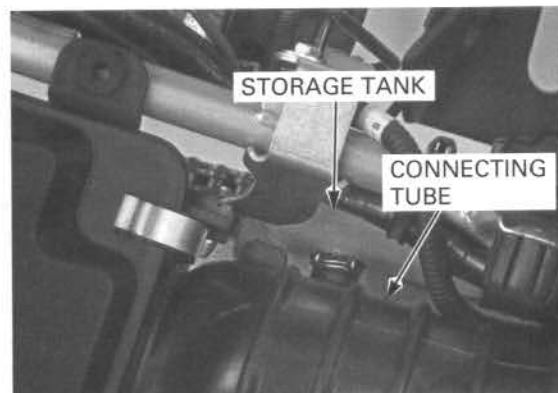
- Clogged fuel system
- Faulty ignition system (page 17-4)

## AIR CLEANER HOUSING

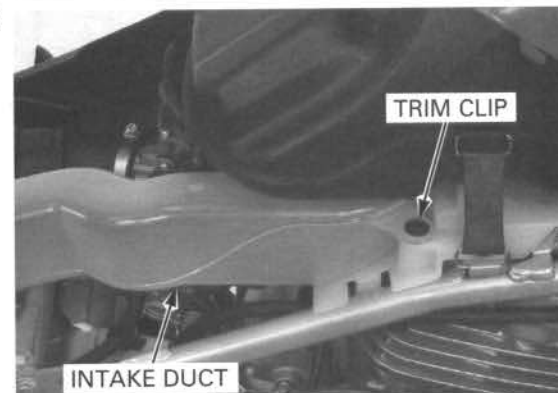
### REMOVAL

Remove the right side cover (page 3-4).

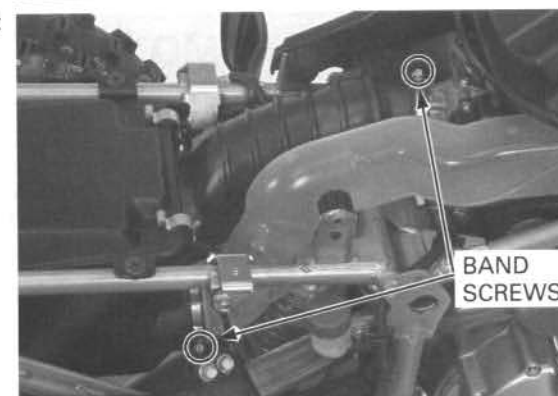
Remove the crankcase breather storage tank from the connecting tube.



Release the trim clip by pulling the center pin and remove it from the air intake duct.



Loosen the connecting hose band and intake duct band screws.



Remove the flange bolt and two washer-bolts, and the air cleaner housing assembly.

Remove the housing stays and intake duct from the air cleaner housing.



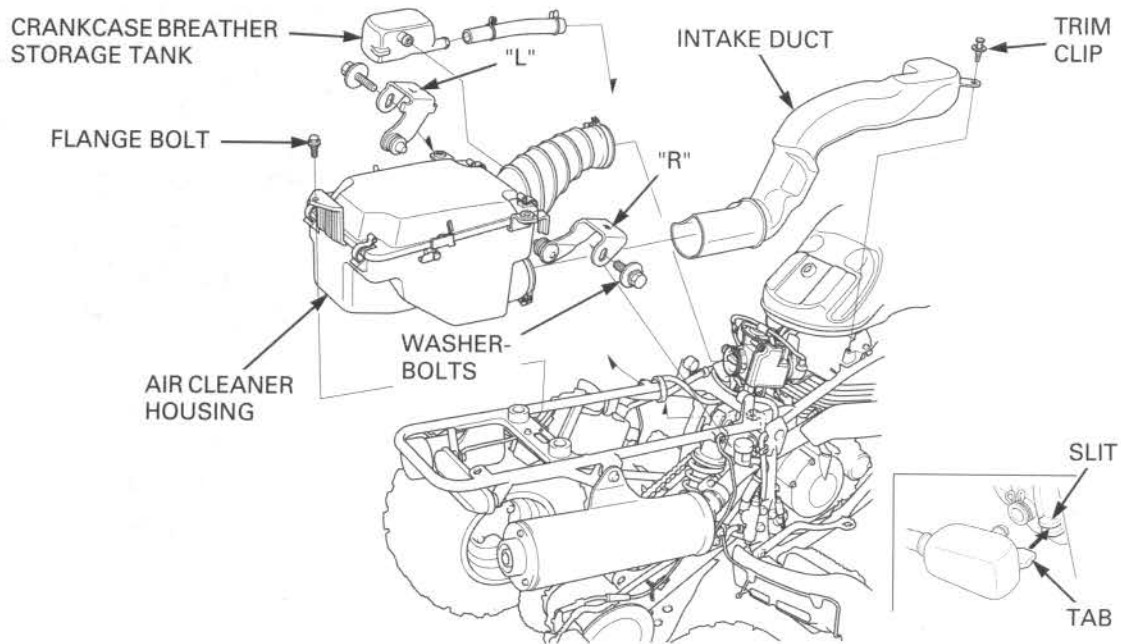
## FUEL SYSTEM

### INSTALLATION

Installation is in the reverse order of removal.

#### NOTE:

- The housing stays have the identification marks; "L" (left side) and "R" (right side).
- When installing the crankcase breather storage tank, align the locating tab with the slit of the connecting tube.



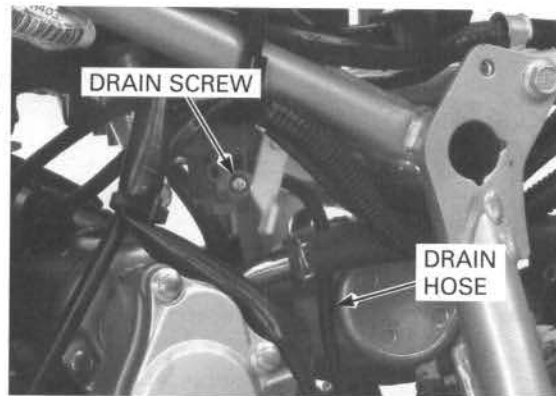
### CARBURETOR REMOVAL

Remove the following:

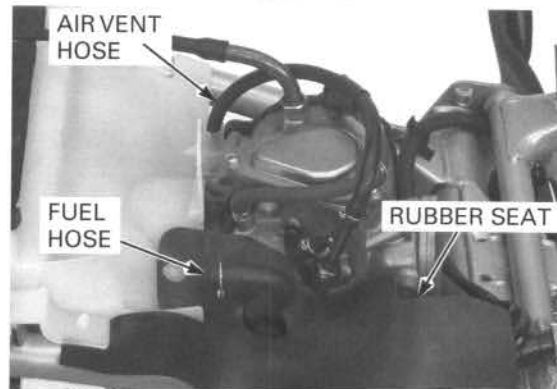
- fuel tank (page 3-6)
- air cleaner housing (page 6-5)

Place an approved fuel container under the drain hose. Loosen the drain screw and drain the carburetor.

Remove the drain hose from the frame.

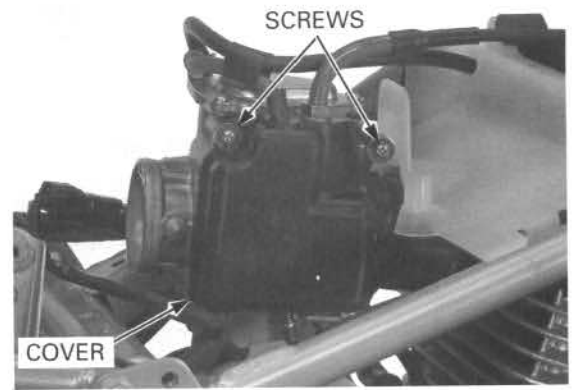


Remove the air vent hose from the heat guard plate and the fuel hose from the rubber seat.

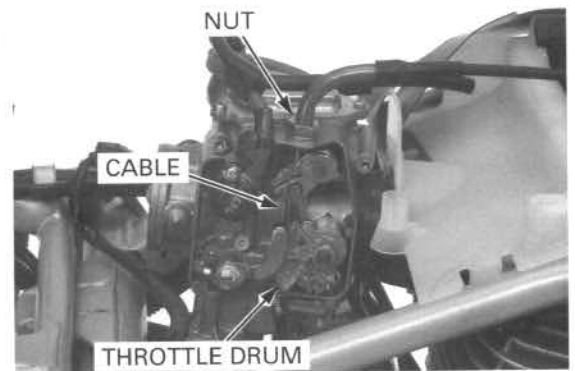




Remove the two screws and throttle linkage cover.



Loosen the throttle cable nut.  
Disconnect the throttle cable from the throttle drum.

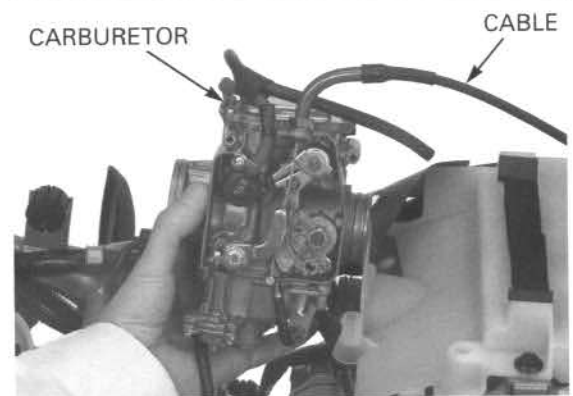


Loosen the insulator band screw. Release the carburetor from the insulator.



Disconnect the throttle cable by turning the carburetor and remove it.

Seal the insulator with tape or a clean cloth to keep dirt and debris from entering the engine.



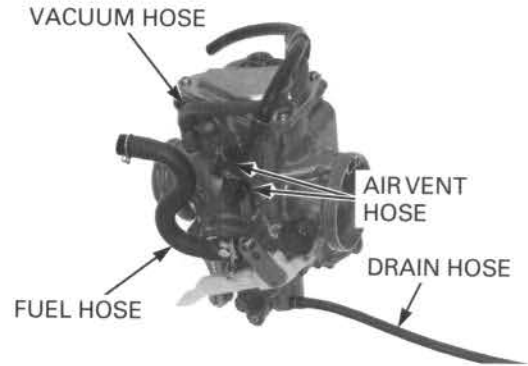
## FUEL SYSTEM

# CARBURETOR DISASSEMBLY/ INSPECTION

### HOSES

Disconnect the following:

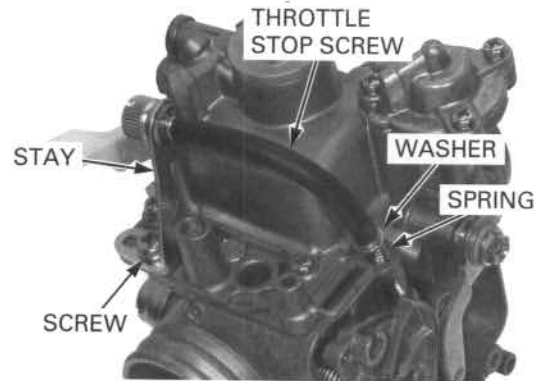
- drain hose
- fuel hose
- air vent hoses
- air cut-off valve vacuum hose



### THROTTLE STOP SCREW

Remove the following:

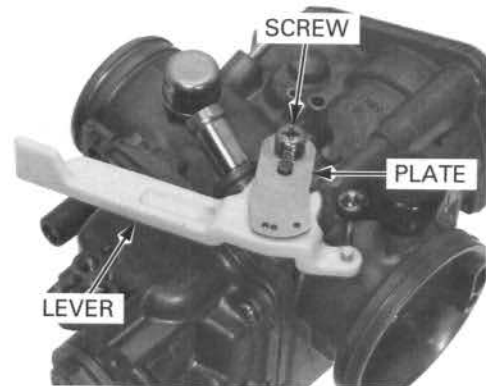
- screw and stay
- throttle stop screw
- spring
- washer



### CHOKE LEVER

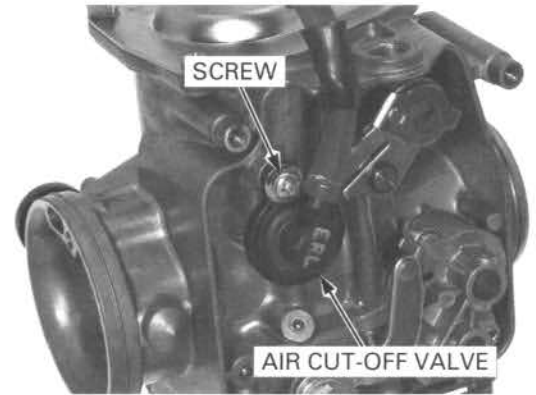
Remove the following:

- screw
- setting plate
- choke lever

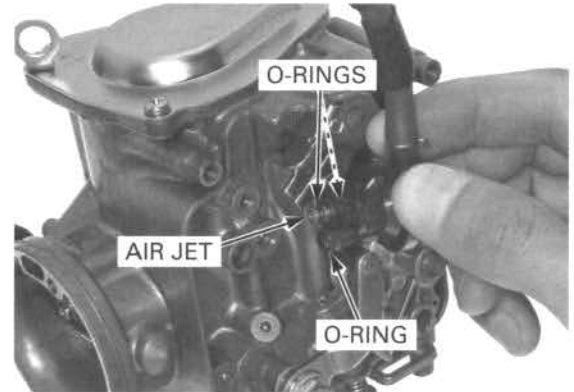


**AIR CUT-OFF VALVE**

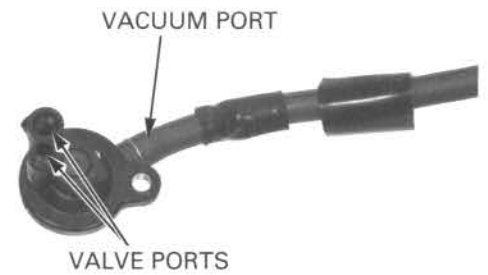
- Remove the following:
- screw
  - air cut-off valve



- slow air jet
- O-rings

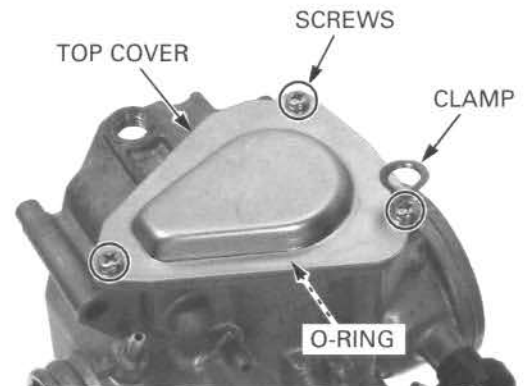


Apply vacuum to the vacuum port (hose).  
 The vacuum should be maintained.  
 Air should not flow through the valve ports when the vacuum is applied, and should flow when the vacuum is not applied.



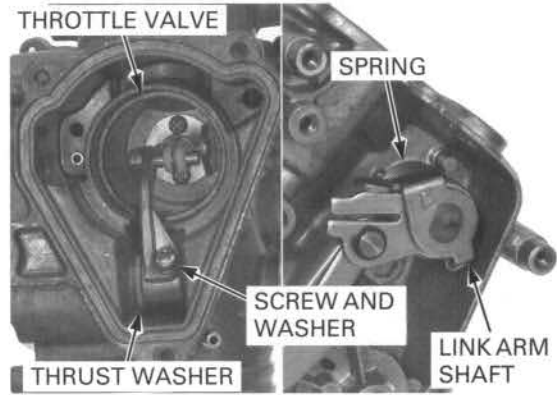
**THROTTLE VALVE**

- Remove the following:
- three screws and clamp
  - top cover
  - O-ring

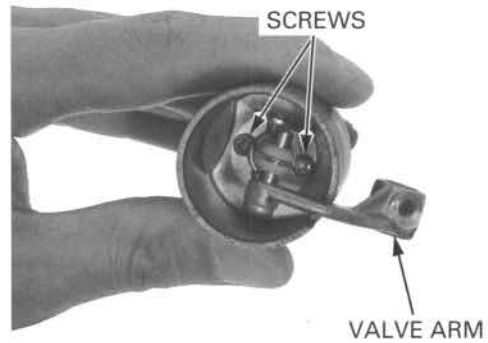


## FUEL SYSTEM

- screw and spring washer
- link arm shaft (pull it while turning counterclockwise)
- return spring
- thrust washer
- throttle valve assembly (being careful not to damage the jet needle)

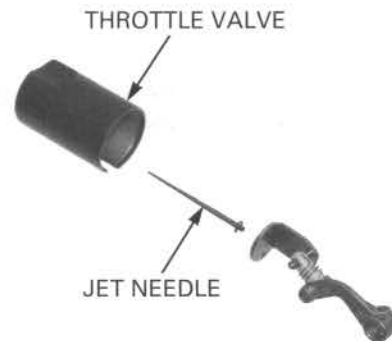


- two screws
- throttle valve arm



- jet needle

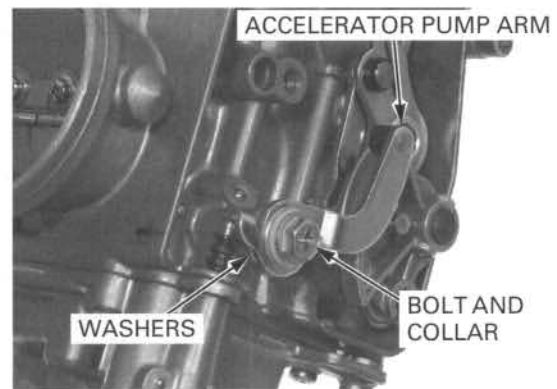
Check the jet needle for stepped wear or damage. Check the throttle valve for scoring, scratches or damage.



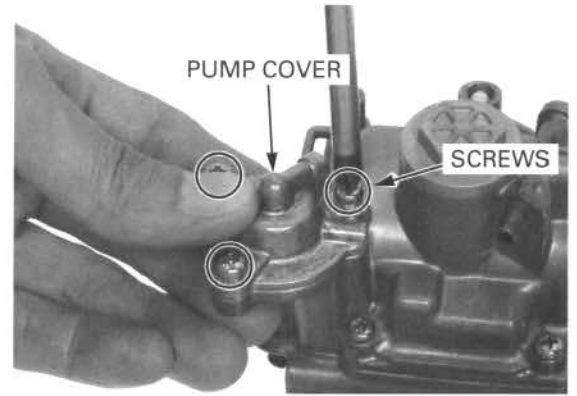
## ACCELERATOR PUMP

Remove the following:

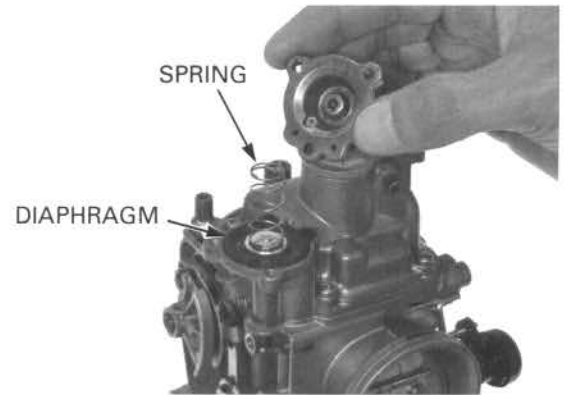
- bolt and collar
- accelerator pump arm
- plastic washer
- plain washer
- spring washer



- three screws (while holding the pump cover)
- accelerator pump cover

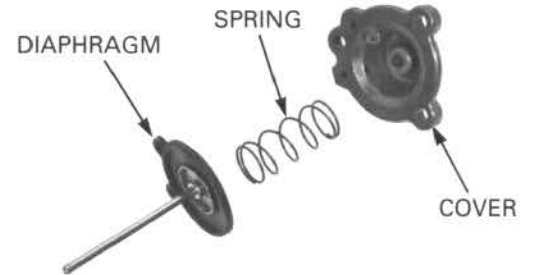


- spring
- diaphragm



Visually inspect the following:

- diaphragm for deterioration or pin holes
- spring for damage
- diaphragm shaft for excessive wear or damage
- orifice in the cover for clogging or restriction

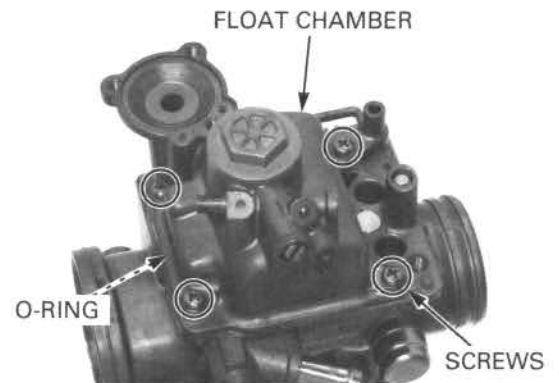


### FLOAT AND JETS

Remove the accelerator pump (page 6-10).

Remove the following:

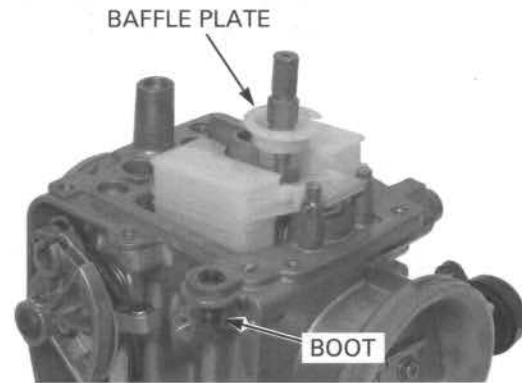
- four screws
- float chamber
- O-ring



## FUEL SYSTEM

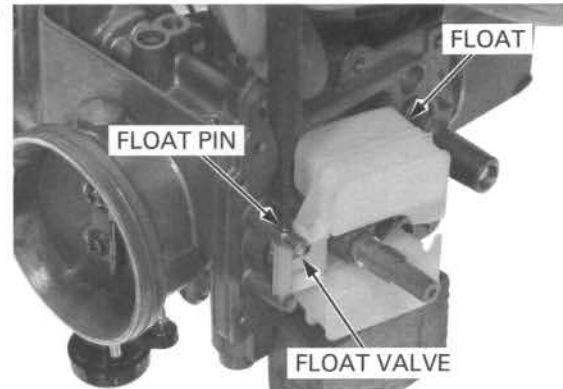
- baffle plate
- diaphragm shaft boot

Check the boot for deterioration or damage.



Remove the following:

- float pin (by gently tapping it from the throttle drum side with a suitable pin driver)
- float
- float valve

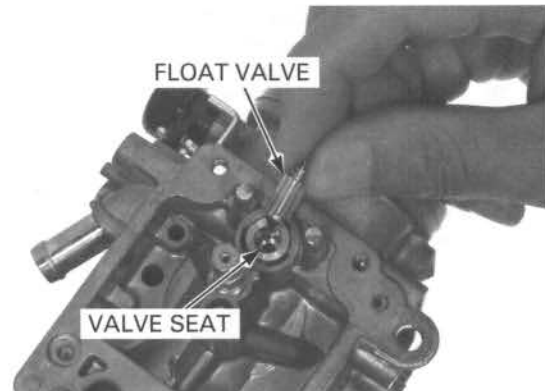


Check the float for deformation or damage.

Check the float valve and valve seat for scoring, scratches, clogs or damage.

Check the tip of the float valve, where it contacts the valve seat, for stepped wear or contamination.

Check the operation of the float valve.



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

Remove the following:

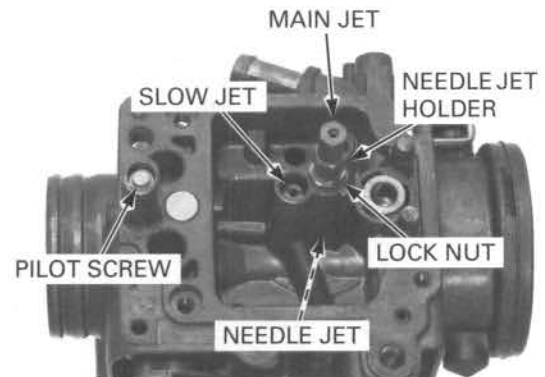
- slow jet
- main jet
- needle jet holder (loosen the lock nut)
- needle jet

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

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

**TOOL:**

**Pilot screw wrench (D type) 07KMA-MS60101 or 07KMA-MN9A100 (U.S.A. only)**



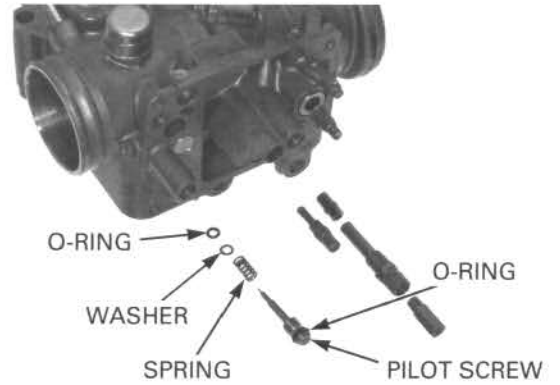
Remove the following:

- pilot screw
- spring
- washer
- O-rings

Check each jet for wear or damage.

Check the pilot screw for stepped wear or damage.

Clean the jets with cleaning solvent and blow open with compressed air.

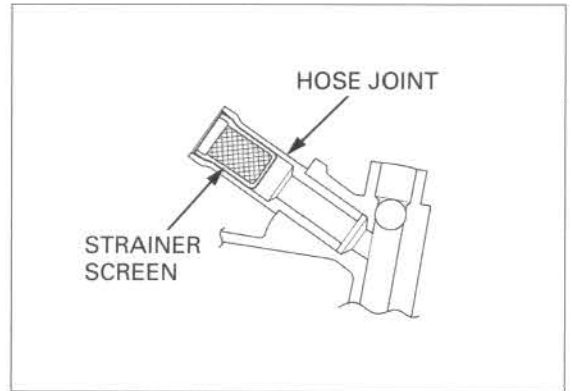


### CARBURETOR CLEANING

Remove the strainer screen from the fuel hose joint.

Wash the strainer screen thoroughly in non-flammable or high flash point solvent until all accumulated dirt has been removed.

Blow dry it with compressed air to clean completely.

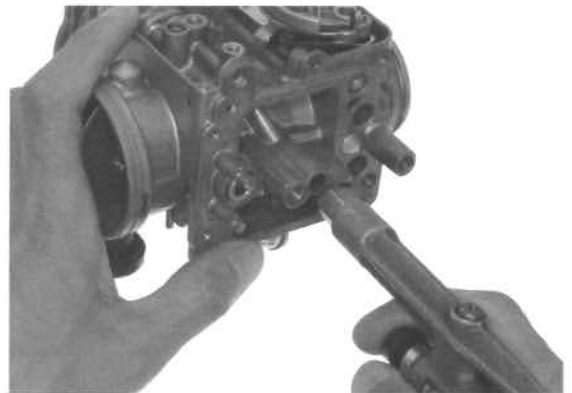


Remove the following:

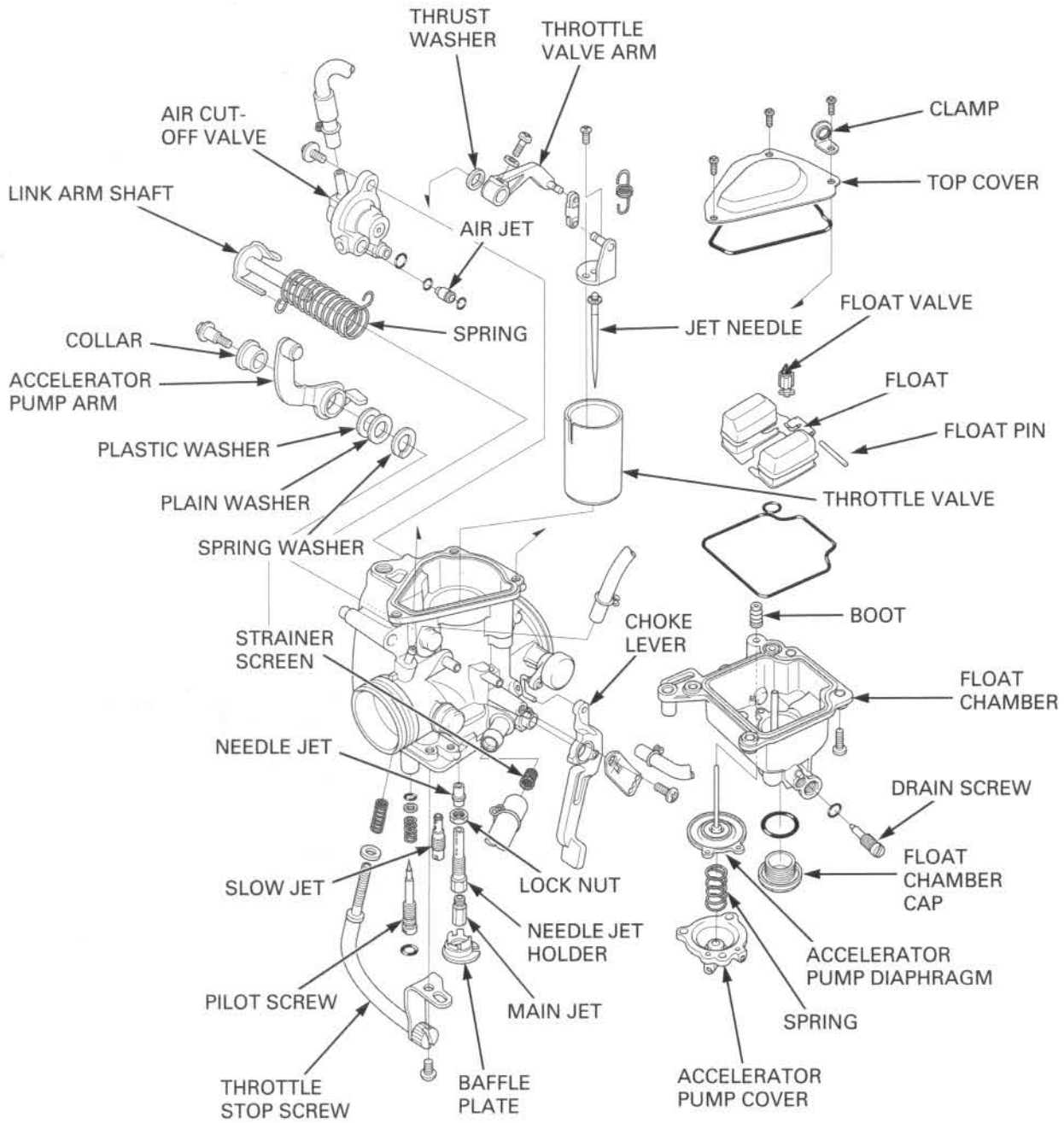
- air cut-off valve (page 6-9)
- throttle valve (page 6-9)
- accelerator pump (page 6-10)
- float, all jets and pilot screw (page 6-11)

*Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.*

Blow open all air and fuel passages in the carburetor body with compressed air.



CARBURETOR ASSEMBLY





### JETS AND FLOAT

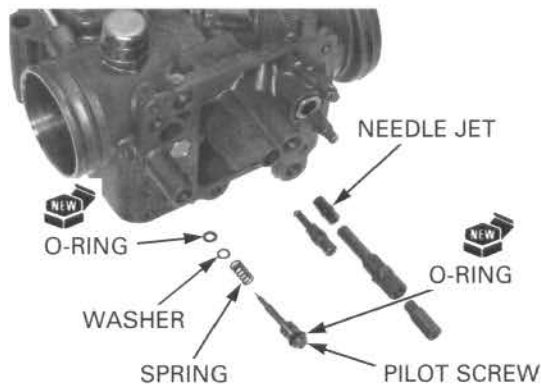
*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Install a new O-ring into the pilot screw groove. Install the pilot screw with the spring, washer and a new O-ring and return it to its original position as noted during removal.

**TOOL:**

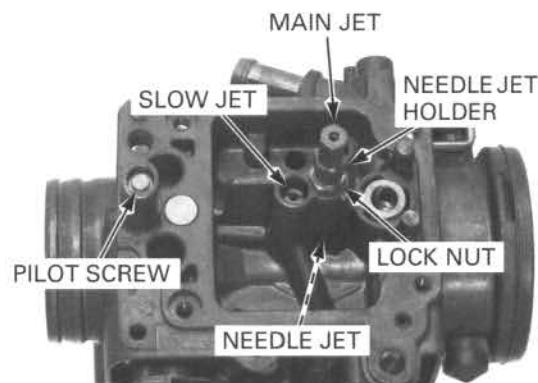
**Pilot screw wrench (D type) 07KMA-MN90101 or 07KMA-MS60101**

Perform the pilot screw adjustment if a new pilot screw is installed (page 6-22).



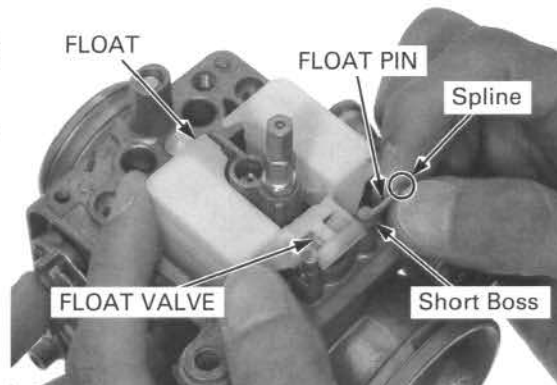
*Handle all jets with care. They can easily be scored or scratched.*

Install the needle jet and needle jet holder and tighten the lock nut. Install the main jet and slow jet.



Hang the float valve onto the float arm lip. Install the float with the float valve and insert the float pin so that the splined end rests in the short boss (splined hole) side as shown.

Drive the float pin using a pin driver until its end is flush with the boss.



### FLOAT LEVEL INSPECTION

Check the float level after checking the float valve, valve seat and float.

*Set the float level gauge so that it is perpendicular to the float chamber face and in line with the main jet.*

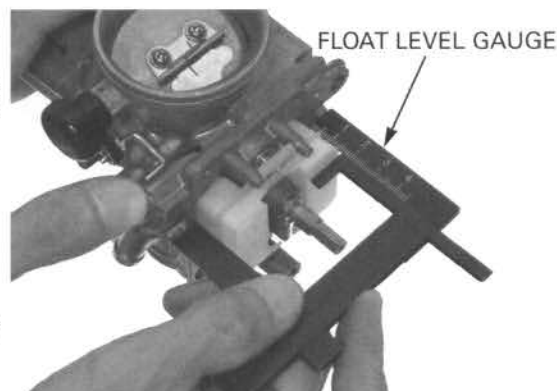
With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

**TOOL:**

**Carburetor float level gauge 07401-0010000**

**FLOAT LEVEL: 15.9 mm (0.63 in)**

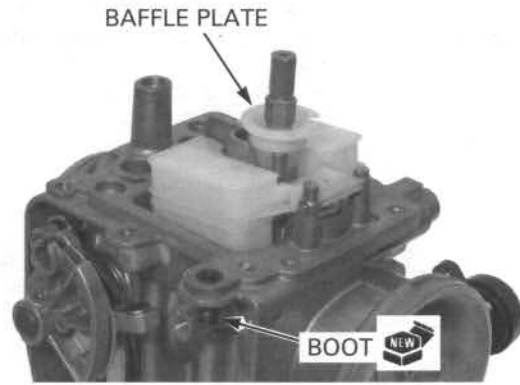
The float level cannot be adjusted. Replace the float assembly if the float level is out of specification.



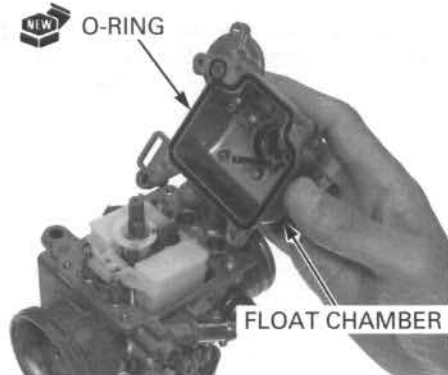
## FUEL SYSTEM

Install a new diaphragm shaft boot until it is flush with the carburetor body.

Install the baffle plate by aligning the groove with the lug on the carburetor body as shown.



Install a new O-ring in the float chamber groove. Install the float chamber onto the carburetor body.



Install the four screws and tighten them.

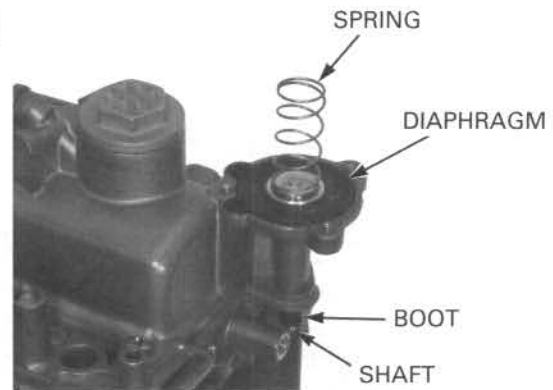


### ACCELERATOR PUMP

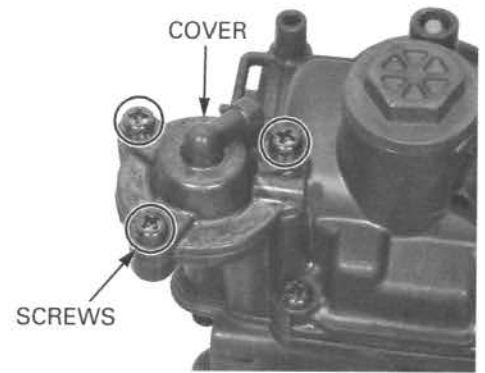
Install the diaphragm shaft into the float chamber through the boot while slowly turn it to prevent the boot from damaging.

Set the diaphragm rib into the groove properly.

Install the spring onto the diaphragm.

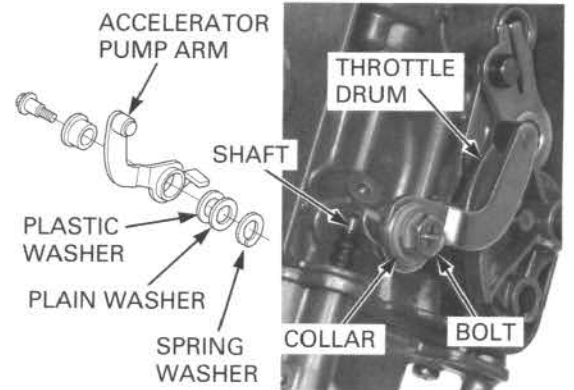


Be careful not to pinch the diaphragm. Install the pump cover while compressing the spring and tighten three screws securely.



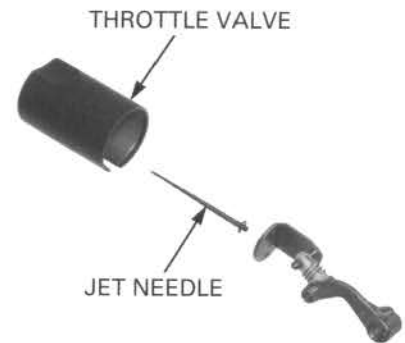
Install the collar and bolt into the accelerator pump arm. Install the plastic washer, plain washer, spring washer onto the bolt.

Install the pump arm assembly so it is set onto the diaphragm shaft and throttle drum and tighten the bolt securely.



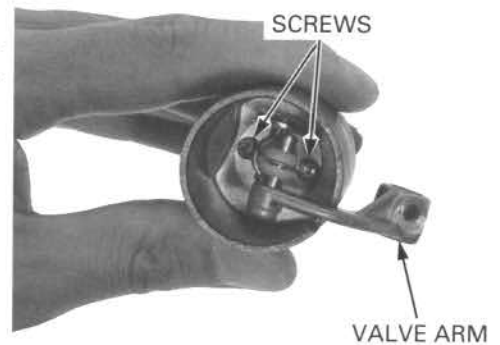
### THROTTLE VALVE

Install the jet needle into the throttle valve.



Install the valve arm into the throttle valve in the direction as shown and tighten the two screws.

Install the throttle valve assembly into the carburetor body, being careful not to damage the jet needle.



## FUEL SYSTEM

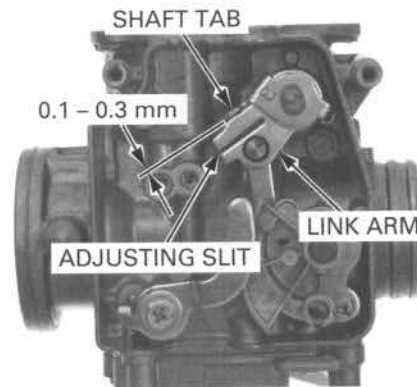
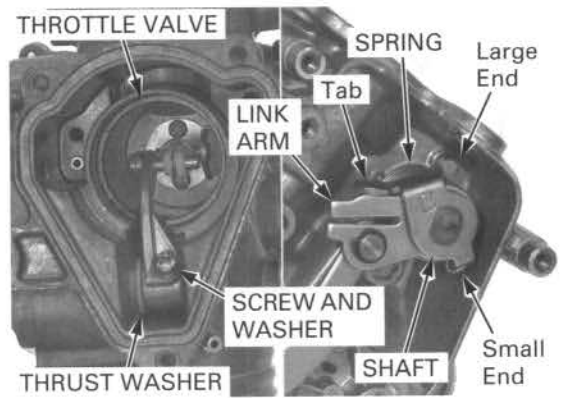
Set the thrust washer between the valve arm and carburetor body (throttle drum side). Install the return spring by hanging the large end onto carburetor boss (stopper) and set the throttle link arm over the spring. Insert the link arm shaft through the link arm, carburetor body, thrust washer and valve arm. Hang the shaft hook to the spring small end. Turn the link arm shaft clockwise and set the shaft tab onto the link arm as shown.

Align the screw holes in the valve arm and shaft, install the screw with the spring washer and tighten it securely.

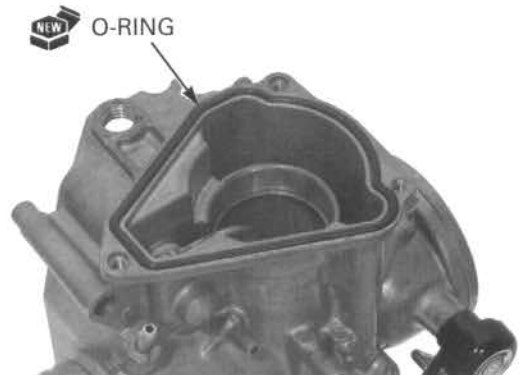
Turn the throttle drum and check for smooth operation.

Make sure that the clearance between the throttle link arm and shaft tab is 0.1 – 0.3 mm (0.004 – 0.012 in) when the throttle valves are fully closed.

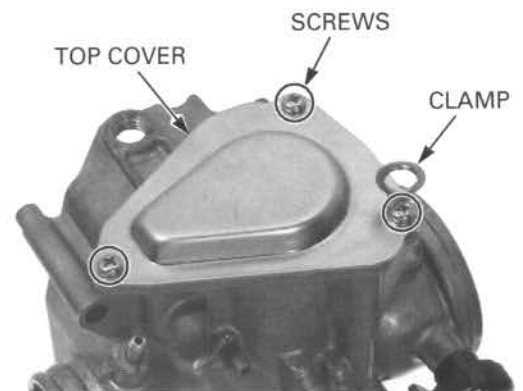
Adjust the clearance by opening or closing the slit in the link arm.



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

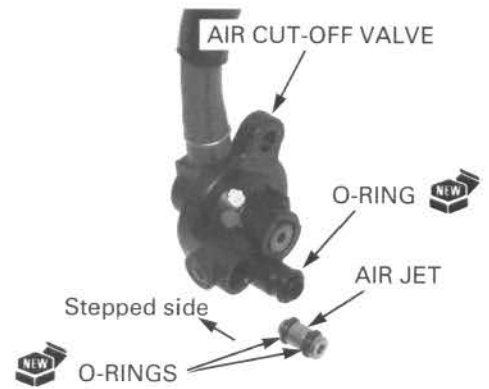


Install the top cover and tighten the three screws with the clamp securely.

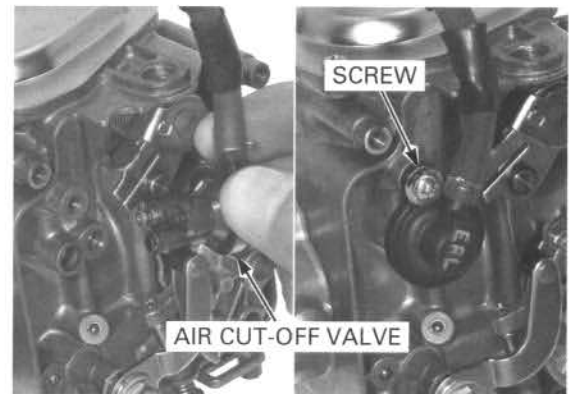


**AIR CUT-OFF VALVE**

Install new O-rings onto the slow air jet.  
 Install the air jet into the air cut-off valve with the stepped side facing the valve side.  
 Install a new O-ring onto the air cut-off valve and install the valve onto the carburetor body.

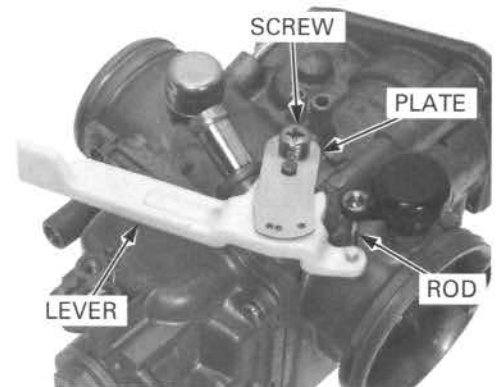


Install the screw and tighten it securely.



**CHOKE LEVER**

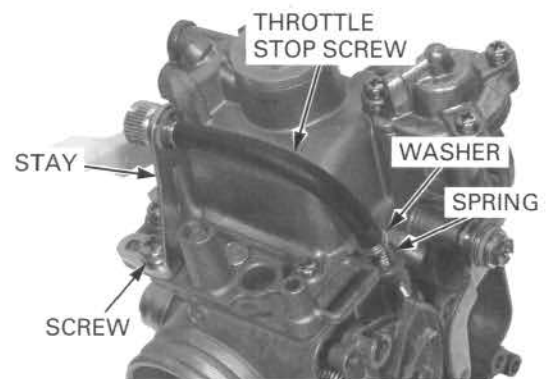
Install the choke lever onto the pivot and choke arm rod.  
 Install the setting plate in the direction as shown and tighten the screw.



**THROTTLE STOP SCREW**

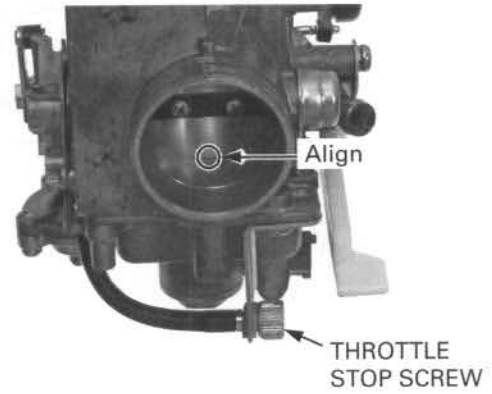
Install the washer and spring onto the throttle stop screw. Install the throttle stop screw by screwing it clockwise.

Install the stay by aligning the hole with the locating pin and tighten the screw.



## FUEL SYSTEM

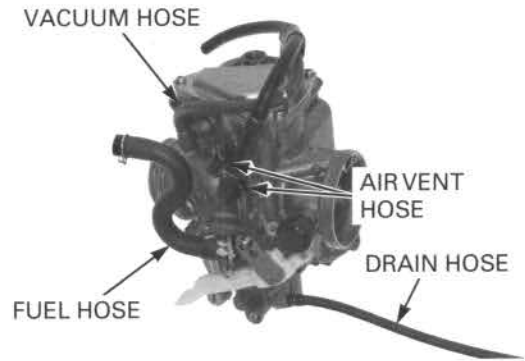
Turn the throttle stop screw to align the butterfly throttle valve with the edge of the outside by-pass hole in the carburetor.



## HOSES

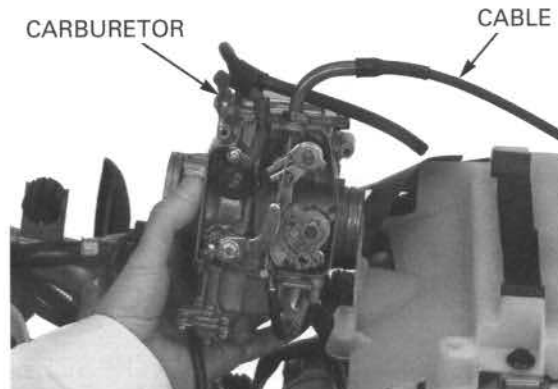
Connect the following hoses as shown:

- air vent hoses
- air cut-off valve vacuum hose
- drain hose
- fuel hose

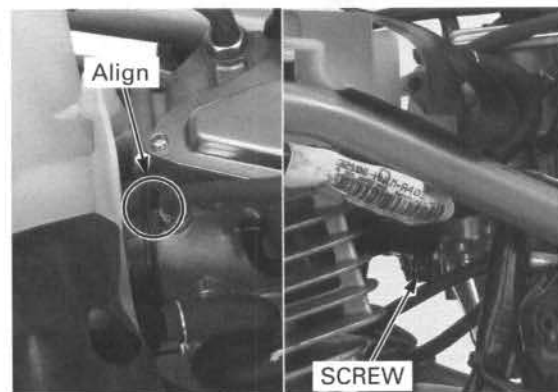


## CARBURETOR INSTALLATION

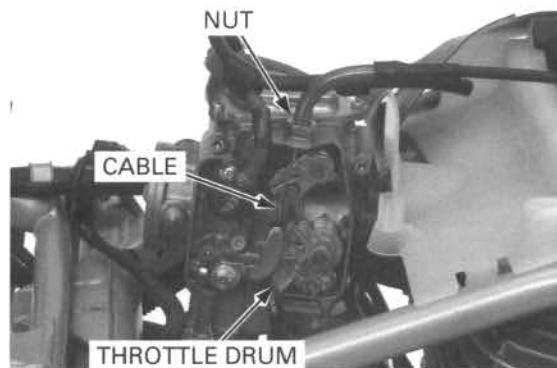
Install the throttle cable into the carburetor body by turning the carburetor.



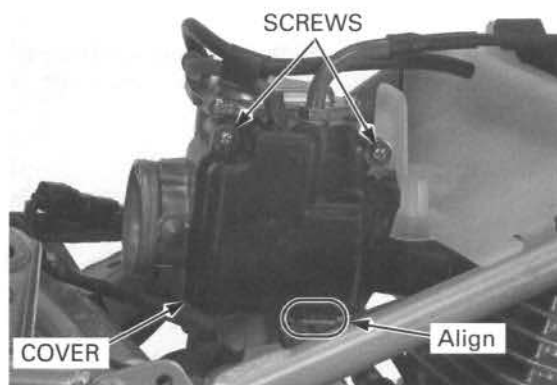
Install the carburetor into the insulator. Align the lug with the groove in the insulator and tighten the band screw.



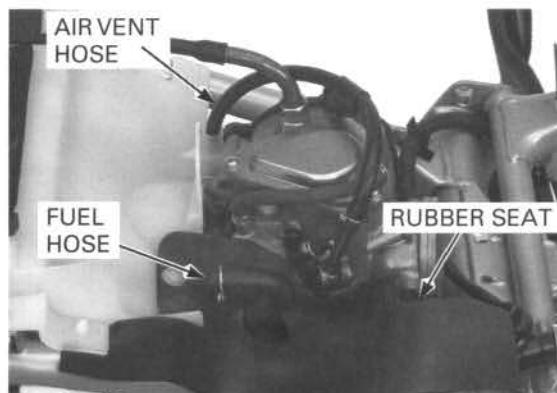
Connect the throttle cable to the throttle drum.  
Tighten the throttle cable nut.



Install the linkage cover by aligning the tab with the slit in the carburetor and secure it with the two screws.



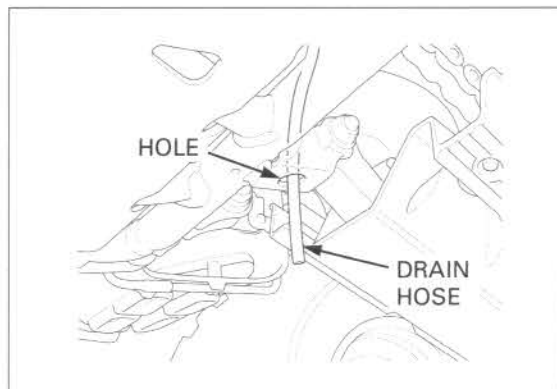
Install the air vent hose into the heat guard plate.  
Insert the fuel hose through the rubber seat and place the rubber seat in position.



*Be sure to tighten the drain screw.* Route the drain hose properly and insert it into the hole in the bottom of the frame (page 1-18).

- Install the following:
- fuel tank (page 3-6)
  - air cleaner housing (page 6-6)

- Perform the following inspection and adjustment:
- throttle operation (page 4-4)
  - pilot screw (if it was replaced; page 6-22)



# PILOT SCREW ADJUSTMENT

### IDLE DROP PROCEDURE

#### NOTE:

- The pilot screw is factory pre-set and no adjustment is necessary unless the pilot screw is replaced.
- Use a tachometer with graduations of 50 rpm ( $\text{min}^{-1}$ ) or smaller that will accurately indicate 50 rpm ( $\text{min}^{-1}$ ) 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 specification given. This is an initial setting prior to the final pilot screw adjustment.

#### TOOLS:

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

#### INITIAL OPENING: 2 turns out

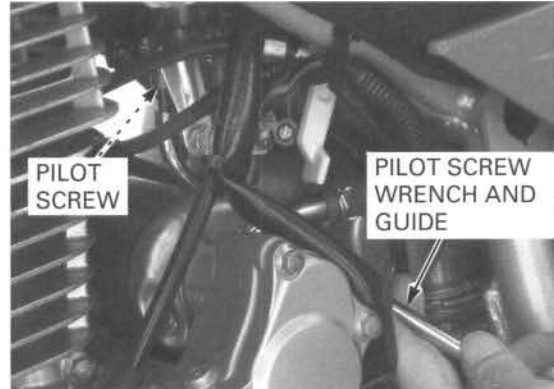
2. Warm up the engine to operating temperature. Stop and go riding for 10 minutes is sufficient.
3. Stop the engine and connect a tachometer according to its manufacturer's instructions.
4. Start the engine and adjust the idle speed with the throttle stop screw.

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

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Lightly open the throttle 2 - 3 times, readjust the idle speed with the throttle stop screw.
7. Turn the pilot screw in gradually until the engine speed drops 50 rpm ( $\text{min}^{-1}$ ).
8. Turn the pilot screw out to the final opening from the position obtained in step 7.

#### FINAL OPENING: 1 turn out

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





## HIGH ALTITUDE ADJUSTMENT

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 6,500 feet (2,000 meters), you should perform this carburetor modification.

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

This 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.

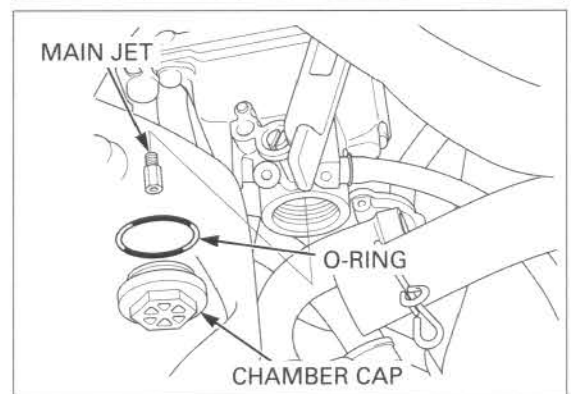


Replace the standard main jet with the high altitude type.

### HIGH ALTITUDE MAIN JET: #142

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.



## FUEL SYSTEM

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

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<sup>-1</sup>)**

### 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 5,000 feet (1,500 m) 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: #148**

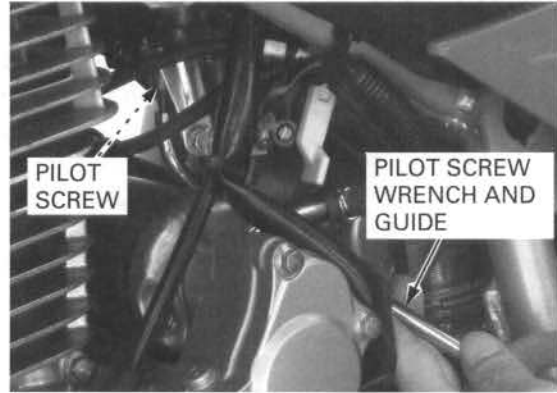
**LOW ALTITUDE PILOT SCREW OPENING:**  
1 turn out from the high altitude setting

### 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 ± 100 rpm (min<sup>-1</sup>)**



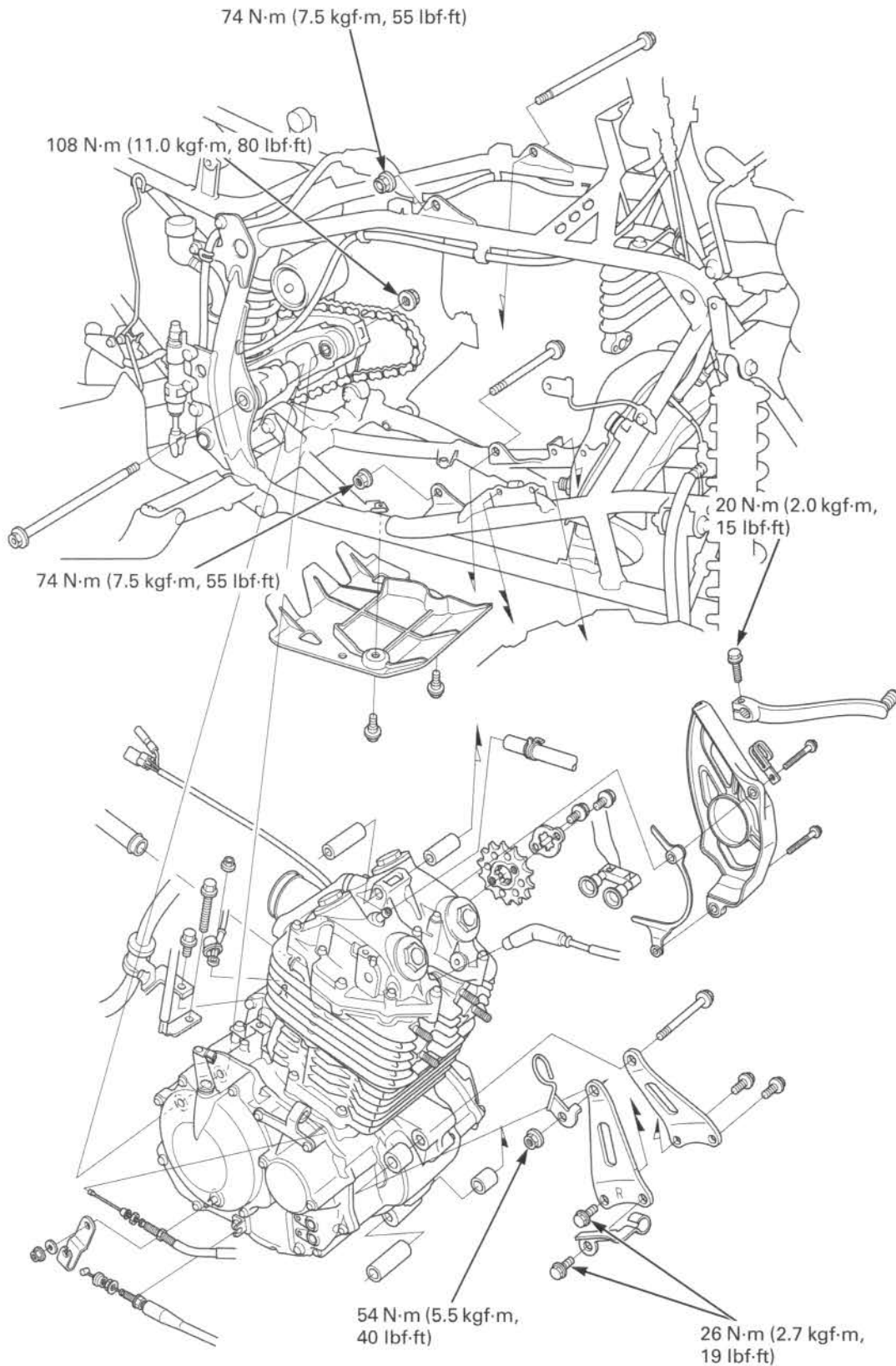
# 7. ENGINE REMOVAL/INSTALLATION

---

SYSTEM COMPONENTS .....	7-2	ENGINE REMOVAL .....	7-4
SERVICE INFORMATION .....	7-3	ENGINE INSTALLATION .....	7-8

# ENGINE REMOVAL/INSTALLATION

## SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components require engine removal for service:
  - transmission (including shift fork and shift drum; page 12-8)
  - crankshaft (page 12-16)
 Other components can be serviced with the engine installed in the frame.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		42.5 kg (93.7 lbs)
Engine oil capacity	After draining	1.8 liters (1.9 US qt, 1.6 Imp qt)
	After filter change	1.85 liters (1.95 US qt, 1.63 Imp qt)
	After disassembly	2.2 liters (2.3 US qt, 1.9 Imp qt)

### TORQUE VALUES

Upper engine hanger nut	74 N·m (7.5 kgf·m, 55 lbf·ft)
Front engine hanger plate bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)
Front engine hanger nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Lower engine hanger nut	74 N·m (7.5 kgf·m, 55 lbf·ft)
Swingarm pivot nut	108 N·m (11.0 kgf·m, 80 lbf·ft)
Gearshift pedal pinch bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)

### ENGINE REMOVAL

Drain the engine oil (page 4-11).

Remove the following:

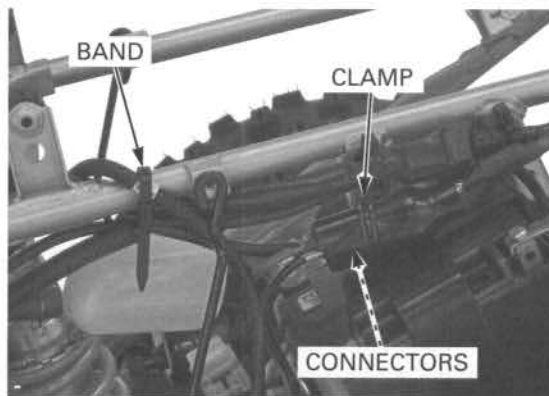
- front fenders (page 3-5)
- heat guard plate (page 3-7)
- carburetor (page 6-6)
- exhaust system (page 3-9)
- oil pipes (page 5-10)
- brake pedal (page 15-28)

Turn the axle bearing holder to obtain maximum drive chain slack (page 4-14).

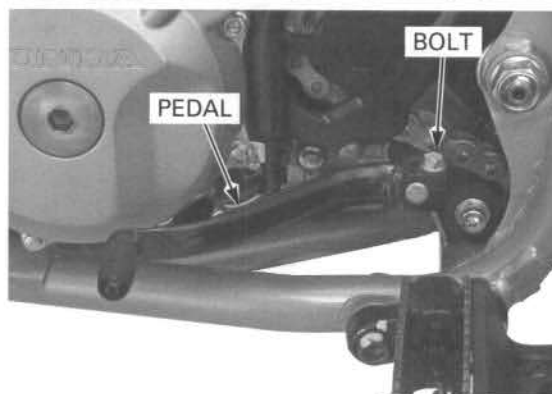
Release the connector boot from the clamp, disconnect the alternator/ignition pulse generator 4P (white) connector and exciter coil connector (black/red wire).

Remove the following:

- three wire bands

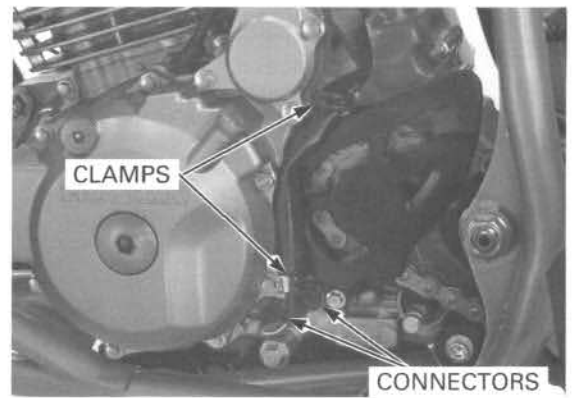


- pinch bolt
- gearshift pedal

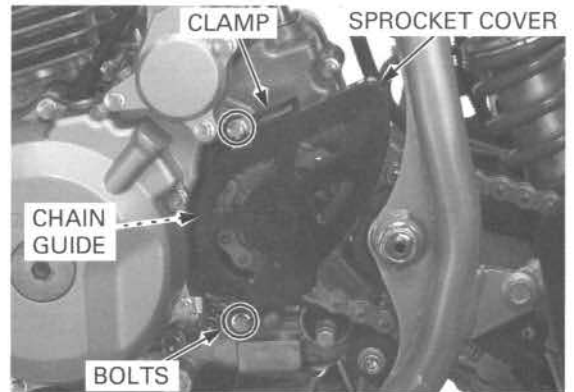


## ENGINE REMOVAL/INSTALLATION

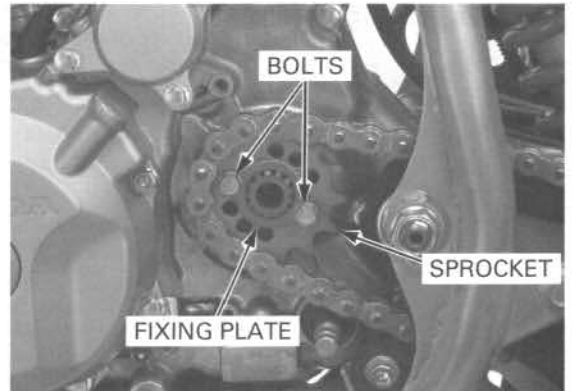
- wire harness (from the two clamps)
- connectors (disconnect from the neutral and reverse switches)



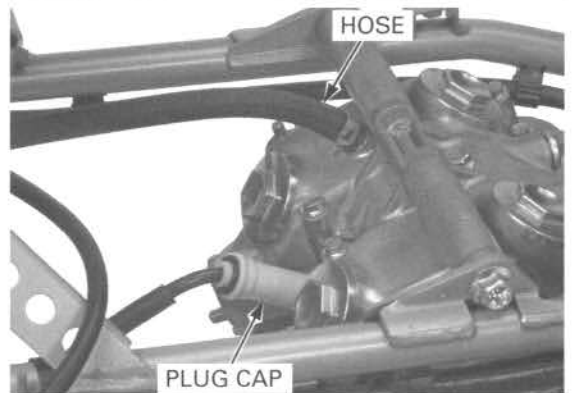
- two bolts and clamp
- sprocket cover
- guide plate



- two bolts
- fixing plate (by aligning the splines of the plate and countershaft)
- drive sprocket (pull it off the countershaft and remove from the chain)

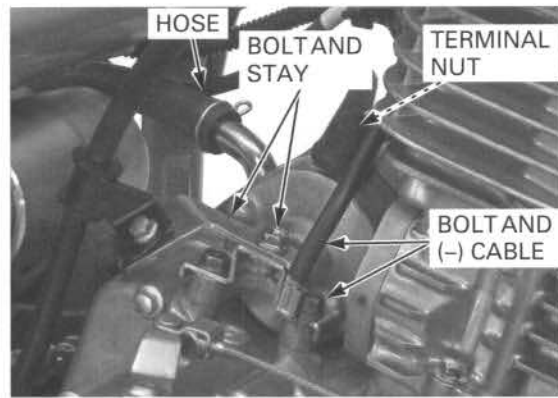


- spark plug cap
- oil tank breather hose

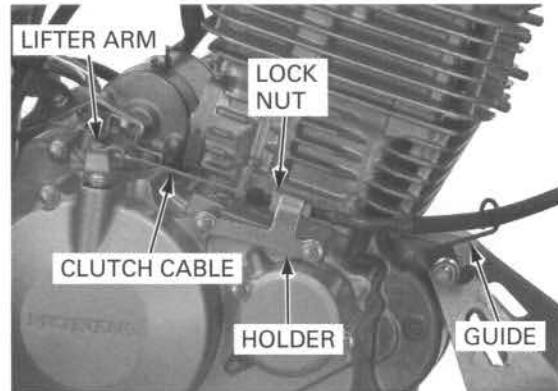


## ENGINE REMOVAL/INSTALLATION

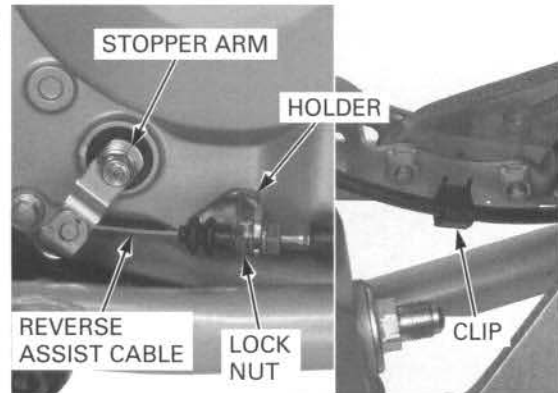
- crankcase breather hose
- bolt and brake cable stay
- bolt and negative (-) cable
- terminal nut (release rubber cap)
- starter motor cable



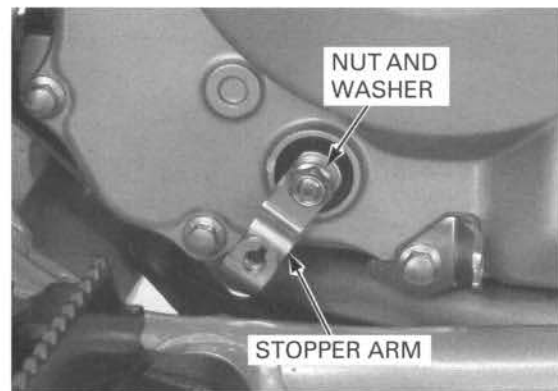
- clutch cable (loosen lock nut and disconnect the cable from the lifter arm, and remove it from the cable holder and guide)



- reverse assist cable (loosen lock nut and disconnect the cable from the stopper arm, and remove it from the cable holder and clip)



- nut and washer
- reverse stopper arm



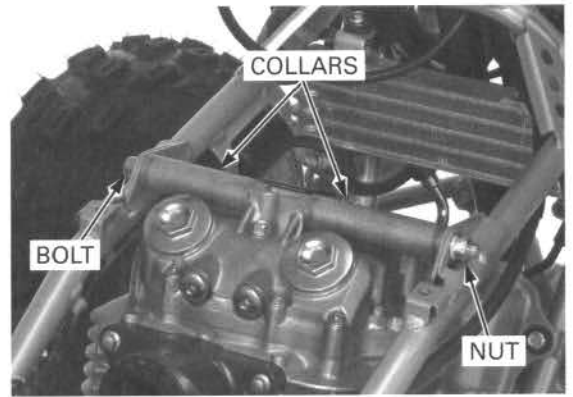


Support the engine with a floor jack or other adjustable support.

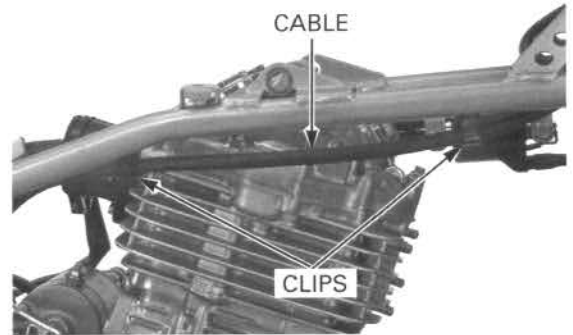
**NOTE:**

- The jack height must be continually adjusted to relieve stress for ease of bolt removal.

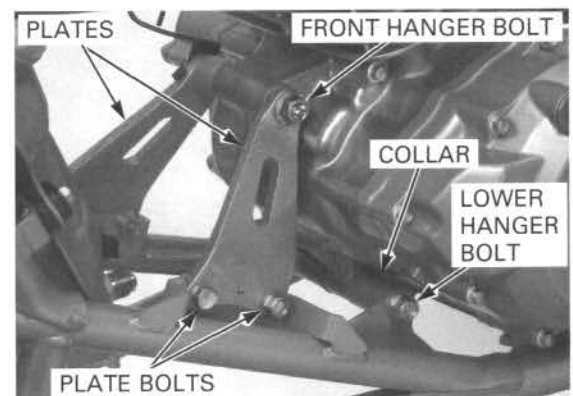
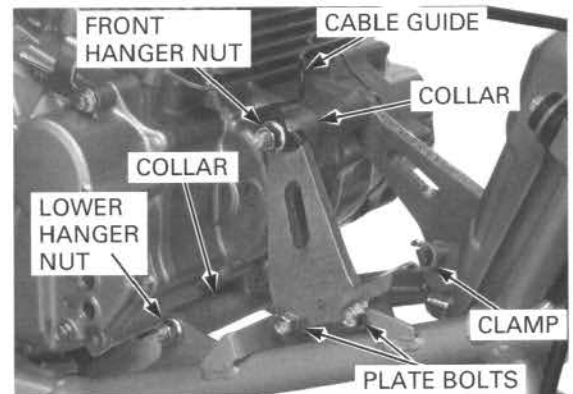
Remove the upper engine hanger nut, bolt and collars.



Release the cable clips and place the parking brake cable over the frame pipe.



- Remove the following engine mounting fasteners:
- front engine hanger nut and cable guide (being careful not to deform the guide)
  - front engine hanger bolt and collar
  - hanger plate bolts, oil pipe clamp and engine hanger plates
  - lower engine hanger nut, bolt and collars

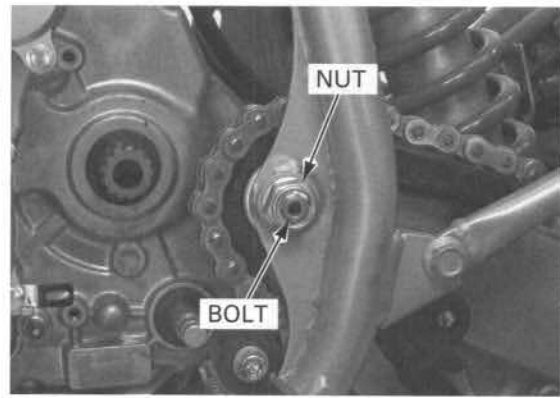


## ENGINE REMOVAL/INSTALLATION

- swingarm pivot nut and bolt

Remove the engine from the frame to the right side.

Reinstall the swingarm pivot bolt and nut so the chassis can be moved and stored safely.



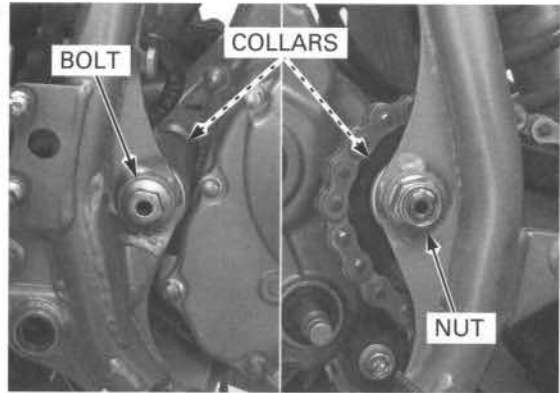
## ENGINE INSTALLATION

*During engine installation hold the engine securely and take care not to damage the frame and engine.*

Before installing the engine, make sure that the pivot collars are installed into the swingarm pivots.

Using the floor jack or other adjustable support, carefully place the engine into the frame from the right side and maneuver it into place.

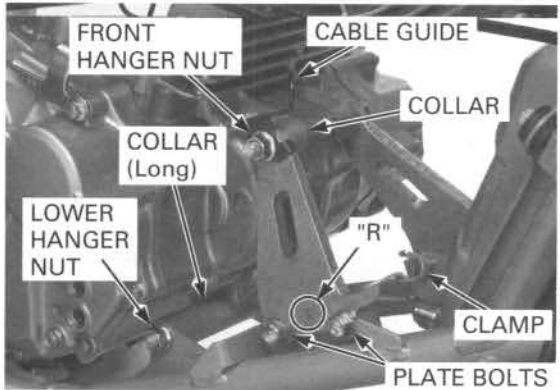
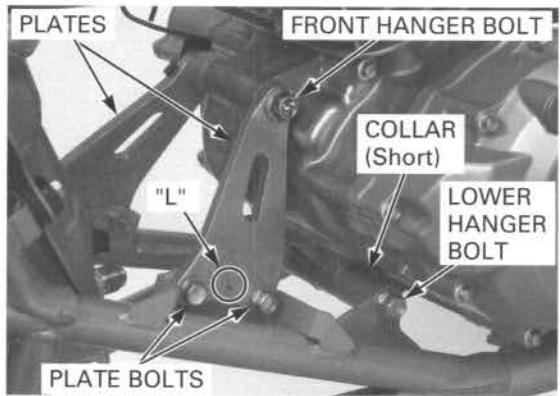
Align the bolt holes and install the swingarm pivot bolt from the right side. Install the pivot nut.



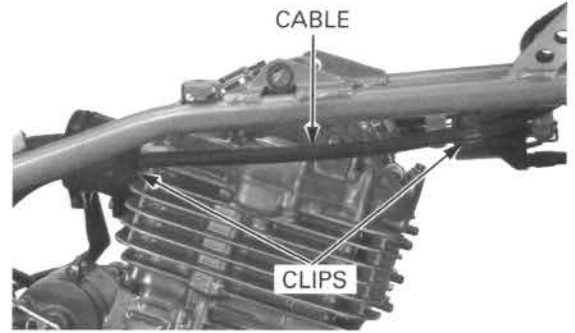
*All the engine hanger bolts are installed from the left side.*

Install the following fasteners:

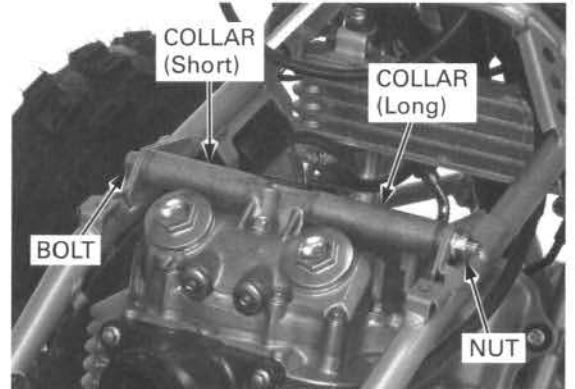
- lower engine bolt, collars (left; short/right; long) and nut
- hanger plates ("L": left side/"R": right side) with the bolts and clamp (right front side)
- front engine hanger bolt, collar (right side of the engine), cable guide and nut



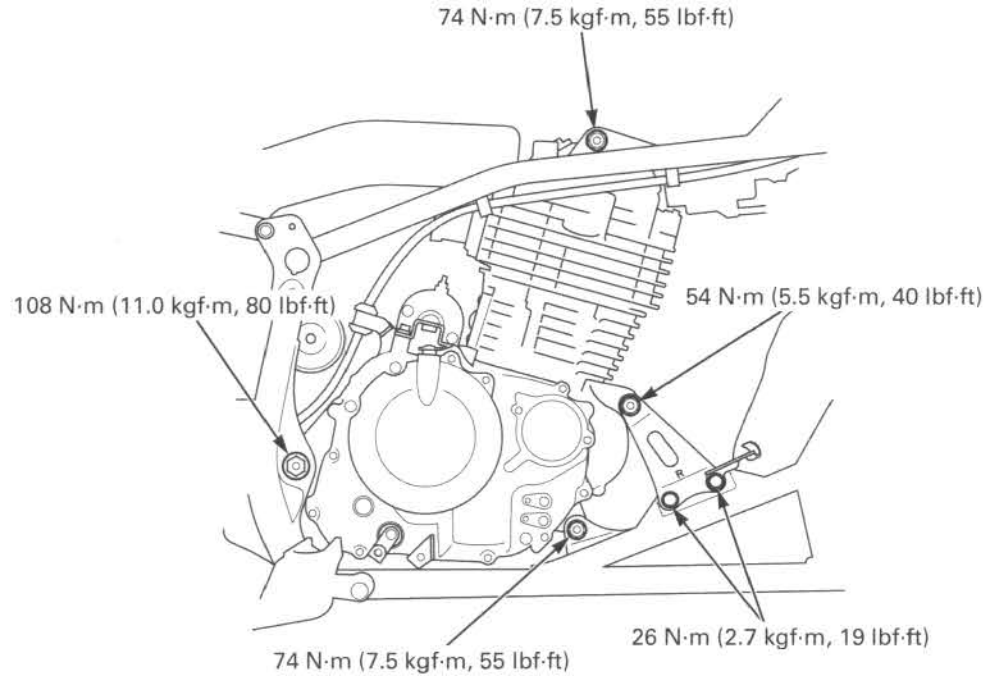
Secure the parking brake cable with the clips.



Install the upper engine hanger bolt, collars (left; short/right; long) and nut.



After installing all the mounting fasteners, tighten them to the specified torque.



## ENGINE REMOVAL/INSTALLATION

Route the wires, cables and hoses properly (page 1-18).

Install the removed parts from the engine removal procedure (page 7-4 to 7-6) in the reverse order of removal.

### TORQUE:

**Gearshift pedal: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

### NOTE:

- When installing the drive sprocket, install with the stamped "OUT" side facing out. Set the fixing plate into the countershaft groove and move it to align the bolt holes in the plate and sprocket, then install the bolts.
- When connecting the neutral "N" and reverse "R" switch connectors, connect them to the corresponding marks on the crankcase.
- When installing the gearshift pedal, align the punch marks on the pedal and spindle.

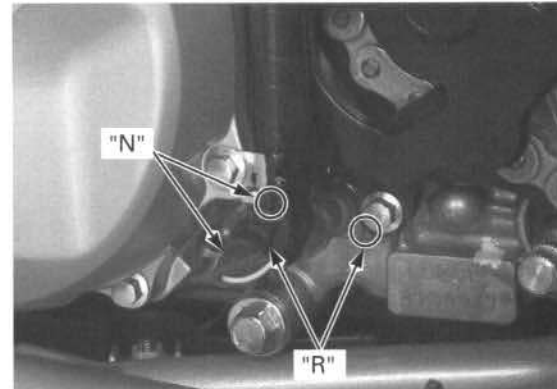
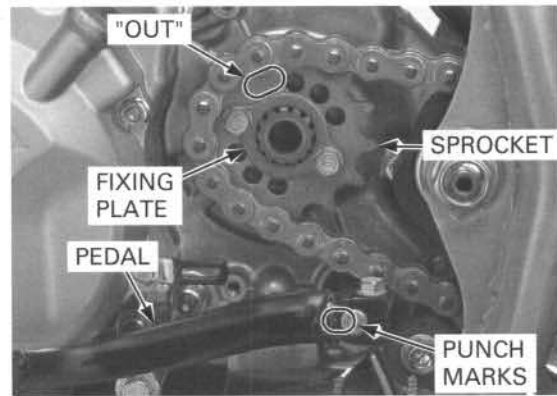
### Install the following:

- brake pedal (page 15-28)
- oil pipes (page 5-10)
- exhaust system (page 3-9)
- carburetor (page 6-20)
- heat guard plate (page 3-7)
- front fenders (page 3-5)

### Adjust the following:

- drive chain slack (page 4-14)
- clutch lever free play (page 4-23)
- reverse assist lever free play (page 4-22)

Pour the engine oil (page 4-11).

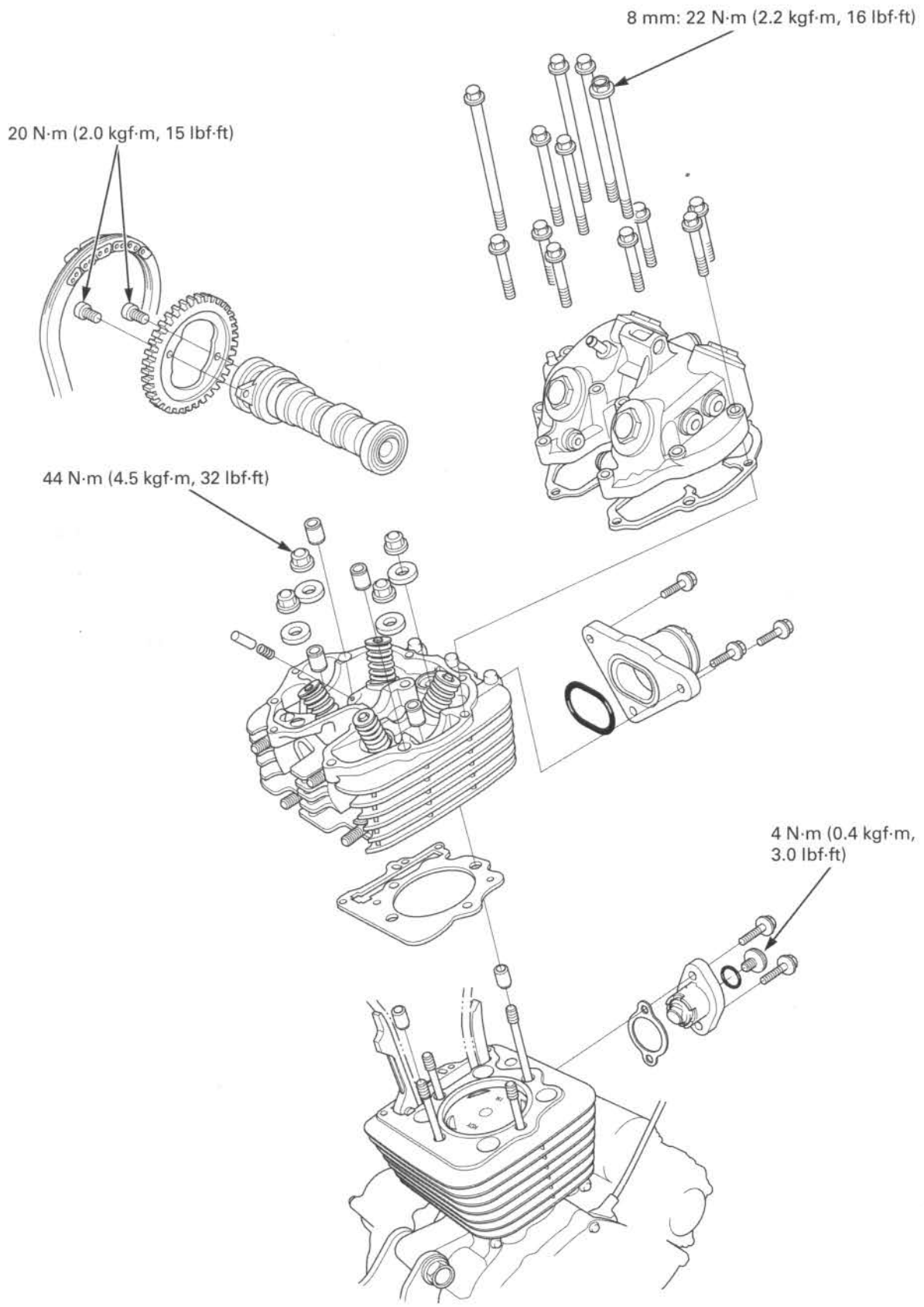


# 8. CYLINDER HEAD/VALVE

---

SYSTEM COMPONENTS .....	8-2	CYLINDER HEAD DISASSEMBLY .....	8-13
SERVICE INFORMATION .....	8-3	VALVE GUIDE REPLACEMENT .....	8-15
TROUBLESHOOTING .....	8-5	VALVE SEAT INSPECTION/REFACING .....	8-16
CYLINDER COMPRESSION.....	8-6	CYLINDER HEAD ASSEMBLY .....	8-20
CYLINDER HEAD COVER REMOVAL .....	8-6	CYLINDER HEAD INSTALLATION.....	8-21
ROCKER ARM REMOVAL .....	8-8	CAMSHAFT INSTALLATION .....	8-22
CAMSHAFT REMOVAL .....	8-9	ROCKER ARM INSTALLATION.....	8-24
CYLINDER HEAD REMOVAL .....	8-13	CYLINDER HEAD COVER INSTALLATION.....	8-25

# CYLINDER HEAD/VALVE SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- This section covers service of the camshaft, rocker arms, cylinder head and valves. These services can be done 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.
- Camshaft and rocker arm lubricating oil is fed through oil passage in the cylinder head and head cover. Clean the oil passages before assembling them.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.

