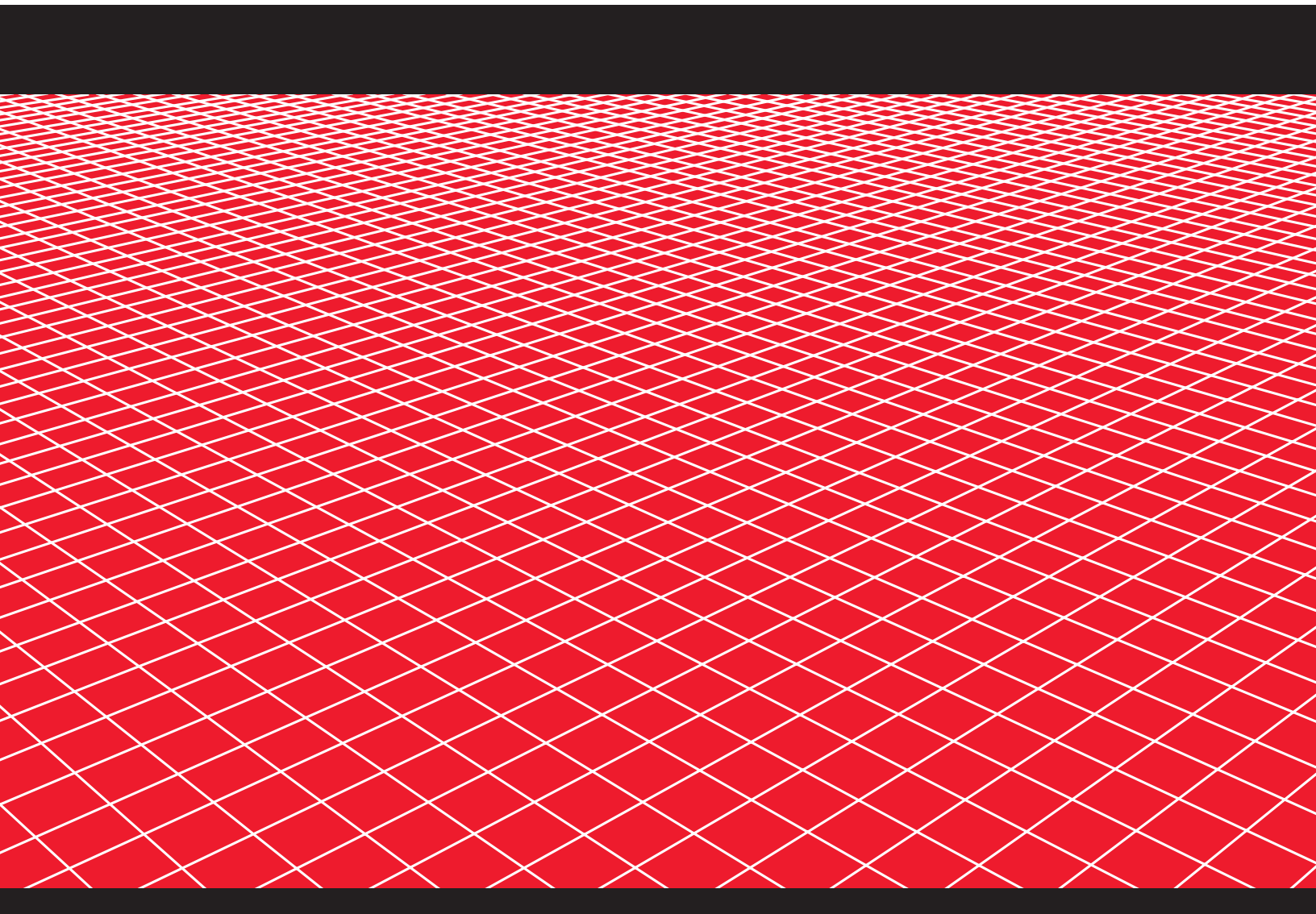




# **SHOP MANUAL**

## **CBX250 TWISTER**

### **2006 ~ 2013**



## TYPE CODE

- Throughout this manual, the following abbreviations are used to identify individual type.

CODE	AREA TYPE
BR	Brazil
2LA	Latin America II
3LA	Latin America III



## 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. Can cause you to be seriously hurt or killed.

### 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 CBX250.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standard set.

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

Section 4 through 18 describe parts of the motorcycle, 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 don't know the source of the trouble, go to section 20 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.

**ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. HSA – Technical Publications RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATSOEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON Honda MOTORCYCLES, MOTOR SCOOTERS OR ATVS.**









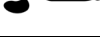


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# SYMBOLS

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

	Replace the part(s) with new one(s) before assembly.
	Use 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 3 or DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use fork or suspension fluid.

# 1. GENERAL INFORMATION

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## GENERAL INFORMATION

### SERVICE RULES

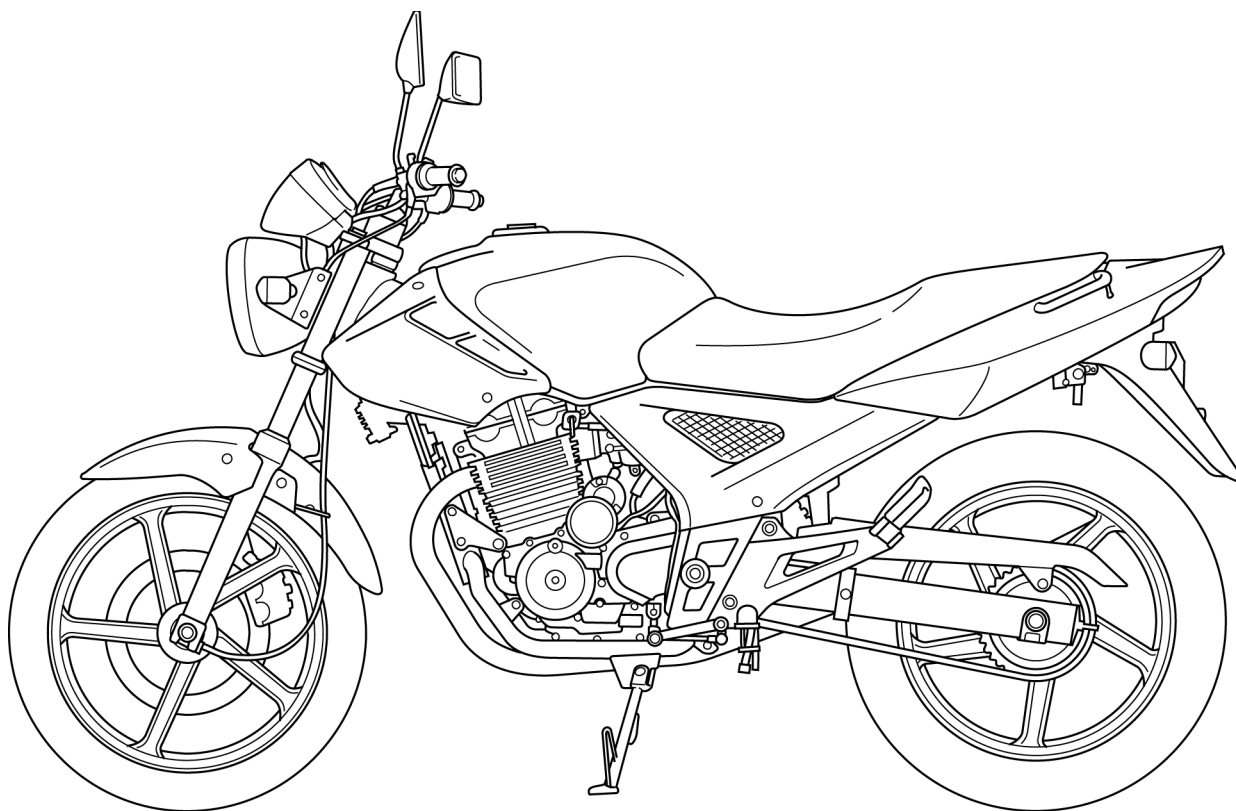
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, and lock plates, etc. when reassembling.
5. When tightening a series of bolts or nuts, begin with the larger-diameter of inner bolts first. and 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 assembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-17).

### ABBREVIATION

Throughout this manual, the following abbreviations are used to identify the respective parts or systems.

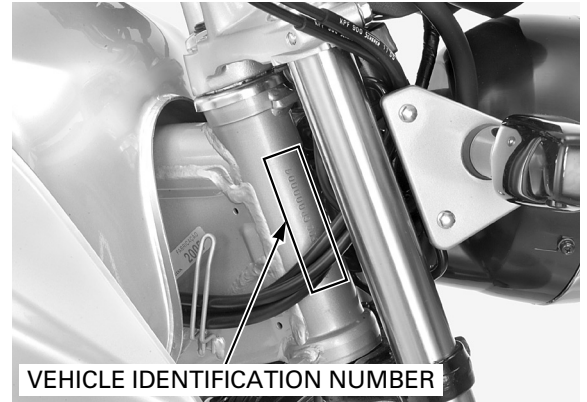
Abbrev. term	Full term
VS sensor	Vehicle Speed sensor
ICM	Ignition Control Module
PAIR	Pulsed Secondary Air Injection

### MODEL IDENTIFICATION

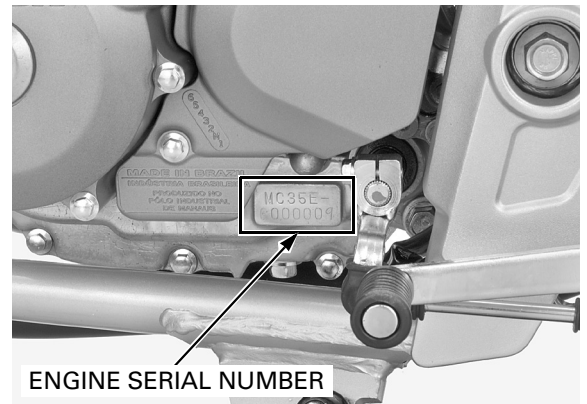


### SERIAL NUMBERS

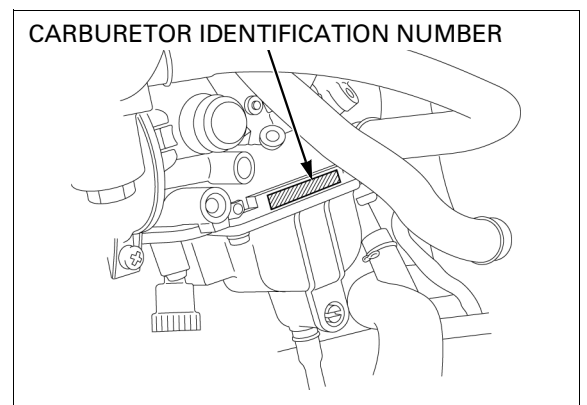
The Vehicle Identification Number (V.I.N) is stamped on the right side of the steering head.



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



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

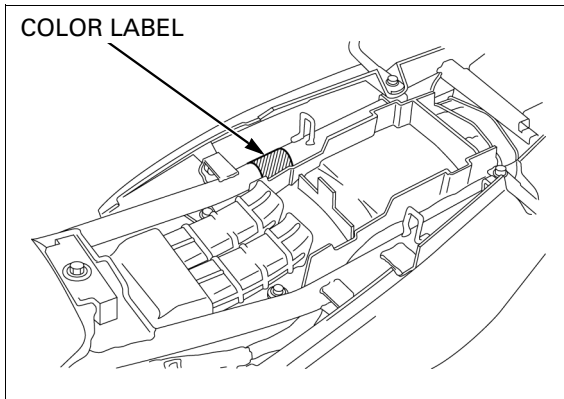


## GENERAL INFORMATION

### LABELS

The color label is attached on the frame under the seat. When ordering color-coded parts, always specify the designated color code (2LA, 3LA type only).

COLOR LABEL



The Vehicle Emission Control Information Label is attached on the left side of the swingarm (BR type only).

In order to ensure that the motorcycle complies with the legal requirements, check if CO and HC emissions are within the recommended levels at idle speed (Resolution no.297/02, article 16 of CONAMA) (page 3-15).



## GENERAL SPECIFICATIONS

ITEM		SPECIFICATION
DIMENSIONS	Overall length	2,031 mm (80.0 in)
	Overall width	746 mm (29.4 in)
	Overall height	1,057 mm (41.6 in)
	Wheelbase	1,369 mm (53.9 in)
	Seat height	782 mm (30.8 in)
	Foot peg height	331 mm (13.0 in)
	Ground clearance	162 mm (6.4 in)
	Curb weight	152.5 kg (336.2 lbs)
	Maximum weight capacity	175 kg (386 lbs)
FRAME	Frame type	Semi double cradle
	Front suspension	Telescopic fork
	Front axle travel	116 mm (4.6 in)
	Rear suspension	Swingarm
	Rear axle travel	100 mm (3.9 in)
	Front tire size	100/80-17 M/C 52S
	Rear tire size	130/70-17 M/C 62S
	Front tire brand	PIRELLI MT75
	Rear tire brand	PIRELLI MT75
	Front brake	Hydraulic single disc
	Rear brake	Mechanical leading trailing
	Caster angle	25°36'
	Trail length	100 mm (3.9 in)
	Fuel tank capacity	16.5 liter (4.36 US gal, 3.63 Imp gal)
	Fuel tank reserve capacity	2.5 liter (0.66 US gal, 0.55 Imp gal)
ENGINE	Bore and stroke	73.0 x 59.5 mm (2.87 x 2.34 in)
	Displacement	249.0 cm <sup>3</sup> (15.19 cu in)
	Compression ratio	9.3 : 1
	Valve train	Silent multi-link chain driven DOHC
	Intake valve	opens at 1.0 mm (0.04 in) lift
		closes at 1.0 mm (0.04 in) lift
	Exhaust valve	opens at 1.0 mm (0.04 in) lift
		closes at 1.0 mm (0.04 in) lift
	Lubrication system	Forced pressure (wet sump)
	Oil pump type	Trochoid
	Cooling system	Air cooled
CARBURETOR	Air filtration	Paper element
	Cylinder arrangement	Single cylinder 15° from vertical
DRIVE TRAIN	Carburetor type	Constant Velocity type
	Throttle bore	32 mm (1.3 in)
ELECTRICAL	Clutch system	Multi-plate, wet
	Clutch operation system	Mechanical type
	Transmission	Constant mesh, 6-speeds
	Primary reduction	3.100 (62/20)
	Final reduction	2.846 (37/13)
	Gear ratio	1st 2.769 (36/13)
		2nd 1.882 (32/17)
		3rd 1.333 (28/21)
		4th 1.083 (26/24)
		5th 0.923 (24/26)
		6th 0.814 (22/27)
ELECTRICAL	Gearshift pattern	Left foot operated return system 1 - N - 2 - 3 - 4 - 5 - 6
	Ignition system	DC-CDI
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted/triple phase, full wave rectification
ELECTRICAL	Lighting system	Battery



## GENERAL INFORMATION

# LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	1.5 liter (1.6 US qt, 1.3 Imp qt)	–
	After oil and oil filter change	1.5 liter (1.6 US qt, 1.3 Imp qt)	–
	After disassembly	1.8 liter (1.9 US qt, 1.6 Imp qt)	–
Recommended engine oil		Honda oil Recommendation Service classification: API SG or higher JASO T 903: MA Viscosity: SAE 10W-30	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.02 – 0.08 (0.001 – 0.003)	0.12 (0.005)

# FUEL SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	BR	VEA2H
	2LA	VEA2K
	3LA	VEA2J
Main jet	BR	#150
	2LA	#138
	3LA	#142
Slow jet		#45
Pilot screw initial/final opening		page 5-18
Float level		18.5 mm (0.73 in)
Engine idle speed		1,400 ± 100 min <sup>-1</sup> (rpm)
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
PAIR control specified vacuum		48 kPa (360 mm Hg)

# CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,128 kPa (11.5 kgf/cm <sup>2</sup> , 164 psi) at 400 min <sup>-1</sup> (rpm)	–
Cylinder head	Warpage		–	0.10 (0.004)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.06 (1.026)
Camshaft	Cam lobe height	IN	37.00 – 37.24 (1.457 – 1.466)	36.94 (1.454)
		EX	37.03 – 37.27 (1.458 – 1.467)	36.97 (1.456)
	Runout		0.02 (0.001)	0.10 (0.004)
	Journal O.D.		24.959 – 24.980 (0.9826 – 0.9835)	–
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.12 ± 0.03 (0.005 ± 0.001)	–
		EX	0.15 ± 0.03 (0.006 ± 0.001)	–
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.96 (0.195)
		EX	4.955 – 4.970 (0.1951 – 0.1957)	4.94 (0.194)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.09 (0.004)
Valve spring	Free length	IN/EX	1.0 – 1.2 (0.04 – 0.05)	2.0 (0.08)
		IN/EX	33.77 (1.330)	32.36 (1.274)
	Outer	IN/EX	36.64 (1.443)	34.84 (1.372)
Valve lifter O.D.		IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)

## CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.	73.000 – 73.010 (2.8740 – 2.8744)	73.11 (2.878)
	Out-of-round	–	0.05 (0.002)
	Taper	–	0.05 (0.002)
	Warpage	–	0.05 (0.002)
Piston, piston pin, piston ring	Piston mark direction		"IN" mark facing toward the intake side
	Piston O.D.		72.950 – 72.970 (2.8720 – 2.8728) at 16 (0.6) from bottom
	Piston pin hole I.D.		17.002 – 17.008 (0.6694 – 0.6696)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)
	Connecting rod small end I.D.		17.016 – 17.034 (0.6699 – 0.6706)
	Cylinder-to-piston clearance		0.030 – 0.060 (0.0012 – 0.0024)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)
	Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)
	Piston ring-to-ring groove clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)
		Second	0.015 – 0.050 (0.0006 – 0.0020)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)
		Second	0.30 – 0.45 (0.012 – 0.018)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)
	Piston ring mark direction	Top/second	Marking facing up

## CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch	Lever free play		10 – 20 (3/8 – 13/16)	–
	Spring free length		35.6 (1.40)	32.0 (1.26)
	Disc thickness	A	2.92 – 3.08 (0.115 – 0.121)	2.69 (0.106)
		B	2.92 – 3.08 (0.115 – 0.121)	2.69 (0.106)
	Plate warpage		–	0.30 (0.012)
	Outer I.D.		25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
	Outer guide	I.D.	19.990 – 20.010 (0.7870 – 0.7878)	20.03 (0.789)
		O.D.	24.959 – 24.980 (0.9826 – 0.9835)	24.17 (0.952)
Mainshaft O.D. at clutch outer guide			19.959 – 19.980 (0.7858 – 0.7866)	19.91 (0.784)

## ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.63 (1.796)

## GENERAL INFORMATION

# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M5	20.000 – 20.021 (0.7874 – 0.7882)	20.08 (0.791)
		M6, C1	23.000 – 23.021 (0.9055 – 0.9063)	23.07 (0.908)
		C2	25.020 – 25.041 (0.9850 – 0.9859)	25.09 (0.988)
		C3	25.000 – 25.021 (0.9843 – 0.9851)	25.07 (0.987)
		C4	22.000 – 22.021 (0.8661 – 0.8670)	22.07 (0.869)
	Gear busing O.D.	C1	22.959 – 22.980 (0.9039 – 0.9047)	22.90 (0.902)
		C2	24.979 – 25.000 (0.9834 – 0.9843)	24.90 (0.980)
		C3	24.959 – 24.980 (0.9826 – 0.9835)	24.90 (0.980)
		M6	22.959 – 22.980 (0.9039 – 0.9047)	22.92 (0.902)
	Gear busing I.D.	C1	18.000 – 18.018 (0.7087 – 0.7094)	18.08 (0.712)
		C2	22.000 – 22.021 (0.8661 – 0.8670)	22.08 (0.869)
	Mainshaft O.D.	at M5	19.959 – 19.980 (0.7858 – 0.7866)	19.91 (0.784)
	Countershaft O.D.	at C1	17.966 – 17.984 (0.7073 – 0.7080)	17.91 (0.705)
		at C2, C4	21.959 – 21.980 (0.8645 – 0.8654)	21.91 (0.863)
	Gear-to-bushing clearance	C1, C2, C3, M6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Bushing-to-shaft clearance	C1	0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
		C2	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Gear-to-mainshaft clearance	at M5	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)	
Gear-to-countershaft clearance	at C4	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)	
Shift fork, fork shaft and drum	Shift fork I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.05 (0.514)
	Shift fork claw thickness	L	4.90 – 5.00 (0.193 – 0.197)	4.5 (0.18)
		R, C	4.93 – 5.00 (0.194 – 0.197)	4.5 (0.18)
	Shift fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
	Drum O.D. at right end journal		19.959 – 19.980 (0.7858 – 0.7866)	19.90 (0.783)
	Drum journal I.D. (R.crankcase)		20.000 – 20.033 (0.7874 – 0.7887)	20.07 (0.790)
Connecting rod	Big end side clearance		0.05 – 0.50 (0.002 – 0.020)	0.6 (0.02)
	Big end radial clearance		0 – 0.008 (0 – 0.0003)	0.05 (0.002)
Crankshaft runout			–	0.05 (0.002)

## FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Driver only	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
	Driver and passenger	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
Axle runout		–	0.20 (0.008)
Wheel runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.
Fork	Spring free length	439.3 (17.30)	428.4 (16.87)
	Tube runout	–	0.20 (0.008)
	Recommended fluid	Honda ULTRA Cushion Oil 10W or equivalent	–
	Fluid level	140 (5.5)	–
	Fluid capacity	300 ± 2.5 cm <sup>3</sup> (10.1 ± 0.08 US oz, 10.6 ± 0.09 Imp oz)	–
Steering head bearing pre-load		10.8 – 15.7 N (1.1 – 1.6 kgf)	–

## REAR WHEEL/BRAKE/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Driver only	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
	Driver and passenger	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Drive chain	Size/link	DID520/106	–
	Slack	15 – 20 (0.6 – 0.8)	–
Brake	Brake pedal height	23.5 (0.93) below the top of the footpeg	–
	Brake pedal free play	20 – 30 (13/16 – 1-3/16)	–
	Brake drum I.D.	130.0 – 130.2 (5.12 – 5.13)	131.0 (5.16)
	Lining thickness	–	To the indicator

## HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Recommended brake fluid	DOT 3 or DOT 4	–
Brake pad wear indicator	–	To groove
Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
Brake disc warpage	–	0.10 (0.004)
Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
Caliper piston O.D.	25.335 – 25.368 (0.9974 – 0.9987)	25.31 (0.996)

## BATTERY/CHARGING SYSTEM SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 6 Ah
	Current leakage		0.1 mA max.
	Voltage (20°C/68°F)	Fully charged	Above 12.8 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.6 A/5 – 10 h
		Quick	3.0 A/1.0 h max
Alternator	Capacity		204 W/5,000 min <sup>-1</sup> (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

## IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATION
Spark plug	Standard	CR8EH-9S (NGK)
	For extended high speed riding	CR9EH-9S (NGK)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		8° BTDC at idle

## GENERAL INFORMATION

# ELECTRIC STARTER SPECIFICATIONS

Unit: mm (in)

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

# LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight	12 V – 35/35 W
	Brake/tail light	12 V – 21/5 W
	Front turn signal light	12 V – 16 W x 2
	Rear turn signal light	12 V – 16 W x 2
	Turn signal indicator	LED x 2
	High beam indicator	LED
	Neutral indicator	LED
	Instrument light	LED x 3
	Side stand indicator	LED x 2
	Speedometer light	LED x 5
	Tachometer light	LED x 5
Fuse	Main fuse	20 A
	Sub fuse	10 A x 3, 5 A x 2
Tachometer input peak voltage		10.5V minimum
Fuel level sensor resistance (20°C/68°F)	Top (FULL)	4 – 10 $\Omega$
	Bottom (EMPTY)	90 – 100 $\Omega$

## STANDARD TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5.2 (0.5, 3.8)	5 mm screw	4.2 (0.4, 3.1)
6 mm bolt and nut (Include SH flange bolt)	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.

### ENGINE

#### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	1	10	16 (1.6, 12)	
Crankshaft hole cap	1	30	8 (0.8, 5.9)	Apply grease to the threads
Timing hole cap	1	14	10 (1.0, 7)	Apply grease to the threads
Engine oil drain bolt	1	12	30 (3.1, 22)	

#### LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pressure relief valve cap	1	14	19 (1.9, 14)	
Oil pump assembly bolt	3	6	10 (1.0, 7)	
Oil pass pipe joint bolt	2	8	12 (1.2, 9)	
Oil pass pipe joint bolt	1	7	12 (1.2, 9)	

#### FUEL SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
PAIR check valve cover bolt	2	5	5.2 (0.5, 3.8)	
Insulator band	1	—	—	page 5-16

## GENERAL INFORMATION

### CYLINDER HEAD/VALVE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	3	6	12 (1.2, 9)	Apply engine oil to the threads and seating surface
Camshaft holder bolt	8	6	12 (1.2, 9)	
Spark plug	1	10	16 (1.6, 12)	Apply engine oil to the threads and seating surface
Cylinder head nut	4	10	45 (4.6, 33)	
Timing hole cap	1	14	10 (1.0, 7)	Apply grease to the threads
Oil pass pipe upper joint bolt	1	8	12 (1.2, 9)	Apply grease to the threads
Crankshaft hole cap	1	30	8 (0.8, 5.9)	

### CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder stud bolt	4	10	—	page 8-8

### CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch center lock nut	1	16	108 (11.0, 80)	Apply engine oil to the threads and seating surface and stake
Primary drive gear nut	1	16	108 (11.0, 80)	
Shift drum stopper arm bolt	1	6	12 (1.2, 9)	Apply engine oil to the threads and seating surface
Oil pass pipe joint bolt	1	8	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	103 (10.5, 76)	Apply engine oil to the threads and seating surface
Starter clutch outer torx bolt	6	6	16 (1.6, 12)	
Ignition pulse generator socket bolt	2	5	5.2 (0.5, 3.8)	Apply a locking agent to the threads
Stator socket bolt	3	6	10 (1.0, 7)	
Stator wire clamp socket bolt	1	6	10 (1.0, 7)	
Neutral switch wire nut	1	4	1.5 (0.2, 1.1)	

### CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Shift return spring pin	1	8	24 (2.4, 18)	
Neutral switch	1	10	12 (1.2, 9)	

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

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Exhaust pipe joint nut	2	8	18 (1.8, 13)	page 2-10
Exhaust pipe joint stud bolt	2	8	–	

**ENGINE REMOVAL/INSTALLATION**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Drive sprocket fixing plate bolt	2	6	10 (1.0, 7)	
Front upper engine mounting nut	1	10	44 (4.5, 32)	
Front lower engine mounting nut	1	10	44 (4.5, 32)	
Rear upper engine mounting nut	1	10	44 (4.5, 32)	
Rear lower engine mounting nut	1	10	44 (4.5, 32)	
Left step holder mounting bolt	2	6	10 (1.0, 7)	

**CLUTCH/GEARSHIFT LINKAGE**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Right step holder mounting bolt	2	6	10 (1.0, 7)	

**FRONT WHEEL/SUSPENSION/STEERING**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fork cap	2	33	22 (2.2, 16)	Apply a locking agent to the threads
Fork socket bolt	2	8	20 (2.0, 15)	
Steering stem nut	1	24	103 (10.5, 76)	page 12-33
Steering top thread	1	26	–	
Top bridge pinch bolt	2	8	22 (2.2, 16)	U-nut ALOC bolt: replace with a new one
Bottom bridge pinch bolt	2	10	39 (4.0, 29)	
Front axle nut	1	12	59 (6.0, 44)	
Front brake disc bolt	5	8	42 (4.3, 31)	
Front axle pinch bolt	1	8	22 (2.2, 16)	
Front master cylinder holder bolt	2	6	12 (1.2, 9)	

**REAR WHEEL/BRAKE/SUSPENSION**

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	16	88 (9.0, 65)	U-nut
Driven sprocket bolt	5	10	28 (2.9, 21)	Apply a locking agent to the threads
Driven sprocket nut	5	10	64 (6.5, 47)	U-nut
Shock absorber upper mounting bolt	1	10	36 (3.7, 27)	U-nut
Shock absorber lower mounting nut	1	10	36 (3.7, 27)	
Swing arm pivot nut	1	14	88 (9.0, 65)	U-nut
Drive chain slider screw	2	5	4.2 (0.4, 3.1)	ALOC screw: replace with a new one
Brake arm nut	1	6	9.8 (1.0, 7.2)	U-nut
Drive chain adjuster lock nut	2	8	21 (2.1, 15)	



## GENERAL INFORMATION

### HYDRAULIC BRAKE

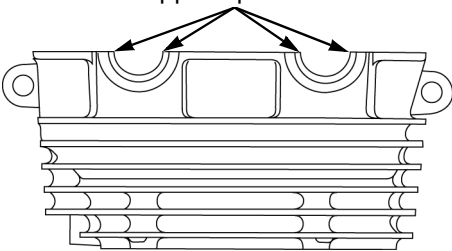
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Brake hose oil bolt	2	10	34 (3.5, 25)	ALOC bolt: replace with a new one
Front master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake reservoir cap screw	2	4	1.5 (0.2, 1.1)	
Front brake light switch screw	1	4	1.2 (0.1, 0.9)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Front brake caliper mounting bolt	2	8	26 (2.7, 19)	
Caliper bracket pin bolt	1	8	22 (2.2, 16)	
Caliper pin bolt	1	8	18 (1.8, 13)	
Pad pin	2	10	18 (1.8, 13)	
Pad pin plug	2	10	2.4 (0.2, 1.8)	
Bleed valve	1	8	5.4 (0.6, 4.0)	

### OTHER FASTENERS

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Side stand pivot bolt	1	10	10 (1.0, 7)	U-nut
Side stand lock nut	1	10	39 (4.0, 29)	
Side stand switch bolt	1	6	10 (1.0, 7)	
Clutch lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6 (0.6, 4.4)	
Change pedal pivot	1	8	27 (2.8, 20)	

# LUBRICATION & SEAL POINTS

## ENGINE

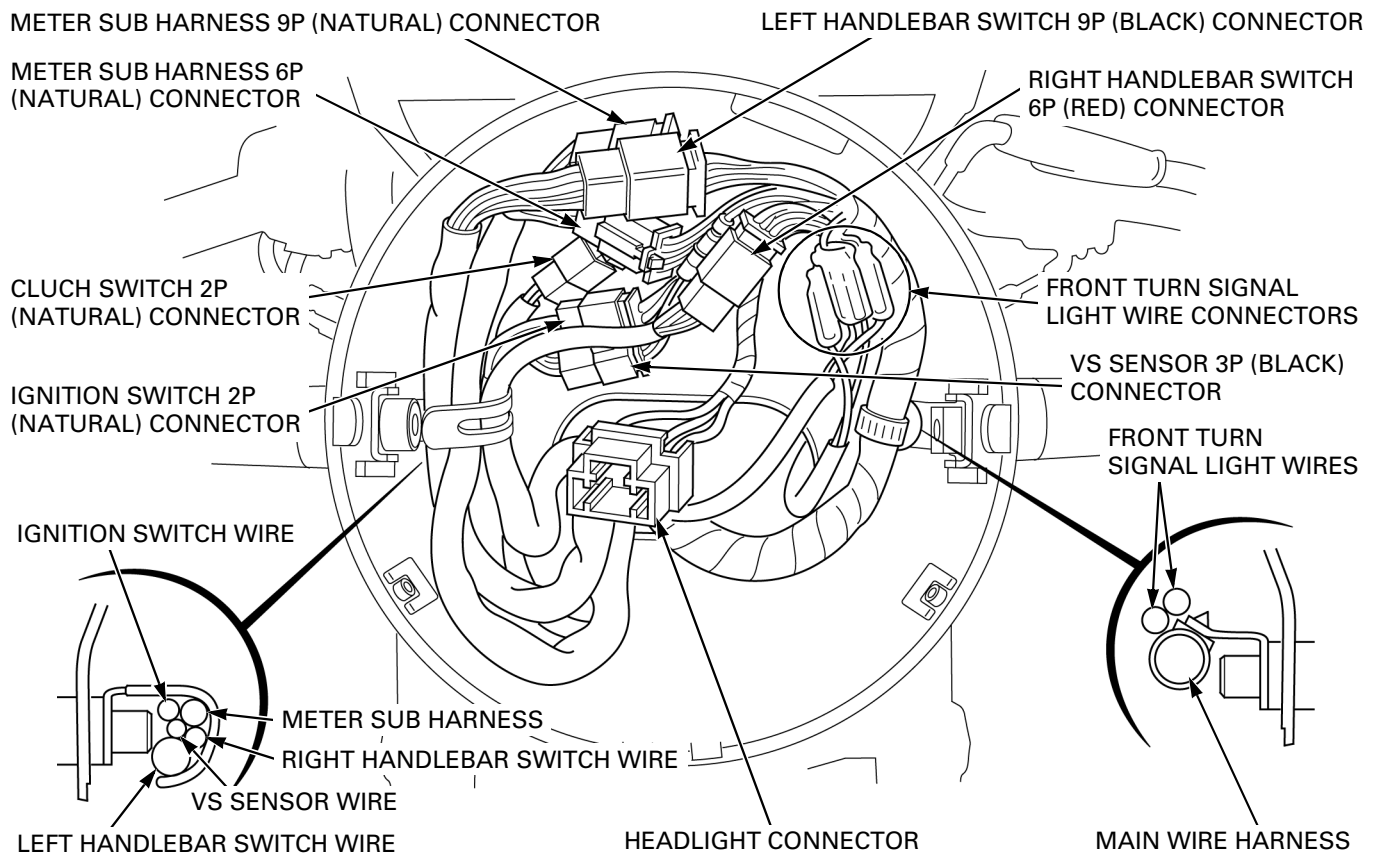
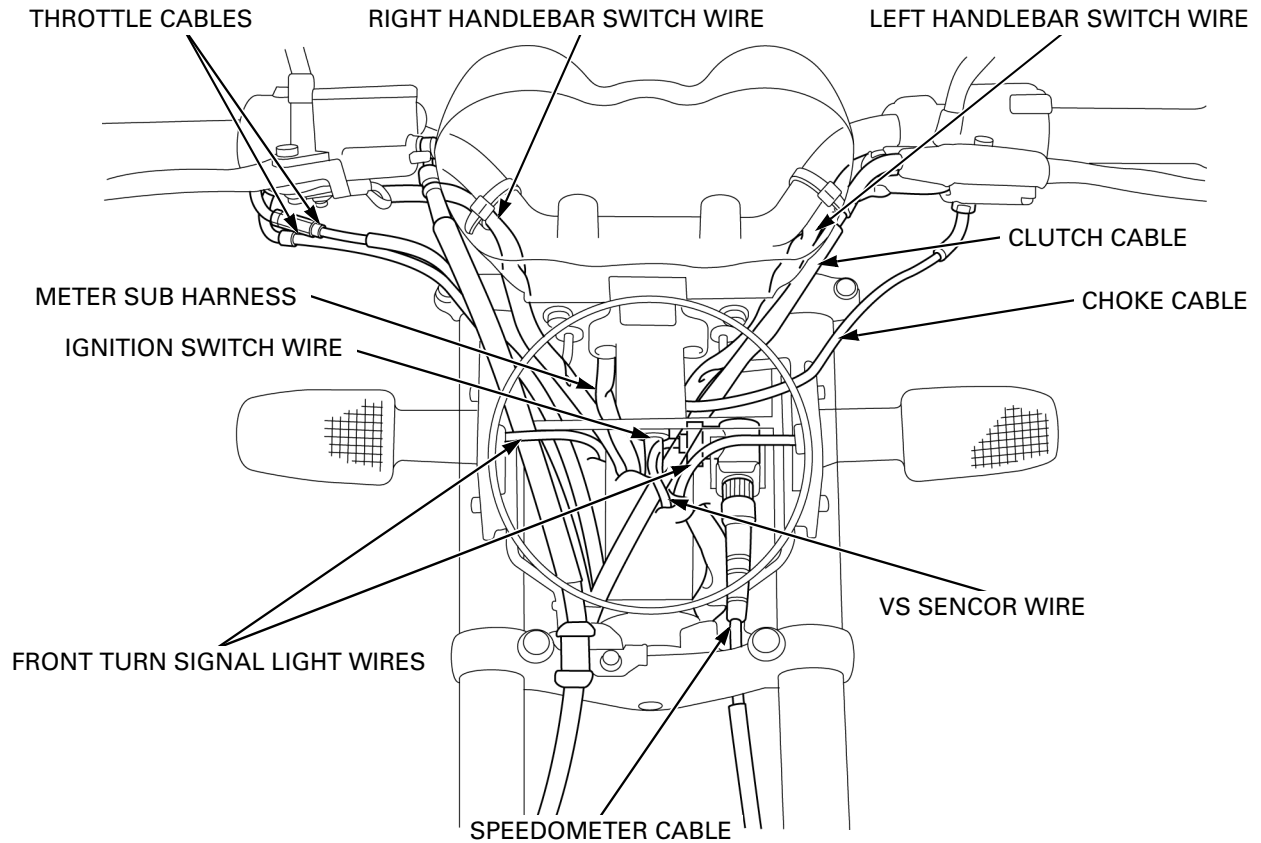
MATERIAL	LOCATION	REMARKS
Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Camshaft journals and cam lobes Valve lifter outer surfaces Valve stem (valve guide sliding surface and stem end) Clutch outer guide inner and outer surfaces Piston pin outer surface Connecting rod small end inner surface Transmission gear sliding surfaces Transmission gear shift fork grooves Starter clutch needle bearing	
Engine oil	Cam chain Cylinder head nut threads and seating surfaces Piston outer surface Piston rings Cylinder bore Clutch lifter arm sliding surface Clutch disc lining Clutch center lock nut threads and seating surface Primary drive gear nut threads and seating surface Flywheel bolt threads and seating surface Starter idle gear washer Starter clutch outer inner surface Transmission gear teeth Shift fork shaft Shift drum grooves Each bearing Each O-ring whole surface Camshaft holder bolt threads	
Multi-purpose grease	Each oil seal lip Starter motor needle bearing Timing hole cap threads Crankshaft hole cap threads	
Locking agent	Gearshift cam bolt threads Breather plate mounting bolt threads Cam chain tensioner mounting bolt threads Starter clutch outer torx bolt threads	Coating width: $6.5 \pm 1$ mm
Liquid sealant	Alternator/ignition pulse generator wire grommet seating surface Cylinder head surface  <div style="text-align: center;"> <p>Applied portion</p>  </div>	

## GENERAL INFORMATION

### FRAME

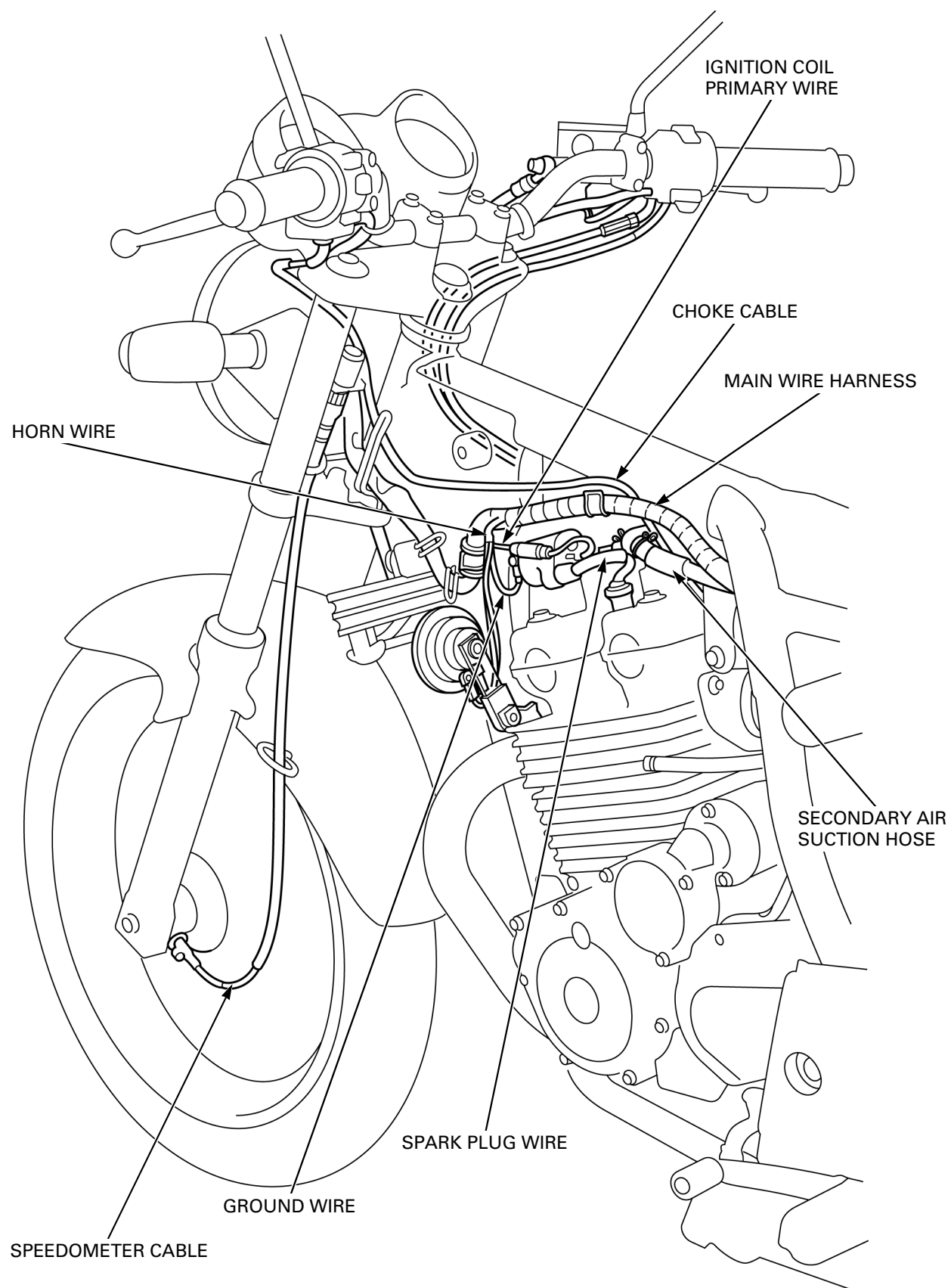
MATERIAL	LOCATION	REMARKS
Multi-purpose grease	Clutch lever pivot sliding surface Throttle grip pipe flange groove and sliding surface Side stand pivot sliding surface Speedometer gear teeth Swingarm pivot radial ball bearings Rear brake pedal pivot sliding surface Rear brake cam Rear brake panel anchor pin sliding surface Rear brake cam dust seal lip Speedometer gear box inner surface Dust seal lips Rear wheel O-ring and bearing Swingarm needle bearings Swingarm pivot bolt surface Shift change pedal joint pin sliding surface Shift change pedal pivot sliding surface Speedometer cable casing inside	Fill with 4 g (0.1 oz)
DOT3 or DOT4 brake fluid	Brake master pistons and cups Caliper piston outer surface Piston seal Caliper dust seal	
Silicone grease	Front brake lever pivot sliding surface Caliper bracket pin bolt outer surfaces Caliper pin bolt outer surfaces Front brake lever contacting surface of the piston	Apply 0 – 1 g (0 – 0.04 oz) Apply 0.4 g (0.01 oz) Apply 0.4 g (0.01 oz)
Fork fluid	Fork oil seal lips Fork dust seal lips Fork tube bushing Fork cap O-ring Front fork inside	
Honda Bond A or equivalent	Handlebar grip rubber inside surfaces Air cleaner connecting tube-housing mating surface	
Engine oil	Steering top thread	
Locking agent	Front fork socket bolt threads Exhaust pipe/muffler joint bolt	
Urea based multi-purpose grease with extreme pressure (example: EXCELITE EP2 manufactured by KYODO YUSHI, Japan)	Steering head bearings Steering head dust seal lips	Apply 3 – 5 g (0.1 – 0.2 oz) Apply 3 – 5 g (0.1 – 0.2 oz)
Cable lubricant	Clutch cable casing inside Clutch cable boot inside Throttle cable casing inside Throttle cable boot inside	Apply 0.1 cm <sup>3</sup> (0.003 US oz) Apply 0.1 cm <sup>3</sup> (0.003 US oz)

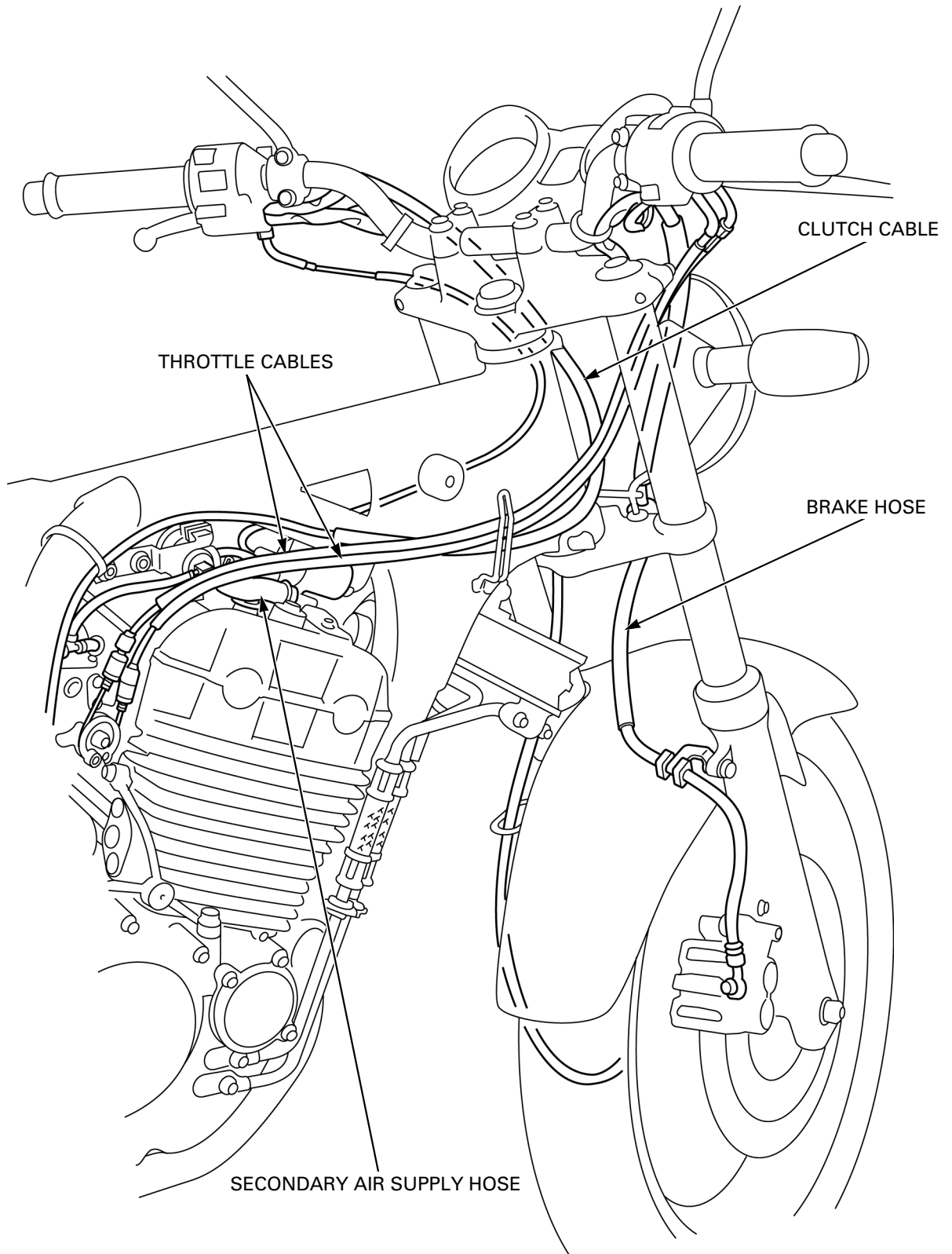
# CABLE & HARNESS ROUTING



## GENERAL INFORMATION

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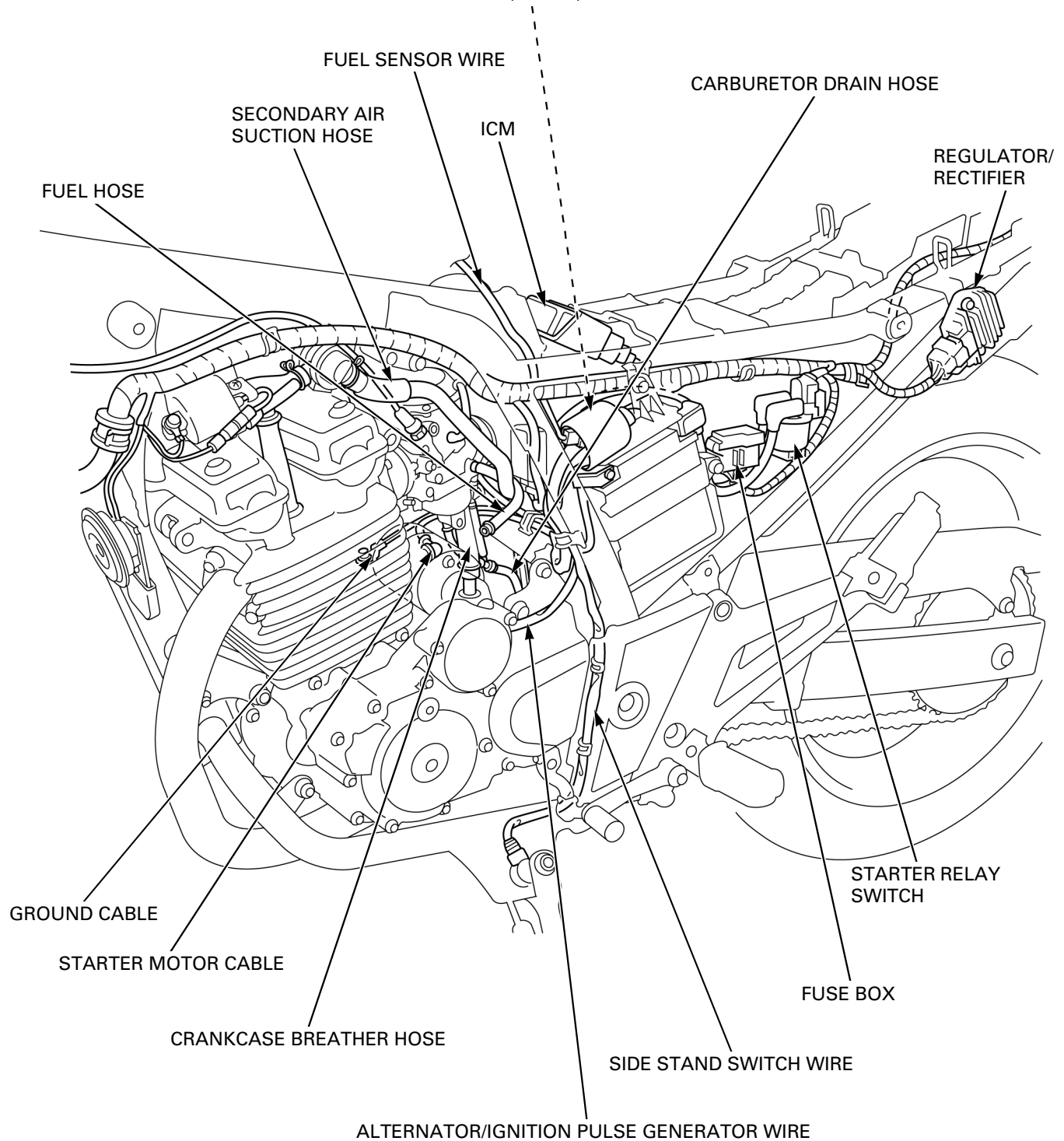


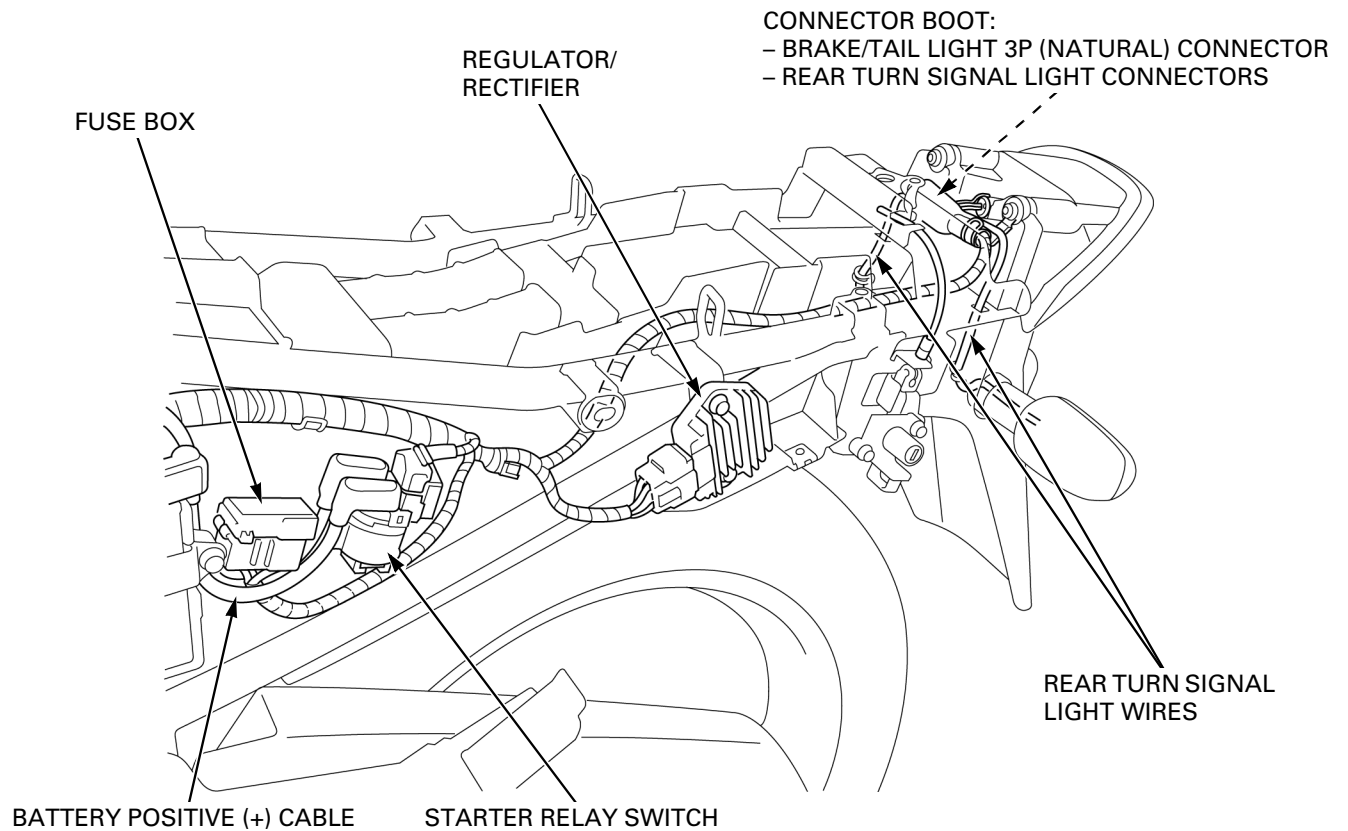
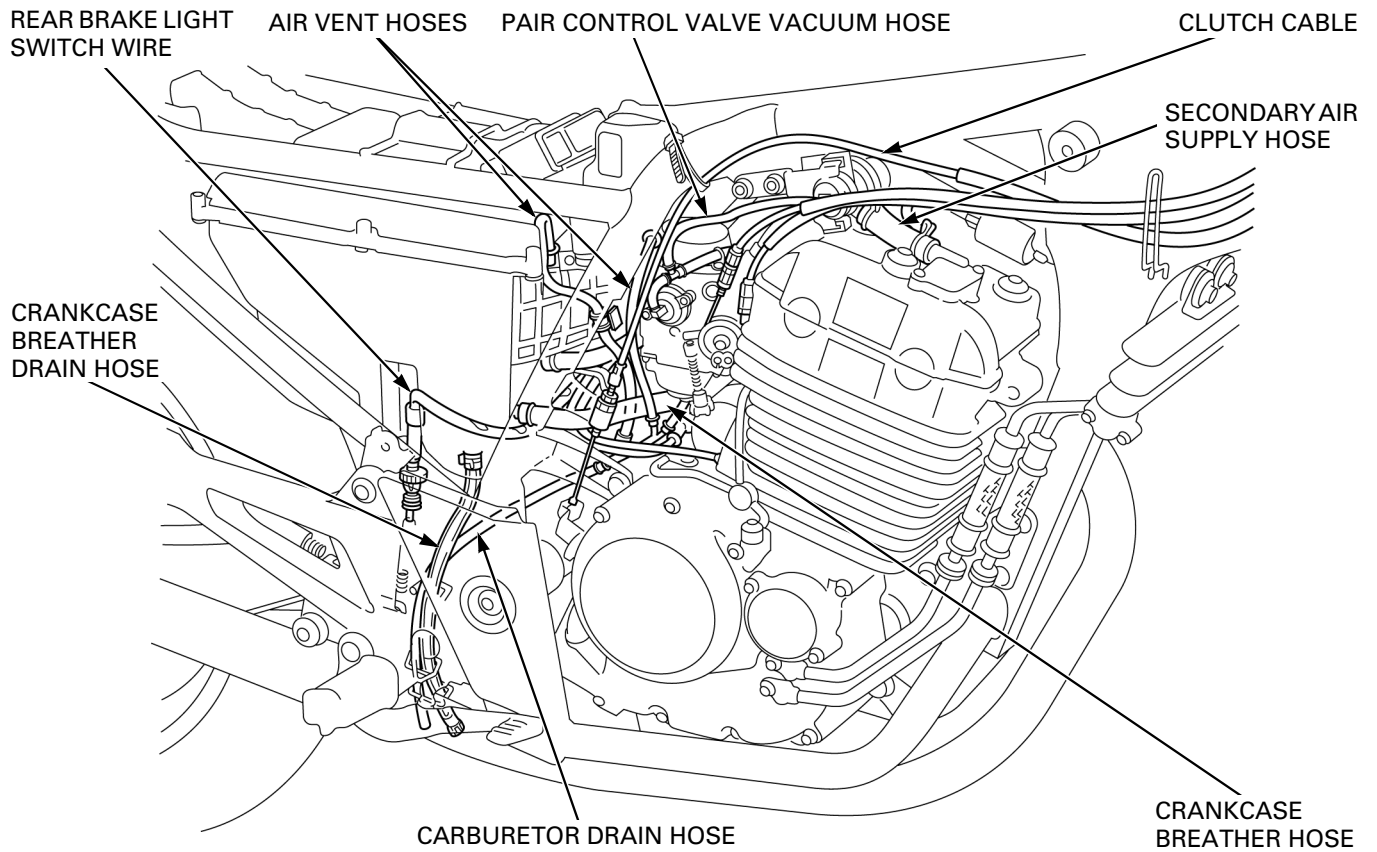


## GENERAL INFORMATION

### CONNECTOR BOOT:

- ALTERNATOR 3P (NATURAL) CONNECTOR
- IGNITION PULSE GENERATOR/NEUTRAL SWITCH 3P (NATURAL) CONNECTOR
- SIDE STAND SWITCH 3P (BLACK) CONNECTOR
- REAR BRAKE LIGHT SWITCH 2P (NATURAL) CONNECTOR
- FUEL SENSOR 2P (BLACK) CONNECTOR







## GENERAL INFORMATION

# EMISSION CONTROL SYSTEMS

This motorcycle complies with the requirements of the Air Pollution Control Program for Motorcycles and Similar Vehicles-PROMOT (Resolution no. 297 dated 02/26/2002 of CONAMA - Environmental National Council).

## POLLUTANT EMISSIONS

The combustion process produces carbon monoxide, oxides of nitrogen and hydrocarbons among other elements. Control of hydrocarbon 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.

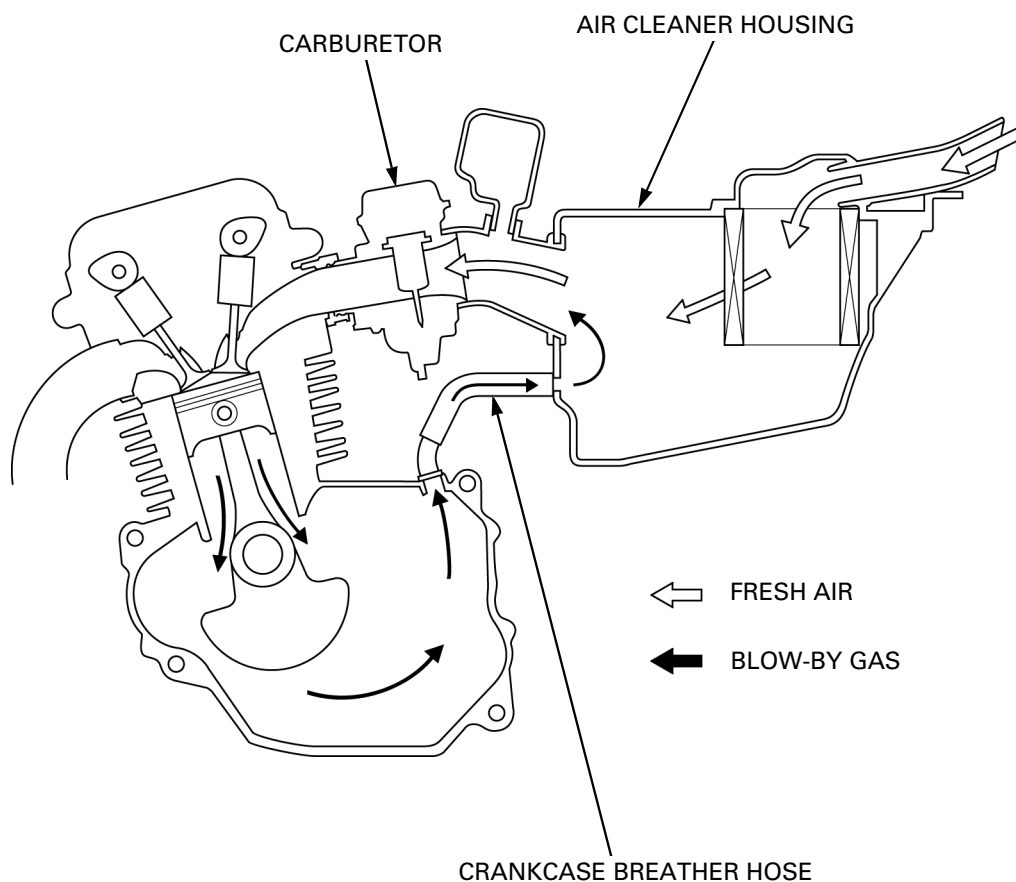
Moto Honda da Amazonia Ltda. utilizes lean carburetor settings and other systems to reduce carbon monoxide and hydrocarbons.

## EXHAUST EMISSION CONTROL SYSTEM

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



## EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

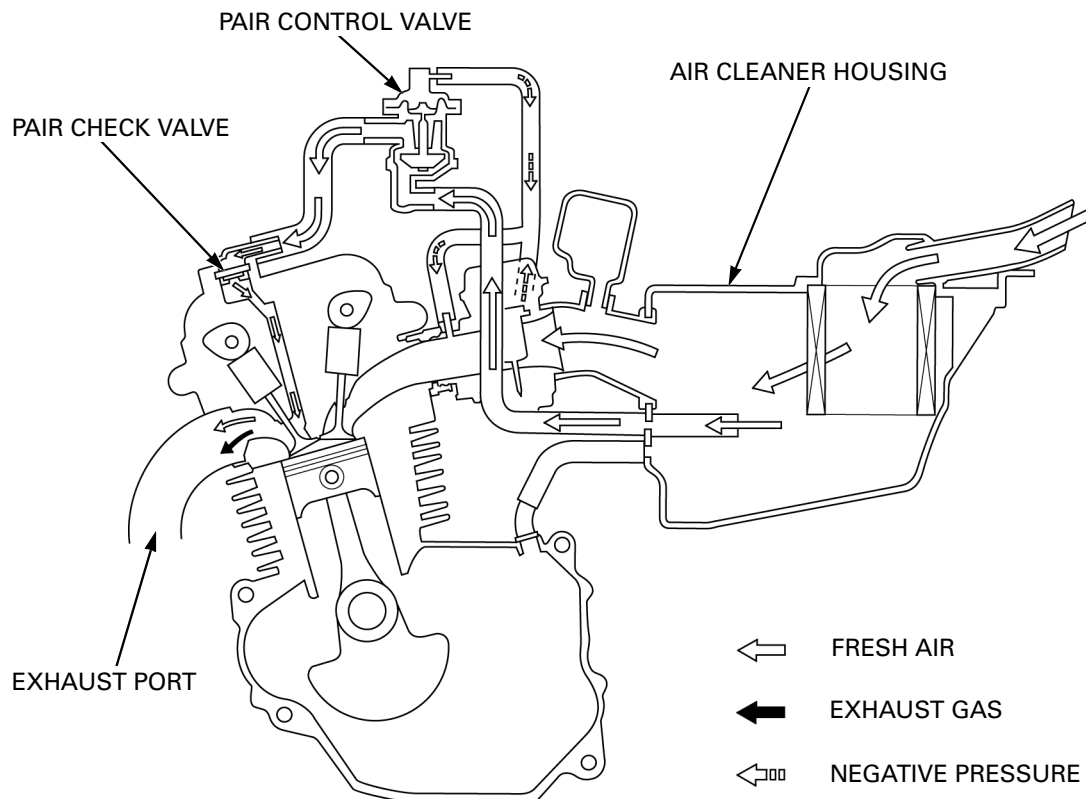
The exhaust emission control system is composed of a lean carburetor setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR control valve.

This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The PAIR check valve prevents reverse air flow through the system. The PAIR control valve reacts to high intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.



This motorcycle is equipped with an oxidation catalytic converter.

The oxidation catalytic converter is in the exhaust system. Through chemical reactions, it converts HC and CO in the engine's exhaust to carbon dioxide (CO<sub>2</sub>) and water vapor.

## NOISE EMISSION CONTROL SYSTEM

**TAMPERING WITH THE NOISE EMISSION CONTROL SYSTEM IS PROHIBITED:** Local law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for the purposes of maintenance, repair or replacement, of any device or element of design incorporated into any vehicle for the purpose of noise control prior to its sale or delivery to the ultimate customer or while it is in use; or (2) the use of any 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 ACTS LISTED BELOW:**

1. Removal of or puncturing of the muffler, 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, of parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

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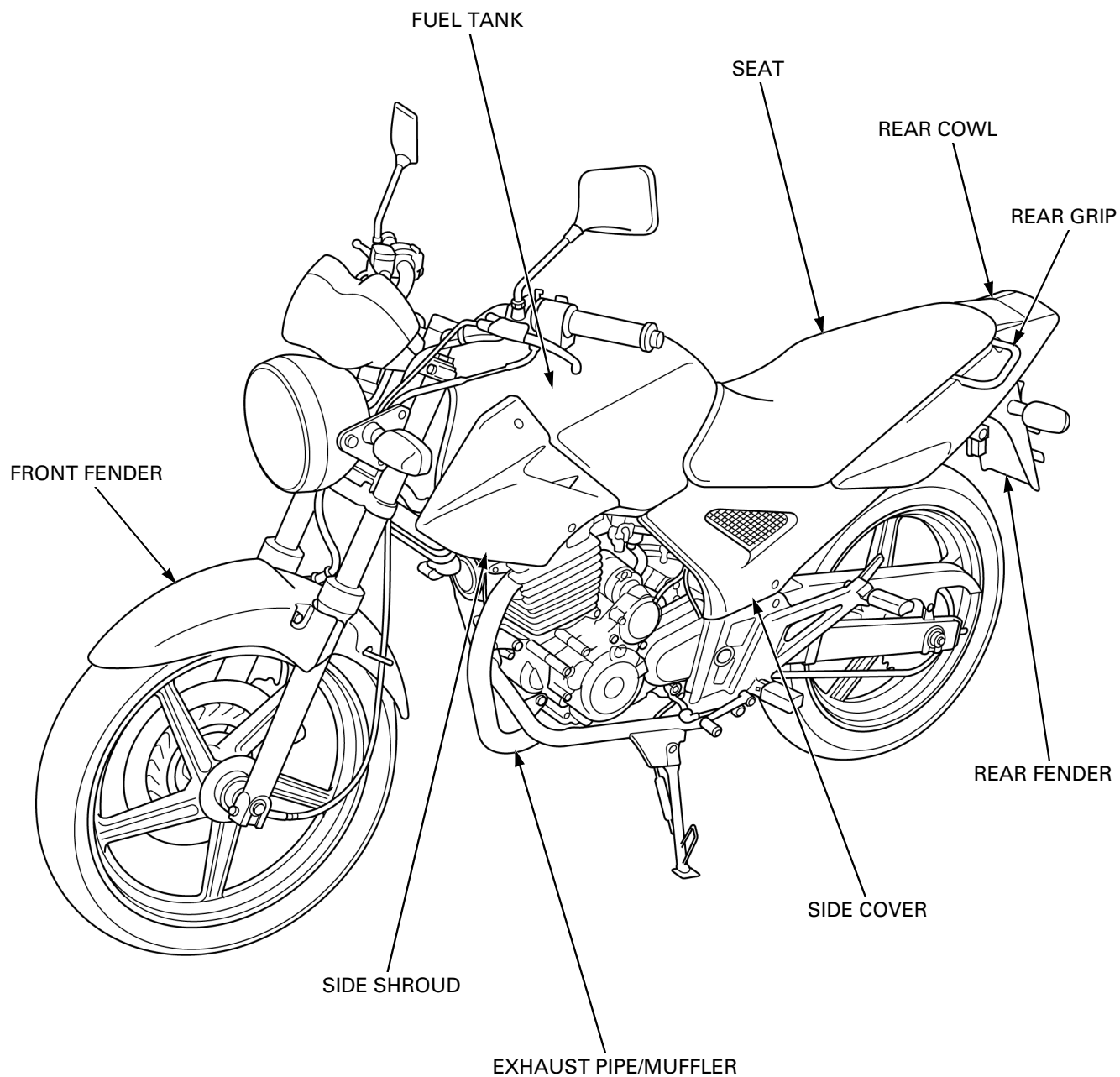
## MEMO

# 2. FRAME/BODY PANELS/EXHAUST SYSTEM

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BODY PANEL LOCATIONS .....	2-2	REAR COWL.....	2-5
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## BODY PANEL LOCATIONS



## **SERVICE INFORMATION**

### **GENERAL**

- This section covers removal and installation of the body panels, fuel tank and exhaust system.
- Always replace the gaskets when removing the muffler and exhaust pipe.
- When installing the exhaust system, loosely install all of the exhaust pipe/muffler fasteners, Always tighten the exhaust pipe joint nuts first, then tighten the mounting bolts. If you tighten the mounting bolts first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

### **TORQUE VALUES**

Exhaust pipe joint nut	18 N·m (1.8 kgf·m, 13 lbf·ft)
------------------------	-------------------------------

## **TROUBLESHOOTING**

### **Excessive exhaust noise**

- Broken exhaust system
- Exhaust gas leak

### **Poor performance**

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

### SEAT

#### REMOVAL

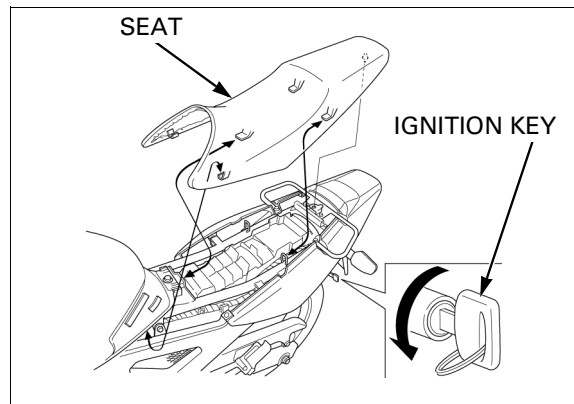
Insert the ignition key into the seat lock/helmet holder.

Unlock the seat lock while turning the ignition key counterclockwise and raise the rear end of the seat. Remove the seat backward.

#### INSTALLATION

Install the seat align its hooks with the brackets of the frame.

Push the rear end of the seat and lock it.



### SIDE COVERS

#### REMOVAL/INSTALLATION

Remove the seat (page 2-4).

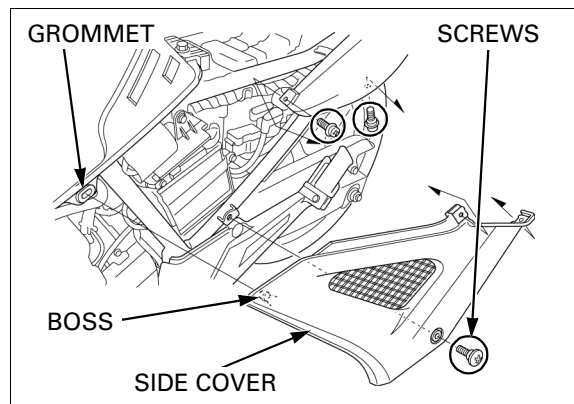
Remove the screws.

*Be careful not to damage the boss of the side covers.*

Remove the side cover by releasing the boss from the grommet.

Remove the side cover to forward.

Installation is in the reverse order of removal.



### REAR GRIP

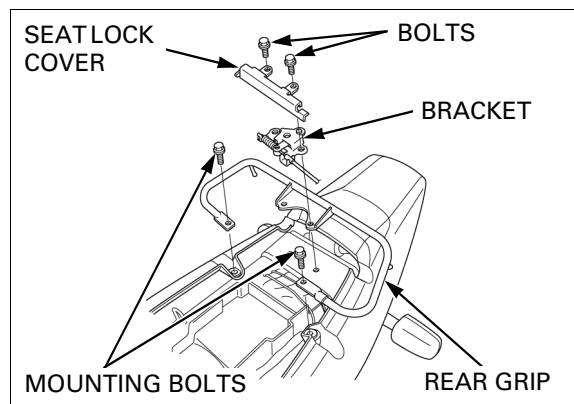
#### REMOVAL/INSTALLATION

Remove the seat (page 2-4).

Remove the bolts, seat lock cover and seat lock cable bracket.

Remove the rear grip mounting bolts and rear grip.

Installation is in the reverse order of removal.



## REAR COWL

### REMOVAL

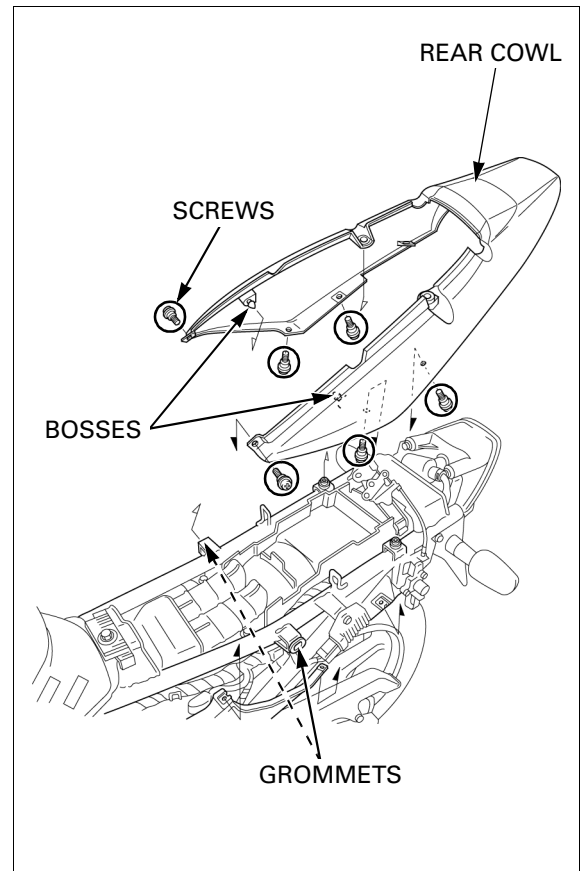
Remove the following:

- Seat (page 2-4)
- Rear grip (page 2-4)

Remove the screws.

Carefully release the bosses of the rear cowl from the grommets of the frame and hole of the rear cowl from the tabs of the frame.

Remove the rear cowl backward.



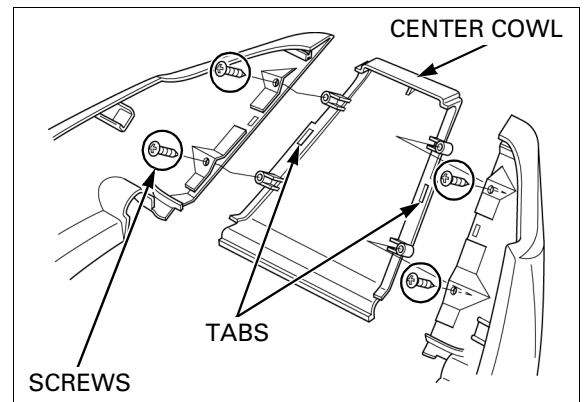
### DISASSEMBLY

Remove the screws and disassemble the rear cowl.

*Be careful not to damage the tabs of the center cowl.*

### ASSEMBLY/INSTALLATION

Installation is in the reverse order of removal.





### REAR FENDER

#### REMOVAL/INSTALLATION

Remove the following:

- Side covers (page 2-4)
- Rear cowl (page 2-5)

Disconnect the following:

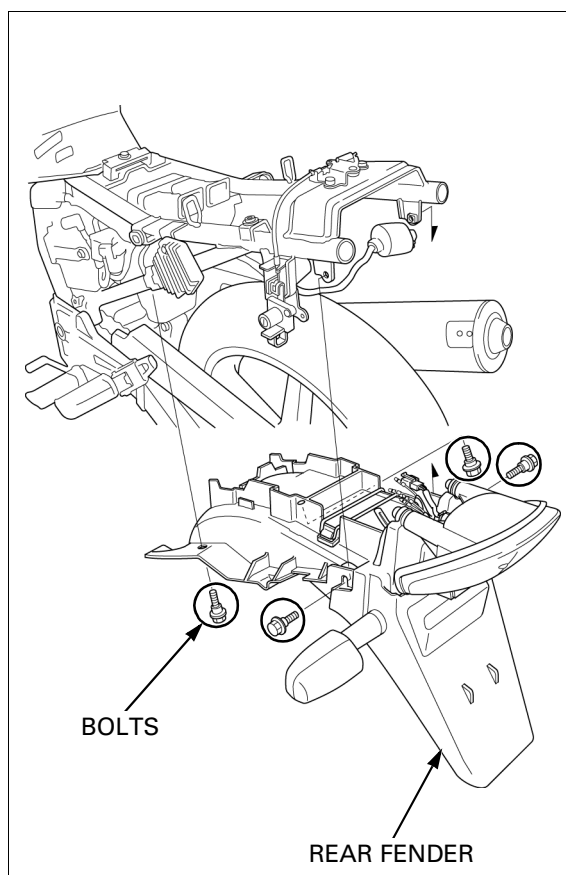
- Brake/tail light connector
- Rear turn signal light connectors



Remove the bolts and rear fender from the frame.

*Route the wires properly (page 1-17).*

Installation is in the reverse order of removal.



## SIDE SHROUDS

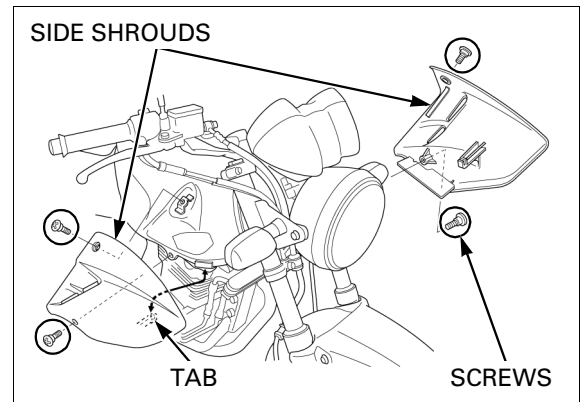
### REMOVAL/INSTALLATION

Remove the screws from the side shroud.

*Be careful not to damage the tab.*

Remove the side shroud while releasing the tab of the side shroud from the fuel tank flange.

Installation is in the reverse order of removal.



## FUEL TANK

### REMOVAL/INSTALLATION

Remove the following:

- Seat (page 2-4)
- Side covers (page 2-4)
- Side shrouds (page 2-7)

Turn the fuel valve "OFF".

Disconnect the fuel hose from the fuel valve.

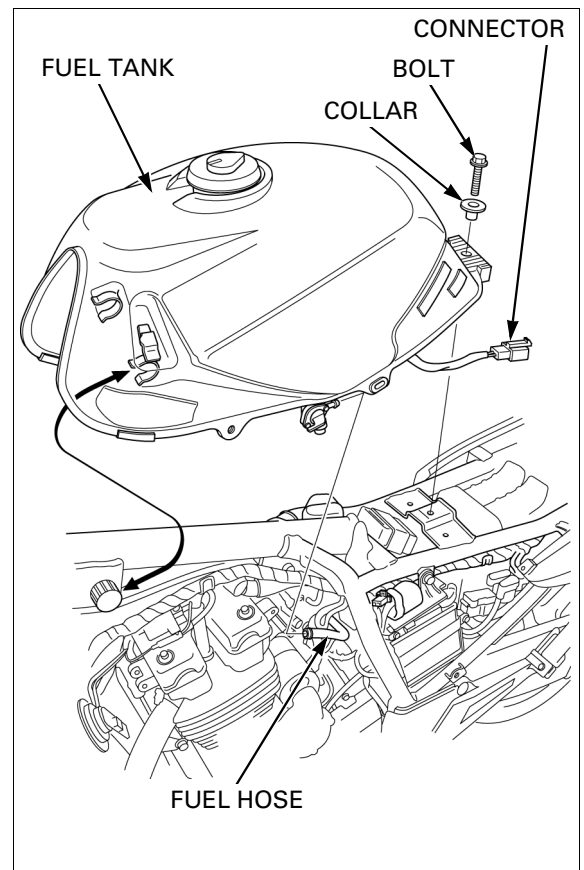
Disconnect the fuel sensor 2P (Black) connector.

Remove the bolt and collar.

Remove the fuel tank by moving it backward.

Installation is in the reverse order of removal.

*Route the wire properly (page 1-17).*



### FRONT FENDER

#### REMOVAL/INSTALLATION

Remove the speedometer cable (page 12-13).

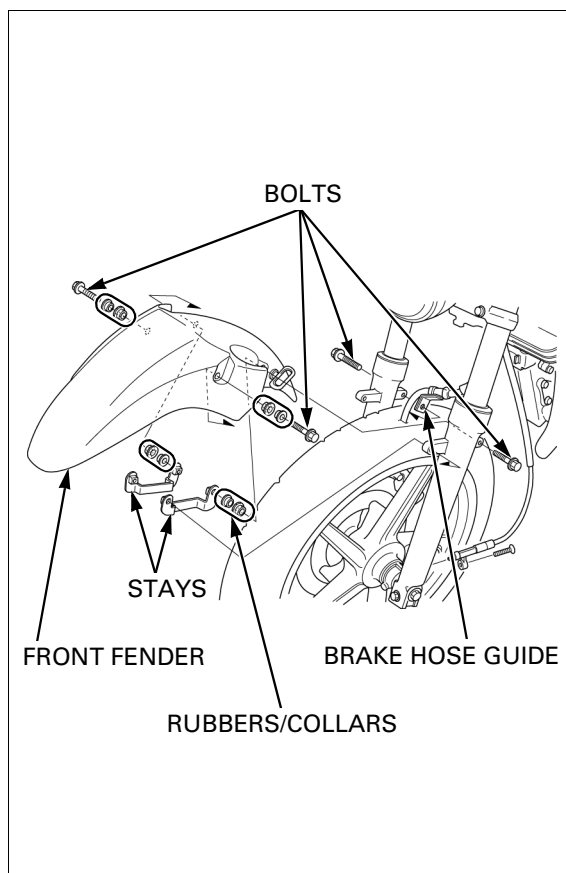
Remove the followings:

- Front fender mounting bolts
- Collars
- Rubbers
- Brake hose guide
- Stays
- Front fender

Installation is in the reverse order of removal.

#### NOTE:

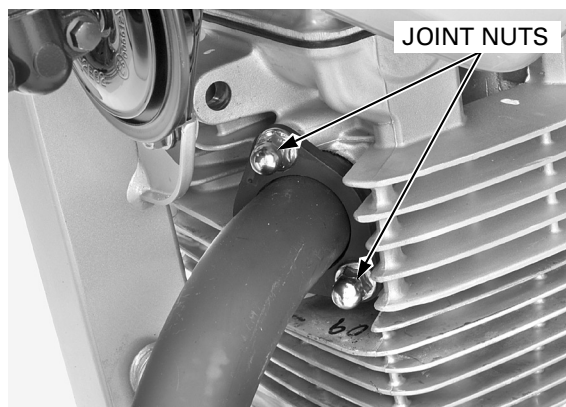
Each stay has an identification mark, "L" is for the left side and "R" is for the right side.



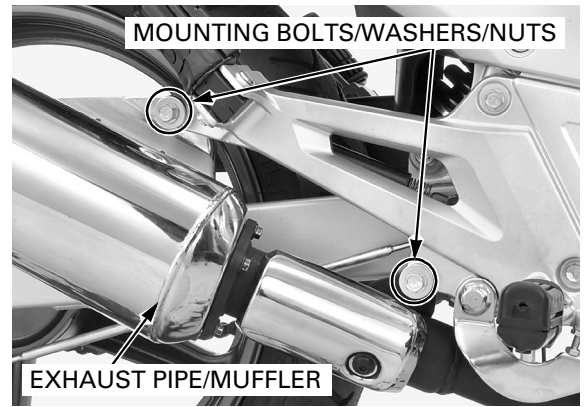
### EXHAUST PIPE/MUFFLER

#### REMOVAL

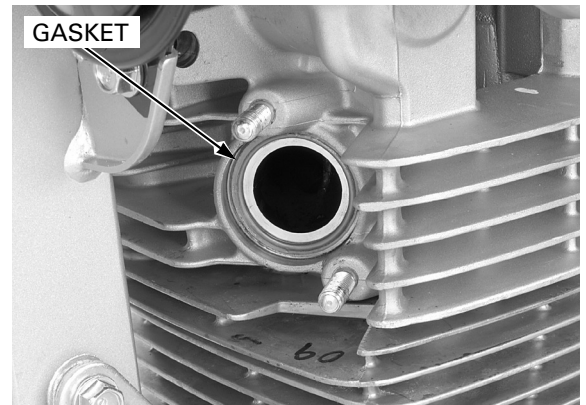
Remove the exhaust pipe joint nuts.



Remove the mounting bolts, washers, nuts and exhaust pipe/muffler.

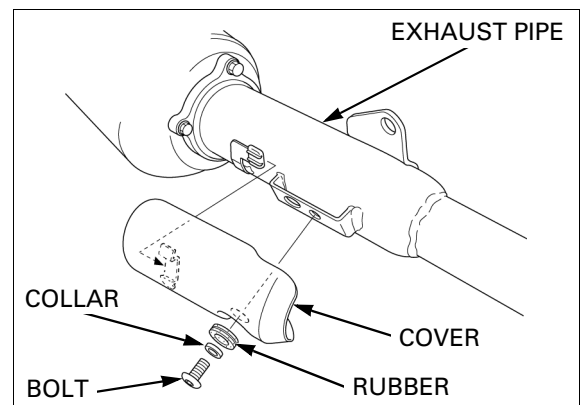


Remove the gasket from the exhaust port of the cylinder head.



### DISASSEMBLY

Remove the bolt, collar, rubber and exhaust pipe cover from the exhaust pipe.



Remove the bolts, gasket and muffler from the exhaust pipe.

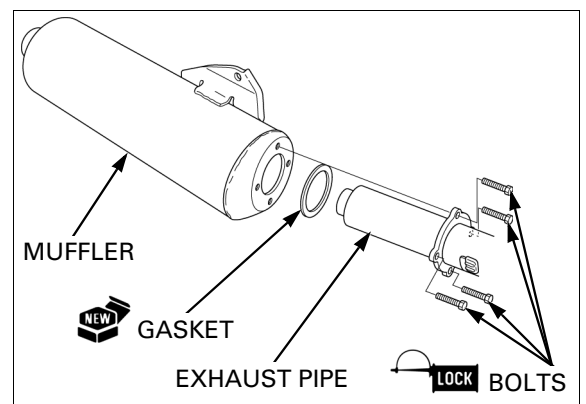
### ASSEMBLY

Apply a locking agent to the exhaust pipe/muffler joint bolt threads.

Install a new gasket, exhaust pipe and bolts to the muffler.

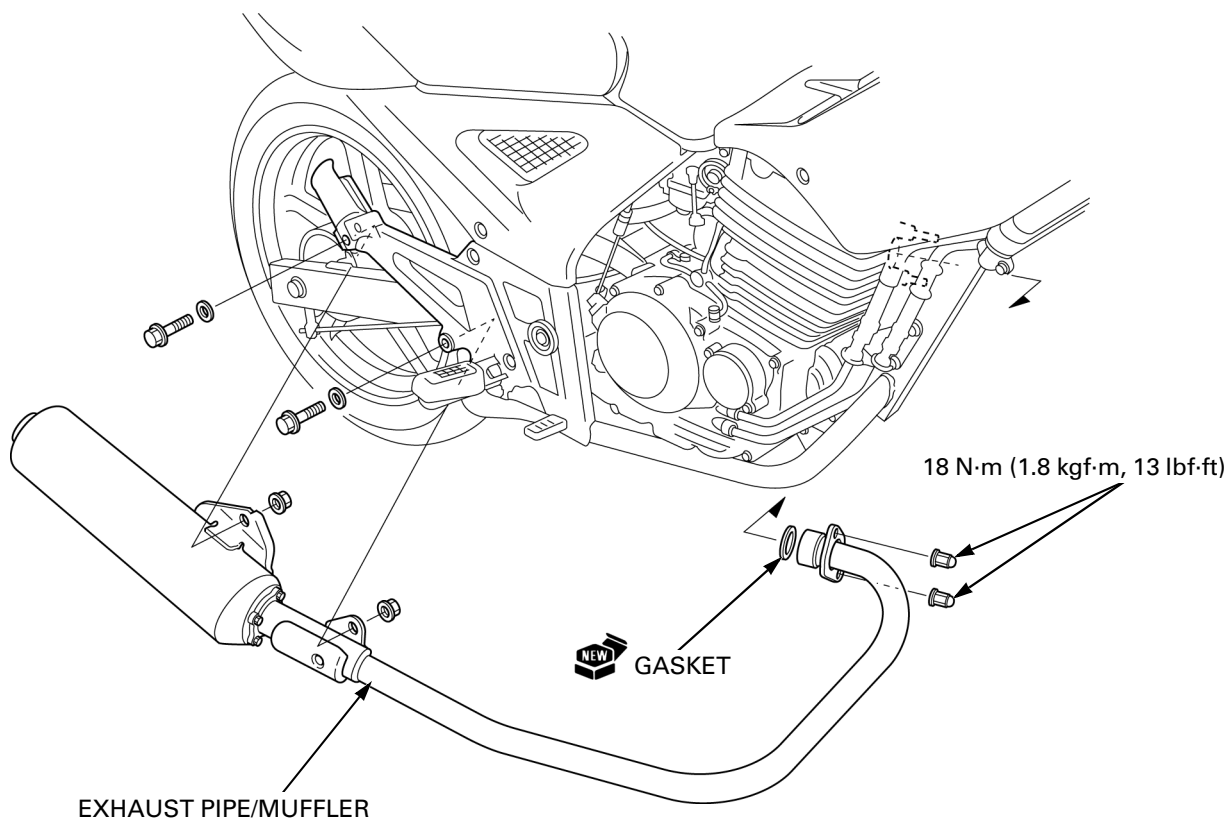
Tighten the bolts securely.

Install the exhaust pipe cover in the reverse order of removal.

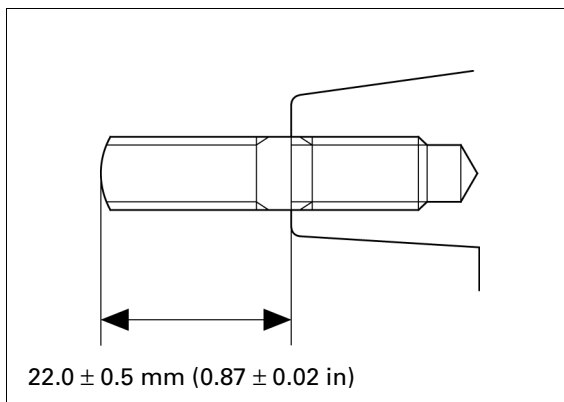


## FRAME/BODY PANELS/EXHAUST SYSTEM

### INSTALLATION



If the joint stud bolts are loose, tighten them. Be sure to verify the distance from the top of the stud to the cylinder head as shown.



*Always replace the gasket with a new one.*

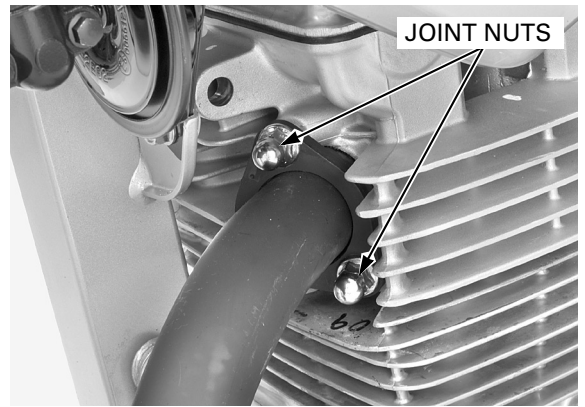
Install a new gasket onto the exhaust port of the cylinder head.



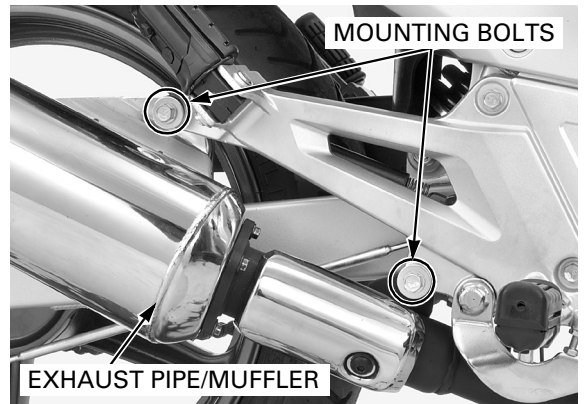
Install the exhaust pipe/muffler, then temporarily install the exhaust pipe joint nuts, muffler mounting bolts, washers and nuts.

Tighten the exhaust pipe joint nuts to the specified torque.

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



Tighten the exhaust pipe/muffler mounting bolts securely.



---

## MEMO

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## MAINTENANCE

# SERVICE INFORMATION

## GENERAL

- Place the motorcycle on level ground before starting any work.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed are.

## SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip free play			2 – 6 mm (1/16 – 1/4 in)
Spark plug	Standard		CR8EH-9S (NGK)
	For extended high speed riding		CR9EH-9S (NGK)
Spark plug gap			0.8 – 0.9 mm (0.03 – 0.04 in)
Valve clearance	IN		0.12 ± 0.03 mm (0.005 ± 0.001 in)
	EX		0.15 ± 0.03 mm (0.006 ± 0.001 in)
Recommended engine oil			Honda oil Recommendation Service classification: API SG or higher JASO T 903: MA Viscosity: SAE 10W-30
Engine oil capacity	After draining		1.5 liter (1.6 US qt, 1.3 Imp qt)
	After oil and oil filter change		1.5 liter (1.6 US qt, 1.3 Imp qt)
	After disassembly		1.8 liter (1.9 US qt, 1.6 Imp qt)
Engine idle speed			1,400 ± 100 min <sup>-1</sup> (rpm)
Drive chain	Size/link		DID520/106
	Slack		15 – 20 mm (0.6 – 0.8 in)
Recommended brake fluid			DOT 3 or DOT 4
Brake pedal height			23.5 mm (0.93 in) below the top of the footpeg
Brake pedal free play			20 – 30 mm (13/16 – 1-3/16 in)
Clutch lever free play			10 – 20 mm (3/8 – 13/16 in)
Cold tire pressure	Drive only	Front	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
		Rear	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
	Driver and passenger	Front	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
		Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
Tire size		Front	100/80-17 M/C 52S
		Rear	130/70-17 M/C 62S
Tire brand		Front	PIRELLI MT75
		Rear	PIRELLI MT75
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

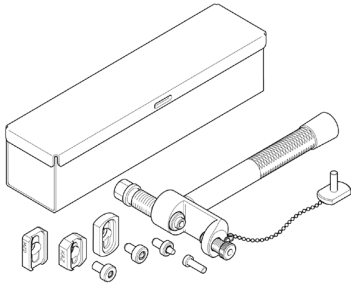
## TORQUE VALUES

Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Crankshaft hole cap	8 N·m (0.8 kgf·m, 5.9 lbf·ft)	Apply grease to the threads
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Engine oil drain bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive chain adjuster lock nut	21 N·m (2.1 kgf·m, 15 lbf·ft)	
Drive sprocket fixing plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut

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**TOOL**

Drive chain tool set  
07HMH-MR10103



## MAINTENANCE

# MAINTENANCE SCHEDULE

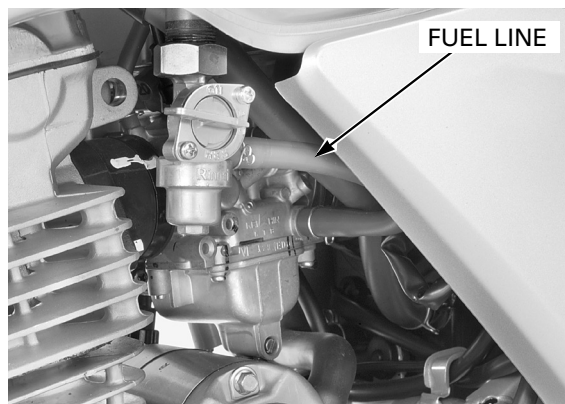
Item	Operations	Period				Ref. Page
		1.000 km	3.000 km	6.000 km	cada ... km	
Fuel line	Inspect				3.000	—
Fuel strainer screen	Clean				3.000	3-5
Throttle	Inspect and adjust				3.000	3-6
Choke	Inspect and adjust				3.000	3-6
Air cleaner	Clean (note 1)				3.000	3-7
	Change				18.000	3-7
Crankcase breather	Clean (note 2)				3.000	3-8
Spark plug	Clean and adjust				3.000	3-8
	Change				12.000	3-8
Valve clearance	Inspect and adjust				3.000	3-10
Engine oil	Change (note 3 and 4)				3.000	3-12
Engine oil filter	Change				6.000	3-14
Carburetor	Adjust idle speed				3.000	—
	Clean				6.000	—
Brake hoses	Inspect				3.000	
Exhaust system	Inspect				6.000	—
Secondary air supply system	Inspect				12.000	3-16
Oil strainer	Clean				12.000	—
Drive chain	Inspect, adjust and lubricate	a cada 1.000 km				3-17
Illumination/ Turn signal system	Inspect				3.000	—
Brake fluid	Inspect level and add				3.000	3-21
	Change (note 5)				18.000	3-21
Brake pad wear	Inspect				3.000	—
Rear brake shoes/drum	Clean				3.000	—
Brake system	Inspect operation				3.000	3-22
Brake light switch	Inspect operation				3.000	3-23
Headlight aim	Adjust				3.000	3-24
Clutch system	Inspect operation				3.000	3-25
Side stand	Inspect				3.000	3-25
Front and rear suspensions	Inspect				6.000	3-25
Nuts, bolts, fasteners	Inspect and retighten				3.000	—
Rims and wheels	Inspect				3.000	3-26
Tyres	Calibrate	a cada 1.000 km				3-26
Steering head bearings	Inspect, adjust and lubricate				3.000	3-27
Instruments/Switches	Inspect operation				3.000	—
Front suspension oil	Change				12.000	—
Drive chain guide	Inspect wear				3.000	—

- Notes:**
1. Service more frequently when ridden in unusually wet or dusty areas.
  2. Service more frequently when riding in rain or at full throttle.
  3. Change every year or at each odometer interval, whichever comes first.
  4. Check the oil level daily before riding the motorcycle and add the recommended oil, if necessary.
  5. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

For safety reasons, we recommend that all items be serviced only by your authorized Honda dealer.

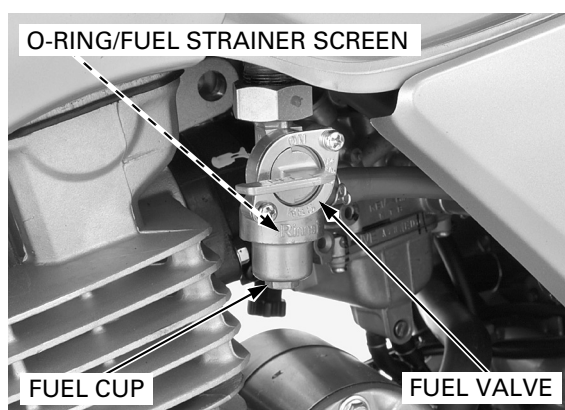
## FUEL LINE

Check the fuel line between the fuel tank and carburetor for deterioration, damage or leakage. Replace the fuel line if necessary.



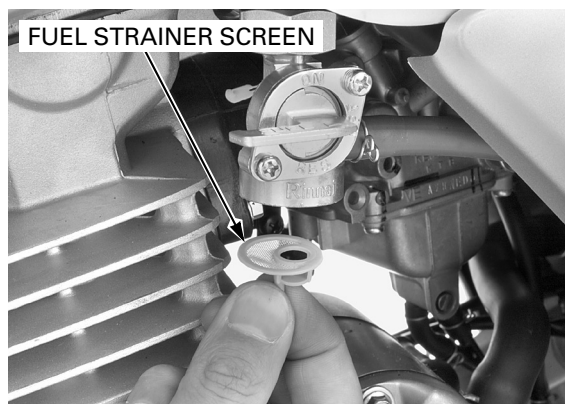
## FUEL STRAINER SCREEN

Turn the fuel valve "OFF".  
Remove the fuel cup, O-ring and fuel strainer screen and drain the contents of the fuel cup into a suitable container.



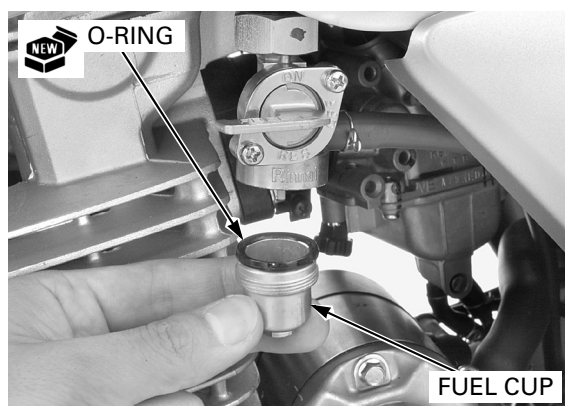
Wash the fuel strainer screen and fuel cup in clean non-flammable high flash point solvent.

Install the fuel strainer screen into the fuel valve.



Install a new O-ring and fuel cup in the fuel valve, make sure that the O-ring is in place. Tighten the fuel cup securely.

Turn the fuel valve "ON" and be sure there are no fuel leaks.



### THROTTLE OPERATION

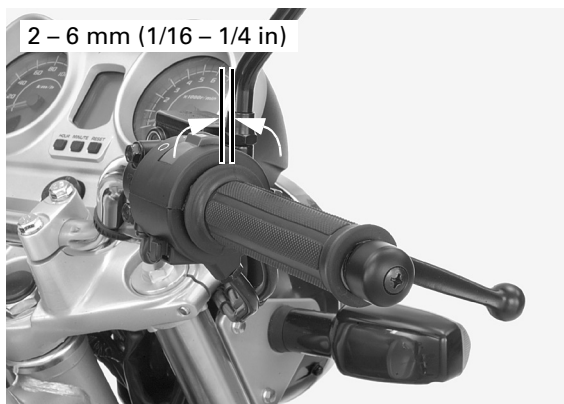
Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables, if throttle operation is not smooth.

Measure the throttle grip free play at the throttle grip flange.

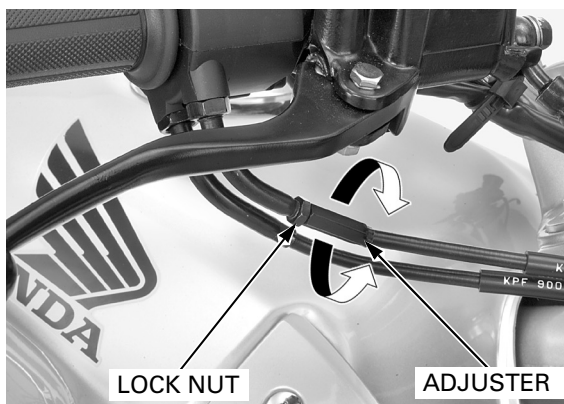
**FREE PLAY: 2 – 6 mm (1/16 – 1/4 in)**



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

Minor adjustment is made with the upper adjuster.

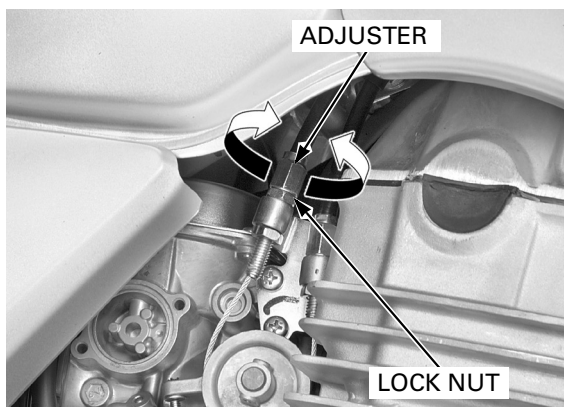
Loosen the lock nut, turn the adjuster as required and tighten the lock nut.



Major adjustments are made with the lower adjuster.

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

Recheck the throttle operation.



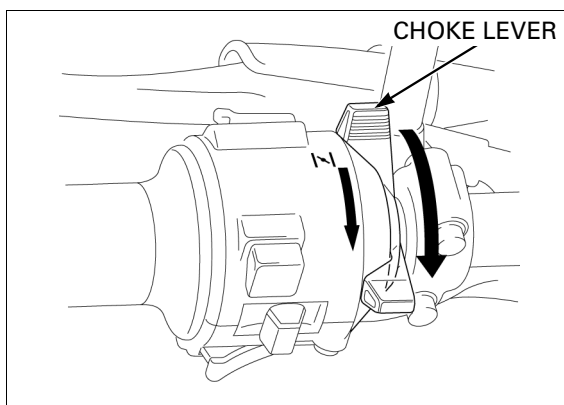
### CARBURETOR CHOKE

#### STARTING ENRICHMENT (SE) VALVE

The choke system uses a fuel enriching circuit controlled by an SE valve. The SE valve opens the enriching circuit via a cable when the choke lever on the handlebar is pulled back.

Check for smooth operation of the choke lever.

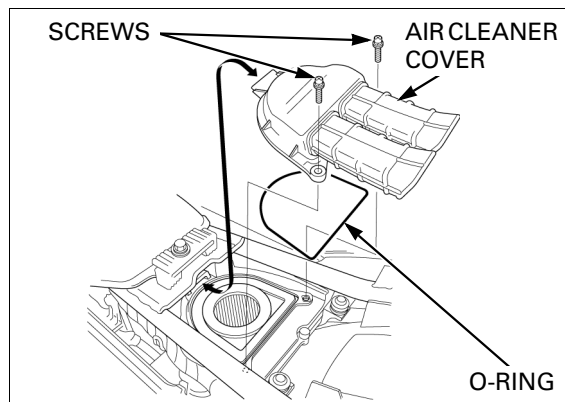
Lubricate the choke cable if the operation is not smooth.



# AIR CLEANER

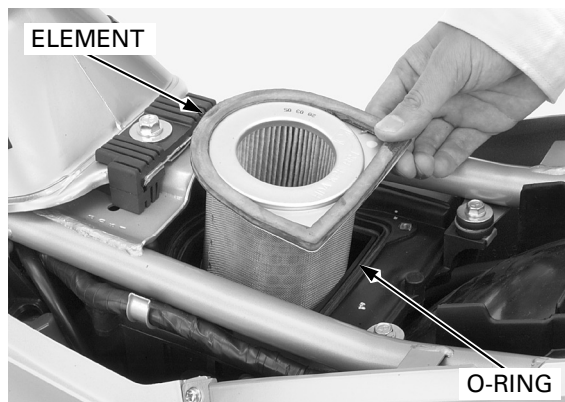
Remove the seat (page 2-4).

Remove the screws, air cleaner cover and O-ring from the air cleaner housing.



*Be careful not to allow the foreign material into the air cleaner housing.*

Remove the air cleaner element and O-ring.



Replace the element accordance with the maintenance schedule (page 3-4).

Also, clean the element using compressed air from the outside, or replace it if necessary.

Install new O-rings onto each groove.

Installation is in the reverse order of removal.

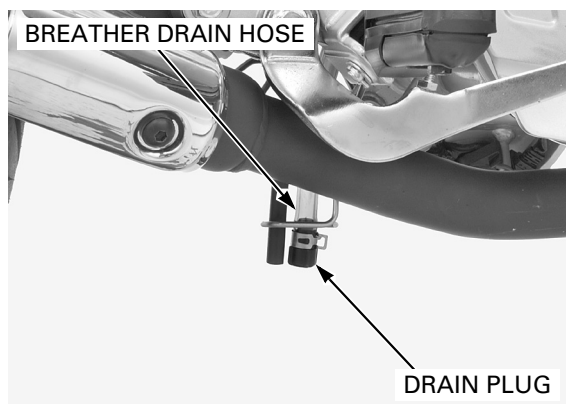


### CRANKCASE BREATHER

**NOTE:**

Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposits level can be seen in the transparent section of the breather drain hose.

Remove the drain plug from the breather drain hose and drain the deposits into a suitable container, then reinstall the drain plug securely.



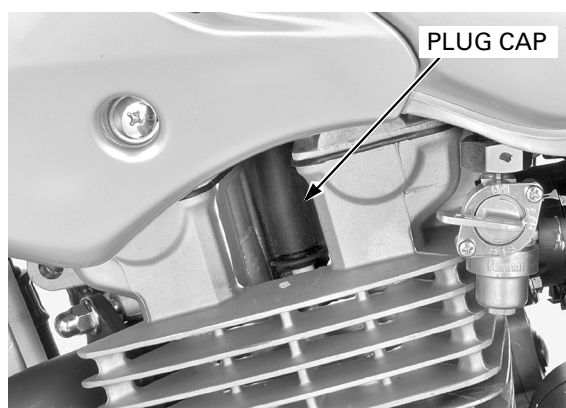
### SPARK PLUG

**REMOVAL**

Disconnect the spark plug cap.

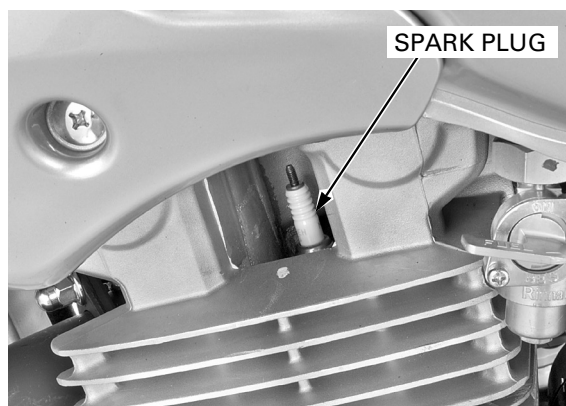
**NOTE:**

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



Remove the spark plug using the spark plug wrench or an equivalent.

Inspect or replace as described in the maintenance schedule (page 3-4).



## INSPECTION

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

### RECOMMENDED SPARK PLUG:

**Standard:**

**CR8EH-9S (NGK)**

**For extended high speed riding:**

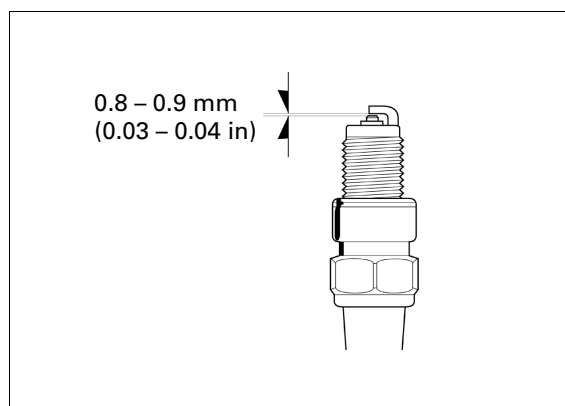
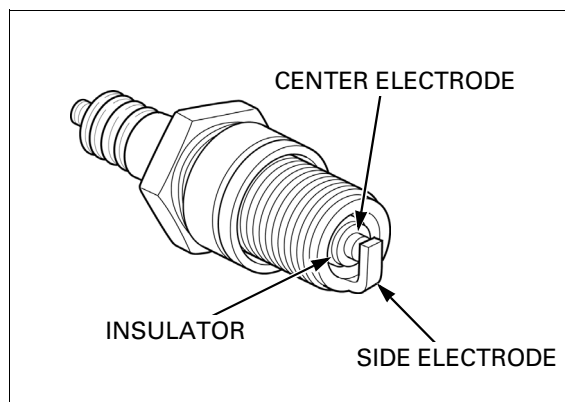
**CR9EH-9S (NGK)**

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

Check the gap between the center electrodes with a leaf-type feeler gauge.

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

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

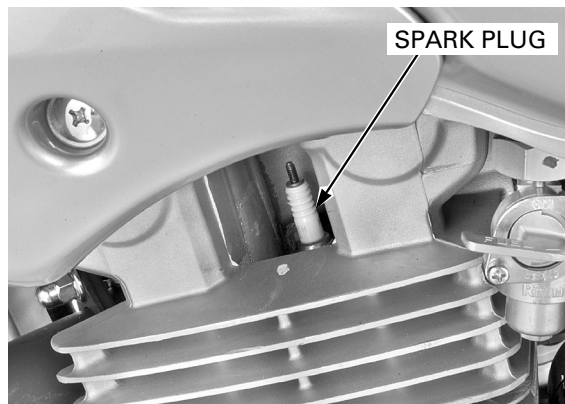


## INSTALLATION

Install and hand tighten the spark plug to the cylinder head, then tighten the spark plug to the specified torque with a spark plug wrench.

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

Connect the spark plug cap.





## MAINTENANCE

# VALVE CLEARANCE

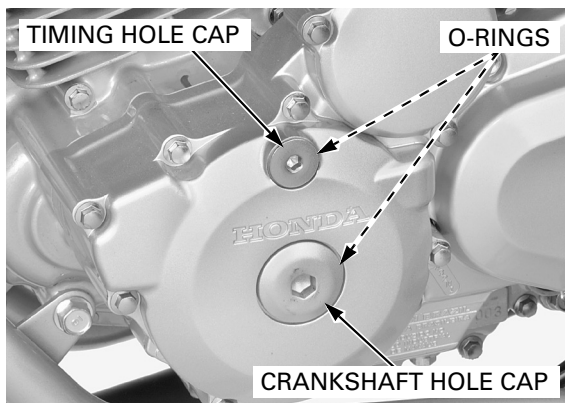
### NOTE:

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

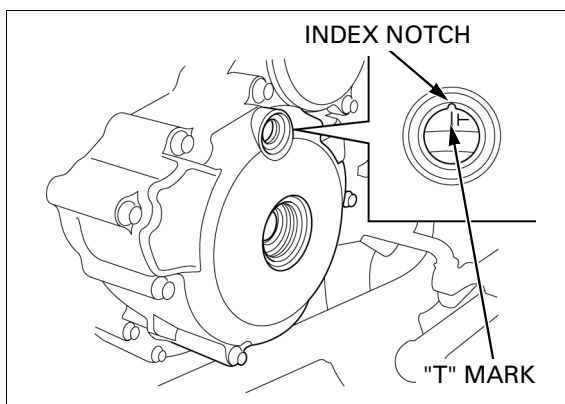
Remove the following:

- Fuel tank (page 2-7)
- Cylinder head cover (page 7-6)

Remove the crankshaft hole cap, timing hole cap and O-rings.



Rotate the crankshaft counterclockwise to align the "T" mark on the flywheel with the index notch of the timing hole in the left crankcase cover.



Make sure that the timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks on the cam sprockets are facing inward, turn the crankshaft counterclockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.

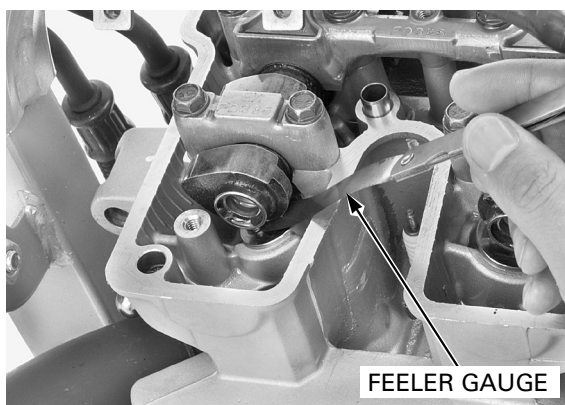


Inspect the intake and exhaust valve clearances by inserting a feeler gauge between each valve lifter and cam lobe.

### VALVE CLEARANCE:

IN:  $0.12 \pm 0.03$  mm ( $0.005 \pm 0.001$  in)

EX:  $0.15 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)

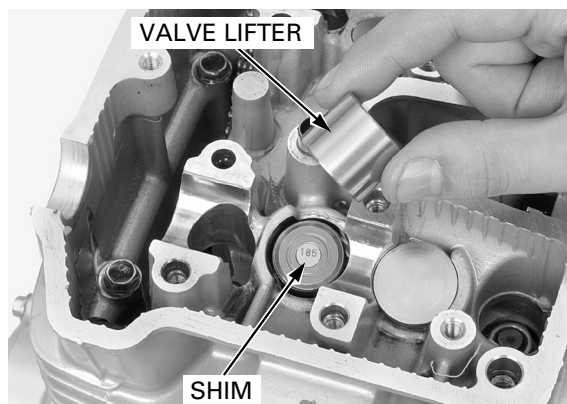


# ADJUSTMENT

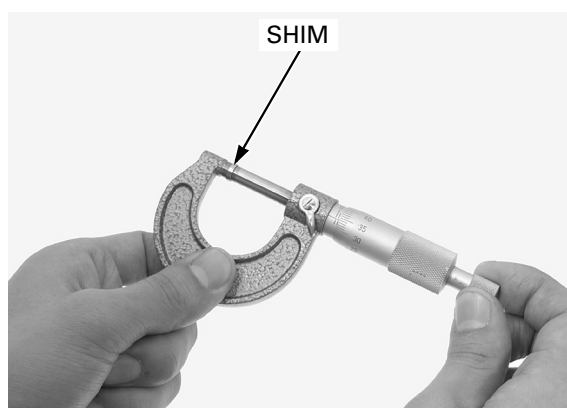
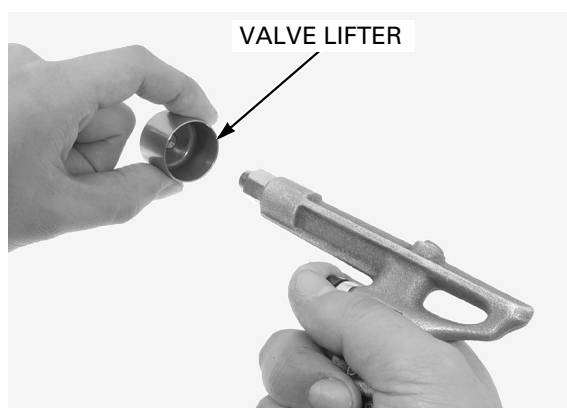
Remove the camshafts (page 7-7).

Remove the valve lifters and shims.

- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.



Clean the valve shim contact area in the valve lifter with compressed air.



Measure the shim thickness and record it.

*Sixty-nine different thickness shims are available from the thinnest 1.200 mm thickness shim to the thickest 2.900 mm thickness shim in intervals of 0.025 mm.*

Calculate the new shim thickness using the equation below.

$$A = (B - C) + D$$

A: New shim thickness

B: Recorded valve clearance

C: Specified valve clearance

D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.900 mm.

1.80 mm	1.825 mm	1.85 mm	1.875 mm

## MAINTENANCE

*Install the shims and valve lifters in their original locations.*

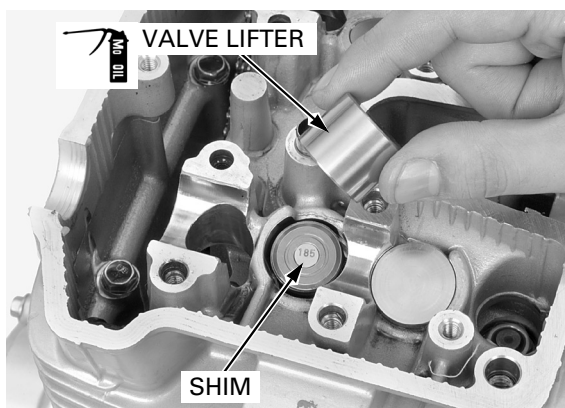
Install the newly selected shim on the valve spring retainer.

Apply molybdenum oil solution to the outer surface of the each valve lifter and install them into the valve lifter bores.

Install the camshafts (page 7-23).

