

## **TYPE CODE**

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

CODE	AREA TYPE
E	U.K. (Ireland)
F	France
ED	EUROPEAN DIRECT SALES (Austria, Switzerland, Belgium, Germany, Portugal, Italy, Spain, Israel)
U	Australia
II G	Germany II
CM	Canada

## ***A Few Words About Safety***

### **Service Information**

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

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

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

### **For Your Customer's Safety**

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

### **For Your Safety**

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

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

### **Important Safety Precautions**

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

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

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

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

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

- Use only a non-flammable 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 CBR125RW.

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

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

Sections 1 and 3 apply to the whole 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 19 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 21 Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle.

You must use your own good judgement.

You will find important safety information in a variety of forms including:

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

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

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

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

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

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

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**Honda Motor Co., Ltd.  
SERVICE PUBLICATION OFFICE**

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# SYMBOLS

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

	<p>Replace the part (s) with new one (s) before assembly.</p>
	<p>Use the recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).</p>
	<p>Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).</p>
	<p>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</p>
	<p>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</p>
	<p>Use silicone grease.</p>
	<p>Apply locking agent. Use a medium strength locking agent unless otherwise specified.</p>
	<p>Apply sealant.</p>
	<p>Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.</p>
	<p>Use fork or suspension fluid.</p>

# 1. GENERAL INFORMATION

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## GENERAL INFORMATION

### SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown in the Cable and Harness Routing (page 1-18).
9. Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

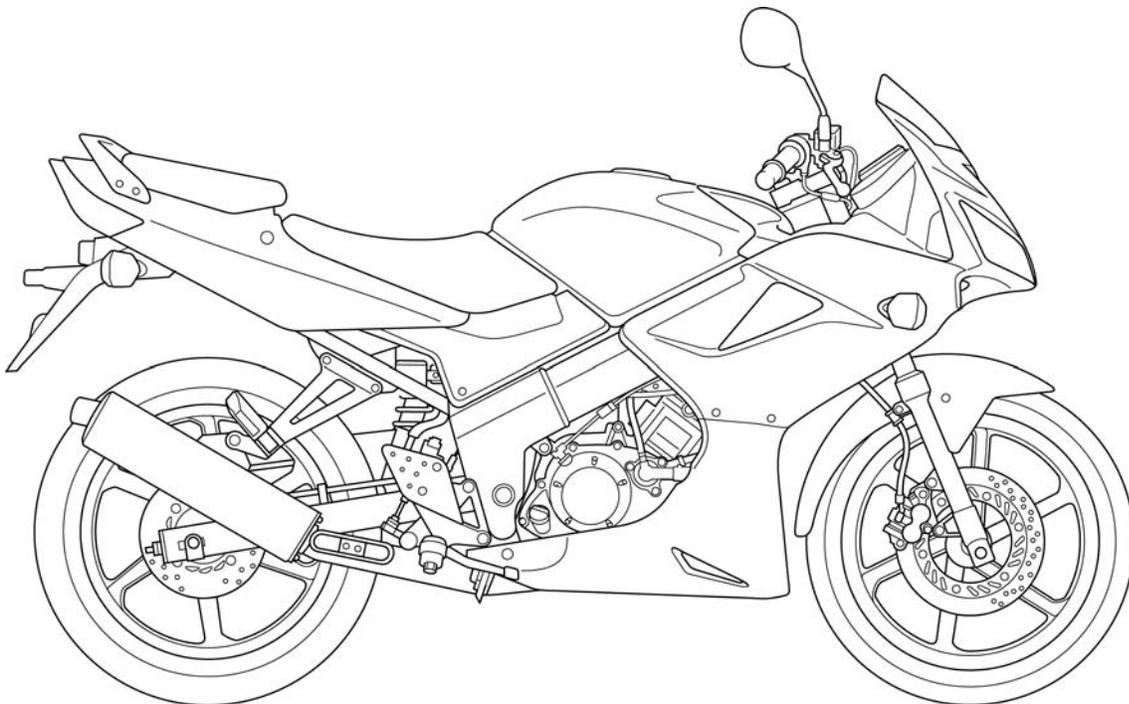
### ABBREVIATION

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

Abbrev. term	Full term
CKP sensor	Crankshaft Position sensor
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
ECM	Engine Control Module
ECT sensor	Engine Coolant Temperature sensor
EEPROM	Electrically Erasable Programmable Read Only Memory
HDS	Honda Diagnostic System
IACV	Idle Air Control Valve
IAT sensor	Intake Air Temperature sensor
MAP sensor	Manifold Absolute Pressure sensor
MIL	Malfunction Indicator Lamp
PGM-FI	Programmed Fuel Injection
SCS connector	Service Check Short connector
TP sensor	Throttle Position sensor

### MODEL IDENTIFICATION

EXCEPT CM AND U model shown:

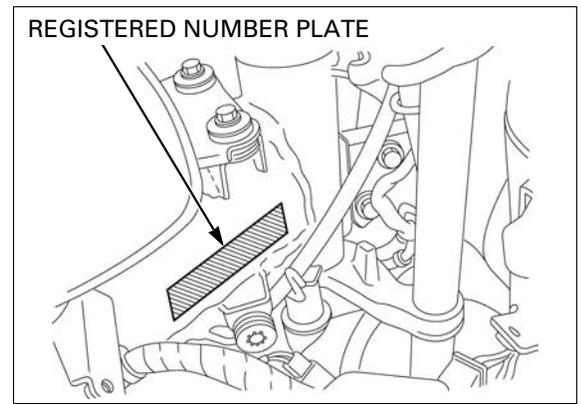


**SERIAL NUMBERS**

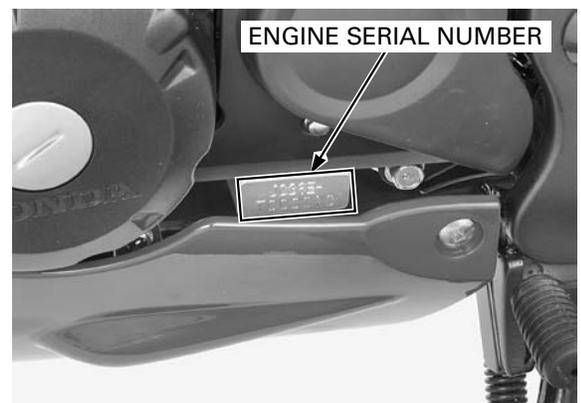
The Vehicle Identification Number (VIN) is stamped on the right side of the steering head.



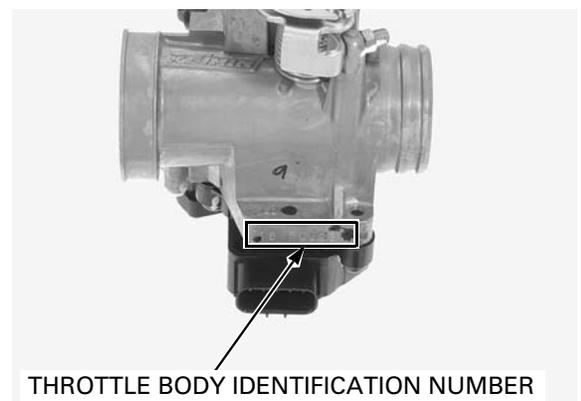
The registered number plate is located on the right side of the frame (Except CM and U type).



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



The throttle body identification number is stamped on the right side of the throttle body.



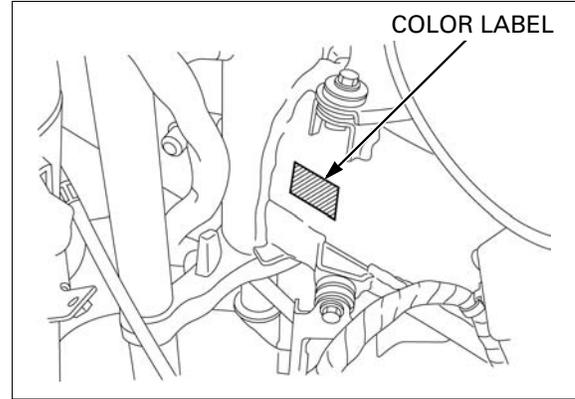
## GENERAL INFORMATION

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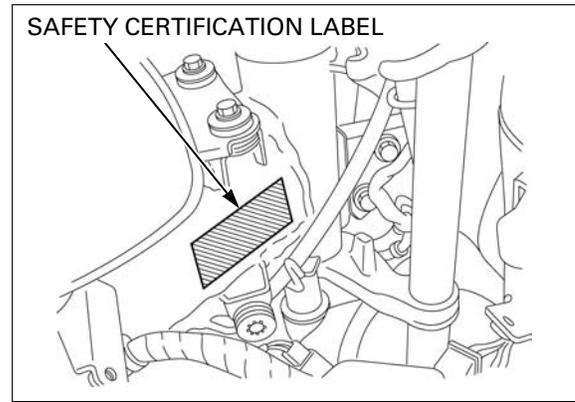
### LABELS

The color label is attached on the left side of the frame.

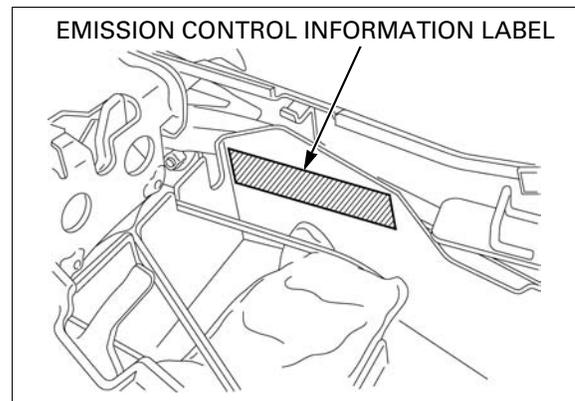
When ordering color-coded parts, always specify the designated color code.



The Safety Certification Label is located on the right side of the frame (CM type only).



The Emission Control Information Label is located on the rear fender (CM type only).



**GENERAL SPECIFICATIONS**

ITEM		SPECIFICATION
DIMENSIONS	Overall length	1,920 mm (75.6 in)
	Overall width	680 mm (26.8 in)
	Overall height	1,065 mm (41.9 in)
	Wheelbase	1,295 mm (51.0 in)
	Seat height	780 mm (30.7 in)
	Footpeg height	312 mm (12.3 in)
	Ground clearance	175 mm (6.9 in)
	Curb weight	127 kg (280 lbs)
	Maximum weight capacity	(Except CM type) (CM type only) 180 kg (397 lbs) 170 kg (375 lbs)
FRAME	Frame type	Diamond type
	Front suspension	Telescopic fork
	Front axle travel	109 mm (4.3 in)
	Rear suspension	Swingarm
	Rear axle travel	120 mm (4.7 in)
	Rear damper	Single effected tube type
	Tire size	Front 80/90-17M/C 44P Rear 100/80-17M/C 52P
	Tire brand	Front NR73s (IRC) Rear NR73s (IRC)
	Front brake	Hydraulic single disc
	Rear brake	Hydraulic single disc
	Caster angle	25° 06'
	Trail length	88.8 mm (3.50 in)
	Fuel tank capacity	10.0 liter (2.64 US gal, 2.20 Imp gal)
	ENGINE	Cylinder arrangement
Bore and stroke		58.0 x 47.2 mm (2.28 x 1.86 in)
Displacement		125 cm <sup>3</sup> (7.6 cu-in)
Compression ratio		11.0:1
Valve train		Chain driven OHC with rocker arm
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 and wet sump
Oil pump type		Trochoid
Cooling system		Liquid cooled
Air filtration		Paper filter
Engine dry weight	24.8 kg (54.7 lbs)	
FUEL DELIV- ERY SYSTEM	Type	PGM-FI
	Throttle bore	30 mm (1.2 in)
DRIVE TRAIN	Clutch system	Multi-plate, wet
	Clutch operation system	Cable operating
	Transmission	Constant mesh, 6 speeds
	Primary reduction	3.350 (67/20)
	Final reduction	2.800 (42/15)
	Gear ratio	1st 3.455 (38/11) 2nd 1.941 (33/17) 3rd 1.450 (29/20) 4th 1.174 (27/23) 5th 1.041 (25/24) 6th 0.923 (24/26)
	Gearshift pattern	Left foot operated return system 1 - N - 2 - 3 - 4 - 5 - 6

## GENERAL INFORMATION

ITEM		SPECIFICATION
ELECTRICAL	Ignition system	Computer-controlled digital transistorized with electric advance
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full-wave rectification
	Lighting system	Battery

## LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	1.0 liter (1.1 US qt, 0.9 Imp qt)	–
	At disassembly	1.3 liters (1.4 US qt, 1.1 Imp qt)	–
Recommended engine oil	Except CM type	Honda "4-stroke motorcycle oil" or an equivalent API classification: SG or higher (except oils labeled as energy conserving on the circular API service label) JASO T 903 standard: MA Viscosity: SAE 10W-30	–
	CM type only	Pro Honda GN4 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Oil pump rotor	Tip clearance	–	0.15 (0.006)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.26 (0.010)
	Side clearance	0.05 – 0.10 (0.002 – 0.004)	0.12 (0.005)

## FUEL SYSTEM (PGM-FI) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ16A
Engine idle speed	1,450 ± 100 min <sup>-1</sup> (rpm)
Throttle grip freeplay	2 – 6 mm (1/16 – 1/4 in)
Fuel injector resistance (20°C/68°F)	9 – 12 Ω
Fuel pressure at idle	294 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)
Fuel pump flow (at 12 V)	13.9 cm <sup>3</sup> (0.47 US oz, 0.49 Imp oz) minimum/10 seconds

## COOLING SYSTEM SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	0.70 liter (0.74 US qt, 0.62 Imp qt)
	Reserve tank	0.28 liter (0.30 US qt, 0.25 Imp qt)
Radiator cap relief pressure		93.2 – 122.6 kPa (0.95 – 1.25 kgf/cm <sup>2</sup> , 13.5 – 17.8 psi)
Thermostat	Begin to open	74 – 78°C (165 – 172°F)
	Fully open	85°C (185°F)
	Valve lift	3.5 – 4.5 mm (0.14 – 0.18 in) minimum
Recommended antifreeze	Except CM type	High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
	CM type only	Pro Honda HP coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

## GENERAL INFORMATION

# CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder compression at 530 min <sup>-1</sup> (rpm)		1,343 kPa (13.7 kgf/cm <sup>2</sup> , 195 psi)	–
Valve clearance		IN	0.06 ± 0.02 (0.002 ± 0.001)
		EX	0.27 ± 0.02 (0.011 ± 0.001)
Valve, valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)
		EX	4.965 – 4.980 (0.1955 – 0.1961)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)
		EX	0.020 – 0.047 (0.0008 – 0.0019)
	Valve guide height	IN	11.5 – 11.7 (0.45 – 0.46)
		EX	12.3 – 12.5 (0.48 – 0.49)
Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	
Valve spring	Free length	Inner	33.50 (1.319)
		Outer	35.70 (1.406)
Rocker arm, rocker arm shaft	Arm I.D.	IN/EX	10.000 – 10.015 (0.3937 – 0.3943)
	Shaft O.D.	IN/EX	9.972 – 9.987 (0.3926 – 0.3932)
	Arm-to-shaft clearance	IN/EX	0.013 – 0.043 (0.0005 – 0.0017)
Camshaft	Cam lobe height	IN	29.316 – 29.556 (1.1542 – 1.1636)
		EX	29.138 – 29.378 (1.1472 – 1.1566)
Cylinder head warpage		–	0.05 (0.002)

# CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	58.000 – 58.010 (2.2835 – 2.2839)	58.05 (2.285)	
	Out-of-round	–	0.010 (0.0004)	
	Taper	–	0.010 (0.0004)	
	Warpage	–	0.05 (0.002)	
Piston, piston pin, piston ring	Piston O.D. at 6.5 (0.26) from bottom	57.970 – 57.990 (2.2823 – 2.2831)	56.67 (2.231)	
	Piston pin hole I.D.	13.002 – 13.008 (0.5119 – 0.5121)	13.045 (0.5136)	
	Piston pin O.D.	12.994 – 13.000 (0.5116 – 0.5118)	12.70 (0.500)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.08 (0.003)	
	Piston ring end gap	Top	0.10 – 0.25 (0.004 – 0.010)	0.40 (0.016)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.70 (0.028)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.10 (0.043)
Piston ring-to-ring groove clearance	Top	0.045 – 0.075 (0.0018 – 0.0030)	0.10 (0.004)	
	Second	0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)	
Cylinder-to-piston clearance		0.010 – 0.040 (0.0004 – 0.0016)	0.09 (0.004)	
Connecting rod small end I.D.		13.016 – 13.034 (0.5124 – 0.5131)	13.06 (0.514)	
Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.10 (0.004)	

# CLUTCH/GEARSHIFT LINKAGE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length	40.0 (1.57)	38.3 (1.51)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
	Plate warpage	–	0.15 (0.006)
Clutch outer I.D.		30.000 – 30.021 (1.1811 – 1.1819)	30.54 (1.202)
Clutch outer guide	O.D.	22.959 – 22.980 (0.9039 – 0.9047)	22.93 (0.903)
	I.D.	16.991 – 17.009 (0.6689 – 0.6696)	17.04 (0.671)
Mainshaft O.D. at clutch outer guide		16.966 – 16.984 (0.6680 – 0.6687)	16.59 (0.653)

## ALTERNATOR/STARTER CLUTCH SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	I.D.	22.010 – 22.031 (0.8665 – 0.8674)	22.08 (0.869)
	O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.60 (1.795)

## CRANKSHAFT/BALANCER/TRANSMISSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Runout	–	0.03 (0.001)
	Connecting rod big end radial clearance	0.006 – 0.014 (0.0002 – 0.0006)	0.05 (0.002)
	Connecting rod big end side clearance	0.40 – 0.60 (0.016 – 0.024)	0.85 (0.033)
Transmission	Gear I.D.	M5, M6	20.000 – 20.021 (0.7874 – 0.7882)
		C1	18.000 – 18.021 (0.7087 – 0.7095)
		C2	23.020 – 23.041 (0.9063 – 0.9071)
		C3, C4	22.020 – 22.041 (0.8669 – 0.8678)
	Bushing O.D.	M5, M6	19.959 – 19.980 (0.7858 – 0.7866)
		C1	17.959 – 17.980 (0.7070 – 0.7079)
		C2	22.984 – 23.005 (0.9049 – 0.9057)
	Gear-to-bushing clearance	M5, M6, C1	0.020 – 0.062 (0.0008 – 0.0024)
		C2	0.015 – 0.057 (0.0006 – 0.0022)
	Bushing I.D.	M5	17.000 – 17.018 (0.6693 – 0.6700)
		C1	15.000 – 15.018 (0.5906 – 0.5913)
		C2	20.020 – 20.041 (0.7882 – 0.7890)
	Mainshaft / countershaft O.D.	at M5 bushing	16.966 – 16.984 (0.6680 – 0.6687)
		at C1 bushing	14.966 – 14.984 (0.5892 – 0.5899)
		at C2 bushing	19.978 – 19.989 (0.7865 – 0.7870)
Bushing-to-shaft clearance	M5, C1	0.016 – 0.052 (0.0006 – 0.0020)	
	C2	0.031 – 0.063 (0.0012 – 0.0025)	
Shift fork, shift fork shaft	Shift fork shaft O.D.	9.986 – 9.995 (0.3931 – 0.3935)	
	Shift fork I.D.	10.000 – 10.018 (0.3937 – 0.3944)	
	Shift fork claw thickness	4.93 – 5.00 (0.194 – 0.197)	
Shift drum	Shift drum O.D.	Right side	25.959 – 25.980 (1.0220 – 1.0228)
		Left side	24.959 – 24.980 (0.9826 – 0.9835)
	Shift drum journal I.D.	Right side	26.000 – 26.021 (1.0236 – 1.0244)
		Left side	25.000 – 25.033 (0.9843 – 0.9855)
	Shift drum-to-shift drum journal clearance	Right side	0.020 – 0.062 (0.0008 – 0.0024)
		Left side	0.020 – 0.074 (0.0008 – 0.0029)

## GENERAL INFORMATION

### FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Minimum tire thread depth		–	0.8 (0.03)	
Cold tire pressure	Standard	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	–	
	With cargo	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	–	
Axle runout		–	0.2 (0.01)	
Wheel rim runout	Radial	–	2.0 (0.08)	
	Axial	–	2.0 (0.08)	
Wheel balancer weight		–	60 g max.	
Fork	Spring free length	412.4 (16.24)	404.1 (15.91)	
	Pipe runout	–	0.20 (0.008)	
	Recommended fork fluid	Except CM type	Honda ULTRA CUSHION OIL 10W or equivalent	–
		CM type only	Pro Honda Suspension Fluid SS-8 (10W) or equivalent	–
	Fluid level	131 (5.2)	–	
Fluid capacity	206 ± 2.5 cm <sup>3</sup> (7.0 ± 0.08 US oz, 7.3 ± 0.09 Imp oz)	–		

### REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire thread depth		–	0.8 (0.03)
Cold tire pressure	Standard	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
	With cargo	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balancer weight		–	60 g max.
Drive chain	Size/link	428/124	–
	Slack	25 – 35 (1.0 – 1.4)	–

### HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Specified 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.	11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
	Caliper piston O.D.	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
Rear	Specified 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.	32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.	31.948 – 31.998 (1.2578 – 1.2598)	31.940 (1.2575)
Brake pedal height	84 – 86 (3.3 – 3.4)	–	

## 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	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	0.6 A/5 – 10 h
Quick		3 A/1 h	
Alternator	Capacity	0.290 kW/5,000 min <sup>-1</sup> (rpm)	
	Charging coil resistance (20°C/68°F)	0.2 – 0.6 Ω	

## IGNITION SYSTEM SPECIFICATIONS

ITEM		SPECIFICATION
Spark plug	Standard	CR8E (NGK) or U24ESR-N (DENSO)
	Optional	CR9E (NGK) or U27ESR-N (DENSO)
Spark plug gap		0.70 – 0.80 mm (0.028 – 0.031 in)
Ignition coil peak voltage		100 V minimum
CKP sensor peak voltage		0.7 V minimum
Ignition timing ("F" mark)		8° BTDC at idle

## ELECTRIC STARTER SPECIFICATION

ITEM	STANDARD	Unit: mm (in)	
		SERVICE LIMIT	
Starter motor brush length	10.00 – 10.05 (0.394 – 0.396)	3.5 (0.14)	

## LIGHTS/METERS/SWITCHES SPECIFICATIONS

ITEM		SPECIFICATION	
Bulbs	Headlight	Hi	12 V - 55 W
		Lo	12 V - 55 W
	Position light		12 V - 5 W
	Brake/tail light		12 V - 21/5 W
	Turn signal light	Except CM type	12 V - 21 W x 4
		CM type only	12 V - 23 W x 4
	License light		12 V - 5 W
	Instrument light		12 V - 1.7 W x 4
	Turn signal indicator		12 V - 1.7 W
	High beam indicator		12 V - 1.7 W
	Neutral indicator		12 V - 1.7 W
	MIL		LED
Fuse	Main fuse	30 A	
	Sub fuse	10 A x 4	

## GENERAL INFORMATION

# 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 (0.9, 6.6)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange) and nut	12 (1.2, 9)
10 mm bolt and nut	34 (3.5, 25)	8 mm flange bolt and nut	27 (2.8, 20)
12 mm bolt and nut	55 (5.6, 41)	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.

### BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Grab rail mounting bolt	4	8	27 (2.8, 20)	See page 2-17
Muffler joint bolt	3	6	13 (1.3, 10)	
Exhaust pipe cover bolt	3	6	13 (1.3, 10)	
Exhaust pipe stud bolt	2	8	–	

### MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Spark plug	1	10	16 (1.6, 12)	Apply engine oil to the threads and seating surface.
Tappet adjusting nut	2	5	10 (1.0, 7)	
Crankshaft hole cap	1	30	8.0 (0.8, 5.9)	Apply engine oil to the threads and seating surface.
Oil drain bolt	1	12	25 (2.5, 18)	
Air cleaner cover screw	5	5	1.2 (0.1, 0.9)	U-nut
Sidestand pivot bolt	1	10	18 (1.8, 13)	
Sidestand pivot nut	1	10	44 (4.5, 32)	

### LUBRICATION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Oil pump assembly bolt	2	5	5.0 (0.5, 3.7)	

### FUEL SYSTEM (PGM-FI)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Bank angle sensor mounting screw	2	4	1.2 (0.1, 0.9)	See page 5-57
Bank angle sensor stay nut	2	4	1.5 (0.2, 1.1)	
O <sub>2</sub> sensor	1	12	25 (2.5, 18)	
Insulator band screw	2	5	–	
Throttle cable stay screw	2	5	3.4 (0.3, 2.5)	
IACV setting plate torx screw	2	4	2.1 (0.2, 1.5)	
Sensor unit torx screw	3	5	3.4 (0.3, 2.5)	
Injector joint mounting bolt	2	5	5.1 (0.5, 3.8)	
ECT sensor	1	12	24.5 (2.5, 18)	For tightening sequence (page 5-50)
Fuel pump setting plate nut	6	6	–	

## GENERAL INFORMATION

### COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump impeller	1	7	10 (1.0, 7)	See page 6-14
Water hose band screw	6	–	–	
Fan motor shroud mounting bolt	2	6	8.4 (0.9, 6.2)	
Fan motor screw	3	4	2.8 (0.3, 2.1)	
Cooling fan nut	1	3	1.0 (0.1, 0.7)	
Thermostat housing cover bolt	2	6	13 (1.3, 10)	Apply locking agent to the threads.

### ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine hanger nut (upper)	1	10	60 (6.1, 44)	
(lower)	1	10	60 (6.1, 44)	
(front)	1	10	60 (6.1, 44)	
Drive sprocket fixing plate bolt	2	6	10 (1.0, 7)	

### CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head cover bolt	2	6	10 (1.0, 7)	Apply engine oil to the threads and seating surface.
Camshaft holder mounting nut	4	8	29 (3.0, 21)	
Cam sprocket mounting bolt	2	5	9.0 (0.9, 6.6)	
Rocker arm shaft stopper bolt	2	5	9.0 (0.9, 6.6)	
Cam chain tensioner lifter plug	1	6	4.0 (0.4, 3.0)	

### CYLINDER/PISTON

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder stud bolt	4	8	–	See page 9-8

### CLUTCH/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Clutch center lock nut	1	14	74 (7.5, 55)	Apply engine oil to the threads and seating surface. Apply locking agent to the threads.
Primary drive gear lock nut	1	14	64 (6.5, 47)	
Shift drum stopper arm bolt	1	6	12 (1.2, 9)	
Shift drum stopper plate bolt	1	6	12 (1.2, 9)	
Clutch spring bolt	4	6	12 (1.2, 9)	
Gearshift return spring pin	1	8	25 (2.5, 18)	

### ALTERNATOR/STARTER CLUTCH

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Starter clutch bolt	6	6	16 (1.6, 12)	Apply locking agent to the threads.
Flywheel nut	1	12	64 (6.5, 47)	Apply engine oil to the threads and seating surface.
Stator mounting bolt	3	6	10 (1.0, 7)	Apply locking agent to the threads.
CKP sensor	2	6	10 (1.0, 7)	

## GENERAL INFORMATION

### FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Front axle nut	1	12	59 (6.0, 44)	U-nut
Front brake disc bolt	6	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Fork bolt	2	27	23 (2.3, 17)	
Fork socket bolt	2	8	20 (2.0, 15)	Apply locking agent to the threads.
Steering stem nut	1	24	88 (9.0, 65)	
Steering stem adjusting nut	1	26	-	See page 13-30
Top bridge pinch bolt	2	8	23 (2.3, 17)	
Bottom bridge pinch bolt	2	8	27 (2.8, 20)	
Handlebar pinch bolt	2	8	27 (2.8, 20)	
Handlebar weight screw	2	6	9.0 (0.9, 6.6)	
Clutch lever pivot bolt	1	6	1.0 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6.0 (0.6, 4.4)	

### REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Rear axle nut	1	12	59 (6.0, 44)	U-nut
Driven sprocket nut	4	10	64 (6.5, 47)	U-nut
Rear brake disc bolt	4	8	42 (4.3, 31)	ALOC bolt; replace with a new one.
Shock absorber upper mounting bolt	1	10	39 (4.0, 29)	
Shock absorber lower mounting nut	1	10	44 (4.5, 32)	U-nut
Swingarm pivot nut	1	12	88 (9.0, 65)	U-nut
Drive chain slider screw	1	6	5.9 (0.6, 4.4)	
Brake hose guide screw	1	5	4.2 (0.4, 3.1)	
Driven sprocket stud bolt	4	10	28 (2.9, 21)	Apply locking agent to the threads.

### HYDRAULIC BRAKE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Brake hose oil bolt	4	10	34 (3.5, 25)	
Front master cylinder reservoir cover screw	2	4	1.5 (0.2, 1.1)	
Rear reservoir cover 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 bolt	1	6	1.0 (0.1, 0.7)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	ALOC bolt; replace with a new one.
Brake pad hanger pin	2	10	17 (1.7, 13)	
Brake caliper bleed valve	2	8	5.4 (0.6, 4.0)	
Rear master cylinder push rod lock nut	1	8	17 (1.7, 13)	
Rear master cylinder hose joint screw	1	4	1.5 (0.2, 1.1)	Apply locking agent to the threads.
Step holder mounting bolt	4	8	27 (2.8, 20)	
Step bar mounting bolt	2	6	10 (1.0, 7)	
Brake caliper pin bolt	2	8	17 (1.7, 13)	
Brake caliper torque nut	2	8	22 (2.2, 16)	Apply locking agent to the threads.

### IGNITION SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
Timing hole cap	1	14	6.0 (0.6, 4.4)	

**GENERAL INFORMATION****LIGHTS/METERS/SWITCHES**

<b>ITEM</b>	<b>Q'TY</b>	<b>THREAD DIA. (mm)</b>	<b>TORQUE N·m (kgf·m, lbf·ft)</b>	<b>REMARKS</b>
Turn signal light lens screw	4	4	0.9 (0.1, 0.7)	
Turn signal light mounting nut	4	6	8.8 (0.9, 6.5)	
License light cover screw	2	4	1.0 (0.1, 0.7)	
License light mounting nut	2	5	4.5 (0.5, 3.3)	

## GENERAL INFORMATION

# LUBRICATION & SEAL POINTS

## ENGINE

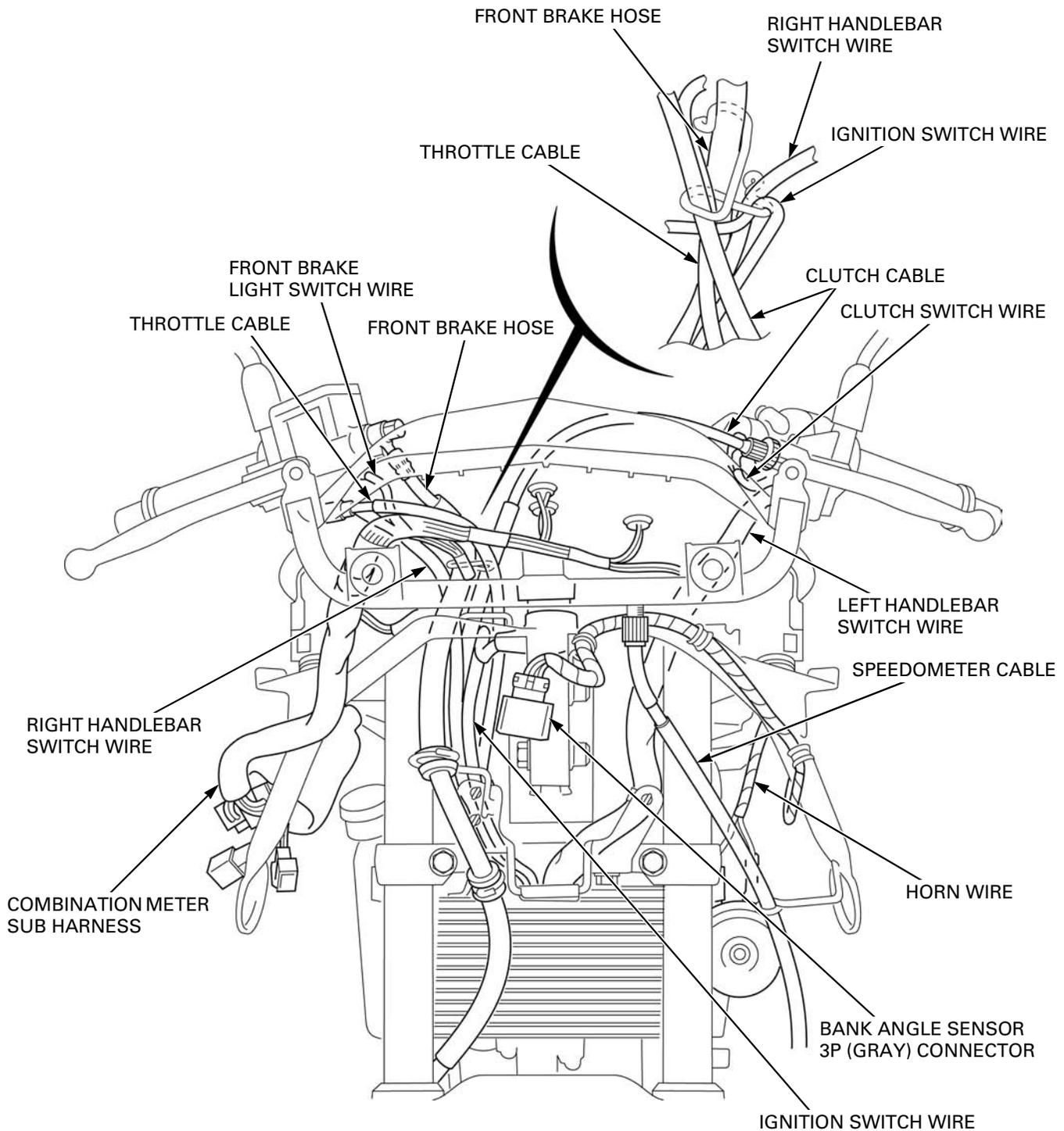
MATERIAL	LOCATION	REMARKS
Liquid sealant (Three bond 1215 or equivalent)	Left crankcase mating surface Alternator/CKP sensor wire grommet sealing surface	See page 12-22
Engine oil	Oil pump rotor entire surface Water pump shaft outer surface Starter clutch rolling surface Starter reduction gear shaft outer surface Right crankshaft outer surface Left crankshaft starter driven gear sliding surface Cam chain entire surface Cylinder inner surface Piston outer surface and piston ring entire surface Clutch disc entire surface Each oil seal lips Each bearing rotating area Each gear teeth Each O-ring	
Multi-purpose grease	Each oil seal lips (clutch lifter arm, gearshift spindle, countershaft)	
Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Valve stem sliding surface and stem end Piston pin outer surface Clutch outer guide outer surface Clutch lifter arm sliding surface and arm end Shift drum journal outer surface Gearshift spindle shaft outer surface Balancer driven gear inner surface Camshaft lobes Rocker arm shaft outer surface Clutch lifter arm hole inner surface (right crankcase cover) Shift fork shaft outer surface M5, M6, C1, C2, C3, C4 gear rotating surface M5, M6, C1, C2 gear bushing entire surface M3/4, C5, C6 gear shift fork grooves	
Locking agent	Right crankcase cover plate bolt threads  Mainshaft bearing setting plate bolt threads	Coating width: 6.5 ± 1.0 mm from tip  Coating width: 6.5 ± 1.0 mm from tip

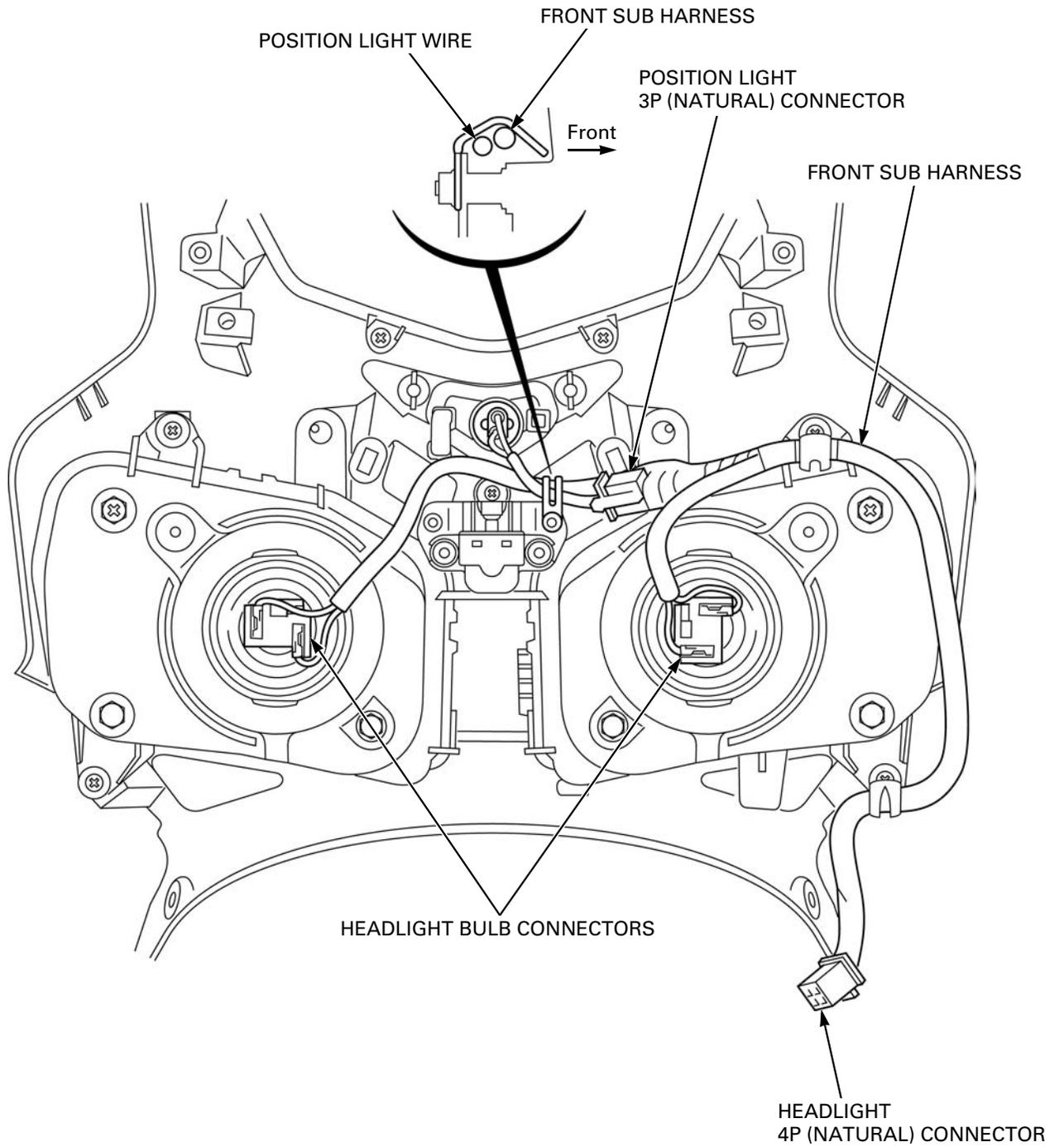
FRAME

MATERIAL	LOCATION	REMARKS
Urea based multi-purpose grease with extreme pressure (example: Kyodo Yushi, Shell stamina EP2 or equivalent)	Inner race and outer race rolling surface Steering head bearing dust seal lips	3.0 g minimum 3.0 g minimum
Multi-purpose grease	Axle rolling surface Swingarm pivot bolt sliding surface Pillion seat catch hook sliding area Gearshift tie rod sliding area Sidestand pivot bolt sliding area Gearshift pedal pivot sliding area Speedometer cable boot inside Speedometer gear teeth and inner surface Speedometer pinion gear teeth and shaft outer surface Throttle grip pipe sliding area Clutch lever pivot bolt sliding area Brake pedal pivot sliding area Driven flange bearing rotating area Each dust seal lips Each O-ring	3.0 g        0.2 g minimum
Engine oil	Fuel tank contacting area (fuel pump unit)	
Silicone grease	Throttle cable boot inside Brake caliper pin bolt sliding surface Brake caliper dust seal Brake lever pivot bolt sliding surface Brake pad hanger pin O-ring Brake lever contacting area (master piston) Rear master cylinder push rod contacting area (master cylinder piston and boot)	0.4 g minimum   0.1 g  0.1 g minimum 0.1 g
DOT 3 or DOT 4 brake fluid	Brake master piston sliding area Brake caliper piston sliding area and piston seal	
Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Clutch cable boot inside	
Locking agent	Ignition switch stay mounting bolt threads	
Fork fluid	Fork bolt O-ring Fork oil seal lips	
Honda Bond A or equivalent	Left handlebar and throttle pipe outer surface (grip rubber contacting area) Air cleaner connecting boot matching surface	

GENERAL INFORMATION

CABLE & HARNESS ROUTING



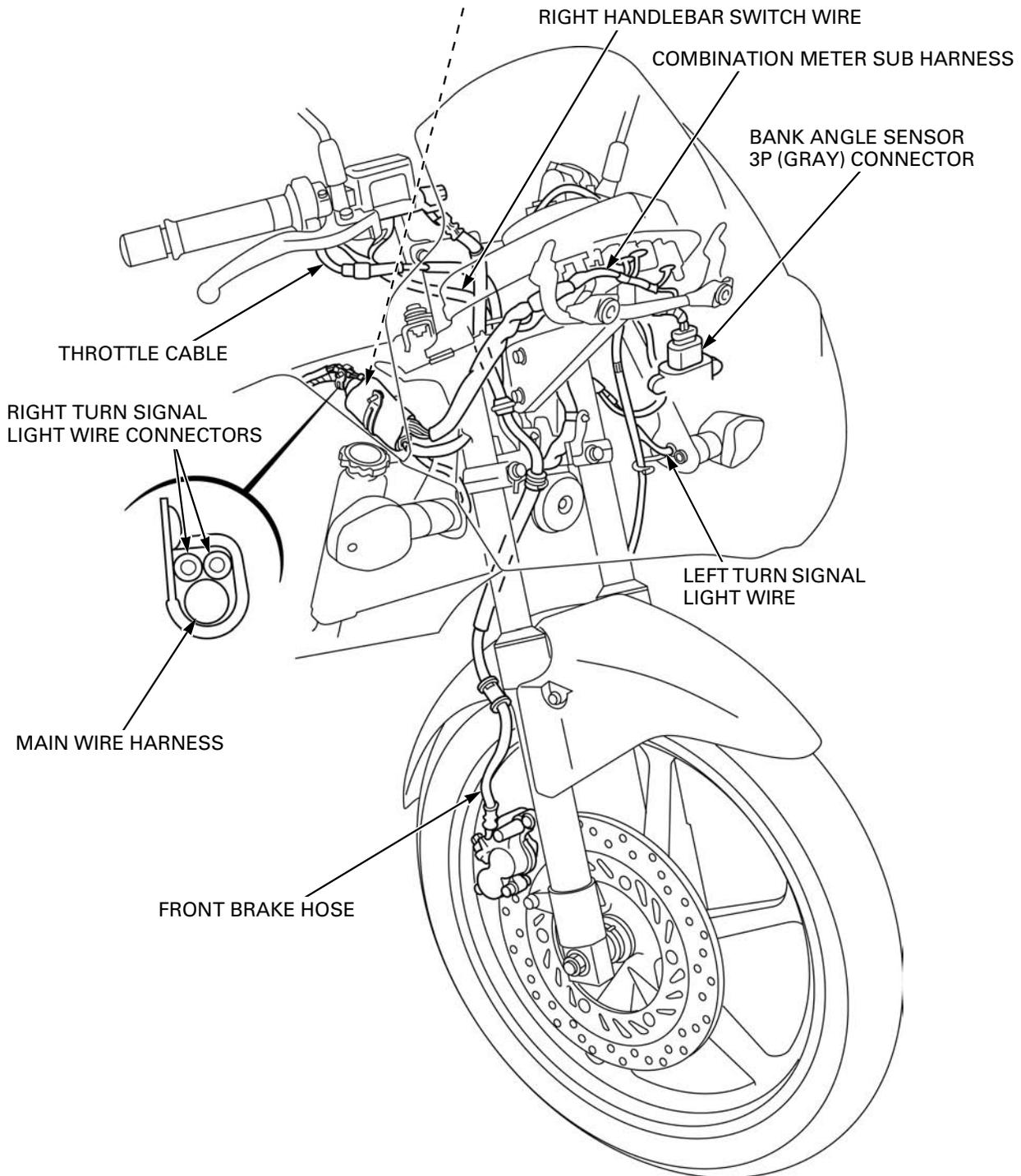


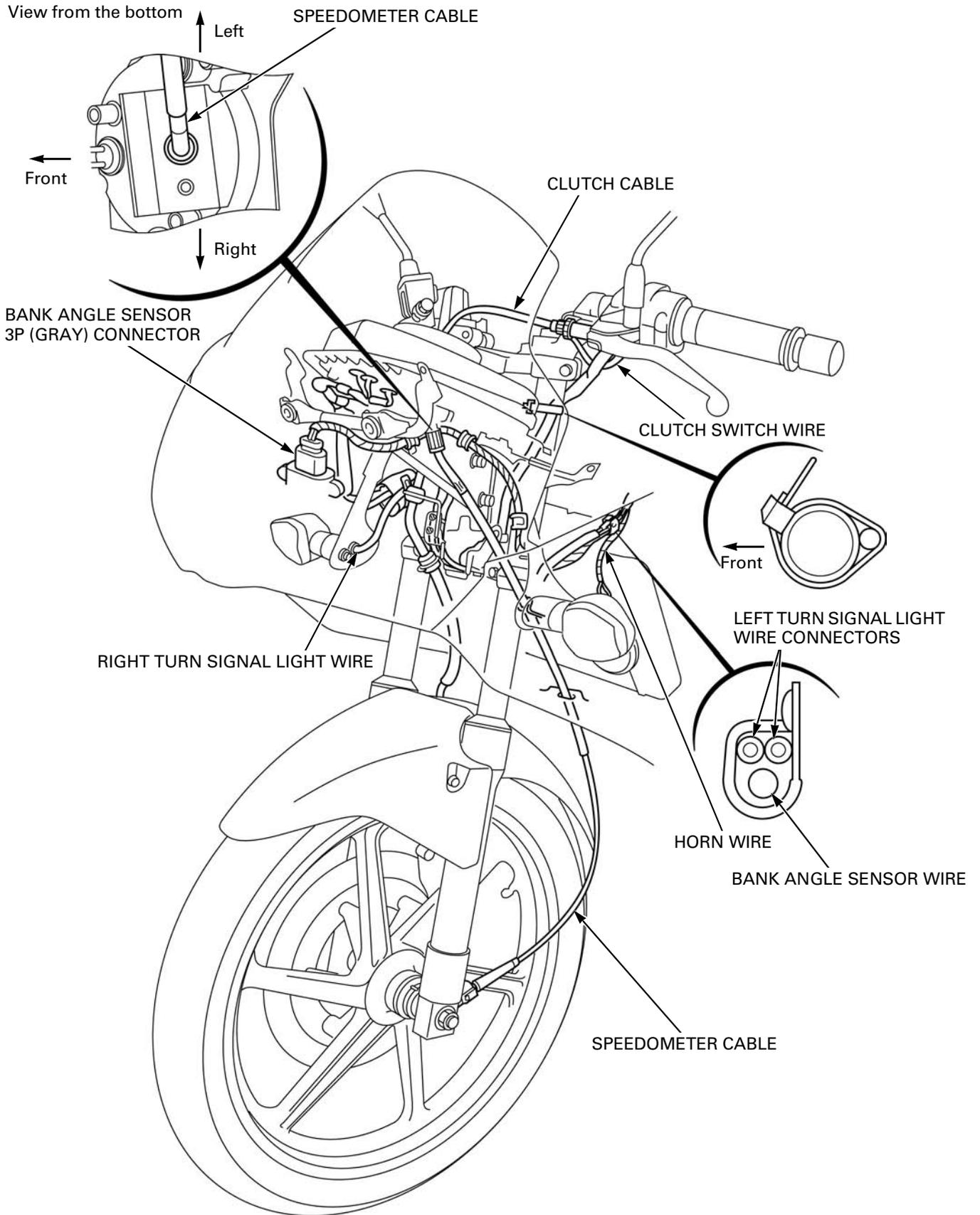
## GENERAL INFORMATION

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### INSIDE BOOT CONNECTORS:

- HEADLIGHT 4P (NATURAL) CONNECTOR
- COMBINATION METER 9P (NATURAL) CONNECTOR
- COMBINATION METER 3P (NATURAL) CONNECTOR
- DLC 4P (NATURAL) CONNECTOR

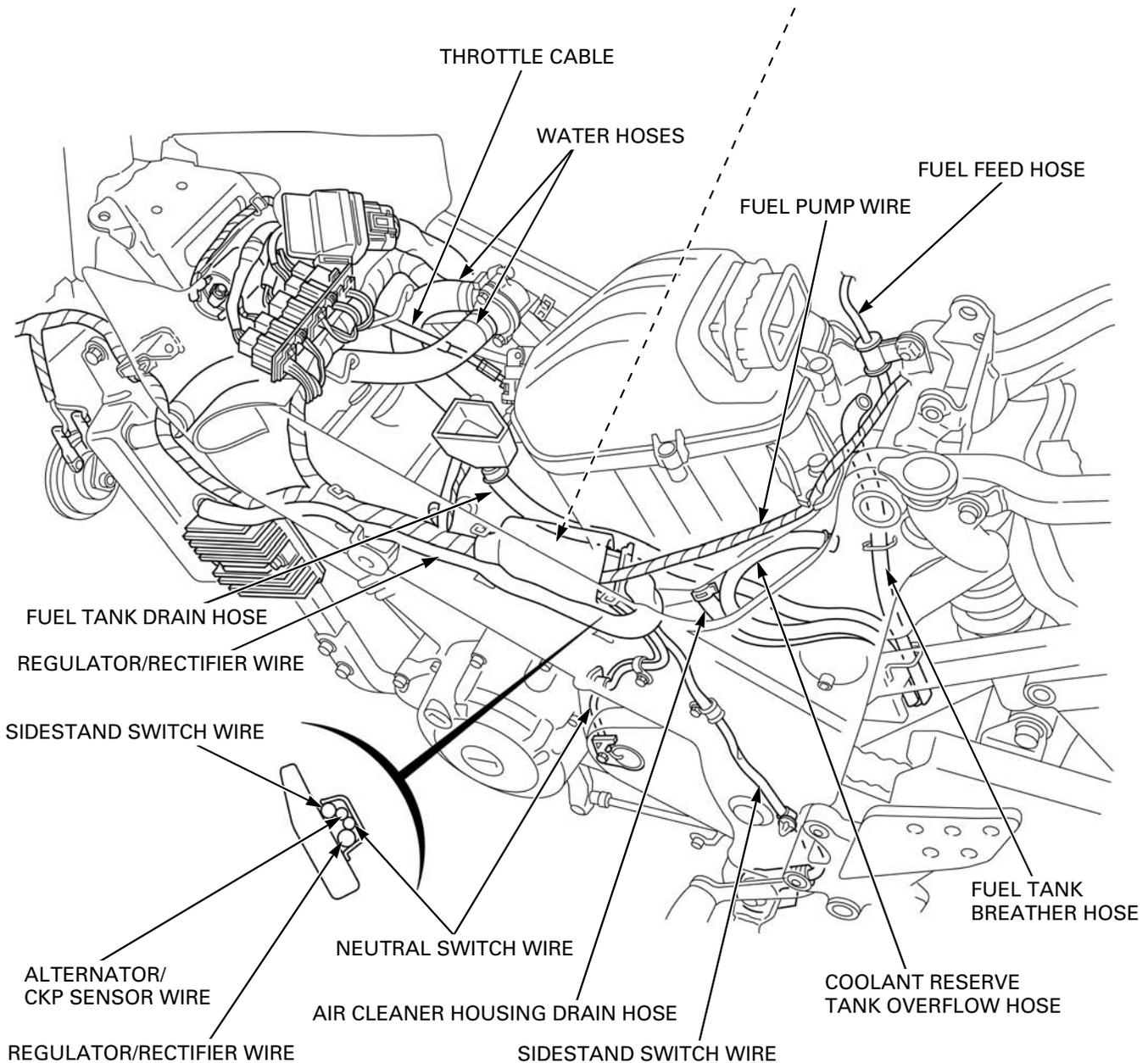


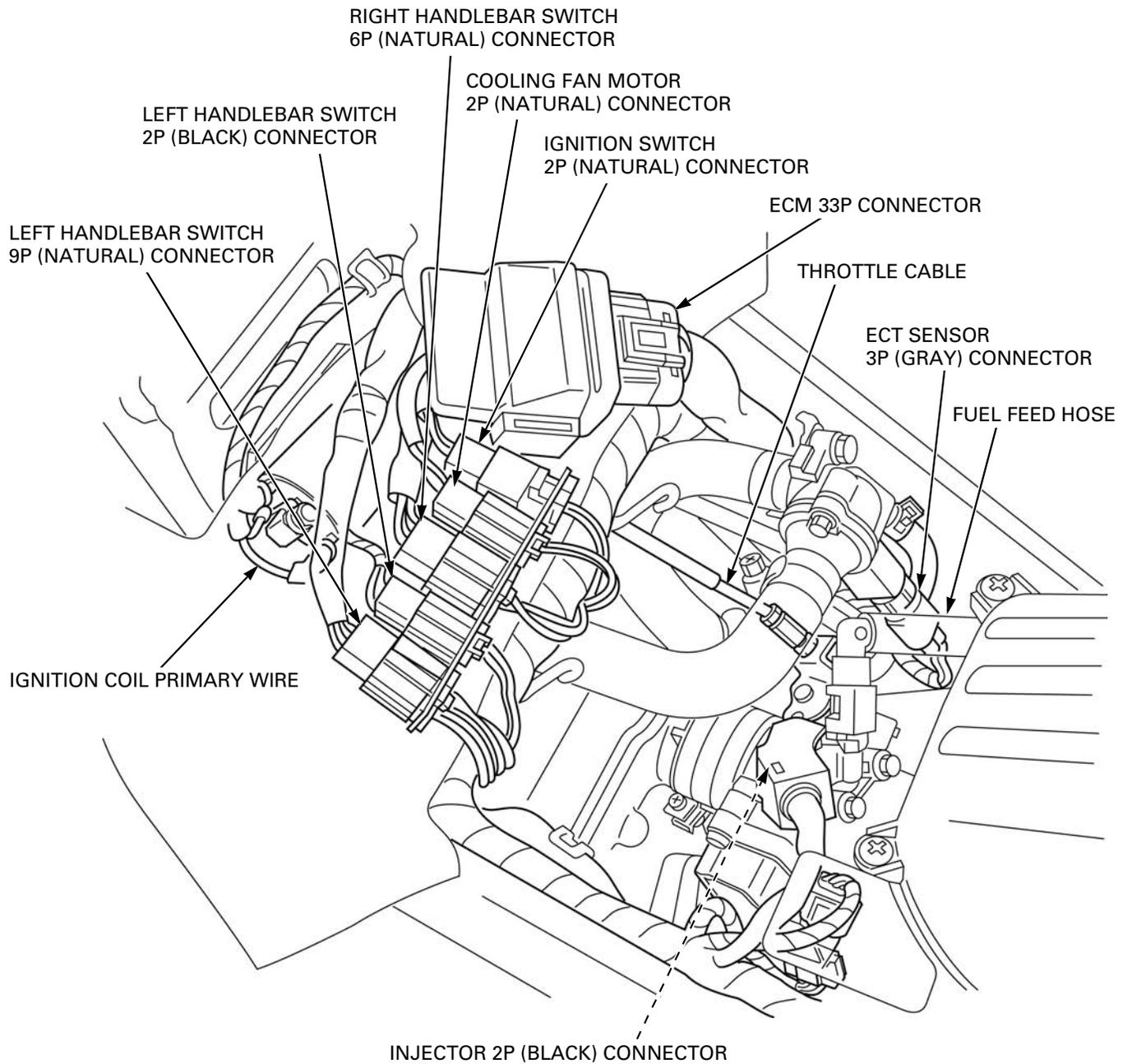


## GENERAL INFORMATION

### INSIDE BOOT CONNECTORS:

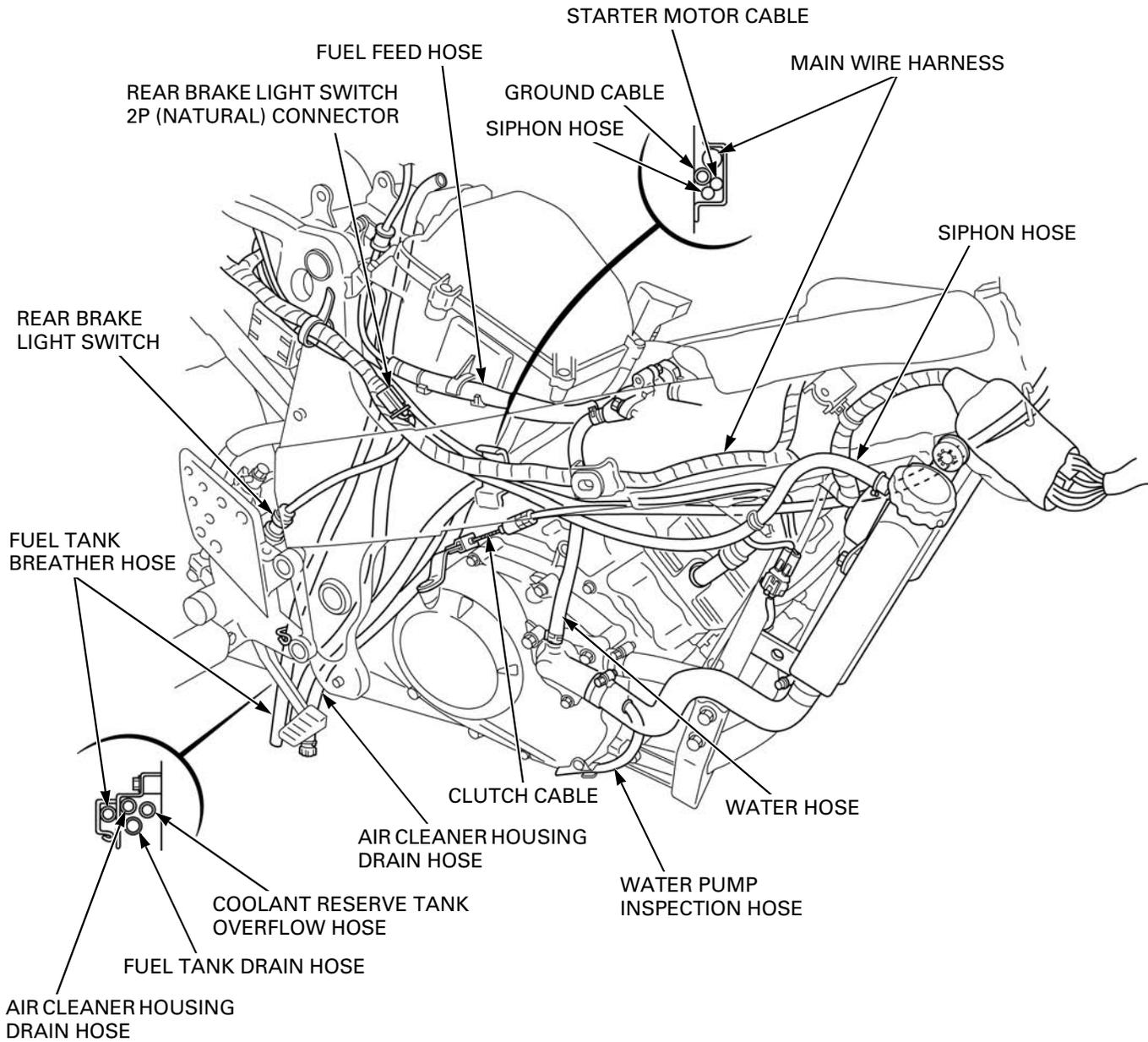
- REGULATOR/RECTIFIER 6P (BLACK) CONNECTOR
- NEUTRAL SWITCH WIRE CONNECTOR
- ALTERNATOR/CKP SENSOR 6P (NATURAL) CONNECTOR
- SIDESTAND SWITCH 3P (GREEN) CONNECTOR

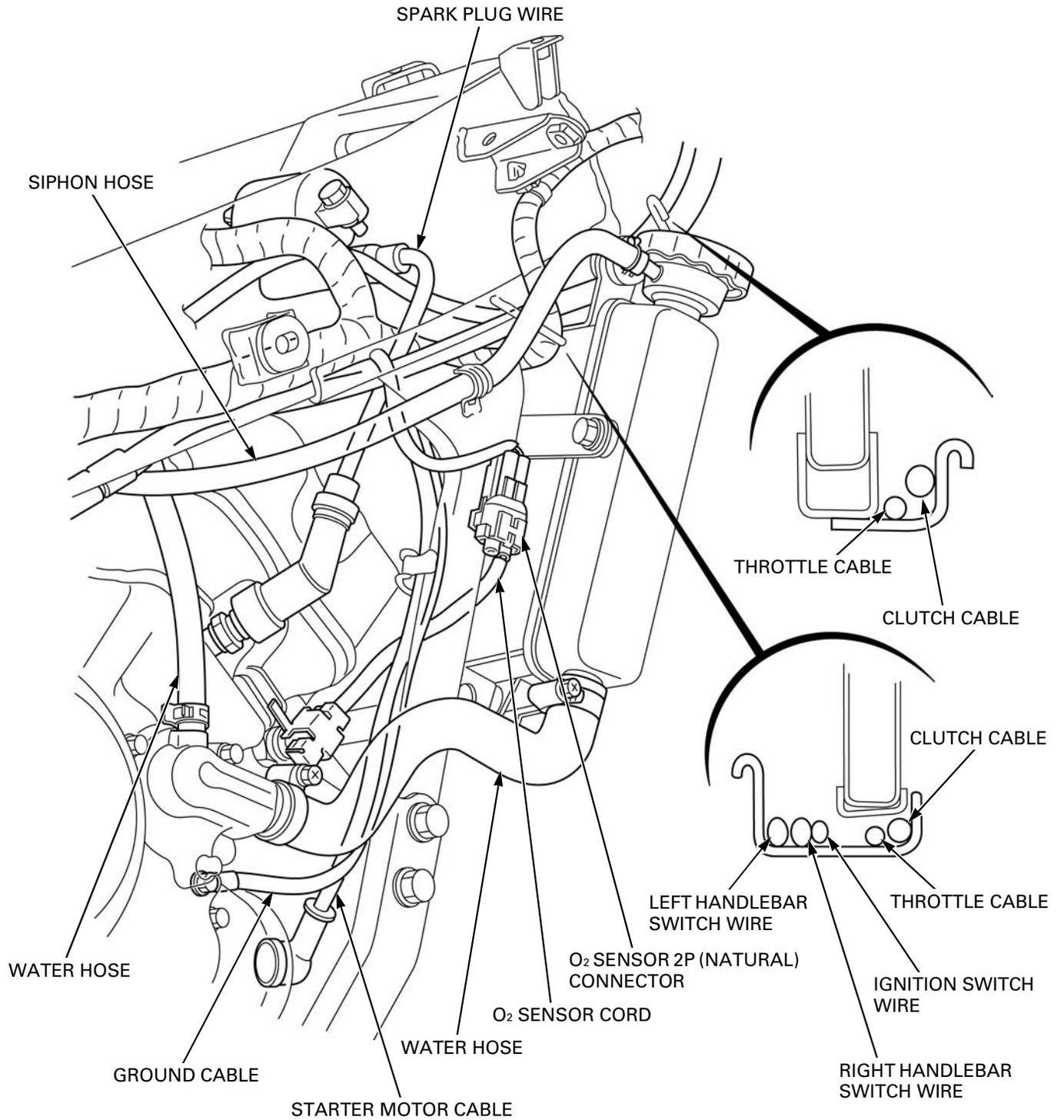




# GENERAL INFORMATION

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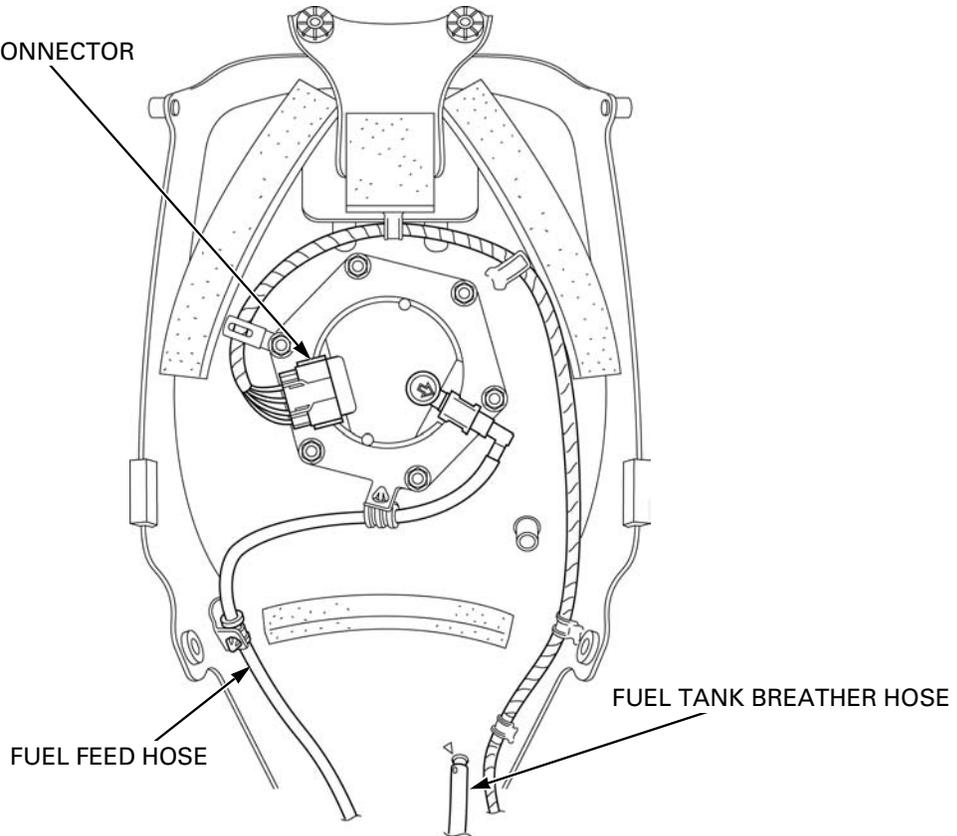




# GENERAL INFORMATION

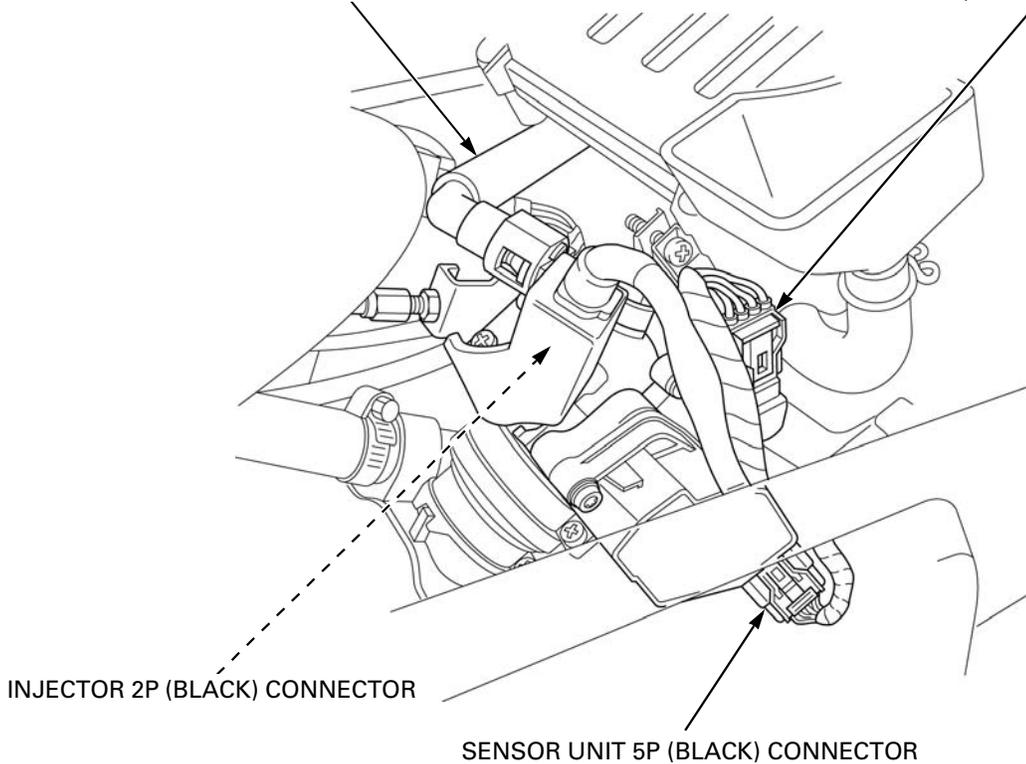
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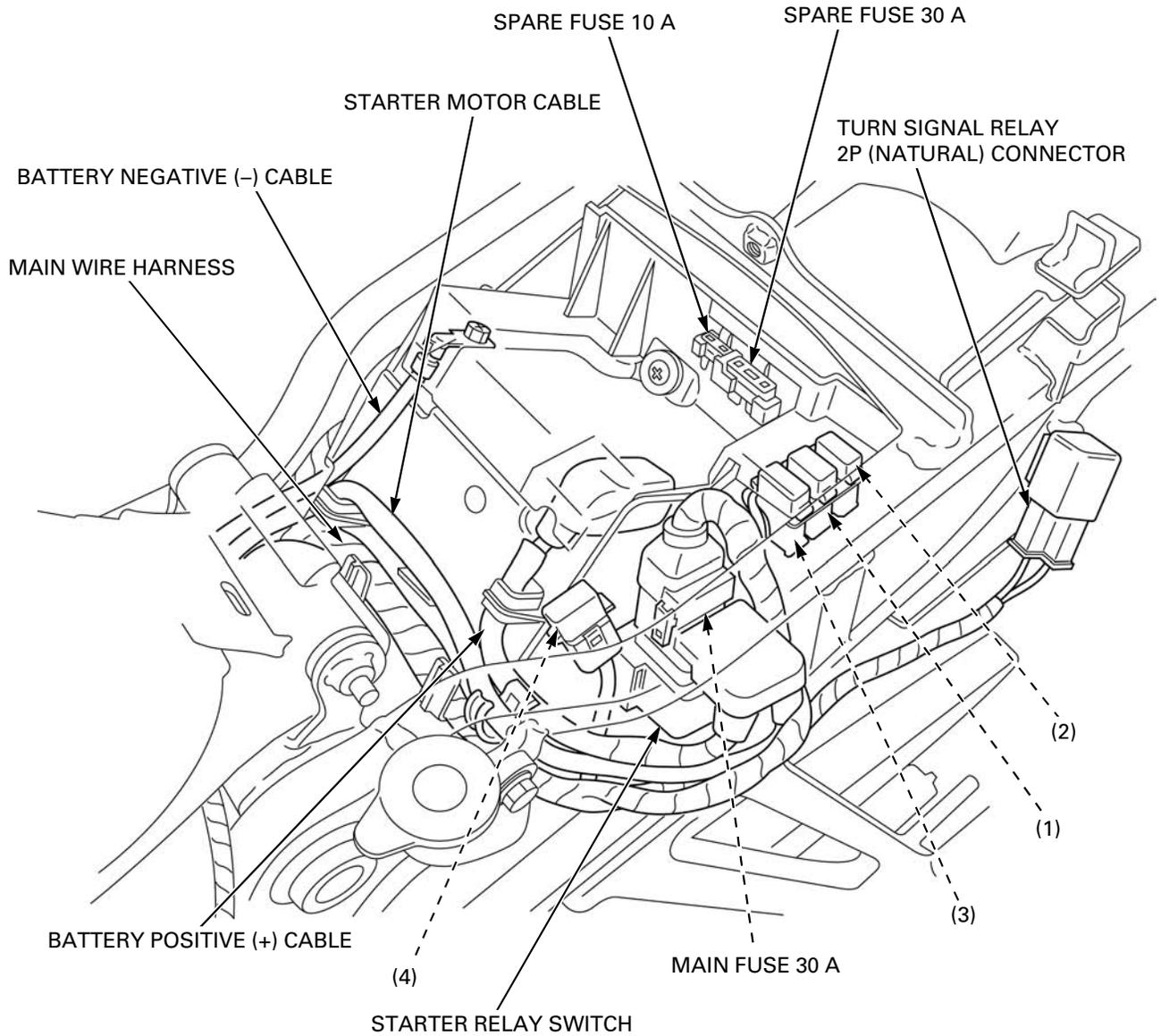
FUEL PUMP  
5P (NATURAL) CONNECTOR



FUEL FEED HOSE

IACV 4P (BLACK) CONNECTOR



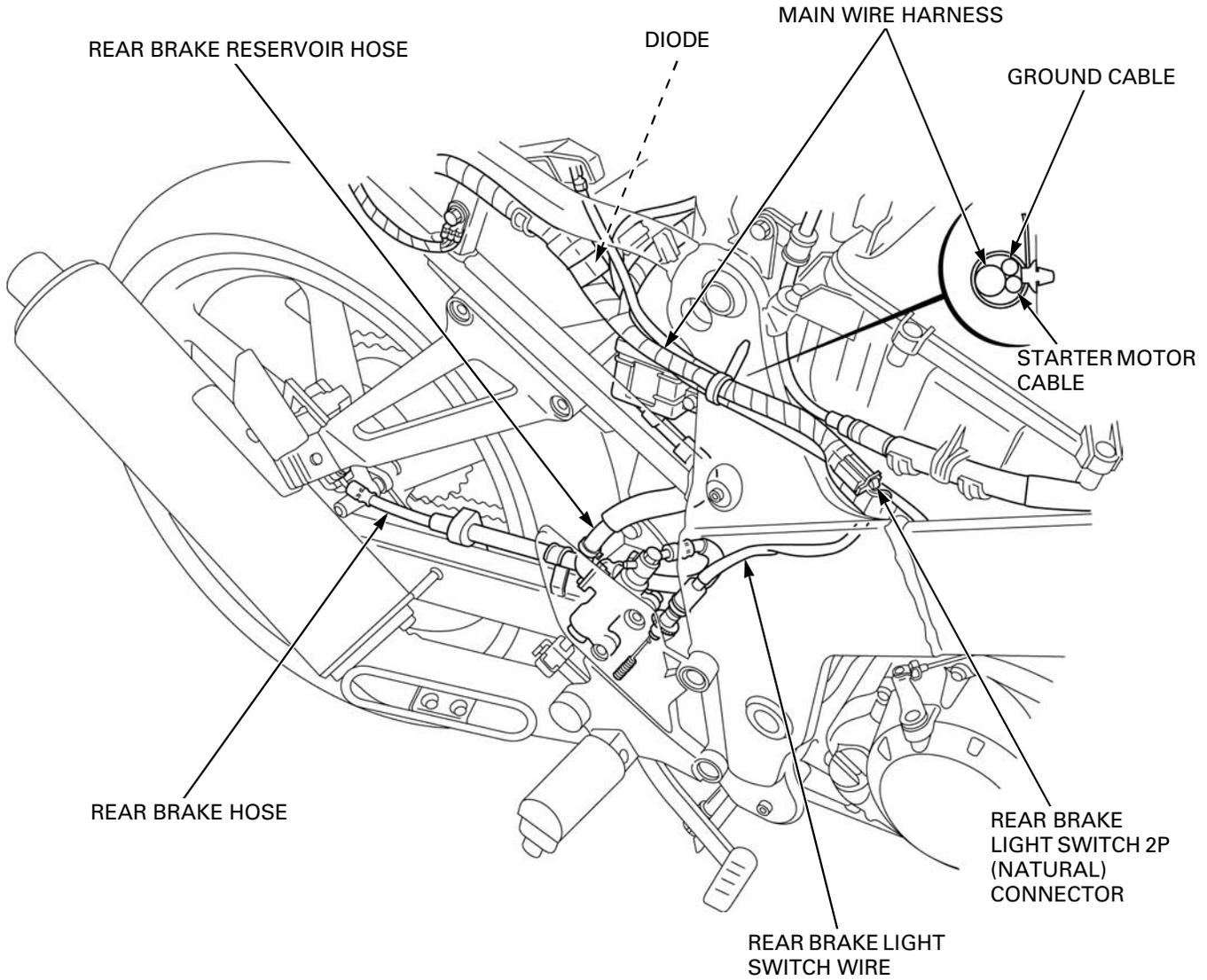


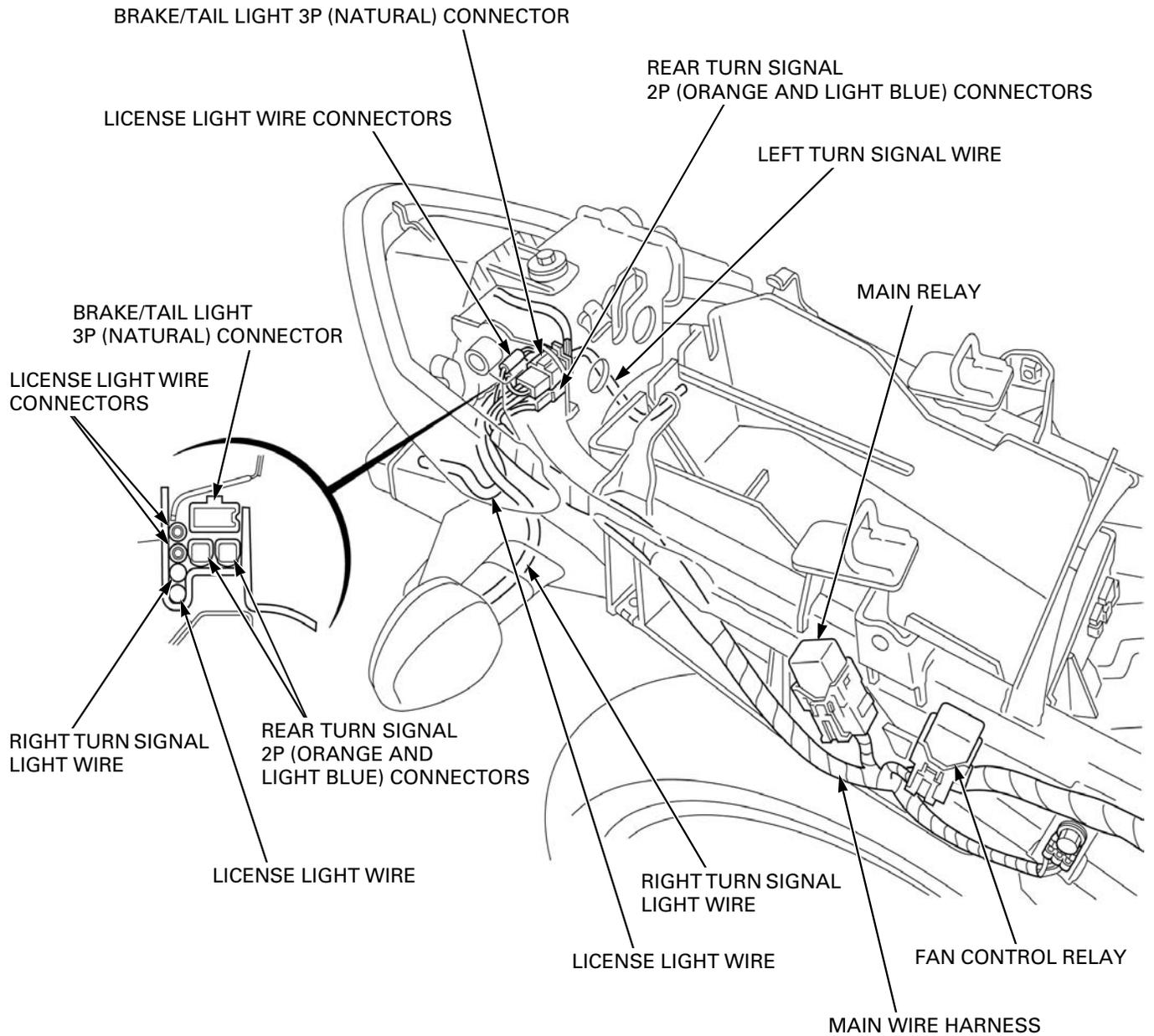
**SUB FUSE 10 A:**

(1) SUB FUSE A	(2) SUB FUSE B	(3) SUB FUSE C	(4) SUB FUSE D
<ul style="list-style-type: none"> <li>- FUN MOTOR</li> </ul>	<ul style="list-style-type: none"> <li>- BRAKE/TAIL LIGHT</li> <li>- TURN SIGNAL LIGHT</li> <li>- TURN SIGNAL INDICATOR</li> <li>- LICENSE LIGHT</li> <li>- MIL</li> <li>- INSTRUMENT LIGHT</li> <li>- NEUTRAL INDICATOR</li> <li>- POSITION LIGHT</li> <li>- HORN</li> </ul>	<ul style="list-style-type: none"> <li>- HEADLIGHT</li> <li>- HIGH BEAM INDICATOR</li> <li>- TACHOMETER</li> <li>- COOLANT TEMPERATURE GAUGE</li> <li>- FUEL GAUGE</li> </ul>	<ul style="list-style-type: none"> <li>- FUEL PUMP</li> <li>- IGNITION COIL</li> <li>- ECM</li> <li>- INJECTOR</li> </ul>

# GENERAL INFORMATION

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## GENERAL INFORMATION

# EMISSION CONTROL SYSTEMS (Except CM type)

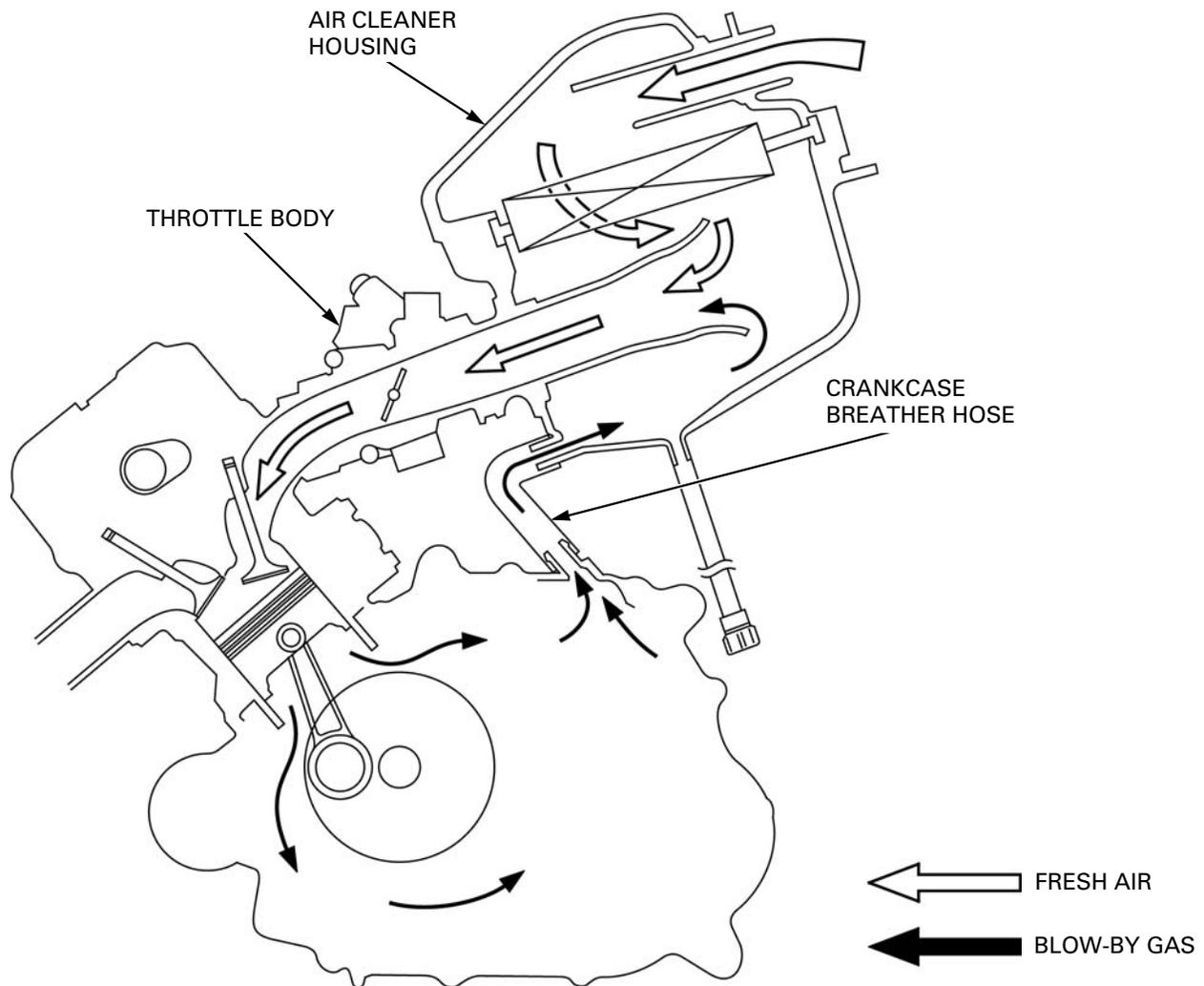
## SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>) and hydrocarbons (HC). Control of carbon monoxide, oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subject to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes various systems (page 1-31) to reduce carbon monoxide, oxides of nitrogen and hydrocarbons.

## 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 throttle body.



## **EXHAUST EMISSION CONTROL SYSTEM**

The exhaust emission control system is composed of a three-way catalytic converter and PGM-FI system.

### **THREE-WAY CATALYTIC CONVERTER**

This motorcycle is equipped with a three-way catalytic converter.

The three-way catalytic converter is in the exhaust system. Through chemical reactions, it converts HC, CO and NO<sub>x</sub> in the engine's exhaust to carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), and water vapor.

No adjustment to these systems should be made although periodic inspection of the components is recommended.

## **NOISE EMISSION CONTROL SYSTEM (Except U type)**

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

**AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:**

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

## **NOISE EMISSION CONTROL SYSTEM (U type only)**

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

## GENERAL INFORMATION

# EMISSION CONTROL SYSTEMS (CM type only)

## EXHAUST EMISSION REQUIREMENT

The U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB) and Transport Canada require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided.

## NOISE EMISSION REQUIREMENT

The EPA also requires that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 3,730 miles (6,000 km) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided.

## WARRANTY COMPLIANCE

Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

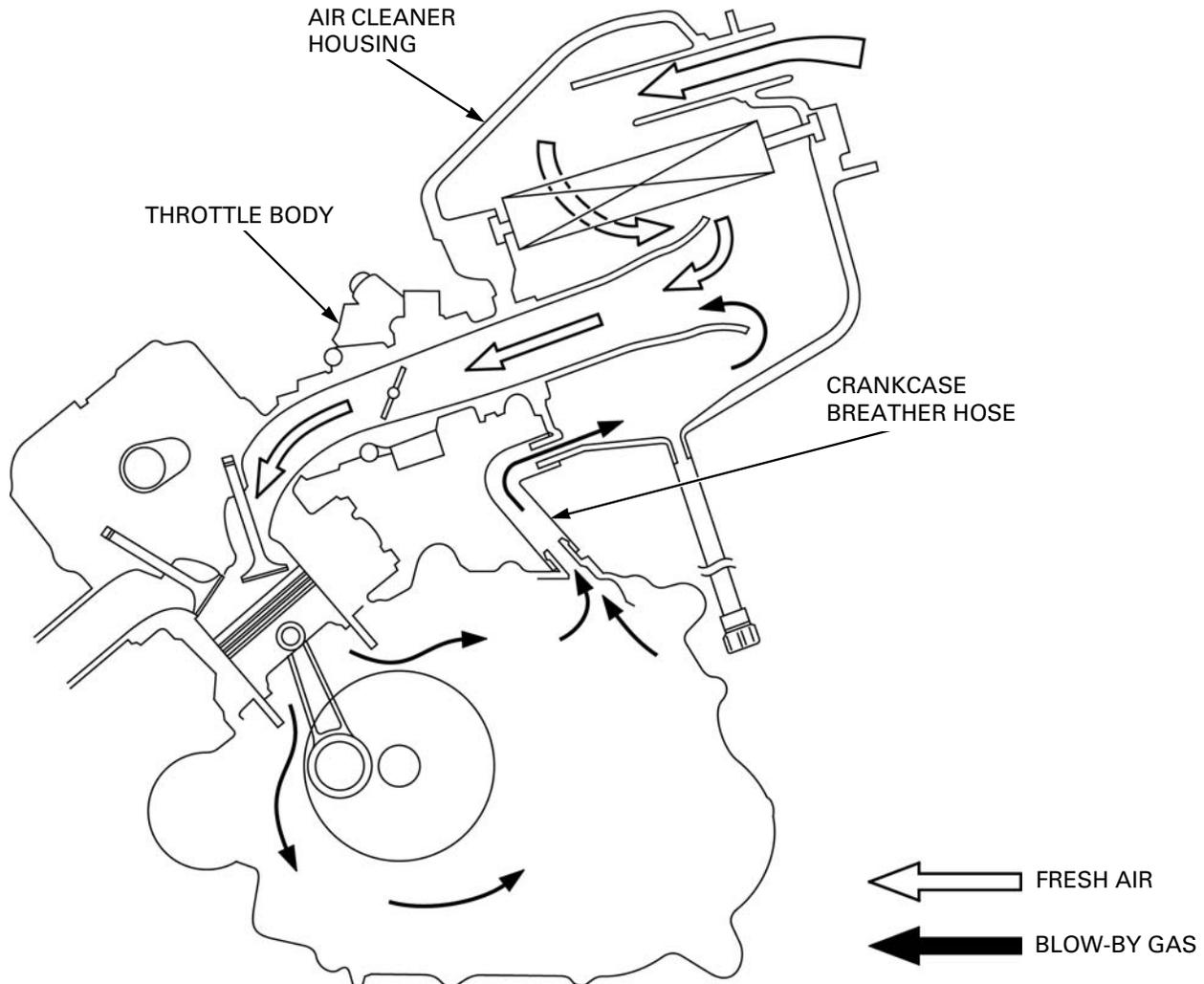
## SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>) and hydrocarbons (HC). Control of carbon monoxide, oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subject to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes various systems (page 1-33) to reduce carbon monoxide, oxides of nitrogen and hydrocarbons.

## 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 throttle body.



## **EXHAUST EMISSION CONTROL SYSTEM**

The exhaust emission control system is composed of a three-way catalytic converter and PGM-FI system.

### **THREE-WAY CATALYTIC CONVERTER**

This motorcycle is equipped with a three-way catalytic converter.

The three-way catalytic converter is in the exhaust system. Through chemical reactions, it converts HC, CO and NO<sub>x</sub> in the engine's exhaust to carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), and water vapor.

No adjustment to these systems should be made although periodic inspection of the components is recommended.

## **NOISE EMISSION CONTROL SYSTEM**

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

**AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:**

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

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**MEMO**

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# 2. BODY PANELS/EXHAUST SYSTEM

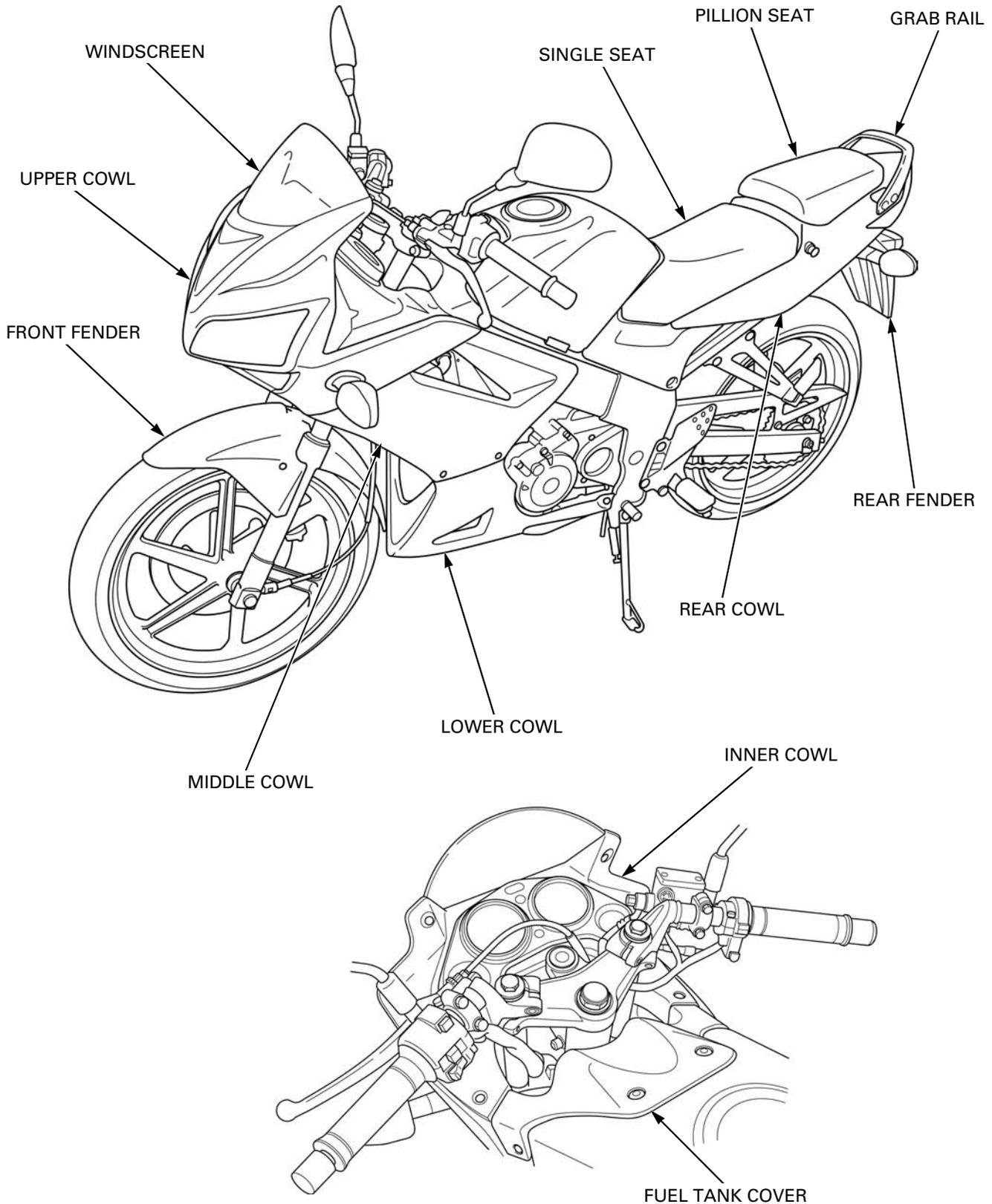
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## BODY PANELS/EXHAUST SYSTEM

# BODY PANEL LOCATIONS

EXCEPT CM AND U TYPE shown:



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## **SERVICE INFORMATION**

### **GENERAL**

- This section covers removal and installation of the body panels and exhaust system.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust pipe gasket with new ones after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust pipe joint nuts first, then tighten the mounting bolts.
- Always inspect the exhaust system for leaks after installation.

### **TORQUE VALUES**

Grab rail mounting bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Turn signal light mounting nut	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)
Muffler joint bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Exhaust pipe cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Exhaust pipe stud bolt	–

See page 2-17

## **TROUBLESHOOTING**

### **Excessive exhaust noise**

- Broken exhaust system
- Exhaust gas leak

### **Poor performance**

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

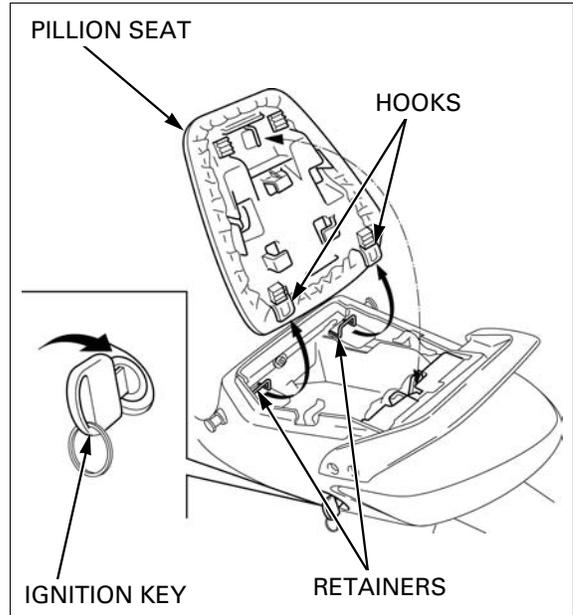
**PILLION SEAT**

**REMOVAL/INSTALLATION**

Unhook the pillion seat lock using the ignition key.  
Remove the pillion seat by pulling it rearward.

Install the pillion seat by inserting the hooks into the seat retainers.

Push the pillion seat down to lock it.



**SINGLE SEAT**

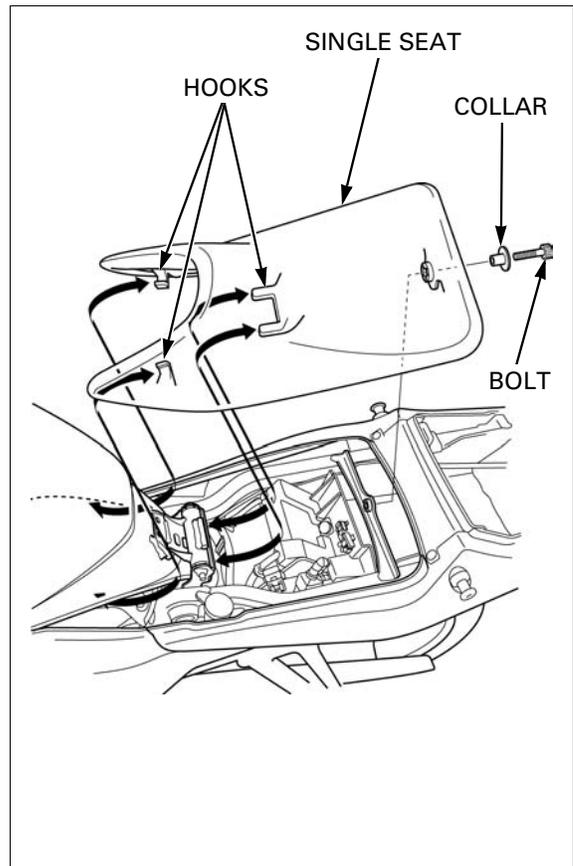
**REMOVAL/INSTALLATION**

Remove the pillion seat (page 2-4).

Remove the mounting bolt and collar.  
Remove the single seat by pulling it rearward.

Install the single seat hooks under the seat bracket on the frame and fuel tank.

Install the collar and mounting bolt, tighten the mounting bolt securely.



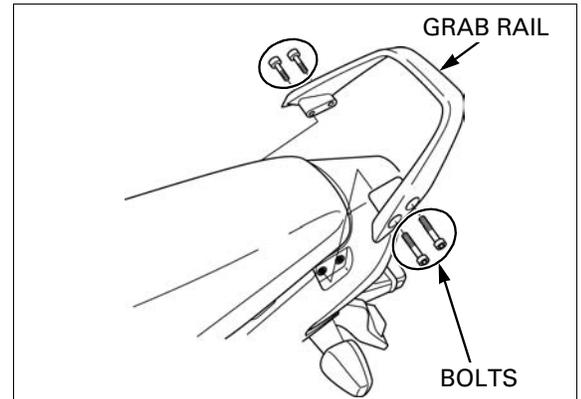
## GRAB RAIL

### REMOVAL/INSTALLATION

Remove the mounting bolts and grab rail.

Install the grab rail and mounting bolts, tighten the bolts to the specified torque.

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



## REAR COWL

### REMOVAL/INSTALLATION

Remove the following:

- Single seat (page 2-4)
- Grab rail (page 2-5)

Remove the bolts, collars, spacers and screws.

Release the bosses from the grommets of the fuel tank.

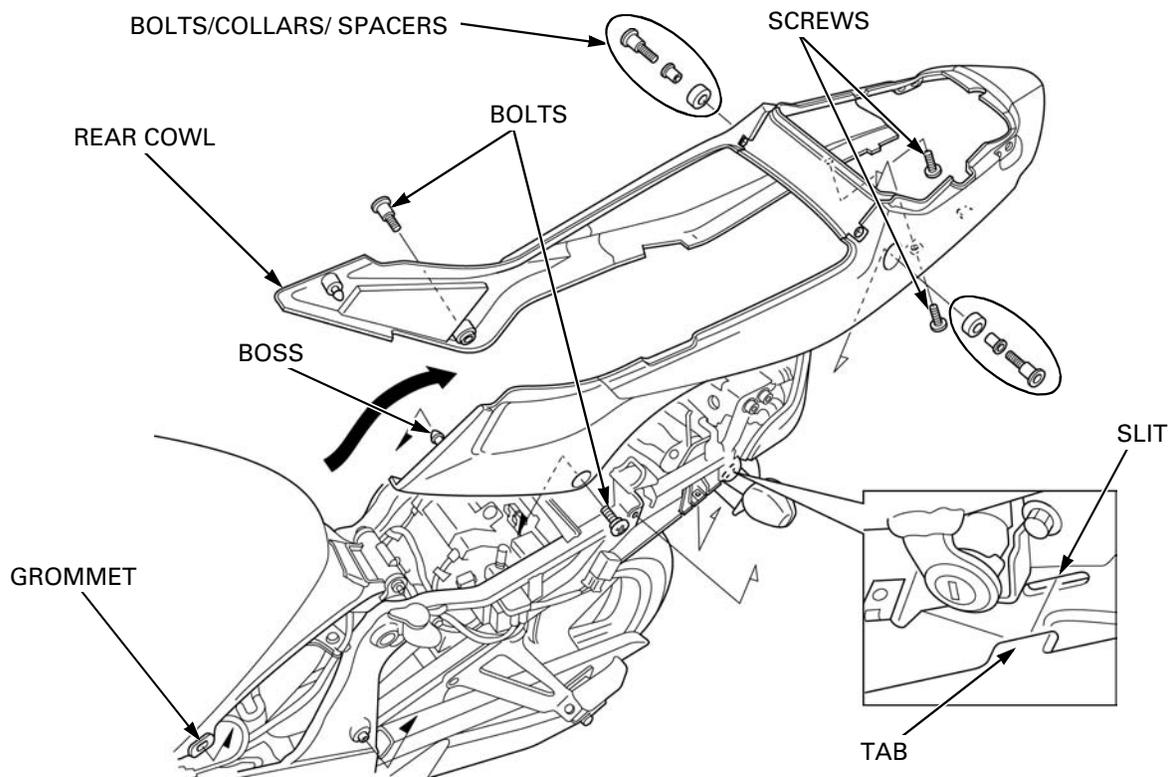
*Be careful not to damage the rear cowl.*

Carefully pull out both sides of the rear cowl, then remove it rearward.

Install the rear cowl in the reverse order of removal.

**NOTE:**

Insert the tabs to the slits of the rear fender.



## BODY PANELS/EXHAUST SYSTEM

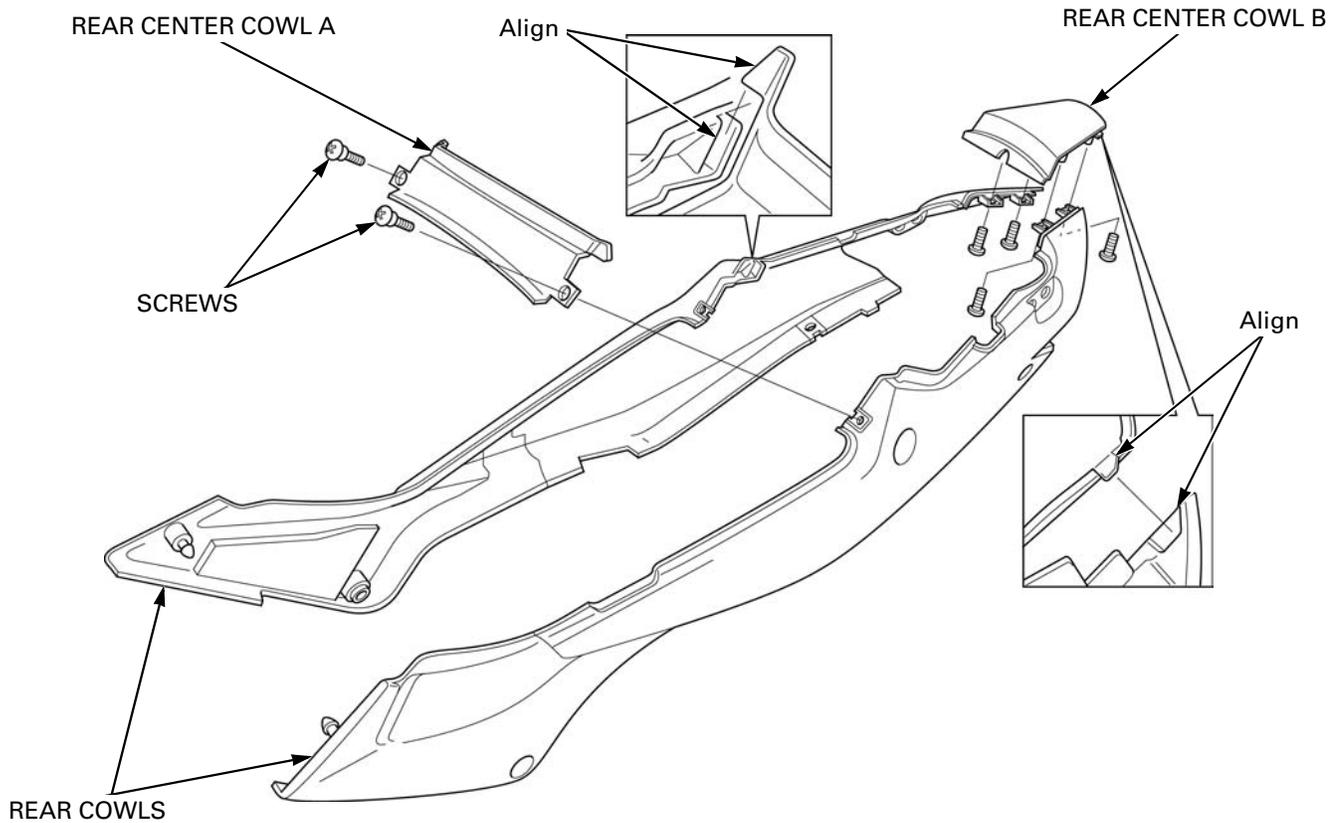
### DISASSEMBLY/ASSEMBLY

Remove the screws, rear center cowl A and B from the rear cowls.

Assembly is in the reverse order of disassembly.

#### NOTE:

Install the rear center cowl A and B by aligning its tabs with the slits of the both rear cowls.

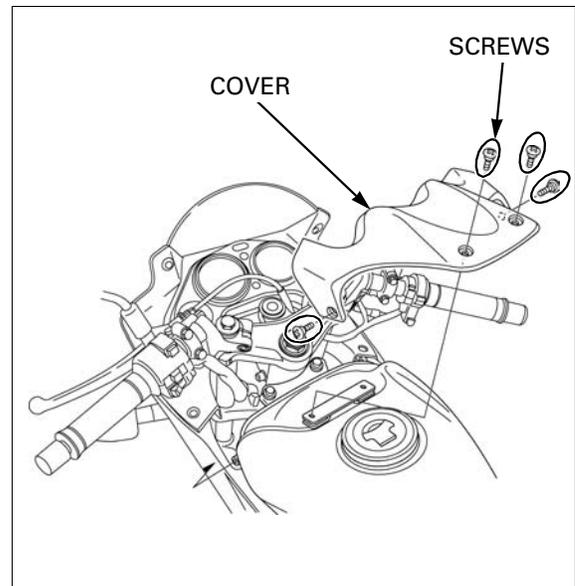


## FUEL TANK COVER

### REMOVAL/INSTALLATION

Remove the screws and fuel tank cover.

Install the fuel tank cover and screws.



**INNER COWL**

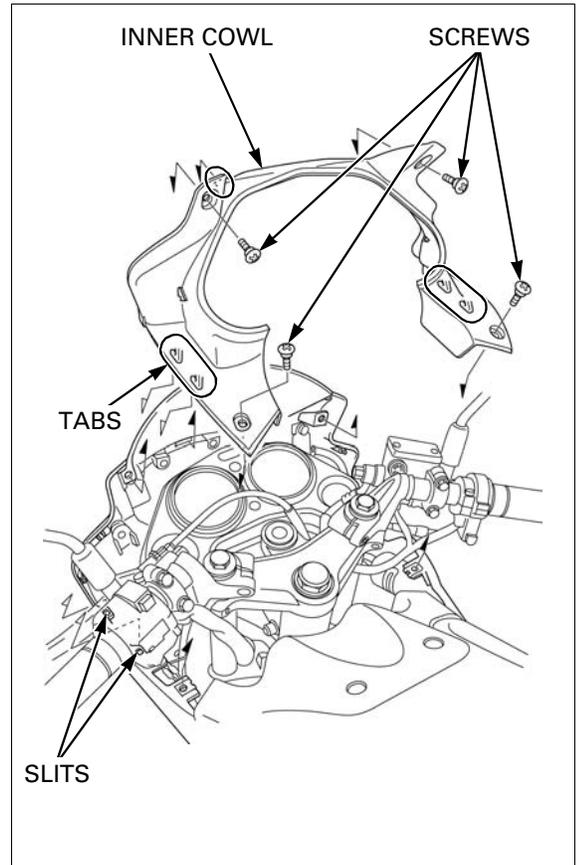
**REMOVAL/INSTALLATION**

Remove the screws and inner cowl by pulling it rearward.

Install the inner cowl in the reverse order of removal.

**NOTE:**

Insert the tabs of the inner cowl to the slits of the middle cowl and upper cowl.



## BODY PANELS/EXHAUST SYSTEM

### LOWER COWL

#### REMOVAL/INSTALLATION

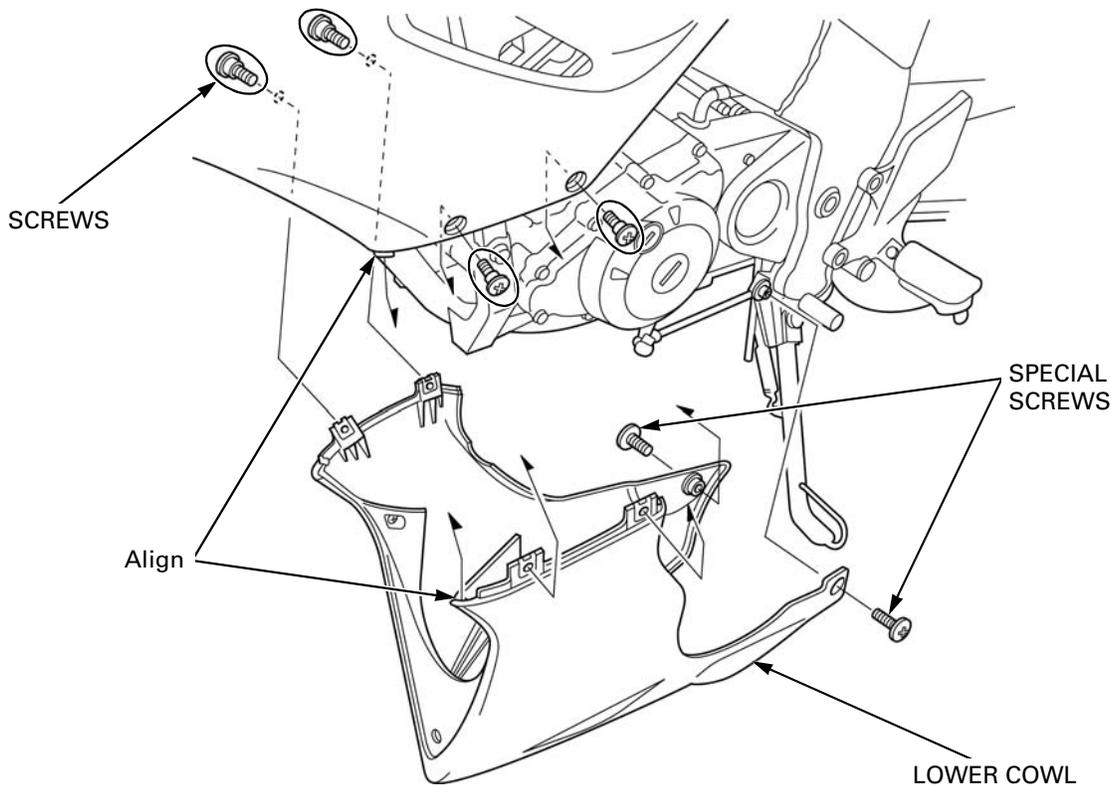
Remove the lower cowl special screws.

*Be careful not to damage the tabs and slits.* Remove the lower cowl-to-middle cowl screws and then remove the lower cowl downward.

Install the lower cowl by aligning the tabs of the middle cowl with the slits of the lower cowl.

Install and tighten the lower cowl-to-middle cowl screws.

Install and tighten the lower cowl special screws.



#### DISASSEMBLY/ASSEMBLY

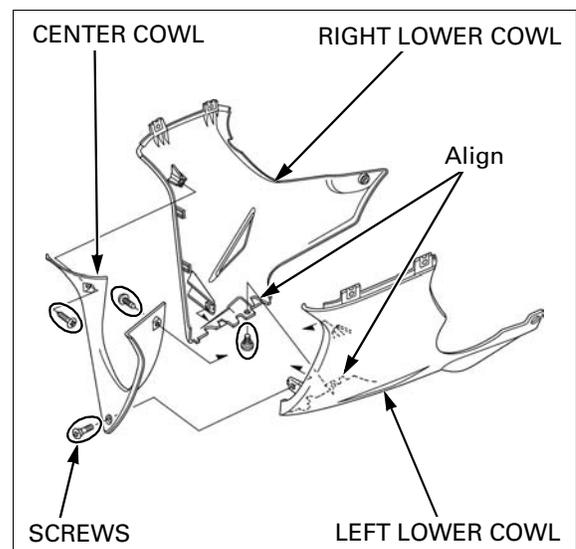
Remove the screws and lower center cowl.

*Be careful not to damage the tabs.* Remove the screws and separate the right and left lower cowl.

Assemble the lower cowl in the reverse order of disassembly.

NOTE:

Assemble the right and left lower cowl by aligning its tabs with the slits.



# MIDDLE COWL

## REMOVAL/INSTALLATION

Remove the following:

- Fuel tank cover (page 2-6)
- Inner cowl (page 2-7)
- Lower cowl (page 2-8)
- Turn signal light (page 19-5)

Release the wires from the clamps.

Remove the screws and bolts.

*Be careful not to damage the tabs and slits.*

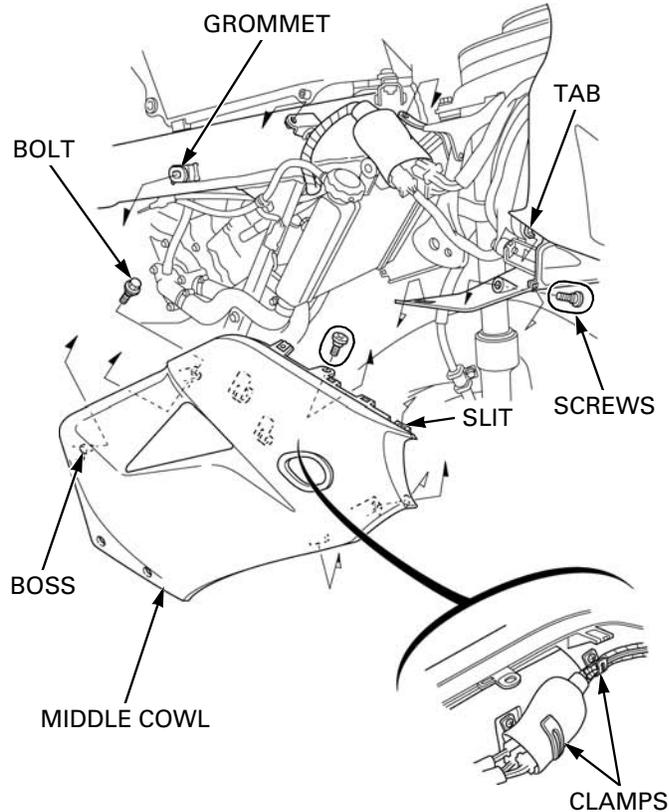
Release the boss from the grommet of the frame and remove the middle cowl by pulling it forward.

**LEFT SIDE:** Release the speedometer cable from the cable guide.

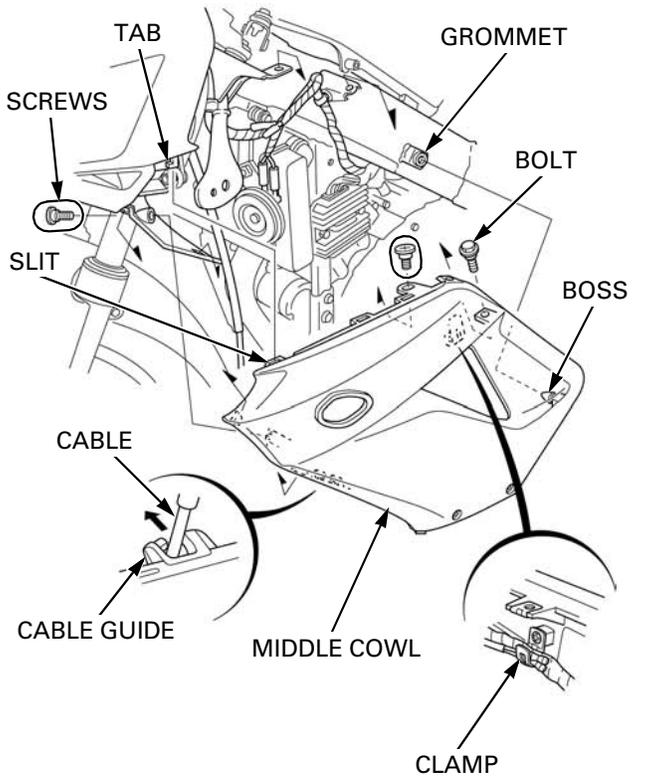
*Route the wires properly (page 1-18).*

Install the middle cowl in the reverse order of removal.

**RIGHT SIDE:**



**LEFT SIDE:**

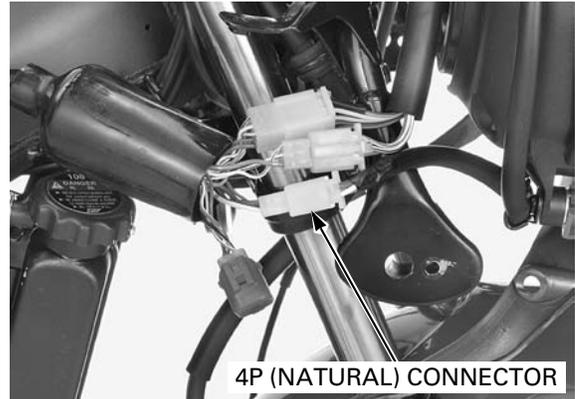


**UPPER COWL**

**REMOVAL/INSTALLATION**

Remove the middle cowl (page 2-9).

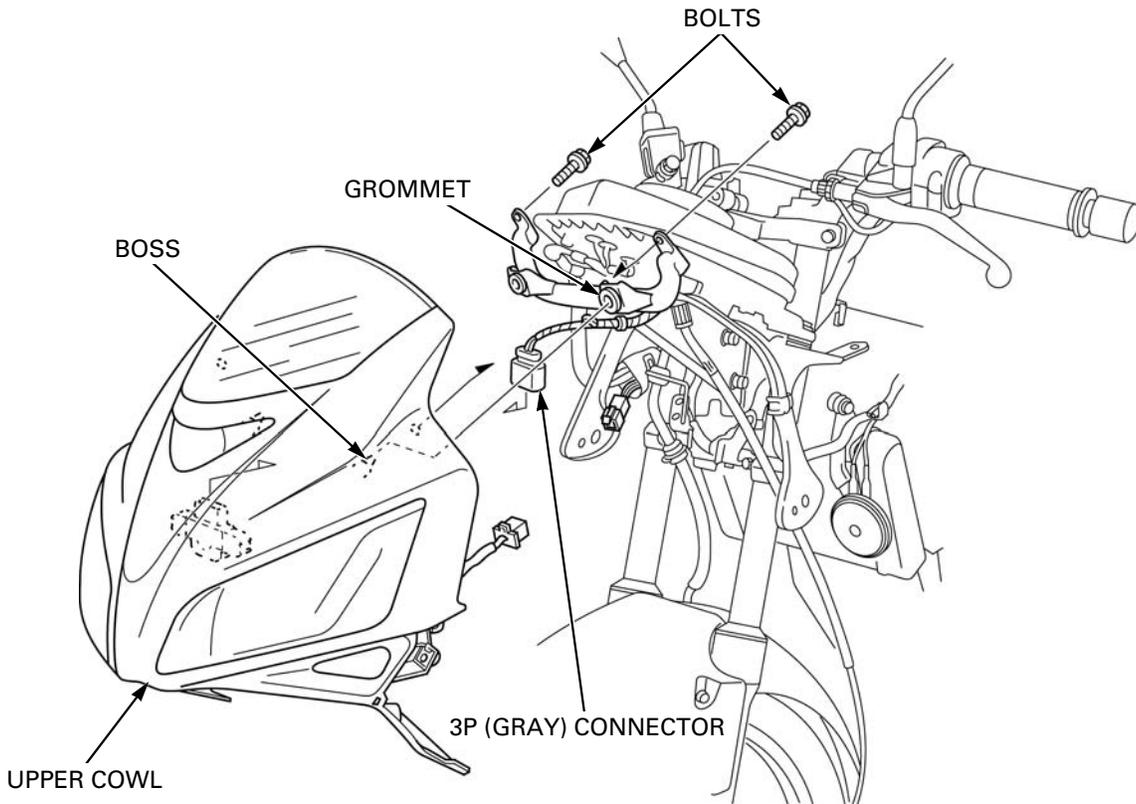
Disconnect the headlight/position light 4P (Natural) connector.



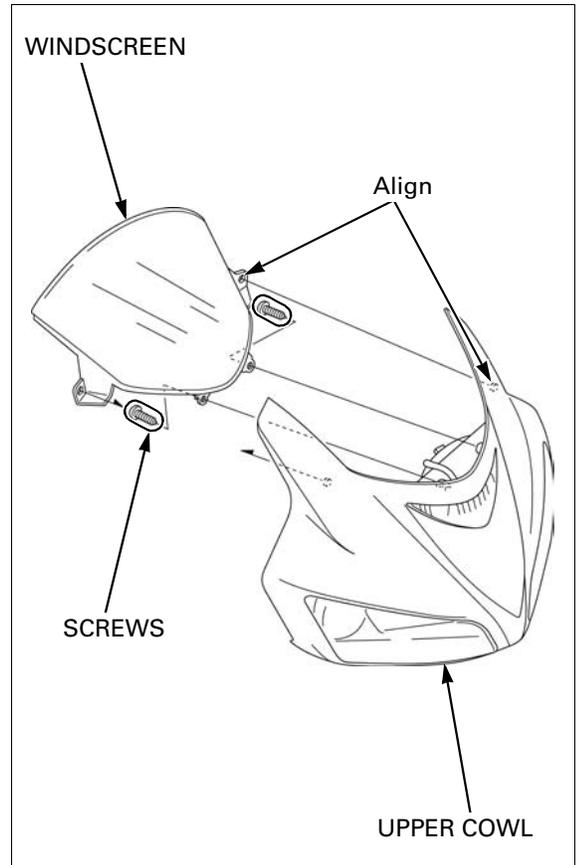
**4P (NATURAL) CONNECTOR**

Remove the bolts and release the bosses from the grommets of the upper cowl stay.

Disconnect the bank angle sensor 3P (Gray) connector.



Remove the screws and windscreen.  
Install the windscreen by aligning its holes with the bosses of the upper cowl.  
Install and tighten the screws.  
Install the upper cowl in the reverse order of removal.

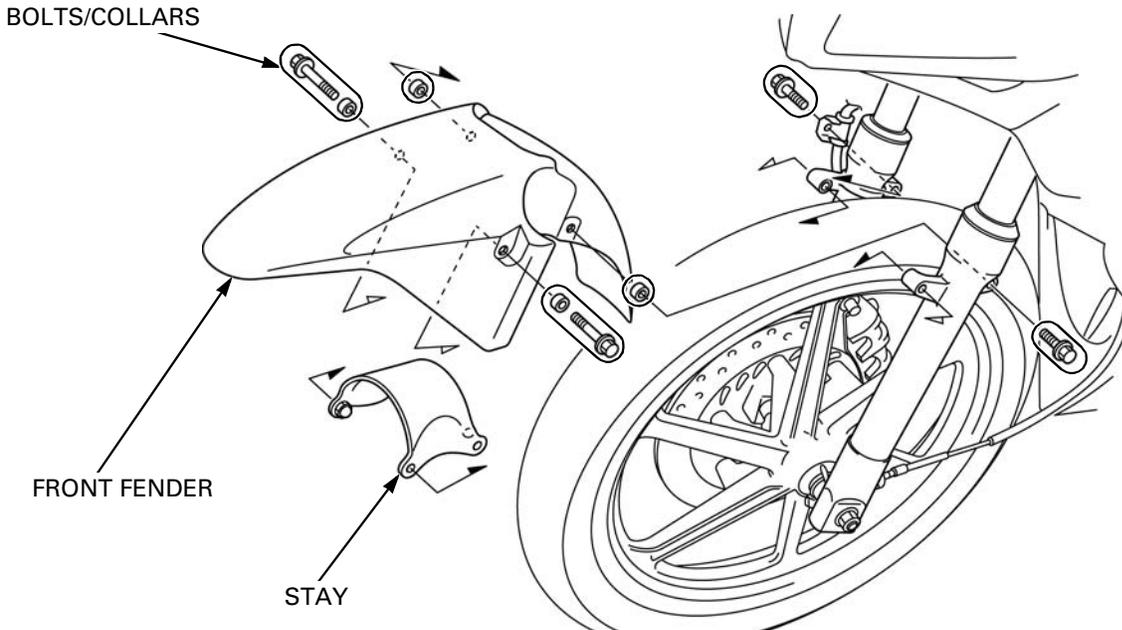


**FRONT FENDER**

**REMOVAL/INSTALLATION**

*Be careful not to damage the fork legs.* Remove the bolts, collars, front fender and front fender stay from the fork legs.

**NOTE:**  
Pull the front fender up and then pull it forward between the fork legs.  
Install the front fender in the reverse order of removal.



## BODY PANELS/EXHAUST SYSTEM

### REAR FENDER

#### REMOVAL/INSTALLATION

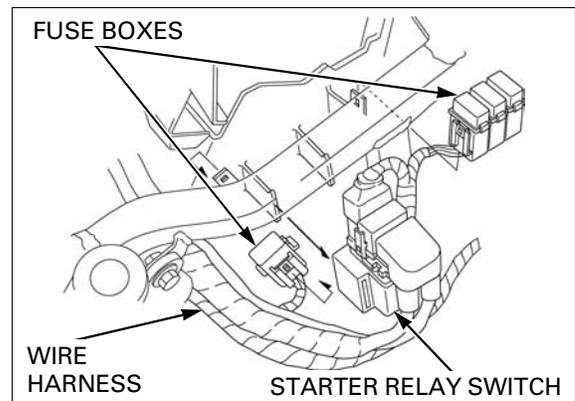
Remove the following:

- Brake/tail light (page 19-6)
- Battery (page 16-5)

Disconnect the turn signal light 2P (Orange and Light blue) connectors and license light connectors.



Remove the starter relay switch and fuse boxes. Release the wire harness from the rear fender.



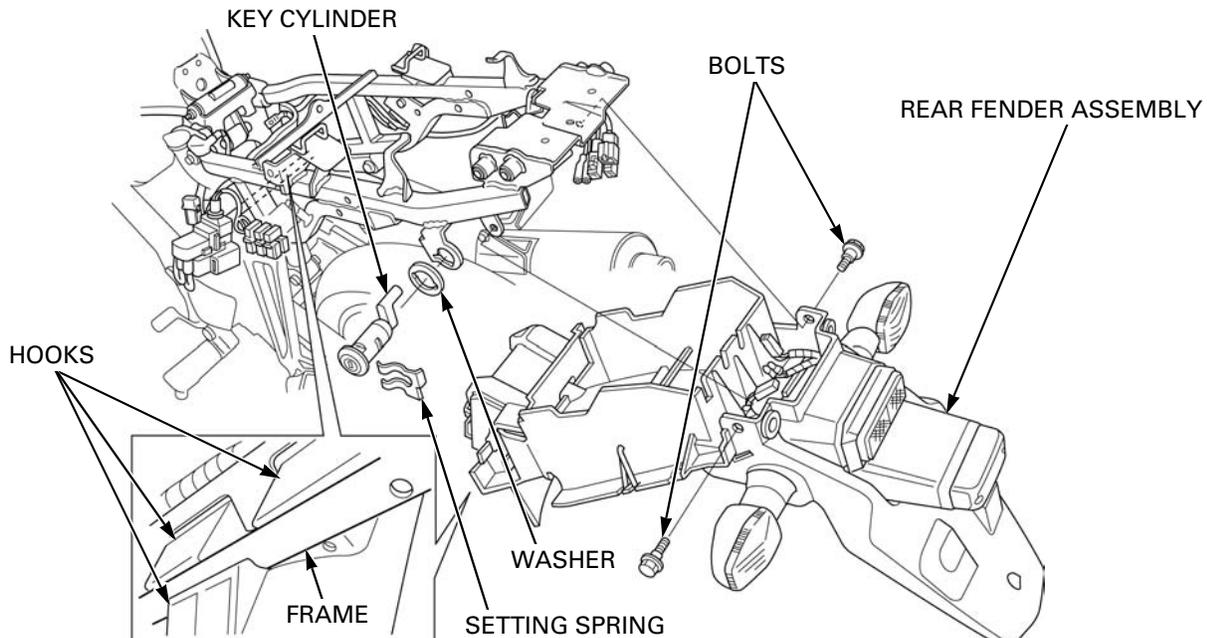
Remove the setting spring, seat lock key cylinder and retaining washer from the rear fender. Remove the bolts and rear fender by pulling it rearward.

*Route the wires properly (page 1-18).*

Install the rear fender in the reverse order of removal.

**NOTE:**

Insert the hooks of the rear fender into the frame.



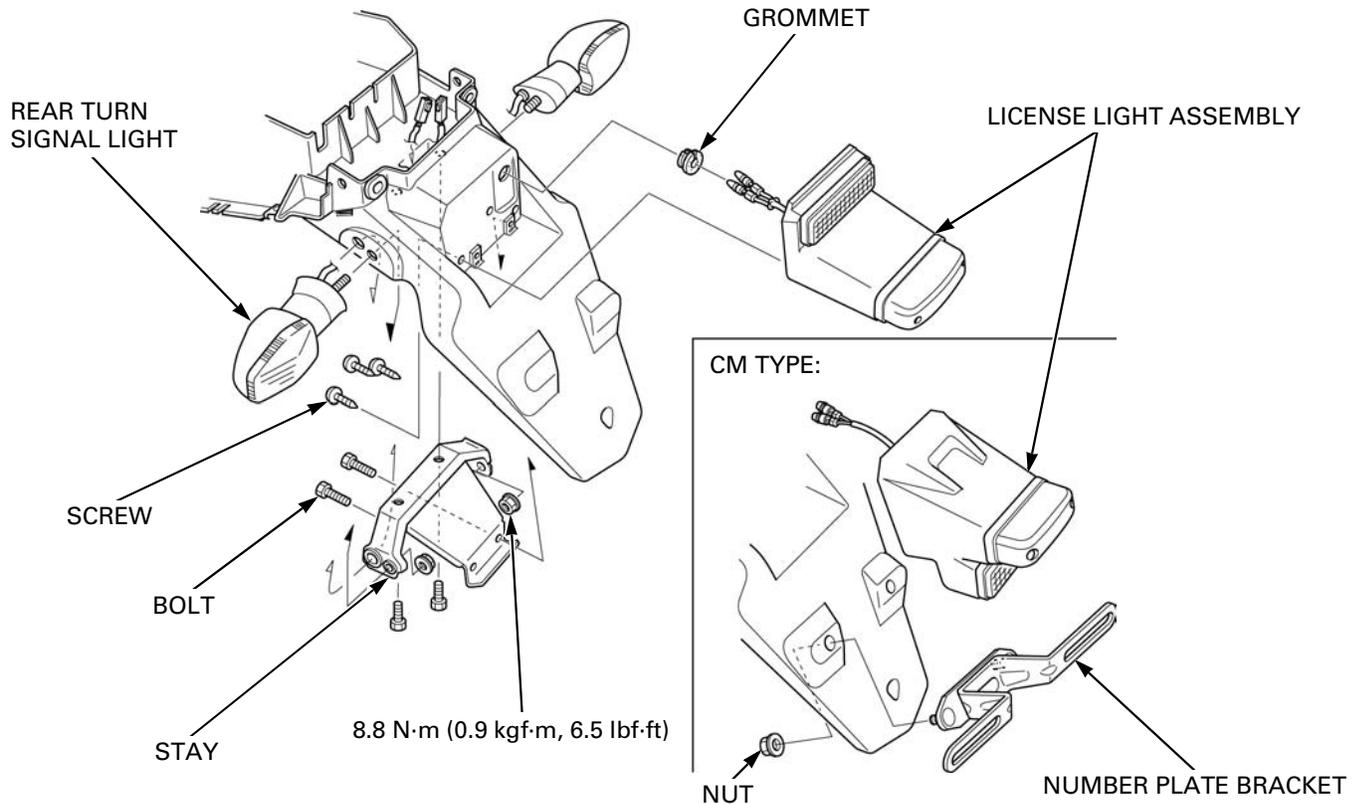
**DISASSEMBLY/ASSEMBLY**

Remove the following:

- Turn signal light mounting nuts and turn signal lights
- Bolts and turn signal light stay
- Screws and license light assembly
- Grommet
- Nuts and number plate bracket (CM type)

Assemble is in the reverse order of disassembly.

EXCEPT CM TYPE:

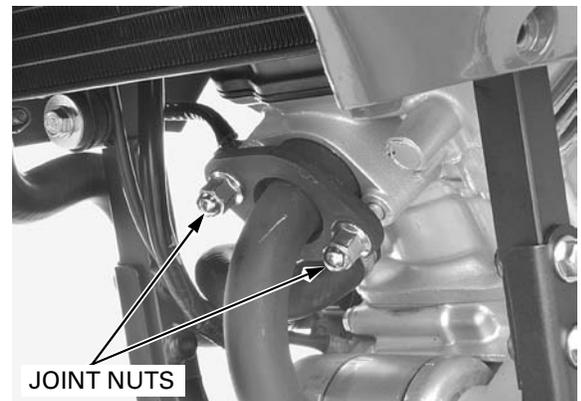


**EXHAUST PIPE/MUFFLER**

**REMOVAL**

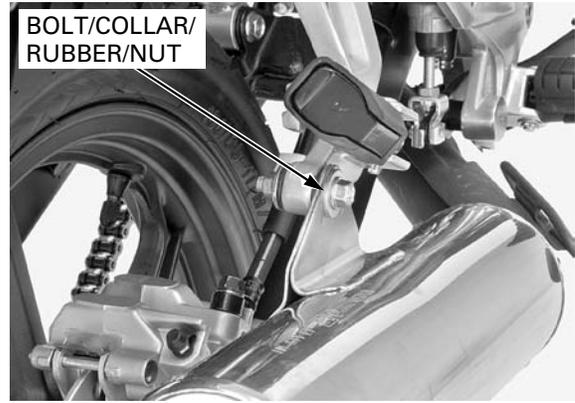
Remove the lower cowl (page 2-8).

Remove the exhaust pipe joint nuts.



## BODY PANELS/EXHAUST SYSTEM

Remove the muffler mounting bolt, collar, rubber and nut.

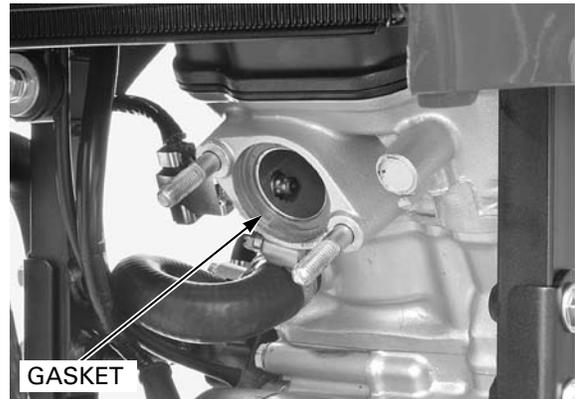


Remove the exhaust pipe mounting bolt, nut, washer, collar and rubbers.

Remove the exhaust pipe/muffler as assembly.



Remove the exhaust pipe gasket.



**DISASSEMBLY/ASSEMBLY**

Remove the following:

- Bolts, spring washers, washers and exhaust pipe cover
- Bolts, nuts and muffler guard
- Bolts, muffler and gasket

Assembly is in the reverse order of disassembly.

**NOTE:**

Always replace the muffler gasket with a new one whenever the muffler is removed from the exhaust pipe.

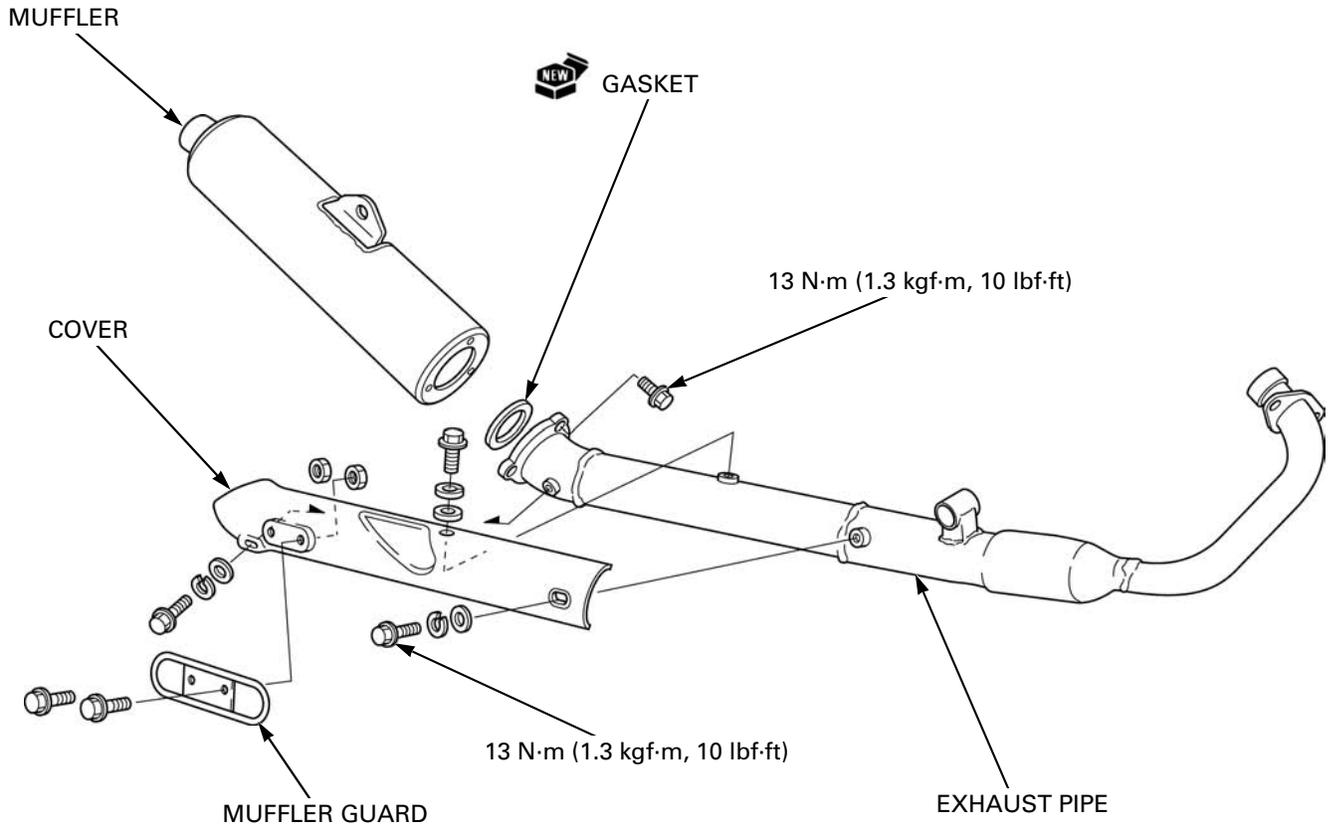
**TORQUE:**

**Muffler joint bolt:**

**13 N·m (1.3 kgf·m, 10 lbf·ft)**

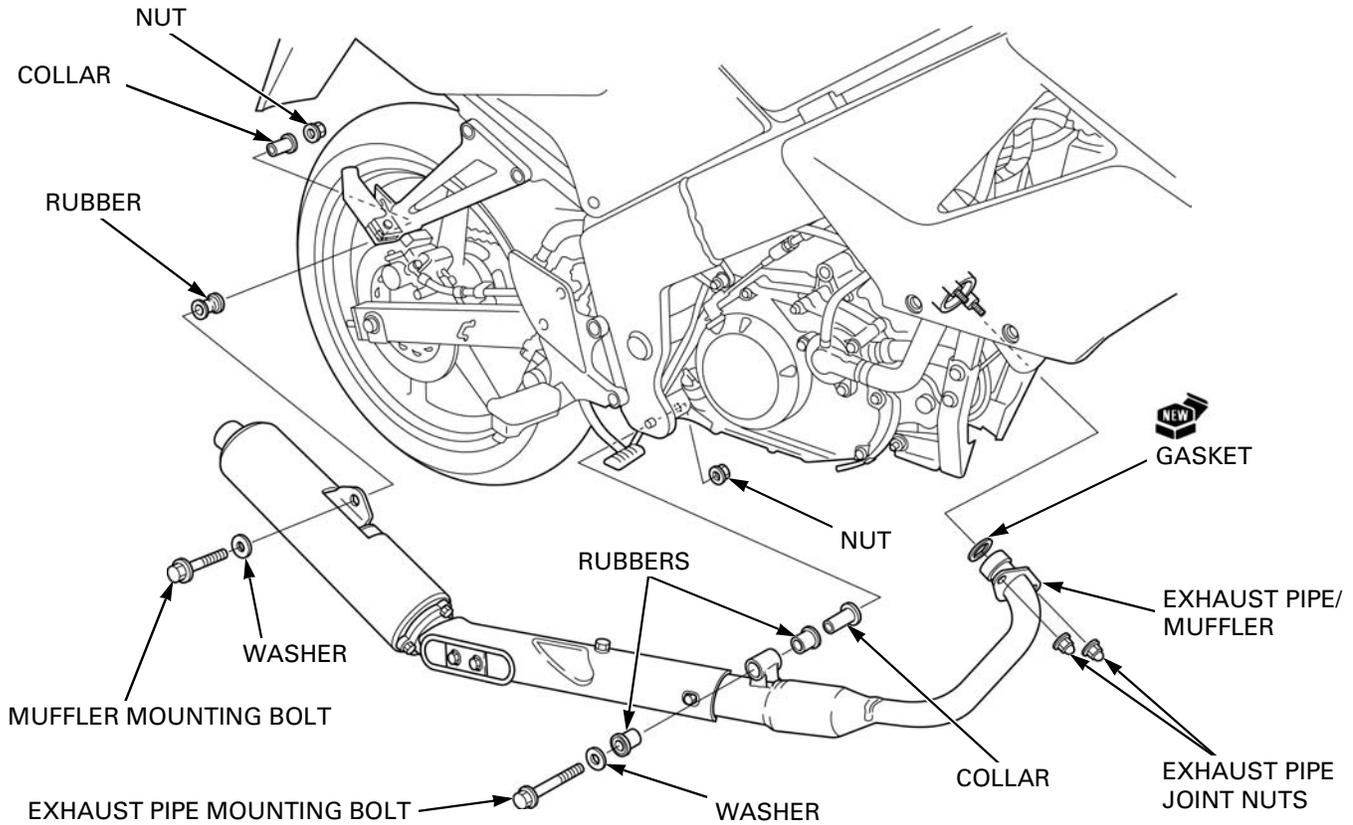
**Exhaust pipe cover bolt:**

**13 N·m (1.3 kgf·m, 10 lbf·ft)**



# BODY PANELS/EXHAUST SYSTEM

## INSTALLATION

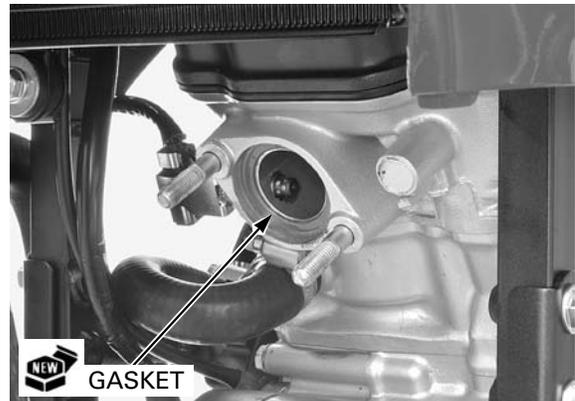


Install a new exhaust pipe gasket to the exhaust port of the cylinder head.

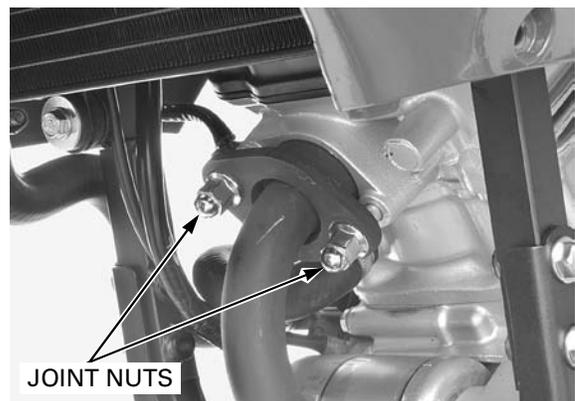
**NOTE:**

Always replace the exhaust pipe gasket with a new one whenever the exhaust pipe is removed.

Install the exhaust pipe/muffler, then temporarily install the all mounting fasteners.



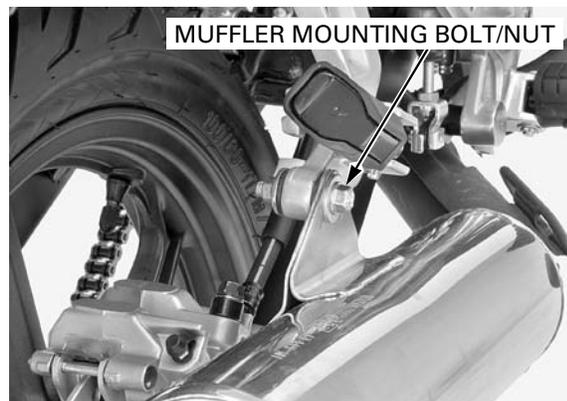
Tighten the exhaust pipe joint nuts securely.



Tighten the exhaust pipe mounting bolt and nut securely.



Tighten the muffler mounting bolt and nut securely.  
After the installation, inspect the exhaust system for leaks.



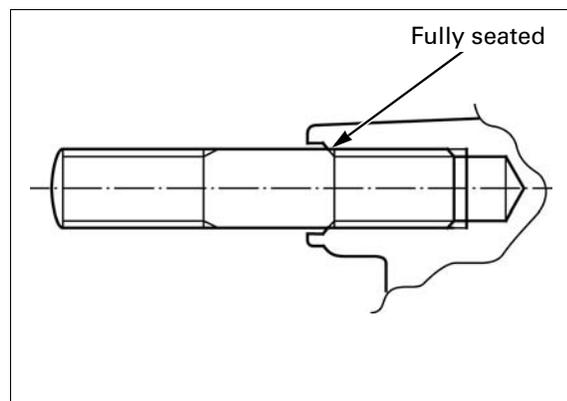
### STUD BOLT REPLACEMENT

Remove the exhaust pipe/muffler (page 2-13).

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

Install new stud bolts into the cylinder head until it is fully seated as shown.

Install the exhaust pipe/muffler (page 2-16).



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**MEMO**

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## MAINTENANCE

# SERVICE INFORMATION

## GENERAL

- Place the motorcycle on level surface before starting any work.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

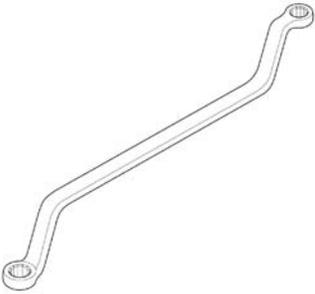
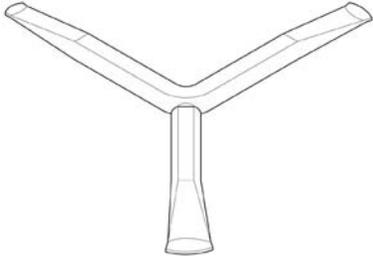
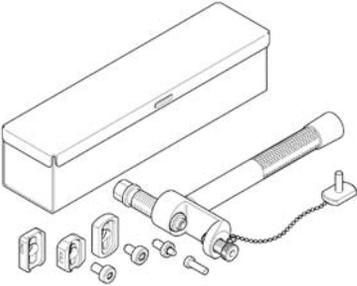
## SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle grip freeplay		2 – 6 mm (1/16 – 1/4 in)	
Spark plug	Standard	CR8E (NGK) or U24ESR-N (DENSO)	
	Optional	CR9E (NGK) or U27ESR-N (DENSO)	
Spark plug gap		0.70 – 0.80 mm (0.028 – 0.031 in)	
Valve clearance	IN	0.06 ± 0.02 mm (0.002 ± 0.001 in)	
	EX	0.27 ± 0.02 mm (0.011 ± 0.001 in)	
Engine oil capacity	At draining	1.0 liter (1.1 US qt, 0.9 Imp qt)	
	At disassembly	1.3 liters (1.4 US qt, 1.1 Imp qt)	
Recommended engine oil	Except CM type	Honda "4-stroke motorcycle oil" or an equivalent API classification: SG or higher (except oils labeled as energy conserving on the circular API service label) JASO T 903 standard: MA Viscosity: SAE 10W-30	
	CM type only	Pro Honda GN4 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	
Engine idle speed		1,450 ± 100 min <sup>-1</sup> (rpm)	
Recommended antifreeze	Except CM type	High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors	
	CM type only	Pro Honda HP coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors	
Drive chain	Size/link	428/124	
	Slack	25 – 35 mm (1.0 – 1.4 in)	
Specified brake fluid		DOT 3 or DOT 4	
Brake pedal height		84 – 86 mm (3.3 – 3.4 in)	
Clutch lever freeplay		10 – 20 mm (3/8 – 13/16 in)	
Cold tire pressure	Front	Driver only	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)
		Driver and passenger	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)
	Rear	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)
Tire size	Front	80/90-17M/C 44P	
	Rear	100/80-17M/C 52P	
Tire brand	Front	NR73s (IRC)	
	Rear	NR73s (IRC)	
Minimum tire tread depth	Front	0.8 mm (0.03 in)	
	Rear	0.8 mm (0.03 in)	

**TORQUE VALUES**

Air cleaner cover screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Tappet adjusting nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply engine oil to the threads and seating surface.
Timing hole cap	6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Crankshaft hole cap	8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)	
Oil drain bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	Apply engine oil to the threads and seating surface.
Water hose band screw	–	See page 6-14
Rear axle nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	U-nut
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
Front master cylinder reservoir cover screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Rear reservoir cover screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Sidestand pivot bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Sidestand pivot nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut

**TOOLS**

<p>Lock nut wrench 07708-0030100</p> 	<p>Valve adjusting wrench 07708-0030300</p> 	<p>Timing cap wrench 07709-0010001</p> 
<p>Drive chain tool set 07HMH-MR10103</p> 		

## MAINTENANCE

# MAINTENANCE SCHEDULES

### Except CM type

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

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

The following items require some mechanical knowledge. Certain items (particularly those marked \* and \*\*) may require more technical information and tools. Consult an authorized Honda dealer.