### SPECIFICATIONS

Unit: mm (in)

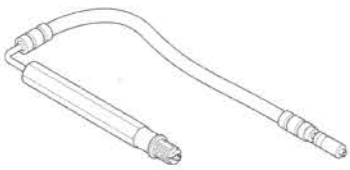
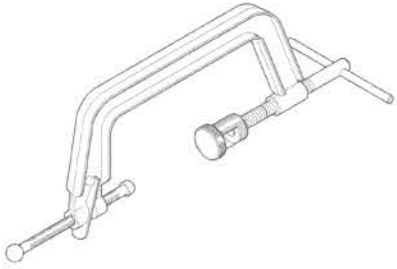







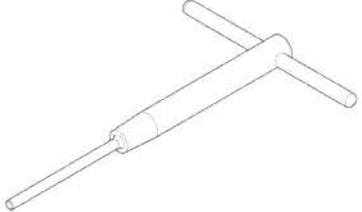

ITEM		STANDARD	SERVICE LIMIT
Cylinder compression		686 – 883 kPa (7.0 – 9.0 kgf/cm <sup>2</sup> , 100 – 128 psi)	–
Valve clearance		IN	0.10 (0.004)
		EX	0.12 (0.005)
Camshaft	Cam lobe height	IN	30.673 – 30.773 (1.2076 – 1.2115)
		EX	30.468 – 30.568 (1.1995 – 1.2035)
	Runout	–	0.03 (0.001)
Rocker arm	Arm I.D.	IN/EX	11.500 – 11.518 (0.4528 – 0.4535)
	Shaft O.D.	IN/EX	11.466 – 11.484 (0.4514 – 0.4521)
	Arm-to-shaft clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)
Sub-rocker arm	Arm I.D.	IN/EX	7.000 – 7.015 (0.2756 – 0.2762)
	Shaft O.D.	IN/EX	6.972 – 6.987 (0.2745 – 0.2751)
	Arm-to-shaft clearance	IN/EX	0.013 – 0.043 (0.0005 – 0.0017)
Valve, valve guide	Valve stem O.D.	IN	5.475 – 5.490 (0.2156 – 0.2161)
		EX	5.455 – 5.470 (0.2148 – 0.2154)
	Valve guide I.D.	IN/EX	5.500 – 5.512 (0.2165 – 0.2170)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)
		EX	0.030 – 0.057 (0.0012 – 0.0022)
Valve seat width	IN/EX	1.0– 1.1 (0.039 – 0.043)	
Valve spring	Free length	Inner	37.19 (1.464)
		Outer	44.20 (1.740)
Cylinder head warpage		–	0.10 (0.004)

### TORQUE VALUES

Cylinder head nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	Apply engine oil to the threads and seating surface.
Cam sprocket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads.
Rocker arm shaft	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.
Intake sub-rocker arm shaft	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.
Exhaust sub-rocker arm shaft	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.
Cylinder head cover bolt (8 mm)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Cam tensioner lifter plug screw	4 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Upper engine hanger nut	74 N·m (7.5 kgf·m, 55 lbf·ft)	

# CYLINDER HEAD/VALVE

## TOOLS

<p>Compression gauge attachment 07908-KK60000</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Valve spring compressor 07757-0010000</p> 	<p>Valve guide driver, 5.5 mm 07742-0010100</p> 
<p>Valve guide reamer, 5.5 mm 07984-2000001</p>  <p>or 07984-200000D (U.S.A. only)</p>	<p>Valve seat cutter, 35 mm (45° IN) 07780-0010400</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Valve seat cutter, 29 mm (45° EX) 07780-0010300</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Flat cutter, 35 mm (32° IN) 07780-0012300</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Flat cutter, 30 mm (32° EX) 07780-0012200</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Interior cutter, 30 mm (60° IN/EX) 07780-0014000</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Cutter holder, 5.5 mm 07781-0010101</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Cam chain tensioner holder 070MG-0010100</p>  <p>or 07ZMG-MCAA400 (U.S.A. only)</p>	



## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems 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 white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring (page 9-2).

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

- Valves
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Weak 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 problem (page 9-3)

### Compression too high

- Excessive carbon build-up on piston head or combustion chamber
- Worn or damaged decompressor system

### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 9-3)

### Excessive noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn rocker arm and/or shaft
- Worn rocker arm follower and valve stem end
- Worn cam sprocket teeth
- Worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 9-3)

### Rough idle

- Low cylinder compression

## CYLINDER COMPRESSION

Warm the engine to normal operating temperature.

Stop the engine.

Remove the spark plug (page 4-7).

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

**TOOL:**

**Compression gauge attachment** 07908-KK60000 or equivalent commercially available in U.S.A.

Shift the transmission into neutral.

Push the choke lever down fully (open).

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:**

**686 – 883 kPa (7.0 – 9.0 kgf/cm<sup>2</sup>, 100 – 128 psi)**

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

High compression can be caused by:

- carbon deposits in combustion chamber or on piston head

*The cylinder compression specification is comparatively low because the camshaft has a decompression device installed.*



## CYLINDER HEAD COVER REMOVAL

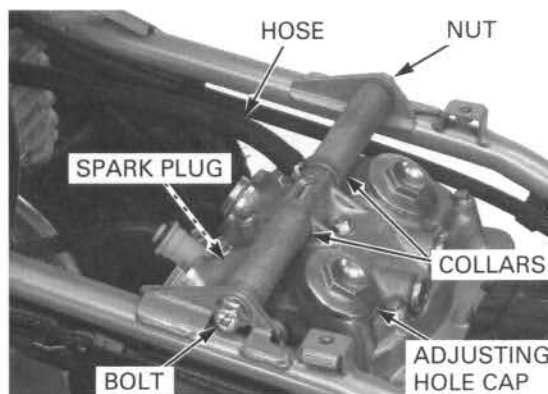
Remove the following:

- heat guard plate (page 3-7)
- carburetor (page 6-6)
- spark plug (page 4-7)

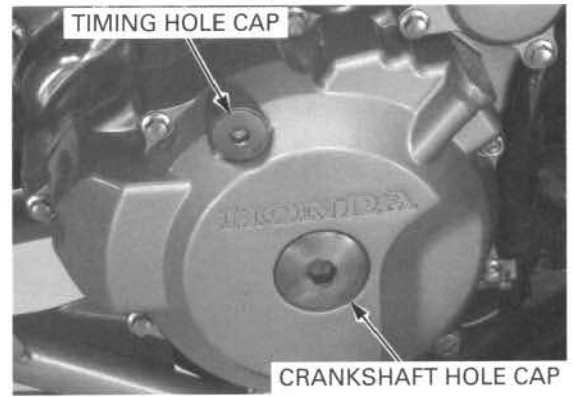
Disconnect the oil tank breather hose.

Remove the engine hanger nut, bolt and collars.

Remove the valve adjusting hole caps.



Remove the timing hole and crankshaft hole caps.

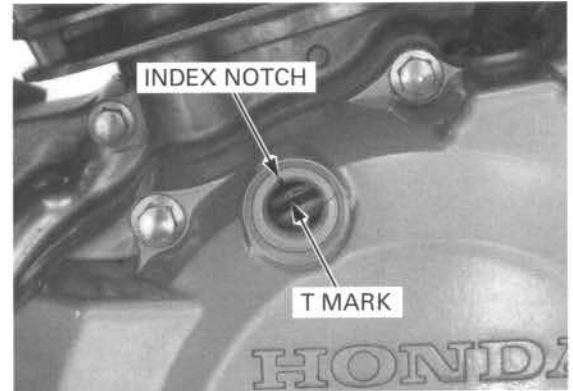


*The crankshaft should be turned counterclockwise. This must be done to prevent the one-way decompressor system from functioning.*

Rotate the crankshaft counterclockwise and align the T mark on the flywheel with the index notch in the crankcase cover.

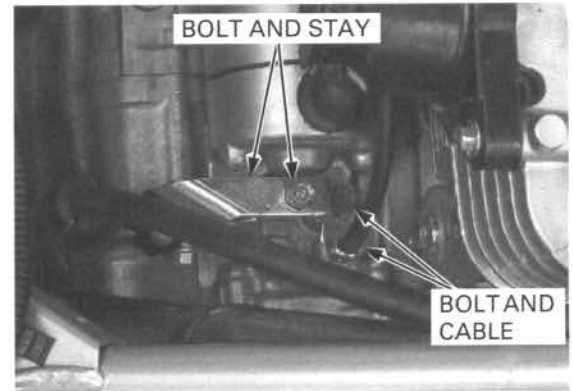
Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

This position can be confirmed by checking for slack in the rocker arms. If there is no slack, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and match up the T mark again.



Remove the bolt and brake cable stay.

Disconnect the negative (-) cable by removing the stator motor mounting bolt.



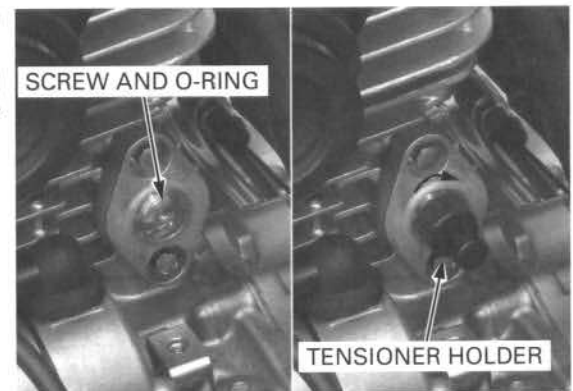
Remove the plug screw and O-ring from the cam chain tensioner lifter.

Turn the tensioner lifter shaft clockwise fully and secure it with the special tool to loosen the tensioner lifter.

**TOOL:**

Cam chain tensioner holder 070MG-0010100 or 07ZMG-MCAA400 (U.S.A. only)

For tensioner lifter service, see page 9-4.

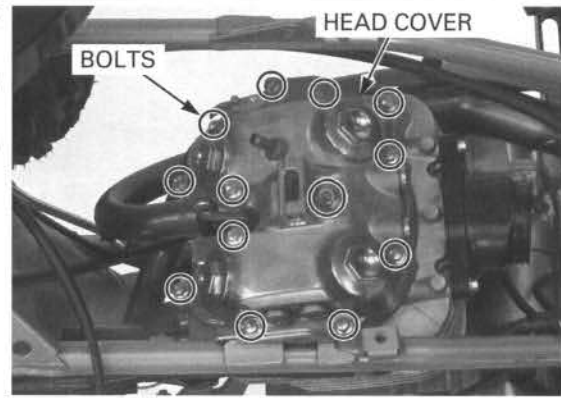


## CYLINDER HEAD/VALVE

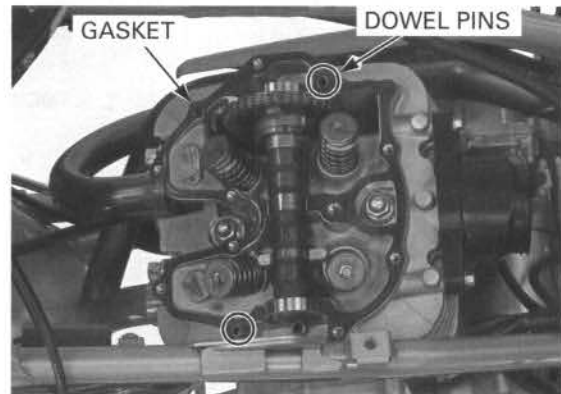
Wrap the cylinder head with shop towels to prevent spilling engine oil.

Loosen the twelve 6-mm bolts and 8-mm bolt in a crisscross pattern in several steps.

Remove the head cover bolts and the cylinder head cover.



Remove the gasket and the dowel pins.



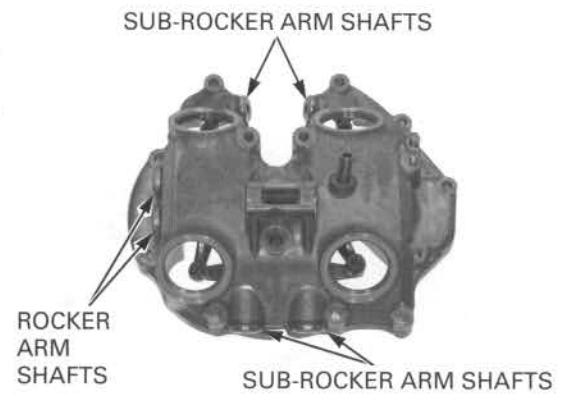
## ROCKER ARM REMOVAL

Remove the cylinder head cover (page 8-6).

*Do not clamp the mating surface.*

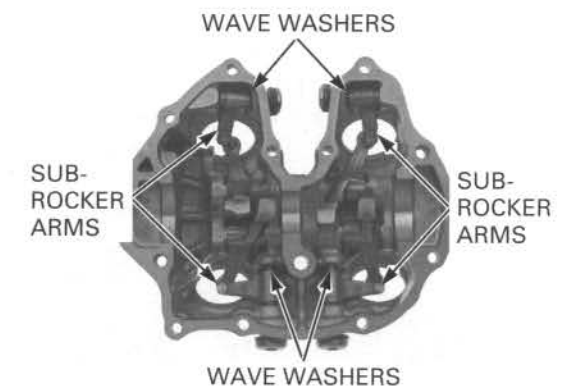
Hold the head cover in a vise with soft jaws or shop towels.

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

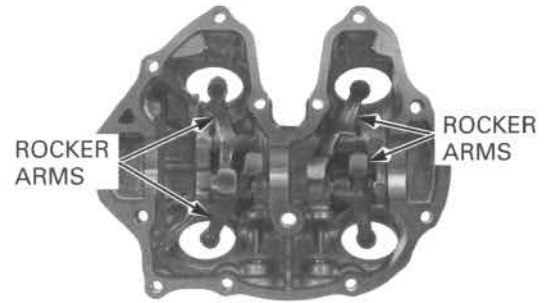


Remove the following:

- sub-rocker arm shafts and sealing washers
- sub-rocker arms
- wave washers



- rocker arm shafts and sealing washers
- rocker arms



**INSPECTION**

Inspect the sliding surfaces of the rocker arms and shaft for wear or damage. If the slipper surface of the rocker arm is excessive worn or damaged, inspect the cam lobe and oil passages.

Measure each shaft O.D. at the rocker arm sliding areas.

**SERVICE LIMITS:**

Rocker arm shaft: 11.41 mm (0.449 in)

Sub-rocker arm shaft: 6.92 mm (0.272 in)

Measure each rocker arm I.D.

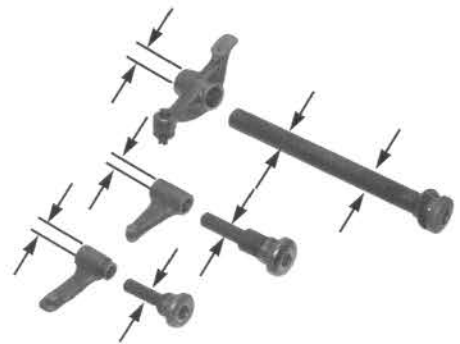
**SERVICE LIMITS:**

Rocker arm: 11.53 mm (0.454 in)

Sub-rocker arm: 7.05 mm (0.278 in)

Calculate the rocker arm-to-shaft clearance.

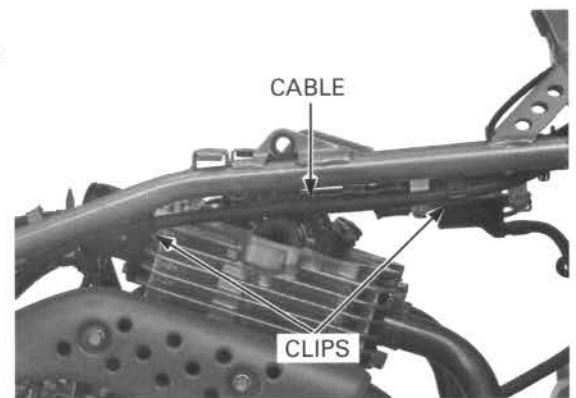
**SERVICE LIMIT: 0.10 mm (0.004 in)**



**CAMSHAFT REMOVAL**

Remove the cylinder head cover (page 8-6).

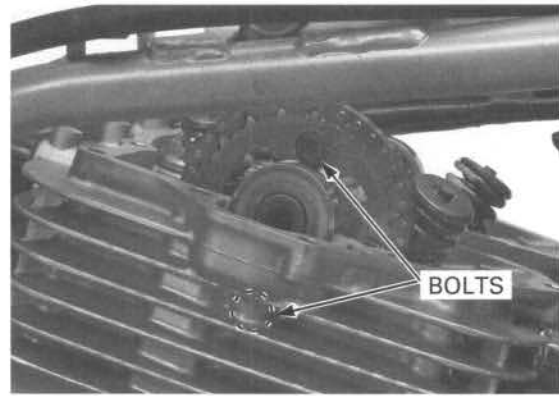
Release the cable clips and place the parking brake cable over the frame pipe.



## CYLINDER HEAD/VALVE

Be careful not to let the bolts fall into the crankcase.

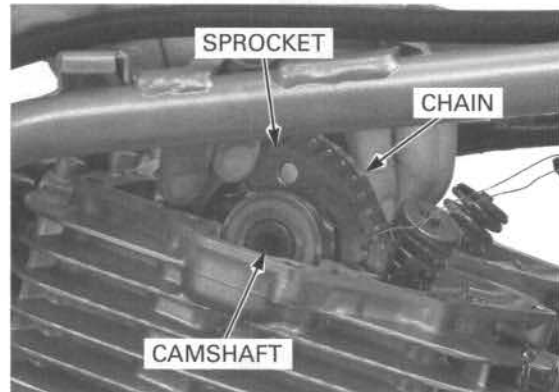
Remove the cam sprocket bolt.  
Rotate the crankshaft counterclockwise one turn and remove the other cam sprocket bolt.



Remove the cam sprocket off the camshaft flange. Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

Lift the camshaft and remove it.

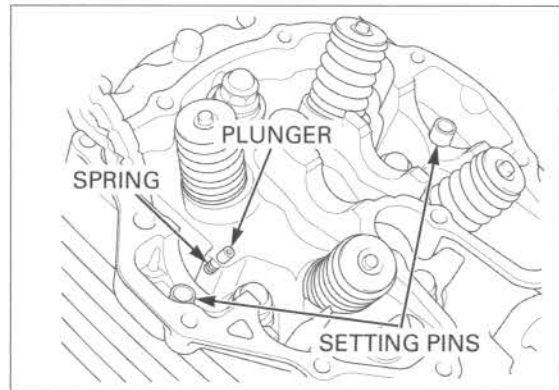
Remove the cam sprocket from the cam chain.



Be careful not to drop them into the crankcase.

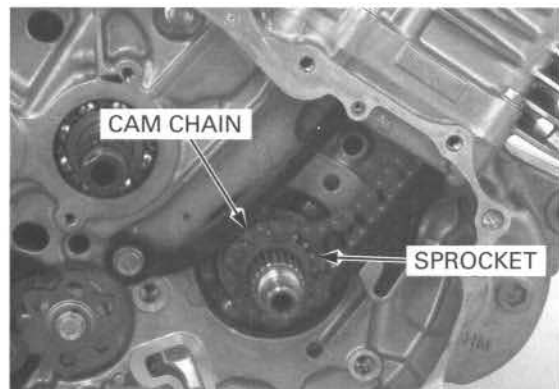
Remove the following:

- decompressor plunger
- plunger spring
- camshaft setting pins



To replace the cam chain and timing sprocket, remove the following:

- oil pump (page 5-4)
- primary drive gear (page 10-13)



**INSPECTION**

**CAMSHAFT**

Check the cam sprocket for wear or damage.

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

Check the oil holes in the camshaft for debris.

Turn the camshaft bearings with your finger. The bearings should turn smoothly and quietly.



Measure each cam lobe height.

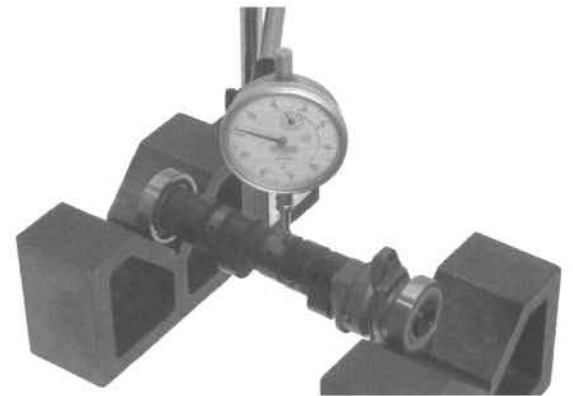
**SERVICE LIMITS: IN: 30.57 mm (1.204 in)  
EX: 30.37 mm (1.196 in)**

If the cam lobe is damaged or excessively worn, inspect the oil passage and rocker arm.



Measure the camshaft runout using a dial indicator.

**SERVICE LIMIT: 0.03 mm (0.001 in)**



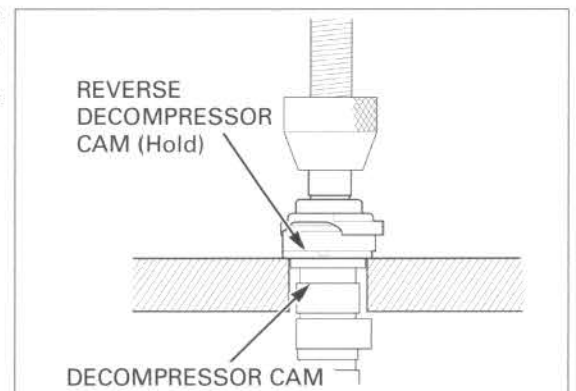
**DECOMPRESSOR DISASSEMBLY**

*Take care not to contact the support blocks against the cam lobe or decompressor cam to avoid damaging them when pressing.*

Set the camshaft assembly onto the hydraulic press by supporting the reverse decompressor cam flange.

Do not support the assembly by the cam sprocket flange. It will break or crack.

Press the camshaft out of the cam sprocket flange.



## CYLINDER HEAD/VALVE

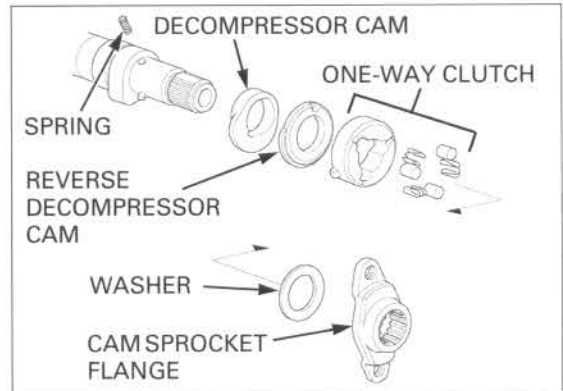
Remove the following:

- thrust washer
- one-way clutch (clutch outer, rollers and springs)
- reverse decompressor cam
- decompressor cam
- cam spring

### INSPECTION

Check the one-way clutch outer, rollers and springs for wear or damage.

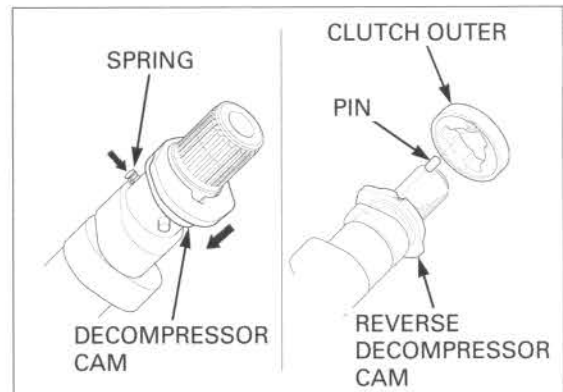
Check each cam for wear or damage.



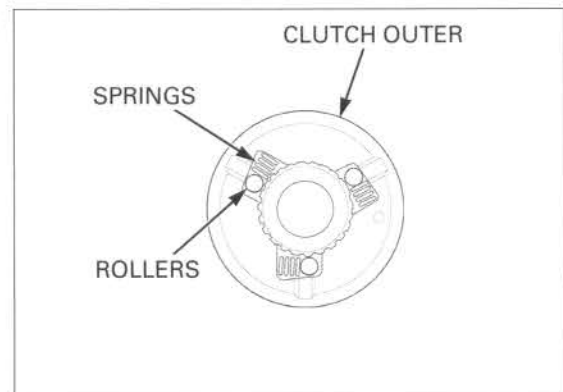
Lubricate the cams, one-way clutch and washer.

Install the cam spring into the camshaft hole, then install the decompressor cam while pressing the spring.

Assemble the reverse decompressor cam and clutch outer with the stopper pin, and install them onto the camshaft.



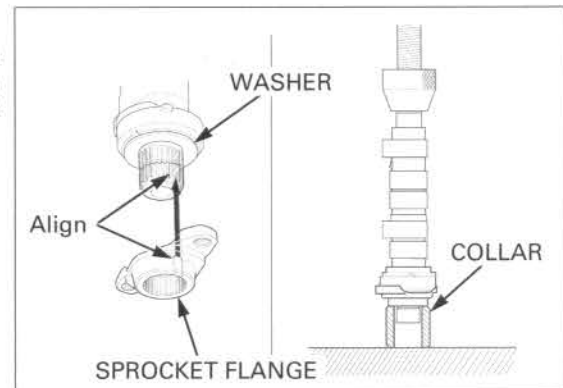
Install the clutch springs and rollers into the clutch outer grooves as shown.



Install the thrust washer onto the clutch outer.

*Do not support the flange section.*

Support the center of the sprocket flange using a suitable collar (I.D. 19 mm), press the camshaft into the sprocket flange by aligning the wide tooth with the wide groove.





## CYLINDER HEAD REMOVAL

Remove the following:

- exhaust system (page 3-9)
- camshaft (page 8-9)

Tape the frame pipe around the cylinder head beforehand for frame protection.

Remove the following:

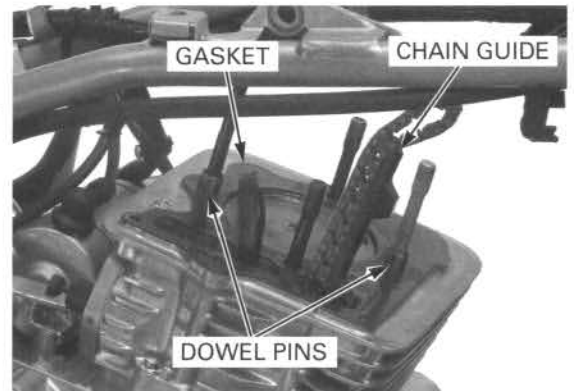
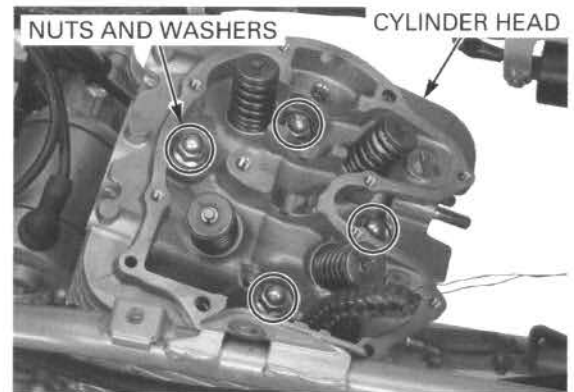
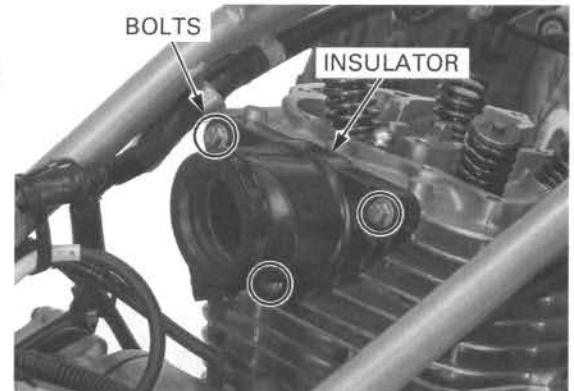
- three bolts
- carburetor insulator
- O-ring

*Take care not to drop the nuts and washers into the crankcase.*

- four cap nuts and washers
- cylinder head

- gasket
- dowel pins
- cam chain guide

Check the chain guide for excessive wear or damage.



## CYLINDER HEAD DISASSEMBLY

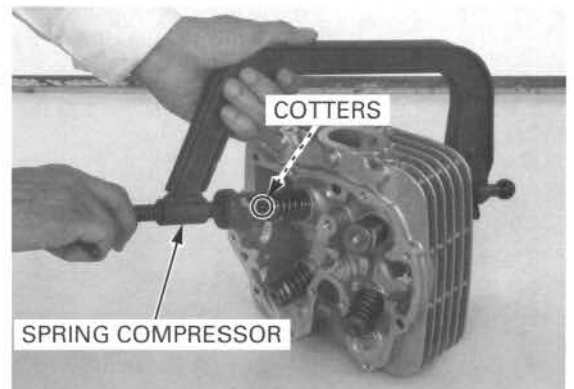
Remove the cylinder head (page 8-13).

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

Remove the valve spring cotters using the spring compressor.

**TOOL:**

**Valve spring compressor      07757-0010000**

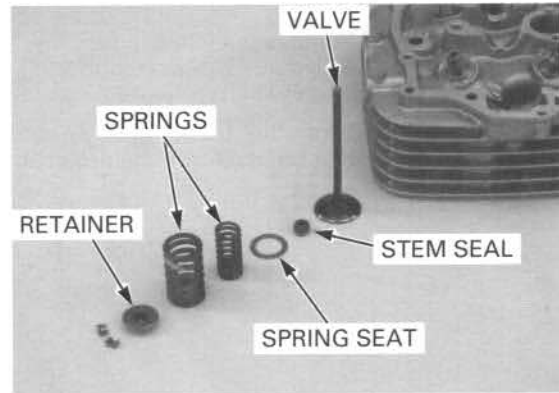


## CYLINDER HEAD/VALVE

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

Remove the following:

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



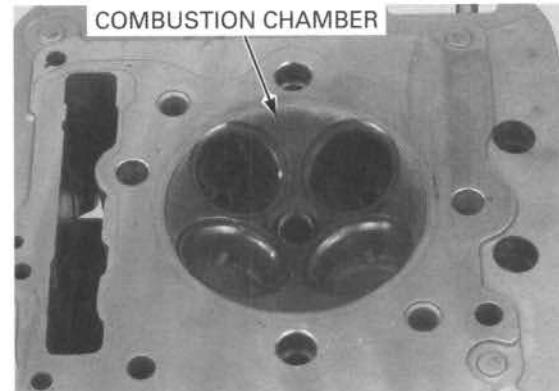
### INSPECTION

#### CYLINDER HEAD

Be careful not to damage the valve seat and gasket surfaces.

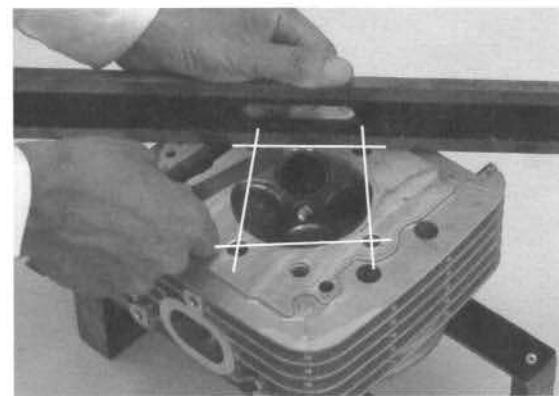
Remove the carbon deposits from the combustion chamber.

Check the spark plug hole and valve areas for cracks.



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

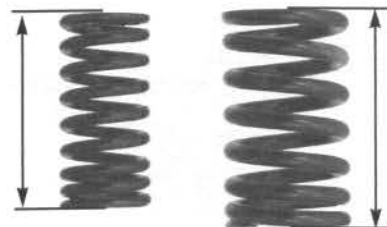
**SERVICE LIMIT: 0.10 mm (0.004 in)**



#### VALVE SPRING

Check the valve springs for fatigue or damage. Measure the valve spring free length.

**SERVICE LIMITS: IN/EX: Inner: 36.3 mm (1.43 in)  
Outer: 43.1 mm (1.70 in)**



**VALVE/VALVE GUIDE**

Check that 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: 5.46 mm (0.215 in)**  
**EX: 5.44 mm (0.214 in)**



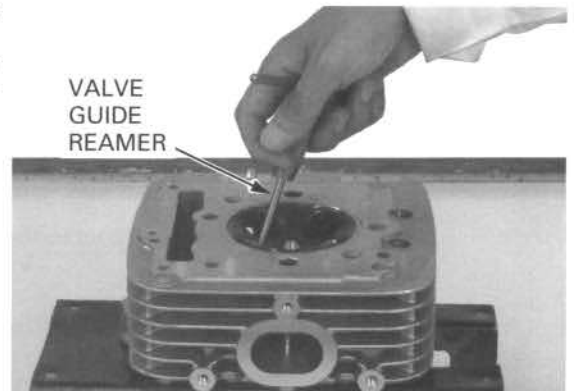
Ream the guides to remove any carbon build-up before measuring the guide.

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

**TOOL:**

Valve guide reamer, 5.5 mm

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



VALVE  
GUIDE  
REAMER

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

**SERVICE LIMIT: IN/EX: 5.52 mm (0.217 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)**

*Inspect and reface the valve seats whenever the valve guides are replaced (page 8-16).*

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.



VALVE GUIDE

**VALVE GUIDE REPLACEMENT**

Mark new valve guides at the specified height indicated on the next page, using a marker.

Chill the new valve guides in a freezer for about an hour.

*Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head.*

Heat the cylinder head to 130°C–140°C (275°F–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 warpage.*

## CYLINDER HEAD/VALVE

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

**TOOL:**

Valve guide driver, 5.5 mm 07742-0010100



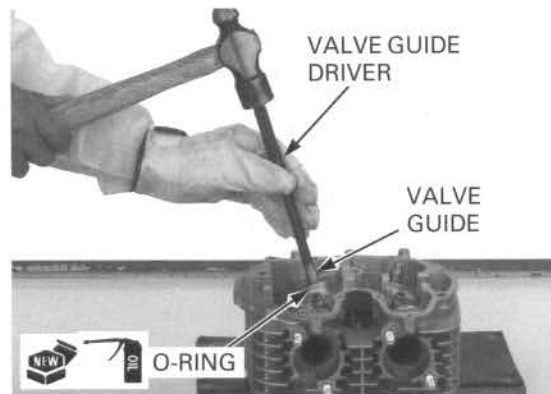
Remove the new valve guides from the freezer. Coat new O-rings with engine oil and install them onto the valve guides.

While the cylinder head is still heated, drive each valve guide into the cylinder head from the camshaft side until it is fully seated.

**TOOL:**

Valve guide driver, 5.5 mm 07742-0010100

Let the cylinder head cool to room temperature.



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

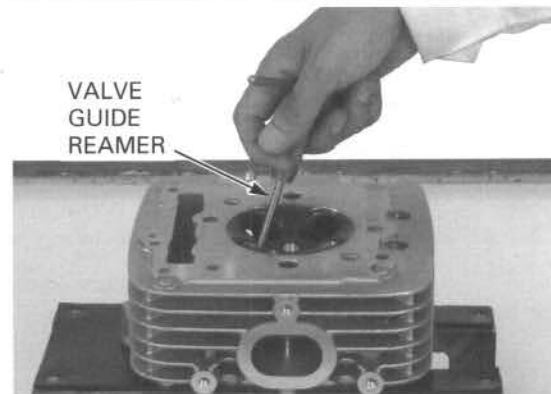
Ream the new valve guides.

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)

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat (page 8-16).

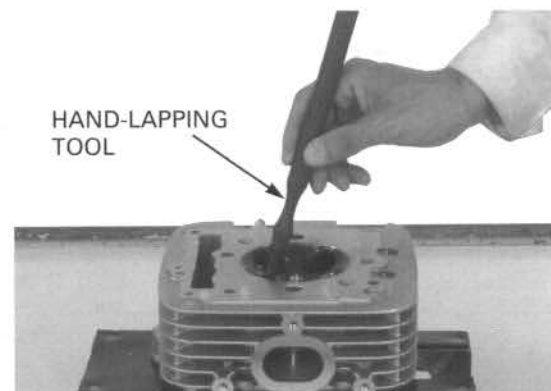


## VALVE SEAT INSPECTION/REFACING

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

Apply a light coat 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.

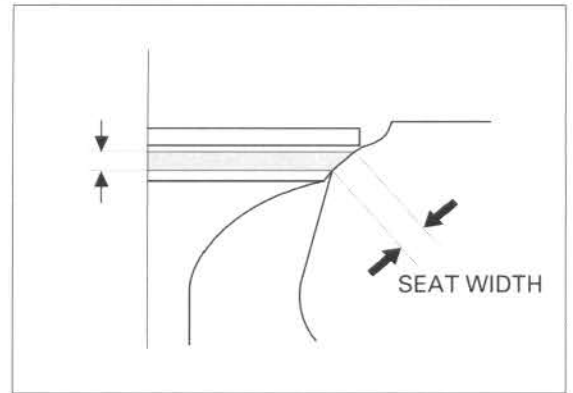


The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

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.

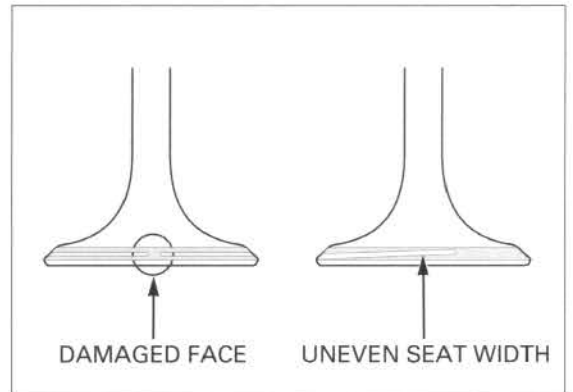
**STANDARD: 1.0 – 1.1 mm (0.039 – 0.043 in)**  
**SERVICE LIMIT: 2.0 mm (0.08 in)**

If the seat width is not within specification, reface the valve seat.

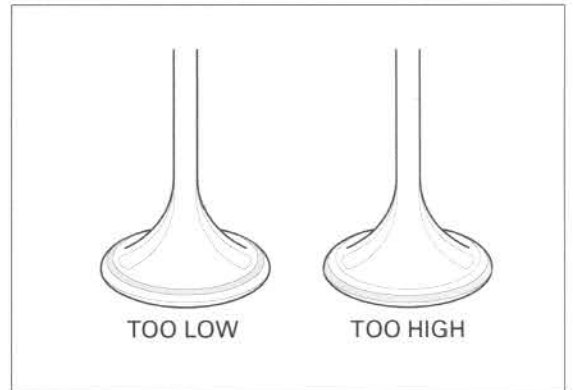


Inspect the valve seat face for:

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



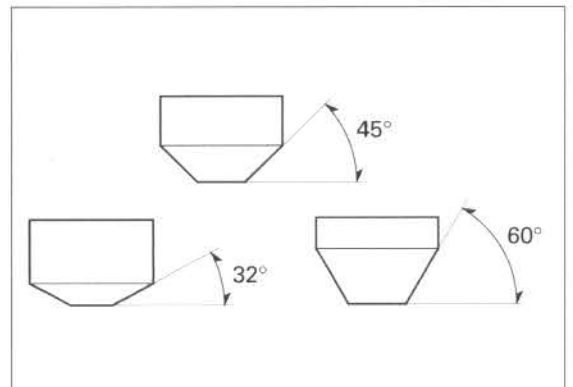
- Contact area (too high or too low)
  - Reface the valve seat.



**REFACING**

Follow the refacing manufacturer's operating instructions.

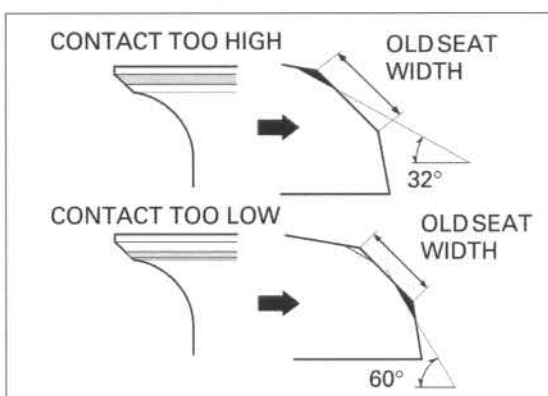
Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.



## CYLINDER HEAD/VALVE

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

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



*Reface the seat with a 45° cutter whenever a valve guide is replaced.*

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

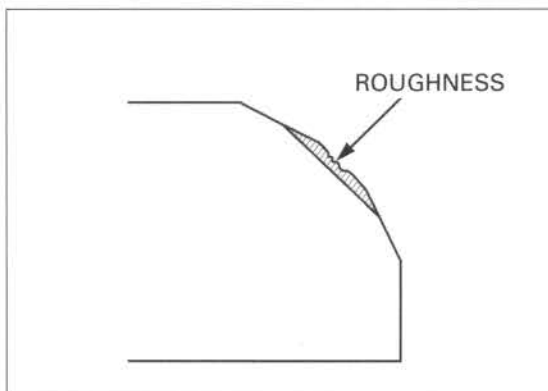
### TOOLS:

Seat cutter, 35 mm (45° IN) 07780-0010400

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

Cutter holder, 5.5 mm 07781-0010101

or equivalent commercially available in U.S.A.



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

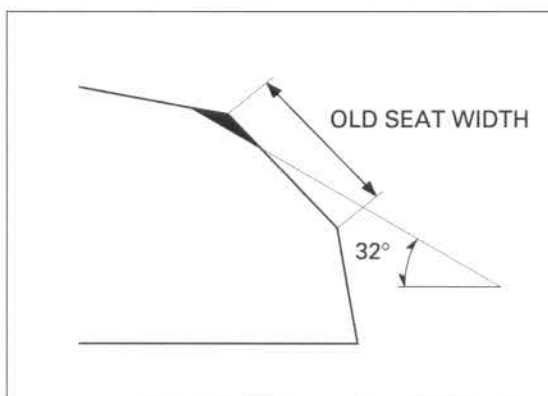
### TOOLS:

Flat cutter, 35 mm (32° IN) 07780-0012300

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

Cutter holder, 5.5 mm 07781-0010101

or equivalent commercially available in U.S.A.



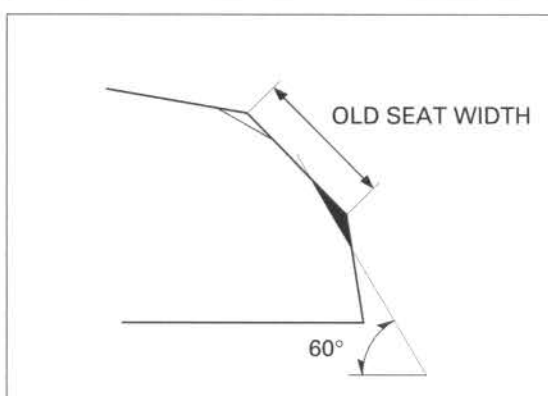
Using a 60° interior cutter, remove 1/4 of the existing valve seat material.

### TOOLS:

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

Cutter holder, 5.5 mm 07781-0010101

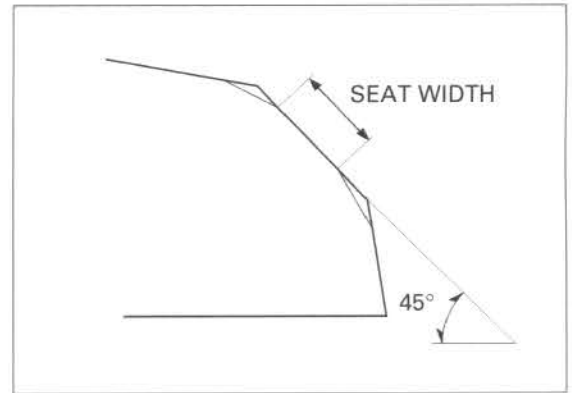
or equivalent commercially available in U.S.A.



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

**VALVE SEAT WIDTH: 1.0 – 1.1 mm (0.039 – 0.043 in)**

Make sure that all pitting and irregularities are removed.

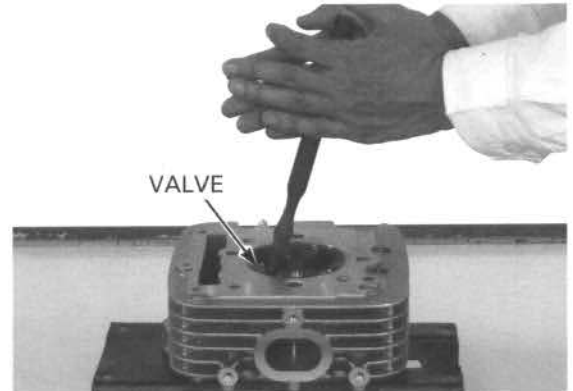


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

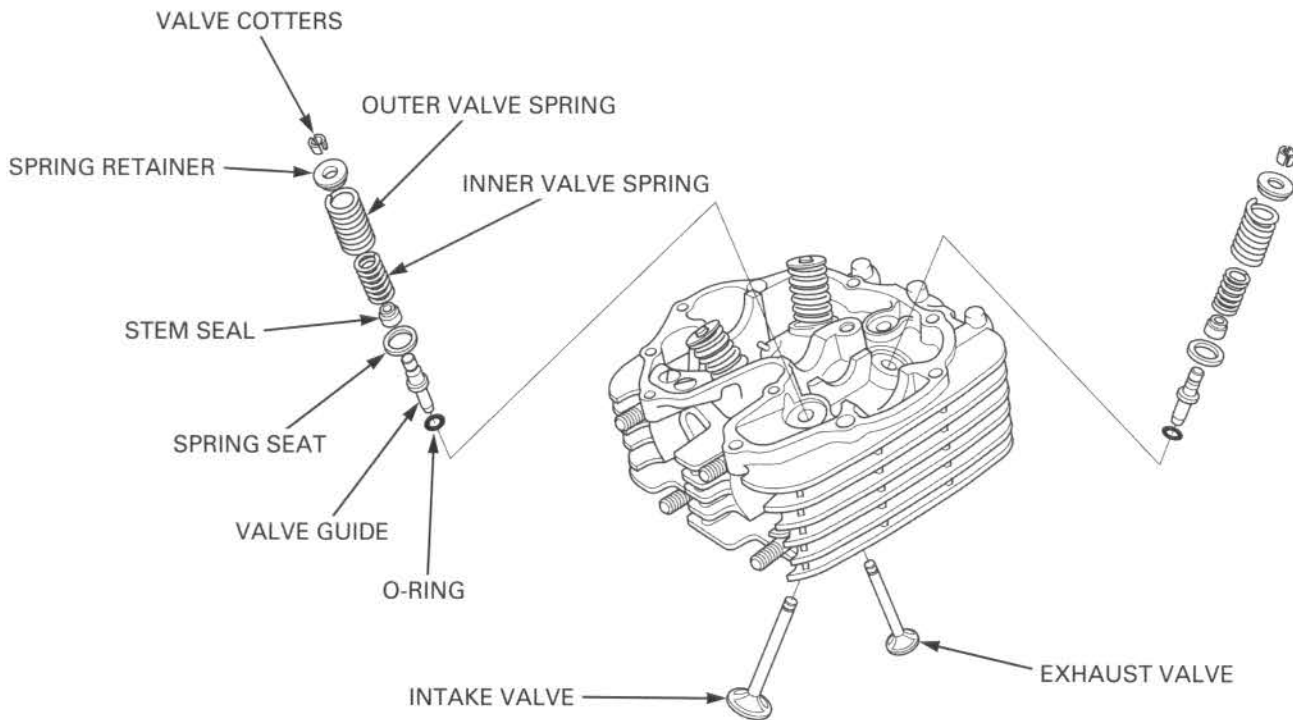
**NOTE:**

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of the lapping tool frequently to prevent uneven seat wear.
- Do not allow lapping compound to enter the guides.

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

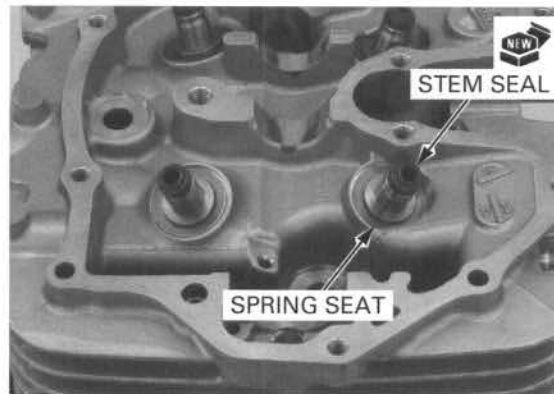


# CYLINDER HEAD ASSEMBLY



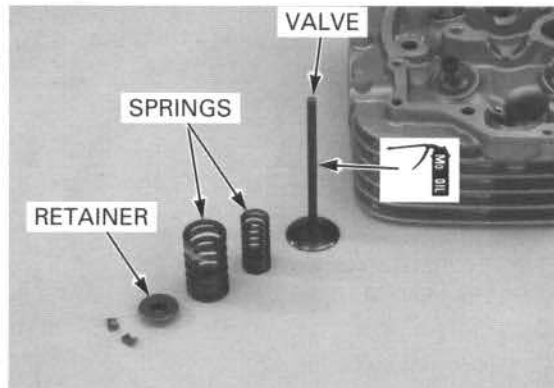
Blow through the oil passage in the cylinder head with compressed air.

Install the spring seats and new stem seals.



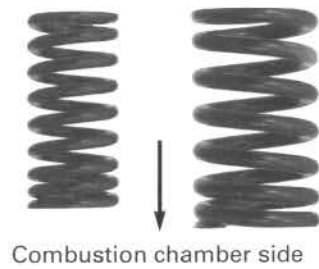
Lubricate the valve stem sliding surface with molybdenum oil solution.

Insert the valve into the guide while turning it slowly to avoid damaging to the stem seal.





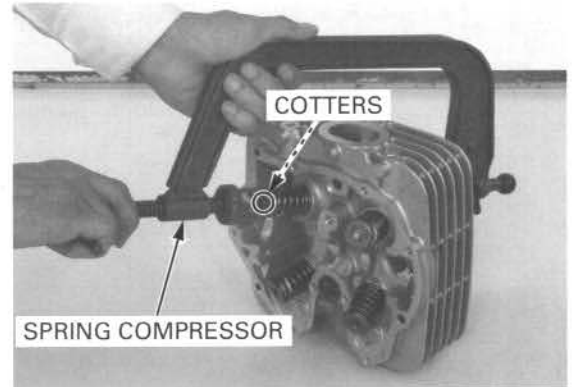
Install the inner and outer valve springs with the tightly wound coils facing the combustion chamber.  
Install the spring retainer.



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

Install the valve spring cotters using the valve spring compressor.

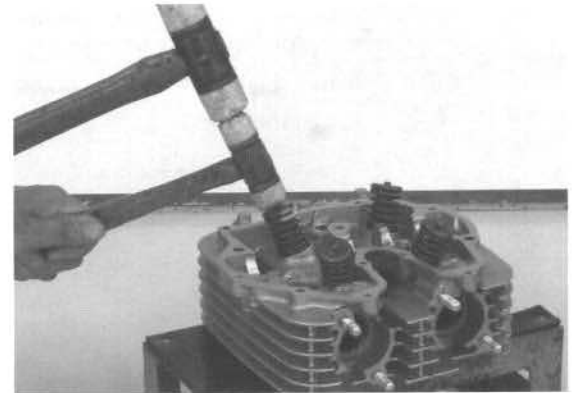
**TOOLS:**  
Valve spring compressor      07757-0010000



*Support the cylinder head so the valve heads will not contact anything that cause damage.*

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

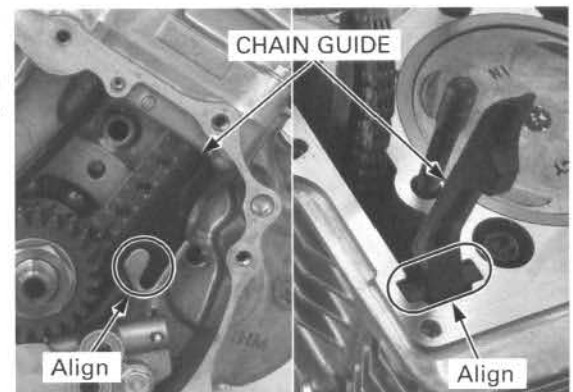
Install the cylinder head (page 8-21).



## CYLINDER HEAD INSTALLATION

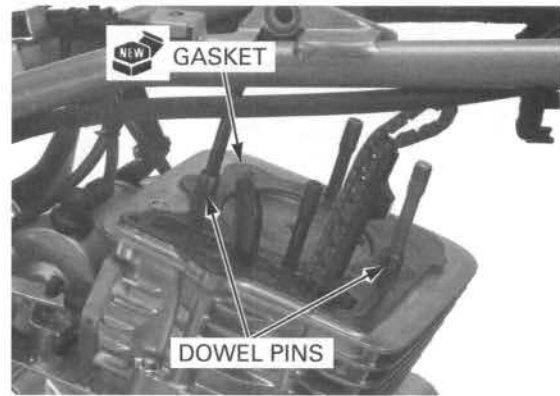
Clean the gasket mating surfaces of the cylinder and cylinder head, being careful not to damage them.

Install the cam chain guide by aligning the guide end with the groove in the crankcase and the bosses with the grooves in the cylinder.



## CYLINDER HEAD/VALVE

Install the two dowel pins and a new gasket.



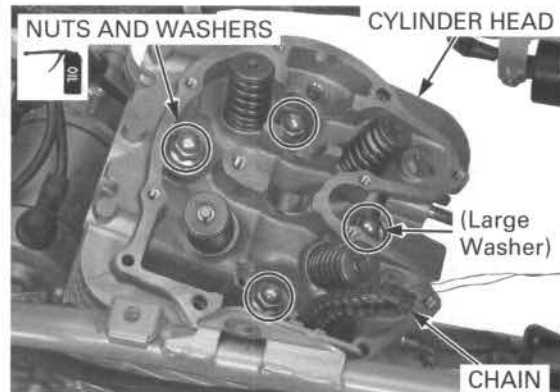
Route the cam chain through the cylinder head and install the cylinder head.

*The large washer is installed on the front side.*

Apply engine oil to the threads and seating surfaces of the cylinder head nuts and install them with the washers.

Tighten the four nuts in a crisscross pattern in several steps.

**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**

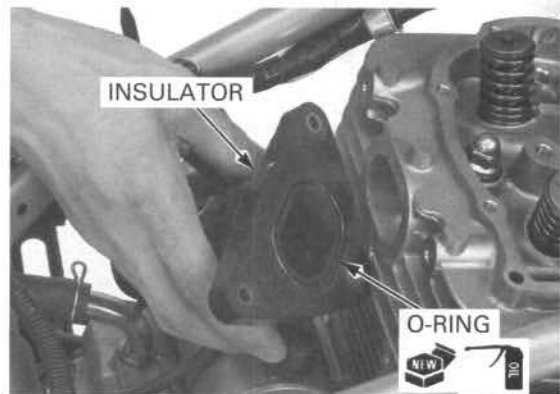


Coat a new O-ring with engine oil and install it into the groove in the carburetor insulator.

Install the insulator and tighten the three bolts.

Install the following:

- camshafts (page 8-22)
- exhaust system (page 3-9)



## CAMSHAFT INSTALLATION

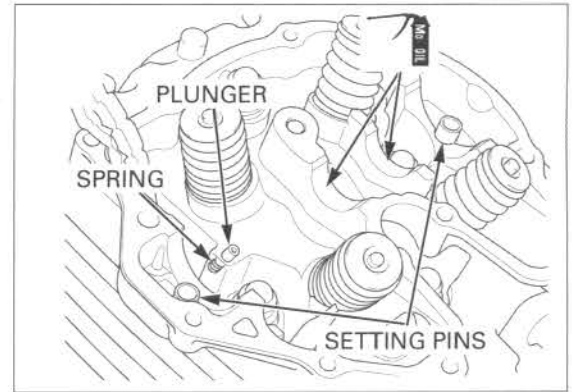
Apply engine oil to the camshaft bearings. Install the camshaft bearings with the sealed side of the sprocket side bearing facing out.



Be careful not to drop them into the crankcase.

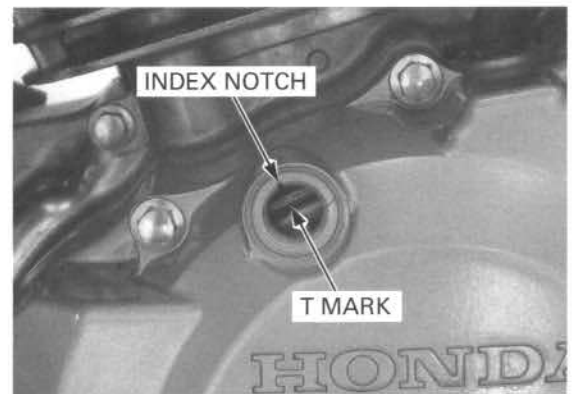
- Install the following:
- camshaft setting pins
  - plunger spring
  - decompressor plunger

Apply molybdenum oil solution to the camshaft journals.

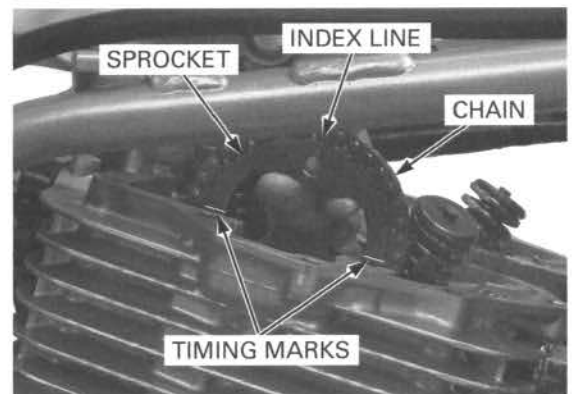


Take care not to jam the cam chain at the crankshaft.

Rotate the crankshaft counterclockwise while holding the cam chain and carefully align the T mark on the flywheel with the index notch in the crankcase cover.

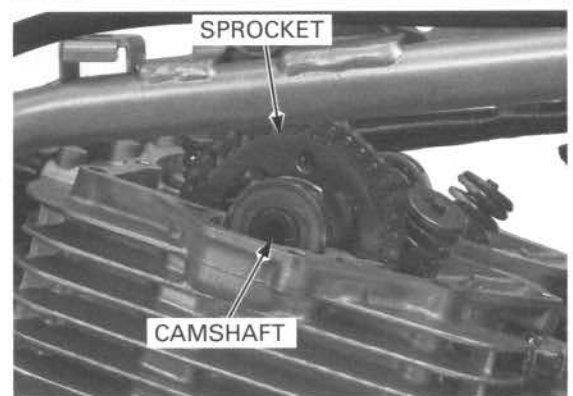


Install the cam sprocket onto the cam chain so that the timing marks are flush with the cylinder head surface and the index line is facing up.



Install the camshaft onto the cylinder head through the cam sprocket. With the cam lobes facing down, set the cam sprocket onto the camshaft flange by aligning the bolt holes.

Make sure the timing marks on the sprocket are flush with the cylinder head surface when the T mark on the flywheel is aligned with the index notch.



## CYLINDER HEAD/VALVE

*Be careful not to let the bolts fall into the crankcase. The crankshaft should be turned counterclockwise. This must be done to prevent the one-way decompressor system from functioning.*

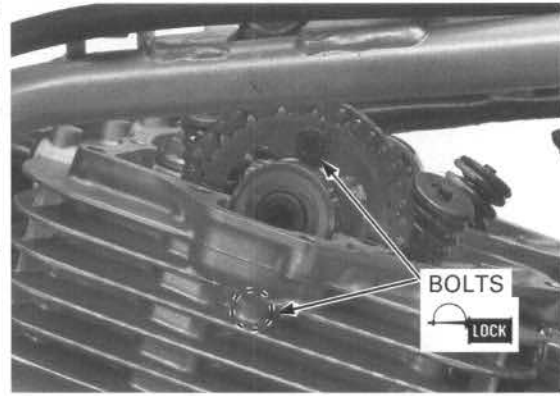
Apply locking agent to the threads of the cam sprocket bolts.

Install the sprocket bolt. Rotate the crankshaft counterclockwise one turn and install the remaining bolt.

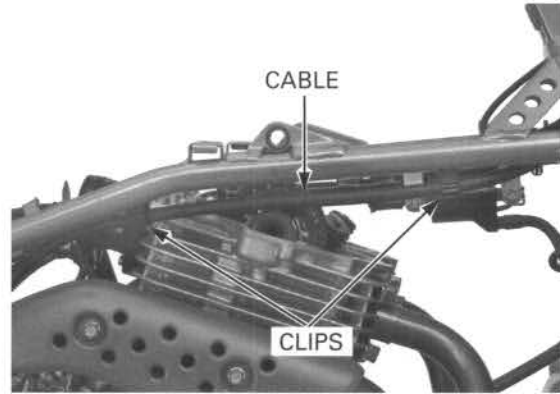
Tighten the index line side bolt first while holding the crankshaft.

**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

Rotate the crankshaft one turn and tighten the other bolt to the same torque.



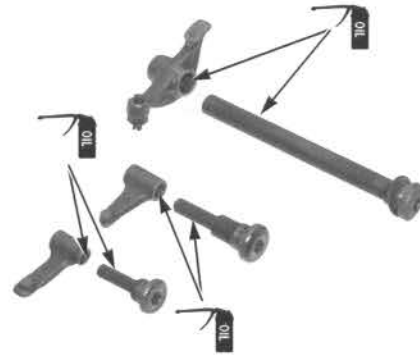
Secure the parking brake cable with the clips.  
Install the cylinder head cover (page 8-25).



## ROCKER ARM INSTALLATION

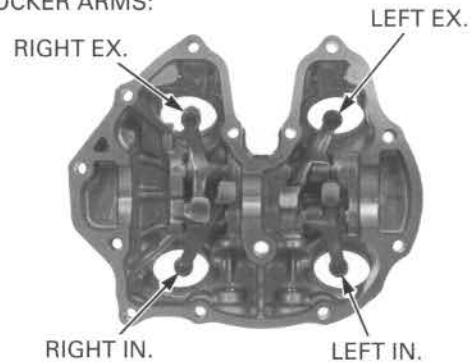
Clean the threads of each rocker arm shaft thoroughly.

Apply engine oil to the rocker arm and shaft sliding surface.

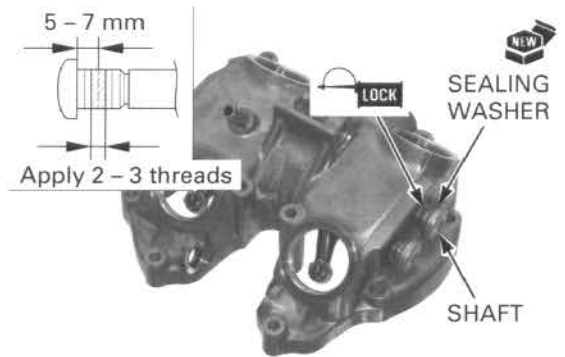


Install the rocker arms as shown by inserting the arm shafts with new sealing washers.

ROCKER ARMS:

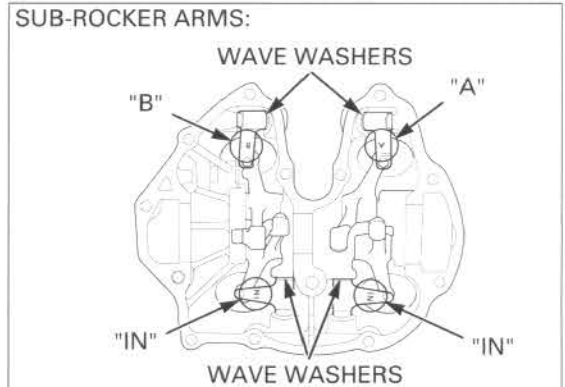


Apply locking agent to the 2 - 3 threads of the shafts, and temporarily tighten them.



*Note the installation position of the wave washers.*

Install the sub-rocker arms and wave washers, noting each identification mark as shown by inserting the arm shafts with new sealing washers.

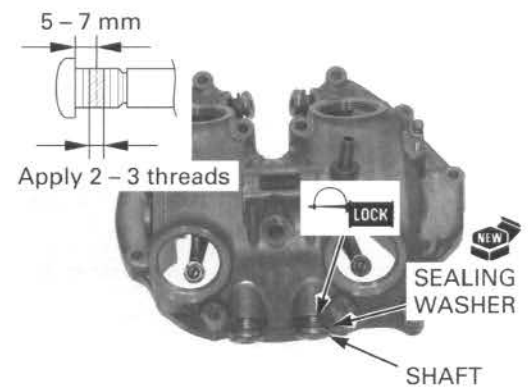


Apply locking agent to the 2 - 3 threads of the shafts.

Hold the head cover securely and tighten all the shafts to the specified torque.

**TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)**

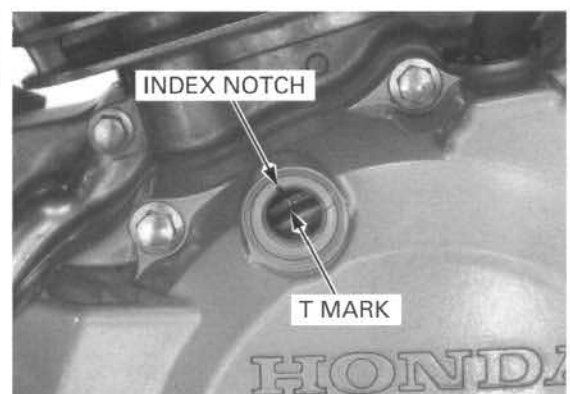
Install the cylinder head cover (page 8-25).



## CYLINDER HEAD COVER INSTALLATION

*The crankshaft should be turned counterclockwise. This must be done to prevent the one-way decompressor system from functioning.*

Rotate the crankshaft counterclockwise and align the T mark on the flywheel with the index notch in the crankcase cover so the camshaft cam lobes face down.

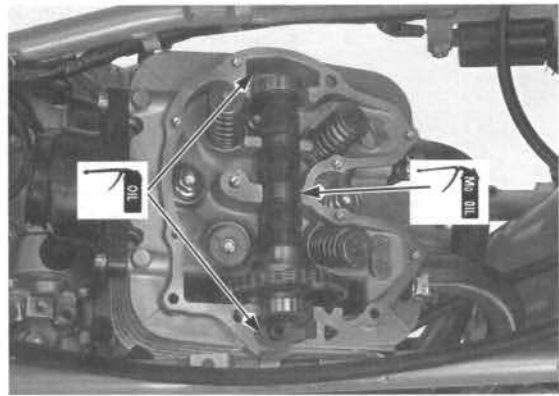


## CYLINDER HEAD/VALVE

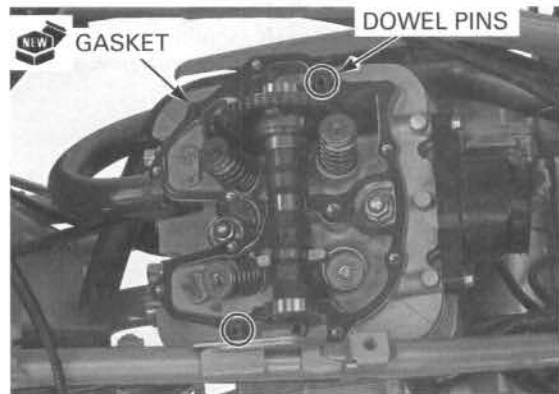
Clean the mating surfaces of the cylinder head and cover thoroughly, being careful not to damage them.

Pour engine oil into the oil pockets in the cylinder head.

Apply molybdenum oil solution to the camshaft cam lobes and journals.



Install the dowel pins and a new gasket.



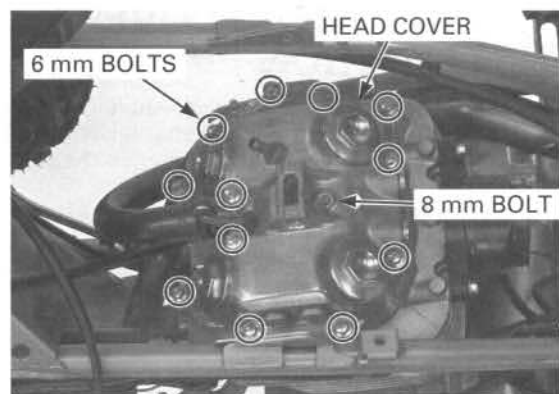
Apply molybdenum oil solution to the slipper surfaces of the rocker arms and sub-rocker arms in the cylinder head cover.



Install the head cover onto the cylinder head.

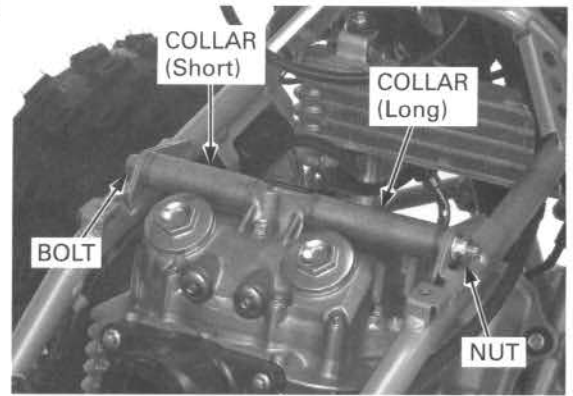
Install the twelve 6-mm bolts and 8-mm bolt, and tighten them in a crisscross pattern in several steps.

**TORQUE: 8 mm bolt: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Install the engine hanger bolt from the left side, and the collars (left; short/right; long) and nut.

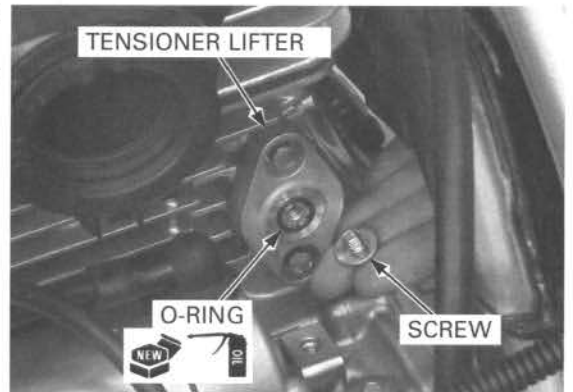
**TORQUE: 74 N·m (7.5 kgf·m, 55 lbf·ft)**



Remove the tensioner holder (stopper tool) from the tensioner lifter.

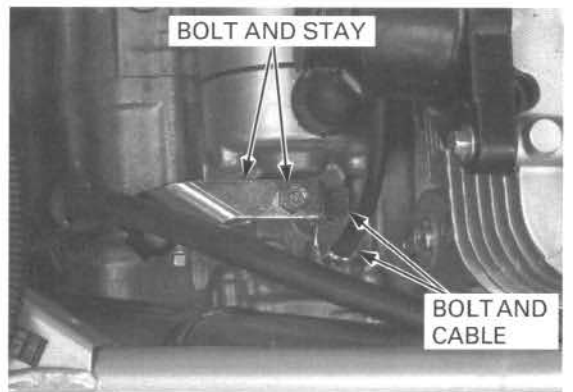
Coat a new O-ring with engine oil and install it into the tensioner lifter groove. Install the plug screw and tighten it.

**TORQUE: 4 N·m (0.4 kgf·m, 3.0 lbf·ft)**



Connect the negative (-) cable with the motor mounting bolt and tighten it.

Install brake cable stay and tighten the bolt.



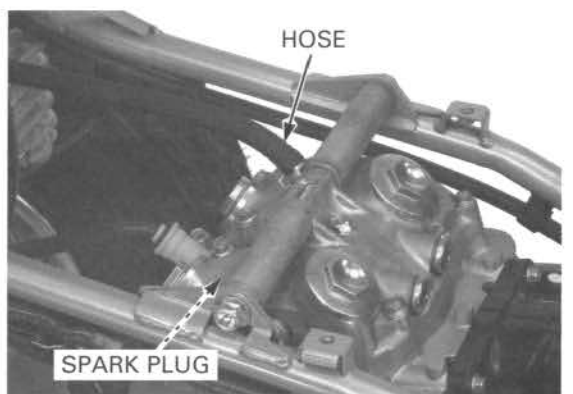
Connect the oil tank breather hose.

Check the valve clearance (page 4-8).

Install the following:

- spark plug (page 4-7)
- carburetor (page 6-6)
- heat guard plate (page 3-7)

Check the engine oil level (page 4-10).



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MEMO



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**RIDE RED**

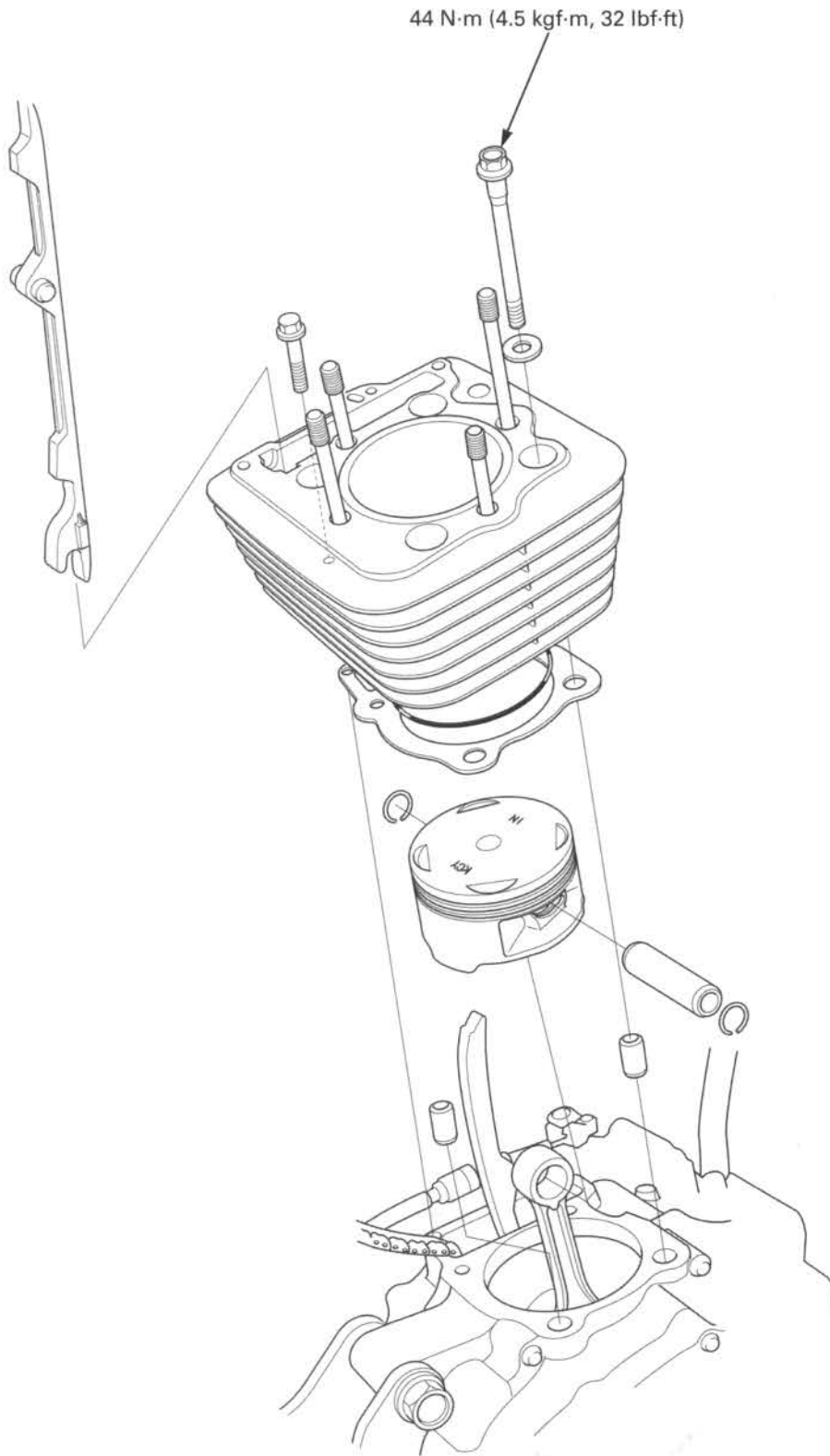


# 9. CYLINDER/PISTON

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SYSTEM COMPONENTS .....	9-2	CYLINDER/PISTON REMOVAL .....	9-4
SERVICE INFORMATION .....	9-3	CYLINDER/PISTON INSTALLATION.....	9-8
TROUBLESHOOTING .....	9-3		

SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- The cylinder and piston can be serviced with the engine installed in the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces when removing the cylinder.
- Camshaft and rocker arm lubricating oil is fed through an oil passage in the cylinder. Clean the oil passage before installing cylinder.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	85.000 – 85.010 (3.3465 – 3.3468)	85.10 (3.350)	
	Out-of-round	–	0.05 (0.002)	
	Taper	–	0.05 (0.002)	
	Warpage	–	0.10 (0.004)	
Piston, piston pin, piston ring	Piston O.D. at 15 (0.6) from bottom	84.960 – 84.985 (3.3449 – 3.3459)	84.880 (3.3417)	
	Piston pin hole I.D.	20.002 – 20.008 (0.7875 – 0.7877)	20.060 (0.7898)	
	Piston pin O.D.	19.994 – 20.000 (0.7872 – 0.7874)	19.964 (0.7860)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.096 (0.0038)	
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.14 (0.006)
Second		0.015 – 0.050 (0.0006 – 0.0020)	0.12 (0.005)	
Cylinder-to-piston clearance		0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)	
Connecting rod small end I.D.		20.020 – 20.041 (0.7882 – 0.7890)	20.067 (0.7900)	
Connecting rod-to-piston pin clearance		0.020 – 0.047 (0.0008 – 0.0019)	0.103 (0.0041)	

### TORQUE VALUES

Cylinder bolt 44 N·m (4.5 kgf·m, 32 lbf·ft)  
 Cylinder stud bolt 20 N·m (2.0 kgf·m, 15 lbf·ft)

Apply oil to the threads and seating surface.  
 See page 9-8

## TROUBLESHOOTING

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

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

#### Compression too high, overheating or knocking

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

#### Excessive smoke

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

#### Abnormal noise

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings

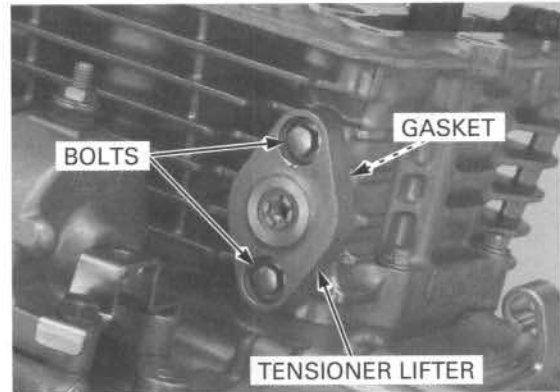
## CYLINDER/PISTON REMOVAL

### CYLINDER REMOVAL

Remove the cylinder head (page 8-13).

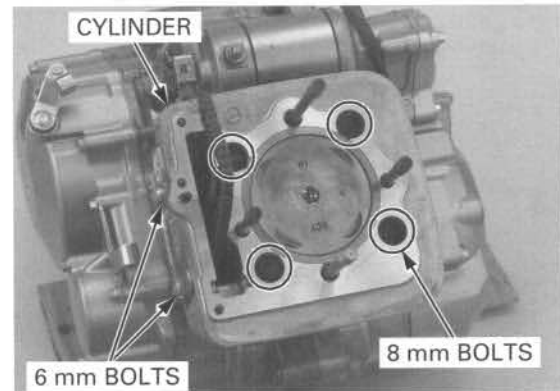
Remove the following:

- two bolts
- cam chain tensioner lifter
- gasket

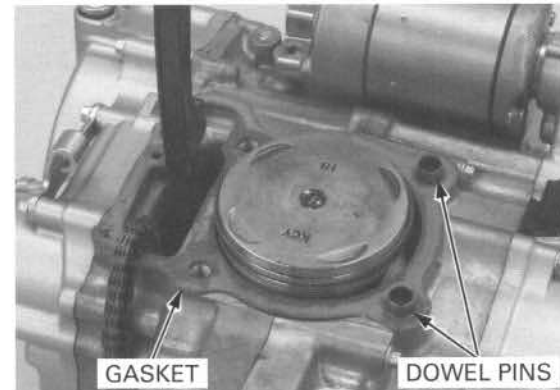


*Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.*

- two 6-mm cylinder bolts
- four 10-mm cylinder bolts and washers
- cylinder



- two dowel pins
- gasket

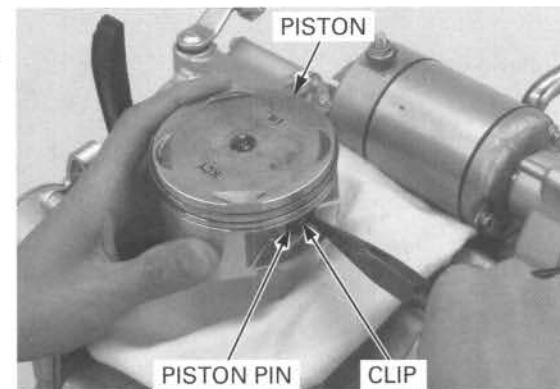


### PISTON REMOVAL

*Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.*

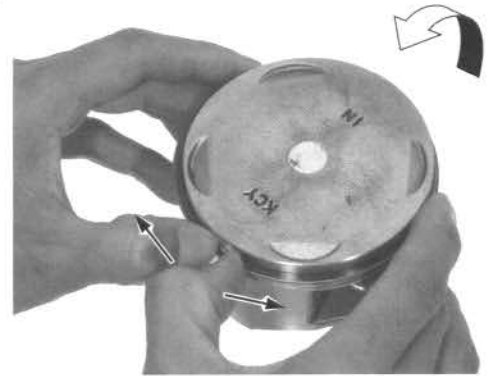
Remove the piston pin clip with pliers.

Push the piston pin out of the piston and connecting rod, and remove the piston.



*Do not damage the piston rings by spreading the ends too far.*

Spread each piston ring and remove it by lifting up at a point opposite the gap.



*Never use a wire brush; it will scratch the groove.*

Clean carbon deposits from the piston ring grooves with a ring that will be discarded.



**INSPECTION**

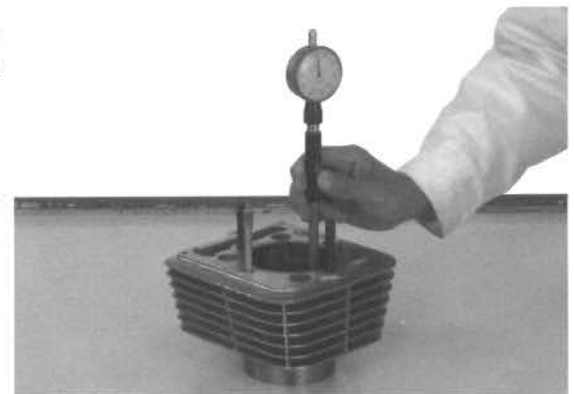
**CYLINDER**

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

**SERVICE LIMIT: 85.10 mm (3.350 in)**

Calculate the cylinder-to-piston clearance. Refer to page 9-6 for measurement of the piston O.D.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

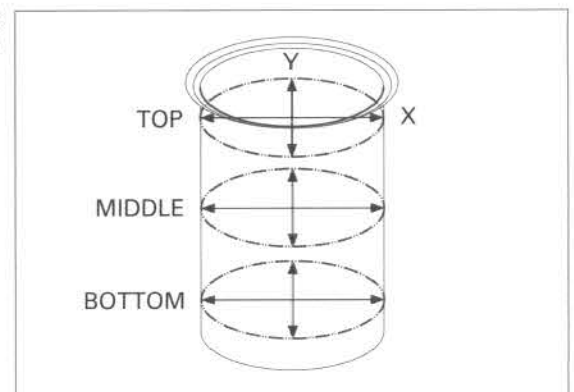


Calculate the cylinder for taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.