Rotate the camshafts by rotating the crankshaft counterclockwise several times.

Recheck the valve clearance.



Coat new O-rings with engine oil and install them onto each cap.

Apply grease to the timing hole cap and crankshaft hole cap threads.

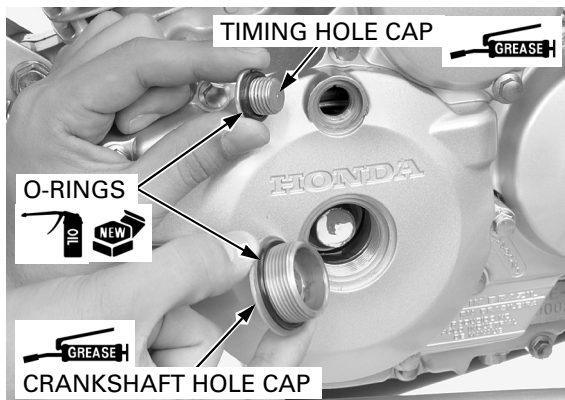
Install and tighten the timing hole cap and crankshaft hole cap to the specified torque.

### TORQUE:

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

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

Installation is in the reverse order of removal.



## ENGINE OIL

### OIL LEVEL INSPECTION

Start the engine and let it idle for 3 – 5 minutes.

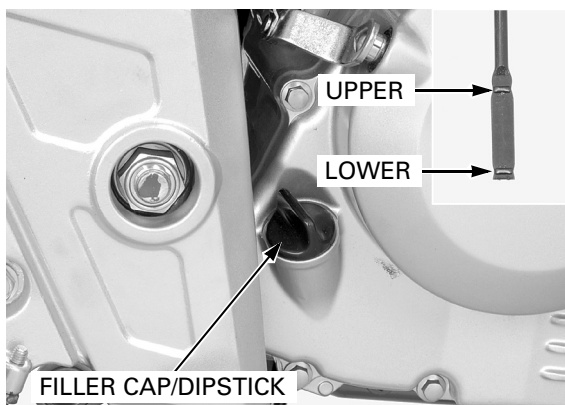
Stop the engine and wait 2 – 3 minutes.

Hold the motorcycle in an upright position.

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

Insert the oil filler cap/dipstick without screwing it in, remove it and check the oil level

If the oil level is below or near the lower level line on the dipstick, fill the recommended engine oil to the upper level line through the oil filler hole.



### RECOMMENDED ENGINE OIL:

**Honda oil Recommendation**

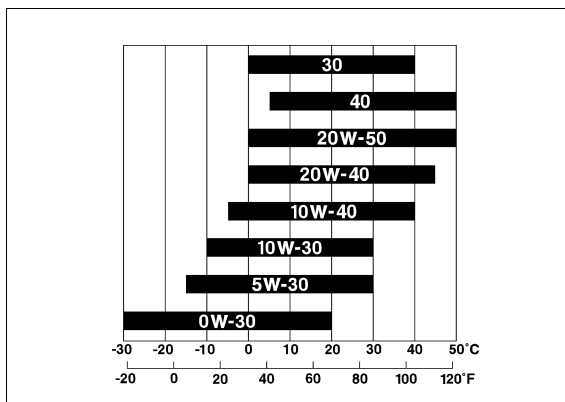
**Service classification:** API SG or higher

**JASO T 903:** MA

**Viscosity:** SAE 10W-30

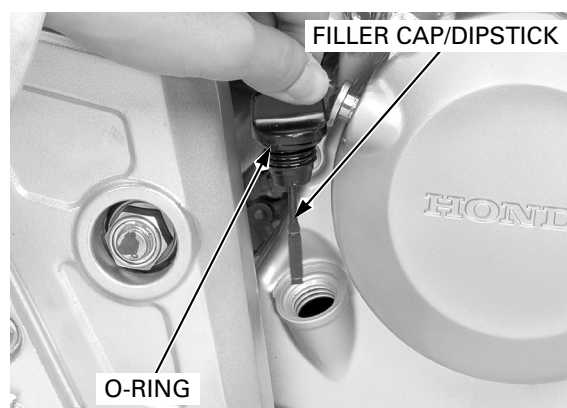
### NOTE:

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



Check that the O-ring is in good condition, replace it if necessary.

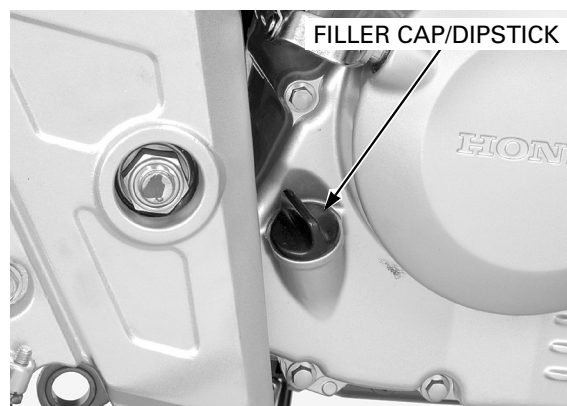
Reinstall and tighten the oil filler cap/dipstick securely.



## ENGINE OIL CHANGE

Start the engine, warm up it up and stop it. Support the motorcycle on its side stand on a level ground.

Remove the oil filler cap/dipstick.



Place a clean container under the engine to catch the engine oil. Then remove the drain bolt and sealing washer.

Drain the engine oil completely.

Install a new sealing washer onto the drain bolt. Install and tighten the drain bolt to the specified torque.

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

Fill the crankcase with recommended engine oil.

### OIL CAPACITY:

**1.5 liter (1.6 US qt, 1.3 Imp qt) after draining/filter change**

**1.8 liter (1.9 US qt, 1.6 Imp qt) after disassembly**

Install and tighten the oil filler cap/dipstick securely.

Start the engine and let it idle for 3 – 5 minutes.

Stop the engine and wait 2 – 3 minutes.

Hold the motorcycle in an upright position and recheck the oil level.

Make sure there are no oil leaks.



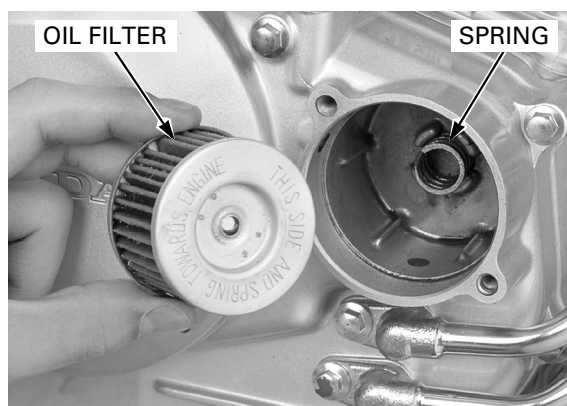
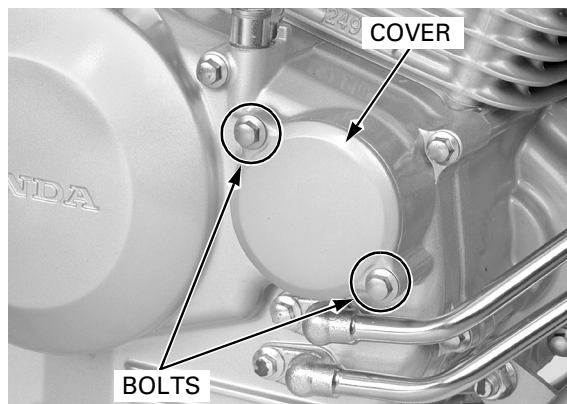
## MAINTENANCE

### ENGINE OIL FILTER

Drain the engine oil (page 3-13).

Remove the bolts and oil filter cover.

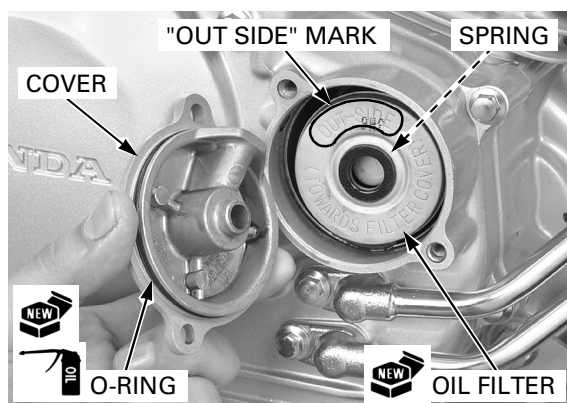
Remove the oil filter and spring.



*Install the oil filter with its "OUT SIDE" mark facing out.*

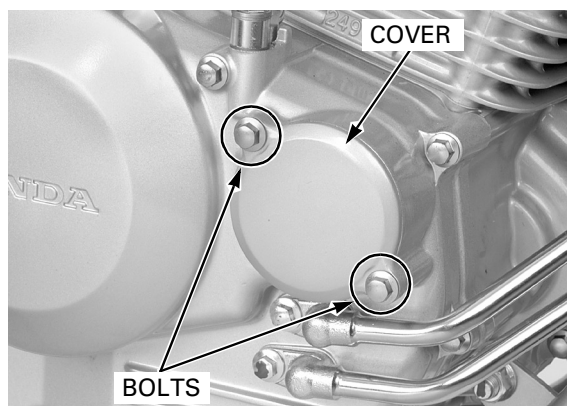
Install the spring and new oil filter.

Apply engine oil to a new O-ring and install it in the oil filter cover groove.



Install the oil filter cover and bolts.  
Tighten the bolts securely.

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



## ENGINE IDLE SPEED

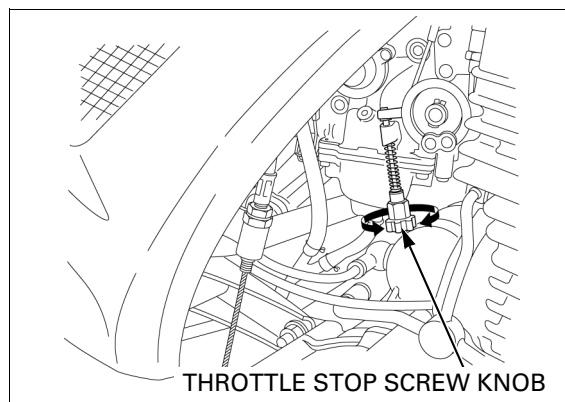
### NOTE:

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

Warm up the engine, shift the transmission into neutral and support the motorcycle on its side stand on a level ground.

Check the idle speed and adjust by turning the throttle stop screw control knob if necessary.

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



## EXHAUST SYSTEM (BR TYPE ONLY)

### EXHAUST EMISSION MEASUREMENT AT IDLE

Check the following items before inspection.

- Spark plug condition (page 3-9)
  - Air cleaner element condition (page 3-7)
  - Crankcase emission control system
  - Ignition timing (page 16-7)
1. Support the motorcycle with side stand.
  2. Connect an appropriate pipe or hose (heat-resistance, chemical-resistant) to the muffler so that the probe can be inserted by more than 60 cm (23.6 in).
  3. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.

### NOTE:

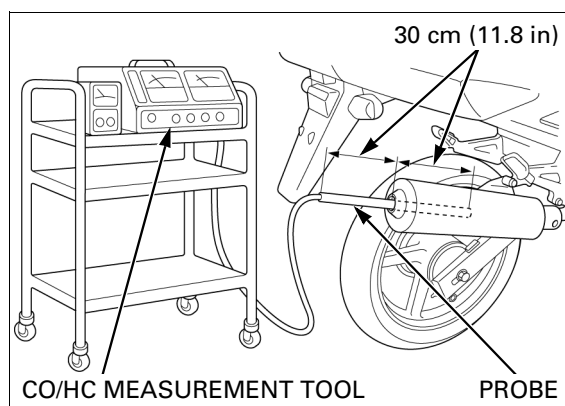
Reference engine oil temperature: 60°C

4. Adjust the engine idle speed, if necessary (page 3-15).
5. Insert the probe into the muffler and measure the carbon monoxide (CO, %) and hydrocarbon (HC, ppm) concentration.

**CO measurement at idle: Below  $0.8 \pm 0.2 \%$**

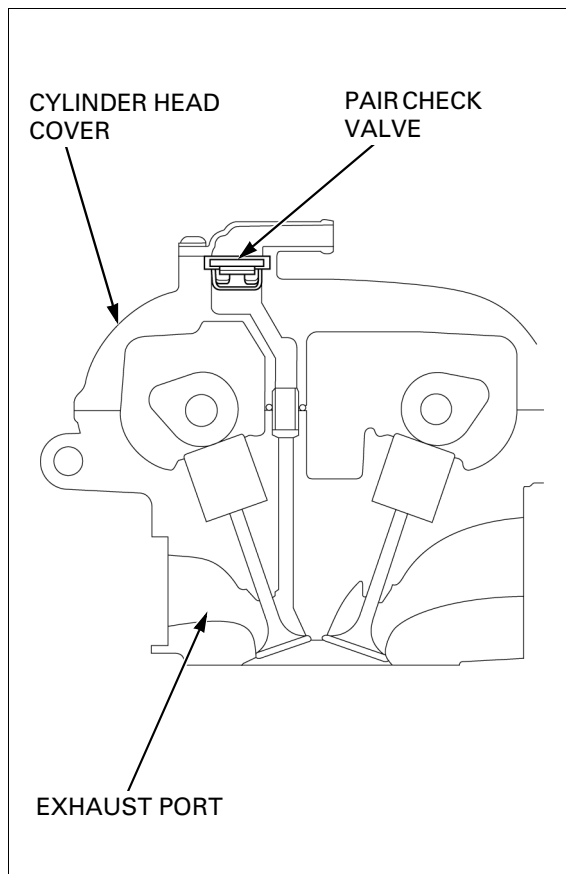
**HC measurement at idle: Below 250 ppm**

If the CO and/or HC concentration is exist, adjust the pilot screw (page 5-18).



### SECONDARY AIR SUPPLY SYSTEM

- This model is equipped built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The fresh air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system.  
This charged fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.



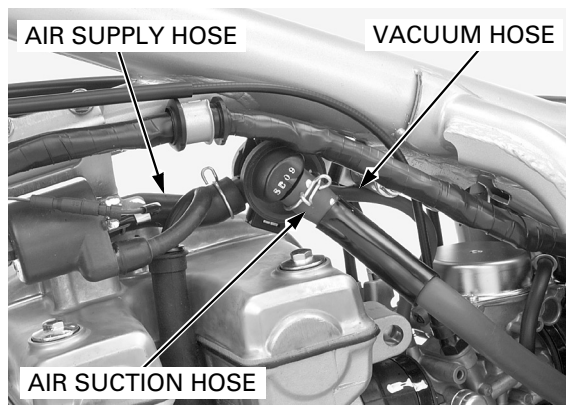
#### NOTE:

If the hoses show any signs of heat damage, inspect the PAIR check valve.

Check the secondary air supply hose between the PAIR control valve and PAIR check valve for deterioration, damage or loose connections. Make sure that the hose is not cracked.

Check the secondary air suction hose between the air cleaner housing and PAIR control valve for deterioration, damage or loose connections. Make sure that the hose is not kinked, pinched or cracked.

Check the PAIR control valve vacuum hose between the carburetor and PAIR control valve for deterioration, damage or loose connections. Make sure that the hose is not kinked, pinched or cracked.



# DRIVE CHAIN

## DRIVE CHAIN SLACK INSPECTION

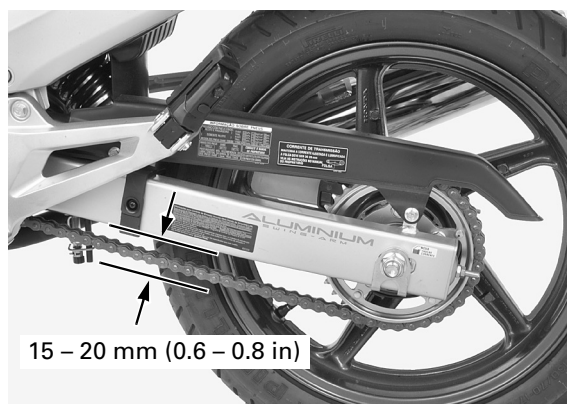
*Never inspect and adjust the drive chain while the engine is running.*

Turn the ignition switch "OFF", place the motorcycle on its side stand and shift the transmission into neutral. Check the slack in the drive chain lower run midway between the sprockets.

**CHAIN SLACK: 15 – 20 mm (0.6 – 0.8 in)**

### NOTICE

*Excessive chain slack, 50 mm (2.0 in) or more, may damage the frame.*



## ADJUSTMENT

Loosen the rear axle nut.  
Loosen the both drive chain adjuster lock nuts.  
Turn the both drive chain adjusting nuts until the correct drive chain slack is obtained.  
Make sure the index lines on the both adjusters are aligned with the rear edges of the axle slots in the swingarm.

Tighten the rear axle nut to the specified torque.

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

Tighten the both drive chain adjuster lock nuts to the specified torque.

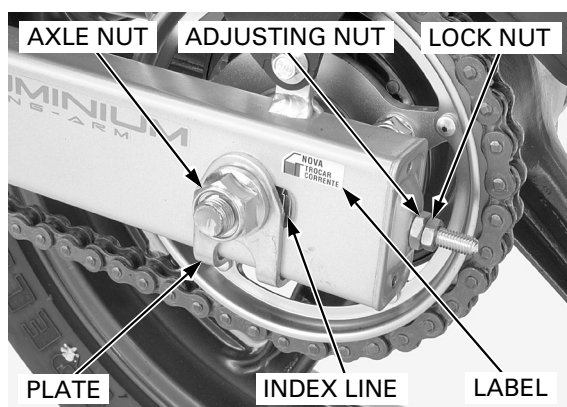
**TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)**

Recheck the drive chain slack and free wheel rotation.

Check the drive chain wear indicator label attached on the left side swingarm.

If the rear edge of the axle plate reaches red zone of the indicator label, replace the drive chain with a new one (page 3-19).

Lubricate the drive chain (page 3-17).



## CLEANING AND LUBRICATION

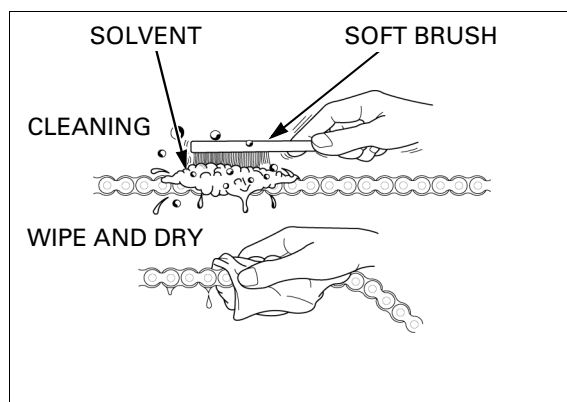
Clean the chain with non-flammable or high flash point solvent and wipe it dry.

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.

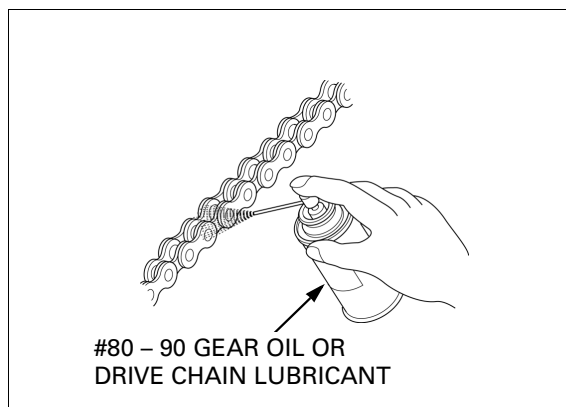
Inspect and replace sprocket as necessary.





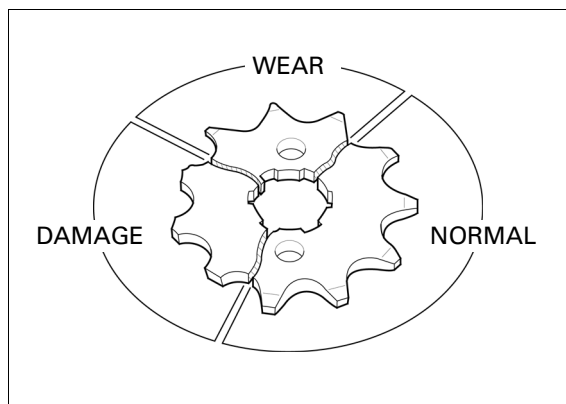
## MAINTENANCE

Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



### SPROCKETS INSPECTION

Inspect the drive and driven sprocket teeth for wear or damage, replace it 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.

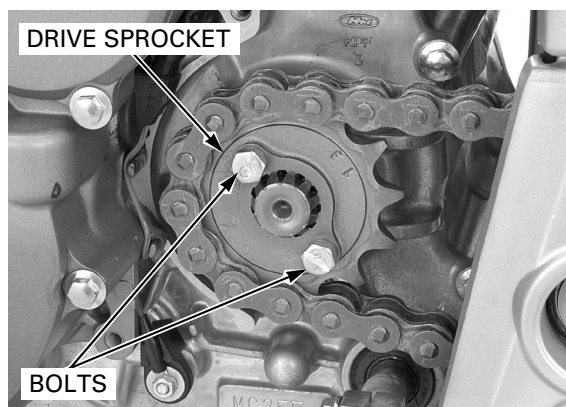


Check the attaching bolts and nuts on the drive and driven sprockets. If any are loose, torque them.

#### TORQUE:

Drive sprocket fixing plate bolt:  
10 N·m (1.0 kgf·m, 7 lbf·ft)

Driven sprocket nut:  
64 N·m (6.5 kgf·m, 47 lbf·ft)



## REPLACEMENT

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

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

Loosen the drive chain (page 3-17).

Assemble the special tool as shown.

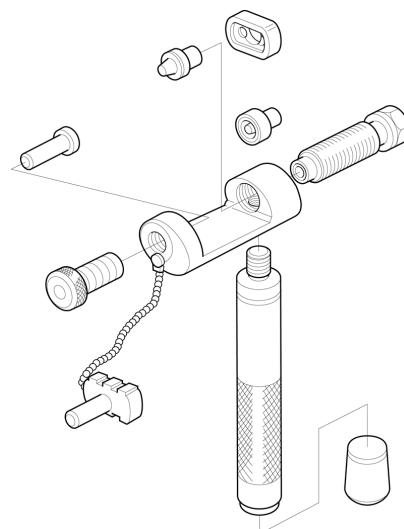
### TOOL:

**Drive chain tool set 07HMH-MR10103**

### NOTE:

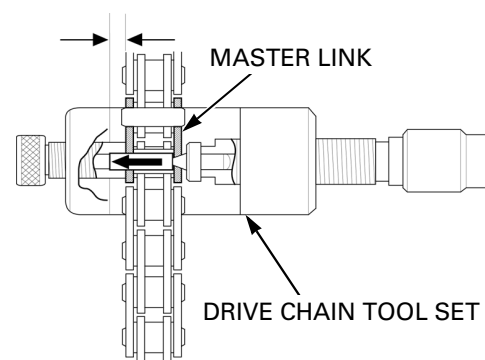
When using the special tool, follow the manufacturer's instruction.

### DRIVE CHAIN TOOL SET:



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.

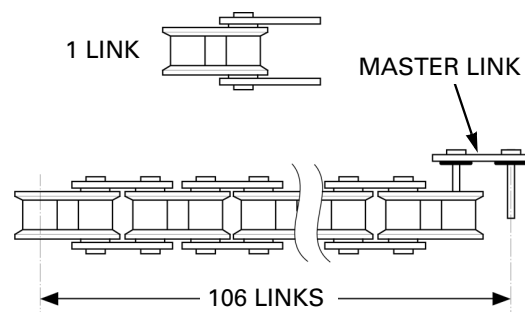


Remove the excess drive chain links from the new drive chain with the drive chain tool set.

### NOTE:

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

**STANDARD LINKS: 106 links**  
**REPLACEMENT CHAIN: DID520**

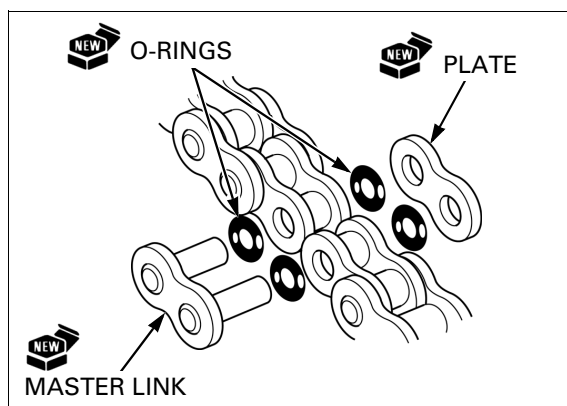


## MAINTENANCE

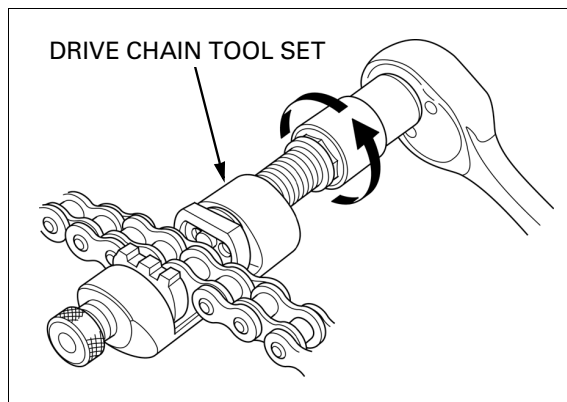
- Never reuse the old drive chain, master link, master link plate and O-rings.

*Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing the outside.*

Assemble new master link, O-rings and plate.



Assemble and set the drive chain tool set.

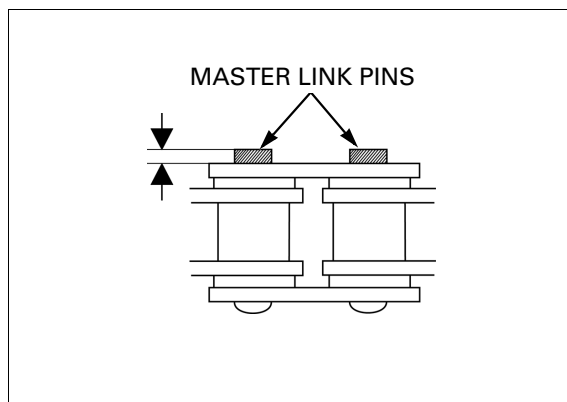


Make sure the master link pins are installed properly. Measure the master link pin length projected from the plate.

### STANDARD LENGTH:

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

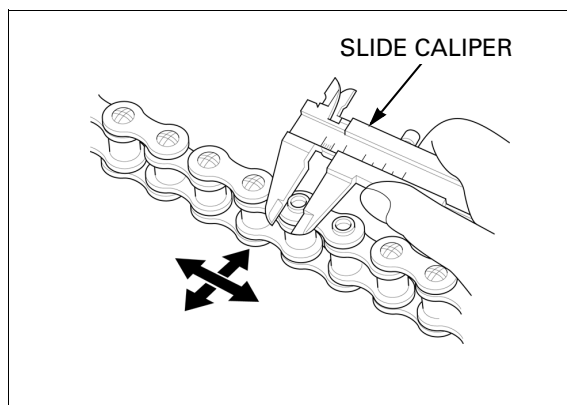
Stake the master link pins with the drive chain tool set.



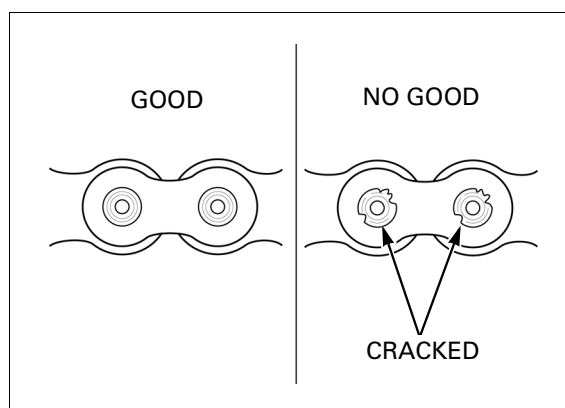
Make sure the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

### DIAMETER OF THE STAKED AREA:

**DID: 5.50 – 5.80 mm (0.217 – 0.228 in)**



After staking, check the staked area of the master link for cracks.  
If there is any cracking, replace the master link, O-rings and plate.



## BRAKE FLUID

### FRONT BRAKE

#### NOTICE

*Spilled fluid can damage painted, plastic or rubber parts. Place a shop towel over these parts whenever the system is serviced.*

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

Turn the handlebar so the reservoir is level and check the front brake fluid level.

When the fluid level is low, check the brake pads for wear (page 3-21).

A low fluid level may be due to wear of the brake pads.

If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level.

If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-22).



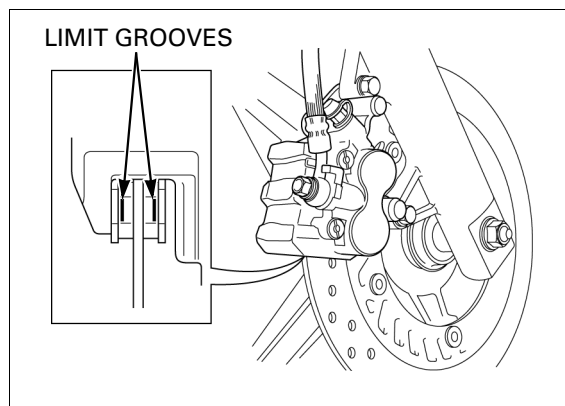
## BRAKE SHOES/PADS WEAR

### FRONT BRAKE PADS

Check the brake pads for wear.

Replace the brake pads if either pad is worn to the bottom of wear limit grooves.

Refer to brake pads replacement (page 14-7).



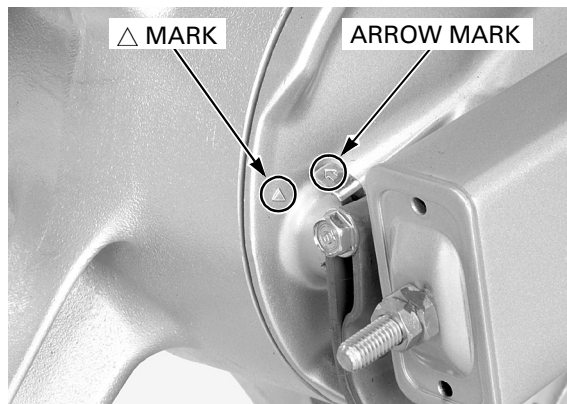
## MAINTENANCE

### REAR BRAKE SHOES

Check the wear indicator position when the brake pedal is applied.

If the arrow mark on the indicator aligns with the "△" mark on the brake panel, inspect the brake drum (page 13-13).

Replace the brake shoes (page 13-13) if the drum I.D. is within the service limit.



## BRAKE SYSTEM

### FRONT BRAKE

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

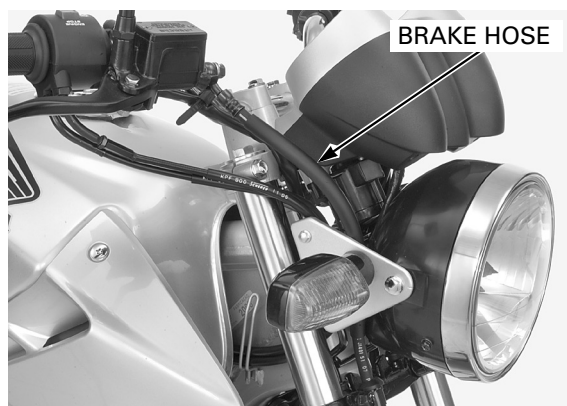
If the lever feels soft or spongy when operated, bleed air from the system.

Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.

Tighten any loose fittings.

Replace hose and fittings as required.

Refer to brake air bleeding procedures (page 14-5).

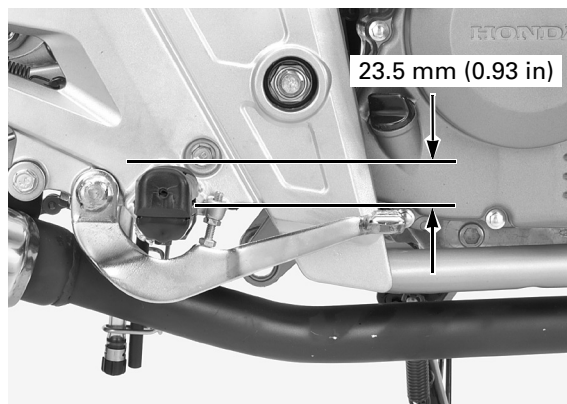


### BRAKE PEDAL HEIGHT

Check the brake pedal height.

#### BRAKE PEDAL HEIGHT:

23.5 mm (0.93 in) below the top of the footpeg



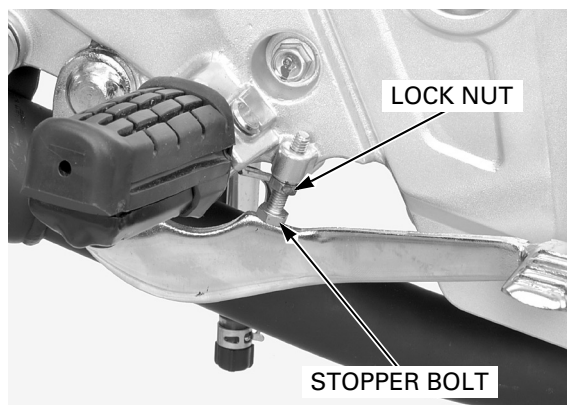
To adjust:

Loosen the lock nut and turn the stopper bolt.

Retighten the lock nut securely.

#### NOTE:

After adjusting the brake pedal height, check the rear brake light switch and brake pedal free play.



## BRAKE PEDAL FREE PLAY

### NOTE:

Perform brake pedal free play adjustment after adjusting brake pedal height.

Check the brake pedal free play.

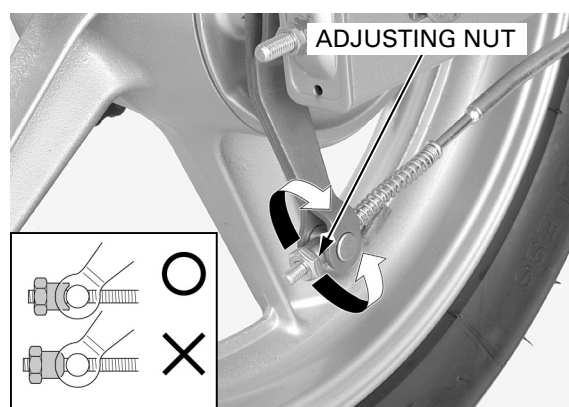
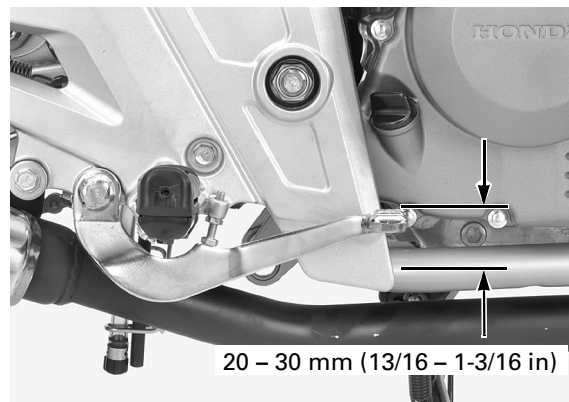
**FREE PLAY: 20 – 30 mm (13/16 – 1-3/16 in)**

*Make sure the cut-out on the adjusting nut is seated on the joint piece.*

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

### NOTE:

After adjusting the brake pedal free play, check the rear brake light switch operation and adjust if necessary.



## BRAKE LIGHT SWITCH

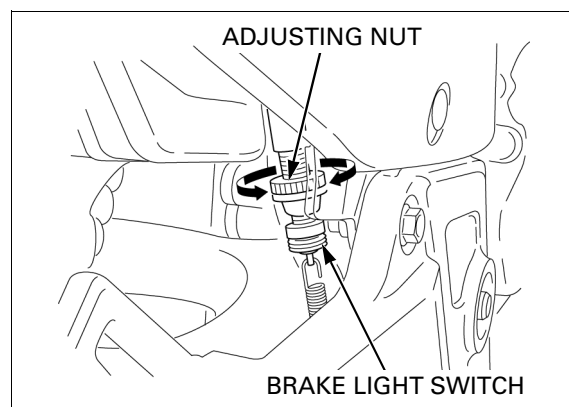
### NOTE:

- Perform the rear brake light switch adjustment after adjusting the brake pedal free play.
- The front brake light switch does not require adjustment.

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

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

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



## MAINTENANCE

### HEADLIGHT AIM

#### NOTE:

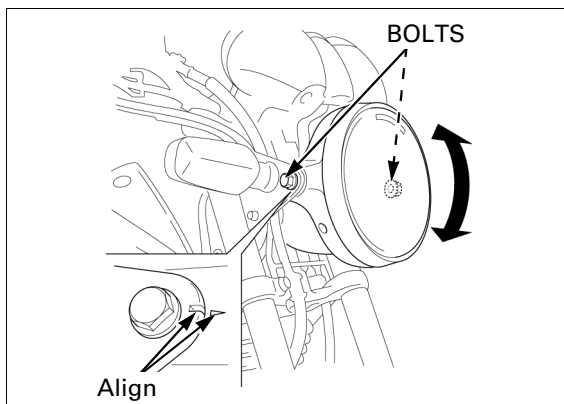
Adjust the headlight beam as specified by local laws and regulations.

Place the motorcycle on a level surface.

Loosen the headlight case bolts.

Adjust the headlight beam vertically by aligning the index mark of the headlight case with the index groove of the stay.

Tighten the bolts securely.

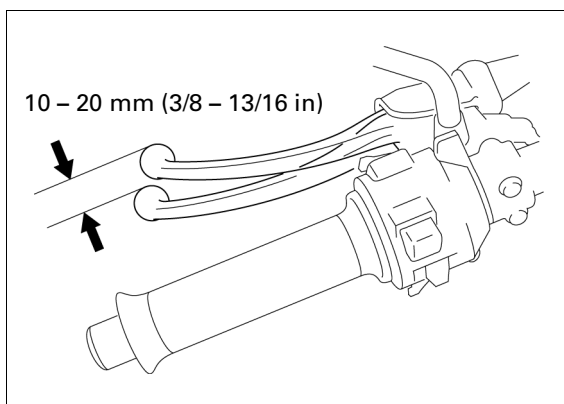


### CLUTCH SYSTEM

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

Measure the clutch lever free play at the end of the lever.

**FREE PLAY: 10 – 20 mm (3/8 – 13/16 in)**



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

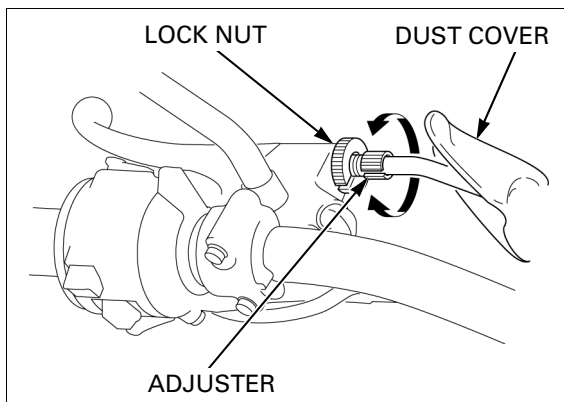
Minor adjustment is made with the upper adjuster at the clutch lever.

Remove the dust cover.

Loosen the lock nut and turn the adjuster.

If the adjuster is threaded out near the 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 and make a major adjustment as described as follow.

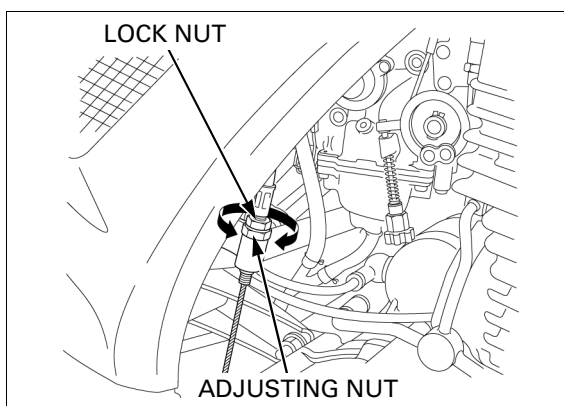


Major adjustment is performed at the clutch lifter arm.

Loosen the lock nut and turn the adjusting nut to adjust free play.

Hold the adjusting nut securely while tightening the lock nut

If the free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (page 9-7).



## SIDE STAND

Support the motorcycle on a level surface.

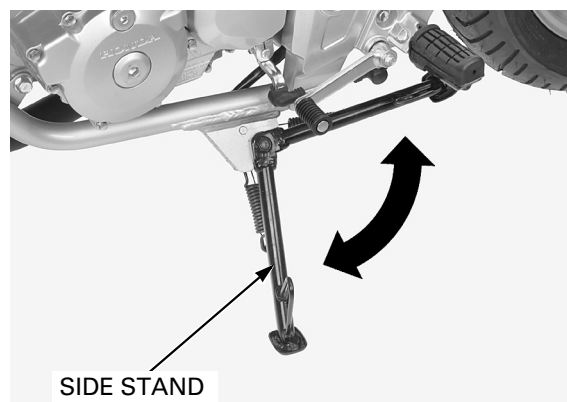
Check the side stand spring for damage or loss of tension.

Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Check that the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand full down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 18-23).



## SUSPENSION

### FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brake and compressing the front suspension several times.

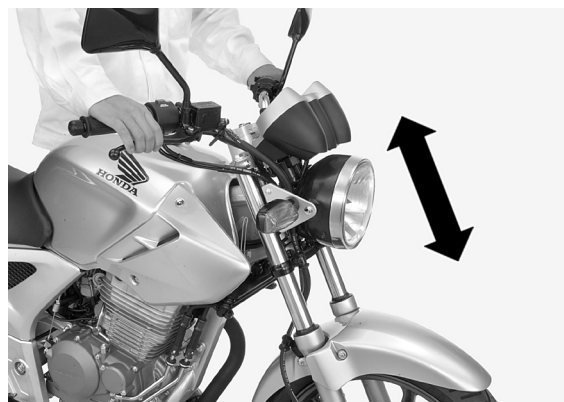
Check the entire assembly for signs of leaks, damage or loose fasteners.

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to fork service (page 12-19).

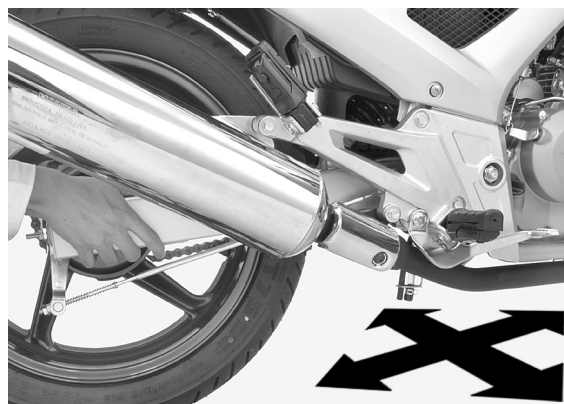


### REAR SUSPENSION INSPECTION

Support the motorcycle securely and raise the rear wheel off the ground.

Check for worn swingarm bearings by grabbing the rear end of the swingarm and attempting to move the swingarm side to side.

Replace the bearings if any looseness is noted.





## MAINTENANCE

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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 rear suspension service (page 13-16).



## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-11).  
Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

## WHEELS/TIRES

Support the motorcycle securely and raise the front wheel off the ground.  
Hold the front fork leg and move the front wheel sideways with force to see if the wheel bearings are worn.  
Refer to front wheel service (page 12-13).



Support the motorcycle securely and raise the rear wheel off the ground.  
Hold the swingarm and move the rear wheel sideways with force to see if the wheel bearings are worn.  
Refer to rear wheel service (page 13-6).



Tire pressure should be checked when the tires are COLD.

#### RECOMMENDED TIRE PRESSURE:

	DRIVER ONLY	DRIVER AND PASSENGER
FRONT	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
REAR	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)

#### RECOMMENDED TIRE SIZE AND TIRE BRAND:

	FRONT	REAR
Tire size	100/80 – 17 M/C 52S	130/70 – 17 M/C 62S
Tire brand	PIRELLI MT75	MT75

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

Check the front wheel (page 12-13) and rear wheel (page 13-6).

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

#### MINIMUM TREAD DEPTH:

**FRONT:** 1.5 mm (0.06 in)

**REAR:** 2.0 mm (0.08 in)



## STEERING HEAD BEARINGS

Check that the control cables do not interfere with handlebar rotation.

Support the motorcycle securely and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 12-29)



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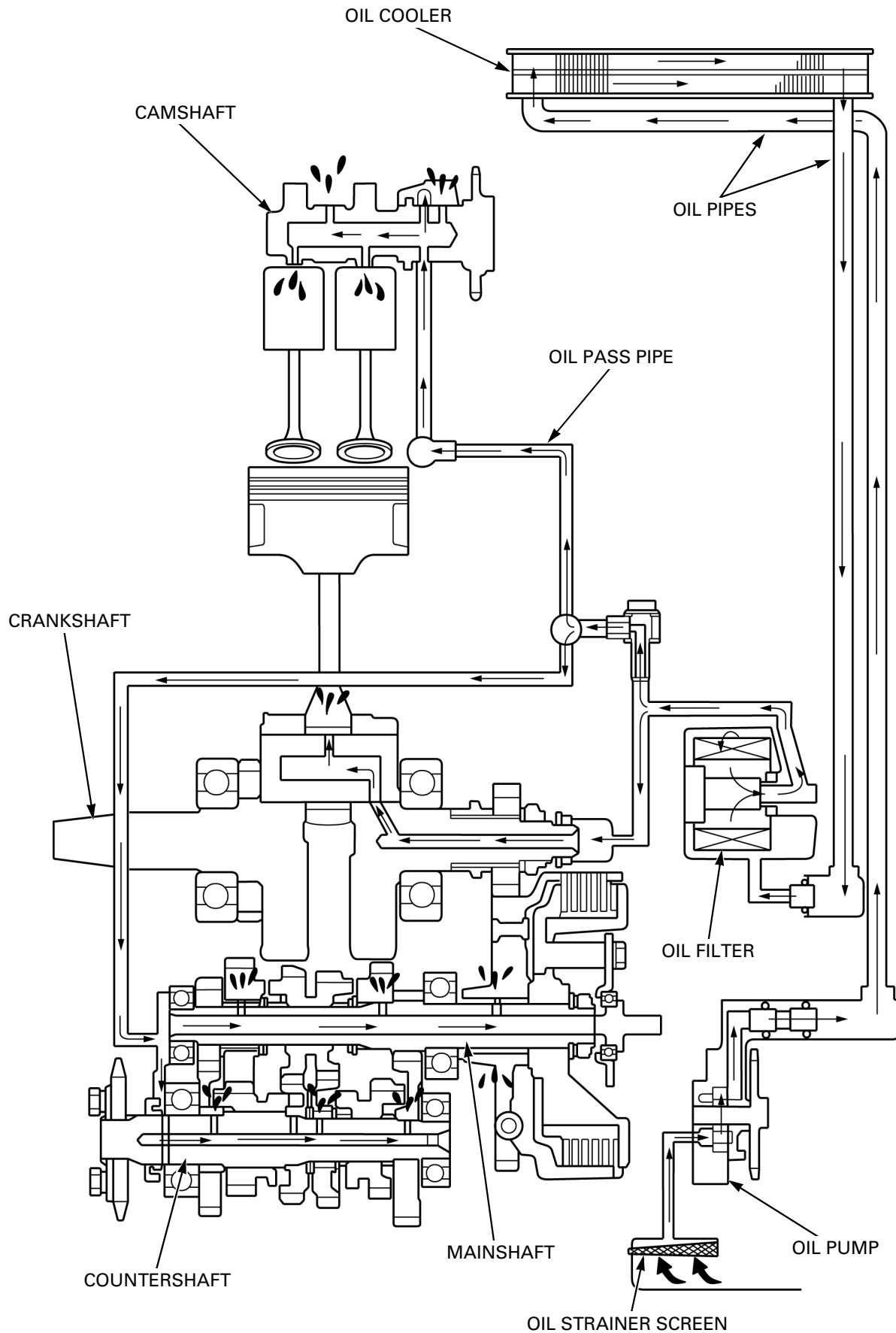
## MEMO

# 4. LUBRICATION SYSTEM

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LUBRICATION SYSTEM DIAGRAM .....	4-2	OIL STRAINER SCREEN.....	4-9
SERVICE INFORMATION .....	4-3	OIL COOLER.....	4-9
TROUBLESHOOTING .....	4-3	OIL PIPE/OIL PASS PIPE .....	4-10
OIL PUMP.....	4-4		

## 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.

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	1.5 liter (1.6 US qt, 1.3 Imp qt)	–
	After oil and oil filter change	1.5 liter (1.6 US qt, 1.3 Imp qt)	–
	After disassembly	1.8 liter (1.9 US qt, 1.6 Imp qt)	–
Recommended engine oil		Honda oil Recommendation Service classification: API SG or higher JASO T 903: MA Viscosity: SAE 10W-30	–
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.02 – 0.08 (0.001 – 0.003)	0.12 (0.005)

### TORQUE VALUES

Oil pressure relief valve cap	19 N·m (1.9 kgf·m, 14 lbf·ft)
Oil pump assembly bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Oil pass pipe joint bolt 8 mm	12 N·m (1.2 kgf·m, 9 lbf·ft)
7 mm	12 N·m (1.2 kgf·m, 9 lbf·ft)

## TROUBLESHOOTING

#### Engine oil level too low

- Oil consumption
- External oil leak
- Improperly installed piston rings
- Worn piston ring
- Worn cylinder
- Worn valve guide
- Worn valve stem seal

#### Oil contamination

- Oil or filter not changed often enough
- Worn piston rings

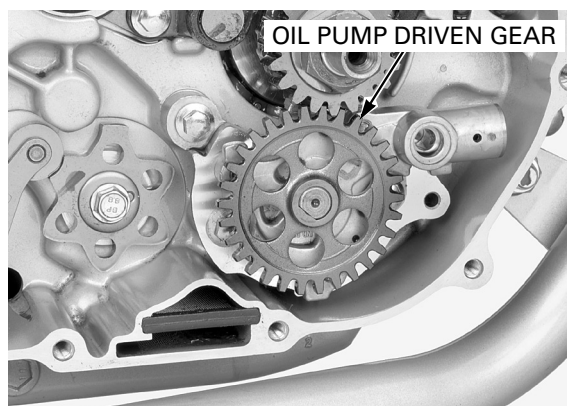
### OIL PUMP

#### REMOVAL

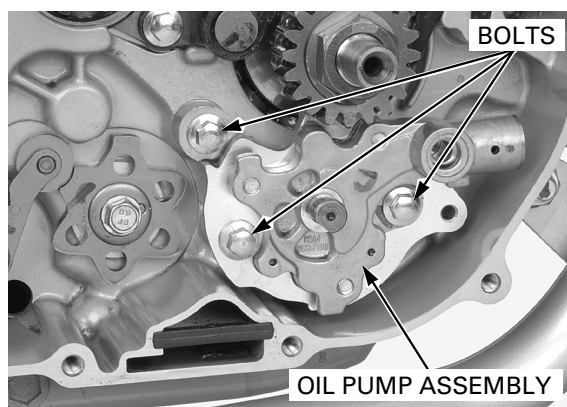
Drain the engine oil (page 3-13).

Remove the clutch (page 9-7).

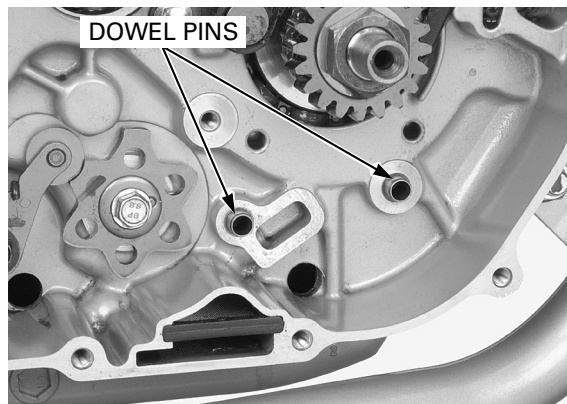
Remove the oil pump driven gear.



Remove the oil pump mounting bolts and oil pump assembly.

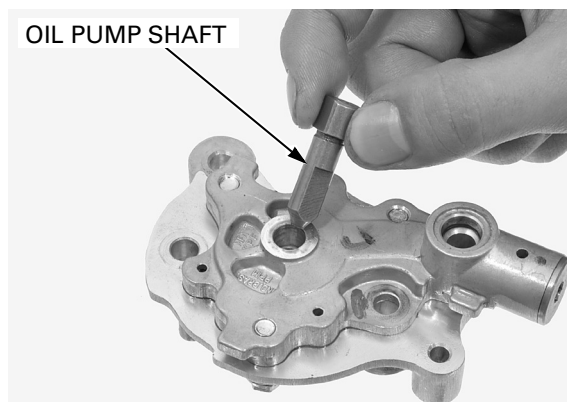


Remove the dowel pins from the right crankcase.

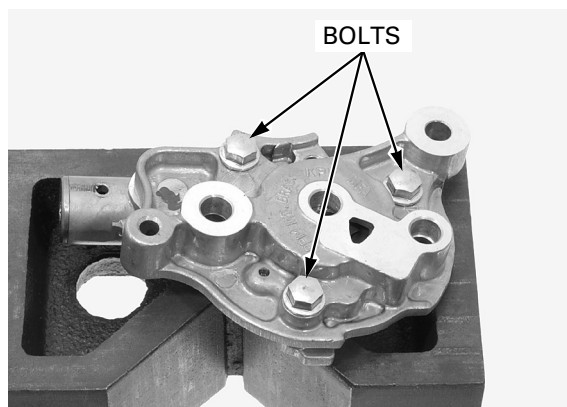


#### DISASSEMBLY

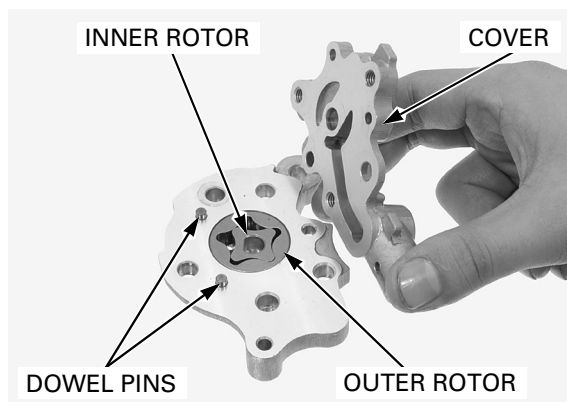
Remove the oil pump shaft from the oil pump assembly.



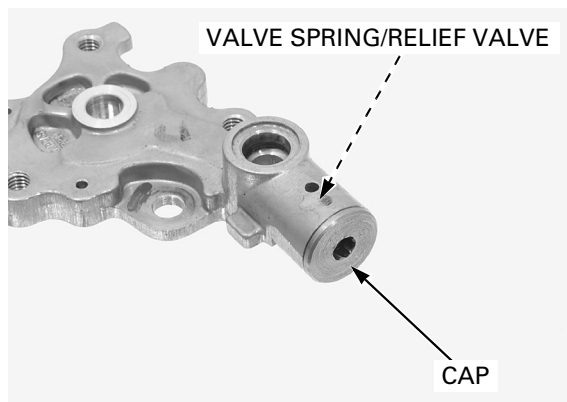
Remove the oil pump assembly bolts.



Remove the oil pump cover.  
Remove the inner rotor, outer rotor and dowel pins.



Remove the relief valve cap, valve spring and pressure relief valve.



### INSPECTION

Temporarily install the outer rotor, inner rotor and oil pump shaft into the oil pump body.

Measure the tip clearance between the inner rotor and outer rotor.

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





## LUBRICATION SYSTEM

---

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

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



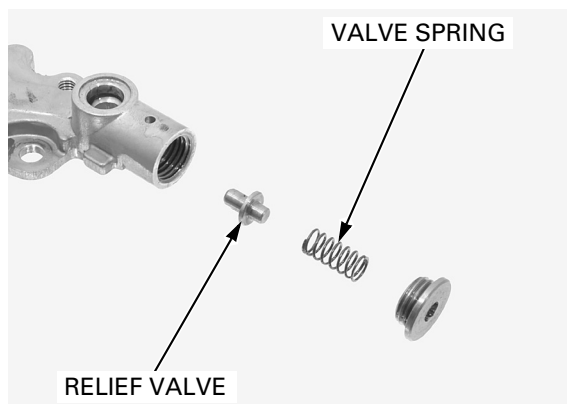
Measure the side clearance using a straight edge and feeler gauge.

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

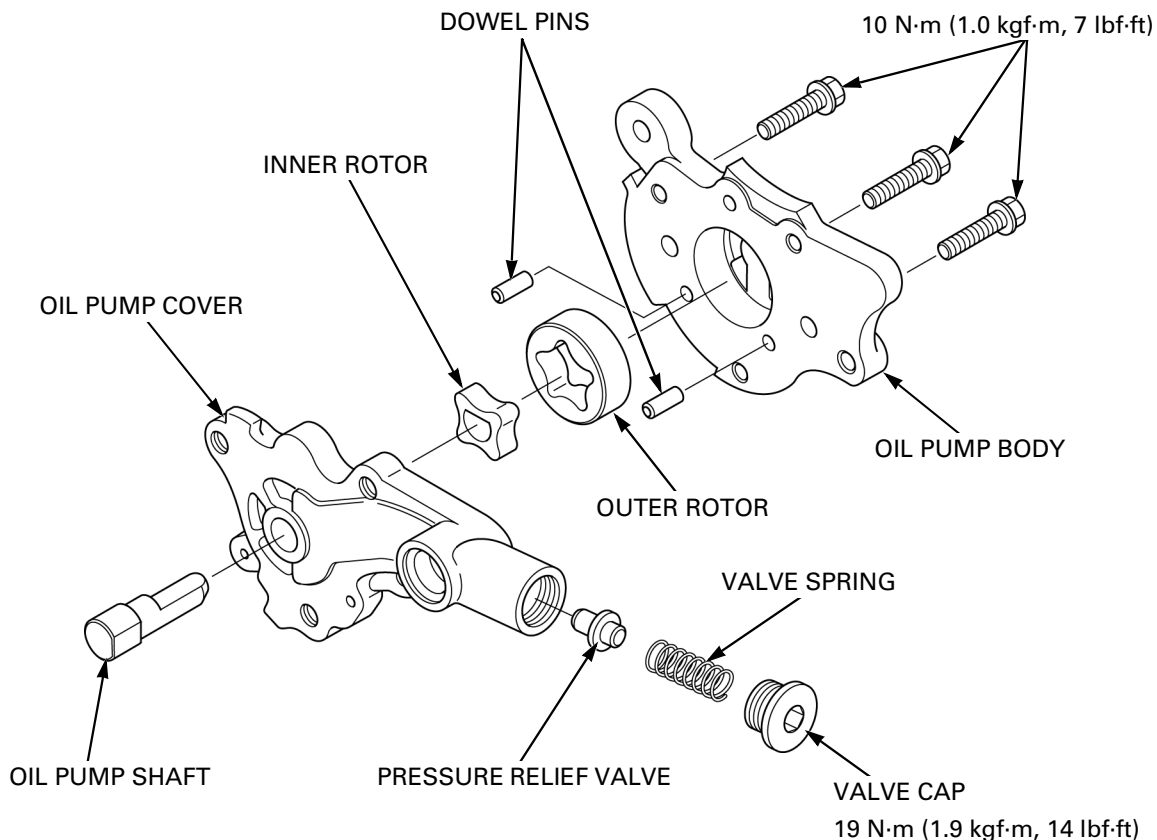


Check the valve spring for wear or fatigue.  
Check the pressure relief valve for clogging or damage.

Clean the remaining parts.



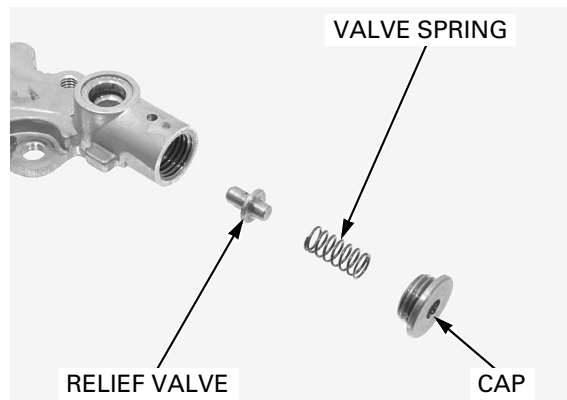
ASSEMBLY



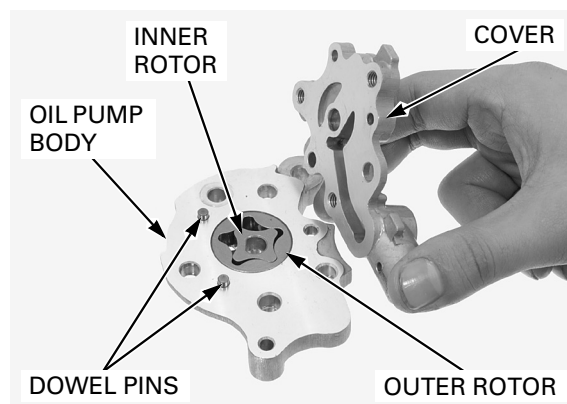
*Install the relief valve with its short end facing toward the spring.*

Install the pressure relief valve to the oil pump cover.  
Install the valve spring, relief valve cap and tighten the relief valve cap to the specified torque.

**TORQUE: 19 N·m (1.9 kgf·m, 14 lbf·ft)**



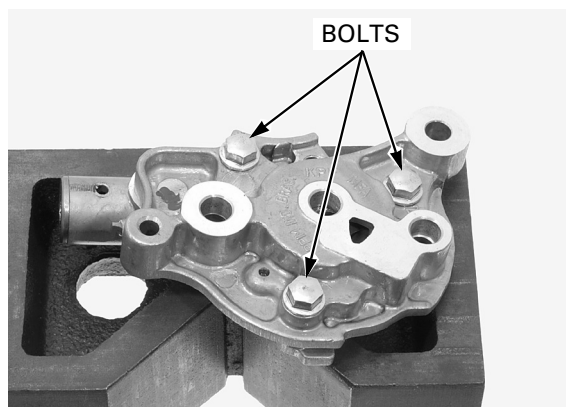
Install the outer rotor and inner rotor into the oil pump body.  
Install the dowel pins and oil pump cover.



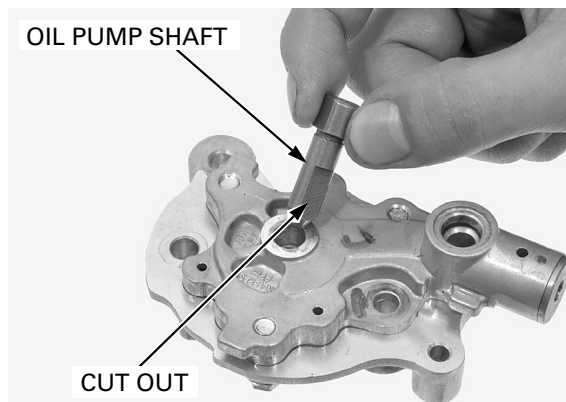
## LUBRICATION SYSTEM

Install and tighten the oil pump assembly bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

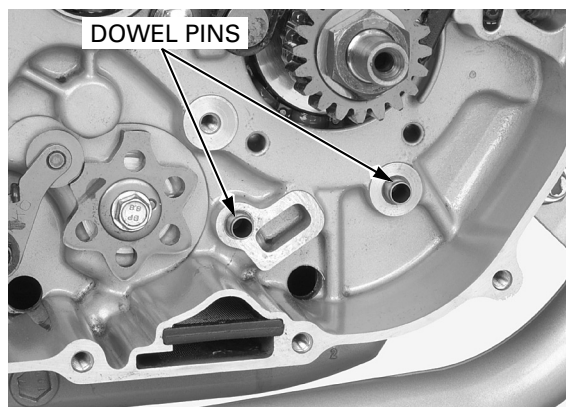


Install the oil pump shaft into the oil pump while aligning the cut outs of the oil pump shaft and inner rotor.



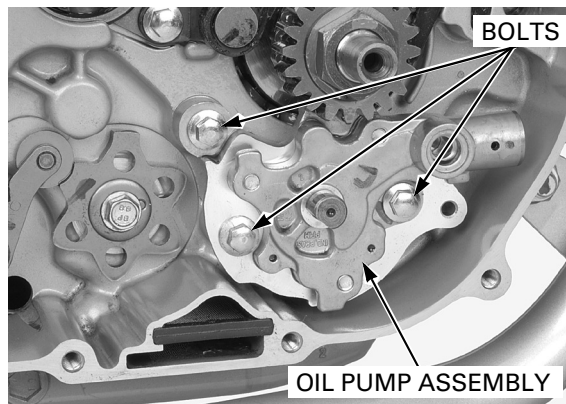
## INSTALLATION

Install the dowel pins to the right crankcase.



Install the oil pump assembly.

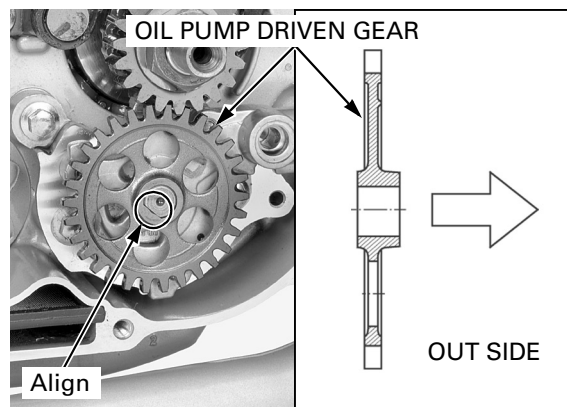
Install and tighten the oil pump mounting bolts securely.



Install the oil pump driven gear aligning the cut outs of the driven gear and oil pump shaft.

Install the clutch (page 9-11).

After installation, fill the crankcase with recommended engine oil (page 3-12) and check that there are no oil leaks.



## OIL STRAINER SCREEN

Remove the right crankcase cover (page 9-5).

Pull the oil strainer screen out of the right crankcase.

Wash the oil strainer screen thoroughly in non-flammable or high flash point solvent.

Install the oil strainer screen.

Install the right crankcase cover (page 9-16).



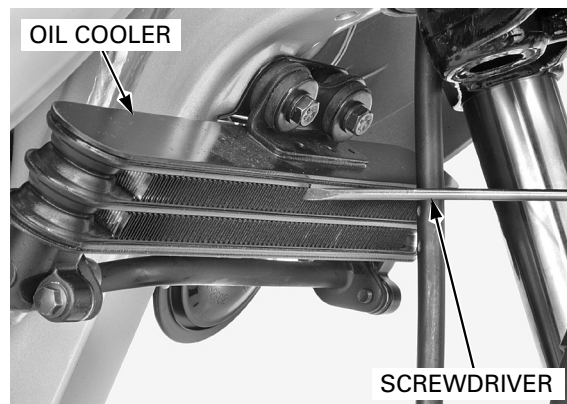
## OIL COOLER

### INSPECTION

Check the oil cooler air passage for clogging or damage.

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

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

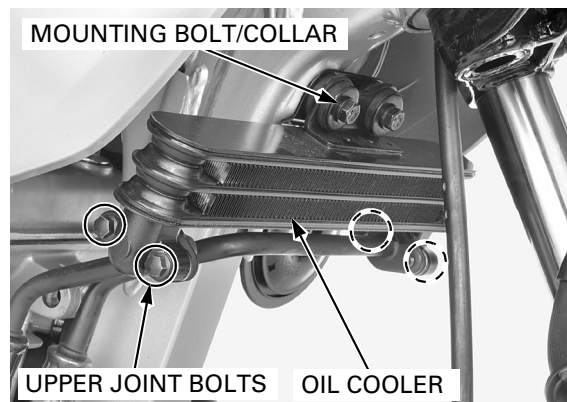


### REMOVAL

Drain the engine oil (page 3-13).

Remove the oil pipe upper joint bolts, oil pipe upper joints and O-rings.

Remove the oil cooler mounting bolt, collar and oil cooler.



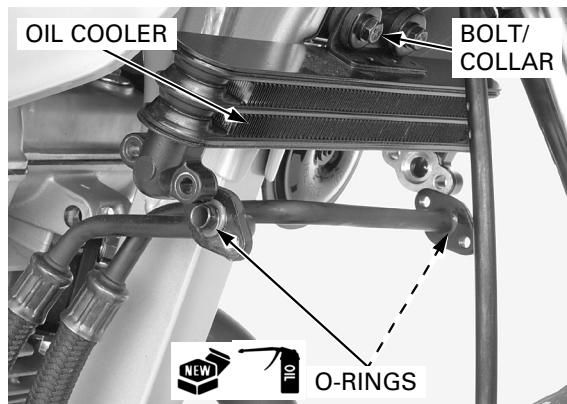
## LUBRICATION SYSTEM

### INSTALLATION

Install the oil cooler, collar and oil cooler mounting bolt.

Tighten the oil cooler mounting bolt securely.

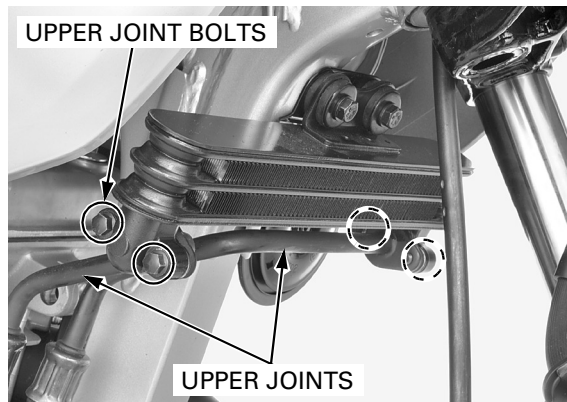
Coat new O-rings with engine oil and install them onto the oil pipe upper joints.



Install the oil pipe upper joints and upper joint bolts to the oil cooler.

Tighten the upper joint bolts securely.

Fill the recommended engine oil and check the engine oil level (page 3-12).



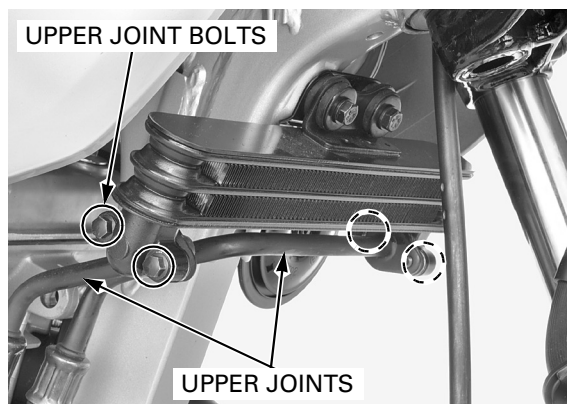
## OIL PIPE/OIL PASS PIPE

### REMOVAL

#### OIL PIPE

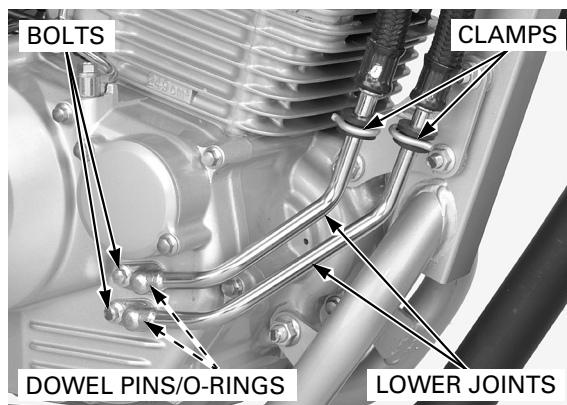
Drain the engine oil (page 3-13).

Remove the oil pipe upper joint bolts, oil pipe upper joints and O-rings.



Remove the oil pipe lower joint bolts, oil pipe lower joints, dowel pins and O-rings from the right crankcase cover.

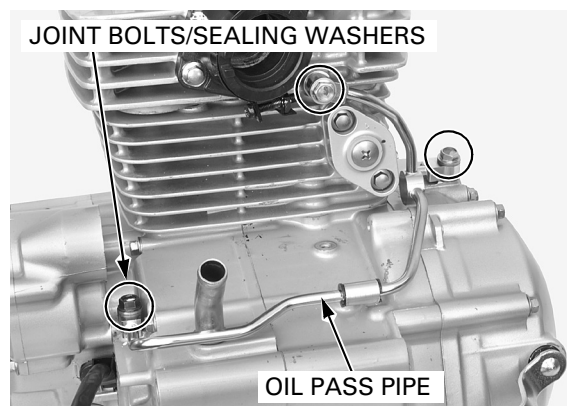
Remove the oil pipe lower joints from the clamps.



### OIL PASS PIPE

Remove the starter motor (page 17-6).

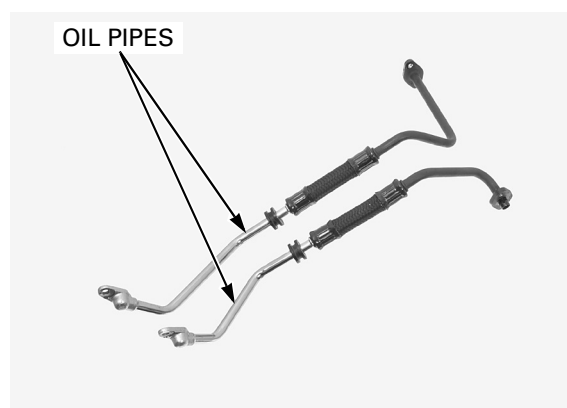
Remove the oil pass pipe joint bolts, sealing washers and oil pass pipe.



### INSPECTION

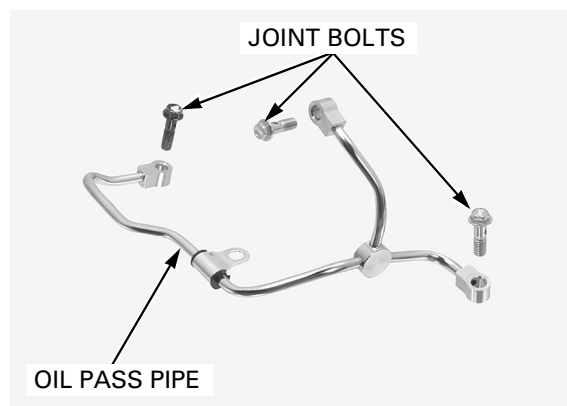
#### OIL PIPE

Check the oil pipes for clog, damage or bends and replace them if necessary.



#### OIL PASS PIPE/JOINT BOLT

Check the oil pass pipe and pipe bolts for clog, damage or bends and replace them if necessary.



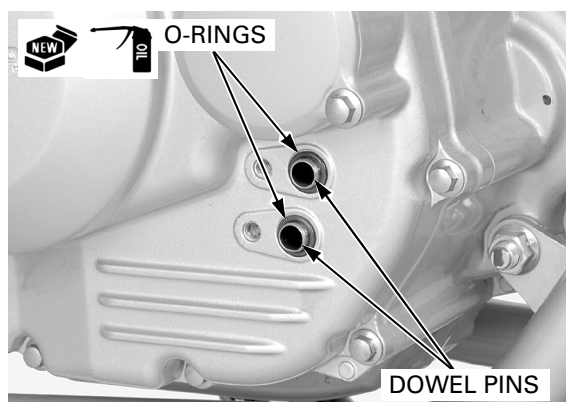
## LUBRICATION SYSTEM

### INSTALLATION

#### OIL PIPE

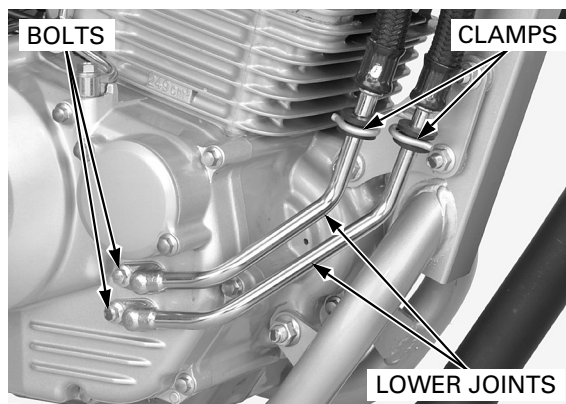
Install the dowel pins to the right crankcase cover.

Coat new O-rings with engine oil and install them onto the dowel pins.

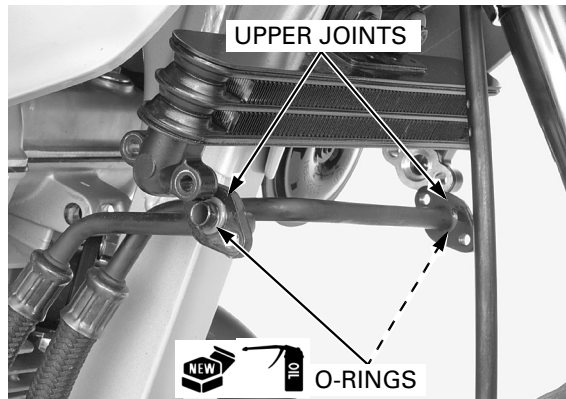


Install the oil pipe lower joints to the clamps.

Install the oil pipe lower joints, oil pipe lower joint bolts to the right crankcase cover and tighten them securely.



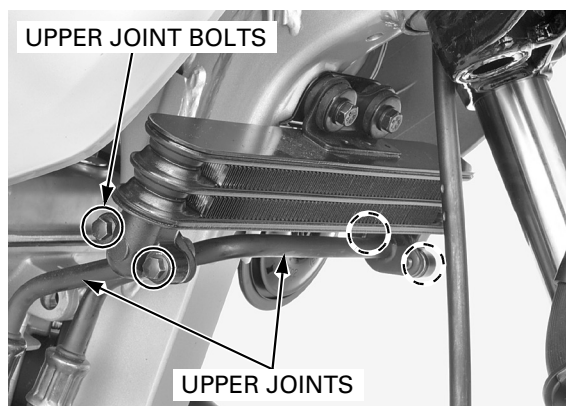
Coat new O-rings with engine oil and install them onto the oil pipe upper joints.



Install the oil pipe upper joints and joint bolts to the oil cooler.

Tighten the oil pipe upper joint bolts securely.

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



### OIL PASS PIPE

Install the oil pass pipe with new sealing washers and joint bolts.

Tighten the oil pass pipe joint bolts to the specified torque.

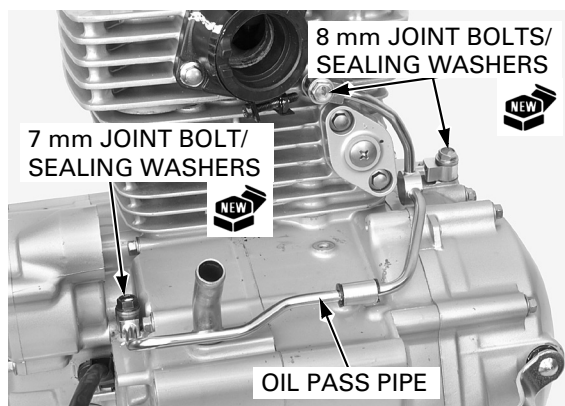
#### TORQUE:

**Oil pass pipe joint bolt:**

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

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

Install the starter motor (page 17-12).





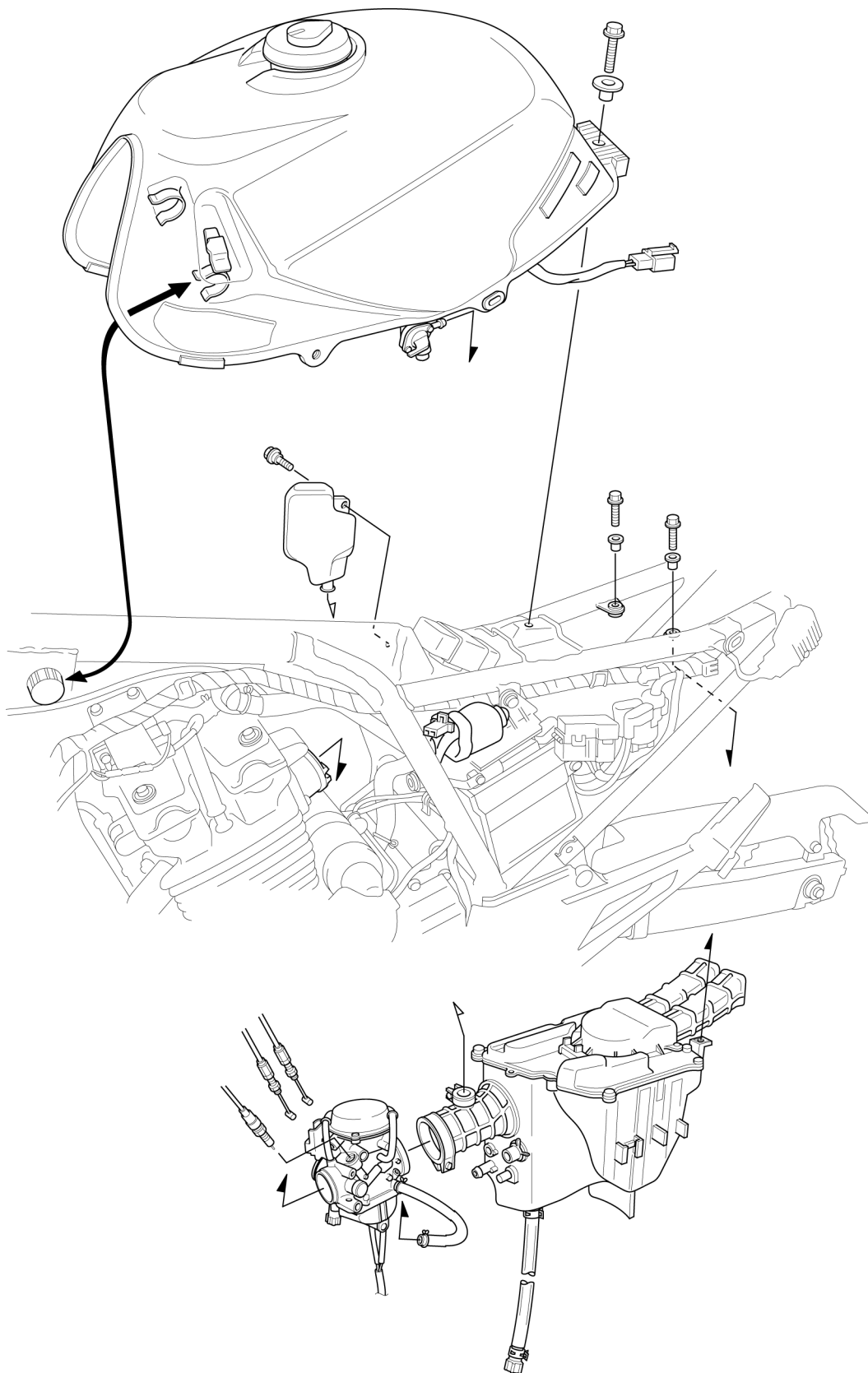
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## MEMO

COMPONENT LOCATION .....	5-2	CARBURETOR INSTALLATION .....	5-16
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CARBURETOR REMOVAL.....	5-7	PAIR CONTROL VALVE .....	5-20
CARBURETOR DISASSEMBLY.....	5-8	PAIR CHECK VALVE.....	5-21
CARBURETOR ASSEMBLY.....	5-12		

## COMPONENT LOCATION

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## SERVICE INFORMATION

### GENERAL

- 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.
- 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.
- Before disassembling the carburetor, place an approved fuel container under the drain hose, loosen the drain screw and drain the carburetor.
- After removing the carburetor, cover the intake port of the cylinder head with shop towel 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 clogging jets, resulting in hard starting or poor driveability.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	BR	VEA2H
	2LA	VEA2K
	3LA	VEA2J
Main jet	BR	#150
	2LA	#138
	3LA	#142
Slow jet		#45
Pilot screw initial/final opening		page 5-18
Float level		18.5 mm (0.73 in)
Engine idle speed		1,400 ± 100 min <sup>-1</sup> (rpm)
Throttle grip free play		2 – 6 mm (1/16 – 1/4 in)
PAIR control specified vacuum		48 kPa (360 mm Hg)

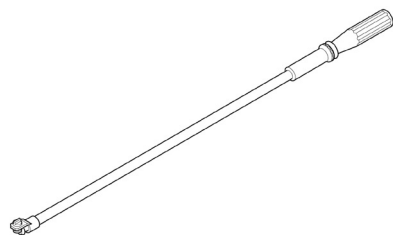
### TORQUE VALUES

PAIR check valve cover bolt  
Insulator band

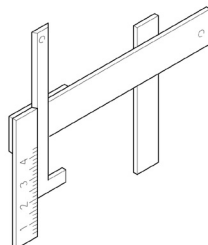
5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)  
page 5-16

### TOOLS

Pilot screw wrench  
07908-4730002



Carburetor float level gauge  
07401-0010000



## FUEL SYSTEM

---

### TROUBLESHOOTING

#### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
  - Clogged fuel strainer
  - Clogged fuel line
- Too much fuel getting to the engine
  - Clogged air cleaner
  - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Improper choke operation
- Improper throttle operation
- No spark at plug (faulty ignition system – page 16-2)

#### Lean mixture

- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent hose
- Intake air leak
- Faulty vacuum piston

#### Rich mixture

- SE valve open
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Faulty vacuum piston

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

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Clogged air cleaner
- Clogged slow circuit
- SE valve open
- Faulty ignition system (page 16-2)

#### Afterburn when engine braking is used

- Lean mixture in slow circuit
- Faulty ignition system (page 16-2)
- Faulty secondary air supply system
  - Faulty PAIR control valve
  - Faulty PAIR check valve
  - Clogged hose of the secondary air supply system
- Faulty air cut-off valve

#### Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (page 16-2)

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

- Clogged fuel system
- Faulty ignition system (page 16-2)

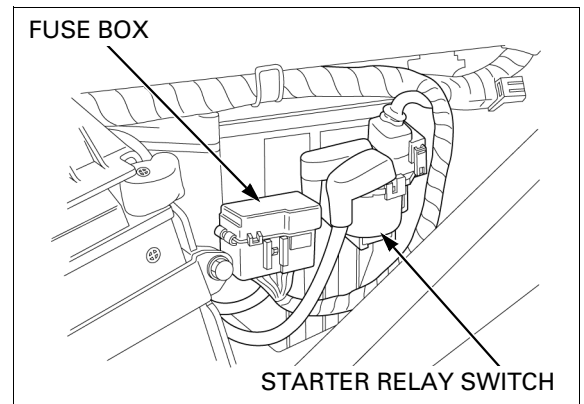
## AIR CLEANER HOUSING

### REMOVAL

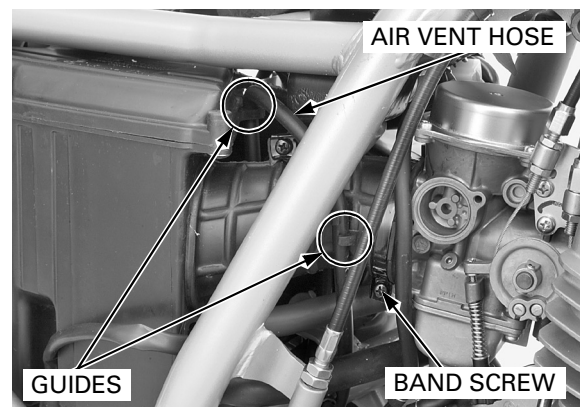
Remove the following:

- Fuel tank (page 2-7)
- Rear fender (page 2-6)
- Rear wheel (page 13-6)

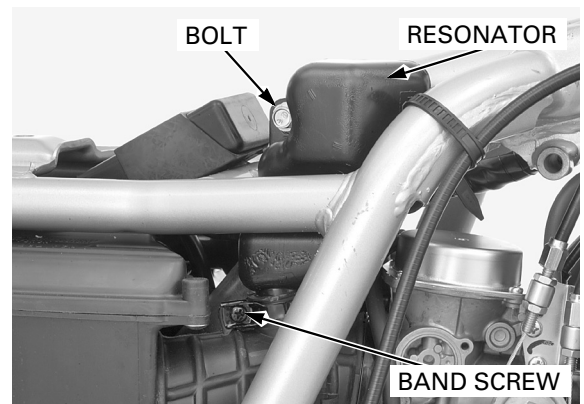
Remove the fuse box and starter relay switch from the air cleaner housing.



Release the air vent hose from the hose guides. Loosen the connecting tube band screw.

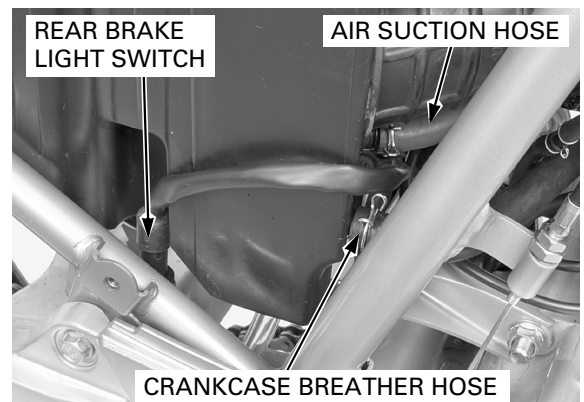


Remove the bolt and loosen the resonator connecting tube band screw. Remove the resonator.



Disconnect the crankcase breather hose and air suction hose.

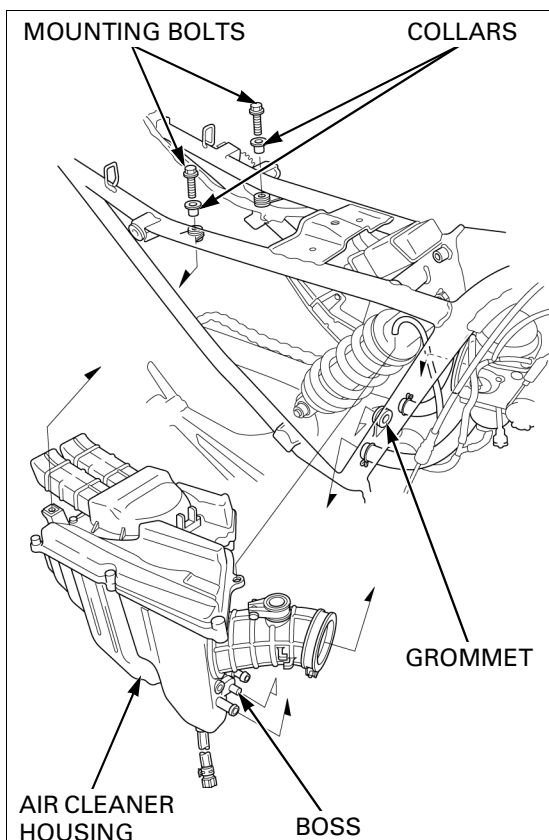
Unhook the return spring and remove the rear brake light switch.



## FUEL SYSTEM

*Be careful not to damage the boss.*

Remove the air cleaner housing mounting bolts and collars.  
Remove the air cleaner housing while releasing the boss from the grommet of the frame.



### DISASSEMBLY/ASSEMBLY

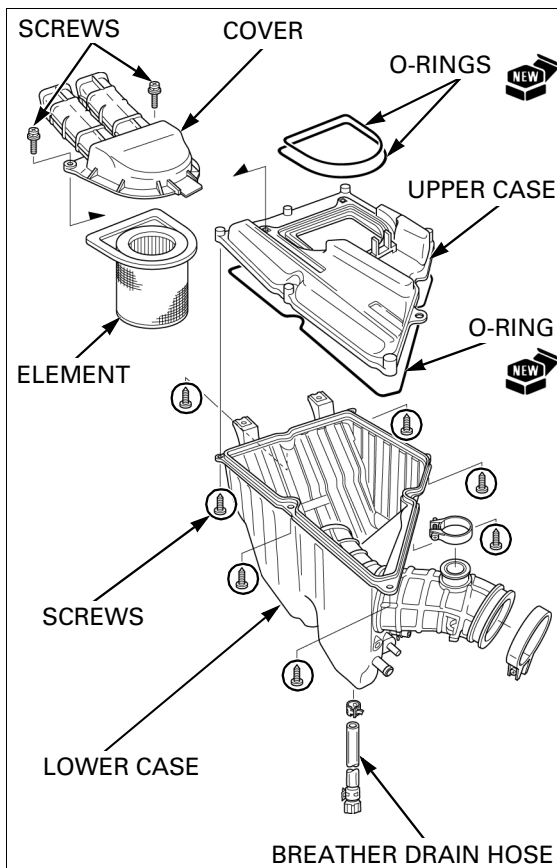
Remove the screws, air cleaner cover, air cleaner element and O-rings.  
Remove the screws, air cleaner upper case and O-ring from the air cleaner lower case.

Install new O-rings into each groove in the upper case and lower case.

Assemble the air cleaner housing in the reverse order of disassembly.

### INSTALLATION

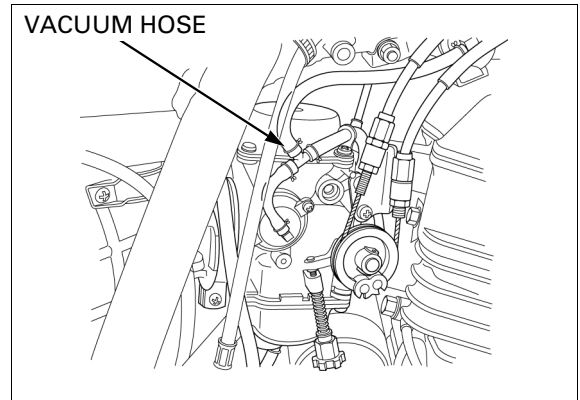
Installation is in the reverse order of removal.



## CARBURETOR REMOVAL

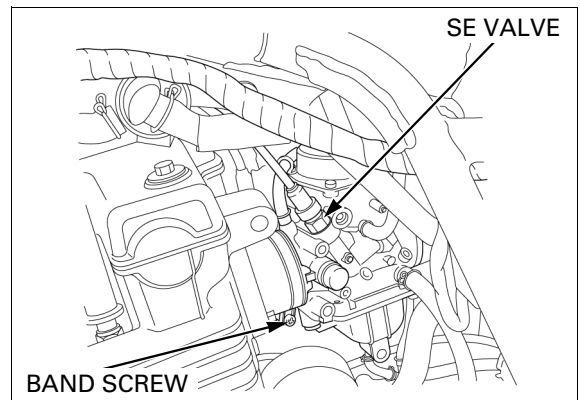
Remove the fuel tank (page 2-7).

Remove the PAIR control valve vacuum hose.

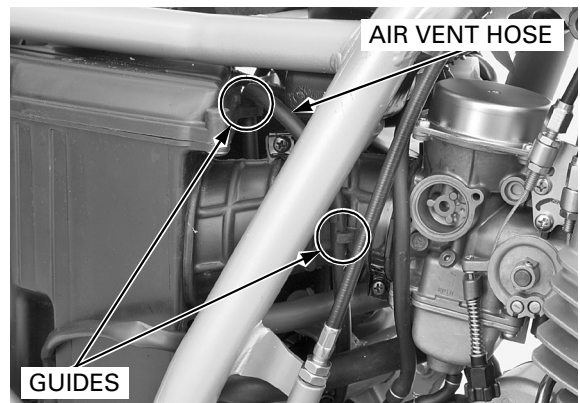


Remove the SE valve

Loosen the insulator band screw.

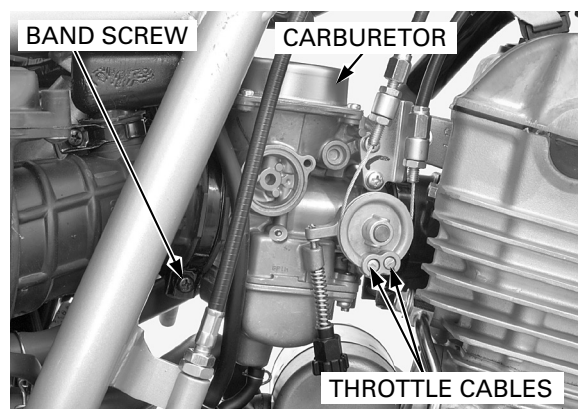


Release the air vent hose from the hose guides.



Disconnect the throttle cables from the throttle drum.

Loosen the connecting tube band screw and remove the carburetor.



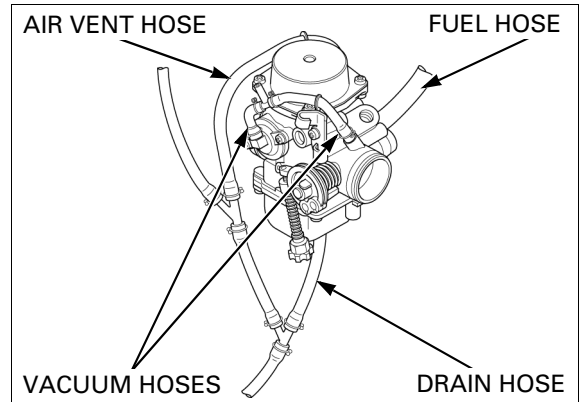


## FUEL SYSTEM

### CARBURETOR DISASSEMBLY

Remove the following:

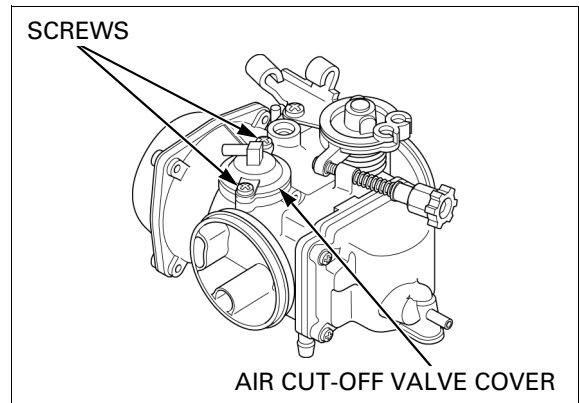
- Air vent hose
- Drain hose
- Fuel hose
- Vacuum hoses



#### AIR CUT-OFF VALVE

*The air cut-off valve cover is under spring pressure. Do not lose the spring and screws.*

Remove the screws while holding the air cut-off valve cover.

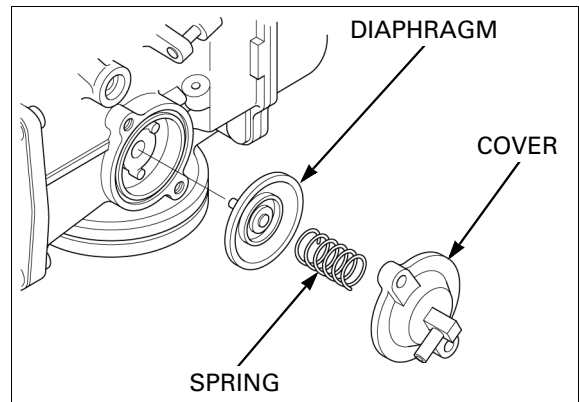


Remove the air cut-off valve cover, spring and air cut-off valve/diaphragm from the carburetor body.

Check the diaphragm for pin holes, deterioration or other damage.

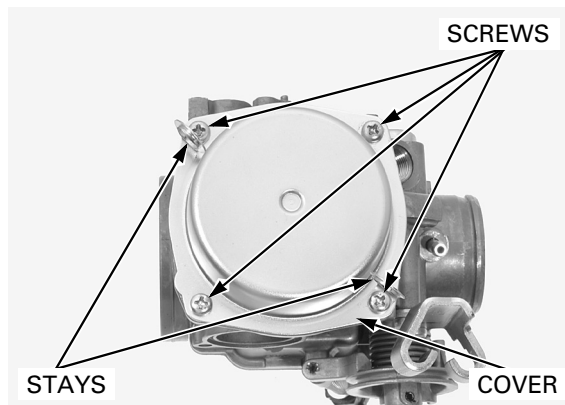
Check the air cut-off valve for wear or damage at the tip.

Check the orifice in the carburetor body for clog or restriction.

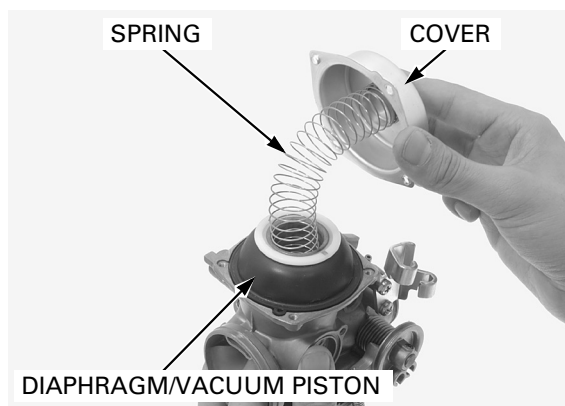


## VACUUM CHAMBER

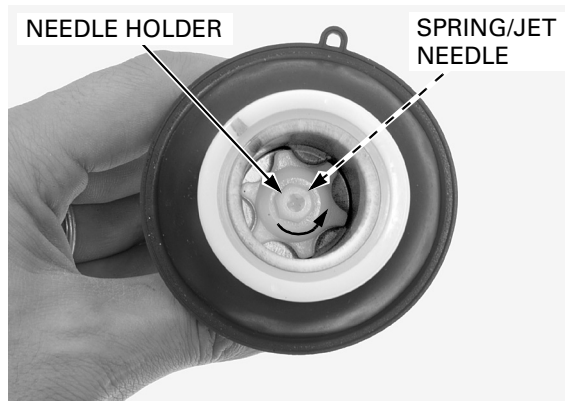
Remove the screws and stays while holding the vacuum chamber cover.



Remove the vacuum chamber cover, compression spring and diaphragm/vacuum piston from the carburetor body.



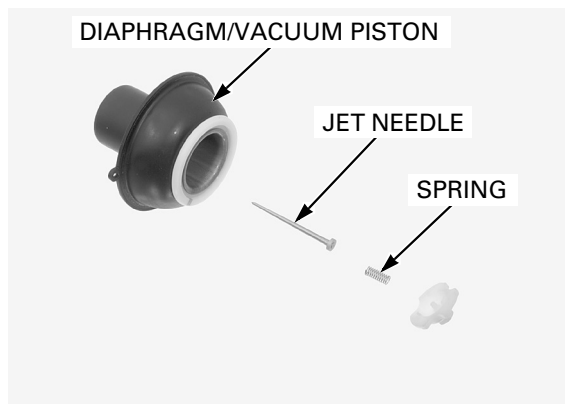
Turn the needle holder counterclockwise while pressing it in and remove the holder flanges from the piston grooves. Remove the needle holder, spring and jet needle from the vacuum piston.



Check the following:

- Jet needle for stepped wear
- Vacuum piston for wear or damage
- Diaphragm for pin holes, deterioration or damage
- Vacuum piston for smooth operation up and down in the carburetor body

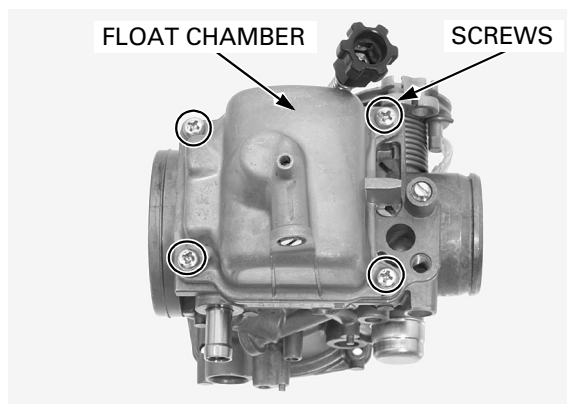
Air can leak out of the vacuum chamber if the diaphragm is damaged in any way, even if only a pin hole.



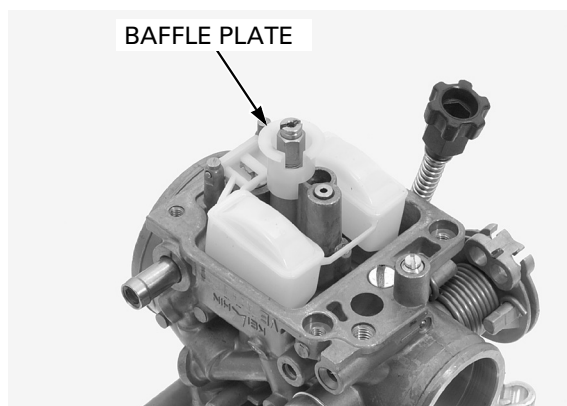
## FUEL SYSTEM

### FLOAT CHAMBER

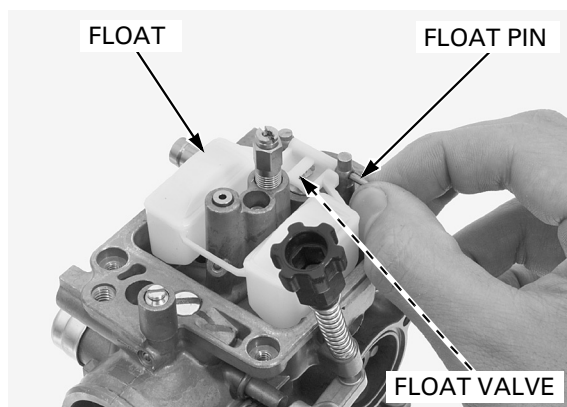
Remove the screws, float chamber and O-ring.



Remove the baffle plate.

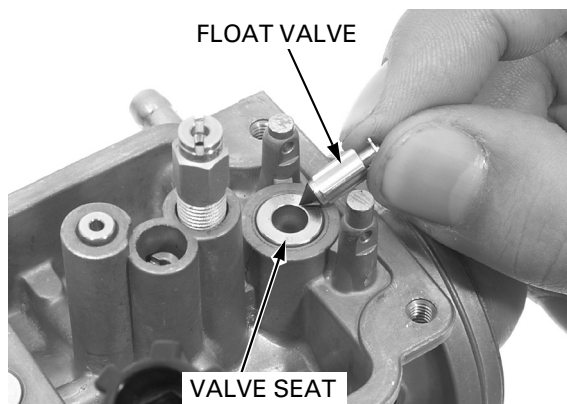


Remove the float pin, float and float valve.  
Check the float for damage or fuel in the float.



Check the following:

- Float valve and valve seat for scoring, scratches, clogging or damage
- Tip of the float valve, where it contacts the valve seat, for stepped wear or contamination
- Operation of the float valve



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

Remove the following:

- Main jet
- Needle jet holder
- Needle jet
- Slow jet

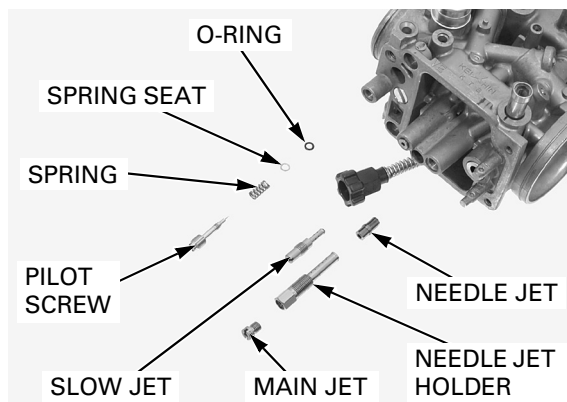
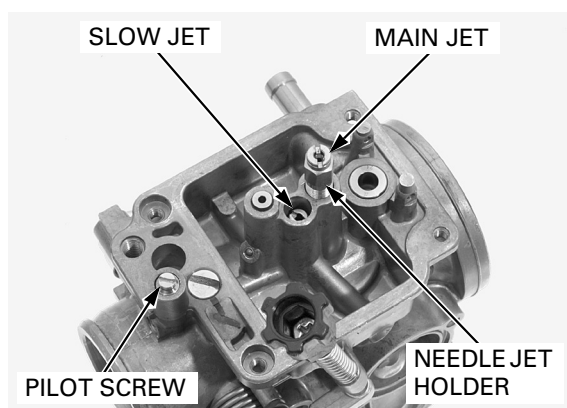
*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

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.

Remove the pilot screw, spring, spring seat and O-ring.

Check the each jet for wear or damage.  
Check the pilot screw for wear or damage.

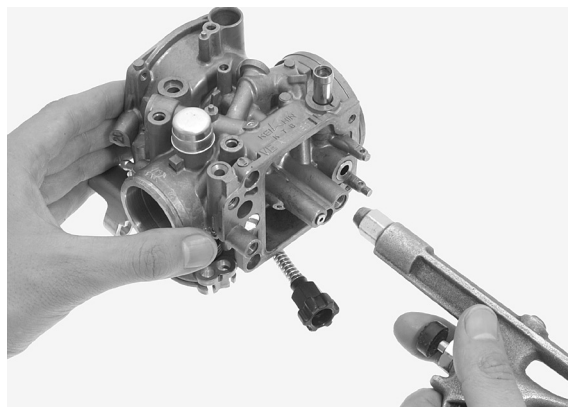
Clean the jets with cleaning solvent and blow open with compressed air.



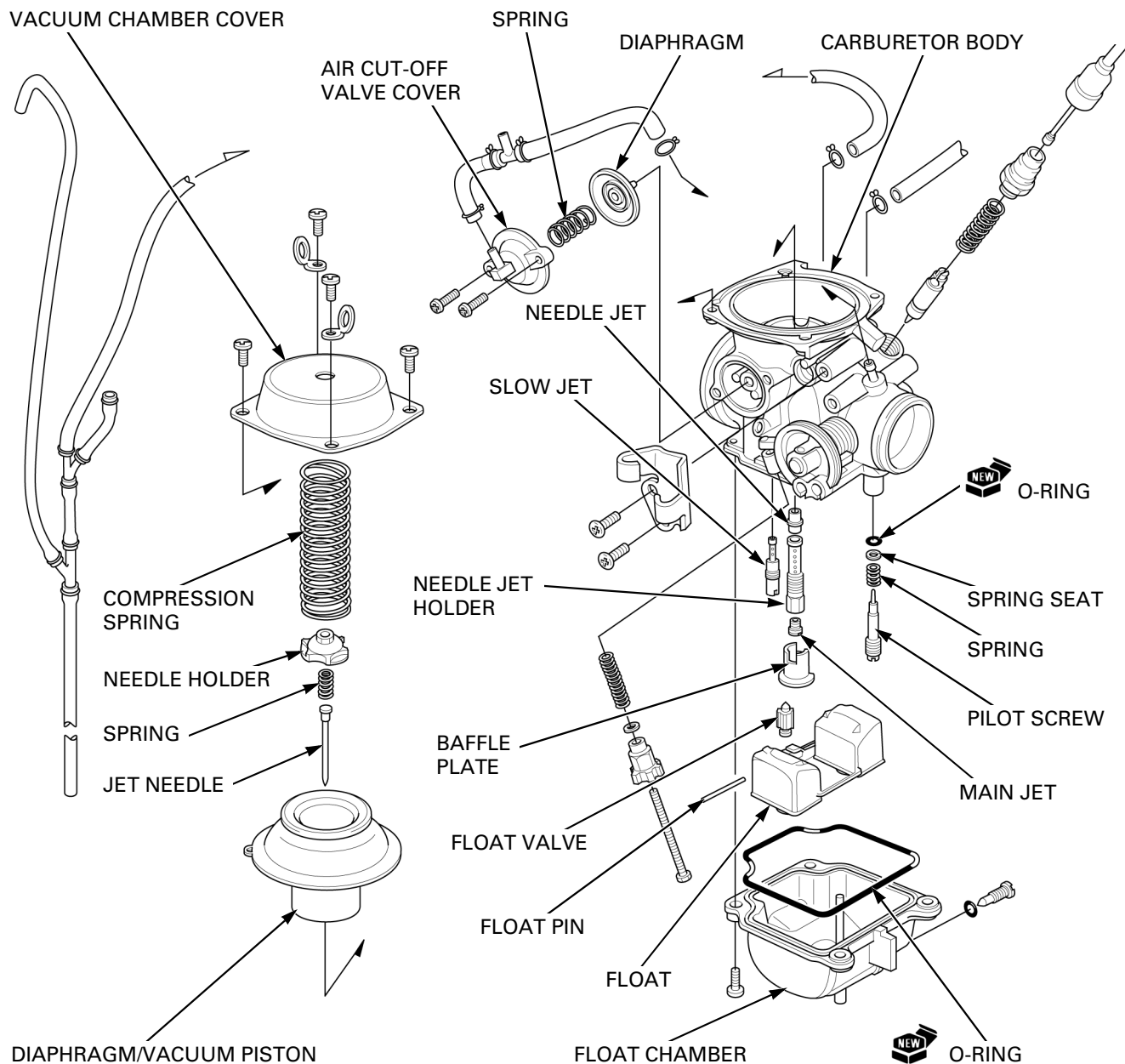
## CARBURETOR CLEANING

*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



### FLOAT AND JETS

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

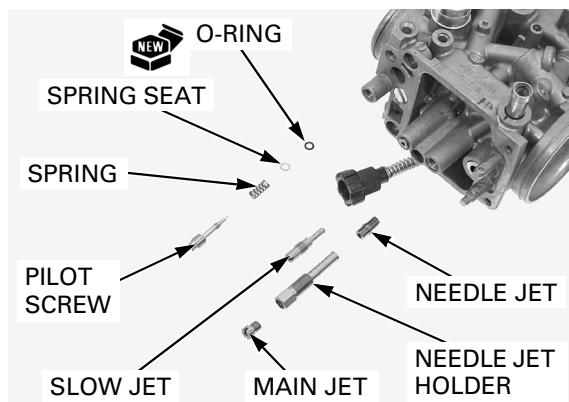
*Install the needle jet its short end facing toward the needle jet holder.*

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

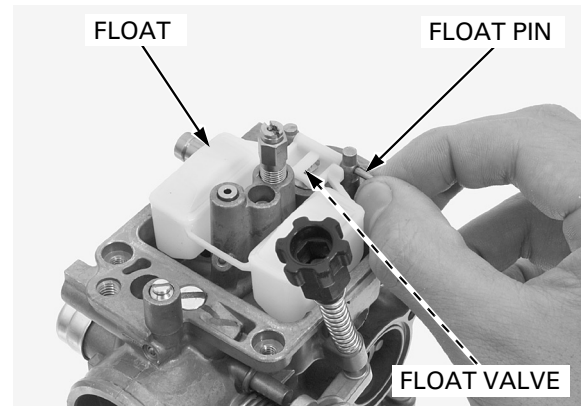
Perform the pilot screw adjustment if new pilot screw is installed (page 5-18).

Install the following:

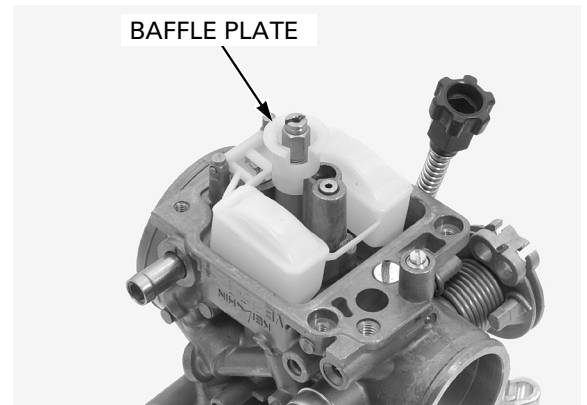
- Needle jet
- Needle jet holder
- Main jet
- Slow jet



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



Install the baffle plate.



## 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 at the highest position of the float.*

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

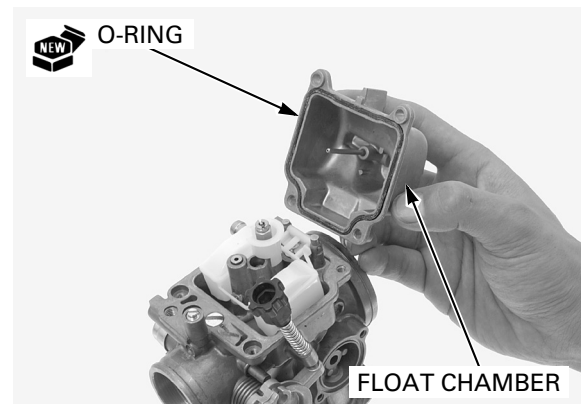
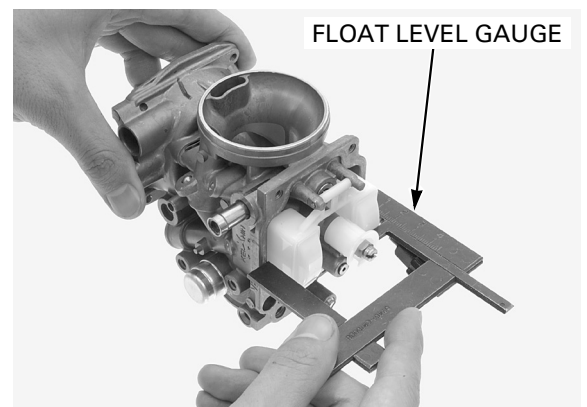
**FLOAT LEVEL: 18.5 mm (0.73 in)**

### TOOL:

**Carburetor float level gauge      07401-0010000**

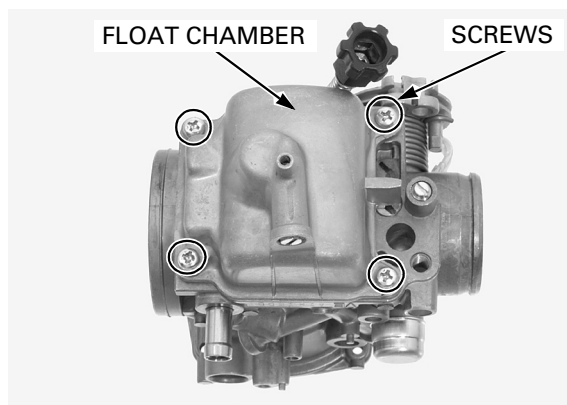
The float cannot be adjusted. Replace the float assembly if the float level is out of specification.

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



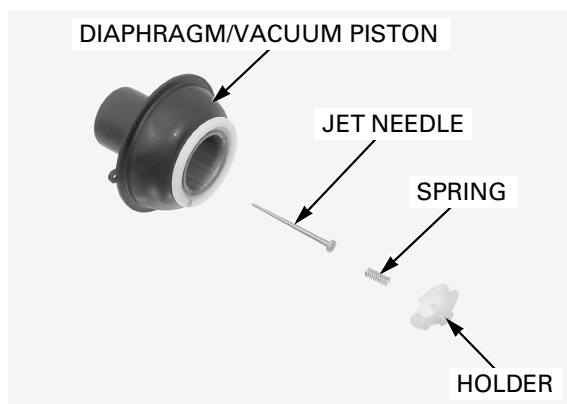
## FUEL SYSTEM

Install the float chamber and tighten the screws.



### VACUUM CHAMBER

Install the jet needle into the vacuum piston.  
Install the spring onto the needle holder and set the  
needle holder into the vacuum piston.



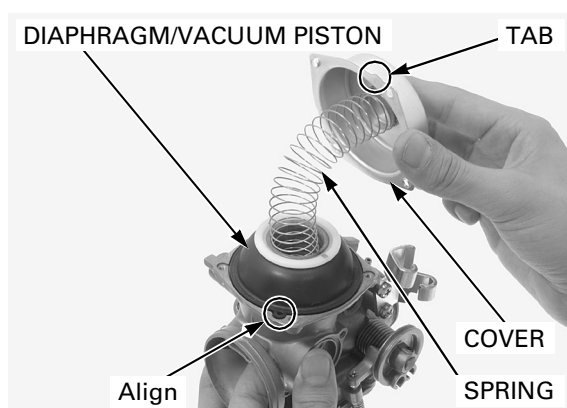
Turn the needle holder clockwise while pressing it  
until it locks.  
Holder flanges and piston grooves should be fitted  
after turning.



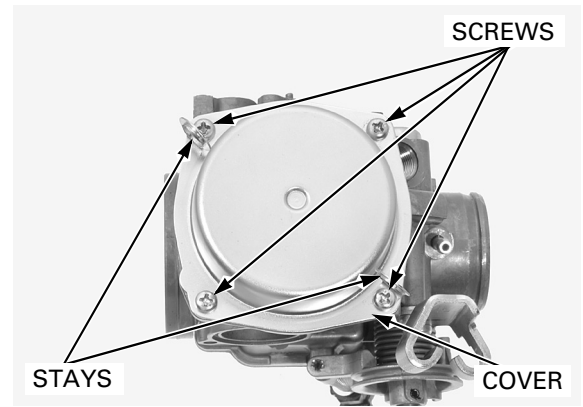
Install the diaphragm/vacuum piston into the carburetor body while aligning the tab of the diaphragm with the air passage, then insert the jet needle into the needle jet.

Lift the bottom of the piston with your finger to set the diaphragm rib into the groove in the carburetor body.

Install the compression spring and vacuum chamber cover while lifting the piston in place.  
Align the tab of the cover with the air passage and secure the cover with at least two screws before releasing the vacuum piston.



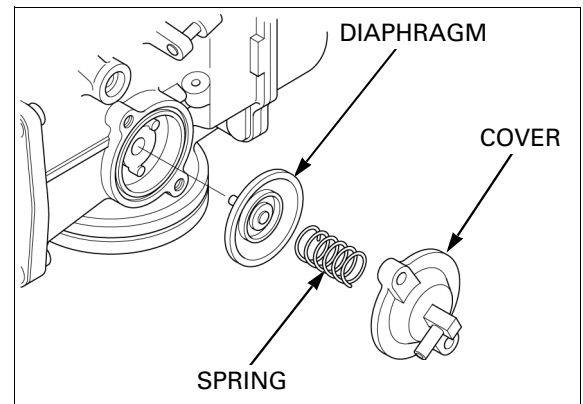
Install the stays and tighten the screws securely.