ITEMS	FREQUENCY	WHICHEVER COMES FIRST ↓ NOTE	ODOMETER READING (NOTE 1)				REFER TO PAGE		
			x 1,000 km	1	4	8		12	
			x 1,000 mi	0.6	2.5	5		7.5	
			MONTHS		6	12	18		
* FUEL LINE					I	I	I		3-6
* THROTTLE OPERATION					I	I	I		3-7
* AIR CLEANER		NOTE 2			C	C	R		3-8
CRANKCASE BREATHER		NOTE 3			C	C	C		3-9
SPARK PLUG					I	R	I		3-9
* VALVE CLEARANCE				I	I	I	I		3-11
ENGINE OIL				R		R			3-13
** ENGINE OIL STRAINER SCREEN							C		3-14
RADIATOR COOLANT		NOTE 4				I			3-15
* COOLING SYSTEM						I			3-15
DRIVE CHAIN				EVERY 1,000 km (600 mi)	I, L				3-16
BRAKE FLUID		NOTE 4				I	I	I	3-21
BRAKE PADS WEAR						I	I	I	3-22
BRAKE SYSTEM					I	I	I	I	3-23
* BRAKE LIGHT SWITCH						I	I	I	3-23
CLUTCH SYSTEM					I	I	I	I	3-24
* HEADLIGHT AIM						I	I	I	3-24
SIDESTAND						I	I	I	3-25
* SUSPENSION						I	I	I	3-25
* NUTS, BOLTS, FASTENERS					I		I		3-26
** WHEELS/TIRES						I	I	I	3-26
** STEERING HEAD BEARINGS					I			I	3-27

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

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

Honda recommends that an authorized Honda dealer should road test your motorcycle after each periodic maintenance is carried out.

#### NOTES:

1. At higher odometer readings, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Replace every 2 years. Replacement requires mechanical skill.

**CM type only**

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

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

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			x 1,000 mi	0.6	2.5	5	7.5	
			x 1,000 km	1	4	8	12	
EMISSION RELATED ITEMS	* FUEL LINE						3-6	
	* THROTTLE OPERATION						3-7	
	* AIR CLEANER	NOTE 2			C	C	R	3-8
	CRANKCASE BREATHER	NOTE 3			C	C	C	3-9
	SPARK PLUG				R		3-9	
	* VALVE CLEARANCE							3-11
	ENGINE OIL		INITIAL = 600 mi (1,000 km) or 1 month: R REGULAR = EVERY 2,500 mi (4,000 km) or 6 months: R					3-13
	** ENGINE OIL STRAINER SCREEN						C	3-14
	RADIATOR COOLANT	NOTE 4						3-15
	* COOLING SYSTEM							3-15
NON-EMISSION RELATED ITEMS	DRIVE CHAIN		EVERY 500 mi (800 km) I, L					3-16
	BRAKE FLUID	NOTE 4						3-21
	BRAKE PADS WEAR							3-22
	BRAKE SYSTEM							3-23
	* BRAKE LIGHT SWITCH							3-23
	* HEADLIGHT AIM							3-24
	CLUTCH SYSTEM							3-24
	SIDESTAND							3-25
	* SUSPENSION							3-25
	* NUTS, BOLTS, FASTENERS							3-26
	** WHEELS/TIRES							3-26
	** STEERING HEAD BEARINGS							3-27

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**NOTES:**

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## MAINTENANCE

### FUEL LINE

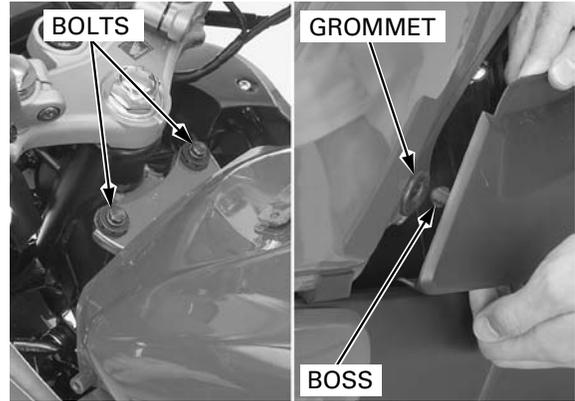
#### FUEL TANK LIFTING

Remove the following:

- Single seat (page 2-4)
- Fuel tank cover (page 2-6)

Remove the bolts.

Release the bosses from the grommets of the fuel tank.



Lift the front end of the fuel tank and support it using a suitable support as shown.



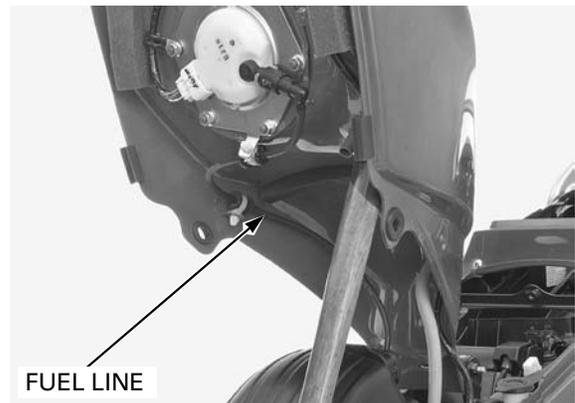
#### INSPECTION

Check the fuel line for deterioration, damage or leakage.

Replace the fuel line if necessary.

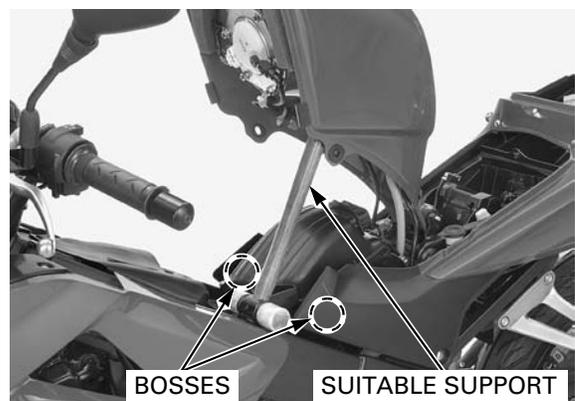
Check the fuel pump mounting area for leakage.

Replace the fuel pump packing if necessary (page 5-49).



#### FUEL TANK LOWERING

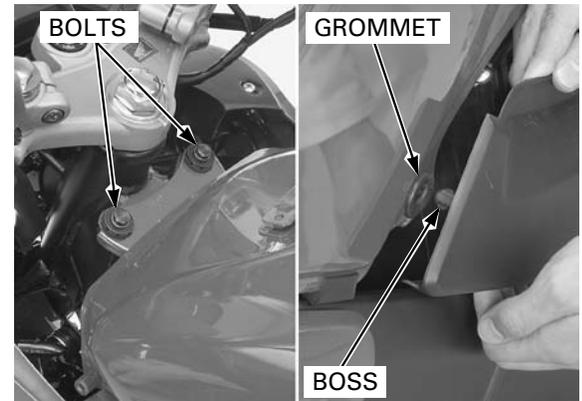
*Be careful not to damage the rear cowl bosses.* Remove a suitable support and close the fuel tank.



Install and tighten the bolts securely.  
 Insert the rear cowl bosses to the grommets of the fuel tank.

Install the following:

- Fuel tank cover (page 2-6)
- Single seat (page 2-4)



## THROTTLE OPERATION

Check for any deterioration or damage to the throttle cable. Check the throttle grip for smooth operation. Check that the throttle opens and automatically closes in all steering positions.

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

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

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

Measure the throttle grip freeplay at the throttle grip flange.

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

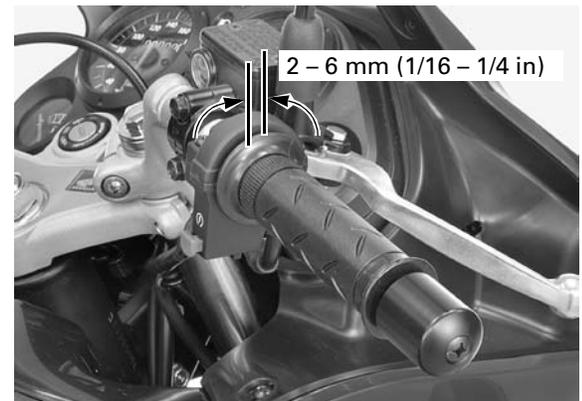
Throttle grip freeplay can be adjusted at either end of the throttle cable.

Minor adjustment is made with the upper adjuster at throttle housing adjuster.

Slide the dust cover from the adjuster.  
 Loosen the lock nut and turning the adjuster.

Tighten the lock nut while holding the adjuster and reposition the dust cover properly on the adjuster.

Recheck the throttle operation.



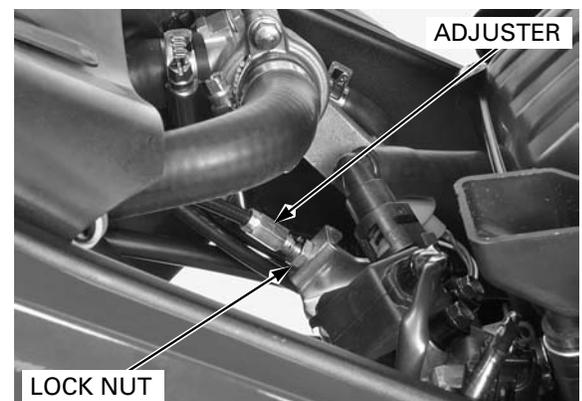
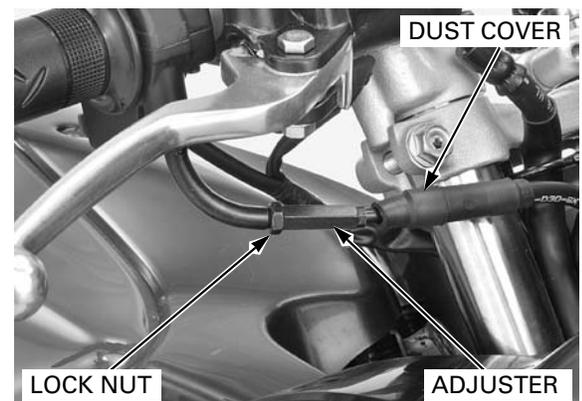
Major adjustment is made with the lower adjuster nut at the throttle body.

Lift and support the fuel tank (page 3-6).

Loosen the lock nut and turn the adjuster.  
 Tighten the lock nut while holding the adjuster.

Recheck the throttle operation.

Remove the suitable support and close the fuel tank (page 3-6).



## AIR CLEANER

### REMOVAL/INSTALLATION

Lift and support the fuel tank (page 3-6).

Remove the screws, air cleaner cover and packings. Remove the air cleaner element.

Clean and replace the air cleaner element in accordance with the maintenance schedule (page 3-4) or any time it is excessively dirt or damaged.

For air cleaner element cleaning (page 3-8).

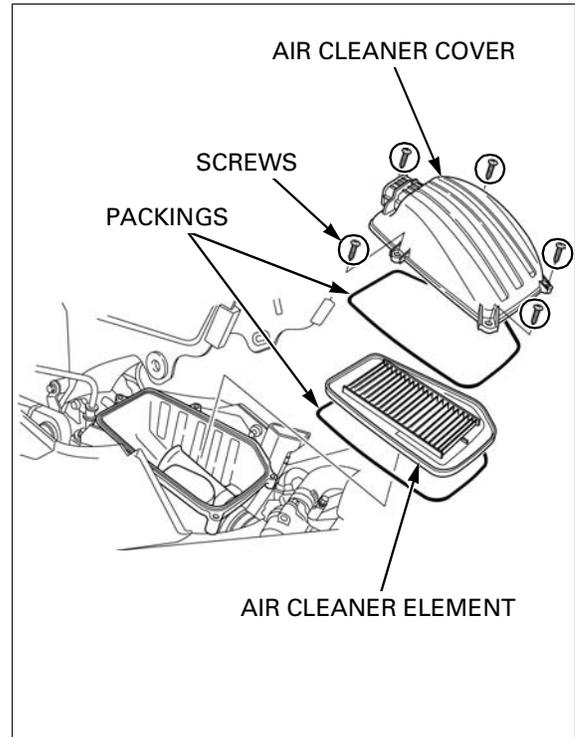
Install the air cleaner element in the reverse order of removal.

#### TORQUE:

**Air cleaner cover screw:**  
**1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**

#### NOTE:

Check that the condition of the packings, replace them if necessary.

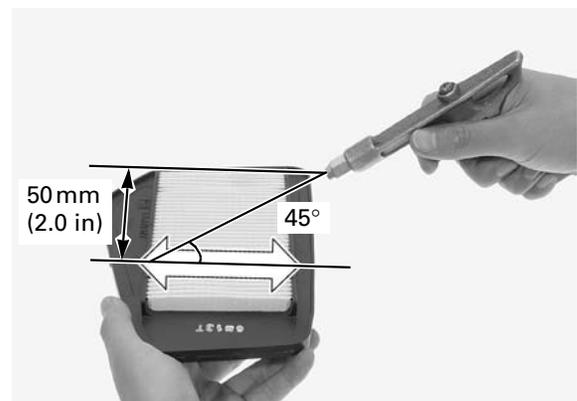


### CLEANING

Remove the air cleaner element (page 3-8).

Clean the air cleaner element using a compressed air as follows:

1. Blow off the dust from the throttle body side.
  - Position the air blow gun 30 mm (1.2 in) away from the air cleaner element.
  - Move the air blow gun up to down and side to side alternately five times or more for two minutes.
2. Blow off the dust from opposite side.
  - Position the air blow gun 50 mm (2.0 in) away and 45° to the air cleaner element.
  - Move the air blow gun along the fold line for 30 seconds.



3. Blow off the remaining dust from the throttle body side.
  - Position the air blow gun 30 mm (1.2 in) away from the air cleaner element.
  - Move the air blow gun up to down and side to side alternately five times or more for 30 seconds.



## **CRANKCASE BREATHER**

**NOTE:**

Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned.

Check the crankcase breather hose for deterioration, damage or loose connection. Make sure that the hoses are not kinked, pinched or cracked.

Replace the crankcase breather hose if necessary.



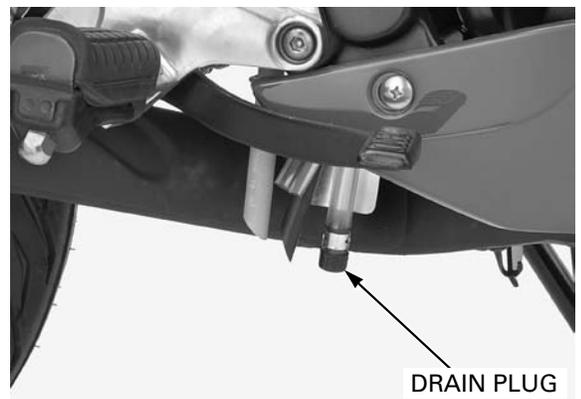
**NOTE:**

Service if the deposits level can be seen in the transparent section of the air cleaner housing drain hose.

Check the air cleaner housing drain hose.

If necessary, remove the drain plug from the air cleaner housing drain hose and drain the deposits into a suitable container.

Reinstall the drain plug securely.



## **SPARK PLUG**

### **REMOVAL**

Disconnect the spark plug cap.



## MAINTENANCE

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

Remove the spark plug using a spark plug wrench.

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



## INSPECTION

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

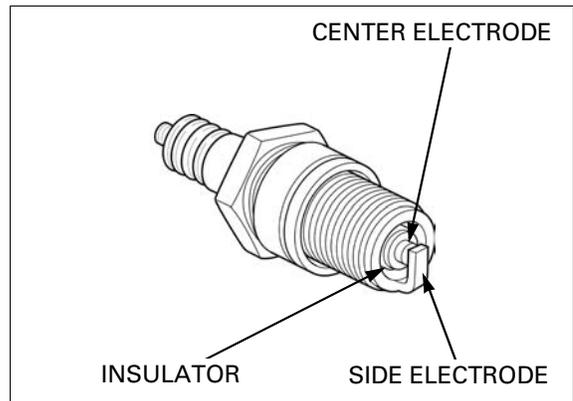
Check the insulator for cracks or discoloration, and the electrodes for wear, fouling or discoloration.

Replace the spark plug if necessary.

*Always use the specified spark plug on this motorcycle.*

### RECOMMENDED SPARK PLUG:

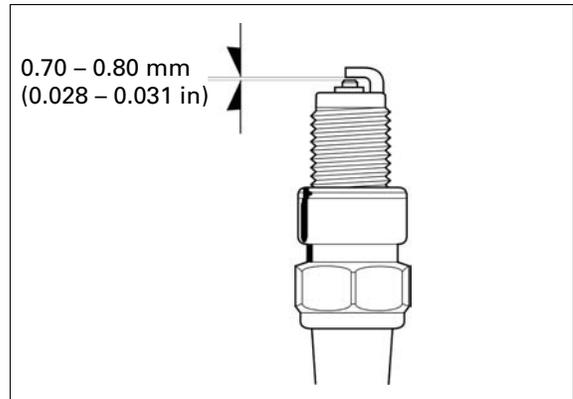
**Standard:** NGK: CR8E  
DENSO: U24ESR-N  
**Optional:** NGK: CR9E  
DENSO: U27ESR-N



Measure the gap between the center and side electrodes with a feeler gauge.

**SPARK PLUG GAP: 0.70 – 0.80 mm (0.028 – 0.031 in)**

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

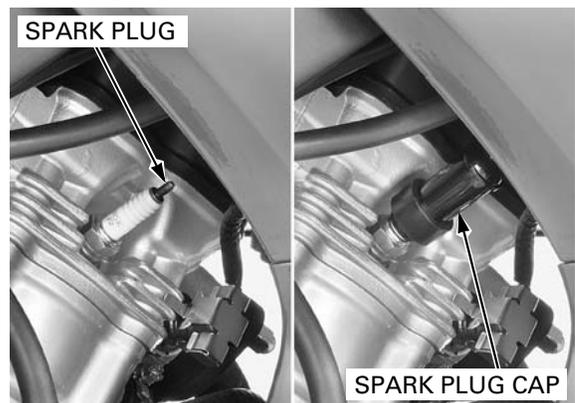


## INSTALLATION

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

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

Connect the spark plug cap securely.



# VALVE CLEARANCE

## INSPECTION

**NOTE:**

- Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).
- After the valve clearance inspection, check the engine idle speed (page 5-62).
- Inspect and adjust the valve clearance can be serviced with the engine installed in the frame.

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

Remove the timing hole cap and crankshaft hole cap.

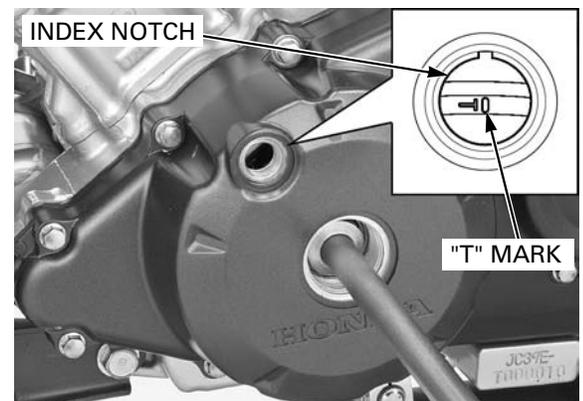
**TOOL:**

Timing cap wrench

07709-0010001  
or equivalent



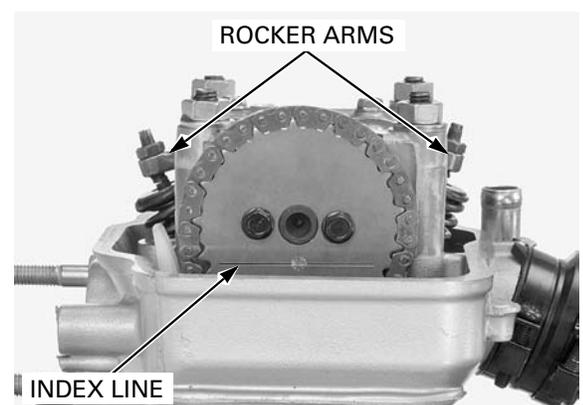
Rotate the crankshaft counterclockwise and align the "T" mark on the flywheel with the index notch on the left crankcase cover.



The index line on the cam sprocket must be flush with the cylinder head surface as shown.

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

This position can be obtained by confirming that there is slack in the rocker arm. If there is no slack, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and match up the "T" mark again.



## MAINTENANCE

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

### VALVE CLEARANCE:

**IN:**  $0.06 \pm 0.02$  mm ( $0.002 \pm 0.001$  in)

**EX:**  $0.27 \pm 0.02$  mm ( $0.011 \pm 0.001$  in)

### ADJUSTMENT

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

Apply engine oil to the lock nut threads and seating surface.

Hold the adjusting screw and tighten the lock nut to the specified torque.

### TOOLS:

**Valve adjusting wrench**                      **07708-0030300**

**Lock nut wrench**                              **07708-0030100**

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

Recheck the valve clearances.

Install the cylinder head cover (page 8-7).

Apply engine oil to new O-rings and install them to each hole cap.

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

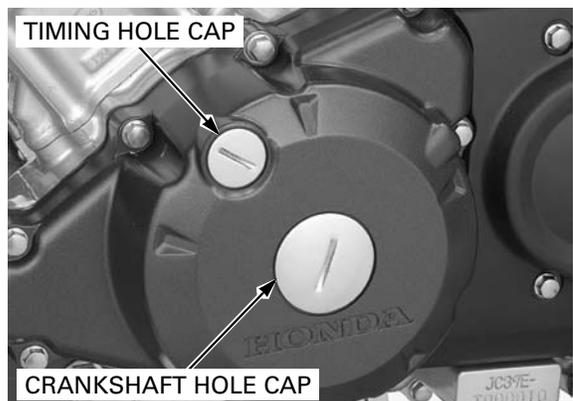
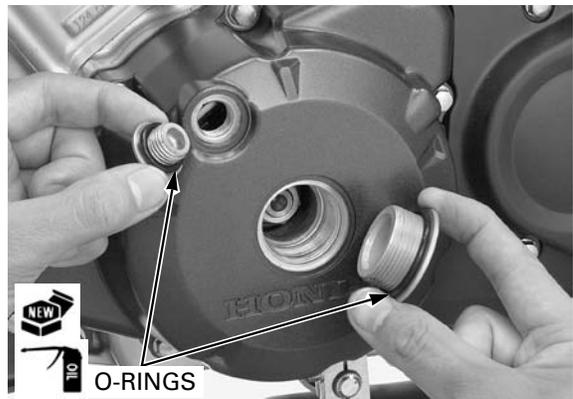
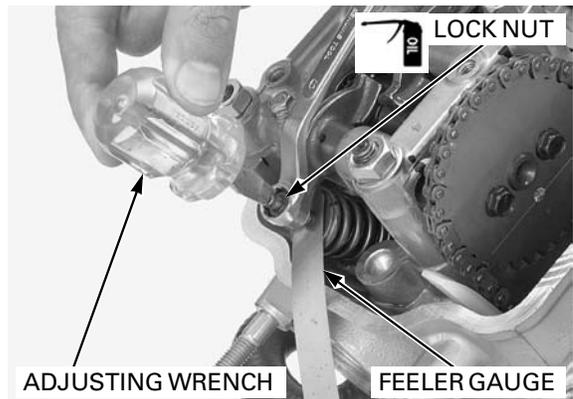
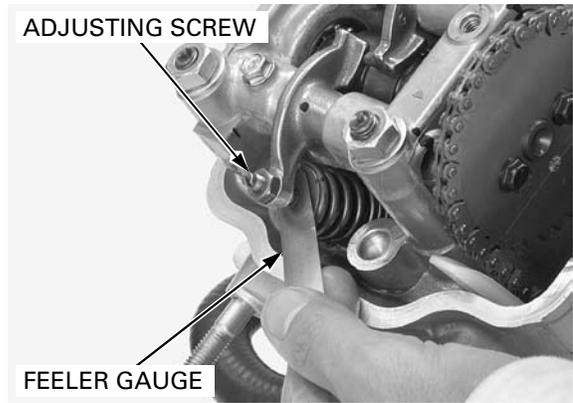
### TORQUE:

**Timing hole cap:**

**6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**

**Crankshaft hole cap:**

**8.0 N·m (0.8 kgf·m, 5.9 lbf·ft)**



# ENGINE OIL

## OIL LEVEL INSPECTION

Hold the motorcycle in an upright position.

Start the engine and let it idle for 3 – 5 minutes.  
Stop the engine and wait 2 – 3 minutes.

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

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

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



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

### RECOMMENDED ENGINE OIL (Except CM type):

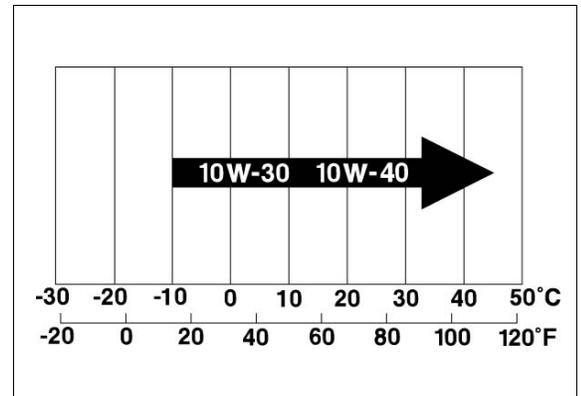
**Honda "4-stroke motorcycle oil" or an equivalent  
API classification: SG or higher (except oils labeled as energy conserving on the circular API service label)**

**JASO T 903 standard: MA  
Viscosity: SAE 10W-30**

### RECOMMENDED ENGINE OIL (CM type only):

**Pro Honda GN4 4-stroke oil or equivalent motor oil  
API service classification: SG or Higher**

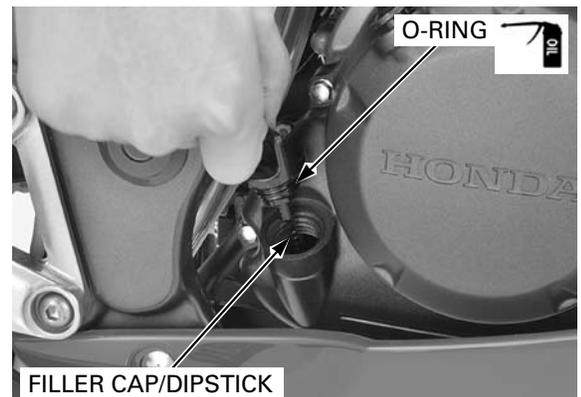
**JASO T 903 standard: MA  
Viscosity: SAE 10W-30**



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

Apply engine oil to the O-ring and install it to the filler cap/dipstick.

Install the oil filler cap/dipstick.



## MAINTENANCE

### ENGINE OIL CHANGE

Warm up the engine.

Stop the engine and remove the oil filler cap/dipstick.



Place an oil pan under the engine to catch the engine oil, then remove the drain bolt/sealing washer.

Drain the engine oil completely.

Install a new sealing washer onto the drain bolt.

Apply engine oil to the drain bolt threads and seating surface.

Install and tighten the drain bolt/sealing washer to the specified torque.

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



Fill the engine with the recommended engine oil (page 3-13).

#### ENGINE OIL CAPACITY:

**1.0 liter (1.1 US qt, 0.9 Imp qt) at draining**

**1.3 liters (1.4 US qt, 1.1 Imp qt) at disassembly**

Install the oil filler cap/dipstick.

Check the oil level (page 3-13).

Make sure there are no oil leaks.



### ENGINE OIL STRAINER SCREEN

#### REMOVAL/INSTALLATION

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

*Be careful not to damage the oil strainer screen.*

Pull the oil strainer screen out of the crankcase.

Wash the oil strainer screen thoroughly in nonflammable or high flash point solvent until all accumulated dirt has been removed.

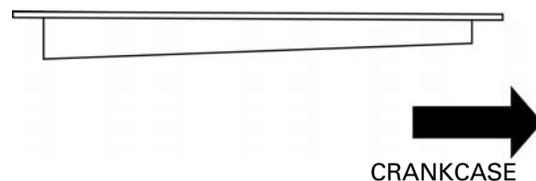
Blow dry it with compressed air to clean completely. Before installing the strainer, it should be examined closely for damage, and make sure the sealing rubber is good condition.



Install the oil strainer screen with the thin edge facing in and flange side facing up as shown.

Install the right crankcase cover (page 10-8).

OIL STRAINER SCREEN DIRECTION:



## RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature.

The level should be between the "UPPER" and "LOWER" level lines with the motorcycle in an upright position.

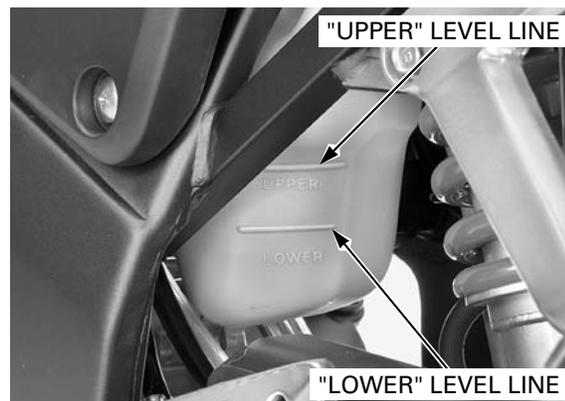
If necessary, add recommended coolant.

**RECOMMENDED ANTIFREEZE (Except CM type):**

**High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors**

**RECOMMENDED ANTIFREEZE (CM type only):**

**Pro Honda HP coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors**



Remove the single seat (page 2-4).

Remove the reserve tank cap and add the coolant to the "UPPER" level line with a 1:1 mixture of distilled water and antifreeze (coolant preparation: page 6-6).

Reinstall the reserve tank cap.

Install the single seat (page 2-4).

Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system.

Be sure to remove any air from the cooling system (page 6-7).



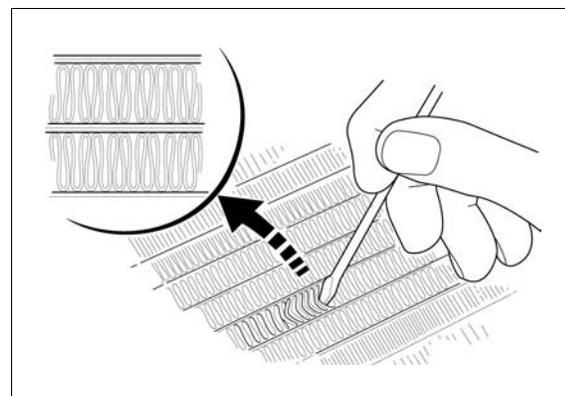
## COOLING SYSTEM

Remove the middle cowl (page 2-9).

Check the radiator air passages for clogging or damage.

Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

Replace the radiator if the air flow is restricted over more than 20 % of the radiating surface.



## MAINTENANCE

Inspect the water hoses for cracks or deterioration, and replace them if necessary. Check the tightness of all water hose band screws (page 6-14).



## DRIVE CHAIN

### DRIVE CHAIN SLACK INSPECTION

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

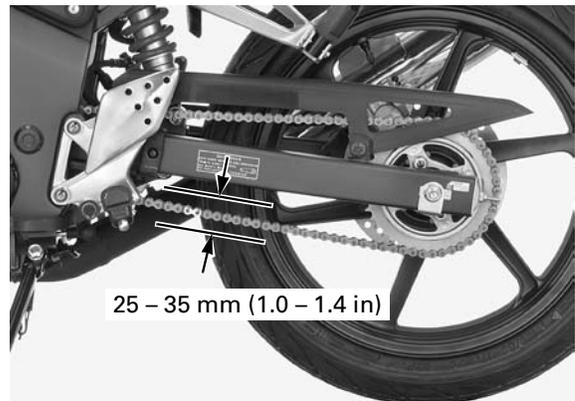
Turn the ignition switch OFF, support the motorcycle on its sidestand and shift the transmission into neutral.

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

**DRIVE CHAIN SLACK: 25 – 35 mm (1.0 – 1.4 in)**

#### NOTICE

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



### ADJUSTMENT

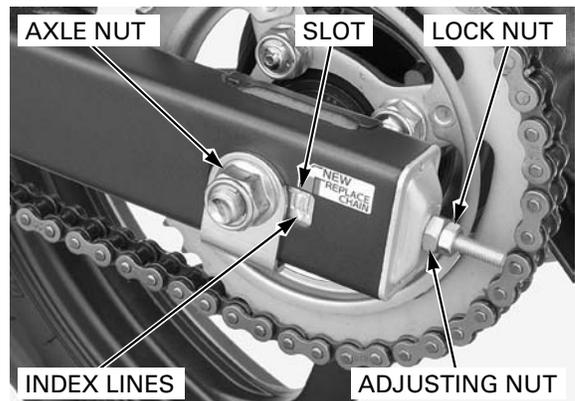
Loosen the axle nut. Loosen the lock nuts and turn the adjusting nuts until the correct drive chain slack is obtained.

Make sure the index lines on both adjusting plates are aligned with the rear end of the axle slots in the swingarm. Tighten the axle nut to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)**

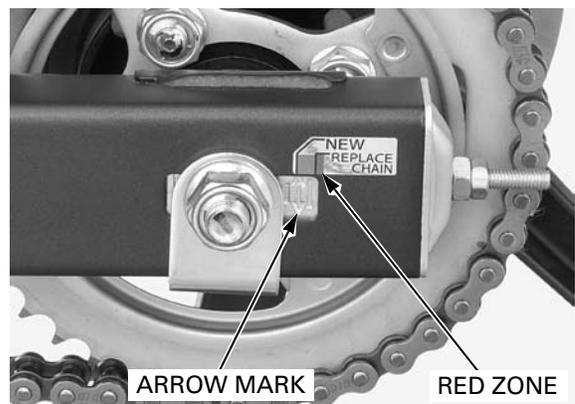
Hold the adjusting nuts and tighten the lock nuts.

Recheck the drive chain slack and free wheel rotation.



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

If the drive chain adjusting plate arrow mark reaches red zone of the indicator label, replace the drive chain with a new one (page 3-18).



**CLEANING AND LUBRICATION**

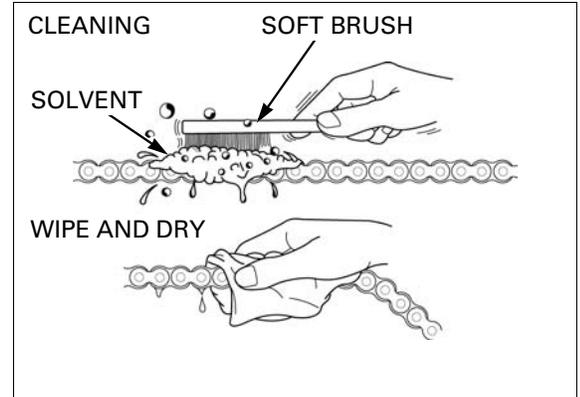
Clean the chain with non-flammable or high flash point solvent and wipe it dry.  
Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear.

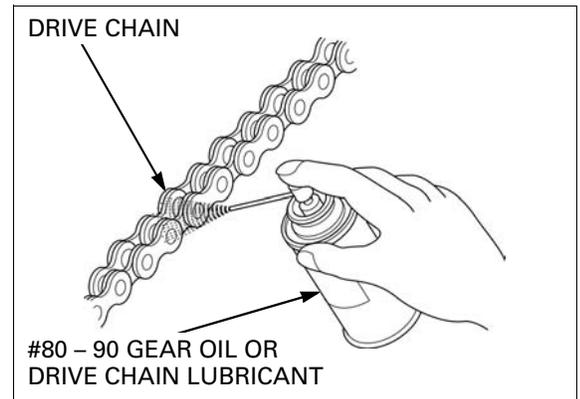
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

Inspect and replace sprocket as necessary.



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 drive chain lubricant.

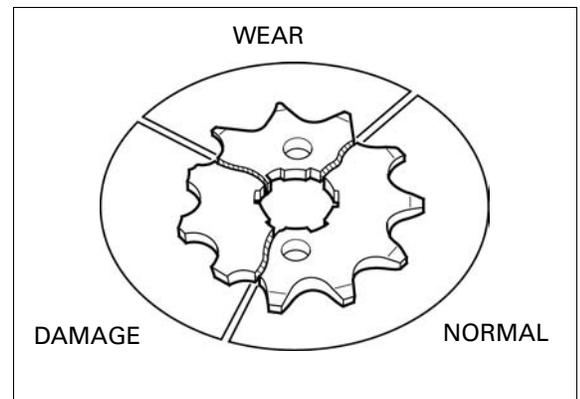


**SPROCKET INSPECTION**

Remove the drive sprocket cover (page 11-4).

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

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



## MAINTENANCE

Check the attaching bolts and nuts on the drive and driven sprockets.

If any are loose, torque them.

### TORQUE:

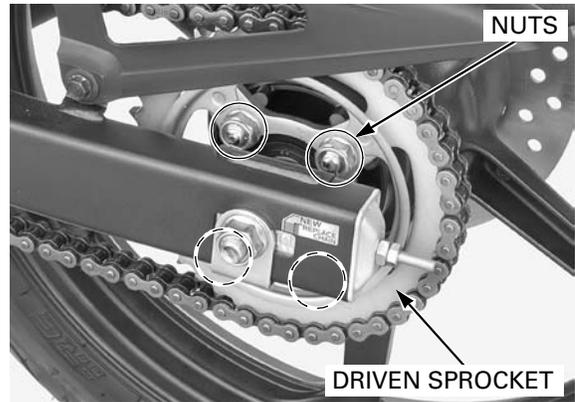
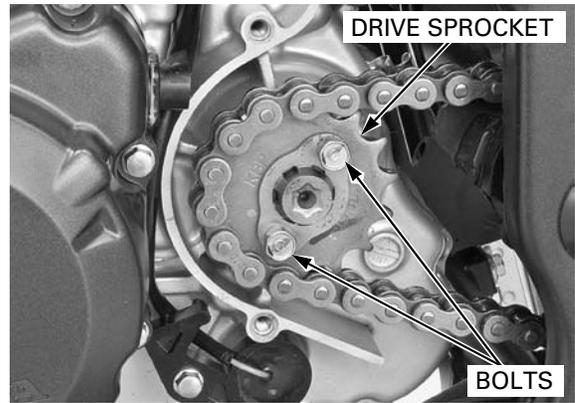
**Drive sprocket fixing plate bolt:**

**10 N·m (1.0 kgf·m, 7 lbf·ft)**

**Driven sprocket nut:**

**64 N·m (6.5 kgf·m, 47 lbf·ft)**

Install the drive sprocket cover (page 11-5).



## REPLACEMENT

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

Loosen the drive chain (page 3-16).

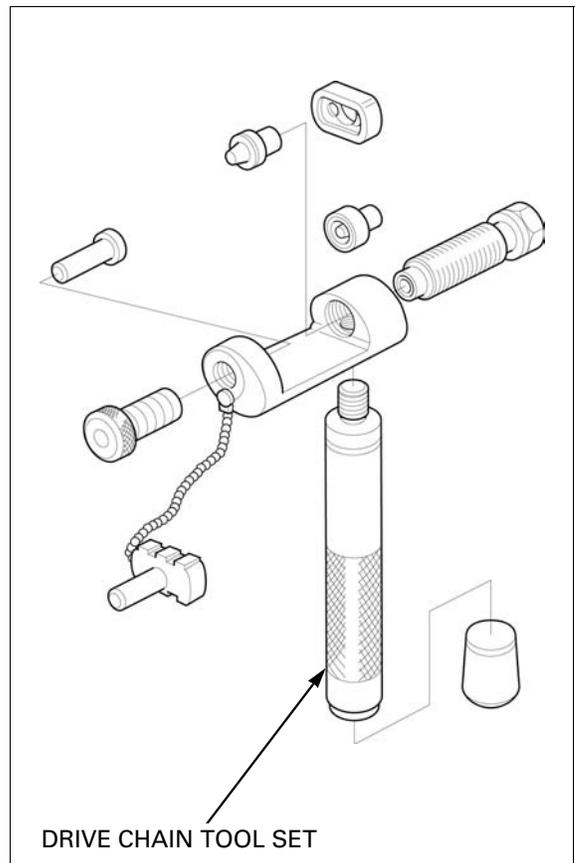
Assemble the special tool as shown.

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

### TOOL:

**Drive chain tool set**

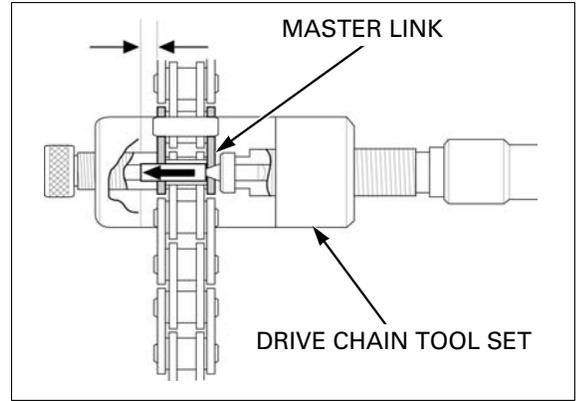
**07HMH-MR10103**



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

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

Remove the drive chain.

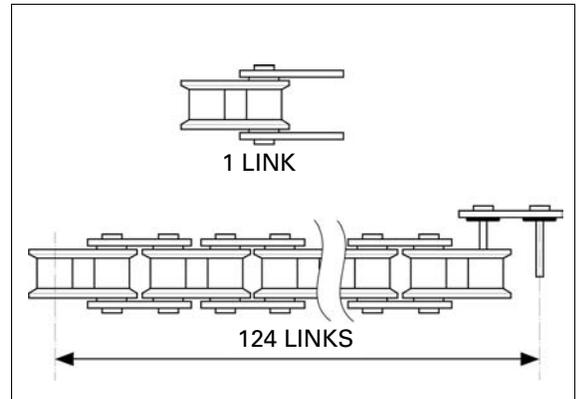


*Include the master link when you count the drive chain links.*

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

**STANDARD LINKS: 124 LINKS**

**REPLACEMENT CHAIN**  
**DID: 428VI3-124LE**

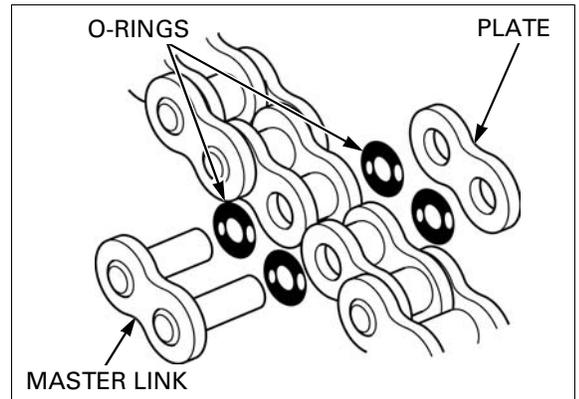


**NOTE:**

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

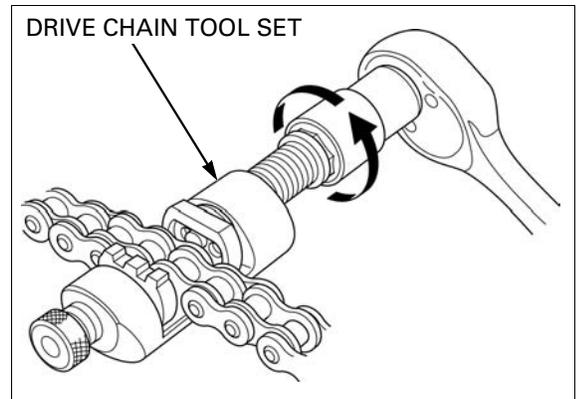
*Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing the outside.*

Assemble the new master link, O-rings and plate.



Assemble and set the drive chain tool set.

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



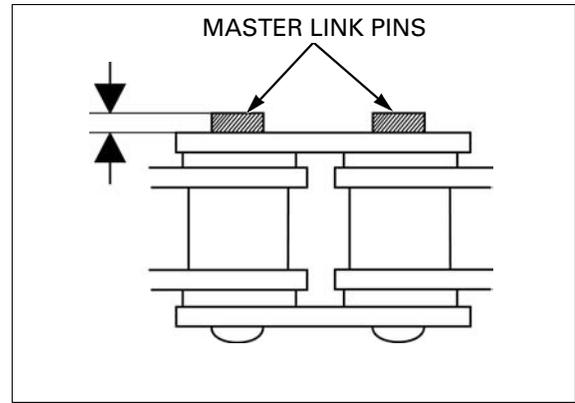
## MAINTENANCE

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

**STANDARD LENGTH:**

**Approx. 1.1 mm (0.04 in)**

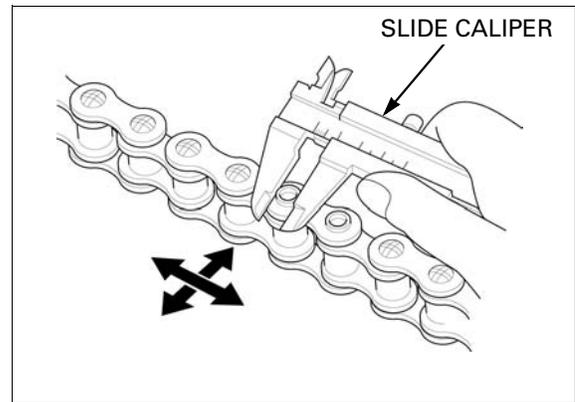
Stake the master link pins.



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

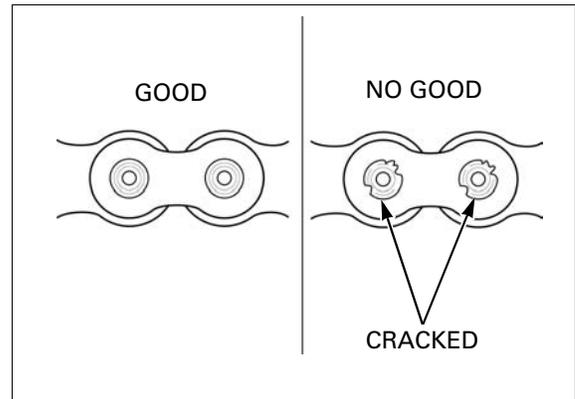
**DIAMETER OF THE STAKED AREA:**

**4.75 – 4.95 mm (0.187 – 0.195 in)**



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

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

### NOTICE

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

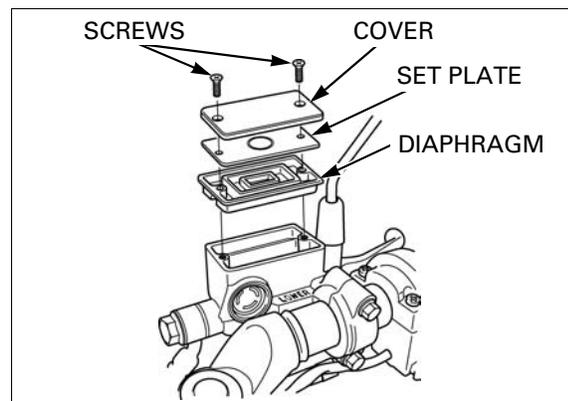
- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- When the fluid level is low, check the brake pads for wear (page 3-22).
- A low fluid level may be due to wear of the brake pads. If the brake pads are worn and caliper pistons are pushed out, this accounts for a low fluid level. If the brake pads are not worn and fluid level is low, check the entire system for leaks (page 3-23).

### FRONT BRAKE

Turn the handlebar so that the reservoir is level and check the front brake fluid level through the sight glass.



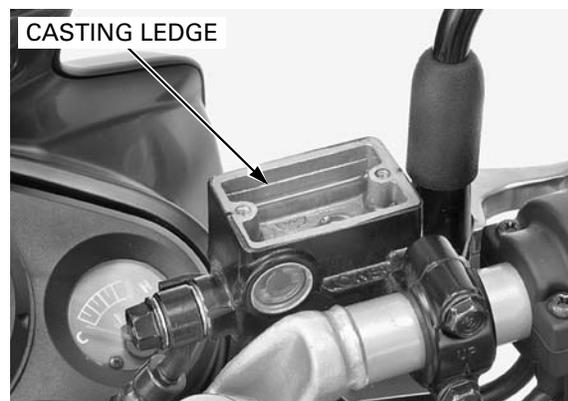
Remove the cover screws, reservoir cover, set plate and diaphragm.



Add the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container to the casting ledge.

Install the diaphragm, set plate and reservoir cover. Install and tighten the cover screws to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



## MAINTENANCE

### REAR BRAKE

Support the motorcycle on a level surface, and check the rear brake fluid level.

If you will add the brake fluid, remove the bolt.



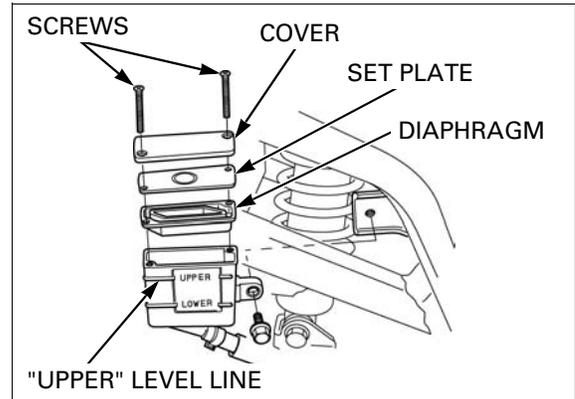
Remove the cover screws, reservoir cover, set plate and diaphragm.

Add the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container to the "UPPER" level line.

Install the diaphragm, set plate and reservoir cover. Install and tighten the cover screws to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**

Install the bolt.



## BRAKE PADS WEAR

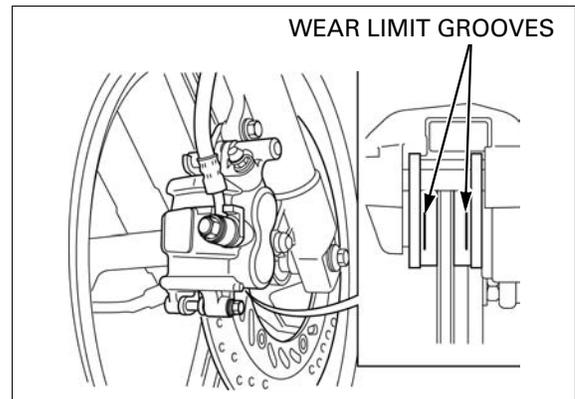
### FRONT BRAKE PADS

Check the brake pads for wear.

*Always replace the brake pads as a set to assure even disc pressure.*

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

For brake pad replacement (page 15-8).



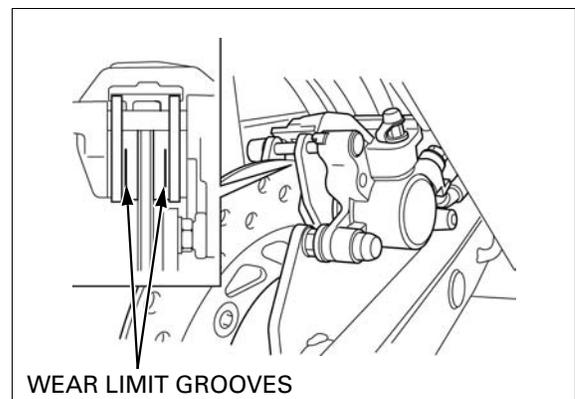
### REAR BRAKE PADS

Check the brake pads for wear.

*Always replace the brake pads as a set to assure even disc pressure.*

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

For brake pad replacement (page 15-9).



## BRAKE SYSTEM

### INSPECTION

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

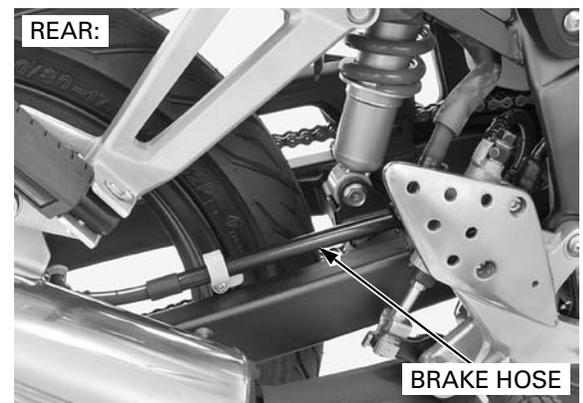
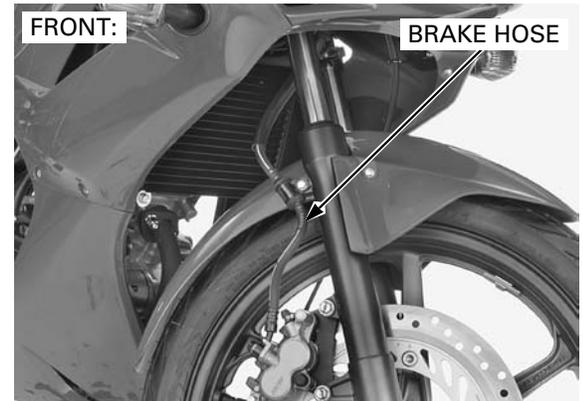
If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

For brake air bleeding (page 15-6).

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

Tighten any loose fittings.

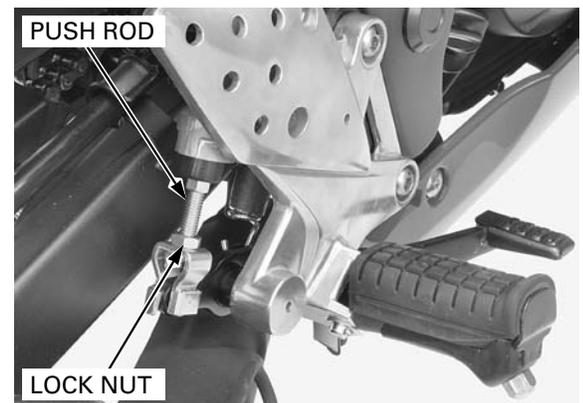
Replace hoses and fittings as required.



### BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod until the correct pedal height is obtained.

After adjustment, tighten the lock nut securely.



### BRAKE LIGHT SWITCH

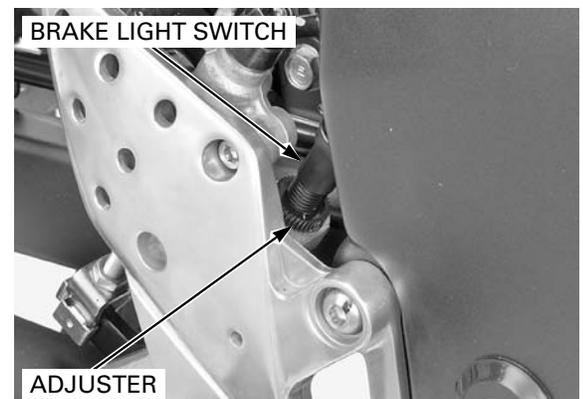
*The front brake light switch does not require adjustment.*

Adjust the brake light switch so 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.

#### NOTE:

Hold the switch body and turn the adjuster. Do not turn the switch body.

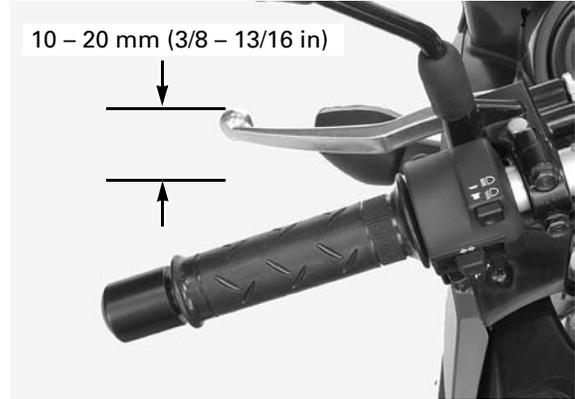


## MAINTENANCE

# CLUTCH SYSTEM

Measure the clutch lever freeplay at the end of the clutch lever.

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



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

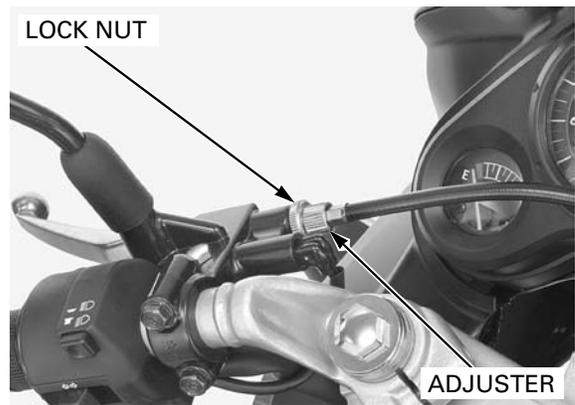
Minor adjustment is made with the upper adjuster at the clutch lever.

Loosen the lock nut and turn the adjuster.

If the adjuster is threaded out near its limit and the correct freeplay cannot be obtained, turn the adjuster all the way in and back out one turn.

Tighten the lock nut while holding the adjuster.

Recheck the clutch lever freeplay.

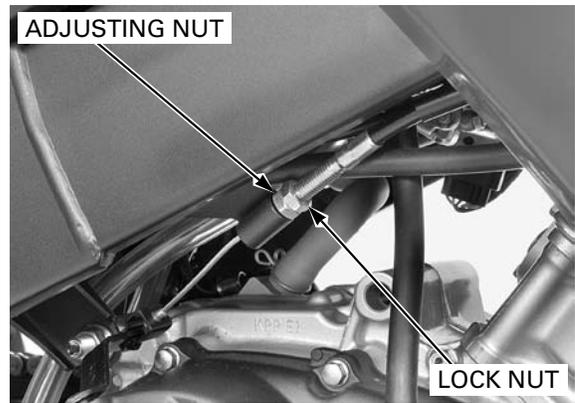


Major adjustment is made with the lower adjusting nut at the clutch lifter lever.

Loosen the lock nut and turn the adjusting nut to adjust the freeplay.

Tighten the lock nut while holding the adjusting nut.

If proper freeplay cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch (page 10-9).



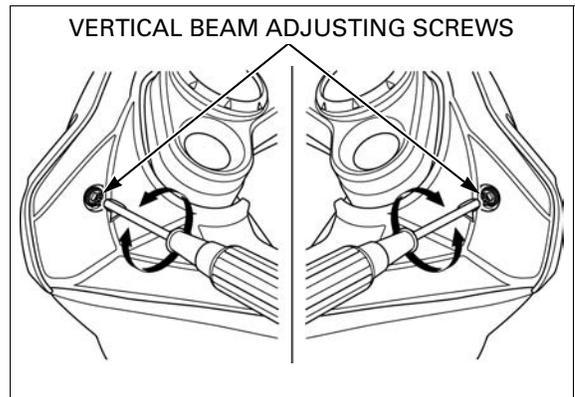
## HEADLIGHT AIM

Support the motorcycle in an upright position.

*Adjust the headlight aim as specified by local laws and regulations.*

Adjust the headlight aim vertically by turning the vertical beam adjusting screw.

A clockwise rotation moves the beam up and counterclockwise rotation moves the beam down.



## SIDESTAND

Support the motorcycle using a safety stand or hoist.

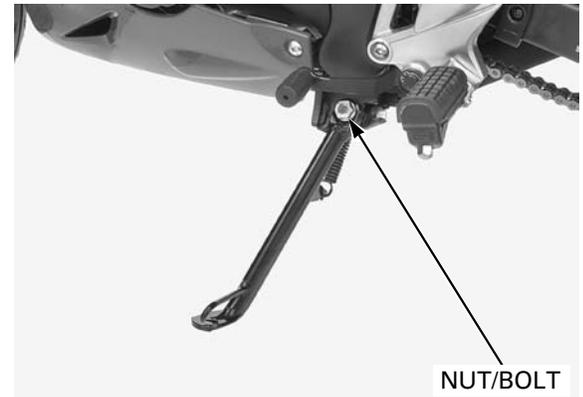
Check the sidestand spring for damage or loss of tension.

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

### TORQUE:

**Sidestand pivot bolt: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

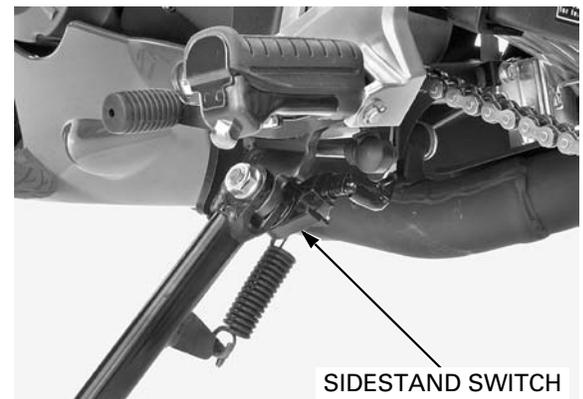
**Sidestand pivot nut: 44 N·m (4.5 kgf·m, 32 lbf·ft)**



Check the sidestand ignition cut-off system:

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

If there is a problem with the system, check the sidestand switch (page 19-19).



## 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.

For fork service (page 13-18).



### REAR SUSPENSION INSPECTION

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

Check the entire shock absorber assembly for 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.

For shock absorber service (page 14-11).



## MAINTENANCE

Support the motorcycle using a safety stand or hoist, raise the rear wheel off the ground.

Check for worn swingarm bushings by grabbing the rear wheel and attempting to move the wheel side to side.

Replace the bushings if any looseness is noted.

For swingarm service (page 14-12).



## NUTS, BOLTS, FASTENERS

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

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

## WHEELS/TIRES

Support the motorcycle using a safety stand or hoist, 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.

For front wheel service (page 13-13).



Support the motorcycle using a safety stand or hoist, raise the rear wheel off the ground.

Hold the swingarm and move the rear wheel sideways with force to see if the wheel and driven flange bearings are worn.

For rear wheel service (page 14-5).



Check the tire pressure with a tire pressure gauge when the tires are cold.

**RECOMMENDED TIRE PRESSURE AND TIRE SIZE:**

		FRONT	REAR
Tire pressure kPa (kgf/cm <sup>2</sup> , psi)	Driver only	200 (2.00, 29)	225 (2.25, 33)
	Driver and passenger	200 (2.00, 29)	225 (2.25, 33)
Tire size		80/90-17 M/C 44P	100/80-17 M/C 52P
Tire brand	IRC	NR73s	NR73s



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

Check the front and rear wheels for trueness.

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

**MINIMUM TIRE TREAD DEPTH**

**FRONT: 0.8 mm (0.03 in)**

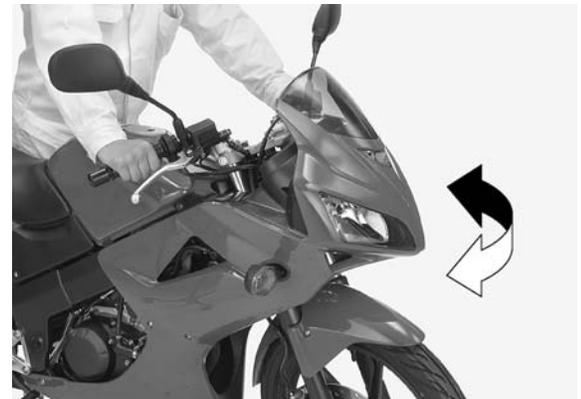
**REAR: 0.8 mm (0.03 in)**



**STEERING HEAD BEARINGS**

Support the motorcycle using a safety stand or hoist, raise the front wheel off the ground.

Check that the handlebar moves freely from side to side. Make sure the control cables do not interfere with the handlebar rotation.



Check for steering stem bearings by grabbing the fork legs and attempting to move the front fork forward to backward.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 13-27).



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**MEMO**

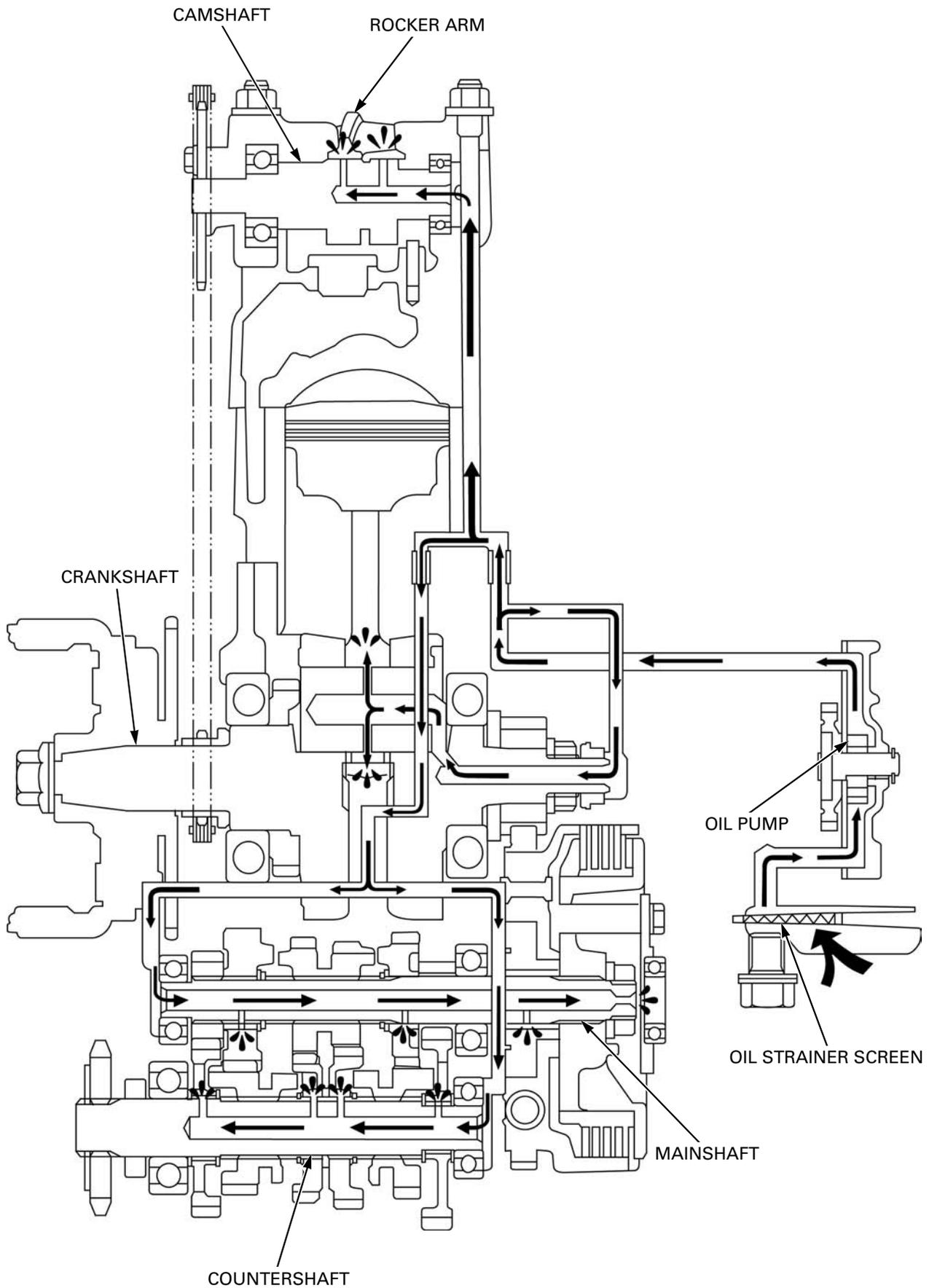
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# 4. LUBRICATION SYSTEM

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LUBRICATION SYSTEM DIAGRAM .....	4-2	TROUBLESHOOTING.....	4-3
SERVICE INFORMATION .....	4-3	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 limit, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks.
- Refer to the following:
  - engine oil level check (page 3-13)
  - engine oil change (page 3-14)

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	1.0 liter (1.1 US qt, 0.9 Imp qt)	–
	At disassembly	1.3 liters (1.4 US qt, 1.1 Imp qt)	–
Recommended engine oil	Except CM type	Honda "4-stroke motorcycle oil" or an equivalent API classification: SG or higher (except oils labeled as energy conserving on the circular API service label) JASO T 903 standard: MA Viscosity: SAE 10W-30	–
	CM type only	Pro Honda GN4 4-stroke oil or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Oil pump rotor	Tip clearance	–	0.15 (0.006)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.26 (0.010)
	Side clearance	0.05 – 0.10 (0.002 – 0.004)	0.12 (0.005)

### TORQUE VALUE

Oil pump assembly bolt 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

### TROUBLESHOOTING

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

- Oil consumption
- External oil leaks
- Worn valve guide or stem seal
- Worn piston rings
- Improperly installed piston rings
- Worn cylinder

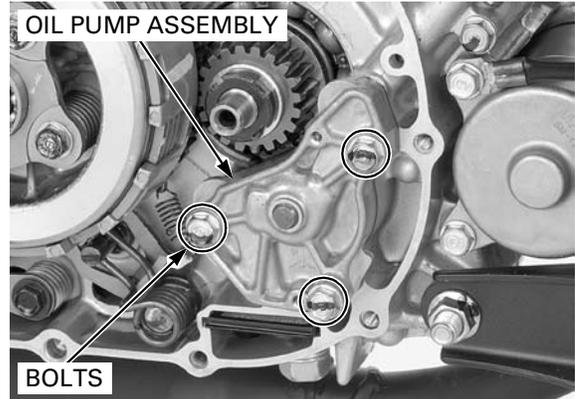
#### Engine oil contamination

- Oil not changed often enough
- Worn valve guide or stem seal
- Worn piston rings
- Improperly installed piston rings
- From coolant mixing with oil
  - Faulty head gasket
  - Water leak in crankcase

# OIL PUMP

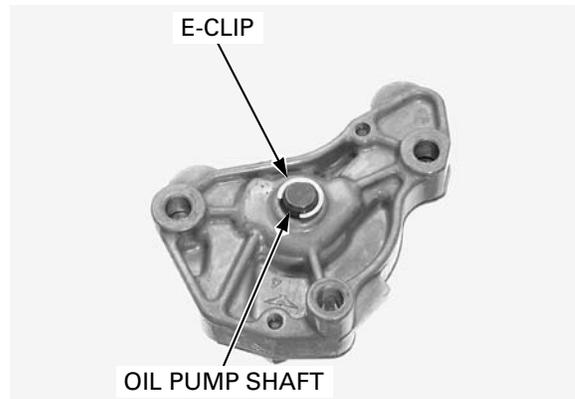
## REMOVAL

Remove the right crankcase cover (page 10-5).  
Remove the mounting bolts and oil pump assembly.

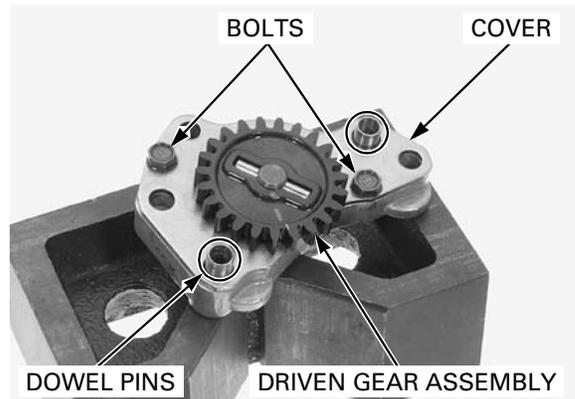


## DISASSEMBLY

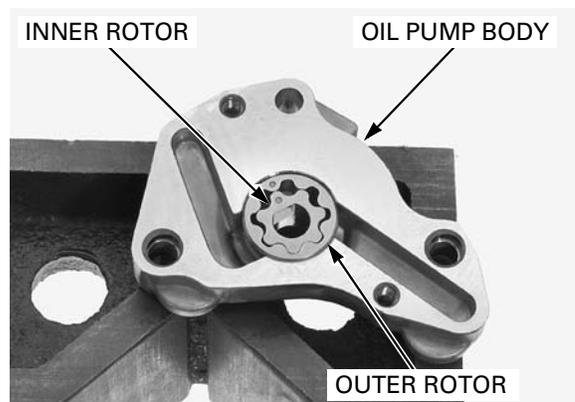
Remove the E-clip from the oil pump shaft.



Remove the oil pump driven gear assembly and disassemble them.  
Remove the dowel pins, bolts and oil pump cover.



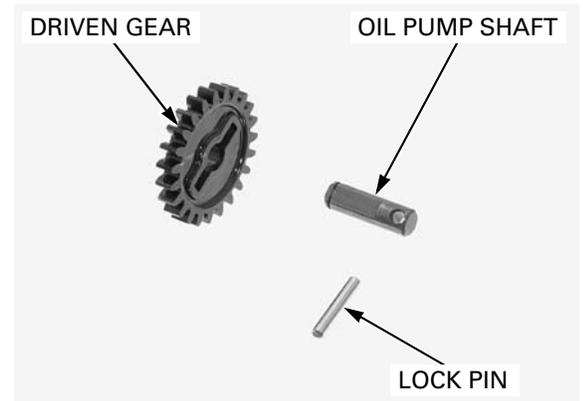
Remove the inner and outer rotors from the oil pump body.



**INSPECTION**

**OIL PUMP DRIVEN GEAR/OIL PUMP SHAFT/LOCK PIN**

Check the oil pump driven gear, oil pump shaft and lock pin for wear or damage, replace them if necessary.

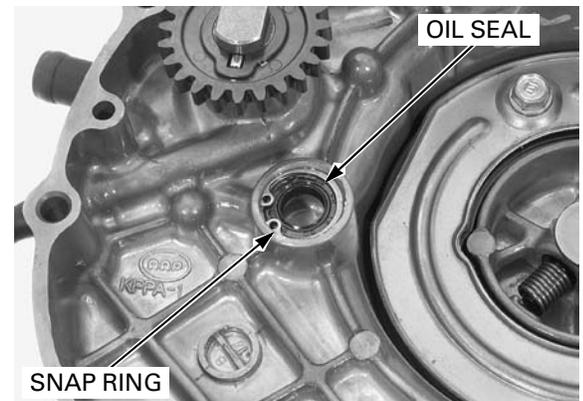


**OIL SEAL**

Check the oil seal for damage or deterioration, replace it if necessary.

*After installing a snap ring, always rotate it in its groove to be sure it is fully seated.*

Check that the washer and snap ring are installed in the left crankcase cover securely.



**OIL PUMP**

**NOTE:**

Measure each clearance at several points and use the largest reading to compare the service limit.

*If any portion of the oil pump is worn beyond the specified service limit, replace the oil pump as an assembly.*

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

Measure the tip clearance.

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



## LUBRICATION SYSTEM

Measure the body clearance.

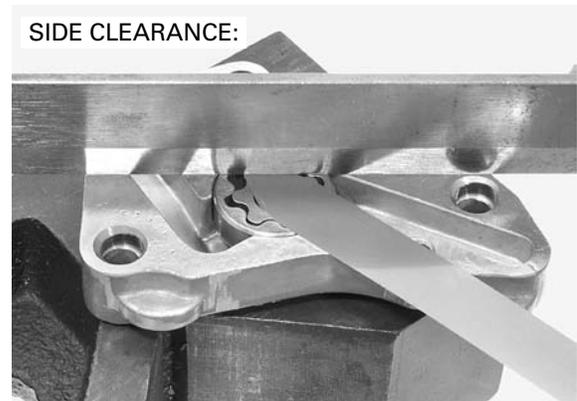
**SERVICE LIMIT: 0.26 mm (0.010 in)**



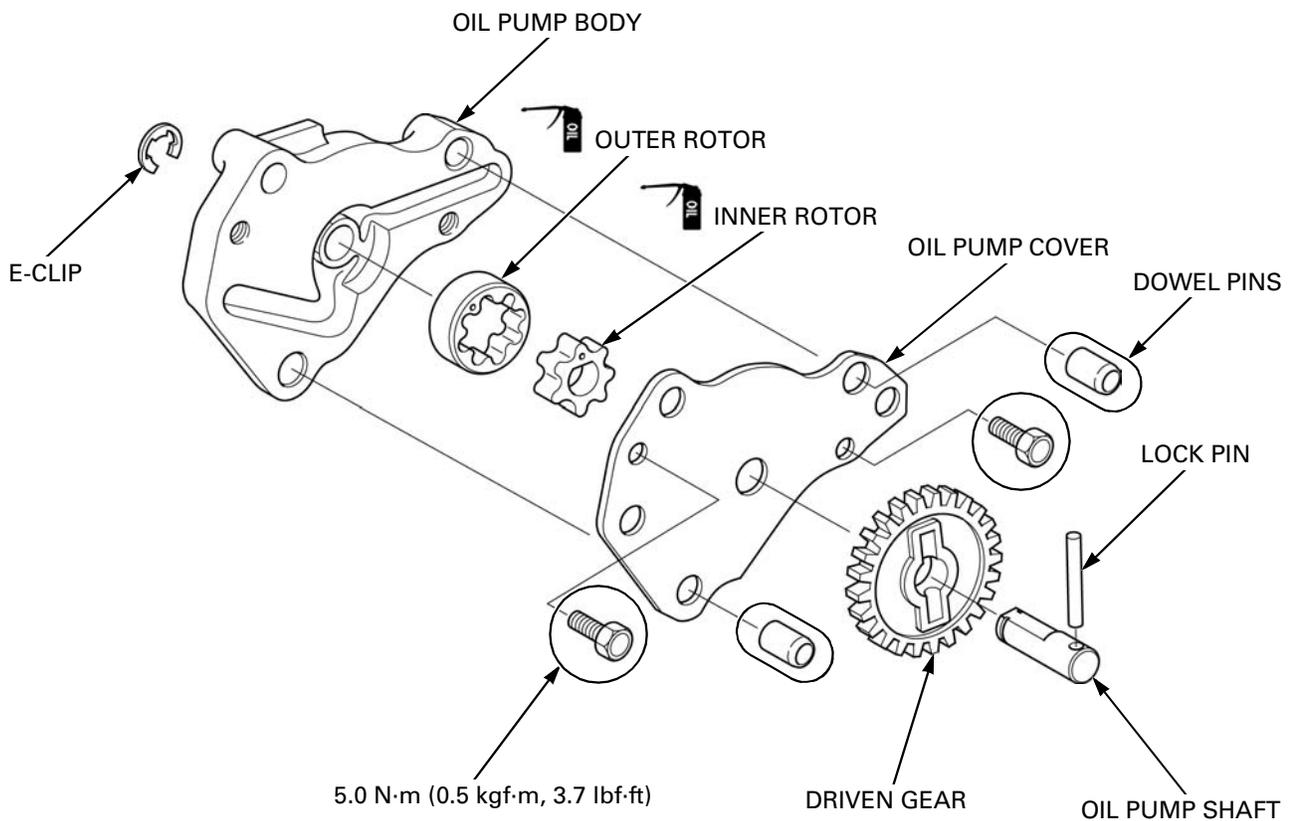
Remove the oil pump shaft.

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

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

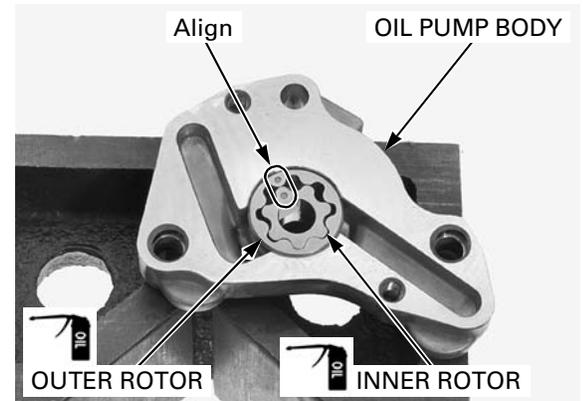


## ASSEMBLY

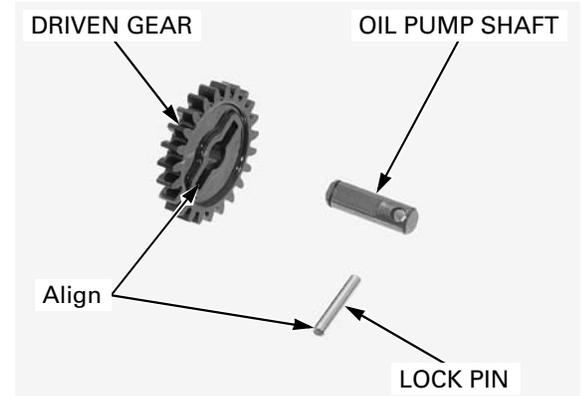


Apply engine oil to the inner and outer rotors entire surface.

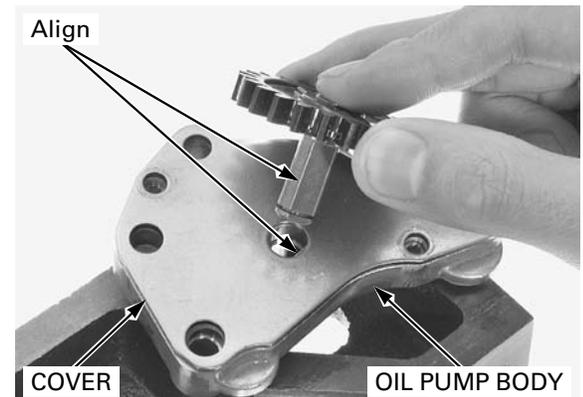
Install the oil pump inner and outer rotors in to the oil pump body with aligning the both punch marks.



Install the lock pin into the oil pump shaft, then install the oil pump driven gear aligning the oil pump driven gear groove with lock pin.

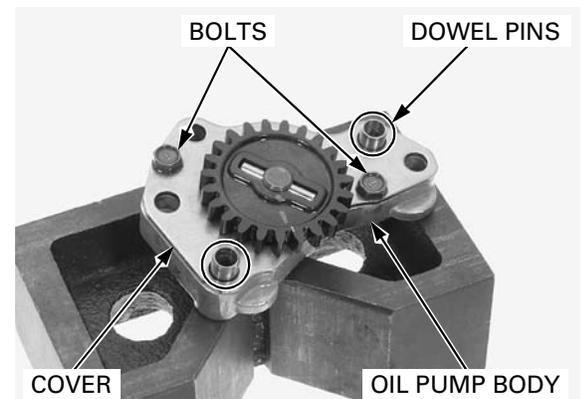


Install the oil pump cover.  
Install the oil pump driven gear assembly into the oil pump body aligning the flats of the oil pump shaft and inner rotor.



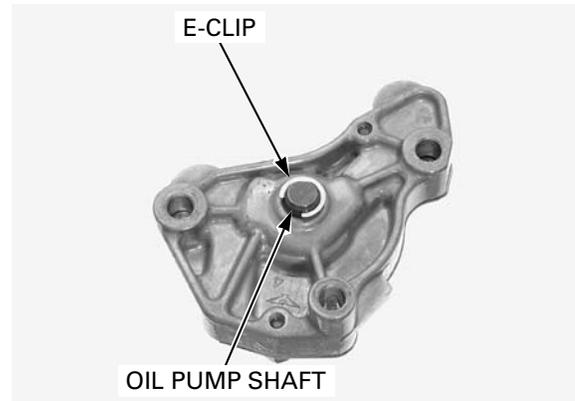
Install the dowel pins in to the oil pump body.  
Install and tighten the bolts to the specified torque.

**TORQUE: 5.0 N-m (0.5 kgf-m, 3.7 lbf-ft)**



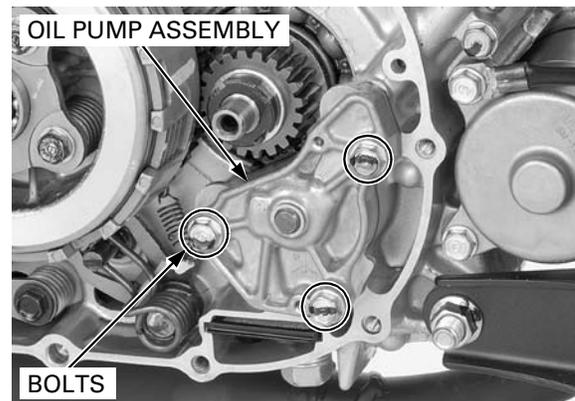
## LUBRICATION SYSTEM

*Set the flat surface of the E-clip is upward.* Install the E-clip to the oil pump shaft.



### INSTALLATION

Install the oil pump assembly.  
Install and tighten the mounting bolts securely.  
Install the right crankcase cover (page 10-8).

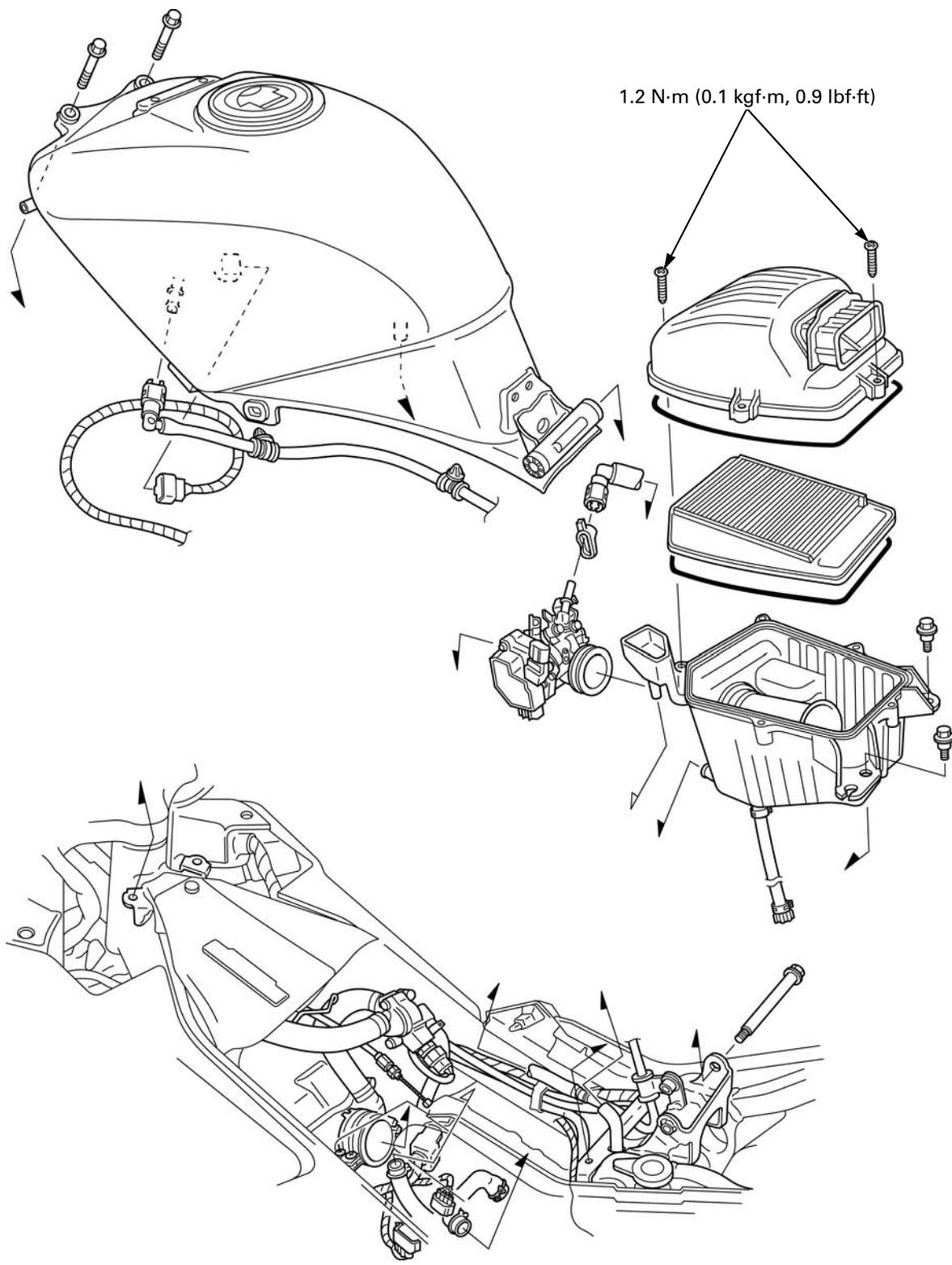


# 5. FUEL SYSTEM (PGM-FI)

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COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Before disconnecting the fuel feed hose, relieve fuel pressure from the system by disconnecting the quick connect fitting at the fuel pump (page 5-44).
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the intake ports with tape or a clean cloth to keep dirt and debris from entering the engine after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Prevent dirt and debris from entering the throttle bore and air passages after the throttle body has been removed. Clean them using a compressed air if necessary.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted nut and screw of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.
- The parts of the throttle body not shown in this manual should not be disassembled.
- Always replace the packing when the fuel pump is removed.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- The PGM-FI system is equipped with the Self-Diagnostic System described (page 5-10). If the MIL blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI system, always follow the steps in the troubleshooting table.
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map.  
It must be remembered, however, that when any abnormality is detected in injector, the fail-safe function stops the engine to protect it from damage.
- For PGM-FI system location (page 5-6).
- When disassembling the PGM-FI system parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Use a digital tester for PGM-FI system inspection.
- For fuel level sensor inspection (page 19-21).

### SPECIFICATIONS

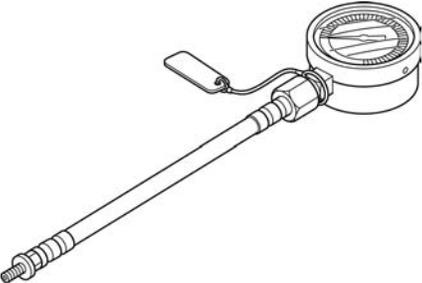
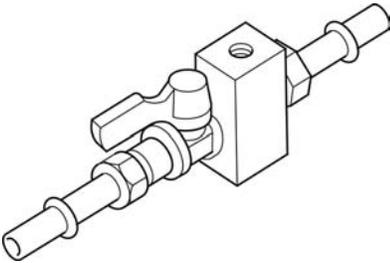
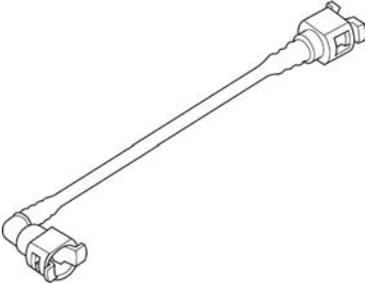
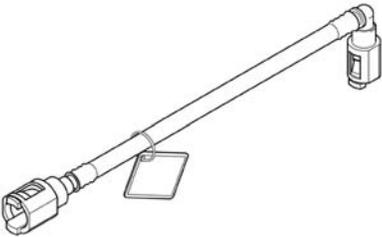
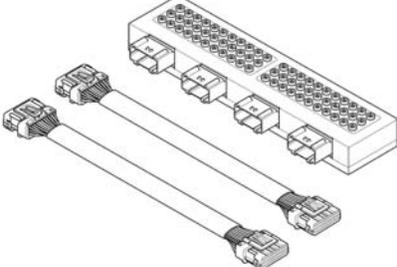
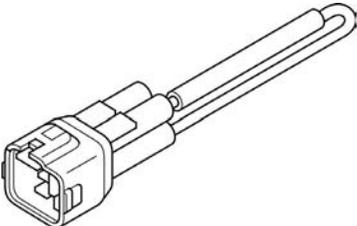
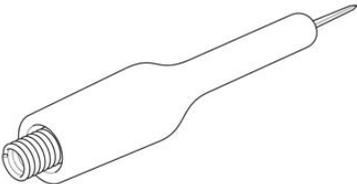
ITEM	SPECIFICATIONS
Throttle body identification number	GQ16A
Engine idle speed	1,450 ± 100 min <sup>-1</sup> (rpm)
Throttle grip freeplay	2 – 6 mm (1/16 – 1/4 in)
Fuel injector resistance (20°C/68°F)	9 – 12 Ω
Fuel pressure at idle	294 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)
Fuel pump flow (at 12 V)	13.9 cm <sup>3</sup> (0.47 US oz, 0.49 Imp oz) minimum/10 seconds

### TORQUE VALUES

Bank angle sensor mounting screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
ECT sensor	24.5 N·m (2.5 kgf·m, 18 lbf·ft)	
Fuel pump setting plate nut	–	For tightening sequence (page 5-50)
Injector joint mounting bolt	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)	
O <sub>2</sub> sensor	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Sensor unit torx screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
IACV setting plate torx screw	2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)	
Throttle cable stay screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Insulator band screw	–	See page 5-57
Air cleaner cover screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	

# FUEL SYSTEM (PGM-FI)

## TOOLS

<p>Fuel pressure gauge 07406-0040004</p> 	<p>Pressure gauge manifold 07ZAJ-S5A0111</p> 	<p>Hose attachment, 9 mm/9 mm 07ZAJ-S5A0120</p> 
<p>Hose attachment, 6 mm/9 mm 07ZAJ-S5A0130</p> 	<p>Attachment joint, 6 mm/9 mm 07ZAJ-S5A0150</p> 	<p>ECM test harness 33P 070MZ-MCA0100</p> 
<p>SCS connector 070PZ-ZY30100</p> 	<p>Test probe 07ZAJ-RDJA110</p> 	

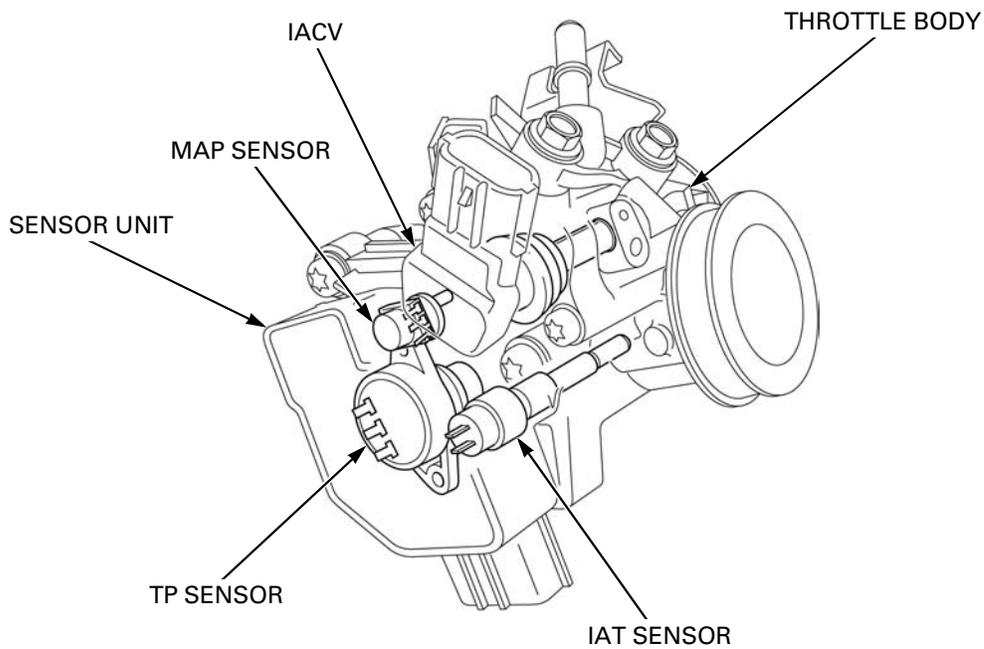
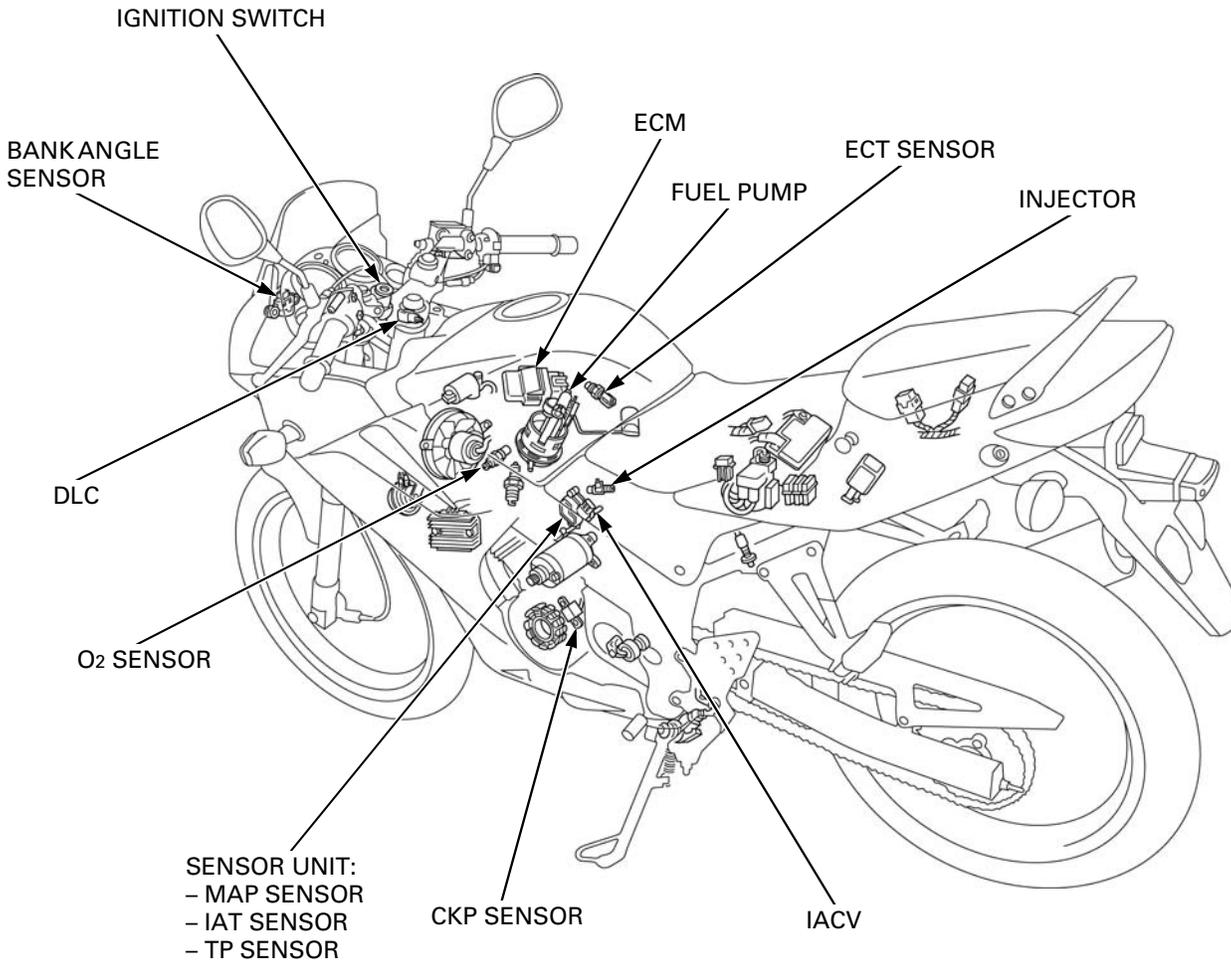
## PGM-FI SYMPTOM TROUBLESHOOTING

When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 5-14) and begin the appropriate troubleshooting procedure. If there are no DTC/MIL blinking stored in the ECM memory, do the diagnostic procedure for the symptom, in sequence listed below, until you find cause.

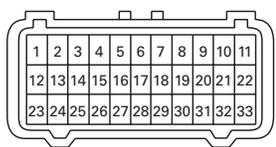
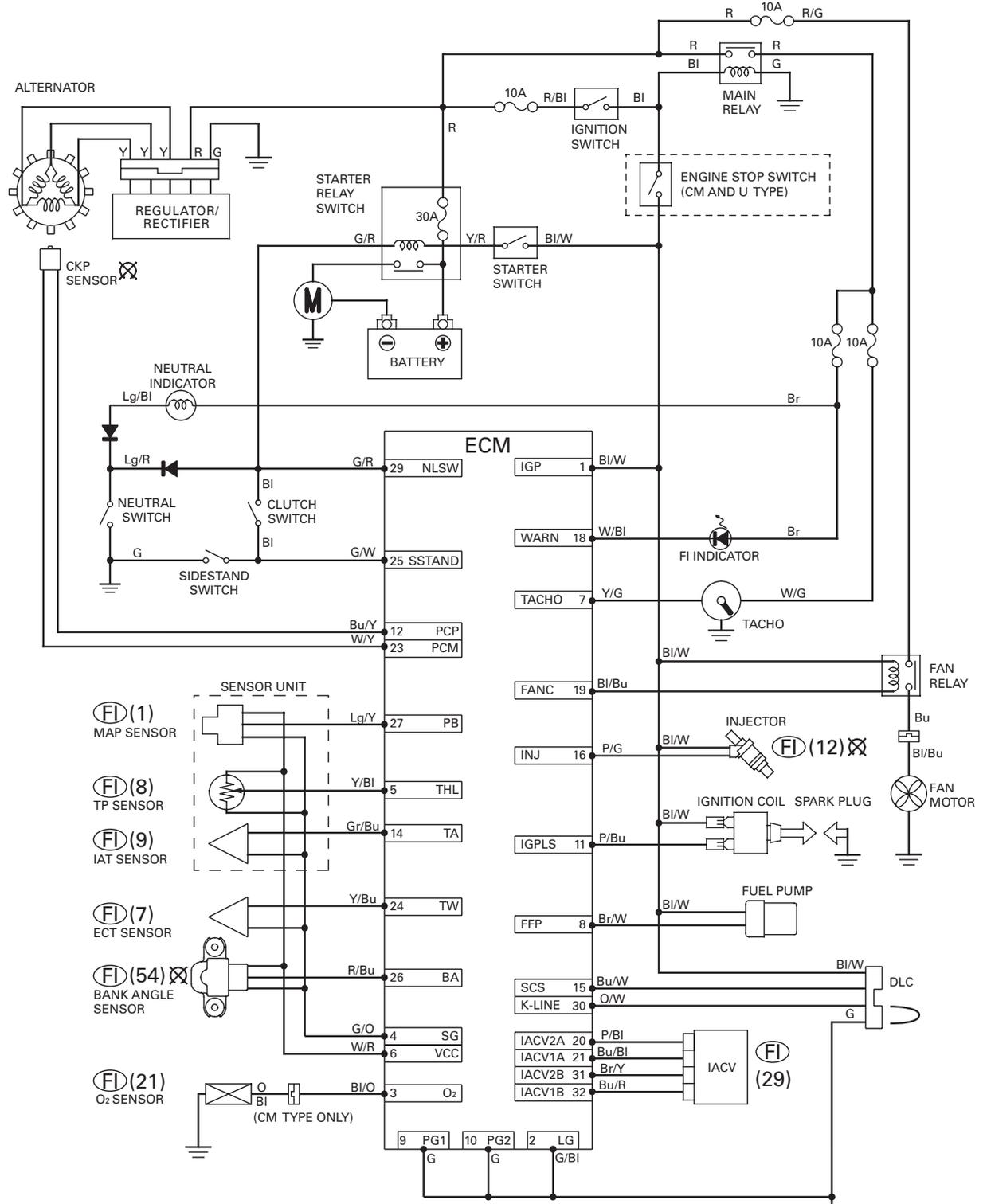
Symptom	Diagnosis procedure	Also check for
Engine cranks but won't start (No DTC and MIL blinking)	<ol style="list-style-type: none"> <li>1. Crank the starter for more than ten seconds and check the DTC (page 5-12) and execute the troubleshooting according to the DTC.</li> <li>2. Inspect the fuel supply system (page 5-44).</li> </ol>	<ul style="list-style-type: none"> <li>• No fuel to injector                             <ul style="list-style-type: none"> <li>– Clogged fuel filter</li> <li>– Pinched or clogged fuel feed hose</li> <li>– Faulty fuel pump</li> <li>– Faulty fuel pump circuits</li> </ul> </li> <li>• Intake air leak</li> <li>• Contaminated/deteriorated fuel</li> <li>• Faulty fuel injector</li> <li>• IACV stuck</li> <li>• Faulty ignition system</li> </ul>
Engine cranks but won't start (No fuel pump operation sound when the turning the ignition ON)	<ol style="list-style-type: none"> <li>1. ECM power/ground circuits malfunction (page 5-66).</li> <li>2. Inspect the fuel supply system (page 5-44).</li> </ol>	<ul style="list-style-type: none"> <li>• Open circuit in the power input and/or ground wire of the ECM</li> <li>• Blown main fuse (30 A)</li> <li>• Blown sub fuse (10 A)</li> </ul>
Engine stalls, hard to start, rough idling	<ol style="list-style-type: none"> <li>1. Check the idle speed.</li> <li>2. Check the IACV.</li> <li>3. Inspect the fuel supply system (page 5-44).</li> <li>4. Inspect the battery charging system (page 16-6).</li> </ol>	<ul style="list-style-type: none"> <li>• Restricted fuel feed hose</li> <li>• Contaminated/deteriorated fuel</li> <li>• Intake air leak</li> <li>• Faulty IACV</li> <li>• Restricted fuel tank breather hose</li> <li>• Faulty ignition system</li> <li>• Faulty battery charging system</li> </ul>
Backfiring or misfiring during acceleration	Check the ignition system.	<ul style="list-style-type: none"> <li>• Faulty ignition system</li> </ul>
Poor performance (driveability) and poor fuel economy	<ol style="list-style-type: none"> <li>1. Inspect the fuel supply system.</li> <li>2. Inspect the air cleaner element (page 3-8).</li> </ol>	<ul style="list-style-type: none"> <li>• Pinched or clogged fuel feed hose</li> <li>• Faulty pressure regulator (fuel pump)</li> <li>• Faulty injector</li> <li>• Faulty ignition system</li> <li>• Clogged air cleaner element</li> </ul>
Idle speed is below specifications or fast idle too low (No DTC and MIL blinking)	<ol style="list-style-type: none"> <li>1. Check the idle speed.</li> <li>2. Check the IACV.</li> </ol>	<ul style="list-style-type: none"> <li>• IACV stuck closed</li> <li>• Faulty fuel supply system</li> <li>• Faulty ignition system</li> </ul>
Idle speed is above specifications or fast idle too high (No DTC and MIL blinking)	<ol style="list-style-type: none"> <li>1. Check the idle speed.</li> <li>2. Check the throttle operation and freeplay.</li> <li>3. Check the IACV.</li> </ol>	<ul style="list-style-type: none"> <li>• IACV stuck opened</li> <li>• Faulty ignition system</li> <li>• Intake air leak</li> <li>• Engine top-end problem</li> <li>• Air cleaner element condition</li> </ul>
MIL stays ON but no DTCs set, or MIL never comes ON at all	Troubleshoot the MIL circuit (page 5-44).	<ul style="list-style-type: none"> <li>• Faulty MIL circuit</li> </ul>
MIL stays ON at all (No DTC set)	Inspect the DLC circuit.	<ul style="list-style-type: none"> <li>• Short circuit in the DLC related wire</li> </ul>

# FUEL SYSTEM (PGM-FI)

## PGM-FI SYSTEM LOCATION



PGM-FI SYSTEM DIAGRAM



ECM 33P CONNECTOR  
ECM side of male terminals

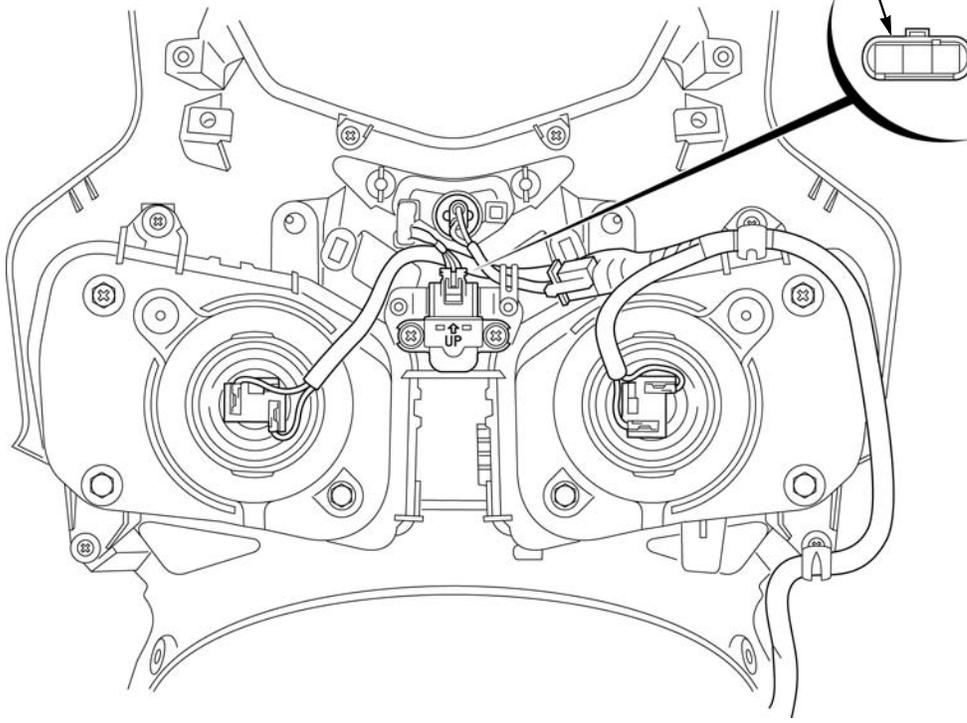
- Br : Brown
- Bl : Black
- Y : Yellow
- Bu : Blue
- G : Green
- R : Red
- W : White
- O : Orange
- Lg : Light Green
- P : Pink
- Gr : Gray

## FUEL SYSTEM (PGM-FI)

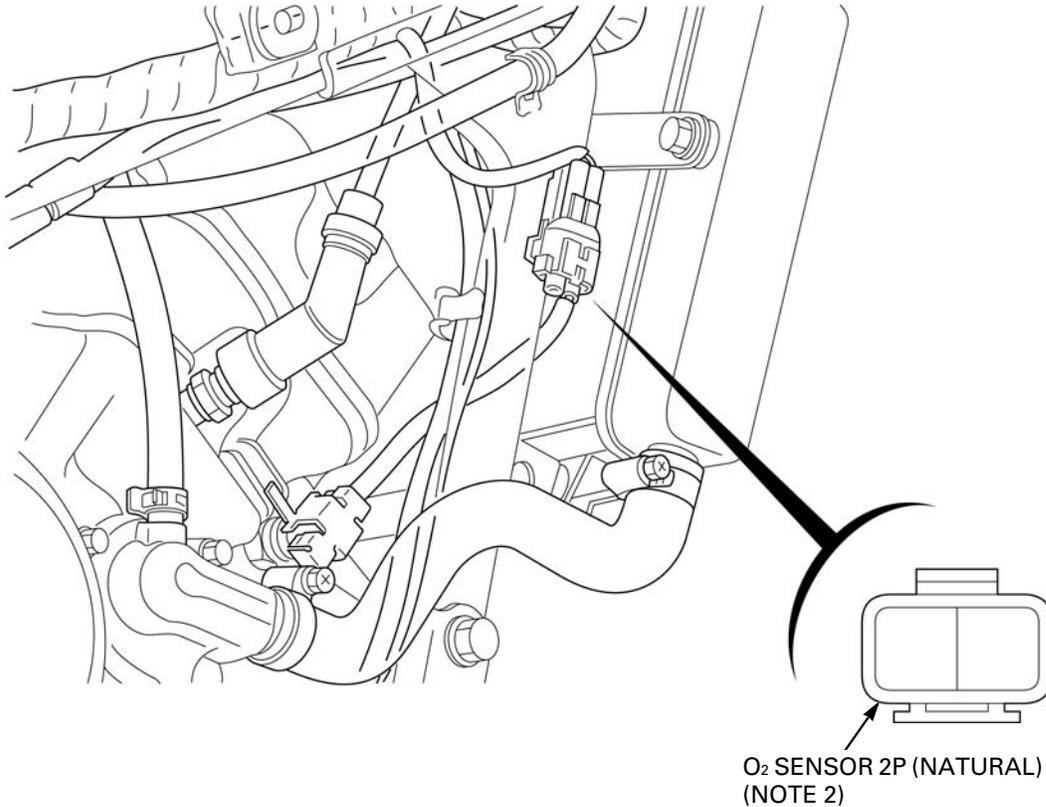
# PGM-FI CONNECTOR LOCATIONS

NOTE 1: Remove the upper cowl (page 2-10).

BANK ANGLE SENSOR 3P (GRAY) CONNECTOR  
(NOTE 1)



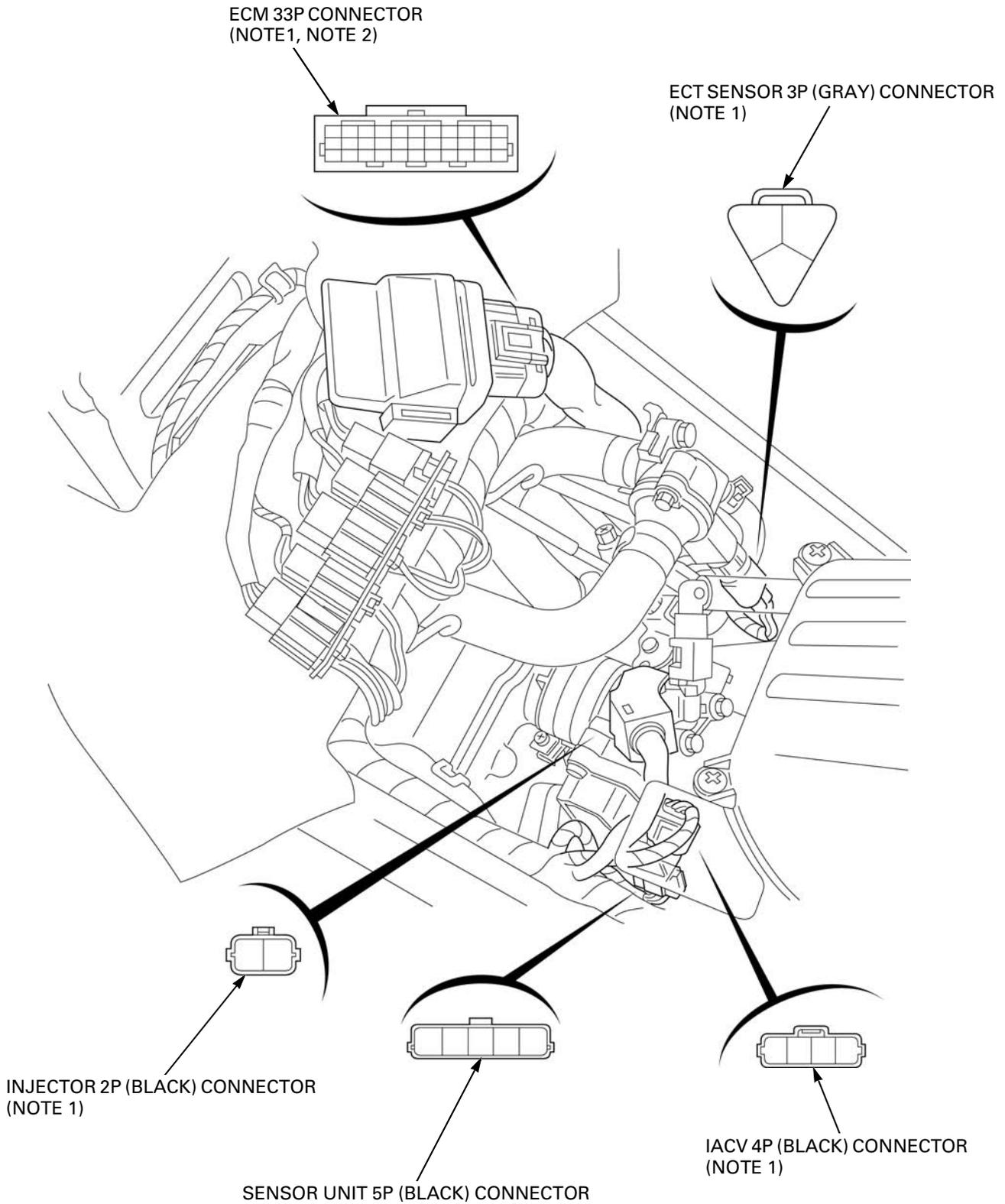
NOTE 2: Remove the right middle cowl (page 2-9).



O<sub>2</sub> SENSOR 2P (NATURAL) CONNECTOR  
(NOTE 2)

NOTE 1: Lift and support the fuel tank (page 3-6).

NOTE 2: Open the rubber sheet (page 6-10).



# PGM-FI TROUBLESHOOTING INFORMATION

## GENERAL TROUBLESHOOTING

### Intermittent Failure

The term "intermittent failure" means a system may have had a failure, but it checks OK now. If the MIL does not come on, check for poor contact or loose pins at all connectors related to the circuit that of the troubleshooting. If the MIL was on, but then went out, the original problem may be intermittent.

### Opens and Shorts

"Opens" and "Shorts" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something will not work at all. With ECMs this can something mean something work, but not the way it's supposed to.

### If the MIL has come on

Refer to DTC READOUT (page 5-12).

### If the MIL did not stay on

If the MIL did not stay on, but there is a driveability problem, do the SYMPTOM TROUBLESHOOTING (page 5-5).

## SYSTEM DESCRIPTION

### SELF-DIAGNOSIS SYSTEM

The PGM-FI system is equipped with the self-diagnostic system. When any abnormality occurs in the system, the ECM turns on the MIL and stores a DTC in its erasable memory.

### FAIL-SAFE FUNCTION

The PGM-FI system is provided with a fail-safe function to secure a minimum running capability even when there is trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is maintained by pre-programmed value in the simulated program map. When any abnormality is detected in the injector, the fail-safe function stops the engine to protect it from damage.

### DTC

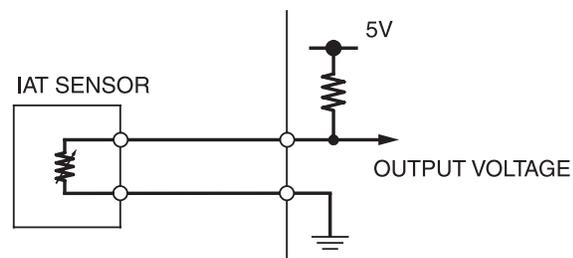
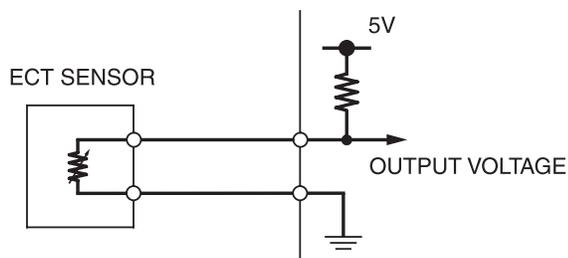
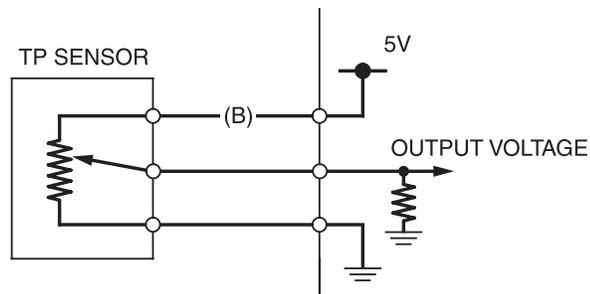
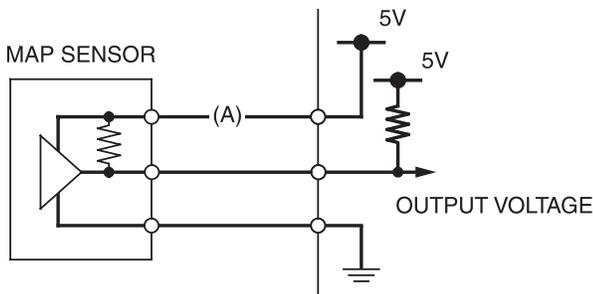
- The DTC is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the HDS pocket tester.

The digits in front of the hyphen are the main code, they indicate the component of function failure.

The digits behind the hyphen are the sub code, they detail the specific symptom of the component or function failure.

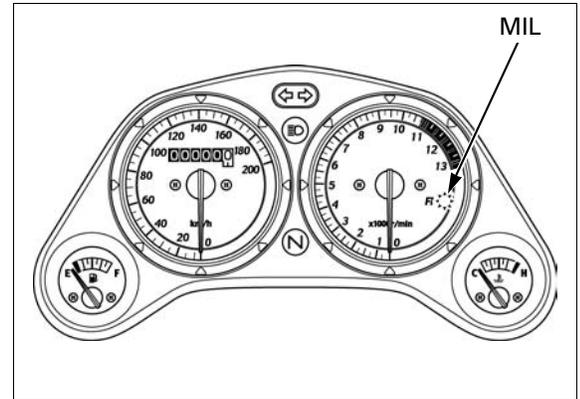
For example, in the case of the TP sensor:

- DTC 08 - 1 = (TP sensor voltage) - (lower than the specified value)
- DTC 08 - 2 = (TP sensor voltage) - (higher than the specified value)
- The MAP, ECT, TP and IAT sensor diagnosis will be made according to the voltage output of the affected sensor. If a failure occurs, the ECM determines the Function Failure, compares the sensor voltage output to the standard value, and then outputs the corresponding DTC to the HDS pocket tester.  
For example:
  - If the input voltage line (A) on the MAP sensor is opened, the ECM detects the output voltage is about 5 V, then the DTC 1-2 (MAP sensor circuit high voltage) will be displayed.
  - If the input voltage line (B) on the TP sensor is opened, the ECM detects the output voltage is 0 V, then the DTC 8-1 (TP sensor circuit low voltage) will be displayed.



## MIL Blink Pattern

- If the HDS pocket tester is not available, DTC can be read from the ECM memory by the MIL blink pattern.
- The number of MIL blinks is the equivalent of the main code of the DTC (the sub code cannot be displayed by the MIL).
- The MIL will blink the current DTC, in case the ECM detects the problem at present, when the ignition switch ON (and engine stop switch "O": CM and U type) or idling with the sidestand down. The MIL will stay ON when the engine speed is over 5,000 min<sup>-1</sup> (rpm) or with the sidestand up.
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.3 seconds, the short blinking lasts for 0.5 seconds. One long blink is the equivalent of ten short blinks. For example, when two long blinks are followed by five short blinks, the MIL is 25 (two long blinks = 20 blinks, plus five short blinks).
- When the ECM stores more than one DTC, the MIL will indicate them by blinking in the order from the lowest number to highest number.



## MIL Check

When the ignition switch is turned ON (and engine stop switch "O": CM and U type) the MIL will stay on for a few seconds, then go off. If the MIL does not come on, troubleshoot the MIL circuit (page 5-44).

## CURRENT DTC/FREEZE DTC

The DTC is indicated in two ways according to the failure status.

- In case the ECM detects the problem at present, the MIL will come on and the MIL will start to blink as its DTC when the sidestand is lowered. It is possible to readout the MIL blink pattern as the current DTC.
- In case the ECM does not detect any problem at present but has a problem stored in its memory, the MIL will not light and blink. If it is necessary to retrieve the past problem, readout the freeze DTC by following the DTC readout procedure (page 5-12).

## HDS POCKET TESTER INFORMATION

- The HDS pocket tester can readout the DTC, freeze data, current data and other ECM condition.

### How to connect the HDS pocket tester

Turn the ignition switch OFF.

Remove the dummy connector from the DLC.  
Connect the HDS pocket tester to the DLC.

Turn the ignition switch ON (and engine stop switch "O": CM and U type) check the DTC and freeze data.

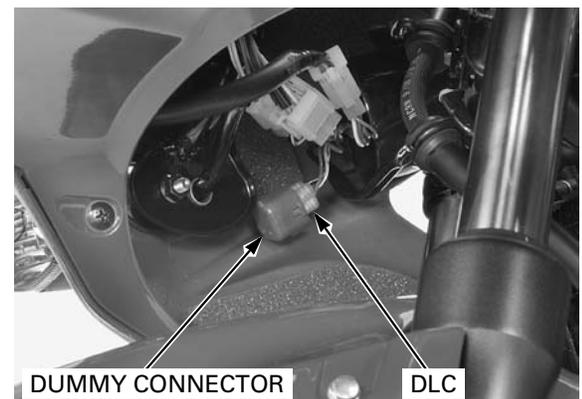
### NOTE:

Freeze data indicates the engine conditions when the first malfunction was detected.

### ECM reset

The HDS pocket tester can reset the ECM data including the DTC, freeze data and some learning memory.

After the ECM reset, follow the idle learn procedure from ECM initialization (page 5-58).



## FUEL SYSTEM (PGM-FI)

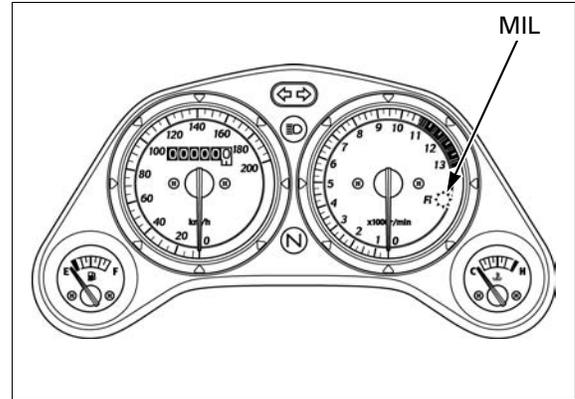
### DTC READOUT

Start the engine and check the MIL.

- If the engine will not start, turn the starter motor for more than 10 seconds and check that the MIL blinks.
- When the ignition switch is turned ON (and engine stop switch "O": CM and U type), the MIL will stay on for a few seconds, then go off.

If the MIL stays on or blinks, connect the HDS pocket tester to the DLC (page 5-11), read the DTC, freeze data and follow the troubleshooting index (page 5-14).

To read the DTC with the MIL blinking, refer to the following procedure.



#### Reading DTC with the MIL

Turn the ignition switch OFF.

Remove the dummy connector from the DLC.  
Short the DLC terminals using a special tool.

#### TOOL:

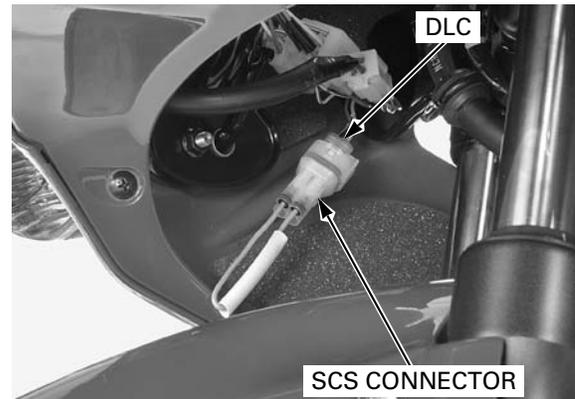
**SCS connector**                      **070PZ-ZY30100**

**Connection: Blue/white – Green**

Turn the ignition switch ON (and engine stop switch "O": CM and U type), read, note the MIL blinks and refer to the troubleshooting index (page 5-14).

#### NOTE:

If the ECM has any DTC in its memory, the MIL will start blinking.



### CLEARING DTC

Connect the HDS pocket tester to the DLC (page 5-11).

Clear the DTC with the HDS pocket tester while the engine is stopped.

To clear the DTC without HDS pocket tester, refer to the following procedure.

#### How to clear the DTC with SCS connector

1. Turn the ignition switch OFF.
2. Remove the dummy connector from the DLC.  
Short the DLC terminals using a special tool.

#### TOOL:

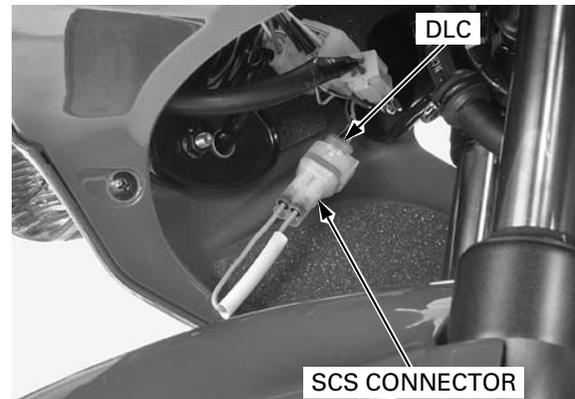
**SCS connector**                      **070PZ-ZY30100**

**Connection: Blue/white – Green**

3. Turn the ignition switch ON (and engine stop switch "O": CM and U type).
4. Remove the special tool from the DLC.
5. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with a special tool. The self-diagnostic memory is erased if the malfunction indicator goes off and starts blinking.

#### NOTE:

- The DLC must be jumped while the MIL lights. If not, the MIL will not start blinking.
- Note that the self-diagnostic memory cannot be erased if the ignition switch is turned OFF before the MIL starts blinking.



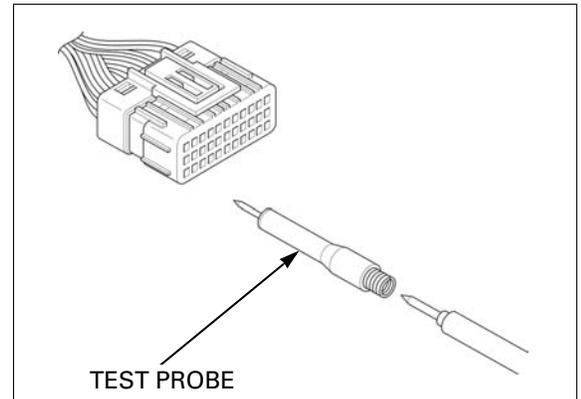
**CIRCUIT INSPECTION**

**INSPECTION AT ECM CONNECTOR**

- Always clean around and keep any foreign material away from the ECM 33P connector before disconnecting it.
- A faulty PGM-FI system is often related to poorly connected or corroded terminals. Check those connections before proceeding.
- In testing at ECM 33P connector (wire harness side) terminal, always use the test probe. Insert the test probe into the connector terminal, then attach the digital multimeter probe to the test probe.

**TOOL:**

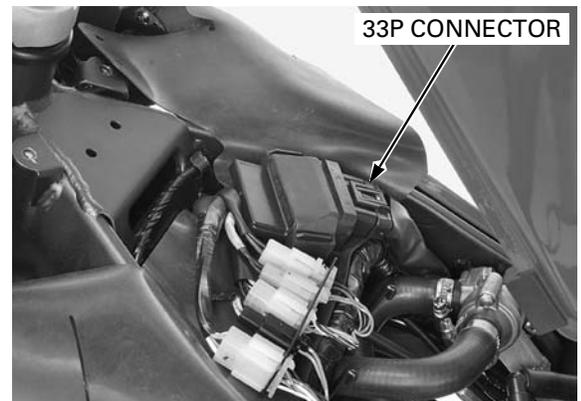
Test probe 07ZAJ-RDJA110



**TEST HARNESS CONNECTION**

Lift and support the fuel tank (page 3-6).  
Open the rubber sheet (page 6-10).

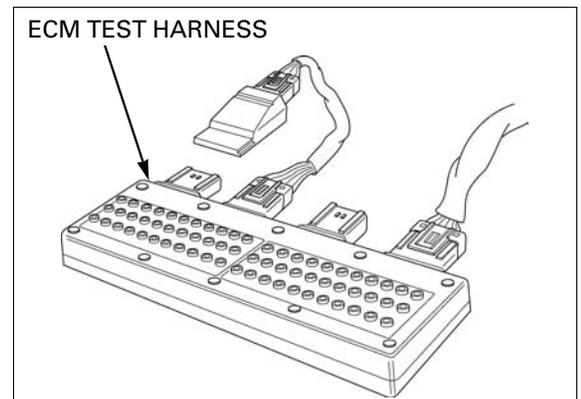
Turn the ignition switch OFF.  
Disconnect the ECM 33P connector.



Connect the ECM test harness between the main wire harness and ECM.

**TOOL:**

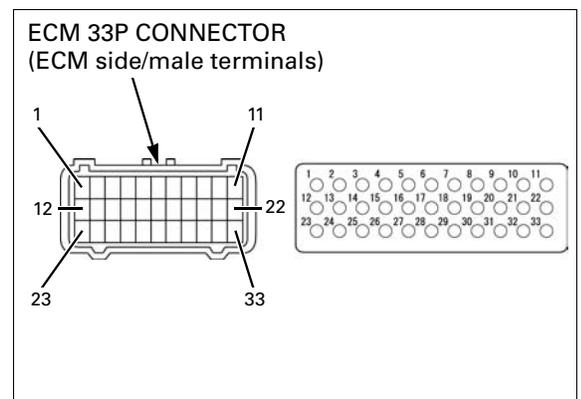
ECM test harness 33P 070MZ-MCA0100



**TEST HARNESS TERMINAL LAYOUT**

The ECM 33P connector terminals are numbered as shown in this illustration.

The ECM test harness terminals are same layout as for the ECM 33P connector terminals as shown.



## FUEL SYSTEM (PGM-FI)

### DTC INDEX

DTC (MIL blinks)	Function Failure	Symptom/Fail-safe function	Refer to (DTC)	Refer to (MIL)
1-1 (1)	MAP sensor circuit low voltage (less than 0.19 V) • MAP sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 760 mmHg/1,013 hPa	5-17	5-33
1-2 (1)	MAP sensor circuit high voltage (more than 3.84 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 760 mmHg/1,013 hPa	5-18	
7-1 (7)	ECT sensor circuit low voltage (less than 0.07 V) • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 75°C/167°F • Cooling fan turns on	5-19	5-34
7-2 (7)	ECT sensor circuit high voltage (more than 4.92 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-program value: 75°C/167°F • Cooling fan turns on	5-20	
8-1 (8)	TP sensor circuit low voltage (less than 0.21 V) • Loose or poor contact of the TP sensor connector • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	5-21	5-36
8-2 (8)	TP sensor circuit high voltage (more than 4.92 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-program value: 0°	5-22	
9-1 (9)	IAT sensor circuit low voltage (less than 0.07 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 35°C/95°F	5-23	5-37
9-2 (9)	IAT sensor circuit high voltage (more than 4.92 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-program value: 35°C/95°F	5-24	
12-1 (12)	Injector circuit malfunction • Loose or poor contact of the injector connector • Injector or its circuit malfunction	• Engine does not start • Injector, fuel pump and ignition coil shut down	5-25	5-38
21-1 (21)	O <sub>2</sub> sensor malfunction • Loose or poor contact of the O <sub>2</sub> sensor connector • O <sub>2</sub> sensor or its circuit malfunction	• Engine operates normally	5-27	5-40
29-1 (29)	IACV circuit malfunction • Loose or poor contact of the IACV connector • IACV or its circuit malfunction	• Engine stalls, hard to start, rough idling	5-28	5-41
33-2 (-)	ECM EEPROM malfunction	• Engine operates normally	5-29	-
54-1 (54)	Bank angle sensor circuit low voltage (less than 0.31 V) • Bank angle sensor or its circuit malfunction	• Engine does not start • Injector, fuel pump and ignition coil shut down	5-30	5-42
54-2 (54)	Bank angle sensor circuit high voltage (more than 4.53 V) • Loose or poor contact of the bank angle sensor connector • Bank angle sensor or its circuit malfunction	• Engine does not start • Injector, fuel pump and ignition coil shut down	5-31	

# SENSOR UNIT POWER LINE INSPECTION

## BEFORE DTC TROUBLESHOOTING

- When the DTC displays 1-1, 1-2, 8-1, 8-2, 9-1 and 9-2, check the following before DTC troubleshooting.
- Before starting the inspection, check for loose or poor contact on the sensor unit 5P connector and ECM 33P connector.

### 1. Sensor Unit Power Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the wire side.

**Connection: White/red (+) – Green/orange (-)**

**Standard: 4.75 – 5.25 V**

**If the voltage within 4.75 – 5.25 V?**

**YES** – Turn the ignition switch OFF. Connect the sensor unit 5P connector and start the DTC troubleshooting (page 5-17).

**NO** – GO TO STEP 2.

### 2. Sensor Unit Input Voltage Line Short Circuit Inspection

Turn the ignition switch OFF.

Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection: White/red – Ground**

**Is there continuity?**

**YES** – Short circuit in White/red wire

**NO** – GO TO STEP 3.

### 3. Sensor Unit Power Line Open Circuit Inspection

Disconnect the ECM 33P connector.

Check for continuities at the White/red and Green/orange wires between the sensor unit 5P and ECM 33P connectors.

**Connection: 6 (Yellow/red) – White/red**

**4 (Green/orange) – Green/orange**

**TOOL:**

**Test probe**

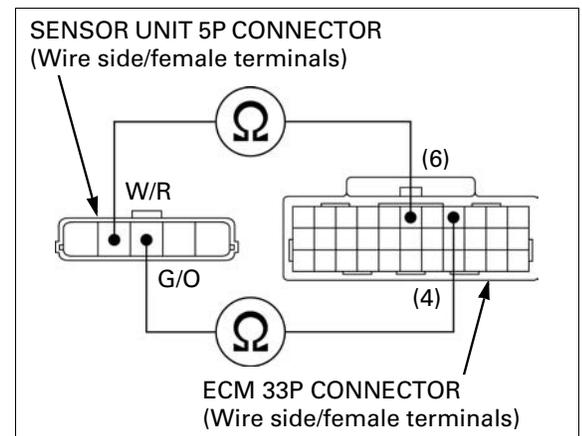
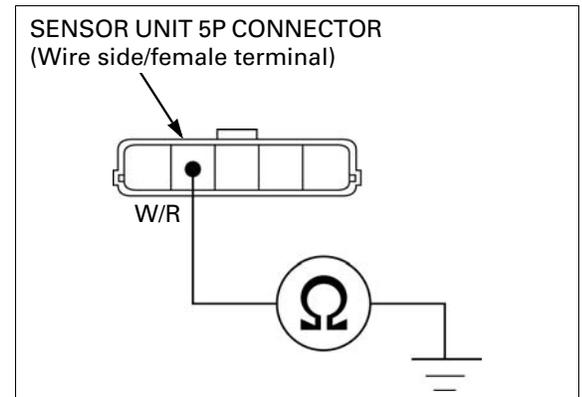
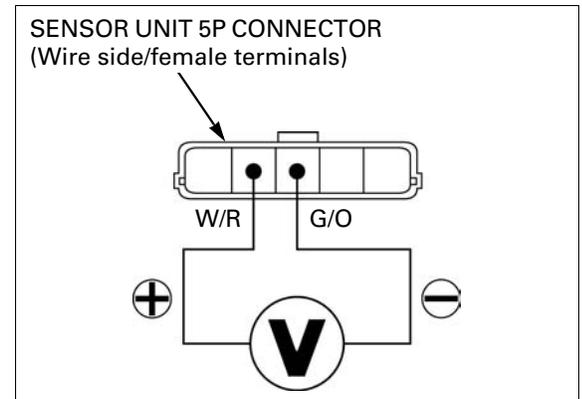
**07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** –

- Open circuit in White/red wire
- Open circuit in Green/orange wire



## BEFORE MIL TROUBLESHOOTING

- When the MIL blinks 1, 8 and 9 times, check the following before MIL troubleshooting.
- Before starting the inspection, check for loose or poor contact on the sensor unit 5P connector and ECM 33P connector.

### 1. Sensor Unit Power Input Voltage Inspection 1

Turn the ignition switch OFF.

Connect the ECM test harness to the ECM 33P connector (page 5-13).

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the test harness terminals.

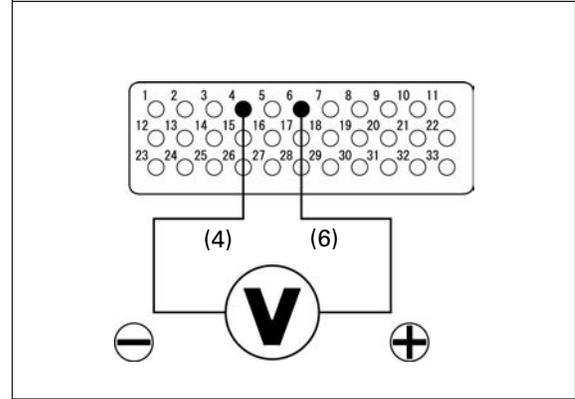
**Connection:** 6 (+) – 4 (-)

**Standard:** 4.75 – 5.25 V

**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 2.

**NO** – Replace the ECM with a known good one, and recheck.



### 2. Sensor Unit Power Input Voltage Inspection 2

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the wire side.

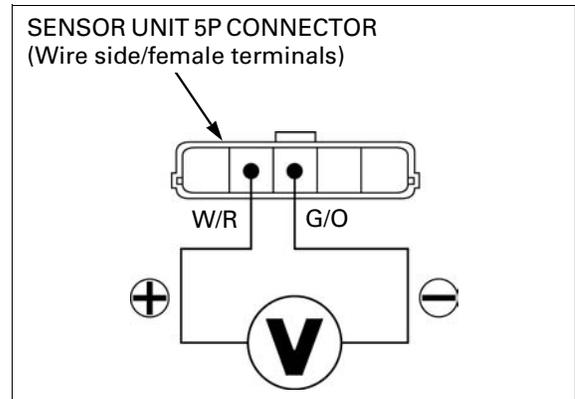
**Connection:** White/red (+) – Green/orange (-)

**Standard:** 4.75 – 5.25 V

**If the voltage within 4.75 – 5.25 V?**

**YES** – Turn the ignition switch OFF. Connect the sensor unit 5P connector and start the MIL troubleshooting (page 5-33).

**NO** – GO TO STEP 3.



### 3. Sensor Unit Input Voltage Line Short Circuit Inspection

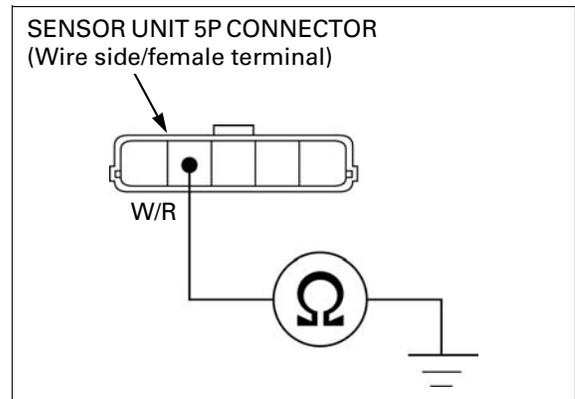
Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection:** White/red – Ground

**Is there continuity?**

**YES** – Short circuit in White/red wire

**NO** – GO TO STEP 4.



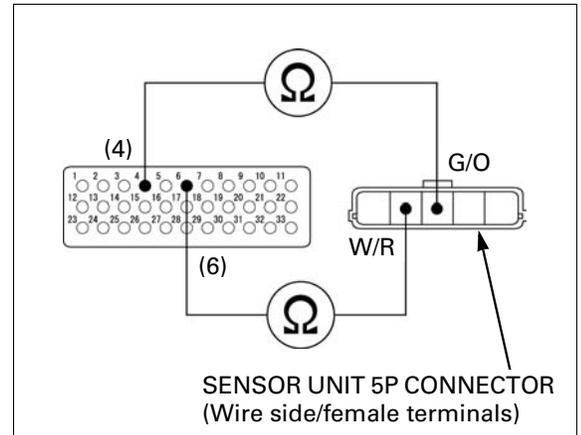
**4. Sensor Unit Input Voltage Line Open Circuit Inspection**

Check for continuities between the test harness and sensor unit 5P connector of the wire side.

**Connection:** 6 – White/red  
4 – Green/orange

*Is there continuity?*

- YES** – Intermittent failure
- NO** –
- Open circuit in White/red wire
  - Open circuit in Green/orange wire



**DTC TROUBLESHOOTING**

**DTC 1-1 (MAP SENSOR LOW VOLTAGE)**

**1. MAP Sensor System Inspection**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the MAP sensor with the HDS pocket tester.

*Is about 0 V indicated?*

- YES** – GO TO STEP 2.
- NO** –
- Intermittent failure
  - Loose or poor contact on the sensor unit 5P connector

**2. Sensor Unit Power Line Inspection**

Check the sensor unit power line inspection (page 5-15).

*Is the sensor unit power line normal?*

- YES** – GO TO STEP 3.
- NO** – Replace or repair the abnormal circuit.

**3. MAP Sensor Output Voltage Inspection**

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

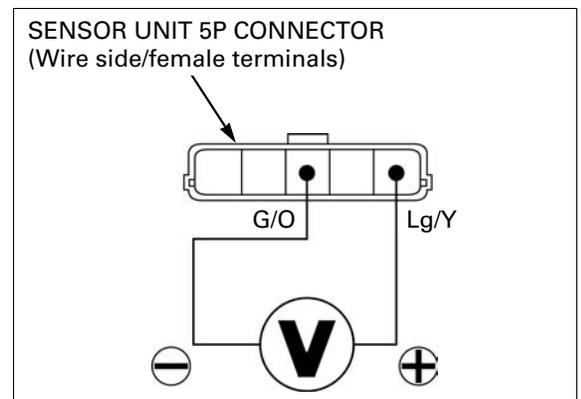
Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the sensor unit 5P connector of the wire side.

**Connection:**  
Light green/yellow (+) – Green/orange (–)  
**Standard:** 3.80 – 5.25 V

*Is the voltage within 3.80 – 5.25 V?*

- YES** – GO TO STEP 5.
- NO** – GO TO STEP 4.



## FUEL SYSTEM (PGM-FI)

### 4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

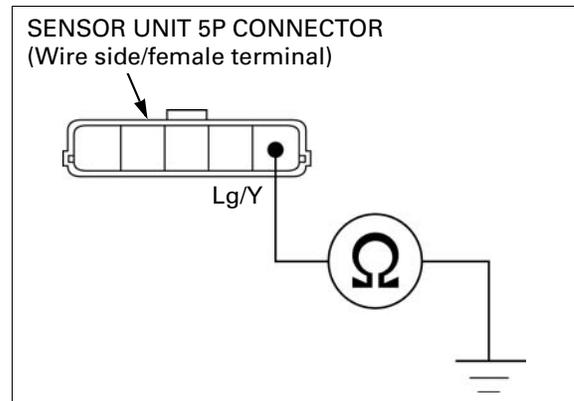
Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection:** Light green/yellow – ground

**Is there continuity?**

**YES** – Short circuit in Light green/yellow wire

**NO** – GO TO STEP 5.



### 5. MAP Sensor Inspection

Replace the sensor unit with a known good one (page 5-52).

Clear the DTC's (page 5-12).

Turn the ignition switch OFF.

Connect the sensor unit 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the MAP sensor with the HDS pocket tester.

**Is DTC 1-1 indicated?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty original sensor unit (MAP sensor)

## DTC 1-2 (MAP SENSOR HIGH VOLTAGE)

### 1. MAP Sensor System Inspection 1

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the MAP sensor with the HDS pocket tester.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** –

- Intermittent failure
- Loose or poor contact on the sensor unit 5P connector

### 2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-15).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

**3. MAP Sensor System Inspection 2**

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Connect the sensor unit 5P connector terminals at the wire side with a jumper wire.

**Connection:**

**Light green/yellow – Green/orange**

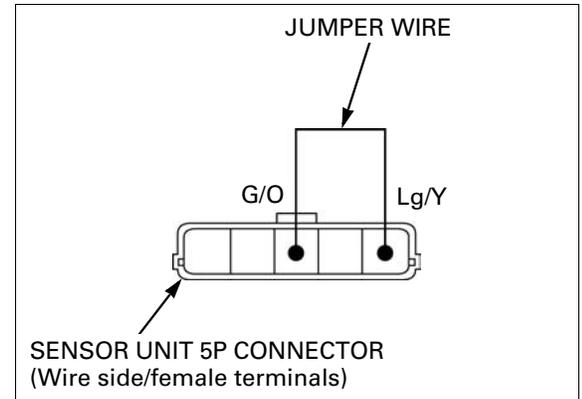
Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the MAP sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – Faulty sensor unit (MAP sensor)

**NO** – GO TO STEP 4.



**4. MAP Sensor Output Line Open Circuit Inspection**

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the ECM 33P connector.

Check for continuity at the Light green/yellow wire between the sensor unit 5P and ECM 33P connectors.

**Connection:**

**27 (Light green/yellow) – Light green/yellow**

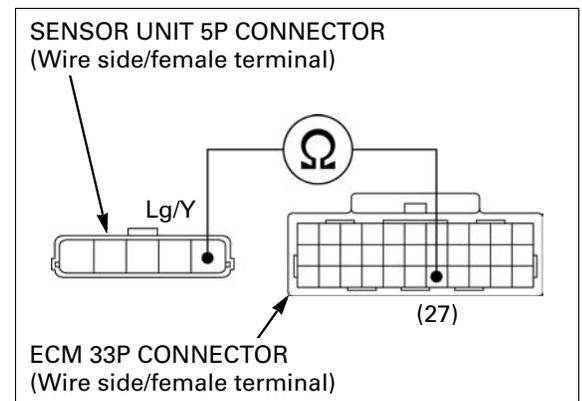
**TOOL:**

**Test probe** **07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Light green/yellow wire



**DTC 7-1 (ECT SENSOR LOW VOLTAGE)**

**1. ECT Sensor System Inspection**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the ECT sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. ECT Sensor Inspection**

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the ECT sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.

## FUEL SYSTEM (PGM-FI)

### 3. ECT Sensor Resistance Inspection

Turn the ignition switch OFF.

Measure the resistance between the ECT sensor terminals.

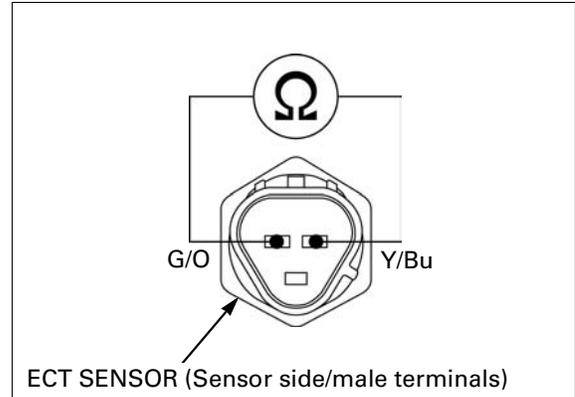
**Connection:** Yellow/blue – Green/orange

**Standard:** 2.3 – 2.6 k $\Omega$  (20°C/68°F)

**Is the resistance within 2.3 – 2.6 k $\Omega$  (20°C/68°F)?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty ECT sensor



### 4. ECT Sensor Short Circuit Inspection

Turn the ignition switch OFF.

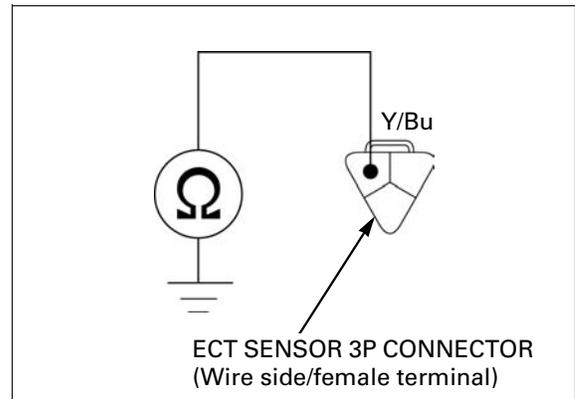
Check for continuity between the ECT sensor 3P connector of the wire side and ground.

**Connection:** Yellow/blue – Ground

**Is there continuity?**

**YES** – Short circuit in Yellow/blue wire

**NO** – Replace the ECM with a known good one, and recheck.



## DTC 7-2 (ECT SENSOR HIGH VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P connector and recheck the DTC.

### 1. ECT Sensor System Inspection

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the ECT sensor with the HDS pocket tester.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** –

- Intermittent failure
- Loose or poor contact on the ECT sensor 3P connector

**2. ECT Sensor Inspection**

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P connector.

Connect the ECT sensor 3P connector terminals at the wire side with a jumper wire.

**Connection: Yellow/blue – Green/orange**

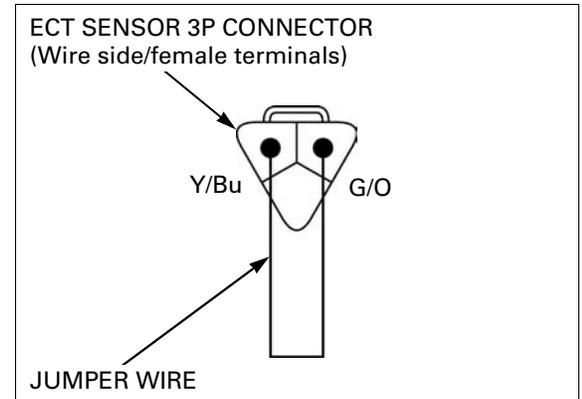
Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the ECT sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – Inspect the ECT sensor (page 19-13).

**NO** – GO TO STEP 3.



**3. ECT Sensor Open Circuit Inspection**

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the ECM 33P connector.

Check the continuities at the Yellow/blue and Green/orange wires between the ECM 33P and ECT sensor 3P connectors.

**Connection: 24 (Yellow/blue) – Yellow/blue  
4 (Green/orange) – Green/orange**

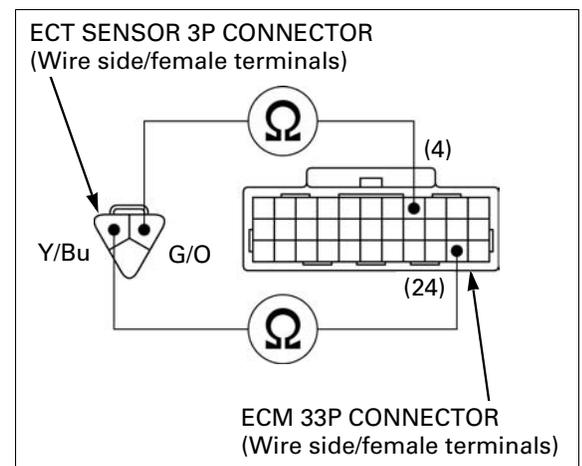
**TOOL:**

**Test probe 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Replace the ECM with new one, and recheck.

**NO** – • Open circuit in Yellow/blue wire  
• Open circuit in Green/orange wire



**DTC 8-1 (TP SENSOR LOW VOLTAGE)**

**1. TP Sensor System Inspection**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the TP sensor with the HDS pocket tester when the throttle fully closed.

