

**2010-2013**



**HONDA**

**SERVICE MANUAL**



**CRF250R**

## HOW TO USE THIS MANUAL

# 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 Honda Genuine 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.

#### **⚠ 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.

### 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.

#### **⚠ 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.

### Important Safety Precautions

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

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

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

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

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

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



## How To Use This Manual

This manual describes the service procedures for the CRF250R.

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

Section 4 through 16 describe parts of the motorcycle, grouped according to location.

Follow the Maintenance Schedule 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.

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 Troubleshooting section 18.

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.

Date of Issue: August, 2012

## HOW TO USE THIS MANUAL

### SYMBOLS

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

	Replace the part(s) with new one(s) before assembly.
	Use the recommend engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent). Example: <ul style="list-style-type: none"><li>• Molykote® BR-2 plus manufactured by Dow Corning U.S.A.</li><li>• Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan</li></ul>
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent). Example: <ul style="list-style-type: none"><li>• Molykote® G-n Paste manufactured by Dow Corning U.S.A.</li><li>• Honda Moly 60 (U.S.A. only)</li><li>• Rocol ASP manufactured by Rocol Limited, U.K.</li><li>• Rocol Paste manufactured by Sumico Lubricant, Japan</li></ul>
	Use silicone grease.
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use fork or suspension fluid.



## CONTENTS

	GENERAL INFORMATION	1
	FRAME/BODY PANELS/EXHAUST SYSTEM	2
	MAINTENANCE	3
ENGINE AND DRIVE TRAIN	LUBRICATION SYSTEM	4
	FUEL SYSTEM (PGM-FI)	5
	COOLING SYSTEM	6
	ENGINE REMOVAL/INSTALLATION	7
	CYLINDER HEAD/VALVES	8
	CYLINDER/PISTON	9
	CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE	10
	ALTERNATOR	11
	CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER	12
	CHASSIS	FRONT WHEEL/SUSPENSION/STEERING
REAR WHEEL/SUSPENSION		14
HYDRAULIC BRAKE		15
ELECTRICAL	ELECTRICAL SYSTEM	16
	WIRING DIAGRAM	17
	TROUBLESHOOTING	18
	INDEX	

---

MEMO



# 1. GENERAL INFORMATION

SERVICE RULES .....	1-2	CRANKCASE/CRANKSHAFT/ TRANSMISSION/BALANCER SPECIFICATIONS .....	1-9
MODEL IDENTIFICATION .....	1-3	FRONT WHEEL/SUSPENSION/ STEERING SPECIFICATIONS .....	1-10
GENERAL SPECIFICATIONS .....	1-5	REAR WHEEL/SUSPENSION SPECIFICATIONS .....	1-11
LUBRICATION SYSTEM SPECIFICATIONS .....	1-7	HYDRAULIC BRAKE SPECIFICATIONS .....	1-11
FUEL SYSTEM (PGM-FI) SPECIFICATIONS .....	1-7	ELECTRICAL SYSTEM SPECIFICATIONS .....	1-12
COOLING SYSTEM SPECIFICATIONS .....	1-7	TORQUE VALUES .....	1-12
CYLINDER HEAD/VALVES SPECIFICATIONS .....	1-8	LUBRICATION & SEAL POINTS .....	1-18
CYLINDER/PISTON SPECIFICATIONS .....	1-8	CABLE & HARNESS ROUTING .....	1-21
CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE SPECIFICATIONS .....	1-9	OPTIONAL PARTS .....	1-30

## GENERAL INFORMATION

### SERVICE RULES

1. Use Honda genuine 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 fastener.
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 1-21).
9. Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

### ABBREVIATION

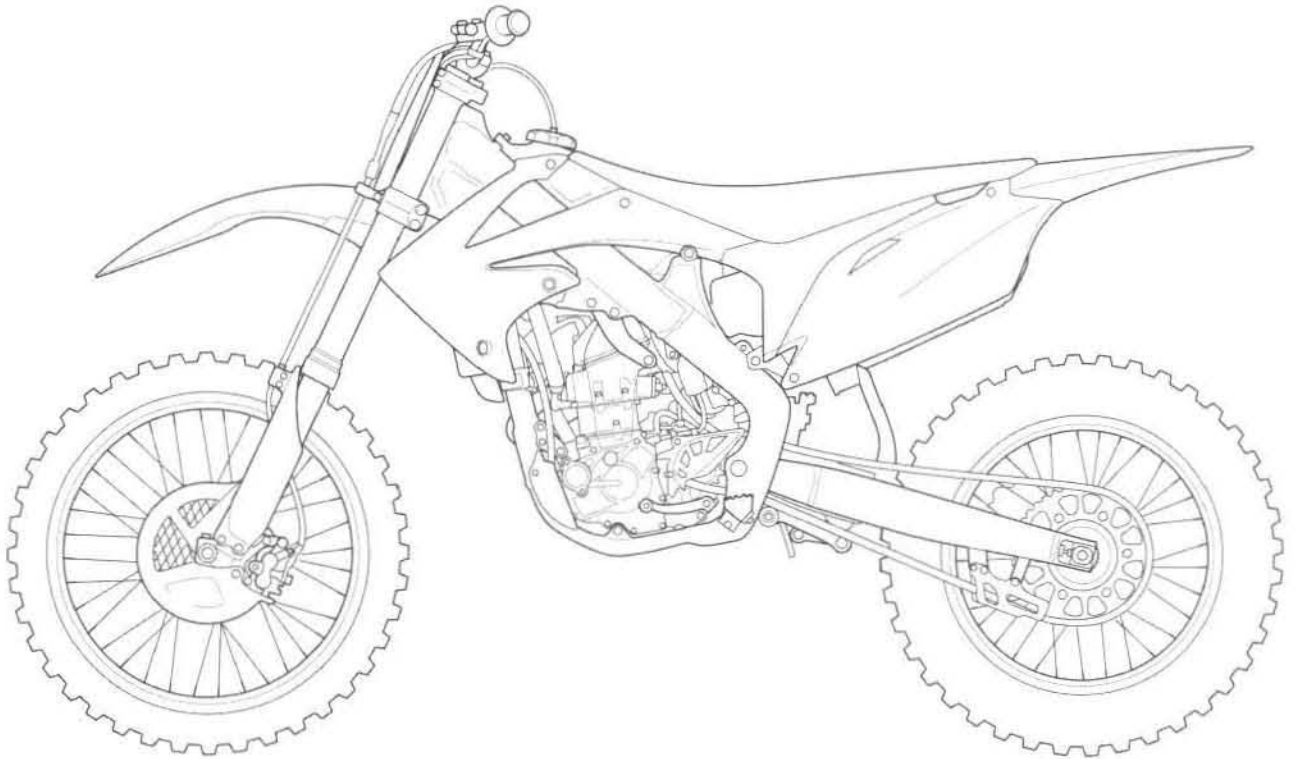
Throughout this manual, the following abbreviations are used to identify the respective parts or systems.

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
HPSD	Honda Progressive Steering Damper
IAT sensor	Intake Air Temperature sensor
MAP sensor	Manifold Absolute Pressure sensor
PGM-FI	Programmed Fuel Injection
SCS service connector	Service Check Short connector
TP sensor	Throttle Position sensor



## MODEL IDENTIFICATION

'10 shown:

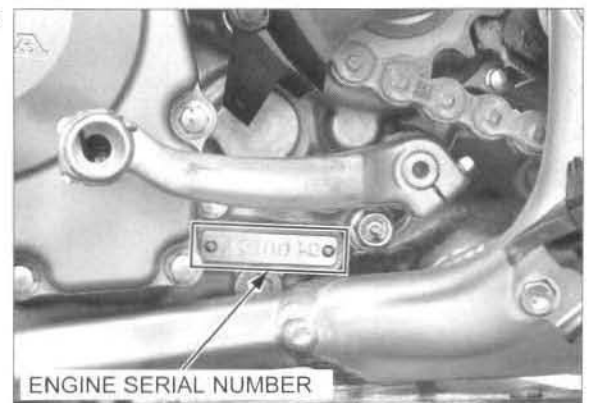


### SERIAL NUMBERS

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



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



## GENERAL INFORMATION

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

'10 shown:



THROTTLE BODY IDENTIFICATION NUMBER

## LABEL

The name plate is located on the right side of the frame.



NAME PLATE



## GENERAL SPECIFICATIONS

		ITEM	SPECIFICATION	
DIMENSIONS	Overall length	'10	2,187 mm (86.1 in)	
		'11	2,183 mm (85.9 in)	
		After '11	2,181 mm (85.9 in)	
	Overall width		827 mm (32.6 in)	
	Overall height	'10, '11	1,273 mm (50.1 in)	
		After '11	1,271 mm (50.0 in)	
	Wheelbase	'10	1,493 mm (58.8 in)	
		'11	1,488 mm (58.6 in)	
		After '11	1,489 mm (58.6 in)	
	Seat height	'10, '11	955 mm (37.6 in)	
After '11		951 mm (37.4 in)		
Footpeg height	'10	423 mm (16.7 in)		
	'11	422 mm (16.6 in)		
	After '11	418 mm (16.5 in)		
Ground clearance	'10, '11	325 mm (12.8 in)		
	After '11	322 mm (12.7 in)		
FRAME	Frame type		Twin tube	
	Front suspension		Telescopic fork	
	Front suspension axle travel	'10, '11	273 mm (10.7 in)	
		After '11	275 mm (10.8 in)	
	Front suspension cushion stroke		310 mm (12.2 in)	
	Rear suspension		Pro-Link	
	Rear wheel travel	'10	320 mm (12.6 in)	
		'11	318 mm (12.5 in)	
		After '11	313 mm (12.3 in)	
	Rear damper		Decarbon type with nitrogen gas filled damper	
	Front tire size		80/100-21 51M	
	Rear tire size		100/90-19 57M	
	Tire brand (Dunlop)	'10, '11	Front: D742FA/Rear: D756	
		'12	Front: MX51F/Rear: MX51	
		After '12	Front: MX51FA/Rear: MX51	
	Front brake		Hydraulic single disc	
	Front brake swept area		334.5 cm <sup>2</sup> (51.8 in <sup>2</sup> )	
	Rear brake		Hydraulic single disc	
	Rear brake swept area		391.1 cm <sup>2</sup> (60.6 in <sup>2</sup> )	
	Caster angle	'10	27° 9'	
'11		27° 12'		
After '11		27° 23'		
Trail length	'10	116.0 mm (4.57 in)		
	'11	117.0 mm (4.61 in)		
	After '11	118.0 mm (4.65 in)		
Fuel tank capacity		5.7 liter (1.51 US gal, 1.25 Imp gal)		
ENGINE	Bore and stroke		76.8 x 53.8 mm (3.02 x 2.12 in)	
	Displacement		249.4 cm <sup>3</sup> (15.21 cu-in)	
	Compression ratio		13.2:1	
	Valve train		Chain drive and OHC with rocker arm	
	Intake valve	opens	at 1.0 mm (0.04 in) lift	20° BTDC
		closes	at 1.0 mm (0.04 in) lift	45° ABDC
	Exhaust valve	opens	at 1.0 mm (0.04 in) lift	50° BBDC
		closes	at 1.0 mm (0.04 in) lift	20° ATDC
	Lubrication system		Forced pressure and wet sump	
	Oil pump type		Trochoid	
	Cooling system		Liquid cooled	
	Air filtration		Oiled polyurethane foam	
Crankshaft type		Assembled type		
Engine dry weight		24.5 kg (54.0 lbs)		
Cylinder arrangement		Single cylinder, inclined 5° from vertical		

## GENERAL INFORMATION

ITEM		SPECIFICATION	
FUEL DELIVERY SYSTEM	Type Throttle bore	PGM-FI 50 mm (2.0 in) 46 mm (1.8 in)	
DRIVE TRAIN	Clutch system	Multi-plate, wet	
	Clutch operation system	Cable operated	
	Transmission	Constant mesh, 5-speed	
	Primary reduction	3.166 (57/18)	
	Final reduction	'10 3.692 (48/13)	
	Gear ratio	After '10	3.769 (49/13)
		1st	2.357 (33/14)
2nd		1.888 (34/18)	
3rd		1.555 (28/18)	
4th		1.333 (24/18)	
Gearshift pattern	5th	1.136 (25/22)	
		Left foot operated return system, 1 - N - 2 - 3 - 4 - 5	
ELECTRICAL	Ignition system	Computer-controlled digital transistorized with electric advance	
	Charging system	Single phase output alternator	
	Regulator/rectifier	SCR shorted/single phase, full wave rectification	

## LUBRICATION SYSTEM SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.67 liter (0.70 US qt, 0.59 Imp qt)	–
	At oil filter change	0.69 liter (0.73 US qt, 0.61 Imp qt)	–
	At disassembly	0.85 liter (0.90 US qt, 0.75 Imp qt)	–
Transmission oil capacity	At draining	0.68 liter (0.72 US qt, 0.60 Imp qt)	–
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)	–
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	–
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	–
	Side clearance	0.15 – 0.22 (0.006 – 0.009)	–

## FUEL SYSTEM (PGM-FI) SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	'10, '11
	'12
	After '12
Idle speed	2,000 ± 100 rpm
Throttle grip freeplay	3 – 5 mm (1/8 – 3/16 in)
ECT sensor resistance (at 20°C/68°F)	2.3 – 2.6 kΩ
Fuel injector resistance (at 20°C/68°F)	11.6 – 12.4 Ω
Fuel pressure	333 – 360 kPa (3.4 – 3.7 kgf/cm <sup>2</sup> , 48 – 52 psi)
Fuel pump flow (at 12 V)	150 cm <sup>3</sup> (5.1 US oz, 5.3 Imp oz) minimum/10 seconds

## COOLING SYSTEM SPECIFICATIONS

ITEM	SPECIFICATIONS
Coolant capacity	At change
	At disassembly
Radiator cap relief pressure	108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Recommended antifreeze	Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors (1:1 mixture with distilled water)

## GENERAL INFORMATION

# CYLINDER HEAD/VALVES SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			598 kPa (6.1 kgf/cm <sup>2</sup> , 87 psi) at cranking	—
Cylinder head warpage			—	0.05 (0.002)
Valve and valve guide	Valve clearance	IN	0.12 ± 0.03 (0.005 ± 0.001)	—
		EX	0.28 ± 0.03 (0.011 ± 0.001)	—
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	—
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.052 (0.1989)
		EX	4.500 – 4.512 (0.1772 – 0.1776)	4.552 (0.1792)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
		EX	0.020 – 0.047 (0.0008 – 0.0019)	—
	Valve guide projection above cylinder head	IN	15.4 – 15.6 (0.606 – 0.614)	—
EX		21.3 – 21.5 (0.839 – 0.847)	—	
Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.7 (0.07)	
Valve spring free length	IN	42.50 (1.673)	42.1 (1.66)	
	EX	46.71 (1.839)	46.3 (1.82)	
Rocker arm	Rocker arm I.D.		13.000 – 13.018 (0.5118 – 0.5125)	13.025 (0.5128)
	Rocker arm shaft O.D.		12.977 – 12.985 (0.5109 – 0.5112)	12.97 (0.511)
	Rocker arm-to-shaft clearance		0.015 – 0.041 (0.0006 – 0.0016)	0.055 (0.0022)
Camshaft	Cam lobe height	IN	36.200 – 36.440 (1.4252 – 1.4346)	36.06 (1.420)
		EX	25.524 – 25.764 (1.0049 – 1.0143)	25.41 (1.000)
Valve lifter O.D.			22.478 – 22.493 (0.8850 – 0.8855)	22.47 (0.885)
Valve lifter bore I.D.			22.510 – 22.526 (0.8862 – 0.8868)	22.54 (0.887)

# CYLINDER/PISTON SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		76.800 – 76.815 (3.0236 – 3.0242)	76.825 (3.0246)
	Out-of-round		—	0.010 (0.0004)
	Taper		—	0.010 (0.0004)
	Warpage		—	0.05 (0.002)
Piston, piston ring	Piston mark direction		"O" mark facing toward the intake side	—
	Piston O.D.		76.770 – 76.780 (3.0224 – 3.0228)	76.740 (3.0213)
	Piston O.D. measurement point		7.0 (0.28) from the bottom of skirt	—
	Piston pin bore I.D.		16.002 – 16.008 (0.6300 – 0.6302)	16.03 (0.631)
	Piston pin O.D.		15.994 – 16.000 (0.6297 – 0.6299)	15.98 (0.629)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Top ring mark		"RNM" mark side facing up	—
	Piston ring-to-ring groove clearance	Top	0.035 – 0.065 (0.0014 – 0.0026)	0.08 (0.003)
	Piston ring end gap	Top ring	0.15 – 0.25 (0.006 – 0.010)	0.39 (0.015)
Oil ring (side rail)		0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)	
Cylinder-to-piston clearance			0.020 – 0.045 (0.0008 – 0.0018)	0.085 (0.0033)
Connecting rod small end I.D.			16.016 – 16.034 (0.6305 – 0.6313)	16.04 (0.631)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0017)	0.06 (0.002)

**CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE SPECIFICATIONS**

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 – 13/16)	–
Clutch spring free length		50.86 (2.002)	49.96 (1.967)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
Clutch plate warpage		–	0.10 (0.004)
Kickstarter pinion gear I.D.		16.516 – 16.534 (0.6502 – 0.6509)	16.55 (0.652)
Kickstarter spindle O.D.		16.466 – 16.484 (0.6483 – 0.6490)	16.46 (0.648)
Kickstarter idle gear I.D.		19.000 – 19.021 (0.7480 – 0.7489)	19.050 (0.7500)
Kickstarter idle gear bushing	I.D.	15.000 – 15.018 (0.5906 – 0.5913)	15.037 (0.5920)
	O.D.	18.959 – 18.980 (0.7464 – 0.7472)	18.941 (0.7457)
Countershaft O.D. at kickstarter idle gear bushing		14.966 – 14.984 (0.5892 – 0.5899)	14.952 (0.5887)

**CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER SPECIFICATIONS**

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Side clearance	0.30 – 0.75 (0.012 – 0.030)	0.8 (0.03)	
	Radial clearance	0.006 – 0.018 (0.0002 – 0.0007)	0.05 (0.002)	
	Runout	–	0.05 (0.002)	
Transmission	Gear I.D.	M4, M5	23.020 – 23.041 (0.9063 – 0.9071)	23.07 (0.908)
		C1	20.020 – 20.041 (0.7882 – 0.7890)	20.07 (0.790)
		C2	27.020 – 27.041 (1.0638 – 1.0646)	27.07 (1.066)
		C3	25.020 – 25.041 (0.9850 – 0.9859)	25.07 (0.987)
	Bushing O.D.	M4, M5	22.979 – 23.000 (0.9047 – 0.9055)	22.96 (0.904)
		C1	19.979 – 20.000 (0.7866 – 0.7874)	19.95 (0.785)
		C2	26.979 – 27.000 (1.0622 – 1.0630)	26.95 (1.061)
		C3	24.979 – 25.000 (0.9834 – 0.9843)	24.96 (0.983)
	Bushing I.D.	M5	20.000 – 20.021 (0.7874 – 0.7882)	20.04 (0.789)
		C1	17.000 – 17.018 (0.6693 – 0.6700)	17.04 (0.671)
		C2	24.000 – 24.021 (0.9449 – 0.9457)	24.04 (0.946)
		C3	22.000 – 22.021 (0.8661 – 0.8670)	22.04 (0.868)
	Gear-to-bushing clearance	M4, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
		C1, C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)
	Mainshaft O.D.	at M5 bushing	19.959 – 19.980 (0.7858 – 0.7866)	19.94 (0.785)
	Countershaft O.D.	at C1 bushing	16.981 – 16.992 (0.6685 – 0.6690)	16.97 (0.668)
		at C2 bushing	23.959 – 23.980 (0.9433 – 0.9441)	23.94 (0.943)
at C3 bushing		21.959 – 21.980 (0.8645 – 0.8654)	21.94 (0.864)	
Bushing-to-shaft clearance	M5	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)	
	C1	0.008 – 0.037 (0.0003 – 0.0015)	0.07 (0.003)	
	C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	0.12 (0.005)	
Shift fork, shift fork shaft	Fork claw thickness		4.93 – 5.00 (0.194 – 0.197)	4.8 (0.19)
	Shift fork I.D.	Center	11.003 – 11.024 (0.4332 – 0.4340)	11.04 (0.435)
		Right and Left	12.035 – 12.056 (0.4738 – 0.4746)	12.07 (0.475)
	Fork shaft O.D.	Center	10.983 – 10.994 (0.4324 – 0.4328)	10.97 (0.432)
		Right and Left	11.966 – 11.984 (0.4711 – 0.4718)	11.95 (0.470)



**GENERAL INFORMATION**

**FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS**

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
Cold tire pressure			100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—	
Axle shaft runout			—	0.2 (0.01)	
Wheel rim runout	Radial		—	2.0 (0.08)	
	Axial		—	2.0 (0.08)	
Wheel hub-to-rim distance			See page 13-10	—	
Fork	Spring free length		457 – 463 (18.0 – 18.2)	453 (17.8)	
	Fork slider runout		—	0.2 (0.01)	
	Recommended fork oil		Pro Honda HP Fork Oil SS-19	—	
	Oil capacity	Fork tube	'10	342 cm <sup>3</sup> (11.6 US oz, 12.0 Imp oz)	—
			'11	365 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz)	—
			'12	372 cm <sup>3</sup> (12.6 US oz, 13.1 Imp oz)	—
			After '12	363 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz)	—
	Fork damper	'10	195 cm <sup>3</sup> (6.6 US oz, 6.9 Imp oz)	—	
'11, '12		240 cm <sup>3</sup> (8.1 US oz, 8.4 Imp oz)	—		
After '12		243 cm <sup>3</sup> (8.2 US oz, 8.6 Imp oz)	—		
Compression damping adjuster standard position		'10	13 clicks out from full in	—	
		'11	6 clicks out from full in	—	
		After '11	7 clicks out from full in	—	
Rebound damping adjuster standard position		'10	8 clicks out from full in	—	
		'11	10 clicks out from full in	—	
		After '11	11 clicks out from full in	—	
HPSD	Recommended damper oil		'10	Pro Honda HP Fork Oil 5W or equivalent	—
			After '10	Pro Honda HP Fork Oil SS-19	—
	Free piston depth at 20°C (68°F)		'10	27.3 – 27.9 (1.07 – 1.10)	—
			After '10	31.3 – 31.9 (1.23 – 1.26)	—
	Damping force adjuster standard position			11 clicks out from full in	—

## REAR WHEEL/SUSPENSION SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—	
Axle shaft runout		—	0.2 (0.01)	
Wheel rim runout	Radial	—	2.0 (0.08)	
	Axial	—	2.0 (0.08)	
Wheel hub-to-rim distance		See page 14-10	—	
Drive chain	Size/link	DID	DID 520DMA4-116RB	
		RK	RK 520TXZ-116RJ	
	Slack	'10, '11	30 – 40 (1.2 – 1.6)	
		After '11	25 – 35 (1.0 – 1.4)	
Drive chain length at 17 pins (16 pitches)		—	259 (10.2)	
Drive chain slider thickness	Upper side	—	5 (0.2)	
	Lower side	—	2.5 (0.10)	
Drive chain roller O.D.	'10, '11	—	35 (1.4)	
	After '11	Upper	—	39 (1.5)
		Lower	—	31 (1.2)
Shock absorber	Damper gas pressure		980 kPa (9.9 kg/cm <sup>2</sup> , 142 psi)	
	Damper compressed gas		Nitrogen gas	
	Recommended shock oil		HP Fork Oil SS-25	
	Damper rod compressed force at 12 mm compressed		196 – 235 N (20.0 – 24.0 kgf, 44.1 – 52.9 lbf)	
	Spring installed length (standard)	'10	259.9 (10.23)	
		'11, '12	260.8 (10.27)	
After '12		261.2 (10.28)		
Oil capacity		372 cm <sup>3</sup> (12.6 US oz, 13.1 Imp oz)		
High speed compression damping adjuster standard position	'10	11/12 – 1-5/12 turns out from full in		
	'11	1-1/12 – 1-7/12 turns out from full in		
	'12	1-1/2 – 2 turns out from full in		
	After '12	1-3/4 – 2-1/4 turns out from full in		
Low speed compression damping adjuster standard position	'10	7 clicks out from full in		
	After '10	8 clicks out from full in		
Rebound damping adjuster standard position	'10	9 – 12 clicks out from full in		
	'11, '12	10 clicks out from full in		
	After '12	11 clicks out from full in		

## HYDRAULIC BRAKE SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Brake fluid	DOT 4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	2.8 – 3.0 (0.11 – 0.12)	2.5 (0.10)
	Brake disc warpage	—	0.3 (0.01)
	Master cylinder I.D.	11.000 (0.4331)	11.050 (0.4350)
	Master piston O.D.	10.971 (0.4319)	10.840 (0.4268)
	Caliper cylinder I.D.	27.025 (1.0640)	27.060 (1.0654)
	Caliper piston O.D.	26.968 (1.0617)	26.853 (1.0572)
Rear	Brake fluid	DOT 4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	3.8 – 4.0 (0.15 – 0.16)	3.5 (0.14)
	Brake disc warpage	—	0.3 (0.01)
	Master cylinder I.D.	9.547 (0.3759)	9.575 (0.3770)
	Master piston O.D.	9.491 (0.3737)	9.465 (0.3726)
	Caliper cylinder I.D.	22.650 (0.8917)	22.712 (0.8942)
	Caliper piston O.D.	22.620 (0.8905)	22.573 (0.8887)
	Brake pedal height	79.6 (3.13)	—

## GENERAL INFORMATION

### ELECTRICAL SYSTEM SPECIFICATIONS

ITEM			SPECIFICATION
Spark plug	Standard	(NGK)	R0451B-8
Spark plug gap			0.60 – 0.70 mm (0.024 – 0.028 in)
Ignition coil resistance (at 20°C/68°F)			2.6 – 3.2 Ω
Ignition coil peak voltage			100 V minimum
CKP sensor peak voltage			0.7 V minimum
Alternator coil resistance (at 20°C/68°F)			0.1 – 3.0 Ω
Ignition timing ("F" mark)			8° BTDC at idle
Alternator	Capacity		0.091 kW/5,000 rpm

## TORQUE VALUES

### 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 (Includes 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, large flange)	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	54 (5.5, 40)	10 mm flange bolt and nut	39 (4.0, 29)

### ENGINE & FRAME TORQUE VALUES

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

#### FRAME/BODY PANELS/EXHAUST SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Seat mounting bolt	2	8	26 (2.7, 19)	
Side cover bolt	2	6	10 (1.0, 7)	
Radiator shroud bolt (upper side)	4	5	5.0 (0.5, 3.7)	
Engine guard bolt	1	6	10 (1.0, 7)	
Sub-frame upper mounting bolt	2	8	33 (3.4, 24)	
Sub-frame right lower mounting bolt	1	10	49 (5.0, 36)	
Sub-frame left lower mounting bolt	1	8	33 (3.4, 24)	
Seat bracket screw	1	5	4.0 (0.4, 3.0)	
Muffler mounting bolt	2	8	26 (2.7, 19)	
Muffler joint band bolt	1	8	21 (2.1, 15)	
Exhaust pipe joint nut	2	8	21 (2.1, 15)	
Exhaust pipe protector bolt	2	6	12 (1.2, 9)	
Exhaust pipe protector band screw	2	–	1.5 (0.2, 1.1)	
Step bracket (upper)	2	12	55 (5.6, 41)	
(lower)	2	8	30 (3.1, 22)	
Rear fender mounting bolt	4	6	13 (1.3, 10)	
Exhaust pipe stud bolt	2	8	See page 2-17	
Air cleaner connecting boot band bolt (throttle body side)	1	4	See page 2-9	

MAINTENANCE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Engine oil drain bolt	1	8	16 (1.6, 12)	Apply engine oil to the threads and seating surface.
Transmission oil drain bolt	1	8	16 (1.6, 12)	
Transmission oil check bolt	1	6	12 (1.2, 9)	Apply grease to the threads.
Crankshaft hole cap	1	30	15 (1.5, 11)	
Spark plug	1	10	22 (2.2, 16)	
Throttle cable adjuster lock nut (grip side)	1	7	4.0 (0.4, 3.0)	
(throttle body side)	1	6	4.0 (0.4, 3.0)	
Front spoke	36	BC3.5	3.7 (0.4, 2.7)	
Rear spoke	32	4.5	3.7 (0.4, 2.7)	
Front rim lock	1	8	12 (1.2, 9)	
Rear rim lock	1	8	12 (1.2, 9)	
Drive chain upper roller bolt	1	8	12 (1.2, 9)	SH DR bolt

FUEL SYSTEM (PGM-FI)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Fuel tank band bracket screw	1	5	4.0 (0.4, 3.0)	For tightening sequence (page 5-44)
Fuel tank stay bolt	2	6	10 (1.0, 7)	
Fuel tank stopper cable mounting bolt (frame side)	1	4	3.5 (0.4, 2.6)	
Mud guard mounting screw	2	5	1.1 (0.1, 0.8)	
IAT sensor screw	2	5	1.1 (0.1, 0.8)	
Air cleaner housing mounting bolt	2	6	10 (1.0, 7)	
Air cleaner connecting boot band screw (air cleaner side)	1	4	0.7 (0.1, 0.5)	
Fuel pump mounting bolt	6	6	11 (1.1, 8)	
Insulator band screw (throttle body side)	1	–	See page 5-53	
Throttle drum cover bolt	1	5	3.4 (0.3, 2.5)	
Throttle cable bolt	2	6	4.0 (0.4, 3.0)	
Fast idle knob lock nut	1	12	2.3 (0.2, 1.7)	
MAP sensor screw	2	6	4.9 (0.5, 3.6)	
ECT sensor	1	10	12 (1.2, 9)	
Injector joint bolt	2	5	5.1 (0.5, 3.8)	
Clamper stay screw	1	5	3.4 (0.3, 2.5)	

COOLING SYSTEM

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Water pump impeller	1	7	12 (1.2, 9)	Left hand threads

ENGINE REMOVAL/INSTALLATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Cylinder head hanger plate bolt	4	8	33 (3.4, 24)	
Cylinder head hanger bolt	2	10	54 (5.5, 40)	
Lower engine hanger nut	1	10	54 (5.5, 40)	
Front engine hanger nut	1	10	54 (5.5, 40)	
Front engine hanger plate nut	2	8	26 (2.7, 19)	

## GENERAL INFORMATION

### CYLINDER HEAD/VALVES

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Breather plate bolt	2	6	12 (1.2, 9)	Apply locking agent to the threads (page 8-8).
Cylinder head cover bolt	2	6	10 (1.0, 7)	Apply engine oil to the threads.
Camshaft holder mounting bolt	4	7	16 (1.6, 12)	
Cylinder head bolt	4	10	45 (4.6, 33)	Apply engine oil to the threads and seating surface.
Insulator band screw (cylinder head side)	1	—	See page 8-29	Apply locking agent to the threads (page 8-37).
Cam chain tensioner bolt	1	6	12 (1.2, 9)	

### CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Gearshift drum center pin	1	8	22 (2.2, 16)	Apply locking agent to the threads (page 10-23).
Gearshift drum stopper arm bolt	1	6	12 (1.2, 9)	Apply engine oil to the threads and seating surfaces.
Clutch center lock nut	1	18	69 (7.0, 51)	
Clutch spring bolt	5	6	12 (1.2, 9)	Apply locking agent to the threads.
Gearshift return spring pin	1	8	22 (2.2, 16)	
Gearshift pedal pinch bolt	1	6	12 (1.2, 9)	
Kickstarter pedal bolt	1	8	38 (3.9, 28)	
Kickstarter arm screw	1	6	9.0 (0.9, 6.6)	

### ALTERNATOR

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Flywheel nut	1	12	64 (6.5, 47)	Apply engine oil to the threads and seating surfaces.
CKP sensor mounting bolt	4	5	5.2 (0.5, 3.8)	Apply locking agent to the threads. Coating width: 4.5 ± 1.0 mm (0.18 ± 0.04 in)
Stator mounting socket bolt	3	5	5.2 (0.5, 3.8)	Apply locking agent to the threads. Coating width: 4.5 ± 1.0 mm (0.18 ± 0.04 in)
Left crankcase cover bolt	10	6	12 (1.2, 9)	

CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Crankshaft bearing set plate torx screw	2	6	22 (2.2, 16)	Apply locking agent to the threads (Pro Honda Hondalock 3 or equivalent high strength locking agent). (page 12-27) Apply locking agent to the threads. Coating width: 3.5 ± 1.0 mm (0.14 ± 0.04 in) Apply locking agent to the threads. Apply locking agent to the threads.
Countershaft bearing set plate screw	2	6	12 (1.2, 9)	
Gearshift drum bearing set plate bolt	2	6	12 (1.2, 9)	
Mainshaft bearing set plate bolt	2	6	12 (1.2, 9)	
Drive sprocket bolt	1	8	31 (3.2, 23)	
Primary drive gear bolt	1	12	108 (11.0, 80)	
Balancer shaft lock nut	1	12	36 (3.7, 27)	
Oil jet bolt	1	6	10 (1.0, 7)	Apply engine oil to the threads and seating surfaces. Apply engine oil to the threads. Apply locking agent to the threads (page 12-32).

FRONT WHEEL/SUSPENSION/STEERING

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Front axle nut	1	16	88 (9.0, 65)	U-nut
Axle holder bolt	4	8	20 (2.0, 15)	
Front brake disc nut	6	6	16 (1.6, 12)	
Front brake hose guide bolt	1	6	5.2 (0.5, 3.8)	
Steering stem nut	1	26	108 (11.0, 80)	
Steering stem adjusting nut	1	30	See page 13-55	
Fork top bridge pinch bolt	4	8	22 (2.2, 16)	
Fork bottom bridge pinch bolt	4	8	20 (2.0, 15)	
Fork cap	2	42	30 (3.1, 22)	
Fork center bolt	2	22	69 (7.0, 51)	
Fork center bolt lock nut	2	12	22 (2.2, 16)	Apply locking agent to the threads.
Plug bolt	4	5	1.3 (0.1, 1.0)	
	(After '10)	5	1.3 (0.1, 1.0)	
Fork damper	2	51	34 (3.5, 25)	
Fork protector mounting bolt	6	6	7.0 (0.7, 5.2)	
Front brake disc cover bolt	1	6	13 (1.3, 10)	
	(After '12)	6	13 (1.3, 10)	
Handlebar upper holder bolt	4	8	22 (2.2, 16)	
Handlebar lower holder nut	2	10	44 (4.5, 32)	
Clutch lever pivot bolt	1	6	See page 13-57	
Clutch lever pivot nut	1	6	10 (1.0, 7)	U-nut
Engine stop switch screw	1	4	1.5 (0.2, 1.1)	
Steering damper mounting bolt	2	7	20 (2.0, 15)	



## GENERAL INFORMATION

### REAR WHEEL/SUSPENSION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
Rear axle nut	1	22	128 (13.1, 94)	U-nut
Rear brake disc nut	4	6	16 (1.6, 12)	U-nut
Rear brake hose guide screw	6	5	1.2 (0.1, 0.9)	
Driven sprocket nut	6	8	32 (3.3, 24)	U-nut
Rear wheel bearing retainer	1	50	44 (4.5, 32)	Peen.
Swingarm pivot nut	1	14	88 (9.0, 65)	U-nut
Shock arm nut (swingarm side)	1	12	53 (5.4, 39)	Apply engine oil to the threads and seating surfaces.
Shock arm nut (shock link side)	1	12	53 (5.4, 39)	U-nut Apply engine oil to the threads and seating surfaces.
Shock link nut (frame side)	1	12	53 (5.4, 39)	U-nut Apply engine oil to the threads and seating surfaces.
Shock absorber upper mounting nut	1	10	44 (4.5, 32)	U-nut
Shock absorber lower mounting nut	1	10	44 (4.5, 32)	U-nut
Shock absorber spring adjuster lock nut	1	60	44 (4.5, 32)	
Drive chain slider rear side screw	2	5	4.2 (0.4, 3.1)	Apply locking agent to the threads.
Drive chain slider front side screw	1	5	4.2 (0.4, 3.1)	
Drive chain lower roller nut	1	6	12 (1.2, 9)	U-nut
Drive chain guide mounting bolt/nut	3	6	12 (1.2, 9)	U-nut
Drive chain adjuster lock nut	2	8	27 (2.8, 20)	UBS nut
Shock absorber damper rod end nut	1	12	37 (3.8, 27)	Replace with a new one. Stake.
Shock absorber compression damping adjuster	1	28	30 (3.1, 22)	

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)	
Brake lever adjuster lock nut	1	5	5.9 (0.6, 4.4)	
Brake lever pivot nut	1	6	5.9 (0.6, 4.4)	
Brake lever pivot bolt	1	6	1.0 (0.1, 0.7)	Apply silicone grease to the sliding surface.
Front master cylinder reservoir cover screw	2	4	1.0 (0.1, 0.7)	
Front master cylinder holder bolt	2	6	9.9 (1.0, 7.3)	
Front brake caliper mounting bolt	2	8	30 (3.1, 22)	Apply locking agent to the threads.
Caliper bleed valve	2	8	5.4 (0.6, 4.0)	
Rear master cylinder mounting bolt	2	6	13 (1.3, 10)	
Rear master cylinder reservoir cover bolt	2	4	1.0 (0.1, 0.7)	
Front brake caliper pin bolt	1	8	22 (2.2, 16)	Apply locking agent to the threads.
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	
Brake caliper pad pin	2	10	18 (1.8, 13)	
Front brake caliper pad pin plug	1	10	2.5 (0.3, 1.8)	
Front brake caliper bracket pin bolt	1	8	22 (2.2, 16)	Apply locking agent to the threads.
Rear brake caliper bracket pin bolt	1	8	12 (1.2, 9)	Apply locking agent to the threads.
Brake pedal pivot bolt	1	10	36 (3.7, 27)	Apply locking agent to the threads (page 15-30).
Rear master cylinder push rod lock nut	1	6	5.9 (0.6, 4.4)	

ELECTRICAL 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)	Apply grease to the threads.

## GENERAL INFORMATION

# LUBRICATION & SEAL POINTS

## ENGINE

MATERIAL	LOCATION	REMARKS
Use molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 100 g: 70 cc)	Camshaft lobes Rocker arm inner surface and valve slipper surfaces Decompressor weight sliding area Valve stem (valve guide sliding surfaces) Valve stem end sliding surface Valve lifter outer surface Clutch outer guide inner surface Clutch lifter lever cam area (contact area of clutch lifter rod) Kickstarter spindle spline area and gear rolling area Kickstarter pinion gear inner surface Kickstarter idle gear inner surface Countershaft-to-idle gear bushing contact area Connecting rod big end bearing Connecting rod small end inner surface Mainshaft spline area and gear sliding surface Countershaft spline area and gear sliding surface Transmission gear sliding surfaces Shift fork claws and guide pins Shift fork shafts outer surface	
Engine oil	Injector seal ring and O-ring Spark plug hole seal ring outer surface Left crankshaft bearing oil seal contact surface Piston outer surface and piston pin hole Piston pin outer surface Piston rings Cylinder bore Clutch outer sliding area Clutch lifter piece needle bearing contact area Clutch disc lining surface Kickstarter spindle journal Gearshift drum guide grooves Drum shifter assembly Gearshift spindle serration area Oil pump rotors sliding area Cam chain whole surface Each gear teeth Each bearing Each O-ring	
Multi-purpose grease	Countershaft O-ring Each oil seal lip Oil filter spring (oil filter contact area)	
Locking agent	Oil guide plate mounting bolt threads	
Liquid sealant	Stator/CKP sensor wire grommet contact surface	
Liquid sealant (TB1207B or equivalent)	Cylinder head cover breather plate contact area	See page 8-8

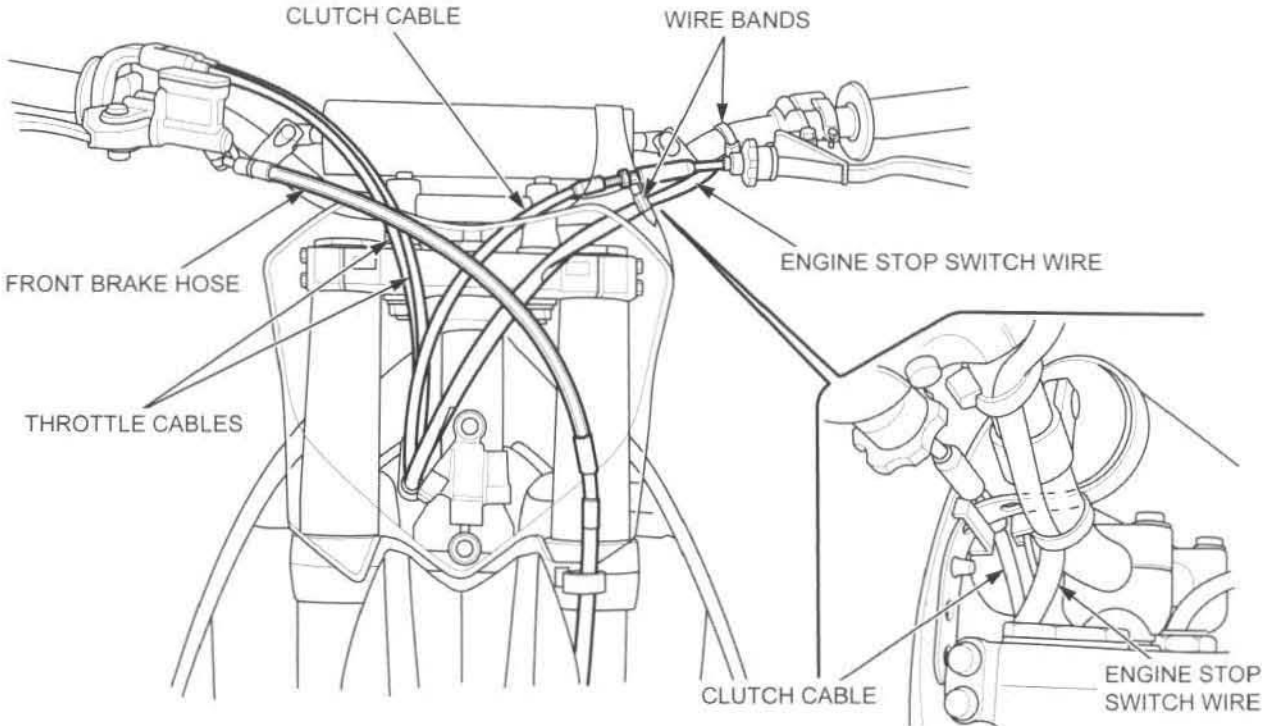
FRAME

MATERIAL	LOCATION	REMARKS
Multi-purpose grease	Wheel bearing dust seal lips Each wheel bearing cavity Kickstarter pedal joint sliding surface Axle shaft surface Swingarm pivot bolt sliding surface Gearshift pedal pivot sliding area Rear shock absorber spherical bearing rolling area Clutch cable end adjuster threads Air cleaner element-to-air cleaner housing contacting area	Apply 3 – 5 g (0.1 – 0.2 oz).
Lithium based multi-purpose grease with extreme pressure agent (Shell Alvania EP2 or equivalent)	Brake pedal pivot bolt sliding surface Throttle pipe flange groove Throttle cable end (grip side) Clutch cable end adjuster inside surface Rear shock absorber dust seal lips Swingarm pivot needle bearing rolling area Swingarm pivot thrust bearing rolling area Swingarm pivot dust seal lips Shock linkage needle bearing rolling area Shock linkage dust seal lips Shock linkage side collar inside surfaces	
Urea based multi-purpose grease with extreme pressure agent (example: Kyodo Yushi EXCELITE EP2, Shell stamina EP2 or equivalent)	Steering head bearing rolling area Steering head dust seal lips Brake pedal dust seal lips	Apply 3 – 5 g (0.1 – 0.2 oz).
Silicone grease	Clutch cable end cap inside Brake caliper pin sliding area Brake caliper bracket pin sliding area Brake caliper dust seal lips Brake caliper pad pin O-ring Front master cylinder push rod contact area Brake lever spring both ends Front brake lever adjusting bolt tip Rear master cylinder push rod rounded surface and boot fitting area	
DOT4 brake fluid	Brake caliper piston seal lips Brake caliper piston outer surface Master cylinder inner surface Master piston outer surface	
Honda Bond A or Honda Handgrip Cement (U.S.A. only)	Handlebar grip rubber inner surface Air cleaner connecting boot contacting surface	
Cemedine #366 or equivalent	Air cleaner housing cover-to-air cleaner housing contacting surface	
Pro Honda HP Fork Oil SS-19	Fork cap O-rings Fork damper O-ring Fork plug bolt O-ring Fork center bolt O-ring Fork oil seal lips Fork dust seal lips Slider bushing Guide bushing	
Pro Honda HP Fork oil 5W ('10)	HPSD plug bolt O-ring End cap O-ring Free piston O-ring Damper rod O-ring	

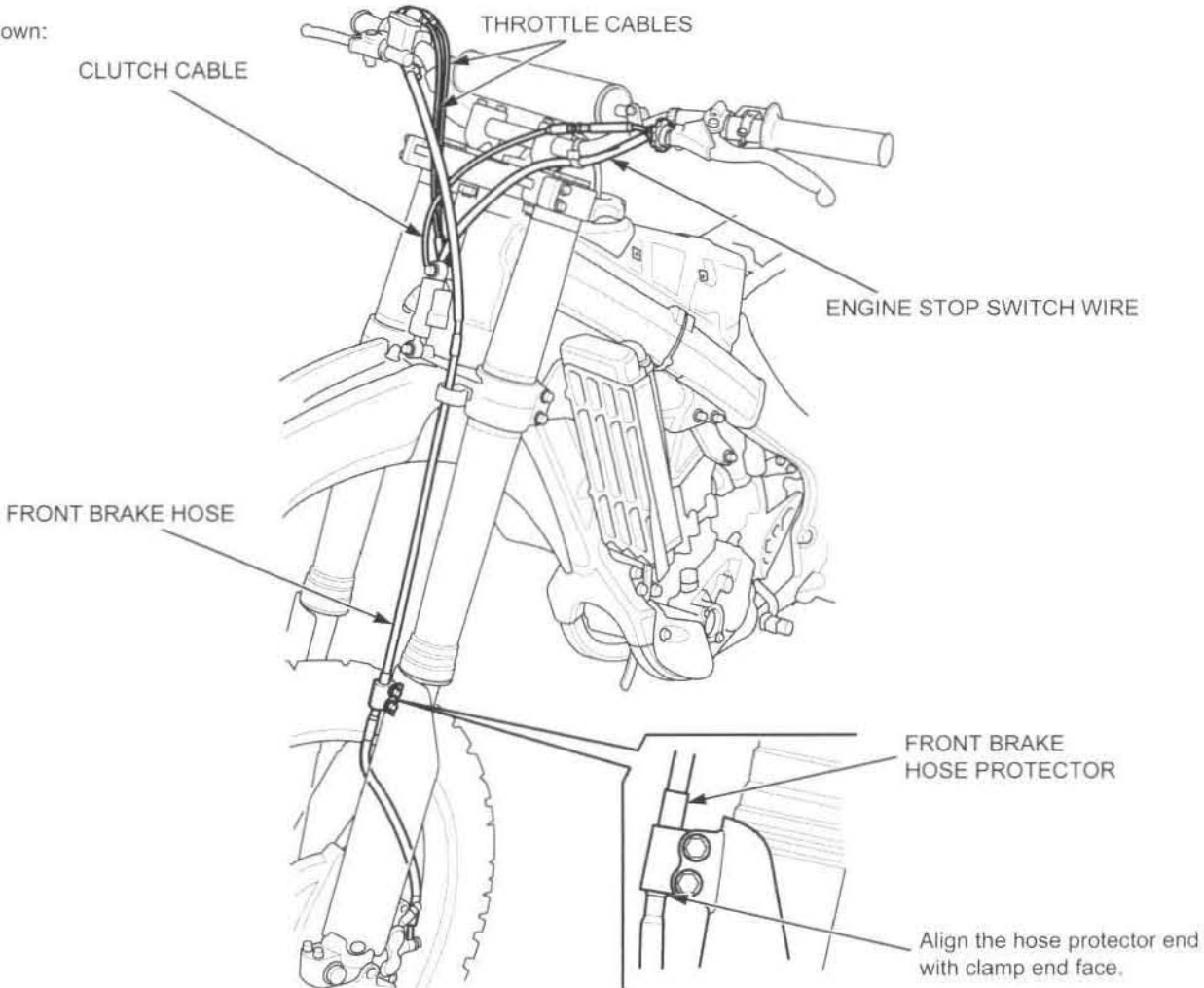
## GENERAL INFORMATION

MATERIAL	LOCATION	REMARKS
Pro Honda HP Fork oil SS-19 (After '10)	HPSD plug bolt O-ring End cap O-ring Free piston O-ring Damper rod O-ring	
HP Fork Oil SS-25	Piston ring and O-rings Damper rod sliding surface Rod guide case O-ring, rebound rubber, oil seal lips, dust seal lips Damper case inner surface Bladder lips Compression damping adjuster O-rings	
Engine oil	Fuel pump O-ring whole surface Fuel pump joint O-ring Fuel pump base joint O-ring	
Muffler sealant (high temperature silicone)	Muffler body contact area (front pipe) Muffler body contact area (end cover)	Apply 5.0 g (0.18 oz). Apply 5.0 g (0.18 oz).

# CABLE & HARNESS ROUTING

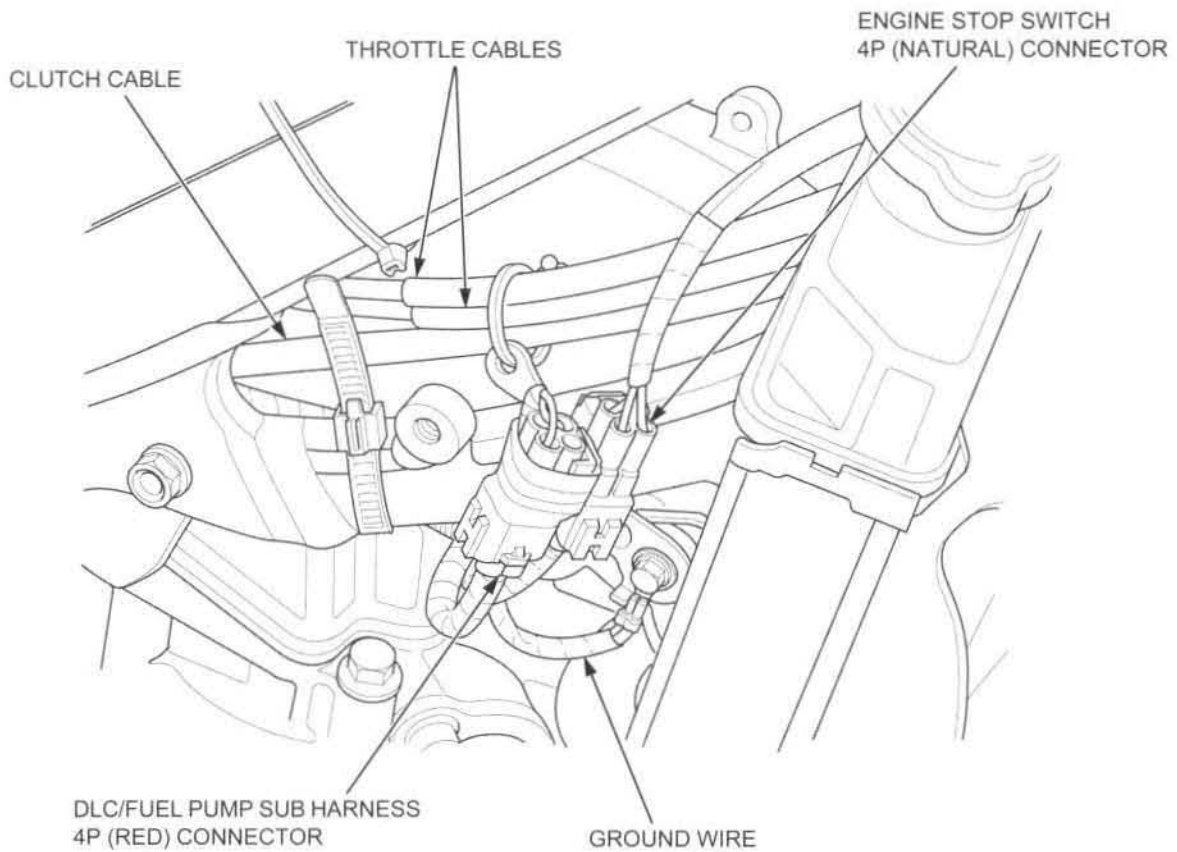
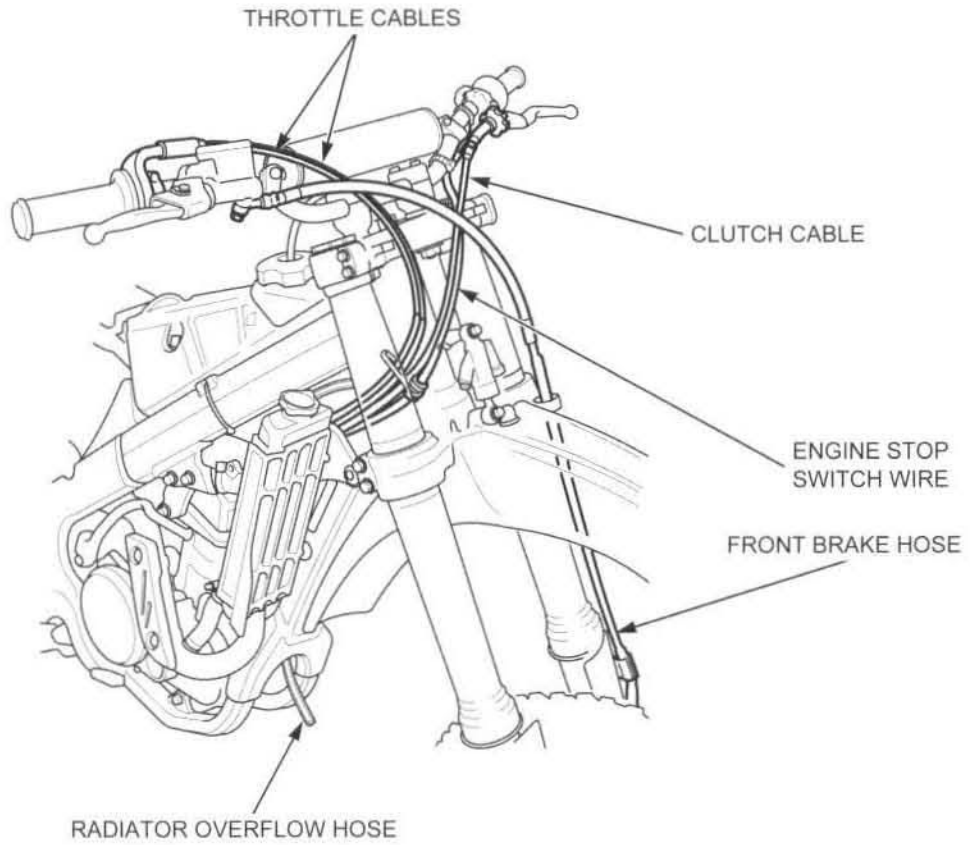


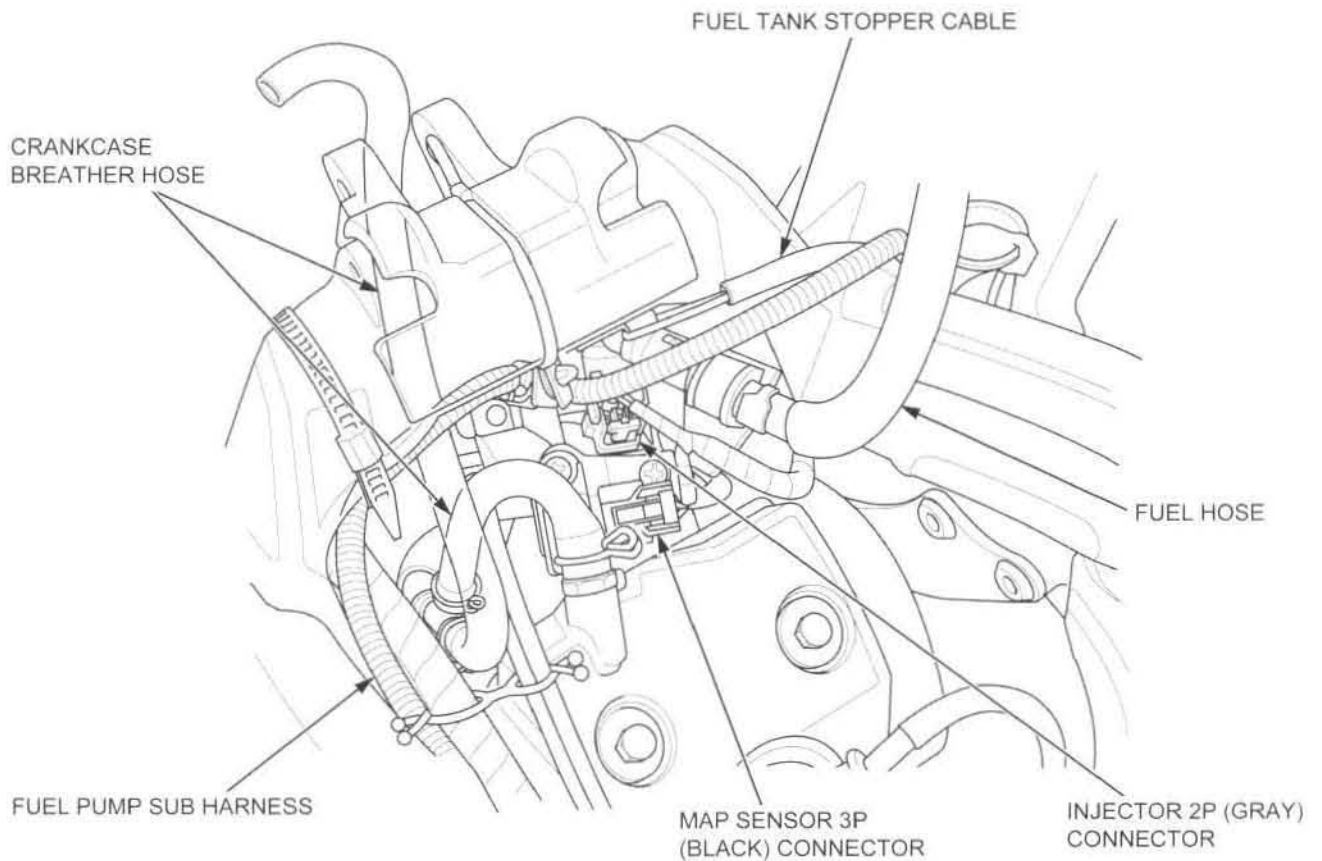
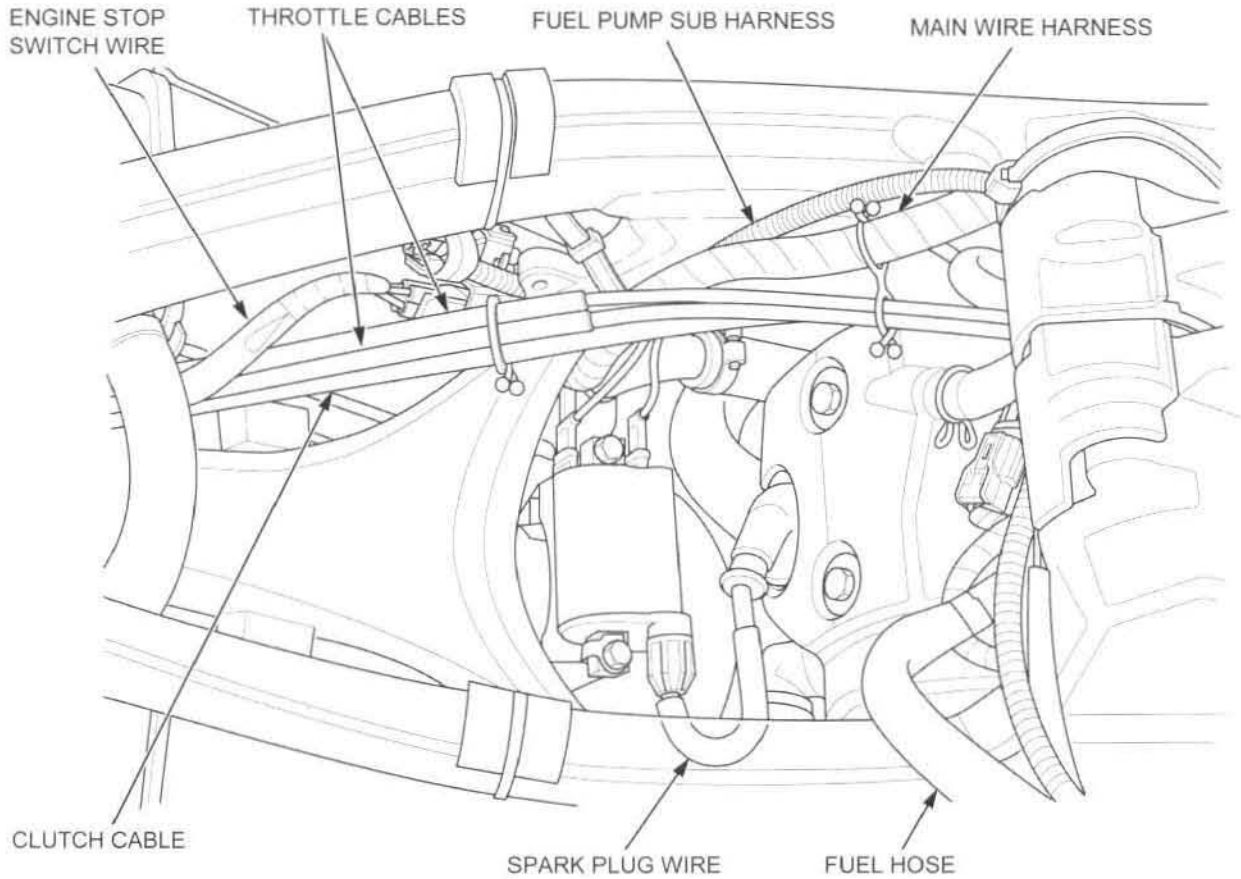
'10 shown:

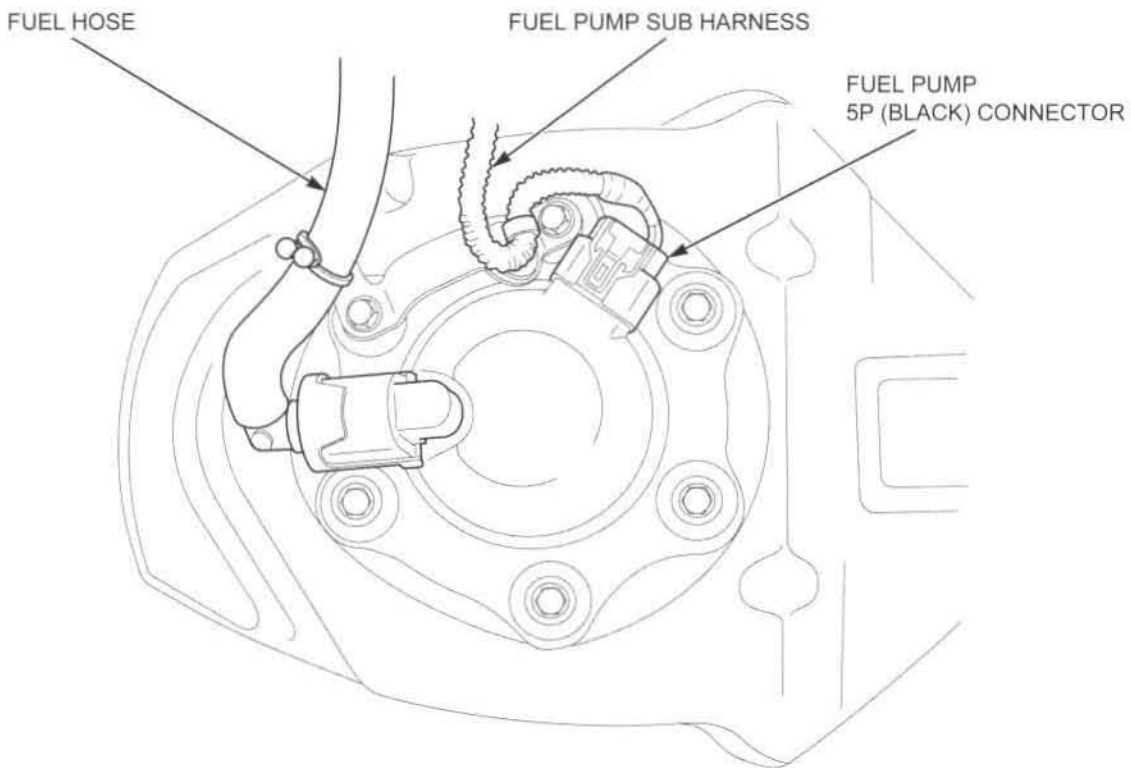
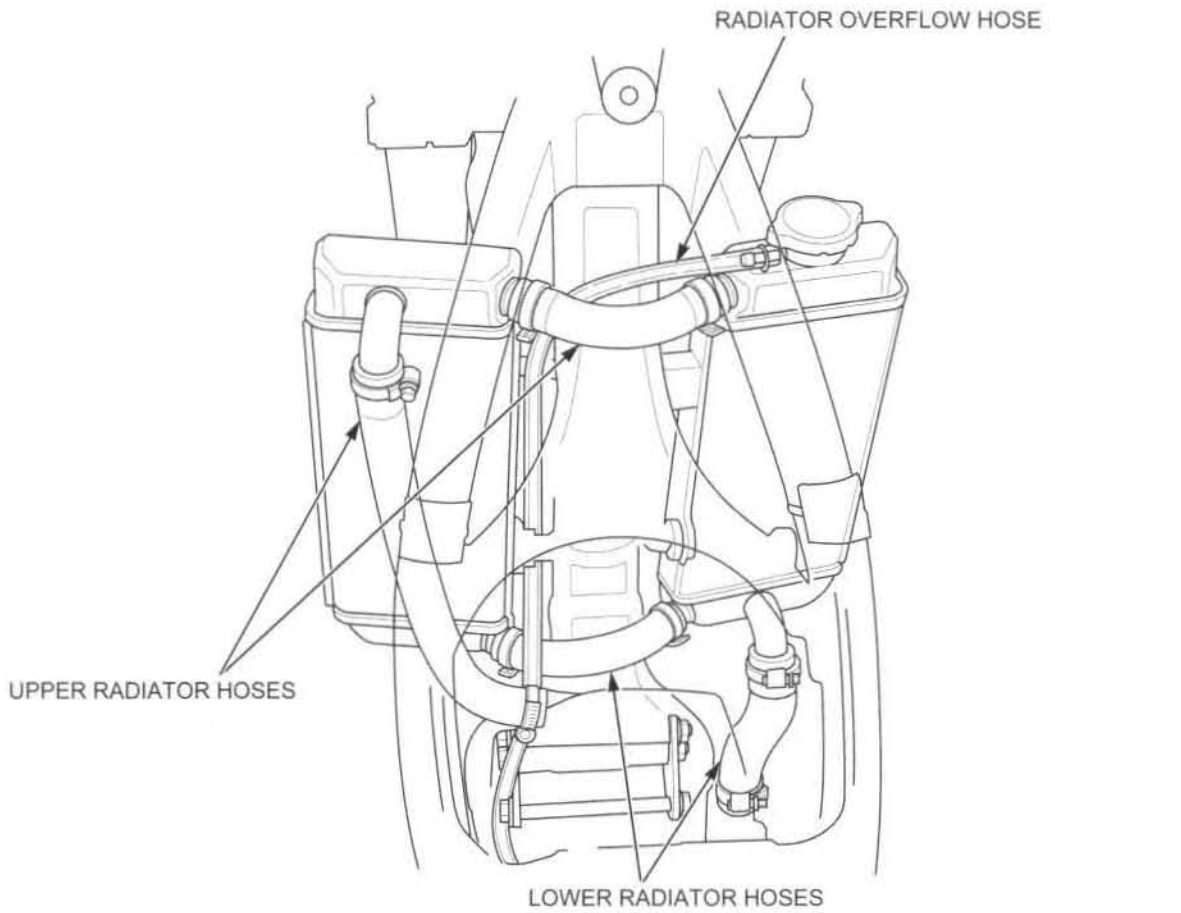




**GENERAL INFORMATION**

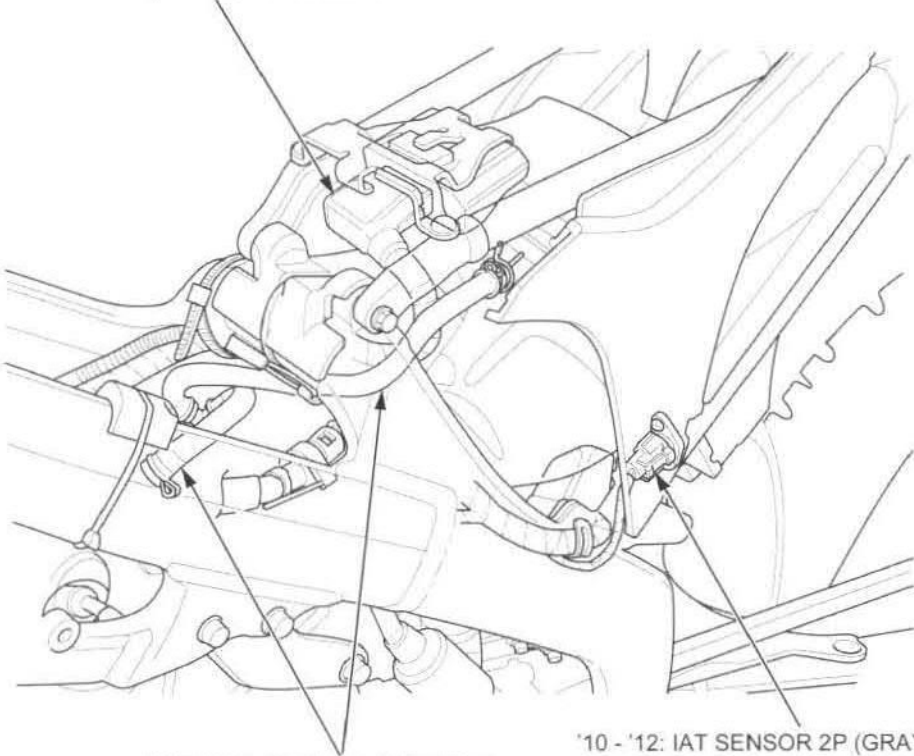






\*10 shown:

ECM 33P (BLACK) CONNECTOR



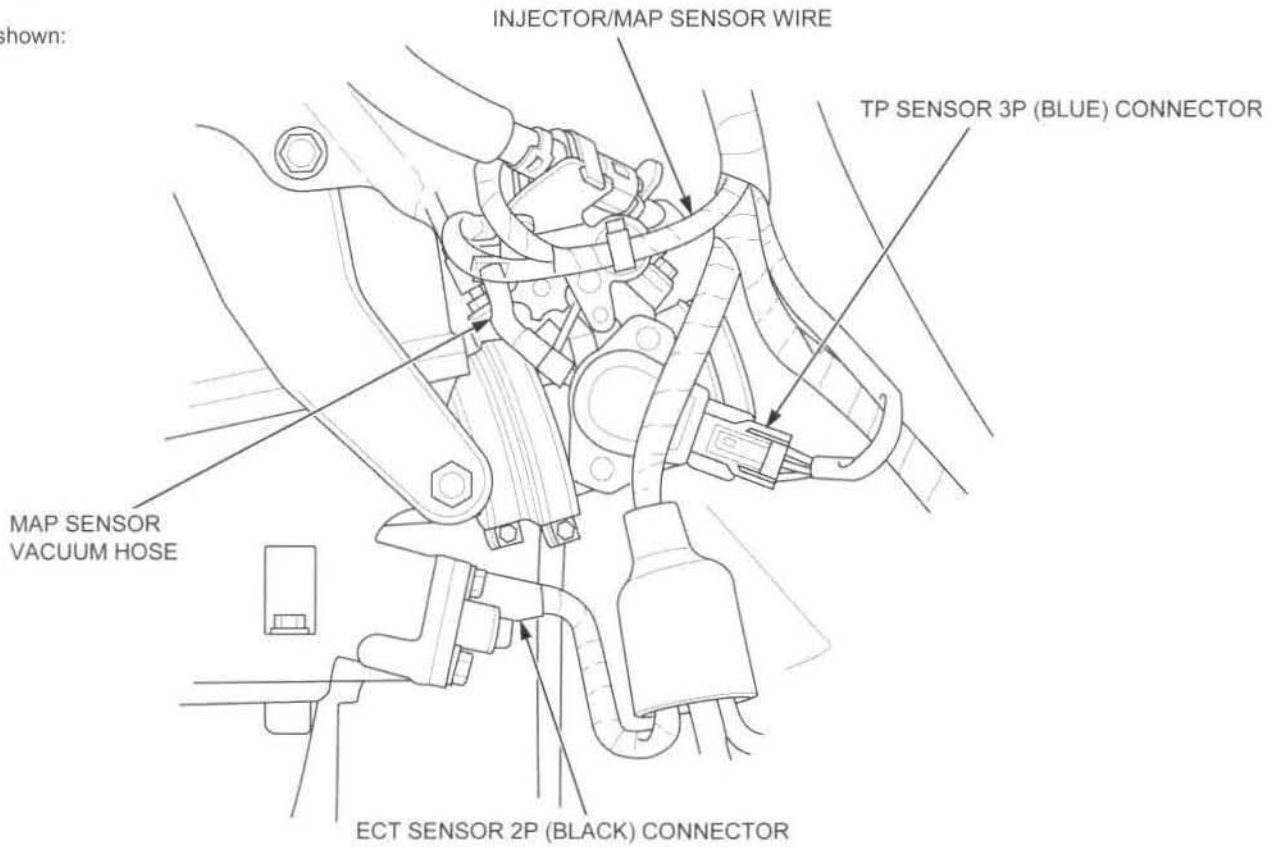
CRANKCASE BREATHER HOSE

\*10 - \*12: IAT SENSOR 2P (GRAY) CONNECTOR  
After \*12: IAT SENSOR 2P (BLACK) CONNECTOR

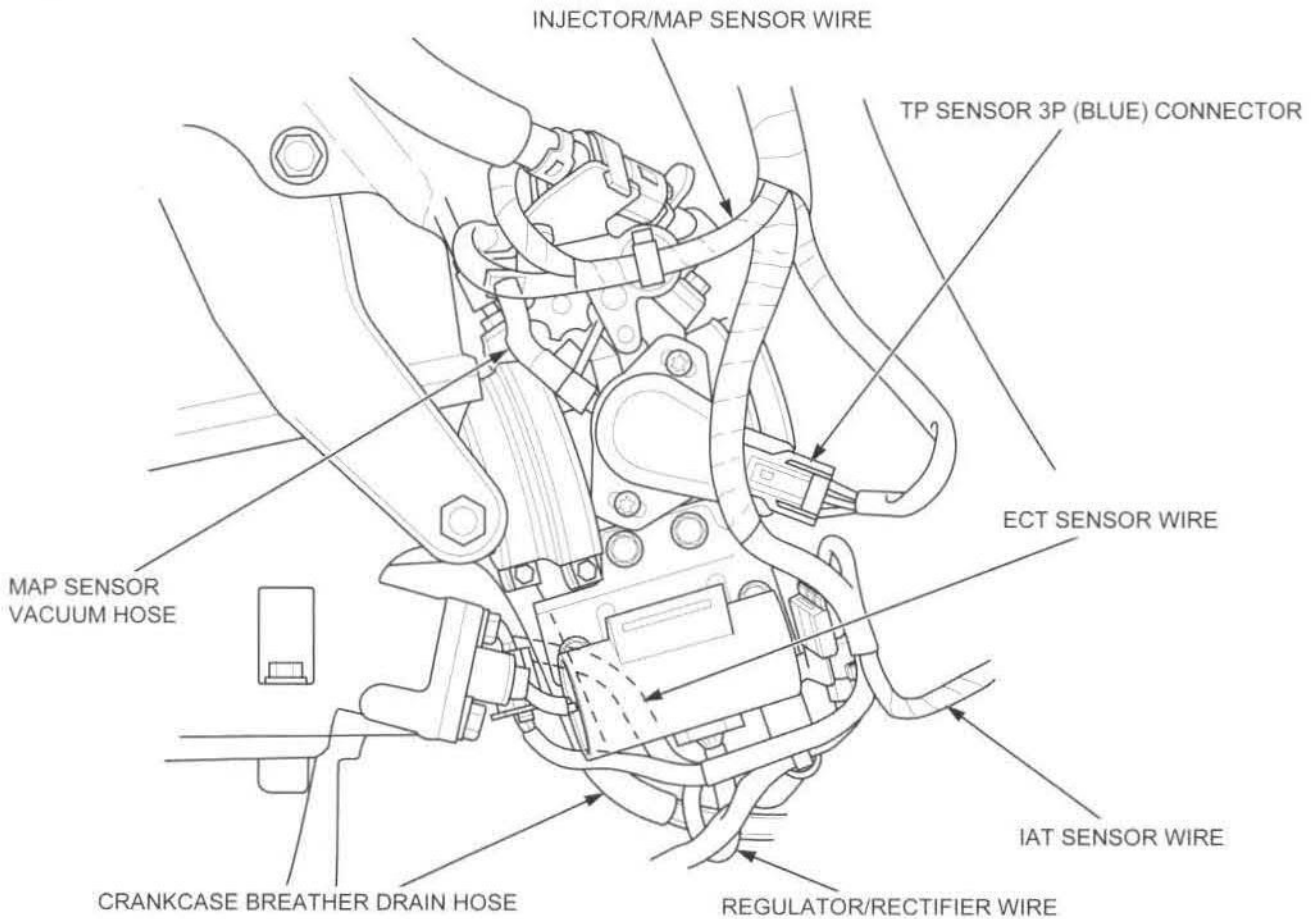
# GENERAL INFORMATION

'10 - '12:

'10 shown:



After '12:

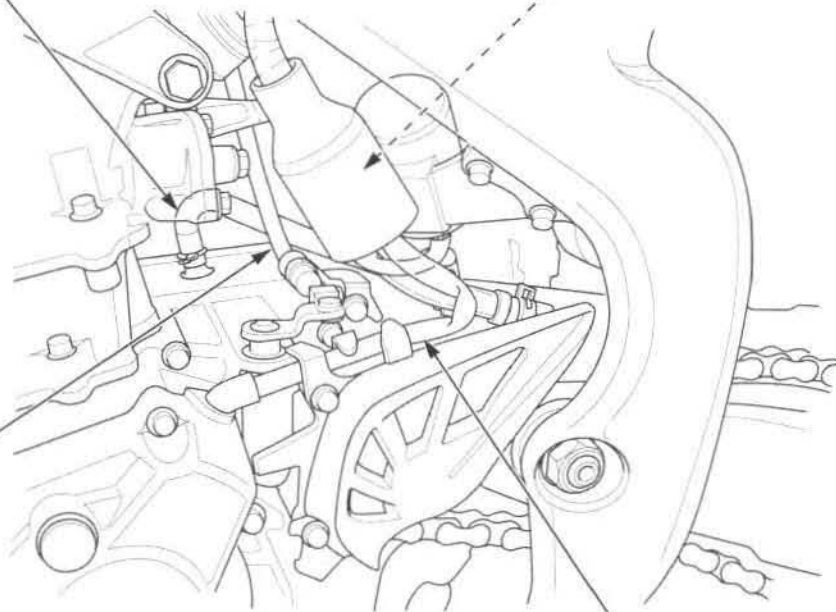


'10 - '12:

TRANSMISSION BREATHER HOSE

ALTERNATOR/CKP SENSOR 6P (BLACK) CONNECTOR  
CONDENSER 2P (BLACK) CONNECTOR

CLUTCH CABLE



ALTERNATOR/CKP SENSOR WIRE

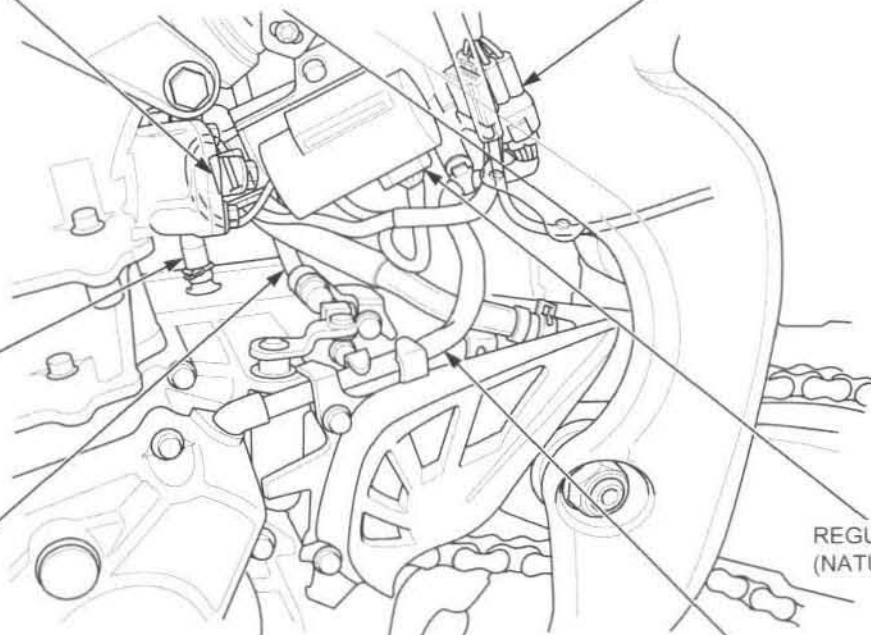
After '12:

CONDENSER 2P (BLACK) CONNECTOR

ALTERNATOR/CKP SENSOR 6P (BLACK) CONNECTOR

TRANSMISSION  
BREATHER HOSE

CLUTCH CABLE

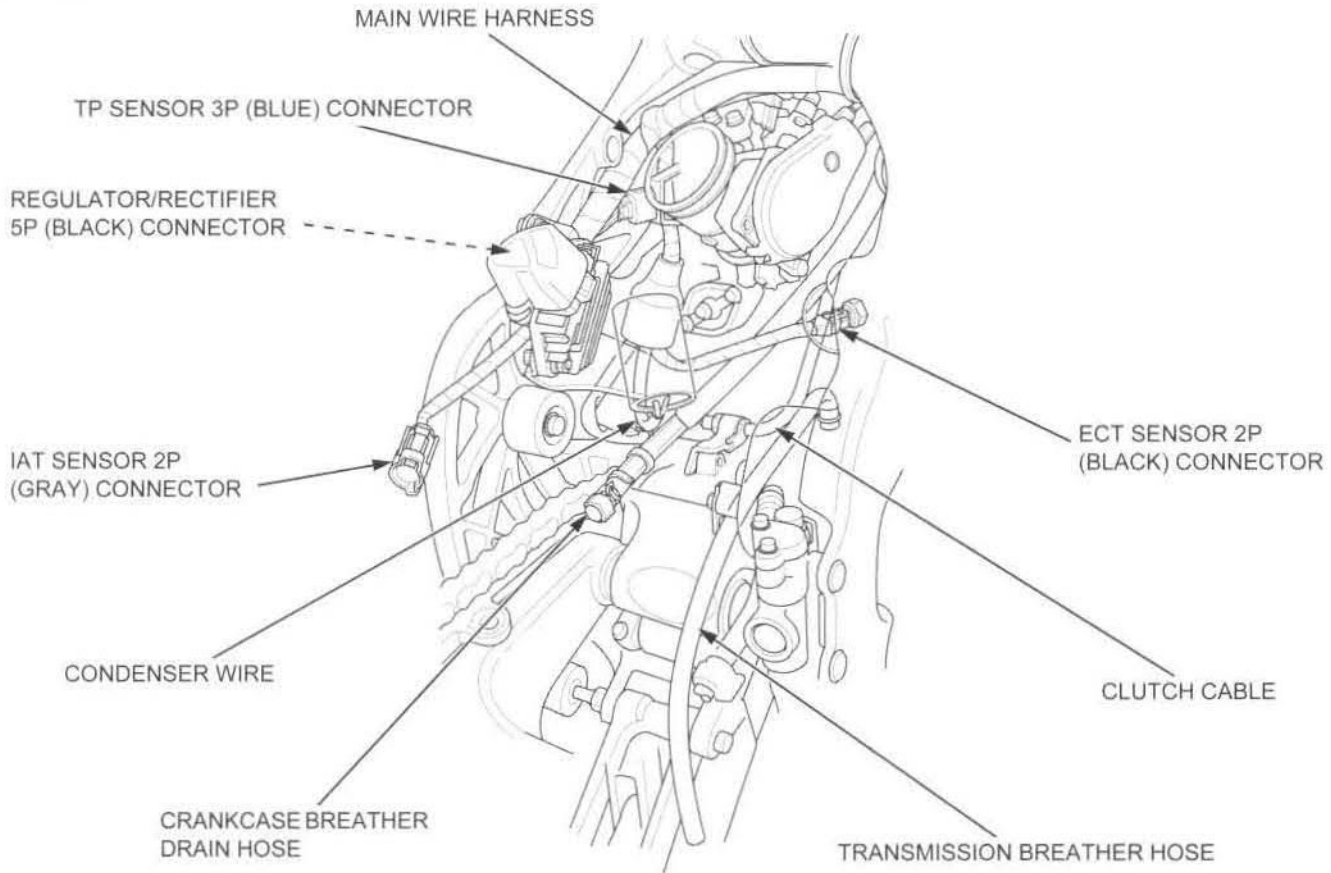


REGULATOR/RECTIFIER 6P  
(NATURAL) CONNECTOR

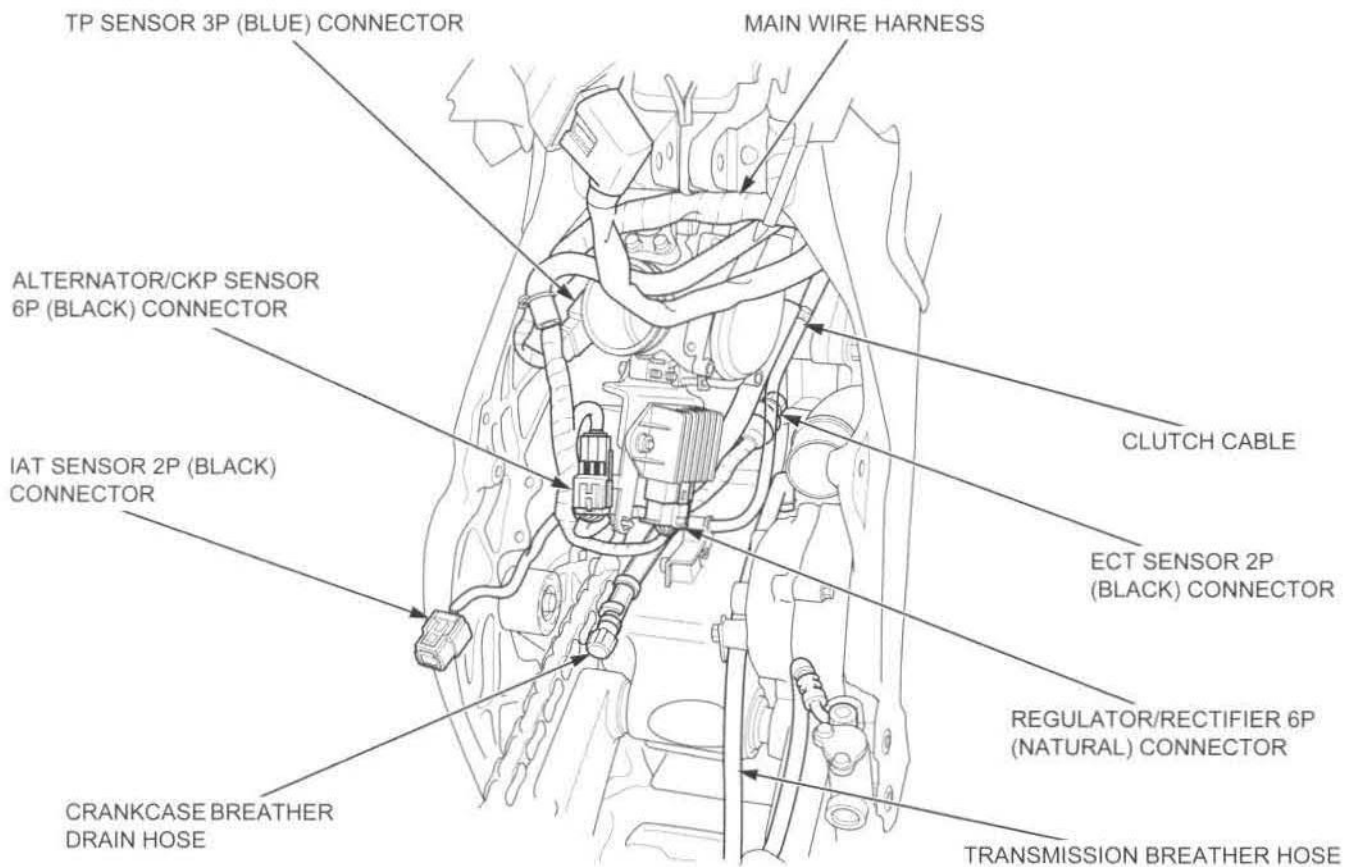
ALTERNATOR/CKP SENSOR WIRE

# GENERAL INFORMATION

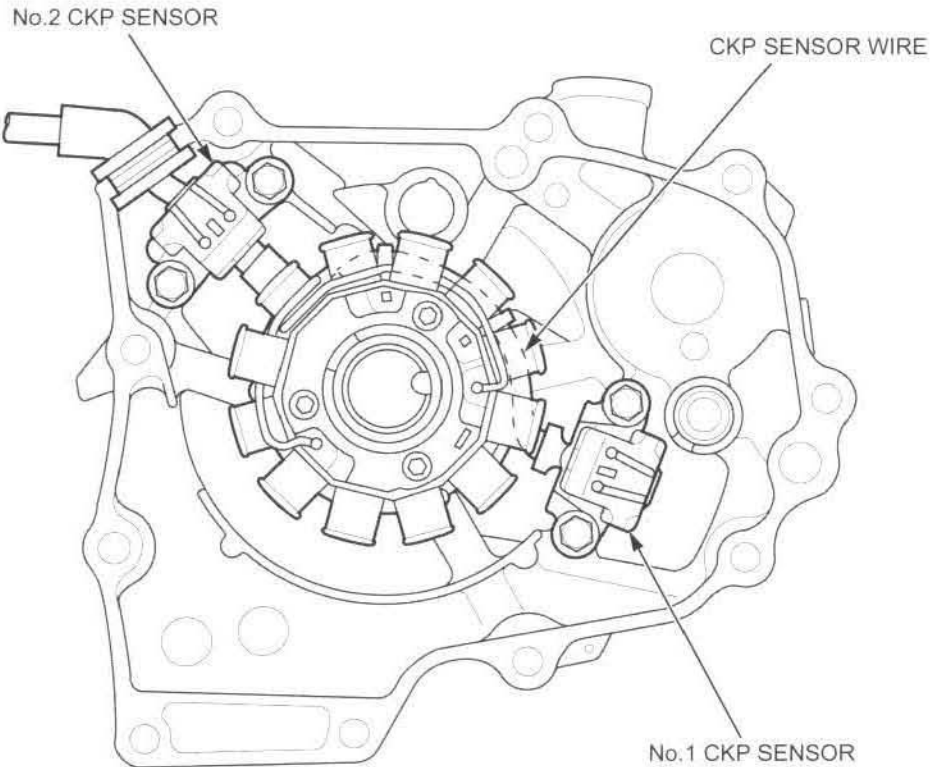
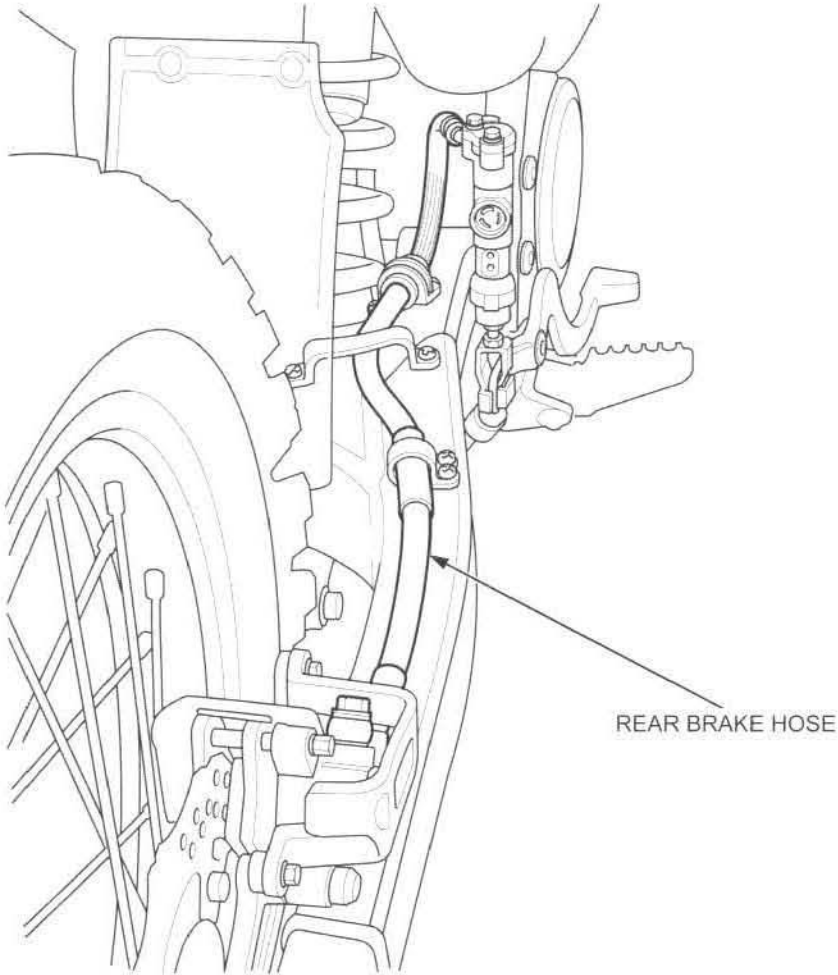
'10 - '12:



After '12:






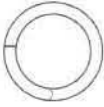
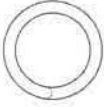

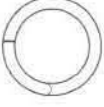
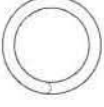
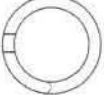
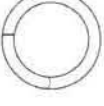




**GENERAL INFORMATION**


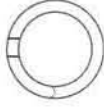




**OPTIONAL PARTS**

**FRAME/ENGINE**

ITEM			REMARKS
<b>MAINTENANCE:</b> Workstand			For maintenance
			
Pin spanner			Pin spanner A x 2 For shock absorber spring installed length (preload) adjustment (two required)
Air gauge			For checking tire air pressure
<b>SPROCKET:</b>			
Driven sprocket /chain link	Standard	'10	48T (Aluminum)/116
		After '10	49T (Aluminum)/116
	Optional	'10	47T (Aluminum)/116
		After '10	49T (Aluminum)/116
DRIVE CHAIN:			48T (Aluminum)/116 50T (Aluminum)/116 DID 520DMA4-120RB RK 520TXZ-120RJ
<b>HANDLEBAR LOWER HOLDER:</b>			
	Standard		3 mm offset
	Optional		no offset

ITEM		REMARKS	
<b>FORK (*10)</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>OIL CAPACITY</b>
Light	1 scribe mark	4.2 N/mm (23.98 lbf/in)	Standard 347 cm <sup>3</sup> (11.7 US oz, 12.2 Imp oz) Maximum 368 cm <sup>3</sup> (12.4 US oz, 13.0 Imp oz) Minimum 291 cm <sup>3</sup> (9.8 US oz, 10.2 Imp oz)
			
Standard	No mark	4.4 N/mm (25.12 lbf/in)	Standard 342 cm <sup>3</sup> (11.6 US oz, 12.0 Imp oz) Maximum 363 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz) Minimum 286 cm <sup>3</sup> (9.7 US oz, 10.1 Imp oz)
			
Heavy	2 scribe marks	4.6 N/mm (26.27 lbf/in)	Standard 345 cm <sup>3</sup> (11.7 US oz, 12.1 Imp oz) Maximum 366 cm <sup>3</sup> (12.4 US oz, 12.9 Imp oz) Minimum 288 cm <sup>3</sup> (9.7 US oz, 10.1 Imp oz)
			
<b>FORK (*11)</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>OIL CAPACITY</b>
Light	1 scribe mark	4.2 N/mm (23.98 lbf/in)	Standard 370 cm <sup>3</sup> (12.5 US oz, 13.0 Imp oz) Maximum 385 cm <sup>3</sup> (13.0 US oz, 13.6 Imp oz) Minimum 301 cm <sup>3</sup> (10.2 US oz, 10.6 Imp oz)
			
Standard	No mark	4.4 N/mm (25.12 lbf/in)	Standard 365 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz) Maximum 380 cm <sup>3</sup> (12.9 US oz, 13.4 Imp oz) Minimum 296 cm <sup>3</sup> (10.0 US oz, 10.4 Imp oz)
			
Heavy	2 scribe marks	4.6 N/mm (26.27 lbf/in)	Standard 368 cm <sup>3</sup> (12.4 US oz, 13.0 Imp oz) Maximum 382 cm <sup>3</sup> (12.9 US oz, 13.4 Imp oz) Minimum 299 cm <sup>3</sup> (10.1 US oz, 10.5 Imp oz)
			
<b>FORK (*12)</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>OIL CAPACITY</b>
Light	1 scribe mark	4.2 N/mm (23.98 lbf/in)	Standard 377 cm <sup>3</sup> (12.8 US oz, 13.3 Imp oz) Maximum 385 cm <sup>3</sup> (13.0 US oz, 13.6 Imp oz) Minimum 301 cm <sup>3</sup> (10.2 US oz, 10.6 Imp oz)
			
Standard	No mark	4.4 N/mm (25.12 lbf/in)	Standard 372 cm <sup>3</sup> (12.6 US oz, 13.1 Imp oz) Maximum 380 cm <sup>3</sup> (12.9 US oz, 13.4 Imp oz) Minimum 296 cm <sup>3</sup> (10.0 US oz, 10.4 Imp oz)
			
Heavy	2 scribe marks	4.6 N/mm (26.27 lbf/in)	Standard 375 cm <sup>3</sup> (12.7 US oz, 13.2 Imp oz) Maximum 382 cm <sup>3</sup> (12.9 US oz, 13.4 Imp oz) Minimum 299 cm <sup>3</sup> (10.1 US oz, 10.5 Imp oz)
			

## GENERAL INFORMATION

ITEM		REMARKS	
<b>FORK (After '12)</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>OIL CAPACITY</b>
Light	No mark	4.4 N/mm (25.12 lbf/in)	Standard 360 cm <sup>3</sup> (12.2 US oz, 12.7 Imp oz) Maximum 381 cm <sup>3</sup> (12.9 US oz, 13.4 Imp oz) Minimum 298 cm <sup>3</sup> (10.1 US oz, 10.5 Imp oz)
			
Standard	2 scribe marks	4.59 N/mm (26.20 lbf/in)	Standard 363 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz) Maximum 384 cm <sup>3</sup> (13.0 US oz, 13.5 Imp oz) Minimum 300 cm <sup>3</sup> (10.1 US oz, 10.6 Imp oz)
			
Heavy	3 scribe marks	4.8 N/mm (27.41 lbf/in)	Standard 356 cm <sup>3</sup> (12.0 US oz, 12.5 Imp oz) Maximum 377 cm <sup>3</sup> (12.8 US oz, 13.3 Imp oz) Minimum 294 cm <sup>3</sup> (9.9 US oz, 10.4 Imp oz)
			
<b>SHOCK ABSORBER</b>			
Spring			
<b>TYPE</b>		<b>SPRING RATE</b>	<b>IDENTIFICATION MARK</b>
Light		50.0 N/mm (285.5 lbf/in)	White paint
Standard		52.0 N/mm (296.9 lbf/in)	Blue paint
Heavy		53.9 N/mm (307.7 lbf/in)	Red paint

The standard fork and shock springs mounted on the motorcycle when it leaves the factory are not marked. Before replacing the springs, be sure to mark them so they can be distinguished from other optional springs.