**SERVICE LIMITS:**

**Taper: 0.05 mm (0.002 in)**

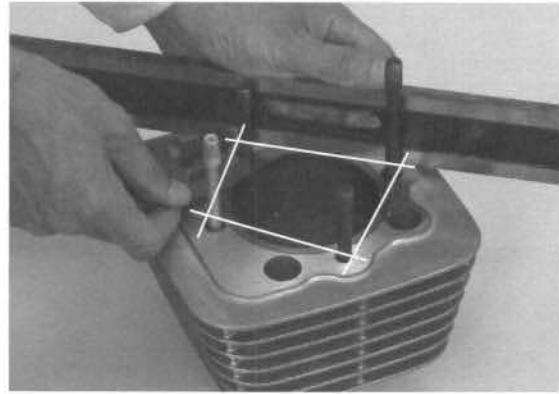
**Out-of-round: 0.05 mm (0.002 in)**



## CYLINDER/PISTON

Check the top of the cylinder for warpage with a straight edge and feeler gauge across the stud holes.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



### PISTON/PISTON RING

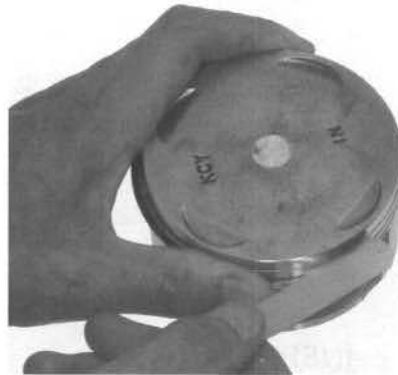
Inspect the piston rings for smooth movement by rotating them. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

#### SERVICE LIMITS:

**Top: 0.14 mm (0.006 in)**

**Second: 0.12 mm (0.005 in)**



Insert the piston ring into the bottom of the cylinder squarely using the piston crown.

Measure the ring end gap.

#### SERVICE LIMITS:

**Top: 0.50 mm (0.020 in)**

**Second: 0.65 mm (0.026 in)**

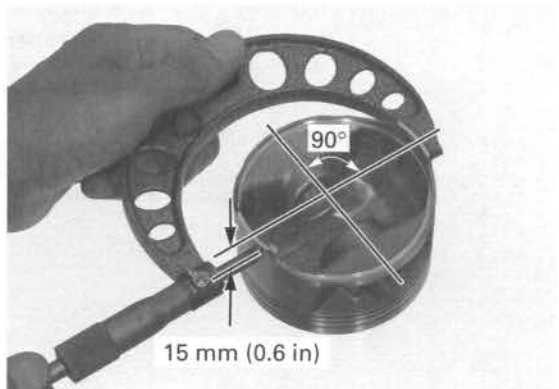
**Oil (side rail): 0.90 mm (0.035 in)**



Measure the piston O.D. at a point 15 mm (0.6 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT: 84.880 mm (3.3417 in)**

Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance (page 9-5).



Measure the piston pin hole I.D. Take the maximum reading to determine the I.D.

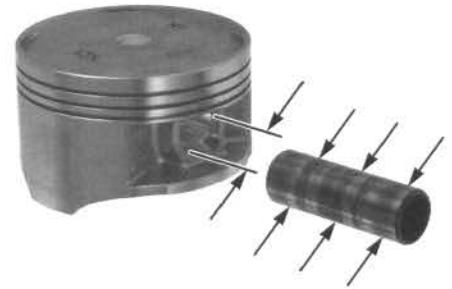
**SERVICE LIMIT: 20.060 mm (0.7898 in)**

Measure the piston pin O.D. at three points.

**SERVICE LIMIT: 19.964 mm (0.7860 in)**

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.096 mm (0.0038 in)**



**CONNECTING ROD**

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 20.067 mm (0.7900 in)**

Calculate the connecting rod-to-piston pin clearance.

**SERVICE LIMIT: 0.103 mm (0.0041 in)**



**CAM CHAIN TENSIONER LIFTER**

Check the lifter operation as follows.

The lifter shaft should not go into the lifter body when it is pushed.

When the shaft (inside of the body) is turned clockwise with a screwdriver or the stopper tool, the lifter shaft should be pulled into the lifter body. The shaft should spring out of the body as soon as the screwdriver is released.



## CYLINDER/PISTON

### CYLINDER STUD BOLT REPLACEMENT

Thread two nuts onto the stud and tighten them together, and use the wrench on them to turn the stud bolt out.

Install new stud bolts in their proper positions and tighten them.

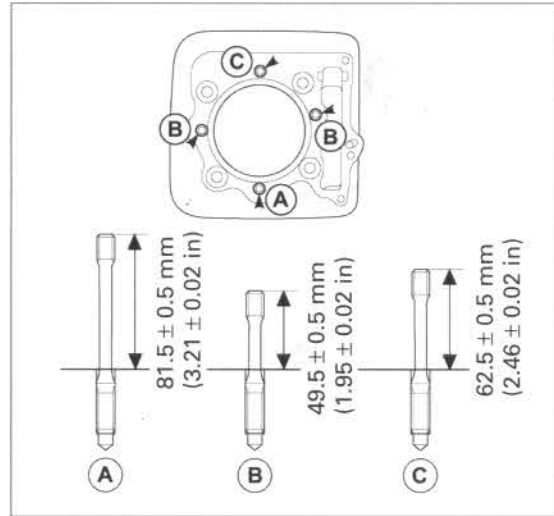
- A: 10 x 92 mm stud bolt
- B: 10 x 60 mm stud bolt
- C: 10 x 73 mm stud bolt

**TORQUE:** 20 N·m (2.0 kgf·m, 15 lbf·ft)

Be sure to verify the stud height from the cylinder surface.

- SPECIFIED HEIGHT:** A:  $81.5 \pm 0.5$  mm ( $3.21 \pm 0.02$  in)  
B:  $49.5 \pm 0.5$  mm ( $1.95 \pm 0.02$  in)  
C:  $62.5 \pm 0.5$  mm ( $2.46 \pm 0.02$  in)

Adjust the height if necessary.



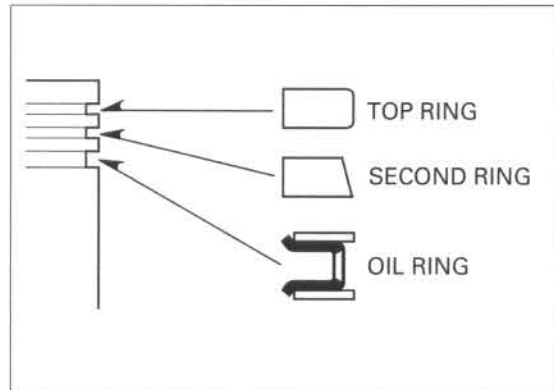
## CYLINDER/PISTON INSTALLATION

### PISTON RING INSTALLATION

Carefully install the piston rings into the piston ring grooves with the marks facing up.

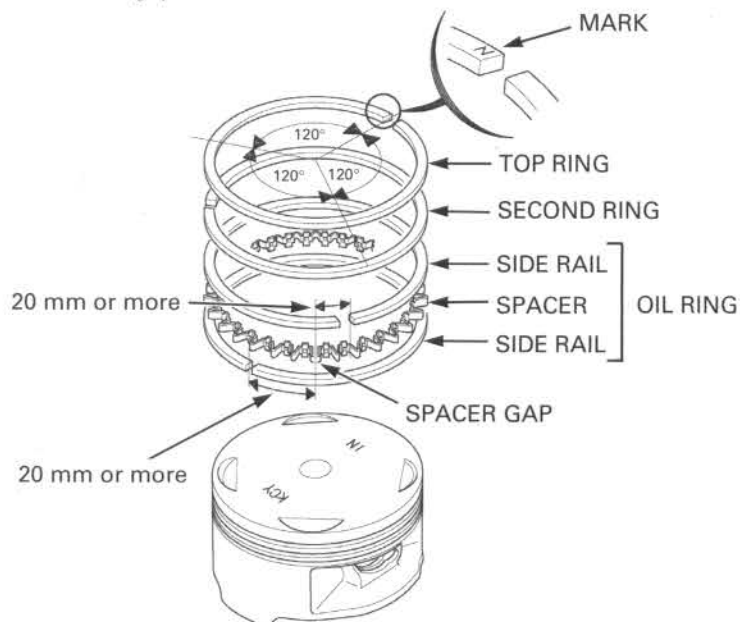
**NOTE:**

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.



Stagger the piston ring end gaps  $120^\circ$  apart from each other.

Stagger the side rail end gaps as shown.





**PISTON INSTALLATION**

Place a clean shop towel over the crankcase to prevent the piston pin clip from falling into the crankcase.

Apply molybdenum oil solution to the connecting rod small end inner surface and piston pin outer surface.

Apply engine oil to the piston pin holes.

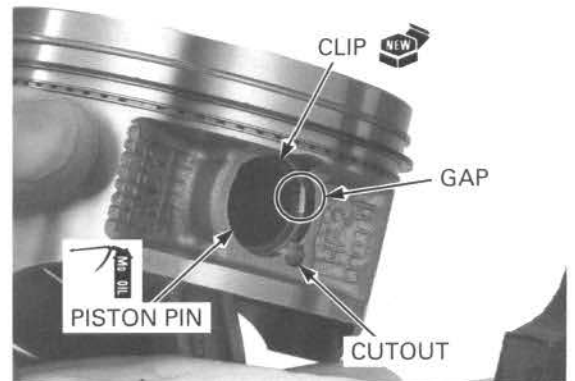
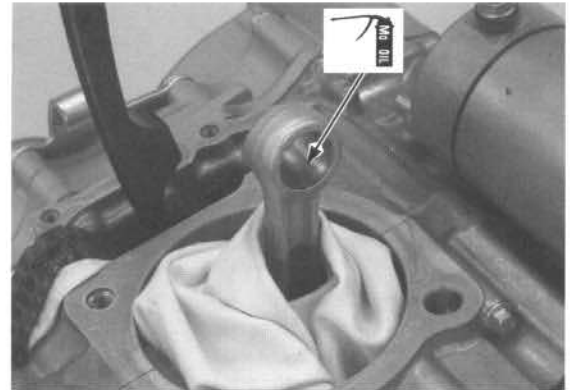
Install the piston with the "IN" mark toward the intake side and insert the piston pin through the piston and connecting rod.

Install new piston pin clips.

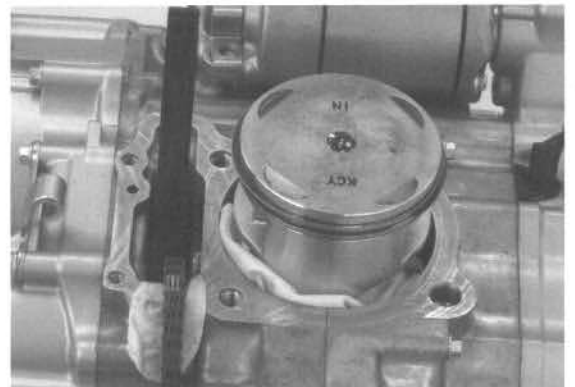
**NOTE:**

- Make sure the piston pin clips are seated securely.

*Do not align the clip end gap with the piston cutout.*

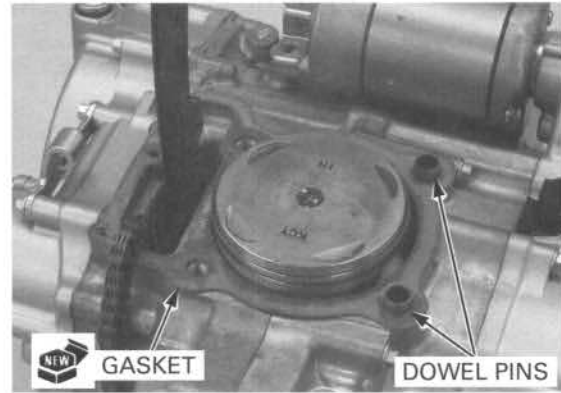
**CYLINDER INSTALLATION**

Clean the gasket surface of the crankcase and cylinder thoroughly, being careful not to damage them.



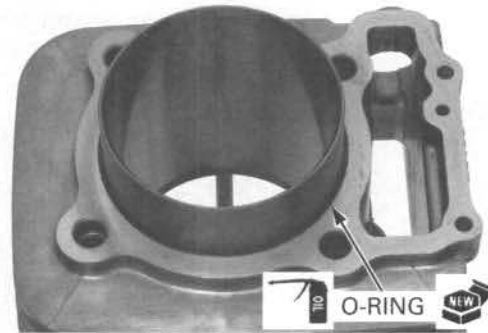
## CYLINDER/PISTON

Install the two dowel pins and a new gasket.



Blow through the oil passage in the cylinder with compressed air.

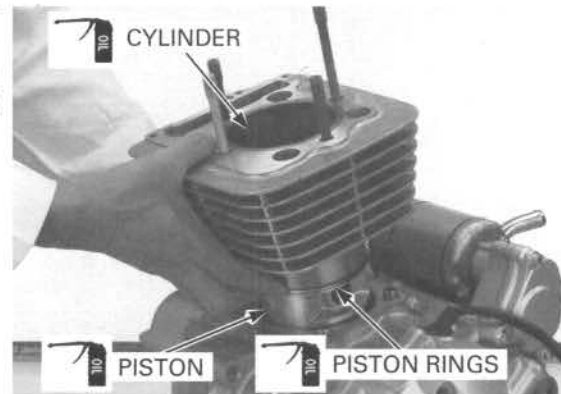
Coat a new O-ring with oil and install it into the groove in the cylinder bottom.



Apply engine oil to the cylinder wall, piston outer surface and piston rings.

*Be careful not to damage the piston rings and cylinder wall.*

Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.

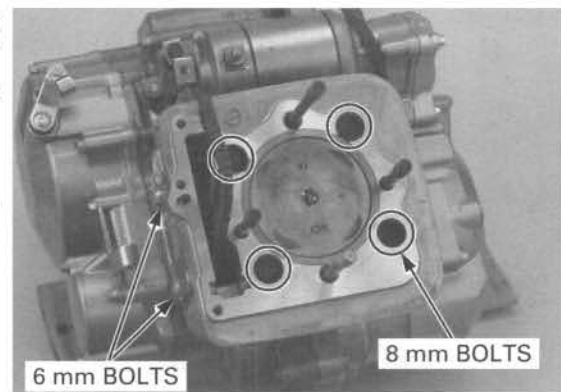


Apply oil to the threads and seating surfaces of the four 10-mm cylinder bolts, and install them with the washers.

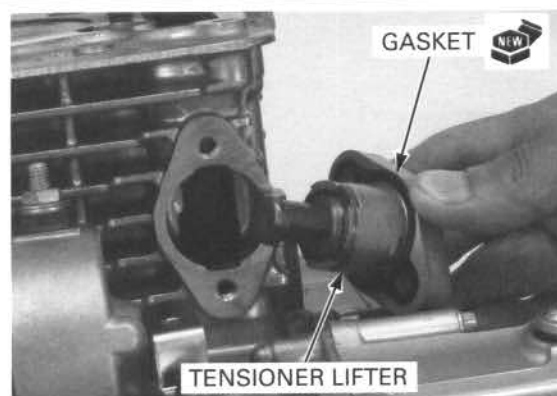
Tighten the bolts in a crisscross pattern in several steps.

**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**

Install the two 6-mm cylinder bolts and tighten them securely.



Install the cam chain tensioner lifter with a new gasket and tighten the two bolts securely.  
Install the cylinder head (page 8-21).



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**MEMO**

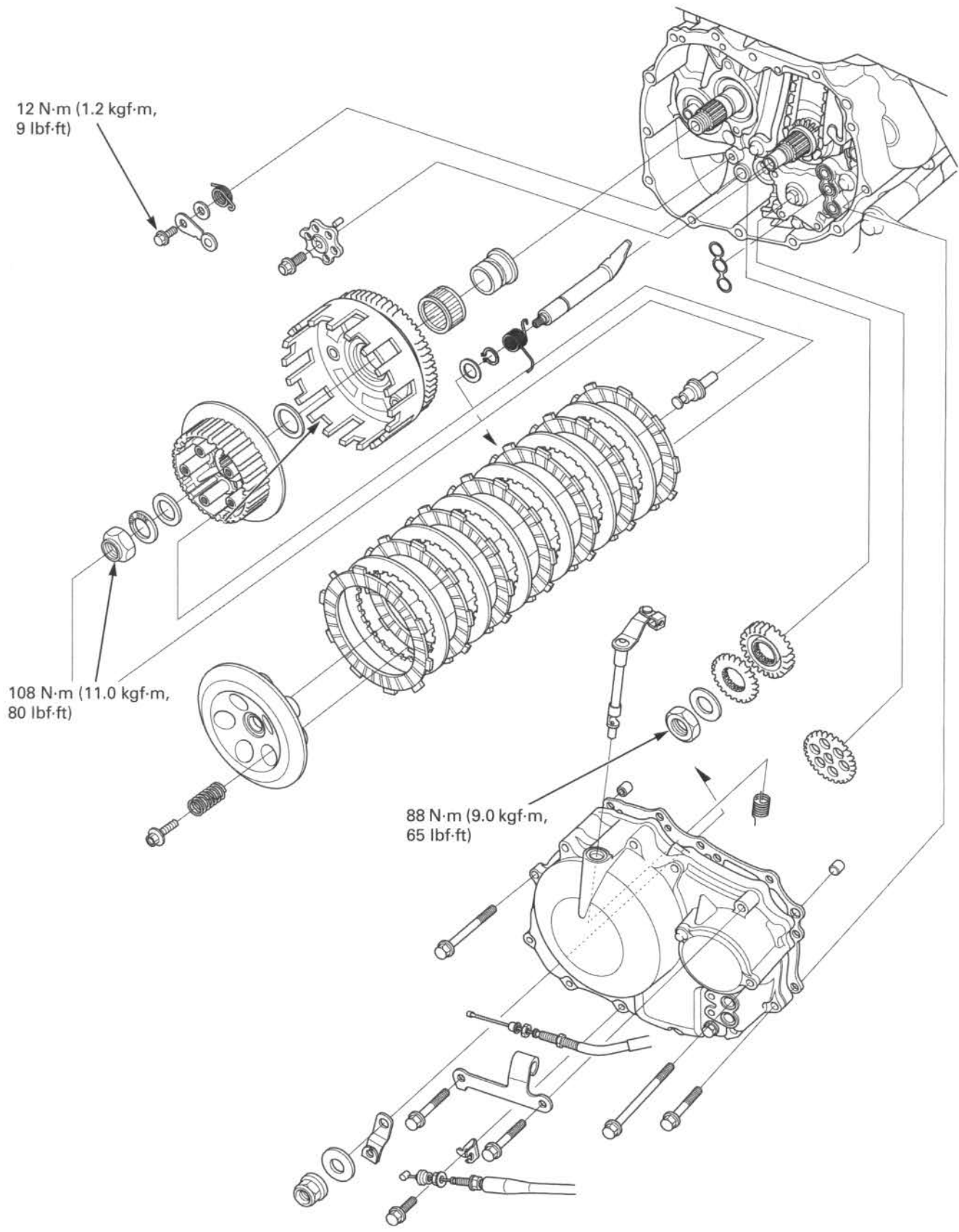


# 10. CLUTCH/GEARSHIFT LINKAGE

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SYSTEM COMPONENTS .....	10-2	CLUTCH.....	10-7
SERVICE INFORMATION .....	10-3	PRIMARY DRIVE GEAR.....	10-13
TROUBLESHOOTING .....	10-4	GEARSHIFT LINKAGE .....	10-14
RIGHT CRANKCASE COVER REMOVAL....	10-5	RIGHT CRANKCASE COVER INSTALLATION.....	10-16

# CLUTCH/GEARSHIFT LINKAGE SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch and gearshift linkage. These services can be performed with the engine installed in the frame.
- Engine oil viscosity, oil level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the vehicle creeps with the clutch disengaged, inspect the engine oil viscosity and oil level before servicing the clutch system.
- The crankcase must be separated when the transmission, gearshift spindle, shift drum and shift forks require service (page 12-2).

### SPECIFICATIONS

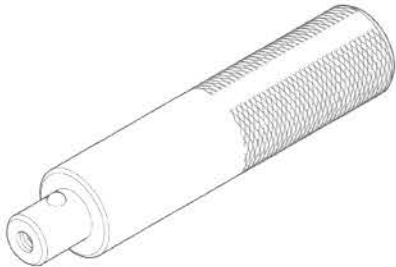


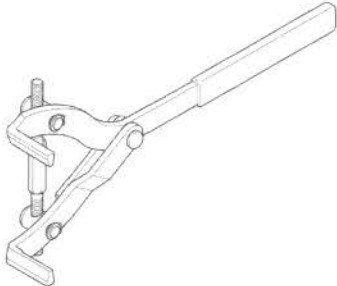
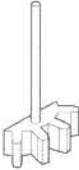
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch	Lever free play	10 – 20 (3/8 – 3/4)	–
	Spring free length	52.64 (2.072)	50.0 (1.97)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.69 (0.106)
	Plate warpage	–	0.15 (0.006)
	Outer guide I.D.	22.000 – 22.021 (0.8661 – 0.8670)	22.05 (0.868)
Mainshaft O.D. at clutch outer guide		21.967 – 21.980 (0.8648 – 0.8654)	21.93 (0.863)

### TORQUE VALUES

Clutch center lock nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	Lock nut: replace with a new one. Apply engine oil to the threads and seating surface. Stake.
Primary drive gear nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply engine oil to the threads and seating surface.
Gearshift stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

### TOOLS

<p>Driver 07749-0010000</p> 	<p>Attachment, 28 x 30 mm 07946-1870100</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Clutch center holder 07724-0050002</p>  <p>or 07724-0050001 or equivalent commercially available in U.S.A.</p>	<p>Gear holder 07724-0010100</p>  <p>or 07724-001A100 (U.S.A. only)</p>	

### TROUBLESHOOTING

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

#### **Clutch lever difficult to pull in**

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Damaged lifter bearing

#### **Clutch will not disengage or vehicle creeps with clutch disengaged**

- Excessive clutch lever free play
- Warped clutch plates
- Damaged clutch lifter mechanism
- Oil level too high, improper oil viscosity or oil additive used

#### **Clutch slips**

- No clutch lever free play
- Worn clutch discs
- Weak clutch springs
- Sticking clutch lifter mechanism
- Oil additive used

#### **Hard to shift**

- Misadjusted clutch lever free play
- Misadjusted reverse assist lever free play
- Damaged gearshift cam
- Damaged reverse stopper shaft
- Incorrect oil viscosity
- Faulty gearshift spindle, shift forks/shaft or shift drum (page 12-6)

#### **Transmission jumps out of gear**

- Worn shift drum stopper arm
- Weak or broken stopper arm return spring
- Worn or damaged gearshift cam
- Weak or broken reverse stopper shaft return spring
- Faulty transmission gears (page 12-6)
- Faulty gearshift spindle, shift forks/shaft or shift drum (page 12-6)



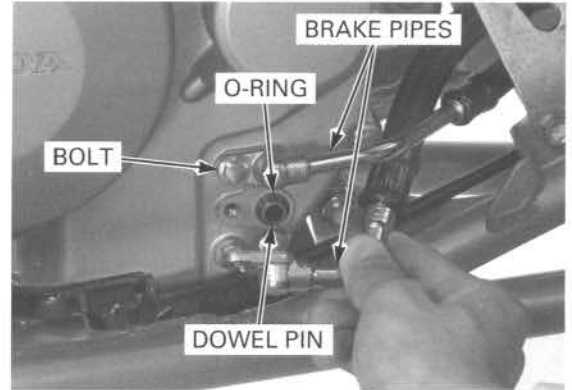
## RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 4-11).

Remove the brake pedal (page 15-28).

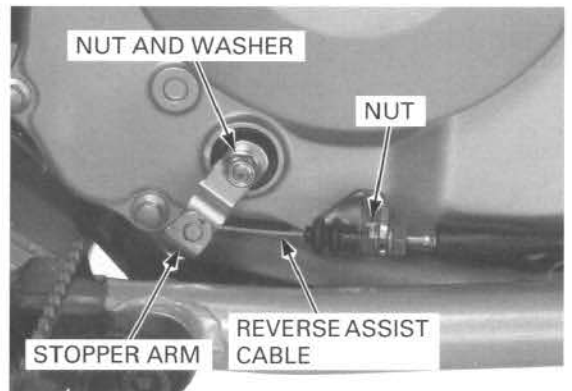
Remove the bolts and the oil pipes from the crankcase cover.

Remove the O-rings and dowel pins.

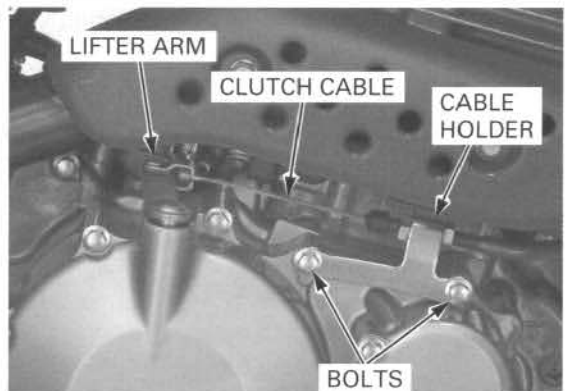


Loosen the lock nut and disconnect the reverse assist cable from the reverse stopper arm, and remove it from the cable holder.

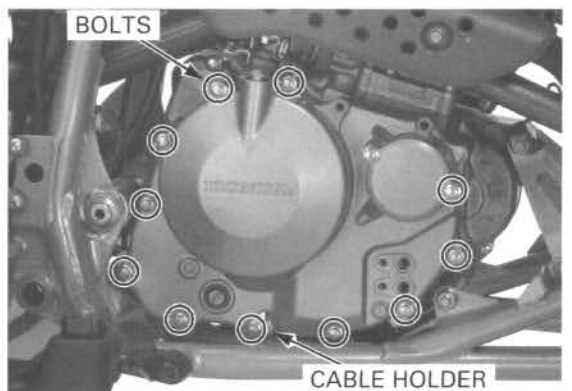
Remove the nut, washer and stopper arm.



Remove the two bolts and clutch cable holder, and disconnect the cable from the lifter arm.

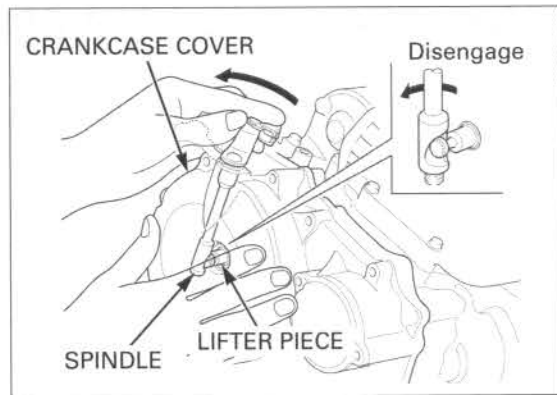


Remove the right crankcase cover bolts and cable holder.



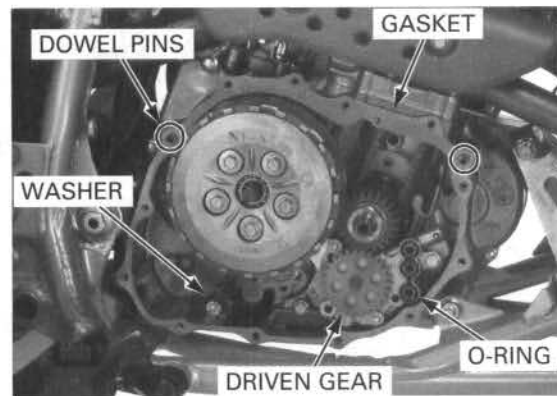
## CLUTCH/GEARSHIFT LINKAGE

Remove the right crankcase cover while turning the clutch lifter arm counterclockwise to disengage the lifter arm spindle from the lifter piece.



Remove the following:

- dowel pins
- O-ring
- thrust washer
- oil pump driven
- gasket

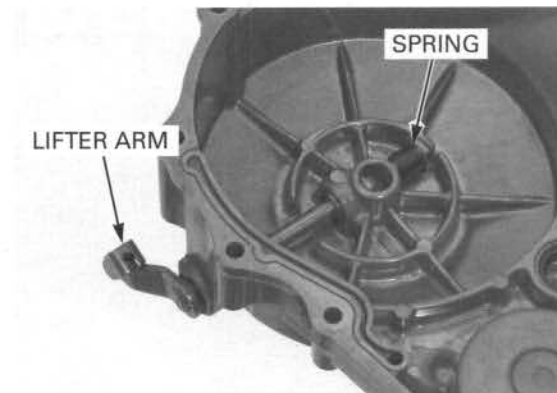


### CLUTCH LIFTER ARM

Remove the clutch lifter arm and return spring from the right crankcase cover.

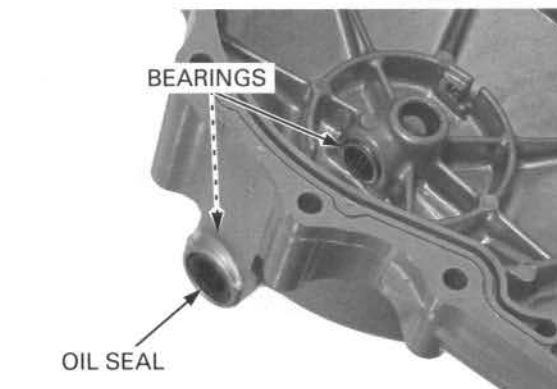
Check the lifter arm spindle for wear, damage or bending.

Check the return spring for fatigue or damage.



Remove the oil seal.

Check the needle bearings for wear, damage or loose fit.



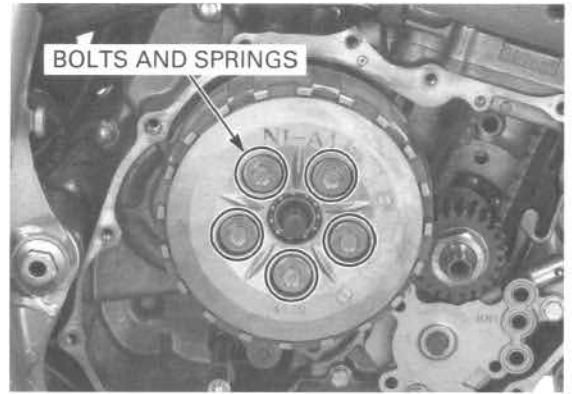
# CLUTCH

## DISASSEMBLY

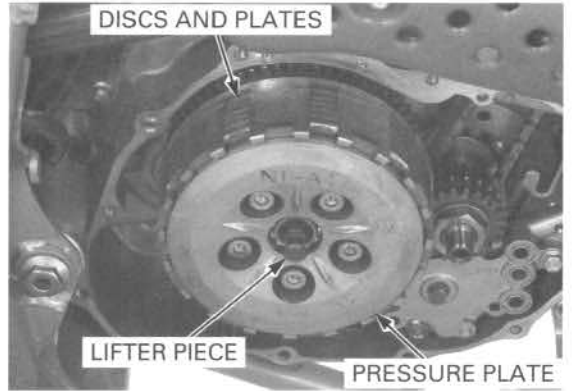
Remove the right crankcase cover (page 10-5).

Remove the following:

- five bolts (loosen in a crisscross pattern several steps)
- clutch springs

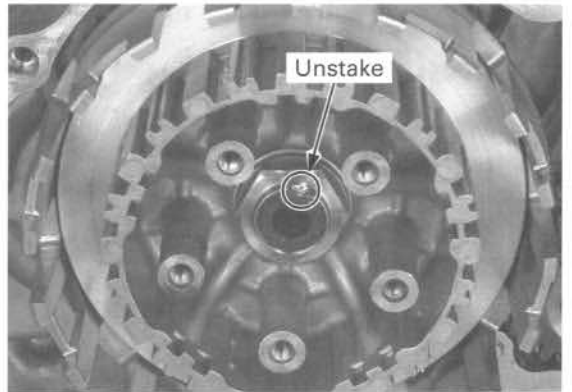


- pressure plate
- lifter piece
- clutch discs and plates



*Be careful not to damage the mainshaft threads.*

Unstake the clutch center lock nut.



Hold the clutch center using the special tool and loosen the lock nut.

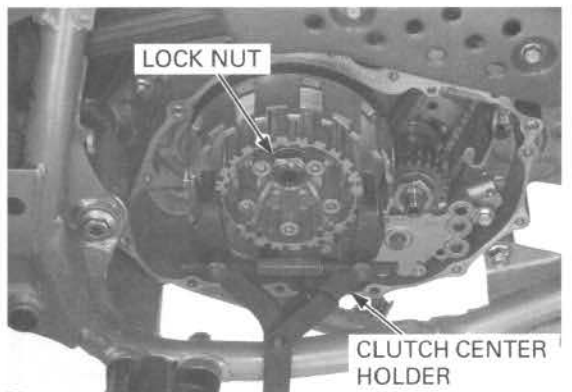
**TOOL:**

**Clutch center holder**

07724-0050002 or 07724-0050001 or equivalent commercially available in U.S.A.

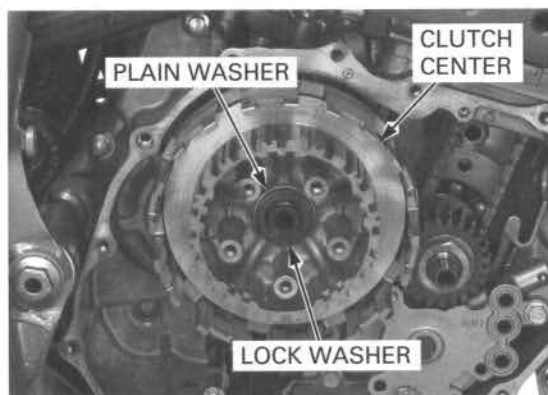
Remove the following:

- lock nut

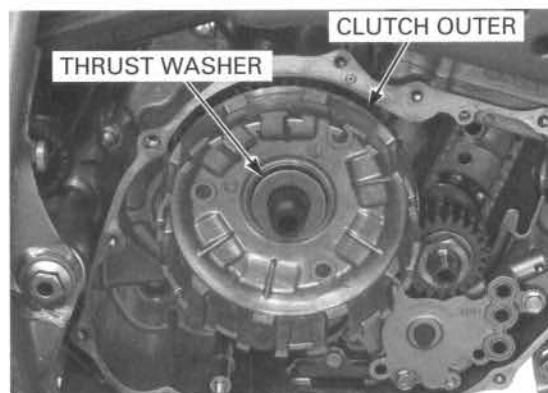


## CLUTCH/GEARSHIFT LINKAGE

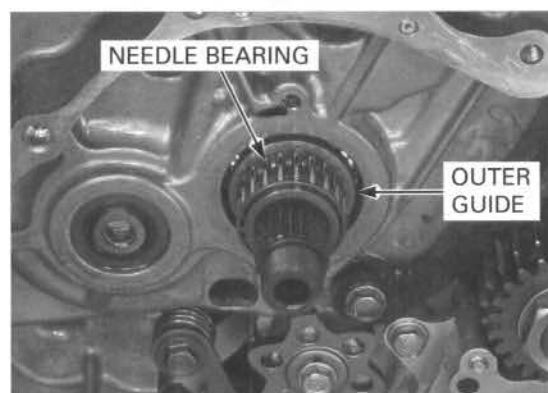
- lock washer
- plain washer
- clutch center



- thrust washer
- clutch outer



- needle bearing
- clutch outer guide



### INSPECTION

#### LIFTER BEARING

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and quietly.

Also check that the outer race of the bearing fits tightly in the pressure plate.

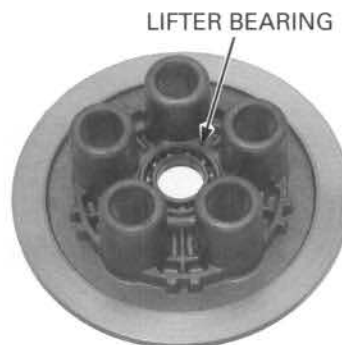
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the pressure plate.

Drive the bearing out of the pressure plate.

Drive a new bearing into the plate with its mark side facing up.

#### TOOLS:

Driver	07749-0010000
Attachment, 28 x 30 mm	07946-1870100
Pilot, 17 mm	07746-0040400



**CLUTCH LIFTER PIECE**

Check the clutch lifter piece for excessive wear or damage.

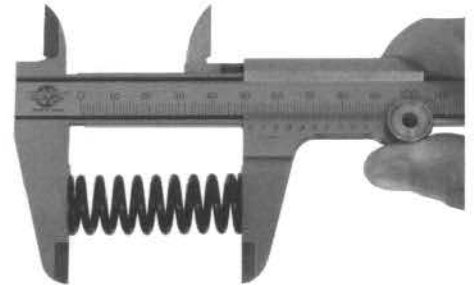


**CLUTCH SPRING**

*Replace the clutch springs as a set.*

Measure the clutch spring free length.

**SERVICE LIMIT: 50.0 mm (1.97 in)**



**CLUTCH DISC**

*Replace the clutch discs and plates as a set.*

Check the clutch discs for signs of scoring or discoloration.

Measure the thickness of each disc.

**SERVICE LIMIT: 2.69 mm (0.106 in)**



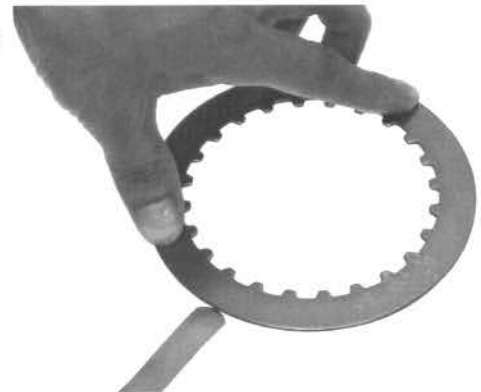
**CLUTCH PLATE**

*Replace the clutch discs and plates as a set.*

Check the plate for discoloration.

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

**SERVICE LIMIT: 0.15 mm (0.006 in)**



## CLUTCH/GEARSHIFT LINKAGE

### CLUTCH CENTER/CLUTCH OUTER

Check the grooves of the clutch center and pressure plate for damage or wear caused by the clutch plates.

Check the slots in the clutch outer for nicks, cuts or indentations made by the clutch discs.  
Check the primary driven gear teeth for wear or damage.



### CLUTCH OUTER GUIDE

Check the clutch outer guide and needle bearing for wear or damage.

Measure the outer guide I.D.

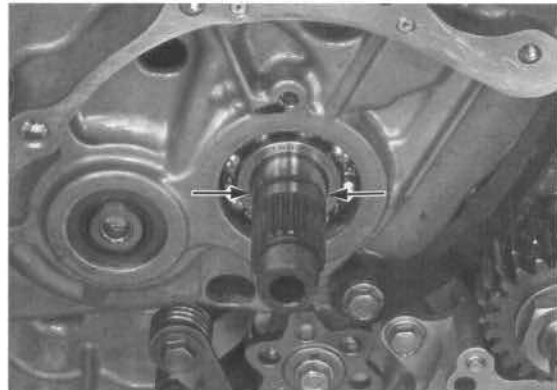
**SERVICE LIMIT: 22.05 mm (0.868 in)**



### MAINSHAFT

Measure the mainshaft O.D. at the outer guide.

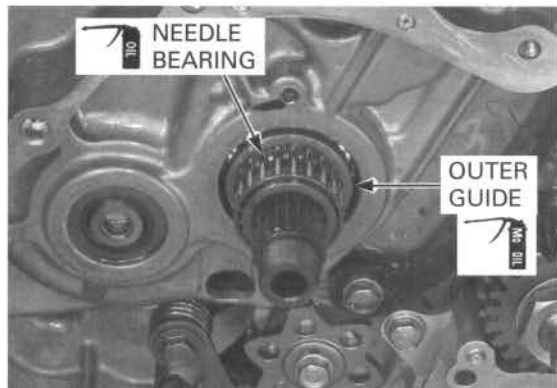
**SERVICE LIMIT: 21.93 mm (0.863 in)**



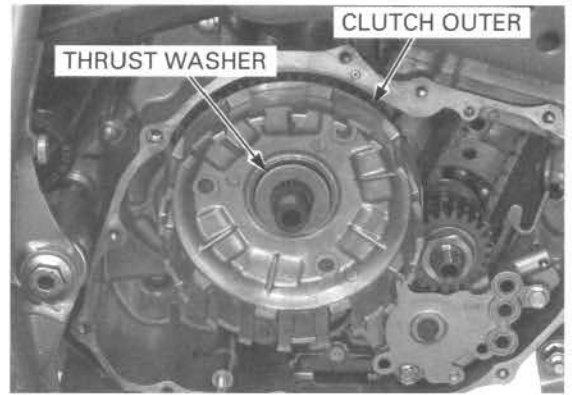
### ASSEMBLY

Apply molybdenum oil solution to the inner and outer surfaces of the clutch outer guide and install it onto the mainshaft.

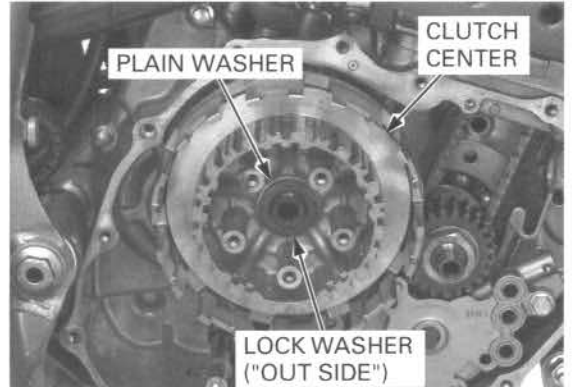
Apply engine oil to the needle bearing and install it onto the outer guide.



Install the clutch outer and thrust washer.



Install the clutch center and plain washer onto the mainshaft.  
Install the lock washer with the "OUT SIDE" mark facing out.



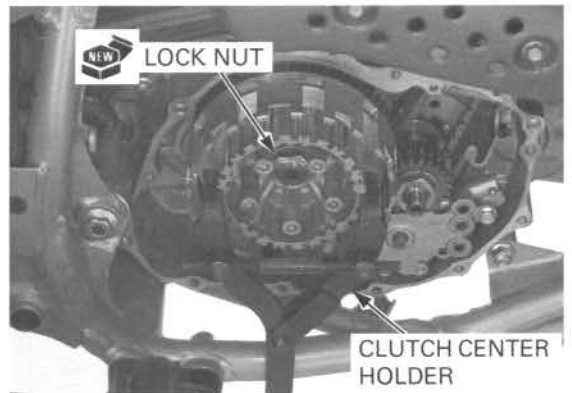
Apply engine oil to the threads and seating surface of a new clutch center lock nut and install it.

Hold the clutch center using the special tool and tighten the lock nut.

**TOOL:**

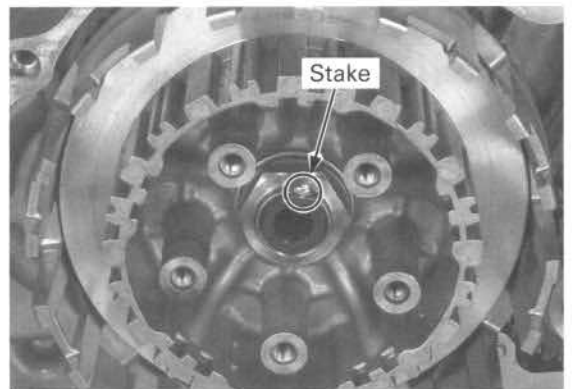
**Clutch center holder** 07724-0050002 or 07724-0050001 or equivalent commercially available in U.S.A.

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



*Be careful not to damage the mainshaft threads.*

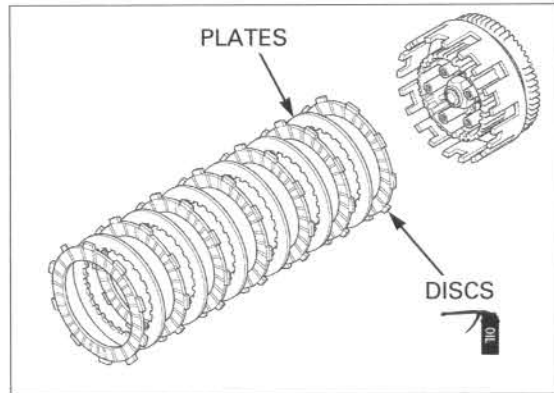
Stake the lock nut into the mainshaft groove.



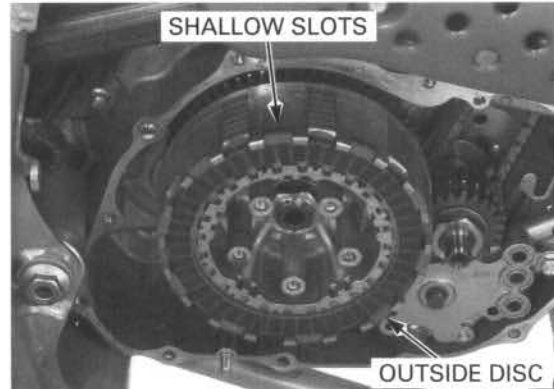
## CLUTCH/GEARSHIFT LINKAGE

Coat the clutch discs with engine oil.

Install the seven clutch disc and six plates alternately, starting with disc.

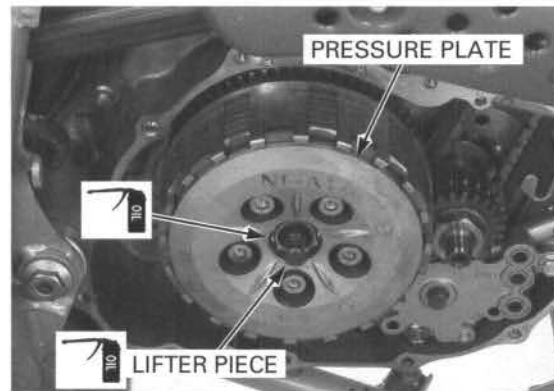


Install the outside clutch disc tabs into the shallow slots in the clutch outer.



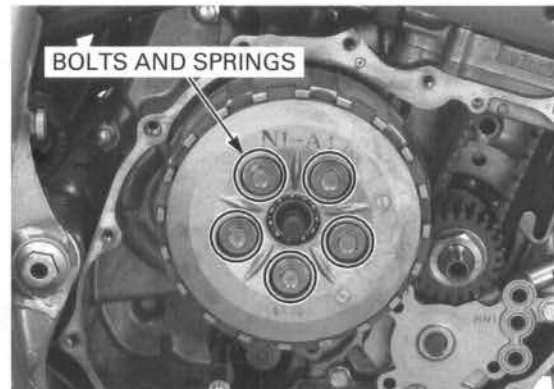
Apply engine oil to the clutch lifter piece entire surface and bearing. Install the lifter piece into the bearing.

Install the pressure plate.



Install the five clutch springs and bolts.  
Tighten the bolts in a crisscross pattern in several steps.

Install the right crankcase cover (page 10-16).





## PRIMARY DRIVE GEAR

### REMOVAL

Disassemble the clutch (page 10-7).

Temporarily install the clutch outer.

Install the special tool between the primary drive and driven gears as shown, and loosen the primary drive gear nut.

#### TOOL:

**Gear holder**

07724-0010200 or  
07724-001A200  
(U.S.A. only)

Remove the clutch outer.

Remove the following:

- nut
- washer
- oil pump drive gear
- primary drive gear

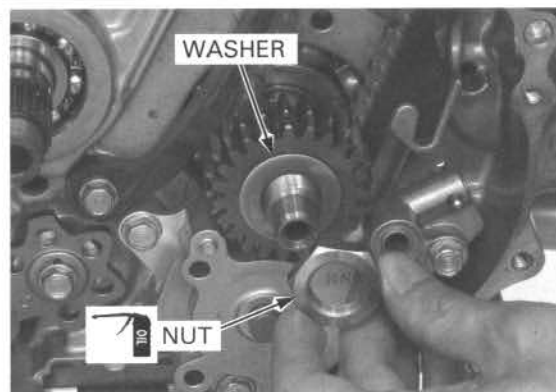
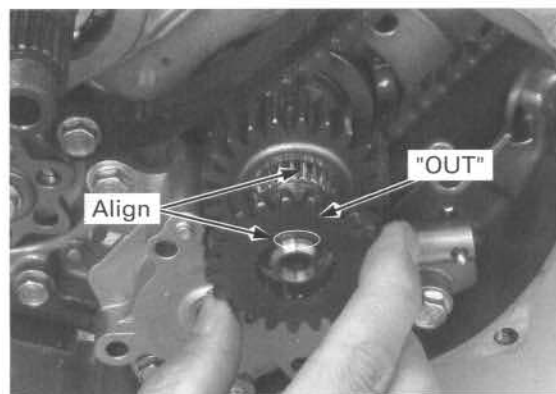
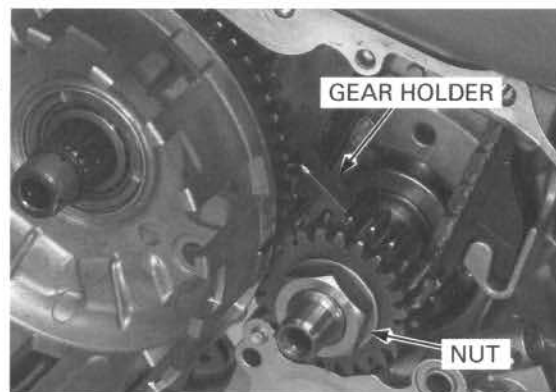
### INSTALLATION

*Align the wide groove in the gears with the grooved tooth of the crankshaft.*

Install the primary and oil pump drive gears with the "OUT" mark on the pump drive gear facing out.

Apply engine oil to the nut threads and seating surface.

Install the washer and nut.



## CLUTCH/GEARSHIFT LINKAGE

Remove the oil pump (page 5-4).

Install the clutch outer (page 10-10).  
Install the special tool between the primary drive and driven gears as shown, and tighten the nut.

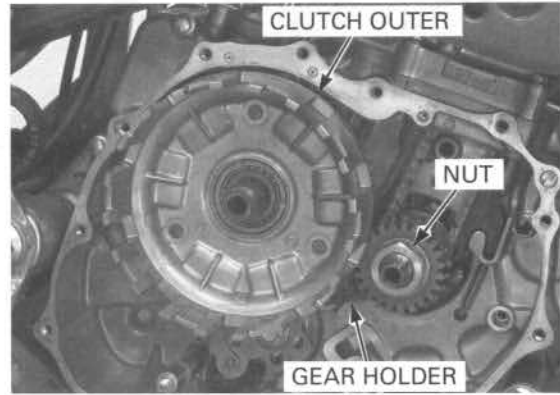
### TOOL:

**Gear holder**                      **07724-0010200 or**  
                                         **07724-001A200**  
                                         **(U.S.A. only)**

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

Install the oil pump (page 5-7).

Assemble the clutch (page 10-11).



## GEARSHIFT LINKAGE

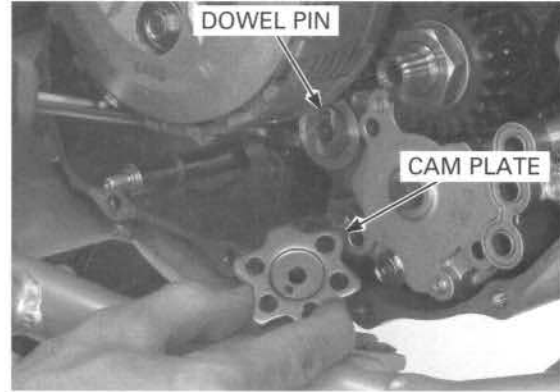
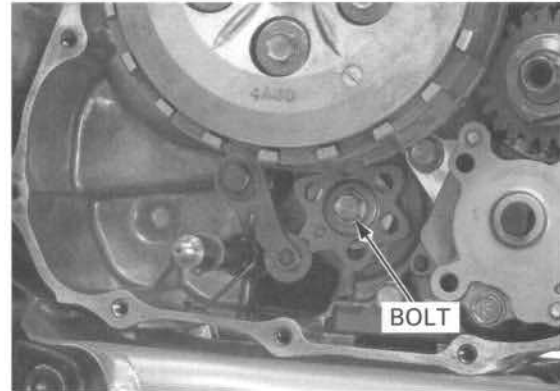
### REMOVAL/INSPECTION

Remove the right crankcase cover (page 10-5).

Remove the following:  
– cam plate bolt

*Hold the stopper arm with a screwdriver.*

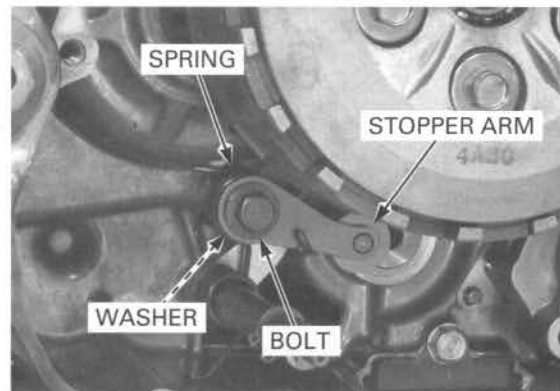
- gearshift cam plate
- dowel pin



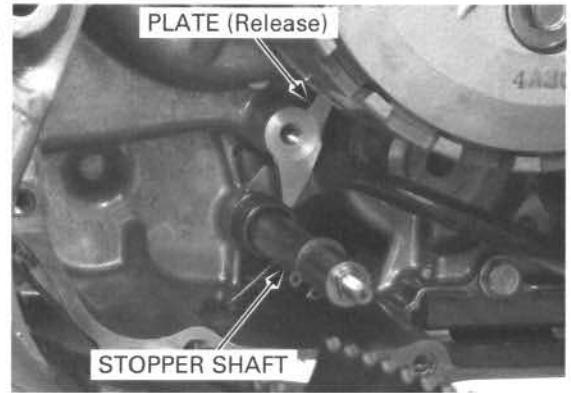
- bolt
- stopper arm
- washer
- return spring

Check the cam plate and stopper arm for wear or damage.

Check the return spring for fatigue or damage.



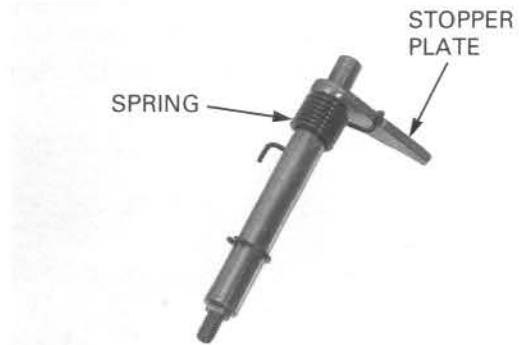
Release the stopper plate from the shift drum with a screwdriver, then pull the reverse stopper shaft out of the crankcase.



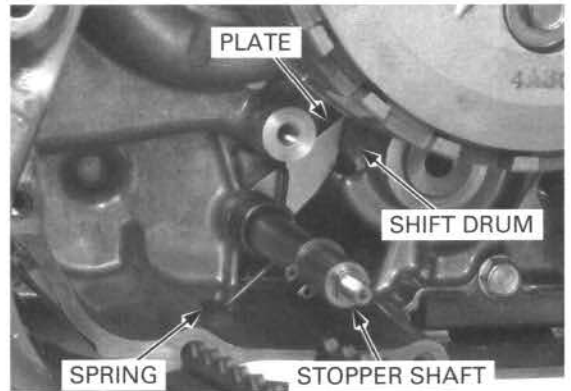
Check the stopper plate for wear, damage or deformation.  
Check the return spring for fatigue or damage.

## INSTALLATION

Install the return spring in the direction as shown.

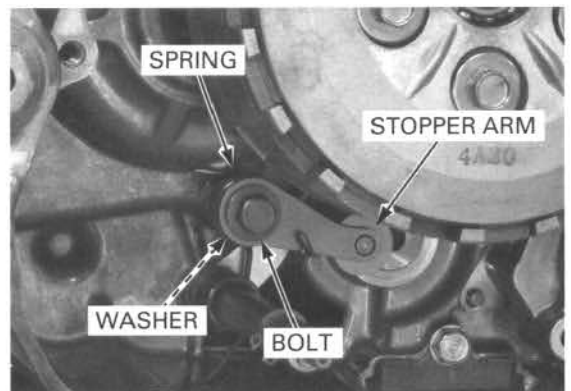


Install the reverse stopper shaft into the hole in the crankcase while holding the lower end of the spring, then set the stopper plate into the guide groove in the shift drum.



Install the return spring, washer (between the arm and crankcase), stopper arm and bolt, and tighten the bolt.

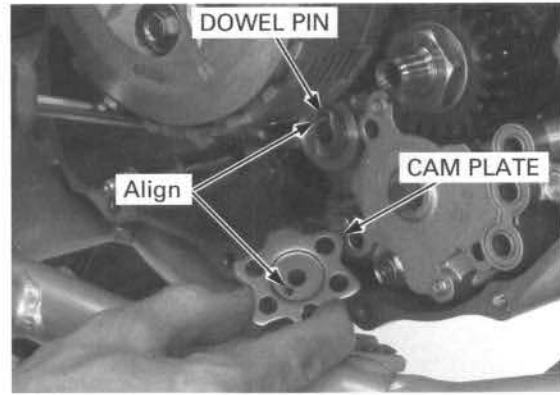
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



## CLUTCH/GEARSHIFT LINKAGE

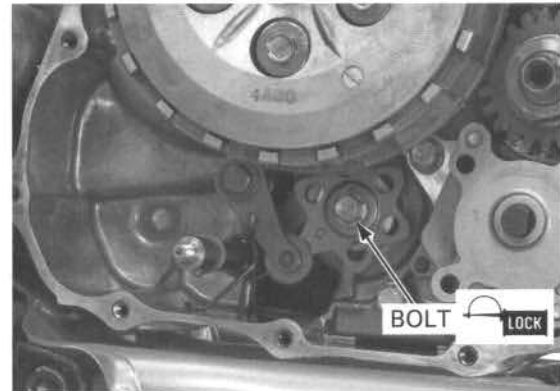
Install the dowel pin into the shift drum hole.

Hold the stopper arm with a screwdriver and install the cam plate by aligning the pin hole with the dowel pin.



Apply locking agent to the cam plate bolt threads. Install the bolt and tighten it.

Install the right crankcase cover (page 10-16).



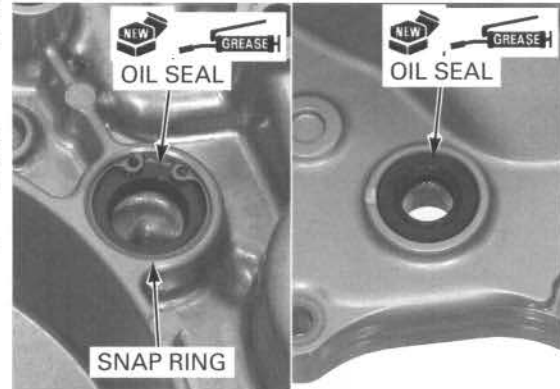
## RIGHT CRANKCASE COVER INSTALLATION

### ASSEMBLY

Clean off any gasket material from the crankcase cover mating surface, being careful not to damage it.

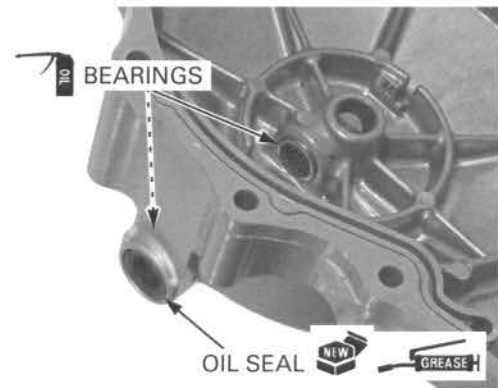
Remove the snap ring and the crankshaft oil seal. Install a new oil seal with the flat surface facing the crankshaft side. Install the snap ring into the cove groove with the chamfered edge facing the oil seal side.

Install a new stopper shaft oil seal with the flat surface facing out until it is fully seated.

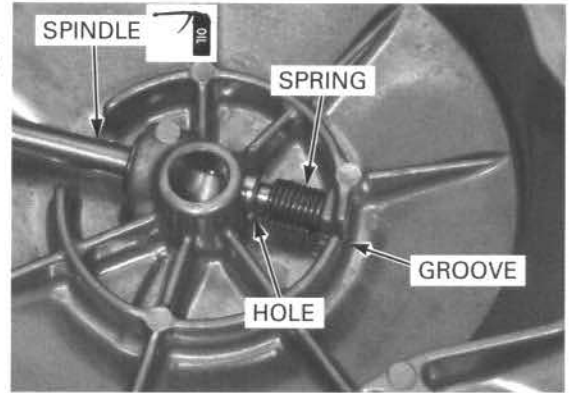


Install a new lifter arm oil seal with the flat surface facing out until it is fully seated.

Pack the lips of all the oil seal with grease. Apply engine oil to the lifter arm bearings.



Apply engine oil to the lifter arm spindle.  
Install the return spring and lifter arm into the crankcase cover by aligning the spring ends with the groove in the cover and the hole in the spindle.

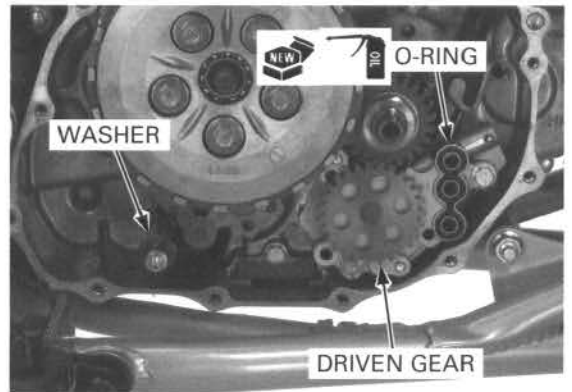


**INSTALLATION**

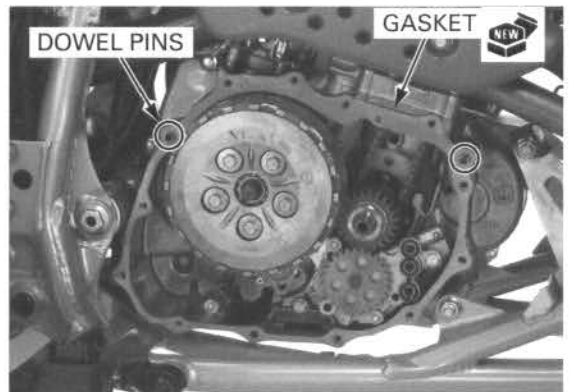
Clean off any gasket material from the crankcase mating surface thoroughly, being careful not to damage it.

Install the following:

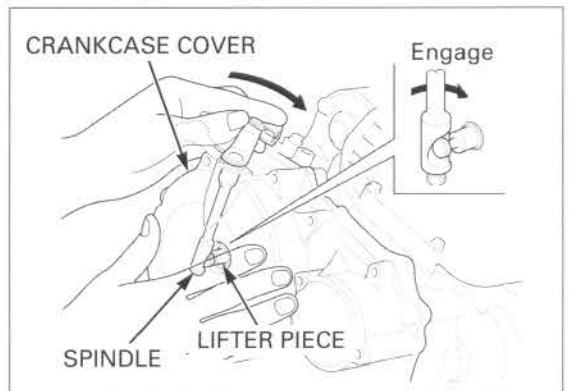
- thrust washer
- oil pump driven
- new O-ring (apply engine oil)



- two dowel pins
- new gasket

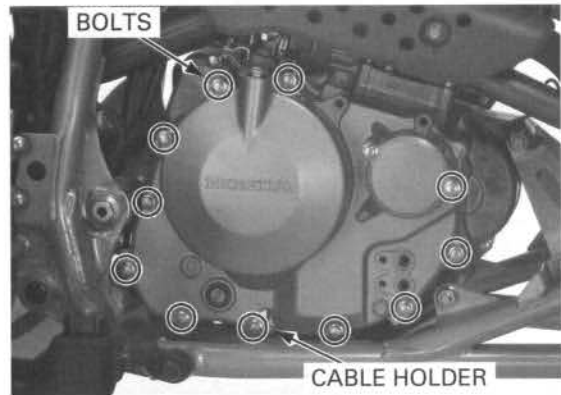


Install the crankcase cover while turning the clutch lifter arm clockwise to engage the spindle groove with the lifter piece.



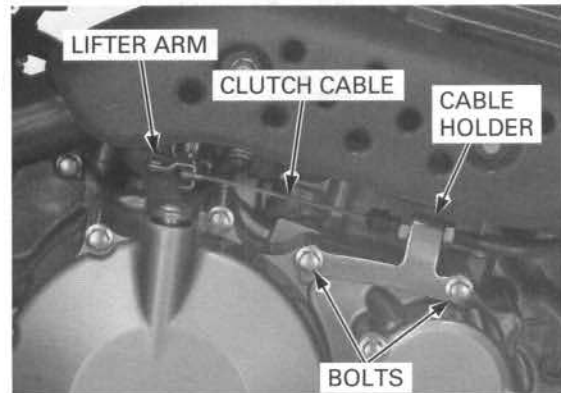
## CLUTCH/GEARSHIFT LINKAGE

Install the 11 cover bolts and cable holder.

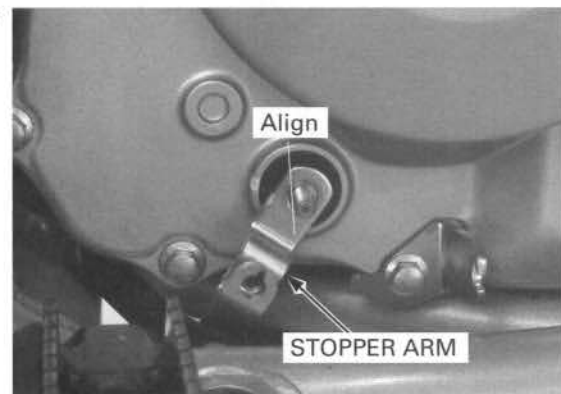


Connect the clutch cable to the lifter arm.  
Install the cable holder with the two bolts.

Tighten the cover bolts in a crisscross pattern in several steps.

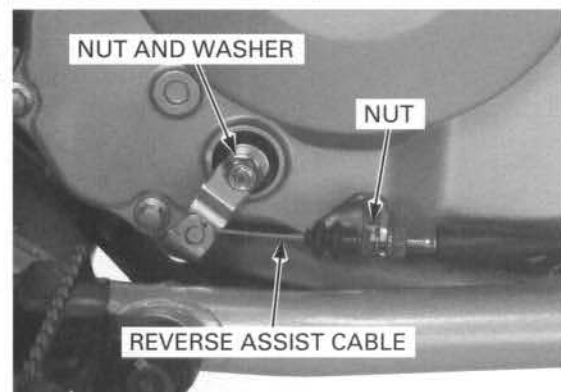


Install the reverse stopper arm by aligning the flats and secure it with the nut and washer.



Tighten the arm nut securely.

Connect the reverse assist cable to the stopper arm and install it to the cable holder. Temporarily tighten the cable lock nut.



Install the dowel pins into the crankcase cover.  
Coat new O-ring with engine oil and install them onto the dowel pins.

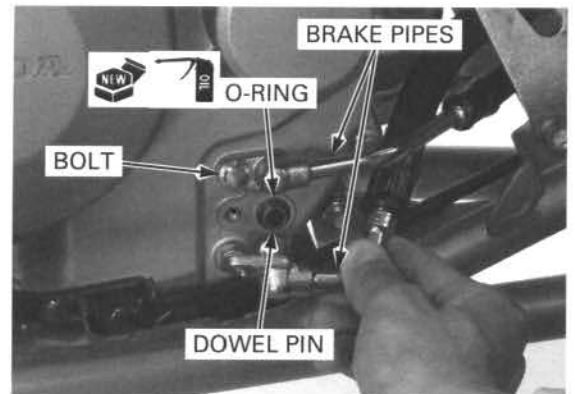
Install the oil pipes and tighten the bolts.

Install the brake pedal (page 15-28).

Perform the following adjustments:

- clutch lever free play (page 4-23)
- reverse assist lever free play (page 4-22)

Pour the engine oil (page 4-11).



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MEMO



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RIDE RED

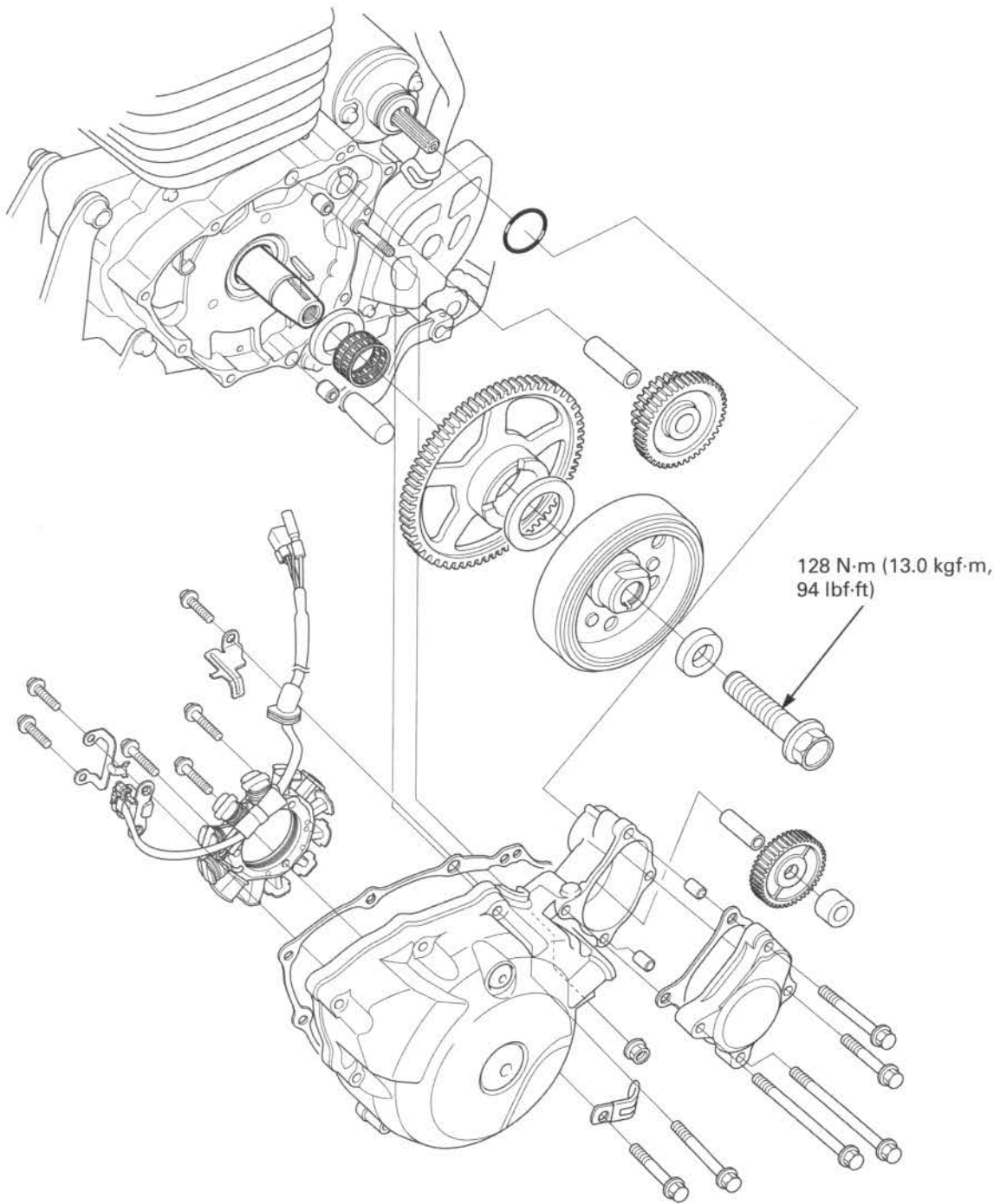


# 11. ALTERNATOR/STARTER CLUTCH

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SYSTEM COMPONENTS .....	11-2	FLYWHEEL REMOVAL .....	11-8
SERVICE INFORMATION .....	11-3	STARTER CLUTCH .....	11-9
TROUBLESHOOTING .....	11-3	FLYWHEEL INSTALLATION.....	11-11
ALTERNATOR STATOR .....	11-4		

**ALTERNATOR/STARTER CLUTCH  
SYSTEM COMPONENTS**



## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. These parts can be serviced with the engine installed in the frame.
- Refer to page 16-2 for alternator stator inspection.
- Refer to page 18-2 for starter motor servicing.

### SPECIFICATION

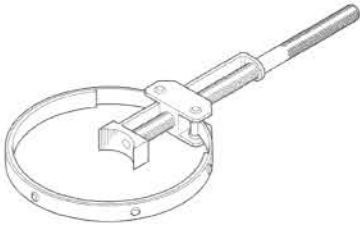
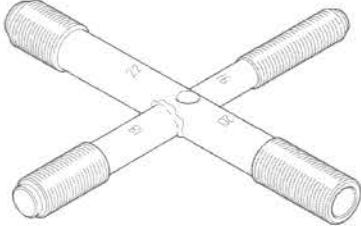
Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.705 – 51.718 (2.0356 – 2.0361)	51.67 (2.034)

### TORQUE VALUES

Gearshift pedal pinch bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)
Flywheel bolt	128 N·m (13.0 kgf·m, 94 lbf·ft) Apply oil to the threads and seating surface.
Starter clutch bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) Apply locking agent to the threads.
Left crankcase stud bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

### TOOLS

<p>Flywheel holder 07725-0040000</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Rotor puller 07733-0020001</p>  <p>or 07933-3950000 (U.S.A. only)</p>
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## TROUBLESHOOTING

### Starter motor turns, but engine does not turn

- Faulty starter clutch
- Damaged starter idle gear and/or reduction gear

## ALTERNATOR STATOR

### LEFT CRANKCASE COVER REMOVAL

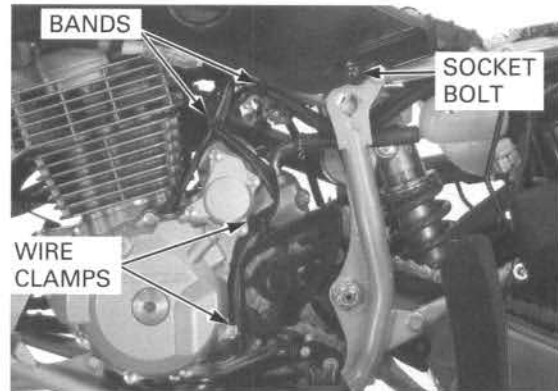
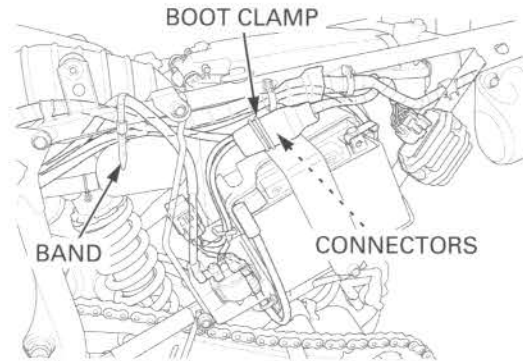
Drain the engine oil (page 4-11).

Remove the seat/rear fender (page 3-3).

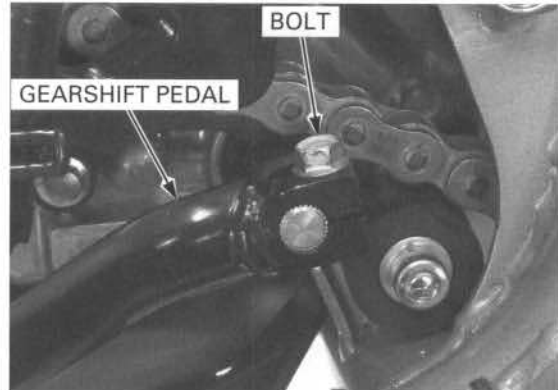
Release the connector boot from the clamp, disconnect the alternator/ignition pulse generator 4P (white) connector and exciter coil connector (black/red wire).

Remove the following:

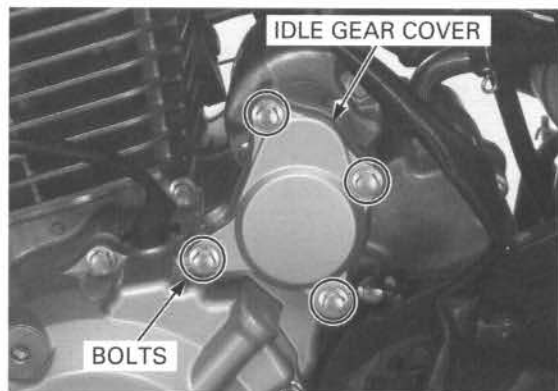
- left side cover bolt
- three wire bands
- neutral/reverse switch wire (from the two clamps)



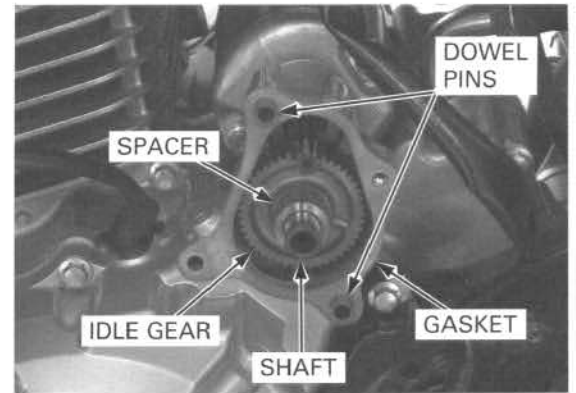
- pinch bolt
- gearshift pedal



- four bolts
- idle gear cover

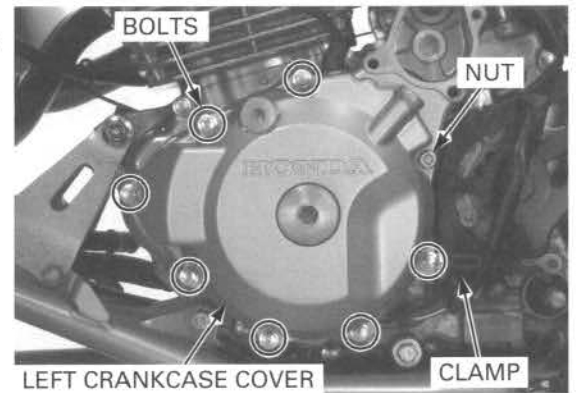


- dowel pins
- gasket
- spacer
- idle gear shaft and gear

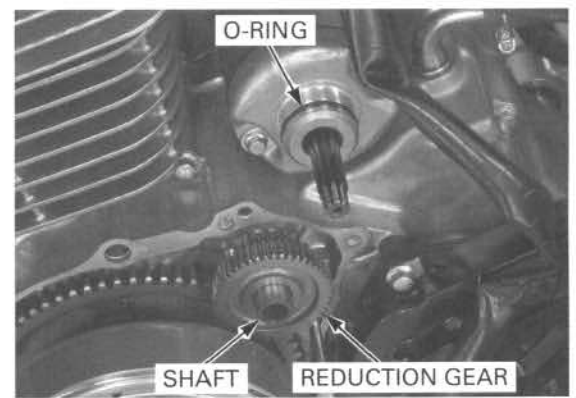


*The left crankcase cover (stator) is magnetically attracted to the fly-wheel. Be careful during removal.*

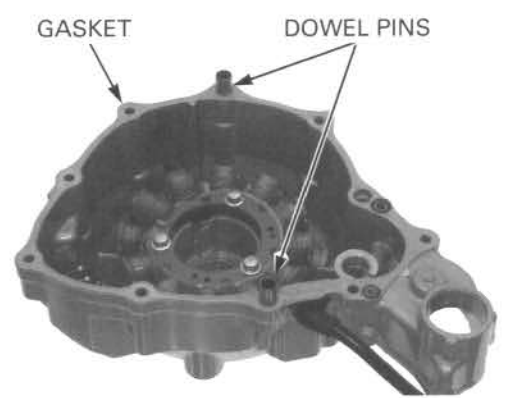
- nut
- seven bolts and clamp (in a crisscross pattern in several steps)
- left crankcase cover



- reduction gear shaft and gear
- O-ring



- dowel pins
- gasket

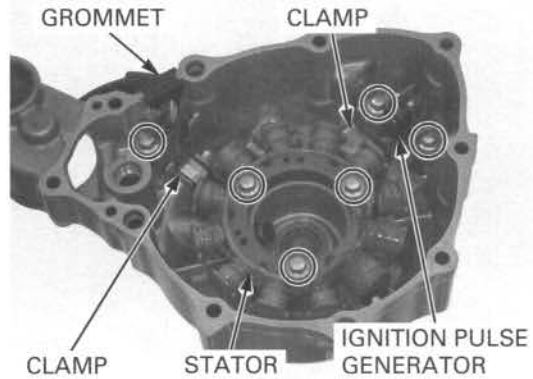


## ALTERNATOR/STARTER CLUTCH

### STATOR REMOVAL

Remove the following from the left crankcase cover:

- bolt and wire clamp
- two ignition pulse generator bolts and wire clamp
- three stator bolts
- wire grommet
- stator/ignition pulse generator assembly



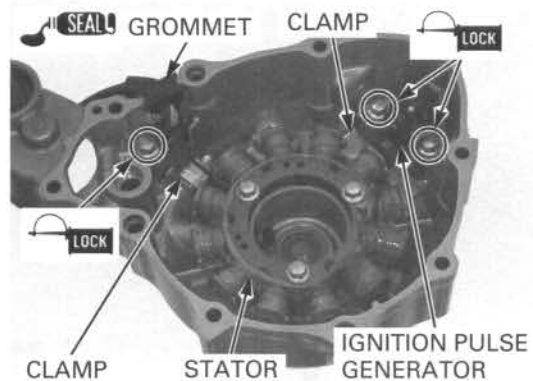
### STATOR INSTALLATION

Install the stator/ignition pulse generator assembly onto the left crankcase cover.

Apply sealant to the wire grommet seating surface and install it into the cover groove properly.

Install the three stator bolts and tighten them securely.

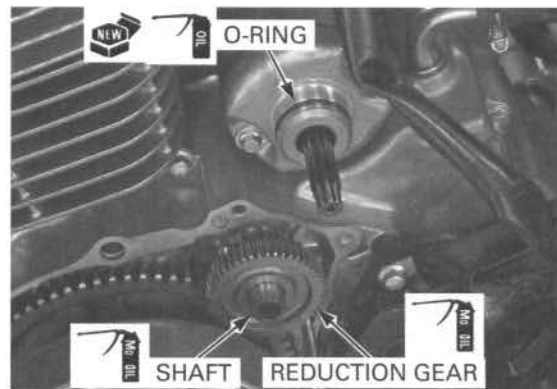
Apply locking agent to the bolt threads. Install the wire clamps and bolts, and tighten the bolts securely.



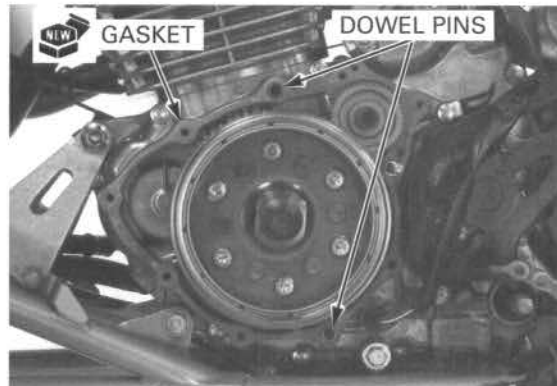
### LEFT CRANKCASE COVER INSTALLATION

Apply molybdenum oil solution to the starter reduction gear teeth and shaft. Install the starter reduction gear and shaft.

Coat a new O-ring with engine oil and install it into the starter motor groove.



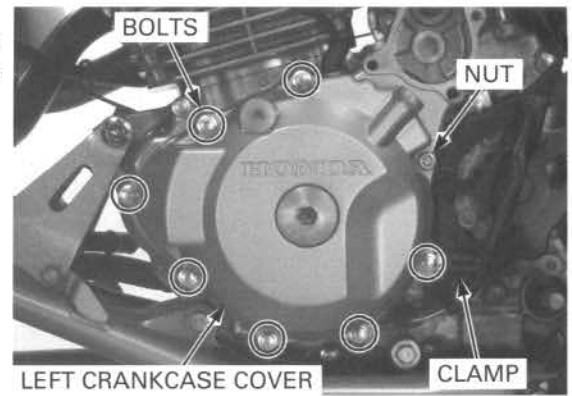
Install the dowel pins and a new gasket.



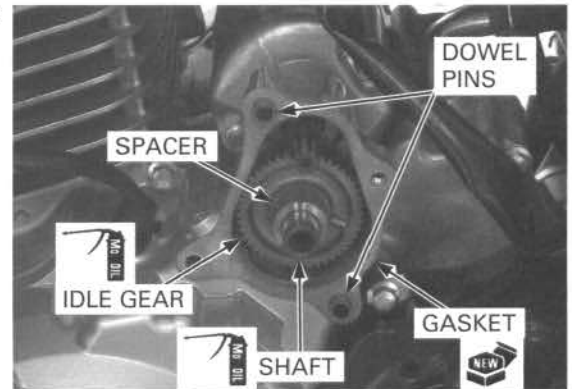
## ALTERNATOR/STARTER CLUTCH

The left crankcase cover (stator) is magnetically attracted to the flywheel. Be careful during installation.

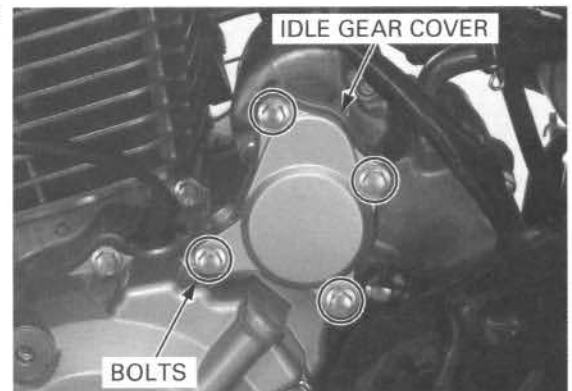
Install the left crankcase cover.  
Install the nut and seven bolts with the clamp, and tighten them in a crisscross pattern in several steps.



Apply molybdenum oil solution to the starter idle gear teeth and shaft.  
Install the idle gear shaft, gear and spacer.  
Install the dowel pins and a new gasket.

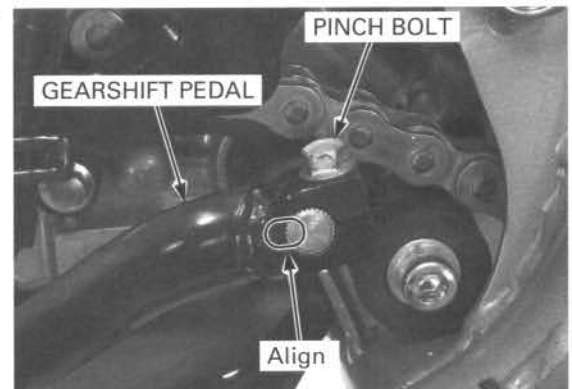


Install the idle gear cover and tighten the four bolts securely.