**Is about 0 V indicated?**

**YES** – • Intermittent failure  
• Loose or poor contact on the sensor unit 5P connector

**NO** – GO TO STEP 2.

**2. Sensor Unit Power Line Inspection**

Check the sensor unit power line inspection (page 5-15).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

## FUEL SYSTEM (PGM-FI)

### 3. TP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

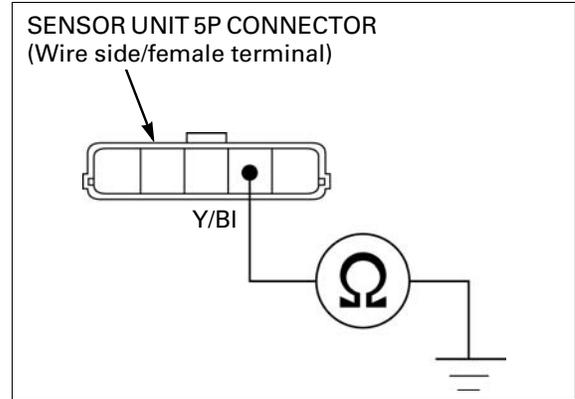
Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection: Yellow/black – Ground**

**Is there continuity?**

**YES** – Short circuit in Yellow/black wire

**NO** – GO TO STEP 4.



### 4. TP Sensor Output Line Open Circuit Inspection

Disconnect the ECM 33P connector.

Check for continuity at the Yellow wire between the sensor unit 5P and ECM 33P connectors.

**Connection: 5 (Yellow/black) – Yellow/black**

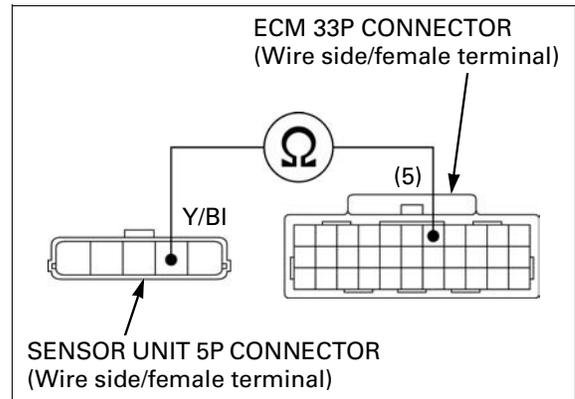
**TOOL:**

**Test probe 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – GO TO STEP 5.

**NO** – Open circuit in Yellow/black wire



### 5. TP Sensor Inspection

Replace the sensor unit with a known good one (page 5-52).

Clear the DTC's (page 5-12).

Connect the sensor unit 5P and ECM 33P connectors.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the TP sensor with the HDS pocket tester.

**Is DTC 8-1 indicated?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty original sensor unit (TP sensor)

## DTC 8-2 (TP SENSOR HIGH VOLTAGE)

### 1. TP Sensor System Inspection

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the TP sensor with the HDS pocket tester.

**Is about 5 V indicated?**

**YES** –

- Intermittent failure
- Loose or poor contact on the sensor unit 5P connector

**NO** – GO TO STEP 2.

**2. Sensor Unit Power Line Inspection**

Check the sensor unit power line inspection (page 5-15).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

**3. TP Sensor Resistance Inspection**

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Check that the resistance between the sensor unit 5P connector terminals while operating the throttle grip.

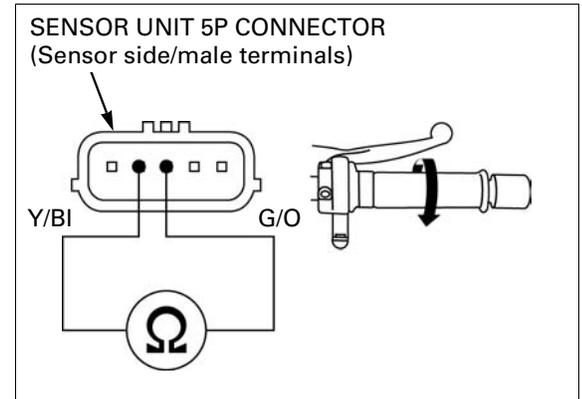
**Connection: Yellow/black – Green/orange**

**Standard: Fully closed-Fully open position:  
Resistance increases  
Fully open-Fully closed position:  
Resistance decreases**

**Is the resistance normal?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty sensor unit (TP sensor)



**DTC 9-1 (IAT SENSOR LOW VOLTAGE)**

**1. IAT Sensor System Inspection**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the IAT sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – GO TO STEP 2.

**NO** – • Intermittent failure  
• Loose or poor contact on the sensor unit 5P connector

**2. Sensor Unit Power Line Inspection**

Check the sensor unit power line inspection (page 5-15).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

**3. IAT Sensor Inspection**

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the IAT sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – GO TO STEP 4.

**NO** – Faulty sensor unit (IAT sensor)

## FUEL SYSTEM (PGM-FI)

### 4. IAT Sensor Voltage Input Line Short Circuit Inspection

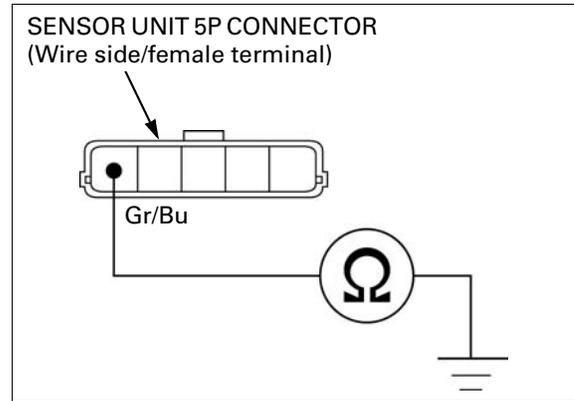
Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection: Gray/blue – Ground**

**Is there continuity?**

**YES** – Short circuit in Gray/blue wire

**NO** – Replace the ECM with a known good one, and recheck.



## DTC 9-2 (IAT SENSOR HIGH VOLTAGE)

### 1. IAT Sensor System Inspection

Turn the ignition switch ON (and engine stop switch "Q": CM and U type).

Check the IAT sensor with the HDS pocket tester.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** –

- Intermittent failure
- Loose or poor contact on the sensor unit 5P connector

### 2. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-15).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 3.

**NO** – Replace or repair the abnormal circuit.

### 3. IAT Sensor Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Connect the IAT sensor terminals at the wire side with a jumper wire.

**Connection: Gray/blue – Green/orange**

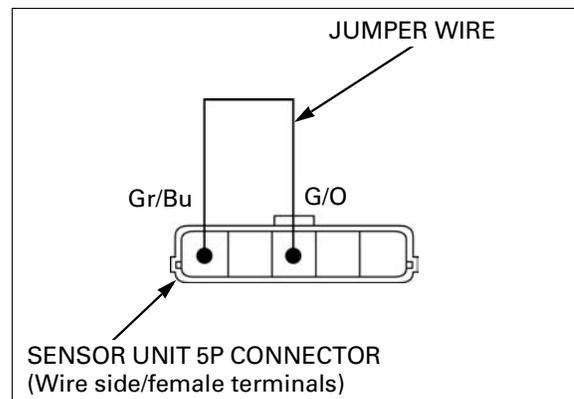
Turn the ignition switch ON (and engine stop switch "Q": CM and U type).

Check the IAT sensor with the HDS pocket tester.

**Is about 0 V indicated?**

**YES** – Faulty sensor unit (IAT sensor)

**NO** – GO TO STEP 4.



**4. IAT Sensor Voltage Input Line Open Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P connector.

Check the continuity at the Gray/blue wire between the sensor unit 5P and ECM 33P connectors.

**Connection: 14 (Gray/blue) – Gray/blue**

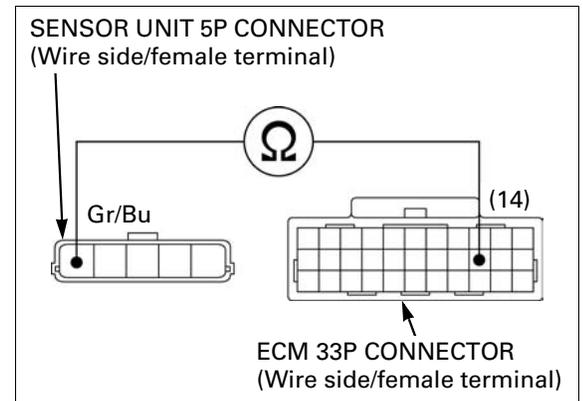
**TOOL:**

**Test probe 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Gray/blue wire



**DTC 12-1 (INJECTOR)**

- Before starting the inspection, check for loose or poor contact on the injector connector and recheck the DTC.

**1. Injector System Inspection**

Clear the DTC's (page 5-12).

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and check the injector with the HDS pocket tester.

**Is the DTC 12-1 indicated?**

**YES** – GO TO STEP 2.

- NO** –
- Intermittent failure
  - Loose or poor contact on the injector 2P connector

**2. Injector Input Voltage Inspection**

Turn the ignition switch OFF.

Disconnect the injector 2P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage between the injector 2P connector of the wire side and ground.

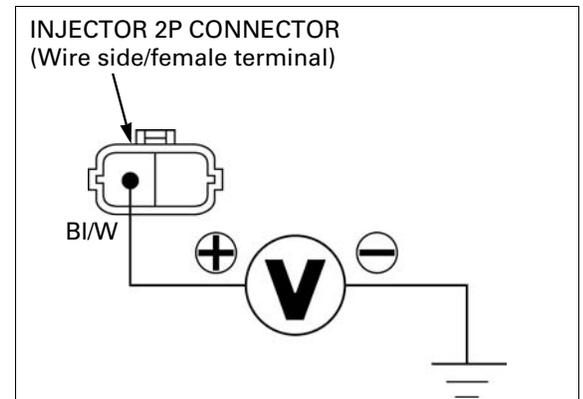
**Connection: Black/white (+) – Ground (-)**

**Standard: Battery voltage**

**Does the standard voltage exist?**

**YES** – GO TO STEP 3.

**NO** – Open or short circuit in Black/white wire



## FUEL SYSTEM (PGM-FI)

### 3. Injector Signal Line Short Circuit Inspection

Turn the ignition switch OFF.

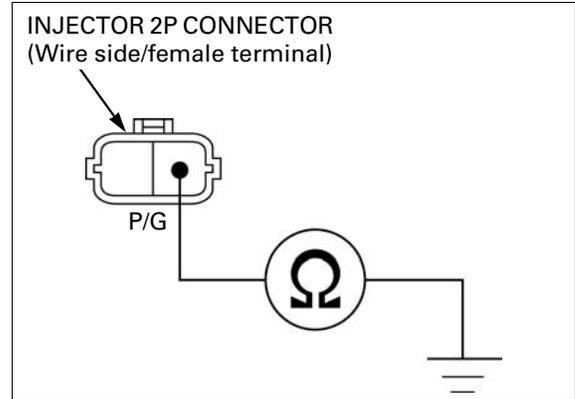
Check for continuity between the injector 2P connector of wire side and ground.

**Connection: Pink/green – Ground**

**Is there continuity?**

**YES** – Short circuit in Pink/green wire

**NO** – GO TO STEP 4.



### 4. Injector Resistance Inspection

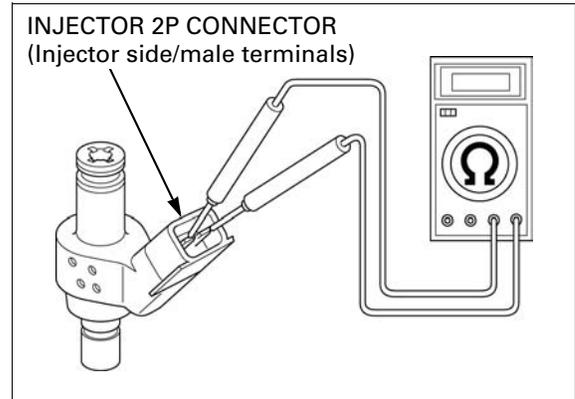
Measure the resistance between the injector 2P connector terminals.

**Standard: 9 – 12  $\Omega$  (20°C/68°F)**

**Is the resistance within 9 – 12  $\Omega$  (20°C/68°F)?**

**YES** – GO TO STEP 5.

**NO** – Faulty injector



### 5. Injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P connector.

Check the continuity at the Pink/green wire between the ECM 33P and injector 2P connectors.

**Connection: 16 (Pink/green) – Pink/green**

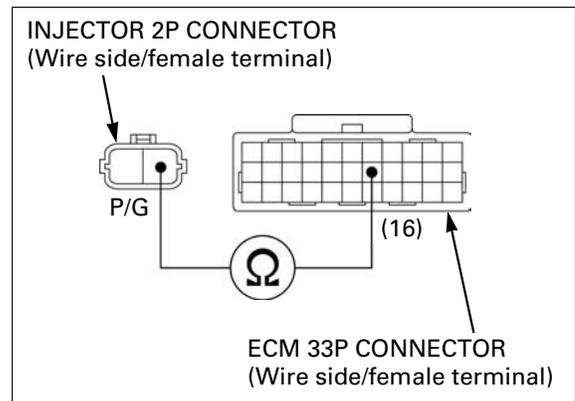
**TOOL:**

**Test probe 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Pink/green wire



**DTC 21-1 (O<sub>2</sub> SENSOR)**

**NOTICE**

- Do not get grease, oil or other materials in the O<sub>2</sub> sensor air hole.
- Do not reuse O<sub>2</sub> sensor cord, if the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one.
- Before starting the inspection, check for loose or poor contact on the O<sub>2</sub> sensor 2P connector or O<sub>2</sub> sensor cap and recheck the DTC.

**1. O<sub>2</sub> Sensor System Inspection**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and warm up the engine up to coolant temperature is 80°C (176°F).

Test-ride the motorcycle and check the O<sub>2</sub> sensor with the HDS pocket tester.

**Is the DTC 21-1 indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. O<sub>2</sub> Sensor Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the O<sub>2</sub> sensor 2P connector (page 7-5).

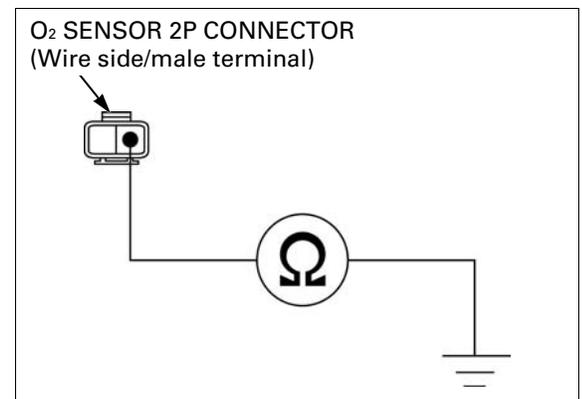
Check for continuity between the O<sub>2</sub> sensor 2P connector of the wire side and ground.

**Connection: Black/orange – Ground**

**Is there continuity?**

**YES** – Short circuit in Black/orange wire

**NO** – GO TO STEP 3.



**3. O<sub>2</sub> Sensor Open Circuit Inspection**

Disconnect the ECM 33P connector.

Check the continuity between the ECM 33P connector of the wire side and O<sub>2</sub> sensor 2P connector of the wire side.

**Connection: 3 (Black/orange) – Black/orange**

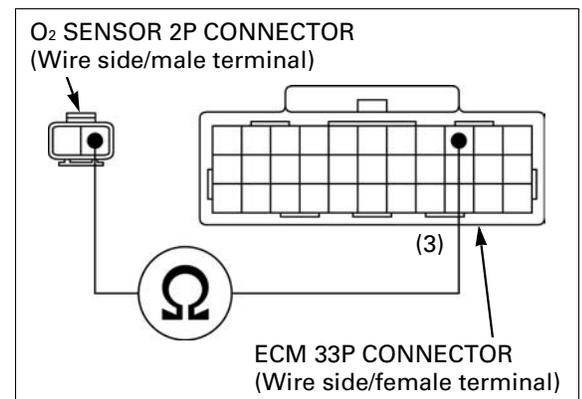
**TOOL:**

**Test probe** 07ZAJ-RDJA110

**Is there continuity?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Black/orange wire



## FUEL SYSTEM (PGM-FI)

### 4. O<sub>2</sub> Sensor Inspection

Replace the O<sub>2</sub> sensor and O<sub>2</sub> sensor cord with a known good one (page 5-67).  
Clear the DTC's (page 5-12).

Connect the O<sub>2</sub> sensor 2P connector and ECM 33P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and warm up the engine up to coolant temperature is 80°C (176°C).

Test-ride the motorcycle and recheck the O<sub>2</sub> sensor with the HDS pocket tester.

#### **Is the DTC 21-1 indicated?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty original O<sub>2</sub> sensor and/or O<sub>2</sub> sensor cord

### DTC 29-1 (IACV)

- Before starting the inspection, check for loose or poor contact on the IACV 4P connector and recheck the DTC.

#### 1. Recheck DTC

Clear the DTC's (page 5-12).

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the IACV with the HDS pocket tester.

#### **Is the DTC 29-1 indicated?**

**YES** – GO TO STEP 2.

**NO** –

- Intermittent failure
- Loose or poor contact on the IACV 4P connector

#### 2. IACV Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the IACV 4P connector.

Check for continuities between the IACV 4P connector of the wire side and ground.

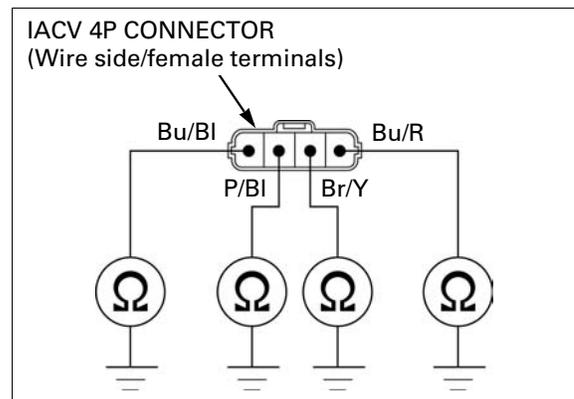
**Connection:** **Blue/black – Ground**  
**Pink/black – Ground**  
**Brown/yellow – Ground**  
**Blue/red – Ground**

#### **Is there continuity?**

**YES** –

- Short circuit in Blue/black or Pink/black wire
- Short circuit in Brown/yellow or Blue/red wire

**NO** – GO TO STEP 3.



**3. IACV Open Circuit Inspection**

Disconnect the ECM 33P connector.

Check the continuities between the ECM 33P and IACV 4P connectors of the wire side.

**Connection:**

- 20 (Pink/black) – Pink/black
- 21 (Blue/black) – Blue/black
- 31 (Brown/yellow) – Brown/yellow
- 32 (Blue/red) – Blue/red

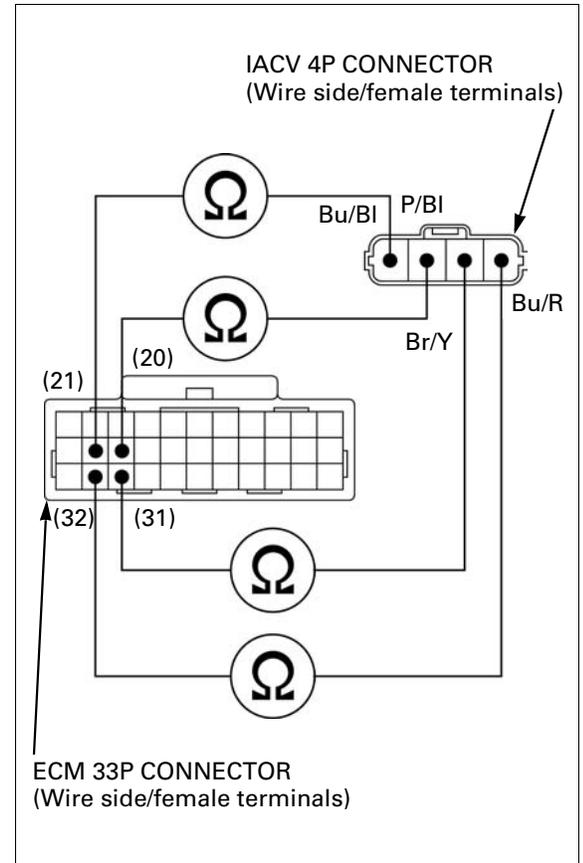
**TOOL:**

Test probe 07ZAJ-RDJA110

**Is there continuity?**

**YES** – GO TO STEP 4.

- NO** –
- Open circuit in Blue/black or Pink/black wire
  - Open circuit in Brown/yellow or Blue/red wire



**4. IACV Resistance Inspection**

Measure the resistance at the IACV 4P connector terminals.

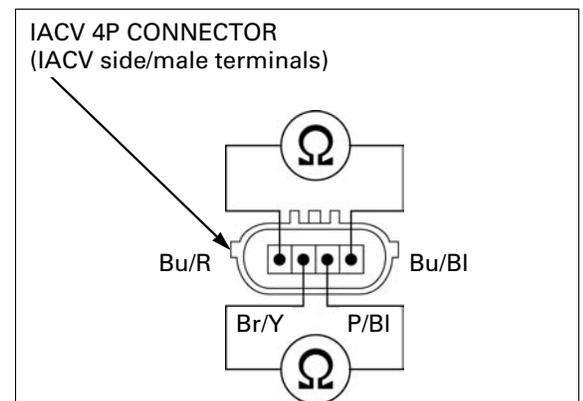
**Connection:** Blue/black – Blue/red  
Pink/black – Brown/yellow

**Standard:** 110 – 150 Ω (25°C/77°F)

**Is the resistance within 110 – 150 Ω (25°C/77°F)?**

**YES** – Replace the ECM with a good one, and recheck.

**NO** – Faulty IACV



**DTC 33-2 (EEPROM)**

**1. Recheck DTC**

Clear the DTC's (page 5-12).

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Recheck the ECM EEPROM.

**Is the DTC 33-2 indicated?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Intermittent failure

### DTC 54-1 (BANK ANGLE SENSOR LOW VOLTAGE)

#### 1. Recheck DTC

Clear the DTC's (page 5-12).

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Check the bank angle sensor with the HDS pocket tester.

**Is the DTC 54-1 indicated?**

**YES** – GO TO STEP 2.

**NO** –

- Intermittent failure
- Loose or poor contact on the bank angle sensor 3P connector

#### 2. Bank Angle Sensor Power Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the bank angle sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the bank angle sensor connector of the wire side.

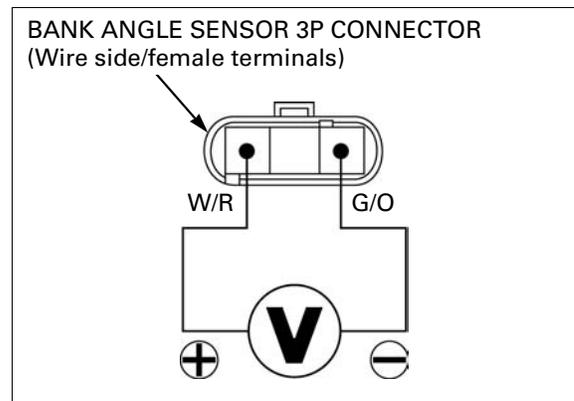
**Connection: White/red (+) – Green/orange (-)**

**Standard: 4.75 – 5.25 V**

**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.



#### 3. Bank Angle Sensor Input Voltage Line Short Circuit Inspection

Turn the ignition switch OFF.

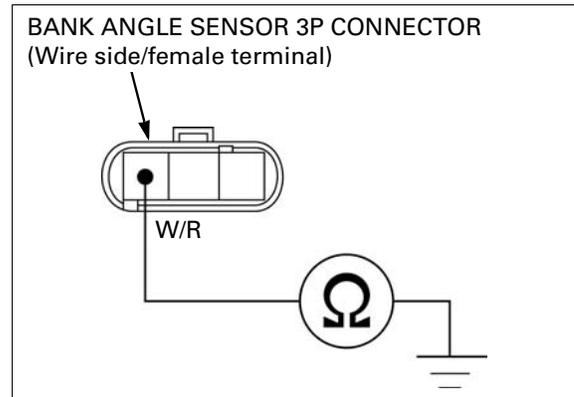
Check the continuity between the bank angle sensor 3P connector of the wire side and ground.

**Connection: White/red – Ground**

**Is there continuity?**

**YES** – Short circuit in White/red wire

**NO** – Replace the ECM with a known good one, and recheck.



**4. Bank Angle Sensor Output Line Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the ECM 33P connector.

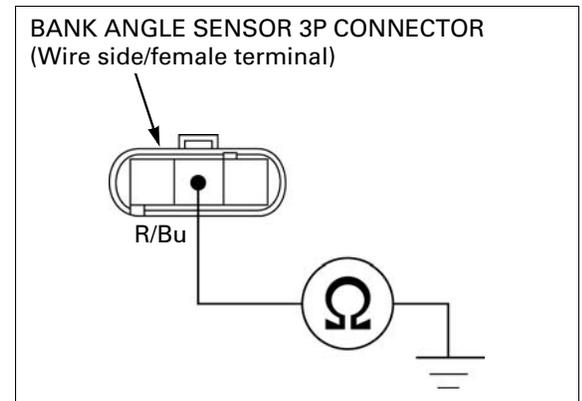
Check the continuity between the bank angle sensor 3P connector of the wire side and ground.

**Connection: Red/blue – Ground**

**Is there continuity?**

**YES** – Short circuit in Red/blue wire

**NO** – GO TO STEP 5.



**5. Bank Angle Sensor Inspection**

Replace the bank angle sensor with a known good one (page 5-63).

Clear the DTC's (page 5-12).

Connect the bank angle sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "Q": CM and U type).

Check the bank angle sensor with the HDS pocket tester.

**Is DTC 54-2 indicated?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty original bank angle sensor

**DTC 54-2 (BANK ANGLE SENSOR HIGH VOLTAGE)**

- Before starting the inspection, check for loose or poor contact on the bank angle sensor 3P connector and recheck the DTC.

**1. Recheck DTC**

Clear the DTC's (page 5-12).

Turn the ignition switch ON (and engine stop switch "Q": CM and U type).

Check the bank angle sensor with the HDS pocket tester.

**Is the DTC 54-2 indicated?**

**YES** – GO TO STEP 2.

**NO** –

- Intermittent failure
- Loose or poor contact on the bank angle sensor 3P connector

## FUEL SYSTEM (PGM-FI)

### 2. Bank Angle Sensor Power Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the bank angle sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the bank angle sensor connector of the wire side.

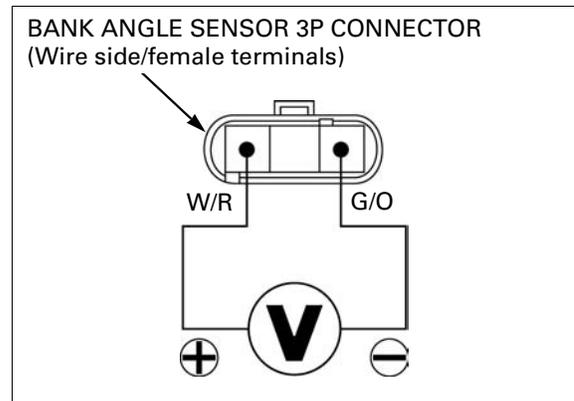
**Connection: White/red (+) – Green/orange (-)**

**Standard: 4.75 – 5.25 V**

**Is there within 4.75 – 5.25 V?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.



### 3. Bank Angle Sensor Input Voltage Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P connector.

Check the continuities between the ECM 33P and bank angle sensor 3P connectors.

**Connection: 6 (White/red) – White/red  
4 (Green/orange) – Green/orange**

**TOOL:**

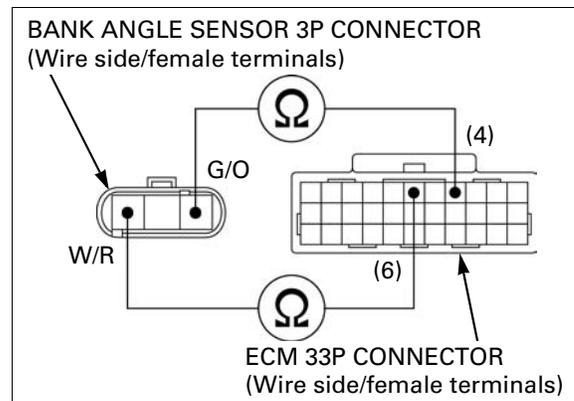
**Test probe 07ZAJ-RDJA110**

**Are there continuities?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** –

- Open circuit in White/red wire
- Open circuit in Green/orange wire



### 4. Bank Angle Sensor Output Line Open Circuit Inspection

Turn the ignition switch OFF.

Disconnect the ECM 33P connector.

Check the continuity between the ECM 33P and bank angle sensor 3P connectors.

**Connection: 26 (Red/blue) – Red/blue**

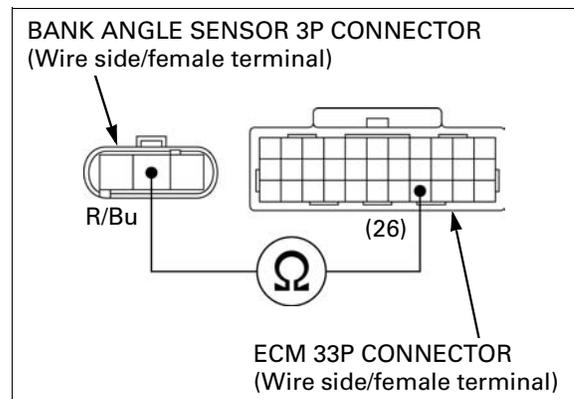
**TOOL:**

**Test probe 07ZAJ-RDJA110**

**Is there continuity?**

**YES** – Inspect the bank angle sensor (page 5-64).

**NO** – Open circuit in Red/blue wire



# MIL TROUBLESHOOTING

## MIL 1 BLINK (MAP SENSOR)

### 1. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-16).

**Is the sensor unit power line normal?**

**YES** – GO TO STEP 2.

**NO** – Replace or repair of the abnormal circuit.

### 2. MAP Sensor Output Voltage Inspection

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the test harness terminals.

**Connection:** 27 (+) – 4 (–)

**Standard:** 2.6 – 3.2 V (20°C/68°F)

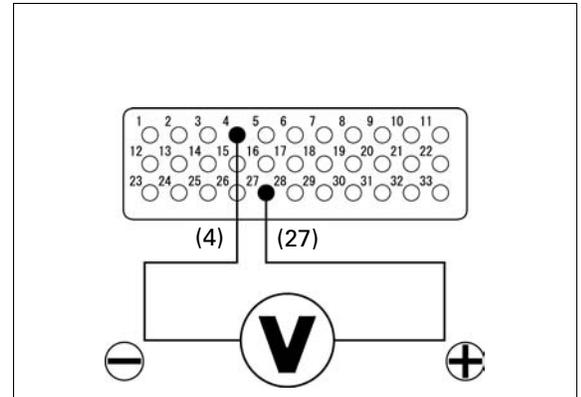
**Is the voltage within 2.6 – 3.2 V (20°C/68°F)?**

**YES** –

- Intermittent failure
- Loose or poor contact on the ECM connector

**NO** –

- About 5 V: GO TO STEP 3.
- About 0 V: GO TO STEP 4.



### 3. MAP Sensor Output Line Open Circuit Inspection 1

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the sensor unit 5P connector of the wire side.

**Connection:**

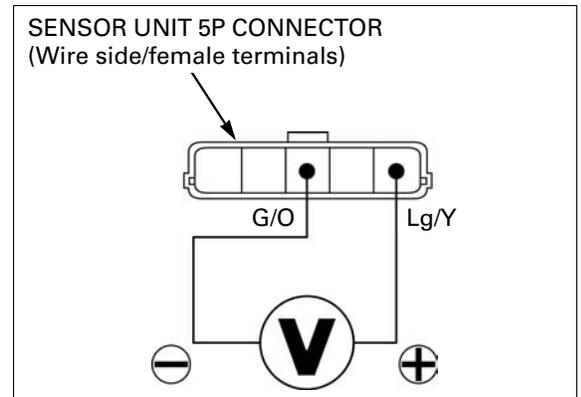
Light green/yellow (+) – Green/orange (–)

**Standard:** 3.80 – 5.25 V

**Is the voltage within 3.80 – 5.25 V?**

**YES** – Faulty sensor unit (MAP sensor)

**NO** – Open circuit in Light green/yellow wire



### 4. MAP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

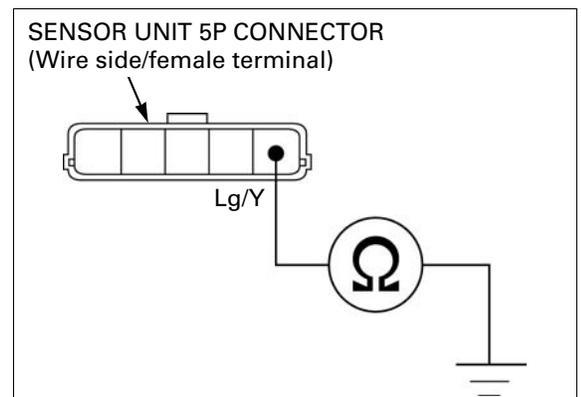
Check for continuity between the sensor unit 5P connector terminal of the wire side and ground.

**Connection:** Light green/yellow – Ground

**Is there continuity?**

**YES** – Short circuit in Light green/yellow wire

**NO** – GO TO STEP 5.



## 5. MAP Sensor Output Line Open Circuit Inspection 2

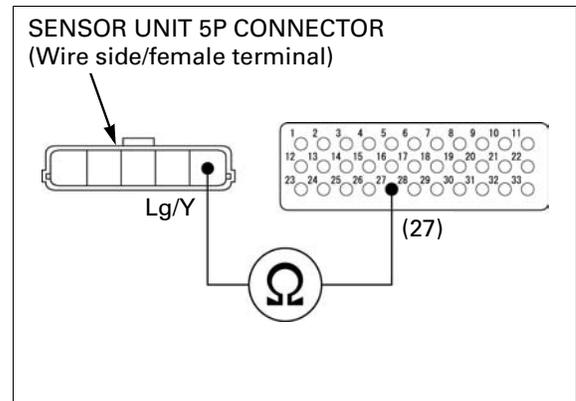
Check the continuity between the ECM test harness and sensor unit 5P connector of the wire side.

**Connection:** 27 – Light green/yellow

**Is there continuity?**

**YES** – Faulty sensor unit (MAP sensor)

**NO** – Open circuit in Light green/yellow wire



## MIL 7 BLINKS (ECT SENSOR)

- Before starting the inspection, check for loose or poor contact on the ECT sensor 3P connector and recheck the MIL blinking.

### 1. ECT Sensor Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the ECT sensor connector of the wire side and ground.

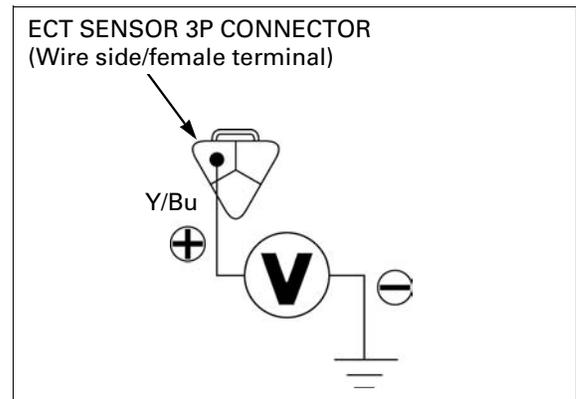
**Connection:** Yellow/blue (+) – Ground (-)

**Standard:** 4.75 – 5.25 V

**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 3.

**NO** – GO TO STEP 2.



### 2. ECT Sensor Short Circuit Inspection

Turn the ignition switch OFF.

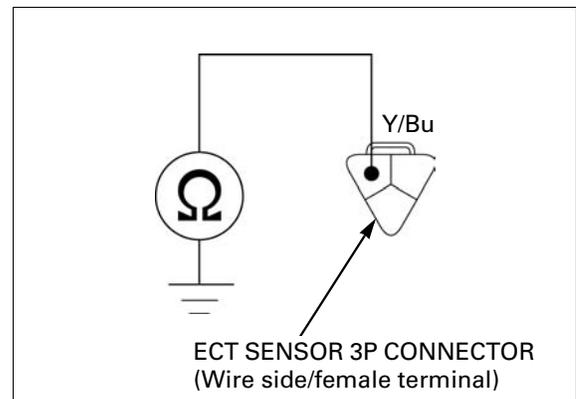
Check for continuity between the ECT sensor connector of the wire side and ground.

**Connection:** Yellow/blue – Ground

**Is there continuity?**

**YES** – Short circuit in Yellow/blue wire

**NO** – GO TO STEP 3.



**3. ECT Sensor Resistance Inspection**

Turn the ignition switch OFF.

Measure the resistance at the ECT sensor terminals.

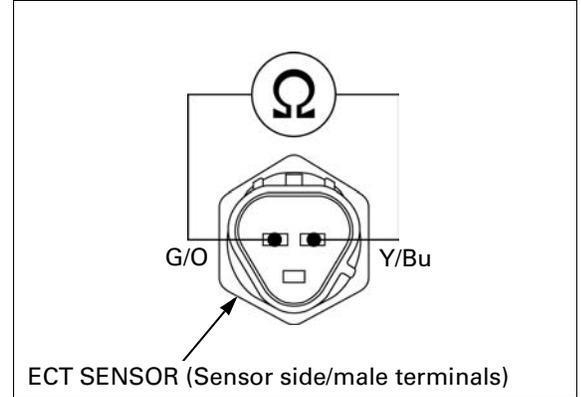
**Connection:** Yellow/blue – Green/orange

**Standard:** 2.3 – 2.6 k $\Omega$  (20°C/68°F)

**Is the resistance within 2.3 – 2.6 k $\Omega$  (20°C/68°F)?**

**YES** – GO TO STEP 4.

**NO** – Faulty ECT sensor



**4. ECT Sensor Open Circuit Inspection**

Connect the ECM test harness to ECM 33P connector (page 5-13).

Check the continuities between the ECM test harness and ECT 3P sensor connector of the wire side.

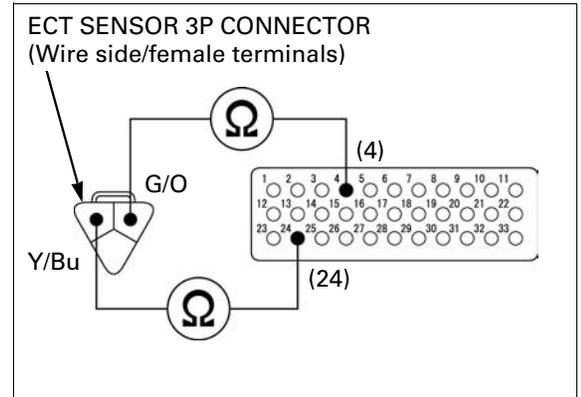
**Connection:** 24 – Yellow/blue  
4 – Green/orange

**Are there continuities?**

**YES** – GO TO STEP 5.

**NO** –

- Open circuit in Yellow/blue wire
- Open circuit in Green/orange wire



**5. ECT Sensor Output Voltage Inspection**

Connect the ECT sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the ECM test harness terminals.

**Connection:** 24 (+) – 4 (-)

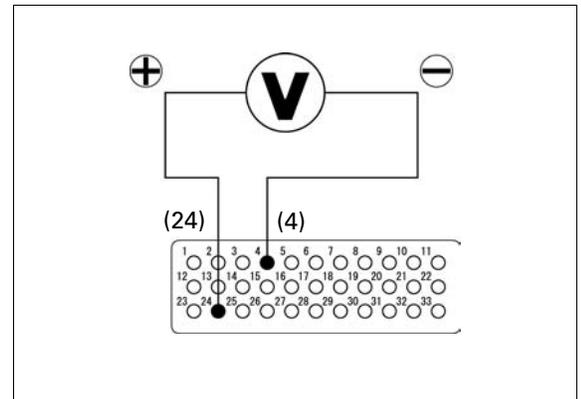
**Standard:** 2.7 – 3.1 V (20°C/68°F)

**Is the voltage within 2.7 – 3.1 V (20°C/68°F)?**

**YES** –

- Loose or poor contact on the ECM connector
- Intermittent failure

**NO** – Replace the ECM with a known good one, and recheck.



## MIL 8 BLINKS (TP SENSOR)

### 1. Sensor Unit Power Line Inspection

Check the sensor unit power line inspection (page 5-16).

*Is the sensor unit power line normal?*

**YES** – GO TO STEP 2.

**NO** – Replace or repair the abnormal circuit.

### 2. TP Sensor Output Voltage

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the TP sensor output voltage at the ECM test harness terminals.

**Connection: 5 (+) – 4 (-)**

**Standard:**

**0.29 – 0.71 V (throttle fully closed)**

**4.13 – 4.76 V (throttle fully opened)**

*Is there standard voltage?*

**YES** –

- Intermittent failure
- Loose or poor contact on the ECM 33P connector

**NO** – GO TO STEP 3.

### 3. TP Sensor Output Line Short Circuit Inspection

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

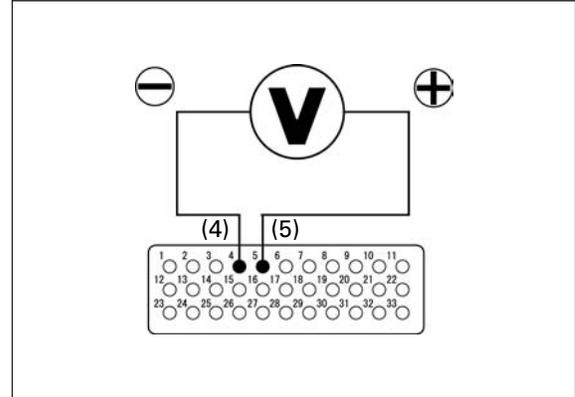
Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection: Yellow/black – Ground**

*Is there continuity?*

**YES** – Short circuit in Yellow/black wire

**NO** – GO TO STEP 4.



### 4. TP Sensor Voltage Input Line Open Circuit Inspection

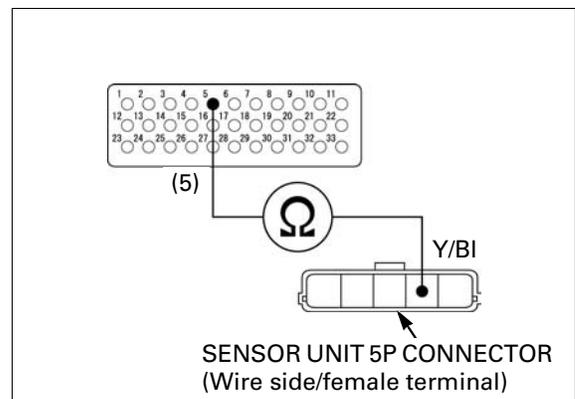
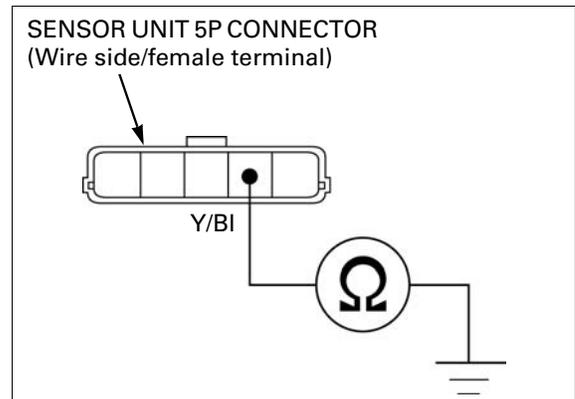
Check for continuity between the sensor unit 5P connector of the wire side and ECM test harness.

**Connection: 5 – Yellow/black**

*Is there continuity?*

**YES** – Faulty sensor unit (TP sensor)

**NO** – Open circuit in Yellow/black wire



**MIL 9 BLINKS (IAT SENSOR)**

**1. Sensor Unit Power Line Inspection**

Check the sensor unit power line inspection (page 5-16).

*Is the sensor unit power line normal?*

**YES** – GO TO STEP 2.

**NO** – Replace or repair the abnormal circuit.

**2. IAT Sensor Output Voltage Inspection 1**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the ECM test harness terminals.

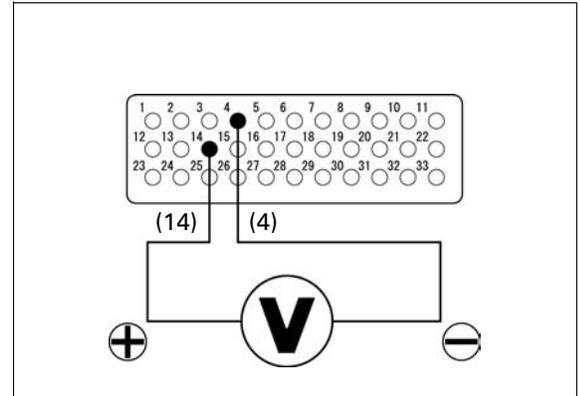
**Connection:** 14 (+) – 4 (-)

**Standard:** 2.7 – 3.1 V (20°C/68°F)

*Is the voltage within 2.7 – 3.1 V (20°C/68°F)?*

- YES** –
- Intermittent failure
  - Loose or poor contact on the ECM 33P connector

**NO** – GO TO STEP 3.



**3. IAT Sensor Output Voltage Inspection 2**

Turn the ignition switch OFF.

Disconnect the sensor unit 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the sensor unit 5P connector of the wire side.

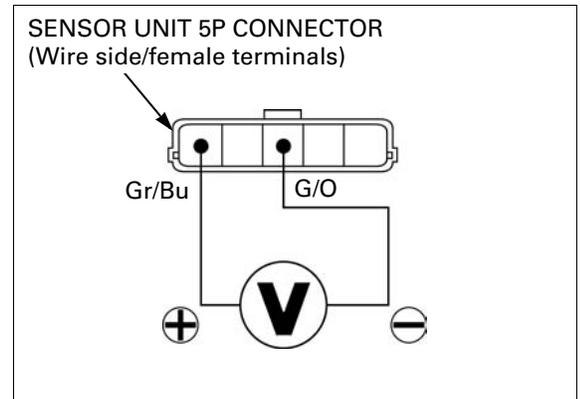
**Connection:** Gray/blue (+) – Green/orange (-)

**Standard:** 4.75 – 5.25 V

*Is the voltage within 4.75 – 5.25 V?*

**YES** – GO TO STEP 6.

**NO** – GO TO STEP 4.



**4. IAT Sensor Voltage Input Line Short Circuit Inspection**

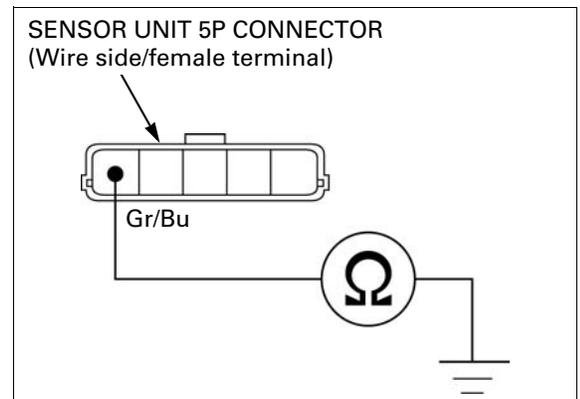
Check for continuity between the sensor unit 5P connector of the wire side and ground.

**Connection:** Gray/blue – Ground

*Is there continuity?*

**YES** – Short circuit in Gray/blue wire

**NO** – GO TO STEP 5.



## FUEL SYSTEM (PGM-FI)

### 5. IAT Sensor Voltage Input Line Open Circuit Inspection

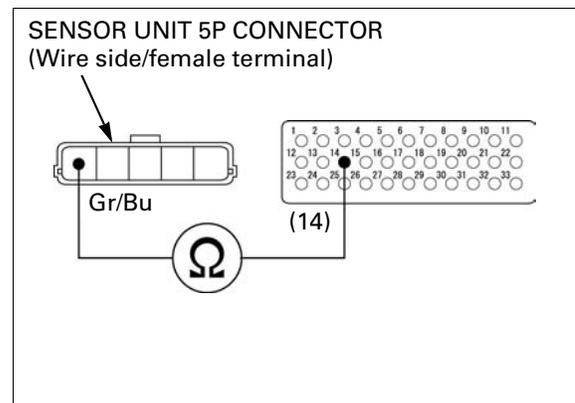
Check for continuity at the Gray/blue wire between the sensor unit 5P connector of the wire side and ECM test harness.

**Connection:** 14 – Gray/blue

**Is there continuity?**

**YES** – GO TO STEP 6.

**NO** – Open circuit in Gray/blue wire



### 6. IAT Sensor Resistance Inspection

Turn the ignition switch OFF.

Connect the sensor unit 5P connector.

Measure the resistance at the ECM test harness terminals (at 20°C/68°F).

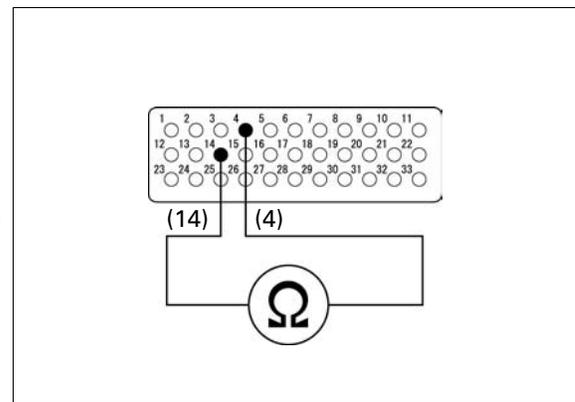
**Connection:** 14 – 4

**Standard:** 1.13 – 1.88 kΩ (20°C/68°F)

**Is the resistance within 1.13 – 1.88 kΩ (20°C/68°F)?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty sensor unit (IAT sensor)



## MIL 12 BLINKS (INJECTOR)

- Before starting the inspection, check for loose or poor contact on the injector 2P connector and recheck the MIL blinking.

### 1. Injector Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the injector 2P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage between the injector 2P connector of the wire side and ground.

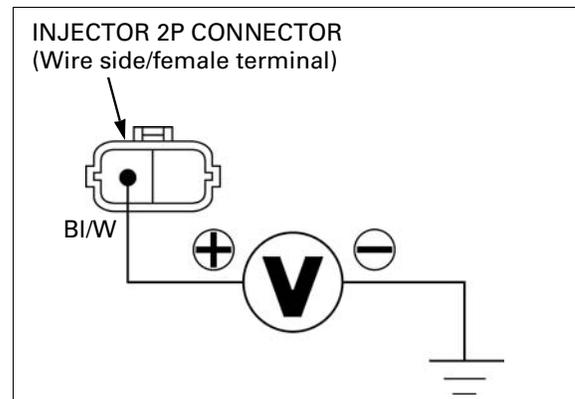
**Connection:** Black/white (+) – Ground (-)

**Standard:** Battery voltage

**Does the standard voltage exist?**

**YES** – GO TO STEP 2.

**NO** – Open or short circuit in Black/white wire



**2. Injector Signal Line Short Circuit Inspection**

Turn the ignition switch OFF.

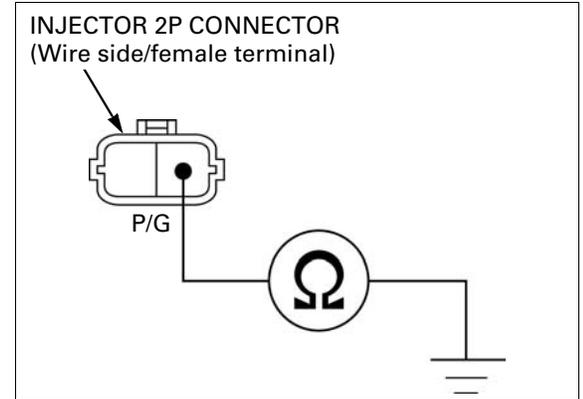
Check for continuity between the injector 2P connector of the wire side and ground.

**Connection: Pink/green – Ground**

*Is there continuity?*

**YES** – Short circuit in Pink/green wire

**NO** – GO TO STEP 3.



**3. Injector Resistance Inspection**

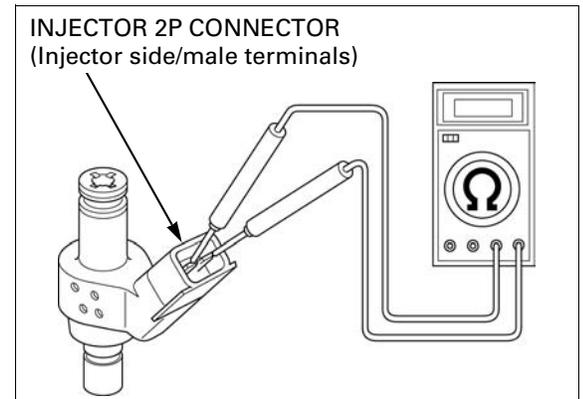
Measure the resistance between the injector 2P connector terminals.

**Standard: 9 – 12 Ω (20°C/68°F)**

*Is the resistance within 9 – 12 Ω (20°C/68°F)?*

**YES** – GO TO STEP 4.

**NO** – Faulty injector



**4. Injector Signal Line Open Circuit Inspection**

Connect the ECM test harness to the ECM 33P connector.

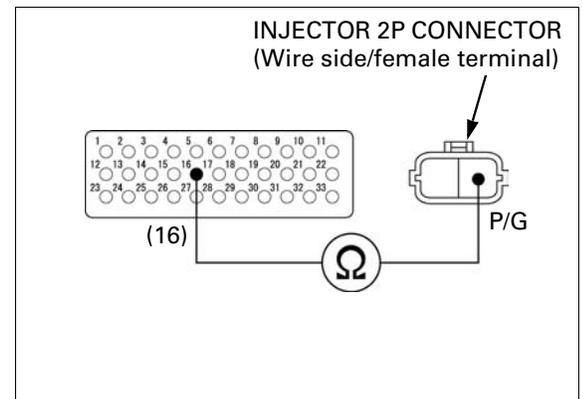
Check the continuity between the ECM test harness and injector 2P connector of the wire side.

**Connection: 16 – Pink/green**

*Is there continuity?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Pink/green wire



MIL 21 BLINKS (O<sub>2</sub> SENSOR)

**NOTICE**

- Do not get grease, oil or other materials in the O<sub>2</sub> sensor air hole.
- Do not reuse O<sub>2</sub> sensor cord, if the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one.
- Before starting the inspection, check for loose or poor contact on the O<sub>2</sub> sensor 2P connector or O<sub>2</sub> sensor cap and recheck the MIL blinking.

**1. O<sub>2</sub> Sensor System Inspection**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and warm up the engine up to coolant temperature is 80°C (176°F).

Test-ride the motorcycle and recheck the MIL blinking.

**Does the MIL blink 21 times?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. O<sub>2</sub> Sensor Short Circuit Inspection**

Turn the ignition switch OFF.

Disconnect the O<sub>2</sub> sensor 2P connector (page 7-5).

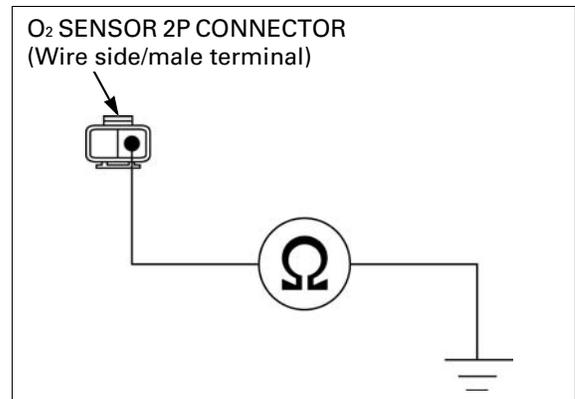
Check for continuity between the O<sub>2</sub> sensor 2P connector of the wire side and ground.

**Connection: Black/orange – Ground**

**Is there continuity?**

**YES** – Short circuit in Black/orange wire

**NO** – GO TO STEP 3.



**3. O<sub>2</sub> Sensor Open Circuit Inspection**

Connect the ECM test harness to the ECM 33P connector.

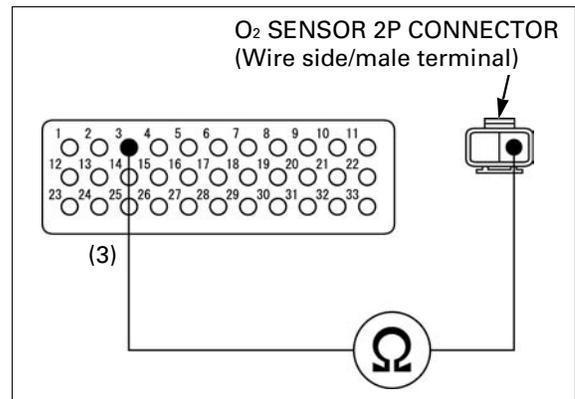
Check the continuity between the ECM test harness and O<sub>2</sub> sensor 2P connector of the wire side.

**Connection: 3 – Black/orange**

**Is there continuity?**

**YES** – GO TO STEP 4.

**NO** – Open circuit in Black/orange wire



**4. O<sub>2</sub> Sensor Inspection**

Replace the O<sub>2</sub> sensor and O<sub>2</sub> sensor cord with a known good one (page 5-67).

Disconnect the ECM test harness and connect the ECM 33P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and warm up the engine up to coolant temperature is 80°C (176°F).

Test-ride the motorcycle and recheck the MIL blinking.

**Does the MIL blink 21 times?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Faulty original O<sub>2</sub> sensor and/or O<sub>2</sub> sensor cord

**MIL 29 BLINKS (IACV)**

- Before starting the inspection, check for loose or poor contact on the IACV 4P connector and recheck the MIL blinking.

**1. IACV Resistance Inspection**

Turn the ignition switch OFF.

Disconnect the IACV 4P connector.

Measure the resistance at the IACV 4P connector terminals.

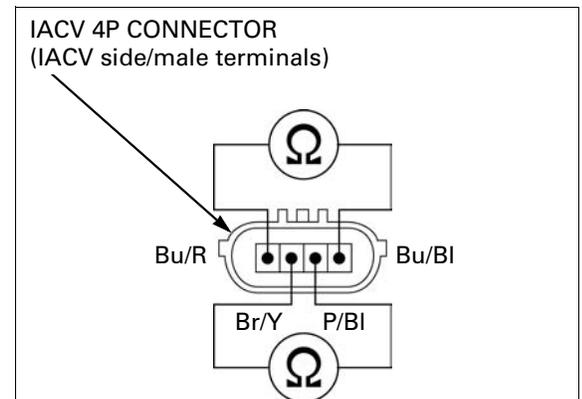
**Connection: Blue/black – Blue/red  
Pink/black – Brown/yellow**

**Standard: 110 – 150 Ω (25°C/77°F)**

**Is the resistance within 110 – 150 Ω (25°C/77°F)?**

**YES** – GO TO STEP 2.

**NO** – Faulty IACV



**2. IACV Short Circuit Inspection**

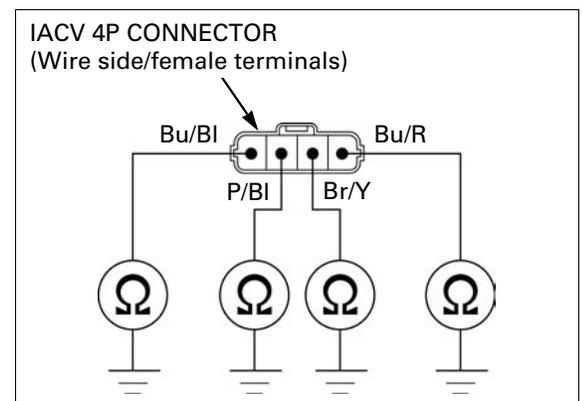
Check for continuities between the IACV 4P connector of the wire side and ground.

**Connection: Blue/black – Ground  
Pink/black – Ground  
Brown/yellow – Ground  
Blue/red – Ground**

**Is there continuity?**

- YES** –
- Short circuit in Blue/black or Pink/black wire
  - Short circuit in Brown/yellow or Blue/red wire

**NO** – GO TO STEP 3.



## FUEL SYSTEM (PGM-FI)

### 3. IACV Open Circuit Inspection

Connect the ECM test harness to ECM 33P connector.

Check the continuities between the ECM test harness and IACV 4P connector of the wire side.

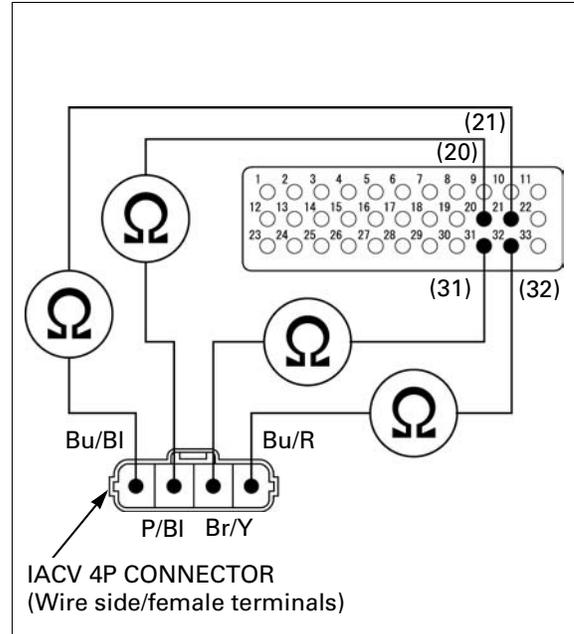
**Connection:** 20 – Pink/black  
21 – Blue/black  
31 – Brown/yellow  
32 – Blue/red

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck.

**NO** –

- Open circuit in Blue/black or Pink/black wire
- Open circuit in Brown/yellow or Blue/red wire



### MIL 54 BLINKS (BANK ANGLE SENSOR)

- Before starting the inspection, check for loose or poor contact on the bank angle sensor 3P connector and recheck the MIL blinking.

#### 1. Bank Angle Sensor Power Input Voltage Inspection

Turn the ignition switch OFF.

Disconnect the bank angle sensor 3P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

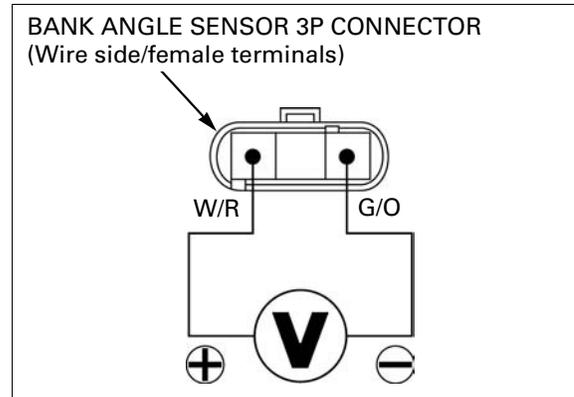
Measure the voltage at the bank angle sensor connector of the wire side.

**Connection:** White/red (+) – Green/orange (-)  
**Standard:** 4.75 – 5.25 V

**Is there within 4.75 – 5.25 V?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 2.



#### 2. Bank Angle Sensor Input Voltage Line Short Circuit Inspection

Turn the ignition switch OFF.

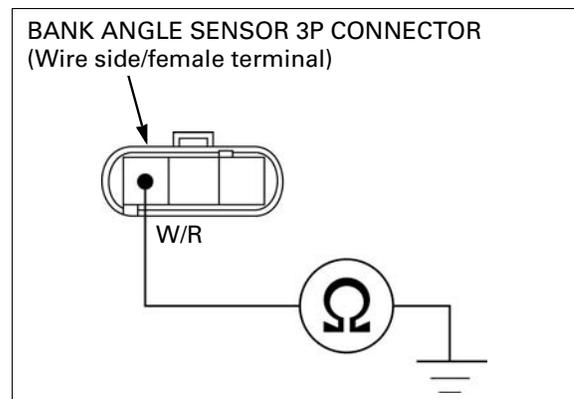
Check the continuity between the bank angle sensor 3P connector of the wire side and ground.

**Connection:** White/red – Ground

**Is there continuity?**

**YES** – GO TO STEP 3.

**NO** – Short circuit in White/red wire



**3. Bank Angle Sensor Input Voltage Line Open Circuit Inspection**

Connect the ECM test harness to the ECM 33P connector.

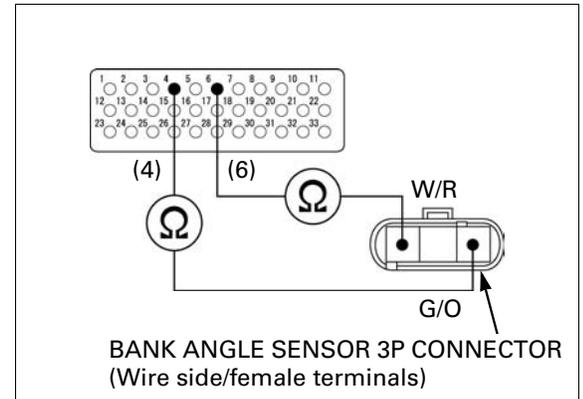
Check the continuities between the ECM test harness and bank angle sensor 3P connector of the wire side.

**Connection: 6 – White/red  
4 – Green/orange**

*Is there continuity?*

**YES** – Replace the ECM with a known good one, and recheck.

**NO** – • Open circuit in White/red wire  
• Open circuit in Green/orange wire



**4. Bank Angle Sensor Output Line Short Circuit Inspection**

Turn the ignition switch OFF.

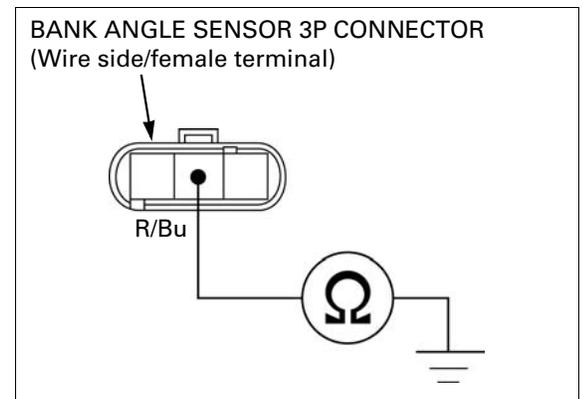
Check the continuity between the bank angle sensor 3P connector of the wire side and ground.

**Connection: Red/blue – Ground**

*Is there continuity?*

**YES** – Short circuit in Red/blue wire

**NO** – GO TO STEP 5.



**5. Bank Angle Sensor Output Line Open Circuit Inspection**

Connect the ECM test harness to the ECM 33P connector.

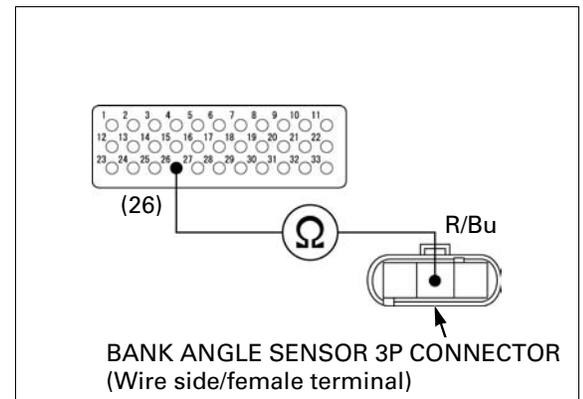
Check the continuity between the ECM test harness and bank angle sensor 3P connector of the wire side.

**Connection: 26 – Red/blue**

*Is there continuity?*

**YES** – Open circuit in Red/blue wire

**NO** – Inspect the bank angle sensor (page 5-65).



## FUEL SYSTEM (PGM-FI)

### MIL CIRCUIT TROUBLESHOOTING

If the engine can be started but the MIL does not come on when the ignition switch is turned ON (and engine stop switch "O": CM and U type), check as follows:

Check for the combination meter function.

NOTE:

- If it does not function, check the combination meter power input line (page 19-11).
- If it functions properly, check as follows:

Turn the ignition switch OFF.

Lift and support the fuel tank (page 3-6).

Open the rubber sheet (page 6-10).

Disconnect the ECM 33P connector.

Ground the White/blue wire terminal of the wire harness side ECM 33P connector with a jumper wire.

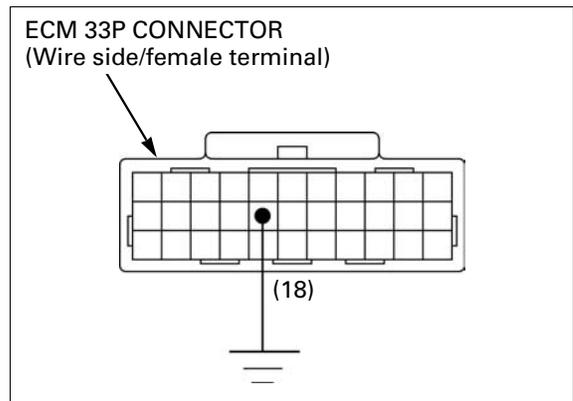
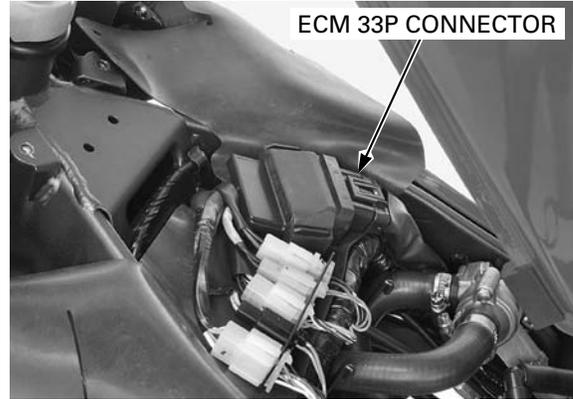
**Connection: 18 (White/black) – Ground**

TOOL:

**Test probe 07ZAJ-RDJA110**

Turn the ignition switch ON (and engine stop switch "O": CM and U type) the MIL should come on.

- If the MIL comes on, replace the ECM with a known good one and recheck the MIL indication.
  - If the MIL does not come on, check for open circuit in the White/black wire between the MIL and ECM 33P connector.
- If the wire is OK, replace the combination meter.



### FUEL LINE INSPECTION

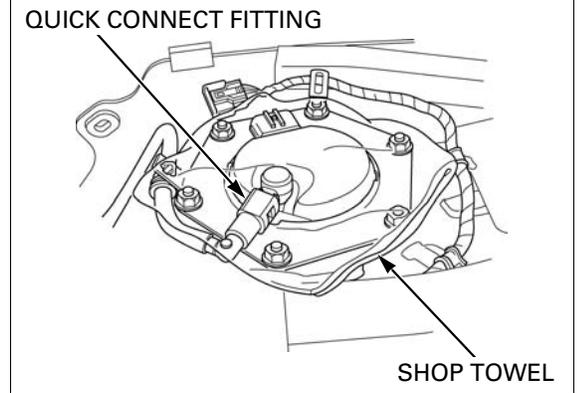
#### FUEL PRESSURE RELIEVING/QUICK CONNECT FITTING REMOVAL

- Do not bend or twist fuel feed hose.
  - Before disconnecting fuel feed hose, relieve pressure from the system as follows.
1. Turn the ignition switch OFF.
  2. Lift and support the fuel tank (page 3-6).
  3. Disconnect the fuel pump 5P (Natural) connector. Turn the ignition switch ON (and engine stop switch "O": CM and U type).
  4. Start the engine, and let it idle until the engine stalls.
  5. Turn the ignition switch OFF.
  6. Disconnect the battery negative (-) cable (page 16-5).



7. Check the fuel quick connect fitting for dirt, and clean if necessary.

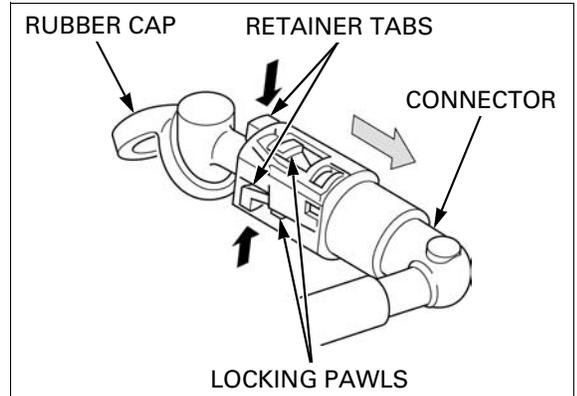
Place a shop towel over the quick connect fitting.



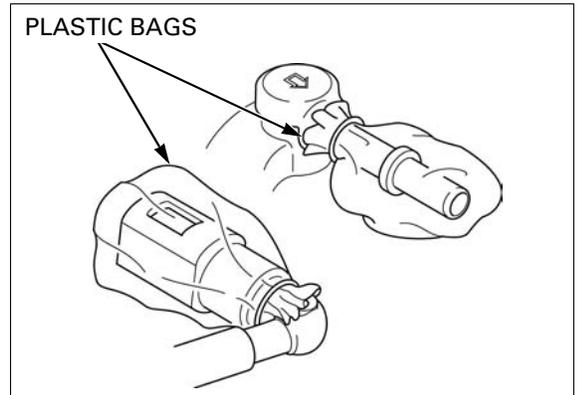
8. Pull and release the rubber cap from the retainer.
9. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls. Pull the connector off and remove the retainer.

**NOTE:**

- Absorb the remaining fuel in the fuel feed hose from flowing out with a shop towel.
- Be careful not to damage the hose or other parts.
- Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.



10. To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.



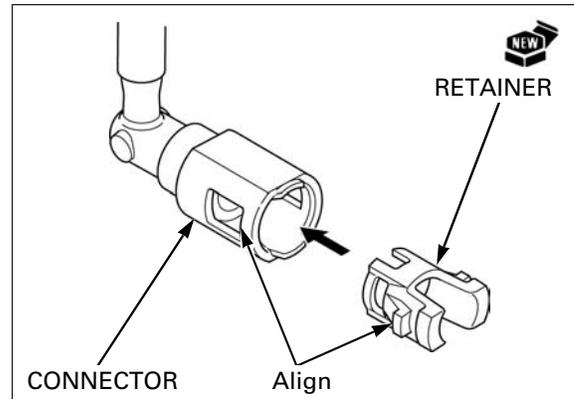
### QUICK CONNECT FITTING INSTALLATION

- Always replace the retainer of the quick connect fitting when the fuel feed hose is disconnected.
- If any retainer needs replacing, use the same manufacturer's retainer as the ones being removed (The various manufactures feature different retainer specifications).
- If any damage or cut-out on the rubber cap or connector damper, replace it with a new one.
- Do not bent or twist fuel feed hose.

1. Insert a new retainer into the connector.

**NOTE:**

- Align new retainer locking pawls with the connector grooves.

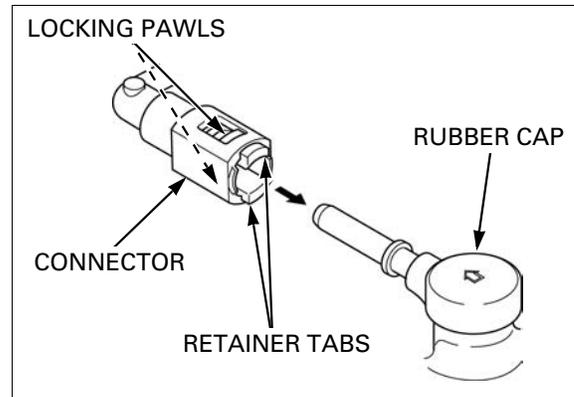


2. Set the rubber cap as shown.

Then press the quick connect fitting onto the pipe until both retainer pawls lock with a "CLICK".

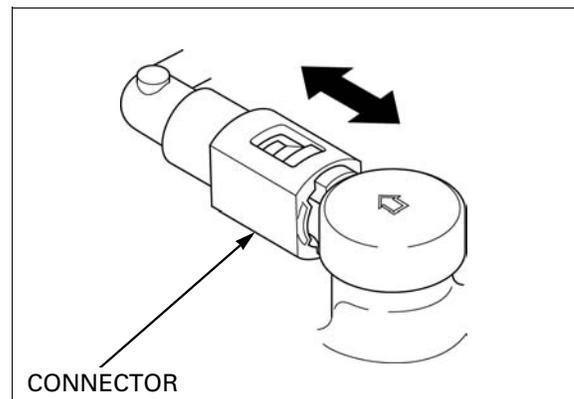
**NOTE:**

- Align the quick connect fitting with the pipe.  
If it is hard to connect, put a small amount of engine oil on the pipe end.



3. Make sure the connection is secure and that the pawls are firmly locked into place; check visually and by pulling the connector.

4. Make sure the rubber cap is in place (between the retainer tabs).



5. Connect the fuel pump 5P (Natural) connector.  
Connect the battery negative (-) cable (page 16-5).
6. Turn the ignition switch ON (and engine stop switch "O": CM and U type).

**NOTE:**

- Do not start the engine.  
The fuel pump will run for about 2 seconds, and fuel pressure will rise.  
Repeat 2 or 3 times, and check that there is no leakage in the fuel supply system.  
Turn the ignition switch OFF.  
Remove the suitable support and close the fuel tank (page 3-6).



### FUEL PRESSURE TEST

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-44).

Attach the fuel pressure gauge, attachments and manifold.

**TOOLS:**

- |   |                      |
|---|----------------------|
| <b>(1): Fuel pressure gauge</b>         | <b>07406-0040004</b> |
| <b>(2): Pressure gauge manifold</b>     | <b>07ZAJ-S5A0111</b> |
| <b>(3): Hose attachment, 9 mm/9 mm</b>  | <b>07ZAJ-S5A0120</b> |
| <b>(4): Hose attachment, 6 mm/9 mm</b>  | <b>07ZAJ-S5A0130</b> |
| <b>(5): Attachment joint, 6 mm/9 mm</b> | <b>07ZAJ-S5A0150</b> |

Temporarily connect the battery negative (-) cable and fuel pump 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and let it idle.  
Read the fuel pressure.

**Standard: 294 kPa (3.0 kgf/cm<sup>2</sup>, 43 psi)**

If the fuel pressure is higher than specified, replace the fuel pump assembly.

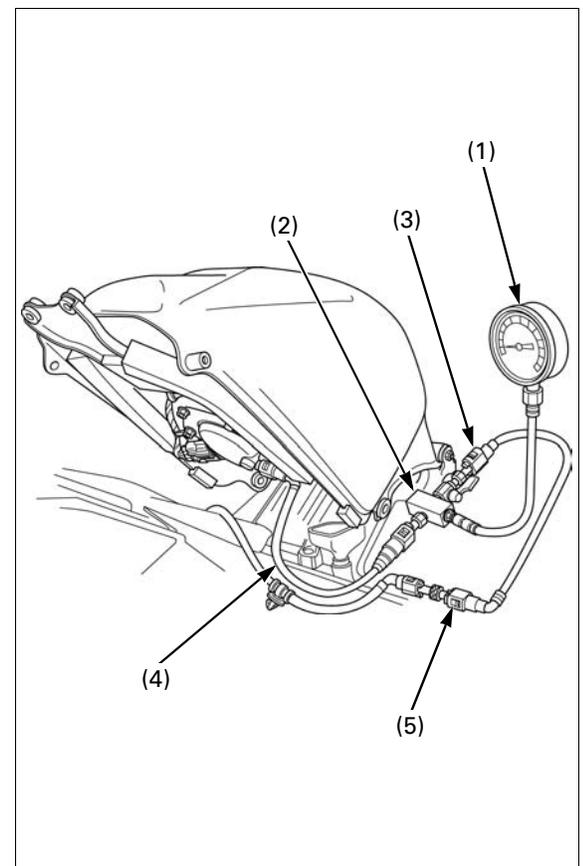
If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Pinched or clogged fuel feed hose or fuel tank breather hose
- Fuel pump unit (page 5-48)
- Clogged fuel filter (Assembly of the fuel pump unit: page 5-49)

After inspection, relieve the fuel pressure (page 5-44).

Remove the fuel pressure gauge, attachment and manifold from the fuel pump.

Connect the quick connect fitting (page 5-46).



## FUEL SYSTEM (PGM-FI)

### FUEL FLOW INSPECTION

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-44).

*Wipe off spilled out gasoline.*

Connect the special tool to the fuel pump joint.

**TOOL:**

**Hose attachment, 6 mm/9 mm 07ZAJ-S5A0130**

Place the end of the hose into an approved gasoline container.

Temporarily connect the battery negative (-) cable and fuel pump 5P connector.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the amount of fuel flow.

**NOTE:**

- The fuel pump operates for 2 seconds. Repeat 5 times so that the total measuring time.
- Return fuel to the fuel tank when the first fuel is flowed.

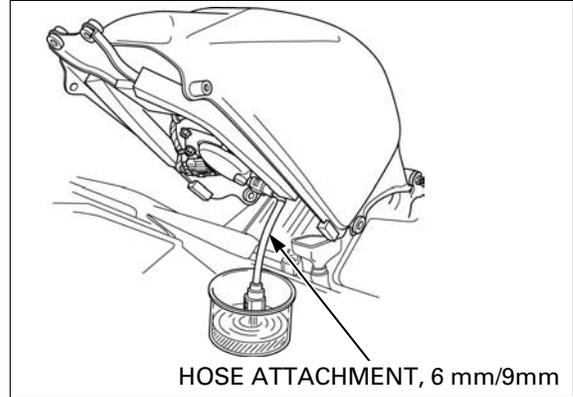
**Amount of fuel flow:**

**13.9 cm<sup>3</sup> (0.47 US oz, 0.49 Imp oz) minimum/10 seconds at 12 V**

If fuel flow is less than specified, inspect the following:

- Fuel pump unit (page 5-48)
- Clogged fuel filter (Assembly of the fuel pump unit)

Connect the quick connect fitting (page 5-46).



## FUEL PUMP UNIT

### INSPECTION

Turn the ignition switch ON (and engine stop switch "O": CM and U type) and confirm that the fuel pump operates for 2 seconds.

If the fuel pump does not operate, inspect as follows:

Turn the ignition switch OFF.

Lift and support the fuel tank (page 3-6).

Disconnect the fuel pump 5P (Natural) connector.



Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the fuel pump 5P (Natural) connector terminals of the wire side.

**Connection:** Black/white (+) – Brown/white (-)

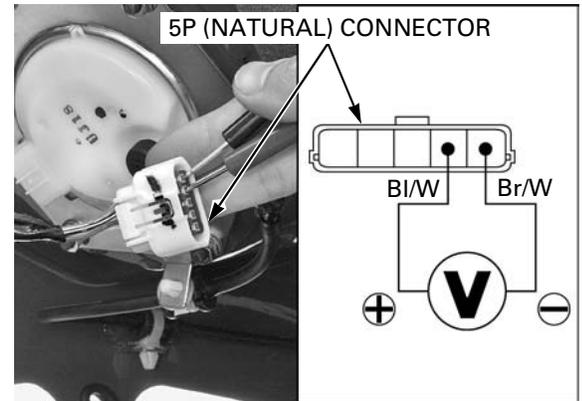
**Standard:** Battery voltage

There should be standard voltage for a few seconds.

If there is standard voltage, replace the fuel pump unit.

If there is no standard voltage, inspect the following:

- Main fuse 30 A
- Sub fuse 10 A
- Ignition switch
- Engine stop switch (CM and U type)
- Open circuit in Black/white or Brown/white wire
- ECM (page 5-66)



### REMOVAL

- Do not disassemble the fuel pump.

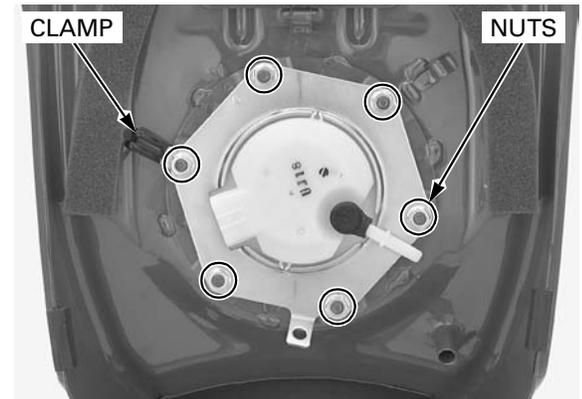
Clean around the fuel pump.

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-44).

Remove the fuel tank (page 5-51).

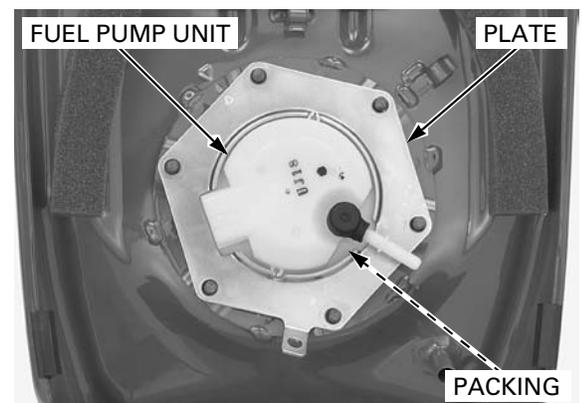
Loosen the fuel pump setting plate nuts in a criss-cross pattern in 2 or 3 steps.

Remove the nuts and clamp.



*Be careful not to damage the fuel level sensor float arm.*

Remove the setting plate, fuel pump unit and packing.



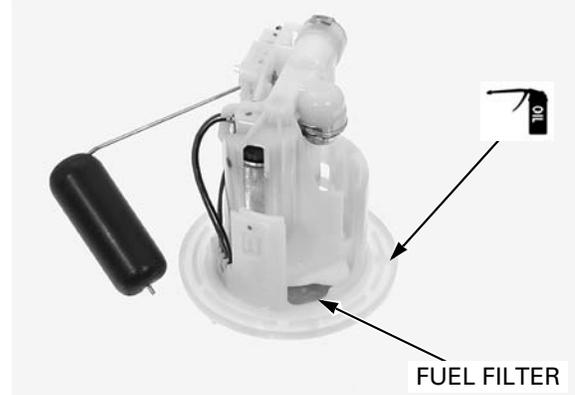
## FUEL SYSTEM (PGM-FI)

### INSPECTION

Check the fuel pump unit for wear or damage, replace it if necessary.

Check the fuel filter for wear or damage.

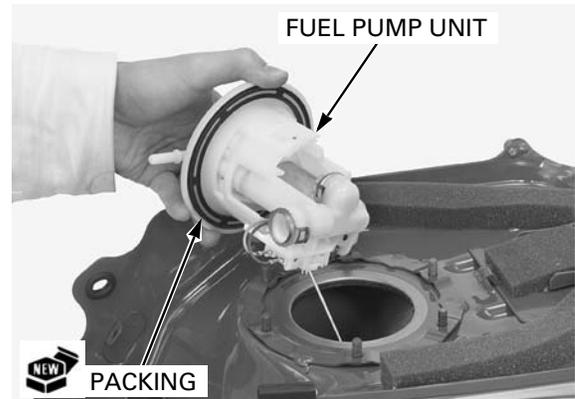
Apply engine oil to the fuel tank contacting area of the fuel pump.



### INSTALLATION

*Always replace the packing with a new one. Be careful not to pinch the dirt and debris between the fuel pump unit and packing.*

Install a new packing onto the fuel pump unit.

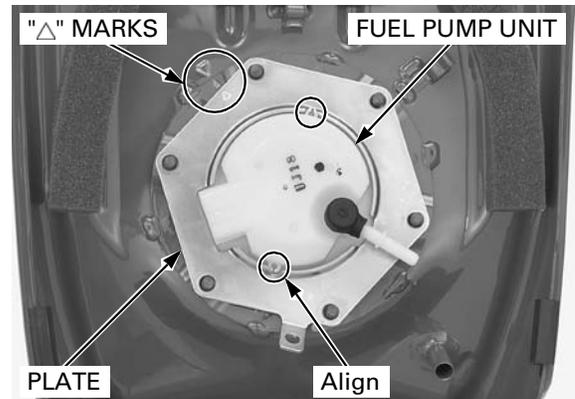


*Be careful not to damage the fuel level sensor float arm.*

Install the fuel pump unit into the fuel tank.

When installing the setting plate onto the fuel pump unit, align the following:

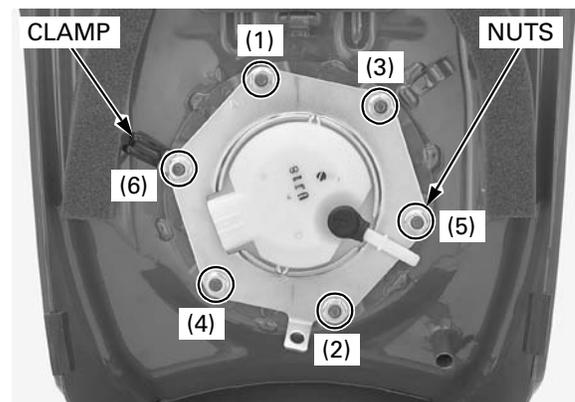
- Slots of the fuel pump setting plate and tabs of the fuel pump unit
- "△" marks of the fuel pump setting plate and fuel tank



Install the nuts and clamp.

Tighten the fuel pump nuts to the specified torque in the specified sequence as shown.

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



*Route the pump unit wire properly (page 1-18).*

Connect the quick connect fitting (page 5-46).  
Install the fuel tank (page 5-51).

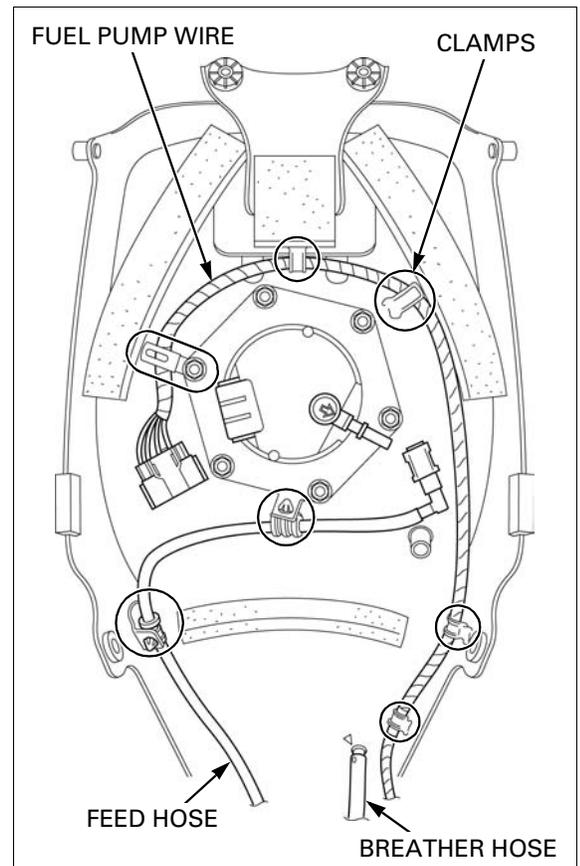
## FUEL TANK

### REMOVAL/INSTALLATION

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-44).

Release the fuel feed hose and fuel pump wire from the clamps.

Disconnect the fuel tank breather hose.

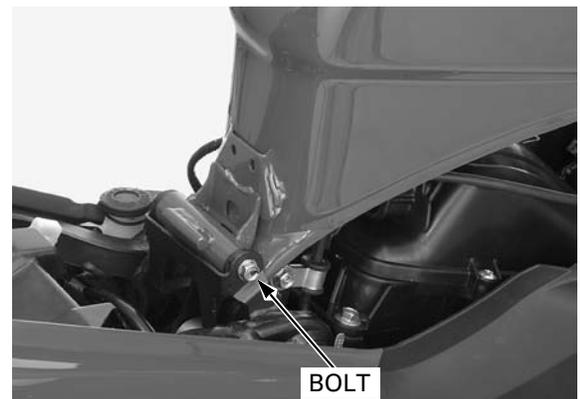


Remove the bolt and fuel tank.

Install the fuel tank in the reverse order of removal.

*Route the hose and wire properly (page 1-18).*

Connect the quick connect fitting (page 5-46).



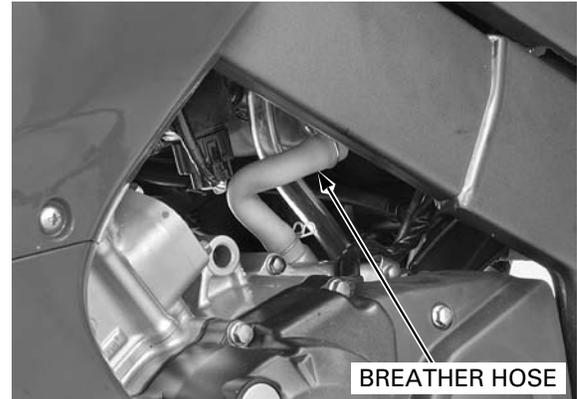
## FUEL SYSTEM (PGM-FI)

### AIR CLEANER HOUSING

#### REMOVAL/INSTALLATION

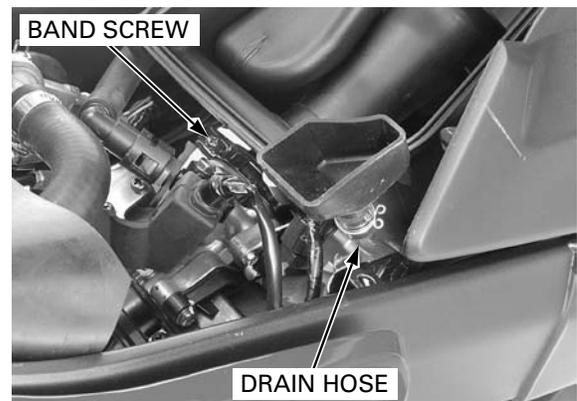
Remove the air cleaner element (page 3-8).

Disconnect the crankcase breather hose.

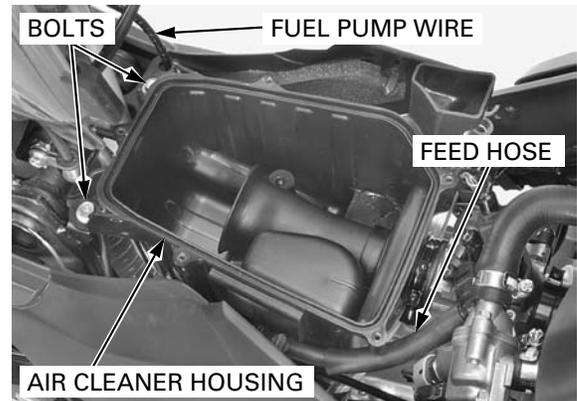


Loosen the connecting hose band screw.

Disconnect the fuel tank drain hose.



Release the fuel feed hose and fuel pump wire from the hose guides of the air cleaner housing. Remove the bolts and air cleaner housing.



*Route the hose and wire properly (page 1-18).*

Installation is in the reverse order of removal.

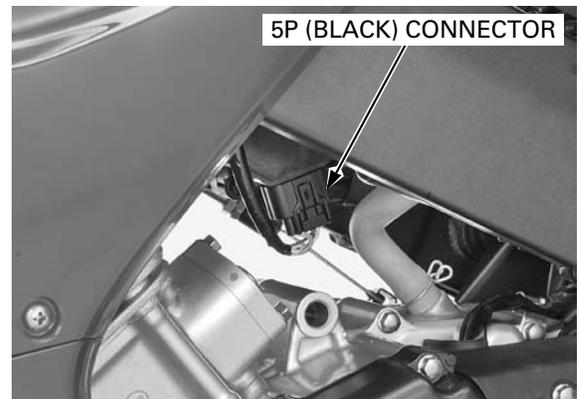
### THROTTLE BODY

#### REMOVAL

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-44).

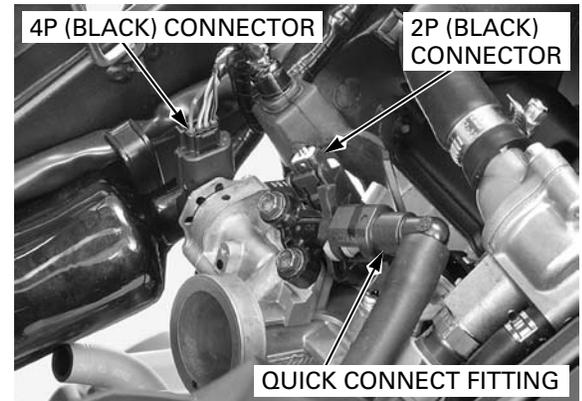
Remove the air cleaner housing (page 5-52).

Disconnect the sensor unit 5P (Black) connector.

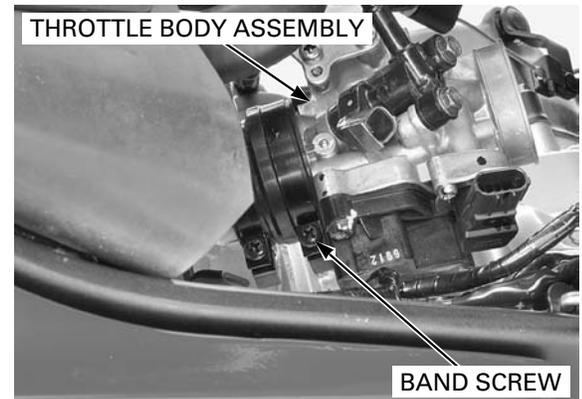


Disconnect the IACV 4P (Black) connector and injector 2P (Black) connector.

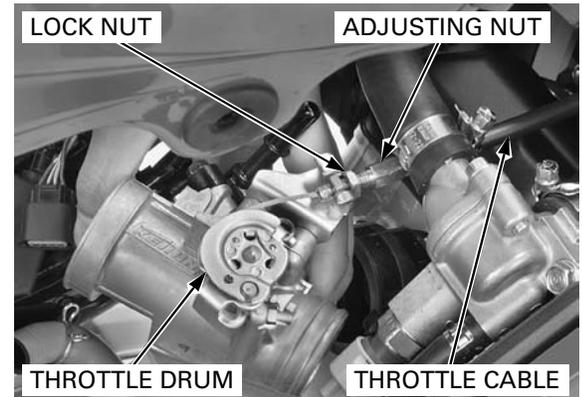
Disconnect the injector side of the quick connect fitting (page 5-59).



Loosen the insulator band screw (throttle body side) and remove the throttle body assembly.



Loosen the throttle cable lock nut and adjusting nut then disconnect the throttle cable from the throttle drum and cable stay.

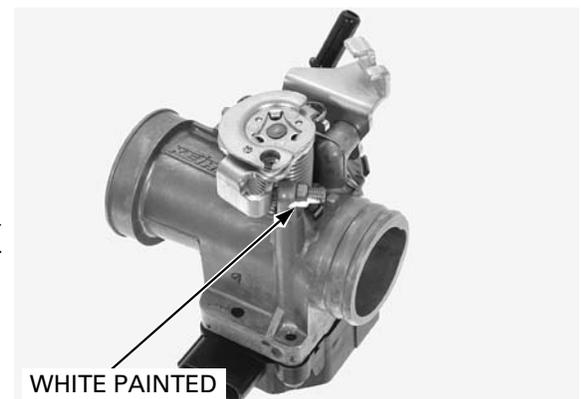


### DISASSEMBLY

#### NOTICE

- The throttle body/sensor unit is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Do not loosen or tighten the white painted nut and screw of the throttle body. Loosening or tightening it can cause throttle valve and idle control failure.
- Always clean around the throttle body before each sensor removal to prevent dirt and debris from entering the air passage.

Remove the injector (page 5-60).



## FUEL SYSTEM (PGM-FI)

### IACV REMOVAL/INSPECTION

The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned ON (and engine stop switch "O": CM and U type), the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned ON (and engine stop switch "O": CM and U type).

Remove the IACV setting plate torx screws and setting plate.

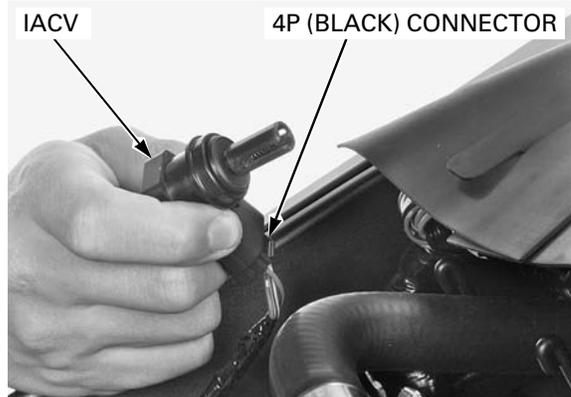
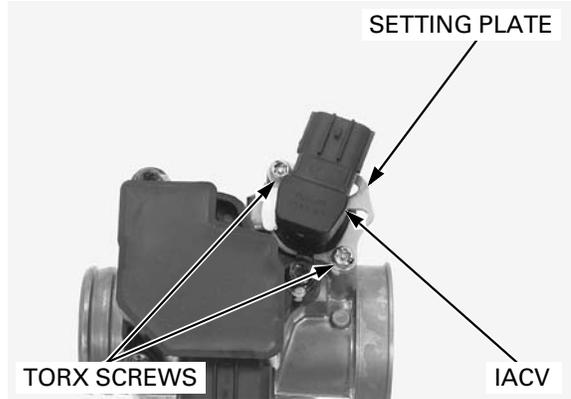
Remove the IACV.

Check the IACV for wear or damage.  
Replace if necessary.

The IACV operation can be checked visually as follows:

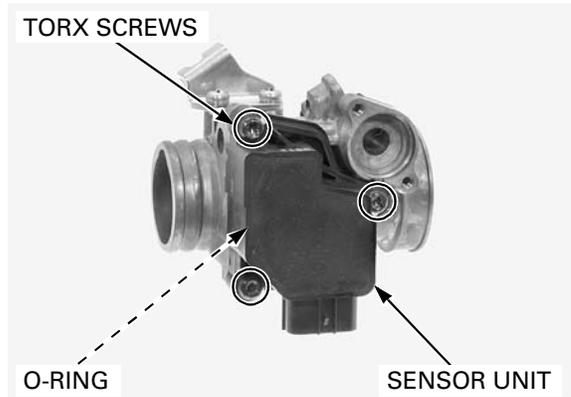
1. Connect the IACV 4P (Black) connector.
2. Turn ignition switch ON (and engine stop switch "O": CM and U type).

Disconnect the IACV 4P (Black) connector.



### SENSOR UNIT REMOVAL

Remove the sensor unit torx screws, sensor unit and O-ring.

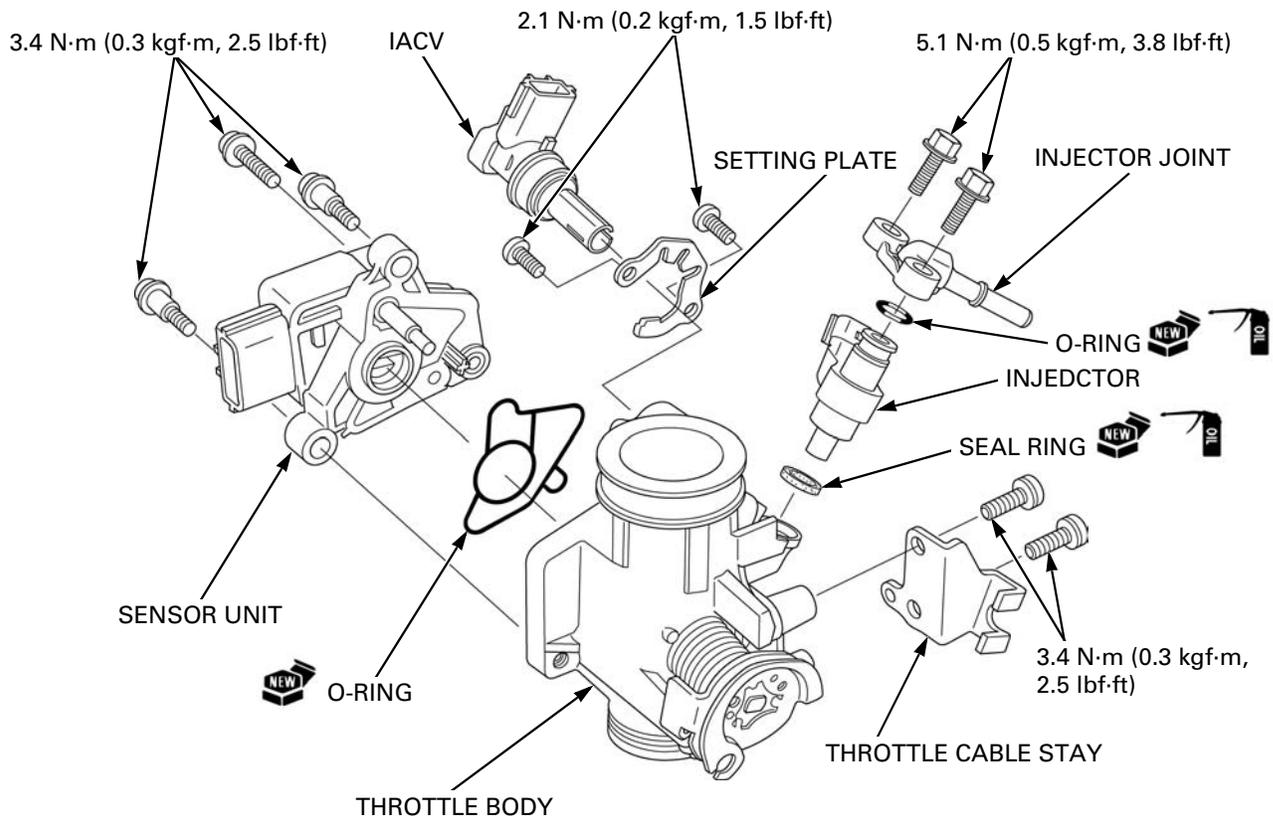


*Cleaning the air passages and sensor hole with a piece of wire will damage the throttle body.*

Clean the air passage of the throttle body using a compressed air.  
Check the air passage for clogs.



**ASSEMBLY**



Install the injector (page 5-61).

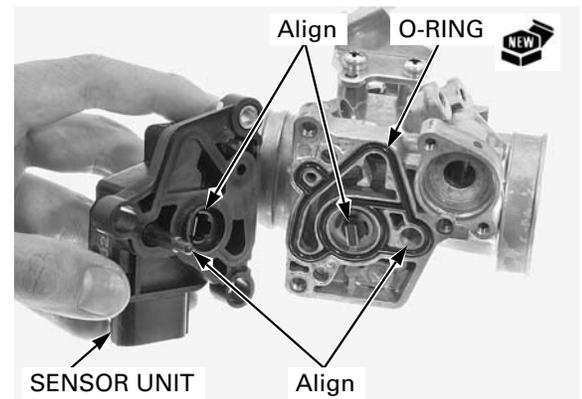
**SENSOR UNIT INSTALLATION**

*If the O-ring is not installed properly, the idle air will leak and engine idle speed will be unstable.*

Install a new O-ring to the throttle body properly.

When installing the sensor unit to the throttle body, align the following:

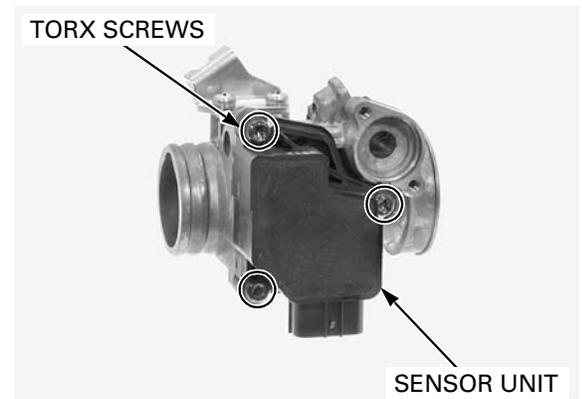
- Clip of the TP sensor with the boss of the throttle valve
- IAT sensor of the throttle body with the hole



Install and tighten the sensor unit torx screws to the specified torque.

**TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)**

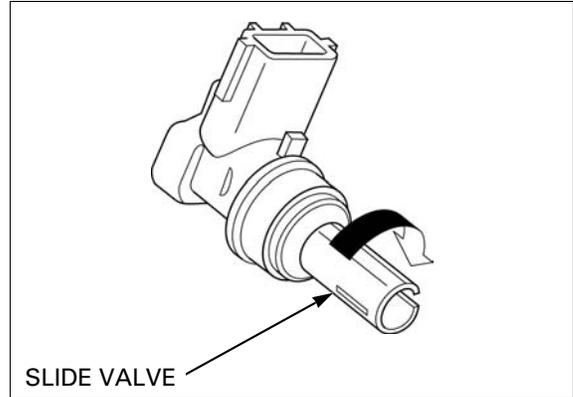
- Perform the throttle valve fully closed reset procedure (page 5-58).



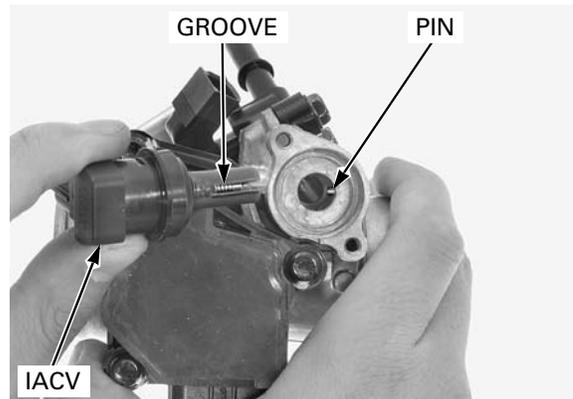
## FUEL SYSTEM (PGM-FI)

### IACV INSTALLATION

Turn the slide valve clockwise until lightly seated on IACV.



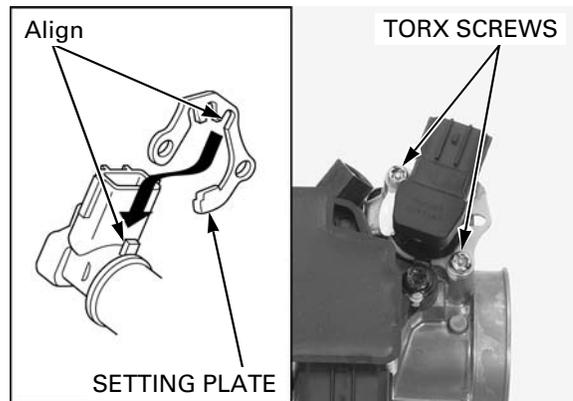
Install the IACV aligning its groove with the slide valve housing pin.



Install the setting plate while aligning the cut-out with the lug on the IACV as shown.

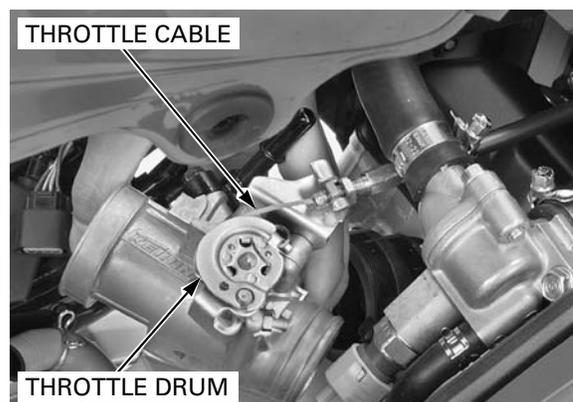
Install and tighten the IACV setting plate torx screws to the specified torque.

**TORQUE: 2.1 N·m (0.2 kgf·m, 1.5 lbf·ft)**

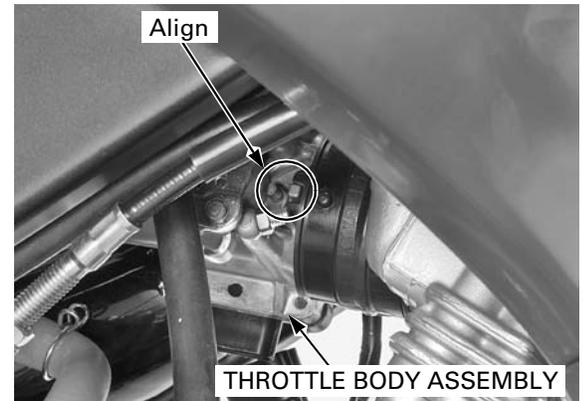


### INSTALLATION

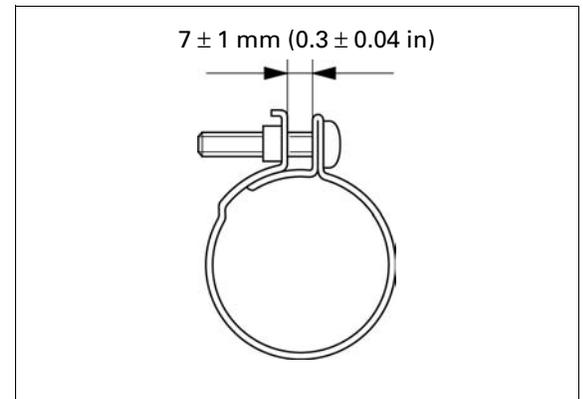
Connect the throttle cable to the throttle drum and throttle cable stay.



Install the throttle body assembly to the throttle body insulator by aligning the tab of the throttle body with the groove of the throttle body insulator.

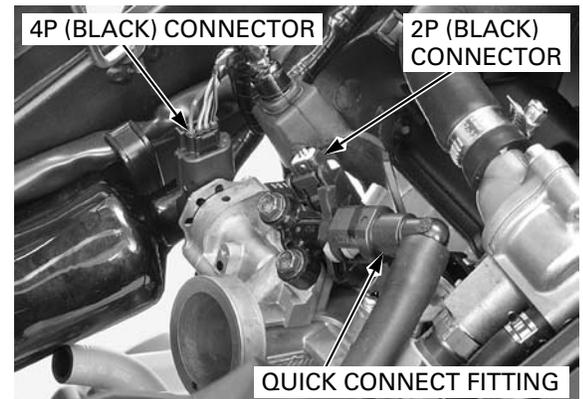


Tighten the insulator band screw so that the width between the band ends clearance is  $7 \pm 1$  mm ( $0.3 \pm 0.04$  in).



Connect the IACV 4P (Black) connector and injector 2P (Black) connector.

Connect the injector side of the quick connect fitting (page 5-61).



Connect the sensor unit 5P (Black) connector.

**NOTE:**

If the sensor unit is removed, reset the throttle valve fully closed position (page 5-58).

Install the air cleaner housing (page 5-52).

Connect the quick connect fitting (page 5-46).

Adjust the throttle grip freeplay (page 3-7).

*Route the hose and wire properly (page 1-18).*



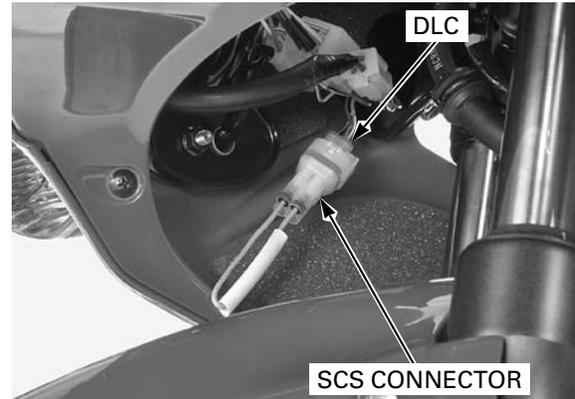
### THROTTLE VALVE FULLY CLOSED POSITION RESET PROCEDURE

- If the sensor unit is removed, reset the throttle valve fully closed position as following.
1. Lift and support the fuel tank (page 3-6).
  2. Clear the DTC's (page 5-12).
  3. Turn the ignition switch OFF.
  4. Remove the dummy connector.
  5. Short the DLC using a special tool.

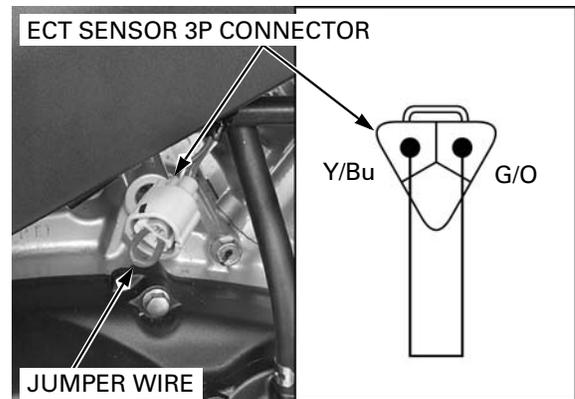
**TOOL:**

**SCS connector**

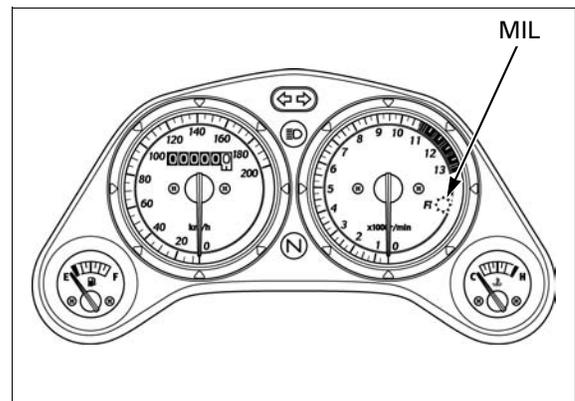
**070PZ-ZY30100**



6. Disconnect the ECT sensor 3P connector.  
Short the ECT sensor 3P connector terminals of the wire harness side using a jumper wire.  
**Connection: Yellow/blue – Green/orange**
7. Turn the ignition switch ON (and engine stop switch "O": CM and U type).  
Disconnect the jumper wire while the MIL blinking (within 10 seconds).

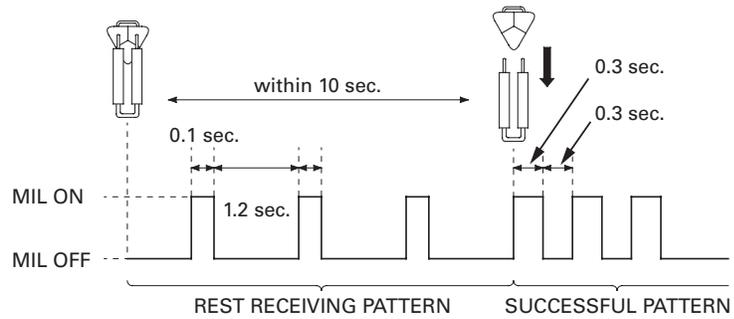


8. After disconnection of the jumper wire, the MIL start to blinking.

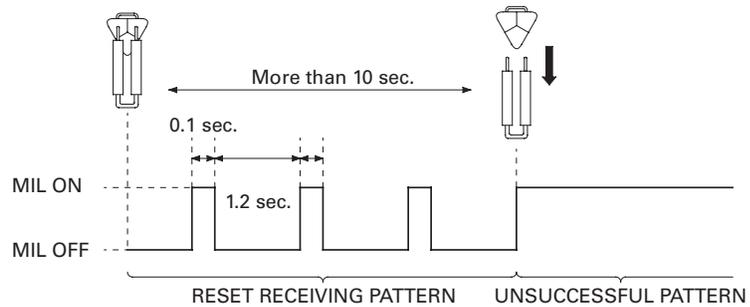


9. Success pattern see below.

If the MIL begins short blink (0.3 seconds), the throttle valve fully closed position is reset.



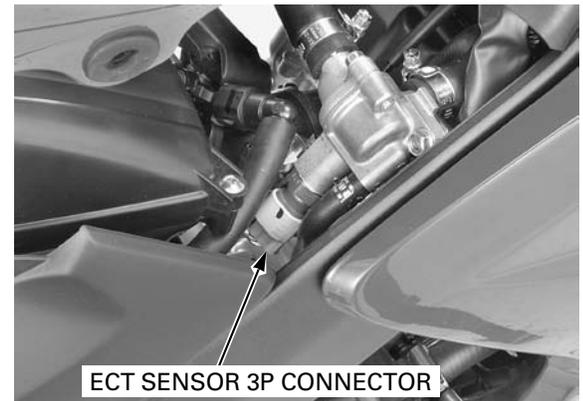
If the MIL stays lit, the throttle valve fully closed position is not reset, repeat the reset procedure from step 2.



10. Turn the ignition switch OFF.

11. Connect the ECT sensor 3P connector.

Remove the suitable support and close the fuel tank (page 3-6).



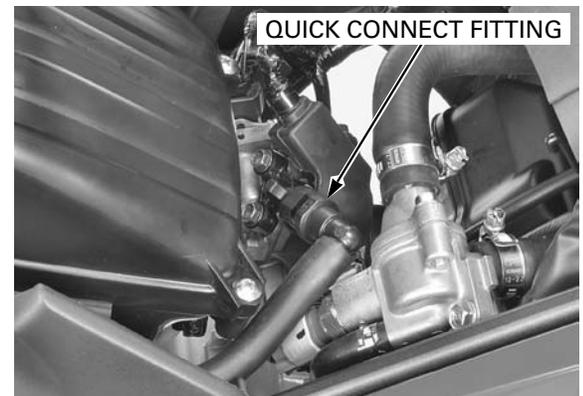
## INJECTOR

### QUICK CONNECT FITTING REMOVAL

- Always clean around the injector before the injector removal to prevent dirt and debris from entering the injector passage.

Relieve the fuel pressure and disconnect the quick connect fitting (page 5-44).

Disconnect the injector joint quick connect fitting as follows.

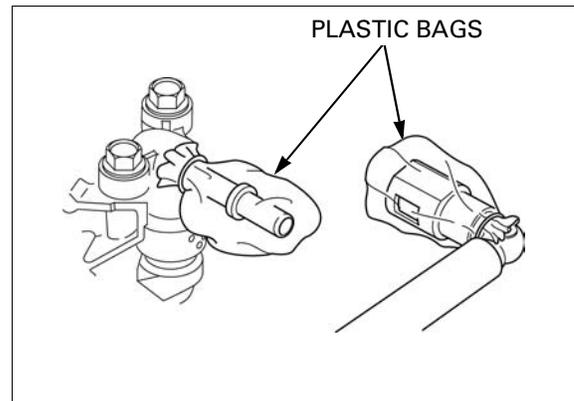
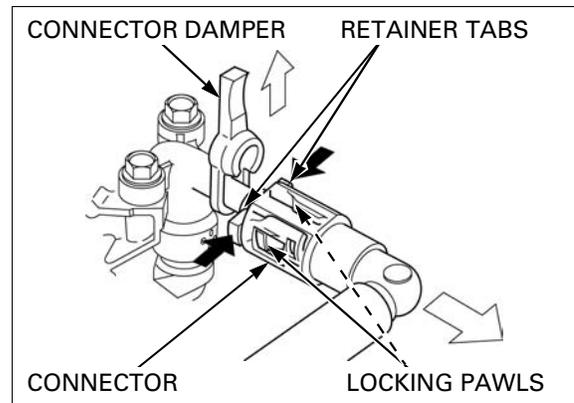


## FUEL SYSTEM (PGM-FI)

1. Pull and release the connector damper tabs from the retainer when disconnecting the injector joint quick connect fitting.
2. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release them from the locking pawls.  
Pull the connector off and remove the retainer.

### NOTE:

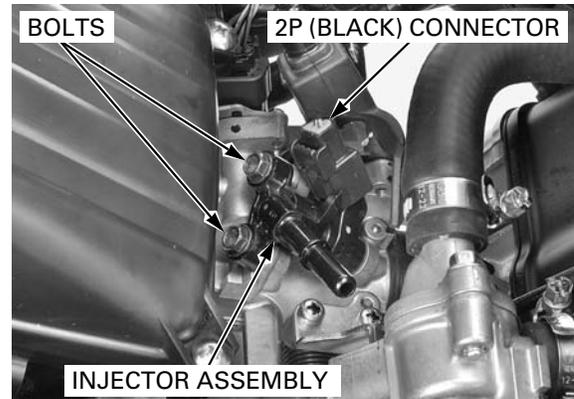
- Absorb the remaining fuel in the fuel feed hose from flowing out with a shop towel.
  - Be careful not to damage the hose or other parts.
  - Do not use tools.
  - If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.
3. To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.



## REMOVAL

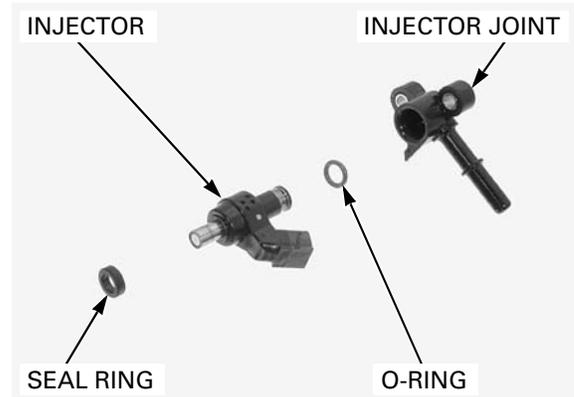
Disconnect the injector 2P (Black) connector.

Remove the bolts and injector assembly from the throttle body.



Remove the injector joint, O-ring and seal ring from the injector.

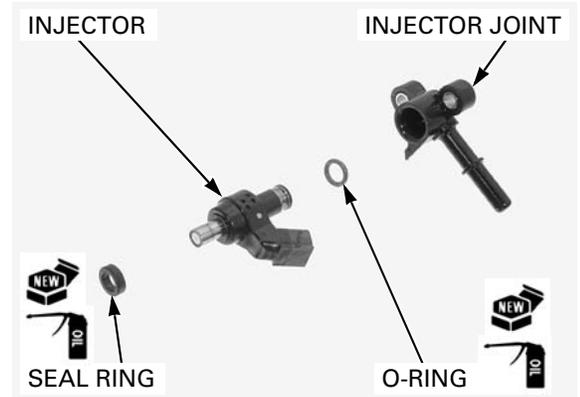
Check the removed parts for wear or damage and replace them if necessary.



## INSTALLATION

Apply engine oil to new O-ring and seal ring.

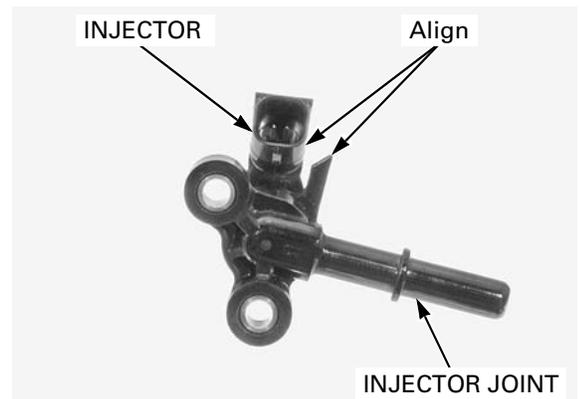
Install the O-ring and seal ring to the injector, being careful not to damage them.



Install the injector into the injector joint, being careful not to damage the O-ring.

NOTE:

Align the injector body with the injector joint tab as shown.

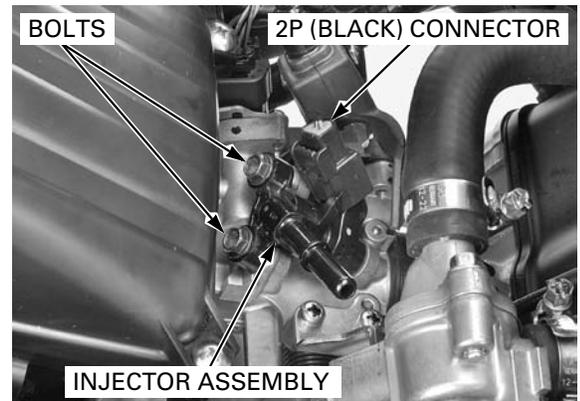


*Be careful not to damage the seal ring.*

Install the injector assembly to the throttle body. Install and tighten the injector joint mounting bolts alternately to the specified torque.

**TORQUE: 5.1 N-m (0.5 kgf-m, 3.8 lbf-ft)**

Connect the injector 2P (Black) connector.



## QUICK CONNECT FITTING INSTALLATION

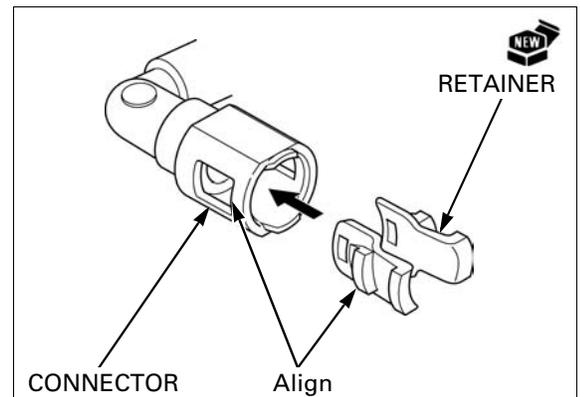
- Always replace the retainer of the quick connect fitting when the fuel feed hose is disconnected.
- If any retainer needs replacing, use the same manufacturer's retainer as the ones being removed (The various manufactures feature different retainer specifications).
- If any damage or cut-out on the connector damper, replace it with a new one.
- Do not bend or twist the fuel feed hose.

Connect the injector joint quick connect fitting as follows:

1. Insert a new retainer into the connector.

NOTE:

- Align new retainer locking pawls with the connector grooves.



## FUEL SYSTEM (PGM-FI)

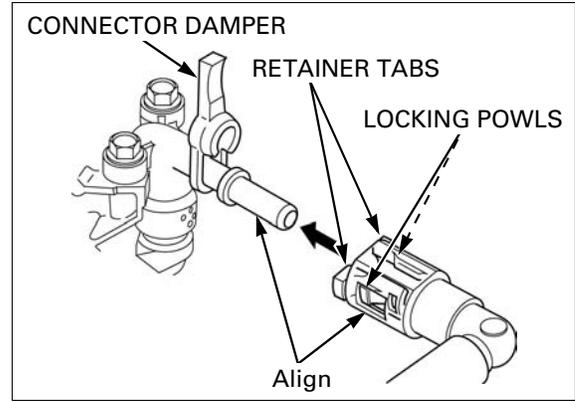
2. Set the connector damper as shown.

Then press the quick connect fitting onto the pipe until both retainer pawls lock with a "CLICK".

**NOTE:**

- Align the quick connect fitting with the injector joint.

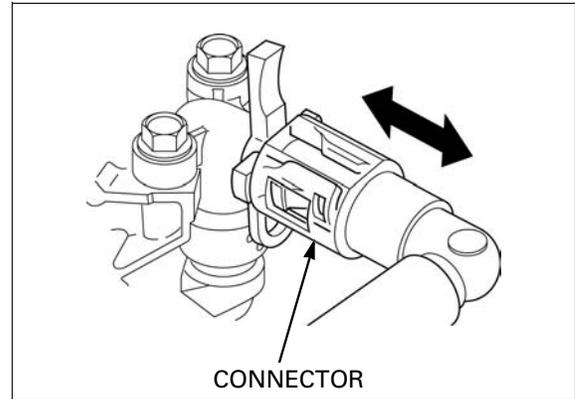
If it is hard to connect, put a small amount of engine oil on the injector joint.



3. Make sure the connection is secure and that the pawls are firmly locked into place; check visually and by pulling the connector.

4. Make sure the connector damper tabs are in place (between the retainer tabs).

Remove the suitable support and close the fuel tank (page 3-6).



## ENGINE IDLE SPEED

**NOTE:**

- Inspect the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before checking the idle speed, inspect the following items.
  - No DTC and MIL blinking
  - Spark plug condition (page 3-9)
  - Air cleaner element condition (page 3-8)
- The engine must be warm for accurate idle speed inspection.
- This system eliminates the need for manual idle speed adjustment compared to previous designs.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Start the engine and let it idle.

Check the idle speed.

**IDLE SPEED:  $1,450 \pm 100 \text{ min}^{-1} \text{ (rpm)}$**

If the idle speed is out of the specification, check the following:

- Intake air leak or engine top-end problem (page 8-5)
- Throttle operation and freeplay (page 3-7)
- IACV operation (page 5-52)

## ECT SENSOR

### REMOVAL/INSTALLATION

Drain the coolant (page 6-7).  
Lift and support the fuel tank (page 3-6).

*Replace the ECT sensor while the engine is cold.*

Disconnect the ECT sensor 3P (Gray) connector.

Remove the ECT sensor and sealing washer.

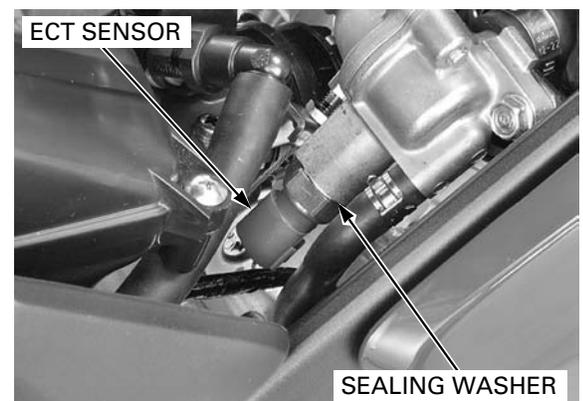
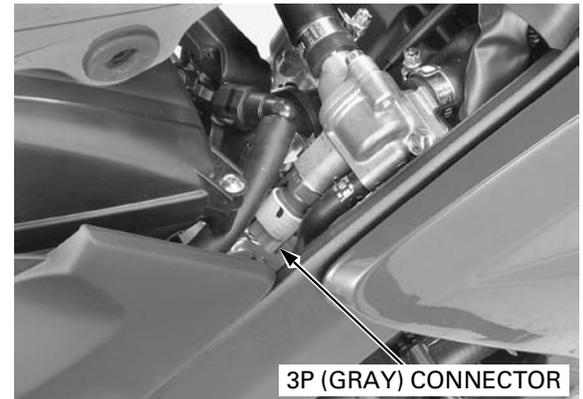
*Always replace a sealing washer with a new one.*

Install a new sealing washer onto the ECT sensor and install them.  
Tighten the ECT sensor to the specified torque.

**TORQUE: 24.5 N·m (2.5 kgf·m, 18 lbf·ft)**

Connect the ECT sensor 3P (Gray) connector.

Remove the suitable support and close the fuel tank (page 3-6).  
Fill the cooling system with recommended coolant (page 6-6).

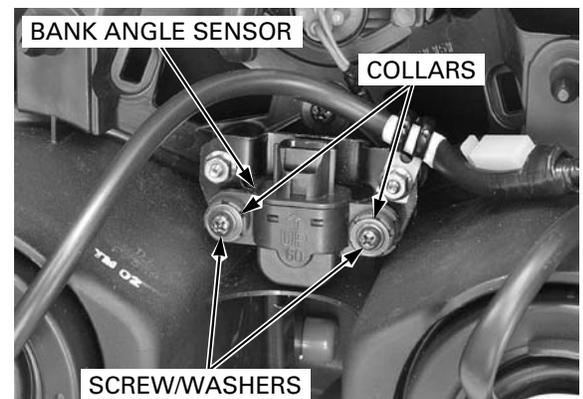


## BANK ANGLE SENSOR

### REMOVAL/INSTALLATION

Remove the upper cowl (page 2-10).

Remove the mounting screw/washers, collars and bank angle sensor.



## FUEL SYSTEM (PGM-FI)

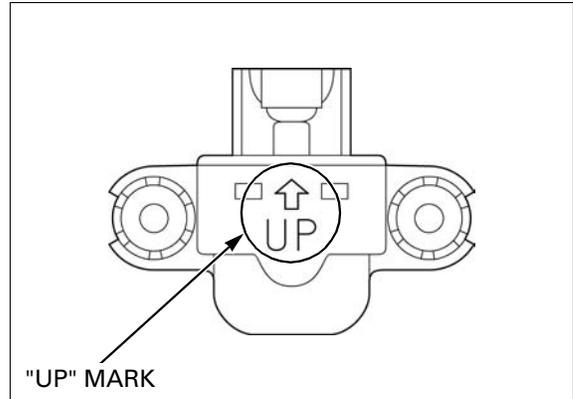
Install the bank angle sensor with its "UP" mark facing up.

Install the bank angle sensor, collars and mounting screw/washers.

Tighten the mounting screws to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**

Install the upper cowl (page 2-10).



### INSPECTION WITH HDS POCKET TESTER

Connect the HDS pocket tester (page 5-11).  
Remove the bank angle sensor (page 5-63).

Connect the bank angle sensor 3P connector.

Place the bank angle sensor horizontal as shown.

Turn the ignition switch ON (and engine stop switch "Q": CM and U type).

Read the voltage with the HDS pocket tester.

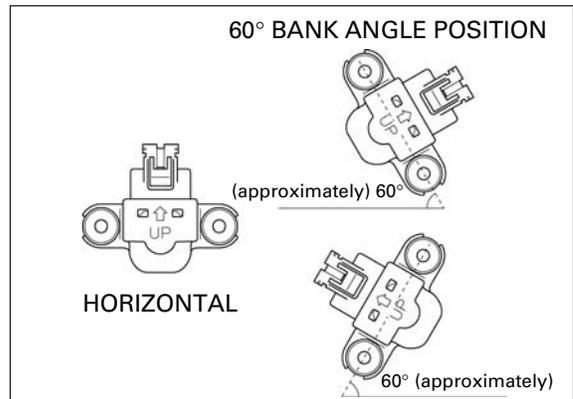
**Standard: 3.6 – 4.4 V**

Incline the bank angle sensor approximately 60° to the left or right with keeping the ignition switch ON (and engine stop switch "Q": CM and U type).

Read the voltage with HDS pocket tester.

**Standard: 0.7 – 1.3 V**

- If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON (and engine stop switch "Q": CM and U type).



### INSPECTION WITH ECM TEST HARNESS

Connect the ECM test harness (page 5-11).  
Remove the bank angle sensor (page 5-63).

Connect the bank angle sensor 3P connector.

Place the bank angle sensor horizontal as shown.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the output voltage with the ECM test harness at its terminals.

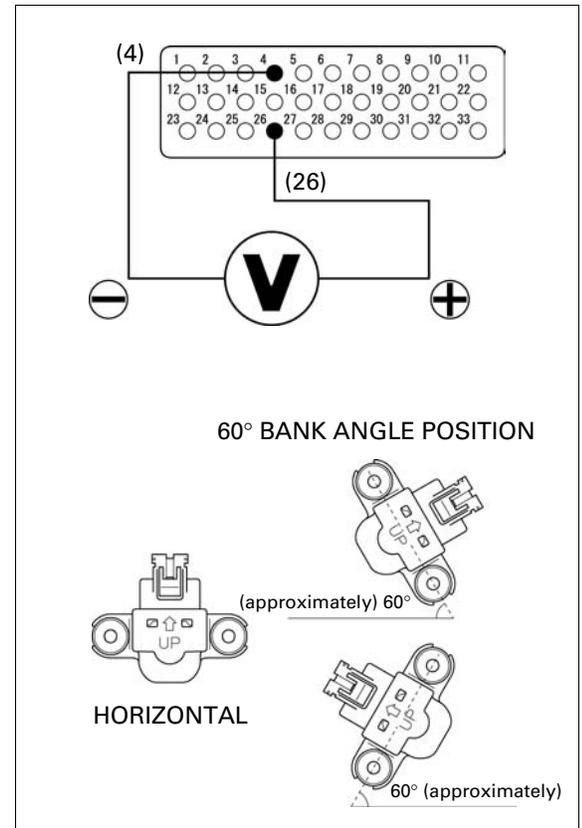
**Connection:** 26 (+) – 4 (–)  
**Standard:** 3.6 – 4.4 V

Incline the bank angle sensor approximately 60° to the left or right with keeping the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the output voltage with ECM test harness at its terminals.

**Connection:** 26 (+) – 4 (–)  
**Standard:** 0.7 – 1.3 V

- If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON (and engine stop switch "O": CM and U type).



## ECM

### REMOVAL/ INSTALLATION

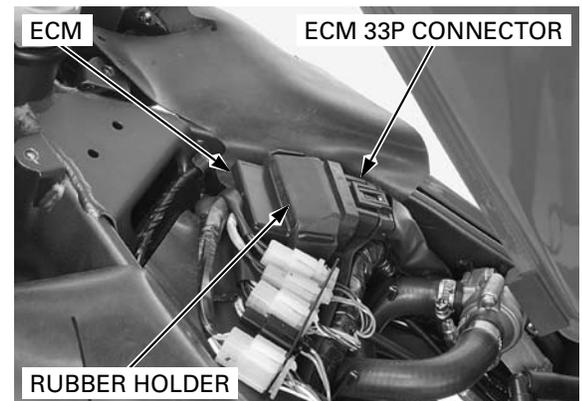
Lift and support the fuel tank (page 3-6).  
Open the rubber sheet (page 6-10).

Turn the ignition switch OFF.

Disconnect the ECM 33P connector.  
Remove the rubber holder and ECM.  
Remove the ECM from the rubber holder.

Install the ECM to the rubber holder install them to the frame.  
Connect the ECM 33P connector.

Close the rubber sheet (page 6-15).  
Remove the suitable support and close the fuel tank (page 3-6).



## ECM POWER/GROUND LINE INSPECTION

**ENGINE DOES NOT START (No DTC and MIL blinking)**

### 1. ECM Power Input Voltage Inspection

- Before starting the inspection, check for loose or poor contact on the ECM 33P connector and recheck the MIL blinking.

Lift and support the fuel tank (page 3-6).  
Open the rubber sheet (page 6-10).

Disconnect the ECM 33P connector.



Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage at the ECM 33P connector of the wire side and ground.

**TOOL:**

**Test probe** 07ZAJ-RDJA110

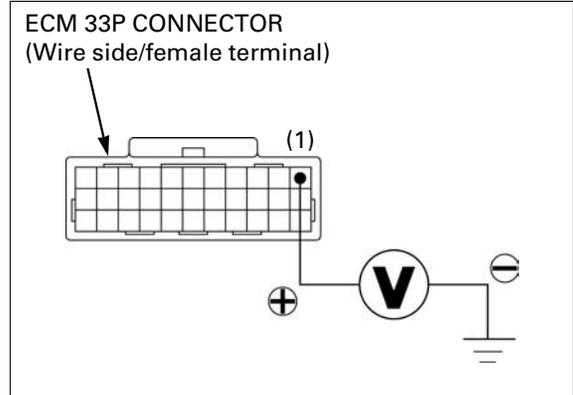
**Connection:** 1 (Black/white) (+) – Ground (-)

**Standard:** Battery voltage

**Does the standard voltage exist?**

**YES** – GO TO STEP 2.

- NO** –
- Open or short circuit in Black/white wire
  - Faulty ignition switch
  - Blown main or sub fuse
  - Faulty engine stop switch (CM and U type)



### 2. ECM Ground Line Inspection

Turn the ignition switch OFF.

Check the continuities between the ECM 33P connector of the wire side and ground.

**TOOL:**

**Test probe** 07ZAJ-RDJA110

**Connection:** 2 (Green/black) – Ground

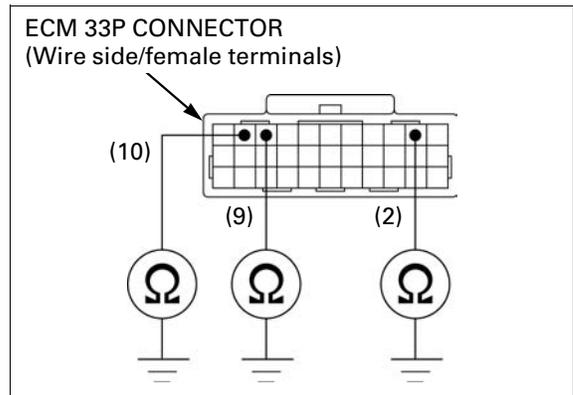
9 (Green) – Ground

10 (Green) – Ground

**Is there continuity?**

**YES** – Replace the ECM with a known good one, and recheck.

- NO** –
- Open circuit in Green/black wire
  - Open circuit in Green wires



## O<sub>2</sub> SENSOR

### NOTICE

- Do not get grease, oil or other materials in the O<sub>2</sub> sensor air hole.
- The O<sub>2</sub> sensor may be damaged if dropped. Replace it with a new one, if dropped.
- If the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one, do not reuse O<sub>2</sub> sensor cord.

### REMOVAL

- Handle the O<sub>2</sub> sensor with care.
- Do not service the O<sub>2</sub> sensor while it is hot.

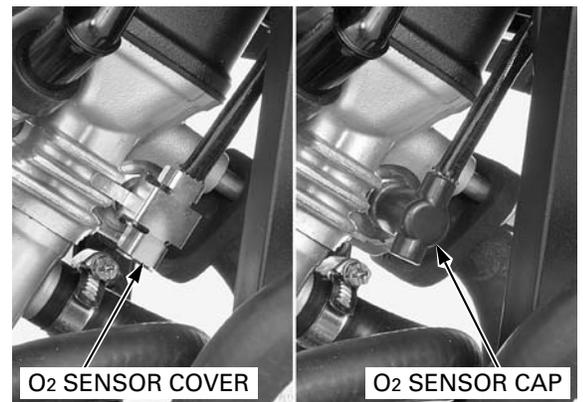
Remove the right middle cowl (page 2-9).

Disconnect the O<sub>2</sub> sensor 2P (natural) connector.

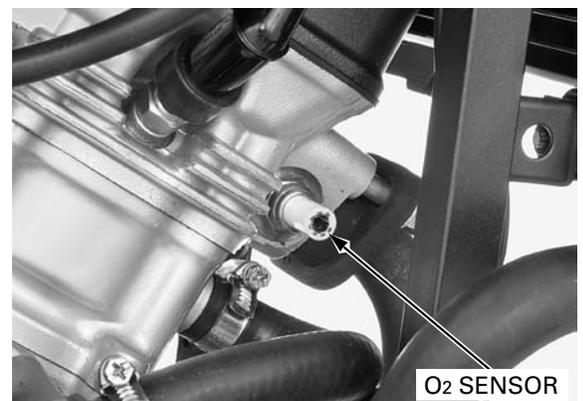


Remove the O<sub>2</sub> sensor cover and disconnect the O<sub>2</sub> sensor cap.

Discard the O<sub>2</sub> sensor cord.



Remove the O<sub>2</sub> sensor.



## FUEL SYSTEM (PGM-FI)

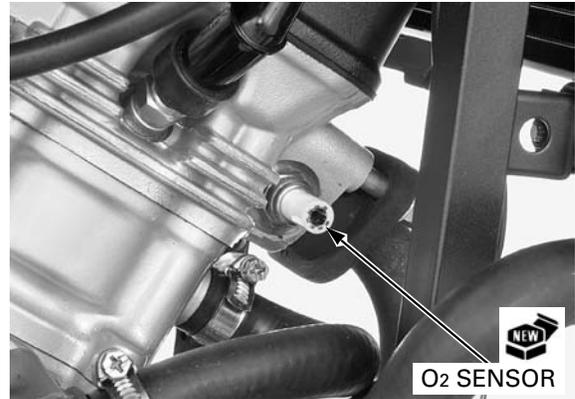
### INSTALLATION

- Do not use an impact wrench while removing or installing the O<sub>2</sub> sensor, or it may be damaged.

Install and hand tighten a new O<sub>2</sub> sensor onto the cylinder head.

Tighten the O<sub>2</sub> sensor to the specified torque.

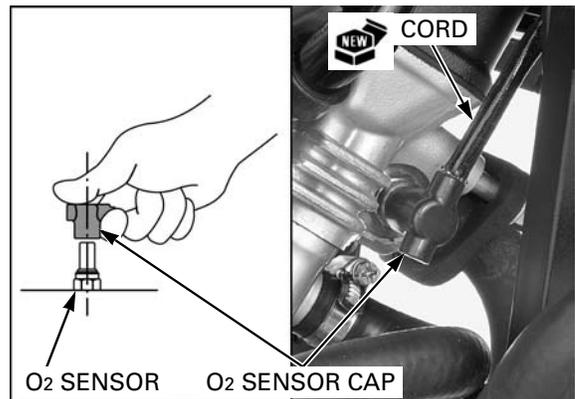
**TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)**



Connect the O<sub>2</sub> sensor cap by installing a new O<sub>2</sub> sensor cord.

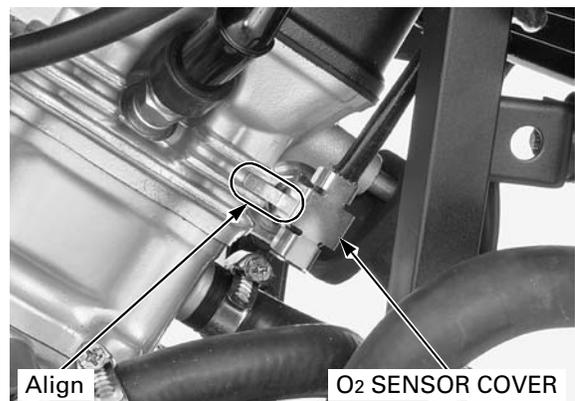
#### NOTICE

- Take care not to tilt the O<sub>2</sub> sensor cap when connecting the cap to the O<sub>2</sub> sensor.
- Do not turn the O<sub>2</sub> sensor cap, after connecting it.



Install the O<sub>2</sub> sensor cover aligning its tab with between the fins of the cylinder head.

Install the right middle cowl (page 2-9).



Connect the O<sub>2</sub> sensor 2P (natural) connector.



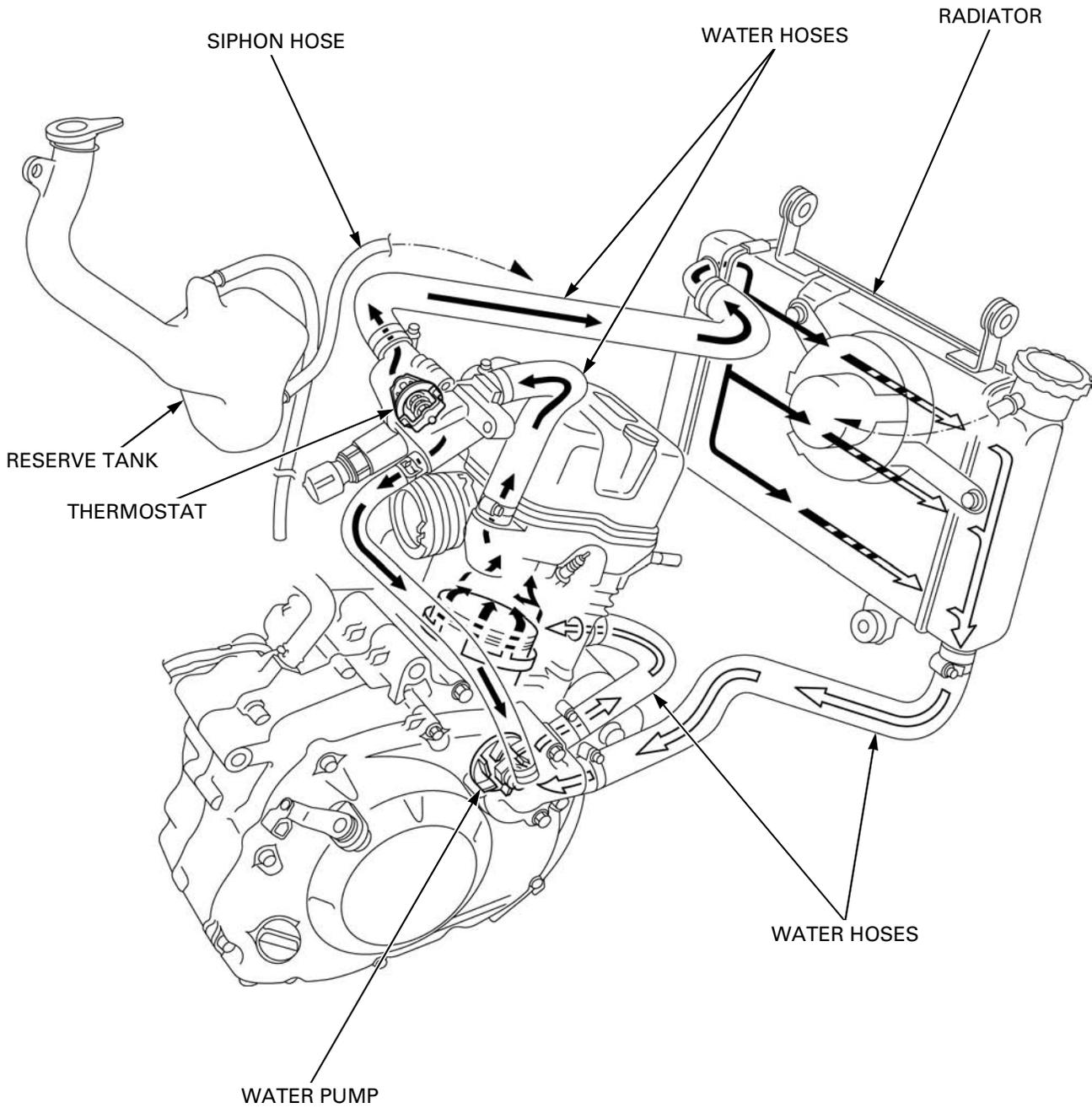
# 6. COOLING SYSTEM

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SYSTEM FLOW PATTERN .....	6-2	THERMOSTAT HOUSING.....	6-9
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COOLANT REPLACEMENT .....	6-6	FAN CONTROL RELAY .....	6-20
THERMOSTAT .....	6-8		

**COOLING SYSTEM**

**SYSTEM FLOW PATTERN**



# SERVICE INFORMATION

## GENERAL

### ⚠ WARNING

Removing the radiator cap while the engine is hot can allow the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

### NOTICE

Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

- Add cooling system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine installed in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For the ECT sensor inspection (page 19-13).