## 2. FRAME/BODY PANELS/EXHAUST SYSTEM

---

SERVICE INFORMATION .....	2-2	NUMBER PLATE .....	2-5
TROUBLESHOOTING.....	2-2	FRONT FENDER.....	2-5
SEAT.....	2-3	REAR FENDER.....	2-6
SIDE COVER.....	2-3	SUB-FRAME .....	2-6
RADIATOR SHROUD.....	2-4	EXHAUST SYSTEM.....	2-9
ENGINE GUARD .....	2-4		

### 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.
- This section covers removal and installation of the body panels, sub-frame 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 gaskets after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust system fasteners. Always tighten the exhaust pipe joint nuts, then tighten the muffler mounting fasteners.
- Always inspect the exhaust system for leaks after installation.

#### TORQUE VALUES

Seat mounting bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)
Side cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Radiator shroud bolt (upper side)	5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)
Engine guard bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Sub-frame upper mounting bolt	33 N·m (3.4 kgf·m, 24 lbf·ft)
Sub-frame right lower mounting bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)
Sub-frame left lower mounting bolt	33 N·m (3.4 kgf·m, 24 lbf·ft)
Exhaust pipe protector bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Exhaust pipe protector band screw	1.5 N·m (0.2 kgf·m, 1.1 lbf·ft)
Exhaust pipe joint nut	21 N·m (2.1 kgf·m, 15 lbf·ft)
Muffler mounting bolt	26 N·m (2.7 kgf·m, 19 lbf·ft)
Muffler joint band bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)
Exhaust pipe stud bolt	See page 2-17
Air cleaner connecting boot band bolt (throttle body side)	See page 2-9
Rear fender mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)

#### TROUBLESHOOTING

##### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

##### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## SEAT

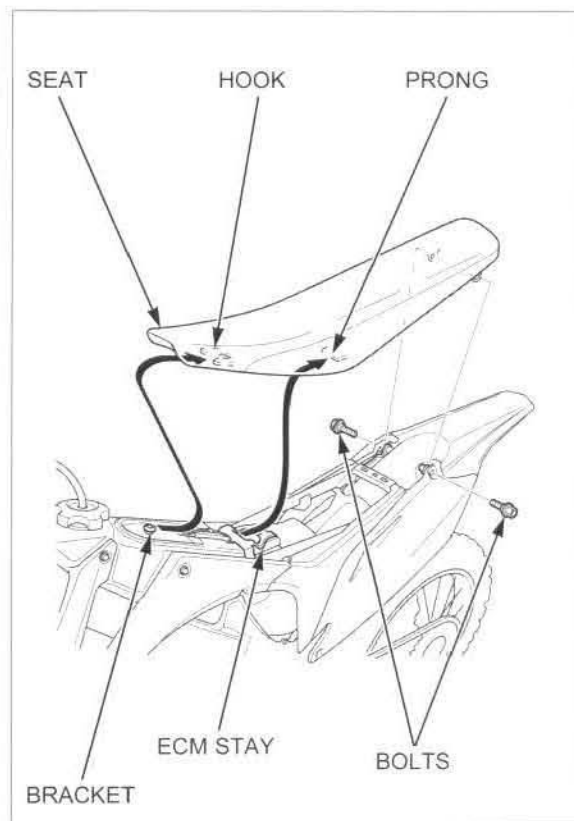
### REMOVAL/INSTALLATION

Remove the seat mounting bolts.  
Remove the seat by pulling it backward.

Align the seat hook with the seat bracket on the fuel tank and seat prong with the ECM stay.

Install and tighten the seat mounting bolts to the specified torque.

**TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)**



## SIDE COVER

### REMOVAL/INSTALLATION

Remove the seat mounting bolt.  
Remove the side cover bolt and side cover.

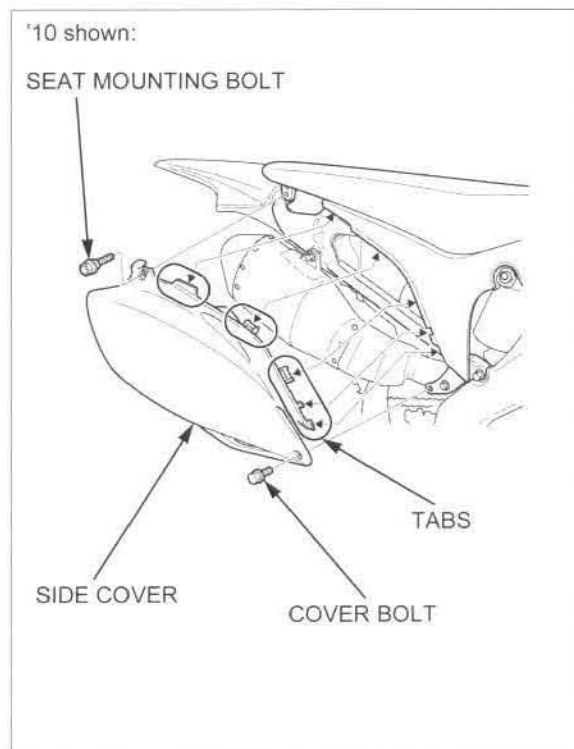
*Be careful not to damage the tabs.*

Install the side cover by inserting the side cover tabs into the air cleaner housing cover and seat as shown. Install and tighten the side cover bolt to the specified torque.

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

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

**TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)**





## RADIATOR SHROUD

### REMOVAL/INSTALLATION

Remove the bolts, collars and radiator shroud.

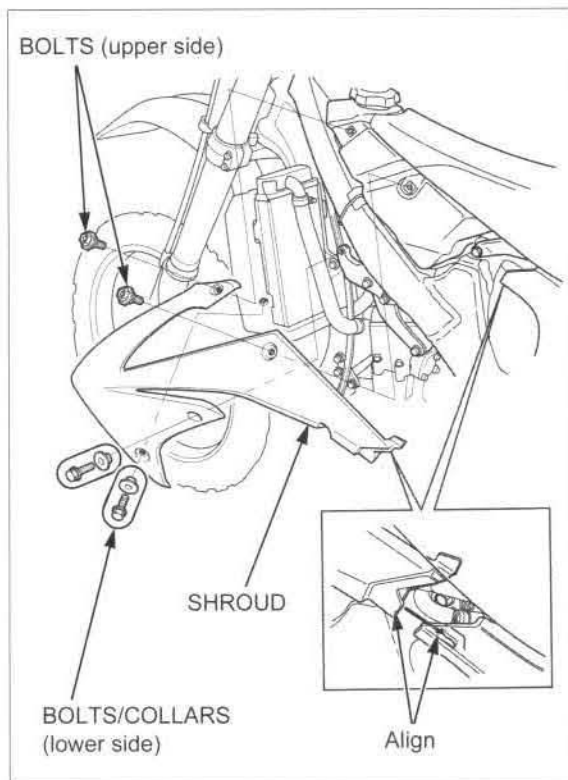
Install the radiator shroud by aligning its tab with the air cleaner housing cover slot.

Install the radiator shroud bolts and collars.

Tighten the upper side bolts to the specified torque.

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

Tighten the lower side bolts securely.



## ENGINE GUARD

### REMOVAL/INSTALLATION

Remove the bolt, collar and engine guard.

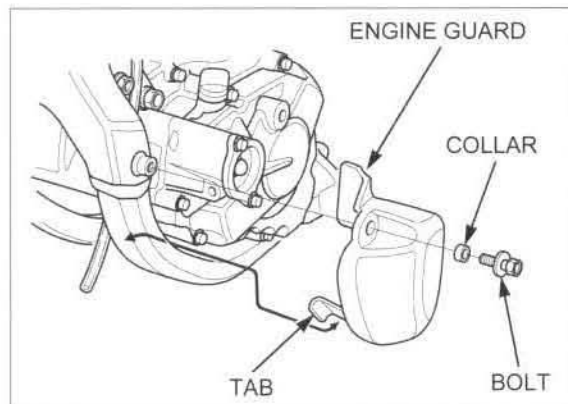
Installation is in the reverse order of removal.

**NOTE:**

Install the engine guard by hooking its tab onto the frame.

**TORQUE:**

Engine guard bolt:  
**10 N·m (1.0 kgf·m, 7 lbf·ft)**



## NUMBER PLATE

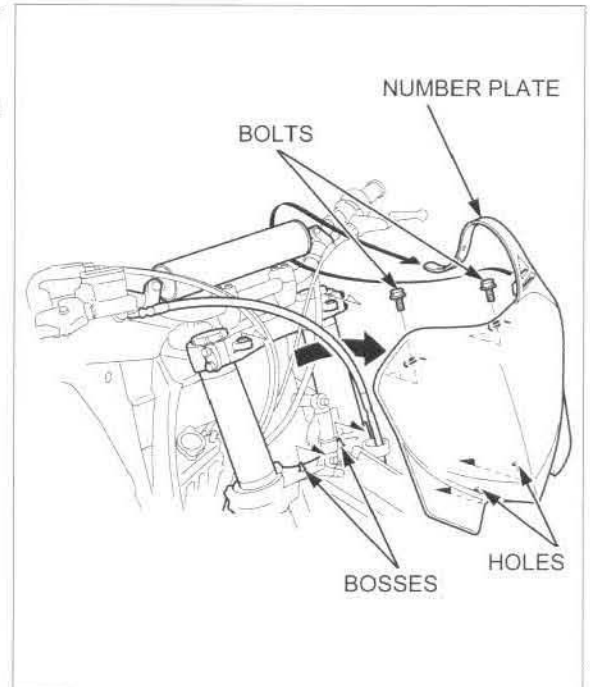
### REMOVAL/INSTALLATION

Release the number plate band from the handlebar pad.

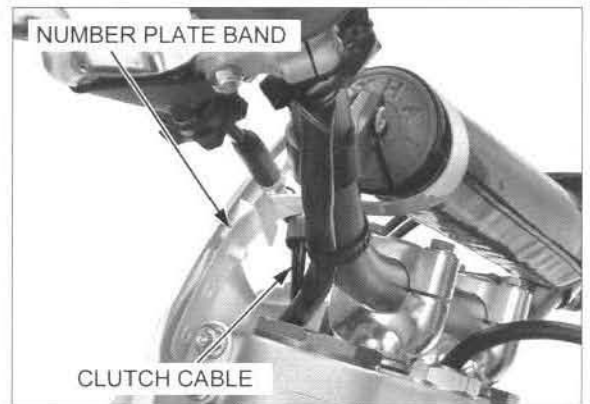
Remove the bolts and number plate.

Install the number plate by aligning its holes with the bosses on the steering stem.

Install and tighten the bolts.



Set the number plate band while positioning the clutch cable as shown.

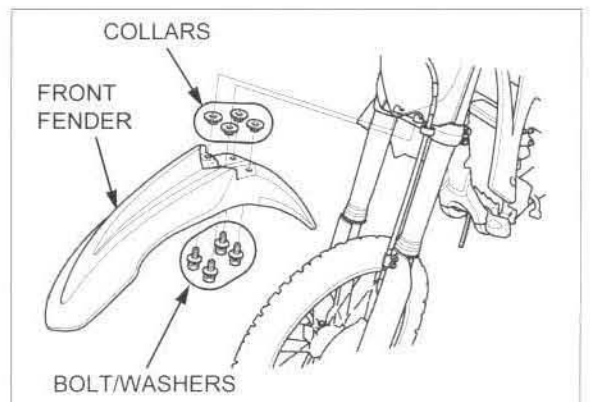


## FRONT FENDER

### REMOVAL/INSTALLATION

Remove the bolt/washers, collars and the front fender.

Installation is in the reverse order of removal.



## REAR FENDER

### REMOVAL/INSTALLATION

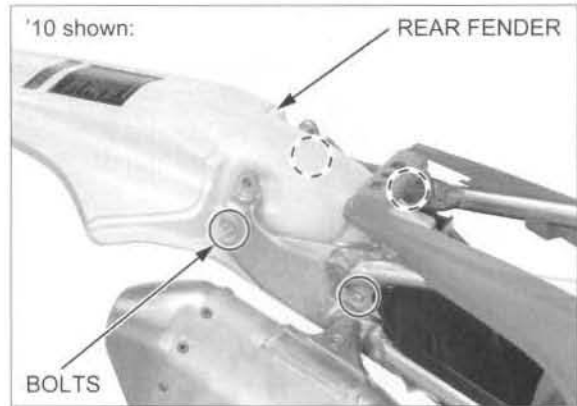
Remove the following:

- Seat (page 2-3)
- Side covers (page 2-3)

Remove the mounting bolts and rear fender.  
Installation is in the reverse order of removal.

#### TORQUE:

Rear fender mounting bolt:  
13 N·m (1.3 kgf·m, 10 lbf·ft)



## SUB-FRAME

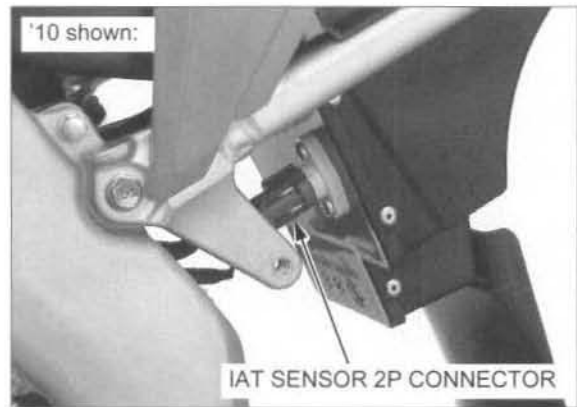
### REMOVAL

Remove the following:

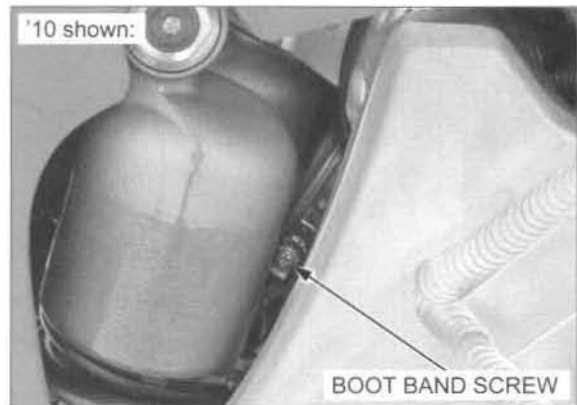
- Seat (page 2-3)
- Side covers (page 2-3)
- Muffler (page 2-9)

'10 - '12: Disconnect the IAT sensor 2P (Gray) connector.

After '12: Disconnect the IAT sensor 2P (Black) connector.



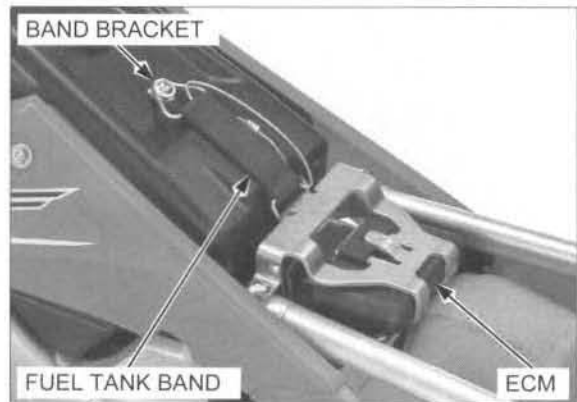
Loosen the air cleaner connecting boot band screw.



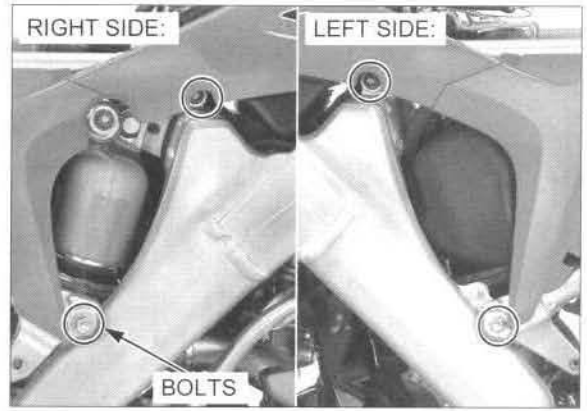
*Be careful not to damage the ECM and wires.*

Remove the ECM with the rubber cover from the stay of the sub-frame.

Unhook the fuel tank band from the fuel tank band bracket.



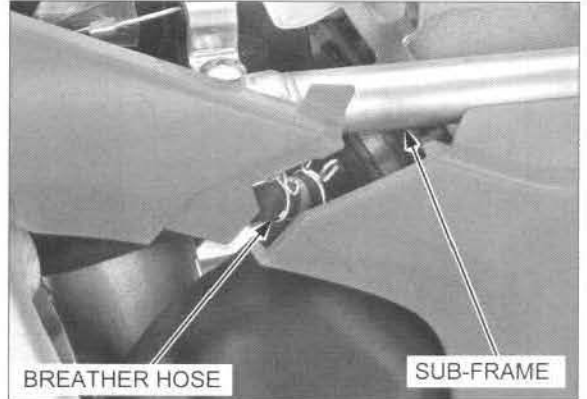
Remove the sub-frame upper and lower mounting bolts.



*Be careful not to damage the mud guard.*

Remove the connecting boot from the throttle body by pulling the sub-frame backward.

Disconnect the crankcase breather hose from the air cleaner housing and remove the sub-frame.



### INSTALLATION

Install the sub-frame while aligning each radiator shroud tab with each air cleaner housing cover slot.

Connect the crankcase breather hose.

Install the ECM to the stay of the sub-frame.

Tighten the sub-frame upper mounting bolts first, then tighten the lower mounting bolts to the specified torque.

#### TORQUE:

**Upper:** 33 N·m (3.4 kgf·m, 24 lbf·ft)

**Right lower:** 49 N·m (5.0 kgf·m, 36 lbf·ft)

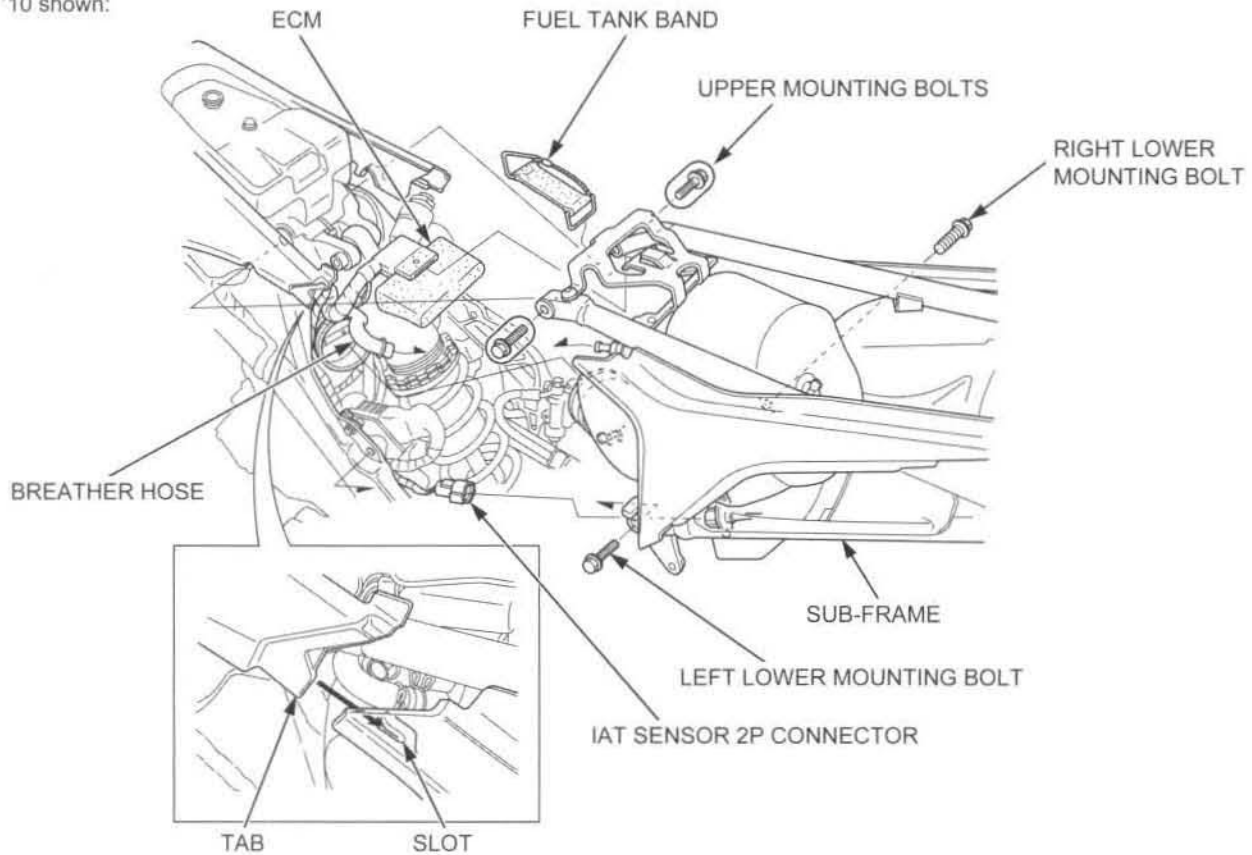
**Left lower:** 33 N·m (3.4 kgf·m, 24 lbf·ft)

Hook the fuel tank band to the fuel tank band bracket.

'10 - '12: Connect the IAT sensor 2P (Gray) connector.

After '12: Connect the IAT sensor 2P (Black) connector.

'10 shown:

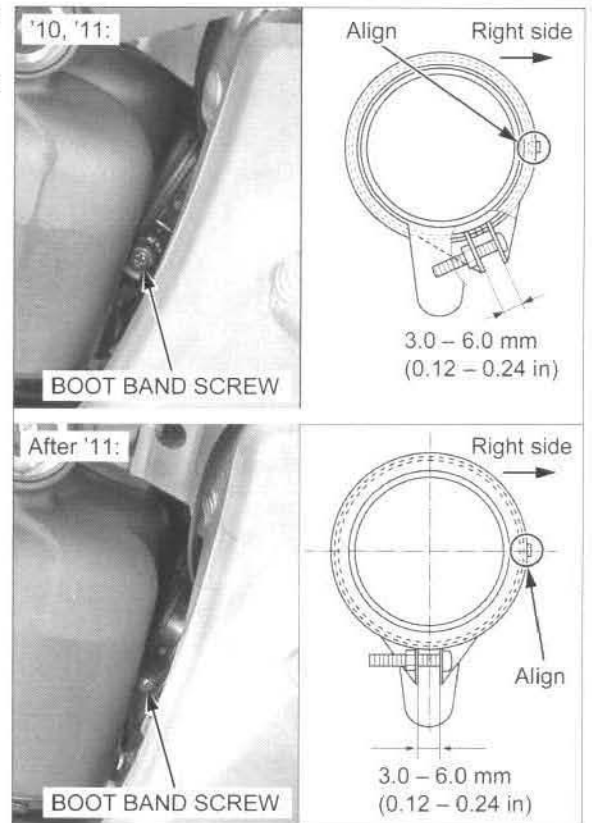


Align the air cleaner connecting boot band hole with the tab of the air cleaner connecting boot.

Tighten the air cleaner connecting boot band screw to the specified width as shown.

Install the following:

- Muffler (page 2-9)
- Side covers (page 2-3)
- Seat (page 2-3)

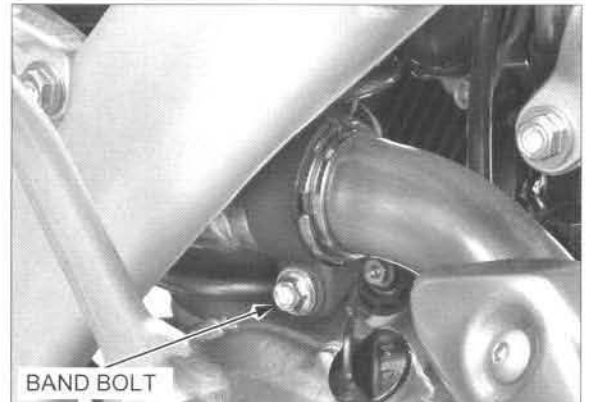


## EXHAUST SYSTEM

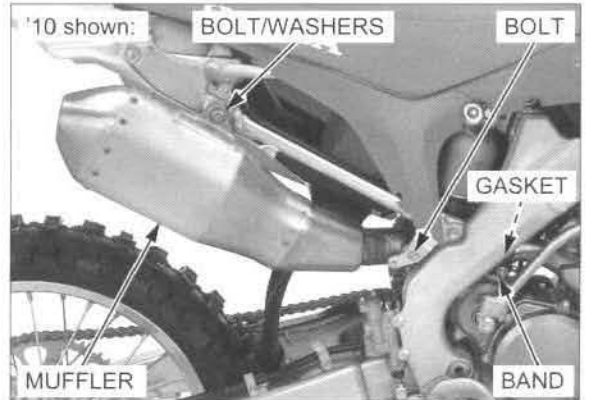
### MUFFLER REMOVAL/INSTALLATION

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

Loosen the muffler joint band bolt.

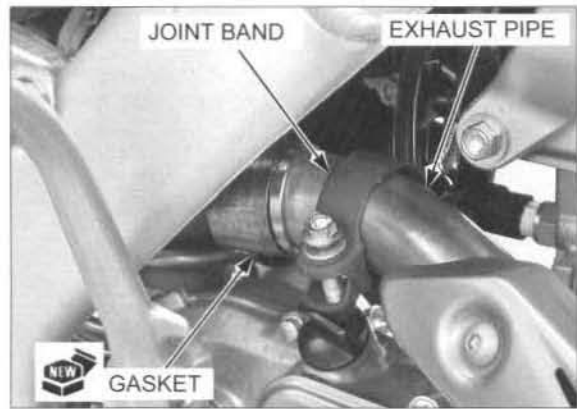


Remove the muffler mounting bolts, washers, muffler, gasket and muffler joint band.



## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the muffler joint band and a new gasket to the exhaust pipe.



Install the muffler by aligning the tab of the muffler joint band with the cut-out of the muffler.

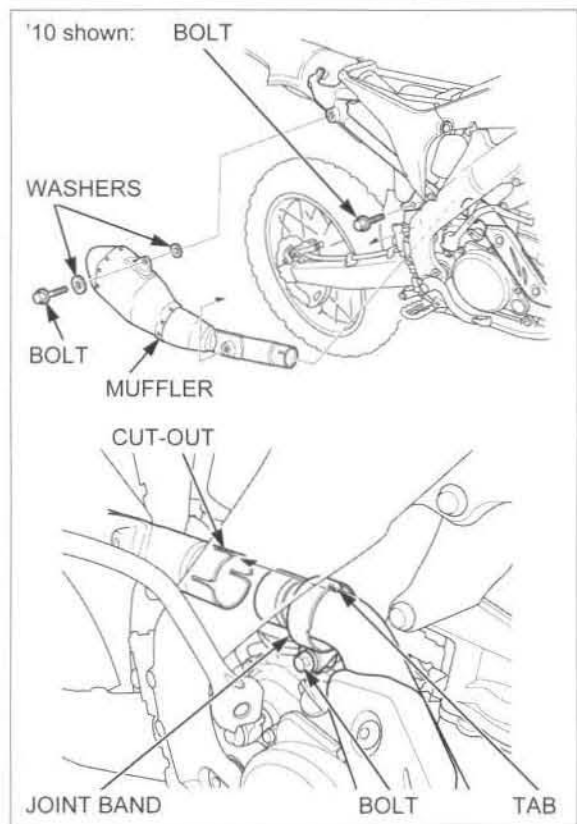
Install the washers and muffler mounting bolts. Tighten the muffler mounting bolts to the specified torque.

**TORQUE: 26 N·m (2.7 kgf·m, 19 lbf·ft)**

Tighten the muffler joint band bolt to the specified torque.

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

Install the right side cover (page 2-3).



**GLASS WOOL REPLACEMENT ('10)**

Remove the muffler (page 2-9).

*Do not overtighten the vise as this will distort the muffler mount stay.*

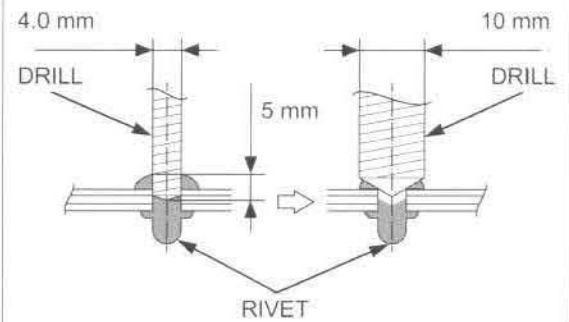
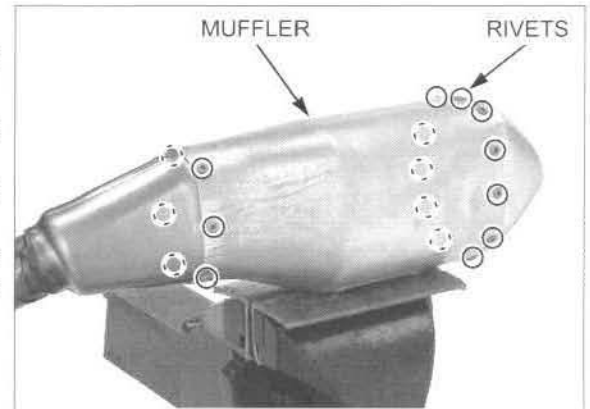
Set the muffler in a vise with pieces of wood or soft jaws to avoid damage.

Remove the rivets with a 4.0 mm and 10 mm drills using the following procedures:

1. Drill the rivet head with a 4.0 mm drill to the specified depth as shown.
2. Drill the rivet head with a 10 mm drill so that the rivet can be removed into the muffler body, then remove the rivet.

**NOTE:**

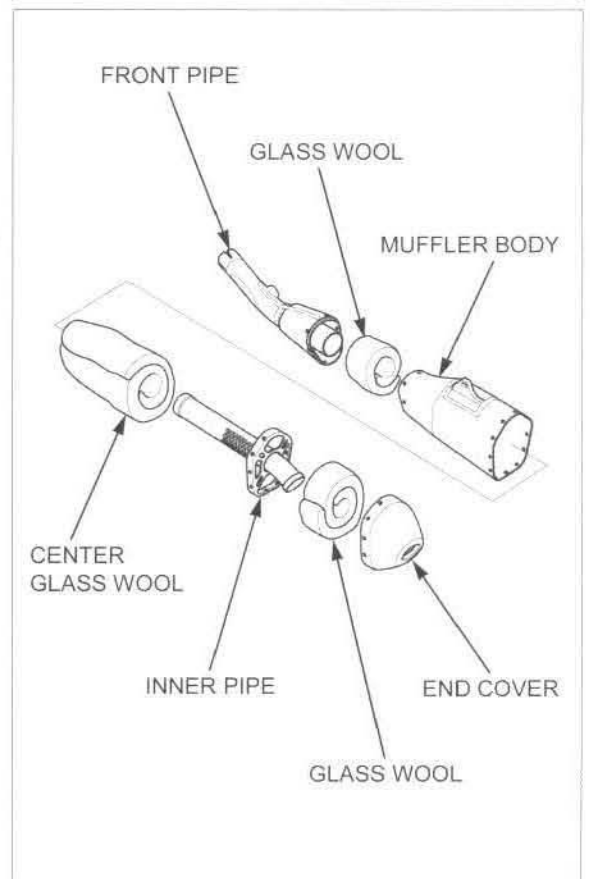
Be careful not to damage the muffler body.



Remove the following:

- Front pipe
- Glass wool
- Muffler body
- End cover
- Center glass wool
- Inner pipe

Clean off the sealant from the muffler body, front pipe, end cover and inner pipe.



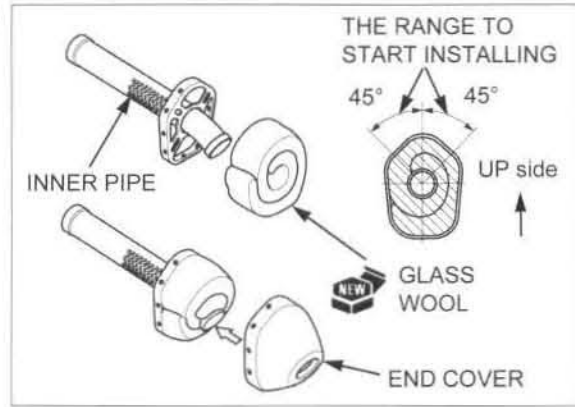


## FRAME/BODY PANELS/EXHAUST SYSTEM

Install new glass wool onto the inner pipe end as shown.

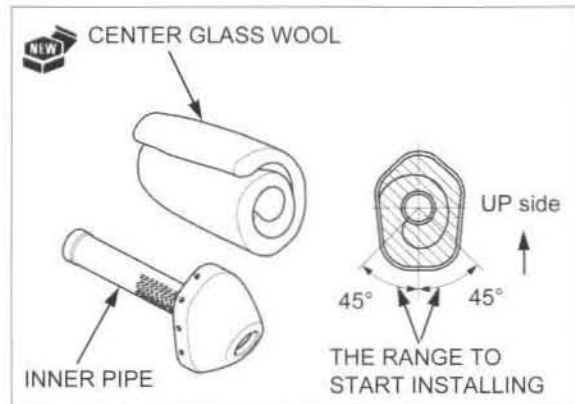
*Be sure that the inside of end cover is filled evenly with the glass wool.*

Install the end cover.



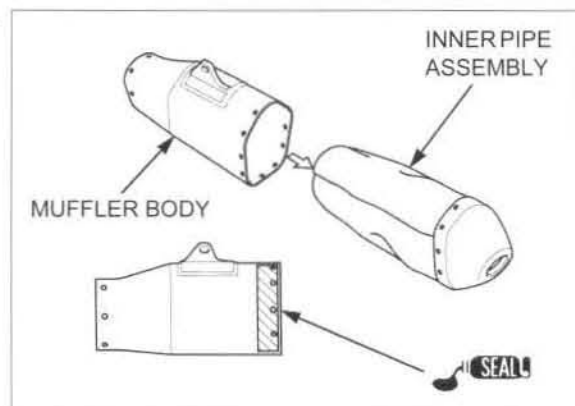
*Completely cover the punched area of the inner pipe.*

Install new center glass wool to the inner pipe assembly.



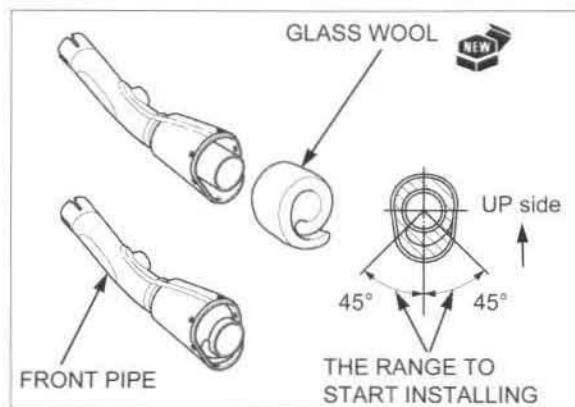
Apply 5.0 g (0.18 oz) of muffler sealant (high-temperature silicone) to the muffler body as shown.

Install the muffler body onto the inner pipe assembly.



*Be sure that the inside of front pipe cup is filled evenly with the glass wool.*

Install new glass wool into the front pipe as shown.

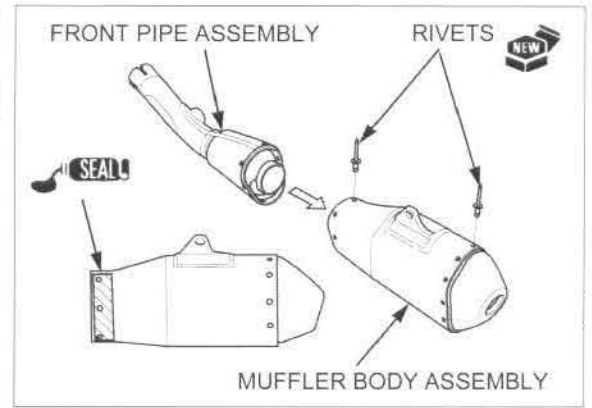


Apply 5.0 g (0.18 oz) of muffler sealant (high-temperature silicone) to the muffler body as shown.

Install the front pipe assembly into the muffler body assembly by inserting the inner pipe end into the front pipe end.

Align each rivet hole and install new rivets.

Install the muffler (page 2-9).



**GLASS WOOL REPLACEMENT (After '10)**

Remove the muffler (page 2-9).

*Do not overtighten the vise as this will distort the muffler mount stay.*

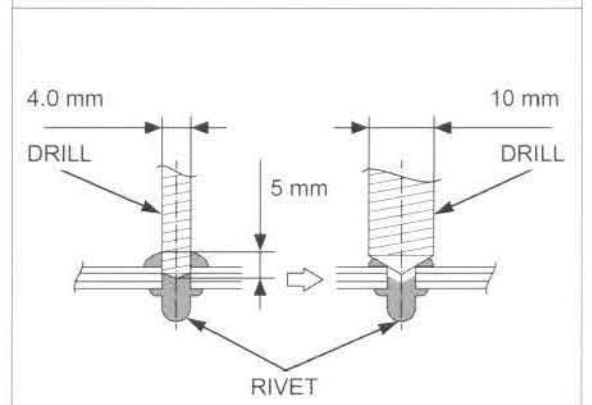
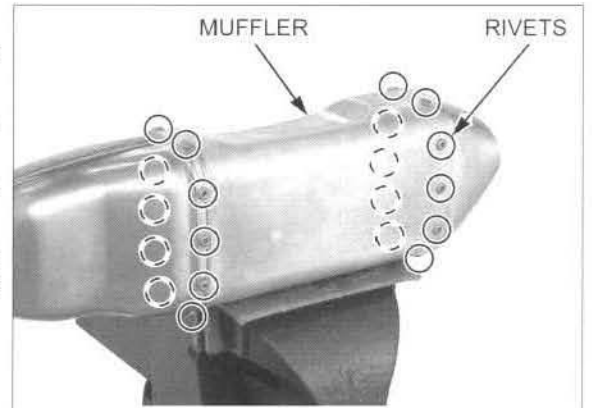
Set the muffler in a vise with pieces of wood or soft jaws to avoid damage.

Remove the rivets with a 4.0 mm and 10 mm drills using the following procedure:

1. Drill the rivet head with a 4.0 mm drill to the specified depth as shown.
2. Drill the rivet head with a 10 mm drill so that the rivet can be removed into the muffler body, then remove the rivet.

**NOTE:**

Be careful not to damage the muffler body.

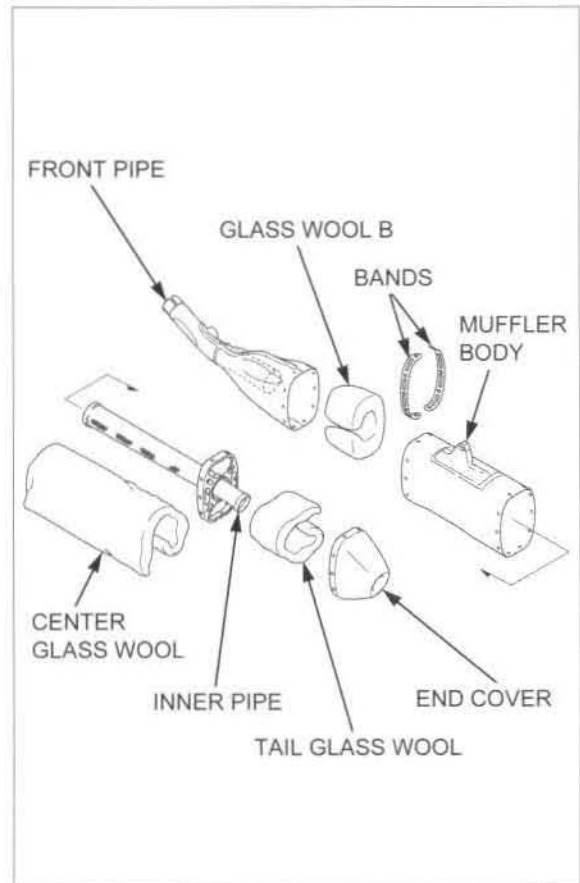


## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the following:

- Bands
- Front pipe
- Glass wool B
- Muffler body
- End cover
- Tail glass wool
- Center glass wool
- Inner pipe

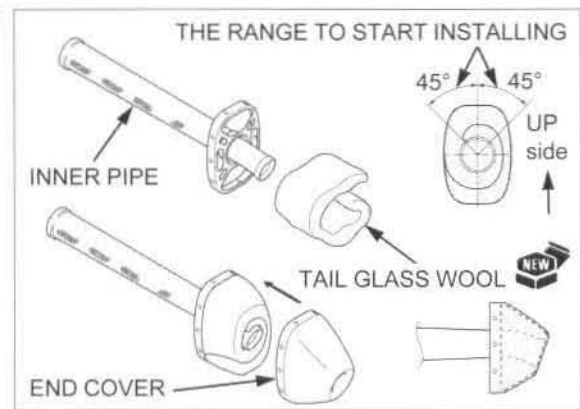
Clean off the sealant from the muffler body, front pipe, end cover and inner pipe.



Install new tail glass wool onto the inner pipe end as shown.

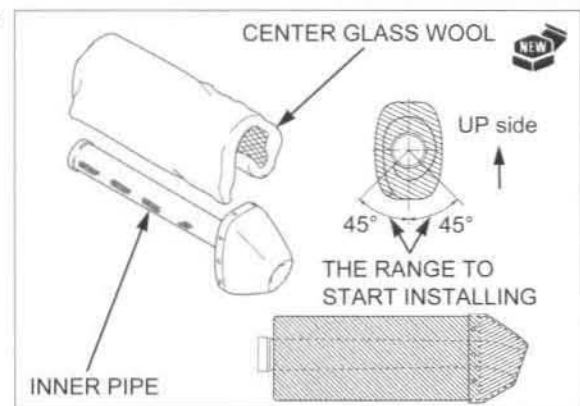
*Be sure that the inside of end cover is filled evenly with the glass wool.*

Install the end cover.



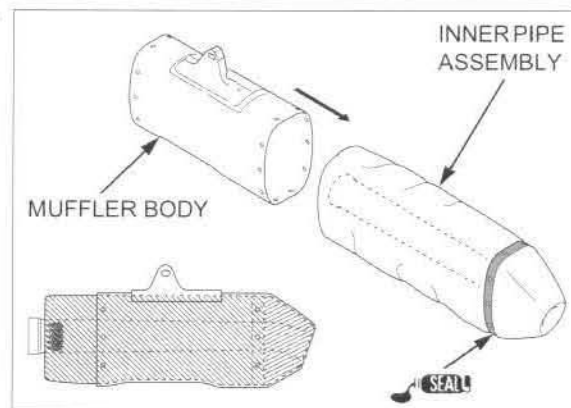
*Completely cover the punched area of the inner pipe.*

Install new center glass wool to the inner pipe assembly.



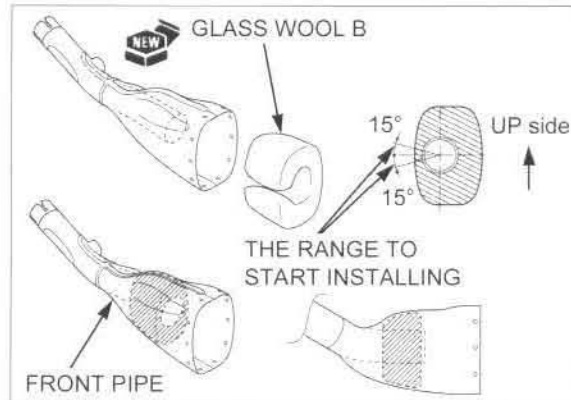
Apply 5.0 g (0.18 oz) of muffler sealant (high-temperature silicone) to the end cover as shown.

Install the muffler body onto the inner pipe assembly.



*Be sure that the inside of front pipe cup is filled evenly with the glass wool.*

Install new glass wool B into the front pipe as shown.

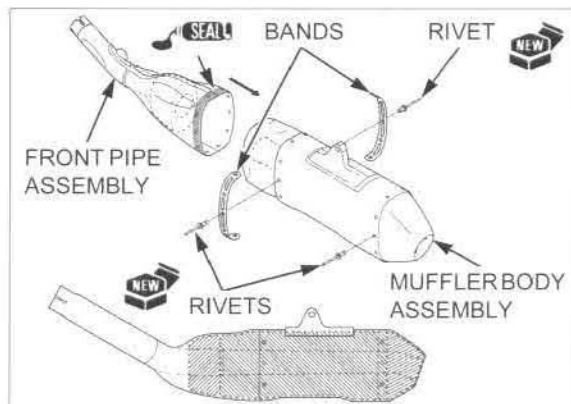


Apply 5.0 g (0.18 oz) of muffler sealant (high-temperature silicone) to the front pipe assembly as shown.

Install the front pipe assembly into the muffler body assembly by inserting the inner pipe end into the front pipe end.

Align each rivet hole then install the bands and new rivets.

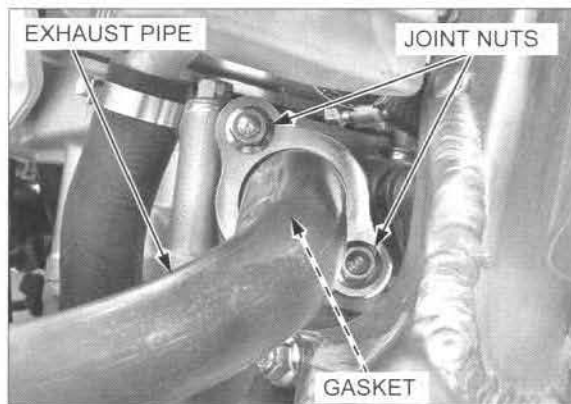
Install the muffler (page 2-9).



### EXHAUST PIPE REMOVAL

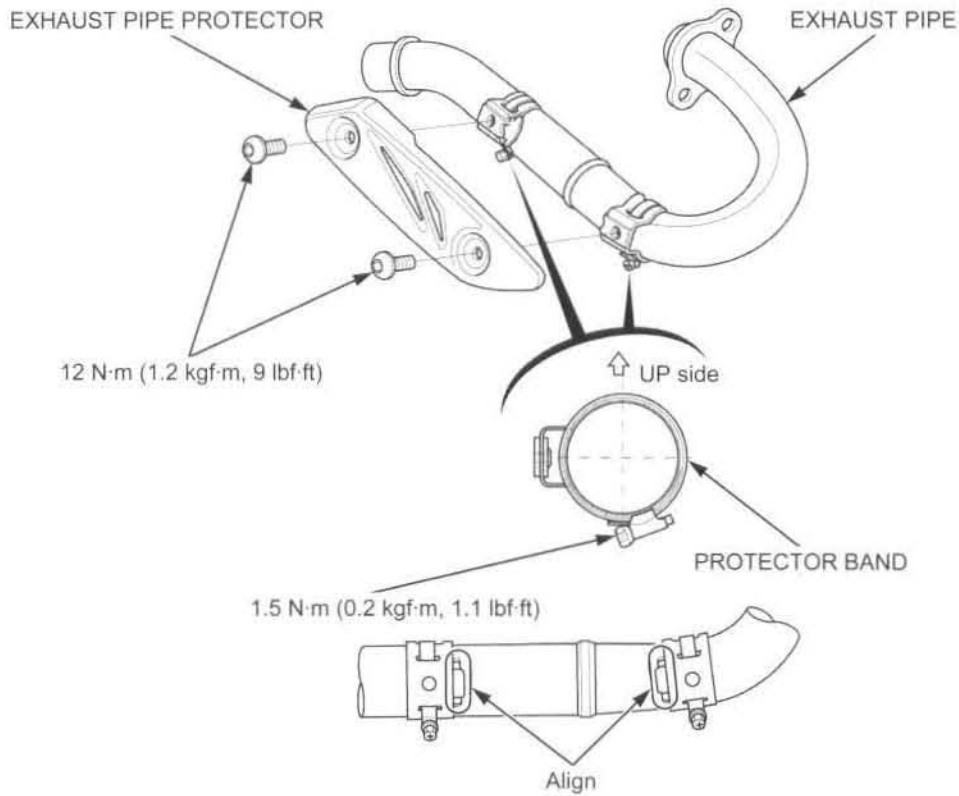
Remove the muffler (page 2-9).

Remove the exhaust pipe joint nuts, exhaust pipe and gasket.



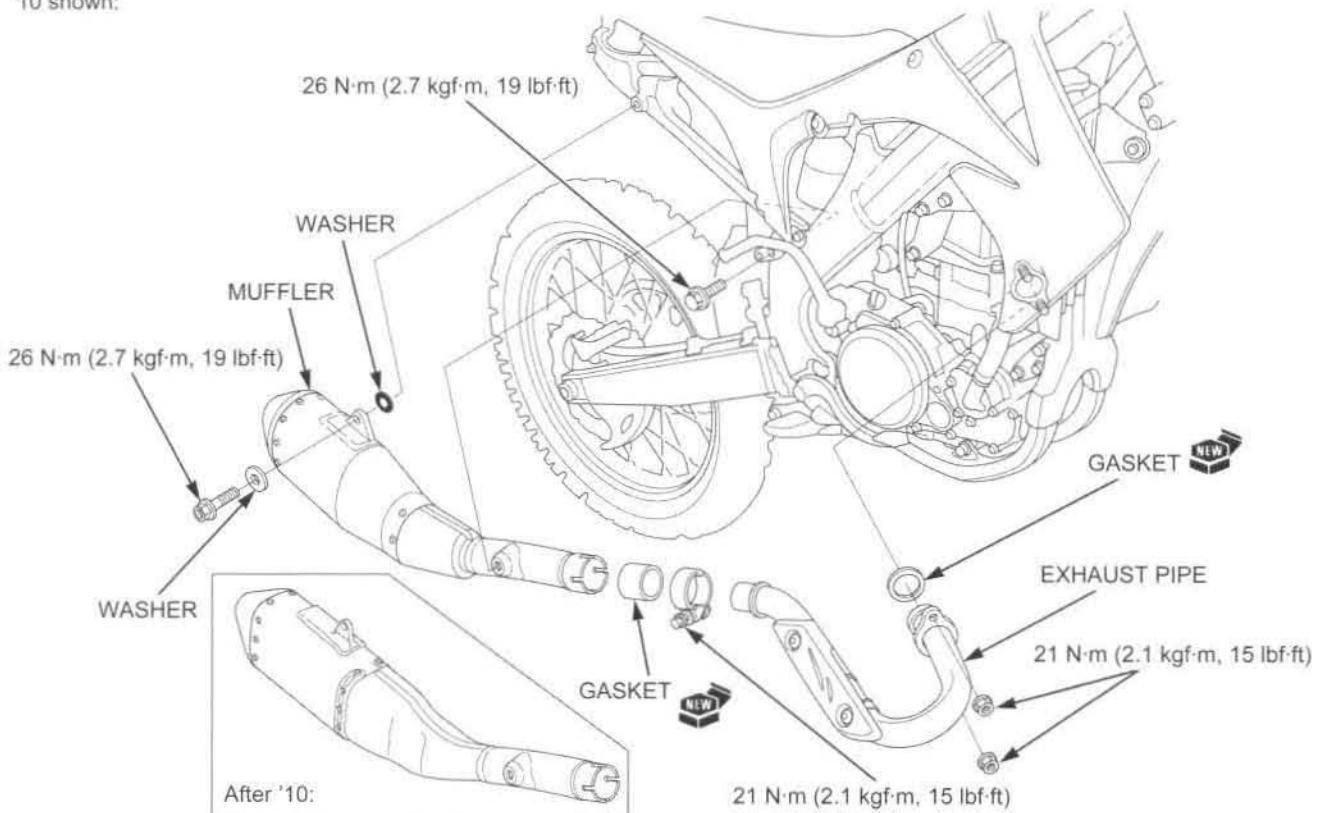
# FRAME/BODY PANELS/EXHAUST SYSTEM

## EXHAUST PIPE DISASSEMBLY/ ASSEMBLY



## EXHAUST PIPE INSTALLATION

\*10 shown:



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

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



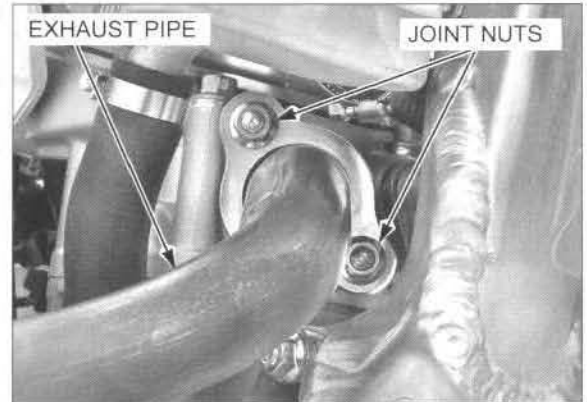
Install the exhaust pipe but do not tighten the exhaust pipe joint nuts yet.

Install the muffler (page 2-9) but do not tighten the muffler mounting bolts yet.

Tighten the exhaust pipe joint nuts to the specified torque.

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

Tighten the muffler mounting fasteners.



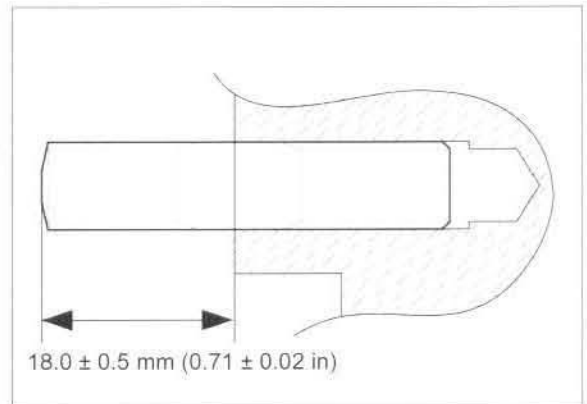
*Always inspect the exhaust system for leaks after installation.*

### CYLINDER HEAD EXHAUST PIPE STUD BOLT REPLACEMENT

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

Install new stud bolts into the cylinder head as shown.

After installing the stud bolts, check that the length from the bolt head to the cylinder head surface is within specification.



---

**MEMO**



SERVICE INFORMATION .....	3-2	DRIVE CHAIN SLIDER .....	3-21
MAINTENANCE SCHEDULE .....	3-4	DRIVE CHAIN ROLLER ('10, '11) .....	3-21
ADDITIONAL ITEMS REQUIRING FREQUENT REPLACEMENT .....	3-5	DRIVE CHAIN ROLLER (After '11) .....	3-22
FUEL LINE .....	3-6	DRIVE/DRIVEN SPROCKET .....	3-22
THROTTLE OPERATION .....	3-7	BRAKE FLUID .....	3-23
AIR CLEANER .....	3-8	BRAKE PADS WEAR .....	3-24
CRANKCASE BREATHER .....	3-10	BRAKE SYSTEM .....	3-25
SPARK PLUG .....	3-10	CLUTCH SYSTEM .....	3-25
RADIATOR COOLANT .....	3-11	CONTROL CABLES .....	3-27
VALVE CLEARANCE .....	3-12	EXHAUST PIPE/MUFFLER .....	3-28
ENGINE OIL/OIL FILTER .....	3-13	SUSPENSION .....	3-28
ENGINE IDLE SPEED .....	3-16	SWINGARM/SHOCK LINKAGE .....	3-30
TRANSMISSION OIL .....	3-16	NUTS, BOLTS, FASTENERS .....	3-30
COOLING SYSTEM .....	3-17	WHEELS/TIRES .....	3-30
DRIVE CHAIN .....	3-18	STEERING HEAD BEARINGS .....	3-31



## MAINTENANCE

# SERVICE INFORMATION

## GENERAL

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

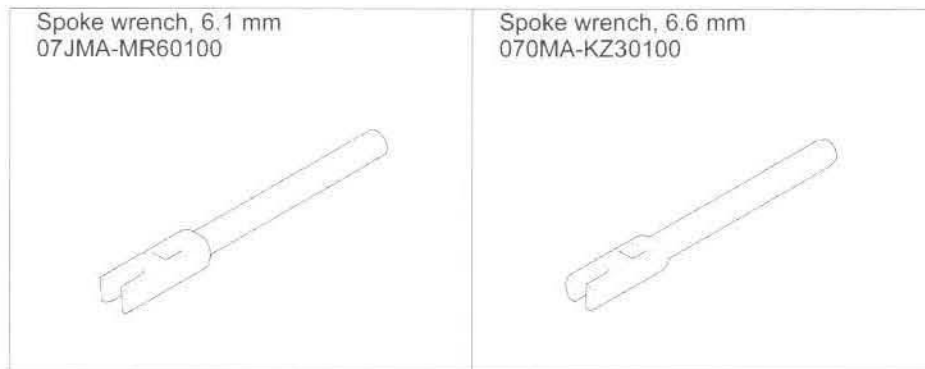
## SPECIFICATIONS

ITEM			SPECIFICATIONS
Throttle grip freeplay			3 – 5 mm (1/8 – 3/16 in)
Spark plug	Standard	NGK	R0451B-8
Spark plug gap			0.60 – 0.70 mm (0.024 – 0.028 in)
Valve clearance	IN		0.12 ± 0.03 mm (0.005 ± 0.001 in)
	EX		0.28 ± 0.03 mm (0.011 ± 0.001 in)
Engine oil capacity	At draining		0.67 liter (0.70 US qt, 0.59 Imp qt)
	At oil filter change		0.69 liter (0.73 US qt, 0.61 Imp qt)
	At disassembly		0.85 liter (0.90 US qt, 0.75 Imp qt)
Transmission oil capacity	At draining		0.68 liter (0.72 US qt, 0.60 Imp qt)
	At disassembly		0.75 liter (0.79 US qt, 0.66 Imp qt)
Recommended engine oil			Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Recommended transmission oil			Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Idle speed			2,000 ± 100 rpm
Drive chain	Size/link	DID	DID 520DMA4-116RB
		RK	RK 520TXZ-116RJ
	Slack	'10, '11	30 – 40 mm (1.2 – 1.6 in)
		After '11	25 – 35 mm (1.0 – 1.4 in)
Drive chain length at 17 pins (16 pitches)			259 mm (10.2 in)
Drive chain slider thickness	Upper side		5 mm (0.2 in)
	Lower side		2.5 mm (0.10 in)
Drive chain roller O.D.	'10, '11	Upper/lower	35 mm (1.4 in)
		After '11	Upper
		Lower	31 mm (1.2 in)
Clutch lever freeplay			10 – 20 mm (3/8 – 13/16 in)
Tire size	Front		80/100-21 51M
	Rear		100/90-19 57M
Cold tire pressure	Front		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)
	Rear		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)
Brake pedal height			79.6 mm (3.13 in)

**TORQUE VALUES**

Throttle cable adjuster lock nut			
	(grip side)	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
	(throttle body side)	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Throttle cable bolt		4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Engine oil drain bolt		16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply engine oil to the threads and seating surface.
Transmission oil drain bolt		16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply engine oil to the threads and seating surface.
Transmission oil check bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Crankshaft hole cap		15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads.
Spark plug		22 N·m (2.2 kgf·m, 16 lbf·ft)	
Brake lever adjuster lock nut		5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Rear master cylinder push rod lock nut		5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)	
Rear axle nut		128 N·m (13.1 kgf·m, 94 lbf·ft)	U-nut
Drive chain upper roller bolt		12 N·m (1.2 kgf·m, 9 lbf·ft)	SH DR bolt
Drive chain lower roller nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Drive sprocket bolt		31 N·m (3.2 kgf·m, 23 lbf·ft)	
Driven sprocket nut		32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Front master cylinder reservoir cover screw		1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Rear master cylinder reservoir cover bolt		1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Exhaust pipe joint nut		21 N·m (2.1 kgf·m, 15 lbf·ft)	
Muffler joint band bolt		21 N·m (2.1 kgf·m, 15 lbf·ft)	
Front spoke		3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Rear spoke		3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)	
Rim lock		12 N·m (1.2 kgf·m, 9 lbf·ft)	
Plug bolt		1.3 N·m (0.1 kgf·m, 1.0 lbf·ft)	
Drive chain adjuster lock nut		27 N·m (2.8 kgf·m, 20 lbf·ft)	UBS nut

**TOOLS**



## MAINTENANCE

# MAINTENANCE SCHEDULE

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

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

FREQUENCY	NOTE	Each race or about 2.5 hours	Every 3 races or about 7.5 hours	Every 6 races or about 15.0 hours	Every 9 races or about 22.5 hours	Every 12 races or about 30.0 hours	Refer to page
ITEMS							
FUEL LINE	(NOTE 6)	I				R	3-6 5-30
FUEL PUMP FILTER (After '10)	(NOTE 6)					R	5-41
THROTTLE OPERATION		I					3-7
AIR CLEANER	(NOTE 1)	C					3-8
CRANKCASE BREATHER		I					3-10
SPARK PLUG		I					3-10
VALVE CLEARANCE	(NOTE 4)			I			3-12
ENGINE OIL	(NOTE 3)	I		R			3-13
ENGINE OIL FILTER	(NOTE 3)			R			3-13
ENGINE IDLE SPEED		I					3-16
PISTON AND PISTON RINGS				R			9-5
PISTON PIN				R			9-5
TRANSMISSION OIL	(NOTE 5)	I		R			3-16
RADIATOR COOLANT	(NOTE 2)	I					3-11
COOLING SYSTEM		I					3-17
DRIVE CHAIN		I, L	R				3-18
DRIVE CHAIN SLIDER		I					3-21
DRIVE CHAIN ROLLER		I					'10, '11: 3-21 After '11: 3-22
DRIVE SPROCKET		I					3-22
DRIVEN SPROCKET		I					3-22
BRAKE FLUID	(NOTE 2)	I					3-23
BRAKE PADS WEAR		I					3-24
BRAKE SYSTEM		I					3-25
CLUTCH SYSTEM	(NOTE 5)	I					3-25
CONTROL CABLES		I, L					3-27
EXHAUST PIPE/MUFFLER		I					3-28
SUSPENSION		I					3-28
SWINGARM/SHOCK LINKAGE			L				3-30
FORK OIL EXCEPT DAMPER	(NOTE 3)		R				13-33
FORK OIL DAMPER					R		13-26
NUTS, BOLTS, FASTENERS		I					3-30
WHEELS/TIRES		I					3-30
STEERING HEAD BEARINGS					I		3-31

This maintenance schedule is based upon average riding conditions. Machine subjected to severe use require more frequent servicing.

### NOTES:

1. Clean after every moto for dusty riding condition.
2. Replace every 2 years. Replacement requires mechanical skill.
3. Replace after the first break-in ride.
4. Inspect after the first break-in ride.
5. Replace the transmission oil, if the clutch discs and plates are replaced.
6. Replace every year.

## ADDITIONAL ITEMS REQUIRING FREQUENT REPLACEMENT

### ENGINE

Item	Cause	Remark
Cylinder head gasket	Compression leak	Replace whenever disassembled.
Clutch disc/plate	Wear or discoloration	
Judder spring/spring seat (After '10)	Warping or damage	
Cylinder base gasket	Leakage	Replace whenever disassembled.
Right crankcase cover gasket	Damage	Replace whenever disassembled.

### FRAME

Item	Cause	Remark
Front/rear brake pads	Wear	Minimum thickness: 1.0 mm (0.04 in)
Sub-frame mounting bolts	Fatigue or damage	
Chain guide	Wear or damage	
Side cover	Damage	
Number plate	Damage	
Front/rear fender	Damage	
Clutch lever/holder	Freeplay or damage	
Brake lever	Freeplay or damage	
Handlebar	Bends or cracks	
Throttle housing	Damage	
Handlebar/throttle grip	Damage	
Gearshift pedal	Damage	
Brake pedal	Damage	
Drive chain adjusting bolt/adjuster lock nut	Damage	
Air cleaner	Damage	

**NOTE:**

- These parts and their possible replacement schedule are based upon average riding conditions.
- Machine subjected to severe use require more frequent servicing.

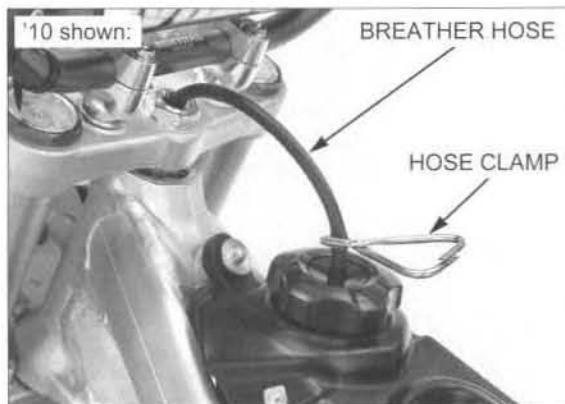
FUEL LINE

FUEL TANK HANGING

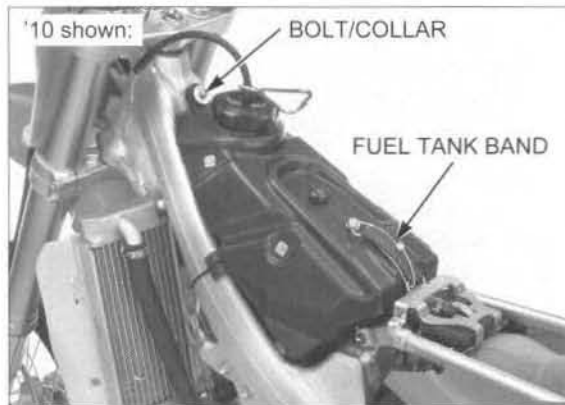
Remove the following:

- Seat (page 2-3)
- Radiator shrouds (page 2-4)

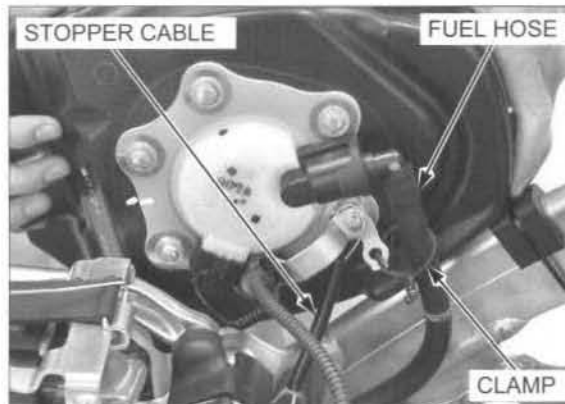
Pinch the fuel tank breather hose with the hose clamp. Pull out the fuel tank breather hose from the steering stem.



Remove the bolt and collar. Release the fuel tank band from the fuel tank band bracket screw.



Remove the fuel hose from the hose clamp. Check the fuel tank stopper cable for proper installation and deterioration, kinks or other damage.



Lift the fuel tank out of the frame and hang it to the left side of the frame.

Route the fuel hose properly (page 1-21).

Installation is in the reverse order of removal.



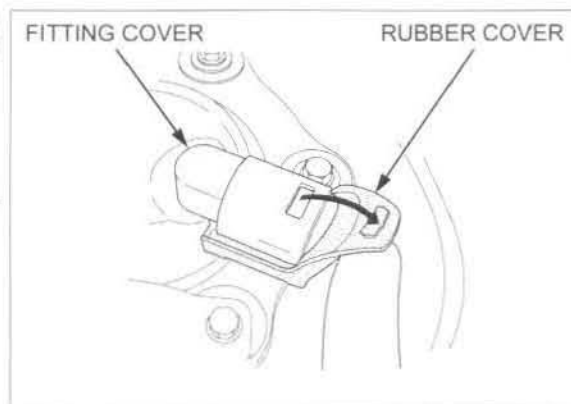
### INSPECTION

- Fuel line should be replaced at least every 12 races or about 30 hours of operation to ensure consistent performance.
- For fuel line replacement (page 5-30).

Hang the fuel tank to the left side of the frame (page 3-6).

Check the fuel pump side quick connect fitting cover and rubber cover for proper installation.

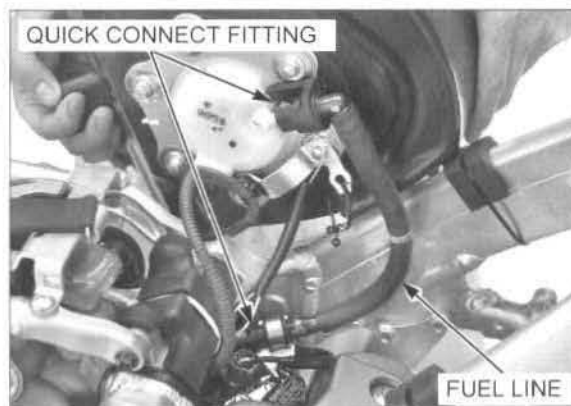
Remove the fuel pump side quick connect fitting cover.



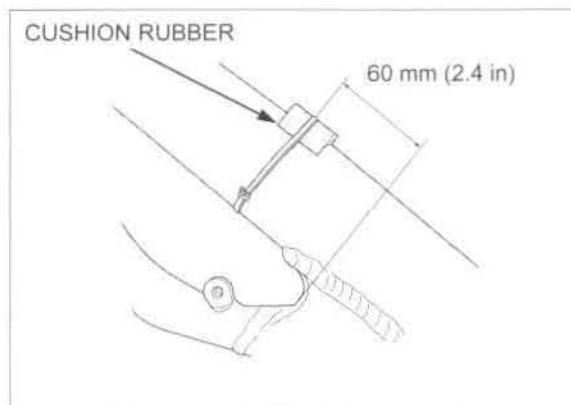
Check the quick connect fitting for looseness.

Check the fuel line for deterioration, damage or leakage.

Check the quick connect fittings for dirt, and clean if necessary.



Check the cushion rubbers for proper installation as shown in the illustration.



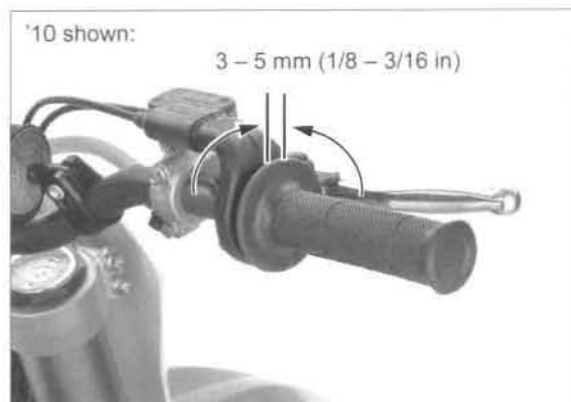
### THROTTLE OPERATION

Check for smooth operation of the throttle and that it returns automatically to the fully closed position from any open position and from any steering position. Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables if throttle operation is not smooth.

Measure the freeplay at the throttle grip flange.

**FREEPLAY: 3 – 5 mm (1/8 – 3/16 in)**



## MAINTENANCE

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

Minor adjustment is made with the upper adjuster. Remove the dust cover from the throttle housing. Adjust the freeplay by loosening the adjuster lock nut, and turning the adjuster.

After adjustment, tighten the adjuster lock nut to the specified torque while holding the adjuster.

**TORQUE: 4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)**

Reinstall the dust cover to the throttle housing.

Recheck the throttle operation.

If you cannot obtain the correct freeplay with grip side adjuster, turn it all the way in and then turn it out one turn.

Make the major adjustment with the throttle body side adjuster.

Major adjustment is made with the lower adjuster.

Hang the fuel tank to the left side of the frame (page 3-6).

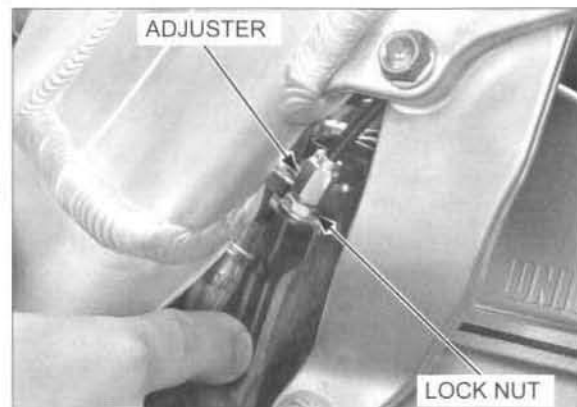
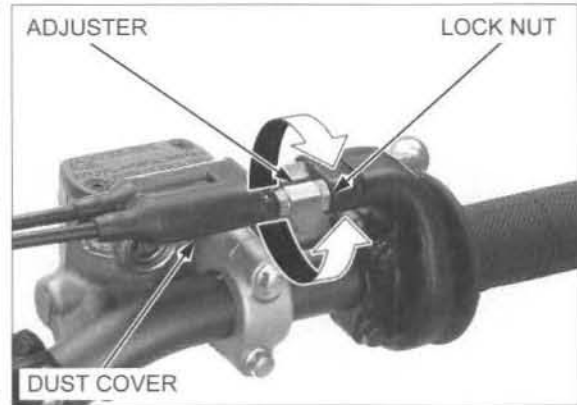
Adjust the freeplay by loosening the adjuster lock nut, and turning the adjuster.

After adjustment, tighten the adjuster lock nut to the specified torque while holding the adjuster.

**TORQUE: 4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)**

Recheck the throttle operation.

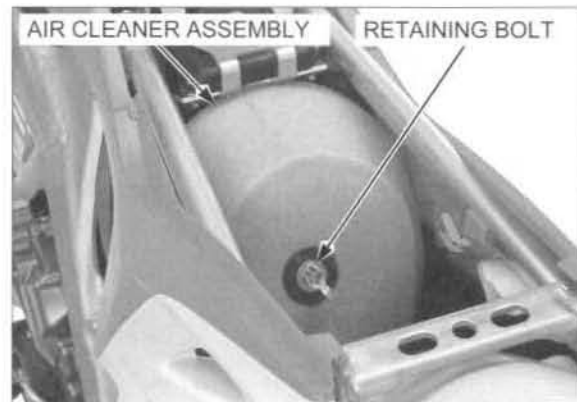
Install the fuel tank (page 3-6).



## AIR CLEANER

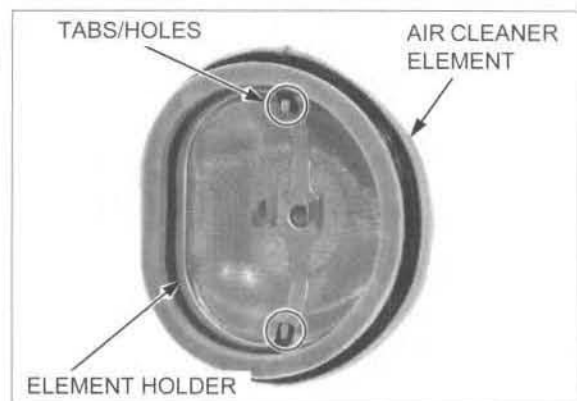
Remove the seat (page 2-3).

Remove the retaining bolt and air cleaner assembly.



Unhook the element holes from the holder tabs.

Remove the air cleaner element from the element holder.

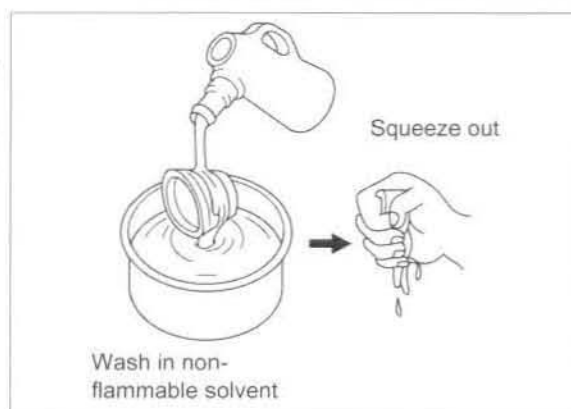


Thoroughly wash the air cleaner element in clean nonflammable or high flash-point cleaning solvent. Then wash the air cleaner element again in a solution of hot water and dishwashing liquid soap.

After cleaning, be sure there is no dirt or dust trapped between the inner and outer layer of the air cleaner element.

Wash again if necessary.

Allow the air cleaner element to dry thoroughly.



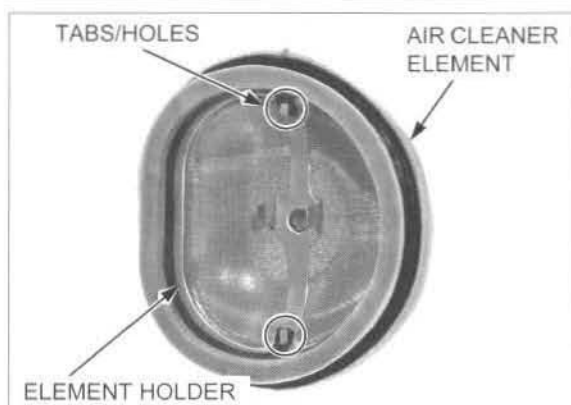
Apply 50 cm<sup>3</sup> of Pro Honda Foam Filter Oil or equivalent oil from the inside of the element. Place the element into a plastic bag and spread the oil evenly by hand.



Apply a thin coat of Pro Honda White Lithium Grease or an equivalent to the sealing surface.

Assemble the air cleaner element and element holder.

Hook the element holes onto the holder tabs.



Apply 3 – 5 g (0.1 – 0.2 oz) of grease to the air cleaner assembly contacting area of the air cleaner housing.

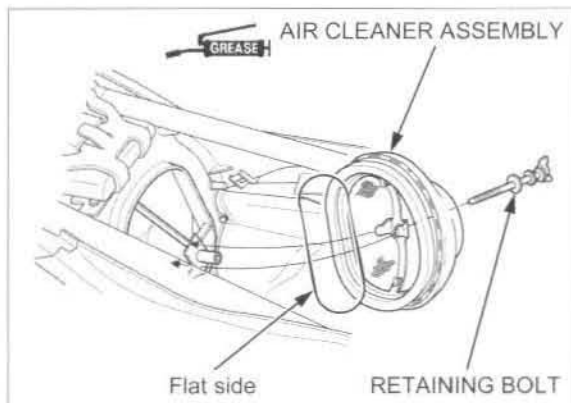
Install the air cleaner assembly into the air cleaner housing with its flat side facing right.

Install and tighten the retaining bolt.

Install the seat (page 2-3).

**NOTE:**

If the air cleaner assembly is not installed correctly, dirt and dust may enter the engine, resulting in wear of the piston ring and cylinder.



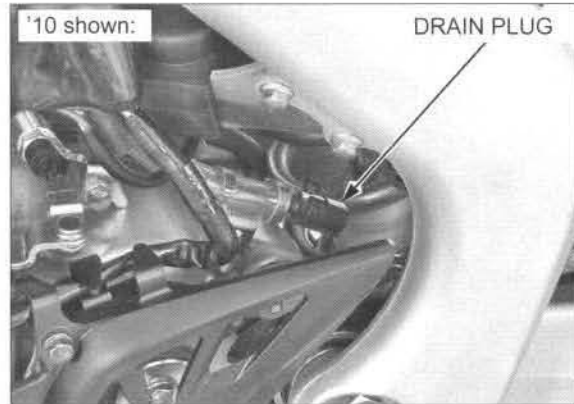


## MAINTENANCE

### CRANKCASE BREATHER

Remove the crankcase breather hose drain plug, then drain any fluids or dirt from the crankcase breather hose into a proper container.

Reinstall the drain plug.



### SPARK PLUG

#### REMOVAL

Hang the fuel tank to the left side of the frame (page 3-6).

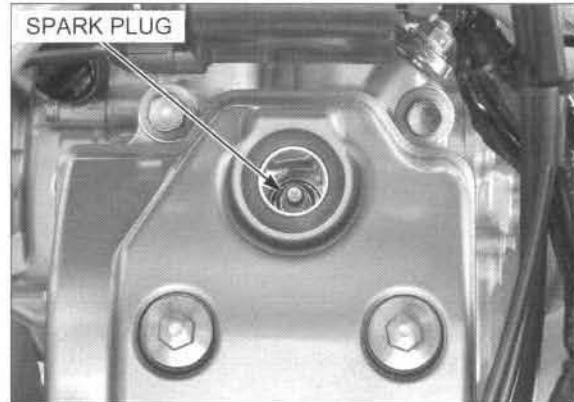
Disconnect the spark plug cap.



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

Remove the spark plug, and inspect it for damage.

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



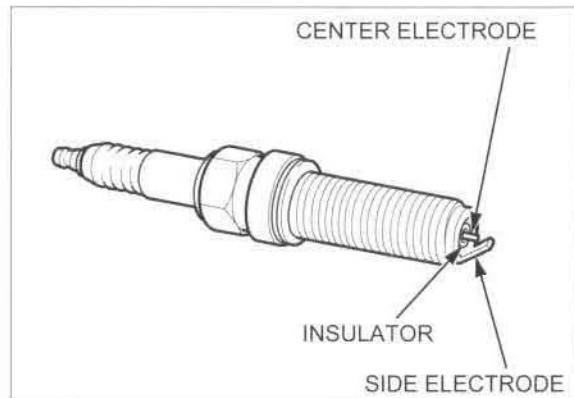
#### INSPECTION

Check the following and replace if necessary.

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration

*This motorcycle's spark plug is equipped with an iridium center electrode. Replace the spark plug if the electrode is contaminated.*

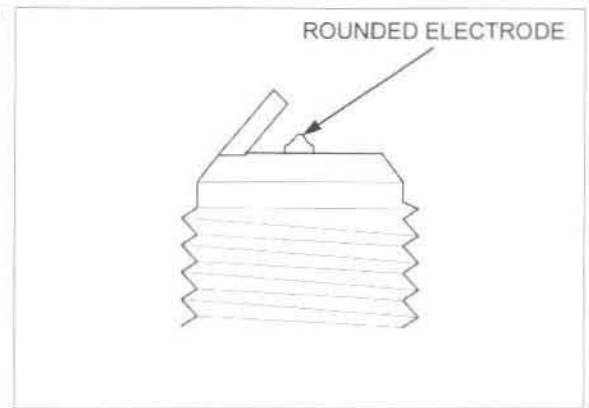
If the electrode is contaminated with accumulated objects or dirt, replace the spark plug.



Replace the spark plug if the center electrode is rounded as shown in the illustration.

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

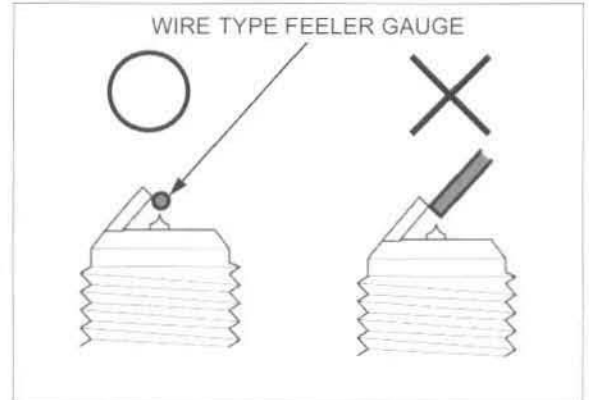
**RECOMMENDED SPARK PLUG (OR EQUIVALENT)**  
**Standard: R0451B-8 (NGK)**



*To prevent damaging the iridium center electrode, use a wire type feeler gauge to check the spark plug gap.*

Check the gap between the center and side electrodes with a wire type feeler gauge.

**SPARK PLUG GAP: 0.60 - 0.70 mm (0.024 - 0.028 in)**



*Do not adjust the spark plug gap. If the gap is out of specification, replace with a new one.*

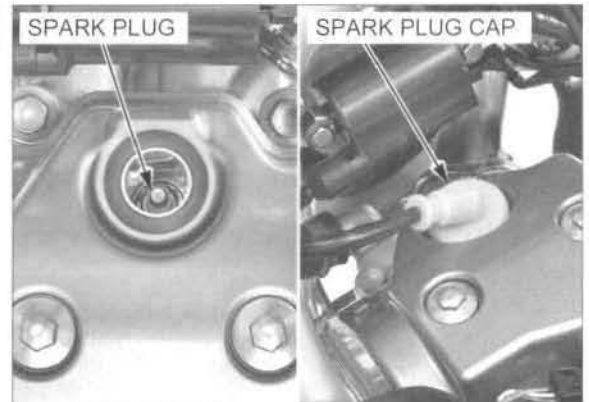
Make sure that the 0.8 mm (0.03 in) diameter plug gauge does not insert between the gap. If the gauge can be inserted into the gap, replace the plug with a new one.

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

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

Connect the spark plug cap securely.

Install the fuel tank (page 3-6).

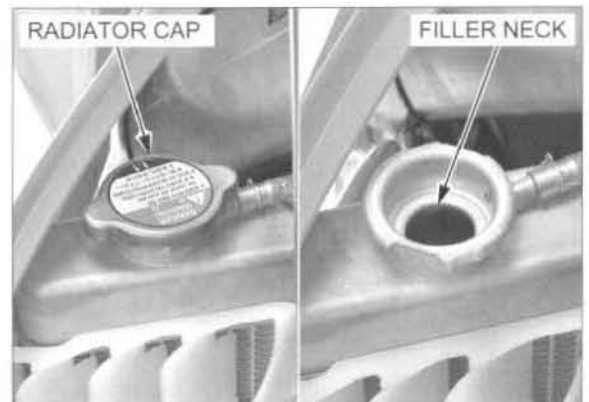


## RADIATOR COOLANT

Remove the radiator cap (page 6-5).

Check the coolant level with the engine cold, it should be up to the filler neck.

Add the coolant as required (page 6-6).



## MAINTENANCE

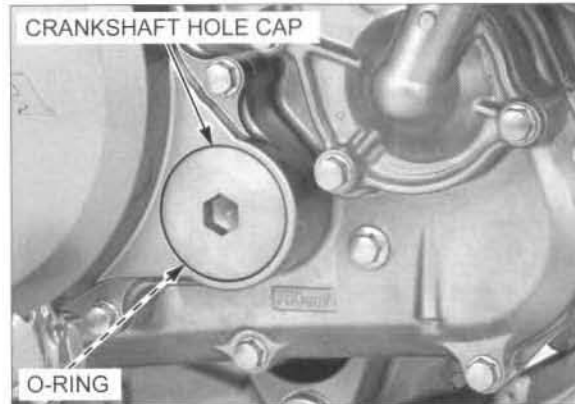
# VALVE CLEARANCE

### INSPECTION

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

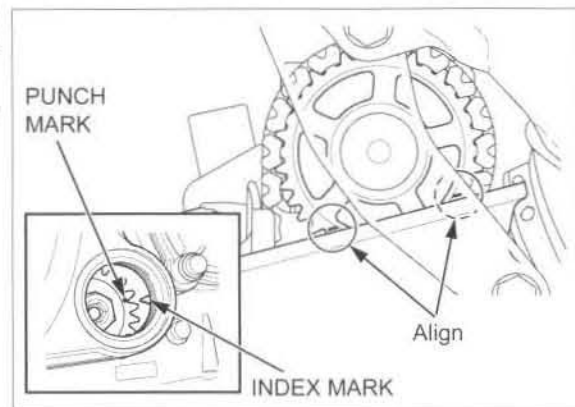
Remove the cylinder head cover (page 8-7).