Install the gearshift pedal onto the spindle by aligning the punch marks.  
Install the pinch bolt and tighten it.

**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**



## ALTERNATOR/STARTER CLUTCH

Route the wires properly (page 1-18).

Secure the neutral/reverse switch wire with the two clamps.

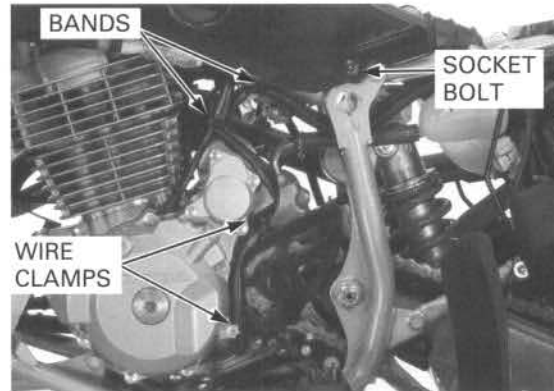
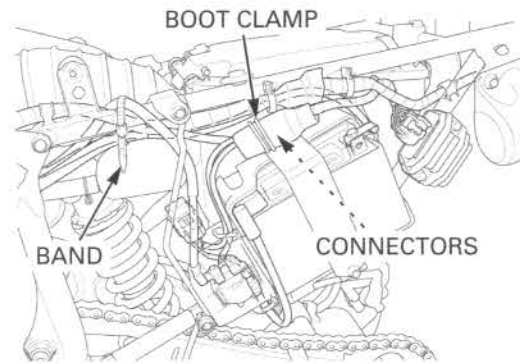
Route the alternator wire around the frame and secure it with the three wire band.

Connect the alternator/ignition pulse generator and exciter coil connectors, and secure the connector boot with the clamp,

Install the socket bolt attaching the front fender.

Pour the engine oil (page 4-11).

Install the seat/rear fender (page 3-3).



## FLYWHEEL REMOVAL

Remove the left crankcase cover (page 11-4).

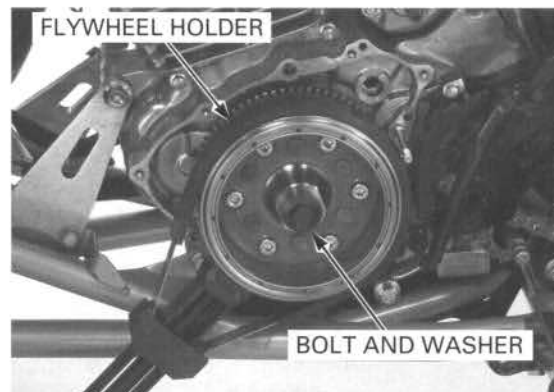
Hold the flywheel with the special tool and loosen the flywheel bolt.

**TOOL:**

Flywheel holder

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

Remove the special tool, bolt and washer.

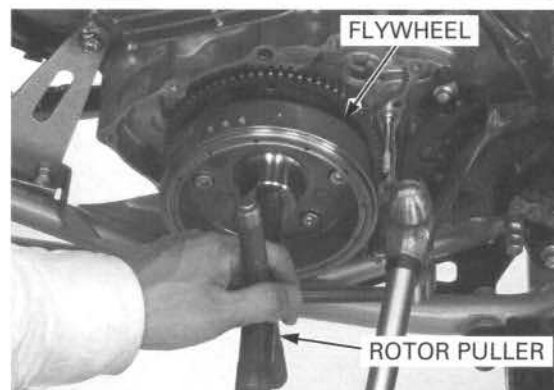


Remove the flywheel using the special tool.

**TOOL:**

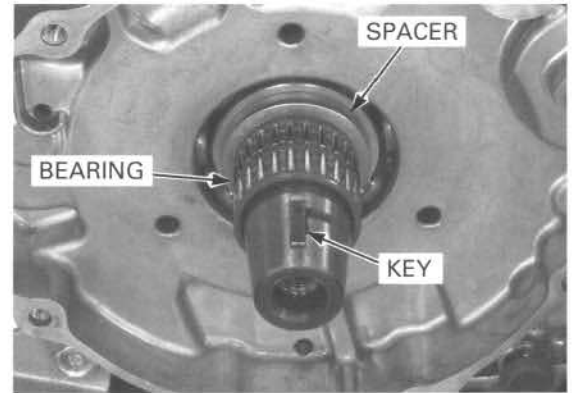
Rotor puller

07733-0020001 or 07933-3950000





- Remove the following from the crankshaft:
- needle bearing
  - spacer
  - woodruff key

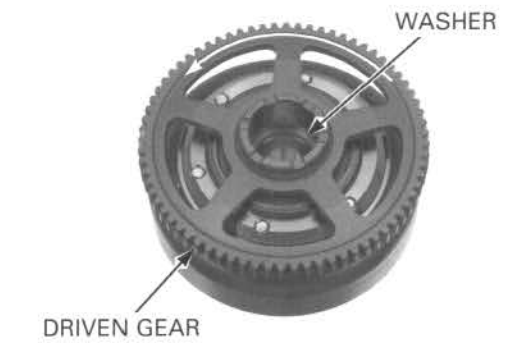


## STARTER CLUTCH

### REMOVAL

Remove the flywheel (page 11-8).

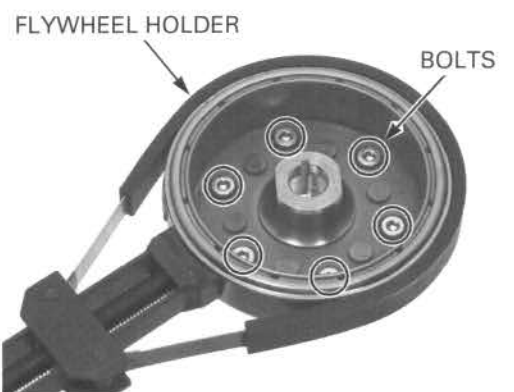
Remove the starter driven gear while turning it counterclockwise.  
Remove the washer.



Hold the flywheel with the special tool and remove the clutch outer bolts.

**TOOL:**  
Flywheel holder

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



Remove the clutch outer and sprag clutch.

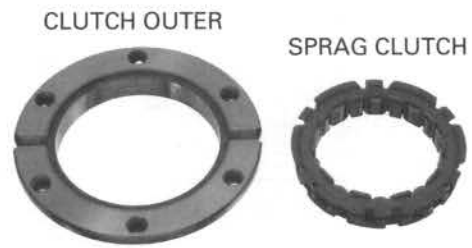
### INSPECTION

Check the starter idle gear and reduction gear for wear or damage.



## ALTERNATOR/STARTER CLUTCH

Check the clutch outer and sprag clutch for abnormal wear or damage.



Check the starter driven gear for wear or damage.

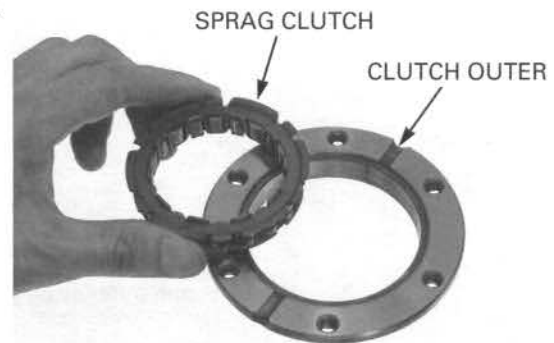
Measure the starter driven gear boss O.D.

**SERVICE LIMIT: 51.76 mm (2.034 in)**



### INSTALLATION

Install the sprag clutch into the clutch outer with the flange side facing the flywheel side.



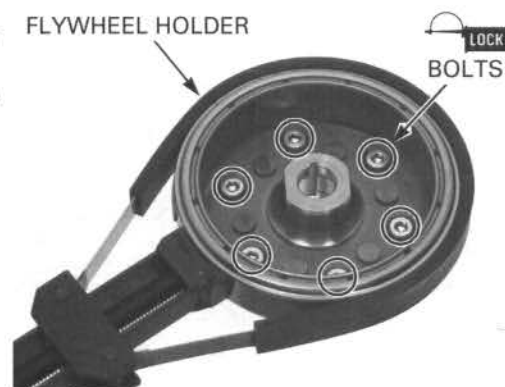
Apply locking agent to the clutch outer bolt threads. Install the flywheel onto the starter clutch assembly and install the bolts. Hold the flywheel with the special tool and tighten the bolts.

**TOOL:**

Flywheel holder

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

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



Install the washer onto the flywheel.  
Install the starter driven gear while turning it counterclockwise.

Check that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

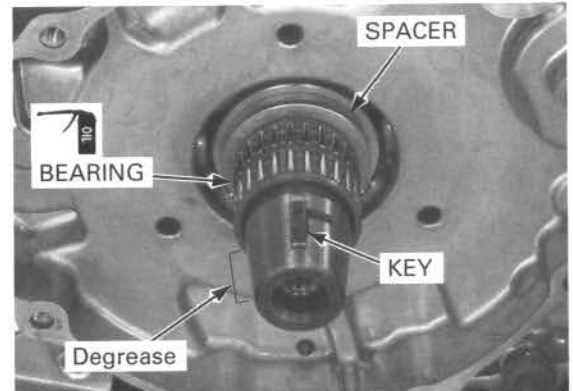
Install the flywheel (page 11-11).



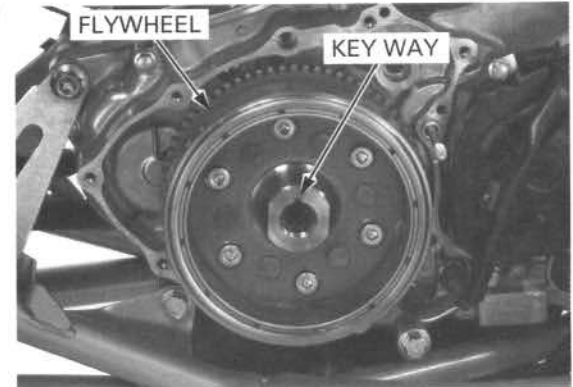
## FLYWHEEL INSTALLATION

Apply engine oil to the needle bearing.  
Install the spacer and needle bearing onto the crankshaft.  
Install the woodruff key into the crankshaft key groove.

Degrease the tapered portions of the crankshaft and flywheel.



Install the flywheel onto the crankshaft by aligning the key way with the woodruff key.



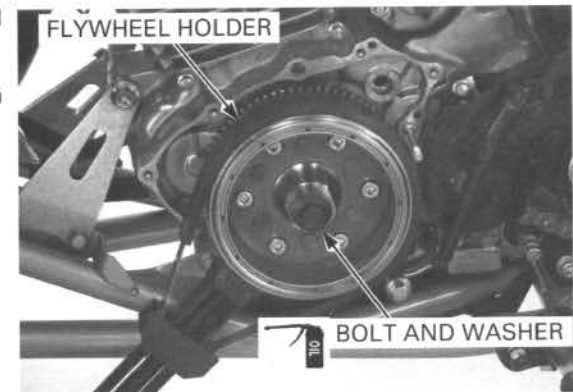
Apply engine oil to the flywheel bolt threads and seating surface.  
Install the washer and flywheel bolt.  
Hold the flywheel with the special tool and tighten the flywheel bolt.

**TOOL:**  
Flywheel holder

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

**TORQUE: 128 N·m (13.0 kgf·m, 94 lbf·ft)**

Install the left crankcase cover (page 11-6).



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**MEMO**



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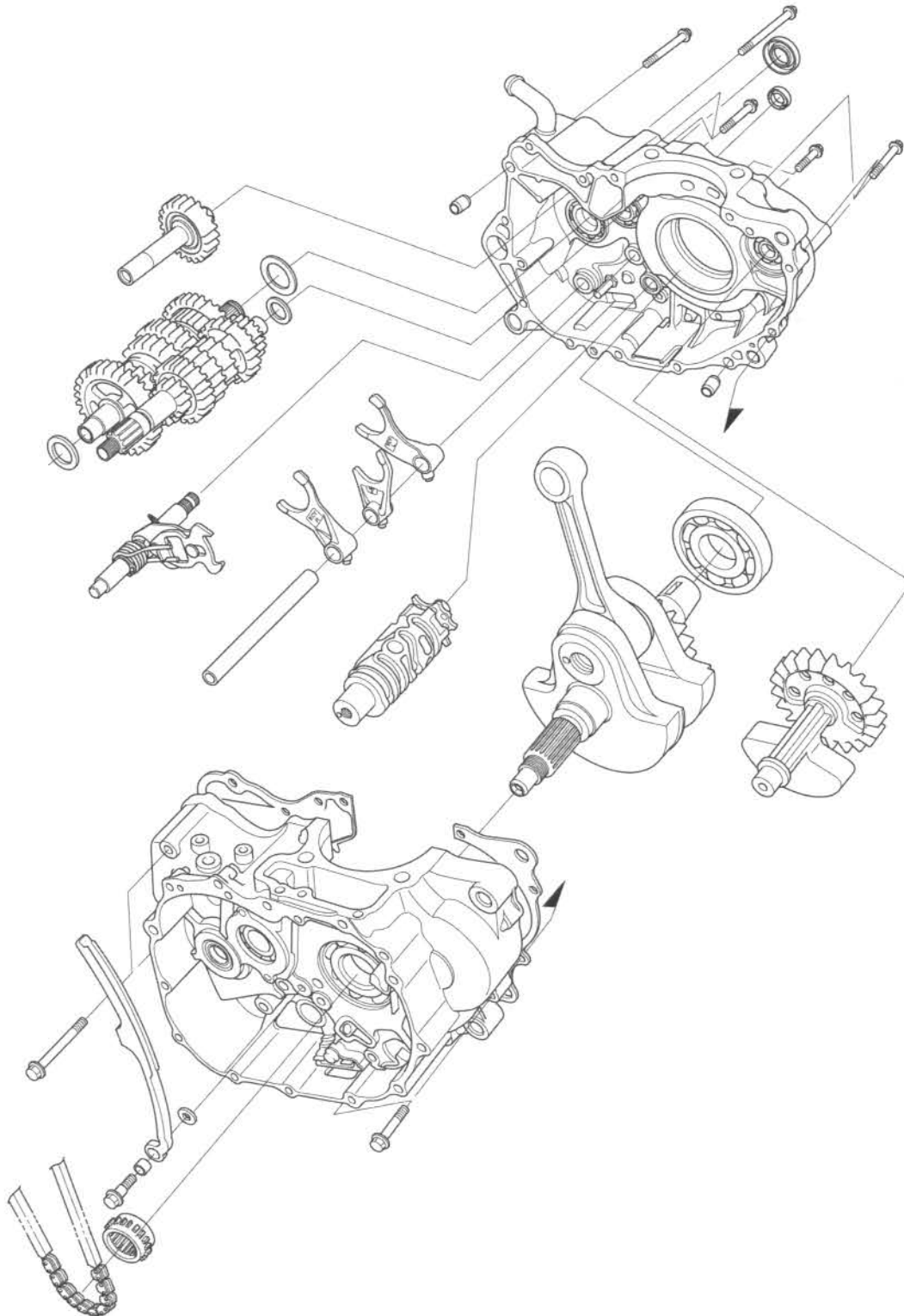
**RIDE RED**

# 12. CRANKCASE/TRANSMISSION/CRANKSHAFT

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SYSTEM COMPONENTS .....	12-2	TRANSMISSION .....	12-8
SERVICE INFORMATION .....	12-3	CRANKSHAFT/BALANCER .....	12-16
TROUBLESHOOTING .....	12-6	CRANKCASE BEARING .....	12-18
CRANKCASE SEPARATION .....	12-7	CRANKCASE ASSEMBLY .....	12-21

SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- The crankcase halves must be separated to service the transmission and crankshaft. To service these parts, the engine must be removed from the frame (page 7-2).
- Be careful not to damage the crankcase mating surfaces when servicing.

### SPECIFICATIONS

Unit: mm (in)










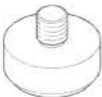
ITEM		STANDARD	SERVICE LIMIT	
Shift fork	Fork I.D.	13.000 – 13.018 (0.5118 – 0.5125)	13.04 (0.513)	
	Shaft O.D.	12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)	
	Fork claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.5 (0.22)	
Transmission	Gear I.D.	M4	25.020 – 25.041 (0.9850 – 0.9859)	25.08 (0.987)
		M5	25.000 – 25.021 (0.9843 – 0.9851)	25.06 (0.987)
		C1	23.000 – 23.021 (0.9055 – 0.9063)	23.07 (0.908)
		C2, C3, CR	28.020 – 28.041 (1.1031 – 1.1040)	28.08 (1.106)
		Reverse idle	17.000 – 17.018 (0.6693 – 0.6700)	17.04 (0.671)
	Gear bushing O.D.	M4	24.979 – 25.000 (0.9834 – 0.9843)	24.90 (0.980)
		M5	24.959 – 21.980 (0.8645 – 0.8654)	24.90 (0.980)
		C1	22.959 – 22.980 (0.9039 – 0.9047)	22.90 (0.902)
		C2, C3, CR	27.979 – 28.000 (1.1015 – 1.1024)	27.94 (1.100)
		Reverse idle	16.966 – 16.984 (0.6693 – 0.6700)	16.94 (0.667)
	Gear (mainshaft and counter shaft)-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0022)	0.10 (0.004)
	Reverse idle gear-to-bushing clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
	Gear bushing I.D.	M4	22.000 – 22.021 (0.8661 – 0.8670)	22.10 (0.870)
		C1	20.020 – 20.041 (0.7882 – 0.7890)	20.08 (0.791)
		C2, CR	25.000 – 25.021 (0.9843 – 0.9851)	25.06 (0.987)
		Reverse idle	13.000 – 13.018 (0.5118 – 0.5125)	13.04 (0.513)
	Mainshaft O.D.	at M4	21.959 – 21.980 (0.7866 – 0.7874)	21.92 (0.863)
	Countershaft O.D.	at C1	19.979 – 20.000 (1.1791 – 1.1801)	19.94 (0.785)
		at C2, CR	24.959 – 24.980 (0.9826 – 0.9835)	24.92 (0.981)
	Reverse idle shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.94 (0.509)
Bushing-to-shaft (mainshaft and countershaft) clearance		0.020 – 0.062 (0.0008 – 0.0022)	0.10 (0.004)	
Bushing-to-reverse idle shaft clearance		0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)	
Crankshaft	Runout	-	0.12 (0.005)	
	Big end side clearance	0.05 – 0.45 (0.002 – 0.018)	0.6 (0.02)	
	Big end radial clearance	0.006 – 0.018 (0.0002 – 0.0007)	0.05 (0.002)	

### TORQUE VALUE

- |                                      |                                                                  |
|--------------------------------------|------------------------------------------------------------------|
| Mainshaft bearing setting plate bolt | 12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads. |
| Gearshift spindle return spring pin  | 24 N·m (2.4 kgf·m, 18 lbf·ft)                                    |

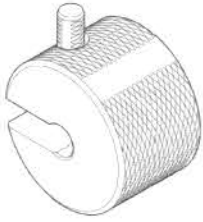



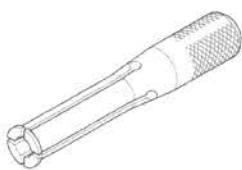

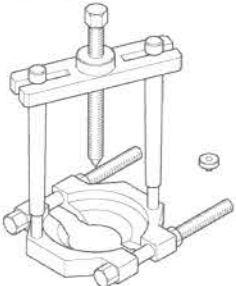

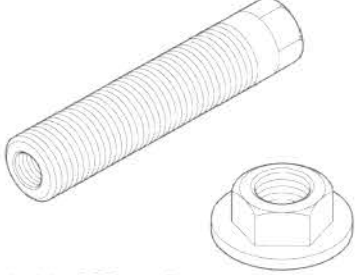

# CRANKCASE/TRANSMISSION/CRANKSHAFT

## TOOLS

<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 52 x 55 mm 07746-0010400</p> 
<p>Attachment, 72 x 75 mm 07746-0010600</p> 	<p>Pilot, 13 mm 07746-0041500</p> 	<p>Pilot, 15 mm 07746-0040300</p> 
<p>Pilot, 16 mm 07746-0041300</p> 	<p>Pilot, 17 mm 07746-0040400</p> 	<p>Pilot, 22 mm 07746-0041000</p> 
<p>Pilot, 25 mm 07746-0040600</p> 	<p>Pilot, 30 mm 07746-0040700</p> 	<p>Driver 07749-0010000</p> 



# CRANKCASE/TRANSMISSION/CRANKSHAFT

<p>Remover weight 07741-0010201</p>  <p>or 07936-3710200 or 07936-371020A (U.S.A. only)</p>	<p>Remover shaft, 12 mm 07936-1660120</p> 	<p>Remover head, 13 mm 07LMC-KZ10100</p> 
<p>Remover shaft, 15 mm 07936-KC10100</p> 	<p>Remover head, 15 mm 07936-KC10200</p> 	<p>Remover head, 16 mm 07936-MK50100</p> 
<p>Universal bearing puller 07631-0010000</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Crankcase assembly collar 07965-VM00100</p> 	<p>Crankcase assembly shaft 07965-VM00200</p>  <p>or 07931-ME4010B and 07931-HB3020A (U.S.A. only)</p>
<p>Threaded adaptor 07965-VM00300</p>  <p>or 07931-KF00200</p>		

## TROUBLESHOOTING

### Excessive engine noise

- Worn connecting rod big end bearing
- Worn crankshaft main journal bearing
- Worn balancer bearing
- Improper balancer installation
- Worn transmission gears
- Worn transmission bearings

### Transmission jumps out of gear

- Worn or broken gearshift spindle return spring
- Worn gear dogs or dog holes
- Worn shift drum guide groove
- Worn shift fork guide pin
- Worn gear shifter groove
- Worn shift fork
- Bent shift fork shaft
- Faulty gearshift linkage (page 10-4)

### Hard to shift

- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum guide grooves
- Damaged shift fork guide pin
- Faulty gearshift linkage (page 10-4)

### Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

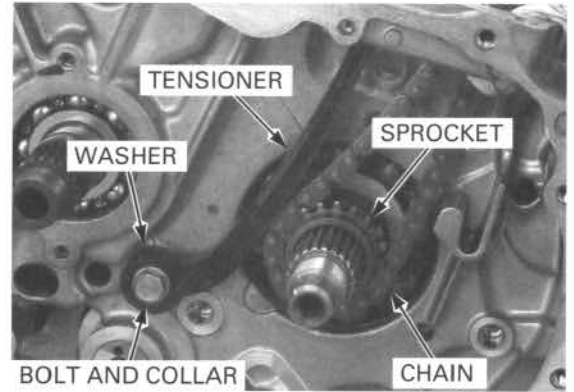
### Engine vibration

- Excessive crankshaft runout
- Improper balancer timing

## CRANKCASE SEPARATION

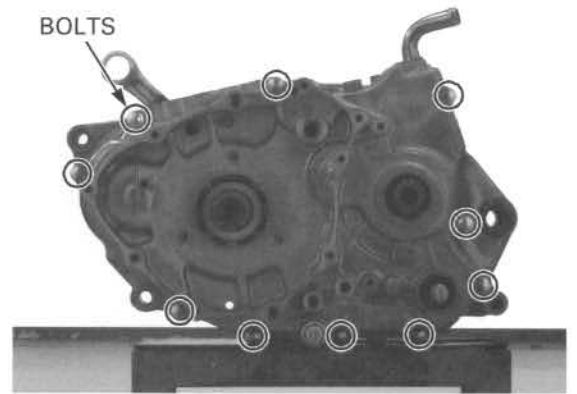
Remove the following:

- engine (page 7-2)
- cylinder head (page 8-13)
- cylinder and piston (page 9-4)
- clutch (page 10-7)
- gearshift linkage (page 10-14)
- oil pump (page 5-4)
- flywheel (page 11-8)
- starter motor (page 18-6)
- neutral and reverse switches (page 19-9)
- bolt, cam chain tensioner, washer and collar
- cam chain
- timing sprocket

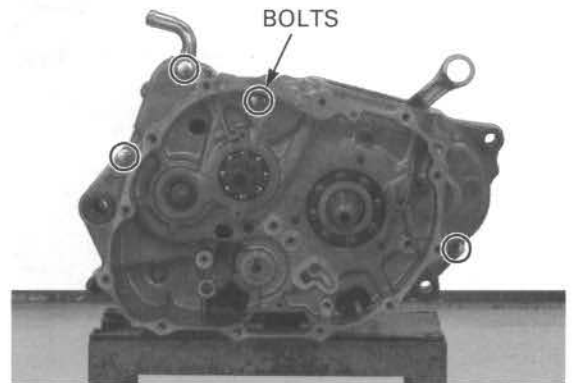


Loosen the crankcase bolts in a crisscross pattern in several steps and remove them.

- left crankcase; 10 bolts



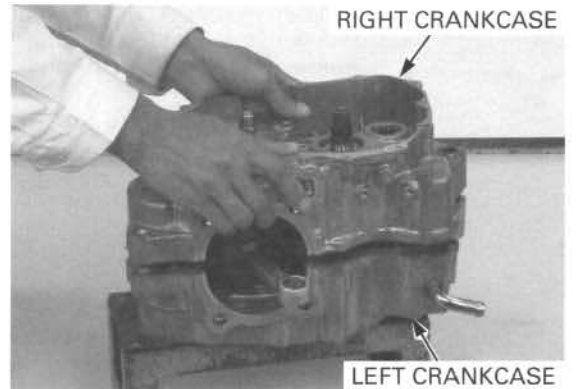
- right crankcase; 4 bolts



Place the crankcase assembly with the left crankcase down.

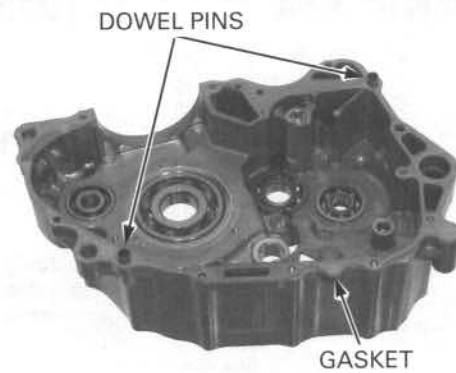
*Do not pry the crankcase apart with a screwdriver.*

Separate the right crankcase from the left crankcase by tapping them at several locations with a soft hammer.



## CRANKCASE/TRANSMISSION/CRANKSHAFT

Remove the dowel pins and gasket.

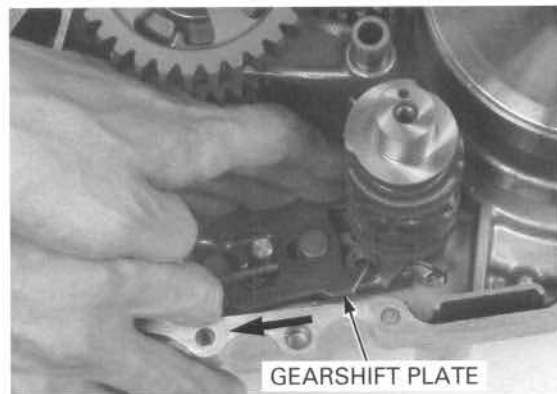


## TRANSMISSION

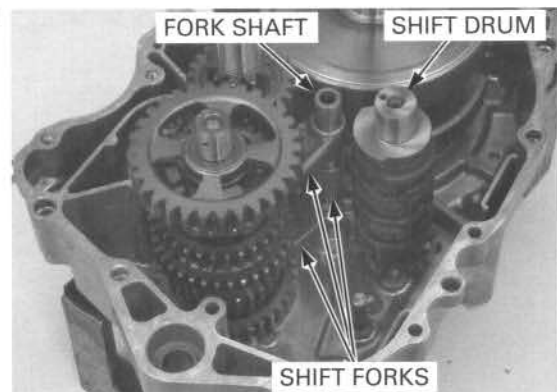
### DISASSEMBLY

Separate the crankcase halves (page 12-7).

Pull the gearshift plate away from the shift drum and remove the gearshift spindle.

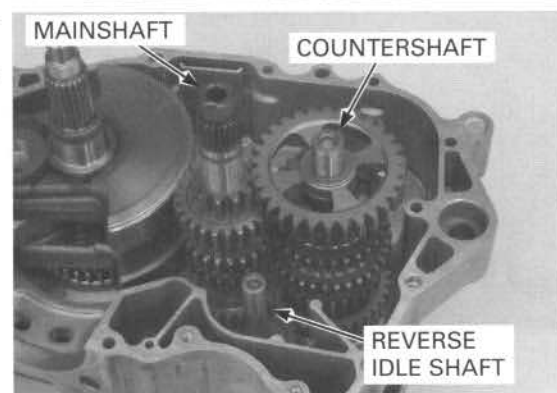


Pull the shift fork shaft out of the left crankcase and shift forks.  
Remove the shift drum and shift forks.



Position the crank weights so that they do not interfere with the mainshaft gears.  
Remove the mainshaft and countershaft as an assembly.

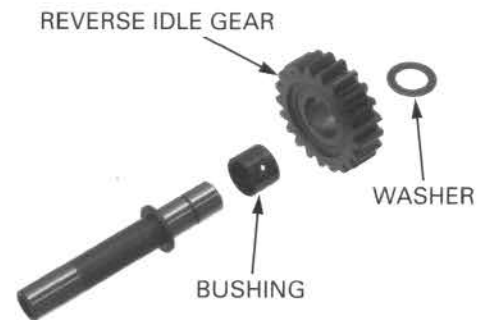
Remove the reverse idle shaft assembly.



Remove the oil seals from the left crankcase.



- Remove the following from the idle shaft:
- lock washer (by prying it with a screwdriver)
  - reverse idle gear
  - gear bushing



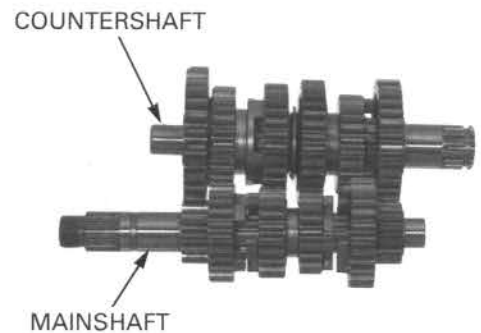
*Do not expand the snap ring more than necessary for removal.*

Disassemble the mainshaft and countershaft.

Clean all disassembled parts in solvent thoroughly.

**NOTE:**

- Keep track of the disassembled parts (gears, bushings, washers and snap rings) by sliding them onto a tool or slipping them onto a piece of wire.



## INSPECTION

### GEAR/BUSHING/SHAFT

Check the gear shifter groove for abnormal wear or damage. Check the gear dogs and teeth for abnormal wear or damage.

If there is damage to the gear dogs, check the slots or dogs on the corresponding engagement gear for damage.



## CRANKCASE/TRANSMISSION/CRANKSHAFT

Measure the I.D. of each gear.

### SERVICE LIMITS:

M4: 25.08 mm (0.987 in)

M5: 25.06 mm (0.987 in)

C1: 23.07 mm (0.908 in)

C2, C3, CR: 28.08 mm (1.106 in)

Reverse idle: 17.04 mm (0.671 in)



Check the bushings for abnormal wear or damage.

Measure the gear bushing O.D.

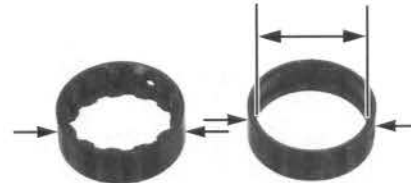
### SERVICE LIMITS:

M4, M5: 24.90 mm (0.980 in)

C1: 22.90 mm (0.902 in)

C2, C3, CR: 27.94 mm (1.100 in)

Reverse idle: 16.94 (0.667)



Calculate the gear-to-bushing clearance.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

Measure the gear bushing I.D.

### SERVICE LIMITS:

M4: 22.10 mm (0.870 in)

C1: 20.08 mm (0.791 in)

C2, CR: 25.06 mm (0.987 in)

Reverse idle: 13.04 (0.513)

Check the reverse idle shaft, mainshaft and countershaft for abnormal wear or damage.

Measure the shaft O.D.

### SERVICE LIMITS:

At M4: 21.92 mm (0.863 in)

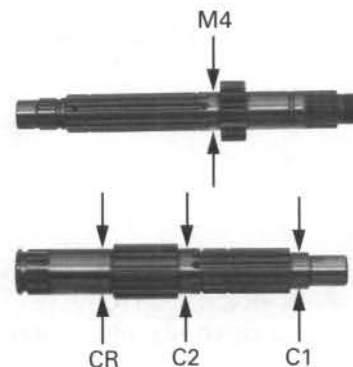
At C1: 19.94 mm (0.785 in)

At C2, CR: 24.92 mm (0.981 in)

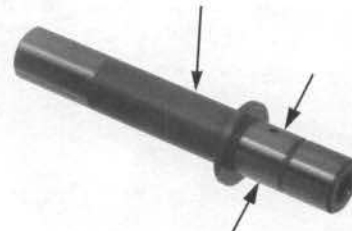
Reverse idle: 12.94 (0.509)

Calculate the gear bushing-to-shaft clearance.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



REVERSE IDLE SHAFT



**SHIFT DRUM**

Inspect the shift drum journals for scoring, scratches or evidence of insufficient lubrication.

Check the guide grooves for abnormal wear or damage.



**SHIFT FORK/SHAFT**

Check the shift fork shaft for damage or binding.

Measure each shift fork shaft O.D.

**SERVICE LIMIT: 12.90 mm (0.508 in)**

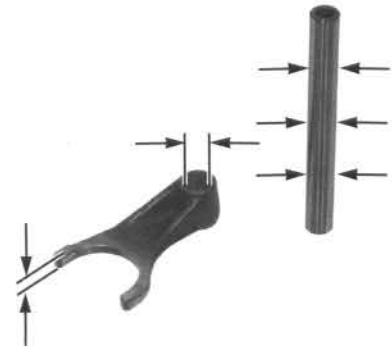
Check the shift forks for abnormal wear or damage.

Measure the I.D. of each shift fork.

**SERVICE LIMIT: 13.04 mm (0.513 in)**

Measure the claw thickness of each shift fork.

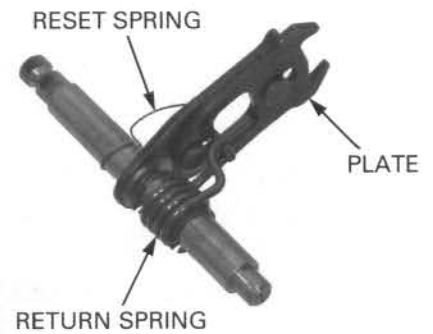
**SERVICE LIMIT: 5.5 mm (0.22 in)**



**GEARSHIFT SPINDLE**

Check the gearshift plate for wear, damage or deformation.

Check the return spring and reset spring for fatigue or damage.



# CRANKCASE/TRANSMISSION/CRANKSHAFT

## ASSEMBLY

Install the crankshaft and balancer (page 12-17).

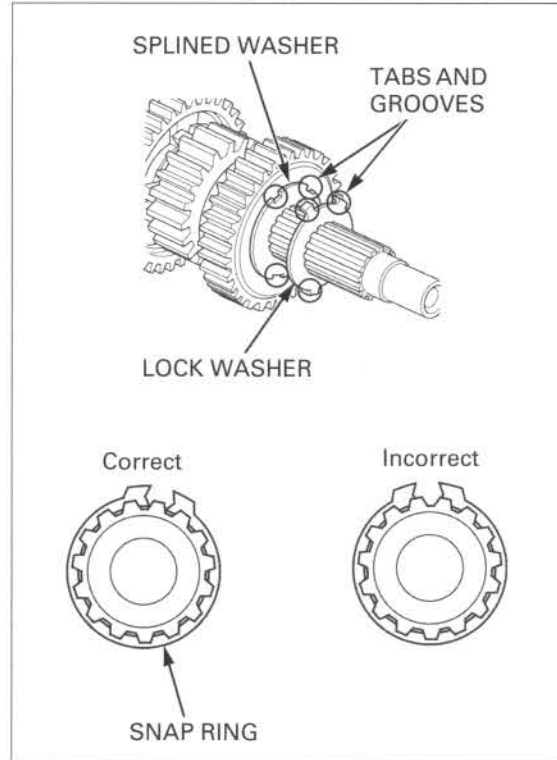
### NOTE:

- Align the lock washer tabs with the splined washer grooves.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so its end gap aligns with the groove in the splines
- Make sure the snap ring is fully seated in the shaft groove after installing it.

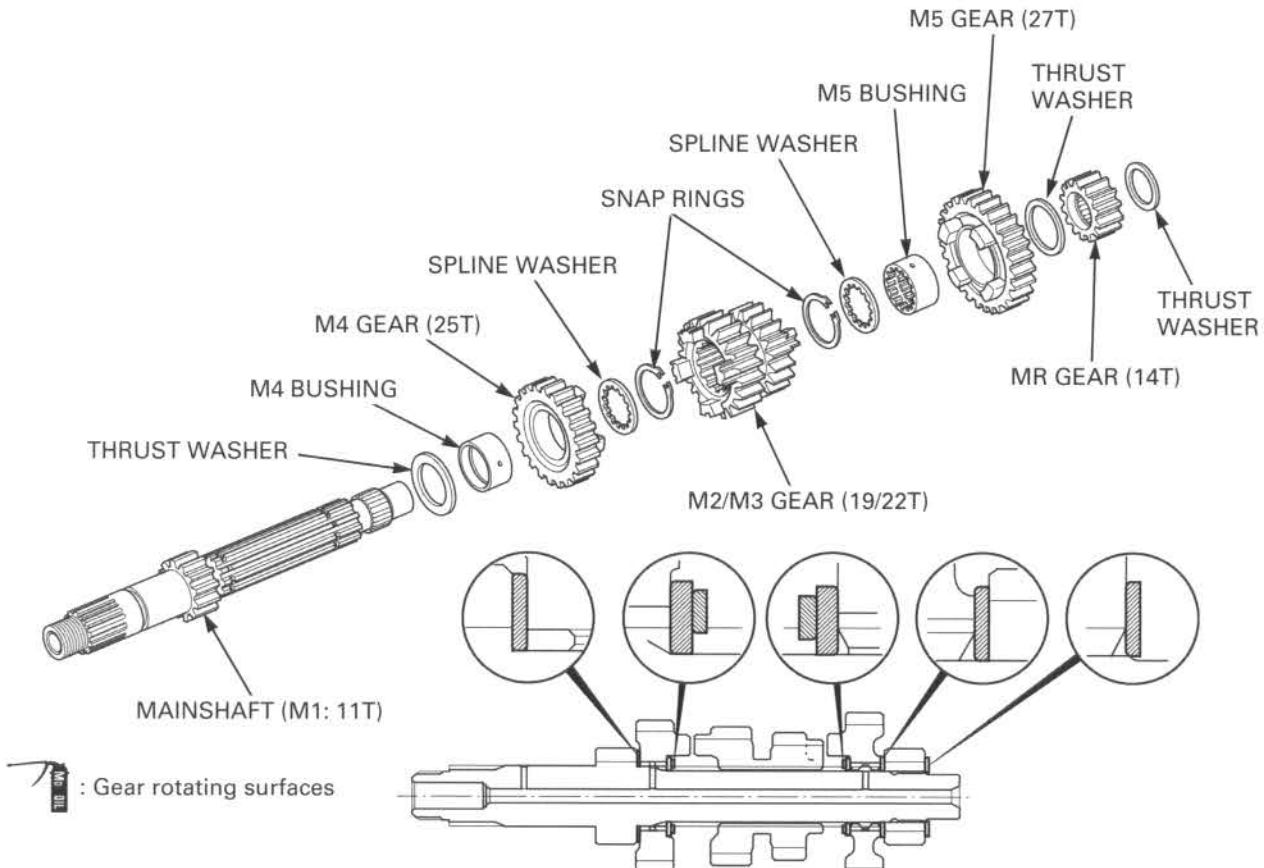
Clean all parts in solvent and dry them thoroughly.

Apply molybdenum oil solution to the gear rotating surfaces.

Assemble the mainshaft and countershaft.

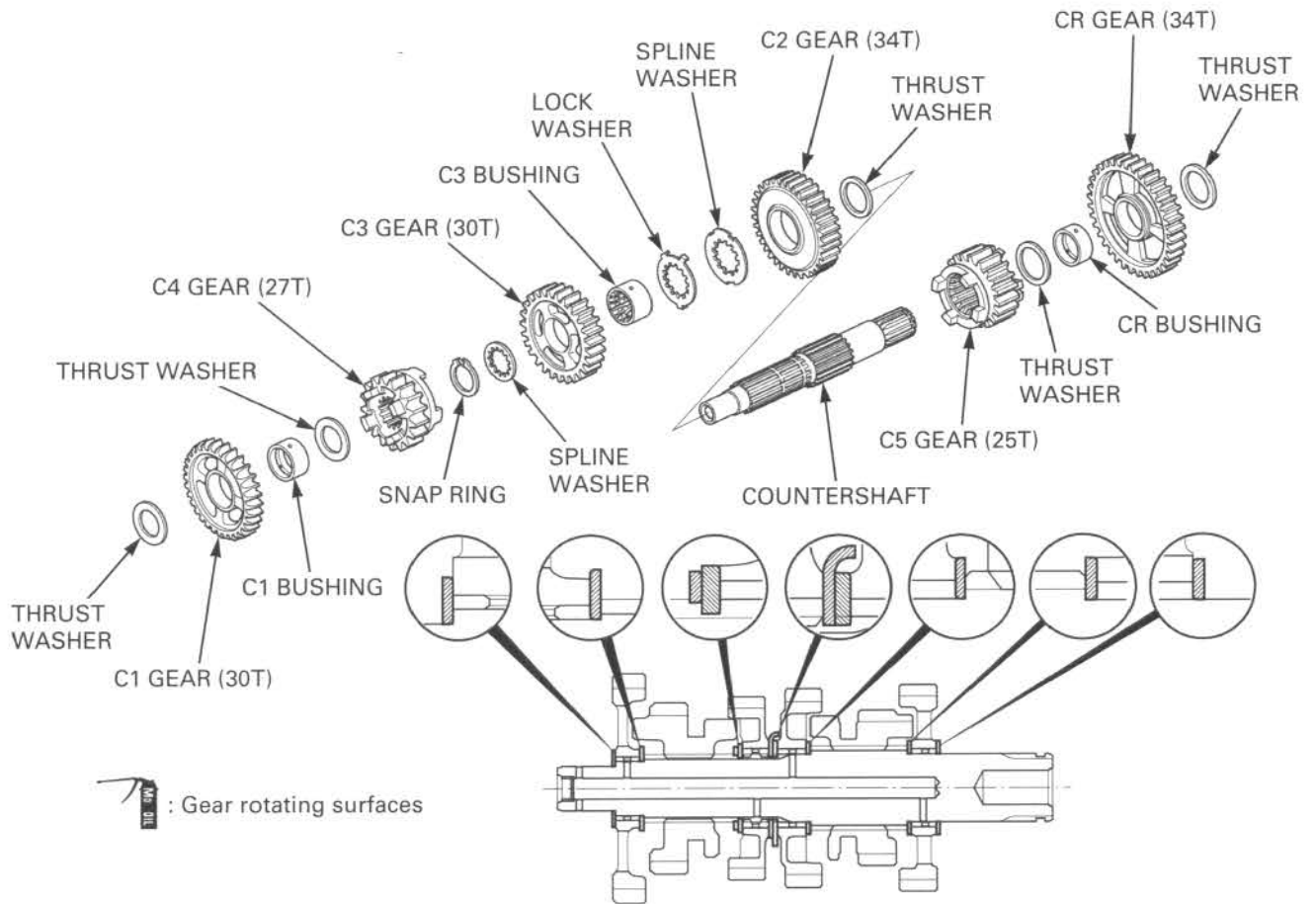


## MAINSHAFT





COUNTERSHAFT



Apply molybdenum oil solution to the reverse idle gear rotating surface.

Install the bushing and idle gear onto the shaft in the direction as shown. Install the lock washer into the shaft groove by tapping it lightly to secure the gear.

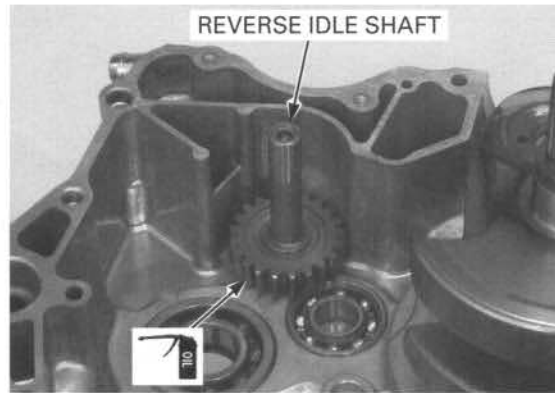


Coat the outer surface of new oil seals of the countershaft and gearshift spindle. Install the oil seals into the left crankcase until they are flush with the crankcase.



## CRANKCASE/TRANSMISSION/CRANKSHAFT

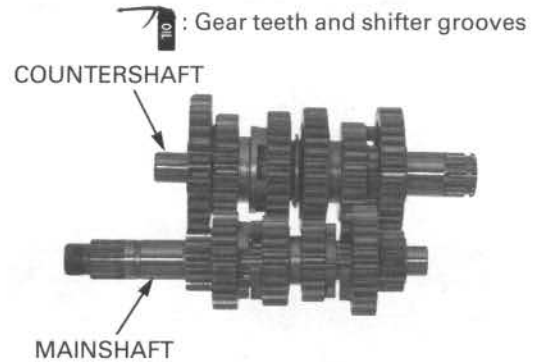
Apply engine oil to the gear teeth and install the reverse idle shaft into the left crankcase.



Check the transmission gears for freedom of movement and rotation on the shaft.

Apply engine oil to the gear teeth and gear shifter grooves (M2/3, C4 and C5).

Engage the mainshaft and countershaft gears.

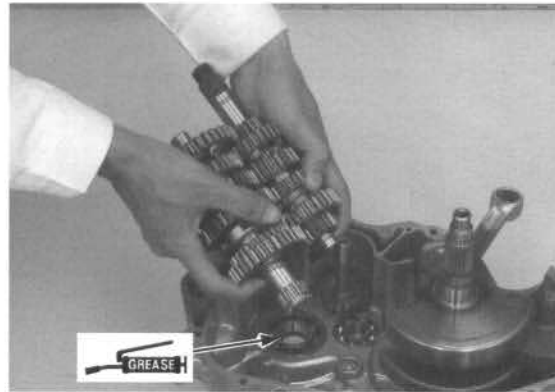


Apply grease to the countershaft oil seal.

Position the crank weights so that they do not interfere with the mainshaft.

*Take care not to drop the thrust washers.*

Install the mainshaft and countershaft as an assembly into the left crankcase.

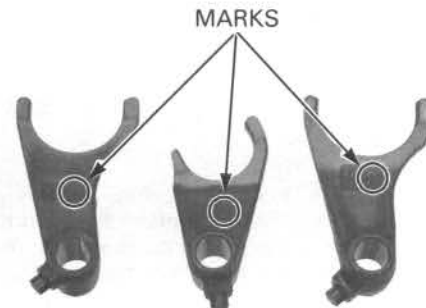


Note the shift fork identification marks.

"L": Left shift fork

"C": Center shift fork

"R": Right shift fork

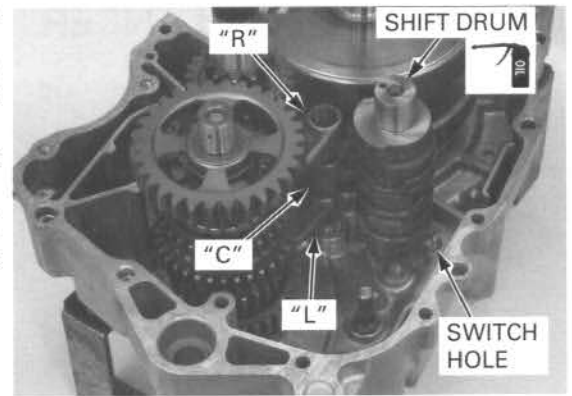


Apply engine oil to the inner surfaces and guide pins of the shift forks.

Install the shift forks into gear shifter grooves with each identification mark facing up (right crankcase side).

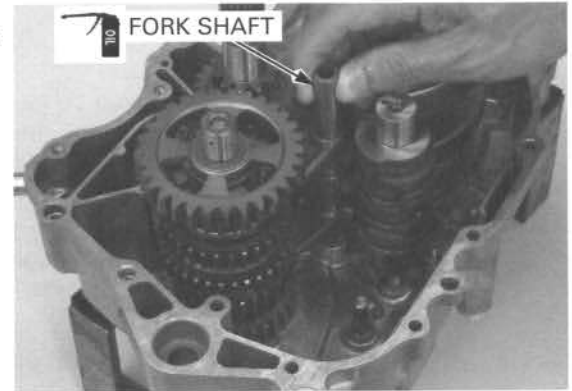
Apply engine oil to the guide grooves in the shift drum.

Install the shift drum, aligning the switch plate contacting tab with the neutral switch hole in the crankcase. Set the guide pin of each fork into the guide grooves carefully.

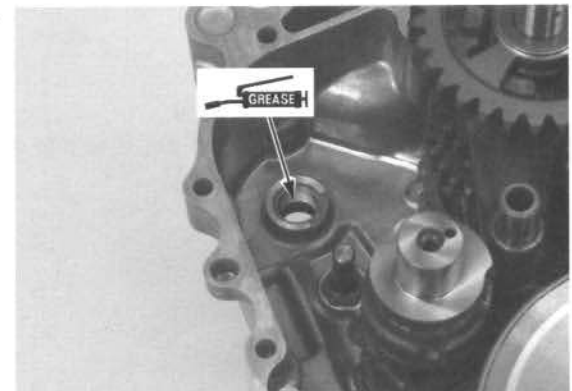


Apply engine oil to the shift fork shaft.

Install the shift fork through the shift forks and into the crankcase.



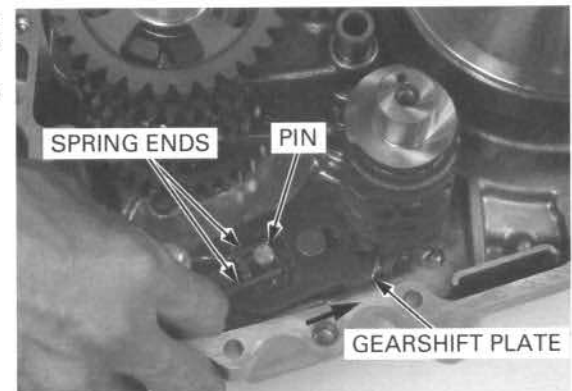
Apply grease to the oil seal lips of the gearshift spindle.



Install the gearshift spindle by aligning the return spring ends with the spring pin while pulling the gearshift plate.

Release the gearshift plate to engage it with the shift drum.

Assemble the crankcase halves (page 12-21).



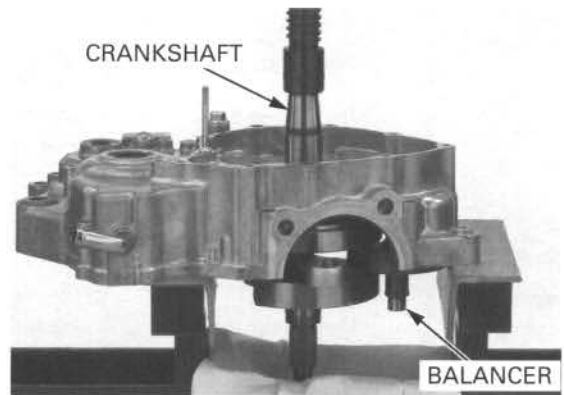
CRANKSHAFT/BALANCER

REMOVAL

Separate the crankcase halves (page 12-7).  
Remove the transmission (page 12-8).

*Cover the support blocks with shop towels or equivalent to prevent damaging the mating surface. Take care not to drop the crankshaft and balancer.*

Remove the crankshaft and balancer by pressing the crankshaft using a hydraulic press while holding them.



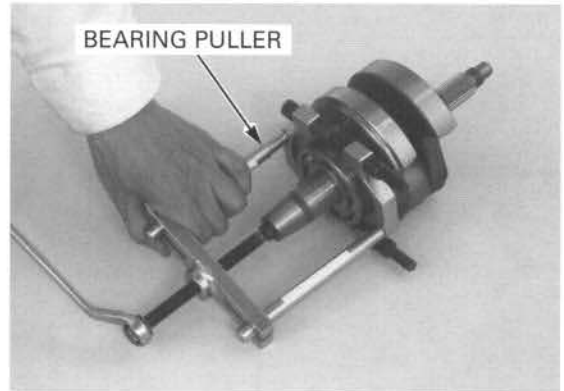
Remove the left crankshaft bearing using the bearing puller if it comes out with the crankshaft. Discard the bearing.

TOOL:

Universal bearing puller 07631-0010000 or equivalent commercially available in U.S.A.

NOTE:

- Always replace the left crankshaft bearing with a new one when the crankshaft is removed.



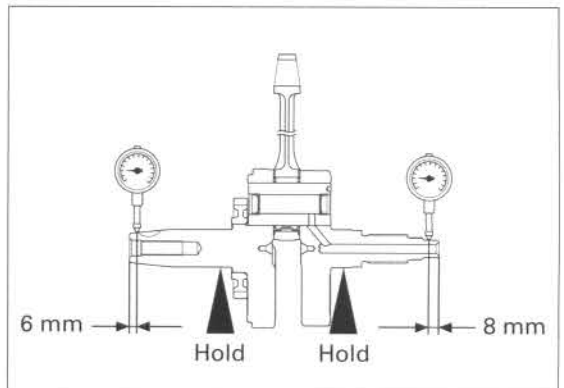
INSPECTION

Check the balancer drive and driven gears for wear or damage.



Set the crankshaft on a stand or V-blocks and measure the runout using a dial indicator.

SERVICE LIMIT: 0.12 mm (0.005 in)



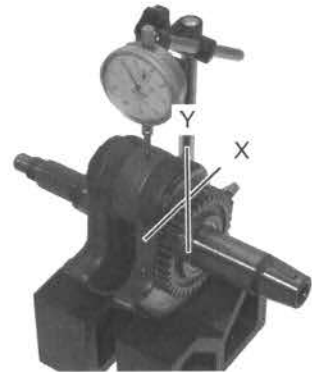
Measure the connecting rod big end side clearance.

**SERVICE LIMIT: 0.6 mm (0.02 in)**



Measure the connecting rod big end radial clearance in an X and Y directions.

**SERVICE LIMIT: 0.05 mm (0.002 in)**



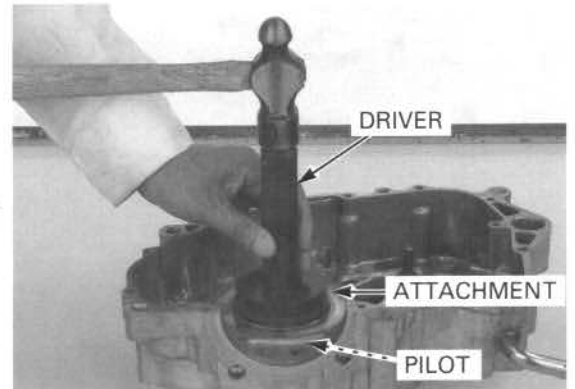
## INSTALLATION

Apply engine oil to a new left crankshaft bearing. Drive the bearing into the left crankcase.

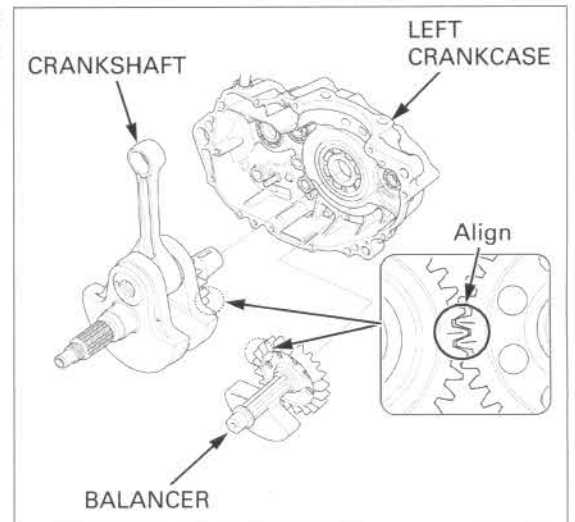
### TOOLS:

Driver	07749-0010000
Attachment, 72 x 75 mm	07746-0010600
Pilot, 30 mm	07746-0040700

For other bearing replacement in the crankcase halves, see page 12-18.



Engage the crankshaft and balancer by aligning the index lines on the balancer drive and driven gears, and install them together into the left crankcase.



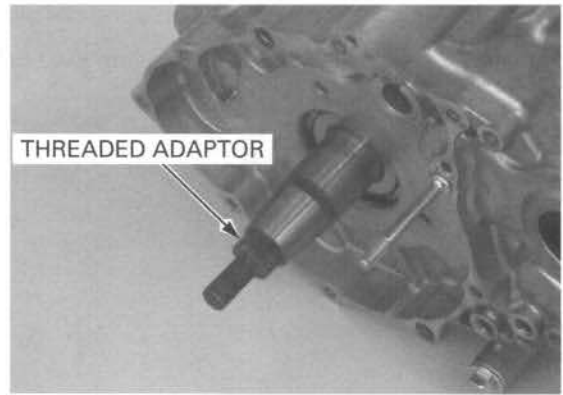
## CRANKCASE/TRANSMISSION/CRANKSHAFT

*Take care that the crankshaft and balancer don't fall out of the crankcase when installing the special tools.*

Install the special tool onto the left crankshaft end.

**TOOL:**  
**Threaded adaptor**

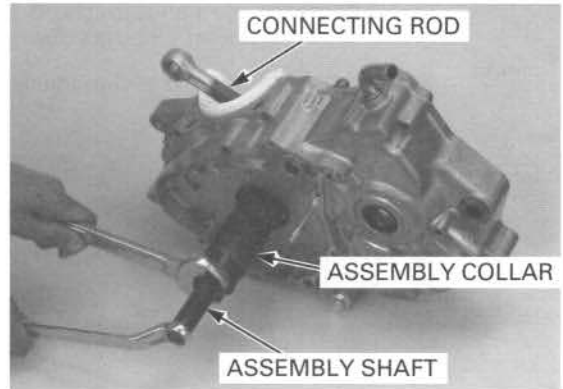
**07965-VM00300 or  
07931-KF00200**



Install the special tools onto the crankshaft and crankshaft bearing.

**TOOLS:**  
**Assembly collar**  
**Assembly shaft**

**07965-VM00100  
07965-VM00200 or  
07931-ME4010B and  
07931-HB3020A  
(U.S.A. only)**

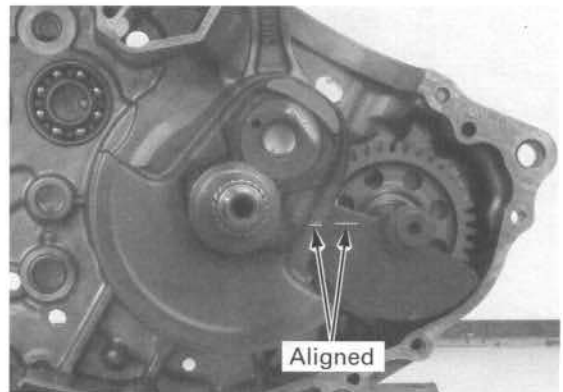


*Be careful not to bend the connecting rod by letting it press against the crankcase mating surface.*

Draw the crankshaft into the crankshaft bearing inner race.

After installing the crankshaft and balancer, make sure the index lines on the crank and balancer weights are aligned.

Install the transmission (page 12-12).  
Assemble the crankcase halves (page 12-21).



## CRANKCASE BEARING

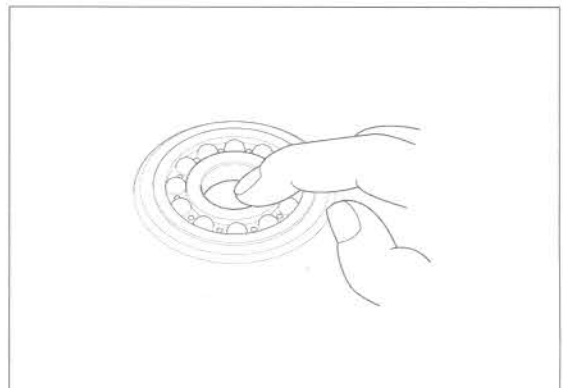
### INSPECTION

Remove the crankshaft and balancer (page 12-16).

Turn the inner race of each crankcase bearing with your finger. The bearing should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the crankcase.

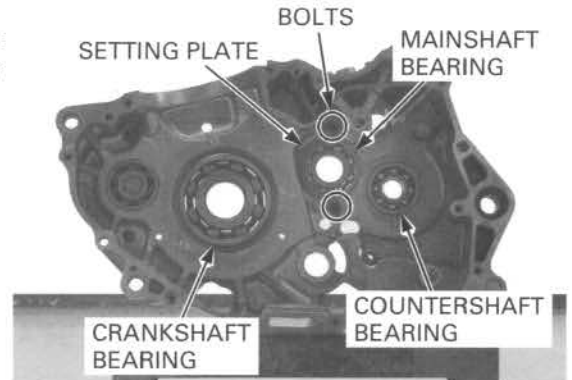
Replace any bearing if the inner race does not turn smoothly, quietly or if the outer race fits loosely in the crankcase.



**RIGHT CRANKCASE BEARING REPLACEMENT**

Remove the two bolts and bearing setting plate.

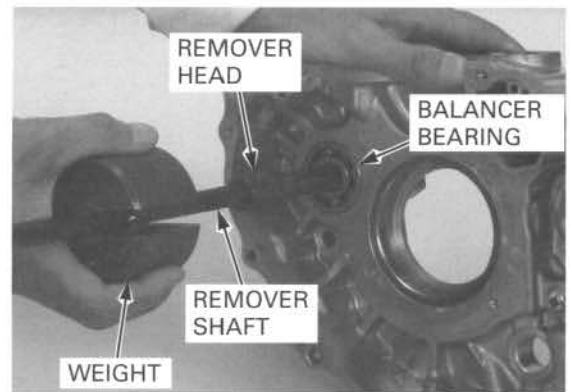
Drive the crankshaft, mainshaft and countershaft bearings out of the right crankcase. The countershaft bearing is removed with the oil seal.



Remove the balancer bearing using the special tools.

**TOOLS:**

- |                        |                  |
|------------------------|------------------|
| Remover shaft, 15 mm   | 07936-KC10100    |
| Remover head, 15 mm    | 07936-KC10200    |
| Bearing remover, 15 mm | 07936-KC10500    |
|                        | (U.S.A. only)    |
|                        | 07741-0010201 or |
|                        | 07936-3710200 or |
|                        | 07936-371020A    |
| Remover weight         |                  |



*Align the cutout with the oil passage in the crankcase.*

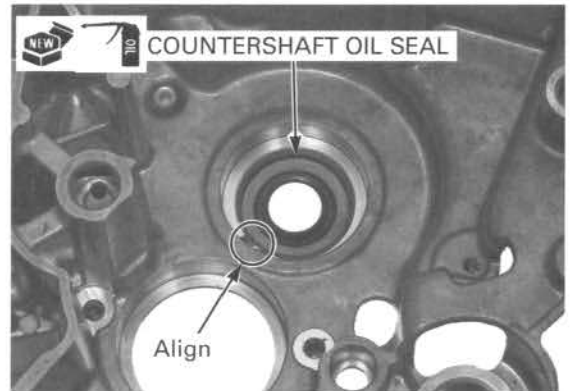
Apply engine oil to the outer surface of a new countershaft oil seal.

Install the countershaft oil seal with the lip side facing up into the right crankcase, using a 24-mm socket.

Drive a new countershaft bearing with the sealed side facing down, using the special tools.

**TOOLS:**

- |                              |               |
|------------------------------|---------------|
| <b>Countershaft bearing:</b> |               |
| Driver                       | 07749-0010000 |
| Attachment, 42 x 47 mm       | 07746-0010300 |
| Pilot, 17 mm                 | 07746-0040400 |

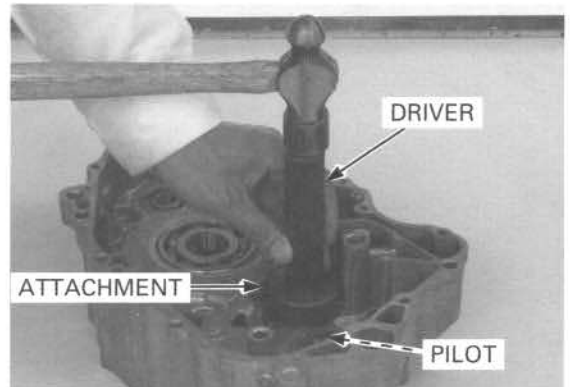


Apply engine oil to each bearing.

Drive new crankshaft, balancer and mainshaft bearings with the markings facing up, using the special tools.

**TOOLS:**

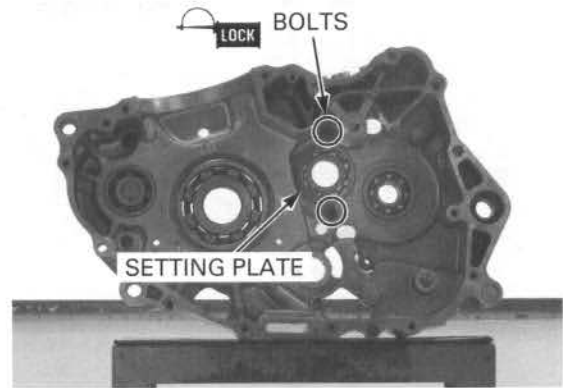
- |                            |               |
|----------------------------|---------------|
| <b>Crankshaft bearing:</b> |               |
| Driver                     | 07749-0010000 |
| Attachment, 72 x 75 mm     | 07746-0010600 |
| Pilot, 30 mm               | 07746-0040700 |
| <b>Balancer bearing:</b>   |               |
| Driver                     | 07749-0010000 |
| Attachment, 37 x 40 mm     | 07746-0010200 |
| Pilot, 15 mm               | 07746-0040300 |
| <b>Mainshaft bearing:</b>  |               |
| Driver                     | 07749-0010000 |
| Attachment, 52 x 55 mm     | 07746-0010400 |
| Pilot, 22 mm               | 07746-0041000 |



## CRANKCASE/TRANSMISSION/CRANKSHAFT

Apply locking agent to the setting plate bolt threads. Install the bearing setting plate and tighten the bolts.

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



### LEFT CRANKCASE BEARING REPLACEMENT

Drive the countershaft bearing out of the left crankcase.



Remove the mainshaft and balancer bearings, using the special tools.

#### TOOLS:

##### Mainshaft bearing:

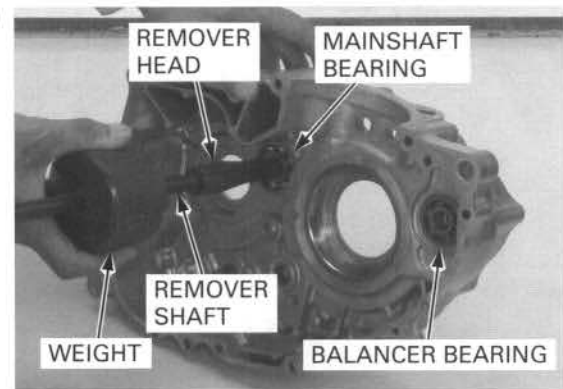
Remover shaft, 15 mm  
Remover head, 16 mm  
Remover weight

07936-KC10100  
7936-MK50100  
07741-0010201 or  
07936-3710200 or  
07936-371020A  
(U.S.A. only)

##### Balancer bearing:

Remover shaft, 12 mm  
Remover head, 13 mm  
Remover weight

07936-1660120  
07LMC-KZ10100  
07741-0010201 or  
07936-3710200 or  
07936-371020A  
(U.S.A. only)





Apply engine oil to each bearings.  
Drive a new mainshaft bearing into the left crankcase with the sealed side facing down, using the special tools.

**TOOLS:**

**Mainshaft bearing:**

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 16 mm	07746-0041300

Drive new balancer and countershaft bearings with the markings facing up, using the special tools.

**TOOLS:**

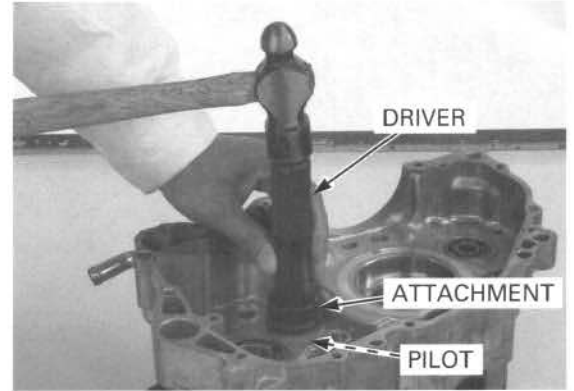
**Balancer bearing:**

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 13 mm	07746-0041500

**Countershaft bearing:**

Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 25 mm	07746-0040600

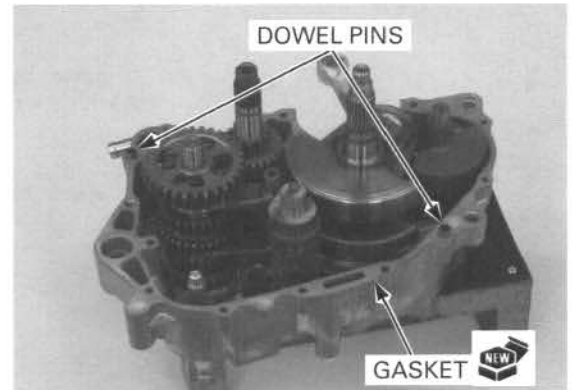
Install the crankshaft (page 12-17).



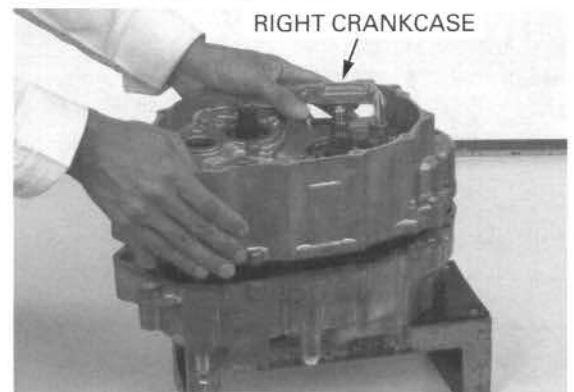
## CRANKCASE ASSEMBLY

Clean the crankcase mating surfaces thoroughly, being careful not to damage them.

Install the dowel pins and a new gasket.

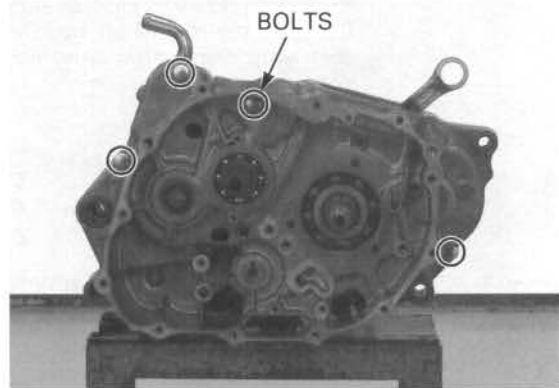


Install the right crankcase onto the left crankcase.



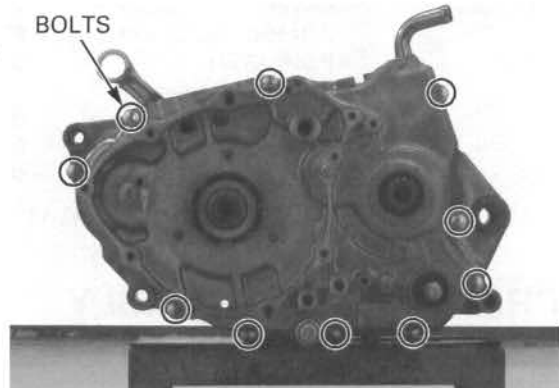
## CRANKCASE/TRANSMISSION/CRANKSHAFT

Install the four right crankcase bolts.



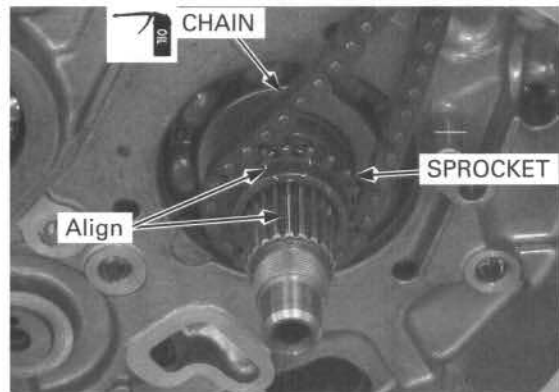
Install the ten left crankcase bolts.

Tighten the all the bolts in a crisscross pattern in several steps.



Install the timing sprocket by aligning the wide spline in the sprocket with the grooved spline of the crankshaft.

Apply engine oil to the cam chain and install it onto the sprocket through the crankcase.

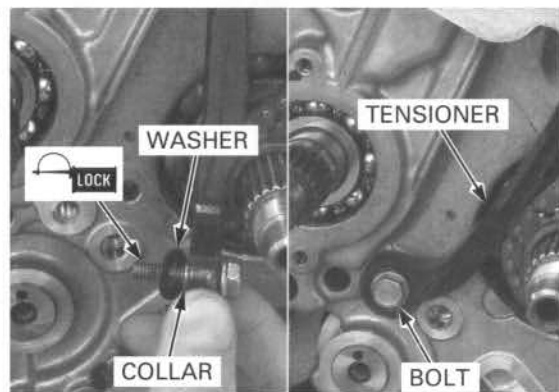


Check the cam chain tensioner for excessive wear or damage and replace if necessary.

Apply locking agent to the tensioner bolt threads. Install the chain tensioner with the collar, washer (between the crankcase and tensioner) and bolt. Tighten the bolt securely.

Install the following:

- oil pump (page 5-7)
- flywheel (page 11-11)
- gearshift linkage (page 10-15)
- clutch (page 10-10)
- piston and cylinder (page 9-8)
- cylinder head (page 8-21)
- starter motor (page 18-11)
- neutral and reverse switches (page 19-9)
- engine (page 7-8)

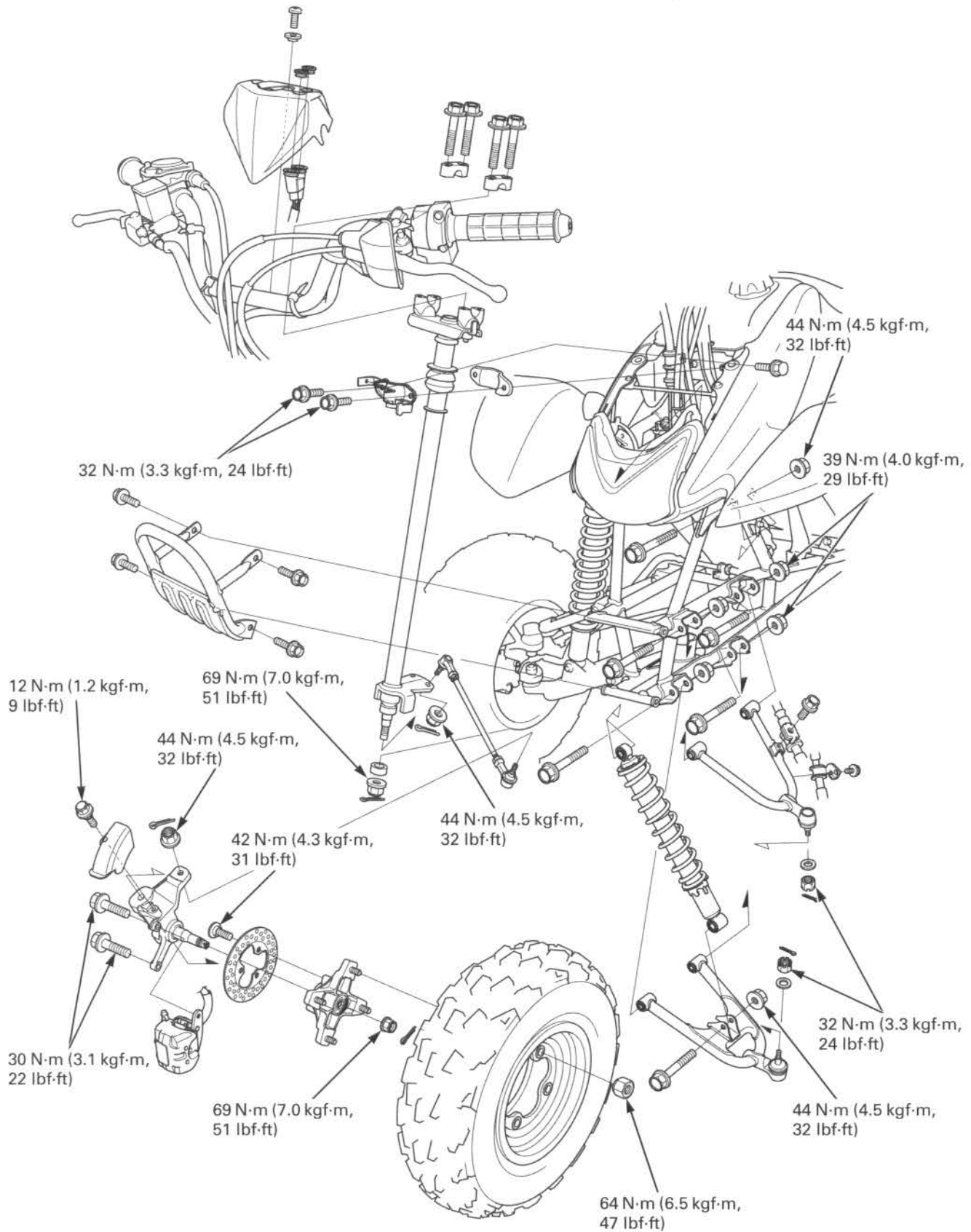


# 13. FRONT WHEEL/SUSPENSION/STEERING

---

SYSTEM COMPONENTS .....	13-2	TIRES.....	13-11
SERVICE INFORMATION .....	13-3	FRONT WHEEL HUB/DISC .....	13-14
TROUBLESHOOTING .....	13-5	FRONT SHOCK ABSORBER.....	13-17
HANDLEBAR .....	13-6	SUSPENSION ARM.....	13-19
THROTTLE HOUSING .....	13-9	STEERING SHAFT .....	13-24
FRONT WHEEL .....	13-10	TIE-ROD.....	13-29

SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc 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 4-26).
- Do not twist or bend the brake hose and pipe when servicing.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to page 15-2 for brake system information.
- Refer to page 19-6 for handlebar switch inspection.

### SPECIFICATIONS

ITEM		STANDARD	Unit: mm (in) SERVICE LIMIT
Minimum tire tread depth		-	4.0 (0.16)
Cold tire pressure	Standard	27 kPa (0.275 kgf/cm <sup>2</sup> , 4.0 psi)	-
	Minimum	23 kPa (0.235 kgf/cm <sup>2</sup> , 3.4 psi)	-
	Maximum	31 kPa (0.315 kgf/cm <sup>2</sup> , 4.6 psi)	-
Shock absorber spring adjuster standard position		2nd from softest position	-
Tie-rod distance between the ball joints		370.9 (14.60)	-
Toe		Toe-in: 11 ± 15 (2/5 ± 3/5)	-

### TORQUE VALUES

Throttle lever pivot nut	7 N·m (0.7 kgf·m, 5.2 lbf·ft)	
Throttle housing cover screw	3.4 N·m (0.35 kgf·m, 2.5 lbf·ft)	
Handlebar switch housing screw	2 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Clutch switch retainer bolt	4 N·m (0.4 kgf·m, 3.0 lbf·ft)	Apply locking agent to the threads.
Front wheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Front wheel hub nut	69 N·m (7.0 kgf·m, 51 lbf·ft)	Castle nut: tighten to the specified torque and further tighten until its grooves aligns with the cotter pin hole.
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one.
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one.
Brake disc cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	ALOC bolt: replace with a new one.
Shock absorber mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	Lock nut: replace with a new one.
Upper and lower arm pivot nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	Lock nut: replace with a new one.
Upper and lower arm ball joint nut	32 N·m (3.3 kgf·m, 24 lbf·ft)	Castle nut: tighten to the specified torque and further tighten until its grooves aligns with the cotter pin hole.
Tie-rod ball joint nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	Lock nut: replace with a new one.
Handlebar lower holder nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	Lock nut: replace with a new one.
Steering shaft end nut	69 N·m (7.0 kgf·m, 51 lbf·ft)	Lock nut: replace with a new one.
Steering shaft holder bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	Lock nut: replace with a new one.

# FRONT WHEEL/SUSPENSION/STEERING

## TOOLS

<p>Driver 07749-0010000</p> 	<p>Driver 07949-3710001</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 
<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 22 x 24 mm 07746-0010800</p> 
<p>Pilot, 15 mm 07746-0040300</p> 	<p>Pilot, 17 mm 07746-0040400</p> 	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Bearing remover shaft 07746-0050100</p> 	<p>Bearing remover head, 15 mm 07746-0050400</p> 	<p>Crankcase assembly collar 07965-VM00100</p> 

<p>Ball joint remover, 28 mm 07MAC-SL00200</p> 	<p>Spherical bearing driver 07HMF-HC00100</p>  <p>(not available in U.S.A., use a suitable collar)</p>	<p>ATV Bead Buster KLS379024</p>  <p>(U.S.A. only)</p>
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## TROUBLESHOOTING

### Hard steering

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

### Steers to one side or does not track straight

- Incorrect wheel alignment
- Unequal tire pressure
- Bent tie-rod, suspension arm or frame
- Worn or damaged wheel hub bearing
- Weak shock absorber

### Front wheel wobbling

- Bent rim
- Worn or damaged wheel hub bearing
- Faulty tire
- Loose wheel hub nut

### Soft suspension

- Weak shock absorber spring
- Faulty shock absorber damper

### Stiff suspension

- Bent shock absorber damper rod
- Improperly installed suspension arms
- Faulty suspension arm spherical bearings

### Front suspension noise

- Binding suspension link
- Loose front suspension fasteners

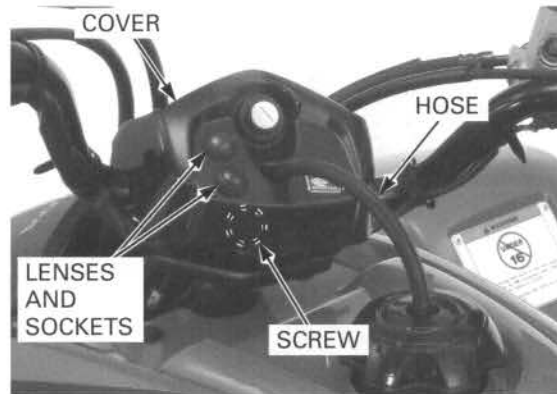
# HANDLEBAR

## REMOVAL

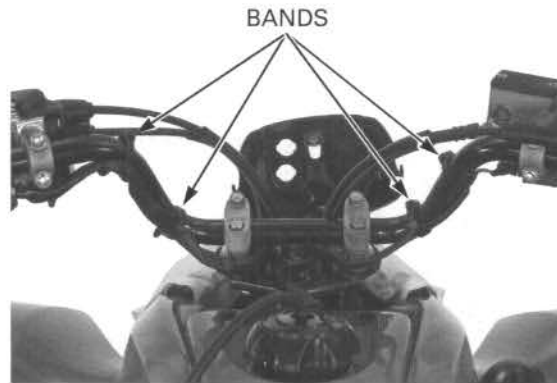
*Be careful not to let the screw fall into the steering shaft.*

Remove the following:

- fuel fill cap breather hose (from the cover)
- indicator lenses (by prying them, using a small flat-blade screwdriver)
- cover attaching screw
- handlebar cover (by releasing its ends off the handlebar)
- bulb sockets (from the cover)

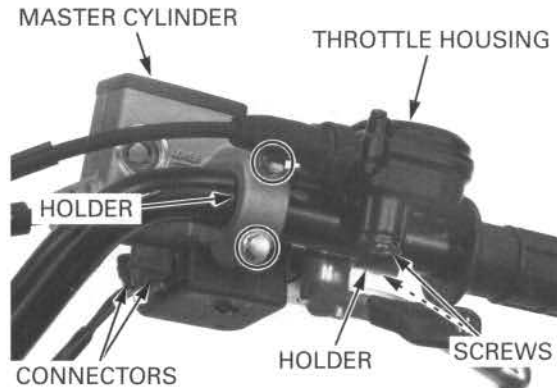


- four wire bands

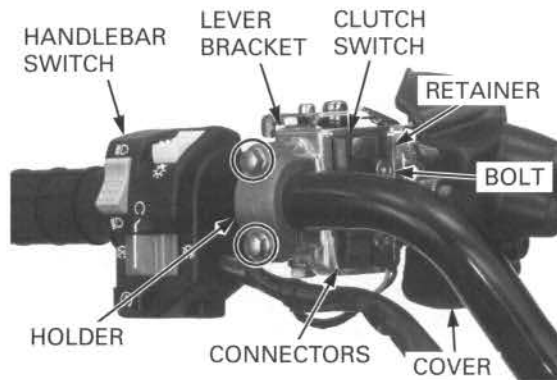


*Keep the master cylinder upright to prevent air from entering the hydraulic system.*

- two screws and throttle housing holder
- throttle housing
- connectors
- two bolts and master cylinder holder
- master cylinder

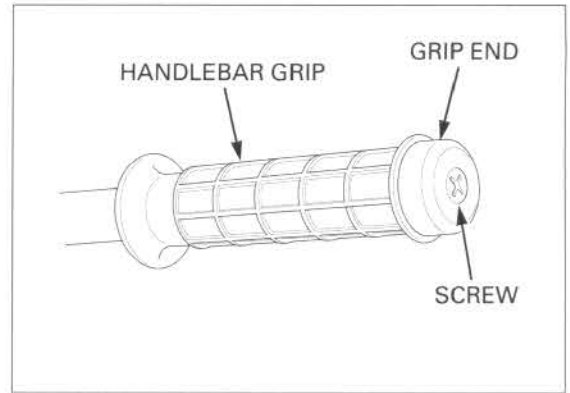


- dust cover (from the lever bracket)
- bolt and switch retainer
- clutch switch (disconnect the connectors)
- two bolts and bracket holder
- clutch lever bracket
- two screws
- handlebar switch housing





- screws and grip ends
- handlebar grips

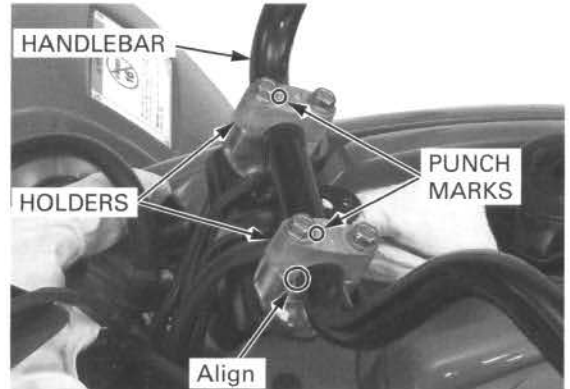


- four bolts and upper holders
- handlebar

**INSTALLATION**

*Align the punch mark on the handlebar with the top edge of the lower holder.*

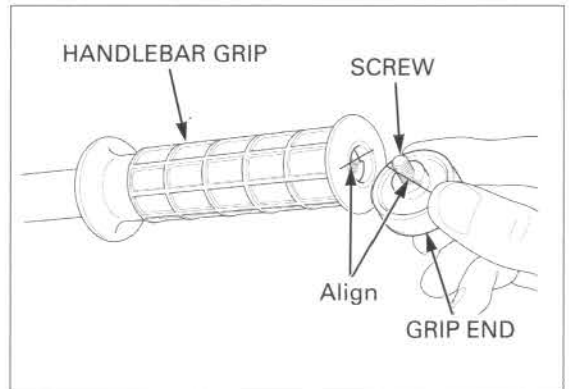
Install the handlebar and upper holders with the punch marks facing forward. Tighten the front bolts first, then tighten the rear bolts.