## SPECIFICATIONS

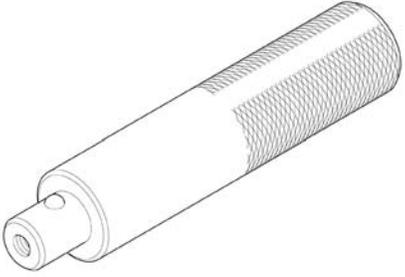
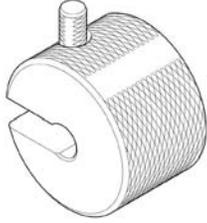
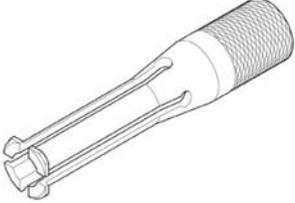
ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	0.70 liter (0.74 US qt, 0.62 Imp qt)
	Reserve tank	0.28 liter (0.30 US qt, 0.25 Imp qt)
Radiator cap relief pressure		93.2 – 122.6 kPa (0.95 – 1.25 kgf/cm <sup>2</sup> , 13.5 – 17.8 psi)
Thermostat	Begin to open	74 – 78°C (165 – 172°F)
	Fully open	85°C (185°F)
	Valve lift	3.5 – 4.5 mm (0.14 – 0.18 in) minimum
Recommended antifreeze	Except CM type	High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
	CM type only	Pro Honda HP coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors
Standard coolant concentration		1:1 (mixture with distilled water)

## TORQUE VALUES

Water pump impeller	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Thermostat housing cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Cooling fan nut	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	Apply locking agent to the threads.
Fan motor screw	2.8 N·m (0.3 kgf·m, 2.1 lbf·ft)	
Fan motor shroud mounting bolt	8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)	
Water hose band screw	–	See page 6-14

## COOLING SYSTEM

### TOOLS

<p>Driver 07749-0010000</p> 	<p>Bearing remover shaft 07936-KC10100</p> 	<p>Remover weight 07741-0010201</p> 
<p>Bearing remover head, 14 mm 07WMC-KFG0100</p> 	<p>Oil seal driver attachment, 36 mm 07945-4150400</p> 	

## TROUBLESHOOTING

### Engine temperature too high

- Faulty temperature gauge or ECT sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan control relay
- Faulty water pump

### Engine temperature too low

- Faulty temperature gauge or ECT sensor
- Thermostat stuck open
- Faulty fan control relay

### Coolant leak

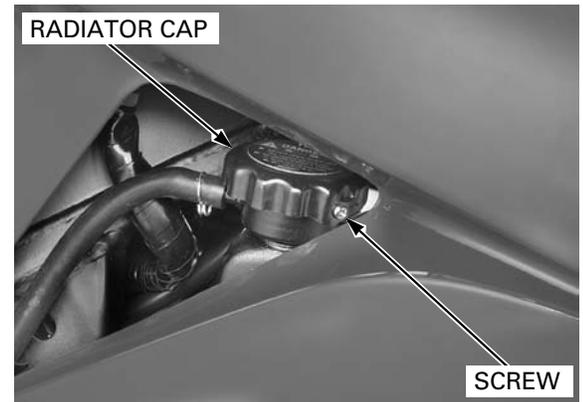
- Faulty water pump mechanical seal
- Deteriorated O-ring
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses
- Damaged radiator

# SYSTEM TESTING

## COOLANT (HYDROMETER TEST)

Remove the inner cowl (page 2-7).

Remove the screw and radiator cap.



Test the coolant gravity using a hydrometer (see below for "COOLANT GRAVITY CHART").

Look for contamination and replace the coolant if necessary.

After checking the gravity, install the radiator cap and screw securely.

Install the inner cowl (page 2-7).



### COOLANT GRAVITY CHART

		Coolant temperature °C (°F)										
		0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio%	5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
	10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
	15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
	20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
	25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
	30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
	35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
	40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
	45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
	50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
	55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071	

## COOLING SYSTEM

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

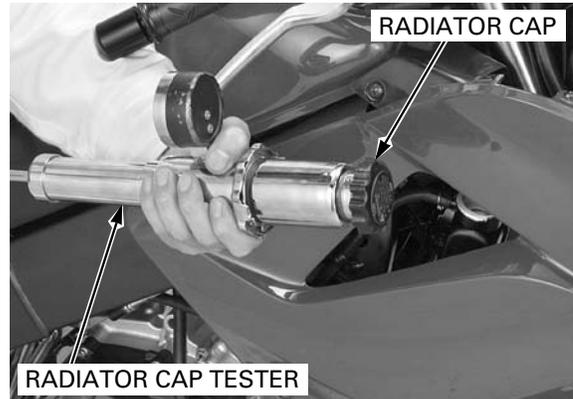
Remove the radiator cap (page 6-5).

Wet the sealing surfaces of the cap, then install the cap onto the tester.

Pressurize the radiator cap using the tester. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold the specified pressure for at least 6 seconds.

#### RADIATOR CAP RELIEF PRESSURE:

93.2 – 122.6 kPa (0.95 – 1.25 kgf/cm<sup>2</sup>, 13.5 – 17.8 psi)



Pressurize the radiator, engine and hoses using the tester, and check for leaks.

#### NOTICE

*Excessive pressure can damage the cooling system components. Do not exceed 122.6 kPa (1.25 kgf/cm<sup>2</sup>, 17.8 psi).*

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

Remove the tester.

Install the radiator cap (page 6-5).



## COOLANT REPLACEMENT

### PREPARATION

#### NOTE:

- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the recommended antifreeze.

#### RECOMMENDED ANTIFREEZE (Except CM type):

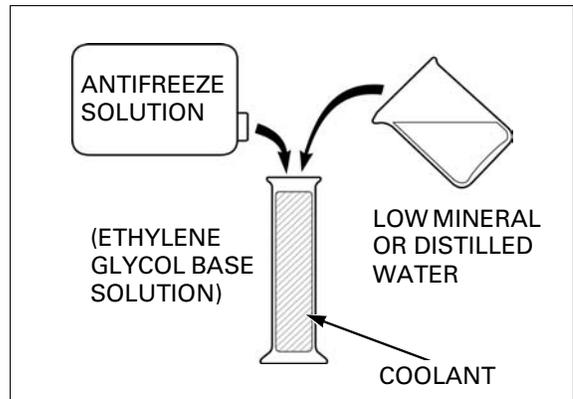
**High quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors**

#### RECOMMENDED ANTIFREEZE (CM type only):

**Pro Honda HP coolant or equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors**

#### STANDARD COOLANT CONCENTRATION:

1:1 (mixture with distilled water)



**REPLACEMENT/AIR BLEEDING**

Remove the following:

- Lower cowl (page 2-8)
- Radiator cap (page 6-5)
- Single seat (page 2-4)

Remove the drain bolt on the water pump cover and drain the system coolant.

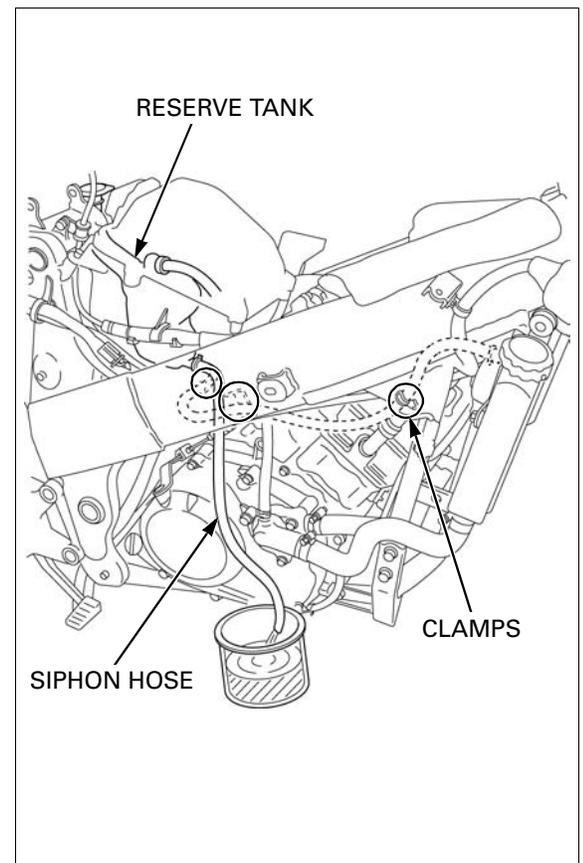
Reinstall the drain bolt with a new sealing washer. Install and tighten the drain bolt securely.



Disconnect the siphon hose from the radiator and release it to the clamps. Drain the coolant from the reserve tank.

Empty the coolant and rinse the inside of the reserve tank with water.

Install the siphon hose to the clamps and connect it to the radiator.

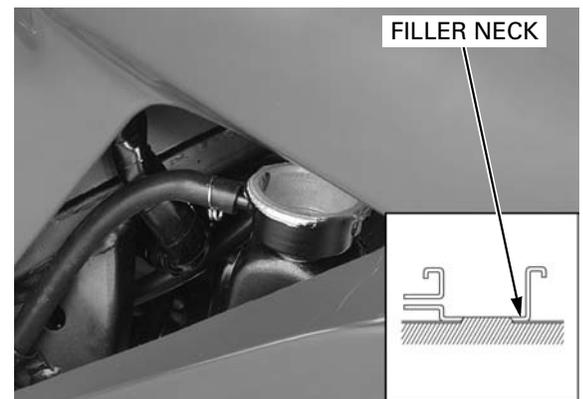


*When filling the system or reserve tank with a coolant (checking coolant level), support the motorcycle on a level surface.*

Fill the system with the recommended coolant through the filler opening up to filler neck.

Bleed air from the system as follows:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle 3 – 4 times to bleed air from the system.
3. Stop the engine and add the coolant up to the filler neck.
4. Install the radiator cap (page 6-5).



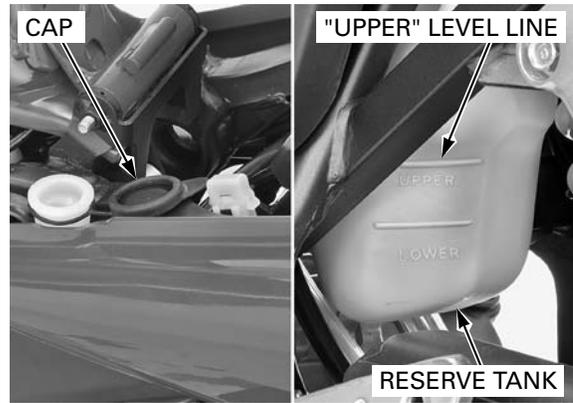
## COOLING SYSTEM

Remove the reserve tank cap and fill the reserve tank to the "UPPER" level line.

Install the reserve tank cap.

Install the following:

- Single seat (page 2-4)
- Lower cowl (page 2-8)



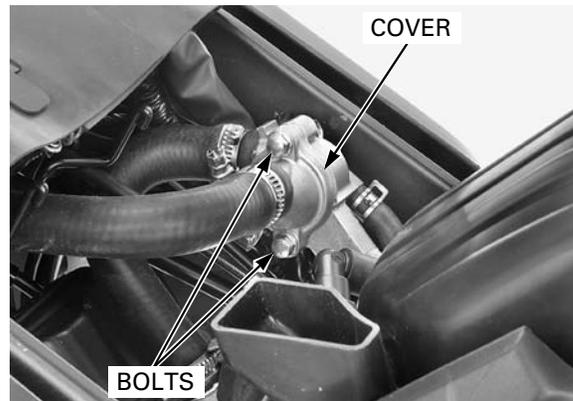
## THERMOSTAT

### REMOVAL

Drain the coolant (page 6-7).

Lift and support the fuel tank (page 3-6).

Remove the bolts and thermostat housing cover.

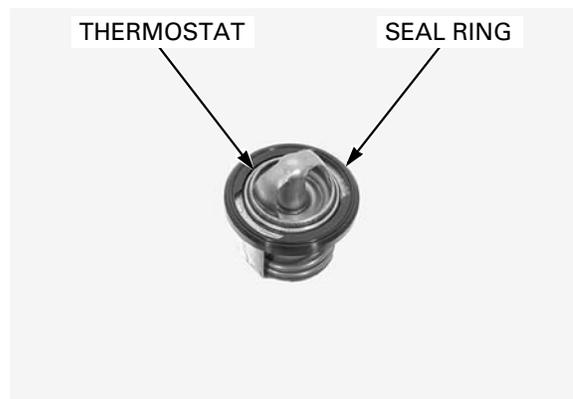


Remove the thermostat from the thermostat housing.



### INSPECTION

Visually inspect the thermostat for damage.  
Check for damage of the seal ring.



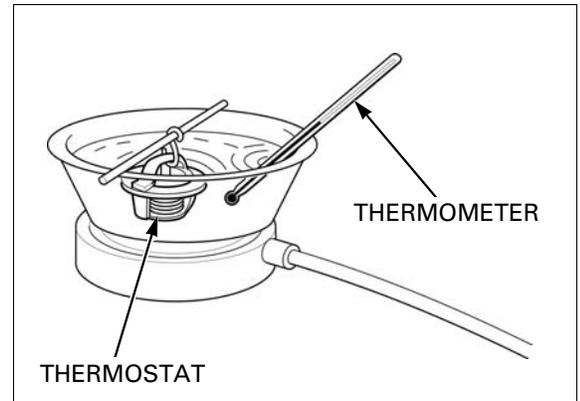
*Wear insulated gloves and adequate eye protection. Keep flammable materials away from the electric heating element. Do not let the thermostat or thermometer touch the pan, or you will get false reading.*

Heat the water with an electric heating element to operating temperature for 5 minutes. Suspend the thermostat in heated water to check its operation.

**THERMOSTAT BEGIN TO OPEN:**  
**74 – 78°C (165 – 172°F)**

**VALVE LIFT:**  
**3.5 – 4.5 mm (0.14 – 0.18 in) minimum at 85°C (185°F)**

Replace the thermostat if the valve open at a temperatures other than those specified.



**INSTALLATION**

Install the thermostat into the housing.

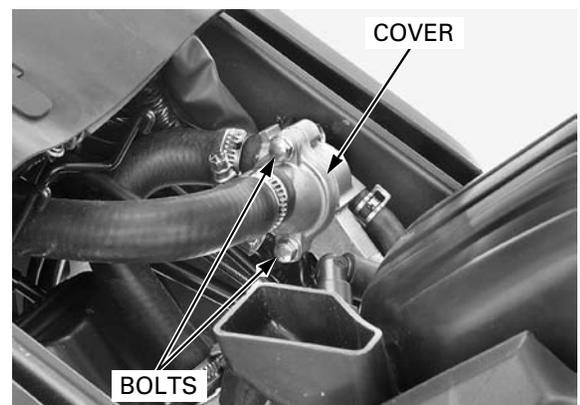


Install the thermostat housing cover onto the housing. Install and tighten the housing cover bolts to the specified torque.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**

Remove the suitable support and close the fuel tank (page 3-6).

Fill the system with the recommended coolant and bleed any air (page 6-6).



**THERMOSTAT HOUSING**

**REMOVAL/INSTALLATION**

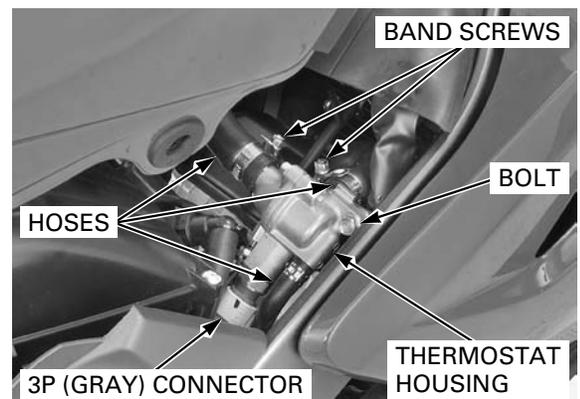
Drain the coolant (page 6-7). Lift and support the fuel tank (page 3-6).

Disconnect the ECT sensor 3P (Gray) connector. Loosen the water hose band screws and disconnect the water hose from the thermostat housing.

Remove the bolt and thermostat housing.

Install the thermostat housing in the reverse order of removal.

Fill the recommended coolant mixture to the filler neck and bleed the air (page 6-6).

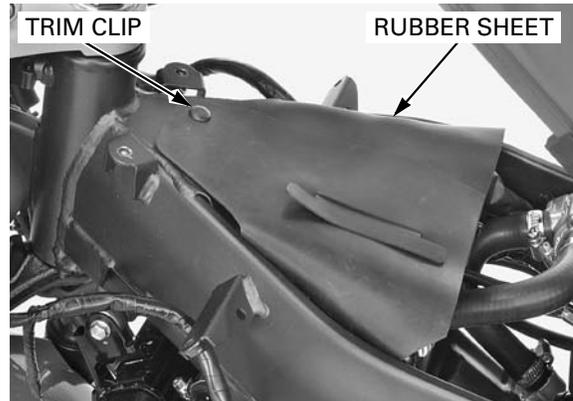


## COOLING SYSTEM

### RADIATOR

#### REMOVAL

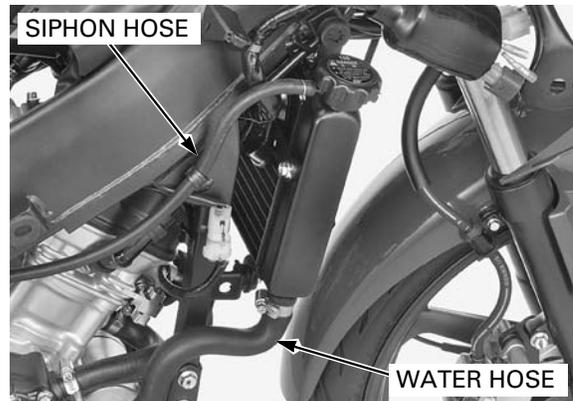
Drain the coolant (page 6-7).  
Lift and support the fuel tank (page 3-6).  
Remove the middle cowl (page 2-9).  
Remove the trim clip.  
Open the rubber sheet.



Disconnect the fan motor 2P (Natural) connector.



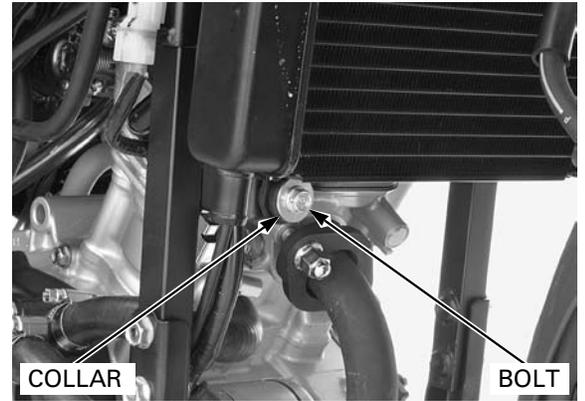
Disconnect the siphon hose from the radiator.  
Loosen the water hose band screw and disconnect the lower water hose.



Loosen the water hose band screw and disconnect the upper water hose.



Remove the radiator lower mounting bolt and collar.

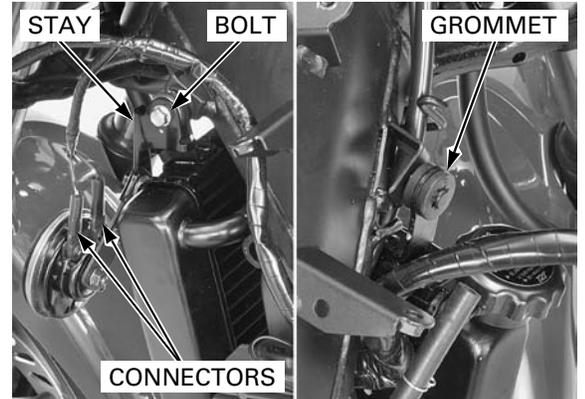


Disconnect the horn connectors.

Remove the radiator upper mounting bolt and horn mounting stay.

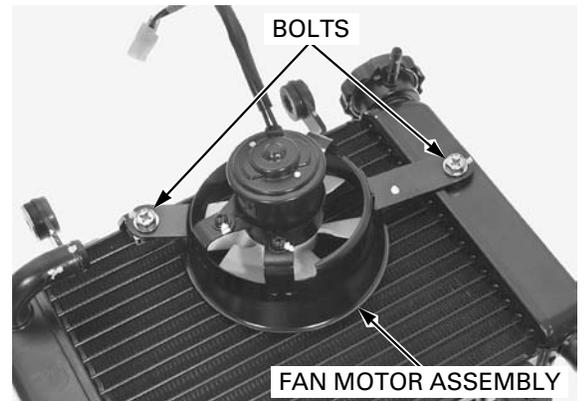
*Be careful not to damage the radiator fins.*

Release the radiator upper grommet from the frame boss by moving the radiator to the right, then remove the radiator assembly.

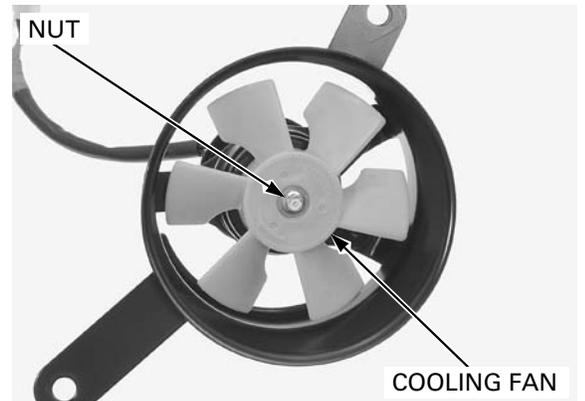


**DISASSEMBLY**

Remove the bolts and fan motor assembly from the radiator.

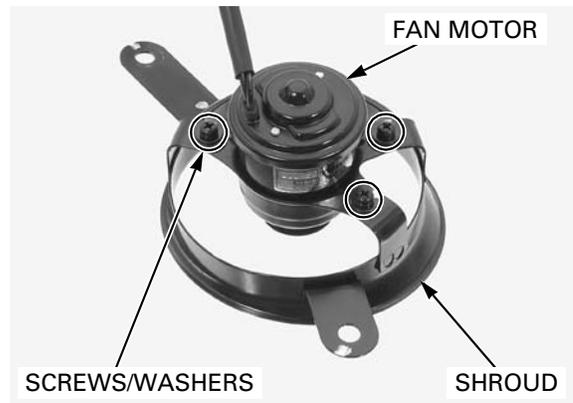


Remove the cooling fan nut and cooling fan.

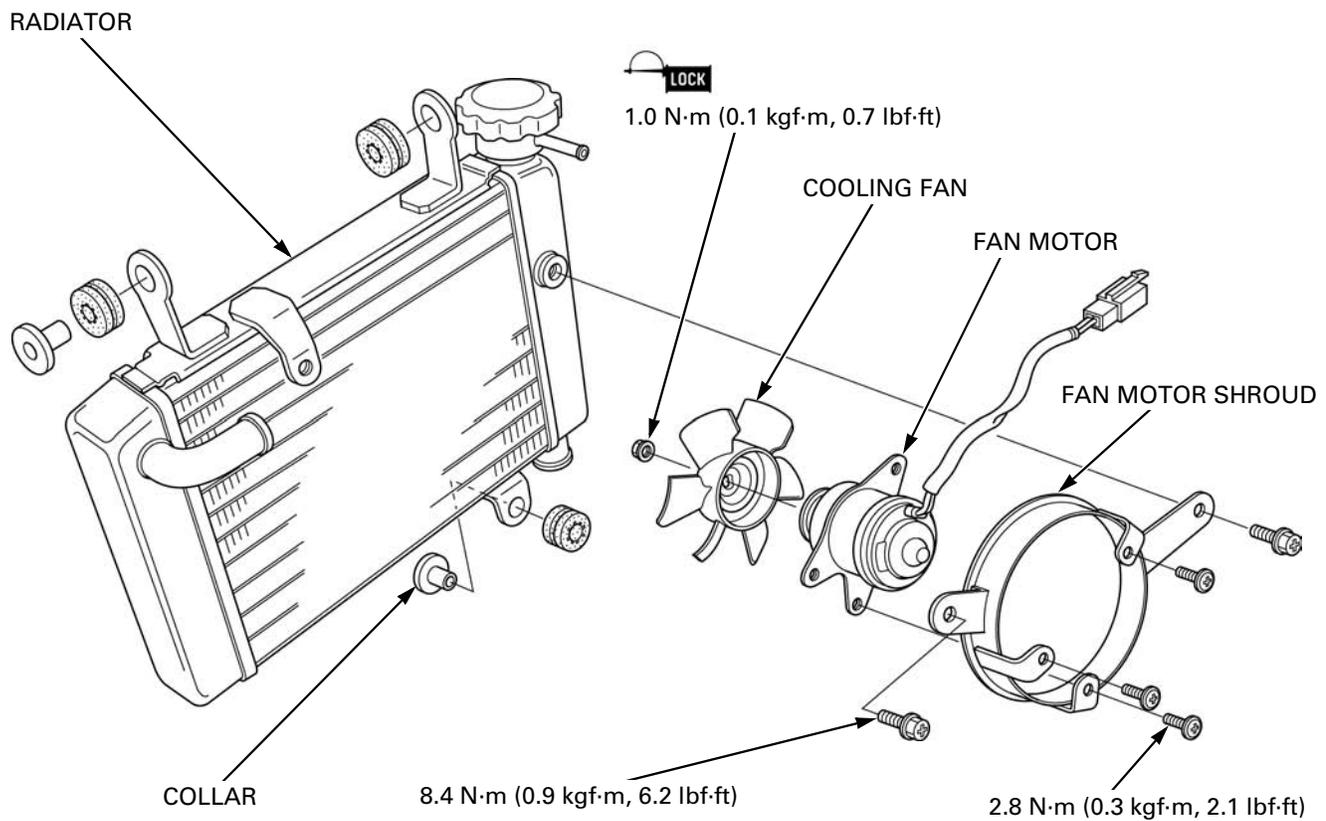


## COOLING SYSTEM

Remove the screws and fan motor from the fan motor shroud.

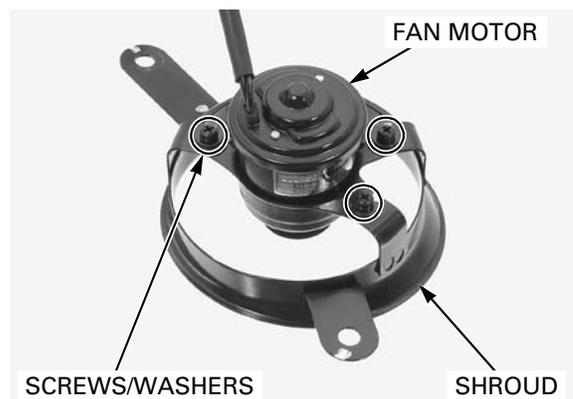


### ASSEMBLY

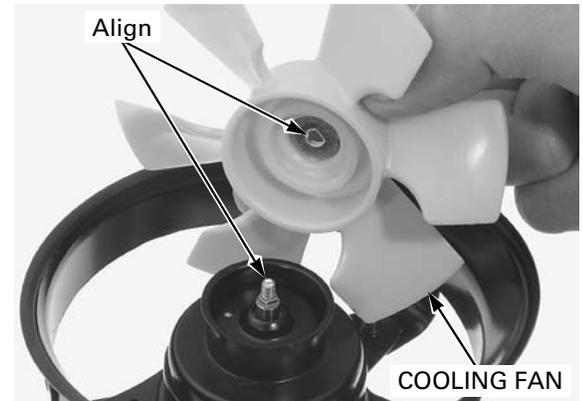


Install the fan motor onto the fan motor shroud. Install and tighten the screws to the specified torque.

**TORQUE: 2.8 N·m (0.3 kgf·m, 2.1 lbf·ft)**

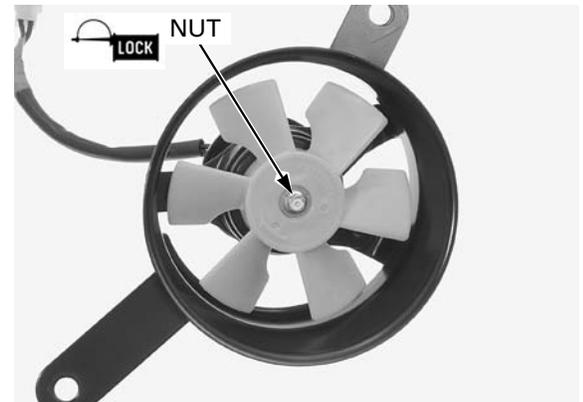


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



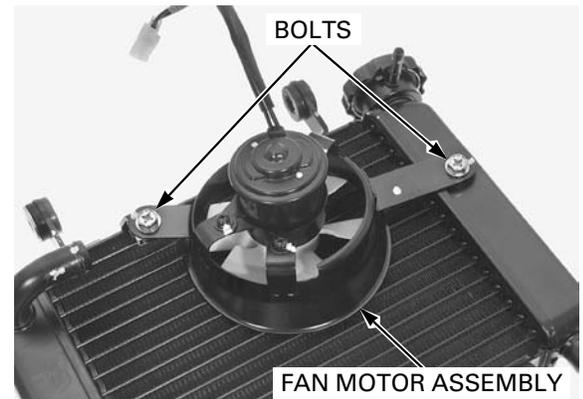
Apply locking agent to the cooling fan nut threads. Install and tighten the nut to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



Install the fan motor assembly onto the radiator. Install and tighten the bolts to the specified torque.

**TORQUE: 8.4 N·m (0.9 kgf·m, 6.2 lbf·ft)**



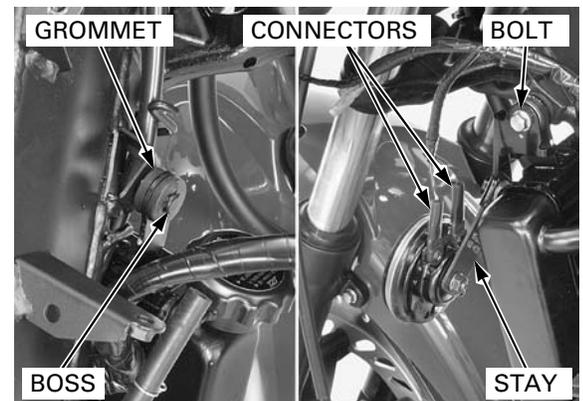
### INSTALLATION

*Be careful not to damage the radiator fins.*

Install the radiator assembly, aligning its upper grommet with the frame boss.

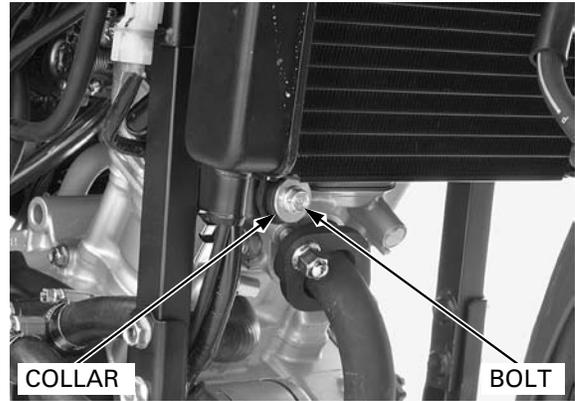
Install the horn mounting stay and radiator upper mounting bolt and tighten the bolt.

Connect the horn connectors.

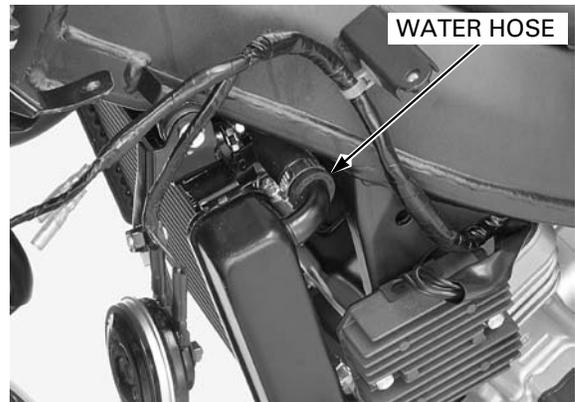


## COOLING SYSTEM

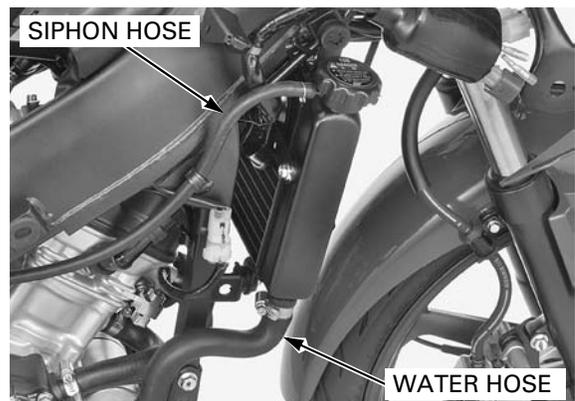
Install the collar and radiator lower mounting bolt.



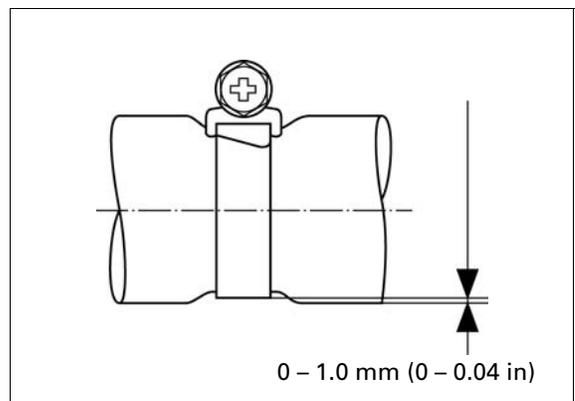
Connect the upper water hose and tighten the water hose band screw.



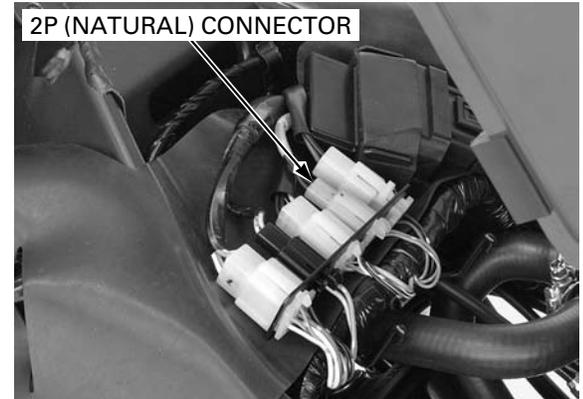
Connect the lower water hose and siphon hose.



Tighten the water hose band screws as shown.  
After installation, check the radiator and radiator hoses for leaks.



Connect the fan motor 2P (Natural) connector.



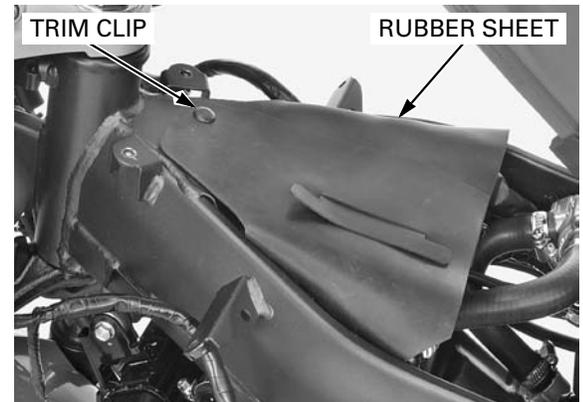
Close the rubber sheet.

Install the trim clip.

Install the middle cowl (page 2-9).

Remove the suitable support and close the fuel tank (page 3-6).

Fill the system with the recommended coolant (page 6-6).



## WATER PUMP

### SEALS INSPECTION

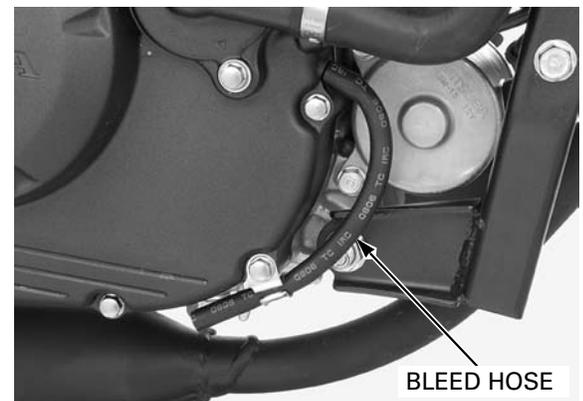
Remove the lower cowl (page 2-8).

Check for signs of seal leakage.

If water leaks through the bleed hose, replace the mechanical seal (page 6-15).

If oil leaks through the bleed hose, replace the oil seal (page 6-15).

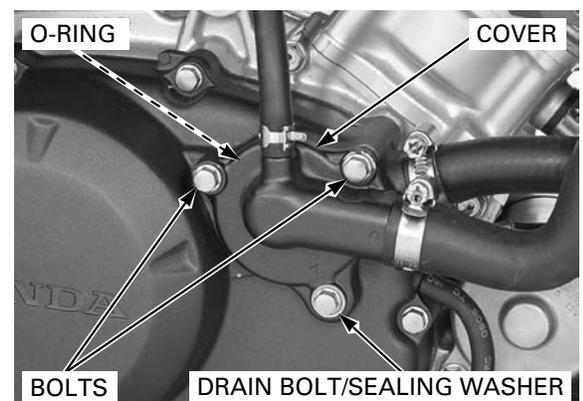
A small amount of "weeping" from the bleed hose is normal.



### REMOVAL/DISASSEMBLY

Drain the coolant (page 6-7).

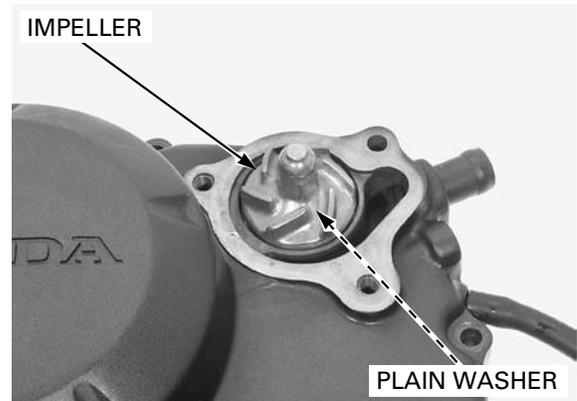
Remove the bolts, drain bolt, sealing washer, water pump cover and O-ring.



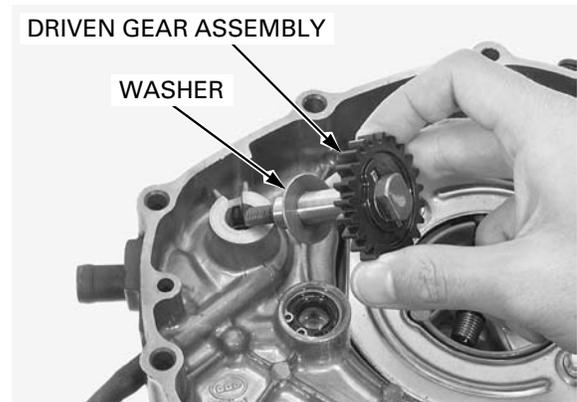
## COOLING SYSTEM

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

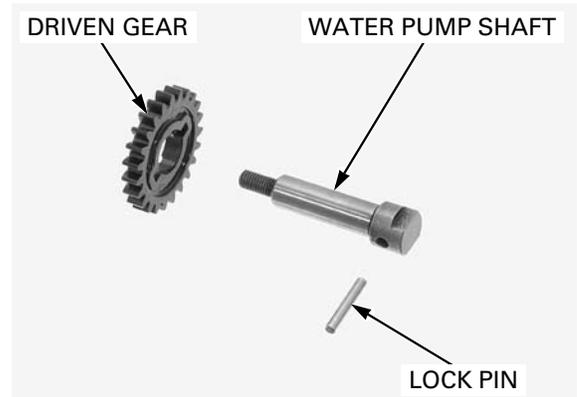
Hold the water pump shaft and remove the impeller and plain washer.



Remove the water pump driven gear assembly and washer from the right crankcase cover and disassemble them.



Check the water pump driven gear, water pump shaft and lock pin for wear or damage, replace them if necessary.



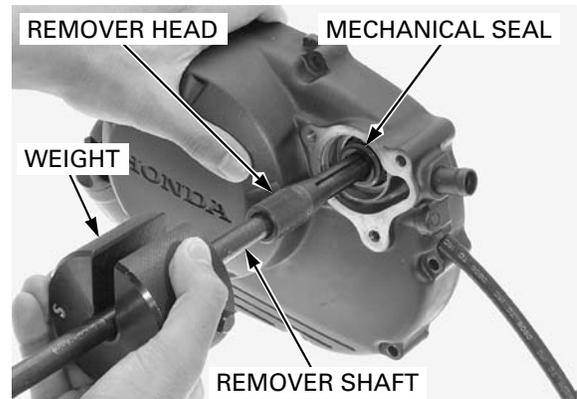
Remove the mechanical seal using the special tools.

### TOOLS:

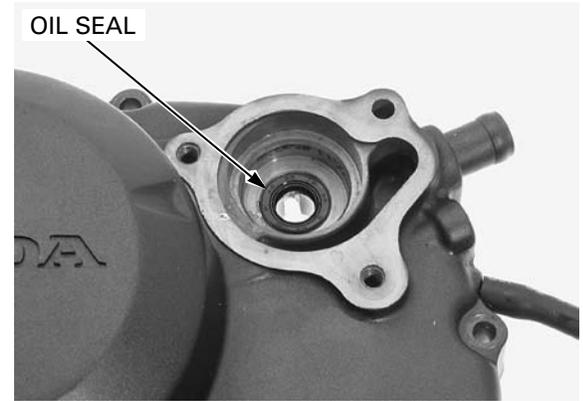
Bearing remover head, 14 mm 07WMC-KFG0100

Remover weight 07741-0010201

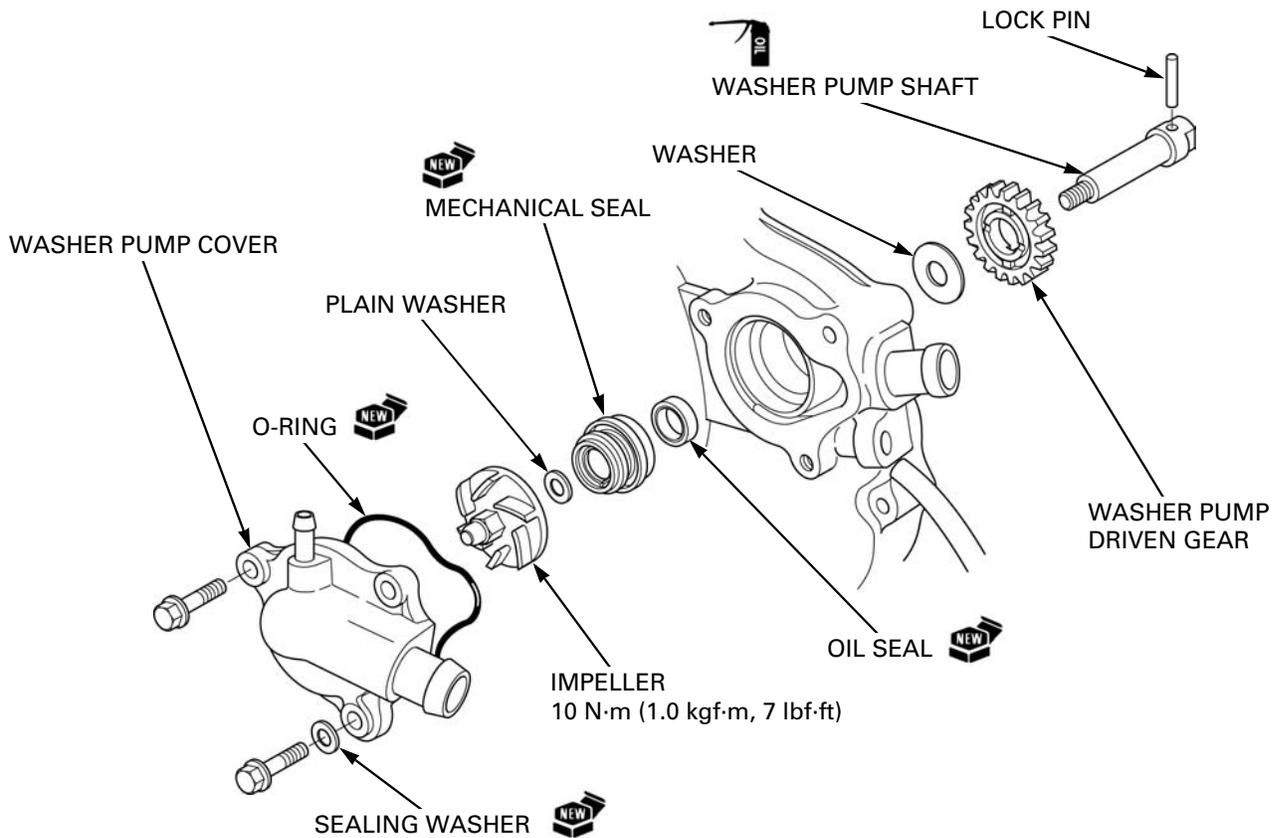
Bearing remover shaft 07936-KC10100



Remove the oil seal.



**ASSEMBLY/INSTALLATION**



Install a new oil seal to the right crankcase cover.

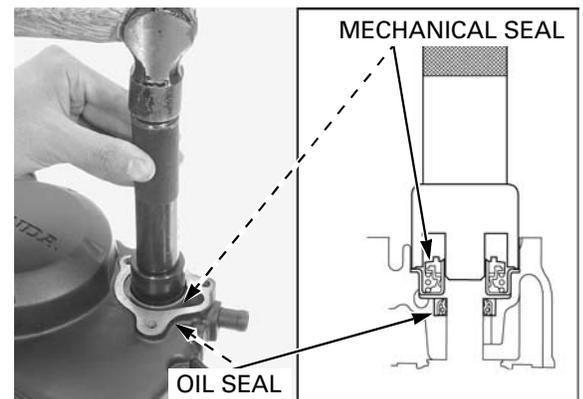
*Be careful not to damage the mechanical seal lips.*

Set and drive in a new mechanical seal using the special tool as shown.

**TOOLS:**  
**Driver**  
**Oil seal driver attachment, 36 mm**

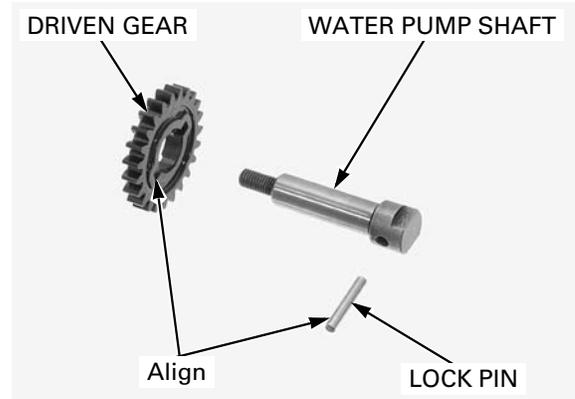
**07749-0010000**

**07945-4150400**

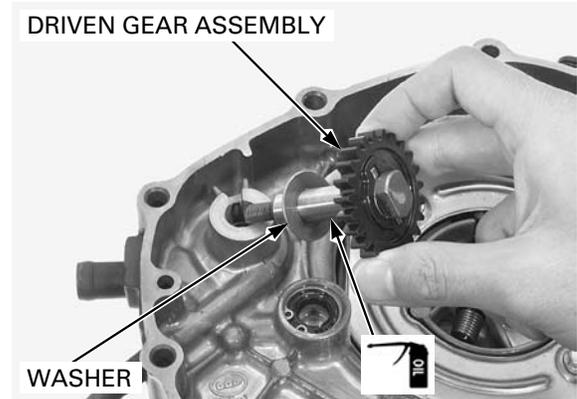


## COOLING SYSTEM

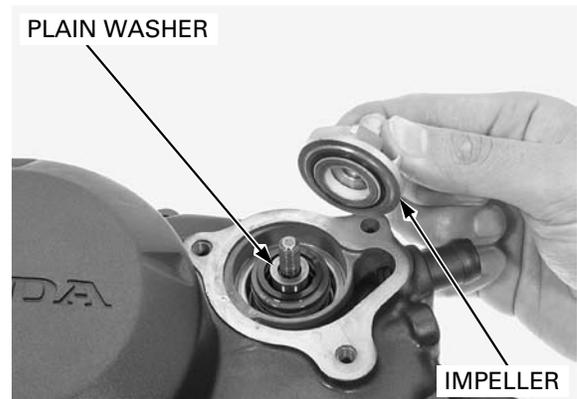
Install the lock pin to the water pump shaft, then install the water pump driven gear aligning the driven gear groove with the lock pin.



Install the washer to the water pump shaft.  
Apply engine oil to the water pump shaft outer surface.  
Install the water pump driven gear assembly into the right crankcase cover.



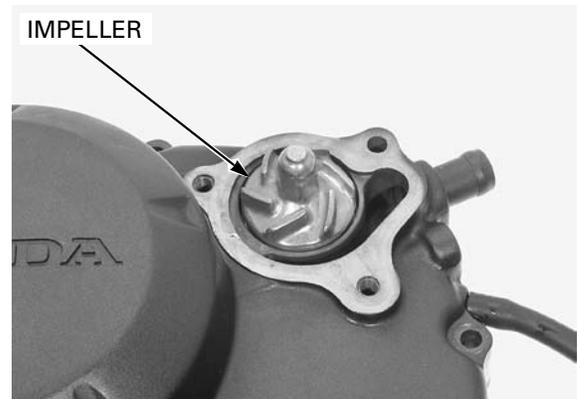
Install the plain washer and impeller to the water pump shaft.



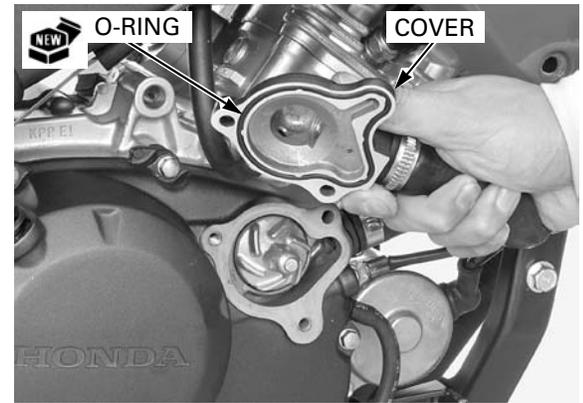
Hold the water pump shaft and tighten the water pump impeller to the specified torque.

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

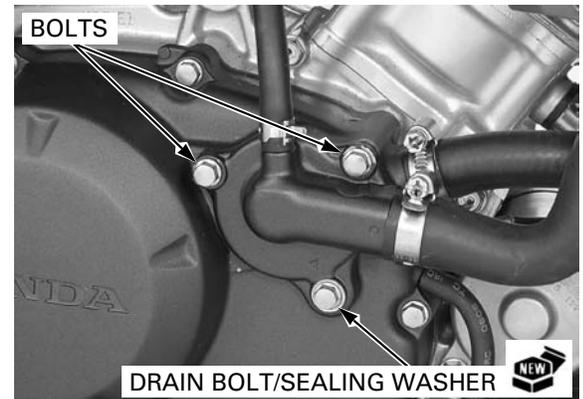
Install the right crankcase cover (page 10-8).



Install a new O-ring to the water pump cover.  
Install the water pump cover.



Install and tighten the bolts, drain bolt and new sealing washer securely.  
Fill the recommended coolant mixture to the filler neck and bleed the air (page 6-6).



## **RADIATOR RESERVE TANK**

### **REMOVAL/INSTALLATION**

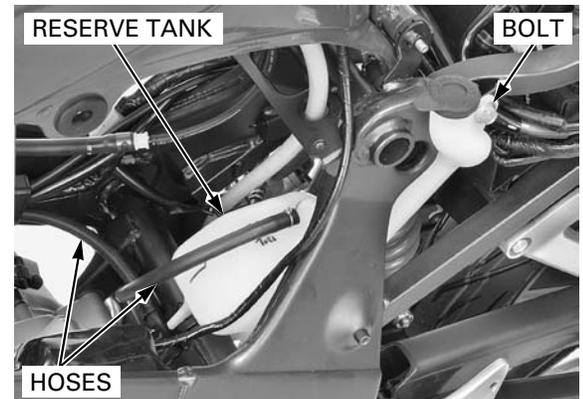
Remove the following:

- Rear cowl (page 2-5)
- Air cleaner housing (page 5-52)

Drain the coolant from the reserve tank (page 6-7).

Remove the bolt and reserve tank.

Disconnect the overflow and siphon hoses from the reserve tank.



Connect the overflow and siphon hoses to the reserve tank.

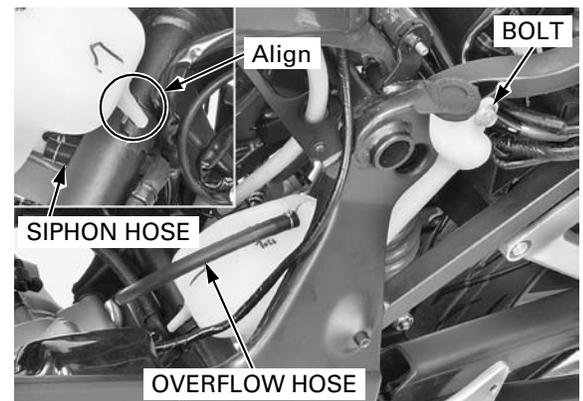
*Route the hoses properly (page 1-18).*

Install the reserve tank to the frame, aligning the tab of the reserve tank with slit of the frame.

Install and tighten the bolt.

Install the following:

- Air cleaner housing (page 5-52)
- Rear cowl (page 2-5)



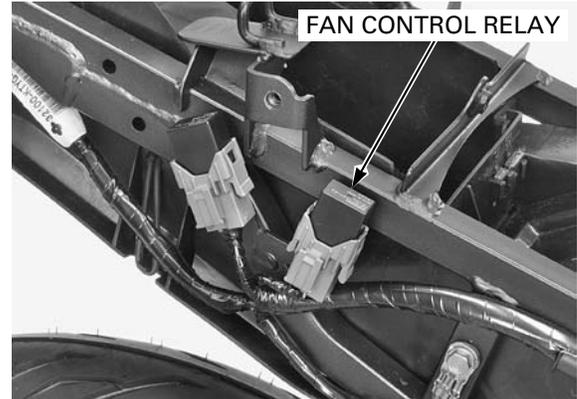
## COOLING SYSTEM

### FAN CONTROL RELAY

#### INSPECTION

Remove the rear cowl (page 2-5).

Remove the fan control relay.

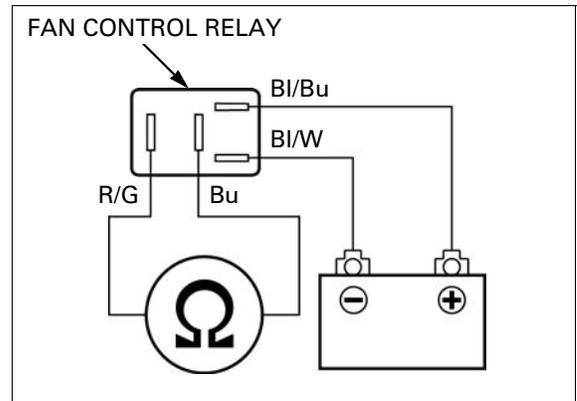


Connect a ohmmeter to the fan control relay connector terminals.

Connect a 12 V battery to the fan control relay connector terminals as shown.

There should be continuity only when 12 V battery is connected.

If there is no continuity only when the 12 V battery is connected, replace the fan control relay.



# 7. ENGINE REMOVAL/INSTALLATION

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COMPONENT LOCATION ..... 7-2

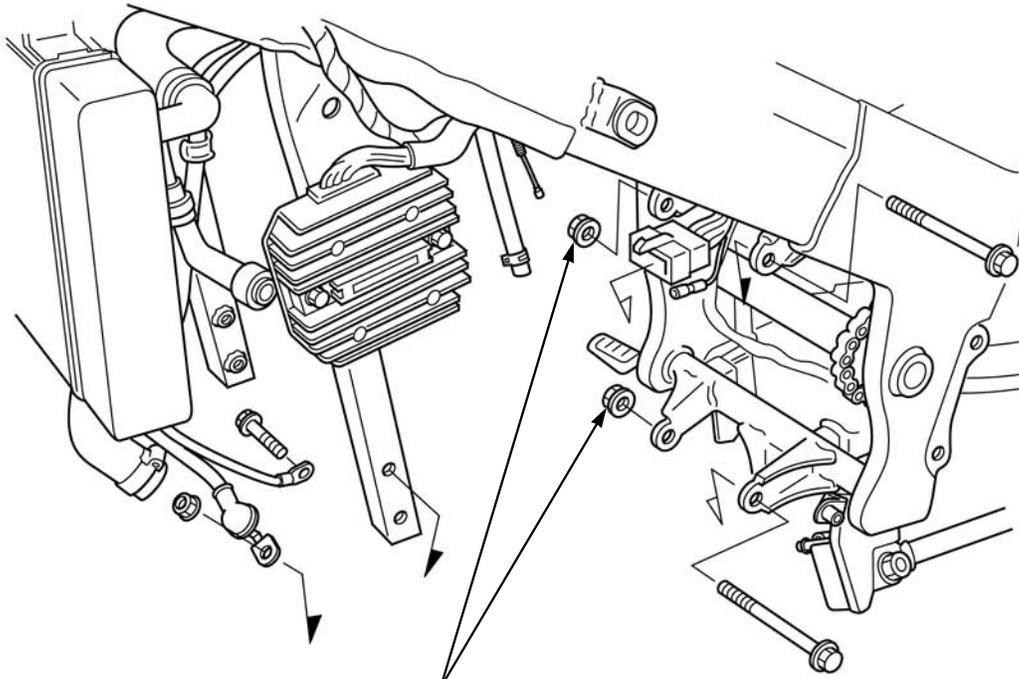
SERVICE INFORMATION ..... 7-3

ENGINE REMOVAL ..... 7-4

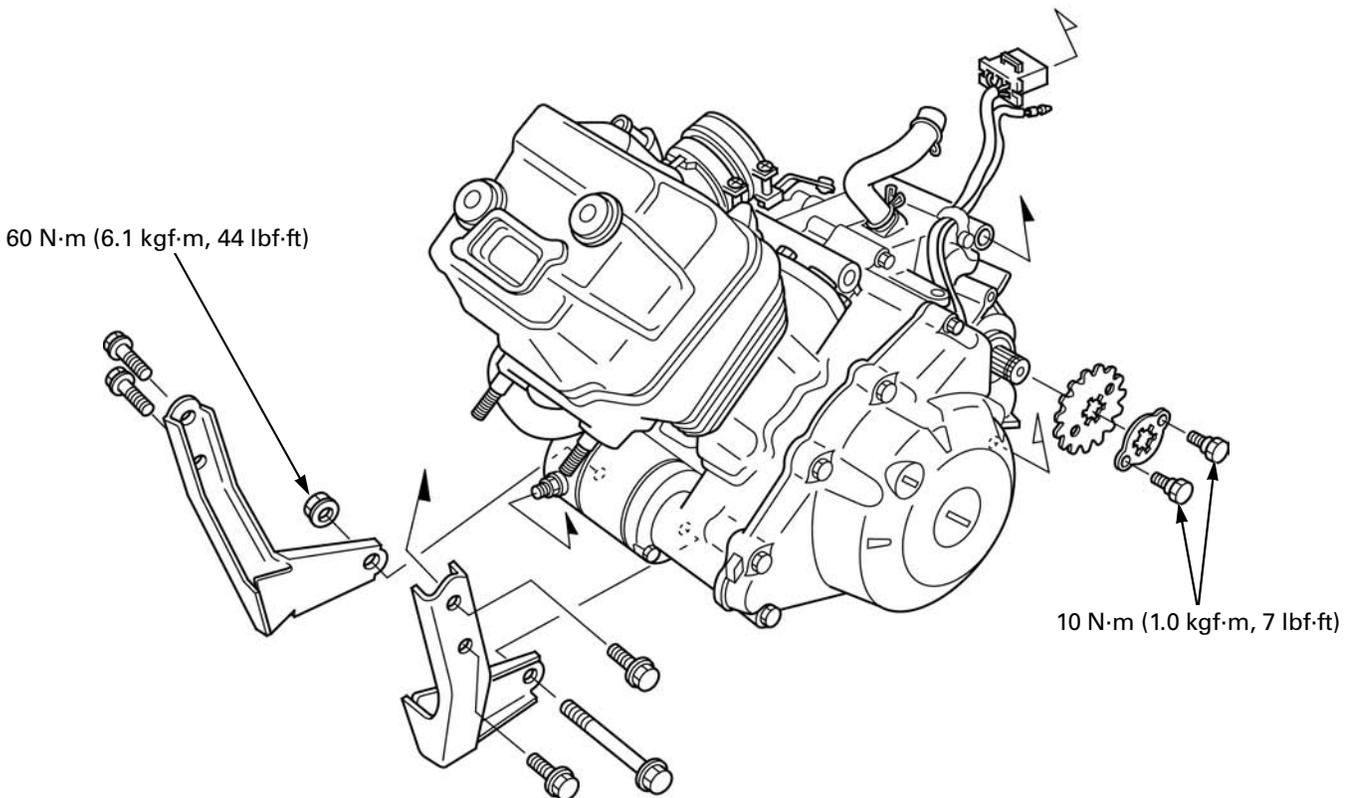
ENGINE INSTALLATION..... 7-6

# ENGINE REMOVAL/INSTALLATION

## COMPONENT LOCATION



60 N·m (6.1 kgf·m, 44 lbf·ft)



60 N·m (6.1 kgf·m, 44 lbf·ft)

10 N·m (1.0 kgf·m, 7 lbf·ft)

## SERVICE INFORMATION

### GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing 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.
  - Oil pump (page 4-4)
  - Camshaft (page 8-8)
  - Clutch (page 10-9)
  - Gearshift linkage (page 10-15)
  - Stator/CKP sensor (page 11-6)
  - Flywheel (page 11-7)
  - Starter motor (page 18-6)
- The following components require engine removal for service.
  - Cylinder head/valves (page 8-15)
  - Cylinder/piston (page 9-4)
  - Crankshaft/balancer (page 12-8)
  - Transmission (page 12-12)

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine oil capacity	At draining	1.0 liter (1.1 US qt, 0.9 Imp qt)
	At disassembly	1.3 liters (1.4 US qt, 1.1 Imp qt)
Engine dry weight		24.7 kg (54.5 lbs)

### TORQUE VALUES

Engine hanger nut	(upper)	60 N·m (6.1 kgf·m, 44 lbf·ft)	
	(lower)	60 N·m (6.1 kgf·m, 44 lbf·ft)	
	(front)	60 N·m (6.1 kgf·m, 44 lbf·ft)	
Drive sprocket fixing plate bolt		10 N·m (1.0 kgf·m, 7 lbf·ft)	
Water hose band screw		–	See page 6-14

## ENGINE REMOVAL/INSTALLATION

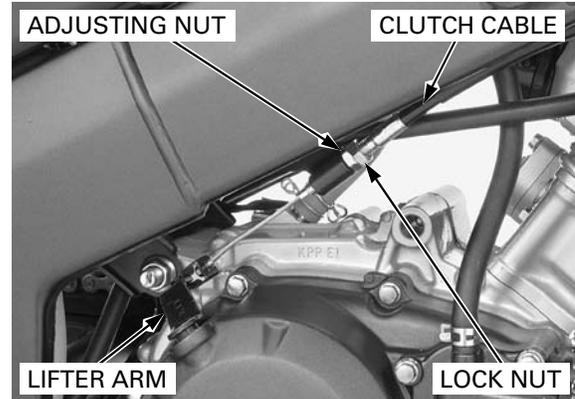
### ENGINE REMOVAL

Drain the engine oil (page 3-14).  
Drain the coolant (page 6-7).

Remove the following:

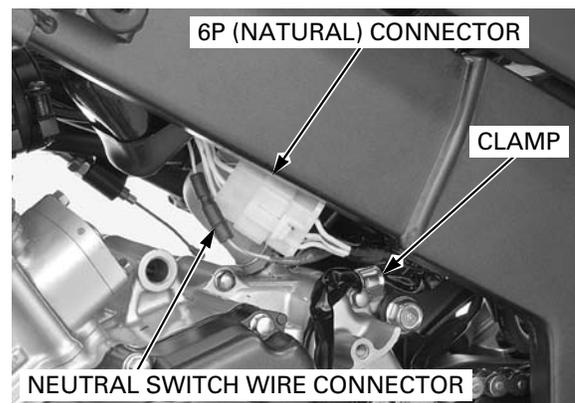
- Middle cowl (page 2-9)
- Gearshift arm and left step holder (page 10-18)
- Throttle body (page 5-52)
- Exhaust pipe/muffler (page 2-13)
- Drive sprocket cover (page 11-4)

Loosen the lock nut and adjusting nut, then disconnect the clutch cable from the clutch lifter arm.



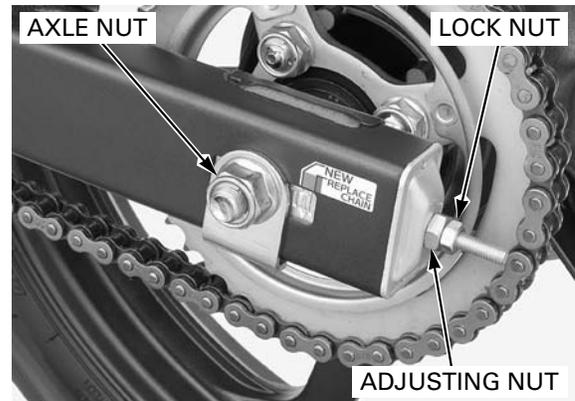
Disconnect the alternator/CKP sensor 6P (Natural) connector and neutral switch wire connector.

Release the alternator/CKP sensor and neutral switch wires from the clamp.

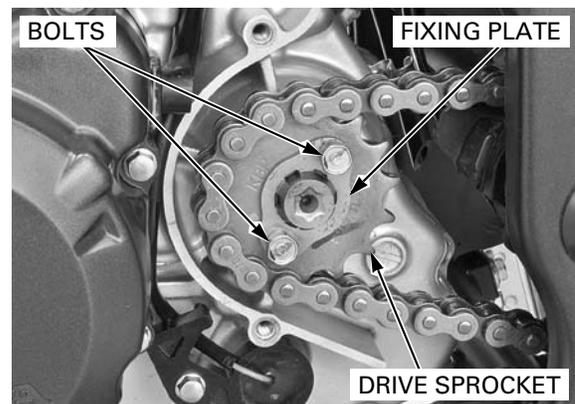


Loosen the axle nut, lock nuts and adjusting nuts.

Push the rear wheel forward and make a drive chain slack fully.

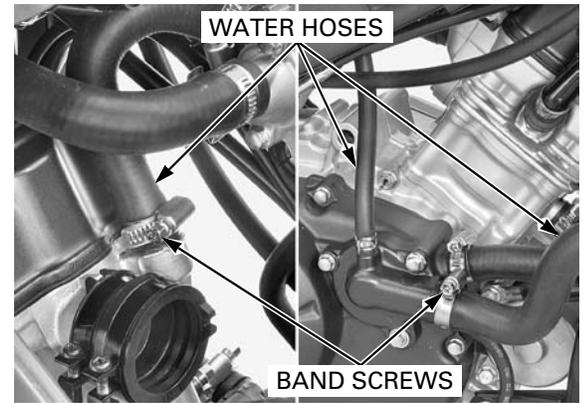


Remove the bolts, fixing plate and drive sprocket.



## ENGINE REMOVAL/INSTALLATION

Loosen the water hose band screws and disconnect the water hoses.

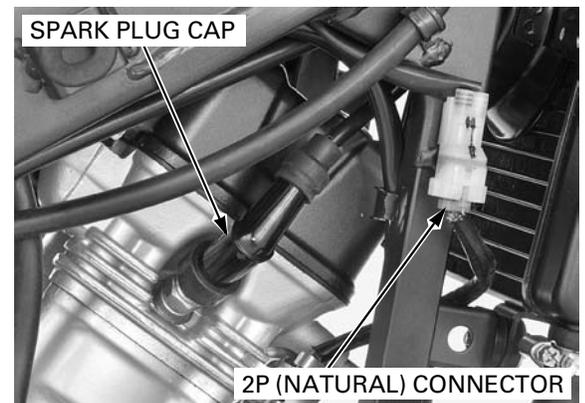


*Do not disconnect the O<sub>2</sub> sensor cap from the O<sub>2</sub> sensor.*

Disconnect the O<sub>2</sub> sensor 2P (Natural) connector and spark plug cap.

### NOTICE

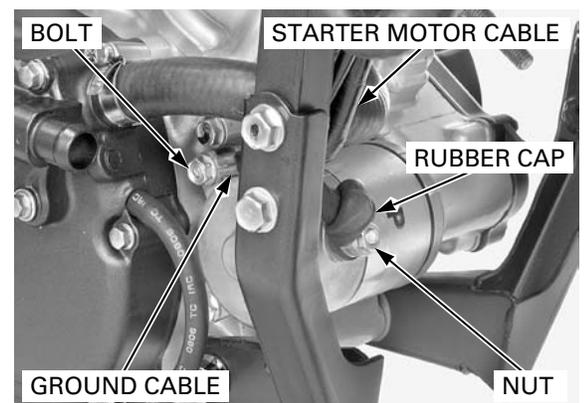
*If the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one.*



Release the rubber cap.

Remove the starter motor terminal nut and starter motor cable.

Remove the starter motor mounting bolt and ground cable.

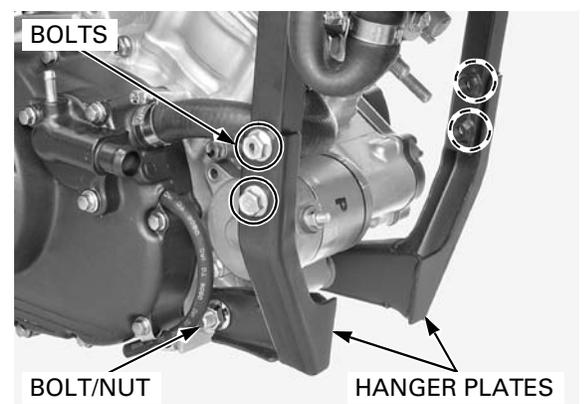


*The jack height must be continually adjusted to relieve stress for ease of bolt removal.*

Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

Remove the following:

- Front engine hanger bolt and nut
- Front engine hanger plate bolts
- Front engine hanger plates

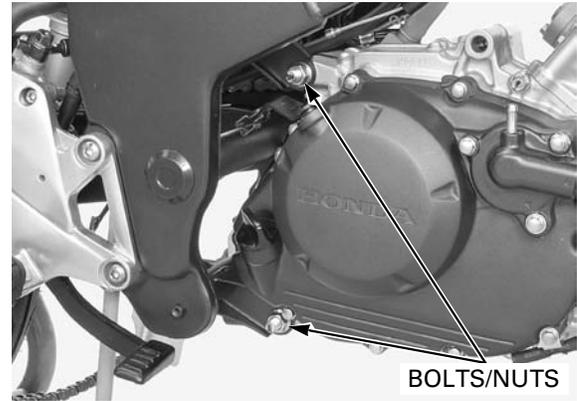


## ENGINE REMOVAL/INSTALLATION

Remove the upper and lower engine hanger bolts and nuts.

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

Remove the engine from the frame.



## ENGINE INSTALLATION

NOTE:

- Note the direction of the engine hanger bolts.
- Place the jack or other adjustable support under the engine.
- The jack height must be continually adjusted to relieve stress for ease bolt installation.
- Carefully align the mounting points with the jack to prevent damage to engine, frame, water hose, wires and cables.
- All the engine mounting bolts and nuts loosely install, then tighten the bolts and nuts to the specified torque.
- Route the water hose, wires and cables properly (page 1-18).

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

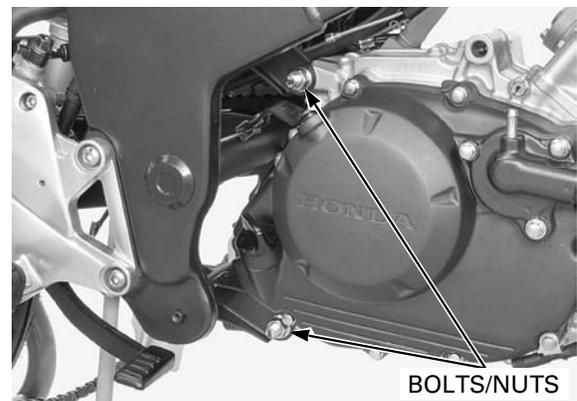
Place the engine in the frame, then loosely install all the bolts, nuts and front engine hanger plates.

Tighten the upper and lower engine hanger nuts to the specified torque.

**TORQUE:**

**Upper engine hanger nut:  
60 N·m (6.1 kgf·m, 44 lbf·ft)**

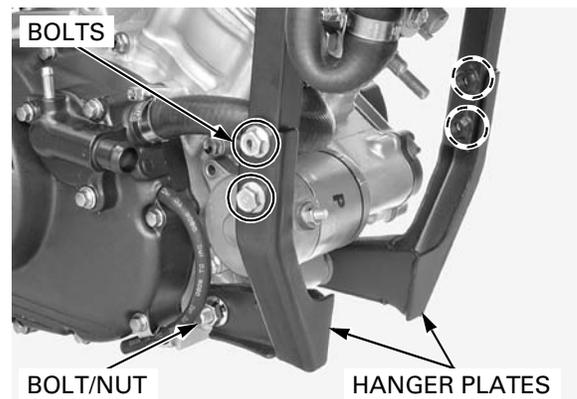
**Lower engine hanger nut:  
60 N·m (6.1 kgf·m, 44 lbf·ft)**



Tighten the front engine hanger plates bolts securely.

Tighten the front engine hanger nuts to the specified torque.

**TORQUE: 60 N·m (6.1 kgf·m, 44 lbf·ft)**



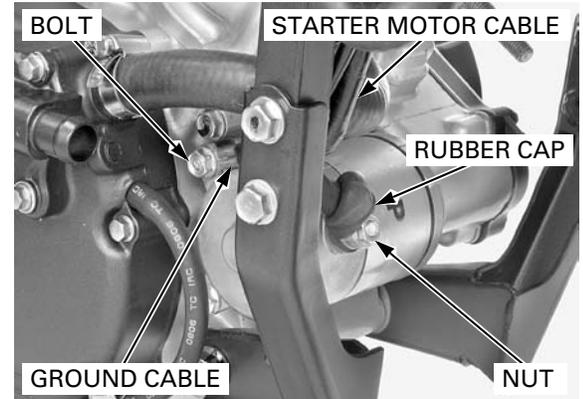
## ENGINE REMOVAL/INSTALLATION

Install the ground cable and starter motor mounting bolt.

Tighten the mounting bolt securely.

Install the starter motor cable and starter motor terminal nut.

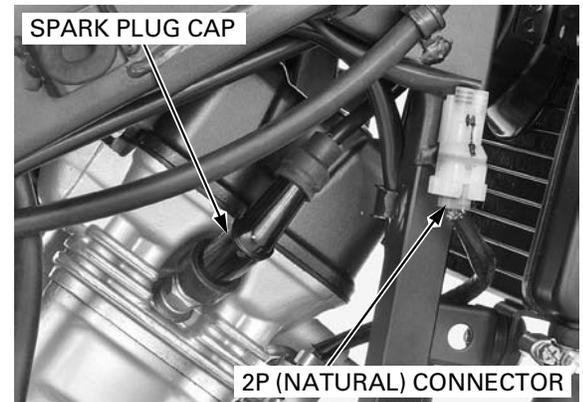
Tighten the terminal nut securely and reposition the rubber cap properly on the starter motor terminal.



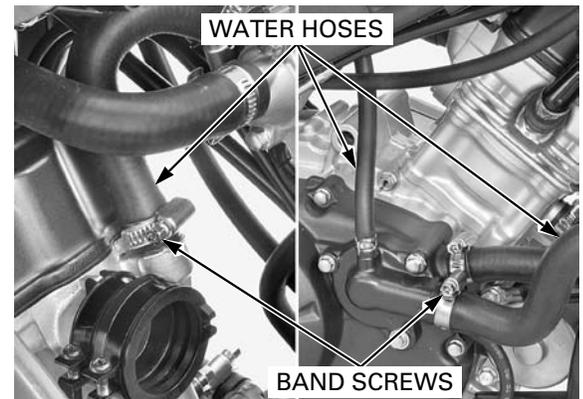
Connect the spark plug cap and O<sub>2</sub> sensor 2P (Natural) connector.

### NOTICE

*If the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one.*



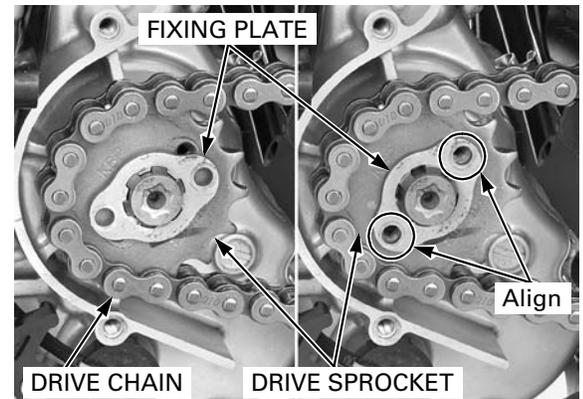
Connect the water hoses and tighten the water hose band screws (page 6-14).



Install the drive chain over the drive sprocket.  
Install the drive sprocket to the countershaft.

Install the fixing plate.

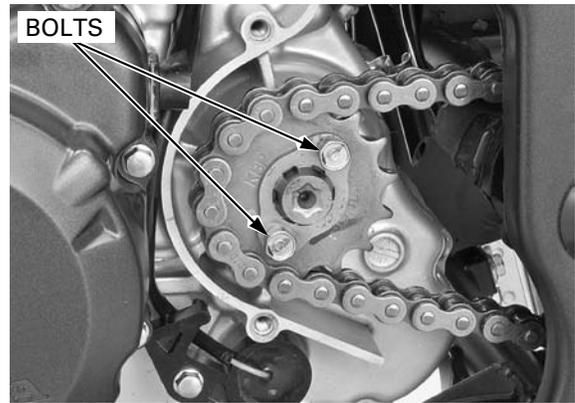
Rotate the fixing plate and align the hole in the plate with the bolt hole in the drive sprocket.



## ENGINE REMOVAL/INSTALLATION

Install and tighten the drive sprocket fixing plate bolts to the specified torque.

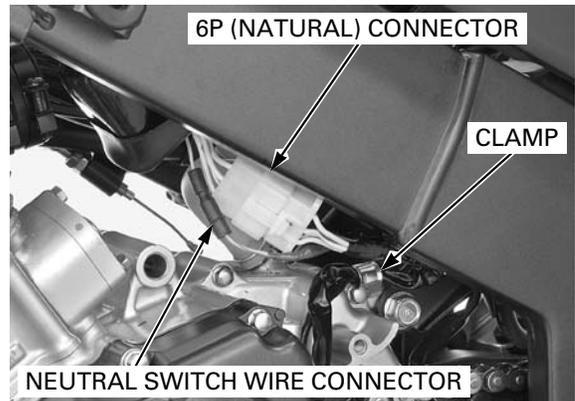
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



Connect the alternator/CKP sensor 6P (Natural) connector and neutral switch wire connector.

*Route the wires properly (page 1-18).*

Install the alternator/CKP sensor and neutral switch wires from the clamp.



Connect the clutch cable.

Install the following:

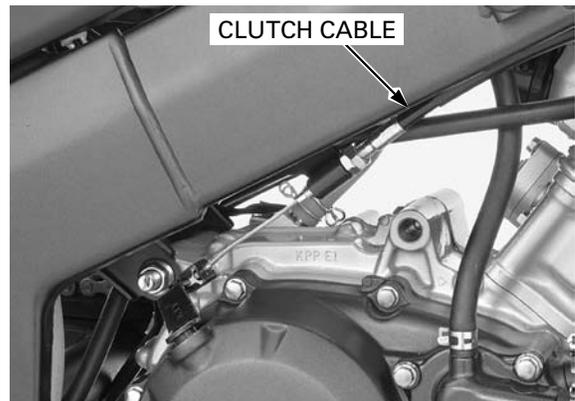
- Drive sprocket cover (page 11-5)
- Exhaust pipe/muffler (page 2-16)
- Throttle body (page 5-56)
- Gearshift arm and left step holder (page 10-19)
- Middle cowl (page 2-9)

Inspect the following:

- Drive chain slack (page 3-16)
- Throttle grip freeplay (page 3-7)
- Clutch lever freeplay (page 3-24)

Fill the engine with the recommended engine oil (page 3-13).

Fill the recommended coolant mixture to the filler neck and bleed the air (page 6-6).



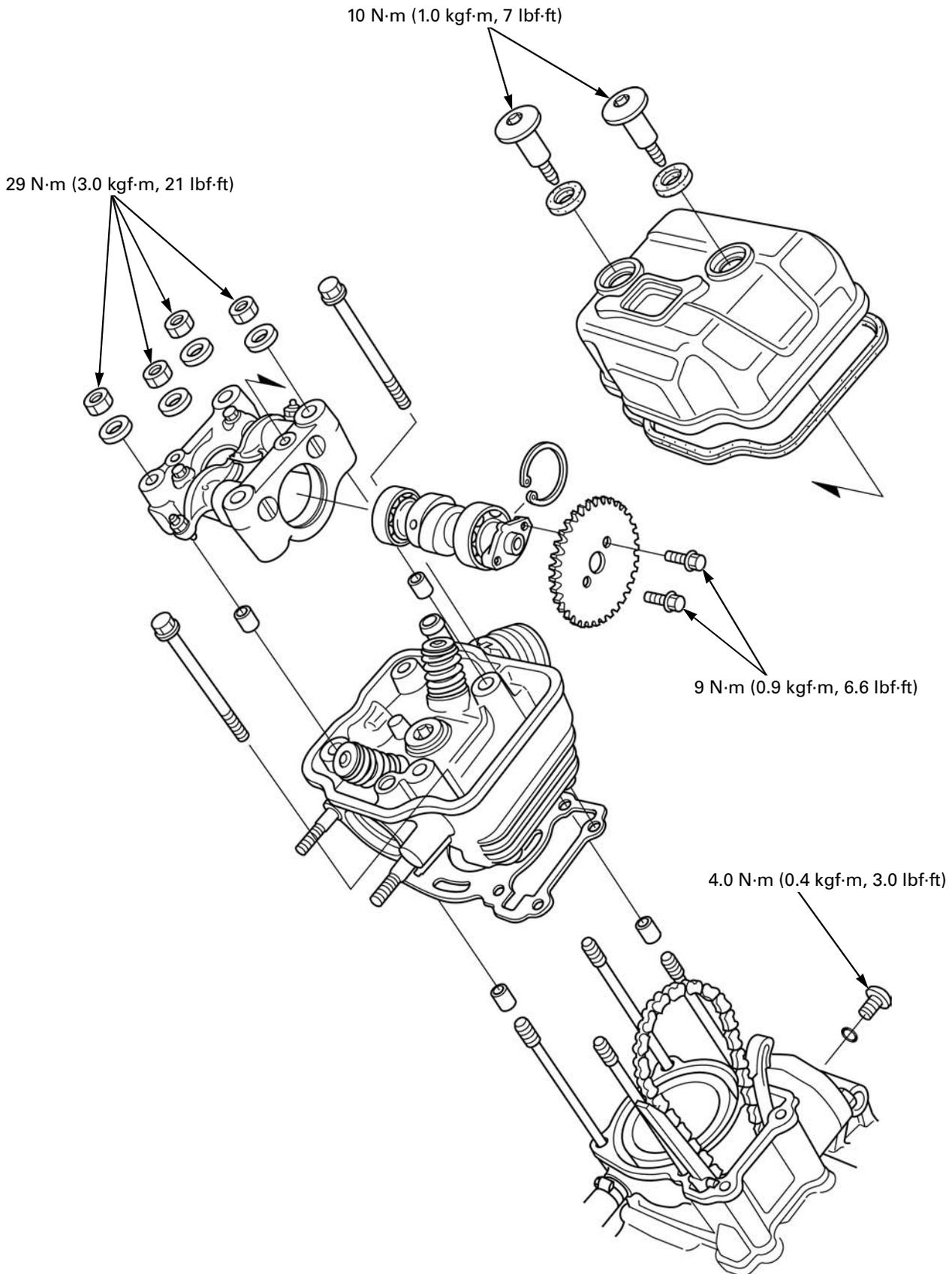
# 8. CYLINDER HEAD/VALVES

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COMPONENT LOCATION .....	8-2	CYLINDER HEAD COVER.....	8-6
SERVICE INFORMATION .....	8-3	CAMSHAFT.....	8-8
TROUBLESHOOTING .....	8-5	CAMSHAFT HOLDER .....	8-12
CYLINDER COMPRESSION.....	8-6	CYLINDER HEAD .....	8-15

# CYLINDER HEAD/VALVES

## COMPONENT LOCATION



# SERVICE INFORMATION

## GENERAL

- This section covers service of the cylinder head, valves, rocker arms and camshaft.
- The camshaft service can be done with the engine installed in the frame. The cylinder head service requires engine removal.
- 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.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passage in the cylinder head (stud bolt hole) and camshaft holder. Clean the oil passage before assembling them.

## SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Cylinder compression at 530 min <sup>-1</sup> (rpm)		1,343 kPa (13.7 kgf/cm <sup>2</sup> , 195 psi)	–
Valve clearance		IN	0.06 ± 0.02 (0.002 ± 0.001)
		EX	0.27 ± 0.02 (0.011 ± 0.001)
Valve, valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)
		EX	4.965 – 4.980 (0.1955 – 0.1961)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)
		EX	0.020 – 0.047 (0.0008 – 0.0019)
	Valve guide height	IN	11.5 – 11.7 (0.45 – 0.46)
EX		12.3 – 12.5 (0.48 – 0.49)	
Valve spring	Free length	Inner	33.50 (1.319)
		Outer	35.70 (1.406)
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)
Rocker arm, rocker arm shaft	Arm I.D.	IN/EX	10.000 – 10.015 (0.3937 – 0.3943)
	Shaft O.D.	IN/EX	9.972 – 9.987 (0.3926 – 0.3932)
	Arm-to-shaft clearance	IN/EX	0.013 – 0.043 (0.0005 – 0.0017)
Camshaft	Cam lobe height	IN	29.316 – 29.556 (1.1542 – 1.1636)
		EX	29.138 – 29.378 (1.1472 – 1.1566)
Cylinder head warpage		–	0.05 (0.002)

## TORQUE VALUES

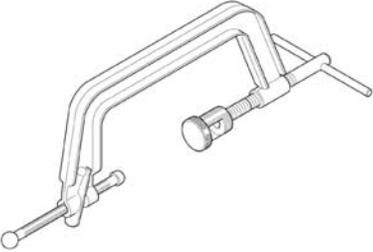
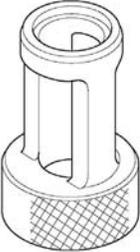
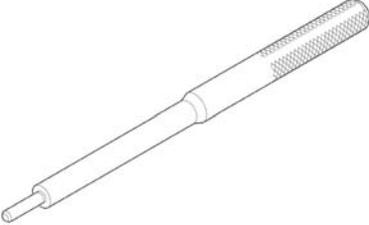
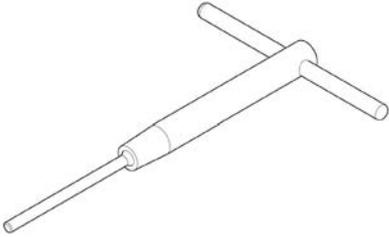
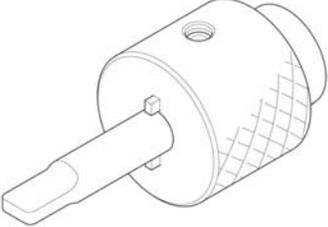
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Rocker arm shaft stopper bolt	9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)
Camshaft holder mounting nut	29 N·m (3.0 kgf·m, 21 lbf·ft)
Cam sprocket mounting bolt	9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)
Cam chain tensioner lifter plug	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)
Insulator band screw	–

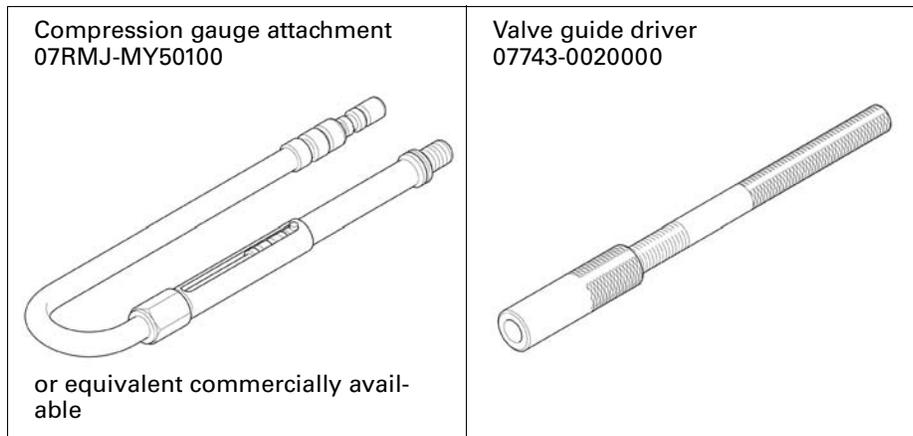
Apply engine oil to the threads and seating surface.

See page 5-57

# CYLINDER HEAD/VALVES

## TOOLS

<p>Valve spring compressor 07757-001000</p> 	<p>Valve spring compressor attachment 07959-KM30101</p> 	<p>Valve guide driver, 5.0 mm 07942-8920000</p> 
<p>Seat cutter, 24 mm (45° EX) 07780-0010600</p> 	<p>Seat cutter, 29 mm (45° IN) 07780-0010300</p> 	<p>Flat cutter, 27 mm (32° EX) 07780-0013300</p> 
<p>Flat cutter, 30 mm (32° IN) 07780-0012200</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>Tensioner stopper 070MG-0010100</p> 



## TROUBLESHOOTING

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

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

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Weak valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Faulty cylinder, piston or piston rings (page 9-4).

### **Compression too high, over-heating or knocking**

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

### **Excessive smoke**

- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder, piston or piston rings (page 9-4).

### **Excessive noise**

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn rocker arm and/or shaft
- Worn rocker arm and valve stem end
- Worn cam sprocket teeth
- Worn and loose cam chain
- Worn or damaged cam chain tensioner
- Faulty cylinder, piston or piston rings (page 9-4).

### **Rough idle**

- Low cylinder compression
- Faulty fuel system

## CYLINDER HEAD/VALVES

### CYLINDER COMPRESSION

Warm the engine to normal operating temperature.

Stop the engine.

Remove the spark plug (page 3-9).

Install the compression gauge attachment into the spark plug hole.

Connect the compression gauge to the attachment.

#### TOOL:

**Compression gauge attachment 07RMJ-MY50100 or equivalent commercially available**

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Shift the transmission into neutral.

Crank the engine with the starter motor.

*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.

#### STANDARD:

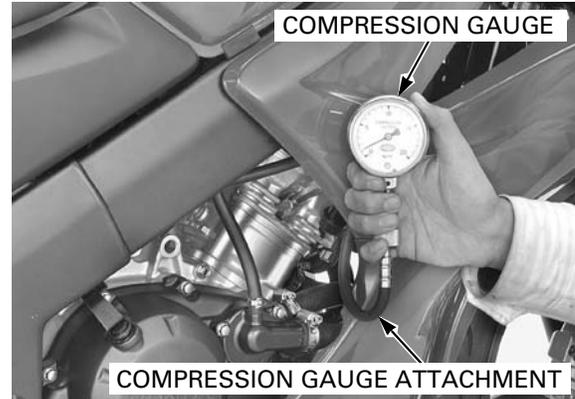
**1,343 kPa (13.7 kgf/cm<sup>2</sup>, 195 psi) at 530 min<sup>-1</sup>(rpm)**

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 combustion chamber or on piston head



### CYLINDER HEAD COVER

#### REMOVAL

Remove the middle cowl (page 2-9).

*The cylinder head cover can be serviced with the engine installed in the frame.*

Remove the radiator lower mounting bolt, then move the radiator forward.



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

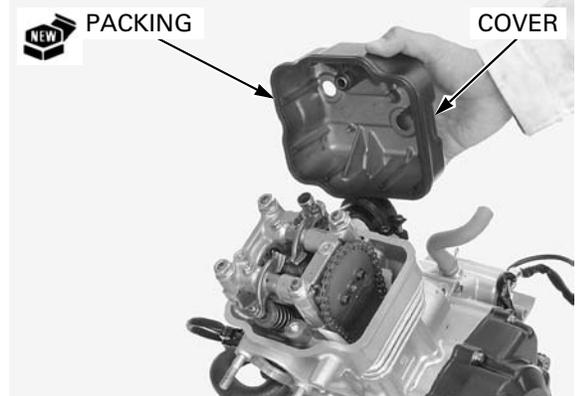
BOLTS/RUBBER SEALS



### INSTALLATION

Install a new packing into the cylinder head cover groove.  
Install the cylinder head cover onto the cylinder head.

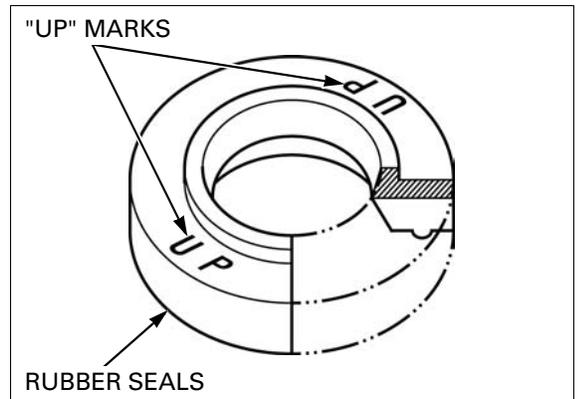
PACKING



Check the rubber seals are in good condition, replace them if necessary.

Install the rubber seals to the cylinder head cover with their "UP" marks facing up.

"UP" MARKS



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

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

BOLTS



## CYLINDER HEAD/VALVES

### CAMSHAFT

#### REMOVAL

*The camshaft can be serviced with the engine installed in the frame.*

Remove the cylinder head cover (page 8-6). Make sure the piston is at TDC (Top Dead Center) on the compression stroke (page 3-11).

Loosen the lock nuts and adjusting screws.

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

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

#### TOOL:

**Tensioner stopper**

**070MG-0010100**

*Be careful not to let the cam sprocket bolts fall into the crankcase.*

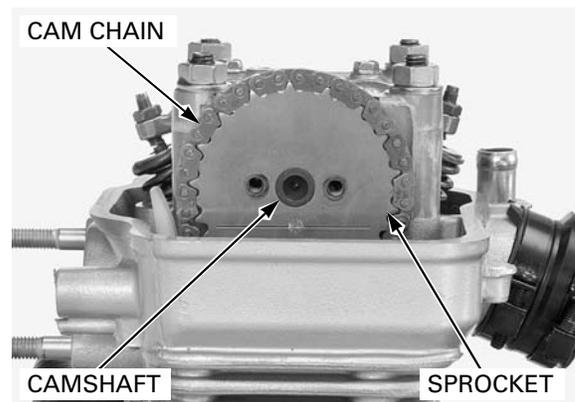
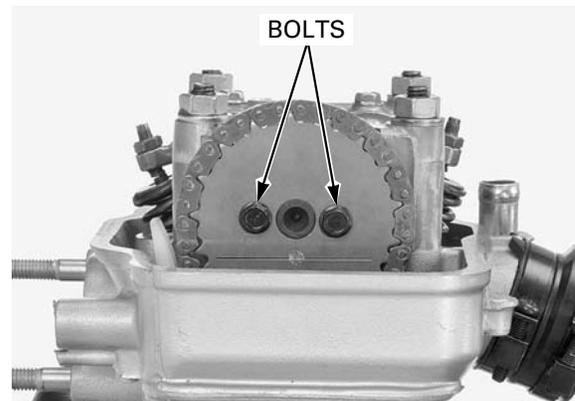
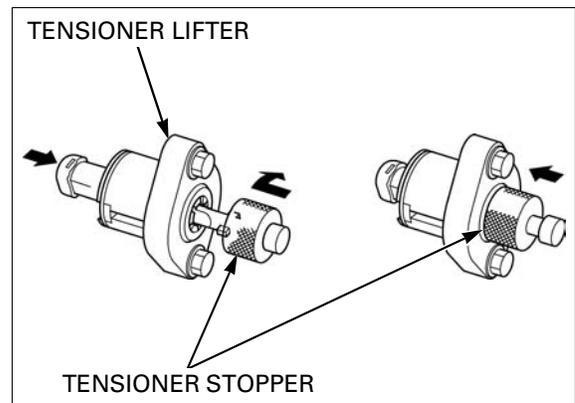
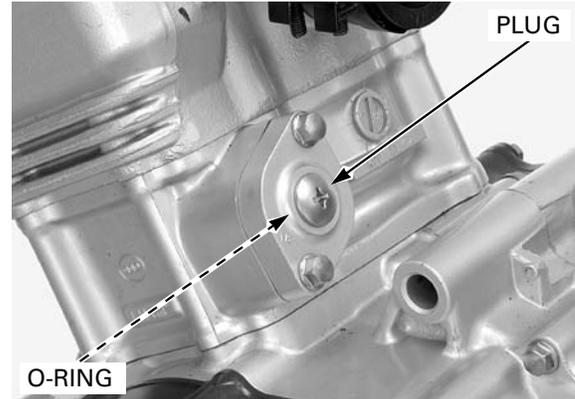
Remove the cam sprocket bolts.

*Be careful not to let the cam sprocket fall into the crankcase.*

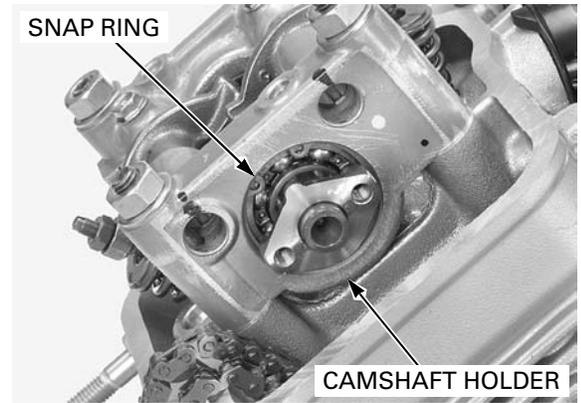
Remove the cam sprocket to the camshaft.

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

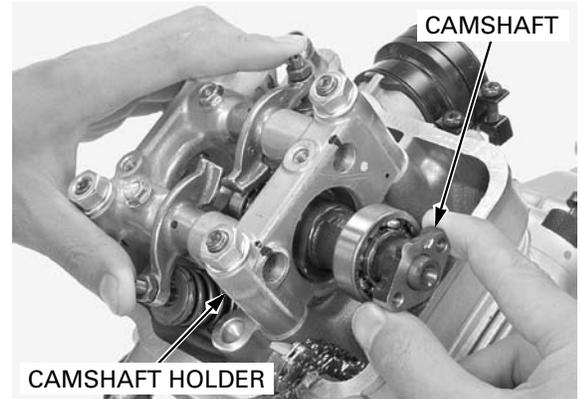
Remove the sprocket from the cam chain.



Remove the snap ring from the camshaft holder.



Remove the camshaft from the camshaft holder while holding the rocker arms to make a good access for camshaft removal.

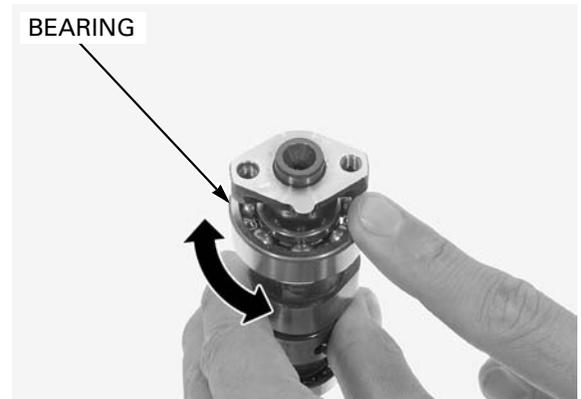


## INSPECTION

### CAMSHAFT BEARING

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

Replace the camshaft assembly if the bearings do not turn smoothly, quietly or if they fit loosely on the camshaft.



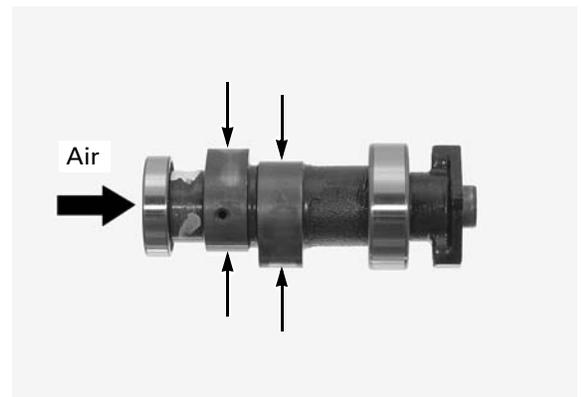
### CAM LOBE

Check the cam lobe surfaces for scoring or evidence of insufficient lubricant.

Measure the height of each cam lobe.

**SERVICE LIMITS: IN: 29.05 mm (1.144 in)**  
**EX: 28.85 mm (1.136 in)**

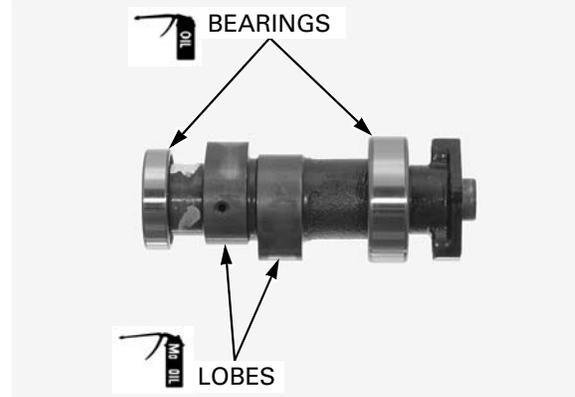
Clean the oil passage of the camshaft using a compressed air.



## CYLINDER HEAD/VALVES

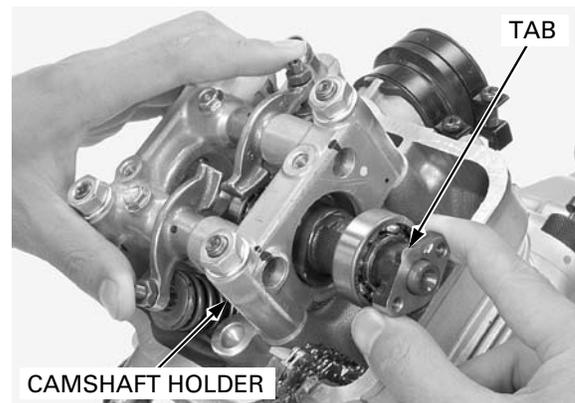
### INSTALLATION

Apply engine oil to the camshaft bearings rotating area.  
Apply molybdenum oil solution to the cam lobes.



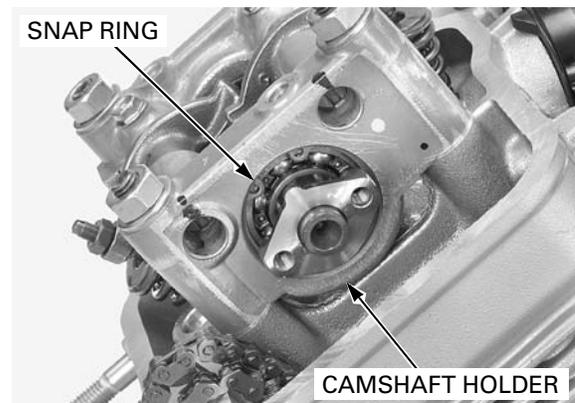
*Make sure the tab of the camshaft facing upward.*

Install the camshaft into the camshaft holder while holding the rocker arms to make a good access for camshaft installation.



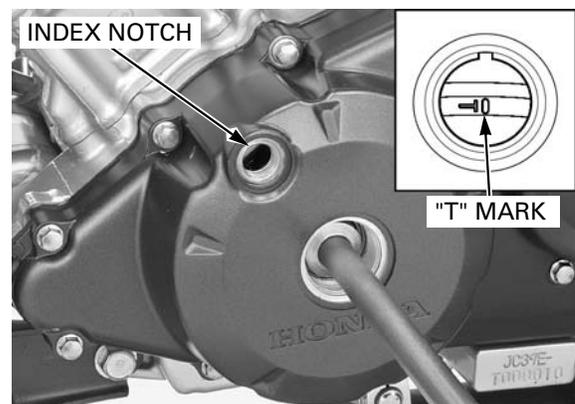
*Make sure the snap ring is firmly seated in the groove.*

Install the snap ring into the groove of the camshaft holder.

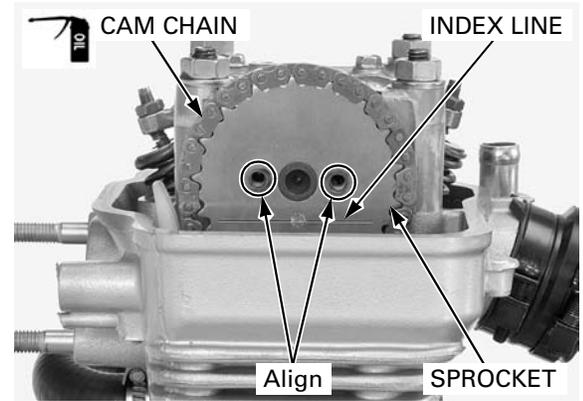


*Be careful not to jam the cam chain and timing sprocket on the crankshaft when rotating the crankshaft.*

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

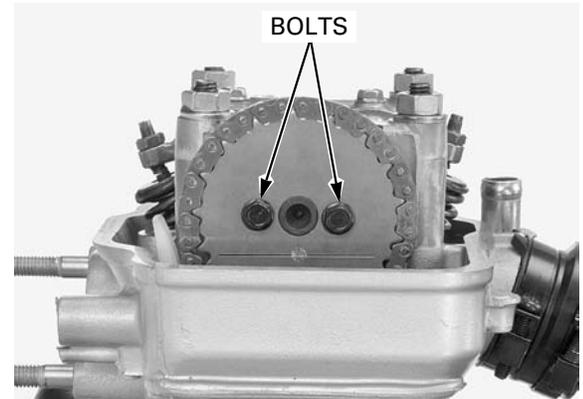


Apply engine oil to the cam chain entire surface.  
 Install the cam chain over the cam sprocket so that the index line of the cam sprocket is flush with the cylinder head upper surface as shown.  
 Align the bolt holes in the cam sprocket and camshaft.

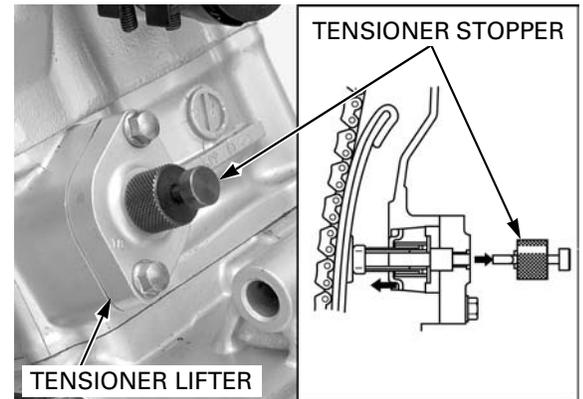


*Be careful not to let the cam sprocket bolts fall into the crankcase.*

Install and tighten the cam sprocket mounting bolts to the specified torque by holding the crankshaft.  
**TORQUE: 9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)**



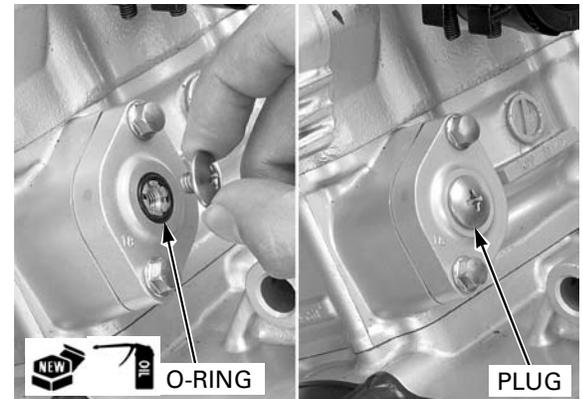
Remove the tensioner stopper from the cam chain tensioner lifter.



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

**TORQUE: 4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)**

Install the cylinder head cover (page 8-7).



## CYLINDER HEAD/VALVES

### CAMSHAFT HOLDER

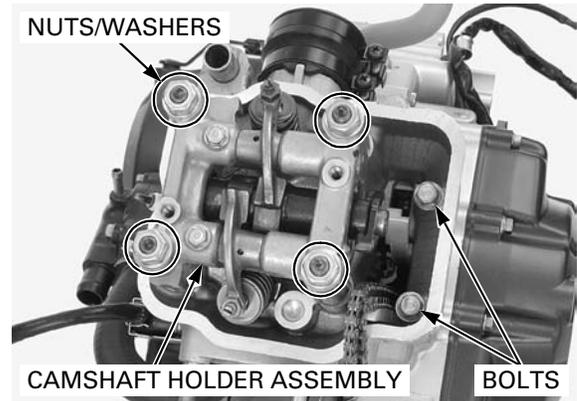
#### REMOVAL

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

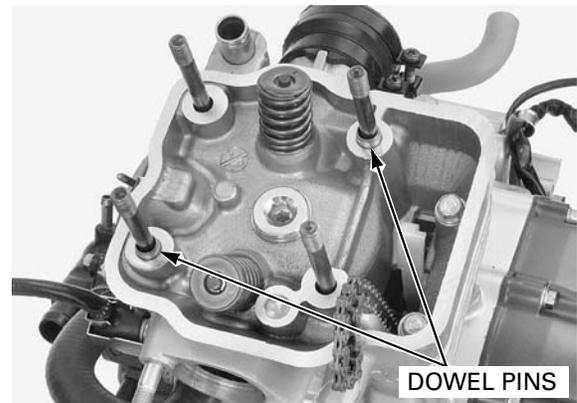
Loosen the cylinder head bolts alternately in several steps.

*Be careful not to let the camshaft holder mounting nuts and washers fall into the crankcase.*

Loosen the camshaft holder mounting nuts in a crisscross pattern in several steps, and remove the washers and camshaft holder assembly.



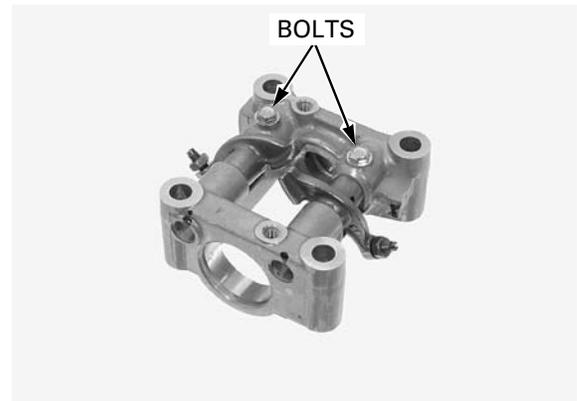
Remove the dowel pins from the cylinder head.



#### DISASSEMBLY

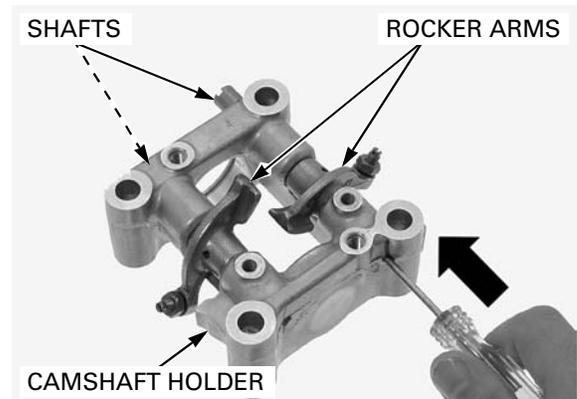
Remove the camshaft (page 8-8).

Remove the rocker arm shaft stopper bolts.



Push the rocker arm shafts from the right side as shown.

Remove the rocker arm shafts and rocker arms from the camshaft holder.



**INSPECTION**

**ROCKER ARM/ROCKER ARM SHAFT**

Check the sliding surface of each rocker arm and rocker arm shaft for wear or damage.  
Check the oil hole for clog of each rocker arm.

Measure the rocker arm I.D.

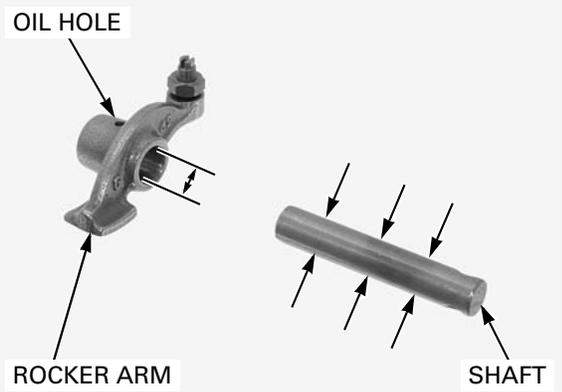
**SERVICE LIMIT: 10.10 mm (0.398 in)**

Measure the rocker arm shaft O.D. at three points.

**SERVICE LIMIT: 9.75 mm (0.384 in)**

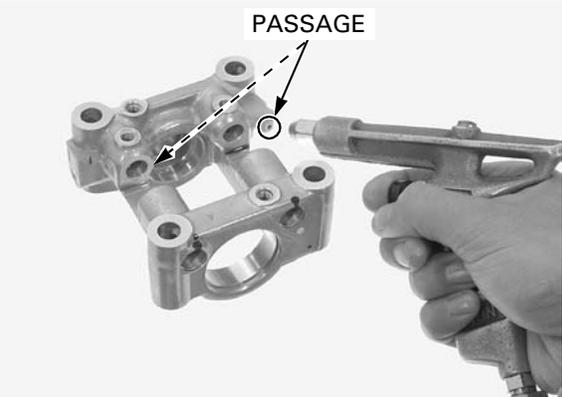
Calculate the rocker arm-to-shaft clearance.

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

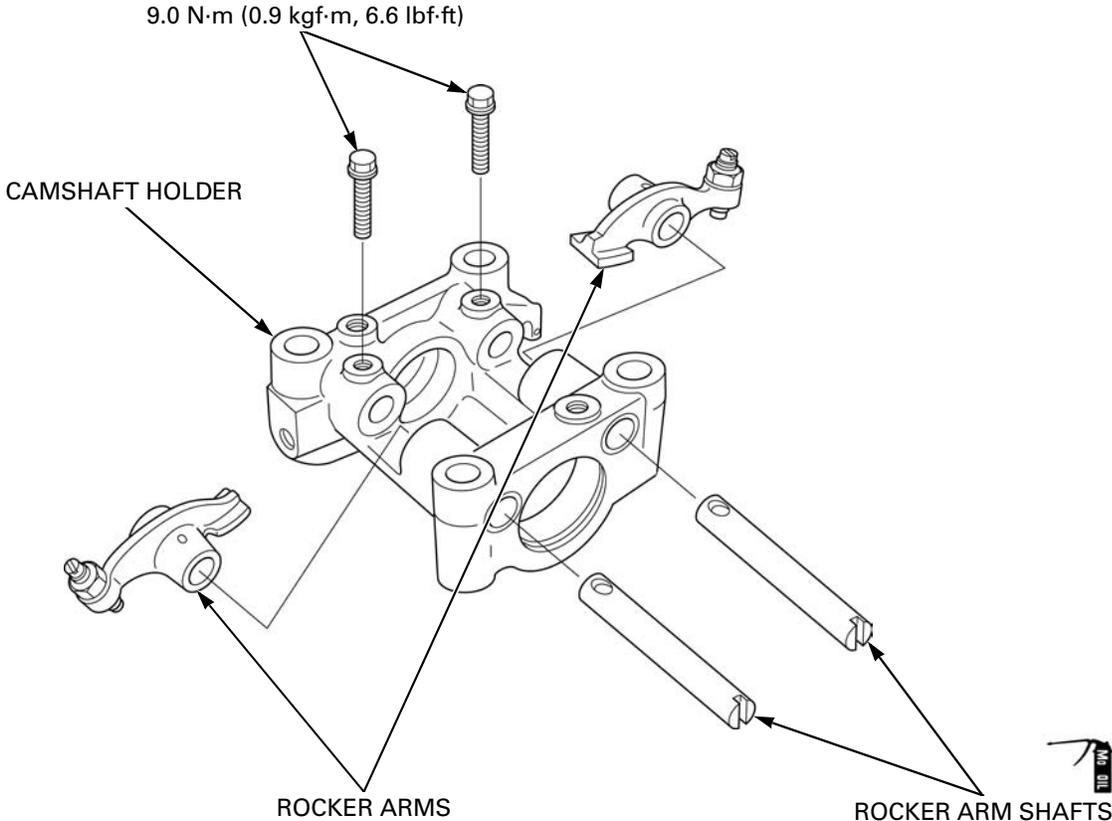


Clean the oil passages of the camshaft holder using a compressed air.

Check the oil passage for clogs.



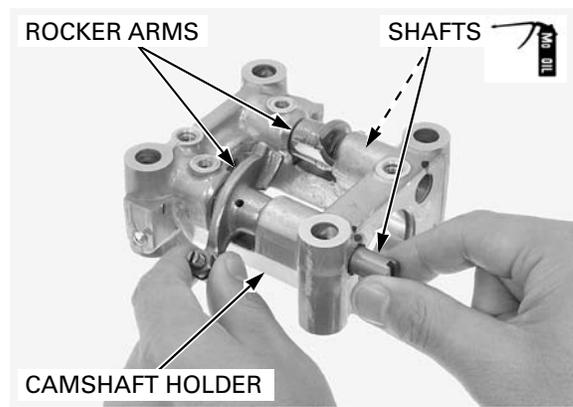
**ASSEMBLY**



## CYLINDER HEAD/VALVES

Apply molybdenum oil solution to each rocker arm shaft outer surface.

Set the rocker arm into the camshaft holder with the camshaft contact area facing the cylinder head as shown, then install the rocker arm shaft with the threads facing the bolt hole into the camshaft holder through the rocker arm.

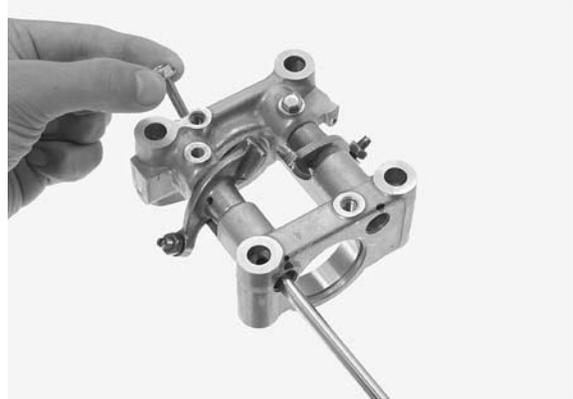


Align the bolt holes in the camshaft holder and rocker arm shaft using a flat blade screwdriver.

Install and tighten the rocker arm shaft stopper bolts to the specified torque.

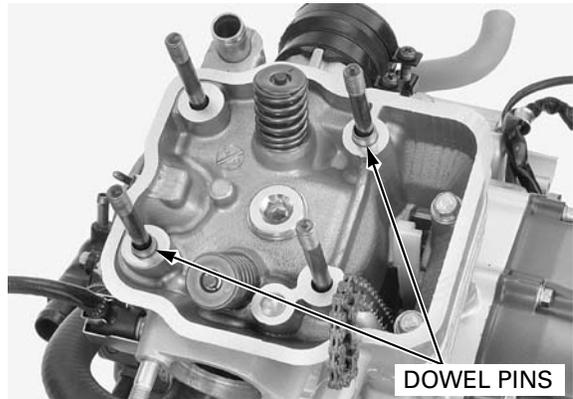
**TORQUE: 9.0 N-m (0.9 kgf-m, 6.6 lbf-ft)**

Install the camshaft (page 8-10).



## INSTALLATION

Install the dowel pins to the cylinder head.



Install the camshaft holder onto the cylinder head.

Apply engine oil to the camshaft holder mounting nut threads and seating surface.

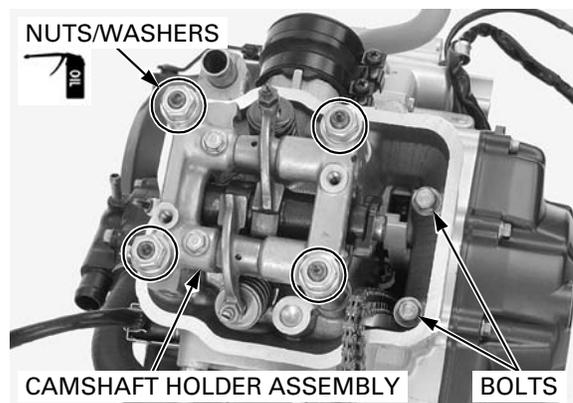
Install the washers and camshaft holder mounting nuts and tighten the nuts to the specified torque in a crisscross pattern in several steps.

**TORQUE: 29 N-m (3.0 kgf-m, 21 lbf-ft)**

Tighten the cylinder head bolts alternately in several steps.

Install the following:

- Cam sprocket (page 8-11)
- Cylinder head cover (page 8-7)



*Be careful not to let the washers and camshaft holder mounting nuts fall into the crankcase.*

## CYLINDER HEAD

### NOTICE

If the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one.

### REMOVAL

Remove the following:

- Engine (page 7-4)
- Camshaft holder (page 8-12)

*Be careful not to let the cylinder head bolts fall into the crankcase.*

Remove the cylinder head bolts and cylinder head.

#### NOTE:

- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.

Remove the dowel pins and gasket.

### DISASSEMBLY

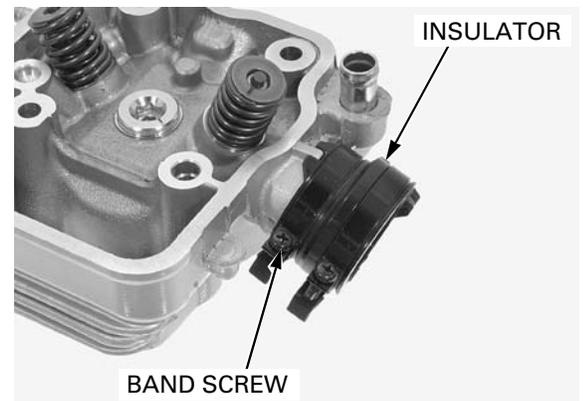
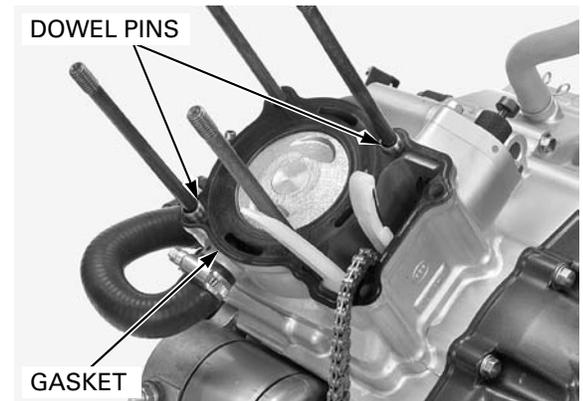
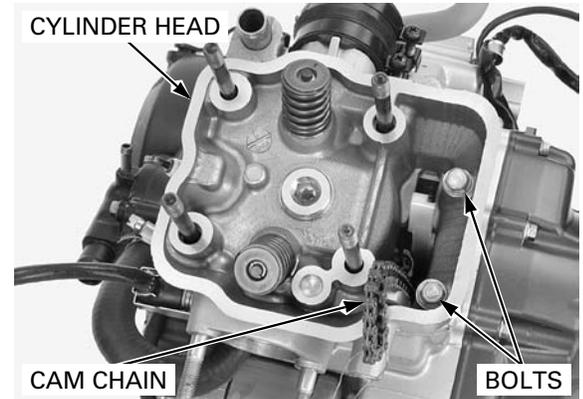
Remove the following:

- Spark plug (page 3-9)
- O<sub>2</sub> sensor (page 5-67)

### NOTICE

If the O<sub>2</sub> sensor cap is disconnected, replace the O<sub>2</sub> sensor cord with a new one.

Loosen the insulator band screw and remove the throttle body insulator.



## CYLINDER HEAD/VALVES

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

Remove the valve spring cotters using the special tools.

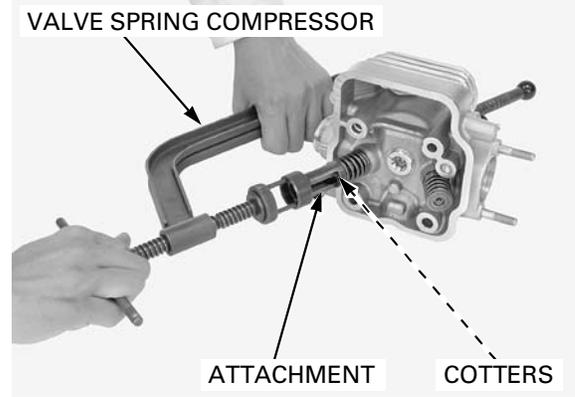
### TOOLS:

**Valve spring compressor**

**07757-001000**

**Valve spring compressor attachment**

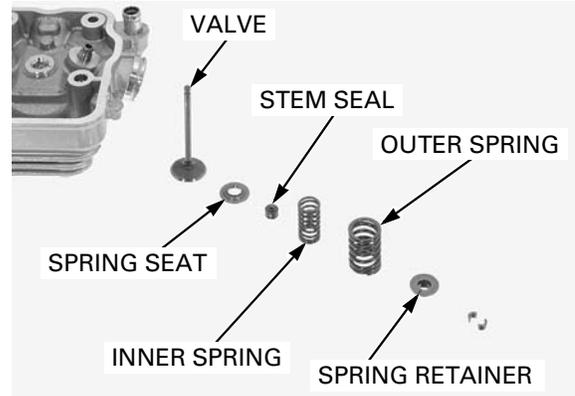
**07959-KM30101**



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

Remove the following:

- Spring retainer
- Inner and outer valve springs
- Valve
- Stem seal
- Spring seat



## INSPECTION

### CYLINDER HEAD

Use care not to scratch the combustion chamber or head gasket surface.

Remove the carbon deposits from the combustion chamber or exhaust port.

Check the spark plug hole and valve area for cracks.

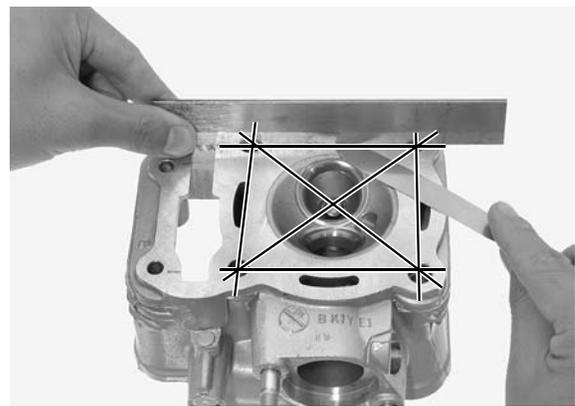
Replace the cylinder head if necessary.



Be careful not to damage the gasket surface.

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

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



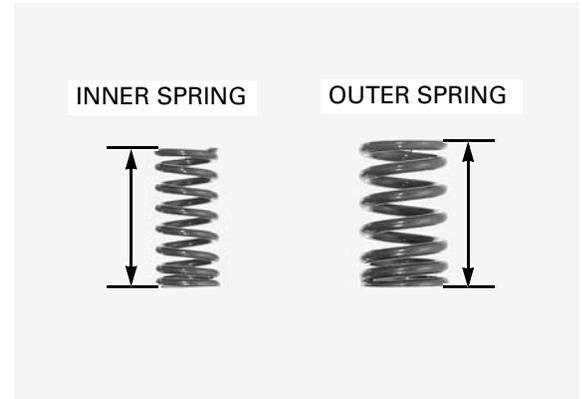
### VALVE SPRING

Check the valve springs for fatigue or damage.

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

**SERVICE LIMITS: INNER: 31.0 mm (1.22 in)**  
**OUTER: 34.0 mm (1.34 in)**

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

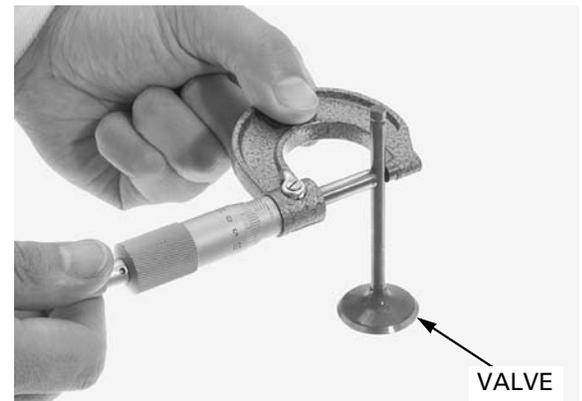


### VALVE

Check that the valve moves smoothly in the guide. Inspect each valve for bending, burning, scratches or abnormal stem wear.

Measure and record each valve stem O.D.

**SERVICE LIMITS: IN: 4.863 mm (0.1915 in)**  
**EX: 4.853 mm (0.1911 in)**



### VALVE GUIDE

Ream the valve guide to remove any carbon build-up before measuring the guide I.D.

**NOTE:**

- Use cutting oil on the reamer during this operation.
- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valves may be installed slanted, causing oil leakage from the stem seal and improper valve seat contact. This may prevent valve seat refacing.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

**TOOL:**

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



## CYLINDER HEAD/VALVES

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

**SERVICE LIMIT: IN/EX: 5.04 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: 0.065 mm (0.0026 in)  
EX: 0.075 mm (0.0030 in)**

If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance.

If so, replace any guides as necessary and ream to fit.

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

**NOTE:**

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-19).

### VALVE GUIDE REPLACEMENT

**NOTE:**

Refinish the valve seats whenever the valve guides are replaced to prevent uneven seating.

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

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

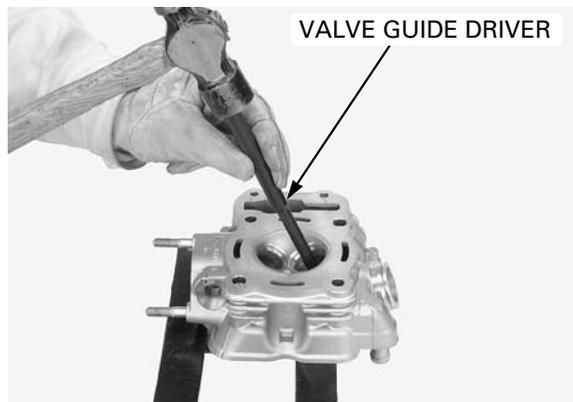
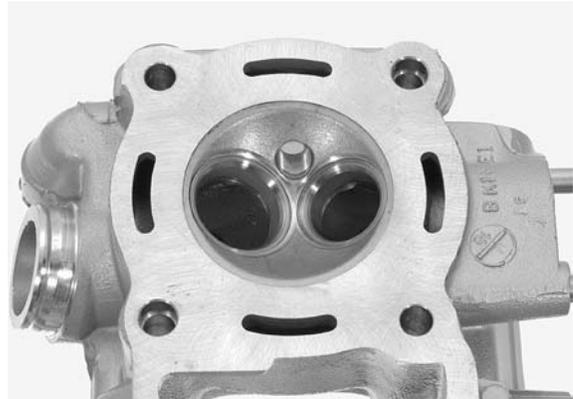
Heat the cylinder head to 130 – 140°C (266 – 284°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (302°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

To avoid burns, wear insulated gloves when handling the heated cylinder head.

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

**TOOL:**

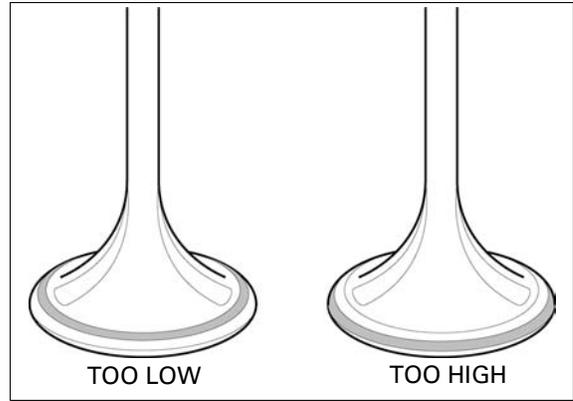
**Valve guide driver, 5.0 mm      07942-892000**





## CYLINDER HEAD/VALVES

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



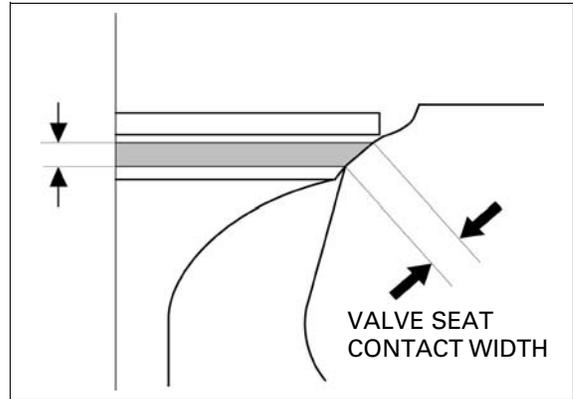
Inspect the width of the valve seat.

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

**STANDARD:** 0.90 – 1.10 mm (0.035 – 0.043 in)

**SERVICE LIMIT:** 1.50 mm (0.059 in)

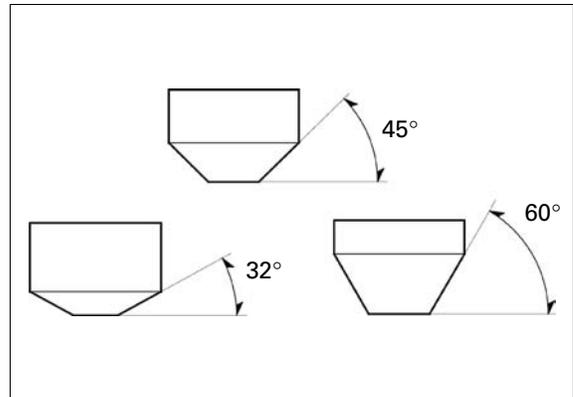
If the valve seat width is not within specification, reface the valve seat.



### VALVE SEAT REFACING

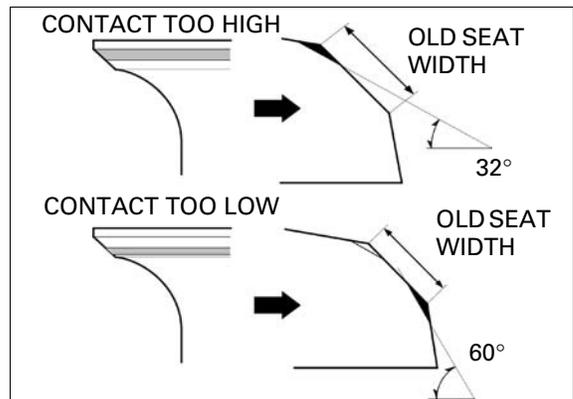
NOTE:

- Follow the refacing manufacturer's operating instructions.
- Reface the valve seat whenever the valve guide has been replaced.
- 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° inner cutter.

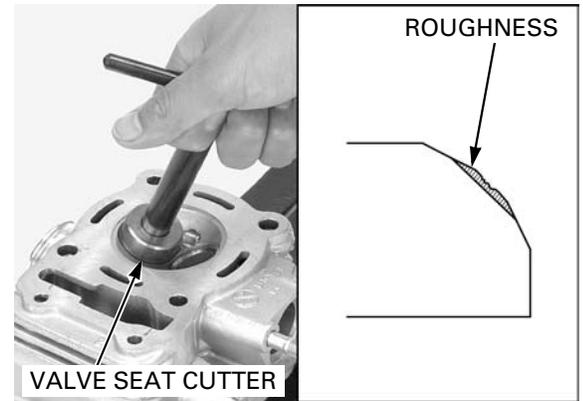


Reface the valve seat with a 45° cutter when a valve guide is replaced.

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

**TOOLS:**

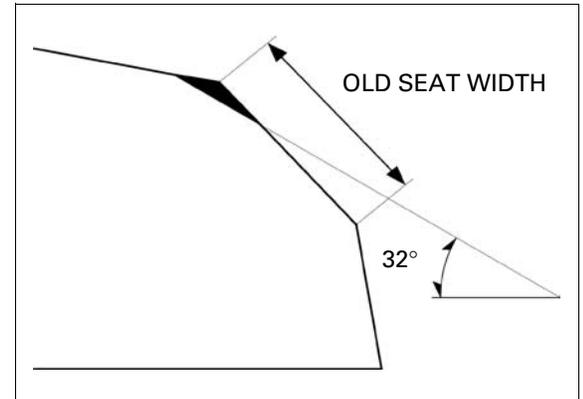
- Seat cutter, 24 mm (45° EX)**      07780-0010600
- Seat cutter, 29 mm (45° IN)**      07780-0010300
- Cutter holder, 5.0 mm**            07781-0010400



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

**TOOLS:**

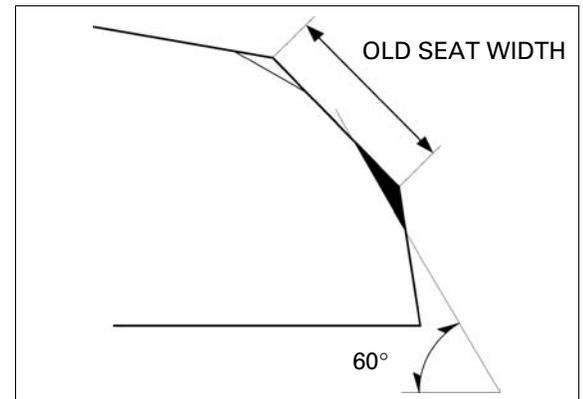
- Flat cutter, 27 mm (32° EX)**      07780-0013300
- Flat cutter, 30 mm (32° IN)**      07780-0012200
- Cutter holder, 5.0 mm**            07781-0010400



Using 60° cutter, remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have just removed.

**TOOLS:**

- Interior cutter, 26 mm (60° EX)**      07780-0014500
- Interior cutter, 30 mm (60° IN)**      07780-0014000
- Cutter holder, 5.0 mm**            07781-0010400

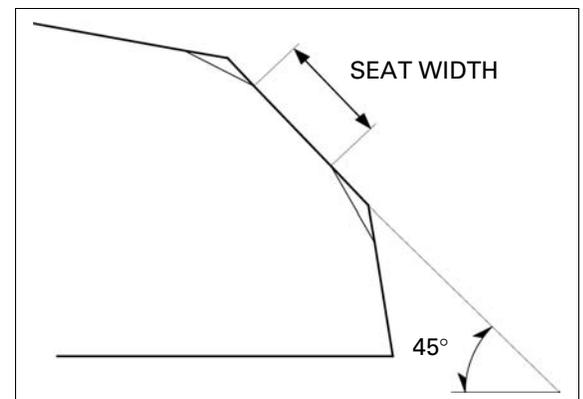


Using a 45° cutter, cut the seat to proper width. Make sure that all pitting and irregularities are removed.

Refinish if necessary.

**STANDARD SEAT WIDTH:**

**0.90 – 1.10 mm (0.035 – 0.043 in)**



## CYLINDER HEAD/VALVES

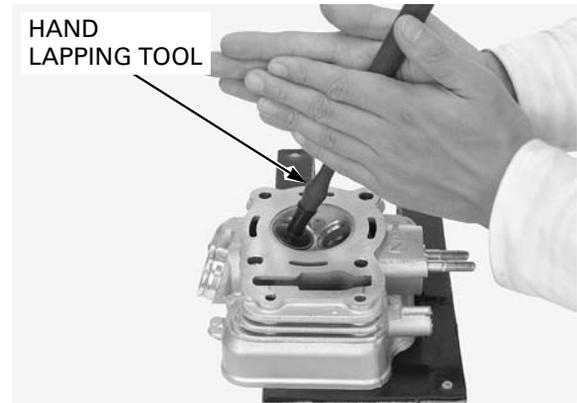
After cutting the seat, apply lapping compound to the valve face and lap the valve using light pressure.

NOTE:

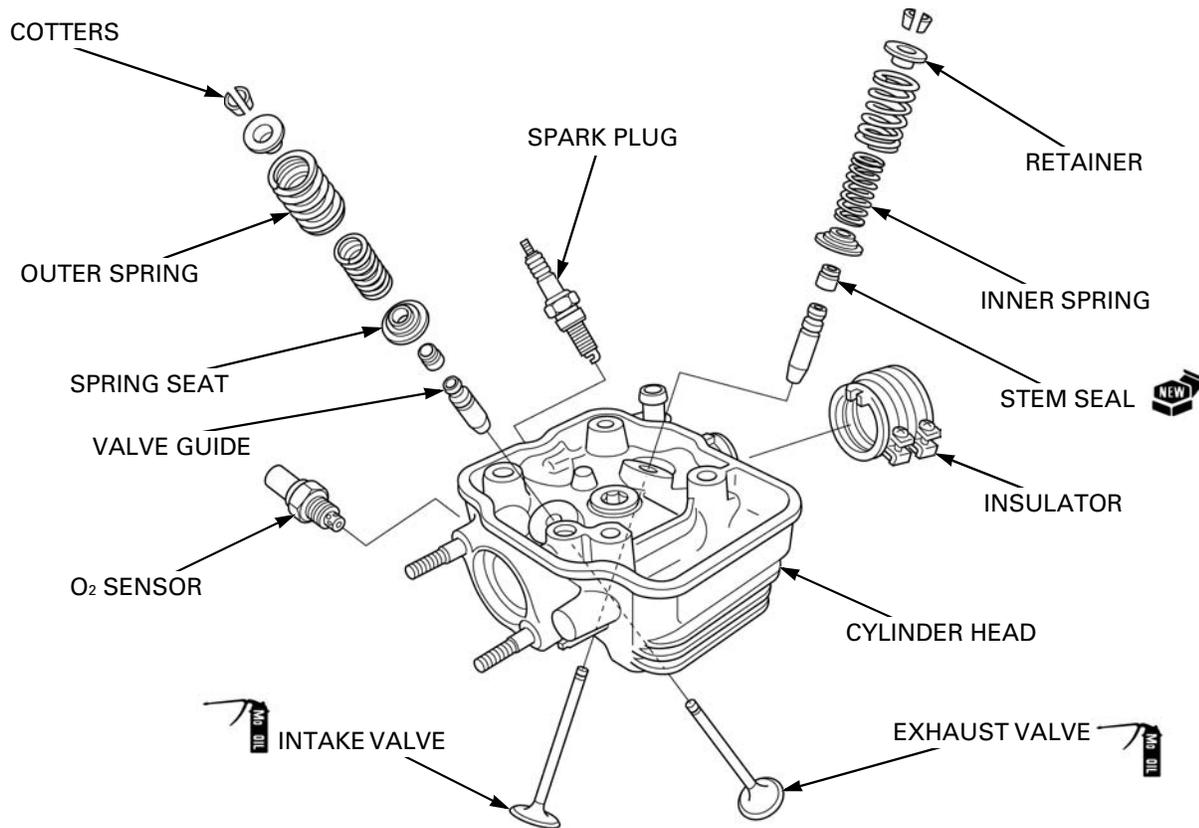
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

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

Recheck the seat contact after lapping.



## ASSEMBLY



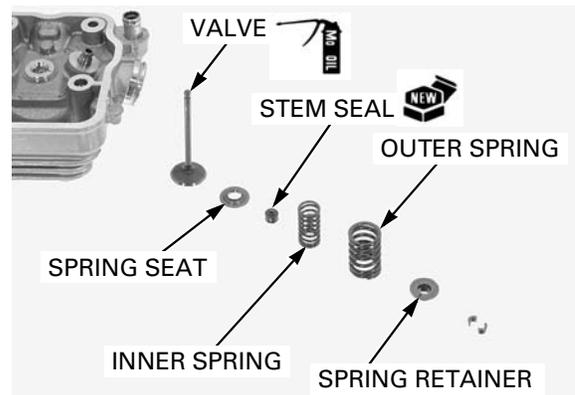
Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the spring seats and new valve stem seals.

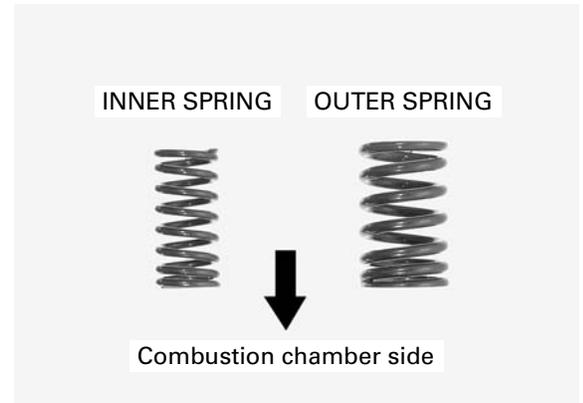
Lubricate each valve stem and stem end with molybdenum oil solution.

Insert the intake and exhaust valves into the valve guides.

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



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



*Grease the cotters to ease installation. To prevent loss of tension, do not compress the valve spring more than necessary.*

Install the spring retainer.

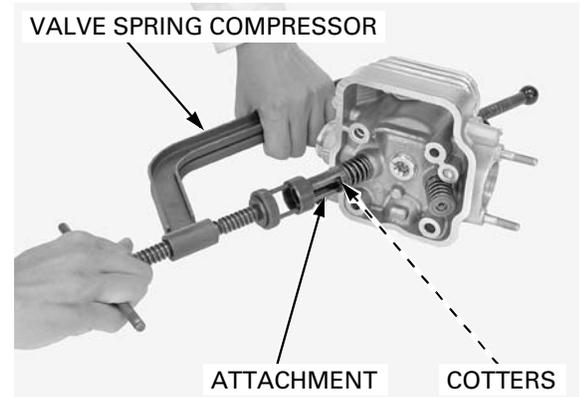
Compress the valve spring using the special tools and install the valve cotters.

**TOOLS:**

**Valve spring compressor**  
**Valve spring compressor attachment**

**07757-0010000**

**07959-KM30101**



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

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

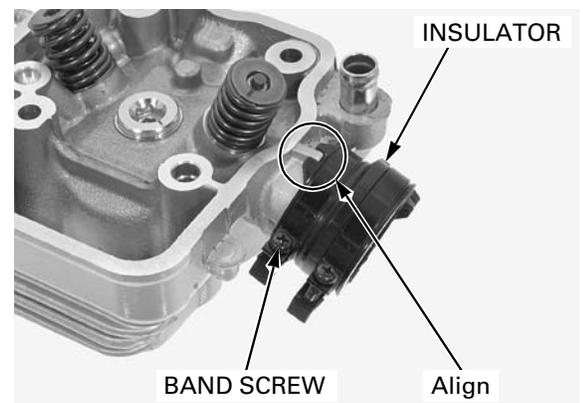


Install the throttle body insulator by aligning the groove of the throttle body insulator with the tab of the cylinder head.

Tighten the insulator band screw (page 5-57).

Install the following:

- Spark plug (page 3-10)
- O<sub>2</sub> sensor (page 5-68)



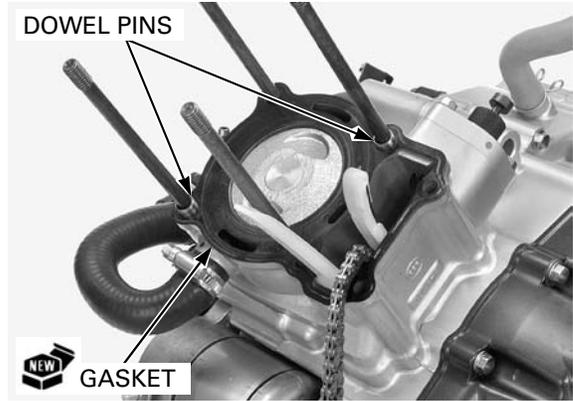
## CYLINDER HEAD/VALVES

### INSTALLATION

*Do not allow dust and dirt to enter the crankcase.*

Clean any gasket material from the cylinder mating surfaces.

Install the dowel pins and new gasket.



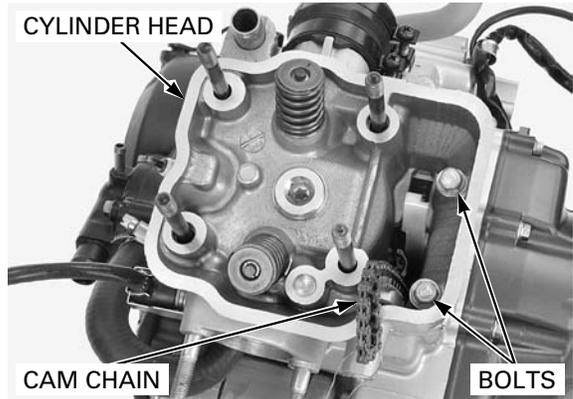
Route the cam chain through the cylinder head and install the cylinder head onto the cylinder.

*Be careful not to let the cylinder head bolts fall into the crankcase.*

Loosely install the cylinder head bolts.

Install the following:

- Camshaft holder (page 8-14)
- Engine (page 7-6)

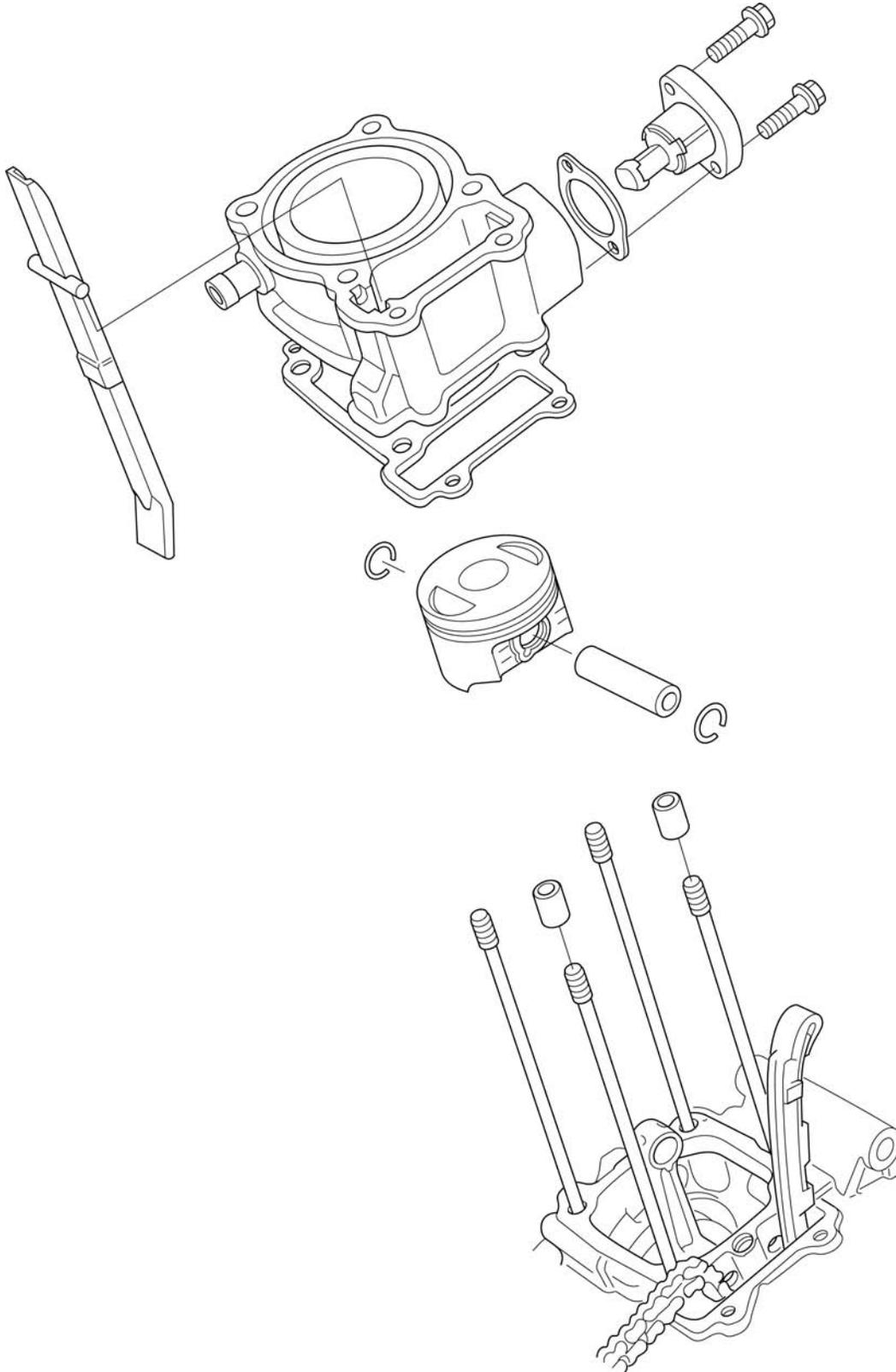


# 9. CYLINDER/PISTON

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COMPONENT LOCATION .....	9-2	TROUBLESHOOTING.....	9-3
SERVICE INFORMATION .....	9-3	CYLINDER/PISTON .....	9-4

COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers maintenance of the cylinder and piston. To service these parts, the engine must be removed from the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces when removing the cylinder. Do not strike the cylinder too hard during removal.
- Camshaft and rocker arm lubricating oil is fed through an oil passage in the cylinder. Clean the oil passage before installing cylinder.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	58.000 – 58.010 (2.2835 – 2.2839)	58.05 (2.285)	
	Out-of-round	–	0.010 (0.0004)	
	Taper	–	0.010 (0.0004)	
	Warpage	–	0.05 (0.002)	
Piston, piston pin, piston ring	Piston O.D. at 6.5 (0.26) from bottom	57.970 – 57.990 (2.2823 – 2.2831)	56.67 (2.231)	
	Piston pin hole I.D.	13.002 – 13.008 (0.5119 – 0.5121)	13.045 (0.5136)	
	Piston pin O.D.	12.994 – 13.000 (0.5116 – 0.5118)	12.70 (0.500)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.08 (0.003)	
	Piston ring end gap	Top	0.10 – 0.25 (0.004 – 0.010)	0.40 (0.016)
		Second	0.35 – 0.50 (0.014 – 0.020)	0.70 (0.028)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.10 (0.043)
	Piston ring-to-ring groove clearance	Top	0.045 – 0.075 (0.0018 – 0.0030)	0.10 (0.004)
Second		0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)	
Cylinder-to-piston clearance		0.010 – 0.040 (0.0004 – 0.0016)	0.09 (0.004)	
Connecting rod small end I.D.		13.016 – 13.034 (0.5124 – 0.5131)	13.06 (0.514)	
Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.10 (0.004)	

### TORQUE VALUE

Cylinder stud bolt

–

See page 9-8

## TROUBLESHOOTING

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

- Leaking or damaged cylinder head gasket
- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston
- Loose spark plug

#### Compression too high, overheating or knocking

- Excessive carbon built-up on piston or combustion chamber

#### Excessive smoke

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

#### Abnormal noise (piston)

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

## CYLINDER/PISTON

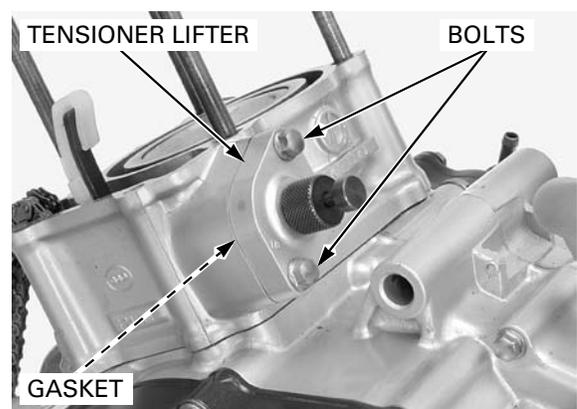
### CYLINDER REMOVAL

Remove the cylinder head (page 8-15).