Remove the crankshaft hole cap and O-ring.



Turn the crankshaft clockwise to align the punch mark on the primary drive gear with the index mark on the right crankcase cover.

Check the index line on the cam sprocket aligns with the cylinder head upper surface.



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 clockwise one full turn, and match up the punch mark on the primary drive gear with the index mark on the right crankcase cover again.



### INTAKE SIDE:

Insert the feeler gauge between the valve lifter and cam lobe.

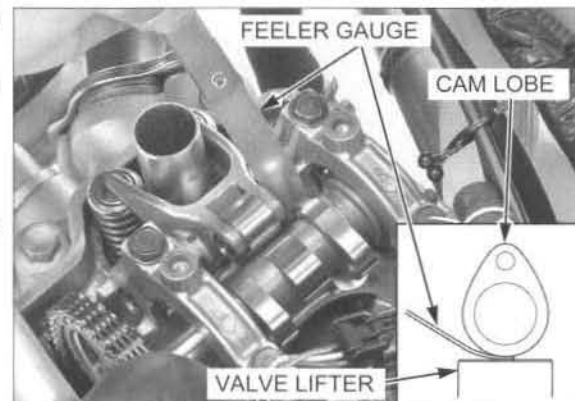
*Record the clearance for each valve for reference in shim selection if adjustment is required.*

Check the valve clearance for the intake valves using a feeler gauge.

### VALVE CLEARANCE:

**0.12 ± 0.03 mm (0.005 ± 0.001 in)**

If the clearance is out of specification, adjust the valve clearance (page 8-15).



**EXHAUST SIDE:**

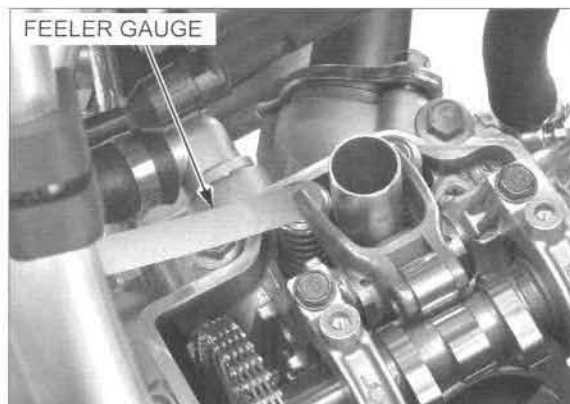
Insert the feeler gauge between the rocker arm and shim.

*Record the clearance for each valve for reference in shim selection if adjustment is required.*

Check the valve clearance for the exhaust valves using a feeler gauge.

**VALVE CLEARANCE:**  
**0.28 ± 0.03 mm (0.011 ± 0.001 in)**

If the clearance is out of specification, adjust the valve clearance (page 8-15).



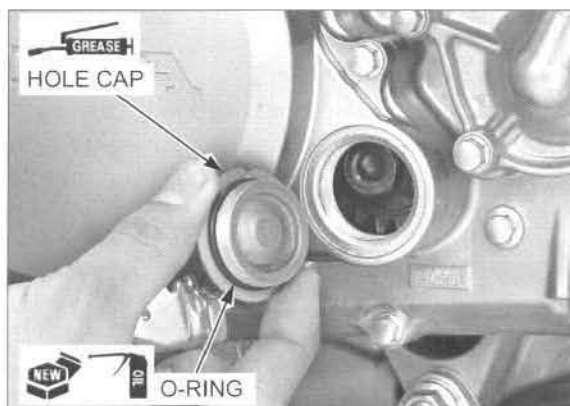
Apply engine oil to a new O-ring, and install it to the crankshaft hole cap.

Apply grease to the crankshaft hole cap threads.

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

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

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



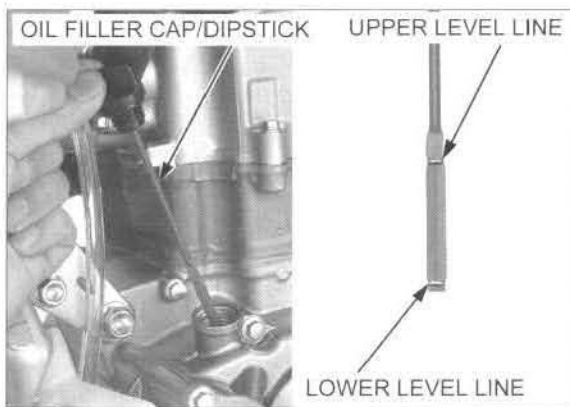
## ENGINE OIL/OIL FILTER

### OIL LEVEL INSPECTION

Start the engine and let it idle for 3 minutes.  
 Stop the engine and wait 3 minutes.  
 Support the motorcycle upright on a level surface.

Remove the oil filler cap/dipstick and wipe the oil with a clean cloth.  
 Insert the oil filler cap/dipstick without screwing it in, remove it and check the oil level.

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



### RECOMMENDED ENGINE OIL:

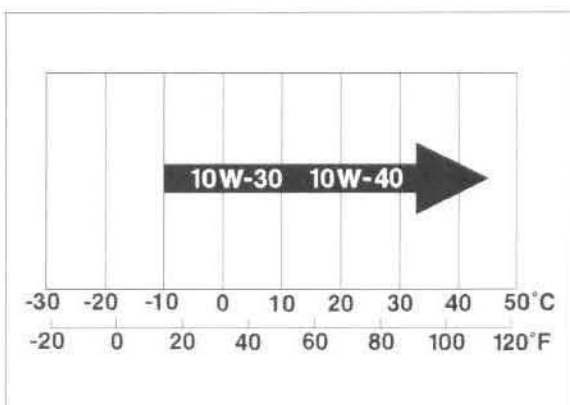
**Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil**  
**API service classification: SG or Higher**  
**JASO T 903 standard: MA**  
**Viscosity: SAE 10W-30**

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

Reinstall the oil filler cap/dipstick.

**NOTE:**

Other viscosities of oil may be used depending upon the average temperature in your riding area. Use the chart as a guide.



## MAINTENANCE

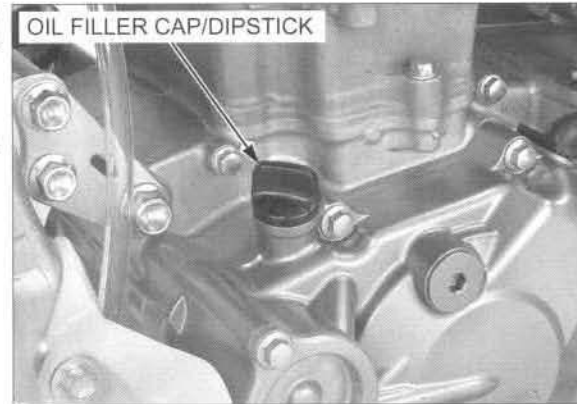
### ENGINE OIL & FILTER CHANGE

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

- Engine oil should be changed at least every 6 races or 15 hours of operation to ensure consistent performance.

Support the motorcycle upright on a level surface.

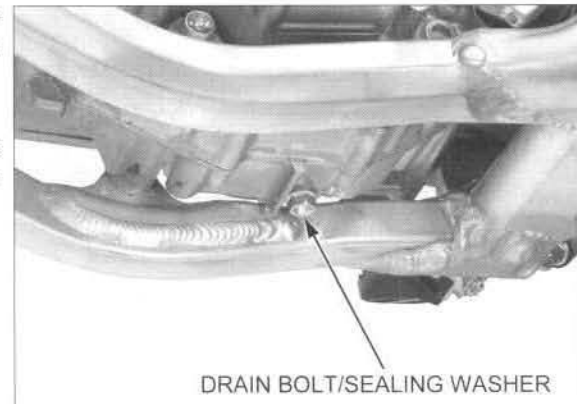
Remove the oil filler cap/dipstick from the left crankcase cover.



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

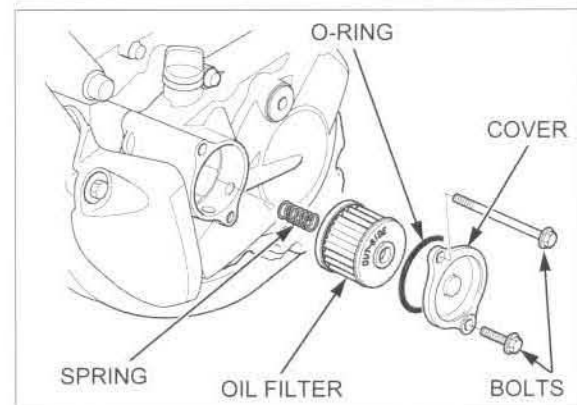
Drain the engine oil.

- Operate the kickstarter pedal five times or more while pressing the engine stop switch, so the engine oil completely drains.



*Oil filter change:* Remove the following:

- Bolts
- Oil filter cover
- O-ring
- Oil filter
- Spring



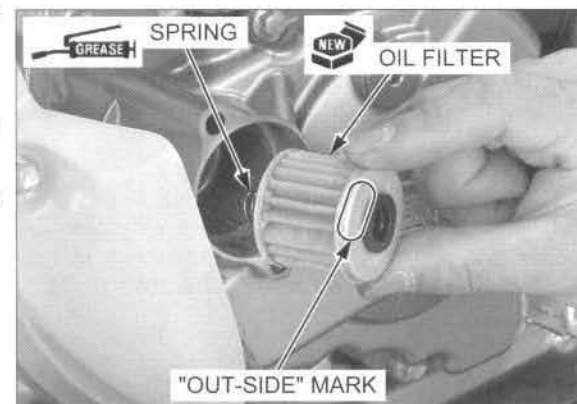
Apply grease to the oil filter contact area of the oil filter spring.

Install the oil filter spring into a new oil filter.

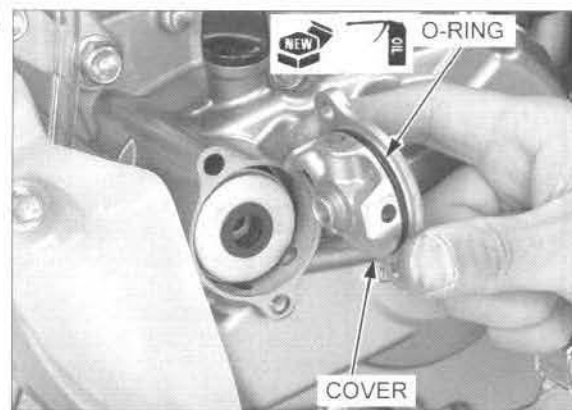
Install the oil filter with the "OUT-SIDE" mark facing out.

**NOTE:**

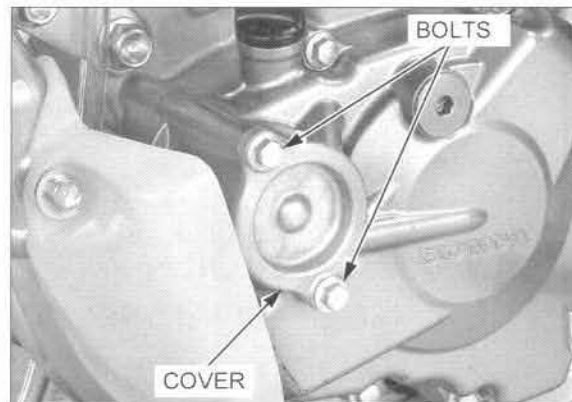
Installing the oil filter backwards will result in severe engine damage.



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



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

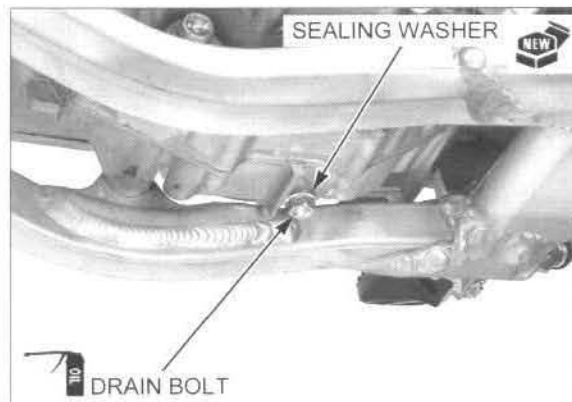


Apply engine oil to the engine oil drain bolt threads and seating surface.

Install a new sealing washer to the engine oil drain bolt, and install them to the crankcase.

Tighten the engine oil drain bolt to the specified torque.

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



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

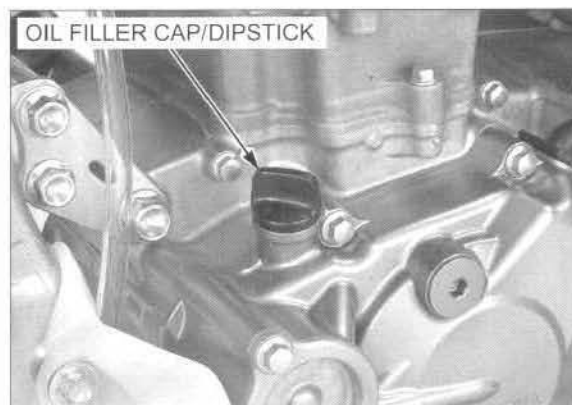
**ENGINE OIL CAPACITY:**

- 0.67 liter (0.70 US qt, 0.59 Imp qt) at draining
- 0.69 liter (0.73 US qt, 0.61 Imp qt) at oil filter change
- 0.85 liter (0.90 US qt, 0.75 Imp qt) at disassembly

Install the oil filler cap/dipstick.

Recheck the oil level (page 3-13).

Make sure there are no oil leaks.





## ENGINE IDLE SPEED

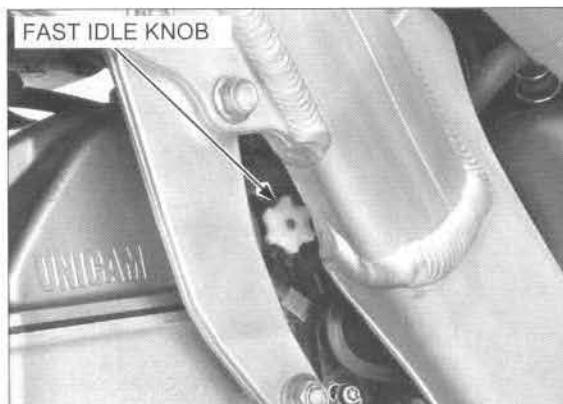
- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- Before inspection, check the following items.
  - No DTC and MIL blinking
  - Spark plug condition (page 3-10)
  - Air cleaner condition (page 3-8)
- The engine must be warm for accurate idle speed inspection.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

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

Stop the engine and connect a tachometer according to the tachometer manufacturer's operating instructions.

Start the engine and let it idle. Turn the fast idle knob to obtain the specified idle speed.

**IDLE SPEED: 2,000 ± 100 rpm**



## TRANSMISSION OIL

### OIL LEVEL INSPECTION

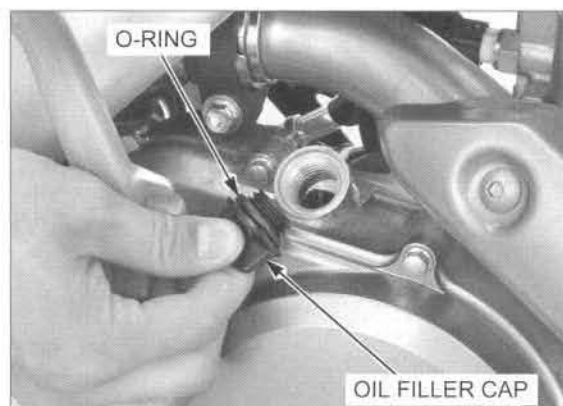
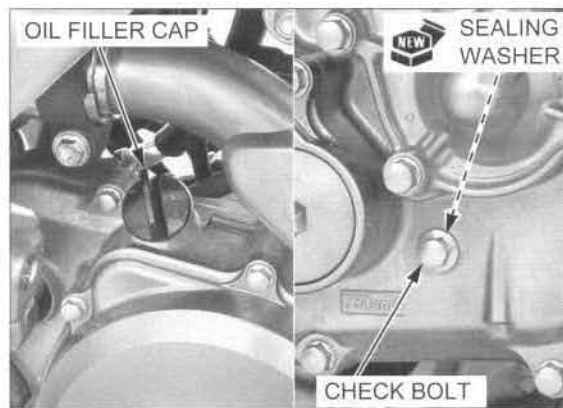
1. Start the engine and let it idle for 3 minutes.
2. Stop the engine and wait 3 minutes.
3. Support the motorcycle upright on a level surface.
4. Remove the oil filler cap. Remove the transmission oil check bolt and sealing washer from the right crankcase cover. A small amount of oil should flow out of the check bolt hole.
5. If no oil flows out of the check bolt hole, add recommended transmission oil (page 3-17) slowly through the oil filler hole until oil starts to flow out of the check bolt hole. Install and tighten the transmission oil check bolt and filler cap.
6. Repeat steps 1 – 5.

After checking the oil level or adding transmission oil, tighten the transmission oil check bolt to the specified torque with a new sealing washer.

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

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

Install the oil filler cap.



## TRANSMISSION OIL CHANGE

- Transmission oil should be changed at least every six races or 15 hours of operation to ensure consistent performance and maximum service life of both transmission and clutch components.

Support the motorcycle upright on a level surface.

Remove the oil filler cap from the right crankcase cover.

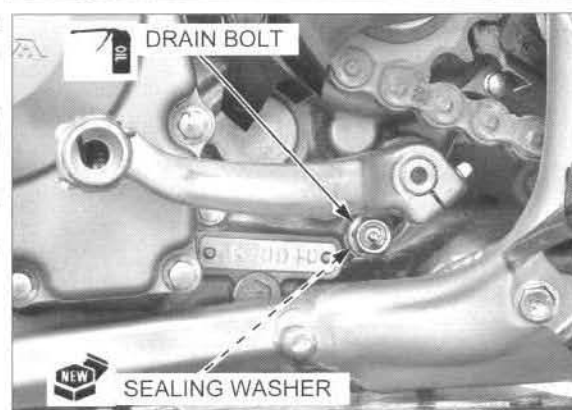


Place an oil pan under the engine to catch the transmission oil, then remove the transmission oil drain bolt and sealing washer.

After the transmission oil is drained completely, apply engine oil to the transmission oil drain bolt threads and seating surface.

Install a new sealing washer to the transmission oil drain bolt, and install them to the left crankcase.

Tighten the transmission oil drain bolt to the specified torque.



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

Fill the engine with the recommended transmission oil.

### RECOMMENDED TRANSMISSION OIL:

**Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil**

**API service classification: SG or Higher**

**JASO T 903 standard: MA**

**Viscosity: SAE 10W-30**

### TRANSMISSION OIL CAPACITY:

**0.68 liter (0.72 US qt, 0.60 Imp qt) at draining**

**0.75 liter (0.79 US qt, 0.66 Imp qt) at disassembly**

Check the oil level by following steps 1 – 6 in the oil level check procedure (page 3-16).

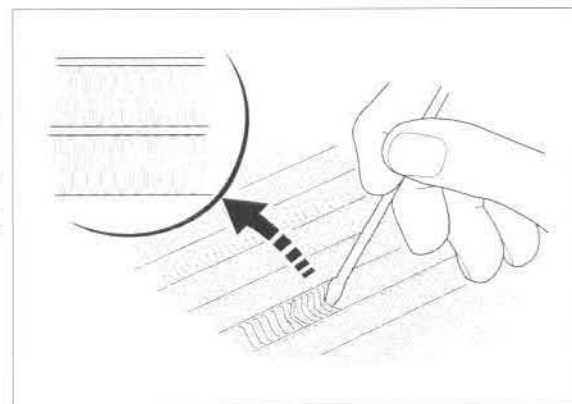
## COOLING SYSTEM

Remove the following:

- Radiator shrouds (page 2-4)
- Radiator grills (page 6-7)

Check the radiator air passages for clogging or damage.

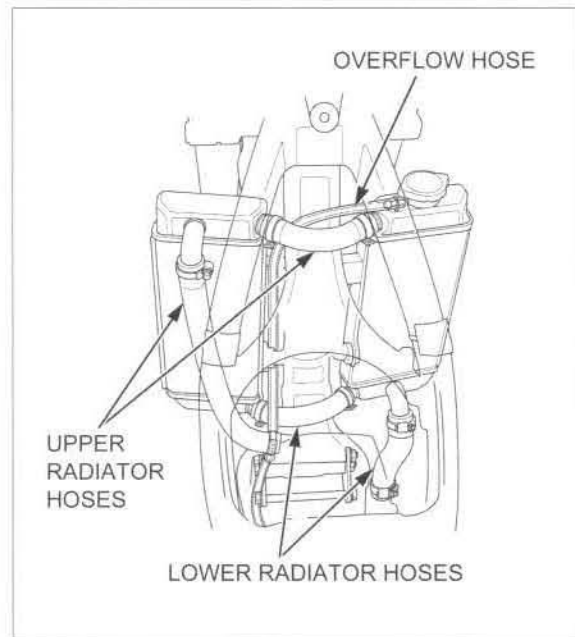
Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure. Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.





## MAINTENANCE

Inspect the radiator hoses for cracks and deterioration. Check the tightness of all hose band screws (page 6-9).



## DRIVE CHAIN

### CLEANING AND LUBRICATION

- For maximum service life, the drive chain should be cleaned and lubricated after every ride.

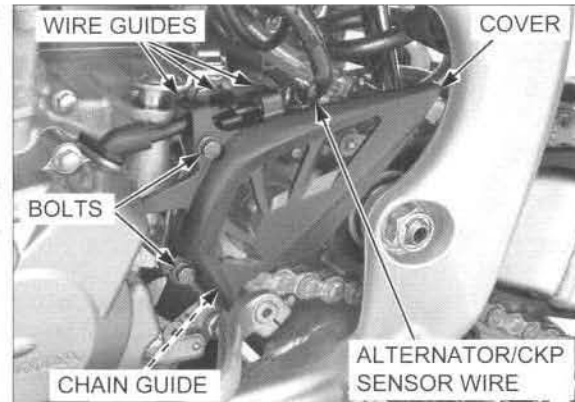
Perform the following service with the engine stopped and shift the transmission into neutral.

Place a workstand or equivalent under the engine.

*Be careful not to damage the wire guide of the drive sprocket cover.*

Release the alternator/CKP sensor wire from the wire guides.

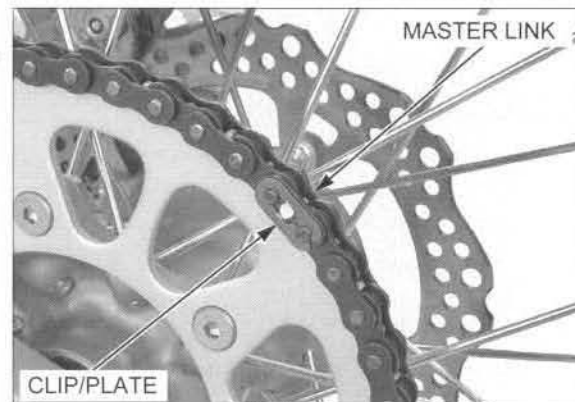
Remove the bolts, drive sprocket cover and drive chain guide.



Carefully remove the master link clip with pliers.

Remove the master link, link plate and disconnect the drive chain.

Remove the drive chain.



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 a new chain to wear quickly.

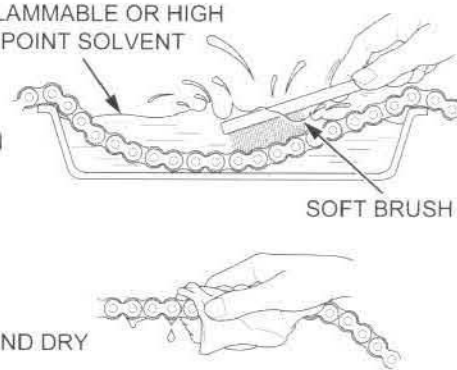
Inspect and replace sprocket as necessary.

NON-FLAMMABLE OR HIGH FLASH POINT SOLVENT

CLEAN

SOFT BRUSH

WIPE AND DRY



Measure the distance between a span of 17 pins (16 pitches) from pin center to pin center with the chain held taut and any kinked joint straightened.

**SERVICE LIMIT: 259 mm (10.2 in)**

If the measurement exceeds the service limit, replace the chain.

**REPLACEMENT CHAIN:**

**DID 520DMA4-116RB**

**RK 520TXZ-116RJ**

SERVICE LIMIT: 259 mm (10.2 in)

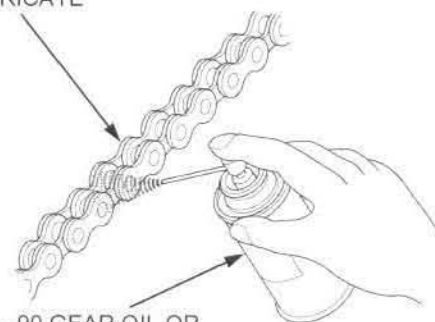


Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant.

Wipe off any excess oil or chain lubricant.

LUBRICATE

#80 – 90 GEAR OIL OR DRIVE CHAIN LUBRICANT



Check the master link clip is in good condition, and replace it if necessary.

Install the drive chain onto the sprockets.

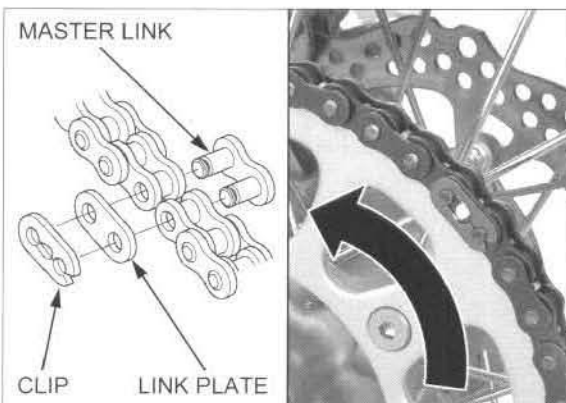
Install the master link and link plate.

Install the open end of the master link clip opposite the direction of chain travel.

MASTER LINK

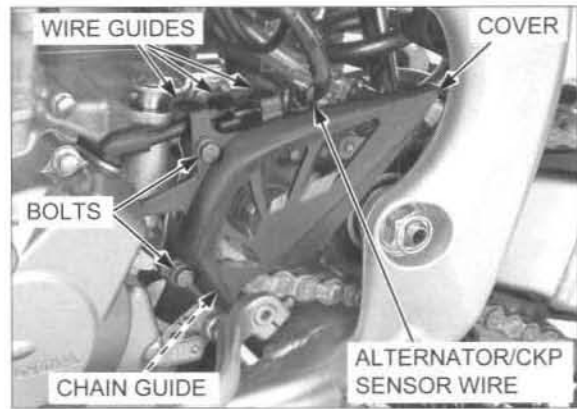
CLIP

LINK PLATE



## MAINTENANCE

Route the wires properly (page 1-21). Install the drive chain guide, drive sprocket cover and bolts. Tighten the bolts securely. Clamp the alternator/CKP sensor wire with the wire guides.



### DRIVE CHAIN SLACK INSPECTION

Raise the rear wheel off the ground by placing a workstand under the engine.

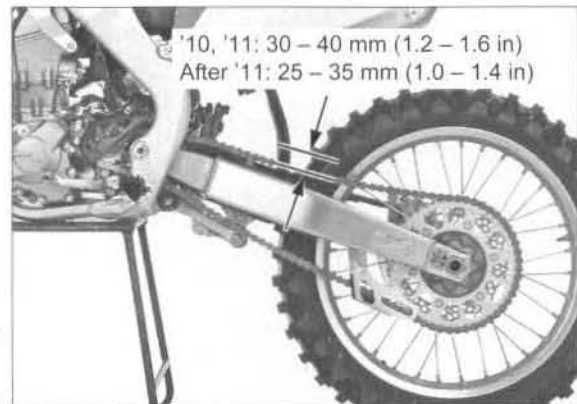
Measure the chain slack, on the upper chain run, midway between the sprockets.

#### CHAIN SLACK:

'10, '11: 30 – 40 mm (1.2 – 1.6 in)  
After '11: 25 – 35 mm (1.0 – 1.4 in)

#### NOTICE

Excessive chain slack, '10, '11: 55 mm (2.2 in),  
After '11: 50 mm (2.0 in) or more, may damage the frame.



#### ⚠ WARNING

Amputation hazard. Never inspect or adjust the drive chain while the engine is running.

### ADJUSTMENT

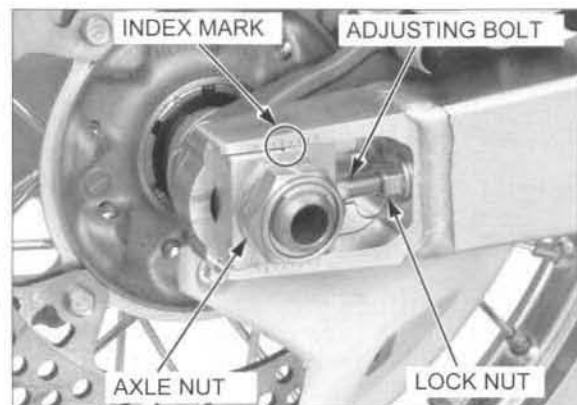
If the chain needs adjustment, loosen the rear axle nut and drive chain adjuster lock nuts, and turn the adjusting bolts.

Check that the adjusting block index marks are in the same position on each side, then tighten the rear axle nut to the specified torque.

**TORQUE: 128 N·m (13.1 kgf·m, 94 lbf·ft)**

After torquing the axle nut, seat the adjusting bolts snugly against the adjusting block, and tighten the drive chain adjuster lock nut to the specified torque while holding the adjusting bolt.

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



## DRIVE CHAIN SLIDER

Inspect the drive chain slider for excessive wear.

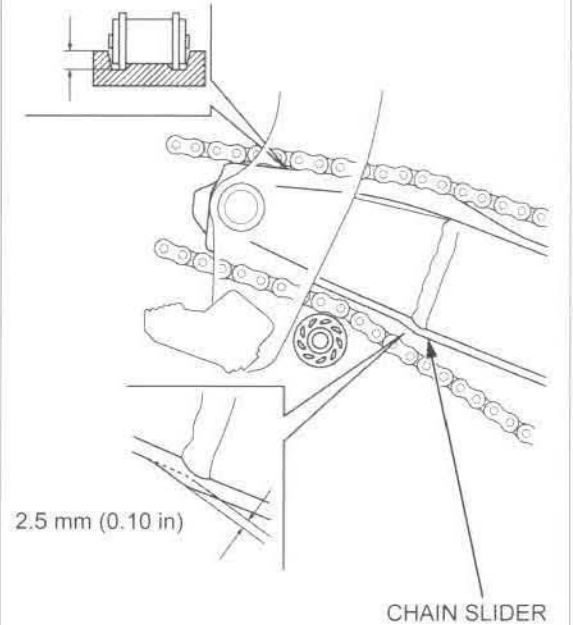
**SERVICE LIMITS:** Upper side: 5 mm (0.2 in)  
Lower side: 2.5 mm (0.10 in)

### NOTICE

*If the chain slider becomes worn through to the swingarm, the chain will wear against the swingarm, damaging the chain and swingarm.*

'10 shown:

5 mm (0.2 in)



2.5 mm (0.10 in)

CHAIN SLIDER

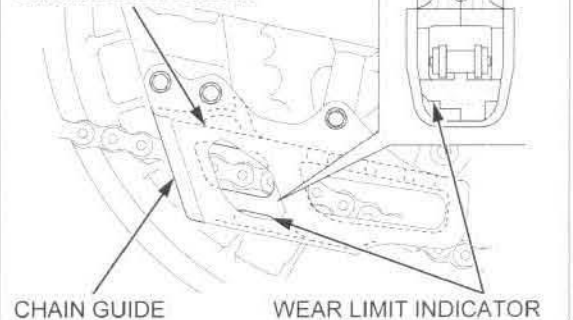
Check the chain guide and chain guide slider for alignment, wear or damage.

Replace the chain guide if it is damaged or worn.

Replace the chain guide slider if the slider is worn to the bottom of the wear limit indicator.

'10 shown:

CHAIN GUIDE SLIDER



CHAIN GUIDE

WEAR LIMIT INDICATOR

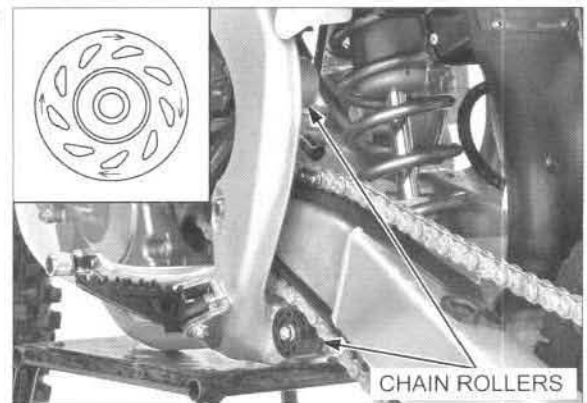
## DRIVE CHAIN ROLLER ('10, '11)

Inspect the drive chain rollers for excessive wear or binding.

Measure the upper and lower drive chain rollers O.D.

**SERVICE LIMIT: 35 mm (1.4 in)**

Replace the drive chain roller if necessary.



CHAIN ROLLERS

## MAINTENANCE

Upper: Green  
Lower: Black

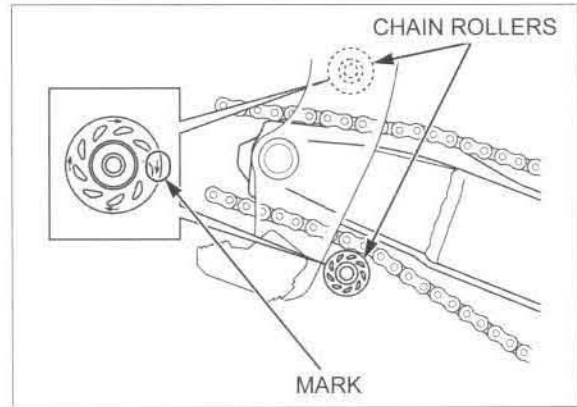
Install the drive chain rollers with the "→" mark facing out.

Install and tighten the drive chain roller bolt and nut to the specified torque.

### TORQUE:

Drive chain upper roller bolt:  
12 N·m (1.2 kgf·m, 9 lbf·ft)

Drive chain lower roller nut:  
12 N·m (1.2 kgf·m, 9 lbf·ft)



## DRIVE CHAIN ROLLER (After '11)

Inspect the drive chain rollers for excessive wear or binding.

Measure the upper and lower drive chain rollers O.D.

### SERVICE LIMIT:

Upper: 39 mm (1.5 in)

Lower: 31 mm (1.2 in)

Replace the drive chain roller if necessary.

Install the drive chain upper roller with the "→" mark facing out.

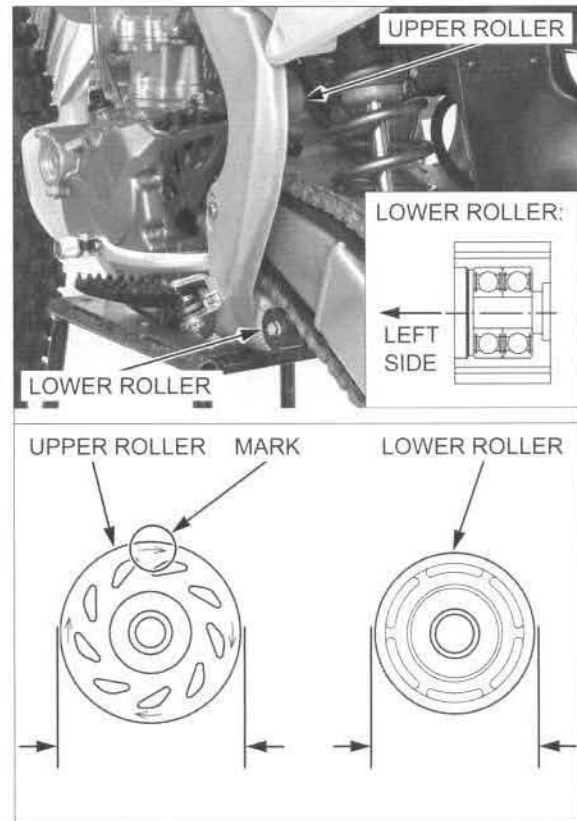
Install the drive chain lower roller as shown.

Install and tighten the drive chain roller bolt and nut to the specified torque.

### TORQUE:

Drive chain upper roller bolt:  
12 N·m (1.2 kgf·m, 9 lbf·ft)

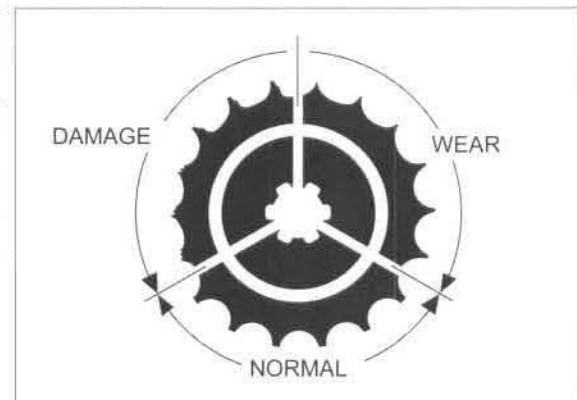
Drive chain lower roller nut:  
12 N·m (1.2 kgf·m, 9 lbf·ft)



## DRIVE/DRIVEN SPROCKET

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

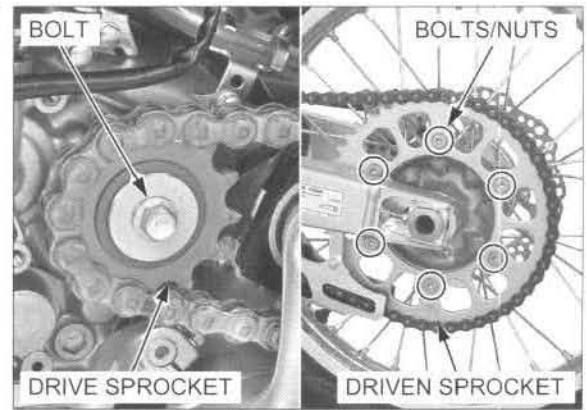
Never use a new drive chain on worn sprockets. Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



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

**TORQUE:**

- Drive sprocket bolt: 31 N·m (3.2 kgf·m, 23 lbf·ft)
- Driven sprocket nut: 32 N·m (3.3 kgf·m, 24 lbf·ft)



**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.

**FLUID LEVEL INSPECTION**

When the fluid level is low, check the brake pads for wear (page 3-24).

A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks (page 3-24).

**FRONT:**

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

If the level is near the lower level line, check the brake pad wear (page 3-24).



**REAR:**

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

If the level is near the lower level line, check the brake pad wear (page 3-24).



## MAINTENANCE

### FLUID FILLING

#### FRONT:

Remove the screws, reservoir cover and diaphragm and fill the reservoir with DOT 4 brake fluid to the upper level line.

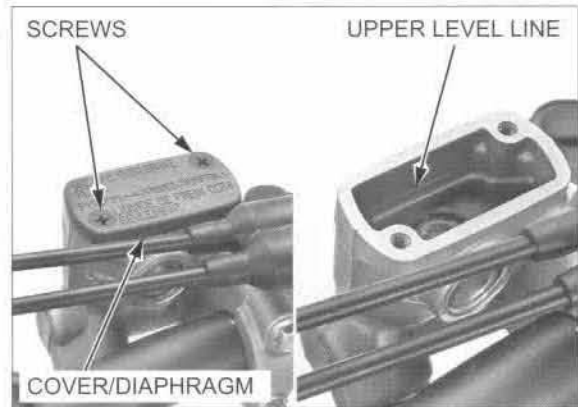
Install the diaphragm and reservoir cover.  
Install and tighten the screws to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Check the entire system for leaks.

Inspect the brake hose and fittings for deterioration, cracks or signs of leakage. Tighten any loose fittings.

Replace the hose and fittings as required.



#### REAR:

Remove the bolts, reservoir cover, plate and diaphragm and fill the reservoir with DOT 4 brake fluid to the upper level line.

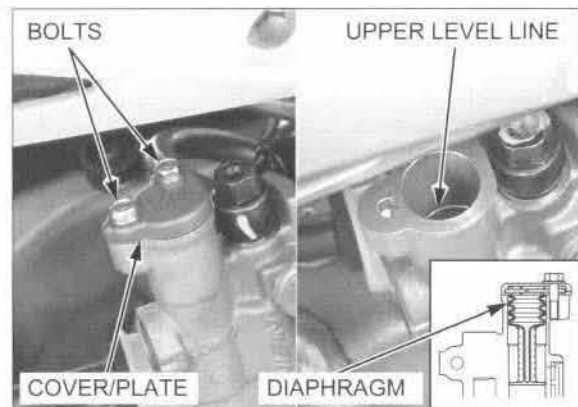
Install the diaphragm, plate and cover.  
Install and tighten the bolts to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Check the entire system for leaks.

Inspect the brake hose and fittings for deterioration, cracks or signs of leakage. Tighten any loose fittings.

Replace the hose and fittings as required.



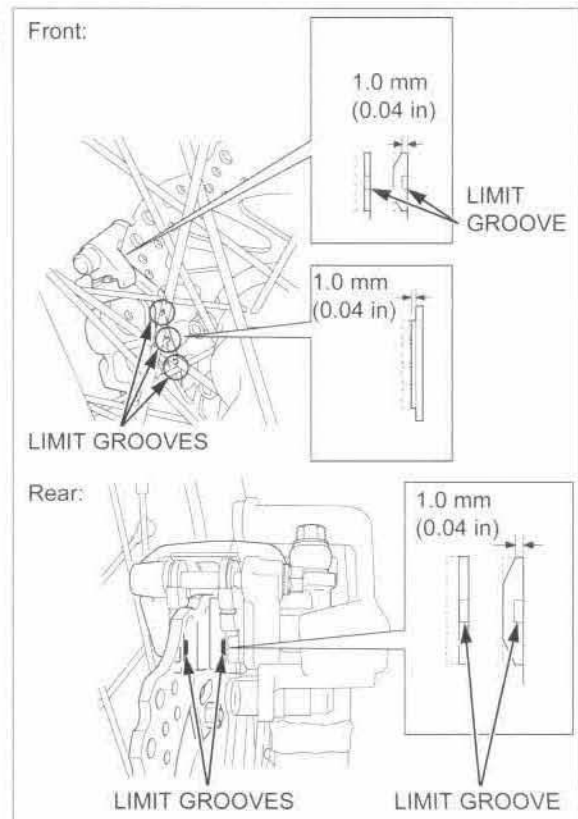
*Do not bend the diaphragm during installation.*

## BRAKE PADS WEAR

Inspect the pads. If either pad is worn anywhere to a thickness of 1.0 mm (0.04 in), both pads must be replaced.

For brake pad replacement

- Front (page 15-11)
- Rear (page 15-13)





## BRAKE SYSTEM

### BRAKE LEVER POSITION

The brake lever position can be adjusted by loosening the adjuster lock nut, and turning the adjusting bolt.

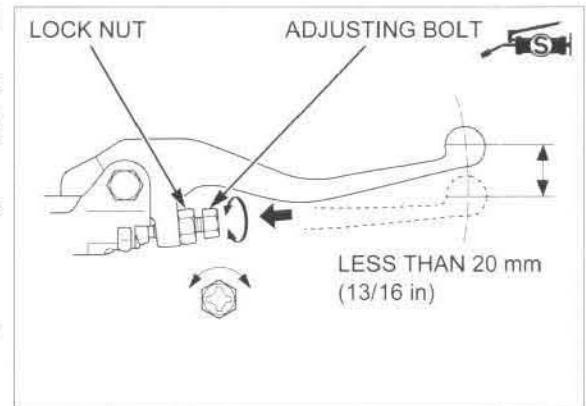
Turning the adjusting bolt clockwise moves the brake lever farther away from the grip; turning the adjusting bolt counterclockwise moves the brake lever closer to the grip.

*Apply silicone grease to the adjusting bolt tip.*

After adjustment, tighten the adjuster lock nut to the specified torque while holding the adjusting bolt.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)**

If the brake lever freeplay exceeds 20 mm (13/16 in), there is air in the system that must be bled. For brake system air bleeding (page 15-7).



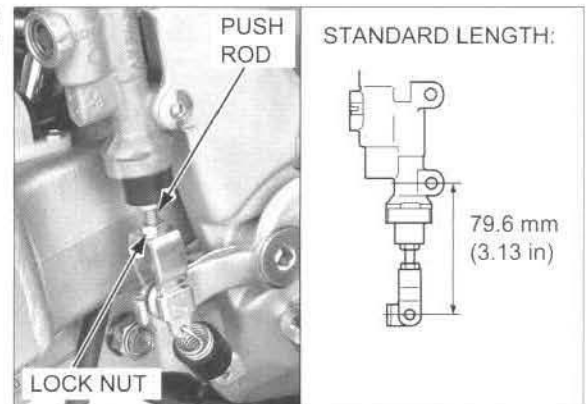
### BRAKE PEDAL HEIGHT

Adjust the brake pedal to the desired height by loosening the push rod lock nut, and turning the push rod.

**STANDARD LENGTH: 79.6 mm (3.13 in)**

Tighten the push rod lock nut to the specified torque.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)**



## CLUTCH SYSTEM

### CLUTCH LEVER POSITION

*Make sure to adjust the clutch lever freeplay after the clutch lever position adjustment or when the clutch cable is disconnected.*

The clutch lever position can be adjusted by loosening the adjuster lock nut, and turning the adjusting bolt.

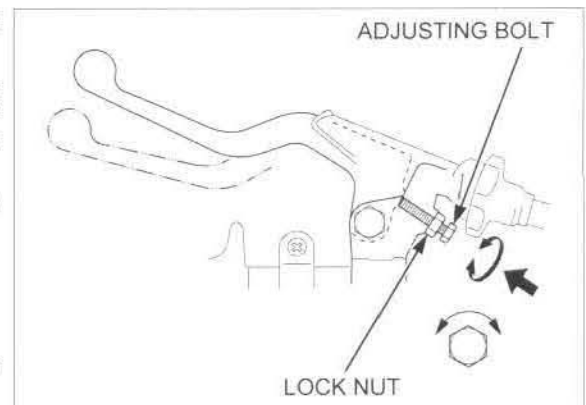
Turning the adjusting bolt counterclockwise moves the clutch lever farther away from the grip; turning the adjusting bolt clockwise moves the clutch lever closer to the grip.

After adjustment, tighten the adjuster lock nut securely while holding the adjusting bolt.

Check the clutch lever freeplay (page 3-26).

#### NOTICE

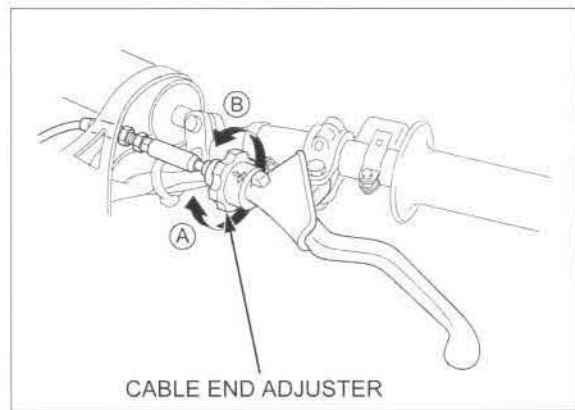
*Failure to check the clutch lever freeplay may result in damaged clutch plates.*





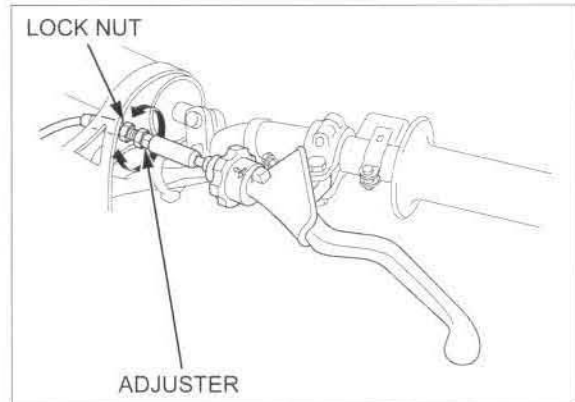
## MAINTENANCE

Turn the cable end adjuster in direction A until it seats lightly and then turn it out 5 turns in direction B.

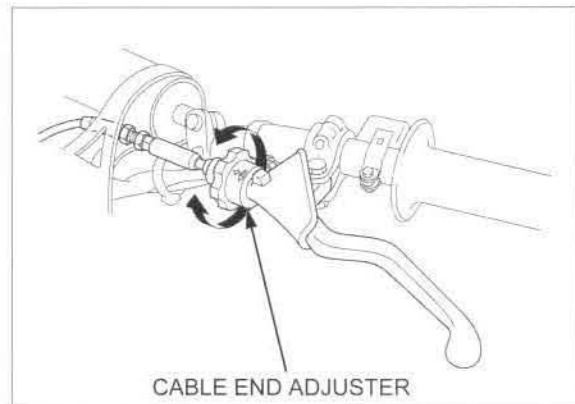


Loosen the adjuster lock nut, and turn the in-line cable adjuster so that the clutch lever freeplay is 10 – 20 mm (3/8 – 13/16 in) at the tip of lever.

After adjustment, tighten the adjuster lock nut securely while holding the adjuster.



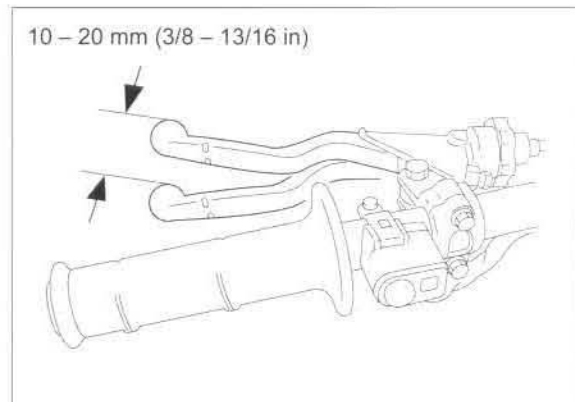
Adjust the clutch cable end adjuster for minor adjustment.



### CLUTCH LEVER FREEPLAY

Measure the clutch lever freeplay at the lever end.

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

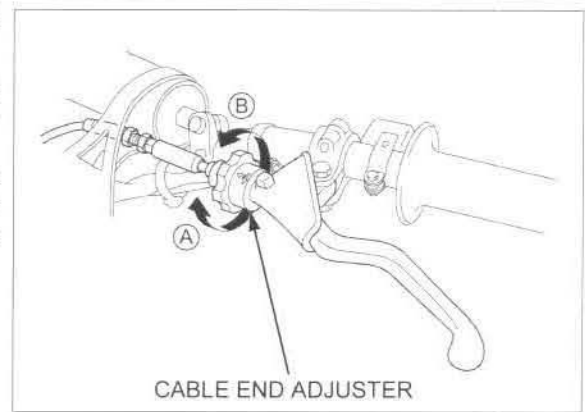


Minor adjustments can be made at the cable end adjuster.

Turning the cable end adjuster in direction A will increase freeplay and turning it in direction B will decrease freeplay.

If the adjuster is threaded out near its limit and the correct freeplay cannot be reached, turn the adjuster in direction A until it seats lightly and then turn it out one turn in direction B.

Make the adjustment with the in-line cable adjuster.



CABLE END ADJUSTER

Major adjustments can be made with the in-line cable adjuster located behind the number plate.

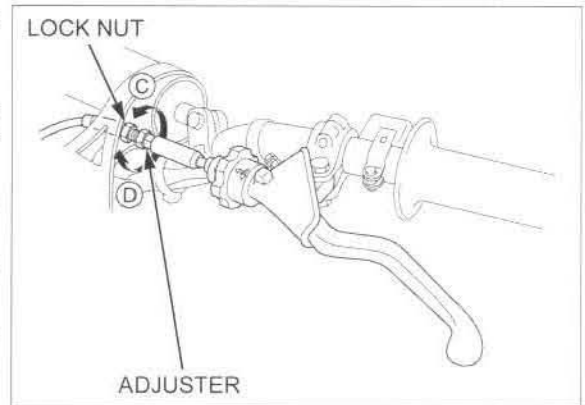
Loosen the adjuster lock nut and turn the adjuster.

Turning the adjuster in direction C will decrease freeplay and turning it in direction D will increase freeplay.

After adjustment, tighten the adjuster lock nut securely while holding the adjuster.

Test ride to be sure the clutch operates properly without slipping or dragging.

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



LOCK NUT

ADJUSTER

## CONTROL CABLES

Remove the dust cover.  
Remove the throttle housing bolts.

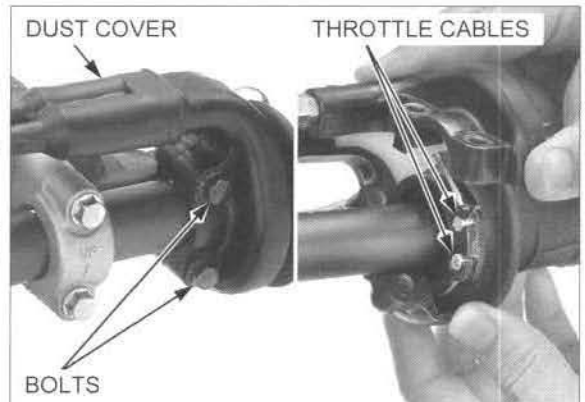
Disconnect the throttle cables from the throttle pipe, and remove the throttle housing.

*It is not necessary to lubricate the entire cable.*

Thoroughly lubricate the cable ends with a commercially available cable lubricant.

If the throttle operation is not smooth, replace the cable.

Be sure the throttle returns freely from fully open to fully closed automatically, in all steering positions.



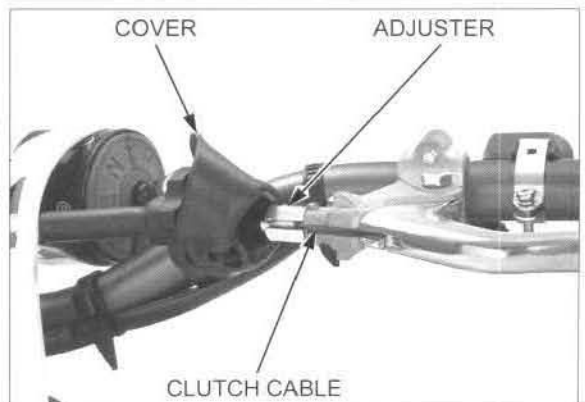
Release the clutch lever cover.  
Turn the adjuster, and remove the clutch cable.

Disconnect the clutch cable from the lever.

*It is not necessary to lubricate the entire cable.*

Thoroughly lubricate the cable ends with a commercially available cable lubricant.

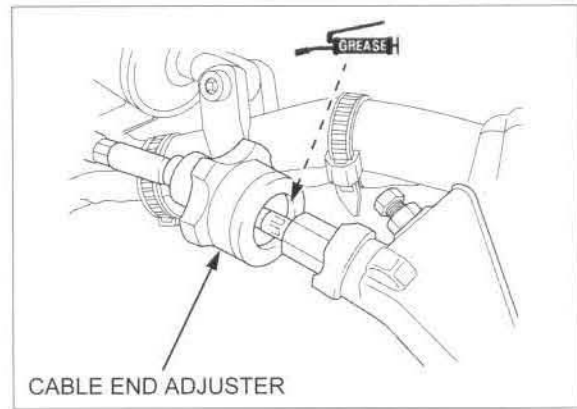
If the clutch lever operation is not smooth, replace the cable.



## MAINTENANCE

Remove the clutch cable end adjuster.

Apply grease to the clutch cable end adjuster inside surface.



## EXHAUST PIPE/MUFFLER

### EXHAUST SYSTEM INSPECTION

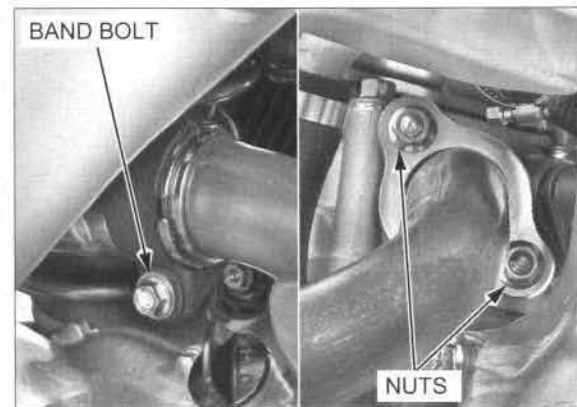
Check the joint band bolt and joint nuts for looseness and exhaust gas leaks.

Tighten each bolt and nut of the exhaust system to the specified torque.

#### TORQUE:

Exhaust pipe joint nut: 21 N·m (2.1 kgf·m, 15 lbf·ft)

Muffler joint band bolt: 21 N·m (2.1 kgf·m, 15 lbf·ft)



## SUSPENSION

### FRONT SUSPENSION INSPECTION

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

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

Make sure the fork protectors and dust seals are clean and not packed with mud and dirt.

Remove any dirt that has accumulated on the bottom of the fork seals.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

For fork service (page 13-14).



Air pressure acts as a progressive spring and affects the entire range of fork travel.

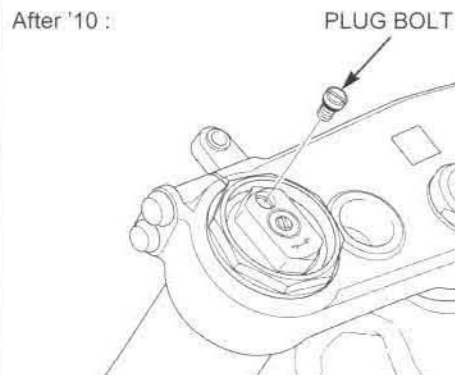
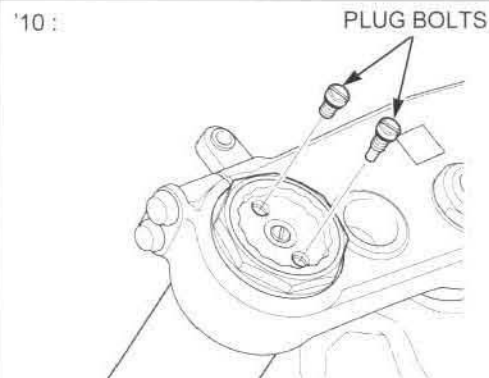
Air is an unstable gas; it increases in pressure as it is worked (such as in a fork), so the fork action on this motorcycle will get stiffer as the race progresses.

Release built-up air pressure from the fork legs after practice and between motos.

Be sure the fork is fully extended with the front tire off the ground.

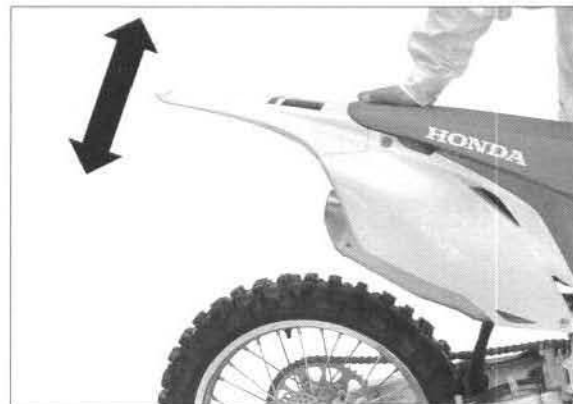
Loosen the plug bolts fully, then tighten them to the specified torque.

**TORQUE: 1.3 N·m (0.1 kgf·m, 1.0 lbf·ft)**



### REAR SUSPENSION INSPECTION

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



Remove the sub-frame (page 2-6).

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

For shock absorber service (page 14-13).

Install the sub-frame (page 2-8).



## MAINTENANCE

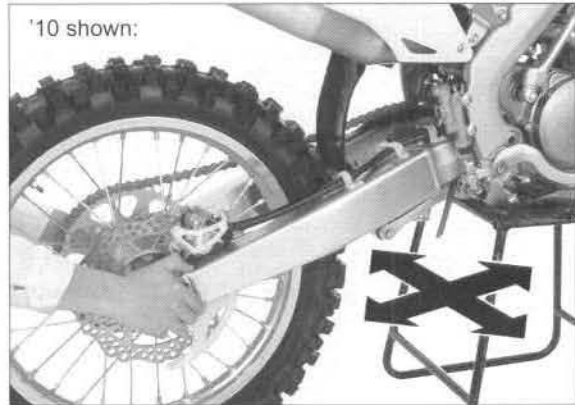
### SWINGARM/SHOCK LINKAGE

Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

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

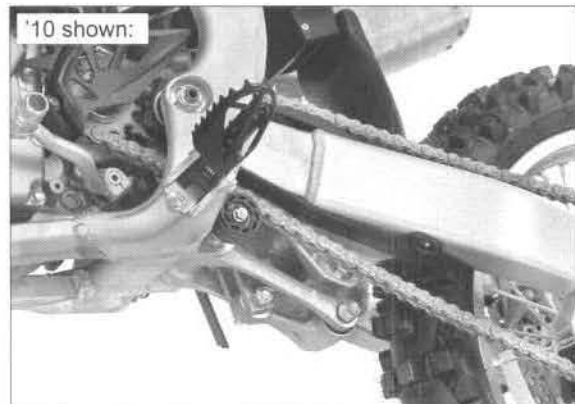
Replace the bearings if excessively worn (page 14-38).

Check the shock linkage and replace any damaged needle bearings.



Disassemble, clean, inspect the swingarm and shock linkage pivot bearings and related seals every three races or about 7.5 hours of operation (page 14-31).

Lubricate and reassemble them.



### NUTS, BOLTS, FASTENERS

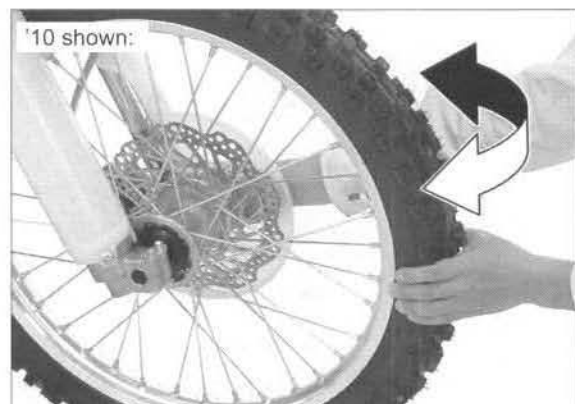
Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).

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

### WHEELS/TIRES

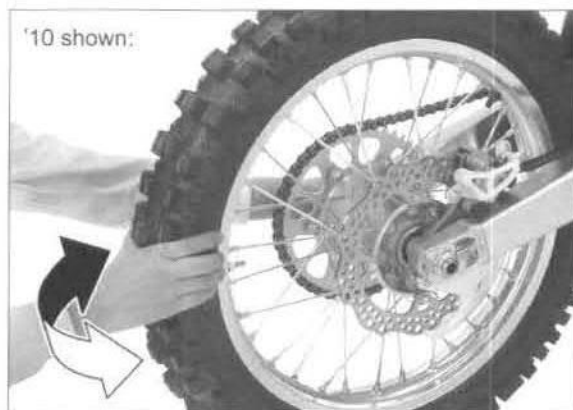
Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

Hold the front fork leg and move the front wheel sideways with force to see if the wheel bearings are worn.



Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

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



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

Check the front wheel (page 13-8) and rear wheel (page 14-7) for trueness.

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

Check the cold tire pressure.

**TIRE PRESSURE:**

**FRONT:** 100 kPa (1.0 kgf/cm<sup>2</sup>, 15 psi)  
**REAR:** 100 kPa (1.0 kgf/cm<sup>2</sup>, 15 psi)



Inspect the wheel rims and spokes for damage.

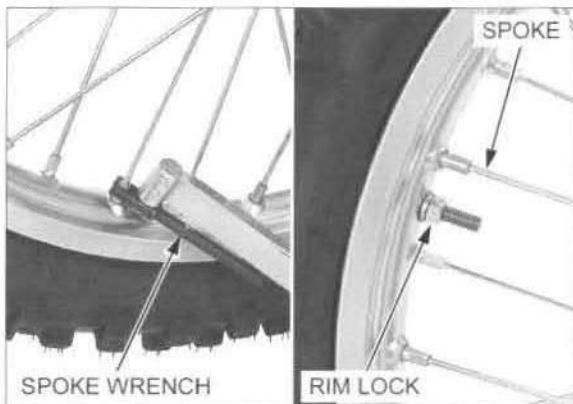
Tighten any loose spokes and rim locks to the specified torque using the special tool.

**TOOLS:**

**FRONT:**  
 Spoke wrench, 6.1 mm      07JMA-MR60100  
**REAR:**  
 Spoke wrench, 6.6 mm      070MA-KZ30100

**TORQUE:**

Spoke:            3.7 N·m (0.4 kgf·m, 2.7 lbf·ft)  
 Rim lock:        12 N·m (1.2 kgf·m, 9 lbf·ft)



## STEERING HEAD BEARINGS

Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

*Be sure the control cables do not interfere with handlebar rotation.*

Check that the handlebar moves freely from side-to-side.

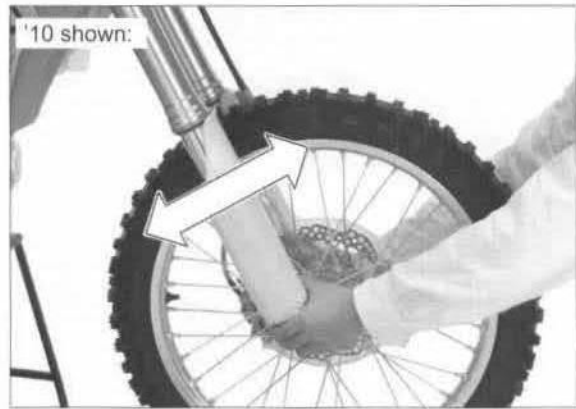


## MAINTENANCE

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (page 13-52).

Check for worn steering head bearing by grabbing the fork legs and attempting to move the front fork forward to backward.

Replace the bearing if any looseness is noted.



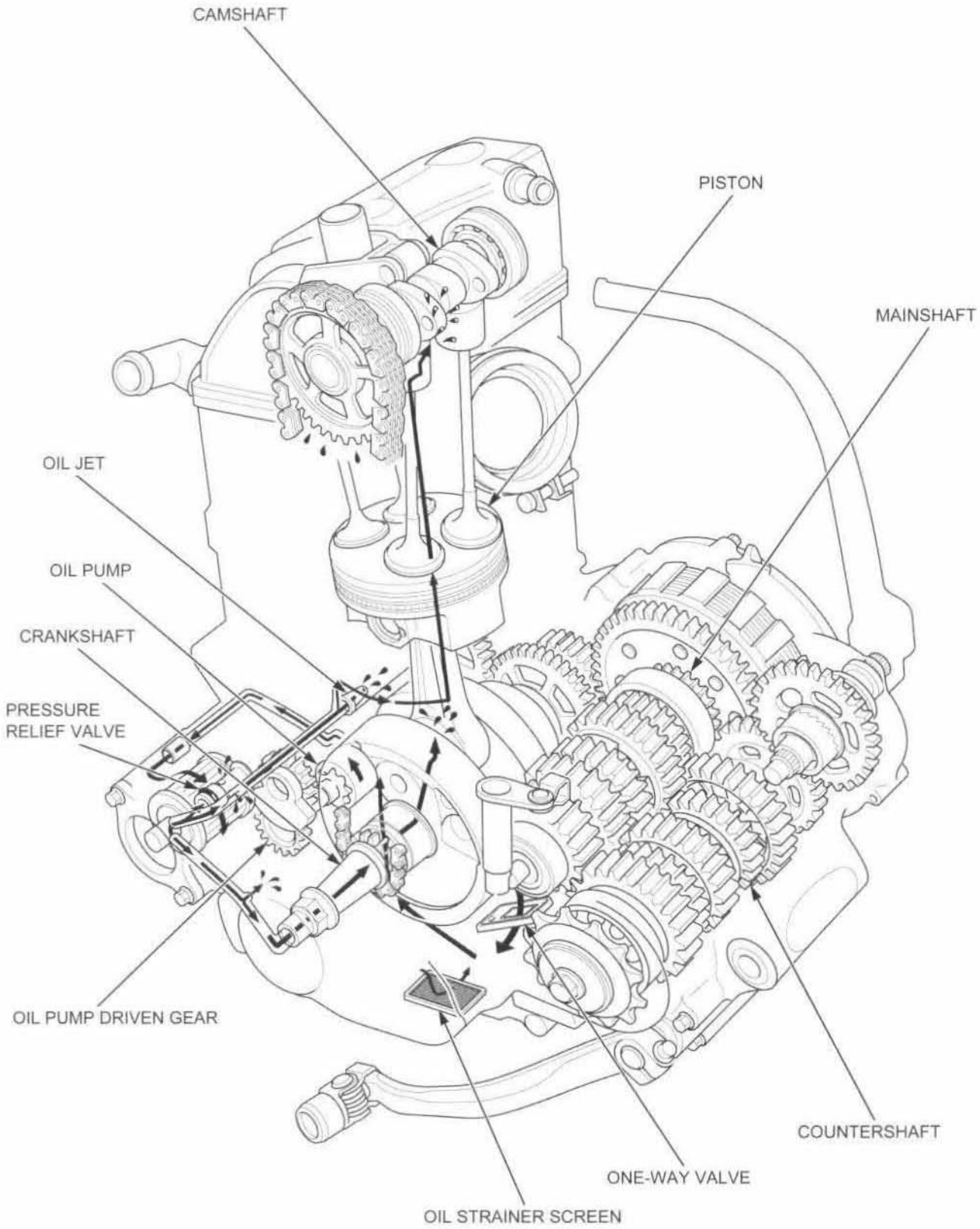
# 4. LUBRICATION SYSTEM

---

LUBRICATION SYSTEM DIAGRAM .....	4-2	OIL STRAINER SCREEN .....	4-4
SERVICE INFORMATION .....	4-3	PRESSURE RELIEF VALVE .....	4-5
TROUBLESHOOTING.....	4-3	OIL PUMP .....	4-5



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 and one-way valve service requires crankcase separation.
- The service procedures in this section must be performed with the engine oil and transmission oil drained.
- When servicing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- The pressure relief valve and oil strainer screen can be serviced with the engine installed in the frame.

### SPECIFICATIONS

ITEM		STANDARD	Unit: mm (in) SERVICE LIMIT
Engine oil capacity	At draining	0.67 liter (0.70 US qt, 0.59 Imp qt)	—
	At oil filter change	0.69 liter (0.73 US qt, 0.61 Imp qt)	—
	At disassembly	0.85 liter (0.90 US qt, 0.75 Imp qt)	—
Transmission oil capacity	At draining	0.68 liter (0.72 US qt, 0.60 Imp qt)	—
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)	—
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	—
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30	—
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	—
	Side clearance	0.15 – 0.22 (0.006 – 0.009)	—

## TROUBLESHOOTING

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

- Engine oil not changed often enough
- External oil leaks
- Worn piston rings or incorrect piston ring installation
- Worn valve guide or stem seal

#### Engine oil contamination

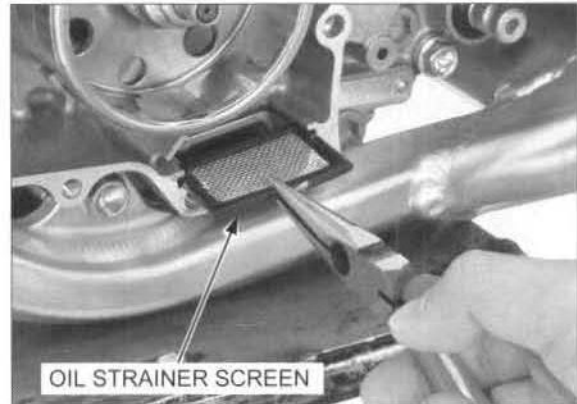
- Engine oil or filter not changed often enough
- Worn piston rings or incorrect piston ring installation
- Worn valve guide or stem seal
- Coolant mixing with oil
  - Faulty cylinder head gasket
  - Water leak in crankcase

## OIL STRAINER SCREEN

### REMOVAL/INSPECTION

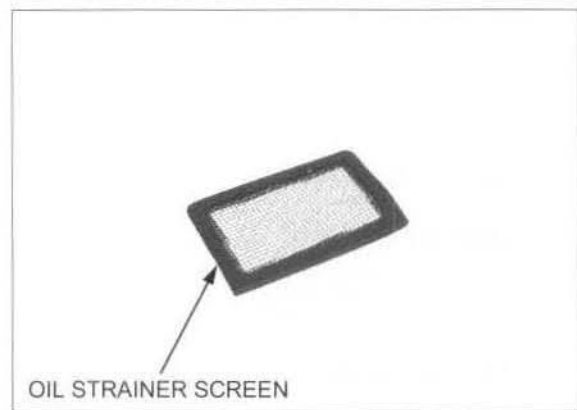
Remove the left crankcase cover (page 11-4).

Remove the oil strainer screen.



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

Check the oil strainer screen for damage or clogs.

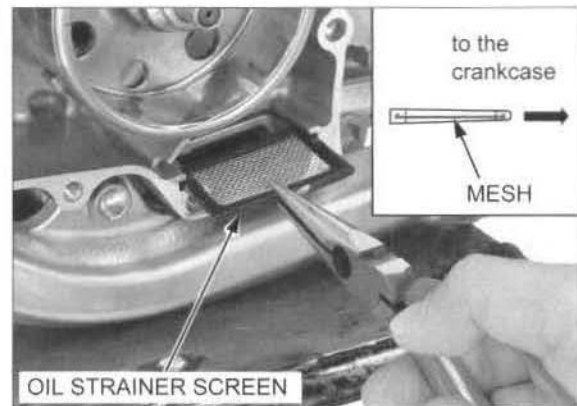


### INSTALLATION

Install the oil strainer screen to the crankcase as shown.

Install the left crankcase cover (page 11-8).

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



## PRESSURE RELIEF VALVE

### REMOVAL/INSPECTION

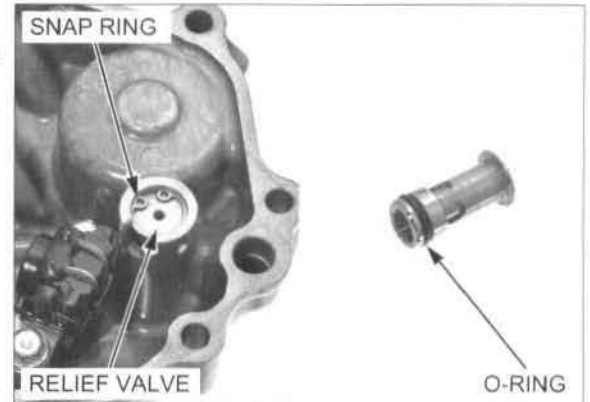
Remove the left crankcase cover (page 11-4).

Remove the snap ring and pressure relief valve from the left crankcase cover.

Remove the O-ring.

Check the pressure relief valve for damage or clogs.

Replace the pressure relief valve if necessary.



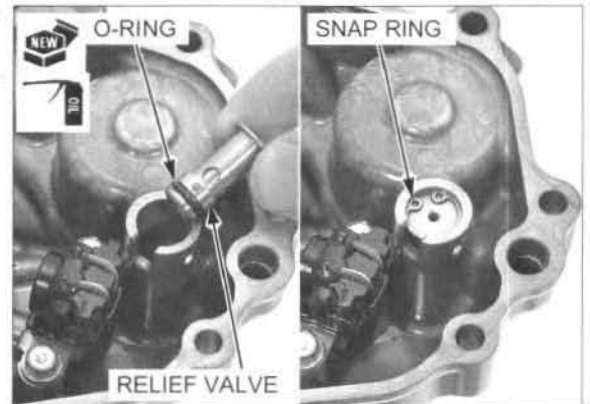
### INSTALLATION

Apply engine oil to a new O-ring, and install it to the pressure relief valve.

Install the pressure relief valve into the left crankcase cover.

Install the snap ring securely.

Install the left crankcase cover (page 11-8).



## OIL PUMP

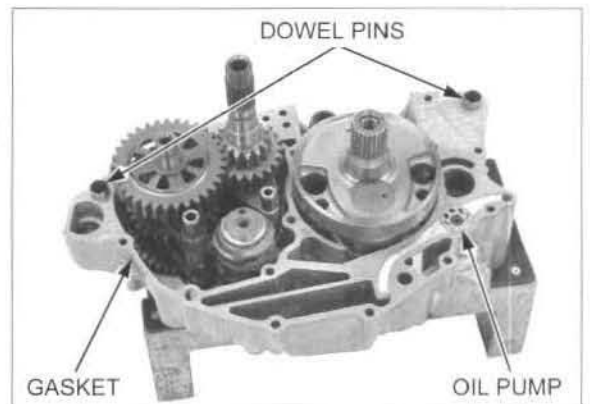
### DISASSEMBLY

Remove the engine from the frame (page 7-4).

Separate the crankcase halves (page 12-13).

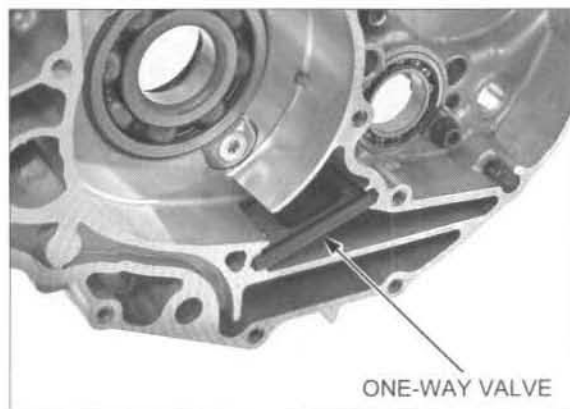
Remove the dowel pins and gasket.

Remove the oil pump inner/outer rotors and oil pump shaft from the left crankcase.



## LUBRICATION SYSTEM

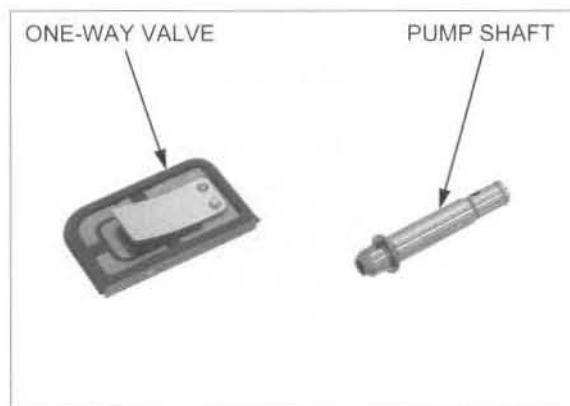
Remove the one-way valve from the right crankcase.



### INSPECTION

Check the one-way valve for wear or damage.

Check the oil pump shaft for wear or damage.

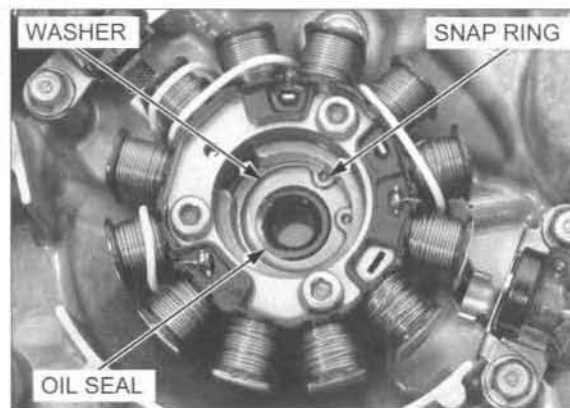


Check the oil seal for damage or deterioration, replace it if necessary.

If replacing the oil seal, install it into the left crankcase cover until it is fully seated.

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

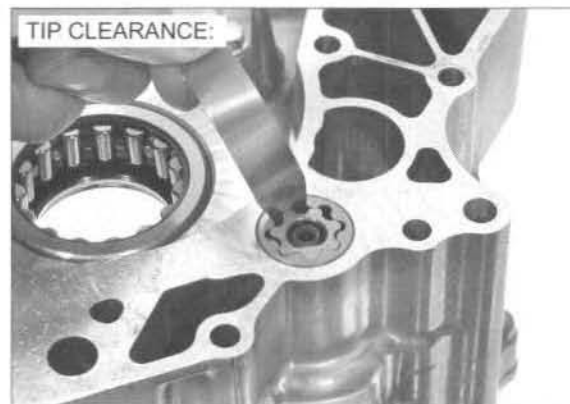
Check that the washer and snap ring are installed in the left crankcase cover securely.



Temporarily install the oil pump shaft and inner/outer rotors into the left crankcase.

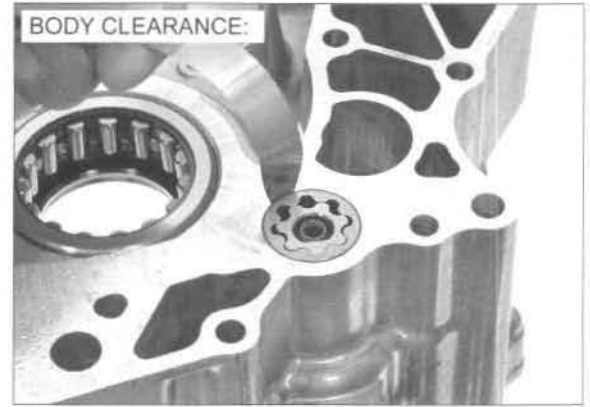
Measure the tip clearance.

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



Measure the body clearance.

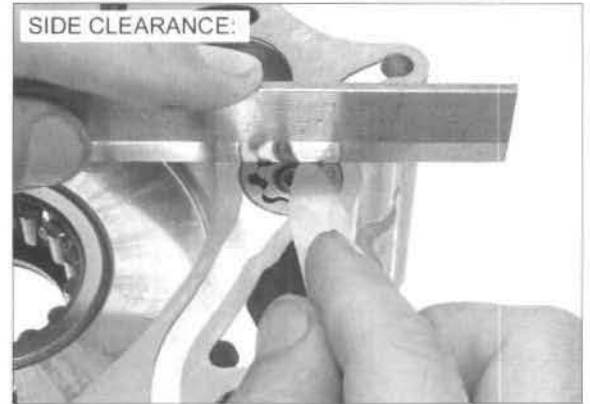
**STANDARD: 0.15 – 0.21 mm (0.006 – 0.008 in)**



*Measure the side clearance with the gasket installed.*

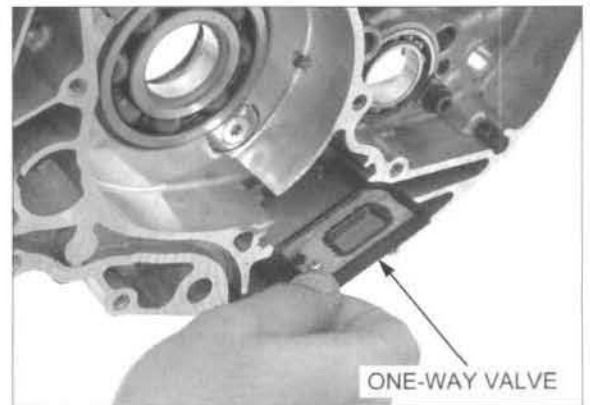
Measure the side clearance using a straight edge and feeler gauge.

**STANDARD: 0.15 – 0.22 mm (0.006 – 0.009 in)**



### ASSEMBLY

Install the one-way valve onto the right crankcase as shown.



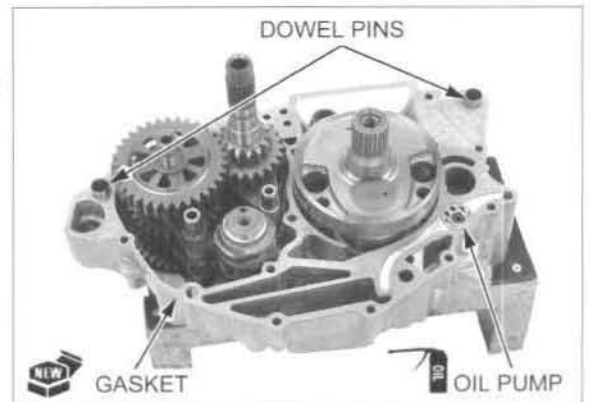
Install the oil pump shaft into the left crankcase.

Apply engine oil to the oil pump rotors sliding area.  
Install the oil pump inner rotor while aligning its cut-out with the cut-out of the oil pump shaft.  
Install the oil pump outer rotor.

Install the dowel pins and new gasket.

Assemble the crankcase halves (page 12-15).

Install the engine to the frame (page 7-6).



---

**MEMO**

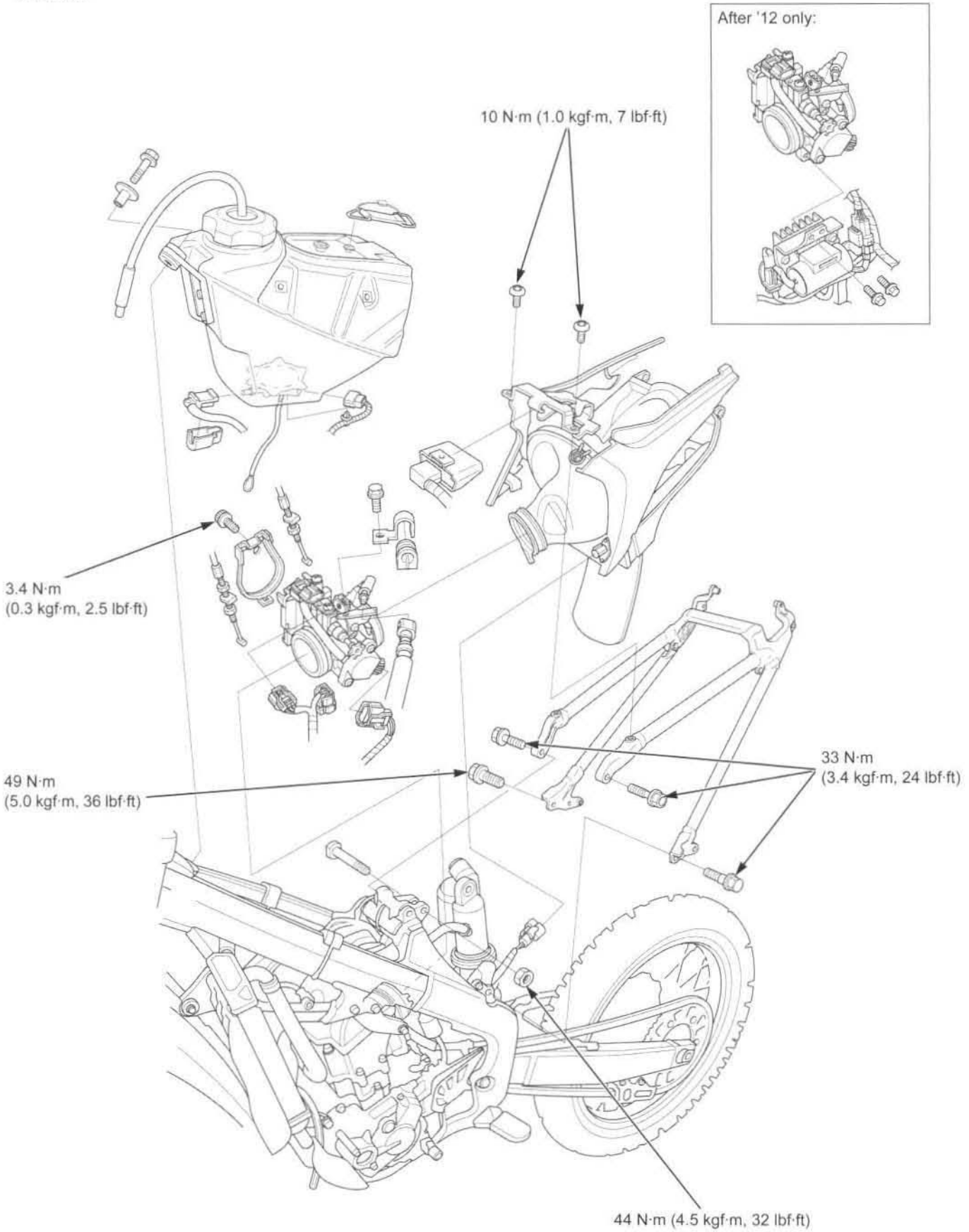


COMPONENT LOCATION .....	5-2	FUEL LINE REPLACEMENT .....	5-30
SERVICE INFORMATION .....	5-3	FUEL PUMP UNIT .....	5-37
PGM-FI SYMPTOM TROUBLESHOOTING .....	5-6	FUEL TANK .....	5-45
PGM-FI SYSTEM LOCATION .....	5-7	AIR CLEANER HOUSING .....	5-46
PGM-FI SYSTEM DIAGRAM ('10 - '12) .....	5-8	INJECTOR .....	5-47
PGM-FI SYSTEM DIAGRAM (After '12) .....	5-9	THROTTLE BODY .....	5-49
CONNECTOR LOCATION .....	5-10	FAST IDLE KNOB .....	5-54
PGM-FI TROUBLESHOOTING INFORMATION .....	5-11	MAP SENSOR .....	5-55
DTC INDEX .....	5-15	IAT SENSOR .....	5-56
DTC TROUBLESHOOTING .....	5-16	ECT SENSOR .....	5-57
MIL CIRCUIT INSPECTION .....	5-29	ECM .....	5-58



COMPONENT LOCATION

'10 shown:



## SERVICE INFORMATION

### GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- 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.
- 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.
- Do not snap the throttle valve from fully opened to fully closed after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports 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 engine, clean the throttle bore and fuel hose with compressed air.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- Before disconnecting the fuel hose, relieve fuel pressure from the system by disconnecting the quick connect fitting (page 5-30).
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.