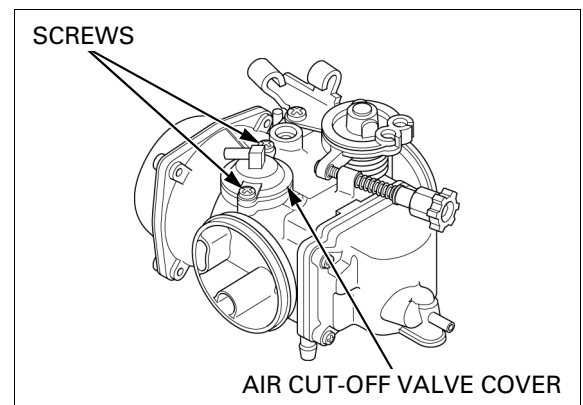
## AIR CUT-OFF VALVE

*Be careful not to pinch the diaphragm.*

Install the air cut-off valve/diaphragm, spring and air cut-off valve cover onto the carburetor body.

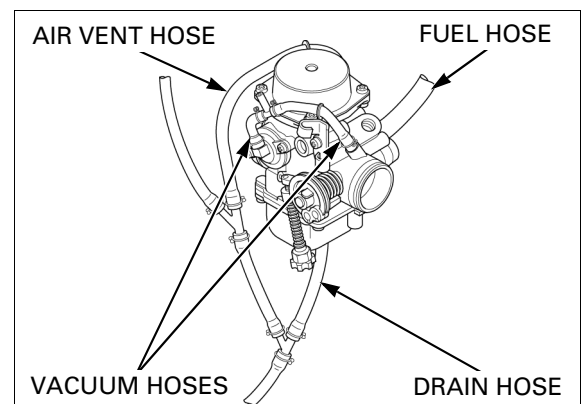


Install the screws while holding the air cut-off valve cover, and tighten the screws securely.



Install the following:

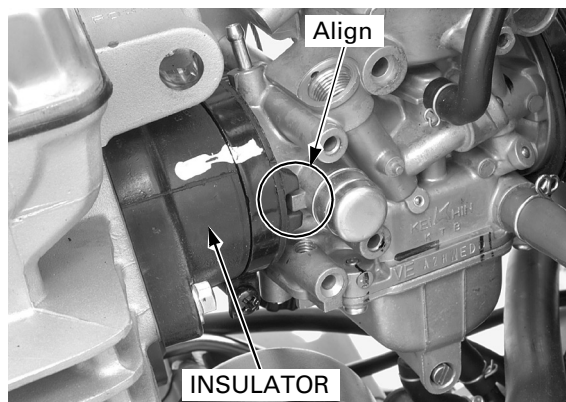
- Vacuum hoses
- Fuel hose
- Drain hose
- Air vent hose



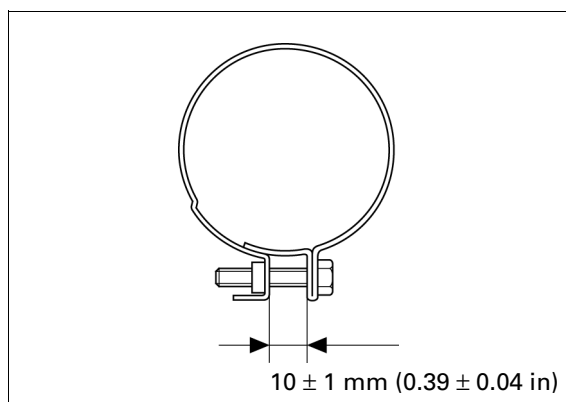


### CARBURETOR INSTALLATION

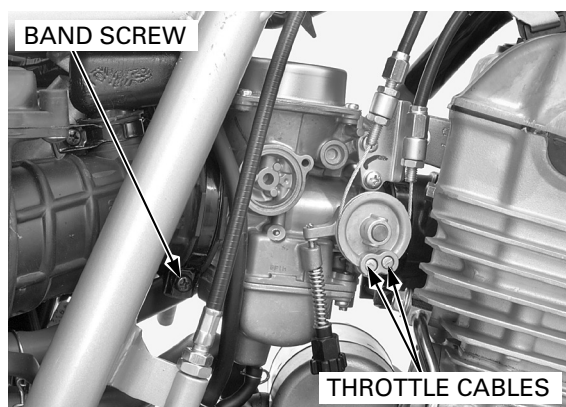
Install the carburetor into the insulator while aligning the carburetor boss with the insulator groove.



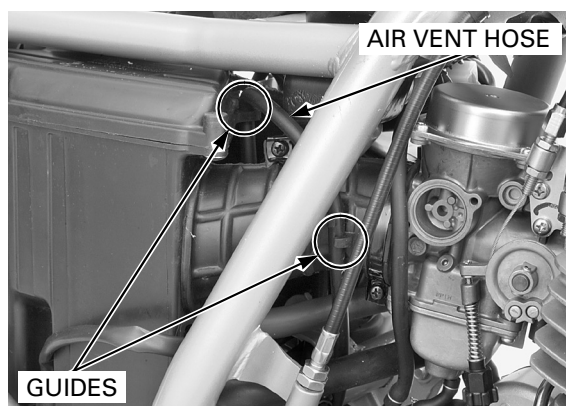
Tighten the insulator band screw so the distance between the band ends is  $10 \pm 1$  mm ( $0.39 \pm 0.04$  in).



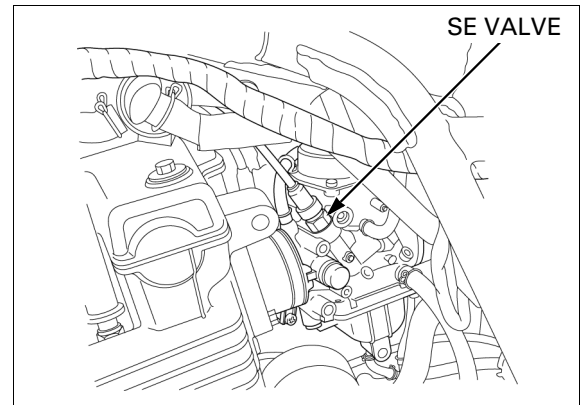
Tighten the connecting tube band screw.  
Connect the throttle cables to the throttle drum.



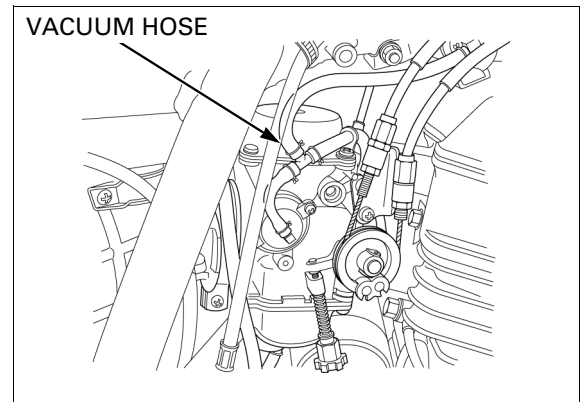
Install the air vent hose to the hose guides.



Install the SE valve.



Install the PAIR control valve vacuum hose.  
Install the fuel tank (page 2-7).



## STARTING ENRICHMENT (SE) VALVE

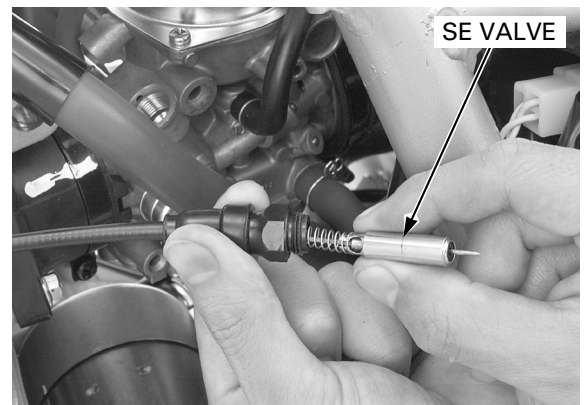
Remove the SE valve (page 5-7).

Check the SE valve for scoring, scratches or wear.  
Check the seat at the tip of the SE valve for stepped wear.

Replace the SE valve as a set if necessary.

Installation is in the reverse order of removal.

After the installation, check for the smooth operation of the choke lever (page 3-6).



# PILOT SCREW ADJUSTMENT

## IDLE DROP PROCEDURE

### NOTE:

- The pilot screw is factory pre-set adjustment is not necessary unless the carburetor overhauled or a new pilot screw is installed.
- Use a tachometer with graduations of 50 min<sup>-1</sup> (rpm) or smaller that will accurately indicate a 50 min<sup>-1</sup> (rpm) change.

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

Turn the pilot screw with the pilot screw wrench clockwise until it seats lightly, then back it out to specification given. This is an initial setting prior to the final pilot screw adjustment.

### TOOL:

Pilot screw wrench

07908-4730002

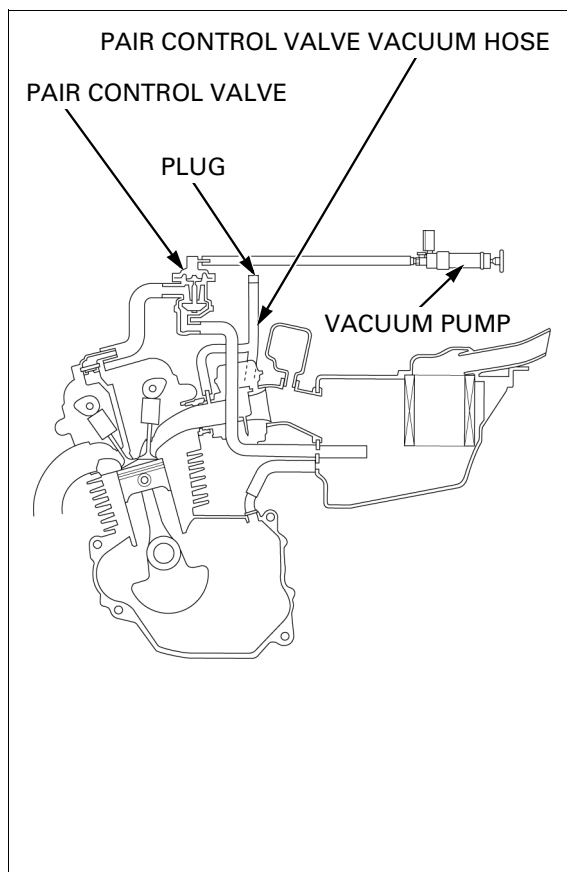
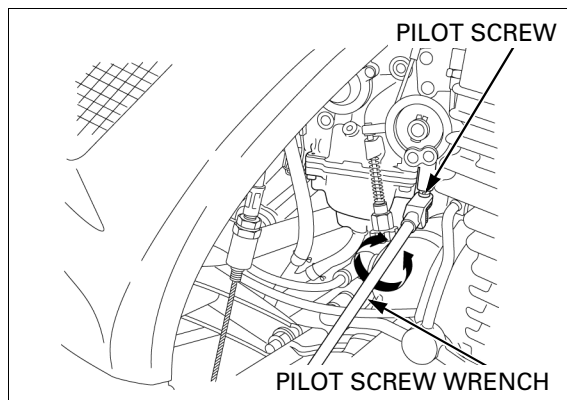
### INITIAL OPENING:

BR: 2 turns out

2LA: TBD

3LA: TBD

1. Warm up the engine to operating temperature. Stop and go riding for 10 minutes is sufficient.
2. Stop the engine and connect a tachometer according to its manufacturer's instructions.
3. Disconnect the PAIR control valve vacuum hose from the PAIR control valve, then install the plug to the PAIR control valve vacuum hose and connect the vacuum pump to the PAIR control valve.
4. Apply the specified vacuum to the PAIR control valve vacuum hose more than 48 kPa (360 mm Hg).



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

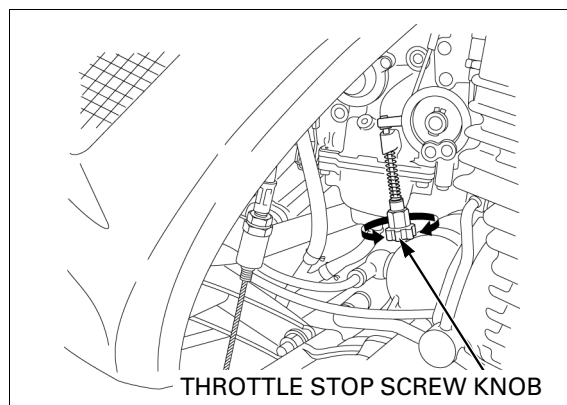
**IDLE SPEED:  $1,400 \pm 100 \text{ min}^{-1} \text{ (rpm)}$**

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

**FINAL OPENING: 1/2 turns out**

10. Disconnect the vacuum pump from the PAIR control valve, then remove the plug from the PAIR control valve vacuum hose and connect the PAIR control valve vacuum hose to the PAIR control valve.
11. Readjust the idle speed with the throttle stop screw knob.
12. Recheck the exhaust emission measurement at idle (page 3-15) (BR type only).

If the CO and/or HC concentration is exit, inspect the secondary air supply system (page 5-19).



## SECONDARY AIR SUPPLY SYSTEM

### INSPECTION

Start the engine and warm it up to normal operating temperature, then stop the engine.

Remove the air cleaner element (page 3-7).

Check that the secondary air intake port is clean and free of carbon deposits.

Check the PAIR check valve if the port is carbon fouled (page 5-21).



## FUEL SYSTEM

Disconnect the PAIR control valve vacuum hose from the PAIR control valve, then install the plug to the PAIR control valve vacuum hose. Connect the vacuum pump to the PAIR control valve.

Start the engine and open the throttle slightly to be certain that air is sucked in through the secondary air suction hose.

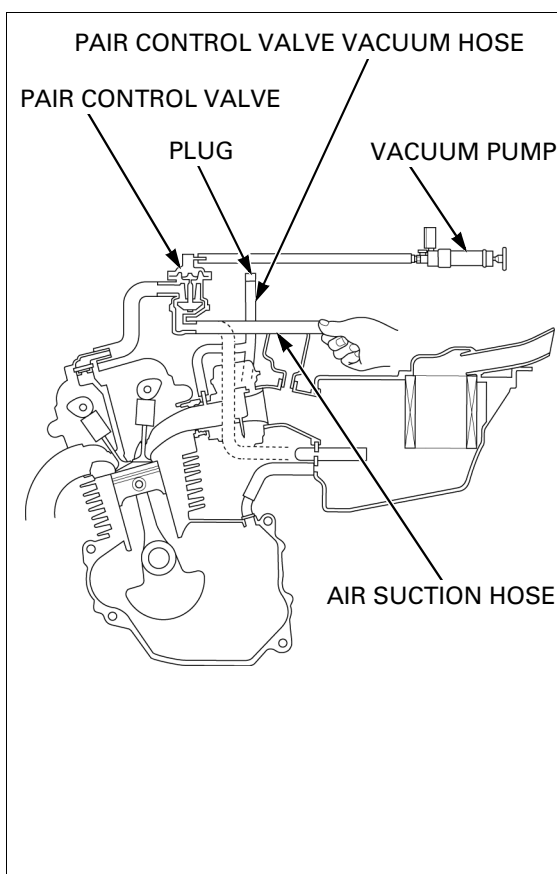
If the air is not drawn in, check the secondary air suction hoses for clogging.

With the engine running, gradually apply vacuum to the PAIR control valve vacuum hose.

Check that the secondary air suction hose stops drawing air, and that the vacuum does not bleed.

**SPECIFIED VACUUM: 48 kPa (360 mm Hg)**

If the air is drawn, or if the specified vacuum is not maintained, install a new PAIR control valve (page 5-20).



## PAIR CONTROL VALVE

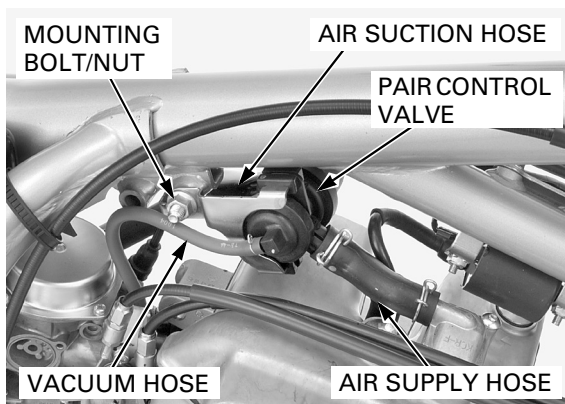
### REMOVAL/INSTALLATION

Remove the fuel tank (page 2-7).

Disconnect the secondary air supply hose, air suction hose and PAIR control valve vacuum hose from the PAIR control valve.

Remove the PAIR control valve mounting bolt, nut and PAIR control valve.

Installation is in the reverse order of removal.



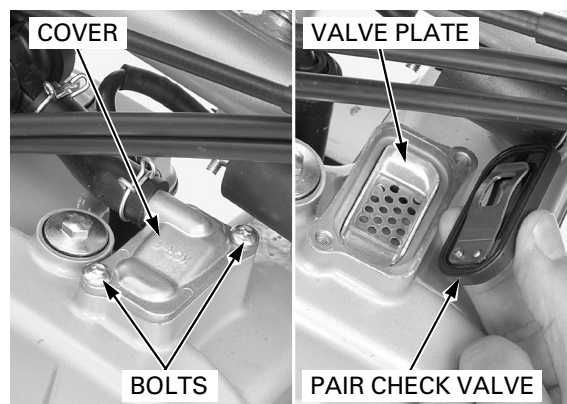
## PAIR CHECK VALVE

### REMOVAL

Remove the fuel tank (page 2-7).

Remove the bolts and PAIR check valve cover from the cylinder head cover.

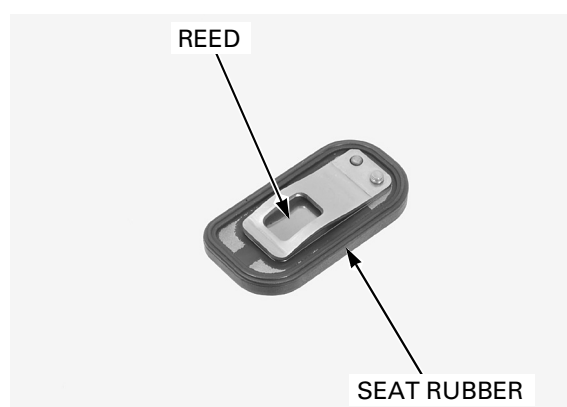
Remove the PAIR check valve and valve plate.



### INSPECTION

Check the reed for damage or fatigue. Replace the PAIR check valve if necessary.

Replace the PAIR check valve if the seat rubber is cracked, deteriorated or damaged, or if there is clearance between the reed and seat rubber.



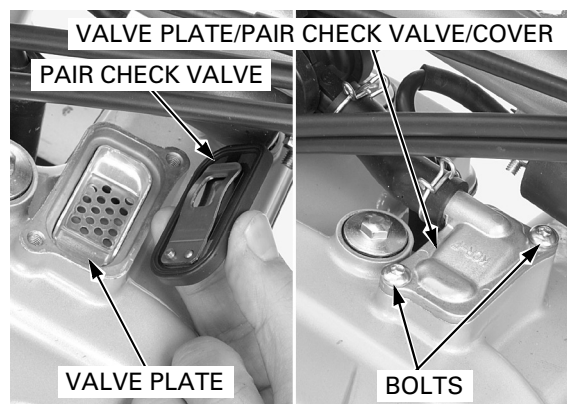
### INSTALLATION

Install the valve plate, PAIR check valve and cover.

Install and tighten the bolts to the specified torque.

**TORQUE: 5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)**

Install the fuel tank (page 2-7).



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## MEMO

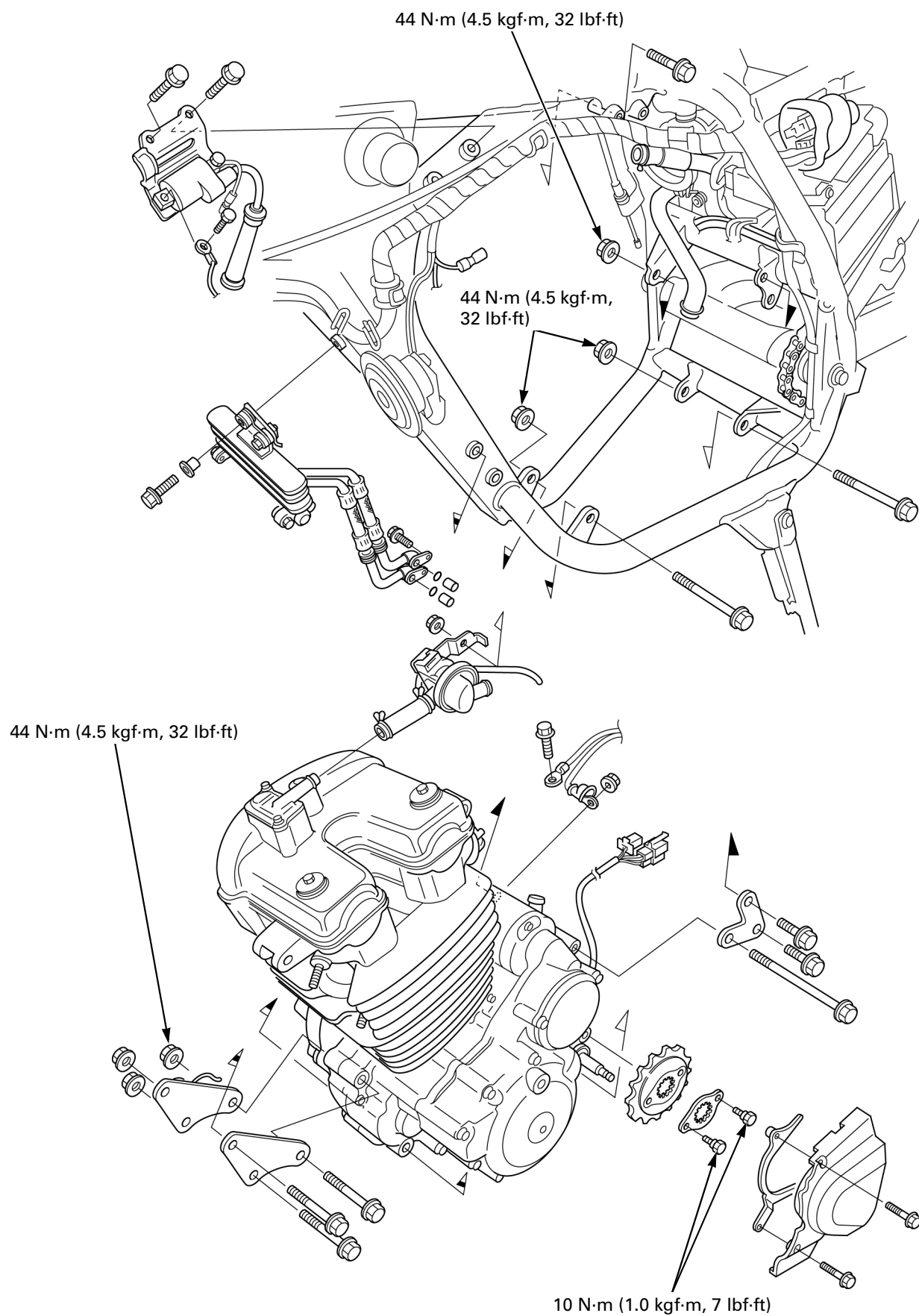
# 6. ENGINE REMOVAL/INSTALLATION

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



## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- The following components can be serviced with the engine installed in the frame.
  - Flywheel/starter clutch
  - Camshaft
  - Carburetor
  - Clutch/gearshift linkage
  - Cylinder head
  - Starter motor
  - Cylinder/piston
  - Oil pump
- The following components require engine removal for service.
  - Crankshaft/balancer
  - Transmission

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine oil capacity after disassembly	1.8 liter (1.9 US qt, 1.6 Imp qt)

### TORQUE VALUES

Drive sprocket fixing plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Front upper engine mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)
Front lower engine mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)
Rear upper engine mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)
Rear lower engine mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)
Left step holder mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

### ENGINE REMOVAL

Drain the engine oil (page 3-13).

Support the motorcycle securely with a hoist or equivalent.

Remove the following:

- Fuel tank (page 2-7)
- Battery negative (-) cable (page 15-5)
- PAIR control valve (page 5-20)
- Carburetor (page 5-7)
- Right step holder (page 9-5)

Remove the oil pipe lower joint bolts, oil pipe lower joints, dowel pins and O-rings from the right crank-case cover.

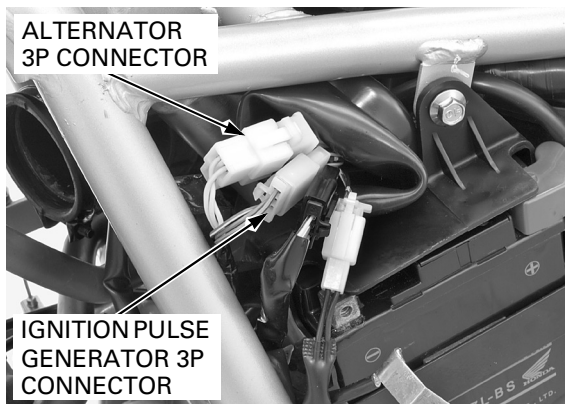
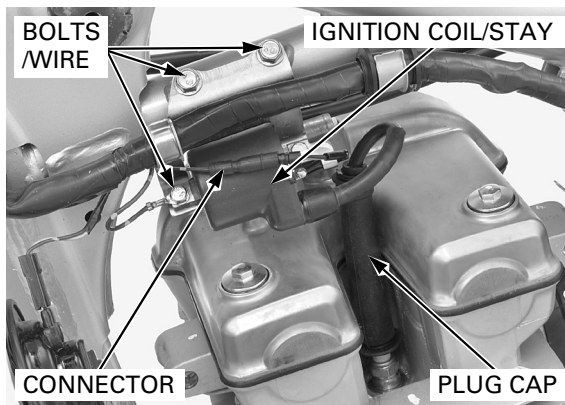
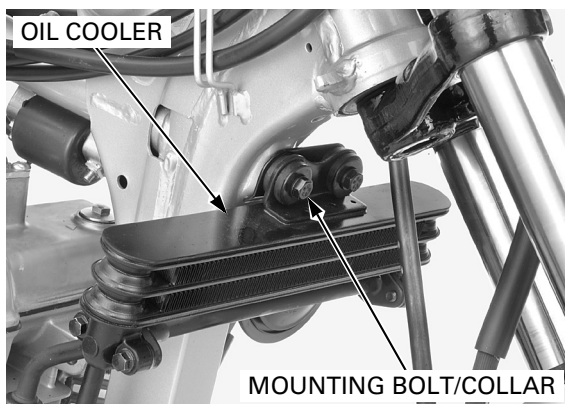
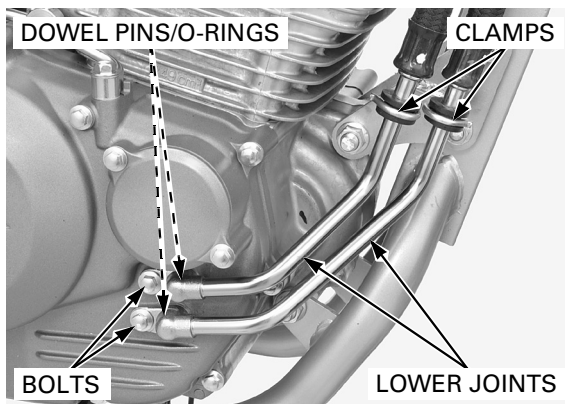
Remove the oil pipe lower joints from the clamps.

Remove the oil cooler mounting bolt, and collar, then remove the oil cooler with the oil pipes.

Disconnect the spark plug cap and ignition coil primary wire connector.

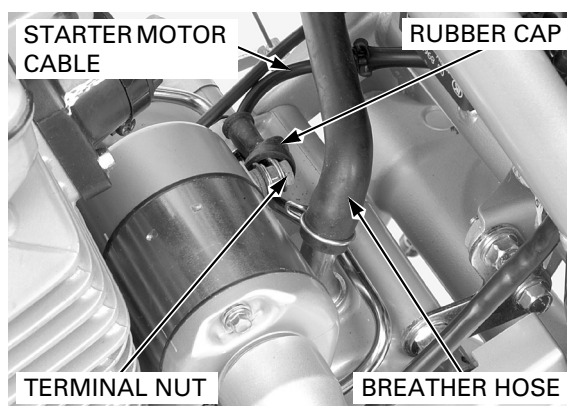
Remove the bolt, ground wire, ignition coil/stay mounting bolts and ignition coil/stay.

Disconnect the alternator 3P connector, ignition pulse generator/neutral switch 3P connector.



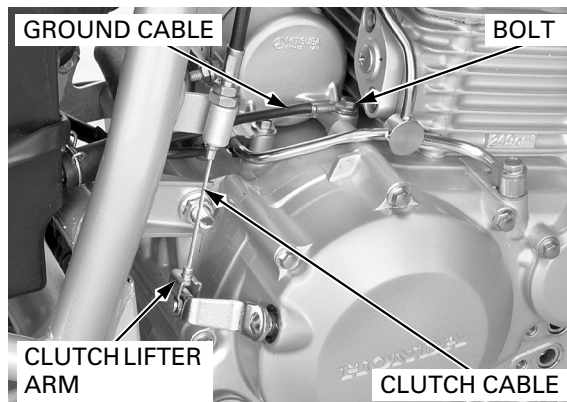
## ENGINE REMOVAL/INSTALLATION

Remove the rubber cap, terminal nut and starter motor cable.  
Disconnect the crankcase breather hose

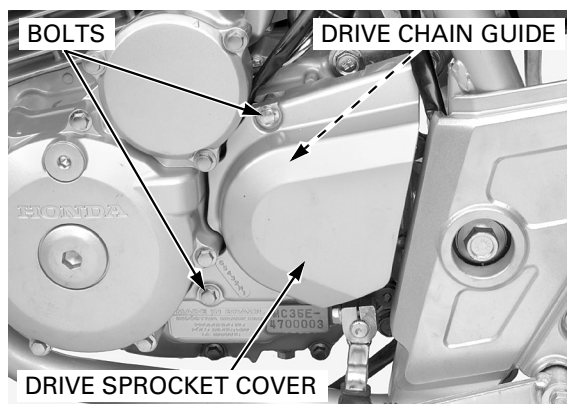


Disconnect the clutch cable from the clutch lifter arm.

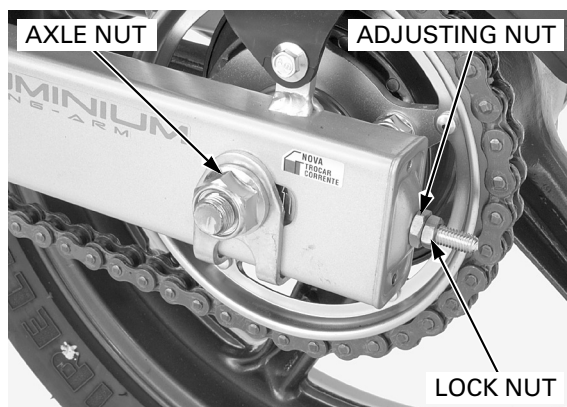
Remove the bolt and ground cable.



Remove the bolts, drive sprocket cover and drive chain guide.

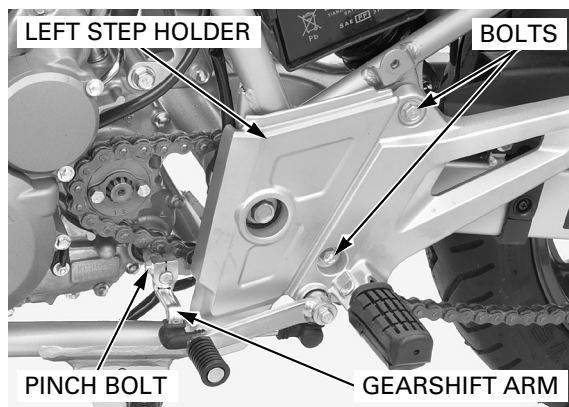


Loosen the rear axle nut, drive chain adjuster lock nuts and adjusting nuts.  
Push the rear wheel forward and make a drive chain slack fully.

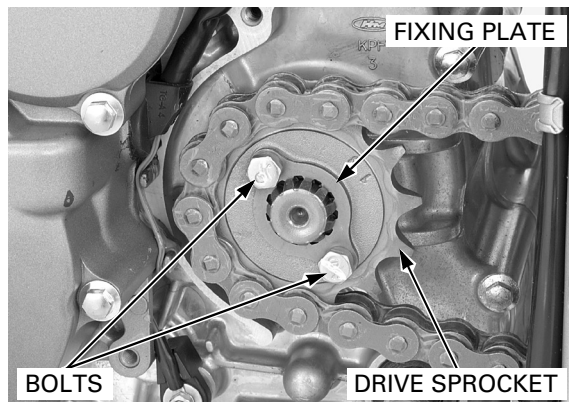


## ENGINE REMOVAL/INSTALLATION

Remove the pinch bolt and disconnect the gearshift arm from the gearshift spindle.  
Remove the step holder mounting bolts and left step holder.



Remove the drive sprocket fixing plate bolts, fixing plate and drive sprocket.



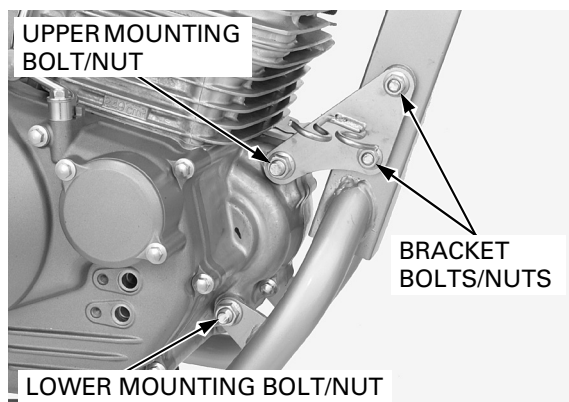
Place the floor jack or other adjustable support under the engine.

### NOTE:

The jack height must be continuously adjusted to relieve stress for ease bolt removal.

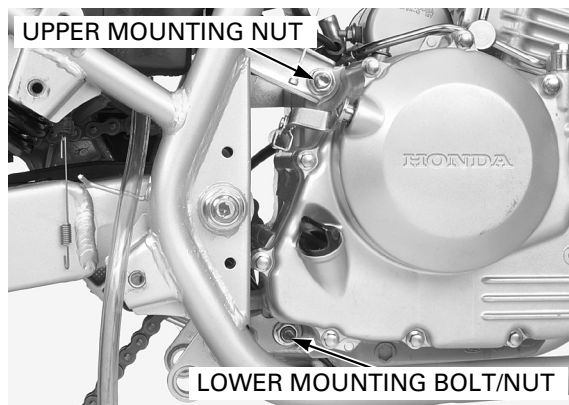
Remove the front upper engine mounting bolt/nut, front upper engine hanger bracket bolts/nuts and hanger bracket.

Remove the front lower engine mounting bolt/nut.



Remove the rear upper engine mounting nut.

Remove the rear lower engine mounting bolt/nut.

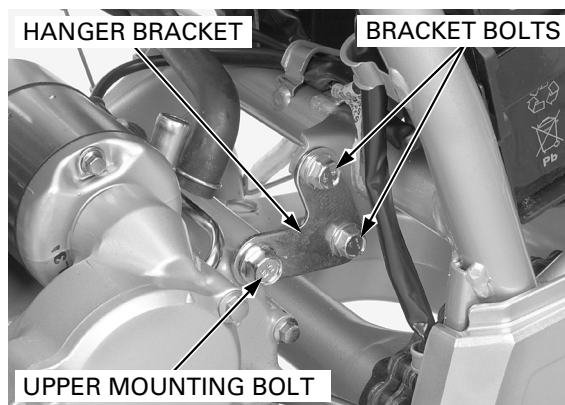


## ENGINE REMOVAL/INSTALLATION

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

*During engine removal, hold the engine securely and be careful not to damage the frame and engine.*

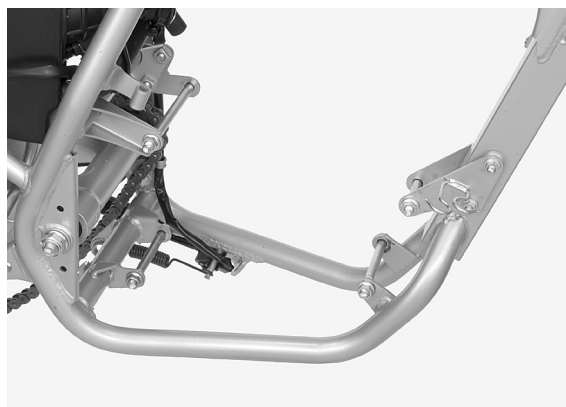
Carefully maneuver the engine and remove it out of the frame to the left.



## ENGINE INSTALLATION

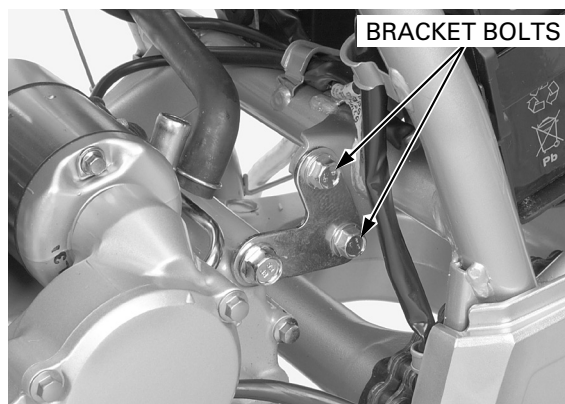
### NOTE:

- Note the direction of the mounting bolts.
- The jack height must be continuity adjusted to relieve stress for ease bolt installation.
- Route the wires and cables properly (page 1-17).



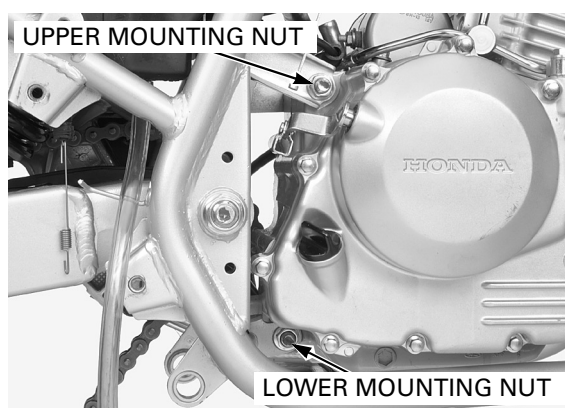
Place the engine in the frame and all the bolts, nuts, and hanger plates temporarily install.

Tighten the rear upper engine hanger bracket bolts securely.



Tighten the rear upper engine mounting nut and rear lower engine mounting nut to the specified torque.

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



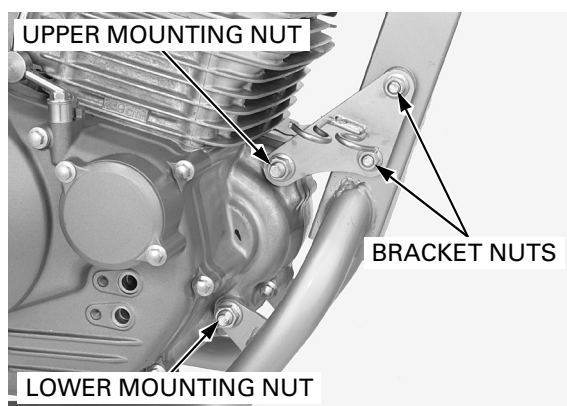
## ENGINE REMOVAL/INSTALLATION

Tighten the front lower engine mounting nut to the specified torque.

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

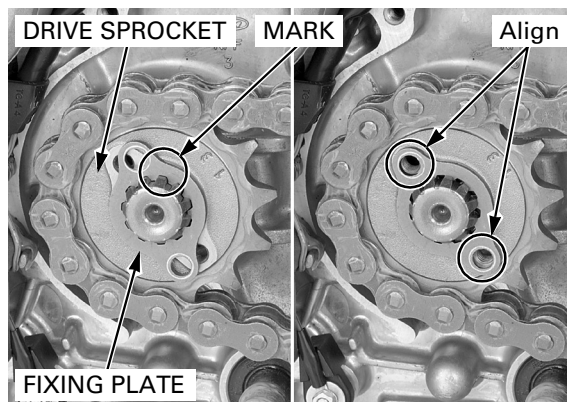
Tighten the front upper engine hanger bracket nuts securely and tighten the front upper engine mounting nut to the specified torque.

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



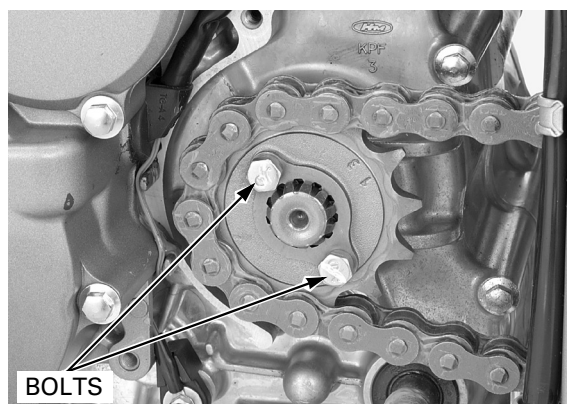
Install the drive sprocket onto the drive chain, and then install it onto countershaft.

Install the fixing plate with the punch mark facing out and align the bolt holes in the plate with the holes in the sprocket.



Install and tighten the fixing plate bolts to specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



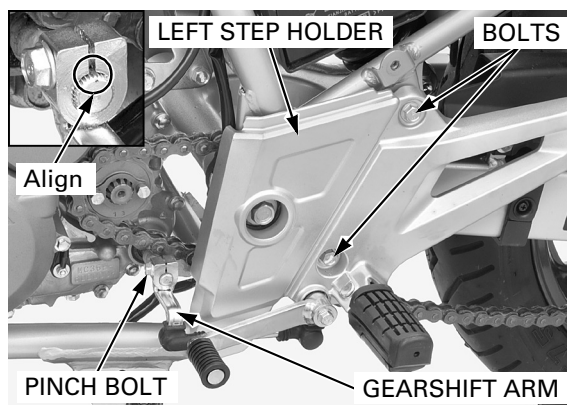
Install the left step holder and step holder mounting bolts.

Tighten the step holder mounting bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

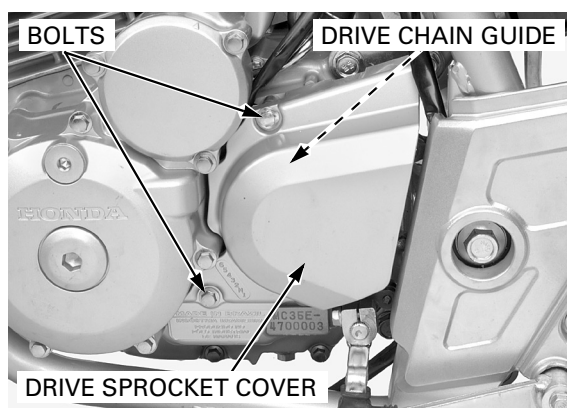
Connect the gearshift arm to the gearshift spindle while aligning the slit with the punch mark on the gearshift spindle.

Install and tighten the pinch bolt securely.

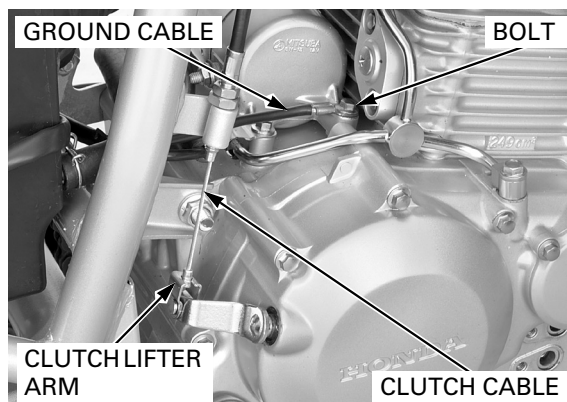


## ENGINE REMOVAL/INSTALLATION

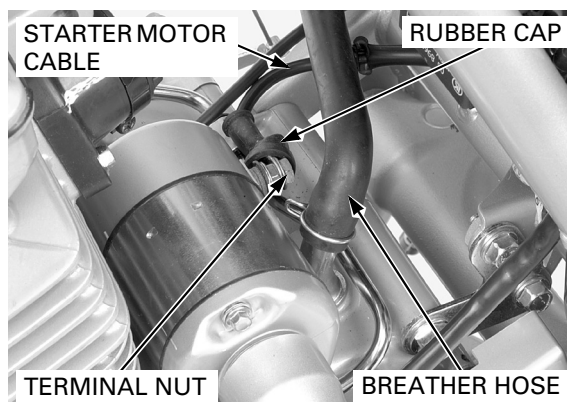
Install the drive chain guide, drive sprocket cover and bolts.  
Tighten the bolts securely.



Connect the clutch cable to the clutch lifter arm.  
Install the ground cable and tighten the bolt securely.

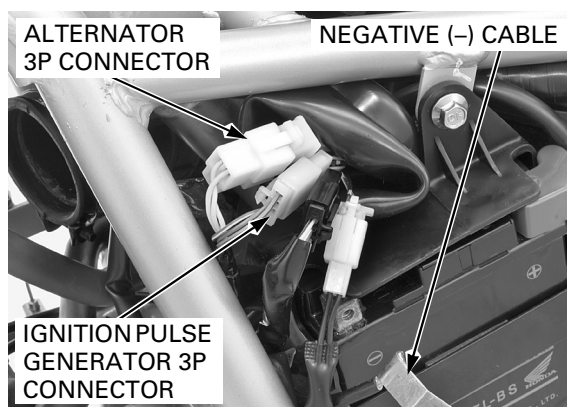


Connect the crankcase breather hose.  
Install the starter motor cable, then tighten the terminal nut securely.  
Install the rubber cap securely.



*Route the wires properly (page 1-17).*

Connect the alternator 3P connector, ignition pulse generator/neutral switch 3P connector and battery negative (-) cable.



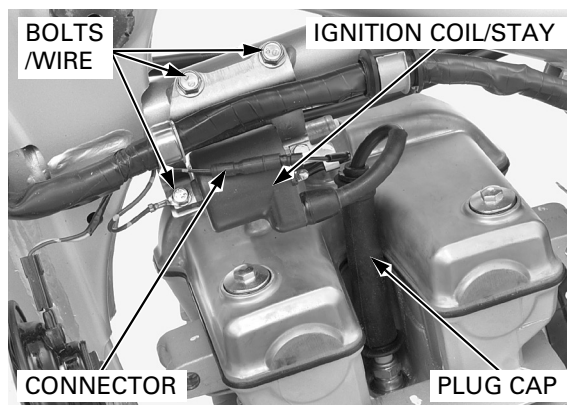


## ENGINE REMOVAL/INSTALLATION

Install the ignition coil/stay, ignition coil/stay mounting bolts and tighten them.

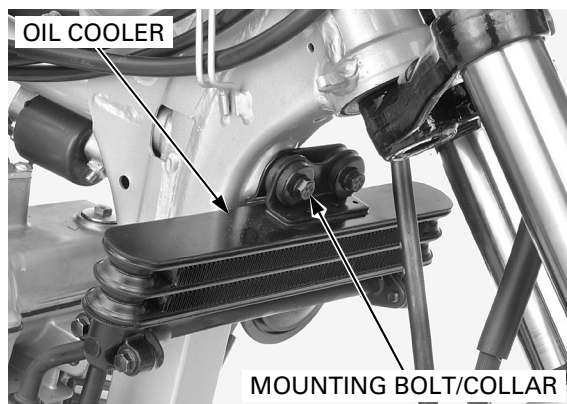
Install the ground wire, bolt and tighten it.

Connect the ignition coil primary wire connector and spark plug cap.



Install the oil cooler with the oil pipes, collar and mounting bolt.

Tighten the oil cooler mounting bolt securely.



Install the dowel pins to the right crankcase cover.

Coat new O-rings with engine oil and install them onto the dowel pins.

Install the oil pipes to the clamps.

Install the oil pipes, lower joint bolts to the right crankcase cover and tighten them securely.

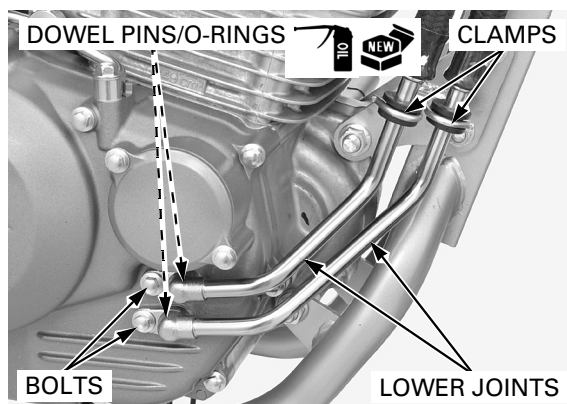
Install the following:

- Right step holder (page 9-17)
- Carburetor (page 5-16)
- PAIR control valve (page 5-20)
- Fuel tank (page 2-7)

Adjust the drive chain slack (page 3-17).

Adjust clutch lever free play (page 3-24).

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



# 7. CYLINDER HEAD/VALVES

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COMPONENT LOCATION .....	7-2	CYLINDER HEAD DISASSEMBLY .....	7-12
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## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers service of the camshaft, cylinder head and valves.
- 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.
- Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head. Do not strike the cylinder head cover and cylinder head too hard during removal.
- Lubricate the camshaft journals, cam lobes, valve lifters and valve stems with molybdenum oil solution for initial lubrication.

### SPECIFICATIONS

Unit: mm (in)

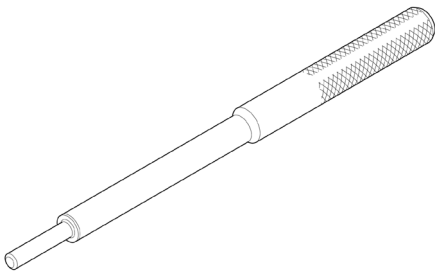
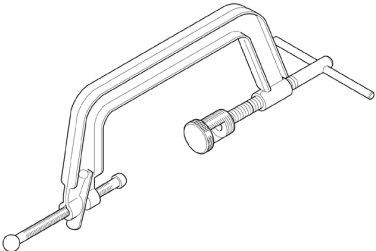



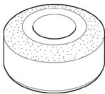


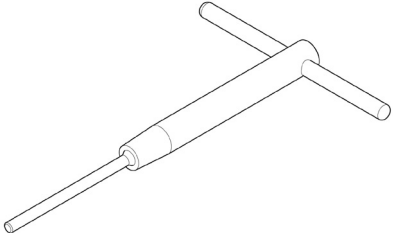
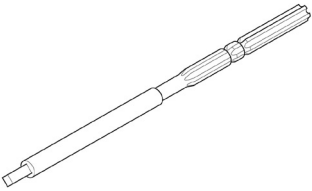
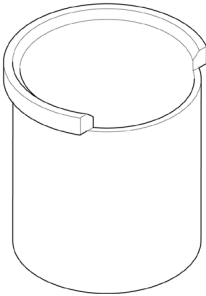
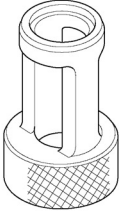
ITEM				STANDARD	SERVICE LIMIT
Cylinder compression				1,128 kPa (11.5 kgf/cm <sup>2</sup> , 164 psi) at 400 min <sup>-1</sup> (rpm)	–
Cylinder head	Warpage			–	0.10 (0.004)
	Valve lifter bore I.D.	IN/EX		26.010 – 26.026 (1.0240 – 1.0246)	26.06 (1.026)
Camshaft	Cam lobe height	IN		37.00 – 37.24 (1.457 – 1.466)	36.94 (1.454)
		EX		37.03 – 37.27 (1.458 – 1.467)	36.97 (1.456)
	Runout			0.02 (0.001)	0.10 (0.004)
	Journal O.D.			24.959 – 24.980 (0.9826 – 0.9835)	–
	Oil clearance			0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Valve, valve guide	Valve clearance	IN		0.12 ± 0.03 (0.005 ± 0.001)	–
		EX		0.15 ± 0.03 (0.006 ± 0.001)	–
	Valve stem O.D.	IN		4.975 – 4.990 (0.1959 – 0.1965)	4.96 (0.195)
		EX		4.955 – 4.970 (0.1951 – 0.1957)	4.94 (0.194)
	Valve guide I.D.	IN/EX		5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
	Stem-to-guide clearance	IN		0.010 – 0.037 (0.0004 – 0.0015)	0.07 (0.003)
		EX		0.030 – 0.057 (0.0012 – 0.0022)	0.09 (0.004)
Valve spring	Free length	Inner	IN/EX	33.77 (1.330)	32.36 (1.274)
		Outer	IN/EX	36.64 (1.443)	34.84 (1.372)
	Valve lifter O.D.			25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)

### TORQUE VALUES

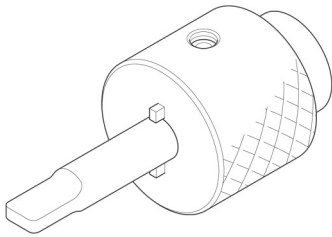
Cylinder head cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply engine oil to the threads and seating surface
Cylinder head nut	45 N·m (4.6 kgf·m, 33 lbf·ft)	Apply engine oil to the threads and seating surface
Oil pass pipe upper joint bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Timing hole cap	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply grease to the threads
Crankshaft hole cap	8 N·m (0.8 kgf·m, 5.9 lbf·ft)	Apply grease to the threads

## CYLINDER HEAD/VALVES

### TOOLS

<p>Valve guide driver, 5.0 mm 07942-MA60000</p> 	<p>Valve spring compressor 07757-0010000</p> 	<p>Valve seat cutter, 24.5 mm (45° EX) 07780-0010100</p> 
<p>Valve seat cutter, 29 mm (45° IN) 07780-0010300</p> 	<p>Flat cutter, 25 mm (32° EX) 07780-0012000</p> 	<p>Flat cutter, 29 mm (32° IN) 07780-0013400</p> 
<p>Interior cutter, 26 mm (60° EX) 07780-0014500</p> 	<p>Interior cutter, 30 mm (60° IN) 07780-0014000</p> 	<p>Cutter holder, 5.0 mm 07781-0010400</p> 
<p>Valve guide reamer, 5.0 mm 07984-MA60001</p> 	<p>Tappet hole protector 24 x 25.5 07HMG-MR70002</p> 	<p>Valve spring compressor attachment 07959-KM30101</p> 

Tensioner stopper  
070MG-0010100



## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noise to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather drain hose. If the drain hose is smoky, check for a seized piston ring (page 8-7).

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

- Valves
  - Incorrect valve clearance
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Worn cylinder, piston or piston rings (page 8-5)

### Compression too high, overheating or knocking

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

### Excessive smoke

- Cylinder head
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (page 8-5)

### Excessive noise

- Cylinder head
  - Incorrect valve clearance
  - Sticking valve or broken valve spring
  - Worn or damaged camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (page 8-5)

### Rough idle

- Low cylinder compression

## CYLINDER HEAD/VALVES

### CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine, disconnect the spark plug cap and remove the spark plug (page 3-8).

Install the compression gauge into the spark plug hole.

*To avoid discharging the battery, do not operate the starter motor for more than 7 seconds.*

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

The maximum reading is usually reached within 4 – 7 seconds.

#### COMPRESSION PRESSURE:

**1,128 kPa (11.5 kgf/cm<sup>2</sup>, 164 psi)  
at 400 min<sup>-1</sup> (rpm)**

Low compression can be caused by:

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

High compression can be caused by:

- Carbon deposits in the combustion chamber or on piston head



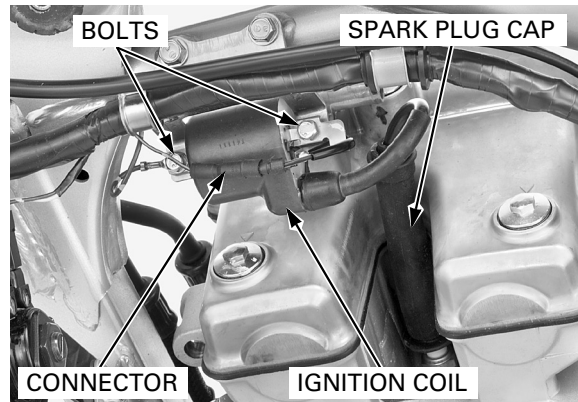
### CYLINDER HEAD COVER REMOVAL

Remove the following:

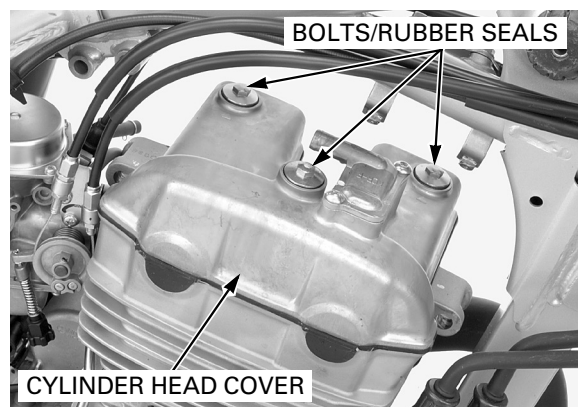
- Fuel tank (page 2-7)
- PAIR control valve (page 5-20)

Disconnect the spark plug cap and ignition coil primary wire connector.

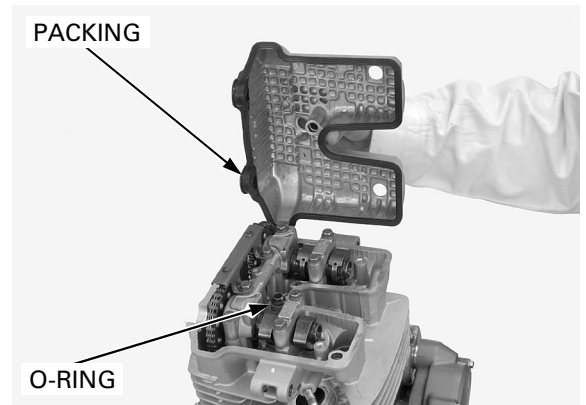
Remove the bolts, ground wire and ignition coil.



Remove the cylinder head cover bolts, rubber seals and cylinder head cover.



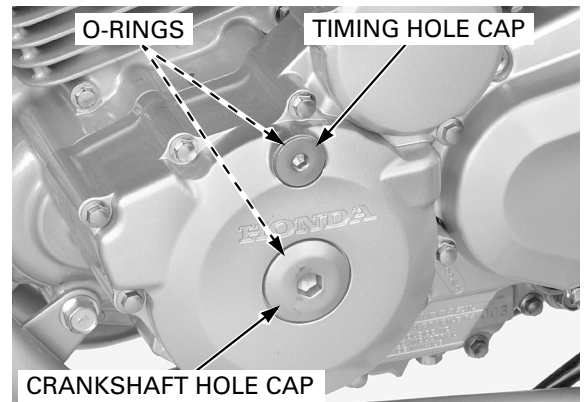
Remove the packing from the cylinder head cover.  
Remove the O-ring from the dowel pin.



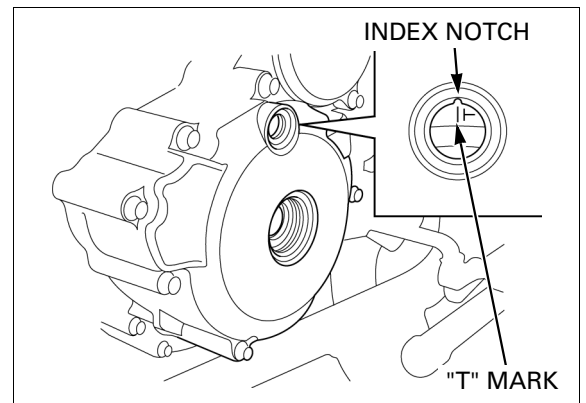
## CAMSHAFT REMOVAL

Remove the cylinder head cover (page 7-6).

Remove the timing hole cap, crankshaft hole cap and each O-ring.

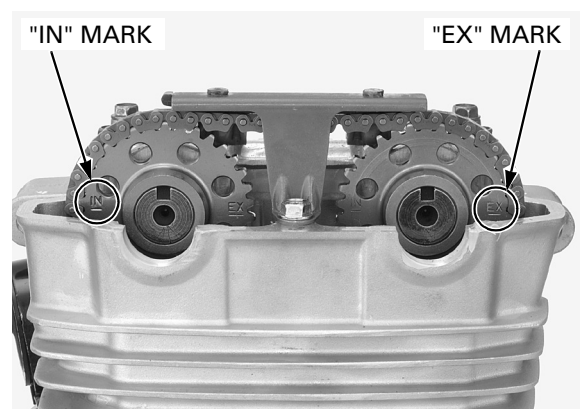


Rotate the crankshaft counterclockwise to align the "T" mark on the flywheel with the index notch of the timing hole in the left crankcase cover.



Make sure that the timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

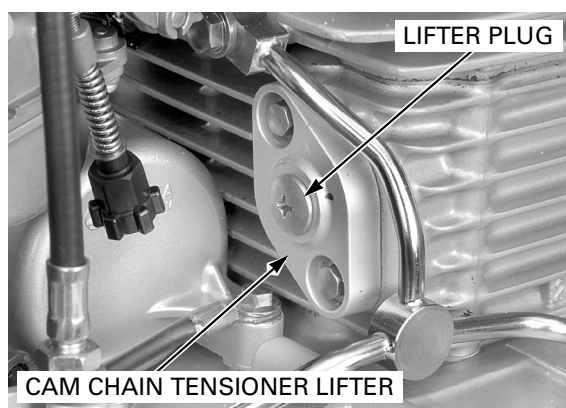
If the timing marks on the cam sprocket are facing inward, turn the crankshaft counterclockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.





## CYLINDER HEAD/VALVES

Remove the tensioner lifter plug from the cam chain tensioner lifter.



Turn the cam chain tensioner lifter shaft fully in (clockwise) and secure it using the special tool to prevent damaging the cam chain.

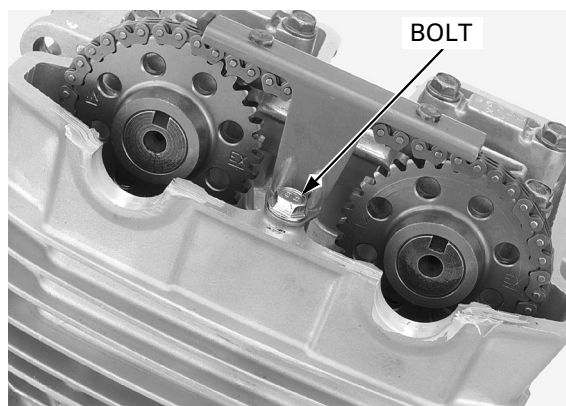
**TOOL:**

**Tensioner stopper**

**070MG-0010100**

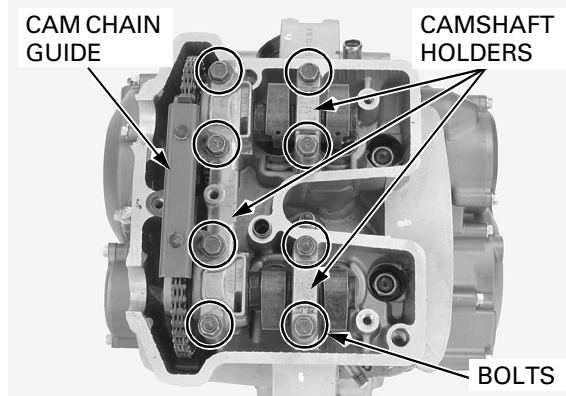


Remove the cam chain guide mounting bolt.



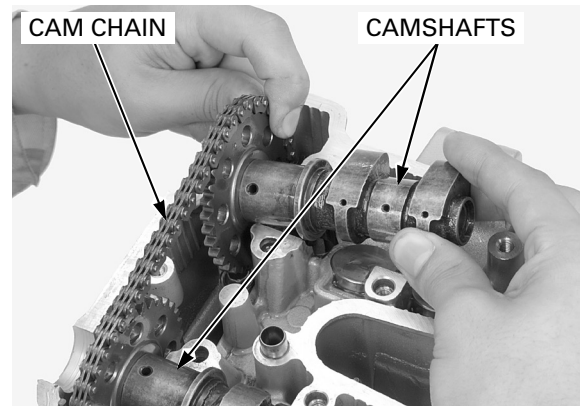
Remove the bolts, camshaft holders and cam chain guide.

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



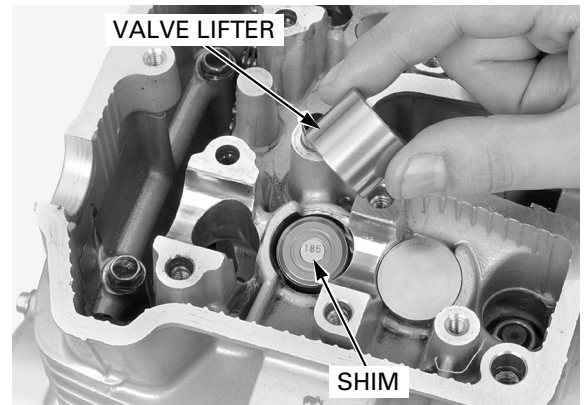
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.

Remove the camshafts.



Remove the valve lifters and shims.

- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Make all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifters can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.



## INSPECTION

### CAMSHAFT HOLDERS

Inspect the camshaft journal surface of each camshaft holder and cylinder head for scoring, scratches, or evidence of insufficient lubrication. Inspect the oil orifices of the camshaft holders for clogging.



### CAMSHAFT

Using a micrometer, measure each cam lobe height.

**SUREVICE LIMIT: IN: 36.94 mm (1.454 in)**

**EX: 36.97 mm (1.456 in)**

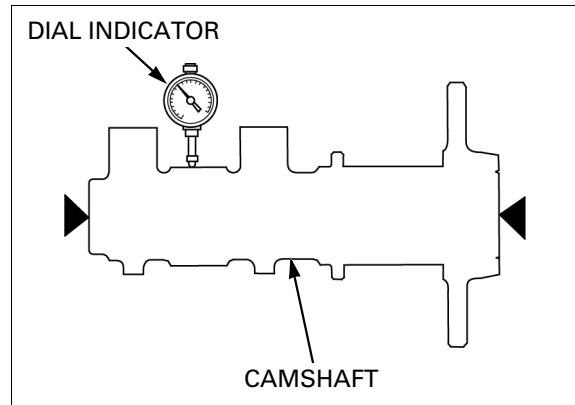
If the cam lobe is damaged or excessively worn, inspect the oil passages for clogging, wear or damage.



## CYLINDER HEAD/VALVES

Support both ends of the camshaft and measure the camshaft runout with a dial indicator.

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

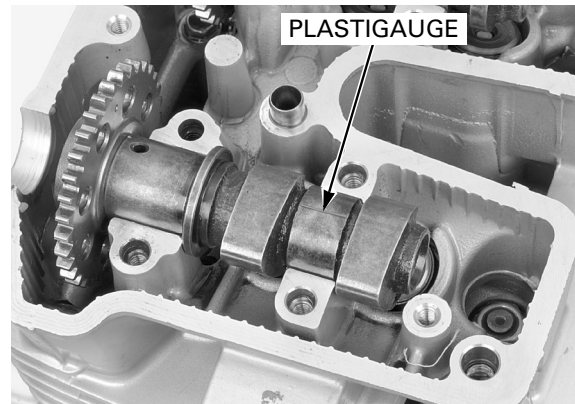


### CAMSHAFT OIL CLEARANCE

*Do not rotate the camshaft when using plastigauge.*

Wipe off any oil from the journals of the camshaft, cylinder head and camshaft holders.

Lay a strip of plastigauge lengthwise on top each camshaft journal.

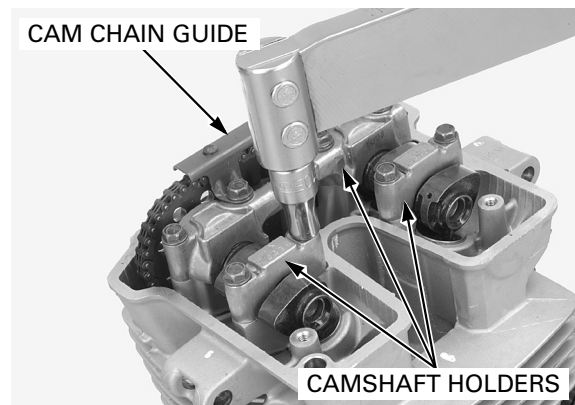


Install the cam chain guide.

*Tighten the bolts in a crisscross pattern in 2 – 3 steps.*

Apply engine oil to the camshaft holder bolt threads and seating surfaces and tighten them to the specified torques.

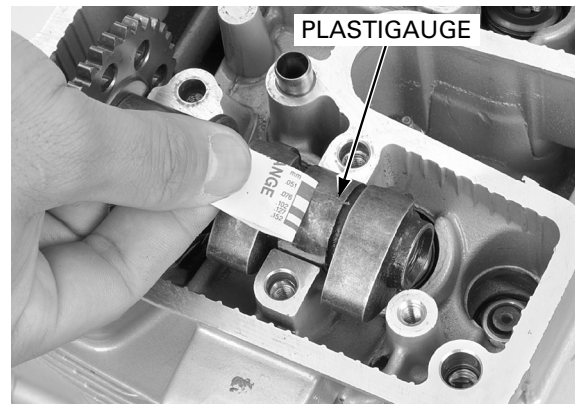
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

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

When the service limits are exceeded, replace the camshaft and recheck the oil clearance. Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.

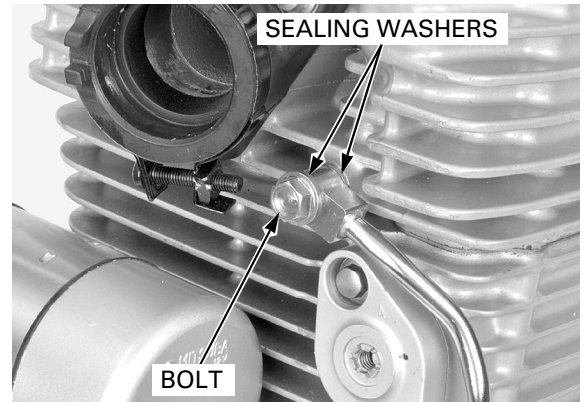


## CYLINDER HEAD REMOVAL

Remove the following:

- Camshafts (page 7-7)
- Exhaust pipe/muffler (page 2-8)
- Carburetor (page 5-7)

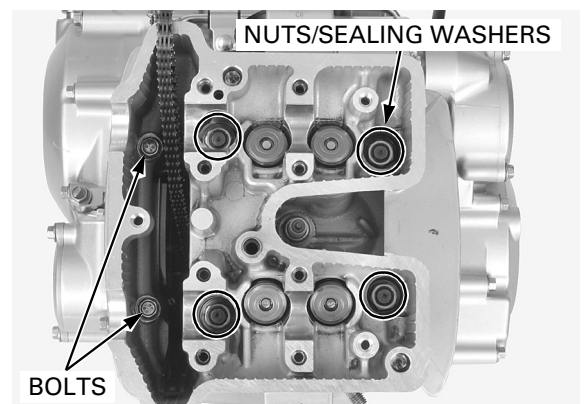
Remove the oil pass pipe upper joint bolt and sealing washers from the cylinder head.



Remove the cylinder head mounting bolts. Loosen the cylinder head nuts in a crisscross pattern in 2 – 3 steps, and remove them and sealing washers.

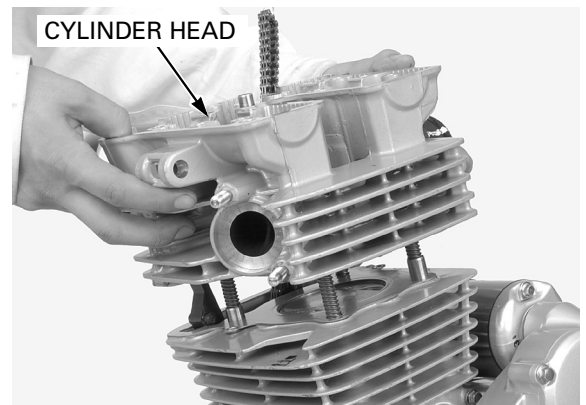
**NOTE:**

Be careful not to drop the bolts, nuts and sealing washers into the crankcase.

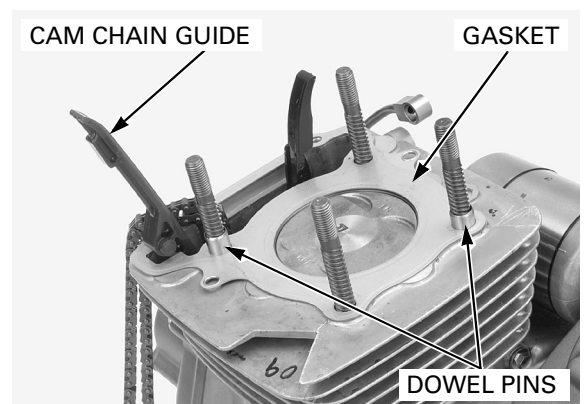


*Do not strike the cylinder head too hard and do not damage the mating surface with a screwdriver.*

Remove the cylinder head.



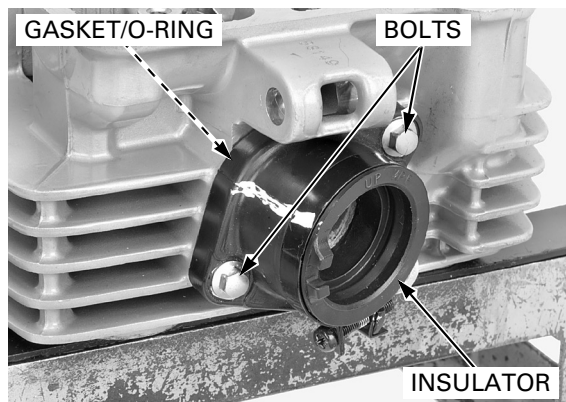
Remove the cam chain guide from the cylinder. Remove the gasket and dowel pins.



## CYLINDER HEAD/VALVES

### CYLINDER HEAD DISASSEMBLY

Remove the bolts, carburetor insulator, O-ring and gasket.

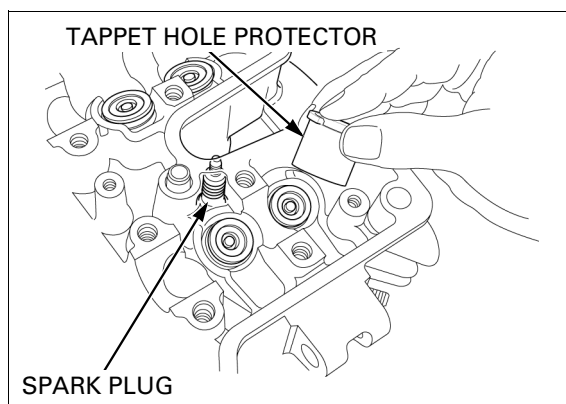


Remove the spark plug.

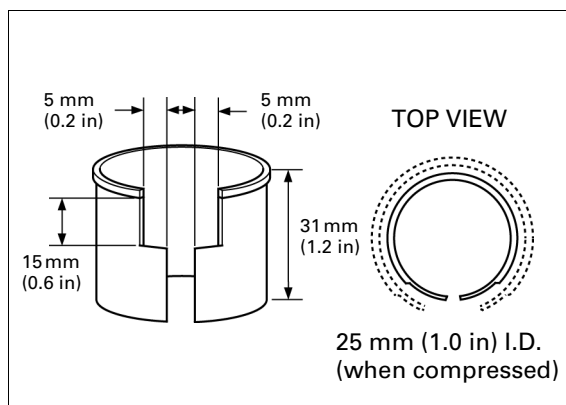
Install the tappet hole protector into the valve lifter bore.

**TOOL:**

**Tappet hole protector 24 x 25.5 07HMG-MR70002**



An equivalent tool can easily be made from a plastic 35 mm film container as shown.



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

Remove the cotters using the special tools.

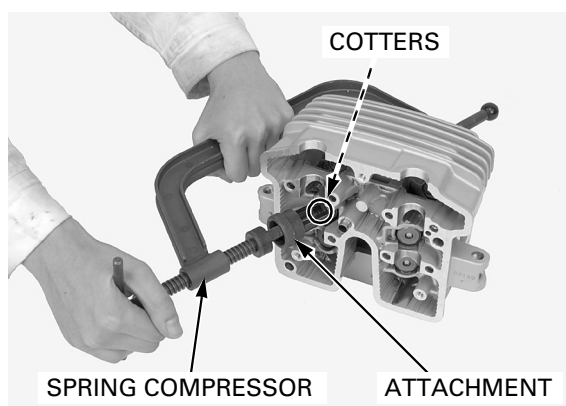
**TOOLS:**

**Valve spring compressor**

**07757-0010000**

**Valve spring compressor attachment**

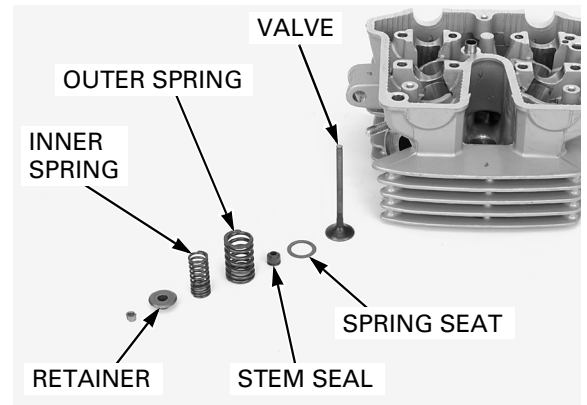
**07959-KM30101**



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

Remove the following:

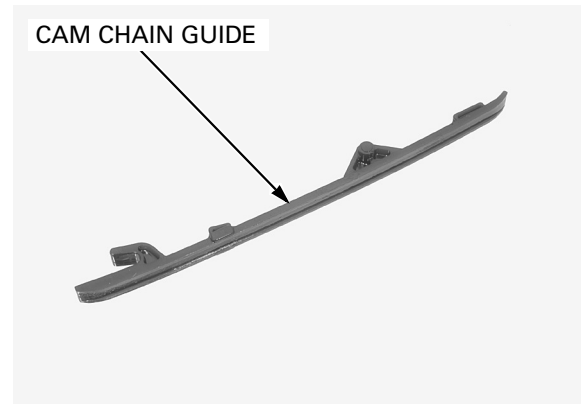
- Spring retainers
- Inner/outer valve springs
- Valves
- Stem seals
- Valve spring seats



### INSPECTION

#### CAM CHAIN GUIDE

Check the cam chain guide for excessive wear or damage and replace it if necessary.



#### CYLINDER HEAD

Remove the carbon deposits from the combustion chamber.

NOTE:

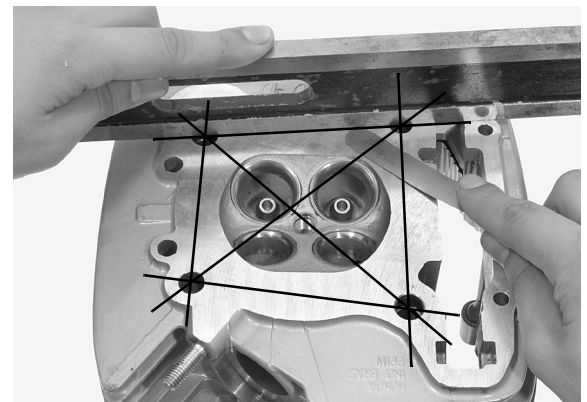
Avoid damaging the gasket surface.

Check the spark plug hole and valve areas for cracks.



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

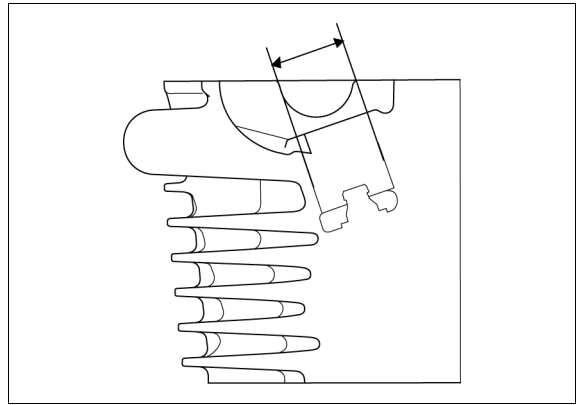
**SERVICE LIMIT: 0.10 mm (0.004 in)**



## CYLINDER HEAD/VALVES

Inspect the each valve lifter bore for scoring, scratches or damage.  
Measure the each valve lifter bore I.D.

**SERVICE LIMIT: 26.06 mm (1.026 in)**



### VALVE LIFTER

Inspect the each valve lifter for scoring, scratches or damage.  
Measure the each valve lifter O.D.

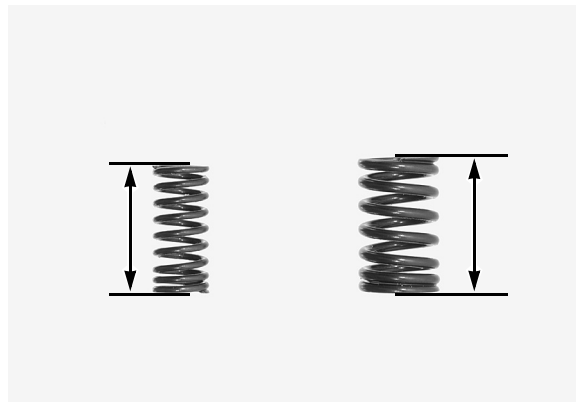
**SERVICE LIMIT: 25.97 mm (1.022 in)**



### VALVE SPRING

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

**SERVICE LIMITS: Inner: 32.36 mm (1.274 in)**  
**Outer: 34.84 mm (1.372 in)**



### VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide.  
Check the valve for bending, burning or abnormal wear.  
Measure the each valve stem O.D. and record it.

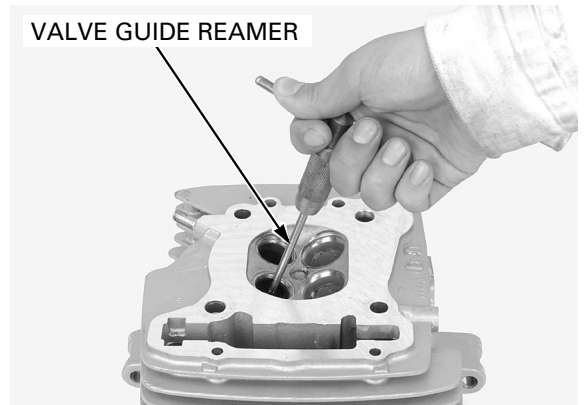
**SERVICE LIMITS: IN: 4.96 mm (0.195 in)**  
**EX: 4.94 mm (0.194 in)**



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

**TOOL:**

**Valve guide reamer, 5.0 mm      07984-MA60001**



Measure and record each valve guide I.D.

**SERVICE LIMIT: IN/EX: 5.03 mm (0.198 in)**

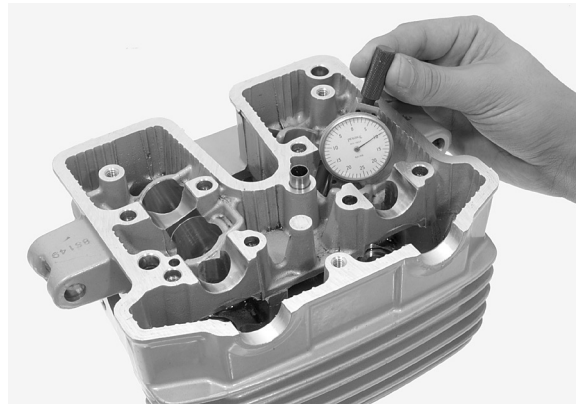
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

**SERVICE LIMITS: IN: 0.07 mm (0.003 in)  
EX: 0.09 mm (0.004 in)**

*Reface the valve seats whenever the valve guides are replaced (page 7-17).*

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

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



## VALVE GUIDE REPLACEMENT

Chill new valve guides in a freezer section of a refrigerator for about an hour.

*Be sure to wear heavy gloves to avoid burns when handling the heated cylinder head. Using a torch to heat the cylinder head may cause warpage.*

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.

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

**TOOL:**

**Valve guide driver, 5.0 mm      07942-MA60000**





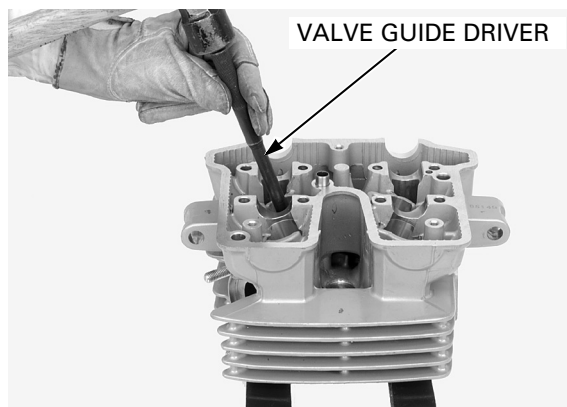
## CYLINDER HEAD/VALVES

Drive new valve guides in the cylinder head from the camshaft side while the cylinder head is still seated.

**TOOL:**

**Valve guide driver, 5.0 mm      07942-MA60000**

Let the cylinder head cool to room temperature.



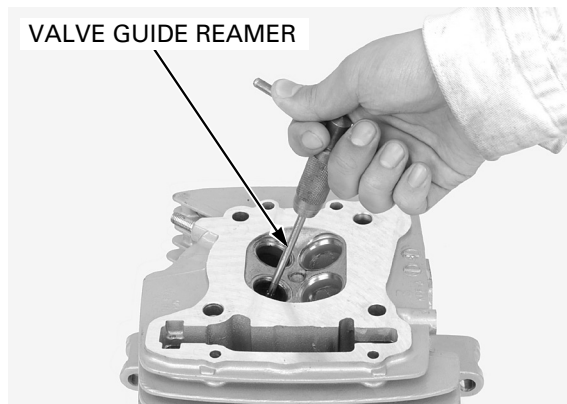
*Use cutting oil on the reamer during this operation.*

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

**TOOL:**

**Valve guide reamer, 5.0 mm      07984-MA60001**

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat.



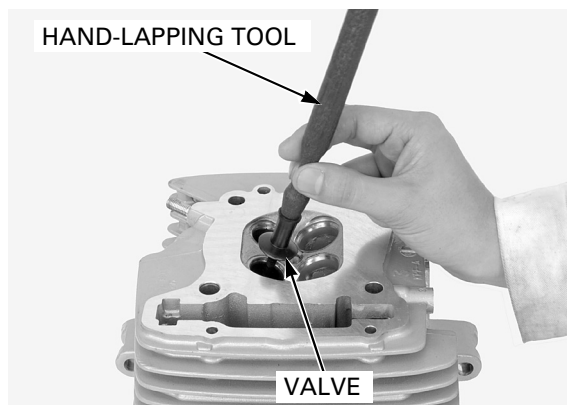
## VALVE SEAT INSPECTION/REFACING

### INSPECTION

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

Apply a light coating of Prussian Blue to the valve seats.

Tap the valves and seats using a rubber hose or other hand-lapping tool.



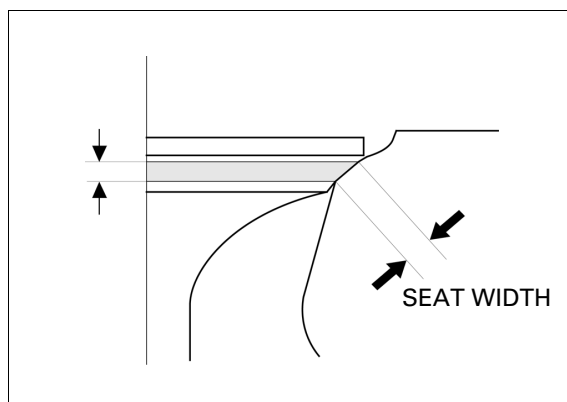
Remove the valve and inspect the width of the valve seat.

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

**STANDARD:      1.0 – 1.2 mm (0.04 – 0.05 in)**

**SERVICE LIMIT: 2.0 mm (0.08 in)**

If the seat width is not within specification, reface the valve seat (page 7-17).

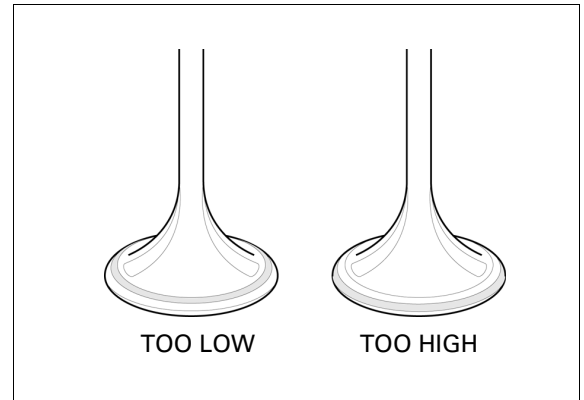
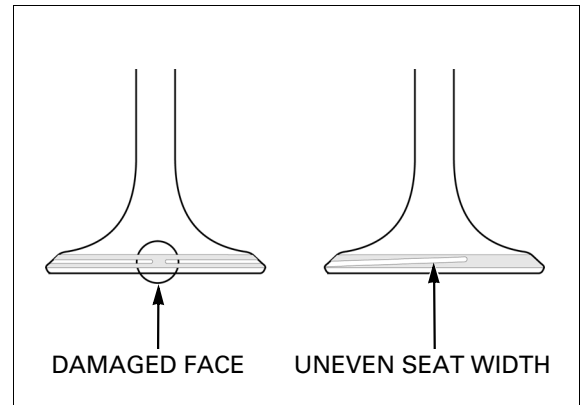


Inspect the valve seat face for:

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

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

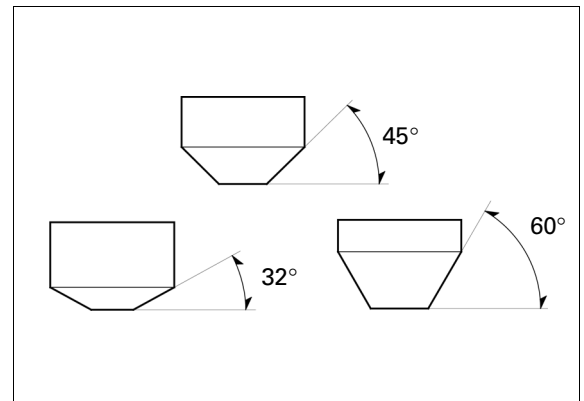
- Contact area (too high or too low):
  - Reface the valve seat.



## VALVE SEAT REFACING

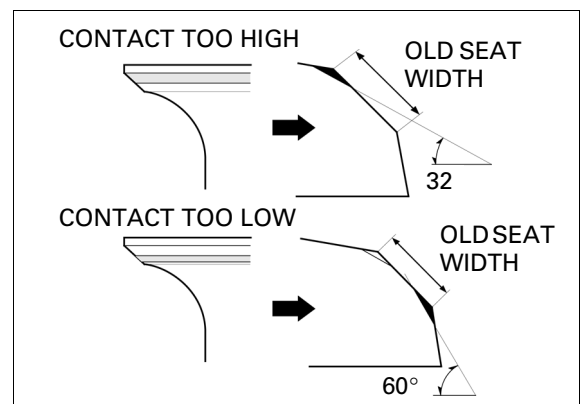
NOTE:

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



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

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



## CYLINDER HEAD/VALVES

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

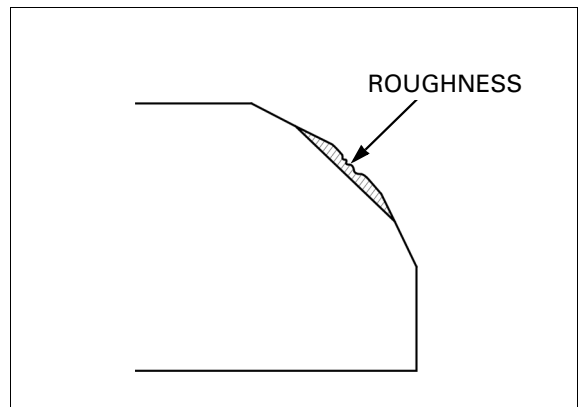
Use a 45° seat cutter to remove any roughness or irregularities from the seat.

### TOOLS:

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

**Valve seat cutter, 24.5 mm (45° EX) 07780-0010100**

**Cutter holder, 5.0 mm 07781-0010400**



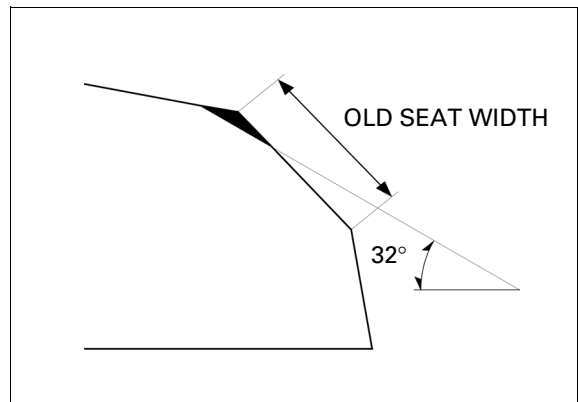
Use a 32° flat cutter to remove the top 1/4 of the existing valve seat material.

### TOOLS:

**Flat cutter, 29 mm (32° IN) 07780-0013400**

**Flat cutter, 25 mm (32° EX) 07780-0012000**

**Cutter holder, 5.0 mm 07781-0010400**



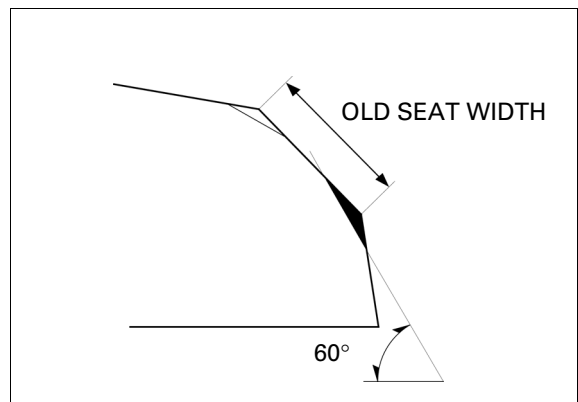
Use a 60° interior cutter to remove the bottom 1/4 of the existing valve seat material.

### TOOLS:

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

**Interior cutter, 26 mm (60° EX) 07780-0014500**

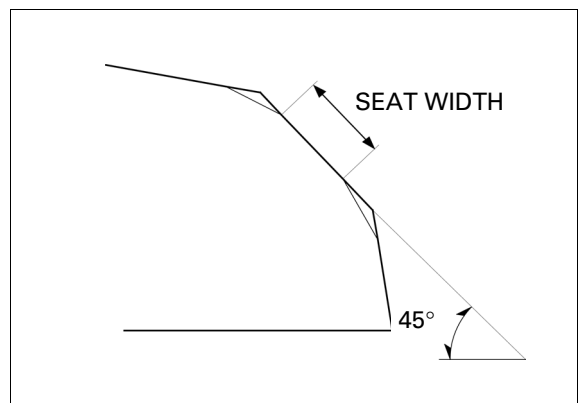
**Cutter holder, 5.0 mm 07781-0010400**



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

**VALVE SEAT WIDTH: 1.0 – 1.2 mm (0.04 – 0.05 in)**

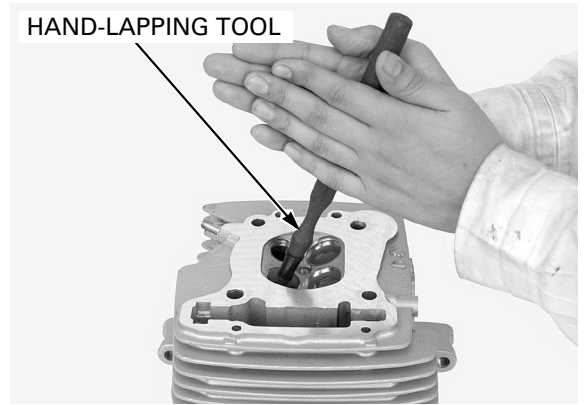
Make sure that all pitting and irregularities are removed.  
Refinish if necessary.



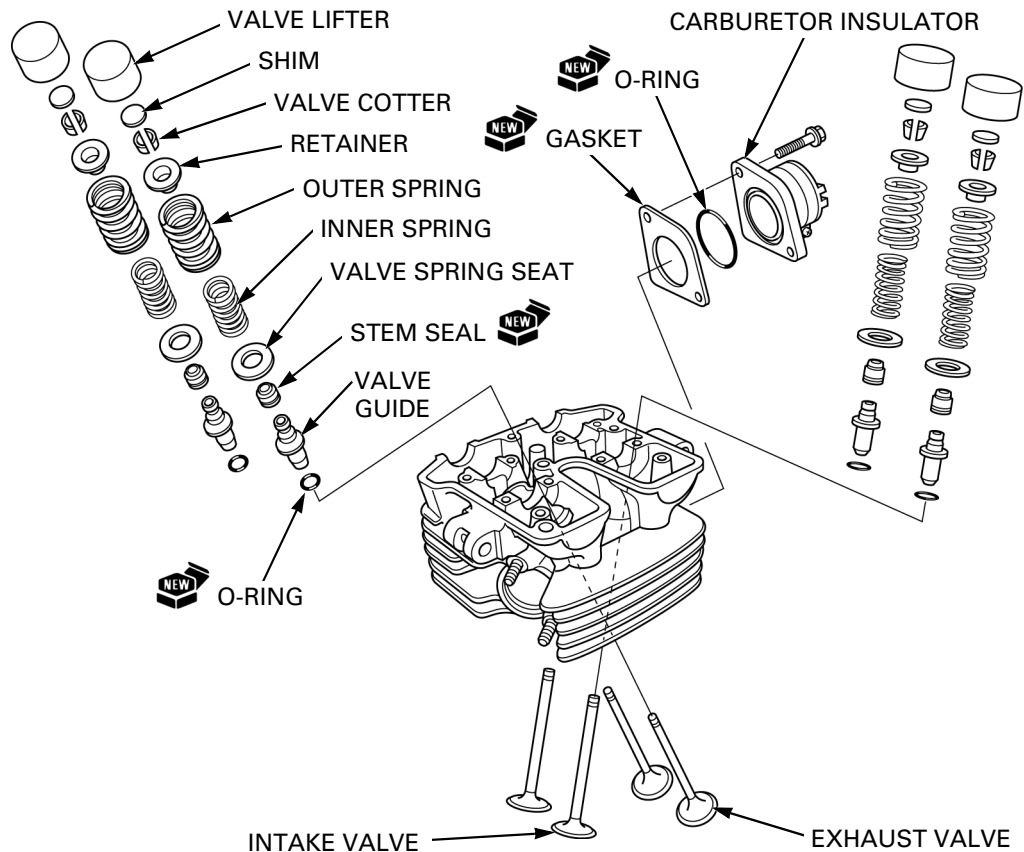
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

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



## CYLINDER HEAD ASSEMBLY

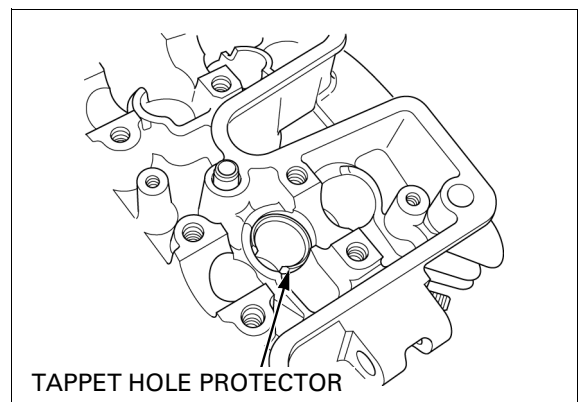


Clean the cylinder head with solvent and blow through all oil passages with compressed air.

Install the special tool or equivalent (page 7-12) into the valve lifter bore.

### TOOL:

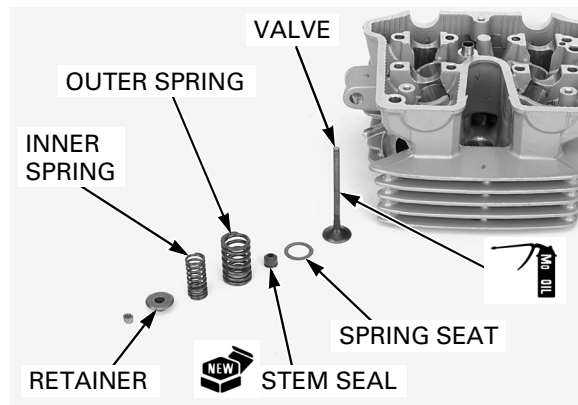
Tappet hole protector, 24 x 25.5 07HMG-MR70002



## CYLINDER HEAD/VALVES

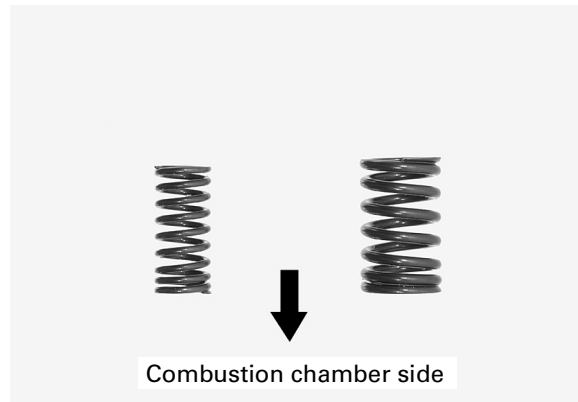
Install the valve spring seats.  
Install new stem seals.

Lubricate the valve stems with molybdenum oil solution.  
Insert the valves into the valve guides while turning it slowly to avoid damage to the stem seals.



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

Install the retainer.



*Grease the cotters to ease installation.*

Install the valve cotters using the special tools.

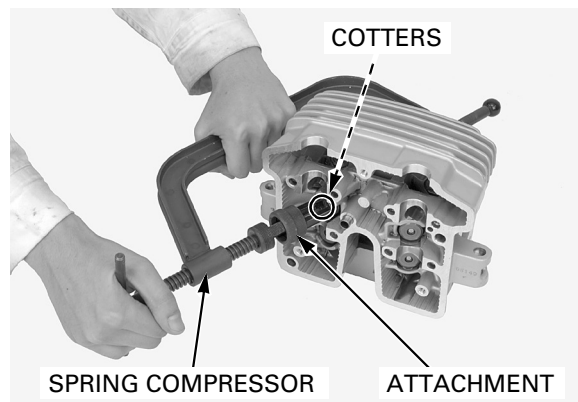
### TOOLS:

**Valve spring compressor** 07757-0010000

**Valve spring compressor attachment** 07959-KM30101

### NOTE:

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

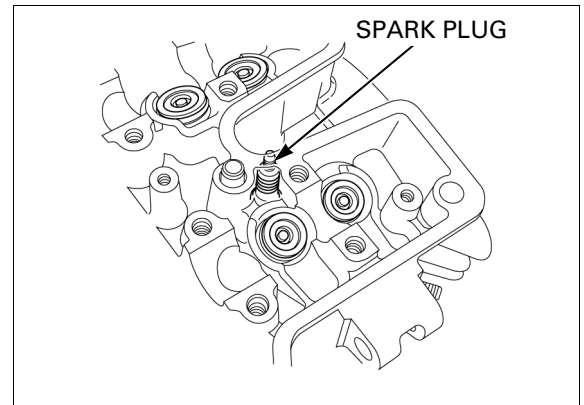


*Support the cylinder head above the work bench surface to prevent possible valve damage.*

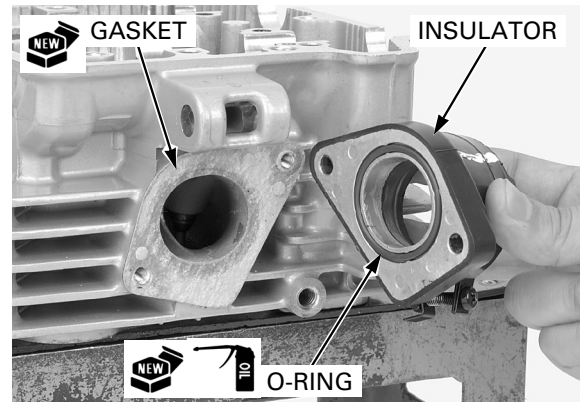
Tap the valve stems gently with two plastic hammers to seat the cotters firmly as shown.

Install and hand tighten the spark plug to the cylinder head, then tighten the spark plug to the specified torque with a spark plug wrench.

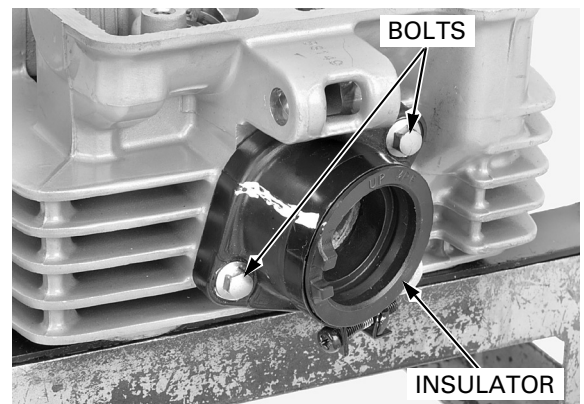
**TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)**



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

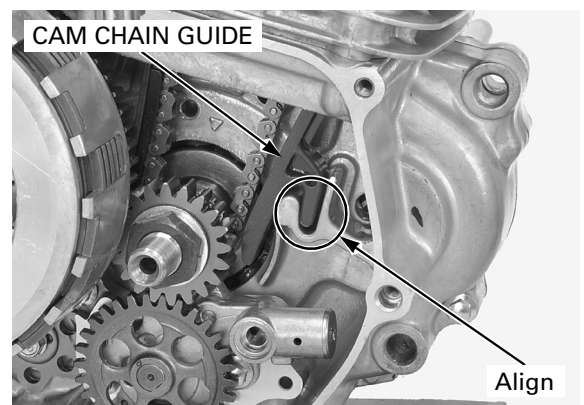


Install the carburetor insulator, bolts and tighten them securely.



## CYLINDER HEAD INSTALLATION

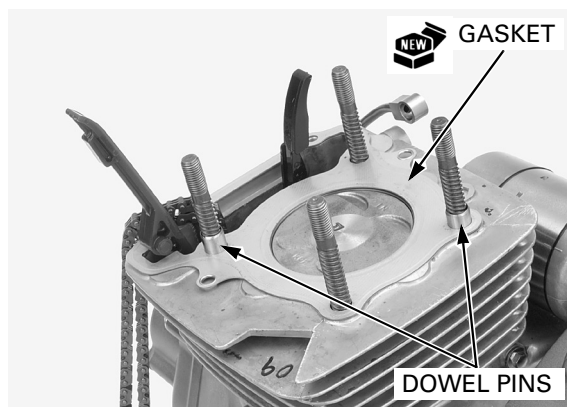
Install the cam chain guide align the its tab with right crankcase groove.



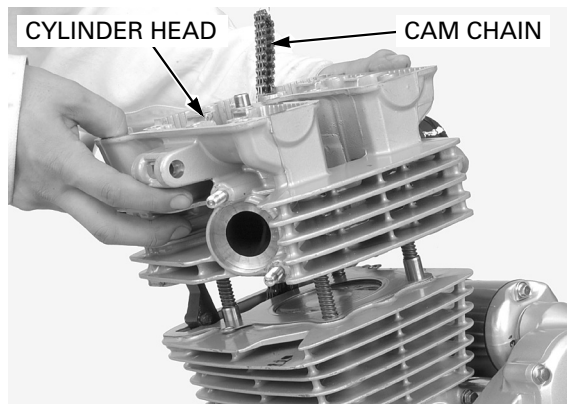
## CYLINDER HEAD/VALVES

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

Install the dowel pins and new gasket.



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



Apply engine oil to the cylinder head nut threads and seating surfaces.

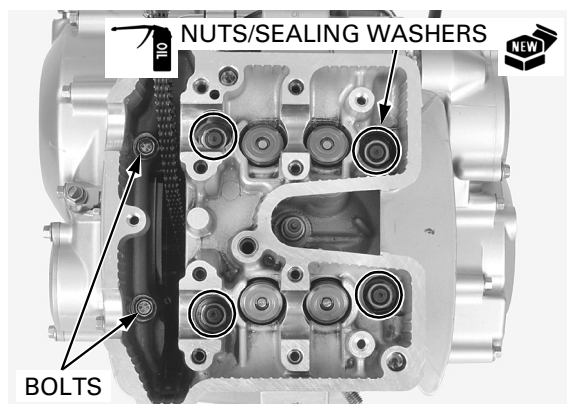
Install new sealing washers and cylinder head nuts.

*Tighten the nuts in a crisscross pattern in 2 – 3 steps.*

Tighten the cylinder head nuts to the specified torque.

**TORQUE: 45 N·m (4.6 kgf·m, 33 lbf·ft)**

Tighten the cylinder head mounting bolts securely.



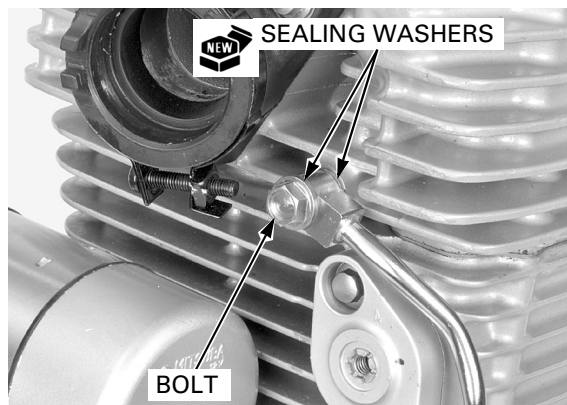
Install the oil pass pipe and new sealing washers to cylinder head.

Tighten the oil pass pipe upper joint bolt to specified torque.

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

Install the following:

- Carburetor (page 5-16)
- Exhaust pipe/muffler (page 2-10)
- Camshafts (page 7-23)

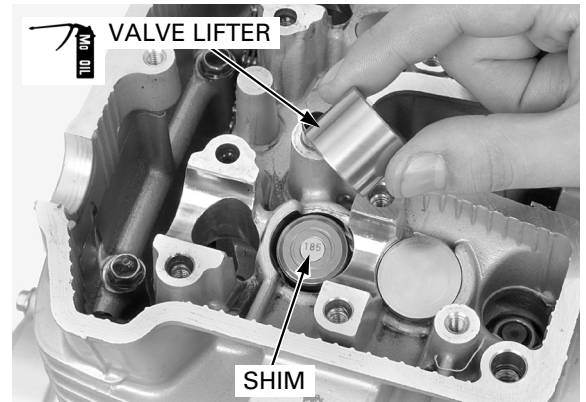


## CAMSHAFT INSTALLATION

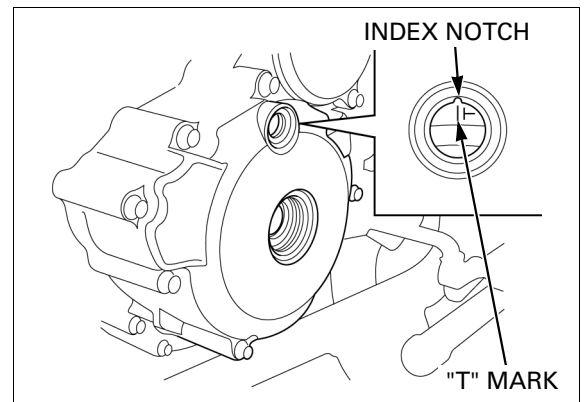
*Install the shims and valve lifters in their original location.*

Install the shims on the valve spring retainers.

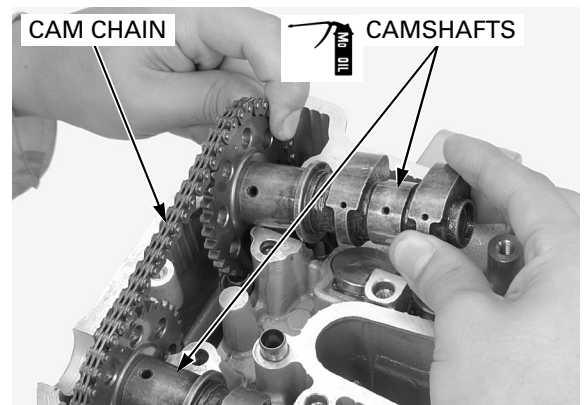
Apply molybdenum oil solution to the outer surface of the each valve lifter and install them into the valve lifter bores.



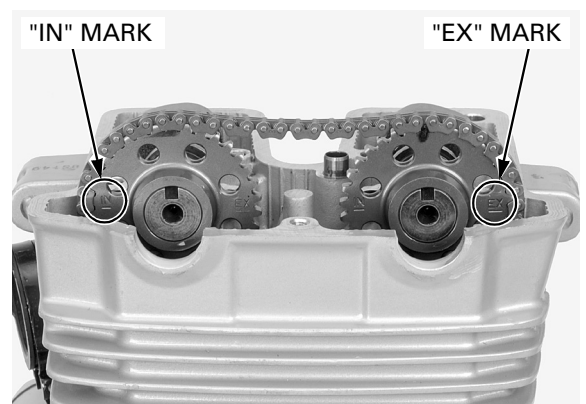
Rotate the crankshaft counterclockwise slowly while holding the cam chain, to align "T" mark on the fly-wheel with the index notch of the timing hole in the left crankcase cover.



Apply molybdenum oil solution to the cam lobes and camshaft journals of the cylinder head, camshafts and camshaft holder. Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.



Make sure that the timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.



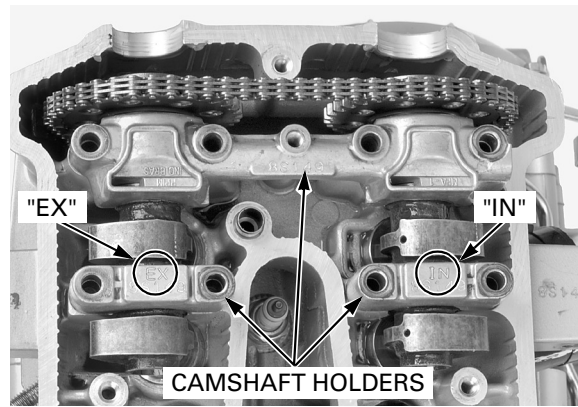


## CYLINDER HEAD/VALVES

Install the camshaft holders.

The marks on the camshaft holder have following meanings:

- "IN" : Intake camshaft holder
- "EX" : Exhaust camshaft holder

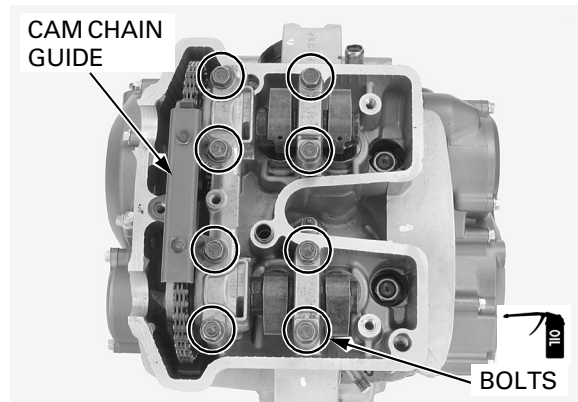


Install the cam chain guide.

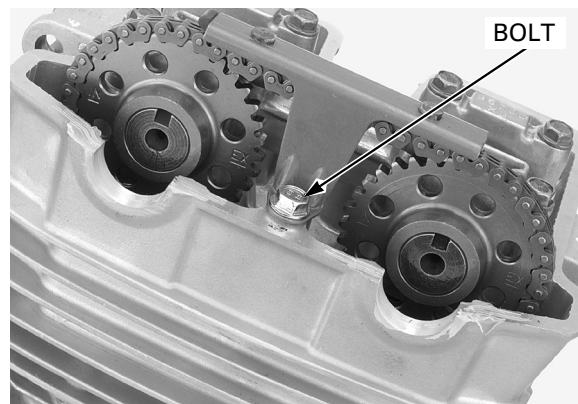
*Tighten the bolts in a crisscross pattern in 2 – 3 steps.*

Apply engine oil to the camshaft holder bolt threads and seating surfaces and tighten them to the specified torque.

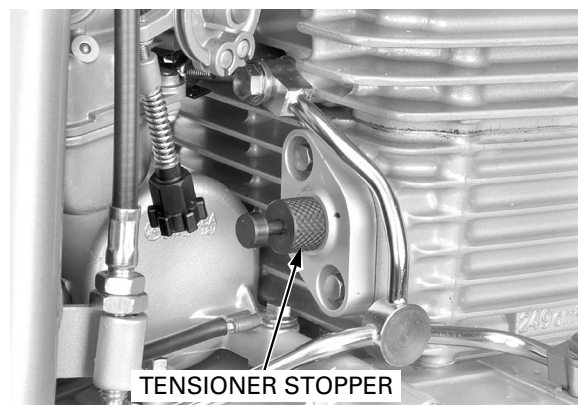
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Tighten the cam chain guide mounting bolt securely.



Remove the tensioner stopper from the cam chain tensioner lifter.



Apply engine oil to a new O-ring and install it to the cam chain tensioner lifter.  
Install and tighten the tensioner lifter plug.  
Recheck the valve timing.



Coat new O-rings with engine oil and install them onto each cap.  
Apply grease to the timing hole cap and crankshaft hole cap threads.

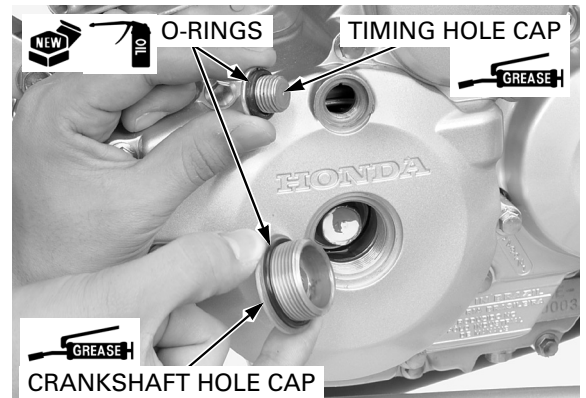
Install and tighten the timing hole cap and crankshaft hole cap to the specified torque.

### TORQUE:

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

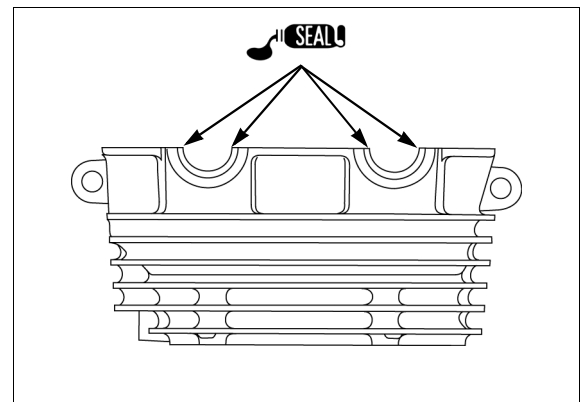
**Crankshaft hole cap:** 8 N·m (0.8 kgf·m, 5.9 lbf·ft)

Install the cylinder head cover (page 7-25).



## CYLINDER HEAD COVER INSTALLATION

Clean the mating surface of the cylinder head and cylinder head cover.  
Apply sealant to the cylinder head semi-circular cut-outs as shown.



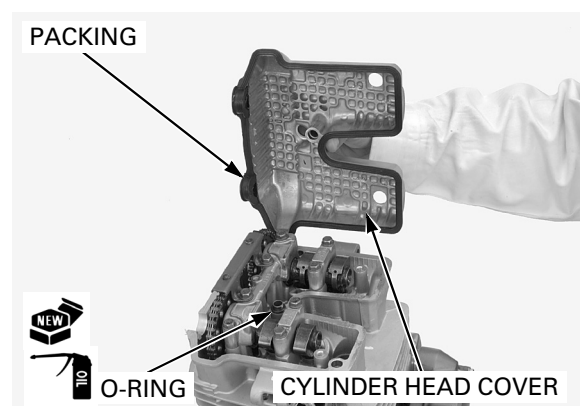
Check the packing is in good condition, replace it if necessary.

Install the packing into the groove of the cylinder head cover.

Install the dowel pin on the cylinder head.

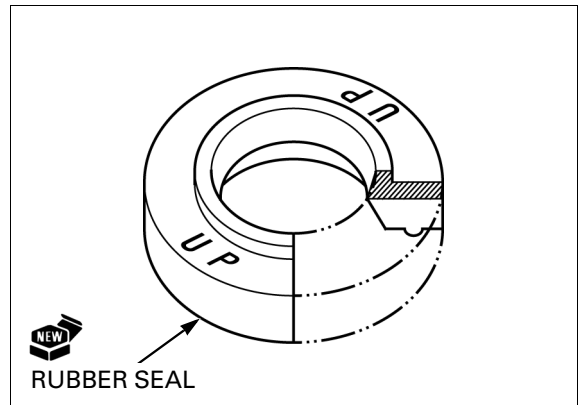
Apply engine oil to a new O-ring and install it onto the dowel pin.

Install the cylinder head cover.