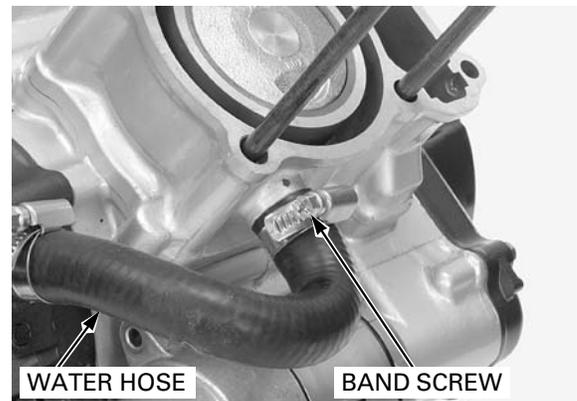
Remove the cam chain guide.



Remove the cam chain tensioner lifter mounting bolts.  
Remove the cam chain tensioner lifter and gasket.



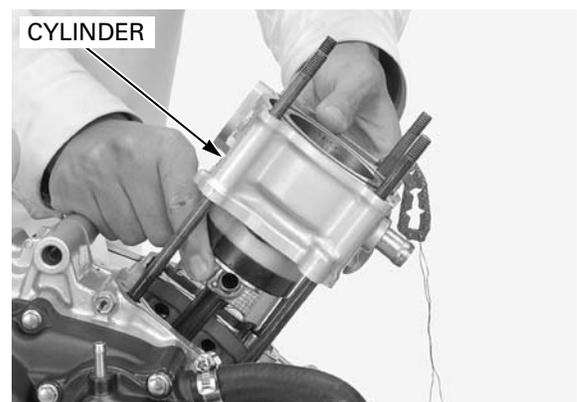
Loosen the water hose band screw and disconnect the water hose.



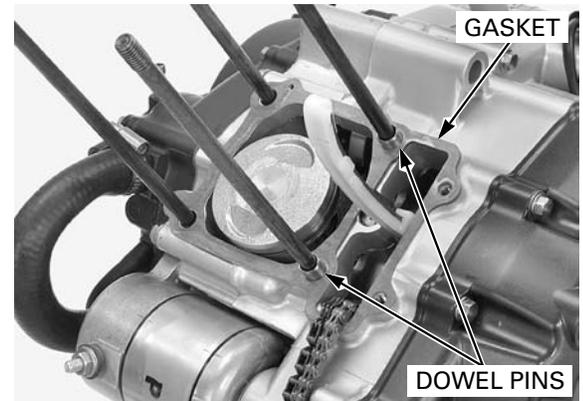
Lift the cylinder and remove it, being careful not to damage the piston with the stud bolts.

**NOTE:**

- Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.
- Do not strike the cylinder too hard and do not damage the mating surface with a screwdriver.



Remove the dowel pins and gasket.



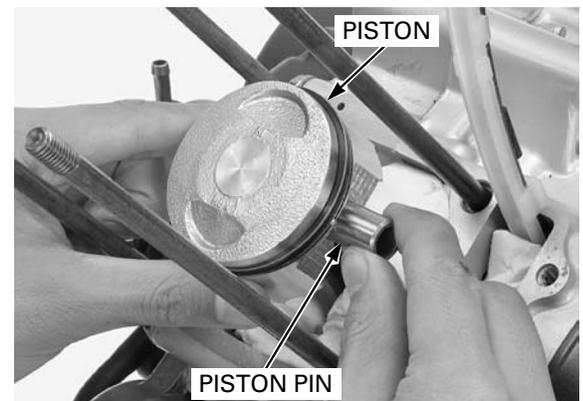
**PISTON REMOVAL**

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

Remove the piston pin clips with pliers.



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



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

**NOTE:**

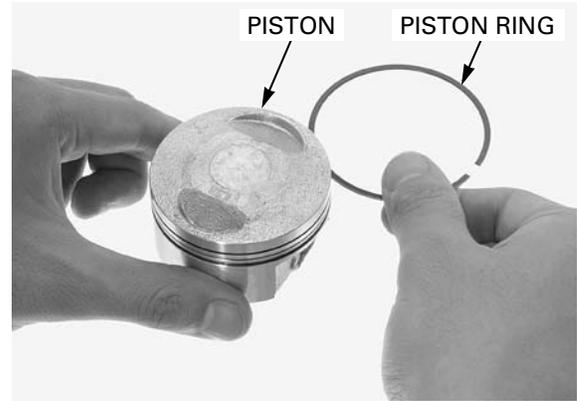
- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston when the piston ring removal.



## CYLINDER/PISTON

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

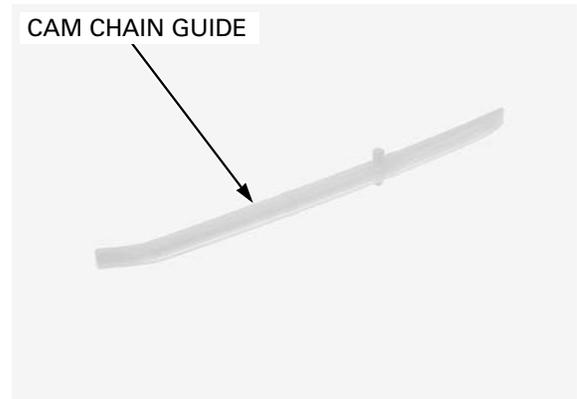
Clean carbon deposits from the piston ring grooves with a used piston ring that will be discarded.



### INSPECTION

#### CAM CHAIN GUIDE

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



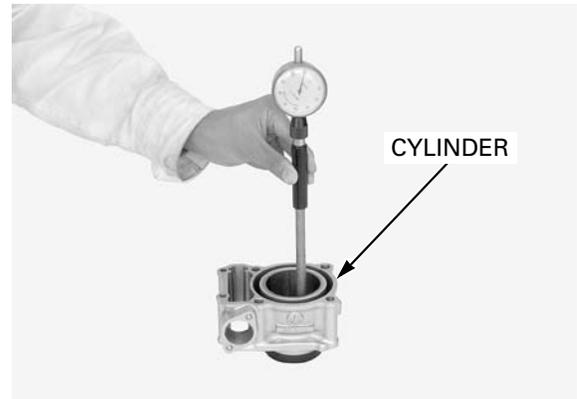
#### CYLINDER

Check the cylinder wall for scratches and wear.

Measure the cylinder I.D. at three levels on the X and Y axes. Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 58.05 mm (2.285 in)**

Calculate the cylinder-to-piston clearance (page 9-7).



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

#### SERVICE LIMITS:

**Taper: 0.010 mm (0.0004 in)**

**Out-of-round: 0.010 mm (0.0004 in)**

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

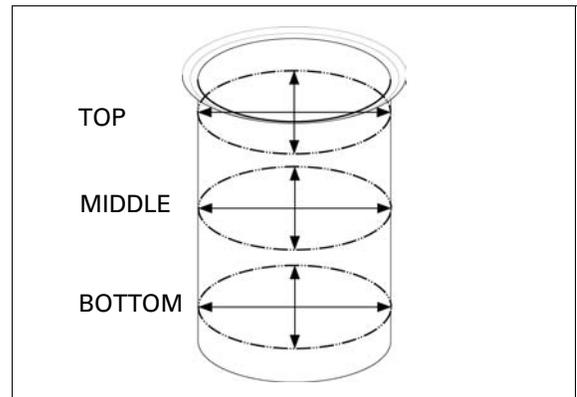
**The following oversize pistons are available:**

0.25 mm (0.010 in): 13012-KGH-305

0.50 mm (0.020 in): 13013-KGH-305

0.75 mm (0.030 in): 13014-KGH-305

1.00 mm (0.040 in): 13015-KGH-305

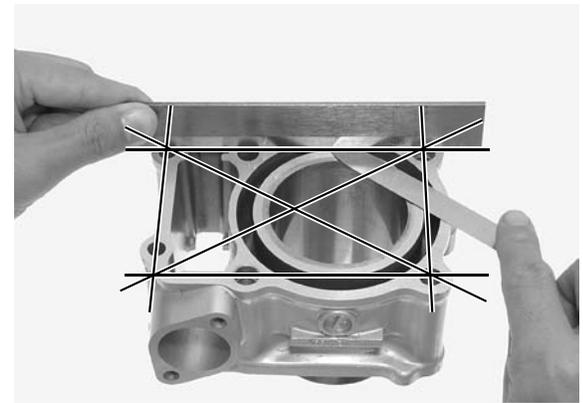


*These parts numbers may be change without written permission.*

The cylinder-to-piston clearance for the oversize piston must be: 0.010 – 0.040 mm (0.0004 – 0.0016 in).

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

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



**PISTON/PISTON RING**

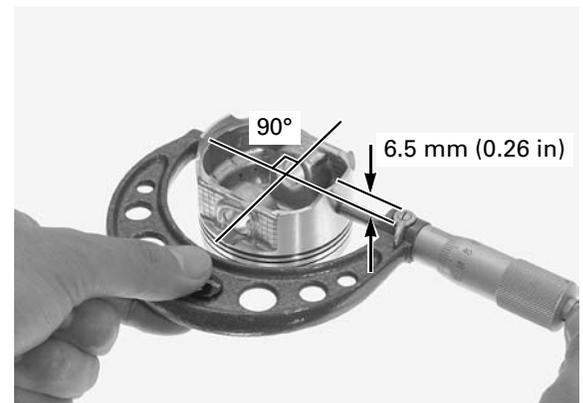
Check the piston for cracks or other damage. Check the ring grooves for excessive wear and carbon build-up.

Measure each piston O.D. at a point 6.5 mm (0.26 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT: 56.67 mm (2.231 in)**

Calculate the cylinder-to-piston clearance. Take the maximum reading to determine the clearance (Cylinder I.D.:page 9-6).

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



Measure piston pin hole I.D.

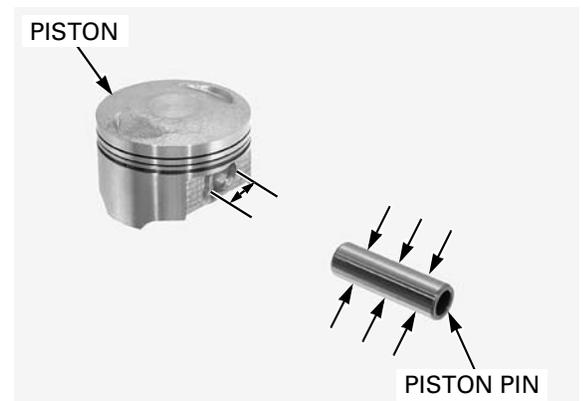
**SERVICE LIMIT: 13.045 mm (0.5136 in)**

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

**SERVICE LIMIT: 12.70 mm (0.500 in)**

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.08 mm (0.003 in)**



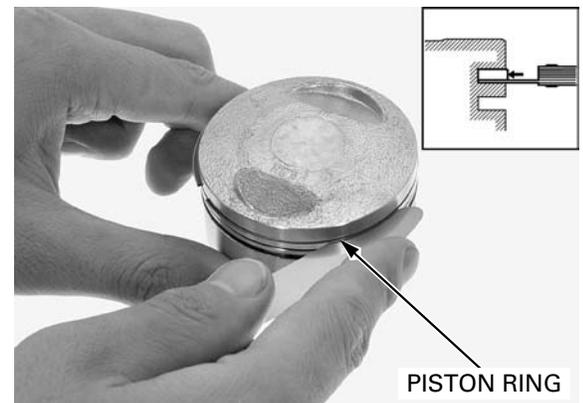
*Always replace the piston rings as a set.*

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

Push in the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance using a feeler gauge.

**SERVICE LIMITS:**

**Top: 0.10 mm (0.004 in)**  
**Second: 0.09 mm (0.004 in)**



## CYLINDER/PISTON

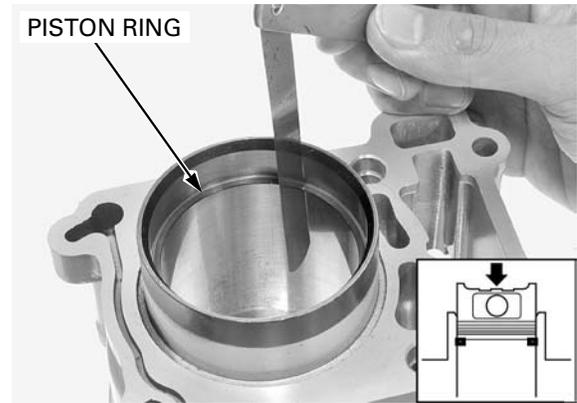
Insert the piston ring into the bottom of the cylinder squarely using the piston crown. Measure the piston ring end gap.

### SERVICE LIMITS:

**Top: 0.40 mm (0.016 in)**

**Second: 0.70 mm (0.028 in)**

**Oil: 1.10 mm (0.043 in)**



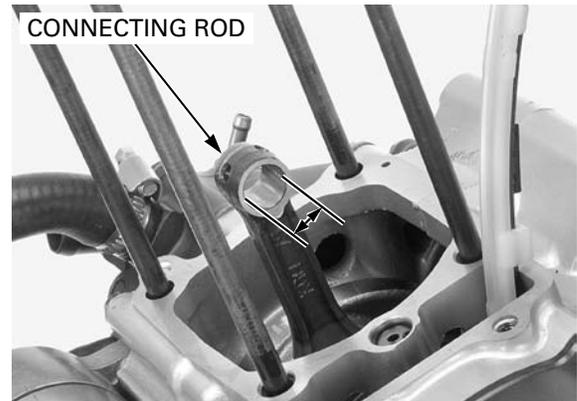
## CONNECTING ROD

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 13.06 mm (0.514 in)**

Calculate the connecting rod-to-piston pin clearance.

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



## CAM CHAIN TENSIONER LIFTER

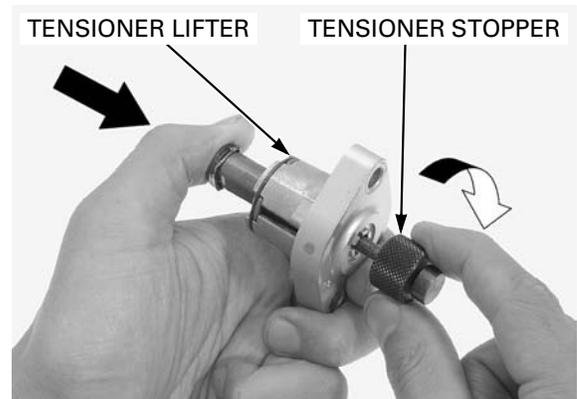
Check the lifter operation:

- The cam chain tensioner lifter shaft should not go into the cam chain tensioner lifter body when it is pushed.
- When it is turned clockwise with a tensioner stopper, the cam chain tensioner lifter shaft should be pulled into the cam chain tensioner lifter body. The cam chain tensioner lifter shaft should spring out of the cam chain tensioner lifter body as soon as the tensioner stopper is released.

### TOOL:

**Tensioner stopper**

**070MG-0010100**

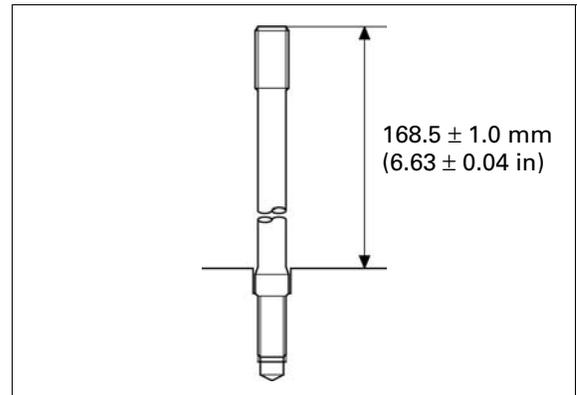


## STUD BOLT REPLACEMENT

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

Install new stud bolts into the crankcase as shown.

After installing the stud bolts, check that the length from the bolt head to the crankcase surface is within specification.



**PISTON INSTALLATION**

Apply engine oil to the piston ring entire surface.

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

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

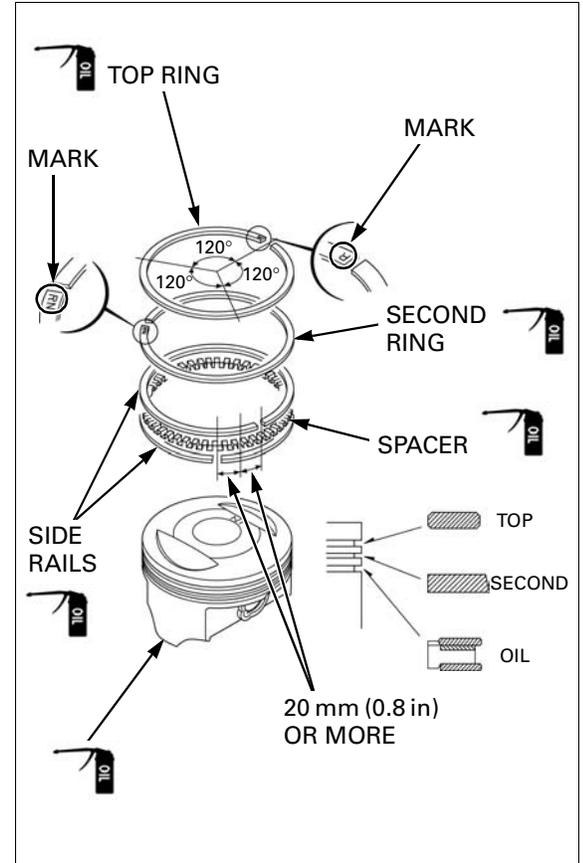
NOTE:

- 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° apart from each other.

Stagger the side rail end gaps as shown.

Apply engine oil to the piston outer surface.



*When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt enter the crankcase.*

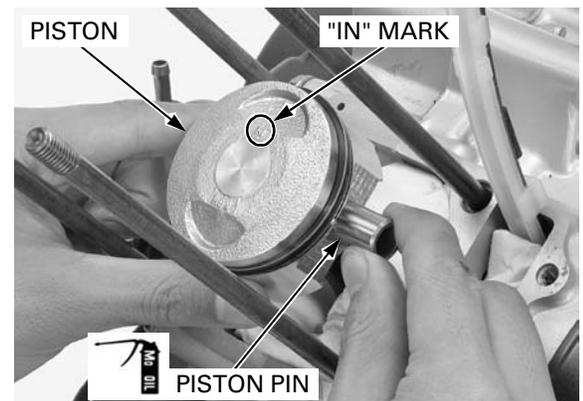
Clean any gasket material from the cylinder mating surface of the crankcase.



Apply molybdenum oil solution to the piston pin outer surfaces.

Install the piston with its "IN" mark facing intake side.

Install the piston pin.

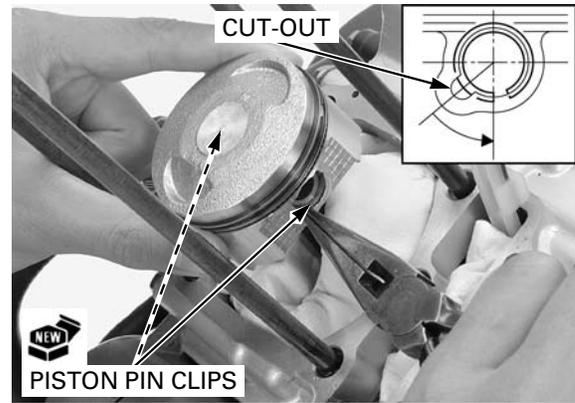


## CYLINDER/PISTON

Install new piston pin clips into the grooves of the piston pin hole.

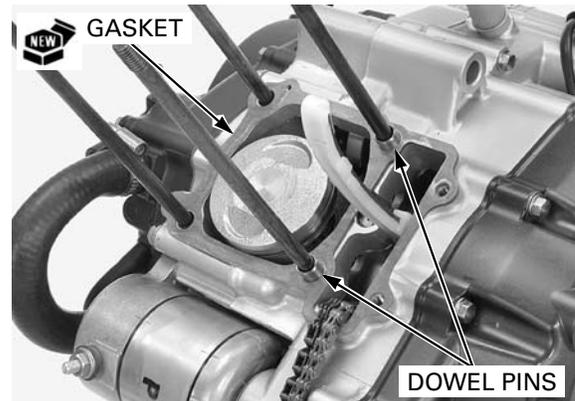
**NOTE:**

- Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.
- Set the piston pin clip in the groove properly.
- Do not align the clip's end gap with the piston cut-out.



## CYLINDER INSTALLATION

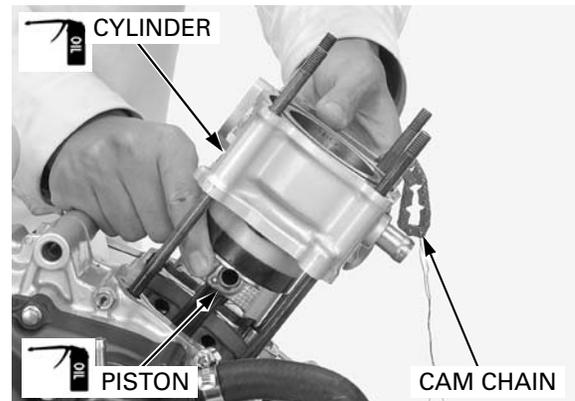
Install the dowel pins and a new gasket.



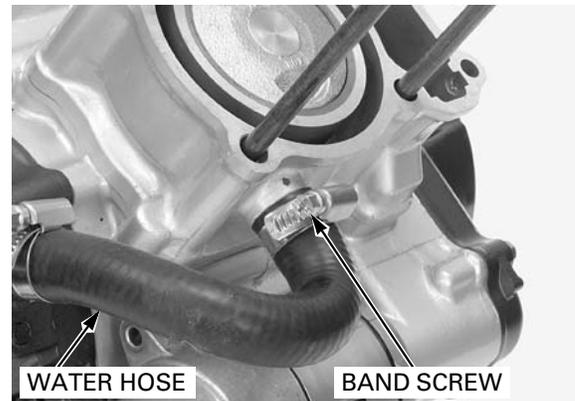
Apply engine oil to the cylinder inner surface and piston outer surface.

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

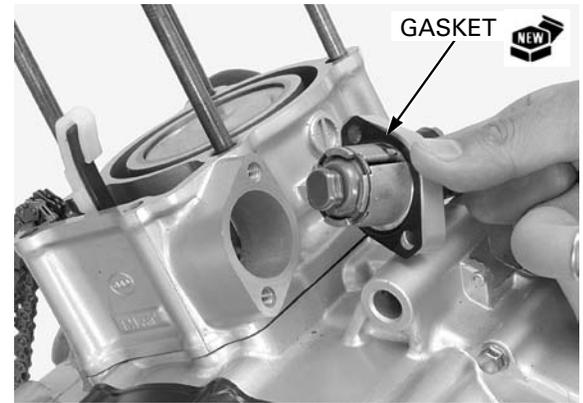
Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.



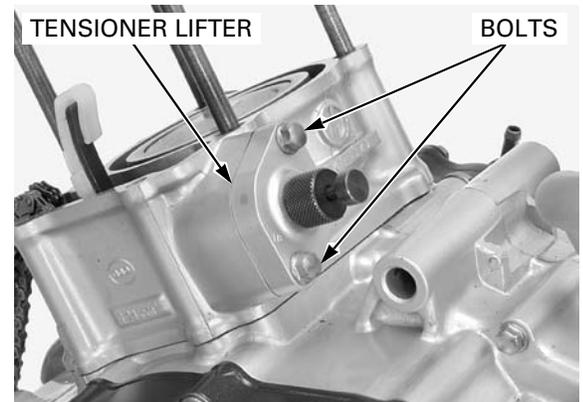
Connect the water hose and tighten the water hose band screw (page 6-14).



Install a new gasket on the cam chain tensioner lifter and install them to the cylinder.

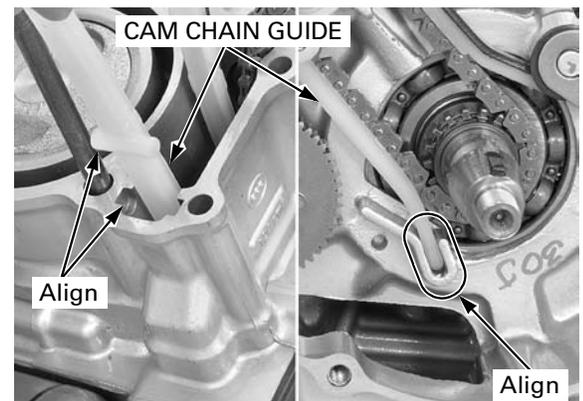


Install and tighten the cam chain tensioner mounting bolts.



Install the cam chain guide, aligning its tabs with the cylinder grooves and its end with the left crankcase groove.

Install the cylinder head (page 8-24).



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**MEMO**

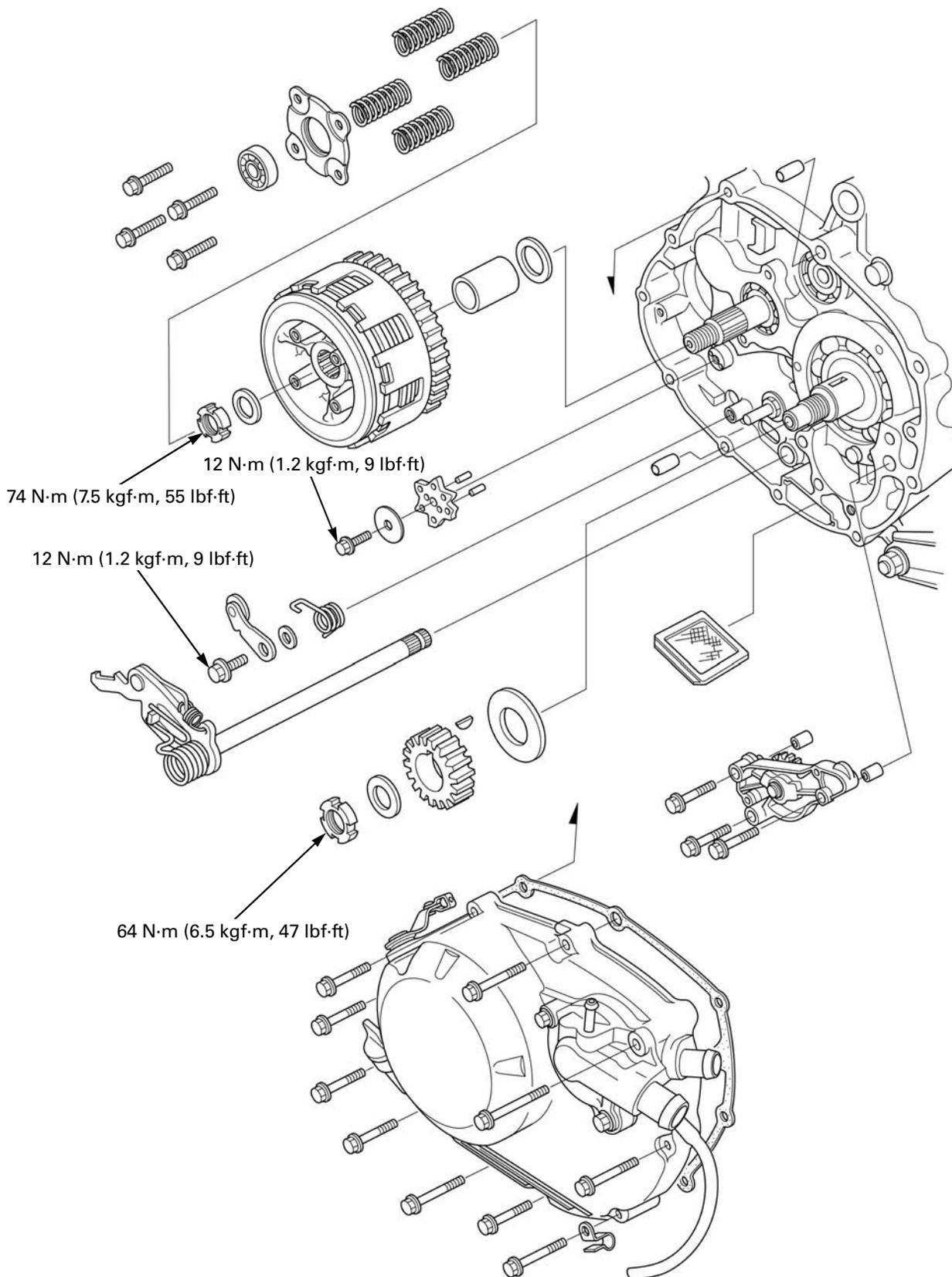
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# 10. CLUTCH/GEARSHIFT LINKAGE

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COMPONENT LOCATION .....	10-2	CLUTCH .....	10-9
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TROUBLESHOOTING .....	10-4	GEARSHIFT PEDAL .....	10-18
RIGHT CRANKCASE COVER.....	10-5	PRIMARY DRIVE GEAR.....	10-20

# CLUTCH/GEARSHIFT LINKAGE COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch and gearshift linkage. All services can be done with the engine installed in the frame.
- Engine oil viscosity and level have an effect on clutch disengagement. Oil additives also effect clutch performance and are not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch lever pulled in, inspect the engine oil level before servicing the clutch system.
- The oil pump removal is required when you remove the washer is located between the primary drive gear and right crankshaft bearing (page 4-4).

### SPECIFICATIONS

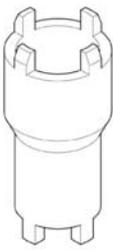
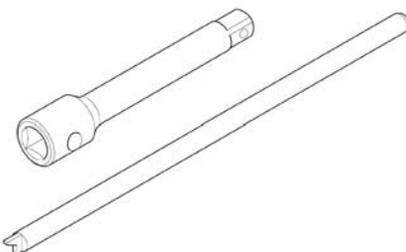
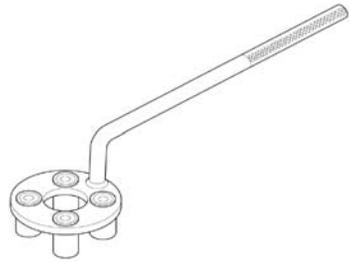
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 – 13/16)	–
Clutch	Spring free length	40.0 (1.57)	38.3 (1.51)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
	Plate warpage	–	0.15 (0.006)
Clutch outer I.D.		30.000 – 30.021 (1.1811 – 1.1819)	30.54 (1.202)
Clutch outer guide	O.D.	22.959 – 22.980 (0.9039 – 0.9047)	22.93 (0.903)
	I.D.	16.991 – 17.009 (0.6689 – 0.6696)	17.04 (0.671)
Mainshaft O.D. at clutch outer guide		16.966 – 16.984 (0.6680 – 0.6687)	16.59 (0.653)

### TORQUE VALUES

Clutch center lock nut	74 N·m (7.5 kgf·m, 55 lbf·ft)	Apply engine oil to the threads and seating surface.
Clutch spring bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Primary drive gear lock nut	64 N·m (6.5 kgf·m, 47 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)	Apply locking agent to the threads.
Shift drum stopper plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift return spring pin	25 N·m (2.5 kgf·m, 18 lbf·ft)	

### TOOLS

Lock nut wrench, 20 x 24 mm 07716-0020100 	Extension bar/handle 07716-0020500 	Clutch center holder 07GMB-KT70101 
Gear holder 07724-0010200 		

## CLUTCH/GEARSHIFT LINKAGE

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### TROUBLESHOOTING

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

#### **Clutch lever too hard 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 freeplay
- Clutch plate warped
- Engine oil level too high, improper oil viscosity or additive used
- Loosen clutch center lock nut

#### **Clutch slips**

- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever freeplay
- Engine oil level too low or oil additive used

#### **Hard to shift**

- Misadjusted clutch cable
- Damaged or bent shift fork
- Bent shift fork shaft
- Incorrect engine oil viscosity
- Bent or damaged gearshift spindle
- Damaged shift drum stopper plate
- Damaged shift drum guide grooves

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

- Worn shift drum stopper arm
- Worn or broken gearshift spindle return spring
- Bent shift fork shaft
- Worn or damaged shift drum stopper plate
- Damaged shift drum guide grooves
- Worn gear dogs or dog holes

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

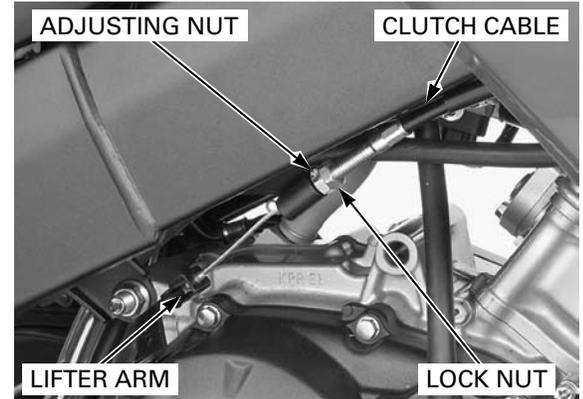
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

## RIGHT CRANKCASE COVER

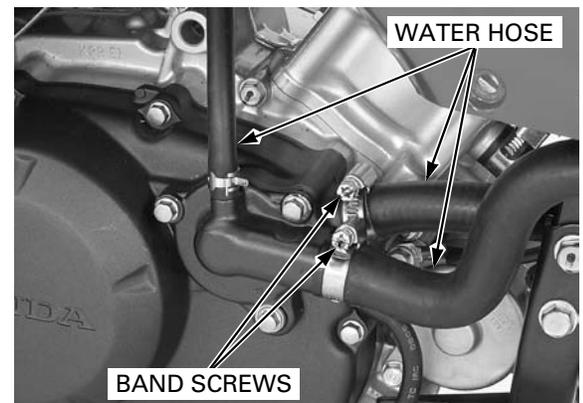
### REMOVAL

Drain the engine oil (page 3-14).  
 Drain the coolant (page 6-7).

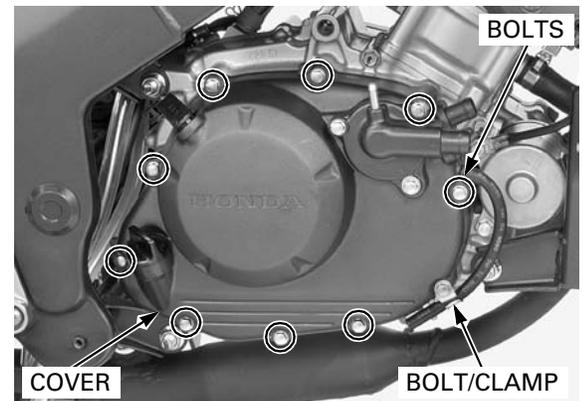
Loosen the lock nut and adjusting nut, then disconnect the clutch cable from the clutch lifter arm.



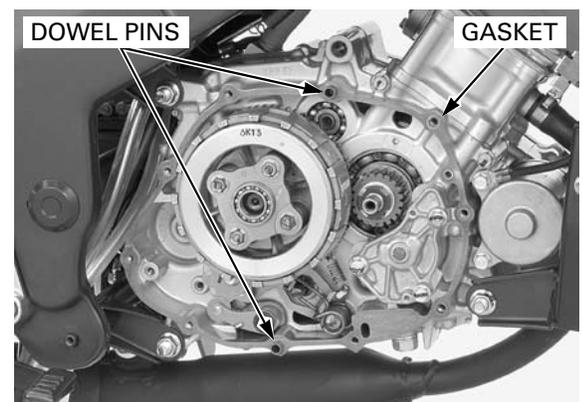
Loosen the water hose band screws and disconnect the water hoses.



Loosen the right crankcase cover bolts in a criss-cross pattern in 2 or 3 steps, and remove the bolts, clamp and right crankcase cover.



Remove the dowel pins and gasket.

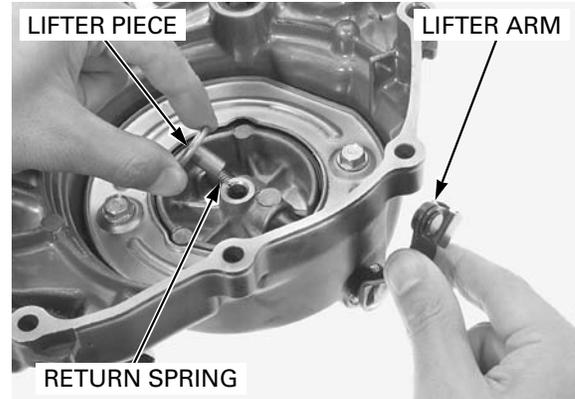


## CLUTCH/GEARSHIFT LINKAGE

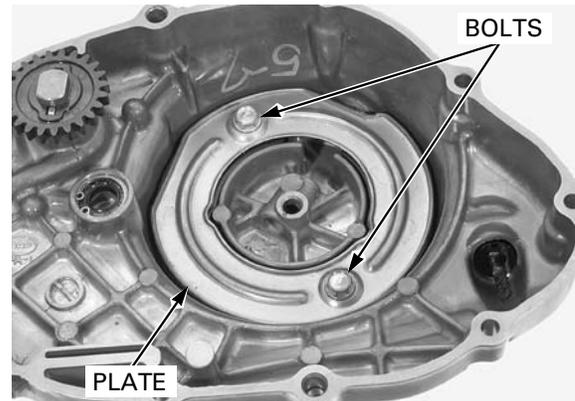
### DISASSEMBLY

Remove the following:

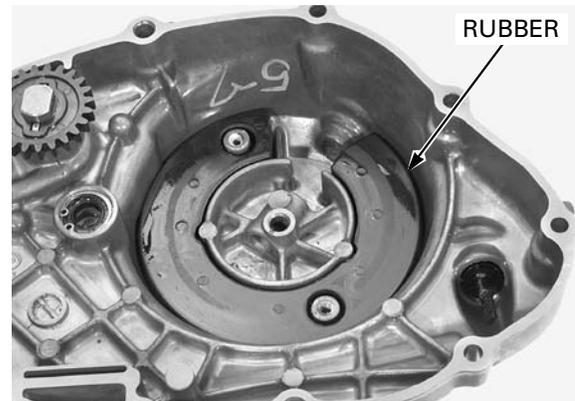
- Clutch lifter piece
- Clutch lifter arm
- Return spring



Remove the bolts and plate from the right crankcase cover.



Remove the rubber from the right crankcase cover.



### INSPECTION

Check the clutch lifter arm oil seal for wear or damage and replace if necessary.

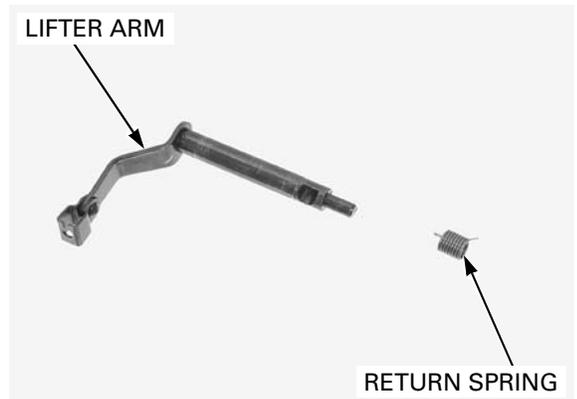


Check the rubber for damage and replace if necessary.



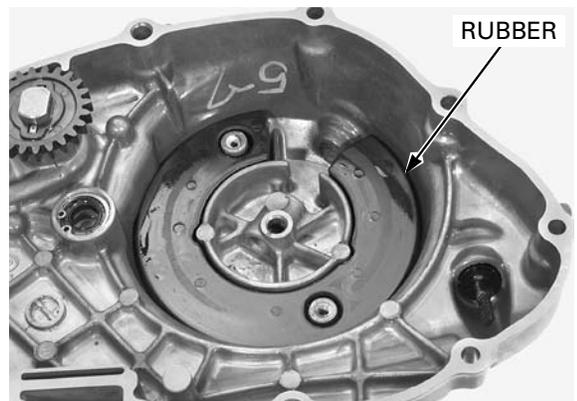
Check the following:

- Lifter arm for wear or damage
- Return spring for fatigue or damage



### ASSEMBLY

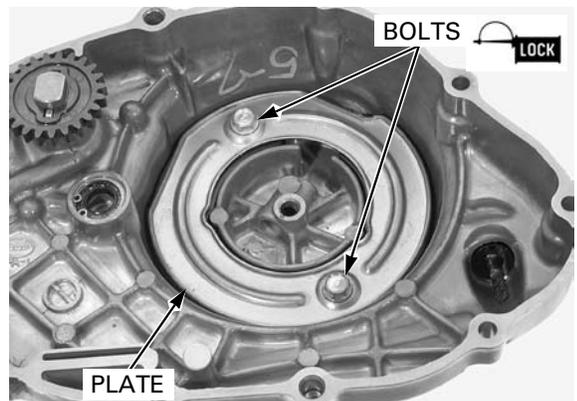
Install the rubber to the right crankcase cover.



Install the plate to the right crankcase cover.

Apply locking agent to the right crankcase cover plate bolt threads (page 1-16).

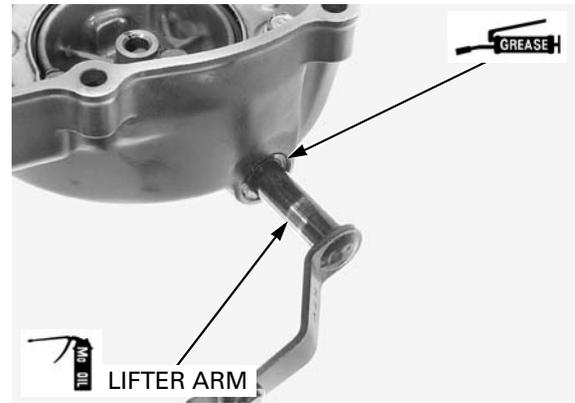
Install and tighten the bolts.



## CLUTCH/GEARSHIFT LINKAGE

Apply grease to the clutch lifter arm oil seal lips.  
Apply molybdenum oil solution to the clutch lifter arm sliding surface and arm end.

Install the clutch lifter arm.

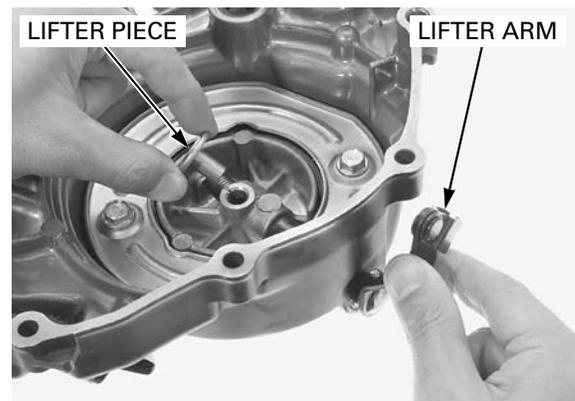


Apply molybdenum oil solution to the clutch lifter arm hole inner surface.

Install the return spring to the right crankcase cover by aligning the spring upper end with the hole of the clutch lifter arm.



Install the lifter piece to the clutch lifter arm groove while aligning the groove with the lifter piece hole.

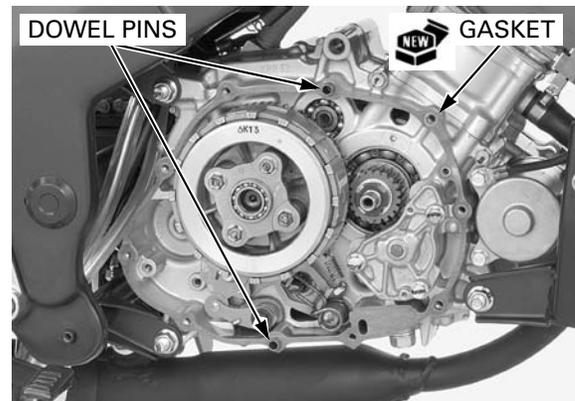


## INSTALLATION

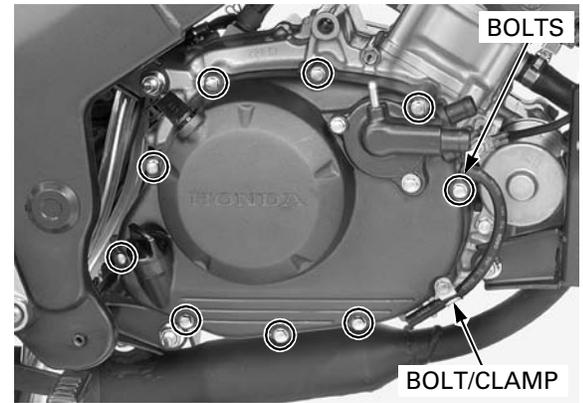
*Be careful not to damage the mating surfaces.*

Clean any gasket material from the mating surfaces of the right crankcase and cover.

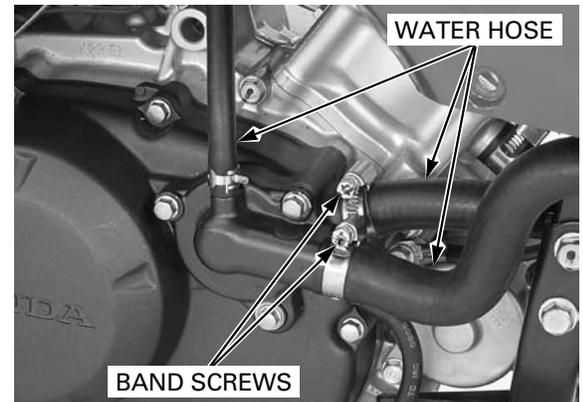
Install the dowel pins and a new gasket.



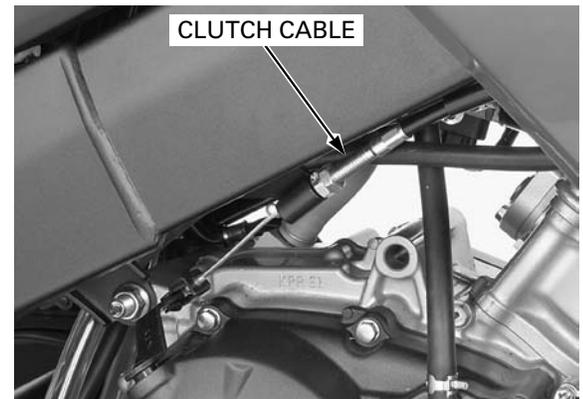
Install the right crankcase cover, clamp and bolts.  
Tighten the bolts in a crisscross pattern in 2 or 3 steps.



Connect the water hoses and tighten the water hose band screws (page 6-14).



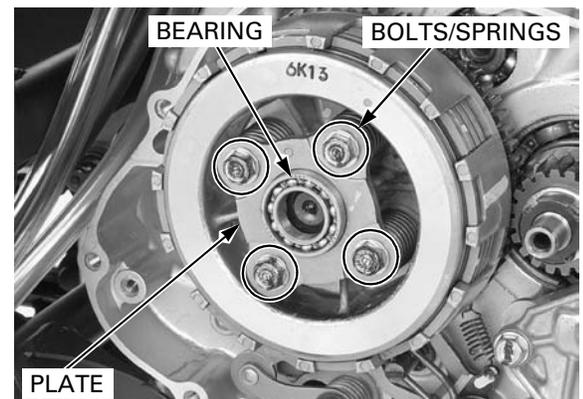
Connect the clutch cable.  
Adjust the clutch lever freeplay (page 3-24).  
Fill the engine with the recommended engine oil (page 3-13).  
Fill the recommended coolant mixture to the filler neck and bleed the air (page 6-6).



## CLUTCH

### REMOVAL

Remove the right crankcase cover (page 10-5).  
Remove the clutch lifter bearing.  
Remove the clutch spring bolts in a crisscross pattern in 2 or 3 steps.  
Remove the clutch lifter plate and clutch springs.



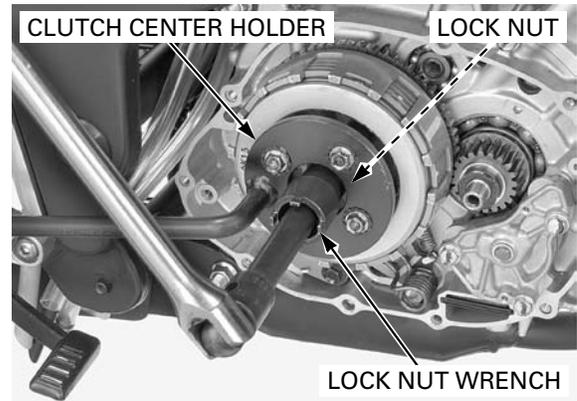
## CLUTCH/GEARSHIFT LINKAGE

Install the clutch center holder and tighten the clutch spring bolts securely.

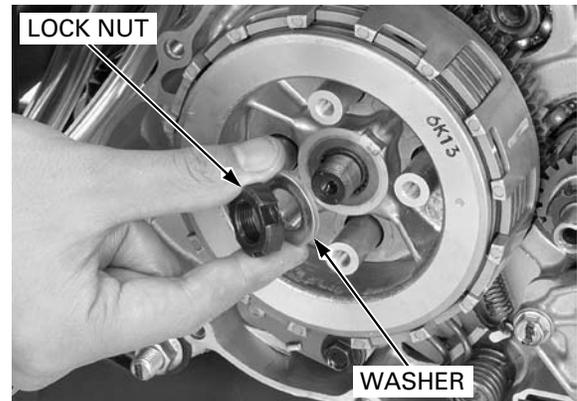
Loosen the clutch center lock nut using the special tools.

### TOOLS:

Clutch center holder	07GMB-KT70101
Lock nut wrench, 20 x 24 mm	07716-0020100
Extension bar/handle	07716-0020500

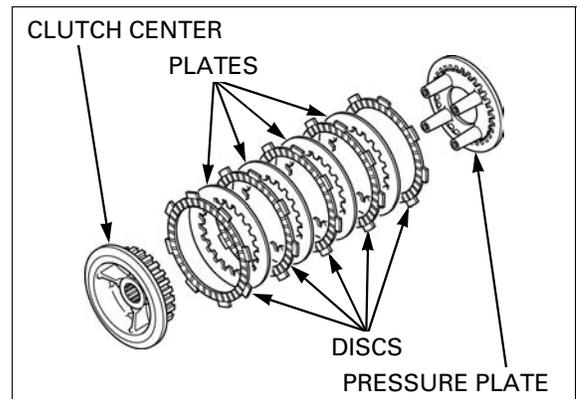


Remove the clutch center lock nut and washer.

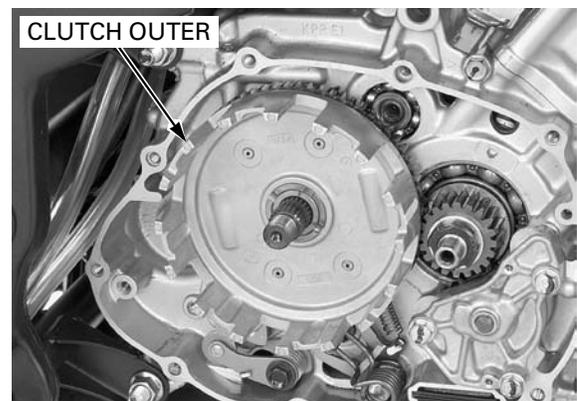


Remove the following:

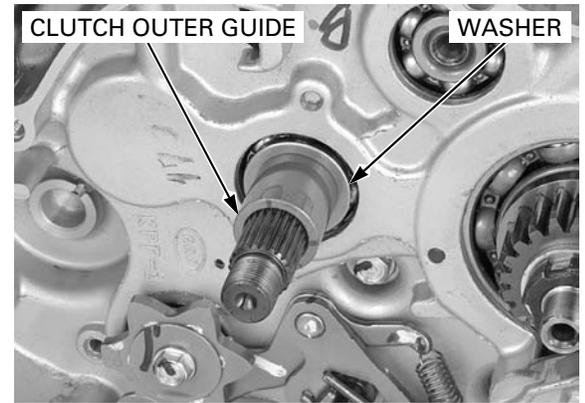
- Clutch center
- Clutch disc
- Clutch plates
- Pressure plate



Remove the clutch outer.



Remove the clutch outer guide and washer from the mainshaft.



### INSPECTION

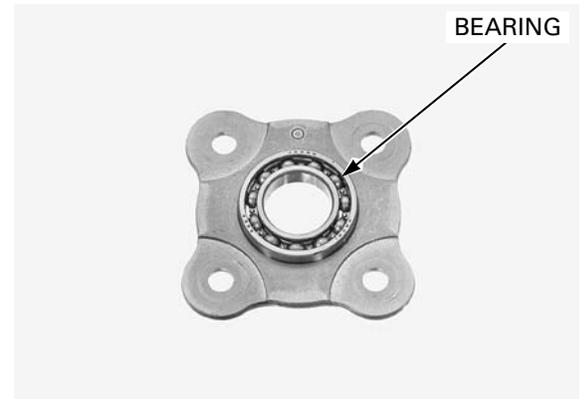
#### CLUTCH LIFTER BEARING

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

The bearing should turn smoothly and quietly.

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

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



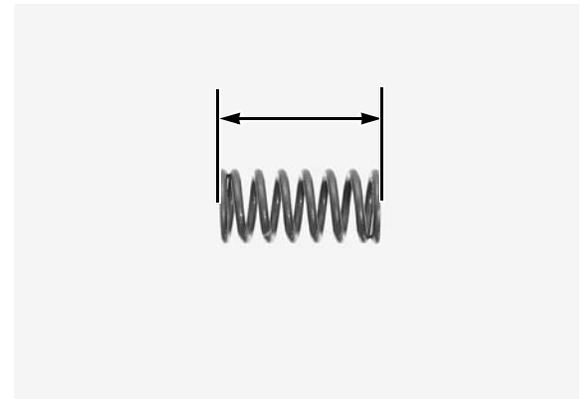
#### CLUTCH SPRING

*Replace the clutch springs as a set.*

Check the clutch spring for fatigue or damage.

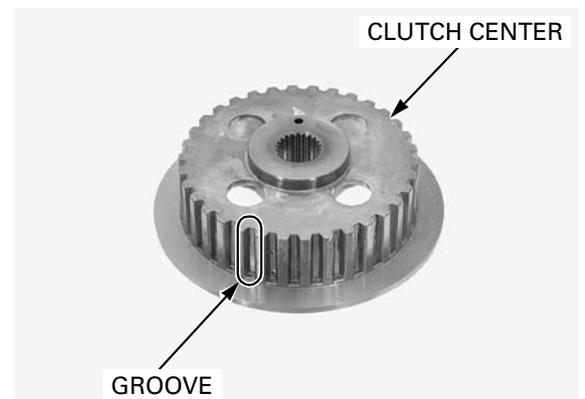
Measure the free length of the clutch spring.

**SERVICE LIMIT: 38.3 mm (1.51 in)**



#### CLUTCH CENTER

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



## CLUTCH/GEARSHIFT LINKAGE

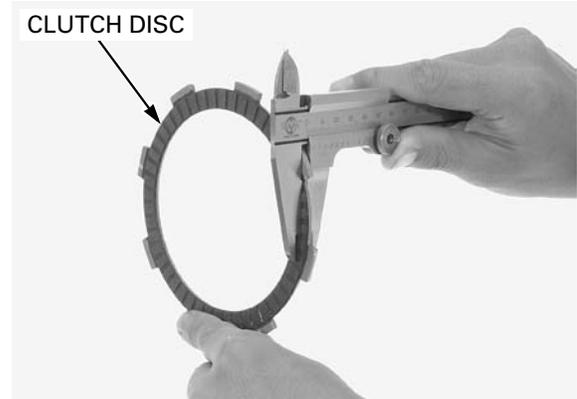
### CLUTCH DISC

Replace the clutch discs and plates as a set.

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

Measure the disc thickness of each disc.

**SERVICE LIMIT: 2.65 mm (0.104 in)**



### CLUTCH PLATE

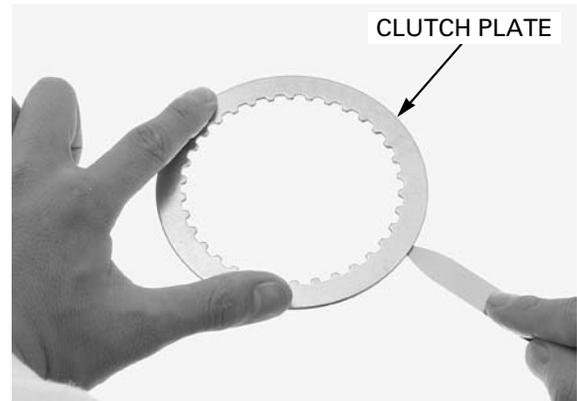
Replace the clutch discs and plates as a set.

Check the plate for discoloration.

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

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

Warped clutch plates prevent the clutch from disengaging properly.



### CLUTCH OUTER/OUTER GUIDE

Check the slots of the clutch outer for nicks, cuts or indentations made by the clutch discs.

Check the primary driven gear teeth for wear or damage.

Measure the clutch outer I.D.

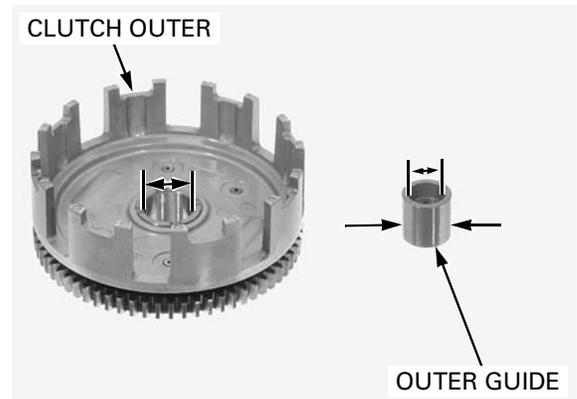
**SERVICE LIMIT: 30.54 mm (1.202 in)**

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

**SERVICE LIMITS:**

**I.D.: 17.04 mm (0.671 in)**

**O.D.: 22.93 mm (0.903 in)**



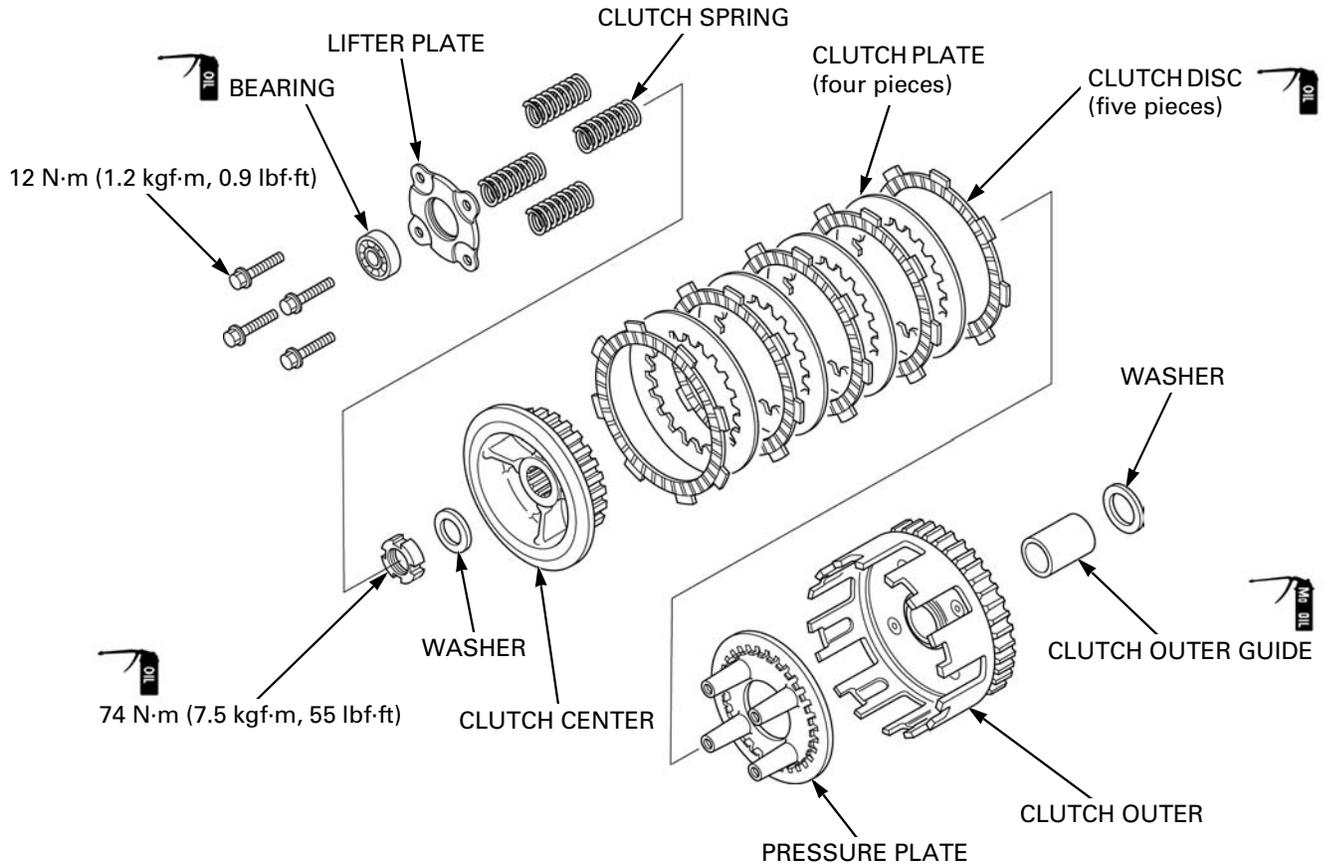
### MAINSHAFT

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

**SERVICE LIMIT: 16.59 mm (0.653 in)**

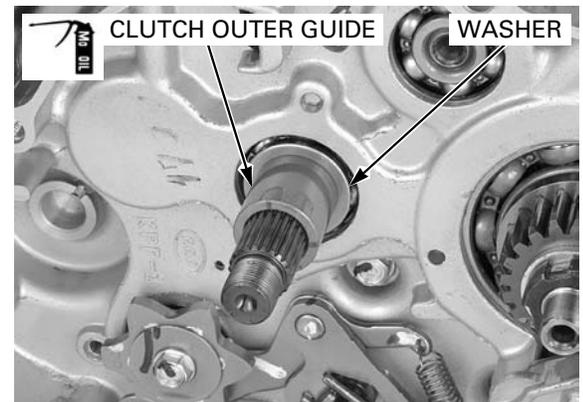


**INSTALLATION**

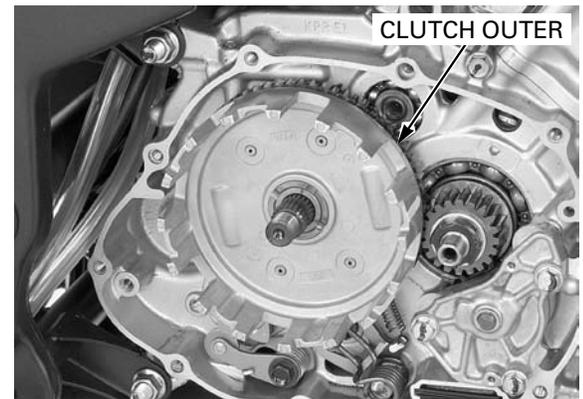


Install the washer to the mainshaft.

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

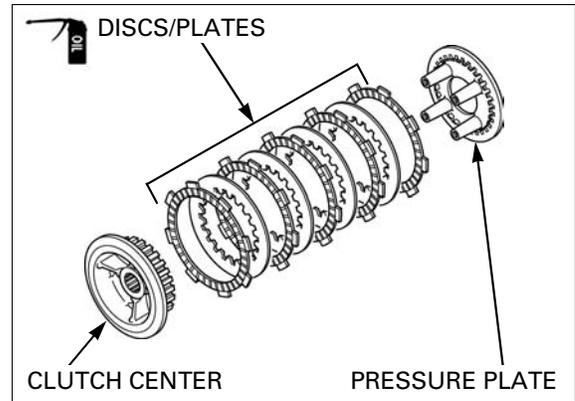


Install the clutch outer.

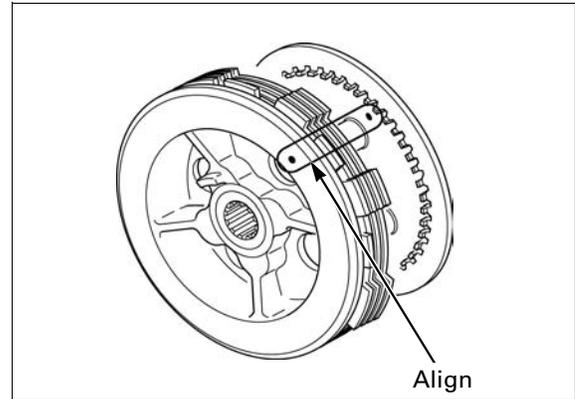


## CLUTCH/GEARSHIFT LINKAGE

Apply engine oil to the clutch disc entire surfaces.

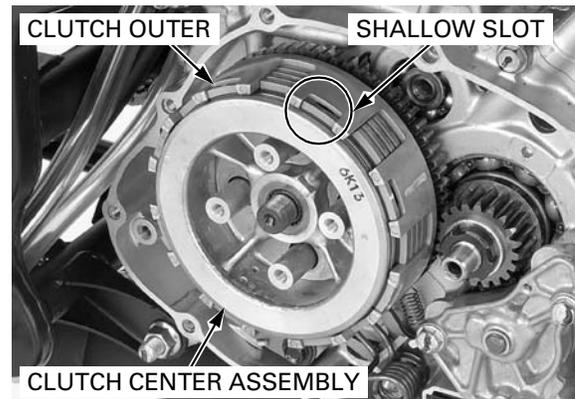


Assemble clutch discs, clutch plates and pressure plate onto clutch center, while aligning "O" mark of clutch center and pressure plate.



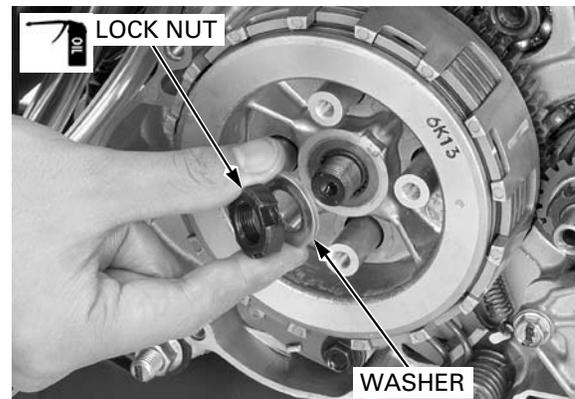
*Install the tabs of the clutch disc (out side) into the shallow slots in the clutch outer.*

Install the clutch center assembly into the clutch outer.



Install the washer.

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



## CLUTCH/GEARSHIFT LINKAGE

Attach the clutch center holder to the pressure plate using the clutch spring bolts to hold the clutch center, then tighten the clutch center lock nut to the specified torque using the special tools.

### TOOLS:

Clutch center holder	07GMB-KT70101
Lock nut wrench, 20 x 24 mm	07716-0020100
Extension bar/handle	07716-0020500

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

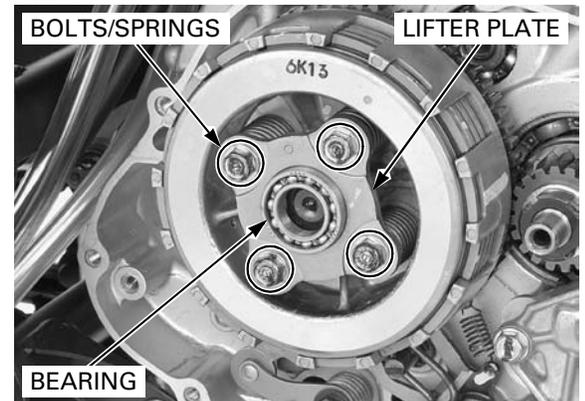
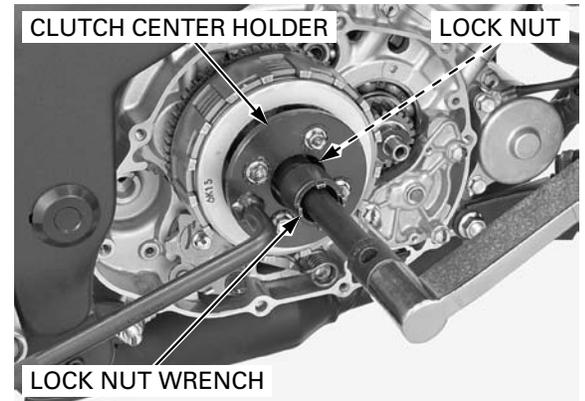
Install the clutch springs, lifter plate and bolts.

Tighten the lifter plate bolts to the specified torque in a crisscross pattern in 2 or 3 steps.

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

Install the clutch lifter bearing.

Install the right crankcase cover (page 10-8).



## GEARSHIFT LINKAGE

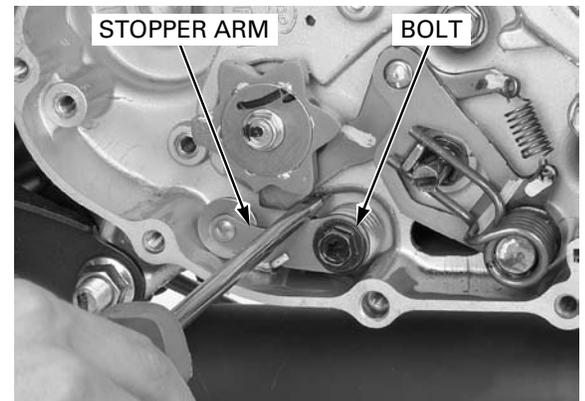
### REMOVAL

Remove the following:

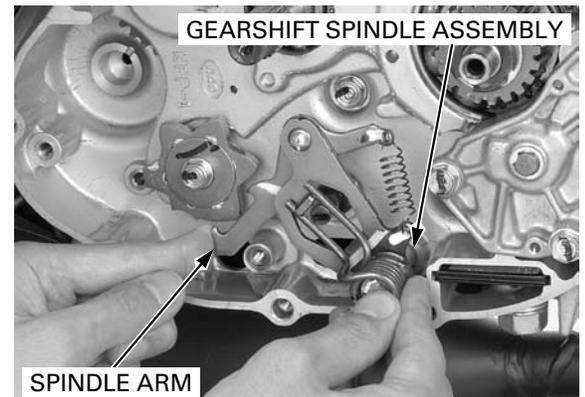
- Right crankcase cover (page 10-5)
- Clutch assembly (page 10-9)
- Gearshift arm (page 10-18)

Clean the gearshift spindle end.

Remove the shift drum stopper arm bolt and shift drum stopper arm while holding the shift drum stopper arm using a screwdriver.



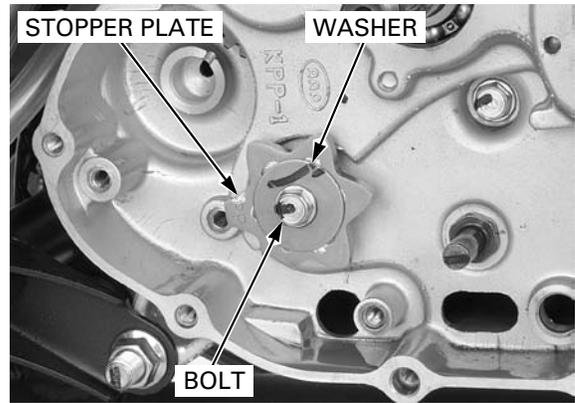
Pull down the spindle arm, then pull out the gearshift spindle assembly from the crankcase.



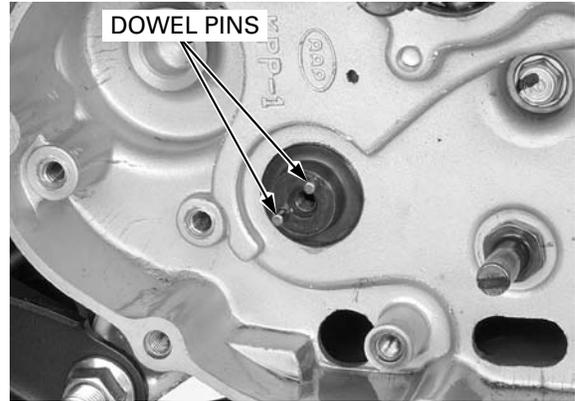
## CLUTCH/GEARSHIFT LINKAGE

Remove the following:

- Shift drum stopper plate bolt
- Washer
- Shift drum stopper plate



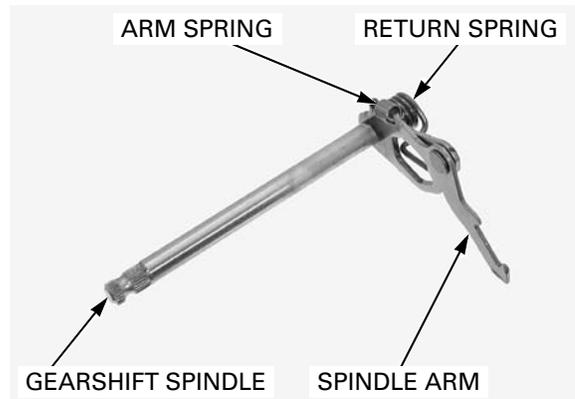
Remove the dowel pins from the shift drum.



### INSPECTION

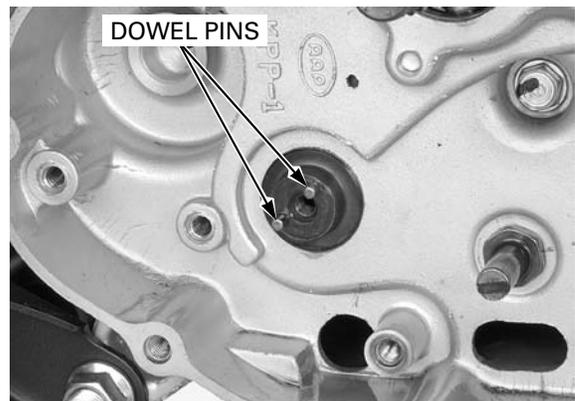
Check the return spring and spindle arm spring for fatigue or damage replace them if necessary. Check the gearshift spindle for wear or bend. Check the spindle arm for wear, damage or deformation.

Replace the gearshift spindle as an assembly if necessary.

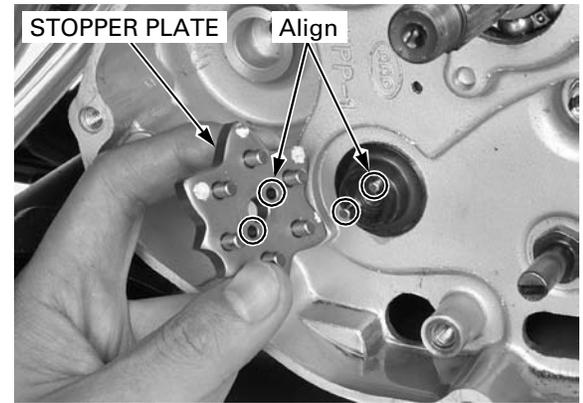


### INSTALLATION

Install the dowel pin into the shift drum hole.



Install the shift drum stopper plate, while aligning the pins hole with the dowel pins.



Install the shift drum stopper plate bolt and washer to the shift drum stopper plate and install them.

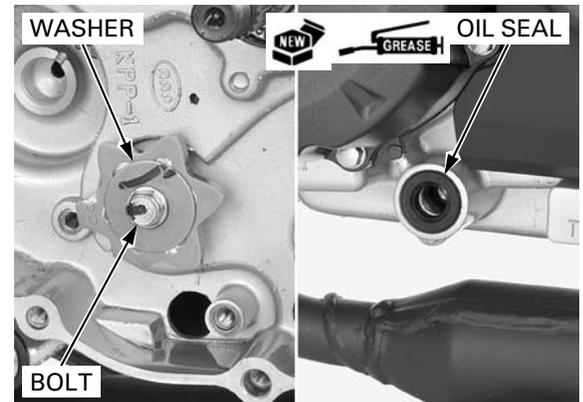
Tighten the bolt to the specified torque.

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

Remove the gearshift spindle oil seal.

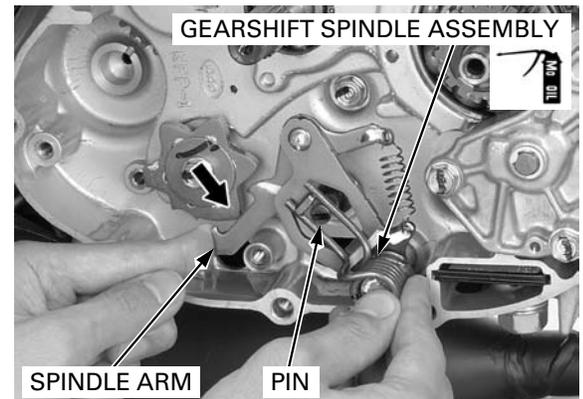
Apply grease to a new gearshift spindle oil seal lips.

Install the gearshift spindle oil seal until it is flush with the crankcase surface.



Apply molybdenum oil solution to the gearshift spindle shaft outer surface.

Install the gearshift spindle assembly to the crankcase by aligning the return spring ends with the spring pin while pushing down the spindle arm and set the spindle arm to the shift drum pins.



Apply  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in) from tip of locking agent to the shift drum stopper arm bolt threads.

Install the return spring, washer, stopper arm with hooking the return spring at the stopper arm groove.

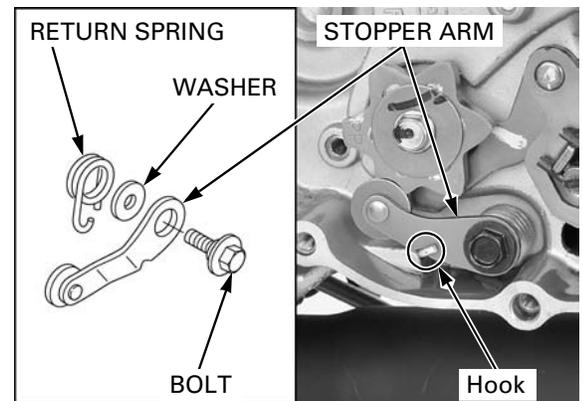
Install and tighten the bolt to the specified torque.

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

Check the stopper arm for proper operation.

Install the following:

- Gearshift arm (page 10-19)
- Clutch assembly (page 10-13)
- Right crankcase cover (page 10-8)



## CLUTCH/GEARSHIFT LINKAGE

### GEARSHIFT PEDAL

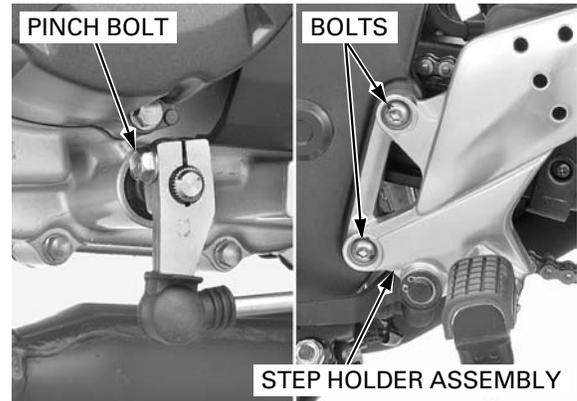
#### REMOVAL

Remove the lower cowl (page 2-8).

Remove the pinch bolt and gearshift arm.

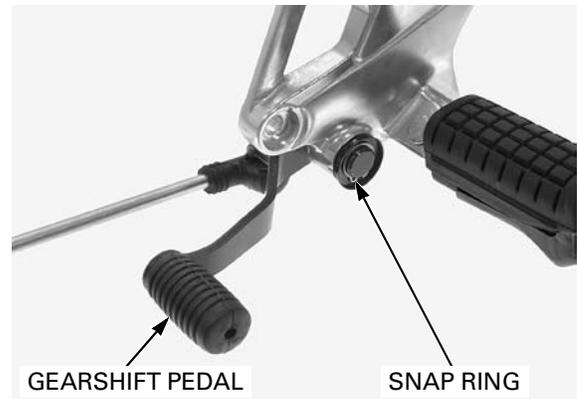
Remove the left step holder mounting bolts and left step holder assembly.

*When removing the gearshift pedal, mark the pedal position to ensure correct reassembly in its original location.*



#### DISASSEMBLY/ASSEMBLY

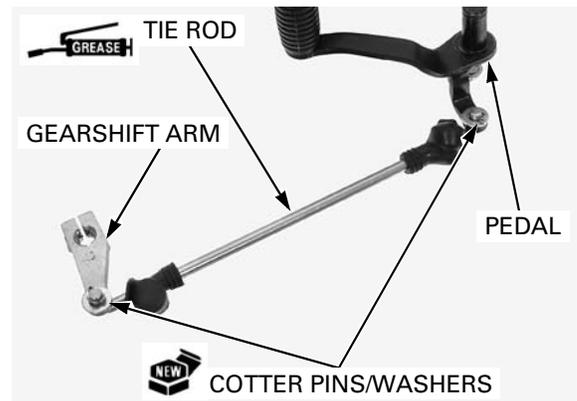
Remove the snap ring and gearshift pedal.



Remove the cotter pins and washers then remove the gearshift tie rod from the gearshift pedal and gearshift arm.

Apply grease to the gearshift tie rod sliding area and install the gearshift pedal and gearshift arm.

Install the washers and new cotter pins.



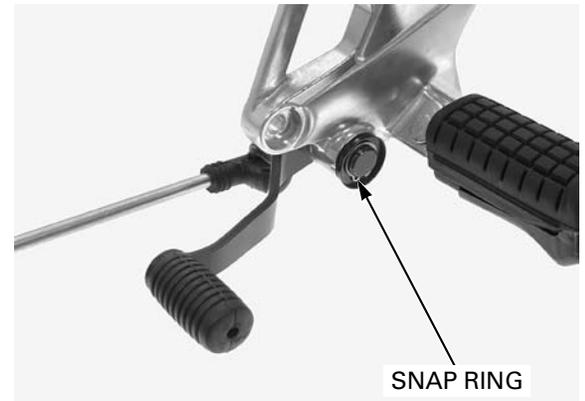
Apply grease to the gearshift pedal pivot sliding area.

Install the gearshift pedal to the left step holder.



*Make sure the snap ring is firmly seated in the groove.*

Install the snap ring.



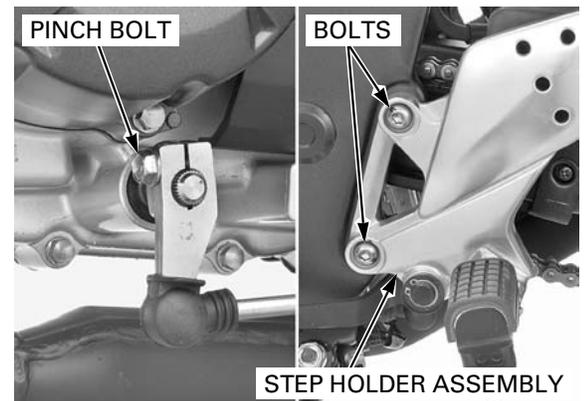
### INSTALLATION

Install the left step holder assembly and left step holder mounting bolts, tighten the bolts to the specified torque.

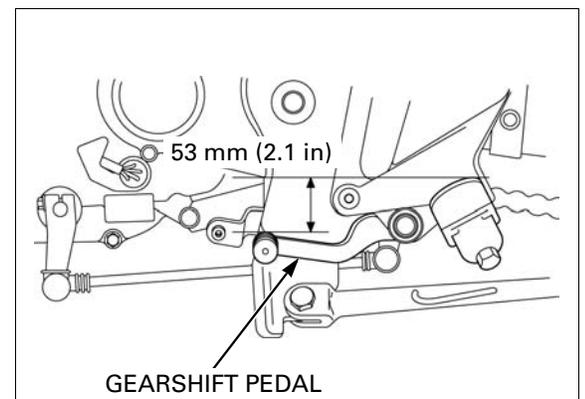
**TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)**

Install the gearshift arm on its original position as marked during removal.

Install and tighten the pinch bolt securely.



Standard pedal height is 53 mm (2.1 in) below the top of the left step as shown.



## CLUTCH/GEARSHIFT LINKAGE

### PRIMARY DRIVE GEAR

#### REMOVAL

##### NOTE:

If you replace the primary drive gear, be careful to select the identification color of the primary drive gear (page 10-22).

Remove the following:

- Clutch assembly (page 10-9)
- Oil pump (page 4-4)

Temporarily install the washer, clutch outer guide and clutch outer.

Insert the gear holder between the primary drive and driven gears.

Loosen the primary drive gear lock nut using the special tools.

##### TOOLS:

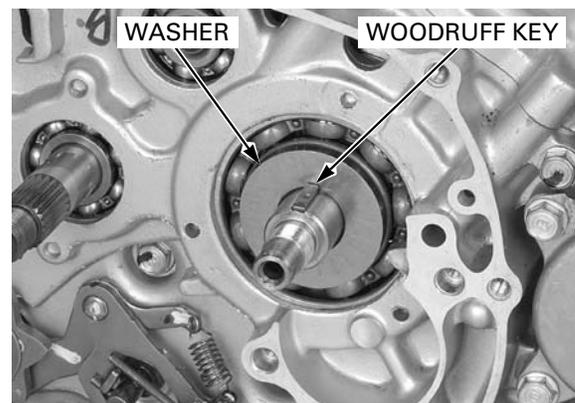
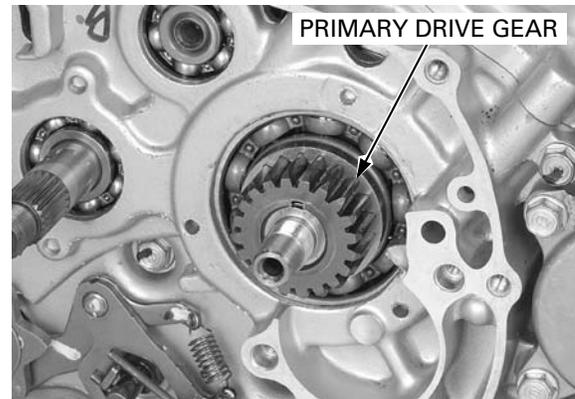
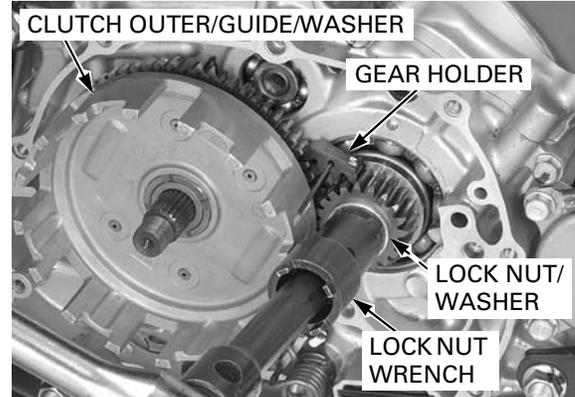
**Lock nut wrench, 20 x 24 mm** 07716-0020100

**Gear holder** 07724-0010200

**Extension bar/handle** 07716-0020500

Remove the clutch outer, clutch outer guide, lock nut and washers.

Remove the primary drive gear.



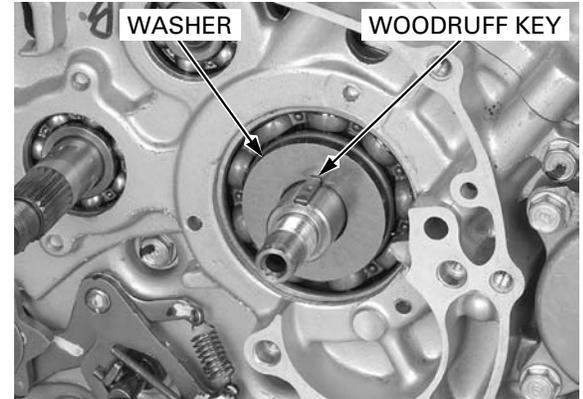
*Be careful not to damage the key groove and crankshaft.* Remove the woodruff key and washer.

## INSTALLATION

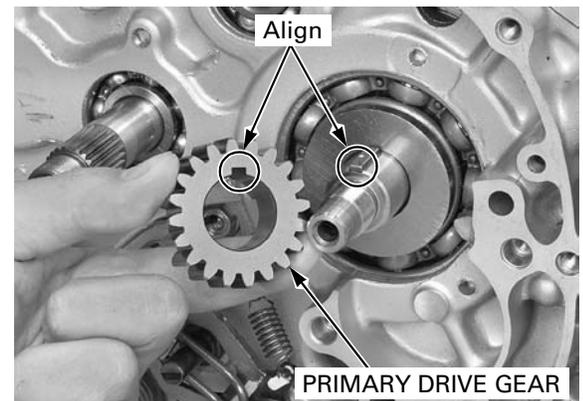
Install the washer.

*Be careful not to damage the key groove and crankshaft.*

Install the woodruff key onto the crankshaft.

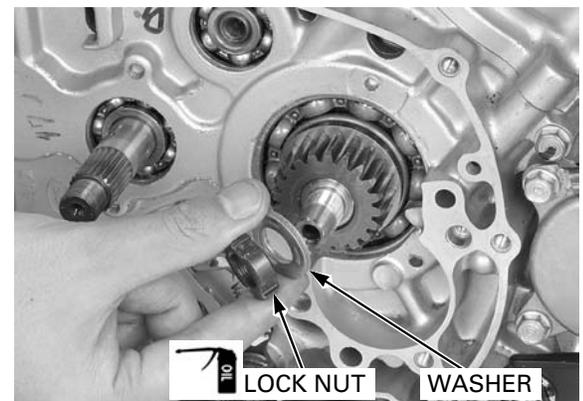


Install the primary drive gear, while aligning the groove with the woodruff key.



Install the washer.

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



Temporarily install the washer, clutch outer guide and clutch outer.

Insert the gear holder between the primary drive and driven gears.

Tighten the primary drive gear lock nut to the specified torque using the special tools.

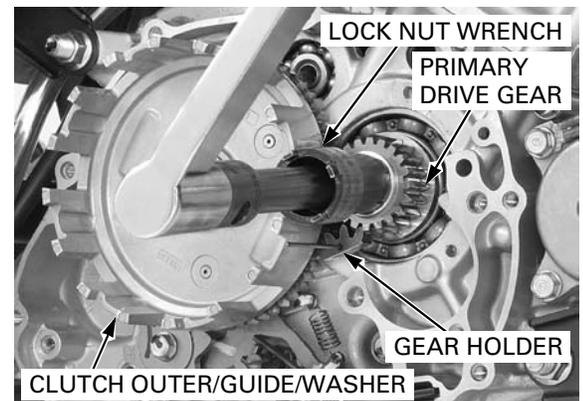
**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**

### TOOLS:

Lock nut wrench, 20 x 24 mm	07716-0020100
Gear holder	07724-0010200
Extension bar/handle	07716-0020500

Install the following:

- Oil pump (page 4-8)
- Clutch assembly (page 10-13)



## CLUTCH/GEARSHIFT LINKAGE

### PRIMARY DRIVE GEAR SELECTION

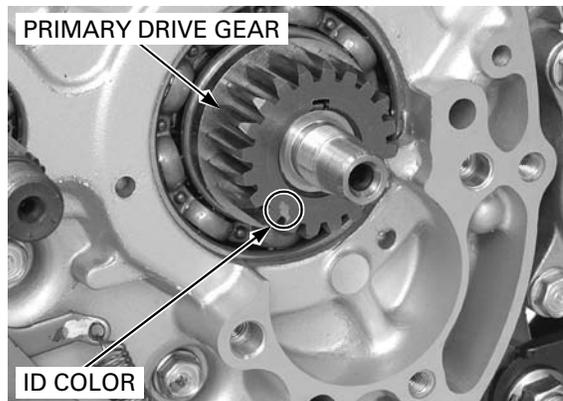
The primary drive gear has identification color.

#### PRIMARY DRIVE GER SELECTION TABLE

ID COLOR	P/N
WHITE	23121-KGH-900
BLUE	23122-KGH-900
YELLOW	23123-KGH-900

If the primary drive gear is replaced with a new one, select the same colored gear as the original gear.

If the crankcase is replaced with a new one, select the blue marked gear.



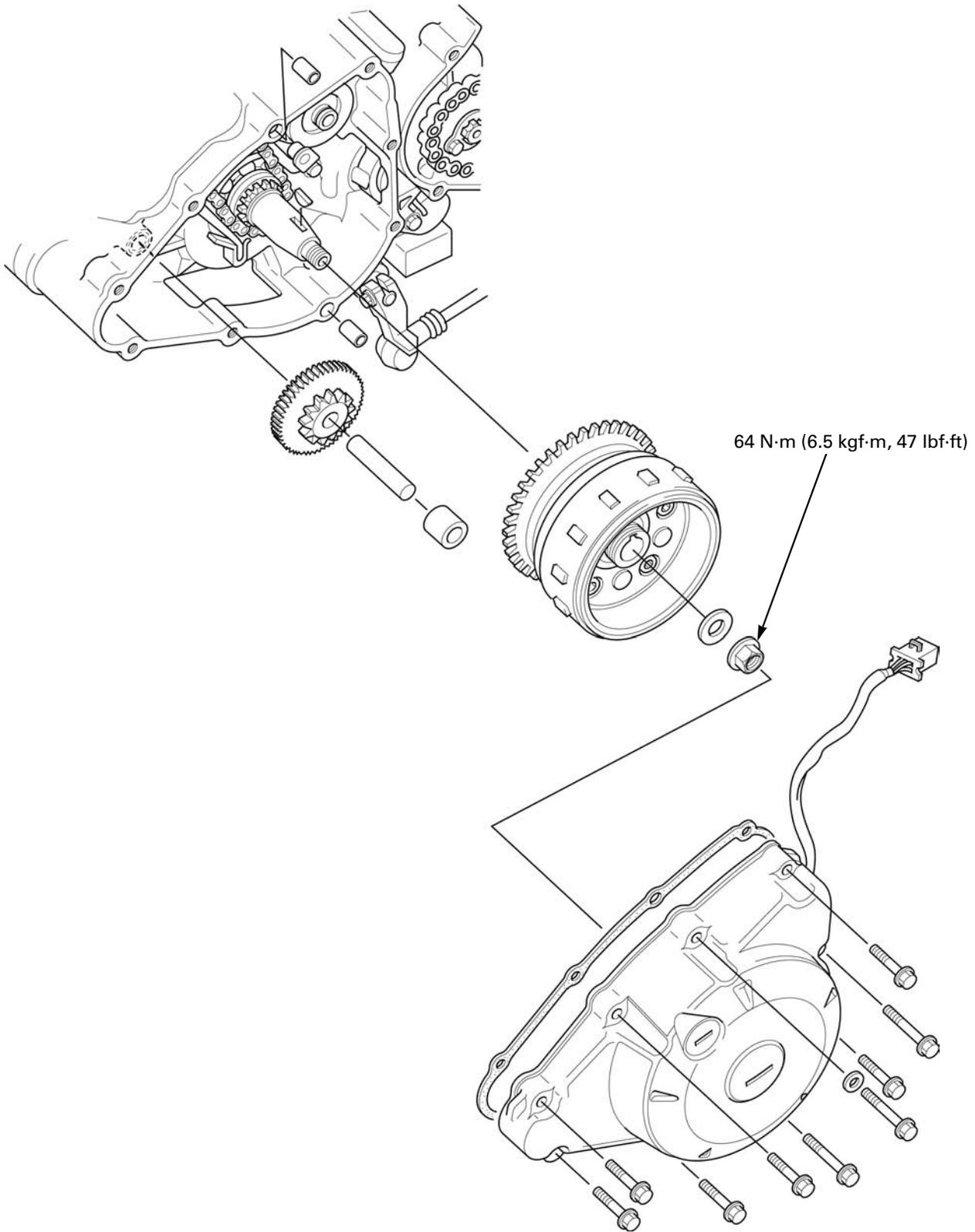
# 11. ALTERNATOR/STARTER CLUTCH

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COMPONENT LOCATION .....	11-2	STATOR/CKP SENSOR.....	11-6
SERVICE INFORMATION .....	11-3	FLYWHEEL REMOVAL.....	11-7
TROUBLESHOOTING .....	11-3	STARTER CLUTCH .....	11-8
LEFT CRANKCASE COVER .....	11-4	FLYWHEEL INSTALLATION .....	11-11

# ALTERNATOR/STARTER CLUTCH COMPONENT LOCATION

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## SERVICE INFORMATION

### GENERAL

- This section covers the removal and installation of the flywheel, alternator and starter clutch. These services can be done with the engine installed in the frame.
- For alternator inspection (page 16-7).
- For CKP sensor inspection (page 17-6).
- For starter motor service (page 18-6).

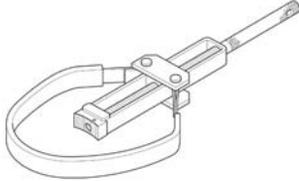
### SPECIFICATIONS

ITEM		STANDARD	Unit: mm (in)
			SERVICE LIMIT
Starter driven gear	I.D.	22.010 – 22.031 (0.8665 – 0.8674)	22.08 (0.869)
	O.D.	45.660 – 45.673 (1.7976 – 1.7981)	45.60 (1.795)

### TORQUE VALUES

Flywheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply engine oil to the threads and seating surface.
CKP sensor bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads.
Stator mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Starter clutch bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply locking agent to the threads.

### TOOLS

<p>Flywheel holder 07725-0040001</p> 	<p>Flywheel puller, 30 mm 07KMC-HE00100</p> 
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## TROUBLESHOOTING

#### Engine does not turn

- Faulty starter clutch
- Damaged reduction gear/shaft
- Faulty starter driven gear

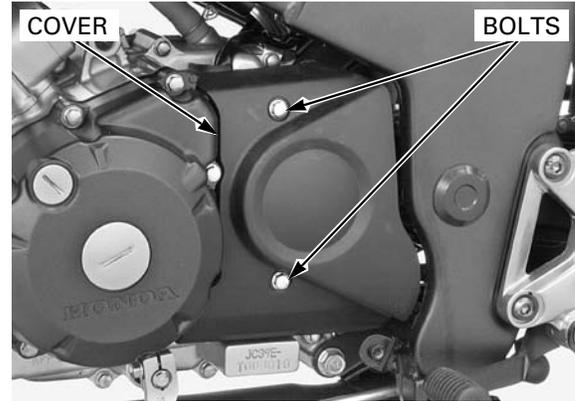
## ALTERNATOR/STARTER CLUTCH

### LEFT CRANKCASE COVER

#### REMOVAL

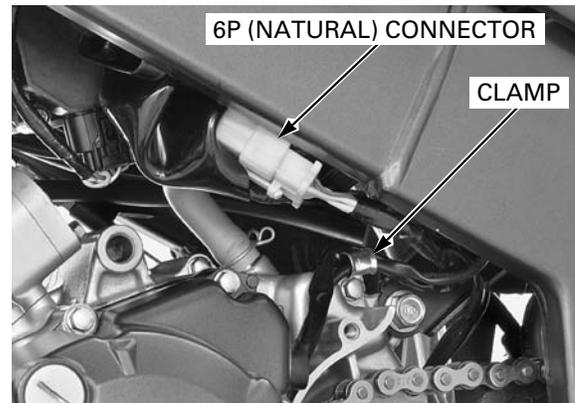
Remove the lower cowl (page 2-8).

Remove the bolts and drive sprocket cover.



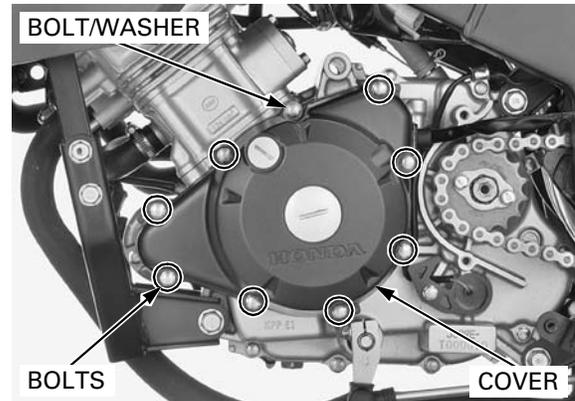
Disconnect the alternator/CKP sensor 6P (Natural) connector.

Release the alternator/CKP sensor wire from the clamp.

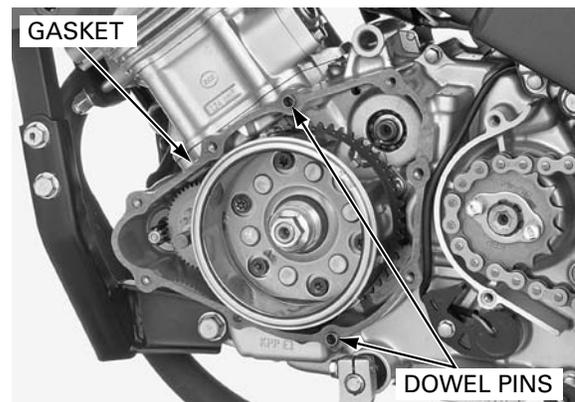


*The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during removal.*

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



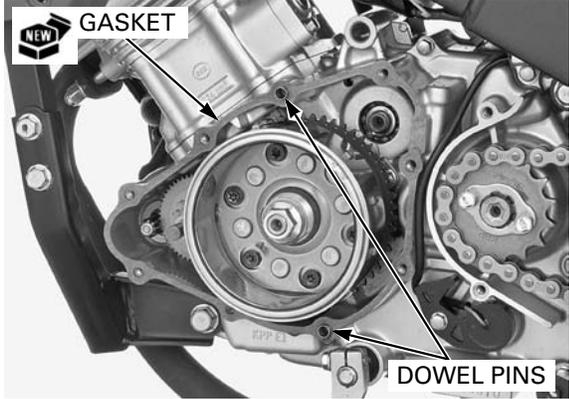
Remove the dowel pins and gasket.



**INSTALLATION**

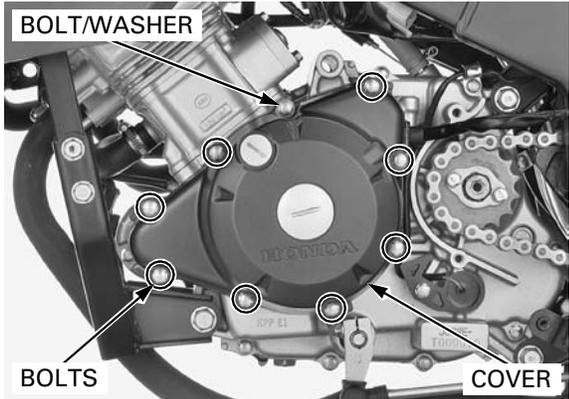
*Be careful not to damage the mating surfaces.*

Clean any gasket material from the mating surfaces of the right crankcase and cover.  
Install the dowel pins and new gasket.



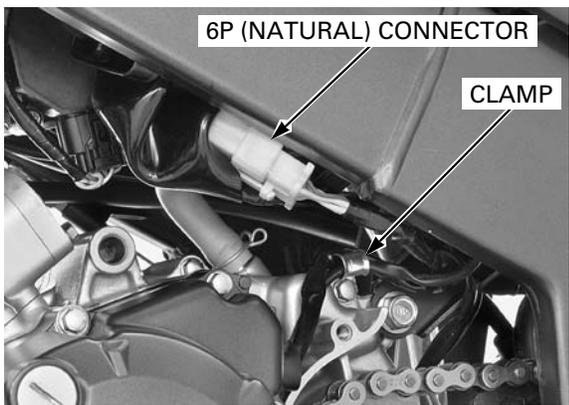
*The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.*

Install the left crankcase cover, bolts and washer.  
Tighten the bolts in a crisscross pattern in 2 or 3 steps.

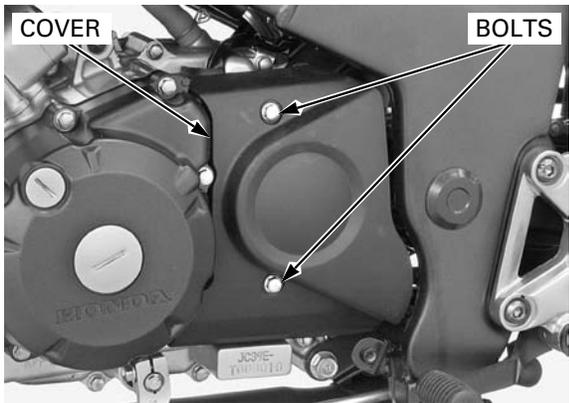


*Route the wire properly (page 1-18).*

Connect the alternator/CKP sensor 6P (Natural) connector.  
Install the alternator/CKP sensor wire to the clamp.



Install the bolts and drive sprocket cover.  
Install the lower cowl (page 2-8).



## ALTERNATOR/STARTER CLUTCH

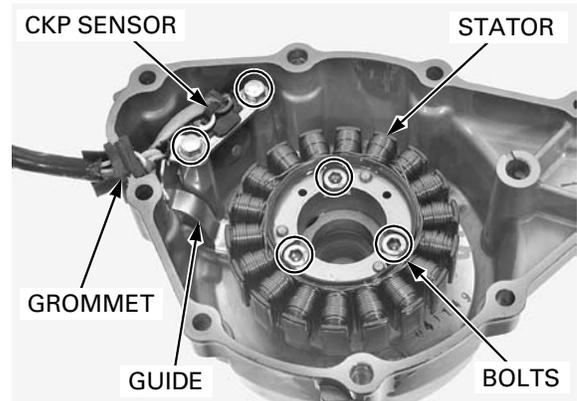
### STATOR/CKP SENSOR

#### REMOVAL

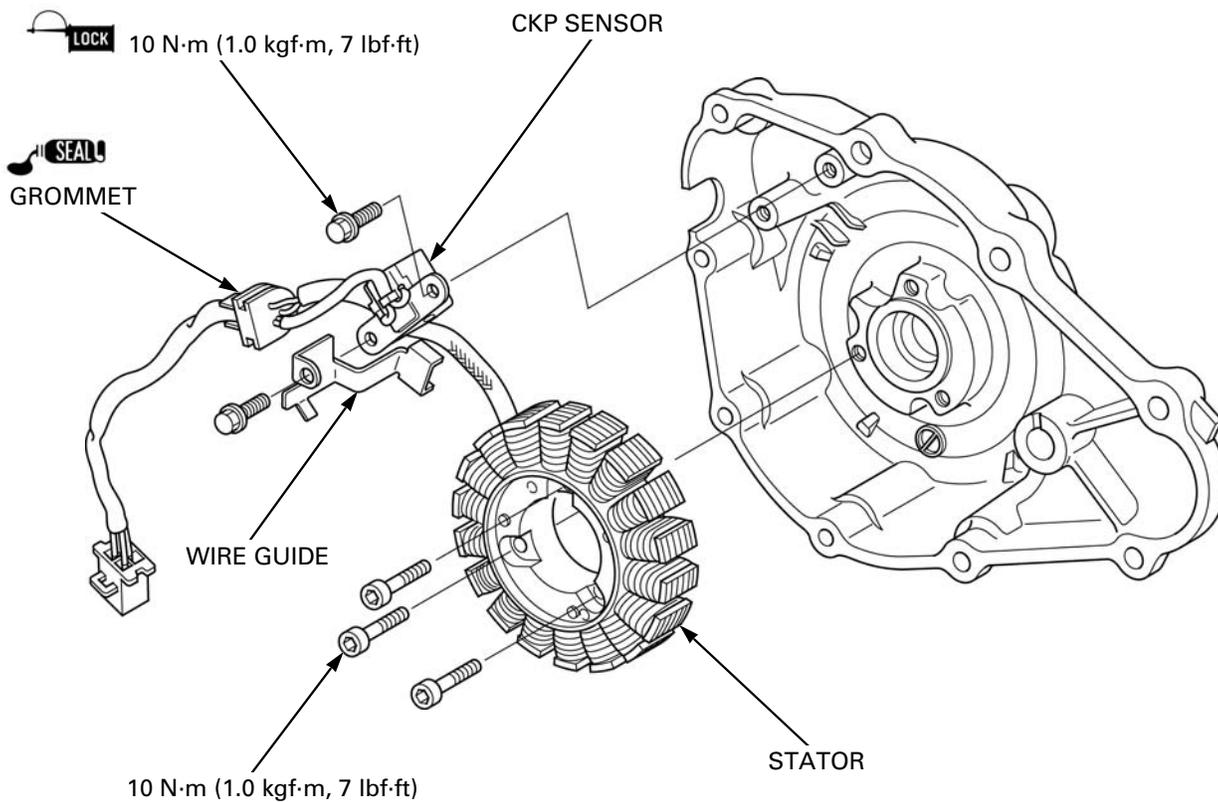
Remove the left crankcase cover (page 11-4).

Remove the grommet.

Remove the CKP sensor bolts, wire guide, CKP sensor, stator mounting bolts and stator from the left crankcase cover.



#### INSTALLATION



Install the stator.  
Install and tighten the stator mounting bolts to the specified torque.

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

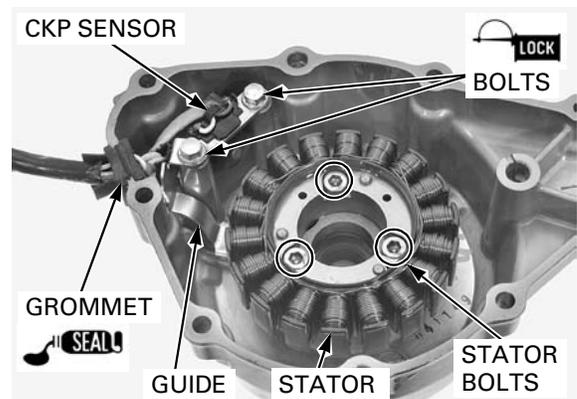
Apply liquid sealant (TB 1215 or equivalent) to the wire grommet sealing surface and install the grommet into the groove.

Install the wire guide and CKP sensor.

Apply  $6.5 \pm 1.0$  mm ( $0.26 \pm 0.04$  in) from tip of locking agent to the CKP sensor bolt threads.

Install and tighten the bolts to the specified torque.

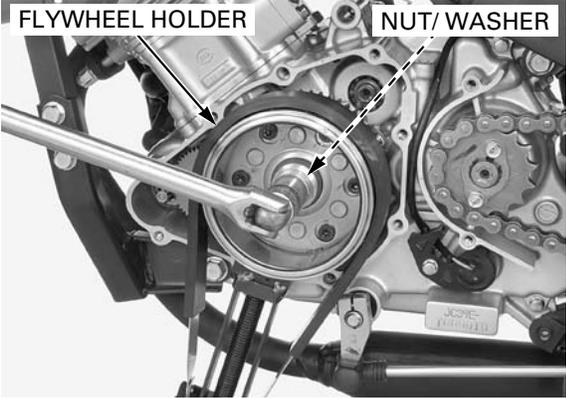
**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



# FLYWHEEL REMOVAL

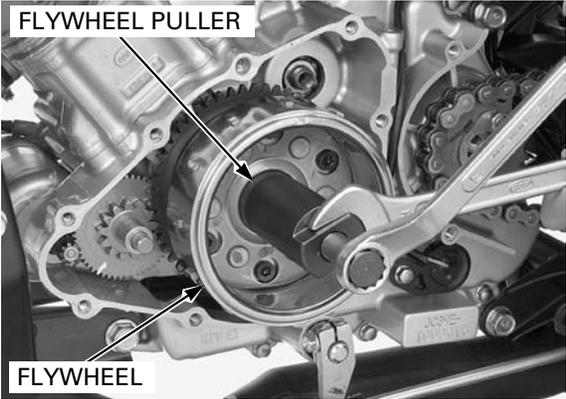
Remove the left crankcase cover (page 11-4).  
Hold the flywheel with a special tool and remove the flywheel nut and washer.

**TOOL:**  
**Flywheel holder** 07725-0040001

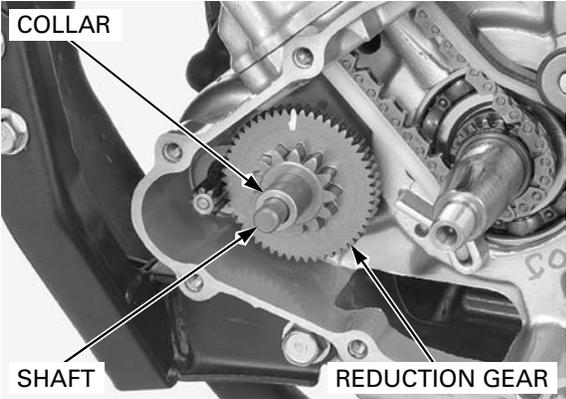


Remove the flywheel using a special tool.

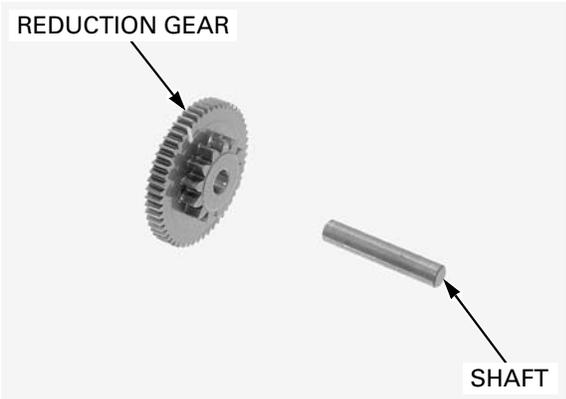
**TOOL:**  
**Flywheel puller, 30mm** 07KMC-HE00100



Remove the collar, starter reduction gear and shaft.

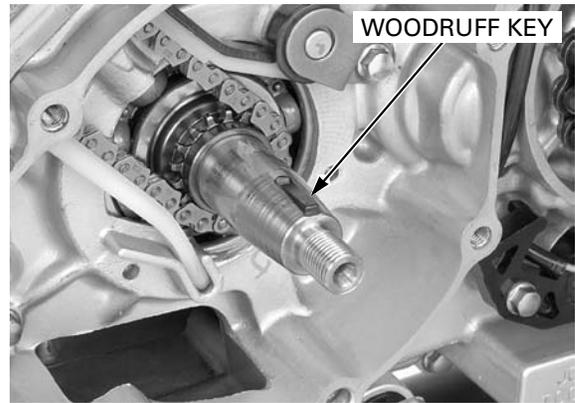


Check the starter reduction gear and shaft for wear or damage.



## ALTERNATOR/STARTER CLUTCH

Be careful not to damage the key groove and crankshaft. Remove the woodruff key.

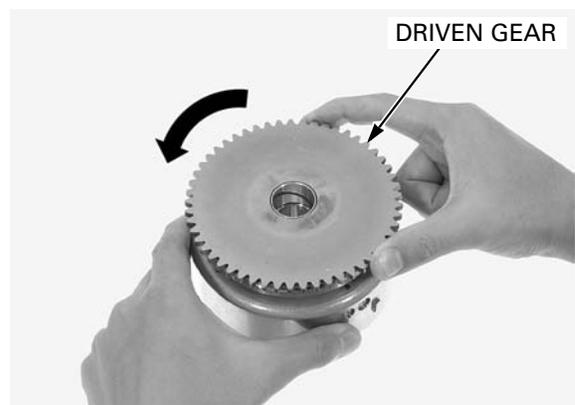


## STARTER CLUTCH

### REMOVAL

Remove the flywheel (page 11-7).

Remove the starter driven gear while turning it counterclockwise.

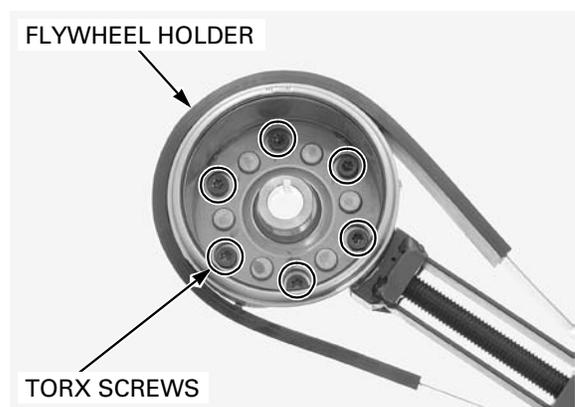


Hold the flywheel with a special tool and remove the starter clutch torx screws.

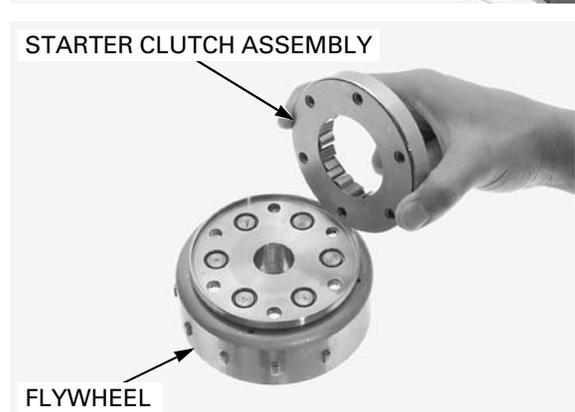
#### TOOL:

Flywheel holder

07725-0040001

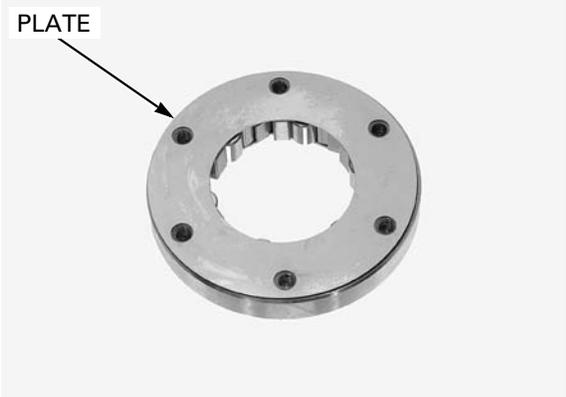


Remove the starter clutch assembly from the flywheel.

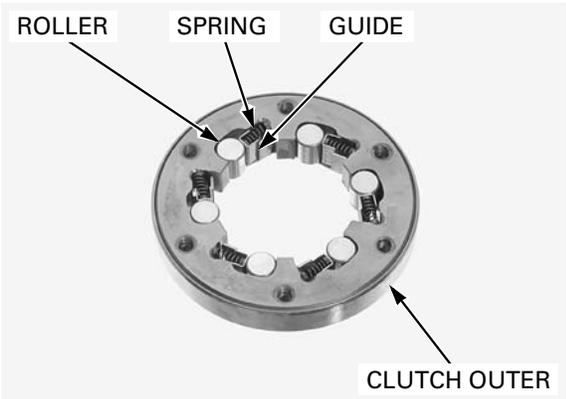


**DISASSEMBLY**

Remove the plate.



Remove the rollers, spring guides and springs from the starter clutch outer.



**INSPECTION**

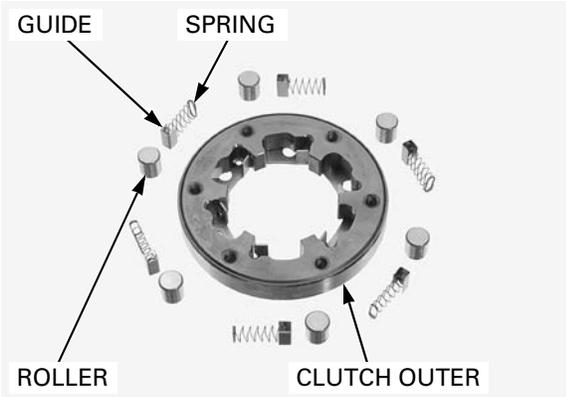
Check the rollers, spring guides, springs and starter clutch outer for wear or damage.

*Replace the rollers as a set.*

Replace the rollers for wear or damage.

**NOTE:**

Starter clutch should be replaced as an assembly if the starter clutch and springs are damaged or worn.



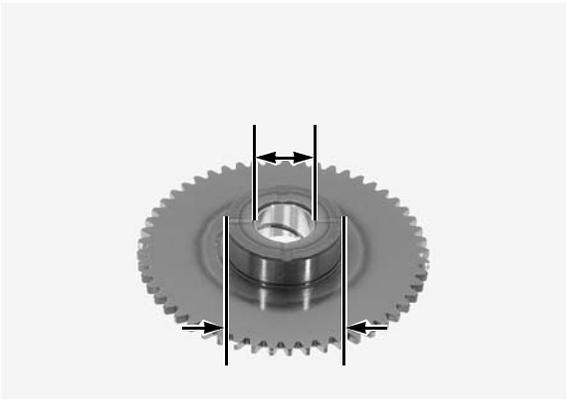
Check the starter driven gear teeth for wear or damage.  
Check the roller contact surface for wear or damage.

Measure the starter driven gear boss I.D.

**SERVICE LIMIT: 22.08 mm (0.869 in)**

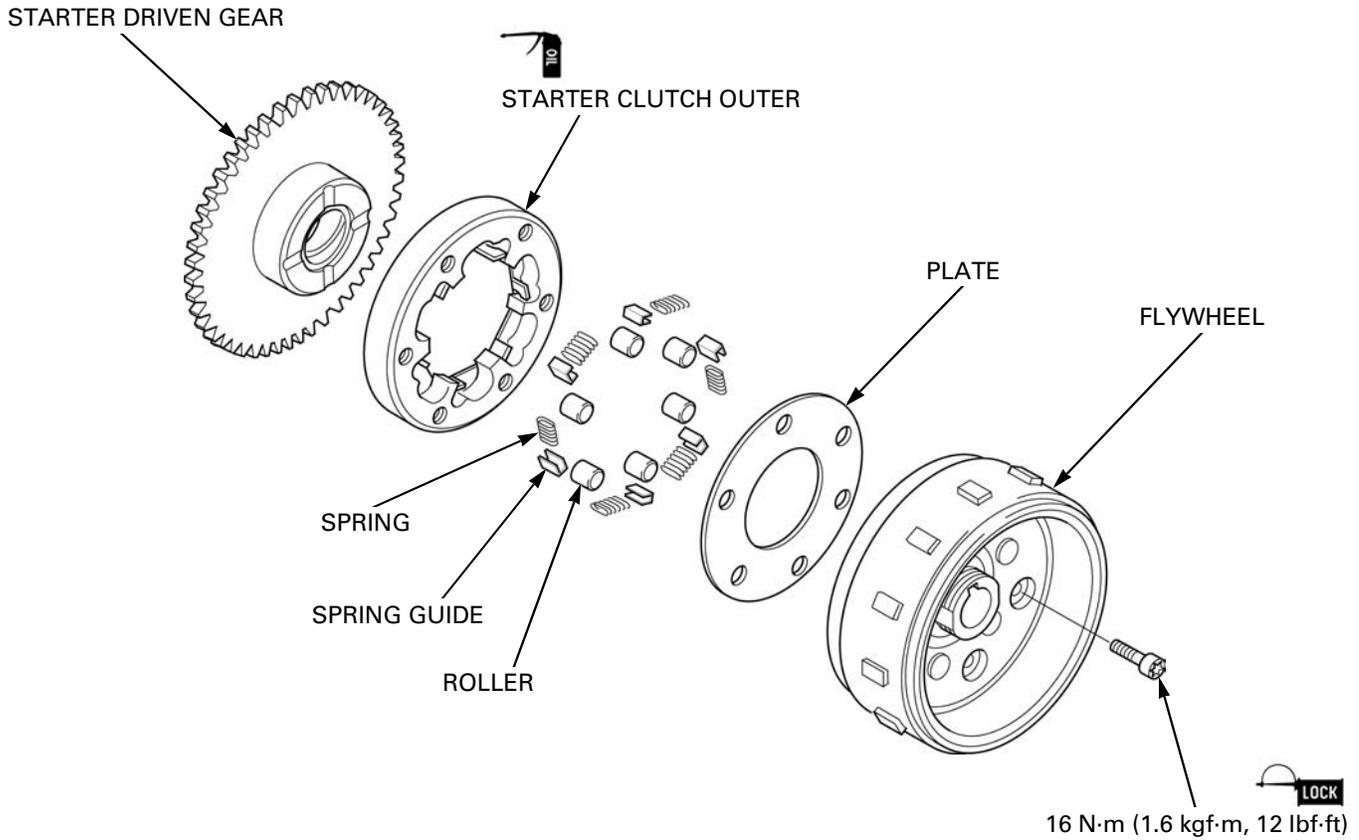
Measure the starter driven gear boss O.D.

**SERVICE LIMIT: 45.60 mm (1.795 in)**



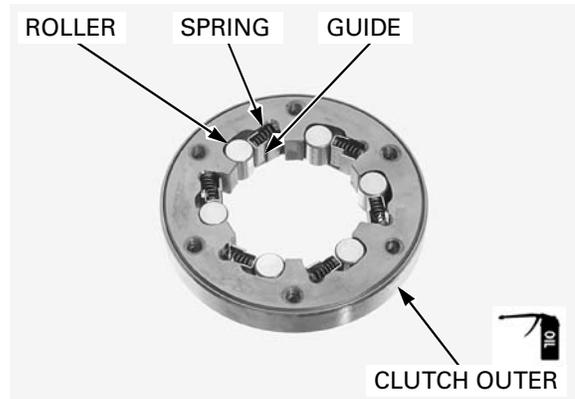
# ALTERNATOR/STARTER CLUTCH

## ASSEMBLY

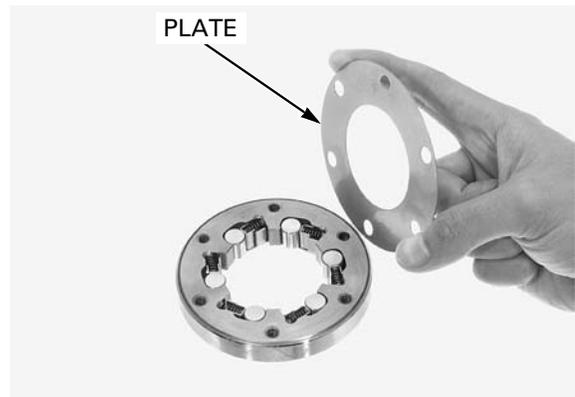


Install the springs, spring guides and rollers into the starter clutch outer.

Apply engine oil to the starter clutch rolling surface.

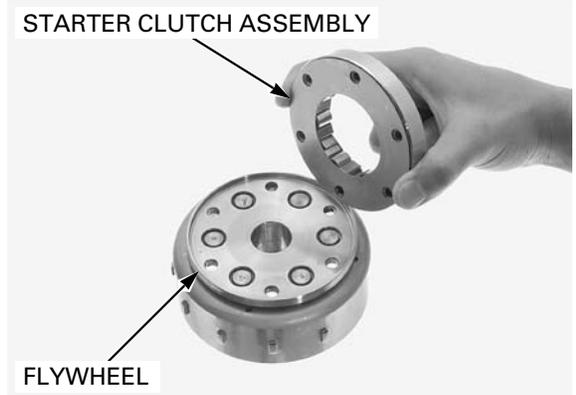


Install the plate.



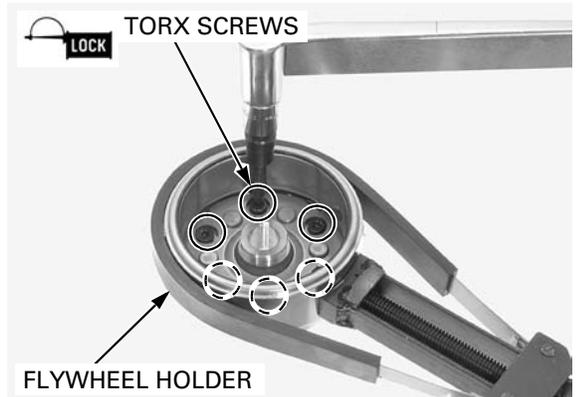
**INSTALLATION**

Install the starter clutch assembly to the flywheel as shown.



Apply  $6.5 \pm 0.1$  mm ( $0.26 \pm 0.04$  in) from tip of locking agent to the starter clutch torx screw threads.

Install the starter clutch assembly onto the flywheel and install the torx screws. Hold the flywheel with a special tool and tighten the torx screws to the specified torque.



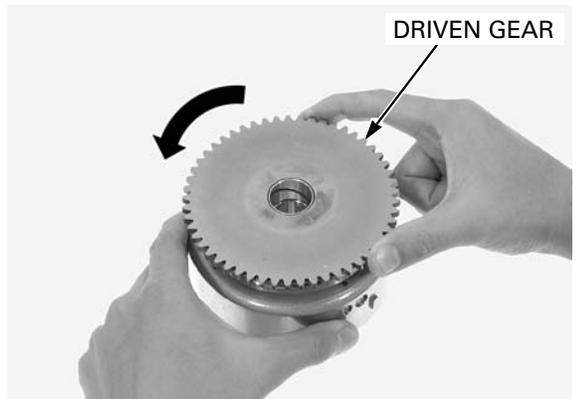
**TOOL:**  
**Flywheel holder** **07725-0040001**

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

Install the starter driven gear while turning it counterclockwise.

Make sure that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

Install the flywheel (page 11-11).

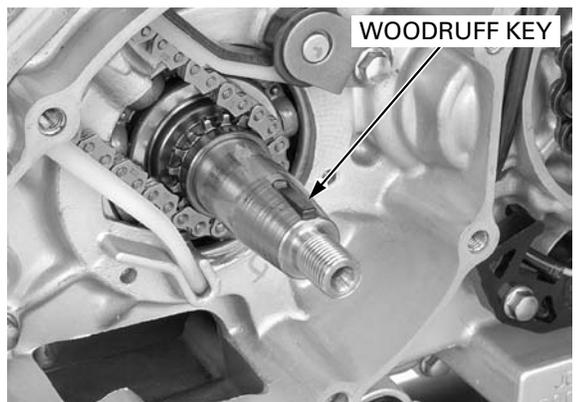


**FLYWHEEL INSTALLATION**

Clean any oil from the crankshaft taper.

*Be careful not to damage the key groove and crankshaft.*

Install the woodruff key onto the crankshaft.

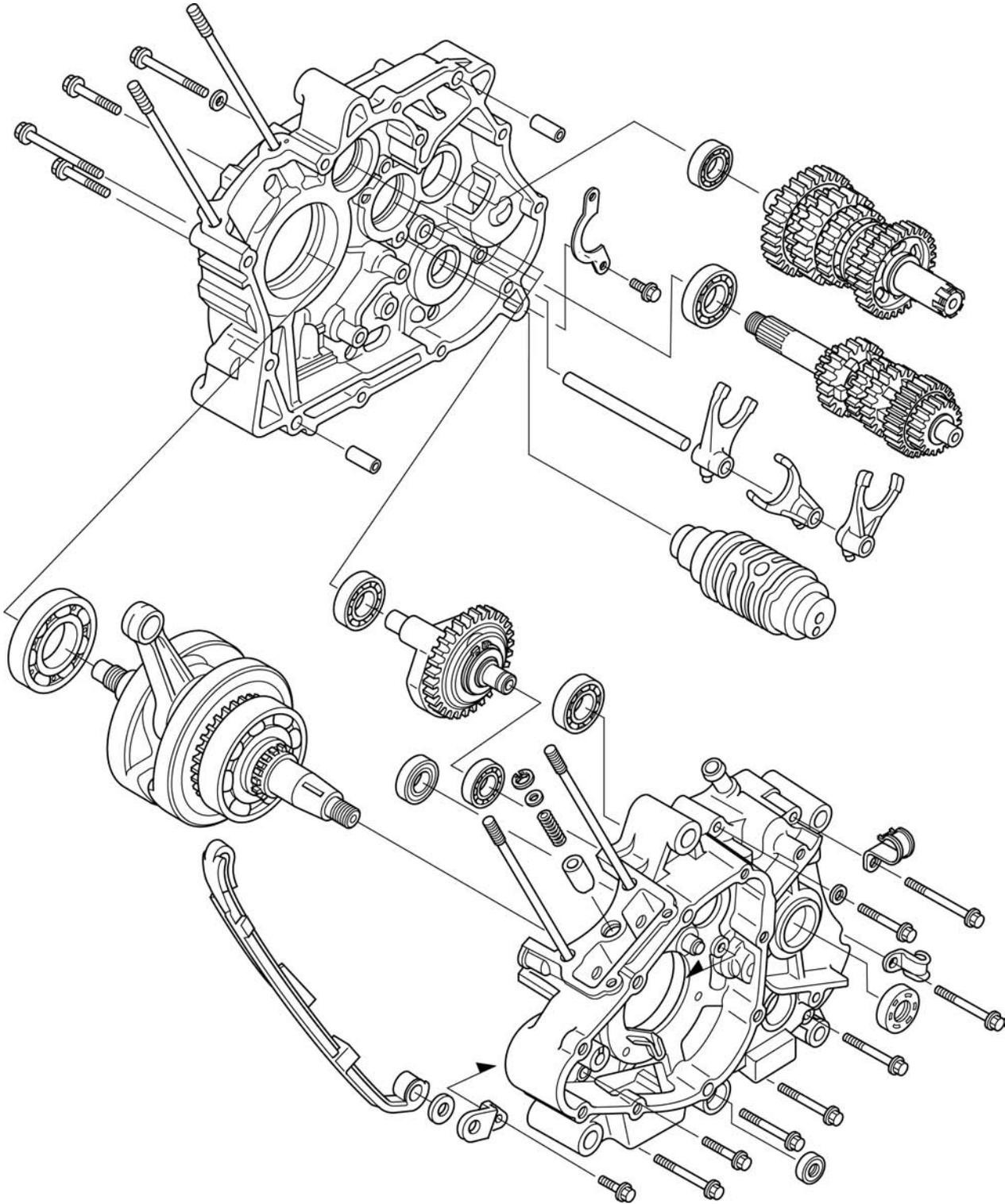




# **12. CRANKSHAFT/BALANCER/TRANSMISSION**

<b>COMPONENT LOCATION .....</b>	<b>12-2</b>	<b>CRANKSHAFT/BALANCER .....</b>	<b>12-8</b>
<b>SERVICE INFORMATION .....</b>	<b>12-3</b>	<b>TRANSMISSION.....</b>	<b>12-12</b>
<b>TROUBLESHOOTING .....</b>	<b>12-5</b>	<b>BEARING REPLACEMENT .....</b>	<b>12-18</b>
<b>CRANKCASE SEPARATION.....</b>	<b>12-6</b>	<b>CRANKCASE ASSEMBLY .....</b>	<b>12-21</b>

COMPONENT LOCATION



# SERVICE INFORMATION

## GENERAL

- This section covers crankcase separation for service of the crankshaft, transmission and balancer.
- The crankcase must be separated to service the crankshaft, balancer and transmission. To service these parts, the engine must be removed from the frame.
- The following components must be removed before separating the crankcase.
  - Camshaft (page 8-8)
  - Cylinder head (page 8-15)
  - Cylinder/piston (page 9-4)
  - Clutch (page 10-9)
  - Gearshift linkage (page 10-15)
  - Oil pump (page 4-4)
  - Primary drive gear (page 10-20)
  - Flywheel (page 11-7)
  - Neutral switch (page 19-17)
  - Starter motor (page 18-6)
  - Engine (page 7-4)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Clean the oil passages before assembling the crankcase halves.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

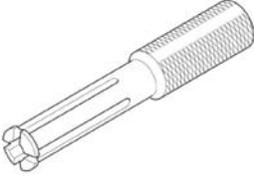
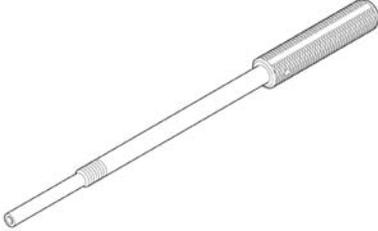
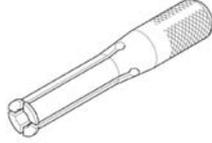
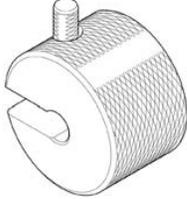
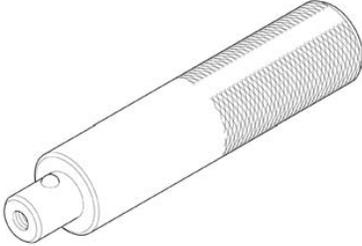
## SPECIFICATIONS

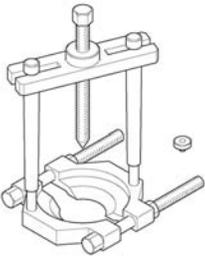
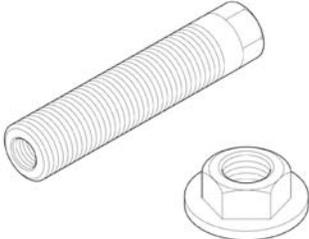
Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Runout	–	0.03 (0.001)
	Connecting rod big end radial clearance	0.006 – 0.014 (0.0002 – 0.0006)	0.05 (0.002)
	Connecting rod big end side clearance	0.40 – 0.60 (0.016 – 0.024)	0.85 (0.033)
Transmission	Gear I.D.	M5, M6	20.000 – 20.021 (0.7874 – 0.7882)
		C1	18.000 – 18.021 (0.7087 – 0.7095)
		C2	23.020 – 23.041 (0.9063 – 0.9071)
		C3, C4	22.020 – 22.041 (0.8669 – 0.8678)
	Bushing O.D.	M5, M6	19.959 – 19.980 (0.7858 – 0.7866)
		C1	17.959 – 17.980 (0.7070 – 0.7079)
		C2	22.984 – 23.005 (0.9049 – 0.9057)
	Gear-to-bushing clearance	M5, M6, C1	0.020 – 0.062 (0.0008 – 0.0024)
		C2	0.015 – 0.057 (0.0006 – 0.0022)
	Bushing I.D.	M5	17.000 – 17.018 (0.6693 – 0.6700)
		C1	15.000 – 15.018 (0.5906 – 0.5913)
		C2	20.020 – 20.041 (0.7882 – 0.7890)
	Mainshaft / countershaft O.D.	at M5 bushing	16.966 – 16.984 (0.6680 – 0.6687)
		at C1 bushing	14.966 – 14.984 (0.5892 – 0.5899)
		at C2 bushing	19.978 – 19.989 (0.7865 – 0.7870)
Bushing-to-shaft clearance	M5, C1	0.016 – 0.052 (0.0006 – 0.0020)	
	C2	0.031 – 0.063 (0.0012 – 0.0025)	
Shift fork, shift fork shaft	Shift fork shaft O.D.	9.986 – 9.995 (0.3931 – 0.3935)	
	Shift fork I.D.	10.000 – 10.018 (0.3937 – 0.3944)	
	Shift fork claw thickness	4.93 – 5.00 (0.194 – 0.197)	
Shift drum	Shift drum O.D.	Right side	25.959 – 25.980 (1.0220 – 1.0228)
		Left side	24.959 – 24.980 (0.9826 – 0.9835)
	Shift drum journal I.D.	Right side	26.000 – 26.021 (1.0236 – 1.0244)
		Left side	25.000 – 25.033 (0.9843 – 0.9855)
	Shift drum-to-shift drum journal clearance	Right side	0.020 – 0.062 (0.0008 – 0.0024)
		Left side	0.020 – 0.074 (0.0008 – 0.0029)

# CRANKSHAFT/BALANCER/TRANSMISSION

## TOOLS

<p>Bearing remover head, 12 mm 07936-1660110</p> 	<p>Bearing remover shaft, 12 mm 07936-1660120</p> 	<p>Bearing remover head, 15 mm 07936-KC10200</p> 
<p>Bearing remover shaft 07936-KC10100</p> 	<p>Remover weight 07741-0010201</p> 	<p>Driver 07749-0010000</p> 
<p>Pilot, 12 mm 07746-0040200</p> 	<p>Pilot, 15 mm 07746-0040300</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Pilot, 20 mm 07746-0040500</p> 	<p>Pilot, 35 mm 07746-0040800</p> 	<p>Attachment, 32 x 35 mm 07746-0010100</p> 

<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Attachment, 72 x 75 mm 07746-0010600</p> 
<p>Universal bearing puller 07631-0010000</p> 	<p>Assembly collar 07965-VM00100</p> 	<p>Assembly shaft 07965-VM00200</p> 

## TROUBLESHOOTING

### Excessive noise

- Worn, seized or chipped transmission gear
- Worn or damaged transmission bearing
- Worn or damaged connecting rod big end bearing
- Worn crankshaft bearing
- Worn connecting rod small end
- Worn balancer bearing
- Improper balancer installation

### Hard to shift

- Bent shift fork
- Bent shift fork shaft
- Damaged shift drum guide groove
- Damaged shift fork guide pin
- Bent shift fork claw
- Damaged gearshift spindle
- Loose shift drum stopper arm bolt

### Transmission jumps out of gear

- Worn gear dogs or dog holes
- Damaged shift drum guide groove
- Worn shift fork guide pin
- Worn shift fork groove in gear
- Worn shift fork shaft
- Bent shift fork shaft
- Weak or broken gearshift spindle return spring

### Engine vibration

- Excessive crankshaft runout
- Improper balancer timing

### CRANKCASE SEPARATION

**NOTE:**

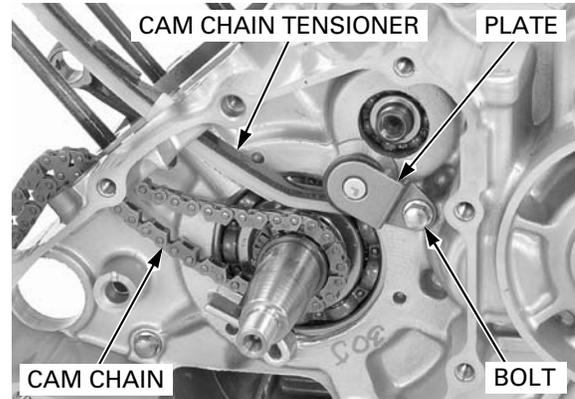
If you replace the crankcase, record the identification color of the following gears:

- Primary drive gear (page 10-22)
- Balancer driven gear (page 12-11)

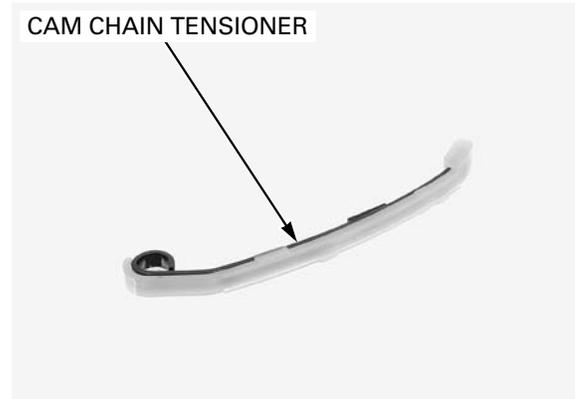
Refer to Service Information (page 12-3) for removal of necessary parts before disassembling the crankcase.

Remove the tensioner guide plate bolt, plate and cam chain tensioner.

Remove the cam chain.



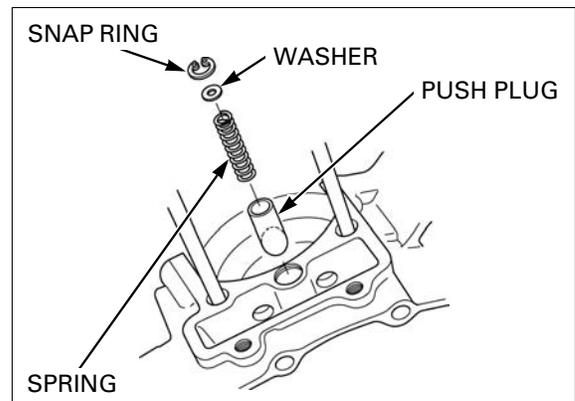
Check the cam chain tensioner for excessive wear or damage, replace if necessary.



Remove the snap ring, washer, spring and bearing push plug from the left crankcase.

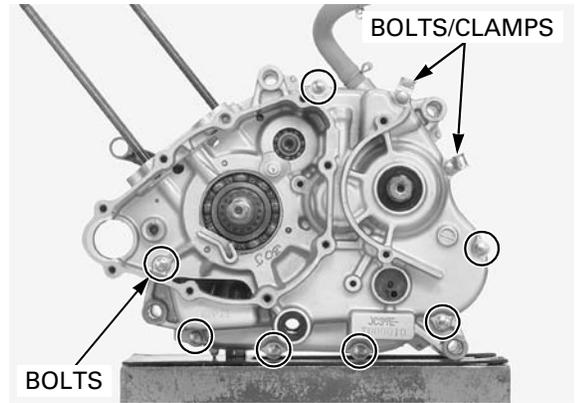
Check the bearing push plug for wear or damage and replace if necessary.

Check the spring for fatigue or damage and replace if necessary.



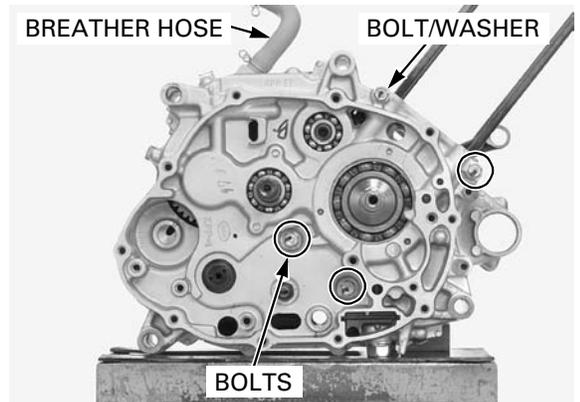
## CRANKSHAFT/BALANCER/TRANSMISSION

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



Disconnect the crankcase breather hose.

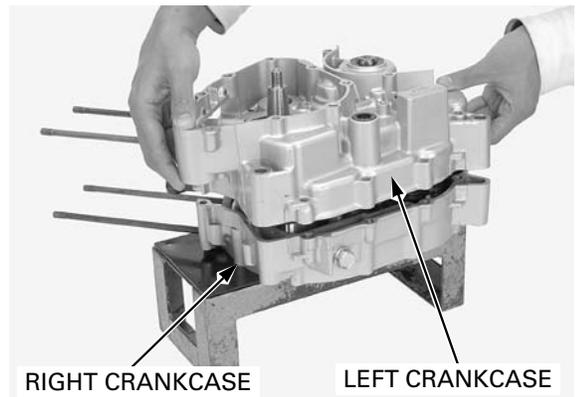
Loosen the right crankcase bolts in a crisscross pattern in 2 or 3 steps, and remove the bolts and washer.



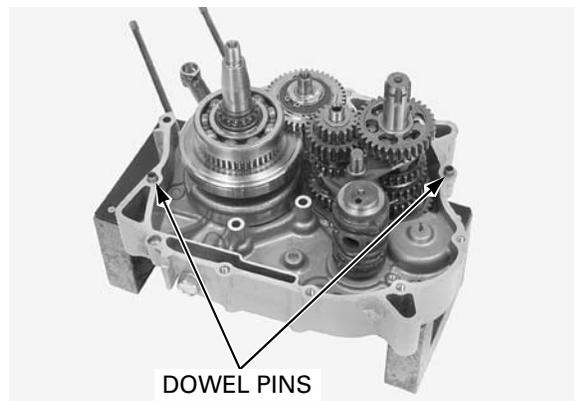
Place the crankcase assembly with the right side down.

*Do not pry the crankcase halves with a screwdriver.*

Carefully separate the left crankcase from the right crankcase while tapping them at several locations with a plastic hammer.



Remove the dowel pins.

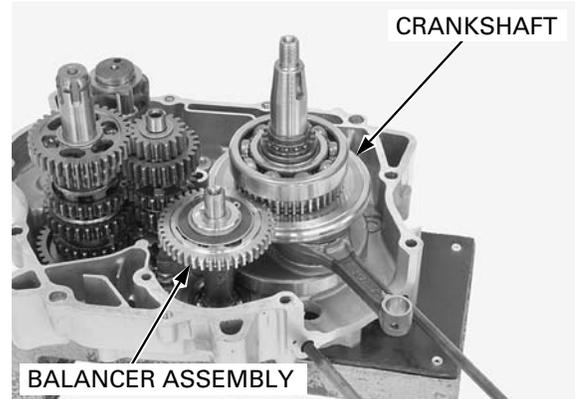


### CRANKSHAFT/BALANCER

#### REMOVAL

Separate the crankcase halves (page 12-6).

Remove the crankshaft and balancer assembly from the right crankcase.

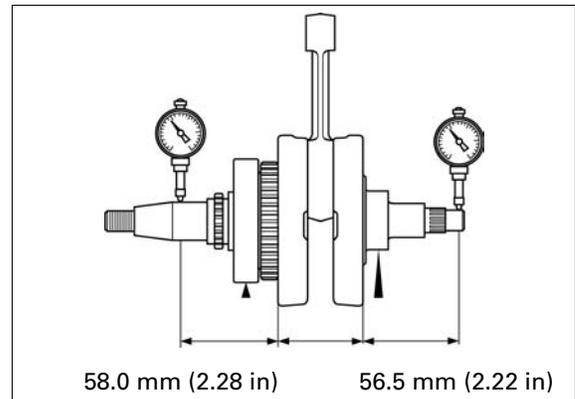


#### CRANKSHAFT INSPECTION

##### CRANKSHAFT RUNOUT

Place the crankshaft on V-blocks.  
Set the dial indicator on the crankshaft.  
Rotate the crankshaft two revolutions (720°) and read the runout.

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



##### BIG END SIDE CLEARANCE

Measure the side clearance of the connecting rod big end with a feeler gauge.

**SERVICE LIMIT: 0.85 mm (0.033 in)**



## BIG END RADIAL CLEARANCE

Measure the radial clearance of the connecting rod big end.

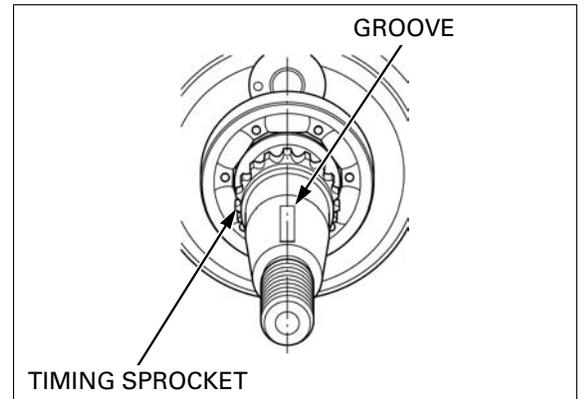
**SERVICE LIMIT: 0.05 mm (0.002 in)**



## TIMING SPROCKET

*If the timing sprocket teeth are worn or damaged, check the cam chain, tensioner and cam sprocket.*

Check the timing sprocket teeth for wear or damage. If you are replacing the timing sprocket, align the center of the sprocket teeth with the center of the woodruff key groove as shown.