### SPECIFICATIONS


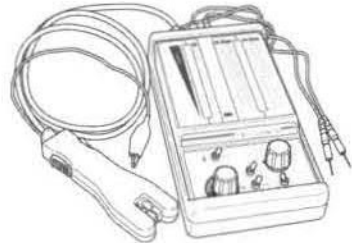
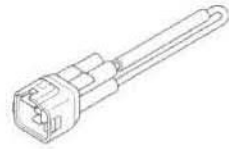
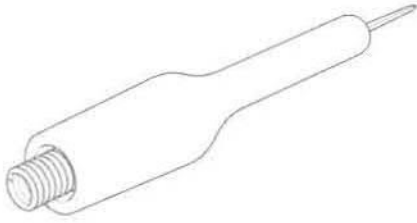
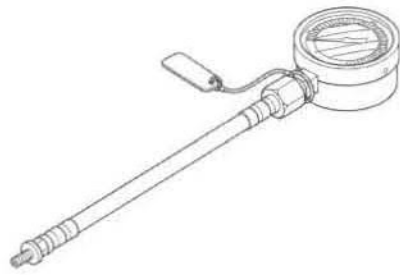
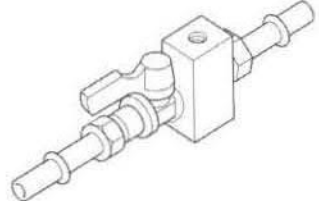
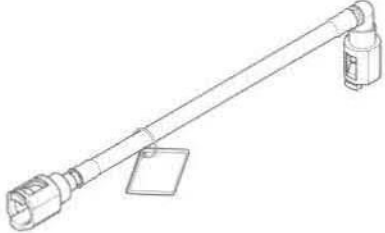



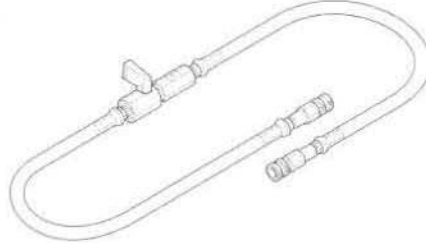
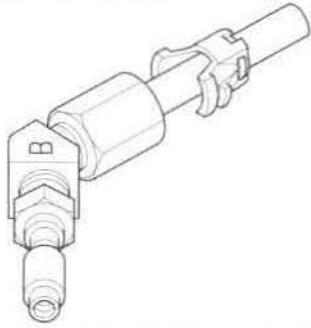
ITEM		SPECIFICATIONS
Throttle body identification number	'10, '11	GQD2A
	'12	GQ26A
	After '12	GQ28A
Idle speed		2,000 ± 100 rpm
Throttle grip freeplay		3 – 5 mm (1/8 – 3/16 in)
ECT sensor resistance (at 20°C/68°F)		2.3 – 2.6 kΩ
Fuel injector resistance (at 20°C/68°F)		11.6 – 12.4 Ω
Fuel pressure		333 – 360 kPa (3.4 – 3.7 kgf/cm <sup>2</sup> , 48 – 52 psi)
Fuel pump flow (at 12 V)		150 cm <sup>3</sup> (5.1 US oz, 5.3 Imp oz) minimum/10 seconds

### TORQUE VALUES

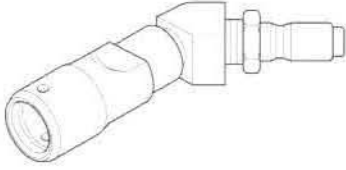
ECT sensor	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Air cleaner housing mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Air cleaner connecting boot band screw (air cleaner side)	0.7 N·m (0.1 kgf·m, 0.5 lbf·ft)	
Insulator band screw (throttle body side)	See page 5-53	
Fuel pump mounting bolt	11 N·m (1.1 kgf·m, 8 lbf·ft)	For tightening sequence (page 5-44)
Fast idle knob lock nut	2.3 N·m (0.2 kgf·m, 1.7 lbf·ft)	
Mud guard mounting screw	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)	
Throttle drum cover bolt	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
IAT sensor screw	1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)	
MAP sensor screw	4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Injector joint bolt	5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)	
Clamper stay screw	3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)	
Throttle cable adjuster lock nut	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Throttle cable bolt	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Shock absorber upper mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut

# FUEL SYSTEM (PGM-FI)

## TOOLS

<p>Peak voltage adaptor 07HGJ-0020100 (Not available in U.S.A.)</p>  <p>with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)</p>	<p>IgnitionMate peak voltage tester TMNTS91H (U.S.A. only)</p> 	<p>SCS service connector 070PZ-ZY30100</p> 
<p>Test probe 07ZAJ-RDJA110</p> 	<p>Fuel pressure gauge, 0 – 100 psi 07406-0040004</p>  <p>or 07406-004000B (U.S.A. only)</p>	<p>Pressure gauge manifold 07ZAJ-S5A0111</p>  <p>(Not available in U.S.A.)</p>
<p>Hose attachment, 8 mm/9 mm 07ZAJ-S7C0100</p>  <p>(Not available in U.S.A.)</p>	<p>Hose attachment, 9 mm/9 mm 07ZAJ-S5A0120</p>  <p>(Not available in U.S.A.)</p>	<p>Attachment joint, 8 mm/9 mm 07ZAJ-S7C0200</p>  <p>(Not available in U.S.A.)</p>
<p>HDS pocket tester TDS3557-0112-01 (U.S.A. only)</p> 	<p>Fuel pressure manifold hose 07AMJ-HW3A100 (U.S.A. only)</p> 	<p>Adaptor, male 07AAJ-S6MA300 (U.S.A. only)</p> 

Adaptor, female  
07AAJ-S6MA500 (U.S.A. only)

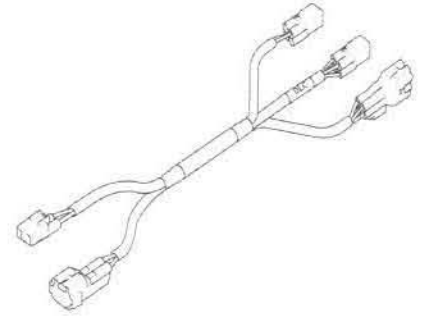


Battery harness  
070MZ-MEN0100



or 070MZ-MENA100 (U.S.A. only)

Battery harness adaptor  
070MZ-KRN0100



or 070MZ-KRNA100 (U.S.A. only)

## FUEL SYSTEM (PGM-FI)

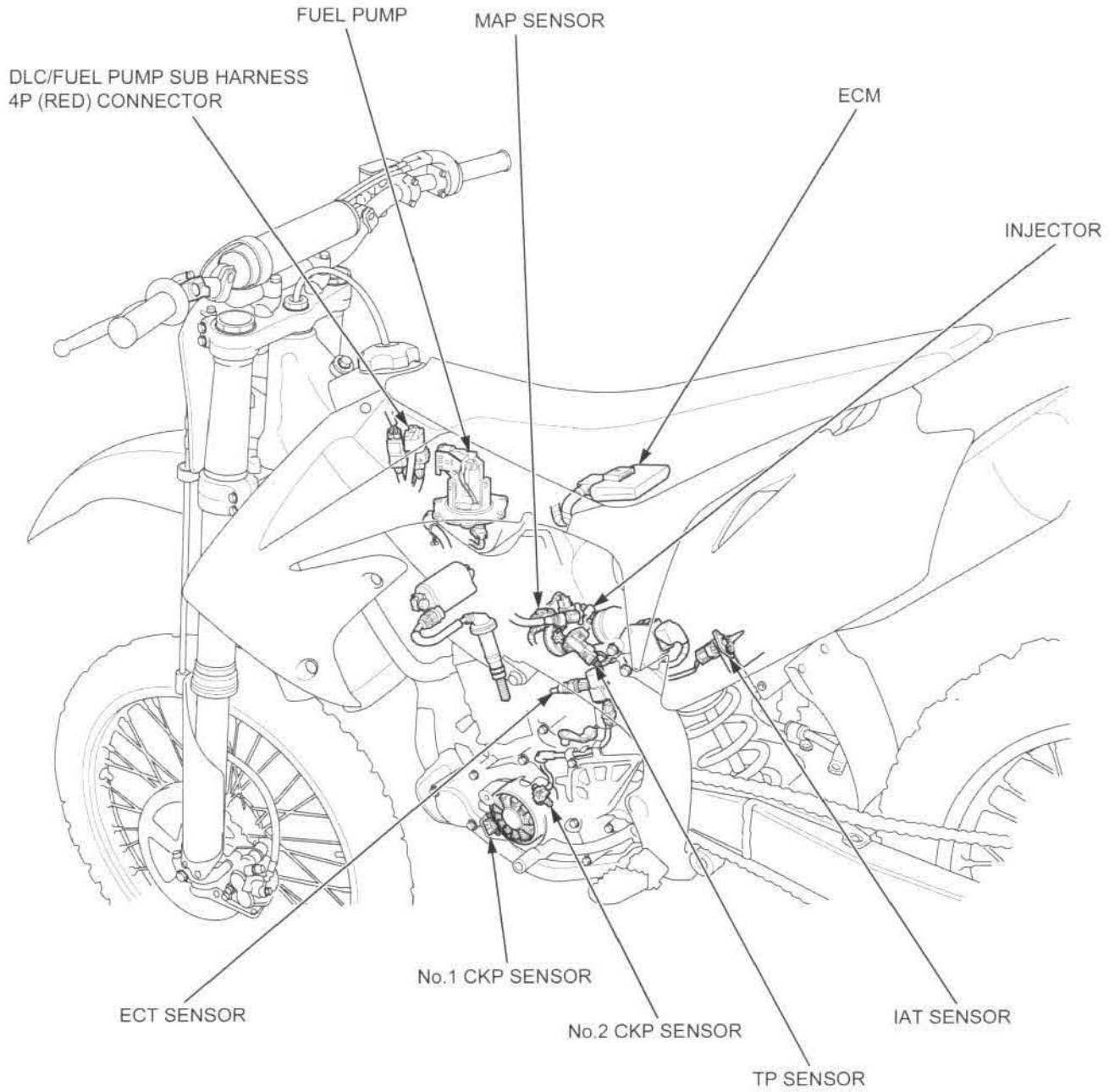
### PGM-FI SYMPTOM TROUBLESHOOTING

When the motorcycle has one of these symptoms, check the DTC or MIL blinking, refer to the DTC index (page 5-15) 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 the 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 engine for more than 10 seconds and check the DTC (page 5-13) and execute the troubleshooting according to the DTC.</li> <li>2. Inspect the fuel line (page 3-6).</li> <li>3. Inspect the ignition system (page 16-5).</li> </ol>	<ul style="list-style-type: none"> <li>• No fuel to injector               <ul style="list-style-type: none"> <li>– Clogged fuel strainer</li> <li>– Restricted fuel hose</li> <li>– Restricted fuel tank breather 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 injector</li> </ul>
Engine cranks but won't start (No fuel pump operation sound when the engine is cranking)	<ol style="list-style-type: none"> <li>1. ECM power/ground circuits malfunction (page 5-58)</li> <li>2. Inspect the fuel supply system (page 5-30).</li> </ol>	Faulty engine stop switch or related circuit
Engine stalls, hard to start, rough idling	<ol style="list-style-type: none"> <li>1. Inspect the idle speed.</li> <li>2. Inspect the fast idle knob.</li> <li>3. Inspect the fuel line (page 3-6).</li> <li>4. Inspect the regulator/rectifier (page 16-11).</li> <li>5. Inspect the condenser (page 16-16).</li> <li>6. Inspect the ignition system (page 16-5).</li> </ol>	<ul style="list-style-type: none"> <li>• Restricted fuel hose</li> <li>• Contaminated/deteriorated fuel</li> <li>• Intake air leak</li> <li>• Restricted fuel tank breather hose</li> <li>• Clogged fuel strainer</li> </ul>
Afterburn when engine braking is used	Inspect the ignition system (page 16-5).	
Backfiring or misfiring during acceleration	Inspect the ignition system (page 16-5).	
Poor performance (driveability) and poor fuel economy	<ol style="list-style-type: none"> <li>1. Inspect the fuel line (page 3-6).</li> <li>2. Inspect the air cleaner element (page 3-8).</li> <li>3. Inspect the ignition system (page 16-5).</li> </ol>	<ul style="list-style-type: none"> <li>• Restricted fuel hose</li> <li>• Restricted fuel tank breather hose</li> <li>• Clogged fuel strainer</li> <li>• Faulty pressure regulator in the fuel pump</li> <li>• Faulty injector</li> <li>• Faulty MAP sensor</li> <li>• Restricted MAP sensor hose</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. Inspect the idle speed.</li> <li>2. Inspect the fuel line (page 3-6).</li> <li>3. Inspect the ignition system (page 16-5).</li> </ol>	<ul style="list-style-type: none"> <li>• Restricted fuel hose</li> <li>• Restricted fuel tank breather hose</li> <li>• Restricted fast idle knob circuit</li> <li>• Clogged fuel strainer</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. Inspect the idle speed.</li> <li>2. Inspect the throttle operation and freeplay</li> <li>3. Inspect the air cleaner element (page 3-8).</li> <li>4. Inspect the fast idle knob (page 5-54).</li> </ol>	<ul style="list-style-type: none"> <li>• Intake air leak</li> <li>• Engine top end problem</li> </ul>
MIL never comes ON at all	Inspect the MIL circuit (page 5-29).	
MIL stays ON (No DTC set)	<ol style="list-style-type: none"> <li>1. Inspect the DLC circuit (page 5-29).</li> <li>2. Inspect the MIL circuit (page 5-29).</li> </ol>	

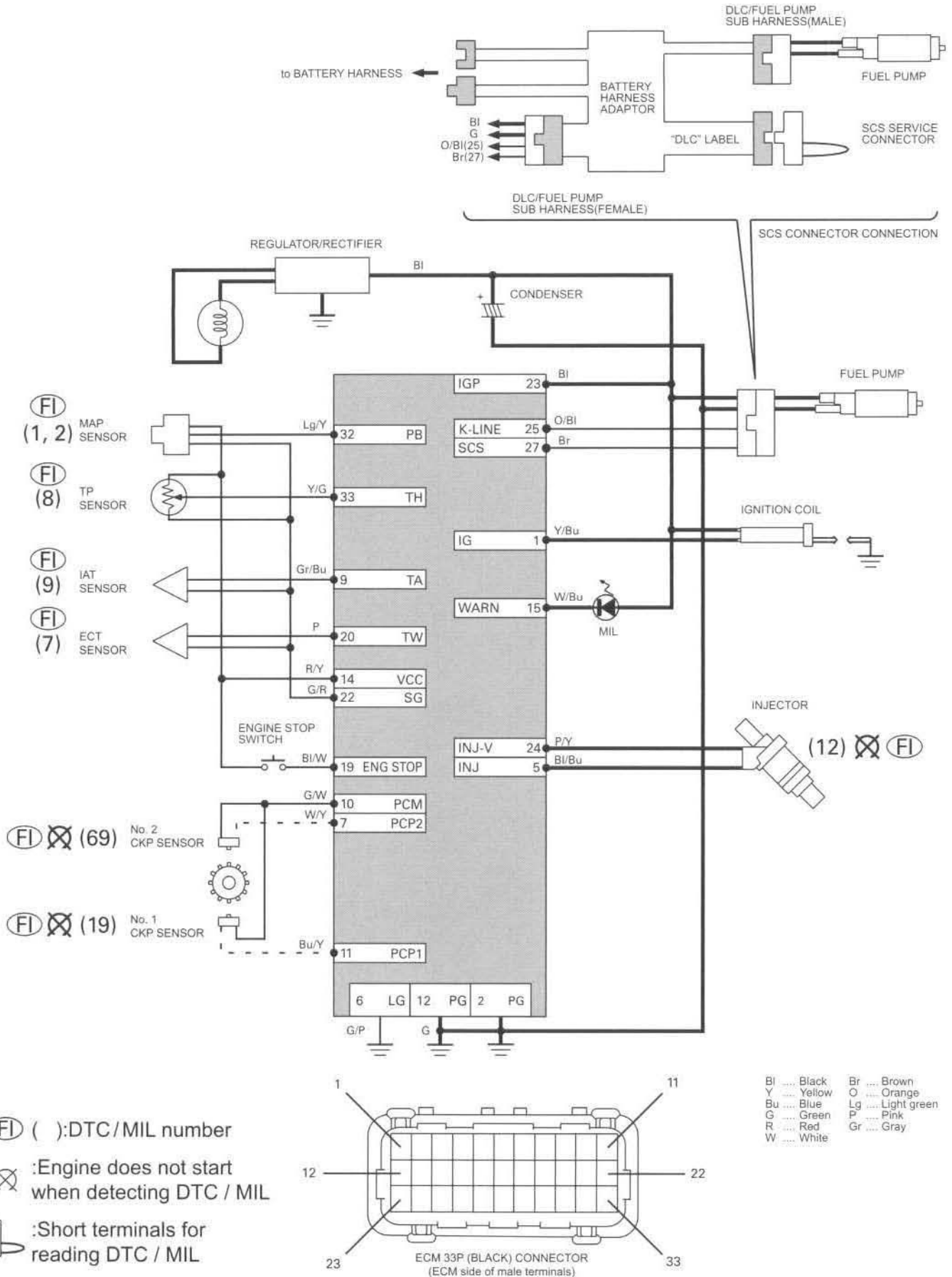
# PGM-FI SYSTEM LOCATION

\*10 shown:

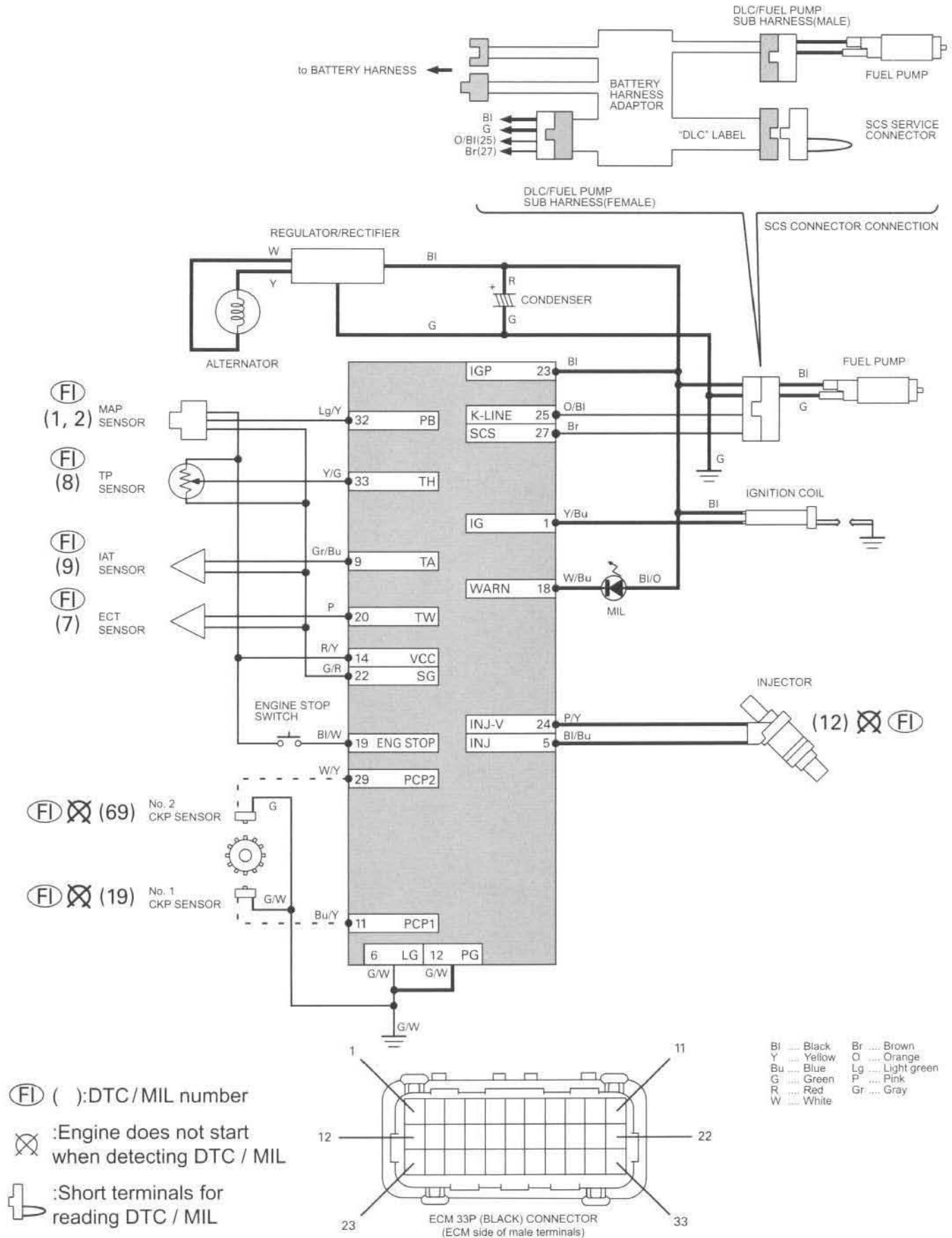


# FUEL SYSTEM (PGM-FI)

## PGM-FI SYSTEM DIAGRAM ('10 - '12)



PGM-FI SYSTEM DIAGRAM (After '12)





# FUEL SYSTEM (PGM-FI)

## CONNECTOR LOCATION

NOTE 1: Hang the fuel tank to the left side of the frame (page 3-6).

NOTE 2: Remove the left side cover (page 2-3).

NOTE 3: Remove the sub-frame (page 2-6).

'10 shown:



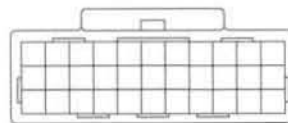
DLC/FUEL PUMP SUB  
HARNESS 4P (RED)  
CONNECTOR



MAP SENSOR 3P (BLACK)  
CONNECTOR (NOTE 1)



INJECTOR 2P (GRAY)  
CONNECTOR (NOTE 1)



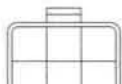
ECM 33P (BLACK)  
CONNECTOR (NOTE 1)



TP SENSOR 3P (BLUE)  
CONNECTOR (NOTE 3)



ECT SENSOR 2P (BLACK)  
CONNECTOR



ALTERNATOR/CKP SENSOR 6P  
(BLACK) CONNECTOR

'10 - '12:

IAT SENSOR 2P (GRAY)  
CONNECTOR (NOTE 2)



After '12:

IAT SENSOR 2P (BLACK)  
CONNECTOR (NOTE 2)



# 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 mean something may work, but not the way it's supposed to.

### If the MIL has come on

Refer to DTC READOUT (page 5-13).

### 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 5-6).

## SYSTEM DESCRIPTION

### SELF-DIAGNOSIS SYSTEM

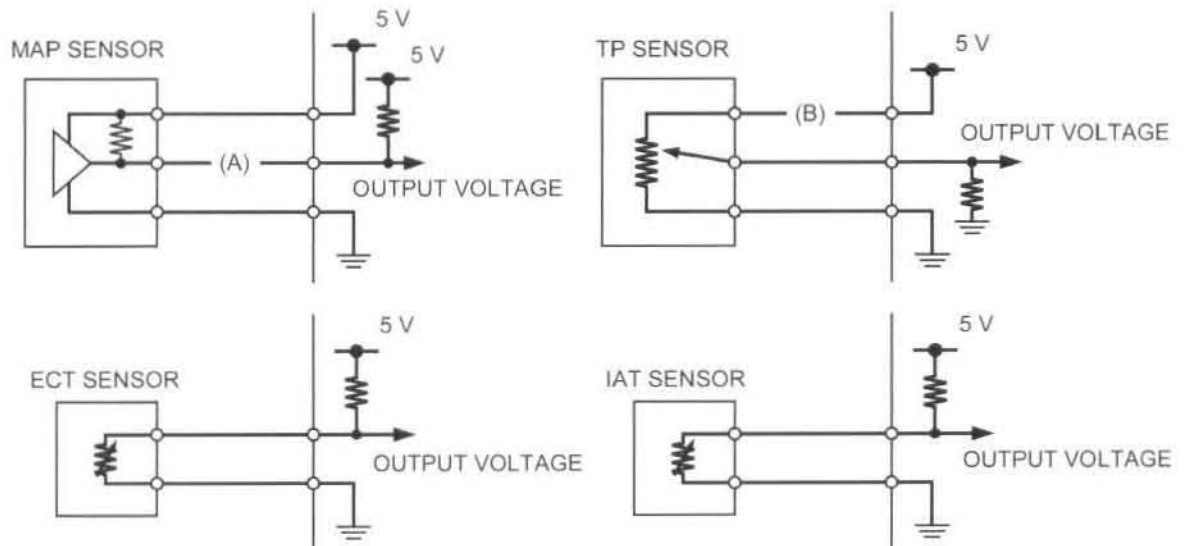
The PGM-FI system is equipped with the self-diagnostic system. When any abnormality occurs in the system, the ECM turns on the MIL and stores a DTC in its erasable memory.

### 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 values in the simulated program map. When any abnormality is detected in the injector and/or CKP sensor, the fail-safe function stops the engine to protect it from damage.

### DTC (Diagnostic Trouble Code)

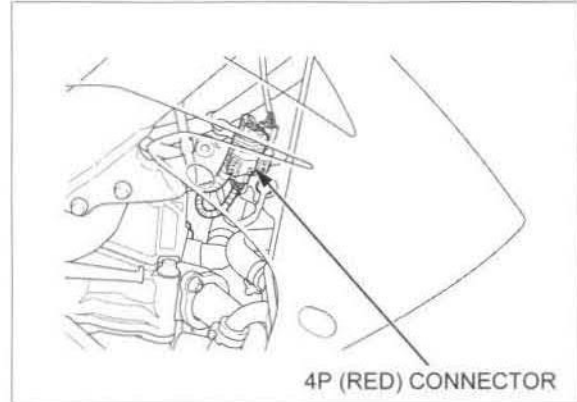
- The DTC is composed of a main code and a sub code and it is displayed as a hyphenated number when retrieved from the ECM with the HDS pocket tester.
  - The digits in front of the hyphen are the main code, they indicate the component of function failure.
  - The digits behind the hyphen are the sub 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 output 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.



## FUEL SYSTEM (PGM-FI)

### BATTERY HARNESS CONNECTING/OPERATION

Disconnect the DLC/fuel pump sub harness 4P (Red) connector.



Connect the battery harness adaptor to the DLC/fuel pump sub harness 4P (Red) connectors.

**TOOL:**

**Battery harness adaptor**      070MZ-KRN0100 or  
070MZ-KRNA100  
(U.S.A. only)

Connect the battery harness to the battery harness adaptor as shown.

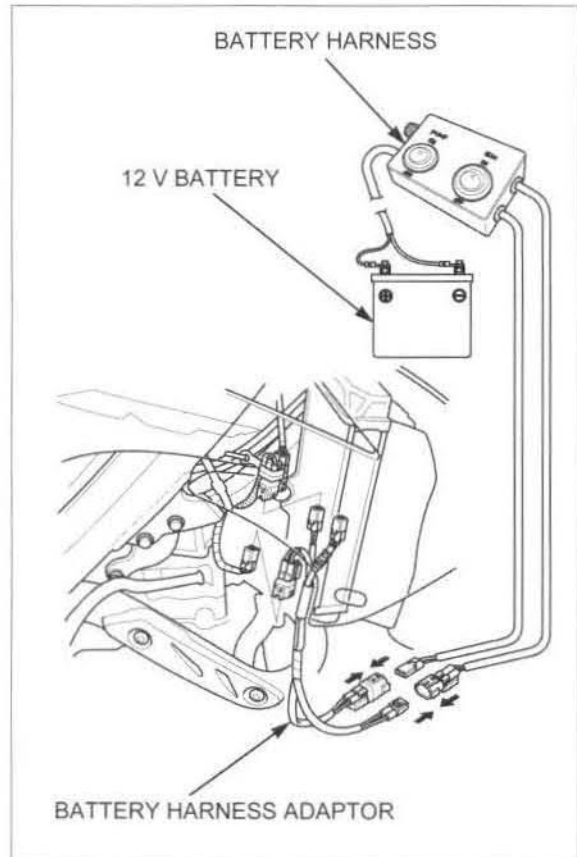
**TOOL:**

**Battery harness**                070MZ-MEN0100 or  
070MZ-MENA100  
(U.S.A. only)

Connect the battery harness positive (+) cable and battery harness (-) cable to the 12 V battery.

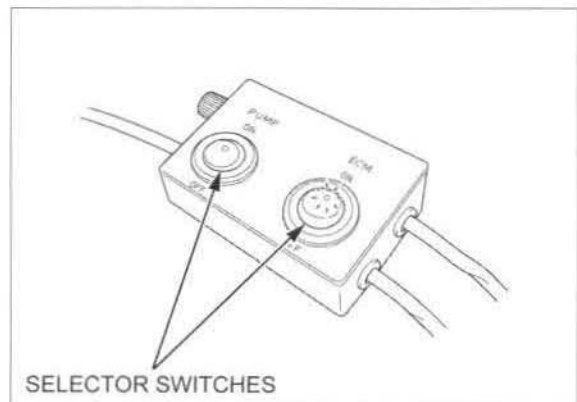
**NOTE:**

Before connecting the battery harness cables to the 12 V battery, make sure the battery harness selector switches are OFF.



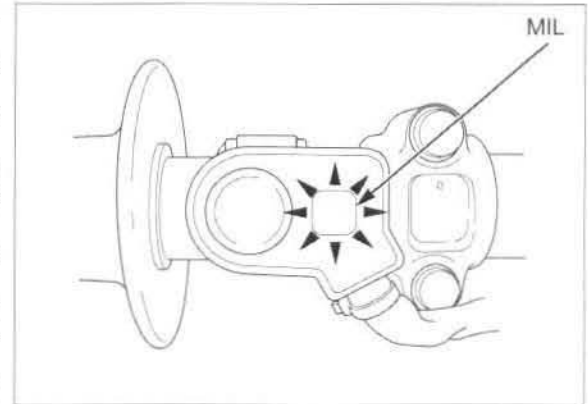
Select the power delivery by operating the selector switches as follows:

- "ECM" selector switch ON: Power to ECM only
- "PUMP" selector switch ON: Power to fuel pump only
- Both selector switches ON: Power to ECM and fuel pump



**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 to 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 running the engine or connecting the 12 V battery to the fuel pump sub harness ("ECM" selector switch is ON) (page 5-12). The MIL will stay ON when the engine speed is over 4,000 (After '10: 5,500) rpm.
- The MIL has two types of blinks, a long blink and short blink. The long blinking lasts for 1.2 seconds, the short blinking lasts for 0.4 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 starting the engine, the MIL will stay on for 2 seconds, then go off. If the MIL does not come on, inspect the MIL circuit (page 5-29).

**CURRENT DTC/FREEZE DTC**

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

- In the case that the ECM detects a problem at present, the MIL will come on and will start blinking the DTC when running the engine or connecting the 12 V battery to the fuel pump sub harness ("ECM" selector switch is ON) (page 5-12).
- In the case that the ECM does not detect any problem at present but has a problem stored in its memory, the MIL will not light and blink. To retrieve the past problem code, readout the freeze DTC by following the DTC readout procedure.

**HDS POCKET TESTER INFORMATION**

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

**How to connect the HDS Pocket Tester**

Stop the engine.

Connect the 12V battery ("ECM" selector switch is ON) (page 5-12).

Connect the HDS pocket tester to the DLC labeled connector of the battery harness adaptor.

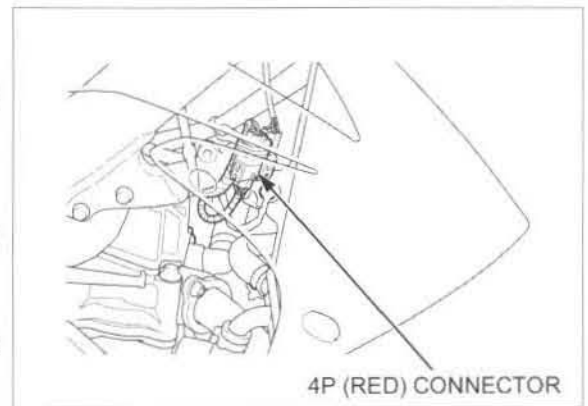
Start the engine, check the DTC and freeze data.

**NOTE:**

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

**ECM reset**

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



**DTC READOUT**

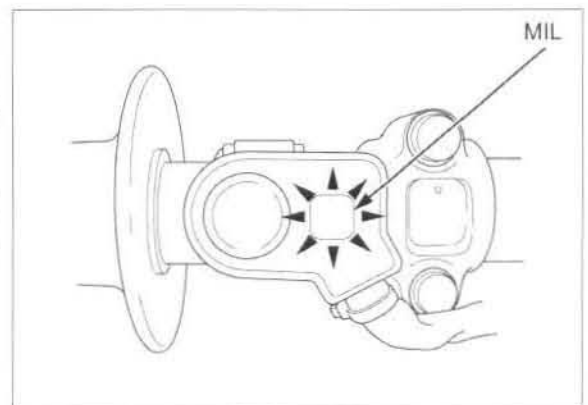
Start the engine and check the MIL.

**NOTE:**

- When starting the engine, the MIL will stay on for 2 seconds, then go off.
- If the engine can not be started, connect the 12 V battery to the fuel pump sub harness ("ECM" selector switch is ON) (page 5-12).

If the MIL stays on or blinks, connect the HDS Pocket Tester to the DLC, read the DTC, freeze data and follow the troubleshooting index (page 5-15).

To read the DTC with the MIL blinking, refer to "Reading DTC with the MIL" (page 5-14).



## FUEL SYSTEM (PGM-FI)

### Reading DTC with the MIL

Stop the engine.

Connect the 12V battery ("ECM" selector switch is ON) (page 5-12).

Short the DLC terminals of the battery harness adaptor ("DLC" labeled connector) using the special tool.

**Connection: Brown – Green**

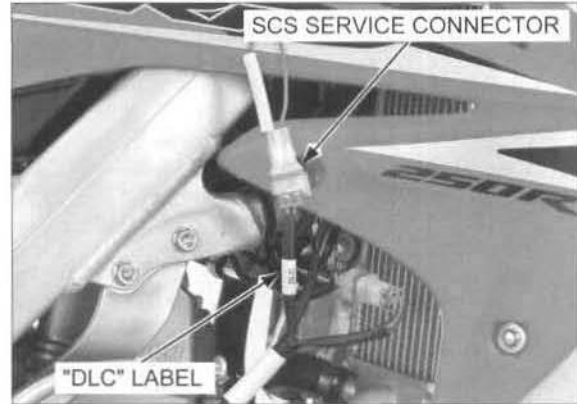
#### TOOL:

**SCS service connector**                      070PZ-ZY30100

Turn the "ECM" selector switch ON, note the MIL blinks, and refer to the troubleshooting index (page 5-15).

#### NOTE:

- If the engine can not be started, connect the 12 V battery to the fuel pump sub harness ("ECM" selector switch is ON) (page 5-12).
- If the ECM has any DTC in its memory, the MIL will start blinking.



### ERASING DTC

#### NOTE:

Start the erasing procedure with the engine stopped.

Connect the HDS Pocket Tester to the battery harness adaptor ("DLC" labeled connector) (page 5-13).

Erase the DTC with the HDS.

To erase the DTC without HDS, use the following procedure.

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

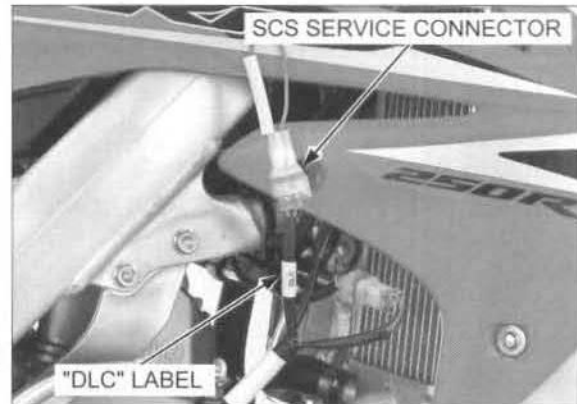
1. Connect the 12V battery (page 5-12).
2. Short the DLC terminals of the battery harness adaptor ("DLC" labeled connector) using the special tool.

**Connection: Brown – Green**

#### TOOL:

**SCS service connector**                      070PZ-ZY30100

3. Turn the "ECM" selector switch ON.
4. Remove the special tool from the DLC labeled connector.
5. The MIL will light for approximately 5 seconds. While the MIL lights, short the DLC terminals again with the special tool. The self-diagnostic memory is erased if the MIL goes off and starts blinking.



#### NOTE:

- The DLC must be jumped while the MIL is illuminated. If not, the MIL will not start blinking.
- Note that the self-diagnostic memory cannot be erased if the engine stop switch is pushed or 12 V battery is disconnected before the MIL starts blinking.

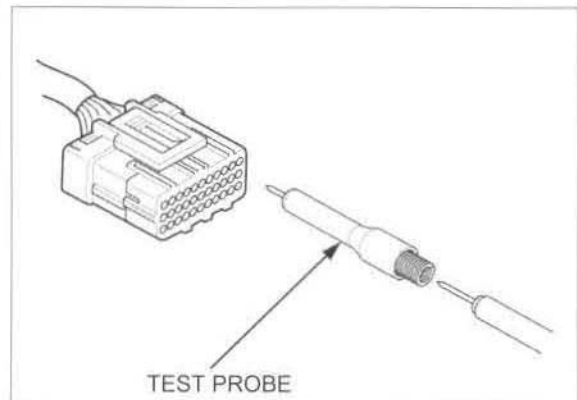
### CIRCUIT INSPECTION

#### INSPECTION AT ECM CONNECTOR

- Always clean around and keep any foreign material away from the ECM connector before disconnecting it.
- A faulty PGM-FI system is often related to poorly connected or corroded connections. Check all related connections before proceeding.
- In testing at ECM 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



DTC INDEX

DTC (MIL blinks)	Function Failure	Symptom/Fail-safe function	Refer to (DTC)
1-1 (1)	MAP sensor circuit low voltage (less than 0.2 V) • MAP sensor or its circuit malfunction	• Engine operates normally • Pre-programmed value: – '10: 68.04 kPa (510.73 mmHg) – After '10: 74.84 kPa (561.78 mmHg)	5-16
1-2 (1)	MAP sensor circuit high voltage (more than 3.9 V) • Loose or poor contact of the MAP sensor connector • MAP sensor or its circuit malfunction	• Engine operates normally • Pre-programmed value: – '10: 68.04 kPa (510.73 mmHg) – After '10: 74.84 kPa (561.78 mmHg)	5-17
2-1 (2)	MAP sensor performance problem • Loose or poor connection of the MAP sensor vacuum hose • MAP sensor malfunction	• Engine operates normally	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-programmed value: – '10: 90°C/194°F – After '10: 50°C/122°F	5-19
7-2 (7)	ECT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the ECT sensor connector • ECT sensor or its circuit malfunction	• Hard start at a low temperature • Pre-programmed value: – '10: 90°C/194°F – After '10: 50°C/122°F	5-20
8-1 (8)	TP sensor circuit low voltage (less than 0.3 V) • Loose or poor contact of the TP sensor connector • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-programmed value: 0°	5-21
8-2 (8)	TP sensor circuit high voltage (more than 4.93 V) • TP sensor or its circuit malfunction	• Poor engine acceleration • Pre-programmed value: 0°	5-23
9-1 (9)	IAT sensor circuit low voltage (less than 0.07 V) • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-programmed value: 34.8°C/95°F	5-23
9-2 (9)	IAT sensor circuit high voltage (more than 4.93 V) • Loose or poor contact of the IAT sensor connector • IAT sensor or its circuit malfunction	• Engine operates normally • Pre-programmed value: 34.8°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 • Injectors, fuel pump and ignition shut down	5-25
19-1 (19)	No.1 CKP sensor no signal • Loose or poor contact of the CKP sensor connector • CKP sensor or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-27
33-2 (-)	ECM EEPROM malfunction	• Engine operates normally	5-29
69-1 (69)	No. 2 CKP sensor no signal • Loose or poor contact of the CKP sensor connector • CKP sensor or its circuit malfunction	• Engine does not start • Injectors, fuel pump and ignition shut down	5-28



## DTC TROUBLESHOOTING

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

#### 1. MAP Sensor System Inspection

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).  
Check the MAP sensor with the HDS.

*Is about 0 V indicated?*

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

#### 2. MAP Sensor Input Voltage Inspection

Turn the "ECM" selector switch OFF.  
Disconnect the MAP sensor 3P (Black) connector.

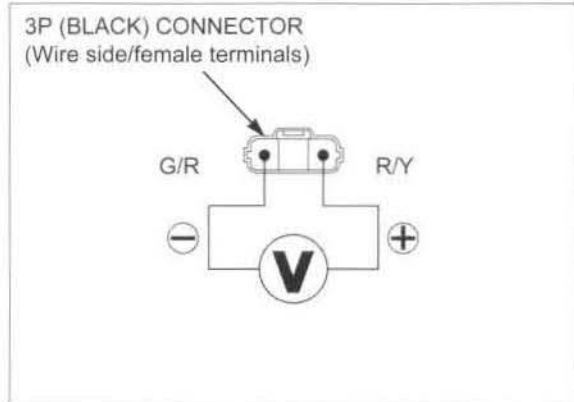
Turn the "ECM" selector switch ON.  
Measure the voltage at the wire side.

**Connection: Red/yellow (+) – Green/red (–)**

*Is the voltage within 4.75 – 5.25 V?*

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.



#### 3. MAP Sensor Input Line Inspection

Turn the "ECM" selector switch OFF.  
Disconnect the ECM 33P (Black) connector.

Check for continuity at the Red/yellow wire between the MAP sensor 3P (Black) connector and ECM 33P (Black) connector.

**Connection: 14 – Red/yellow**

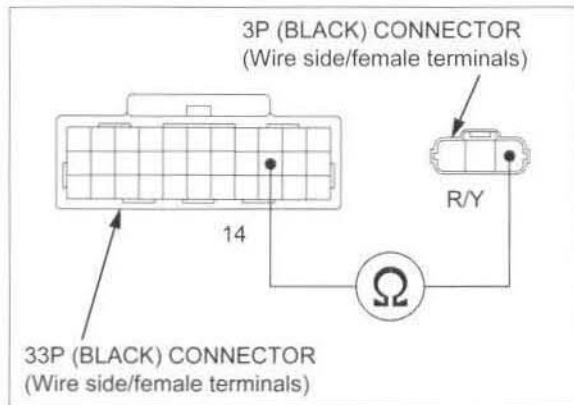
**TOOL:**

**Test probe** 07ZAJ-RDJA110

*Is there continuity?*

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

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



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

Turn the "ECM" selector switch OFF.

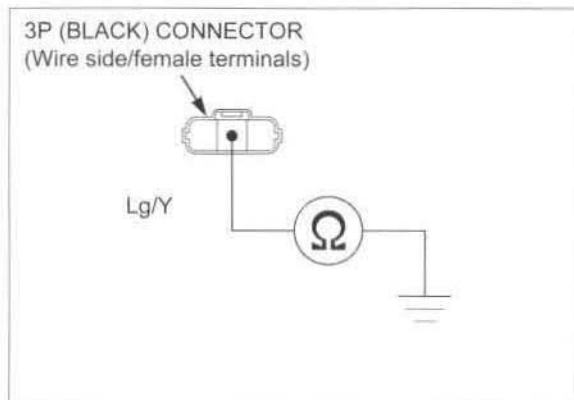
Check for continuity between the MAP sensor 3P (Black) connector at the wire side and ground.

**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**

Connect the ECM 33P (Black) connector.  
 Replace the MAP sensor with a known good one (page 5-55).  
 Erase the DTC's (page 5-14).  
 Turn the "ECM" selector switch ON.  
 Check the MAP sensor with the HDS.

**Is DTC 1-1 indicated?**

- YES** – Replace the ECM with a known good one, and recheck.
- NO** – Faulty original MAP sensor

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

- Before starting the inspection, check for loose or poor contact on the MAP sensor 3P (Black) connector and ECM 33P connector, then recheck the DTC.

**1. MAP Sensor System Inspection 1**

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).  
 Check the MAP sensor with the HDS.

**Is about 5 V indicated?**

- YES** – GO TO STEP 2.
- NO** – Intermittent failure

**2. MAP Sensor System Inspection 2**

Turn the "ECM" selector switch OFF.  
 Disconnect the MAP sensor 3P (Black) connector.  
 Connect the MAP sensor 3P (Black) connector terminals at the wire side with a jumper wire.  
**Connection: Light green/yellow – Green/red**

Turn the "ECM" selector switch ON.  
 Check the MAP sensor with the HDS.

**Is about 0 V indicated?**

- YES** – Faulty MAP sensor
- NO** – GO TO STEP 3.

**3. MAP Sensor Input Voltage Inspection**

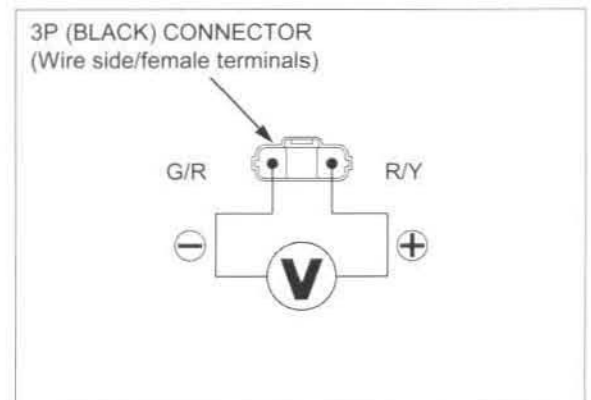
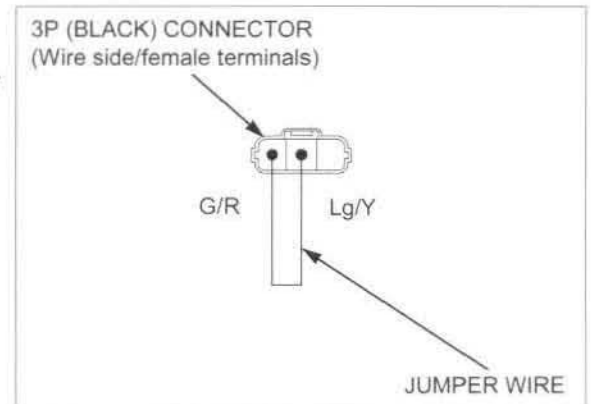
Turn the "ECM" selector switch OFF.  
 Remove the jumper wire.

Turn the "ECM" selector switch ON.  
 Measure the voltage at the wire side.

**Connection: Red/yellow (+) – Green/red (-)**

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

- YES** – GO TO STEP 4.
- NO** –
  - Open circuit in Red/yellow wire
  - Open circuit in Green/red wire





## FUEL SYSTEM (PGM-FI)

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

Turn the "ECM" selector switch OFF.

Disconnect the ECM 33P (Black) connector.  
Check for continuity at the Light green/yellow wire between the MAP sensor 3P (Black) connector and ECM 33P (Black) connector.

**Connection: 32 – Light green/yellow**

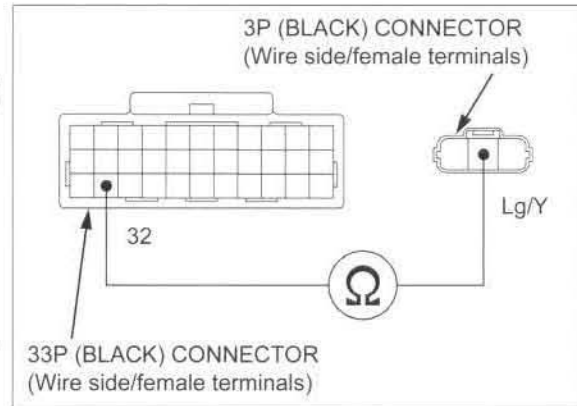
**TOOL:**

**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 2-1 (MAP SENSOR)

#### 1. MAP Sensor System Inspection

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Turn the "ECM" and "PUMP" selector switch ON.

Start the engine.

Check the MAP sensor with the HDS at idle speed.

**Is the reading changed?**

**YES** – Intermittent failure

**NO** – GO TO STEP 2.

#### 2. Manifold Absolute Pressure Test

Stop the engine.

Hang the fuel tank to the left side of the frame (page 3-6).

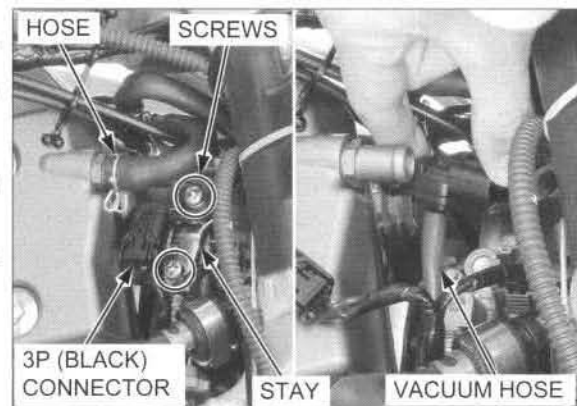
Disconnect the crankcase breather hose and MAP sensor 3P (Black) connector.  
Remove the screws and stay.

Check for connection and installation of the MAP sensor vacuum hose.

**Is the MAP sensor vacuum hose connection correct?**

**YES** – GO TO STEP 3.

**NO** – Correct the hose installation.



#### 3. MAP Sensor System Inspection

Replace the MAP sensor with a known good one (page 5-55).

Start the engine.

Check the MAP sensor with the HDS at idle speed.

**Is the reading changed?**

**YES** – Faulty original MAP sensor

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

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

**1. ECT Sensor System Inspection**

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Check the ECT sensor with the HDS.

**Is about 0 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. ECT Sensor Inspection**

Turn the "ECM" selector switch OFF.  
Disconnect the ECT sensor 2P (Black) connector.

Turn the "ECM" selector switch ON.  
Check the ECT sensor with the HDS.

**Is about 0 V indicated?**

**YES** – GO TO STEP 4.

**NO** – GO TO STEP 3.

**3. ECT Sensor Resistance Inspection**

Turn the "ECM" selector switch OFF.

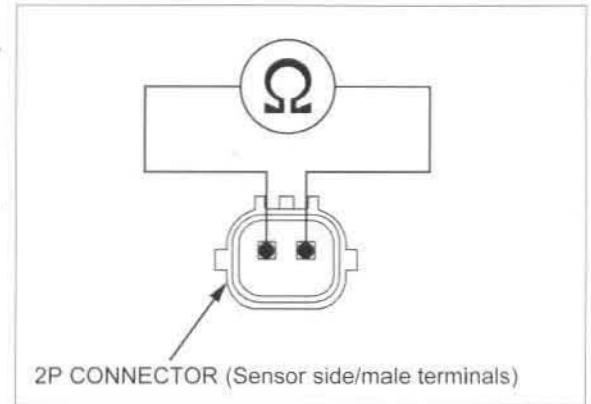
Measure the resistance at the ECT sensor terminals.

**Standard: 2.3 – 2.6 kΩ (20°C/68°F)**

**Is the resistance within 2.3 – 2.6 kΩ?**

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

**NO** – Faulty ECT sensor



**4. ECT Sensor Output Line Short Circuit Inspection**

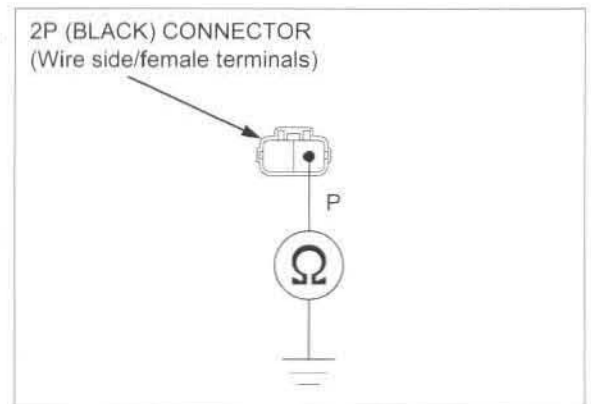
Turn the "ECM" selector switch OFF.  
Check for continuity between the ECT sensor 2P (Black) connector at the wire side and ground.

**Connection: Pink – Ground**

**Is there continuity?**

**YES** – Short circuit in Pink 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 2P (Black) connector and ECM 33P connector, then recheck the DTC.

**1. ECT Sensor System Inspection**

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Check the ECT sensor with the HDS.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. ECT Sensor Inspection**

Turn the "ECM" selector switch OFF.

Disconnect the ECT sensor 2P (Black) connector. Connect the ECT sensor 2P (Black) connector terminals with a jumper wire.

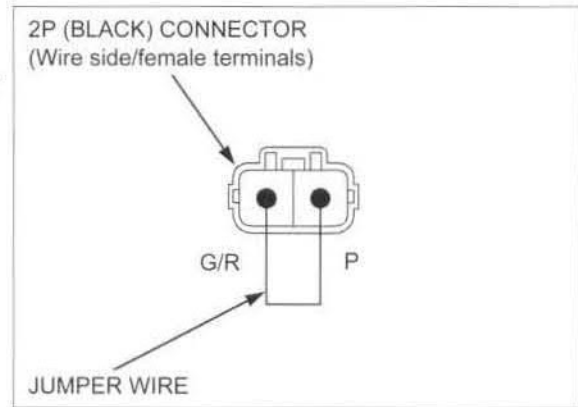
**Connection: Pink – Green/red**

Turn the "ECM" selector switch ON. Check the ECT sensor with the HDS.

**Is about 0 V indicated?**

**YES** – Inspect the ECT sensor (page 5-57).

**NO** – GO TO STEP 3.



**3. ECT Sensor Open Circuit Inspection**

Turn the "ECM" selector switch OFF. Remove the jumper wire.

Disconnect the ECM 33P (Black) connector. Check for continuity between the ECT sensor 2P (Black) and ECM 33P (Black) connectors.

**Connection: 20 – Pink**  
**22 – Green/red**

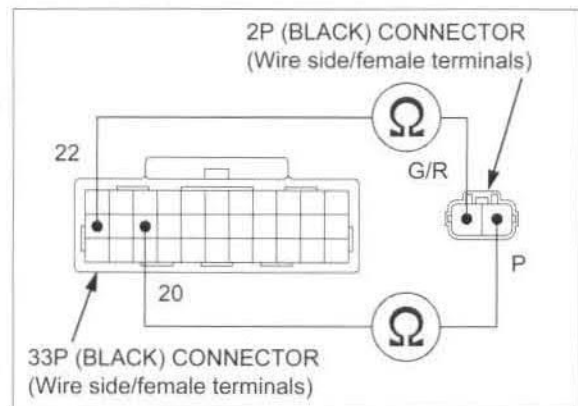
**TOOL:**

**Test probe** 07ZAJ-RDJA110

**Is there continuity?**

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

- NO** –
- Open circuit in Pink wire
  - Open circuit in Green/red wire



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

- Before starting the inspection, check for loose or poor contact on the TP sensor 3P (Blue) connector and ECM 33P connector, then recheck the DTC.

**1. TP Sensor System Inspection**

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Check the TP sensor with the HDS when the throttle is fully closed.

**Is about 0 V indicated?**

**YES** – GO TO STEP 3.

**NO** – GO TO STEP 2.

**2. TP Sensor Inspection**

Check that the TP sensor voltage increases continuously when moving the throttle from fully closed to fully opened using the data list menu of the HDS.

**Does the voltage increase continuously?**

**YES** – Intermittent failure

**NO** – Faulty TP sensor

**3. TP Sensor Input Voltage Inspection**

Turn the "ECM" selector switch OFF.  
Disconnect the TP sensor 3P (Blue) connector.

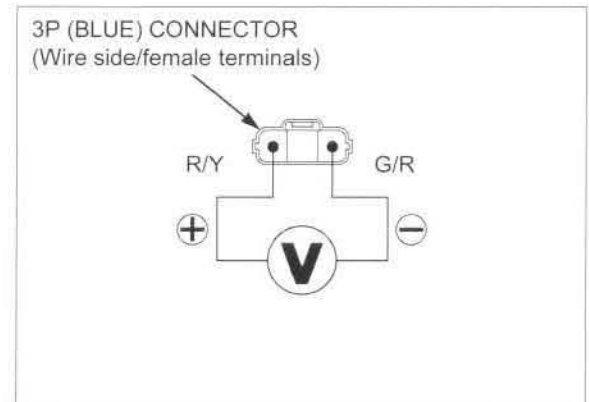
Turn the "ECM" selector switch ON.  
Measure the voltage at the wire side.

**Connection: Red/yellow (+) – Green/red (-)**

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

**YES** – GO TO STEP 5.

**NO** – GO TO STEP 4.



**4. TP Sensor Circuit Inspection**

Turn the "ECM" selector switch OFF.  
Disconnect the ECM 33P (Black) connector.  
Check for continuity at the Red/yellow wire between the TP sensor 3P (Blue) connector and ECM 33P (Black) connector.

**Connection: 14 – Red/yellow**

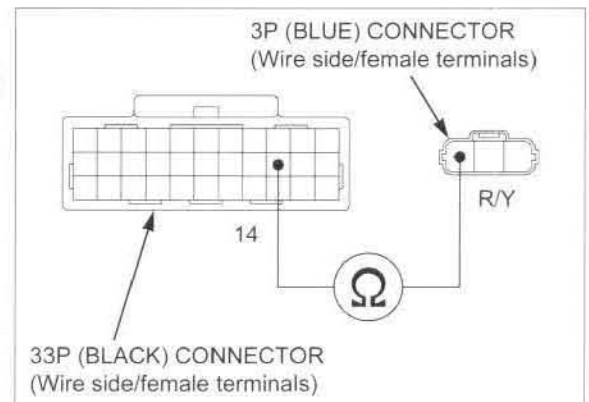
**TOOL:**

**Test probe 07ZAJ-RDJA110**

**Is there continuity?**

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

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



## FUEL SYSTEM (PGM-FI)

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

Turn the "ECM" selector switch OFF.

Disconnect the ECM 33P (Black) connector.  
Check for continuity at the Yellow/green wire between the TP sensor 3P (Blue) connector and ECM 33P (Black) connector.

**Connection: 33 – Yellow/green**

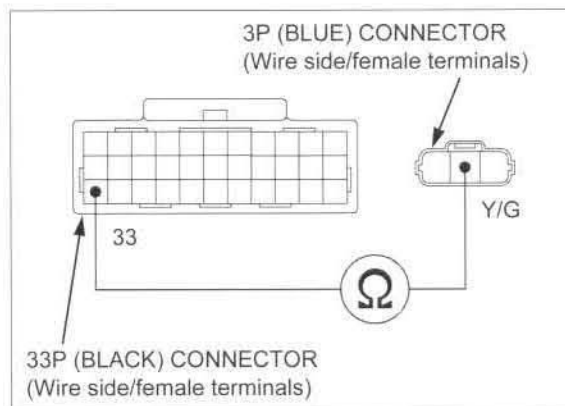
**TOOL:**

Test probe 07ZAJ-RDJA110

*Is there continuity?*

**YES** – GO TO STEP 6.

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



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

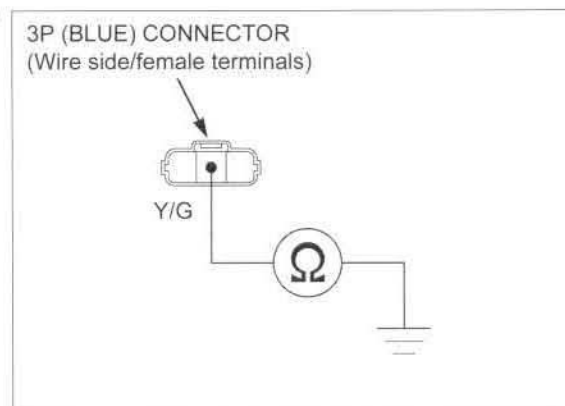
Check for continuity between the TP sensor 3P (Blue) connector of the wire side and ground.

**Connection: Yellow/green – Ground**

*Is there continuity?*

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

**NO** – GO TO STEP 7.



### 7. TP Sensor Inspection

Replace the throttle body with a known good one (page 5-49).

Erase the DTC's (page 5-14).

Turn the "ECM" selector switch ON.

Check the TP sensor with the HDS.

*Is DTC 8-1 indicated?*

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

**NO** – Faulty original throttle body (TP sensor)

**DTC 8-2 (TP SENSOR HIGH VOLTAGE)****1. TP Sensor System Inspection**

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Check the TP sensor with the HDS.

**Is about 5 V indicated?**

**YES** – GO TO STEP 3.

**NO** – GO TO STEP 2.

**2. TP Sensor Inspection 1**

Check that the TP sensor voltage increases continuously when moving the throttle from fully closed to fully opened using the data list menu of the HDS.

**Does the voltage increase continuously?**

**YES** – Intermittent failure

**NO** – Faulty TP sensor

**3. TP Sensor Input Voltage Inspection**

Turn the "ECM" selector switch ON.  
Measure the voltage at the wire side.

**Connection: Red/yellow (+) – Green/red (-)**

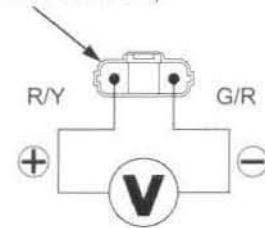
**Is the voltage within 4.75 – 5.25 V?**

**YES** – GO TO STEP 4.

**NO** –

- Open circuit in Green/red wire
- Open circuit in Red/yellow wire

3P (BLUE) CONNECTOR  
(Wire side/female terminals)

**4. TP Sensor Inspection 2**

Replace the throttle body with a known good one (page 5-49).

Erase the DTC's (page 5-14).

Turn the "ECM" selector switch ON.

Check the TP sensor with the HDS.

**Is DTC 8-2 indicated?**

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

**NO** – Faulty original throttle body (TP sensor)

**DTC 9-1 (IAT SENSOR LOW VOLTAGE)****1. IAT Sensor System Inspection**

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Check the IAT sensor with the HDS.

**Is about 0 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

## FUEL SYSTEM (PGM-FI)

### 2. IAT Sensor Inspection

Turn the "ECM" selector switch OFF.  
Disconnect the IAT sensor 2P connector.

Turn the "ECM" selector switch ON.  
Check the IAT sensor with the HDS.

**Is about 0 V indicated?**

**YES** – GO TO STEP 3.

**NO** – Faulty IAT sensor

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

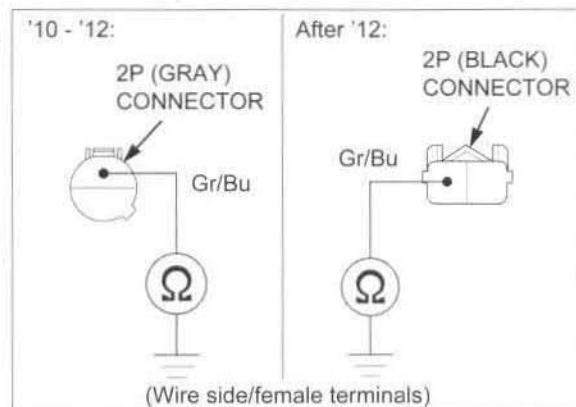
Turn the "ECM" selector switch OFF.  
Check for continuity between the IAT sensor 2P connector at the wire side and ground.

**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)

- Before starting the inspection, check for loose or poor contact on the IAT sensor 2P connector and ECM 33P connector, then recheck the DTC.

### 1. IAT Sensor System Inspection

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

Check the IAT sensor with the HDS.

**Is about 5 V indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

### 2. IAT Sensor Inspection

Turn the "ECM" selector switch OFF.

Disconnect the IAT sensor 2P connector.  
Connect the IAT sensor 2P connector terminals with a jumper wire.

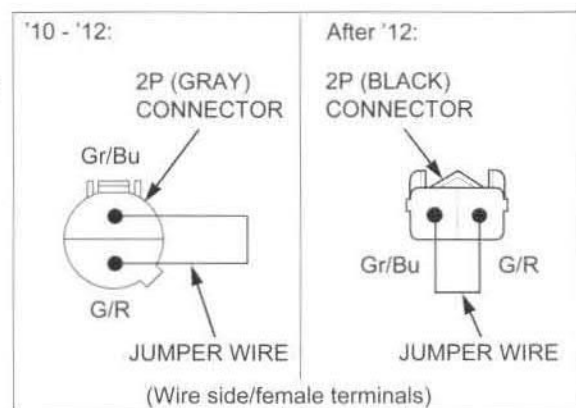
**Connection: Gray/blue – Green/red**

Turn the "ECM" selector switch ON.  
Check the IAT sensor with the HDS.

**Is about 0 V indicated?**

**YES** – Faulty IAT sensor

**NO** – GO TO STEP 3.



**3. IAT Sensor Line Inspection**

Turn the "ECM" selector switch OFF.  
 Disconnect the ECM 33P (Black) connector.  
 Check for continuity at the Gray/blue and Green/red wire between the IAT sensor 2P connector and ECM 33P (Black) connector.

**Connection: 9 – Gray/blue**  
**22 – Green/red**

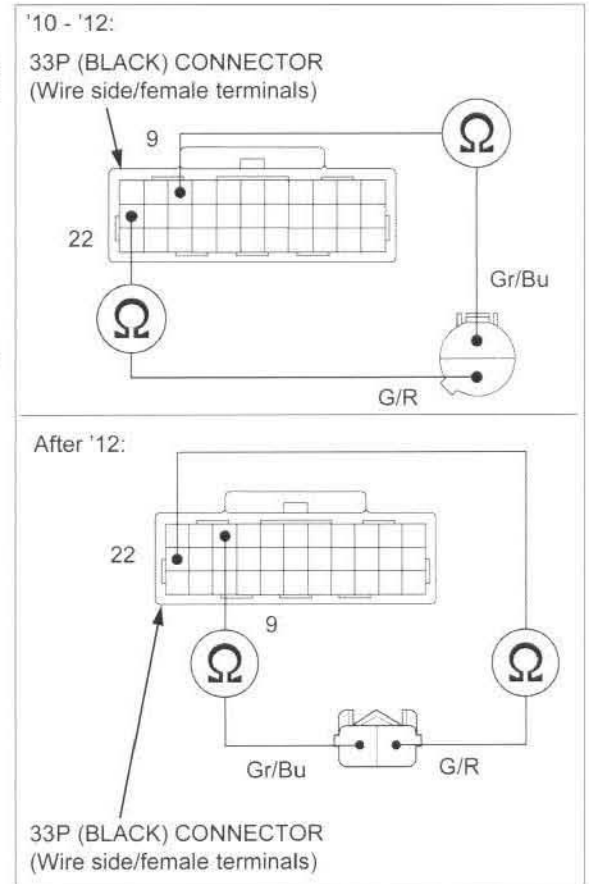
**TOOL:**

**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  
 • Open circuit in Green/red wire



**DTC 12-1 (INJECTOR)**

- Before starting the inspection, check for loose or poor contact on the injector 2P (Gray) connector and ECM 33P (Black) connector, then recheck the DTC.

**1. Injector System Inspection**

Erase the DTC's (page 5-14).  
 Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).  
 Check the injector with the HDS.

**Is DTC 12-1 indicated?**

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. Injector Input Voltage Inspection**

Turn the "ECM" selector switch OFF.

Disconnect the injector 2P (Gray) connector.  
 Turn the "ECM" selector switch ON.

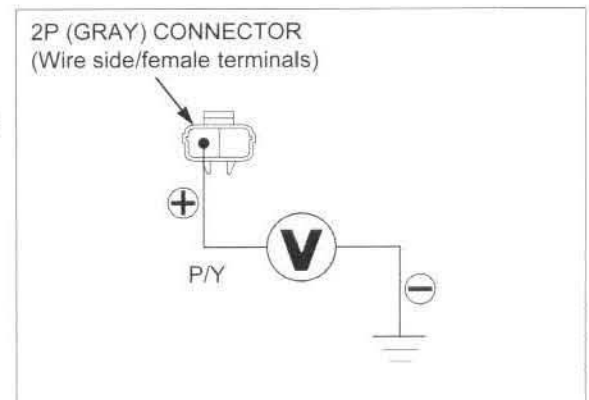
Measure the voltage between the injector 2P (Gray) connector of the wire side and ground.

**Connection: Pink/yellow (+) – Ground (-)**

**Is there battery voltage?**

**YES** – GO TO STEP 3.

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





## FUEL SYSTEM (PGM-FI)

### 3. Injector Resistance Inspection

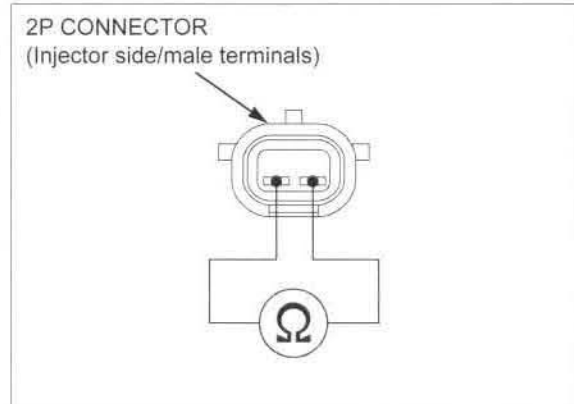
Turn the "ECM" selector switch OFF.

Measure the resistance of the injector 2P connector terminals.

**Is the resistance within 11.6 – 12.4  $\Omega$  (20°C/68°F)?**

**YES** – GO TO STEP 4.

**NO** – Faulty injector



### 4. Injector Signal Line Open Circuit Inspection

Disconnect the ECM 33P (Black) connector. Check for continuity between the ECM 33P (Black) connector and injector 2P (Gray) connector.

**Connection: 5 – Black/blue**

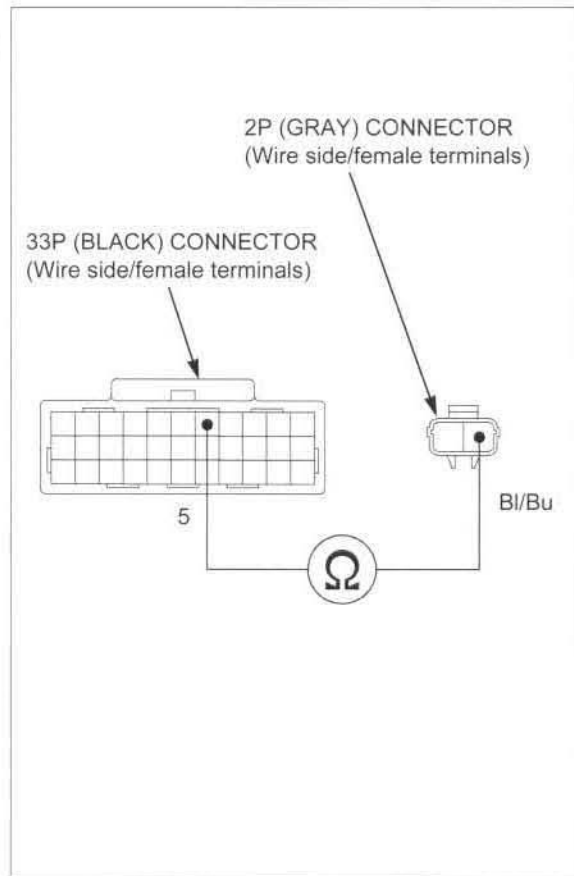
**TOOL:**

**Test probe** 07ZAJ-RDJA110

**Is there continuity?**

**YES** – GO TO STEP 5.

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



### 5. Injector Signal Line Short Circuit Inspection

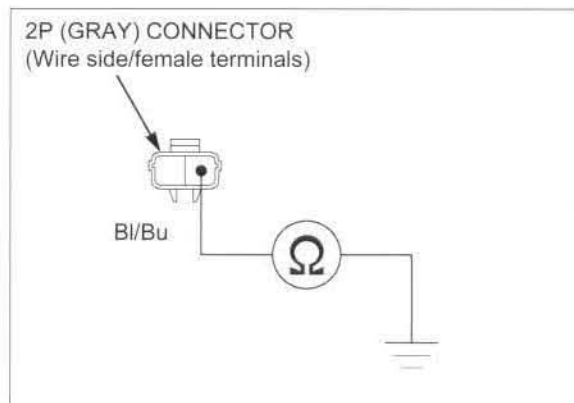
Connect the ECM 33P (Black) connector. Check for continuity between the injector 2P (Gray) connector at the wire side and ground.

**Connection: Black/blue – Ground**

**Is there continuity?**

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

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



**DTC 19-1 (No.1 CKP SENSOR)**

- Before starting the inspection, check for loose or poor contact on the alternator/CKP sensor 6P (Black) connector and ECM 33P connector, then recheck the DTC.

DTC	CKP SENSOR	SIGNAL LINE	GROUND LINE	SIGNAL AT ECM
19-1	No.1 CKP sensor	Blue/yellow	Green/white	11
69-1	No.2 CKP sensor	White/yellow	Green	'10 - '12: 7 After '12: 29

**1. CKP Sensor System Inspection**

Erase the DTC's (page 5-14).  
 Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).  
 Crank the engine and check the CKP sensor with the HDS.

*Is DTC 19-1 indicated?*

**YES** – GO TO STEP 2.

**NO** – Intermittent failure

**2. CKP Sensor Peak Voltage Inspection**

Turn the "ECM" selector switch OFF.  
 Disconnect the alternator/CKP sensor 6P (Black) connector.

Crank the engine and measure the CKP sensor peak voltage at the alternator/CKP sensor 6P (Black) connector.

**Connection: Signal line (+) – Ground line (–)**  
 (Sensor side terminals)

**TOOL:**

IgnitionMate peak voltage tester  
 Peak voltage adaptor

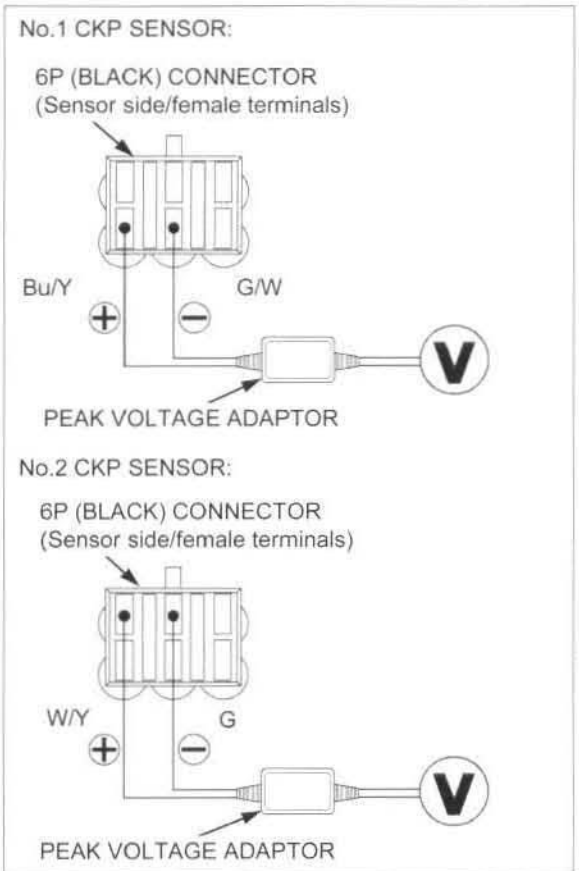
TMNTS91H (U.S.A. only) or  
 07HGJ-0020100 (Not available in U.S.A.)

with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

*Is the voltage more than 0.7 V (20°C/68°F)?*

**YES** – GO TO STEP 3.

**NO** – Faulty CKP sensor



## FUEL SYSTEM (PGM-FI)

### 3. CKP sensor Circuit Inspection

Disconnect the ECM 33P (Black) connector.

Check for continuity at the Blue/yellow, White/yellow and Green/white wire between the alternator/CKP sensor 6P (Black) connector and ECM 33P connector.

#### SIGNAL LINE:

Connection: Signal line – Signal line

#### GROUND LINE:

Connection: '10 - '12: 10 - Ground line  
After '12: Ground line - ground

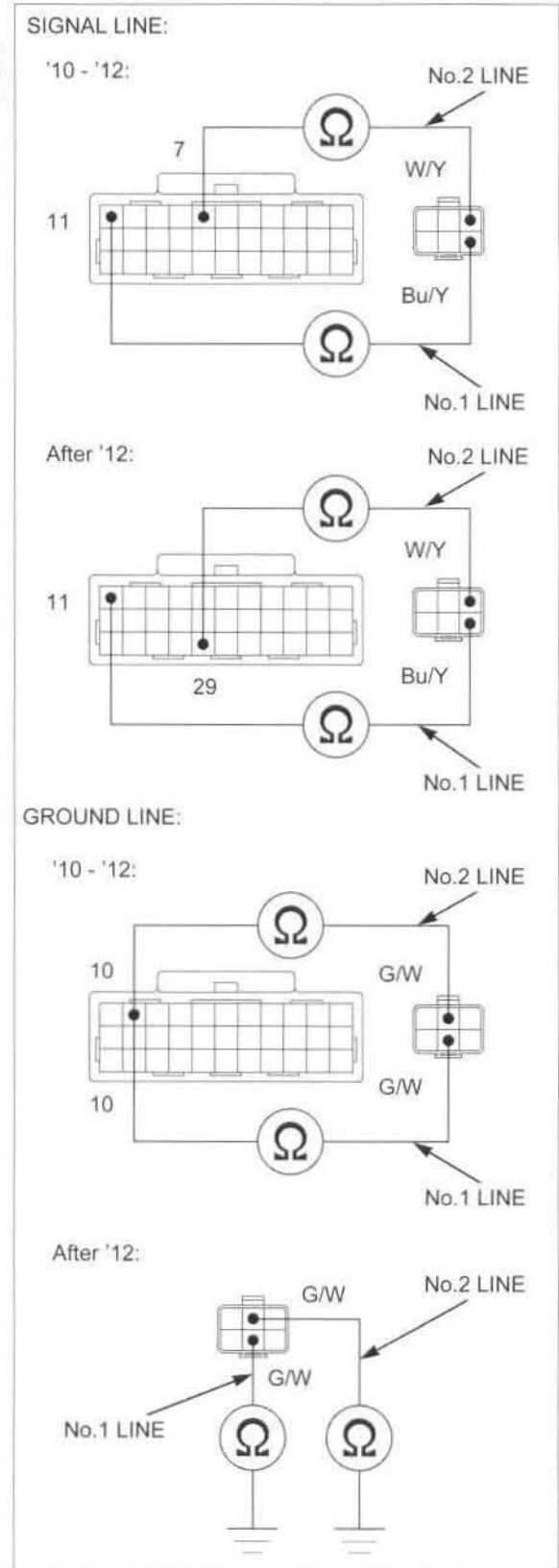
#### TOOL:

Test probe 07ZAJ-RDJA110

Is there continuity?

YES – Short circuit in Signal line

NO – • Open circuit in Signal line  
• Open circuit in Ground line



### DTC 69-1 (No.2 CKP SENSOR)

See page 5-27

### DTC 33-2 (EEPROM)

#### 1. Recheck DTC

Erase the DTC's (page 5-14).  
 Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).  
 Recheck the ECM EEPROM.

#### Is DTC 33-2 indicated?

- YES** – Replace the ECM with a known good one, and recheck.
- NO** – Intermittent failure

## MIL CIRCUIT INSPECTION

### When The Engine Starts But The MIL Does Not Come On

If the engine can be started but the MIL does not come on, check as follows:

- If it does not function, check for loose or poor contact on the engine stop switch 4P (Natural) connector.
- If the connector is connected properly, check as follows:

Stop the engine.  
 Hang the fuel tank to the left side of the frame (page 3-6).  
 Disconnect the ECM 33P (Black) connector.

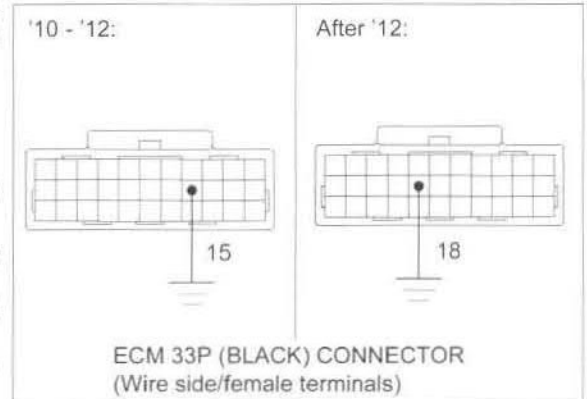


Ground the White/blue ('10 - '12: 15, After '12: 18) wire terminal of the wire harness side connector with a jumper wire.

**TOOL:**  
**Test probe** 07ZAJ-RDJA110

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

- If the MIL comes on, replace the ECM with a known good one, and recheck.
- If the MIL does not come on, check for open circuit in the White/blue wire between the MIL and ECM.  
 If the wire is OK, replace the MIL (Engine stop switch).



### When The Engine Starts But The MIL Does Not Go Off Within A Few Seconds

If the MIL does not go off within a few seconds after the engine has been started, check as follows:

Stop the engine.  
 Disconnect the engine stop switch 4P (Natural) connector.



## FUEL SYSTEM (PGM-FI)

Check for continuity between the engine stop switch 4P (Natural) connector terminal of the wire harness side and ground.

**Connection: White/blue – Ground**

- If there is continuity, check for short circuit in the White/blue wire between the ECM and MIL.
- If there is no continuity, check the DLC circuit as follow:

4P (NATURAL) CONNECTOR  
(Wire side/female terminals)



Connect the engine stop switch 4P (Natural) connector. Disconnect the ECM 33P (Black) connector.

Check for continuity between the ECM 33P (Black) connector of the wire harness side and ground.

**Connection: 27 – Ground**

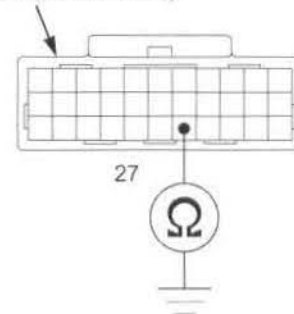
**TOOL:**

**Test probe**

**07ZAJ-RDJA110**

- If there is continuity, check for short circuit in the Brown wire between the DLC and ECM.
- If there is no continuity, replace the ECM with a known good one, and recheck.

ECM 33P (BLACK) CONNECTOR  
(Wire side/female terminals)



## FUEL LINE REPLACEMENT

### FUEL PRESSURE RELIEVING

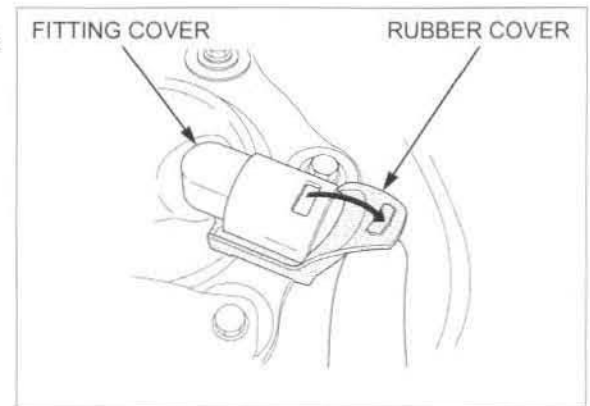
- Before disconnecting the fuel hose, relieve pressure from the system as follows.
1. Hang the fuel tank to the left side of the frame (page 3-6).
  2. Disconnect the fuel pump sub harness 5P (Black) connector.
  3. Start the engine, and let it idle until the engine stalls.



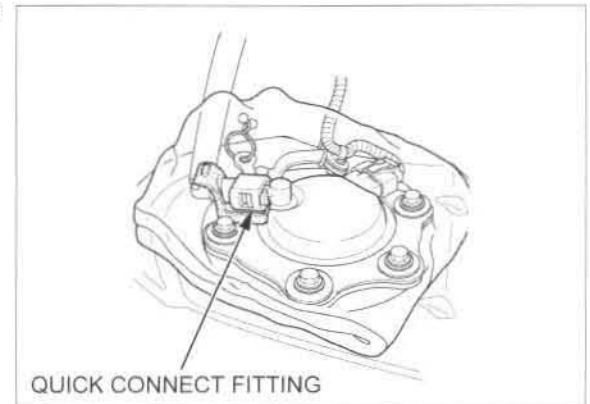
**QUICK CONNECT FITTING REMOVAL**

**FUEL PUMP SIDE**

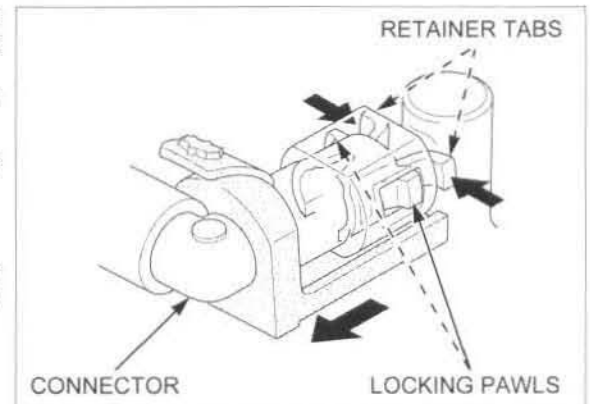
1. Relieve the fuel pressure (page 5-30).  
Release the rubber cover and remove the quick connect fitting cover.



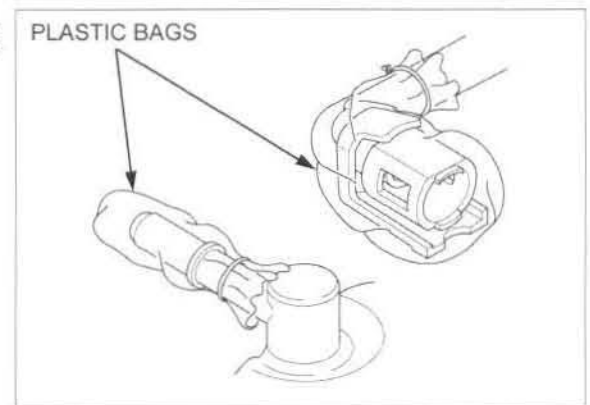
2. Check the fuel quick connect fitting for dirt, and clean if necessary.  
Place a shop towel over the quick connect fitting.



3. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release the locking pawls.  
Pull the connector off, then remove the retainer from the fuel joint.
  - Absorb the remaining fuel in the fuel hose 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.



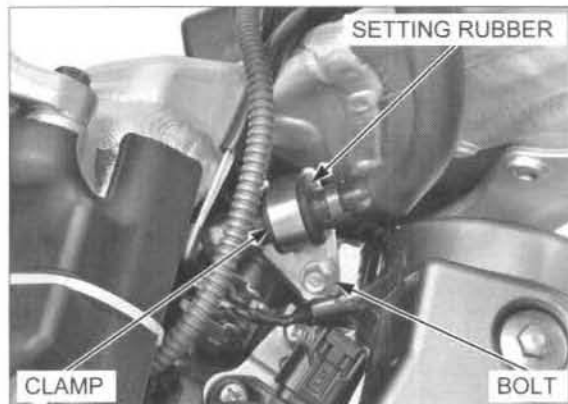
4. To prevent damage and keep foreign matter out, cover the disconnected connector and fuel joint with plastic bags.



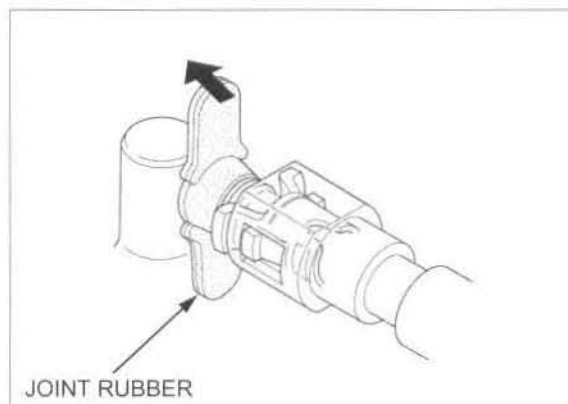
## FUEL SYSTEM (PGM-FI)

### INJECTOR SIDE

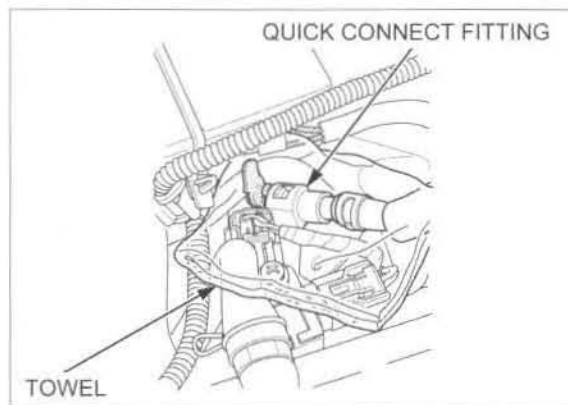
1. Relieve the fuel pressure (page 5-30).  
Check the fuel quick connect fitting for dirt, and clean if necessary.  
Remove the bolt, clamp and setting rubber.



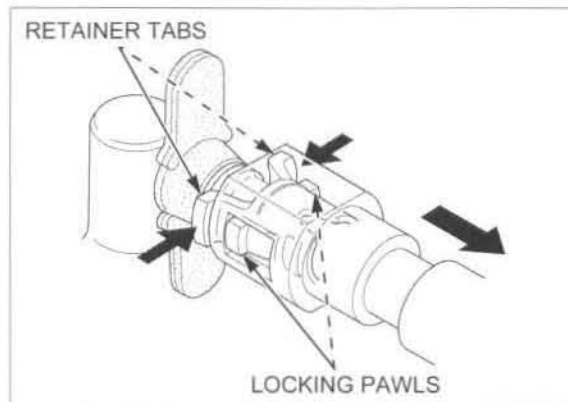
2. Release the joint rubber from the retainer.



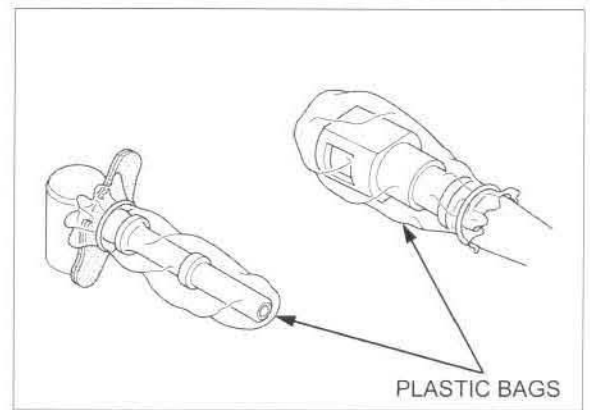
3. Place a shop towel over the quick connect fitting.



4. Hold the connector with one hand and squeeze the retainer tabs with the other hand to release the locking pawls.  
Pull the connector off, then remove the retainer from the injector joint.
- Absorb the remaining fuel in the fuel feed hose 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 unit it comes off easily.



- To prevent damage and keep foreign matter out, cover the disconnected connector and pipe end with the plastic bags.

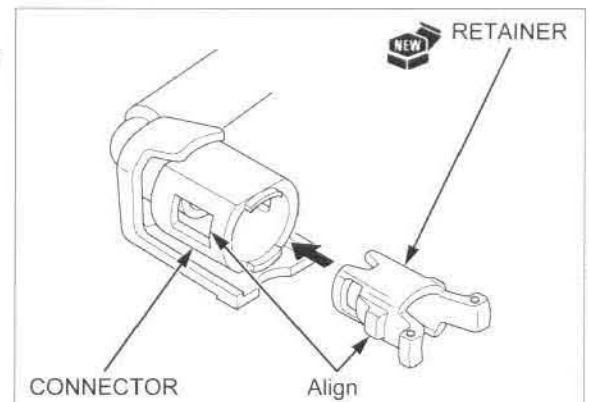


### QUICK CONNECT FITTING INSTALLATION

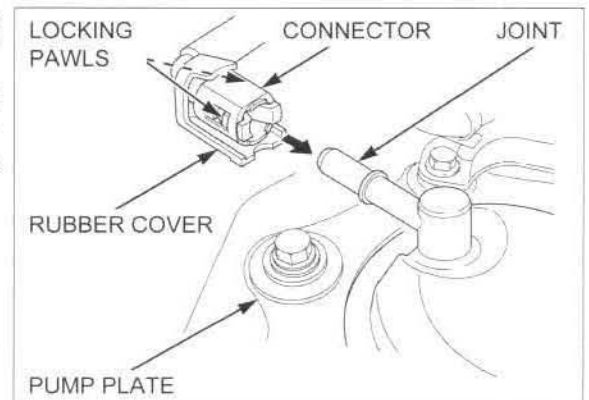
- Always replace the retainer of the quick connect fitting when the fuel hose is disconnected.
- If the rubber cover and joint rubber are damaged or cut, replace them with a new one.
- Do not bend or twist the fuel hose.
- If any retainer needs replacing, use the same manufacturer's retainer as the ones being removed (The various manufactures feature different retainer specification).

#### FUEL PUMP SIDE

1. Insert a new retainer into the connector.
  - Align the retainer locking pawls with the connector grooves.



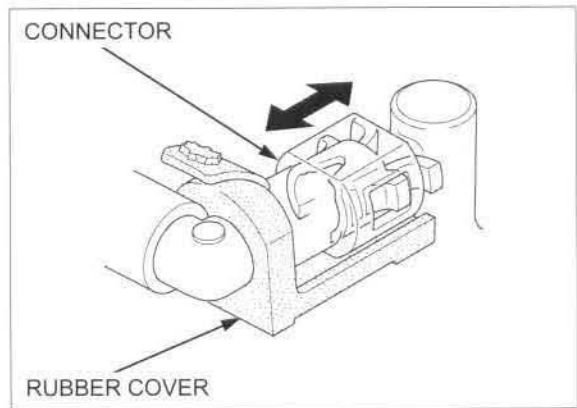
2. Align the quick connect fitting with the fuel joint while inserting the rubber cover between the connector and fuel pump plate. Then press the quick connect fitting onto the joint until both retainer locking pawls lock with a "CLICK". If it is hard to connect, put a small amount of engine oil on the joint end.



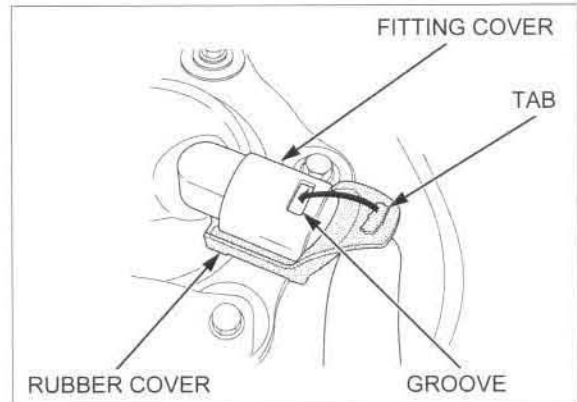


## FUEL SYSTEM (PGM-FI)

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 cover is in place (between the quick connect fitting and fuel pump plate).



5. Install the quick connect fitting cover securely.  
Set the rubber cover tab into the quick connect fitting cover groove.
6. Increase the fuel pressure and check that there is no leakage in fuel supply system (page 3-6).

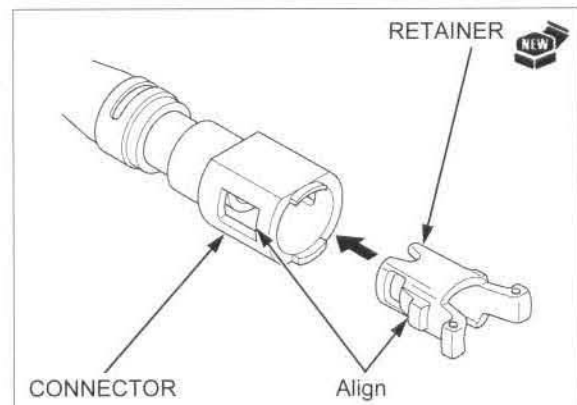


### INJECTOR SIDE

1. Insert a new retainer into the connector.

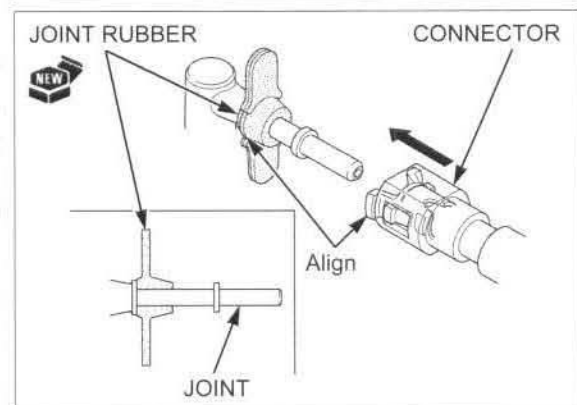
#### NOTE:

- Align new retainer locking pawls with the connector grooves.