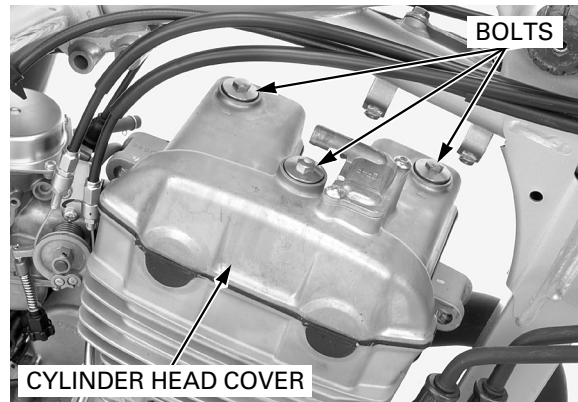
## CYLINDER HEAD/VALVES

Install new rubber seals onto the cylinder head cover with its "UP" marks facing up.



Install and tighten the cylinder head cover bolts to the specified torque.

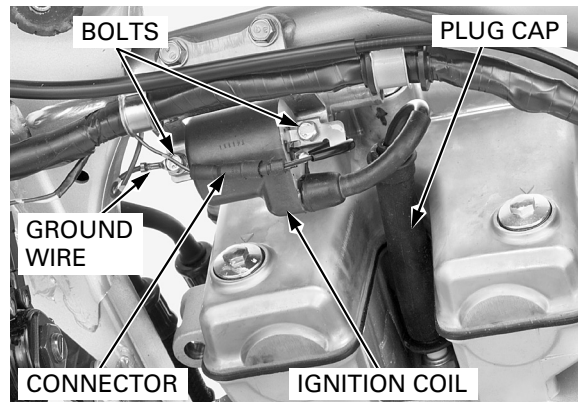
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the ignition coil, ground wire and bolts. Tighten the bolts securely. Connect the primary wire connector and spark plug cap.

Install the following:

- PAIR control valve (page 5-20)
- Fuel tank (page 2-7)



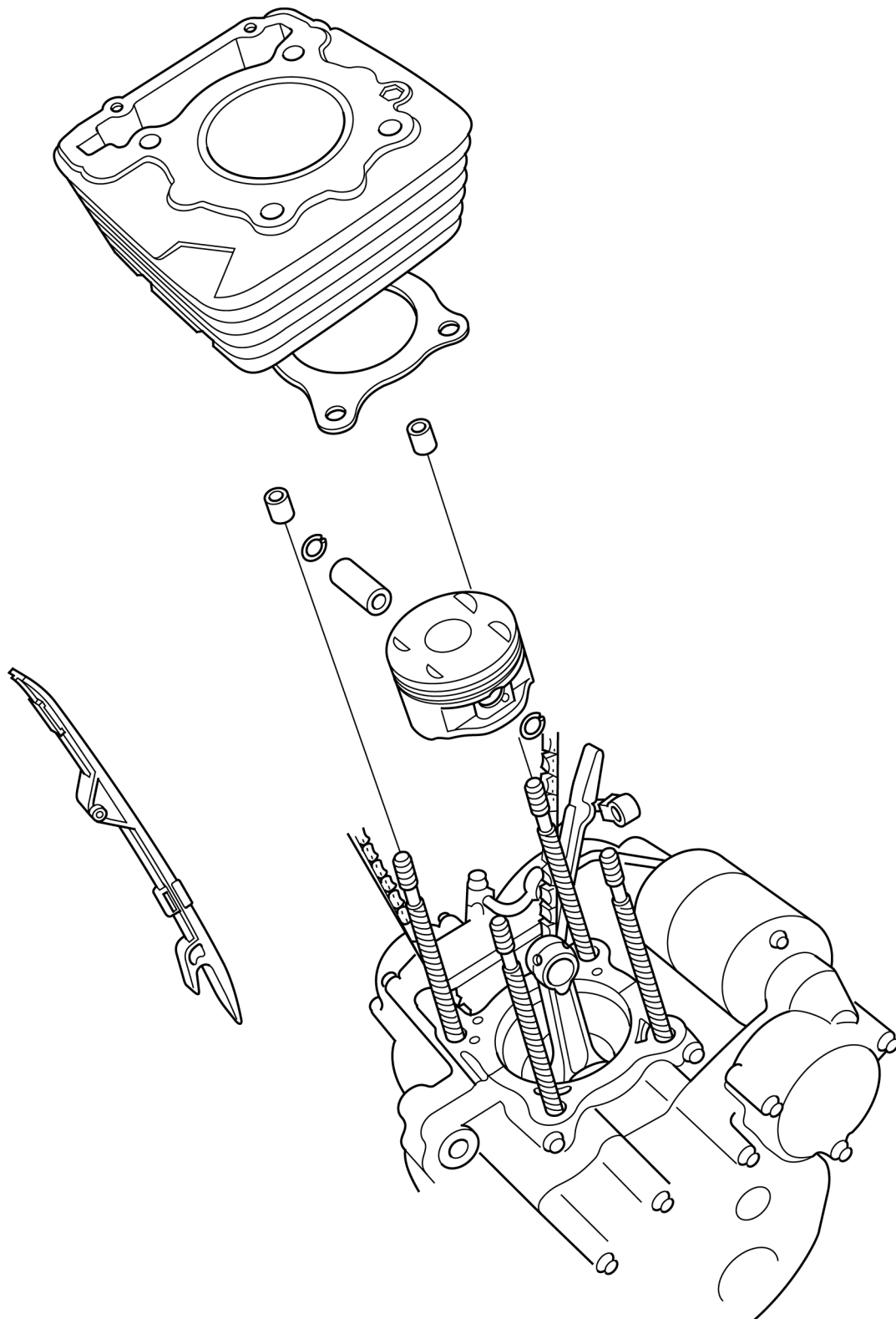
# 8. CYLINDER/PISTON

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COMPONENT LOCATION .....	8-2	CYLINDER/PISTON REMOVAL .....	8-4
SERVICE INFORMATION .....	8-3	CYLINDER/PISTON INSTALLATION .....	8-8
TROUBLESHOOTING .....	8-3		

## COMPONENT LOCATION

---



## SERVICE INFORMATION

### GENERAL

- This section covers service of the cylinder and piston.
- The cylinder and piston service can be done 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 by using the screwdriver when removing the cylinder. Do not strike the cylinder too hard during removal.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before installation.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder	I.D.	73.000 – 73.010 (2.8740 – 2.8744)	73.11 (2.878)
	Out-of-round	–	0.05 (0.002)
	Taper	–	0.05 (0.002)
	Warpage	–	0.05 (0.002)
Piston, piston pin, piston ring	Piston mark direction		"IN" mark facing toward the intake side
	Piston O.D.		72.950 – 72.970 (2.8720 – 2.8728) at 16 (0.6) from bottom
	Piston pin hole I.D.		17.002 – 17.008 (0.6694 – 0.6696)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)
	Connecting rod small end I.D.		17.016 – 17.034 (0.6699 – 0.6706)
	Cylinder-to-piston clearance		0.030 – 0.060 (0.0012 – 0.0024)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)
	Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)
	Piston ring-to-ring groove clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)
		Second	0.015 – 0.050 (0.0006 – 0.0020)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)
		Second	0.30 – 0.45 (0.012 – 0.018)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)
	Piston ring mark direction	Top/second	Marking facing up
			–

### TORQUE VALUES

Cylinder stud bolt

page 8-8

## 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 (piston)

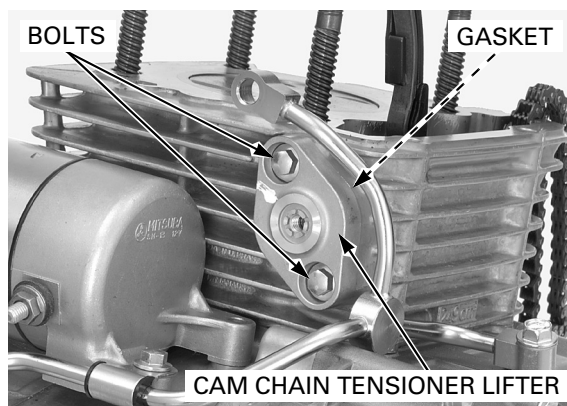
- Worn piston pin or piston pin hole
- Worn cylinder, piston or piston rings
- Worn connecting rod small end

# CYLINDER/PISTON REMOVAL

### CYLINDER REMOVAL

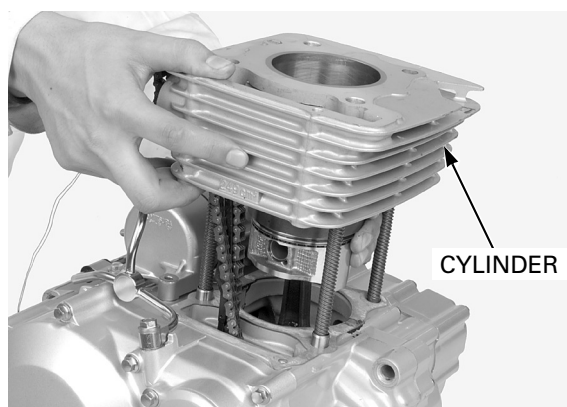
Remove the cylinder head (page 7-11).

Remove the bolts, cam chain tensioner lifter and gasket.

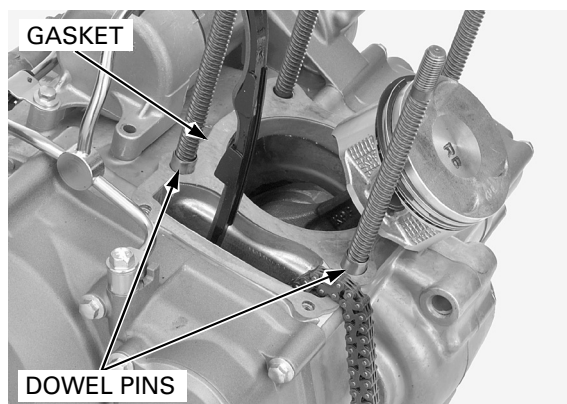


*Take care the oil pass pipe during cylinder removal.*

Lift the cylinder and remove it, being careful not to damage the piston with the stud bolts.



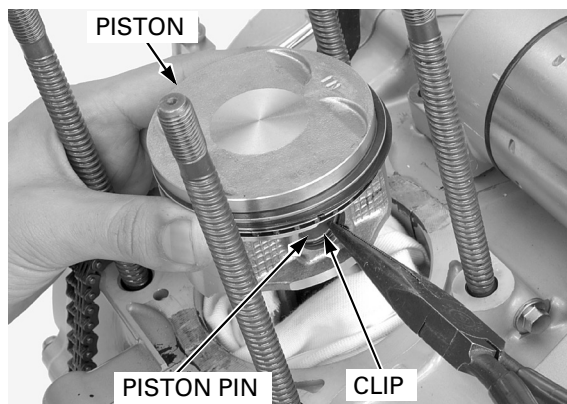
Remove the dowel pins and gasket.



### PISTON REMOVAL

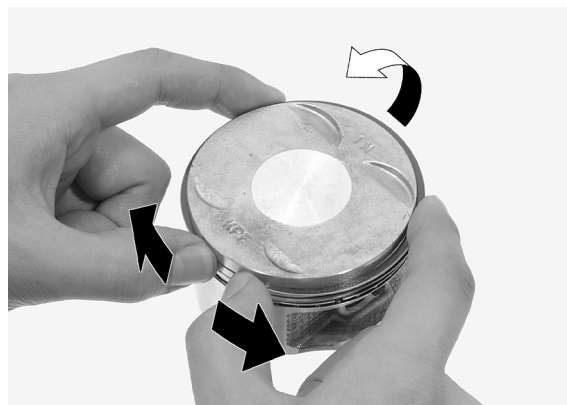
*Place a clean shop towel over the crankcase to prevent the possibility of the piston pin clips falling into the crankcase.*

Remove the piston pin clips with pliers. Push the piston pin out of the piston and connecting rod, then remove the piston.



*Do not damage the piston ring 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 grooves.*

Clean carbon deposits from the piston ring grooves with a used piston 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: 73.11 mm (2.878 in)**

Calculate the cylinder-to-piston clearance. Refer to measurement of the piston O.D. (page 8-6).

**SERVICE LIMIT: 0.23 mm (0.009 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)**

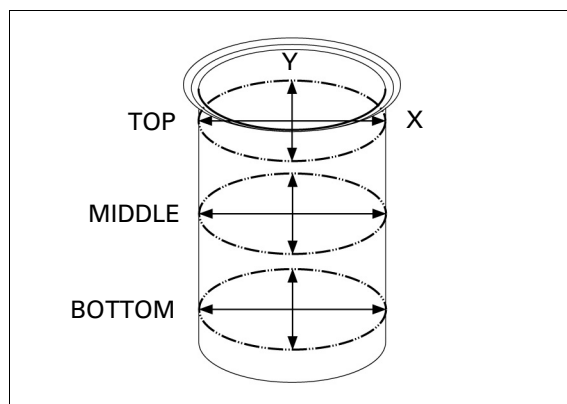
**Out-of-round: 0.05 mm (0.002 in)**

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

The following oversize pistons are available:

- 0.25 mm (0.010 in)
- 0.50 mm (0.020 in)

The cylinder must be rebored so the clearance for an oversize piston is 0.030 – 0.060 mm (0.0012 – 0.0024 in).

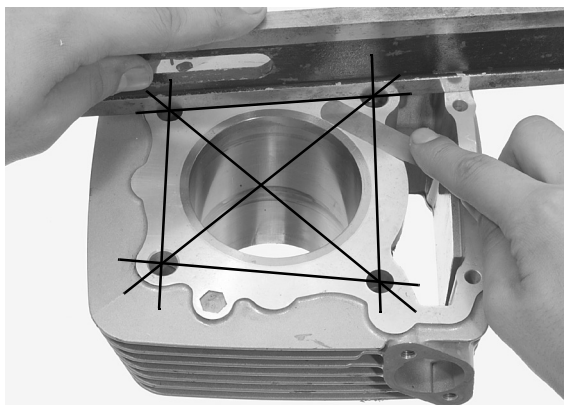




## CYLINDER/PISTON

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

**SERVICE LIMIT: 0.05 mm (0.002 in)**



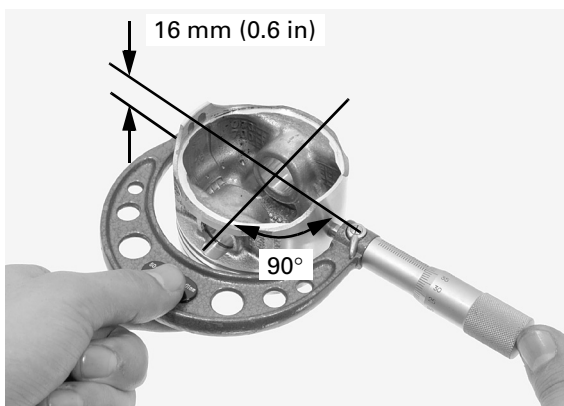
### PISTON/PISTON RING

Measure the piston O.D. at a point 16 mm (0.6 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT: 72.87 mm (2.869 in)**

Calculate the cylinder-to-piston clearance.  
Refer to measurement of the cylinder I.D. (page 8-5).

**SERVICE LIMIT: 0.23 mm (0.009 in)**



Measure the piston pin hole I.D.

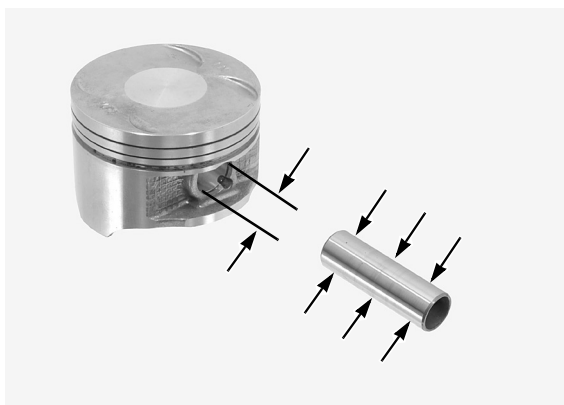
**SERVICE LIMIT: 17.05 mm (0.671 in)**

Measure the piston pin O.D. at piston and connecting rod sliding surface.  
Take the maximum reading to determine the O.D.

**SERVICE LIMIT: 16.97 mm (0.668 in)**

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.07 mm (0.003 in)**



Measure the connecting rod small end I.D.

**SERVICE LIMIT: 17.06 mm (0.672 in)**

Calculate the connecting rod-to-piston pin clearance.

**SERVICE LIMIT: 0.09 mm (0.004 in)**



Inspect the piston rings for smooth movement by rotating the 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: 0.12 mm (0.005 in)**

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



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

Measure the each piston ring end gap.

**SERVICE LIMITS:**

**Top: 0.30 mm (0.012 in)**

**Second: 0.45 mm (0.018 in)**

**Oil (side rail): 0.86 mm (0.034 in)**



**CAM CHAIN TENSIONER LIFTER**

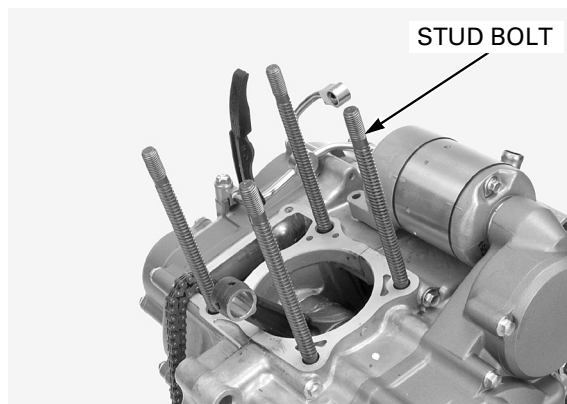
The tensioner shaft should not go into the body when it is pushed.

When it is turned clockwise with a screwdriver, the tensioner shaft should be pulled into the body. The shaft spring out of the body as soon as screwdriver is released.



**CYLINDER STUD BOLT REPLACEMENT**

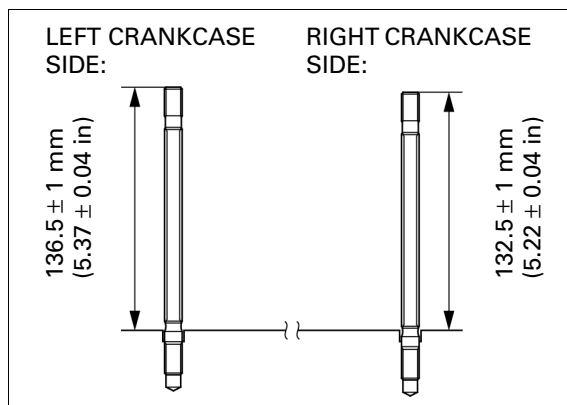
Thread two nuts onto the stud and tighten them together, and use a wrench on them to turn the stud bolt out.



## CYLINDER/PISTON

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

Adjust the height if necessary.



## CYLINDER/PISTON INSTALLATION

### PISTON RING INSTALLATION

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

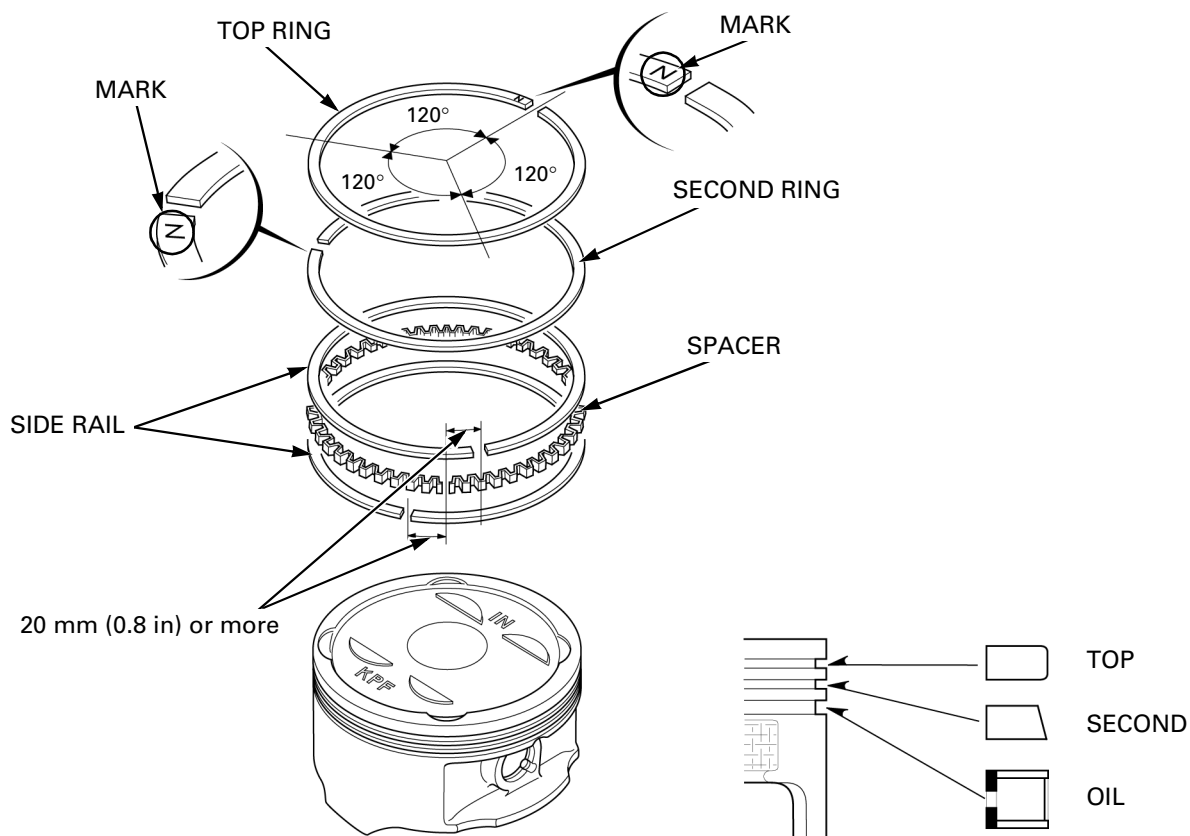
Carefully install the piston rings into the piston ring grooves with each mark facing up.

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.

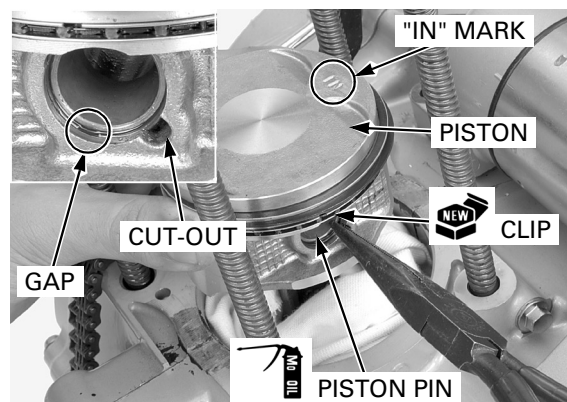
Apply molybdenum oil solution to the piston pin outer surface and connecting rod small end inner surface.

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:

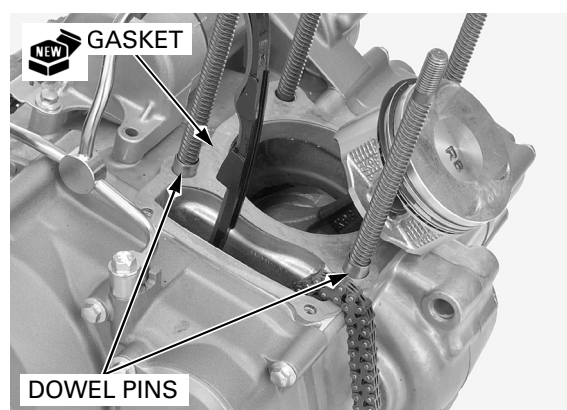
- Make sure the piston pin clips are seated securely.
- Do not align the clip end gap with the piston cut-out.



## CYLINDER INSTALLATION

*Be careful not to allow gasket material into the crankcase.*

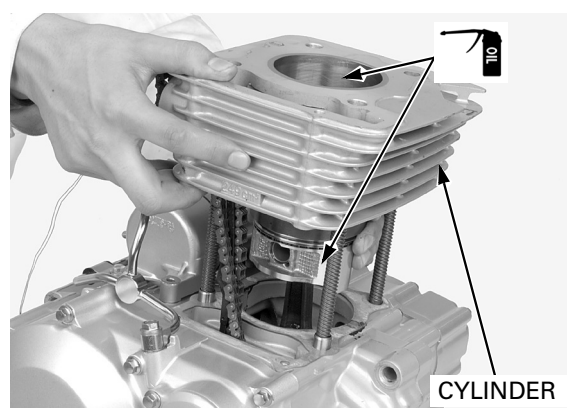
Clean the gasket surface of the crankcase and cylinder thoroughly, being careful not to damage them. Install the dowel pins and a new gasket.



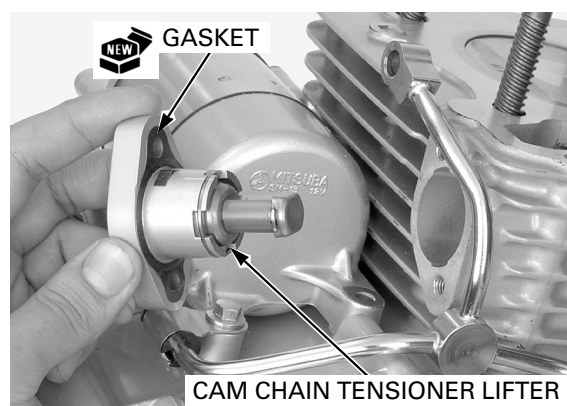
*Be careful not to damage the piston rings, cylinder wall and oil pass pipe.*

Coat the cylinder bore, piston outer surface and piston rings with clean engine oil.

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



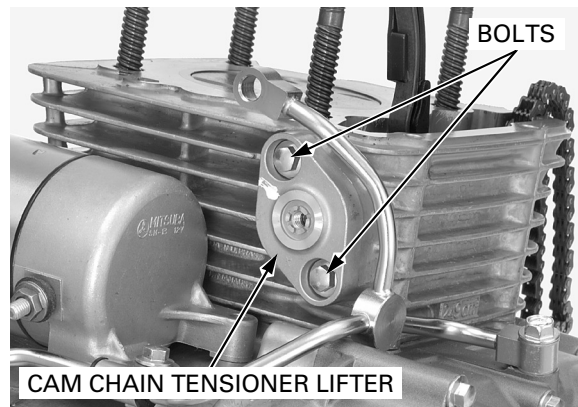
Install a new gasket onto the cam chain tensioner lifter.



## CYLINDER/PISTON

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Install the cam chain tensioner lifter and bolts to the cylinder.  
Tighten the bolts securely.  
Install the cylinder head(page 7-21).



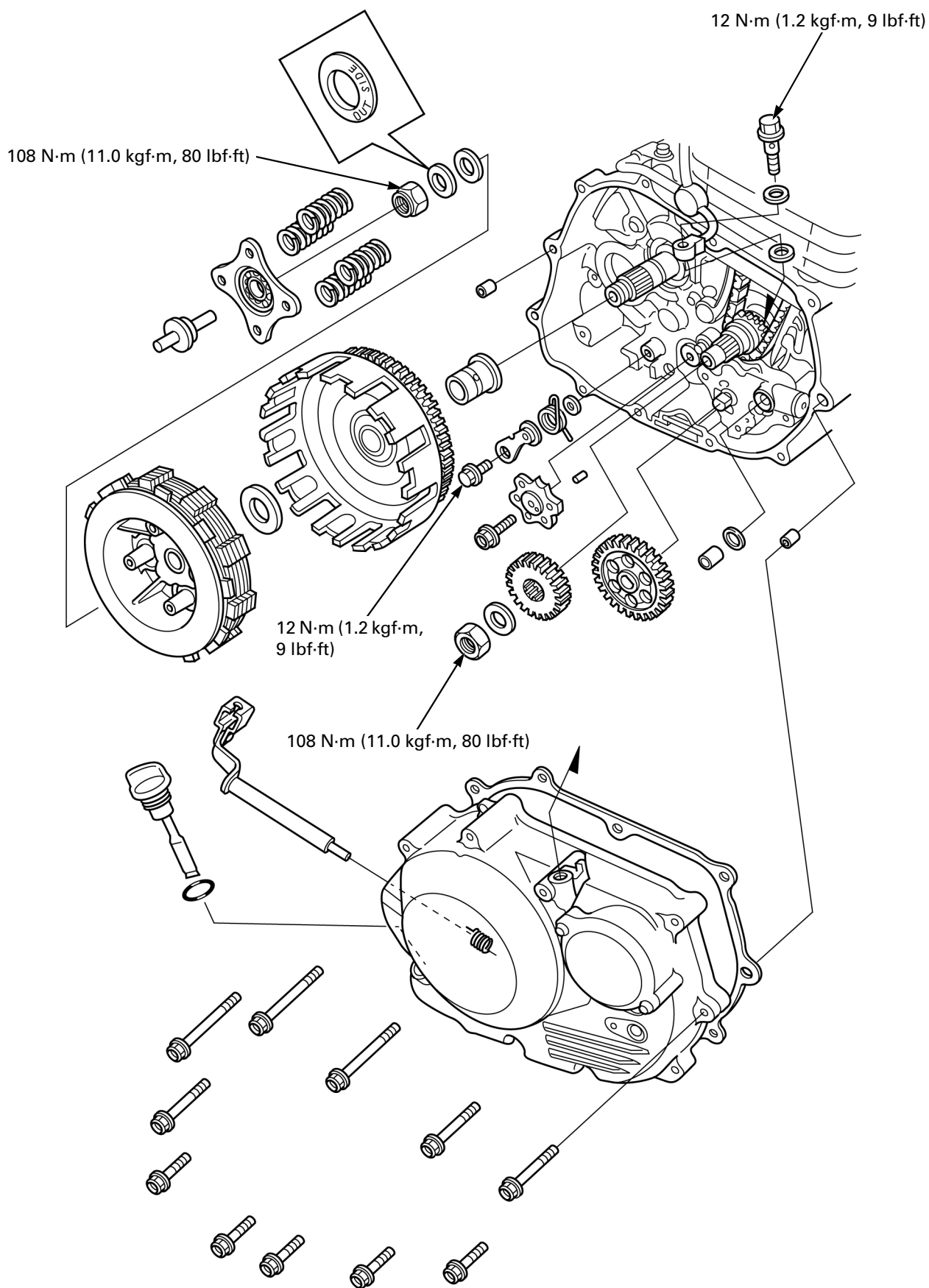
# 9. CLUTCH/GEARSHIFT LINKAGE

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COMPONENT LOCATION .....	9-2	CLUTCH.....	9-7
SERVICE INFORMATION .....	9-3	PRIMARY DRIVE GEAR.....	9-13
TROUBLESHOOTING .....	9-4	GEARSHIFT LINKAGE .....	9-15
RIGHT CRANKCASE COVER REMOVAL.....	9-5	RIGHT CRANKCASE COVER INSTALLATION.....	9-16

## CLUTCH/GEARSHIFT LINKAGE

### COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- The clutch and gearshift linkage can be serviced with the engine installed in the frame.
- Engine oil viscosity and level and the use of oil additives have an effect on clutch operation. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil viscosity and oil level before servicing the clutch system.

### SPECIFICATIONS

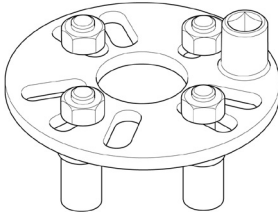
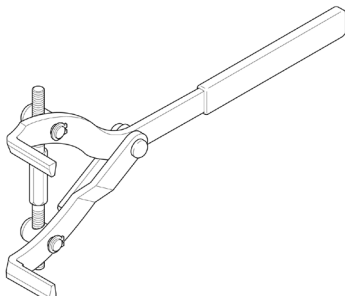
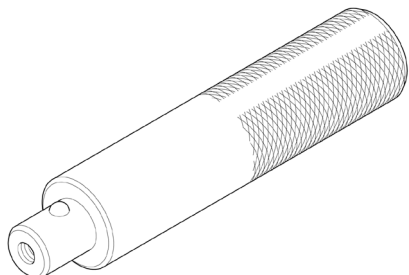


Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch	Lever free play		10 – 20 (3/8 – 13/16)	–
	Spring free length		35.6 (1.40)	32.0 (1.26)
	Disc thickness	A	2.92 – 3.08 (0.115 – 0.121)	2.69 (0.106)
		B	2.92 – 3.08 (0.115 – 0.121)	2.69 (0.106)
	Plate warpage		–	0.30 (0.012)
	Outer I.D.		25.000 – 25.021 (0.9843 – 0.9851)	25.04 (0.986)
	Outer guide	I.D.	19.990 – 20.010 (0.7870 – 0.7878)	20.03 (0.789)
		O.D.	24.959 – 24.980 (0.9826 – 0.9835)	24.17 (0.952)
Mainshaft O.D. at clutch outer guide			19.959 – 19.980 (0.7858 – 0.7866)	19.91 (0.784)

### TORQUE VALUES

Clutch center lock nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply engine oil to the threads and seating surface Stake
Primary drive gear nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply engine oil to the threads and seating surface
Shift drum stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil pass pipe joint bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Right step holder mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	

### TOOLS

Clutch center holder 07JMB-MN50301 	Clutch center holder 07724-0050002 	Driver 07749-0010000 
Attachment, 28 x 30 mm 07946-1870100 	Pilot, 17 mm 07746-0040400 	



## CLUTCH/GEARSHIFT LINKAGE

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### 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
- Faulty clutch lifter plate bearing

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

- Excessive clutch lever free play
- Clutch plate warped
- Damaged clutch lifter mechanism
- Engine oil level too high, improper engine oil viscosity, or additive used

#### **Clutch slips**

- No clutch lever free play
- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- Engine oil additive used

#### **Hard to shift**

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle (page 11-11)
- Damaged gearshift cam
- Bent fork shaft or damaged shift forks and shift drum (page 11-10)

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

- Worn shift drum stopper arm
- Worn or broken gearshift spindle return spring (page 11-11)
- Worn or damaged gearshift cam
- Bent shift fork shaft or worn shift forks or shift drum (page 11-10)
- Worn gear dogs or slots (page 11-9)

#### **Gearshift pedal will not return**

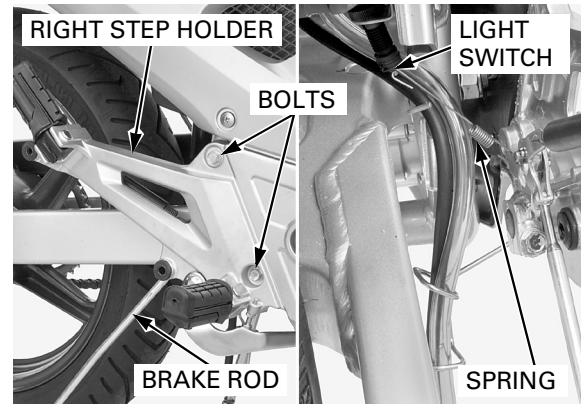
- Weak or broken gearshift spindle return spring (page 11-11)
- Bent gearshift spindle (page 11-11)

## RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-13).  
 Remove the exhaust pipe/muffler (page 2-8).  
 Remove the rear brake rod from the joint piece (page 13-6).

Remove the right step holder mounting bolts and disconnect the return spring from the rear brake light switch and brake rod.

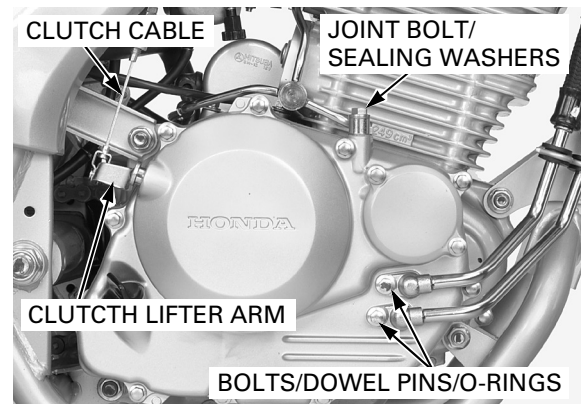
Remove the right step holder.



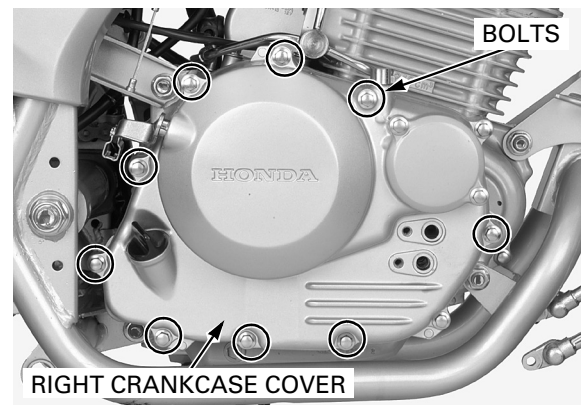
Remove the oil pass pipe joint bolt and sealing washers.  
 Disconnect the clutch cable from the clutch lifter arm.

Remove the oil pipe lower joint bolts, O-rings and dowel pins.

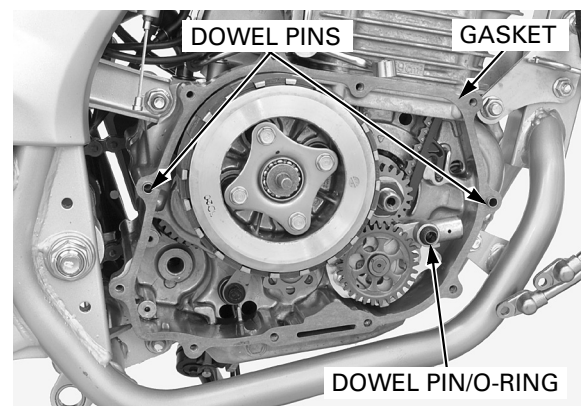
Remove the oil pipes from the clamps.



Loosen the right crankcase cover bolts in a criss-cross pattern in 2 – 3 steps and remove them and right crankcase cover.



Remove the gasket, dowel pins and O-ring.



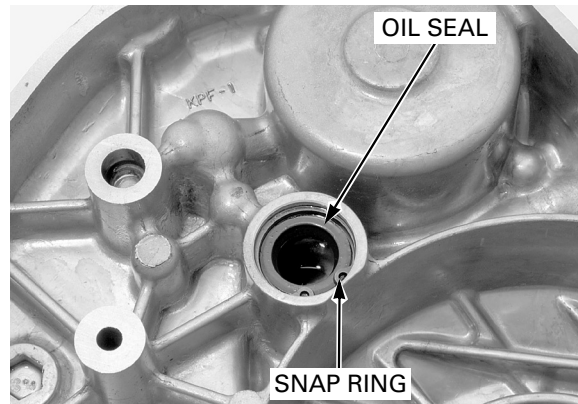
## CLUTCH/GEARSHIFT LINKAGE

### DISASSEMBLY/INSPECTION

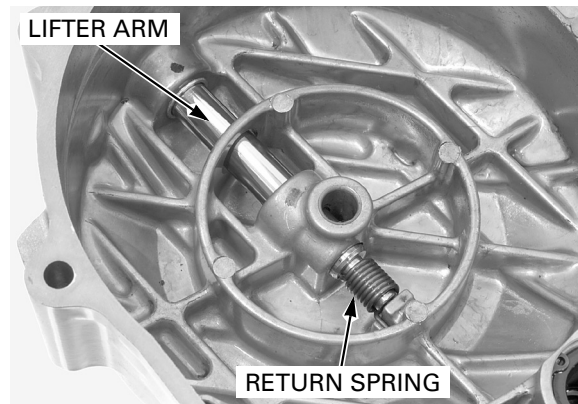
Remove the snap ring and oil seal.  
Inspect the oil seal and replace it if worn or damaged.

Press the oil seal into the crankcase below the snap ring groove.

Install the snap ring securely.



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

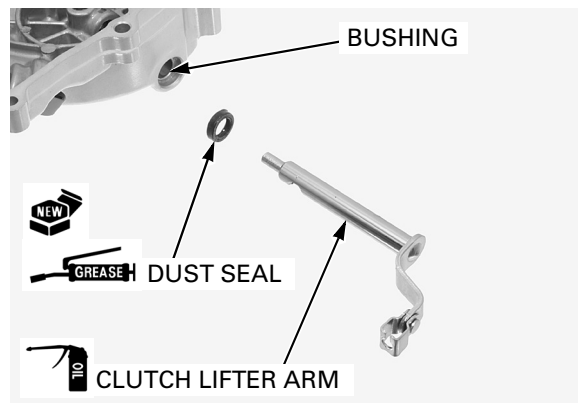


Check the clutch lifter arm for bent or damage.  
Check the return spring for fatigue or damage.  
Check the dust seal and bushing for wear or damage.  
Replace them if necessary.

### ASSEMBLY

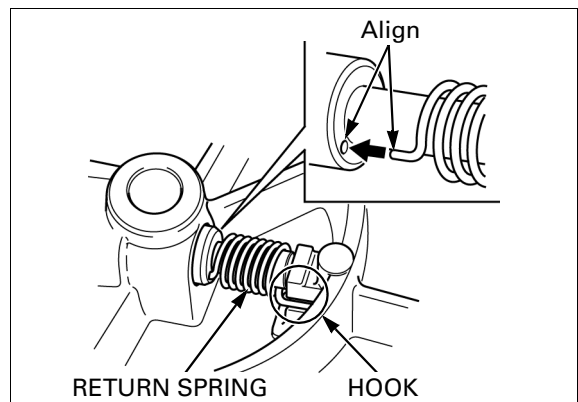
Apply grease to a new dust seal lip and install it to the right crankcase cover.

Apply engine oil to the clutch lifter arm sliding surface and install it into the right crankcase cover.



Install the return spring with its short end side facing toward the lifter arm end as shown.

Hook the return spring end to the crankcase cover tab.

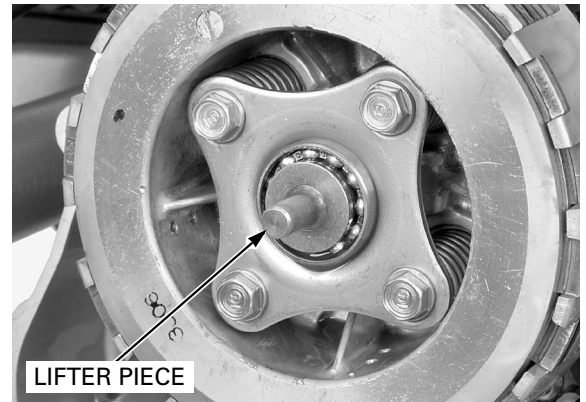


# CLUTCH

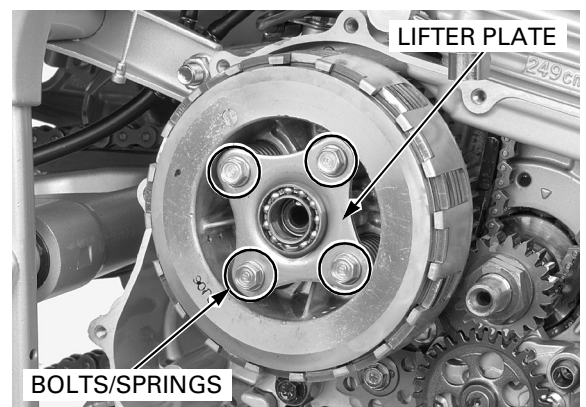
## REMOVAL

Remove the right crankcase cover (page 9-5).

Remove the clutch lifter piece.

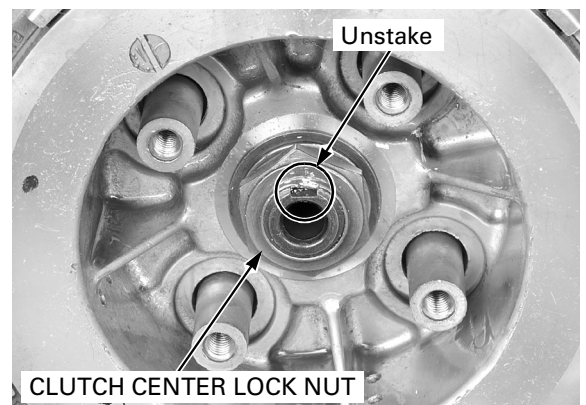


Loosen the clutch spring bolts in a crisscross pattern in 2 – 3 steps.  
Remove the clutch spring bolts, clutch lifter plate and clutch springs.



*Be careful not to damage the main-shaft threads.*

Unstake the clutch center lock nut.



Attach the special tool to the pressure plate using four 6 x 60 mm flange bolts to hold the clutch center.

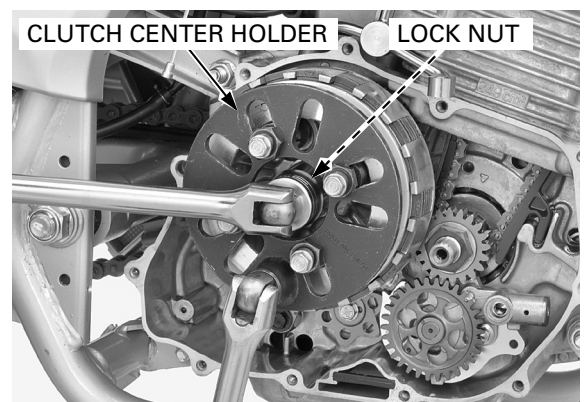
Loosen the clutch center lock nut.

### TOOL:

**Clutch center holder**

**07JMB-MN50301**

Remove the special tool and clutch center lock nut.



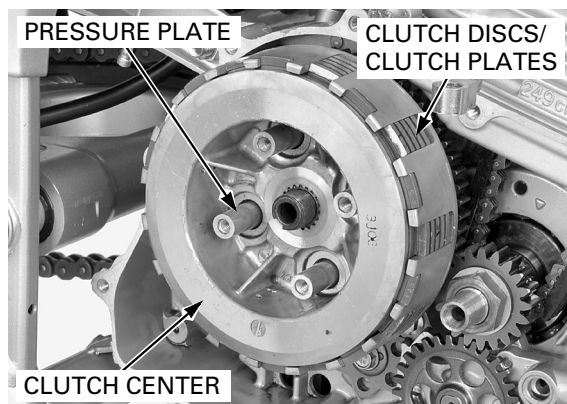
## CLUTCH/GEARSHIFT LINKAGE

Remove the following:

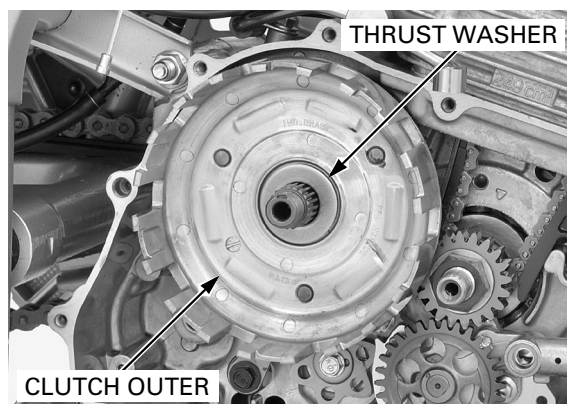
- Spring washer
- Washer



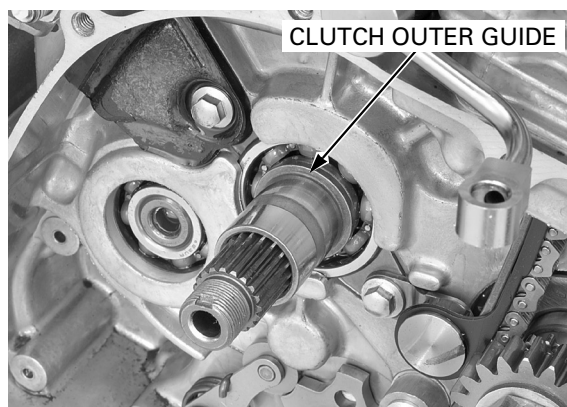
- Clutch center
- Clutch disc A
- Clutch plates
- Clutch disc B
- Pressure plate



- Thrust washer
- Clutch outer



- Clutch outer guide

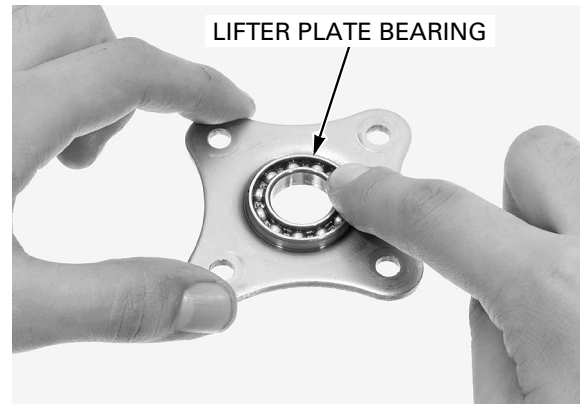


## INSPECTION

### Clutch lifter plate bearing

Check the clutch lifter plate bearing for damage. Turn the bearing inner race with your finger. The bearing should turn smoothly and quietly without play.

Also check that the bearing outer race fits tightly in the clutch lifter plate.



Replace the bearing if the inner race does not turn smoothly, quietly or if the outer race fits loosely in the clutch lifter plate.

Drive out the clutch lifter plate bearing.

Drive new clutch lifter plate bearing into the clutch lifter plate using the special tools.



### TOOLS:

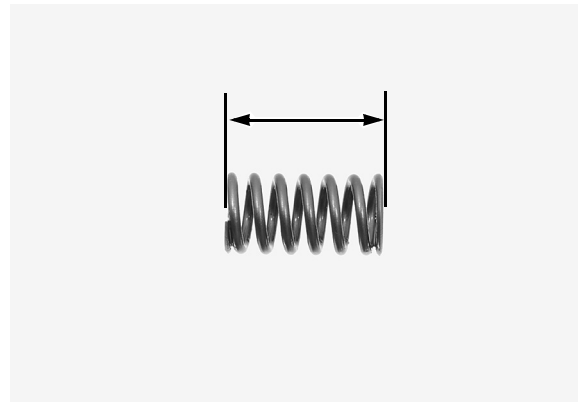
<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 28 x 30 mm</b>	<b>07946-1870100</b>
<b>Pilot, 17 mm</b>	<b>07746-0040400</b>

### Clutch spring

*Replace the clutch springs as a set.*

Measure the clutch spring free length.

**SERVICE LIMIT: 32.0 mm (1.26 in)**



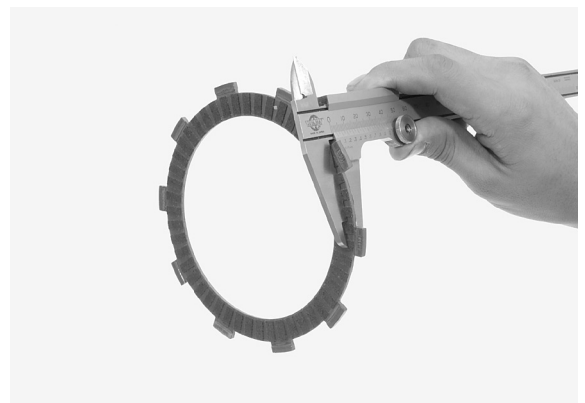
### Clutch disc

*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 LIMITS: Disc A: 2.69 mm (0.106 in)**  
**Disc B: 2.69 mm (0.106 in)**



## CLUTCH/GEARSHIFT LINKAGE

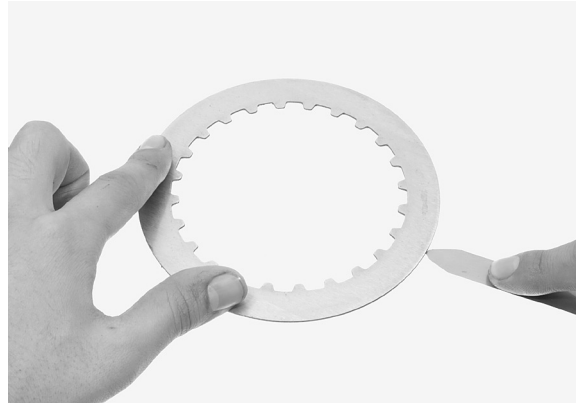
### Clutch plate

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

Check the clutch plates for excessive warpage or discoloration.

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

**SERVICE LIMIT: 0.30 mm (0.012 in)**



### Clutch center

Check the clutch center for nicks, indentations or abnormal wear made by the clutch plates.



### Clutch outer

Check the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

Check the serrated teeth of the primary driven gear for wear or damage.

Measure the I.D. of the clutch outer.

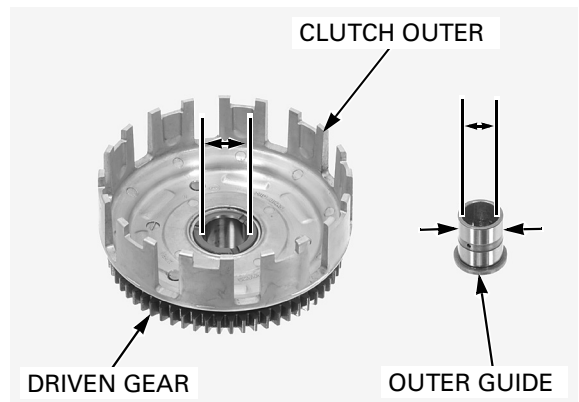
**SERVICE LIMIT: 25.04 mm (0.986 in)**

### Clutch outer guide

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

**SERVICE LIMITS: I.D.: 20.03 mm (0.789 in)**

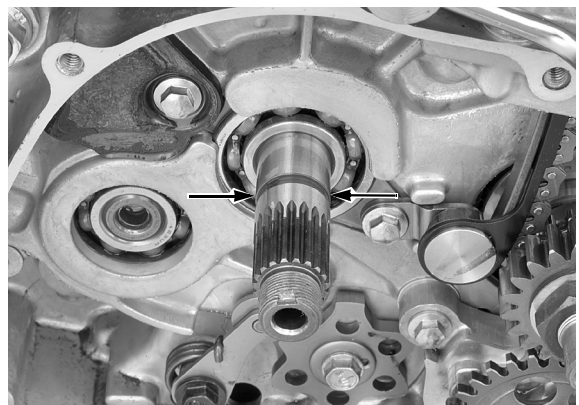
**O.D.: 24.17 mm (0.952 in)**



### Mainshaft

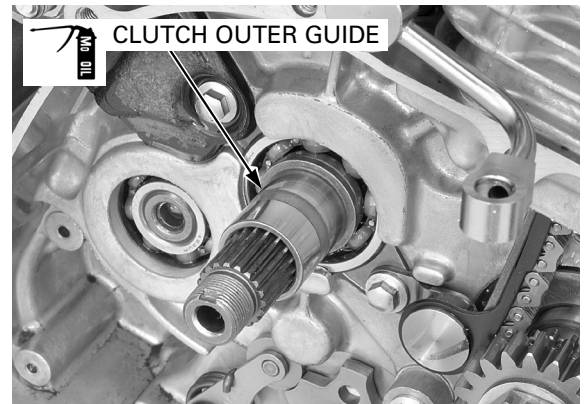
Measure the mainshaft O.D. at the clutch outer guide.

**SERVICE LIMITS: 19.91 mm (0.784 in)**

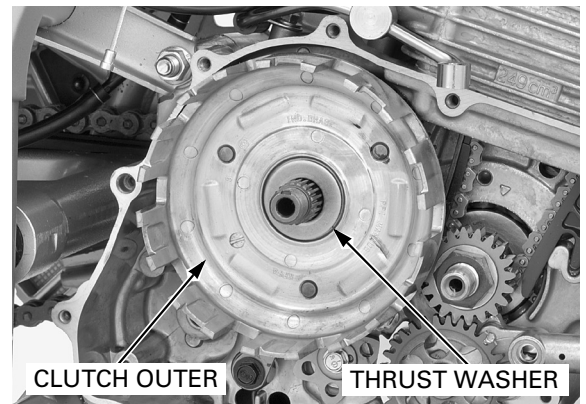


## INSTALLATION

Apply molybdenum oil solution to the clutch outer guide and install it to the mainshaft.



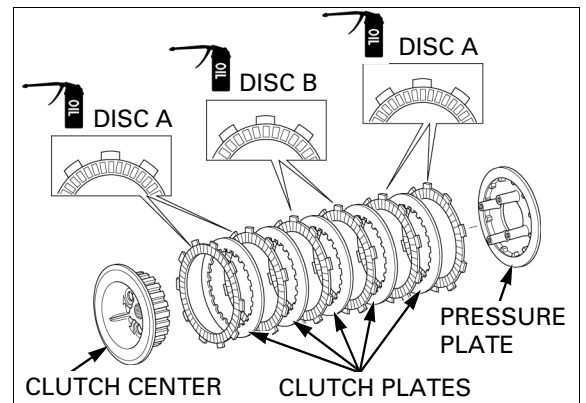
Install the clutch outer and thrust washer.



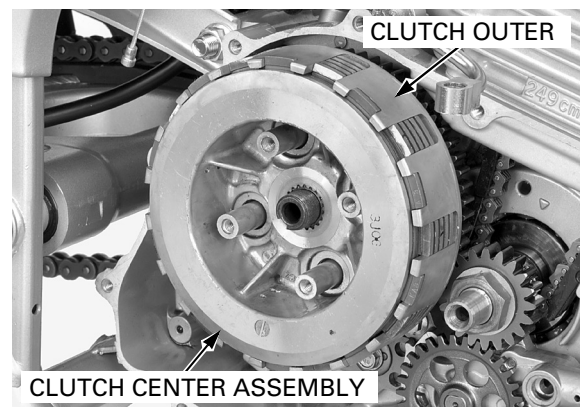
Coat the clutch discs and clutch plates with engine oil.

Install the clutch disc A, disc B and clutch plate onto the clutch center as shown.

Install the pressure plate to the clutch center assembly while aligning pressure plate tabs with slots of clutch center.



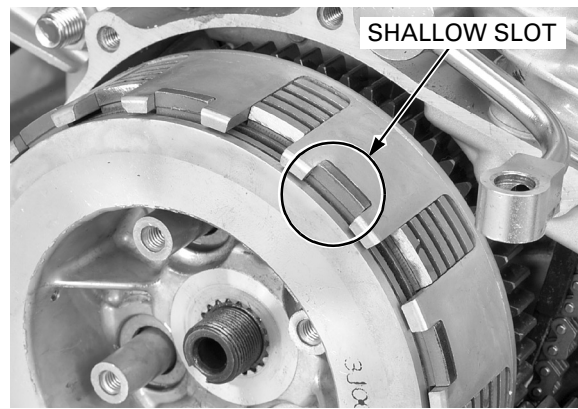
Install the clutch center assembly into the clutch outer.



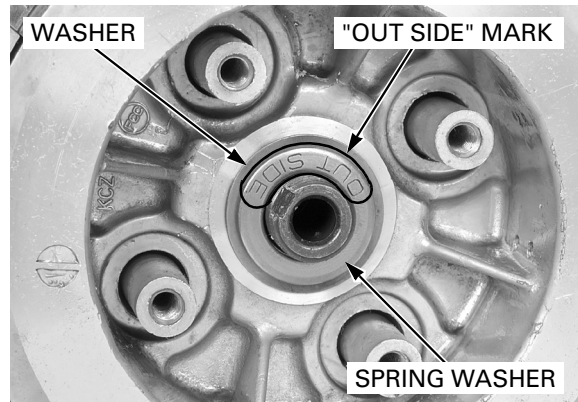


## CLUTCH/GEARSHIFT LINKAGE

Install the outside clutch disc A tabs into the shallow slots of the clutch outer.



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



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

Attach the special tool to the pressure plate using four 6 x 60 mm flange bolts to hold the clutch center.

**TOOL:**  
**Clutch center holder**                      **07JMB-MN50301**

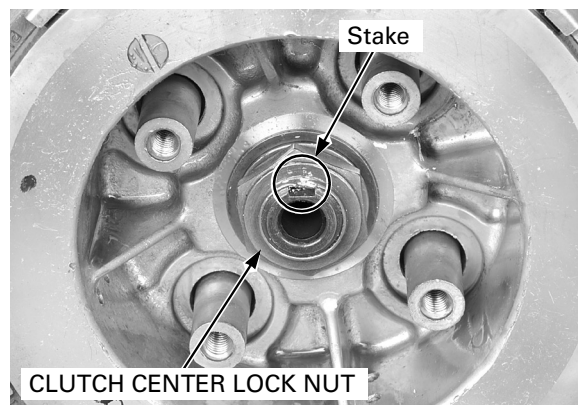
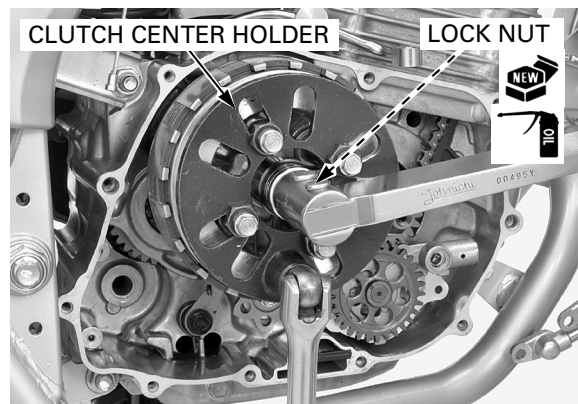
Tighten the clutch center lock nut to the specified torque.

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

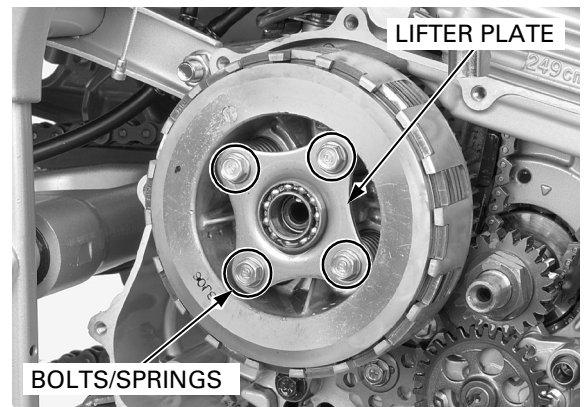
Remove the special tool.

*Be careful not to damage the mainshaft threads.*

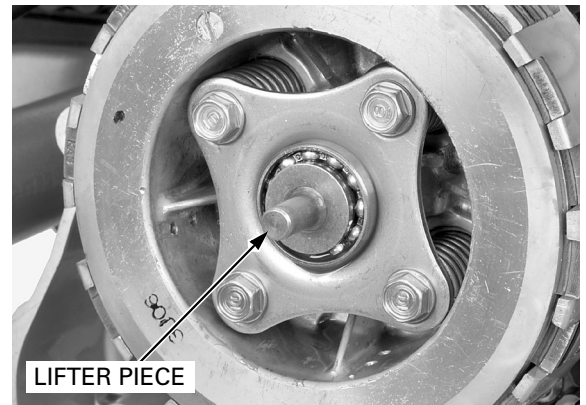
Stake the clutch center lock nut into the mainshaft groove.



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



Install the clutch lifter piece.  
Install the right crankcase cover (page 9-16).



## PRIMARY DRIVE GEAR

### REMOVAL

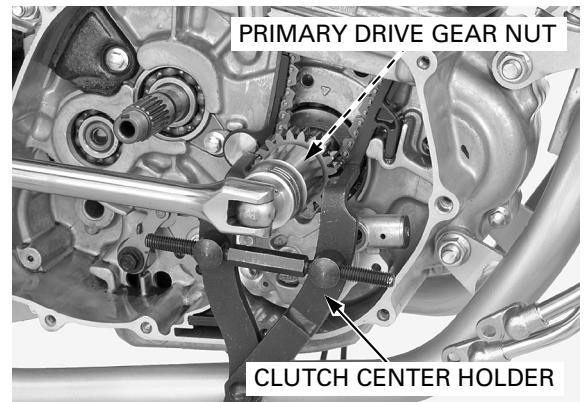
Remove the following:

- Right crankcase cover (page 9-5)
- Clutch (page 9-7)
- Oil pump driven gear (page 4-4)

Hold the primary drive gear with the special tool and remove the primary drive gear nut.

#### TOOL:

**Clutch center holder**                      **07724-0050002**



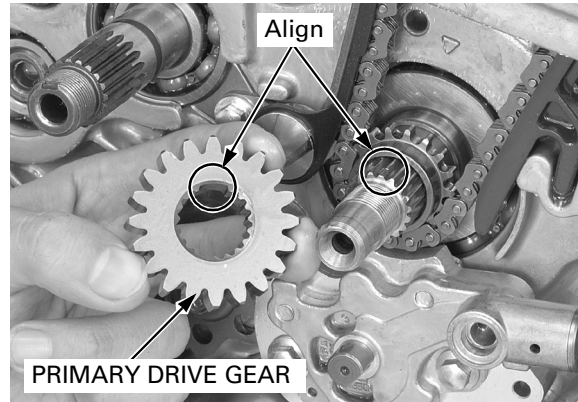
Remove the washer and primary drive gear from the crankshaft.



## CLUTCH/GEARSHIFT LINKAGE

### INSTALLATION

Install the primary drive gear while aligning its wide groove with its wide tooth of the crankshaft.



Install the washer.



Apply engine oil to the threads and seating surface of the primary drive gear nut and install it to the crankshaft.

Hold the primary drive gear with the special tool and tighten the primary drive gear nut to the specified torque.

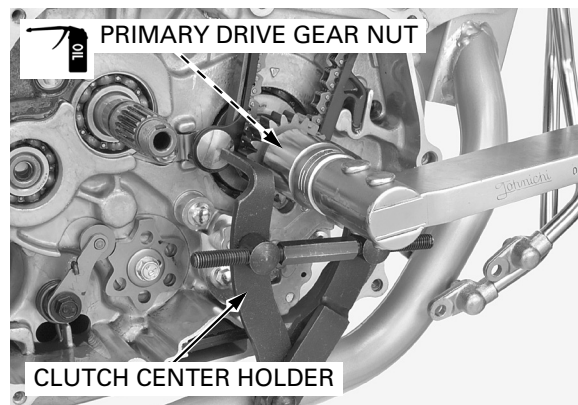
#### TOOL:

**Clutch center holder** 07724-0050002

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

Install the following:

- Oil pump driven gear (page 4-9)
- Clutch (page 9-11)
- Right crankcase cover (page 9-16)



## GEARSHIFT LINKAGE

### NOTE:

For gearshift spindle service, refer to page 11-8.

### REMOVAL

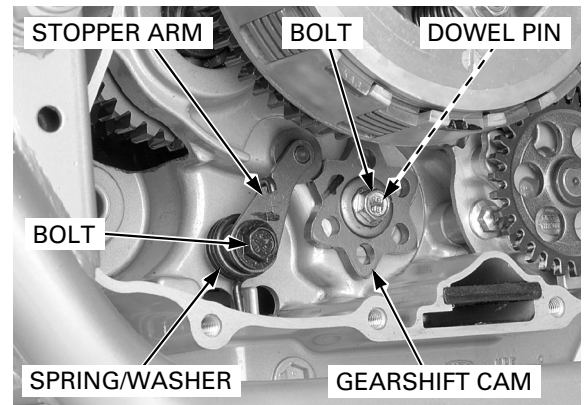
Remove the right crankcase cover (page 9-5).

Remove the following:

- Gearshift cam bolt
- Gearshift cam
- Dowel pin
- Stopper arm bolt
- Stopper arm
- Washer
- Return spring

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

Check the return spring for fatigue or damage.



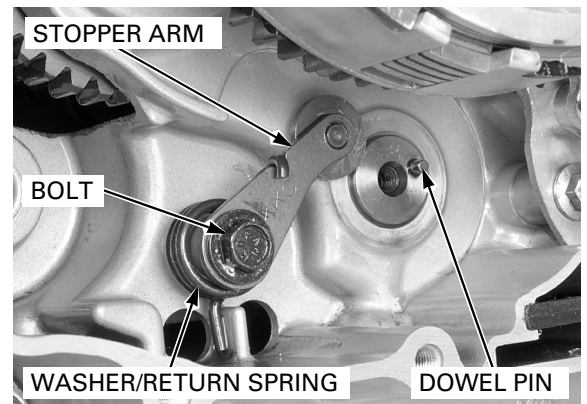
### INSTALLATION

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

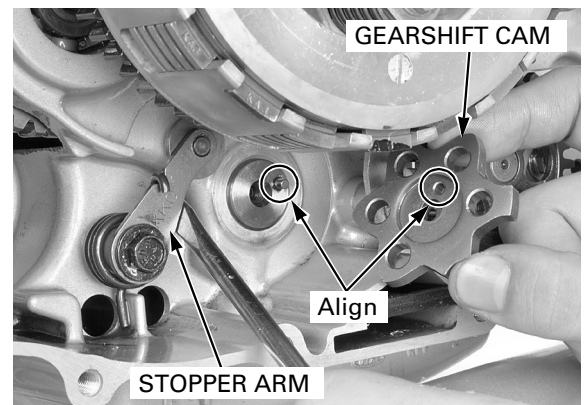
Tighten the stopper arm bolt to the specified torque.

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

Install the dowel pin into the shift drum hole.



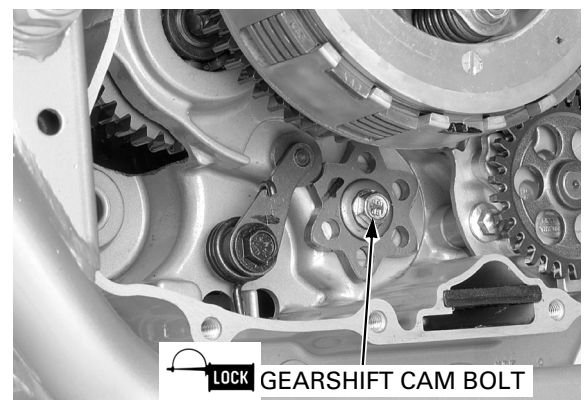
Hold the stopper arm using a screwdriver and install the gearshift cam by aligning the pin hole with the dowel pin.



Apply a locking agent to the gearshift cam bolt threads.

Install the gearshift cam bolt and tighten it securely.

Install the right crankcase cover (page 9-16).

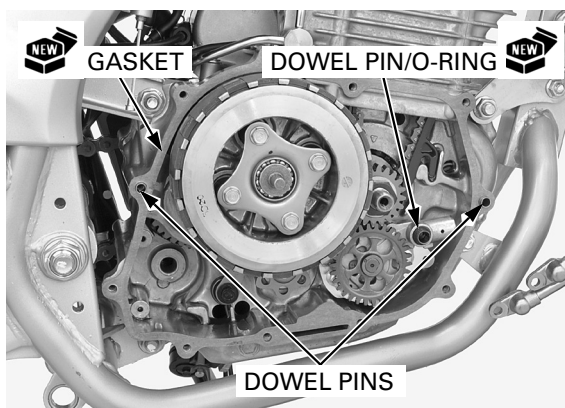


### RIGHT CRANKCASE COVER INSTALLATION

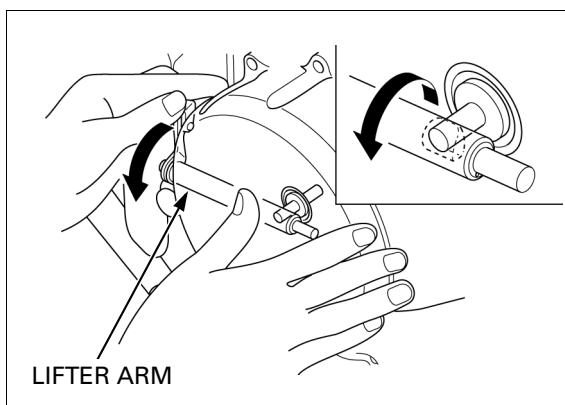
Clean the mating surfaces of right crankcase and right crankcase cover.

Apply engine oil to a new O-ring.

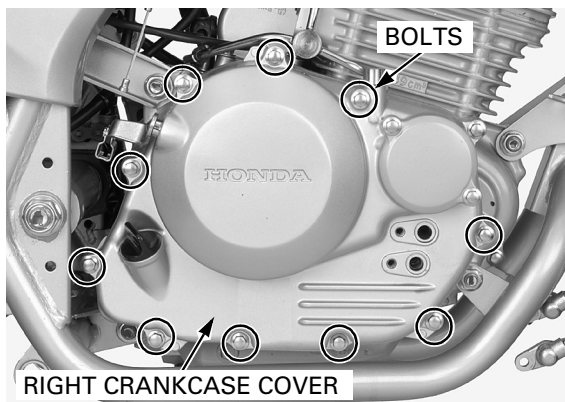
Install the dowel pins, O-ring and a new gasket.



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

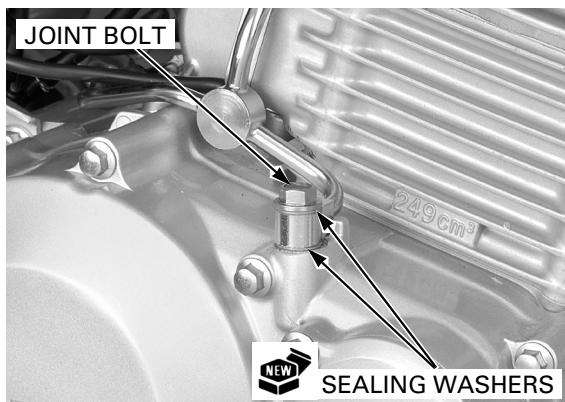


Install the right crankcase cover bolts and tighten them in a crisscross pattern in 2 – 3 steps.

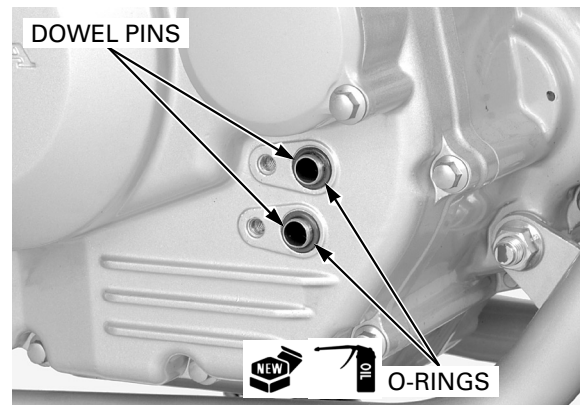


Install new sealing washers and tighten the oil pass pipe joint bolt to the specified torque.

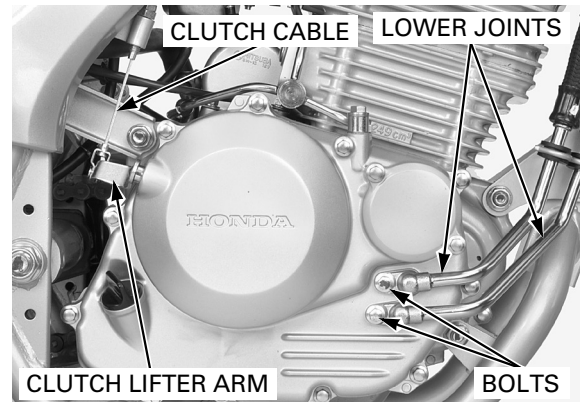
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the dowel pins to the right crankcase cover.  
Coat new O-rings with engine oil and install them onto the dowel pins.



Install the oil pipes to the clamps.  
Install the oil pipe lower joints, lower joint bolts to the right crankcase cover and tighten them securely.  
Connect the clutch cable to the clutch lifter arm.



Hook the return spring to the rear brake light switch and brake rod.  
Install the right step holder and tighten the step holder mounting bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

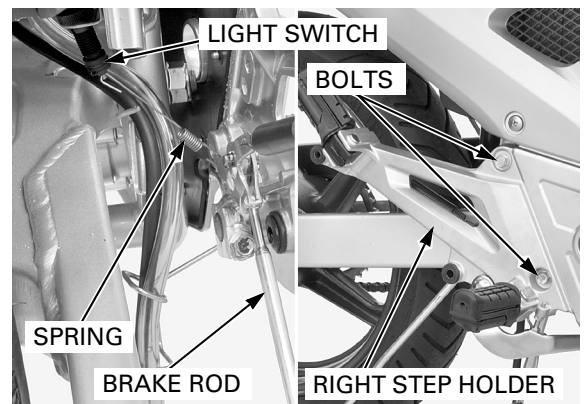
Install the rear brake rod to the joint piece (page 13-12)

Install the exhaust pipe/muffler (page 2-10)

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

Adjust the following:

- Clutch lever free play (page 3-24)
- Rear brake pedal free play (page 3-23)



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## MEMO

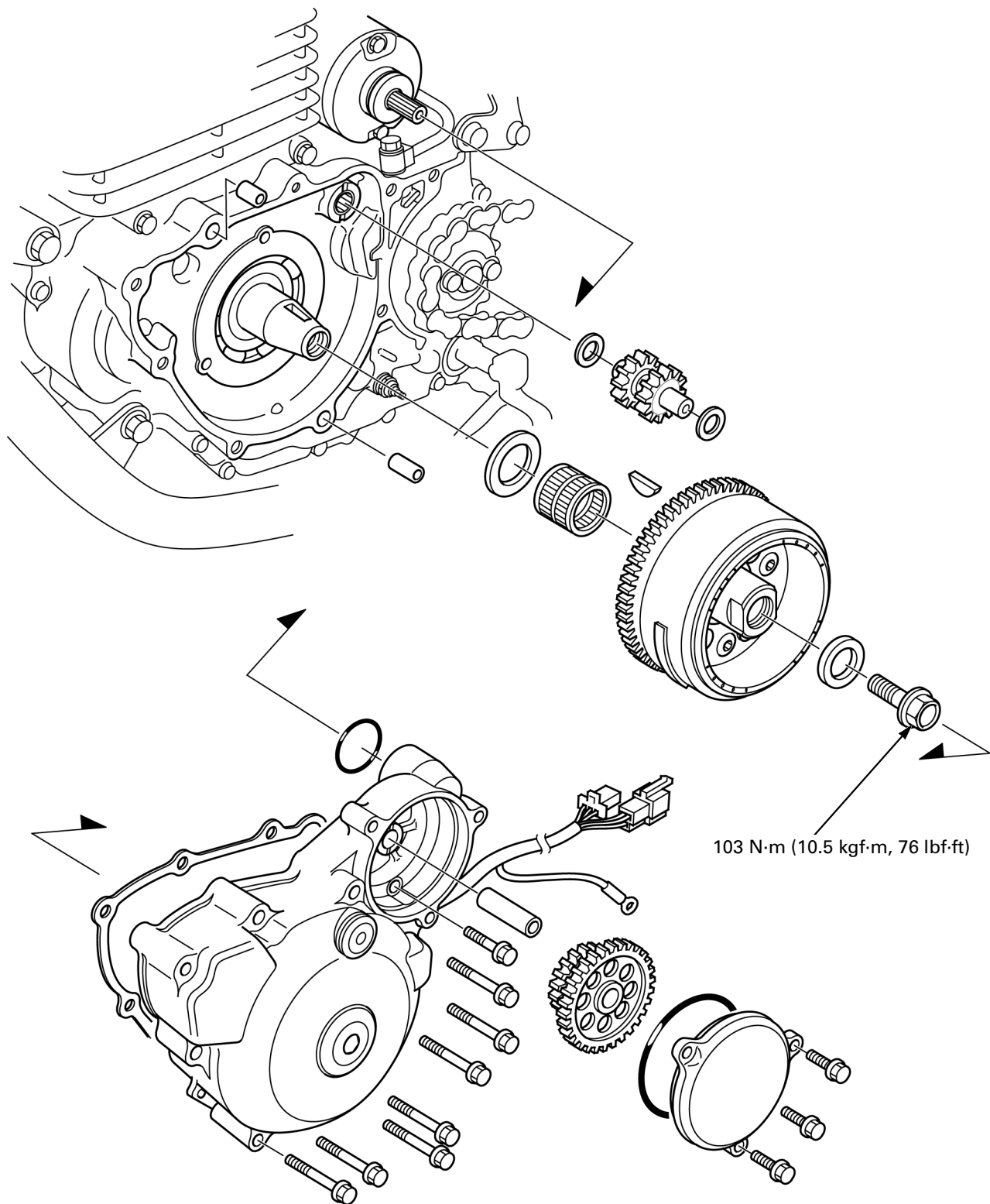
# 10. ALTERNATOR/STARTER CLUTCH

---

COMPONENT LOCATION .....	10-2	STATOR/IGNITION PULSE GENERATOR.....	10-6
SERVICE INFORMATION .....	10-3	FLYWHEEL/STARTER CLUTCH.....	10-8
TROUBLESHOOTING .....	10-3	LEFT CRANKCASE COVER INSTALLATION.....	10-13
LEFT CRANKCASE COVER REMOVAL .....	10-4		



COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator, flywheel and starter clutch. These services can be done with the engine installed in the frame.
- Refer to alternator inspection (page 15-6).
- Refer to starter motor servicing (page 17-6).

### SPECIFICATIONS

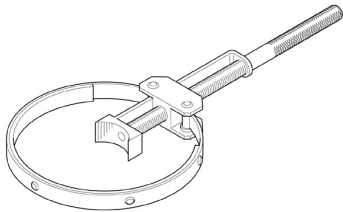
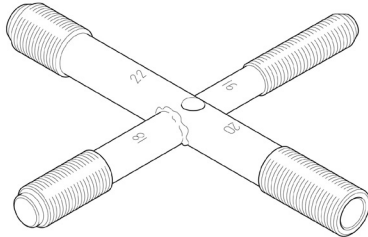
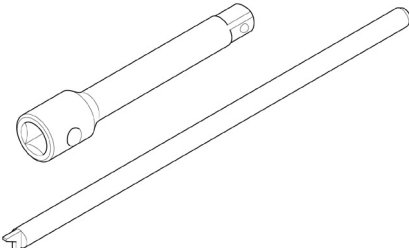
Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.63 (1.796)

### TORQUE VALUES

Flywheel bolt	103 N·m (10.5 kgf·m, 76 lbf·ft)	Apply engine oil to the threads and seating surface
Starter clutch outer torx bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply a locking agent to the threads
Ignition pulse generator socket bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Stator socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Stator wire clamp socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Neutral switch wire nut	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	

### TOOLS

<p>Flywheel holder 07725-0040000</p> 	<p>Flywheel puller 07733-0020001</p> 	<p>Puller bar 07716-0020500</p> 
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## TROUBLESHOOTING

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

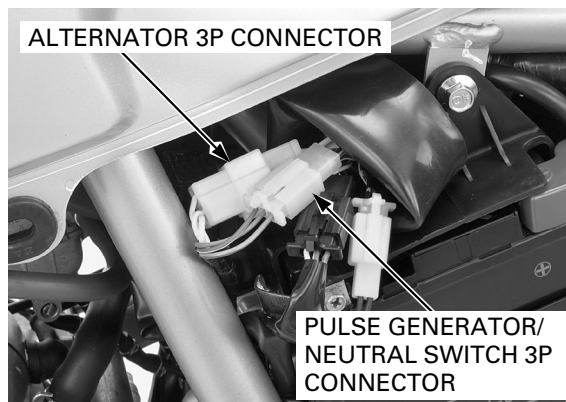
- Faulty starter clutch
- Damaged starter idle and/or reduction gears

## ALTERNATOR/STARTER CLUTCH

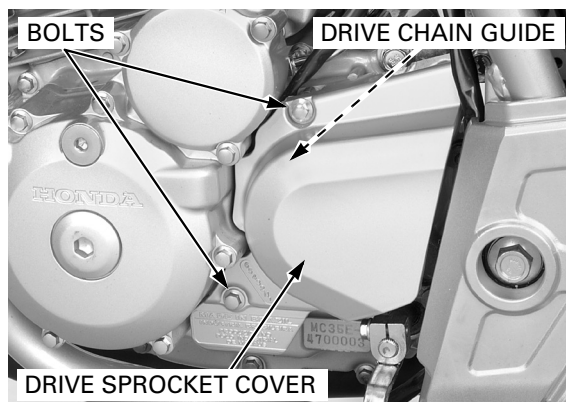
### LEFT CRANKCASE COVER REMOVAL

Remove the left side cover (page 2-4).

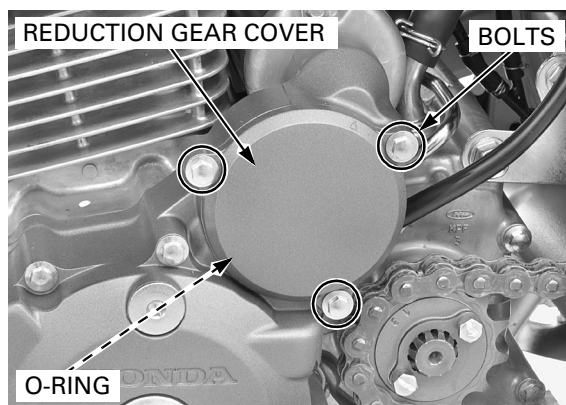
Disconnect the alternator 3P connector and ignition pulse generator/neutral switch 3P connector.



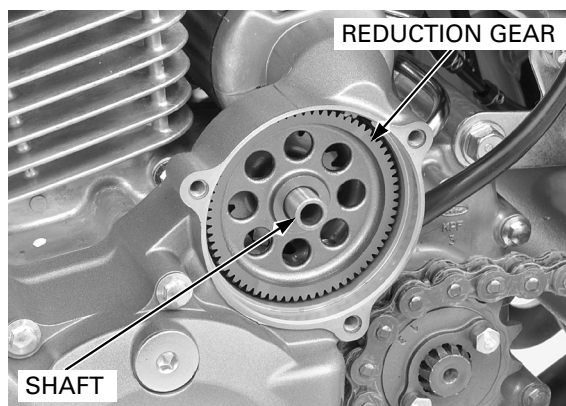
Remove the bolts, drive sprocket cover and drive chain guide.



Remove the bolts, starter reduction gear cover and O-ring.



Remove the starter reduction gear and shaft from the left crankcase cover.

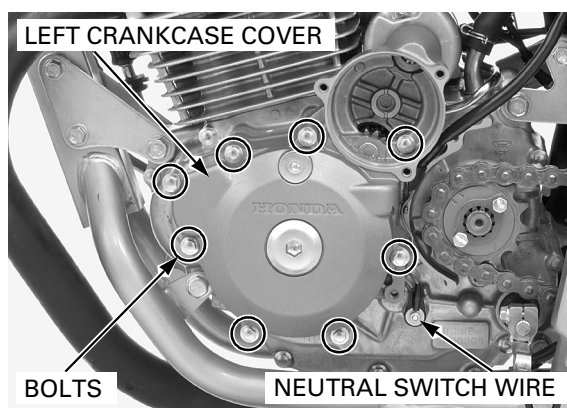


## ALTERNATOR/STARTER CLUTCH

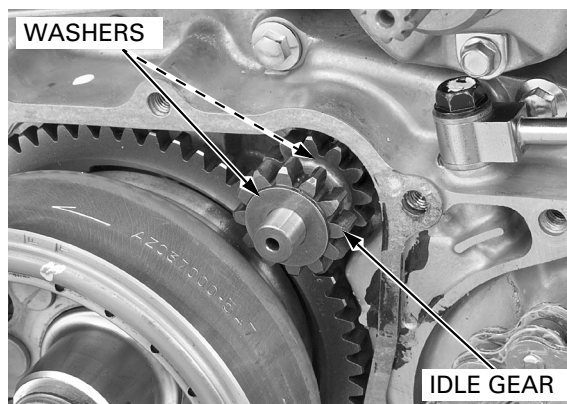
Remove the nut, washer, neutral switch wire and spacer from the neutral switch.

*The left crankcase cover is magnetically attached to the flywheel, be careful during removal.*

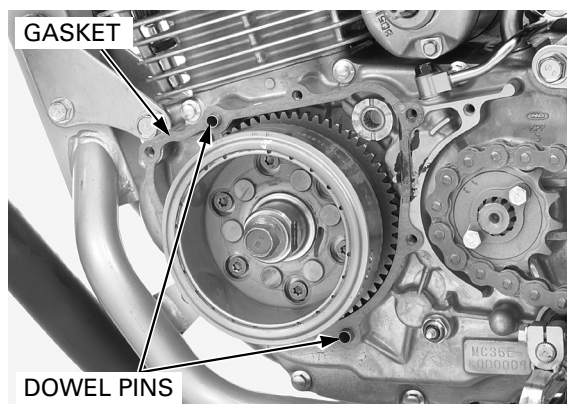
Loosen the left crankcase cover bolts in a crisscross pattern in 2 – 3 steps, and remove the bolts and left crankcase cover.



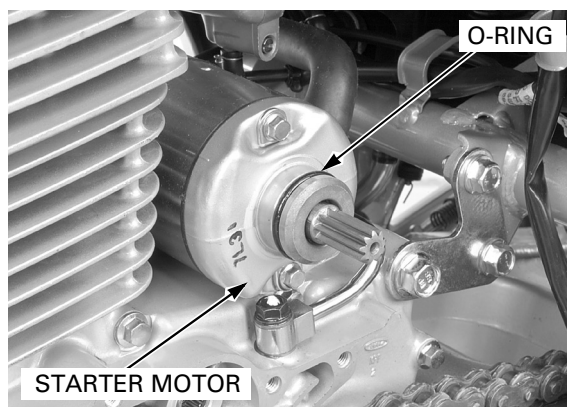
Remove the starter idle gear and washers from the left crankcase.



Remove the gasket and dowel pins.



Remove the O-ring from the starter motor.



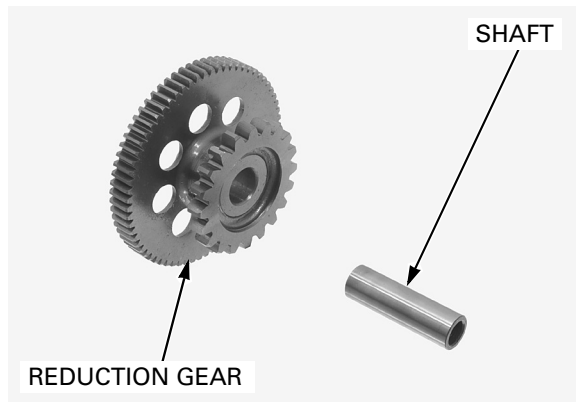
## ALTERNATOR/STARTER CLUTCH

### INSPECTION

Check the starter idle gear for wear or damage.



Check the starter reduction gear and shaft for wear or damage.



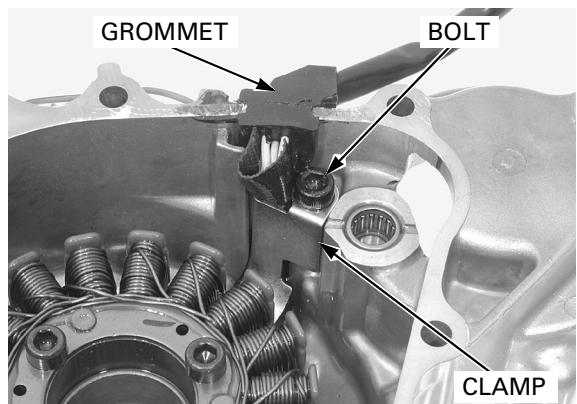
## STATOR/IGNITION PULSE GENERATOR

### REMOVAL

Remove the left crankcase cover (page 10-4).

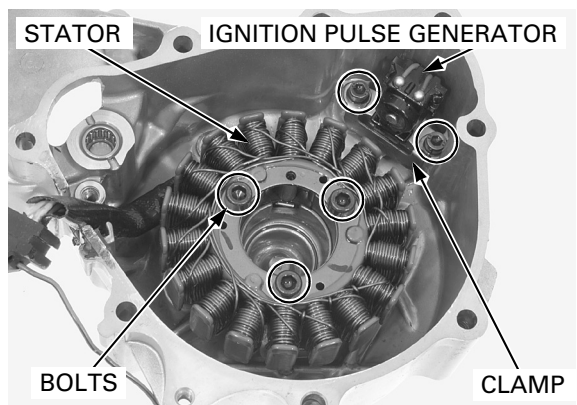
Remove the stator wire clamp socket bolt and stator wire clamp.

Remove the wire grommet from the left crankcase cover.

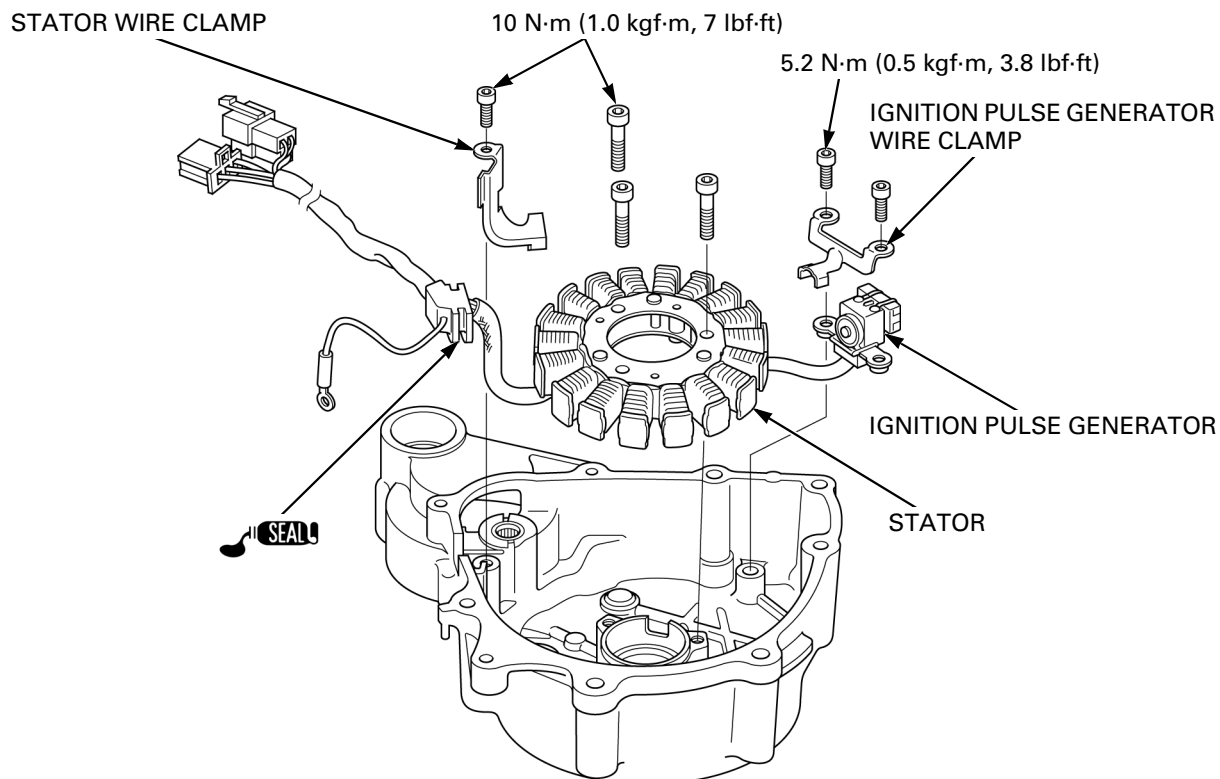


Remove the stator socket bolts and ignition pulse generator socket bolts.

Remove the stator/ignition pulse generator and ignition pulse generator wire clamp from the left crankcase cover.



## INSTALLATION



Install the ignition pulse generator wire clamp and stator/ignition pulse generator into the left crankcase cover.

Install the ignition pulse generator socket bolts and tighten them to the specified torque.

**TORQUE: 5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)**

Install the stator socket bolts and tighten them to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

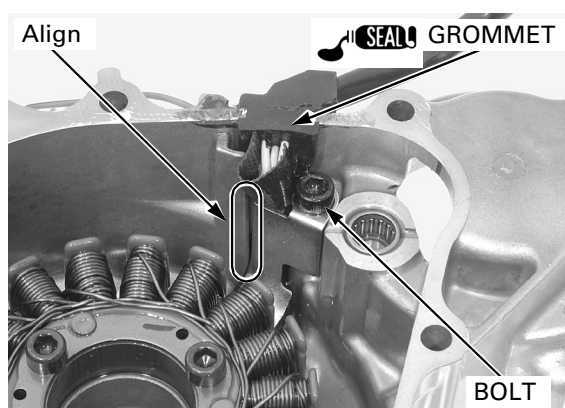
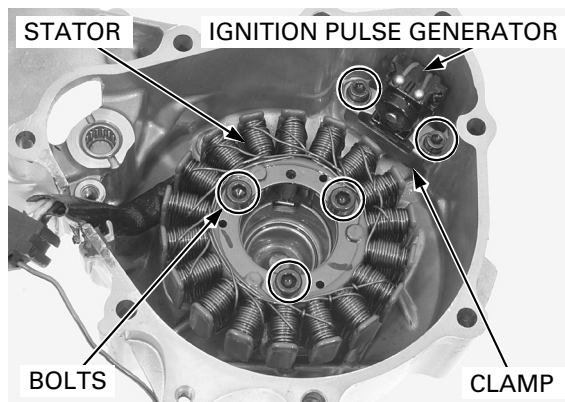
Apply sealant to the seating surface of the wire grommet, and install it into the left crankcase cover groove properly.

Install the stator wire clamp while aligning its flange with the groove of the left crankcase cover.

Install the stator wire clamp socket bolt and tighten it to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the left crankcase cover (page 10-13).



### FLYWHEEL/STARTER CLUTCH

#### FLYWHEEL REMOVAL

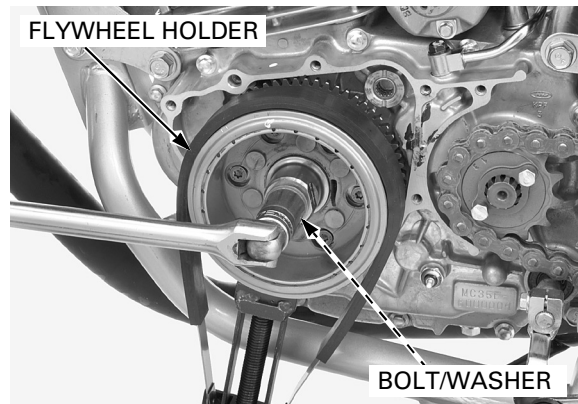
Remove the left crankcase cover (page 10-4).

Hold the flywheel with the special tool and loosen the flywheel bolt.

**TOOL:**

**Flywheel holder** 07725-0040000

Remove the flywheel bolt and washer.

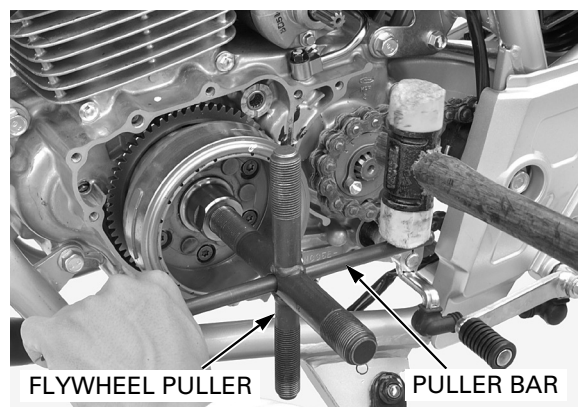


Remove the flywheel using the special tools.

**TOOLS:**

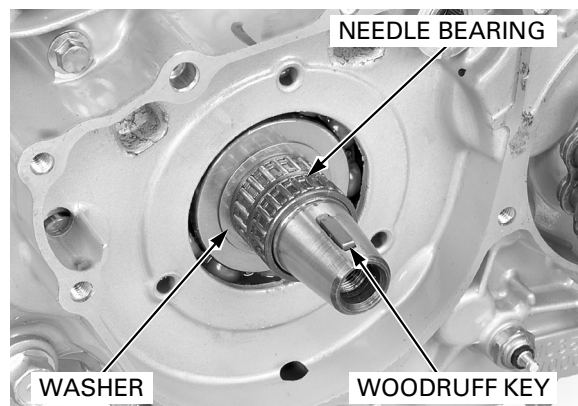
**Flywheel puller** 07733-0020001

**Puller bar** 07716-0020500



*When woodruff key removal, be careful not to damage the crankshaft.*

Remove the needle bearing, washer and woodruff key.



#### STARTER DRIVEN GEAR/STARTER CLUTCH REMOVAL

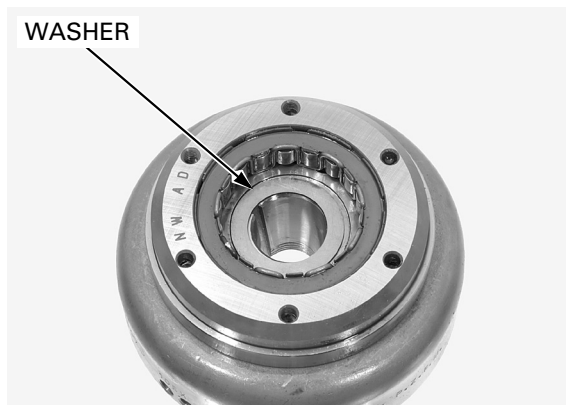
Check the operation of the one-way clutch by turning the starter driven gear.

You should be able to turn the starter driven gear counterclockwise smoothly, but the gear should not turn clockwise.

Remove the starter driven gear while turning it counterclockwise.



Remove the washer.

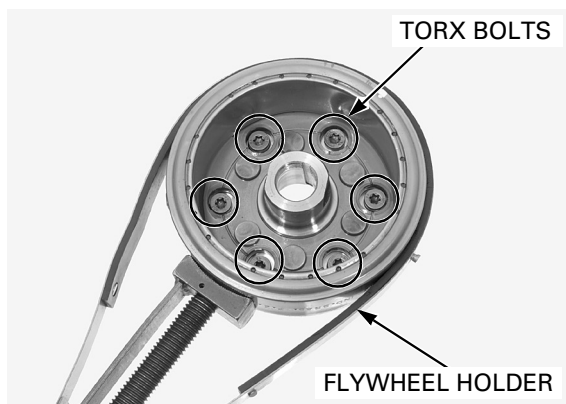


Hold the flywheel with the special tool and remove the starter clutch outer torx bolts.

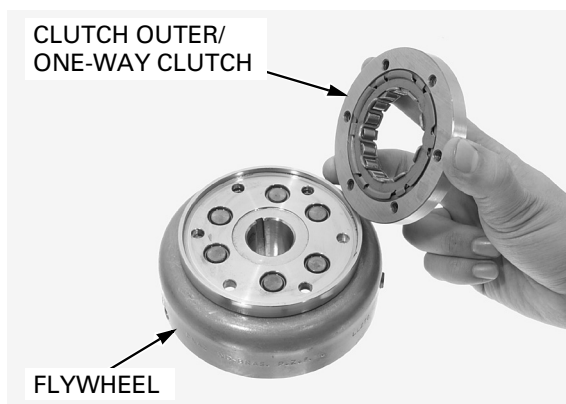
**TOOL:**

**Flywheel holder**

**07725-0040000**



Remove the starter clutch outer/one-way clutch as an assembly from the flywheel.



### STARTER CLUTCH INSPECTION

Check the needle bearing for abnormal wear or damage.

Replace the needle bearing if necessary.





## ALTERNATOR/STARTER CLUTCH

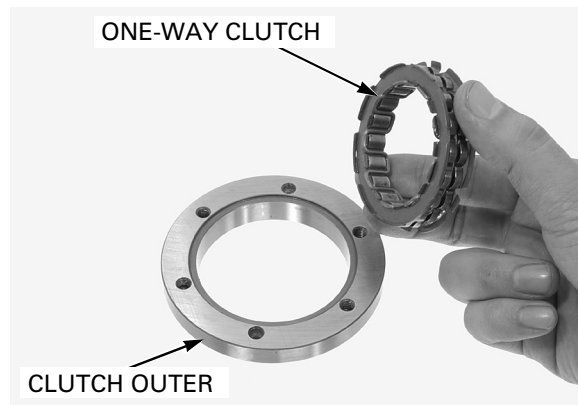
Remove the one-way clutch from the clutch outer.

Check the one-way clutch sprag for wear, damage or irregular movement.

Replace the one-way clutch if necessary.

Check the one-way clutch roller contact surface of the starter clutch outer for wear or damage.

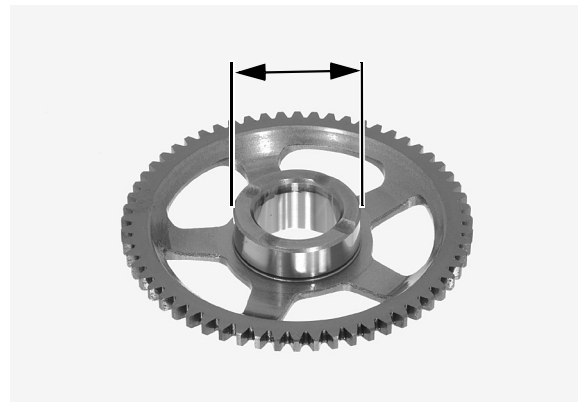
Replace the starter clutch outer if necessary.



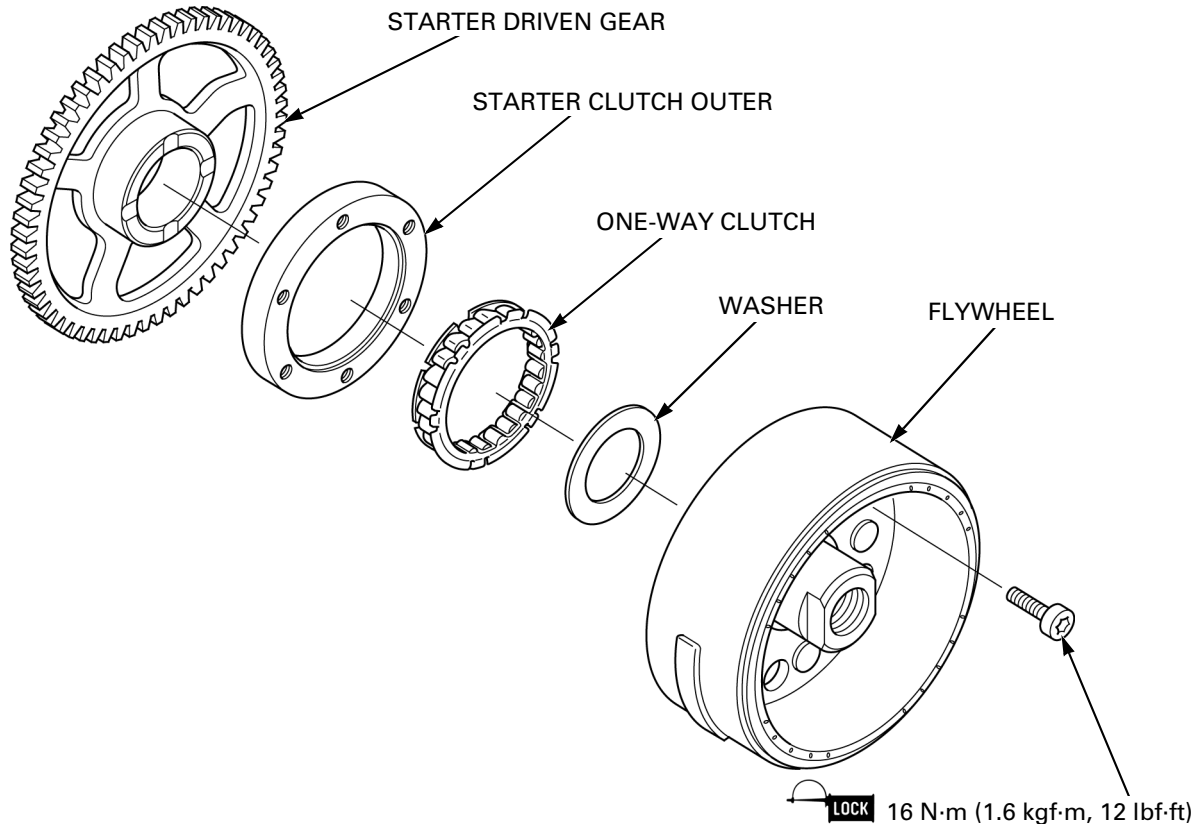
Check the starter driven gear teeth for wear or damage.

Measure the starter driven gear boss O.D.

**SERVICE LIMIT: 45.63 mm (1.796 in)**

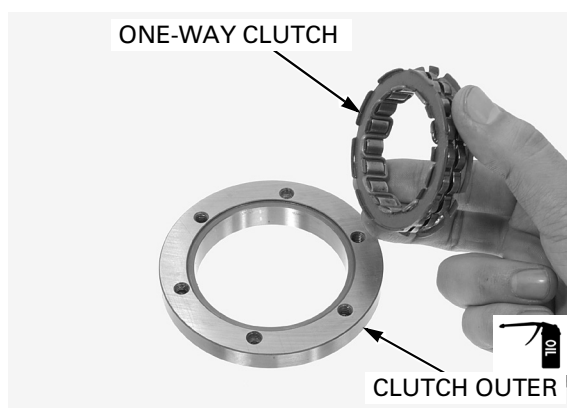


## STARTER DRIVEN GEAR/STARTER CLUTCH INSTALLATION

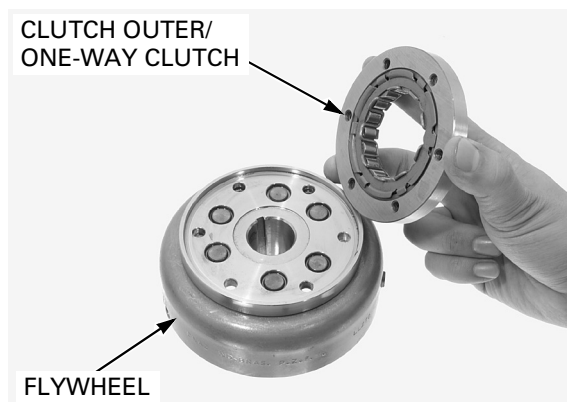


Apply engine oil to the one-way clutch contacting surface of the starter clutch outer.

Install the one-way clutch into the starter clutch outer with the flange side facing the flywheel side.



Install the starter clutch outer/one-way clutch onto the flywheel.



Apply a locking agent to the starter clutch outer torx bolt threads.

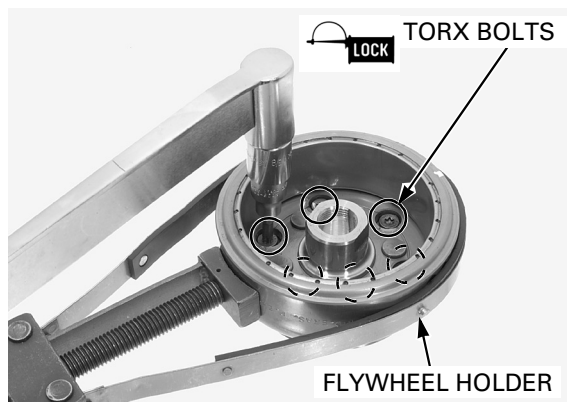
Hold the flywheel with the special tool and tighten the starter clutch outer torx bolts to the specified torque.

**TOOL:**

**Flywheel holder**

**07725-0040000**

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



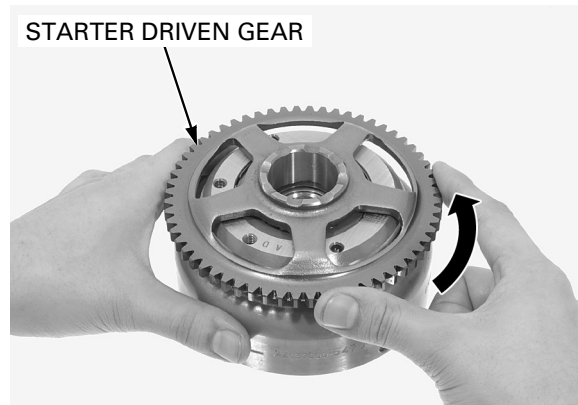
Install the washer onto the flywheel.



## ALTERNATOR/STARTER CLUTCH

Install the starter driven gear while turning it counterclockwise.

Make sure that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.



## FLYWHEEL INSTALLATION

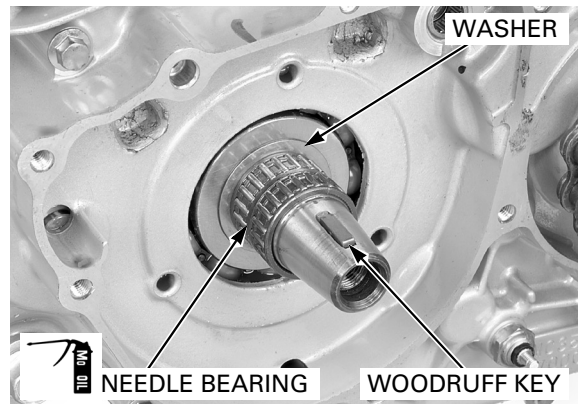
*When woodruff key installation, be careful not to damage the crankshaft.*

Install the woodruff key into the crankshaft key groove.

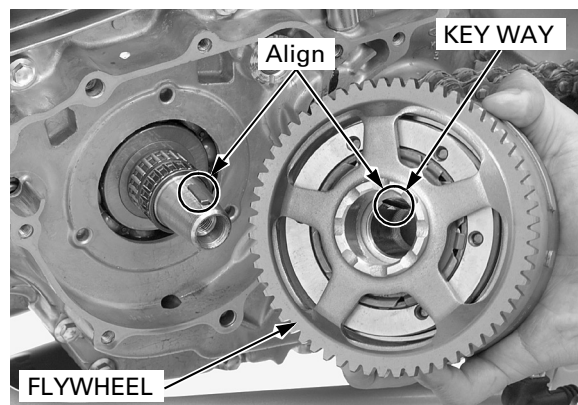
Apply molybdenum oil solution to the needle bearing.

Install the washer and needle bearing onto the crankshaft.

Clean any oil from the tapered portions of the crankshaft and flywheel.



Install the flywheel on the crankshaft while aligning the key way with the woodruff key.



Apply engine oil to the flywheel bolt threads and seating surface, and install the washer and flywheel bolt.

Hold the flywheel with the special tool and tighten the flywheel bolt to the specified torque.

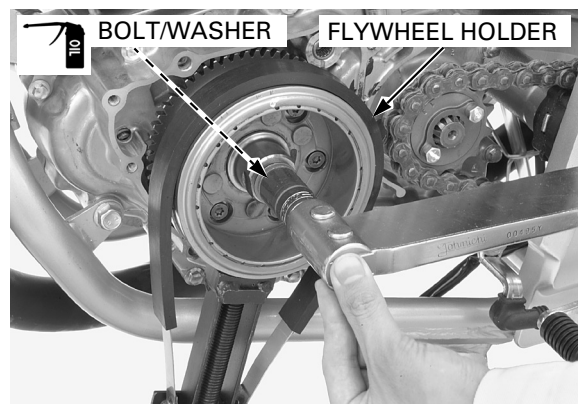
### TOOL:

Flywheel holder

07725-0040000

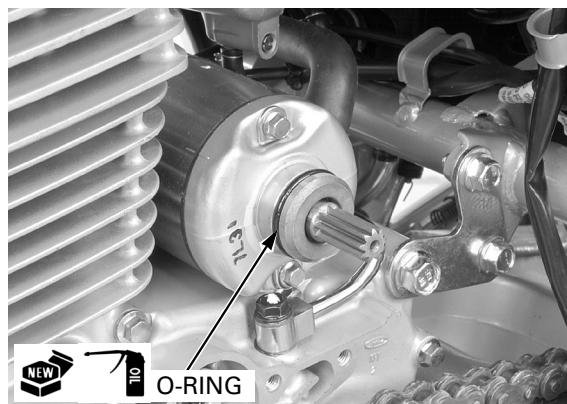
**TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)**

Install the left crankcase cover (page 10-13).

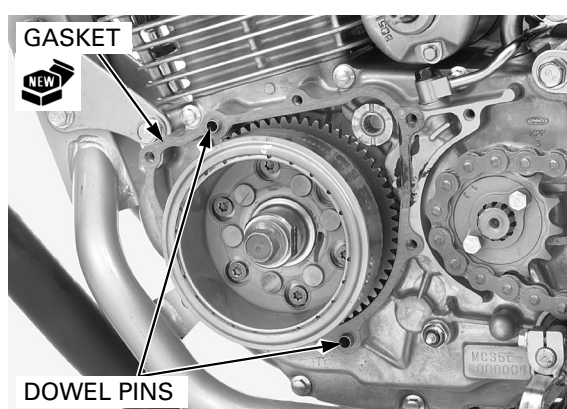


## LEFT CRANKCASE COVER INSTALLATION

Apply engine oil to a new O-ring and install it into the starter motor groove.



Clean the gasket surface of the crankcase and cover thoroughly, being careful not to damage them. Install the dowel pins and a new gasket.



Apply engine oil to the washers and install it to the starter idle gear. Install the starter idle gear into the left crankcase.



*The left crankcase cover is magnetically attached to the flywheel, be careful during installation.*

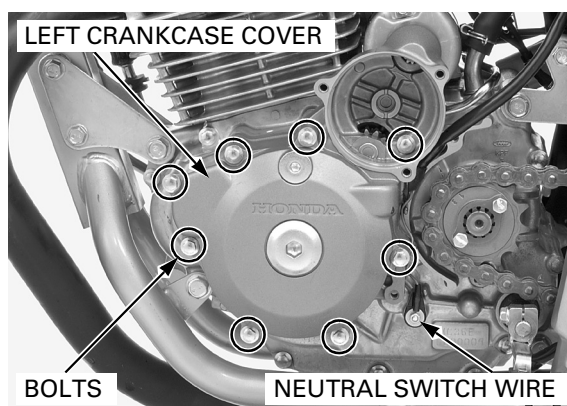
Install the left crankcase cover, being careful not to pinch the neutral switch wire.

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

Install the spacer, neutral switch wire and washer to the neutral switch.

Install the nut and tighten it to the specified torque.

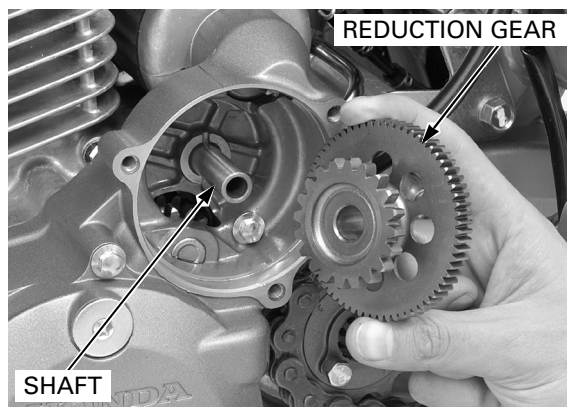
**TORQUE: 1.5 N·m (0.2 Kg·m, 1.1 lbf·ft)**



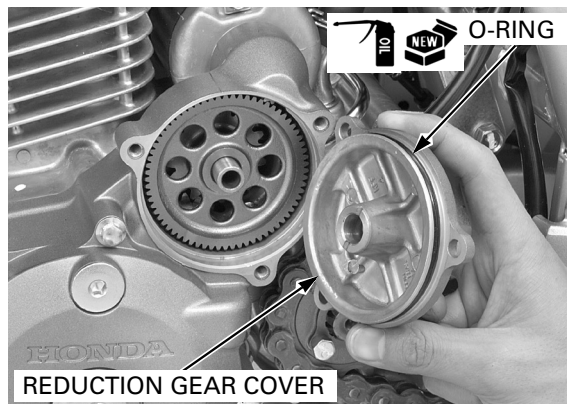
## ALTERNATOR/STARTER CLUTCH

Install the reduction gear shaft.

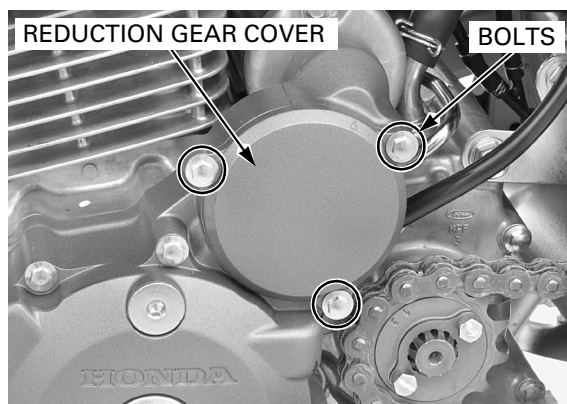
Install the starter reduction gear by aligning its teeth with the starter idle gear and starter motor gear teeth.



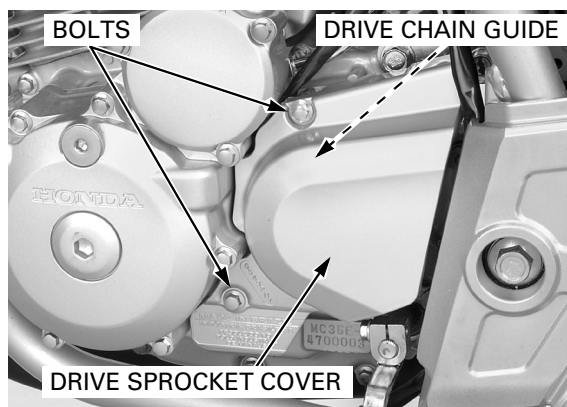
Apply engine oil to a new O-ring and install it to the starter reduction gear cover groove.



Install the starter reduction gear cover and tighten the bolts securely.



Install the drive chain guide and drive sprocket cover, then tighten the bolts securely.