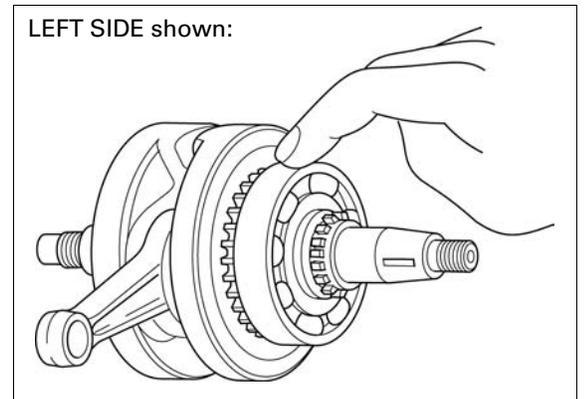
## CRANKSHAFT BEARING

**RIGHT SIDE:** Turn the inner race of the right crankshaft bearing with your finger. The bearing should turn smoothly and quietly. Also check that the outer race fits tightly in the crankcase.

**LEFT SIDE:** Turn the outer race of the left crankshaft bearing with your finger. The bearing should turn smoothly and quietly. Also check that the inner race fits tightly on the crankshaft.

*Replace the bearing in pairs.* Remove and discard the bearing if the races do not turn smoothly, quietly, or if they fit loosely in the crankcase and crankshaft.

For crankshaft bearing replacement (page 12-18).

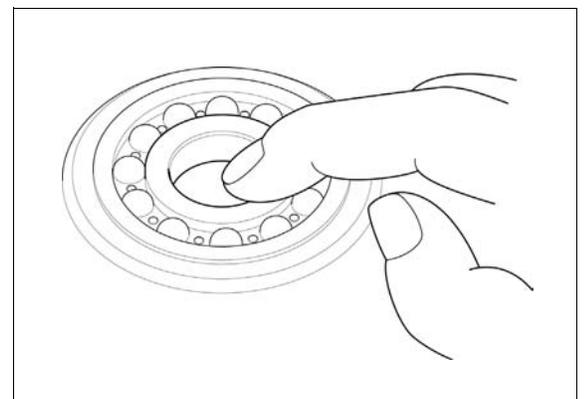


## BALANCER BEARING

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

Remove and discard the bearing if the races do not turn smoothly, quietly, or if they fit loosely in the crankcase and crankshaft.

For balancer bearing replacement (page 12-19).



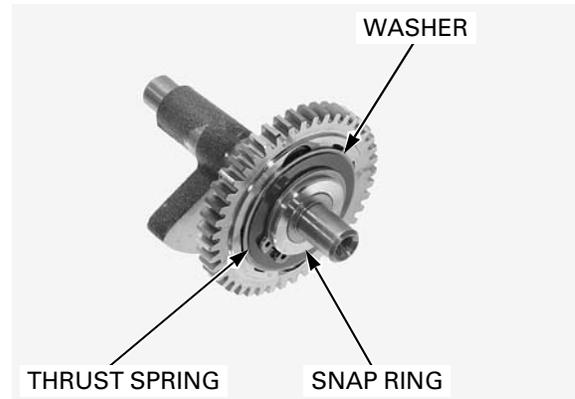
### BALANCER DISASSEMBLY

**NOTE:**

If you replace the balancer driven gear, be careful to select the identification color of the balancer driven gear (page 12-11).

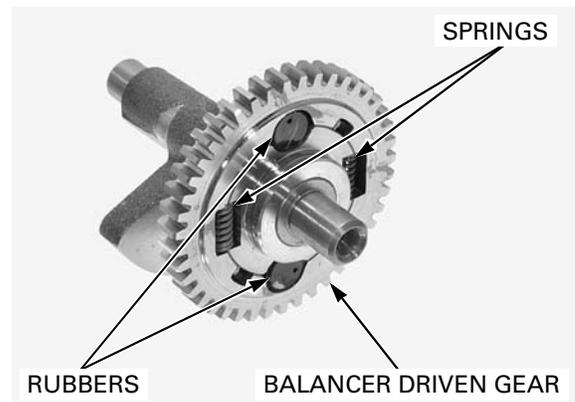
Remove the following:

- Snap ring
- Thrust spring
- Washer



Remove the balancer damper rubbers, balancer gear springs and balancer driven gear.

Check the rubbers and springs for damage, replace it if necessary.



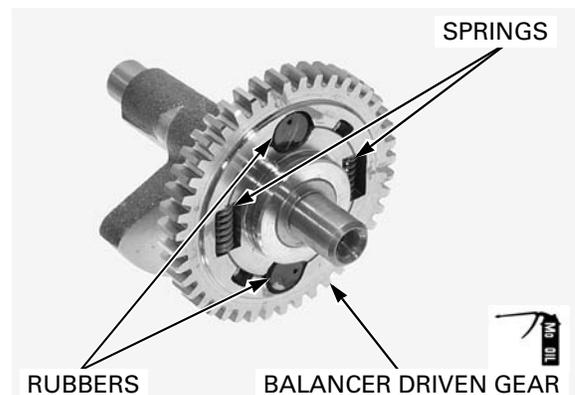
Check the balancer driven gear for excessive or damage, replace it if necessary.



### BALANCER ASSEMBLY

Apply molybdenum oil solution to the balancer driven gear inner surface.

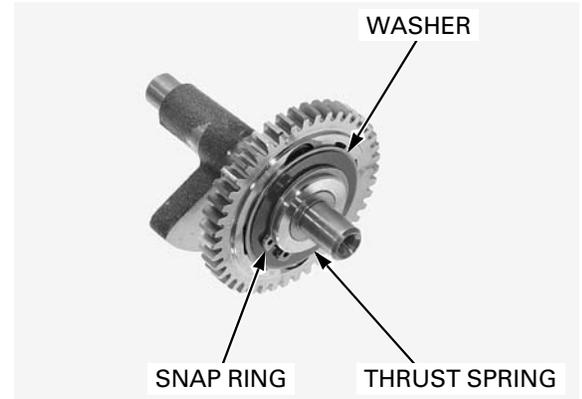
Install the balancer driven gear, balancer gear springs and balancer damper rubbers.



Make sure the snap ring is firmly seated in the groove.

Install the following:

- Washer
- Thrust spring
- Snap ring



## BALANCER DRIVEN GEAR SELECTION

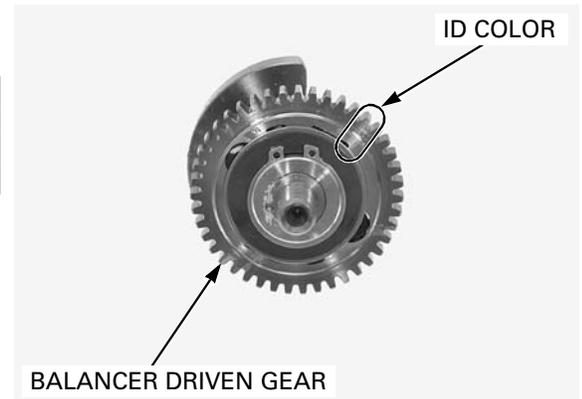
The balancer driven gear has ID color.

### BALANCER DRIVEN GEAR SELECTION TABLE

ID COLOR	P/N
WHITE	13422-KPP-860
BLUE	13423-KPP-860
YELLOW	13424-KPP-860

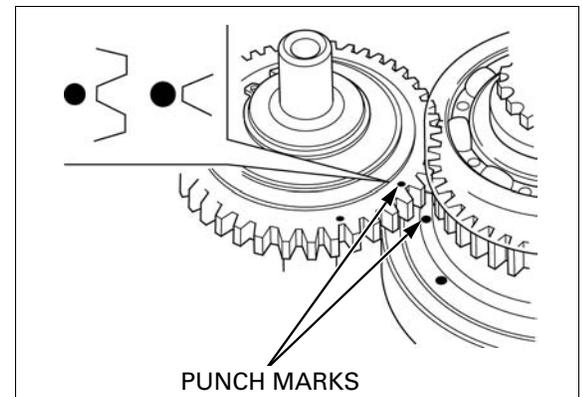
If the balancer driven gear is replaced with a new one, select the same colored gear as the original gear.

If the crankcase is replaced a new one, select the blue marked gear.



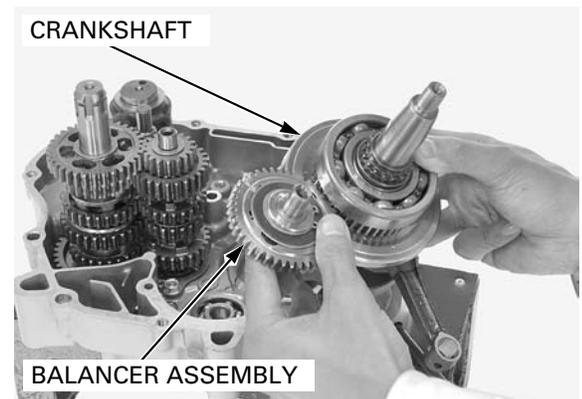
## INSTALLATION

Engage the balancer assembly and crankshaft by aligning the two punch marks on the balancer driven gear and crank weight as shown.



Be careful not to out of alignment.

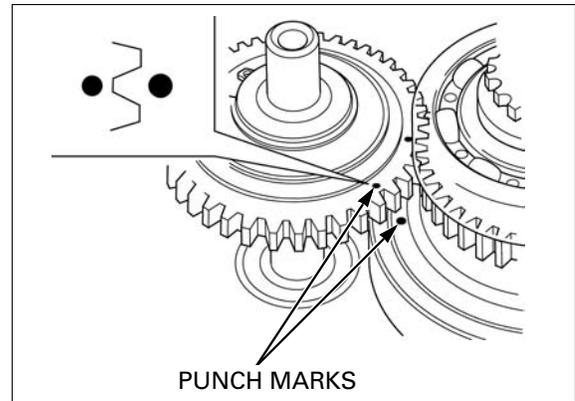
Install the crankshaft and balancer assembly together into the right crankcase.



## CRANKSHAFT/BALANCER/TRANSMISSION

After installing the crankshaft and balancer assembly, make sure to align the two punch marks on the balancer driven gear and crank weight.

Assemble the crankcase (page 12-21).

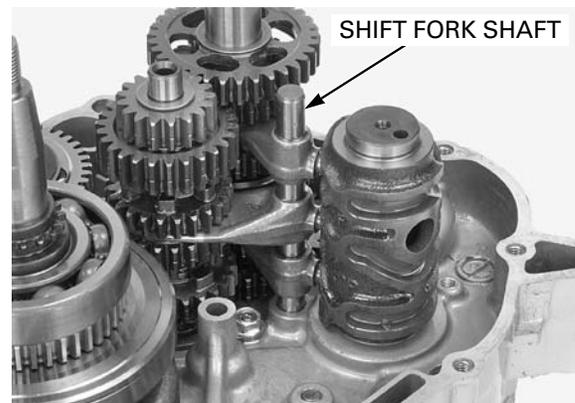


## TRANSMISSION

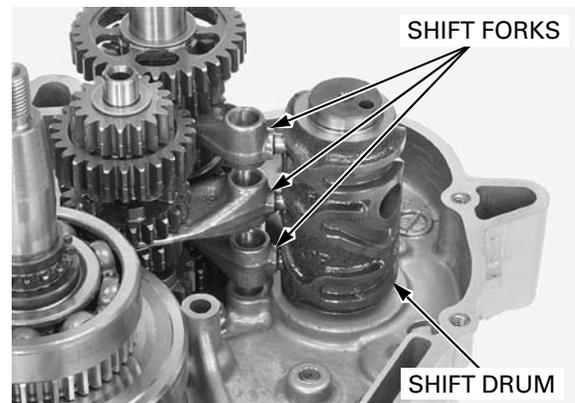
### REMOVAL/DISASSEMBLY

Separate the crankcase halves (page 12-6).

Pull the shift fork shaft and remove it from the shift forks.

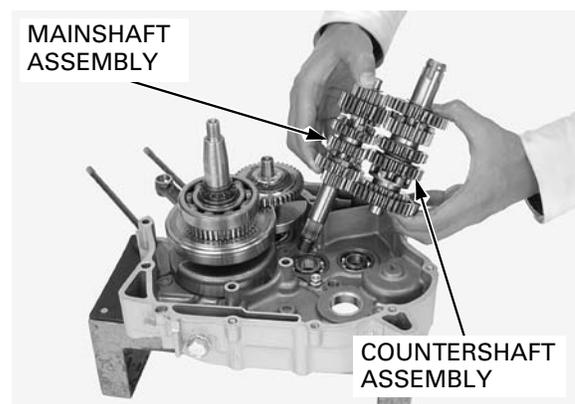


Remove the shift forks and shift drum.



Be sure to remove the three end washers (mainshaft: left only/countershaft: both ends).

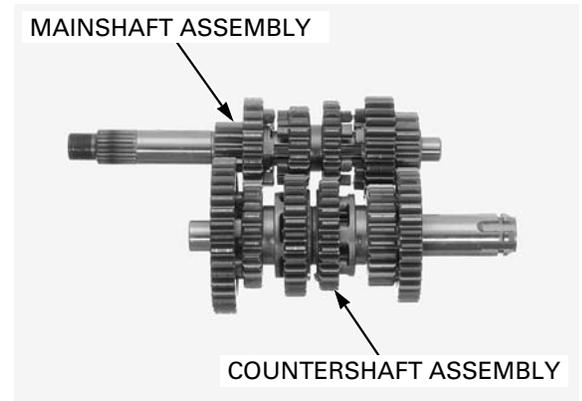
Remove the mainshaft assembly and countershaft assembly together.



Disassemble the mainshaft assembly and countershaft assembly.

NOTE:

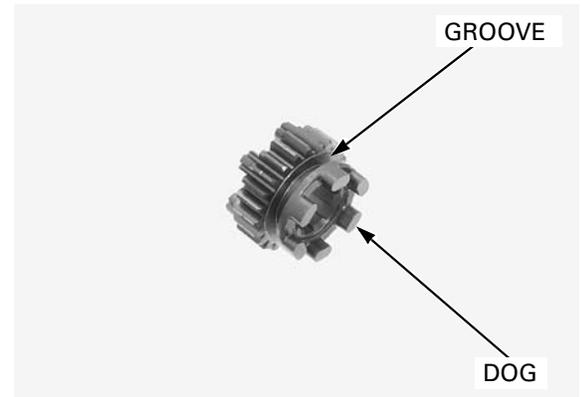
- Keep track of the disassembled parts (gears, bushings, washers, and snap rings) by sliding them onto a tool or a piece of wire.
- Do not expand the snap ring more than necessary for removal. To remove a snap ring, expand the snap ring and pull it off using the gear behind it.



## INSPECTION

### GEARS/BUSHINGS

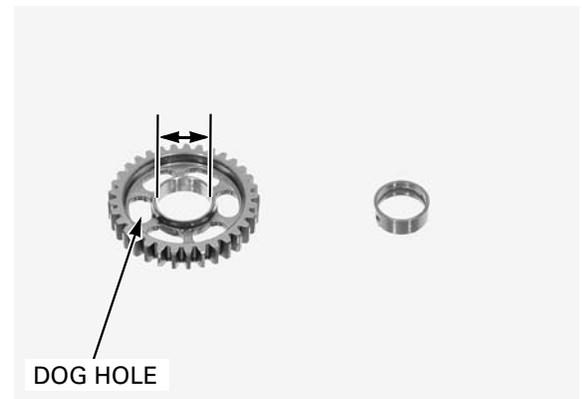
Check the gear shifter groove, dogs, dog holes and teeth for damage or excessive wear.



Measure the I.D. of each gear.

#### SERVICE LIMITS:

- M5, M6:** 20.05 mm (0.789 in)
- C1:** 18.07 mm (0.711 in)
- C2:** 23.09 mm (0.909 in)
- C3, C4:** 22.10 mm (0.870 in)



Check the bushings for wear or damage. Measure the O.D. of each bushing.

#### SERVICE LIMITS:

- M5, M6:** 19.91 mm (0.784 in)
- C1:** 17.90 mm (0.705 in)
- C2:** 22.47 mm (0.885 in)

Calculate the gear-to-bushing clearance.

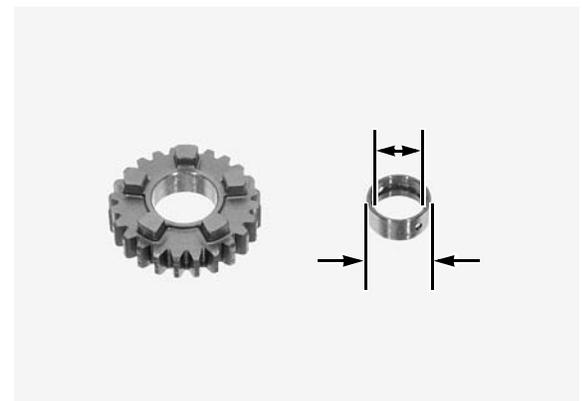
#### SERVICE LIMIT:

- M5, M6, C1, C2:** 0.10 mm (0.004 in)

Measure the I.D. of each bushing.

#### SERVICE LIMITS:

- M5:** 17.04 mm (0.671 in)
- C1:** 15.10 mm (0.594 in)
- C2:** 20.10 mm (0.791 in)



## CRANKSHAFT/BALANCER/TRANSMISSION

### 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 bushing): 16.93 mm (0.667 in)

##### Countershaft

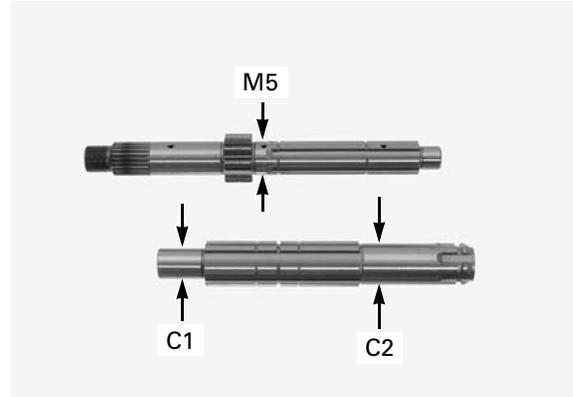
(at C1 gear bushing): 14.90 mm (0.587 in)

(at C2 gear bushing): 19.92 mm (0.784 in)

Calculate the bushing-to-shaft clearance.

#### SERVICE LIMIT:

M5, C1, C2: 0.10 mm (0.004 in)



### SHIFT DRUM/DRUM JOURNAL

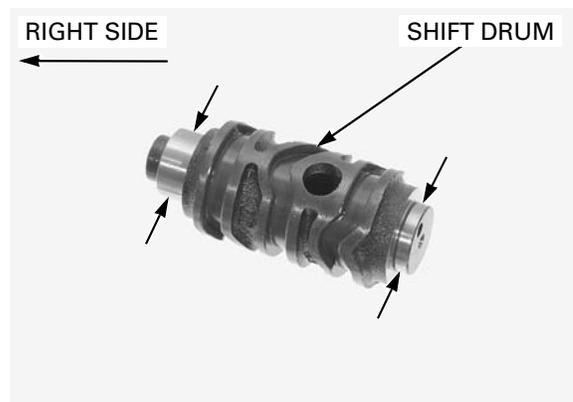
Inspect the shift drum end for scoring, scratches, or evidence of un sufficient lubrication.  
Check the shift drum grooves for abnormal wear or damage.

Measure the shift drum O.D. at each end.

#### SERVICE LIMITS:

Right side: 25.90 mm (1.020 in)

Left side: 24.90 mm (0.980 in)



Check the shift drum journal in the each crankcase for excessive wear or damage.

Measure the shift drum journal I.D.

#### SERVICE LIMITS:

Right side: 26.50 mm (1.043 in)

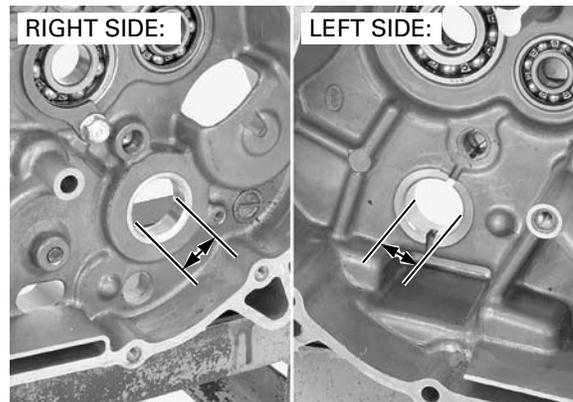
Left side: 25.50 mm (1.004 in)

Calculate the shift drum- to-shift drum journal clearances.

#### SERVICE LIMITS:

Right side: 0.07 mm (0.003 in)

Left side: 0.08 mm (0.003 in)



### SHIFT FORK

Check the shift forks for deformation or abnormal wear.

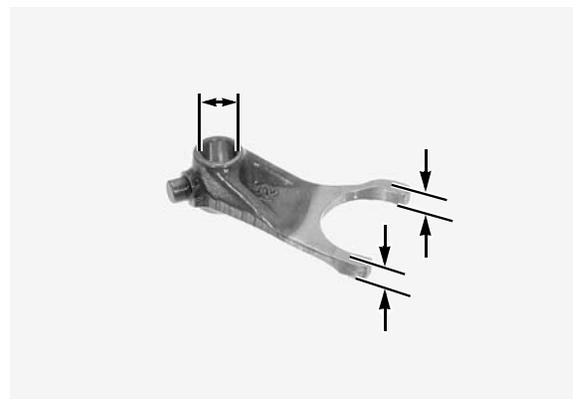
Check the shift fork guide pin for abnormal wear or damage.

Measure each shift fork claw thickness.

**SERVICE LIMIT: 4.82 mm (0.190 in)**

Measure I.D. of each fork.

**SERVICE LIMIT: 10.03 mm (0.395 in)**

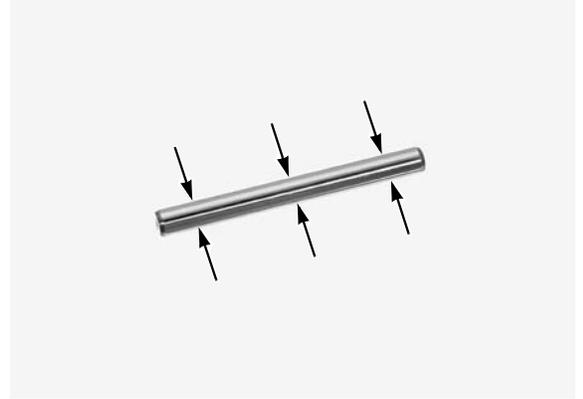


## SHIFT FORK SHAFT

Check the shift fork shafts for damage and straightness.

Measure the shift fork shaft O.D. at three points.

**SERVICE LIMIT: 9.93 mm (0.391 in)**

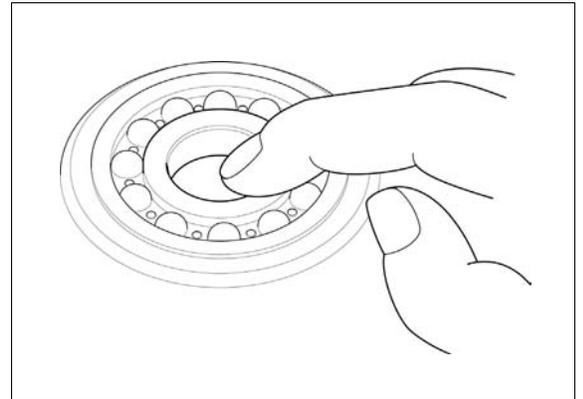


## TRANSMISSION BEARING

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

Remove and discard the bearing if the races do not turn smoothly, quietly, or if they fit loosely in the crankcase.

For transmission bearing replacement (page 12-19).



## ASSEMBLY/INSTALLATION

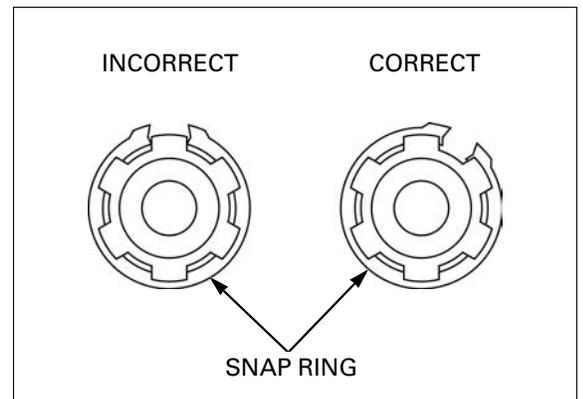
Clean all parts in solvent, and dry them thoroughly.

Apply molybdenum oil solution to the gear rotating surface (M5, M6, C1, C2, C3, C4), bushing entire surface (M5, M6, C1, C2), shift fork grooves (M3/4, C5, C6) to ensure initial lubrication.

Assemble all parts into their original positions.

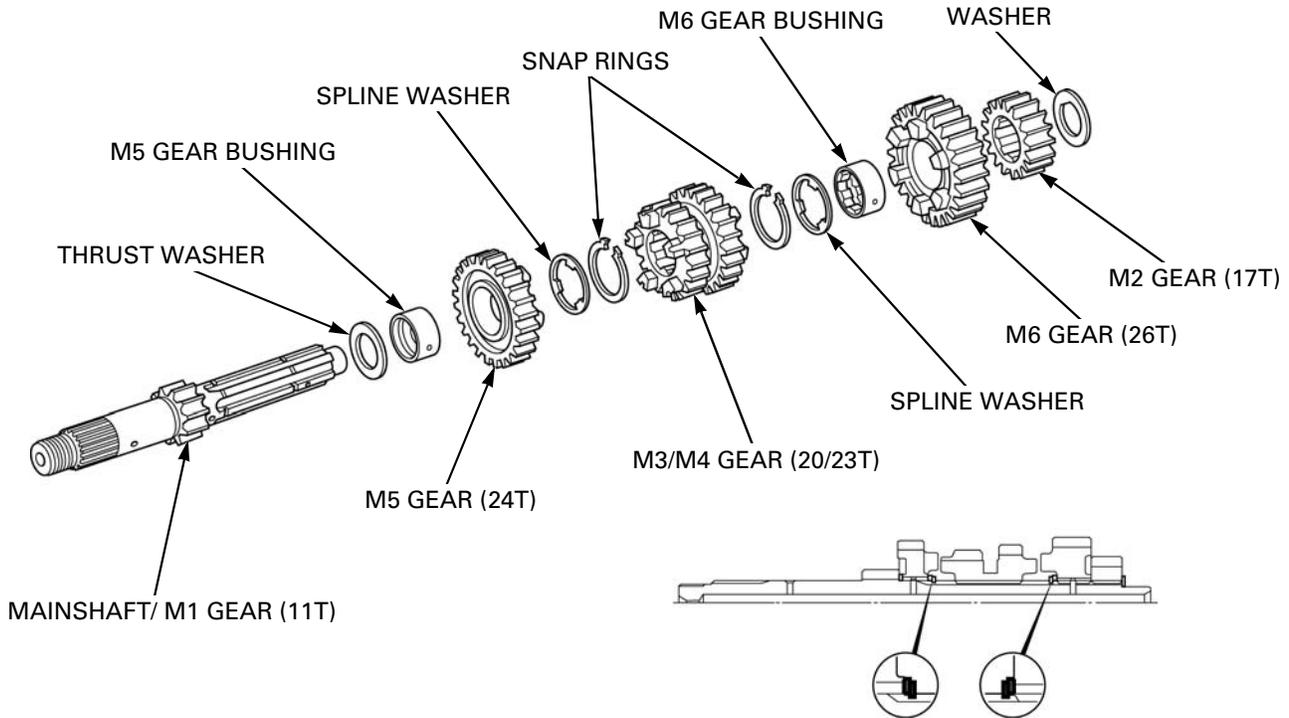
### NOTE:

- Install the washers and snap rings with the chamfered edge facing the thrust load side. Confirm the inner side of snap rings and washer when you detect the chamfered 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.

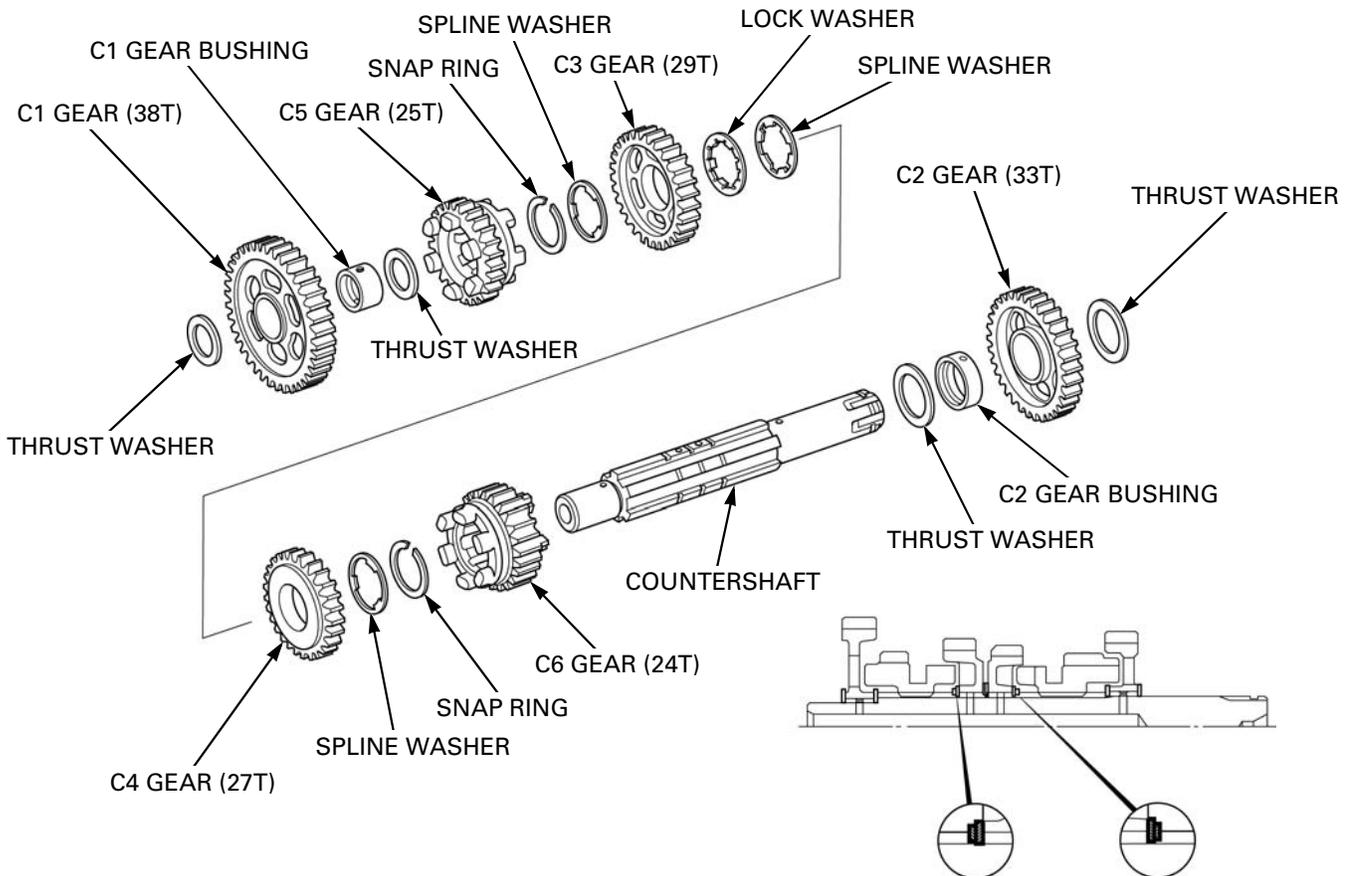


# CRANKSHAFT/BALANCER/TRANSMISSION

## MAINSHAFT



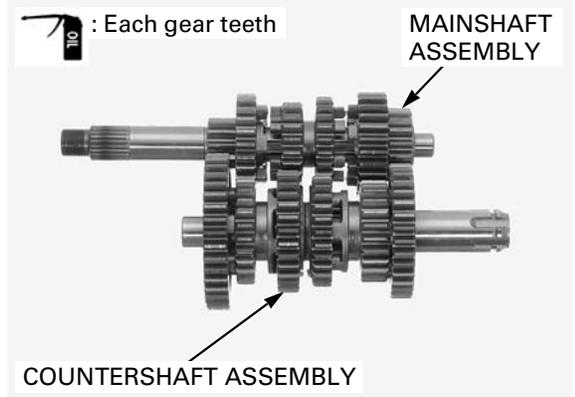
## COUNTERSHAFT



Check the gears for freedom of movement or rotation on each shaft.

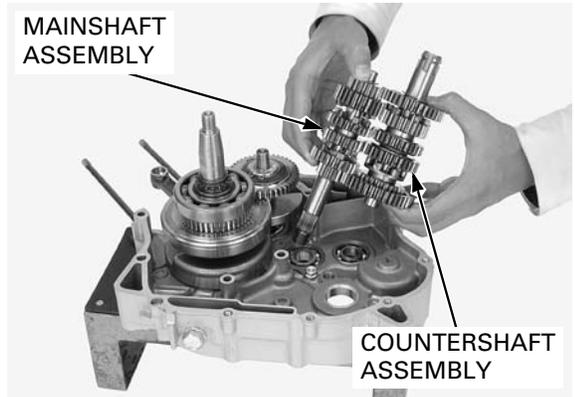
Apply engine oil to the transmission gear teeth.

Engage the mainshaft assembly and countershaft assembly.

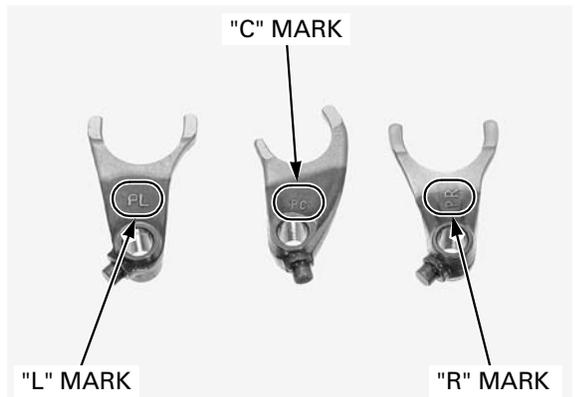


*Be sure to install the three end washers (mainshaft; left only/countershaft; both ends).*

Install the mainshaft assembly and countershaft assembly together into the right crankcase.

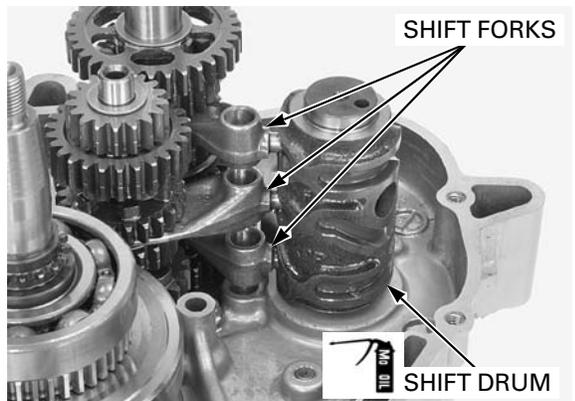


Each shift fork has an identification marks, "R" is for the right shift fork, "L" is the left shift fork and "C" is for the center shift fork.



Install the shift forks into the shifter gear grooves with the marks facing up (left crankcase side).

Apply molybdenum oil solution to the shift drum journal outer surface and install it, while aligning the shift fork guide pins with the guide grooves.

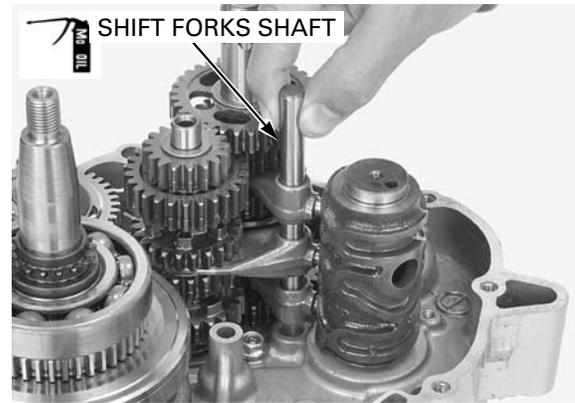


## CRANKSHAFT/BALANCER/TRANSMISSION

Apply molybdenum oil solution to the shift fork shaft outer surface and insert it through the shift forks into the right crankcase.

After installation, check for smooth transmission operation.

Assemble the crankcase (page 12-21).



## BEARING REPLACEMENT

### CRANKSHAFT BEARING

Remove the crankshaft (page 12-8).

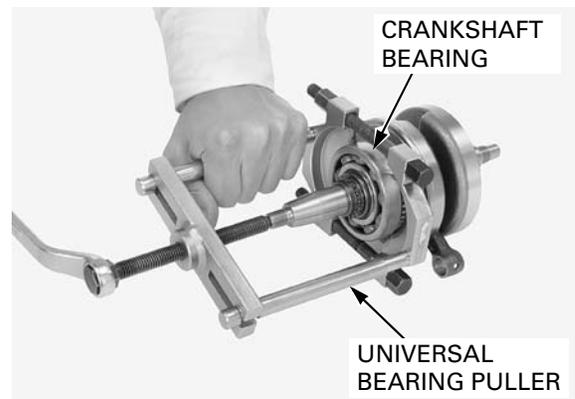
Remove the left crankshaft bearing using a special tool.

**TOOL:**

**Universal bearing puller**                      **07631-0010000**  
or equivalent

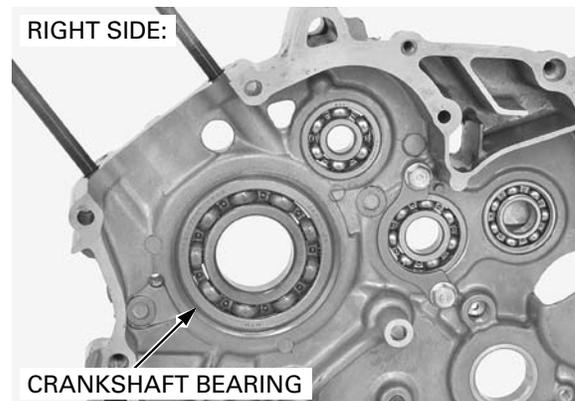
**NOTE:**

Always replace the left bearing with a new one whenever the crankshaft is removed.



Remove the transmission (page 12-12).

Drive out the right crankshaft bearing from the right crankcase.



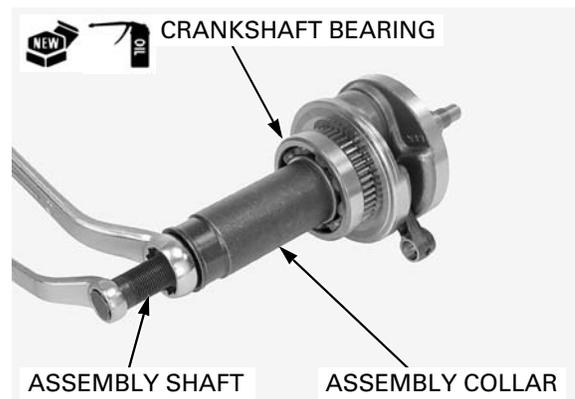
Install new left crankshaft bearing to the crankshaft left side using the special tools.

**TOOLS:**

**Assembly collar**                              **07965-VM00100**  
**Assembly shaft**                              **07965-VM00200**

Draw the crankshaft into the bearing inner race.

After installation, apply engine oil to the left crankshaft bearing.

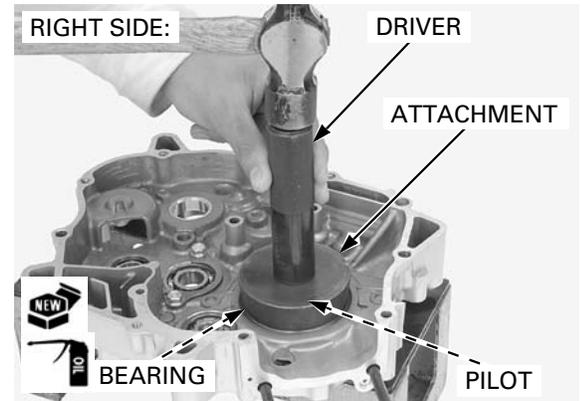


Drive in new right crankshaft bearing into the right crankcase with the marked side facing up until it is fully seated using the special tools.

**TOOLS:**

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 72 x 75 mm</b>	<b>07746-0010600</b>
<b>Pilot, 35 mm</b>	<b>07746-0040800</b>

Install the crankshaft (page 12-11).



### BALANCER/TRANSMISSION BEARING

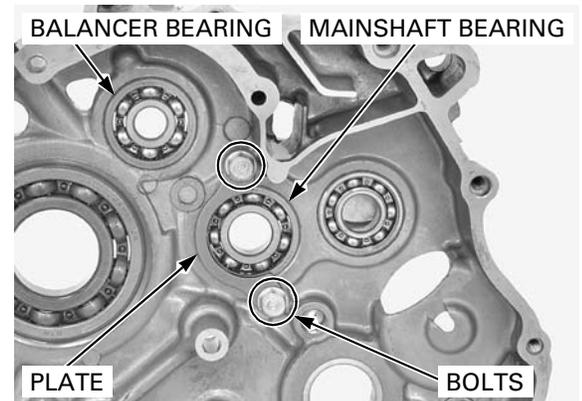
Remove the following:

- Crankshaft/balancer (page 12-8)
- Transmission (page 12-12)

**RIGHT CRANKCASE SIDE**

Remove the bolts and mainshaft bearing setting plate.

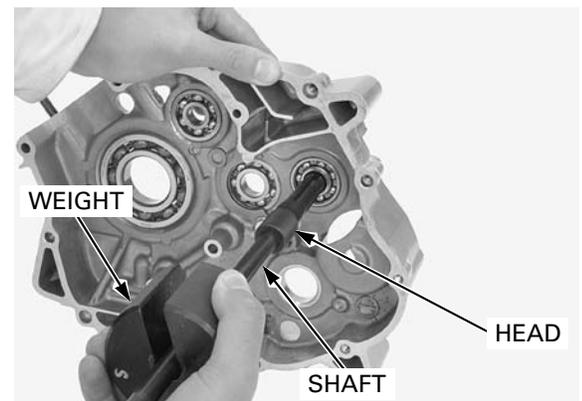
Drive out the mainshaft and balancer bearings.



Remove the countershaft bearing using the special tools.

**TOOLS:**

<b>Bearing remover head, 15 mm</b>	<b>07936-KC10200</b>
<b>Bearing remover shaft</b>	<b>07936-KC10100</b>
<b>Remover weight</b>	<b>07741-0010201</b>



## CRANKSHAFT/BALANCER/TRANSMISSION

Drive in new bearings into the right crankcase until they are fully seated using the special tools.

### TOOLS:

#### Mainshaft bearing (marked side facing up):

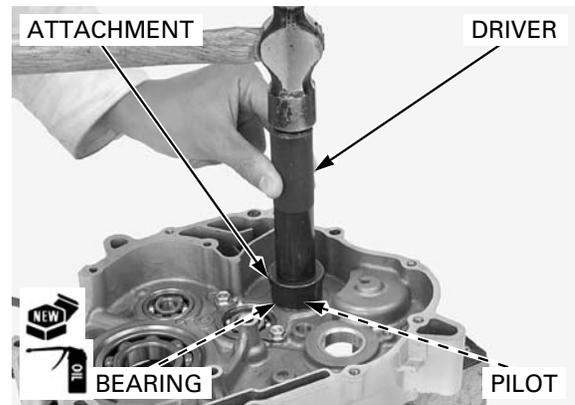
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 17 mm	07746-0040400

#### Countershaft bearing (sealed side facing down):

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

#### Balancer bearing (marked side facing up):

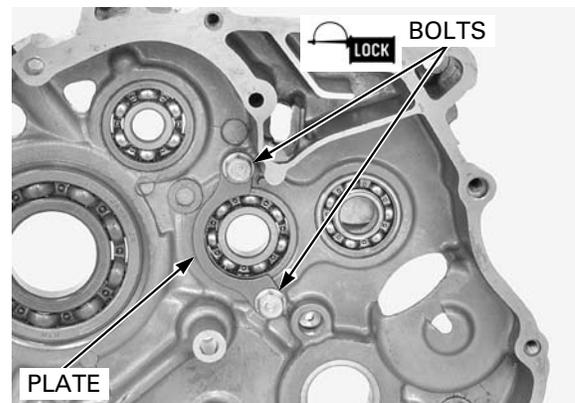
Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200
Pilot, 12 mm	07746-0040200



After installation, apply engine oil to each bearing rotating area.

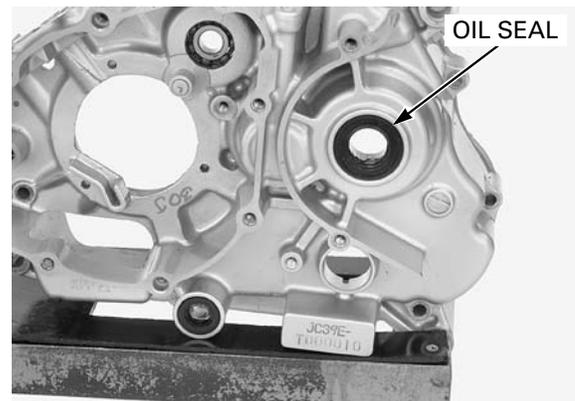
Apply locking agent to the mainshaft bearing setting plate bolt threads (page 1-16).

Install the setting plate and bolts.  
Tighten the bolts.



### LEFT CRANKCASE SIDE

Remove the countershaft oil seal from the left crankcase.

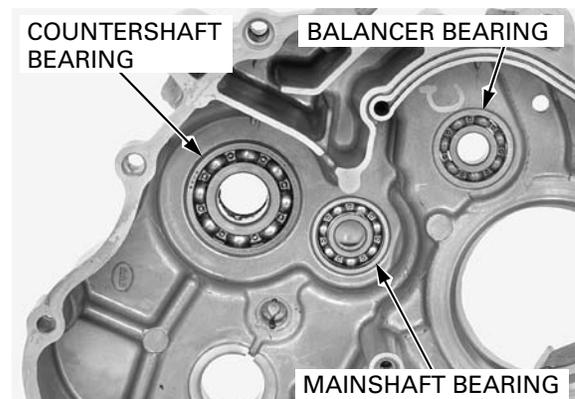


Drive out the countershaft and balancer bearings.

Remove the mainshaft bearing using the special tools.

### TOOLS:

Bearing remover head, 12 mm	07936-1660110
Bearing remover shaft	07936-1660120
Remover weight	07741-0010201



Drive in new bearings into the left crankcase until they are fully seated using the special tools.

**TOOLS:**

**Mainshaft bearing (sealed side facing down):**

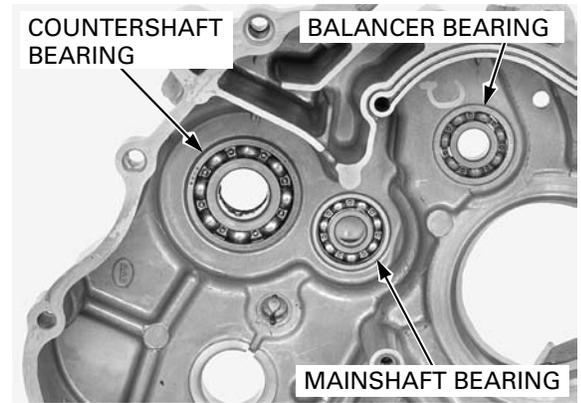
- Driver 07749-0010000
- Attachment, 32 x 35 mm 07746-0010100
- Pilot, 12 mm 07746-0040200

**Countershaft bearing (marked side facing up):**

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

**Balancer bearing (marked side facing up):**

- Driver 07749-0010000
- Attachment, 32 x 35 mm 07746-0010100
- Pilot, 12 mm 07746-0040200



After installation, apply engine oil to each bearing rotating area.

Apply grease to new countershaft oil seal lips.

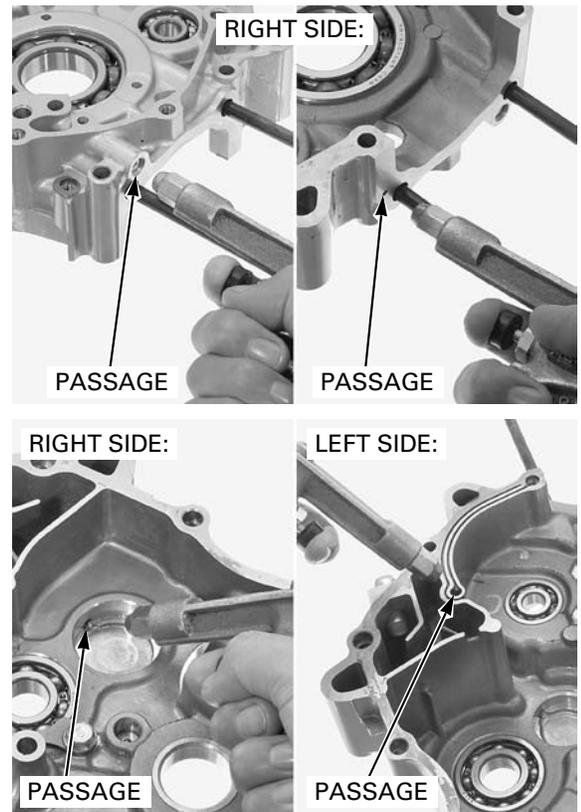
Install the countershaft oil seal until it is flush with the crankcase surface.



## CRANKCASE ASSEMBLY

Clean the oil passages of each crankcase using compressed air.

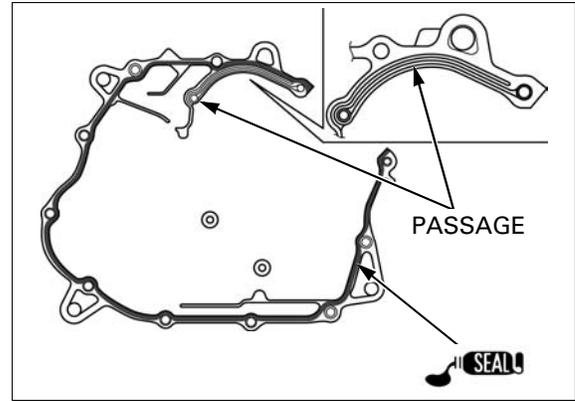
Check the oil passage for clogs.



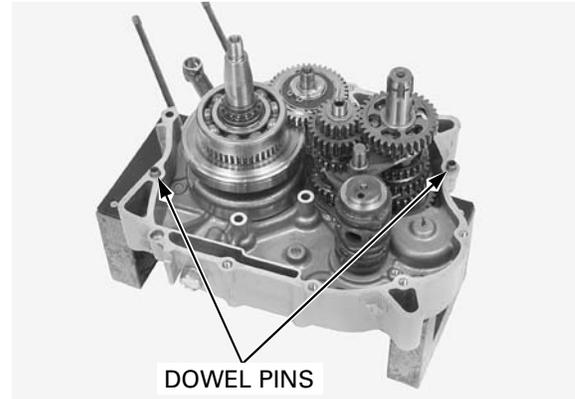
## CRANKSHAFT/BALANCER/TRANSMISSION

Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them and check for damage.

Apply a light but thorough coating of sealant (TB1215 or equivalent) to left crankcase mating surface except the oil passage area.

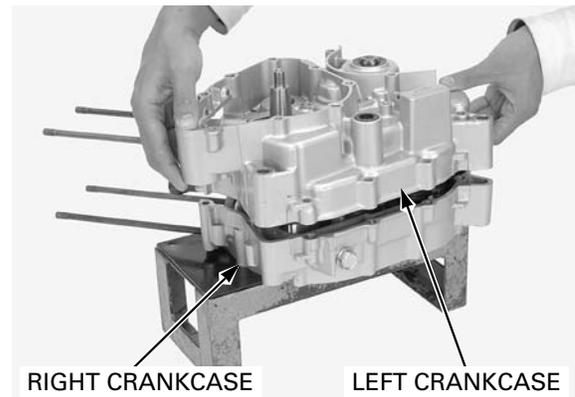


Install the dowel pins.



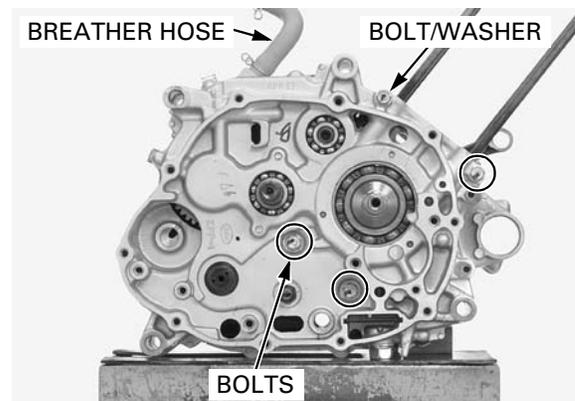
*Do not force the crankcase halves together, If there is excessive force required, something is wrong. Remove the left crankcase and check for misaligned parts.*

Install the left crankcase on the right crankcase, being careful not to damage the oil seal lips.

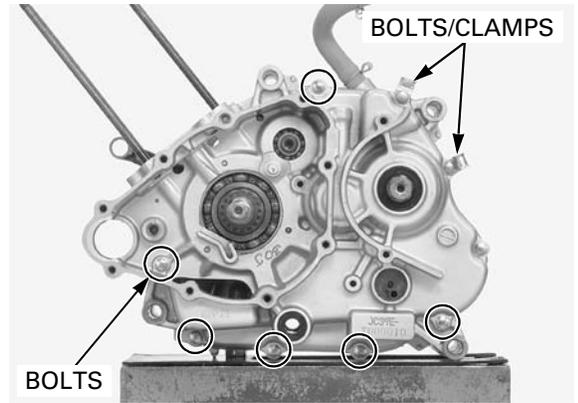


Install the right crankcase bolts and washer, and tighten the bolts in a crisscross pattern in 2 or 3 steps.

Connect the crankcase breather hose.



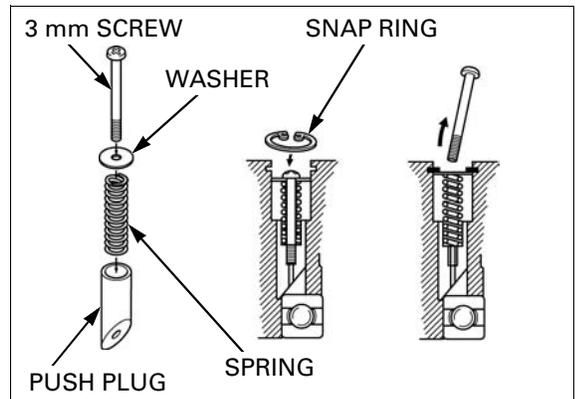
Install the left crankcase bolts and clamps and tighten the bolts in a crisscross pattern in 2 or 3 steps.



Install the spring, washer and suitable 3 mm screw to the bearing push plug, then install them into the left crankcase.

*Make sure the snap ring is firmly seated in the groove.*

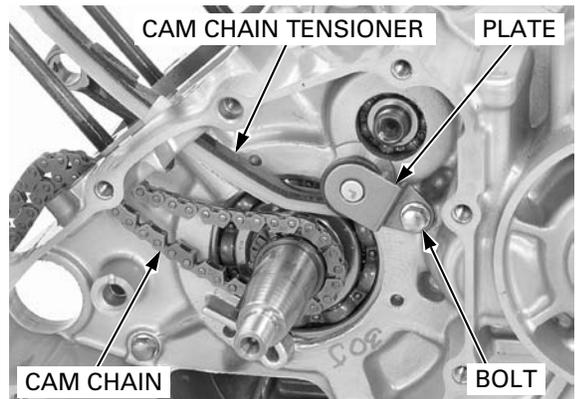
Install the snap ring and remove the screw.



Install the cam chain through the crankcase.  
Install the cam chain over the timing sprocket.

Install the cam chain tensioner and tensioner guide plate.  
Install and tighten the tensioner guide plate bolt.

Install the removed parts (page 12-3) in the reverse order of removal.



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**MEMO**

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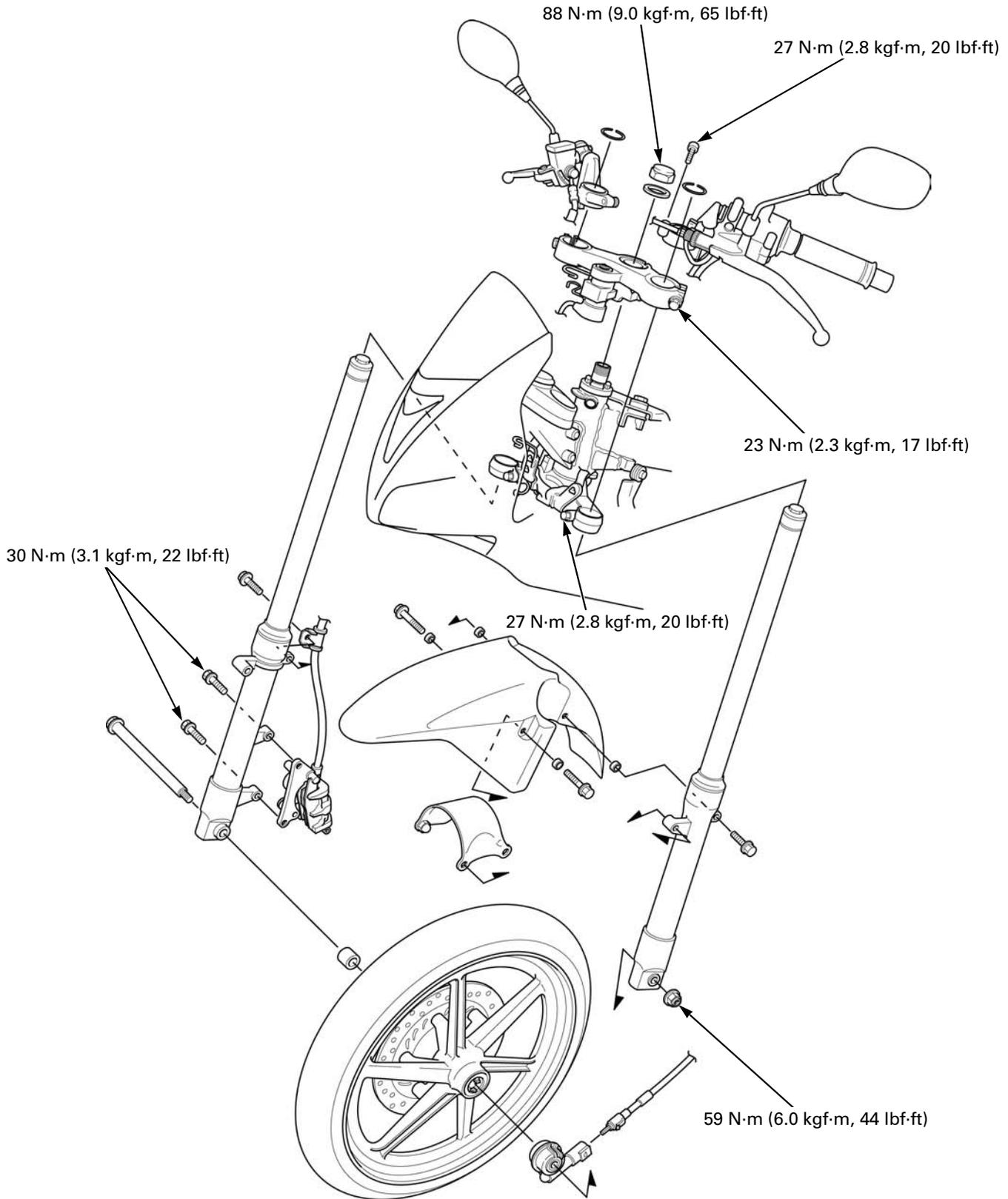
# 13. FRONT WHEEL/SUSPENSION/STEERING

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COMPONENT LOCATION .....	13-2	FRONT WHEEL .....	13-13
SERVICE INFORMATION .....	13-3	FORK .....	13-18
TROUBLESHOOTING .....	13-5	STEERING STEM.....	13-27
HANDLEBARS.....	13-6	CLUTCH LEVER .....	13-31

# FRONT WHEEL/SUSPENSION/STEERING

## 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.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- For brake system information (page 15-3).

## SPECIFICATIONS

Unit: mm (in)

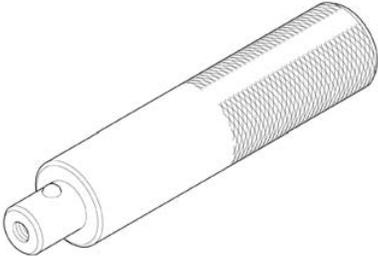
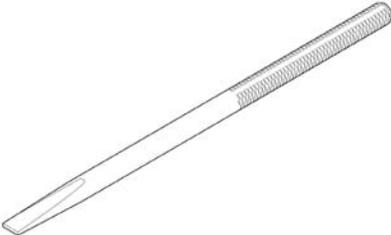
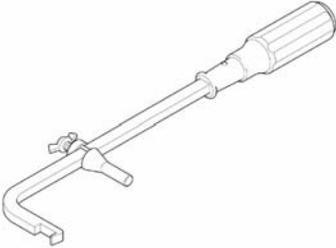
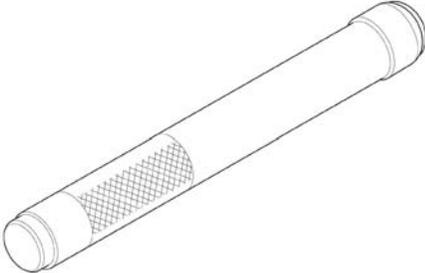
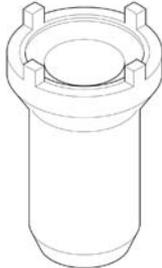
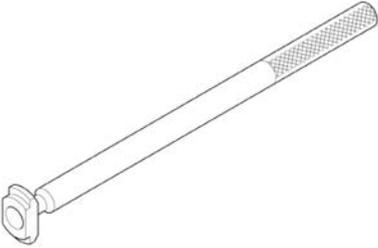
ITEM		STANDARD	SERVICE LIMIT	
Minimum tire thread depth		-	0.8 (0.03)	
Cold tire pressure	Standard	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	-	
	With cargo	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	-	
Axle runout		-	0.2 (0.01)	
Wheel rim runout	Radial	-	2.0 (0.08)	
	Axial	-	2.0 (0.08)	
Wheel balancer weight		-	60 g max.	
Fork	Spring free length		412.4 (16.24)	
	Pipe runout		-	
	Recommended fork fluid	Except CM type	Honda ULTRA CUSHION OIL 10W or equivalent	-
		CM type only	Pro Honda Suspension Fluid SS-8 (10W) or equivalent	-
	Fluid level		131 (5.2)	-
	Fluid capacity		206 ± 2.5 cm <sup>3</sup> (7.0 ± 0.08 US oz, 7.3 ± 0.09 Imp oz)	-

## TORQUE VALUES

Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one.
Front axle nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	U-nut
Handlebar weight screw	9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)	
Handlebar pinch bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads.
Fork bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Bottom bridge pinch bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Steering stem adjusting nut	-	See page 13-30
Steering stem nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt; replace with a new one.
Clutch lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)	

# FRONT WHEEL/SUSPENSION/STEERING

## TOOLS

<p>Attachment, 37 x 40 mm 07746-0010200</p> 	<p>Attachment, 42 x 47 mm 07746-0010300</p> 	<p>Pilot, 12 mm 07746-0040200</p> 
<p>Driver 07749-0010000</p> 	<p>Bearing remover shaft 07746-0050100</p> 	<p>Bearing remover head, 12 mm 07746-0050300</p> 
<p>Oil seal remover 07748-0010001</p> 	<p>Steering stem driver 07946-4300101</p> 	<p>Steering stem socket 07916-3710101</p> 
<p>Ball race remover 07GMD-KS40100</p> 		

## **TROUBLESHOOTING**

### **Hard steering**

- Steering stem adjusting nut too tight
- Damaged steering head bearings
- Insufficient tire pressure
- Faulty tire

### **Steers to one side or does not track straight**

- Bent fork pipe
- Bent axle
- Worn wheel bearing
- Unequal fork fluid quantity in each fork pipe
- Faulty steering head bearing
- Bent frame
- Faulty wheel bearing
- Weak front fork
- Loose steering stem adjusting nut

### **Front wheel wobbling**

- Bent rim
- Worm wheel bearing
- Faulty tire
- Insufficient tire pressure
- Axle not tightened properly
- Unbalanced tire and wheel

### **Wheel hard to turn**

- Faulty wheel bearing
- Faulty speedometer gear
- Bent axle
- Brake drag

### **Soft suspension**

- Weak fork spring
- Insufficient fork fluid
- Insufficient tire pressure
- Incorrect fork fluid viscosity

### **Stiff suspension**

- Incorrect fork fluid viscosity
- Bent fork pipe
- Clogged fork fluid passage
- Damaged fork pipe and/or fork slider
- Fork pipe binds
- High tire pressure

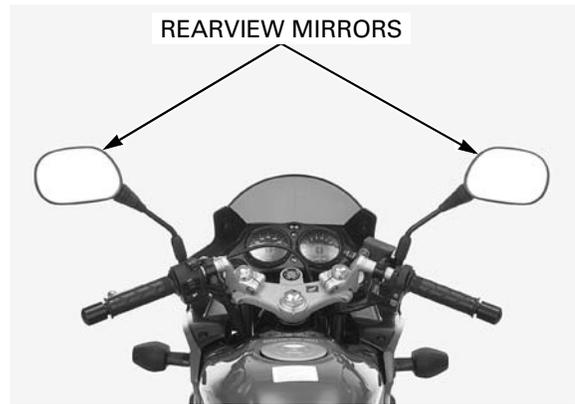
### **Front suspension noisy**

- Insufficient fork fluid
- Loose fork fasteners
- Bent fork pipe

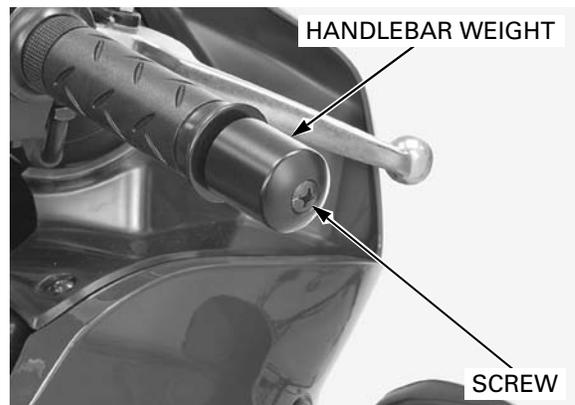
# HANDLEBARS

## REMOVAL

Remove the rearview mirrors.



Hold the handlebar weight and remove the screw, then remove both handlebar weights.

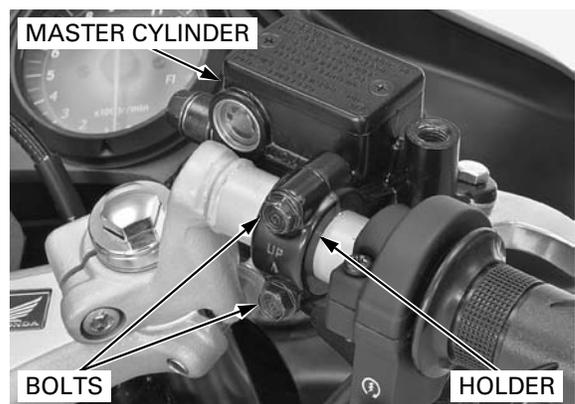


Disconnect the brake light switch connectors.



*Keep the brake master cylinder upright to prevent air from entering the hydraulic system.*

Remove the bolts, holder and master cylinder.



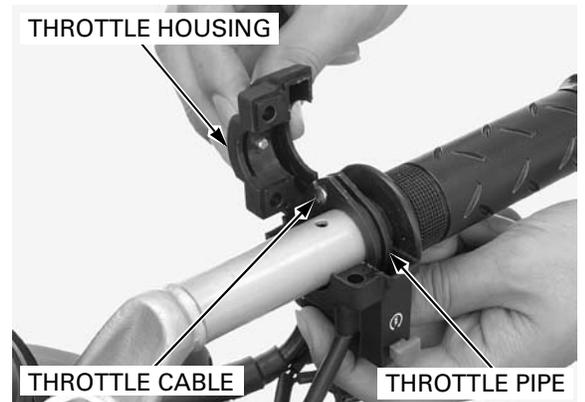
Remove the screws.



Separate the throttle housing.

Disconnect the throttle cable from the throttle pipe, then remove the throttle pipe.

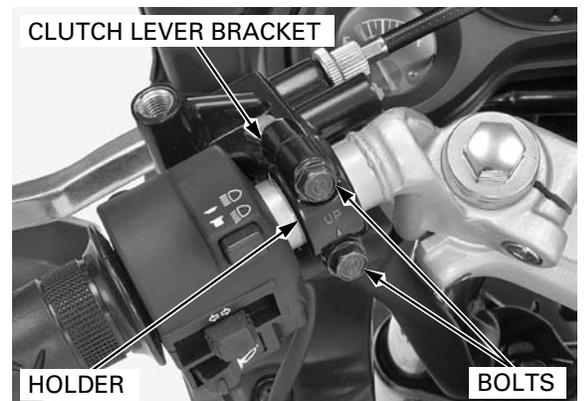
Remove the grip rubber, replace it if necessary.



Disconnect the clutch switch connectors.

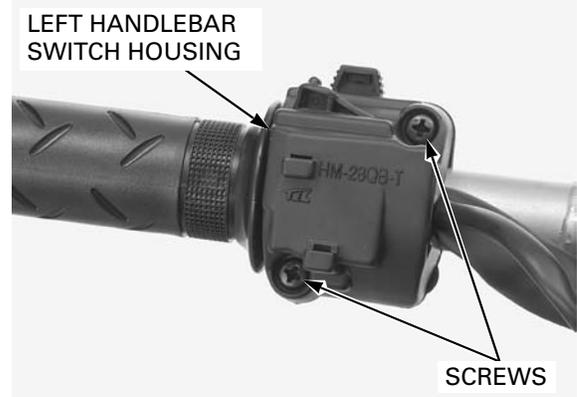


Remove the bolts, holder and clutch lever bracket.

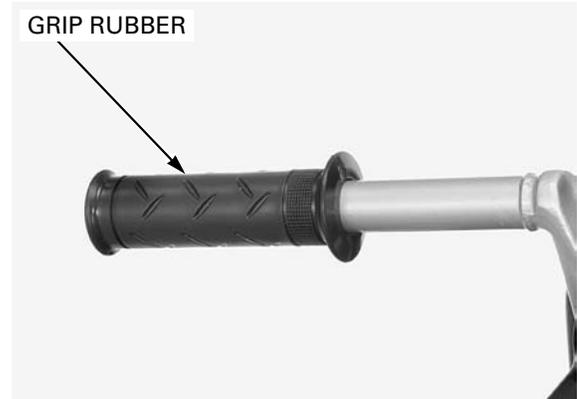


## FRONT WHEEL/SUSPENSION/STEERING

Remove the screws and separate the left handlebar switch housing.



Remove the left handlebar grip rubber.



Remove the stopper rings from both fork pipes.  
Loosen the handlebar pinch bolts and remove the handlebars.



## INSTALLATION

NOTE:

Route the wires, hose and cable properly (page 1-18).

Install the handlebars to both fork pipes while aligning the bosses on the handlebars with the cut outs on the top bridge.



## FRONT WHEEL/SUSPENSION/STEERING

Tighten both handlebar pinch bolts to the specified torque.

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

Install the stopper rings to the grooves of both fork pipes.

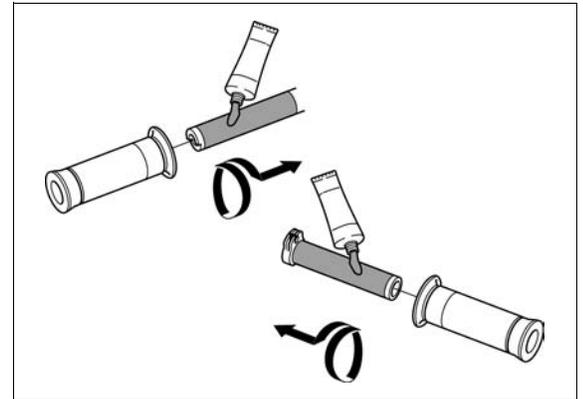


Clean the inside surface of the handlebar grip and outside surface of the handlebar and throttle pipe.

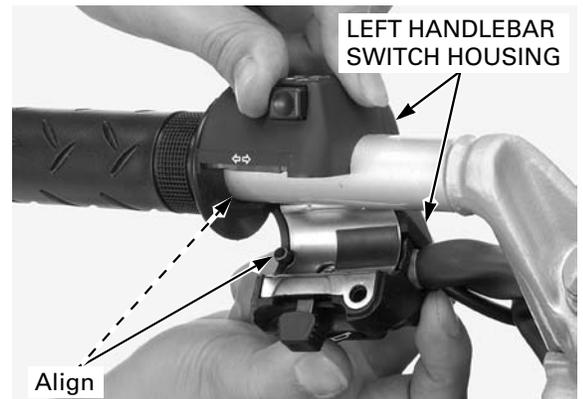
Apply Honda Bond A or equivalent to the inside surface of the grips and to the clean surface of the left handlebar and throttle pipe.

*Allow the adhesive to dry for 1 hour before using.*

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



Install the left handlebar switch housing while aligning the locating pin in the housing with the hole in the handlebar.



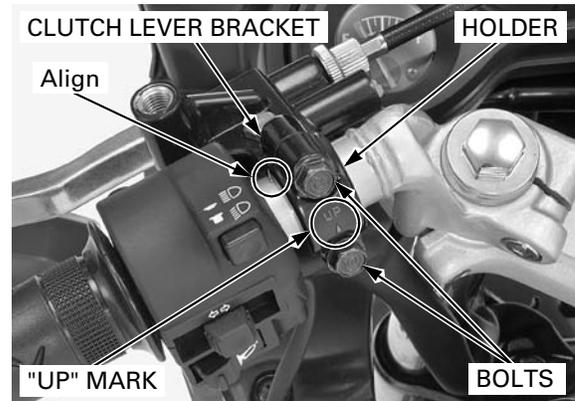
Install the screws and tighten the forward screw first, then tighten the rear screw.



## FRONT WHEEL/SUSPENSION/STEERING

Install the clutch lever bracket, holder ("UP" mark facing up) and bolts.

Align the end of the clutch lever bracket with the punch mark on the handlebar, and tighten the upper bolt first, then the lower bolt.

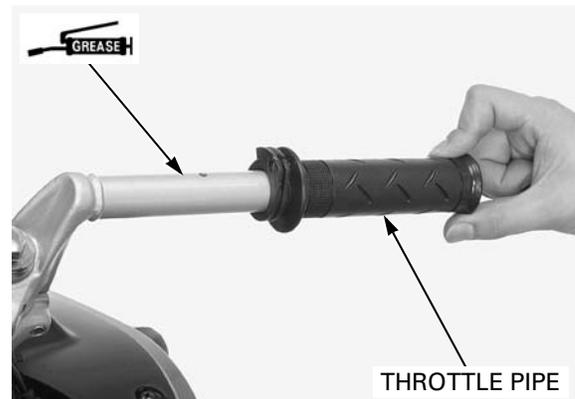


Connect the clutch switch connectors.



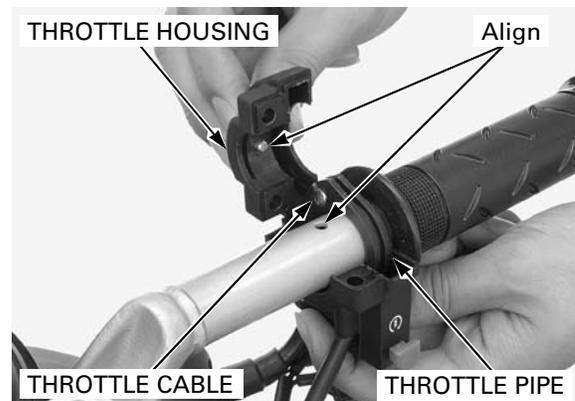
Apply grease to the throttle pipe sliding area of the right handlebar.

Install the throttle pipe to the right handlebar.



Connect the throttle cable end to the throttle pipe.

Install the right handlebar switch housing while aligning its locating pin with the hole on the handlebar.



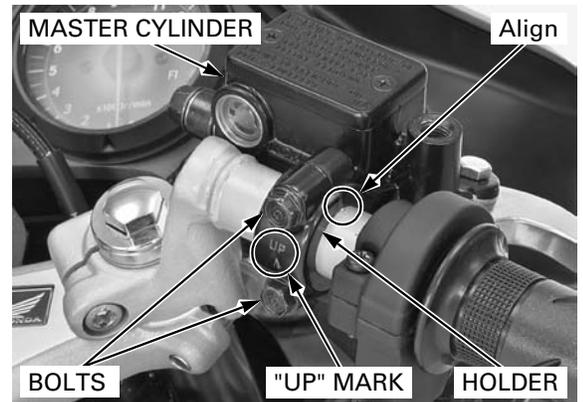
## FRONT WHEEL/SUSPENSION/STEERING

Install the screws and tighten the forward screw first, then tighten the rear screw.



Install the master cylinder, holder ("UP" mark facing up) and bolts.

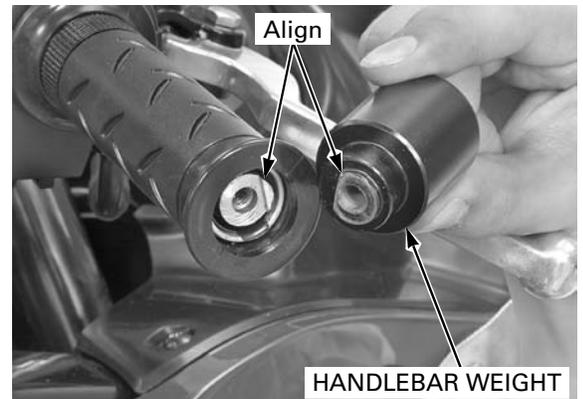
Align the end of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then the lower bolt.



Connect the brake light switch connectors.



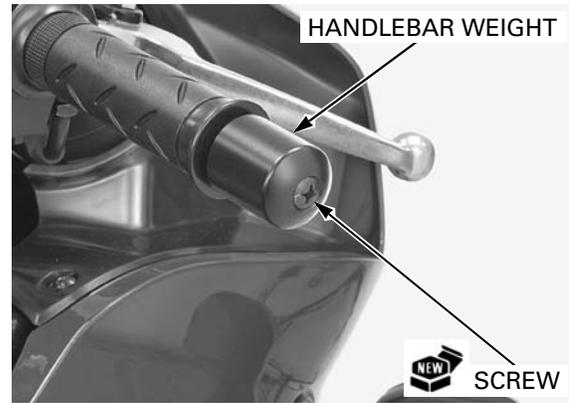
Install the handlebar weight to both handlebars aligning with each handlebar and handlebar weight cutout.



## FRONT WHEEL/SUSPENSION/STEERING

Hold the handlebar weight.  
Install and tighten new screw to the specified torque.

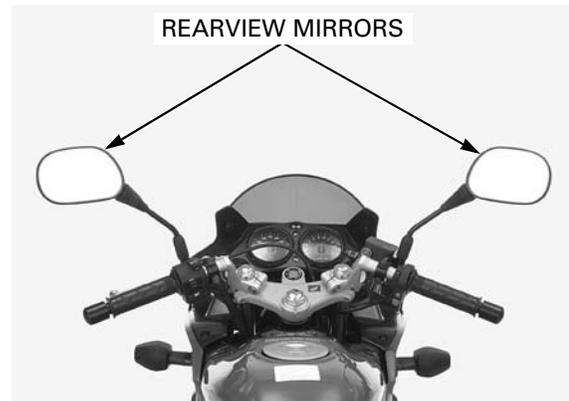
**TORQUE: 9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)**



Install the rearview mirrors.

Adjust the following:

- Clutch lever freeplay (page 3-24)
- Throttle grip freeplay (page 3-7)



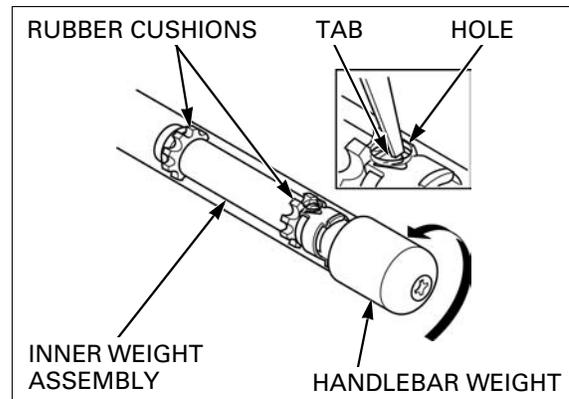
### INNER WEIGHT REPLACEMENT

Remove the throttle pipe or grip rubber from the handlebar (page 13-6).

Straighten the weight retainer tab by the screwdriver or punch.

Temporarily install the handlebar weight and screw, then remove the inner weight assembly by turning the handlebar weight.

*Apply lubricant spray through the tab locking hole to the rubber cushions for easy removal.*

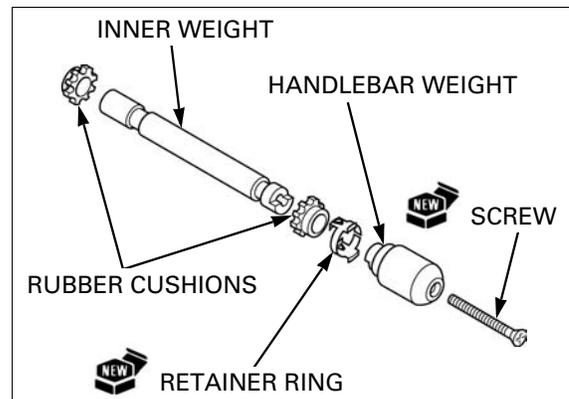


Remove the screw, handlebar weight, retainer ring and rubber cushions from the inner weight.

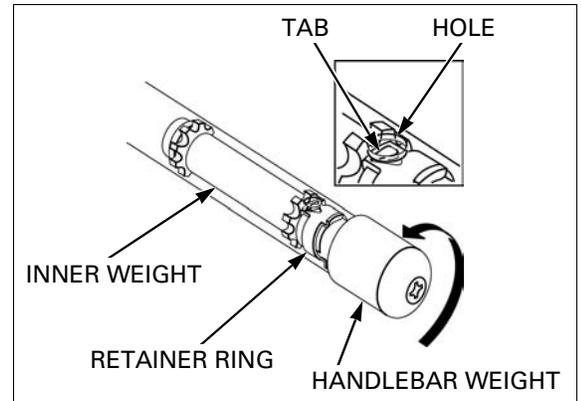
Install the rubber cushions and new retainer onto the inner weight.

Install the handlebar weight to the inner weight, aligning with each cut-outs of the inner weight and handlebar weight.

Install and tighten a new handlebar weight screw.



Install the inner weight assembly into the handlebar.  
Turn the inner weight and hook the weight retainer tab with the tab locking hole in the handlebar.



## FRONT WHEEL

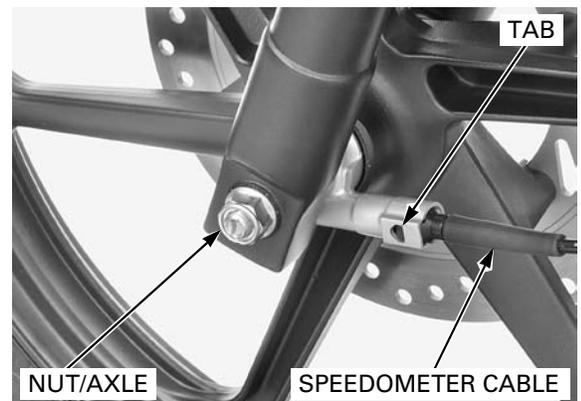
### REMOVAL

Support the motorcycle using a safety stand or hoist, raise the front wheel off the ground.

Disconnect the speedometer cable while pushing the tab of the cable.

Remove the axle nut.

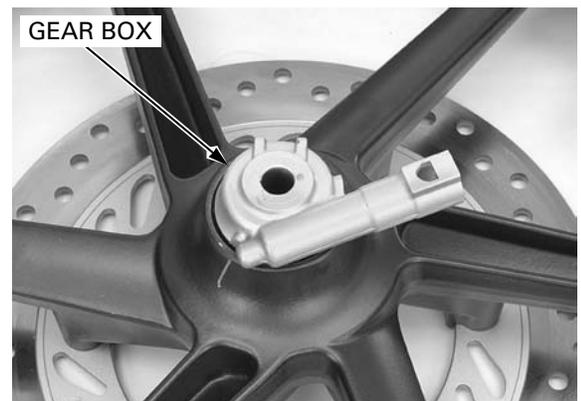
*Do not operate the brake lever after removing the front wheel.* Remove the axle and front wheel.



Remove the side collar.



Remove the speedometer gear box.



## FRONT WHEEL/SUSPENSION/STEERING

### INSPECTION

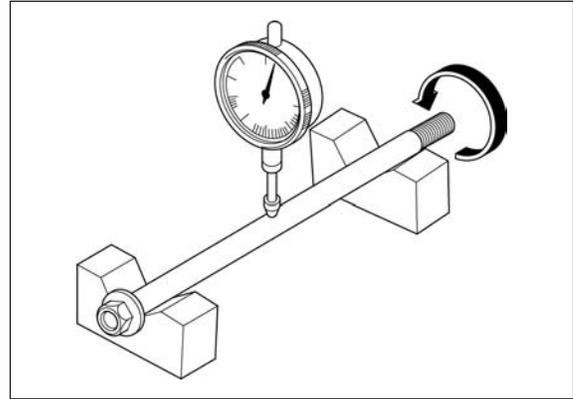
#### AXLE

Place the axle on V-blocks.

Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**



#### WHEEL RIM

Check the wheel rim runout by placing the wheel in a truing stand.

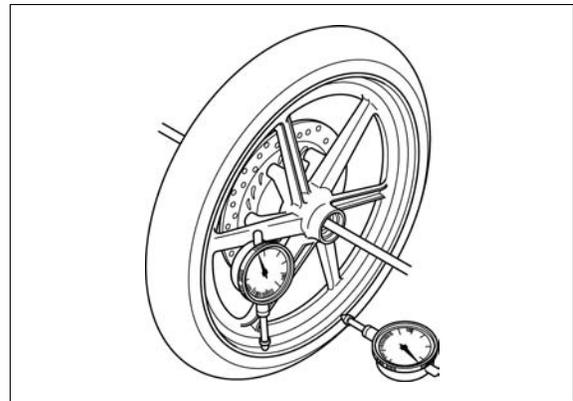
Spin the wheel by hand and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

#### SERVICE LIMITS:

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

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

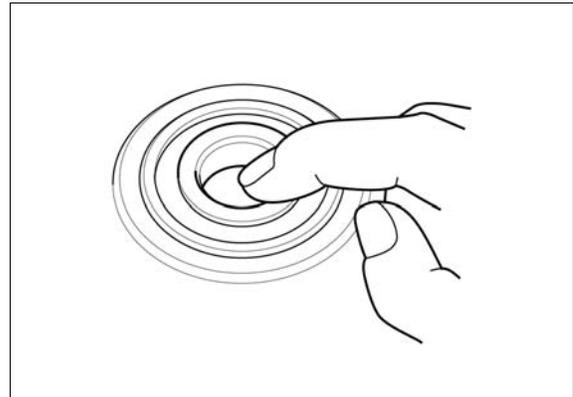


#### WHEEL BEARING

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

*Replace the bearings in pairs.*

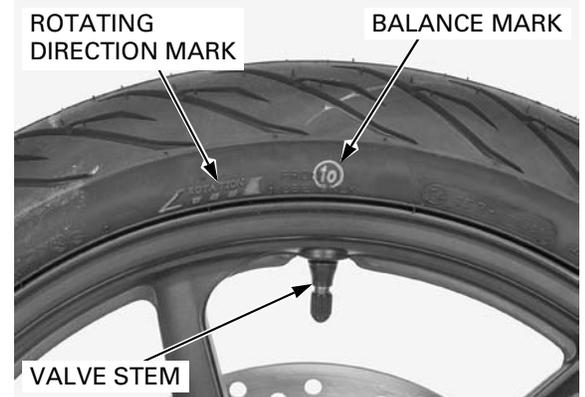
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the wheel hub.



## WHEEL BALANCE

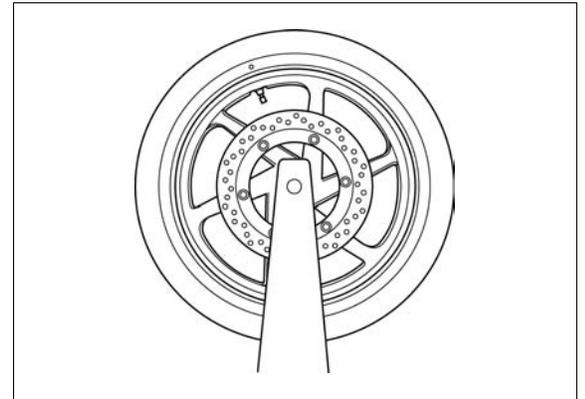
### NOTE:

- Carefully check balance before installing the wheel.
- Mount the tire with the arrow mark facing in the direction of rotation.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (light mass point: a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



Mount the wheel, tire and brake disc assembly on an inspection stand.  
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.  
Do this 2 or 3 times to verify the heaviest area.  
If the wheel is balanced, it will not stop consistently in the same position.

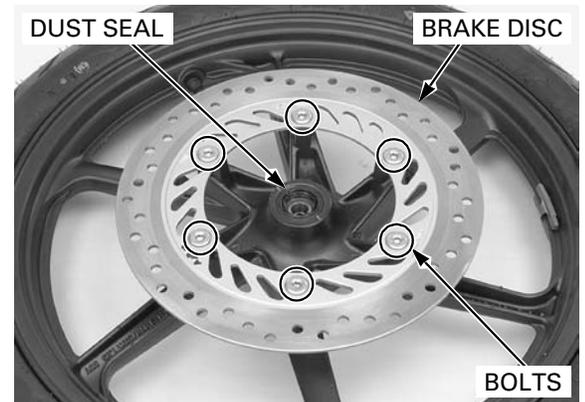
To balance the wheel, install a new balance weight on the lightest side of the rim, on the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.  
Do not add more than 60 g to the wheel.



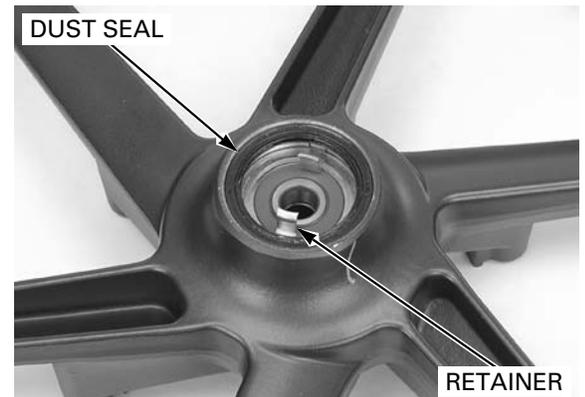
## DISASSEMBLY

Remove the dust seal from the right wheel hub.

Loosen the brake disc mounting bolts in a crisscross pattern in 2 or 3 steps, and remove the bolts and brake disc.



Remove the dust seal and speedometer retainer from the left wheel hub.

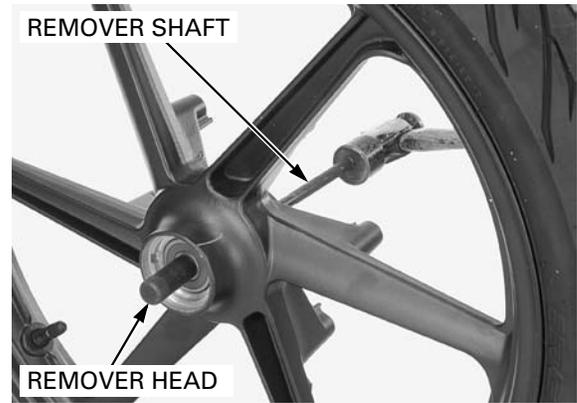


## FRONT WHEEL/SUSPENSION/STEERING

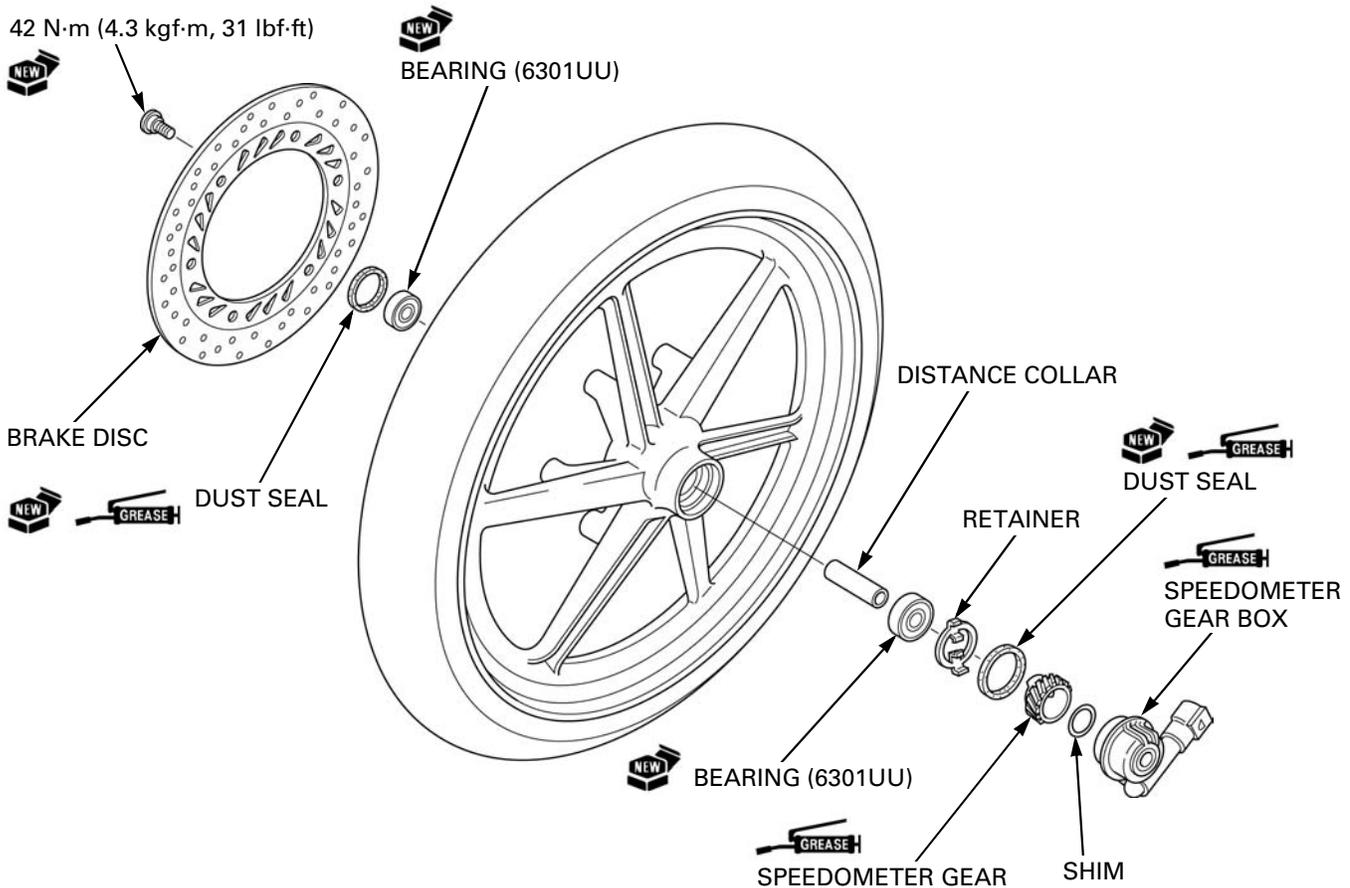
Install the bearing remover head into the bearing.  
From the opposite side, install the bearing remover shaft and drive out the bearing from the wheel hub.  
Remove the distance collar and drive out the other bearing.

### TOOLS:

**Bearing remover head, 12 mm** 07746-0050300  
**Bearing remover shaft** 07746-0050100



## ASSEMBLY



Never install the old bearing, once the bearing has been removed, the bearing must be replaced with new ones.

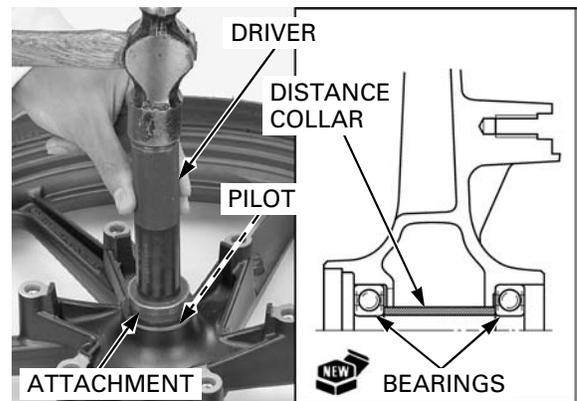
Drive in a new right side bearing squarely with its marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new left side bearing squarely with its marked side facing up until it is seated on the distance collar.

### TOOLS:

**Driver** 07749-0010000  
**Attachment, 37 x 40 mm** 07746-0010200  
**Pilot, 12 mm** 07746-0040200



Install the speedometer retainer to the left wheel hub, while aligning the tabs on the retainer with the slots on the hub.



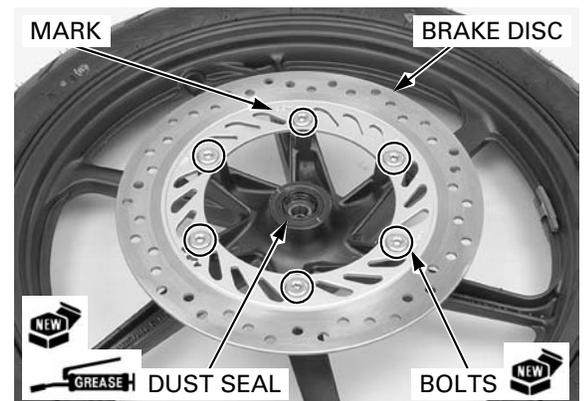
Apply grease to a new dust seal lips. Install the dust seal until it is fully seated to the left wheel hub.



Install the brake disc with the stamped mark "MIN.TH. 3.5 mm" facing outside.

Install and tighten new brake disc bolts to the specified torque in a crisscross pattern in 2 or 3 steps.

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



*Do not get grease on the brake disc or stopping power will be reduced.*

Apply grease to a new dust seal lips.

Install the dust seal until it is flush with the wheel hub surface to the right wheel hub.

**INSTALLATION**

Apply grease to the speedometer gear teeth, gear inner surface and shaft outer surface (page 1-17).

Install the speedometer gear box into the left wheel hub while aligning the tabs with the slots.



## FRONT WHEEL/SUSPENSION/STEERING

Install the side collar into the right wheel hub.



When installing the front wheel, align the following:

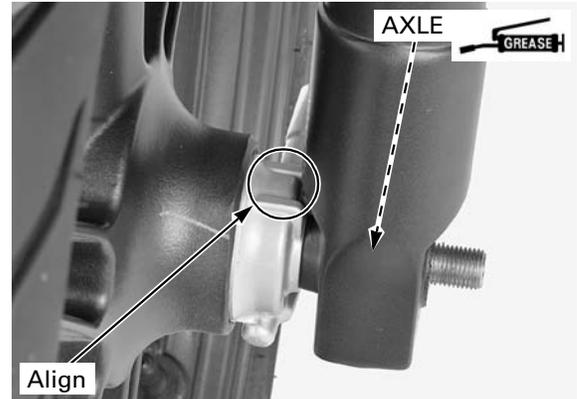
- Brake disc between the brake pads
- Speedometer gear box groove with the boss on the left fork leg

### NOTE:

Be careful not to damage the brake pads.

Apply a thin coat of grease to the axle rolling surface.

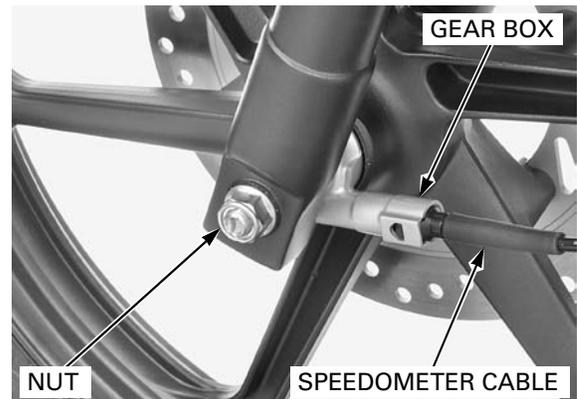
Install the axle from right side.



Install and tighten the axle nut to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)**

Connect the speedometer cable to the speedometer gear box by aligning the tab of the cable with the hole of the gear box.



## FORK

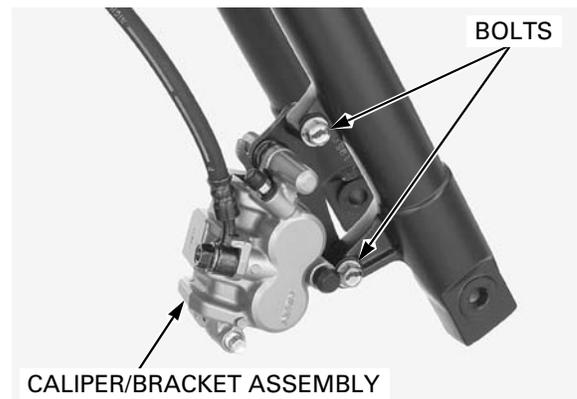
### REMOVAL

Remove the following:

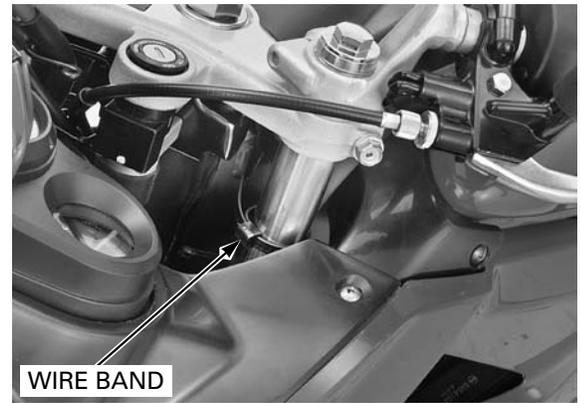
- Front fender (page 2-11)
- Front wheel (page 13-13)

*Do not suspend the brake caliper/bracket assembly from the brake hose. Do not twist the brake hose.*

Remove the brake caliper mounting bolts and brake caliper/bracket assembly.



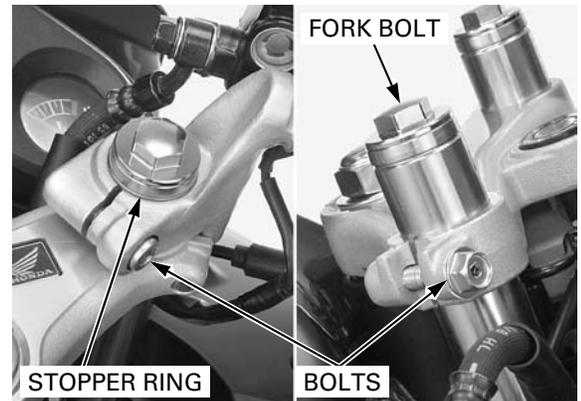
*LEFT SIDE:* Remove the wire band from the fork pipe.



Remove the stopper rings from both fork pipes.  
Loosen the handlebar pinch bolts and remove the handlebars.

*When the fork is ready to be disassembled, loosen the fork bolt.*

Loosen the top bridge pinch bolts.



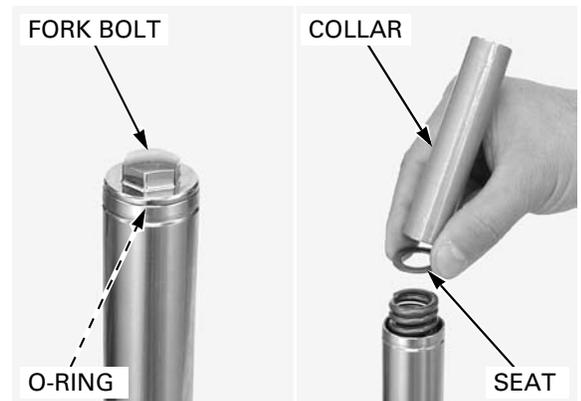
Hold the fork leg and loosen the bottom bridge pinch bolt and lower the fork leg, then remove it.



## DISASSEMBLY

Remove the following:

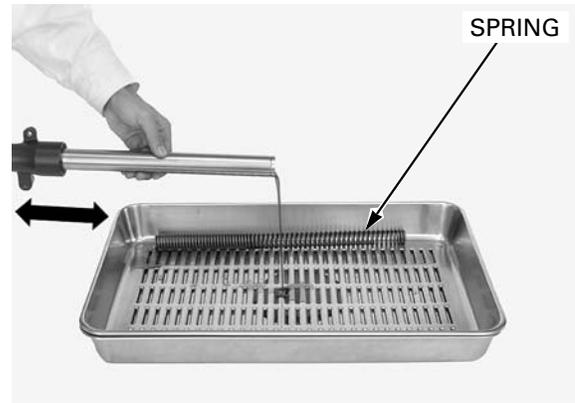
- Fork bolt
- O-ring
- Spring collar
- Spring seat



## FRONT WHEEL/SUSPENSION/STEERING

Remove the fork spring.

Drain the fork fluid by pumping the fork pipe several times.

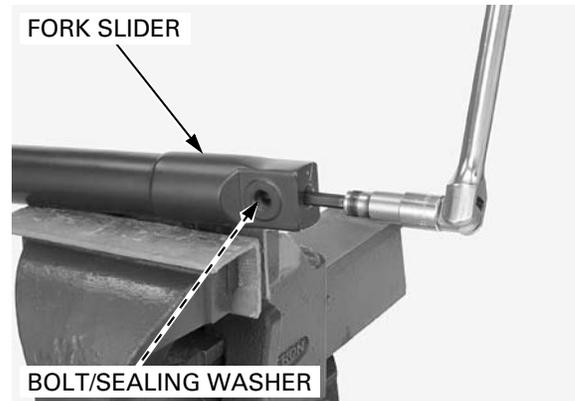


*Do not over-tighten the vise on the fork slider.*

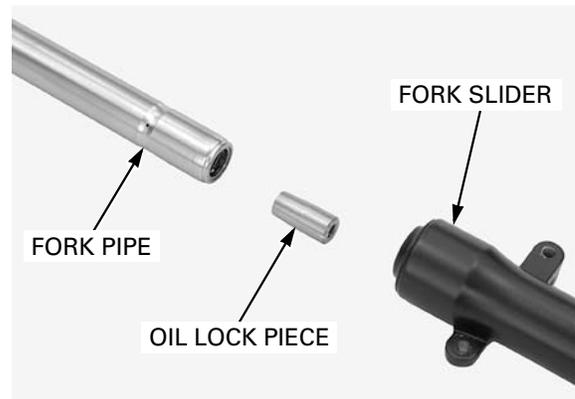
Set the fork slider in a vise with a piece of wood or soft jaws to avoid damage.

*If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spring collar and fork cap.*

Remove the fork socket bolt and sealing washer.

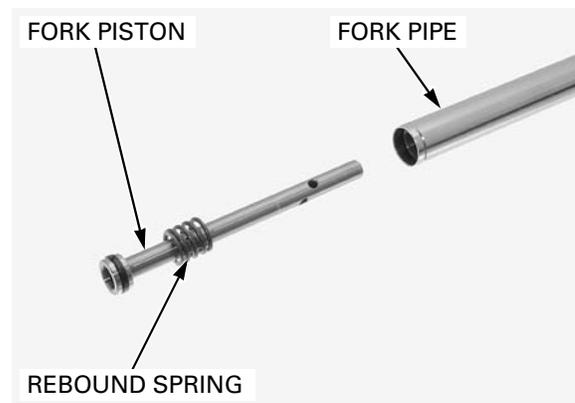


Remove the fork pipe and oil lock piece from the fork slider.



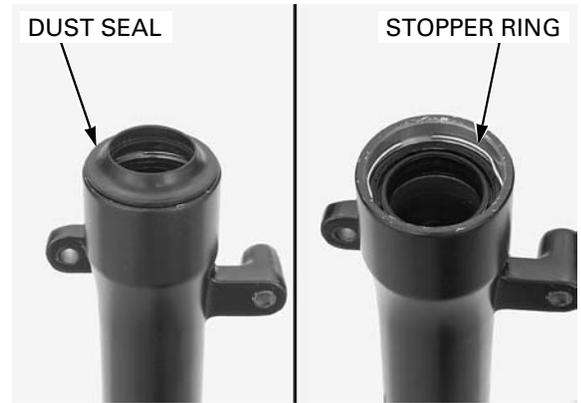
*Do not remove the piston ring unless it is to replace with a new one.*

Remove the fork piston and rebound spring from the fork pipe.



*Be careful not to scratch the fork pipe.*

Remove the dust seal and stopper ring.



*Be careful not to damage the fork slider.*

Remove the oil seal using a special tool.

**TOOL:**  
**Oil seal remover**

**07748-0010001 or equivalent commercially available**



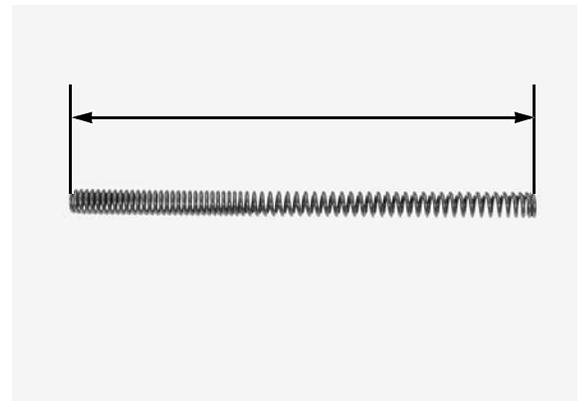
**INSPECTION**

**FORK SPRING**

Check the fork spring for fatigue or damage.

Measure the fork spring free length.

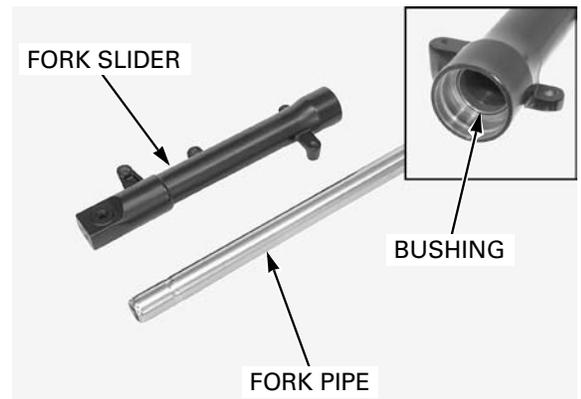
**SERVICE LIMIT: 404.1 mm (15.91 in)**



**FORK PIPE/SLIDER/PISTON**

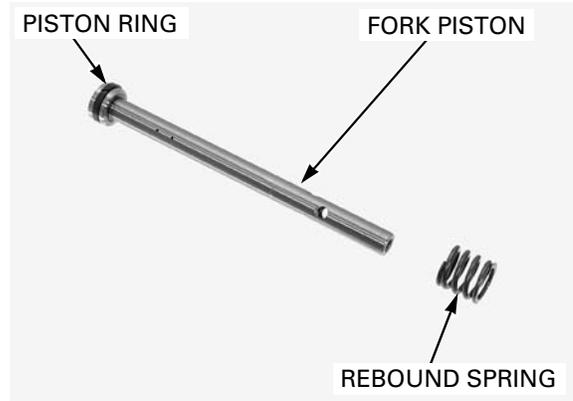
Check the fork pipe, slider and for score marks, scratches, or excessive or abnormal wear.

Check the slider bushing for wear or damage.

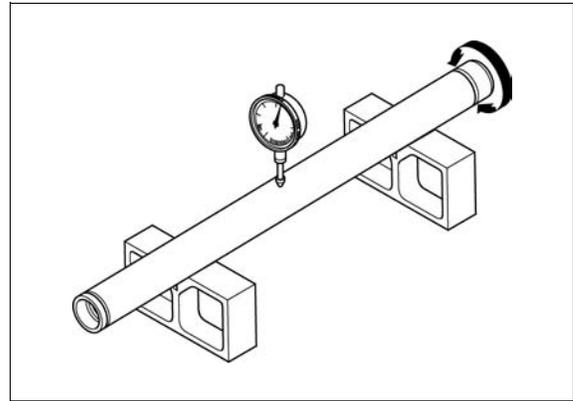


# FRONT WHEEL/SUSPENSION/STEERING

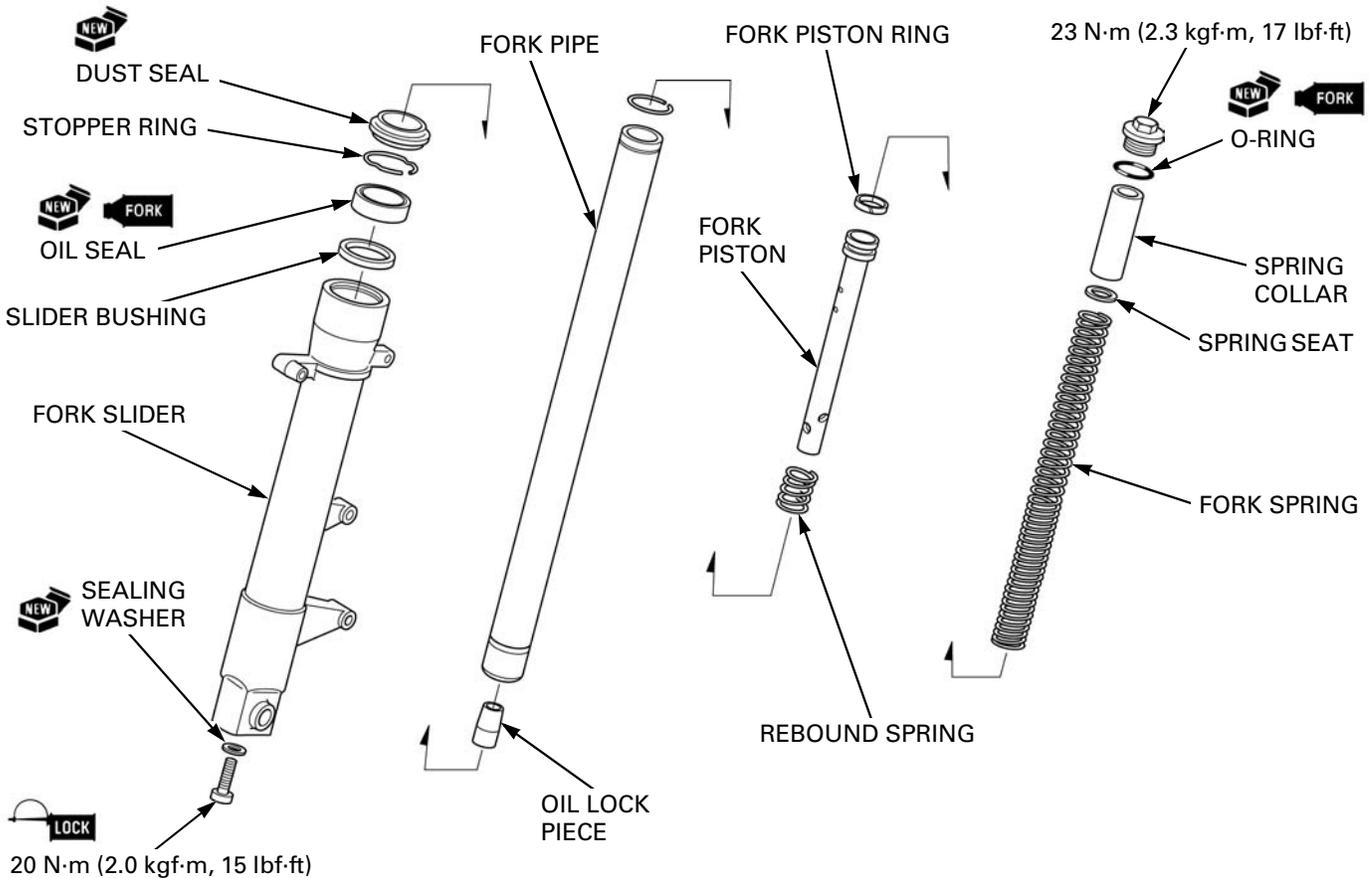
Check the fork piston and piston ring for wear or damage.  
 Check the rebound spring for fatigue or damage.  
 Replace any components that are worn or damaged.



Place the fork pipe on V-blocks.  
 Turn the fork pipe and measure the runout using a dial indicator.  
 Actual runout is 1/2 of the total indicator reading.  
**SERVICE LIMIT: 0.20 mm (0.008 in)**



## ASSEMBLY



## FRONT WHEEL/SUSPENSION/STEERING

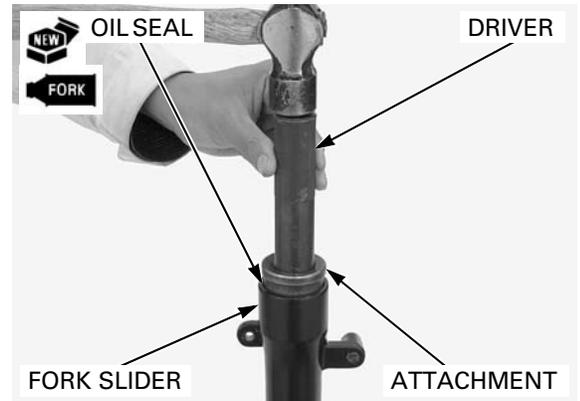
Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.

Apply fork fluid to a new oil seal lips, then install it into the fork slider with its marking facing up.

Drive in the oil seal into the fork slider until the stopper ring groove is visible, using the special tools.

### TOOLS:

**Driver** 07749-0010000  
**Attachment, 42 x 47 mm** 07746-0010300

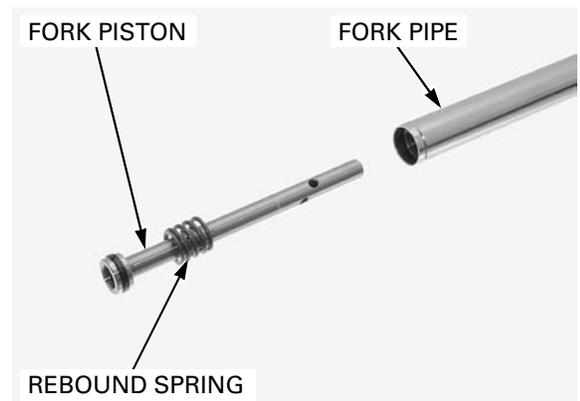


Install the stopper ring into the groove of the fork slider securely.

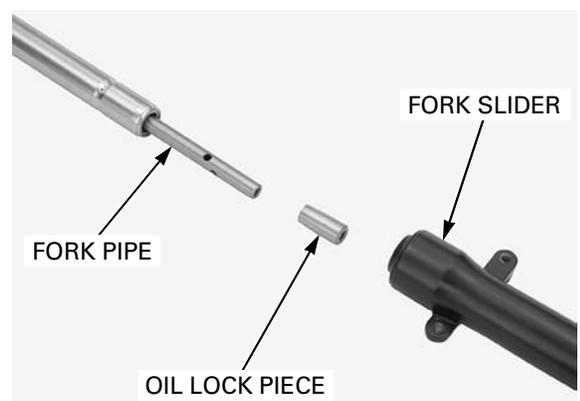
Install a new dust seal.



Install the rebound spring to the fork piston and install them into the fork pipe.



Install the oil lock piece onto the fork piston end.  
Install the fork pipe into the fork slider.

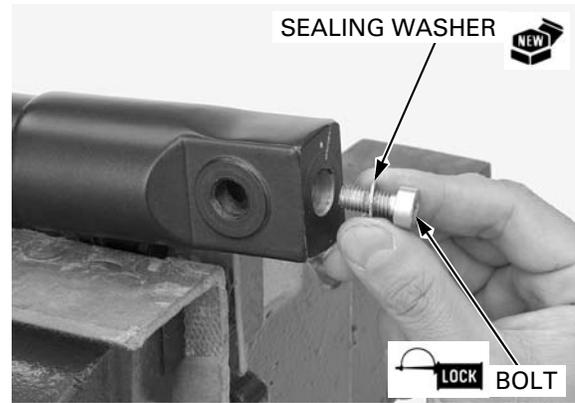


## FRONT WHEEL/SUSPENSION/STEERING

*Do not over-tighten the vise on the fork slider.*

Set the fork slider in a vise with a piece of wood or soft jaws to avoid damage.

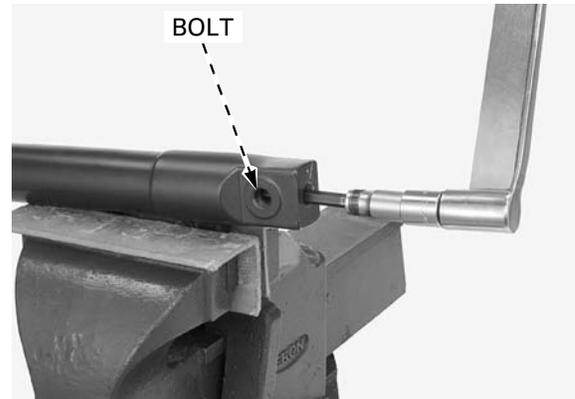
Install a new sealing washer to the fork socket bolt. Apply locking agent to the fork socket bolt threads and install it.



*If the fork piston turns with the socket bolt, temporarily install the fork spring, spring seat, spring collar and fork bolt.*

Tighten the fork socket bolt to the specified torque.

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



Pour the specified amount of recommended fork fluid into the fork pipe.

**RECOMMENDED FORK FLUID (Except CM type):**  
**Honda ULTRA CUSHION OIL 10W or equivalent**

**RECOMMENDED FORK FLUID (CM type only):**  
**Pro Honda Suspension Fluid SS-8 (10W) or equivalent**

**FORK FLUID CAPACITY:**  
**206 ± 2.5 cm<sup>3</sup> (7.0 ± 0.08 US oz, 7.3 ± 0.09 Imp oz)**

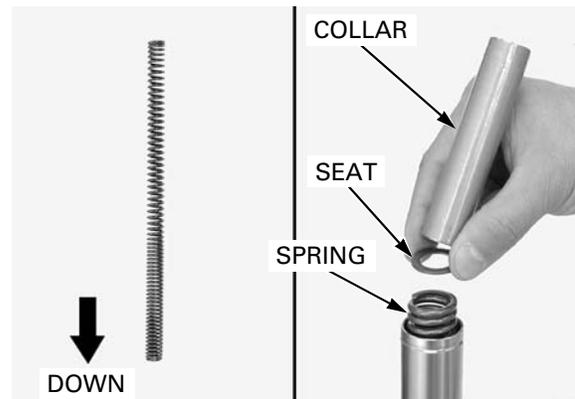
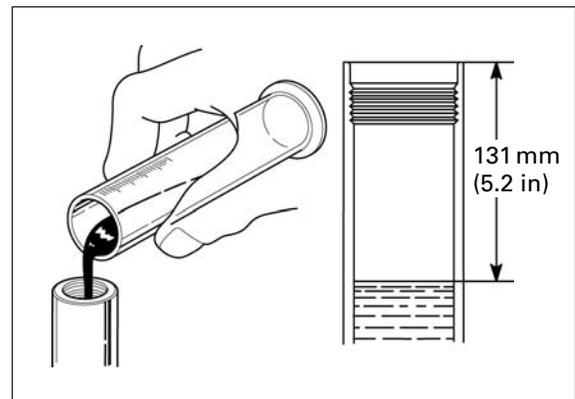
Slowly pump the fork pipe several times to remove any trapped air from the lower portion of the fork pipe.

Compress the fork pipe fully and measure the fluid level from the top of the fork pipe.

**FLUID LEVEL: 131 mm (5.2 in)**

Pull the fork pipe up and install the fork spring with the tightly wound coil side facing down.

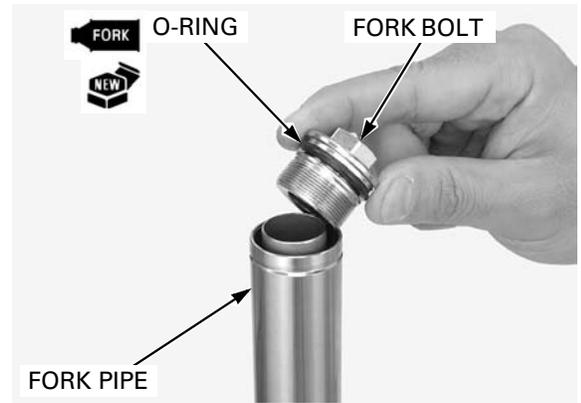
Install the spring seat and spring collar.



Apply fork fluid to a new O-ring and install it onto the fork bolt.

*Tighten the fork bolt after installing the fork pipe into the fork bridges.*

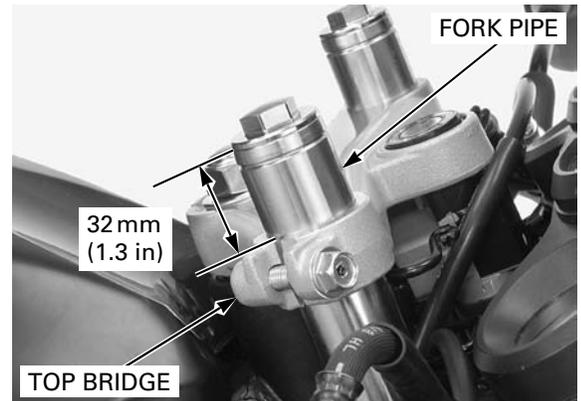
Loosely install the fork bolt by pushing it to the fork pipe.



## INSTALLATION

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

Install the fork leg through the bottom bridge and top bridge so that the height from the top bridge upper surface to the fork pipe end is 32 mm (1.3 in).



Tighten the bottom bridge and top bridge pinch bolts to the specified torque.

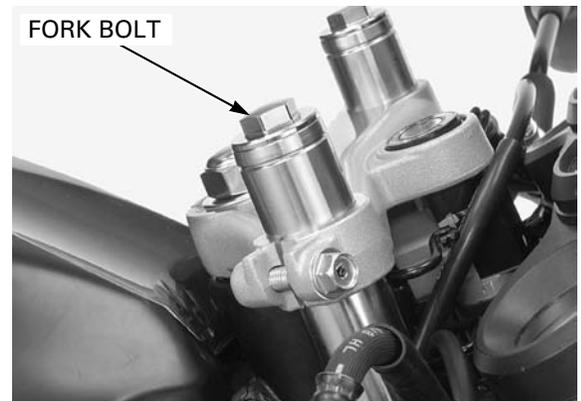
### TORQUE:

- Bottom bridge pinch bolt:**  
27 N·m (2.8 kgf·m, 20 lbf·ft)
- Top bridge pinch bolt:**  
23 N·m (2.3 kgf·m, 17 lbf·ft)



If the fork bolt is loosened, tighten the fork bolt to the specified torque.

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



## FRONT WHEEL/SUSPENSION/STEERING

Install the handlebars to both fork pipes while aligning the bosses on the handlebars with the cut outs on the top bridge.



Tighten both handlebar pinch bolts to the specified torque.

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

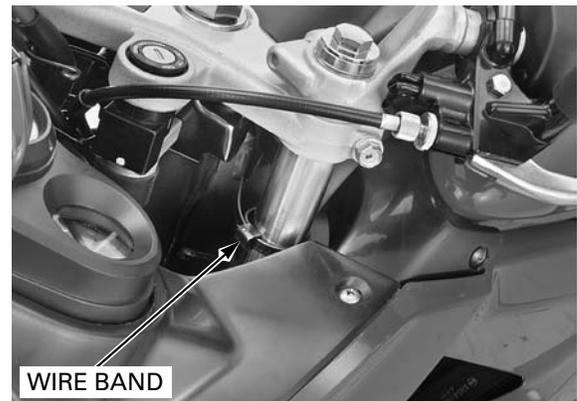
Install the stopper rings to the grooves of both fork pipes.



*LEFT SIDE:* Install the wire band to the fork pipe.

**NOTE:**

Route the wire properly (page 1-18).

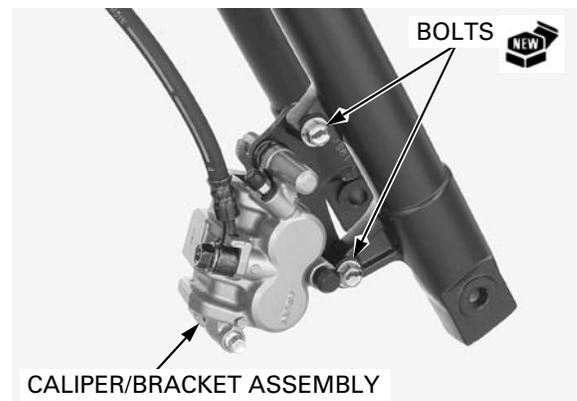


Install the brake caliper/bracket assembly and tighten new brake caliper mounting bolts to the specified torque.

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

Install the following:

- Front wheel (page 13-17)
- Front fender (page 2-11)



## STEERING STEM

### REMOVAL

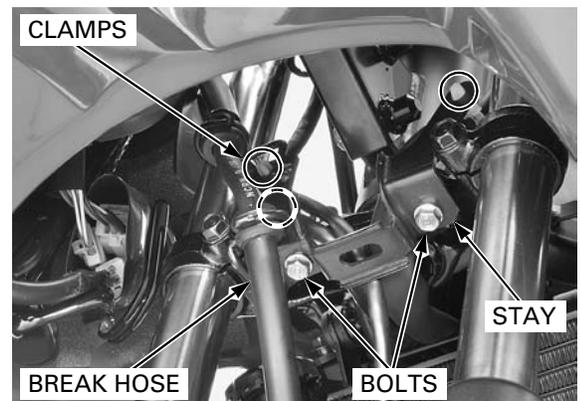
Lift and support the fuel tank (page 3-6).  
Open the rubber sheet (page 6-10).

Disconnect the ignition switch 2P (Natural) connector.



Release the brake hose and wire harness clamps from the stay.

Remove the bolts and stay.

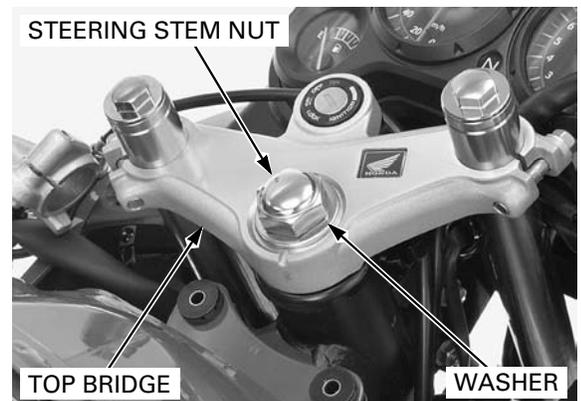


Remove the suitable support and close the fuel tank (page 3-6).

Loosen the steering stem nut.

Remove the fork legs (page 13-18).

Remove the steering stem nut, washer and top bridge.



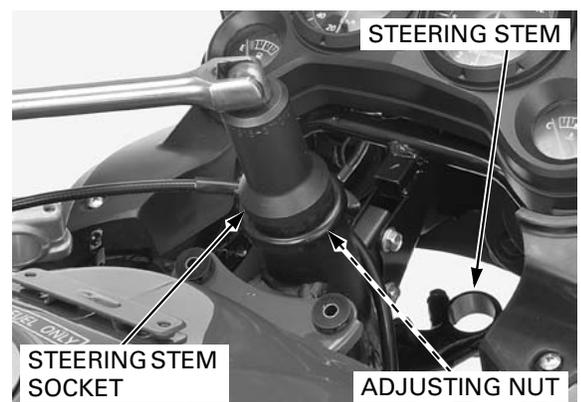
Loosen the steering stem adjusting nut using a special tool.

#### TOOL:

**Steering stem socket**

**07916-3710101**

Hold the steering stem and remove the steering stem adjusting nut.

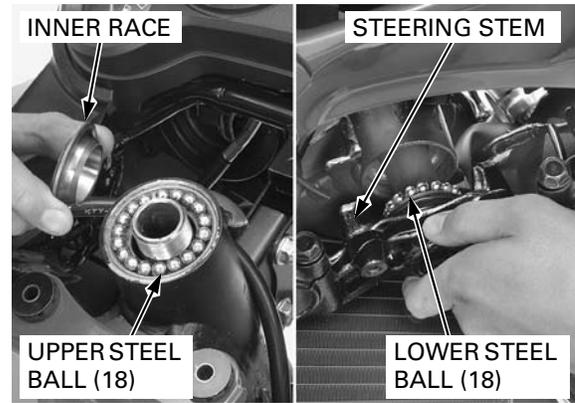


## FRONT WHEEL/SUSPENSION/STEERING

*Be careful not to  
loose the steel  
balls.*

Remove the following:

- Upper bearing inner race
- Upper steel ball (18)
- Steering stem
- Lower steel ball (18)



### BEARING REPLACEMENT

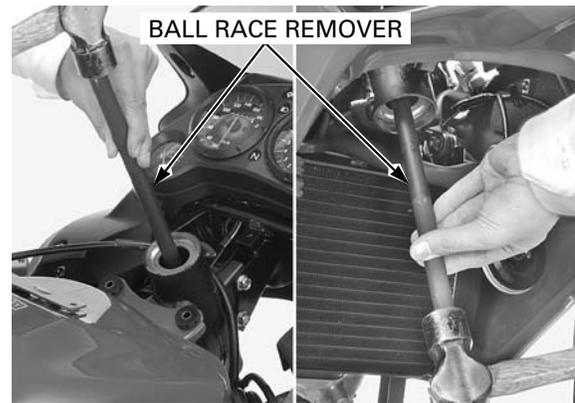
*Replace the steel  
balls, outer and  
inner races as a set.*

Drive out the upper and lower outer races using a special tool.

**TOOL:**

**Ball race remover**

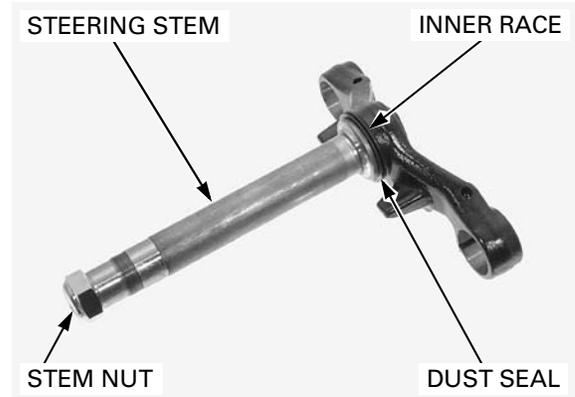
**07GMD-KS40100**



Temporarily install the steering stem nut onto the steering 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 tools, being careful not to damage the steering stem.

Remove the steering head bearing dust seal.



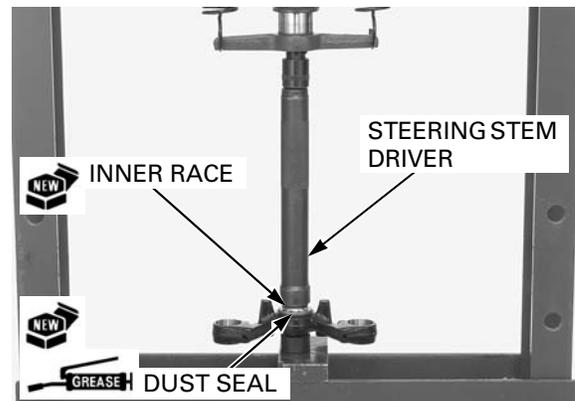
Apply specified grease (page 1-17) to a new steering head bearing dust seal lips and install it to the steering stem.

Install a new lower inner race using a hydraulic press and special tool.

**TOOL:**

**Steering stem driver**

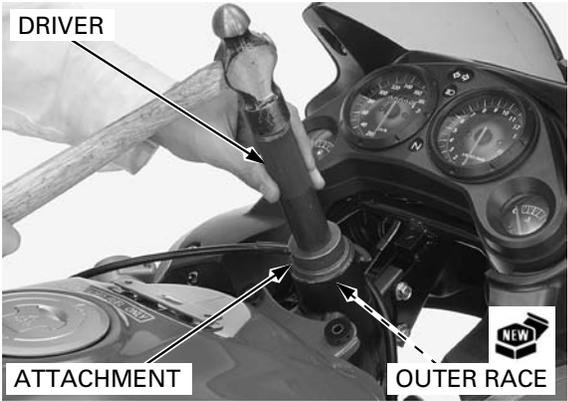
**07946-4300101**



**FRONT WHEEL/SUSPENSION/STEERING**

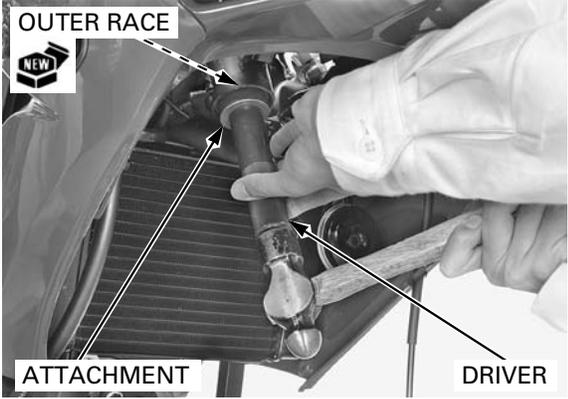
Drive in a new upper outer race using the special tools.

**TOOLS:**  
**Driver** 07749-0010000  
**Attachment, 42 x 47 mm** 07746-0010300

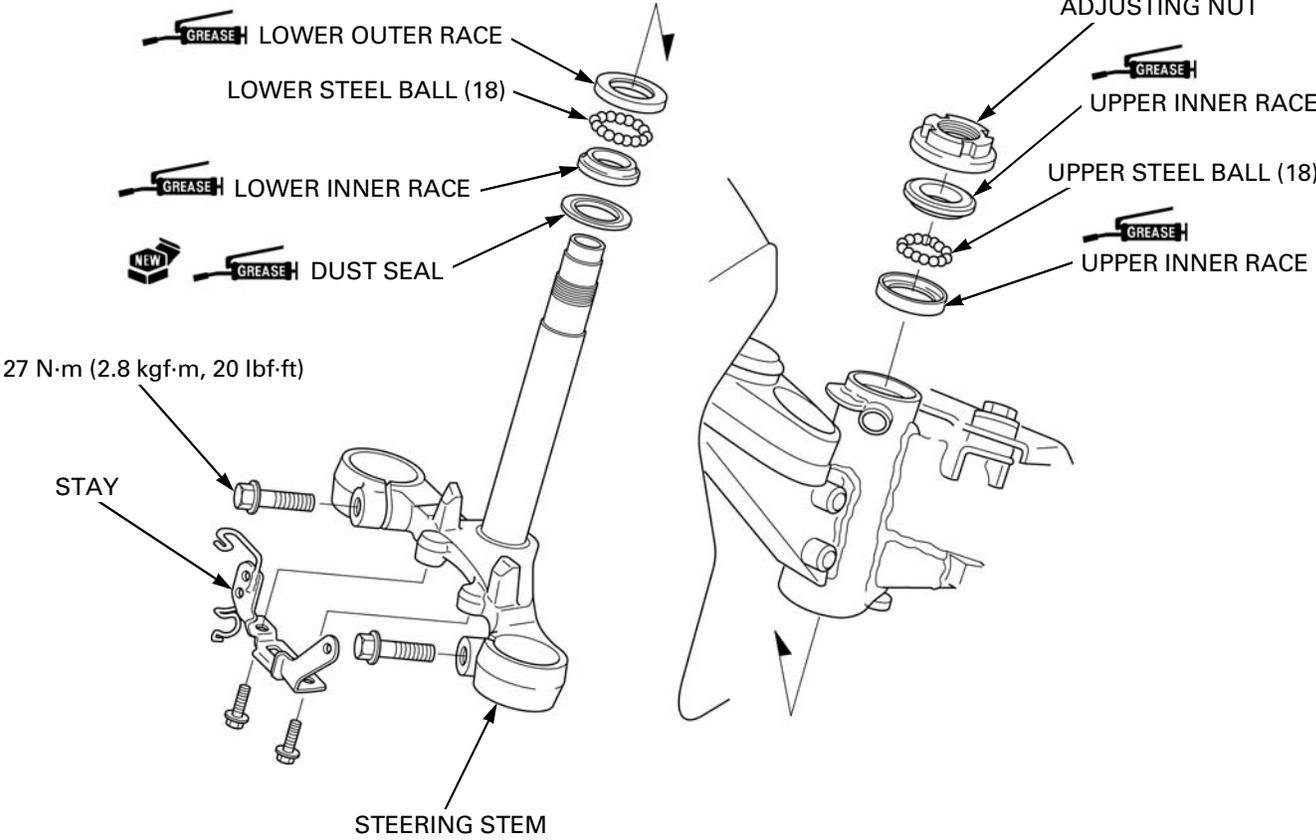


Drive in a new lower outer race using the special tools.

**TOOLS:**  
**Driver** 07749-0010000  
**Attachment, 42 x 47 mm** 07746-0010300



**INSTALLATION**

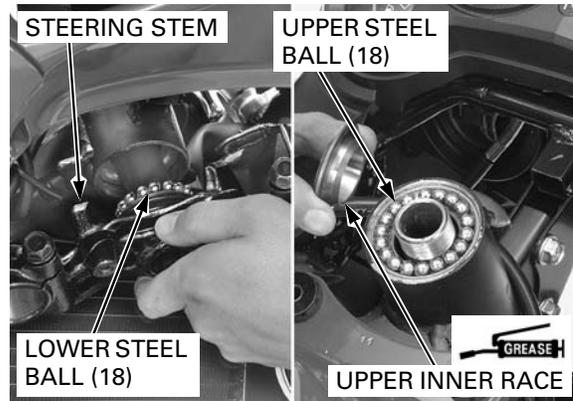


## FRONT WHEEL/SUSPENSION/STEERING

Apply specified grease (page 1-17) to each inner races and outer races rolling surface.  
Install the steel balls in the lower inner race and upper outer race.

Upper steel ball: 18 Pieces  
Lower steel ball: 18 Pieces

Install the steering stem and upper inner race.

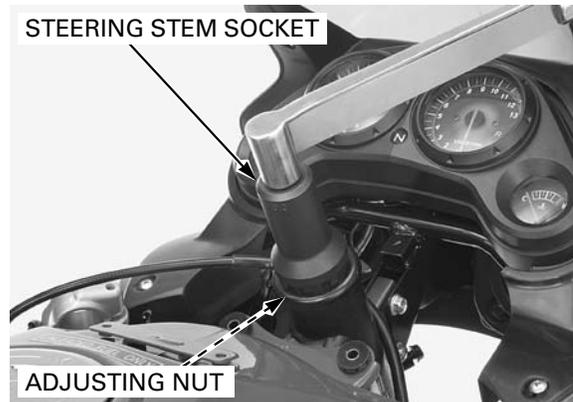


Install and tighten the steering stem adjusting nut to the specified torque using a special tool.

**TOOL:**

**Steering stem socket**                      **07916-3710101**

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



Move the steering stem left and right, lock-to-lock five times to seat the bearings.

Loosen the adjusting nut to torque of 0 N·m (0 kgf·m, 0 lbf·ft).

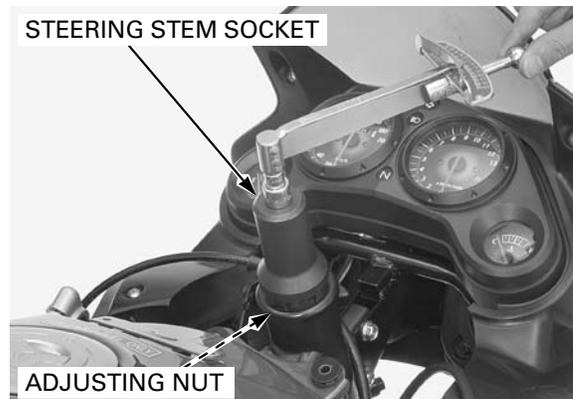


Retighten the adjusting nut to the specified torque using a special tool.

**TOOL:**

**Steering stem socket**                      **07916-3710101**

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



Install the top bridge.

Install the washer and steering stem nut, but do not tighten the steering stem nut yet.

Install the fork legs (page 13-25).

Tighten the steering stem left and right, lock-to-lock several times to make sure the steering stem nut to the specified torque.

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

Turn the steering stem left and right, lock-to-lock several times to make sure the steering stem moves smoothly without play or binding.

*Route the wires, hose and cable properly (page 1-18).*

Install the stay and bolts, tighten the bolts.

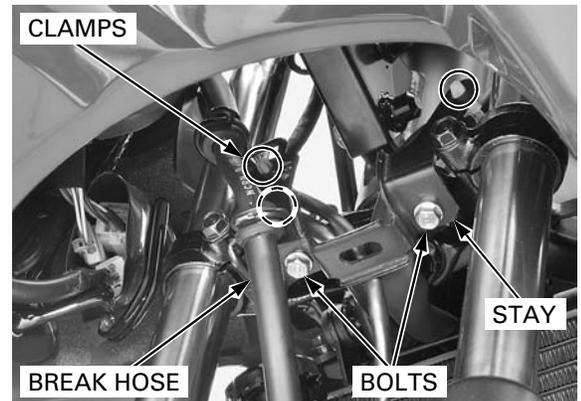
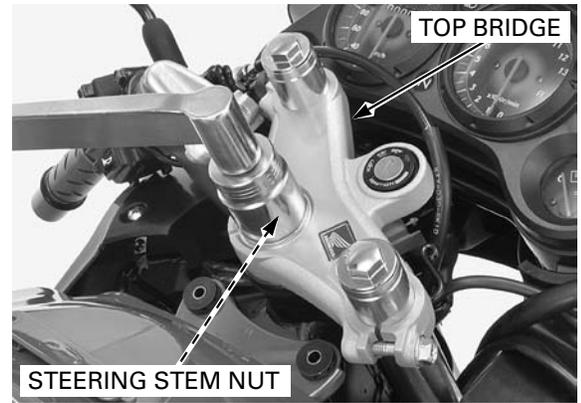
Install the wire harness clamps and brake hose to the stay.

Lift and support the fuel tank.

Connect the ignition switch 2P (Natural) connector.

Close the rubber sheet (page 6-15).

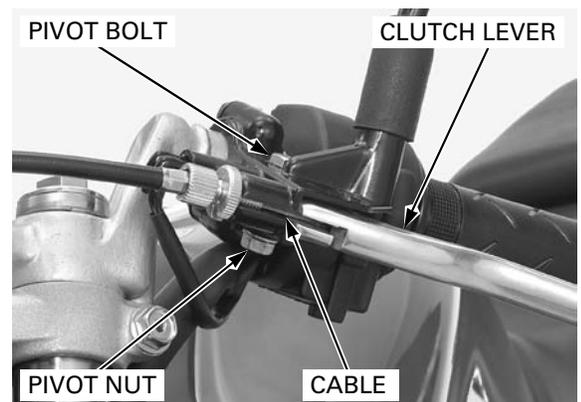
Remove the suitable support and close the fuel tank (page 3-6).



## **CLUTCH LEVER**

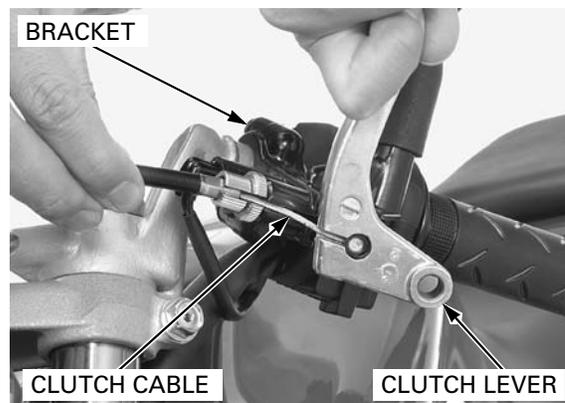
### **REMOVAL/INSTALLATION**

Remove the clutch lever pivot nut and bolt.  
Remove the clutch lever and disconnect the clutch cable.



## FRONT WHEEL/SUSPENSION/STEERING

Connect the clutch cable to the clutch lever.  
Install the clutch lever to the clutch lever bracket.



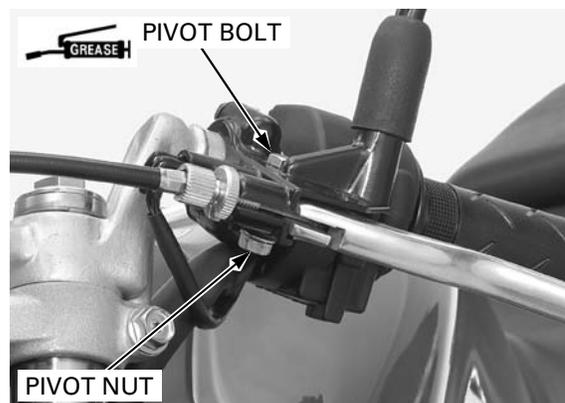
Apply grease to the clutch lever pivot bolt sliding surface (page 1-17).

Install and tighten the clutch lever pivot bolt to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Install and tighten the clutch lever pivot nut to the specified torque while holding the clutch lever pivot bolt.

**TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**



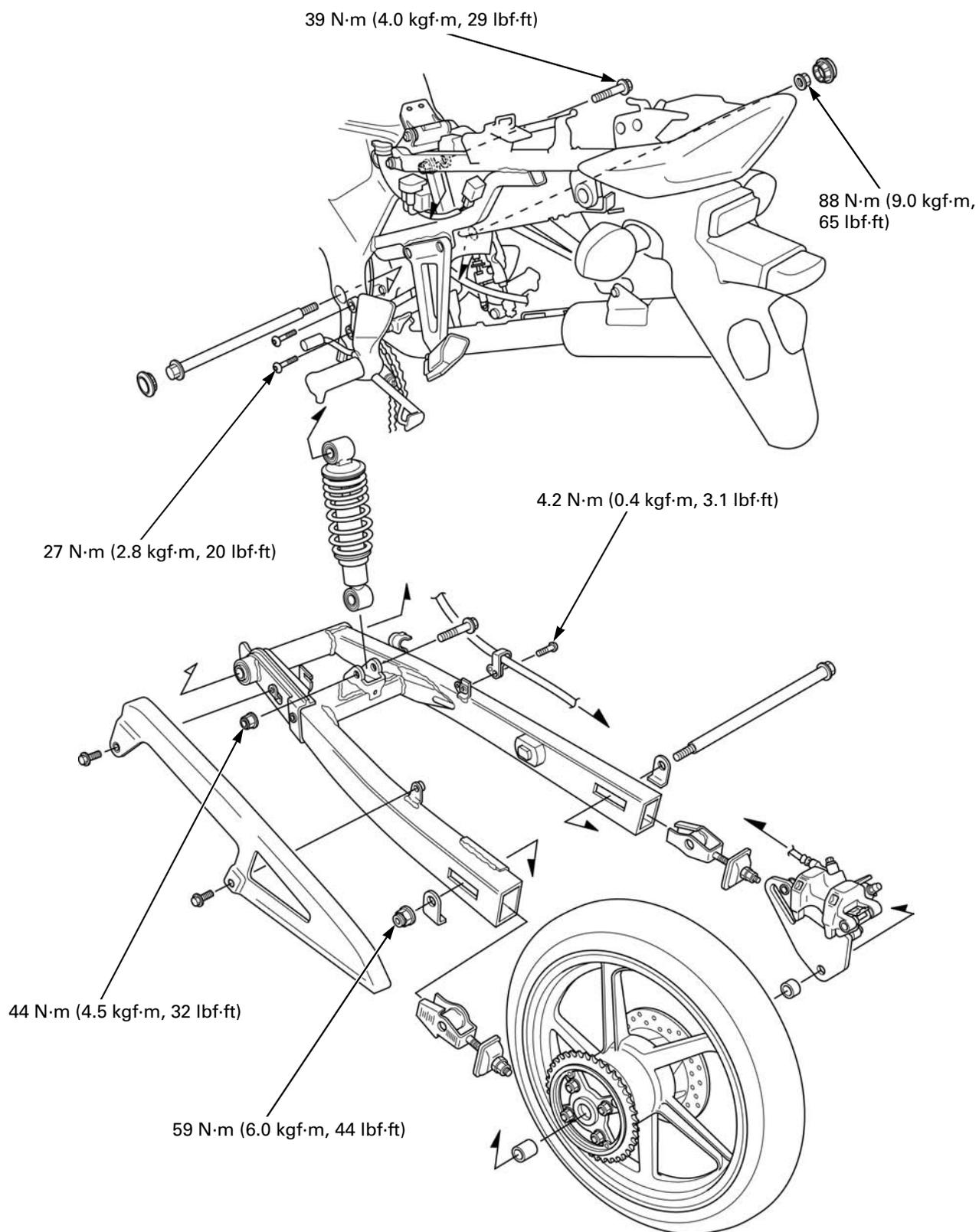
# 14. REAR WHEEL/SUSPENSION

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COMPONENT LOCATION .....	14-2	REAR WHEEL.....	14-5
SERVICE INFORMATION .....	14-3	SHOCK ABSORBER.....	14-11
TROUBLESHOOTING .....	14-4	SWINGARM.....	14-12

## REAR WHEEL/SUSPENSION

### COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- When servicing the rear wheel and suspension, 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.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.
- For brake system information (page 15-3).