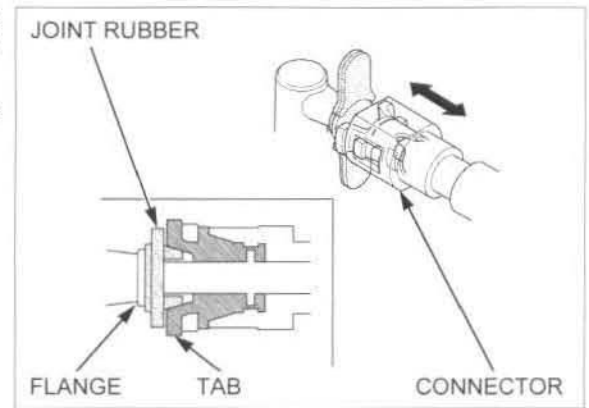
2. Set a new joint rubber to the injector joint as shown.
3. Install the connector to the injector joint by aligning retainer tabs with joint rubber grooves. Then press the quick connect fitting onto the injector joint until both retainer locking pawls lock with a "CLICK".

If it is hard to connect, put a small amount of engine oil on the injector joint end.



4. Make sure the connection is secure and that the pawls are firmly locked into place; check visually and by pulling the connector.

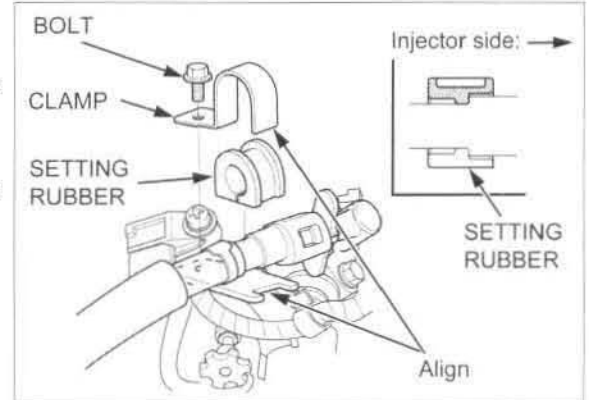
Make sure the joint rubber is in place (between the flange and retainer tab).



5. Install the setting rubber and clamp as shown.

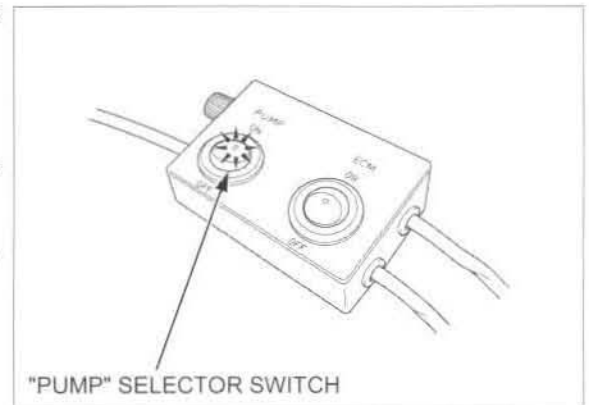
**NOTE:**

- Install the fuel feed hose clamp by aligning its tab with the groove of the fuel feed hose stay.  
Install and tighten the bolt securely.
6. Increase the fuel pressure and check that there is no leakage in fuel supply system (page 3-6).



**FUEL PRESSURE INCREASING**

1. Connect the 12 V battery to the fuel pump sub harness (page 5-12).
2. Temporarily install the fuel tank onto the frame.
3. Turn the "PUMP" selector switch ON.
4. Run the fuel pump for about 3 – 5 seconds and raise the fuel pressure.
5. Turn the "PUMP" selector switch OFF.  
Check that there is no leakage in the fuel supply system.  
Remove the battery harness (page 5-12).  
Install the fuel tank (page 3-6).



## FUEL SYSTEM (PGM-FI)

### FUEL PRESSURE TEST

#### NOTE:

Make sure there is one liter or more of fuel remaining in the fuel tank before starting fuel pressure test.

Relieve the fuel pressure (page 5-30).

Disconnect the quick connect fitting from the fuel pump side (page 5-31).

Attach the fuel pressure gauge, hoses, attachment joint and manifold between the fuel pump and quick connector.

#### TOOLS:

- |  |               |
|--|---------------|
| (1): Fuel pressure gauge,<br>0 – 100 psi | 07406-0040004 |
| (2): Pressure gauge manifold             | 07ZAJ-S5A0111 |
| (3): Hose attachment,<br>9 mm/9 mm       | 07ZAJ-S5A0120 |
| (4): Hose attachment,<br>8 mm/9 mm       | 07ZAJ-S7C0100 |
| (5): Attachment joint,<br>8 mm/9 mm      | 07ZAJ-S7C0200 |

#### TOOLS, U.S.A. only:

- |                                  |               |
|----------------------------------|---------------|
| Fuel pressure gauge, 0 – 100 psi | 07406-004000B |
| Fuel pressure manifold hose      | 07AMJ-HW3A100 |
| Adaptor, male                    | 07AAJ-S6MA300 |
| Adaptor, female                  | 07AAJ-S6MA500 |

Connect the 12 V battery to the fuel pump sub harness (page 5-12).

Support the fuel tank in an upright position onto the frame then remove the hose clamp from the breather hose.

Turn the "PUMP" selector switch ON.

Read the fuel pressure.

**Standard: 333 – 360 kPa (3.4 – 3.7 kgf/cm<sup>2</sup>, 48 – 52 psi)**

If the fuel pressure is higher than specified, replace the fuel pump assembly (faulty fuel pump or fuel pressure regulator).

If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Restricted fuel hose or fuel tank breather hose
- Fuel pump (page 5-37)
- Clogged fuel strainer
  - '10: (page 5-39)
  - After '10: (page 5-41)

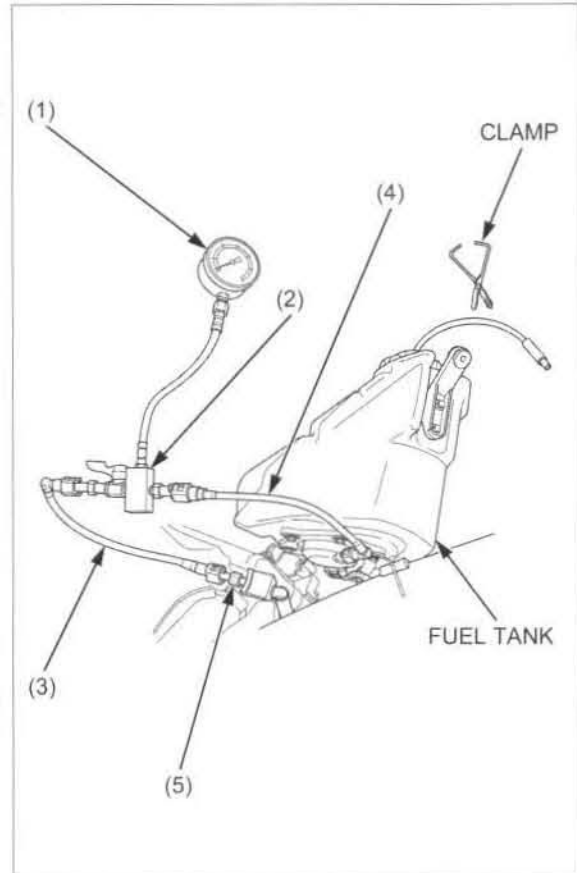
*Wrap a shop towel around the attachment to soak up any spilled fuel.*

After inspection, disconnect the battery harness.

Relieve the fuel pressure by starting the engine and let it idle until it stalls (page 5-30).

Remove the fuel pressure gauge, hose attachments, attachment joint and manifold.

Connect the quick connect fitting to the fuel pump side (page 5-33).



## FUEL FLOW INSPECTION

**NOTE:**

Make sure there is one liter or more of fuel remaining in the fuel tank before starting fuel flow inspection.

Relieve the fuel pressure (page 5-30).

Disconnect the quick connect fitting from the fuel pump side (page 5-31).

Connect the hose attachment to the fuel joint of the fuel tank.

**TOOL:**

**Hose attachment, 8 mm/9 mm 07ZAJ-S7C0100**

Make sure the fuel pressure gauge is installed when using U.S.A. tools.

**TOOLS, U.S.A. only:**

**Fuel pressure manifold hose 07AMJ-HW3A100**

**Adaptor, female 07AAJ-S6MA500**

Support the fuel tank in an upright position onto the frame then remove the hose clamp from the breather hose.

*Wipe up any spilled gasoline.*

Place the end of the hose into an approved gasoline container.

Turn the "PUMP" selector switch ON for 10 seconds. Measure the amount of fuel flow.

Perform this inspection three times and take the average value.

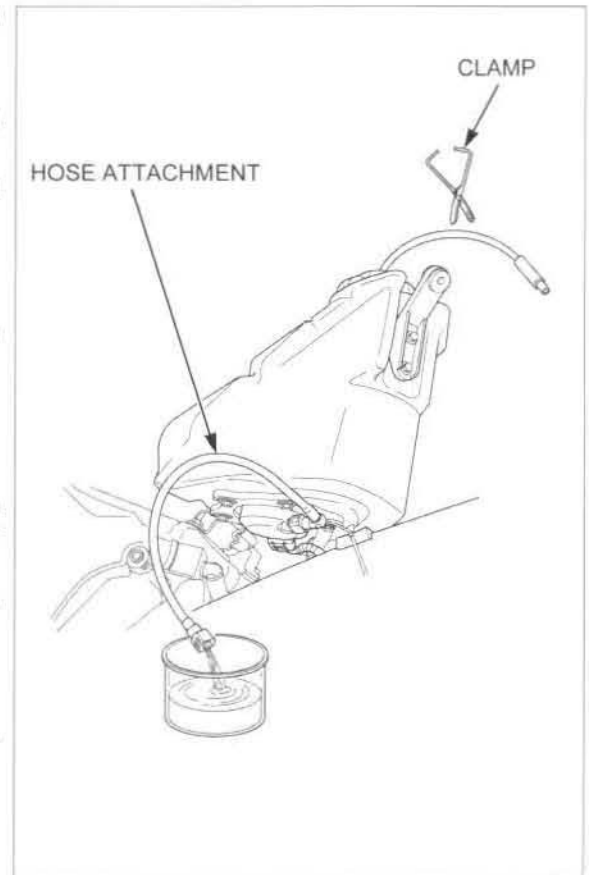
**Amount of fuel flow:**

**150 cm<sup>3</sup> (5.1 US oz, 5.3 Imp oz) minimum/10 seconds at 12 V**

If the fuel flow is less than specified, inspect the following:

- Pinched or clogged fuel tank breather hose
- Clogged fuel strainer
  - '10: (page 5-39)
  - After '10: (page 5-41)
- Fuel pump unit (page 5-37)

Connect the quick connect fitting to the fuel pump side (page 5-33).



## FUEL PUMP UNIT

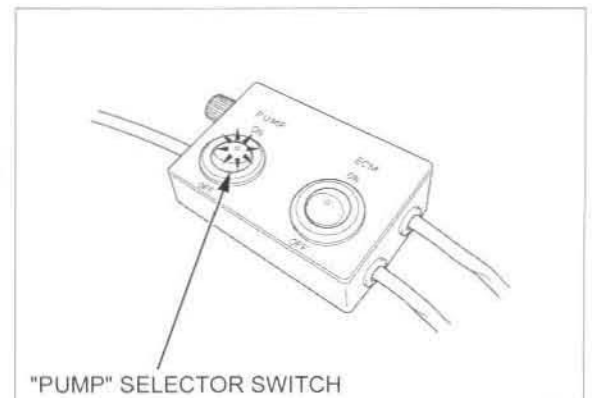
### INSPECTION

Before starting inspection, check the following:

- Engine stop switch (page 16-15)
- Regulator/rectifier (page 16-11)

Connect the 12V battery (page 5-12).

Turn the "PUMP" selector switch ON and confirm that the fuel pump operates.



## FUEL SYSTEM (PGM-FI)

Turn the "PUMP" selector switch OFF and disconnect the fuel pump 5P (Black) connector.

Turn the "PUMP" selector switch ON and measure the voltage between the terminals.

**Connection: Black (+) – Green (-)**

There should be battery voltage.

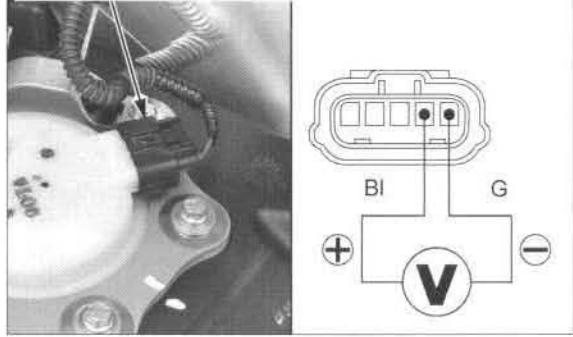
If there is battery voltage, remove the fuel pump and check the fuel pump wires for loose connection or damage.

- '10: (page 5-39)
- After '10: (page 5-41)

If the wires are normal, replace the fuel pump unit (page 5-38).

If there is no battery voltage, check for open circuit in Black or Green wire between the regulator/rectifier connector and fuel pump sub harness connector.

5P (BLACK) CONNECTOR  
(Wire side/female terminals)

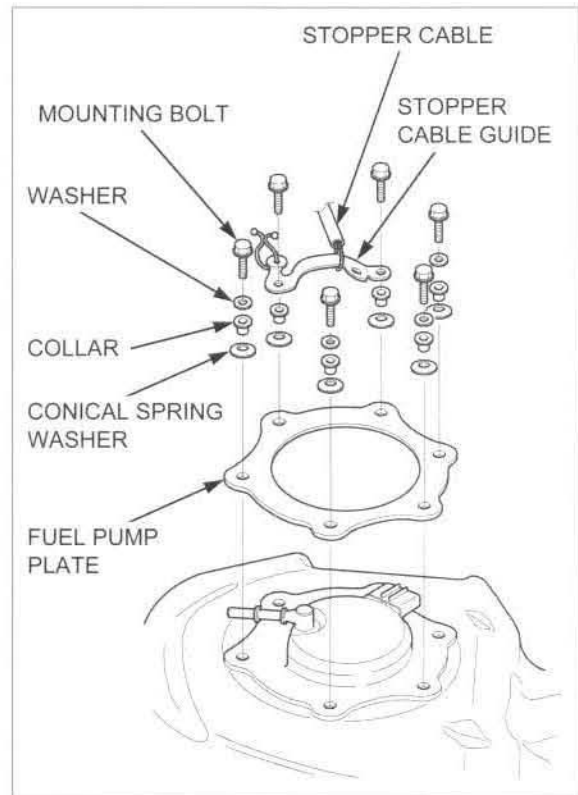


## REMOVAL

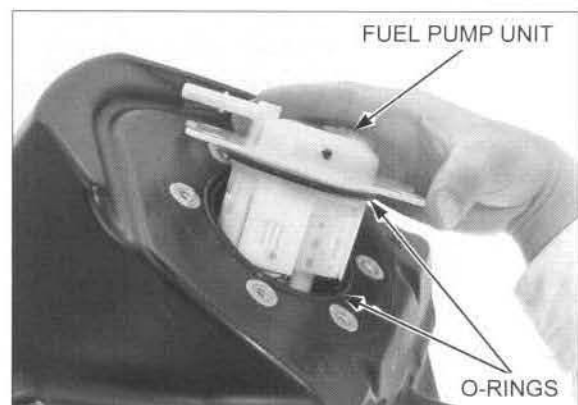
Remove the fuel tank (page 5-45).

Remove the following:

- Six fuel pump mounting bolts
- Stopper cable guide
- Stopper cable
- Four washers
- Six collars
- Six conical spring washers
- Fuel pump plate



*Be careful not to damage the fuel pump wire.* Remove the fuel pump unit and O-rings.



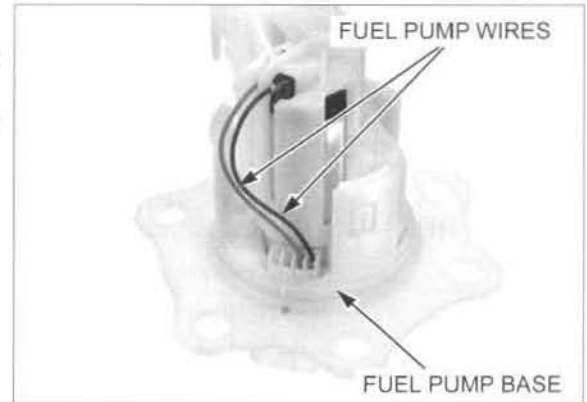
**DISASSEMBLY/INSPECTION ('10)**

Remove the fuel pump unit (page 5-38).

Check the fuel pump wires for loose connection or damage.

*Be careful not to damage the fuel pump wires.*

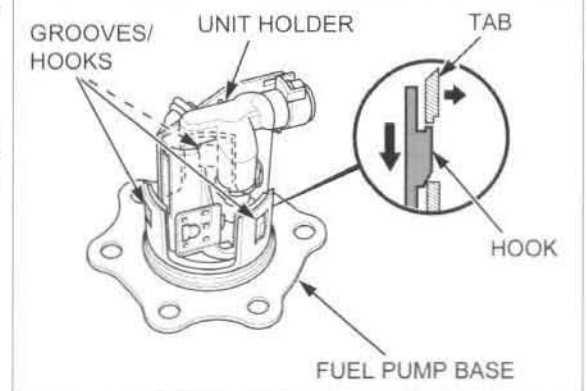
Disconnect the fuel pump wires from the fuel pump base.



Check the hooks of the fuel pump unit holder and tabs on the fuel pump base for damage or discoloration. If the hooks and tabs are damaged or discolored, replace the fuel pump unit as an assembly.

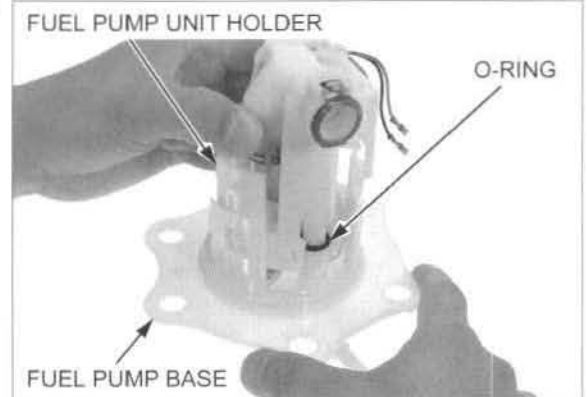
*Be careful not to damage the hooks and tabs.*

Release the hooks of the fuel pump unit holder from the grooves on the fuel pump base tabs while pushing the holder against the base and slightly spreading the base tabs.



*Wipe up any spilled fuel immediately.*

Remove the fuel pump unit holder assembly from the fuel pump base. Remove the O-ring.

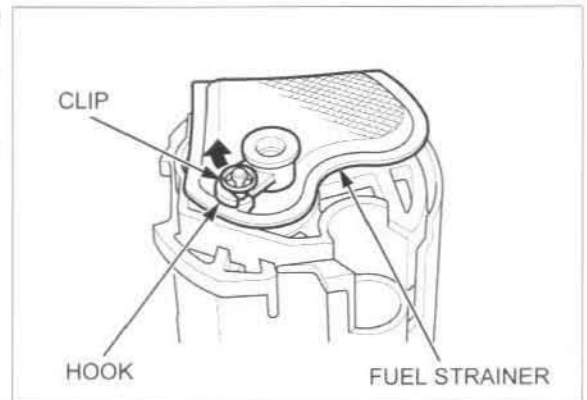


Check the fuel strainer for clog, damage or deterioration and replace if necessary.

Check the fuel strainer clip for looseness, deformation or damage and replace if necessary.

*Be careful not to damage the hook, boss and clip.*

Slightly turn the fuel strainer clockwise and release its hook from the joint boss of the fuel pump assembly. Remove the fuel strainer.



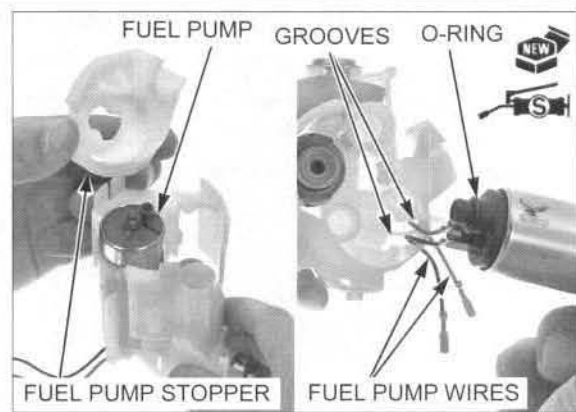
## FUEL SYSTEM (PGM-FI)

Remove the fuel pump stopper, fuel pump assembly and O-ring.

### ASSEMBLY ('10)

Apply small amount of silicone grease to a new O-ring. Install the O-ring to the fuel pump assembly. Install the fuel pump assembly into the fuel pump unit holder while routing the fuel pump wires through the holder grooves as shown.

Install the fuel pump stopper.



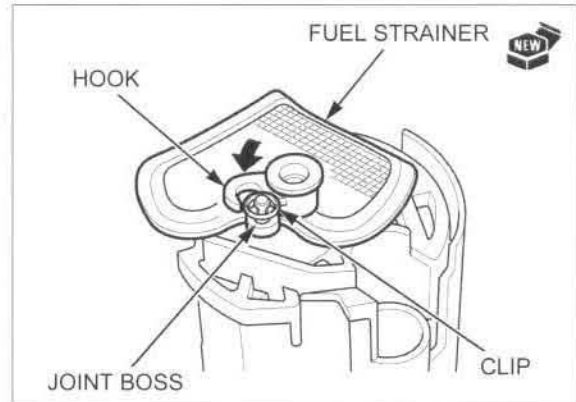
*Do not blow into the fuel pump.*

Clean the fuel pump joint area with compressed air.

Install a new fuel strainer onto the fuel pump assembly joint.

*Be careful not to damage the hook, boss and clip.*

Turn the strainer counterclockwise until its hook is completely seated on the joint boss.

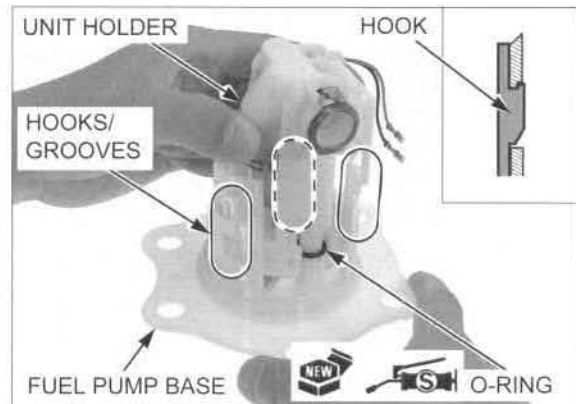


Apply small amount of silicone grease to a new O-ring. Install the O-ring to the fuel pump base.

*Be sure that the hooks are completely seated in the grooves.*

Install the fuel pump unit holder assembly into the fuel pump base while aligning its hooks with the grooves in the pump base tabs.

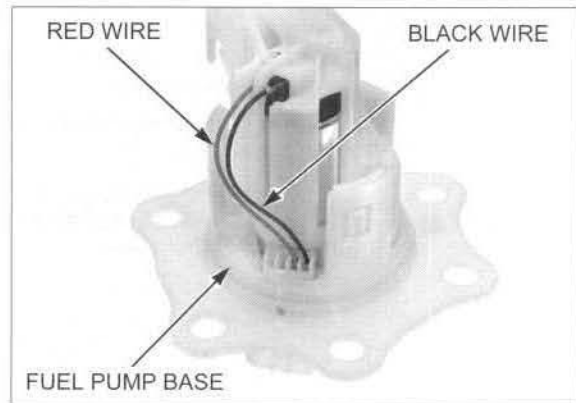
*Replace the fuel pump unit if the gap between the hook and tab is more than 1.0 mm (0.04 in).*



*Be careful not to damage the fuel pump wires.*

Connect the fuel pump wires to the fuel pump base terminals as shown.

Install the fuel pump unit (page 5-43).



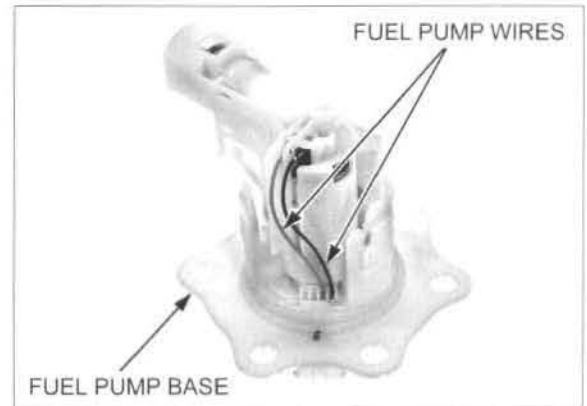
**DISASSEMBLY/INSPECTION  
(After '10)**

Remove the fuel pump unit (page 5-38).

Check the fuel pump wires for loose connection or damage.

*Be careful not to damage the fuel pump wires.*

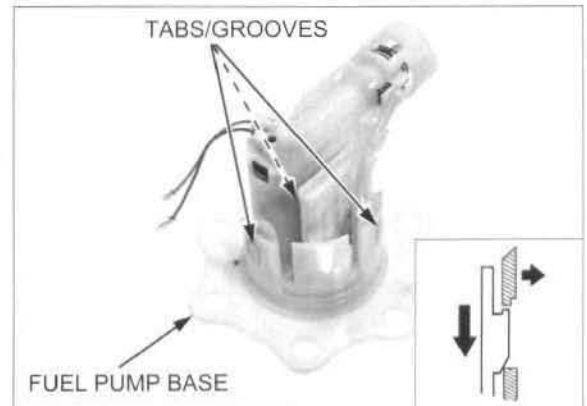
Disconnect the fuel pump wires from the fuel pump base.



Check the hooks of the fuel pump unit holder and tabs on the fuel pump base for damage or discoloration. If the hooks and tabs are damaged or discolored, replace the fuel pump unit as an assembly.

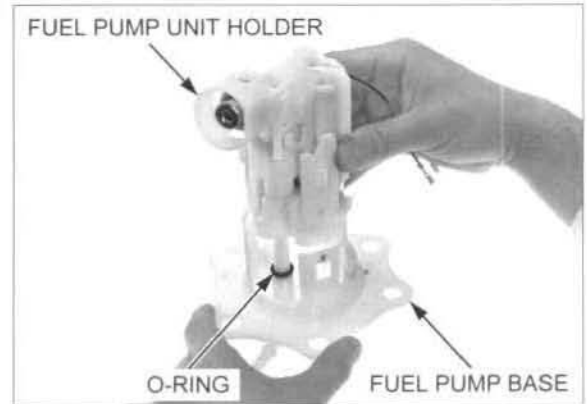
*Be careful not to damage the hooks and tabs.*

Release the hooks of the fuel pump unit holder from the grooves on the fuel pump base tabs while pushing the holder against the base and slightly spreading the base tabs.

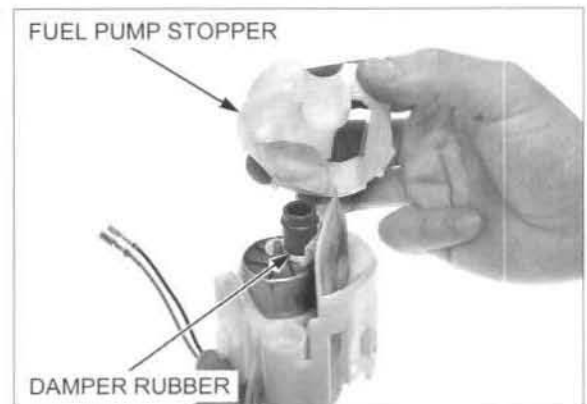


*Wipe up any spilled fuel immediately.*

Remove the fuel pump unit holder assembly from the fuel pump base. Remove the O-ring.



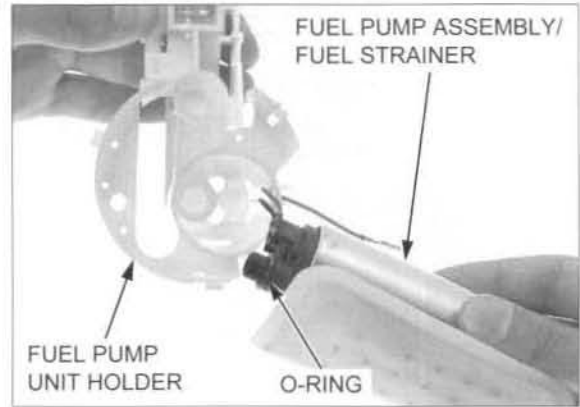
Remove the fuel pump stopper and damper rubber from the fuel unit holder assembly.





## FUEL SYSTEM (PGM-FI)

Remove the fuel pump assembly with the fuel strainer and O-ring from the fuel pump assembly.



Check the fuel strainer for clog, damage or deterioration and replace if necessary.

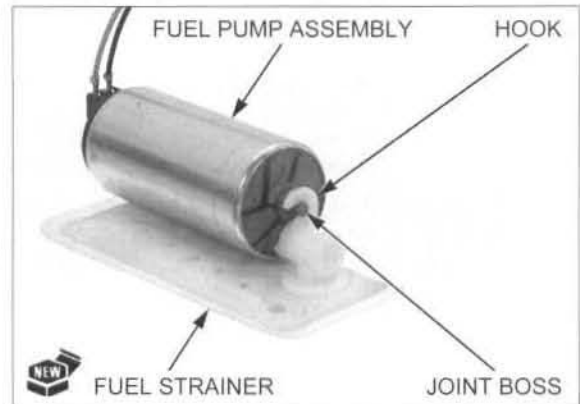
Remove the fuel strainer from the fuel pump assembly.

### ASSEMBLY (After '10)

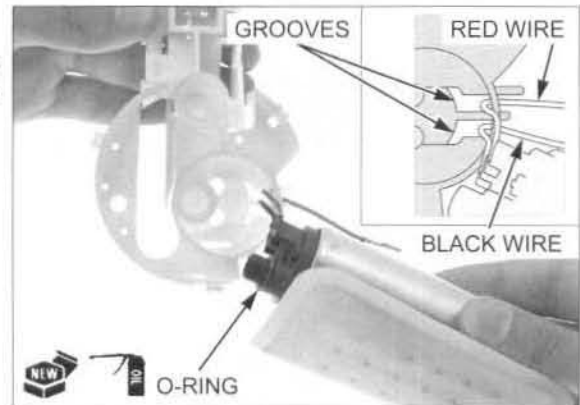
*Do not blow into the fuel pump.*

Clean the fuel pump joint area with compressed air.

Install a new fuel strainer onto the fuel pump assembly aligning its hook with the joint boss completely.

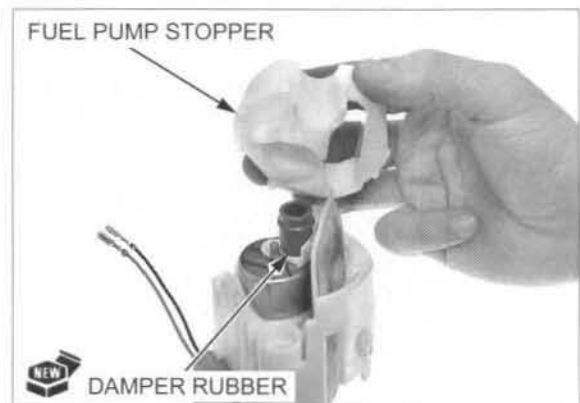


Apply small amount of engine oil to a new O-ring. Install the O-ring to the fuel pump assembly. Install the fuel pump assembly into the fuel pump unit holder while routing the fuel pump wires through the holder grooves as shown.



Install a damper joint rubber to the fuel strainer as shown.

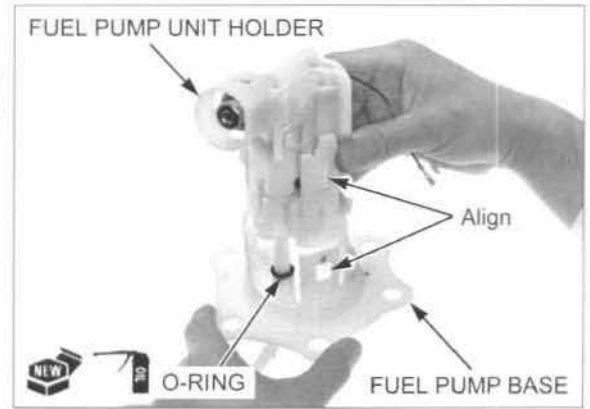
Install the fuel pump stopper.



Apply small amount of engine oil to a new O-ring.  
Install the O-ring to the fuel pump base.

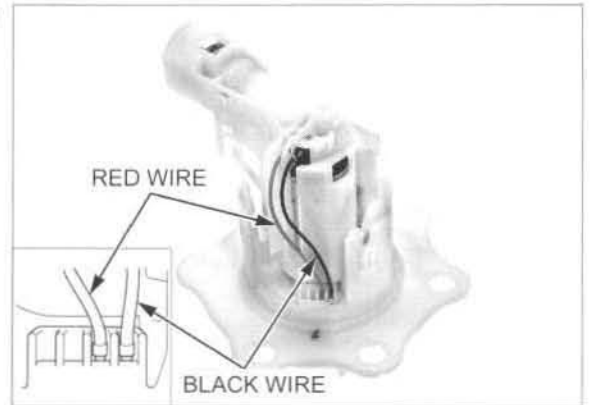
*Be sure that the hooks are completely seated in the grooves. Replace the fuel pump unit if the gap between the hook and tab is more than 1.0 mm (0.04 in).*

Install the fuel pump unit holder assembly into the fuel pump base while aligning its hooks with the grooves in the pump base tabs.



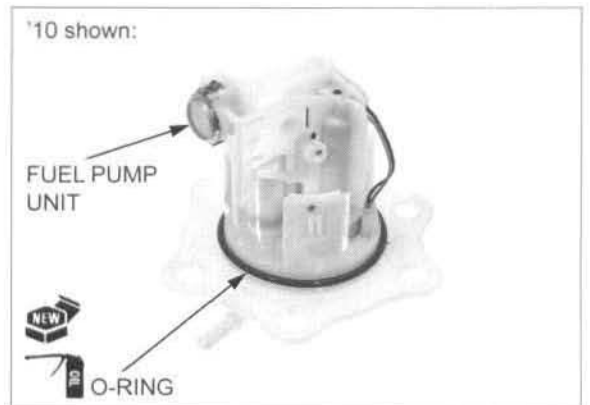
*Be careful not to damage the fuel pump wires.*

Connect the fuel pump wires to the fuel pump base terminals completely as shown.  
Install the fuel pump unit (page 5-43).



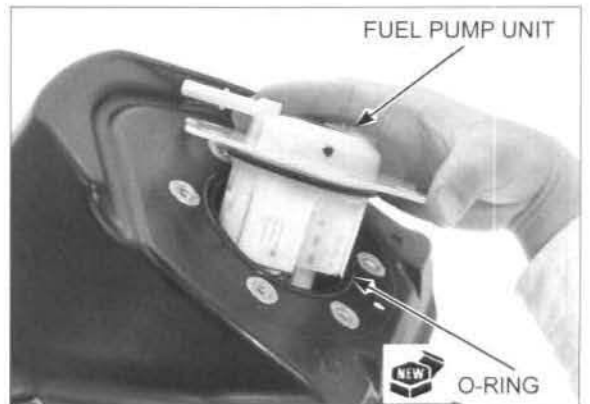
### INSTALLATION

Apply engine oil to a new O-ring.  
Install a new O-ring onto the fuel pump unit.



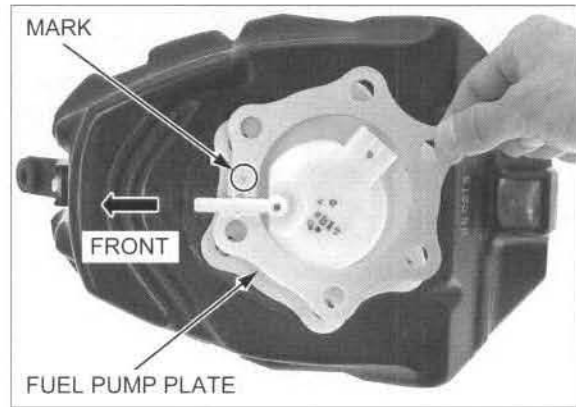
*Be careful not to damage the fuel pump wire.*

Install a new O-ring into the fuel tank groove.  
Install the fuel pump unit into the fuel tank.



## FUEL SYSTEM (PGM-FI)

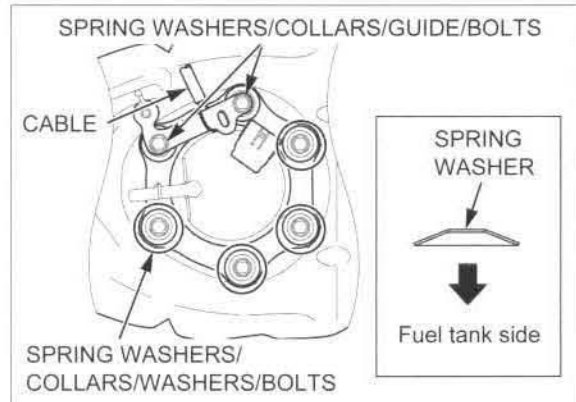
Install the fuel pump plate with its identification mark facing toward the front side and facing up.



Install the following:

*Install the conical spring washers in the shown direction.*

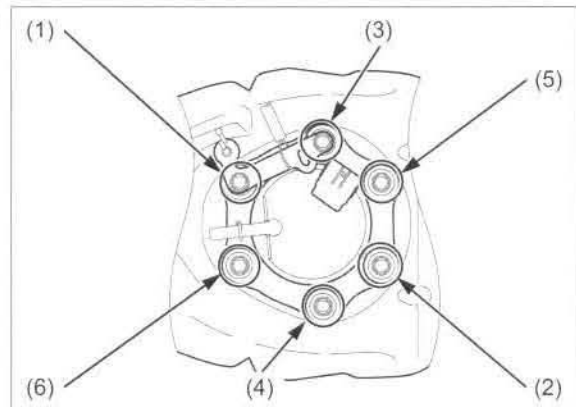
- Six conical spring washers
- Six collars
- Four washers
- Stopper cable (to the stopper cable guide)
- Stopper cable guide
- Six fuel pump mounting bolts



Tighten the fuel pump mounting bolts to the specified torque in the specified sequence as shown.

**TORQUE: 11 N·m (1.1 kgf·m, 8 lbf·ft)**

Install the fuel tank (page 5-45).



## FUEL TANK

### REMOVAL/INSTALLATION

Relieve the fuel pressure (page 5-30).  
 Disconnect the quick connect fitting from the fuel pump side (page 5-31).

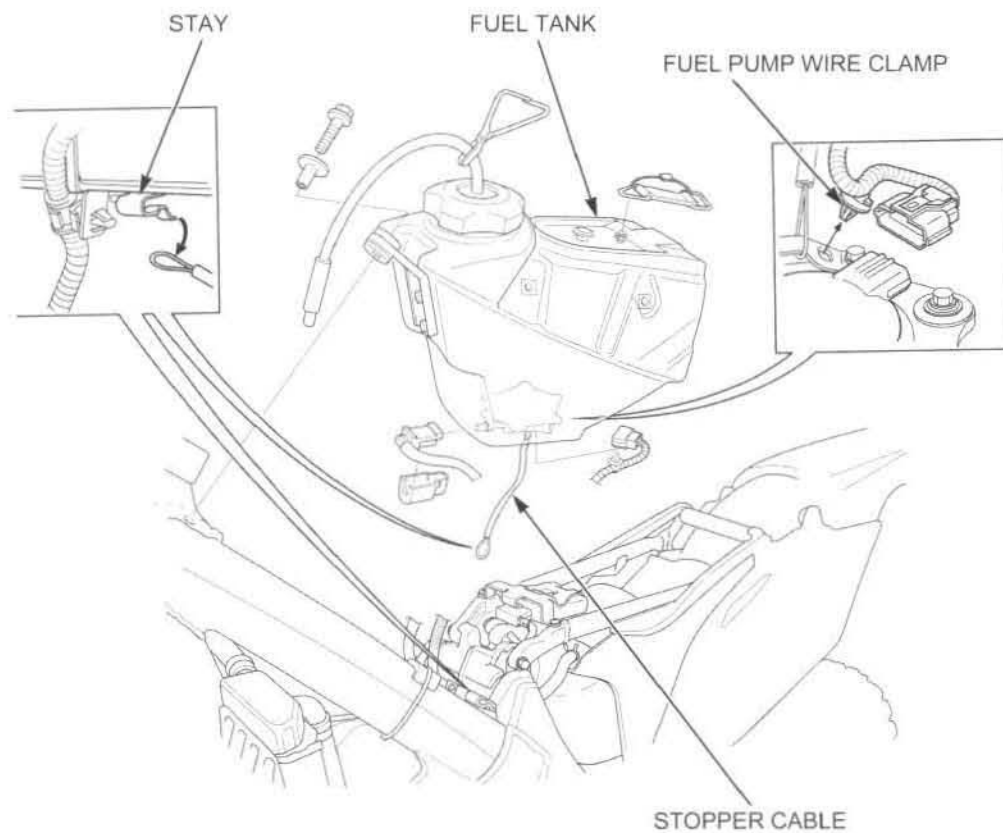
Remove the fuel pump wire clamp from the stopper cable guide.

Hold the fuel tank and disconnect the stopper cable from the frame stay.

Remove the fuel tank.

For fuel pump unit removal (page 5-38).

Installation is in the reverse order of removal.



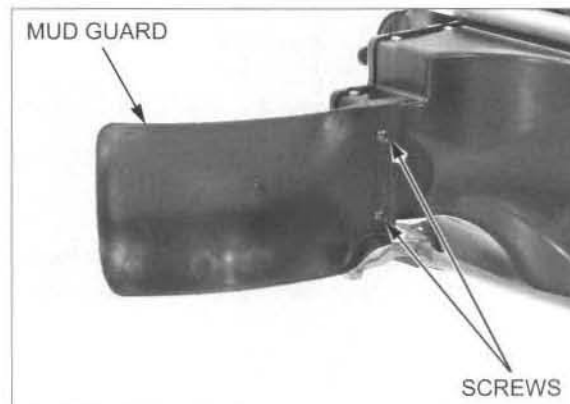
## AIR CLEANER HOUSING

### REMOVAL

Remove the following:

- Rear fender (page 2-6)
- Sub-frame (page 2-6)

Remove the screws and mud guard.

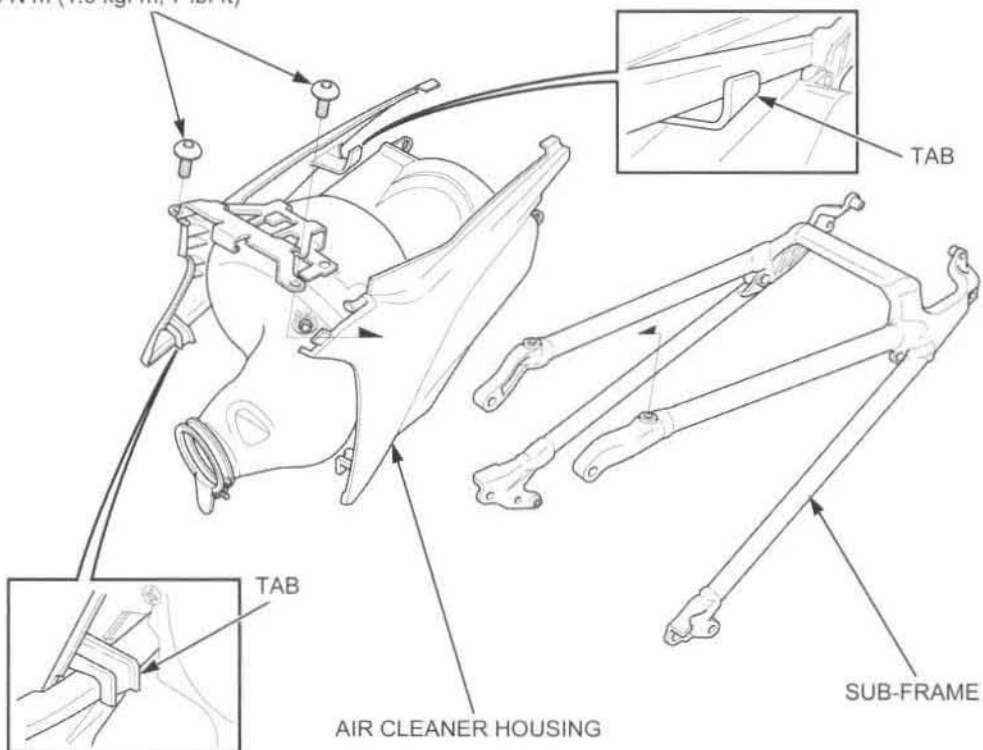


Remove the air cleaner housing mounting bolts.

Remove the air cleaner housing while releasing air cleaner housing cover tabs from the sub-frame.

\*10 shown:

10 N·m (1.0 kgf·m, 7 lbf·ft)



### INSPECTION/INSTALLATION

Check that the connecting boot is sealed properly at the air cleaner housing.

Check the air cleaner housing for damage.

Installation is in the reverse order of removal.

#### TORQUE:

Mud guard mounting screw:

1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)

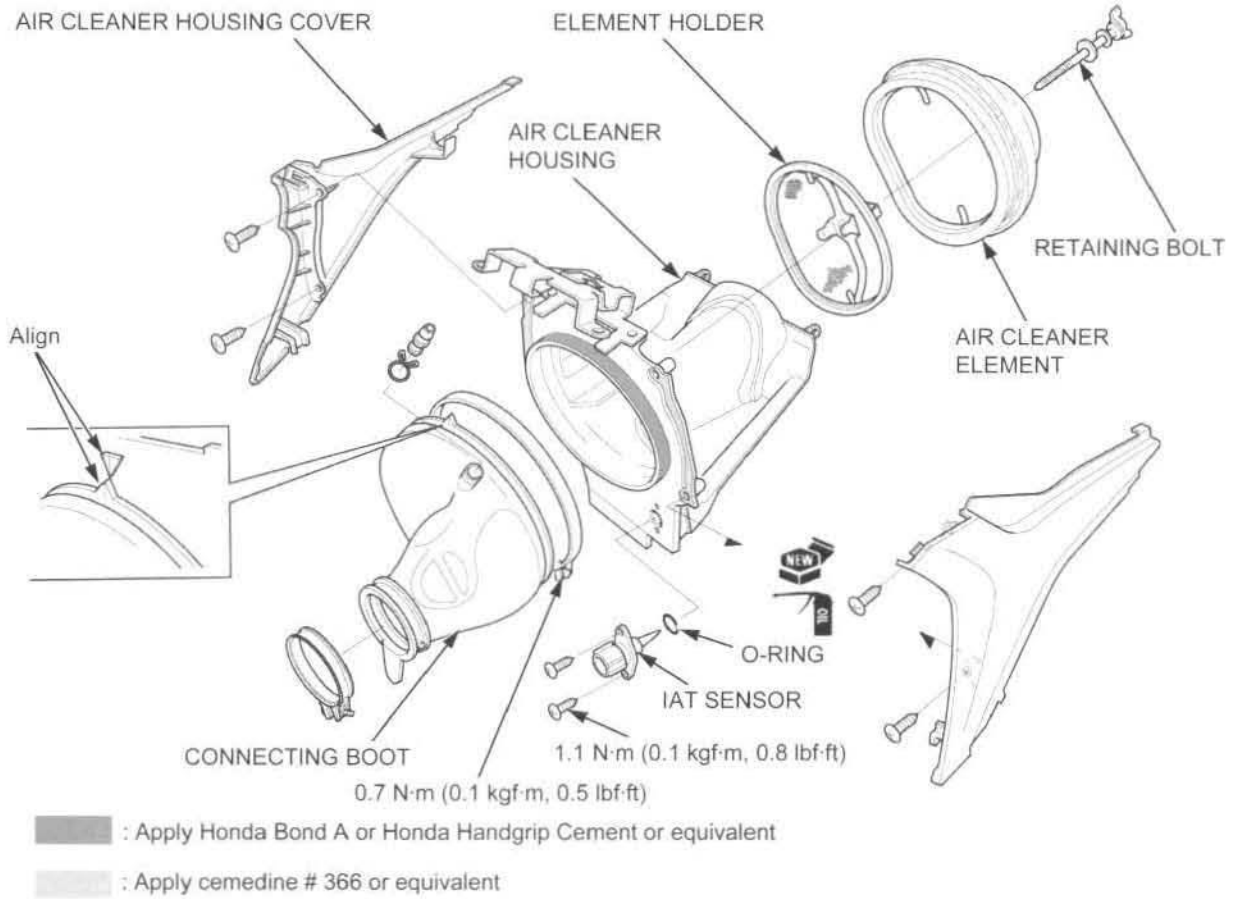
Air cleaner housing mounting bolt:

10 N·m (1.0 kgf·m, 7 lbf·ft)

**DISASSEMBLY/ASSEMBLY**

Remove the air cleaner housing (page 5-46).

\*10 shown:



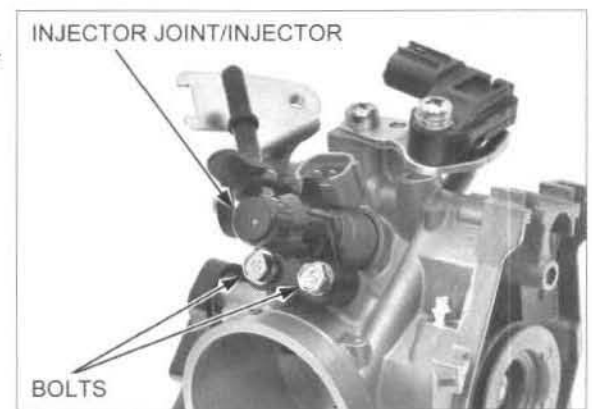
**INJECTOR**

**REMOVAL**

Remove the throttle body (page 5-49).

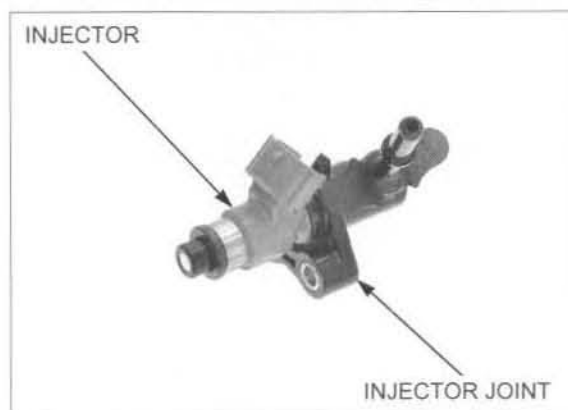
Clean around the injector base with compressed air before removing the injector.

Remove the bolts and injector joint/injector.



## FUEL SYSTEM (PGM-FI)

Remove the injector from the injector joint.

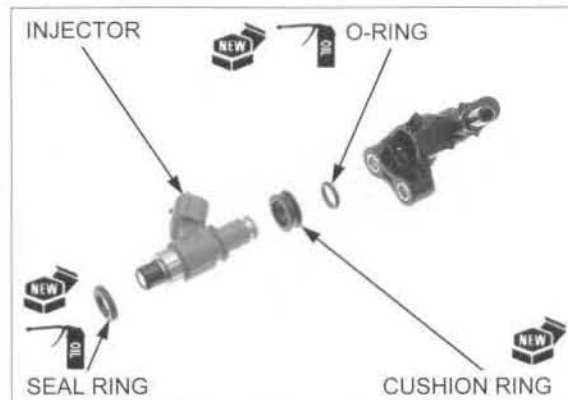


Remove the O-ring, cushion ring and seal ring.

### INSTALLATION

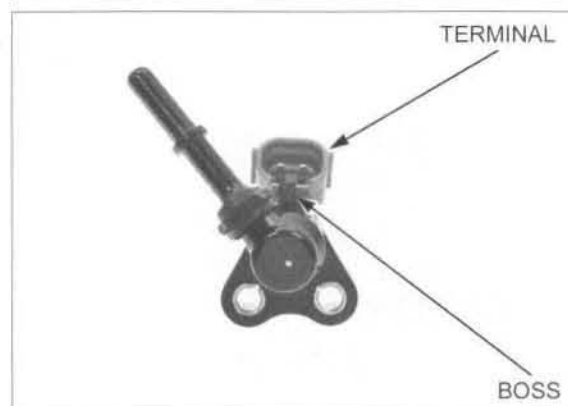
Coat a new O-ring and seal ring with engine oil.

Install a new O-ring, cushion ring and seal ring, being careful not to damage them.



*Be careful not to damage the O-ring.*

Install the injector into the injector joint. Align the boss of the injector with the injector terminals as shown.

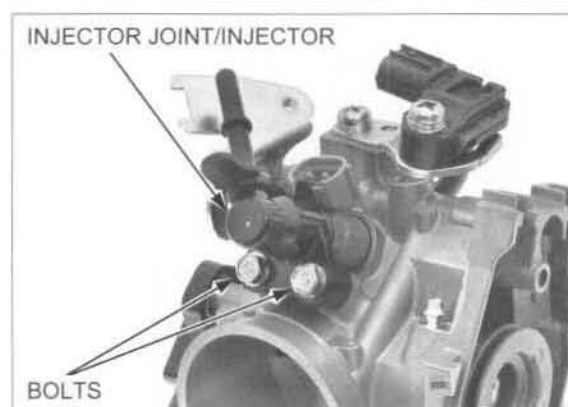


Install the injector joint/injector to the throttle body.

Install and tighten the injector joint bolts to the specified torque.

**TORQUE: 5.1 N·m (0.5 kgf·m, 3.8 lbf·ft)**

Install the throttle body (page 5-52).



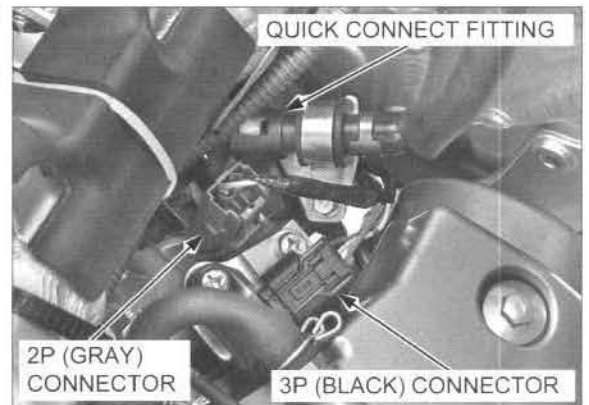
# THROTTLE BODY

## REMOVAL

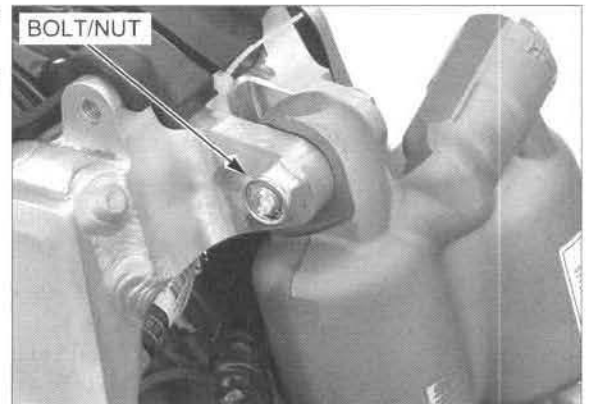
Relieve the fuel pressure (page 5-30).  
 Remove the sub-frame (page 2-6).  
 Disconnect the TP sensor 3P (Blue) connector.



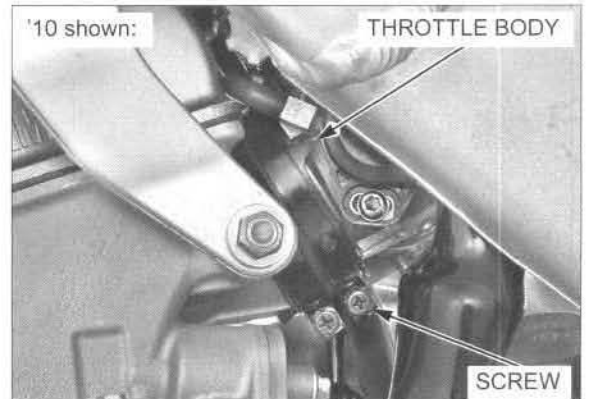
Disconnect the quick connect fitting from the injector side (page 5-32).  
 Disconnect the injector 2P (Gray) and MAP sensor 3P (Black) connectors.



Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.  
 Remove the rear shock absorber upper mounting bolt and nut.



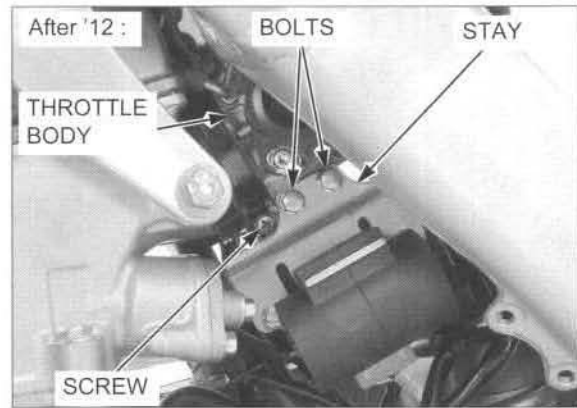
'10 - '12: Loosen the insulator band screw.  
 Release the throttle body from the insulator.





## FUEL SYSTEM (PGM-FI)

*After '12 :* Remove the bolts and regulator/rectifier stay.  
Loosen the insulator band screw.  
Release the throttle body from the insulator.



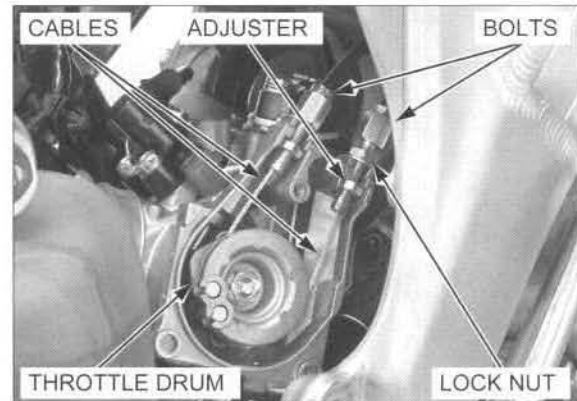
Remove the clamp of the MAP sensor and injector wire harness.



Remove the bolt.  
Remove the throttle drum cover while releasing its slot from the throttle body tab.



Loosen the throttle cable adjuster lock nut, adjuster and cable bolts, then disconnect the throttle cables from the throttle drum.



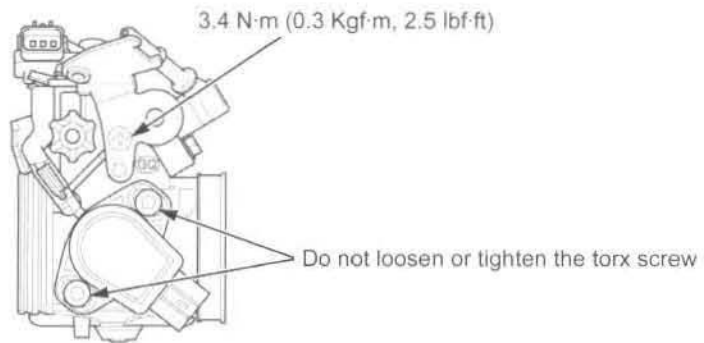
DISASSEMBLY/ASSEMBLY

**NOTICE**

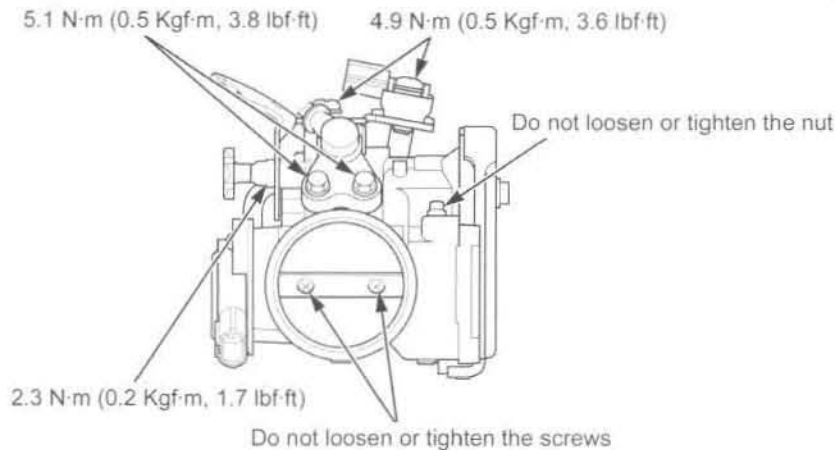
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Do not loosen or tighten the white painted bolts, nuts and screws of the throttle body. Loosening or tightening them can cause throttle valve and idle control failure.
- Always clean the throttle body before disassembly to prevent dirt and debris from entering the passages.
- Do not remove the TP sensor.

\*10 shown:

LEFT VIEW:



REARVIEW:



RIGHT VIEW:



Remove the following:

- MAP sensor (page 5-55)
- Injector (page 5-47)
- Fast idle knob (page 5-54)

Blow open all air passages in the throttle body with compressed air.

**NOTE:**

Cleaning the air passages with a piece of wire will damage the throttle body.



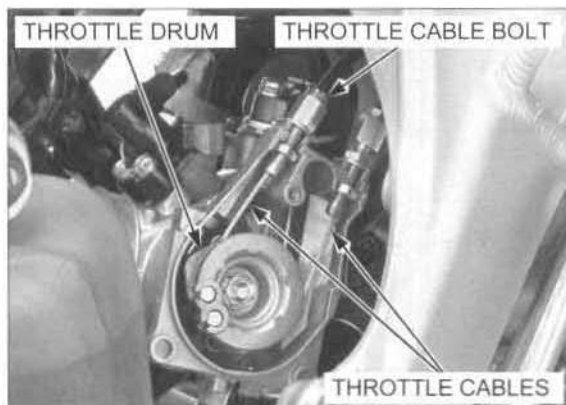
## FUEL SYSTEM (PGM-FI)

### INSTALLATION

Connect the throttle cables to the throttle drum and throttle body.

Tighten the throttle cable bolt to the specified torque.

**TORQUE: 4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)**



Install the throttle drum cover while aligning its slot with the tab of the throttle body.

Install and tighten the bolt to the specified torque.

**TORQUE: 3.4 N·m (0.3 kgf·m, 2.5 lbf·ft)**



*Route the wire harness properly (page 1-21).*

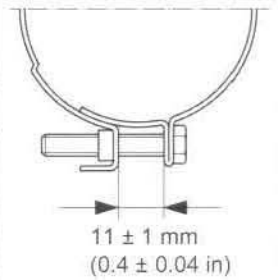
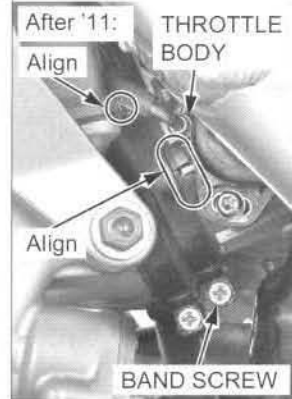
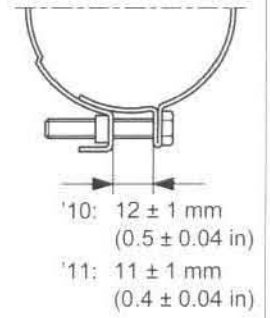
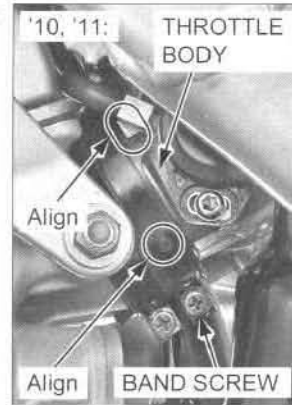
Install the clamp of the MAP sensor and injector wire harness to the stay.



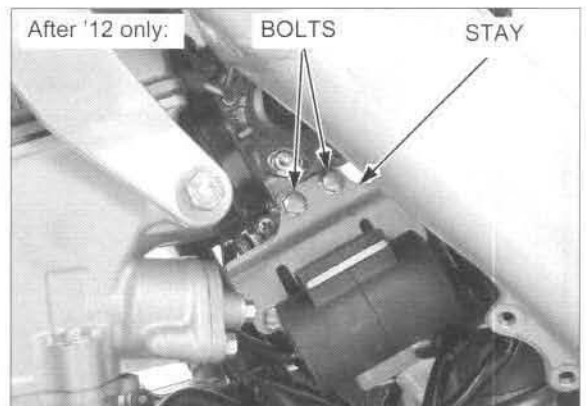
Install the throttle body by aligning its tab with the insulator groove.

*Align the insulator band hole with the insulator tab.*

Tighten the insulator band screw as shown.



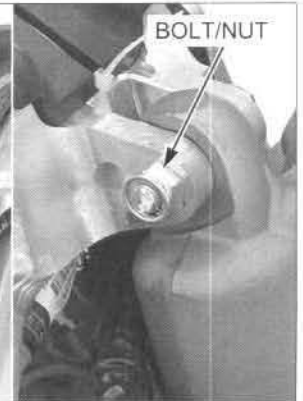
*After '12 only:* Set the regulator/rectifier stay to the throttle body, install and tighten the bolts.



Install the rear shock absorber upper mounting bolt by aligning cut-outs of the frame and upper mounting bolt.

Install and tighten the rear shock absorber upper mounting nut to the specified torque.

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

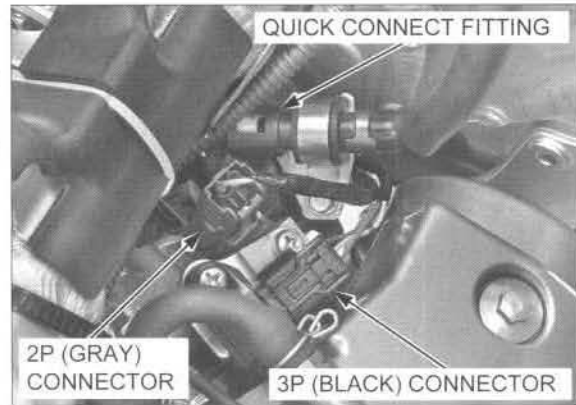


## FUEL SYSTEM (PGM-FI)

Route the wire harness and hoses properly (page 1-21).

Connect the injector 2P (Gray) and MAP sensor 3P (Black) connectors.

Connect the quick connect fitting to the injector joint (page 5-34).



Connect the TP sensor 3P (Blue) connector.

Adjust the throttle grip freeplay (page 3-7).

Install the sub-frame (page 2-8).

Install the fuel tank (page 5-45).



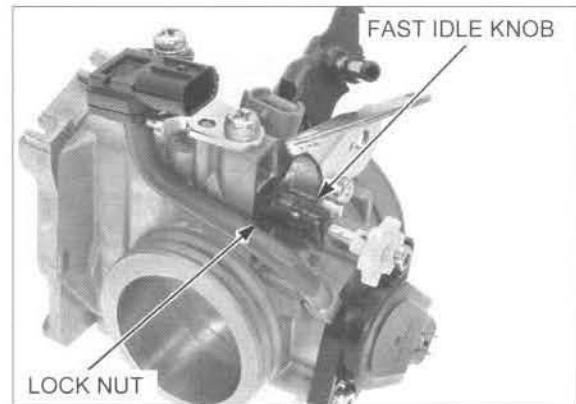
## FAST IDLE KNOB

### REMOVAL

Remove the throttle body (page 5-49).

Clean around the fast idle knob with compressed air before removing the fast idle knob.

Loosen the lock nut and remove the fast idle knob.

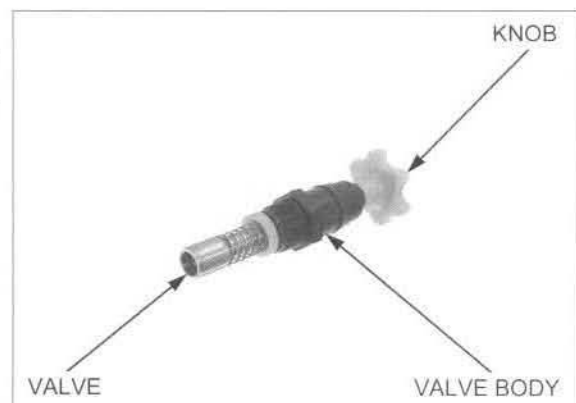


### INSPECTION

Check the fast idle knob operation:

- Turn the fast idle knob counterclockwise, then the valve should be pulled into the valve body.
- Turn the fast idle knob clockwise, then the valve should be come out from the valve body.

Check the fast idle knob for wear or damage. Replace the fast idle knob if necessary.

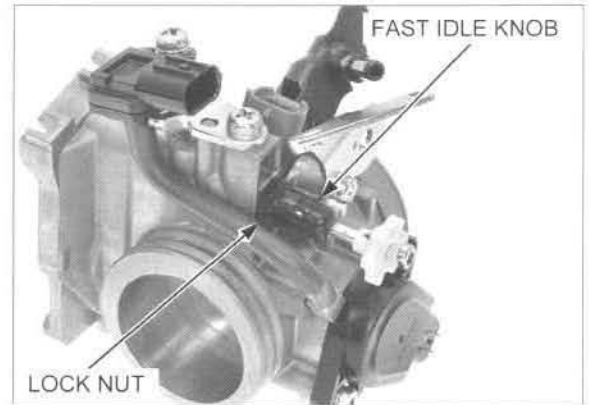


### INSTALLATION

Install the fast idle knob and tighten the lock nut to the specified torque.

**TORQUE: 2.3 N·m (0.2 kgf·m, 1.7 lbf·ft)**

Install the throttle body (page 5-52).



## MAP SENSOR

### OUTPUT VOLTAGE INSPECTION

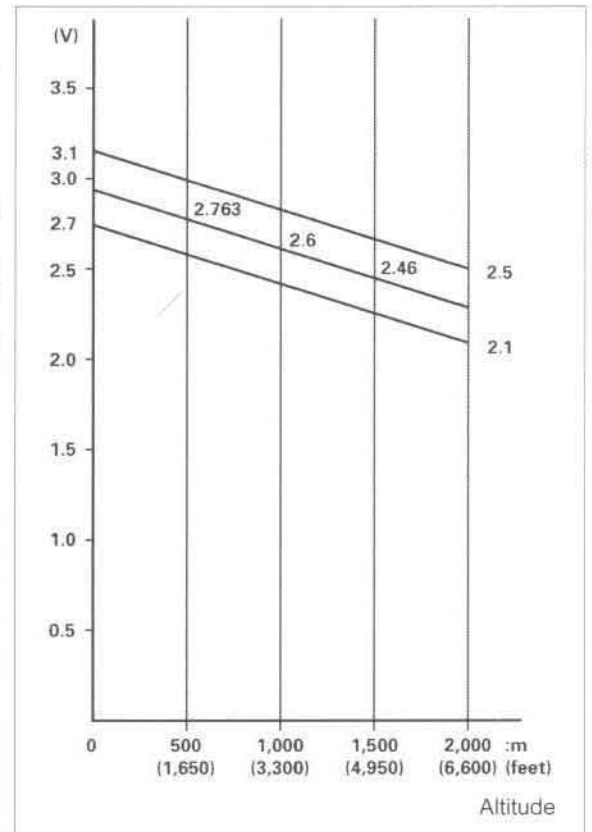
Connect the HDS pocket tester (page 5-13).

Connect the 12 V battery ("ECM" selector switch is ON) (page 5-12).

View the voltage with HDS pocket tester.

**Standard: 2.7 – 3.1 V**

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,013 hPa). The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmospheric pressure. Check the altitude and be sure that the measured voltage falls within the specified value.

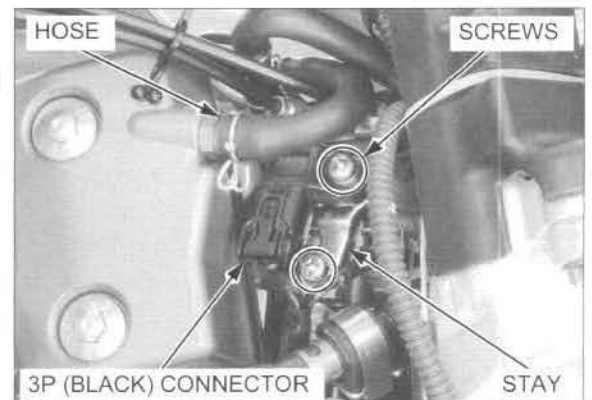


### REMOVAL/INSTALLATION

Hang the fuel tank to the left side of the frame (page 3-6).

Disconnect the crankcase breather hose and MAP sensor 3P (Black) connector.

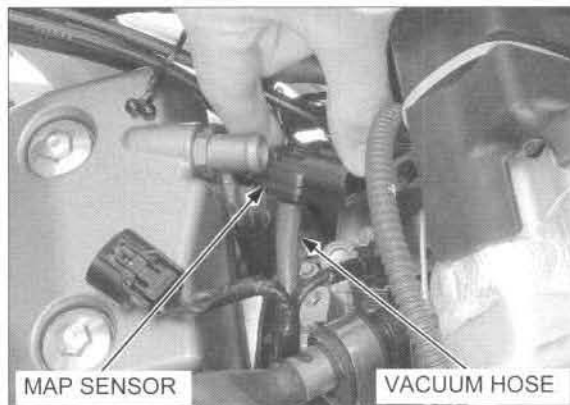
Remove the screws and stay.



## FUEL SYSTEM (PGM-FI)

Disconnect the MAP sensor vacuum hose from the MAP sensor.

Connect the MAP sensor vacuum hose to the MAP sensor.



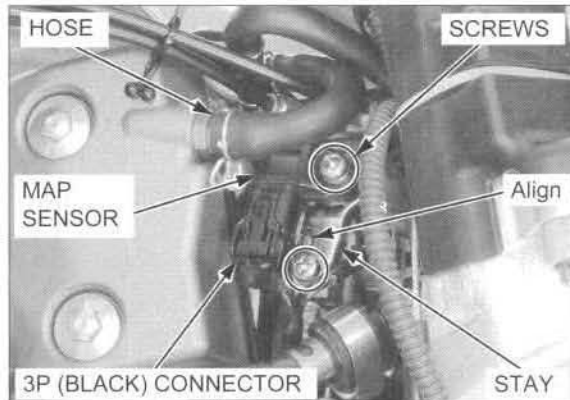
Install the MAP sensor/stay by aligning the stay hole with the tab of the throttle body.

Install and tighten the MAP sensor screws to the specified torque.

**TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)**

Connect the MAP sensor 3P (Black) connector and crankcase breather hose.

Install the fuel tank (page 3-6).



## IAT SENSOR

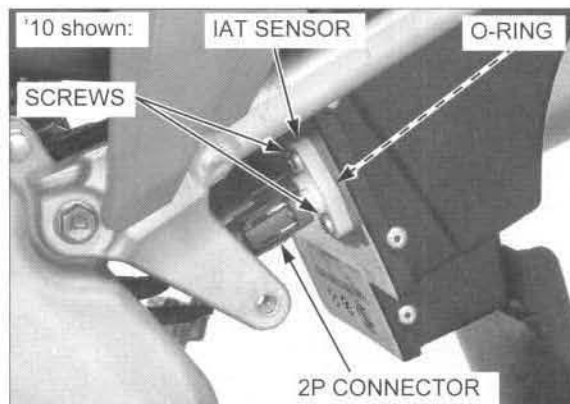
### REMOVAL/INSTALLATION

Remove the left side cover (page 2-3).

'10 - '12: Disconnect the IAT sensor 2P (Gray) connector.

After '12: Disconnect the IAT sensor 2P (Black) connector.

Remove the screws, IAT sensor and O-ring.



Apply engine oil to a new O-ring and install it to the IAT sensor.

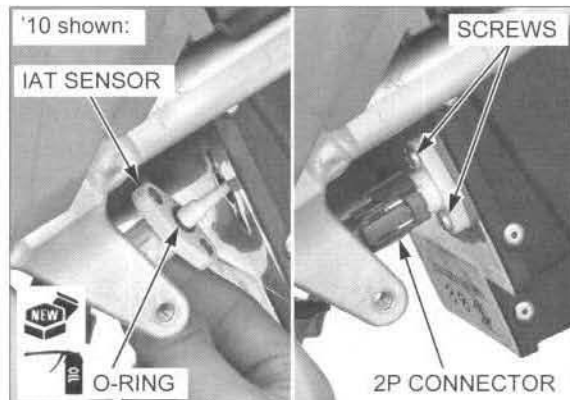
Install the IAT sensor and screws.  
Tighten the screws to the specified torque.

**TORQUE: 1.1 N·m (0.1 kgf·m, 0.8 lbf·ft)**

'10 - '12: Connect the IAT sensor 2P (Gray) connector.

After '12: Connect the IAT sensor 2P (Black) connector.

Install the left side cover (page 2-3).





# ECT SENSOR

## INSPECTION

Drain the coolant from the system (page 6-6).  
Remove the ECT sensor (page 5-57).

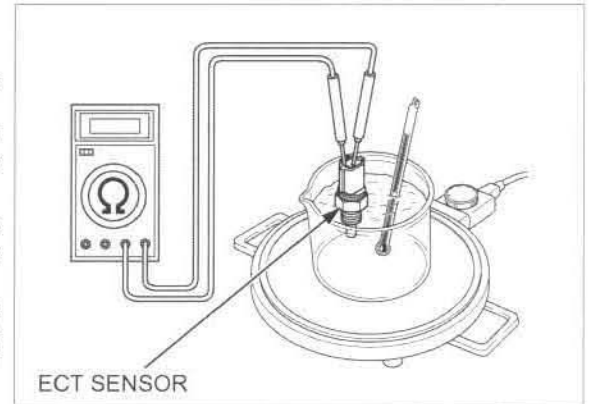
Heat the coolant (1:1 mixture) with an electric heating element.

Suspend the ECT sensor in heated coolant and measure the resistance through the sensor as the coolant heats up.

- 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 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	40°C (104°F)	100°C (212°F)
Resistance	1.0 – 1.3 kΩ	0.14 – 0.17 kΩ

Replace the ECT sensor if it is out of specifications.  
Install the ECT sensor (page 5-57).



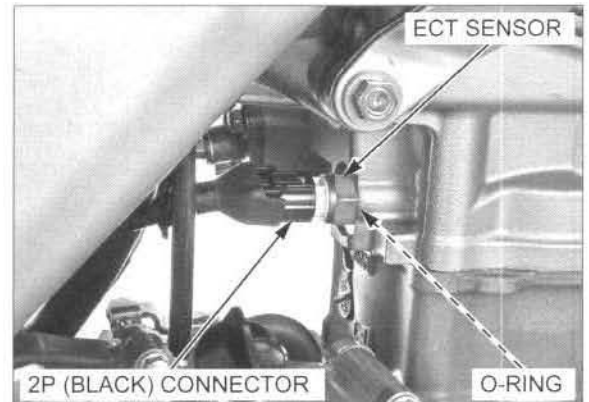
## REMOVAL

Drain the coolant (page 6-6).

Remove the exhaust system (page 2-9).

Disconnect the ECT sensor 2P (Black) connector.

Remove the ECT sensor and O-ring.



## INSTALLATION

Install a new O-ring onto the ECT sensor.

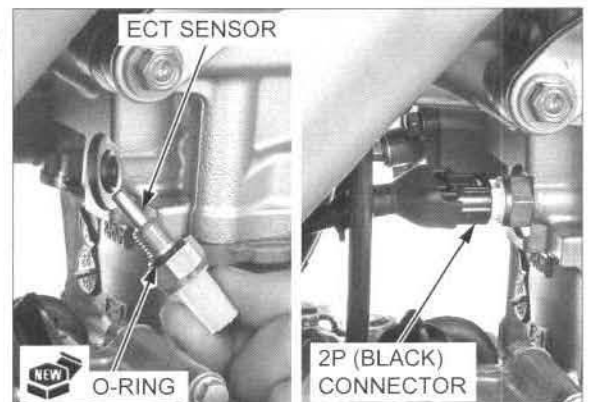
Install and tighten the ECT sensor to the specified torque.

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

Connect the ECT sensor 2P (Black) connector.

Install the exhaust system (page 2-9).

Fill and bleed the cooling system (page 6-6).





ECM

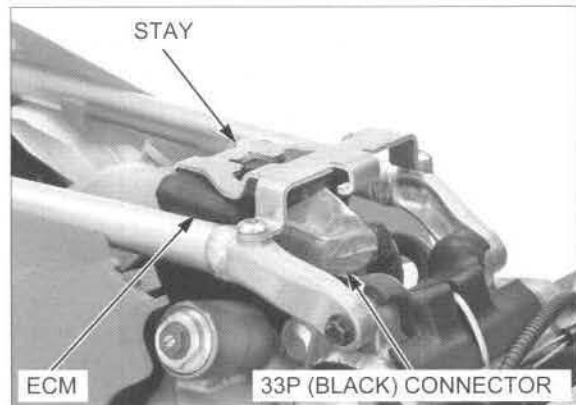
REMOVAL/INSTALLATION

Hang the fuel tank to the left side of the frame (page 3-6).

Disconnect the ECM 33P (Black) connector.

Remove the ECM from the ECM stay.

Installation is in the reverse order of removal.



POWER/GROUND LINE INSPECTION

NOTE:

- Before starting the inspection, check the regulator/rectifier (page 16-11).

ENGINE DOES NOT START (MIL DOES NOT BLINK)

1. Engine Stop Switch Inspection

Inspect the engine stop switch (page 16-15).

*Does the engine stop switch operate normally?*

**YES** – GO TO STEP 2.

**NO** – Faulty engine stop switch

2. ECM Power Input Line Inspection

Disconnect the ECM 33P (Black) connector (page 5-58).

Check for continuity at the ECM 33P (Black) connector terminals and ground.

**Connection: 23 – Ground**

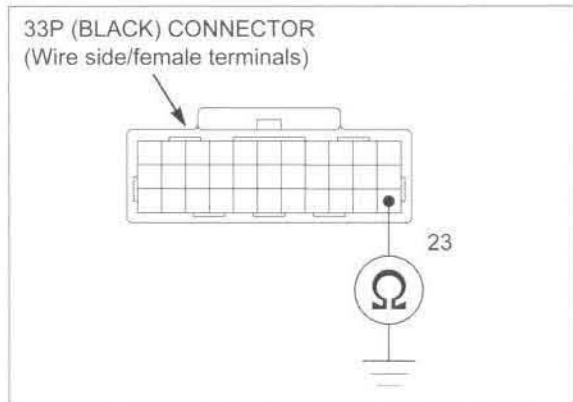
TOOL:

Test probe 07ZAJ-RDJA110

*Is there continuity?*

**YES** – Short circuit in Black wire

**NO** – GO TO STEP 3.



3. ECM Ground Line Inspection

Check for continuity between the ECM 33P (Black) connector terminals and ground.

**Connection: 2 – Ground ('10 - '12 only)**

**6 – Ground**

**12 – Ground**

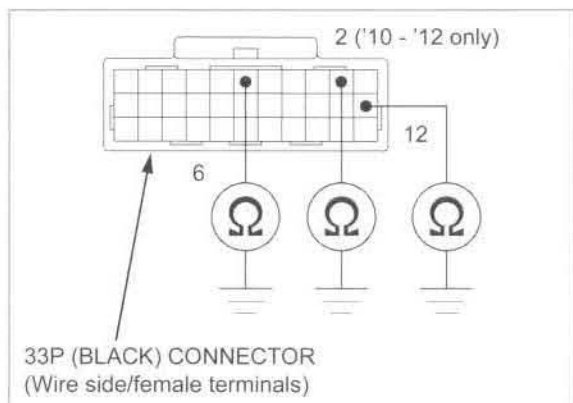
TOOL:

Test probe 07ZAJ-RDJA110

*Is there continuity?*

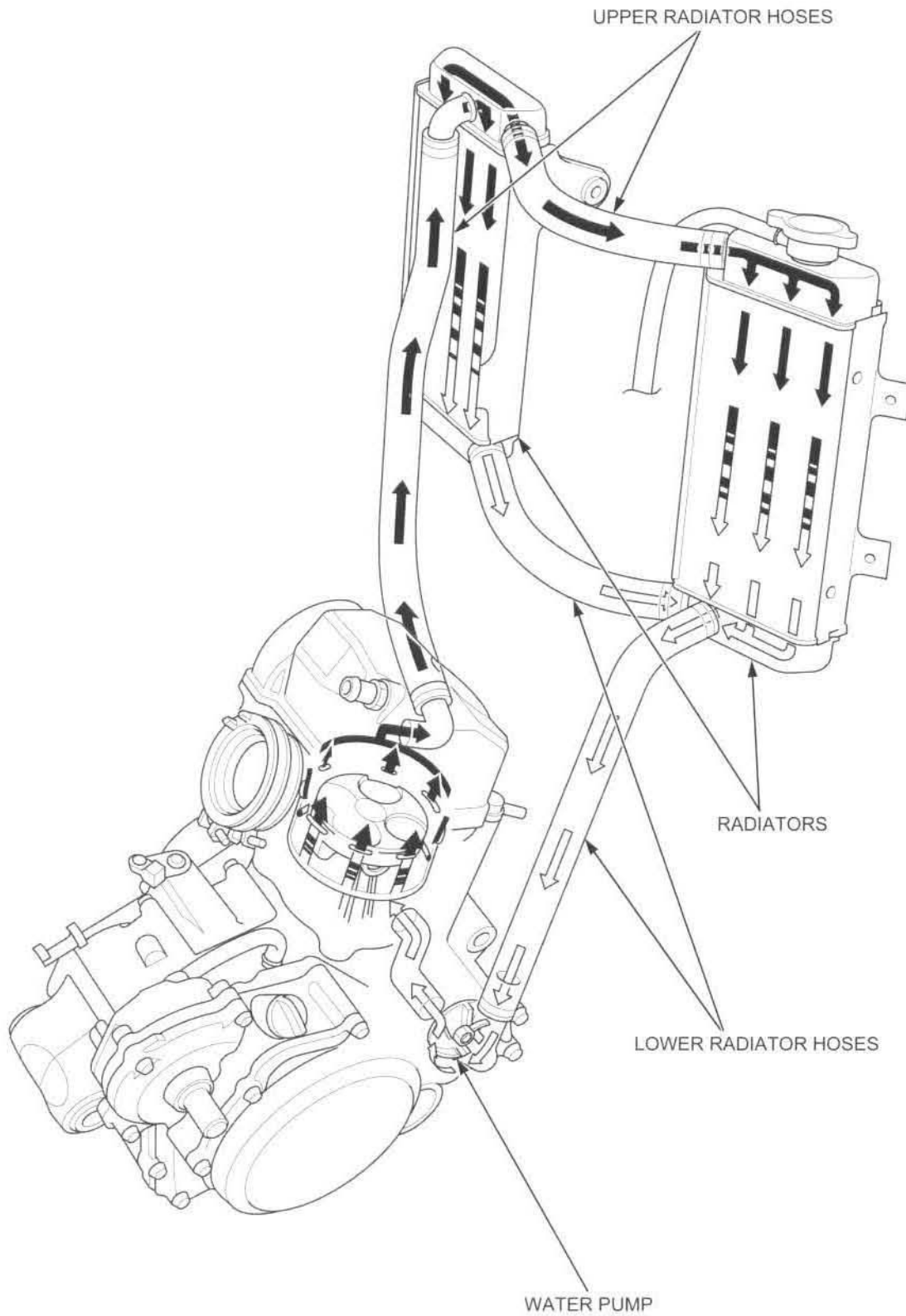
**YES** – Replace the ECM with a known good one, and recheck.

**NO** – Open circuit in Ground line



SYSTEM FLOW PATTERN.....	6-2	COOLANT REPLACEMENT.....	6-6
SERVICE INFORMATION.....	6-3	RADIATOR.....	6-7
TROUBLESHOOTING.....	6-4	WATER PUMP.....	6-10
SYSTEM TESTING.....	6-5		

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 mechanical seal or blockage of radiator passages. Using tap water may cause engine damage.

- 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.
- After servicing the system, check for leaks with a cooling system tester.

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	At change	1.03 liter (1.09 US qt, 0.91 Imp qt)
	At disassembly	1.10 liter (1.16 US qt, 0.97 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors (1:1 mixture with distilled water)

## TORQUE VALUES

Water pump impeller

12 N·m (1.2 kgf·m, 9 lbf·ft)

Left hand threads

## TOOLS

Attachment, 32 x 35 mm 07746-0010100 	Bearing remover set, 12 mm 07936-1660101  not available in U.S.A.	Remover weight 07741-0010201  or 07936-371020A (U.S.A. only)
Remover head, 12 mm 07936-1660110  not available in U.S.A.	Remover shaft 07936-1660120  not available in U.S.A.	Remover handle 07936-3710100 (U.S.A. only) 

## COOLING SYSTEM

<p>Driver 07749-0010000</p> 	<p>Installer collar 070MF-MEN0210</p>  <p>or 070MF-MENA210 (U.S.A. only)</p>	<p>Installer base 070MF-KRN0100</p>  <p>or 070MF-KRNA100 (U.S.A. only)</p>
<p>Attachment, 22 x 24 mm 07746-0010800</p> 	<p>Bearing remover, 12 mm 07936-166010A (U.S.A. only)</p> 	<p>Pilot, 12 mm 07746-0040200</p> 

## TROUBLESHOOTING

### Engine temperature too high

- Faulty radiator cap
- Insufficient coolant
- Passage blocked in radiator, hoses or water jacket
- Radiator air passage clogged with dirt
- Air in system
- Faulty water pump
- Bent or worn water pump shaft
- Damaged water pump shaft bearings

### Coolant leak

- Faulty oil seal and mechanical seal
- Deteriorated oil seal and mechanical seal
- Damaged or deteriorated O-ring
- Loose hose connection or clamp
- Damaged or deteriorated hose
- Faulty radiator cap
- Damaged radiator

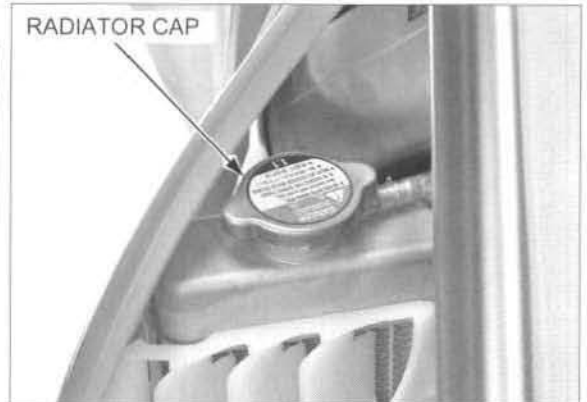
## SYSTEM TESTING

### COOLANT (HYDROMETER TEST)

Make sure the engine is cool, remove the radiator cap.

#### ⚠ WARNING

Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.



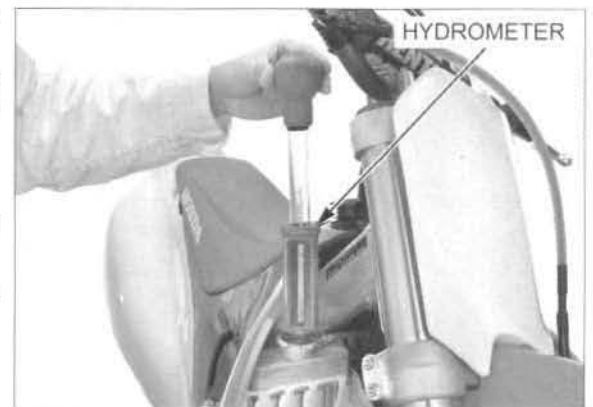
Test the coolant specific gravity using a hydrometer (see below for "COOLANT GRAVITY CHART").

For maximum corrosion protection, a 1:1 solution of ethylene glycol and distilled water is recommended (page 6-6).

#### STANDARD COOLANT CONCENTRATION: 1:1

Look for contamination and replace the coolant if necessary.

After checking the gravity, install the radiator cap securely.



#### 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 surface with water.*

Install the radiator cap on the tester.

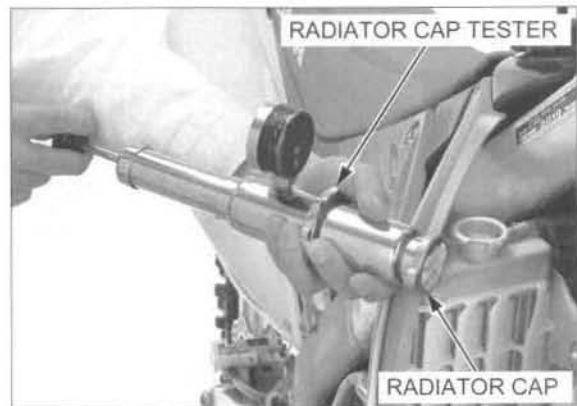
Pressure test the radiator cap.

Replace the radiator cap if it does not hold pressure, or if the relief pressure is too high or too low.

It must hold the specified pressure for at least 6 seconds.

#### RADIATOR CAP RELIEF PRESSURE:

108 – 137 kPa (1.1 – 1.4 kgf/cm<sup>2</sup>, 16 – 20 psi)



Pressurize the radiator, engine and hoses, and check for leaks.

#### NOTICE

*Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm<sup>2</sup>, 20 psi).*

Repair or replace components if the system will not hold the specified pressure for at least 6 seconds.

After checking the pressure, install the radiator cap securely.