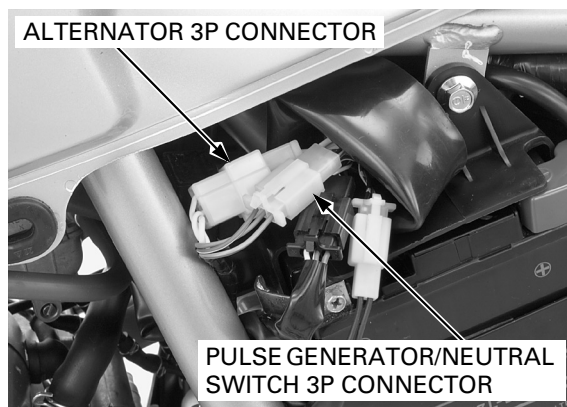


## ALTERNATOR/STARTER CLUTCH

Route the alternator wire properly (page 1-17).

Connect the alternator 3P connector and ignition pulse generator/neutral switch 3P connector.

Install the left side cover (page 2-4).



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## MEMO

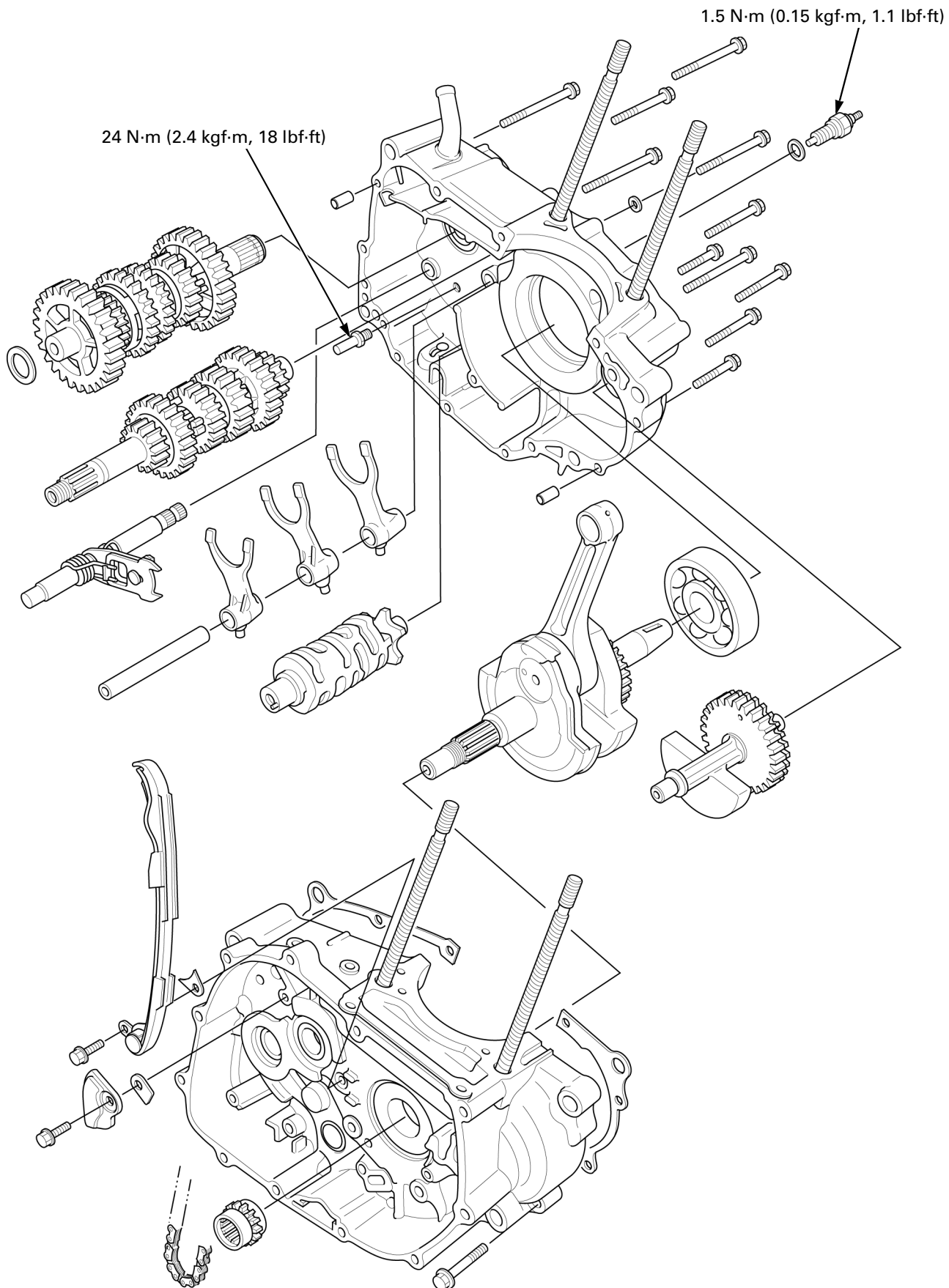
# 11. CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

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COMPONENT LOCATION .....	11-2	TRANSMISSION .....	11-8
SERVICE INFORMATION .....	11-3	CRANKSHAFT/BALANCER.....	11-18
TROUBLESHOOTING .....	11-6	CRANKCASE ASSEMBLY .....	11-22
CRANKCASE SEPARATION.....	11-7		



## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers crankcase separation for service of the crankshaft, transmission and balancer.
- The crankcase halves must be separate to service the transmission. To service these parts, the engine must be removed from the frame (page 6-3).
- The following parts must be removed before separating the crankcase.
  - Cylinder head (page 7-11)
  - Cylinder and piston (page 8-4)
  - Clutch, primary drive gear, gearshift linkage (page 9-2)
  - Oil pump (page 4-4)
  - Flywheel/starter clutch (page 10-8)
  - Starter motor (page 17-6)
  - Oil pass pipe (page 4-11)
- Be careful not to damage the crankcase mating surfaces when servicing.

### SPECIFICATIONS

Unit: mm (in)

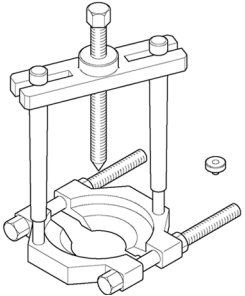
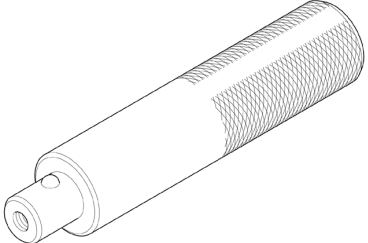
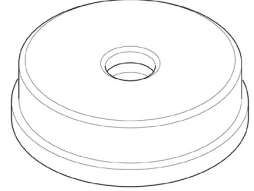

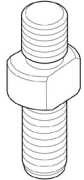
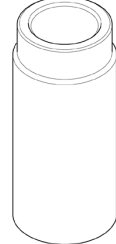
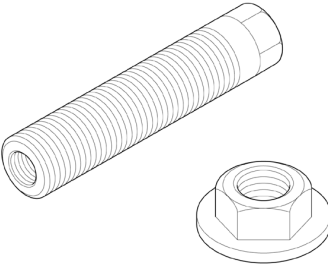
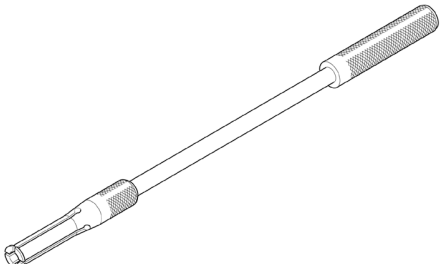
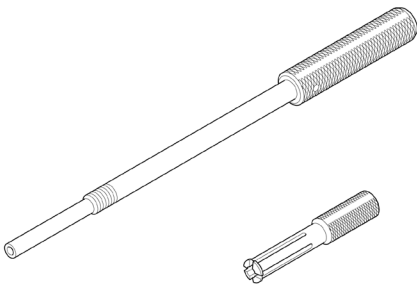
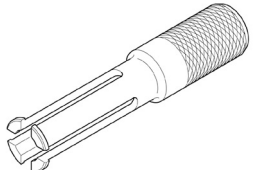
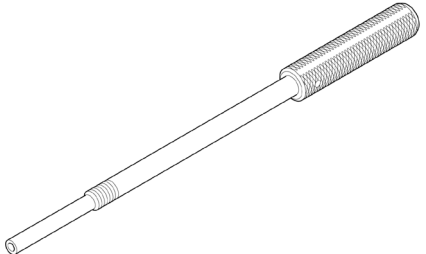
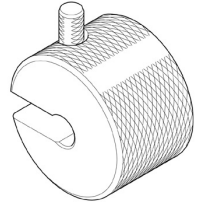
ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M5	20.000 – 20.021 (0.7874 – 0.7882)	20.08 (0.791)
		M6, C1	23.000 – 23.021 (0.9055 – 0.9063)	23.07 (0.908)
		C2	25.020 – 25.041 (0.9850 – 0.9859)	25.09 (0.988)
		C3	25.000 – 25.021 (0.9843 – 0.9851)	25.07 (0.987)
		C4	22.000 – 22.021 (0.8661 – 0.8670)	22.07 (0.869)
	Gear busing O.D.	C1	22.959 – 22.980 (0.9039 – 0.9047)	22.90 (0.902)
		C2	24.979 – 25.000 (0.9834 – 0.9843)	24.90 (0.980)
		C3	24.959 – 24.980 (0.9826 – 0.9835)	24.90 (0.980)
		M6	22.959 – 22.980 (0.9039 – 0.9047)	22.92 (0.902)
	Gear busing I.D.	C1	18.000 – 18.018 (0.7087 – 0.7094)	18.08 (0.712)
		C2	22.000 – 22.021 (0.8661 – 0.8670)	22.08 (0.869)
	Mainshaft O.D.	at M5	19.959 – 19.980 (0.7858 – 0.7866)	19.91 (0.784)
	Countershaft O.D.	at C1	17.966 – 17.984 (0.7073 – 0.7080)	17.91 (0.705)
		at C2, C4	21.959 – 21.980 (0.8645 – 0.8654)	21.91 (0.863)
	Gear-to-bushing clearance	C1, C2, C3, M6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Bushing-to-shaft clearance	C1	0.016 – 0.052 (0.0006 – 0.0020)	0.10 (0.004)
		C2	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Gear-to-main-shaft clearance	at M5	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
	Gear-to-counter-shaft clearance	at C4	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
Shift fork, fork shaft and drum	Shift fork I.D.		13.000 – 13.021 (0.5118 – 0.5126)	13.05 (0.514)
	Shift fork claw thickness	L	4.90 – 5.00 (0.193 – 0.197)	4.5 (0.18)
		R, C	4.93 – 5.00 (0.194 – 0.197)	4.5 (0.18)
	Shift fork shaft O.D.		12.966 – 12.984 (0.5105 – 0.5112)	12.90 (0.508)
	Drum O.D. at right end journal		19.959 – 19.980 (0.7858 – 0.7866)	19.90 (0.783)
Connecting rod	Drum journal I.D. (R.crankcase)		20.000 – 20.033 (0.7874 – 0.7887)	20.07 (0.790)
	Big end side clearance		0.05 – 0.50 (0.002 – 0.020)	0.6 (0.02)
	Big end radial clearance		0 – 0.008 (0 – 0.0003)	0.05 (0.002)
Crankshaft runout			–	0.05 (0.002)

### TORQUE VALUE

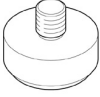
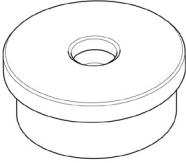






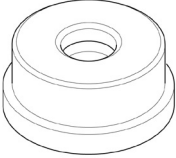
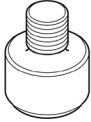
Shift return spring pin	24 N·m (2.4 kgf·m, 18 lbf·ft)
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)

## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

### TOOLS

<p>Universal bearing puller 07631-0010000</p>  A mechanical bearing puller with a central threaded rod, a base plate with four mounting points, and a top plate with a central nut and washer.	<p>Driver 07749-0010000</p>  A long, cylindrical metal driver with a threaded end and a knurled grip section.	<p>Attachment, 72 x 75 mm 07746-0010600</p>  A circular metal attachment with a central hole and a flange.
<p>Pilot, 13 mm 07746-0041500</p>  A small, cylindrical metal pilot with a threaded end.	<p>Thread adapter 07965-VM00300</p>  A hexagonal metal thread adapter with a threaded end.	<p>Crankcase assembly collar 07965-VM00100</p>  A cylindrical metal collar with a flange at one end.
<p>Crankcase assembly shaft 07965-VM00200</p>  A long, threaded metal shaft with a hexagonal nut and washer at one end.	<p>Bearing remover set, 15 mm 07936-KC10500</p>  A long, thin metal rod with a knurled grip and a small, cylindrical attachment at the end.	<p>Bearing remover set, 12 mm 07936-1660101</p>  A long, thin metal rod with a knurled grip and a small, cylindrical attachment at the end.
<p>Bearing remover head, 13 mm 07LMC-KZ10100</p>  A small, cylindrical metal head with a knurled grip and a small, cylindrical attachment at the end.	<p>Bearing remover shaft 07936-1660120</p>  A long, thin metal rod with a knurled grip and a small, cylindrical attachment at the end.	<p>Bearing remover weight 07741-0010201</p>  A cylindrical metal weight with a knurled grip and a small, cylindrical attachment at the end.

## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

<p>Pilot, 28 mm 07746-0041100</p> 	<p>Attachment, 45 x 50 mm 07946-6920100</p> 	<p>Pilot, 20 mm 07746-0040500</p> 
<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Pilot, 15 mm 07746-0040300</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Pilot, 22 mm 07746-0041000</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 
<p>Pilot, 16 mm 07746-0041300</p> 		

# TROUBLESHOOTING

### Excessive noise

- Worn connecting rod big end bearing
- Sized or damaged transmission gear
- Worn or damaged transmission bearings
- Worn or damaged crankshaft bearings
- Worn connecting rod small end
- Worn balancer bearings
- Improper balancer installation

### Hard to shift

- Improper clutch operation
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum guide grooves
- Damaged shift fork guide pin
- Damaged gearshift spindle
- Incorrect engine oil viscosity

### Transmission jumps out of gear

- Worn gear dogs or slots
- Worn shift drum guide grooves
- Worn shift fork guide pin
- Worn gear shifter groove
- Bent shift fork shaft
- Worn or bent shift fork

### Abnormal vibration

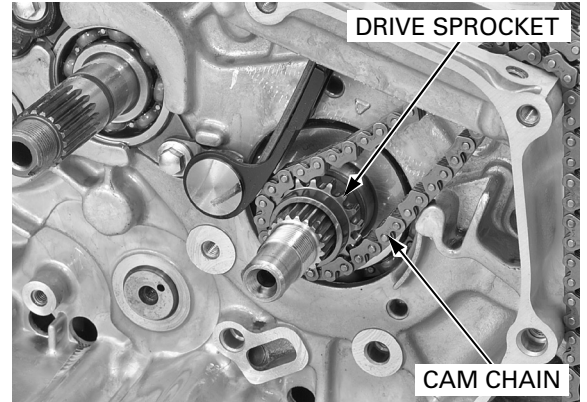
- Improper balancer timing
- Excessive crankshaft runout

## CRANKCASE SEPARATION

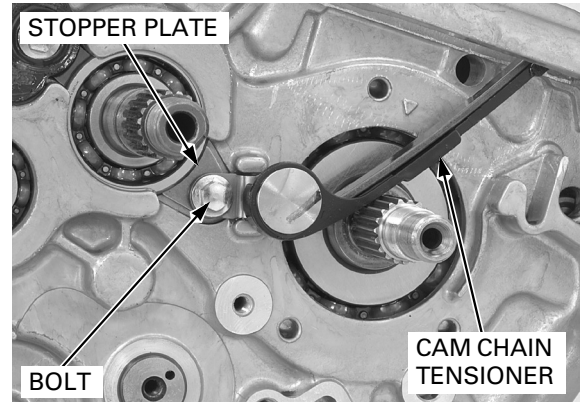
Remove the engine from the frame (page 6-4).

Refer to Service Information (page 11-3) for removal of necessary parts before disassembling the crankcase.

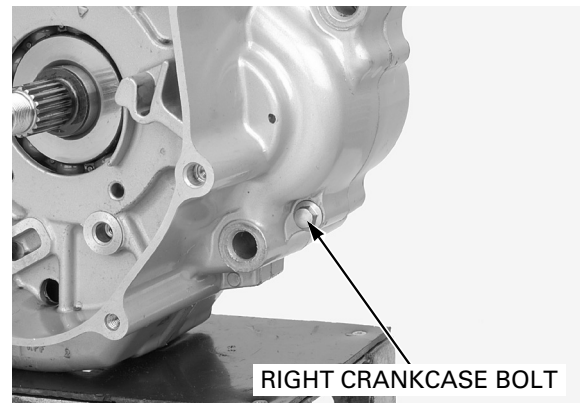
Remove the cam chain and cam chain drive sprocket.



Remove the cam chain tensioner mounting bolt, cam chain tensioner and bearing stopper plate.

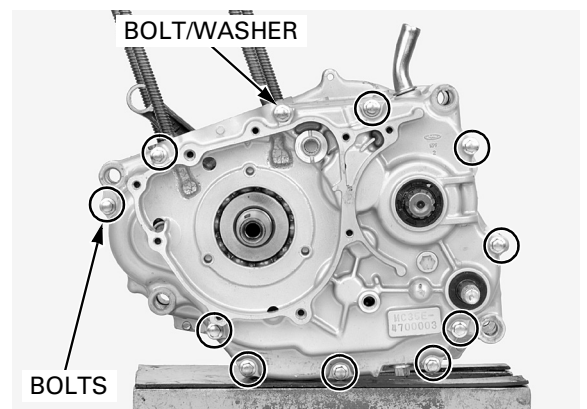


Remove the right crankcase bolt.



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

Remove the left crankcase bolts and washer.

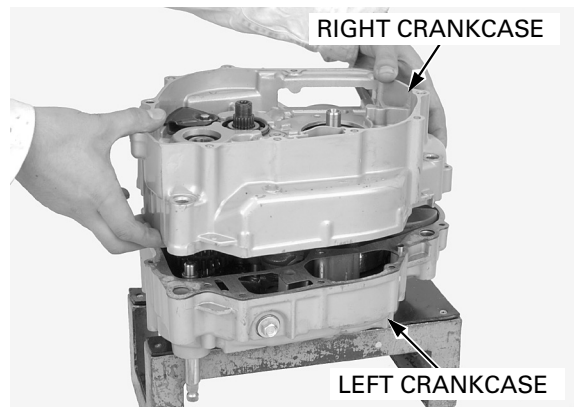


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

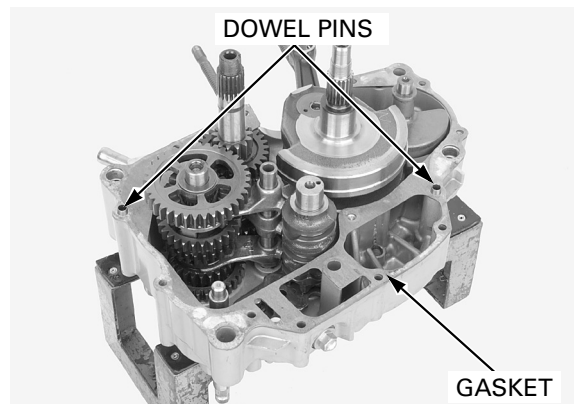
Place the crankcase assembly with the left side down.

*Do not pry the crankcase halves apart with the end of a screwdriver.*

Carefully separate the right crankcase from the left crankcase while tapping them at several locations with a plastic hammer.



Remove the gasket and dowel pins.

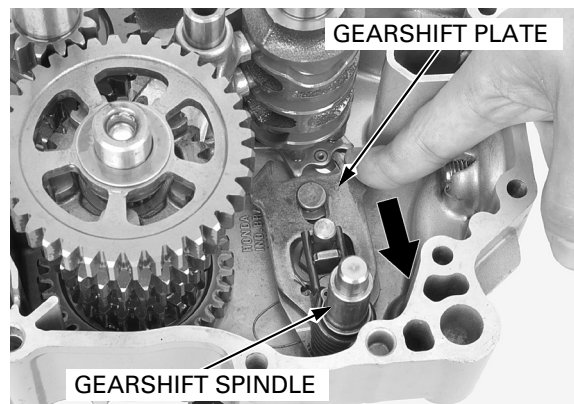


## TRANSMISSION

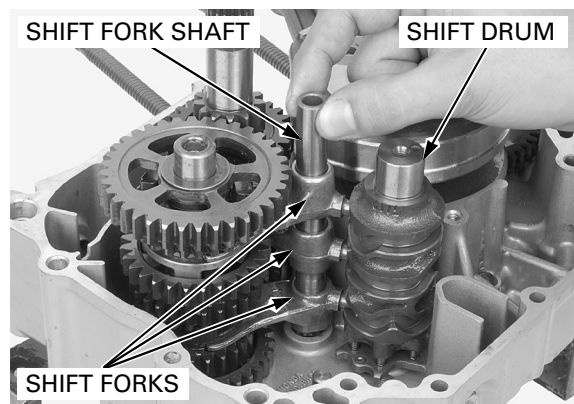
### REMOVAL/DISASSEMBLY

Separate the crankcase halves (page 11-7).

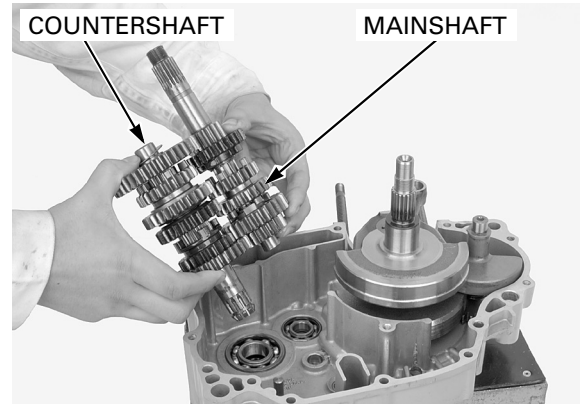
Remove the gearshift spindle while releasing the gearshift plate from the shift drum.



Pull out the shift fork shaft.  
Remove the shift drum and shift forks.

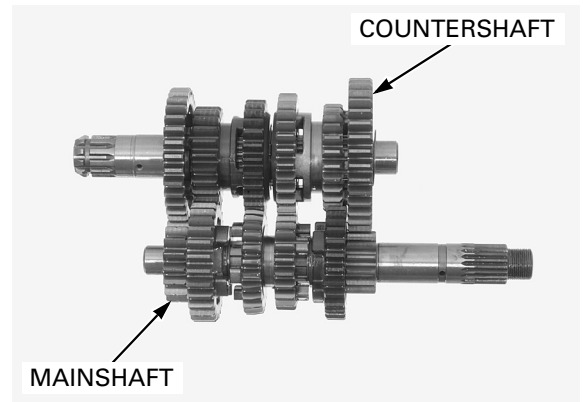


Remove the mainshaft and countershaft as an assembly.



Disassemble the mainshaft and countershaft.

- Keep track of the disassembled parts (gears, bushing, washers, and snap rings) by sliding them onto a tool or slipping them onto a piece of wire.
- Do not remove the snap rings over the shafts. Expand the snap ring ends and slide the snap ring off the shaft, along with the gear behind it.



## INSPECTION

### GEARS

Check the gear dogs, dog holes and teeth for damage or excessive wear.

Measure the I.D. of each gear.

#### SERVICE LIMITS:

M5:	20.08 mm (0.791 in)
M6, C1:	23.07 mm (0.908 in)
C2:	25.09 mm (0.988 in)
C3:	25.07 mm (0.987 in)
C4:	22.07 mm (0.869 in)

### BUSHINGS

Check the bushings for wear or damage.  
Measure the O.D. of the gear bushing.

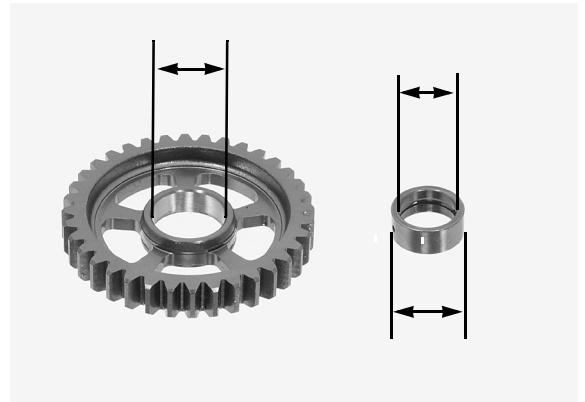
#### SERVICE LIMITS:

C1:	22.90 mm (0.902 in)
C2, C3:	24.90 mm (0.980 in)
M6:	22.92 mm (0.902 in)

Measure the I.D. of the gear bushing.

#### SERVICE LIMITS:

C1:	18.08 mm (0.712 in)
C2:	22.08 mm (0.869 in)





### MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for abnormal wear or damage.

Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.

#### SERVICE LIMITS:

**Mainshaft (at M5 gear): 19.91 mm (0.784 in)**

#### Countershaft

**(at C1 gear bushing): 17.91 mm (0.705 in)**

**(at C2 gear bushing): 21.91 mm (0.863 in)**

**(at C4 gear): 21.91 mm (0.863 in)**

Calculate the gear-to-bushing, bushing-to-shaft and shaft-to-gear clearance.

#### SERVICE LIMITS:

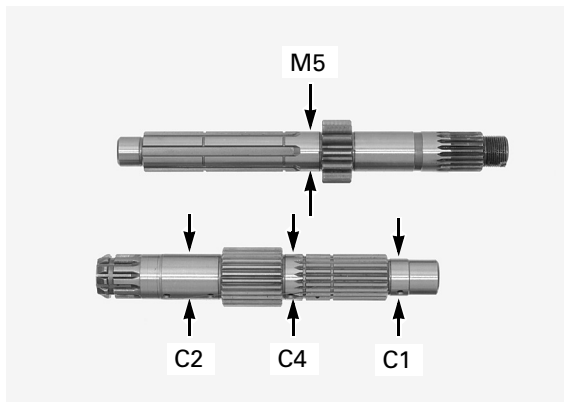
##### Gear-to-bushing:

**C1/C2/C3/M6: 0.10 mm (0.004 in)**

**Bushing-to-shaft: C1/C2: 0.10 mm (0.004 in)**

**Gear-to-mainshaft (at M5): 0.10 mm (0.004 in)**

**Gear-to-countershaft (at C4): 0.10 mm (0.004 in)**



### SHIFT DRUM/DRUM JOURNAL

Inspect the shift drum end for scoring, scratches or evidence of sufficient lubrication.

Check the shift drum grooves for abnormal wear or damage.

Measure the O.D. of the shift drum right end journal.

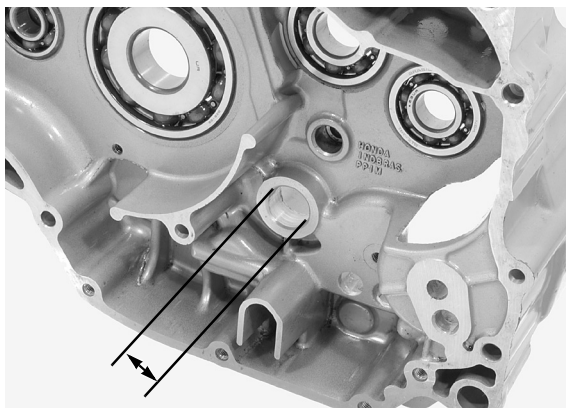
**SERVICE LIMIT: 19.90 mm (0.783 in)**



Check the shift drum journal in the right crankcase for excessive wear or damage.

Measure the shift drum journal I.D.

**SERVICE LIMIT: 20.07 mm (0.790 in)**



**SHIFT FORKS**

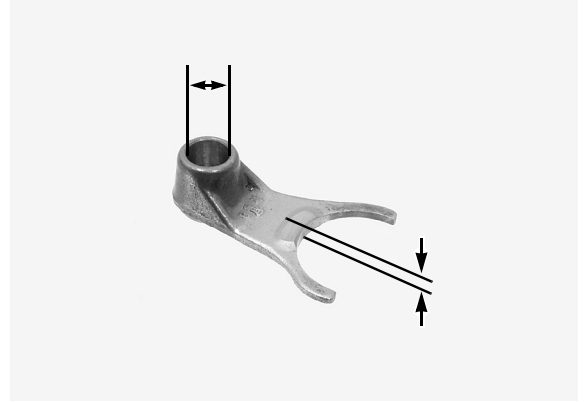
Check the shift fork guide for wear or damage.

Measure the shift fork I.D.

**SERVICE LIMIT: 13.05 mm (0.514 in)**

Measure the shift fork claw thickness.

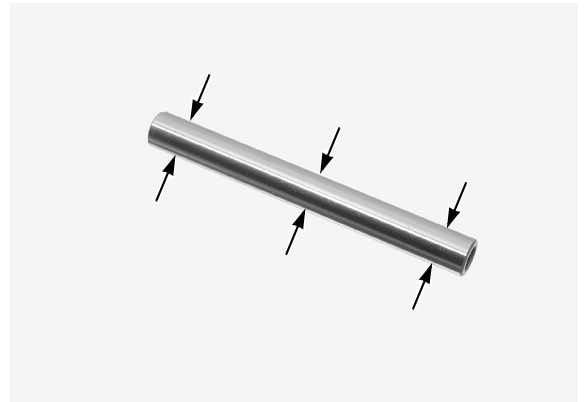
**SERVICE LIMIT: 4.5 mm (0.18 in)**

**SHIFT FORK SHAFT**

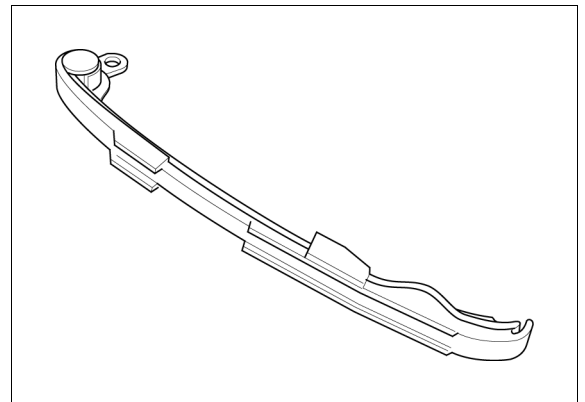
Check the shift fork shaft for wear, damage or straightness.

Measure the shift fork shaft O.D.

**SERVICE LIMIT: 12.90 mm (0.508 in)**

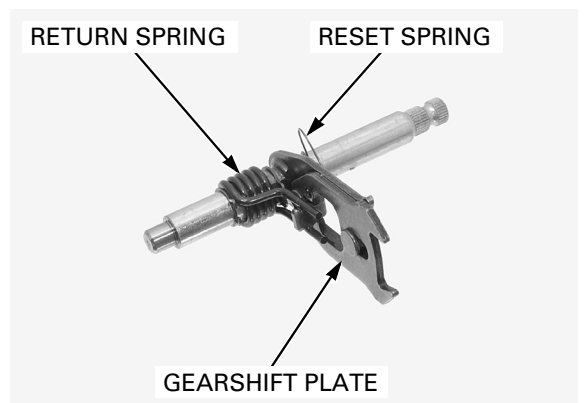
**CAM CHAIN TENSIONER**

Check the cam chain tensioner for wear or damage and replace it if necessary.

**GEARSHIFT SPINDLE**

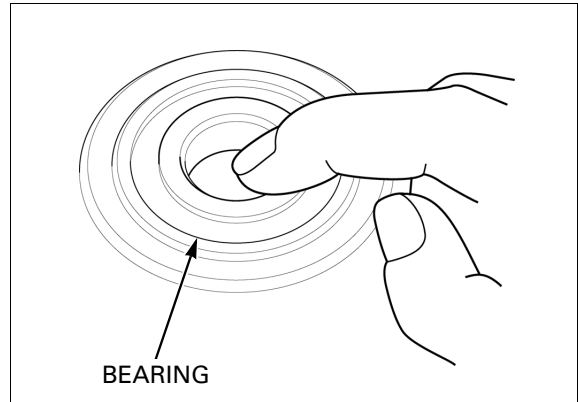
Check the gearshift plate for wear or damage.

Check the return and reset springs for fatigue or damage.



### TRANSMISSION BEARING

Remove and discard the bearings if the races do not turn smoothly, quietly or if they fit loosely in the crankcase (page 11-12).

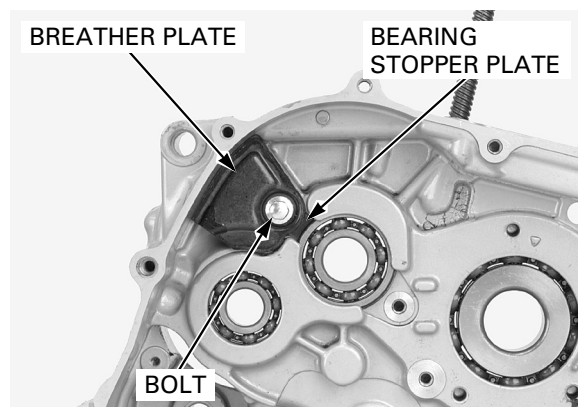


### TRANSMISSION BEARING REPLACEMENT

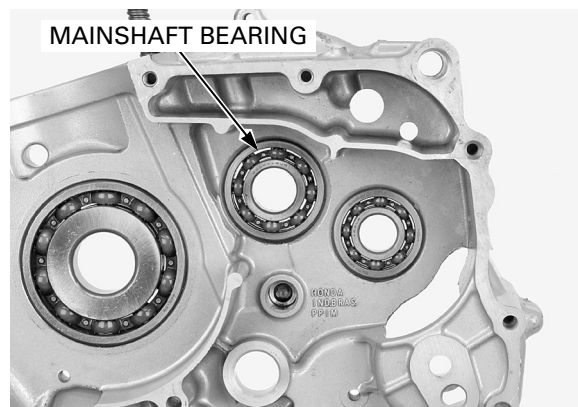
#### MAINSHAFT BEARING

Remove the following from the right crankcase:

- Breather plate mounting bolt
- Breather plate
- Mainshaft bearing stopper plate



Drive out the right mainshaft bearing.

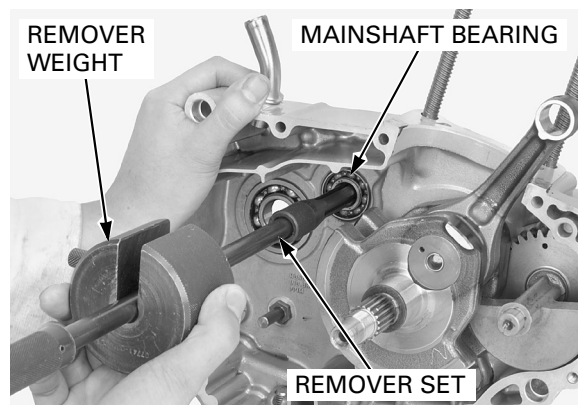


Remove the left mainshaft bearing using the special tools.

#### TOOLS:

Bearing remover set, 15 mm  
Bearing remover weight

07936-KC10500  
07741-0010201



Drive a new right mainshaft bearing into the right crankcase with its marked side facing up until it is fully seated, using the special tools.

### TOOLS:

#### Right mainshaft bearing:

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

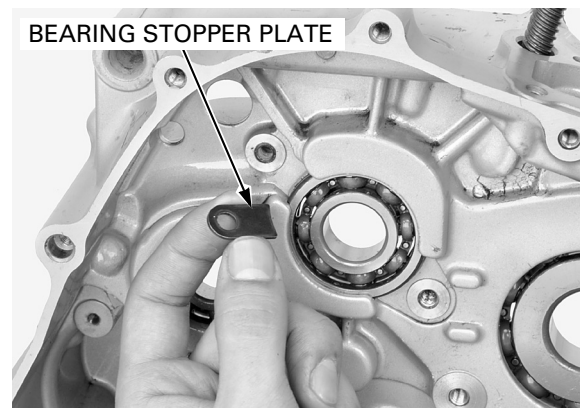
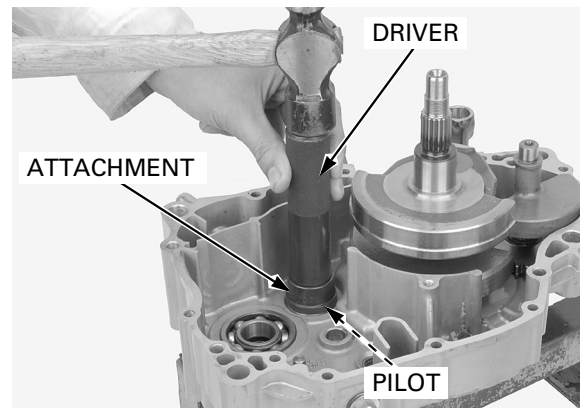
Drive a new left mainshaft bearing into the left crankcase with its sealed side facing down until it is fully seated, using the special tools.

### TOOLS:

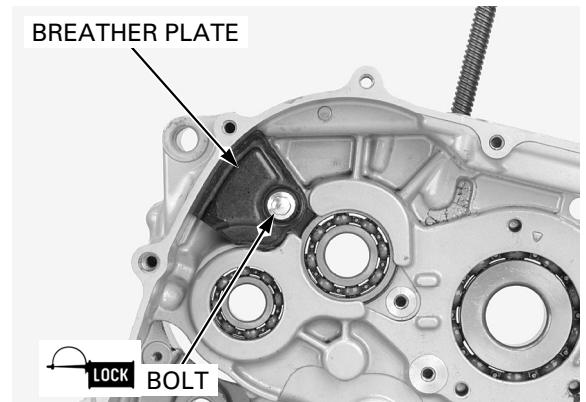
#### Left mainshaft bearing:

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

Install the mainshaft bearing stopper plate into the mainshaft bearing groove.

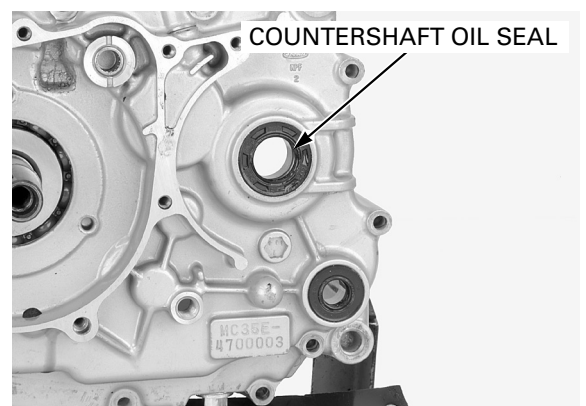


Install the breather plate.  
Apply a locking agent to the breather plate mounting bolt threads, and install it.  
Tighten the breather plate mounting bolt securely.



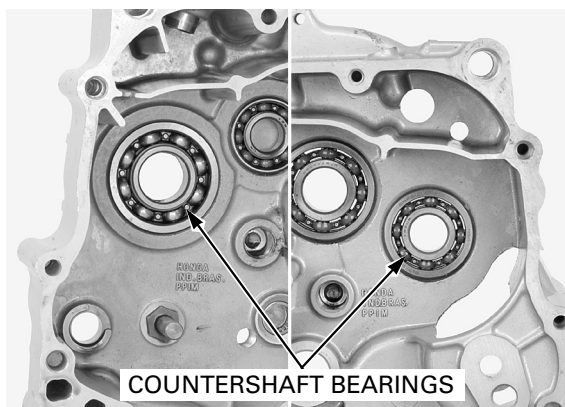
### COUNTERSHAFT BEARING

Remove the left countershaft oil seal.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Drive the countershaft bearings out of the right and left crankcase halves.



Drive a new right countershaft bearing into the right crankcase with its marked side facing up until it is fully seated, using the special tools.

### TOOLS:

#### Right countershaft bearing:

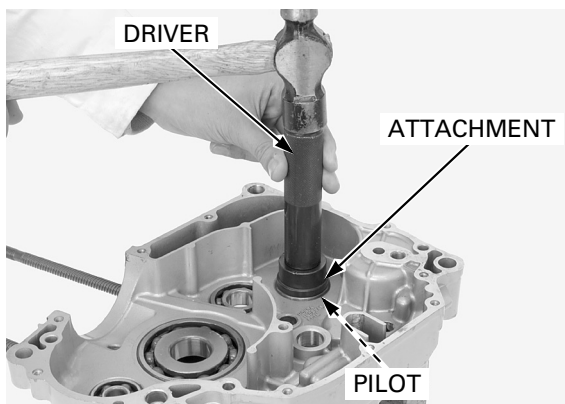
Driver	07749-0010000
Attachment, 42 x 47 mm	07746-0010300
Pilot, 17 mm	07746-0040400

Drive a new left countershaft bearing into the left crankcase with its sealed side facing down until it is fully seated, using the special tools.

### TOOLS:

#### Left countershaft bearing:

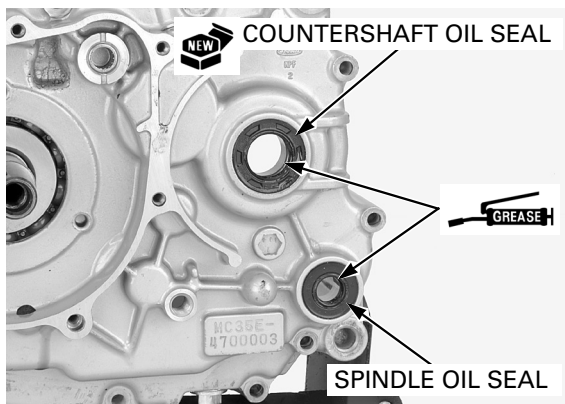
Driver	07749-0010000
Attachment, 45 x 50 mm	07946-6920100
Pilot, 22 mm	07746-0041000



After installing the bearings, install a new left countershaft oil seal.

Check the gearshift spindle oil seal for damage and replace it if necessary.

Apply grease to the oil seal lips.

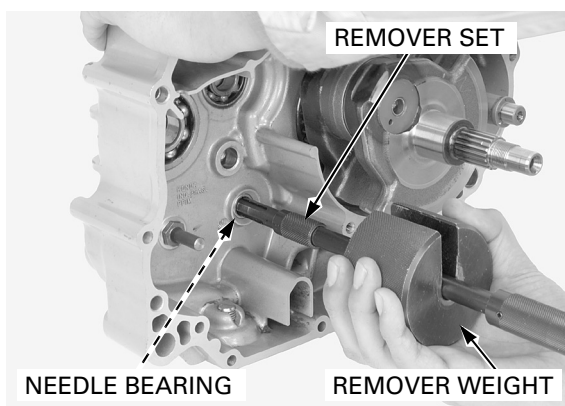


### SHIFT DRUM NEEDLE BEARING

Remove the shift drum needle bearing from the left crankcase using the special tools.

### TOOLS:

Bearing remover set, 12 mm	07936-1660101
Bearing remover weight	07741-0010201



Drive a new shift drum needle bearing into the left crankcase with its marked side facing up until it is fully seated, using the special tools.

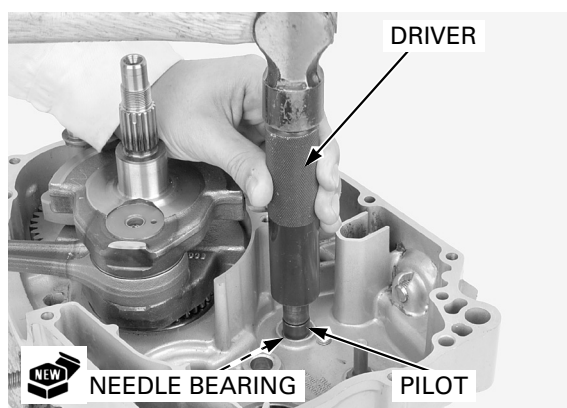
## TOOLS:

**Driver**

**07749-0010000**

**Pilot, 16 mm**

**07746-0041300**



## ASSEMBLY/INSTALLATION

Clean all parts in solvent.

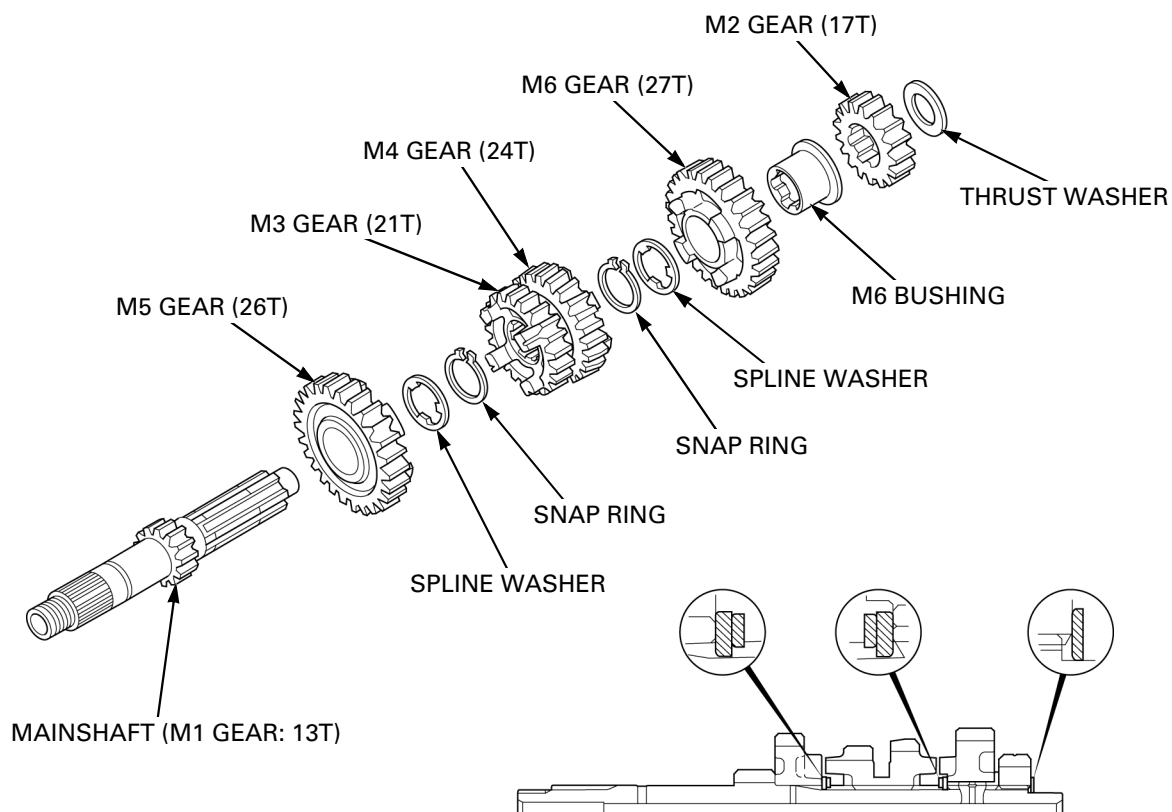
Apply molybdenum oil solution to the gear sliding surface and shift fork grooves to ensure initial lubrication.

Assemble all parts into their original positions.

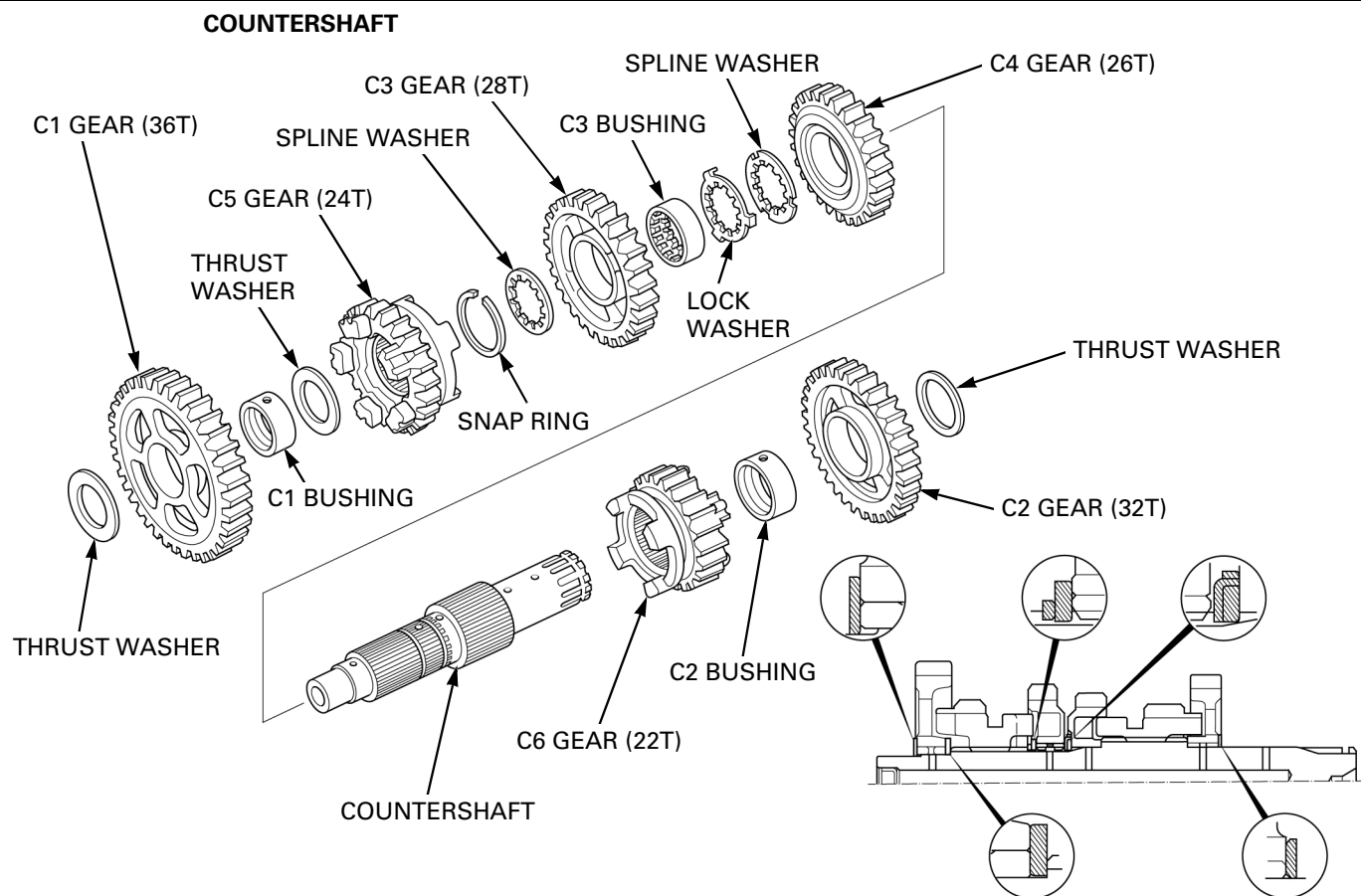
### NOTE:

- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust load side. Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.
- Align the lock washer tabs with the spline washer grooves.

### MAINSHAFT



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

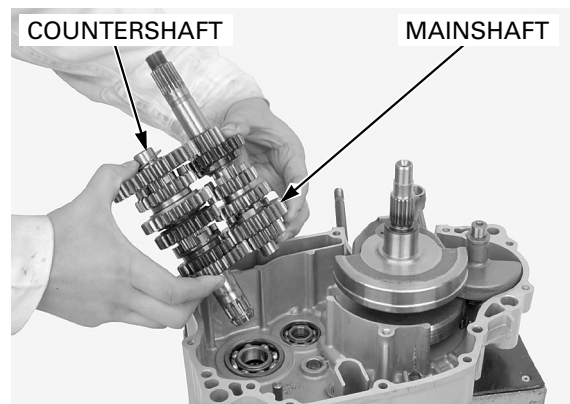


If the crankshaft removed, install the crankshaft and balancer first (page 11-21).

Apply molybdenum oil solution to the shift fork grooves.

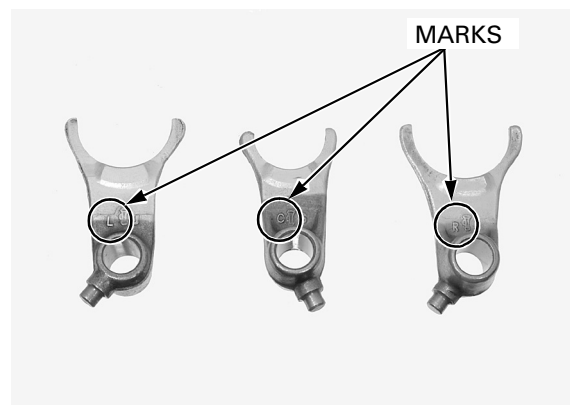
Apply engine oil to the each gear teeth.

Install the mainshaft and countershaft assembly into the left crankcase. Be sure to install the three end washers (mainshaft; left only/countershaft; both ends).

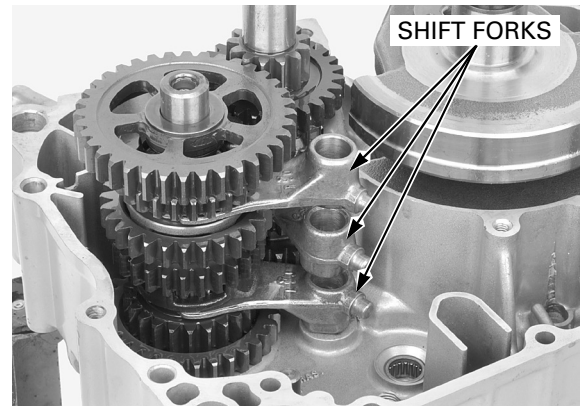


The shift forks have the following identification marks.

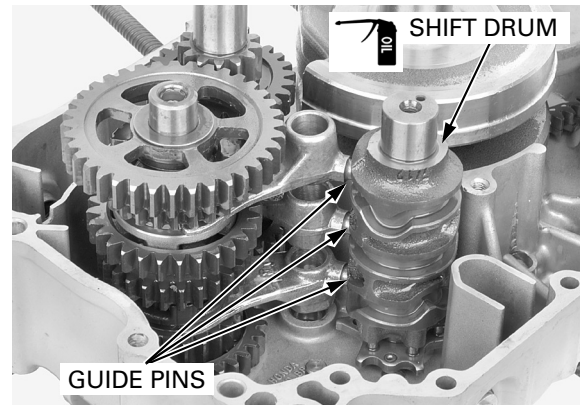
- "L" : Left shift fork
- "C" : Center shift fork
- "R" : Right shift fork



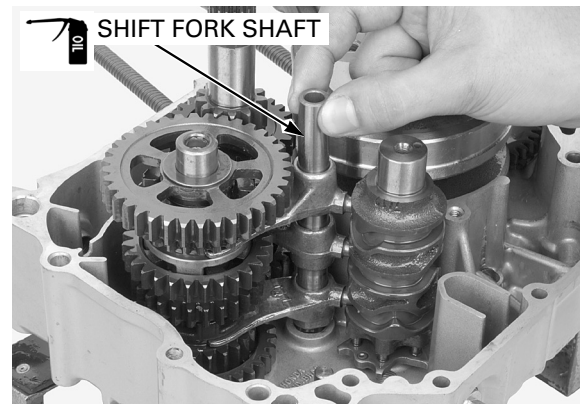
Install the shift fork into the shifter gear grooves with its marked side facing up (right crankcase side).



Apply engine oil to the guide grooves in the shift drum and install it while aligning the shift fork guide pins with the drum guide grooves.

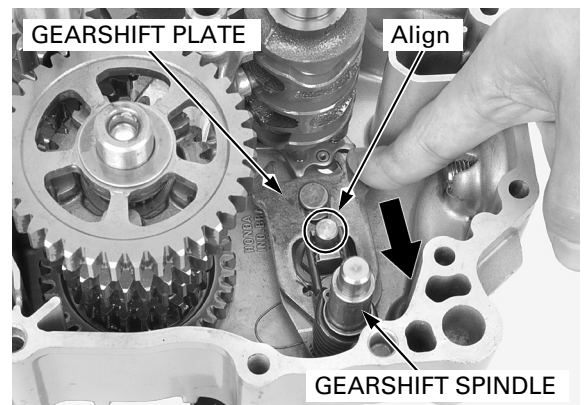


Apply engine oil to the shift fork shaft sliding surface and insert it through the shift forks and into the left crankcase.



Install the gearshift spindle while aligning the return spring ends with the pin bolt while pulling the gear shift plate.

Assemble the crankcase halves (page 11-22).





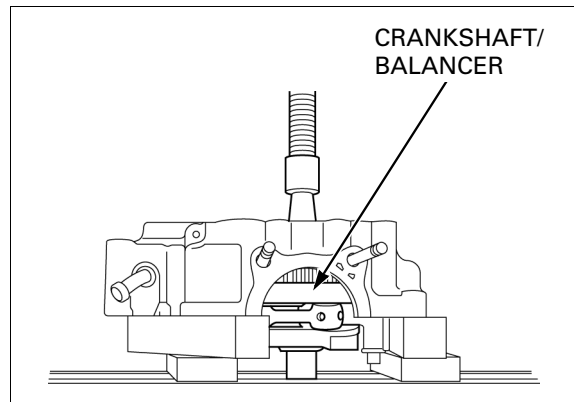
### CRANKSHAFT/BALANCER

#### REMOVAL

Separate the crankcase (page 11-7) and remove the transmission (page 11-8).

*Be careful not to damage the crankcase mating surface and crankshaft assembly.*

Remove the crankshaft and balancer from the left crankcase using a hydraulic press while holding them.



If the crankshaft bearing is left on the crankshaft, remove it using the special tool with a suitable protector.

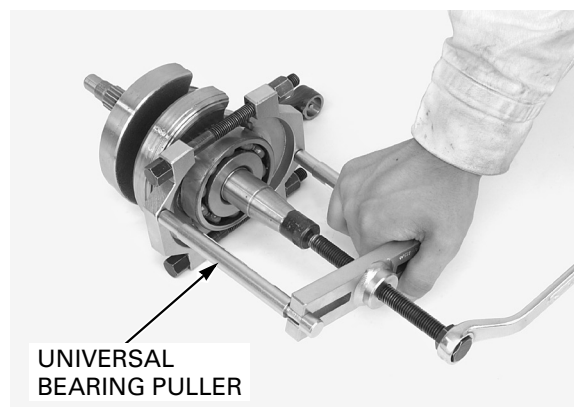
#### TOOL:

**Universal bearing puller**

**07631-0010000**

#### NOTE:

Always replace the left crankshaft bearing with a new one if it comes out with the crankshaft.

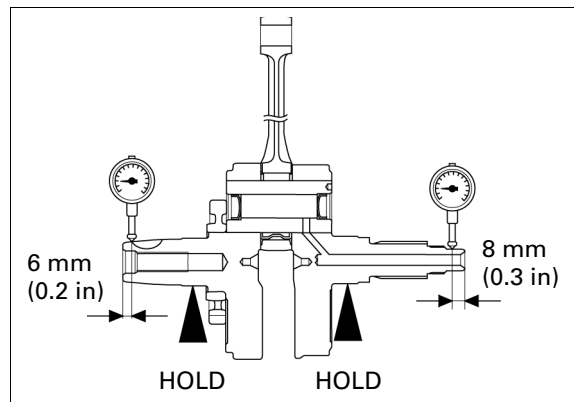


#### CRANKSHAFT INSPECTION

##### CRANKSHAFT RUNOUT

Place the crankshaft on a stand or V-blocks. Set the dial indicator on the shafts. Rotate the crankshaft two revolutions and read the runout.

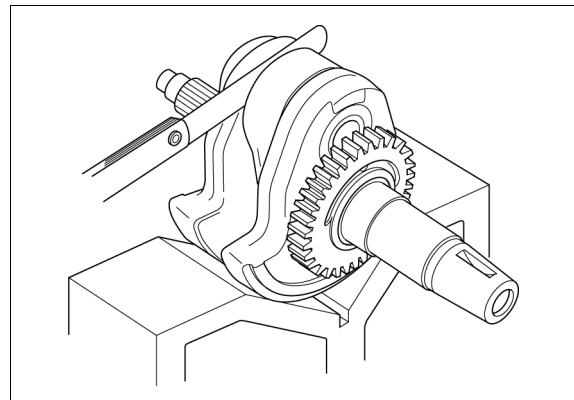
**SERVICE LIMIT: 0.05 mm (0.002 in)**



##### BIG END SIDE CLEARANCE

Measure the connecting rod big end side clearance.

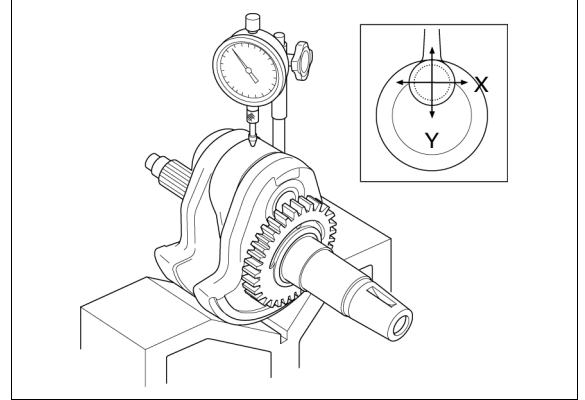
**SERVICE LIMIT: 0.6 mm (0.02 in)**



## BIG END RADIAL CLEARANCE

Measure the connecting rod big end radial clearance in both X and Y directions.

**SERVICE LIMIT: 0.05 mm (0.002 in)**

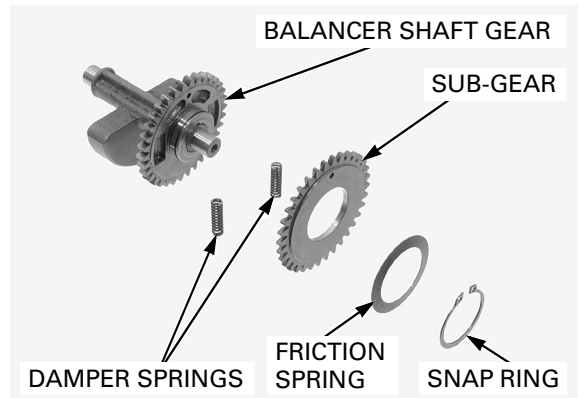
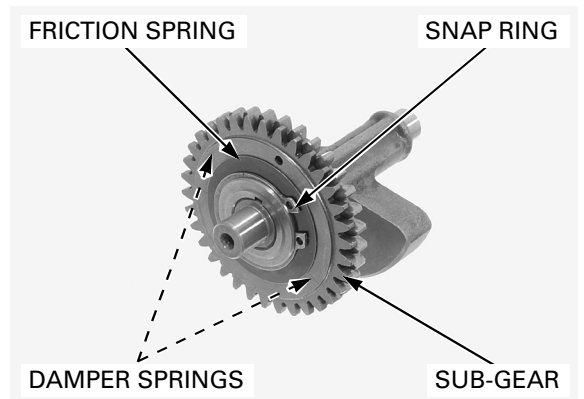


## BALANCER GEAR DISASSEMBLY/ASSEMBLY

Remove the following:

- Snap ring
- Friction spring
- Sub-gear
- Damper springs

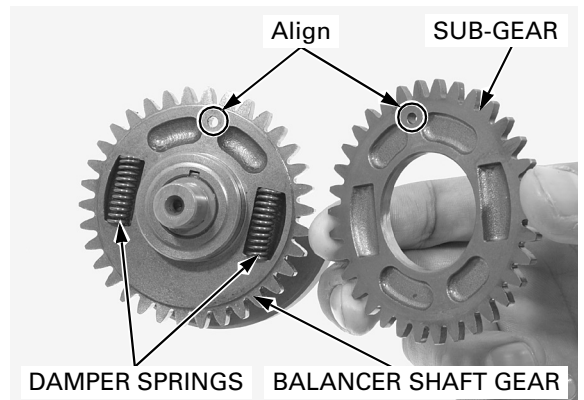
Check the balancer shaft gear for wear or damage.  
Check the sub-gear for wear or damage.  
Check the damper springs and friction spring for fatigue or damage.



Install the damper springs into the balancer shaft gear.

*Align the hole on the sub-gear and balancer shaft gear.*

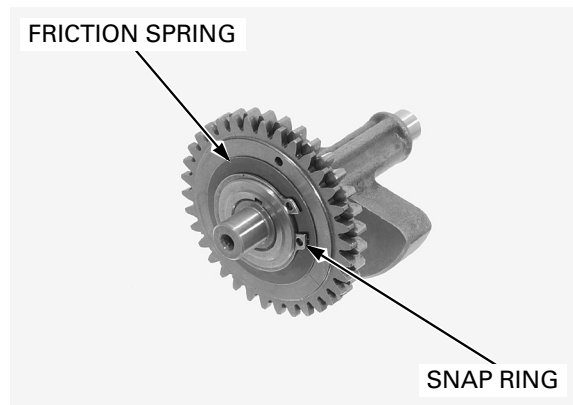
Install the sub-gear onto the balancer shaft gear.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Install the friction spring onto the sub-gear with the concaved side facing the sub-gear.

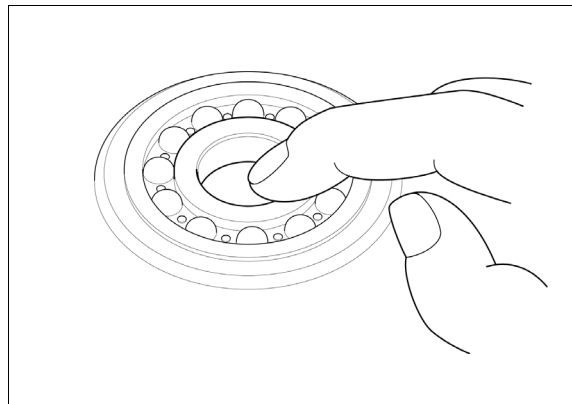
Install the snap ring into the balancer shaft groove securely.



### BEARING INSPECTION

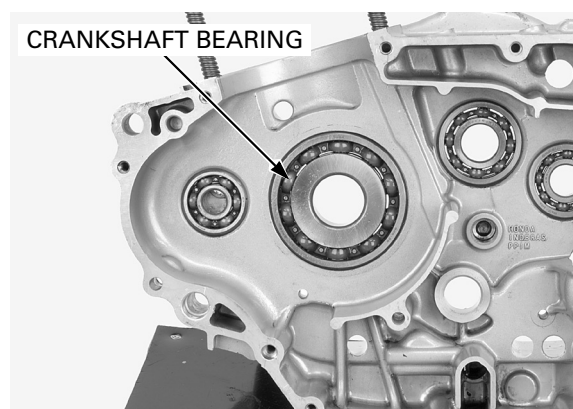
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that bearing outer races fit tightly in the crankcase.

Remove and discard the bearings if the races do not turn smoothly, quietly or if they fit loosely in the crankcase.



### BEARING REPLACEMENT

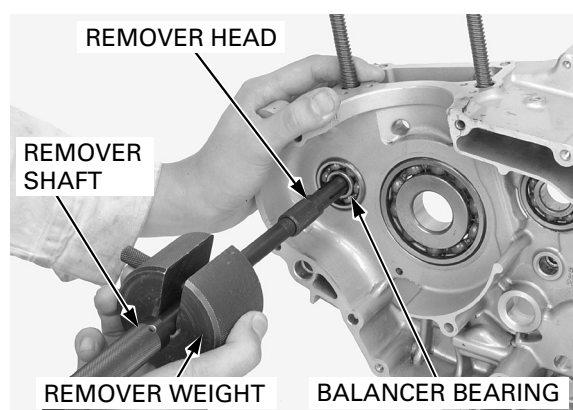
Drive out the crankshaft bearings from the right and left crankcase halves.



Remove the balancer bearings from the right and left crankcase halves using the special tools.

#### TOOLS:

Bearing remover head, 13 mm	07LMC-KZ10100
Bearing remover weight	07741-0010201
Bearing remover shaft	07936-1660120



Drive new crankshaft bearings into the right and left crankcase halves with its marked side facing up until they are fully seated, using the special tools.

### TOOLS:

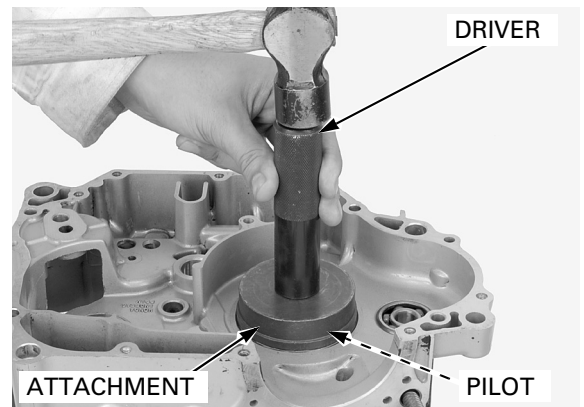
#### Crankshaft bearings:

Driver	07749-0010000
Attachment, 72 x 75 mm	07746-0010600
Pilot, 28 mm	07746-0041100

#### Balancer bearings:

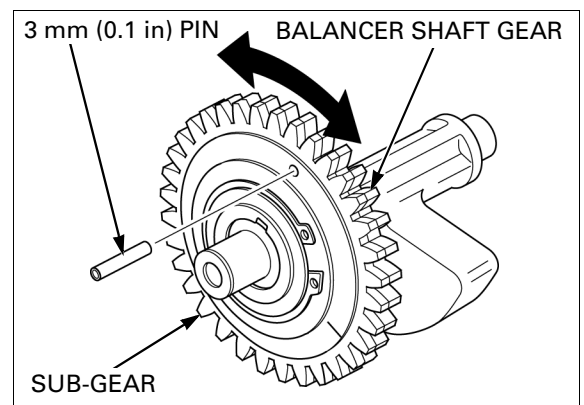
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 13 mm	07746-0041500

After installing the bearings, lubricate them with engine oil.

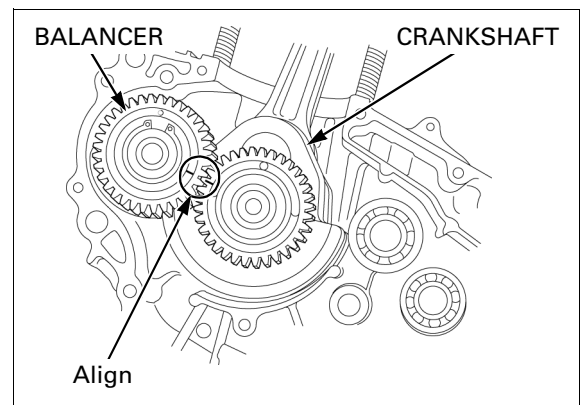


## INSTALLATION

Hold the balancer gear by inserting the 3 mm (0.1 in) pin through the balancer shaft gear and sub-gear.



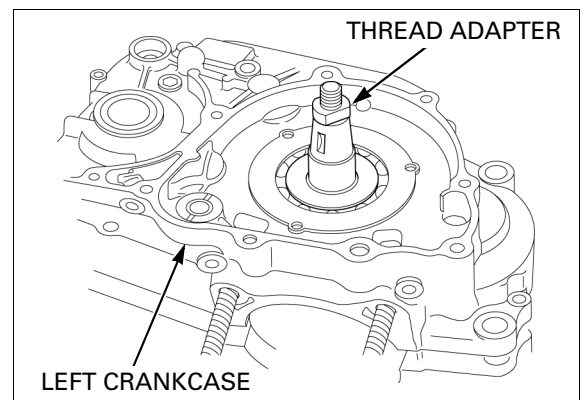
Temporarily install the balancer and crankshaft while aligning the index lines on the balancer driven gear and drive gear as shown.



Place the left crankcase onto the right crankcase. Install the special tool onto the crankshaft.

### TOOL:

Thread adapter	07965-VM00300
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## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Install the crankshaft into the left crankcase using the special tools.

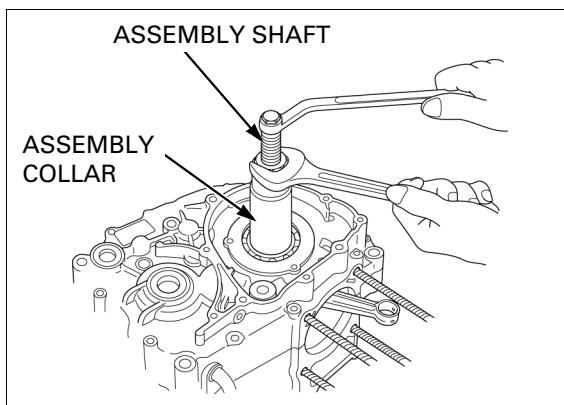
### TOOLS:

Crankcase assembly collar

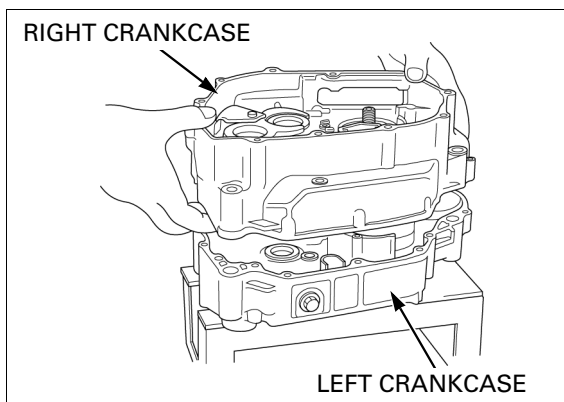
07965-VM00100

Crankcase assembly shaft

07965-VM00200



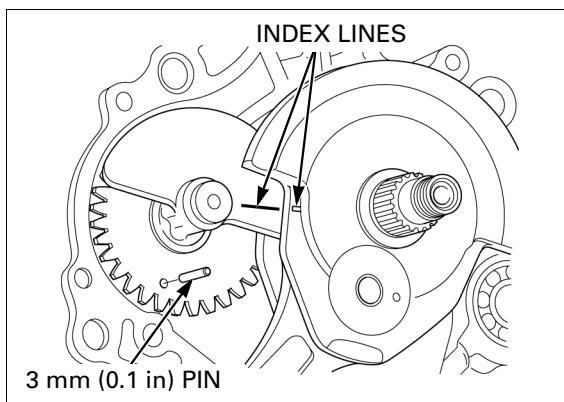
Place the crankcase up side (left crankcase) down. Remove the right crankcase from the left crankcase.



After installing the crankshaft, make sure that the index lines on the crank weight and balancer weight are aligned.

Remove the 3 mm (0.1 in) pin.

Install the transmission (page 11-15) and assemble the crankcases (page 11-22).

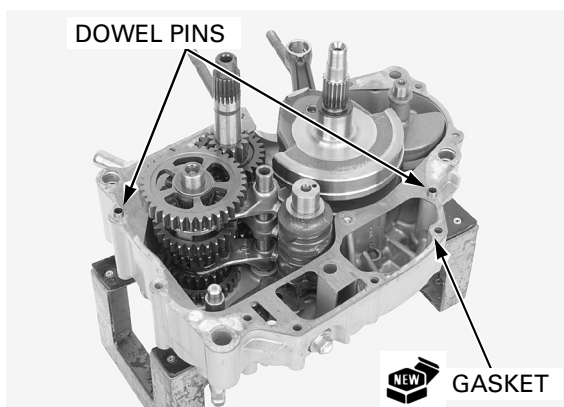


## CRANKCASE ASSEMBLY

*Be careful not to damage the crankcase mating surface.*

Clean the left and right crankcase mating surfaces thoroughly.

Install the dowel pins and a new gasket onto the crankcase.

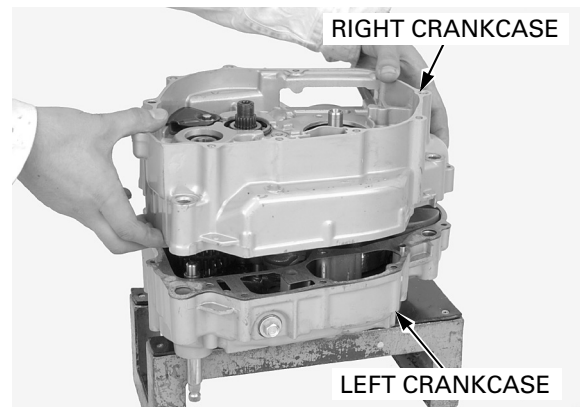


Make sure the all parts are installed in the left and right crankcases.

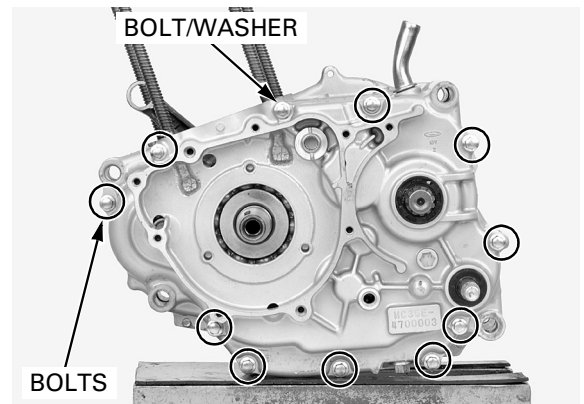
**NOTE:**

Do not force the crankcase halves together; if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.

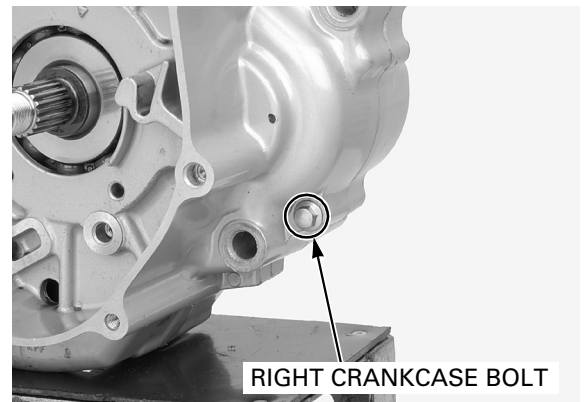
Install the right crankcase over the left crankcase.



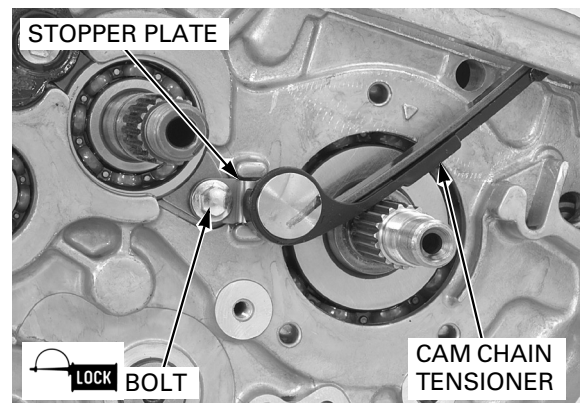
Make sure that the crankcase mating surfaces are touched evenly.  
Install the crankcase bolts and washer.  
Tighten the left crankcase bolts in a crisscross pattern in 2 – 3 steps.



Install and tighten the right crankcase bolt.

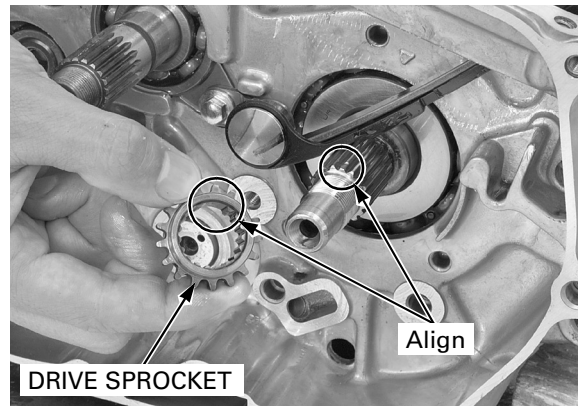


Apply a locking agent to the cam chain tensioner mounting bolt threads.  
Install the mainshaft bearing stopper plate, cam chain tensioner and mounting bolt.  
Tighten the cam chain tensioner mounting bolt securely.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Install the cam chain drive sprocket while aligning its wide groove with its wide tooth of the crankshaft.



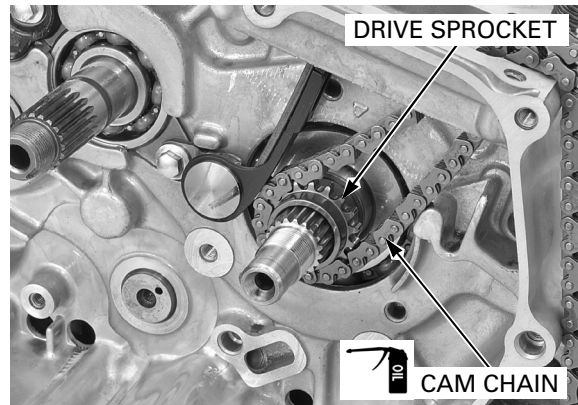
Apply engine oil to the cam chain.  
Install the cam chain to the cam chain drive sprocket.

Install the following:

- Flywheel/starter clutch (page 10-12)
- Oil pump (page 4-8)
- Clutch, primary drive gear, gearshift linkage (page 9-11)
- Cylinder and piston (page 8-8)
- Cylinder head (page 7-21)
- Oil pass pipe (page 4-13)
- Starter motor (page 17-12)

Place the engine in the frame (page 6-7).

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



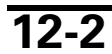
# 12. FRONT WHEEL/SUSPENSION/STEERING

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COMPONENT LOCATION .....	12-2	FRONT WHEEL .....	12-13
SERVICE INFORMATION .....	12-3	FORK .....	12-19
TROUBLESHOOTING .....	12-5	STEERING STEM .....	12-29
HANDLEBAR .....	12-6		



## COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- After the front wheel installation, check the brake operation by applying the brake lever.
- Refer to page 14-3 for brake system information.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	1.5 (0.06)
Cold tire pressure	Driver only	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
	Driver and passenger	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
Axle runout		–	0.20 (0.008)
Wheel runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balance weight		–	60 g (2.1 oz) max.
Fork	Spring free length	439.3 (17.30)	428.4 (16.87)
	Tube runout	–	0.20 (0.008)
	Recommended fluid	Honda ULTRA Cushion Oil 10W or equivalent	–
	Fluid level	140 (5.5)	–
	Fluid capacity	300 ± 2.5 cm <sup>3</sup> (10.1 ± 0.08 US oz, 10.6 ± 0.09 Imp oz)	–
Steering head bearing pre-load		10.8 – 15.7 N (1.1 – 1.6 kgf)	–

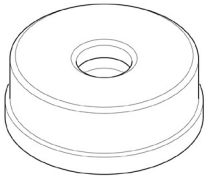
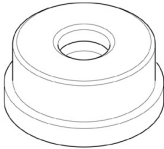


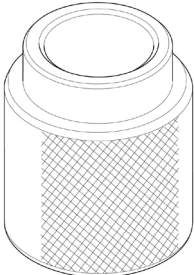
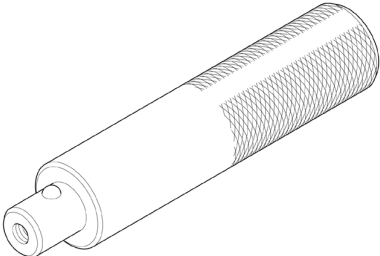
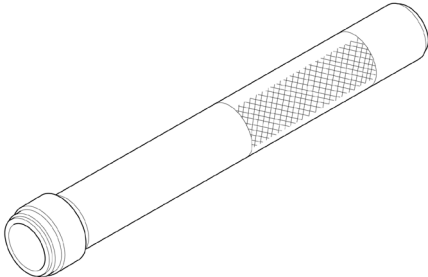
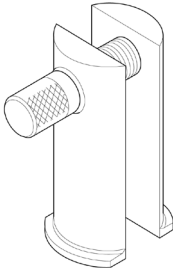
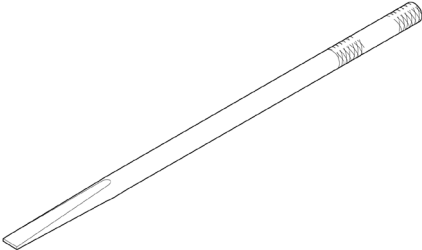
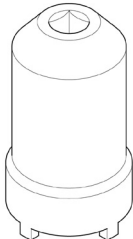
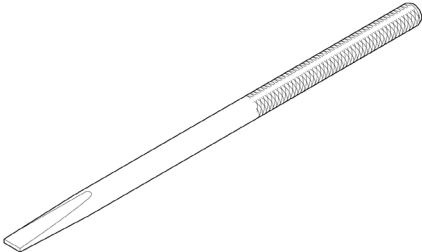
Unit: mm (in)

### TORQUE VALUES

Fork cap	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply a locking agent to the threads
Fork socket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Steering top thread	page 12-33	
Top bridge pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Bottom bridge pinch bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Front axle nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	U-nut
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Front axle pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

## FRONT WHEEL/SUSPENSION/STEERING

### TOOLS

<p>Attachment, 52 x 55 mm 07746-0010400</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Pilot, 15 mm 07746-0040300</p> 
<p>Bearing remover head, 15 mm 07746-0050400</p> 	<p>Fork seal driver 37.2 mm I.D. 07947-3710101</p> 	<p>Driver 07749-0010000</p> 
<p>Inner driver 07946-MB00000</p> 	<p>Ball race remover, 34.5 mm 07948-4630100</p> 	<p>Bearing remover shaft 07GGD-0010100</p> 
<p>Lock nut wrench 07HMA-MR70100</p> 	<p>Bearing remover shaft 07746-0050100</p> 	

## TROUBLESHOOTING

### Hard steering

- Steering top thread too tight
- Worn or damaged steering head bearings
- Insufficient tire pressure
- Faulty tire
- Bent steering stem

### Steers to one side or does not track straight

- Bent fork
- Bent front axle
- Wheel installed incorrectly
- Damaged or loose steering head bearings
- Bent frame
- Worn or damaged wheel bearings

### Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty tire
- Unbalanced tire and wheel

### Front wheel turns hard

- Faulty wheel bearings
- Faulty speedometer gear
- Bent front axle
- Front brake drag

### Soft suspension

- Weak fork springs
- Low fork fluid level
- Insufficient fork fluid weight (low viscosity)
- Low tire pressure

### Hard suspension

- Incorrect fork fluid weight (high viscosity)
- Bent fork tubes
- Clogged fork fluid passage
- High fork fluid level
- High tire pressure

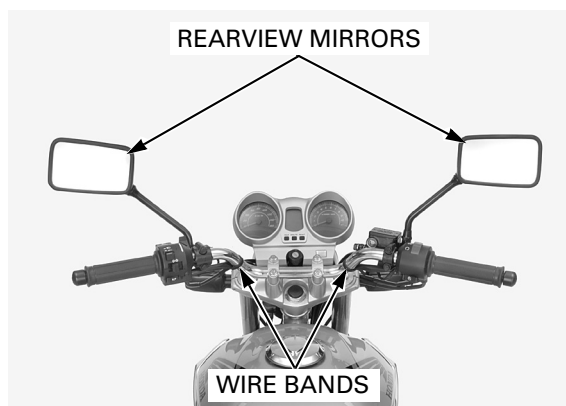
### Suspension noisy

- Low fork fluid level
- Loose fork fasteners
- Worn fork tube or slider bushing

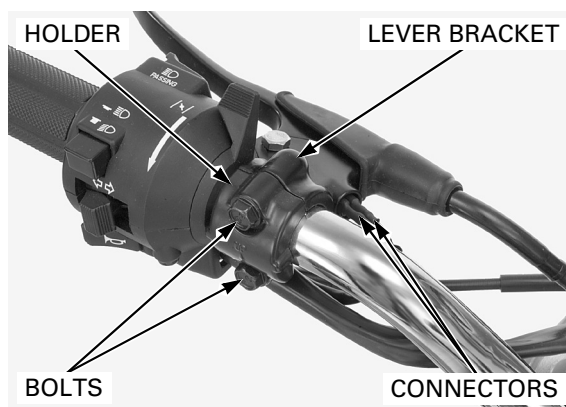
## HANDLEBAR

### REMOVAL

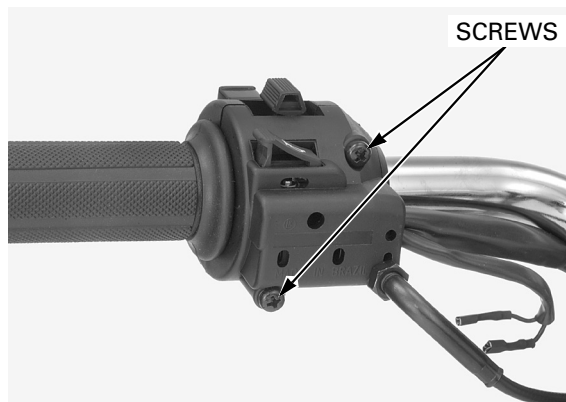
Remove the wire bands.  
Remove the rearview mirrors



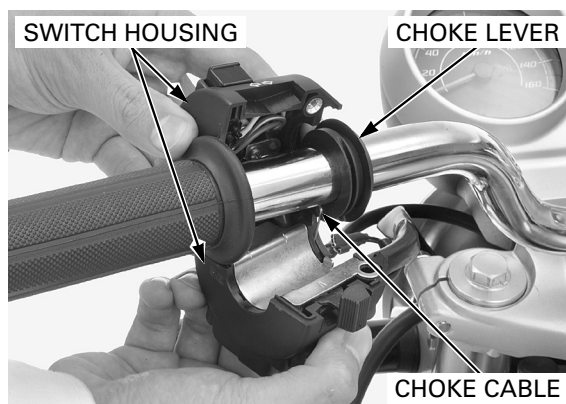
Disconnect the clutch switch connectors from the clutch switch.  
Remove the bolts, clutch lever holder and clutch lever bracket assembly.



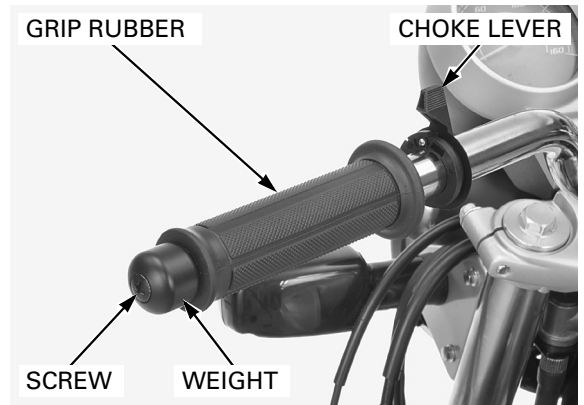
Remove the left handlebar switch housing screws.



Disconnect the choke cable from the choke lever and remove the left handlebar switch housing.

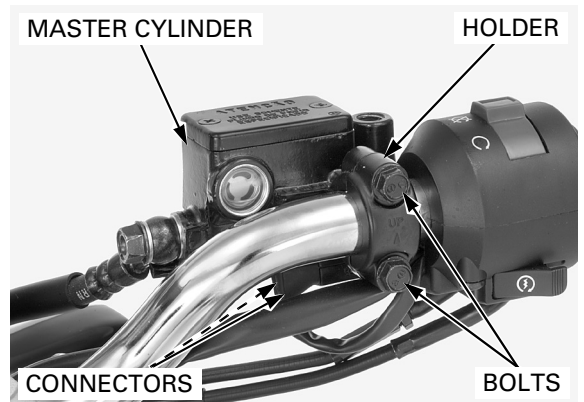


Remove the screw and left handlebar weight, handlebar grip rubber and choke lever.

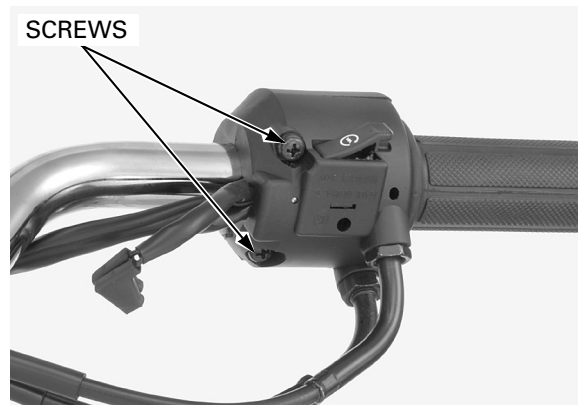


*Do not disconnect the hydraulic line. Keep the brake master cylinder upright to prevent air from entering the hydraulic system.*

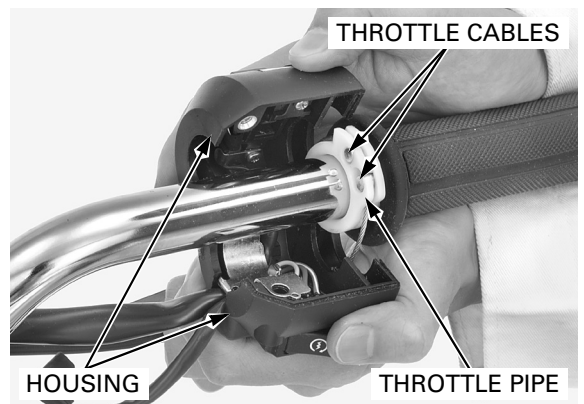
Disconnect the front brake light switch connectors from the front brake light switch. Remove the bolts, master cylinder holder and master cylinder assembly.



Remove the right handlebar switch/throttle housing screws.

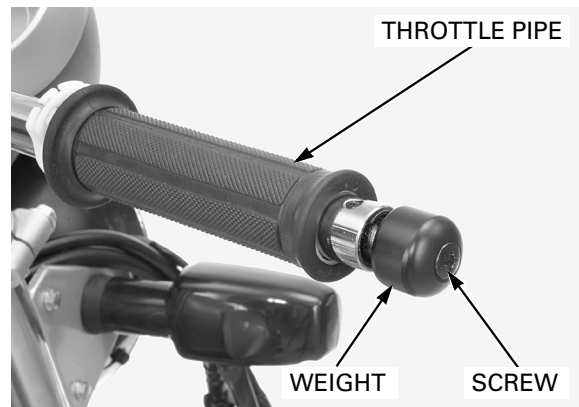


Disconnect the throttle cables from the throttle pipe and remove the right handlebar switch/throttle housing.

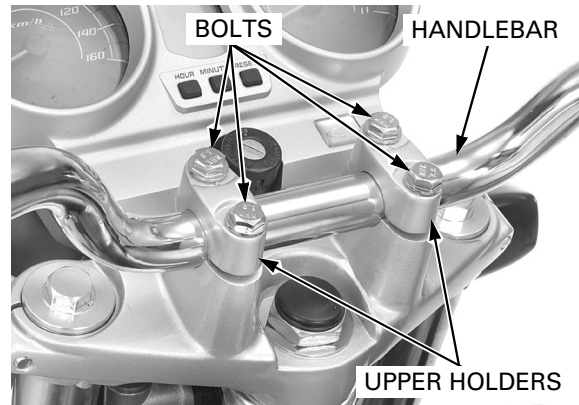


## FRONT WHEEL/SUSPENSION/STEERING

Remove the screw, right handlebar weight and throttle pipe from the handlebar.



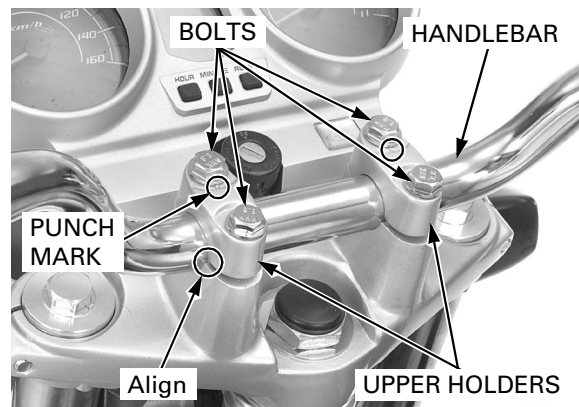
Remove the handlebar upper holder bolts, handlebar upper holders and handlebar.



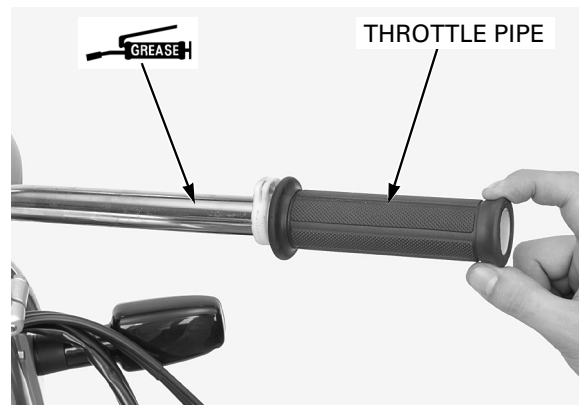
### INSTALLATION

Place the handlebar on the handlebar lower holders aligning the punch mark on the handlebar with its top surface of the handlebar lower holders.

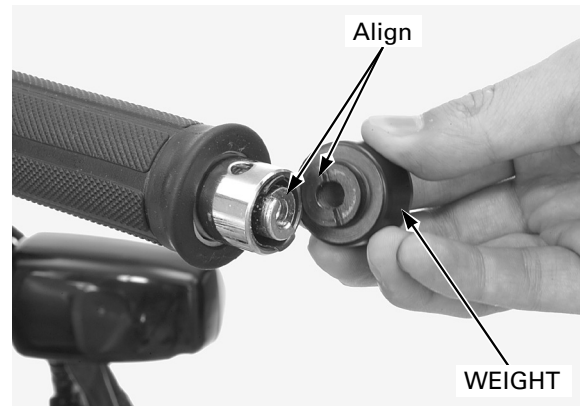
Install the handlebar upper holders on the handlebar with their punch marks facing forward. Install the handlebar upper holder bolts. Tighten the front bolts first, then tighten the rear bolts.



Apply grease to the sliding surface of the throttle pipe. Install the throttle pipe over the handlebar.



Install the right handlebar weight while aligning the cut-out with the cut-out in the handlebar.

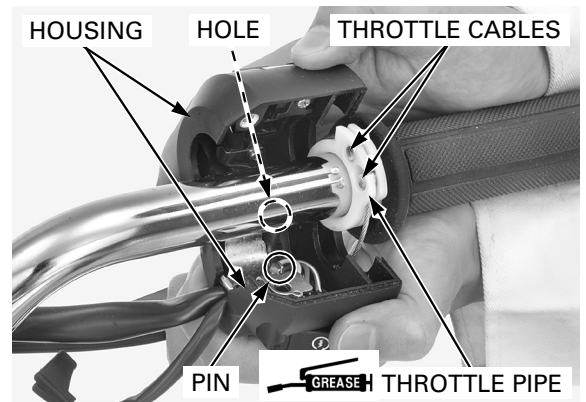


Install and tighten a new weight screw securely.

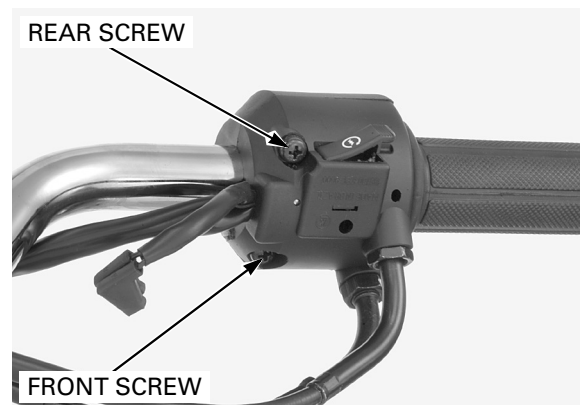


Apply grease to the throttle pipe flange groove. Connect the throttle cables to the throttle pipe.

Install the right handlebar switch/throttle housing while aligning the locating pin with the hole in the handlebar.



Tighten the front screw (short) first, then the rear screw (long).





## FRONT WHEEL/SUSPENSION/STEERING

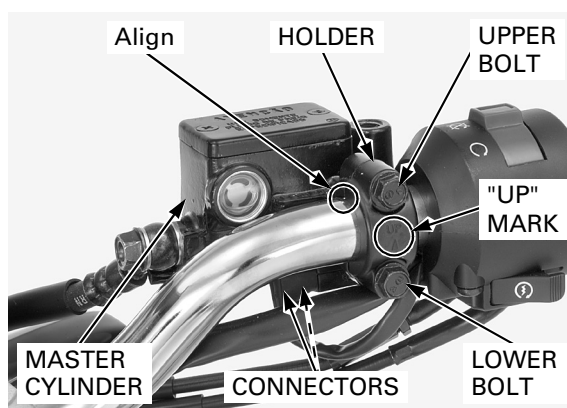
Install the master cylinder while aligning the end of the master cylinder with the punch mark on the handlebar.

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

Tighten the master cylinder holder upper bolt first, then the lower bolt to the specified torque.

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

Connect the front brake light switch connectors.



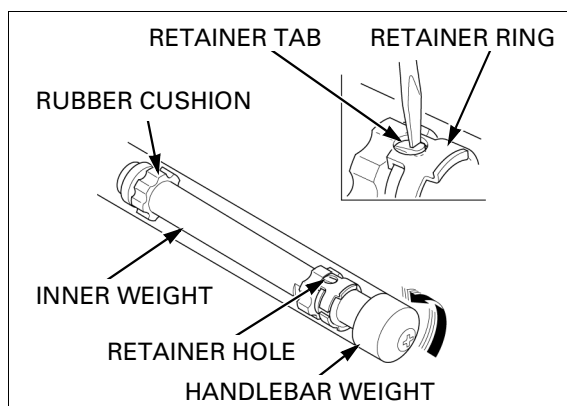
### HANDLEBAR WEIGHT REPLACEMENT

Remove the handlebar grip rubber from the handlebar.

Straighten the weight retainer ring tab with the screwdriver or punch.

*Apply lubricant spray through the retainer hole to the rubber for easy removal.*

Temporarily install the handlebar weight and screw, then remove the inner weight by turning the handlebar weight.



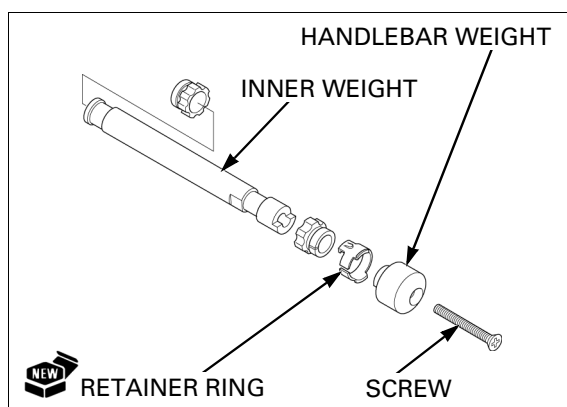
Remove the handlebar weight from the inner weight.

Discard the retainer ring.

Install a new retainer ring onto the handlebar weight.

Install the handlebar weight onto the inner weight while aligning the bosses with the grooves in the handlebar weight.

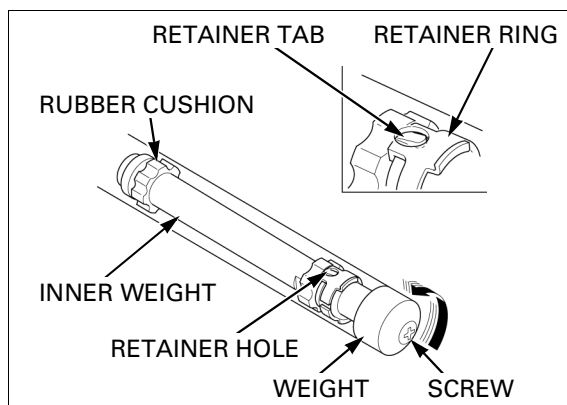
Install and temporarily tighten the weight screw.



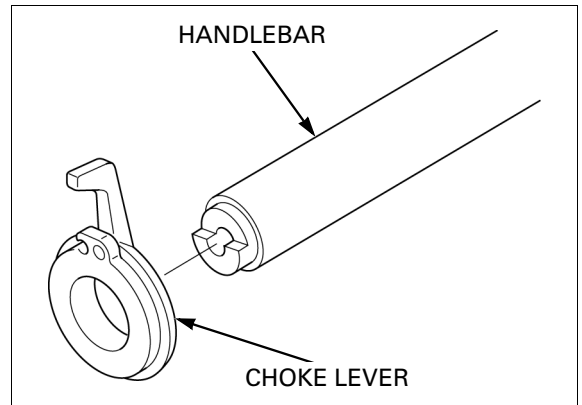
Insert the handlebar weight assembly into the handlebar.

Turn the handlebar weight and hook the retainer tab with the hole in the handlebar.

Remove the weight screw and handlebar weight.



Install the choke lever onto the left side of the handlebar.



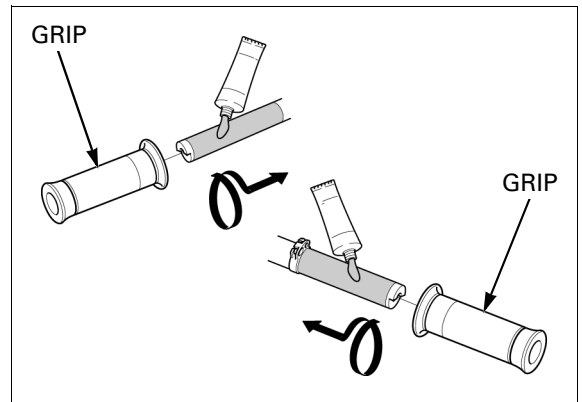
Clean the inside surface of both handlebar grip and the outside surface of the left handlebar and throttle pipe.

Apply Honda Bond A or equivalent to the inside surface of both handlebar grips and to the outside surfaces of the left handlebar and throttle pipe.

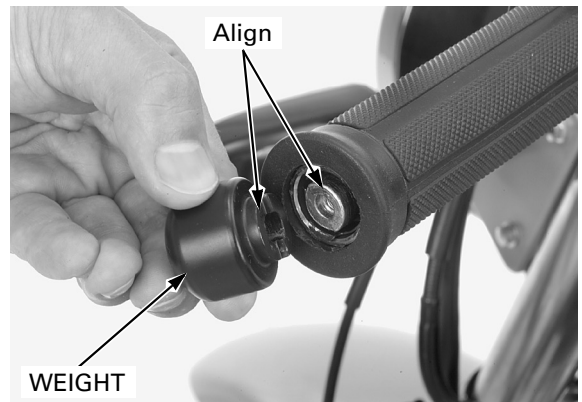
Wait 3 – 5 minutes and install the grips.

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

Rotate the grip rubber for even application of the adhesive.



Install the left handlebar weight while aligning the cut-out with the cut-out in handlebar.



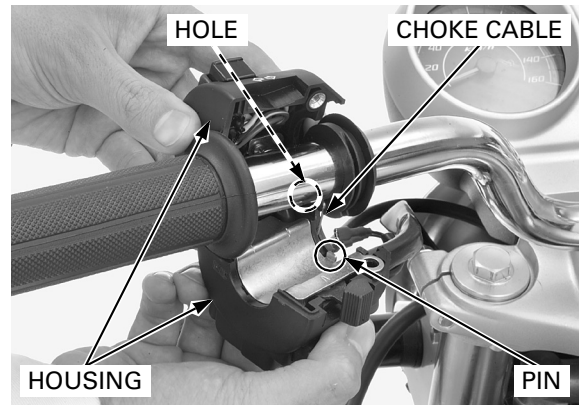
Install and tighten a new weight screw securely.



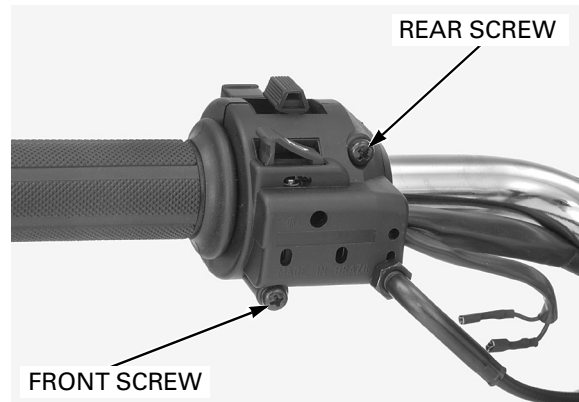
## FRONT WHEEL/SUSPENSION/STEERING

Connect the choke cable to the choke lever.

Install the left handlebar switch housing while aligning the locating pin with the hole in the handlebar.



Tighten the front screw (long) first, then the rear screw (short).

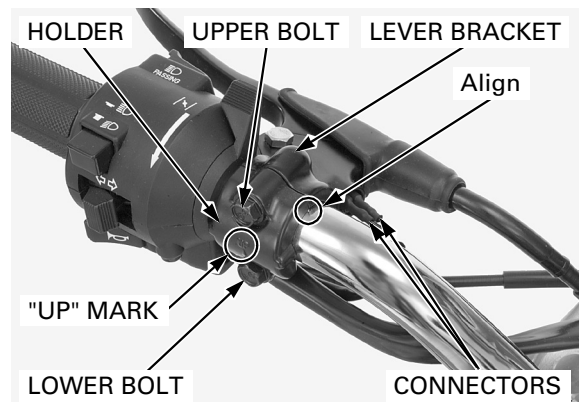


Install the clutch lever bracket assembly aligning the end of the bracket with the punch mark on the handlebar.

Install the clutch lever bracket holder with its "UP" mark facing up.

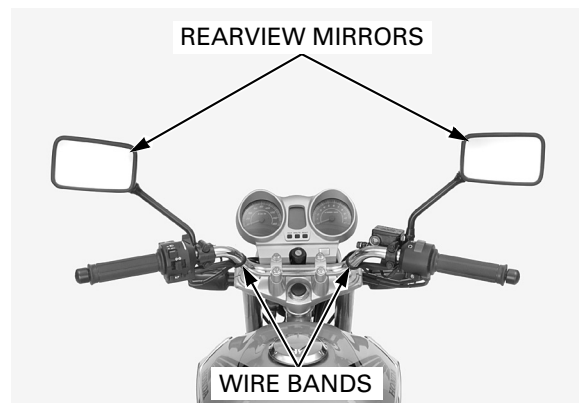
Tighten the upper bolt first, then the lower bolt.

Connect the clutch switch connectors.



Install the rearview mirrors.

Install the wire bands.

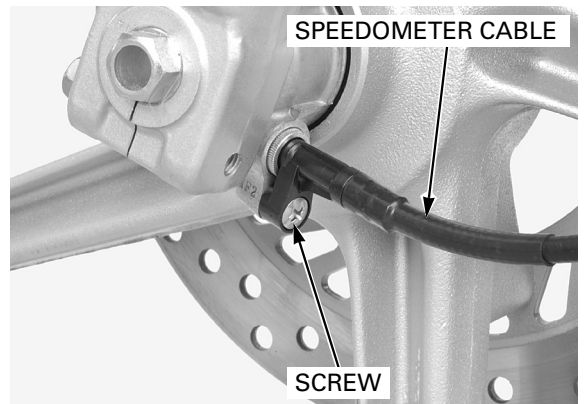


*Route the wires  
and cables properly  
(page 1-17).*

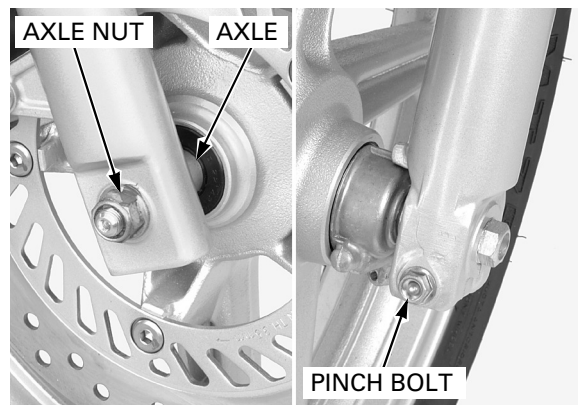
## FRONT WHEEL

### REMOVAL

Remove the screw and disconnect the speedometer cable.

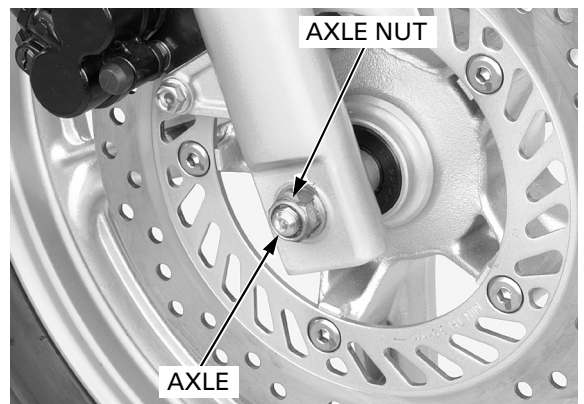


Loose the axle nut and front axle pinch bolt.

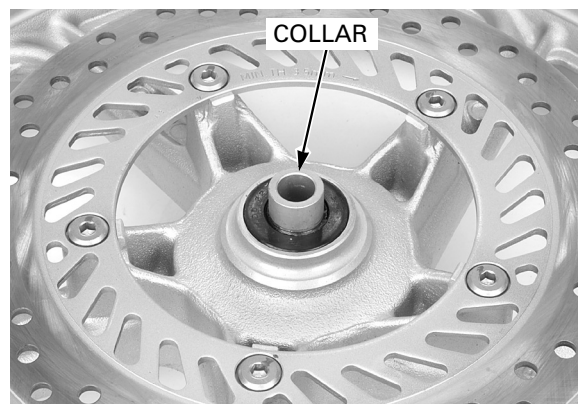


Support motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.

Remove the axle nut, axle and front wheel.

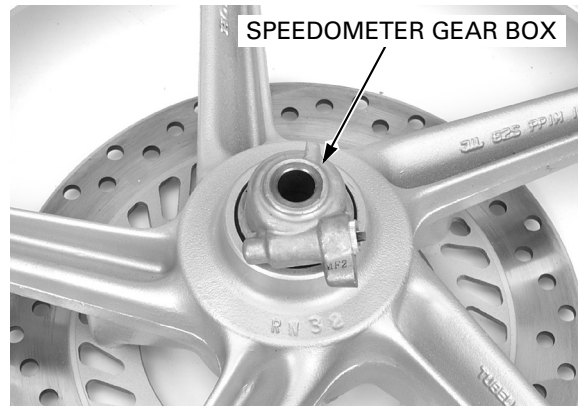


Remove the side collar from the right wheel hub.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the speedometer gear box from the left wheel hub.

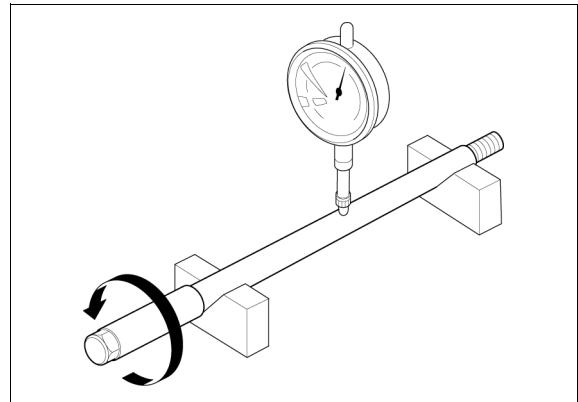


### INSPECTION

#### AXLE

Set the axle in V-blocks. Turn the axle and measure the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

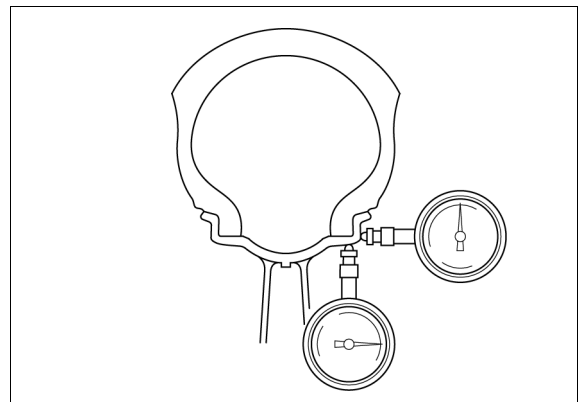
**SERVICE LIMIT: 0.20 mm (0.008 in)**



#### WHEEL RIM

Check the wheel rim runout by placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS: Radial: 2.0 mm (0.08 in)**  
**Axial: 2.0 mm (0.08 in)**



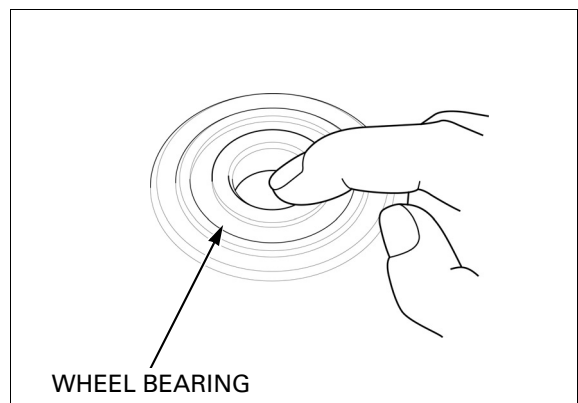
#### WHEEL BEARING

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

Remove and discard the bearings if they do not turn smoothly, quietly or if they fit loosely in the hub.

*Replace the bearings in pairs.*

Replace the bearings if necessary (page 12-16).

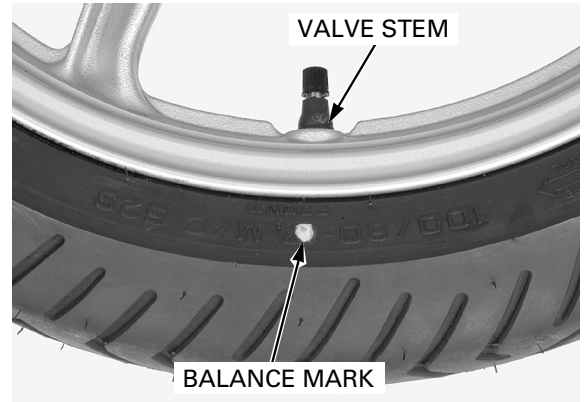


## WHEEL BALANCE

The wheel balance must be checked when the tire is remounted.

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

- Wheel balance directly affects the stability, handling and over all safety of the motorcycle.
- Always check balance when the tire has been removed from the rim.



Check the rotating direction mark on the side wall of the tire.



Remove the dust seals from the wheel (page 12-15).

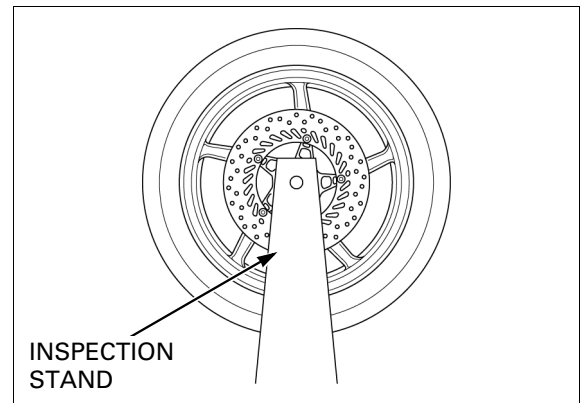
Mount the wheel, tire and brake discs assembly in an inspection stand and spin the wheel.

Allow it to stop, and mark the lowest (heaviest) point of the tire with a chalk.

Do this two or three times to verify the heaviest area.

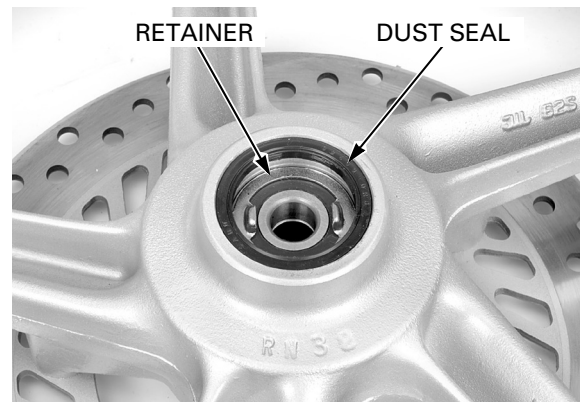
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Adjust enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 g (2.1 oz) to the wheel.



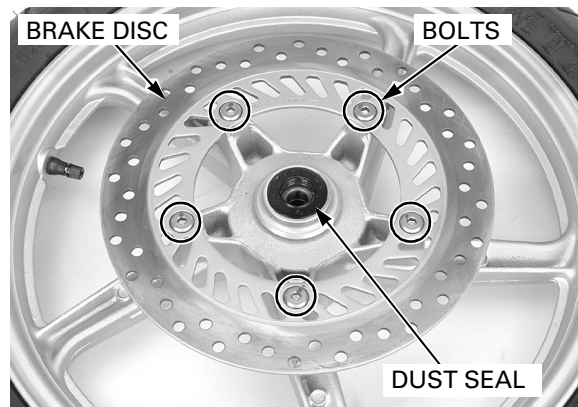
## DISASSEMBLY

Remove the dust seals and retainer.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the dust seal from the right wheel hub.  
Remove the mounting bolts and brake disc.