### SPECIFICATIONS

Unit: mm (in)

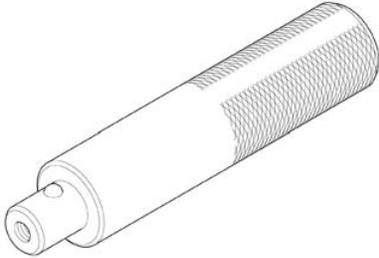
ITEM		STANDARD	SERVICE LIMIT
Minimum tire thread depth		–	0.8 (0.03)
Cold tire pressure	Standard	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
	With cargo	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	–
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)
Wheel balancer weight		–	60 g max.
Drive chain	Size/link	428/124	–
	Slack	25 – 35 (1.0 – 1.4)	–

### TORQUE VALUES

Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Rear axle nut	59 N·m (6.0 kgf·m, 44 lbf·ft)	U-nut
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt; replace with a new one.
Shock absorber upper mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive chain slider screw	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Brake hose guide screw	4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Driven sprocket stud bolt	28 N·m (2.9 kgf·m, 21 lbf·ft)	
Step holder mounting bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply locking agent to the threads.

## REAR WHEEL/SUSPENSION

### TOOLS

<p>Pilot, 12 mm 07746-0040200</p> 	<p>Pilot, 17 mm 07746-0040400</p> 	<p>Attachment, 37 x 40 mm 07746-0010200</p> 
<p>Bearing remover shaft 07746-0050100</p> 	<p>Bearing remover head, 12 mm 07746-0050300</p> 	<p>Driver 07749-0010000</p> 

## TROUBLESHOOTING

### Steers to one side or does not track straight

- Drive chain adjusters not adjusted equally
- Bent axle
- Bent frame
- Worn swingarm pivot components

### Rear wheel wobbling

- Bent rim
- Worn wheel bearing
- Worn driven flange bearing
- Faulty tire
- Bent frame or swingarm
- Axle not tightened properly
- Unbalanced tire and wheel
- Insufficient tire pressure

### Wheel hard to turn

- Brake drag
- Faulty wheel bearing
- Faulty driven flange bearing
- Bent axle
- Drive chain too tight (page 3-16)

### Soft suspension

- Weak shock absorber spring
- Oil leakage from damper unit
- Insufficient tire pressure

### Stiff suspension

- Bent shock absorber damper rod
- Damaged suspension or swingarm pivot bushing
- Bent swingarm pivot or frame

### Rear suspension noisy

- Loose suspension fasteners
- Faulty shock absorber

## REAR WHEEL

### REMOVAL

Support the motorcycle using a safety stand or hoist, raise the rear wheel off the ground.

Loosen the lock nut, drive chain adjusting nut and axle nut.

Push the rear wheel forward.

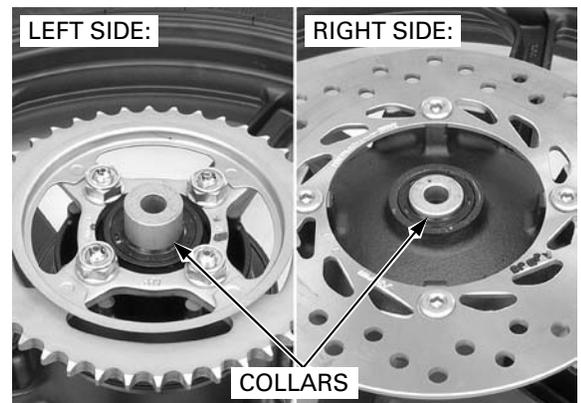
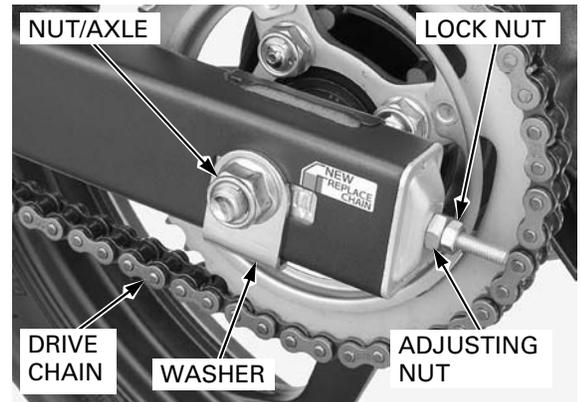
Derail the drive chain from the driven sprocket.

Remove the axle nut.

Remove the axle and rear wheel.

*Do not operate the brake pedal after removing the rear wheel.*

Remove the side collars.



### INSPECTION

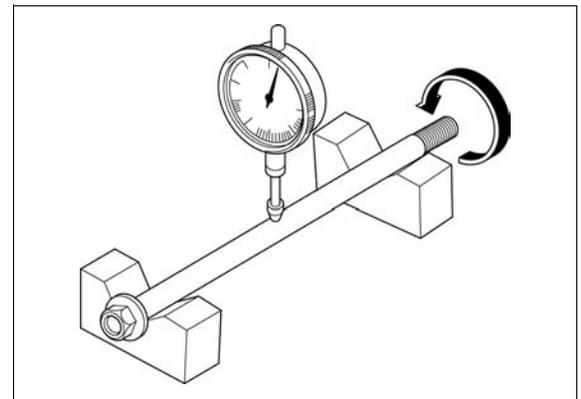
#### AXLE

Place the axle on V-blocks.

Turn the axle and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**



## REAR WHEEL/SUSPENSION

### WHEEL RIM

Check the rim runout by placing the wheel in a truing stand.

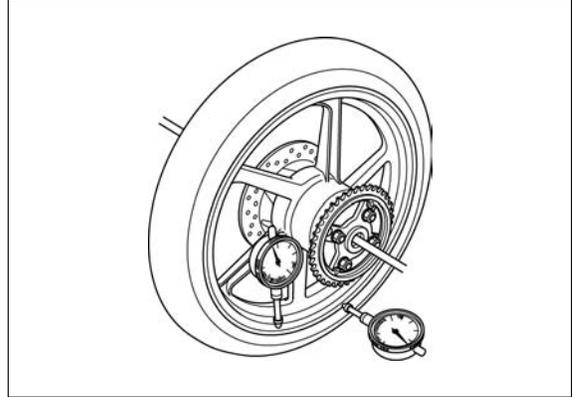
Spin the wheel by hand, and measure the runout using a dial indicator.

Actual runout is 1/2 of the total indicator reading.

### SERVICE LIMITS:

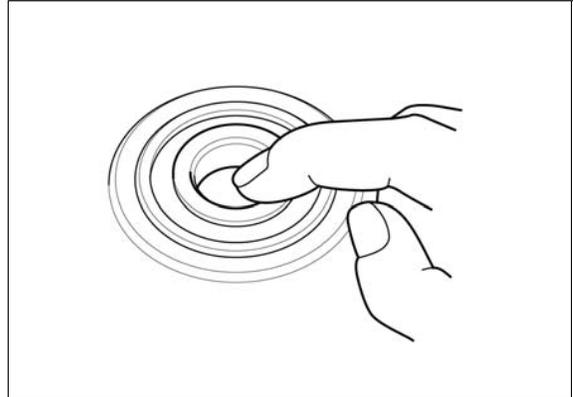
Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)



### WHEEL AND DRIVEN FLANGE BEARINGS

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



*Replace the bearings as a set.*

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the wheel hub and driven flange.

### WHEEL BALANCE

For wheel balance servicing (page 13-15).

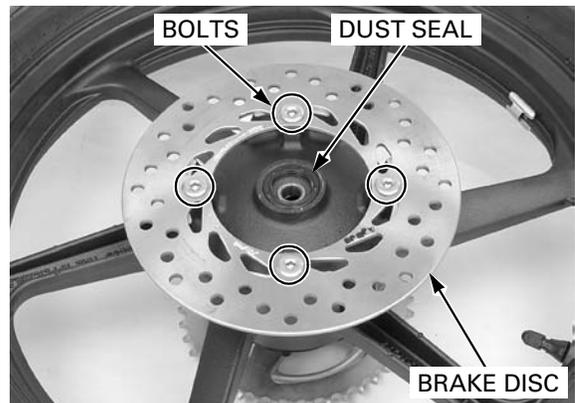
### DRIVEN SPROCKET

For driven sprocket inspection (page 3-17).

## DISASSEMBLY

Remove the dust seal from the right wheel hub.

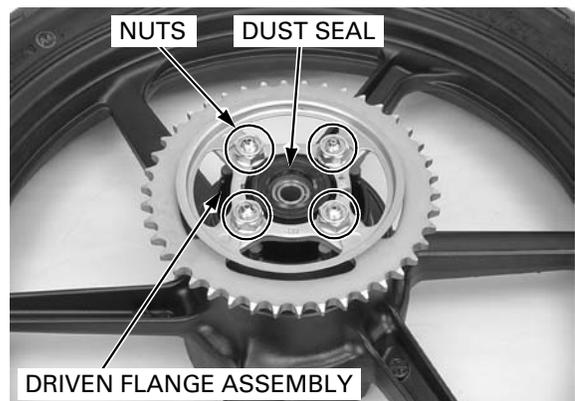
Loosen the brake disc mounting bolts in a crisscross pattern in 2 or 3 steps, and remove the bolts and brake disc.



Remove the dust seal from the driven flange.

Remove the driven flange assembly.

*If you will disassemble the driven flange, loosen the driven sprocket nuts in a crisscross pattern in 2 or 3 steps, before removing the driven flange from the left wheel hub.*

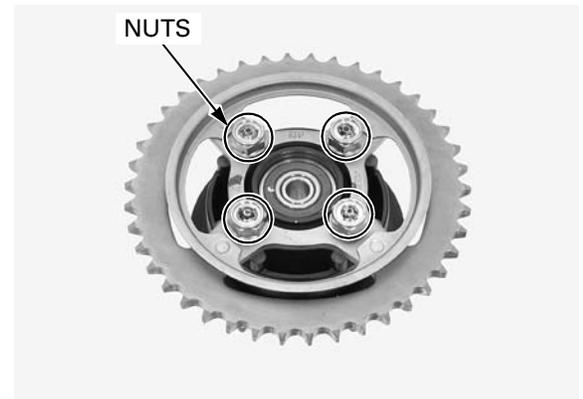


## REAR WHEEL/SUSPENSION

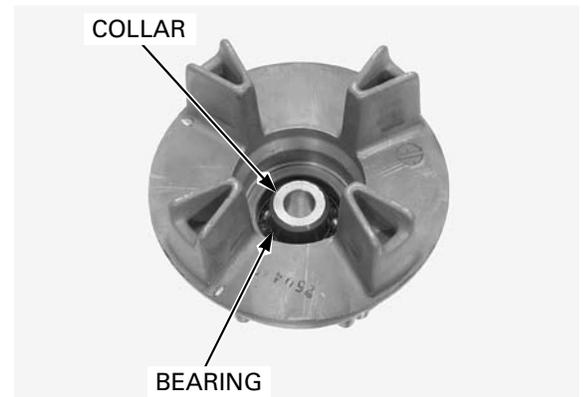
Remove the damper rubbers and O-ring.



Remove the driven sprocket nuts.



Remove the driven flange collar.  
Drive out the driven flange bearing.



Install the bearing remover head into the bearing.  
From the opposite side, install the bearing remover shaft and drive out the bearing from the wheel hub.  
Remove the distance collar and drive out the other bearing.

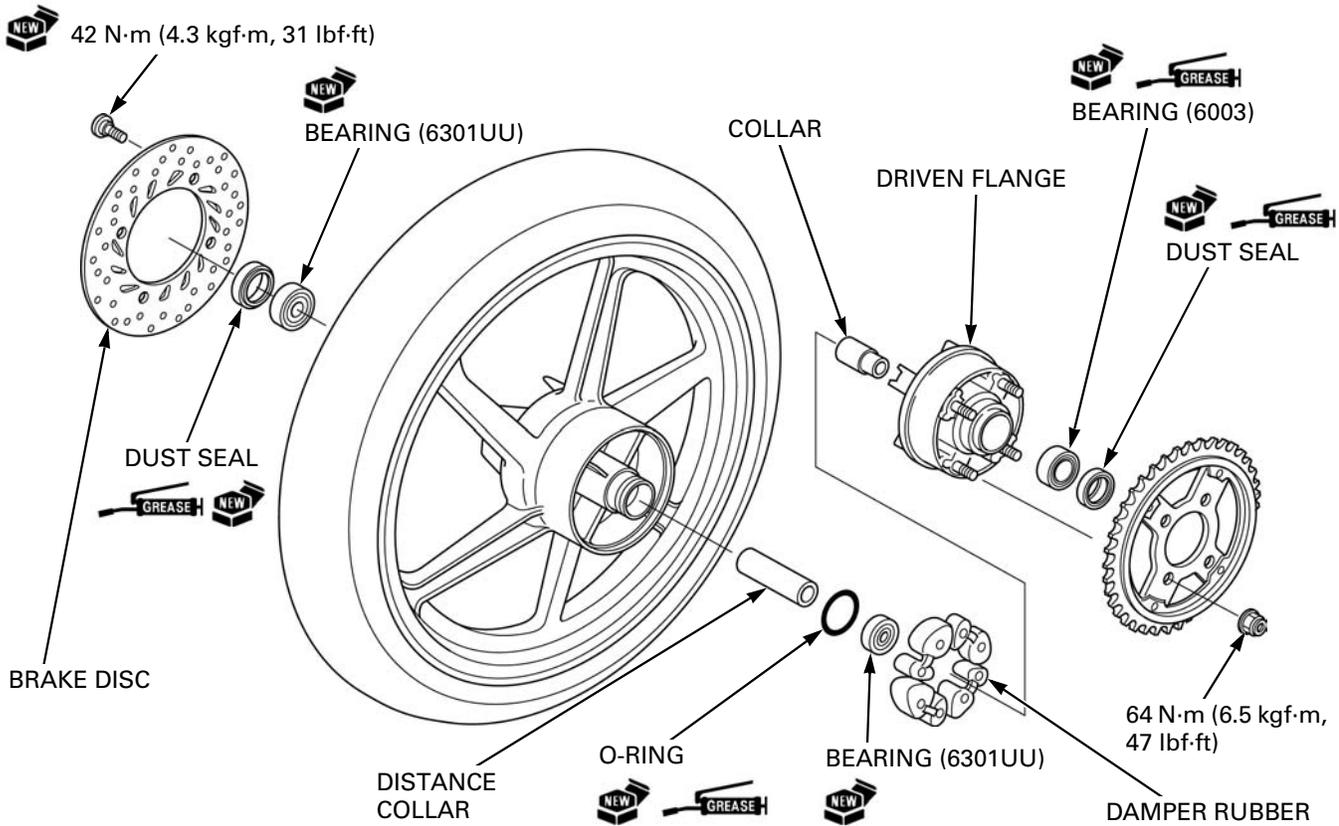
**TOOLS:**

**Bearing remover head, 12 mm** 07746-0050300  
**Bearing remover shaft** 07746-0050100



# REAR WHEEL/SUSPENSION

## ASSEMBLY



Never install the old bearing, once the bearing has been removed, the bearing must be replaced with new ones.

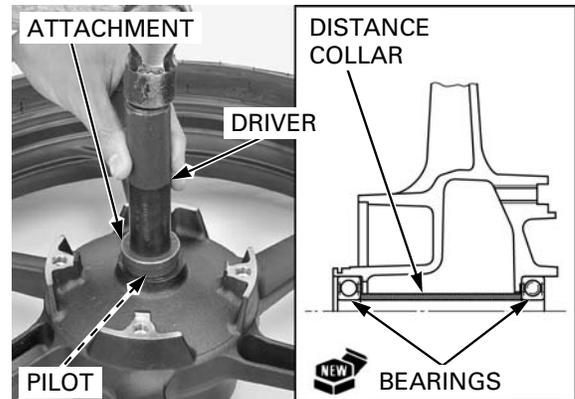
Drive in a new right side bearing squarely with its marked side facing up until it is fully seated.

Install the distance collar.

Drive in a new left side bearing squarely with its marked side facing up until it is seated on the distance collar.

**TOOLS:**

- Driver** 07749-0010000
- Attachment, 37 x 40 mm** 07746-0010200
- Pilot, 12 mm** 07746-0040200

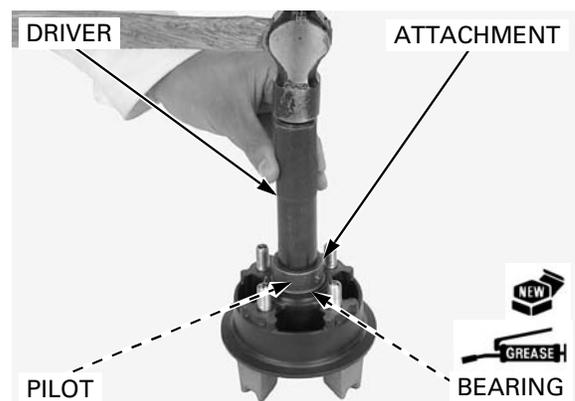


Apply grease to the driven flange bearing rotating area.

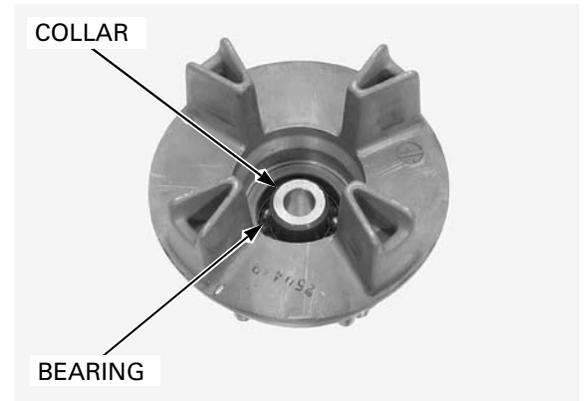
Drive in a new driven flange bearing squarely with its sealed side facing up until it is fully seated.

**TOOLS:**

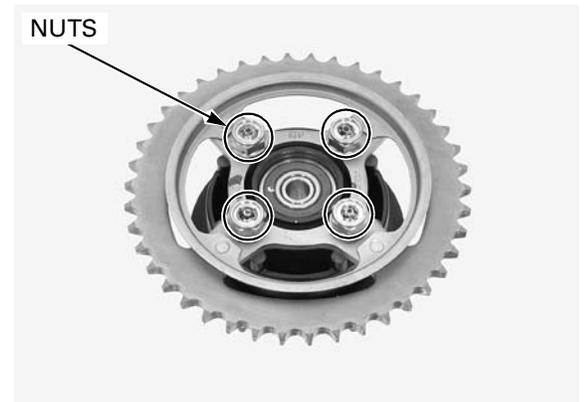
- Driver** 07749-0010000
- Attachment, 37 x 40 mm** 07746-0010200
- Pilot, 17 mm** 07746-0040400



Install the collar to the driven flange bearing.



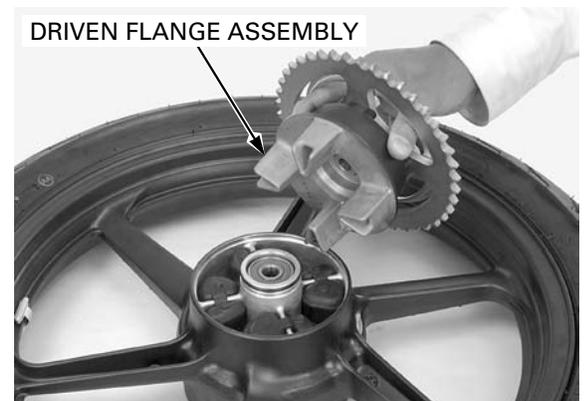
Install the driven sprocket to the driven flange. Loosely install the driven sprocket nuts.



Apply grease to a new O-ring. Install the O-ring and wheel damper rubbers into the left wheel hub.



Install the driven flange assembly into the left wheel hub.

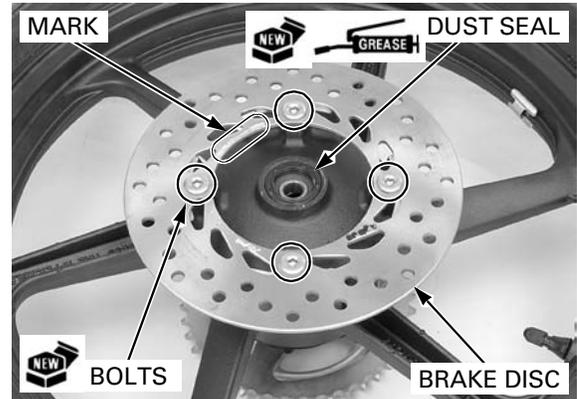
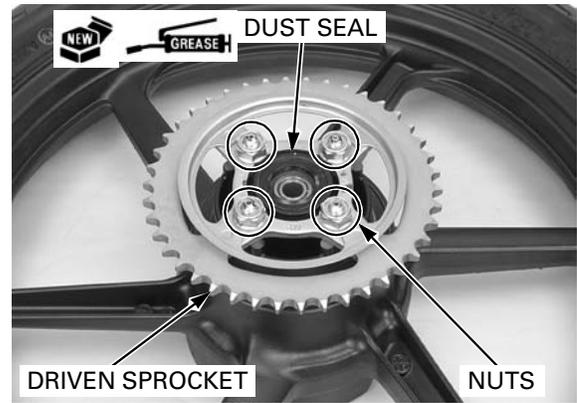


## REAR WHEEL/SUSPENSION

Tighten the nuts to the specified torque in a crisscross pattern in 2 or 3 steps.

**TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)**

Apply grease to a new dust seal lips.  
Install the dust seal to the driven flange.



*Do not get grease on the brake disc.*

Apply grease to a new dust seal lips.  
Install the dust seal to the right wheel hub.

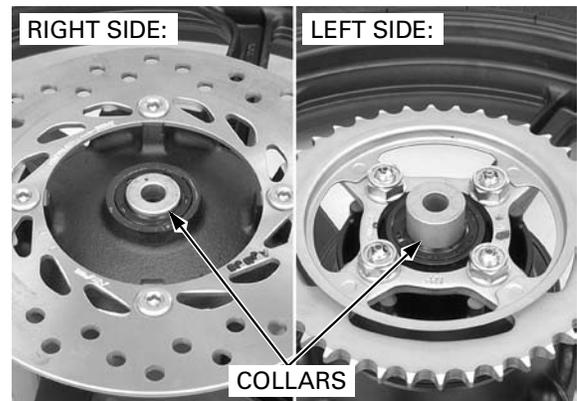
Install the brake disc with the stamped mark "MIN.TH. 3.5 mm" facing outside.

Install and tighten new brake disc bolts to the specified torque in a crisscross pattern in 2 or 3 steps.

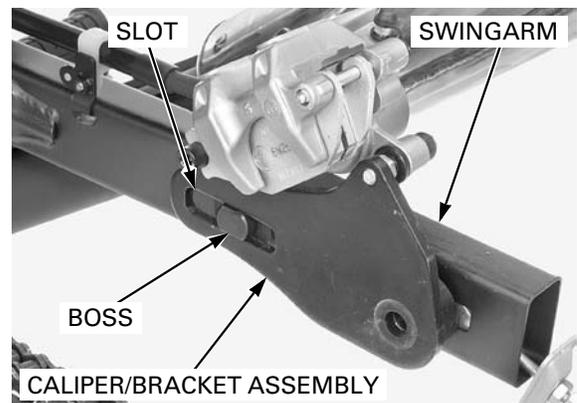
**TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)**

## INSTALLATION

Install the right side collar (short) and left side collar (long).



Check the slot of the brake caliper/bracket assembly is installed to the boss of the swingarm.



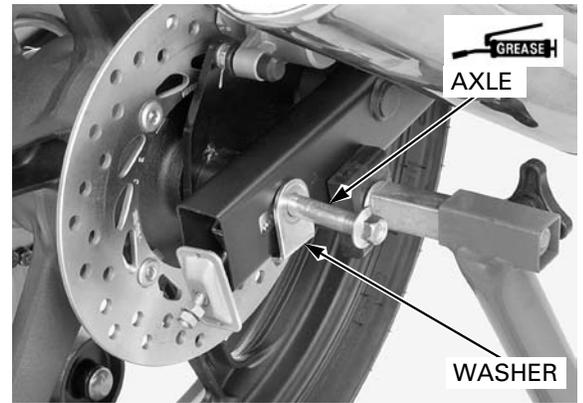
## REAR WHEEL/SUSPENSION

*Be careful not to damage the brake pads.*

Install the rear wheel in the swingarm aligning the brake disc between the brake pads.  
Install the drive chain over the driven sprocket.

Apply a thin coat of grease to the axle rolling surface.

Install the axle from the right side through the axle washer, swingarm, rear wheel and collar.



Install the axle washer.

Install and tighten the axle nut to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 44 lbf·ft)**

Adjust the drive chain slack (page 3-16).



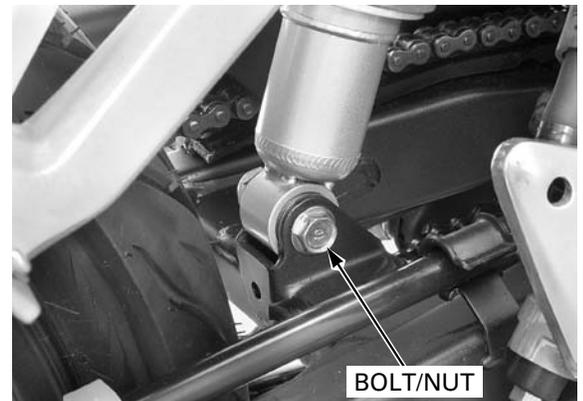
## SHOCK ABSORBER

### REMOVAL

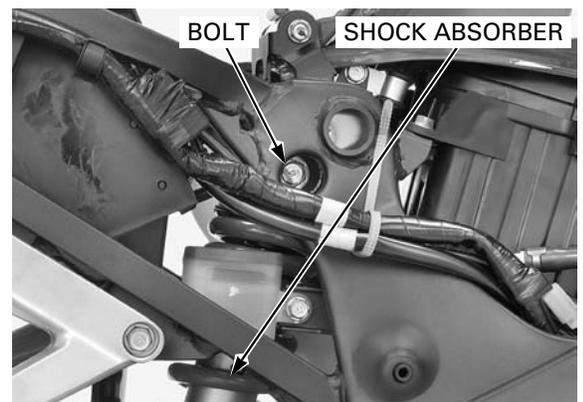
Support the motorcycle using a safety stand or hoist, raise the rear wheel off the ground.

Remove the rear cowl (page 2-5).

Remove the shock absorber lower mounting bolt and nut.



Remove the shock absorber upper mounting bolt and shock absorber.



## REAR WHEEL/SUSPENSION

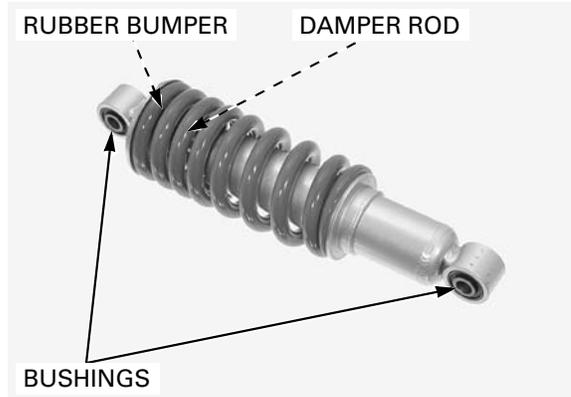
### INSPECTION

Visually inspect the shock absorber for wear or damage.

Check the following:

- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Bushings for wear or damage
- Rubber bumper for wear or damage

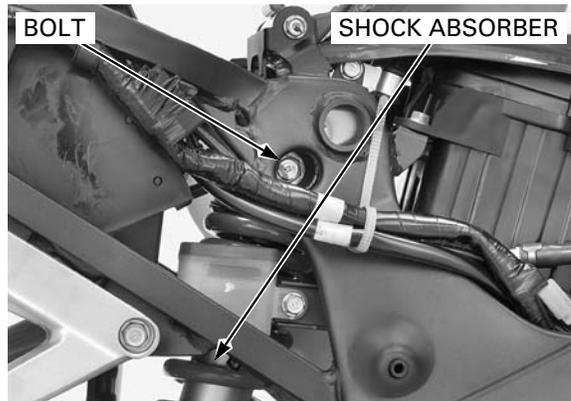
Replace the shock absorber as an assembly if necessary.



### INSTALLATION

Install the shock absorber and upper mounting bolt. Tighten the shock absorber upper mounting nut to the specified torque.

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



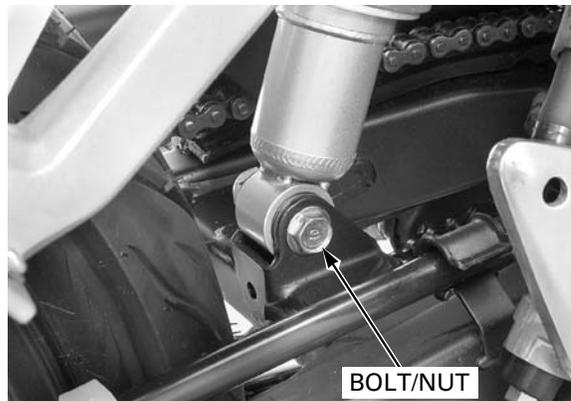
Install the shock absorber lower mounting bolt and nut.

Tighten the lower mounting nut to the specified torque.

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

Install the rear cowl (page 2-5).

Check the operation of the shock absorber (page 3-25).

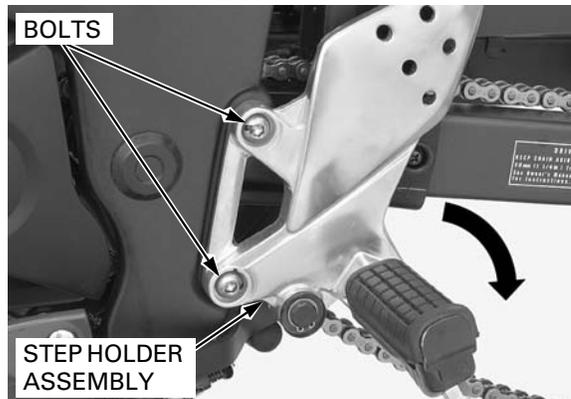


## SWINGARM

### REMOVAL

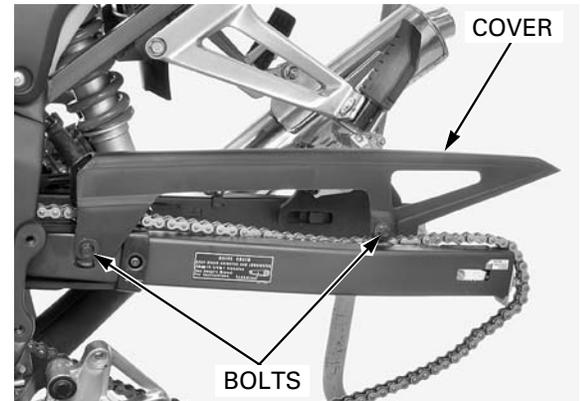
Remove the rear wheel (page 14-5).

Remove the left step holder mounting bolts and move the left step holder assembly downward.

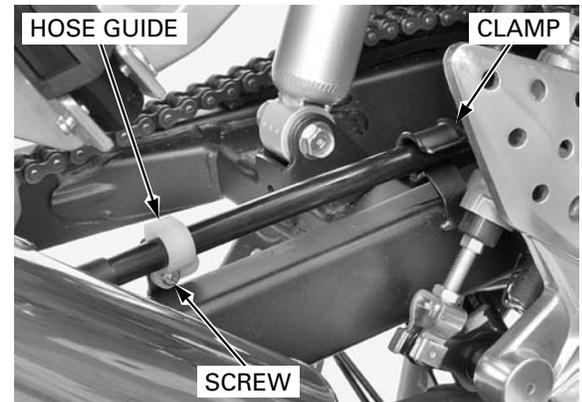


## REAR WHEEL/SUSPENSION

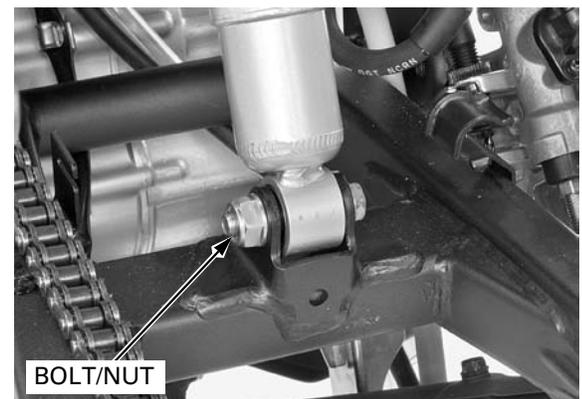
Remove the bolts and chain cover.



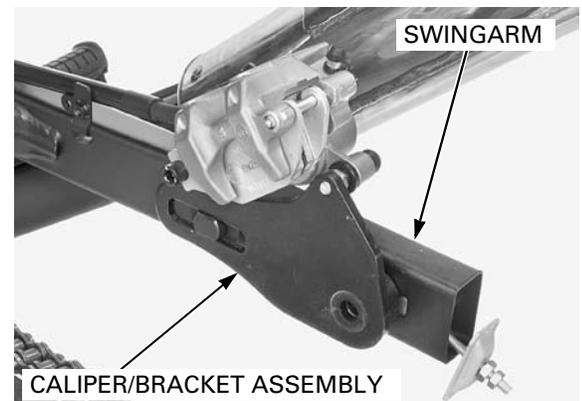
Remove the screw and brake hose guide.  
Release the brake hose from the clamp.



Remove the shock absorber lower mounting bolt and nut.

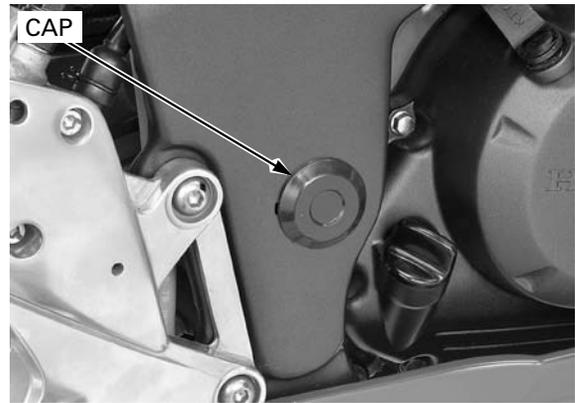


Remove the rear brake caliper/bracket assembly from the swingarm.

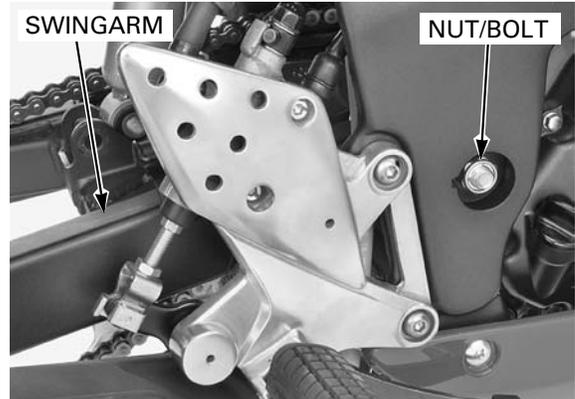


## REAR WHEEL/SUSPENSION

Remove both swingarm pivot caps.

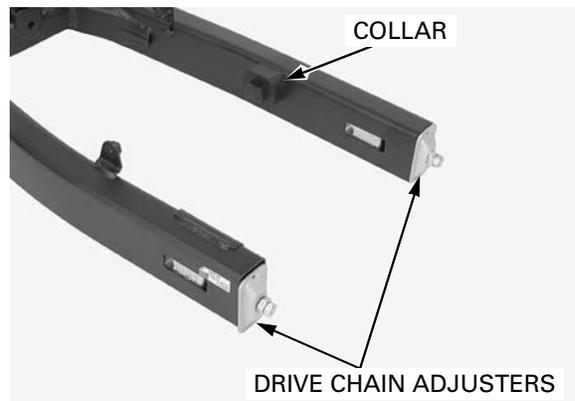


Remove the swingarm pivot nut, pivot bolt and swingarm.



### DISASSEMBLY

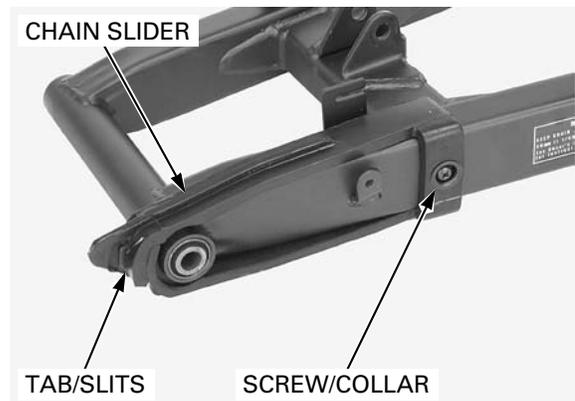
Remove the drive chain adjusters and rubber collar.



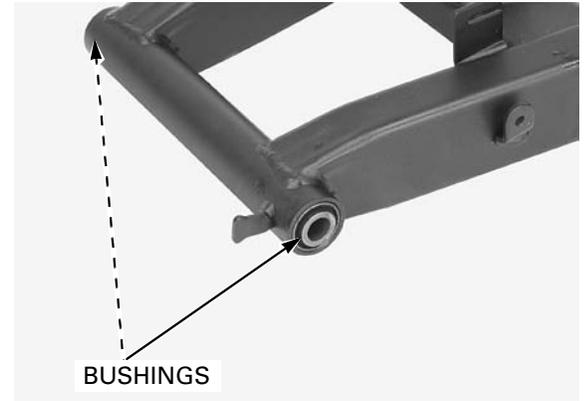
Remove the screw and collar.

Remove the drive chain slider by releasing the slider slits from the swingarm tab.

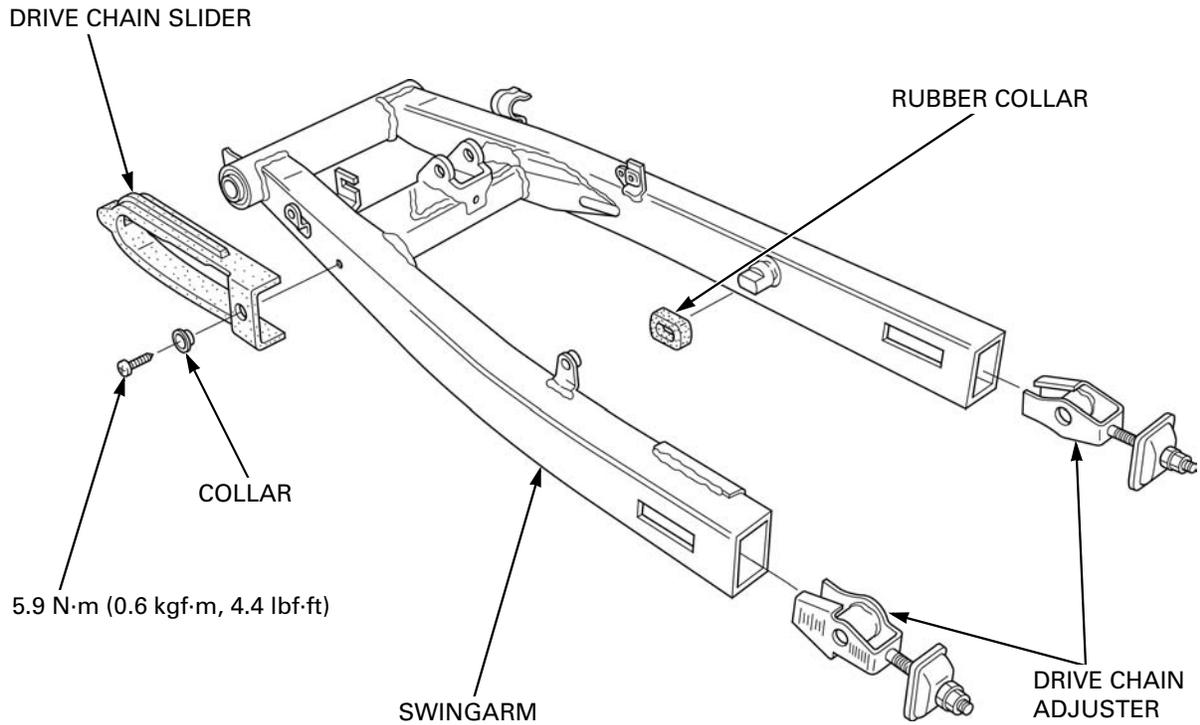
Check the drive chain slider for wear or damage.



Check the rubber bushings for wear, damage or fatigue and replace if necessary.



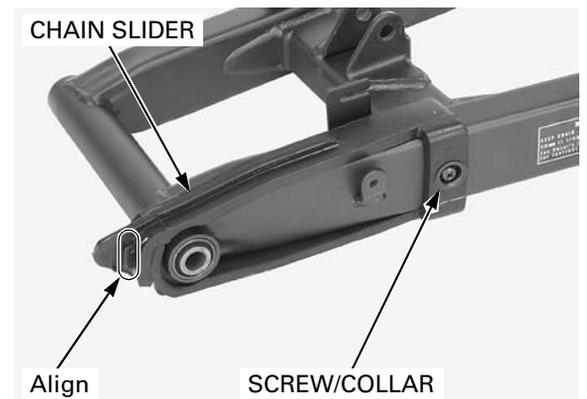
## ASSEMBLY



Install the drive chain slider while aligning the swingarm tabs with the slider slits.

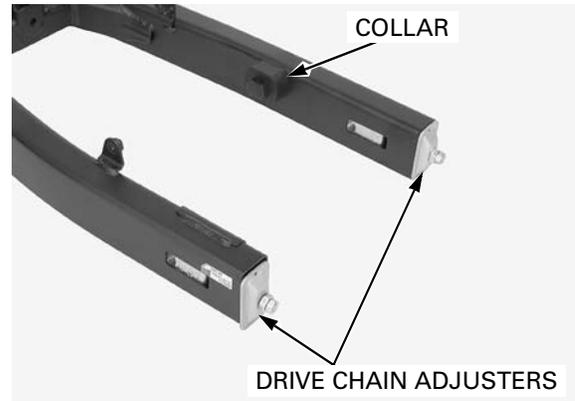
Install the collar and drive chain slider screw, then tighten the screw to the specified torque.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)**



## REAR WHEEL/SUSPENSION

Install the drive chain adjusters and rubber collar.

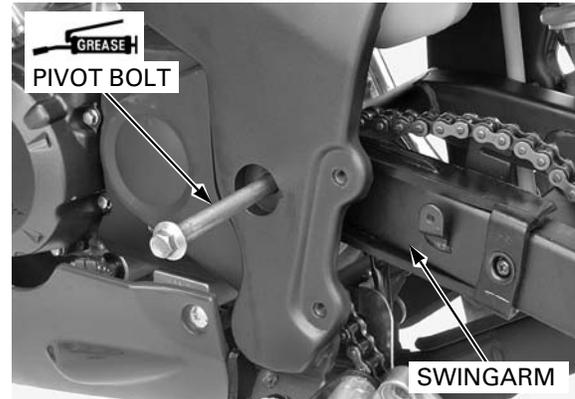


### INSTALLATION

Apply a thin coat of grease to the swingarm pivot bolt sliding surface.

Set the drive chain onto the swingarm and install the swingarm to the frame.

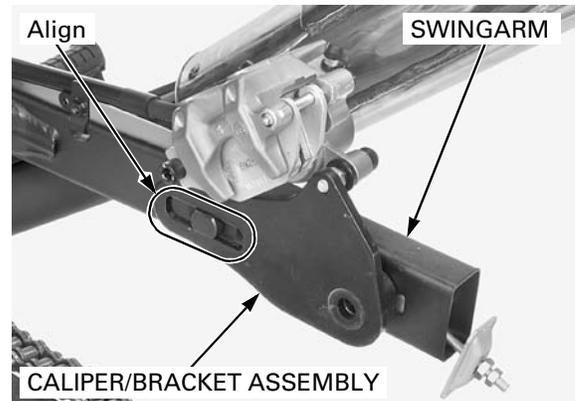
Install the swingarm pivot bolt from the left side.



Install the swingarm pivot nut and loosely tighten it.



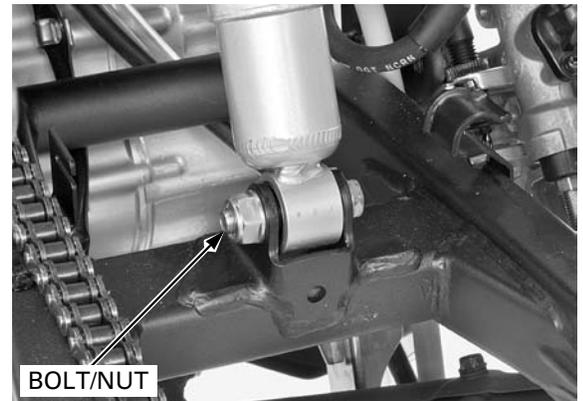
Install the brake caliper/bracket assembly to the swingarm by aligning the slot of the bracket and boss of the swingarm.



Install the shock absorber lower mounting bolt and nut.

Tighten the lower mounting nut to the specified torque.

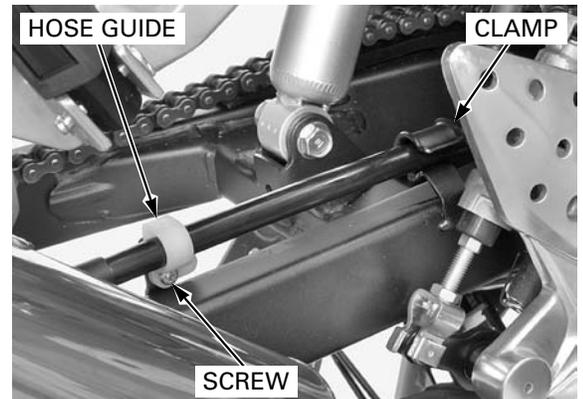
**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**



Install the brake hose to the clamp.

Install the brake hose guide and brake hose guide screw, tighten the screw to the specified torque.

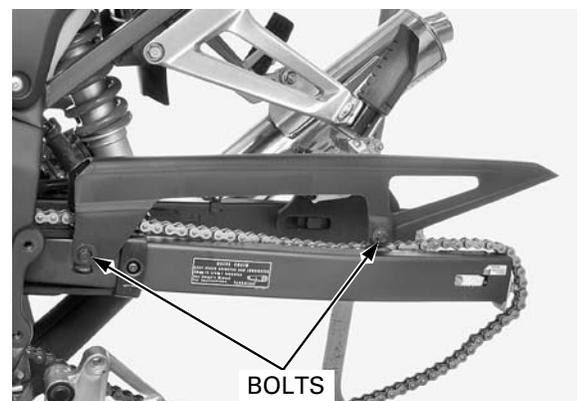
**TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**



Install the chain cover to the swingarm with aligning the boss of the chain cover with the groove on the swingarm.



Install and tighten the bolts.



## REAR WHEEL/SUSPENSION

Reposition the left step holder assembly and install the left step holder mounting bolts.

Tighten the mounting bolts to the specified torque.

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



Install the rear wheel (page 14-10).

Lift down the motorcycle from the safety stand or hoist, and support the motorcycle by your hands as be preload to the shock absorber and rubber bushings.

Tighten the swingarm pivot nut to the specified torque.

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



Install both swingarm pivot caps.

Adjust the drive chain slack (page 3-16).

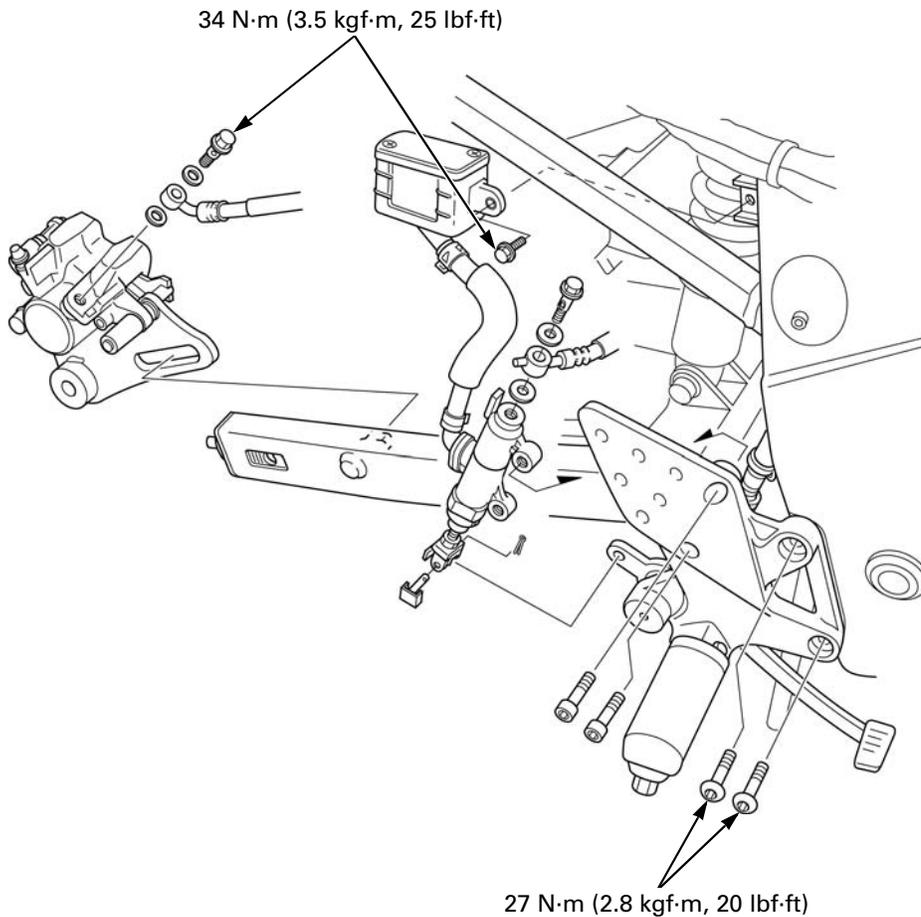
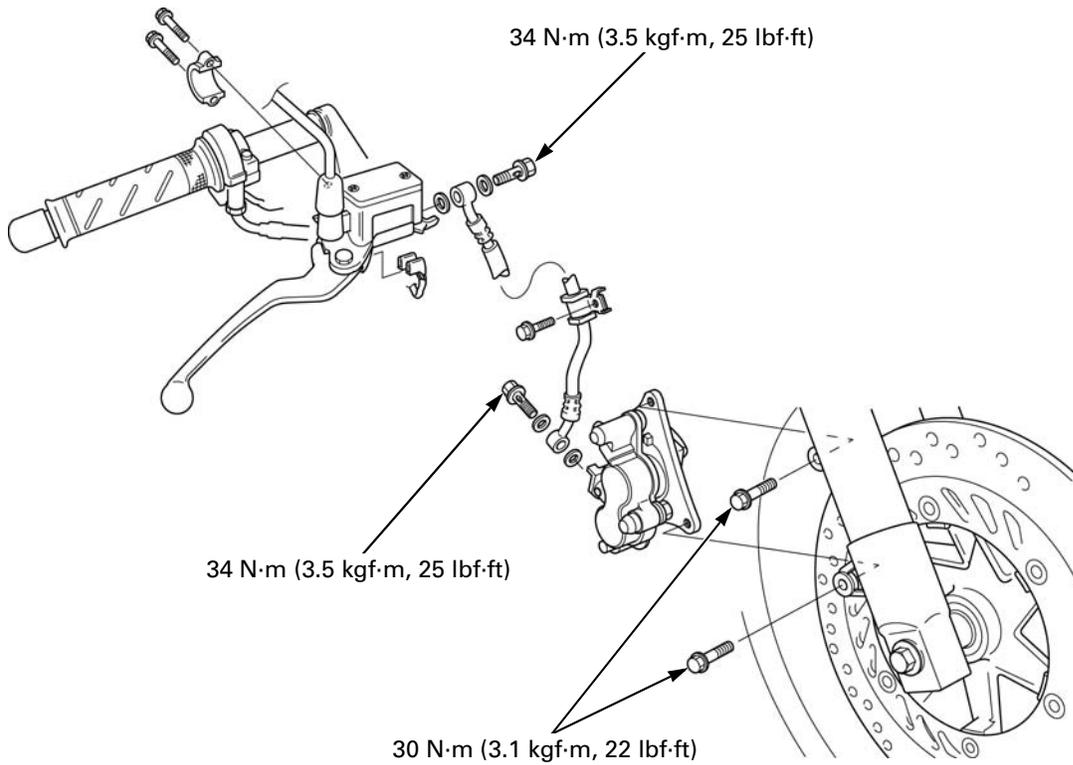


# 15. HYDRAULIC BRAKE

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COMPONENT LOCATION .....	15-2	FRONT MASTER CYLINDER.....	15-11
SERVICE INFORMATION .....	15-3	REAR MASTER CYLINDER .....	15-15
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COMPONENT LOCATION



# 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

Spilling brake fluid will severely damage instrument lenses and painted surface. 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.
- Check the brake system by applying the brake lever or pedal after the air bleeding.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 3 or DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid, they may not be compatible.
- Always check brake operation before riding the motorcycle.

## SPECIFICATIONS

Unit: mm (in)

	ITEM	STANDARD	SERVICE LIMIT
Front	Specified 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.	11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Master piston O.D.	10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
	Caliper cylinder I.D.	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
	Caliper piston O.D.	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
Rear	Specified 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.	32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.	31.948 – 31.998 (1.2578 – 1.2598)	31.940 (1.2575)
	Brake pedal height	84 – 86 (3.3 – 3.4)	–

## TORQUE VALUES

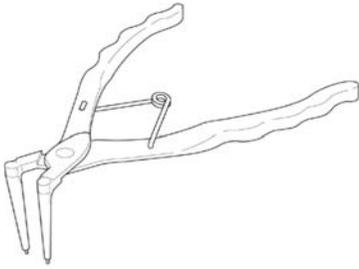
Brake caliper bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)	
Reservoir cover screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC: replace with a new one.
Front brake light switch screw	1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake pad hanger pin	17 N·m (1.7 kgf·m, 13 lbf·ft)	
Rear master cylinder push rod lock nut	17 N·m (1.7 kgf·m, 13 lbf·ft)	
Rear master cylinder hose joint screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)	Apply locking agent to the threads.
Step holder mounting bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Step bar mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Brake caliper pin bolt	17 N·m (1.7 kgf·m, 13 lbf·ft)	
Brake caliper torque nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads.

## HYDRAULIC BRAKE

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### TOOL

Snap ring pliers  
07914-SA50001



### TROUBLESHOOTING

#### Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

#### Brake lever/pedal hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

#### Brake drags

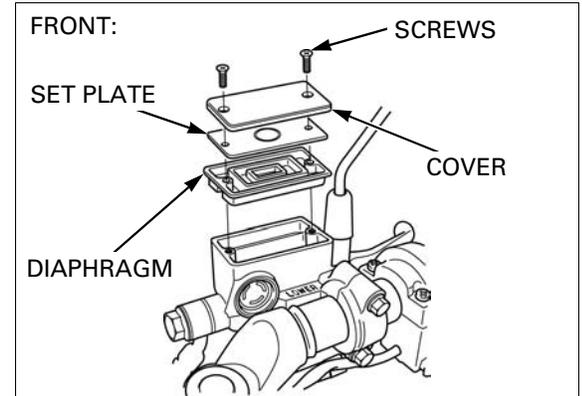
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port
- Sticking master cylinder piston

# BRAKE FLUID REPLACEMENT/AIR BLEEDING

## BRAKE FLUID DRAINING

*FRONT BRAKE:* Turn the handlebar until the reservoir is parallel to the ground.

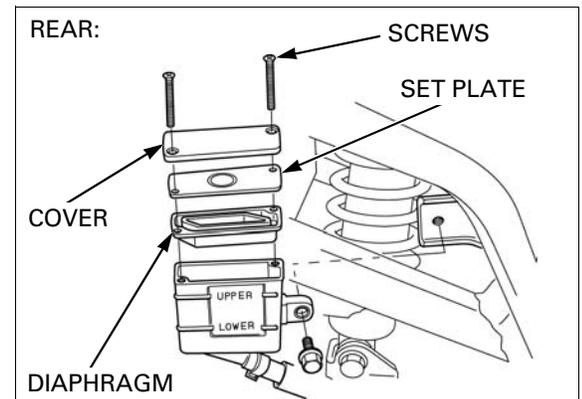
Remove the reservoir cover screws, reservoir cover, set plate and diaphragm.



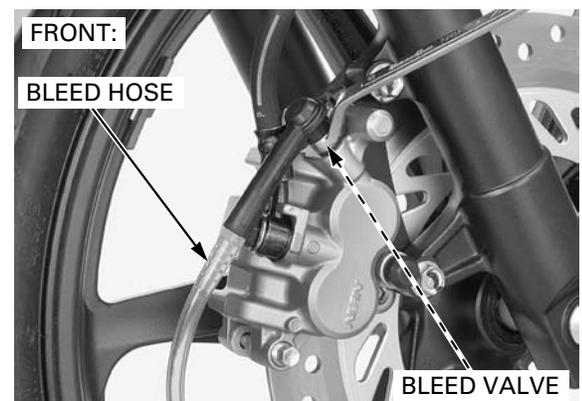
*REAR BRAKE:* Support the motorcycle in an upright position.  
Remove the bolt and reservoir.



Remove the reservoir cover screws, reservoir cover, set plate and diaphragm.



Connect a bleed hose to the caliper bleed valve.  
Loosen the bleed valve and pump the brake lever/pedal until no more fluid flows out of the bleed valve.



## HYDRAULIC BRAKE

### BRAKE FLUID FILLING/AIR BLEEDING

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

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

Connect an automatic refill system to the reservoir.

If an automatic refill system is not used, add fluid when the fluid level in the reservoir is low.

**NOTE:**

Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.

**NOTE:**

When using a brake bleeding tool, follow the manufacturer's operating instructions.

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve.

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

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

After bleeding the system completely, tighten the brake caliper bleed valve to the specified torque.

**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

If the brake bleeder is not available, perform the following procedure.

Pump up the system pressure with the brake lever/pedal until the lever/pedal resistance is felt.

Connect a bleed hose to the bleed valve.

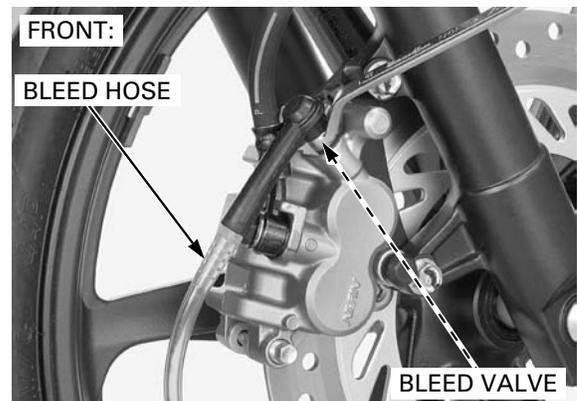
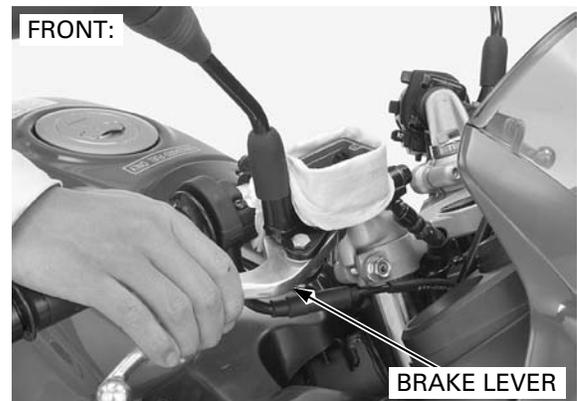
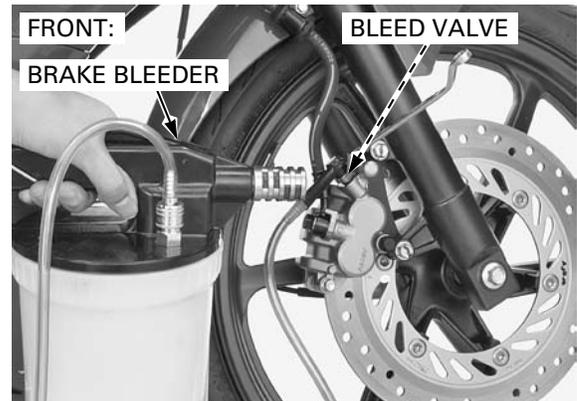
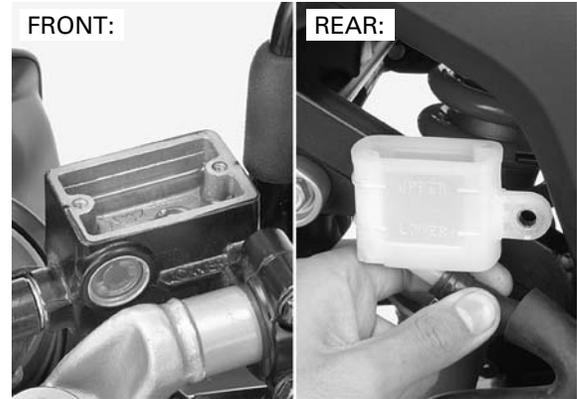
1. Squeeze the brake lever/pedal all the way and loosen the bleed valve 1/2 turn. Wait several seconds and then close the bleed valve.

**NOTE:**

- Do not release the brake lever/pedal until the bleed valve has been closed.
2. Release the brake lever/pedal slowly and wait several seconds after it reaches the end of its travel.
  3. Repeat the steps 1 and 2 until there are no air bubbles in the bleed hose.

After bleeding the system completely, tighten the brake caliper bleed valve to the specified torque.

**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

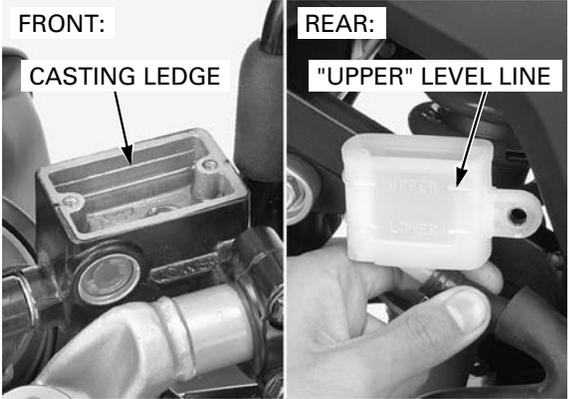


*If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.*

# HYDRAULIC BRAKE

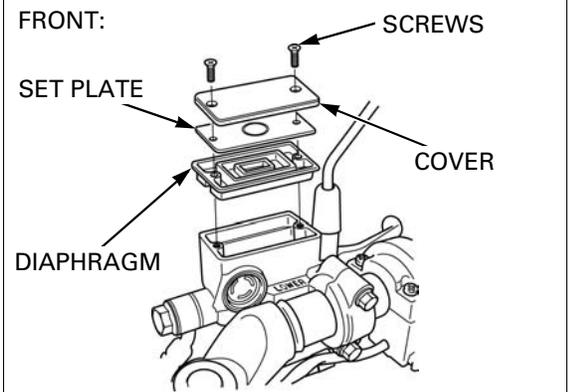
Do not mix different types of fluid. They are not compatible.

Add the reservoir with DOT 3 or DOT 4 brake fluid to the casting ledge/upper level line.



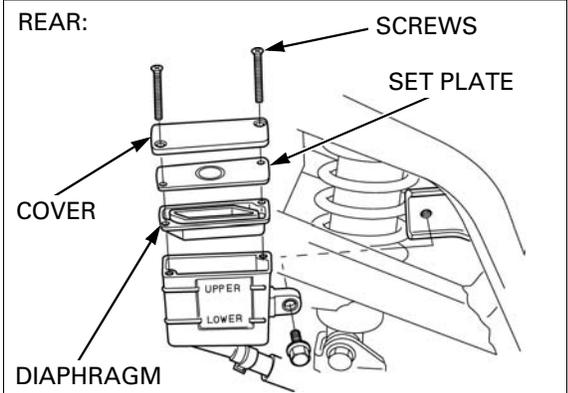
**FRONT BRAKE:** Install the diaphragm, set plate, reservoir cover and reservoir cover screws, then tighten the screws to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**

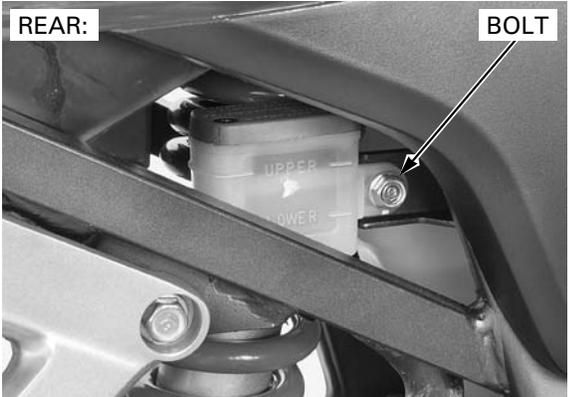


**REAR BRAKE:** Install the diaphragm, set plate, reservoir cover and reservoir cover screws, then tighten the screws to the specified torque.

**TORQUE: 1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)**



Install the reservoir and bolt.



## HYDRAULIC BRAKE

### BRAKE PAD/DISC

#### FRONT BRAKE PAD REPLACEMENT

*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.

*Do not operate the brake lever after removing the brake pads.*

Remove the brake pad hanger pin and brake pads.

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

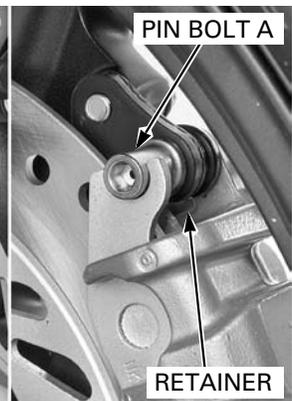
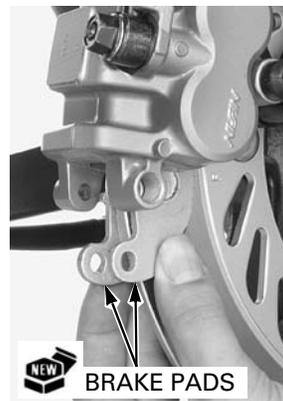
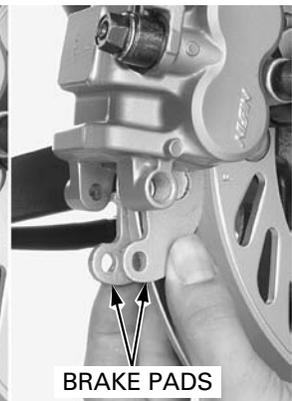
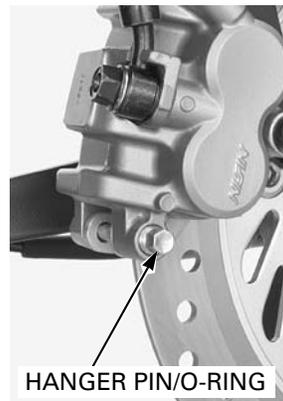
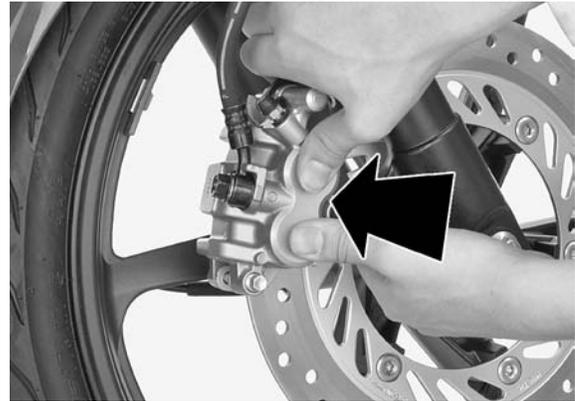
Install new brake pads to the brake caliper so their ends seat against the retainer and brake caliper pin bolt A.

**NOTE:**

Make sure that the retainer is installed to the brake caliper.

Apply silicone grease to the brake pad hanger pin O-ring and install it to the hanger pin groove.

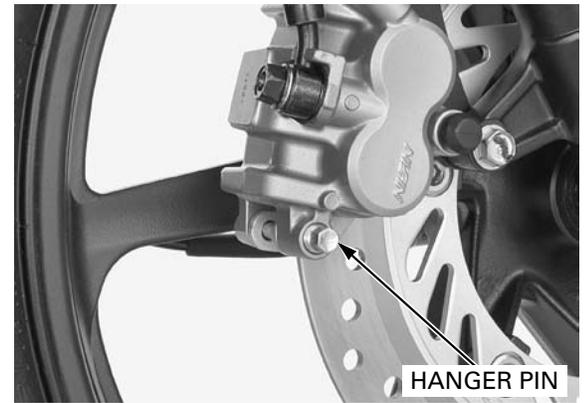
Install the brake pad hanger pin by pushing the pads against the pad spring to align the hanger pin holes in the pads and brake caliper.



Tighten the brake pad hanger pin to the specified torque.

**TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)**

Operate the brake lever to seat the caliper pistons against the pads.



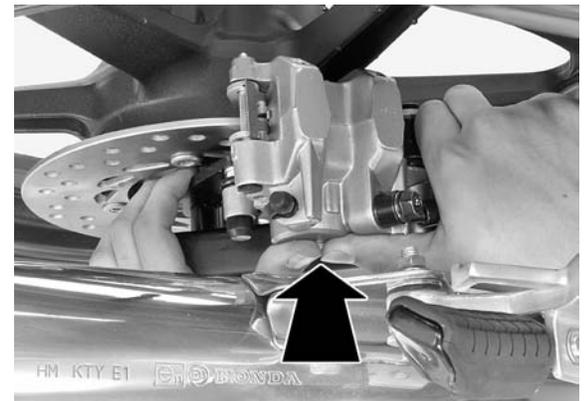
**REAR BRAKE PAD REPLACEMENT**

*Always replace the brake pads in pairs to assure even disc pressure.*

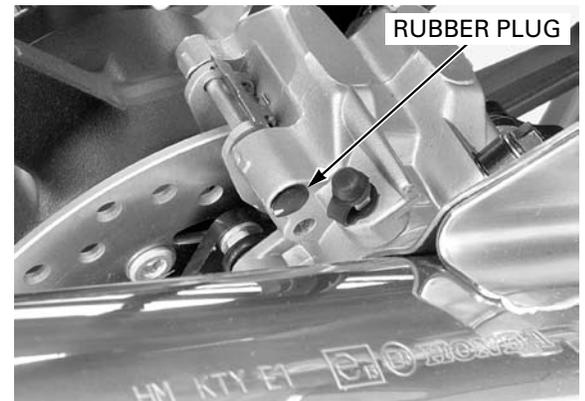
Push the caliper pistons all the way in to allow installation of new brake pads.

**NOTE:**

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

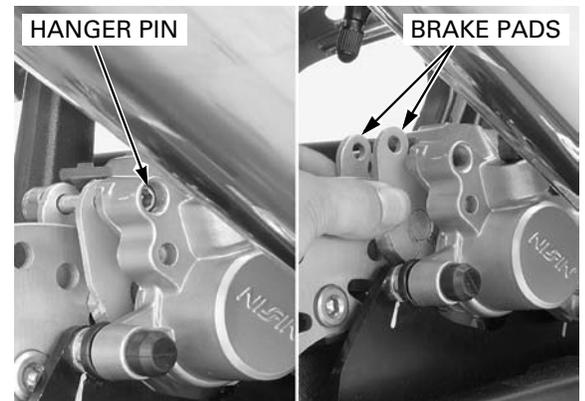


Remove the rubber plug.



*Do not operate the brake pedal after removing the brake pads.*

Remove the brake pad hanger pin and brake pads. Check that the O-ring is in good condition, replace it if necessary.

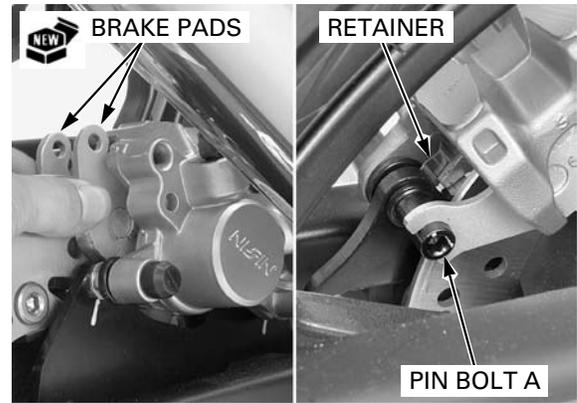


## HYDRAULIC BRAKE

Install new brake pads to the brake caliper so their ends seat against the retainer and brake caliper pin bolt A.

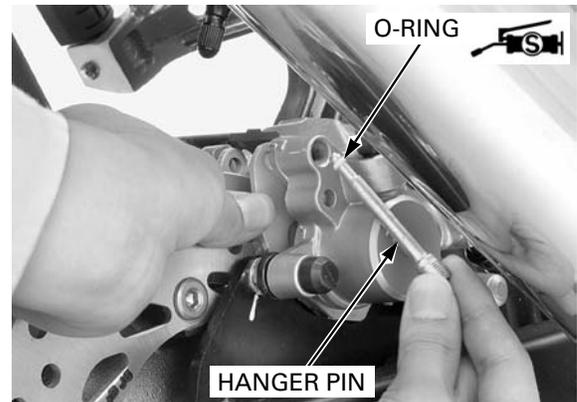
**NOTE:**

Make sure that the retainer is installed to the brake caliper.



Apply silicone grease to the brake pad hanger pin O-ring and install it to the pad pin groove.

Install the brake pad hanger pin by pushing the pads against the pad spring to align the hanger pin holes in the pads and brake caliper.

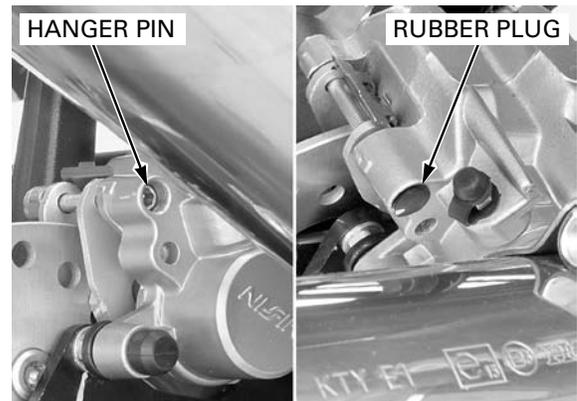


Tighten the brake pad hanger pin to the specified torque.

**TORQUE: 17 N·m (1.7 kgf·m, 13 lbf·ft)**

Install the rubber plug.

Operate the brake pedal to seat the caliper pistons against the pads.



## BRAKE DISC INSPECTION

Visually inspect the brake discs for damage or crack.

Measure the brake disc thickness using a micrometer.

**SERVICE LIMITS:**

**FRONT: 3.5 mm (0.14 in)**

**REAR: 3.5 mm (0.14 in)**

Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake discs warpage using a dial indicator.

**SERVICE LIMITS:**

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

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

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



**FRONT MASTER CYLINDER**

**REMOVAL**

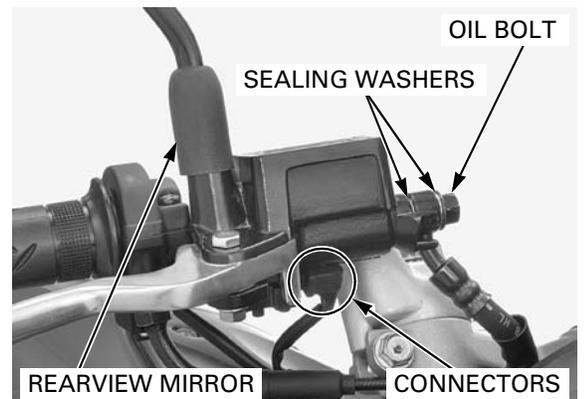
Drain the brake fluid from the hydraulic system (page 15-5).

Remove the right rearview mirror.

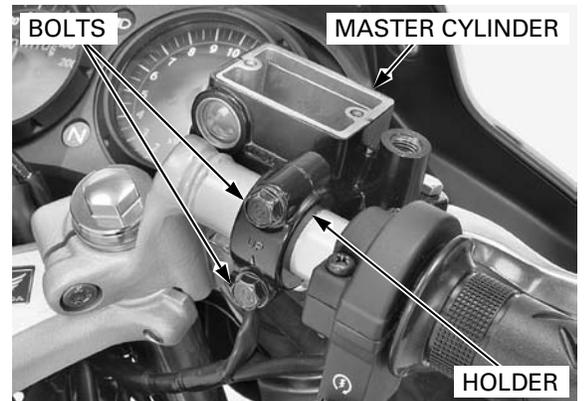
*When removing the oil bolt, cover the end of the brake hose to prevent contamination.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

Disconnect the brake light switch connectors.

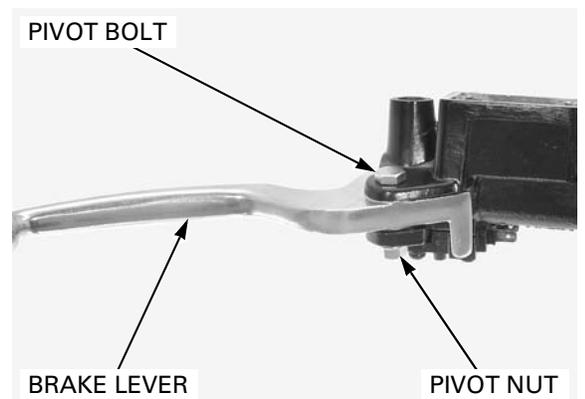


Remove the bolts, holder and master cylinder.



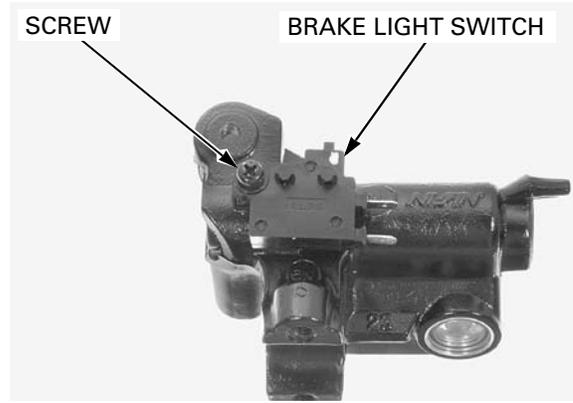
**DISASSEMBLY**

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



# HYDRAULIC BRAKE

Remove the screw and brake light switch.



*Be careful not to damage the boot.*

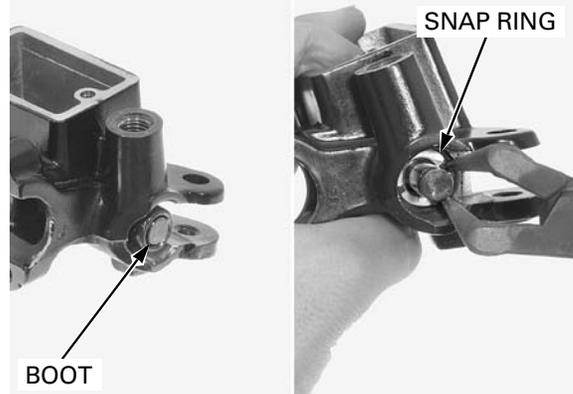
Remove the boot.

Remove the snap ring using a special tool.

**TOOL:**

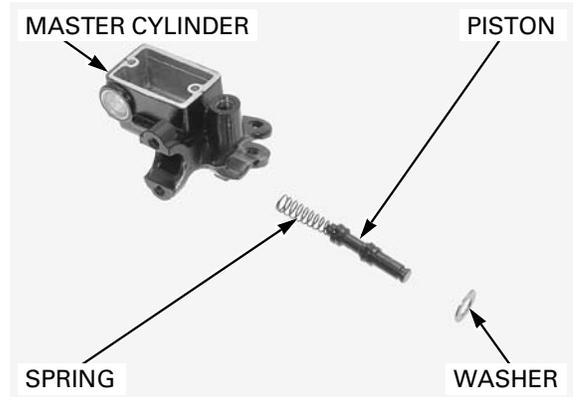
**Snap ring pliers**

**07914-SA50001**



Remove the washer, master piston/spring and separate them.

Clean the inside of the master cylinder, reservoir and master piston with brake fluid.

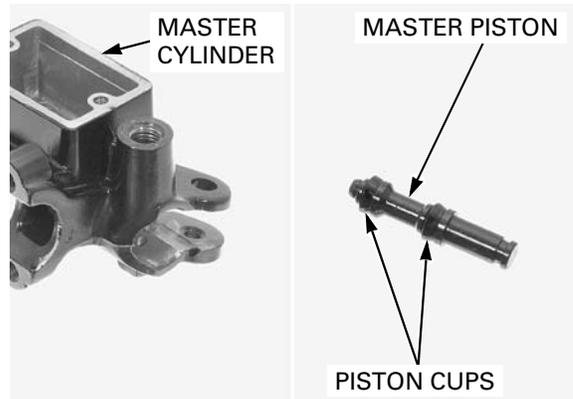


## INSPECTION

Check the master cylinder for scoring, scratches or damage.

Check the master piston for scoring, scratches or damage.

Check the piston cups for wear, deterioration or damage.

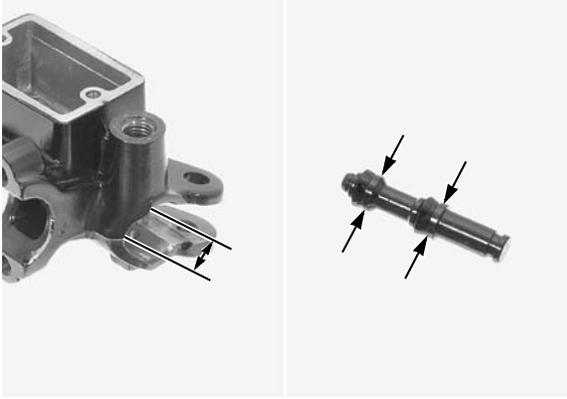


Measure the master cylinder I.D.

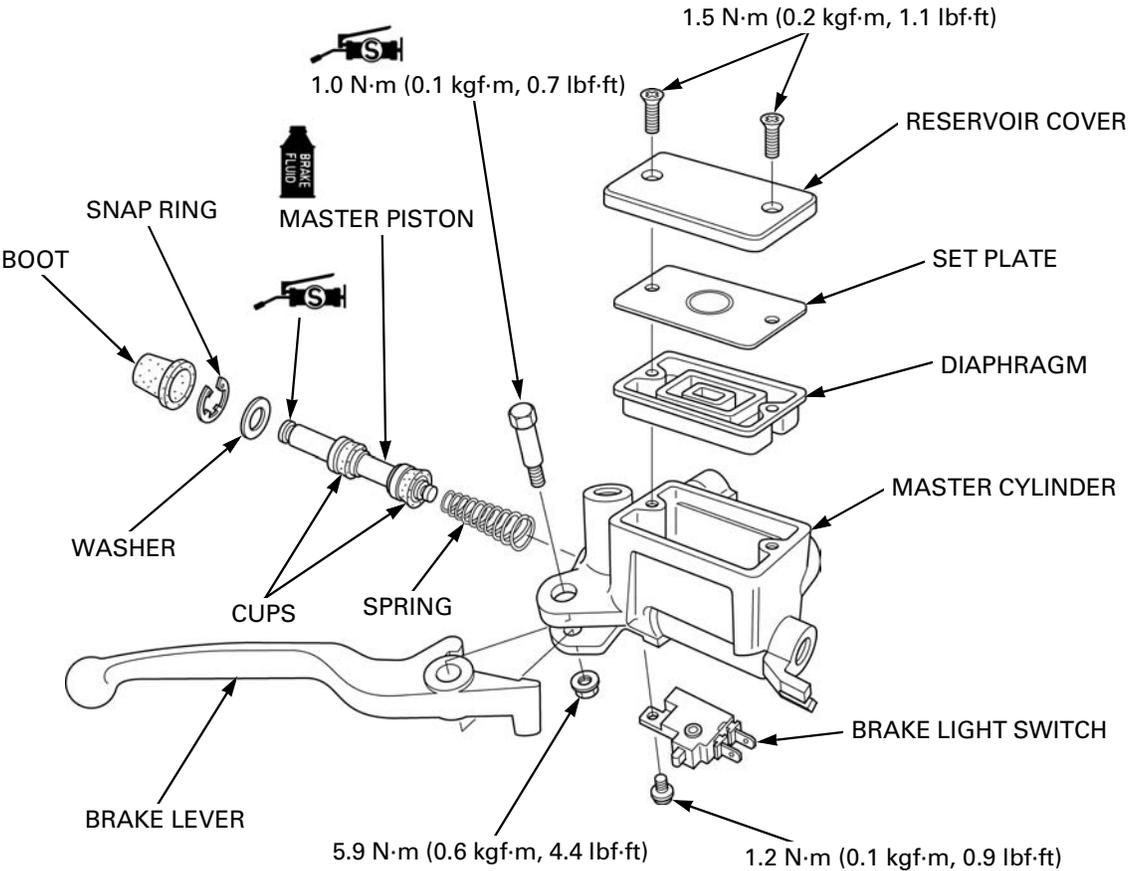
**SERVICE LIMIT: 11.055 mm (0.4352 in)**

Measure the master piston O.D.

**SERVICE LIMIT: 10.945 mm (0.4309 in)**



**ASSEMBLY**



**NOTE:**

Replace the piston, cups and washer as a set.

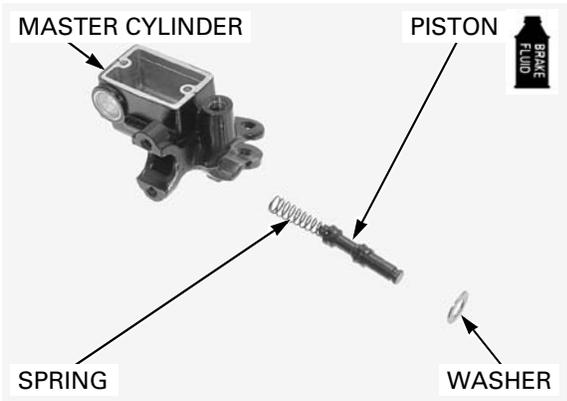
Apply brake fluid to the master piston sliding area.

Install the spring onto the piston end.

Install the master piston/spring into the master cylinder.

Install the washer.

*Do not allow the piston cup lips to turn inside out.*



## HYDRAULIC BRAKE

*Make sure the snap ring is firmly seated in the groove.*

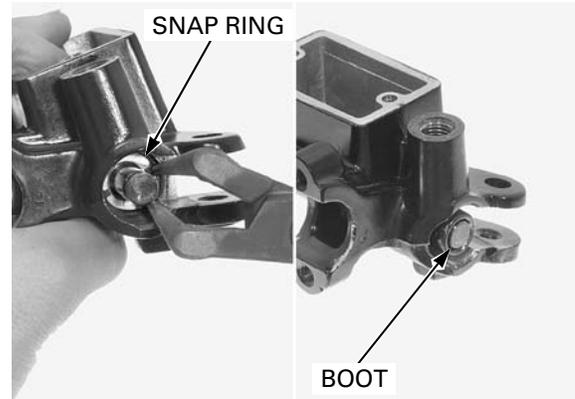
Install the snap ring into the groove of the master cylinder using a special tool.

**TOOL:**

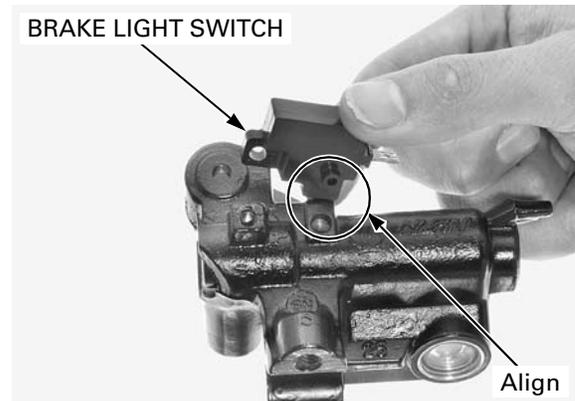
**Snap ring pliers**

**07914-SA50001**

Install the boot securely.

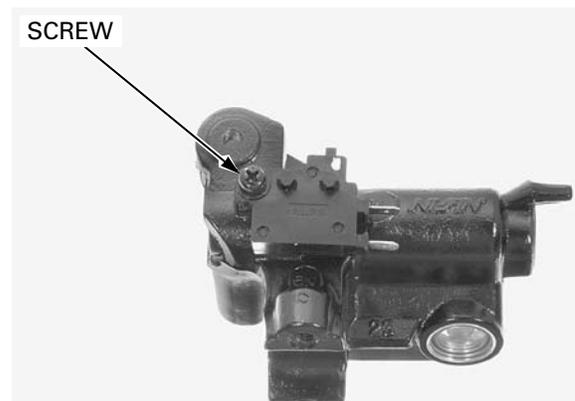


Install the brake light switch to the master cylinder while aligning the brake light switch boss and master cylinder hole.



Install and tighten the brake light switch screw to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**



Apply silicone grease to the brake lever contacting area of the master piston and brake lever pivot bolt sliding surface (page 1-17).

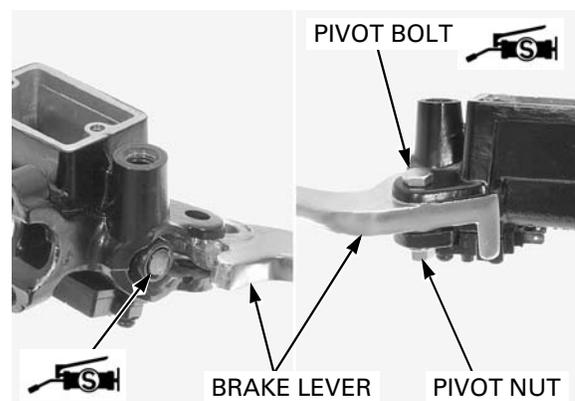
Install the brake lever to the master cylinder.

Install and tighten the brake lever pivot bolt to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Install and tighten the brake lever pivot nut to the specified torque while holding the brake lever pivot bolt.

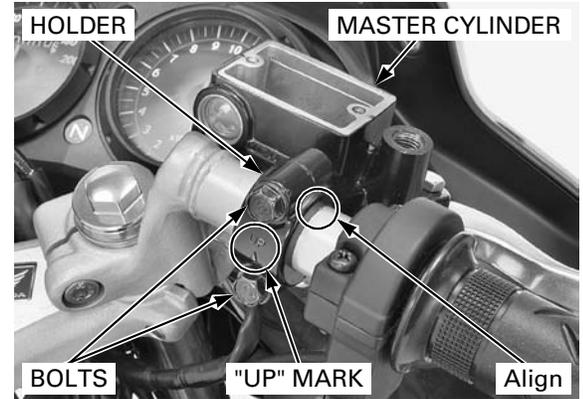
**TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)**



**INSTALLATION**

Install the master cylinder, holder ("UP" mark facing up) and bolts.

Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then the lower bolt.



Connect the brake light switch connectors.

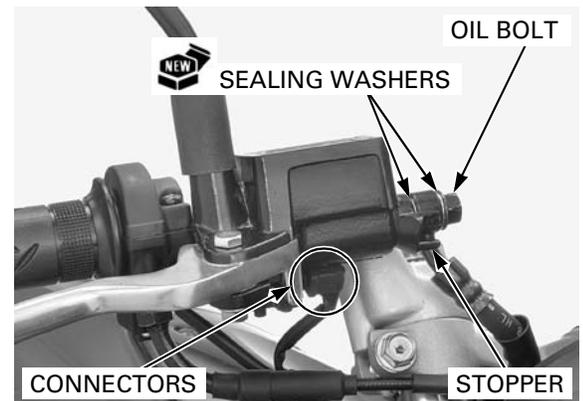
Install the brake hose eyelet with the brake hose oil bolt and new sealing washers.

Push the brake hose eyelet joint against the stopper, then tighten the brake hose oil bolt to the specified torque.

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

Install the right rearview mirror.

Fill the reservoir to the upper level and bleed the front brake system (page 15-6).



**REAR MASTER CYLINDER**

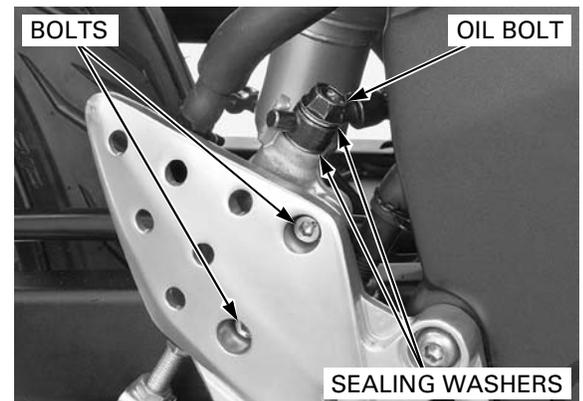
**REMOVAL**

Drain the brake fluid from the hydraulic system (page 15-5).

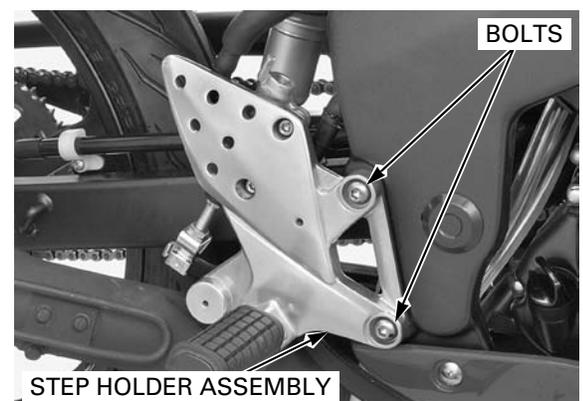
*When removing the oil bolt, cover the end of the brake hose to prevent contamination.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

Loosen the master cylinder mounting bolts.

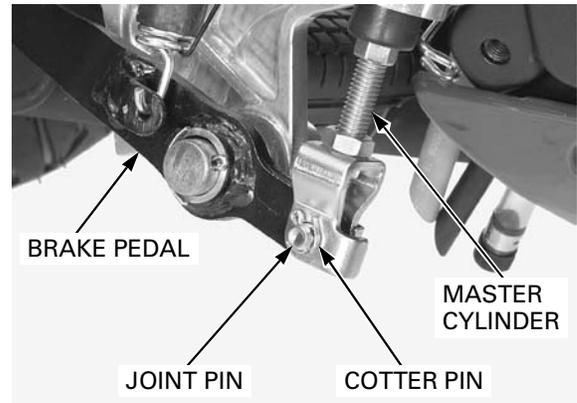


Remove the step holder mounting bolts and right step holder assembly.

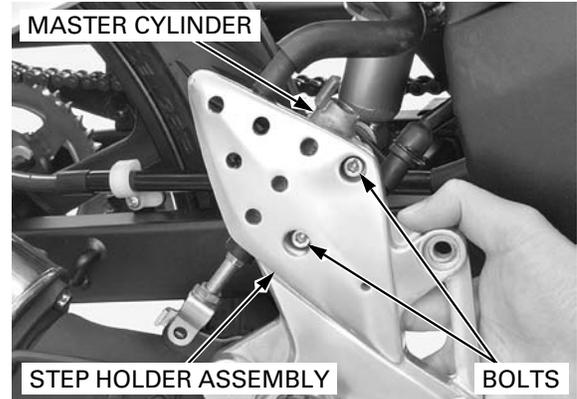


## HYDRAULIC BRAKE

Remove the cotter pin, joint pin and master cylinder from the brake pedal.

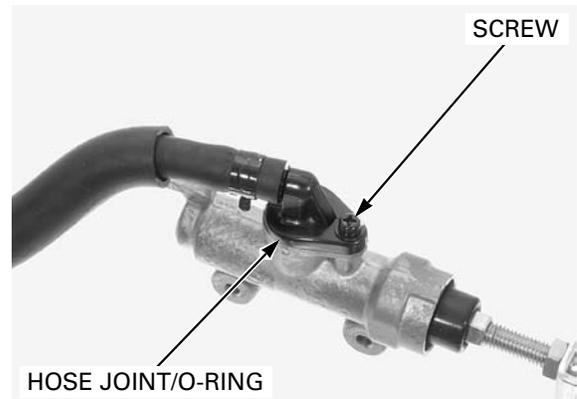


Remove the master cylinder mounting bolts and master cylinder from the right step holder assembly.



### DISASSEMBLY

Remove the hose joint screw, O-ring and reservoir hose joint.



*Be careful not to damage the boot.*

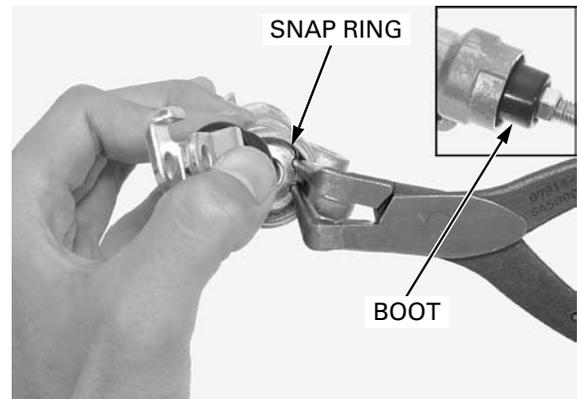
Remove the boot.

Remove the snap ring using a special tool.

**TOOL:**

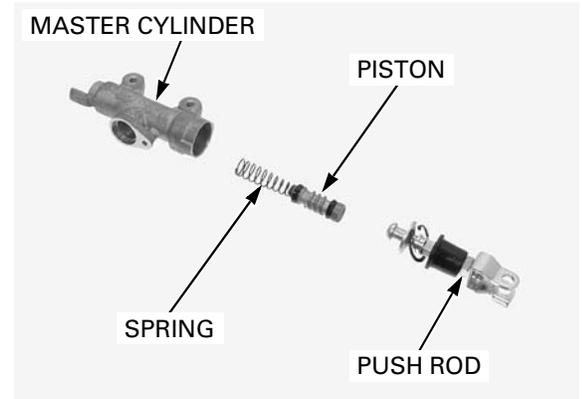
**Snap ring pliers**

**07914-SA50001**



Remove the push rod, master piston/spring and separate them.

Clean the inside of the master cylinder and master piston with brake fluid.

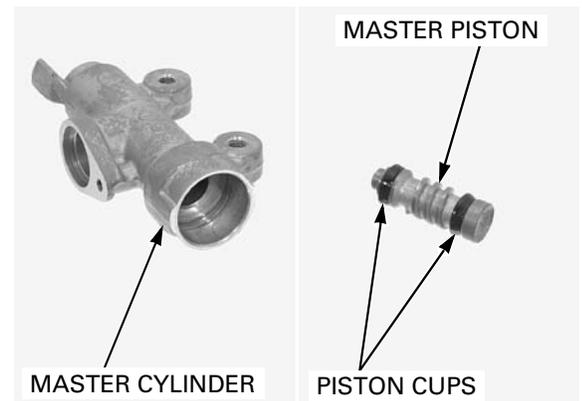


## INSPECTION

Check the master cylinder for scoring, scratches or damage.

Check the master piston for scoring, scratches or damage.

Check the piston cups for wear, deterioration or damage.

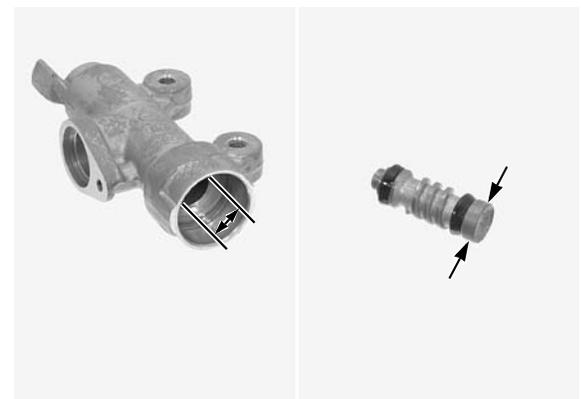


Measure the master cylinder I.D.

**SERVICE LIMIT: 12.755 mm (0.5022 in)**

Measure the master piston O.D.

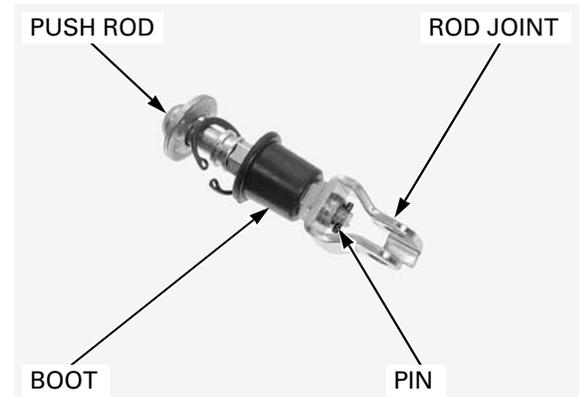
**SERVICE LIMIT: 12.645 mm (0.4978 in)**



Check the following:

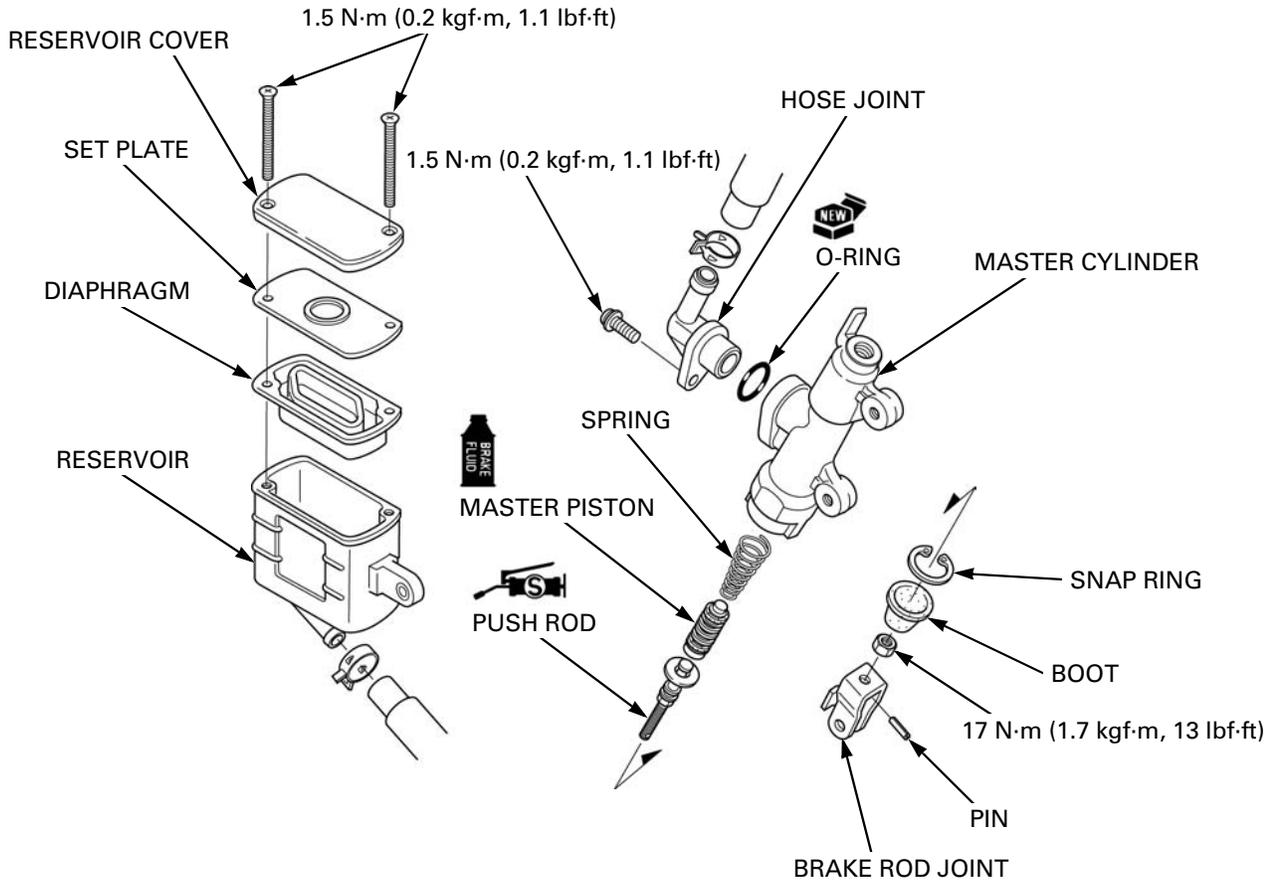
- Push rod for bent
- Boot for damage
- Rod joint for damage

Remove the pin and replace the damaged part if necessary.



# HYDRAULIC BRAKE

## ASSEMBLY

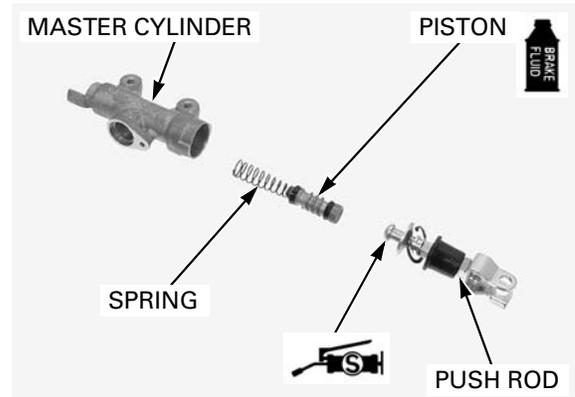


**NOTE:**

- Replace the piston, spring and cups as a set.
- Apply brake fluid to the master piston sliding area.
- Install the spring onto the piston end.

*Do not allow the piston cup lips to turn inside out.*

- Install the master piston/spring into the master cylinder.
- Apply silicone grease to the push rod contacting area (page 1-17).
- Install the push rod into the master cylinder.

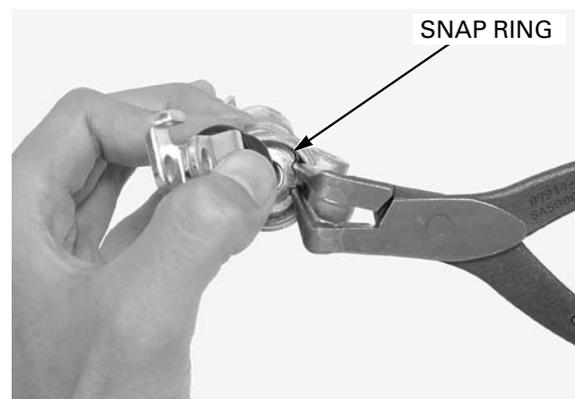


*Make sure the snap ring is firmly seated in the groove.*

- Install the snap ring into the groove of the master cylinder using a special tool.

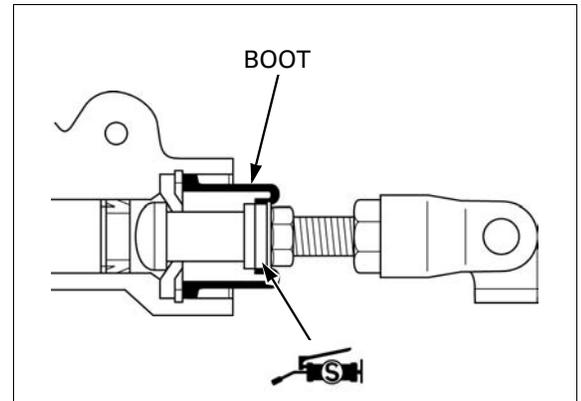
**TOOL:**  
Snap ring pliers

**07914-SA50001**



Apply silicone grease to the boot groove of the push rod.

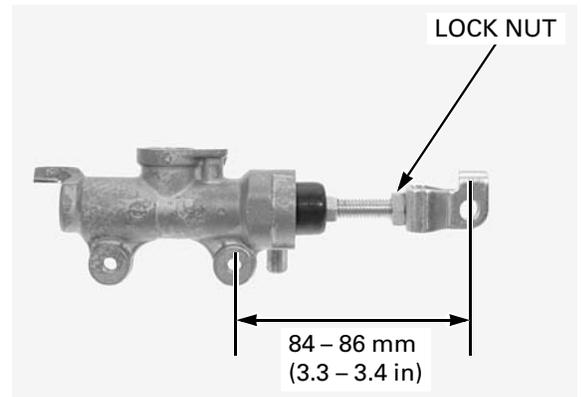
Install the boot securely.



If the push rod joint is reinstalled, adjust the push rod length so that the distance from the center of the master cylinder lower mounting hole to the center of the joint pin hole is 84 – 86 mm (3.3 – 3.4 in) as shown.

After adjustment tighten the push rod lock nut to the specified torque.

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

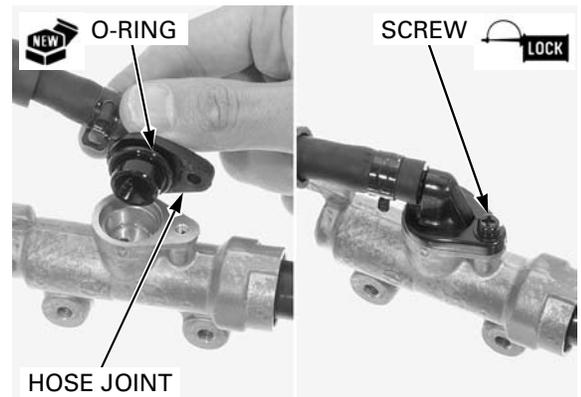


Install a new O-ring to the reservoir hose joint and install them to the master cylinder.

Apply locking agent to the hose joint screw threads and install it

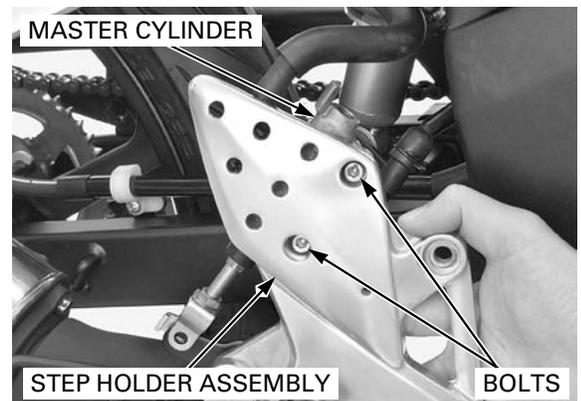
Tighten the hose joint screw to the specified torque.

**TORQUE: 1.5 N-m (0.2 kgf-m, 1.1 lbf-ft)**



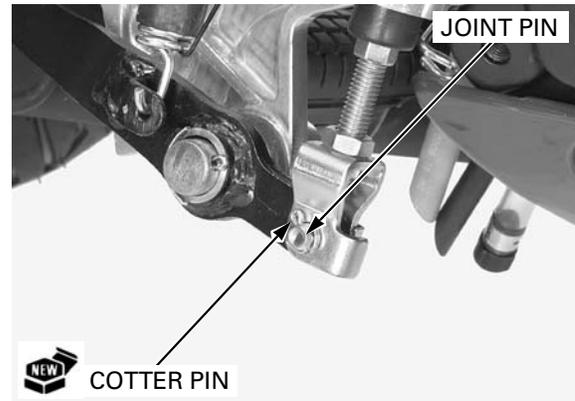
## INSTALLATION

Install the master cylinder and master cylinder mounting bolts to the right step holder assembly.



## HYDRAULIC BRAKE

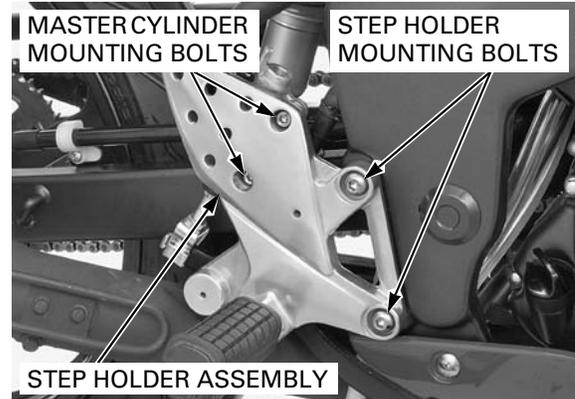
Install the master cylinder to the brake pedal and install the joint pin and new cotter pin.



Install the right step holder assembly and step holder mounting bolts. Tighten the step holder mounting bolts to the specified torque.

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

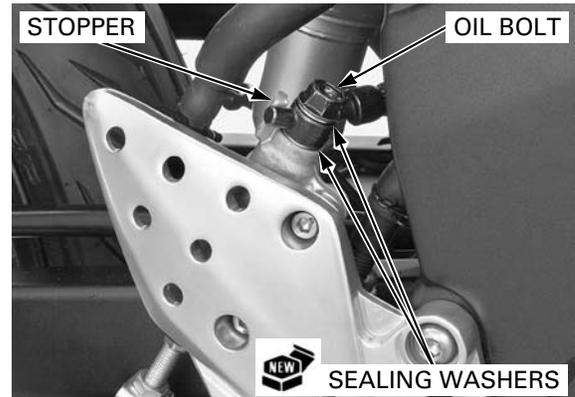
Tighten master cylinder mounting bolts.



Install the brake hose eyelet with the brake hose oil bolt and new sealing washers. Push the brake hose eyelet joint against the stopper, then tighten the brake hose oil bolt to the specified torque.

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

Fill the reservoir to the upper level and bleed the rear brake system (page 15-6).



## FRONT BRAKE CALIPER

### REMOVAL

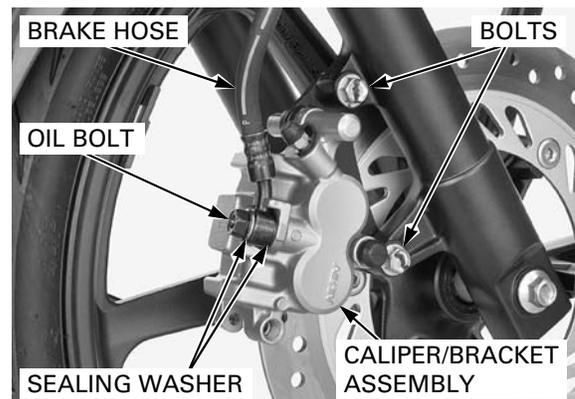
Drain the brake fluid from the hydraulic system (page 15-5).

Remove the brake pads (page 15-8).

*When removing the oil bolt, cover the end of brake hose to prevent contamination.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

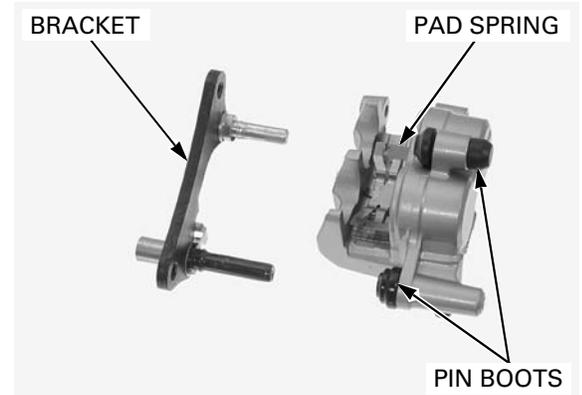
Remove the brake caliper mounting bolts and brake caliper/bracket assembly.



## DISASSEMBLY

Remove the following:

- Caliper bracket
- Pin boots
- Pad spring



Place a shop towel over the pistons.

*Do not use high pressure air or bring the nozzle too close to the inlet.*

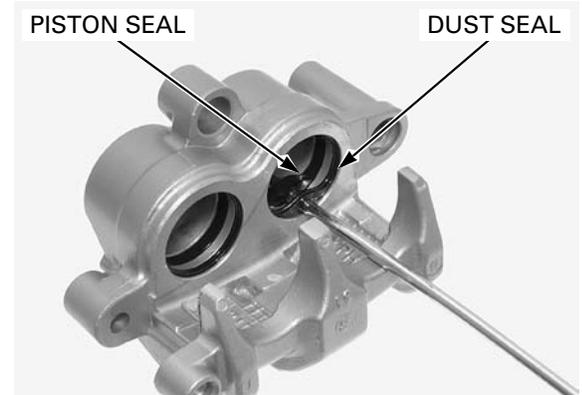
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the pistons.



*Be careful not to damage the piston sliding surface.*

Push the dust and piston seals in and lift them out.

Clean the seal grooves, caliper cylinder and pistons with clean brake fluid.



## INSPECTION

Check the caliper cylinders for scoring, scratches or damage.

Measure the caliper cylinder I.D.

**SERVICE LIMIT: 25.460 mm (1.0024 in)**

Check the caliper pistons for scoring, scratches or damage.

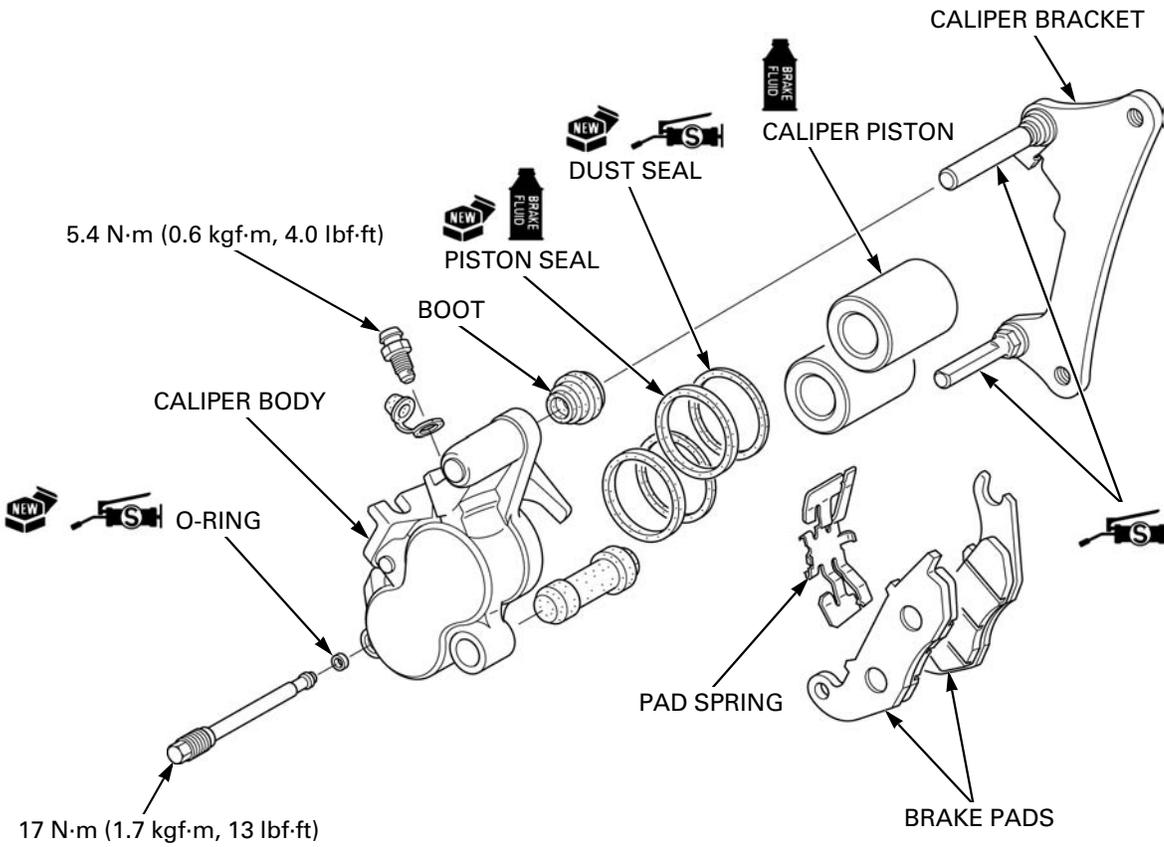
Measure the caliper piston O.D.

**SERVICE LIMIT: 25.310 mm (0.9965 in)**

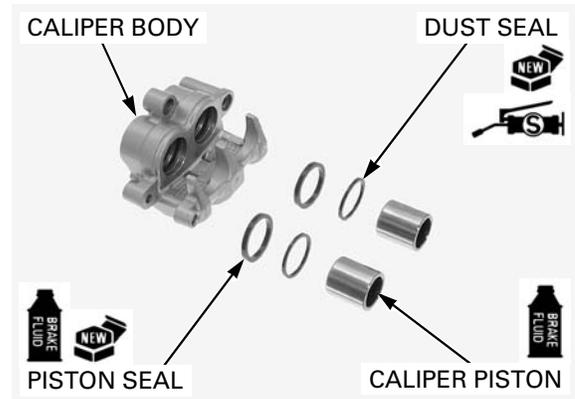


# HYDRAULIC BRAKE

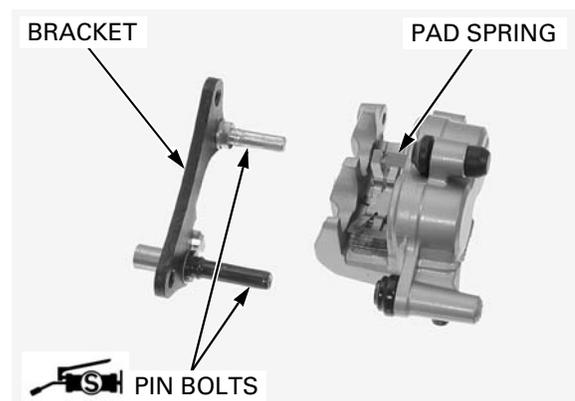
## ASSEMBLY



Apply brake fluid to new piston seals.  
Apply silicone grease to new dust seals.  
Install the piston and dust seals into the seal grooves in the caliper body.  
Apply brake fluid to the caliper pistons sliding area and install them into the caliper cylinders with the opening side toward the pad.



Install the pad spring onto the caliper body.  
Apply silicone grease to the brake caliper pin bolt sliding surface (page 1-17).  
Install the caliper bracket to the caliper body.



## INSTALLATION

Install the brake caliper/bracket assembly to the right fork leg.  
Install new mounting bolts and tighten them to the specified torque.

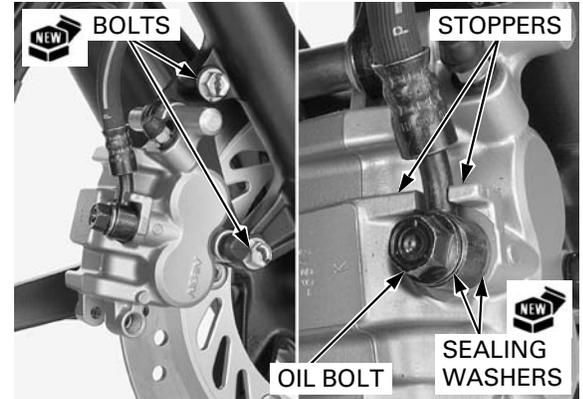
**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

Install the brake hose eyelet between the stoppers with brake hose oil bolt and new sealing washers.  
Tighten the brake hose oil bolt to the specified torque.

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

Install the brake pads (page 15-8).

Fill the reservoir to the upper level and bleed the front brake system (page 15-6).



## REAR BRAKE CALIPER

### REMOVAL

Drain the brake fluid from the hydraulic system (page 15-5).

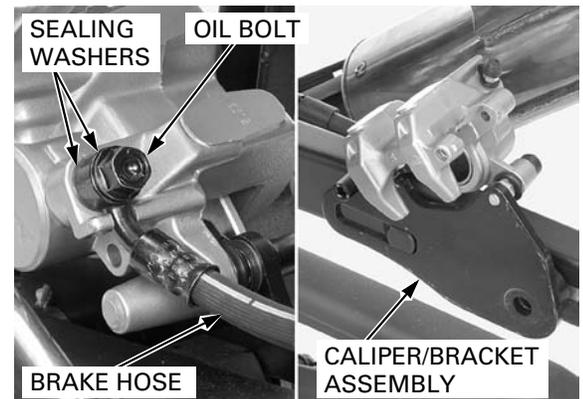
Remove the brake pads (page 15-9).

*When removing the oil bolt, cover the end of brake hose to prevent contamination.*

Remove the brake hose oil bolt and sealing washers.

Remove the rear wheel (page 14-5).

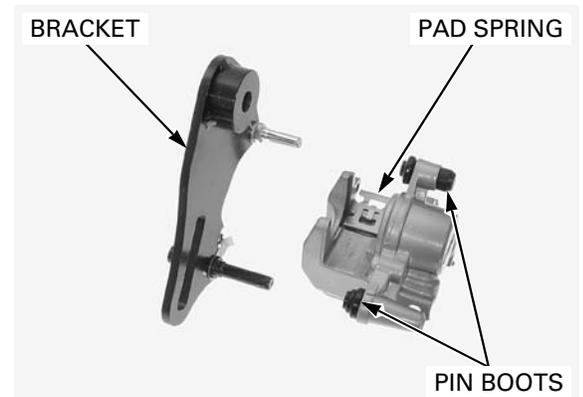
Remove the brake caliper/bracket assembly from the swingarm.



### DISASSEMBLY

Remove the following:

- Caliper bracket
- Pin boots
- Pad spring



## HYDRAULIC BRAKE

Place a shop towel over the piston.

*Do not use high pressure air or bring the nozzle too close to the inlet.*

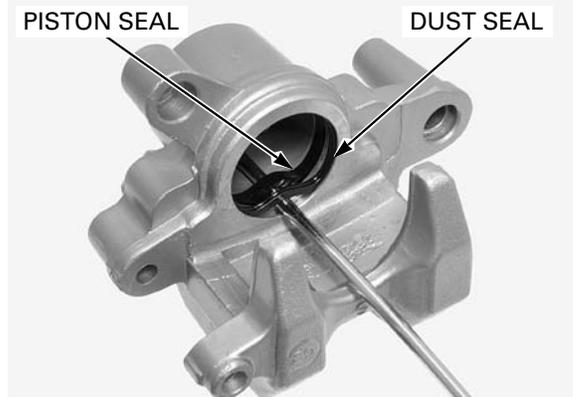
Position the caliper body with the piston facing down and apply small squirts of air pressure to the fluid inlet to remove the piston.



*Be careful not to damage the piston sliding surface.*

Push the dust and piston seals in and lift them out.

Clean the seal grooves, caliper cylinder and piston with clean brake fluid.



### INSPECTION

Check the caliper cylinder for scoring, scratches or damage.

Measure the caliper cylinder I.D.

**SERVICE LIMIT: 32.090 mm (1.2634 in)**

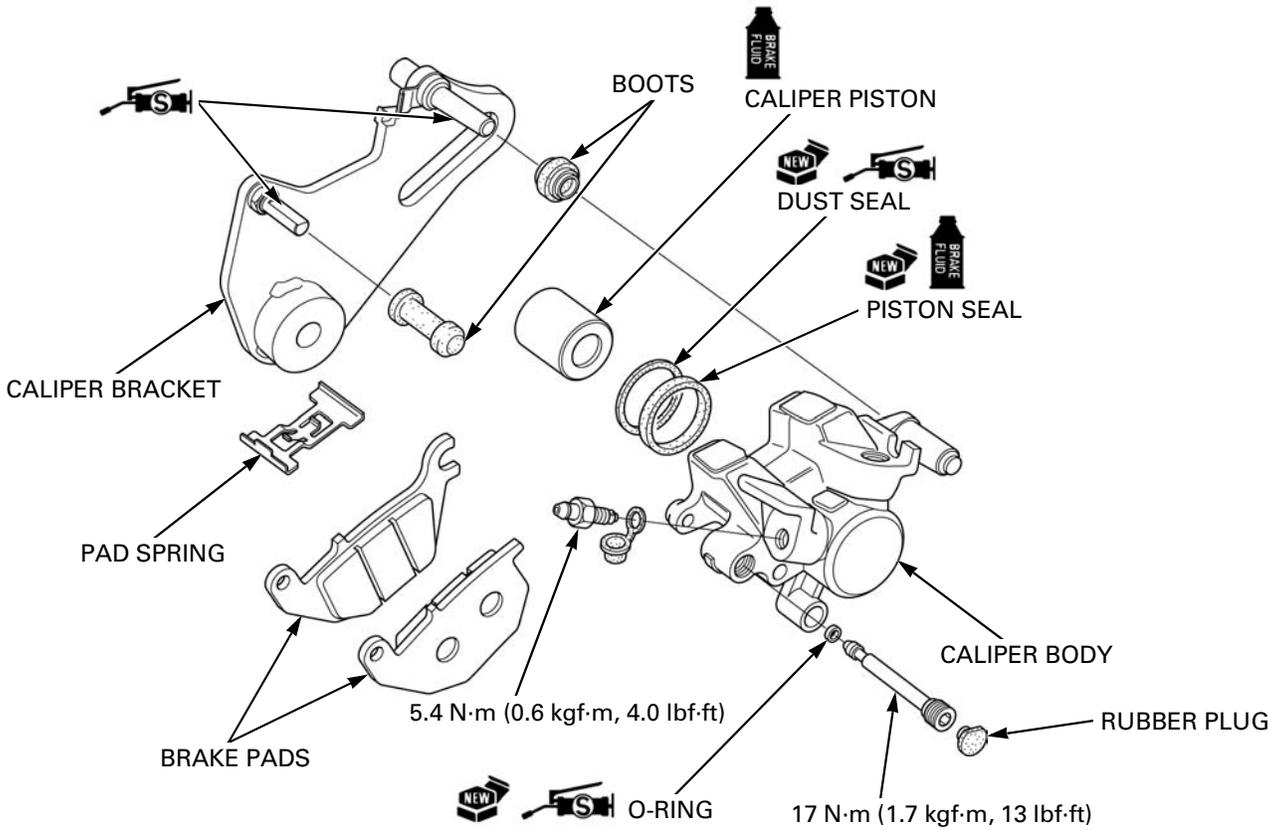
Check the caliper piston for scoring, scratches or damage.

Measure the caliper piston O.D.

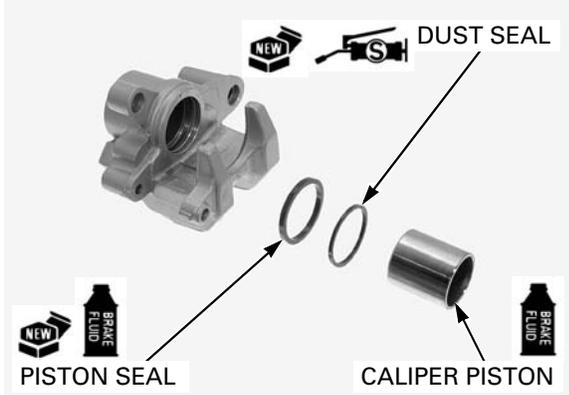
**SERVICE LIMIT: 31.940 mm (1.2575 in)**



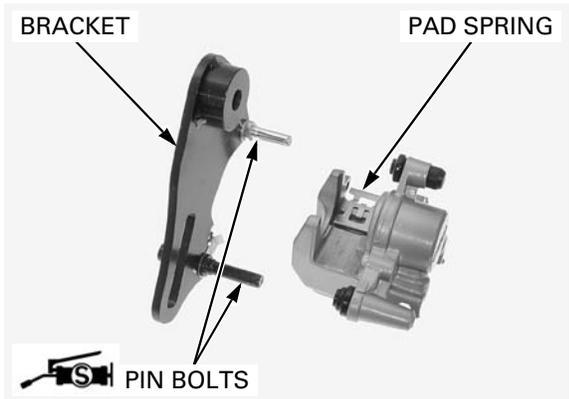
ASSEMBLY



Apply brake fluid to new piston seals.  
 Apply silicone grease to new dust seals.  
 Install the piston and dust seals into the seal grooves in the caliper body.  
 Apply brake fluid to the caliper piston sliding area and install them into the caliper cylinder with the opening side toward the pad.



Install the pad spring onto the caliper body.  
 Apply silicone grease to the brake caliper pin bolt sliding surface (page 1-17).  
 Install the caliper bracket to the caliper body.



## HYDRAULIC BRAKE

### INSTALLATION

Install the brake caliper/bracket assembly to the swingarm by aligning the slot of the bracket and boss of the swingarm.

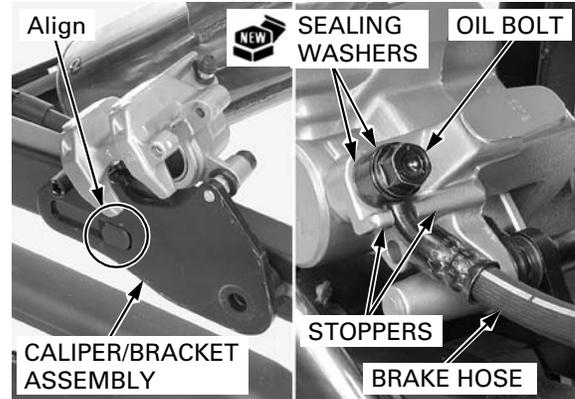
Install the rear wheel (page 14-10).

Install the brake hose eyelet between the stoppers with brake hose oil bolt and new sealing washers. Tighten the brake hose oil bolt to the specified torque.

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

Install the brake pads (page 15-9).

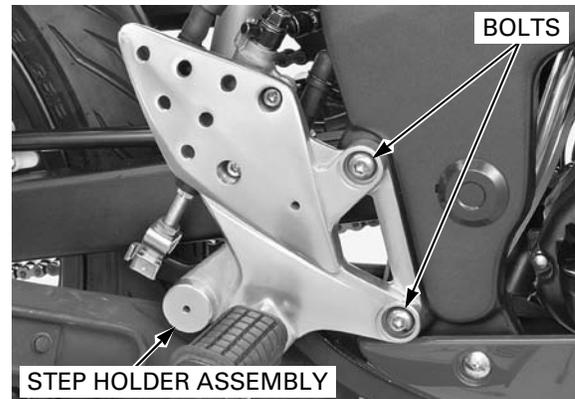
Fill the reservoir to the upper level and bleed the rear brake system (page 15-6).



## BRAKE PEDAL

### REMOVAL

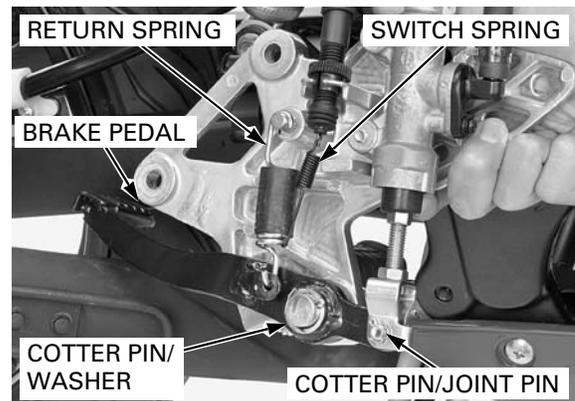
Remove the step holder mounting bolts and right step holder assembly.



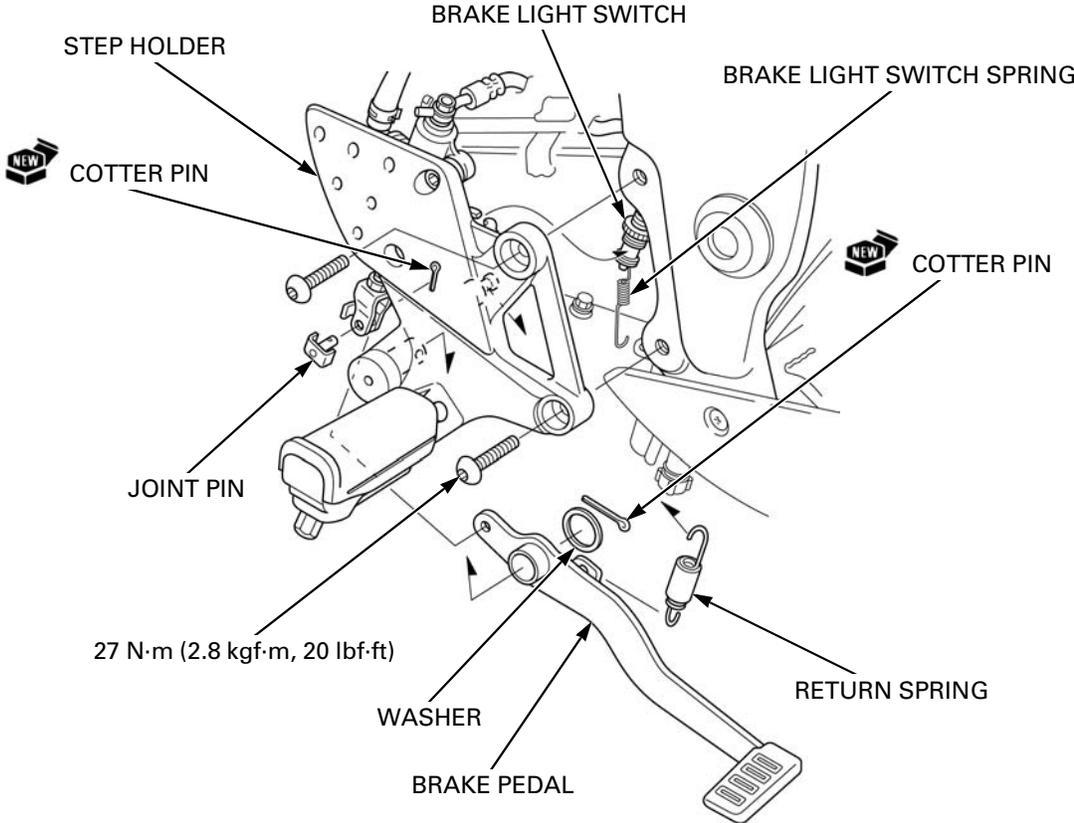
Unhook the brake light switch spring from the brake pedal return spring.

Remove and discard the brake pedal joint cotter pin. Remove the joint pin and disconnect the push rod lower joint from the brake pedal.

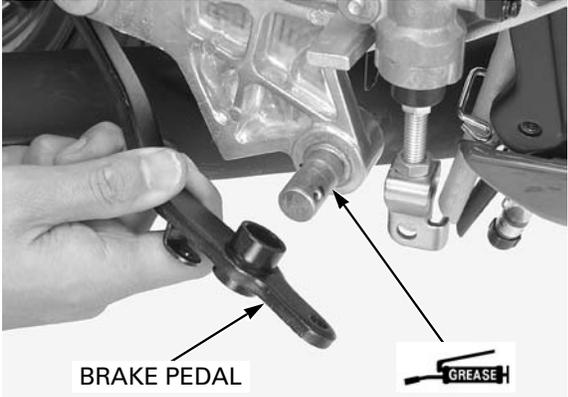
Remove the cotter pin, washer, return spring and brake pedal.



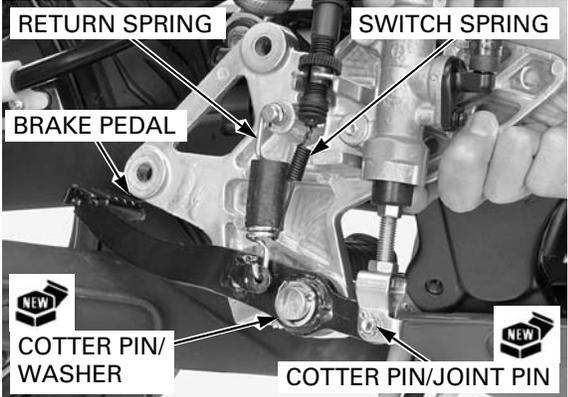
INSTALLATION



Apply grease to the brake pedal pivot sliding area and install the brake pedal into the right step holder.



Secure the brake pedal with the washer and new cotter pin.  
Connect the brake pedal to the push rod lower joint.  
Install the joint pin and new cotter pin.  
Install the brake light switch spring to the brake pedal return spring as shown.



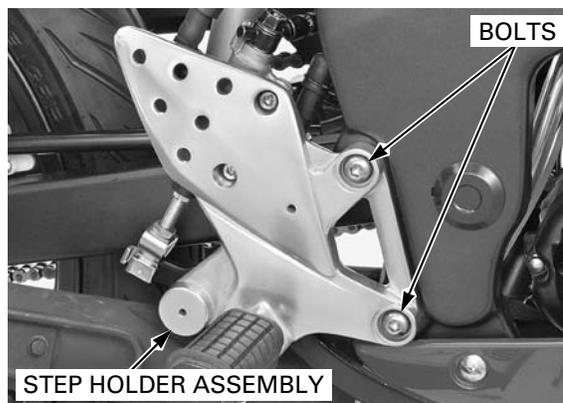
## HYDRAULIC BRAKE

---

Install the right step holder assembly.  
Install and tighten the step holder mounting bolts to the specified torque.

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

After the installation, check the brake operation and adjust the rear brake light switch operation (page 3-23).



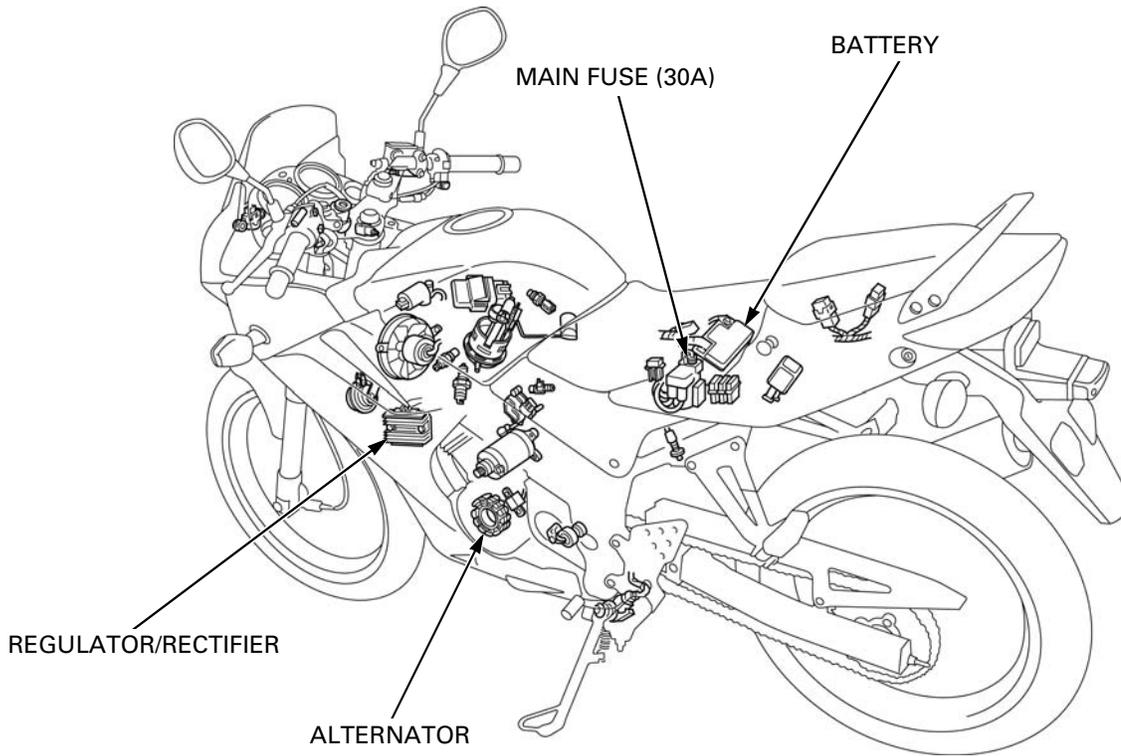
# 16. BATTERY/CHARGING SYSTEM

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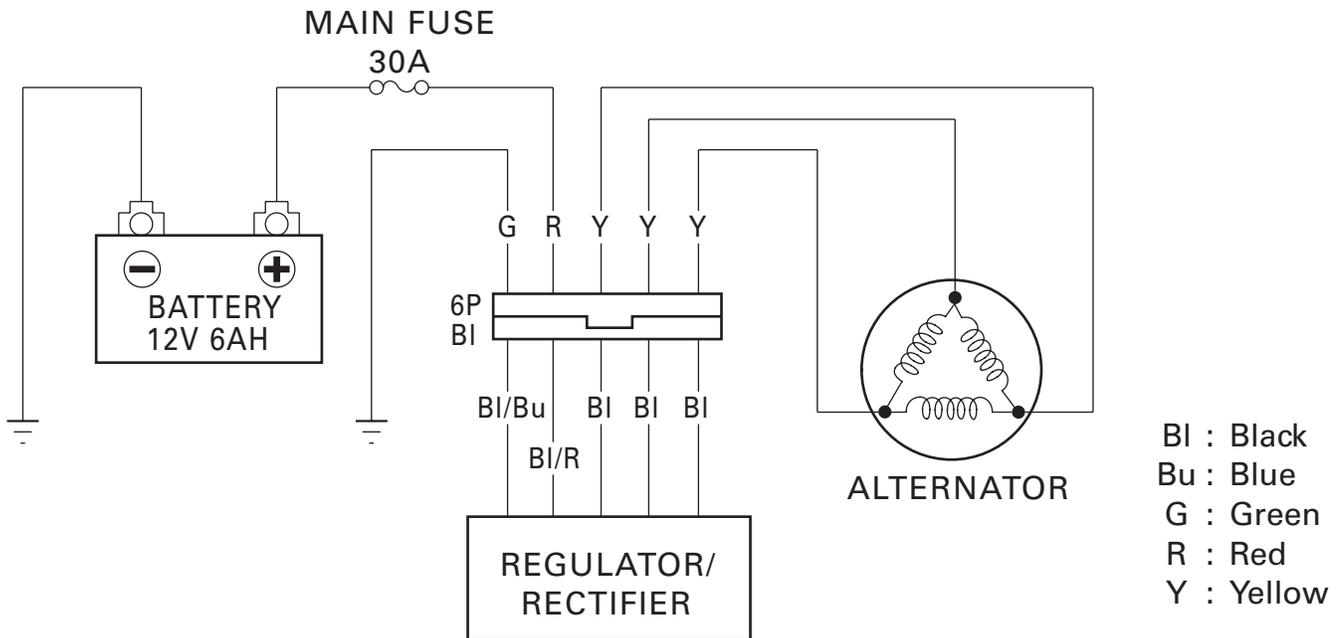
SYSTEM LOCATION.....	16-2	BATTERY .....	16-5
SYSTEM DIAGRAM.....	16-2	CHARGING SYSTEM INSPECTION.....	16-6
SERVICE INFORMATION .....	16-3	ALTERNATOR CHARGING COIL .....	16-7
TROUBLESHOOTING .....	16-4	REGULATOR/RECTIFIER .....	16-7

# 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.

### NOTICE

- *Always turn OFF the ignition switch before disconnecting any electrical component.*
- *Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every 2 weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and tail light 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 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-4).
- For alternator removal (page 11-6).

### 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 instruction of the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so the actual battery condition can be measured.

**Recommended battery tester**    **BM-210 or BATTERY MATE or equivalent**

## SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12 V - 6 Ah	
	Current leakage	0.1 mA max.	
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	0.6 A/5 – 10 h
Quick		3 A/1 h	
Alternator	Capacity	0.290 kW/5,000 min <sup>-1</sup> (rpm)	
	Charging coil resistance (20°C/68°F)	0.2 – 0.6 Ω	

# TROUBLESHOOTING

### BATTERY IS DAMAGED OR WEAK

#### 1. BATTERY TEST

Remove the battery (page 16-5).

Check the battery condition using a recommended battery tester.

**RECOMMENDED BATTERY TESTER: BM-210 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 16-5).

Check the battery current leakage test (Leak test; page 16-6).

*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 CONNECTOR

Disconnect the regulator/rectifier 6P (Black) 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. CHARGING VOLTAGE INSPECTION

Measure and record the battery voltage using a digital multimeter (page 16-5).

Start the engine.

Measure the charging voltage (page 16-6).

Compare the measurements to the results of the following calculation.

**STANDARD:**

**Measured BV < Measured CV < 15.5 V**

- **BV = Battery Voltage**
- **CV = Charging Voltage**

*Is the measured charging voltage within the standard voltage?*

**YES** – Faulty battery

**NO** – GO TO STEP 5.

#### 5. ALTERNATOR CHARGING COIL INSPECTION

Check the alternator charging coil (page 16-7).

*Is the alternator charging coil resistance within 0.2 – 0.6  $\Omega$  (20°C/68°F)?*

**YES** – Faulty charging coil

**NO** – GO TO STEP 6.

#### 6. REGULATOR/RECTIFIER SYSTEM INSPECTION

Check the voltage and resistance at the regulator/rectifier 6P (Black) connector (page 16-7).

*Are the measurements correct?*

**YES** – Faulty regulator/rectifier

**NO** – 

- Open circuit in related wire
- Loose or poor contacts of related terminal
- Shorted wire harness

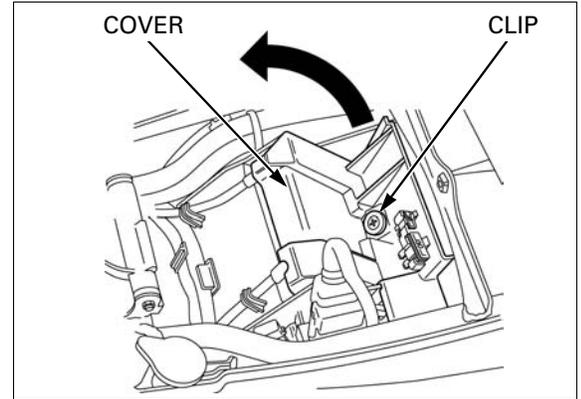
**BATTERY**

**REMOVAL/INSTALLATION**

Remove the single seat (page 2-4).

Turn the ignition switch OFF.

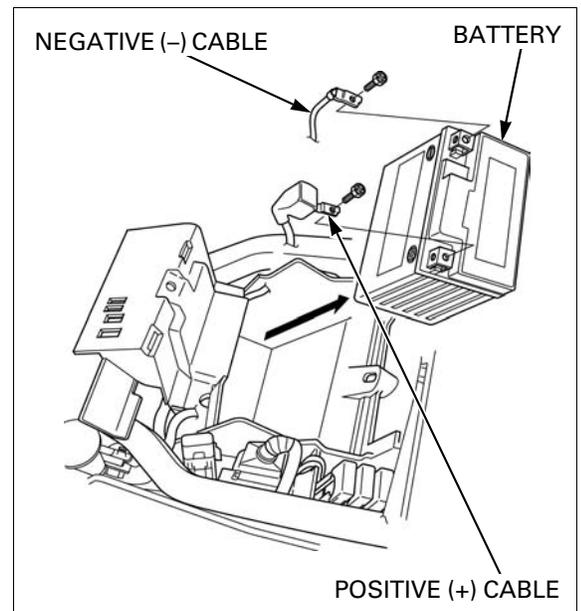
Remove the trim clip and open the battery case cover.



Disconnect the negative (-) cable first and then the positive (+) cable.  
Remove the battery.

*Connect the positive cable first and then the negative cable.*

Install the battery in the reverse order of removal.



**VOLTAGE INSPECTION**

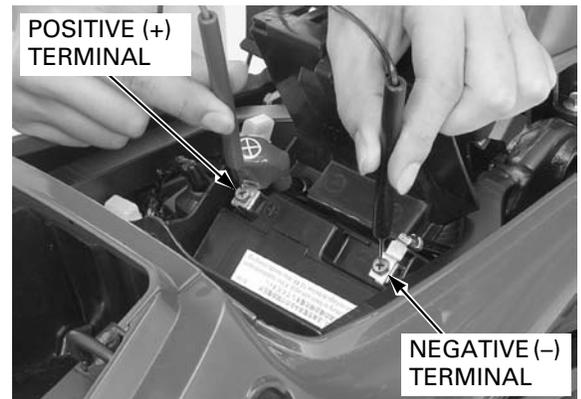
Measure the battery voltage using a commercially available digital multimeter.

**VOLTAGE (20°C/68°F):**

**Fully charged: 13.0 – 13.2 V**

**Under charged: Below 12.4 V**

If the battery voltage is below 12.4 V, charge the battery.



**BATTERY TESTING**

Refer to the instructions that are appropriate to the battery testing equipment available to you.

**TOOL:**

**Battery tester**

**BM-210 or  
BATTERY MATE or  
equivalent**

# CHARGING SYSTEM INSPECTION

### CURRENT LEAKAGE INSPECTION

Remove the single seat (page 2-4).  
Open the battery case cover (page 16-5).

With the ignition switch turned OFF, disconnect the negative (-) cable.

Connect the ammeter (+) probe to the wire harness negative (-) cable and ammeter (-) probe to the battery negative (-) terminal.

With the ignition switch turned OFF, check for current leakage.

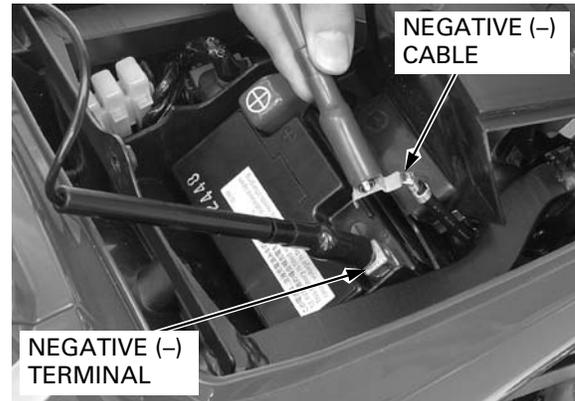
#### NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow 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.



### CHARGING VOLTAGE INSPECTION

Remove the single seat (page 2-4).  
Open the battery case cover (page 16-5).