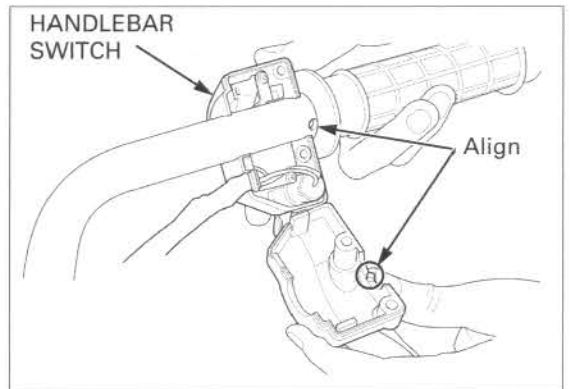
*Allow the adhesive to dry for 1 hour before using.*

Apply Honda Bond A, Pro Honda Hand Grip Cement or equivalent to the inside surface of each handlebar grip and to the clean surfaces of the handlebar. Wait 3 – 5 minutes and install the grips. Rotate the grips for even application of the adhesive.

Install each grip end, aligning the flats each other. Tighten the screw securely.



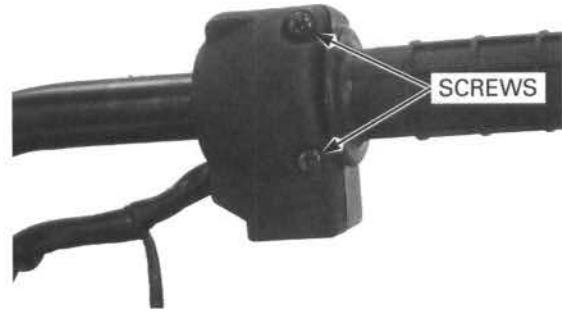
Install the handlebar switch housing by aligning the locating pin with the hole in the handlebar.



## FRONT WHEEL/SUSPENSION/STEERING

Install the switch screws and tighten the upper screw first, then tighten the lower screw.

**TORQUE: 2 N·m (0.2 kgf·m, 1.5 lbf·ft)**



*Align the edge of the clutch lever bracket with the punch mark on the handlebar.*

Install the clutch lever bracket and holder with the "UP" mark facing up. Tighten the upper bolt first, then tighten the lower bolt.

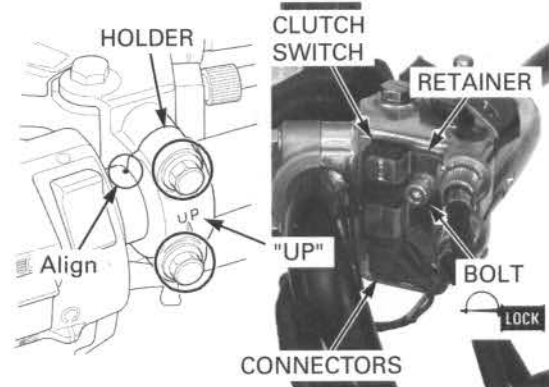
Apply locking agent to the threads of the clutch switch retainer bolt.

Connect the clutch switch to the connectors and install it into the lever bracket.

Secure the switch with the retainer and bolt.

**TORQUE: 4 N·m (0.4 kgf·m, 3.0 lbf·ft)**

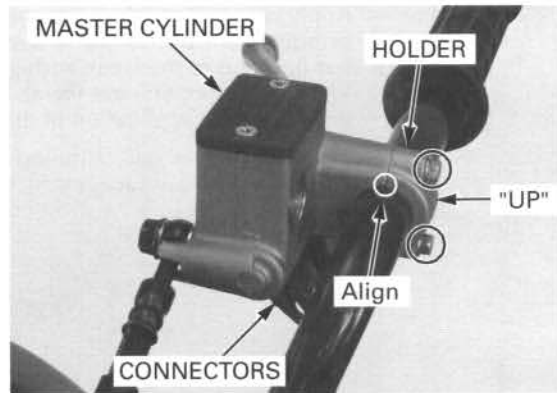
Install the dust cover over the lever bracket.



*Align the edge of the master cylinder with the punch mark on the handlebar.*

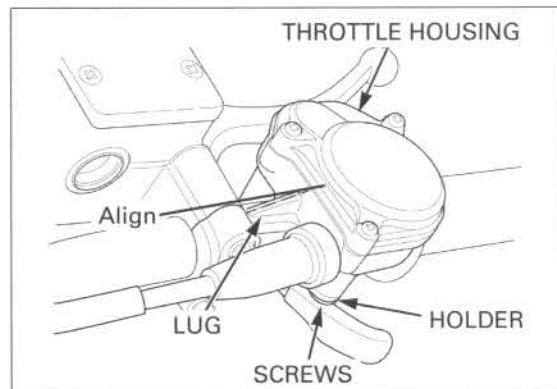
Install the master cylinder and holder with the "UP" mark facing up. Tighten the upper bolt first, then tighten the lower bolt.

Connect the brake light switch connectors.

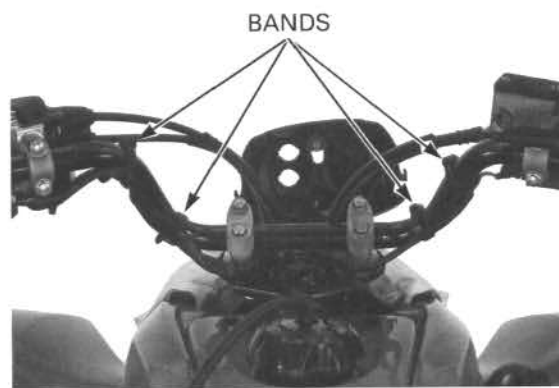


*Align the lug on the throttle housing with the mating line of the master cylinder.*

Install the throttle housing and holder against the master cylinder. Tighten the front screw first, then tighten the rear screw.



Secure the switch wires with the four wire bands.



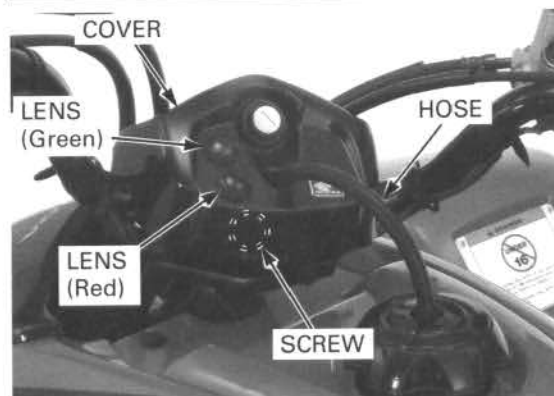
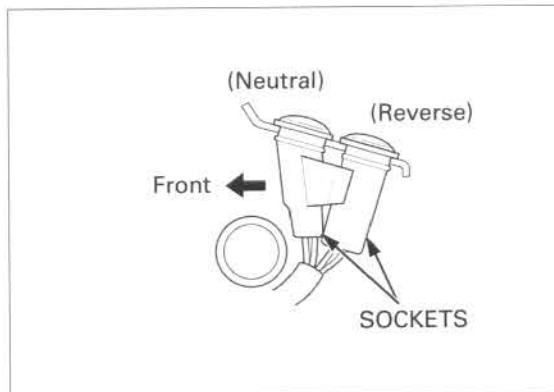
Install the bulb sockets into the handlebar cover in the direction as shown.

*Take care not to drop the screw into the steering shaft.*

Install the cover onto the handlebar. Install the cover screw and tighten it securely.

*Do not interchange the neutral and reverse indicator lenses.*

Install the indicator lenses into the socket properly. Install the breather hose into the cover.

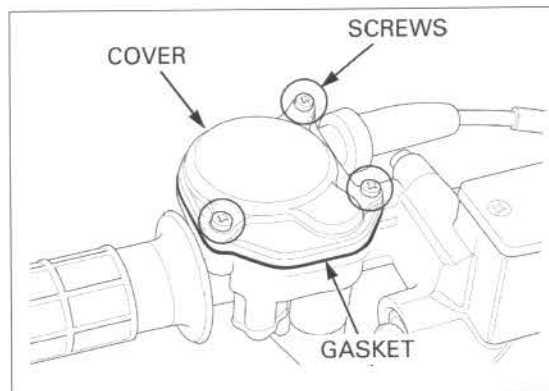


## THROTTLE HOUSING

### DISASSEMBLY

Remove the following:

- three screws
- throttle housing cover
- gasket



## FRONT WHEEL/SUSPENSION/STEERING

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

Bend down the lock washer tab and remove the following:

- pivot nut
- lock washer
- throttle lever and plastic washer
- return spring
- throttle arm (by disconnecting the cable)
- dust seal (from the housing)

### ASSEMBLY

Coat a new dust seal lip with grease and install it into the housing.

Apply grease to the lever pivot in the housing and to the throttle cable end.

Install the plastic washer onto the throttle lever.

Connect the cable to the throttle arm and install the spring as shown.

Insert the lever into the housing and set the throttle arm onto the lever, aligning the flat surfaces.

Install a new lock washer and the nut, and tighten the nut.

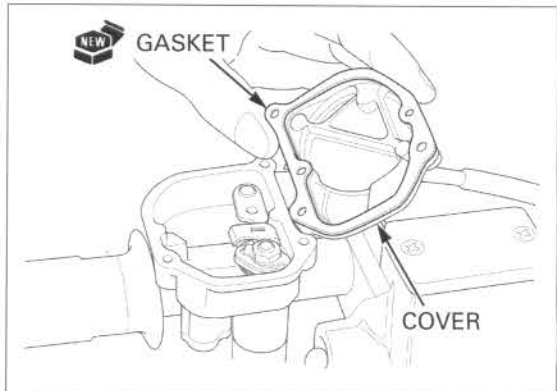
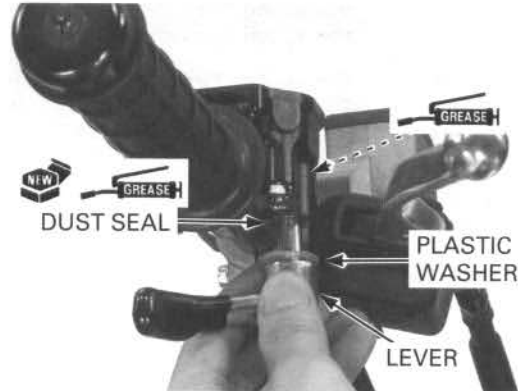
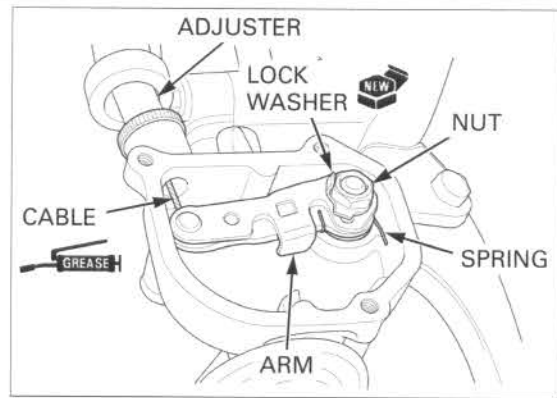
**TORQUE: 7 N·m (0.7 kgf·m, 5.2 lbf·ft)**

Bend the lock washer tab against the nut.

Install the throttle housing cover with a new gasket and tighten the three screws.

**TORQUE: 3.4 N·m (0.35 kgf·m, 2.5 lbf·ft)**

Adjust the throttle lever free play (page 4-4).



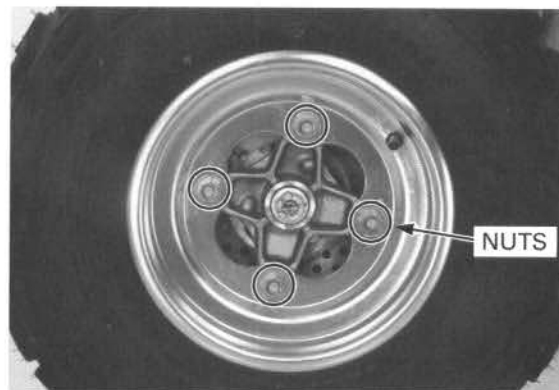
## FRONT WHEEL

### REMOVAL

Loosen the wheel nuts.

Support the vehicle using a hoist or equivalent and raise the front wheels off the ground.

Remove the wheel nuts and wheel.



**INSTALLATION**

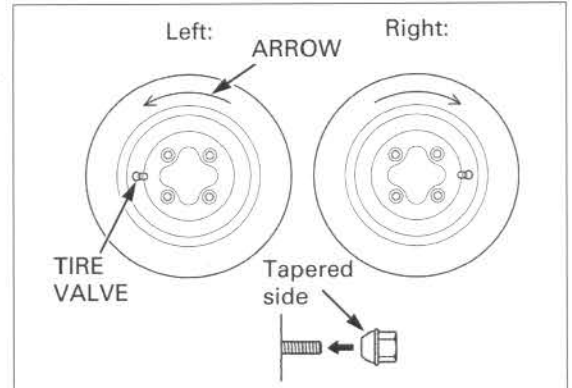
**NOTE:**

- Do not interchange the left and right tires.

Install the wheel with the tire valve facing out and the arrow mark facing in the normal rotating direction.

Install the wheel nuts with the tapered side facing inward and tighten them.

**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**



**TIRES**

**REMOVAL (U.S.A. only)**

**NOTE:**

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

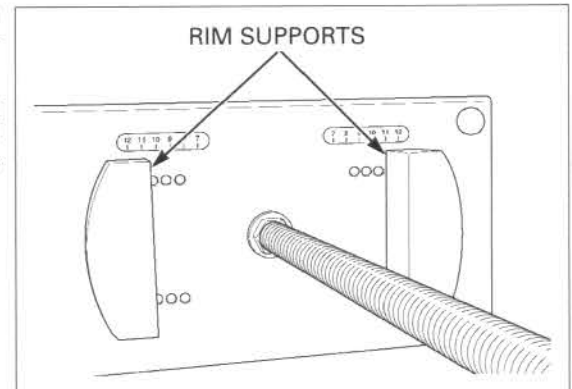
Remove the core from the valve stem.

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.

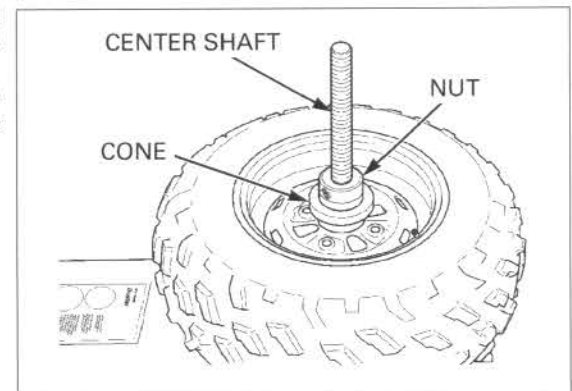
*Use only water as a lubricant when removing or mounting tires. Soap or some mounting lubricants may leave a slippery residue which can cause the tire to shift on the rim and lose tire pressure during riding.*

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.



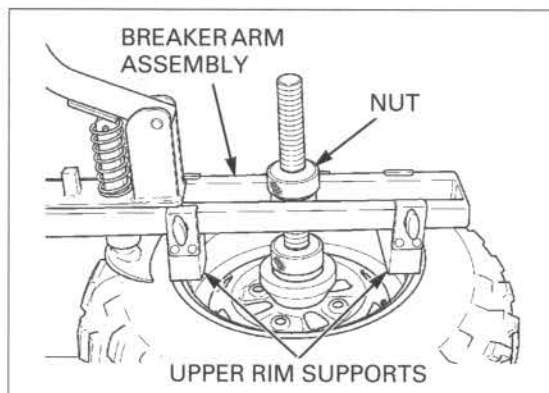
Place the wheel assembly over the center shaft and use the correct size cone to keep the wheel centered during operation.

Install the bottom hold down nut, bearing side down, and finger tighten it so the wheel can rotate freely during operation.



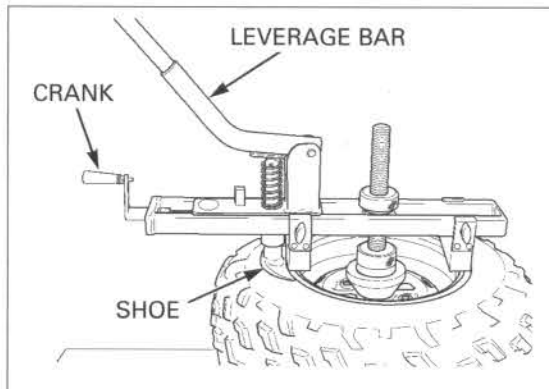
## FRONT WHEEL/SUSPENSION/STEERING

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.*

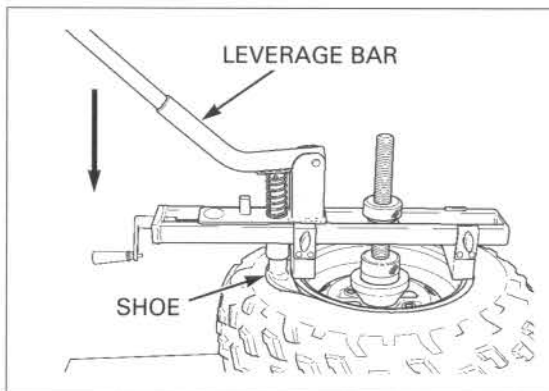
Pull the leverage bar down so the breaker shoe is just below the rim lip. Turn the crank to fully push the breaker shoe between the tire bead and rim. Once the shoe contacts the rim, back the crank out two turns to allow the shoe to clear the rim's bead lock.



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.



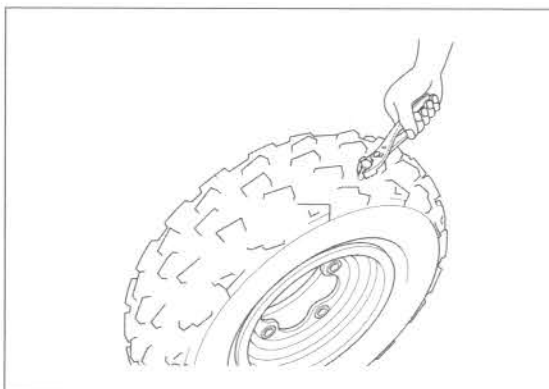
## TIRE REPAIR

### NOTE:

- Use the manufacturer's instructions for the tire repair kit you are using. If your kit does not have instructions, use the procedures described below.

Check the tire for puncturing objects. Chalk mark the punctured area and remove the puncturing objects.

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 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.

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 13-11) and apply a cold patch to the inside of the tire.

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.

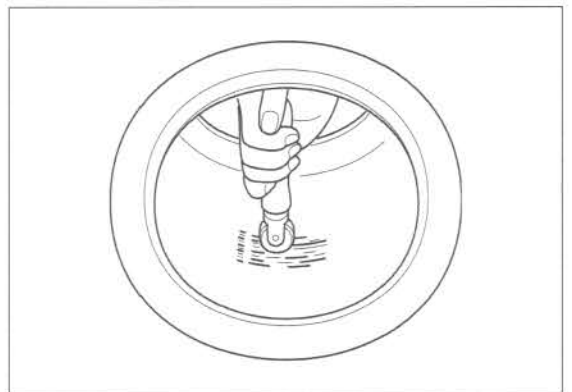
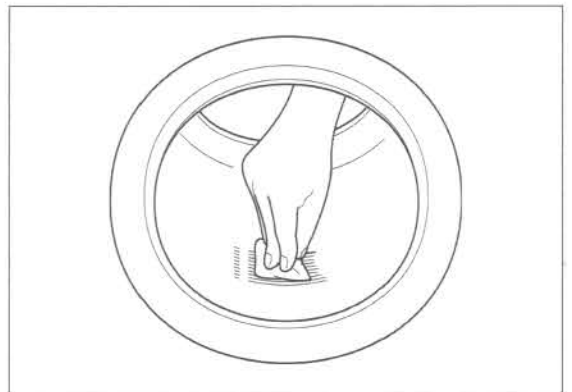
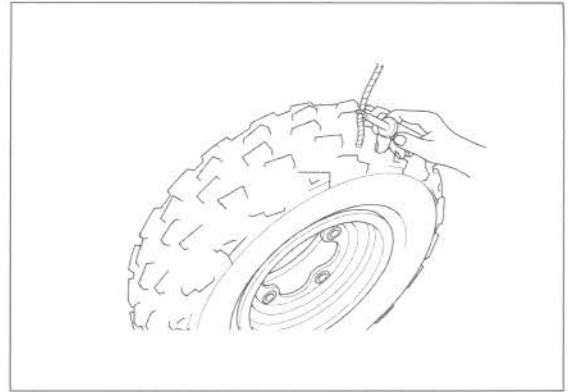
Rough the area inside the tire with a tire buffer or a wire brush. Clean the rubber dust from the buffed area.

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 over the injury.

Press the patch against the injury using a special roller.

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



## FRONT WHEEL/SUSPENSION/STEERING

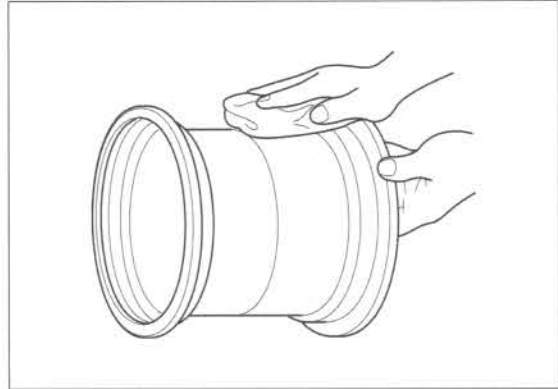
### ASSEMBLY

Install the tire onto the rim, where the rim shoulder width is the narrowest, to simplify installation.

Clean the rim bead seat and flanges.

*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.*

Apply clean water to the rim flanges, bead seat and base.



Install the valve core in the valve stem.

*Front tire:* Install the front tire with the arrow mark facing in the normal rotating direction.

*Rear tire:* Install the rear tire with the "SIDE FACING OUTWARDS" facing the tire valve.

Inflate the tire to seat the tire bead.

Deflate the tire. Wait 1 hour and inflate the tire to the specified pressure.

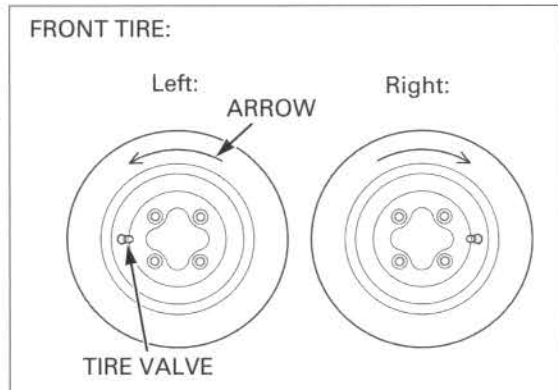
#### RECOMMENDED TIRE PRESSURE (Front/Rear):

**Standard:** 27 kPa (0.275 kg/cm<sup>2</sup>, 4.0 psi)

**Minimum:** 23 kPa (0.235 kg/cm<sup>2</sup>, 3.4 psi)

**Maximum:** 31 kPa (0.315 kg/cm<sup>2</sup>, 4.6 psi)

Check for air leaks and install the valve cap.



## FRONT WHEEL HUB/DISC

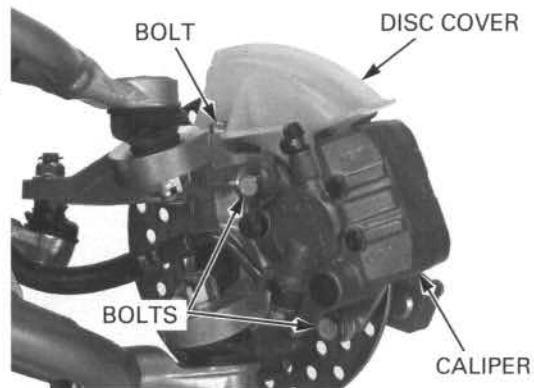
### REMOVAL

Remove the front wheel (page 13-10).

Remove the bolt and disc cover.

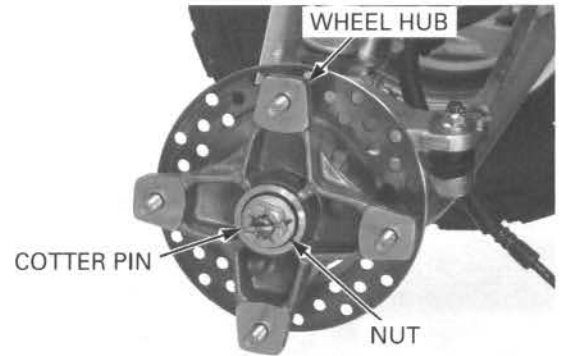
*Support the caliper so that it does not hang from the brake hose. Do not twist or bend the brake hose.*

Remove the two mounting bolts and the brake caliper.



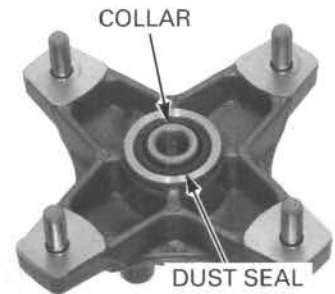
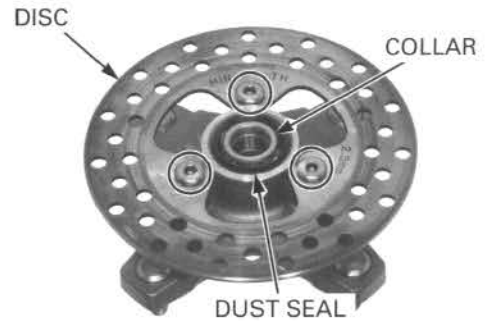


Remove the cotter pin, hub nut and wheel hub.



**DISASSEMBLY**

- Remove the following:
- three bolts and brake disc
  - side collars
  - dust seals

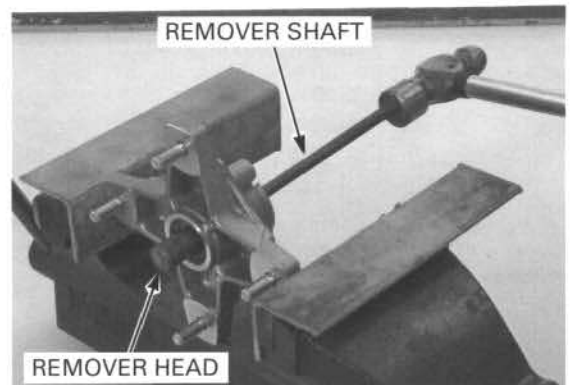


*Replace the bearings in pairs.*

Install the bearing remover head into the bearing. From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

**TOOLS:**

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



## FRONT WHEEL/SUSPENSION/STEERING

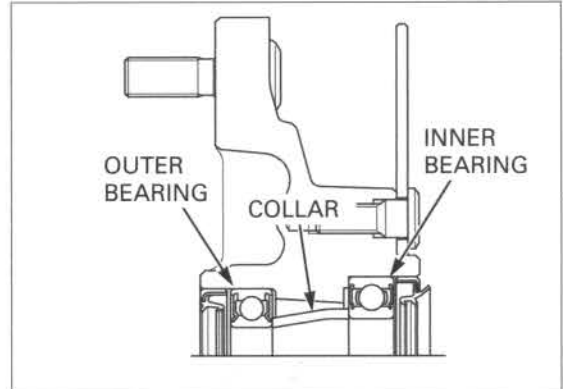
### ASSEMBLY

Drive a new inner (disc side) bearing in the hub squarely until it is fully seated.

#### TOOLS:

##### Inner bearing:

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

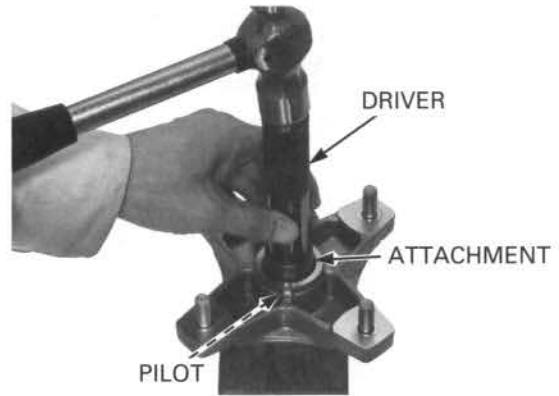


Install the distance collar with the large diameter side facing the inner bearing. Drive a new outer bearing in the hub squarely until it is fully seated.

#### TOOLS:

##### Outer bearing:

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



Apply grease to new dust seal lips.

Install the outer dust seal into the wheel side of the hub until it is flush with the hub surface.

Install the outer side collar.

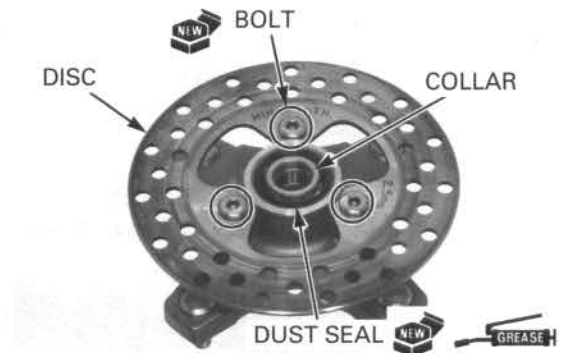


Install the inner dust seal into the disc side of the hub until it is flush with the hub surface, using the assembly collar or a 37 mm I.D. collar.

#### TOOL:

Assembly collar	07965-VM00100
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Install the inner side collar.



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

Install the brake disc with the marking facing up. Install new disc bolts and tighten them.

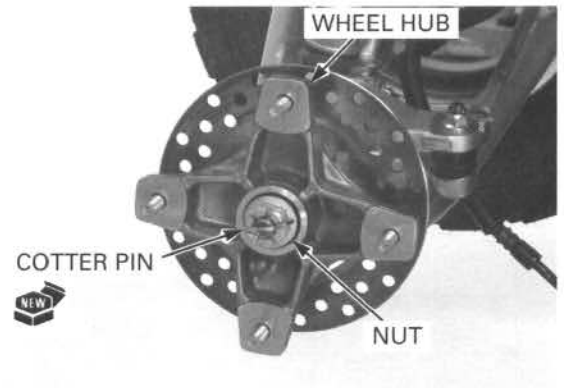
**TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)**

**INSTALLATION**

Install the wheel hub and hub nut onto the knuckle. Tighten the hub nut to the specified torque and further tighten it until its grooves align with the cotter pin hole.

**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**

Install a new cotter pin.



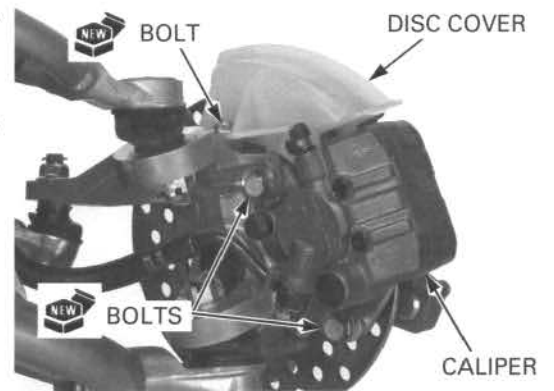
Install the brake caliper with new mounting bolts, and tighten the bolts.

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

Install the disc cover with a new bolt, and tighten the bolt.

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

Install the front wheel (page 13-11).

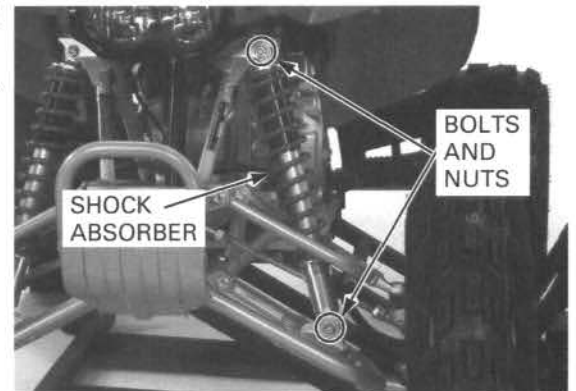


**FRONT SHOCK ABSORBER**

**REMOVAL**

Support the vehicle using a hoist or equivalent and raise the front wheels off the ground.

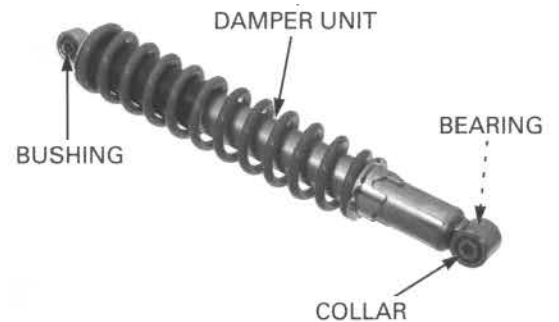
Support the lower arm. Remove the mounting nuts, bolts and shock absorber.



**INSPECTION**

Remove the lower pivot collar and check the needle bearing for wear or damage. Replace the bearing if necessary.

Check the upper pivot bushing for wear or damage. Check the damper unit for leaks or other damage. Replace the shock absorber assembly if necessary.



## FRONT WHEEL/SUSPENSION/STEERING

### BEARING REPLACEMENT

Remove the dust seals.



Press the needle bearing out of the lower pivot using the special tools.

#### TOOLS:

Driver

07949-3710001

Attachment, 22 x 24 mm

07746-0010800

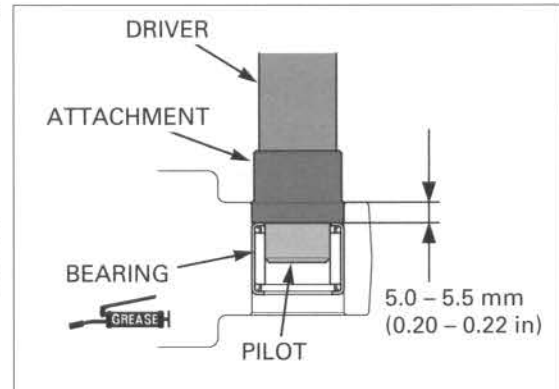
Pilot, 17 mm

07746-0040400

Apply grease to the rollers of a new needle bearing.

*Press in the bearing with the marked side facing up.*

Press the needle bearing into the lower pivot until the depth from the outer surface is 5.0 – 5.5 mm (0.20 – 0.22 in), using the same tools.



Apply grease to new dust seal lips and install them into the lower pivot until they are flush with the pivot surfaces.

Install the pivot collar.

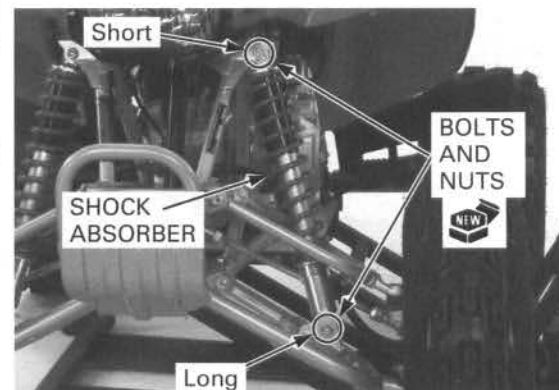


### INSTALLATION

Install the shock absorber in the frame and lower arm, and insert the mounting bolts from the front side.

Install new mounting nuts and tighten them.

**TORQUE: Upper/Lower: 44 N-m (4.5 kgf-m, 32 lbf-ft)**



## SUSPENSION ARM

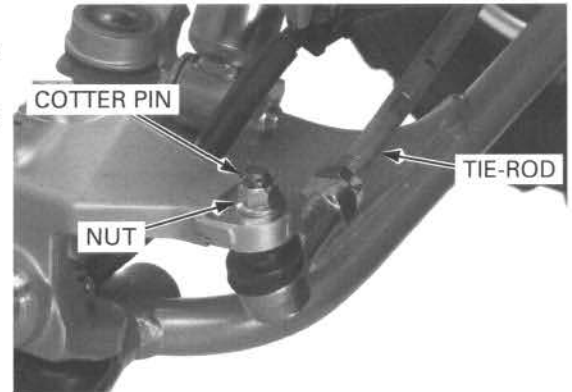
### REMOVAL

Remove the wheel hub (page 13-14).

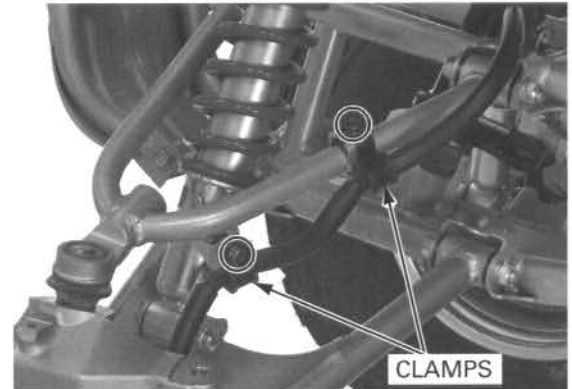
Remove the cotter pin from the tie-rod ball joint stud.

*Be careful not to damage the ball joint boot.*

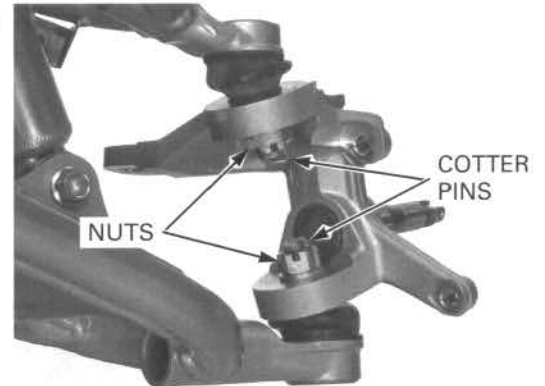
Remove the ball joint nut while holding the joint stud flat surfaces with an open end wrench. Disconnect the tie-rod from the knuckle.



Remove the bolts and brake hose clamps



Remove the cotter pins and loosen the castle nuts, but do not remove them yet.



Release the ball joints, using the special tool according to the instructions described below.

#### TOOL:

Ball joint remover

07MAC-SL00200



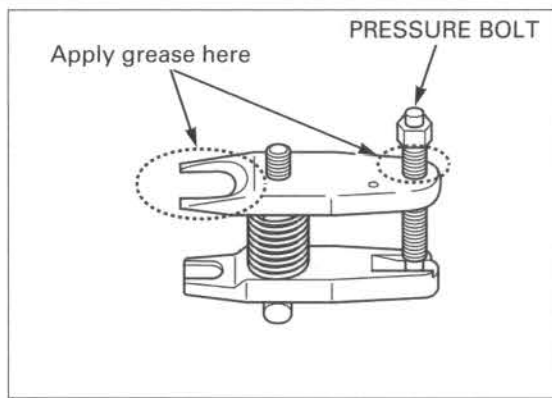
## FRONT WHEEL/SUSPENSION/STEERING

Apply grease to the ball joint remover at the point shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.

Insert the jaws carefully, making sure that you do not damage the ball joint boot.

Adjust the jaw spacing by turning the pressure bolt.

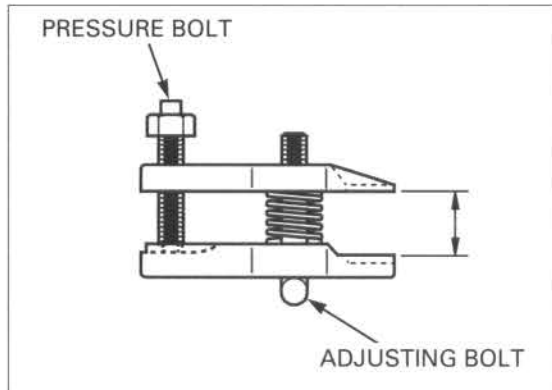
*If necessary, apply penetrating type lubricant to loosen the ball joint.*



Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand-tighten the pressure bolt and recheck the jaws to make sure they are still parallel.

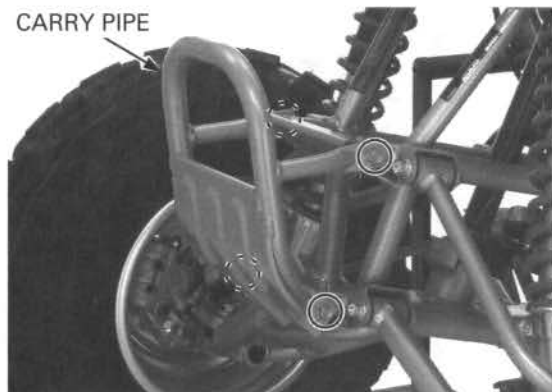
Tighten the pressure bolt with a wrench until the ball joint stud pops loose.

Remove the ball joint nuts and washers, and the knuckle from the upper and lower arms.

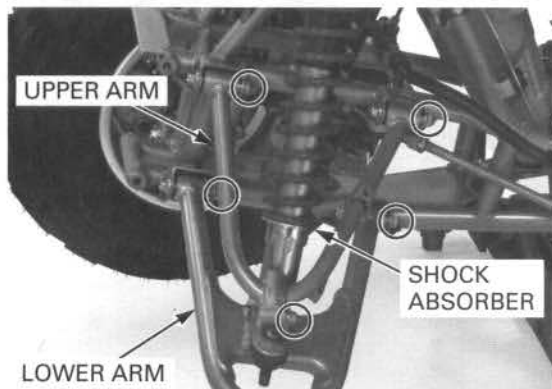


Remove the following:

- four bolts and carry pipe



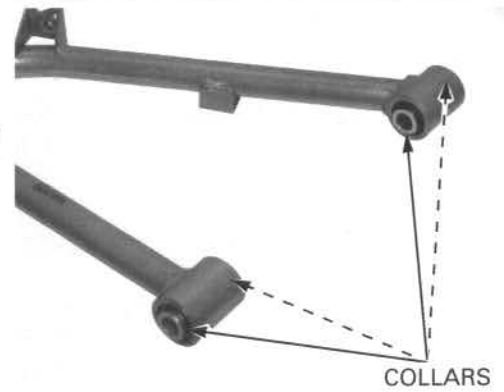
- pivot nuts, bolt and upper arm
- shock absorber lower mounting nut and bolt
- pivot nuts, bolt and lower arm



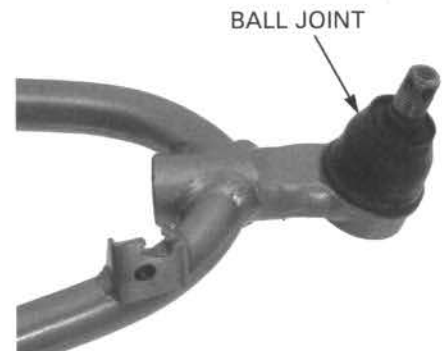
- pivot collars from the arm pivots

**INSPECTION**

Check the spherical bearings in the arm pivots for wear or damage.



Inspect the ball joint boot for tears or other damage by moving the ball joint stud. It should move freely and smoothly.



Inspect the knuckle for damage or cracks.



**PIVOT BEARING REPLACEMENT**

Remove the dust seals.

Clean any grease from the upper arm pivots thoroughly.

Remove the stopper rings.



## FRONT WHEEL/SUSPENSION/STEERING

Press the spherical bearing out of the arm using the special tool.

### TOOL:

**Spherical bearing driver**      **07HMF-HC00100**  
(not available in  
U.S.A., use a suitable  
collar)

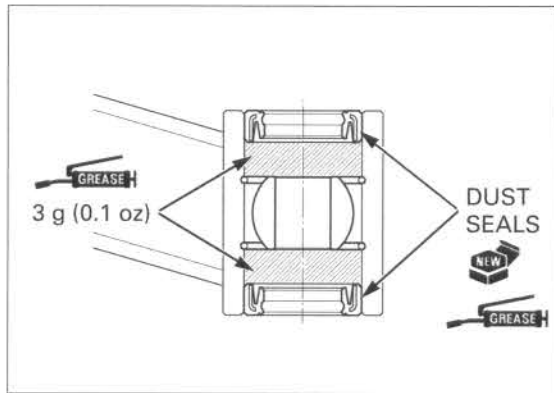
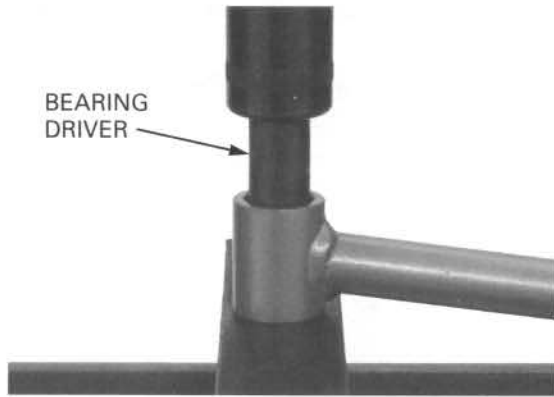
Install a new stopper ring into the inside groove in the pivot securely.

Carefully press in a new bearing until it contacts the stopper ring, using the same tool.

Install a new stopper ring into the opposite side groove.

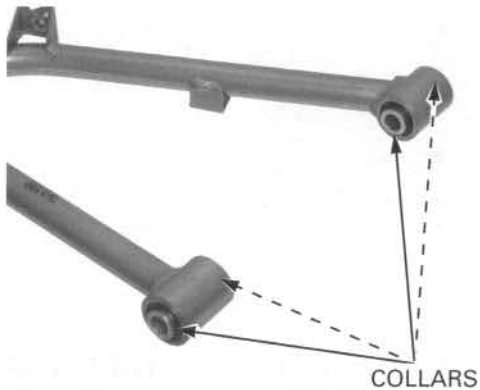
Pack 3 g (0.1 oz) of grease into the arm pivot as shown.

Apply grease to new dust seal lips and install them into the arm pivot until they are flush with the pivot ends.



## INSTALLATION

Install the pivot collars into the arm pivots.



*Insert all the bolt  
from the front side.*

Install the lower arm into the frame with the pivot bolts and new nuts.

Connect the shock absorber to the lower arm with the mounting bolt and a new nut.

Tighten the nuts.

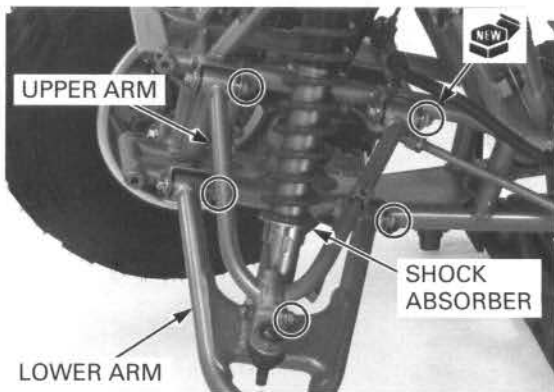
### TORQUE:

**Lower arm: 39 N·m (4.0 kgf·m, 29 lbf·ft)**

**Shock absorber: 44 N·m (4.5 kgf·m, 32 lbf·ft)**

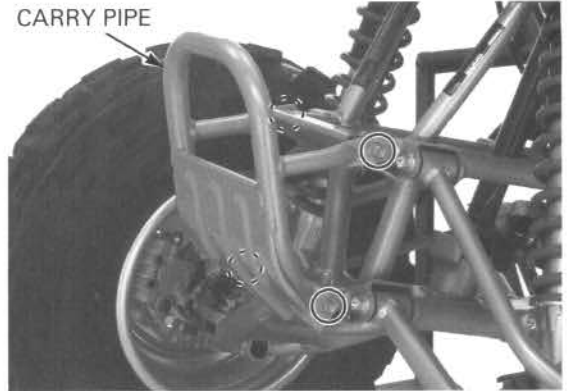
Install the upper arm with the pivot bolts and new nuts, and tighten it.

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





Install the carry pipe and tighten the four bolts.

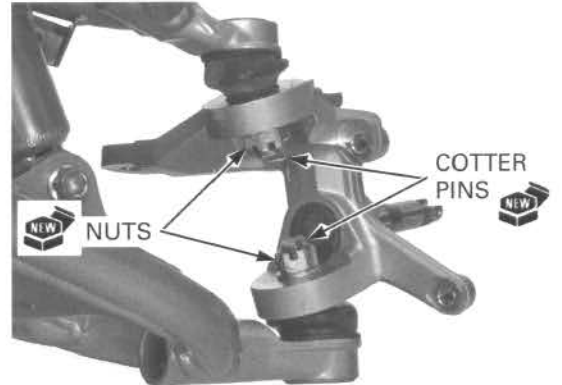


Install the knuckle onto the upper and lower arms with the washers and castle nuts.

Tighten each nut to the specified torque and further tighten them until the grooves align with the cotter pin hole.

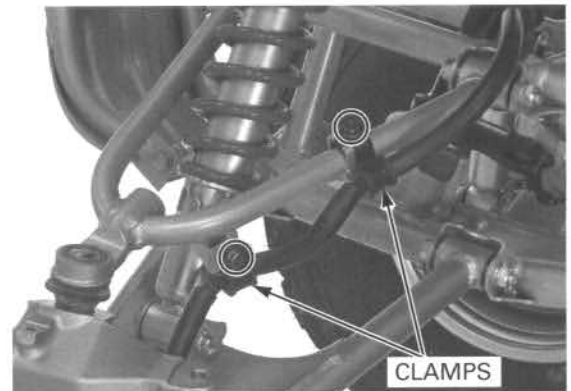
**TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)**

Install new cotter pins.



Place the brake caliper before the lower arm.

Install the brake hose clamps and tighten the bolts.



Connect the tie-rod to the knuckle with a new nut.

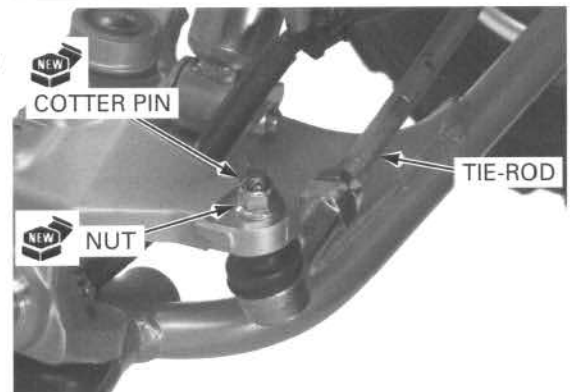
*Be careful not to damage the ball joint boot.*

Tighten the ball joint nut while holding the joint stud flat surfaces with an open end wrench.

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

Install a new cotter pin.

Install the wheel hub (page 13-17).



## STEERING SHAFT

### REMOVAL

Remove the following:

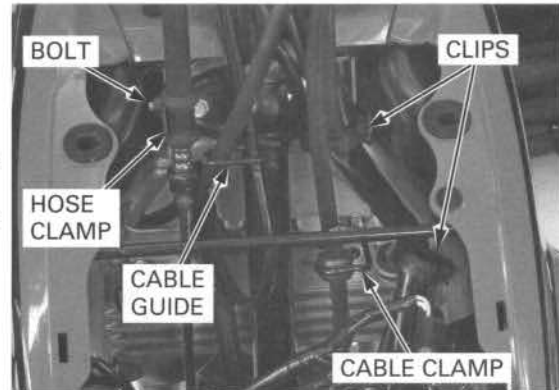
- top cover (page 3-3)
- handlebar cover (page 13-6)

Release the wires from the two clips.

Release the clutch cable from the cable clamp.

Release the throttle and parking brake cables from the cable guide.

Remove the bolt and brake hose clamp from the steering shaft holder.



*Do not twist or bend the brake hose and pipe.*

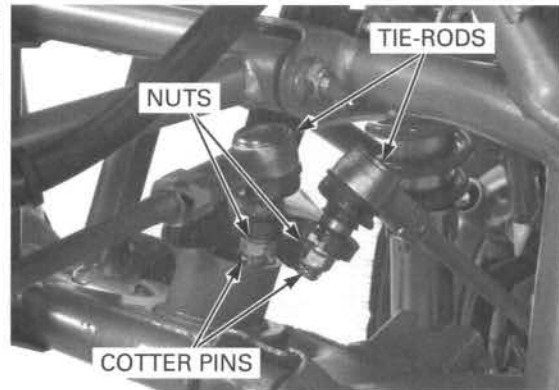
Remove the handlebar lower holder nuts and washers, and support the handlebar assembly.



Remove the cotter pins from the tie-rod ball joint studs.

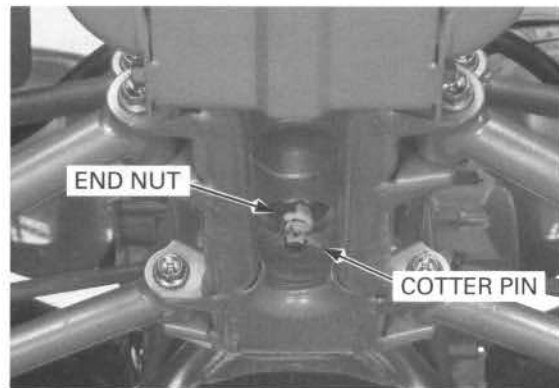
*Be careful not to damage the ball joint boots.*

Remove the ball joint nuts while holding the joint stud flat surfaces with an open end wrench. Disconnect the tie-rods from the steering shaft.



Remove the following:

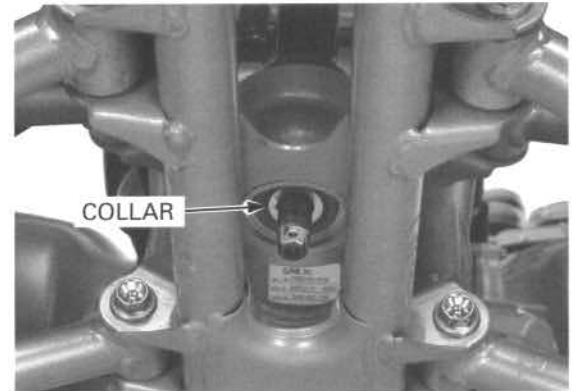
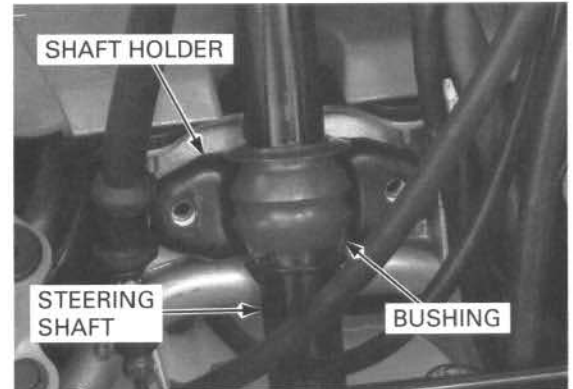
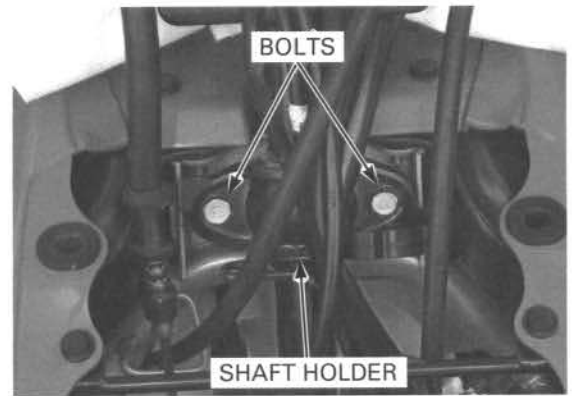
- cotter pin
- steering shaft end nut



- two bolts
- front shaft holder

*Be careful not to damage the oil cooler fins.*

- steering shaft and rear shaft holder
- shaft collar
- shaft bushing



**INSPECTION**

Check the steering shaft bushing for wear or damage.



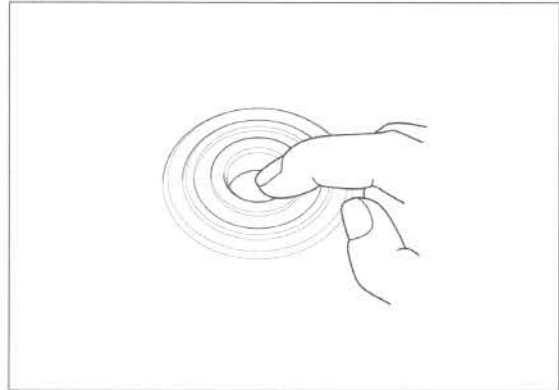
## FRONT WHEEL/SUSPENSION/STEERING

Check the steering shaft for distortion or damage.



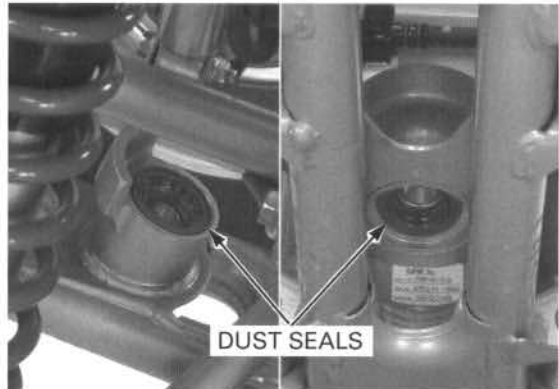
Turn the inner race of the steering shaft bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the frame.

Replace the bearing if the inner race does not turn smoothly and quietly, or if the outer race fits loosely in the frame.



### BEARING REPLACEMENT

Remove the upper and lower dust seals.

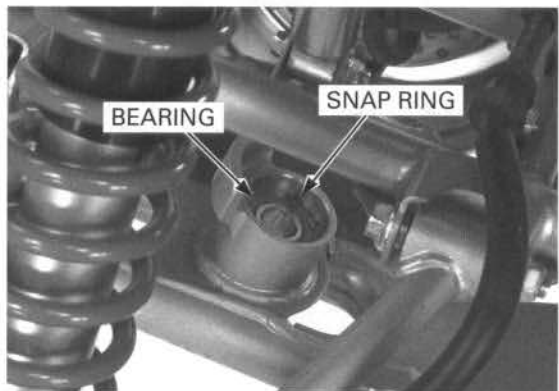


Remove the snap ring.

Drive the steering shaft bearing out of the frame from the bottom.

#### TOOLS:

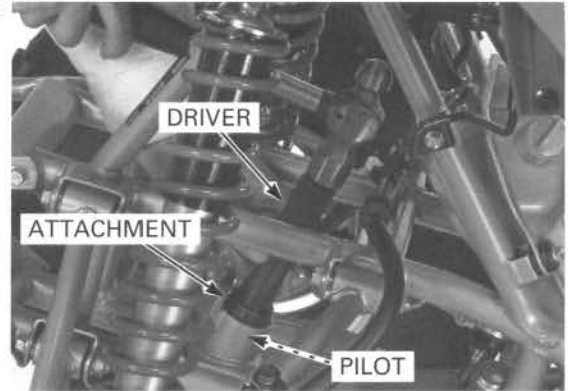
Driver 07749-0010000  
Attachment, 32 x 35 mm 07746-0010100



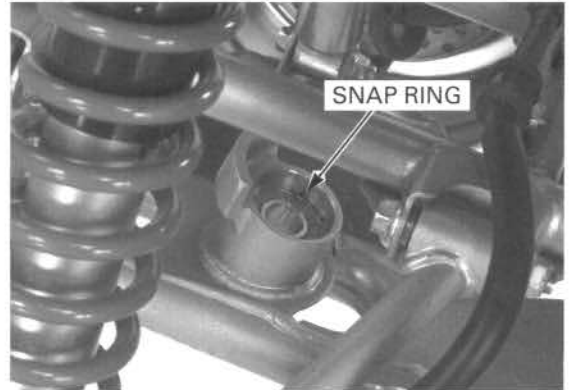
Drive a new bearing squarely into the frame until it is fully seated.

**TOOLS:**

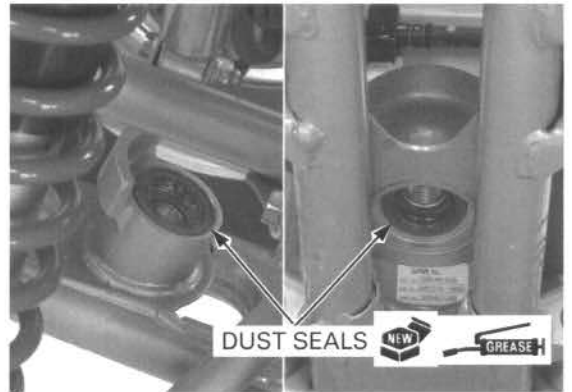
<b>Driver</b>	07749-0010000
<b>Attachment, 37 x 40 mm</b>	07746-0010200
<b>Pilot, 17 mm</b>	07746-0040400



Install the snap ring into the frame groove properly.



Apply grease to new dust seal lips and install them into the frame.



**INSTALLATION**

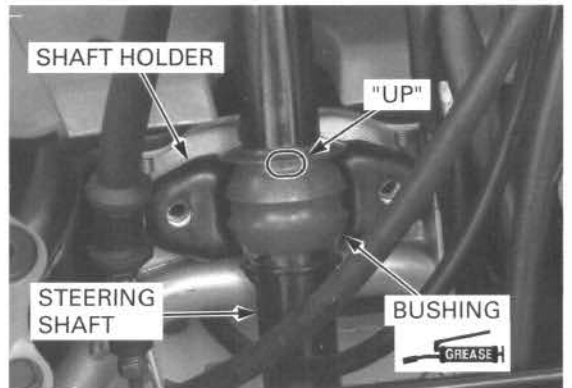
**NOTE:**

- Route the wires, hose and cables properly (page 1-18).

Apply grease to the shaft bushing inner surface. Install the bushing onto the steering shaft with the "UP" mark facing up.

*Take care not to damage the oil cooler fins.*

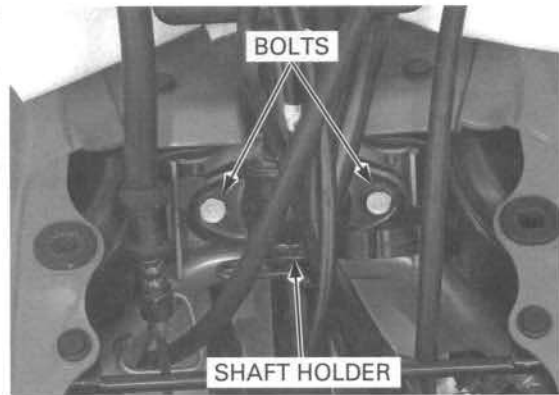
Install the steering shaft into the steering shaft bearing and the rear shaft holder onto the frame.



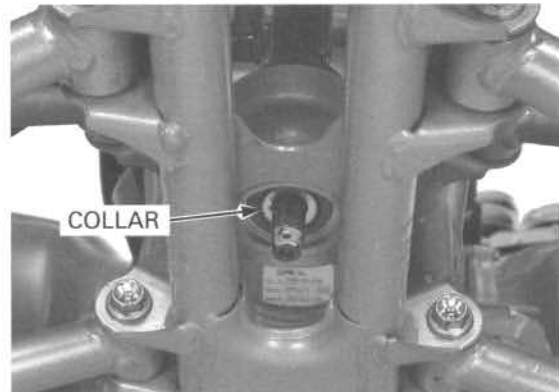
## FRONT WHEEL/SUSPENSION/STEERING

Make sure the steering shaft is fully seated on the bearing.  
Install the front shaft holder and tighten the two bolts alternately.

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



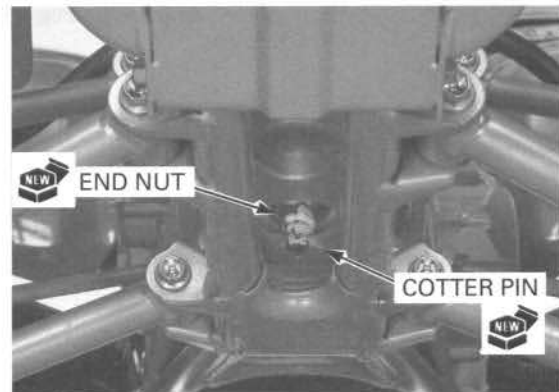
Install the shaft collar.



Install a new end nut and tighten it.

**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**

Install a new cotter pin.



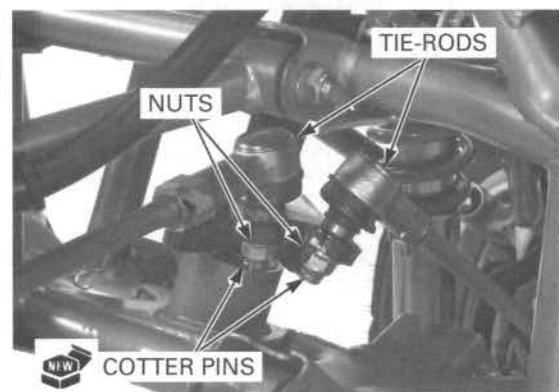
Connect the tie-rods onto the steering shaft.

*Be careful not to damage the ball joint boots.*

Install new ball joint nuts and tighten them while holding the ball joint stud flats with an open end wrench.

**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**

Install new cotter pins.



*Do not twist or bend the brake hose and pipe.*

Install the handlebar assembly onto the steering shaft with the washers and new holder nuts. Tighten the nuts.

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



NUTS AND WASHERS

Install the brake hose clamp onto the steering shaft holder with the bolt, and tighten it.

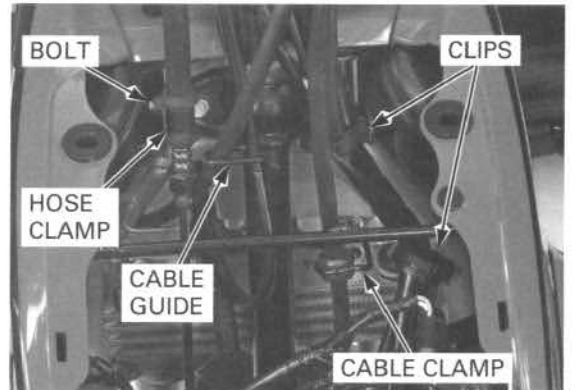
Install the throttle and parking brake cables into the cable guide.

Install the clutch cable into the cable clamp.

Secure the wires with the two clips.

Install the following:

- handlebar cover (page 13-9)
- top cover (page 3-3)



## TIE-ROD

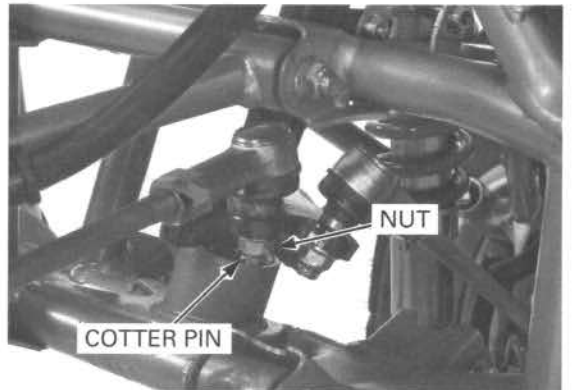
### REMOVAL

Remove the front wheel (page 13-10).

Remove the cotter pins.

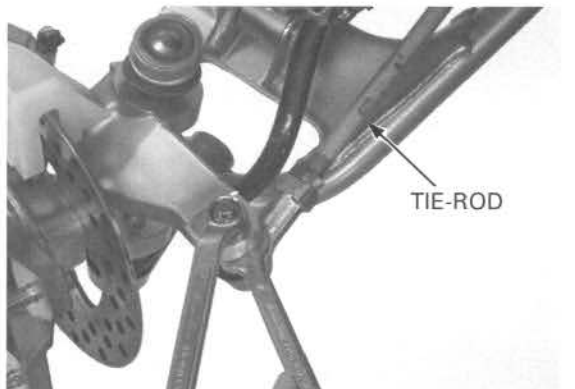
*Be careful not to damage the ball joint boots.*

Remove the ball joint nuts while holding the joint stud flats with an open end wrench. Remove the tie-rod from the knuckle and steering shaft arm.



COTTER PIN

NUT



TIE-ROD

## FRONT WHEEL/SUSPENSION/STEERING

### INSPECTION

Inspect the tie-rod for distortion or damage.  
Inspect the ball joint boots for tears or other damage by moving the ball joint studs. They should move freely and smoothly.

Replace the ball joint if necessary.

### DISASSEMBLY/ASSEMBLY

Loosen the lock nuts and remove the ball joints and lock nuts from the tie-rod.

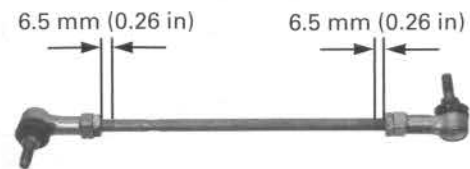
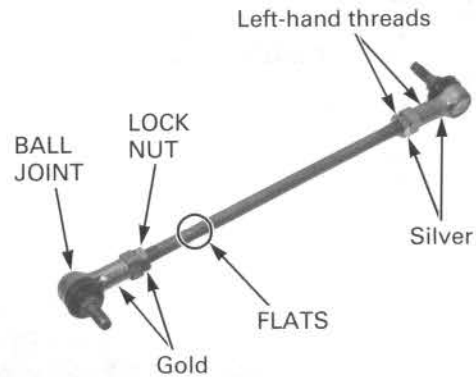
Install the gold ball joint and nut on the flat (wrench holding area) side of the tie-rod, and the silver ball joint and nut on the opposite side.

*A difference between the distances should be 3.0 mm (0.12 in) or less.*

*The ball joint positions are 180° from each other. Tighten these nuts after installing the tie-rod.*

Adjust the tie-rod length so that the distance between each lock nut and thread end is 6.5 mm (0.26 in).

Hand-tighten the ball joint lock nuts.



### INSTALLATION

Install the tie-rod onto the steering shaft and knuckle with the flat side (wrench holding area) of the rod toward the knuckle.

*Be careful not to damage the ball joint boots.*

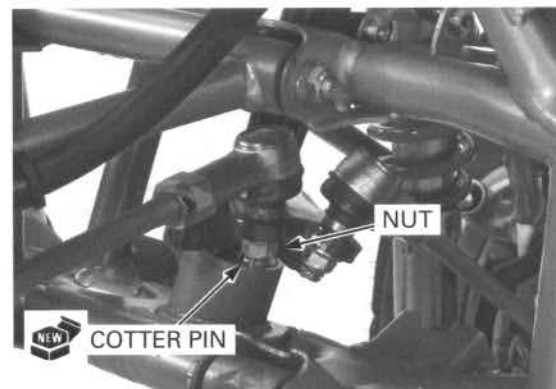
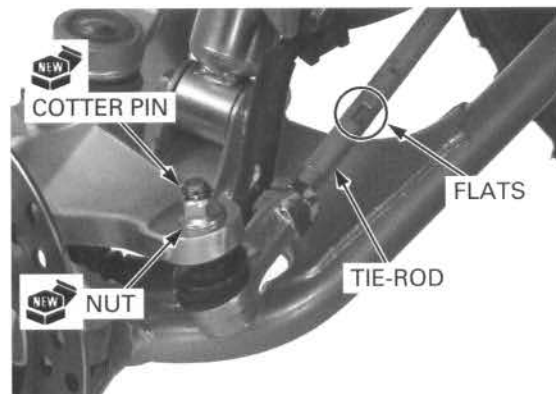
Install new joint nuts and tighten them while holding the ball joint stud flats with an open end wrench.

**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**

Install new cotter pins.

Install the front wheel (page 13-11).

Adjust the toe (page 4-26).



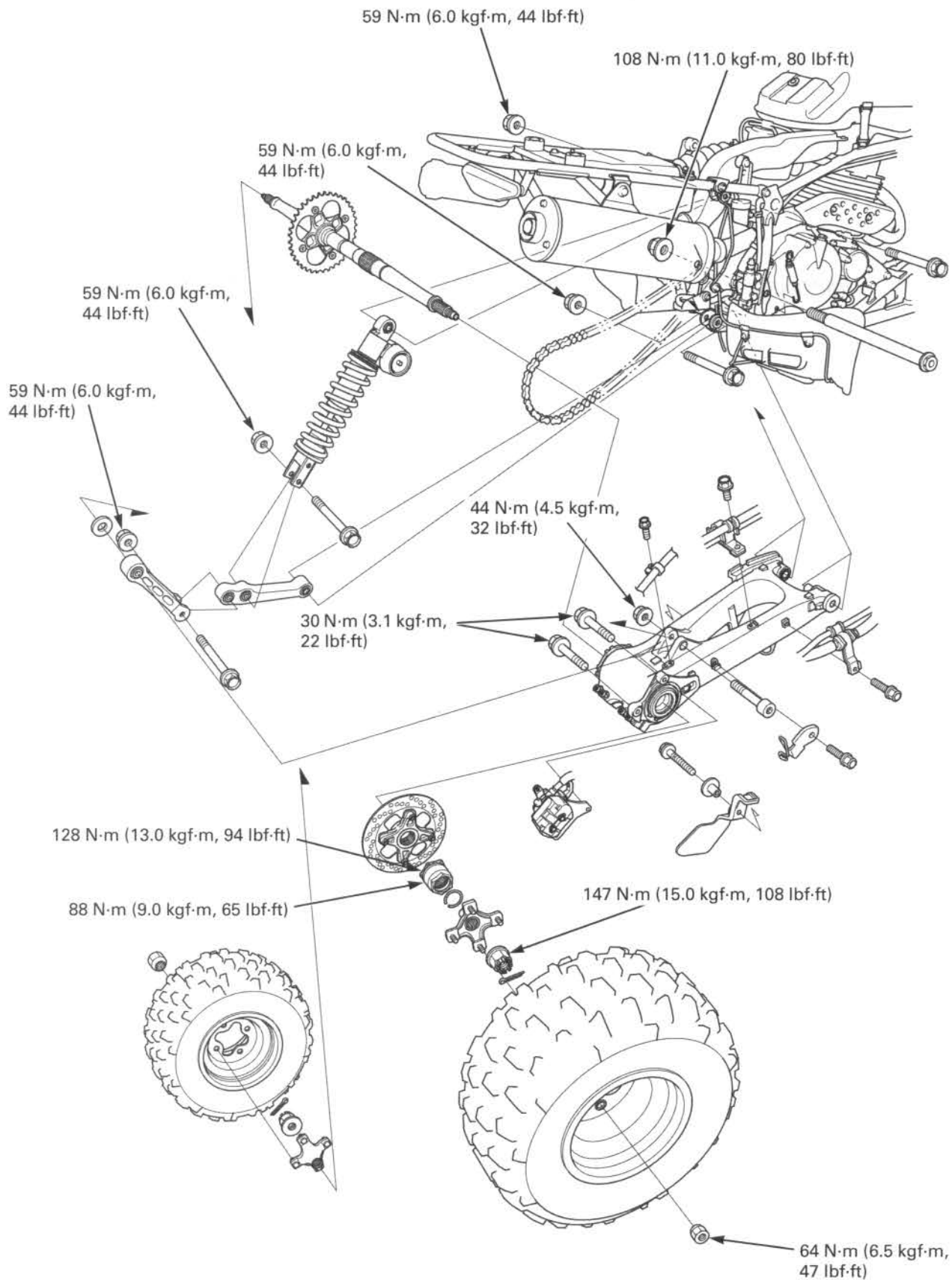


# 14. REAR WHEEL/SUSPENSION

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SYSTEM COMPONENTS .....	14-2	REAR AXLE/BEARING HOLDER.....	14-6
SERVICE INFORMATION .....	14-3	REAR SHOCK ABSORBER .....	14-15
TROUBLESHOOTING .....	14-5	SHOCK LINKAGE.....	14-17
REAR WHEEL.....	14-6	SWINGARM .....	14-19

# REAR WHEEL/SUSPENSION SYSTEM COMPONENTS



## SERVICE INFORMATION

### GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- A jack or other support is required to support the vehicle.
- When using the lock nut wrench for the axle lock nuts, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not over tighten the lock nut. The specification later in the text gives both actual and indicated.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to page 13-11, for tire information.
- Refer to page 4-14, for drive chain information.
- Refer to page 15-2 for brake system information.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		-	4.0 (0.16)
Cold tire pressure	Standard	27 kPa (0.275 kgf/cm <sup>2</sup> , 4.0 psi)	-
	Minimum	23 kPa (0.235 kgf/cm <sup>2</sup> , 3.4 psi)	-
	Maximum	31 kPa (0.315 kgf/cm <sup>2</sup> , 4.6 psi)	-
Axle runout		-	3.0 (0.12)
Drive chain	Slack	30 - 40 (1-1/4 - 1-5/8)	-
	Size/link	DID	520V6/94
		RK	520SMOZ10S/94
Shock absorber spring installed length		231.5 (9.11)	-
Compression damping adjuster standard position		2-1/2 turns out from full in	-
Rebound damping adjuster standard position		1-3/4 turns out from full in	-

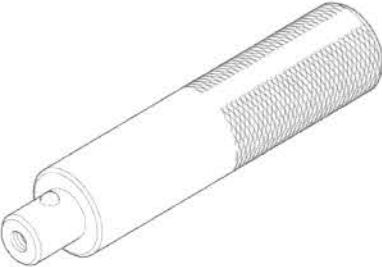
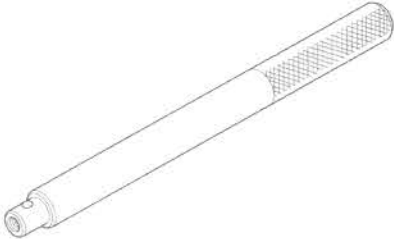





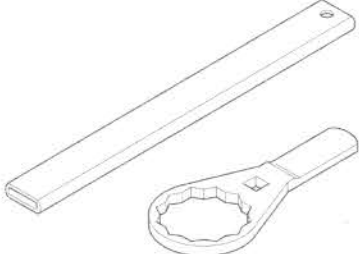

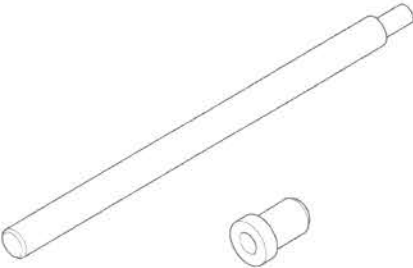
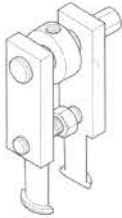
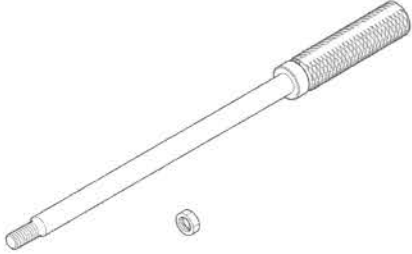
Unit: mm (in)

### TORQUE VALUES

Rear wheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Axle outer lock nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	Apply locking agent to the threads.
Axle inner lock nut	128 N·m (13.0 kgf·m, 94 lbf·ft)	Apply locking agent to the threads.
Rear wheel hub nut	147 N·m (15.0 kgf·m, 108 lbf·ft)	Castle nut: tighten to the specified torque and further tighten until its grooves aligns with the cotter pin hole. Apply grease to the threads and seating surface.
Final driven sprocket nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one.
Rear brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one.
Shock absorber mounting nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	Lock nut: replace with a new one.
Shock arm-to-frame nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	Lock nut: replace with a new one.
Shock link-to-swingarm nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	Lock nut: replace with a new one.
Shock arm-to-shock link nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	Lock nut: replace with a new one.
Swingarm pivot nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Brake caliper stay stopper pin bolt	59 N·m (6.0 kgf·m, 44 lbf·ft)	Apply locking agent to the threads.

# REAR WHEEL/SUSPENSION

## TOOLS

<p>Driver 07749-0010000</p> 	<p>Driver 07949-3710001</p> 	<p>Attachment, 22 x 24 mm 07746-0010800</p> 
<p>Attachment, 62 x 68 mm 07746-0010500</p> 	<p>Attachment, 35 mm I.D. 07746-0030400</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Pilot, 40 mm 07746-0040900</p> 	<p>Lock nut wrench, 56 mm 07916-HA20000</p>  <p>or 07916-HA2010A (U.S.A. only)</p>	<p>Lock nut wrench, 45.5 mm 07916-1870101</p>  <p>or commercially available equivalent</p>
<p>Needle bearing remover 07946-KA50000</p> 	<p>Adjustable bearing remover 07JAC-PH80100</p>  <p>or 07736-A01000B or 07736-A01000A (U.S.A. only) with slide hammer, 3/8" x 16 (commercially available)</p>	<p>Bearing remover shaft 07JAC-PH80200</p>  <p>or 07736-A01000B or 07736-A01000A (U.S.A. only) with slide hammer, 3/8" x 16 (commercially available)</p>

<p>Remover weight 07741-0010201</p>  <p>or 07936-3710200 or 07936-371020A (U.S.A. only)</p>	<p>Oil seal driver attachment 07965-SA00600</p> 
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## TROUBLESHOOTING

### Rear wheel wobbling

- Bent rim
- Worn or damaged rear axle bearings
- Faulty rear tire
- Rear wheel hub nut not tightened properly
- Faulty swingarm pivot bearings

### Rear wheel hard to turn

- Faulty rear axle bearings
- Bent rear axle
- Rear brake drag (page 15-5)
- Drive chain too tight (page 4-14)

### Soft suspension

- Incorrect suspension adjustment
- Weak shock absorber spring
- Faulty shock absorber damper

### Stiff suspension

- Incorrect suspension adjustment
- Bent shock absorber damper rod
- Damaged rear suspension pivot bearings

### Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

### REAR WHEEL

#### REMOVAL

Loosen the wheel nuts.

Support the vehicle using a hoist or equivalent and raise the rear wheels off the ground.

Remove the wheel nuts and rear wheel.

For tire removal/installation and repair, refer to page 13-11.

#### INSTALLATION

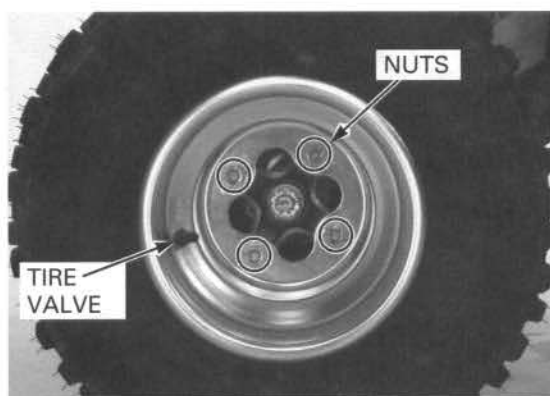
NOTE:

- Do not interchange the left and right tires.

Install the rear wheel with the tire valve facing out.

Install the wheel nuts with the tapered side facing inward and tighten them.

**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**



### REAR AXLE/BEARING HOLDER

#### REMOVAL

Remove the following:

- rear wheels (page 14-6)
- skid plate (page 3-7)

*Always replace the disc bolts with new ones.*

If you plan replace the brake disc or drive sprocket, loosen its mounting fasteners.

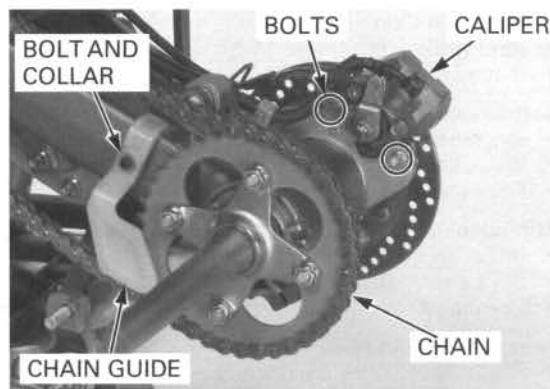
Remove the following.

- two bolts and brake caliper
- bolt, collar and chain guide

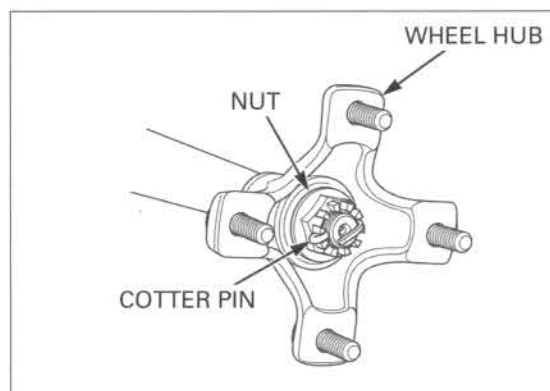
*Do not twist or bend the brake hose and cable after removing the caliper.*

Turn the rear axle bearing holder to obtain maximum drive chain slack (page 4-14).

Remove the drive chain from the driven sprocket.



Remove the right wheel hub by removing the cotter pin and hub nut. If necessary, remove the left wheel hub.