## COOLANT REPLACEMENT

### PREPARATION

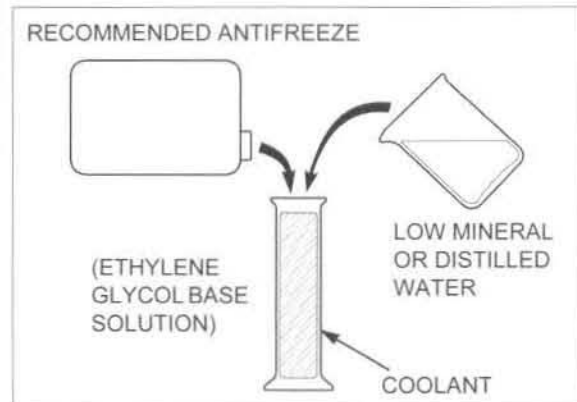
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance, change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

#### RECOMMENDED ANTIFREEZE:

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

#### RECOMMENDED MIXTURE:

**1:1 Mixture with distilled water**



## REPLACEMENT/AIR BLEEDING

*Support the motorcycle in an upright position on a level surface.*

Remove the radiator cap (page 6-5).

Drain the coolant from the system, removing the coolant drain bolt and sealing washer on the water pump cover.

Install the drain bolt with a new sealing washer. Tighten the drain bolt securely.

### ⚠ WARNING

Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

*When filling the system, place the motorcycle in an upright position on a flat, level surface.*

Fill the system with the recommended coolant through the filler opening up to the filler neck.

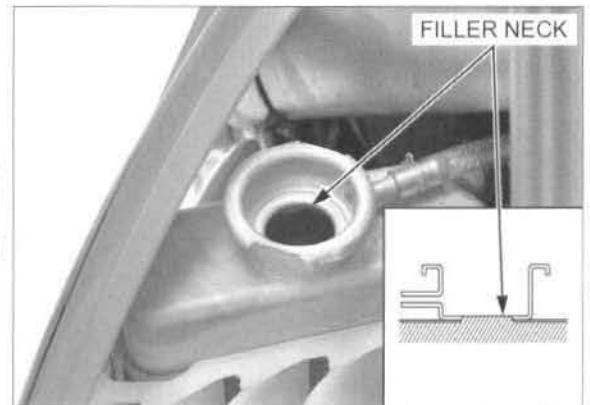
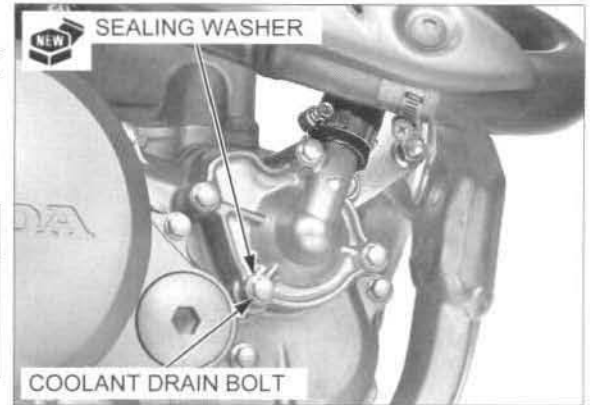
#### CAPACITY:

**1.03 liter (1.09 US qt, 0.91 Imp qt) at change**

Lean the machine approximately 20° to the right and several times to bleed any air trapped in the cooling system.

If the coolant level drops, add more coolant and repeat the air bleeding procedure.

Install the radiator cap securely.



## RADIATOR

### REMOVAL

Drain the coolant (page 6-7).

Remove the radiator shrouds (page 2-4).

*Be careful not to damage the radiator core.*

Remove the radiator grills.

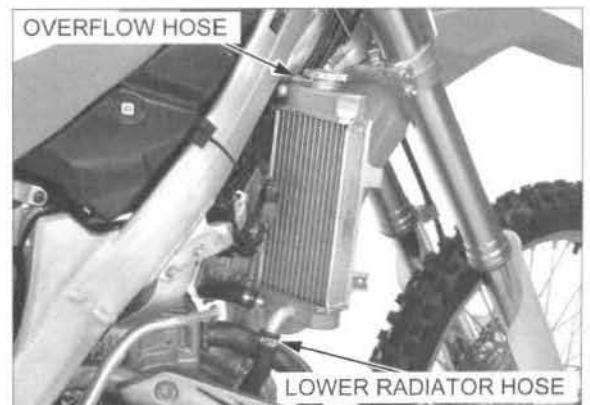


*Note the direction of the hose clamp.*

*Be careful not to damage the radiator core.*

Disconnect the following from the right side radiator:

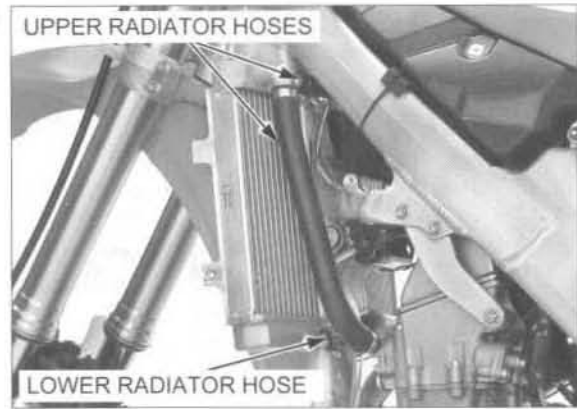
- Overflow hose
- Lower radiator hose



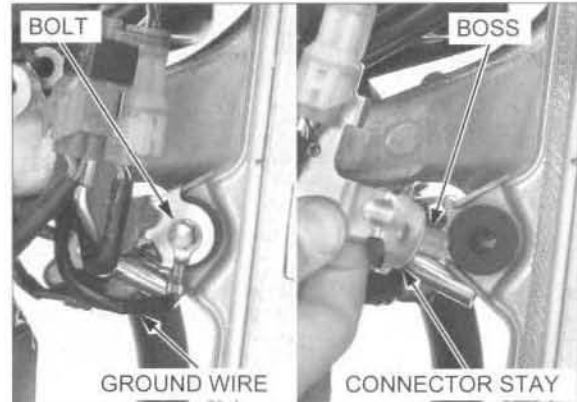


## COOLING SYSTEM

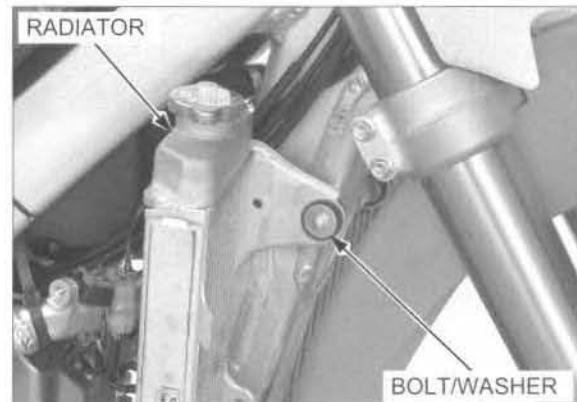
Disconnect the left side upper and lower radiator hoses from the radiator.



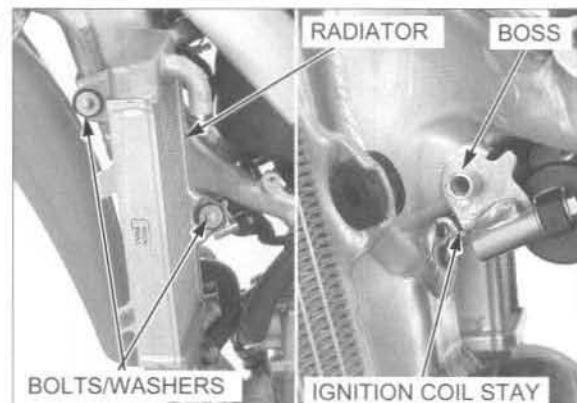
Remove the bolt, ground wire and connector stay boss from the right side radiator lower mount.



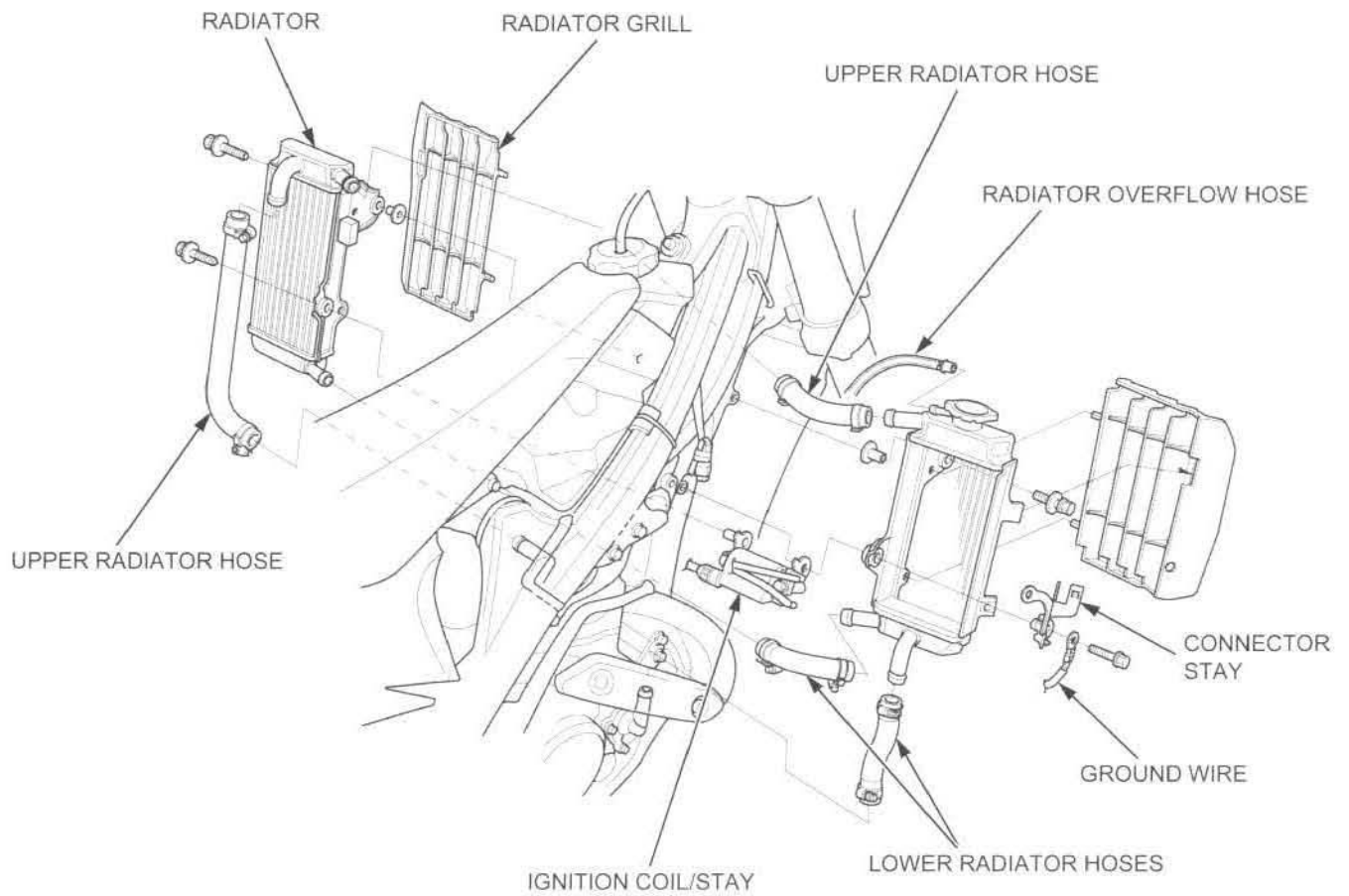
Remove the right side radiator upper mounting bolt, washer and then remove the right side radiator.



Remove the left side radiator mounting bolts, washers and left side radiator by releasing it from the ignition coil stay boss.



INSTALLATION



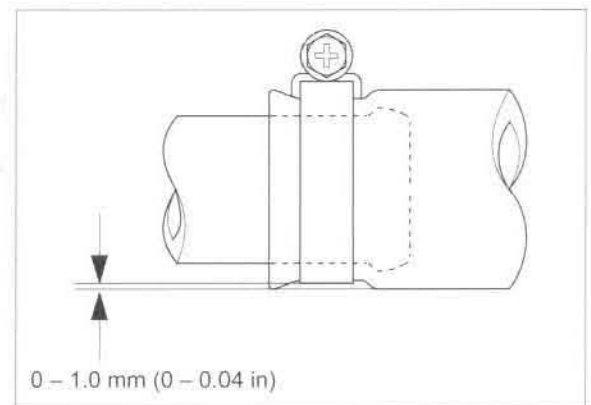
*Route the wires and hoses properly (page 1-21).*

Installation is in the reverse order of removal.

Tighten the radiator hose band screws as shown.

Fill the radiator with the recommended coolant mixture to the filler neck and bleed the air (page 6-7).

After installation, check the radiator and radiator hoses for leaks.



**WATER PUMP**

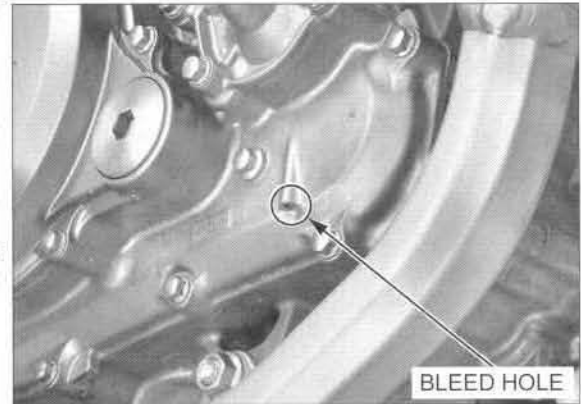
**MECHANICAL SEAL INSPECTION**

Check the bleed hole of the water pump for signs of coolant leakage.

If water leaks through the bleed hole, replace the mechanical seal (page 6-11).

If oil leaks through the bleed hole, replace the oil seal (page 6-11)

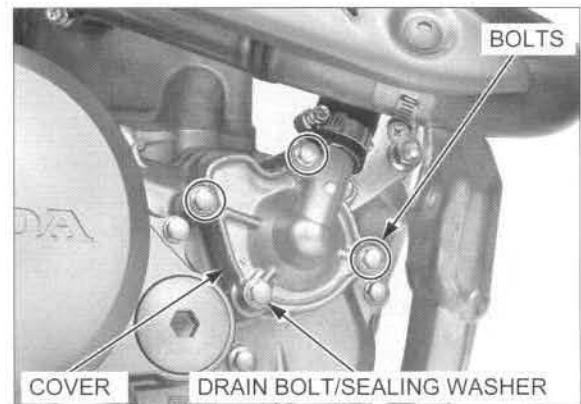
- A small amount of weeping from the bleed hole is normal.
- Make sure that there is no continuous coolant leakage from the bleed hole while operating the engine.



**REMOVAL**

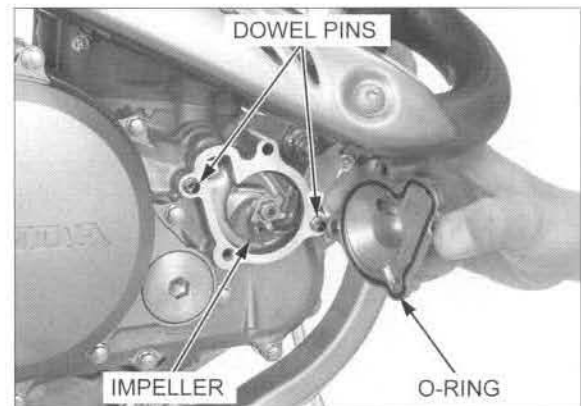
Drain the coolant (page 6-7)

Remove the drain bolt and sealing washer.  
Remove the bolts and water pump cover.



Remove the O-ring and dowel pins.  
Loosen the impeller.

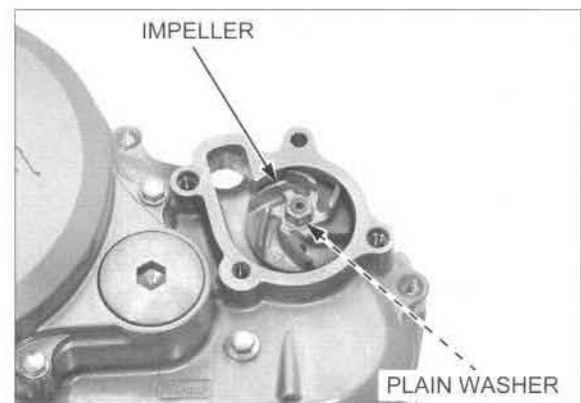
*The impeller has left hand threads.*



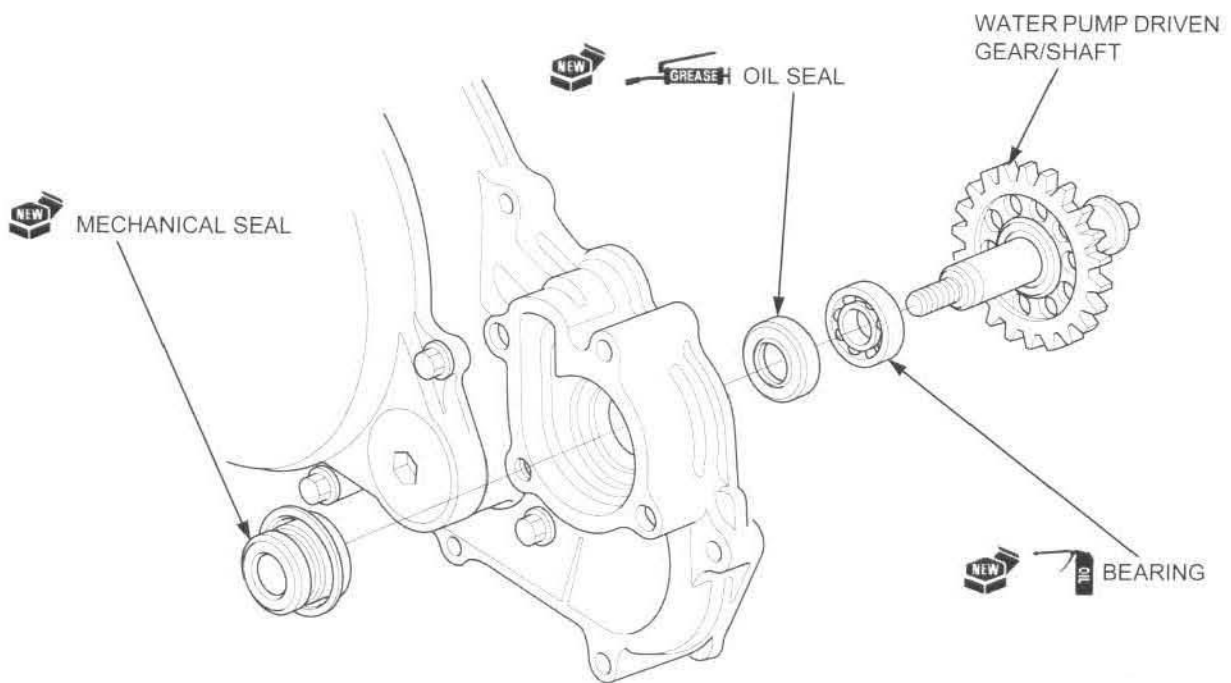
Remove the right crankcase cover (page 10-5).

*The impeller has left hand threads.*

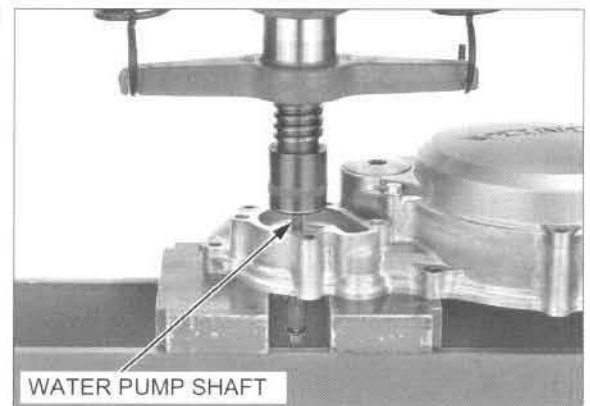
Remove the impeller and plain washer.



**BEARING/MECHANICAL SEAL/OIL SEAL REPLACEMENT**



Press the water pump shaft out from the right crankcase cover.



Remove the water pump shaft bearing using the special tools.

**TOOLS:**

Bearing remover set,  
12 mm

- Remover weight
- Remover head, 12 mm

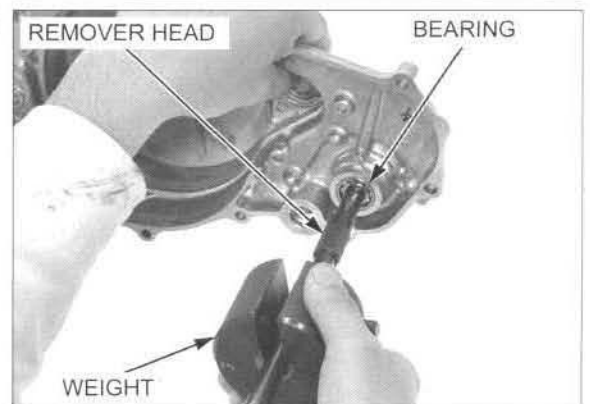
- Remover shaft

**TOOLS, U.S.A. only:**

Bearing remover, 12 mm  
Remover handle  
Remover weight

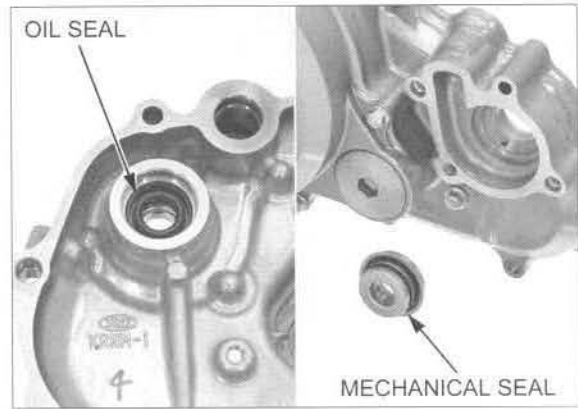
07936-1660101  
not available in  
U.S.A.  
07741-0010201  
07936-1660110  
not available in  
U.S.A.  
07936-1660120  
not available in  
U.S.A.

07936-166010A  
07936-3710100  
07936-371020A



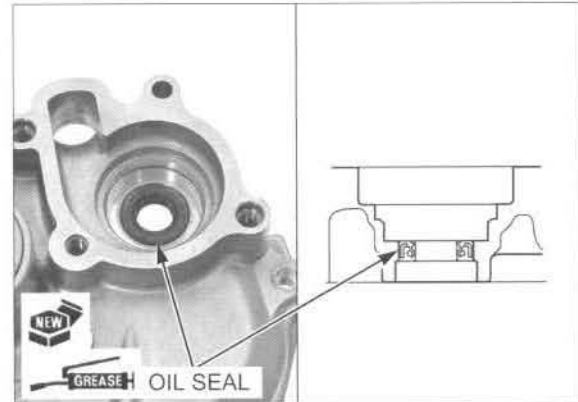
## COOLING SYSTEM

Remove the oil seal and mechanical seal from the right crankcase cover.



Apply grease to a new oil seal lips.

Install the oil seal into the right crankcase cover as shown.



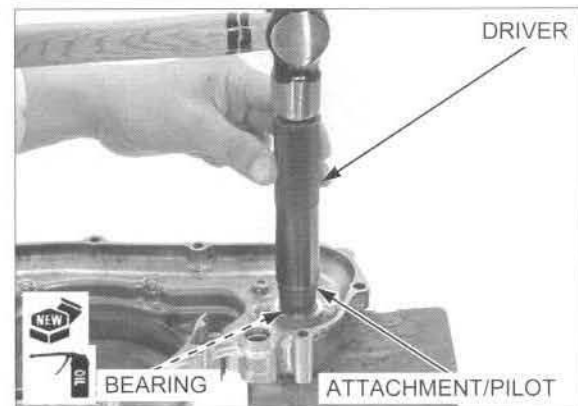
*Drive in a new bearing squarely with the marking side facing up.*

Drive in a new bearing into the right crankcase cover using the special tools as shown.

**TOOLS:**

<b>Driver</b>	07749-0010000
<b>Attachment, 22 x 24 mm</b>	07746-0010800
<b>Pilot, 12mm</b>	07746-0040200

After installing the bearing, lubricate it with engine oil.



Set the water pump shaft and a new mechanical seal.  
 Set the special tools onto the mechanical seal and water pump shaft as shown.

**TOOLS:**

Installer collar **070MF-MEN0210**  
 Installer base **070MF-KRN0100**

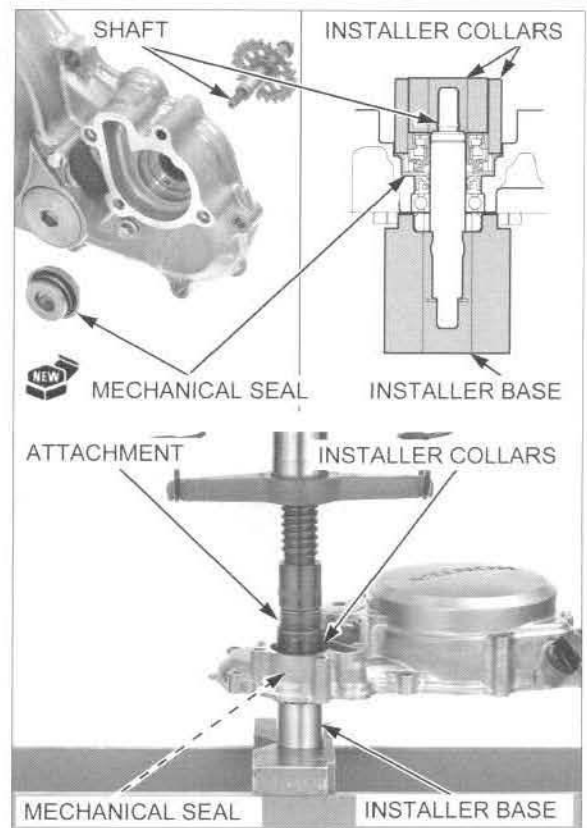
**TOOLS, U.S.A. only:**

Installer collar **070MF-MENA210**  
 Installer base **070MF-KRNA100**

Press the mechanical seal until it is fully seated to the right crankcase cover using the hydraulic press and special tool.

**TOOL:**

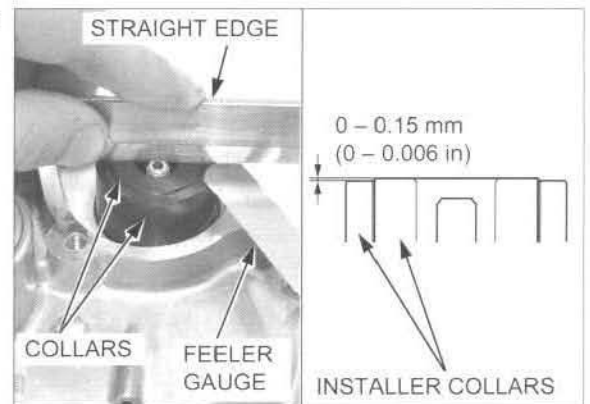
Attachment, 32 x 35 mm **07746-0010100**



Check the mechanical seal for proper installation using the straight edge and feeler gauge.

Measure the clearance between the installer collars.

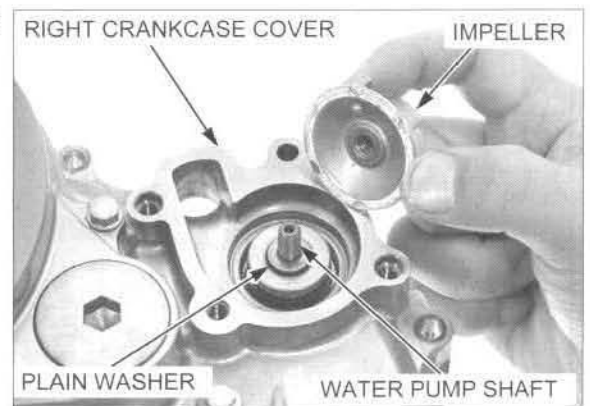
**STANDARD: 0 – 0.15 mm (0 – 0.006 in)**



**INSTALLATION**

*The impeller has left hand threads. Tighten it after installing the right crankcase cover.*

Install the plain washer and impeller to the water pump shaft.



## COOLING SYSTEM

Install the right crankcase cover (page 10-6).

*The impeller has left  
hand threads.*

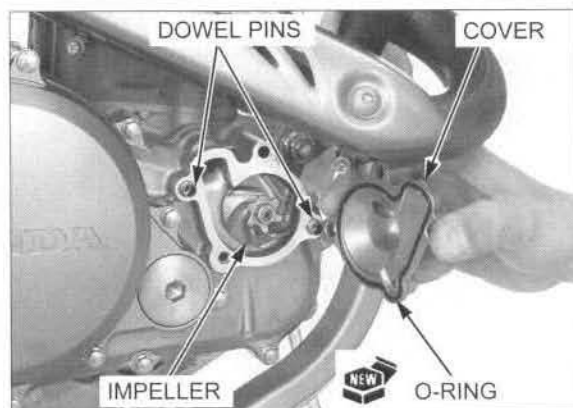
Tighten the water pump impeller to the specified torque.

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

Install the dowel pins.

Install a new O-ring to the water pump cover.

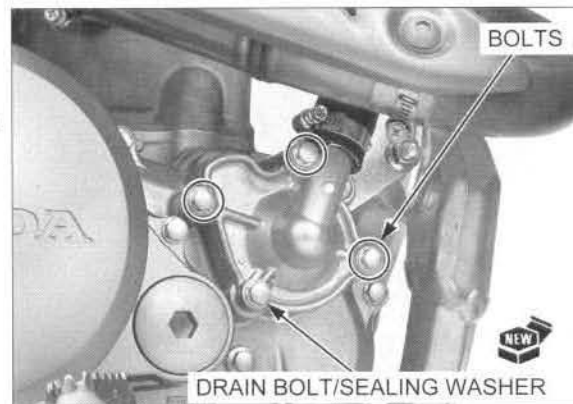
Install the water pump cover.



Install and tighten the bolts securely.

Install the coolant drain bolt with a new sealing washer.  
Tighten the coolant drain bolt securely.

Fill the radiator with the recommended coolant mixture  
to the filler neck and bleed the air (page 6-7).



# 7. ENGINE REMOVAL/INSTALLATION

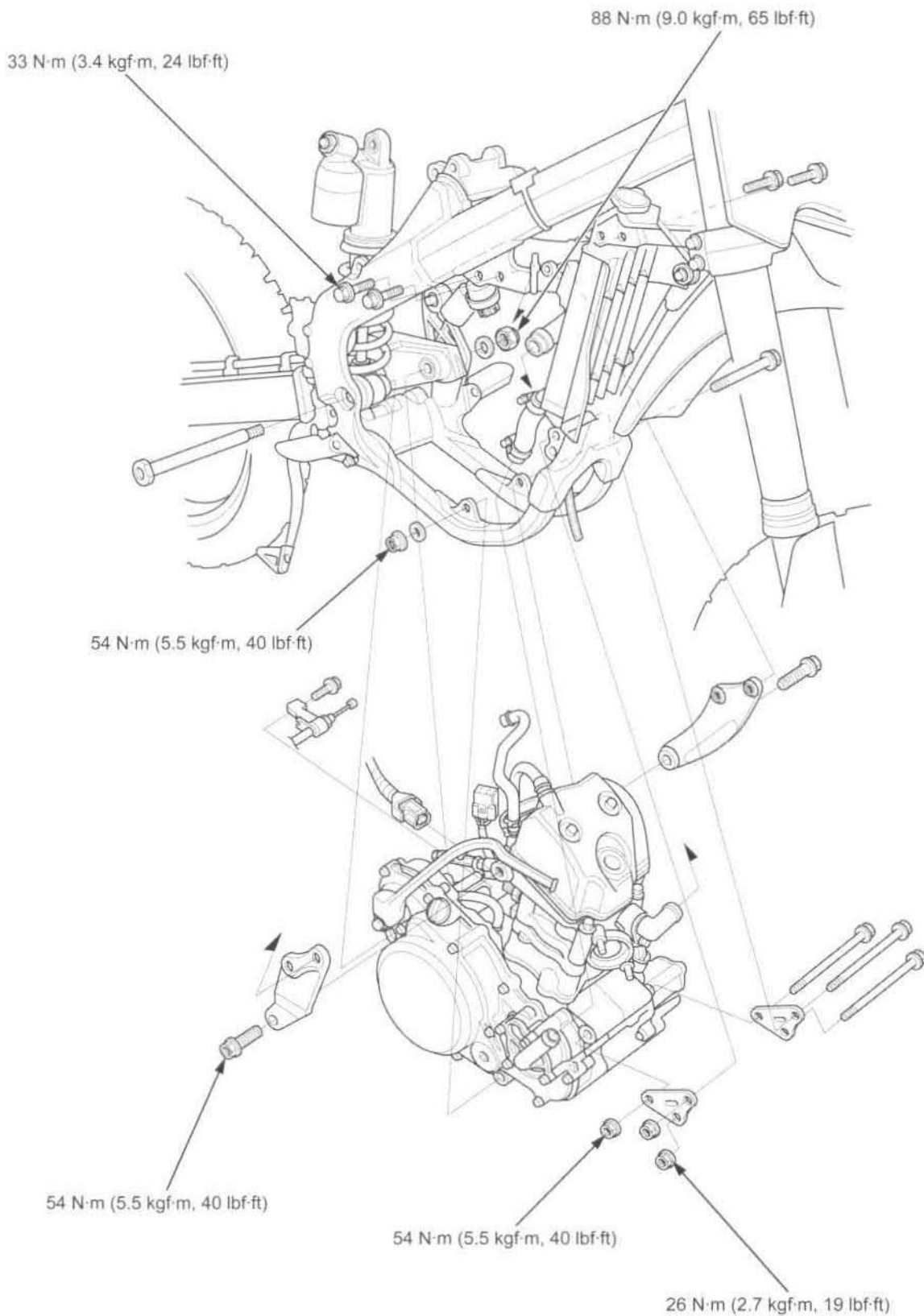
---

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



COMPONENT LOCATION

\*10 shown:



## SERVICE INFORMATION

### GENERAL

- When removing/installing the engine, tape the frame around the engine beforehand for frame protection.
- During engine removal and installation, support the motorcycle using a workstand or equivalent.
- The following components require engine removal for service.
  - Crankcase (page 12-13)/Crankshaft (page 12-24)/Transmission (page 12-18)
  - One-way valve (page 12-15)
  - Oil pump (page 4-5)
- The following components can be serviced with the engine installed in the frame.
  - Cylinder head (page 8-17)/Valves (page 8-19)
  - Cylinder (page 9-4)/Piston (page 9-4)
  - Clutch (page 10-7)/Kickstarter (page 10-16)/Gearshift linkage (page 10-20)
  - Throttle body (page 5-49)
  - Flywheel (page 11-5)
  - Water pump (page 6-10)
  - Primary drive gear (page 12-7)/Balancer (page 12-9)

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		24.5 kg (54.0 lbs)
Recommended engine oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Recommended transmission oil		Pro Honda GN4 4-stroke oil (U.S.A. and Canada) or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W-30
Engine oil capacity	At draining	0.67 liter (0.70 US qt, 0.59 Imp qt)
	At oil and filter change	0.69 liter (0.73 US qt, 0.61 Imp qt)
	At disassembly	0.85 liter (0.90 US qt, 0.75 Imp qt)
Transmission oil capacity	At draining	0.68 liter (0.72 US qt, 0.60 Imp qt)
	At disassembly	0.75 liter (0.79 US qt, 0.66 Imp qt)
Coolant capacity	At change	1.03 liter (1.09 US qt, 0.91 Imp qt)
	At disassembly	1.10 liter (1.16 US qt, 0.97 Imp qt)

### TORQUE VALUES

Cylinder head hanger bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Lower engine hanger nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Front engine hanger nut	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Front engine hanger plate nut	26 N·m (2.7 kgf·m, 19 lbf·ft)	
Cylinder head hanger plate bolt	33 N·m (3.4 kgf·m, 24 lbf·ft)	
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut

## ENGINE REMOVAL/INSTALLATION

### ENGINE REMOVAL

Drain the engine oil (page 3-13).  
Drain the transmission oil (page 3-17).  
Drain the coolant (page 6-7).

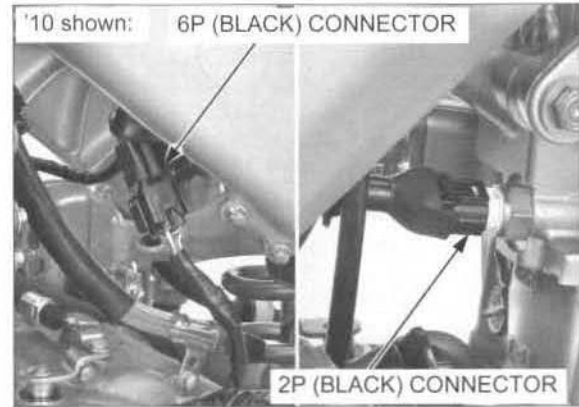
Remove the following:

- Engine guard (page 2-4)
- Fuel tank (page 5-45)
- Exhaust pipe (page 2-15)
- Throttle body (page 5-49)
- Ignition coil (page 16-13)
- Gearshift pedal (page 10-20)
- Brake pedal pivot bolt (page 15-29)
- Condenser (page 16-16)
- Regulator/ rectifier (page 16-11) (After '12 only)
- Drive sprocket cover (page 3-18)
- Drive chain (page 3-18)

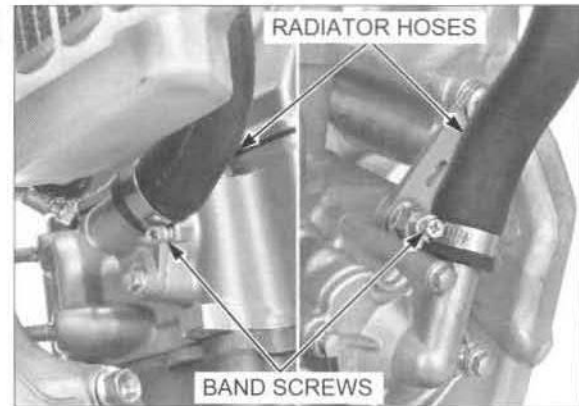
Disconnect the alternator/CKP sensor 6P (Black) connector.

Disconnect the ECT sensor 2P (Black) connector.

Loosen the hose band screws, and disconnect the lower radiator hose and upper radiator hose from the engine.

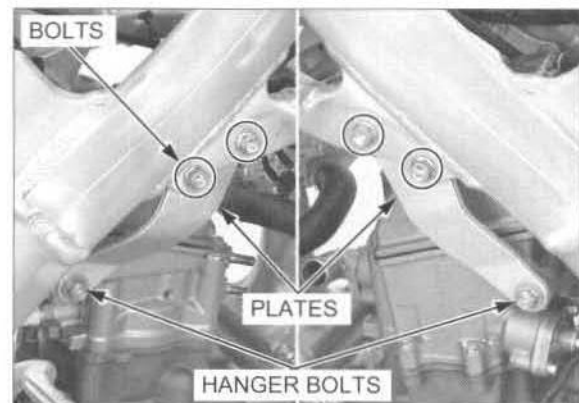
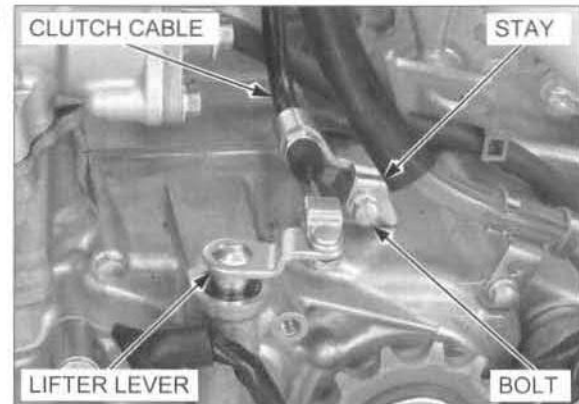


Remove the bolt and clutch cable stay, and disconnect the clutch cable from the clutch lifter lever.



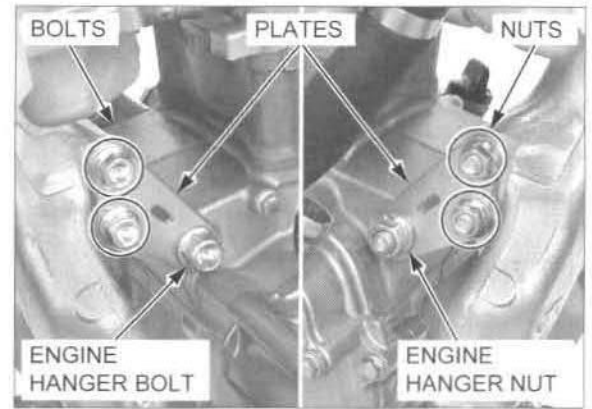
Remove the cylinder head hanger bolts.

Remove the bolts and cylinder head hanger plates.



## ENGINE REMOVAL/INSTALLATION

Remove the front engine hanger bolt and nut.  
Remove the bolts, nuts and front engine hanger plates.



Remove the swingarm pivot nut, washer and bolt.

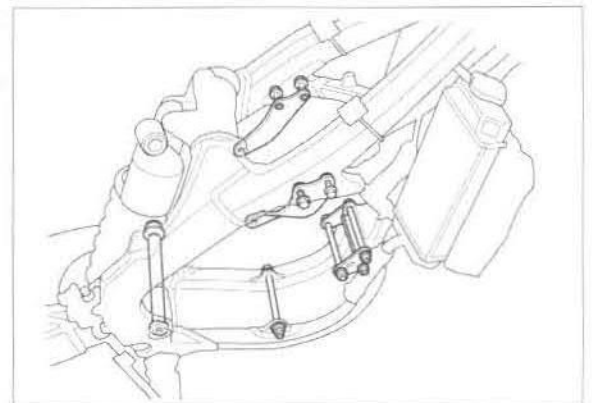


Remove the lower engine hanger bolt, nut and washer.  
Remove the engine from the right side of the frame.



Note the direction of the engine hanger plates and mounting bolts.

Temporarily install the swingarm pivot bolt so the frame can be moved and stored safely.



## ENGINE REMOVAL/INSTALLATION

### ENGINE INSTALLATION

#### NOTE:

- Install all the engine mounting fasteners loosely, then tighten the bolts and nuts to the specified torque.
- Route the wires, hoses and cables properly (page 1-21)

*Carefully align the mounting points to prevent damage to engine, frame, wire and cables.*

Set the engine into the frame in the reverse order of removal.

Apply thin coat of grease to the swingarm pivot bolt sliding surface.

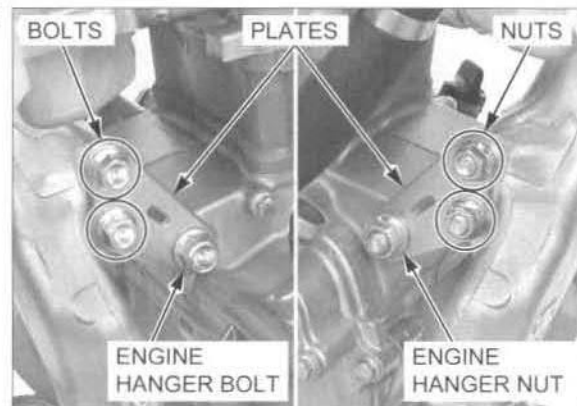
Loosely install the swingarm pivot bolt, washer and nut.



Loosely install the lower engine hanger bolt, washer and nut.



Loosely install the front engine hanger plates, bolts and nuts.

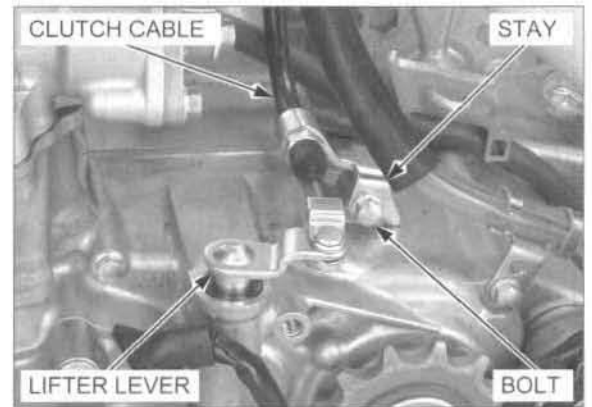
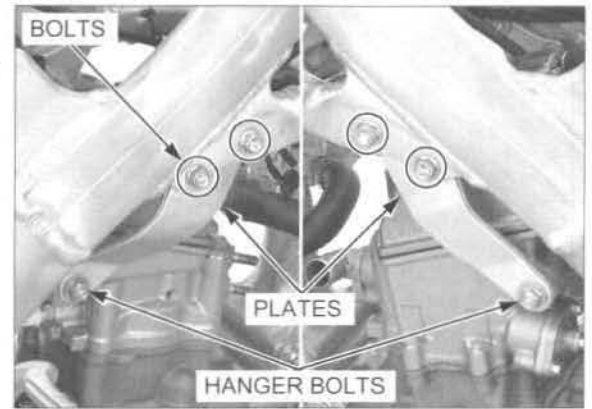


Install the cylinder head hanger plates and bolts.  
Loosely install the cylinder head hanger bolts.  
After installing all mounting fasteners, tighten the fasteners to the specified torque.

### TORQUE:

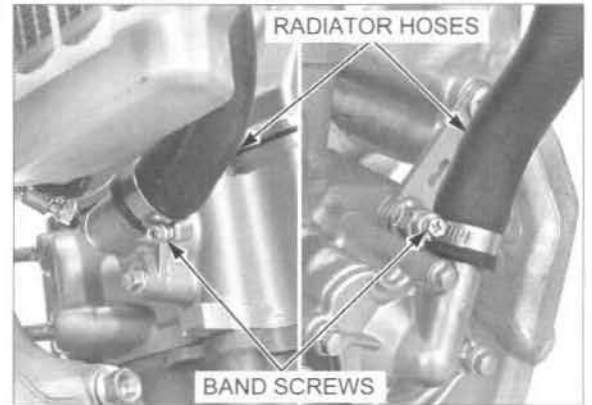
- Swingarm pivot nut:  
88 N·m (9.0 kgf·m, 65 lbf·ft)
- Front engine hanger nut:  
54 N·m (5.5 kgf·m, 40 lbf·ft)
- Lower engine hanger nut:  
54 N·m (5.5 kgf·m, 40 lbf·ft)
- Cylinder head hanger bolt:  
54 N·m (5.5 kgf·m, 40 lbf·ft)
- Cylinder head hanger plate bolt:  
33 N·m (3.4 kgf·m, 24 lbf·ft)
- Front engine hanger plate nut:  
26 N·m (2.7 kgf·m, 19 lbf·ft)

Connect the clutch cable to the clutch lifter lever.  
Install the clutch cable stay and bolts.  
Tighten the bolts securely.



Connect the lower radiator hose to the water pump cover.

Connect the upper radiator hose to the cylinder head.  
Tighten the hose band screws securely (page 6-9).



## ENGINE REMOVAL/INSTALLATION

Connect the alternator/CKP sensor 6P (Black) connector.

Connect the ECT sensor 2P (Black) connector.

Install the following:

- Drive chain (page 3-18)
- Drive sprocket cover (page 3-20)
- Regulator/rectifier (page 16-11) (After '12 only)
- Condenser (page 16-16)
- Brake pedal pivot bolt (page 15-29)
- Gearshift pedal (page 10-24)
- Ignition coil (page 16-13)
- Throttle body (page 5-52)
- Exhaust pipe (page 2-16)
- Fuel tank (page 5-45)
- Engine guard (page 2-4)

Fill the radiator with the recommended coolant mixture to the filler neck and bleed the air (page 6-7).

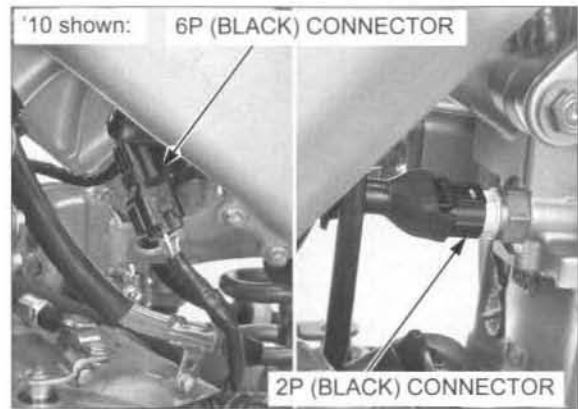
Fill the engine with the recommended oil (page 3-13).

Fill the transmission with the recommended oil (page 3-17).

After installing the engine, perform the following inspections and adjustments:

- Throttle grip freeplay (page 3-7)
- Drive chain slack (page 3-20)
- Clutch lever freeplay (page 3-26)

Check the exhaust system and cooling system for leaks.



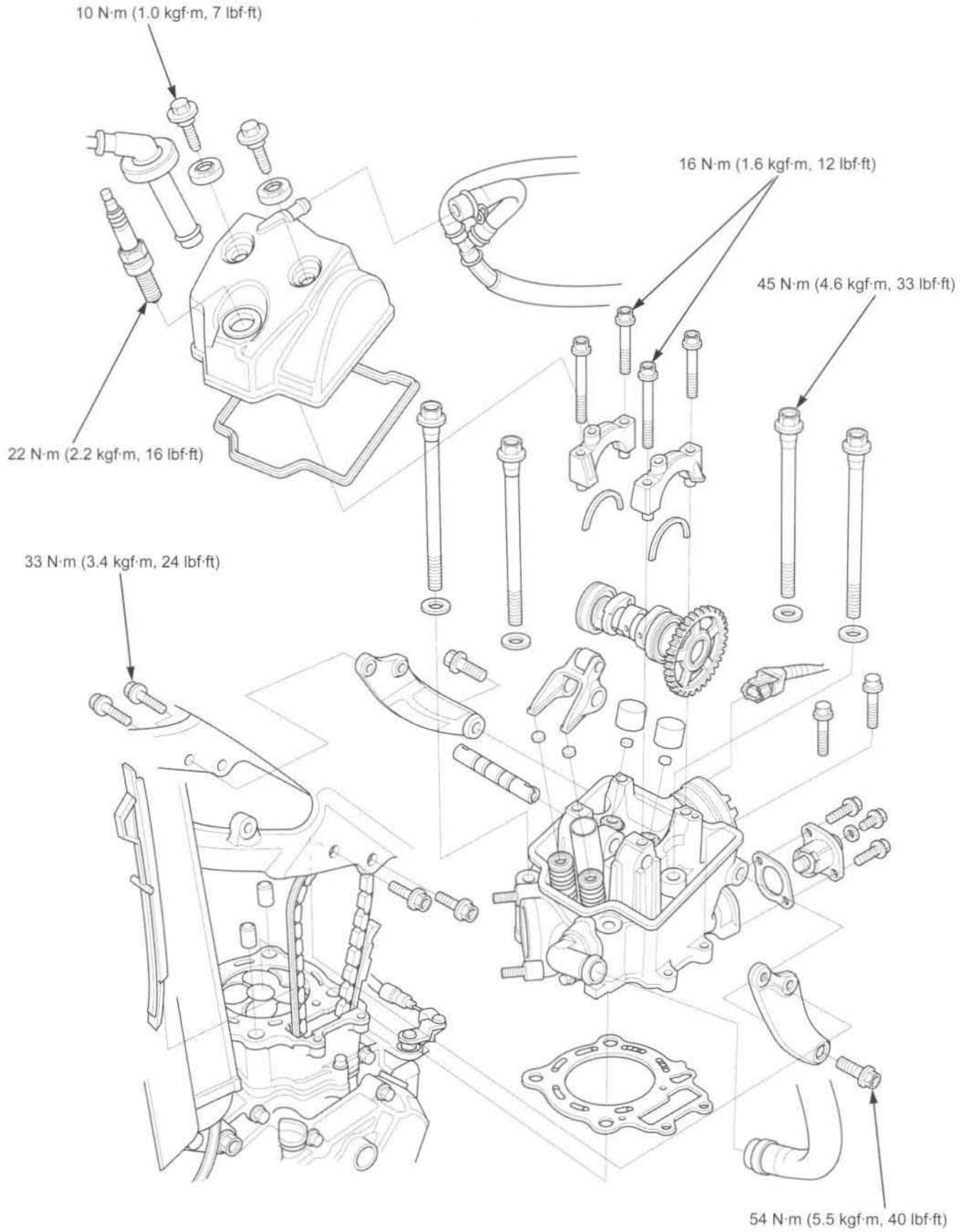
# 8. CYLINDER HEAD/VALVES

---

COMPONENT LOCATION .....	8-2	CYLINDER HEAD DISASSEMBLY .....	8-19
SERVICE INFORMATION .....	8-3	CYLINDER HEAD INSPECTION .....	8-20
TROUBLESHOOTING .....	8-6	VALVE GUIDE REPLACEMENT .....	8-22
CYLINDER COMPRESSION TEST .....	8-7	VALVE SEAT INSPECTION/REFACING ...	8-23
CYLINDER HEAD COVER .....	8-7	CYLINDER HEAD ASSEMBLY .....	8-26
CAMSHAFT/ROCKER ARM REMOVAL ...	8-10	CYLINDER HEAD INSTALLATION .....	8-30
DECOMPRESSOR SYSTEM .....	8-14	CAMSHAFT/ROCKER ARM INSTALLATION .....	8-32
VALVE CLEARANCE ADJUSTMENT .....	8-15	CAM CHAIN TENSIONER .....	8-35
CYLINDER HEAD REMOVAL .....	8-17		



COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers service of the camshaft, cylinder head, valves and cam chain tensioner. These services can be done with the engine installed in the frame.
- During disassembly, 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 lubrication oil is fed through oil passages in the cylinder head and camshaft holders. Clean the oil passages before assembling them.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

### SPECIFICATIONS

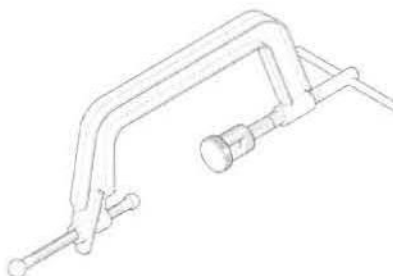
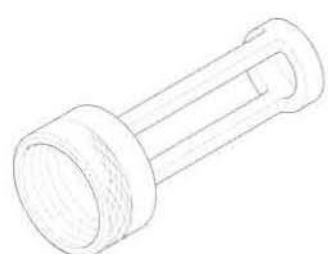
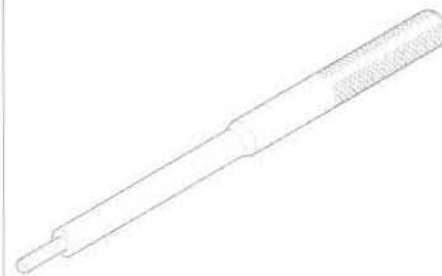

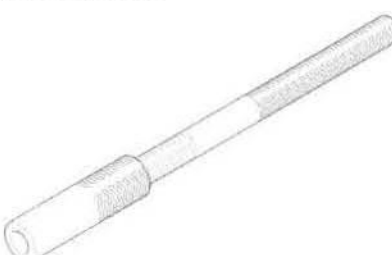







ITEM		STANDARD		Unit: mm (in)	SERVICE LIMIT
Cylinder compression		598 kPa (6.1 kgf/cm <sup>2</sup> , 87 psi) at cranking			—
Cylinder head warpage		—			0.05 (0.002)
Valve and valve guide	Valve clearance	IN	0.12 ± 0.03 (0.005 ± 0.001)		—
		EX	0.28 ± 0.03 (0.011 ± 0.001)		—
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)		—
		EX	4.465 – 4.480 (0.1758 – 0.1764)		4.455 (0.1754)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)		5.052 (0.1989)
		EX	4.500 – 4.512 (0.1772 – 0.1776)		4.552 (0.1792)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)		—
		EX	0.020 – 0.047 (0.0008 – 0.0019)		—
Valve guide projection above cylinder head	IN	15.4 – 15.6 (0.606 – 0.614)		—	
	EX	21.3 – 21.5 (0.839 – 0.847)		—	
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)		1.7 (0.07)
Valve spring free length		IN	42.50 (1.673)		42.1 (1.66)
		EX	46.71 (1.839)		46.3 (1.82)
Rocker arm	Rocker arm I.D.		13.000 – 13.018 (0.5118 – 0.5125)		13.025 (0.5128)
	Rocker arm shaft O.D.		12.977 – 12.985 (0.5109 – 0.5112)		12.97 (0.511)
	Rocker arm-to-shaft clearance		0.015 – 0.041 (0.0006 – 0.0016)		0.055 (0.0022)
Camshaft	Cam lobe height	IN	36.200 – 36.440 (1.4252 – 1.4346)		36.06 (1.420)
		EX	25.524 – 25.764 (1.0049 – 1.0143)		25.41 (1.000)
Valve lifter O.D.			22.478 – 22.493 (0.8850 – 0.8855)		22.47 (0.885)
Valve lifter bore I.D.			22.510 – 22.526 (0.8862 – 0.8868)		22.54 (0.887)

### TORQUE VALUES

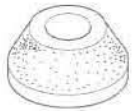

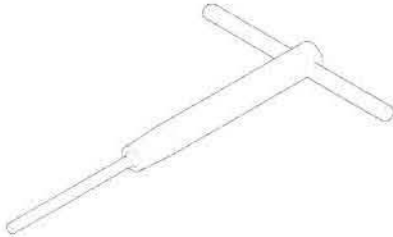
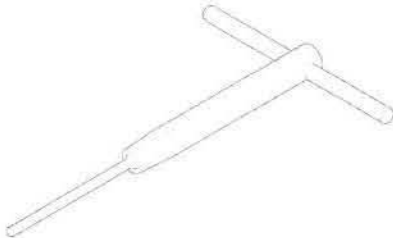
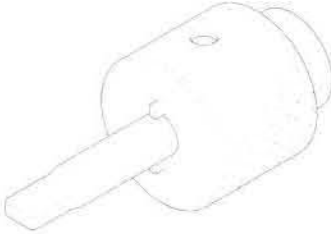

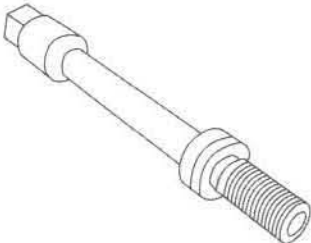
Breather plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads (page 8-8).
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder mounting bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply engine oil to the threads.
Cylinder head bolt	45 N·m (4.6 kgf·m, 33 lbf·ft)	Apply engine oil to the threads and seating surface.
Cam chain tensioner bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads (page 8-37).
Crankshaft hole cap	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply grease to the threads.
Cylinder head hanger bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Cylinder head hanger plate bolt	33 N·m (3.4 kgf·m, 24 lbf·ft)	
Shock absorber upper mounting nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Insulator band screw (Cylinder head side)	See page 8-29	

# CYLINDER HEAD/VALVES

## TOOLS

<p>Valve spring compressor 07757-0010000</p> 	<p>Valve spring compressor attachment 070ME-MCW0100</p>  <p>070ME-MCWA100 (U.S.A. only)</p>	<p>Valve guide driver, 5.0 mm 07942-8920000</p>  <p>07942-MA60000 (U.S.A. only)</p>
<p>Valve guide driver, 4.5 mm 07HMD-ML00101</p> 	<p>Valve guide driver 07743-0020000</p>  <p>Not available in U.S.A.</p>	<p>Tappet hole protector 07JMG-KY20100</p>  <p>Not available in U.S.A.</p>
<p>Valve guide reamer, 5.0 mm 07984-MA60001</p>  <p>or 07984-MA6000D (U.S.A. only)</p>	<p>Valve guide reamer, 4.5 mm 07HMH-ML00101</p>  <p>or 07HMH-ML0010B (U.S.A. only)</p>	<p>Valve seat cutter, 33 mm (45°, IN) 07780-0010800</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Valve seat cutter, 24.5 mm (45°, EX) 07780-0010100</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Flat cutter, 33 mm (32°, IN) 07780-0012900</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Flat cutter, 27 mm (32°, EX) 07780-0013300</p>  <p>or equivalent commercially available in U.S.A.</p>

## CYLINDER HEAD/VALVES

<p>Interior cutter, 34 mm (60°, IN) 07780-0014700</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Interior cutter, 26 mm (60°, EX) 07780-0014500</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Cutter holder, 5.0 mm 07781-0010400</p>  <p>or equivalent commercially available in U.S.A.</p>
<p>Cutter holder, 4.5 mm 07781-0010600</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Cam chain tensioner holder 070MG-0010100</p>  <p>or 07AMG-001A100 (U.S.A. only)</p>	<p>Compression gauge attachment 07RMJ-MY50100</p>  <p>Not available in U.S.A.</p>
<p>Compression gauge attachment 07AMJ-MENA200 (U.S.A. only)</p> 		

## CYLINDER HEAD/VALVES

---

### 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 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 seized piston rings.

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

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
- Loose spark plug
- Faulty cylinder, piston or piston rings (page 9-5)
- Faulty decompressor plunger
- Faulty decompressor weight

#### **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 9-5)

#### **Excessive noise**

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn or damaged valve lifter
- Worn or loose cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Faulty cylinder, piston or piston rings (page 9-5)
- Worn crankshaft bearings (page 12-26)
- Worn or damaged connecting rod big end bearing (page 12-24)
- Worn connecting rod small end (page 9-7)
- Worn balancer shaft bearings (page 12-10)
- Improper balancer installation (page 12-9)
- Worn, seized or chipped transmission gear (page 12-18)
- Worn or damaged transmission bearing (page 12-28)

#### **Rough idle**

- Low cylinder compression

## CYLINDER COMPRESSION TEST

Warm up the engine.

Stop the engine, and remove the spark plug (page 3-10).

Install a compression gauge attachment into the spark plug hole.

### TOOL:

**Compression gauge attachment**      **07RMJ-MY50100 or  
07AMJ-MENA200  
(U.S.A. only)**

Connect a compression gauge onto the compression gauge attachment.

Temporarily install the fuel tank and seat.

Open the throttle fully.

Operate the kickstarter pedal forcefully several times until the gauge needle stops moving.

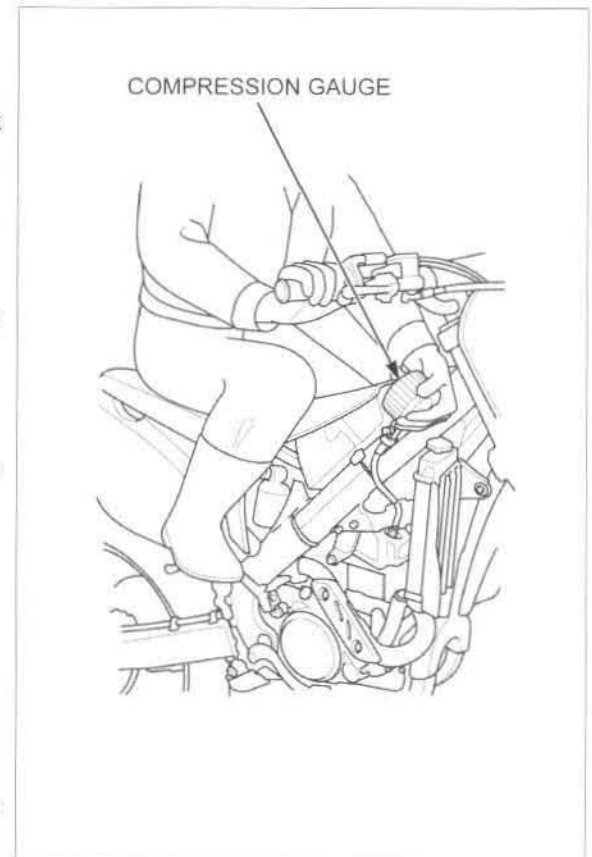
**COMPRESSION: 598 kPa (6.1 kg/cm<sup>2</sup>, 87 psi)  
at cranking**

### Low compression can be caused by:

- Improper valve adjustment
- Valve leakage
- Blown cylinder head gasket
- Worn piston rings or cylinder (page 9-5)

### High compression can be caused by:

- Carbon deposits on piston head or combustion chamber
- Faulty decompressor system



## CYLINDER HEAD COVER

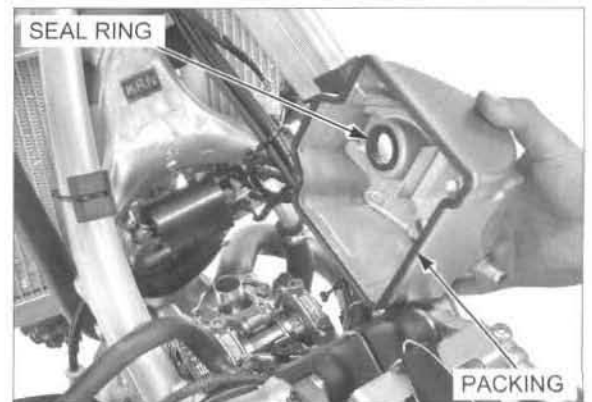
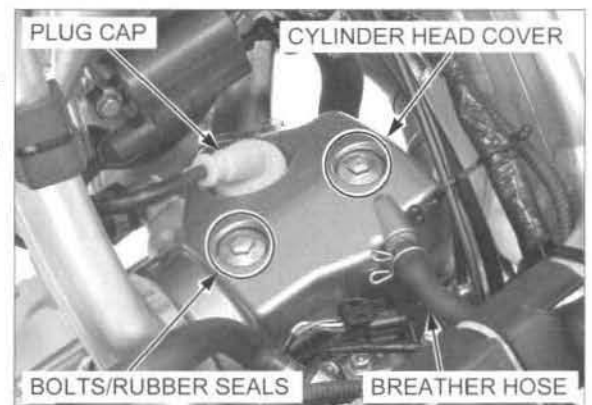
### REMOVAL

Hang the fuel tank to the left side of the frame (page 3-6).

Disconnect the spark plug cap and crankcase breather hose.

Remove the bolts, rubber seals and cylinder head cover.

Remove the plug hole seal ring and packing.



## CYLINDER HEAD/VALVES

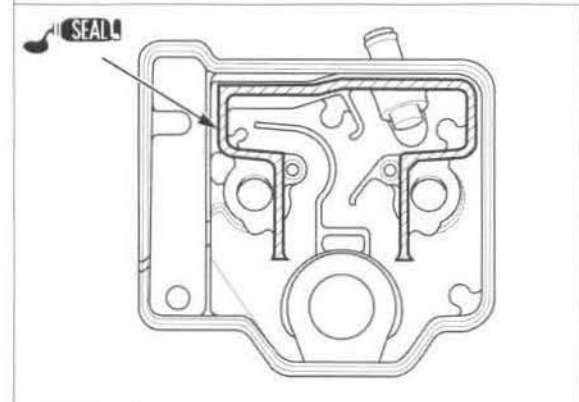
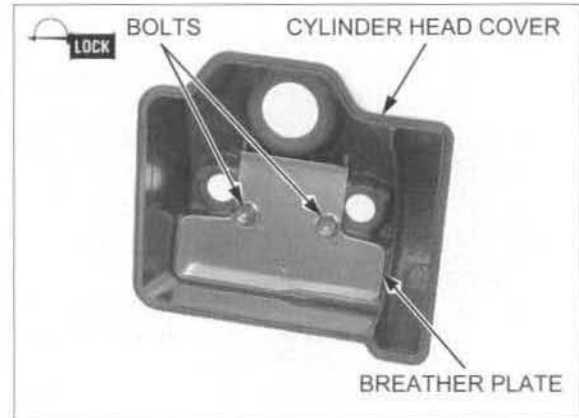
### DISASSEMBLY/ASSEMBLY

Remove the bolts and breather plate.

Clean the cylinder head cover and breather plate.

Apply liquid sealant (TB1207B or equivalent) to the cylinder head cover as shown.

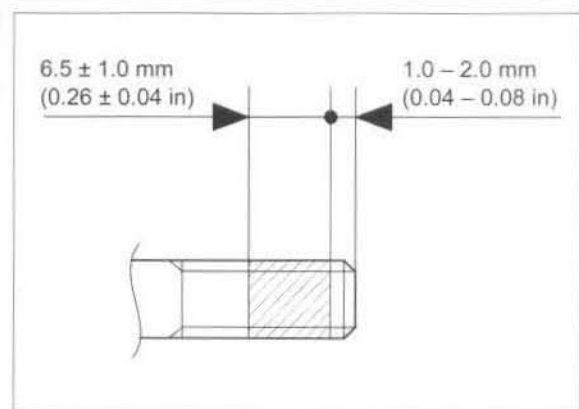
Install the breather plate to the cylinder head cover.



Clean and apply locking agent to the breather plate bolt threads as shown.

Install and tighten the breather plate bolts to the specified torque.

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



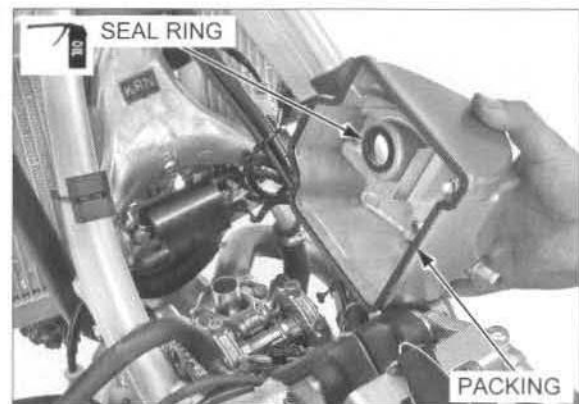
### INSTALLATION

Check the plug hole seal ring and packing for damage or deterioration and replace them if necessary.

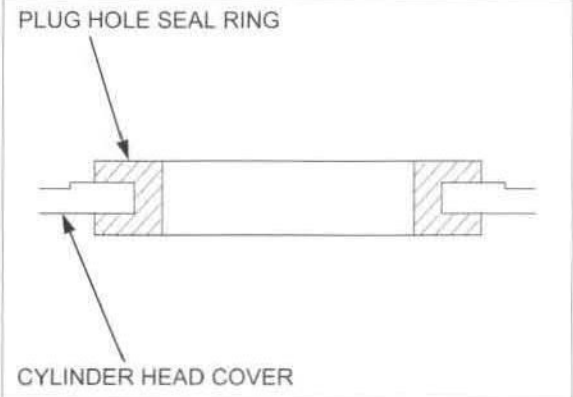
Apply engine oil to the plug hole seal ring outer surface, and install it.

Install the packing to the cylinder head cover.

Install the cylinder head cover.

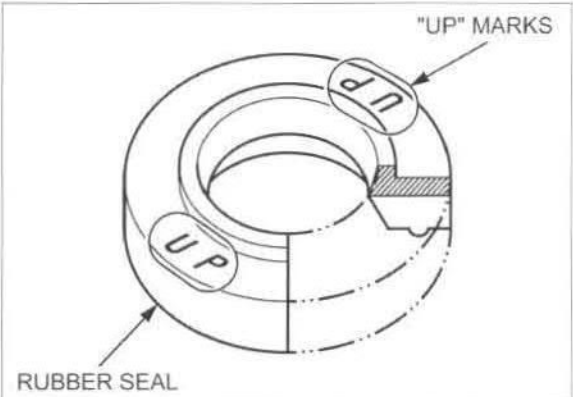


Make sure the plug hole seal ring installed properly as shown.



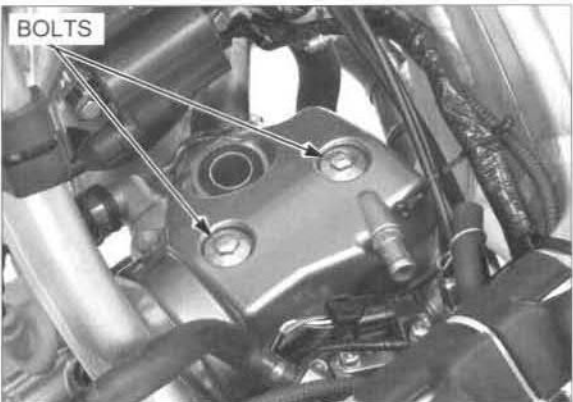
Check that the rubber seals are in good condition, replace them if necessary.

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



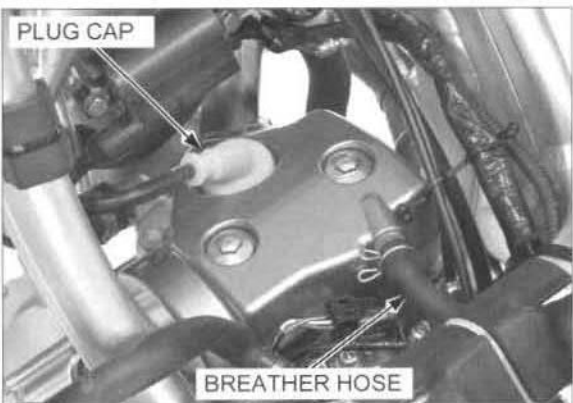
Install and tighten the bolts to the specified torque.

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



Connect the spark plug cap and crankcase breather hose.

Install the fuel tank (page 3-6).





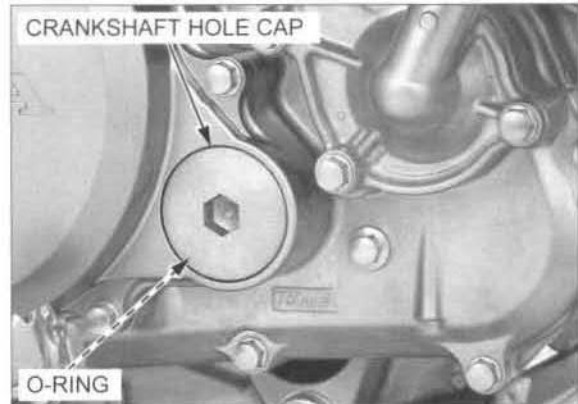
# CAMSHAFT/ROCKER ARM REMOVAL

## CAMSHAFT

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

*After '12 only:* Remove the condenser (page 16-16).

Remove the crankshaft hole cap and O-ring.



Turn the crankshaft clockwise to align the punch mark on the primary drive gear with the index mark on the right crankcase cover.

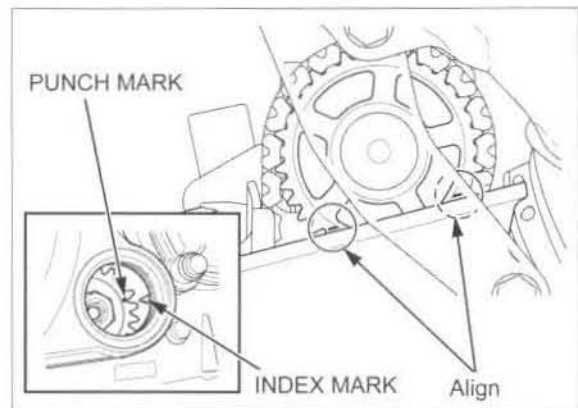
Check the index line on the cam sprocket aligns with cylinder head top surface.

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 clockwise one full turn, and match up the punch mark on the primary drive gear with index mark on the right crankcase cover again.

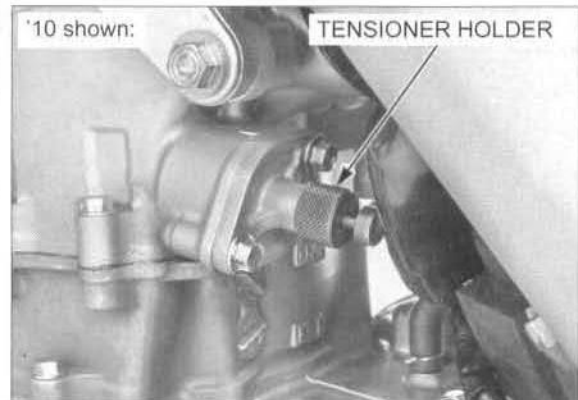


Remove the cam chain tensioner lifter bolt and sealing washer.



Insert the cam chain tensioner holder into the cam chain tensioner lifter.

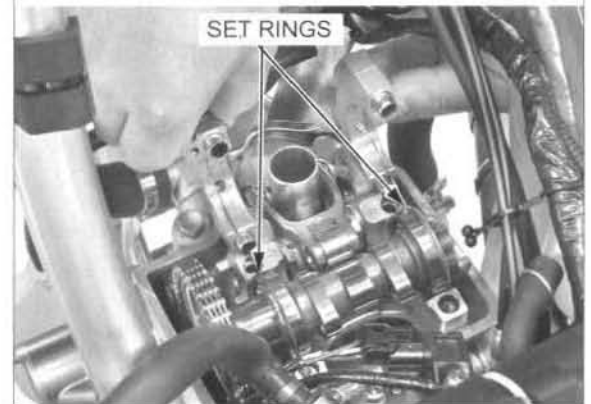
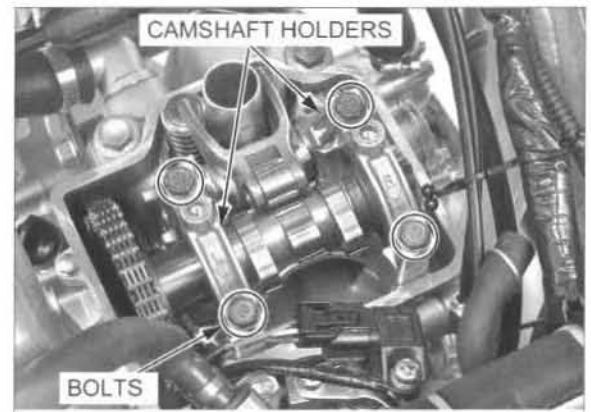
Turn the cam chain tensioner holder clockwise fully and lock the cam chain tensioner lifter by pushing the handle.



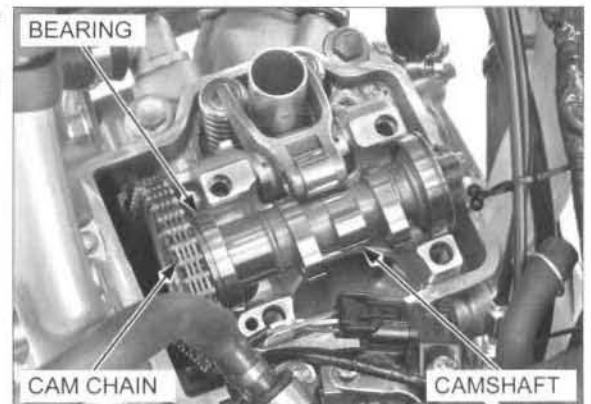
**TOOL:**

Cam chain tensioner holder 070MG-0010100 or 07AMG-001A100 (U.S.A. only)

*Be careful not to drop the set rings into the crankcase.* Remove the bolts, camshaft holders and set rings.



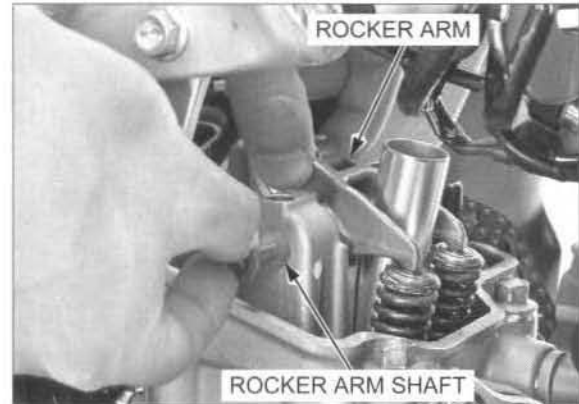
Slide the cam sprocket side camshaft bearing to the cam sprocket.  
Remove the camshaft by removing the cam chain from the cam sprocket.



## CYLINDER HEAD/VALVES

### ROCKER ARM

Push out the rocker arm shaft from the cylinder head.  
Remove the rocker arm.



### INSPECTION

#### ROCKER ARM

*If the camshaft contact surface of the rocker arm is damaged or abnormally worn, check the cam lobes for damage (page 8-13).*

Inspect the camshaft contact surface of the rocker arm for wear or damage.  
Inspect the rocker arm oil passage for clogs.

Measure the rocker arm I.D.

**SERVICE LIMIT: 13.025 mm (0.5128 in)**



#### ROCKER ARM SHAFT

Inspect the rocker arm shaft for wear or damage.

Measure the rocker arm shaft O.D.

**SERVICE LIMIT: 12.97 mm (0.511 in)**

Calculate the rocker arm-to-shaft clearance.

**SERVICE LIMIT: 0.055 mm (0.0022 in)**



#### CAMSHAFT

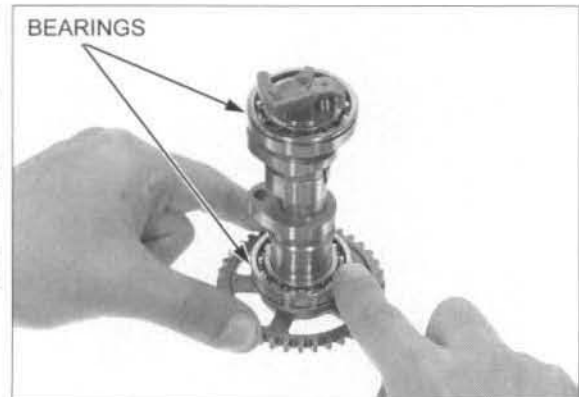
Turn the outer race of the camshaft bearings with your finger.

The bearing should turn smoothly and quietly.

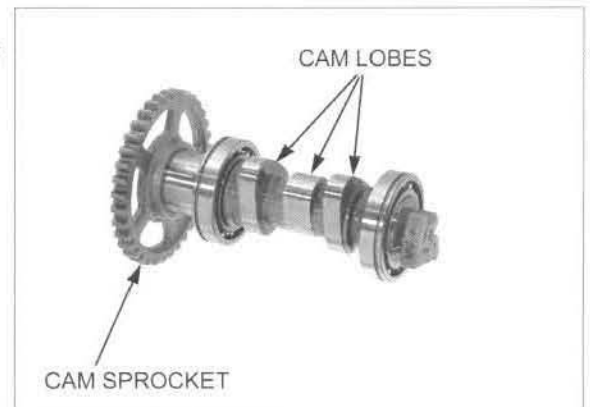
Also check that the bearing inner race fits tightly on the camshaft.

Replace the camshaft assembly if the cam sprocket side bearing do not turn smoothly, quietly or if they fit loosely on the camshaft.

Replace the decompressor side bearing if it do not turn smoothly, quietly or if they fit loosely on the camshaft (page 8-14).



Check the cam sprocket teeth for wear or damage.  
 Check the cam lobe surfaces for scoring or evidence of insufficient lubrication.



Measure the height of each cam lobe.

**SERVICE LIMITS:**

**IN:** 36.06 mm (1.420 in)

**EX:** 25.41 mm (1.000 in)

**NOTE:**

Check the rocker arm if the cam lobe is worn or damaged.



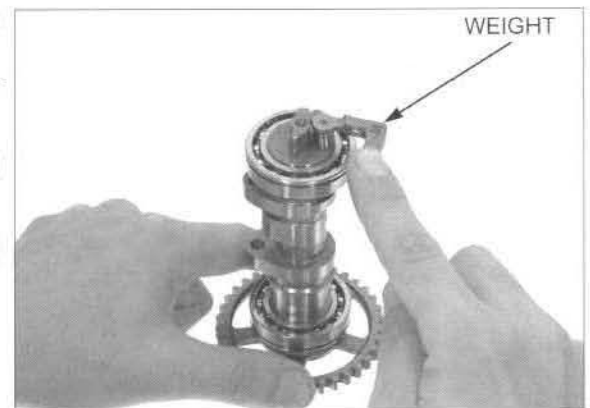
**DECOMPRESSOR SYSTEM**

Inspect the decompressor operation using the following procedure:

1. Move the decompressor weight outward with your finger.
2. Release the decompressor weight.
  - The decompressor weight should move inward automatically.

If the decompressor weight operation is abnormal, disassemble and clean the decompressor system and camshaft (page 8-14).

Replace the damaged parts if necessary.

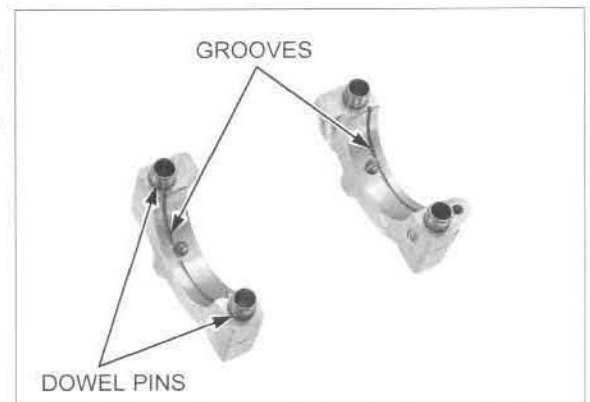


**CAMSHAFT HOLDERS**

Check the set ring grooves for scoring or scratches.

Check the camshaft holder for installation of the dowel pins.

Blow open all oil passages in the camshaft holders with compressed air.



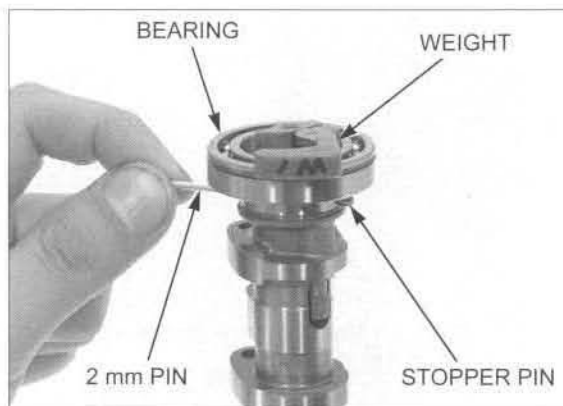
## DECOMPRESSOR SYSTEM

### DISASSEMBLY

Remove the camshaft (page 8-10).

Turn the decompressor weight outward as shown and slide the camshaft bearing upward.

Push out the decompressor weight stopper pin using an O.D. 2 mm pin.



Remove the decompressor weight, spring and bearing.

### INSPECTION/CLEANING

Check the decompressor weight for bends or damage.  
Check the decompressor cam surface for wear or damage.

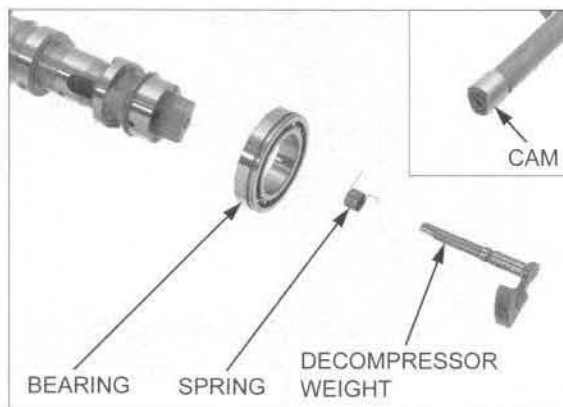
Check the camshaft bearing for wear or damage.

Check the decompressor spring for fatigue.

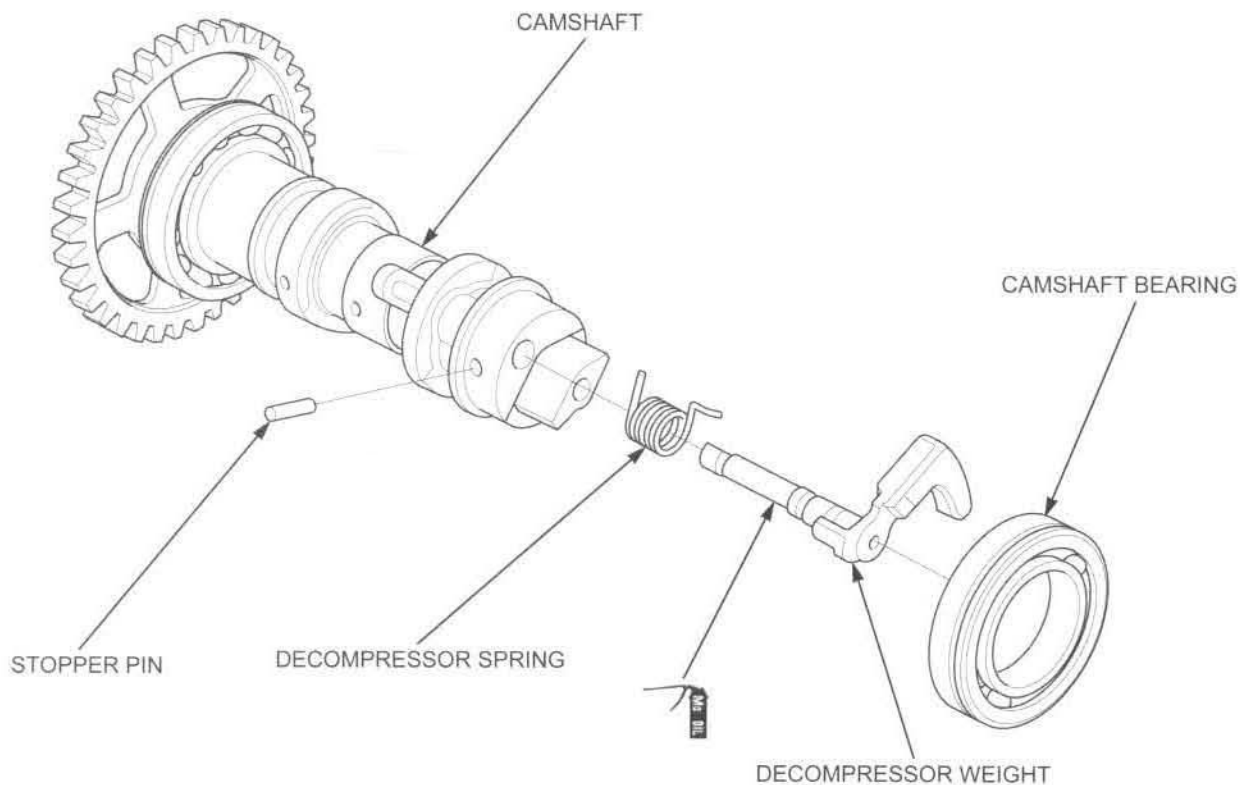
Replace the damaged parts if necessary.

Clean the decompressor weight, bearing and spring.

Blow the oil passage in the camshaft with compressed air.



### ASSEMBLY

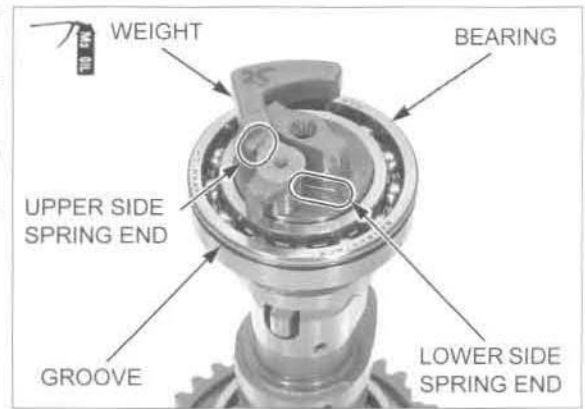


Apply molybdenum oil solution to the decompressor weight sliding area.

Hook the upper side spring end to the decompressor weight as shown.

Install the camshaft bearing with its groove side facing up.

Install the decompressor weight by aligning the lower side spring end with the camshaft flange.



Turn the decompressor weight outward as shown and slide the camshaft bearing upward.

Install the decompressor weight stopper pin into the camshaft.

Install the camshaft (page 8-33).



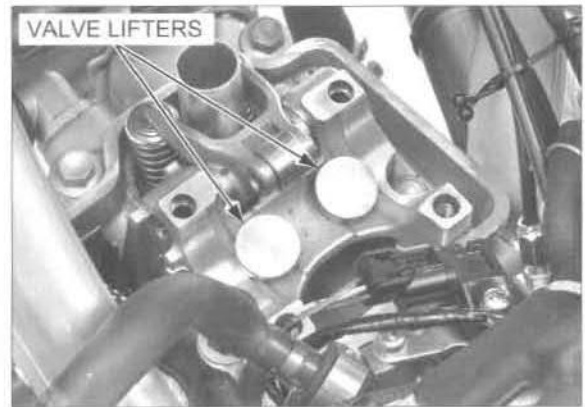
## VALVE CLEARANCE ADJUSTMENT

*Adjust the valve clearance while the engine is cold (below 35°C/95°F).*

Remove the camshaft (page 8-10).

Remove the valve lifters.

- The shims may stick to the inside of the valve lifter. Do not allow the shims to drop into the crankcase.



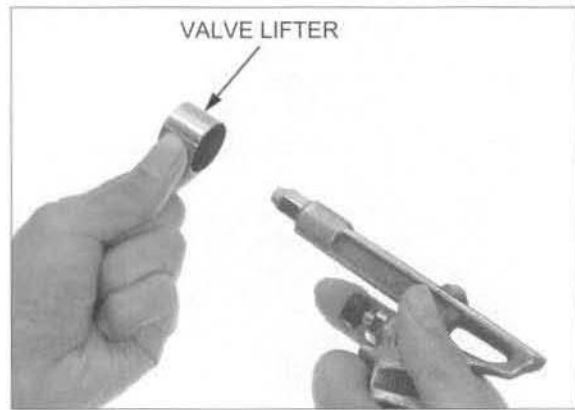
Remove the shims.

- Mark all valve shims to ensure correct reassembly in their original locations.
- The shims can be easily removed with tweezers or a magnet.