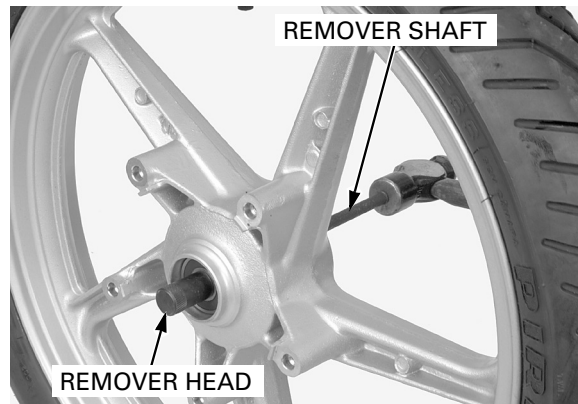


### WHEEL BEARING REPLACEMENT

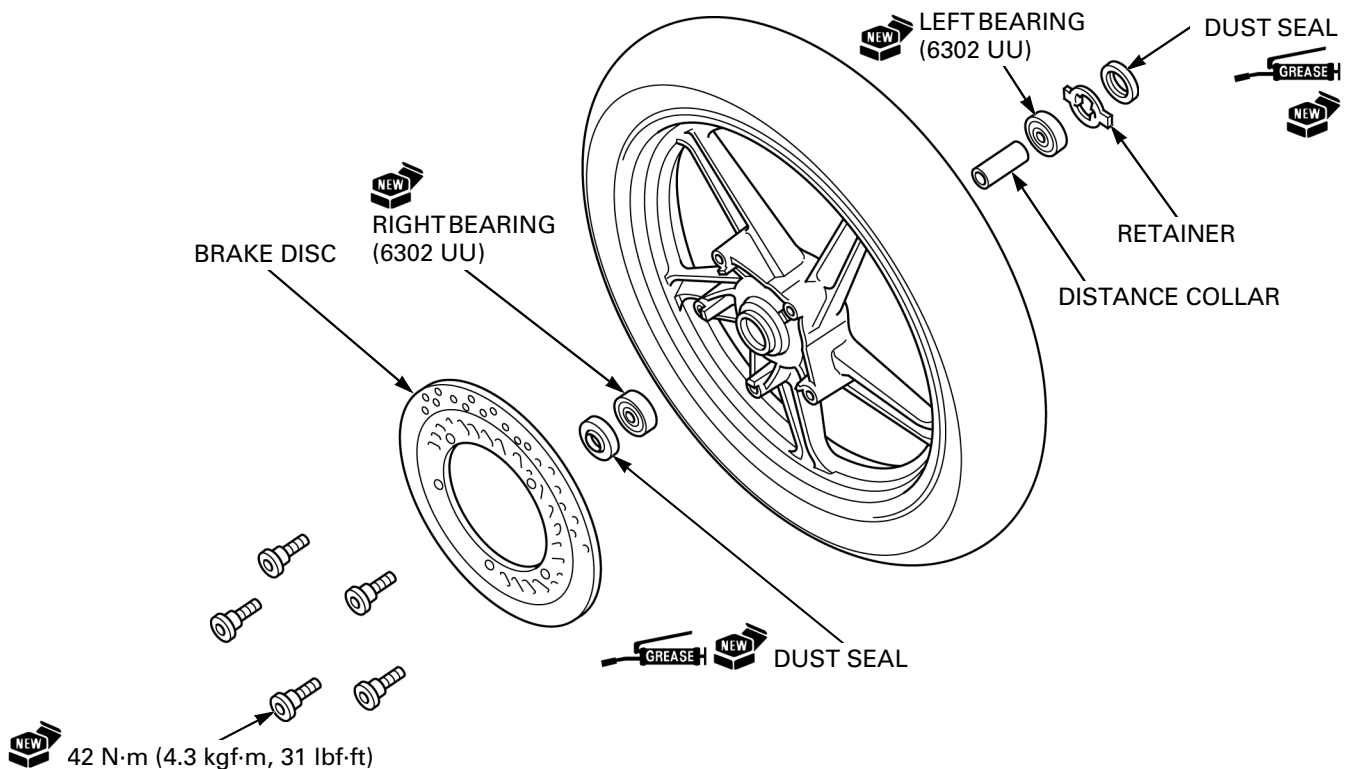
Install the bearing remover head into the wheel bearing.  
From the opposite side install the remover shaft and drive the wheel bearing out of the wheel hub.  
Remove the distance collar and drive out the other bearing.

#### TOOLS:

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



### ASSEMBLY



Never install the old bearings. Once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely with its marked side facing out.  
Install the distance collar, then drive in a new left wheel bearing with its marked side facing out.

## TOOLS:

**Driver**

**07749-0010000**

**Attachment, 42 x 47 mm**

**07746-0010300**

**Pilot, 15 mm**

**07746-0040300**

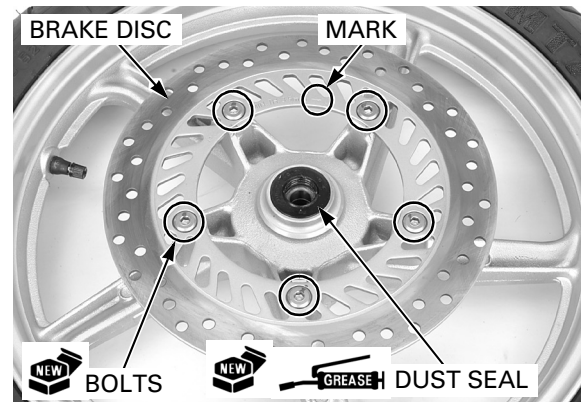
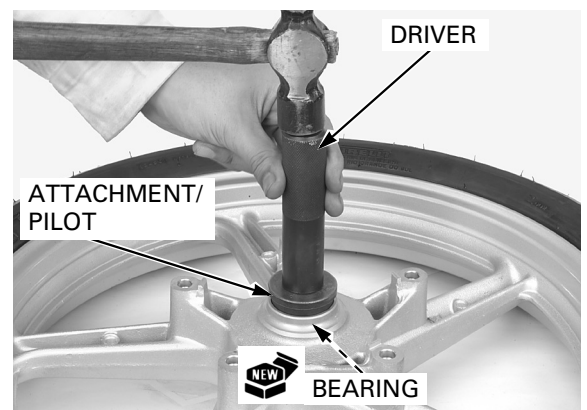
Do not get grease on the brake disc or stopping power will be reduced.

Install the brake disc on the right wheel hub with the arrow mark facing out.

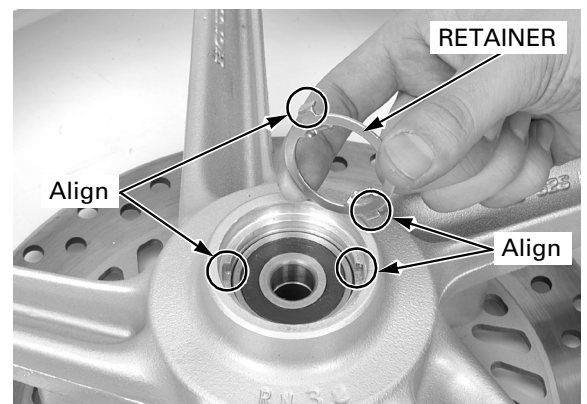
Install and tighten new front disc bolts to the specified torque in a crisscross pattern in 2 – 3 steps.

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

Apply grease to new dust seal lips, then install it into the right wheel hub.



Install the retainer in the left wheel hub while aligning the tabs with the slots in the hub.

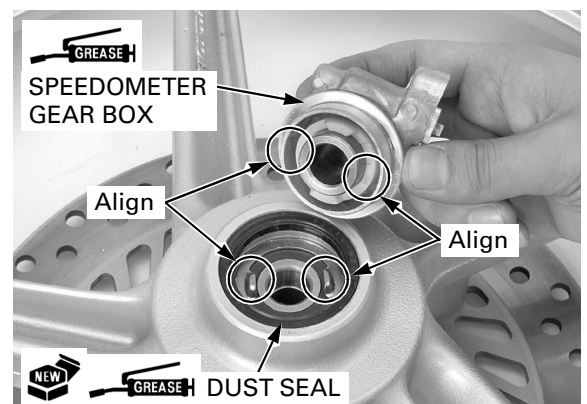


## INSTALLATION

Apply grease to new dust seal lips, then install it into the left wheel hub.

Apply grease to the speedometer gear teeth and sliding surface.

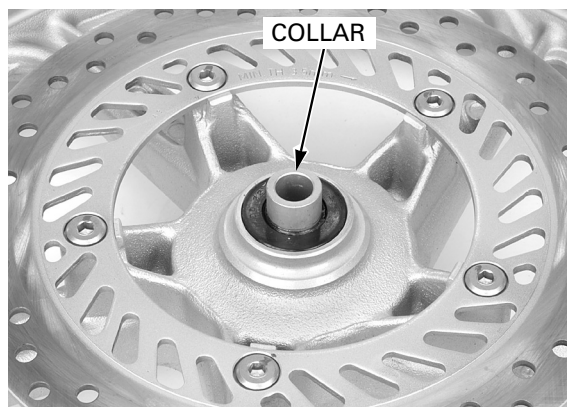
Install the speedometer gear box in the left wheel hub while aligning the slots of the speedometer gear with the tabs of the retainer.





## FRONT WHEEL/SUSPENSION/STEERING

Install the right side collar.

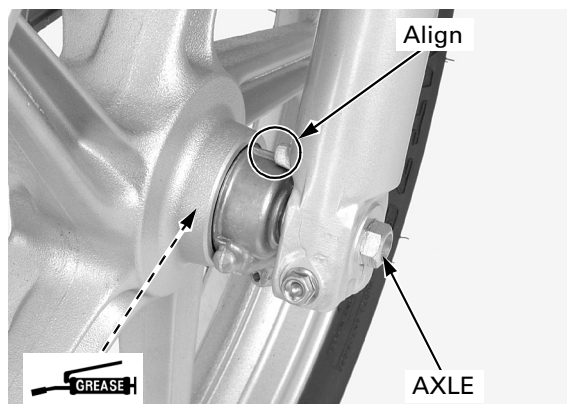


Place the front wheel between the fork legs so that the brake disc is positioned between the brake pads, being careful not to damage the brake pads.

Apply thin layer of grease to the front axle surface.

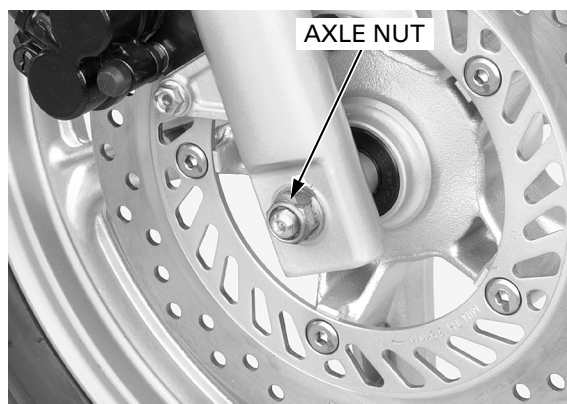
Install the front axle from the left side.

Position the lug on the speedometer gear box against the back of the stopper on the left fork leg.

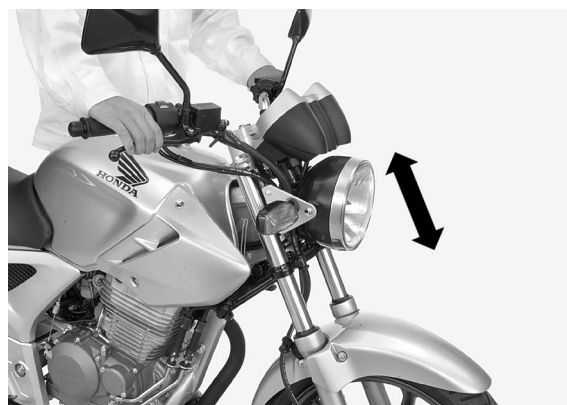


Hold the axle and tighten the axle nut to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)**

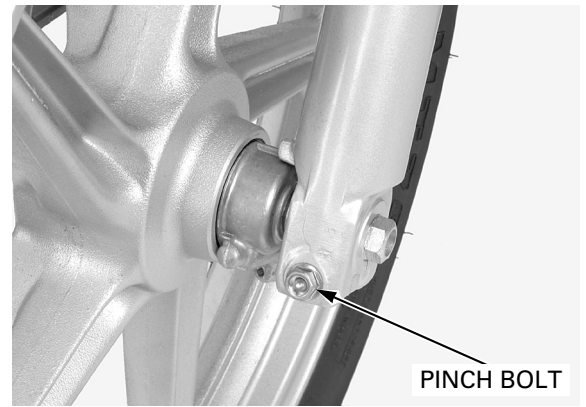


With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.

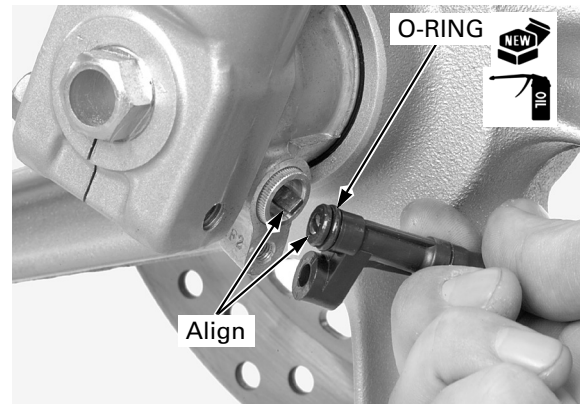


Tighten the front axle pinch bolt to the specified torque.

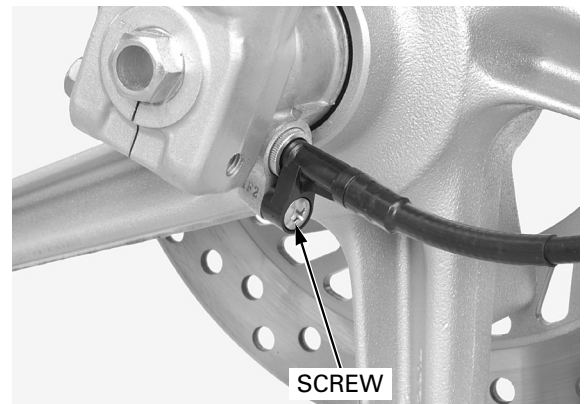
**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Apply engine oil to a new O-ring.  
Install a new O-ring into the speedometer cable groove.  
Install the speedometer cable while aligning the groove with the tab of the speedometer gear box.



Install and tighten the screw securely.



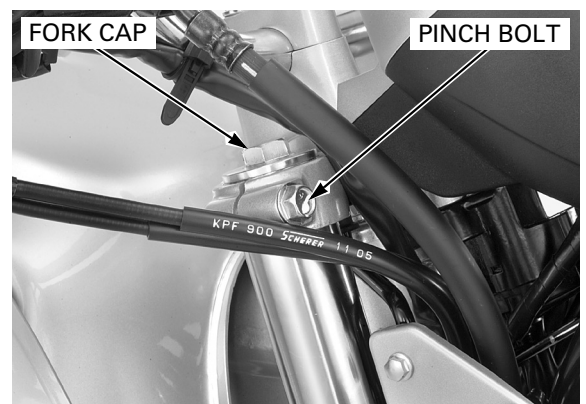
## FORK

### REMOVAL

Remove the following:

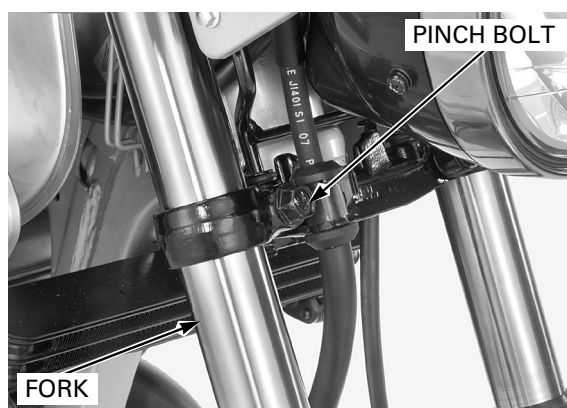
- Front wheel (page 12-13)
- Front brake caliper (page 14-14)
- Front fender (page 2-8)

Loosen the top bridge pinch bolt.  
When the fork will be disassembled, loosen the fork cap but do not remove yet.



## FRONT WHEEL/SUSPENSION/STEERING

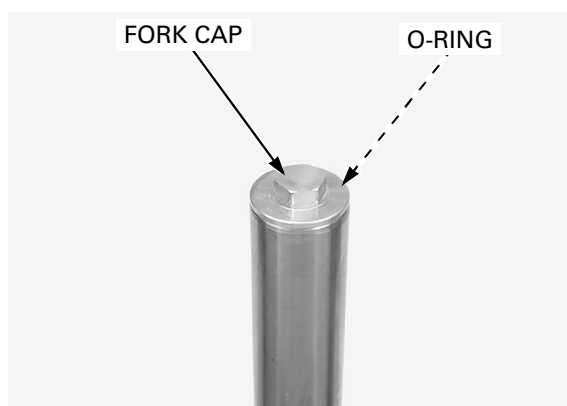
Loosen the bottom bridge pinch bolt while holding the fork and remove the fork from the top bridge and steering stem.



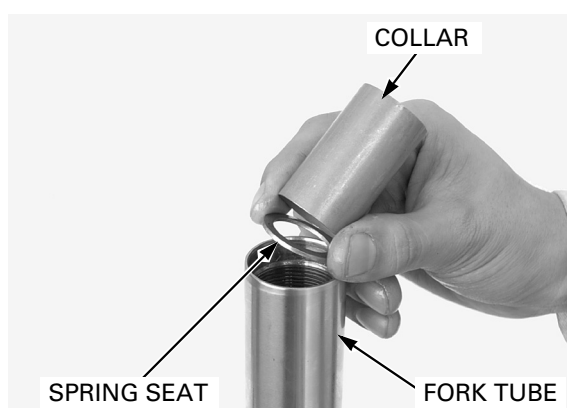
### DISASSEMBLY

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

Remove the fork cap and O-ring from the fork tube.

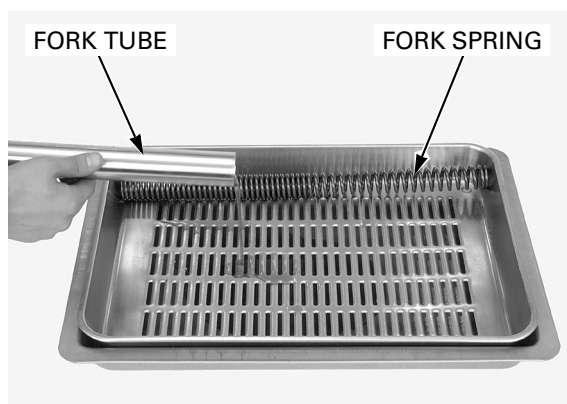


Remove the spring collar and spring seat from the fork tube.



Remove the fork spring from the fork tube.

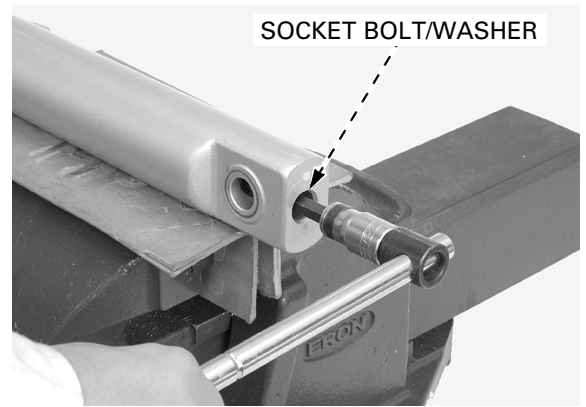
Pour out the fork fluid by pumping the fork tube several times.



Hold the fork slider in a vise with soft jaws or shop towels to avoid damage.

*If the fork piston turns with the socket bolt, temporarily install the fork spring, spring collar, spring seat and fork cap.*

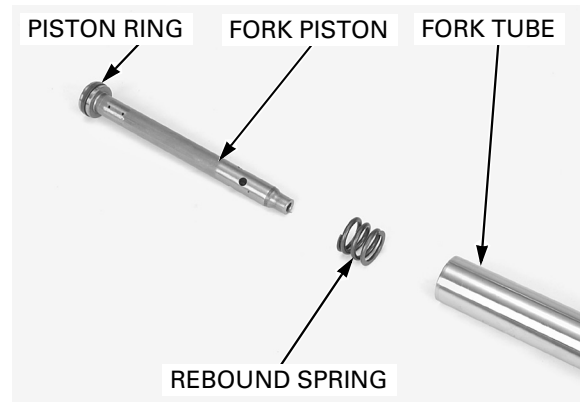
Remove the fork socket bolt and sealing washer from the fork slider.



Remove the fork piston and rebound spring from the fork tube.

**NOTE:**

Do not remove the fork piston ring, unless it is necessary to replace with a new one.



Remove the dust seal from the fork slider.



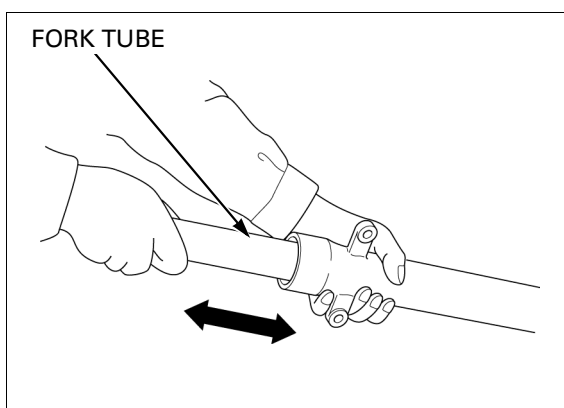
*Do not scratch the fork tube sliding surface.*

Remove the stopper ring from the groove of the fork slider.

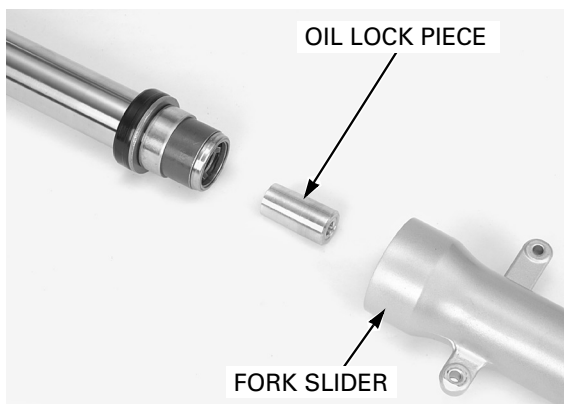


## FRONT WHEEL/SUSPENSION/STEERING

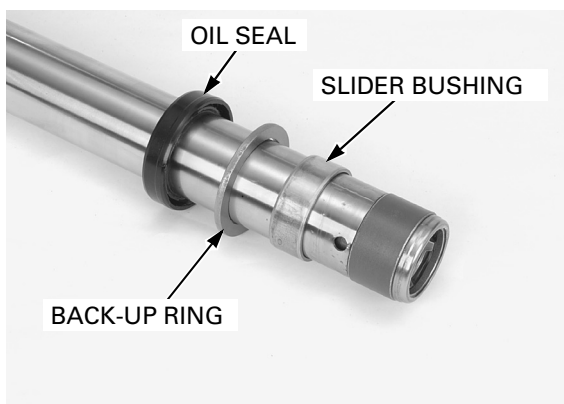
Using quick successive motions, pull the fork tube out of the fork slider. The slider bushing will be forced out by the fork tube bushing.



Remove the oil lock piece from the fork slider.

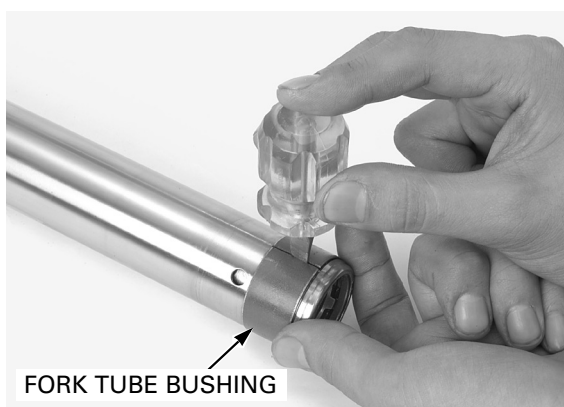


Remove the oil seal, back-up ring and slider bushing from the fork tube.



*Do not remove the fork tube bushing unless it is necessary to replace it with a new one.*

Carefully remove the fork tube bushing while prying the slit with a screwdriver until the bushing can be pulled off by hand.

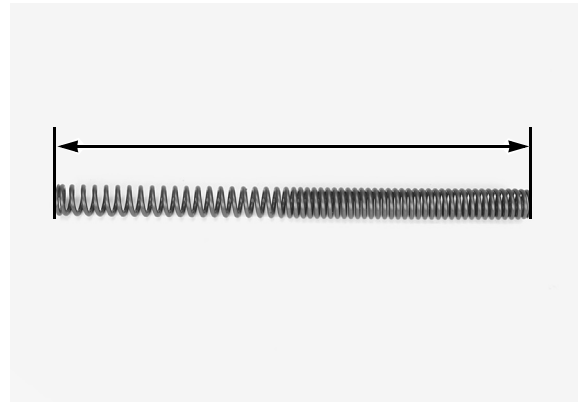


## INSPECTION

### FORK SPRING

Measure the fork spring free length.

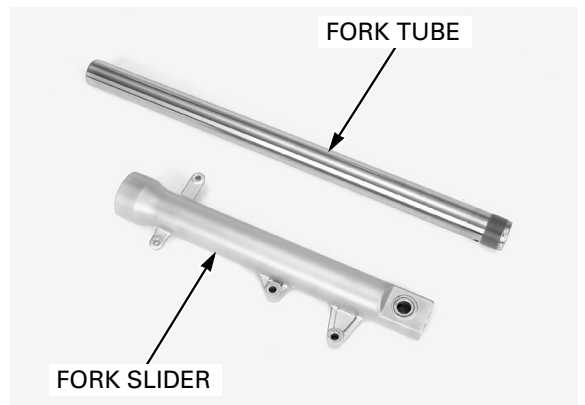
**SERVICE LIMIT: 428.4 mm (16.87 in)**



### FORK TUBE/SLIDER

Check the fork tube and fork slider for score marks, and excessive or abnormal wear.

Replace the component if necessary.

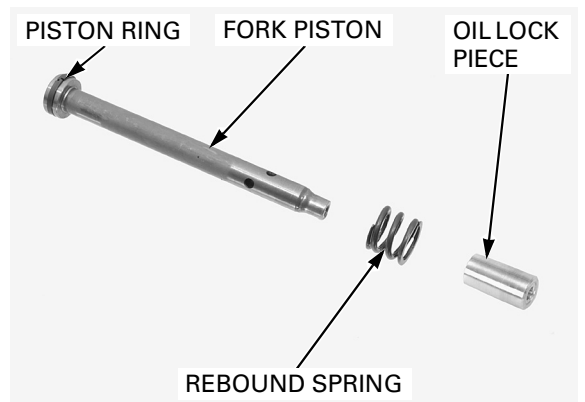


### FORK PISTON/REBOUND SPRING/OIL LOCK PIECE

Check the fork piston, fork piston ring and oil lock piece for wear or damage.

Check the rebound spring for fatigue or damage.

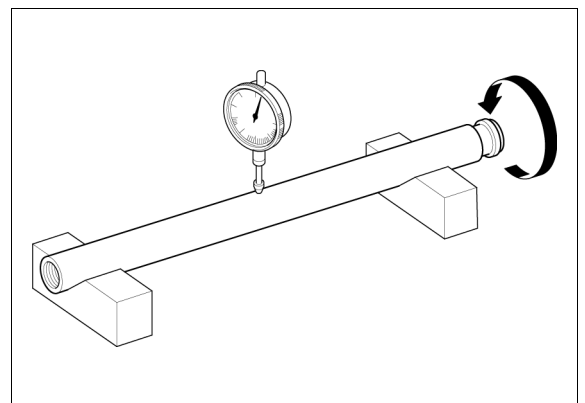
Replace the component if necessary.



Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.

Actual runout is 1/2 the total indicator reading.

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



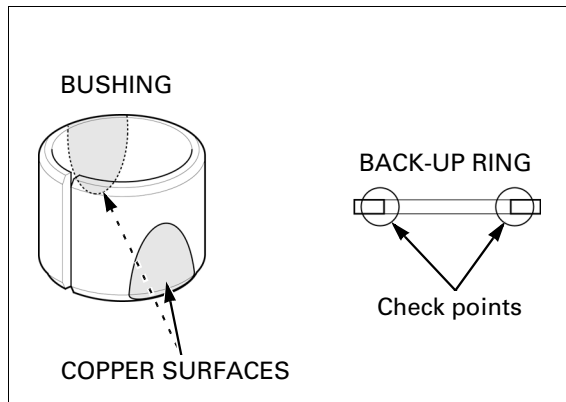
## FRONT WHEEL/SUSPENSION/STEERING

### FORK TUBE BUSHING/BACK UP RING/SLIDER BUSHING

Visually inspect the slider bushing and fork tube bushing.

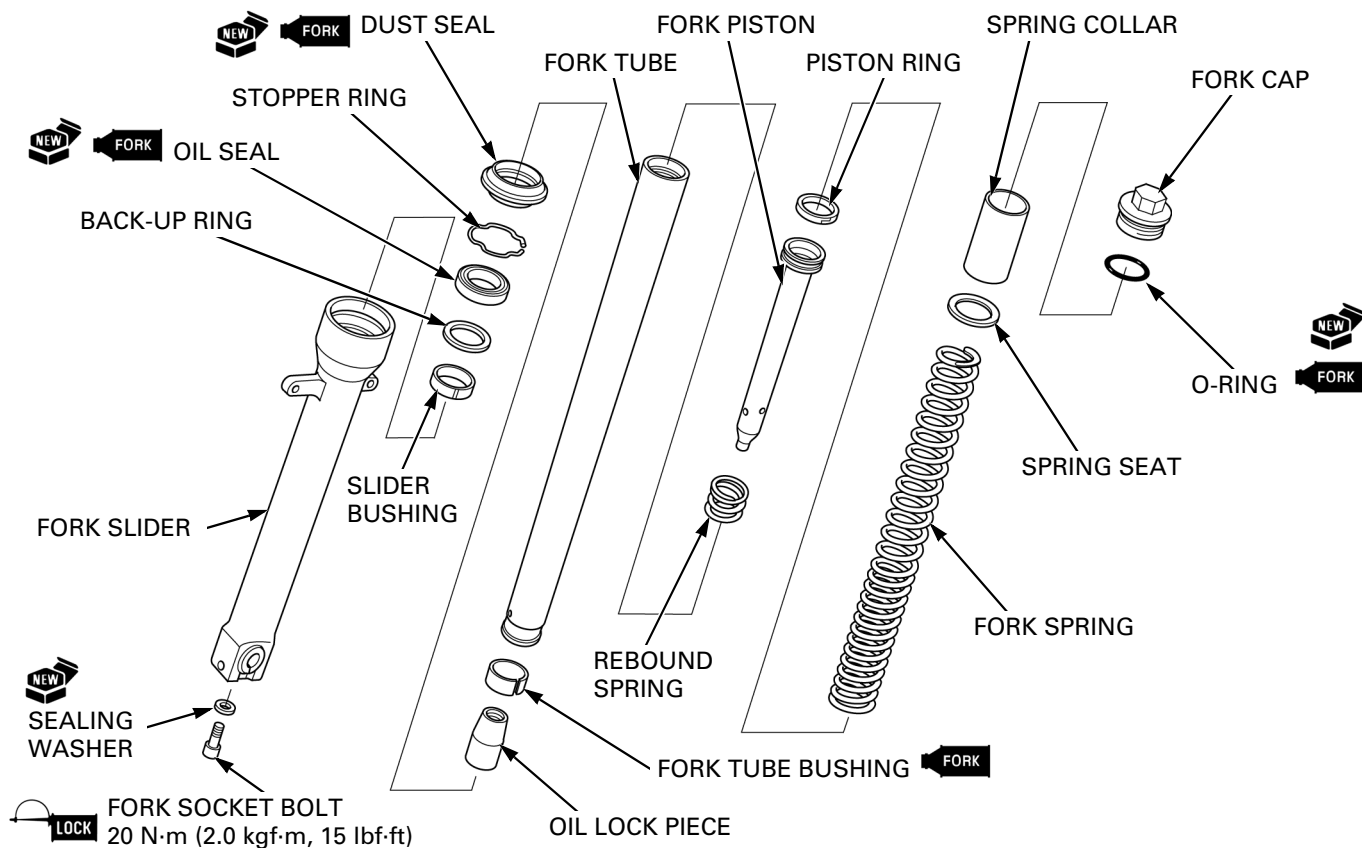
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so the copper surface appears on more than 3/4 of the entire surface.

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



### ASSEMBLY

Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them off completely.



*Do not open the fork tube bushing more than necessary.*

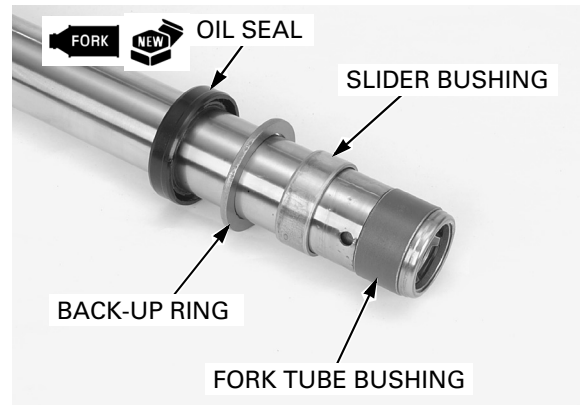
Install the fork tube bushing being careful not to damage the coating of the bushing if it has been removed.

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the slider bushing and back-up ring to the fork tube.

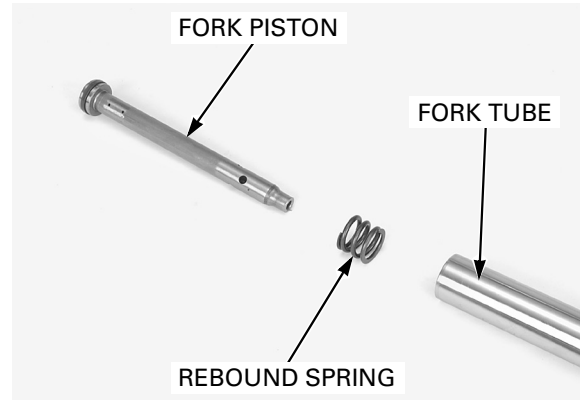
Apply fork fluid to a new oil seal lip.

Install a new oil seal to the fork tube with its marked side facing up.



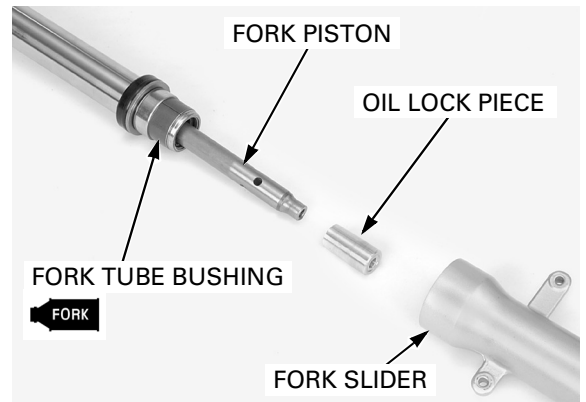
Install the rebound spring to the fork piston.

Install the fork piston into the fork tube.



Install the oil lock piece onto the fork piston end.

Coat the fork tube bushing with the fork oil and install the fork tube into the fork slider.



Hold the fork slider in a vise with soft jaws or shop towels to avoid damage.

Clean and apply a locking agent to the fork socket bolt threads and install it with a new sealing washer into the fork piston.





## FRONT WHEEL/SUSPENSION/STEERING

*If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spring collar and fork cap.*

Tighten the fork socket bolt to the specified torque.

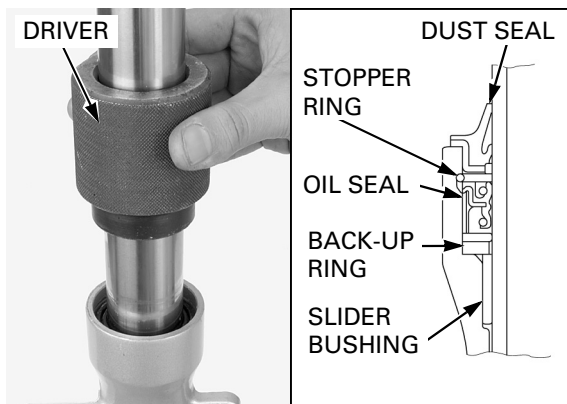
**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**



Drive the oil seal until the stopper ring groove is visible using a special tool.

**TOOL:**

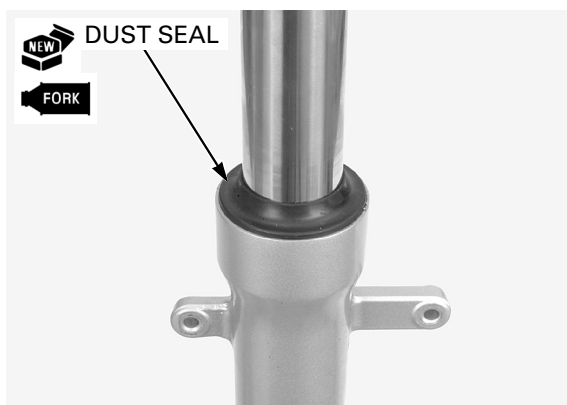
**Fork seal driver, 37.2 mm I.D. 07947-3710101**



Install the stopper ring into the fork slider groove securely.



Apply fork fluid to a new dust seal lip and install it onto the fork slider.

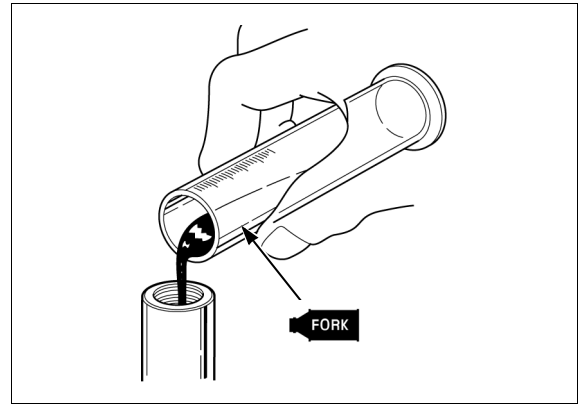


Pour the specified amount of recommended fork fluid into the fork tube.

**RECOMMENDED FORK FLUID:**  
**Honda Ultra Cushion Oil 10W or equivalent**

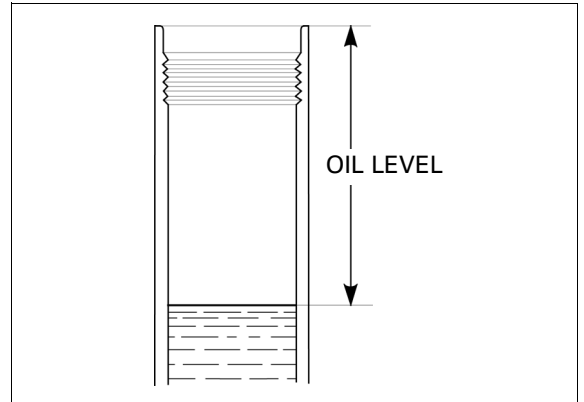
**FORK FLUID CAPACITY:**  
 **$300 \pm 2.5 \text{ cm}^3$  ( $10.1 \pm 0.08 \text{ US oz}$ ,  $10.6 \pm 0.09 \text{ Imp oz}$ )**

Pump the fork tube several times to remove trapped air from the lower portion of the fork tube.

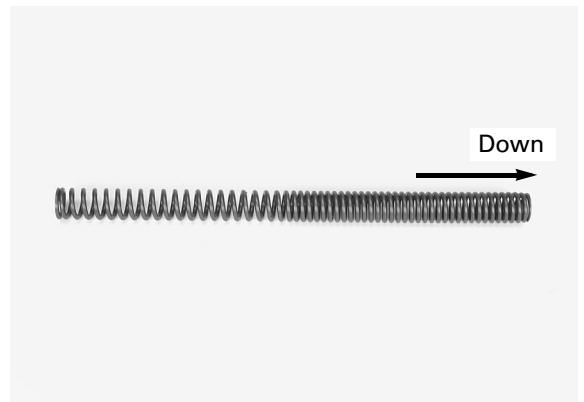


Compress the fork fully and measure the oil level from the top of the fork tube.

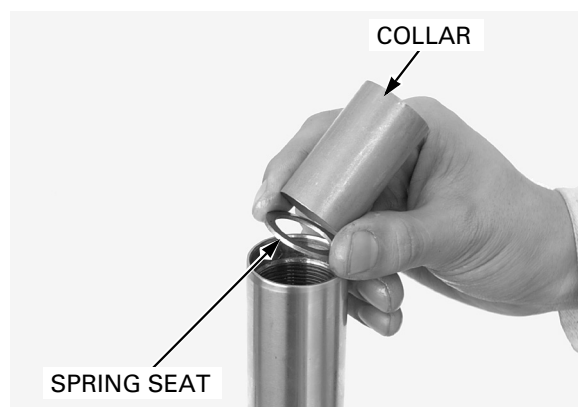
**FORK FLUID LEVEL: 140 mm (5.5 in)**



Blow out the oil completely off the fork spring using the compressed air.  
 Install the fork spring with its tightly wound coil facing down.



Install the spring seat and spring collar.



## FRONT WHEEL/SUSPENSION/STEERING

Coat a new O-ring with fork fluid and install it into the fork cap groove.

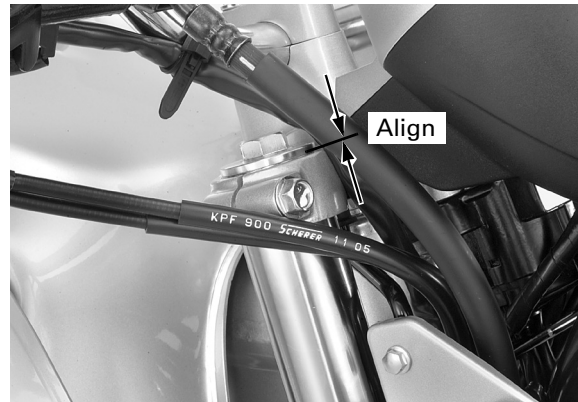
*Be careful not to cross-thread the fork cap. Tighten the fork cap after installing the fork tube into the fork bridge.*

Hold the fork cap securely and install it into the fork tube.



### INSTALLATION

Install the fork into the steering stem and top bridge. Align the top surface of the top bridge with the fork tube upper surface as shown.



Tighten the bottom bridge pinch bolt to the specified torque.

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



Tighten the fork cap to the specified torque if it was removed.

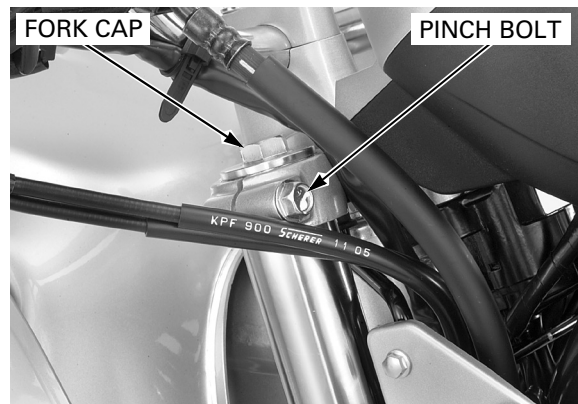
**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

Tighten the top bridge pinch bolt to the specified torque.

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

Install the following:

- Front fender (page 2-8)
- Front brake caliper (page 14-17)
- Front wheel (page 12-17)



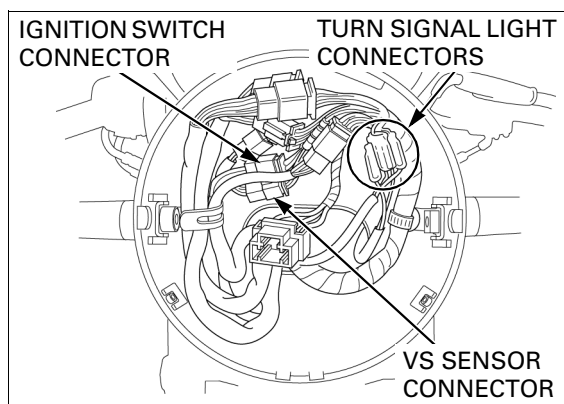
## STEERING STEM

### REMOVAL

Disconnect the ignition switch, turn signal light and VS sensor connectors.

Remove the following:

- Handlebar (page 12-6)
- Headlight case (page 18-8)
- Combination meter (page 18-12)

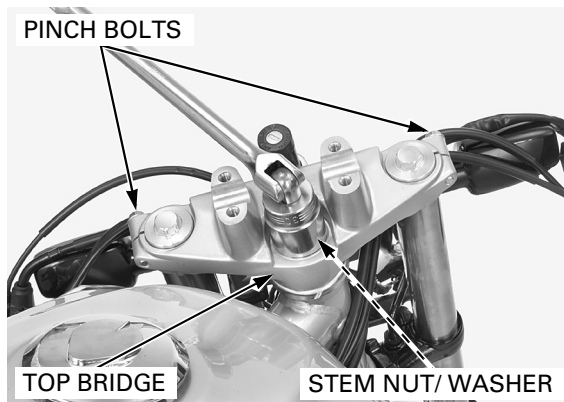


Remove the steering stem cap.

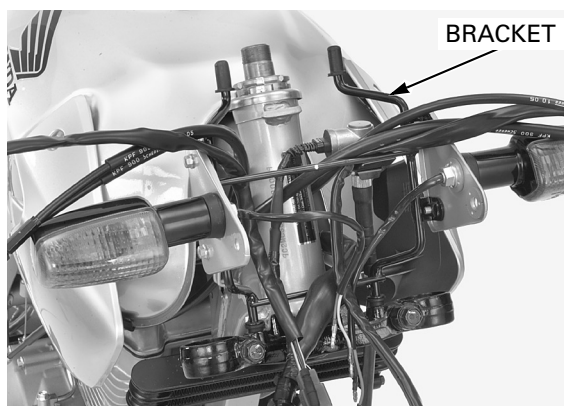


Remove the steering stem nut and washer. Loosen the top bridge pinch bolts and remove the top bridge.

Remove the fork legs (page 12-19).

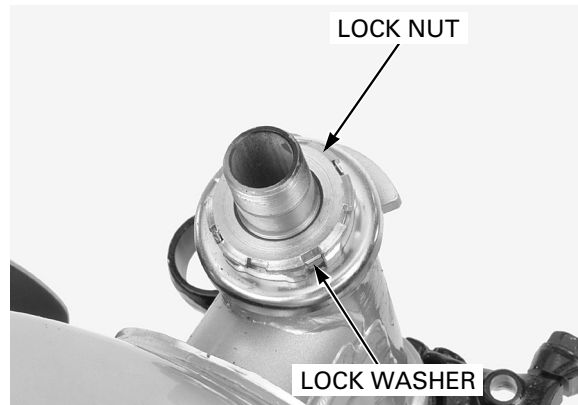


Remove the headlight case bracket assembly from the steering stem.



## FRONT WHEEL/SUSPENSION/STEERING

Straighten the tabs of the lock washer.  
Remove the lock nut and lock washer.



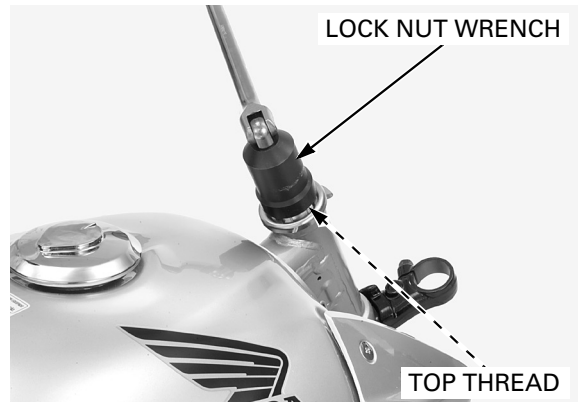
Loosen the steering top thread using the special tool.

**TOOL:**

**Lock nut wrench**

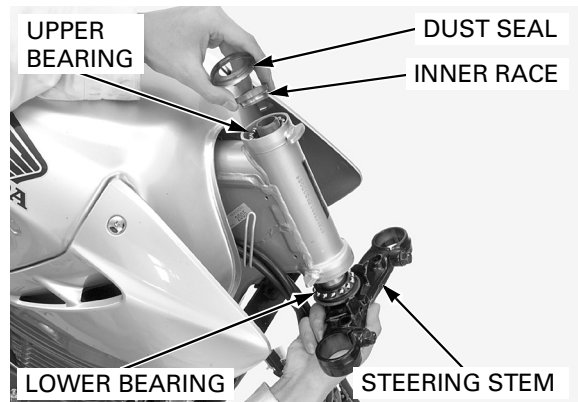
**07HMA-MR70100**

While holding the steering stem, remove the top thread.



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



## BEARING RACE REPLACEMENT

**NOTE:**

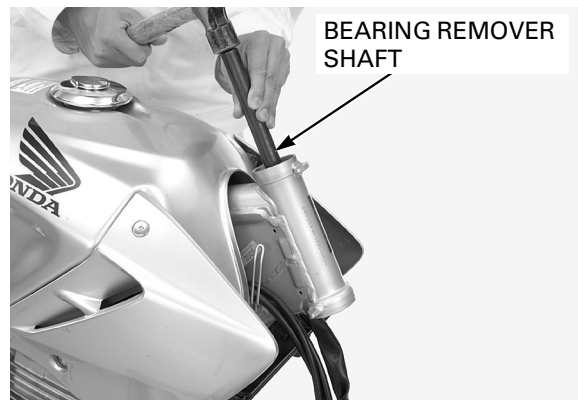
Always replace the steering bearings and races as a set.

Remove the lower outer race using the special tool.

**TOOL:**

**Bearing remover shaft**

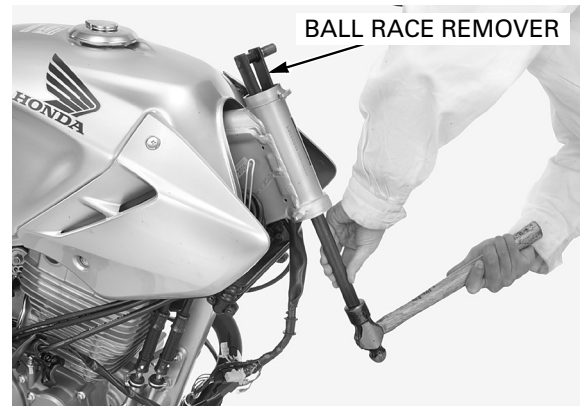
**07GGD-0010100**



Remove the upper outer race using the special tool.

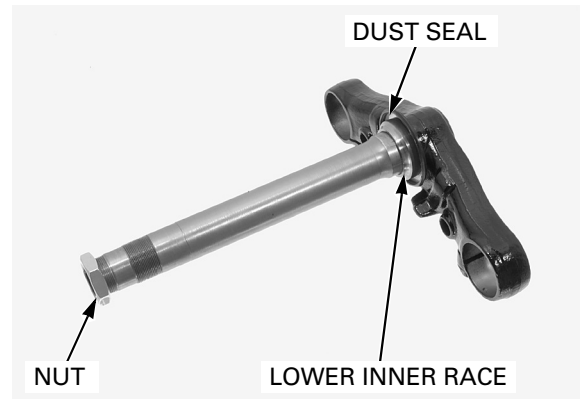
**TOOL:**

**Ball race remover, 34.5 mm**      **07948-4630100**



Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower inner race from the steering stem.

Remove the lower inner race with a chisel or equivalent tool, being careful not to damage the stem. Remove the dust seal.



**NOTE:**

Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

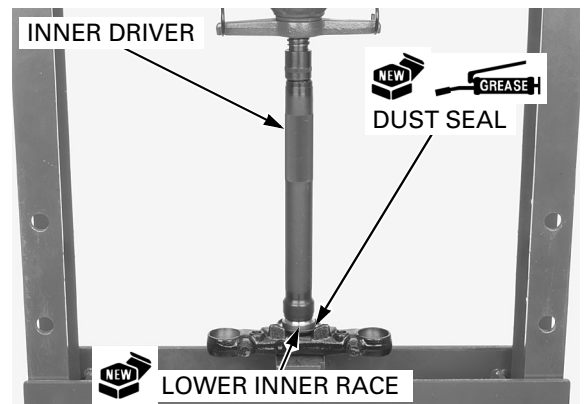
- Excelite EP2 (Kyodo yushi) or equivalent

Apply grease to new dust seal lips and install it over the steering stem.

Install a new lower steering bearing inner race using a special tool and a hydraulic press.

**TOOL:**

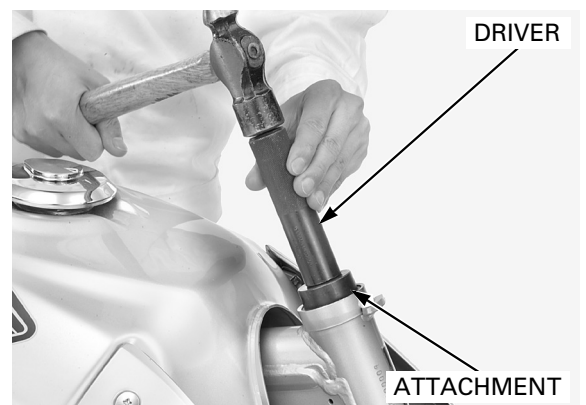
**Inner driver**      **07946-MB00000**



Drive in a new upper outer race into the head pipe using the special tools.

**TOOLS:**

**Driver**      **07749-0010000**  
**Attachment, 42 x 47 mm**      **07746-0010300**



## FRONT WHEEL/SUSPENSION/STEERING

Drive in a new lower outer race into the head pipe using the special tools.

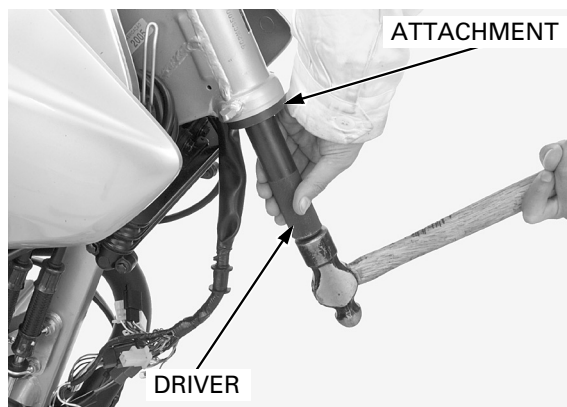
### TOOLS:

**Driver**

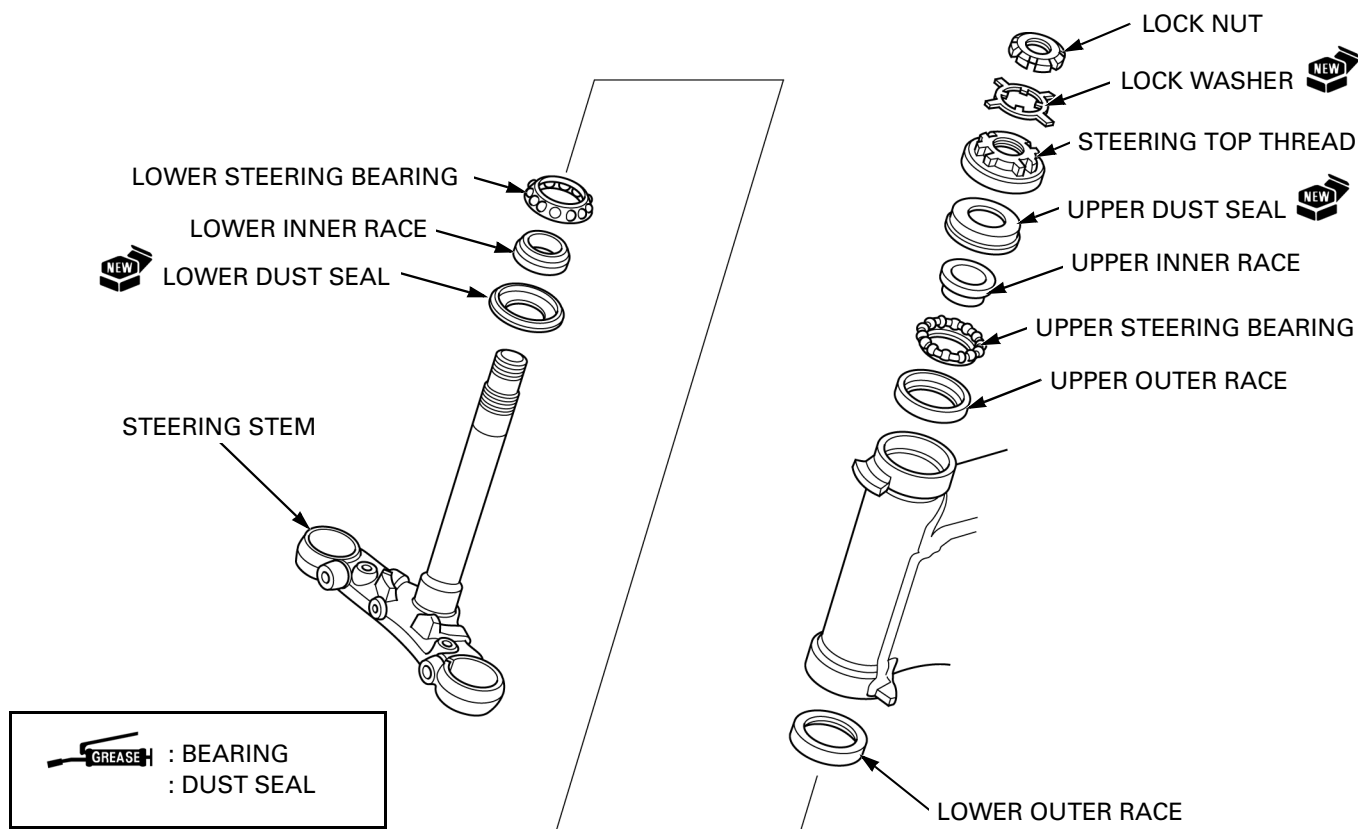
**07749-0010000**

**Attachment, 52 x 55 mm**

**07746-0010400**



## INSTALLATION



### NOTE:

Use water resistant grease (urea based multi-purpose grease NLGI #2) for the steering bearings and dust seals:

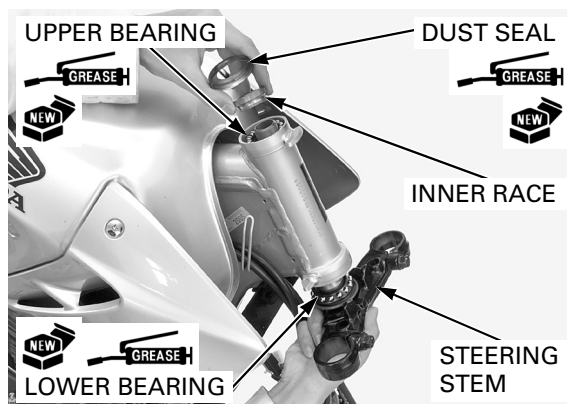
- Excelite EP2 (Kyodo yushi) or equivalent

Apply 3 – 5 g (0.1 – 0.2 oz) of grease to each new steering bearing and fill it up. Install the lower steering bearing onto the steering stem.

Apply grease to a new upper dust seal lip.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

- Upper steering bearing
- Upper inner race
- New upper dust seal



Apply engine oil to the threads of the steering top thread.

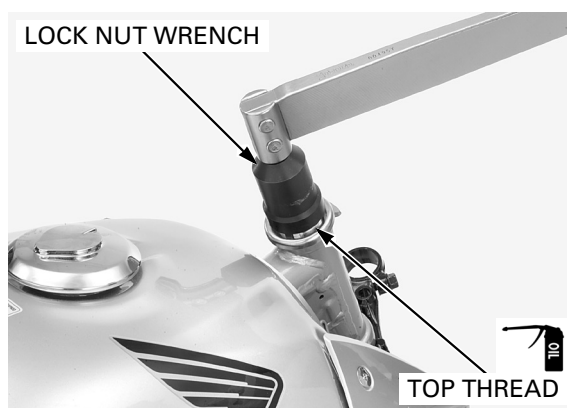
Install and tighten the steering top thread to the specified torque.

## TOOL:

Lock nut wrench

07HMA-MR70100

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



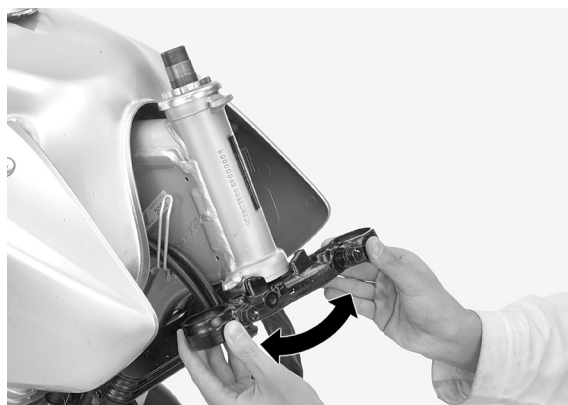
Move the steering stem right and left, lock-to-lock, five times to seat the bearings.

Make sure that the steering stem moves smoothly, without play or binding; then loosen the steering top thread until it can be turned by hand.

Retighten the steering top thread to the specified torque.

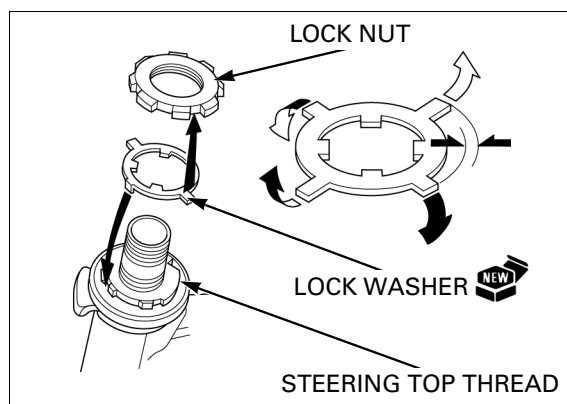
**TORQUE: 29 N·m (3.0 kgf·m, 21 lbf·ft)**

Recheck that the steering stem moves smoothly without play or binding.



Install a new lock washer onto the steering stem.

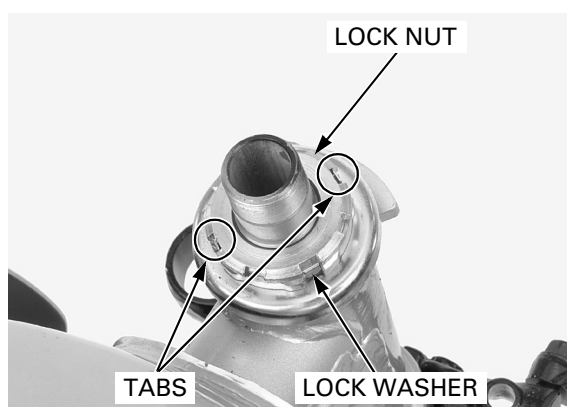
Align the tabs of the lock washer with the grooves in the steering top thread and bend two opposite tabs (short) down into the steering top thread.



Install and finger tighten the lock nut.

Hold the lock nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.

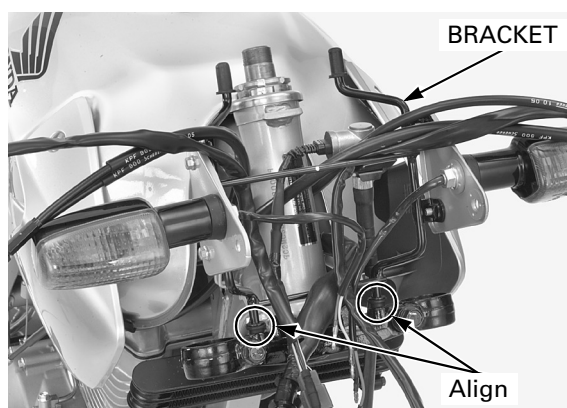




## FRONT WHEEL/SUSPENSION/STEERING

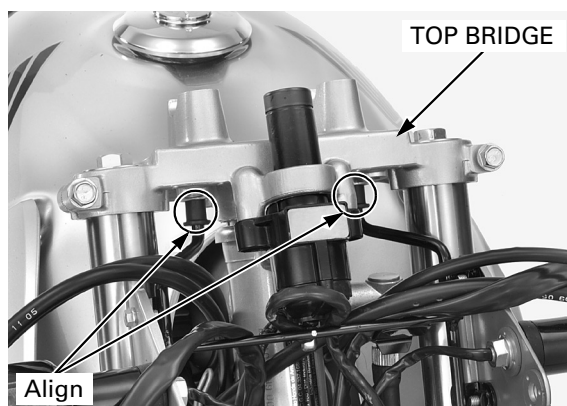
*Route the wires,  
cables properly  
(page 1-17).*

Install the headlight case bracket assembly with the rubber grommets to the holes on the steering stem.



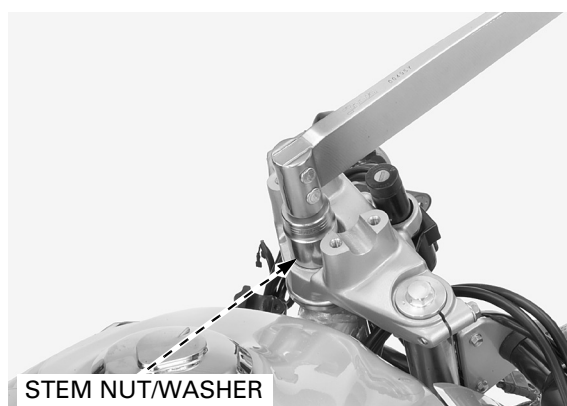
Install the top bridge aligning its holes with the grommets of the headlight case bracket.

Install the fork legs (page 12-28).



Install the washer and steering stem nut. Tighten the steering stem nut to the specified torque.

**TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)**



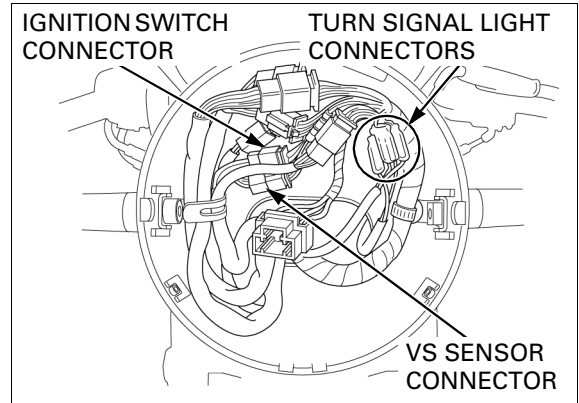
Install the steering stem nut cap.



Install the following:

- Combination meter (page 18-14)
- Headlight case (page 18-8)
- Handlebar (page 12-8)

Connect the ignition switch, turn signal light and VS sensor connectors.



### STEERING BEARING PRELOAD

Raise the front wheel off the ground.

Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

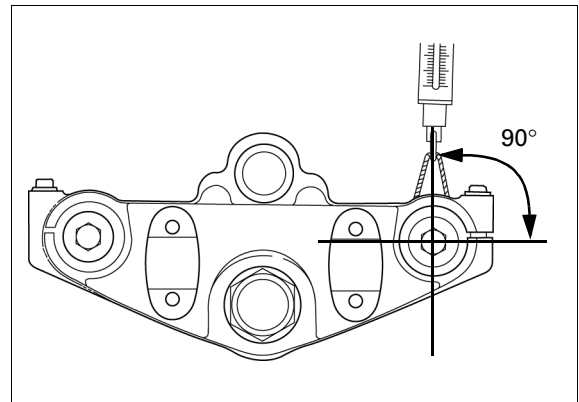
Make sure that there is no cable or wire harness interfere.

Pull the spring scale keeping the scale at a right angle to the steering stem.

#### STEERING BEARING PRELOAD:

**10.8 – 15.7 N (1.1 – 1.6 kgf)**

If the readings do not fall within the limits, readjust the steering top thread (page 12-33).



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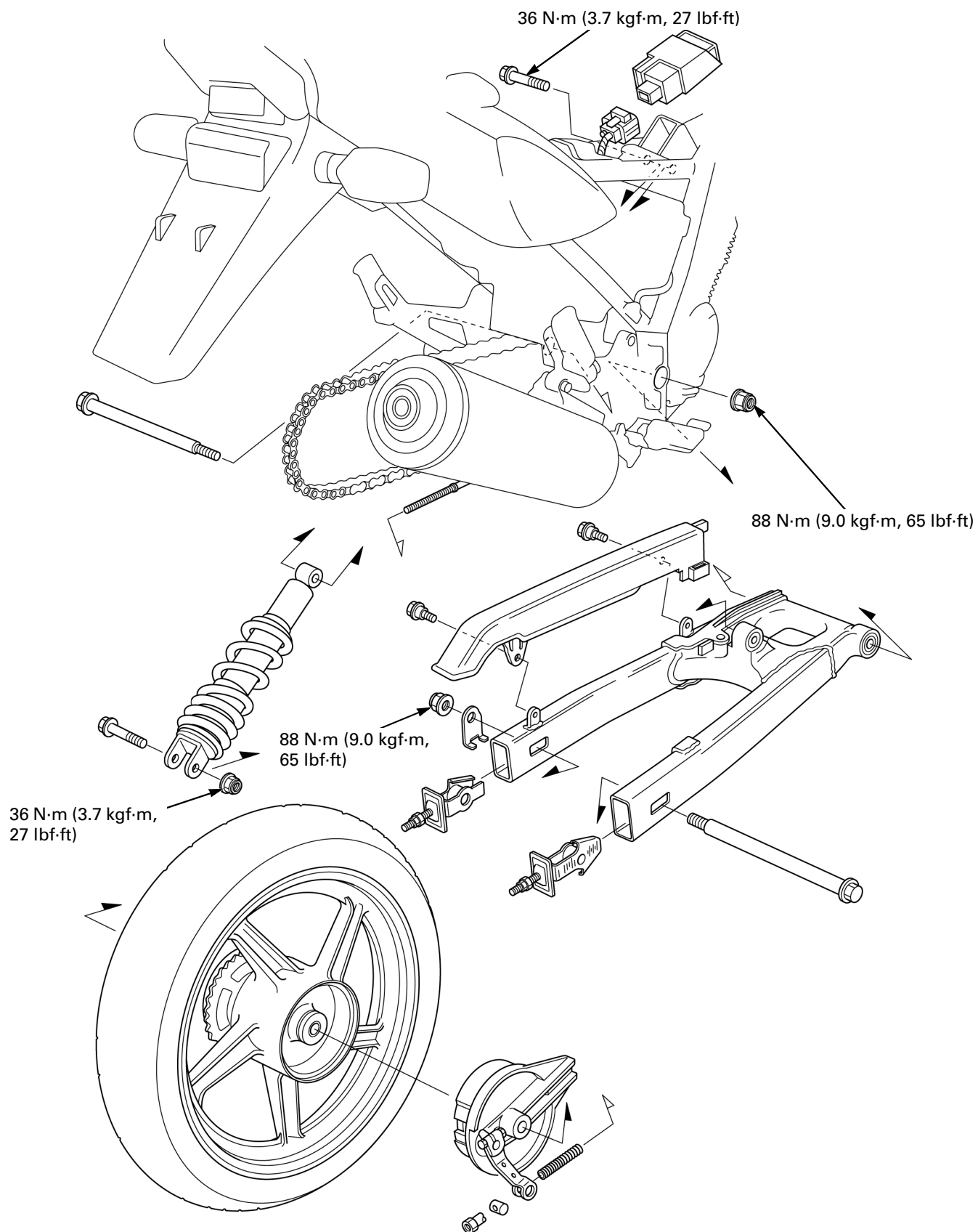
## MEMO

# 13. REAR WHEEL/BRAKE/SUSPENSION

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COMPONENT LOCATION .....	13-2	REAR BRAKE .....	13-13
SERVICE INFORMATION .....	13-3	SHOCK ABSORBER.....	13-16
TROUBLESHOOTING .....	13-5	SWINGARM .....	13-18
REAR WHEEL .....	13-6	BRAKE PEDAL .....	13-25

## COMPONENT LOCATION



# SERVICE INFORMATION

## GENERAL

### ⚠ CAUTION

Frequent inhalation of brake shoe 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.

- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tires marked "TUBELESS" and tubeless valve stems on rims marked "TUBELESS TIRE APPLICABLE".
- Use only genuine Honda replacement bolts and nuts for all suspension pivot mounting points.

## SPECIFICATIONS

Unit: mm (in)


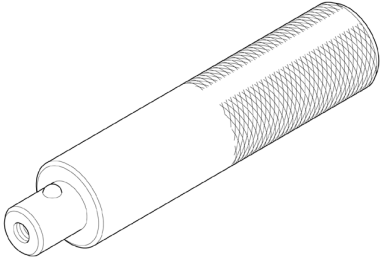

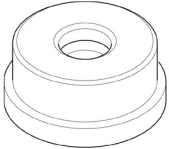



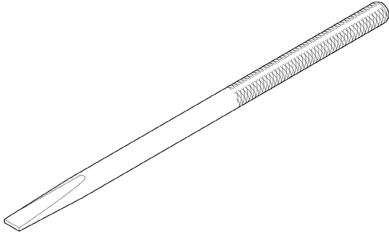
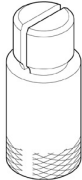
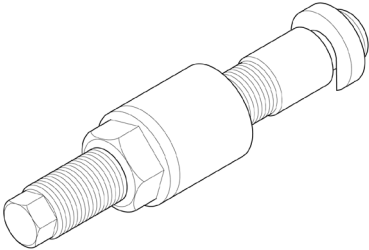
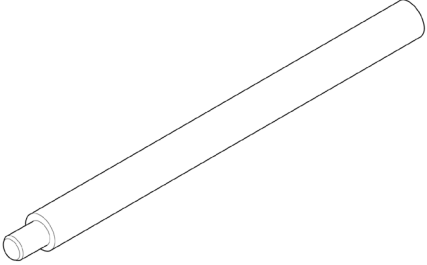

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		–	2.0 (0.08)
Cold tire pressure	Driver only	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
	Driver and passenger	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	–
Axle runout		–	0.20 (0.008)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Drive chain	Size/link	DID520/106	–
	Slack	15 – 20 (0.6 – 0.8)	–
Brake	Brake pedal height	23.5 (0.93) below the top of the footpeg	–
	Brake pedal free play	20 – 30 (13/16 – 1-3/16)	–
	Brake drum I.D.	130.0 – 130.2 (5.12 – 5.13)	131.0 (5.16)
	Lining thickness	–	To the indicator

## TORQUE VALUES

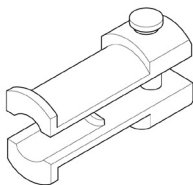
Rear axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Driven sprocket bolt	28 N·m (2.9 kgf·m, 21 lbf·ft)	Apply a locking agent to the threads
Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Shock absorber upper mounting bolt	36 N·m (3.7 kgf·m, 27 lbf·ft)	
Shock absorber lower mounting nut	36 N·m (3.7 kgf·m, 27 lbf·ft)	U-nut
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive chain slider screw	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	ALOC screw: replace with a new one
Brake arm nut	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)	U-nut
Drive chain adjuster lock nut	21 N·m (2.1 kgf·m, 15 lbf·ft)	

## REAR WHEEL/BRAKE/SUSPENSION

### TOOLS

<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Driver 07749-0010000</p> 	<p>Attachment, 37 x 40 mm 07746-0010200</p> 
<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 28 x 30 mm 07946-1870100</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Pilot, 22 mm 07746-0041000</p> 	<p>Bearing remover shaft 07746-0050100</p> 	<p>Bearing remover head, 17 mm 07746-0050500</p> 
<p>Needle bearing remover 07LMC-KV30100</p> 	<p>Driver shaft 07946-MJ00100</p> 	<p>Pilot, 15 mm 07746-0040300</p> 

Remover attachment, 22 mm  
07GMD-KT70200



## **TROUBLESHOOTING**

### **Suspension noise**

- Faulty shock absorber
- Loose suspension fasteners

### **Hard suspension**

- Bent swingarm pivot
- Damaged swingarm pivot bearings
- Bent damper rod
- High tire pressure

### **Soft suspension**

- Weak shock absorber springs
- Oil leakage from damper unit
- Low tire pressure

### **Steers to one side or does not track straight**

- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

### **Rear wheel wobbling**

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty tire
- Low tire pressure
- Faulty swingarm pivot bearings
- Axle nut not tightened properly

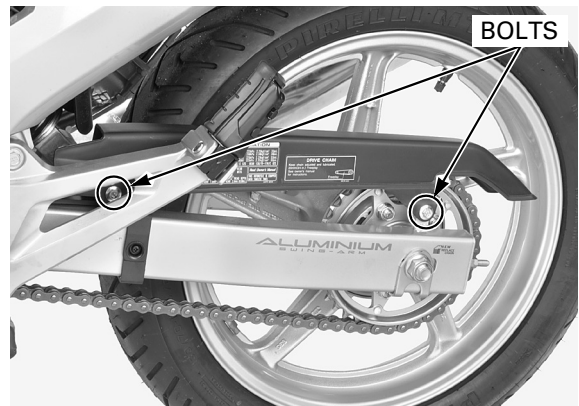


## REAR WHEEL/BRAKE/SUSPENSION

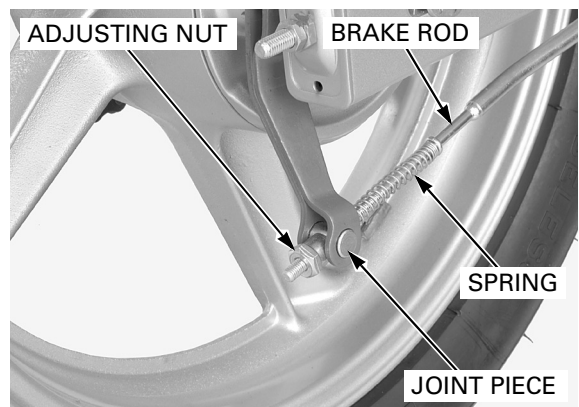
### REAR WHEEL

#### REMOVAL

Remove the bolts and drive chain case from the swingarm.



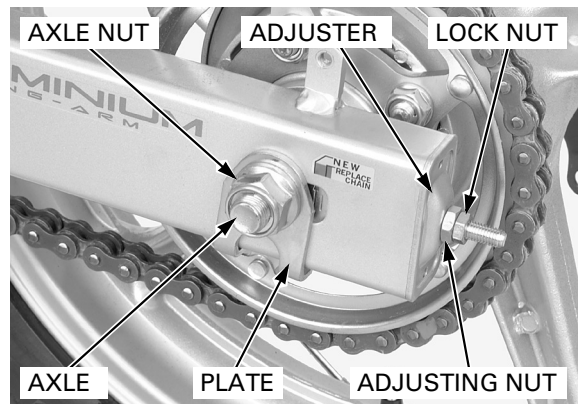
Remove the rear brake adjusting nut.  
Push the brake pedal down and remove the brake rod from the joint piece.  
Remove the spring and joint piece.



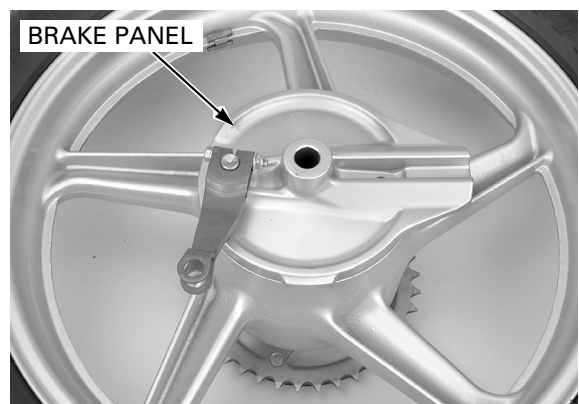
Loosen the rear axle nut.  
Support the motorcycle securely using a hoist or equivalent, raise the rear wheel off the ground.  
Remove the rear axle nut and axle plate.

Loosen the drive chain adjusting nut/lock nut all the way.  
Push the rear wheel forward and derail the drive chain from the driven sprocket.  
Remove the axle from the right side and remove the rear wheel.

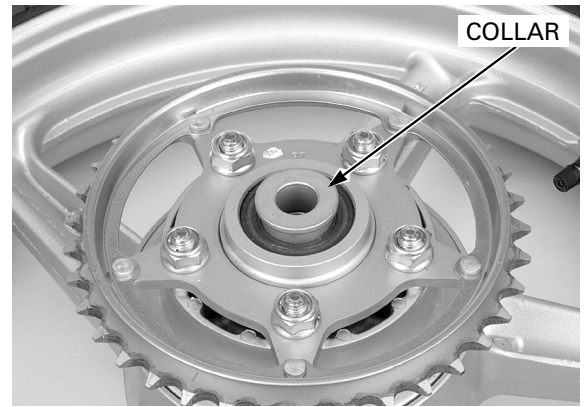
Remove the drive chain adjusters.



Remove the brake panel assembly from the right wheel hub.



Remove the side collar from the driven flange.

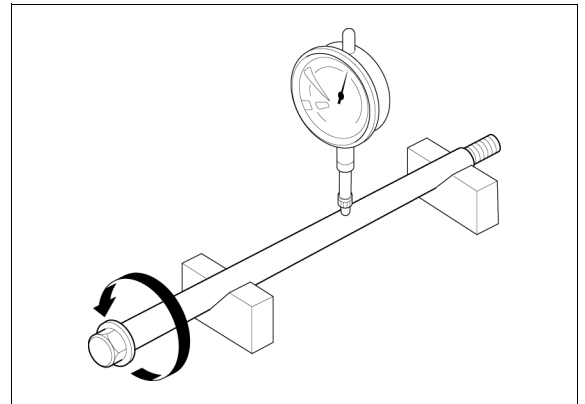


## INSPECTION

### AXLE

Set the axle in V-blocks. Turn the axle and measure the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

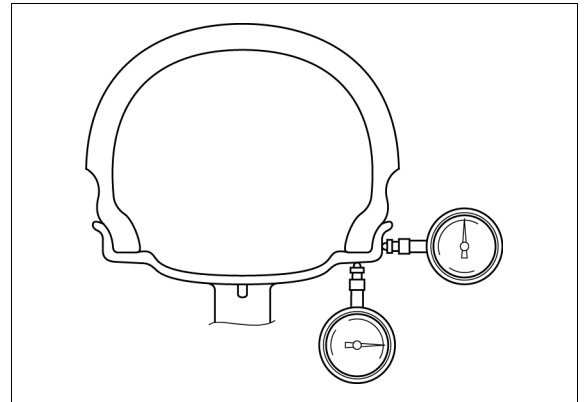
**SERVICE LIMIT: 0.20 mm (0.008 in)**



### WHEEL

Check the wheel rim runout by placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: Radial: 2.0 mm (0.08 in)**  
**Axial: 2.0 mm (0.08 in)**

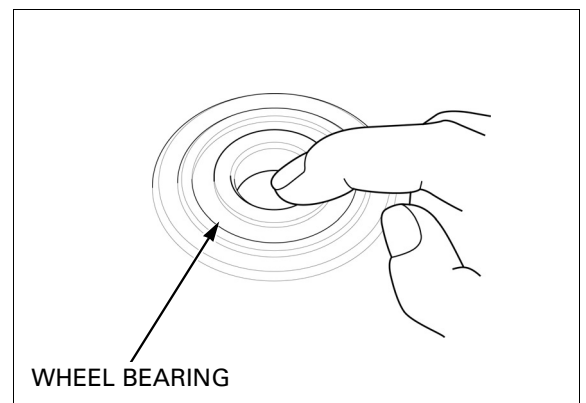


### WHEEL BEARING

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

Remove and discard the bearings if they do not turn smoothly, quietly or if they fit loosely in the hub or driven flange.

*Replace the bearings in pairs.* Replace the bearings if necessary (page 13-8).



## REAR WHEEL/BRAKE/SUSPENSION

### DRIVEN SPROCKET

Check the condition of the driven sprocket teeth.  
Replace the sprocket if worn or damaged.

#### NOTE:

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

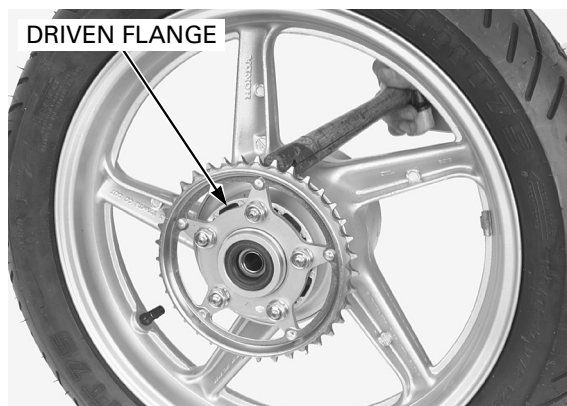
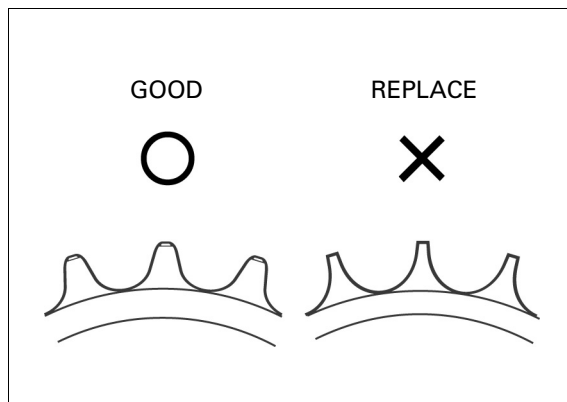
### WHEEL BALANCE

Refer to the wheel balance servicing (page 12-15).

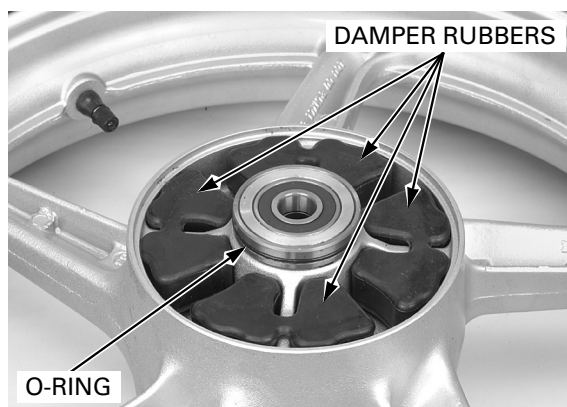
### DISASSEMBLY

*If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.*

Remove the driven flange from the left wheel hub.



Remove the damper rubbers and O-ring.



### WHEEL BEARING REMOVAL

Install the bearing remover head into the wheel bearing.

From the opposite side install the bearing remover shaft and drive the wheel bearing out of the wheel hub.

Drive out the other bearing and remove the distance collar.

#### TOOLS:

Bearing remover head, 17 mm 07746-0050500

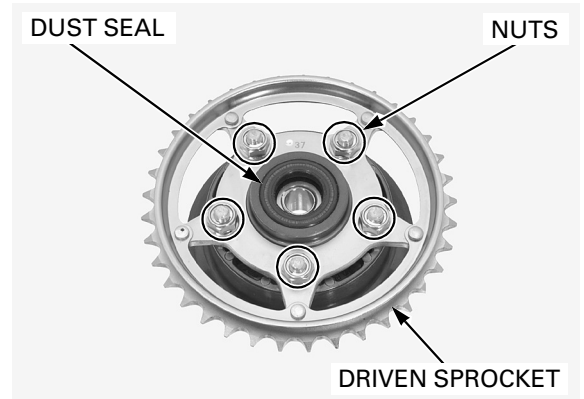
Bearing remover shaft 07746-0050100



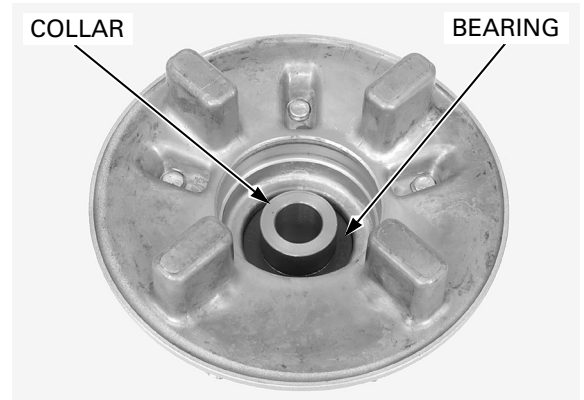
## DRIVEN FLANGE BEARING REMOVAL

Remove the dust seal.

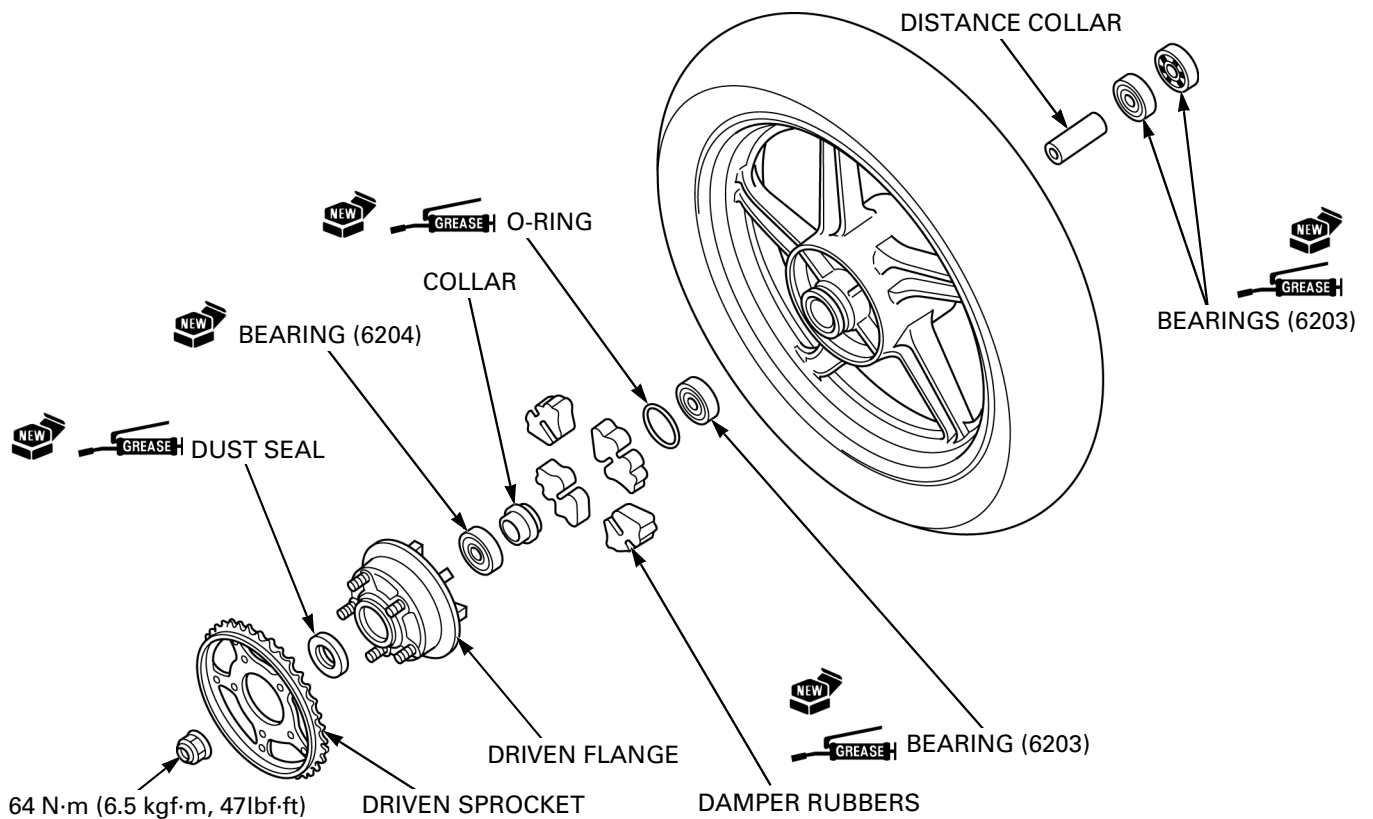
Remove the driven sprocket nuts and driven sprocket.



Drive out the driven flange collar and bearing.



## ASSEMBLY



## REAR WHEEL/BRAKE/SUSPENSION

### WHEEL BEARING INSTALLATION

Pack all bearing cavities with grease.

*Never install an old bearing has been removed, the bearing must be replaced with a new one.*

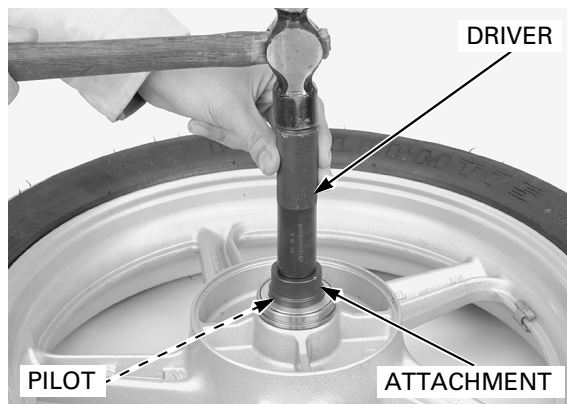
Drive new right wheel bearings using the special tools.

- Drive the inside right wheel bearing with the sealed side facing down.
- Drive the outside right wheel bearing with the sealed side facing up.

#### TOOLS:

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 37 x 40 mm</b>	<b>07746-0010200</b>
<b>Pilot, 17 mm</b>	<b>07746-0040400</b>

Install the distance collar, then drive in a new left wheel bearing with the sealed side facing up until it is fully seated using the same tools.



### DRIVEN FLANGE BEARING INSTALLATION

Install the driven flange bearing into a new driven flange bearing using the special tools.

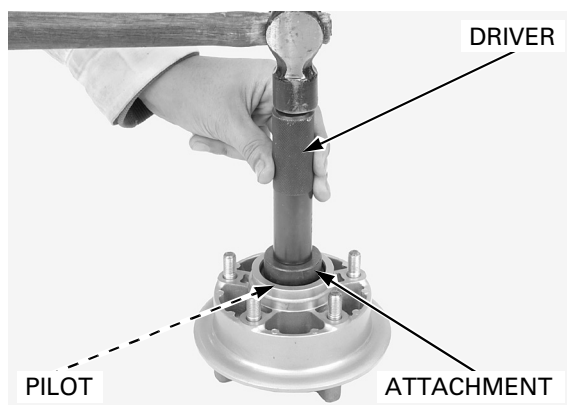
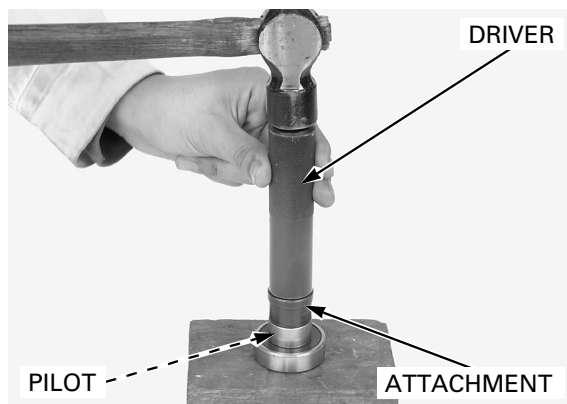
#### TOOLS:

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

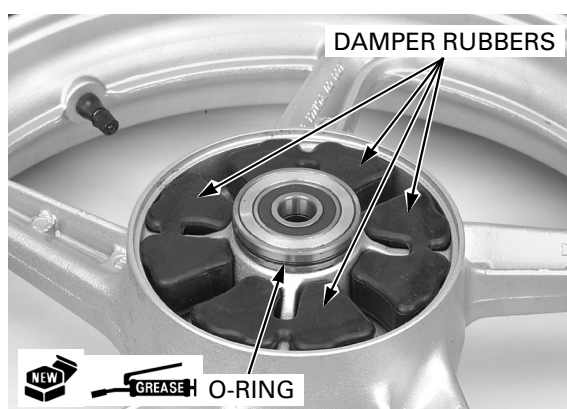
Drive the driven flange bearing/collar into the driven flange using the special tools.

#### TOOLS:

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 42 x 47 mm</b>	<b>07746-0010300</b>
<b>Pilot, 17 mm</b>	<b>07746-0040400</b>



Apply grease to a new O-ring and install it to the groove of the left wheel hub.  
Install the damper rubbers into the left wheel hub.

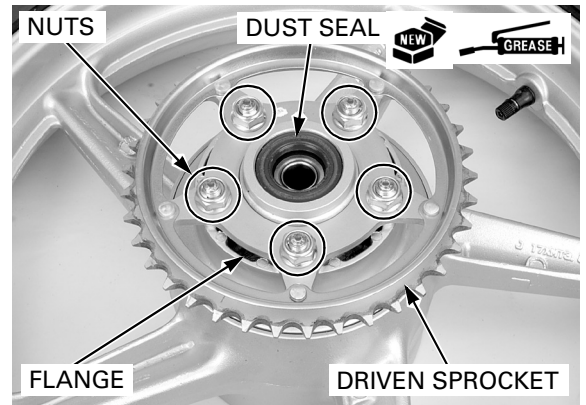


Install the driven flange assembly into the left wheel hub.

If the driven sprocket was removed, install the driven sprocket and tighten the nuts to the specified torque.

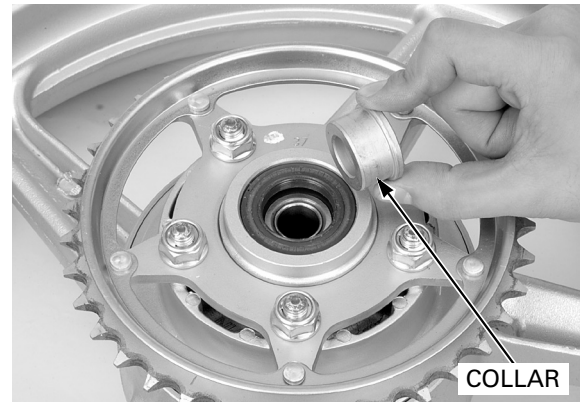
**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**

Apply grease to a new dust seal lips, then install it into the driven flange.



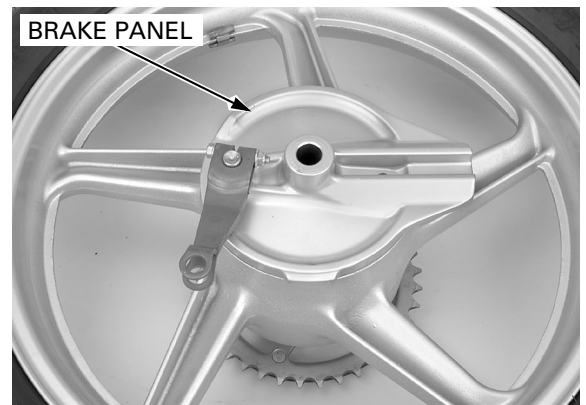
### INSTALLATION

Install the left side collar.

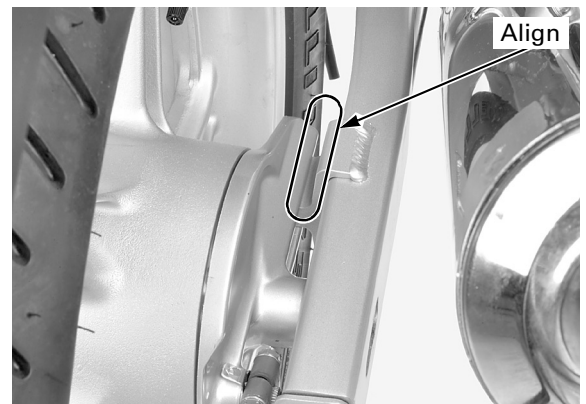


*Do not get grease on the brake drum and shoe linings.*

Install the brake panel assembly into the right wheel hub.



Place the rear wheel into the swingarm while aligning the brake panel groove with the swingarm boss.



## REAR WHEEL/BRAKE/SUSPENSION

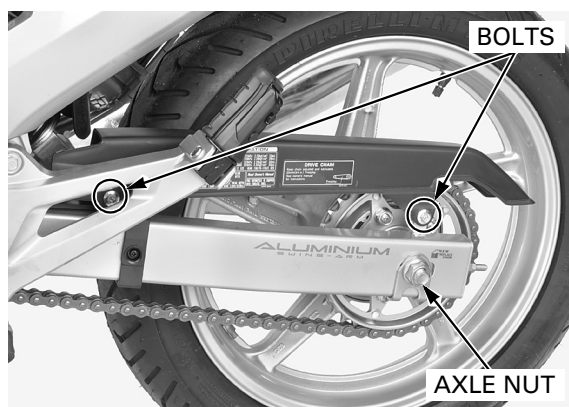
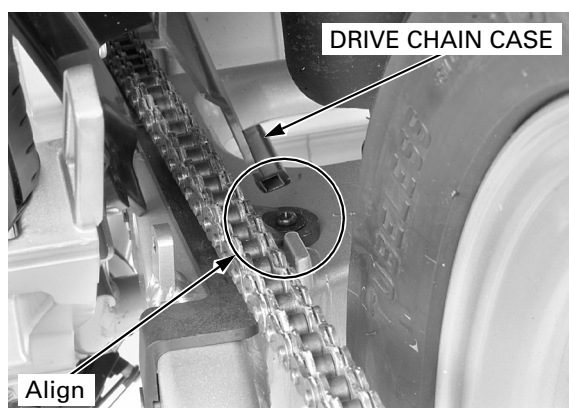
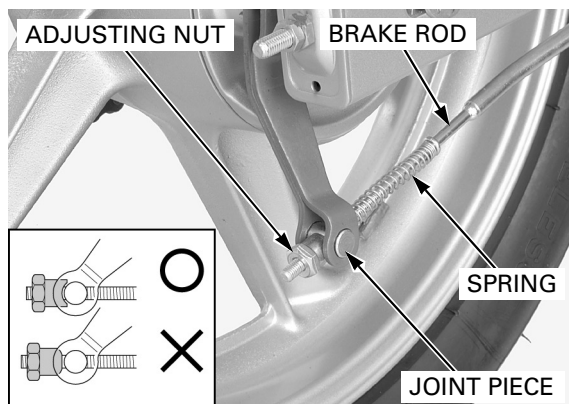
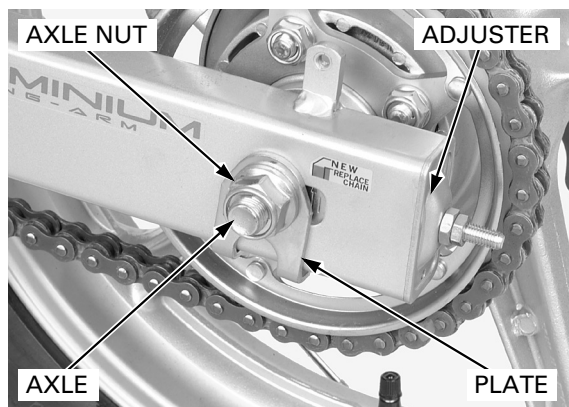
Install the drive chain adjusters.  
Insert the axle from the right side through the right chain adjuster, rear wheel, left side collar and left chain adjuster.  
Install the drive chain onto the driven sprocket.  
Install the axle plate and axle nut.

*Make sure the cut-out on the adjusting nut is seated on the joint piece.*

Install the joint piece to the brake arm.  
Install the spring onto the brake rod.  
Push down the brake pedal, and insert the brake rod into the joint piece.  
Install the adjusting nut.

Install the drive chain case while aligning the hole with the boss of the swingarm.

Install and tighten the chain case bolts securely.  
Adjust the drive chain slack (page 3-17).  
Adjust the rear brake pedal free play (page 3-23).



## REAR BRAKE

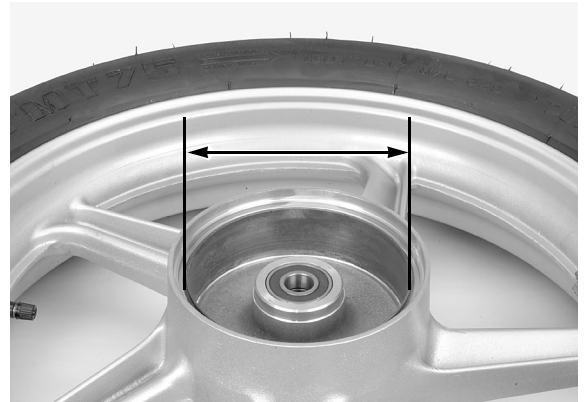
### REMOVAL

Remove the brake panel from the rear wheel (page 13-6).

### INSPECTION

Measure the brake drum I.D.

**SERVICE LIMIT: 131.0 mm (5.16 in)**

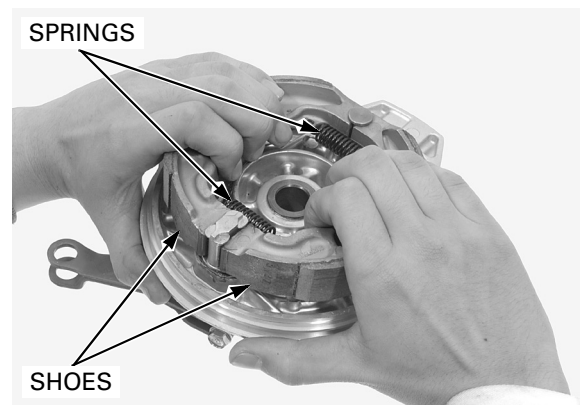


### DISASSEMBLY

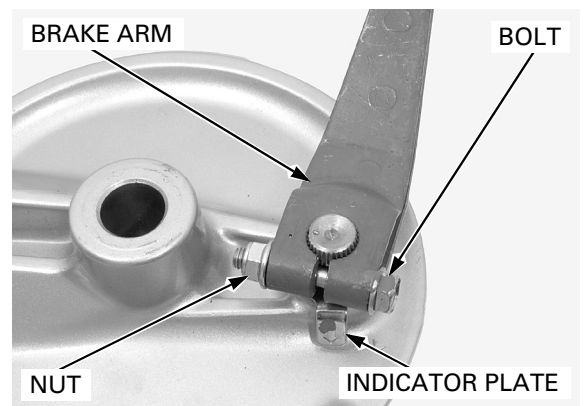
NOTE:

- Always replace brake shoes in pairs.
- If the brake shoes are to be reused, mark them so that they can be reassembled in their original positions.

Remove the brake shoes and springs.



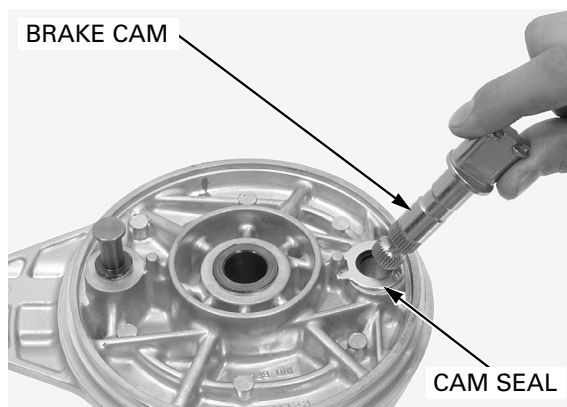
Remove the brake arm nut, bolt and brake arm.  
Remove the indicator plate.



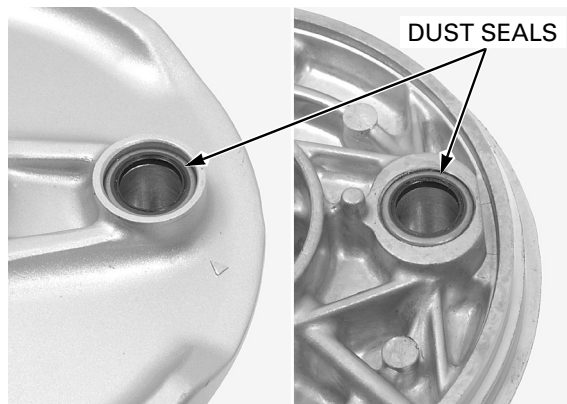


## REAR WHEEL/BRAKE/SUSPENSION

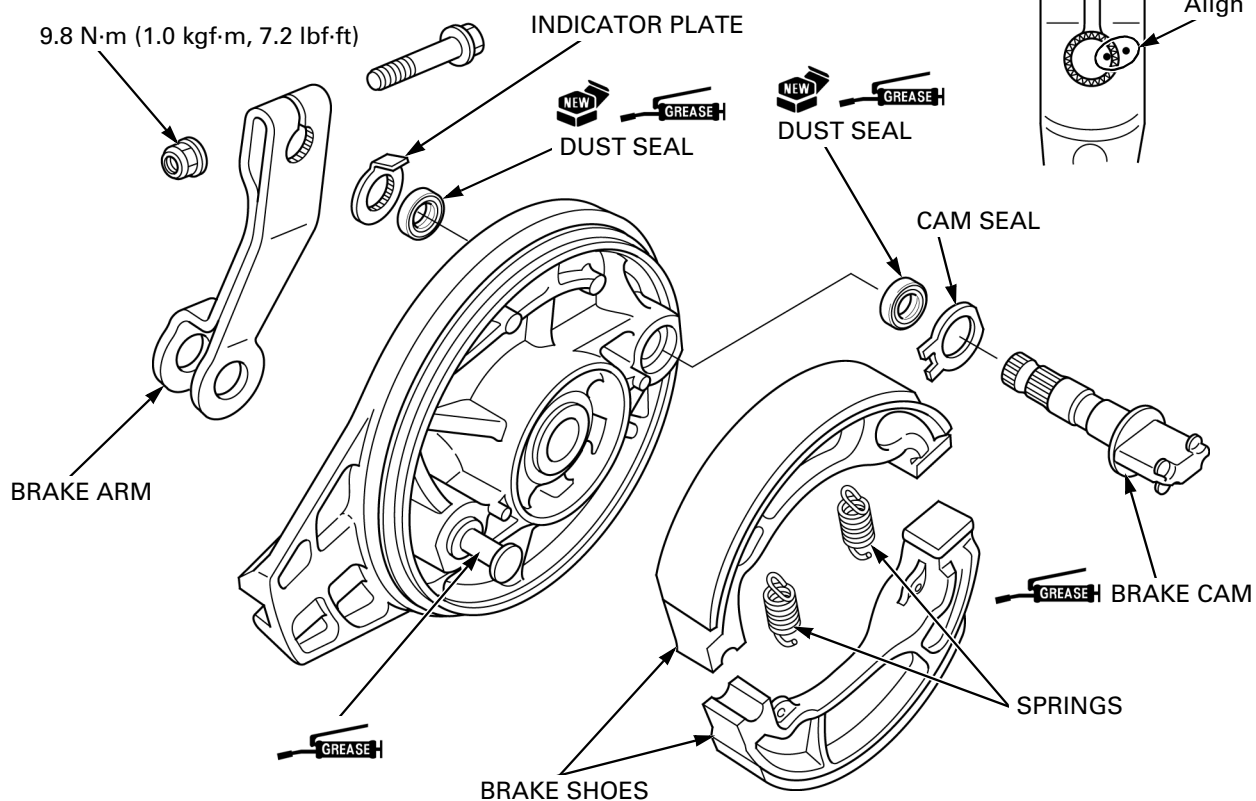
Remove the brake cam and cam seal.



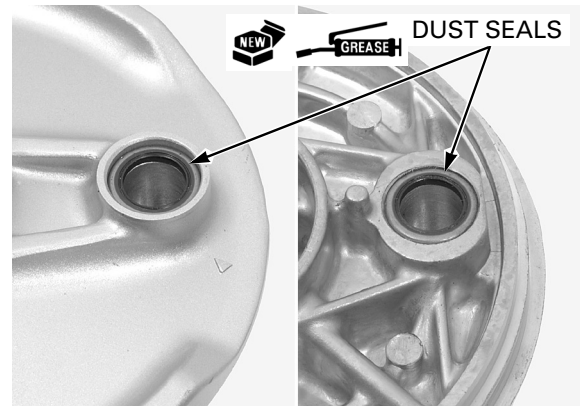
Remove the dust seals from the brake panel.



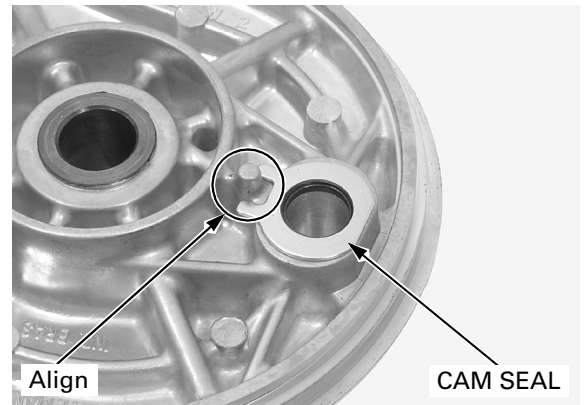
### ASSEMBLY



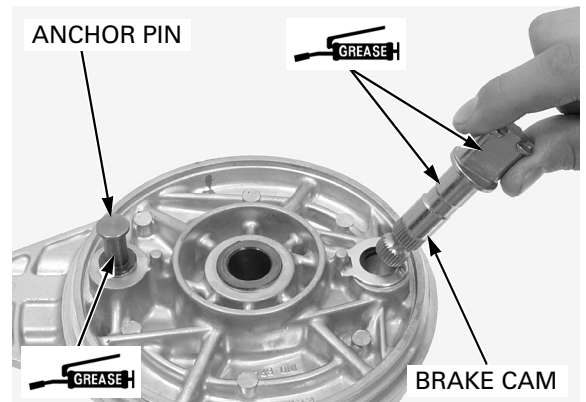
Apply grease to new dust seal lips.  
Install new dust seals into the brake panel.



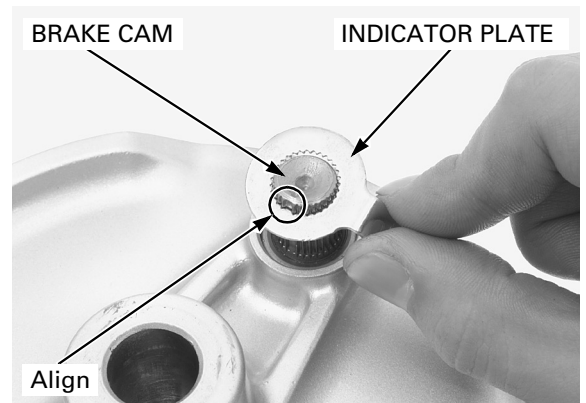
Install the cam seal while aligning the cut-out with the boss of the brake panel.



Apply grease to the brake cam and anchor pin sliding surface.  
Install the brake cam into the brake panel.



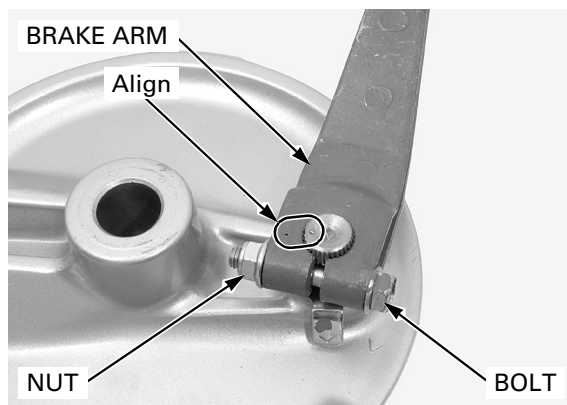
Install the indicator plate on the brake cam while aligning its wide tooth with its wide groove in the brake cam.



## REAR WHEEL/BRAKE/SUSPENSION

Install the brake arm while aligning the punch marks of the brake arm and brake cam.  
Install the brake arm bolt and tighten the nut to the specified torque.

**TORQUE: 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)**



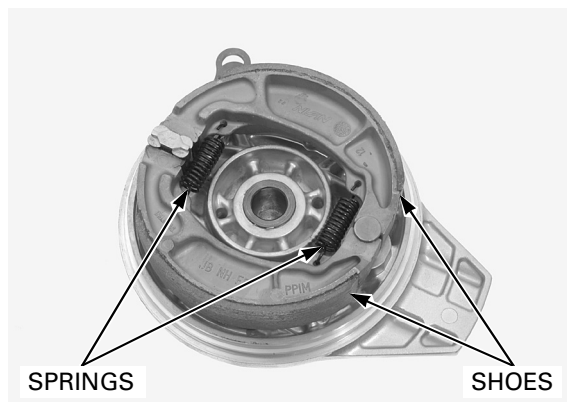
Install the brake shoes and springs.

### NOTE:

If the brake shoes are reused, be sure to reassemble them in their original positions.

### INSTALLATION

Install the brake panel and rear wheel (page 13-11).



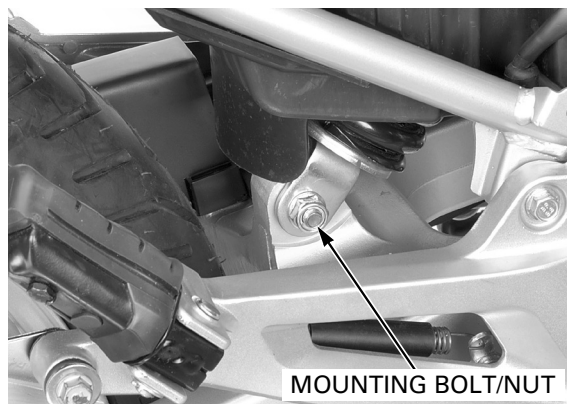
## SHOCK ABSORBER

### REMOVAL

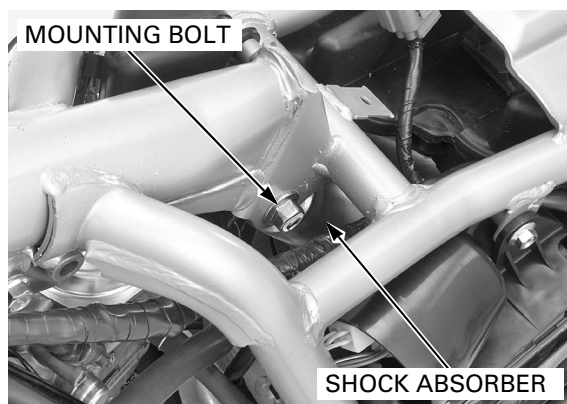
Remove the following:

- Fuel tank (page 2-7)
- ICM (page 16-8)

Support the motorcycle securely using a safety stand or hoist, raise the rear wheel off the ground.  
Remove the shock absorber lower mounting bolt and nut.



Remove the shock absorber upper mounting bolt and shock absorber.



## INSPECTION

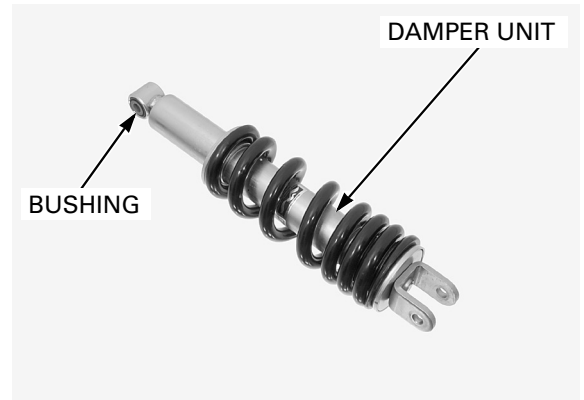
*Do not disassemble the shock absorber. Replace the shock absorber as an assembly.*

Visually inspect the shock absorber for damage.

Check the following:

- Damper unit for deformation or oil leaks
- Damper bushing for wear or damage

Inspect all the other parts for wear or damage.



## SHOCK ABSORBER DISPOSAL

Center punch the damper case to mark the drilling point.

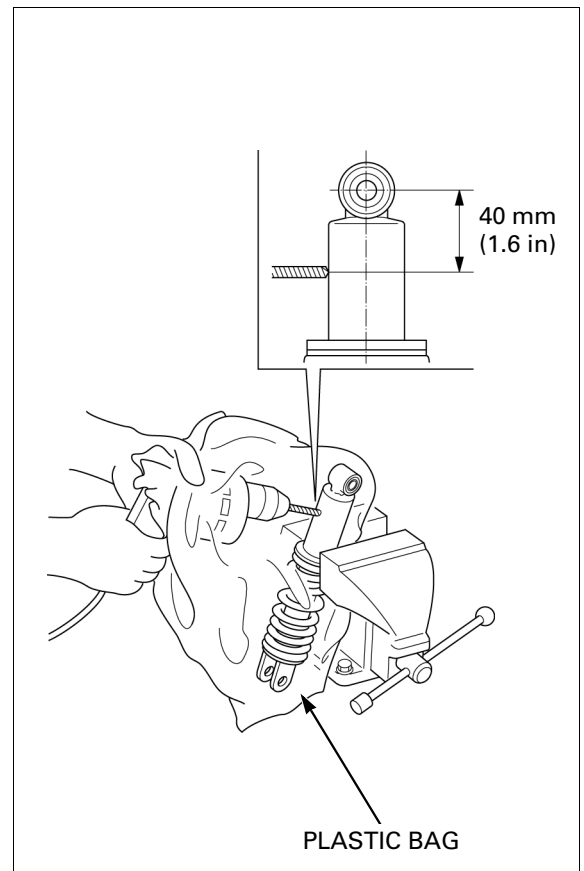
**DRILLING POINT: 40 mm (1.6 in) from upper bushing**

Wrap the shock absorber inside a plastic bag.

Support the shock absorber upright in a vise as shown.

Through the open end of the plastic bag, insert a drill motor with a sharp 2 – 3 mm (1/16 – 1/8 in) drill bit.

Hold the bag around the drill motor and briefly run the drill motor inside the plastic bag; this will inflate the plastic bag with air from the motor and help keep the plastic bag from the getting caught in the bit when you start.



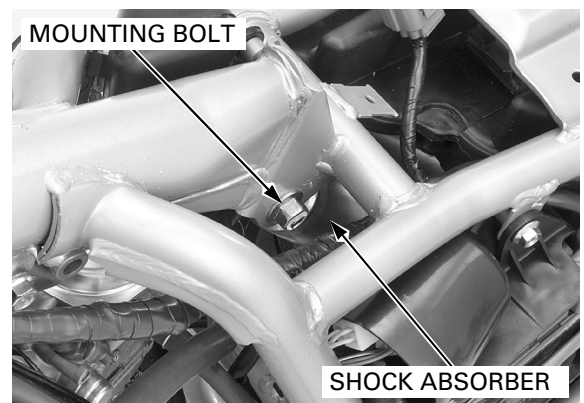
## INSTALLATION

Install the shock absorber to the frame.

Install the shock absorber upper and lower mounting bolts/nut.