## REAR WHEEL/SUSPENSION

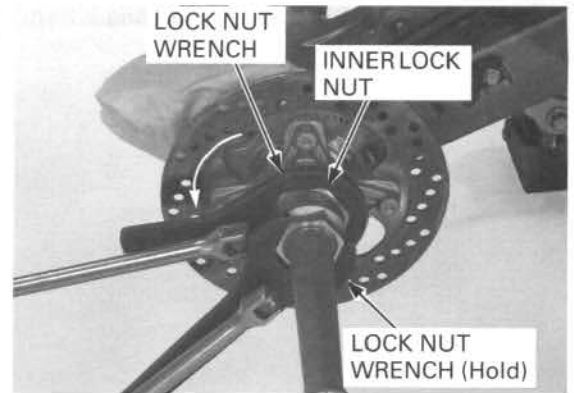
*The lock nuts has left-hand threads.*

Loosen the axle inner lock nut by turning it counter-clockwise while holding the outer lock nut, using the special tools.

**TOOLS:**

**Lock nut wrench, 56 mm** 07916-HA20000 or 07916-HA2010A (U.S.A. only)

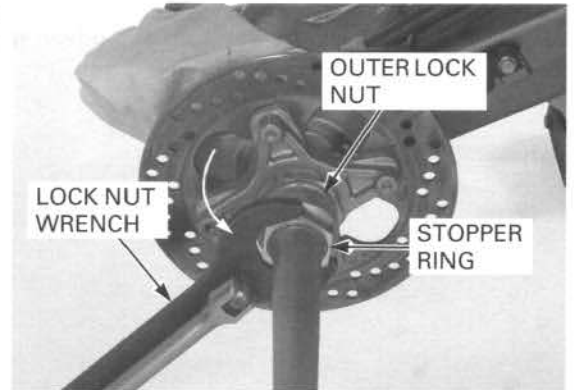
**Lock nut wrench, 45.5 mm** 07916-1870101 or commercially available equivalent



Loosen the axle outer lock nut until the stopper ring can be removed while supporting the disc flange, using the special tool.

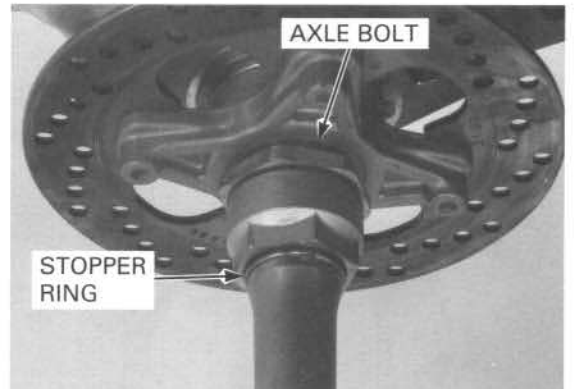
**TOOL:**

**Lock nut wrench, 45.5 mm** 07916-1870101 or commercially available equivalent

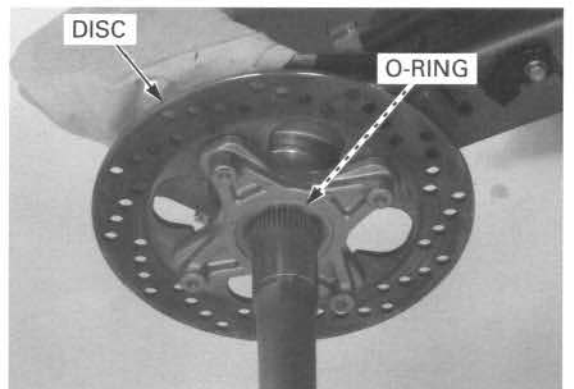


Remove the following:

- stopper ring
- rear axle bolt (with the lock nuts)

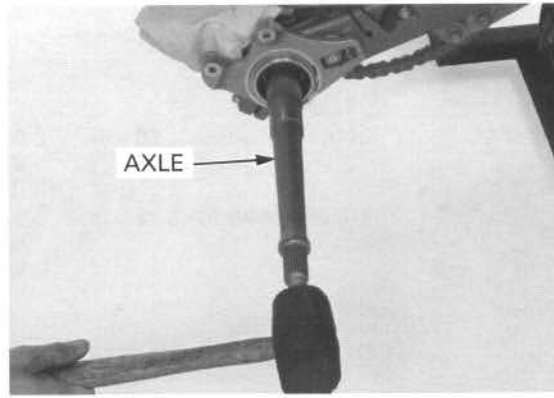


- brake disc assembly
- O-ring (from the inside of the disc flange)

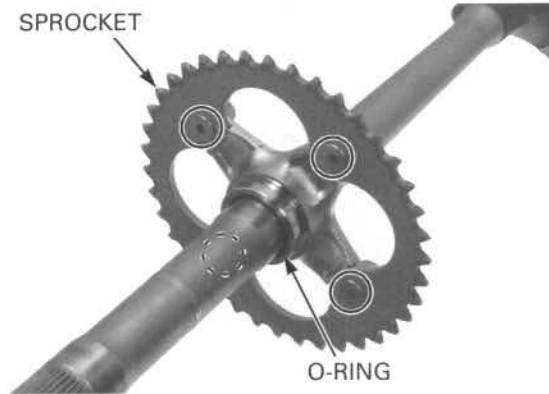


## REAR WHEEL/SUSPENSION

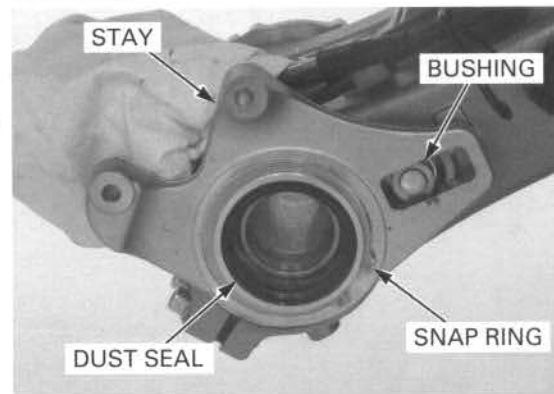
- rear axle (by driving it from the right side with a rubber mallet)



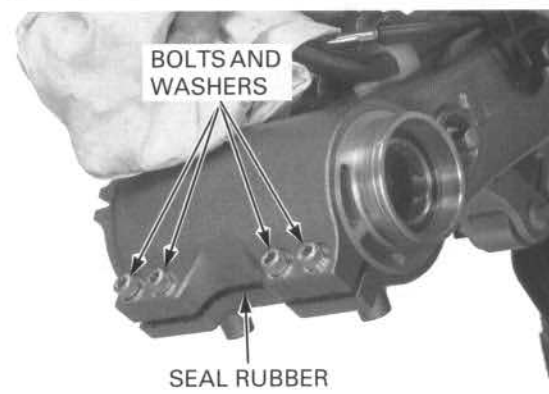
- O-ring
- four nuts, bolts and driven sprocket



- dust seals
- snap ring
- caliper stay
- stopper bushing
- O-rings (from the bearing holder and stay groove)

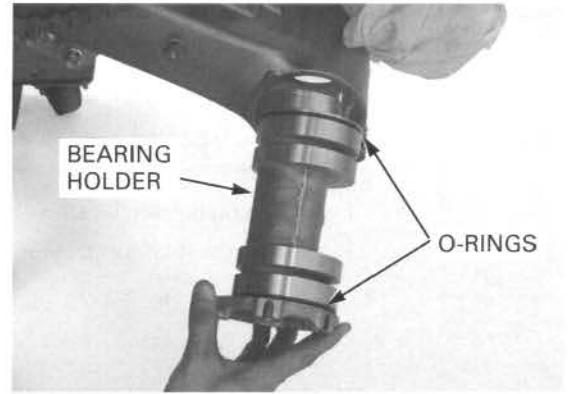


- pinch bolts and washers
- seal rubber





- bearing holder (by tapping it from the right side)
- O-rings



**INSPECTION**

Set the axle in v-blocks and measure the axle runout with a dial indicator. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 3.0 mm (0.12 in)**



Turn the inner race of each bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the holder.

*Replace the bearings in pairs.*

Replace the bearings if the races do not turn smoothly and quietly or if they fit loosely in the holder.

**BEARING REPLACEMENT**

*Be sure to wear heavy gloves when handling the heated bearing holder.*

Heat the gear case to 80°C (176°F) evenly using a heat gun.

Remove the bearings using the special tools.

**TOOLS:**

- Adjustable bearing remover** 07JAC-PH80100
- Remover shaft** 07JAC-PH80200
- Remover weight** 07741-0010201

**U.S.A. only:**

- Adjustable bearing puller, 25 – 40 mm** 07736-A01000B or 07736-A01000A
- and**

**Slide hammer, 3/8" x 16 (equivalent commercially available in U.S.A.)**

Remove the distance collar and drive out the other bearing.



## REAR WHEEL/SUSPENSION

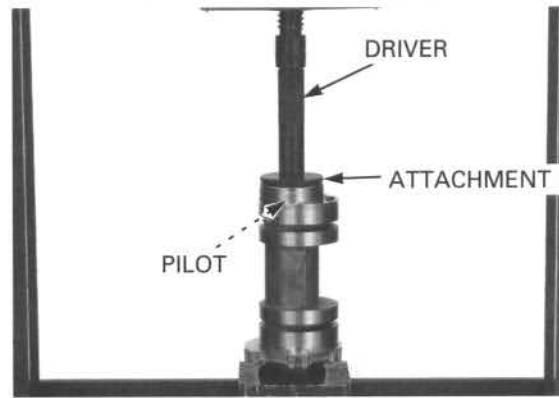
Press a new right (brake disc side) bearing into the bearing holder until it is fully seated.

### TOOLS:

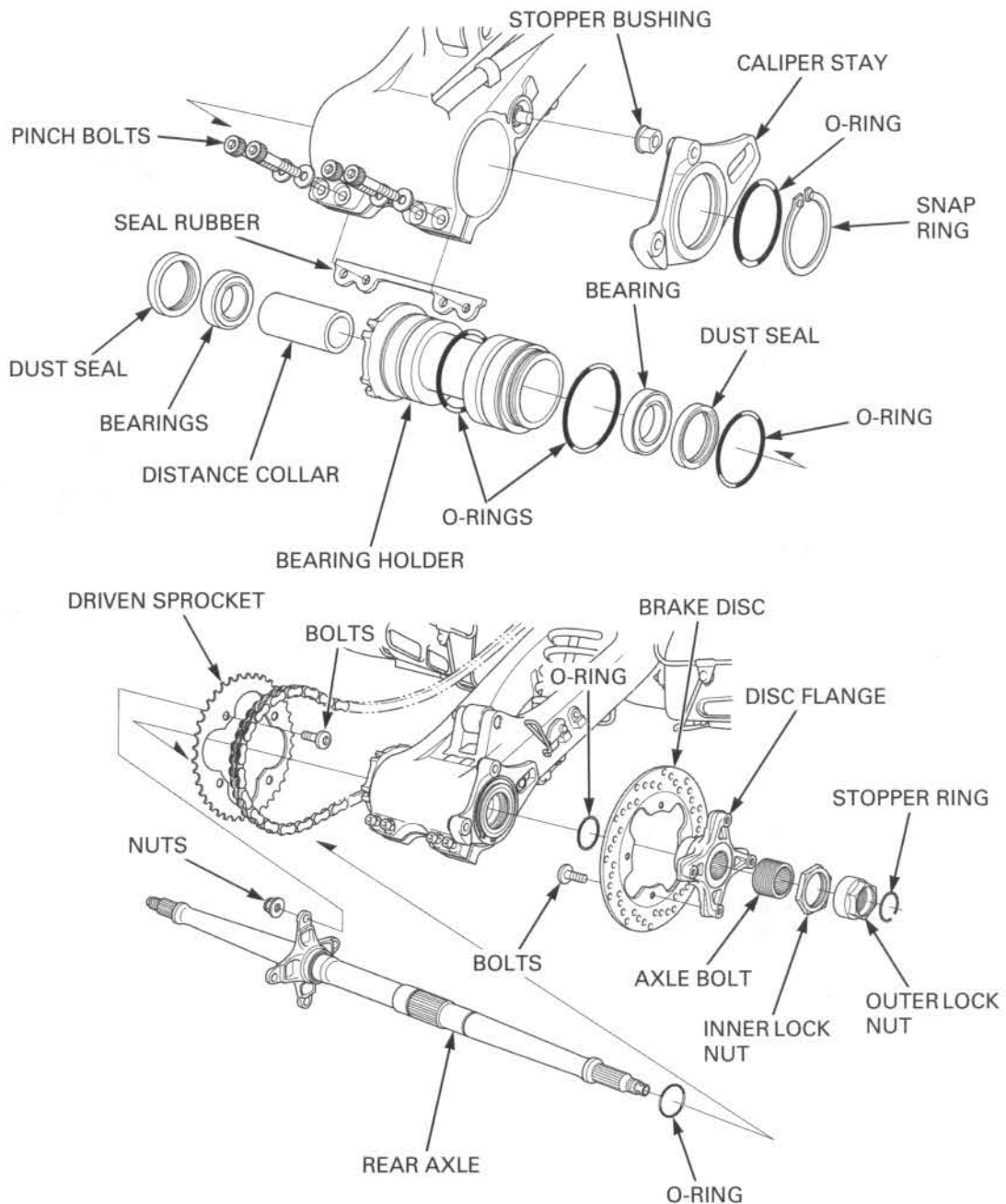
Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500
Pilot, 40 mm	07746-0040900

Install the distance collar.

Press a new left bearing, using the same tools.



## INSTALLATION

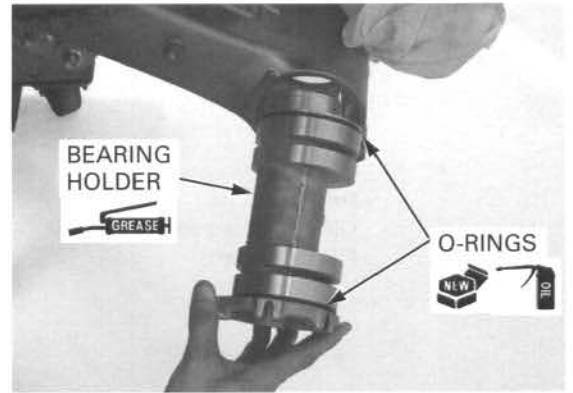


Clean the bearing holder outer surface and the swingarm inner surface.

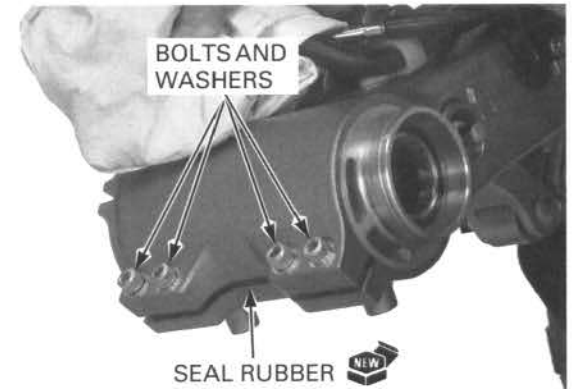
Coat new O-rings with engine oil and install them into the bearing holder grooves.

*Be careful not to damage the O-rings.*

Apply grease to the bearing holder seating surface. Install the bearing holder into the swingarm until it is fully seated.



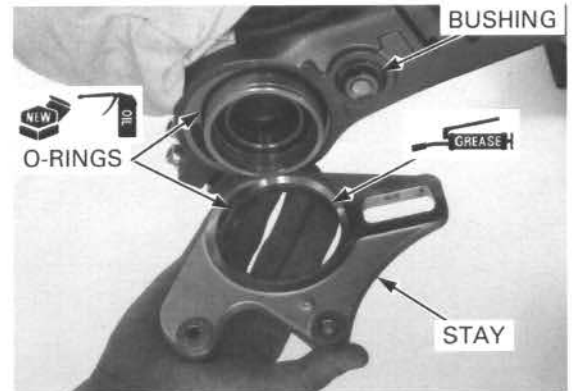
Install a new seal rubber into the swingarm and loosely install the pinch bolts with the washers.



Coat new O-rings with engine oil and install them into the caliper stay groove and onto the bearing holder.

Install the bushing onto the stopper pin.

Apply grease to the inner surface of the caliper stay and install it onto the bearing holder and bushing.



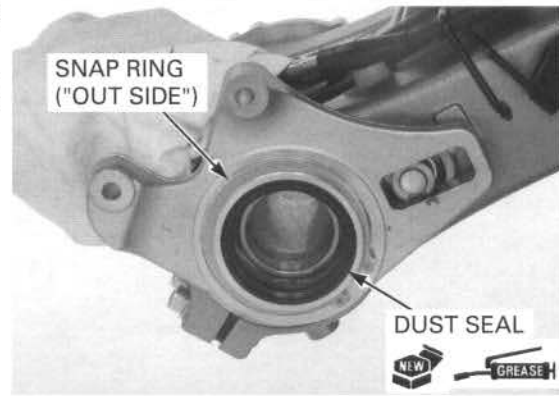
## REAR WHEEL/SUSPENSION

Install the snap ring into the bearing holder groove with the "OUT SIDE" mark facing out.

Apply grease to new dust seal lips and install them into the bearing holder until they are flush with the holder end surfaces.

### TOOLS:

Driver	07749-0010000
Oil seal driver attachment	07965-SA00600
Pilot, 40 mm	07746-0040900



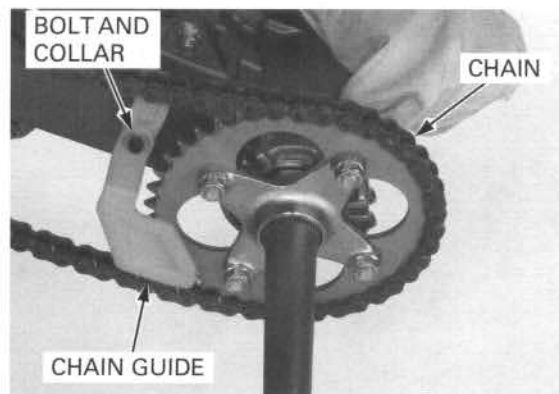
Install the driven sprocket with the chamfered bolt holes facing the swingarm side. Install the four bolts and nuts, and temporarily tighten them.

Coat a new O-ring with engine oil and install it between the sprocket flange and axle.

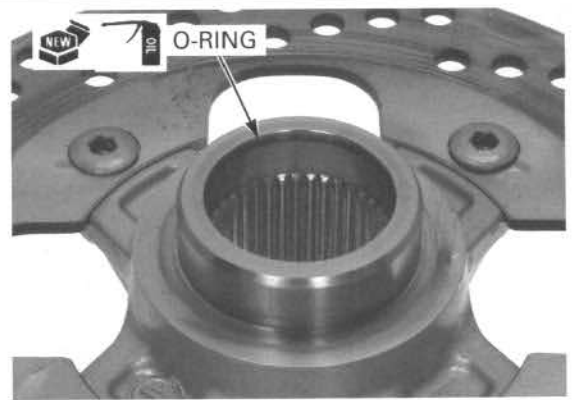


Install the rear axle into the bearing holder through the drive chain until it is fully seated. Install the drive chain over the driven sprocket.

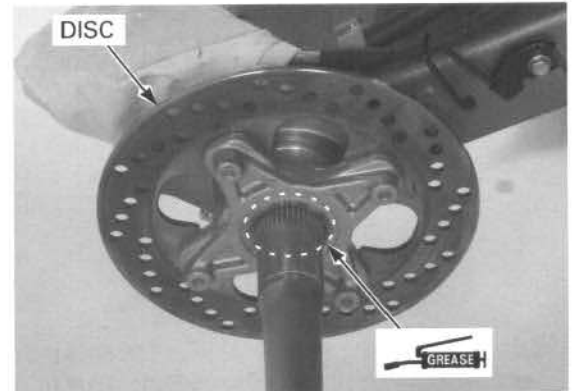
Install the chain guide with the collar and bolts, and tighten it.



Coat a new O-ring with engine oil and install it into the groove in the disc flange.



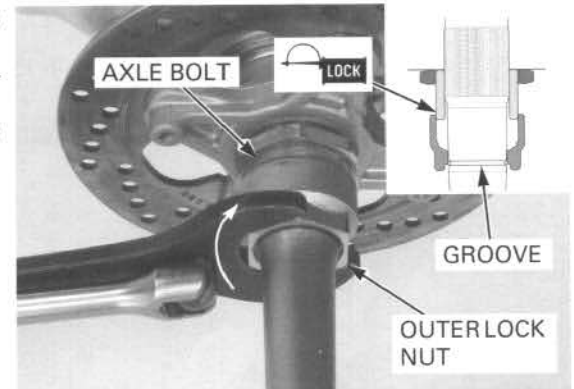
Apply grease to the rear axle splines.  
Install the brake disc assembly onto the axle.



*The lock nuts have left-hand threads.*

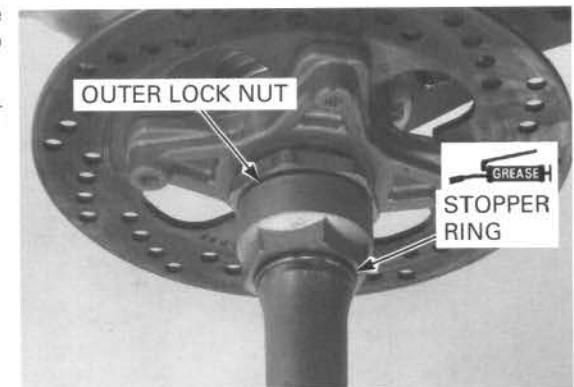
Install the axle bolt with the inner and outer lock nuts.

Turn the outer lock nut clockwise until the stopper ring groove is covered with the lock nut.  
Apply locking agent to the outer lock nut seating area of the axle bolt threads.



Turn the outer lock nut counterclockwise until the ring groove is visible. Install the stopper ring into the axle groove.

Apply grease to the stopper ring (outer lock nut contacting area).



## REAR WHEEL/SUSPENSION

Turn the outer lock nut clockwise to seat it against the stopper ring.

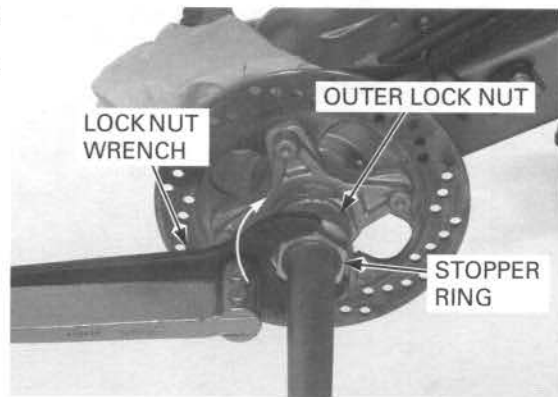
Tighten the outer lock nut while supporting the disc flange, using the special tool.

### TOOL:

**Lock nut wrench, 45.5 mm** 07916-1870101 or commercially available equivalent

*Refer to page 14-3 for torque wrench reading information.*

**TORQUE: Actual: 88 N·m (9.0 kgf·m, 65 lbf·ft)**  
**Indicated: 79 N·m (8.1 kgf·m, 58 lbf·ft)**



Apply locking agent to the inner lock nut seating area of the axle bolt threads.

Tighten the inner lock nut while holding the outer lock nut, using the special tools.

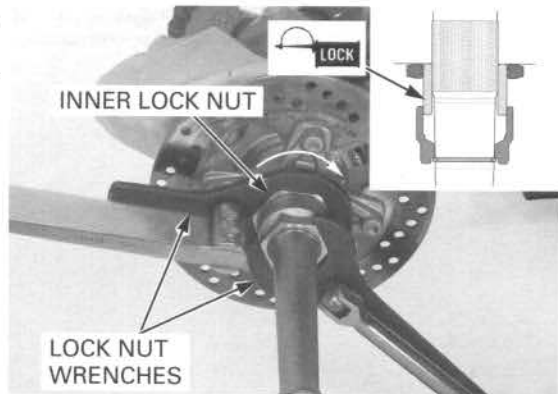
### TOOLS:

**Lock nut wrench, 56 mm** 07916-HA20000 or 07916-HA2010A (U.S.A. only)

**Lock nut wrench, 45.5 mm** 07916-1870101 or commercially available equivalent

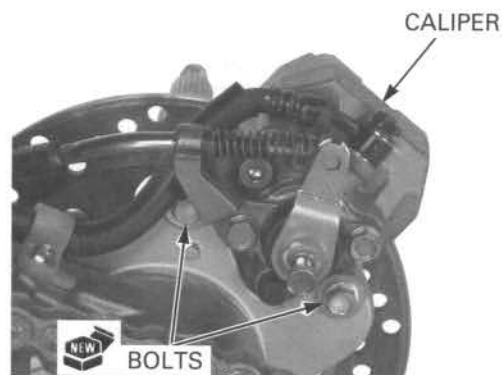
*Refer to page 14-3 for torque wrench reading information.*

**TORQUE: Actual: 128 N·m (13.0 kgf·m, 94 lbf·ft)**  
**Indicated: 115 N·m (11.7 kgf·m, 85 lbf·ft)**



Install the brake caliper with new bolts and tighten them.

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



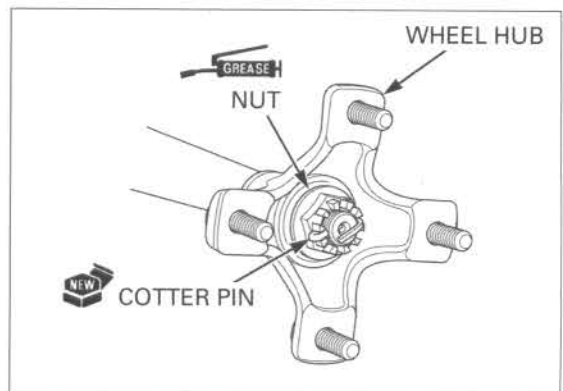
Apply grease to the hub nut threads and seating surface.

Install the wheel hub and hub nut.

Tighten the hub nut to the specified torque and further tighten it until its grooves align with the cotter pin hole.

**TORQUE: 147 N·m (15.0 kgf·m, 108 lbf·ft)**

Install a new cotter pin.



Tighten the fasteners of the brake disc and driven sprocket if they were removed.

### TORQUE:

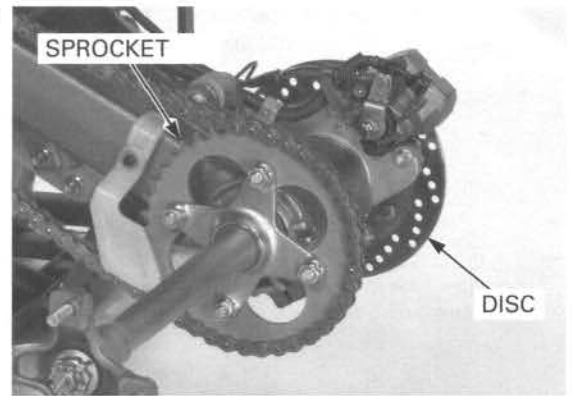
Sprocket nut: 59 N·m (6.0 kgf·m, 44 lbf·ft)

Disc bolt: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Install the following:

- rear wheels (page 14-6)
- skid plate (page 3-7)

Adjust the drive chain slack (page 4-14).



## REAR SHOCK ABSORBER

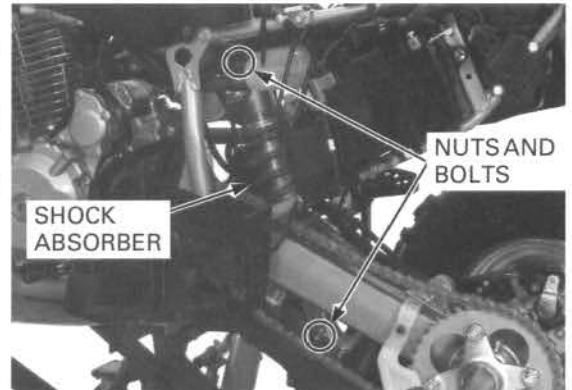
### REMOVAL

Remove the seat/rear fender (page 3-3).

Support the vehicle with a support block to raise the rear wheels off the ground.

Support the swingarm, and remove the mounting nuts and bolts.

Lower the swingarm and remove the rear shock absorber.



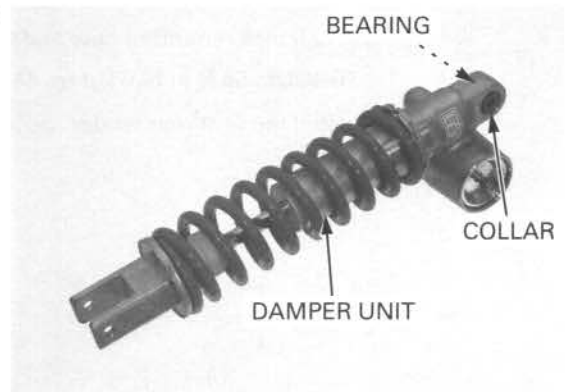
### INSPECTION

Remove the upper pivot collar and check the needle bearing for wear or damage.

Replace the bearing if necessary.

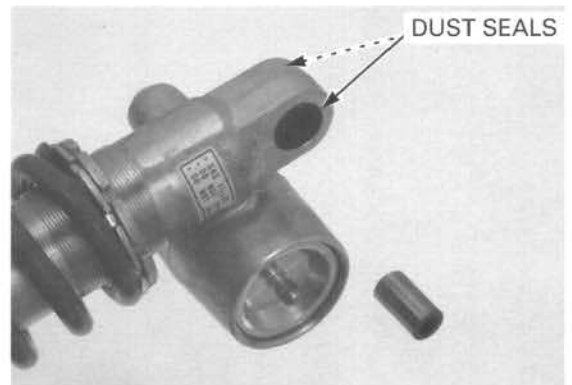
Check the damper unit for leaks or other damage.

Replace the shock absorber assembly if necessary.



### BEARING REPLACEMENT

Remove the dust seals.



## REAR WHEEL/SUSPENSION

Press the needle bearing out of the upper pivot using the special tool.

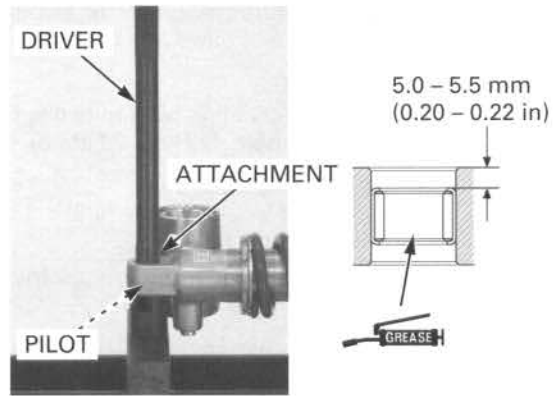
### TOOLS:

<b>Driver</b>	<b>07949-3710001</b>
<b>Attachment, 22 x 24 mm</b>	<b>07746-0010800</b>
<b>Pilot, 17 mm</b>	<b>07746-0040400</b>

Apply grease to the rollers of a new needle bearing.

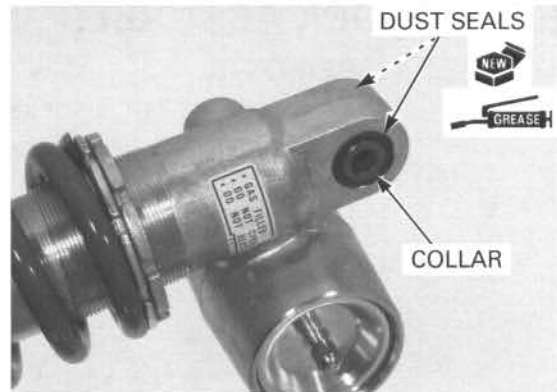
*Press in the bearing with the marked side facing up.*

Press the needle bearing into the upper pivot until the depth from the outer surface is 5.0 – 5.5 mm (0.20 – 0.22 in), using the same tools.



Apply grease to new dust seal lips and install them into the upper pivot until they are flush with the pivot surfaces.

Install the pivot collar.



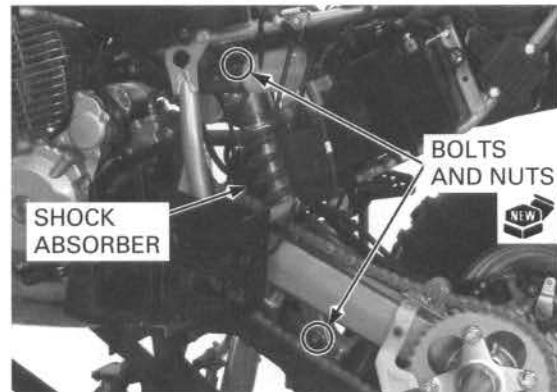
## INSTALLATION

Set the shock absorber onto the shock arm and into the frame with the damping adjuster facing the left side, and install the mounting bolts from the right side.

Install new mounting nuts and tighten them.

**TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)**

Install the seat/rear fender (page 3-3).





## SHOCK LINKAGE

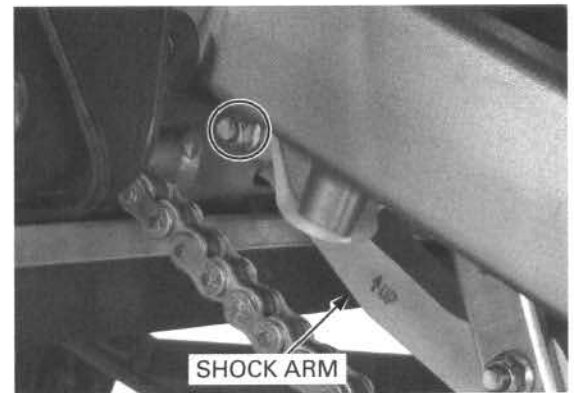
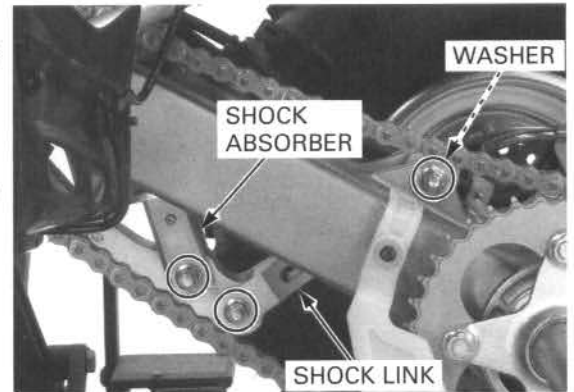
### REMOVAL

Remove the skid plate (page 3-7).

Support the vehicle with a support block to raise the rear wheels off the ground.

Support the swingarm and remove the following:

- shock absorber lower mounting nut and bolt
- shock arm-to-shock link nut and bolt
- shock link-to-swingarm nut, bolt and washer (between the left side of the link and swingarm)
- shock link
- shock arm-to-frame bolt
- shock arm

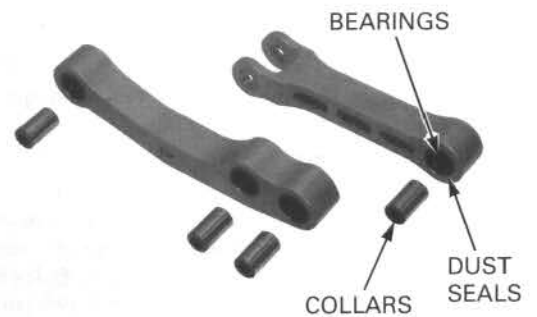


Remove the pivot collars.

Check the needle bearings for wear or damage.

### BEARING REPLACEMENT

Remove the dust seals.



Press the needle bearings out of each pivot.

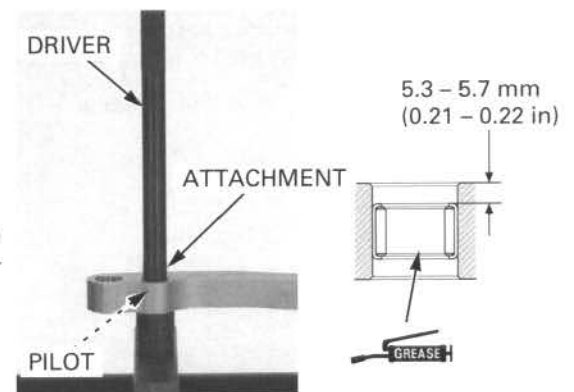
#### TOOLS:

<b>Driver</b>	<b>07949-3710001</b>
<b>Attachment, 22 x 24 mm</b>	<b>07746-0010800</b>
<b>Pilot, 17 mm</b>	<b>07746-0040400</b>

Apply grease to new needle bearing rollers.

*Press in the bearing with the marked side facing up.*

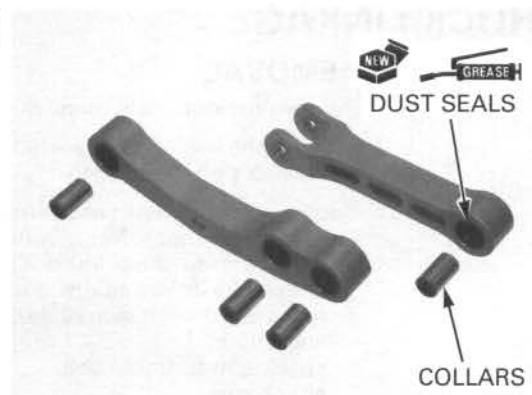
Press the needle bearing into the pivot until the depth from the outer surface is 5.3 – 5.7 mm (0.21 – 0.22 in), using the same tools.



## REAR WHEEL/SUSPENSION

Apply grease to the lips of the dust seals and install them into the shock arm and shock link pivots until they are seated to the bearings.

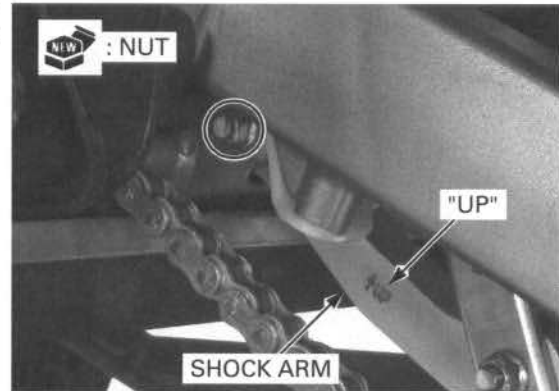
Install the pivot collars.



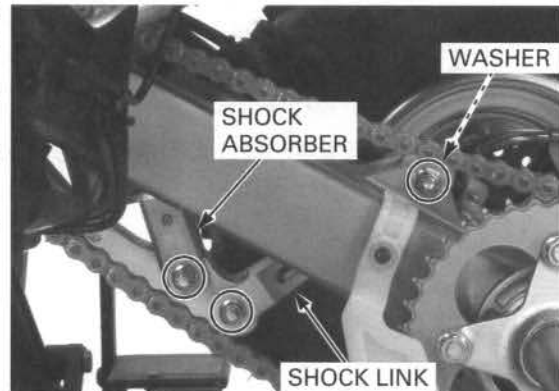
### INSTALLATION

*Note the installation direction of the shock linkage bolts. All bolts are installed from the right side.*

Install the shock arm into the frame with the "UP" mark facing up and to the left side with the bolt and a new nut.



Install the shock link and washer (between the left side of the link and swingarm) into the swingarm with the bolt and a new nut. Connect the shock link to the shock arm with the bolt and a new nut.



Connect the shock absorber to the shock arm with the bolt and a new nut.

Tighten the shock linkage and shock absorber mounting nuts.

#### TORQUE:

**Shock arm-to-frame nut:**

59 N·m (6.0 kgf·m, 44 lbf·ft)

**Shock link-to-swingarm nut:**

44 N·m (4.5 kgf·m, 32 lbf·ft)

**Shock arm-to-shock link nut:**

59 N·m (6.0 kgf·m, 44 lbf·ft)

**Rear shock absorber lower mounting nut:**

59 N·m (6.0 kgf·m, 44 lbf·ft)

Install the skid plate (page 3-7).

## SWINGARM

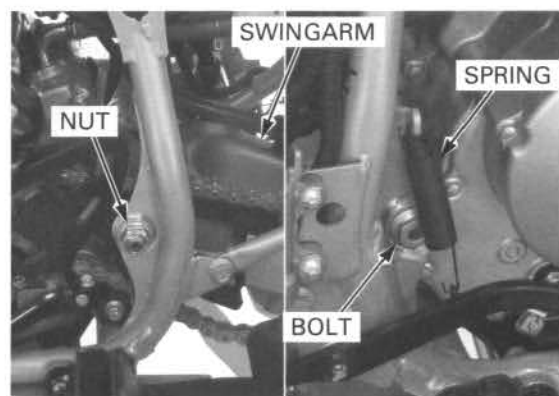
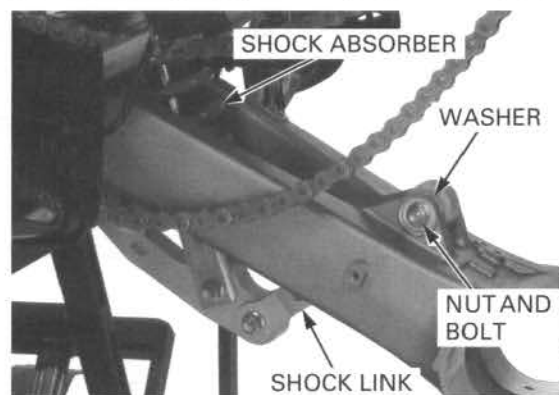
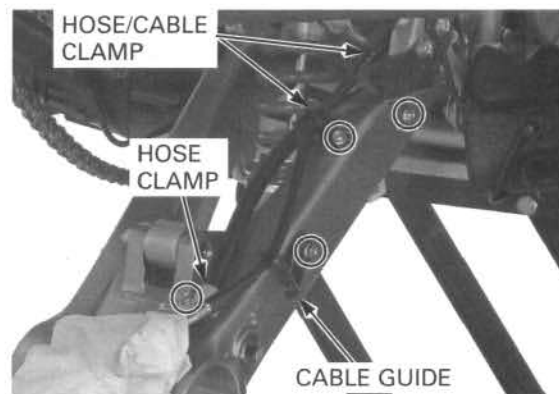
### REMOVAL

Remove the rear axle and bearing holder (page 14-6).

*Support the caliper so that it does not hang from the brake hose. Do not twist or bend the brake hose.*

Remove the following:

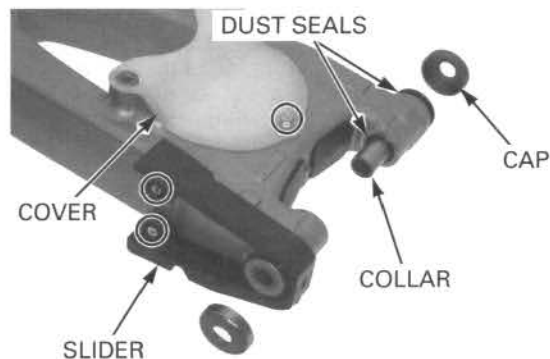
- bolt and brake hose clamp
- bolt and brake cable guide
- bolts and hose/cable clamps
  
- shock link-to-swingarm nut, bolt and washer
- shock absorber (page 14-15)
  
- brake pedal return spring
- swingarm pivot nut and bolt
- swingarm



### DISASSEMBLY

- dust seal caps
- outer dust seals
- pivot collars
- inner dust seals
- two bolts, collars and chain slider
- bolt and under cover

Check the needle bearings for wear or damage.



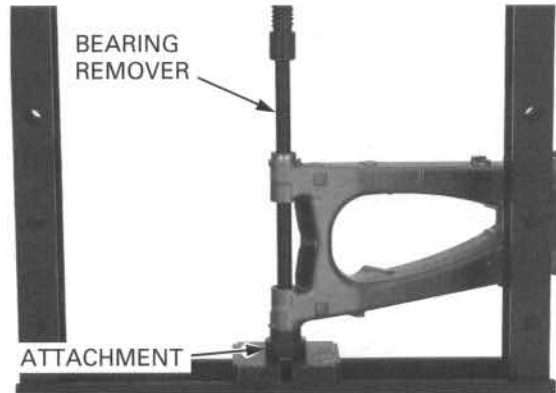
## REAR WHEEL/SUSPENSION

### BEARING REPLACEMENT

Press the needle bearing and thrust bushing out of the swingarm pivot using the special tools.

**TOOLS:**

**Needle bearing remover**      07946-KA50000  
**Attachment, 35 mm I.D.**      07746-0030400



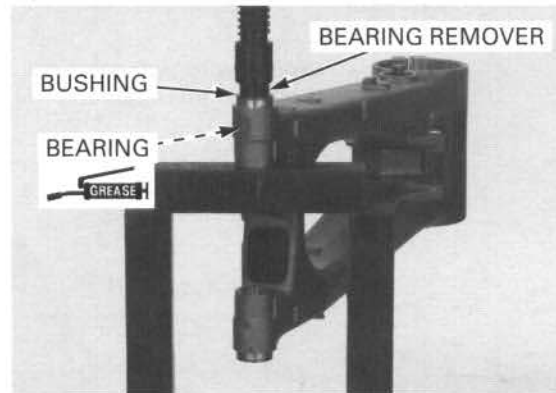
Apply 3 g (0.1 oz) of grease to the needle rollers of each new bearing.

*Press in the bearing with the marked side facing up.*

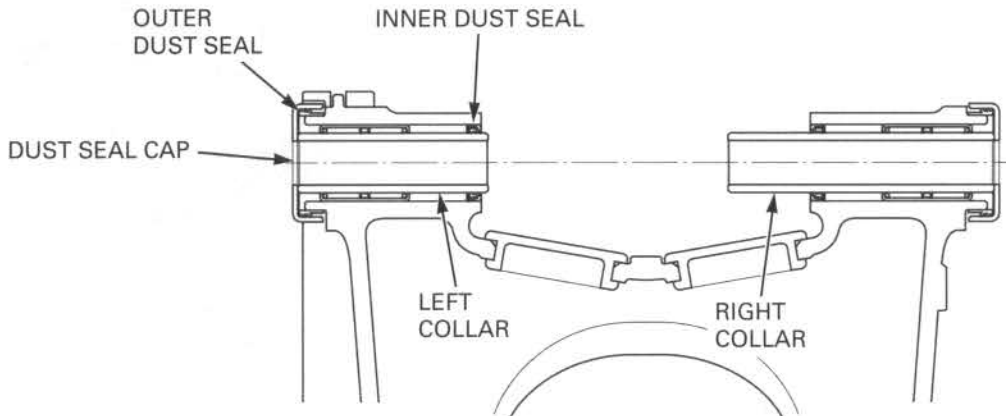
Press the bearing and the thrust bushing into the swingarm pivot until the bushing is fully seated.

**TOOL:**

**Needle bearing remover**      07946-KA50000

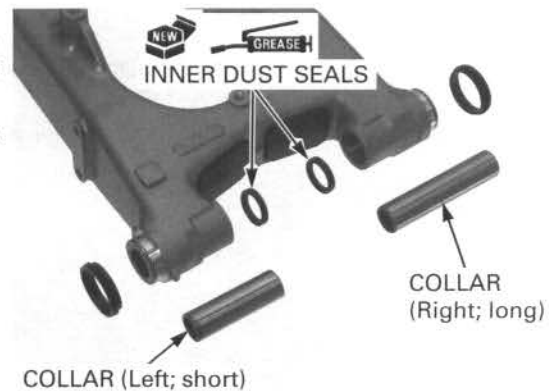


### ASSEMBLY



Apply grease to the lips of new inner dust seals. Install the inner dust seals with the flat surface facing the swingarm until they are flush with the pivot surfaces.

Install the pivot collars (left; slider side: short/right side: long).

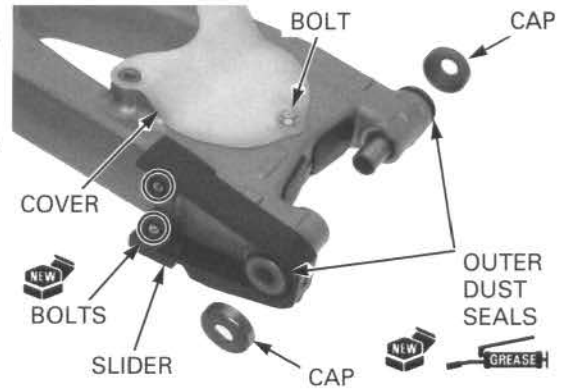


Install new outer dust seals with the lips facing out. Pack grease into lip cavities of the outer dust seal and install the seal caps securely.

Install the under cover and tighten the bolt.

*Install with the wear limit groove facing up, aligning the slit with the locating tab.*

Install the chain slider with the collars and new bolts, and tighten them.



**INSTALLATION**

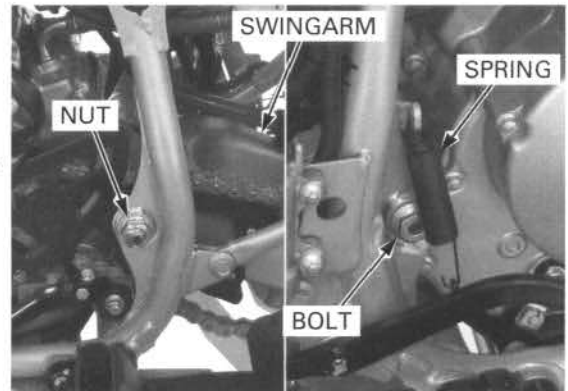
*Be careful not to drop the dust seal caps.*

Install the swingarm between the frame and engine, and insert the pivot bolt from the right side.

Install the pivot nut and tighten it.

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

Install the pedal return spring in the direction as shown.

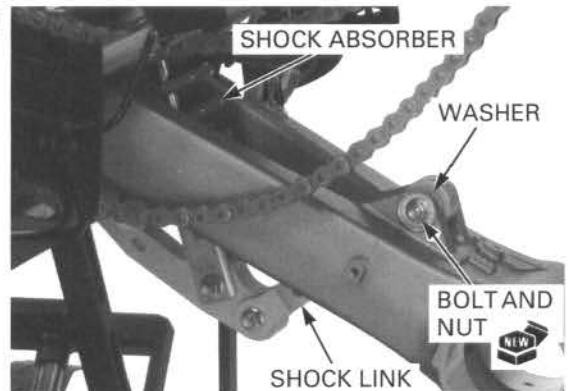


Connect the shock link to the swingarm by inserting the bolt from the right side, then install the washer between the left side of the link and swingarm.

Install a new nut and tighten it.

**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**

Install the shock absorber (page 14-16)

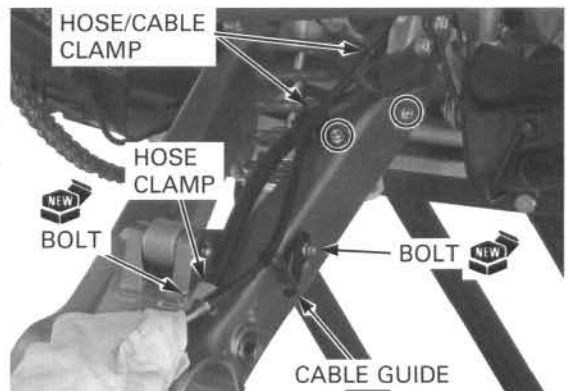


Install the brake hose/cable clamps and tighten the bolt.

Install the cable guide with a new bolt and tighten it.

Install the hose clamp with a new bolt and tighten it.

Install the bearing holder and rear axle (page 14-10).



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MEMO



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**RIDE RED**

# 15. HYDRAULIC DISC BRAKE

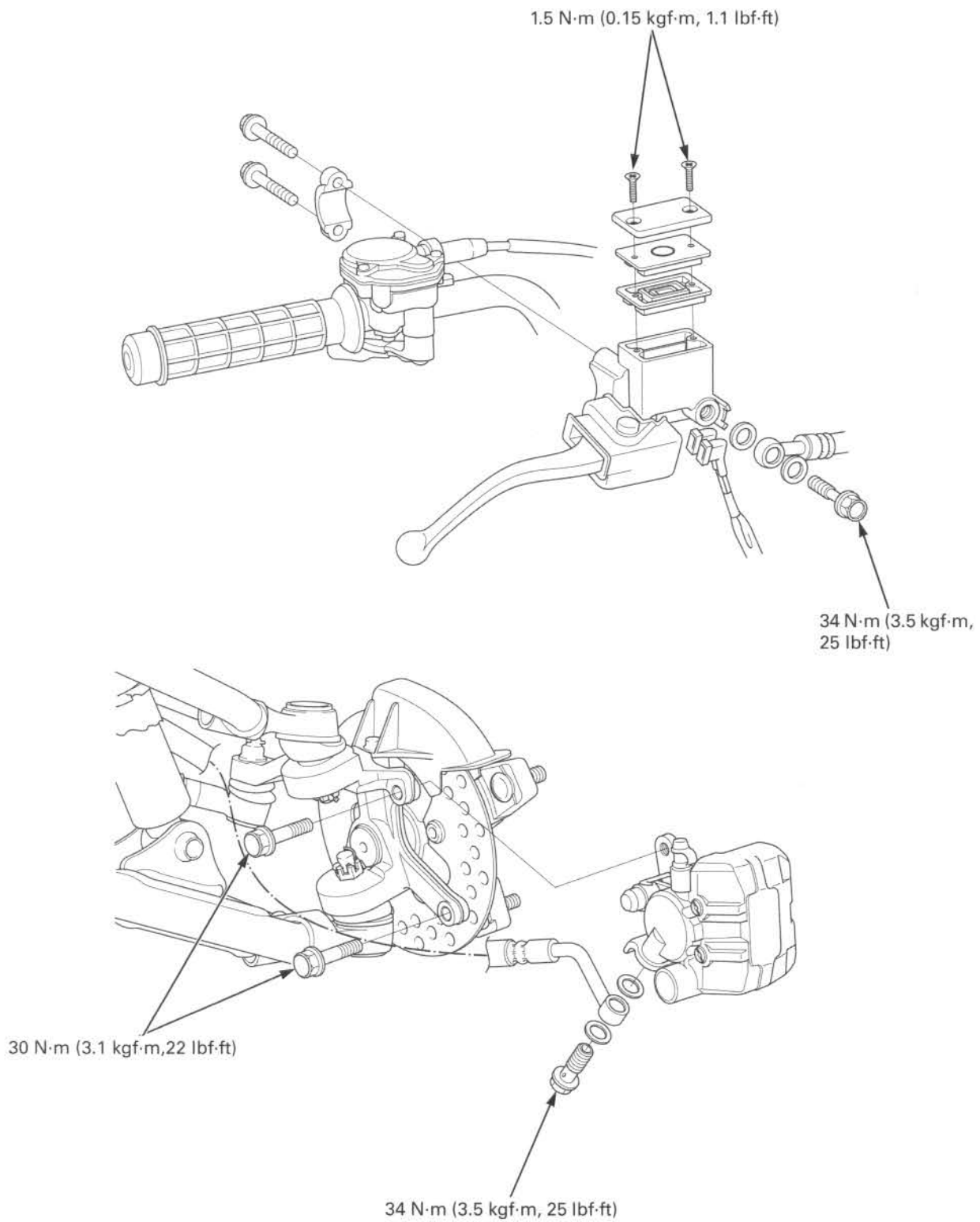
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SYSTEM COMPONENTS .....	15-2	FRONT MASTER CYLINDER.....	15-12
SERVICE INFORMATION .....	15-4	FRONT BRAKE CALIPER.....	15-16
TROUBLESHOOTING .....	15-5	REAR MASTER CYLINDER .....	15-18
BRAKE FLUID REPLACEMENT/ AIR BLEEDING .....	15-6	REAR BRAKE CALIPER.....	15-22
BRAKE PAD/DISC.....	15-9	BRAKE PEDAL .....	15-28

# HYDRAULIC DISC BRAKE

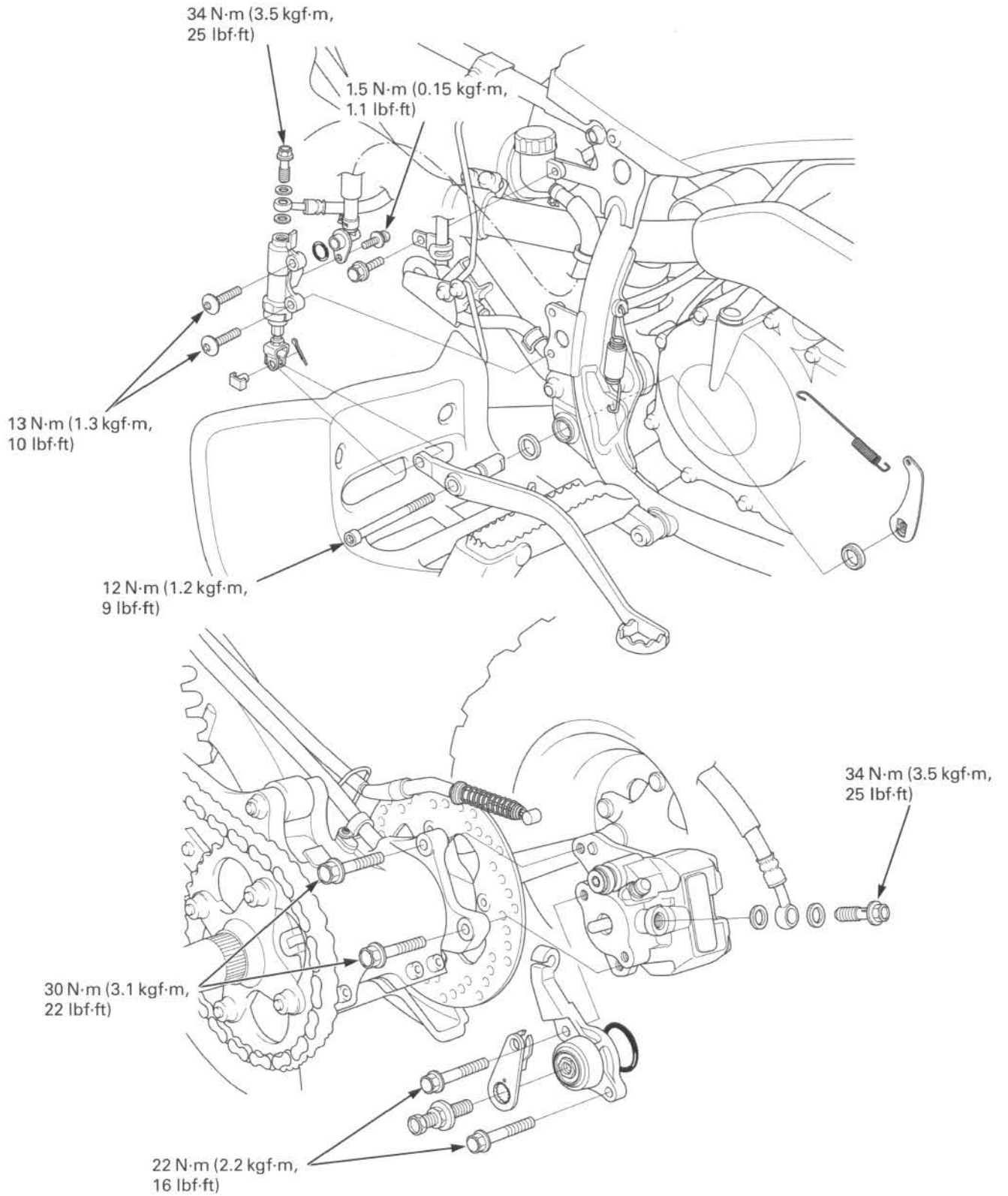
## SYSTEM COMPONENTS

FRONT:





REAR:



## HYDRAULIC DISC BRAKE

# SERVICE INFORMATION

## GENERAL

### ⚠ CAUTION

Frequent inhalation of brake pad 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.

### NOTICE

*Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.*

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Never allow contaminants (e.g., dirt, water) to enter an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 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 brake operation before riding the vehicle.

## SPECIFICATION

Unit: mm (in)

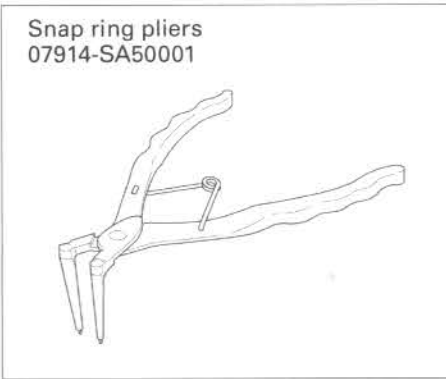
ITEM	STANDARD	SERVICE LIMIT
Recommended brake fluid	DOT 4	–
Brake disc thickness	Front	2.8 – 3.2 (0.11 – 0.13)
	Rear	3.8 – 4.2 (0.15 – 0.17)
Brake disc runout	–	0.30 (0.012)
Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.75 (0.502)
Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.65 (0.498)
Caliper cylinder I.D.	33.960 – 34.010 (1.3370 – 1.3390)	34.02 (1.340)
Caliper piston O.D.	33.895 – 33.928 (1.3344 – 1.3357)	33.87 (1.333)

## TORQUE VALUES

Caliper bleed valve	5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)
Front master cylinder reservoir cap screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)
Front brake caliper pad pin	17.2 N·m (1.75 kgf·m, 13 lbf·ft)
Front brake caliper pad pin plug	2.4 N·m (0.24 kgf·m, 1.8 lbf·ft)
Rear brake caliper pad pin	17.2 N·m (1.75 kgf·m, 13 lbf·ft)
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Front brake lever pivot bolt	5.9 N·m (0.60 kgf·m, 4.4 lbf·ft)
Front brake lever pivot nut	5.9 N·m (0.60 kgf·m, 4.4 lbf·ft)
Front brake light switch screw	1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)
Rear brake reservoir hose joint screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft) Apply locking agent to the threads.
Rear master cylinder mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Front brake caliper slide pin	22 N·m (2.2 kgf·m, 16 lbf·ft) Apply locking agent to the threads.
Front brake caliper bracket pin	17.2 N·m (1.75 kgf·m, 13 lbf·ft)
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) ALOC bolt: replace with a new one.
Rear brake caliper slide pin	22 N·m (2.2 kgf·m, 16 lbf·ft) Apply locking agent to the threads.
Rear brake caliper bracket pin	17.2 N·m (1.75 kgf·m, 13 lbf·ft) Apply locking agent to the threads.
Rear brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft) ALOC bolt: replace with a new one.
Parking brake base bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Brake pedal pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply locking agent to the threads.
Front brake pipe joint nut	17 N·m (1.7 kgf·m, 13 lbf·ft)

**TOOL**

Snap ring pliers  
07914-SA50001

**TROUBLESHOOTING****Brake lever/pedal soft or spongy**

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

**Brake lever/pedal hard**

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Caliper not sliding properly
- Bent brake lever/pedal

**Brake drags**

- Contaminated brake pad/disc
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

## HYDRAULIC DISC BRAKE

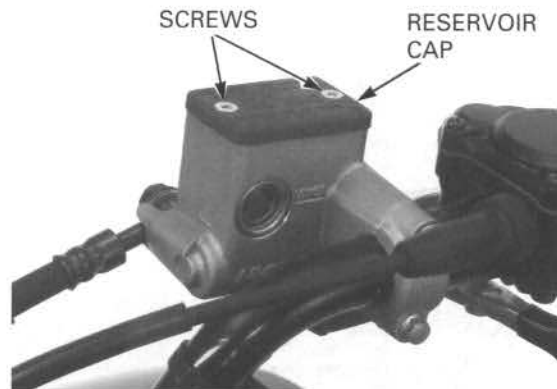
# BRAKE FLUID REPLACEMENT/AIR BLEEDING

### BRAKE FLUID DRAINING

#### FRONT BRAKE

Turn the handlebar to the left until the reservoir is level before removing the reservoir cap.

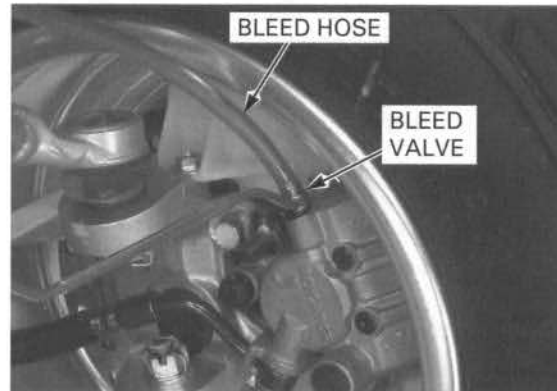
Remove the screws, reservoir cap, set plate and diaphragm.



Connect a bleed hose to the front brake caliper bleed valve.

Loosen the bleed valve and pump the brake lever until no more fluid flows out of the bleed valve.

Perform above procedure for the other side bleed valve.



#### REAR BRAKE

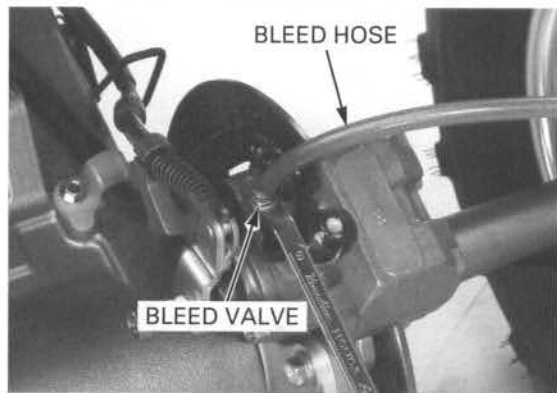
Remove the seat/rear fender (page 3-3).

Remove the reservoir cap, set plate and diaphragm.



Connect a bleed hose to the rear brake caliper bleed valve.

Loosen the bleed valve and pump the brake pedal until no more fluid flows out of the bleed valve.



**BRAKE FLUID FILLING/AIR BLEEDING  
FRONT BRAKE**

Close the front brake caliper bleed valve.

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

*Follow the manufacturer's operating instructions.*

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

*Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.*

If an automatic refill system is not used, add fluid when the fluid level in the reservoir is low.

*If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.*

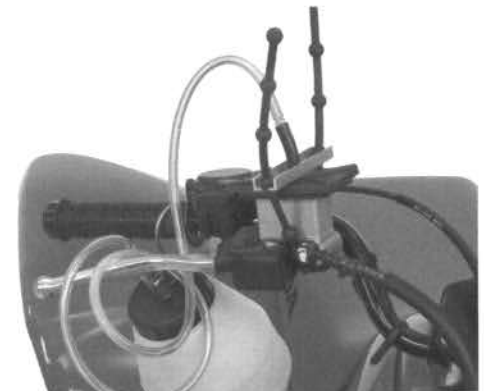
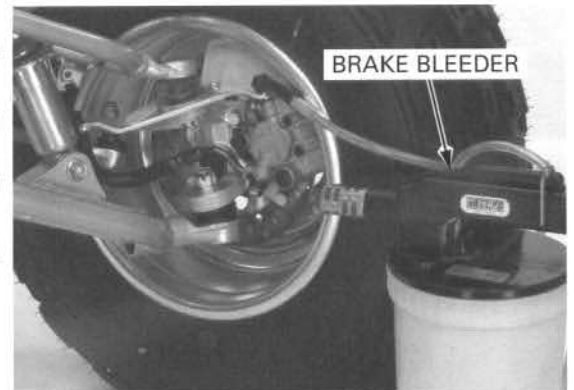
Perform the bleeding procedure until the system is completely flushed/bled.

Tighten the bleed valve.

**TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)**

Perform air bleeding for the other side bleed valve.

After bleeding air, operate the front brake lever. If it still feels spongy, bleed the system again.



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

Pump up the system pressure with the front brake lever until the lever resistance is felt.

Connect a bleed hose to the front brake caliper bleed valve and bleed the system as follows:

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

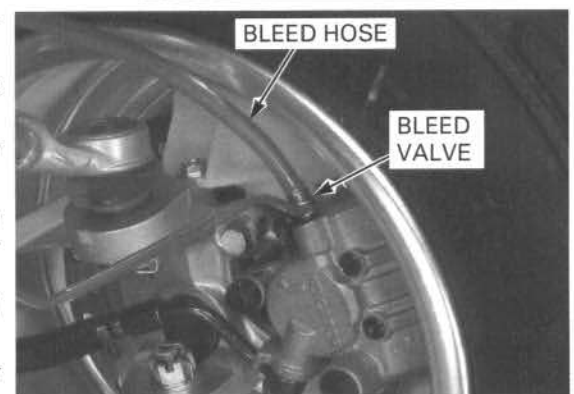
1. Squeeze the brake lever all the way and loosen the bleed valve 1/4 of a turn. Wait several seconds and then close the bleed valve.
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.
3. Repeat the steps 1 and 2 until there are no air bubbles in the bleed hose.

Tighten the bleed valve.

**TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)**

Perform air bleeding for the other side bleed valve.

After bleeding air, operate the front brake lever. If it still feels spongy, bleed the system again.

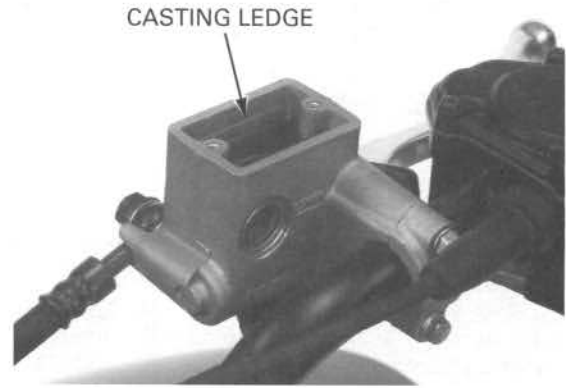


## HYDRAULIC DISC BRAKE

Fill the front master cylinder reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap, and tighten the screws.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



### REAR BRAKE

Close the rear brake caliper bleed valve.

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

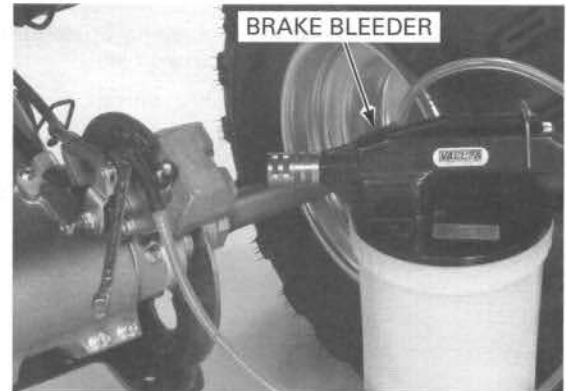
*Follow the manufacturer's operating instructions.*

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

*Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.*

If an automatic refill system is not used, add fluid when the fluid level in the reservoir is low.



*If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.*

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

Tighten the bleed valve.

**TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)**

After bleeding air, operate the brake pedal. If it still feels spongy, bleed the system again.



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

Pump up the system pressure with the brake pedal until the pedal resistance is felt.

Connect a bleed hose to the rear brake caliper bleed valve and bleed the system as follows:

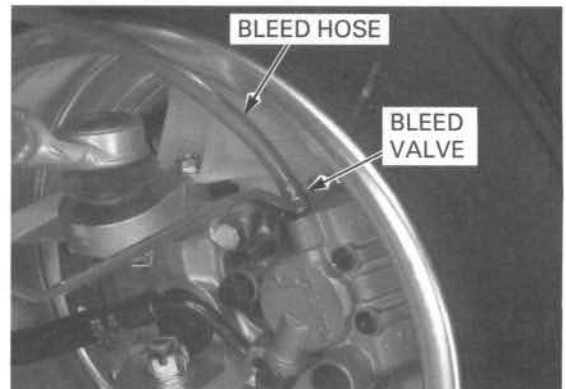
*Do not release the brake pedal until the bleed valve has been closed.*

1. Depress the brake pedal all the way and loosen the bleed valve 1/4 of a turn. Wait several seconds and then close the bleed valve.
2. Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat the steps 1 and 2 until there are no air bubbles in the bleed hose.

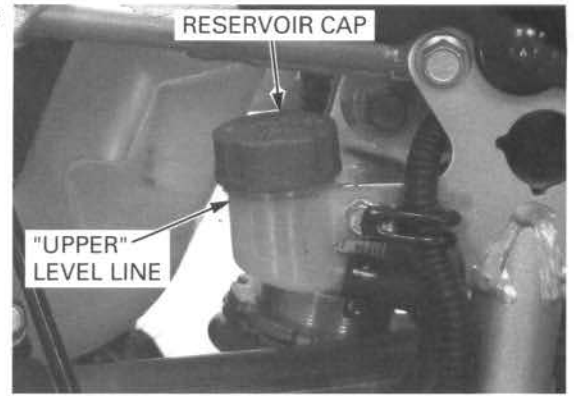
Tighten the bleed valve.

**TORQUE: 5.4 N·m (0.55 kgf·m, 4.0 lbf·ft)**

After bleeding air, operate the brake pedal. If it still feels spongy, bleed the system again.



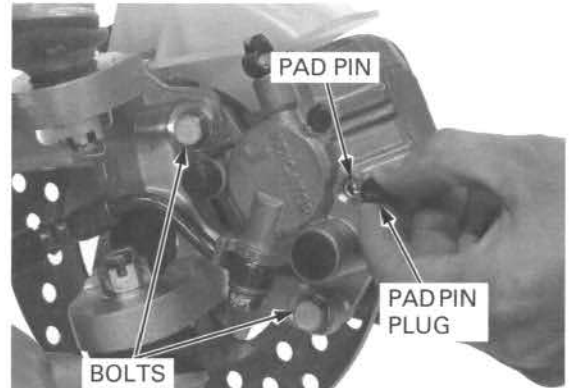
Fill the rear brake reservoir to the "UPPER" level line with DOT 4 brake fluid from a sealed container.  
Install the diaphragm, set plate and reservoir cap.



## BRAKE PAD/DISC

### FRONT BRAKE PAD REPLACEMENT

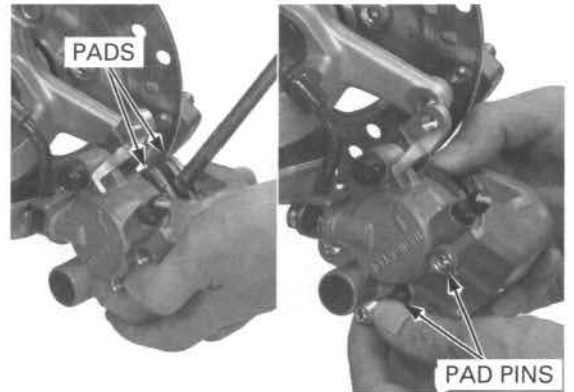
Remove the front wheel (page 13-10).  
Remove the pad pin plugs and loosen the pad pins.  
Remove the two bolts and front brake caliper.



*Check the fluid level in the master cylinder reservoir as this operation causes the fluid level to rise.*

Push the caliper pistons all the way to allow installation of new brake pads.

Pull the pad pins out of the caliper while pushing in the pads against the pad spring.



*Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure.*

Install the pad shim onto a new brake pad as shown.  
Install new pads with the shim pad toward the piston.

Install the pad pins by pushing in the pads against the pad spring to align the pad pin holes.



## HYDRAULIC DISC BRAKE

*Be careful not to damage the pads.*

Install the brake caliper so the disc is positioned between the pads.  
Install new mounting bolts and tighten them.

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

Tighten the pad pins.

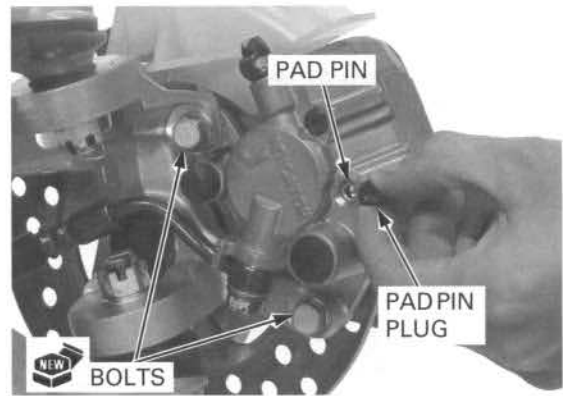
**TORQUE: 17.2 N·m (1.72 kgf·m, 13 lbf·ft)**

Install the pad pin plugs and tighten them.

**TORQUE: 2.4 N·m (0.24 kgf·m, 1.8 lbf·ft)**

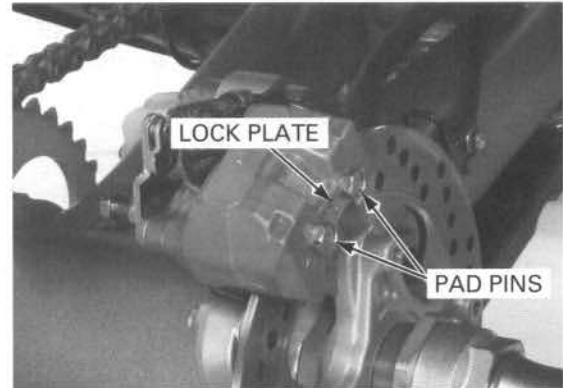
Squeeze the brake lever to seat the caliper piston against the pad.

Install the front wheel (page 13-11).



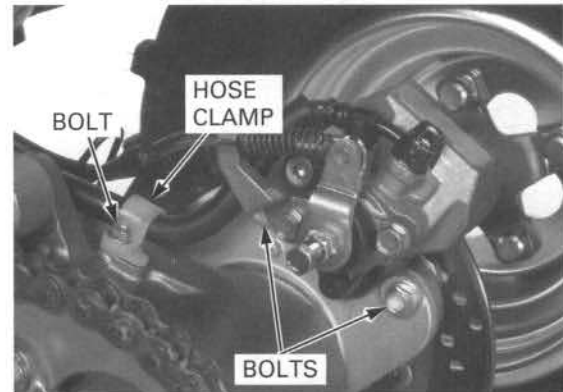
## REAR BRAKE PAD REPLACEMENT

Straighten the lock plate tab and loosen pad pins.



Remove the hose clamp bolt.

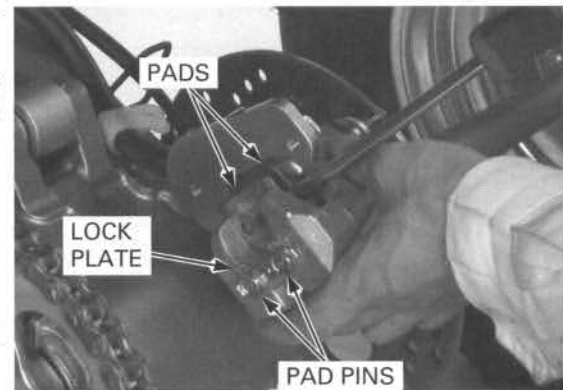
Remove the two bolts and rear brake caliper.



*Check the fluid level in the master cylinder reservoir as this operation causes the fluid level to rise.*

Push the caliper pistons all the way to allow installation of new brake pads.

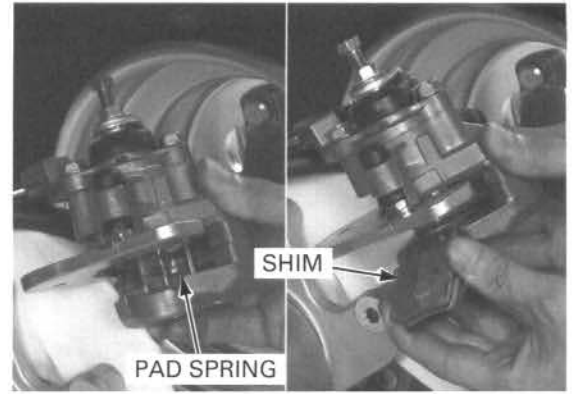
Pull the pad pins out of the caliper with the lock plate while pushing in the pads against the pad spring.





Make sure the pad spring is installed correctly. Always replace the brake pads in pairs to ensure even disc pressure.

Install the pad shim onto a new brake pad as shown. Install new pads with the shim pad toward the piston. Install the pad pins with a new lock plate by pushing in the pads against the pad spring to align the pad pin holes.

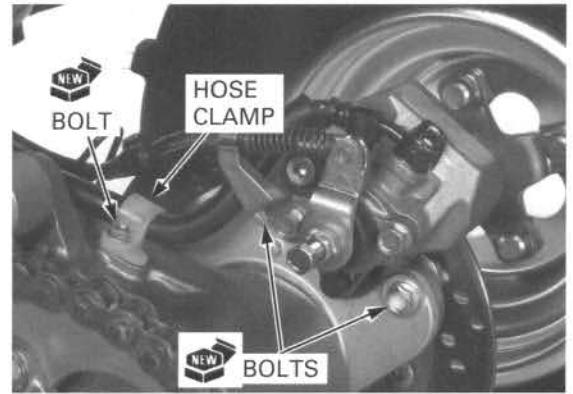


Be careful not to damage the pads.

Install the brake caliper so the disc is positioned between the pads. Install new mounting bolts and tighten them.

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

Install the hose clamp with a new bolt and tighten it securely.

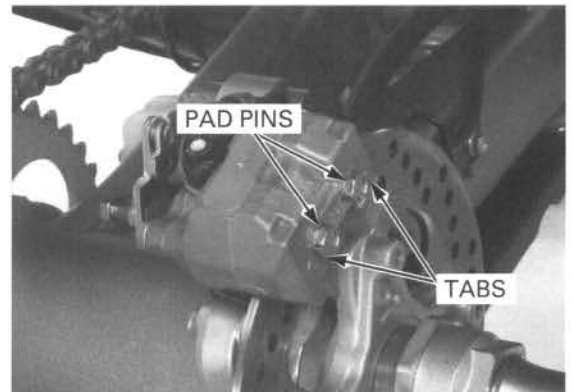


Tighten the pad pins.

**TORQUE: 17.2 N·m (1.72 kgf·m, 13 lbf·ft)**

Bend the lock plate tabs against the pad pins.

Depress the brake pedal to seat the caliper piston against the pad.



**BRAKE DISC INSPECTION**

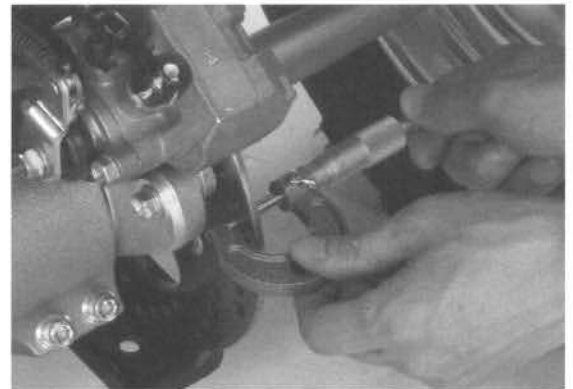
For front brake disc, remove the front wheel (page 13-10).

Visually inspect the brake disc for damage or crack.

Measure the brake disc thickness at several points.

**SERVICE LIMITS: Front: 2.5 mm (0.10 in)  
Rear: 3.5 mm (0.14 in)**

Replace the brake disc if the smallest measurement is less than service limit.



## HYDRAULIC DISC BRAKE

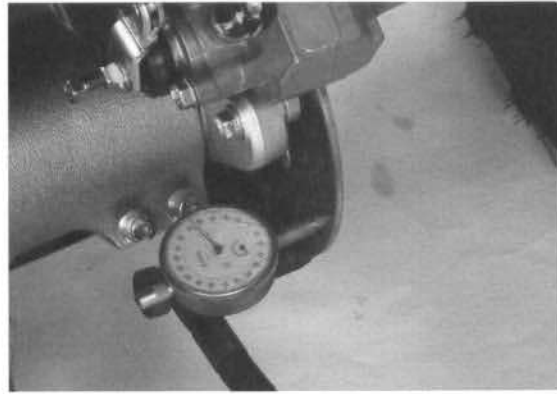
Check the brake disc for warpage.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

Check the front wheel hub bearings or rear axle bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the bearings are normal.

For brake disc replacement, see page 13-14 or 14-6.



## FRONT MASTER CYLINDER

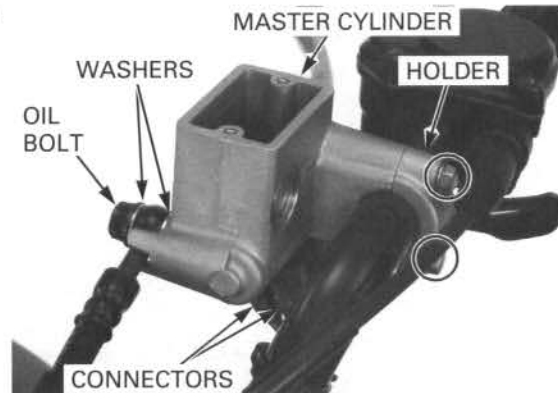
### DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 15-6).

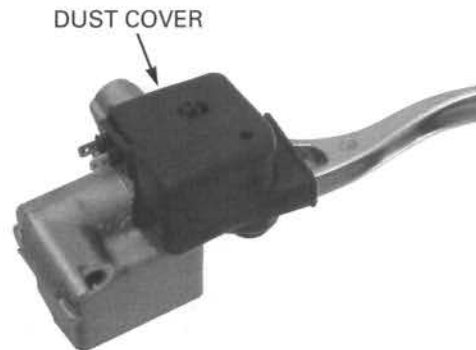
*When removing the oil bolt, cover the end of the hose to prevent contamination.*

Remove the following:

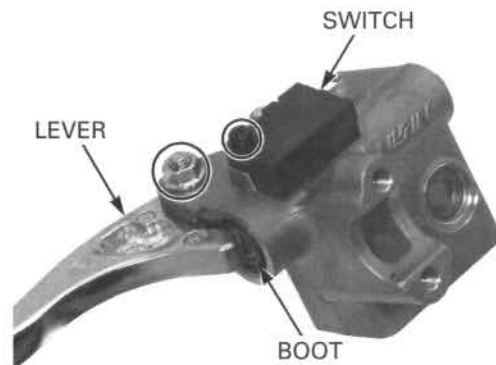
- brake light switch connectors
- oil bolt and sealing washers
- brake hose
- two bolts
- master cylinder holder
- brake master cylinder



- dust cover



- screw and brake light switch
- pivot nut and bolt
- brake lever
- piston boot

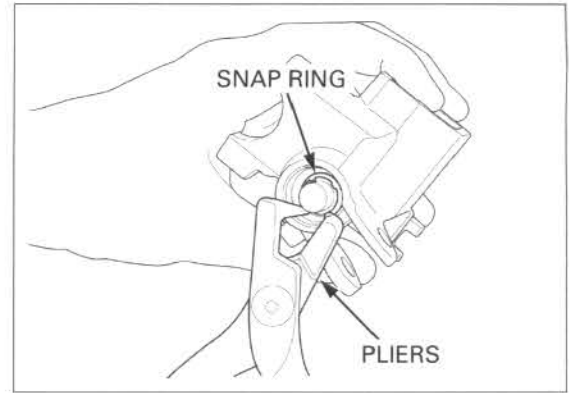


- snap ring

**TOOL:**

Snap ring pliers

07914-SA50001



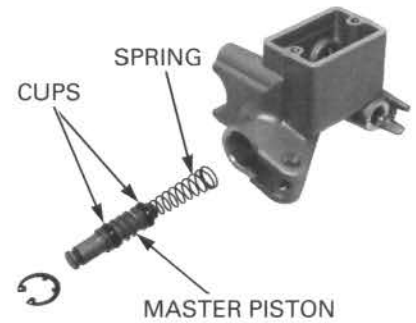
- master piston
- piston spring

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

### INSPECTION

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

Check the piston cups for wear, deterioration or damage.