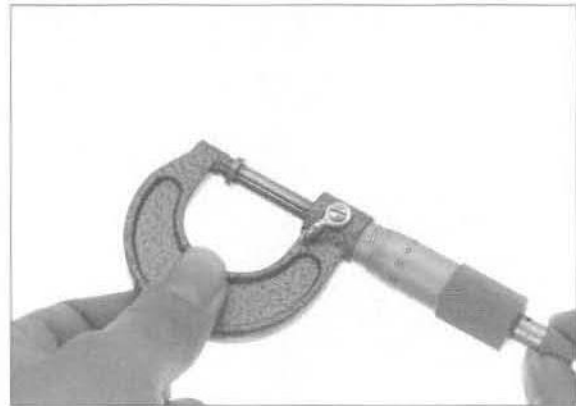


## CYLINDER HEAD/VALVES

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



Measure the shim thickness and record it.



*Sixty-nine different thickness shims are available from 1.200 mm to 2.900 mm in increments of 0.025 mm.*

Calculate the new shim thickness using the equation below.

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

- A: New shim thickness
- B: Recorded valve clearance
- C: Specified valve clearance
- D: Old shim thickness

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



*Install the shims in their original locations.*

Install the newly selected shims on the valve spring retainers.





Apply molybdenum oil solution to the valve lifter outer surface.

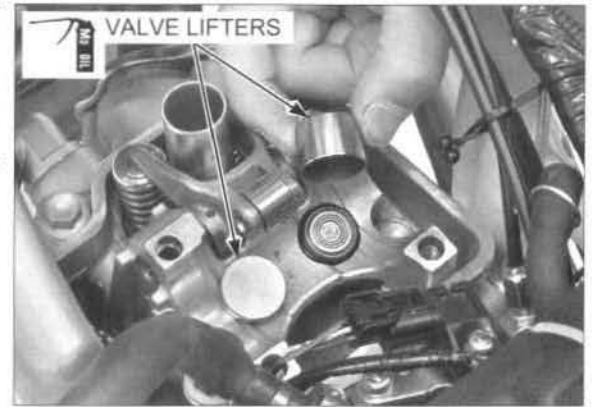
*Install the valve lifters in their original locations.*

Install the valve lifters.

Install the camshaft (page 8-32).

Rotate the camshaft by rotating the crankshaft clockwise several times.

Recheck the valve clearance (page 3-12).



## CYLINDER HEAD REMOVAL

Remove the following:

- Exhaust pipe (page 2-15)
- Sub-frame (page 2-6)
- Camshaft (page 8-10)
- Rocker arm (page 8-12)
- Valve lifters/shims (page 8-15)

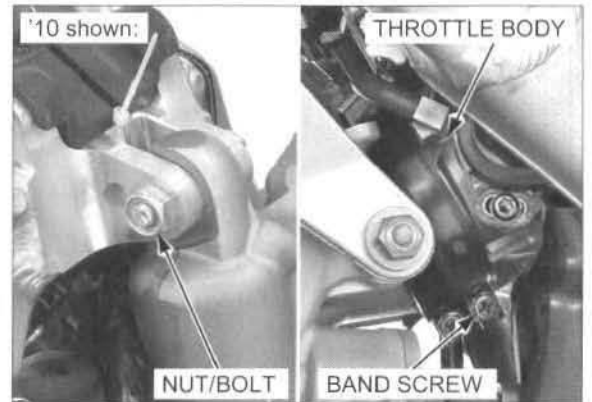
Drain the coolant (page 6-7).

Remove the shock absorber upper nut and bolt. Turn the shock absorber backward.

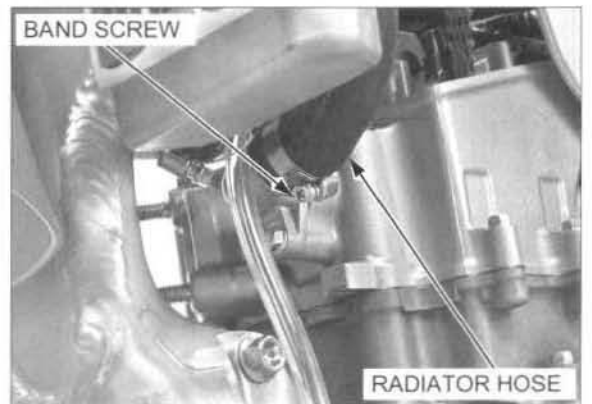
*Do not let the throttle body hang from the throttle cable.*

Loosen the insulator band screw and pull the throttle body out from the insulator.

Disconnect the ECT sensor 2P (Black) connector.



Loosen the hose band screw and disconnect the upper radiator hose.

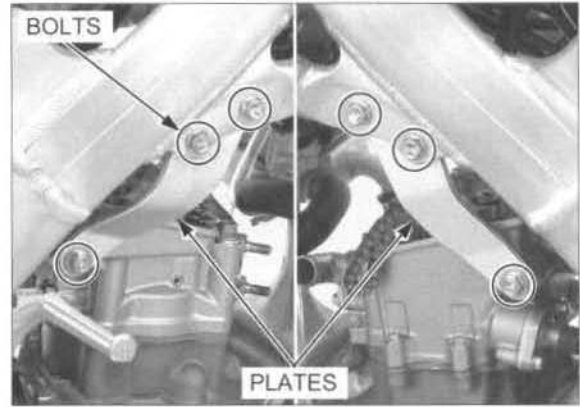




## CYLINDER HEAD/VALVES

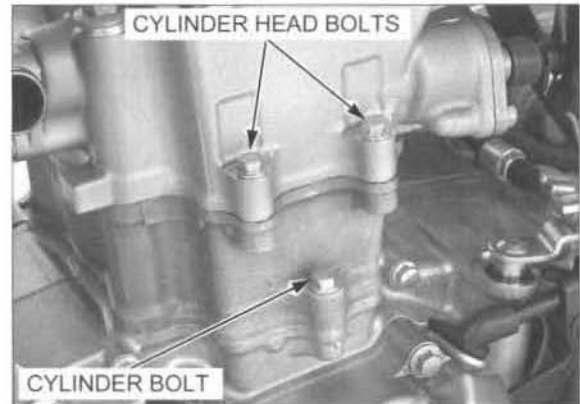
Remove the cylinder head hanger bolts.

Remove the cylinder head hanger plate bolts and cylinder head hanger plates.



Remove the cylinder head 6 mm bolts.

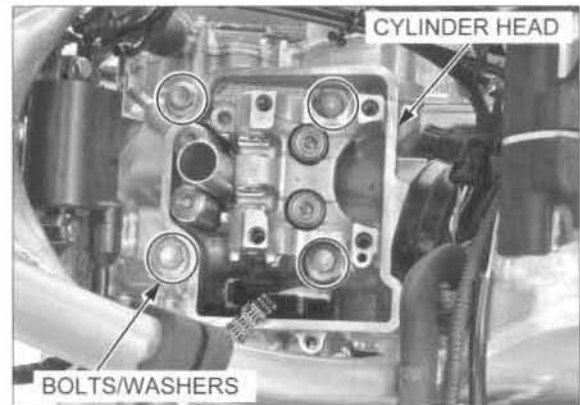
Loosen the cylinder bolt.



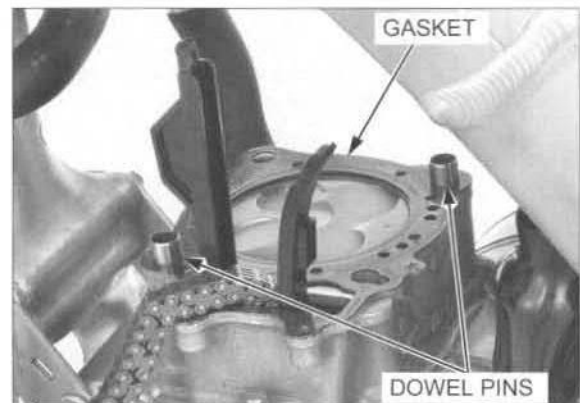
Loosen the cylinder head bolts in a crisscross pattern in two or three steps.

*Be careful not to let the washers drop into the crankcase.*

Remove the bolts, washers and cylinder head.



Remove the dowel pins and gasket.



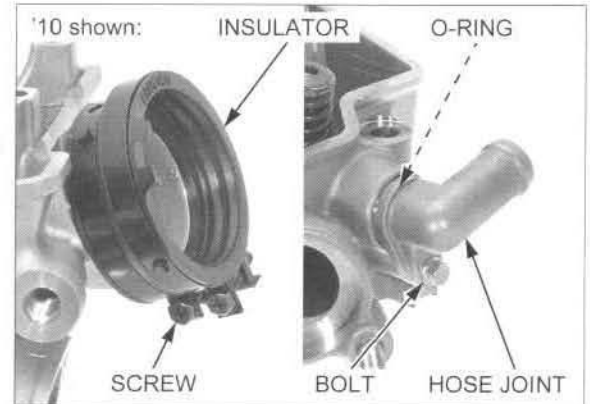
# CYLINDER HEAD DISASSEMBLY

Remove the following:

- Spark plug (page 3-10)
- ECT sensor (page 5-57)
- Cylinder head (page 8-17)

Loosen the insulator band screw and remove the insulator from the cylinder head.

Remove the bolt, water hose joint and O-ring.

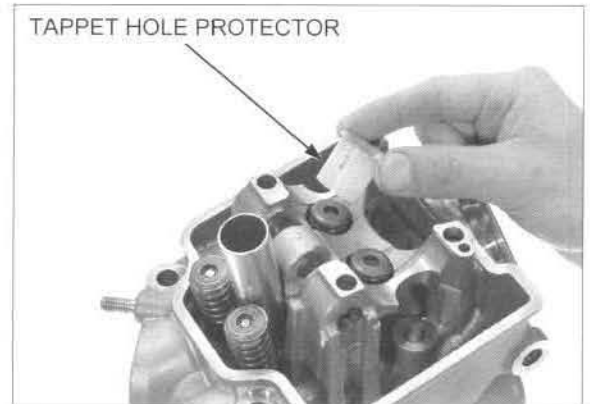


Install the tappet hole protector into the intake valve lifter bore.

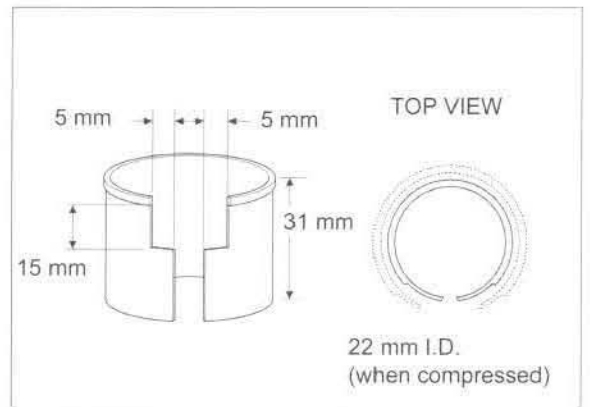
**TOOL:**

Tappet hole protector

07JMG-KY20100  
not available in  
U.S.A.



*U.S.A. only:* An equivalent tool can easily be made from a plastic 35 mm film container as shown.



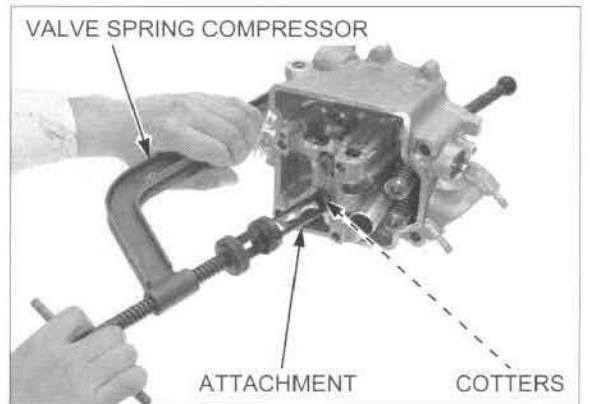
*To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.*

Remove the valve spring cotters using the special tools.

**TOOLS:**

Valve spring compressor  
Valve spring compressor attachment

07757-0010000  
070ME-MCW0100 or  
070ME-MCWA100  
(U.S.A. only)

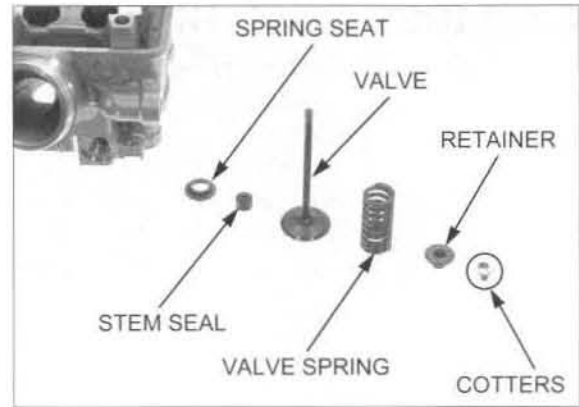


## CYLINDER HEAD/VALVES

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

Remove the following:

- Spring retainer
- Valve spring
- Valve
- Stem seal
- Spring seat



## CYLINDER HEAD INSPECTION

### CYLINDER HEAD

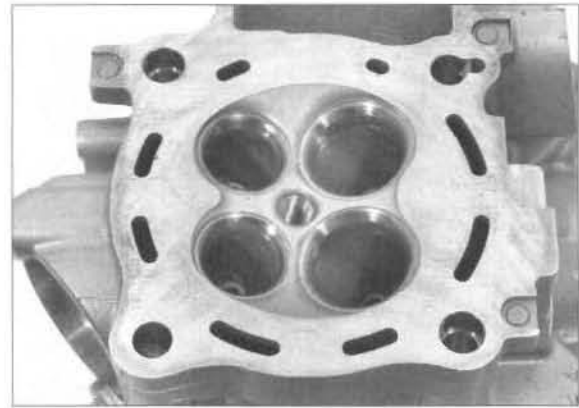
Disassemble the cylinder head (page 8-19).

Use care not to scratch the combustion chamber or head gasket surface.

Remove the carbon deposits from the combustion chamber or exhaust port.

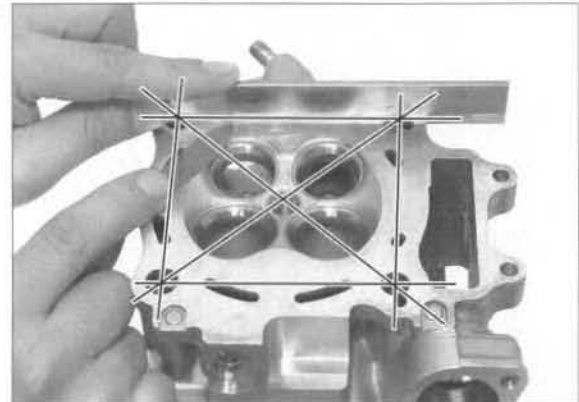
Check the spark plug hole and valve area for cracks.

Replace the cylinder head if necessary.



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

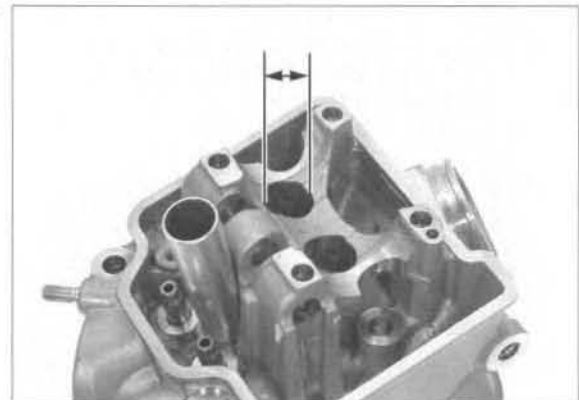
**SERVICE LIMIT: 0.05 mm (0.002 in)**



Check the valve lifter bore for scoring, scratches or damage.

Measure each valve lifter bore I.D.

**SERVICE LIMIT: 22.54 mm (0.887 in)**



**VALVE LIFTER**

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

**SERVICE LIMIT: 22.47 mm (0.885 in)**



**VALVE SPRING**

Check the valve springs for fatigue or damage.

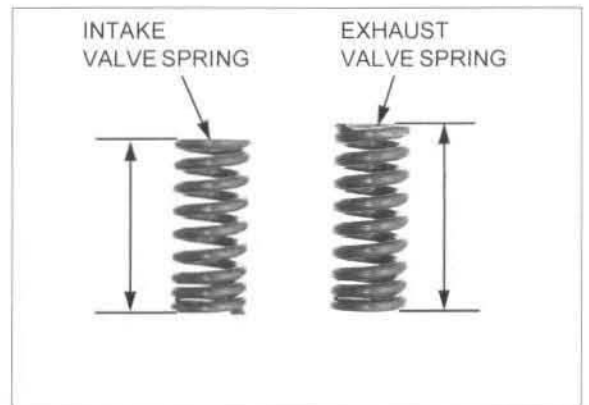
Measure the free length of the intake and exhaust valve springs.

**SERVICE LIMITS:**

**IN: 42.1 mm (1.66 in)**

**EX: 46.3 mm (1.82 in)**

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



**VALVE/VALVE GUIDE**

Inspect each valve for out-of-round, burns, scratches or abnormal stem wear.

Check the valve movement in the guide.  
Measure and record the valve stem O.D.

**STANDARD:**

**IN: 4.975 – 4.990 mm (0.1959 – 0.1965 in)**

**EX: 4.465 – 4.480 mm (0.1758 – 0.1764 in)**

**SERVICE LIMIT:**

**EX: 4.455 mm (0.1754 in)**



*Take care not to tilt or lean the reamer in the guide while reaming.*

Ream the valve guide to remove any carbon build-up before measuring the guide I.D.

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

**TOOLS:**

**IN: Valve guide reamer, 5.0 mm**

**EX: Valve guide reamer, 4.5 mm**

**07984-MA60001 or 07984-MA6000D (U.S.A. only)**  
**07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)**



## CYLINDER HEAD/VALVES

Measure and record each valve guide I.D. in the combustion chamber.

### SERVICE LIMIT:

IN: 5.052 mm (0.1989 in)

EX: 4.552 mm (0.1792 in)

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

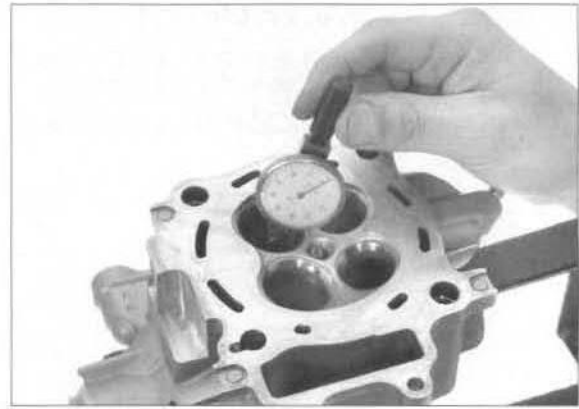
### STANDARD:

IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)

EX: 0.020 – 0.047 mm (0.0008 – 0.0019 in)

*Reface the valve seats whenever the valve guides are replaced (page 8-23).*

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



## VALVE GUIDE REPLACEMENT

Mark new valve guides at the proper depth (see specification page 8-22) using a marker. Chill a new valve guides in a freezer for about 1 hour.

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

Heat the cylinder head to 100 – 150°C (212 – 302°F) with a hot plate or oven. Do not heat the cylinder head beyond 160°C (320°F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

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

### TOOLS:

IN: Valve guide driver,  
5.0 mm

07942-8920000 or  
07942-MA60000  
(U.S.A. only)

EX: Valve guide driver,  
4.5 mm

07HMH-ML00101  
or  
07HMH-ML0010B  
(U.S.A. only)

Adjust the valve guide driver to the valve guide height. While the cylinder head is still heated, drive new valve guides into the cylinder head from the top of the cylinder (camshaft and rocker arm side).

Check that the valve guides are at the proper depth using a caliper, adjust the height if necessary.

### SPECIFIED DEPTH:

IN: 15.4 – 15.6 mm (0.606 – 0.614 in)

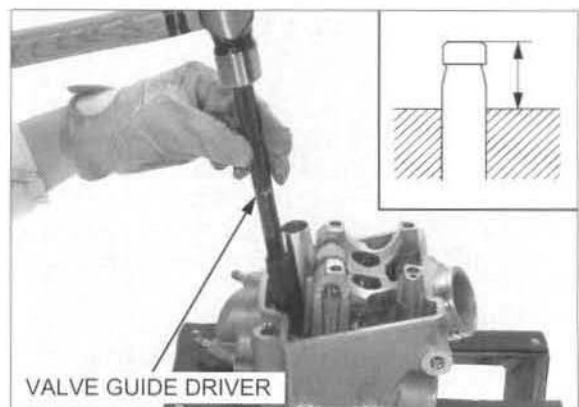
EX: 21.3 – 21.5 mm (0.839 – 0.847 in)

### TOOL:

Valve guide driver

07743-0020000  
not available in  
U.S.A.

Let the cylinder head cool to room temperature.



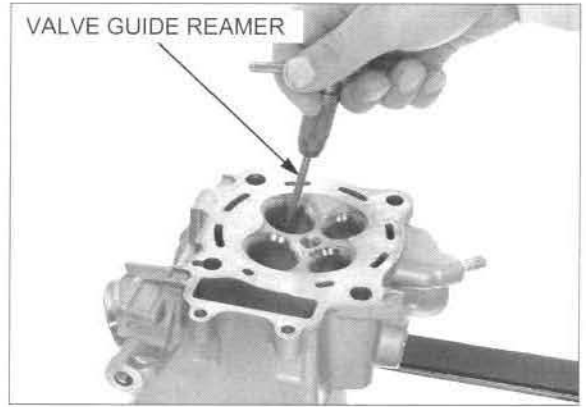
Use cutting oil on the reamer during this operation. Take care not to tilt or lean the reamer in the guide while reaming.

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

**TOOLS:**

- IN:** Valve guide reamer, 5.0 mm      07984-MA60001 or 07984-MA6000D (U.S.A. only)
- EX:** Valve guide reamer, 4.5 mm      07HMH-ML00101 or 07HMH-ML0010B (U.S.A. only)

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seats (page 8-23).



## VALVE SEAT INSPECTION/REFACING

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

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

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



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

**STANDARD:**

**IN/EX:** 0.90 – 1.10 mm (0.035 – 0.043 in)

**SERVICE LIMIT:**

**IN/EX:** 1.7 mm (0.07 in)

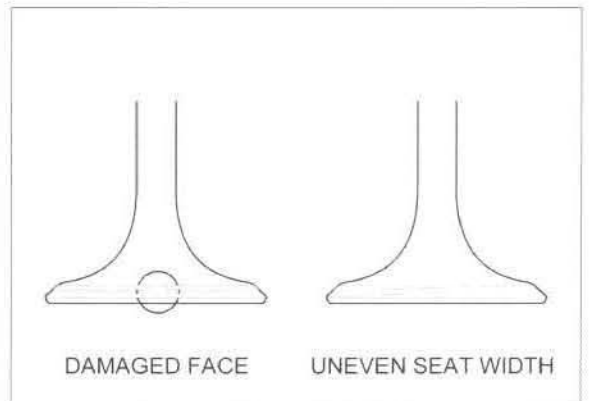
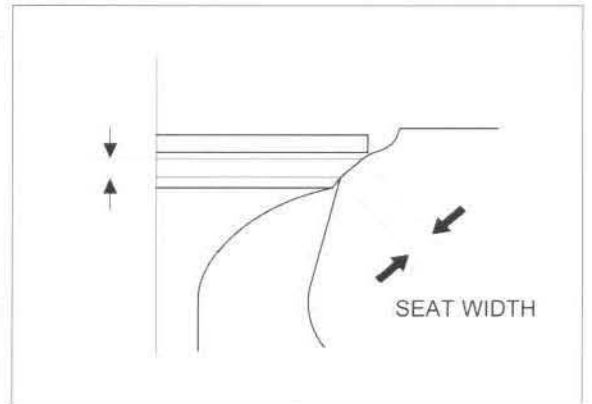
**NOTE:**

- When the service limits are exceeded, replace the intake valve and recheck the valve seat width.

If the seat width is not within specification, reface the valve seat (page 8-24).

Inspect the valve seat face for:

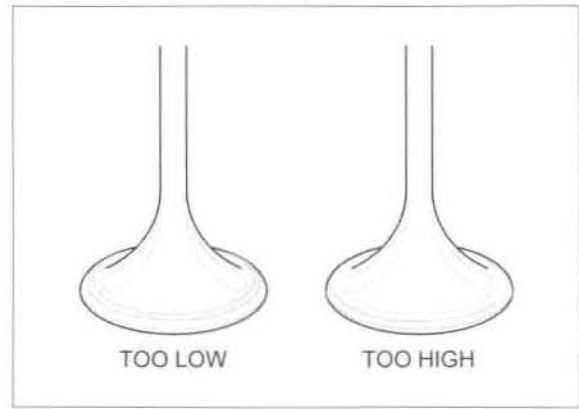
- Uneven seat width:
  - Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat.



## CYLINDER HEAD/VALVES

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

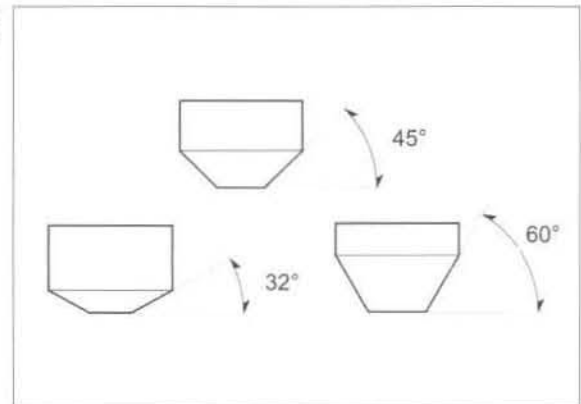
- Contact area (too high or too low)
  - Reface the valve seat.



### VALVE SEAT REFACING

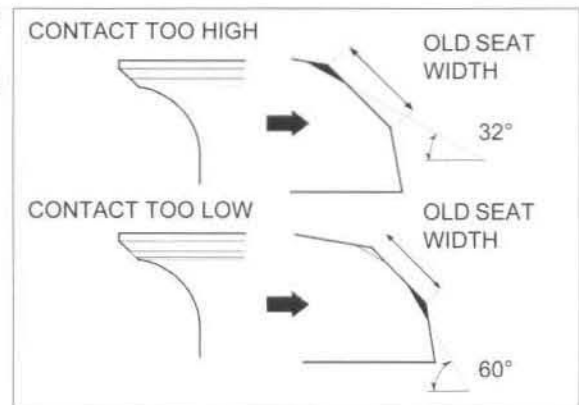
Follow the refacing manufacturer's operating instructions.

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



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

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



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

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

#### TOOLS:

IN:

Seat cutter, 33 mm 07780-0010800

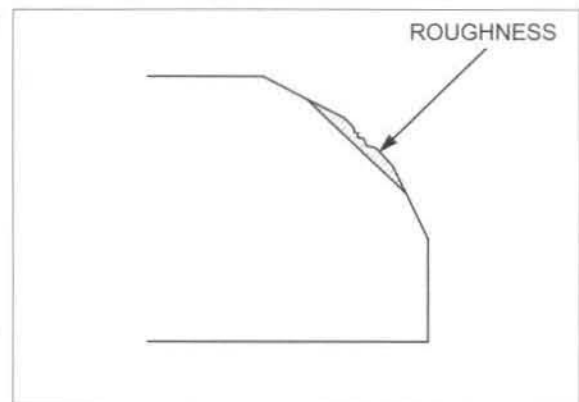
Cutter holder, 5.0 mm 07781-0010400

EX:

Seat cutter, 24.5 mm 07780-0010100

Cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.

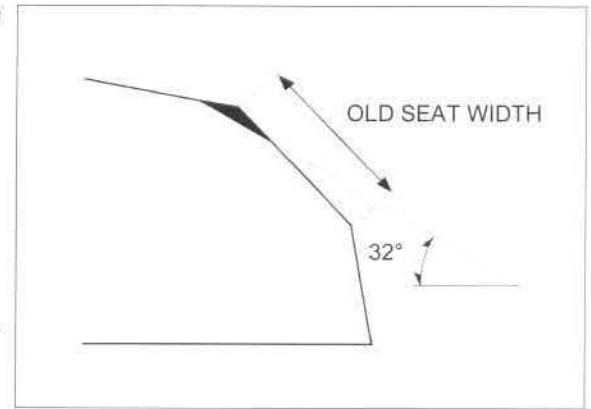


Use a 32° flat cutter, remove 1/4 of the existing valve seat material.

**TOOLS:**

- IN:**  
 Flat cutter, 33 mm 07780-0012900  
 Cutter holder, 5.0 mm 07781-0010400
- EX:**  
 Flat cutter, 27 mm 07780-0013300  
 Cutter holder, 4.5 mm 07781-0010600

or equivalent commercially available in U.S.A.

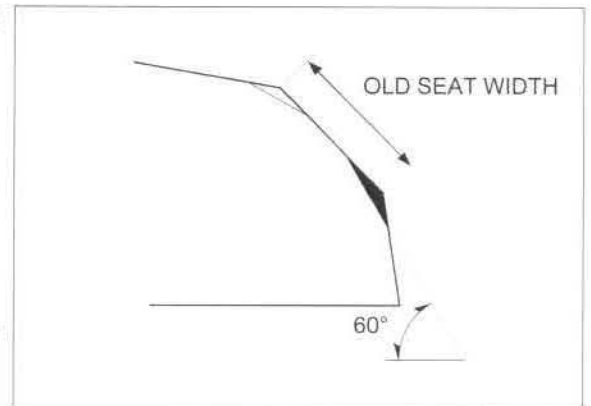


Use a 60° interior cutter, remove 1/4 of the existing valve seat material.

**TOOLS:**

- IN:**  
 Interior cutter, 34 mm 07780-0014700  
 Cutter holder, 5.0 mm 07781-0010400
- EX:**  
 Interior cutter, 26 mm 07780-0014500  
 Cutter holder, 4.5 mm 07781-0010600

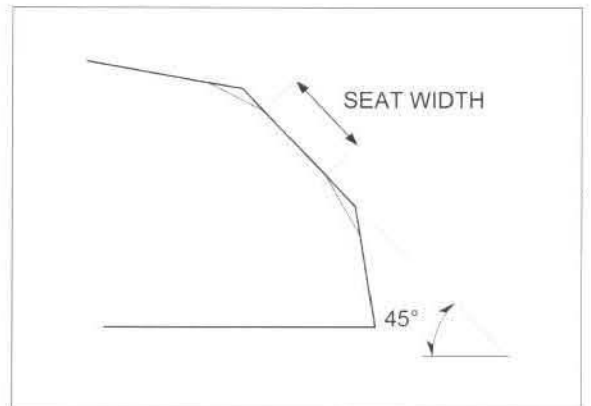
or equivalent commercially available in U.S.A.



Using a 45° seat cutter, cut the seat to proper width.  
 Make sure all pitting and irregularities are removed.  
 Refinish if necessary.

**STANDARD:**

IN/EX: 0.90 – 1.10 mm (0.035 – 0.043 in)





## CYLINDER HEAD/VALVES

### INTAKE SIDE:

After refacing, wash the cylinder head and valves.

### NOTICE

- Do not lap the intake valves. They are titanium and have a thin oxide coating. Lapping will damage this coating.
- Replace the intake valve with a new one.

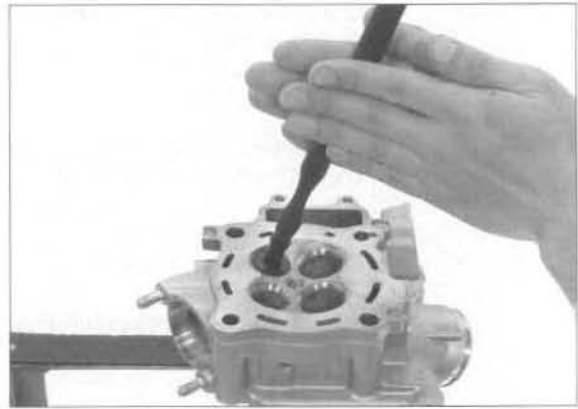
### EXHAUST SIDE:

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

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

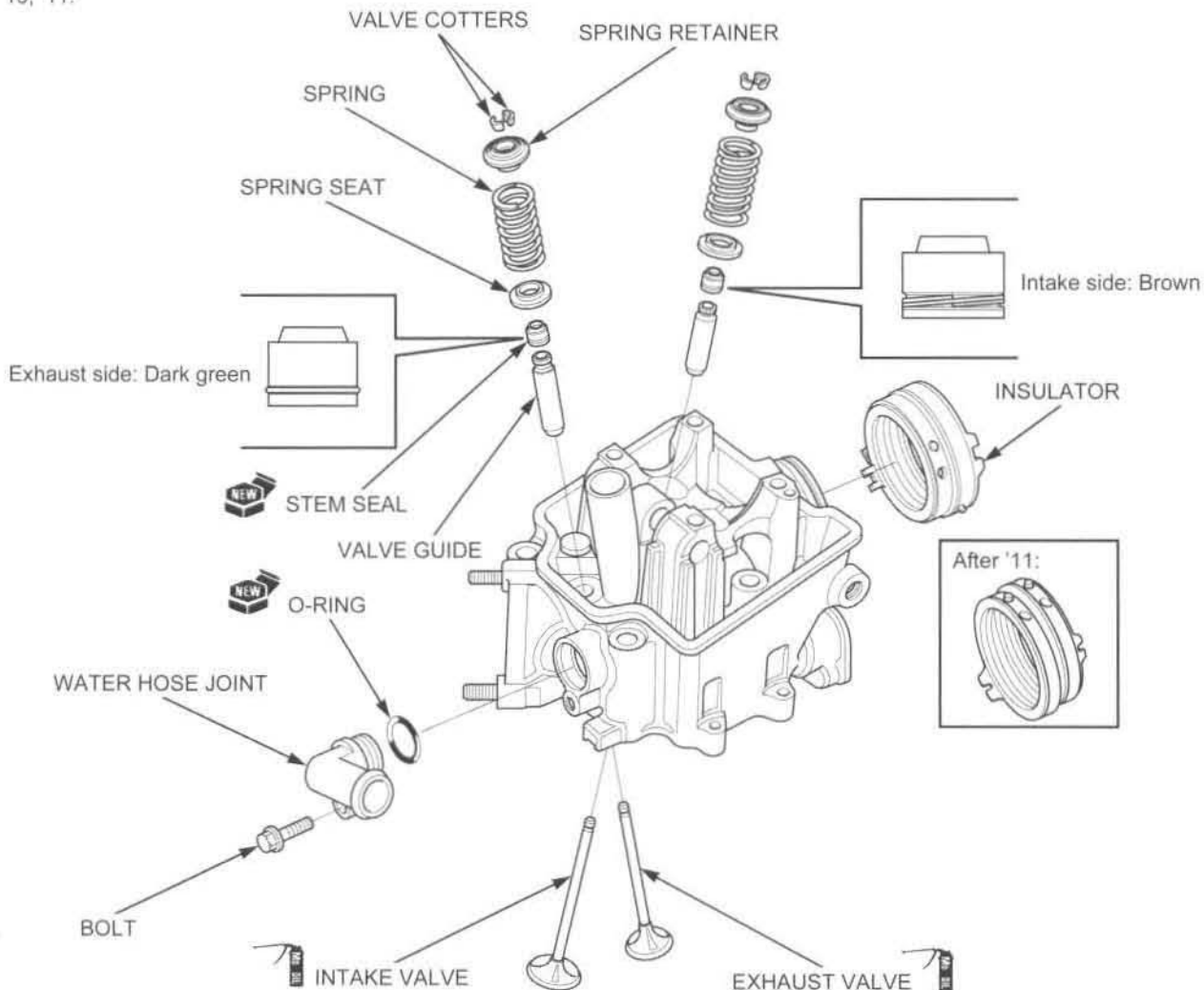
### NOTICE

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



## CYLINDER HEAD ASSEMBLY

'10, '11:



Blow out all oil passages in the cylinder head with compressed air.

Install the spring seat and new stem seal.

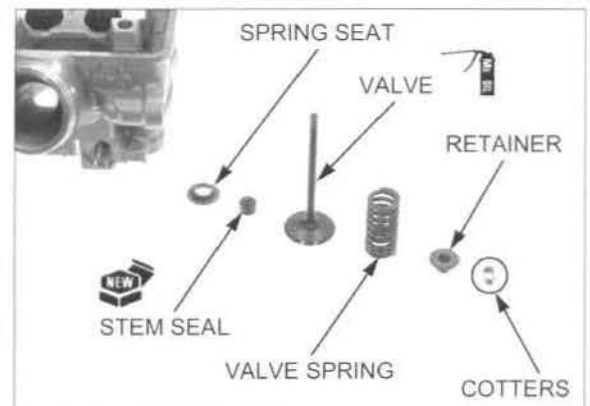
**NOTE:**

Do not interchange the intake and exhaust stem seals.

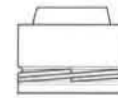
- Intake stem seal: Brown
- Exhaust stem seal: Dark green

Lubricate the valve stem and stem end sliding surface with molybdenum oil solution.

Insert the valves into the guide while turning it slowly to avoid damage to the stem seal.



INTAKE STEM SEAL:



(Brown)

EXHAUST STEM SEAL:



(Dark green)

Install the valve springs with the tightly wound coils facing the combustion chamber side.

Install the spring retainers.

**NOTE:**

Do not confuse the intake spring retainers and exhaust spring retainers.

- Intake spring retainer: Two grooves
- Exhaust spring retainer: One groove

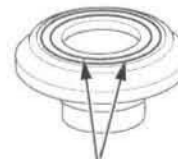
INTAKE VALVE SPRING



EXHAUST VALVE SPRING

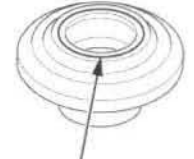


INTAKE SPRING RETAINER:



(Two grooves)

EXHAUST SPRING RETAINER:



(One groove)

Install the tappet hole protector into the valve lifter bore.

**TOOL:**

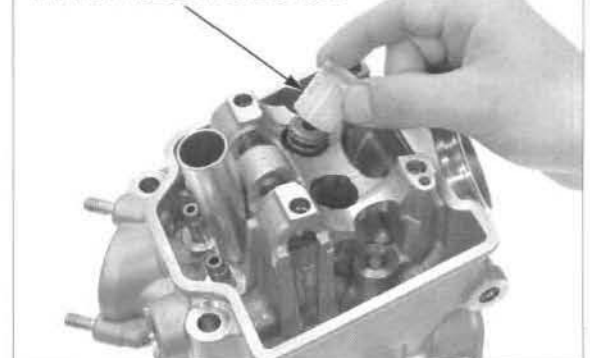
Tappet hole protector

07JMG-KY20100  
not available in  
U.S.A.

TOOL, U.S.A. only:

See instructions on page 8-19

TAPPET HOLE PROTECTOR



## CYLINDER HEAD/VALVES

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

Install the valve cotters using the special tools as shown.

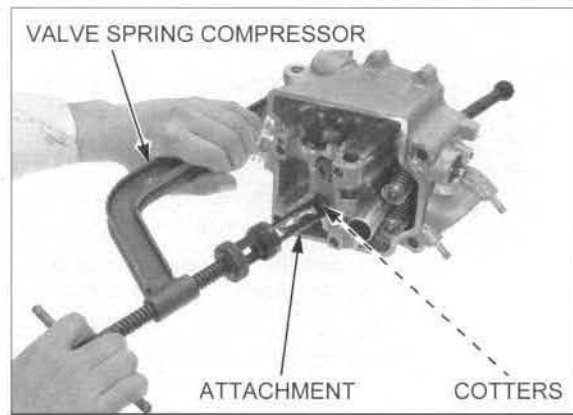
- Grease the cotters to ease installation.

### TOOLS:

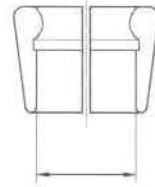
Valve spring compressor 07757-0010000  
 Valve spring compressor attachment 070ME-MCW0100 or 070ME-MCWA100 (U.S.A. only)

### NOTE:

Do not confuse the intake and exhaust valve cotters. The inside radius of intake valve cotter is larger than that of the exhaust valve cotter.

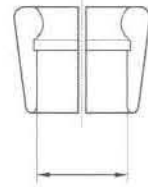


INTAKE COTTER:



4.915 mm (0.194 in)

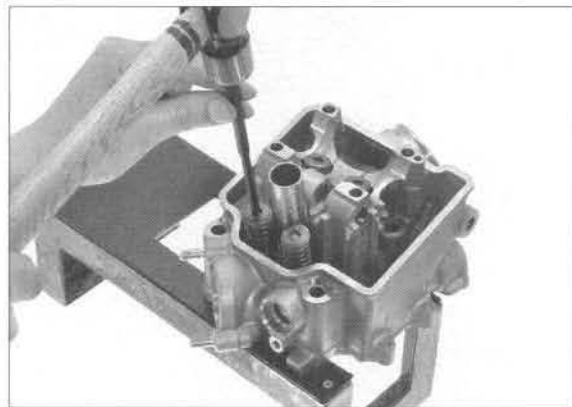
EXHAUST COTTER:



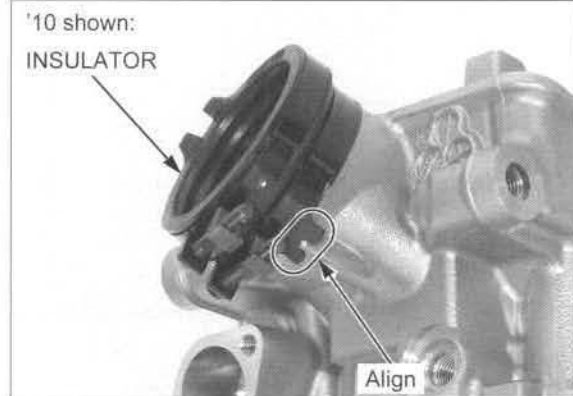
4.415 mm (0.174 in)

Support the cylinder head so the valve heads do not contact anything that could damage them.

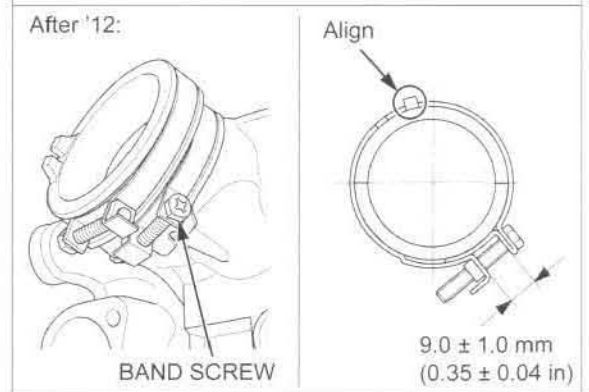
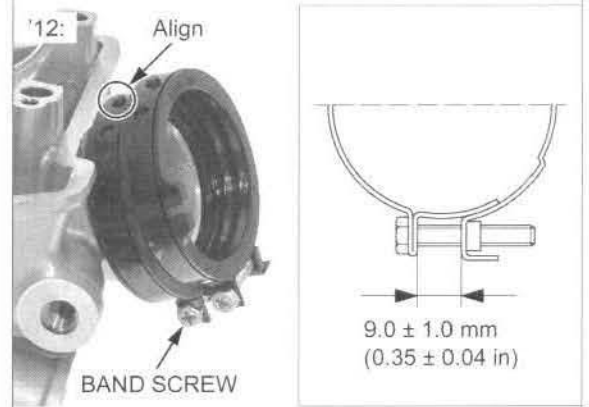
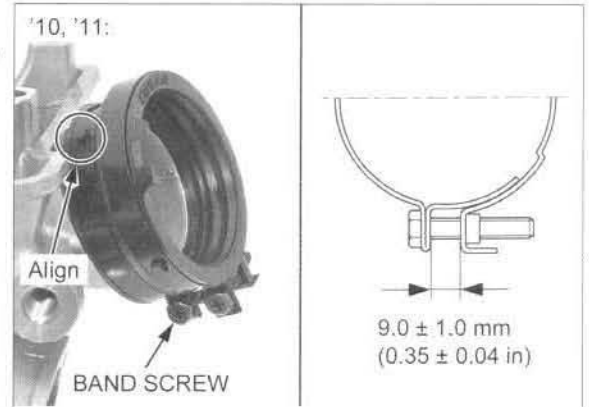
Tap the valve stems with a hammer and shaft as shown to seat the cotters firmly.



Install the insulator to the cylinder head by aligning the groove of the insulator with the tab of the cylinder head.



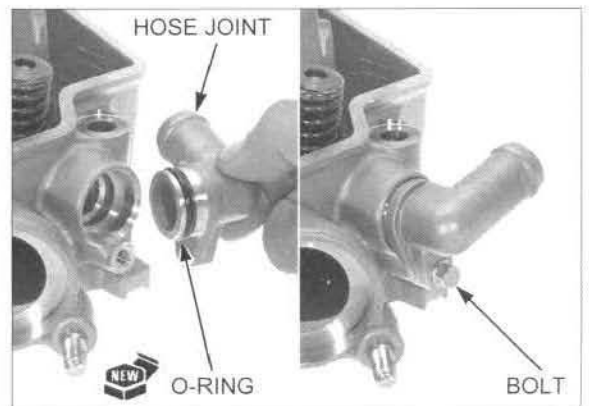
Align the insulator band hole with the insulator tab.  
Tighten the insulator band screw to the specified range as shown.



Install a new O-ring to the water hose joint.  
Install the water hose joint to the cylinder head.  
Install and tighten the bolt securely.

Install the following:

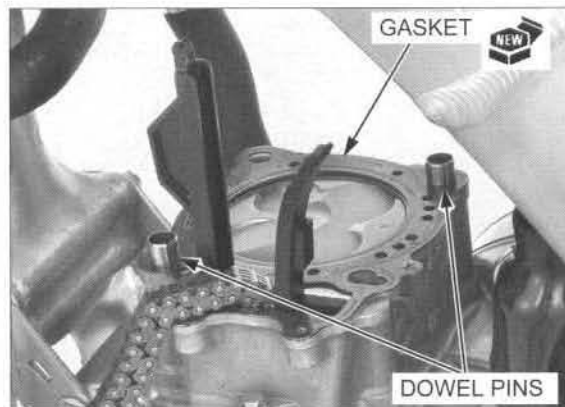
- ECT sensor (page 5-57)
- Spark plug (page 3-11)
- Cylinder head (page 8-30)



## CYLINDER HEAD/VALVES

### CYLINDER HEAD INSTALLATION

Install the dowel pins and a new gasket.



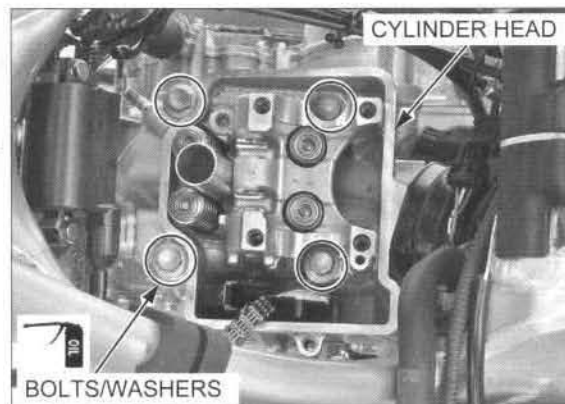
Install the cylinder head onto the cylinder.

*Be careful not to let the washers drop into the left crankcase.*

Apply engine oil to the cylinder head bolt threads and seating surface.

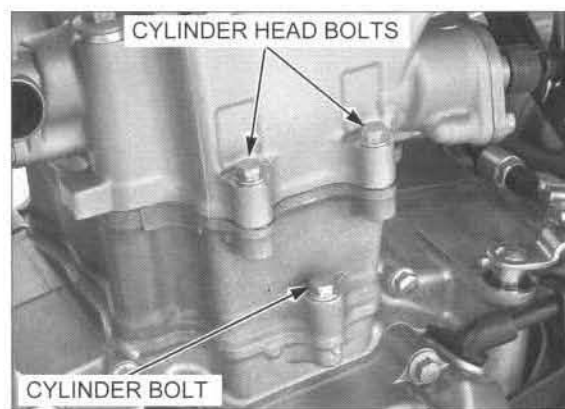
Install the cylinder head bolts with the washers. Tighten the cylinder head bolts in a crisscross pattern in two or three steps to the specified torque.

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



Install and tighten the cylinder head 6 mm bolts.

Tighten the cylinder bolt.



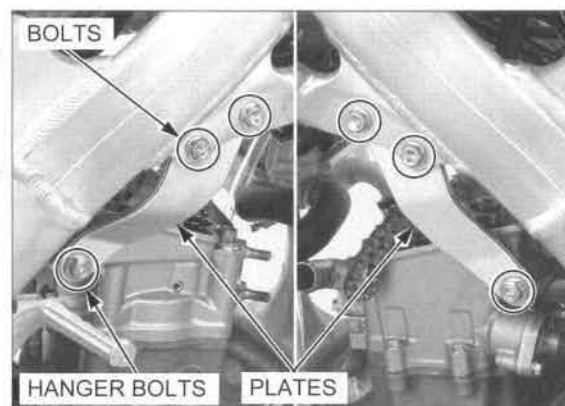
Install the cylinder head hanger plates and bolts.

Tighten the cylinder head hanger bolts to the specified torque.

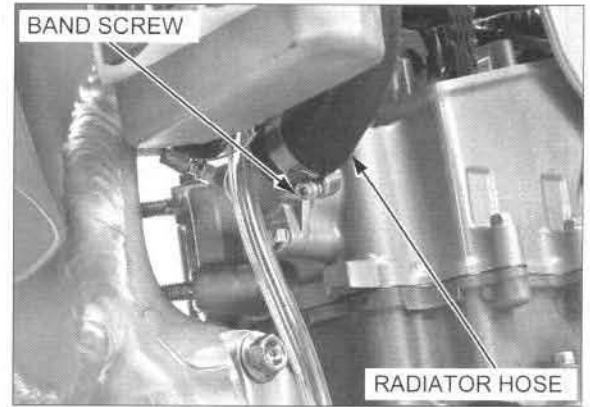
**TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)**

Tighten the cylinder head hanger plate bolts to the specified torque.

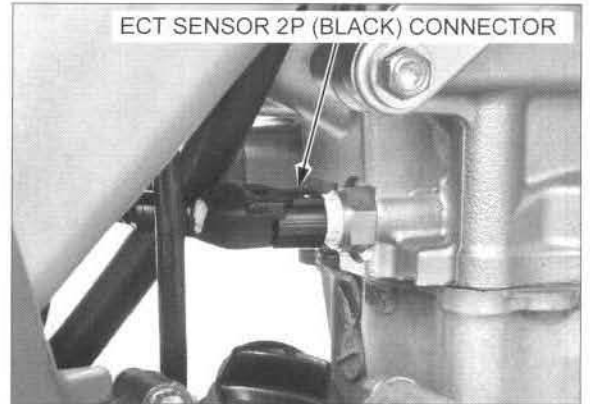
**TORQUE: 33 N·m (3.4 kgf·m, 24 lbf·ft)**



Connect the upper radiator hose to the water hose joint.  
Tighten the hose band screw securely (page 6-9).

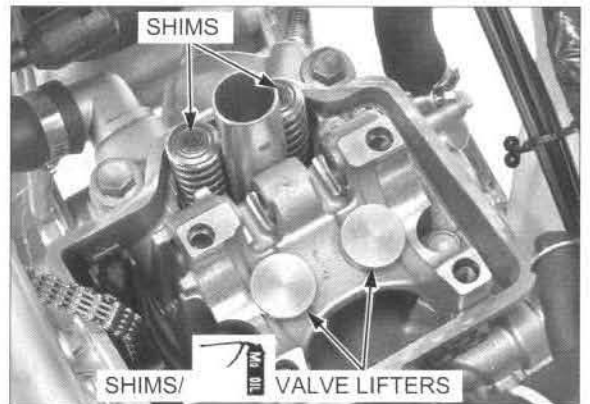


Connect the ECT sensor 2P (Black) connector.



Apply molybdenum oil solution to the valve lifter outer surface.

*Be careful not to let the shims drop into the left crankcase. Install the shims and valve lifters in their original locations.*

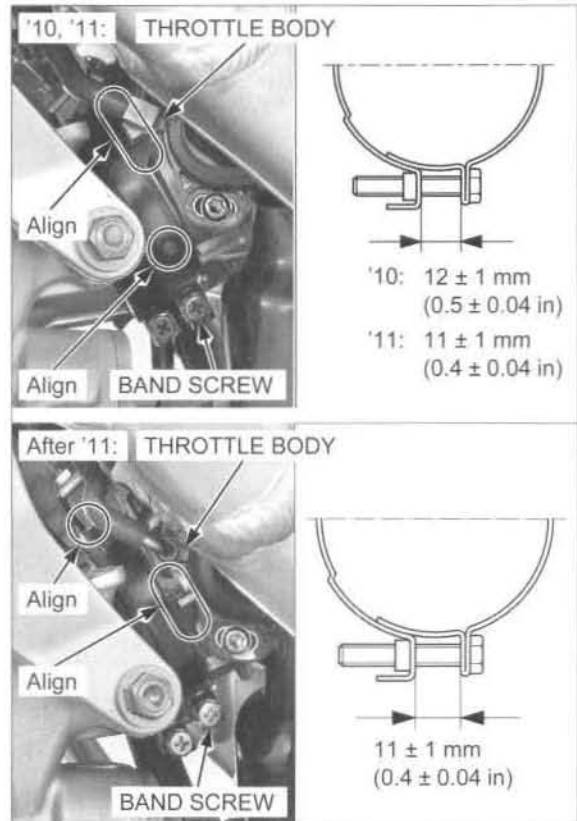


## CYLINDER HEAD/VALVES

Install the throttle body by aligning its tab with the insulator groove.

*Align the insulator band hole with the insulator tab.*

Tighten the insulator band screw as shown.



Install the rear shock absorber upper mounting bolt by aligning cut-outs of the frame and upper mounting bolt.

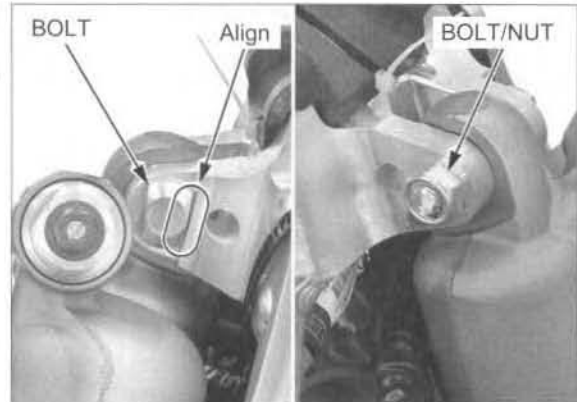
Install and tighten the rear shock absorber upper mounting nut to the specified torque.

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

Install the following:

- Rocker arm (page 8-32)
- Camshaft (page 8-32)
- Sub-frame (page 2-8)
- Exhaust pipe (page 2-16)

Fill the radiator with the recommended coolant mixture to the filler neck and bleed the air (page 6-6).



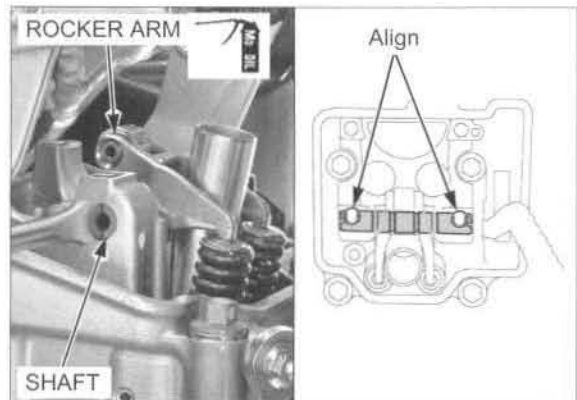
## CAMSHAFT/ROCKER ARM INSTALLATION

### ROCKER ARM

Apply molybdenum oil solution to the rocker arm inner surface and valve slipper surface.

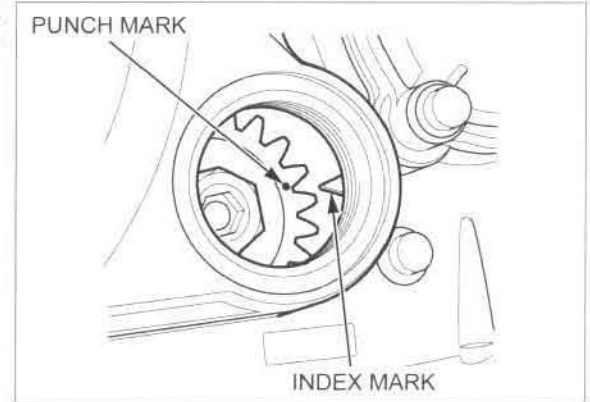
Install the rocker arms onto the camshaft holder base.

Install the rocker arm shaft while aligning the camshaft holder bolt holes with the rocker arm shaft cut-outs.



**CAMSHAFT**

Turn the crankshaft clockwise to align the punch mark on the primary drive gear with the index mark on the right crankcase cover.

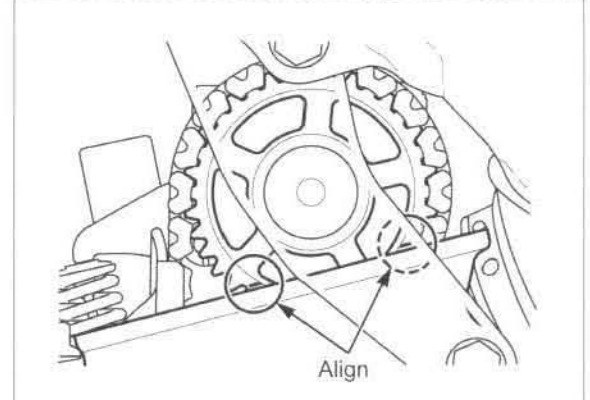
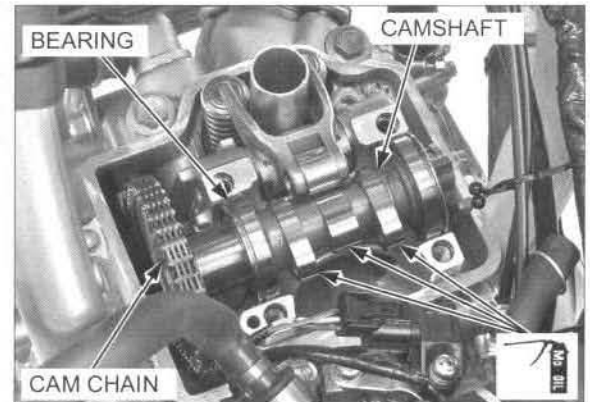


Apply molybdenum oil solution to the camshaft cam lobes.

*Install the camshaft with the intake cam lobes facing up.*

Install the camshaft while installing the cam chain onto the cam sprocket, making sure that the index line on the cam sprocket is aligned with the cylinder head top surface as shown.

Slide the cam sprocket side camshaft bearing until it is fully seated to the camshaft.





## CYLINDER HEAD/VALVES

Install the set rings into the camshaft bearing grooves.

Install the camshaft holders by aligning their grooves with the set rings and dowel pins with the camshaft holder base holes.

**NOTE:**

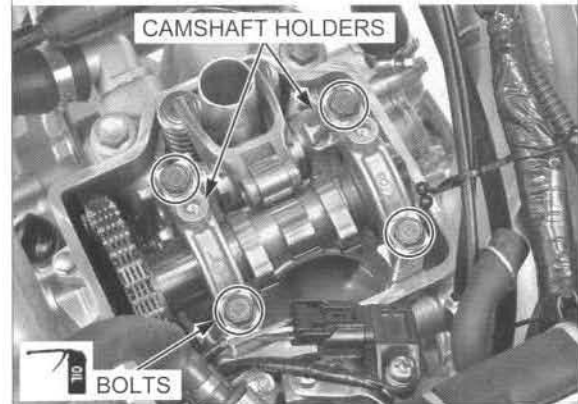
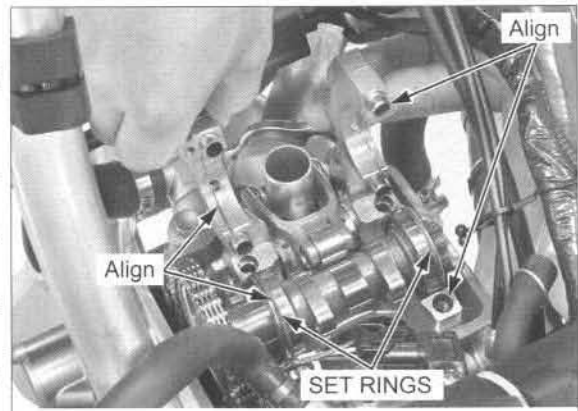
- Each camshaft holder has an identification mark, "L" is for the left side and "R" is for right side.
- Install the holders with their "IN" marks facing the intake side.

Apply engine oil to the camshaft holder mounting bolt threads.

*Align the rocker arm shaft cut-outs with the camshaft holder mounting bolts.*

Install and tighten the camshaft holder mounting bolt to the specified torque.

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

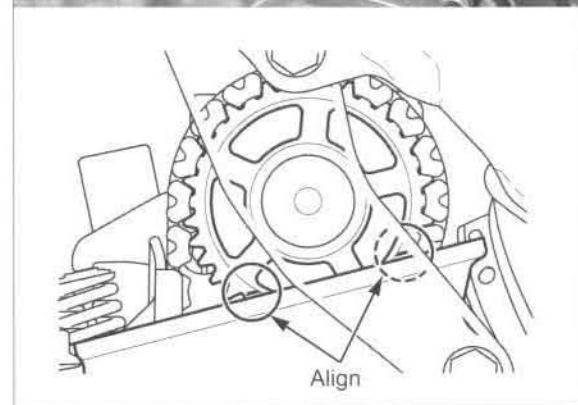
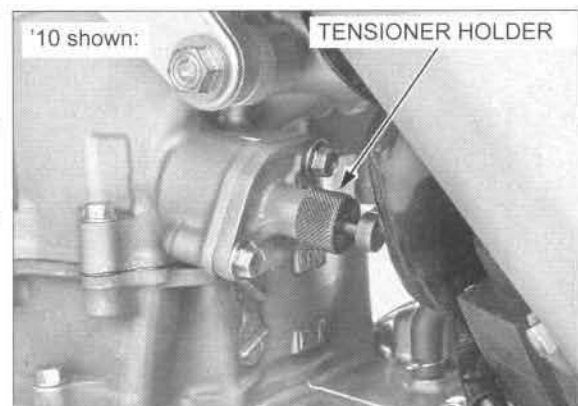


Remove the stopper tool from the cam chain tensioner lifter.

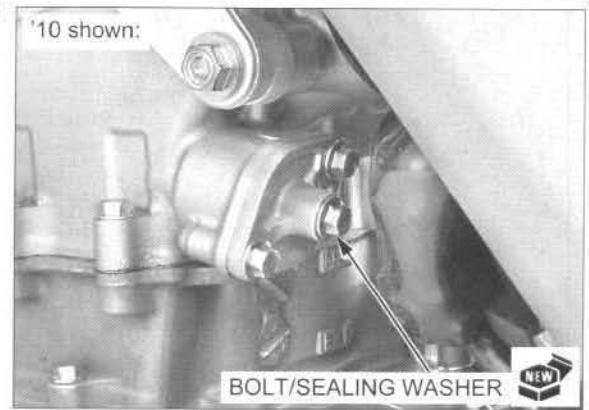
**TOOL:**

**Cam chain tensioner holder**      **070MG-0010100 or 07AMG-001A100 (U.S.A. only)**

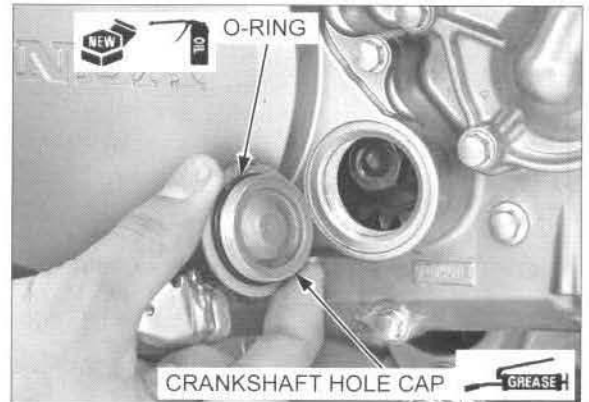
Make sure the index line on the cam sprocket align with the cylinder head top surface.



Install the cam chain tensioner lifter bolt with a new sealing washer.  
Tighten the cam chain tensioner lifter bolt securely.



Apply engine oil to a new O-ring, and install it to the crankshaft hole cap.  
Apply grease to the crankshaft hole cap threads.  
Install the crankshaft hole cap and tighten it to the specified torque.



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

*After '12 only:* Install the condenser (page 16-16).

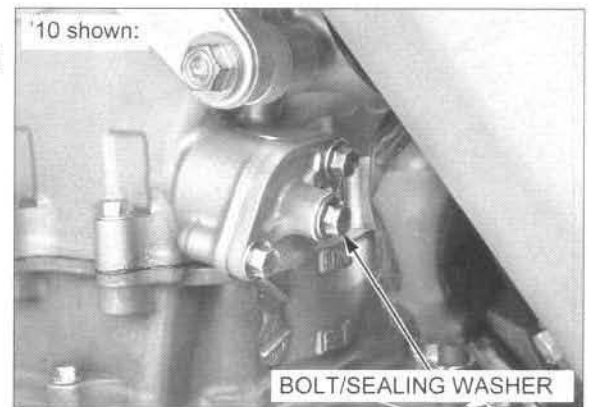
Install the cylinder head cover (page 8-8).

## CAM CHAIN TENSIONER

### CAM CHAIN TENSIONER LIFTER REMOVAL

*After '12 only:* Remove the condenser (page 16-16).

Remove the cam chain tensioner lifter bolt and sealing washer.



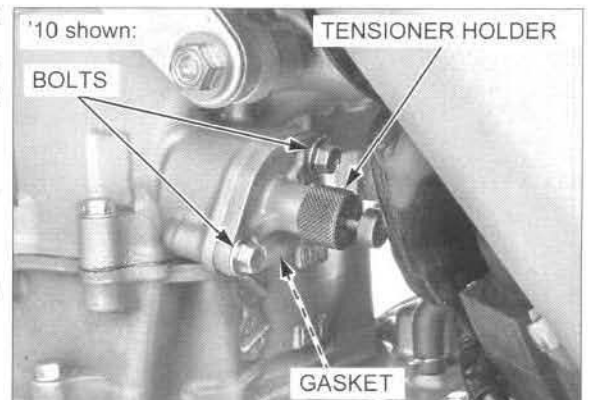
Insert the cam chain tensioner holder into the cam chain tensioner lifter.

Turn the cam chain tensioner holder clockwise fully and lock the cam chain tensioner lifter by pushing the handle.

**TOOL:**

**Cam chain tensioner holder**      **070MG-0010100 or 07AMG-001A100 (U.S.A. only)**

Remove the bolts, cam chain tensioner lifter and gasket.

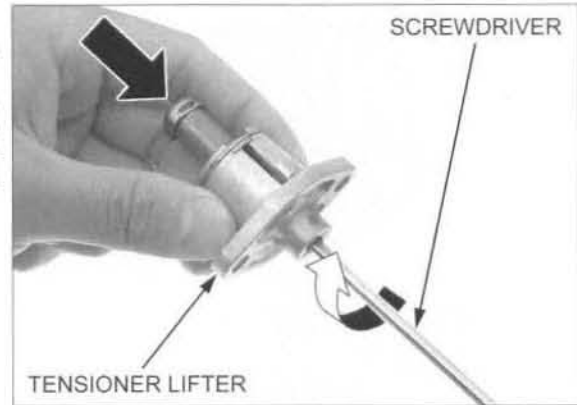


## CYLINDER HEAD/VALVES

### INSPECTION

Check the lifter operation:

- The tensioner shaft should not go into the tensioner lifter body when it is pushed.
- When it is turned clockwise with a screwdriver, the tensioner shaft should be pulled into the tensioner lifter body. The tensioner shaft should spring out of the tensioner lifter body as soon as the screwdriver is released.



### INSTALLATION

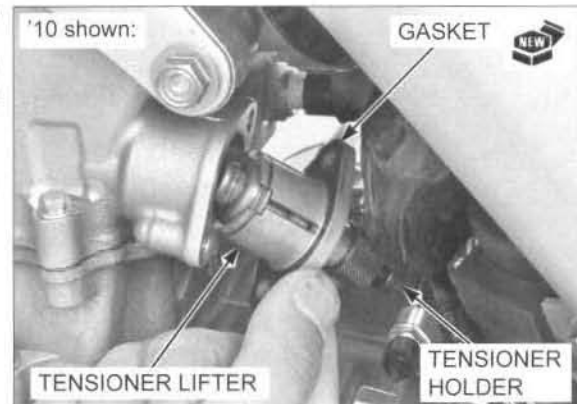
Insert the cam chain tensioner holder into the cam chain tensioner lifter.

Turn the cam chain tensioner holder clockwise fully and lock the cam chain tensioner lifter by pushing the handle.

#### TOOL:

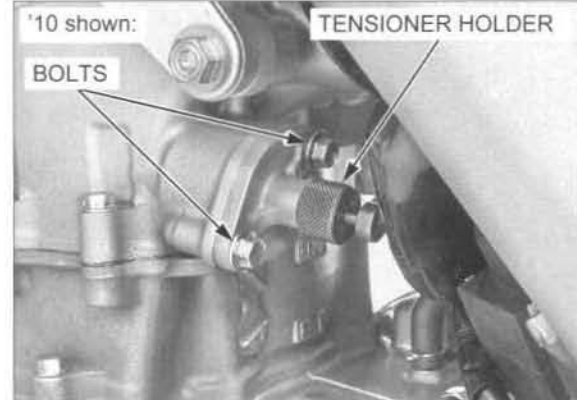
**Cam chain tensioner holder**      **070MG-0010100 or 07AMG-001A100 (U.S.A. only)**

Install a new gasket and cam chain tensioner lifter.



Install and tighten the bolts securely.

Remove the tensioner holder.



Install the cam chain tensioner lifter bolt with a new sealing washer.

Tighten the cam chain tensioner lifter bolt securely.

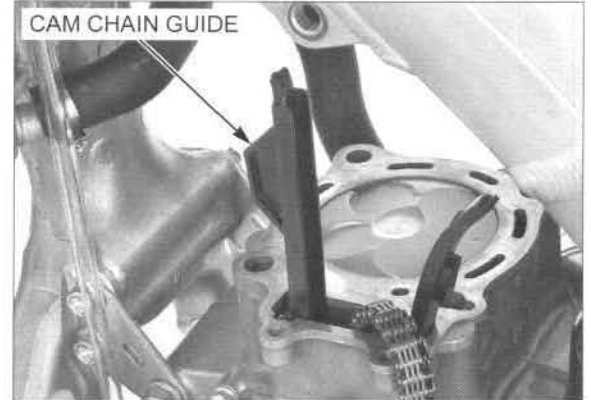
*After '12 only:* Install the condenser (page 16-16).



**CAM CHAIN TENSIONER/CAM CHAIN GUIDE**

**REMOVAL**

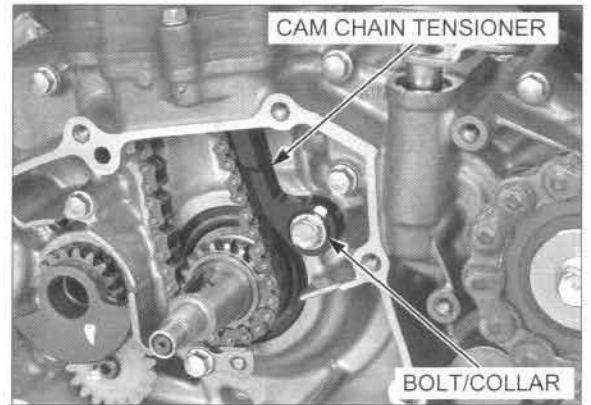
Remove the cylinder head (page 8-17).  
Remove the cam chain guide.



Remove the following:

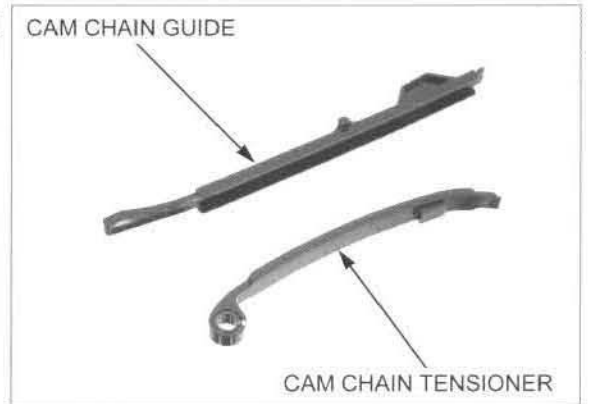
- Left crankcase cover (page 11-4)
- Flywheel (page 11-5)

Remove the bolt, collar and cam chain tensioner.



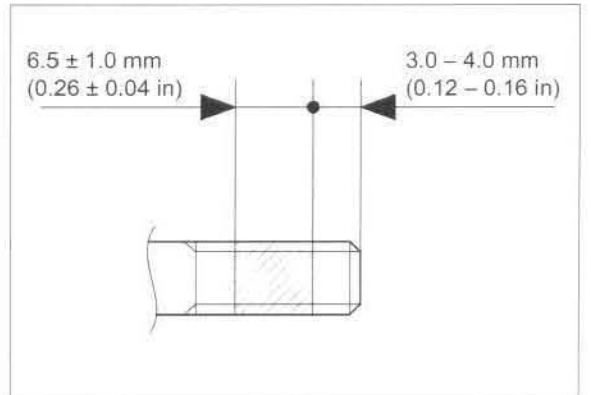
**INSPECTION**

Inspect the cam chain tensioner and cam chain guide for excessive wear or damage, replace them if necessary.



**INSTALLATION**

Clean and apply locking agent to the cam chain tensioner bolt threads as shown.



## CYLINDER HEAD/VALVES

Install the cam chain tensioner, collar and cam chain tensioner bolt.

Tighten the cam chain tensioner bolt to the specified torque.

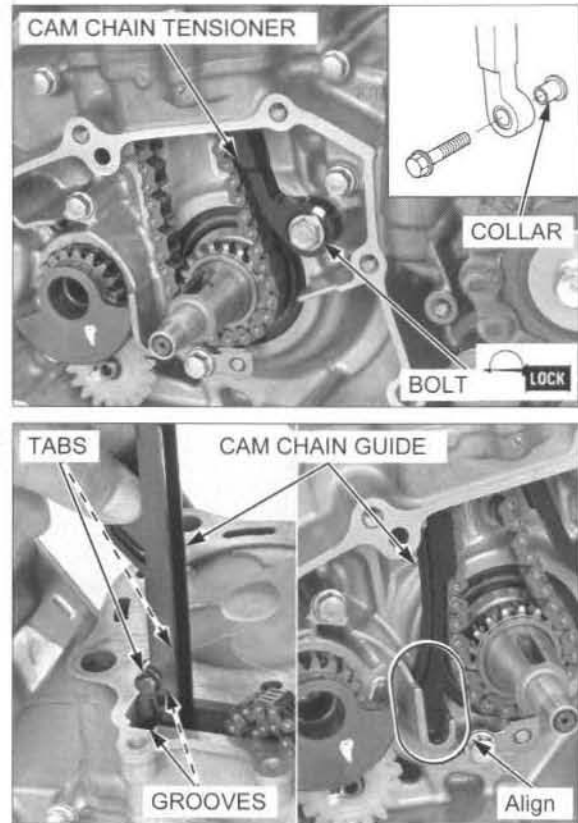
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the following:

- Flywheel (page 11-5)
- Left crankcase cover (page 11-8)

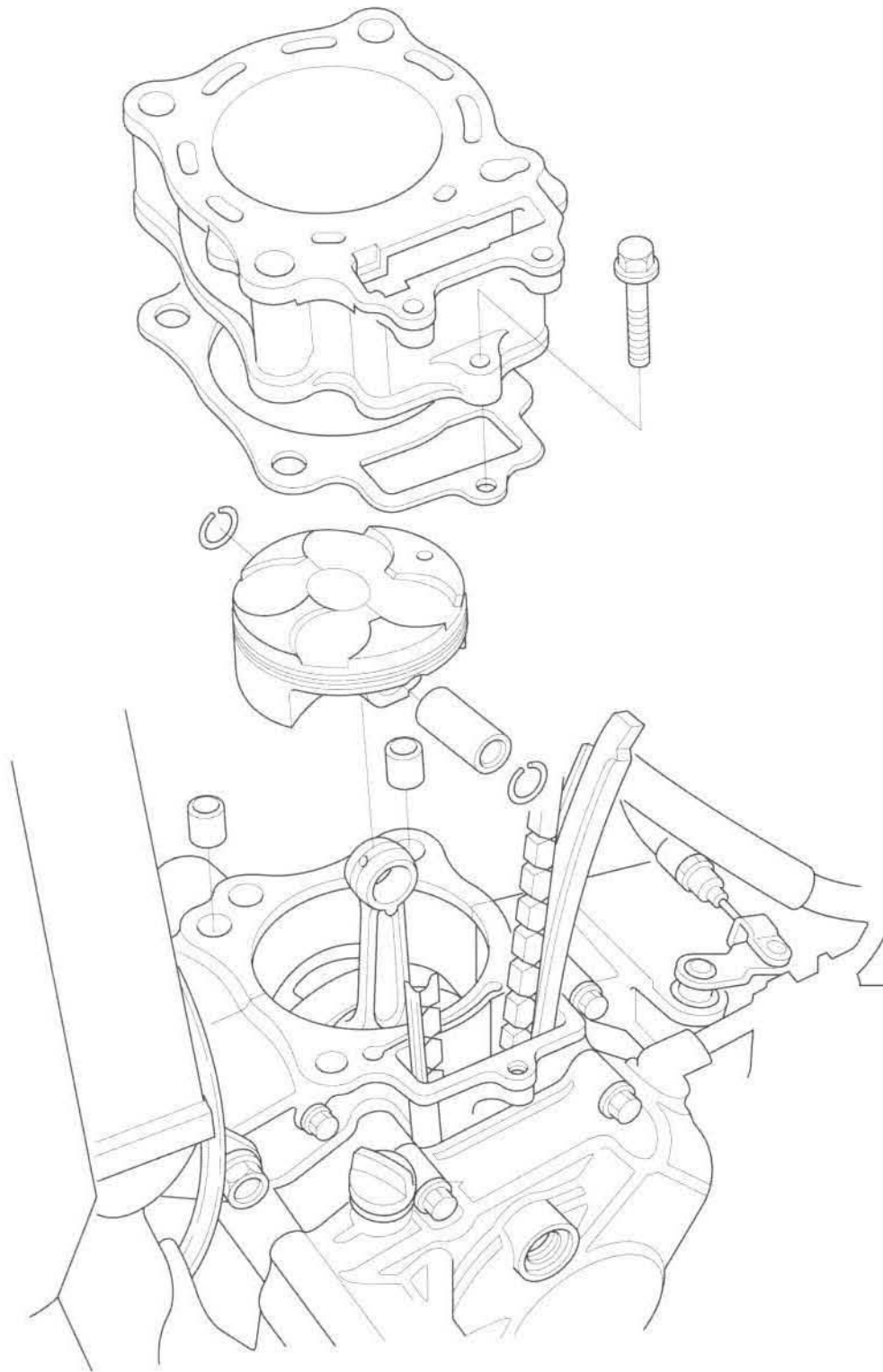
Install the cam chain guide by aligning its tabs with the grooves in the cylinder and guide end with the groove in the crankcase.

Install the cylinder head (page 8-30).



COMPONENT LOCATION .....	9-2	PISTON REMOVAL .....	9-4
SERVICE INFORMATION .....	9-3	CYLINDER/PISTON INSPECTION .....	9-5
TROUBLESHOOTING .....	9-3	PISTON INSTALLATION .....	9-7
CYLINDER REMOVAL .....	9-4	CYLINDER INSTALLATION .....	9-8

COMPONENT LOCATION



## SERVICE INFORMATION

### GENERAL

- This section covers maintenance of the cylinder and piston. These procedures can be done with the engine installed in the frame.
- Before disassembly, clean the engine thoroughly to prevent dirt from entering it.
- Be careful not to damage the mating surfaces when removing the cylinder. For example, do not use a screwdriver to pry the cylinder.
- Clean all disassembled parts with cleaning solvent before inspection, use compressed air to dry the parts.
- Under racing conditions, the piston, piston pin and piston rings should be replaced after every 6 races or about 15 hours of operation.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	76.800 – 76.815 (3.0236 – 3.0242)	76.825 (3.0246)	
	Out-of-round	–	0.010 (0.0004)	
	Taper	–	0.010 (0.0004)	
	Warpage	–	0.05 (0.002)	
Piston, piston ring	Piston mark direction	"O" mark facing toward the intake side	–	
	Piston O.D.	76.770 – 76.780 (3.0224 – 3.0228)	76.740 (3.0213)	
	Piston O.D. measurement point	7.0 (0.28) from the bottom of skirt	–	
	Piston pin bore I.D.	16.002 – 16.008 (0.6300 – 0.6302)	16.03 (0.631)	
	Piston pin O.D.	15.994 – 16.000 (0.6297 – 0.6299)	15.98 (0.629)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)	
	Top ring mark	"RNM" mark side facing up	–	
	Piston ring-to-ring groove clearance	Top	0.035 – 0.065 (0.0014 – 0.0026)	0.08 (0.003)
	Piston ring end gap	Top ring	0.15 – 0.25 (0.006 – 0.010)	0.39 (0.015)
Oil ring (side rail)		0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)	
Cylinder-to-piston clearance		0.020 – 0.045 (0.0008 – 0.0018)	0.085 (0.0033)	
Connecting rod small end I.D.		16.016 – 16.034 (0.6305 – 0.6313)	16.04 (0.631)	
Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0017)	0.06 (0.002)	

## TROUBLESHOOTING

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

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

- Leaking or damaged cylinder head gasket
- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston
- Loose spark plug

#### Compression too high, over-heating or knocking

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

#### Abnormal noise

- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn connecting rod big end bearing (page 12-24)

#### Excessive smoke

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



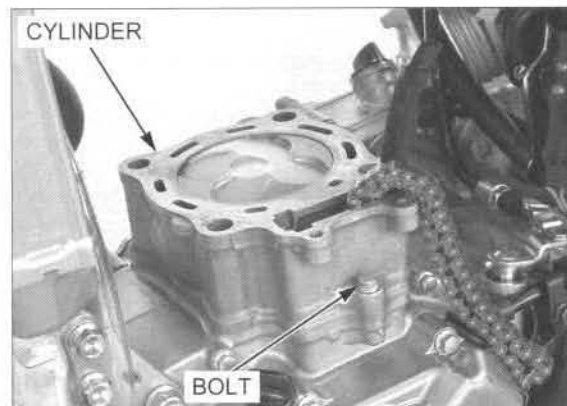
## CYLINDER/PISTON

### CYLINDER REMOVAL

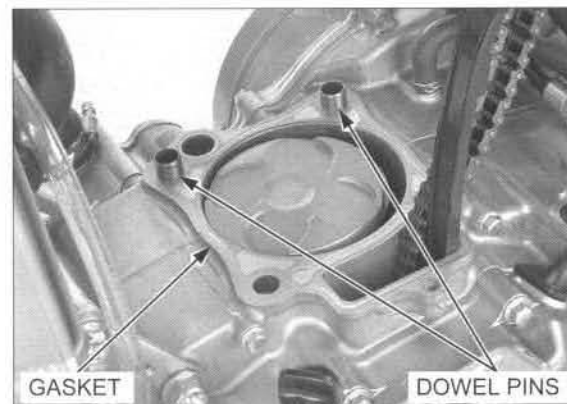
Remove the following:

- cylinder head (page 8-17)
- cam chain guide (page 8-37)

Remove the cylinder bolt and cylinder.



Remove the dowel pins and gasket.



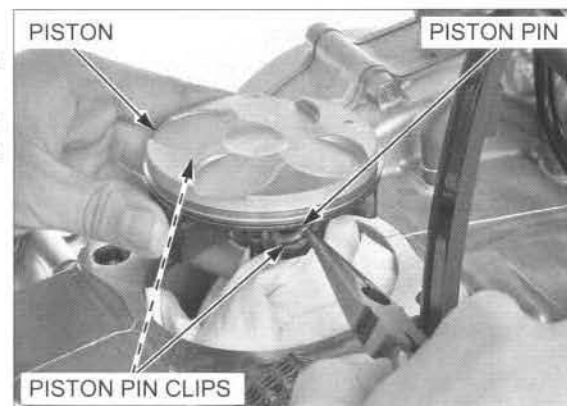
### PISTON REMOVAL

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

Remove the piston pin clips with pliers.

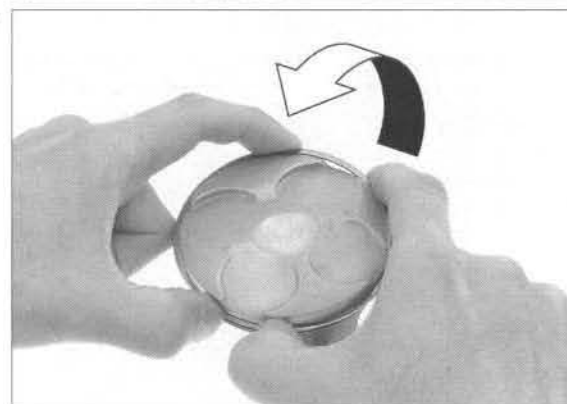
Press the piston pin out of the piston and remove the piston.

- Under racing conditions, the piston, piston pin and piston rings should be replaced according to the maintenance schedule (page 3-4).



*Piston rings are easily broken; take care not to damage them during removal.*

Spread the piston rings, and remove them by lifting up at a point just opposite the gap.



# CYLINDER/PISTON INSPECTION

## CYLINDER

Inspect the cylinder bore for wear or damage.  
Measure the cylinder I.D. in the X and Y axis at three levels.

Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 76.825 mm (3.0246 in)**

Calculate the cylinder-to-piston clearance.  
Take a maximum reading to determine the clearance.

For piston O.D. (page 9-6).

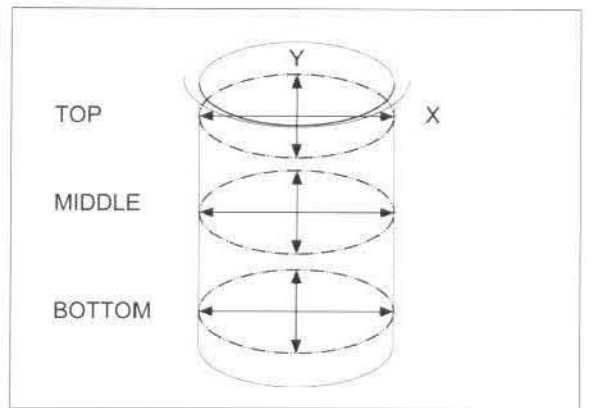
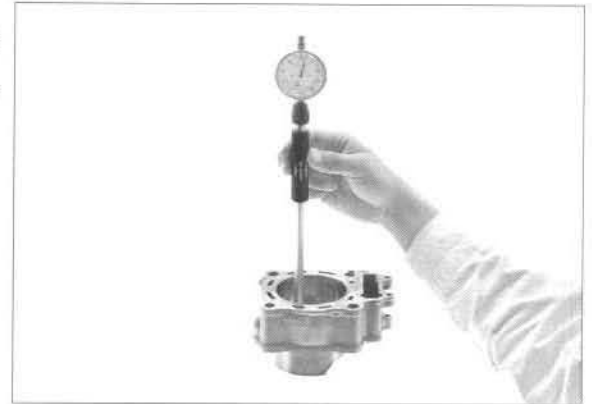
**SERVICE LIMIT: 0.085 mm (0.0033 in)**

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

**SERVICE LIMITS:**

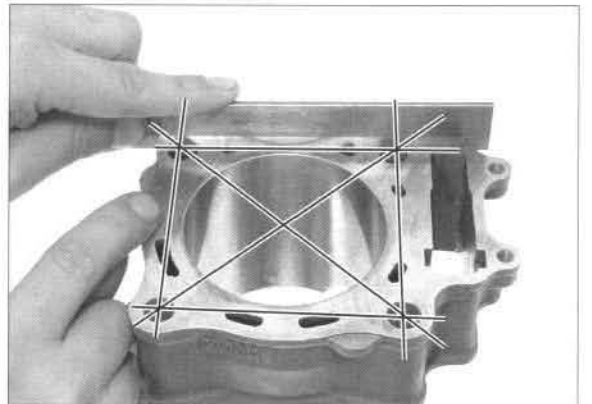
**Taper: 0.010 mm (0.0004 in)**

**Out-of-round: 0.010 mm (0.0004 in)**



Inspect the top of the cylinder for warpage.

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



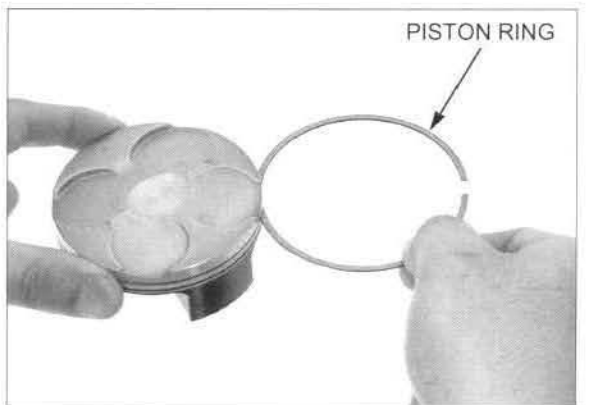
## PISTON/PISTON PIN/PISTON RING

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

Remove the carbon deposits from the piston head and piston ring grooves with the used piston ring.

Inspect the piston for damage and piston ring grooves for wear.

Replace the piston if necessary.

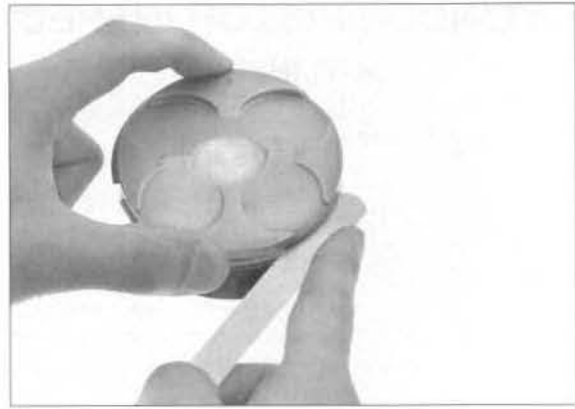


## CYLINDER/PISTON

Temporarily install the piston ring to its proper position with the mark facing up. Inspect the piston ring for free movement by rotating it in its groove. The ring should be able to move freely without catching.

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

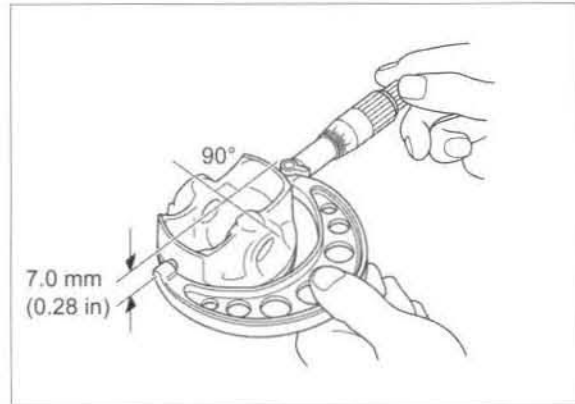
**SERVICE LIMIT: 0.08 mm (0.003 in)**



Measure the diameter of the piston at 7.0 mm (0.28 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT: 76.740 mm (3.0213 in)**

If the O.D. is under the service limit or nearly 15.0 hours of running time have elapsed, replace the piston with a new one.



Measure the piston pin bore I.D.

**SERVICE LIMIT: 16.03 mm (0.631 in)**

Check the piston pin for wear and excessive discoloration.

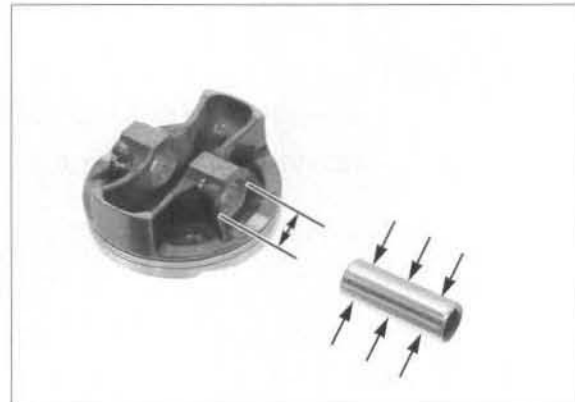
Measure the piston pin O.D.

**SERVICE LIMIT: 15.98 mm (0.629 in)**

If the O.D. is under the service limit, discolored, or nearly 30.0 hours of running time have elapsed, replace the piston pin.

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.04 mm (0.002 in)**



*Push the ring into the cylinder with the top of the piston to be sure the ring is inserted squarely in the cylinder.*

Insert each piston ring into the cylinder and measure the ring end gap.

**SERVICE LIMITS:**

**Top: 0.39 mm (0.015 in)**

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

If the ring end gap is over the service limit or nearly 15.0 hours of running time have elapsed, replace the piston ring with a new one.



**CONNECTING ROD**

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 16.04 mm (0.631 in)**

If the I.D. is over the service limit, replace the crankshaft (page 12-24).

Calculate the connecting rod-to-piston pin clearance.