Tighten the shock absorber upper mounting bolt to the specified torque.

**TORQUE: 36 N·m (3.7 kgf·m, 27 lbf·ft)**



## REAR WHEEL/BRAKE/SUSPENSION

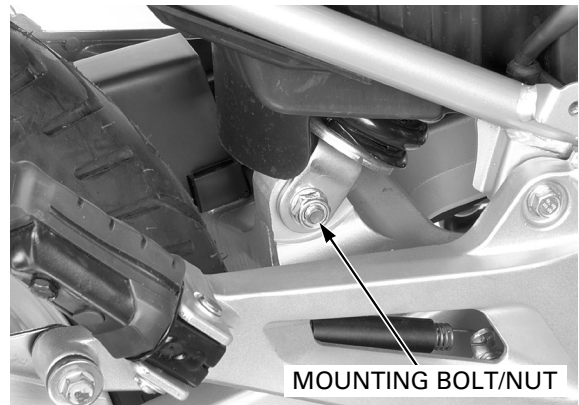
Tighten the shock absorber lower mounting nut to the specified torque.

**TORQUE: 36 N·m (3.7 kgf·m, 27 lbf·ft)**

Check the operation of the shock absorber (page 3-26).

Install the following:

- ICM (page 16-8)
- Fuel tank (page 2-7)

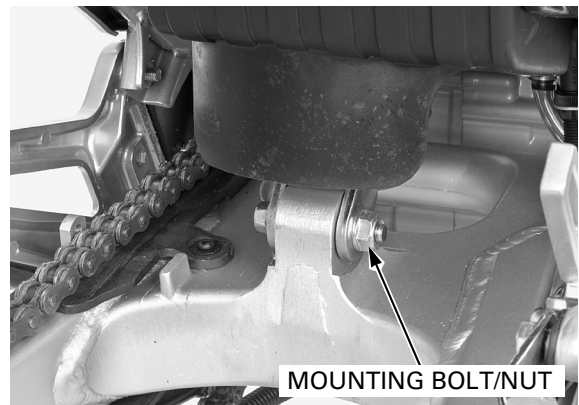


## SWINGARM

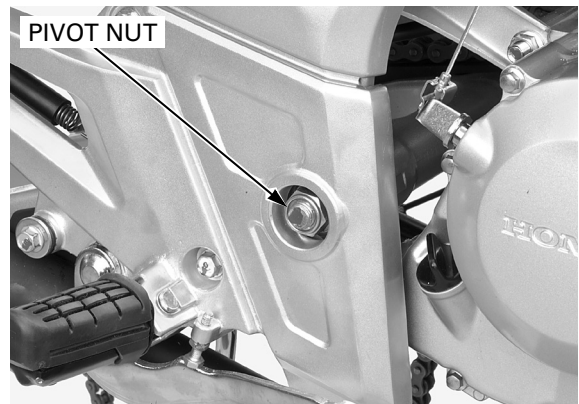
### REMOVAL

Remove the rear wheel (page 13-6).

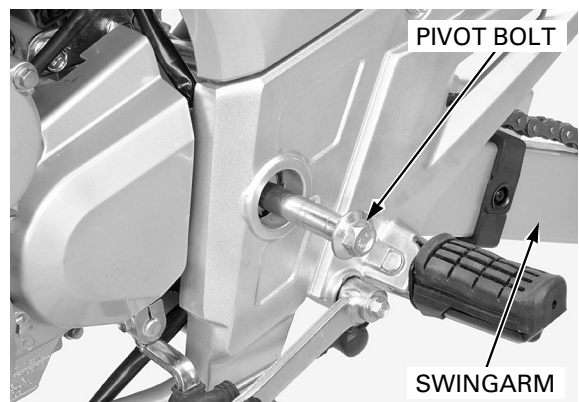
Remove the shock absorber lower mounting bolt and nut.



Remove the swingarm pivot nut.

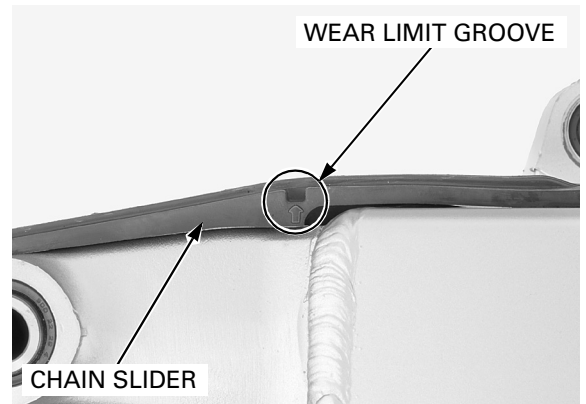


Remove the swingarm pivot bolt and swingarm.

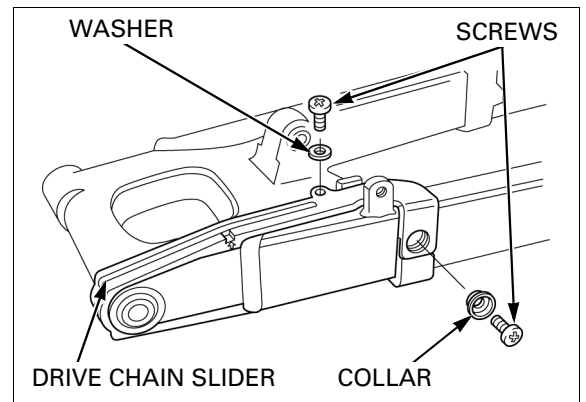


### DISASSEMBLY/INSPECTION

Check the drive chain slider for wear or damage. Replace the drive chain slider if the wear limit groove is worn out.

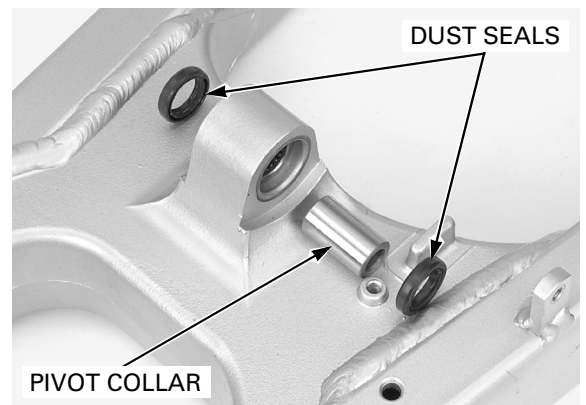


Remove the screws, washer, collar and drive chain slider.

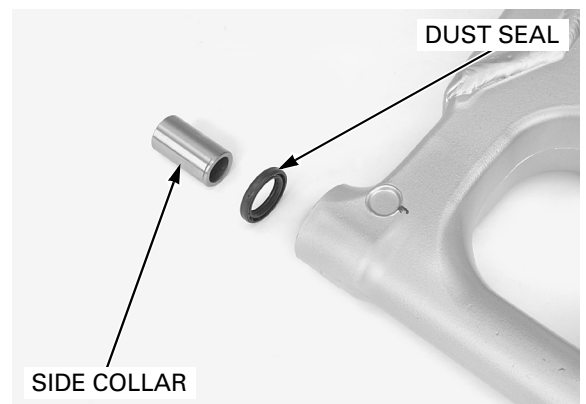


Remove the dust seals and pivot collar from the shock absorber pivot.

Check the needle bearing for damage, replace it if necessary.



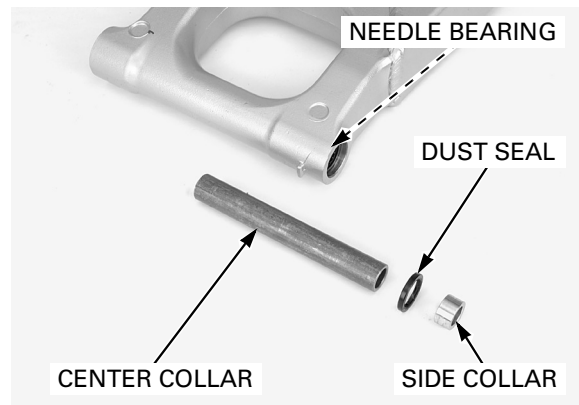
Remove the side collar and dust seal from the right side swingarm pivot.



## REAR WHEEL/BRAKE/SUSPENSION

Remove the side collar, dust seal, and center collar from the left side swingarm pivot.

Check the needle bearing for damage, replace it if necessary.

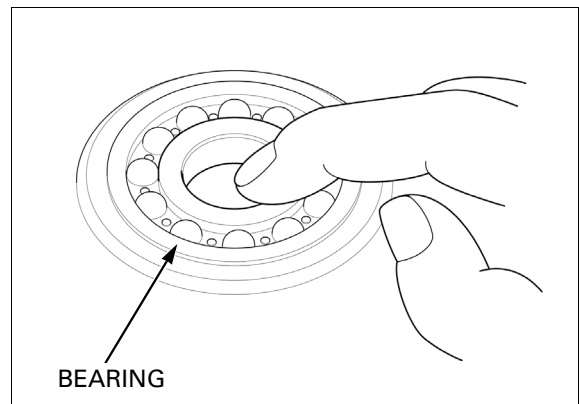


### SWINGARM PIVOT RADIAL BALL BEARING

Turn the inner race of the radial ball bearing with your finger.

The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the pivot.

Remove and discard the bearing if they do not turn smoothly, quietly or if they fit loosely in the pivot.



### PIVOT BEARING REPLACEMENT

Remove the snap ring from the right side swingarm pivot.

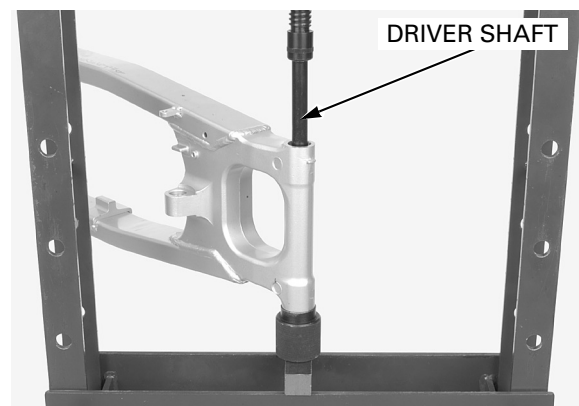


Press the radial ball bearings out from the right side swingarm pivot using the special tool and a hydraulic press.

#### TOOL:

Driver shaft

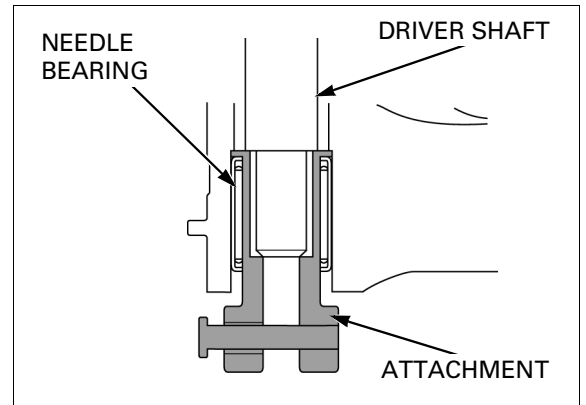
07946-MJ00100



Remove the needle bearing from the left side swingarm pivot using the special tools.

**TOOLS:**

**Driver shaft** 07946-MJ00100  
**Remover attachment, 22 mm** 07GMD-KT70200



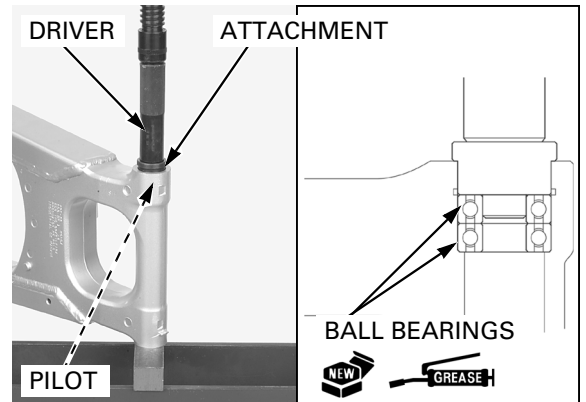
Apply grease to new radial ball bearings.

*Press the radial ball bearings into the swingarm with its marked side facing out.*

Press new radial ball bearings into the right side swingarm pivot using the special tools and a hydraulic press as shown.

**TOOLS:**

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



Install the snap ring into the groove securely.



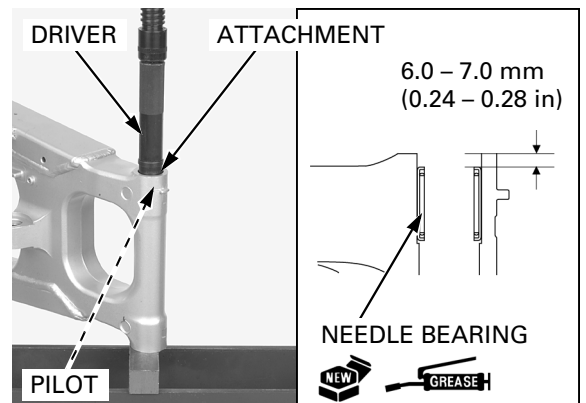
Apply grease to a new needle bearing.

*Press the needle bearing into the swingarm with its marked side facing out.*

Press the needle bearing into the left side swingarm pivot so that the needle bearing surface is 6.0 – 7.0 mm (0.24 – 0.28 in) below the end of the swingarm pivot surface using the special tools and a hydraulic press as shown.

**TOOLS:**

**Driver** 07749-0010000  
**Attachment, 28 x 30 mm** 07946-1870100  
**Pilot, 22 mm** 07746-0041000





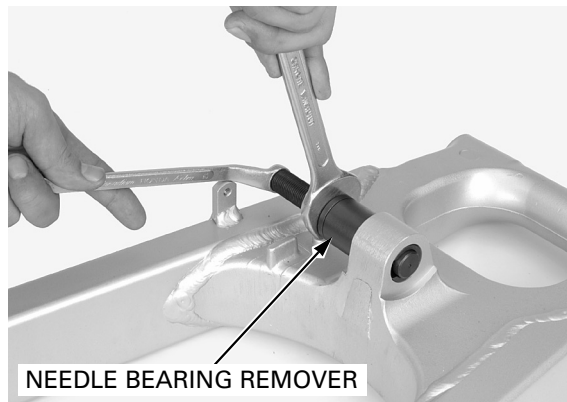
## REAR WHEEL/BRAKE/SUSPENSION

### SHOCK ABSORBER PIVOT BEARING REPLACEMENT

Remove the needle bearing from the shock absorber pivot using the special tool.

#### TOOL:

Needle bearing remover 07LMC-KV30100

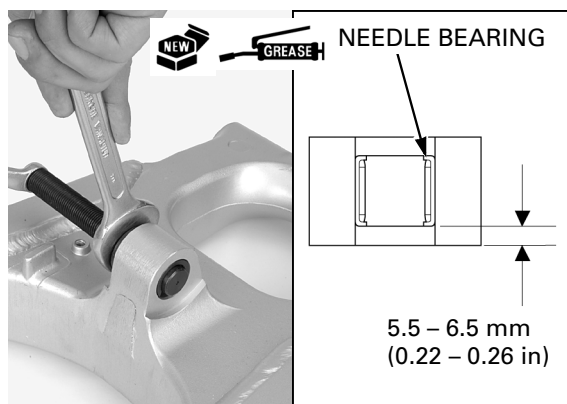


Make sure the needle bearing rollers are in position before installing.

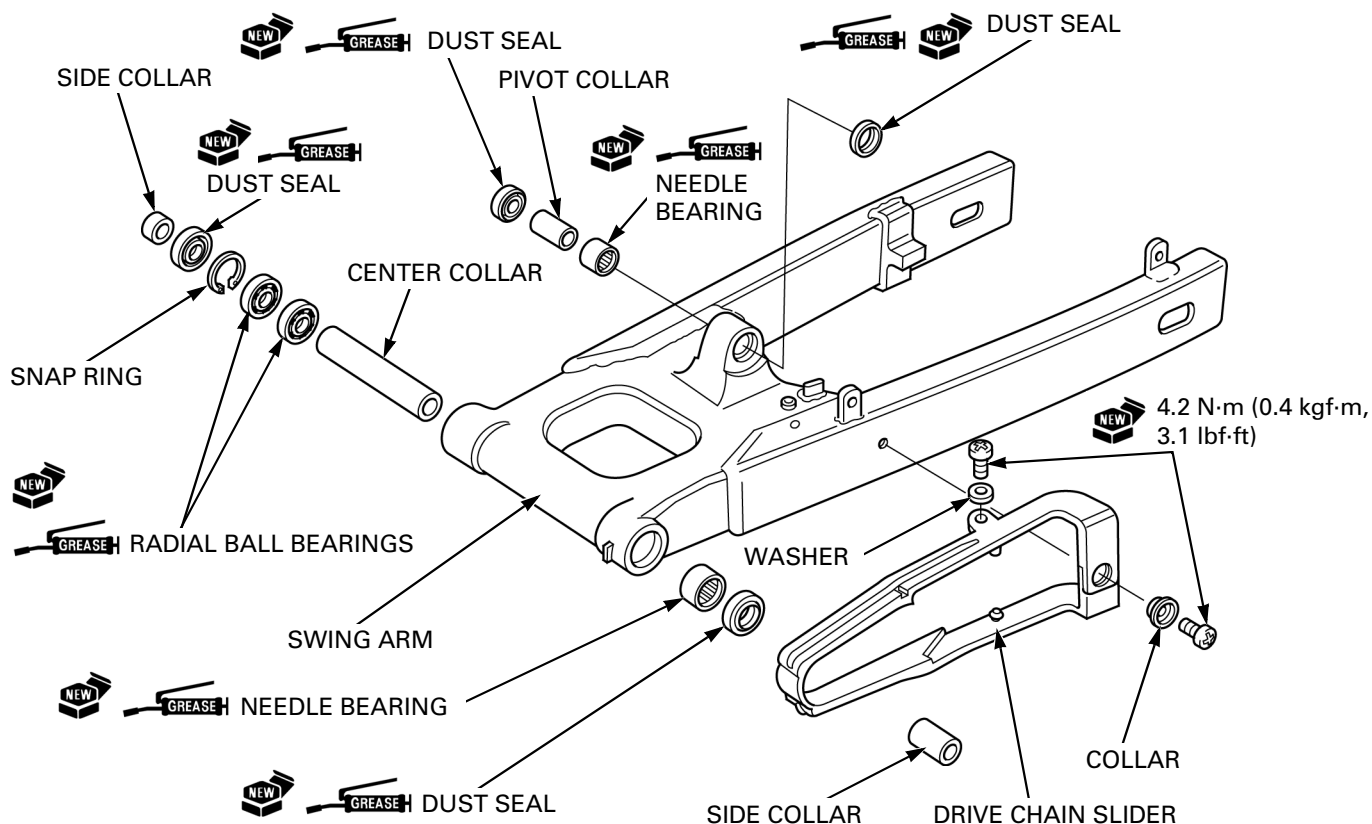
**Number of needle rollers: 24**

Apply grease to a new needle bearing.

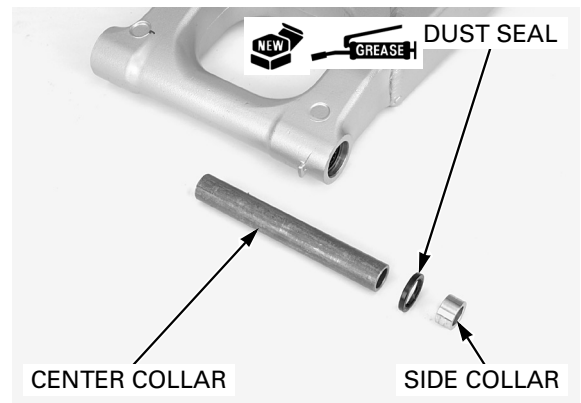
Install the needle bearing into the shock absorber pivot until the depth from the shock absorber pivot surface is 5.5 – 6.5 mm (0.22 – 0.26 in), using the same tool.



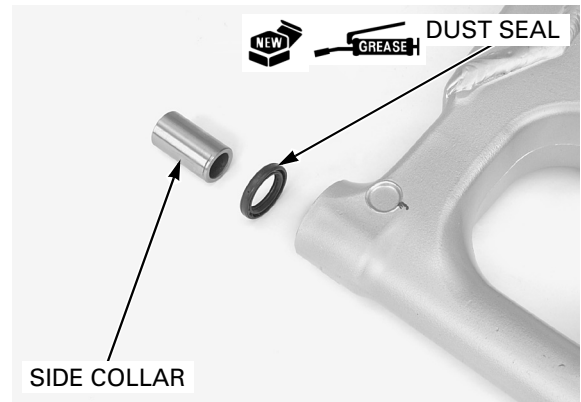
### ASSEMBLY



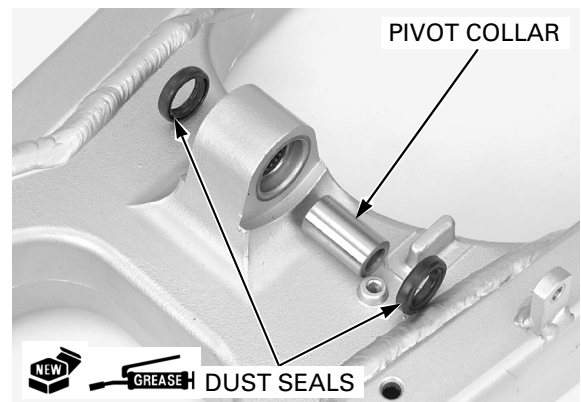
Install the center collar.  
Apply grease to a new dust seal lip, then install it and side collar to the left side pivot.



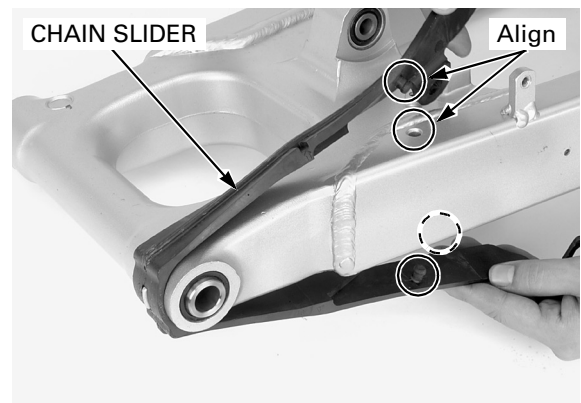
Apply grease to a new dust seal lip, then install it and side collar to the right side pivot.



Apply grease to new dust seal lips, then install them and pivot collar to the shock absorber pivot.

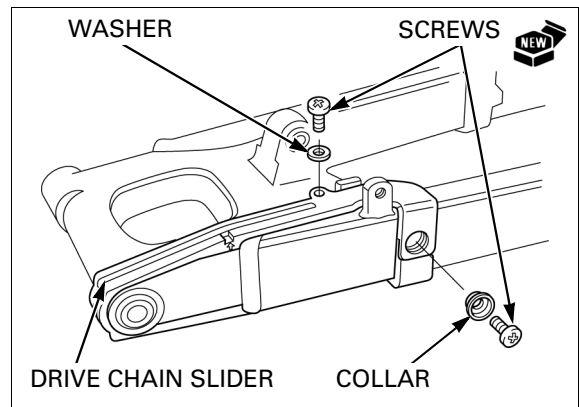


Install the drive chain slider onto the swingarm while aligning the bosses with the holes in the swingarm.



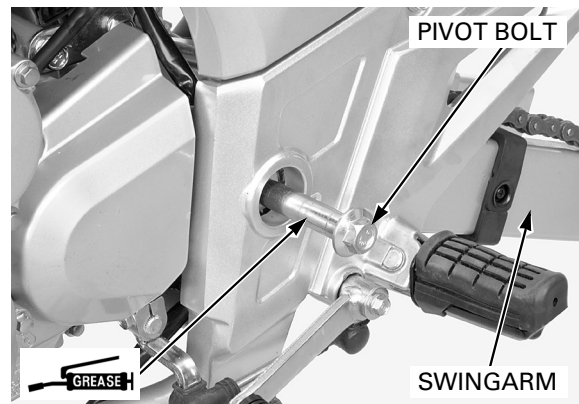
## REAR WHEEL/BRAKE/SUSPENSION

Install the washer, collar and new screws.  
Tighten the screws to the specified torque.  
**TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**



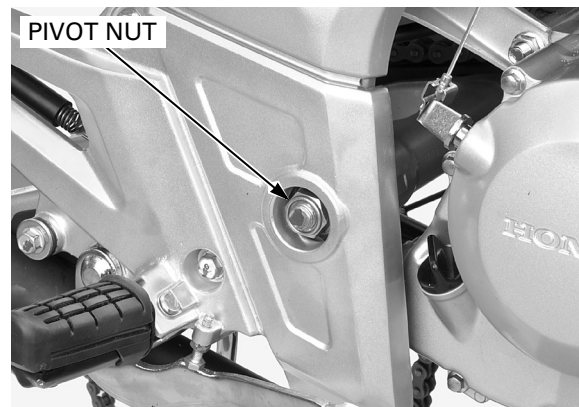
### INSTALLATION

Apply thin coat of grease to the swingarm pivot surface.  
Install the swingarm into the frame.  
Install the swingarm pivot bolt from the left side.



Install and tighten the swingarm pivot nut to the specified torque.

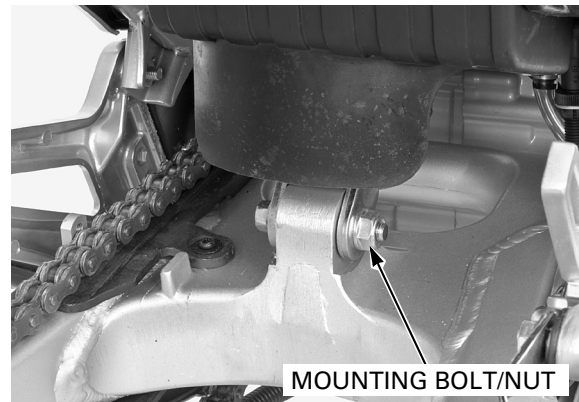
**TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)**



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

**TORQUE: 36 N·m (3.7 kgf·m, 27 lbf·ft)**

Install the rear wheel (page 13-11).



# BRAKE PEDAL

## REMOVAL

Remove the right step holder (page 9-5).

Unhook the return spring from the brake rod and step holder.

Remove the pinch bolt, brake pedal middle arm/brake rod.

Remove the cotter, joint pin and brake rod from the middle arm.

## INSTALLATION

Apply grease to the brake pedal pivot.

Install the brake rod and joint pin to the middle arm, then secure them with a new cotter.

Install the brake pedal to the right step holder.

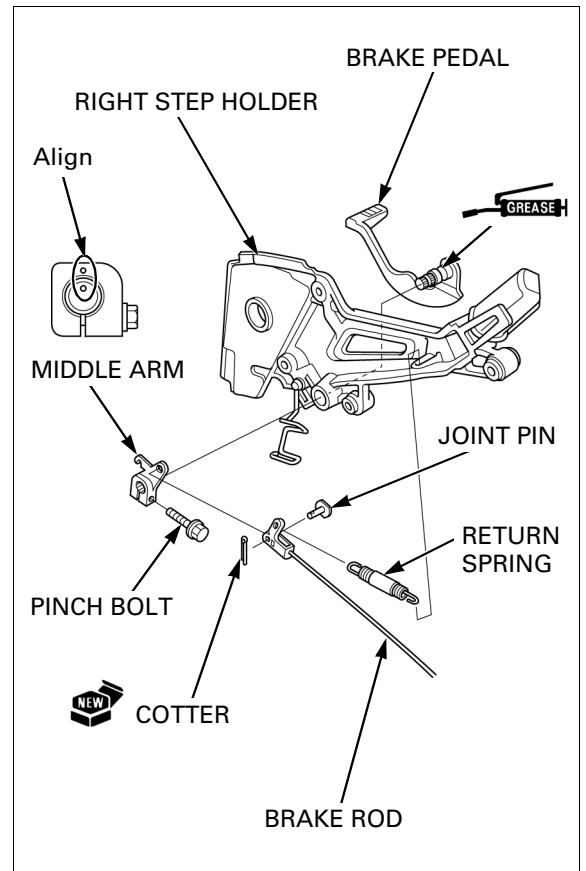
Install the middle arm/brake rod to the brake pedal while aligning the punch marks of the brake pedal and middle arm.

Tighten the brake pedal pinch bolt securely.

Hook the return spring to the brake rod and step holder.

Install the right step holder (page 9-17).

Adjust the rear brake pedal height (page 3-22) and free play (page 3-23).



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## MEMO

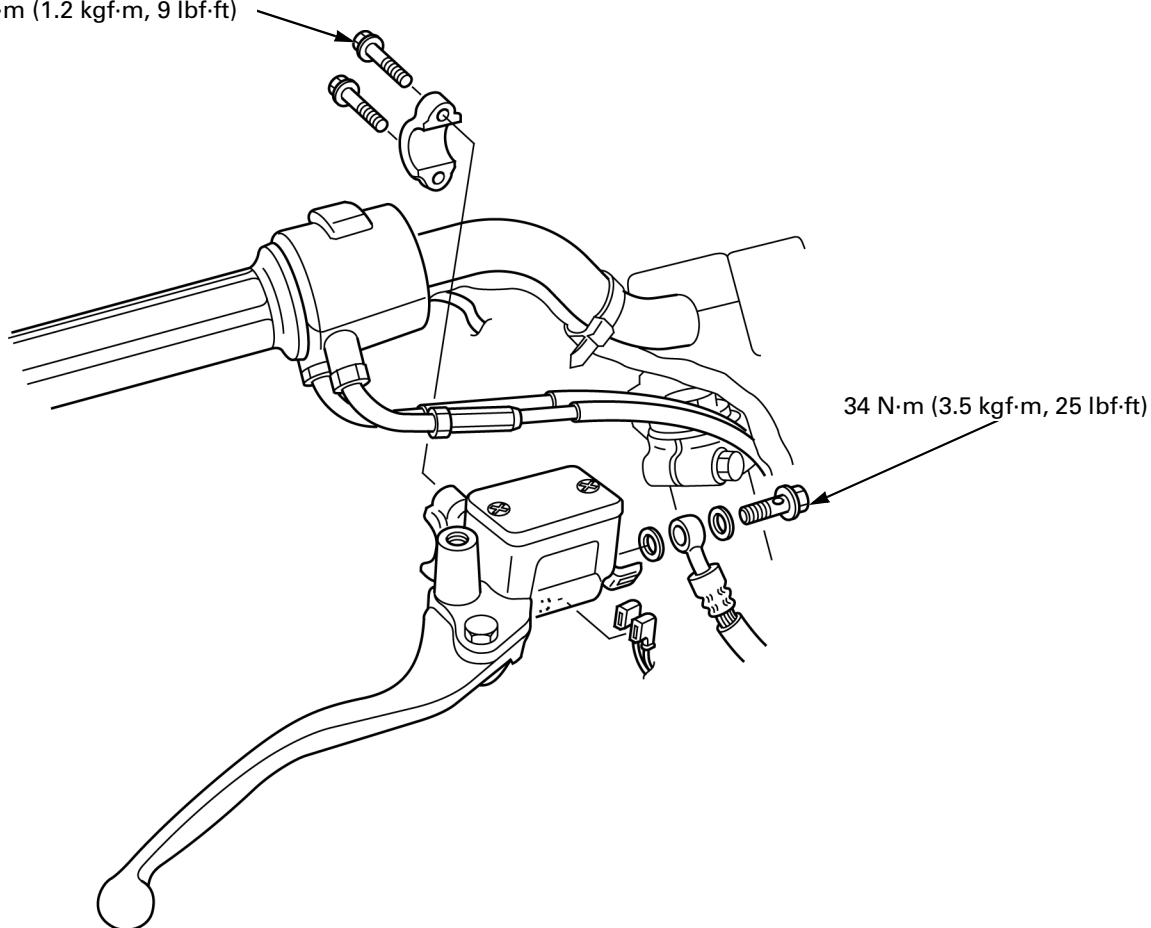
# 14. HYDRAULIC BRAKE

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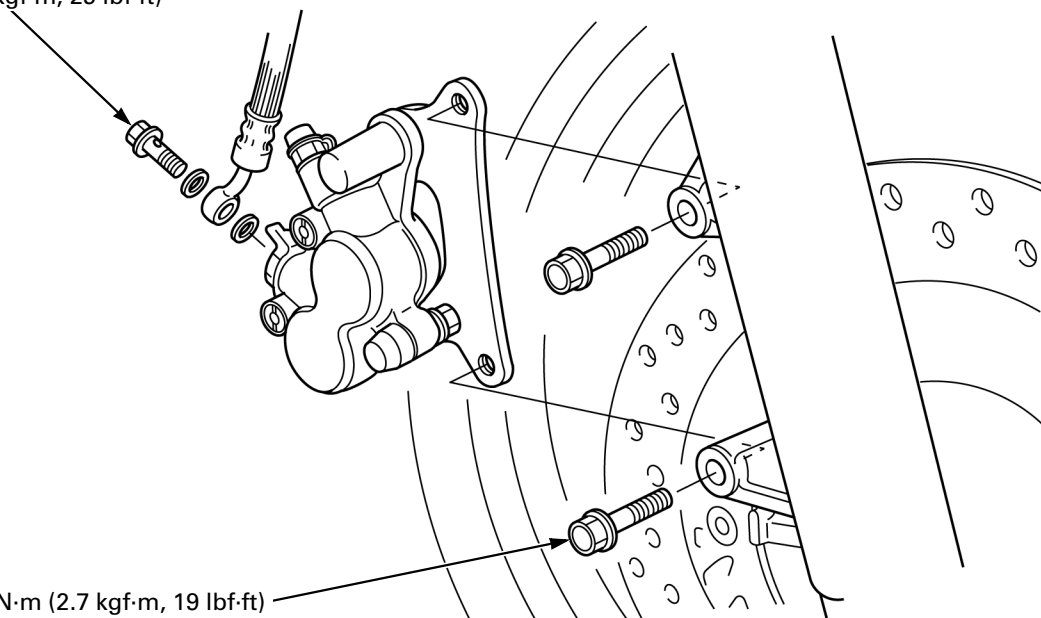
COMPONENT LOCATION .....	14-2	BRAKE PAD/DISC.....	14-7
SERVICE INFORMATION .....	14-3	MASTER CYLINDER .....	14-9
TROUBLESHOOTING .....	14-4	BRAKE CALIPER .....	14-14
BRAKE FLUID REPLACEMENT/ AIR BLEEDING .....	14-5		

## COMPONENT LOCATION

12 N·m (1.2 kgf·m, 9 lbf·ft)



34 N·m (3.5 kgf·m, 25 lbf·ft)



26 N·m (2.7 kgf·m, 19 lbf·ft)

## 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 instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front 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.
- This section covers maintenance of the front hydraulic brake.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT3 or DOT4 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 motorcycle.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.

### SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Recommended brake fluid	DOT 3 or DOT 4	–
Brake pad wear indicator	–	To groove
Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
Brake disc warpage	–	0.10 (0.004)
Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
Caliper piston O.D.	25.335 – 25.368 (0.9974 – 0.9987)	25.31 (0.996)

### TORQUE VALUES

Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Front brake reservoir cap screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Front brake light switch screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front brake caliper mounting bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)
Caliper bracket pin bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Caliper pin bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)
Pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)
Pad pin plug	2.4 N·m (0.2 kgf·m, 1.8 lbf·ft)
Bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)

ALOC bolt: replace with a new one

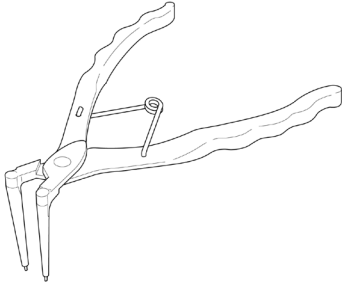


## HYDRAULIC BRAKE

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### TOOL

Snap ring pliers  
07914-3230001



## TROUBLESHOOTING

### Brake lever soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pads/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pads/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper pistons
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever

### Brake lever hard

- Clogged/restricted brake system
- Sticking/worn caliper pistons
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seals
- Sticking/worn master cylinder piston
- Bent brake lever

### Brake drag

- Contaminated brake pads/disc
- Misaligned wheel
- Worn brake pads/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper pistons

# BRAKE FLUID REPLACEMENT/AIR BLEEDING

## BRAKE FLUID DRAINING

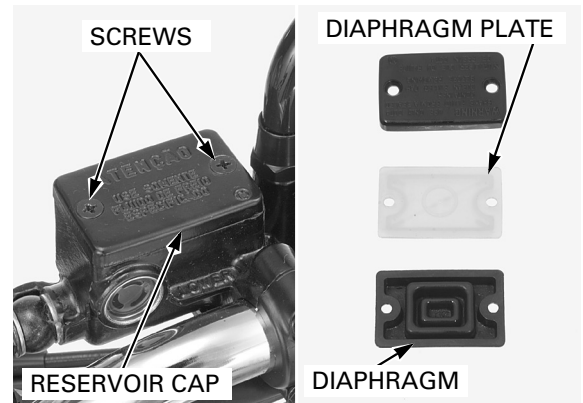
### NOTICE

- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.
- Do not allow foreign material to enter the system when filling the reservoir.

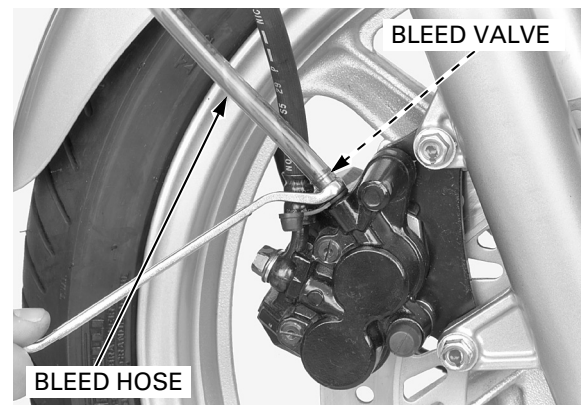
Turn the handlebar until the reservoir parallel to the ground, before removing the reservoir cap.

Remove the screws and reservoir cap.

Remove the diaphragm plate, diaphragm.



Connect a bleed hose to the bleed valve.



Loosen the bleed valve and pump the brake lever. Stop pumping the lever when no more fluid flows out of the bleed valve. Tighten the bleed valve.



## HYDRAULIC BRAKE

### BRAKE FLUID FILLING/AIR BLEEDING

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

**NOTE:**

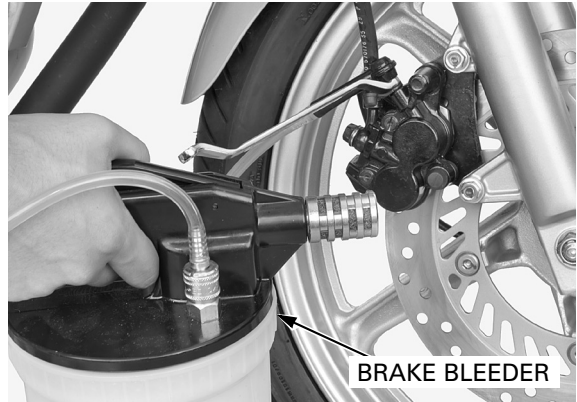
- Use only DOT 3 or DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. These are not compatible.

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

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

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



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

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.
- If a brake bleeder is not available, fill the master cylinder and operate the brake lever to fill the system.

Close the bleed valve.

Operate the brake lever. If it still feels spongy, bleed the system again.



If the brake bleeder is not available, perform the following procedures:

Connect a clear bleed hose to the bleed valve.

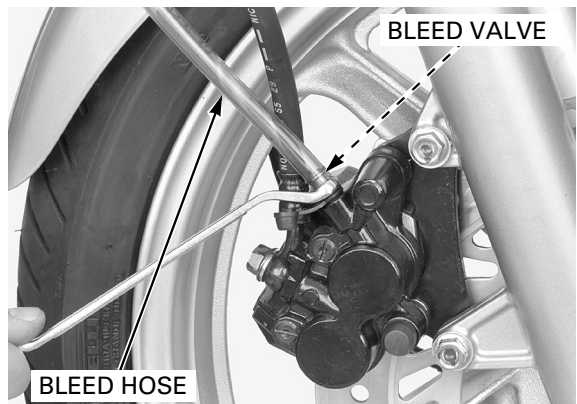
Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the master cylinder and lever resistance is felt.

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

**NOTE:**

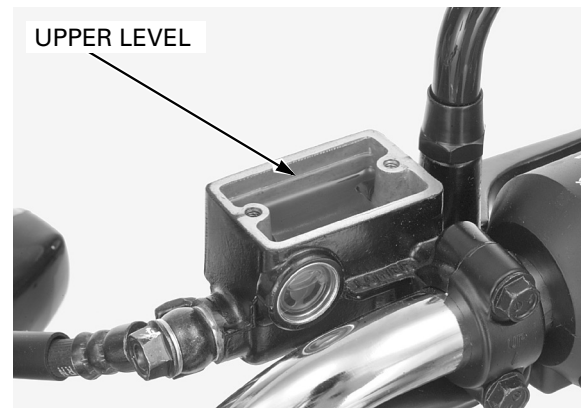
Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever after the bleed valve has been closed.
3. Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleed valve.
4. Tighten the bleed valve to the specified torque.



**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

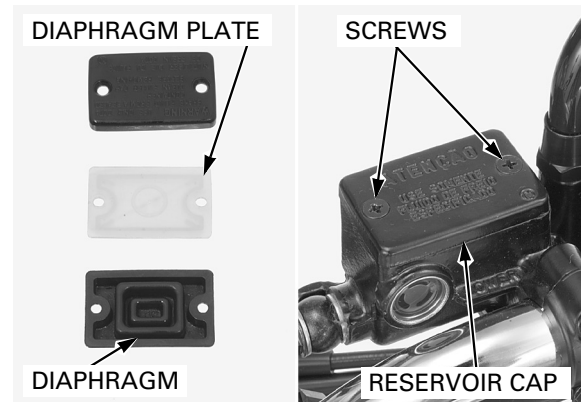
Fill the fluid reservoir to the upper level.



Reinstall the diaphragm, diaphragm plate and reservoir cap.

Install and tighten the screws to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



## BRAKE PAD/DISC

### BRAKE PAD REPLACEMENT

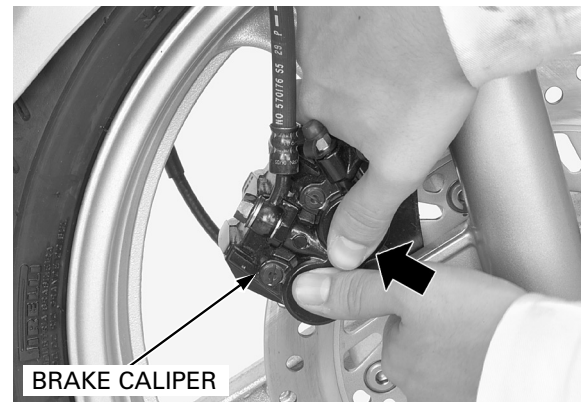
#### NOTE:

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

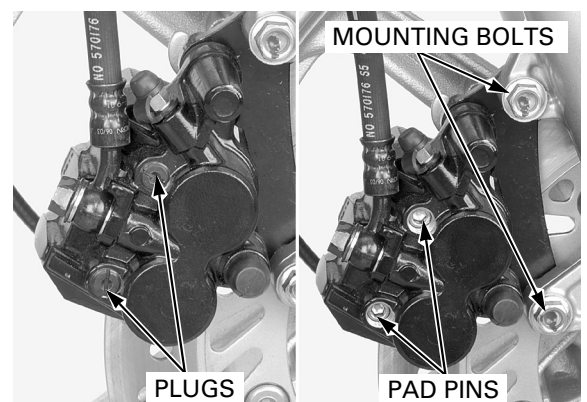
Push the caliper pistons all the way in to allow installation of new brake pads.

#### NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

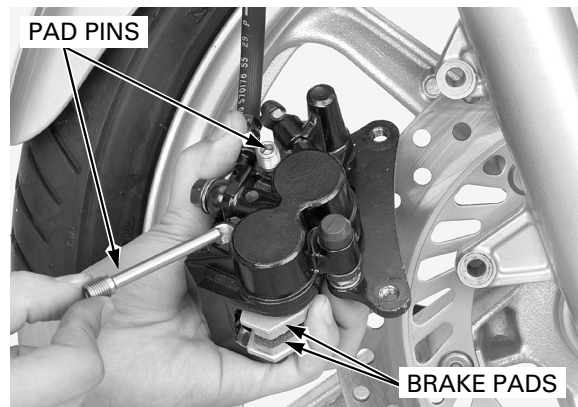


Remove the pad pin plugs and loosen the pad pins.  
Remove the caliper mounting bolts and caliper.

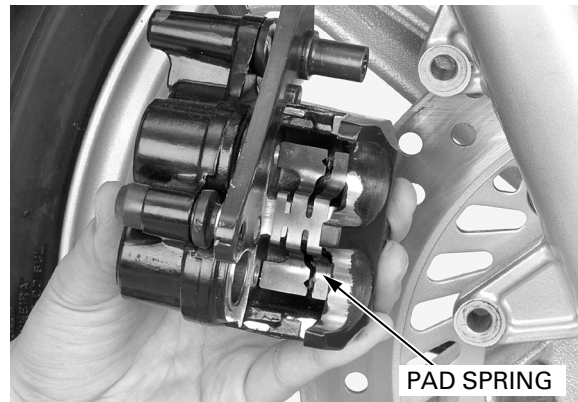


## HYDRAULIC BRAKE

Remove the pad pins and brake pads.

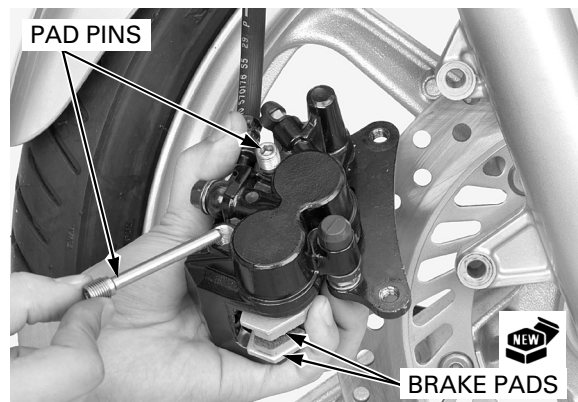


Make sure that the pad spring is in place as shown.



Install new brake pads.

Push the brake pads against the pad spring, then install the pad pins.



*Be careful not to damage the pads.*

Install the brake caliper to the right fork leg so the disc is positioned between the pads.

Install and tighten the new brake caliper mounting bolts to the specified torque.

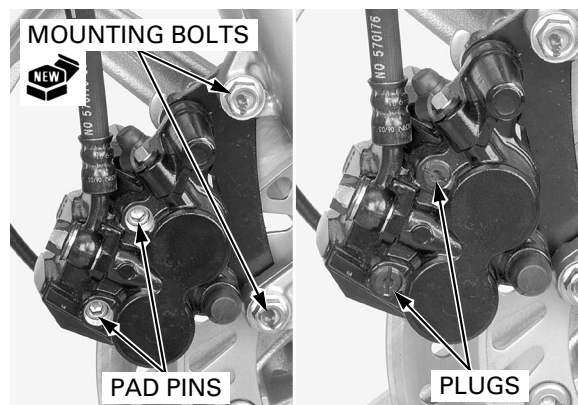
**TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)**

Tighten the pad pins to the specified torque.

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

Install and tighten the pad pin plugs to the specified torque.

**TORQUE: 2.4 N·m (0.2 kgf·m, 1.8 lbf·ft)**



## BRAKE DISC INSPECTION

Measure the brake disc thickness with a micrometer.

**SERVICE LIMIT: 3.5 mm (0.14 in)**



Measure the brake disc warpage with a dial indicator.

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

Check the wheel bearings for excessive play (page 12-14), if the warpage exceeds the service limit. Replace the brake disc if the wheel bearings are normal.



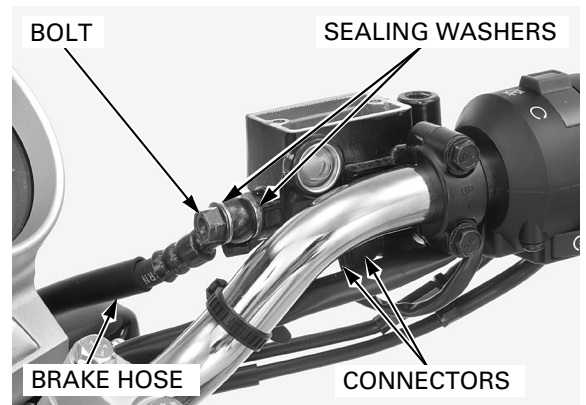
## MASTER CYLINDER

### REMOVAL

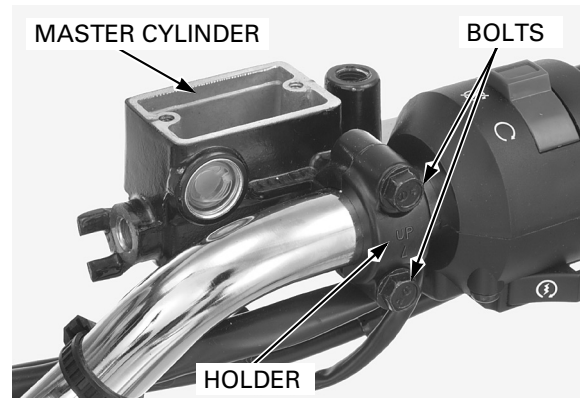
Remove the right rearview mirror (page 12-6). Drain the brake fluid from the hydraulic system (page 14-5).

*When removing the brake hose oil bolt, cover the end of the hose to prevent contamination.*

Remove the brake hose oil bolt, sealing washers and brake hose. Disconnect the front brake light switch connectors.



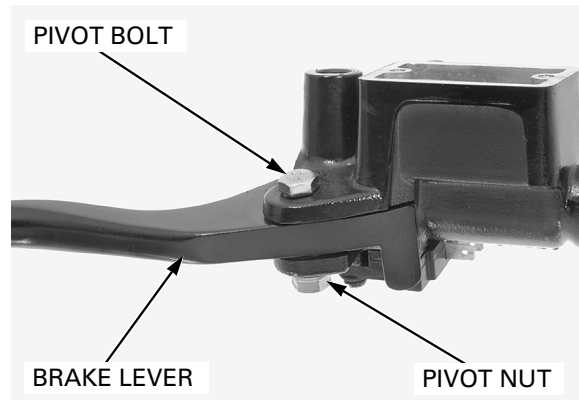
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



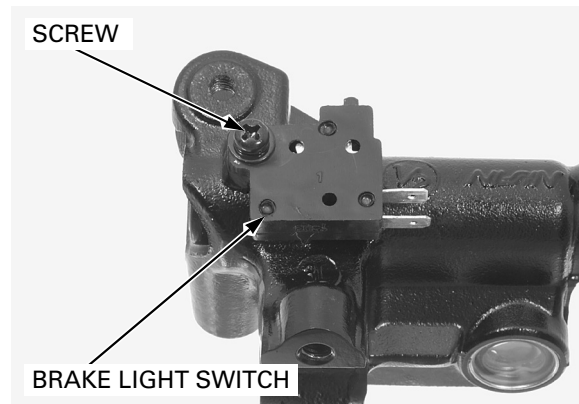
## HYDRAULIC BRAKE

### DISASSEMBLY

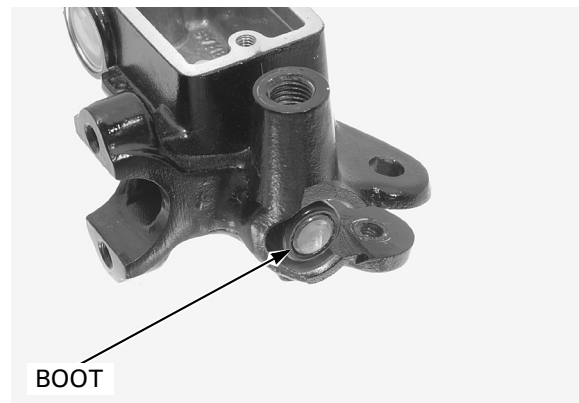
Remove the pivot nut, bolt and brake lever.



Remove the screw and front brake light switch.



*Be careful not to damage the boot.* Remove the boot.

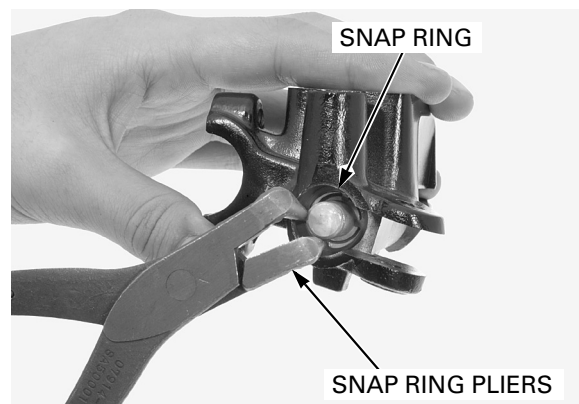


Remove the snap ring from the master cylinder body using the special tool as shown.

**TOOL:**

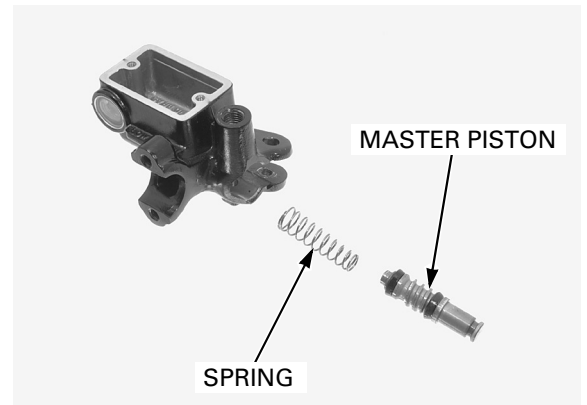
**Snap ring pliers**

**07914-3230001**



Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.



## INSPECTION

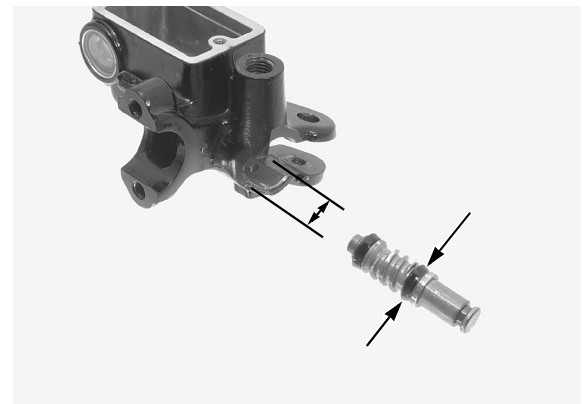
Check the piston boot, primary cup and secondary cup for fatigue or damage.  
Check the master cylinder and piston for abnormal scratches.

Measure the master cylinder I.D.

**SERVICE LIMIT: 12.755 mm (0.5022 in)**

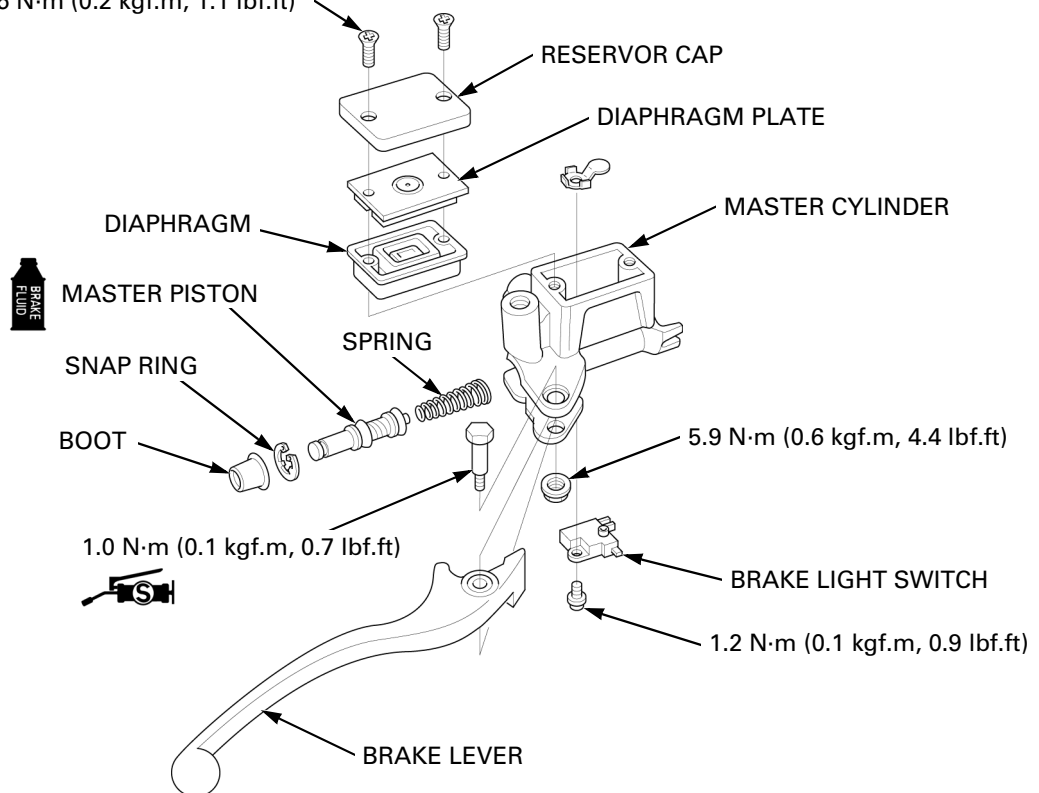
Measure the master piston O.D.

**SERVICE LIMIT: 12.645 mm (0.4978 in)**



## ASSEMBLY

1.5 N·m (0.2 kgf.m, 1.1 lbf.ft)





## HYDRAULIC BRAKE

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

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

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

Install the spring to the master piston.

Dip the master piston in brake fluid.

Install the master piston assembly.

Install the snap ring using the special tool.

**TOOL:**

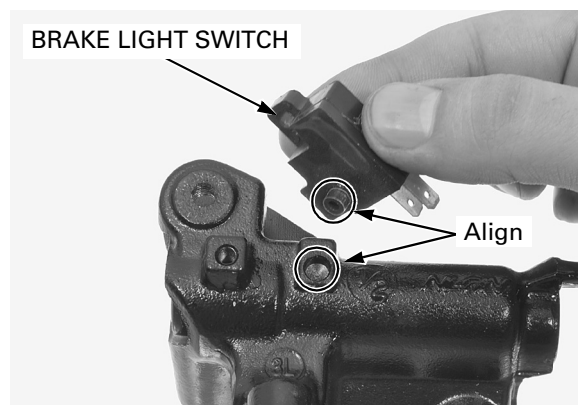
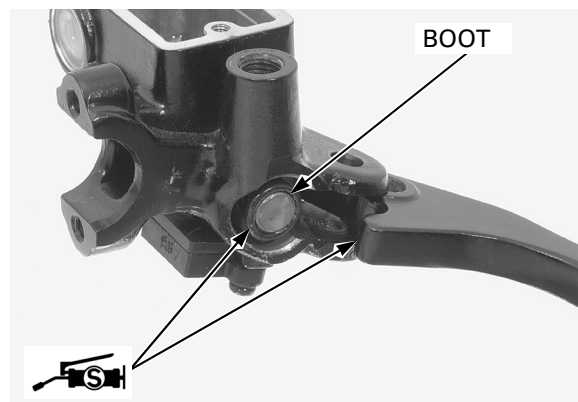
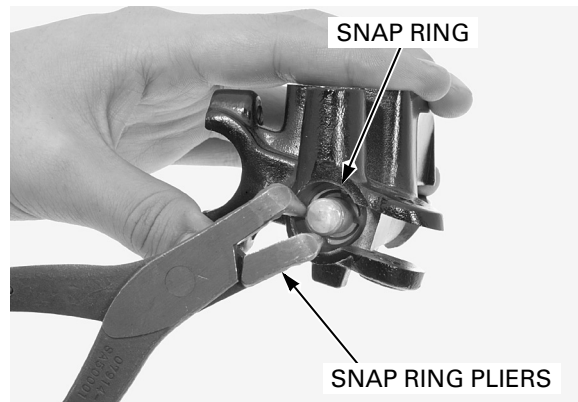
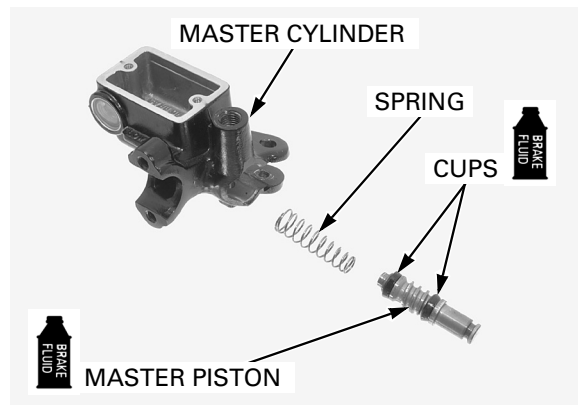
**Snap ring pliers**

**07914-3230001**

Install the boot.

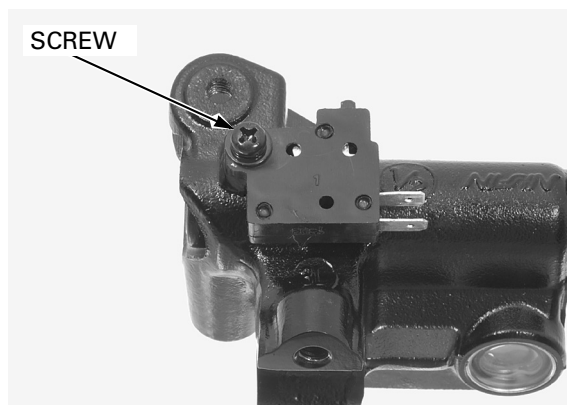
Apply silicone grease to the contact surface of the brake lever and piston.

Install the front brake light switch onto the master cylinder while aligning the boss of the switch with the hole of the master cylinder.



Install and tighten the front brake light switch screw to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**



Apply pivot bolt sliding surface with 0 – 1 g (0 – 0.04 oz) of silicone grease.

Install the brake lever and the pivot bolt.

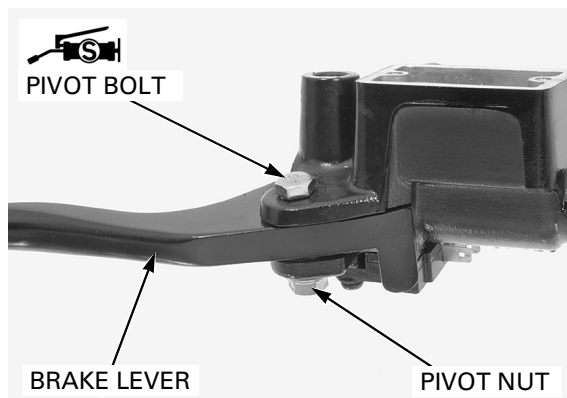
Tighten the brake lever pivot bolt to the specified torque.

Install and tighten the brake lever pivot nut to the specified torque.

**TORQUE:**

**Brake lever pivot bolt: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

**Brake lever pivot nut: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)**

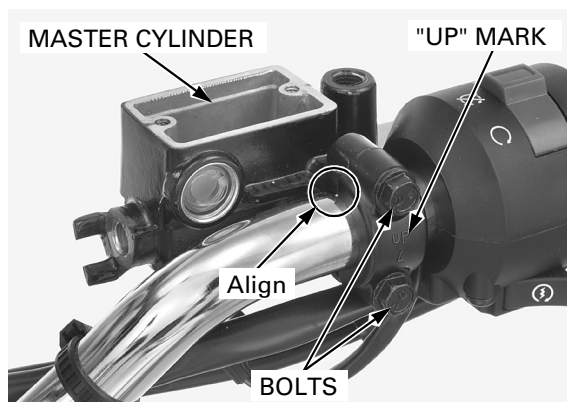


Install the master cylinder while aligning the end of the master cylinder with the punch mark on the handlebar.

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

Tighten the master cylinder holder upper bolt first, then the lower bolt to the specified torque.

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



Install the brake hose eyelet with the brake hose oil bolt and new sealing washers as shown.

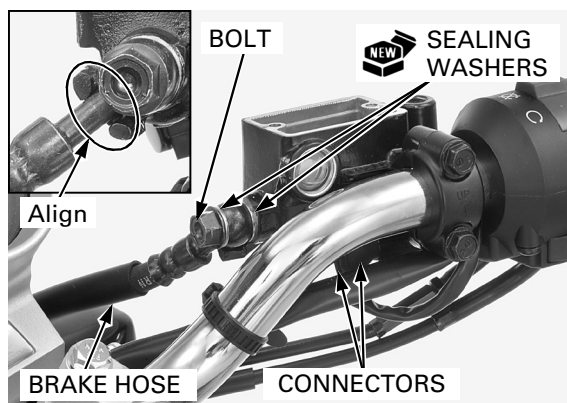
Push the brake hose eyelet to the stopper on the master cylinder, then tighten the brake hose oil bolt to the specified torque.

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

Connect the brake light switch connectors.

Install the right rearview mirror (page 12-12).

Fill and bleed the hydraulic brake system (page 14-5).



## HYDRAULIC BRAKE

### BRAKE CALIPER

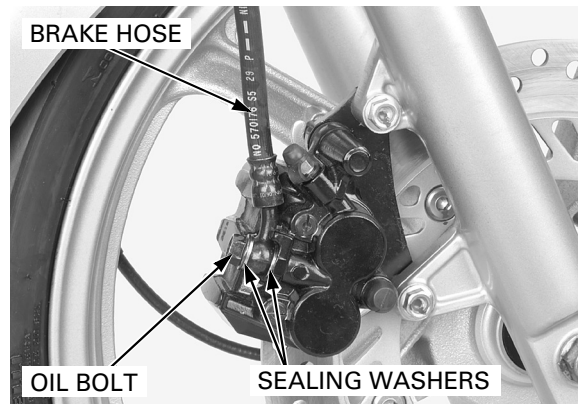
#### REMOVAL

Drain the brake fluid from the hydraulic system (page 14-5).

*When removing the brake hose oil bolt, cover the end of the hose to prevent contamination.*

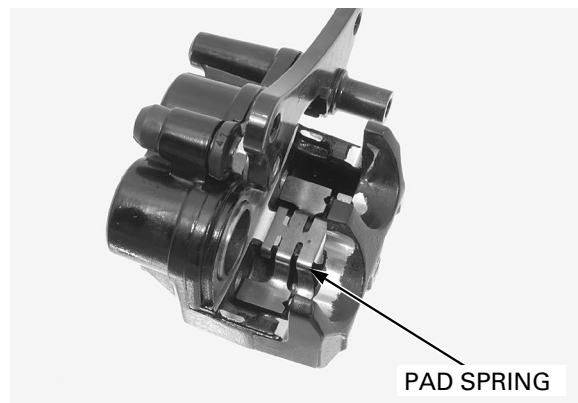
Remove the brake hose oil bolt, sealing washers and brake hose.

Remove the brake pads (page 14-7).



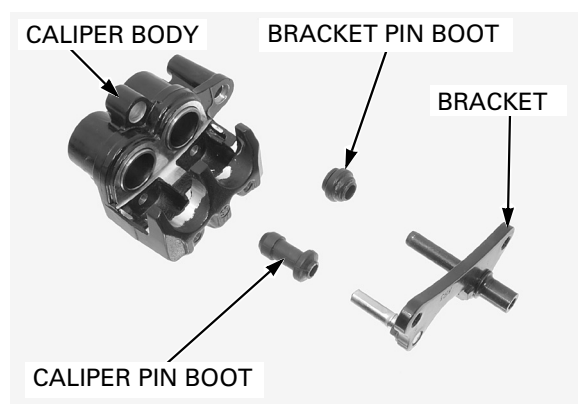
#### DISASSEMBLY

Remove the pad spring.



Remove the caliper bracket from the caliper body. Remove the caliper pin boot from the caliper body. Remove the bracket pin boot from the caliper bracket.

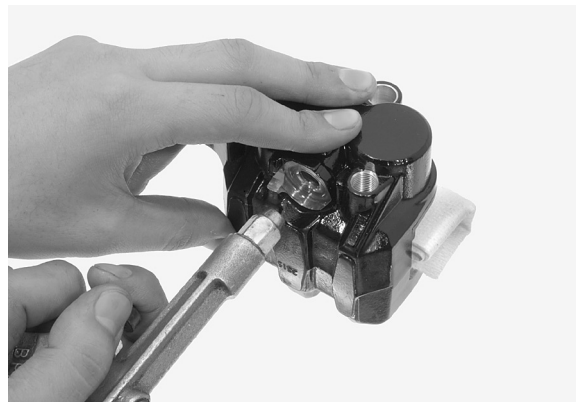
If caliper pin boot and bracket pin boot is hard or deteriorated, replace them with new ones.



Place a shop towel over the pistons.

*Do not use high pressure air or bring the nozzle too close to the inlet.*

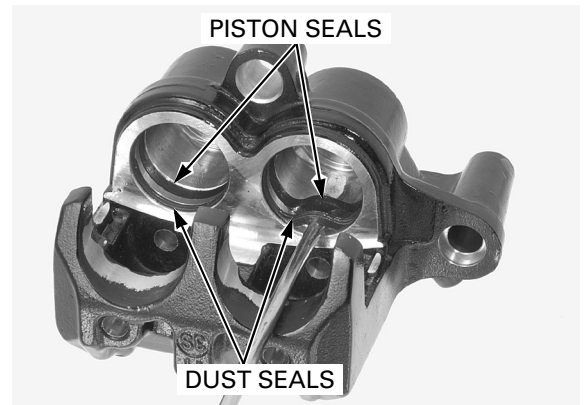
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



*Be careful not to damage the piston sliding surface.*

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with brake fluid.



### INSPECTION

Check the caliper cylinders for scoring or other damage.

Measure the caliper cylinder I.D.

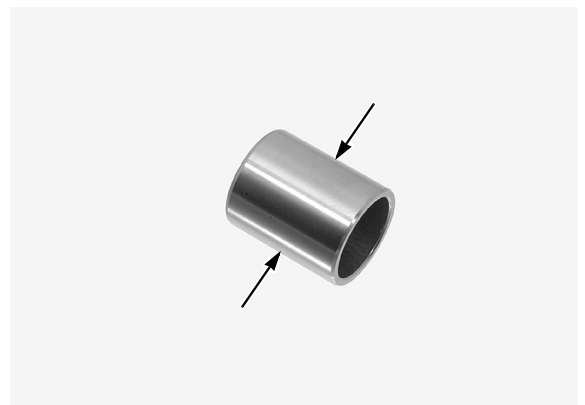
**SERVICE LIMIT: 25.460 mm (1.0024 in)**



Check the caliper pistons for scratches, scoring or other damage.

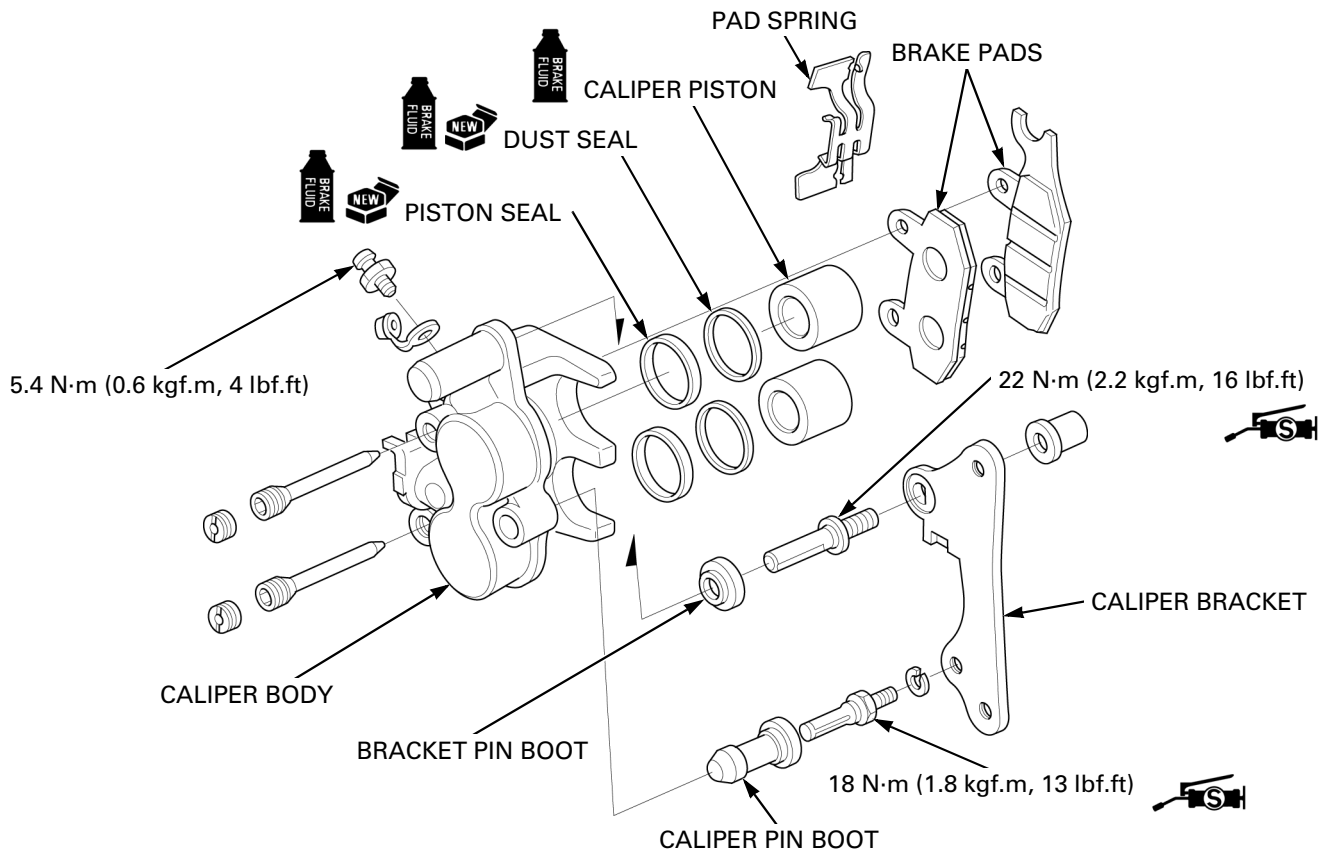
Measure the caliper piston O.D.

**SERVICE LIMIT: 25.31 mm (0.996 in)**



# HYDRAULIC BRAKE

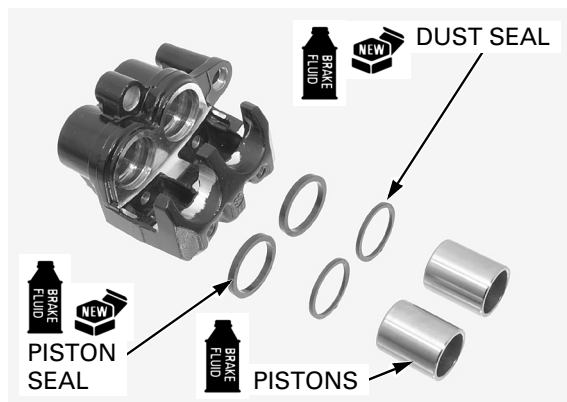
## ASSEMBLY



Coat new piston seals and dust seals with brake fluid.

Install the piston seals and dust seals into the grooves of the caliper body.

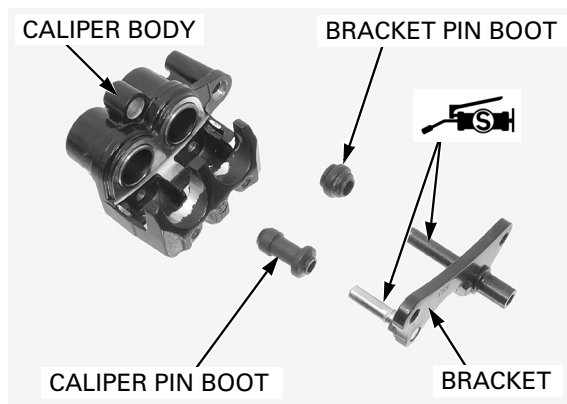
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their open ends toward the pad.



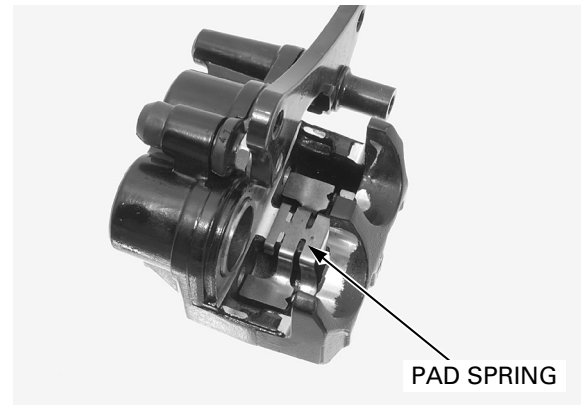
Install the bracket pin boot into the caliper bracket.

Install the caliper pin boot into the caliper body.

Apply caliper pin and bracket pin with 0.4g (0.01 oz) of silicone grease and install the caliper bracket over the caliper body.



Install the pad spring in the caliper body.



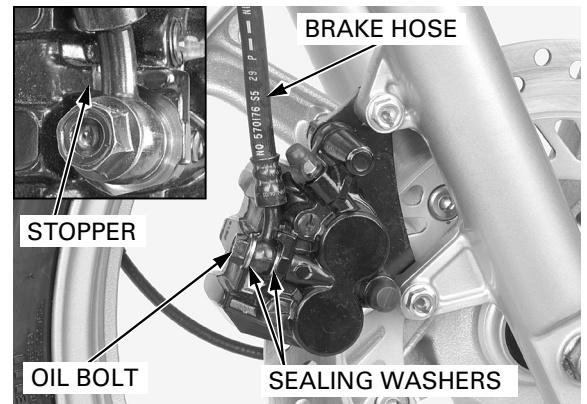
### INSTALLATION

Install the brake pads and caliper onto the right fork leg (page 14-8).

Install the brake hose eyelet with the brake hose oil bolt and new sealing washers as shown. Push the brake hose eyelet to the stopper on the caliper, then tighten the brake hose oil bolt to the specified torque.

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

Fill and bleed the hydraulic brake system (page 14-6).



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## MEMO

# 15. BATTERY/CHARGING SYSTEM

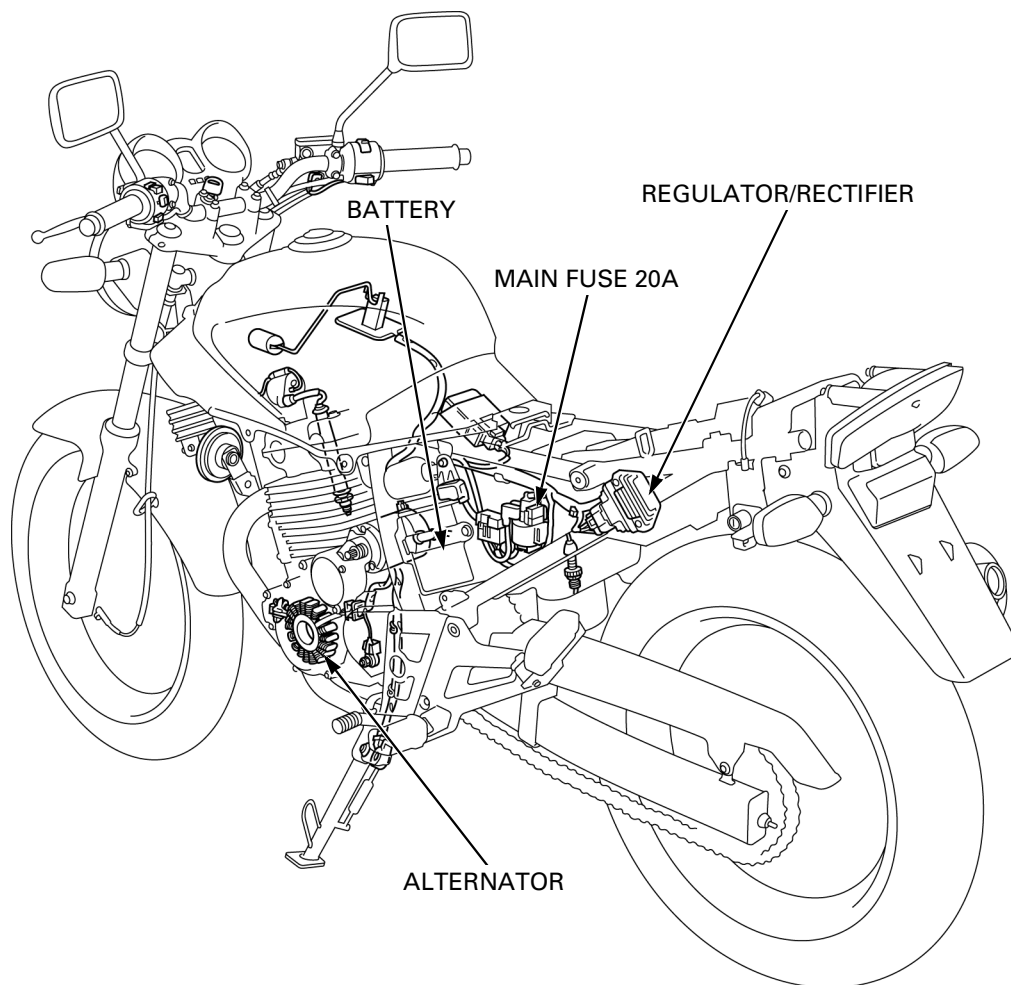
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SYSTEM LOCATION.....	15-2	BATTERY.....	15-5
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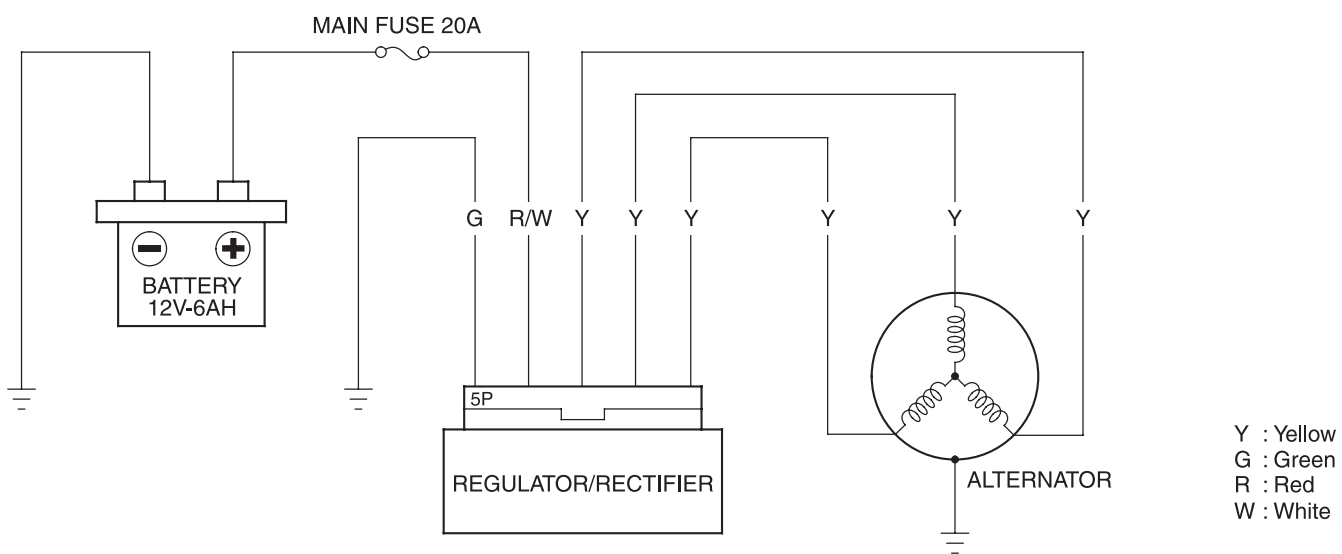


## BATTERY/CHARGING SYSTEM

### SYSTEM 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 OFF the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- 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 extended storage, remove the battery, give it a full charge and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For battery remaining in a stored motorcycle, disconnect the battery negative cable from the battery terminal.
- 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 a long periods. 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 a heavy load, battery voltage will drop quickly and eventually the battery will be completely discharged. For this reason, the charging system is often suspected as the problem. Battery overcharge often results in problems in the battery itself, which may appear to be an overcharge 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 drops 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 motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from forming.
- Refer to page 10-4 for alternator removal and disassembly.

### BATTERY CHARGING

- Turn power ON/OFF at the charger, not at the battery terminal.
- 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 the 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 or equivalent**

### SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 6 Ah
	Current leakage		0.1 mA max.
	Voltage (20°C/68°F)	Fully charged	Above 12.8 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.6 A/5 – 10 h
		Quick	3.0 A/1.0 h max.
Alternator	Capacity		204 W/5,000 min <sup>-1</sup> (rpm)
	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 15-5).

Check the battery condition using the recommended battery tester.

**RECOMMENDED BATTERY TESTER: BM210 or 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 15-5).

Check the battery current leakage test (Leak test; page 15-5).

*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 CONNECTED

Disconnect the regulator/rectifier 5P 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 15-6).

*Is the alternator charging coil resistance within 0.1 – 1.0  $\Omega$  (20°C/68°F)?*

**NO** – Faulty charging coil

**YES** – GO TO STEP 5.

##### 5. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 15-5).

Start the engine.

Measure the charging voltage (page 15-6).

Compare the measurements to the results of the following calculation.

**STANDARD:**

**Measured BV < Measured CV < 15.5 V**

- BV = Battery Voltage (page 15-5)
- CV = Charging Voltage (page 15-6)

*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 5P connector (page 15-7).

*Are the results of checked voltage and resistance correct?*

**YES** – Faulty regulator/rectifier

**NO** – • Open circuit in related wire  
• Loose or poor contacts of related terminal  
• Shorted wire harness

## BATTERY

### REMOVAL/INSTALLATION

*Always turn the ignition switch "OFF" before removing or installing the battery.*

*Connect the positive cable first and then the negative cable.*

Remove the left side cover (page 2-4).

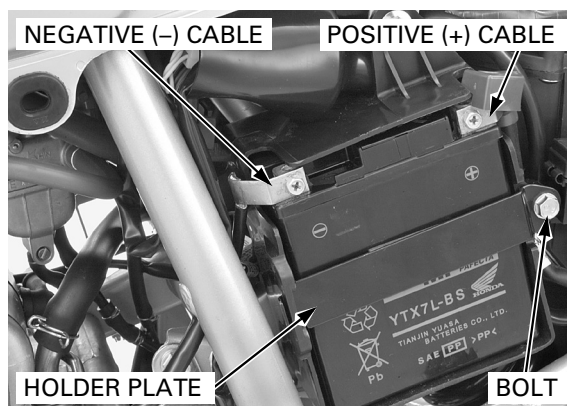
Disconnect the battery negative (-) cable first, then positive (+) cable from the battery.

Remove the bolt and battery holder plate. Pull the battery out of the battery case.

Install the battery in the reverse order of removal.

After installing the battery, coat the terminals with clean grease.

Install the left side cover (page 2-4).



### VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

**VOLTAGE (20°C/68°F):**

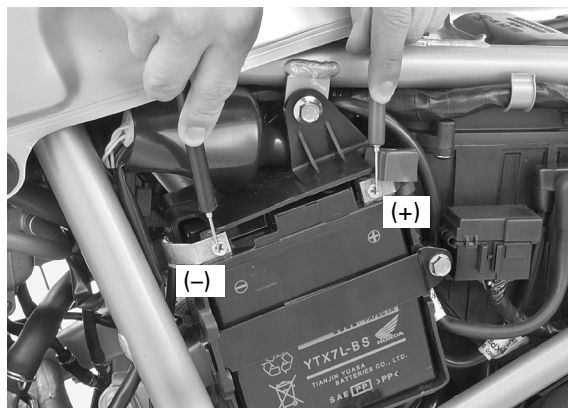
**Fully charged: Above 12.8 V**

**Under charged: Below 12.3 V**

**TOOL:**

**Digital multimeter**

**Commercially available**



## CHARGING SYSTEM INSPECTION

### CURRENT LEAKAGE TEST

Remove the left side cover (page 2-4).

Turn the ignition switch "OFF", and disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the battery negative cable and the ammeter (-) probe to the battery (-) terminal.

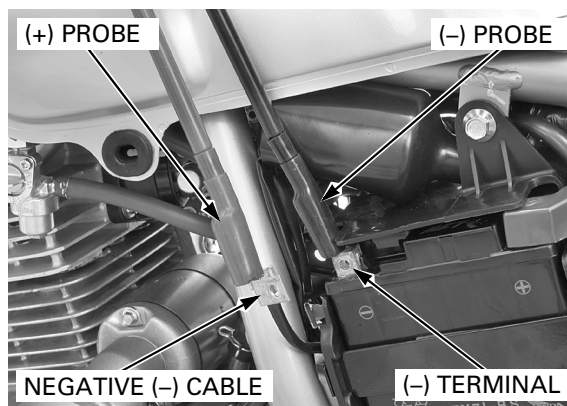
With the ignition switch turned to "OFF", check for current leakage.

- 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 max.**

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



## BATTERY/CHARGING SYSTEM

### CHARGING VOLTAGE INSPECTION

Be sure that the battery is in good condition before performing this test.

*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.*

Start the engine and warm it up to the operating temperature; stop the engine. Connect the multimeter between the positive (+) and negative (-) terminals of the battery.

- To prevent short, make absolutely certain which are the positive (+) and negative (-) terminals or cable.

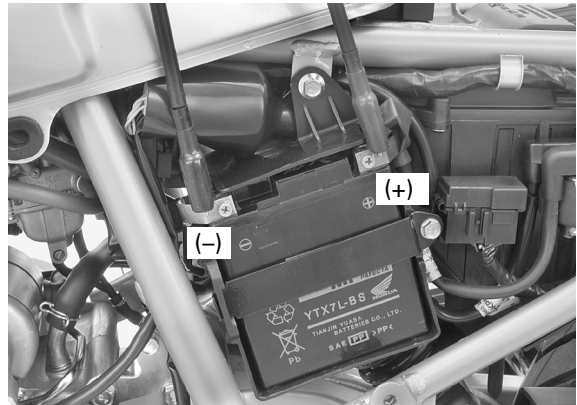
With the headlight on Hi beam, restart the engine.

Measure the voltage on the multimeter when the engine runs at 5,000 min<sup>-1</sup> (rpm).

**Standard:**

**Measured BV < Measured CV < 15.5 V**

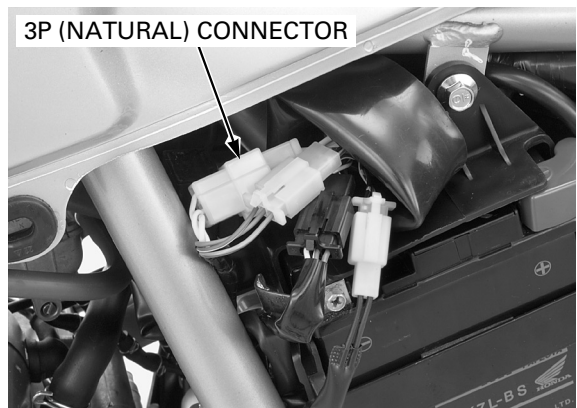
- BV = Battery Voltage (page 15-5)
- CV = Charging Voltage (page 15-6)



## ALTERNATOR CHARGING COIL INSPECTION

Remove the left side cover (page 2-4).

With the ignition switch turned to "OFF", disconnect the alternator 3P (Natural) connector.



Check the resistance between all three Yellow terminals.

**STANDARD: 0.1 – 1.0 Ω (at 20°C/68°F)**

Check for continuity between all three Yellow terminals and Ground.

There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.

Refer to page 10-6 for stator removal.



REGULATOR/RECTIFIER

SYSTEM INSPECTION

Remove the following:

- Side covers (page 2-4)
- Rear cowl (page 2-5)

Disconnect the regulator/rectifier 5P connector.

Check the connector for loose or corroded terminals.



If the charging voltage reading (page 15-6) is out of the specification, check the following at the wire harness side connector:

Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 – 1.0 $\Omega$ at (20°C/68°F)
Ground line	Green and ground	Continuity exists



If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

REMOVAL/INSTALLATION

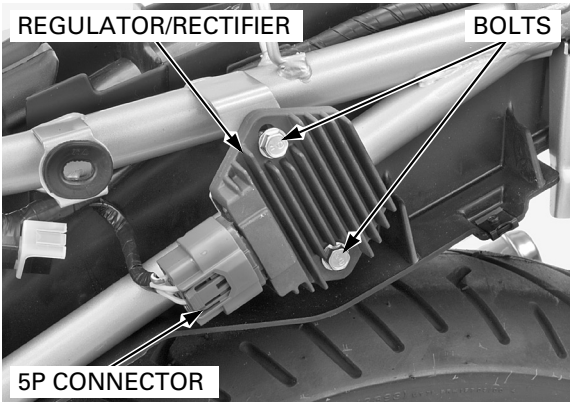
Remove the following:

- Side covers (page 2-4)
- Rear cowl (page 2-5)

Disconnect the regulator/rectifier 5P connector. Remove the bolts and regulator/rectifier unit.

Installation is in the reverse order of removal.

*Route the wire harness properly (page 1-17).*



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## MEMO

# 16. IGNITION SYSTEM

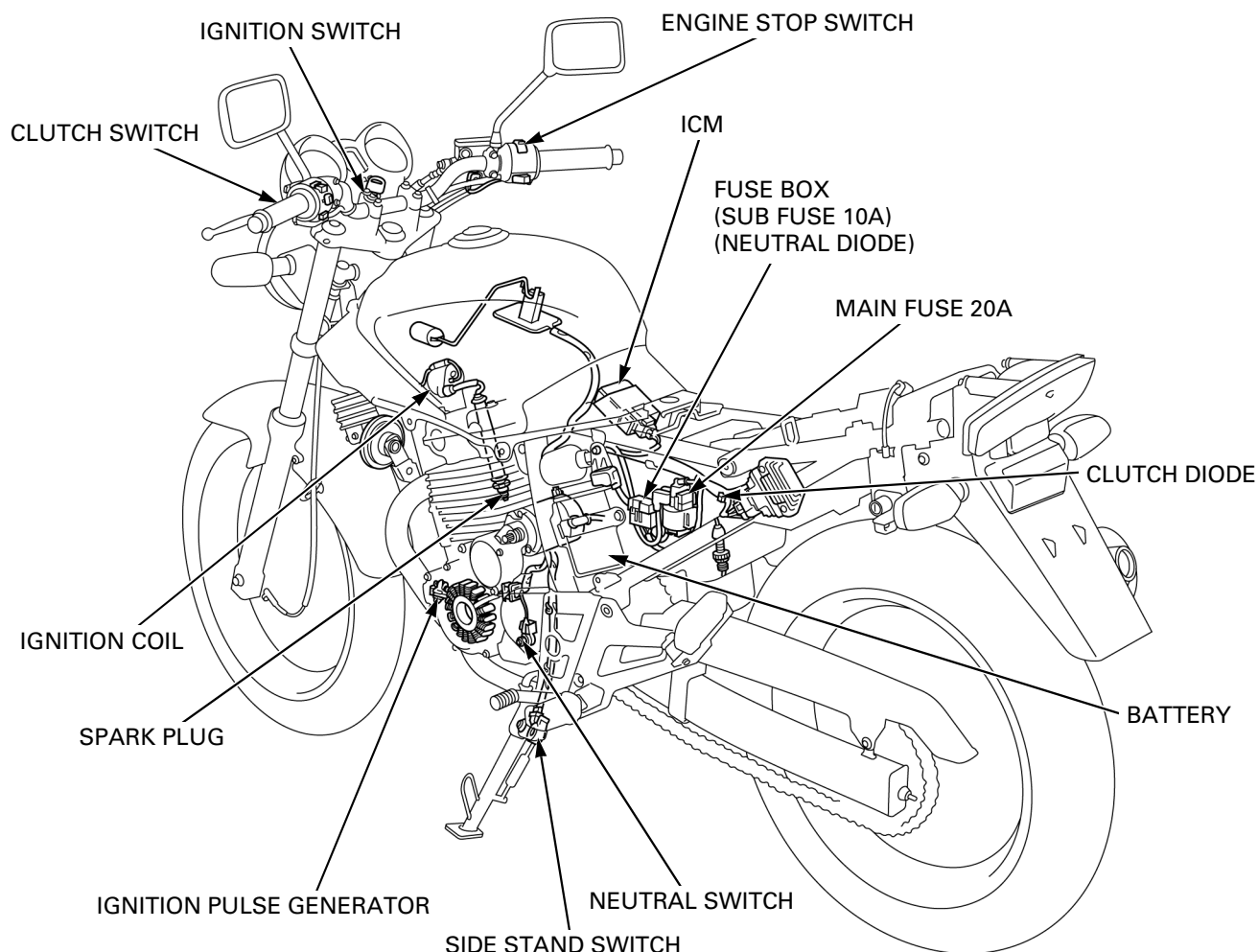
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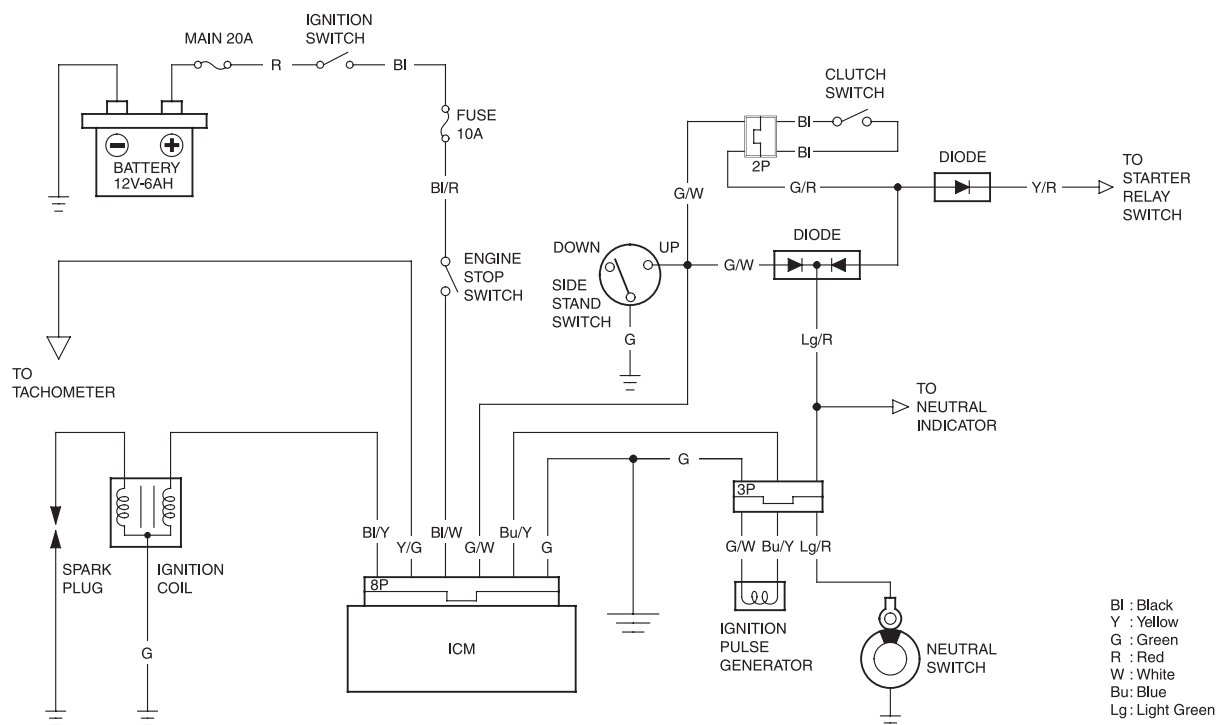


# IGNITION SYSTEM

## SYSTEM LOCATION



## SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 16-4.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- The ignition timing does not normally need to be adjusted since the ICM is factory preset.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- Refer to page 10-6 for ignition pulse generator removal/installation.
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- 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.
- For spark plug inspection, refer to page 3-9.
- For clutch/neutral diode inspection (page 17-14).
- See page 18-2 for following components:
  - Ignition switch
  - Engine stop switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

### SPECIFICATION

ITEM		SPECIFICATION
Spark plug	Standard	CR8EH-9S (NGK)
	For extended high speed riding	CR9EH-9S (NGK)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		8° BTDC at idle

### TORQUE VALUES

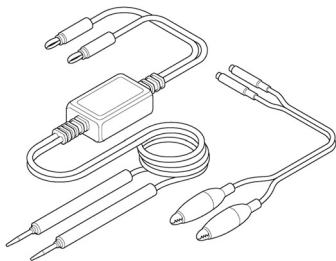
Timing hole cap

10 N·m (1.0 kgf·m, 7 lbf·ft)

Apply grease to the threads

### TOOL

Imrie diagnostic tester (model 625)  
or Peak voltage adaptor  
07HGJ-0020100



with commercially available digital  
multimeter (impedance 10 M $\Omega$ /DCV  
minimum)

## IGNITION SYSTEM

### TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connections
  - Water got into the spark plug cap (Leaking the ignition coil secondary voltage)
- If there is no spark at cylinder, temporarily exchange the ignition coil with a known good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.

#### 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 adaptor connections.</li><li>2. The multimeter impedance is too low; below 10 MΩ/DCV.</li><li>3. Cranking speed is too slow (Battery is undercharged).</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 side stand switch or neutral switch.</li><li>7. Faulty clutch diode and neutral diode.</li><li>8. An open circuit or loose connection in No.6 related circuit wires.<ul style="list-style-type: none"><li>– Side stand switch line: Green/White wire</li><li>– Neutral switch line: Light green/Red wire</li><li>– Clutch switch line: Black/Black wire</li></ul></li><li>9. Faulty ICM (in case when above No. 1 – 8 are normal).</li></ol>
	No peak voltage.	<ol style="list-style-type: none"><li>1. Incorrect peak voltage adapter connections.</li><li>2. The multimeter impedance is too low; below 10 MΩ/DCV.</li><li>3. Faulty ignition switch or engine stop switch.</li><li>4. Loose or poorly connected ICM connector.</li><li>5. No voltage at the black/white wire of the ICM.</li><li>6. Open circuit or poor connection in Green (ground) wire of the ICM.</li><li>7. Faulty side stand switch or neutral switch.</li><li>8. Faulty clutch diode and neutral diode.</li><li>9. An open circuit or loose connection in No.7 related circuit wires.<ul style="list-style-type: none"><li>– Side stand switch line: Green/White wire</li><li>– Neutral switch line: Light green/Red wire</li><li>– Clutch switch line: Black/Black wire</li></ul></li><li>10. Faulty peak voltage adaptor.</li><li>11. Faulty ignition pulse generator (Measure peak voltage).</li><li>12. Faulty ICM (in case when above No.1 – 11 are normal).</li></ol>
	Peak voltage is normal, but does not spark.	<ol style="list-style-type: none"><li>1. Faulty spark plug or leaking the ignition coil secondary voltage.</li><li>2. Faulty ignition 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 MΩ/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 ignition pulse generator (in case when above No.1 – 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

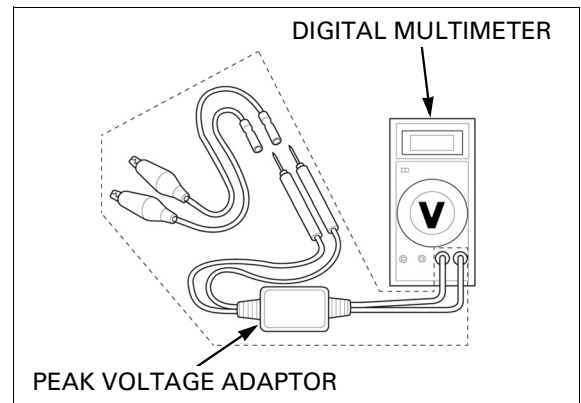
### NOTE:

- If not spark jumps at the plug, check that all connections for loose or poor contact before measuring each peak voltage.
- Use a recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M $\Omega$ /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using the Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adaptor to the digital multimeter.

### TOOL:

**Imrie diagnostic tester (model 625) or  
Peak voltage adaptor 07HGJ-0020100  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)**



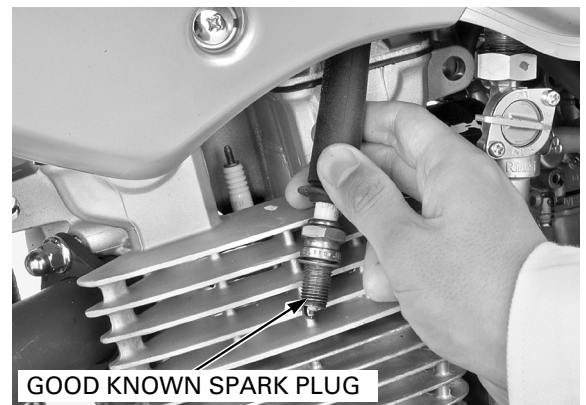
## IGNITION COIL PRIMARY PEAK VOLTAGE INSPECTION

### NOTE:

- Check all system connections before this inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression at the cylinder and check that the spark plug is installed correctly in the cylinder head.

Disconnect the spark plug cap from the spark plug on the cylinder head.

Connect a known good spark plug to the spark plug cap and ground the spark plug to the cylinder as done in a spark test.



## IGNITION SYSTEM

Remove the left side shroud (page 2-7).

With the ignition coil primary wire connected, connect the tester or peak voltage adaptor probes to the ignition coil connector and ground.

### TOOL:

**Imrie diagnostic tester (model 625) or  
Peak voltage adaptor 07HGJ-0020100  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)**

### CONNECTION:

**Black/Yellow (+) – Body ground (–)**

Turn the ignition switch "ON" and engine stop switch to "Q" position.

Retract the side stand.

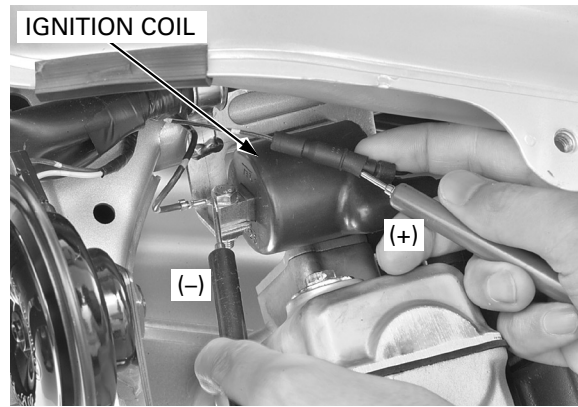
*Avoid touching the  
spark plugs and/or  
tester probes to  
prevent electric  
shock.*

Crank the engine with the starter motor and read ignition coil primary voltage.

**PEAK VOLTAGE: 100 V minimum**

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting on page 16-4.

Install the left side shroud (page 2-7).



## IGNITION PULSE GENERATOR PEAK VOLTAGE INSPECTION

### NOTE:

- Check cylinder compression at the cylinder and check that the spark plug is installed correctly in the cylinder head.

Remove the ICM (page 16-8).

Connect the peak voltage adaptor or tester probes to the connector terminals of the wire harness side.

### TOOL:

**Imrie diagnostic tester (model 625) or  
Peak voltage adaptor 07HGJ-0020100  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)**

### CONNECTION:

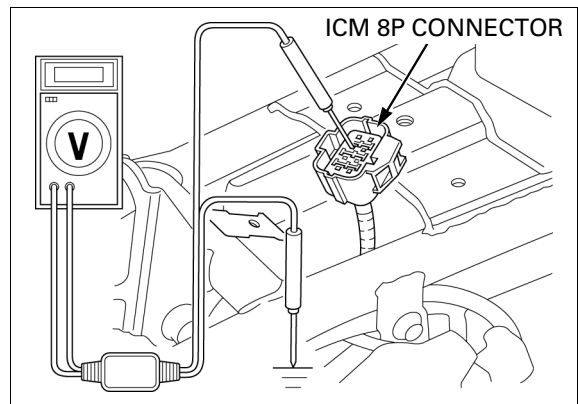
**Blue/Yellow (+) – Body ground (–)**

Retract the side stand.

Turn the ignition switch "ON" and engine stop switch to "Q" position.

Crank the engine with the starter motor and read the peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**



If the peak voltage measured at the ICM 8P connector is abnormal, measure the peak voltage at the ignition pulse generator/neutral switch 3P connector.

Remove the left side cover (page 2-4).

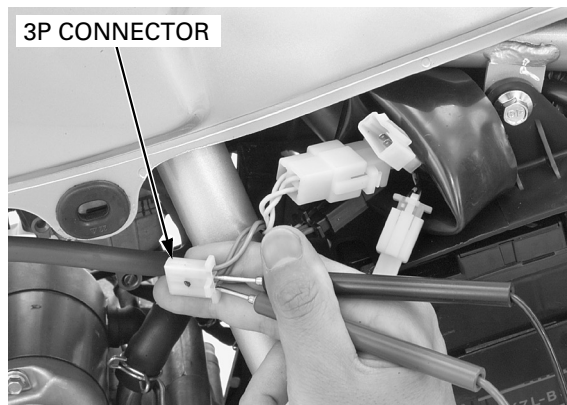
Disconnect the ignition pulse generator/neutral switch 3P connector and connect the peak voltage adaptor or tester probes to the connector terminals of the ignition pulse generator side.

## CONNECTION:

**Blue/Yellow (+) – Green/White (–)**

In the same manner as at the ICM 8P connector, measure the peak voltage and compare it to the voltage measured at the ICM 8P 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 short circuit, or loose connection.
- If both peak voltage measured are lower than standard value, follow the checks described in the troubleshooting on page 16-4.



## IGNITION COIL

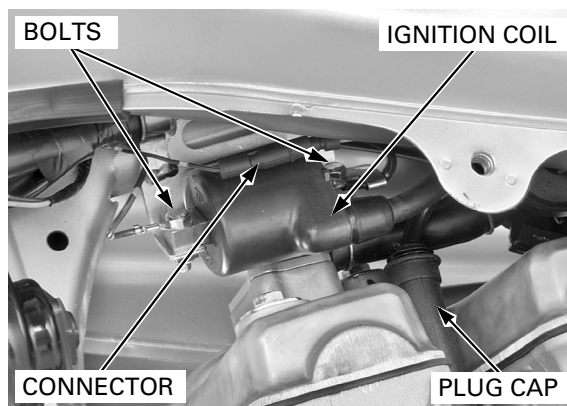
### REMOVAL/INSTALLATION

Remove the left side shroud (page 2-7).

Disconnect the spark plug cap from the spark plug. Disconnect the primary wire connector. Remove the bolts and ignition coil.

Installation is in the reverse order of removal.

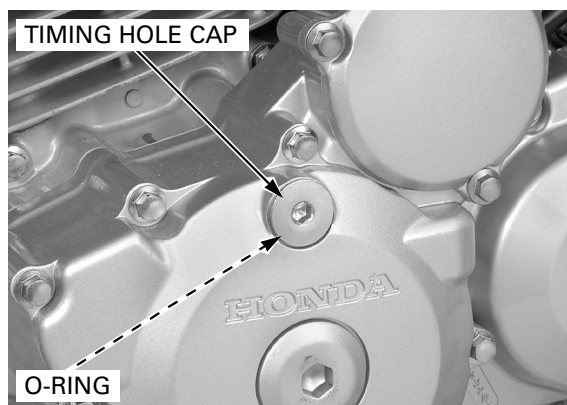
*Route the wire properly (page 1-17).*



## IGNITION TIMING

Warm up the engine.

Stop the engine and remove the timing hole cap and O-ring.



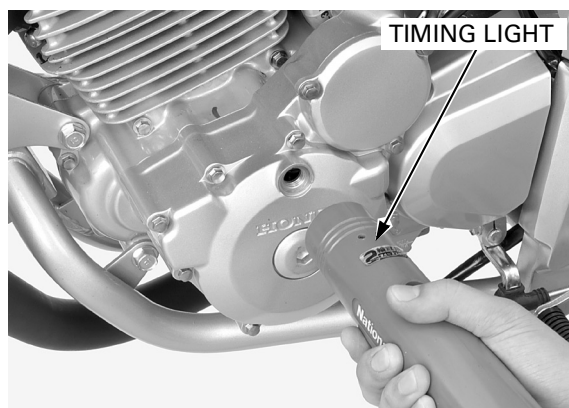
## IGNITION SYSTEM

*Read the instructions for timing light operating.*

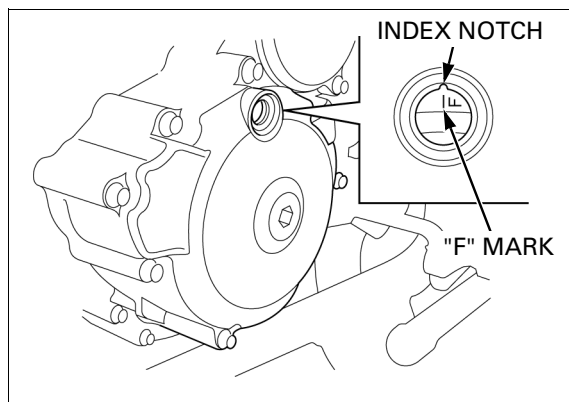
Connect the timing light to the spark plug wire.

Start the engine and let it idle.

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



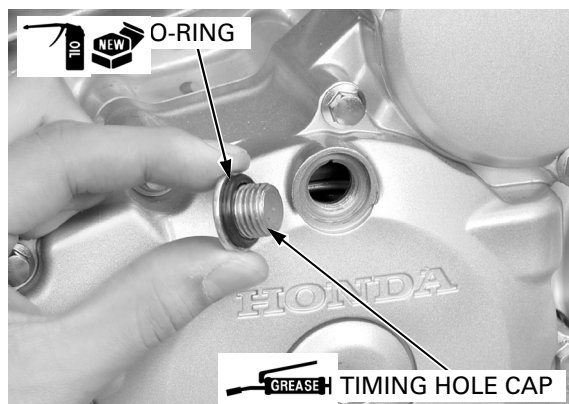
Rotate the crankshaft counterclockwise to align the "F" mark on the flywheel with the index notch of the timing hole in the left crankcase cover.



Coat a new O-ring with engine oil and install it onto the timing hole cap.

Apply grease to the timing hole cap thread. Install and tighten the timing hole cap to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



## IGNITION CONTROL MODULE (ICM)

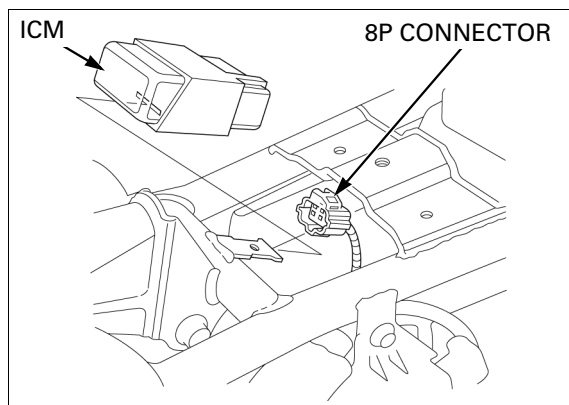
### REMOVAL/INSTALLATION

Remove the fuel tank (page 2-7).

Remove the ICM from the frame with the rubber suspender.

Disconnect the ICM 8P connector.

Installation is in the reverse order of removal.



# 17. ELECTRIC STARTER

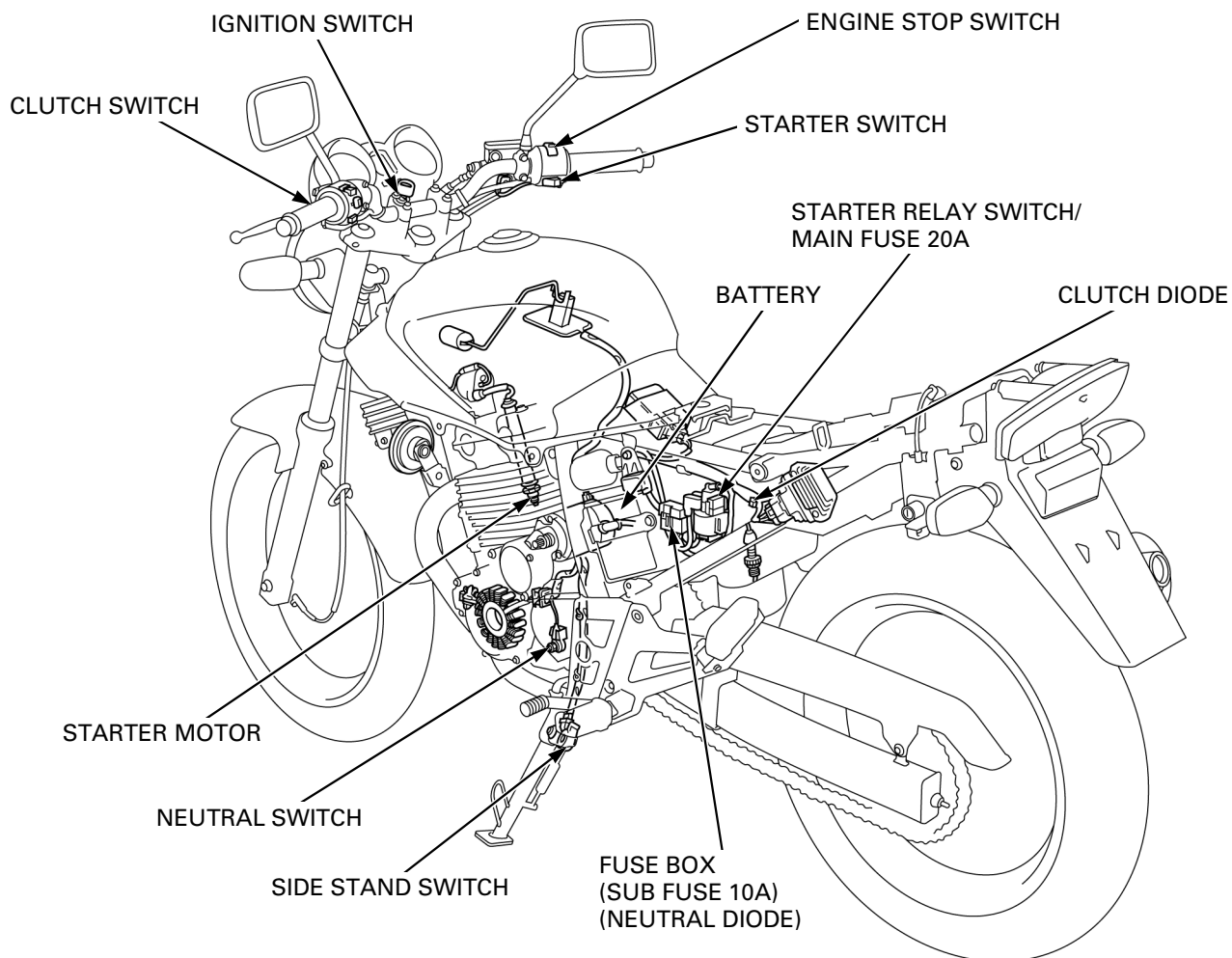
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SYSTEM DIAGRAM.....	17-2	STARTER RELAY SWITCH.....	17-13
SERVICE INFORMATION .....	17-3	CLUTCH/NEUTRAL DIODE.....	17-14
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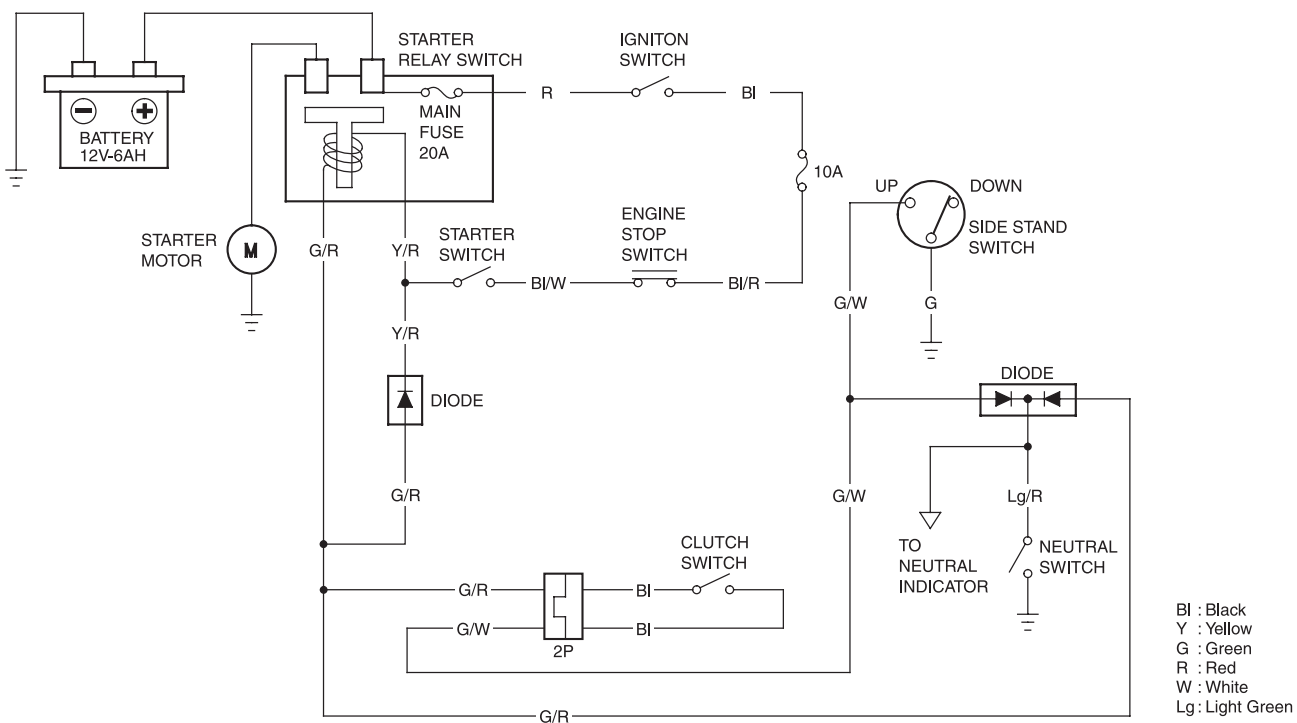


## ELECTRIC STARTER

### SYSTEM 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 installed in the frame.
- When checking the electric starter system, always follow the steps in the troubleshooting flow chart (page 17-4).
- 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.
- See section 10 for starter clutch servicing.
- See page 18-2 for following components:
  - Ignition switch
  - Starter switch
  - Neutral switch
  - Clutch switch
  - Engine stop switch
  - Side stand switch

### SPECIFICATIONS

Unit: mm (in)

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

# TROUBLESHOOTING

### **Starter motor does not turn**

#### **1. Fuse Inspection**

Check for blown sub fuse (10 A).