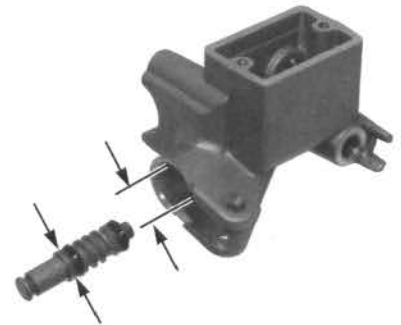


Measure the master cylinder I.D.

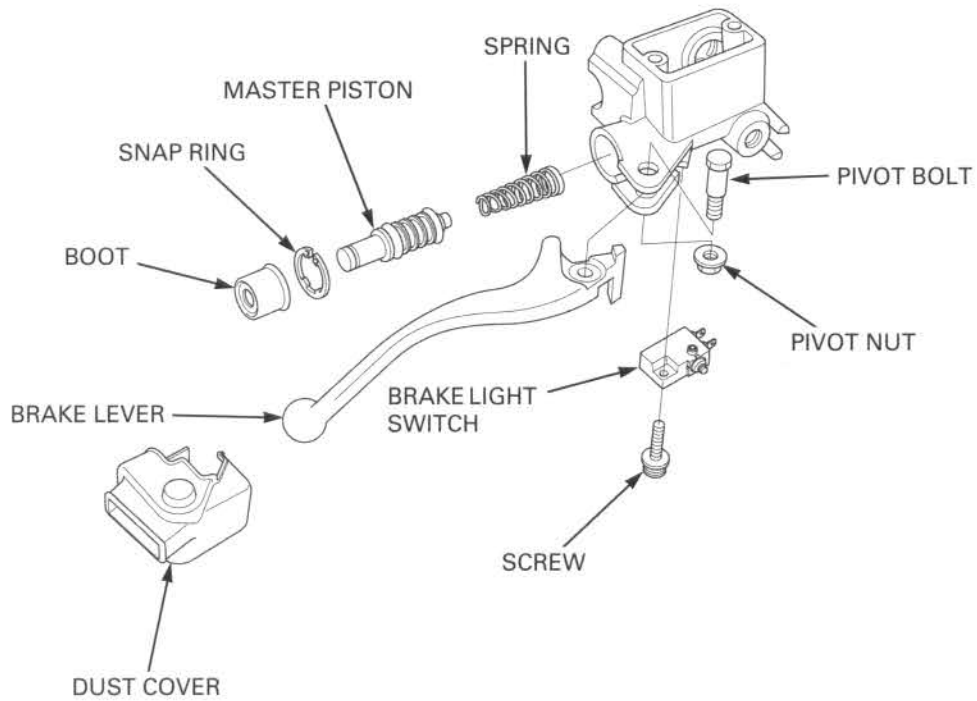
**SERVICE LIMIT: 12.75 mm (0.502 in)**

Measure the master piston O.D.

**SERVICE LIMIT: 12.65 mm (0.498 in)**



# HYDRAULIC DISC BRAKE ASSEMBLY

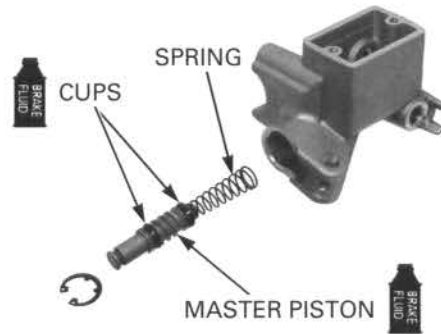


Coat the master piston and piston cups with clean brake fluid.

Install the spring onto the piston end.

*Do not allow the piston cup lips to turn inside out.*

Install the master piston/spring into the master cylinder.

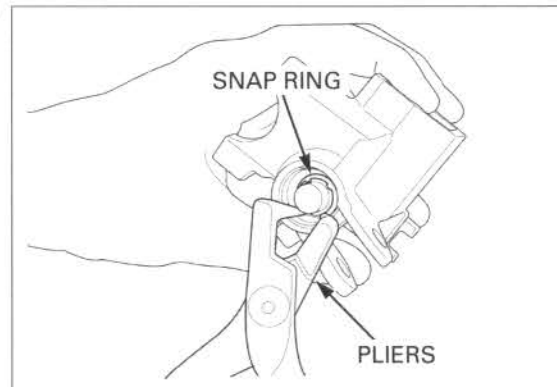


*Be certain the snap ring is firmly seated in the groove.*

Install the snap ring into the groove in the master cylinder.

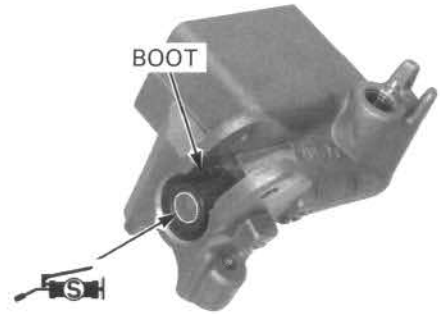
**TOOL:**  
Snap ring pliers

**07914-SA50001**



Install the boot into the master cylinder and the groove in the piston.

Apply silicone grease to the brake lever pivot-to-master piston contact area.



Apply silicone grease to the brake lever pivot. Install the brake lever and pivot bolt, and tighten it.

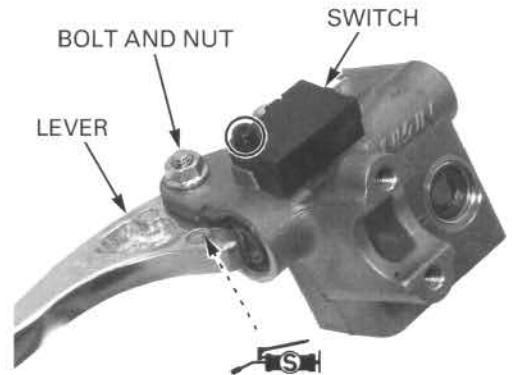
**TORQUE: 5.9 N·m (0.60 kgf·m, 4.4 lbf·ft)**

Install the pivot nut and tighten it.

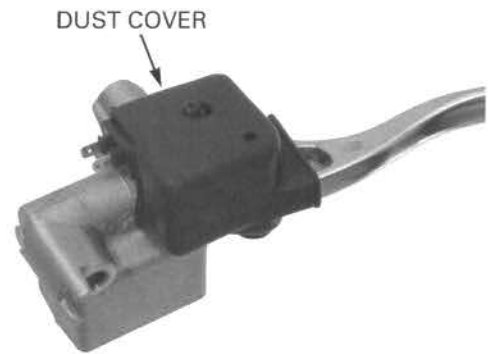
**TORQUE: 5.9 N·m (0.60 kgf·m, 4.4 lbf·ft)**

Install the brake light switch and tighten the screw.

**TORQUE: 1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)**



Install the dust cover over the brake lever.



*Align the edge of the master cylinder with the punch mark on the handlebar.*

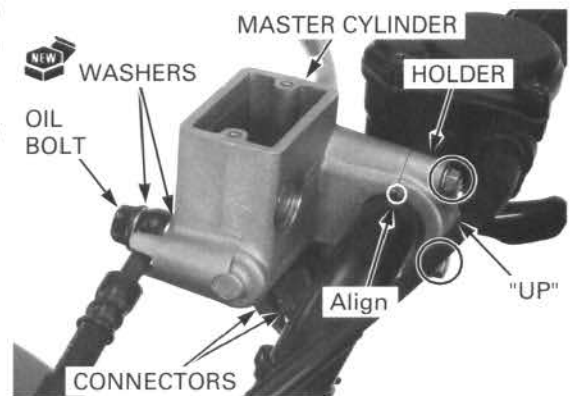
Install the master cylinder and holder with the "UP" mark facing up. Tighten the upper bolt first, then tighten the lower bolt.

Set the brake hose eyelet into the stopper groove. Connect the brake hose with the oil bolt and new sealing washers, and tighten the oil bolt.

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

Connect the brake light switch connectors.

Fill and bleed the hydraulic system (page 15-7).



# FRONT BRAKE CALIPER

## DISASSEMBLY

Remove the front wheel (page 13-10).

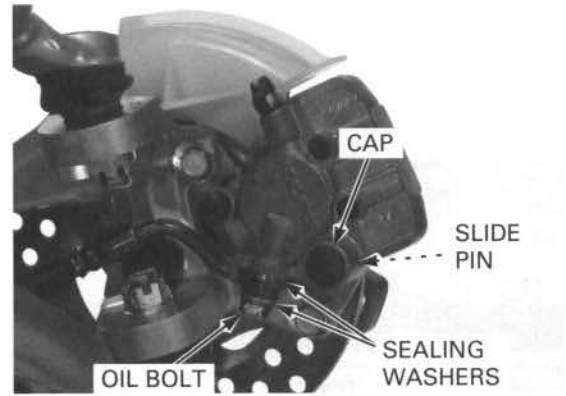
Drain the brake fluid from the hydraulic system (page 15-6).

Remove the rubber cap and loosen the slide pin.

*When removing the oil bolt, cover the end of the hose to prevent contamination.*

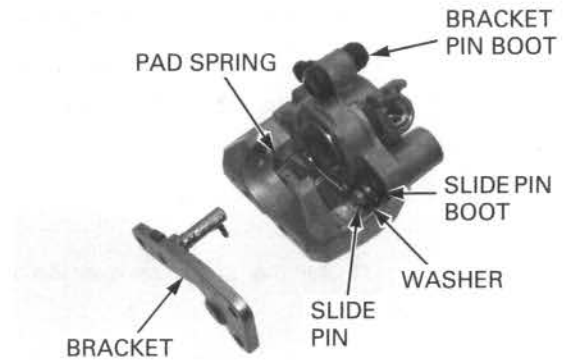
Disconnect the brake hose from the brake caliper by removing the oil bolt and sealing washers.

Remove the front brake pads (page 15-9).



Loosen the slide pin and remove the following from the caliper body:

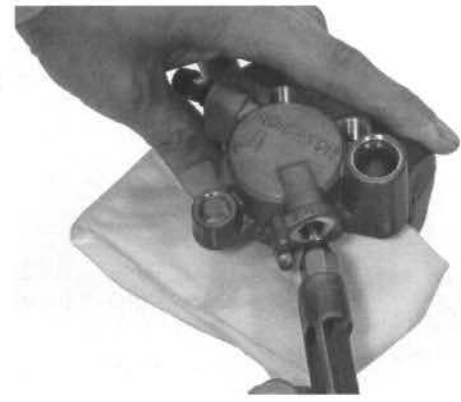
- caliper bracket
- cone washer
- pad spring
- bracket pin boot
- caliper slide pin (release the boot lib from the pin groove)
- slide pin boot



Place a shop towel over the piston.

*Do not use high pressure air or bring the nozzle too close to the inlet.*

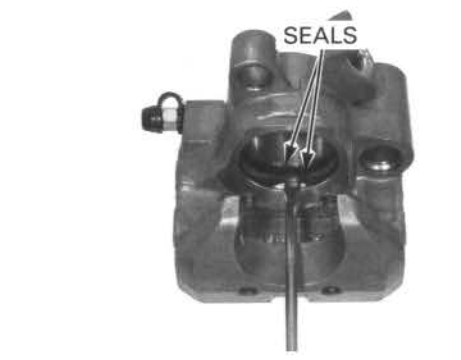
Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.



*Be careful not to damage the piston sliding surface.*

Push the dust and piston seals in and lift them out.

Clean the seal grooves, caliper cylinder and piston with clean brake fluid.



**INSPECTION**

Check the caliper cylinder and piston for scoring, scratches or damage.

Measure the caliper cylinder I.D.

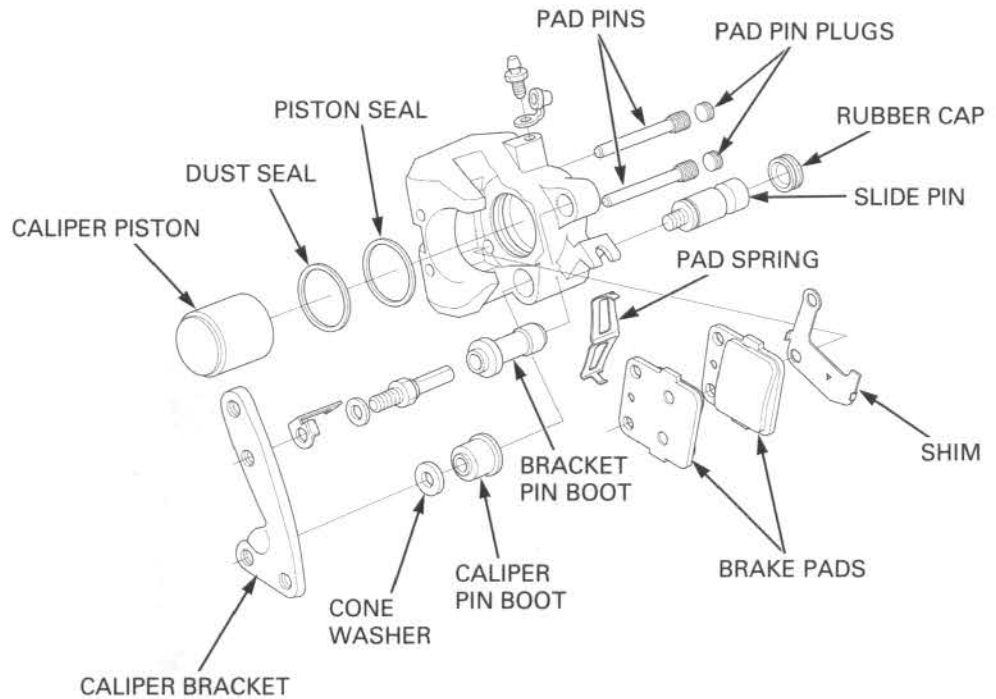
**SERVICE LIMIT: 34.02 mm (1.340 in)**

Measure the caliper piston O.D.

**SERVICE LIMIT: 33.87 mm (1.333 in)**



**ASSEMBLY**



Coat new piston and dust seals with clean brake fluid and install them into the seal grooves in the caliper cylinder.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the caliper body.

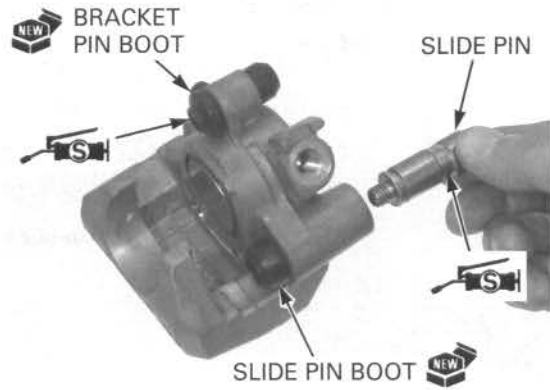


## HYDRAULIC DISC BRAKE

Install a new bracket pin boot into the caliper body and pack the silicone grease to the inside of the boot.

Install the slide pin boot into the groove in the caliper body.

Apply silicone grease to the grease groove in the slide pin. Install the slide pin and set the boot rib into the boot groove in the slide pin.

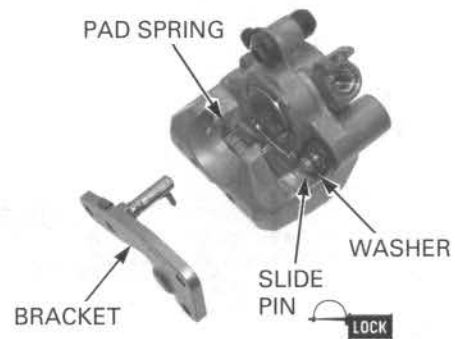


Install the pad spring as shown.

Install the cone washer onto the slide pin with the concavity facing the bracket side.

Apply locking agent to the slide pin threads. Install the caliper bracket over the caliper body and thread the slide pin into the bracket, being careful not to damage the slide pin boot.

Make sure the boot ribs are seated into the boot grooves in the slide and bracket pins properly.



Install the brake pads (page 15-9).

Tighten the slide pin.

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

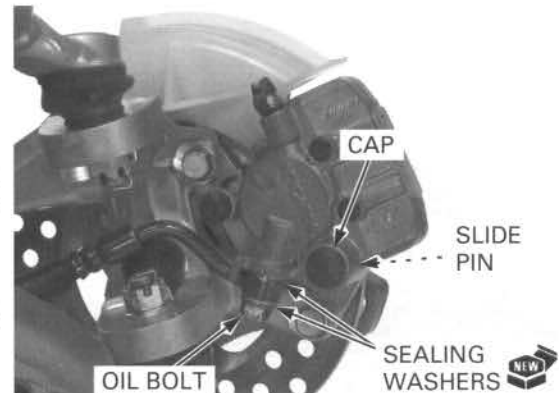
Install the rubber cap.

Set the brake hose eyelet into the stopper groove. Connect the brake hose with the oil bolt and new sealing washers, and tighten the oil bolt.

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

Fill and bleed the front brake hydraulic system (page 15-7).

Install the front wheel (page 13-11).



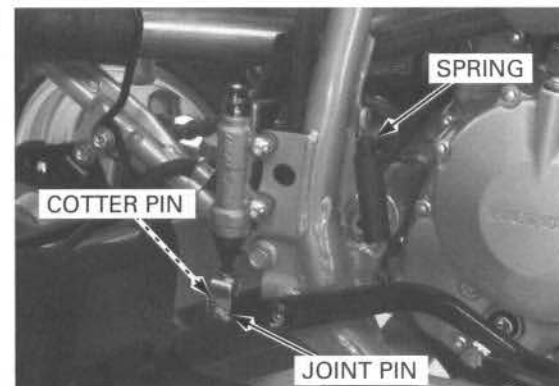
## REAR MASTER CYLINDER

### DISASSEMBLY

Drain the brake fluid from the rear brake hydraulic system (page 15-6).

Remove the following:

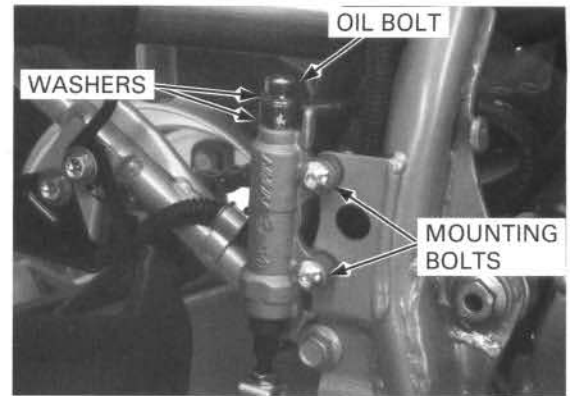
- return spring
- cotter pin
- joint pin



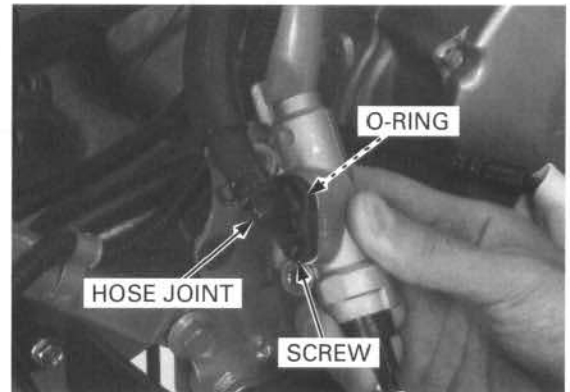


When removing the oil bolt, cover the end of the hose to prevent contamination.

- oil bolt and sealing washers
- brake hose
- mounting bolts



- screw
- reservoir hose joint
- master cylinder
- O-ring

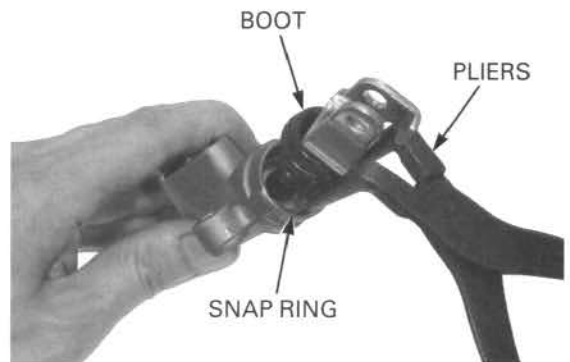


- boot
- snap ring

**TOOL:**  
Snap ring pliers

07914-SA50001

- push rod assembly

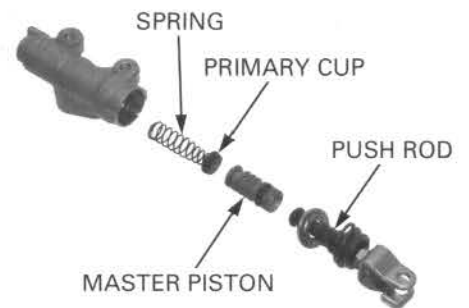


- master piston
- primary cup
- spring

Clean master cylinder and master piston in clean brake fluid.

### INSPECTION

Check the master cylinder and master piston for scoring, scratches or damage. Check the piston cups and boot for wear, deterioration or damage.



## HYDRAULIC DISC BRAKE

Measure the master cylinder I.D.

**SERVICE LIMIT: 12.75 mm (0.502 in)**

Measure the master piston O.D.

**SERVICE LIMIT: 12.65 mm (0.498 in)**



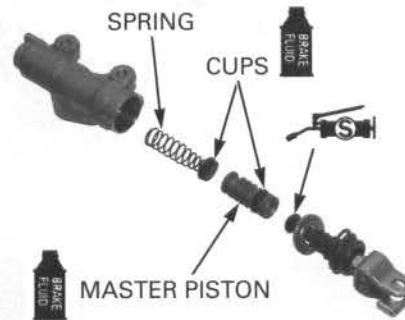
### ASSEMBLY

Coat the master piston and piston cups with clean brake fluid.

*Do not allow the piston cup lips to turn inside out.*

Install the primary cup onto the spring. Install the spring and master piston into the master cylinder.

Apply silicone grease to the piston contacting surface of the push rod.



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

Install the push rod assembly and the snap ring into the groove in the master cylinder.

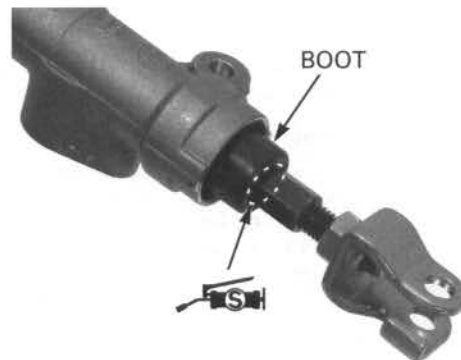
#### TOOL:

**Snap ring pliers**

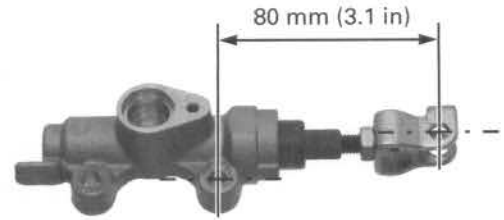
**07914-SA50001**



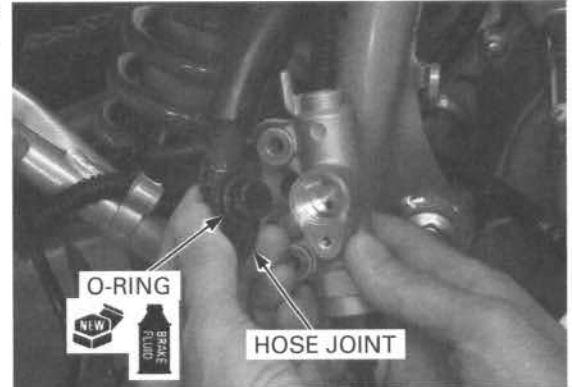
Apply silicone grease to the boot groove in the push rod, and install the boot into the master cylinder and boot groove.



If the push rod joint is reinstalled, adjust the push rod length so the distance from the center of the lower mounting bolt hole to the center of the joint pin hole is 80 mm (3.1 in). Tighten the joint nut.



Coat a new O-ring with brake fluid and install it onto the reservoir hose joint. Install the hose joint into the master cylinder.



Apply locking agent to the joint screw threads. Install the screw and tighten it.

**TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)**



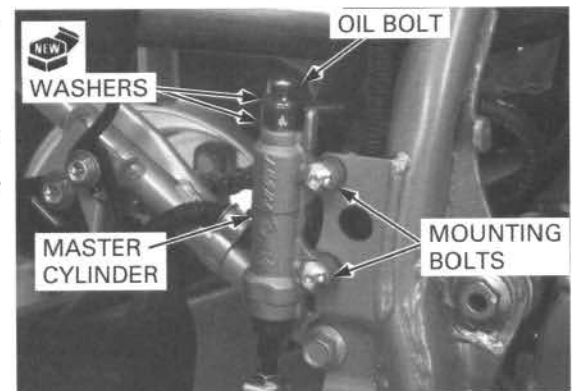
Install the master cylinder with the mounting bolts and tighten them.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Connect the brake hose with the oil bolt and new sealing washers.

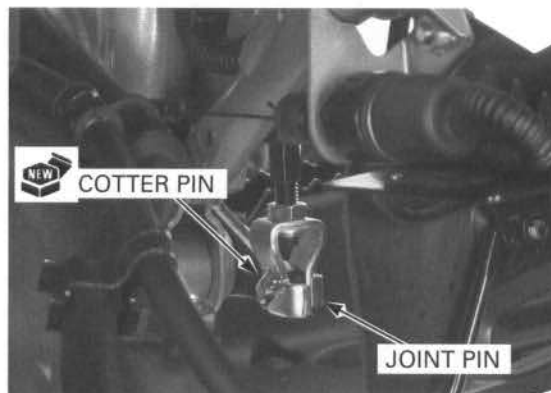
Rest the hose joint against the stopper of the master cylinder and tighten the oil bolt.

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



## HYDRAULIC DISC BRAKE

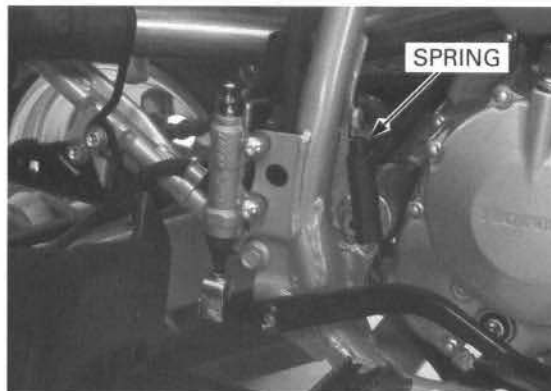
Connect the brake pedal to the push rod with the joint pin and secure it with a new cotter pin.



Install the return spring in the direction as shown.

Adjust the brake pedal height if necessary (page 4-21).

Fill and bleed the rear brake hydraulic system (page 15-8).



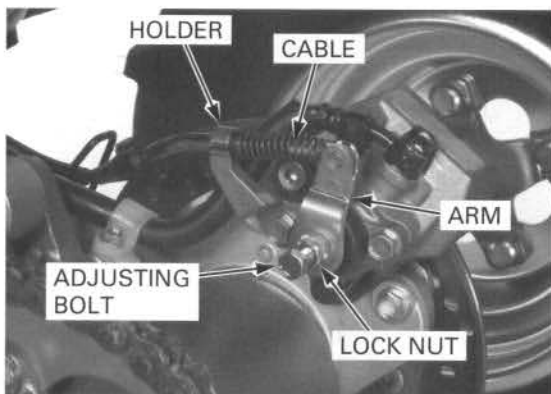
## REAR BRAKE CALIPER

### DISASSEMBLY

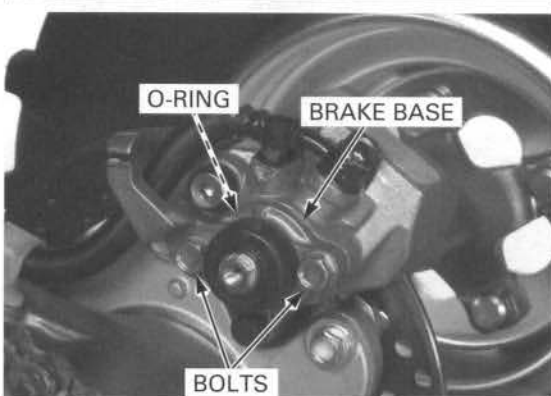
Drain the brake fluid from the rear brake hydraulic system (page 15-6).

Loosen the lock nut, and remove the adjusting bolt and brake arm.

Disconnect the parking brake cable from the brake arm and remove it from the cable holder.

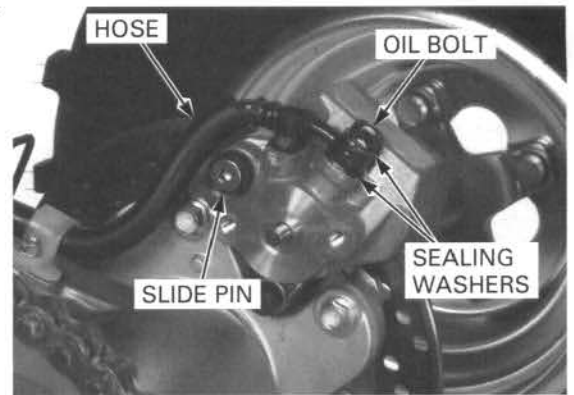


Remove the two bolts and parking brake base.  
Remove the O-ring.



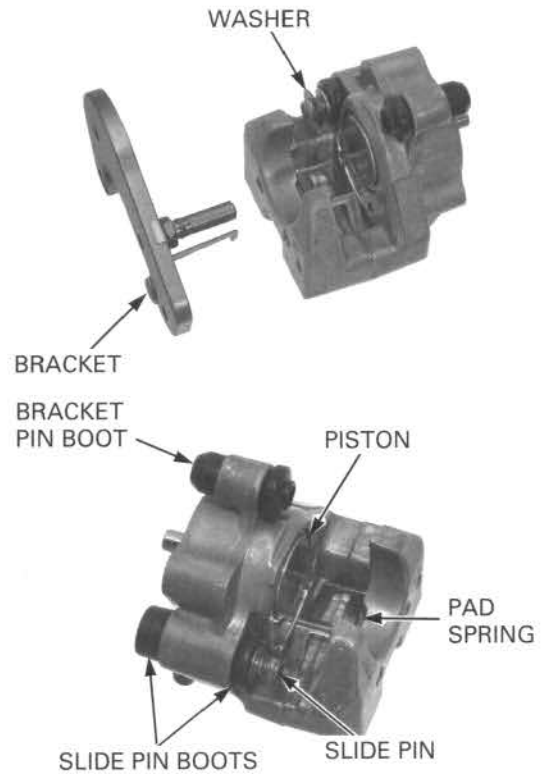
When removing the oil bolt, cover the end of the hose to prevent contamination.

Disconnect the brake hose from the brake caliper by removing the oil bolt and sealing washers.  
 Loosen the caliper slide pin.  
 Remove the brake pads (page 15-10)



Loosen the slide pin and remove the following from the caliper body:

- caliper bracket
- cone washer



- pad spring
- bracket pin boot
- caliper slide pin (release each boot lib from the pin grooves)
- slide pin boots
- caliper piston (by pushing the piston rod)

Be careful not to damage the piston sliding surface.

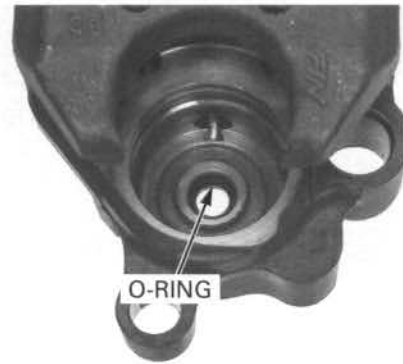
Push the dust and piston seals in and lift them out.



## HYDRAULIC DISC BRAKE

Remove the O-ring.

Clean the seal grooves, caliper cylinder and piston with clean brake fluid.

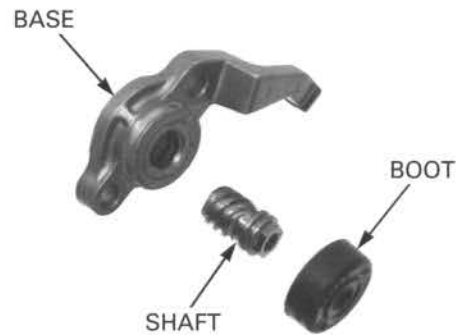


### INSPECTION

Remove the boot and shaft from the parking brake base.

Check the shaft and base threads for wear or damage.

Check the boot for wear, deterioration or damage.



Check the caliper cylinder and piston for scoring, scratches or damage.

Measure the caliper cylinder I.D.

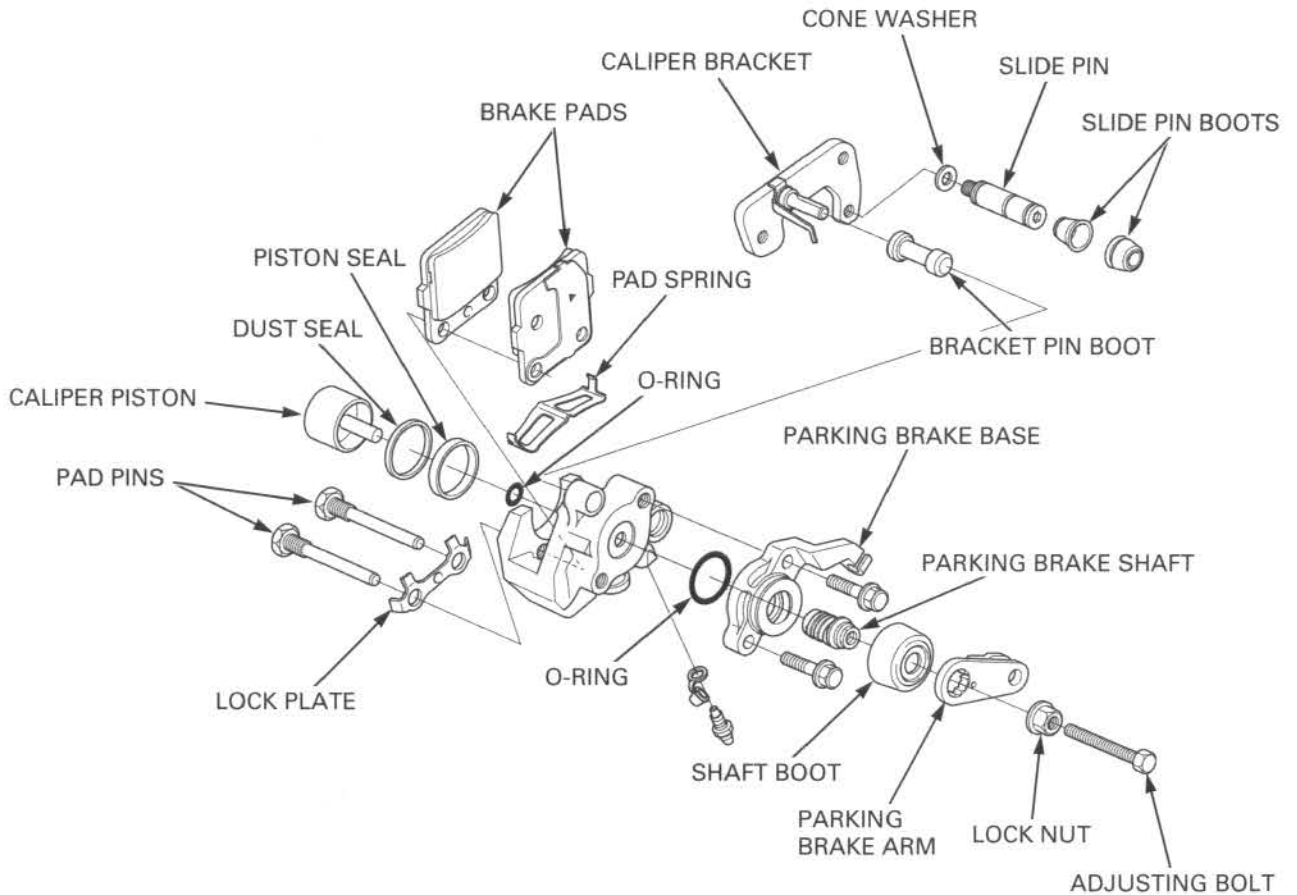
**SERVICE LIMIT: 34.02 mm (1.340 in)**

Measure the caliper piston O.D.

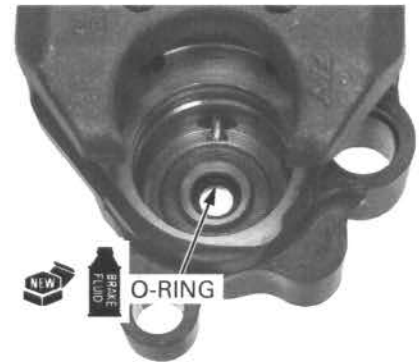
**SERVICE LIMIT: 33.87 mm (1.333 in)**



ASSEMBLY



Coat a new O-ring with clean brake fluid and install it into the groove in the piston rod hole properly.



Coat new piston and dust seals with clean brake fluid and install them into the seal grooves in the caliper cylinder.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder.



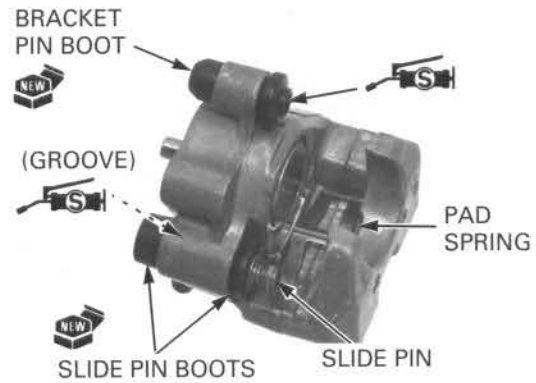
## HYDRAULIC DISC BRAKE

Install a new bracket pin boot into the caliper body and pack the silicone grease to the inside of the boot.

Install each slide pin boot into the grooves in the caliper body.

Apply silicone grease to the grease groove in the slide pin. Install the slide pin and set each boot rib into the boot grooves in the slide pin.

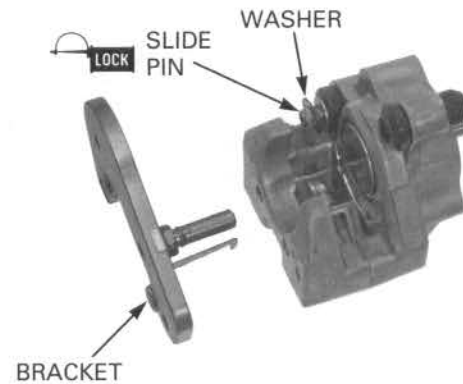
Install the pad spring as shown.



Install the cone washer onto the slide pin with the concavity facing the bracket side.

Apply locking agent to the slide pin threads. Install the caliper bracket over the caliper body and thread the slide pin into the bracket, being careful not to damage the slide pin boots.

Make sure the boot ribs are seated into the boot grooves in the slide and bracket pins properly.



Install the brake pads (page 15-10).

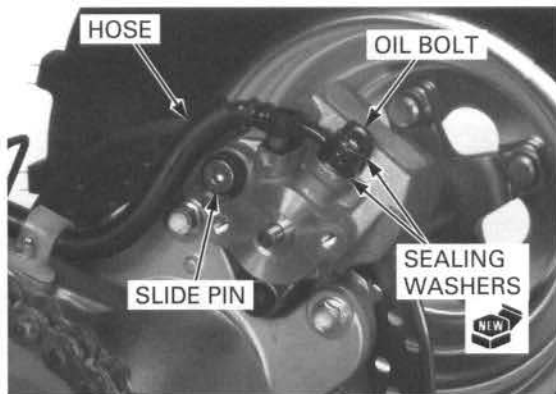
Tighten the slide pin.

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

Connect the brake hose with the oil bolt and new sealing washers.

Rest the hose joint against the stopper of the caliper body and tighten the oil bolt.

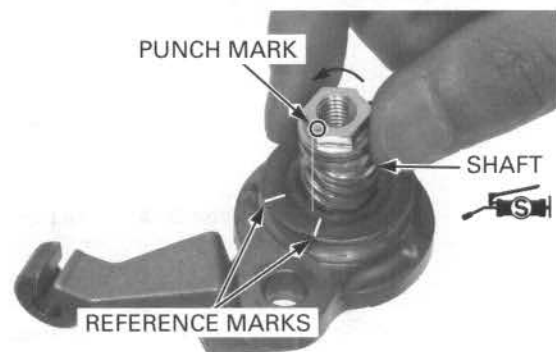
**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**



*The brake shaft has left-hand threads.*

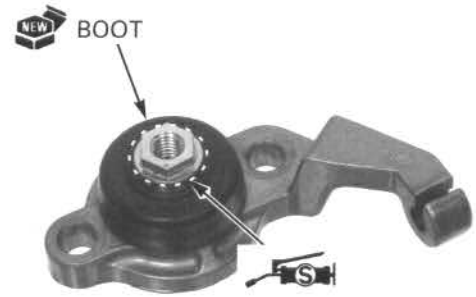
Apply silicone grease to the inner and outer threads of the parking brake shaft.

Position the shaft so that the punch mark is within the reference marks on the base, and thread it. Screw the shaft in fully and make sure that the punch mark is within the reference marks.



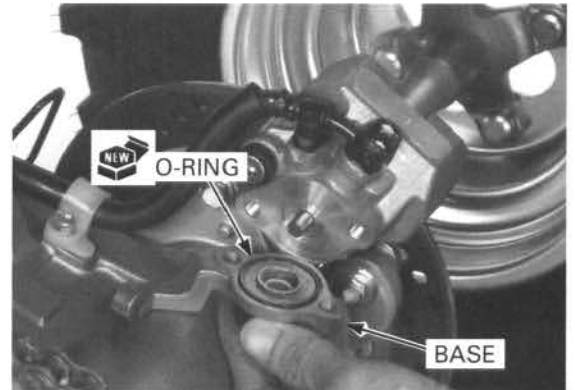


Apply silicone grease to the boot groove in the brake shaft.  
Install a new boot into the grooves in the parking brake base and shaft properly.

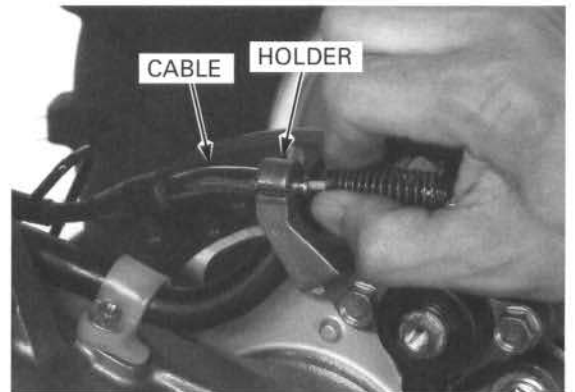


Install a new O-ring into the parking brake base.  
Install the base onto the caliper body and tighten the two bolts.

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

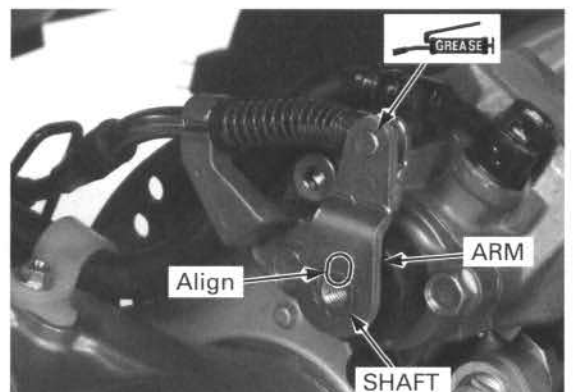


Install the parking brake cable into the cable holder while pressing the cable spring.



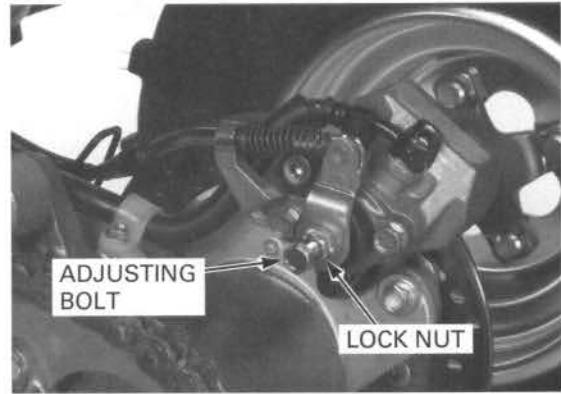
Turn the parking brake shaft clockwise approximately 90° from fully seated position.

Apply grease to the brake cable end.  
Install the brake arm onto the cable and onto the brake shaft by aligning the punch marks.



## HYDRAULIC DISC BRAKE

- Loosely install the adjusting bolt and lock nut.
- Adjust the parking brake cable free play (page 4-20).
- Fill and bleed the rear brake hydraulic system (page 15-8).

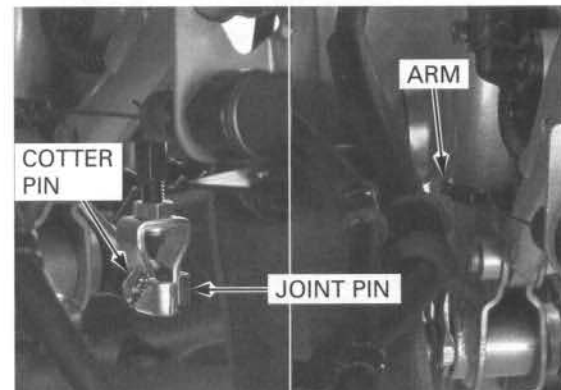
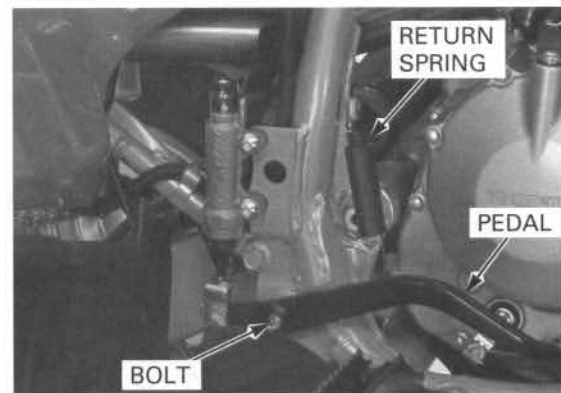


## BRAKE PEDAL

### REMOVAL

Remove the following:

- return spring
- cotter pin
- joint pin
- pivot bolt
- brake pedal
- switch spring arm (from the spring)

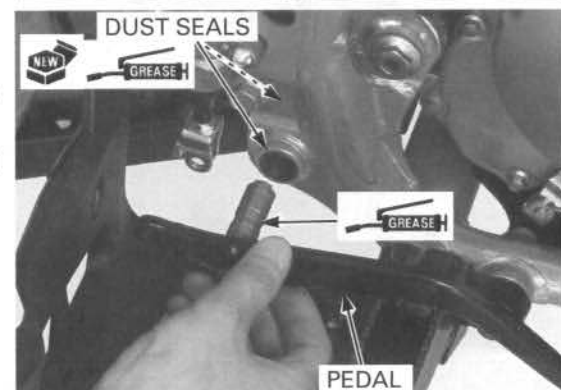


- dust seals

### INSTALLATION

Apply grease to the lips of new dust seals and install them with the lip side facing the frame.

Apply grease to the grease groove in the pedal pivot. Install the brake pedal.



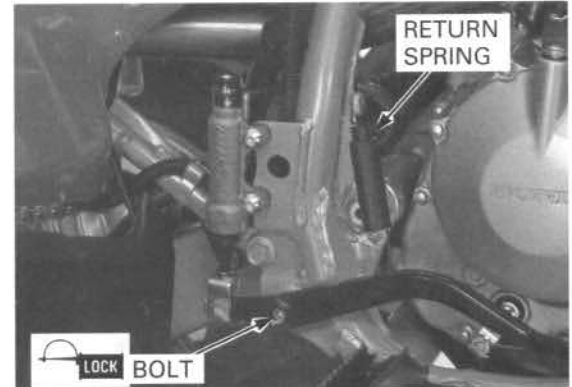
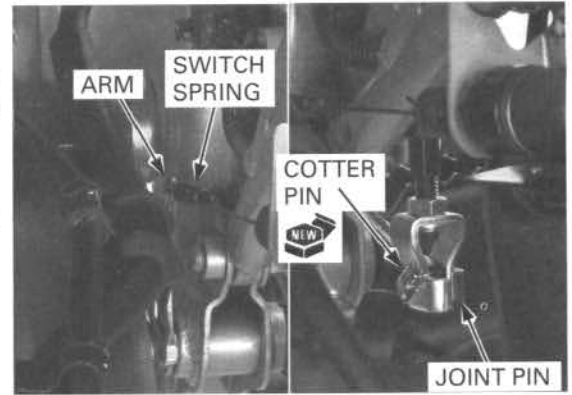
Apply locking agent to the pivot bolt threads.

Hook the switch spring arm onto the switch spring  
Install the pivot bolt and set the spring arm onto the pedal pivot by aligning the flat surfaces. Tighten the pivot bolt.

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

Connect the brake pedal to the master cylinder with the joint pin and secure it with a new cotter pin.

Install the return spring in the direction as shown.



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**MEMO**



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**RIDE RED**

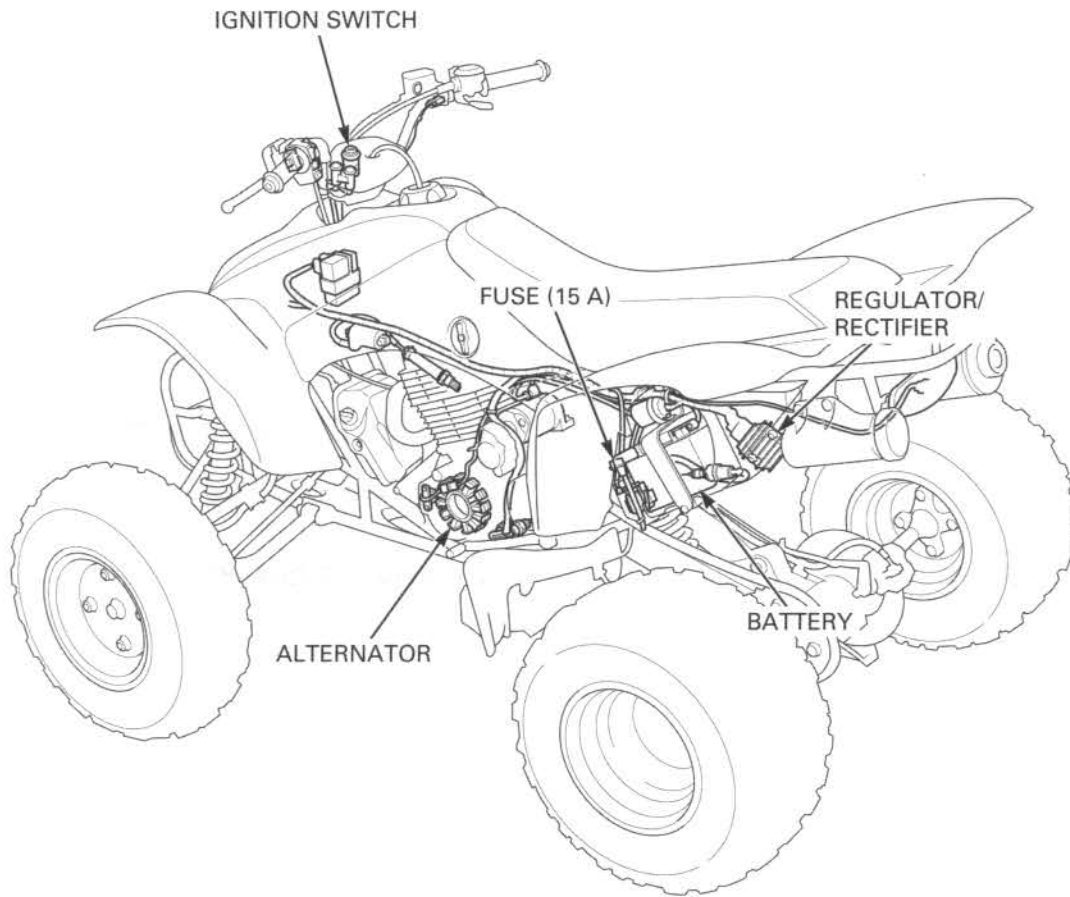
# 16. BATTERY/CHARGING SYSTEM

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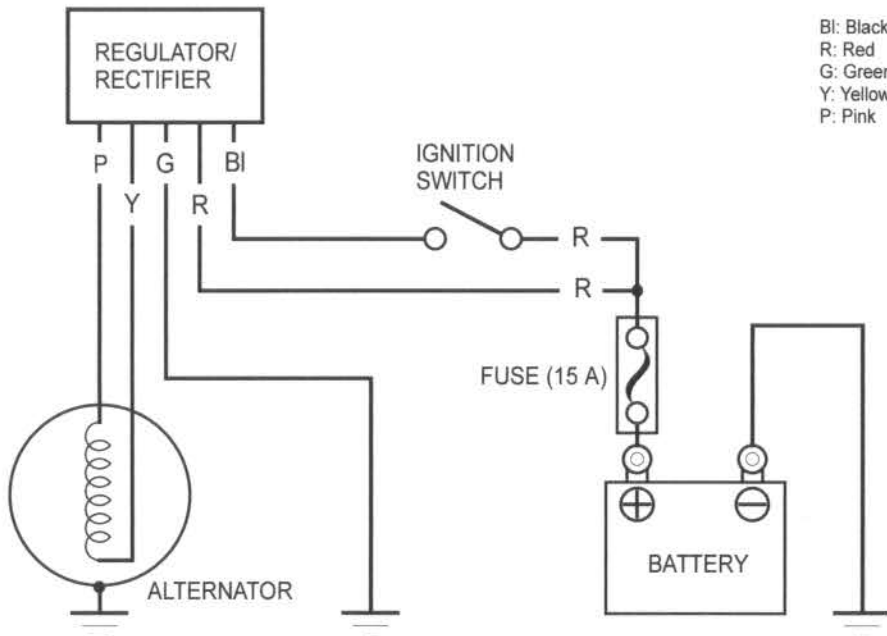
COMPONENT LOCATION .....	16-2	BATTERY.....	16-6
SYSTEM DIAGRAM.....	16-2	CHARGING SYSTEM INSPECTION.....	16-8
SERVICE INFORMATION .....	16-3	REGULATOR/RECTIFIER .....	16-9
TROUBLESHOOTING.....	16-5	ALTERNATOR CHARGING COIL .....	16-10

# 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.
- Always turn the ignition switch to OFF before disconnecting any electrical component.
  - Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to ON and current is present.
  - For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space.
  - For a battery remaining in a stored vehicle, disconnect the negative battery cable from the battery terminal.
  - The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
  - The maintenance free (MF) 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 2 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 (page 16-5).
  - For alternator removal/installation, see page 11-4.

### 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 after installation.
- 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.
- Quick charging should only be done in an emergency; slow charging is preferred.

### BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

**Recommended battery tester: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent**

## BATTERY/CHARGING SYSTEM

### SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12V – 8 Ah	
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
Quick		4.0 A/1 h	
Current leakage		0.1 mA max.	
Alternator	Capacity	147 W/5,000 rpm (min <sup>-1</sup> )	
	Charging coil resistance (20°C/68°F)	0.1 – 1.0 Ω	



## TROUBLESHOOTING

### Battery is Damaged or Weak

#### 1. Battery Test

Remove the battery (page 16-6).

Check the battery condition using the recommended battery tester.

**RECOMMENDED BATTERY TESTER: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent**

*Is the battery in good condition?*

**NO** – Faulty battery

**YES** – GO TO STEP 2.

#### 2. Current Leakage Test

Install the battery (page 16-6).

Check the battery current leakage test (Leak test: page 16-8).

*Is the current leakage below 0.1 mA?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.

#### 3. Current Leakage Test without Regulator/Rectifier

Disconnect the regulator/rectifier connector and recheck the battery current leakage.

*Is the current leakage below 0.1 mA?*

**YES** – Faulty regulator/rectifier

**NO** –

- Shorted wire harness
- Faulty ignition switch

#### 4. Alternator Charging Coil Inspection

Check the alternator charging coil (page 16-10).

*Is the alternator charging coil resistance within 0.1 – 1.0Ω (20°C/68°F)?*

**YES** – Faulty charging coil

**NO** – GO TO STEP 5.

#### 5. Charging Voltage Inspection

Measure and record the battery voltage using a digital multimeter (page 16-6).

Start the engine.

Measure the charging voltage (page 16-9).

Compare the measurements to the results of the following calculation.

**STANDARD: Measured battery voltage < Measured charging voltage < 15.5 V**

*Is the measured charging voltage within the standard voltage?*

**YES** – Faulty battery

**NO** – GO TO STEP 6.

#### 6. Regulator/Rectifier System Inspection

Check the voltage and resistance at the regulator/rectifier connector (page 16-9).

*Are the measurements correct?*

**YES** – Faulty regulator/rectifier

**NO** –

- Open circuit in related wire
- Loose or poor contacts of related terminal
- Shorted wire harness

## BATTERY

### REMOVAL/INSTALLATION

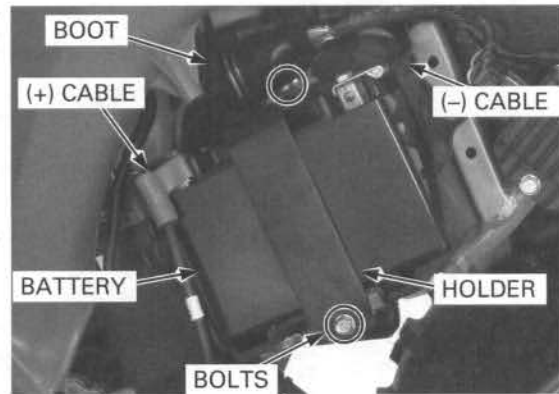
With the ignition switch OFF, disconnect the negative (-) cable first, then disconnect the positive (+) cable by removing each terminal bolt.

Release the connector boot from the clamp. Remove the two bolts and battery holder. Remove the battery from the battery box.

Install the battery in the reverse order of removal.

After installing the battery, coat the terminals with clean dielectric grease.

*Connect the positive (+) cable first and then the negative (-) cable.*



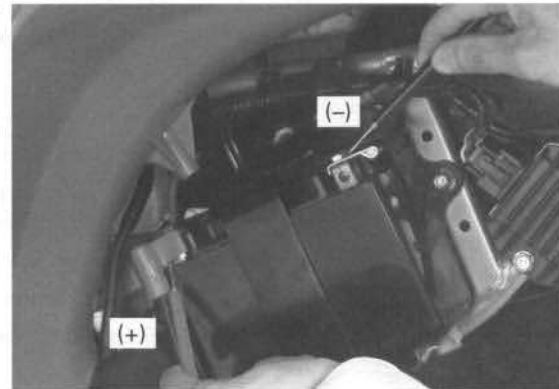
### VOLTAGE INSPECTION

Measure the battery voltage using a commercially available digital multimeter.

**VOLTAGE (20°C/68°F):**

Fully charged: 13.0 – 13.2 V

Under charged: Below 12.3 V



### BATTERY TESTING

Remove the battery (page 16-6).

**NOTE:**

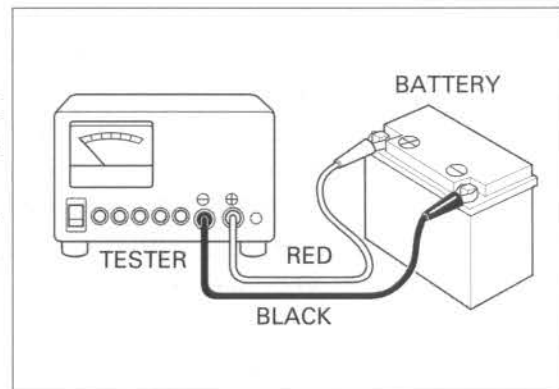
- Always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels when operating the tester, the heat generated by the tester may cause a fire.

Securely connect the tester's positive (+) cable first, then connect the negative (-) cable.

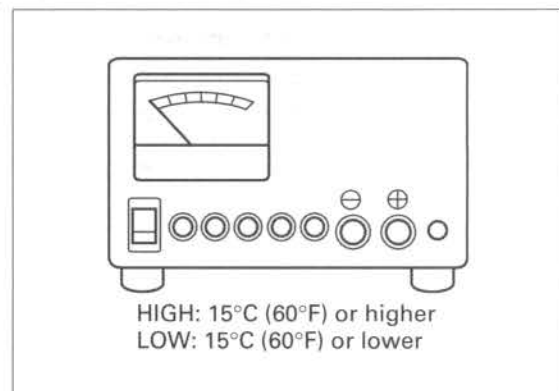
**TOOL:**

**Battery tester** BM-210-AH (U.S.A. only), BM-210, BATTERY MATE or equivalent

*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.



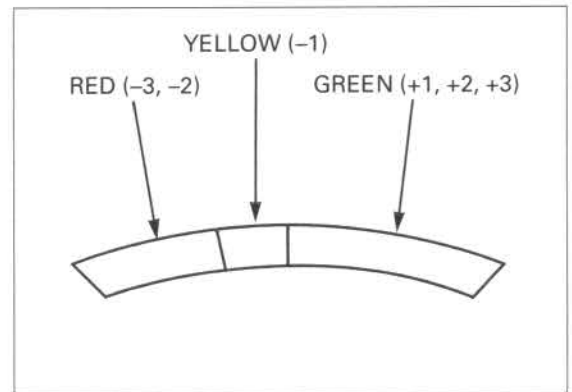
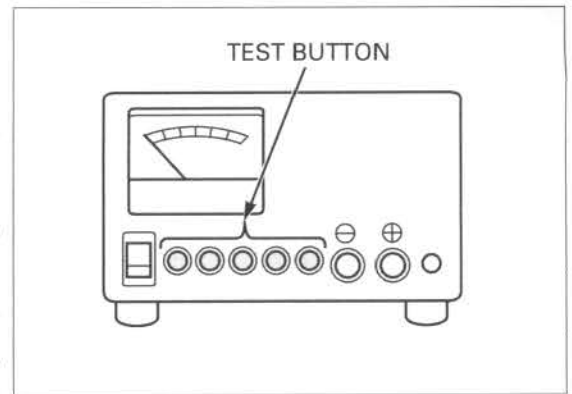
For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.

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 (U.S.A. only)

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.

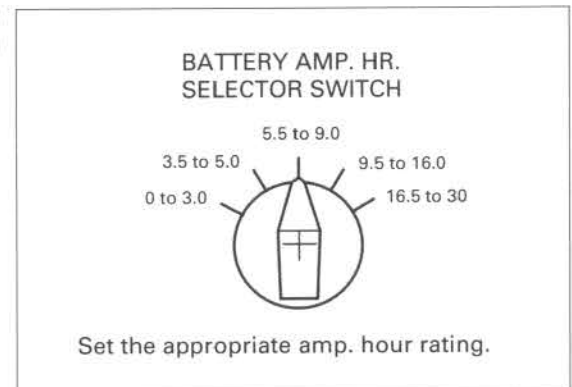
1. Turn the "POWER" switch to OFF.

### TOOL:

Christie battery charger MC1012/2 (U.S.A. only)

Turn the 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.

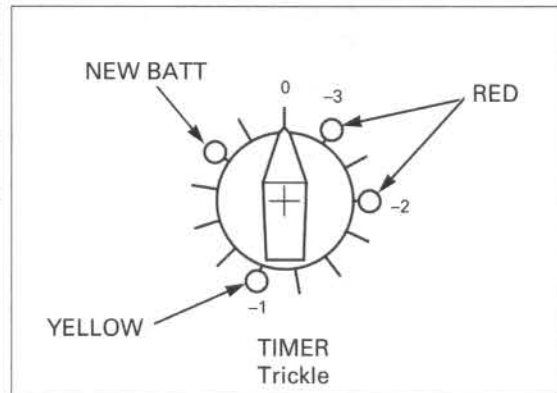


## BATTERY/CHARGING SYSTEM

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 SYSTEM INSPECTION

### CURRENT LEAKAGE INSPECTION

Turn the ignition switch to OFF and disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal.

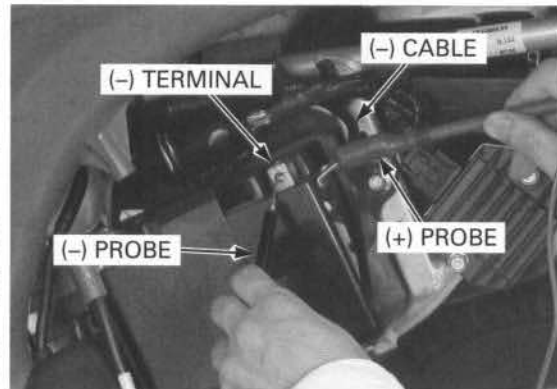
With the ignition switch turned to OFF, check for current leakage.

- 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 switch ON. A sudden surge of current may blow out the fuse in the tester.

### SPECIFIED CURRENT LEAKAGE: 0.1 mA maximum

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.



**CHARGING VOLTAGE INSPECTION**

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

Connect the multimeter between the battery positive (+) and negative (-) terminals.

**NOTICE**

- To prevent a short, make absolutely certain which are the positive (+) and negative (-) terminals or cables.
- 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.

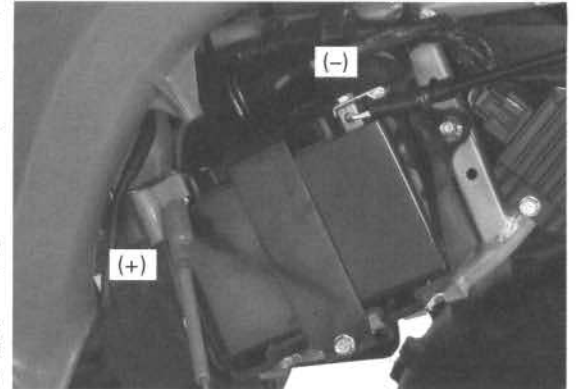
Connect the tachometer.

With the headlight on, measure the voltage on the multimeter when the engine runs at 5,000 rpm (min<sup>-1</sup>).

**STANDARD: Measured BV < Measured CV < 15.5 V**

BV = Battery voltage (page 16-6)

CV = Charging voltage



**REGULATOR/RECTIFIER**

**WIRE HARNESS INSPECTION**

Disconnect the regulator/rectifier 6P connector.

Check the connector for loose contacts or corroded terminals.

**BATTERY LINE**

Measure the voltage between the Red wire terminal and ground.

There should be battery voltage at all times.

**GROUND LINE**

Check the continuity between the Green wire terminal and ground.

There should be continuity at all times.

**CHARGING COIL LINE**

Measure the resistance between the Yellow and Pink wire terminals.

**STANDARD: 0.1 – 1.0 Ω (at 20°C/68°F)**

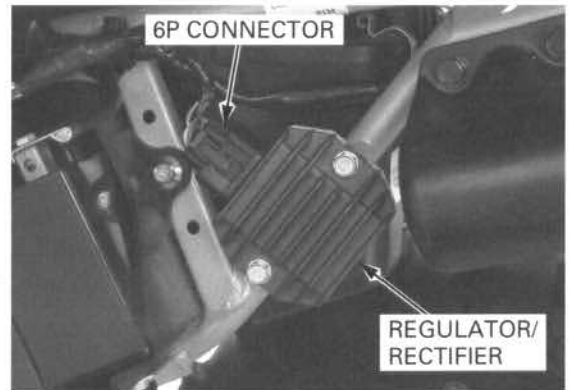
Check for continuity between Yellow wire terminal and ground, and between the Pink wire terminal and ground.

There should be no continuity.

**IGNITION SWITCH LINE**

Measure the voltage between the Black wire terminal and ground.

There should be battery voltage with the ignition switch turned to ON.



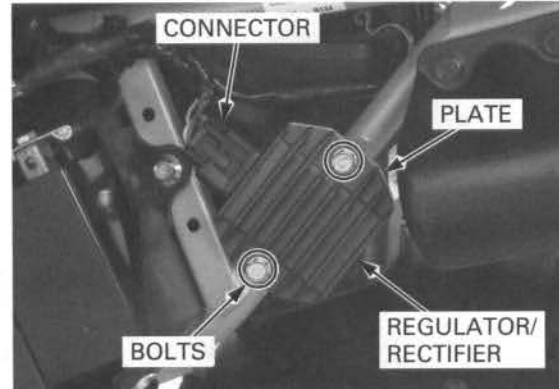
## BATTERY/CHARGING SYSTEM

### REMOVAL/INSTALLATION

Disconnect the 6P connector.

Remove the two bolts, regulator/rectifier and base plate from the frame.

Installation is in the reverse order of removal.



## ALTERNATOR CHARGING COIL

### INSPECTION

Release the connector boot from the clamp and disconnect the alternator/ignition pulse generator 4P (white) connector.

Check the connector for loose contacts or corroded terminals.

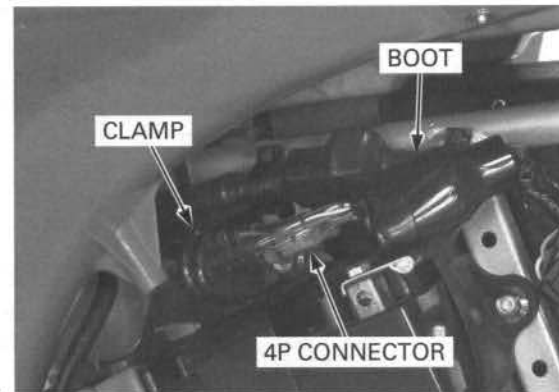
Measure the resistance between the Yellow and Pink wire terminals of the alternator side connector.

**STANDARD: 0.1 – 1.0  $\Omega$  (at 20°C/68°F)**

Check for continuity between Yellow wire terminal of the alternator side connector and ground, and between the Pink wire terminal and ground. There should be no continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

Refer to page 11-4 for alternator stator replacement.



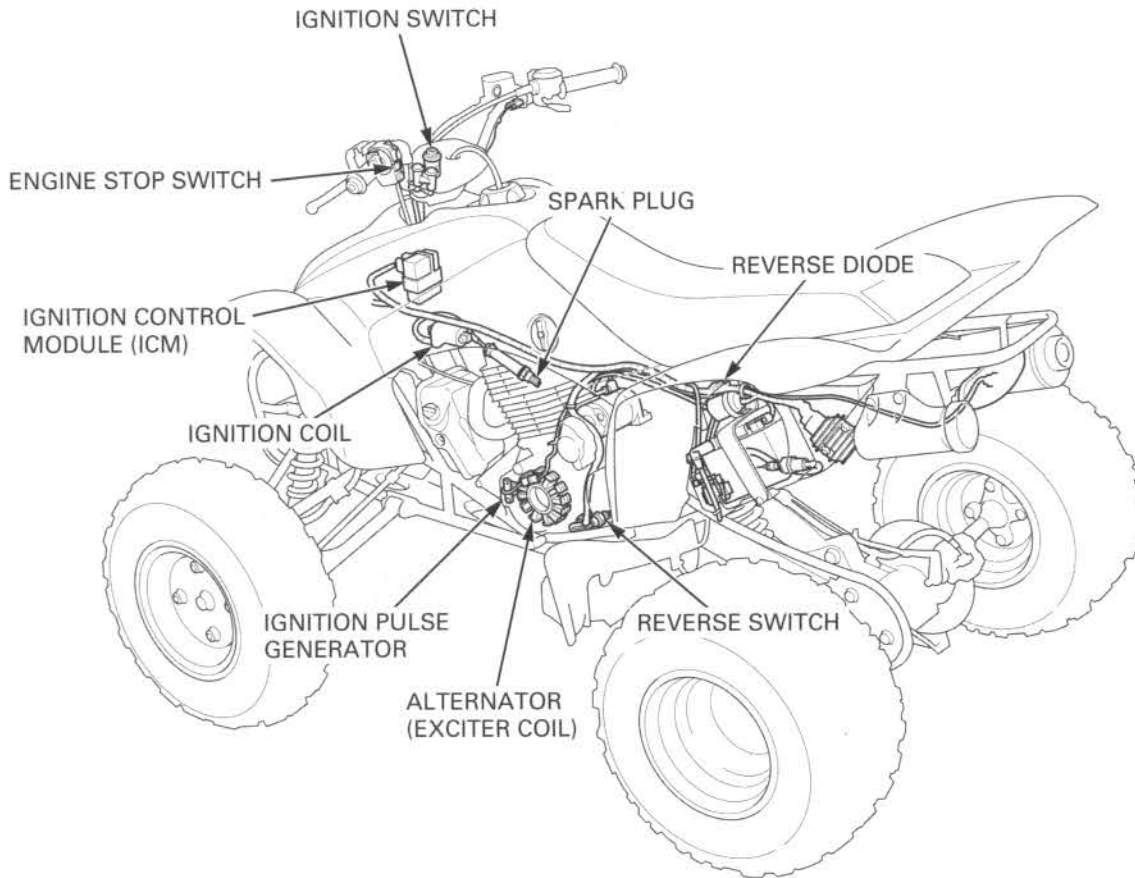
# 17. IGNITION SYSTEM

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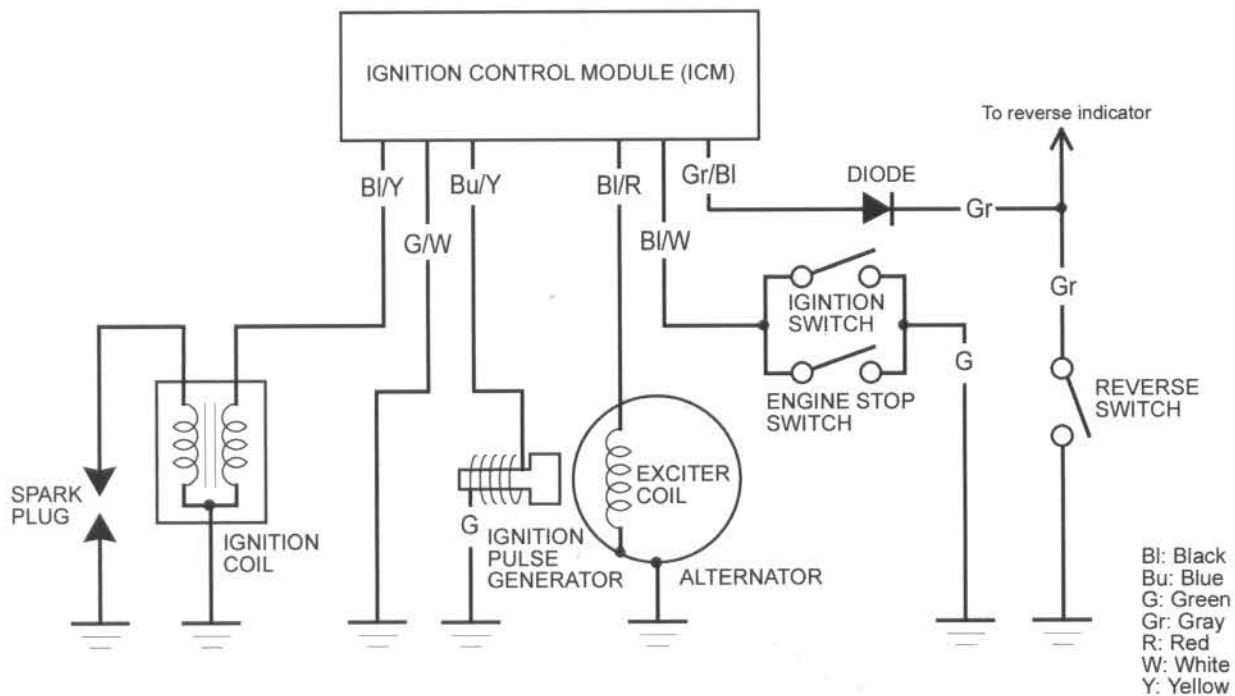
COMPONENT LOCATION .....	17-2	IGNITION SYSTEM INSPECTION.....	17-5
SYSTEM DIAGRAM.....	17-2	IGNITION COIL .....	17-7
SERVICE INFORMATION .....	17-3	IGNITION CONTROL MODULE (ICM) .....	17-7
TROUBLESHOOTING.....	17-4	IGNITION TIMING .....	17-8

# 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 turned to ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table on page 17-4.
- The ignition timing cannot 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 ICM. Always turn the ignition switch to OFF before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug with the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- The ICM stops the ignition to prevent starting the engine when the transmission is in the reverse position (the reverse switch is turned to ON) with the engine stopped. When the vehicle is reverse driving, the ICM limits the engine speed to 4,000 rpm (min<sup>-1</sup>).
- For ignition pulse generator removal/installation, see page 11-4.
- For ignition switch inspection, see page 19-6.
- For engine stop switch inspection, see page 19-6.
- For reverse switch and diode inspections, see page 19-9.


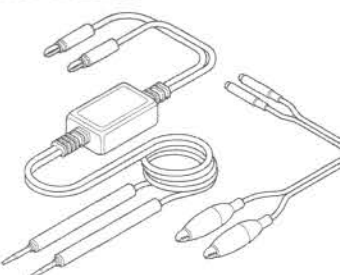
### SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	DPR8Z (NGK), X24GPR-U (DENSO)
	For extended high speed riding	DPR9Z (NGK), X27GPR-U (DENSO)
Spark plug gap		0.6 – 0.7 mm (0.024 – 0.028 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Exciter coil peak voltage		100 V minimum
Ignition timing ("F"mark)		8° BTDC at idle

### TORQUE VALUE

Timing hole cap                      10 N·m (1.0 kgf·m, 7 lbf·ft)

### TOOLS

<p>IgnitionMate 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.MΩ/DCV minimum)</p>
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## IGNITION SYSTEM

### TROUBLESHOOTING

- The ICM stops the ignition to prevent starting the engine when the transmission is in the reverse position (the reverse switch is turned to ON) with the engine stopped. When the vehicle is reverse driving, the ICM limits the engine speed to 4,000 rpm ( $\text{min}^{-1}$ ).
- 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.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adapter connections. (System is normal if measured voltage is over the specifications with reverse connections)</li> <li>2. The multimeter impedance is too low.</li> <li>3. Cranking speed is too slow (battery is under charged).</li> <li>4. 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)</li> <li>5. Poorly connected connectors or an open circuit in the ignition system.</li> <li>6. Faulty exciter coil. (Measure peak voltage)</li> <li>7. Faulty ignition coil.</li> <li>8. Faulty ignition control module (ICM) (when above No.1 through 7 are normal).</li> </ol>
	No peak voltage.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections)</li> <li>2. Short circuit in Black/white wire of the ignition switch and engine stop switch.</li> <li>3. Short circuit in Gray/black wire of the reverse switch.</li> <li>4. Faulty ignition switch, engine stop switch or reverse switch.</li> <li>5. Loose or poorly connected ICM connector(s).</li> <li>6. Open circuit or poor connection in the Green/white wire (ground) of the ICM.</li> <li>7. Faulty peak voltage adaptor.</li> <li>8. Faulty exciter coil. (Measure peak voltage)</li> <li>9. Faulty ignition pulse generator. (Measure peak voltage)</li> <li>10. Faulty ICM (when above No. 1 through 9 are normal).</li> </ol>
	Peak voltage is normal, but no spark jumps at the plug.	<ol style="list-style-type: none"> <li>1. Faulty spark plug or leaking ignition coil secondary current.</li> <li>2. Faulty ignition coil.</li> </ol>
Exciter coil	Low peak voltage	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too slow (Battery is undercharged).</li> <li>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)</li> <li>4. Faulty exciter coil (when above No.1 through 3 are normal).</li> </ol>
	No peak voltage	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor.</li> <li>2. Faulty exciter coil.</li> </ol>
Ignition pulse generator	Low peak voltage.	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too slow (battery is under charged).</li> <li>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)</li> <li>4. Faulty ignition pulse generator (when above No. 1 through 3 are normal).</li> </ol>
	No peak voltage.	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor.</li> <li>2. Faulty ignition pulse generator.</li> </ol>

## IGNITION SYSTEM INSPECTION

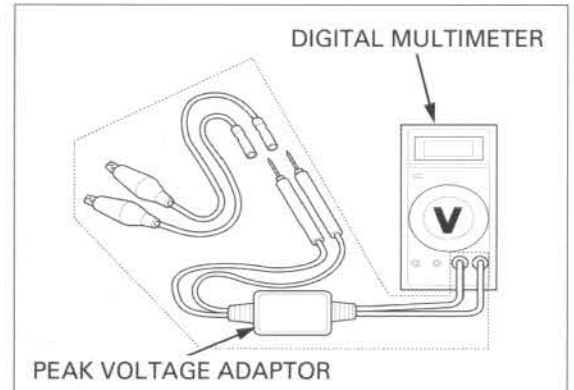
**NOTE:**

- If there is no spark at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use the recommended digital multimeter or a commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.

Use the peak voltage tester or connect the peak voltage adaptor to the digital multimeter.

**TOOLS:**

<b>IgnitionMate peak voltage tester</b>	<b>MTP07-0286 (U.S.A. only) or</b>
<b>Peak voltage adaptor with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)</b>	<b>07HGJ-0020100 (not available in U.S.A.)</b>



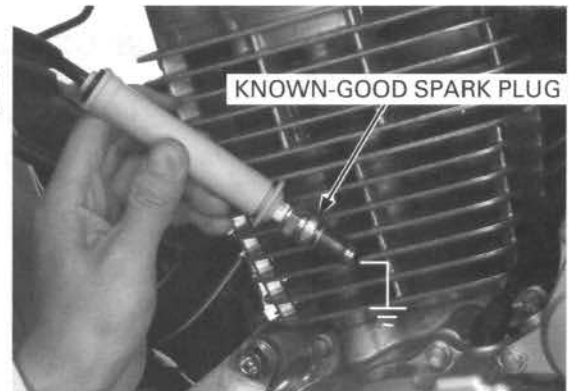
### IGNITION COIL PRIMARY PEAK VOLTAGE

**NOTE:**

- Check all system connections before inspection. Loose connections can cause incorrect readings.

Remove the left side cover (page 3-4).

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 head as done in a spark test.



With the connector connected, connect the peak voltage tester or adaptor probes to the ignition coil primary connector terminal and body ground.

**CONNECTION: Black/yellow (-) – Body ground (+)**

Shift the transmission into neutral.

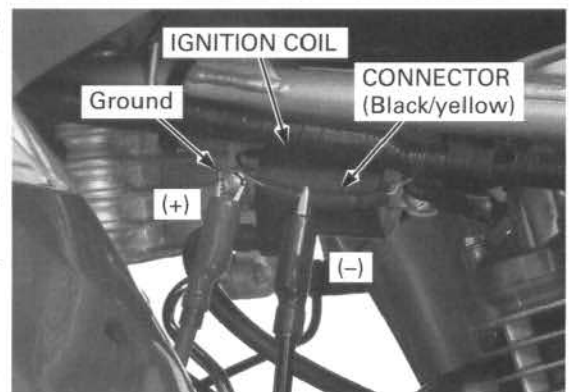
Turn the ignition switch to ON and the engine stop switch to "Q".

*Avoid touching the spark plug or tester probes to prevent electric shock.*

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

**PEAK VOLTAGE: 100 V minimum**

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting chart (page 17-4).



## IGNITION SYSTEM

### ALTERNATOR EXCITER COIL PEAK VOLTAGE

Remove the top cover (page 3-3).

Disconnect the ignition control module (ICM) 2P and 4P connectors.

Connect the peak voltage tester or adaptor probes to the wire harness side ICM connector terminals.

**CONNECTION: Black/red (+) – Green/white (-)**

Turn the ignition switch to ON.

Crank the engine with the starter motor and measure the exciter coil peak voltage.

**PEAK VOLTAGE: 100 V minimum**

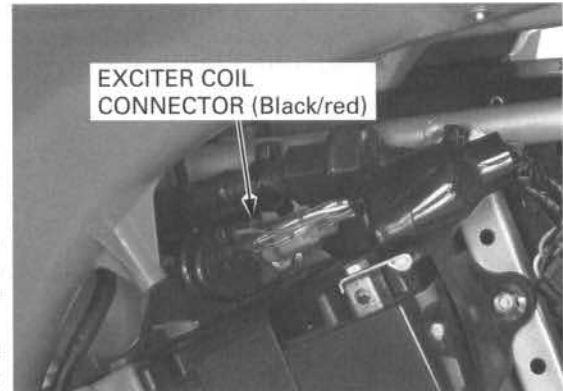
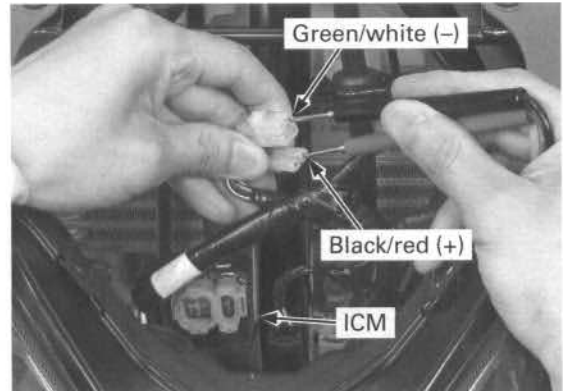
If the peak voltage measured at the ICM is abnormal, measure the peak voltage at the alternator.

Disconnect the exciter coil connector (Black/red) and connect the peak voltage tester or adaptor probes to the alternator side connector terminal and ground.

**CONNECTION: Black/red (+) – 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 exciter coil is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages are abnormal, follow the checks described in the troubleshooting chart (page 17-4).



### IGNITION PULSE GENERATOR PEAK VOLTAGE

Remove the top cover (page 3-3).

Disconnect the ignition control module (ICM) 4P connector.