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

Connect the multimeter between the battery positive (+) and negative (-) terminal.

#### NOTE:

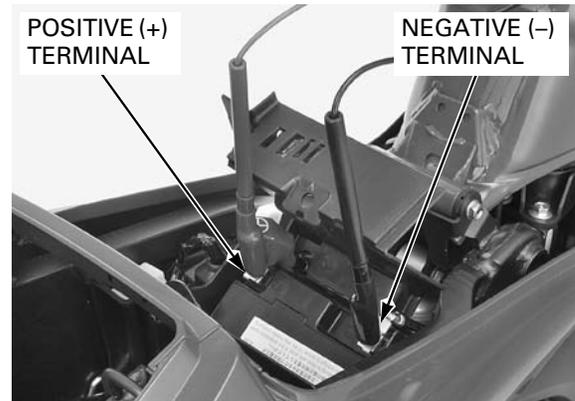
- To prevent a short, make absolutely certain which are the positive (+) and negative (-) terminal or cable.
- Do not disconnect the battery or any cable in the charging system without first turning the ignition switch OFF. Failure to follow this precaution can damage the tester or electrical components.

With the headlight high beam, measure the voltage on the multimeter when the engine runs at 5,000  $\text{min}^{-1}$  (rpm).

#### STANDARD:

**Measured BV < Measured CV < 15.5 V**

- **BV = Battery Voltage**
- **CV = Charging Voltage**



## ALTERNATOR CHARGING COIL

### INSPECTION

*It is not necessary to remove the stator coil to perform this test.* Disconnect the alternator/CKP sensor 6P (Natural) connector.

Measure the resistance between the Yellow wire terminals of the alternator side connector.

**STANDARD: 0.2 – 0.6 Ω (20°C/68°F)**

Replace the alternator stator if the resistance is out of specification, or if any wire has continuity to ground.

For stator replacement (page 11-6).



6P (NATURAL) CONNECTOR



6P (NATURAL) CONNECTOR

## REGULATOR/RECTIFIER

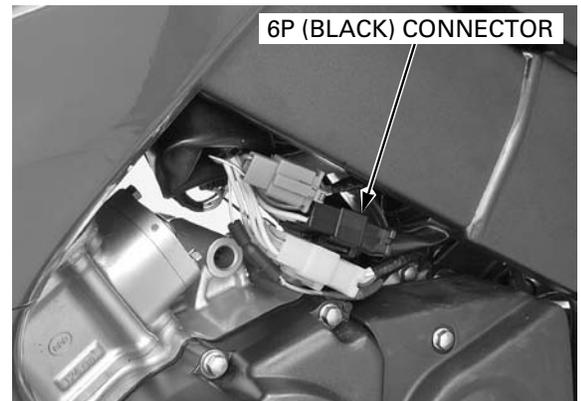
### SYSTEM INSPECTION

*It is not necessary to remove the stator coil to perform this test.* Turn the ignition switch OFF. Disconnect the regulator/rectifier 6P (Black) connector, and check it for loose contacts or corroded terminals.

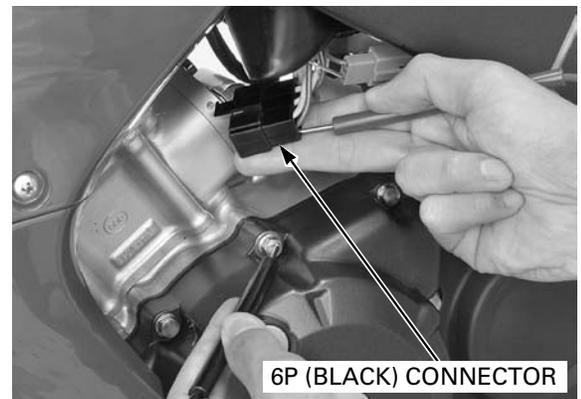
If the charging voltage reading (page 16-6) is out of the specification, check the following at the wire harness side connector:

Item	Terminal	Specification
Battery charging line	Red (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.2 – 0.6 Ω at (20°C/68°F)
Ground line	Green and ground	Continuity should exist

If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connector, replace the regulator/rectifier unit.



6P (BLACK) CONNECTOR



6P (BLACK) CONNECTOR

## BATTERY/CHARGING SYSTEM

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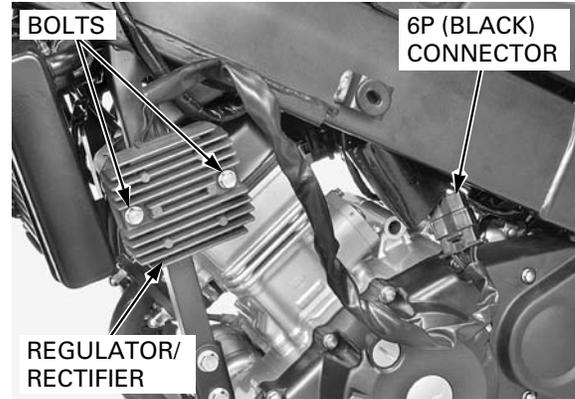
### REMOVAL/INSTALLATION

Remove the left middle cowl (page 2-9).

Disconnect the regulator/rectifier 6P (Black) connector.

Remove the bolts and regulator/rectifier from the frame.

Install the regulator/rectifier in the reverse order of removal.



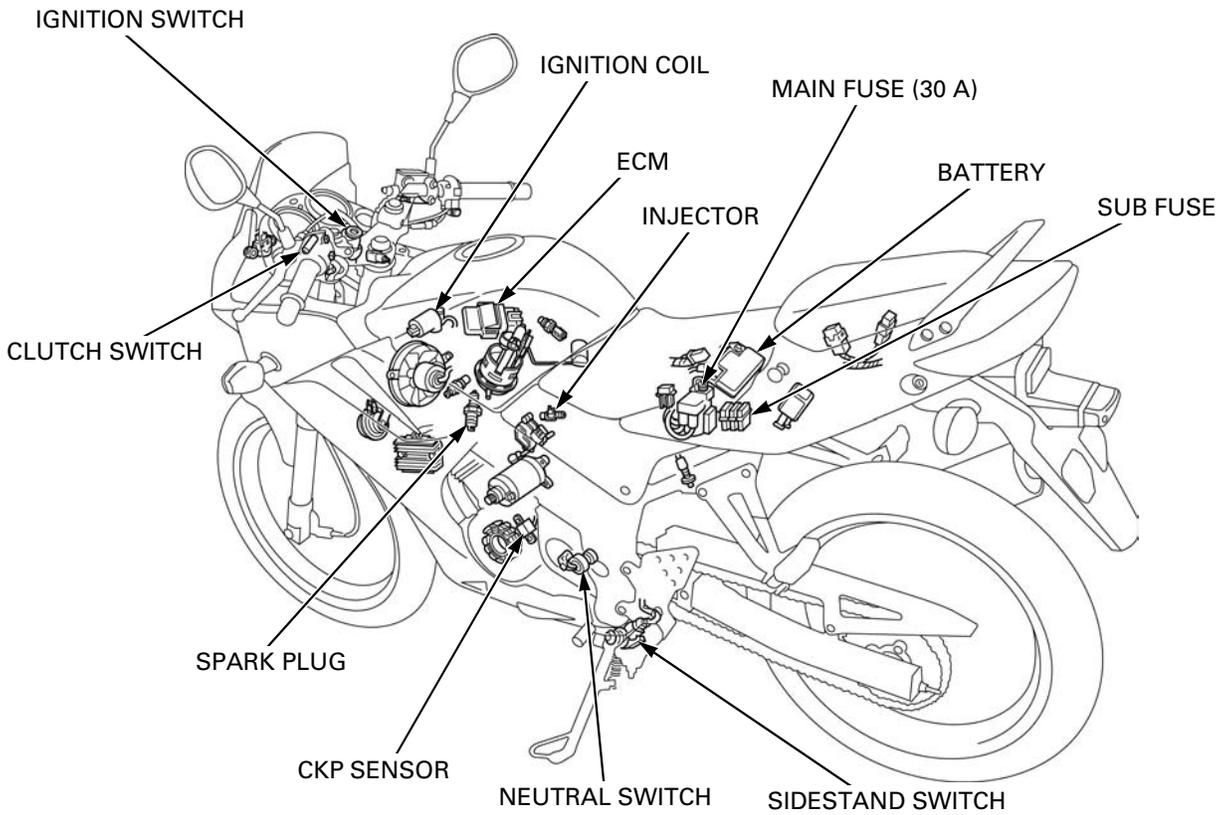
# 17. IGNITION SYSTEM

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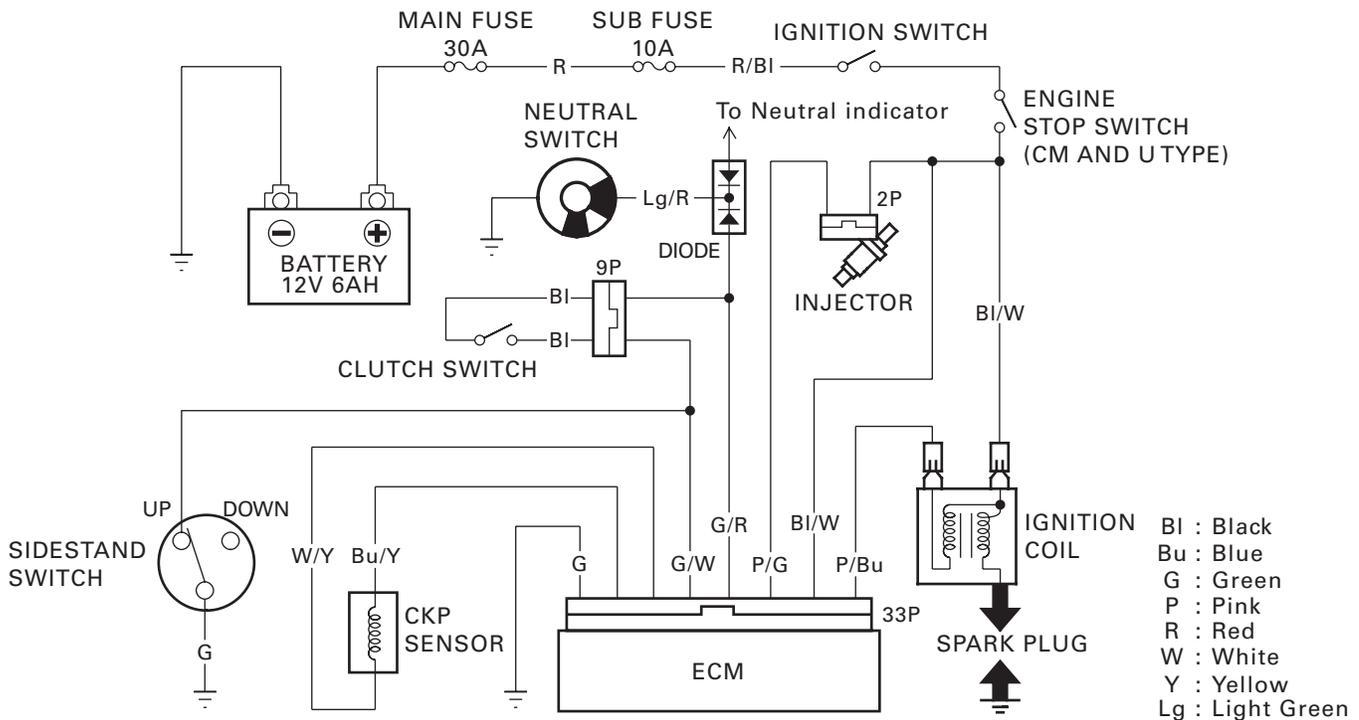
SYSTEM LOCATION.....	17-2	IGNITION SYSTEM INSPECTION.....	17-5
SYSTEM DIAGRAM.....	17-2	IGNITION TIMING .....	17-7
SERVICE INFORMATION .....	17-3	IGNITION COIL .....	17-8
TROUBLESHOOTING .....	17-4		

# IGNITION SYSTEM

## SYSTEM LOCATION



## SYSTEM DIAGRAM





## IGNITION SYSTEM

### TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (Leaking the ignition coil secondary voltage)
- 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 original ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON (and engine stop switch "O": CM and U type) (The engine is not cranked by the starter motor).

#### No spark at spark plug

	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned ON (and engine stop switch "O": CM and U type) (Other electrical components are normal).	<ol style="list-style-type: none"> <li>1. Faulty ignition switch</li> <li>2. An open circuit in Black/white wire between the ignition coil and ignition switch</li> <li>3. Loose or poor connection of the primary terminal, or an open circuit in the primary coil</li> <li>4. Faulty ECM (in case when the initial voltage is normal with the ECM connector disconnected)</li> <li>5. Faulty engine stop switch (CM and U type)</li> </ol>
	Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections).</li> <li>2. Battery is undercharged (Voltage drops largely when the engine is started).</li> <li>3. No voltage between the Black/white (+) wire and body ground (-) at the ECM connector or loosen ECM connection.</li> <li>4. An open circuit or loose connection in Green wire at the ECM.</li> <li>5. An open circuit or loose connection in Pink/blue wire between the ignition coils and ECM.</li> <li>6. Faulty sidestand switch or neutral switch</li> <li>7. Loose or poor connection or an open circuit in No. 6 related wires.               <ul style="list-style-type: none"> <li>– Sidestand switch line: Green/white wire</li> <li>– Neutral switch line: Light Green/red wire</li> </ul> </li> <li>8. Faulty CKP sensor (Measure peak voltage)</li> <li>9. Faulty ECM (in case when above No. 1 through 8 are normal)</li> </ol>
	Initial voltage is normal but there is no peak voltage while cranking the engine.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections.</li> <li>2. Faulty peak voltage adaptor</li> <li>3. Faulty CKP sensor</li> <li>4. Faulty ECM (in case when above No. 1 through 3 are normal).</li> </ol>
	Initial voltage is normal but peak voltage is lower than the standard value.	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too slow (Battery is undercharged).</li> <li>3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once).</li> <li>4. Faulty ECM (in case when above No. 1 through 3 are normal).</li> </ol>
	Initial and peak voltages are normal but no spark jumps.	<ol style="list-style-type: none"> <li>1. Faulty spark plug or leaking ignition coil secondary current ampere</li> <li>2. Faulty ignition coil</li> </ol>
CKP sensor	Peak voltage is lower than standard value	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too low. (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 CKP sensor (in case when above No.1 through 3 are normal).</li> </ol>
	No peak voltage	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adapter</li> <li>2. Faulty CKP sensor</li> </ol>

## IGNITION SYSTEM INSPECTION

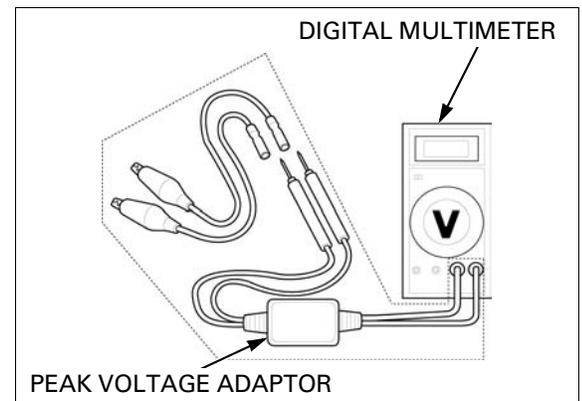
### NOTE:

- If there is no spark at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a 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, or use the Imrie diagnostic tester.

### 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

### NOTE:

- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- If the system is disconnected, incorrect peak voltage might be measured.
- Check the cylinder compression and check that the spark plug is installed correctly in the cylinder head.

Shift the transmission into neutral and disconnect the spark plug cap (page 3-9).

Connect a known good spark plug to the spark plug cap and ground it to the cylinder head as done in a spark test.



## IGNITION SYSTEM

Lift and support the fuel tank (page 3-6).  
Open the rubber sheet (page 6-10).

*Do not disconnect the ignition coil primary wire.*

With the ignition coil primary wire connected, connect the peak voltage adaptor or Imrie tester to the ignition coil primary terminal 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: Pink/blue (+) – Ground (-)**

Shift the transmission into neutral.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

*Avoid touching the spark plug and tester probes to prevent electric shock.*

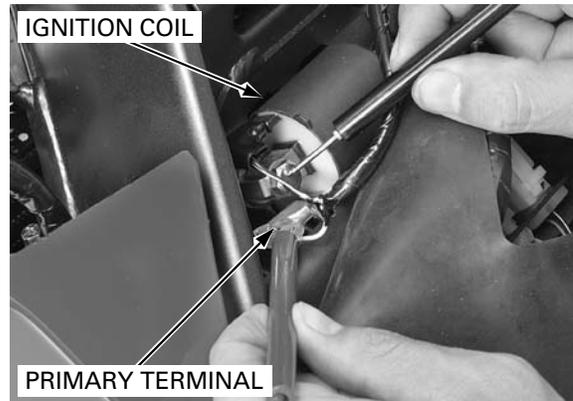
Crank the engine with the starter motor with the throttle grip fully opened and read ignition coil primary peak voltage.

**PEAK VOLTAGE: 100 V minimum**

If the peak voltage is abnormal, follow the checks described in the troubleshooting table (page 17-4).

Close the rubber sheet (page 6-15).

Remove the suitable support and close the fuel tank (page 3-6).



## CKP SENSOR PEAK VOLTAGE

### NOTE:

Check the cylinder compression and check that the spark plug is installed correctly in the cylinder head.

Remove the ECM (page 5-65).

Connect the peak voltage tester or adaptor probes to the ECM 33P connector terminals of the wire harness side.

### TOOLS:

**Imrie diagnostic tester (model 625) or  
Peak voltage adaptor 07HGJ-0020100  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)  
Test probe 07ZAJ-RDJA110**

**CONNECTION: Blue/yellow (+) – White/yellow (-)**

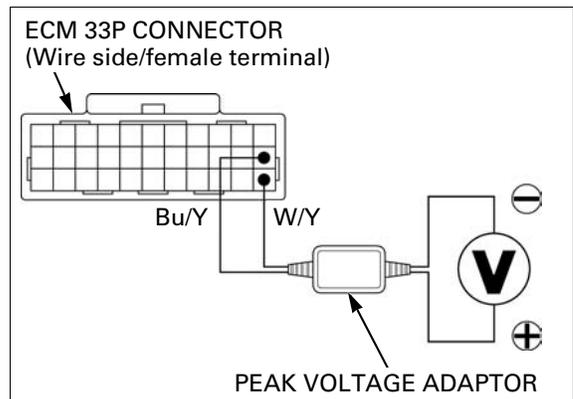
Shift the transmission into neutral.

Turn the ignition switch ON.

Crank the engine with the starter motor with the throttle grip fully opened and read CKP sensor peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**

If the peak voltage measured at the ECM 33P connector is abnormal, measure the peak voltage at the CKP sensor connector.



Turn the ignition switch OFF.

Disconnect the alternator/CKP sensor 6P (Natural) connector and connect the tester probes to the connector terminals of the CKP sensor side.

**CONNECTION: Blue/yellow (+) – White/yellow (-)**

In the same manner as at the ECM 33P connector, measure the peak voltage and compare it to the voltage measured at the ECM 33P connector.

NOTE:

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open or short circuit or loose connection.
- If the peak voltage of the CKP sensor side is lower than standard value, follow the checks described in the troubleshooting table (page 17-4).

For CKP sensor replacement (page 11-6).

Install the removed parts in the reverse order of removal.



## IGNITION TIMING

Warm up the engine.

Stop the engine and remove the timing hole cap using a special tool.

**TOOL:**

**Timing cap wrench**

**07709-0010001 or equivalent**

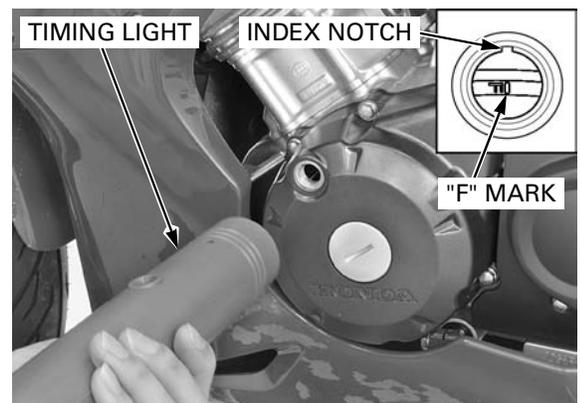
*Read the instructions for timing light operation.*

Connect the timing light to the spark plug wire.

Start the engine and let it idle.

**IDLE SPEED: 1,450 ± 100 min<sup>-1</sup> (rpm)**

The ignition timing is correct if the "F" mark on the flywheel aligns with the index notch on the left crankcase cover.

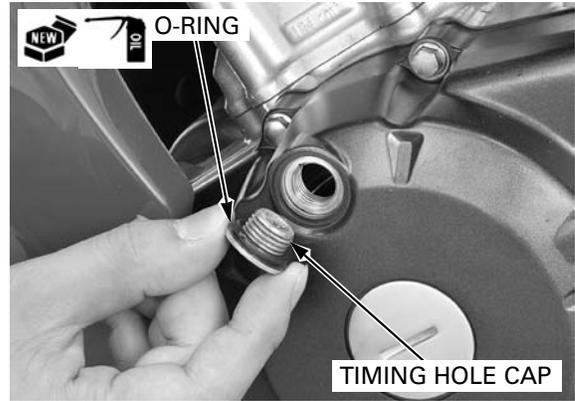


## IGNITION SYSTEM

Apply engine oil to a new O-ring and install it to the timing hole cap.

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

**TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**



## IGNITION COIL

### REMOVAL/INSTALLATION

Lift and support the fuel tank (page 3-6).

Remove the ECM (page 5-65).

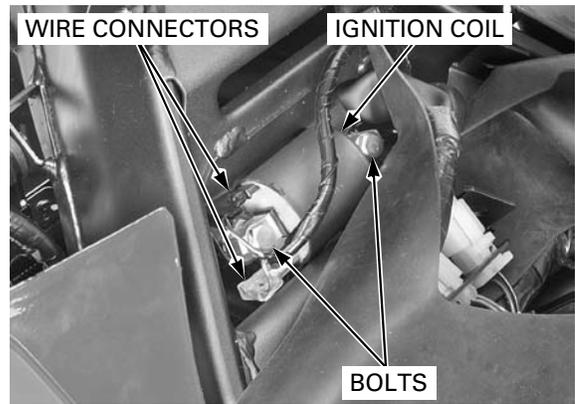
Disconnect the spark plug cap (page 3-9).

Disconnect the wire connectors from the ignition coil.

Remove the bolts and ignition coil.

*Route the wire properly (page 1-18).*

Install the removed parts in the reverse order of removal.

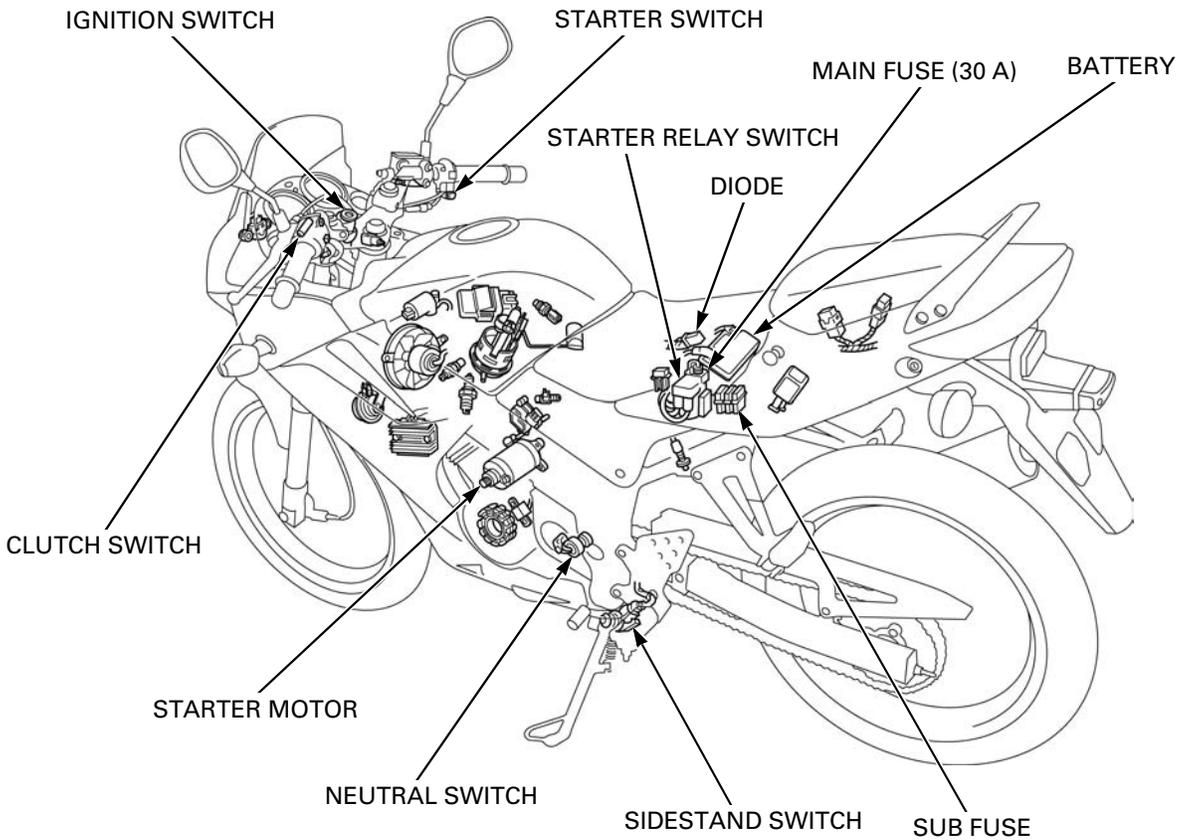


# 18. ELECTRIC STARTER

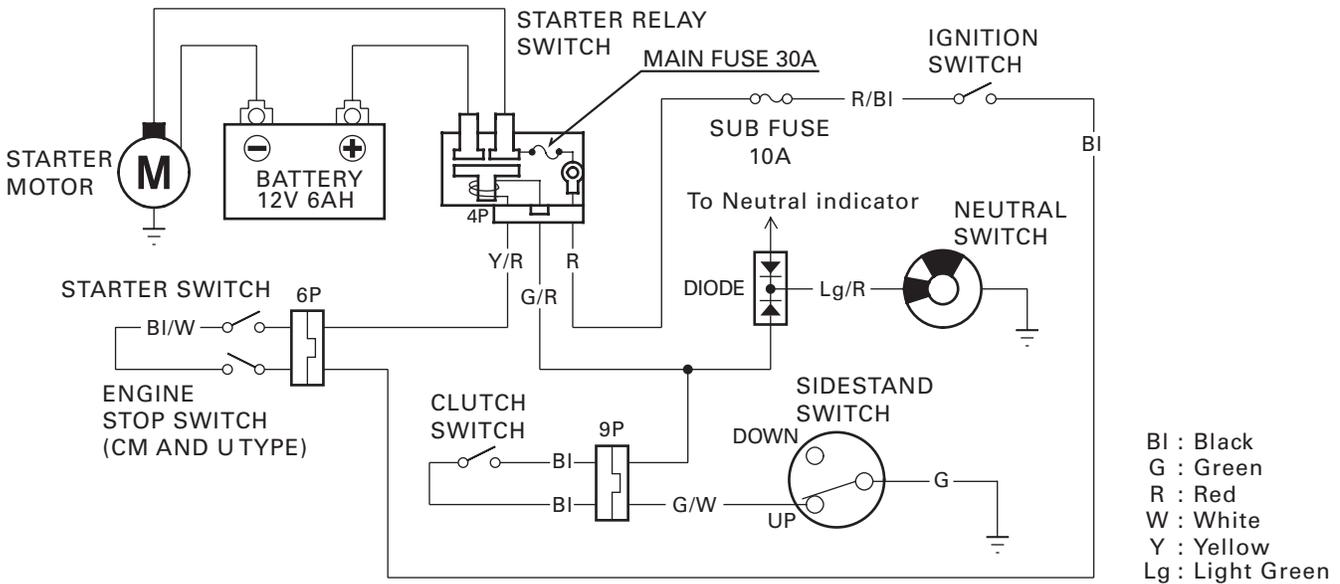
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SYSTEM LOCATION.....	18-2	STARTER MOTOR.....	18-6
SYSTEM DIAGRAM.....	18-2	STARTER RELAY SWITCH.....	18-14
SERVICE INFORMATION .....	18-3	DIODE.....	18-15
TROUBLESHOOTING .....	18-4		

# ELECTRIC STARTER SYSTEM LOCATION



# SYSTEM DIAGRAM



## SERVICE INFORMATION

### GENERAL

#### NOTICE

*If the current is kept flowing through the starter motor turn it while the engine is not cranking over, the starter motor may be damaged.*

- The starter motor can be serviced with the engine installed in the frame.
- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- When servicing the starter system, always follow the steps in the troubleshooting flow chart (page 18-4).
- Refer to the following components information:
  - Ignition switch (page 19-13)
  - Starter switch (page 19-14)
  - Engine stop switch (CM and U type) (page 19-14)
  - Neutral switch (page 19-17)
  - Sidestand switch (page 19-19)
  - Clutch switch (page 19-20)

### SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.00 – 10.05 (0.394 – 0.396)	3.5 (0.14)

# TROUBLESHOOTING

### Starter motor does not turn

#### 1. Fuse Inspection

Check for blown main fuse or sub fuse.

##### *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 (page 16-5).

##### *Is the battery in good condition?*

**YES** – GO TO STEP 3.

**NO** – Charge or replace the battery.

#### 3. Starter Relay Switch Operation

Check the starter relay switch operation.

You should hear the relay "CLICK" when the starter switch button is depressed.

##### *Is there a "CLICK"?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 5.

#### 4. Starter Motor Inspection

Apply battery voltage directly to the starter motor and check the operation.

##### *Does the starter motor turn?*

**YES** –

- Poorly contacted starter motor cable
- Faulty starter relay switch (page 18-15)

**NO** – Faulty starter motor (page 18-6)

#### 5. Relay Coil Ground Lines Inspection

Disconnect the starter relay switch connector, and check the relay coil ground wire line as below for continuity:

1. Green/red terminal – diode – neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/red terminal – clutch switch – sidestand switch line (in any gear except neutral, and with the clutch lever pulled in and sidestand up).

##### *Is there continuity?*

**NO** –

- Loose or poor contact connector
- Open circuit in wire harness
- Faulty starter switch (page 19-14)
- Faulty sidestand switch (page 19-19)
- Faulty diode (page 18-15)
- Faulty clutch switch (page 19-20)
- Faulty neutral switch (page 19-17)

**YES** – GO TO STEP 6.

#### 6. Starter Relay Input Voltage Inspection

Connect the starter relay switch connector.

With the ignition switch ON (and engine stop switch "O": CM and U type), measure the voltage at the starter relay switch connector (between Yellow/red (+) and ground (-)).

##### *Does the battery voltage exist?*

**NO** –

- Faulty ignition switch (page 19-13)
- Faulty starter switch (page 19-14)
- Engine stop switch (CM and U type) (page 19-14)
- Loose or poor contact connector
- Open circuit in wire harness

**YES** – GO TO STEP 7.

**7. Starter Relay Switch Continuity Inspection**

Remove and check the operation of the starter relay switch (page 18-14).

***Is there continuity?***

**NO** – Faulty starter relay switch

**YES** – Loose or poor contact 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 sidestand up and the clutch lever pulled in.**

**1. Clutch Switch Inspection**

Check the clutch switch operation (page 19-20).

***Is the clutch switch operation normal?***

**NO** – Faulty clutch switch

**YES** – GO TO STEP 2.

**2. Sidestand Switch Inspection**

Check the sidestand switch operation (page 19-19).

***Is the sidestand switch operation normal?***

**NO** – Faulty sidestand switch (page 19-19)

**YES** – • Open circuit in wire harness  
• Loose or poor contact connector

**Starter motor turns slowly**

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

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

- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter idle gear and/or reduction gear

**Starter relay switch "Clicks", but engine does not turn over**

- Crankshaft does not turn due to engine problems

## ELECTRIC STARTER

### STARTER MOTOR

#### REMOVAL

Remove the lower cowl (page 2-8).

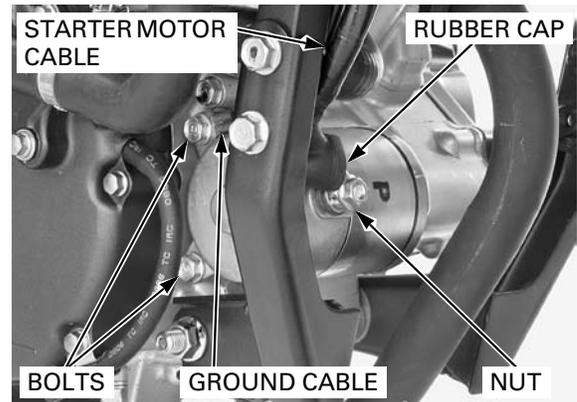
*With the ignition switch OFF, remove the negative (-) cable at the battery before servicing the starter motor.*

Release 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.



Remove the O-ring.



#### DISASSEMBLY/INSPECTION

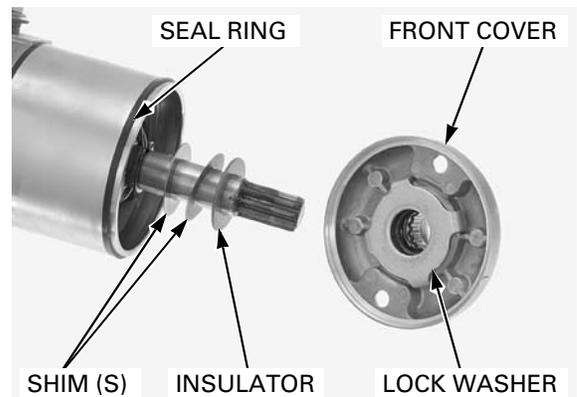
Remove the starter motor case bolts and O-rings.



*Record the location and number of shim (s).*

Remove the front cover, insulator, shim (s) and seal ring.

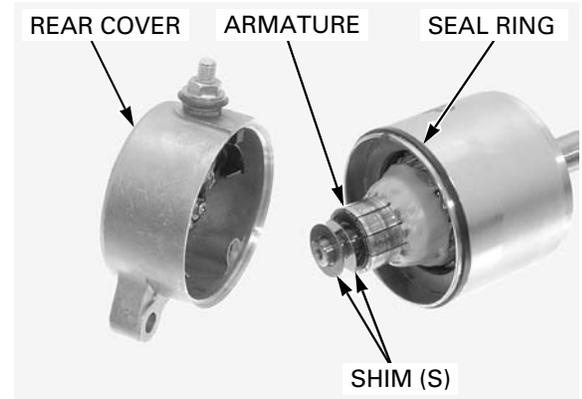
Remove the lock washer from the front cover.



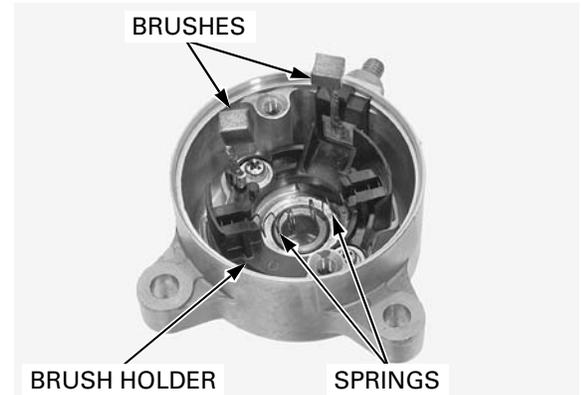
## ELECTRIC STARTER

*Record the location and number of shim (s).*

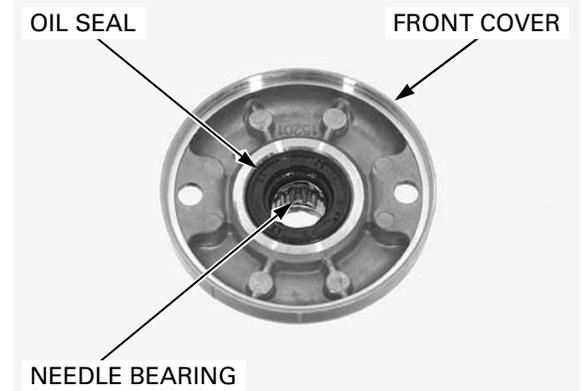
Remove the rear cover, shim (s) and seal ring.  
Remove the armature from the motor case.



Remove the brushes and springs from the brush holder.

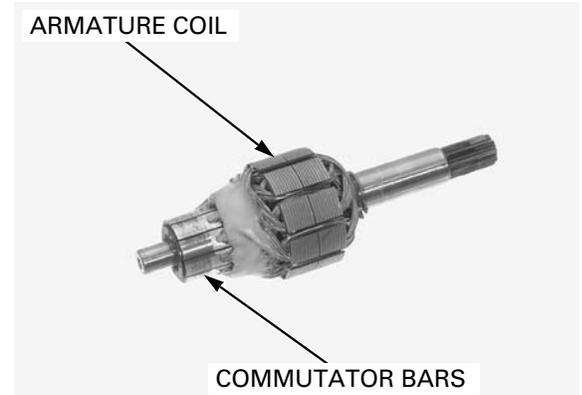


Check the oil seal of the front cover for deterioration or damage.  
Check the needle bearing for wear or damage.  
Replace the starter motor as an assembly if necessary.



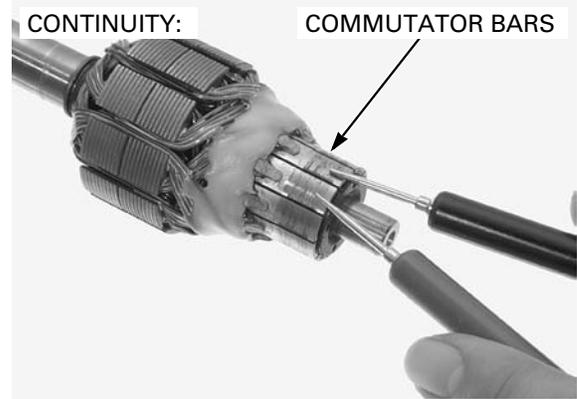
*Do not use emery or sand paper on the commutator.*

Clean the metallic debris off between commutator bars.  
Check the commutator bars of the armature for discoloration, wear or damage.  
Replace the starter motor as an assembly if necessary.

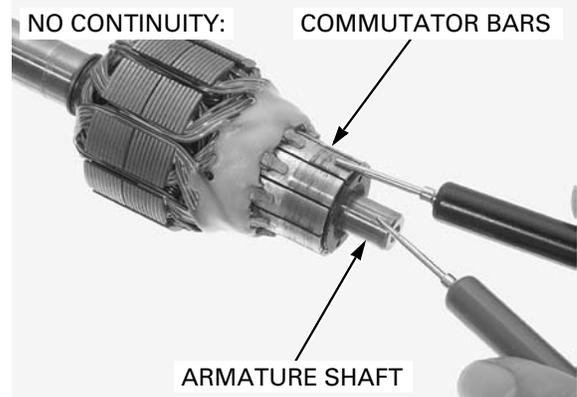


## ELECTRIC STARTER

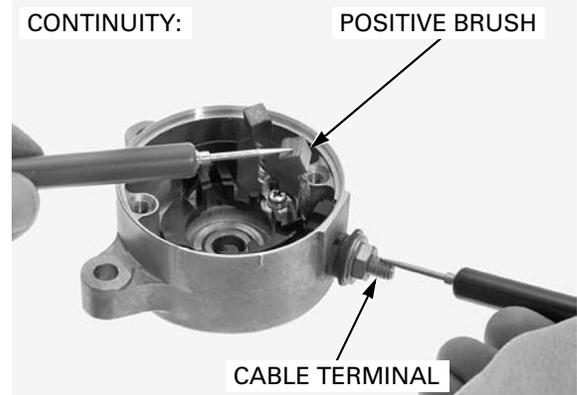
Check for continuity between pair of commutator bars.  
There should be continuity.



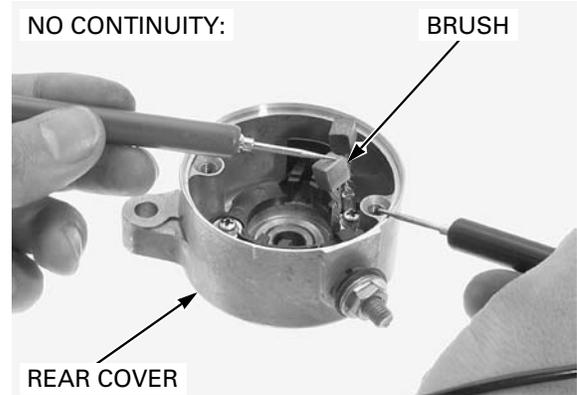
Check for continuity between each individual commutator bar and the armature shaft.  
There should be no continuity.



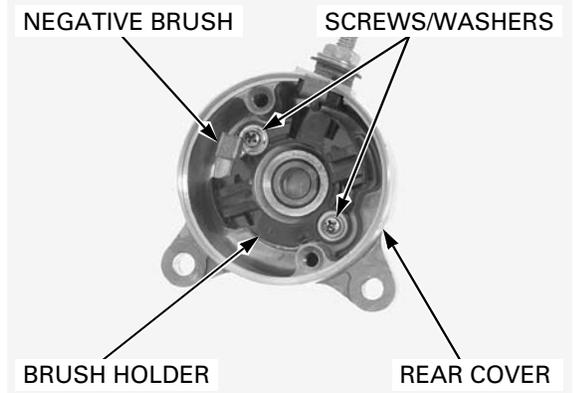
Check for continuity between the positive brush and cable terminal.  
There should be continuity.



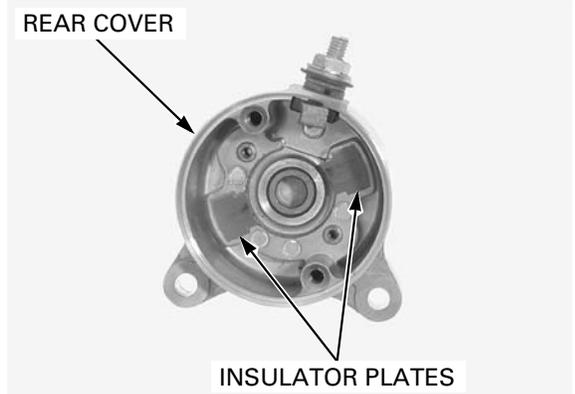
Check for continuity between the positive brush and rear cover.  
There should be no continuity.



Remove the screws, washers, negative brush and brush holder from the rear cover.

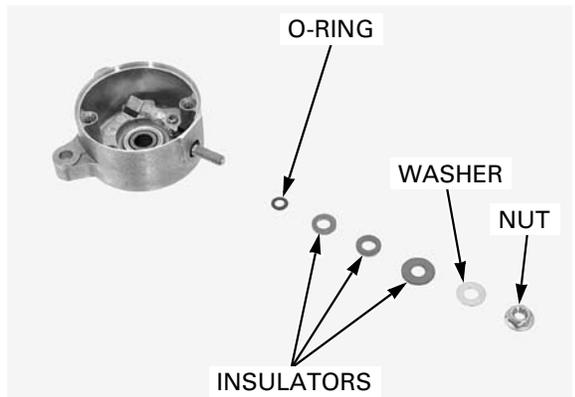


Remove the insulator plates from the rear cover.

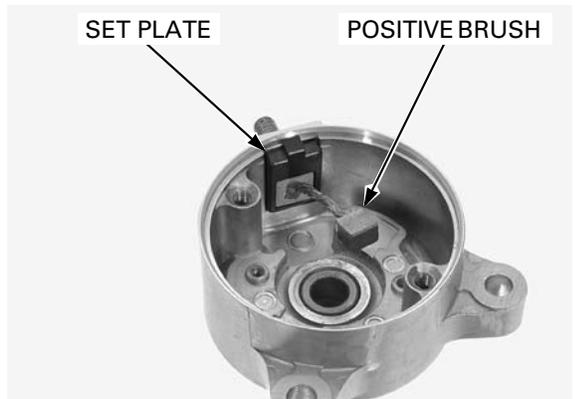


Remove the following:

- Nut
- Washer
- Insulators
- O-ring



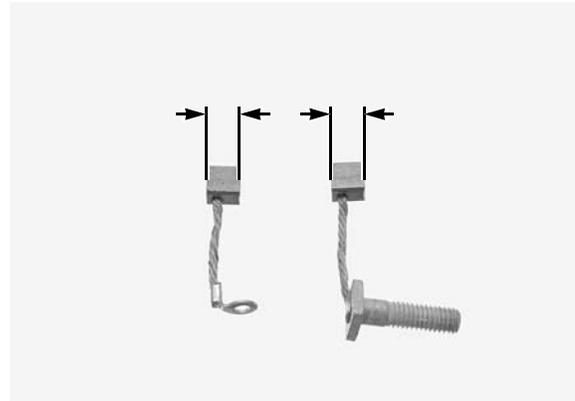
Remove the positive brush and set plate.



# ELECTRIC STARTER

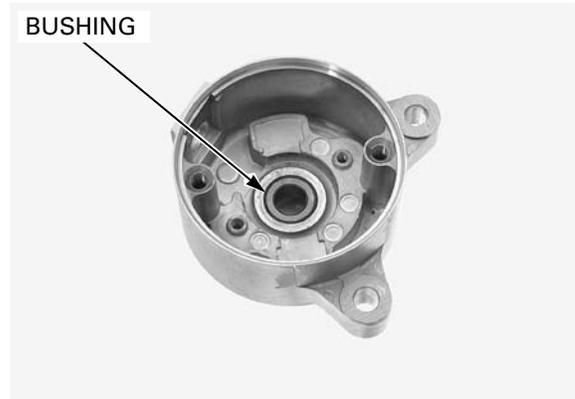
Measure the brush length.

**SERVICE LIMIT: 3.5 mm (0.14 in)**

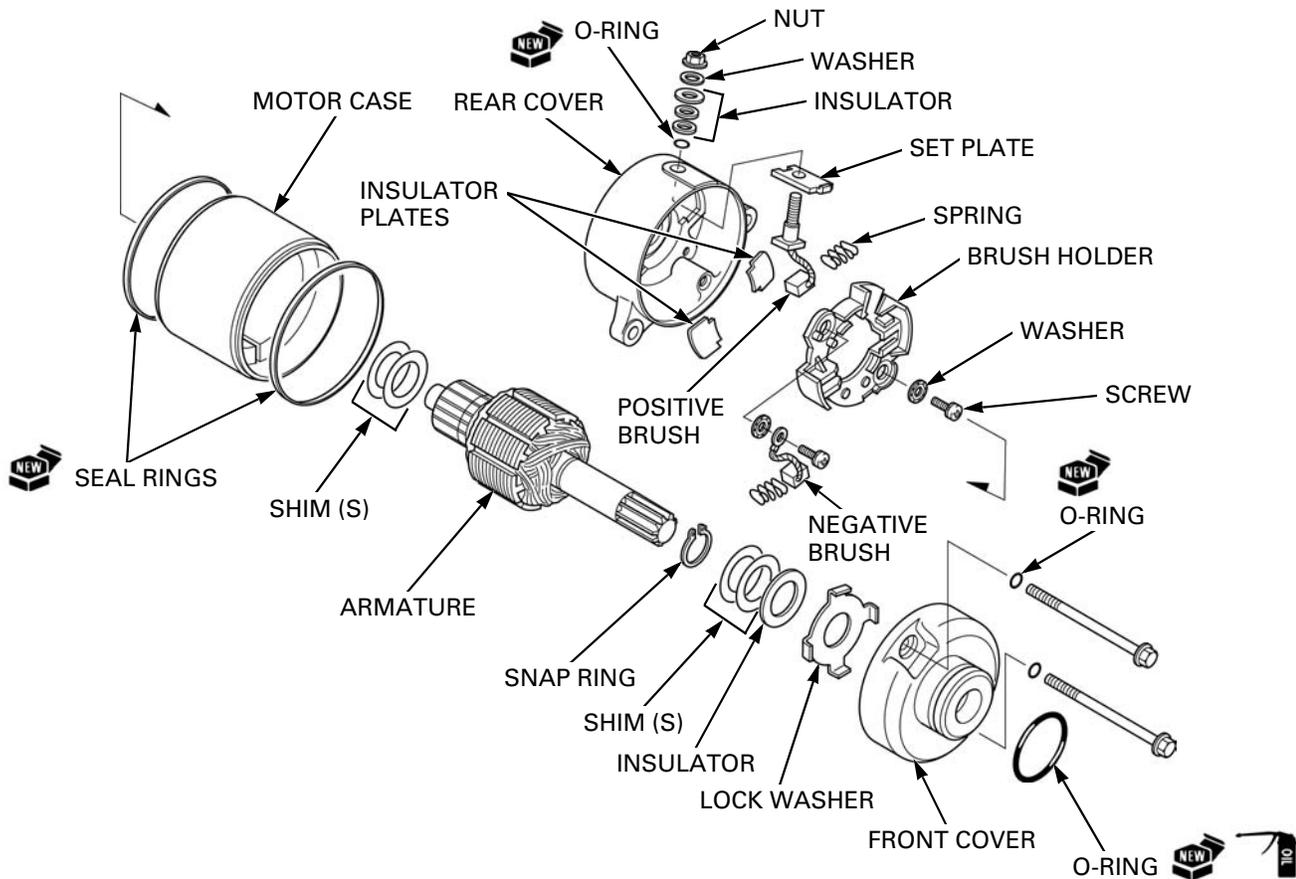


Check the bushing of the rear cover for wear or damage.

Replace the starter motor as an assembly if necessary.

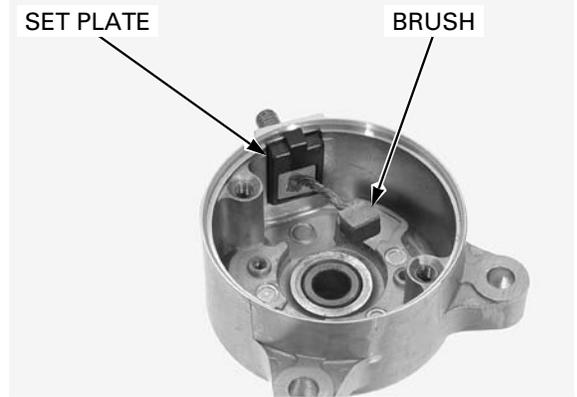


## ASSEMBLY

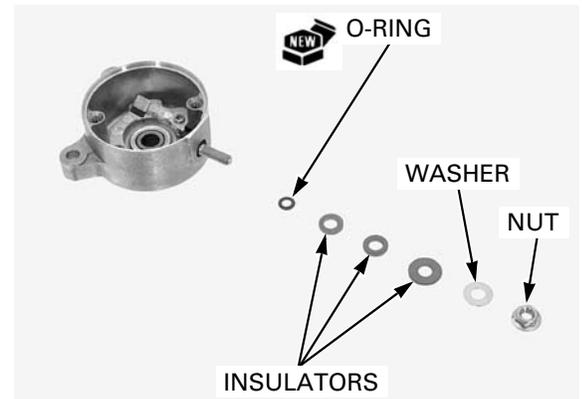


## ELECTRIC STARTER

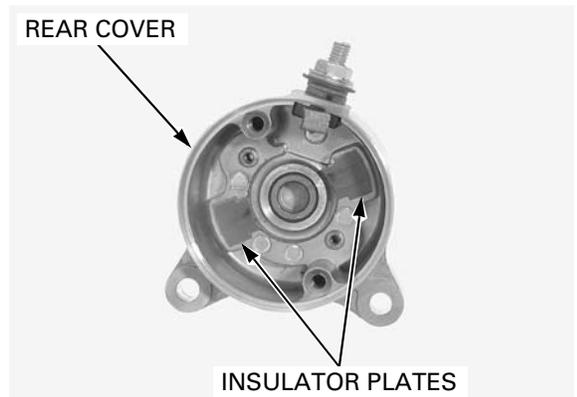
Install the set plate and brush into the rear cover.



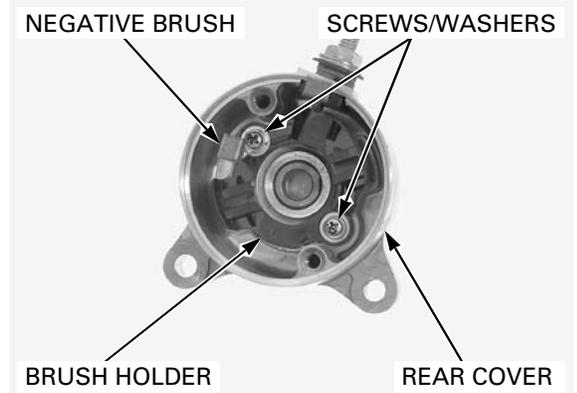
Install a new O-ring, insulators, washer and nut. Tighten the nut securely.



Install the insulator plates onto the rear cover.



Install the brush holder, negative brush, washers and screws into the rear cover as shown. Tighten the screws.



## ELECTRIC STARTER

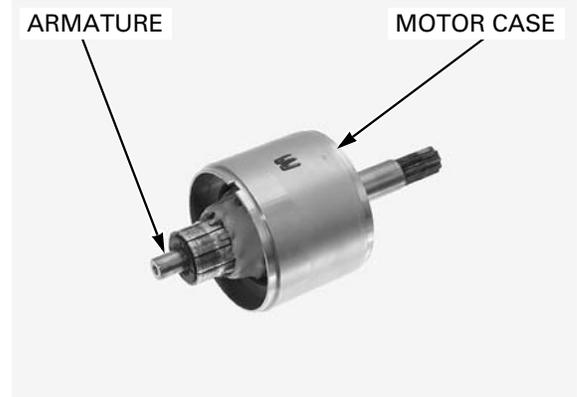
Apply engine oil to the oil seal lips.



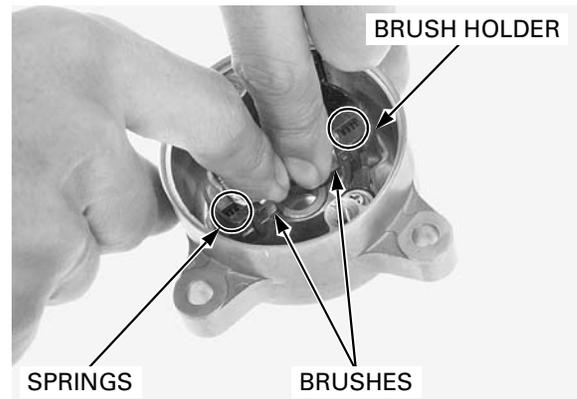
Install the armature into the motor case while holding the armature shaft tightly to keep the magnet of the motor case from pulling the armature shaft against it.

### NOTICE

*The coil may be damaged if the magnet pulls the armature against the motor case.*



Install the springs and brushes to the brush holder.

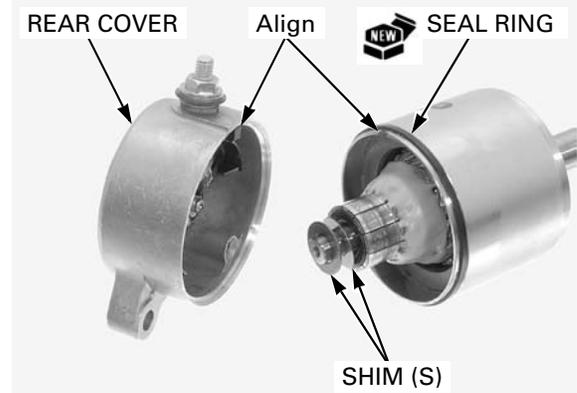


Install a new seal ring to the motor case.

Install the shim (s) onto the armature shaft.

Install the rear cover while pushing the brushes into the brush holder and aligning the brush set plate tab with the motor case groove.

*Install the same number of shim (s) in the same locations as noted during disassembly.*

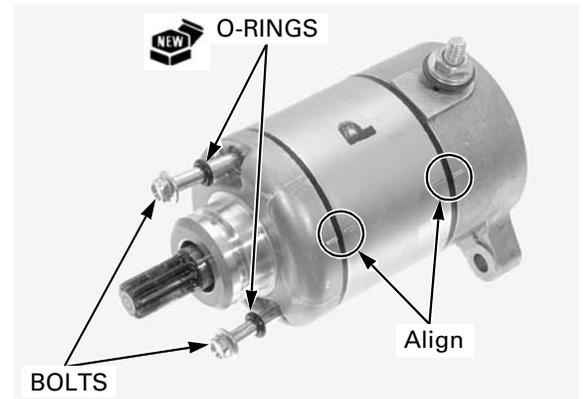
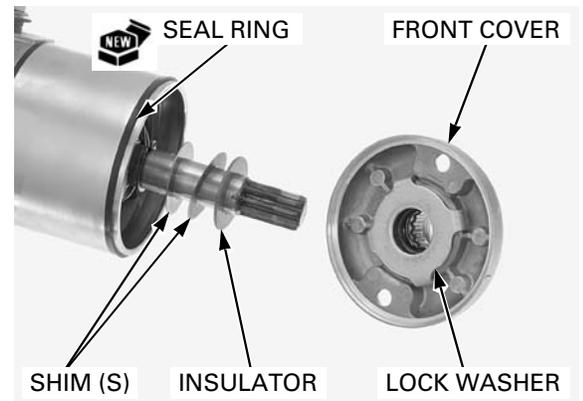


*Install the same number of shim (s) in the same locations as noted during disassembly.*

Install the shim (s) and insulator.  
 Install a new seal ring to the motor case.  
 Install the lock washer to the front cover.  
 Install the front cover.

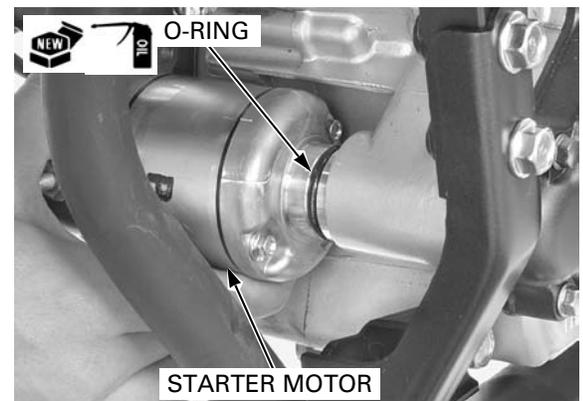
- When installing the front cover, take care to prevent damaging the oil seal lip with the armature shaft.

Align the index lines on the covers and motor case.  
 Install new O-rings onto the motor case bolts.  
 Install and tighten the starter motor case bolts securely.



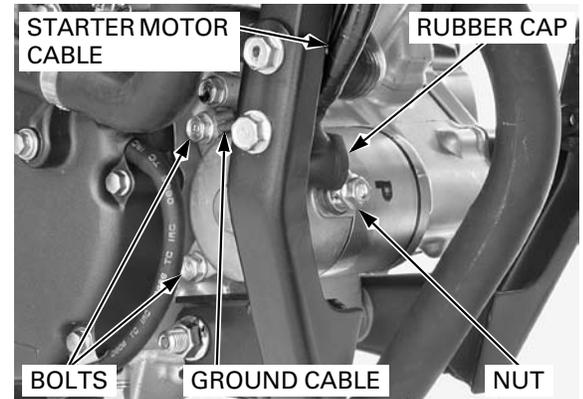
**INSTALLATION**

Apply engine oil to a new O-ring and install it into the starter motor groove.



*Route the cable properly (page 1-18).*

Install the starter motor into the crankcase from the right side.  
 Install the ground cable and starter motor mounting bolts.  
 Tighten the mounting bolts securely.  
 Install the starter motor cable and starter motor terminal nut.  
 Tighten the terminal nut securely and reposition rubber cap properly on the starter motor terminal.  
 Install the lower cowl (page 2-8).



# STARTER RELAY SWITCH

### INSPECTION

Remove the single seat (page 2-4).

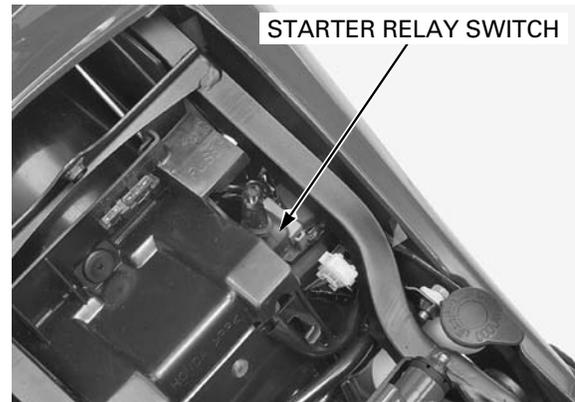
Shift the transmission into neutral.

Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Push the starter switch.

The coil is normal if the starter relay switch clicks.

If you don't hear the starter relay switch "CLICK", inspect the starter relay switch using a procedure below.

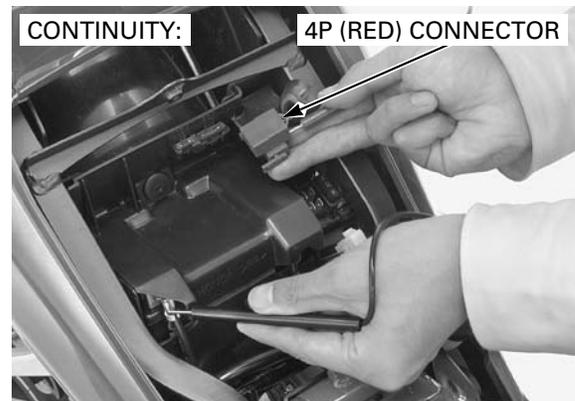


### GROUND LINE

Disconnect the starter relay switch 4P (Red) connector.

Check for continuity between the Green/red wire of the wire harness side (ground line) and ground when the starter switch button is pushed.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the sidestand is retracted, the ground circuit of the relay coil is normal. (In neutral, there is a slight resistance due to the diode.)

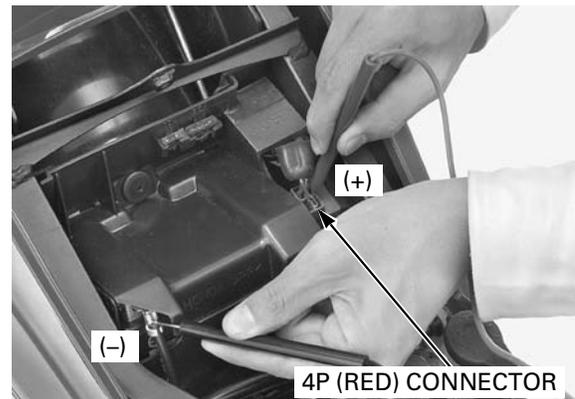


### STARTER RELAY INPUT VOLTAGE

Connect the starter relay switch 4P (Red) connector. Turn the ignition switch ON (and engine stop switch "O": CM and U type).

Measure the voltage between the Yellow/red (+) wire terminal at the starter relay switch 4P (Red) connector and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch ON (and engine stop switch "O": CM and U type), the starter relay input voltage is normal.

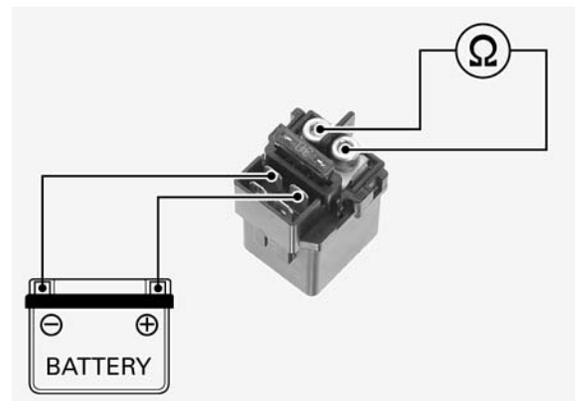


### OPERATION CHECK

Remove the starter relay switch (page 18-15).

Connect a 12 V battery to the starter relay switch as shown.

There should be continuity between the cable terminals when the battery is connected, and not continuity when the battery is disconnected.



**REMOVAL/INSTALLATION**

Remove the rear cowl (page 2-5).

Release the rubber cover.

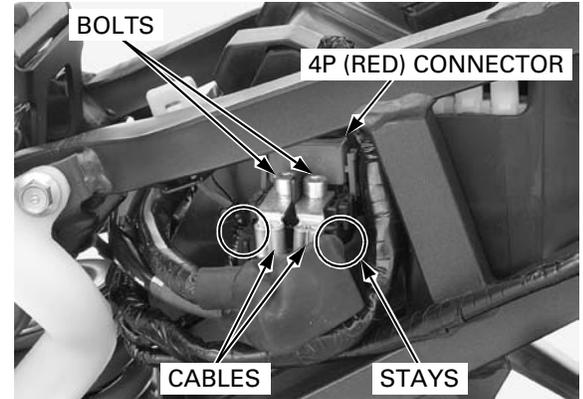
Disconnect the starter relay switch 4P (Red) connector.

Remove the bolts and disconnect the starter and ground cables.

Remove the starter relay switch from the stays with the shock rubber.

Remove the starter relay switch from the shock rubber.

Installation is in the reverse order of removal.



**DIODE**

**INSPECTION**

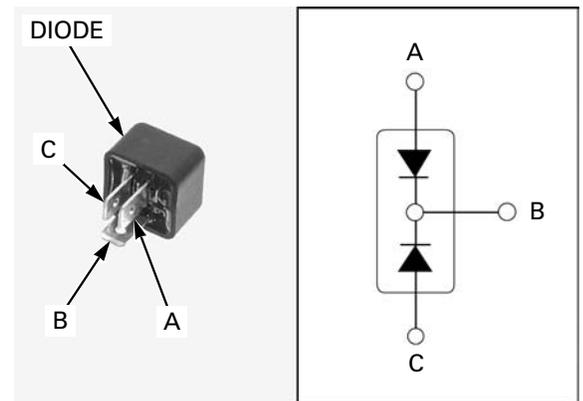
Remove the rear cowl (page 2-5).

Remove the diode.



Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



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**MEMO**

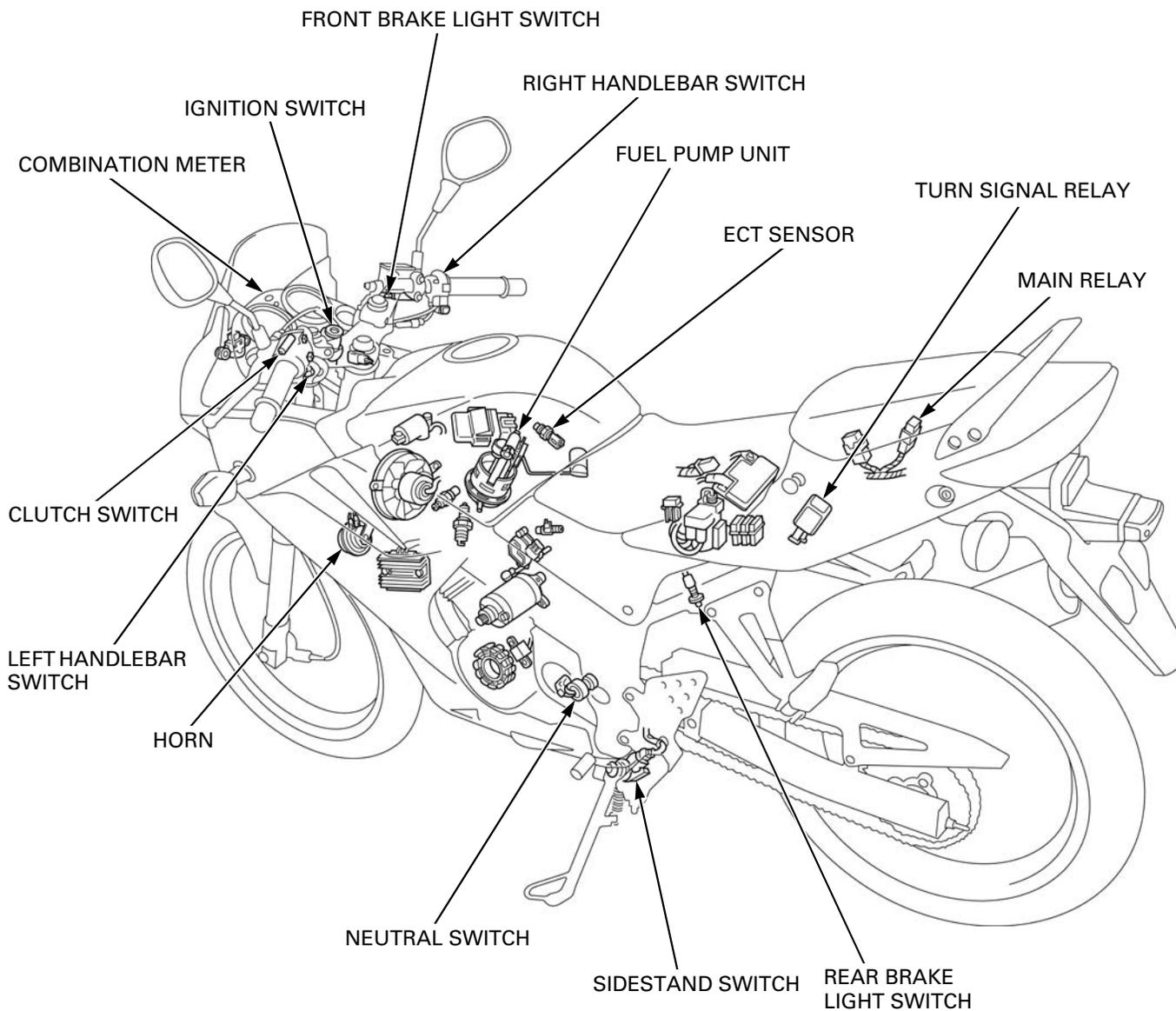
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# 19. LIGHTS/METERS/SWITCHES

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SYSTEM LOCATION.....	19-2	IGNITION SWITCH .....	19-13
SERVICE INFORMATION .....	19-3	HANDLEBAR SWITCHES.....	19-14
HEADLIGHT.....	19-4	BRAKE LIGHT SWITCHES .....	19-16
POSITION LIGHT .....	19-4	NEUTRAL SWITCH.....	19-17
TURN SIGNAL LIGHTS .....	19-5	SIDESTAND SWITCH.....	19-19
BRAKE/TAIL LIGHT .....	19-6	CLUTCH SWITCH .....	19-20
LICENSE LIGHT.....	19-7	FUEL GAUGE/FUEL LEVEL SENSOR ...	19-20
COMBINATION METER.....	19-8	HORN .....	19-21
TACHOMETER .....	19-11	TURN SIGNAL RELAY .....	19-22
COOLANT TEMPERATURE GAUGE/ ECT SENSOR .....	19-12	MAIN RELAY .....	19-22

SYSTEM LOCATION



# SERVICE INFORMATION

## GENERAL

### NOTICE

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put fingerprints 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 headlight bulb.
- A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.
- 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		SPECIFICATION	
Bulbs	Headlight	Hi	12 V - 55 W
		Lo	12 V - 55 W
	Position light		12 V - 5 W
	Brake/tail light		12 V - 21/5 W
	Turn signal light	Except CM type	12 V - 21 W x 4
		CM type only	12 V - 23 W x 4
	License light		12 V - 5 W
	Instrument light		12 V - 1.7 W x 4
	Turn signal indicator		12 V - 1.7 W
	High beam indicator		12 V - 1.7 W
	Neutral indicator		12 V - 1.7 W
	MIL		LED
Fuse	Main fuse	30 A	
	Sub fuse	10 A x 4	

## TORQUE VALUES

Turn signal light lens screw	0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)
Turn signal light mounting nut	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)
License light cover screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
License light mounting nut	4.5 N·m (0.5 kgf·m, 3.3 lbf·ft)

## HEADLIGHT

### BULB REPLACEMENT

Disconnect the headlight bulb connector.  
 Remove the dust cover.  
 Unhook the bulb retainer and remove the headlight bulb.  
 Remove the headlight bulb.

#### NOTICE

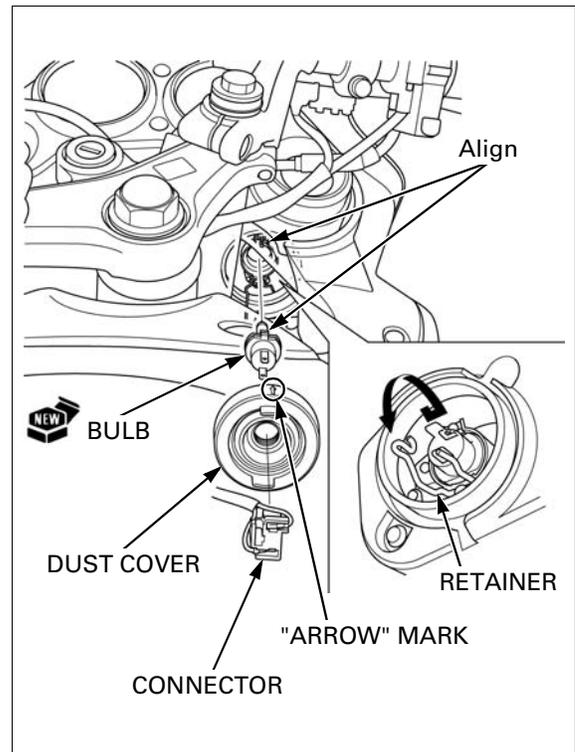
*Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.*

Install a new bulb, while aligning the tabs of the bulb with the slots of the headlight unit.

Hook the bulb retainer into the headlight unit groove.

Install the dust cover with the "arrow" mark facing up.

Connect the headlight connector.



### REMOVAL/INSTLATION

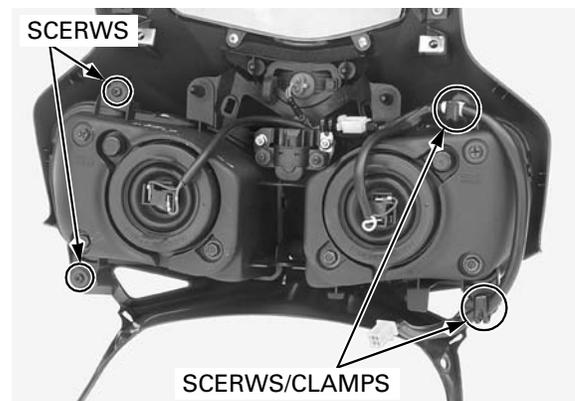
Remove the upper cowl (page 2-10).

Remove the headlight mounting screws, clamps and headlight unit.

*Route the wires properly (page 1-18).*

Install the headlight unit, headlight mounting screws and clamps.

Install the upper cowl (page 2-10).



## POSITION LIGHT

### BULB REPLACEMENT

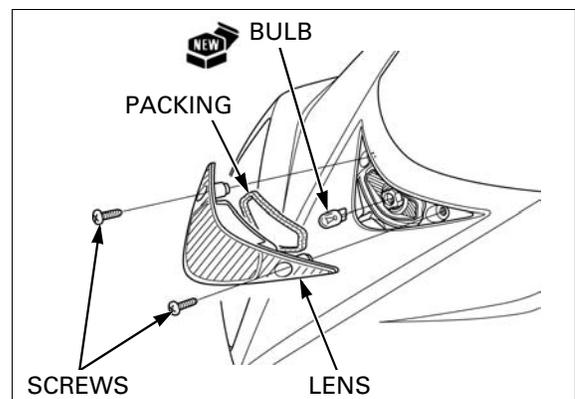
Remove the screws and position light lens.

Remove the bulb from the socket, replace it with a new one.

Check the packing is installed in position and is in good condition, replace it with a new one if necessary.

Install the position light lens and screws.

Tighten the screws.



# TURN SIGNAL LIGHTS

## BULB REPLACEMENT

Remove the screw, washer (CM type only), turn signal light lens.

While pushing in the bulb, turn it counterclockwise to remove it.

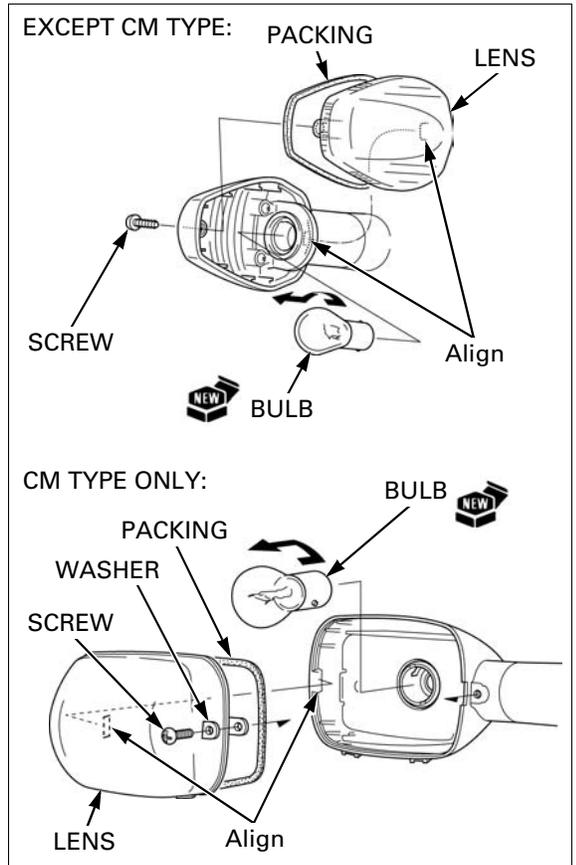
Replace the bulb with a new one.

Check the packing is installed in position and is in good condition, replace it with a new one if necessary.

Install the turn signal light lens by aligning the slot with the tab of the turn signal light.

Install the screw and washer (CM type only). Tighten the screw to the specified torque.

**TORQUE: 0.9 N·m (0.1 kgf·m, 0.7 lbf·ft)**



## REMOVAL/INSTALLATION

### FRONT

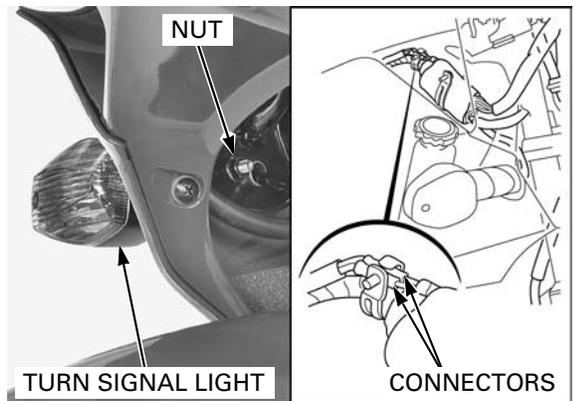
Disconnect the turn signal light connectors. Remove the turn signal light mounting nut and turn signal light.

*Route the wire properly (page 1-18).* Install the turn signal light and turn signal light mounting nut.

Tighten the nut to the specified torque.

**TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)**

Connect the turn signal light connectors.



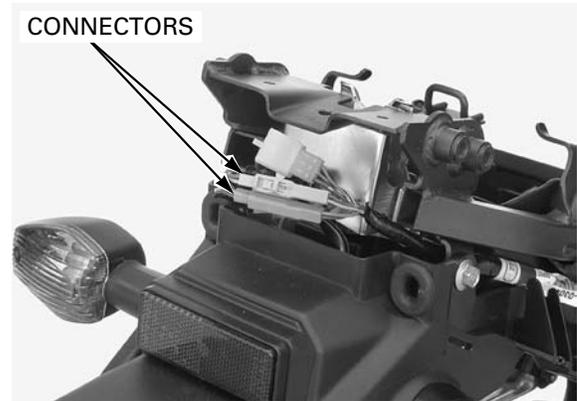
## LIGHTS/METERS/SWITCHES

### REAR

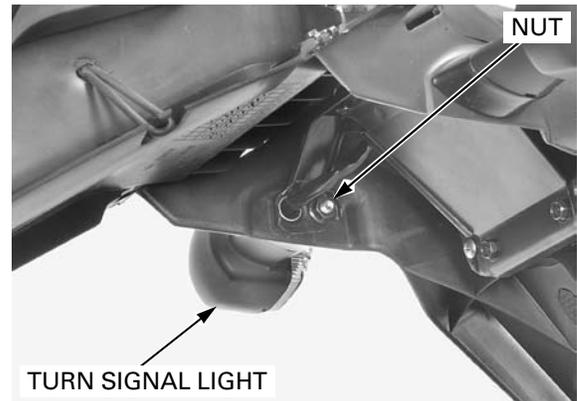
Remove the following:

- Rear cowl (page 2-5)
- Brake/tail light (page 19-6)

Disconnect the turn signal light connectors.



Remove the turn signal light mounting nut and turn signal light.



*Route the wire properly (page 1-18).*

Install the turn signal light in the reverse order of removal.

### TORQUE:

**Turn signal light mounting nut:**  
**8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)**

## BRAKE/TAIL LIGHT

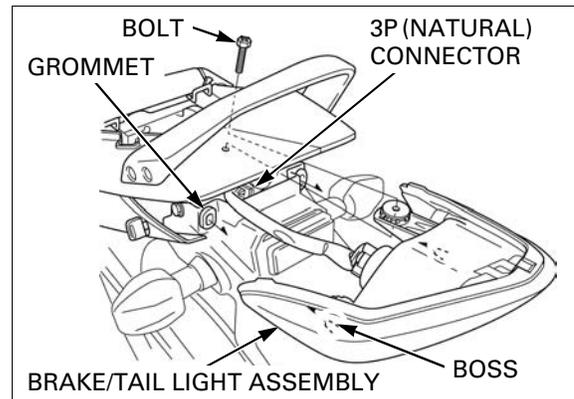
### BULB REPLACEMENT

Remove the pillion seat (page 2-4).

Remove the bolt.

Release the brake/tail light assembly bosses from the rear fender grommets.

Disconnect the brake/tail light 3P (Natural) connector and remove the brake/tail light.

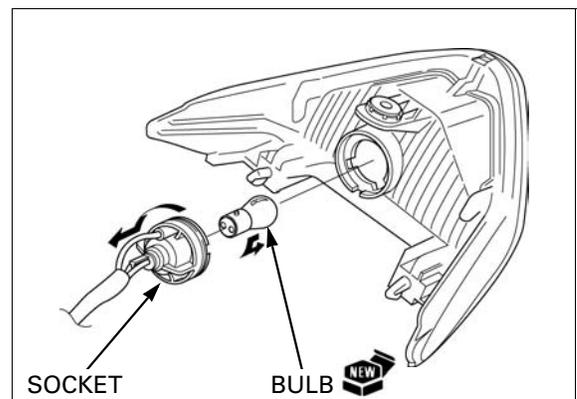


Turn the bulb socket counterclockwise and remove it.

While pushing in the bulb, turn it counterclockwise to remove it.

Replace the bulb with a new one.

Install the removed parts in the reverse order of removal.



## LICENSE LIGHT

### BULB REPLACEMENT

Remove the screws and license light cover.

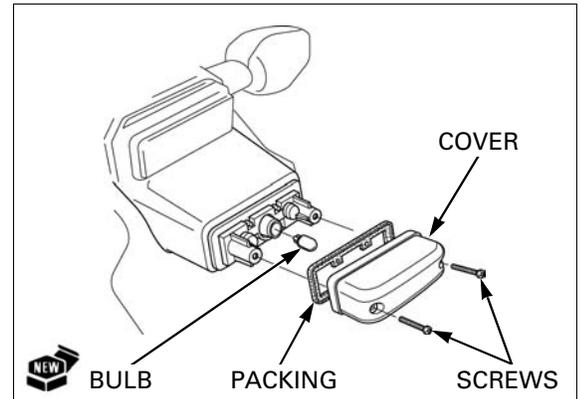
Remove the bulb from the socket, replace it with a new one.

Check the packing is installed in position and is in good condition, replace it with a new one if necessary.

Install the license light cover and screws.

Tighten the screws to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

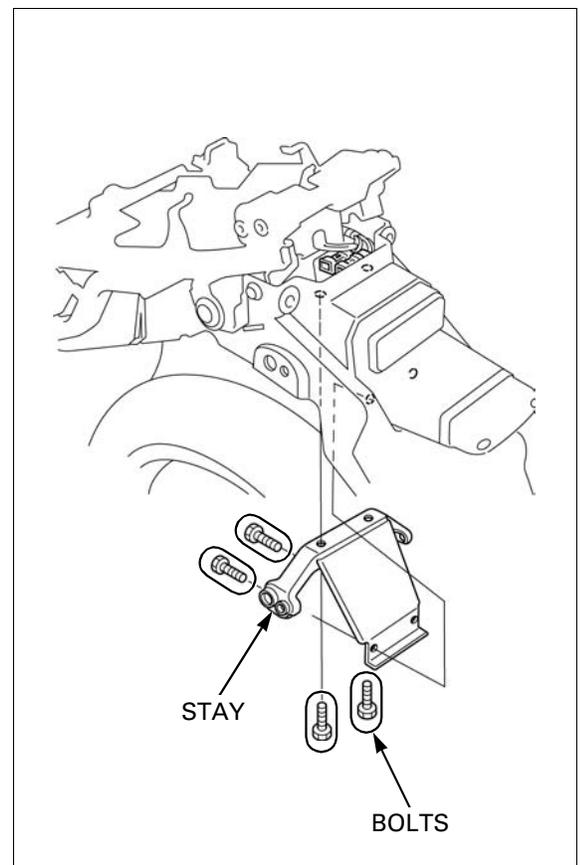


### REMOVAL/INSTALLATION

Remove the following:

- Rear cowl (page 2-5)
- Brake/tail light (page 19-6)
- Rear turn signal light (page 19-6)

Remove the bolts and rear turn signal light stay.

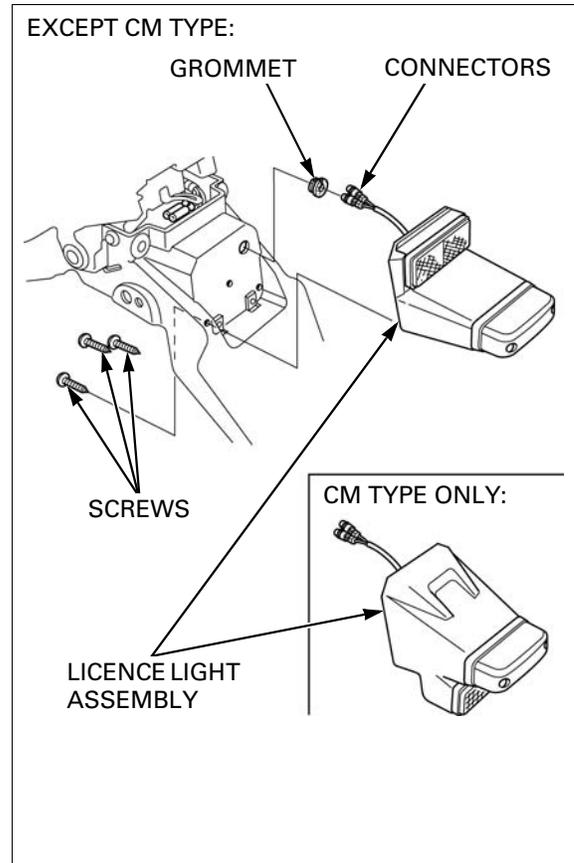


## LIGHTS/METERS/SWITCHES

Disconnect the license light wire connectors.

Remove the screws.

Pull out the wire from the rear fender and remove the license light assembly and grommet.



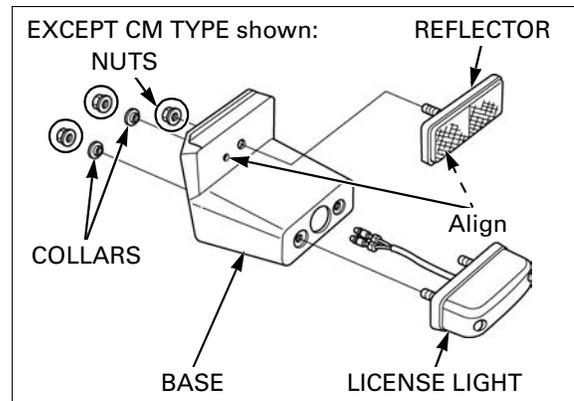
Remove the nuts, collars, reflector and license light from the license light base.

Install the reflector by aligning the pin with hole. Install and tighten the nut.

Install the removed parts in the reverse order of removal.

### TORQUE:

License light mounting nut:  
4.5 N·m (0.5 kgf·m, 3.3 lbf·ft)



## COMBINATION METER

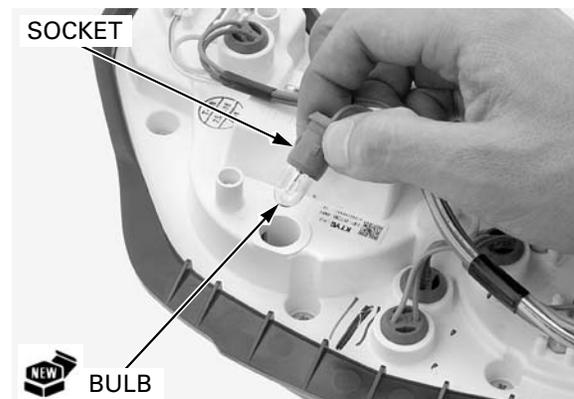
### BULB REPLACEMENT

Remove the combination meter assembly (page 19-9).

Remove the meter bulb sockets.

Remove the bulb from the socket, replace it with a new one.

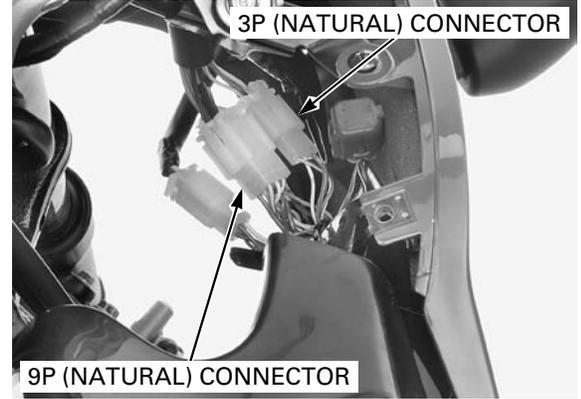
Install the removed parts in the reverse order of removal.



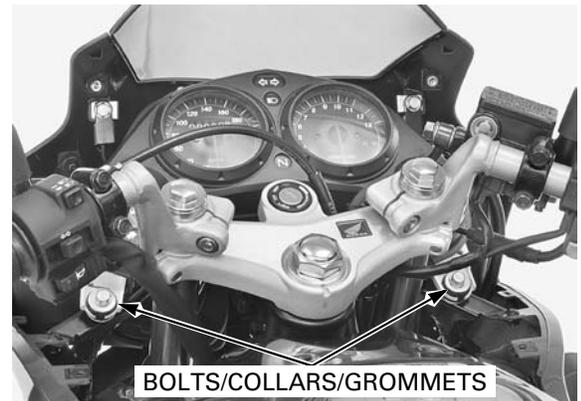
**REMOVAL/INSTALLATION**

Remove the inner cowl (page 2-7).

Disconnect the combination meter 9P (Natural) and 3P (Natural) connectors.

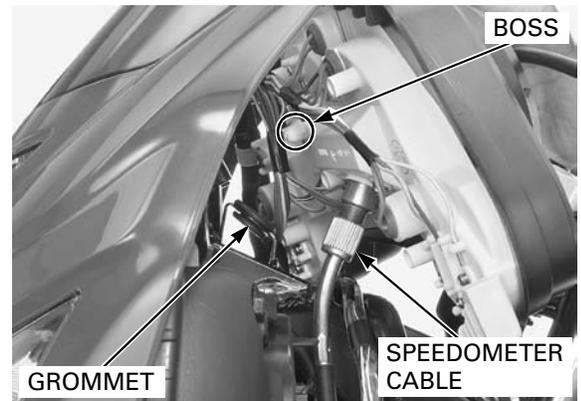


Remove the bolts, collars and grommets.



Lift the combination meter assembly while releasing the boss from the grommet.

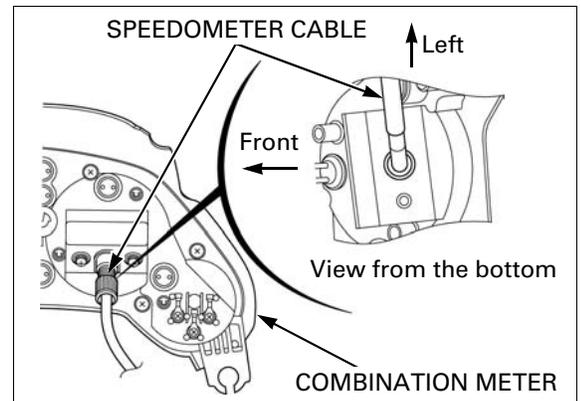
Disconnect the speedometer cable from the combination meter assembly.



Install the combination meter assembly in the reverse order of removal.

**NOTE:**

When connecting the speedometer cable, note the cable direction as shown.



## LIGHTS/METERS/SWITCHES

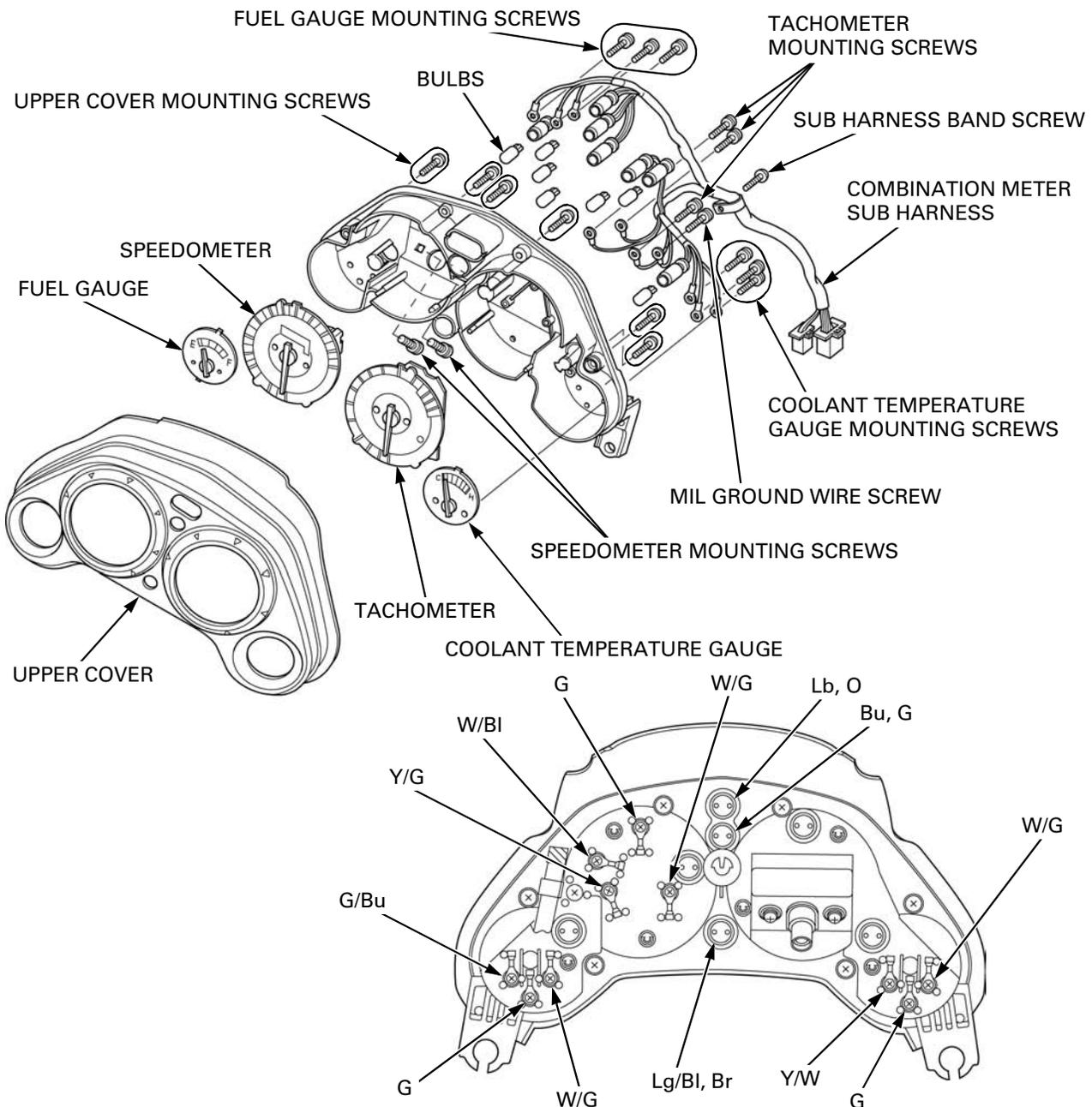
### DISASSEMBLY/ASSEMBLY

Remove the combination meter assembly (page 19-9).

Remove the following:

- Upper cover mounting screws and upper cover
- Coolant temperature gauge mounting screws and coolant temperature gauge
- Tachometer mounting screws and tachometer
- MIL ground wire screw
- Speedometer mounting screws and speedometer
- Fuel gauge mounting screws and fuel gauge
- Sub harness band screw
- Bulb sockets and combination meter sub harness

Assemble the combination meter in the reverse order of disassembly.

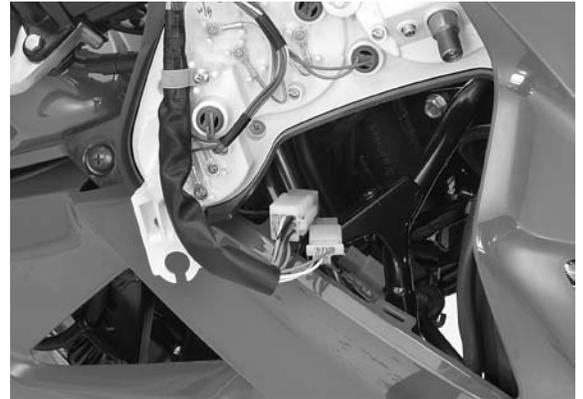


## TACHOMETER

### INSPECTION

Remove the combination meter assembly (page 19-9).

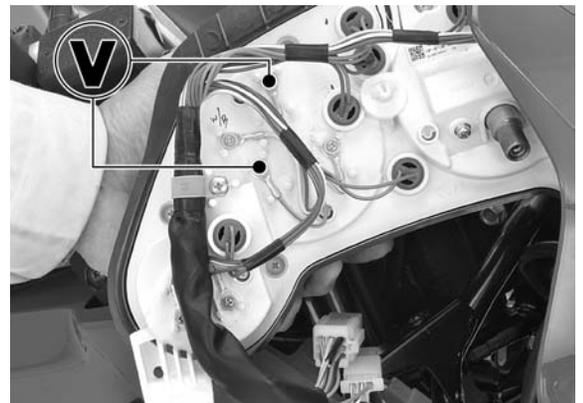
Temporarily connect the combination meter 9P (Natural) and 3P (Natural) connectors.



Start the engine and measure the voltage between the Yellow/green (+) and Green (-) wire terminals.

There should be at least 6 V pulse voltage.

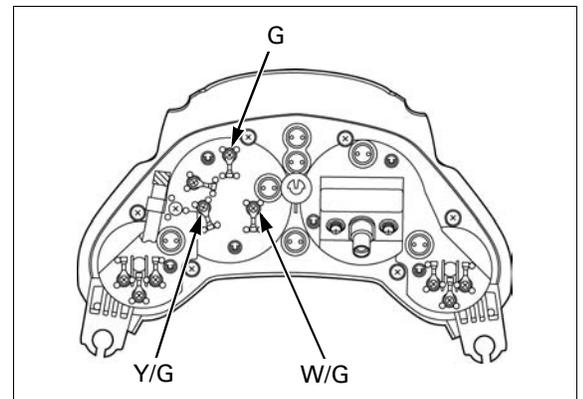
If there is pulse voltage, replace the tachometer (page 19-10).



If there is no pulse voltage, check for following:

- Open or short circuit in Yellow/green wire
- Open or short circuit in White/green line
  - Blown main fuse
  - Blown sub fuse
  - Faulty main relay (page 19-22)
- Open circuit in Green wire

If the wires and tachometer are normal, replace the ECM (page 5-65).



## COOLANT TEMPERATURE GAUGE/ ECT SENSOR

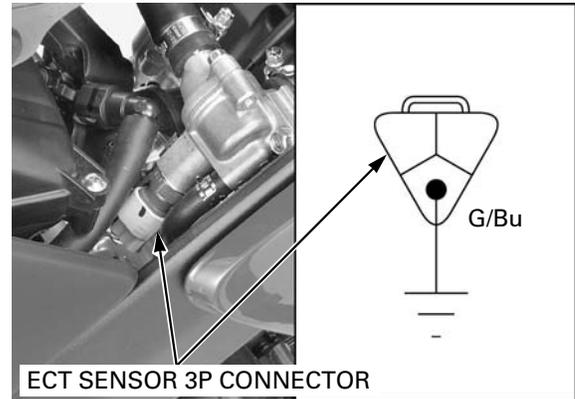
### GAUGE INSPECTION

Lift and support the fuel tank (page 3-6).

**The coolant temperature is too high, but the gauge needle does not move**

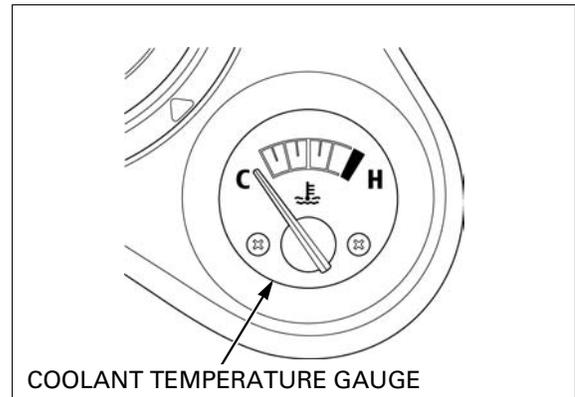
Disconnect the ECT sensor 3P connector.

Ground the ECT sensor 3P connector Green/blue terminal at the wire harness side.



Turn the ignition switch ON and check the coolant temperature gauge needle.

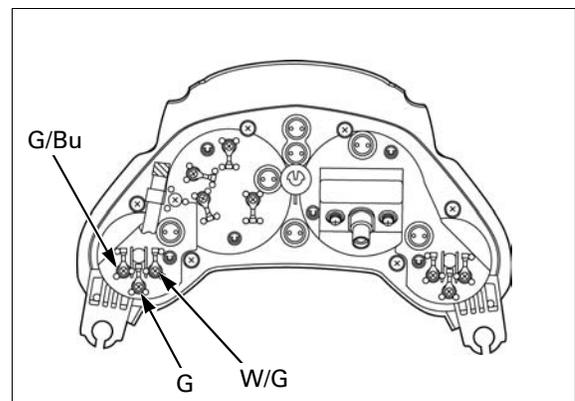
If the gauge needle moves, check the ECT sensor (page 19-13).



If the gauge needle does not move, check for following:

- Open or short circuit in Yellow/green wire
- Open or short circuit in White/green line
  - Blown main fuse
  - Blown sub fuse
  - Faulty main relay (page 19-22)
- Open circuit in Green wire

If the wires and ECT sensor are normal, replace the coolant temperature gauge (page 19-10).



**The coolant temperature is low, but the gauge needle moves**

Turn the ignition switch OFF.

Disconnect the ECT sensor 3P connector.

Turn the ignition switch ON.

If the gauge needle moves, inspect the ECT sensor (page 19-13).

If the gauge needle does not move, check for a short circuit in the Green/blue wire. If the wire is OK, replace the coolant temperature gauge (page 19-10).

### ECT SENSOR INSPECTION

Remove the ECT sensor (page 5-63).

*Wear insulated gloves and adequate eye protection. Keep flammable materials away from the burner.*

Heat the coolant (1:1 mixture) with an electric heating element.

Suspend the ECT sensor in heated coolant and check the continuity through the sensor as the coolant heats up.

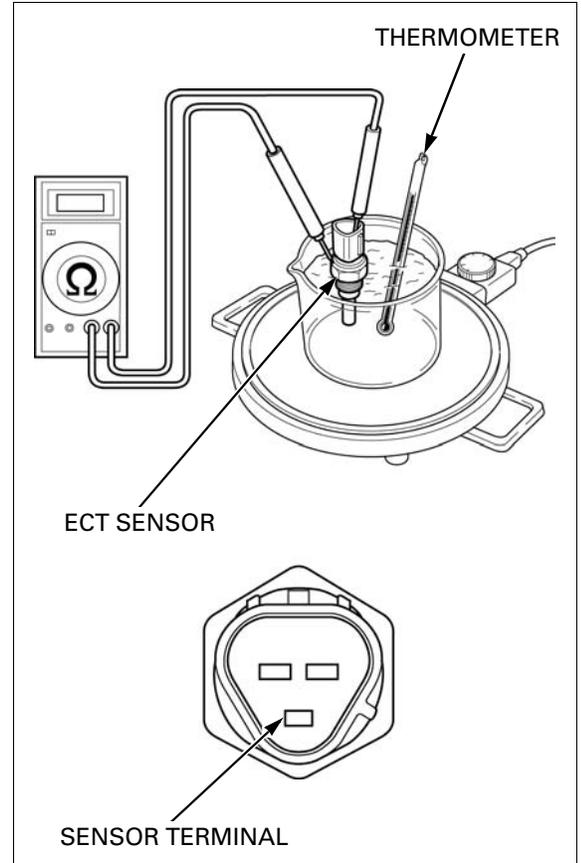
**NOTE:**

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the ECT sensor.
- Keep temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.

Temperature	80°C (176°F)	120°C (248°F)
Resistance	47 – 57 Ω	14 – 18 Ω

Replace the ECT sensor if it is out of specification by more than 10% at any temperature listed.

Install the ECT sensor (page 5-63).



## IGNITION SWITCH

### INSPECTION

Lift and support the fuel tank (page 3-6). Open the rubber sheet (page 6-10).

Disconnect the ignition switch 2P (Natural) connector.

Check for continuity between the switch side connector terminals in each switch position. Continuity should exist between the color coded wires as shown in the table.

	BAT1	BAT2
ON	○	○
OFF		
LOCK		
COLOR	R/BI	BI

Close the rubber sheet (page 6-15).

Remove the suitable support and close the fuel tank (page 3-6).



## LIGHTS/METERS/SWITCHES

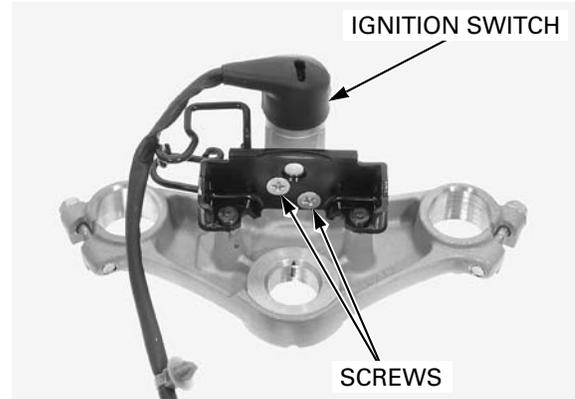
### REMOVAL/INSTALLATION

Remove the top bridge (page 13-27).

Remove the ignition switch mounting screws and ignition switch.

Install the ignition switch onto the top bridge. Install and tighten the ignition switch mounting screws securely.

Install the top bridge in the reverse order of removal.

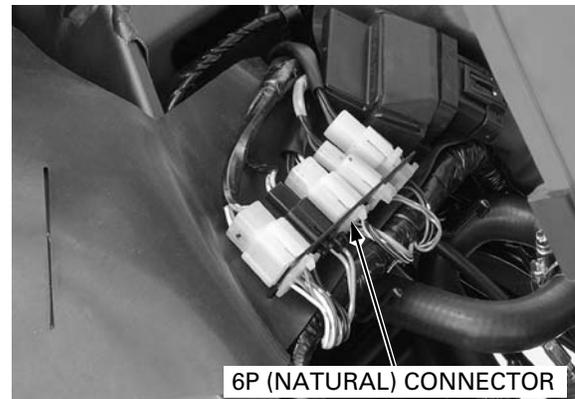


## HANDLEBAR SWITCHES

### RIGHT HANDLEBAR SWITCH

Lift and support the fuel tank (page 3-6). Open the rubber sheet (page 6-10).

Disconnect the right handlebar switch 6P (Natural) connector.



Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wire as shown in the tables.

#### STARTER SWITCH:

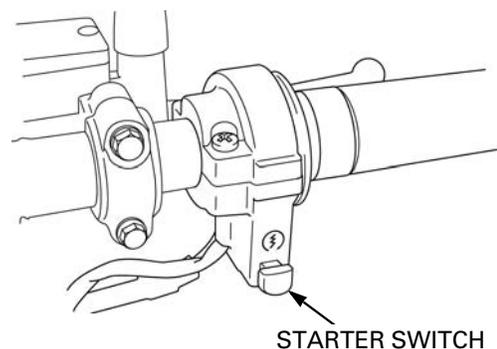
	ST	BAT
FREE		
PUSH	○	○
COLOR	Y/R	BI/W

#### ENGINE STOP SWITCH: (CM and U type)

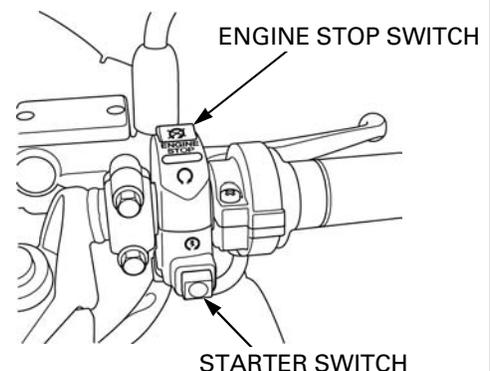
	IG	BAT
	○	○
COLOR	BI/W	BI

Close the rubber sheet (page 6-15). Remove the suitable support and close the fuel tank (page 3-6).

Except CM and U type:



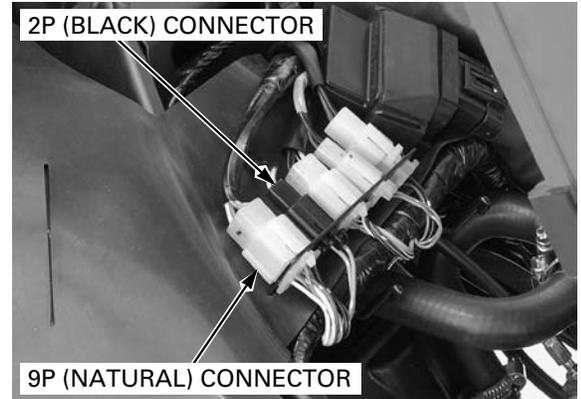
CM and U type:



**LEFT HANDLEBAR SWITCHES**

Lift and support the fuel tank (page 3-6).  
Open the rubber sheet (page 6-10).

Disconnect the left handlebar switch 9P (Natural) and 2P (Black) connectors.



Check for continuity between the switch side connector terminals in each switch position.

Continuity should exist between the color coded wire as shown in the tables.

**DIMMER SWITCH:**

	HL	Lo	Hi
Lo	○—○		
(N)	○		○
Hi	○		○
COLOR	W/G	W	Bu

**TURN SIGNAL SWITCH:**

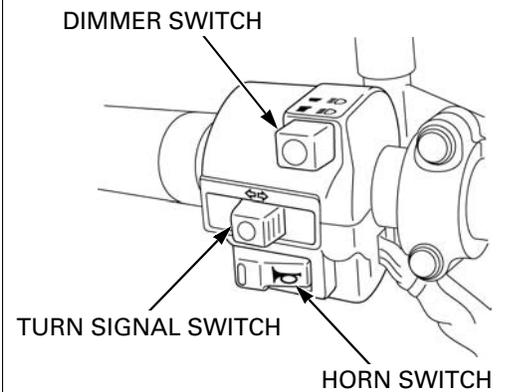
	R	WR	L
R	○—○		
N			
L		○—○	
COLOR	Lb	Gr	O

**HORN SWITCH:**

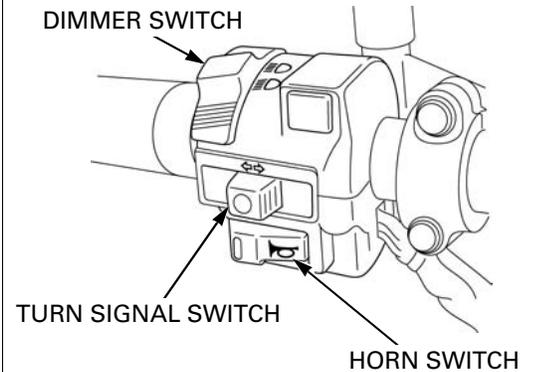
	Ho	BAT
FREE		
PUSH	○—○	
COLOR	Lg	Br

Close the rubber sheet (page 6-15).  
Remove the suitable support and close the fuel tank (page 3-6).

EXCEPT CM TYPE:



CM TYPE ONLY:



## BRAKE LIGHT SWITCHES

### FRONT

Disconnect the front brake light switch connectors and check for continuity between the switch terminals.

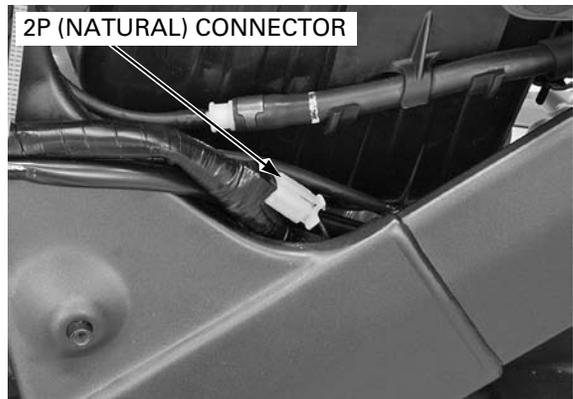
There should be continuity with the brake lever squeezed, and no continuity with the brake lever released.



### REAR

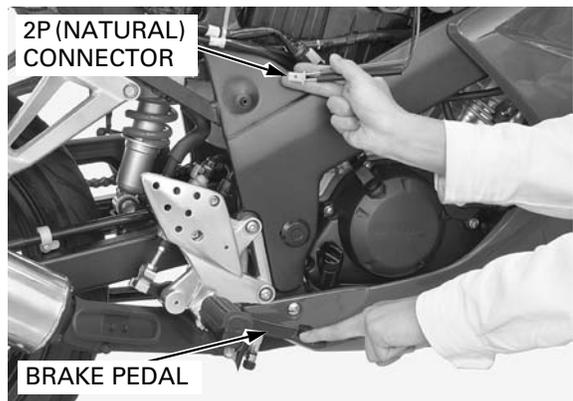
Remove the rear cowl (page 2-5).

Disconnect the rear brake light switch 2P (Natural) connector.



Check for continuity between the switch side connector terminals.

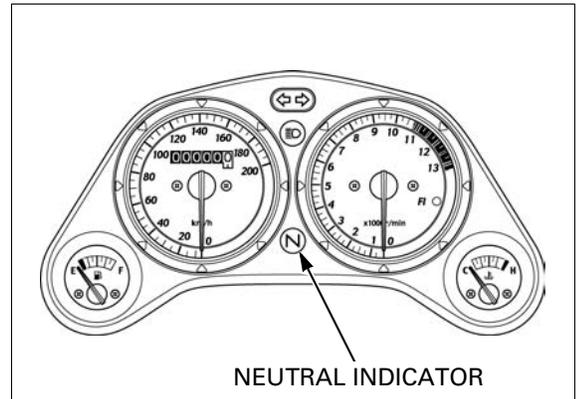
There should be continuity with the brake pedal depressed, and no continuity when the brake pedal released.



# NEUTRAL SWITCH

## INSPECTION

Make sure that the neutral indicator come on with the ignition switch ON and transmission is in neutral.  
 If the neutral indicator does not come on, inspect as follows:

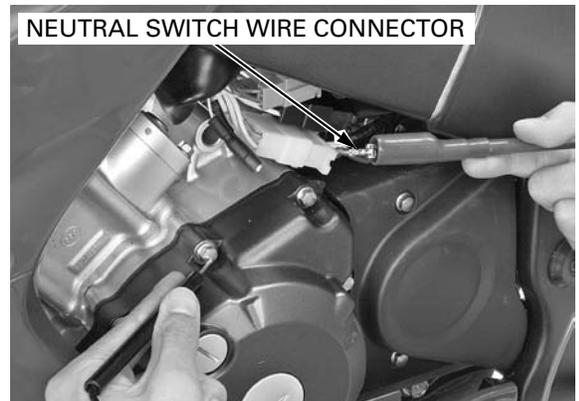


Disconnect the neutral switch wire connector.



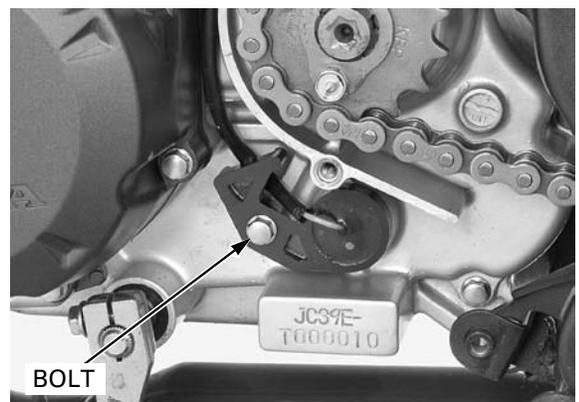
Check for continuity between the switch side Light green/red terminal and ground.

There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.



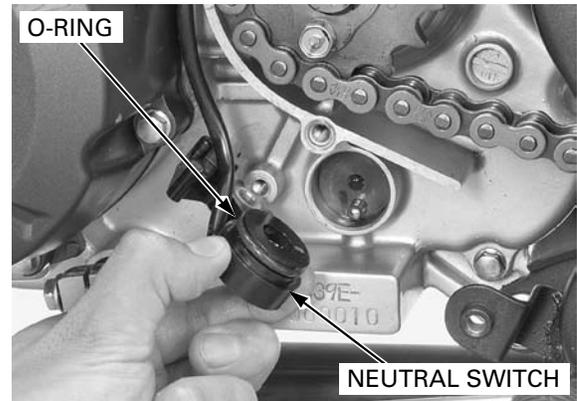
## REMOVAL

Disconnect the neutral switch wire connector.  
 Remove the drive sprocket cover (page 11-4).  
 Remove the neutral switch mounting bolt.

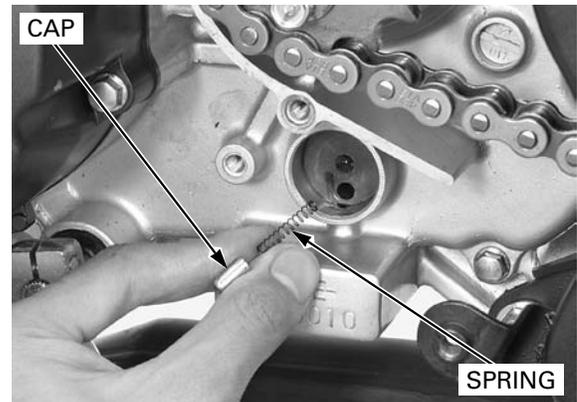


## LIGHTS/METERS/SWITCHES

Remove the neutral switch and O-ring.



Remove the spring cap and spring from the shift drum.



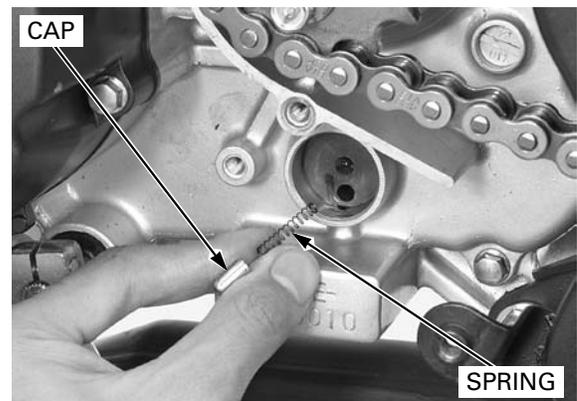
### INSTALLATION

Check the spring cap for wear or damage, replace if necessary.

**NOTE:**

Bend the spring cap by force or crush the contact point will cause poor electricity connection.

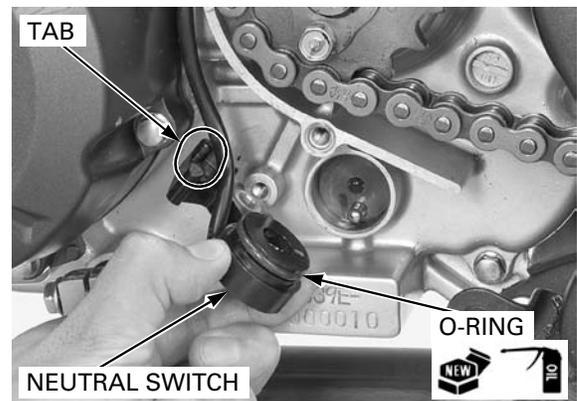
Install the spring into the spring cap and install them into the shift drum.



Apply engine oil to a new O-ring and install it to the neutral switch.

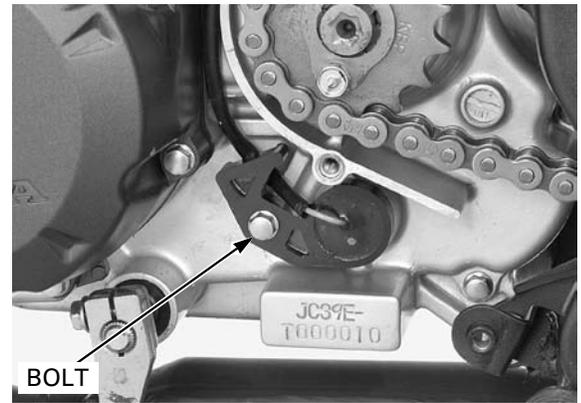
Install the neutral switch.

*Route the wire properly (page 1-18).*



*Route the wire properly (page 1-18).*

Install and tighten the neutral switch mounting bolt.  
 Install the drive sprocket cover (page 11-5).  
 Connect the neutral switch wire connector.

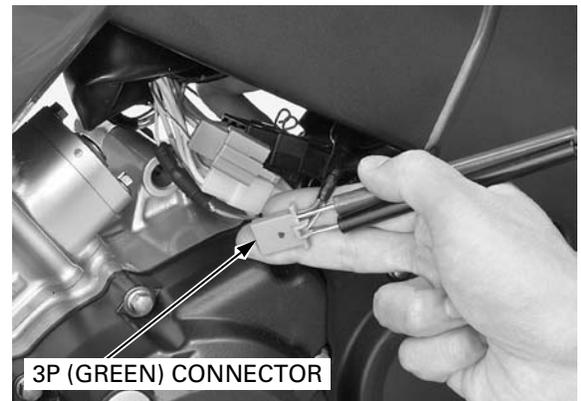


**SIDESTAND SWITCH**

**INSPECTION**

Disconnect the sidestand switch 3P (Green) connector.  
 Check for continuity between the switch side connector terminals.

There should be continuity with the sidestand retracted and no continuity with the sidestand lowered.



**REMOVAL/INSTALLATION**

Disconnect the sidestand switch 3P (Green) connector.



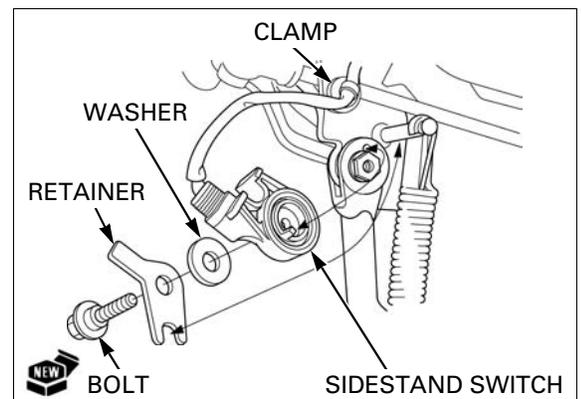
Remove the bolt, retainer, washer and sidestand switch.

Release the wire harness clamp.

Install the sidestand switch, washer, retainer and new bolt.

Tighten the bolt securely.

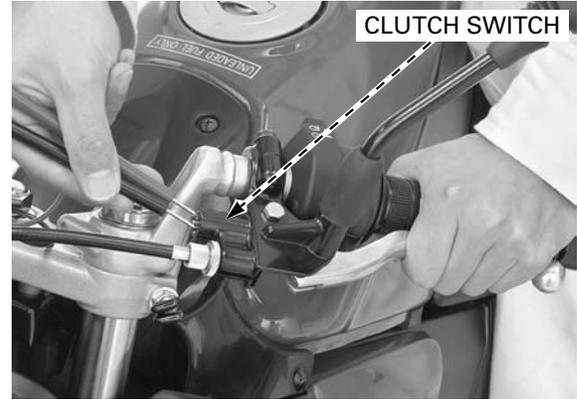
Install the wire harness clamp.



## CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the clutch lever released.



## FUEL GAUGE/FUEL LEVEL SENSOR

### INSPECTION

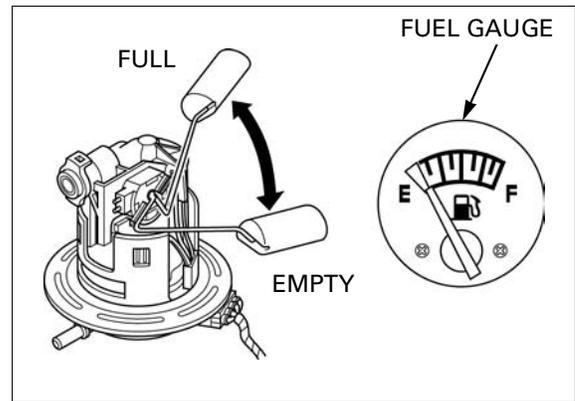
#### FUEL GAUGE

Remove the fuel pump unit (page 5-49).

Connect the fuel pump unit 5P connector.

Turn the ignition switch ON.

Move the float from empty to full, then check the fuel gauge needle.

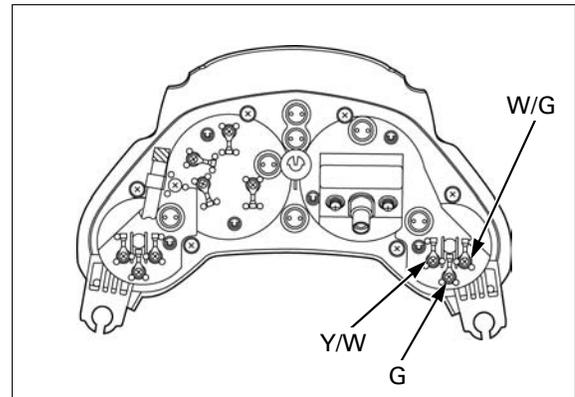


If the needle does not move, check for following:

- Open or short circuit in Yellow/green wire
- Open or short circuit in White/green line
  - Blown main fuse
  - Blown sub fuse
- Faulty main relay (page 19-22)
- Open circuit in Green wire

If the wires are normal, inspect the fuel level sensor (page 19-21).

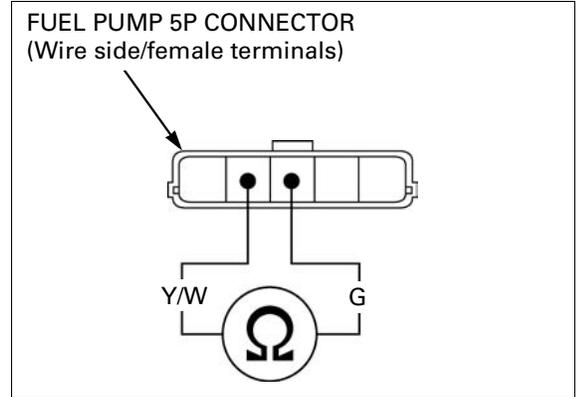
If the fuel level sensor is normal, replace the fuel gauge with a new one (page 19-10).



**FUEL LEVEL SENSOR**

Remove the fuel pump unit (page 5-49).

Connect the ohmmeter to the fuel pump unit 5P connector Yellow/white and Green terminals.

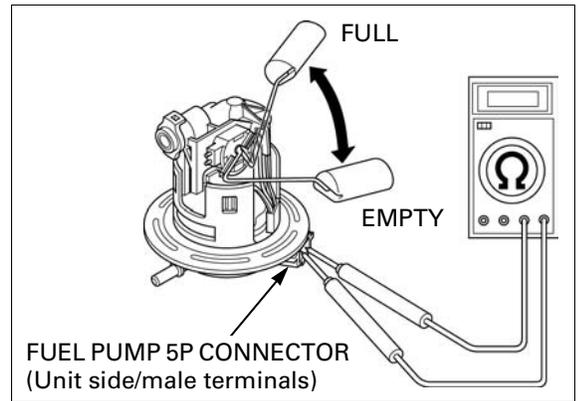


Inspect the resistance of the float at the full and empty positions.

Float position:	FULL	EMPTY
Resistance:	6 – 10 Ω	90 – 100 Ω

Replace the fuel pump unit assembly if fuel level sensor is out of specification.

Install the fuel pump unit (page 5-50).



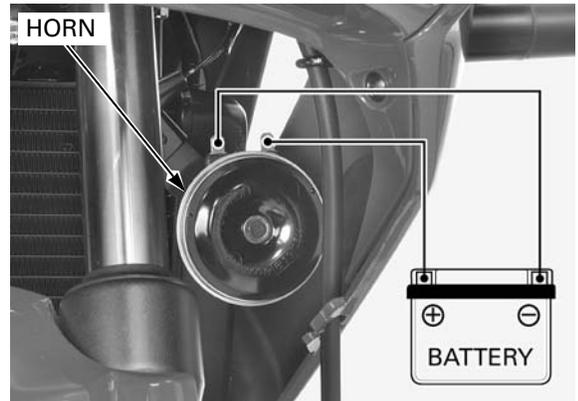
**HORN**

**INSPECTION**

Disconnect the connectors from the horn.

Connect a 12 V battery to the horn terminals.

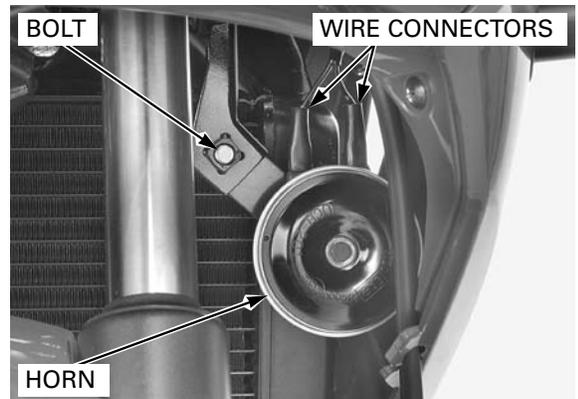
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



**REMOVAL/INSTALLATION**

Disconnect the wire connectors from the horn.  
Remove the bolt and horn.

Install the horn in the reverse order of removal.



## TURN SIGNAL RELAY

### INSPECTION

#### 1. Recommended Inspection

Check the following:

- Battery condition
- Burned out bulb or non-specified wattage
- Blown sub fuse
- Ignition switch and turn signal switch function
- Loose connector

**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

Remove the rear cowl (page 2-5).

Disconnect the turn signal relay 2P (Natural) connector from the relay.

Short the Brown and Gray terminals of the turn signal relay connector with a jumper wire.

Start the engine and check the turn signal light by moving the turn signal switch all the way in the right side or left side.

**Is the light come on?**

**YES** -

- Faulty turn signal relay
- Poor connection of the connector

**NO** - Open circuit in the wire harness



### REMOVAL/INSTALLATION

Remove the rear cowl (page 2-5).

Disconnect the turn signal relay 2P (Natural) connector from the relay.

Remove the turn signal relay from the frame.

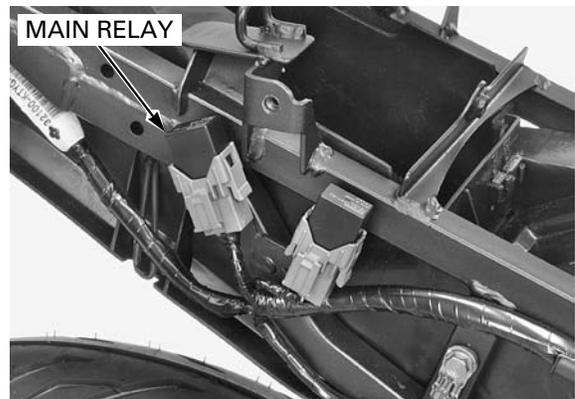
Install the turn signal relay in the reverse order of removal.



## MAIN RELAY

Remove the rear cowl (page 2-5).

Remove the main relay.



Connect an ohmmeter to the main relay connector terminals.

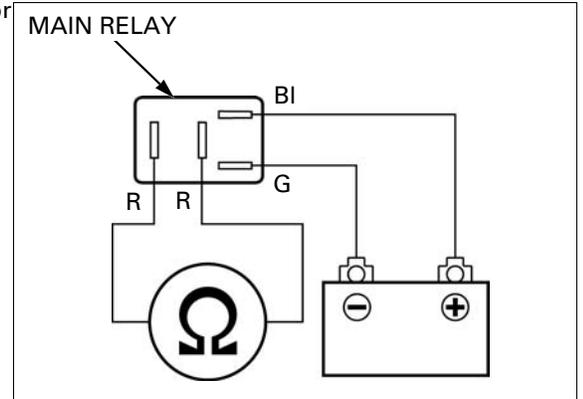
**CONNECTION: Red – Red**

Connect a 12 V battery to the following main relay connector terminals.

**CONNECTION: Green – Black**

There should be continuity only when 12 V battery is connected.

If there is no continuity only when the 12 V battery is connected, replace the main relay.



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**MEMO**

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# 20. WIRING DIAGRAMS

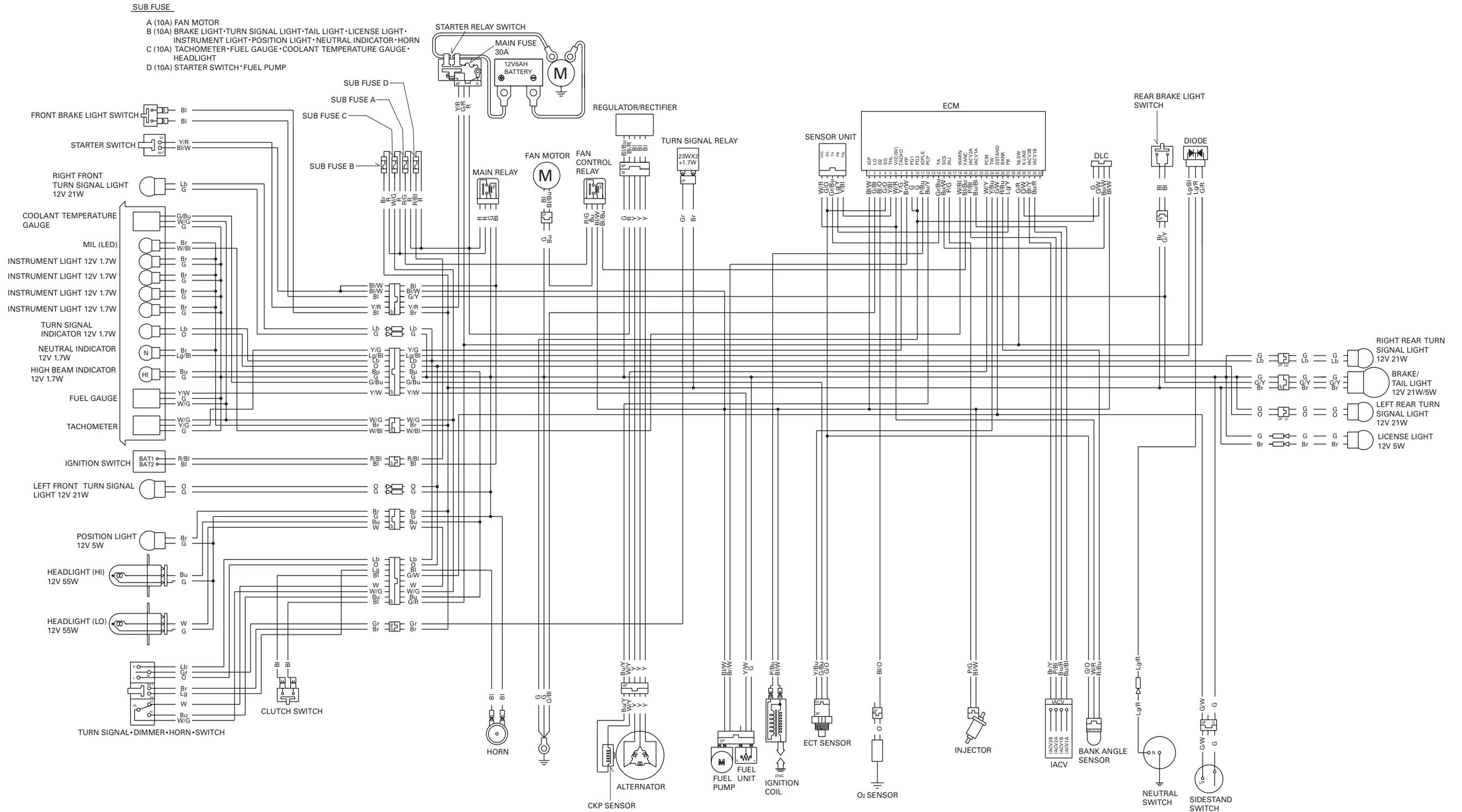
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ED, E, F, II G type:..... 20-3

U type: ..... 20-5

CM type:..... 20-4

ED, E, F, II G type:

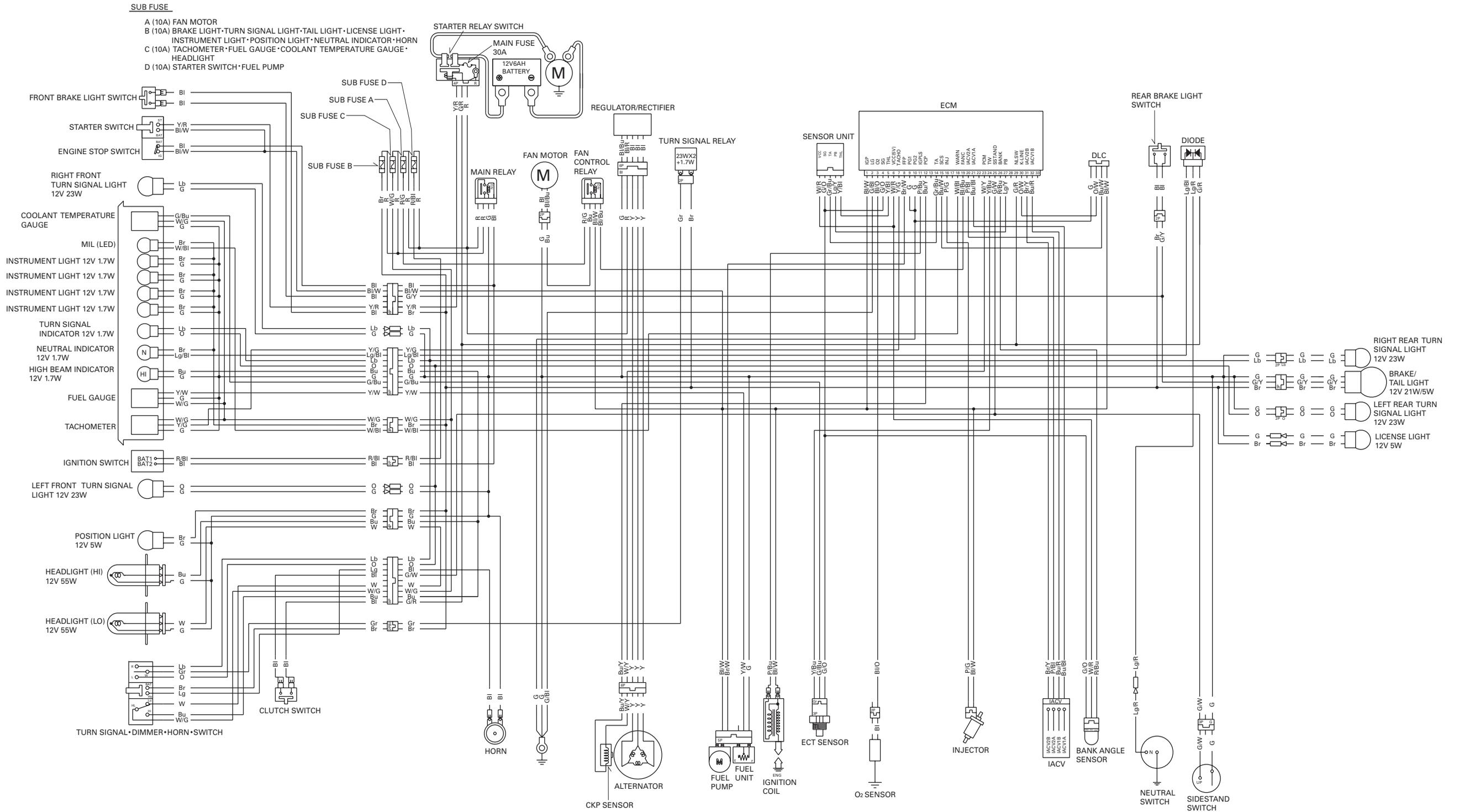


BI	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

0030Z-KTY-D300

# WIRING DIAGRAMS

## CM type:



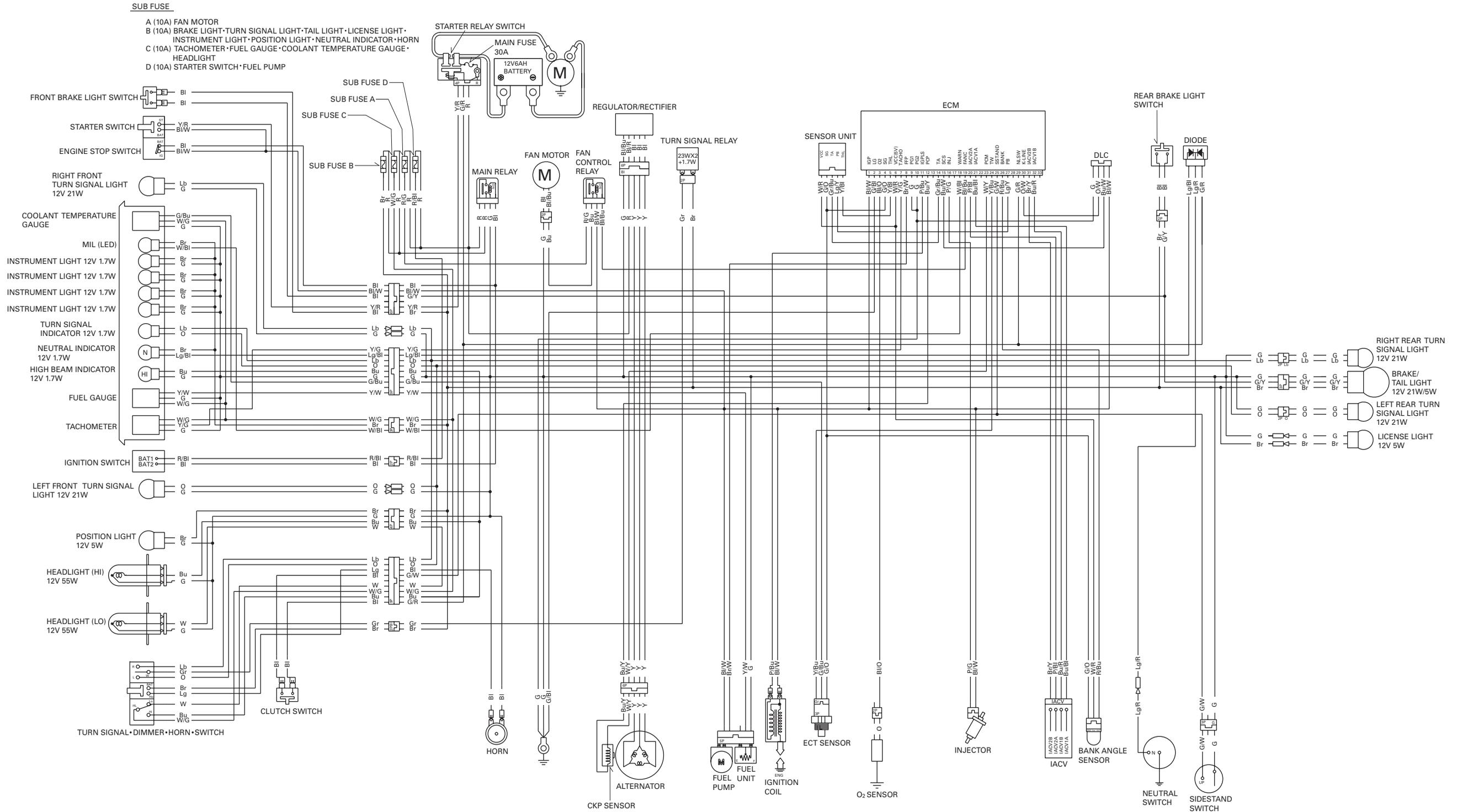
### SWITCH CONTINUITY

IGNITION SWITCH	DIMMER SWITCH	TURN SIGNAL SWITCH	HORN SWITCH	STARTER SWITCH	ENGINE STOP SWITCH
BAT1 BAT2	HL Lo Hi	R WR L	Ho BAT	ST BAT	IG BAT
ON	⬅️	➡️	FREE	FREE	⊗
OFF	(N)	N	PUSH	PUSH	⊙
LOCK	⬅️	⬅️	COLOR	COLOR	COLOR
COLOR R/BI BI	COLOR W/G W Bu	COLOR Lb Gr O	COLOR Lg Br	COLOR Y/R BI/W	COLOR BI/W BI

BI	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

0030Z-KTY-C000

U type:



SWITCH CONTINUITY

IGNITION SWITCH		DIMMER SWITCH			TURN SIGNAL SWITCH			HORN SWITCH		STARTER SWITCH		ENGINE STOP SWITCH		
	BAT1	BAT2	HL	Lo	Hi	R	WR	L	Ho	BAT	ST	BAT	IG	BAT
ON	○	○	☰	○	○	⇄	○	○	FREE		FREE		☒	
OFF			(N)	○	○	N			PUSH	○	○		☒	
LOCK			☒	○	○	⇄							☒	
COLOR	R/BI	BI	COLOR	W/G	W	BI	Gr	O	COLOR	Lg	Br	COLOR	Y/R	BI/W
COLOR	R/BI	BI	COLOR	W/G	W	BI	Lb	Gr	O			COLOR	BI/W	BI

BI	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

0030Z-KTY-U000

# 21. TROUBLESHOOTING

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ENGINE DOES NOT START OR IS HARD  
TO START ..... 21-2

ENGINE LACKS POWER ..... 21-3

POOR PERFORMANCE AT LOW AND  
IDLE SPEED ..... 21-5

POOR PERFORMANCE AT  
HIGH SPEED ..... 21-6

POOR HANDLING ..... 21-7

# ENGINE DOES NOT START OR IS HARD TO START

### 1. Spark Plug Inspection

Remove and inspect spark plug.

***Is the spark plug in good condition?***

- NO** – • Incorrect spark plug heat range  
• Incorrect spark plug gap  
• Dirty air cleaner

**YES** – GO TO STEP 2.

### 2. Spark Test

Perform spark test.

***Is there good spark?***

- NO** – • Faulty spark plug  
• Loose or disconnected ignition system wires  
• Broken or shorted spark plug wire  
• Faulty ignition coil  
• Faulty CKP sensor  
• Faulty ignition switch  
• Faulty ECM  
• Faulty engine stop switch (CM and U type)

**YES** – GO TO STEP 3.

### 3. Fuel Pump Inspection

Check for operation of the fuel pump and inspect the fuel flow.

***Is the fuel pump unit normal?***

- NO** – Faulty fuel pump unit

**YES** – GO TO STEP 4.

### 4. PGM-FI System Inspection

Check the PGM-FI system.

***Is the PGM-FI system normal?***

- NO** – Faulty PGM-FI system

**YES** – GO TO STEP 5.

### 5. Cylinder Compression

Test cylinder compression.

***Is the compression specified?***

- YES** – • Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing

**NO** – GO TO STEP 6.

### 6. Engine Starting Condition

Start by following normal procedure.

***Does the engine start then stops?***

- YES** – • Faulty IACV  
• Leaking insulator or intake manifold  
• Improper ignition timing (Faulty ECM or CKP sensor)  
• Contaminated fuel

---

## ENGINE LACKS POWER

### 1. Drive Train Inspection

Raise wheel off the ground and spin it by hand.

***Does the wheel spin freely?***

- NO** – • Brake dragging  
• Worn or damaged wheel bearings  
• Bent axle

**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, shift from first to second.

***Does the engine speed change accordingly when the gearshift pedal is applied?***

- NO** – • Clutch slipping  
• Worn clutch discs/plates  
• Warped clutch discs/plates  
• Weak clutch spring  
• Sticking clutch lifter mechanism  
• Additive in engine oil  
• Incorrect clutch lever adjustment

**YES** – GO TO STEP 4.

### 4. Engine Performance Inspection

Accelerate lightly.

***Does the engine speed increase?***

- NO** – • Dirty air cleaner  
• Restricted fuel flow  
• Clogged exhaust system.

**YES** – GO TO STEP 5.

### 5. Spark Plug Inspection

Remove and inspect spark plug.

***Is the spark plug fouled or discolored?***

- NO** – • Plugs 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 there correct level and 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 ignition timing.

***Is the ignition timing correct?***

- NO** – • Faulty ECM  
• Faulty CKP sensor

**YES** – GO TO STEP 8.

### 8. Cylinder compression Inspection

Test the cylinder compression.

***Is the compression as specified?***

- NO** – • Improper valve clearance  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Improper valve timing

**YES** – GO TO STEP 9.

### 9. Fuel Pump Inspection

Inspect the fuel flow.

***Is the fuel pump unit normal?***

- NO** – Faulty fuel pump unit

**YES** – GO TO STEP 10.

### 10. PGM-FI system Inspection

Check the PGM-FI system.

***Is the PGM-FI system normal?***

- NO** – Faulty PGM-FI system

**YES** – GO TO STEP 11.

### 11. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

***Is the valve train lubricated properly?***

- NO** – • Clogged oil passage  
• Faulty oil pump  
• Oil strainer screen not serviced frequently enough

**YES** – GO TO STEP 12.

### 12. 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  
• Wrong type of fuel.  
• Clutch slipping

**NO** – GO TO STEP 13.

### 13. Engine Knocking Inspection

Accelerate or run at high speed.

***Is there knocking?***

- YES** – • Worn piston and cylinder  
• Wrong type of fuel  
• Excessive carbon build-up in combustion chamber  
• Ignition timing too advance (Faulty ECM or CKP sensor)

**NO** – Engine does not knock.

---

## POOR PERFORMANCE AT LOW AND IDLE SPEED

### 1. 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

**YES** – GO TO STEP 2.

### 2. Ignition Timing Inspection

Check the ignition timing.

***Is the ignition timing as specified?***

- NO** – • Faulty ECM  
• Faulty CKP sensor  
• Improper valve timing

**YES** – GO TO STEP 3.

### 3. Fuel Pump Inspection

Inspect the fuel flow.

***Is the fuel pump unit normal?***

- NO** – Faulty fuel pump unit

**YES** – GO TO STEP 4.

### 4. PGM-FI System Inspection

Check the PGM-FI system.

***Is the PGM-FI system normal?***

- NO** – Faulty PGM-FI system

**YES** – GO TO STEP 5.

### 5. IACV Inspection

Check the IACV operation.

***Does the IACV operates normal?***

- NO** – Faulty IACV

**YES** – GO TO STEP 6.

### 6. Intake Pipes Leaking Inspection

Check for leaks at the insulator or intake manifold.

***Are there leaks?***

- YES** – • Loose insulator  
• Damaged insulator  
• Damaged intake manifold

**POOR PERFORMANCE AT HIGH SPEED**

**1. Ignition Timing Inspection**

Check the ignition timing.

***Is the ignition timing as specified?***

- NO** – • Faulty ECM  
• Faulty CKP sensor  
• Improper valve timing

**YES** – GO TO STEP 2.

**2. Fuel Pump Inspection**

Inspect the fuel flow.

***In the fuel pump unit operation normal?***

- NO** – Faulty fuel pump unit

**YES** – GO TO STEP 3.

**3. PGM-FI System Inspection**

Check the PGM-FI system.

***Is the PGM-FI system normal?***

- NO** – Faulty PGM-FI system

**YES** – GO TO STEP 4.

**4. Valve Timing Inspection**

Check the valve timing.

***Is the valve timing correct?***

- NO** – Cam sprocket not installed properly.

**YES** – GO TO STEP 5.

**5. Valve Spring Inspection**

Check valve springs.

***Is the valve spring free length as specified?***

- NO** – Faulty valve spring

**YES** – GO TO STEP 6.

**6. Camshaft Inspection**

Remove and inspect the camshaft.

***Is the cam lobe height as specified?***

- NO** – Faulty camshaft

**YES** – Camshaft is OK.

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## POOR HANDLING

**Steering is heavy**

- Steering stem adjusting nut too tight
- Damaged steering head bearings
- Insufficient tire pressure
- Faulty tire

**Either wheel is wobbling**

- Excessive wheel bearing play
- Bent rim
- Improperly installed wheel hub
- Excessively worn swingarm pivot bushings
- 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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