***Is the fuse blown?***

**YES** – Replace the fuse

**NO** – GO TO STEP 2.

#### **2. Battery Inspection**

Make sure the battery is fully charged and in good condition.

***Is the battery in good condition?***

**YES** – GO TO STEP 3.

**NO** – Charge or replace the battery (page 15-5)

#### **3. Battery Cable Inspection**

Check the battery cables for loose or poorly connected terminal, and for an open circuit.

***Is the battery cable in good condition?***

**YES** – GO TO STEP 4.

**NO** – 

- Loose or poorly connected battery cables
- Open circuit in the battery cable

#### **4. Starter Motor Cable Inspection**

Check the starter motor cable for loose or poorly connected terminal, and for an open circuit.

***Is the loose or poorly?***

**YES** – 

- Loose or poorly connected starter motor cable
- Open circuit in the starter motor cable

**NO** – GO TO STEP 5.

#### **5. Starter Relay Switch Operation Inspection**

Check the operation of the starter relay switch (page 17-13).

***Does the starter relay switch click?***

**YES** – GO TO STEP 6.

**NO** – GO TO STEP 7.

#### **6. Starter Motor Inspection**

Connect the starter motor terminal to the battery positive terminal directly (A large amount of current flows, so do not use a thin wire).

***Does the starter motor turn?***

**YES** – 

- Faulty starter relay switch
- Poorly connected starter motor cable

**NO** – Faulty starter motor

#### **7. Relay Coil Ground Line Inspection**

Check the ground line of the starter relay switch (page 17-13).

***Is the ground line normal?***

**YES** – GO TO STEP 8.

**NO** – 

- Faulty neutral switch (page 18-22)
- Faulty neutral diode (page 17-15)
- Faulty clutch diode (page 17-14)
- Faulty clutch switch (page 18-22)
- Faulty side stand switch (page 18-23)
- Loose or poor contact connector
- Open circuit in the wire harness

**8. Starter Relay Voltage Inspection**

Connect the starter relay switch 4P connector.

With the ignition switch to "ON" and the engine stop switch to "○", measure the voltage at the starter relay switch 4P connector (between Yellow/red (+) and body ground (-)) when the starter switch is pushed.

***Is the starter relay switch operation correct?***

**YES** – GO TO STEP 9.

**NO** –

- Faulty ignition switch (page 18-19)
- Faulty engine stop switch (page 18-20)
- Faulty starter switch (page 18-20)
- Loose or poor contact connector
- Open circuit in the wire harness

**9. Starter Relay Switch Continuity Inspection**

Connect the starter relay switch 4P connector.

Turn the ignition switch to "ON" and the engine stop switch to "○", check for continuity at the starter relay switch terminals when the starter switch is pushed.

***Is there continuity?***

**NO** – Faulty starter relay switch

**YES** – Loose or poor contact of the starter relay switch connector

**The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.**

**1. Clutch Switch Inspection**

Check the clutch switch operation (page 18-22).

***Is the clutch switch operation normal?***

**NO** –

- Faulty clutch switch (page 18-22)
- Faulty clutch diode (page 17-14)

**YES** – GO TO STEP 2.

**2. Side Stand Switch Inspection**

Check the side stand switch operation (page 18-23).

***Is the side stand switch operation normal?***

**NO** – Faulty side stand switch (page 18-23)

**YES** –

- Open circuit in the wire harness
- Loose or poor contact connector

**Starter motor turns slowly**

- Weak battery
- Poorly connected battery cable(s)
- Poorly connected starter motor cable
- Faulty starter motor

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

- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch (page 10-9)
- Damaged or faulty starter idle gear and/or reduction gear (page 10-6)

**Starter relay switch clicks, but engine does not turn over**

- Crankshaft does not turn due to engine problem
- Faulty starter reduction gear or idle gear

# STARTER MOTOR

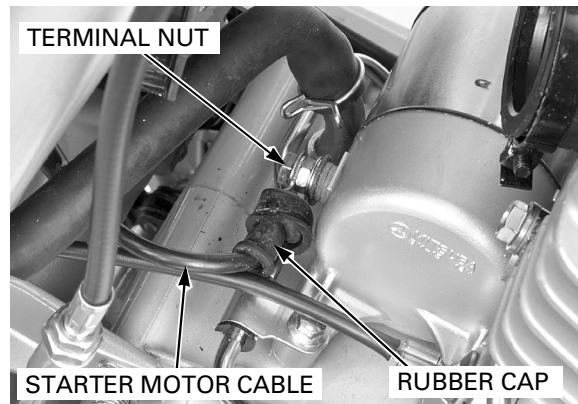
### REMOVAL

Disconnect the battery negative (-) cable (page 15-5).

Remove the carburetor (page 5-7).

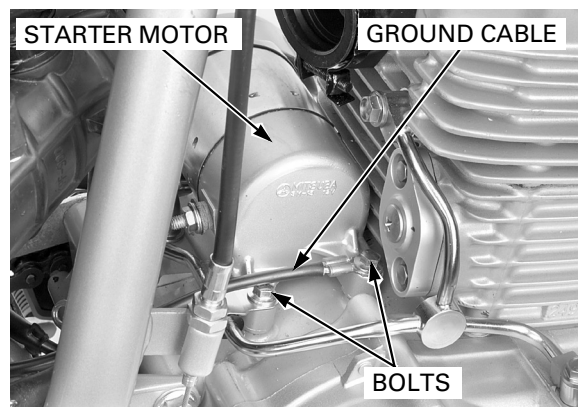
Remove the rubber cap.

Remove the starter motor terminal nut and starter motor cable.

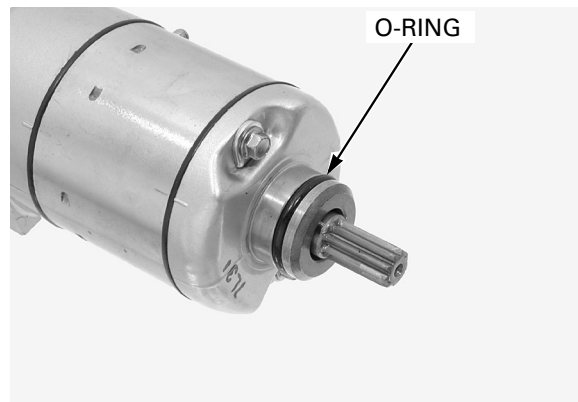


Remove the starter motor mounting bolts and ground cable.

Remove the starter motor from the crankcase.



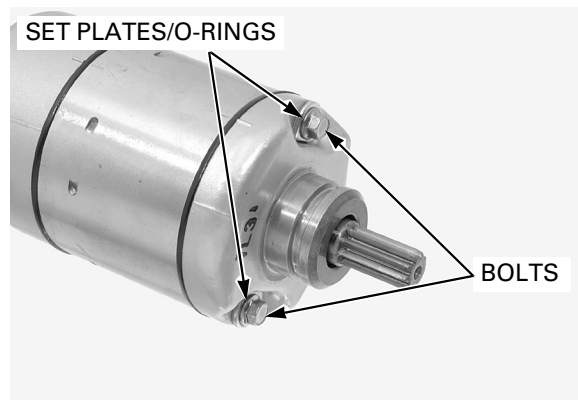
Remove the O-ring from the starter motor.



### DISASSEMBLY

Remove the following:

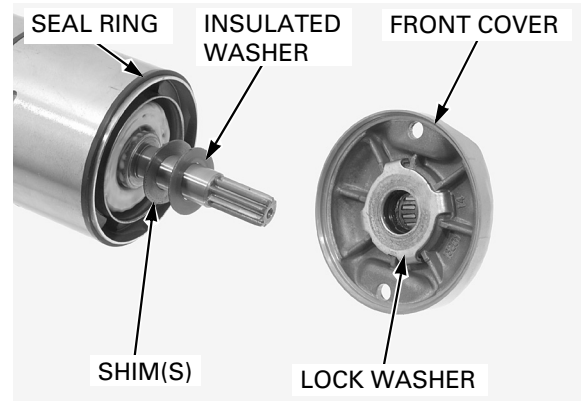
- Starter motor case bolts
- Set plates
- O-rings



- Front cover
- Lock washer
- Insulated washer
- Shim(s)
- Seal ring

NOTE:

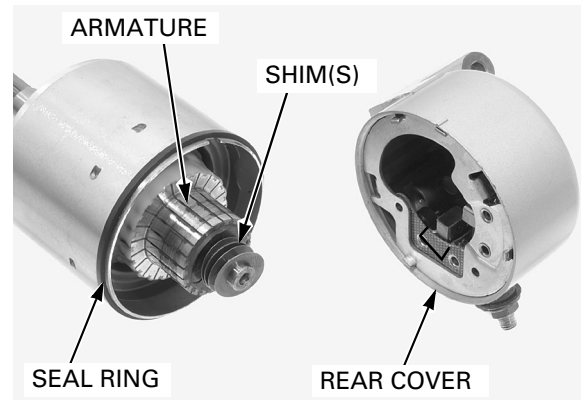
Record the location and number of shim(s).



- Rear cover
- Shim(s)
- Seal ring
- Armature

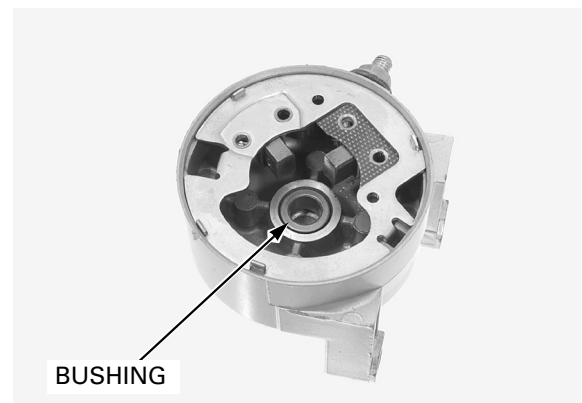
NOTE:

Record the location and number of shim(s).

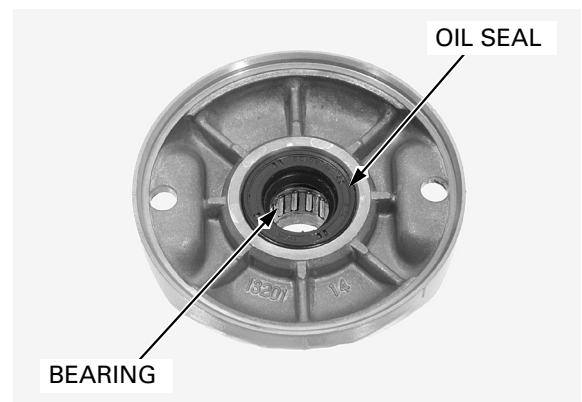


### INSPECTION

Check the bushing in the rear cover for wear or damage.



Check the needle bearing and oil seal in the front cover for wear or damage.



## ELECTRIC STARTER

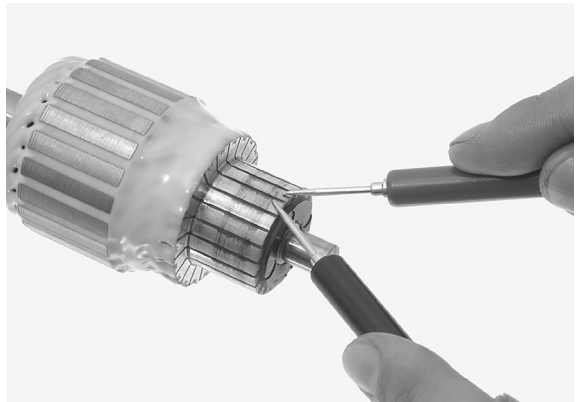
*Do not use emery or sand paper on the commutator.*

Check the commutator bars of the armature for discoloration.



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.

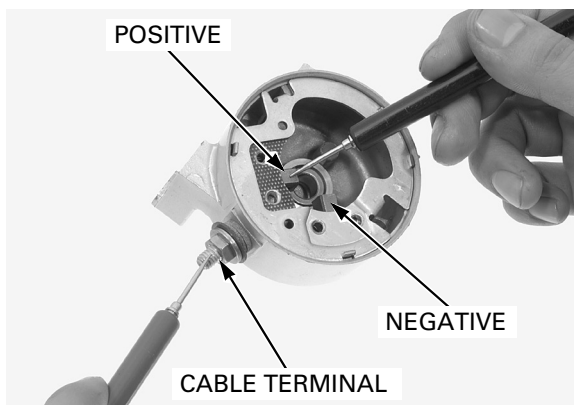


Check for continuity between the positive terminal and cable terminal.

There should be continuity.

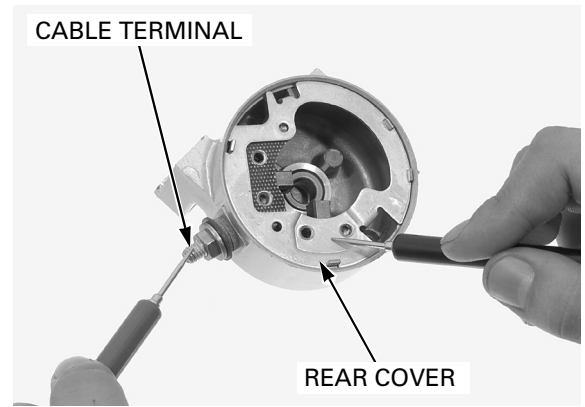
Check for continuity between the negative terminal and cable terminal.

There should be no continuity.



Check for continuity between cable terminal and rear cover.

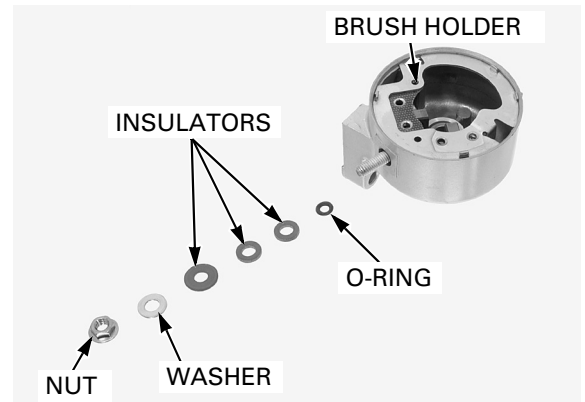
There should be no continuity.



*Record the location  
and number of  
Insulators*

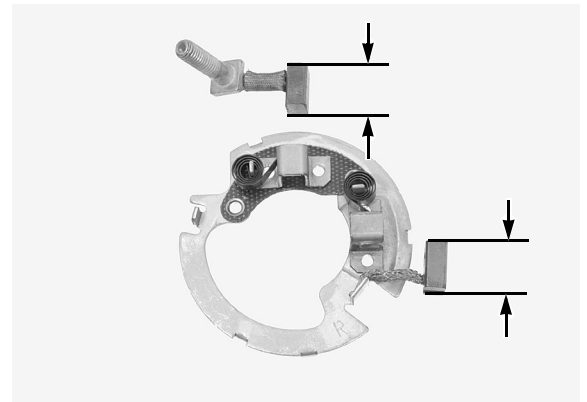
Remove the following from the rear cover:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly



Inspect the brushes for damage and measure the brush length.

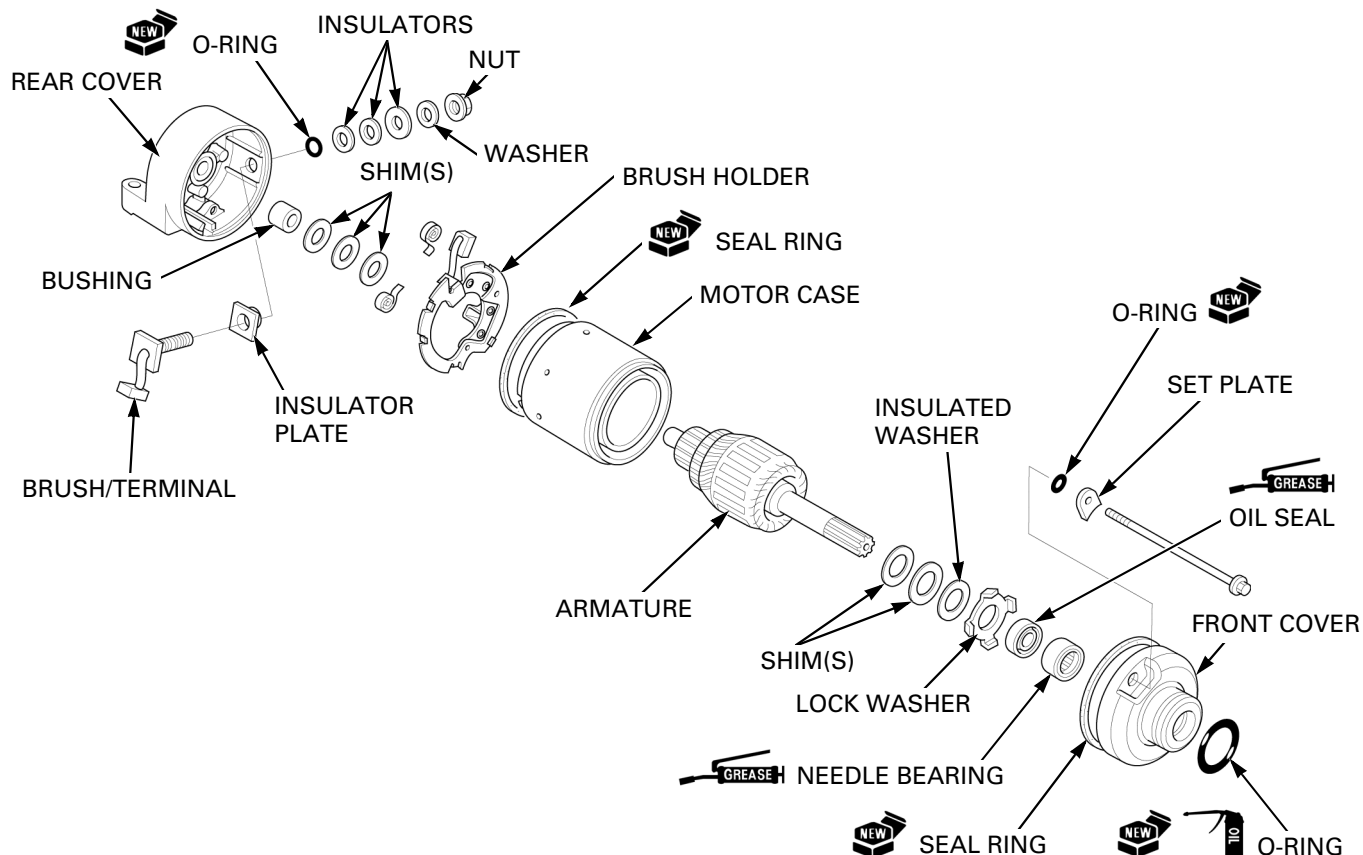
**SERVICE LIMIT: 8.5 mm (0.33 in)**





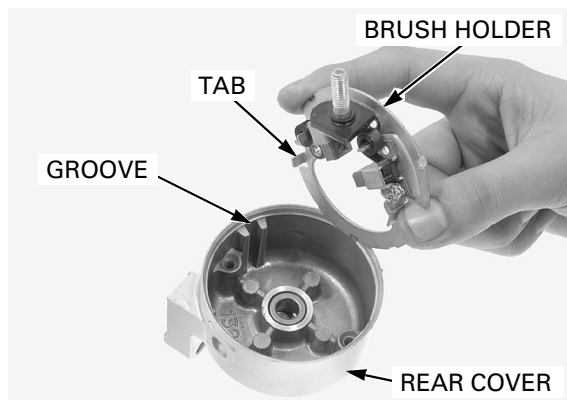
# ELECTRIC STARTER

## ASSEMBLY



Install the brushes into the brush holder.

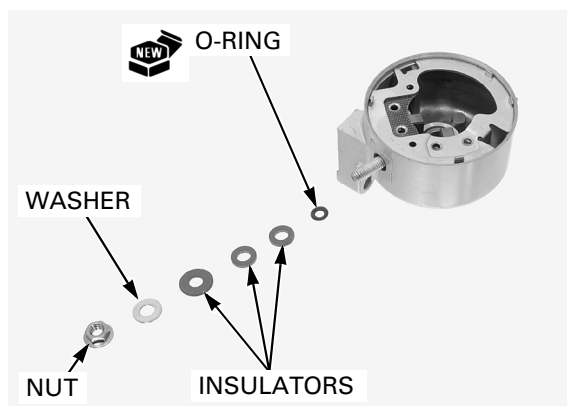
Install the brush holder assembly into the rear cover while aligning the tab of the holder with the groove in the rear cover.



Install the insulators properly as noted during removal.

Install the following:

- New O-ring
- Insulators
- Washer
- Nut

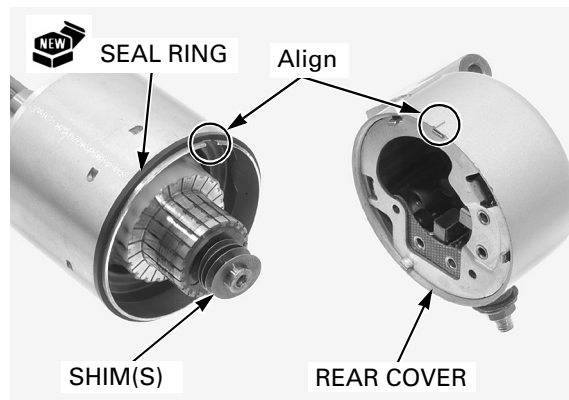
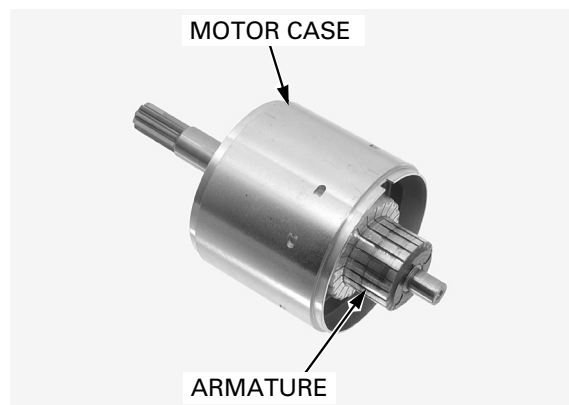


Install the armature into the motor case while holding the armature tightly to keep the magnet of the case from pulling the armature against it.

## NOTICE

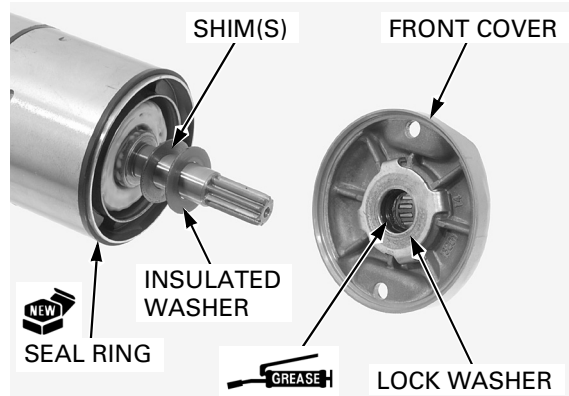
*The coil may be damaged if the magnet pulls the armature against the case.*

Install the same number of shim(s) in the same locations as noted during disassembly.  
Install a new seal ring.  
Install the rear cover while aligning the brush holder tab with the motor case groove.

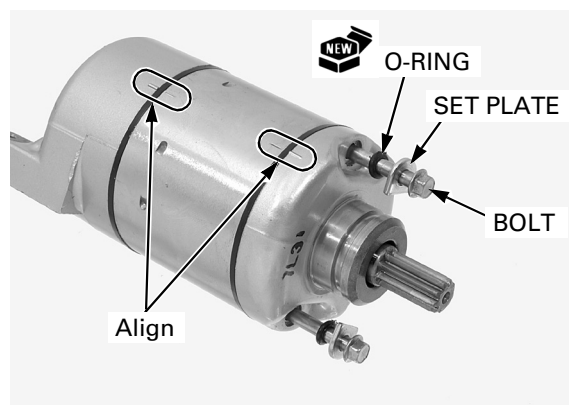


Install the same number of shim(s) in the same locations as noted during disassembly.  
Install the insulated washer onto the armature shaft.  
Install a new seal ring onto motor case.  
Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover.  
Install the front cover.



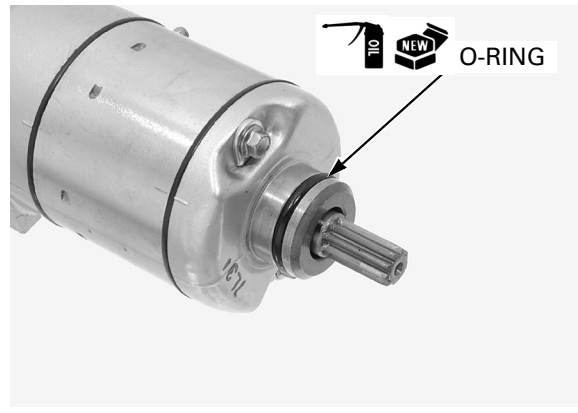
Make sure the index lines are aligned.  
Install the set plates and new O-rings onto the motor case bolts.  
Install and tighten the motor case bolts securely.



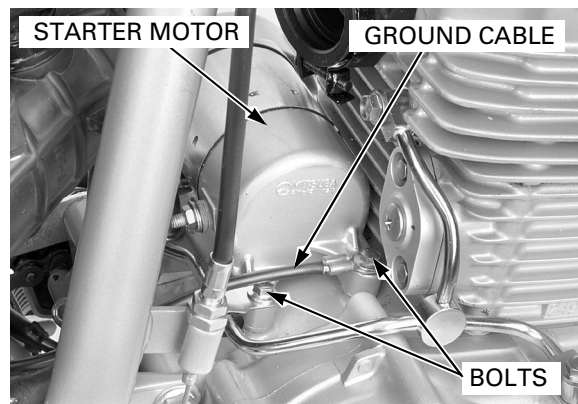
## ELECTRIC STARTER

### INSTALLATION

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



Install the starter motor onto the crankcase.  
Install the ground cable and starter motor mounting bolts.  
Tighten the starter motor mounting bolts securely.

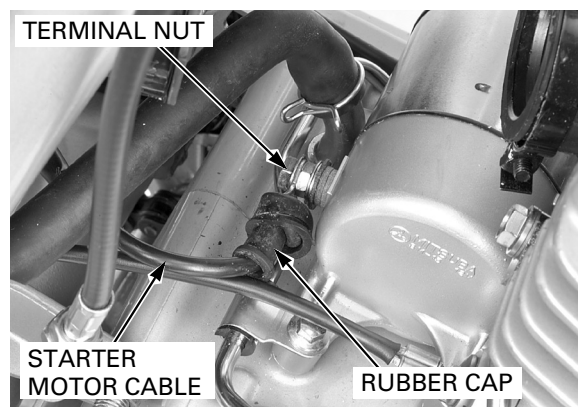


Install the starter motor cable, then tighten the terminal nut securely.

Install the rubber cap over the starter motor terminal securely.

Install the carburetor (page 5-16).

Connect the battery negative (-) cable (page 15-5).



## STARTER RELAY SWITCH

### OPERATION INSPECTION

#### NOTE:

Before checking the starter relay switch, check for battery condition (page 15-5).

Remove the left side cover (page 2-4).

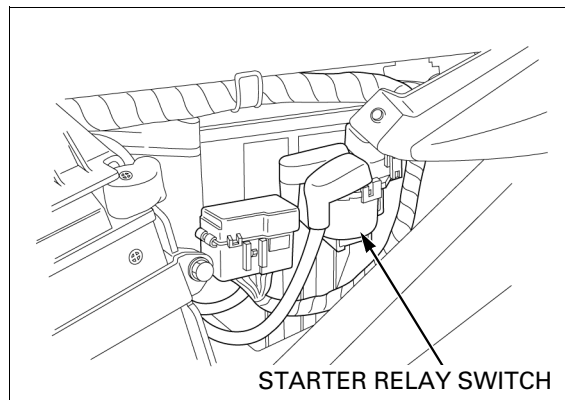
Shift the transmission into neutral.

Turn the ignition switch to "ON" and engine stop switch to "O".

Depress the starter switch.

The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.



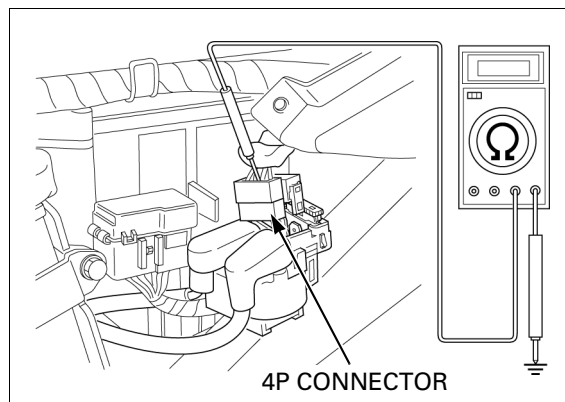
### GROUND LINE INSPECTION

Remove the starter relay switch from the holder with connected the wire and cables.

Disconnect the starter relay switch 4P connector.

Check for continuity between the Green/Red (ground line) and body ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is up position, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).



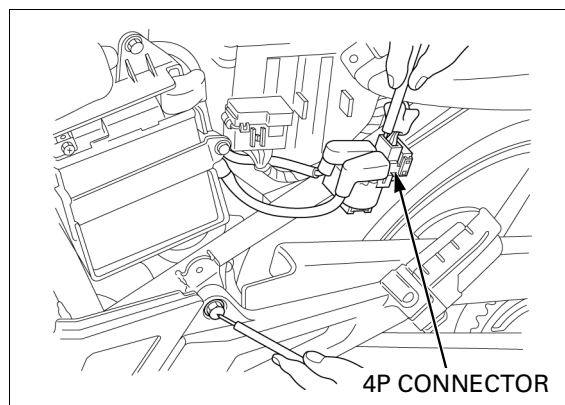
### STARTER RELAY VOLTAGE INSPECTION

Connect the starter relay switch 4P connector.

Shift the transmission into neutral.

Measure the voltage between the Yellow/Red (+) wire at the starter relay switch 4P connector and body ground.

If the battery voltage appears only when the starter switch is pressed with the ignition switch ON and engine stop switch is "O" position, it is normal.



## ELECTRIC STARTER

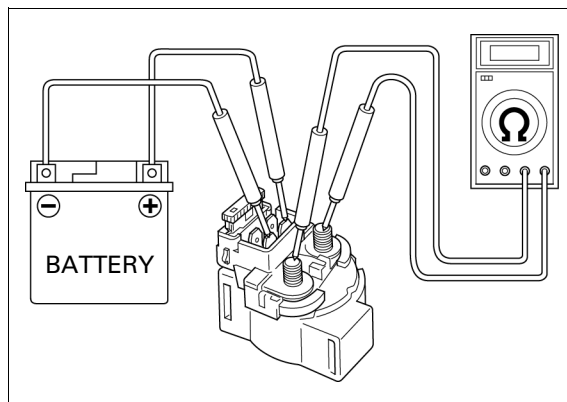
### CONTINUITY INSPECTION

Disconnect the battery negative (–) cable.

Disconnect the 4P connector, battery positive (+) cable and starter motor cable from the starter relay switch.

Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Green/Red wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.

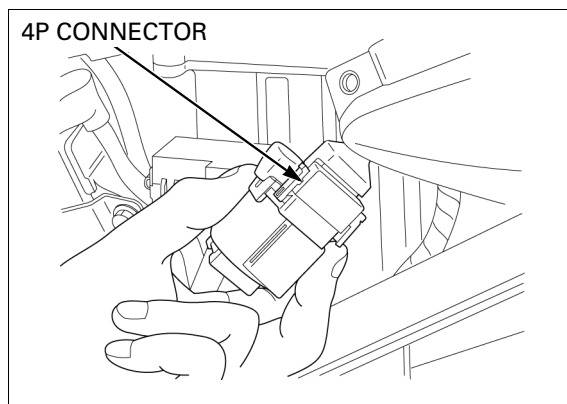


### REMOVAL/INSTALLATION

Remove the left side cover (page 2-4).

Disconnect the battery negative (–) cable (page 15-5).

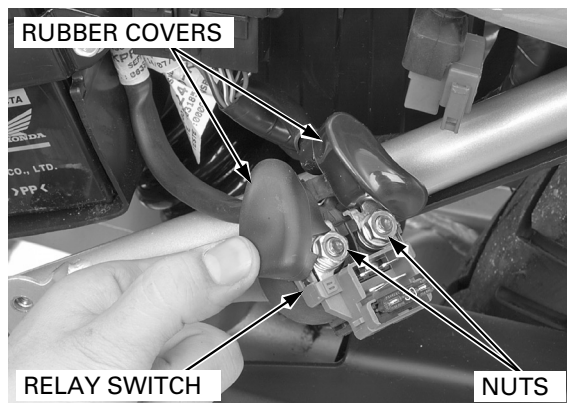
Disconnect the starter relay 4P connector.



Slide the rubber covers and remove the nuts and cables.

Remove the starter relay switch.

Installation is in the reverse order of removal.

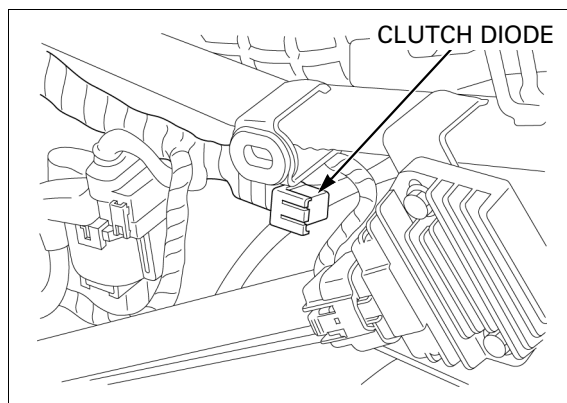


## CLUTCH/NEUTRAL DIODE

### CLUTCH DIODE INSPECTION

Remove the rear cowl (page 2-5).

Remove the clutch diode.

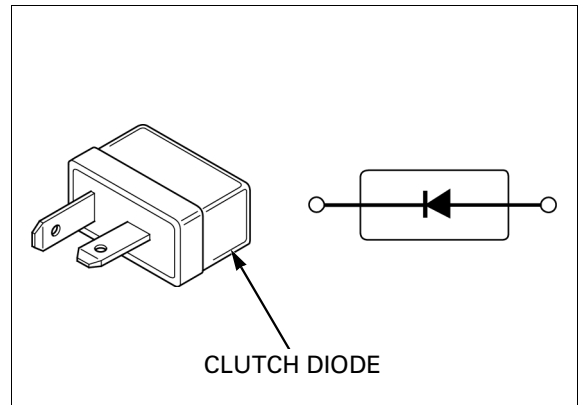


Check for continuity between the clutch diode terminals.

When there is continuity, a small resistance value will register.

If there is continuity in one direction, the clutch diode is normal.

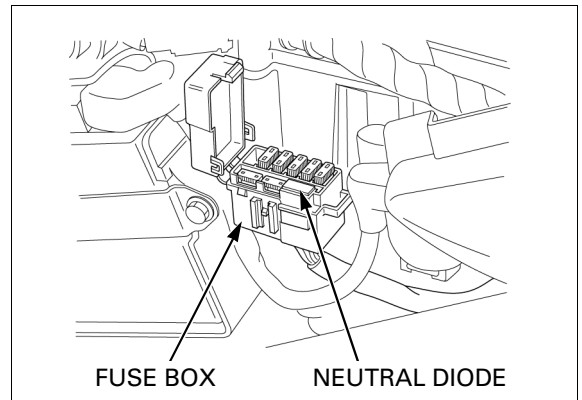
Installation is in the reverse order of removal.



## NEUTRAL DIODE INSPECTION

Remove the left side cover (page 2-4).

Open the fuse box and remove the neutral diode.



Check for continuity between the neutral diode terminals.

### CONNECTION:

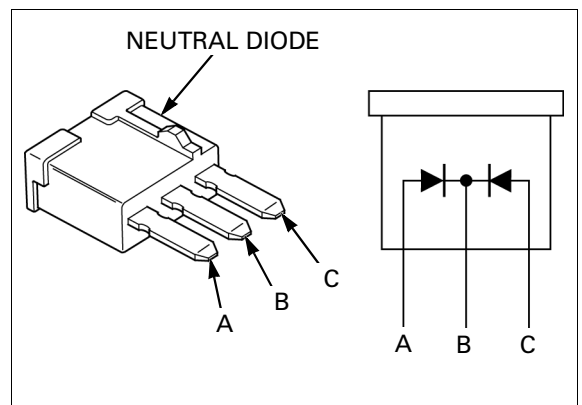
A – B

C – B

When there is continuity, a small resistance value will register.

if there is continuity in one direction, the neutral diode is normal.

Installation is in the reverse order of removal.



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## MEMO

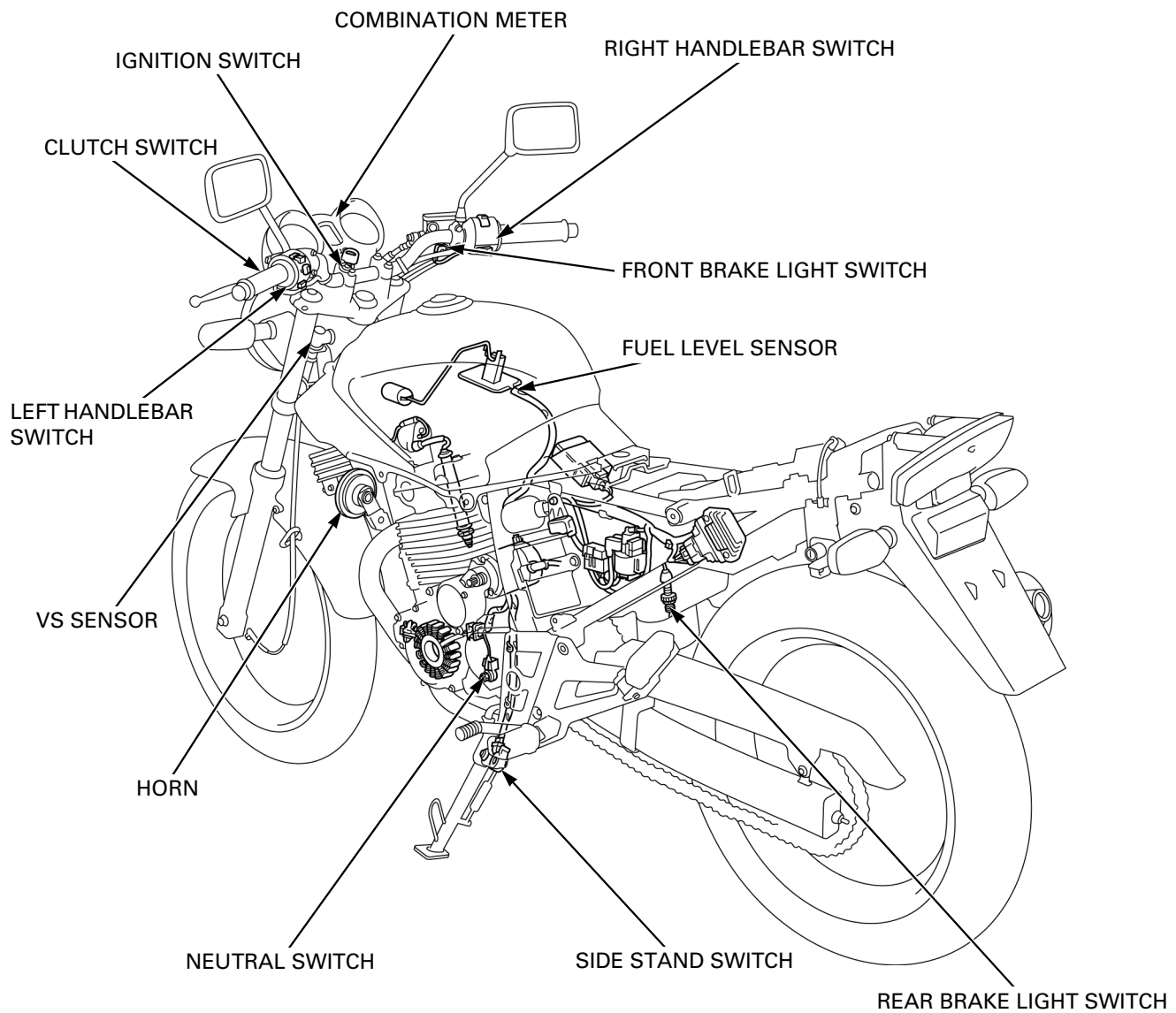
# 18. LIGHTS/METERS/SWITCHES

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SYSTEM LOCATION.....	18-2	FUEL LEVEL SENSOR.....	18-18
SERVICE INFORMATION .....	18-3	IGNITION SWITCH .....	18-19
TROUBLESHOOTING .....	18-5	HANDLEBAR SWITCHES .....	18-20
HEADLIGHT.....	18-7	BRAKE LIGHT SWITCHES.....	18-21
TURN SIGNAL LIGHTS .....	18-9	CLUTCH SWITCH .....	18-22
BRAKE/TAIL LIGHT .....	18-10	NEUTRAL SWITCH.....	18-22
COMBINATION METER.....	18-11	SIDE STAND SWITCH .....	18-23
SPEEDOMETER/VS SENSOR.....	18-15	TURN SIGNAL RELAY.....	18-24
TACHOMETER .....	18-17	HORN .....	18-25



**SYSTEM LOCATION**



## SERVICE INFORMATION

### GENERAL

- A halogen headlight bulb becomes very hot while the headlight is "ON", and remain hot for a while after it is turned "OFF". Be sure to let it cool down before servicing.
- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- 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	12 V – 35/35 W
	Brake/tail light	12 V – 21/5 W
	Front turn signal light	12 V – 16 W x 2
	Rear turn signal light	12 V – 16 W x 2
	Turn signal indicator	LED x 2
	High beam indicator	LED
	Neutral indicator	LED
	Instrument light	LED x 3
	Side stand indicator	LED x 2
	Speedometer light	LED x 5
	Tachometer light	LED x 5
Fuse	Main fuse	20 A
	Sub fuse	10 A x 3, 5 A x 2
Tachometer input peak voltage		10.5V minimum
Fuel level sensor resistance (20 °C/68 °F)	Top (FULL)	4 – 10 Ω
	Bottom (EMPTY)	90 – 100 Ω

### TORQUE VALUES

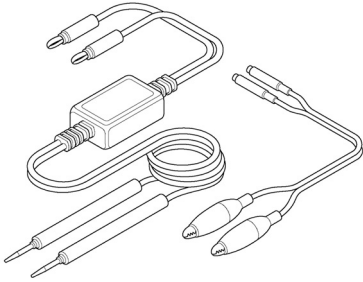
Side stand pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Side stand lock nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	U-nut
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Neutral switch wire nut	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	

## LIGHTS/METERS/SWITCHES

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### TOOL

Imrie diagnostic tester (model 625)  
or Peak voltage adaptor  
07HGJ-0020100



with commercially available digital  
multimeter (impedance 10 M $\Omega$ /DCV  
minimum)

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## TROUBLESHOOTING

### VS SENSOR/SPEEDOMETER

**The odometer/trip meter operates normally, but the speedometer does not operate**  
Faulty speedometer

**The speedometer operates normally, but the odometer/trip meter does not operate**

- Faulty odometer/trip meter
- Blown sub fuse (5A)
- Open circuit Red/Green or Red wires

**The speedometer operation is abnormal**

#### 1. Fuse Inspection

Check for blown main or sub fuses.

***Did the fuse blown?***

**YES** – Replace the fuse

**NO** – GO TO STEP 2.

#### 2. Battery Inspection

Make sure the battery is fully charged and in good condition.

***Is the battery in good condition?***

**YES** – GO TO STEP 3.

**NO** – Replace the battery

#### 3. VS Sensor Power Input Voltage Inspection (Combination Meter Side)

Check for loose or poor contact of the combination meter connectors.

With the ignition switch "ON" and measure the voltage at bottom of the combination meter terminals.

***Is there Battery Voltage?***

- NO** – • Loose or poor contact of related terminals  
• Open circuit in Black/Brown or Red/Green wires between the fuse box and combination meter

**YES** – GO TO STEP 4.

#### 4. VS Sensor Power Input Voltage Inspection (VS Sensor Side)

Check for loose or poor contact of the VS sensor 3P (Black) connector.

With the ignition switch "ON", and measure the voltage at the VS sensor connector.

***Is there Battery Voltage?***

- NO** – • Loose or poor contact of related terminals  
• Open circuit in Black or Blue/Black wires between the combination meter and VS sensor

**YES** – GO TO STEP 5.

#### 5. VS Sensor Signal Line Inspection

With the ignition switch "OFF", check for continuity of the White/Blue wire between the terminals of the VS sensor and combination meter.

***Is there continuity?***

**NO** – Open circuit in White/Blue wire

**YES** – GO TO STEP 6.

## LIGHTS/METERS/SWITCHES

---

### 6. VS Sensor Signal Inspection

Support the motorcycle using a hoist or other support to raise the front wheel off the ground.

Measure the output voltage (sensor signal) at the speedometer with the ignition switch is "ON" while slowly turning the front wheel by your hand.

**CONNECTION:** White/Blue (+) – Blue/Black (–)

**STANDARD:** Repeat 0 to 12 V

*Is the voltage as specified?*

**NO** – • Faulty VS sensor or speedometer gear box  
• Loose speedometer cable

**YES** – Faulty speedometer

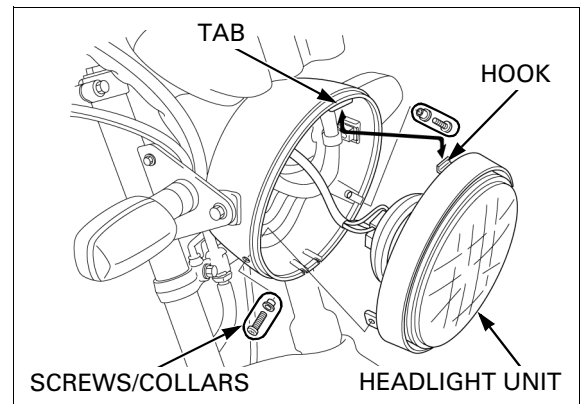
# HEADLIGHT

## BULB REPLACEMENT

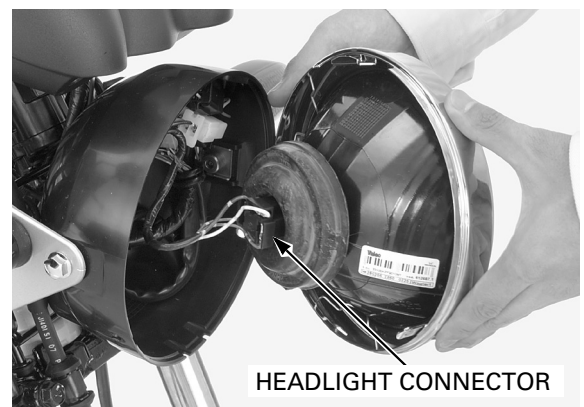
Remove the headlight unit mounting screws and collars.

*Be careful not to damage the tab and slot.*

Remove the headlight unit wire while releasing the hook from the tab of the headlight case.



Disconnect the headlight connector.



Remove the dust cover.

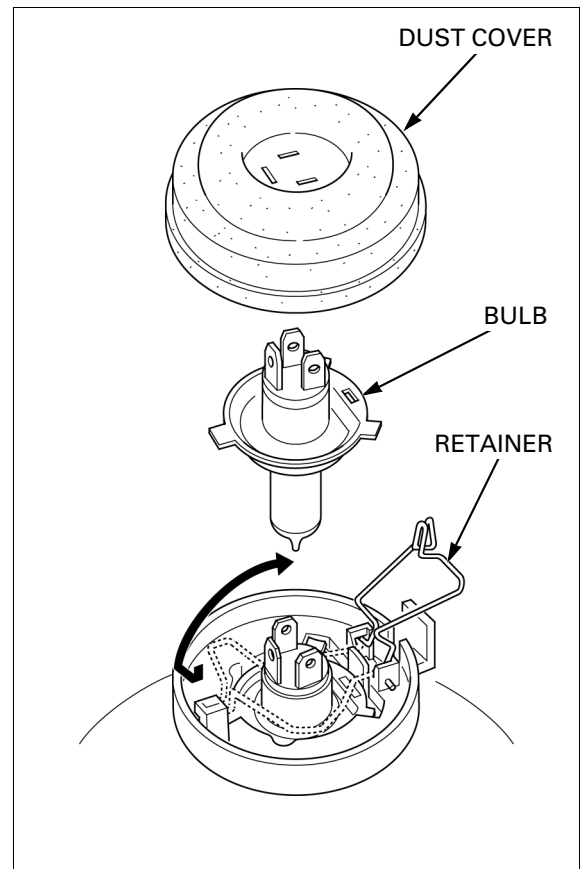
Unhook the bulb retainer and remove the headlight bulb.

### NOTICE

*Avoid touching halogen headlight bulb. Finger points can create hot spots that cause a bulb to break.*

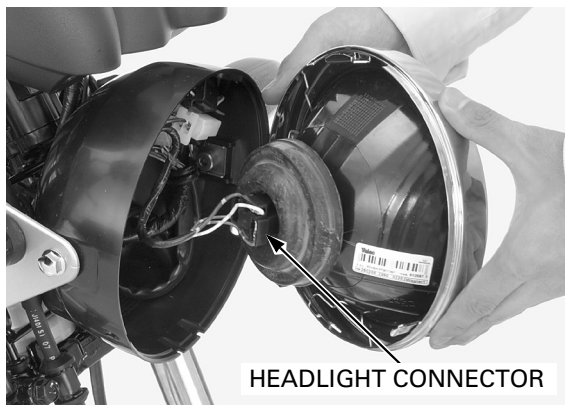
If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

Install a new headlight bulb aligning the tabs with the groove in the headlight unit.  
Hook the bulb retainer into the headlight unit groove.  
Install the dust cover.



## LIGHTS/METERS/SWITCHES

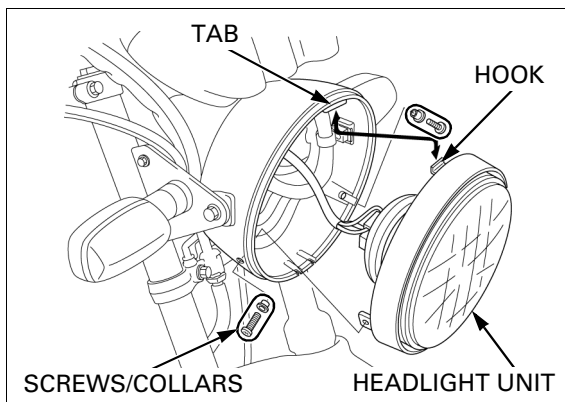
Connect the headlight connector.



*Be careful not to damage the tab and slot.*

Install the headlight unit while aligning the hook with the tab of the headlight case. Install the collars and headlight unit mounting screws. Tighten the headlight unit mounting screws securely.

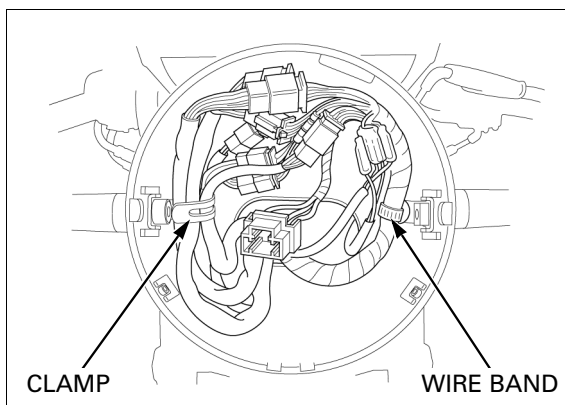
Adjust the headlight aim (page 3-24).



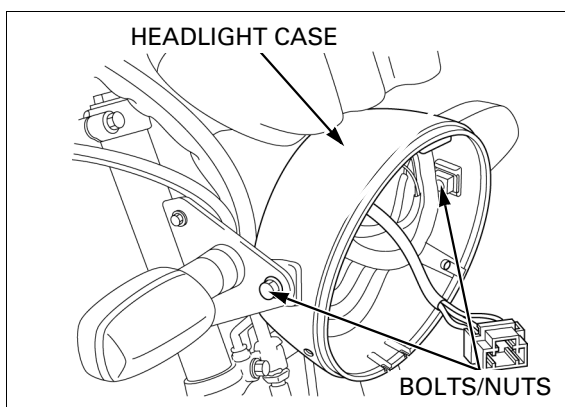
### HEADLIGHT CASE REMOVAL/INSTALLATION

Remove the headlight unit (page 18-7).

Release the wire harness from the clamp and wire band.



Remove the bolts, nuts and headlight case while routing the wire harness.



*Route the wires, wire harness properly (page 1-17).*

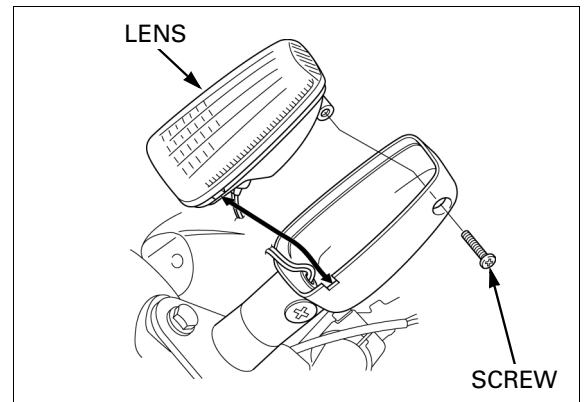
Installation is in the reverse order of removal.

Install the headlight unit (page 18-8).  
Adjust the headlight aim (page 3-24).

## TURN SIGNAL LIGHTS

### BULB REPLACEMENT

Remove the screw and turn signal light lens.

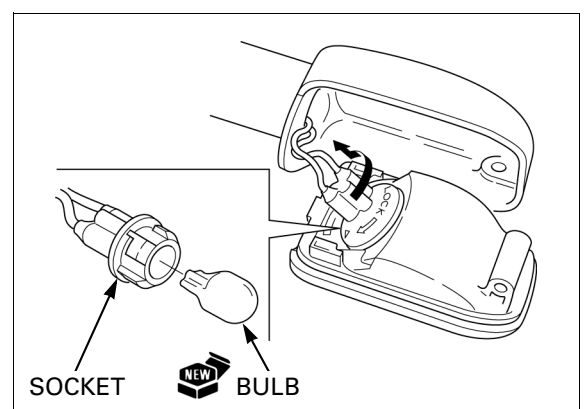


Rotate the bulb socket counterclockwise and remove it from the base.  
Replace the bulb with a new one.

Install the turn signal light lens in the reverse order of removal.

#### NOTE:

When turn signal light lens installation, align the tab on the lens with the groove on the turn signal light case.

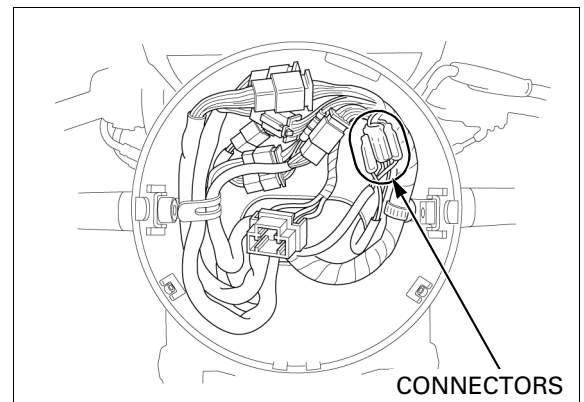


### REMOVAL/INSTALLATION

#### FRONT

Remove the headlight unit (page 18-7).

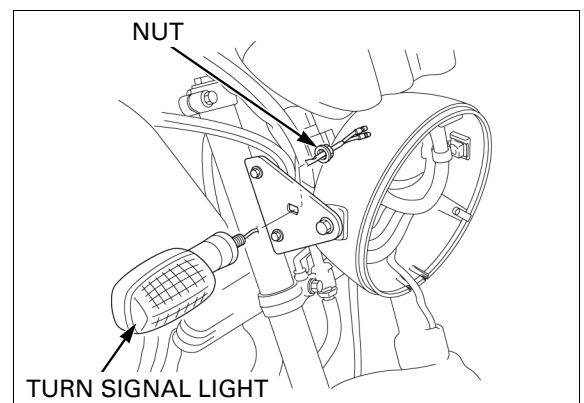
Disconnect the turn signal light connectors.



Remove the turn signal light wire from the headlight case.

Remove the nut and turn signal light.

Installation is in the reverse order of removal.



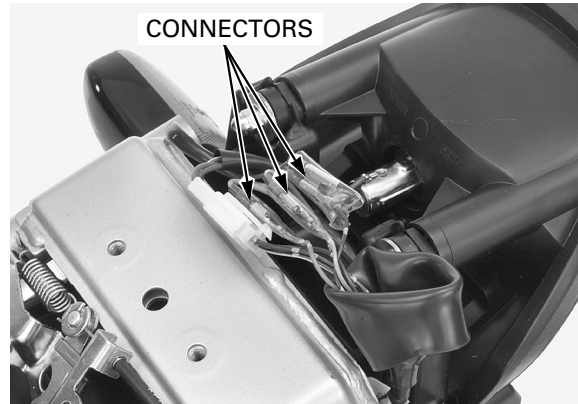


## LIGHTS/METERS/SWITCHES

### REAR

Remove the rear cowl (page 2-5).

Disconnect the turn signal light connectors.



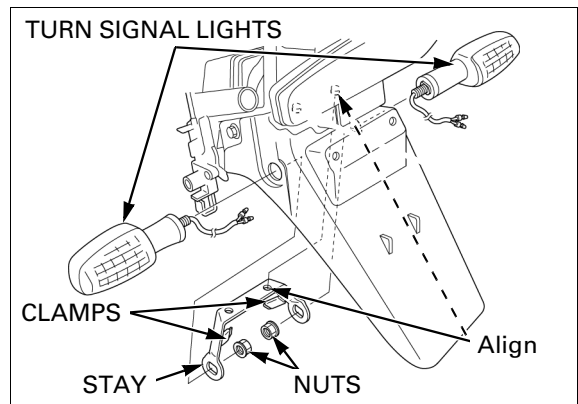
Remove the turn signal wires from the clamps.  
Remove the nuts, stay and turn signal lights.

Installation is in the reverse order of removal.

#### NOTE:

When installing the stay align the holes with the tabs of the rear fender.

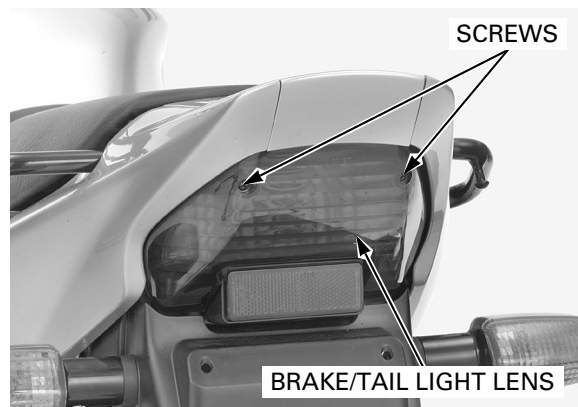
*Route the wires properly (page 1-17).*



## BRAKE/TAIL LIGHT

### BULB REPLACEMENT

Remove the screws and the brake/tail light lens.

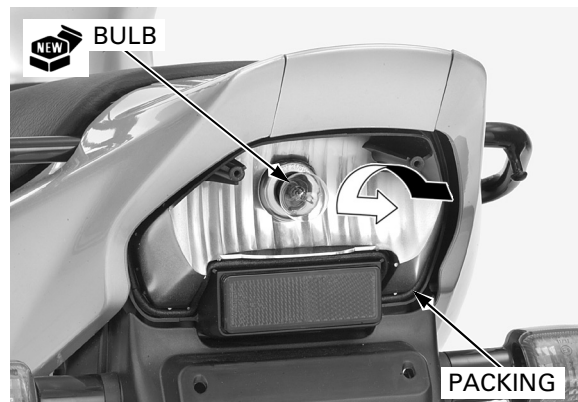


While pushing in, turn the bulb counterclockwise to remove it and replace it with a new one.

Installation is in the reverse order of removal.

#### NOTE:

Seat the rubber packing properly.



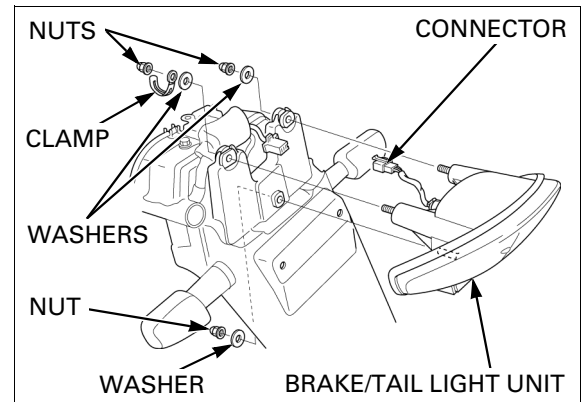
## REMOVAL /INSTALLATION

Remove the rear cowl (page 2-5).

Disconnect the brake/tail light connector.

Remove the nuts, clamp, washers, and brake/tail light unit.

Installation is in the reverse order of removal.



## COMBINATION METER

### POWER/GROUND LINE INSPECTION

Remove the headlight case (page 18-8).

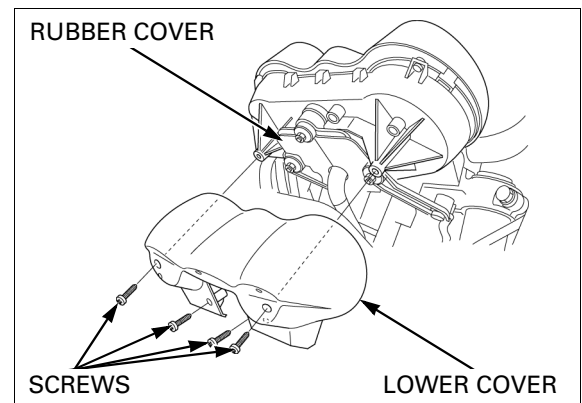
Remove the screws and combination meter lower cover.

Remove the rubber cover.

Expose the combination meter connector.

Check for loose or poor contact of the combination meter 16P connector, meter sub harness 6P and 9P connectors.

Check the following at the wire harness side connector terminals of the combination meter.



### POWER INPUT LINE

Measure the voltage between the Black/Brown wire terminal (+) and Green wire terminal (-).

There should be battery voltage with the ignition switch "ON".

If there is no voltage, check the following:

- Open circuit in Black/Brown wire and Green wire
- Blown sub-fuse (10A)

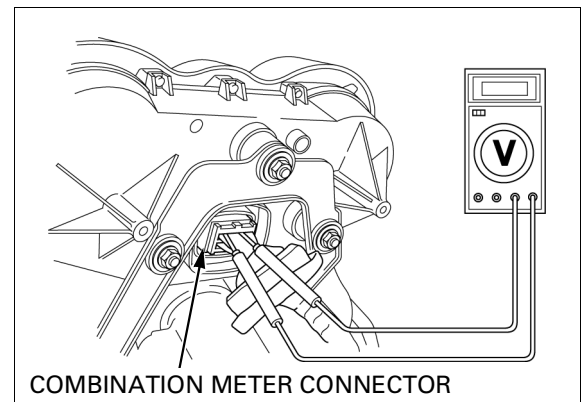
### BACK-UP VOLTAGE LINE

Measure the voltage between the Red/Green wire terminal (+) and Green wire terminal (-).

There should be battery voltage at all times.

If there is no voltage, check the following:

- Open circuit in Red/Green wire and Green wire
- Blown sub-fuse (5A)



## LIGHTS/METERS/SWITCHES

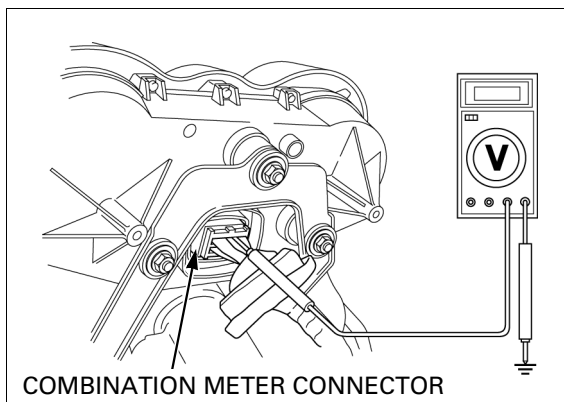
### GROUND LINE

Check for continuity between the Green wire terminal and Ground.

There should be continuity.

If there is no continuity, check for open circuit in Green wire.

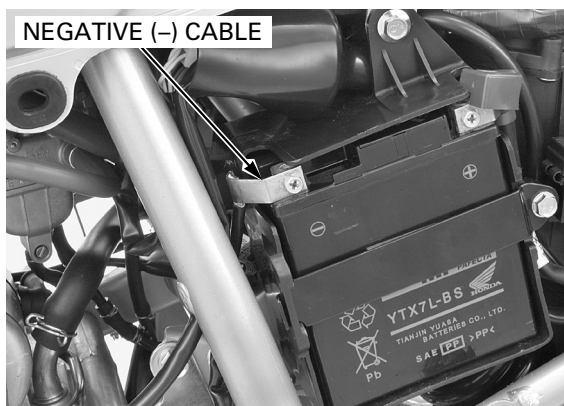
If power/ground line inspection is normal, perform the following inspection.



Remove the battery negative (-) cable to reset the combination meter.

After few seconds, connect the battery negative (-) cable and check the combination meter operation.

If the combination meter does not operate, replace the combination meter.

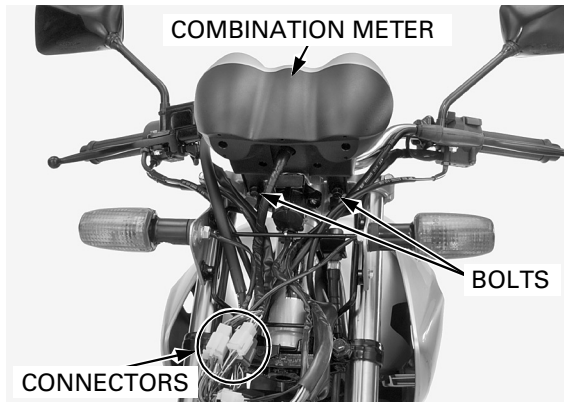


### REMOVAL

Remove the headlight case (page 18-8).

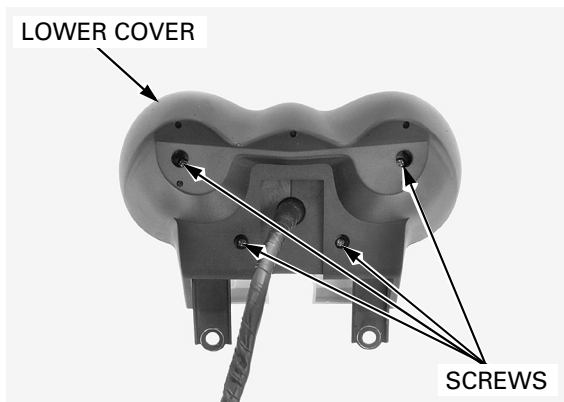
Disconnect the meter sub harness 6P and 9P connectors.

Remove the bolts and combination meter.

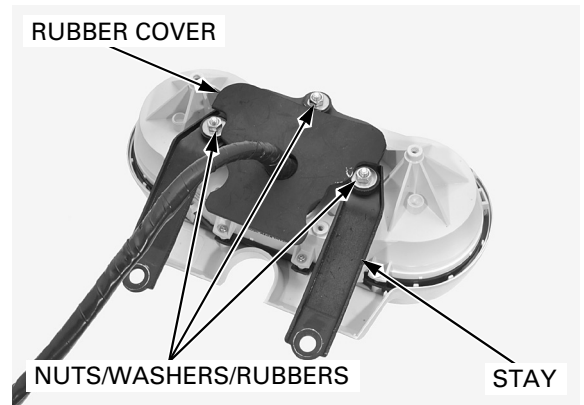


### DISASSEMBLY

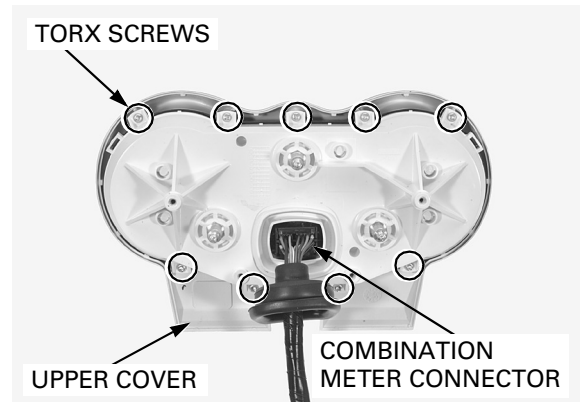
Remove the screws and combination meter lower cover.



Remove the rubber cover, nuts, washers, cushion rubbers and meter stay.

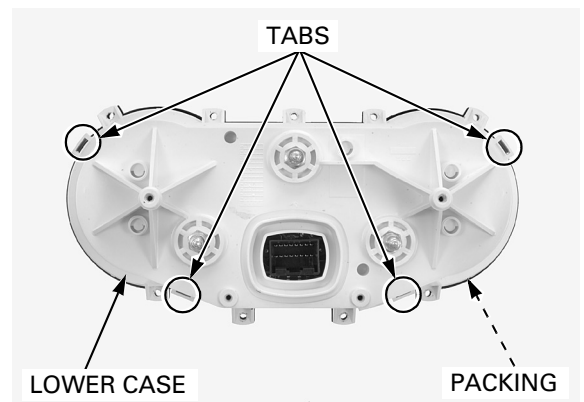


Disconnect the combination meter connector.  
Remove the torx screws and combination meter upper cover.



*Be careful not to damage the tabs.*

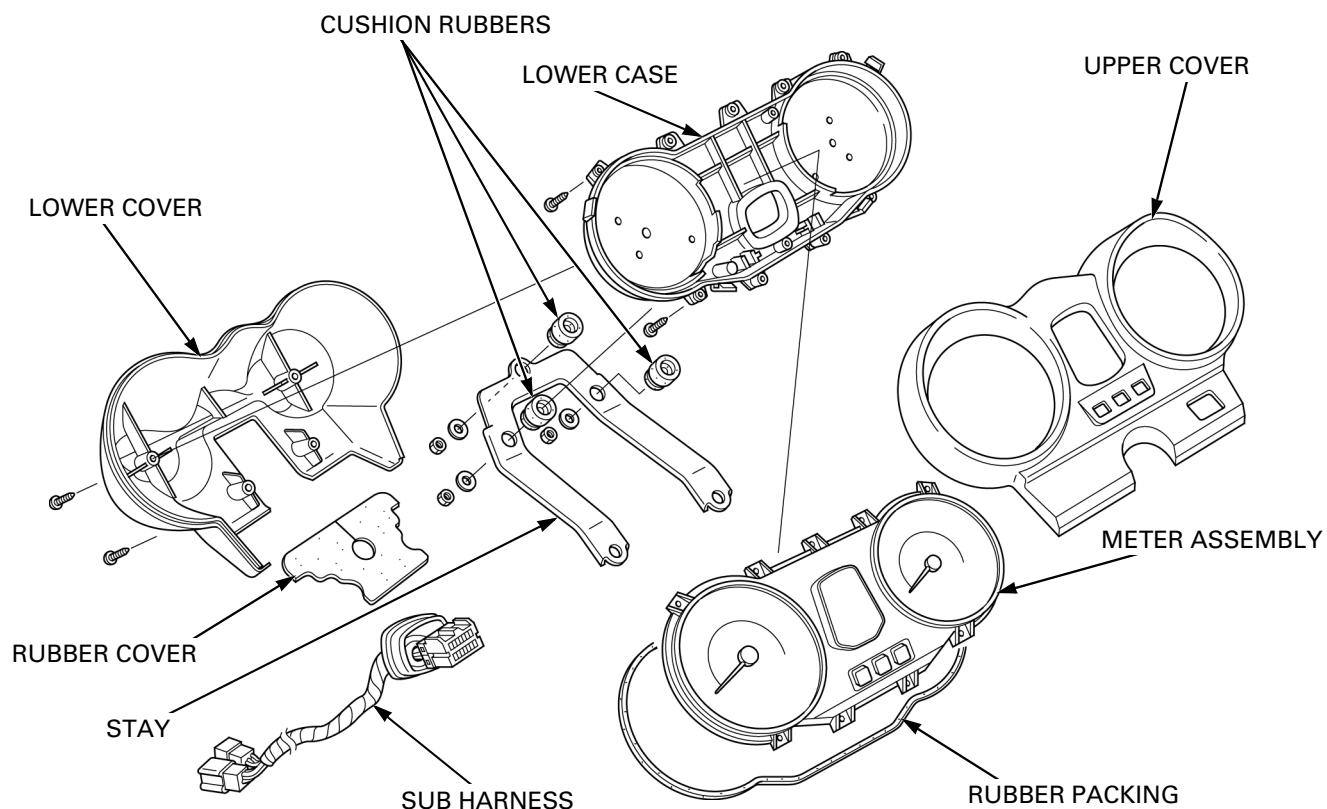
Remove the combination meter lower case and rubber packing.



## LIGHTS/METERS/SWITCHES

### ASSEMBLY

Assemble the combination meter in the reverse order of disassembly.

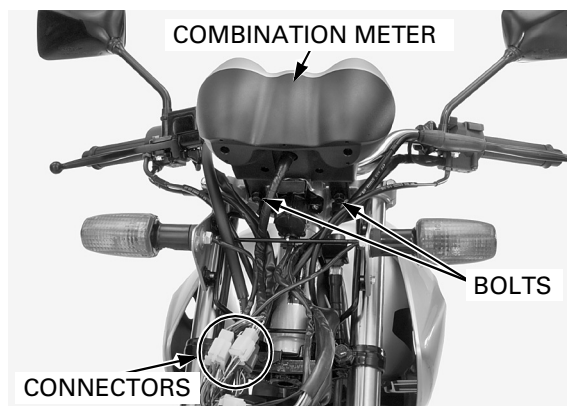


### INSTALLATION

Install the combination meter and tighten the bolts securely.

Connect the meter sub-harness 6P and 9P connectors.

Install the headlight case (page 18-8).



## SPEEDOMETER/VS SENSOR

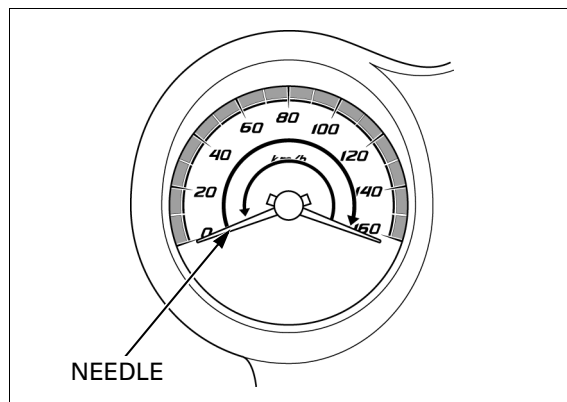
### SYSTEM INSPECTION

When the ignition switch is turned "ON", check that the speedometer needle moves to full scale and then returns to zero.

If the speedometer needle does not show initial function, check that the tachometer and meter display function properly.

If they do not function, perform the power and ground line inspection of the combination meter (page 18-11).

If they function, support the motorcycle securely and raise the front wheel off the ground, shift the transmission into neutral, and turn the ignition switch "ON".



Remove the combination meter lower cover (page 18-11) and expose the combination meter connector.

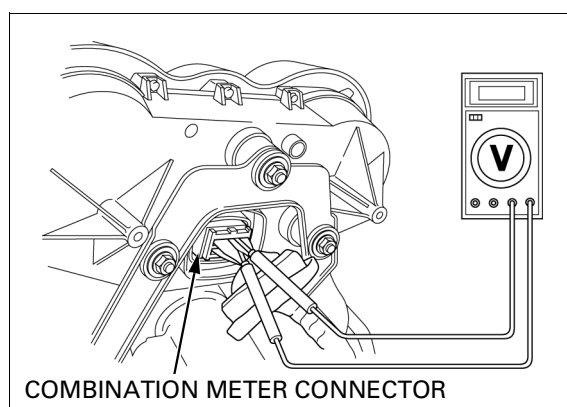
Measure the voltage between the White/Blue (+) and Blue/Black (-) wire terminals of the wire harness side connector.

Slowly turn the front wheel by hand.

There should be 0 to 12 V pulse voltage.

- If pulse voltage appears, replace the combination meter.
- If pulse voltage does not appear, check for open or short circuit in White/Blue wire and Blue/Black wire.

If the White/Blue and Blue/Black wires are OK, check the VS sensor (page 18-15).



### VS SENSOR INSPECTION

Remove the headlight unit (page 18-7).

Check for loose or poor contact of the VS sensor 3P (Black) connector.

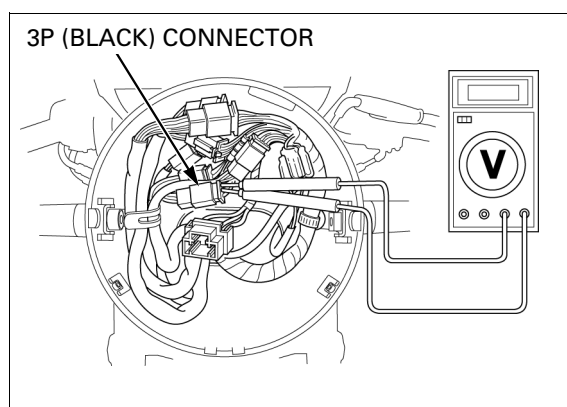
Also check for loose or poor contact of the meter sub harness 6P and 9P connectors (page 1-17).

Turn the ignition switch "ON" and measure the voltage at the VS sensor 3P (Black) connector at the wire harness side.

**CONNECTION** Black (+) – Blue/Black (-)

**STANDARD:** Battery voltage

If there is no voltage, check for open circuit in Black and Blue/Black wires and blown sub-fuse (5A).



## LIGHTS/METERS/SWITCHES

Support the motorcycle securely and raise the front wheel off the ground.

Shift the transmission into neutral.

Measure the voltage at the VS sensor 3P (Black) connector of the wire harness side with the ignition switch "ON" while slowly turning the front wheel by hand.

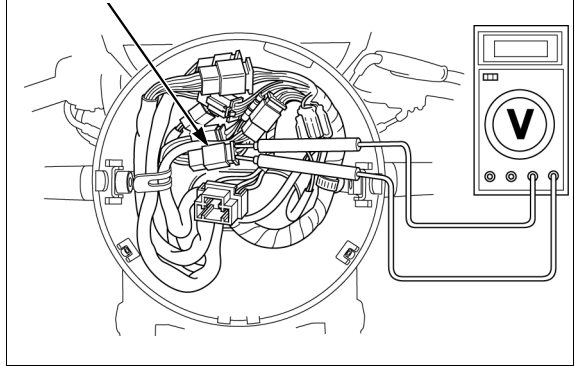
**CONNECTION: White/Blue (+) – Blue/Black (–)**

**STANDARD: Repeat 0 to 12 V**

If measurement is out of specification, check the speedometer cable and speedometer gear box.

If the speedometer cable and speedometer gear box is OK, replace the VS sensor.

3P (BLACK) CONNECTOR

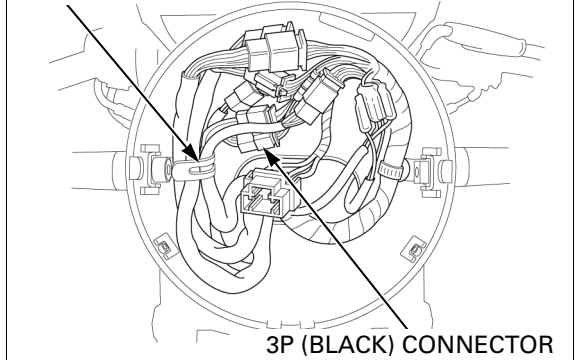


### VS SENSOR REMOVAL/INSTALLATION

Remove the Headlight unit (page 18-7).

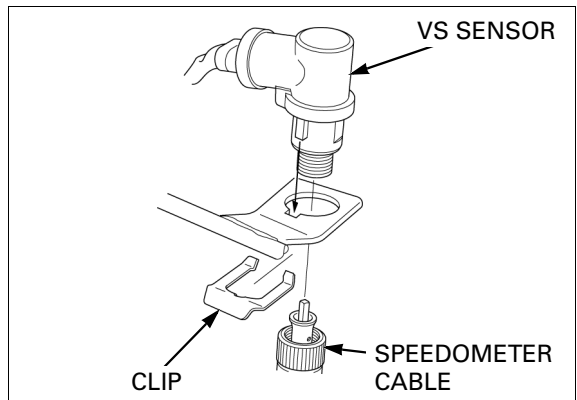
Disconnect the VS sensor 3P (Black) connector, then release the VS sensor wire from the clamp.

CLAMP



Remove the speedometer cable from the VS sensor. Remove the clip and VS sensor.

Installation is in the reverse order of removal.



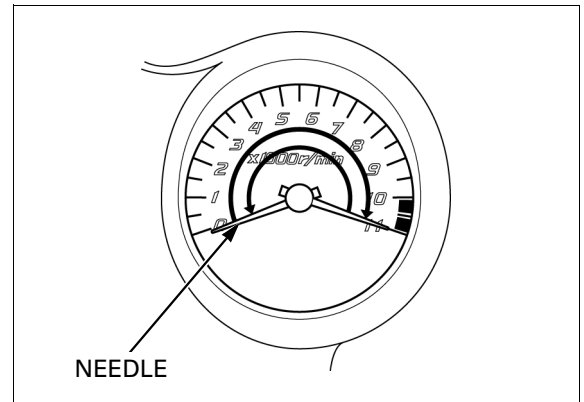
# TACHOMETER

## SYSTEM INSPECTION

- Check for loose or poor contact terminals at the combination meter 16P connector and meter sub harness 6P and 9P connectors.

Turn the ignition switch "ON", check that the tachometer needle move to full scale and then returns to zero.

If the needle does not show initial function, check the combination meter described as below:



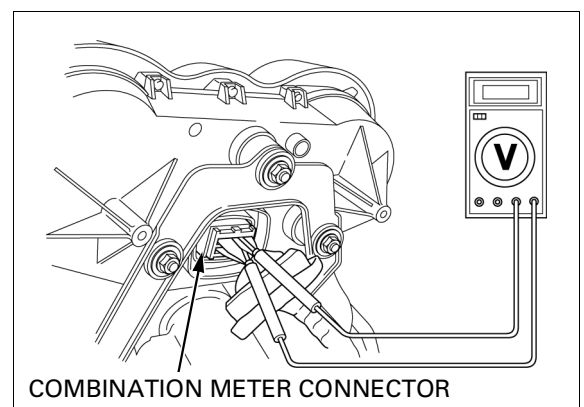
Remove the combination meter lower cover (page 18-11) and expose the combination meter connector.

Check the combination meter power/ground line (page 18-11).

If the power/ground line is normal, connect the peak voltage adaptor to the tachometer Yellow/Green terminal and body ground.

### TOOL:

**Imrie diagnostic tester (model 625) or  
Peak voltage adaptor 07HGJ-0020100  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)**



**CONNECTION: Yellow/Green (+) and Green (-)**

Start the engine and measure the tachometer input peak voltage.

**PEAK VOLTAGE: 10.5 V minimum**

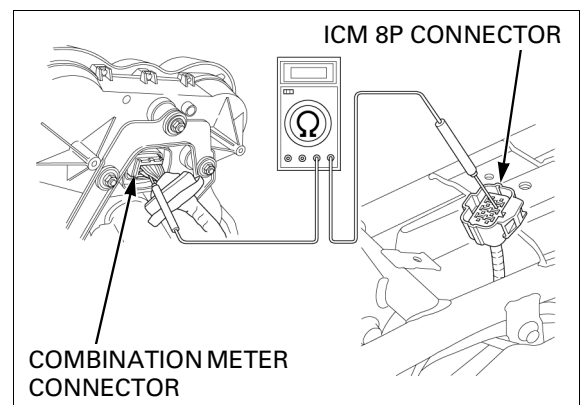
If the peak voltage is normal, replace the combination meter assembly (page 18-12).

If the measured value is below 10.5 V, replace the ICM.

If the value is 0 V, check for continuity between the combination meter connector and ICM 8P (Black) connector Yellow/Green terminals.

If there is no continuity, check the wire harness and meter sub-harness for an open circuit.

If there is continuity, replace the combination meter assembly (page 18-12).





## FUEL LEVEL SENSOR

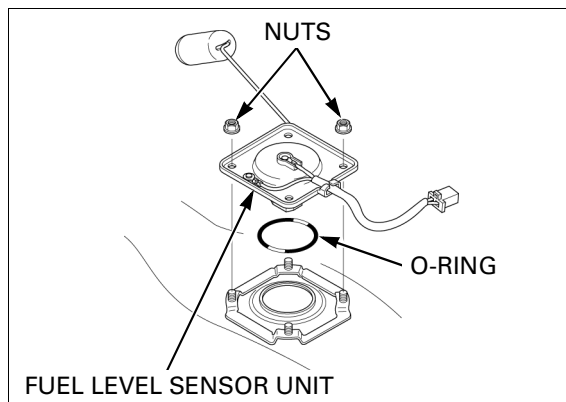
### REMOVAL

Remove the fuel tank (page 2-7).

Turn the fuel valve "RES" and catch the remaining fuel using a approved gasoline container.

*Be careful not to damage the float arm.*

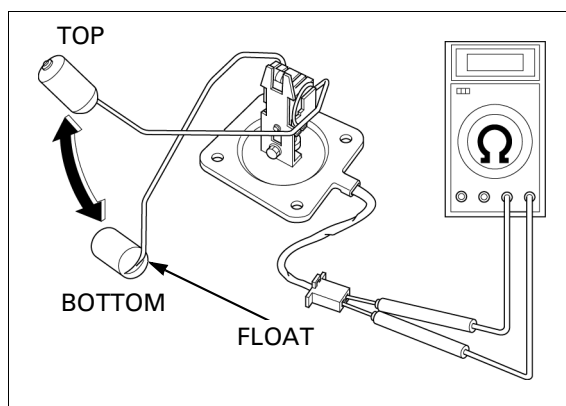
Remove the nuts, fuel level sensor unit and O-ring from the fuel tank.



### INSPECTION

Connect the ohmmeter to the fuel level sensor Yellow/White and Green terminals of the 2P connector. Inspect the resistance of the float at the top and bottom positions.

	TOP (FULL)	BOTTOM (EMPTY)
Resistance (20°C/68°F)	4 – 10 Ω	90 – 100 Ω



### FUEL METER INSPECTION

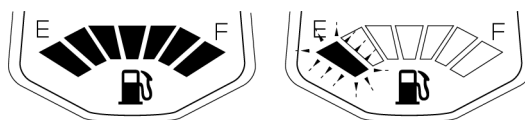
Connect the fuel level sensor 2P (Natural) connector to the wire harness.

Turn the ignition switch "ON" and move the float from bottom (empty) to top (full) to check the fuel meter indication.

If the fuel meter does not indicate properly, check for open or short circuit in wire harness.

If the wire harness is normal, replace the combination meter.

FLOAT POSITION:  
TOP (FULL)



FLOAT POSITION:  
BOTTOM (EMPTY)

### INSTALLATION

Install a new O-ring onto the fuel tank.

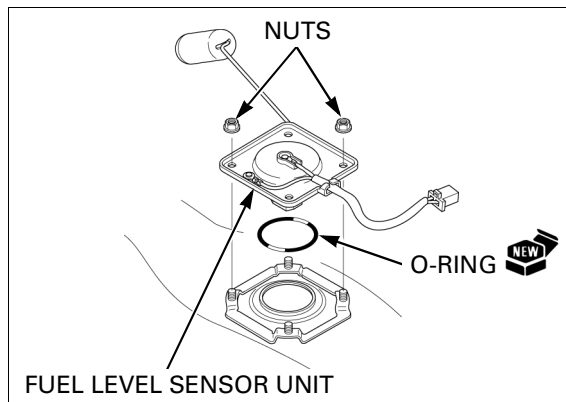
*Be careful not to damage the float arm.*

Install the fuel level sensor unit into the fuel tank.

Install and tighten the nuts securely.

Install the fuel tank (page 2-7).

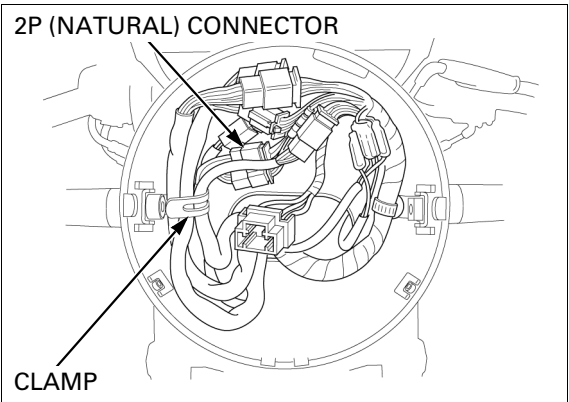
Fill the fuel filler cap with the remained fuel.



# IGNITION SWITCH

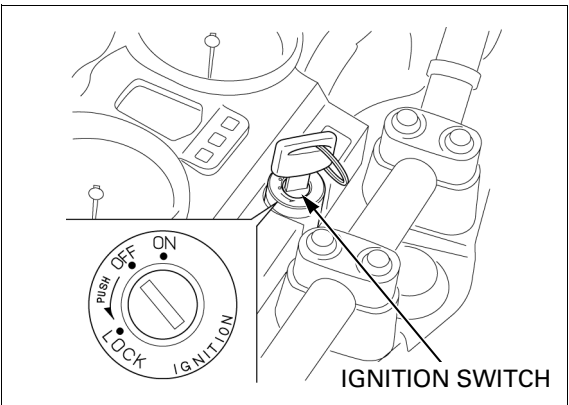
## INSPECTION

Remove the headlight unit (page 18-7).  
Disconnect the ignition switch 2P (Natural) connector, then release the ignition switch wire from the clamp.



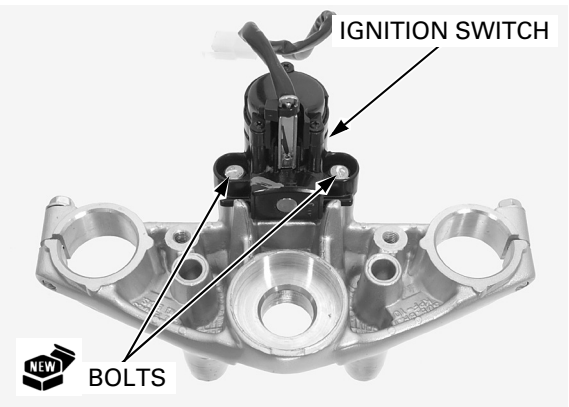
Check for continuity between the ignition switch connector terminal in each switch position. Continuity should exist between the color coded wires as follows:

	BAT	BAT1
ON		
OFF		
COLOR	R	BI



## REMOVAL/INSTALLATION

Remove the top bridge (page 12-29).  
Remove the mounting bolts and ignition switch.  
Install the ignition switch and tighten new mounting bolts securely.  
Install the removed parts in the reverse order of removal.



LIGHTS/METERS/SWITCHES

**HANDLEBAR SWITCHES**

NOTE:  
The handlebar switches removal/installation is refer to page 12-6.

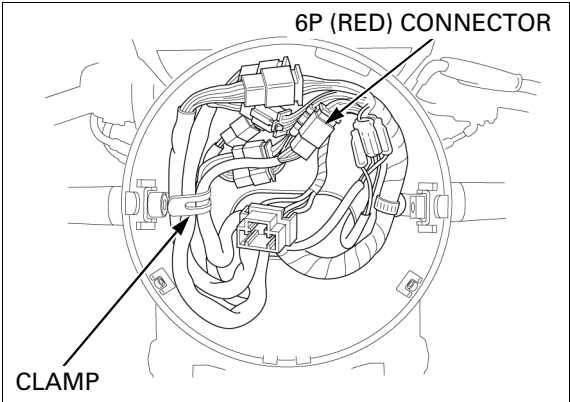
Remove the headlight unit (page 18-7).

Check for continuity between the wire terminals of the handlebar switch connector.

Continuity should exist between the color coded wires as shown in each chart.

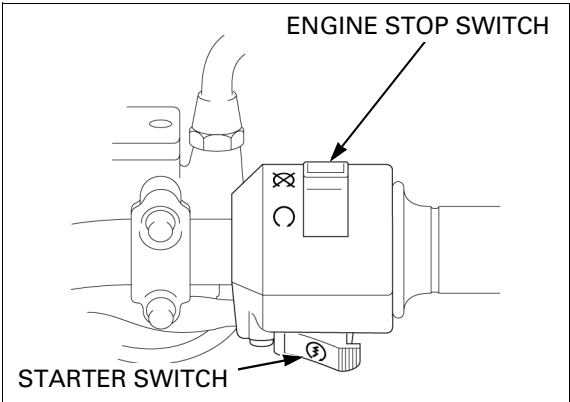
**RIGHT HANDLEBAR SWITCHES**

Disconnect the right handlebar switch 6P (Red) connector, then release the right handlebar switch wire from the clamp.



**ENGINE STOP SWITCH**

	IG	BAT2
COLOR	BI/W	BI/R

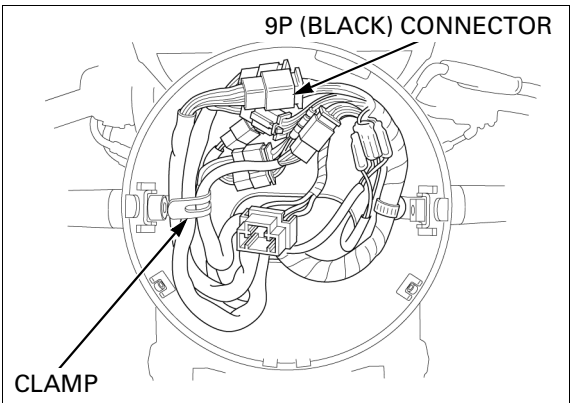


**STARTER SWITCH**

	ST	IG	BAT3	HL
FREE				
PUSH				
COLOR	Y/R	BI/W	R/BI	Bu/W

**LEFT HANDLEBAR SWITCHES**

Disconnect the left handlebar switch 9P (Black) connector, then release the left handlebar switch wire from the clamp.



**DIMMER SWITCH**

	HI	HL	LO
H			
(N)			
L			
COLOR	Bu	Bu/W	W

**TURN SIGNAL SWITCH**

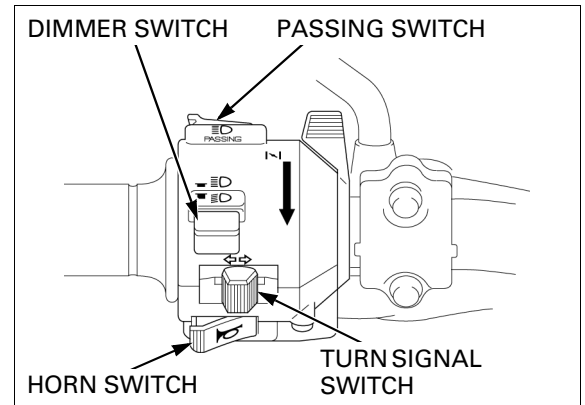
	W	L	R
L			
(N)			
R			
COLOR	Gr	O	Lb

**HORN SWITCH**

	BAT4	HO
FREE		
PUSH		
COLOR	Bl/Br	Lg

**PASSING SWITCH**

	BAT3	HI
FREE		
PUSH		
COLOR	R/Bl	Bu



## BRAKE LIGHT SWITCHES

### FRONT

Disconnect the front brake light switch connectors.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.



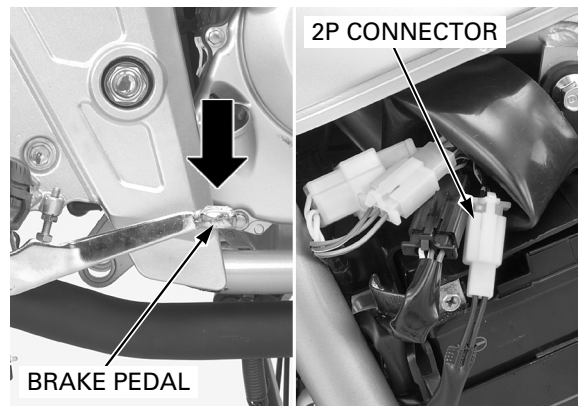
## LIGHTS/METERS/SWITCHES

### REAR

Remove the left side cover (page 2-4).

Disconnect the rear brake light switch 2P (Natural) connector and check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



### CLUTCH SWITCH

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.



### NEUTRAL SWITCH

#### INSPECTION

Remove the drive sprocket cover (page 6-5).

Remove the nut, washer, neutral switch wire and spacer from the neutral switch.

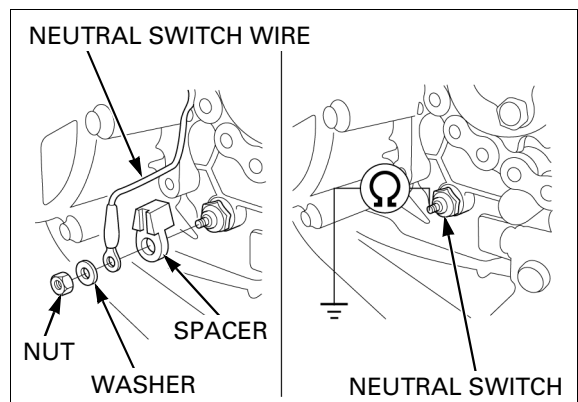
Check for continuity between the switch terminal and engine ground.

There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.

Install the spacer, neutral switch wire and washer.

Install the nut and tighten it to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



## REMOVAL/INSTALLATION

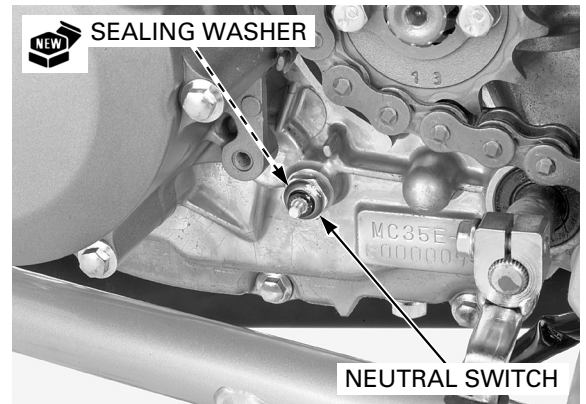
Remove the nut, washer, neutral switch wire and spacer from the neutral switch (page 18-22).

Remove the neutral switch and sealing washer.

Install a new sealing washer and neutral switch into the left crankcase and tighten it to the specified torque.

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

Install the removed parts in the reverse order of removal.

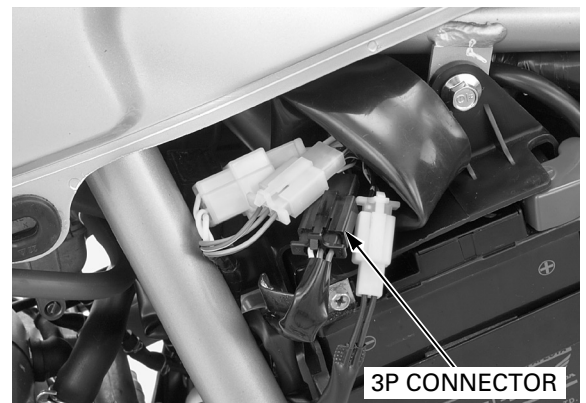


## SIDE STAND SWITCH

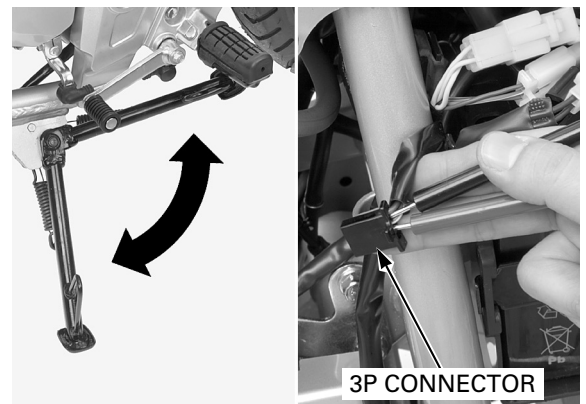
### INSPECTION

Remove the left side cover (page 2-4).

Disconnect the side stand switch 3P (Black) connector.



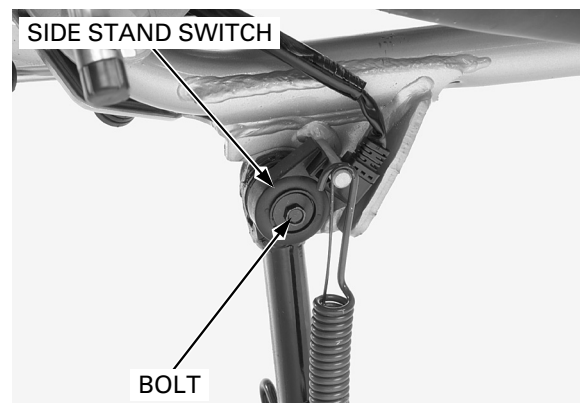
Check for continuity between the wire terminals of the side stand switch 3P (Black) connector. Continuity should exist only when the side stand is up.



### REMOVAL

Disconnect the side stand switch 3P (Black) connector (page 18-23).

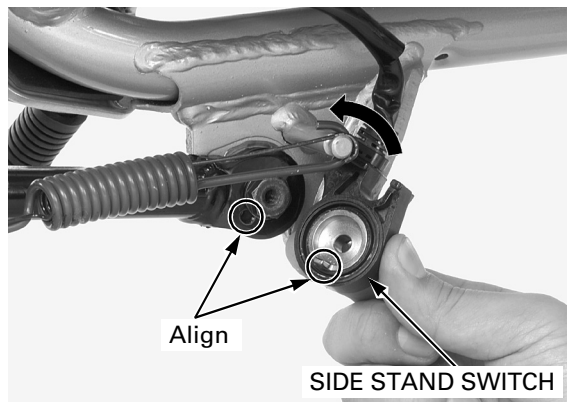
Remove the bolt and side stand switch.



## LIGHTS/METERS/SWITCHES

### INSTALLATION

Install the side stand switch while aligning the pin with the side stand hole and the switch groove with the return spring holding pin.

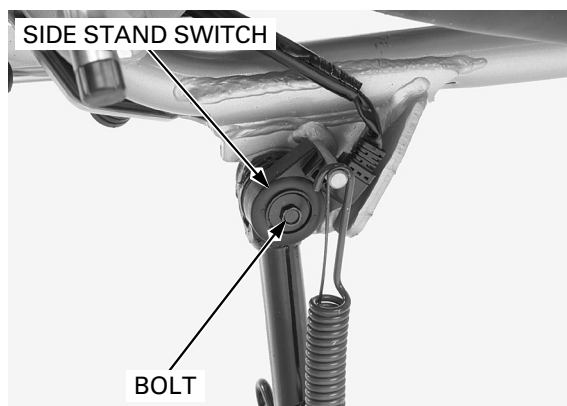


Install and tighten the side stand switch bolt to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Connect the side stand switch 3P (Black) connector.

Install the left side cover (page 2-4).



## TURN SIGNAL RELAY

### INSPECTION

#### 1. Related Circuit Inspection

Check the following:

- Battery condition
- Burned out turn signal light bulbs or non-specified wattage
- Burned fuse (5A)
- Ignition switch and turn signal switch function
- Loose connectors

***Are the above items in good condition?***

**NO** – Replace or repair the malfunction part(s)

**YES** – GO TO STEP 2.

#### 2. Turn Signal Circuit Inspection

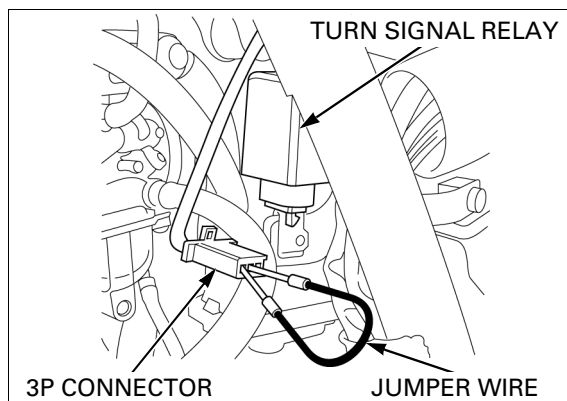
Disconnect the 3P connector from the relay.

Short the Gray and Black/Blue terminals of the turn signal relay connector with a jumper wire. Turn the ignition switch "ON" and check the turn signal light.

***Is the light come on?***

**YES** – GO TO STEP 3.

**NO** – Broken wire harness

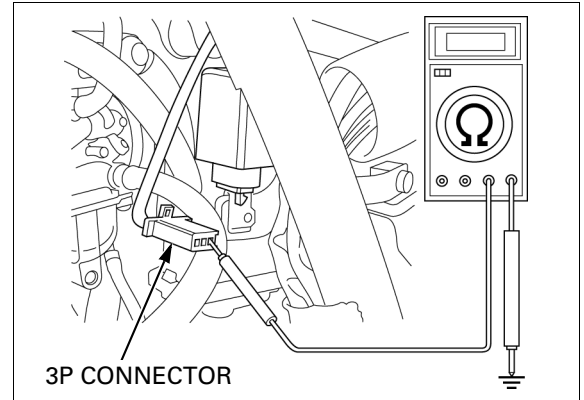


### 3. Turn Signal Ground Line Inspection

Check for continuity between the Green wire terminal of the relay connector and ground.

**Is there continuity?**

- YES** – • Faulty turn signal relay  
• Poor connection of the connector
- NO** – An open circuit in Green wire harness

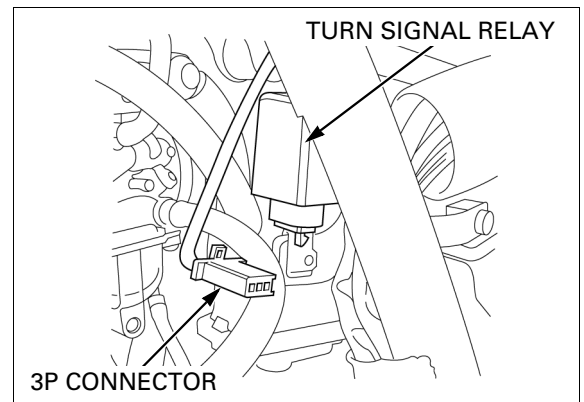


### REMOVAL/INSTALLATION

Remove the left side shroud (page 2-7).

Disconnect the turn signal relay 3P connector and remove the turn signal relay.

Installation is in the reverse order of removal.



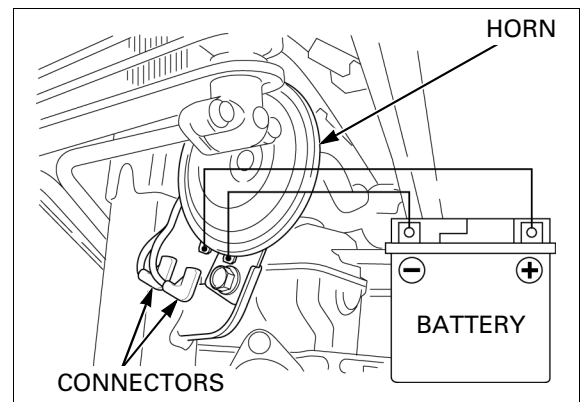
## HORN

### INSPECTION

Disconnect the horn wire connectors from the horn.

Connect the 12 V battery to the horn terminal directly.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.

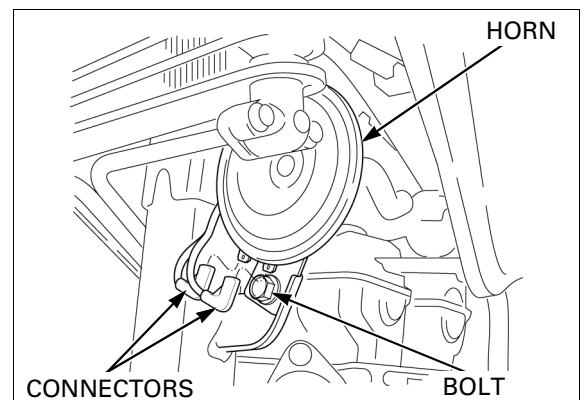


### REMOVAL/INSTALLATION

Disconnect the horn wire connectors from the horn.

Remove the horn mounting bolt and horn.

Installation is in the reverse order of removal.





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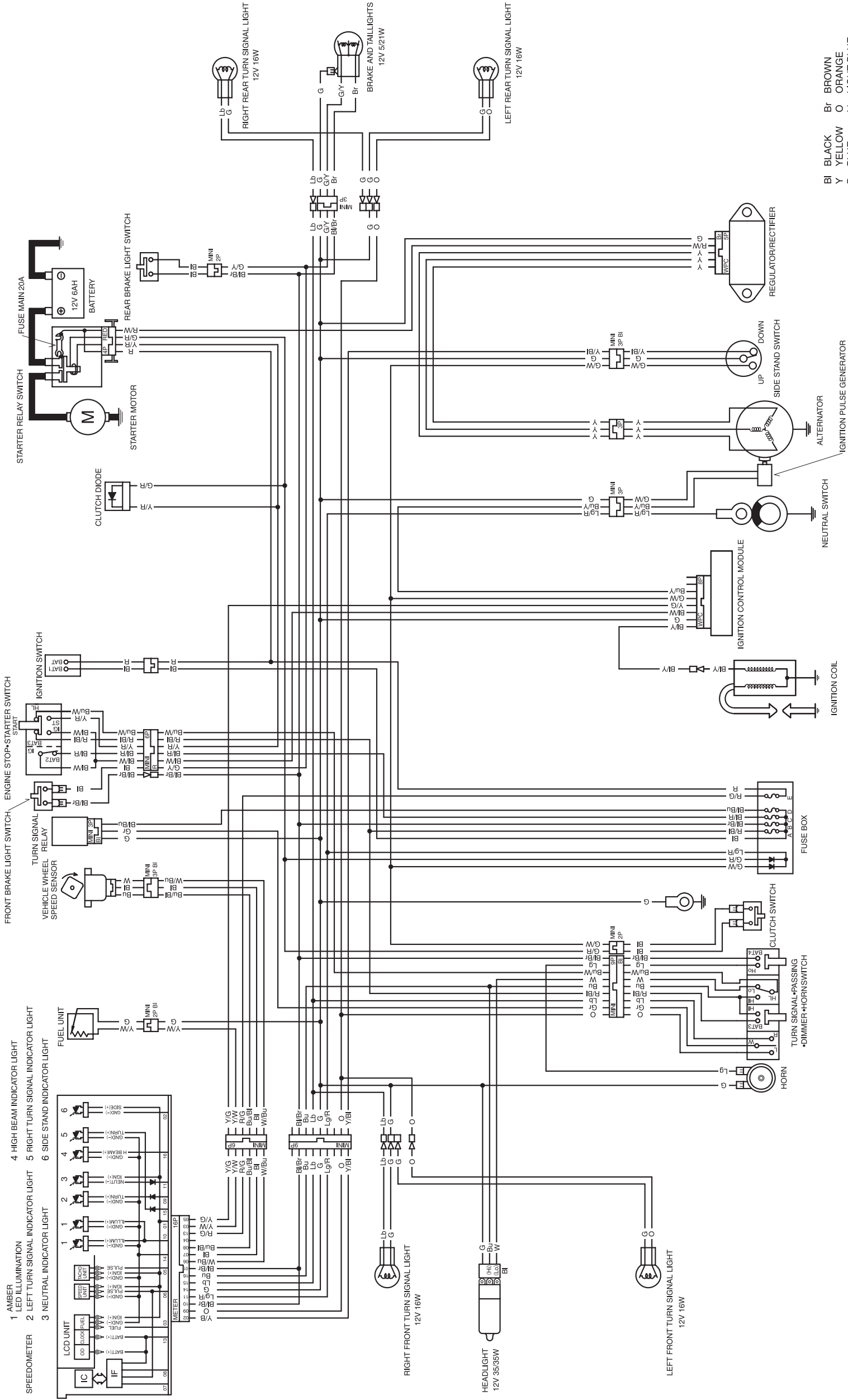
## MEMO

# 19. WIRING DIAGRAM

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WIRING DIAGRAM ..... 19-3

WIRING DIAGRAM



FUSE BOX

FUSE	Rating	Location
A	10A	HEADLIGHT
B	10A	TAIL-METER LIGHT+HORN
C	10A	FRONT-REAR BRAKE
D	10A	IGNITION+STARTER
E	5A	TURN SIGNAL

PASSING SWITCH

Position	Color	Label
1	Bl	Bu
2	Bl	Bu
3	Bl	Bu
4	Bl	Bu
5	Bl	Bu
6	Bl	Bu

STARTER SWITCH

Position	Color	Label
1	Bl	Bu
2	Bl	Bu
3	Bl	Bu
4	Bl	Bu
5	Bl	Bu
6	Bl	Bu

ENGINE STOP SWITCH

Position	Color	Label
1	Bl	Bu
2	Bl	Bu
3	Bl	Bu
4	Bl	Bu
5	Bl	Bu
6	Bl	Bu

HORN SWITCH

Position	Color	Label
1	Bl	Bu
2	Bl	Bu
3	Bl	Bu
4	Bl	Bu
5	Bl	Bu
6	Bl	Bu

DIMMER SWITCH

Position	Color	Label
1	Bl	Bu
2	Bl	Bu
3	Bl	Bu
4	Bl	Bu
5	Bl	Bu
6	Bl	Bu

TURN SIGNAL SWITCH

Position	Color	Label
1	Bl	Bu
2	Bl	Bu
3	Bl	Bu
4	Bl	Bu
5	Bl	Bu
6	Bl	Bu

0030Z-KPF-9600

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# MEMO

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# 20. TROUBLESHOOTING

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ENGINE DOES NOT START OR IS HARD TO START .....	20-2	POOR PERFORMANCE AT LOW AND IDLE SPEED.....	20-5
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# ENGINE DOES NOT START OR IS HARD TO START

### 1. Fuel Line Inspection

Check fuel flow to carburetor.

***Does fuel reach the carburetor?***

**NO** – • Clogged fuel line and filter  
• Sticking float valve

**YES** – GO TO STEP 2.

### 2. Spark Plug Inspection

Remove and inspect spark plug.

***Is the spark plug wet?***

**YES** – • Flooded carburetor  
• SE valve "ON" position (open)  
• Throttle valve open  
• Dirty air cleaner

**NO** – GO TO STEP 3.

### 3. Spark Test

Perform spark test.

***Is there weak or no spark?***

**YES** – • Faulty engine stop switch  
• Faulty spark plug  
• Fouled spark plug  
• Loose or disconnected ignition system wires  
• Faulty ignition pulse generator  
• Faulty ignition switch  
• Faulty ignition coil  
• Faulty ICM

**NO** – GO TO STEP 4.

### 4. Cylinder Compression

Test cylinder compression.

***Is the compression low?***

**YES** – • Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing

**NO** – GO TO STEP 5.

### 5. 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 or intake manifold  
• Improper ignition timing (Faulty ICM or ignition pulse generator)  
• Contaminated fuel

---

## ENGINE LACKS POWER

### 1. Drive Train Inspection

Raise wheel off the ground and spin by hand.

***Does the wheel spin freely?***

- NO** – • Brake dragging  
• Worn or damaged wheel bearings  
• 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 or plates  
• Warped clutch discs or plates  
• Weak clutch spring  
• Additive in engine oil

**YES** – GO TO STEP 4.

### 4. Engine Performance Inspection

Accelerate lightly.

***Does the engine speed increase?***

- NO** – • SE valve "ON" position (open)  
• Clogged air cleaner  
• Restricted fuel flow  
• Clogged muffler

**YES** – GO TO STEP 5.

### 5. Spark Plug Inspection

Remove and inspect spark plug.

***Are the spark plug in good condition?***

- NO** – • Plug not serviced frequently enough  
• Incorrect spark plug heat range  
• Incorrect spark plug gap

**YES** – GO TO STEP 6.

### 6. Engine Oil Inspection

Check oil level and condition.

***Is the engine oil good condition?***

- NO** – • Oil level too high  
• Oil level too low  
• Contaminated oil

**YES** – GO TO STEP 7.

## TROUBLESHOOTING

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### 7. Ignition Timing Inspection

Check the ignition timing.

***Is the ignition timing correct?***

- NO** – • Faulty ICM  
• Faulty ignition pulse generator

**YES** – GO TO STEP 8.

### 8. Cylinder Compression Inspection

Test the cylinder compression.

***Is the compression low?***

- YES** – • Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing

**NO** – GO TO STEP 9.

### 9. Carburetor Inspection

Check carburetor for clogging.

***Is the carburetor for clogged?***

**YES** – Carburetor not serviced frequently enough

**NO** – GO TO STEP 10.

### 10. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

***Is the valve train lubricated properly?***

- NO** – • Clogged oil passage  
• Clogged oil strainer  
• Clogged oil pass pipe

**YES** – GO TO STEP 11.

### 11. Over Heating Inspection

Check for engine over heating.

***Is the engine over heating?***

- YES** – • Excessive carbon build-up in combustion chamber  
• Use of poor quality fuel  
• Lean fuel mixture  
• Wrong type of fuel  
• Clutch slipping

**NO** – GO TO STEP 12.

### 12. Engine Knocking Inspection

Accelerate or run at high speed.

***Is the engine knocking?***

- YES** – • Worn piston and cylinder  
• Wrong type of fuel  
• Excessive carbon build-up in combustion chamber  
• Ignition timing too advance (Faulty ICM)  
• Lean fuel mixture

**NO** – Engine does not knock



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## POOR PERFORMANCE AT LOW AND IDLE SPEED

### 1. Pilot Screw Inspection

Check carburetor pilot screw adjustment.

***Is the adjustment correct?***

**NO** – page 5-18

**YES** – GO TO STEP 2.

### 2. Intake Air Leak Inspection

Check for leaking carburetor insulator.

***Is there leaking?***

**YES** – • Loose insulator bands  
• Damaged insulator  
• Faulty O-ring or gasket

**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  
• Faulty ignition pulse generator  
• Faulty ignition switch  
• Faulty ignition coil  
• Faulty engine stop switch  
• Faulty 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** – • Restricted fuel line  
• Clogged fuel strainer  
• Faulty fuel valve

**YES** – GO TO STEP 2.

#### 2. Spark Plug Inspection

Remove and inspect the spark plug.

***Is the spark plug in good condition?***

- NO** – • Plug not serviced frequently enough  
• Incorrect spark plug heat range  
• Incorrect spark plug gap  
• Faulty SE valve  
• Air cleaner dirty

**YES** – GO TO STEP 3.

#### 3. Carburetor Inspection

Check carburetor for clogging.

***Is the carburetor clogged?***

**YES** – Carburetor not serviced frequently enough

**NO** – GO TO STEP 4.

#### 4. Ignition Timing Inspection

Check ignition timing.

***Is the ignition timing correct?***

- NO** – • Faulty ICM  
• Faulty ignition pulse generator

**YES** – GO TO STEP 5.

#### 5. Valve Timing Inspection

Check valve timing.

***Is the valve timing correct?***

**NO** – Cam sprockets not installed properly

**YES** – GO TO STEP 6.

#### 6. Camshaft Inspection

Removed and inspect the camshaft.

***Is the cam lobe height within specification?***

**NO** – Faulty camshaft

**YES** – GO TO STEP 7.

#### 7. Valve Spring Inspection

Check valve springs.

***Are the valve springs weak?***

**YES** – Faulty valve spring

## POOR HANDLING

### **Steering is heavy**

- Steering top thread too tight
- Damaged steering head bearings
- Low tire pressure

### **Either wheel is wobbling**

- Excessive wheel bearing play
- Bent rim
- Excessively worn swingarm pivot bearings
- Bent frame

### **Motorcycle pulled to one side**

- Front and rear wheels not aligned
- Bent fork
- Bent swingarm
- Bent axle
- Bent frame

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## MEMO

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