Connect the peak voltage tester or adaptor probes to the wire harness side connector terminal and ground.

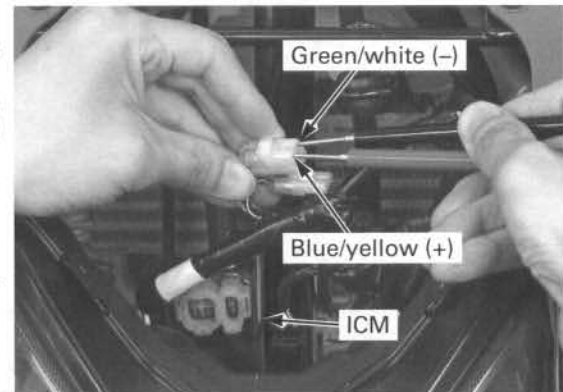
**CONNECTION: Blue/yellow (+) – Green/white (-)**

Turn the ignition switch to ON.

Crank the engine with the starter motor and measure the ignition pulse generator peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**

If the peak voltage measured at the ICM is abnormal, measure the peak voltage at the ignition pulse generator.



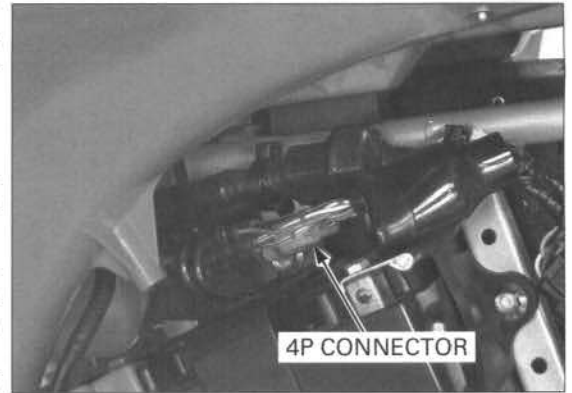
*Avoid touching the tester probes to prevent electric shock.*

Disconnect the alternator/ignition pulse generator 4P (white) connector and connect the peak voltage tester or adaptor probes to the ignition pulse generator side connector terminals.

**CONNECTION: Blue/yellow (+) – Green (-)**

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, follow the checks described in the troubleshooting chart (page 17-4).



## **IGNITION COIL**

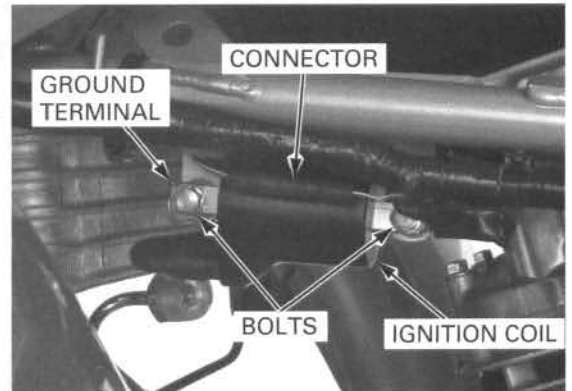
### **REMOVAL/INSTALLATION**

Remove the left side cover (page 3-4).

Disconnect spark plug cap and the primary wire connector.

Remove the two bolts, ground terminal and the ignition coil.

Installation is in the reverse order of removal.



## **IGNITION CONTROL MODULE (ICM)**

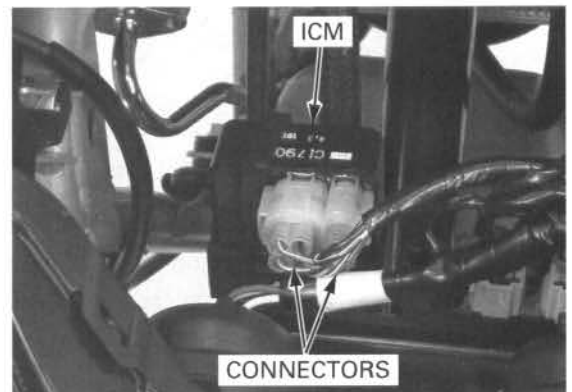
### **REMOVAL/INSTALLATION**

Remove the top cover (page 3-3).

Remove the ICM from the stays.

Disconnect the connectors to remove the ICM.

Installation is in the reverse order of removal.

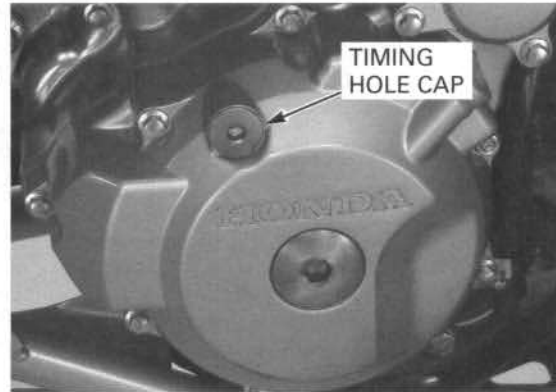


## IGNITION SYSTEM

### IGNITION TIMING

Start the engine and warm it up to operating temperature.

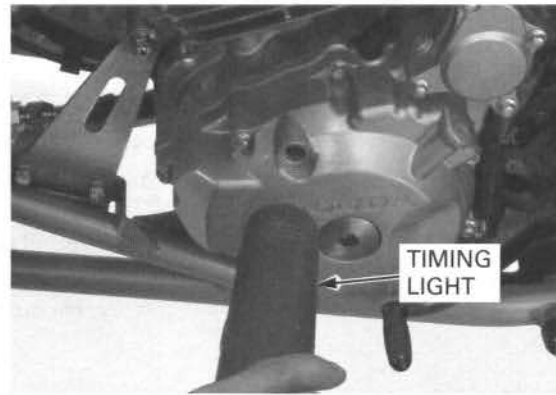
Stop the engine and remove the timing hole cap from the left crankcase cover.



*Read the manufacturer's instructions for timing light and tachometer operation.*

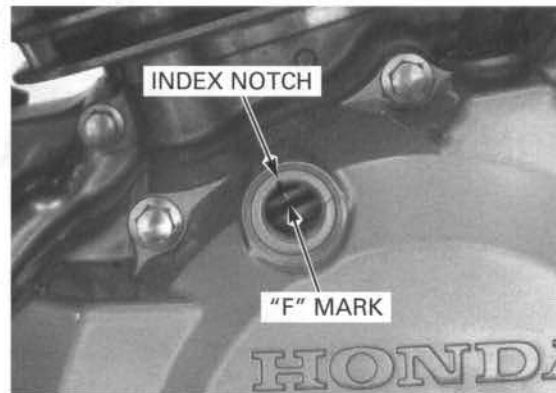
Connect the timing light and tachometer.

Start the engine, let it idle [1,400 rpm (min<sup>-1</sup>)] and check the ignition timing.



The ignition timing is correct if the "F" mark on the flywheel aligns with the index notch in the crankcase cover at idle.

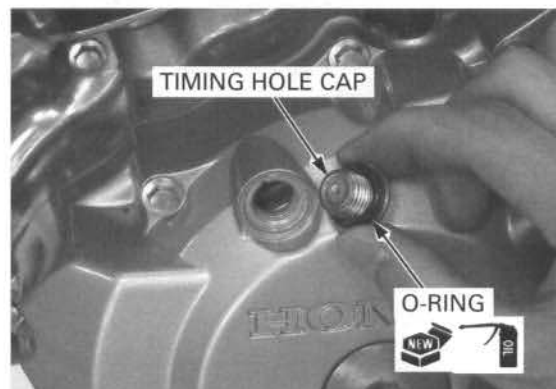
Increase the engine speed and make sure the "F" mark begins to move.



Coat a new O-ring with engine oil and install it onto the timing hole cap.

Install the timing hole cap and tighten it.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

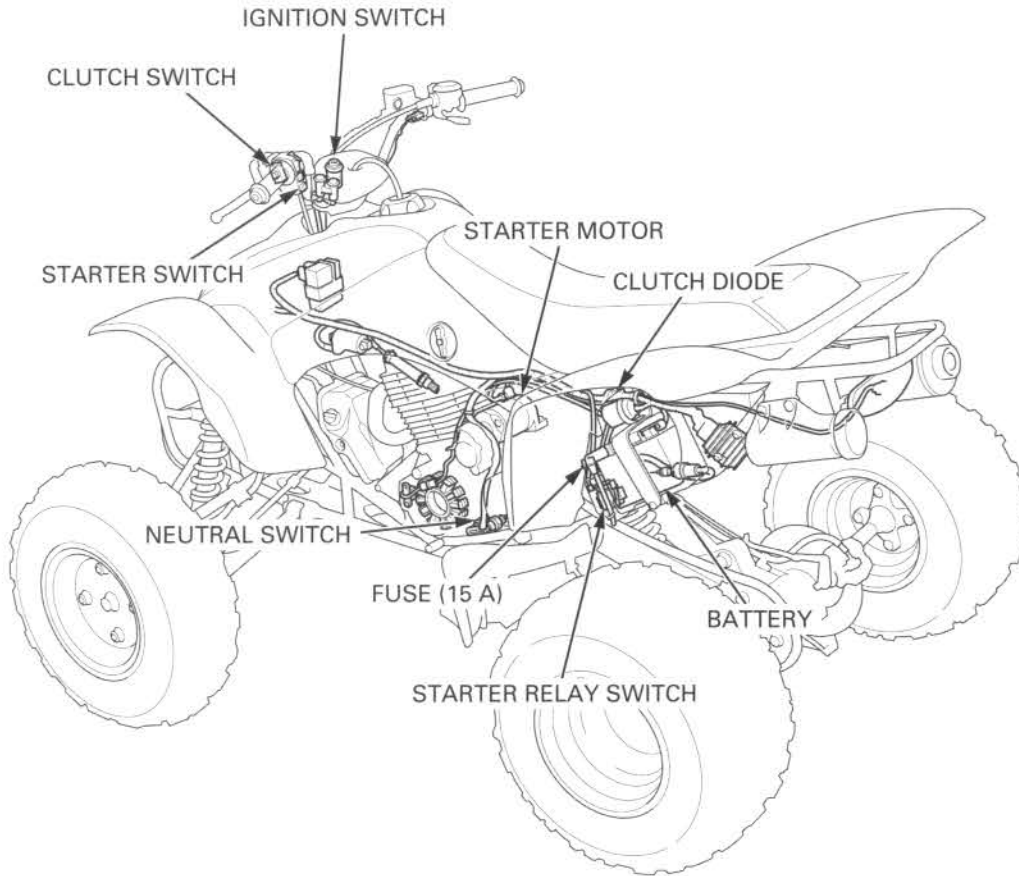


# 18. ELECTRIC STARTER

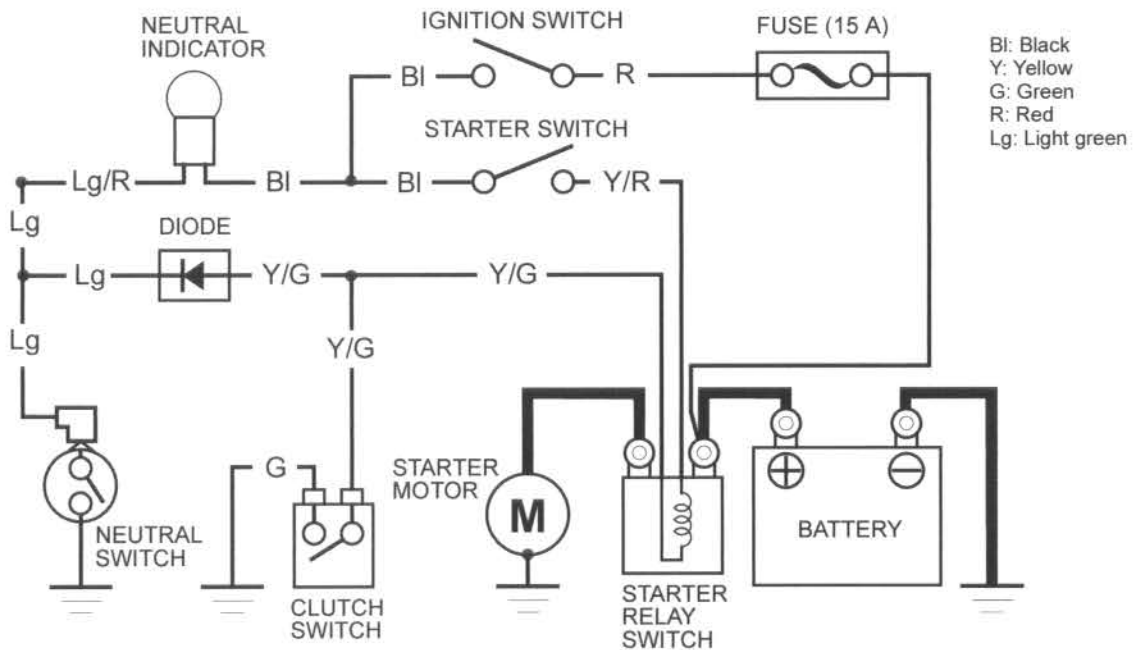
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COMPONENT LOCATION .....	18-2	STARTER MOTOR .....	18-6
SYSTEM DIAGRAM .....	18-2	STARTER RELAY SWITCH .....	18-12
SERVICE INFORMATION .....	18-3	CLUTCH DIODE .....	18-14
TROUBLESHOOTING .....	18-4		

# COMPONENT LOCATION



# SYSTEM DIAGRAM





## SERVICE INFORMATION

### GENERAL

- Always turn the ignition switch to OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting (page 18-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- For starter clutch service, see page 11-9.
- See section 19 for following component inspections:
  - ignition switch (page 19-6)
  - starter switch (page 19-6)
  - neutral switch (page 19-9)
  - clutch switch (page 19-7)

### SPECIFICATIONS

Unit: mm (in)		
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	8.5 (0.33)

## TROUBLESHOOTING

NOTE:

- The starter motor should operate when the transmission is in neutral or when the transmission is into gear and the clutch lever is squeezed.

### Starter Motor Does Not Turn

#### 1. Fuse Inspection

Check for blown main fuse (15 A).

*Is the fuse blown?*

**YES** – Replace the fuse.

**NO** – GO TO STEP 2.

#### 2. Battery Inspection

Check that the battery is fully charged and in good condition.

*Is the battery in good condition?*

**YES** – GO TO STEP 3.

**NO** – Charge the battery (page 16-7).

#### 3. Starter Relay Switch Operation Inspection

Check the operation of the starter relay switch (page 18-12).

*Does the starter relay switch click?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 5.

#### 4. Starter Motor Inspection

Turn the ignition switch to OFF.

Apply battery voltage to the starter motor directly.

*Does the starter motor turn?*

**YES** –

- Poorly connected starter motor cable.
- Faulty starter relay switch (page 18-12).

**NO** – Faulty starter motor (page 18-6).

#### 5. Relay Coil Ground Line Inspection

Turn the ignition switch to OFF.

Check the ground line of the starter relay switch (page 18-12).

*Is the ground line normal?*

**NO** –

- Faulty clutch switch (page 19-7).
- Faulty neutral switch (page 19-9).
- Faulty diode (page 18-14).
- Loose or poor contact of the related connector terminal.
- Open circuit in the wire harness.

**YES** – GO TO STEP 6.

#### 6. Relay Coil Power Input Line Inspection

Check the power input line of the starter relay switch (page 18-12).

*Is the power input line normal?*

**NO** –

- Faulty ignition switch (page 19-6).
- Faulty starter switch (page 19-6).
- Loose or poor contact of the related connector terminal.
- Open circuit in the wire harness.

**YES** – GO TO STEP 7.

**7. Starter Relay Switch Inspection**

Check the function of the starter relay switch (page 18-12).

***Does the starter relay switch function properly?***

**NO** – Faulty starter relay switch.

**YES** – Loose or poor contact of the starter relay switch connector terminal.

**Starter Motor Turns Slowly**

- Low battery voltage
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected ground cable terminal

**Starter Motor Turns, but Engine Does Not Start**

- Faulty starter clutch or starter gear train (page 11-3)
- Faulty ignition system (page 17-4)

**Starter Relay Switch Clicks, but Engine Does Not Turn Over**

- Crankshaft does not turn due to engine problems

## ELECTRIC STARTER

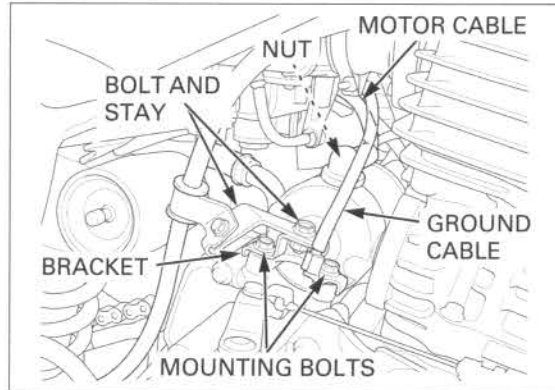
# STARTER MOTOR

### REMOVAL

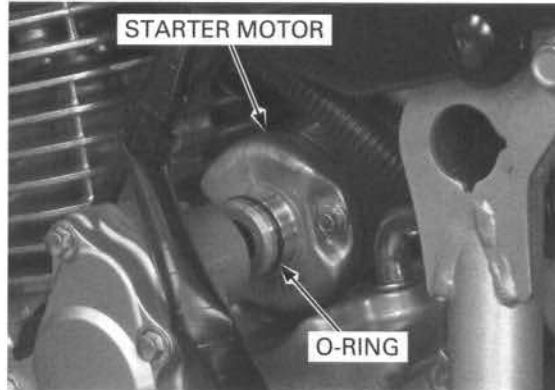
Remove the exhaust system (page 3-9).

Turn the ignition switch to OFF and remove the following:

- terminal nut (release the rubber cap)
- starter motor cable
- bolt and brake cable stay
- two mounting bolts, ground cable and stay bracket



- starter motor
- O-ring



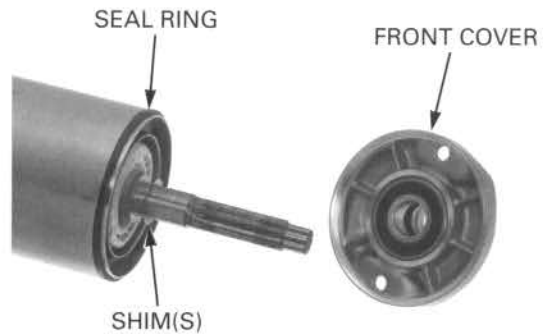
### DISASSEMBLY/INSPECTION

Remove the following:

- two motor case bolts (with the O-rings and setting plates)



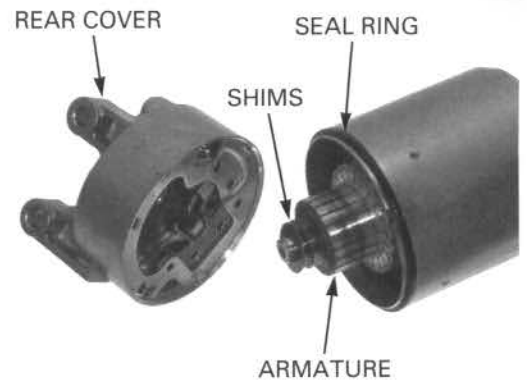
- Record the location and number of shims.
- front cover
  - shims
  - seal ring



## ELECTRIC STARTER

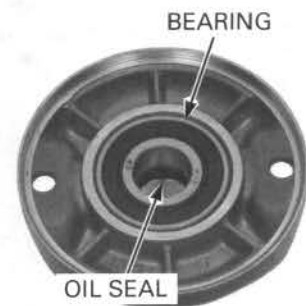
Record the location  
and number of  
shims.

- rear cover
- shims
- seal ring
- armature



Check the oil seal and bearing in the front cover for wear or damage.

Check the bushing in the rear cover for wear or damage.



Check the bushing in the rear cover for wear or damage.



Do not use emery  
or sand paper on  
the commutator.

Check the commutator bars of the armature for discoloration.



## ELECTRIC STARTER

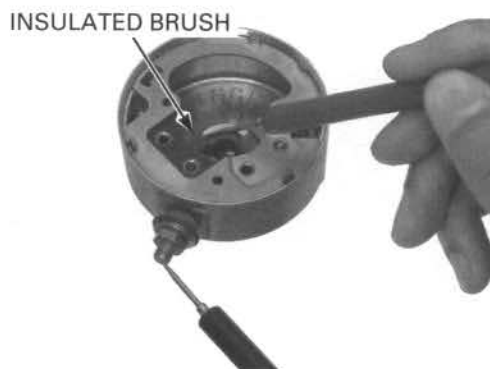
Check for continuity between pairs of commutator bars.  
There should be continuity.



Check for continuity between each commutator bar and the armature shaft.  
There should be no continuity.



Check for continuity between the insulated brush and cable terminal.  
There should be continuity.

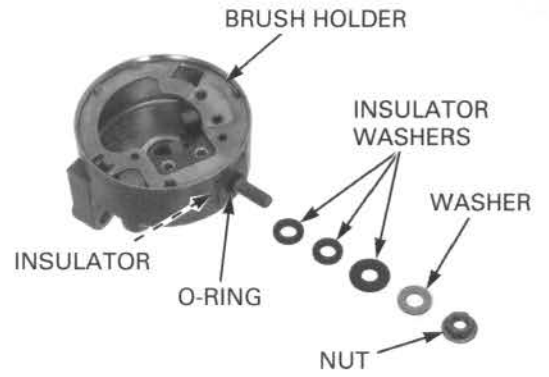


Check for continuity between the cable terminal and rear cover.  
There should be no continuity.



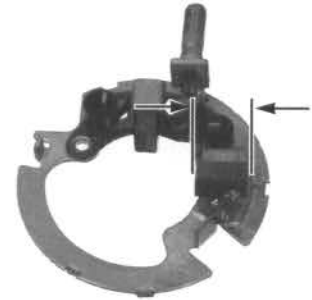
Remove the following:

- nut
- washer
- insulator washers
- brush holder
- O-ring
- insulator
- brushes

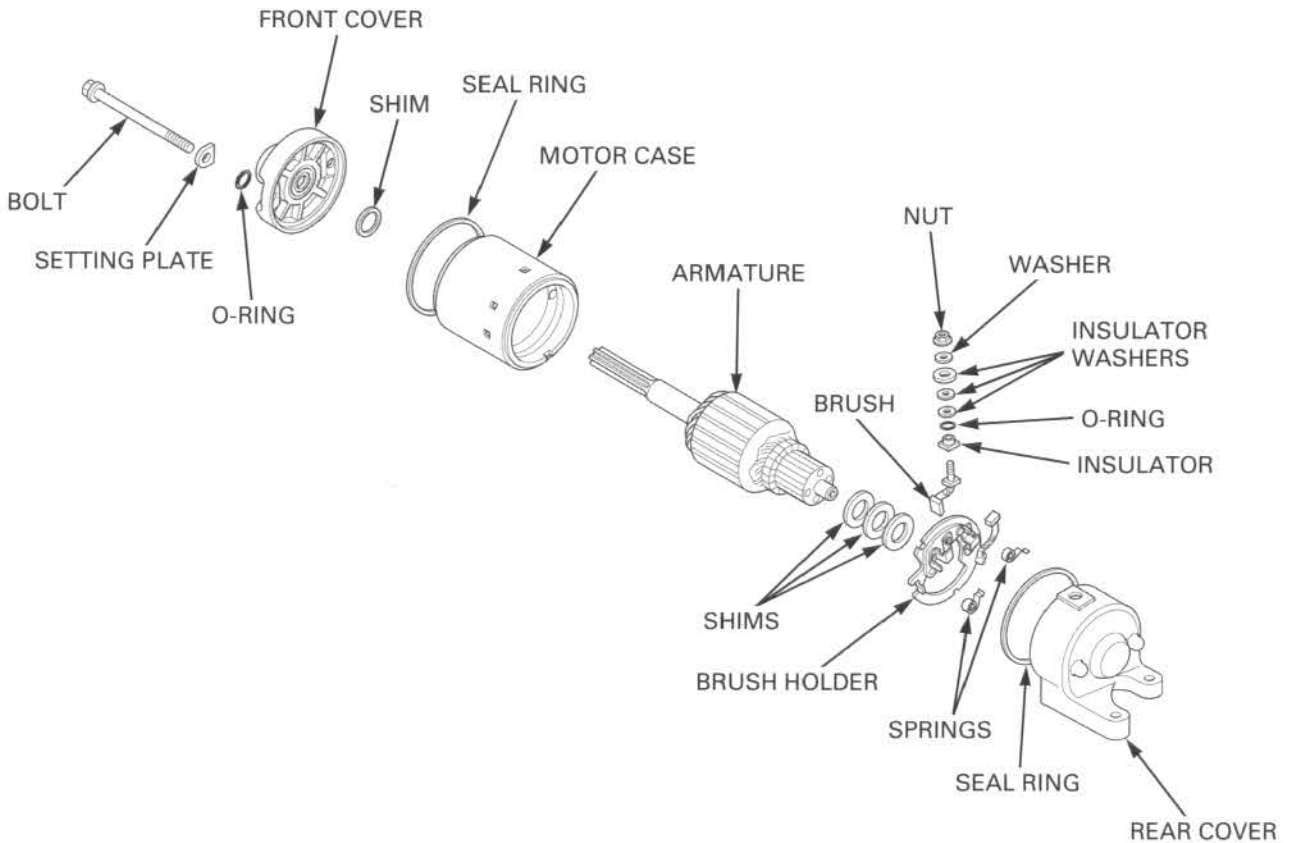


Measure the brush length.

**SERVICE LIMIT: 8.5 mm (0.33 in)**



**ASSEMBLY**

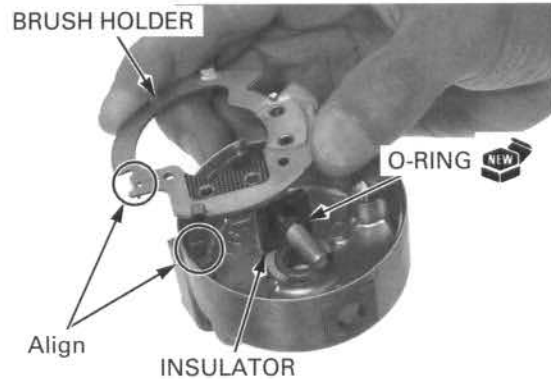


## ELECTRIC STARTER

Install the brushes into the brush holder.

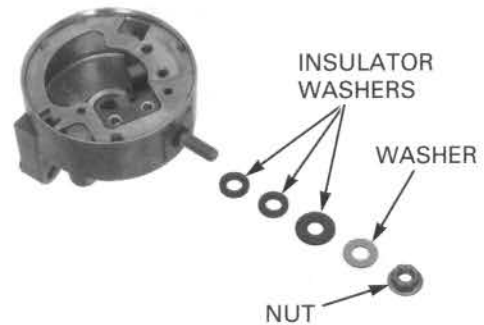
*Be careful not to damage the O-ring.*

Install the insulator and a new O-ring onto the cable terminal, and the brush holder into the rear cover. Align the holder tab with the case groove.



Install the following and tighten the nut:

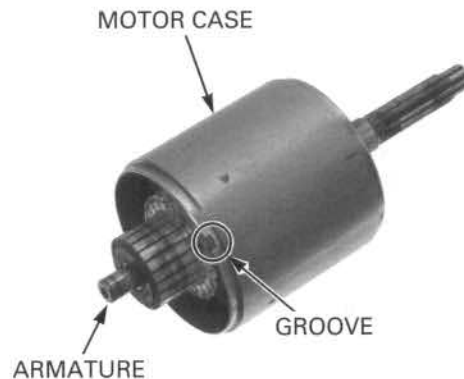
- insulator washers
- washer
- nut



### NOTICE

*The coil may be damaged if the magnet pulls the armature against the case.*

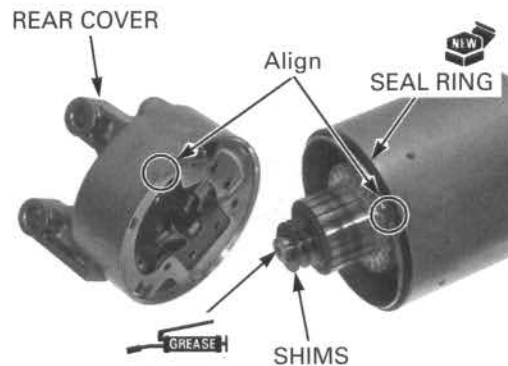
With the commutator bar facing the groove in the motor case, install the armature while holding the armature tightly to keep the magnet of the case from pulling the armature against it.



Install the same number of shims in the same locations as noted during disassembly.

Install a new seal ring onto the motor case.

Apply thin coat of grease to the armature shaft end. Install the rear cover while pushing the brushes into the brush holder and aligning the brush holder tab with the case groove (index marks).

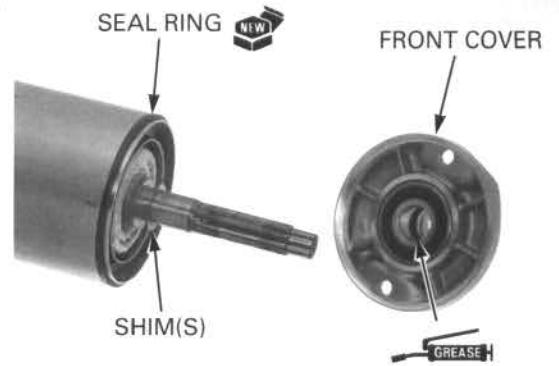




Install the same number of shims in the same locations as noted during disassembly.

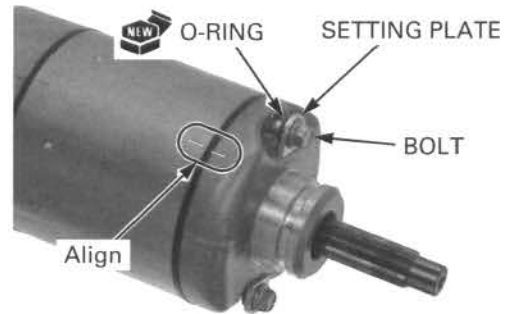
Install a new seal ring onto the motor case.

Apply grease to the oil seal lip in the front cover. Install the front cover, being careful not to damage the oil seal lip.



Align the index marks on the front cover and case.

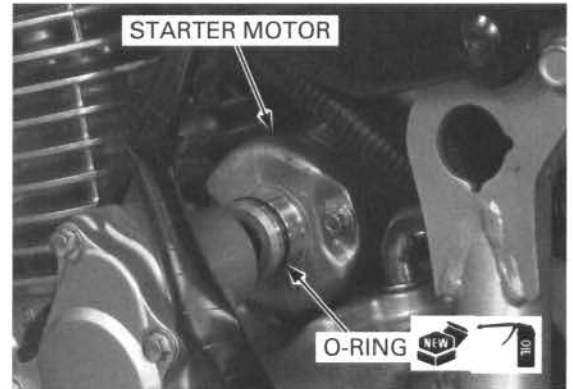
Install the motor case bolts with the setting plates and new O-rings. Set the straight edge of each plate against the cover and tighten the bolts.



**INSTALLATION**

Coat a new O-ring with engine oil and install it in the starter motor groove.

Install the starter motor into the crankcase cover and onto the crankcase.



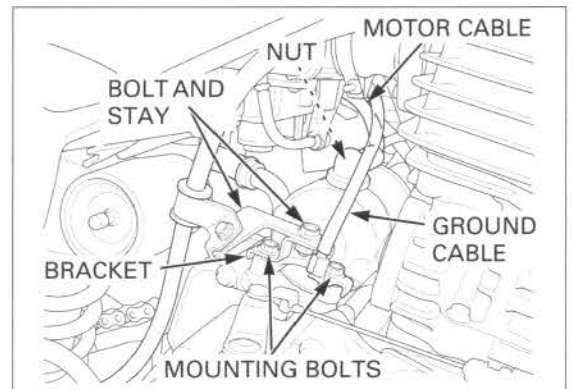
Install the stay bracket, ground cable (install onto front side bolt) and mounting bolts, and tighten the bolts.

Install the cable stay with the bolt and tighten it.

Connect the motor cable with the terminal nut and tighten it.

Install the rubber cap over the motor terminal securely.

Install the exhaust system (page 3-9).



## STARTER RELAY SWITCH

### OPERATION INSPECTION

Shift the transmission into neutral.

Turn the ignition switch to ON and push the starter switch.

The coil is normal if the starter relay switch clicks.

If you don't hear the switch click, and inspect the relay switch circuits (page 18-12).



### CIRCUIT INSPECTION

Release the connector boot from the clamp remove it off of the connectors.

#### GROUND LINE

Disconnect the Yellow/green wire connector of the starter relay switch.

Check for continuity between the wire harness side connector terminal and ground.

If there is continuity when the transmission is in neutral or when the transmission is into gear and the clutch lever is squeezed, the ground circuit is normal. (In neutral, there is a slight resistance due to the diode)

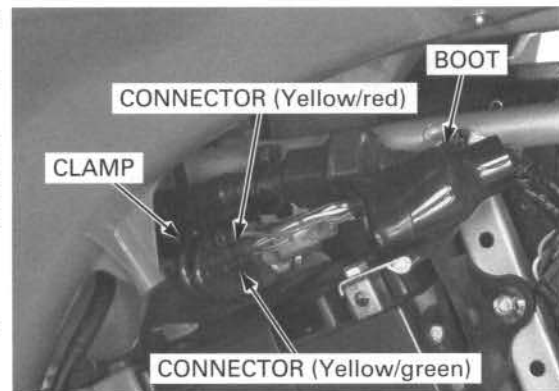
#### POWER INPUT LINE

Disconnect the Yellow/red wire connector of the starter relay switch.

Turn the ignition switch to ON.

Measure the voltage between the Yellow/red wire terminal (+) of the wire harness side connector and ground (-).

If the battery voltage appears only when the starter switch is pushed, the circuit is normal.

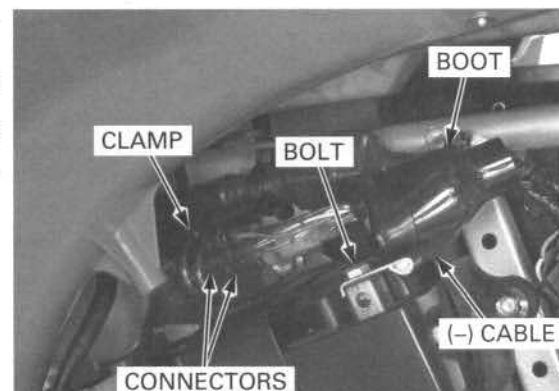


### FUNCTION INSPECTION

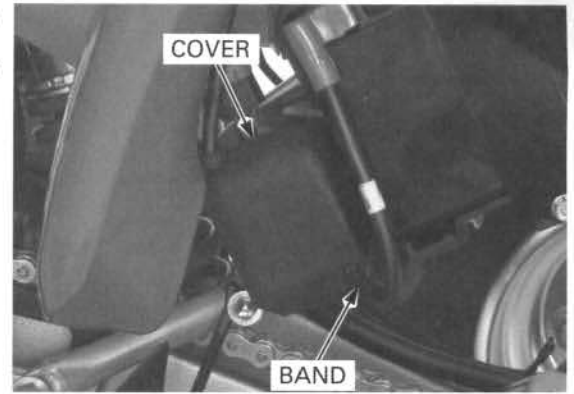
Disconnect the battery negative (-) cable by removing the terminal bolt.

Release the connector boot from the clamp remove it off of the connectors.

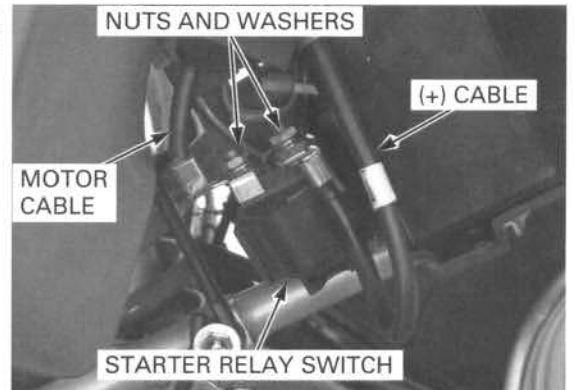
Disconnect the starter relay connectors (Yellow/red and Yellow/green).



Remove the wire band securing the starter relay switch cover.  
Release the relay cover from the starter relay switch.

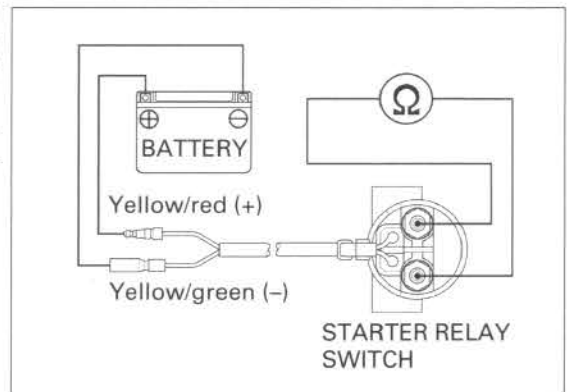


Disconnect the battery positive (+) cable and starter motor cable by removing the terminal nuts and spring washers.



Connect the fully charged 12 V battery positive (+) terminal to the Yellow/red wire terminal and negative (-) terminal to the Yellow/green wire terminal of the starter relay switch.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



## CLUTCH DIODE

### INSPECTION

Release the connector boot from the clamp remove it off of the connectors.

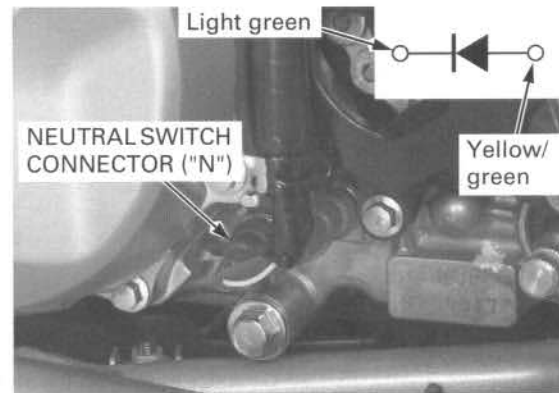
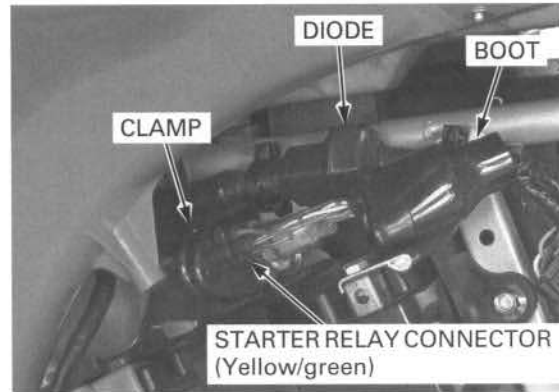
Disconnect the Yellow/green wire connector of the starter relay switch and the neutral switch connector.

Disconnect the neutral switch connector (page 19-9).

Check for continuity between the harness side terminals.

When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.

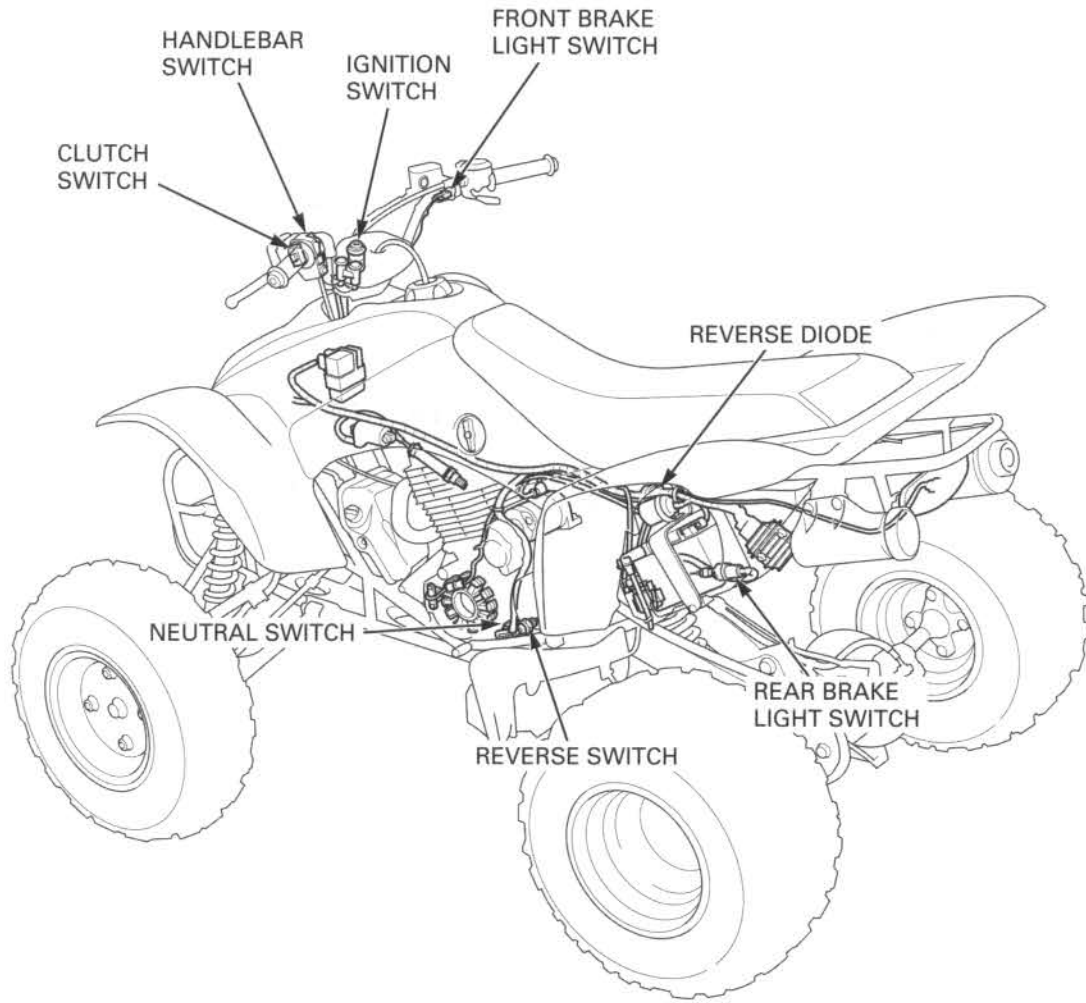


# 19. LIGHTS/SWITCHES

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COMPONENT LOCATION .....	19-2	HANDLEBAR SWITCH.....	19-6
SERVICE INFORMATION .....	19-3	CLUTCH SWITCH .....	19-7
BULB REPLACEMENT .....	19-4	BRAKE LIGHT SWITCH .....	19-8
HEADLIGHT.....	19-5	NEUTRAL AND REVERSE SWITCHES.....	19-9
TAILLIGHT.....	19-5	REVERSE DIODE .....	19-10
IGNITION SWITCH.....	19-6		

COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the vehicle. Simply disconnect the connectors and connect a continuity tester to the terminals or connections.
- The following color codes are used throughout this section.

Bu: Blue	G: Green	Lg: Light Green	R: Red
Bl: Black	Gr: Gray	O: Orange	W: White
Br: Brown	Lb: Light Blue	P: Pink	Y: Yellow

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12 V - 30/30 W
	Brake/taillight	LED
	Neutral indicator	12 V - 3 W
	Reverse indicator	12 V - 3.4 W
Fuse	Main fuse	15 A

### TORQUE VALUES

Clutch switch retainer bolt	4 N·m (0.4 kgf·m, 3.0 lbf·ft) Apply locking agent to the threads.
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Reverse switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Gearshift pedal pinch bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)

# BULB REPLACEMENT

## HEADLIGHT

Remove the top cover (page 3-3).

Remove the dust cover.

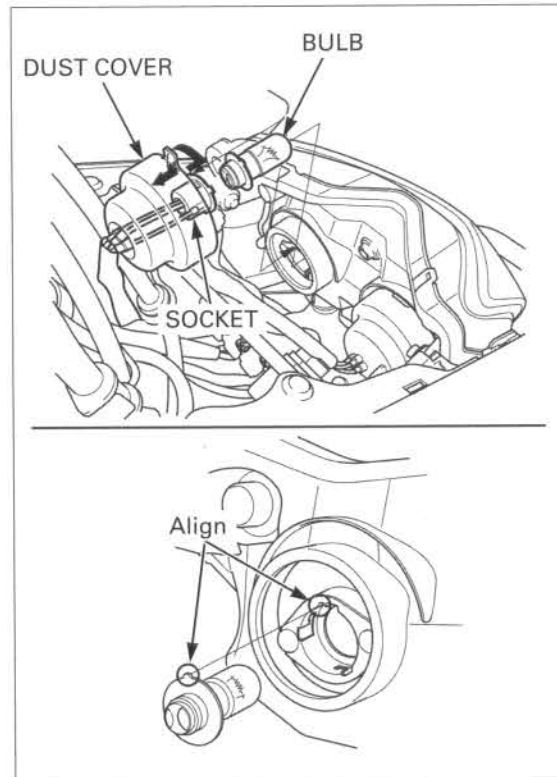
Remove the bulb socket by turning it counterclockwise while pushing it in.

Remove the bulb.

Install a new bulb into the headlight, aligning the tab with the groove.

Install the removed parts in the reverse order of removal.

*Align the socket tabs with the headlight grooves properly.*



## INDICATORS

*Be careful not to let the screw fall into the steering shaft.*

Remove the following:

- fuel fill cap breather hose (from the cover)
- indicator lenses (by prying them, using a small flat-blade screwdriver)
- cover attaching screw
- handlebar cover (by releasing its ends off the handlebar)
- bulb sockets (from the cover)

Carefully turn the bulb socket inside out and pull the bulb out of the socket.

Install a new bulb into the socket.

Install the bulb sockets into the handlebar cover in the direction as shown.

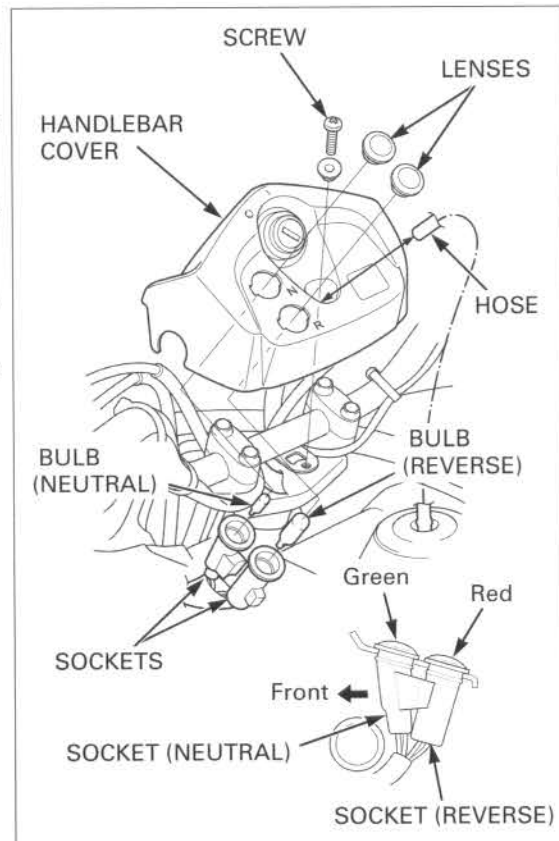
Install the cover onto the handlebar. Install the cover screw and tighten it securely.

Install the indicator lenses into the socket properly.

Install the breather hose into the cover.

*Take care not to drop the screw.*

*Do not interchange the neutral and reverse indicator lenses.*





## HEADLIGHT

### REMOVAL/INSTALLATION

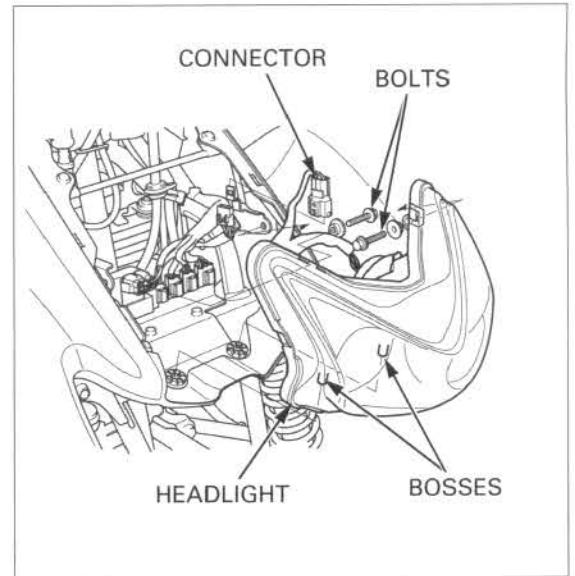
Remove the top cover (page 3-3).

Remove the headlight 3P (black) connector from the stay and disconnect it.

Remove the two bolts.

Release the bosses from the grommets to the remove the headlight.

Installation is in the reverse order of removal.

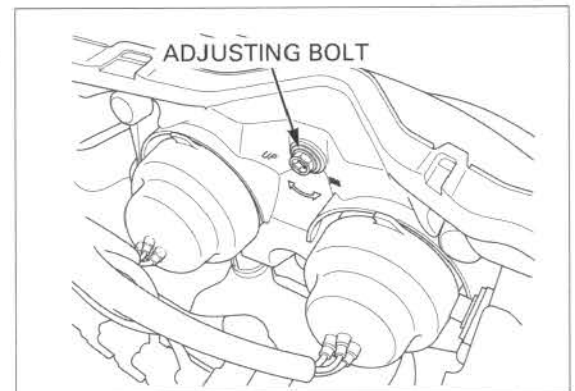


### AIMING

Remove the top cover (page 3-3).

Adjust the headlight beam vertically by turning the adjusting bolt.

Install the top cover (page 3-3).



## TAILLIGHT

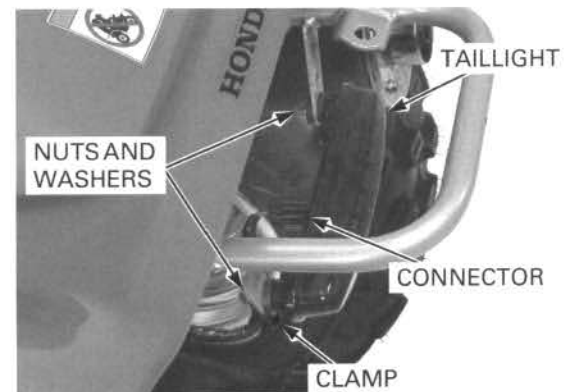
### REMOVAL/INSTALLATION

Disconnect the 3P connector.

Release the taillight wire from the clamp.

Remove the two nut, washers, clamp and taillight.

Installation is in the reverse order of removal.



## LIGHTS/SWITCHES

### IGNITION SWITCH

#### INSPECTION

Remove the top cover (page 3-3).

Remove the ignition switch 4P (green) connector from the stay and disconnect it.

Check for continuity between the switch side connector terminals in each switch position. Continuity should exist between the color coded wires as follows:

Color Position	Black/ white	Green	Red	Black
OFF	○ — ○			
ON			○ — ○	

#### REPLACEMENT

Remove the following:

- top cover (page 3-3)
- handlebar cover (page 19-4)

Remove the 4P (green) connector from the stay and disconnect it.

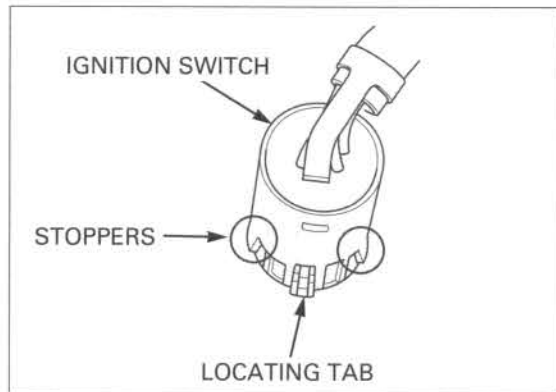
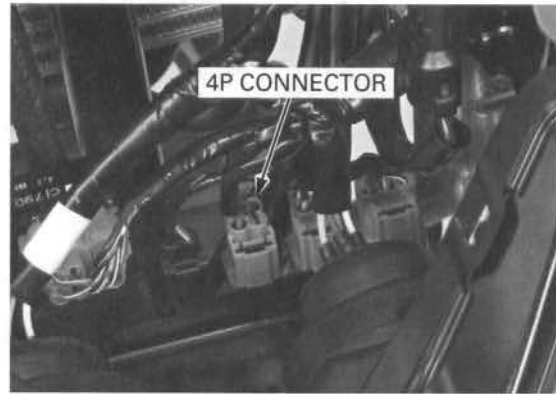
Release the switch wire from the clips on the frame.

Remove the ignition switch from the handlebar cover by pushing in the two stoppers.

Install a new ignition switch by aligning the locating tab with the cover groove.

*Route the ignition switch wire properly (page 1-18).*

Install the removed parts in the reverse order of removal.

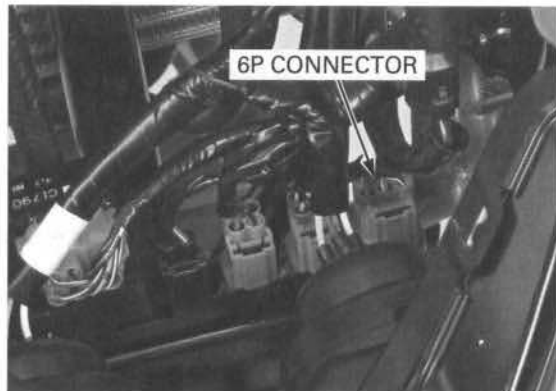


### HANDLEBAR SWITCH

#### INSPECTION

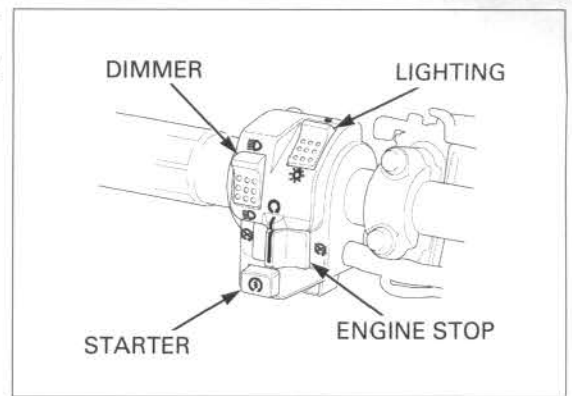
Remove the top cover (page 3-3).

Remove the handlebar switch 6P (white) connector from the stay and disconnect it.



See page 19-7 for clutch switch inspection.

Check for continuity between the switch side connector terminals in each switch position. Continuity should exist between the color coded wires as shown below:



**ENGINE STOP SWITCH**

COLOR	Green	Black/white

**LIGHTING SWITCH/DIMMER SWITCH**

COLOR	Black	Brown	COLOR	Blue	White

**STARTER SWITCH**

COLOR	Black	Yellow/red
Free		
Push		

**CLUTCH SWITCH**

**REMOVAL/INSTALLATION**

Remove the dust cover off of the clutch lever bracket.

Remove the bolt and retainer. Disconnect the connectors to remove the clutch switch.

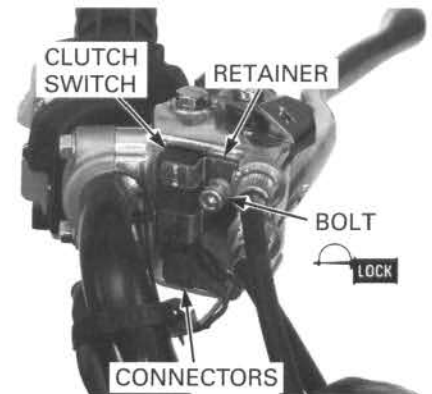
Apply locking agent to the threads of the clutch switch retainer bolt.

Connect the clutch switch to the connectors and install it into the lever bracket.

Secure the switch with the retainer and bolt.

**TORQUE: 4 N·m (0.4 kgf·m, 3.0 lbf·ft)**

Install the dust cover over the lever bracket.

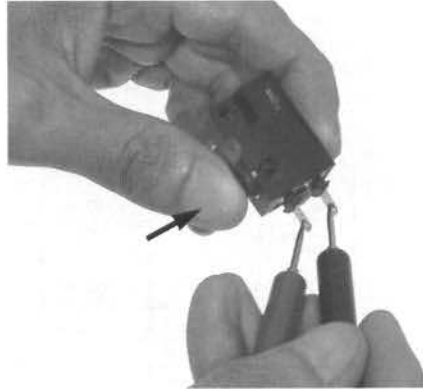


### INSPECTION

Remove the clutch switch (page 19-7).

Check for continuity between the switch terminals.

There should be no continuity with the switch plunger pushed, and continuity with the plunger released.

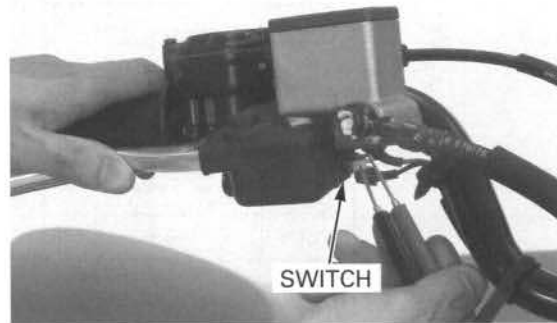


## BRAKE LIGHT SWITCH

### FRONT

Disconnect the brake light 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.

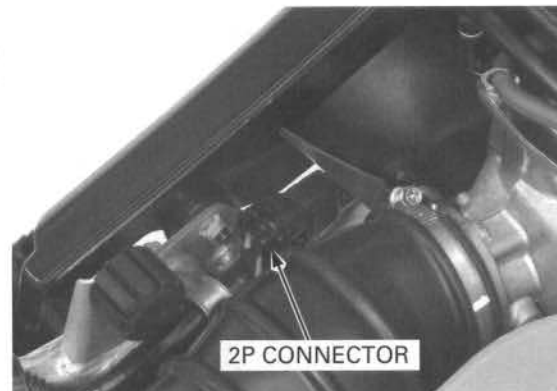


### REAR

Remove the seat/rear fender (page 3-3).

Disconnect the brake light switch 2P (black) connector and check for continuity between the switch side connector terminals.

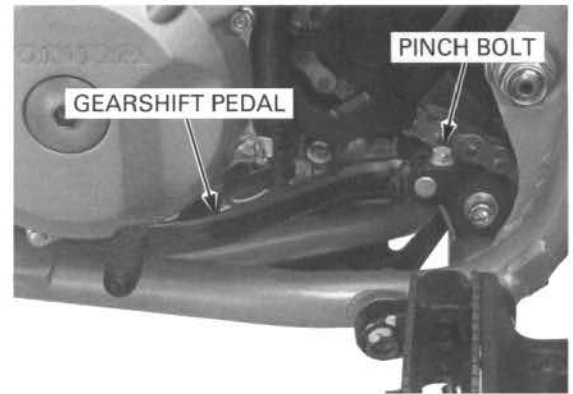
There should be continuity with the brake pedal depressed and no continuity with the pedal released.



## NEUTRAL AND REVERSE SWITCHES

### INSPECTION

Remove the bolt and gearshift pedal.



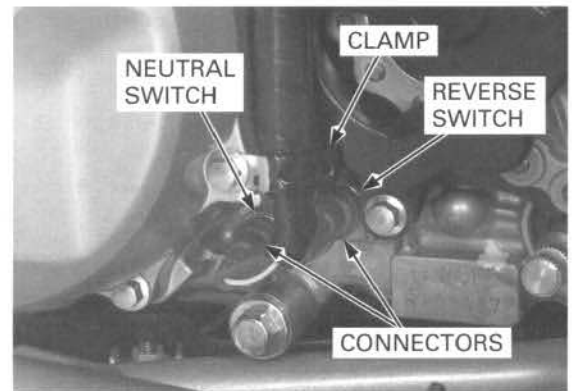
Release the neutral/reverse switch wire from the clamp and disconnect each switch connector.

Check for continuity between the switch terminal and engine ground.

**Neutral Switch:** There should be continuity when the transmission is in neutral, and no continuity when the transmission is in any gear except neutral.

**Reverse Switch:** There should be continuity when the transmission is in reverse, and no continuity when the transmission is in any position except reverse.

Install the removed parts as described below.



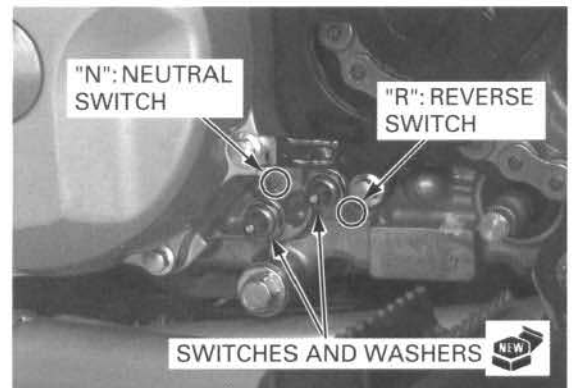
### REPLACEMENT

Disconnect the neutral and reverse switch connectors (page 19-9).

Remove the switch from the crankcase.

Install the switch with a new sealing washer and tighten it.

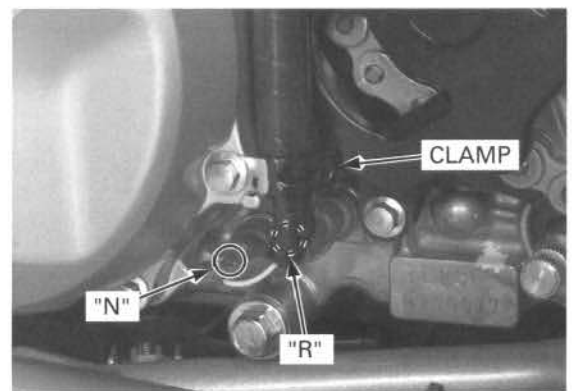
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



*Do not interchange the connectors.*

Connect each switch connector ("N" for Neutral switch/"R" for Reverse switch).

Secure the wire with the clamp.

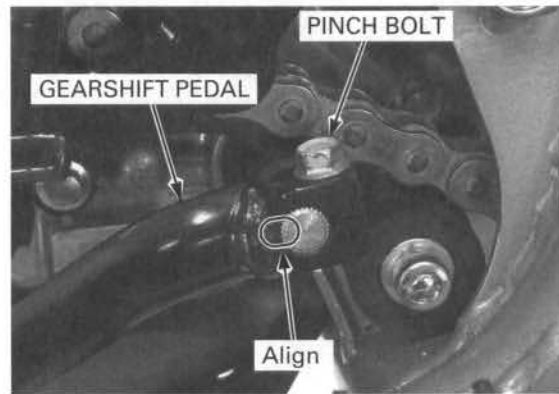


## LIGHTS/SWITCHES

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

Install the pinch bolt and tighten it.

**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**



## REVERSE DIODE

### INSPECTION

Remove the top cover (page 3-3).

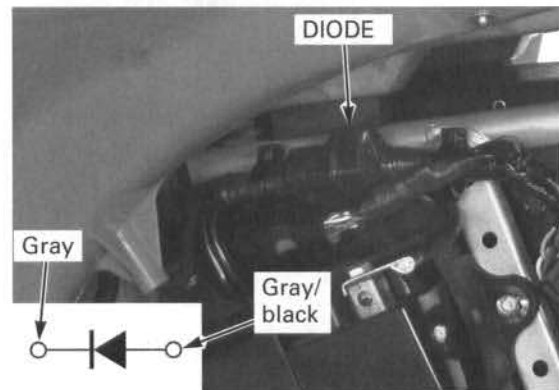
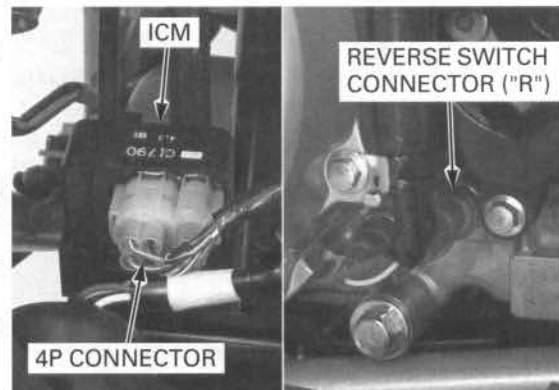
Disconnect the ignition control module (ICM) 4P connector.

Disconnect the reverse switch connector (page 19-9).

Check for continuity between the Gray/black wire terminal of the ICM 4P connector and reverse switch connector terminal (Gray wire).

When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.

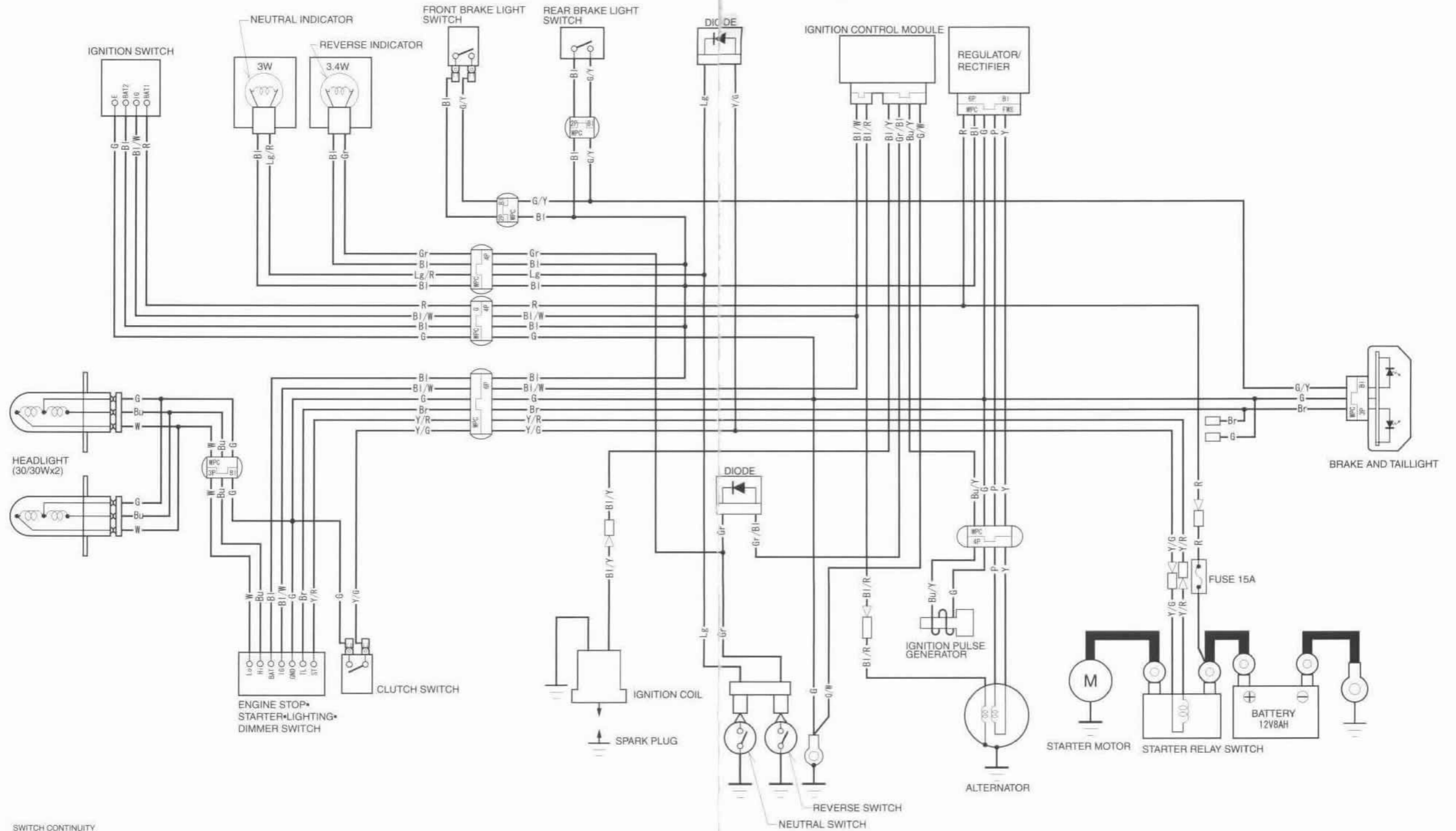


# 20. WIRING DIAGRAM

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WIRING DIAGRAM ..... 20-3

WIRING DIAGRAM



SWITCH CONTINUITY

IGNITION SWITCH				LIGHTING SWITCH		DIMMER SWITCH			ENGINE STOP SWITCH		STARTER SWITCH	
	IG	E	BAT1	BAT2	BAT2	TL	Hi	(HL)	Lo	OFF	GND	IG
OFF	○	○			○	○	○	○	○	○	○	○
ON			○	○	○	○	○	○	○	○	○	○
COLOR:	Bl/W	G	R	Bl	Bl	Br	Bu	W		G	Bl/W	

CONNECTION OF SWITCH	
FREE	BAT
PUSH	ST
COLOR:	Bl Y/R

- Bl :BLACK
- Y :YELLOW
- Bu :BLUE
- G :GREEN
- R :RED
- W :WHITE
- Br :BROWN
- O :ORANGE
- Lb :LIGHT BLUE
- Lg :LIGHT GREEN
- P :PINK
- Gr :GRAY

0030Z-HN1-A400



# 21. TROUBLESHOOTING

---

ENGINE DOES NOT START OR IS HARD  
TO START ..... 21-2

ENGINE LACKS POWER ..... 21-3

POOR PERFORMANCE AT LOW AND  
IDLE SPEED.....21-5

POOR PERFORMANCE AT HIGH SPEED ....21-6

POOR HANDLING.....21-6

## ENGINE DOES NOT START OR IS HARD TO START

### 1. Fuel Line Inspection

Check fuel flow to carburetor.

**Does fuel reach carburetor?**

- NO** – • Clogged fuel line or strainer  
• Clogged fuel valve  
• Clogged fuel fill cap breather

**YES** – GO TO STEP 2.

### 2. Spark Plug Inspection

Remove and inspect spark plug.

**Is the spark plug wet?**

- YES** – • Flooded carburetor  
• Throttle valve open  
• Dirty air cleaner  
• Improperly adjusted pilot screw

**NO** – GO TO STEP 3.

### 3. Spark Test

Perform spark test.

**Is there weak or no spark?**

- YES** – • Faulty spark plug  
• Fouled spark plug  
• Loose or disconnected ignition system wires  
• Broken or shorted spark plug wire  
• Faulty ignition coil  
• Faulty exciter coil  
• Faulty ignition pulse generator  
• Faulty engine stop switch  
• Faulty ignition switch  
• Faulty ignition control module (ICM)

**NO** – GO TO STEP 4.

### 4. Engine Starting Condition

Start engine by following normal procedure.

**Does the engine start then stops?**

- Yes** – • Improper choke operation  
• Incorrectly adjusted carburetor  
• Leaking carburetor insulator  
• Improper ignition timing (Faulty ICM or ignition pulse generator)  
• Contaminated fuel

**NO** – GO TO STEP 5.

### 5. Cylinder Compression

Test cylinder compression.

**Is the compression low?**

- YES** – • 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 wheels off the ground and spin by hand.

**Does the wheel spin freely?**

- NO** – • Brake dragging  
• Worn or damaged wheel hub or axle bearing  
• Drive chain too tight

**YES** – GO TO STEP 2.

### 2. Tire Pressure Inspection

Check tire pressure.

**Are the tire pressures low?**

- YES** – • Faulty tire valve  
• Punctured tire

**NO** – GO TO STEP 3.

### 3. Clutch Inspection

Accelerate rapidly from low to second.

**Does the engine speed change accordingly when clutch is engaged?**

- NO** – • Clutch slipping  
• Worn clutch discs  
• Warped clutch plates  
• Weak clutch springs  
• Damaged clutch lifter arm  
• Additive in engine oil

**YES** – GO TO STEP 5.

### 4. Engine Condition Inspection

Accelerate lightly.

**Does the engine speed increase?**

- NO** – • Choke valve closed  
• Clogged air cleaner  
• Restricted fuel flow  
• Clogged muffler  
• Restricted fuel fill cap breather

**YES** – GO TO STEP 5.

### 5. Engine Condition Inspection

Accelerate or run at high speed.

**Is there knocking?**

- YES** – • Worn piston and cylinder  
• Use of poor quality fuel  
• Excessive carbon build-up in combustion chamber  
• Ignition timing too advance (Faulty ignition control module (ICM) or ignition pulse generator)  
• Lean fuel mixture

**NO** – GO TO STEP 6.

### 6. Ignition Timing Inspection

Check ignition timing.

**Is the ignition timing correct?**

- NO** – • Faulty ICM  
• Faulty ignition pulse generator

**YES** – GO TO STEP 7.

## TROUBLESHOOTING

---

### 7. Cylinder Compression Inspection

Test cylinder compression.

***Is the compression low?***

- YES** – • Valve clearance too small  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing

**NO** – GO TO STEP 8.

### 8. Carburetor Inspection

Check carburetor for clogging.

***Is the carburetor clogged?***

- YES** – • Carburetor not serviced frequently enough

**NO** – GO TO STEP 9.

### 9. Spark Plug Inspection

Remove and inspect spark plug.

***Is the spark plug fouled or discolored?***

- YES** – • Plug not serviced frequently enough  
• Incorrect spark plug used

**NO** – GO TO STEP 10.

### 10. Engine Oil Inspection

Check oil level and condition.

***Is there correct level and good condition?***

- NO** – • Oil level too high  
• Oil level too low  
• Contaminated oil

**YES** – GO TO STEP 11.

### 11. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

***Is the valve train lubricated properly?***

- NO** – • Clogged oil passage  
• Clogged oil orifice

---

## POOR PERFORMANCE AT LOW AND IDLE SPEED

### 1. Pilot Screw Inspection

Check carburetor pilot screw adjustment.

*Is the adjustment correct?*

**NO** – See page 6-22.

**YES** – GO TO STEP 2.

### 2. Intake Air Leak Inspection

Check for leaking carburetor insulator.

*Is there leaking?*

**YES** – • Loose carburetor insulator bands  
• Damaged insulator

**NO** – GO TO STEP 3.

### 3. Spark Test

Perform spark test.

*Is there weak or intermittent spark?*

**YES** – • Faulty spark plug  
• Fouled spark plug  
• Loose or disconnected ignition system wires  
• Broken or shorted spark plug wire  
• Faulty ignition coil  
• Faulty exciter coil  
• Faulty ignition pulse generator  
• Faulty engine stop switch  
• Faulty ignition switch  
• Faulty ignition control module (ICM)

**NO** – GO TO STEP 4.

### 4. Ignition Timing Inspection

Check ignition timing.

*Is the ignition timing correct?*

**NO** – • Faulty ICM  
• Faulty ignition pulse generator

### POOR PERFORMANCE AT HIGH SPEED

#### 1. Fuel Line Inspection

Disconnect fuel line at carburetor.

**Does fuel flow freely?**

- NO** – • Clogged fuel line  
• Clogged fuel fill cap breather  
• Faulty fuel valve  
• Clogged fuel strainer

**YES** – GO TO STEP 2.

#### 2. Carburetor Inspection

Check carburetor for clogging.

**Is the carburetor clogged?**

- YES** – • Carburetor not serviced frequently enough

**NO** – GO TO STEP 3.

#### 3. Valve Timing Inspection

Check valve timing.

**Is the valve timing correct?**

- NO** – • Camshaft not installed properly

**YES** – GO TO STEP 4.

#### 4. Ignition Timing Inspection

Check ignition timing.

**Is the ignition timing correct?**

- NO** – • Faulty ignition control module (ICM)  
• Faulty ignition pulse generator

**YES** – GO TO STEP 5.

#### 5. Valve Spring Inspection

Check valve springs.

**Are the valve springs weak?**

- YES** – • Faulty valve spring

### POOR HANDLING

#### Steering is heavy

- Steering shaft holder too tight
- Damaged steering shaft bushing
- Damaged steering shaft bearing

#### Any wheel is wobbling

- Excessive wheel bearing play
- Bent rim
- Improperly installed wheel hub
- Excessively worn swingarm pivot bearings
- Loose suspension arm
- Bent frame

#### Vehicle pulls to one side

- Tire air pressure incorrect
- Bent tie-rod
- Incorrect tie-rod adjustment
- Bent swingarm
- Bent frame
- Improper wheel alignment

AIR CLEANER .....	4-5	HANDLEBAR SWITCH .....	19-6
AIR CLEANER HOUSING .....	6-5	HEADLIGHT .....	19-5
AIR CLEANER HOUSING DRAIN TUBE .....	4-6	HEAT GUARD PLATE .....	3-7
ALTERNATOR CHARGING COIL .....	16-10	HIGH ALTITUDE ADJUSTMENT .....	6-23
ALTERNATOR STATOR .....	11-4	IGNITION COIL .....	17-7
BATTERY .....	16-6	IGNITION CONTROL MODULE (ICM) .....	17-7
BRAKE FLUID .....	4-18	IGNITION SWITCH .....	19-6
BRAKE FLUID REPLACEMENT/AIR BLEEDING .....	15-6	IGNITION SYSTEM INSPECTION .....	17-5
BRAKE LIGHT SWITCH		IGNITION TIMING .....	17-8
LIGHTS/SWITCHES .....	19-8	LUBRICATION & SEAL POINTS .....	1-16
MAINTENANCE .....	4-20	LUBRICATION SYSTEM DIAGRAM .....	5-2
BRAKE PAD/DISC .....	15-9	MODEL IDENTIFICATION .....	1-2
BRAKE PADS WEAR .....	4-19	MUD GUARD/FOOTPEG .....	3-8
BRAKE PEDAL .....	15-28	NEUTRAL AND REVERSE SWITCHES .....	19-9
BRAKE SYSTEM .....	4-20	NUTS, BOLTS, FASTENERS .....	4-25
BULB REPLACEMENT .....	19-4	OIL COOLER .....	5-8
CABLE & HARNESS ROUTING .....	1-18	OIL PUMP .....	5-4
CAMSHAFT INSTALLATION .....	8-22	OIL STRAINER .....	5-8
CAMSHAFT REMOVAL .....	8-9	OIL TANK/OIL PIPE .....	5-9
CARBURETOR ASSEMBLY .....	6-14	PILOT SCREW ADJUSTMENT .....	6-22
CARBURETOR DISASSEMBLY/INSPECTION .....	6-8	PRIMARY DRIVE GEAR .....	10-13
CARBURETOR INSTALLATION .....	6-20	REAR AXLE/BEARING HOLDER .....	14-6
CARBURETOR REMOVAL .....	6-6	REAR BRAKE CALIPER .....	15-22
CHARGING SYSTEM INSPECTION .....	16-8	REAR MASTER CYLINDER .....	15-18
CLUTCH .....	10-7	REAR SHOCK ABSORBER .....	14-15
CLUTCH DIODE .....	18-14	REAR WHEEL .....	14-6
CLUTCH SWITCH .....	19-7	REGULATOR/RECTIFIER .....	16-9
CLUTCH SYSTEM .....	4-23	REVERSE DIODE .....	19-10
COMPONENT LOCATION		REVERSE LOCK SYSTEM .....	4-22
BATTERY/CHARGING SYSTEM .....	16-2	RIGHT CRANKCASE COVER INSTALLATION .....	10-16
ELECTRIC STARTER .....	18-2	RIGHT CRANKCASE COVER REMOVAL .....	10-5
IGNITION SYSTEM .....	17-2	ROCKER ARM INSTALLATION .....	8-24
LIGHTS/METERS/SWITCHES .....	19-2	ROCKER ARM REMOVAL .....	8-8
CRANKCASE ASSEMBLY .....	12-21	SEAT/REAR FENDER .....	3-3
CRANKCASE BEARING .....	12-18	SERVICE INFORMATION .....	4-3
CRANKCASE SEPARATION .....	12-7	ALTERNATOR/STARTER CLUTCH .....	11-3
CRANKSHAFT/BALANCER .....	12-16	BATTERY/CHARGING SYSTEM .....	16-3
CYLINDER COMPRESSION .....	8-6	CLUTCH/GEARSHIFT LINKAGE .....	10-3
CYLINDER HEAD ASSEMBLY .....	8-20	CRANKCASE/TRANSMISSION/CRANKSHAFT .....	12-3
CYLINDER HEAD COVER INSTALLATION .....	8-25	CYLINDER HEAD/VALVE .....	8-3
CYLINDER HEAD COVER REMOVAL .....	8-6	CYLINDER/PISTON .....	9-3
CYLINDER HEAD DISASSEMBLY .....	8-13	ELECTRIC STARTER .....	18-3
CYLINDER HEAD INSTALLATION .....	8-21	ENGINE REMOVAL/INSTALLATION .....	7-3
CYLINDER HEAD REMOVAL .....	8-13	FRAME/BODY PANELS/EXHAUST SYSTEM .....	3-2
CYLINDER/PISTON INSTALLATION .....	9-8	FRONT WHEEL/SUSPENSION/STEERING .....	13-3
CYLINDER/PISTON REMOVAL .....	9-4	FUEL SYSTEM .....	6-3
DRIVE CHAIN .....	4-14	HYDRAULIC DISC BRAKE .....	15-4
DRIVE CHAIN SLIDER .....	4-17	IGNITION SYSTEM .....	17-3
EMISSION CONTROL SYSTEMS .....	1-28	LIGHTS/METERS/SWITCHES .....	19-3
ENGINE IDLE SPEED .....	4-13	LUBRICATION SYSTEM .....	5-3
ENGINE INSTALLATION .....	7-8	MAINTENANCE .....	4-2
ENGINE OIL .....	4-10	REAR WHEEL/SUSPENSION .....	14-3
ENGINE OIL FILTER .....	4-12	SERVICE RULES .....	1-2
ENGINE OIL STRAINER SCREEN IN OIL TANK .....	4-13	SHOCK LINKAGE .....	14-17
ENGINE REMOVAL .....	7-4	SIDE COVER .....	3-4
EXHAUST SYSTEM .....	3-9	SKID PLATE .....	3-7
FLYWHEEL INSTALLATION .....	11-11	SKID PLATE, ENGINE GUARD .....	4-22
FLYWHEEL REMOVAL .....	11-8	SPARK ARRESTER .....	4-25
FRONT BRAKE CALIPER .....	15-16	SPARK PLUG .....	4-7
FRONT FENDER .....	3-5	SPECIFICATIONS	
FRONT MASTER CYLINDER .....	15-12	ALTERNATOR/STARTER CLUTCH .....	1-8
FRONT SHOCK ABSORBER .....	13-17	BATTERY/CHARGING SYSTEM .....	1-10
FRONT WHEEL .....	13-10	CLUTCH/GEARSHIFT LINKAGE .....	1-8
FRONT WHEEL HUB/DISC .....	13-14	CRANKCASE/TRANSMISSION/CRANKSHAFT .....	1-9
FUEL LINE .....	4-4	CYLINDER HEAD/VALVE .....	1-7
FUEL TANK .....	3-6	CYLINDER/PISTON .....	1-8
FUEL TANK UPPER COVER .....	3-4	ELECTRIC STARTER .....	1-10
GEARSHIFT LINKAGE .....	10-14	FRONT WHEEL/SUSPENSION/STEERING .....	1-9
HANDLEBAR .....	13-6	FUEL SYSTEM .....	1-7

## INDEX

GENERAL .....	1-5	TIE-ROD .....	13-29
HYDRAULIC DISC BRAKE .....	1-10	TIRES .....	13-11
IGNITION SYSTEM .....	1-10	TOP COVER .....	3-3
LIGHTS/SWITCHES .....	1-11	TORQUE VALUES	
LUBRICATION SYSTEM .....	1-7	ENGINE & FRAME .....	1-12
REAR WHEEL/SUSPENSION .....	1-10	STANDARD .....	1-12
STARTER CLUTCH .....	11-9	TRANSMISSION .....	12-8
STARTER MOTOR .....	18-6	TROUBLESHOOTING	
STARTER RELAY SWITCH .....	18-12	ALTERNATOR/STARTER CLUTCH .....	11-3
STEERING SHAFT .....	13-24	BATTERY/CHARGING SYSTEM .....	16-5
STEERING SHAFT HOLDER BEARING .....	4-26	CLUTCH/GEARSHIFT LINKAGE .....	10-4
STEERING SYSTEM .....	4-26	CRANKCASE/TRANSMISSION/CRANKSHAFT .....	12-6
SUSPENSION .....	4-24	CYLINDER HEAD/VALVE .....	8-5
SUSPENSION ARM .....	13-19	CYLINDER/PISTON .....	9-3
SWINGARM .....	14-19	ELECTRIC STARTER .....	18-4
SYSTEM COMPONENTS		ENGINE DOES NOT START OR IS HARD TO	
ALTERNATOR/STARTER CLUTCH .....	11-2	START .....	21-2
CLUTCH/GEARSHIFT LINKAGE .....	10-2	ENGINE LACKS POWER .....	21-3
CRANKCASE/TRANSMISSION/CRANKSHAFT .....	12-2	FRAME/BODY PANELS/EXHAUST SYSTEM .....	3-2
CYLINDER HEAD/VALVE .....	8-2	FRONT WHEEL/SUSPENSION/STEERING .....	13-5
CYLINDER/PISTON .....	9-2	FUEL SYSTEM .....	6-4
ENGINE REMOVAL/INSTALLATION .....	7-2	HYDRAULIC DISC BRAKE .....	15-5
FRONT WHEEL/SUSPENSION/STEERING .....	13-2	IGNITION SYSTEM .....	17-4
FUEL SYSTEM .....	6-2	LUBRICATION SYSTEM .....	5-3
HYDRAULIC DISC BRAKE .....	15-2	POOR HANDLING .....	21-6
REAR WHEEL/SUSPENSION .....	14-2	POOR PERFORMANCE AT HIGH SPEED .....	21-6
SYSTEM DIAGRAM		POOR PERFORMANCE AT LOW AND IDLE	
BATTERY/CHARGING SYSTEM .....	16-2	SPEED .....	21-5
ELECTRIC STARTER .....	18-2	REAR WHEEL/SUSPENSION .....	14-5
IGNITION SYSTEM .....	17-2	VALVE CLEARANCE .....	4-8
TAILLIGHT .....	19-5	VALVE GUIDE REPLACEMENT .....	8-15
TECHNICAL FEATURE (REVERSE SYSTEM) .....	2-2	VALVE SEAT INSPECTION/REFACING .....	8-16
THROTTLE HOUSING .....	13-9	WHEELS/TIRES .....	4-25
THROTTLE OPERATION .....	4-4	WIRING DIAGRAM .....	20-3