**SERVICE LIMIT: 0.06 mm (0.002 in)**

**PISTON INSTALLATION**

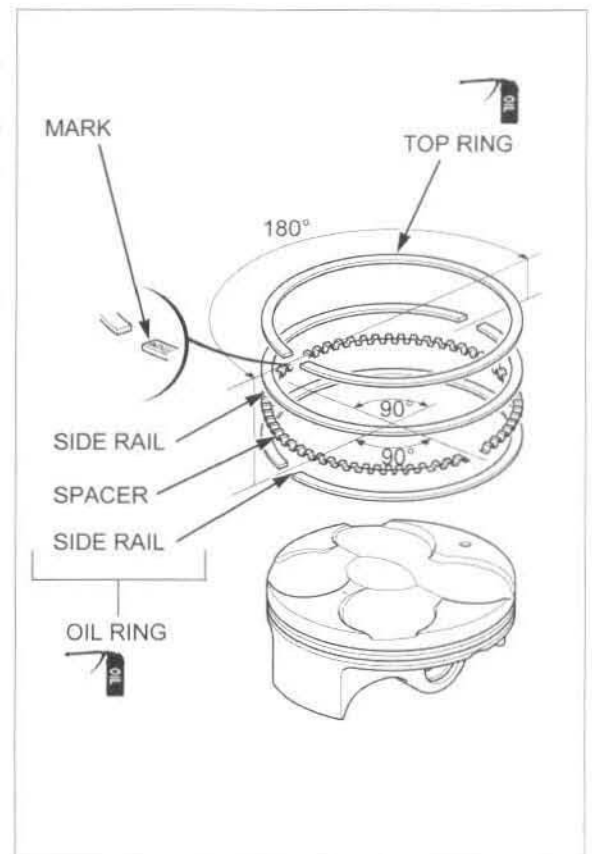
Clean the piston ring grooves thoroughly.

*Install the top ring on the piston with the marked side facing up.*

Apply engine oil to the piston rings, and install them as shown.

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston during piston ring installation.
- Do not align the oil ring (side rails) gaps.
- Space the oil ring end 90° apart.

After installation, the rings should rotate freely in the piston ring grooves.



*When cleaning the cylinder mating surface, place a shop towel over the cylinder opening to prevent dust or dirt from entering the crankcase.*

Clean any gasket material from the cylinder mating surfaces of the crankcase.

Apply molybdenum oil solution to the connecting rod small end inner surface.



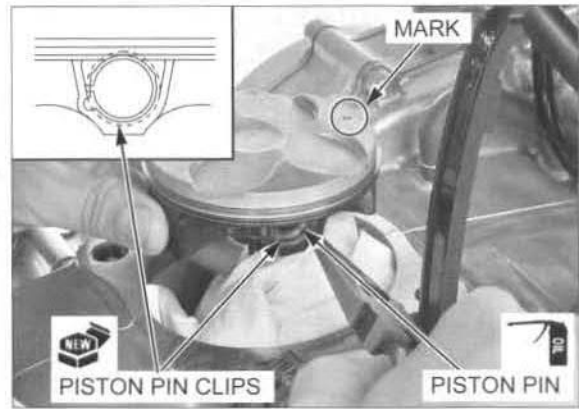
## CYLINDER/PISTON

Apply engine oil to the piston pin outer surface and piston pin hole of the piston.

Install the piston with the "O" mark facing intake side.

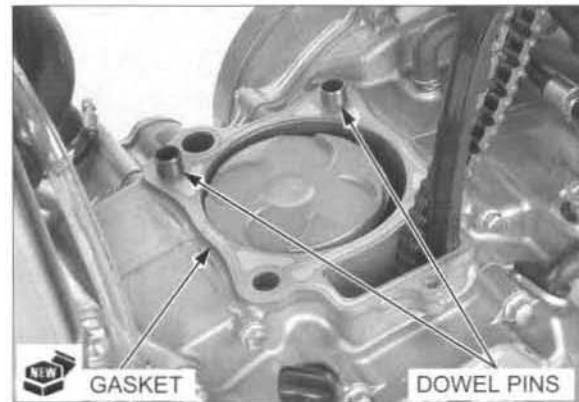
Install the piston pin and new piston pin clips.

- Do not align the piston pin clip end gap with the piston cut-out.
- Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.



## CYLINDER INSTALLATION

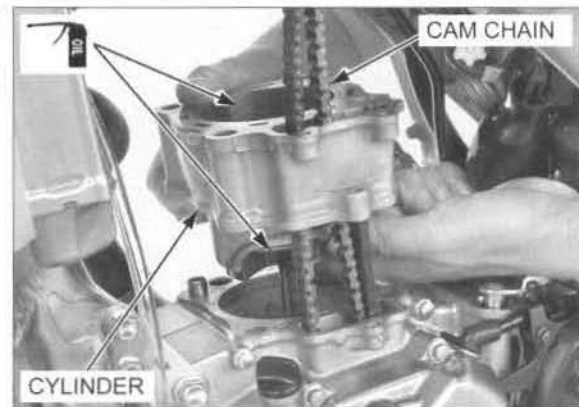
Install the dowel pins and new gasket.



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

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

Route the cam chain through the cylinder, and install the cylinder while compressing the piston rings.



*Tighten the bolt after installing the cylinder head.*

Install the cylinder bolt.

Install the following:

- cam chain guide (page 8-38)
- cylinder head (page 8-30)



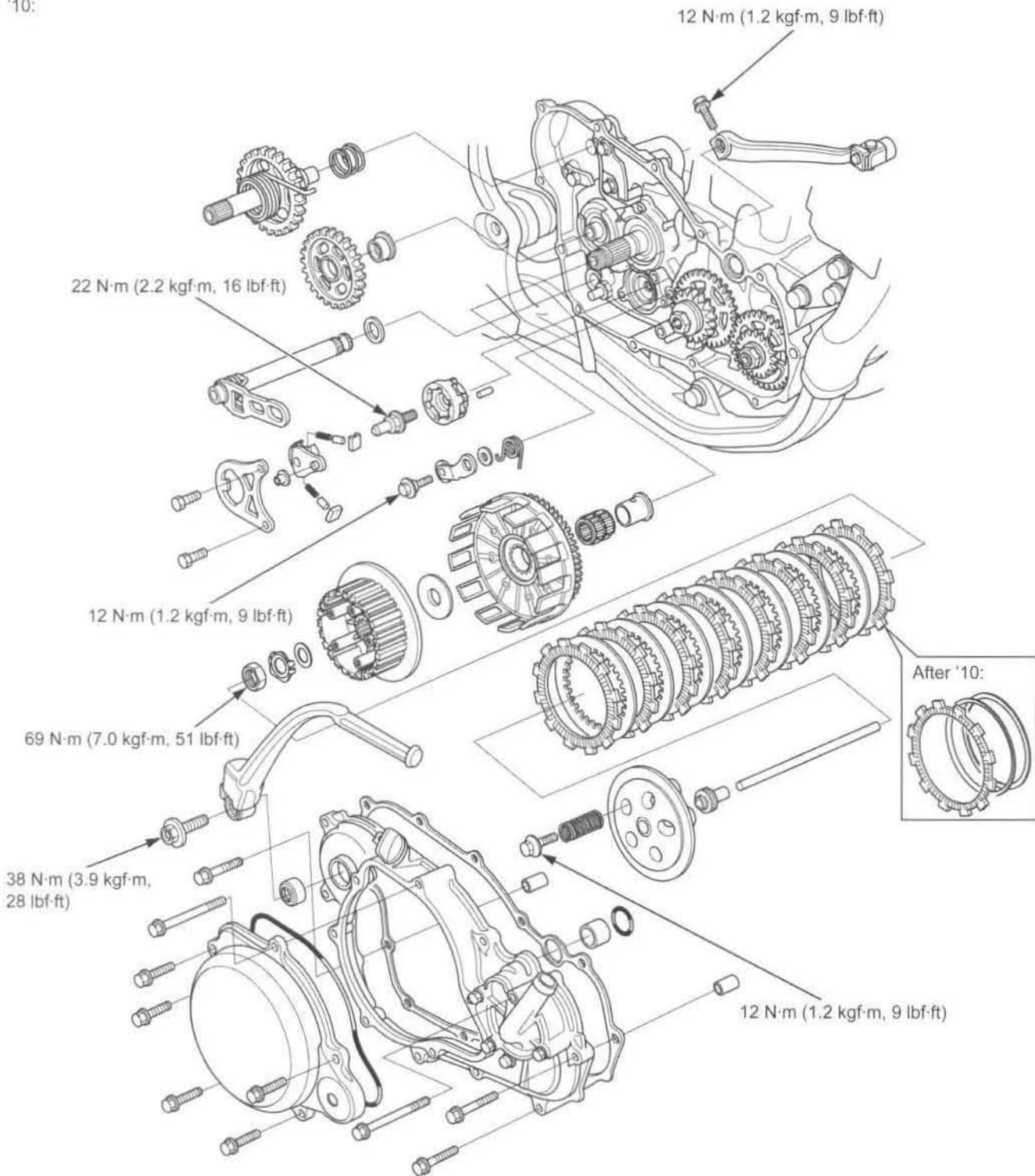
# 10. CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

---

COMPONENT LOCATION .....	10-2	CLUTCH .....	10-7
SERVICE INFORMATION .....	10-3	KICKSTARTER .....	10-16
TROUBLESHOOTING .....	10-4	GEARSHIFT LINKAGE .....	10-20
RIGHT CRANKCASE COVER .....	10-5		

COMPONENT LOCATION

'10:





## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch, kickstarter and gearshift linkage. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. Oil additives also affect clutch performance and are not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch pulled in, inspect the transmission oil level before servicing the clutch system.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Clutch lever freeplay		10 – 20 (3/8 – 13/16)	–
Clutch spring free length		50.86 (2.002)	49.96 (1.967)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.85 (0.112)
Clutch plate warpage		–	0.10 (0.004)
Kickstarter pinion gear I.D.		16.516 – 16.534 (0.6502 – 0.6509)	16.55 (0.652)
Kickstarter spindle O.D.		16.466 – 16.484 (0.6483 – 0.6490)	16.46 (0.648)
Kickstarter idle gear I.D.		19.000 – 19.021 (0.7480 – 0.7489)	19.050 (0.7500)
Kickstarter idle gear bushing	I.D.	15.000 – 15.018 (0.5906 – 0.5913)	15.037 (0.5920)
	O.D.	18.959 – 18.980 (0.7464 – 0.7472)	18.941 (0.7457)
Countershaft O.D. at kickstarter idle gear bushing		14.966 – 14.984 (0.5892 – 0.5899)	14.952 (0.5887)

Unit: mm (in)

### TORQUE VALUES


Clutch center lock nut	69 N·m (7.0 kgf·m, 51 lbf·ft)	Apply engine oil to the threads and seating surface.
Clutch spring bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift drum center pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads (page 10-23).
Gearshift drum stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Kickstarter pedal bolt	38 N·m (3.9 kgf·m, 28 lbf·ft)	Apply locking agent to the threads.
Kickstarter arm screw	9.0 N·m (0.9 kgf·m, 6.6 lbf·ft)	Apply locking agent to the threads.
Gearshift pedal pinch bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift return spring pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	

### TOOLS

<p>Clutch center holder 07724-0050001 or 07724-0050002</p>  <p>or equivalent commercially available in U.S.A.</p>	<p>Bearing remover set, 12 mm 07936-1660101</p>  <p>not available in U.S.A.</p>	<p>Remover weight 07741-0010201</p>  <p>or 07936-371020A (U.S.A. only)</p>
--	---	---



## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

<p>Remover head, 12 mm 07936-1660110</p>  <p>not available in U.S.A.</p>	<p>Remover shaft 07936-1660120</p>  <p>not available in U.S.A.</p>	<p>Remover handle 07936-3710100 (U.S.A. only)</p> 
<p>Driver 07749-0010000</p> 	<p>Pilot, 16 mm 07746-0041300</p> 	<p>Bearing remover, 12 mm 07936-166010A (U.S.A. only)</p> 
<p>Needle bearing driver 07AMD-MENA200 (U.S.A. only)</p> 		

## TROUBLESHOOTING

### Hard to shift

- Incorrect clutch adjustment
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

### Transmission jumps out of gear

- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt

### Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

### Clutch slips when accelerating

- Incorrect clutch adjustment
- Worn clutch discs
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additives

### Motorcycle creeps with the engine idling

- Incorrect clutch adjustment
- Clutch plate warped
- Faulty clutch lifter
- Incorrect transmission oil

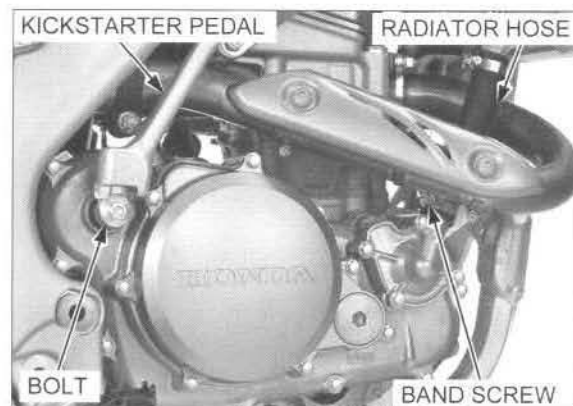
**RIGHT CRANKCASE COVER****REMOVAL**

Drain the coolant (page 6-7).

Drain the transmission oil (page 3-17).

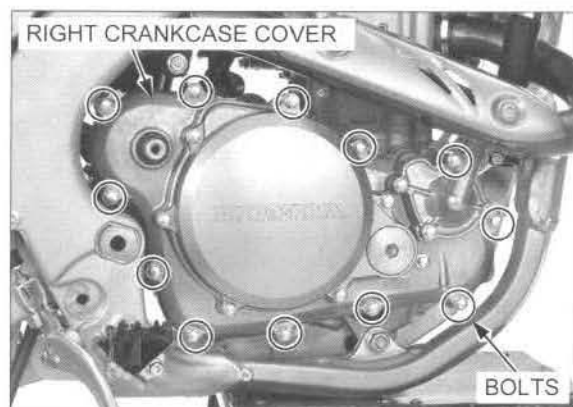
Remove the brake pedal pivot bolt (page 15-29).

Remove the kickstarter pedal bolt and kickstarter pedal.  
Loosen the band screw and disconnect the radiator hose from the right crankcase cover.

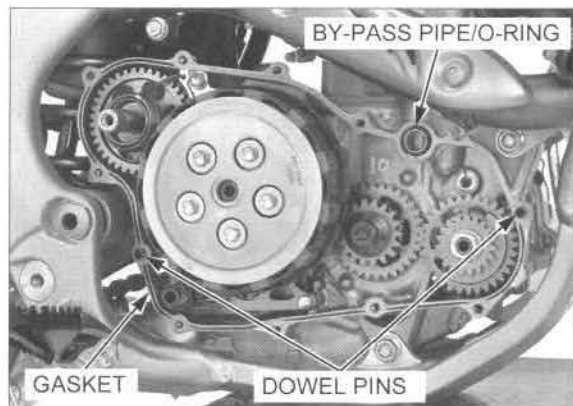


Loosen the right crankcase cover bolts in a criss-cross pattern in two or three steps.

Remove the bolts and right crankcase cover.



Remove the water by-pass pipe and O-ring.  
Remove the gasket and dowel pins.



Check the kickstarter spindle oil seal for deterioration or damage.

If replacing the kickstarter spindle oil seal, install it so that it is flush with the right crankcase cover top surface.



## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

### INSTALLATION

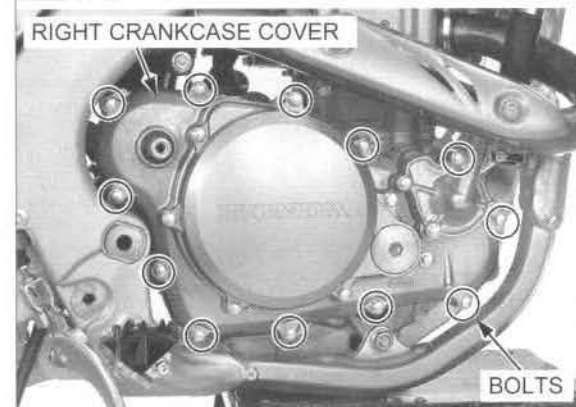
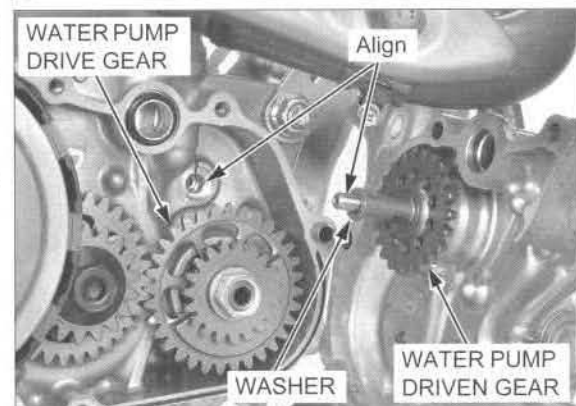
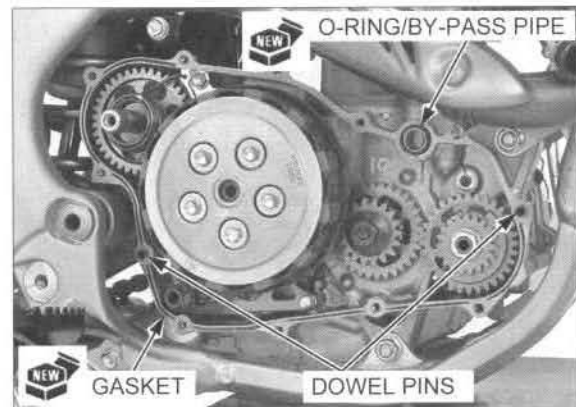
Install a new O-ring onto the by-pass pipe.  
Install the by-pass pipe into the crankcase.  
Install the dowel pins and a new gasket.

*Make sure that the washer is installed on the shaft securely.*

Install the right crankcase cover while engaging the water pump driven gear with water pump drive gear and aligning the water pump shaft with the hole on the right crankcase.

Install the right crankcase cover bolts.

Tighten the right crankcase cover bolts in a crisscross pattern in two or three steps.



Connect the radiator hose to the right crankcase cover and tighten the band screw securely (page 6-9).

Apply locking agent to the kickstarter pedal bolt threads.

Install the kickstarter pedal and bolt.

Tighten the kickstarter pedal bolt to the specified torque.

**TORQUE: 38 N·m (3.9 kgf·m, 28 lbf·ft)**

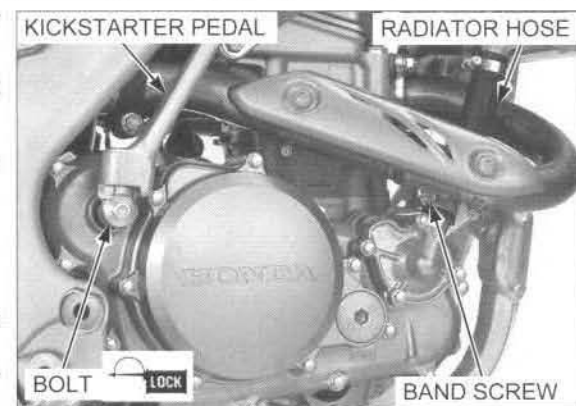
Install the brake pedal pivot bolt (page 15-29).

Add the recommended coolant mixture to the filler neck and bleed the air (page 6-6).

Fill the transmission with the recommended oil (page 3-16).

Check and adjust the rear brake pedal height (page 3-25).

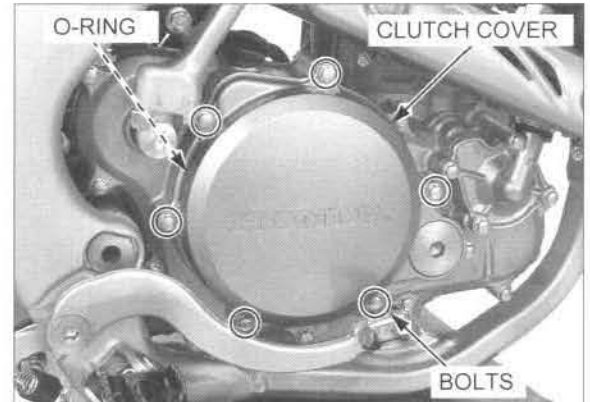
Start the engine and check for oil leaks.



**CLUTCH****REMOVAL**

Drain the transmission oil (page 3-17).

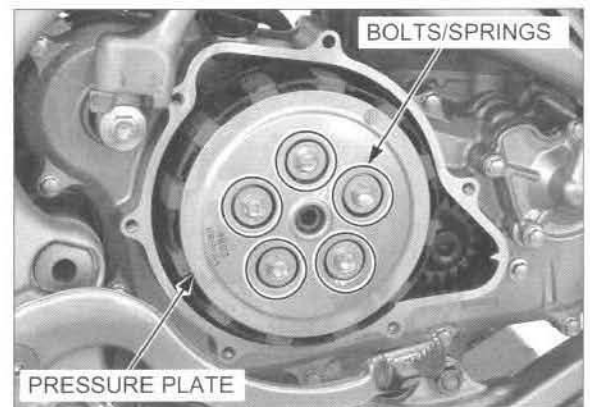
Remove the bolts, clutch cover and O-ring.



Remove the five clutch spring bolts in a crisscross pattern in two or three steps.

Remove the clutch springs.

Remove the clutch pressure plate.

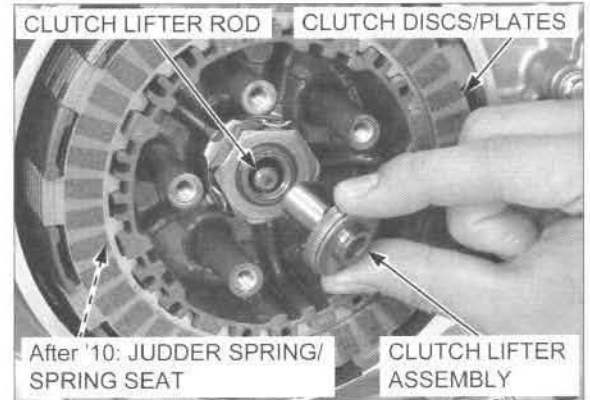


Remove the clutch lifter assembly and clutch lifter rod.

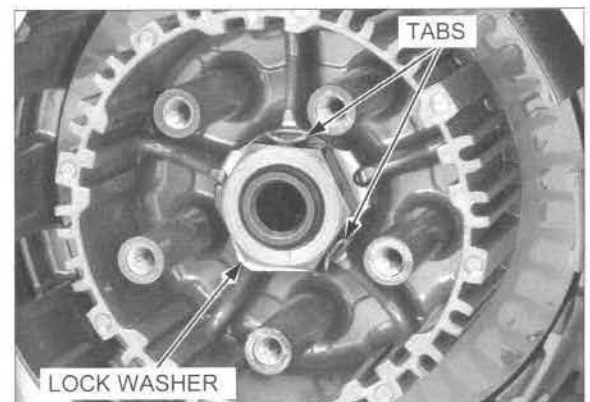
'10: Remove the eight clutch discs and seven clutch plates.

After '10: Remove the following:

- Seven clutch disc B
- Seven clutch plates
- Clutch disc A
- Judder spring
- Spring seat



Bend the tabs of the lock washer away from the lock nut.



## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

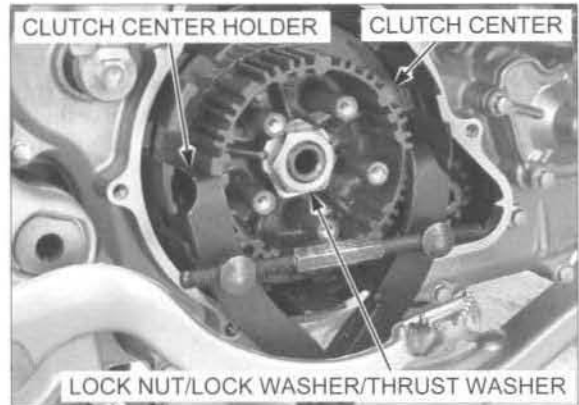
Remove the clutch center lock nut using the special tool.

**TOOL:**

**Clutch center holder**

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

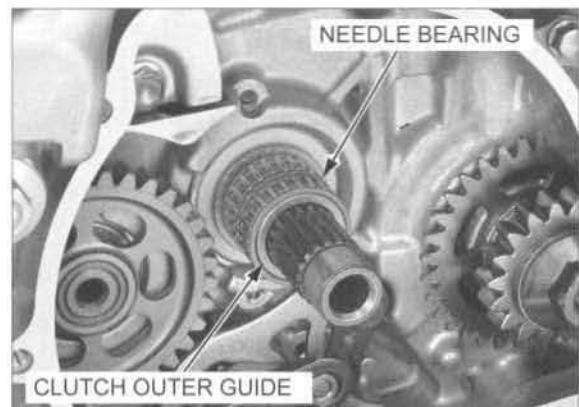
Remove the lock washer and thrust washer.  
Remove the special tool and clutch center.



Remove the thrust washer and clutch outer.



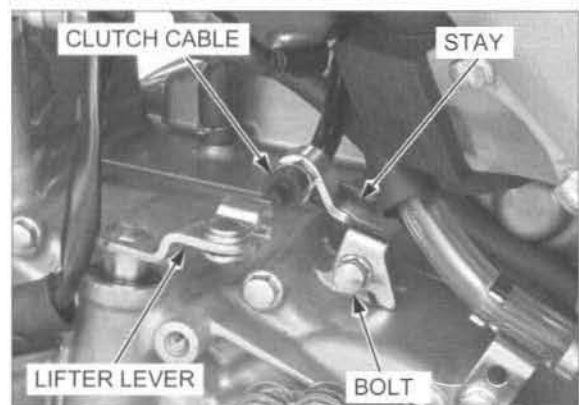
Remove the needle bearing and clutch outer guide.



Remove the drive sprocket cover (page 3-18).

Remove the bolts and cable stay.

Disconnect the clutch cable from the clutch lifter lever and remove the lever from the left crankcase.



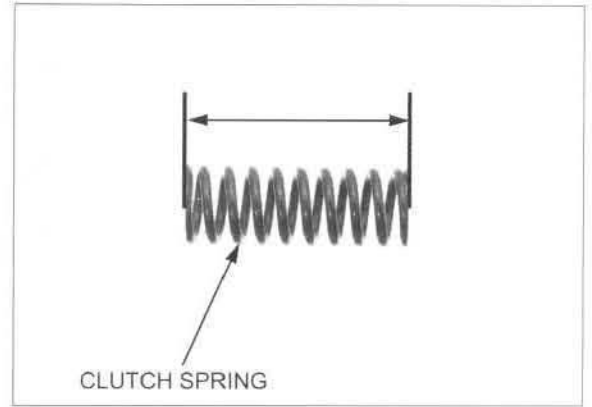
**INSPECTION**

**CLUTCH SPRINGS**

*Clutch springs should be replaced as a set if one or more is below the service limit.*

Measure the clutch spring free length.

**SERVICE LIMIT: 49.96 mm (1.967 in)**



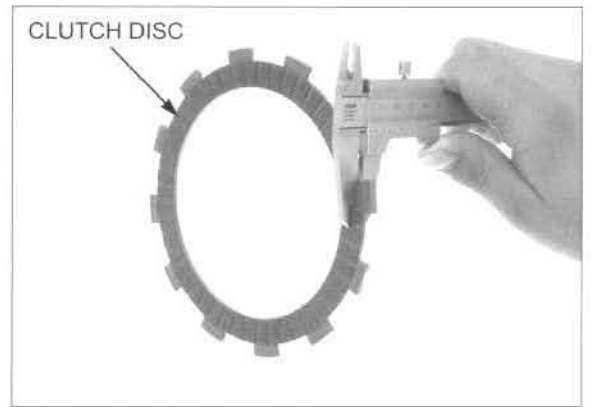
**CLUTCH DISCS**

*Clutch discs should be replaced as a set if one or more is less than the service limit.*

Check the clutch discs for signs of scoring or discoloration.

Measure the thickness of each disc.

**SERVICE LIMIT: 2.85 mm (0.112 in)**



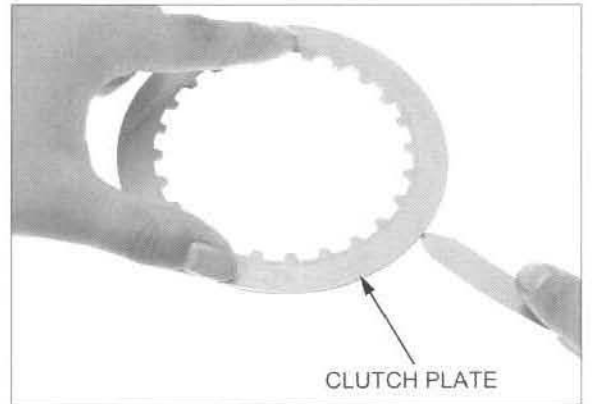
**CLUTCH PLATES**

*Clutch plates should be replaced as a set if one or more is over the service limit.*

Check the plates for excessive warpage or discoloration.

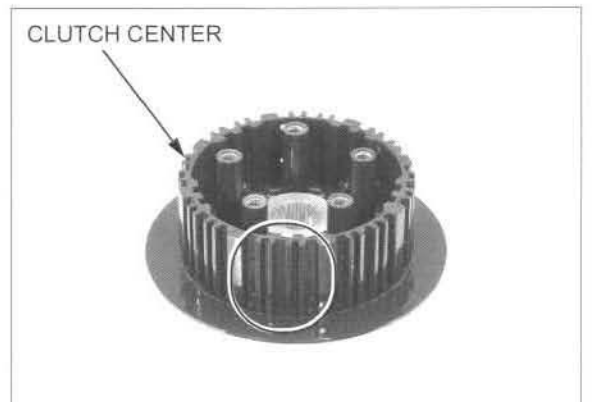
Check the plate warpage on a surface plate using a feeler gauge.

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



**CLUTCH CENTER**

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



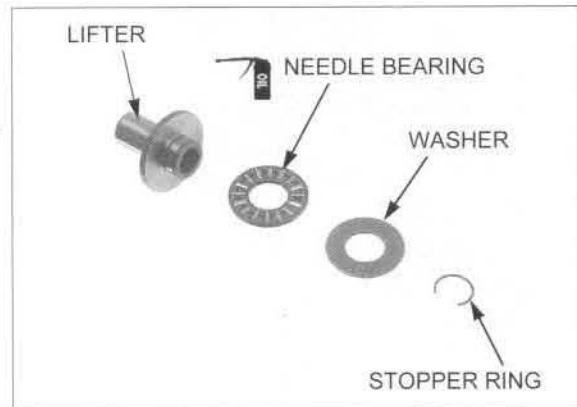
## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

### CLUTCH LIFTER/NEEDLE BEARING

Remove the stopper ring, washer and needle bearing from the clutch lifter.

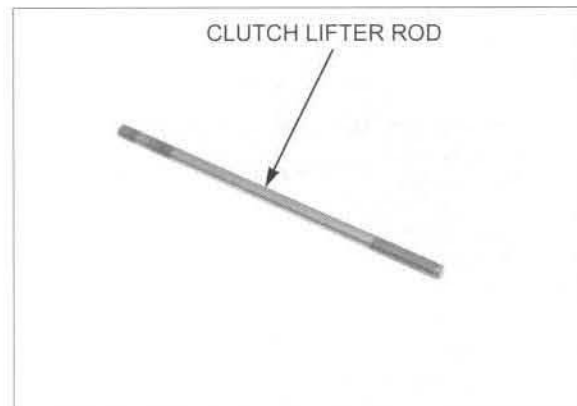
Check the lifter for wear or damage.  
Check the needle bearing for wear or damage.  
Replace the needle bearing and washer as a set if necessary.

Apply engine oil to the needle bearing.  
Install the needle bearing, washer and stopper ring.



### CLUTCH LIFTER ROD

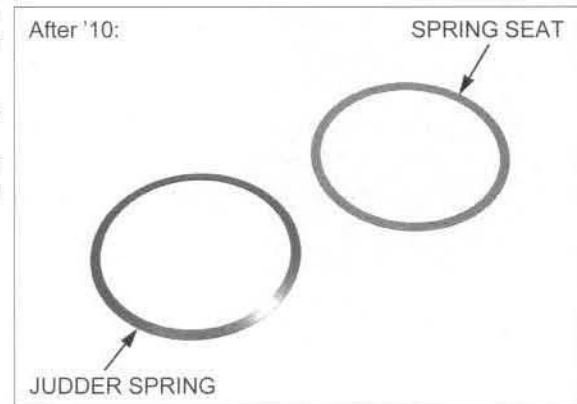
Check the clutch lifter rod for bend or damage.



### JUDDER SPRING/SPRING SEAT (After '10)

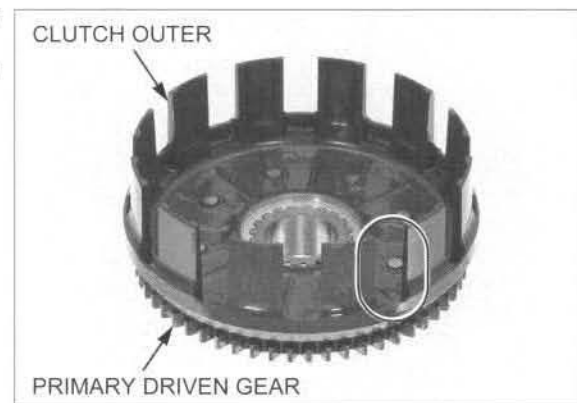
Check the judder spring and spring seat for deformation, warpage or damage; replace them if necessary.

- A damaged or warped spring seat will cause the judder spring to be pressed unevenly.
- A damaged judder spring causes weak contact between the discs and plates or uneven disc/plate contact.



### CLUTCH OUTER

Check the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.  
Check the teeth of the primary driven gear for wear or damage.





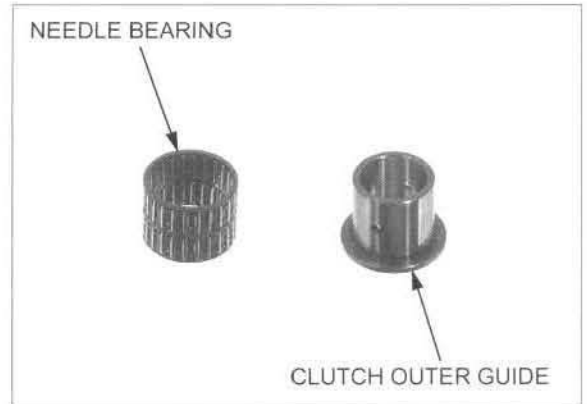
**CLUTCH OUTER GUIDE**

Check the clutch outer guide for abnormal wear or damage.

**NEEDLE BEARING**

Check the needle bearing for wear or damage.

Check the mainshaft for wear or damage at the sliding surface of the clutch outer guide.

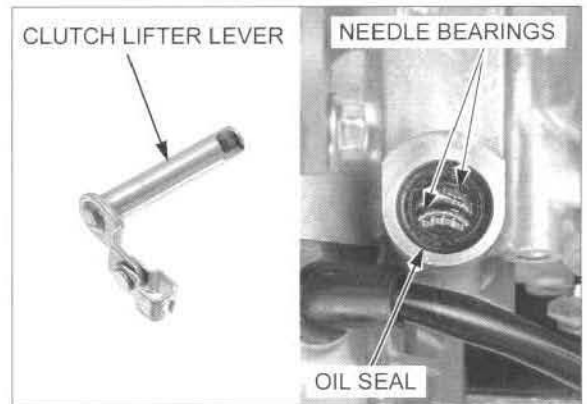


**CLUTCH LIFTER LEVER**

Check the clutch lifter lever for damage.

Check the oil seal and needle bearings for wear or damage.

If necessary, remove the oil seal and replace the bearings as follows.



**LIFTER LEVER BEARING REPLACEMENT**

Remove the engine from the frame (page 7-4).  
Remove the cam chain tensioner lifter (page 8-35).  
Remove the clutch (page 10-7).

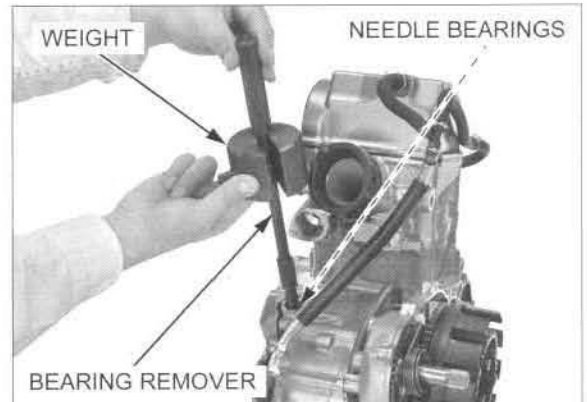
Remove the lifter lever needle bearings using the special tools.

**TOOLS:**

- |                                   |  |
|-----------------------------------|--|
| <b>Bearing remover set, 12 mm</b> | 07936-1660101<br>not available in U.S.A. |
| - Remover weight                  | 07741-0010201                            |
| - Remover head, 12 mm             | 07936-1660110<br>not available in U.S.A. |
| - Remover shaft                   | 07936-1660120<br>not available in U.S.A. |

**TOOLS, U.S.A. only:**

- |                        |               |
|------------------------|---------------|
| Bearing remover, 12 mm | 07936-166010A |
| Remover handle         | 07936-3710100 |
| Remover weight         | 07936-371020A |





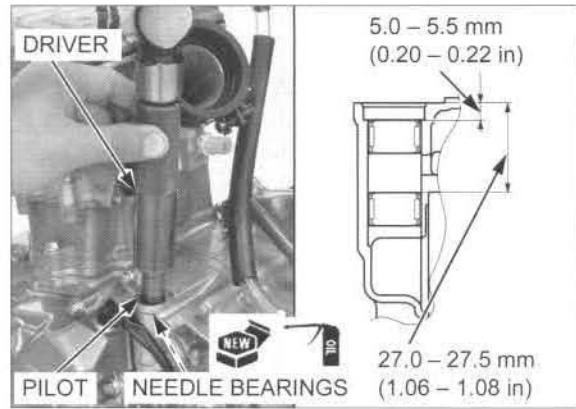
## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Apply engine oil to new needle bearings.

Drive in new needle bearings using the special tools to the specified depth below the crankcase surface as shown.

### TOOLS:

Driver	07749-0010000
Pilot, 16 mm	07746-0041300
TOOLS, U.S.A. only:	
Needle bearing driver	07AMD-MENA200

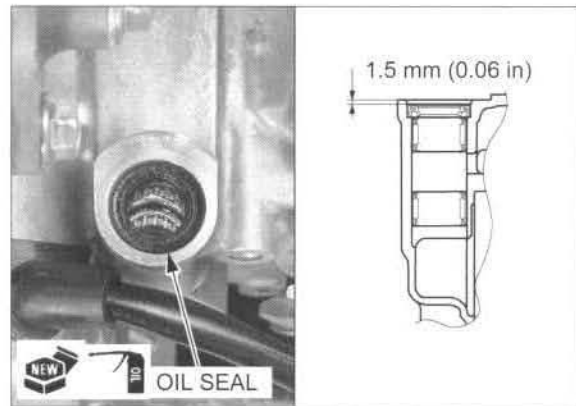


Apply engine oil to new oil seal.

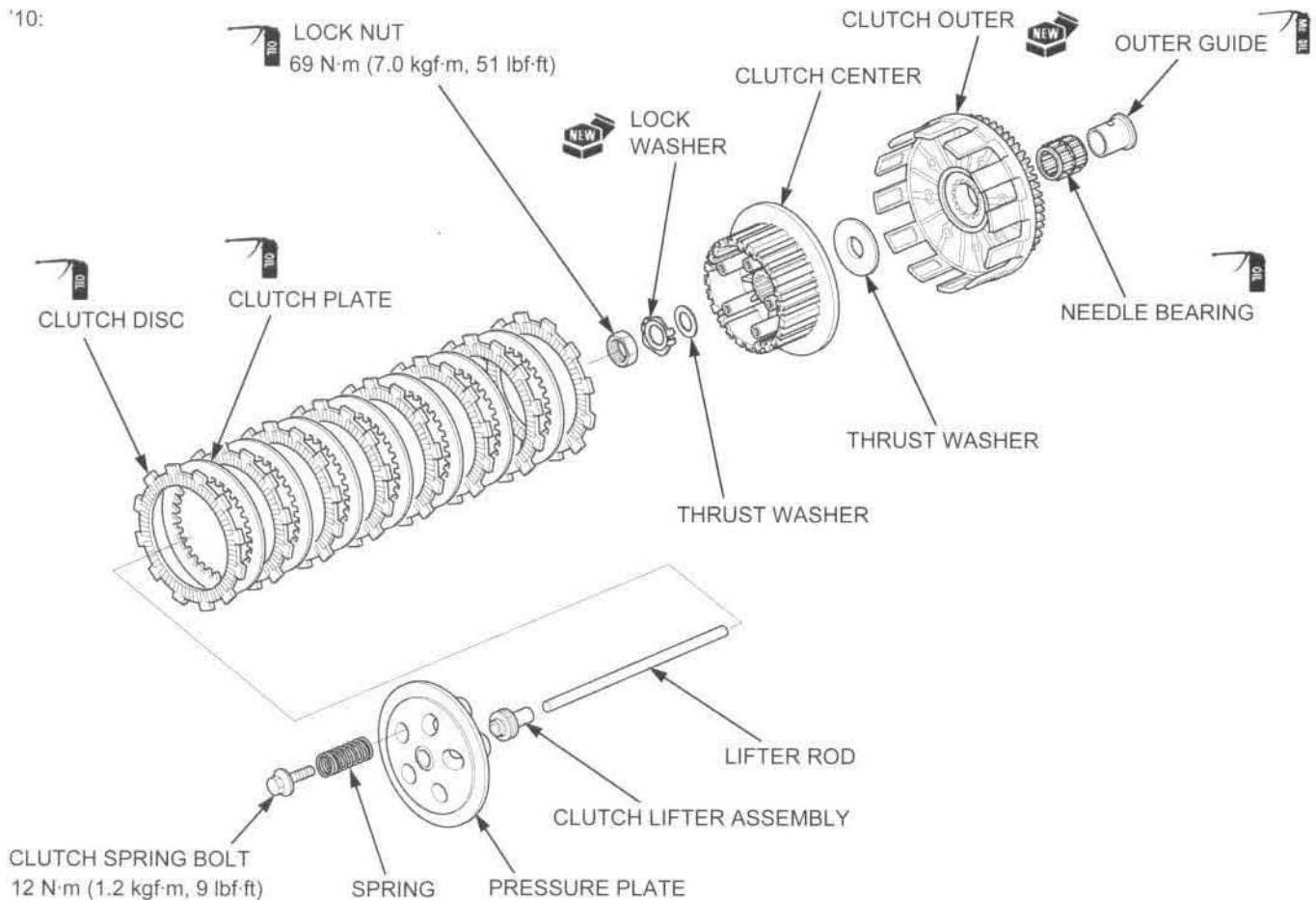
Install new oil seal to the specified depth as shown.

Install the following:

- Clutch (page 10-12)
- Cam chain tensioner lifter (page 8-36)
- Engine (page 7-6)

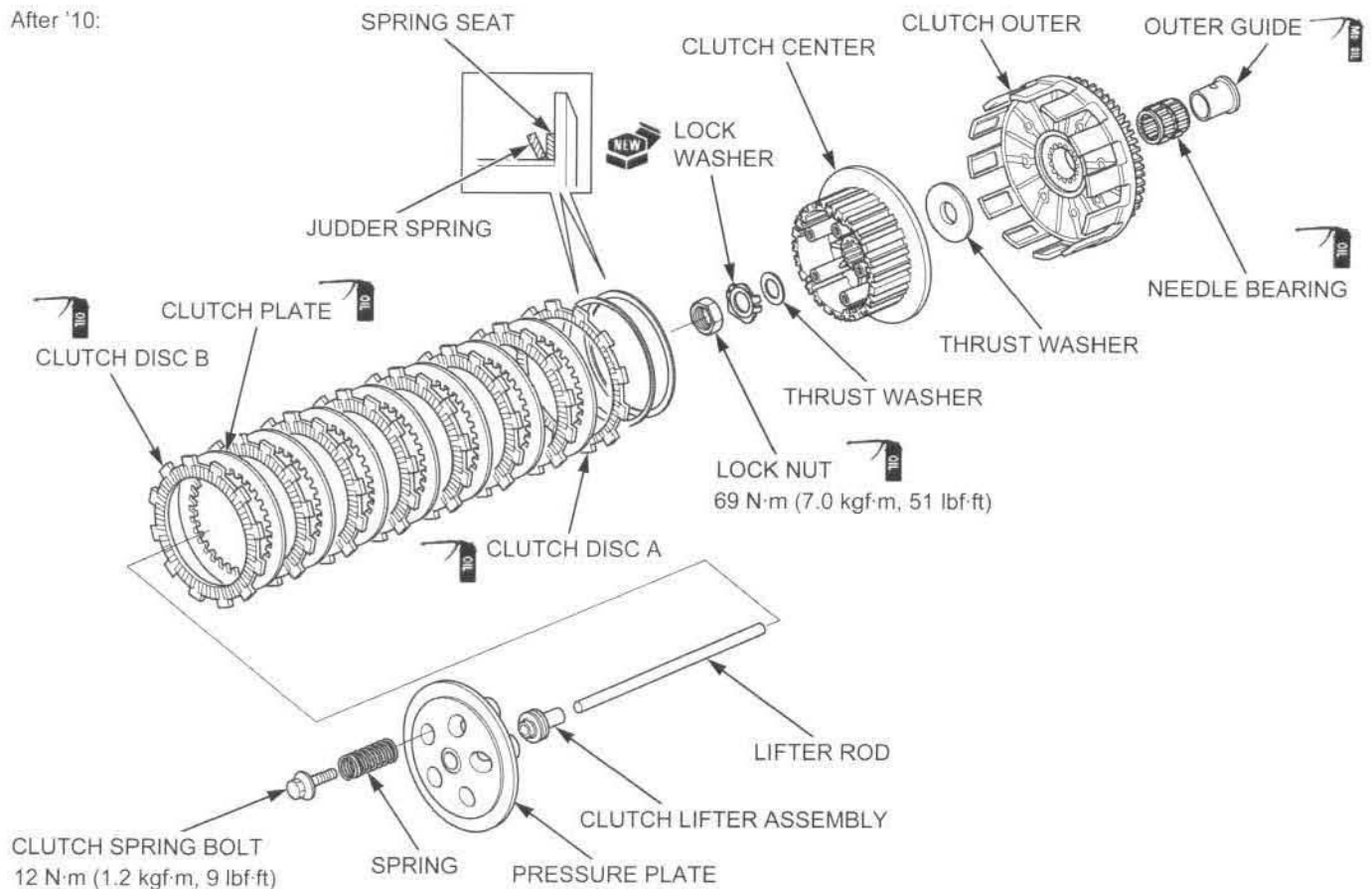


## INSTALLATION



# CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

After '10:

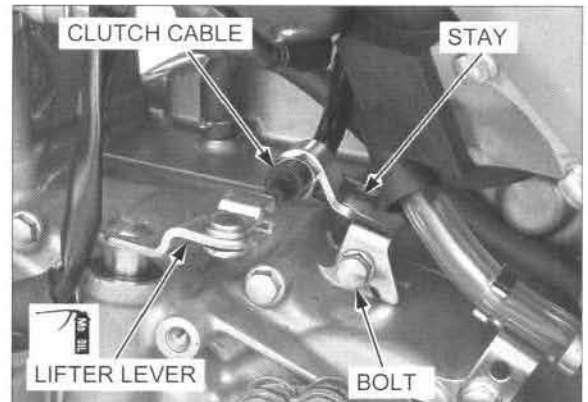


Apply molybdenum oil solution to the clutch lifter lever cam area.

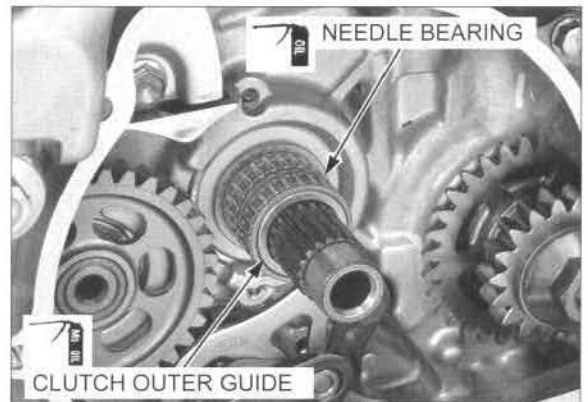
Install the clutch lifter lever into the left crankcase. Connect the clutch cable end to the lifter lever.

Install the clutch cable stay and bolt.

Install the drive sprocket cover (page 3-20).



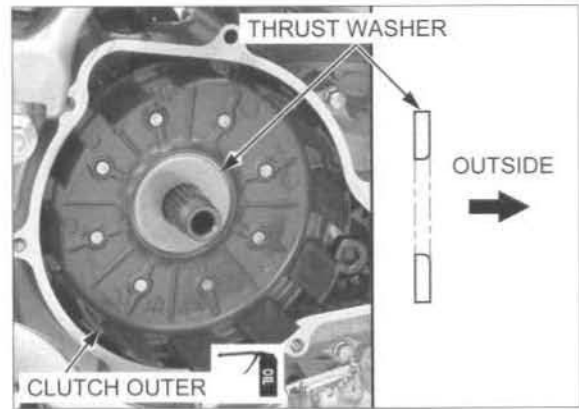
Apply engine oil to the needle bearing.  
Apply molybdenum oil solution to the clutch outer guide inner surface.  
Install the clutch outer guide and needle bearing onto the mainshaft.



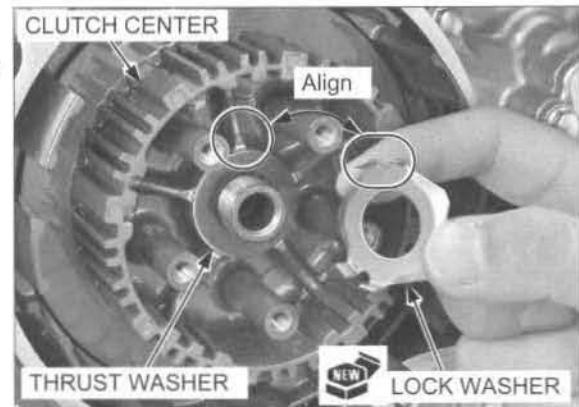
## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Install the thrust washer with its chamfered edge facing out.

Apply engine oil to the clutch outer sliding area. Install the clutch outer and thrust washer.



Install the clutch center onto the mainshaft. Install the thrust washer. Install a new lock washer by aligning its groove with the clutch center rib.



Apply engine oil to the threads and seating surface of the clutch center lock nut, then install it onto the mainshaft.

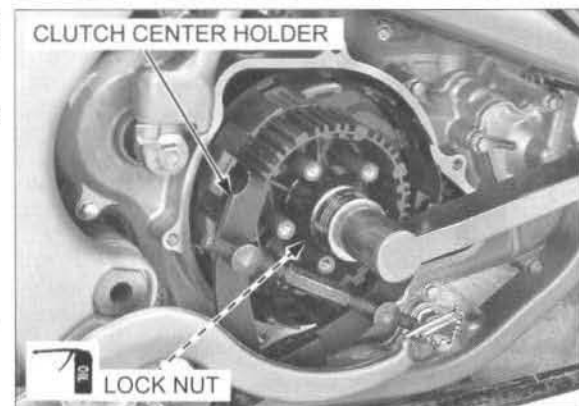
Tighten the lock nut to the specified torque using the special tool.

### TOOL:

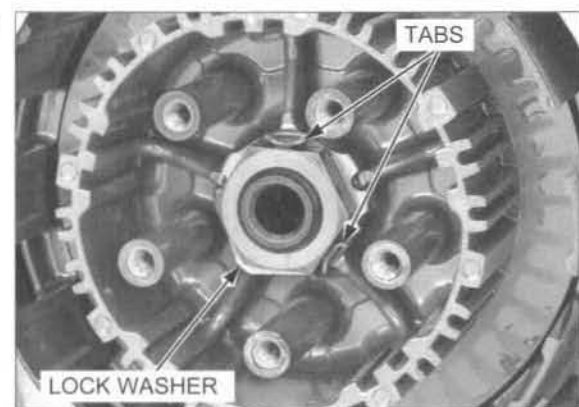
Clutch center holder

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

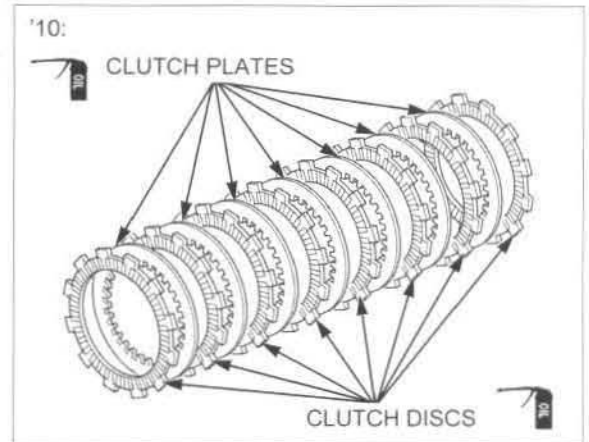
**TORQUE:** 69 N·m (7.0 kgf·m, 51 lbf·ft)



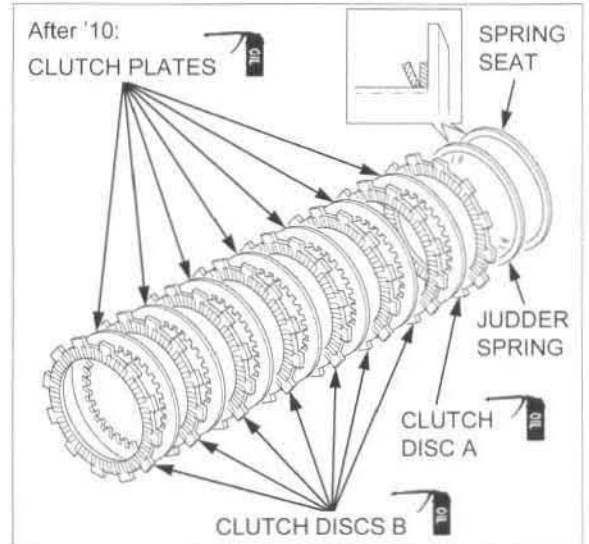
Bend the tabs of the lock washer up against the clutch center lock nut.



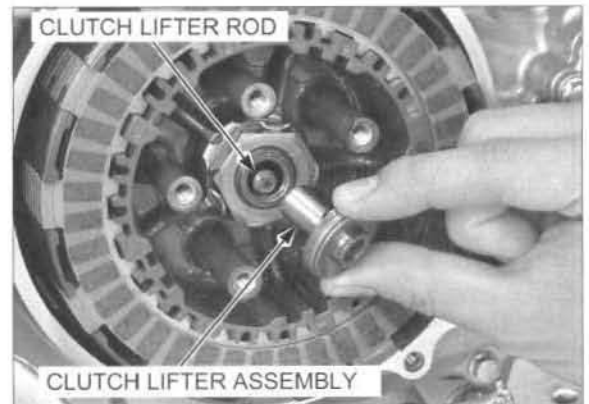
'10: Coat the clutch plates and discs with engine oil.  
Install the eight clutch discs and seven clutch plates alternately, starting with a disc.



After '10: Install the spring seat and judder spring as shown.  
Coat the clutch discs lining surfaces with clean engine oil.  
Install the clutch disc A (large I.D.), seven clutch plates and seven clutch discs B.

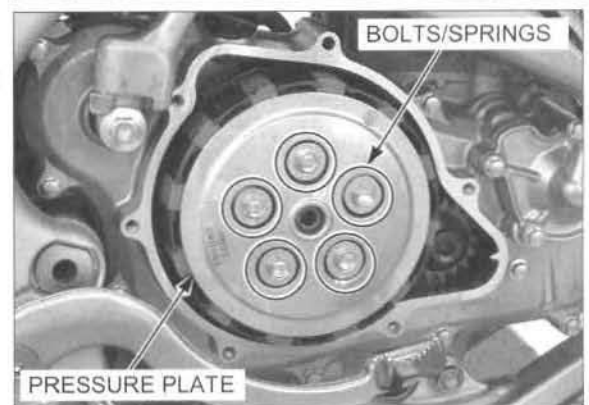


Insert the clutch lifter rod into the mainshaft.  
Install the clutch lifter assembly.



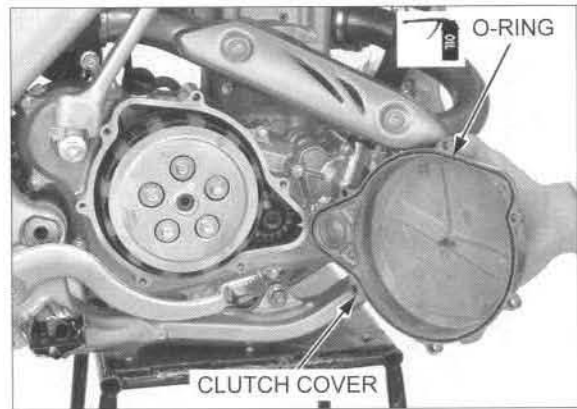
Install the clutch pressure plate.  
Install the five springs and spring bolts.  
Tighten the bolts to the specified torque in a criss-cross pattern in two or three steps.

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



## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Check that the clutch cover O-ring is in good condition. Replace if necessary. Apply engine oil to the O-ring and install the clutch cover.

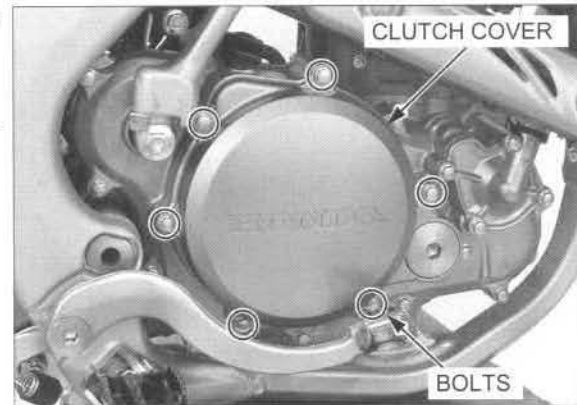


Install and tighten the cover bolts in a crisscross pattern in two or three steps.

Adjust the clutch lever freeplay (page 3-26).

Fill the transmission with the recommended oil (page 3-17).

Start the engine and check for oil leaks.



## KICKSTARTER

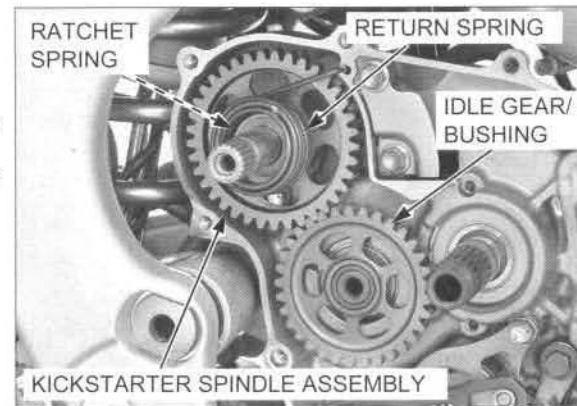
### REMOVAL

Remove the right crankcase cover (page 10-5).  
Remove the clutch (page 10-7).

Remove the idle gear and bushing.

Unhook the kickstarter return spring from the crankcase.

Remove the kickstarter spindle assembly and ratchet spring.



### DISASSEMBLY

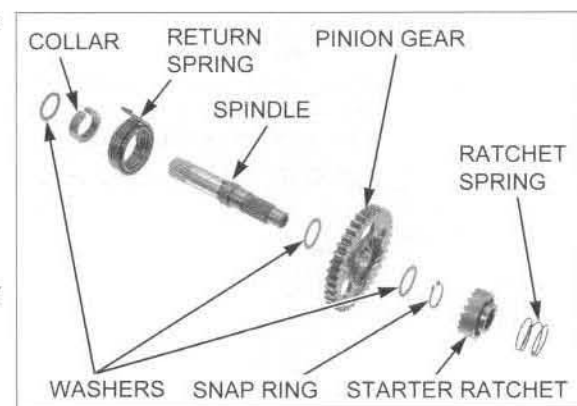
Disassemble the kickstarter spindle by removing the following:

- End washer
- Return spring and collar
- Starter ratchet
- Snap ring, thrust washers and pinion gear

### INSPECTION

Check the return spring and ratchet spring for fatigue or damage.

Check the starter ratchet for wear or damage.

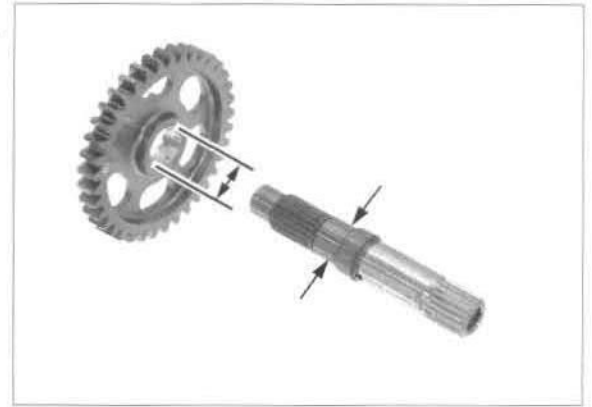


Check the kickstarter pinion for wear or damage.  
Check the kickstarter spindle for bend, wear or damage.  
Measure the kickstarter pinion gear I.D.

**SERVICE LIMIT: 16.55 mm (0.652 in)**

Measure the kickstarter spindle O.D.

**SERVICE LIMIT: 16.46 mm (0.648 in)**



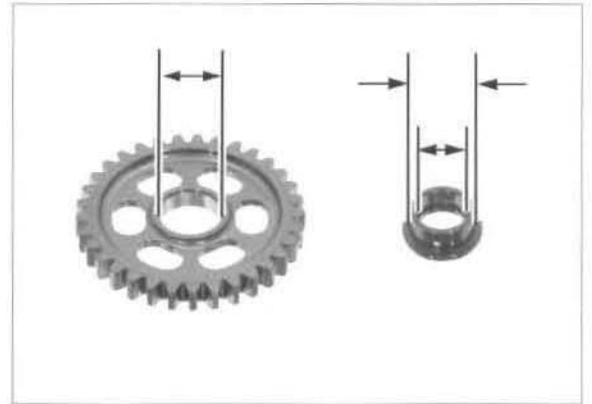
Check the kickstarter idle gear for wear or damage.

Measure the kickstarter idle gear I.D.

**SERVICE LIMIT: 19.050 mm (0.7500 in)**

Measure the kickstarter idle gear bushing I.D. and O.D.

**SERVICE LIMITS: I.D. : 15.037 mm (0.5920 in)  
O.D. : 18.941 mm (0.7457 in)**



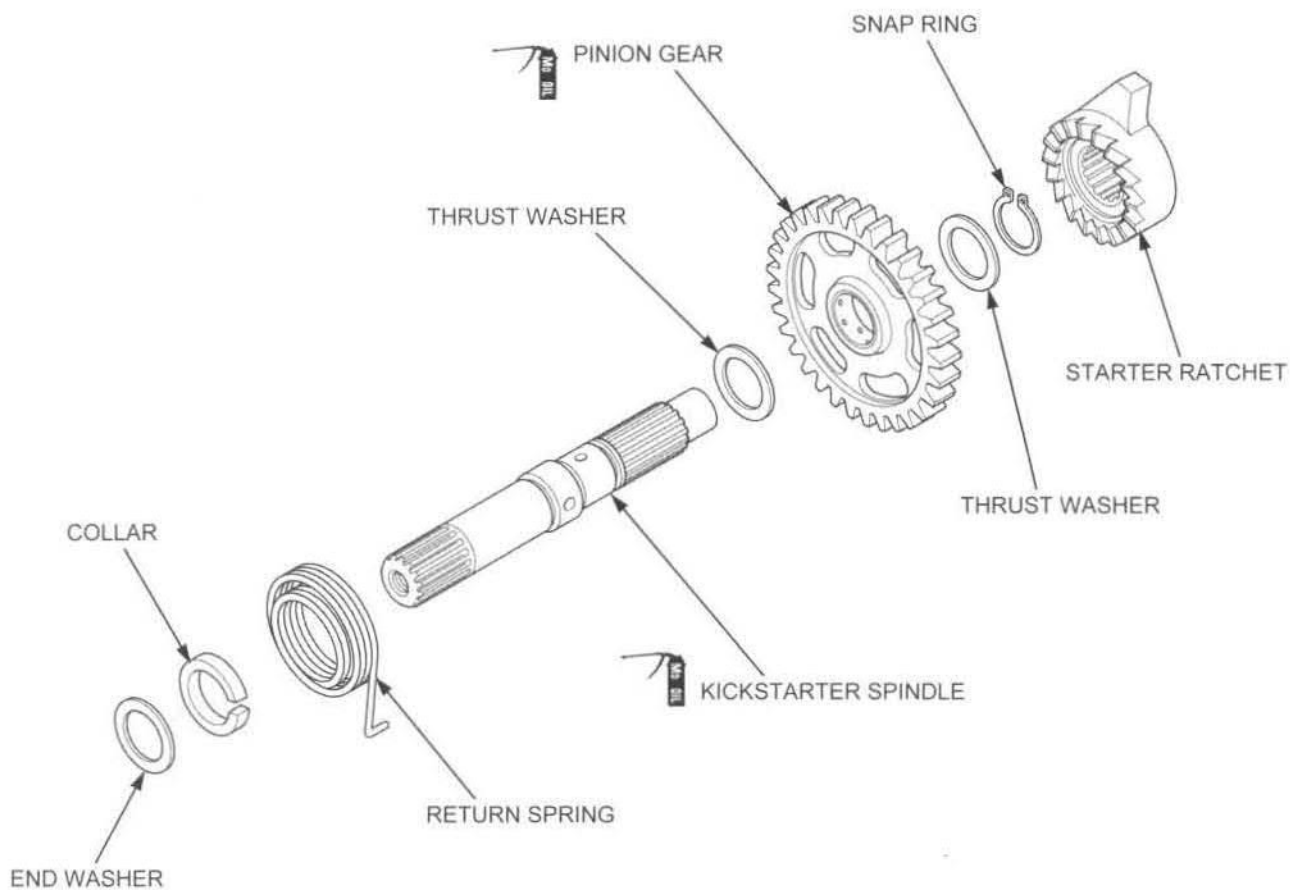
Measure the countershaft O.D. at the idle gear sliding surface.

**SERVICE LIMIT: 14.952 mm (0.5887 in)**



# CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

## ASSEMBLY



Install the thrust washer to the kickstarter spindle.

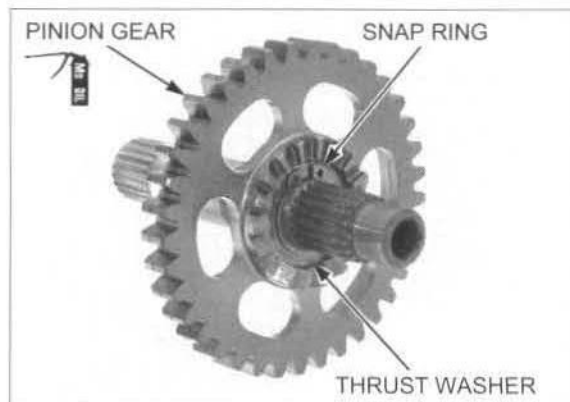


Apply molybdenum oil solution to the pinion gear inner surface.

Install the pinion gear and thrust washer.

Install the snap ring in the groove of the spindle.

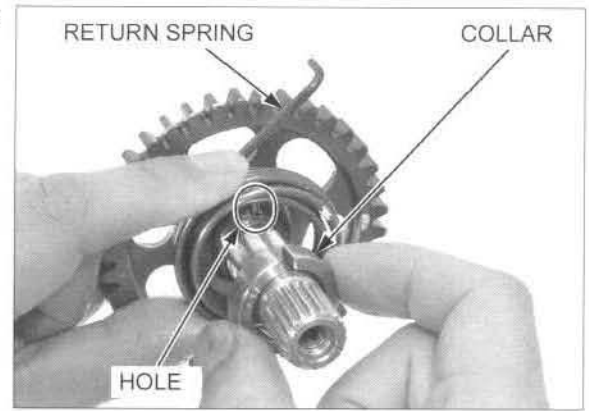
*Set the sharp edge of the snap ring facing out.*



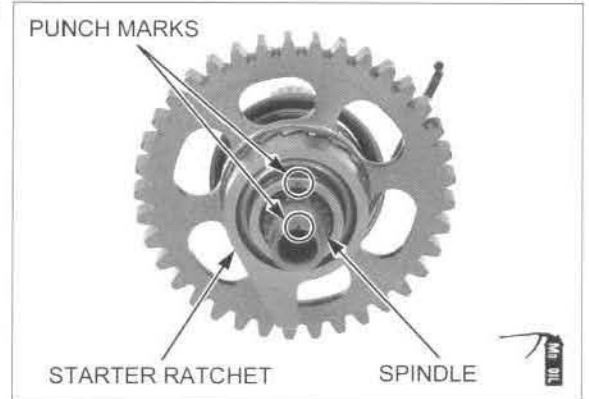


Insert the return spring into the spring hole on the kickstarter spindle.

Install the collar by aligning its cut-out with the spring.



Apply molybdenum oil solution to the spline area and gear rolling area of kickstarter spindle. Align the punch marks and install the starter ratchet.



Install the end washer to the kickstarter spindle.

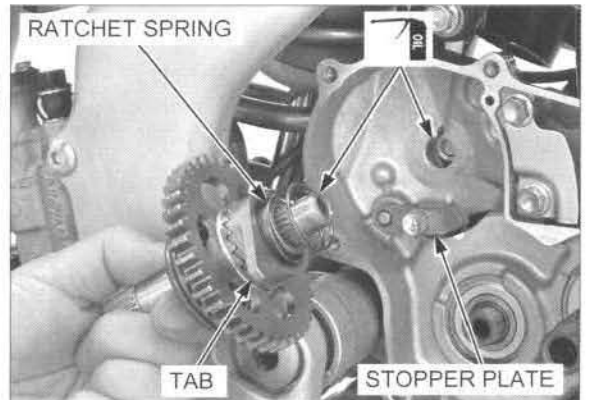


**INSTALLATION**

Install the ratchet spring.  
Apply engine oil to the kickstarter spindle journal.

*Be sure the ratchet spring did not fall off the spindle during installation.*

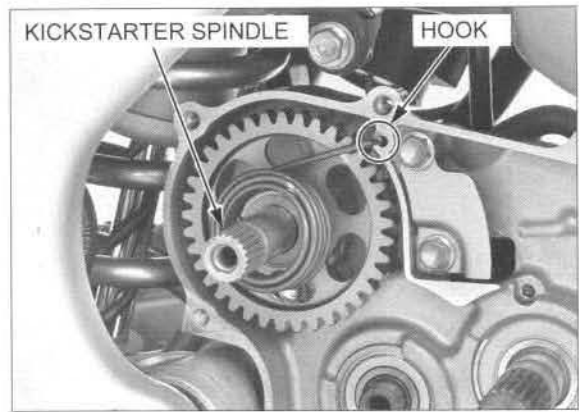
Install the kickstarter assembly to the crankcase and rotate the spindle counterclockwise until the ratchet tab does not contact the stopper plate.





## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Hook the return spring end into the hole in the crankcase.

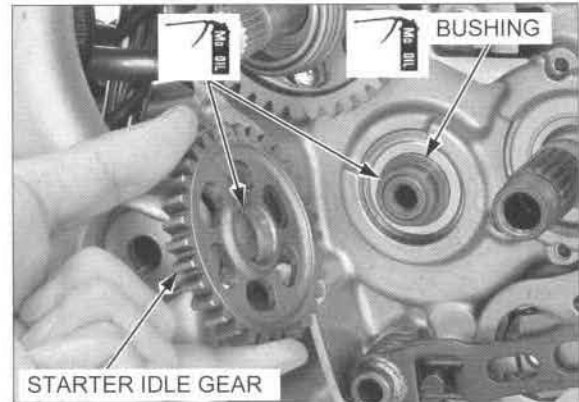


Apply molybdenum oil solution to the starter idle gear inner surface, bushing and countershaft sliding surface.

Install the bushing and starter idle gear onto the countershaft.

Install the clutch (page 10-12).

Install the right crankcase cover (page 10-6).



## GEARSHIFT LINKAGE

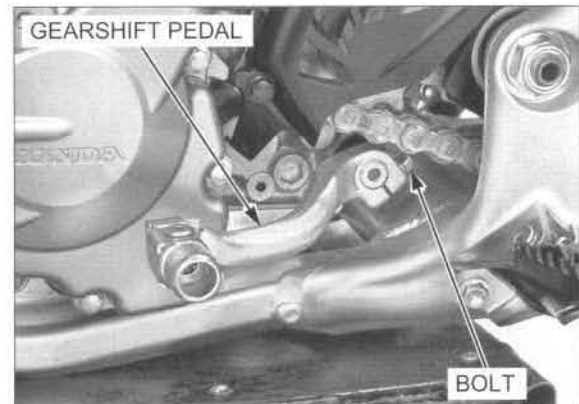
### REMOVAL

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

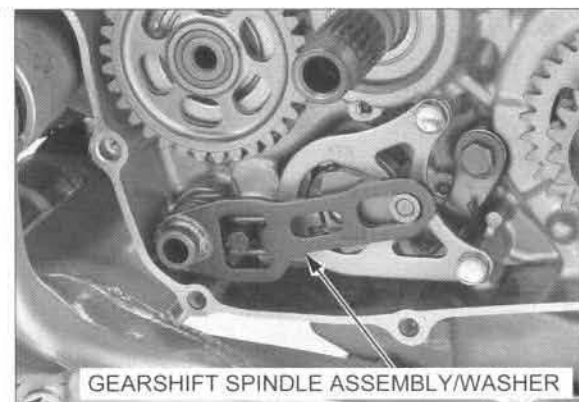
Remove the clutch (page 10-7).

*When removing the gearshift pedal, mark the pedal position to ensure correct reassembly in its original location.*

Remove the bolt and gearshift pedal.



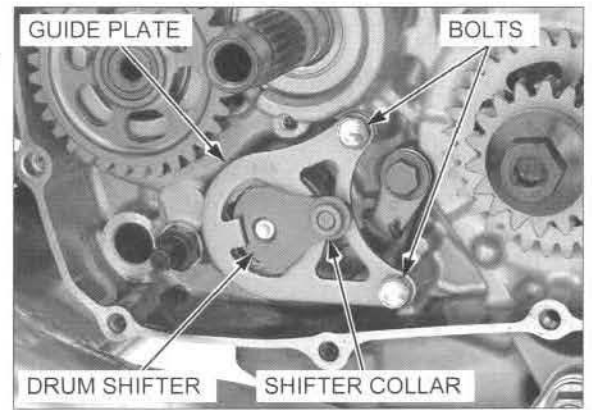
Remove the gearshift spindle assembly and washer from the crankcase.



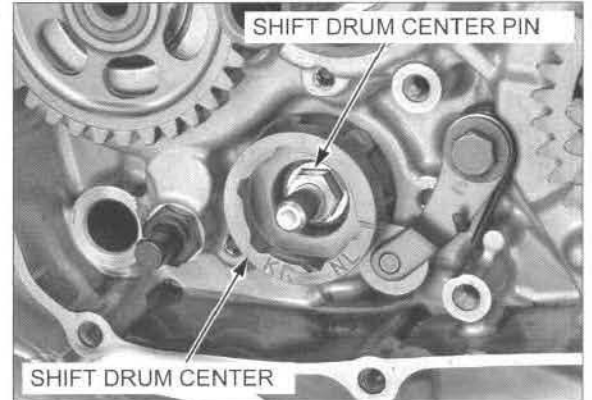
Remove the shifter collar.

*Do not let the ratchet pawls fall when removing the guide plate and drum shifter.*

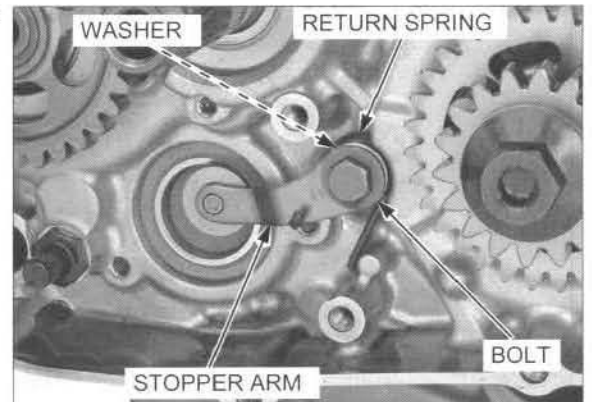
Remove the bolts, guide plate and drum shifter as an assembly.



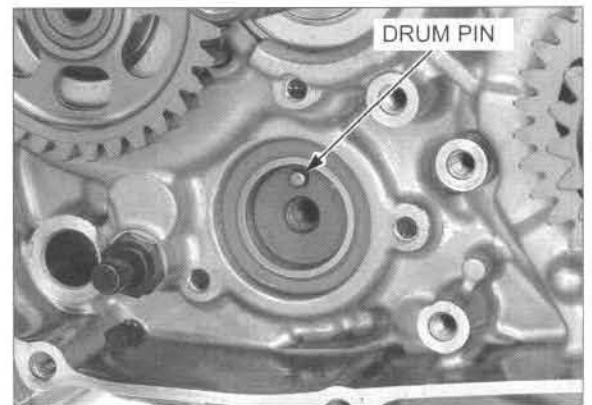
Remove the shift drum center pin and shift drum center.



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



Remove the drum pin from the shift drum.

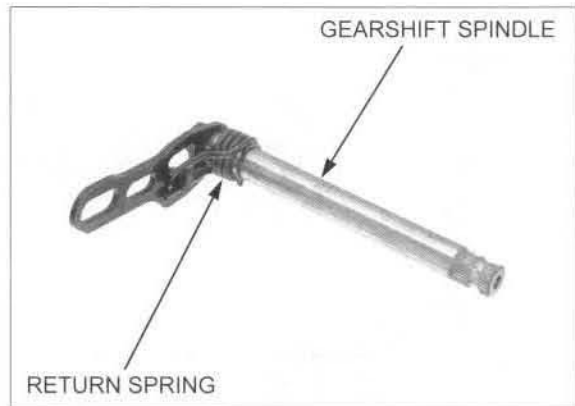


## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

### INSPECTION

#### GEARSHIFT SPINDLE

Check the gearshift spindle for bend, wear or damage.  
Check the return spring for fatigue or damage.



Check the gearshift spindle oil seal for wear or damage.  
If replacing the oil seal, install new oil seal until it is flush with the left crankcase surface.



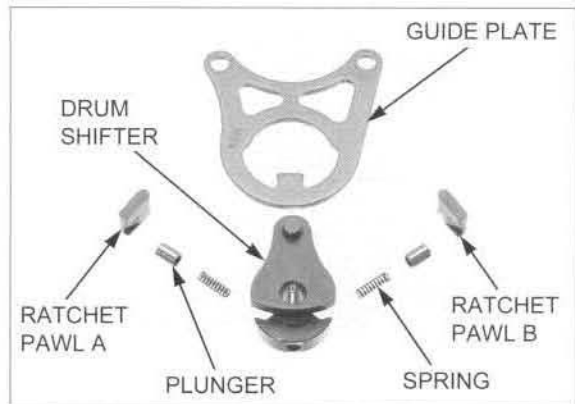
#### RATCHET PAWL

Remove the following:

- Guide plate
- Drum shifter
- Ratchet pawls
- Plungers
- Springs

Clean the ratchet pawls, plungers, springs and drum shifter with engine oil.

Check each part for wear or damage.  
Replace them if necessary.

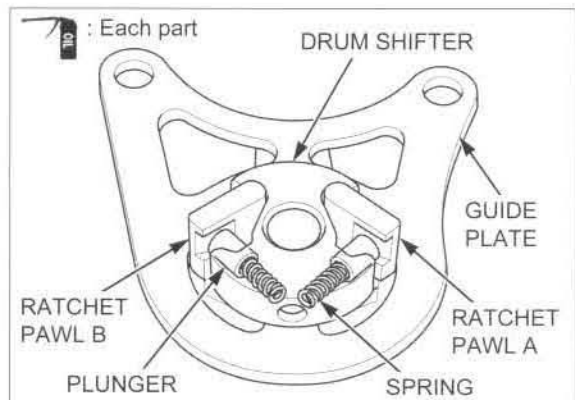


Apply engine oil to each part.

Assemble the drum shifter, springs, plungers and ratchet pawls in the guide plate as shown.

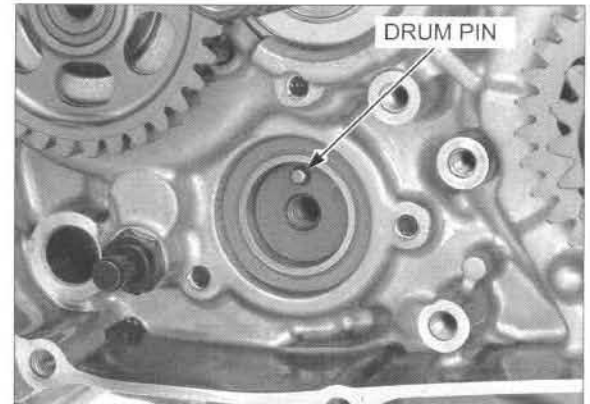
#### NOTE:

Do not interchange the ratchet pawls A and B.



**INSTALLATION**

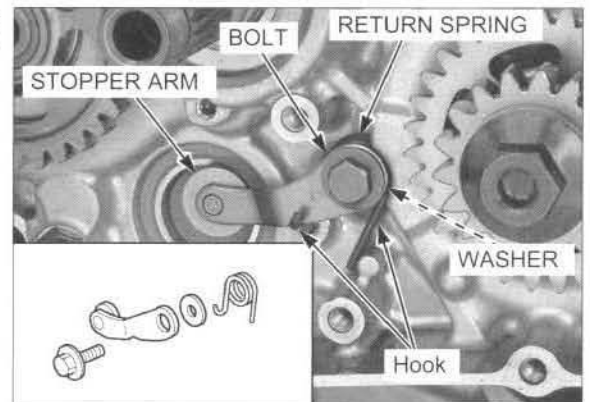
Install the drum pin into the hole on the shift drum.



Install the return spring, washer and stopper arm while hooking the return spring ends as shown, and tighten the stopper arm bolt to the specified torque.

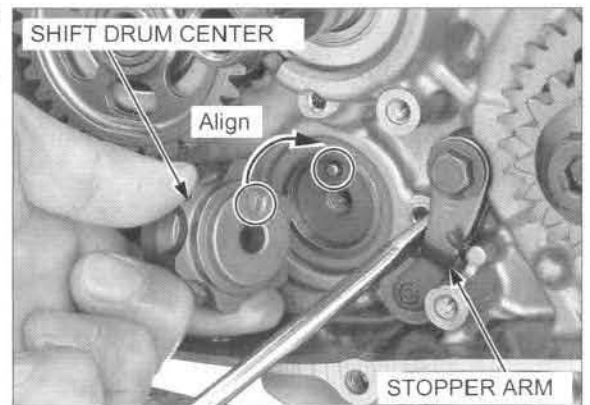
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Check the stopper arm for proper operation.



Move the stopper arm out of the way using a screwdriver.

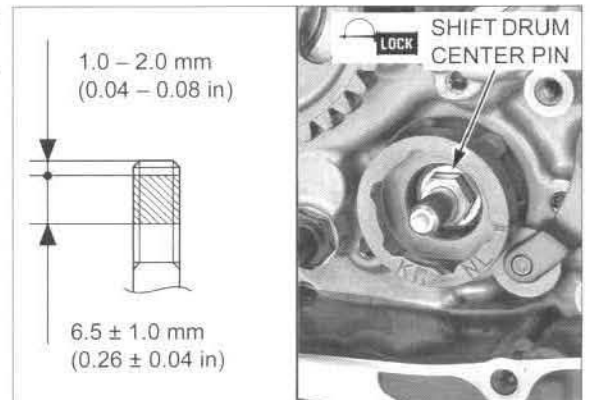
Align the shift drum center groove with the drum pin and install it to the shift drum.



Apply locking agent to the gearshift drum center pin threads as shown, and install the center pin.

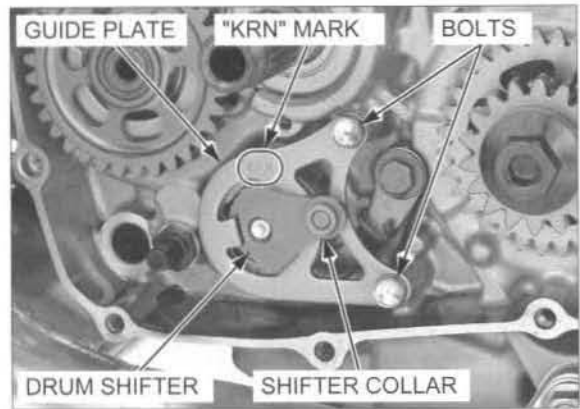
Tighten the shift drum center pin to the specified torque.

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



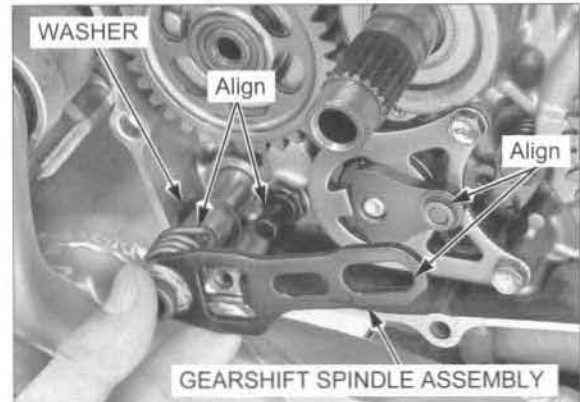
## CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE

Set the drum center in a position other than neutral. While holding the ratchet pawls in place in the guide plate and drum shifter, install the drum shifter assembly by aligning the hole of the drum shifter with the shift drum center pin, and guide plate "KRN" mark facing up. Install and tighten the guide plate bolts securely. Install the shifter collar onto the drum shifter.



*Do not forget to install the washer onto the gearshift spindle.*

Apply engine oil to the gearshift spindle serration area. Install the washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin and the spindle hole with the shifter collar.



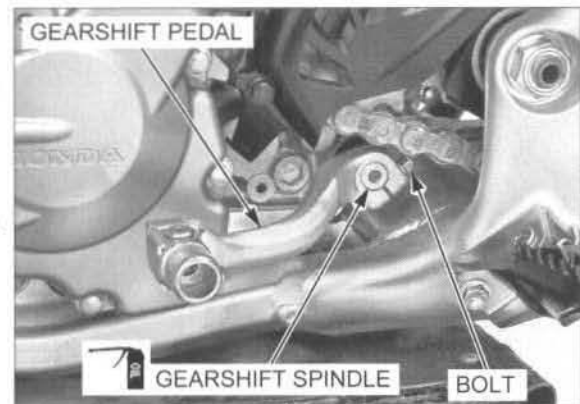
Wipe off any oil from the gearshift spindle serration area.

Install the gearshift pedal on its original position as marked during removal. Tighten the bolt to the specified torque.

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

Move the gearshift pedal and check the shift mechanism for smooth operation.

Install the clutch (page 10-12).  
Install the right crankcase cover (page 10-6).



COMPONENT LOCATION .....	11-2	FLYWHEEL .....	11-5
SERVICE INFORMATION .....	11-3	STATOR/CKP SENSOR .....	11-6
LEFT CRANKCASE COVER REMOVAL ...	11-4	LEFT CRANKCASE COVER INSTALLATION .....	11-8

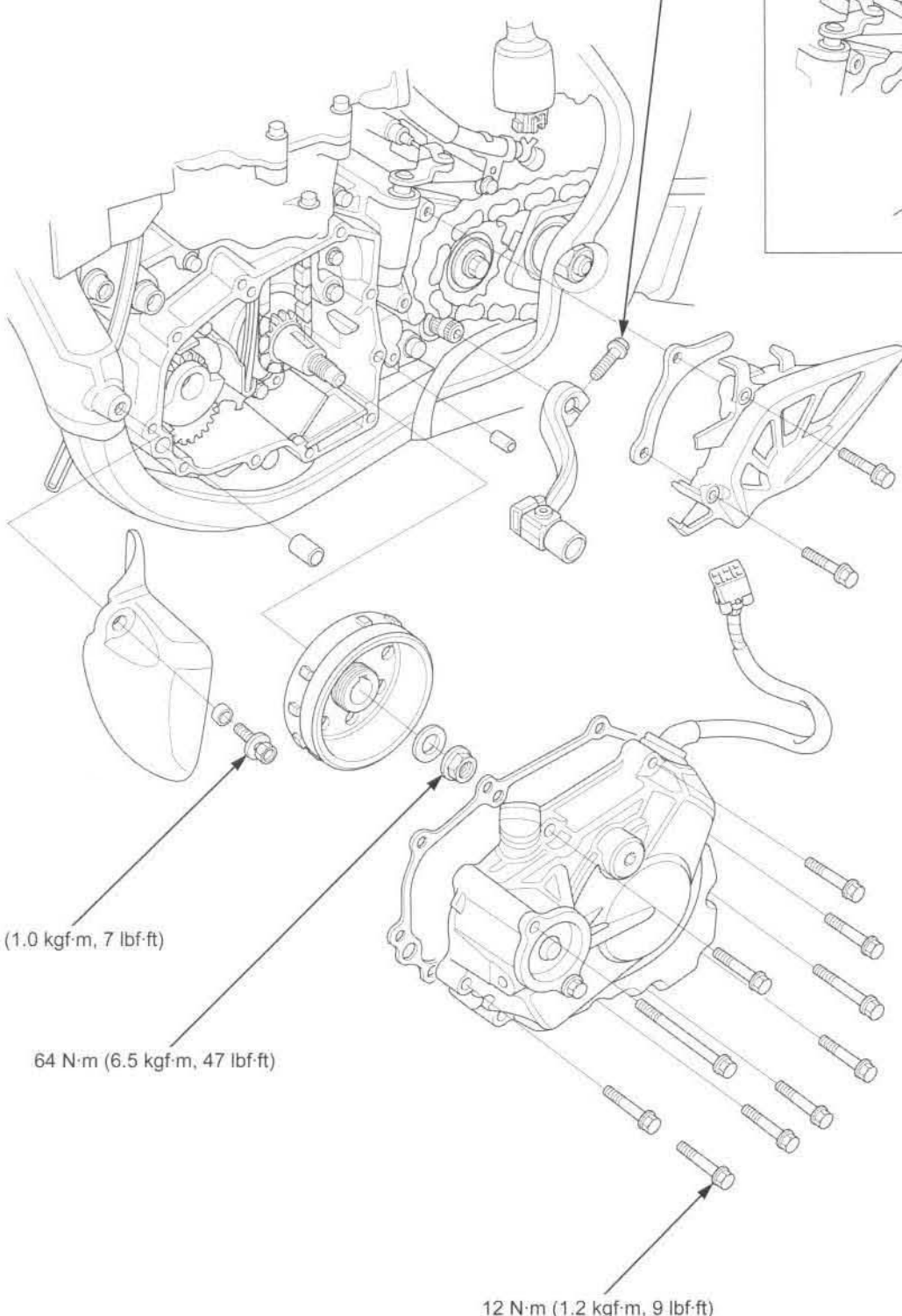
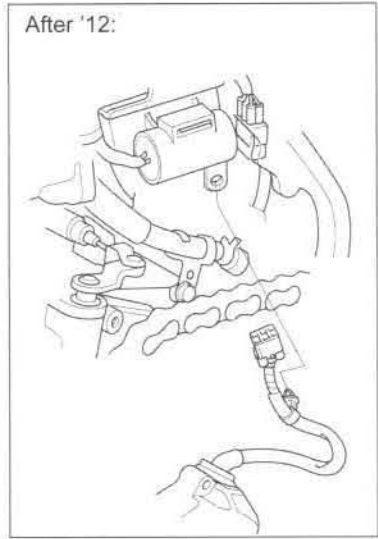
# ALTERNATOR

## COMPONENT LOCATION

'10 shown:

After '12:

12 N·m (1.2 kgf·m, 9 lbf·ft)



10 N·m (1.0 kgf·m, 7 lbf·ft)

64 N·m (6.5 kgf·m, 47 lbf·ft)

12 N·m (1.2 kgf·m, 9 lbf·ft)

## SERVICE INFORMATION

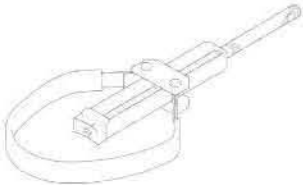
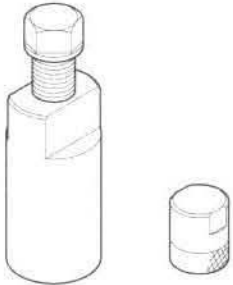


### GENERAL

- This section covers service of the alternator stator and flywheel. All service can be done with the engine installed in the frame.
- Engine lubricating oil is fed through the alternator cover. Clean the oil passage before installing the alternator cover.
- For alternator inspection (page 16-9).
- For CKP sensor inspection (page 16-6).

### 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 mounting bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	Apply locking agent to the threads. Coating width: 4.5 ± 1.0 mm (0.18 ± 0.04 in)
Stator mounting socket bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	Apply locking agent to the threads. Coating width: 4.5 ± 1.0 mm (0.18 ± 0.04 in)
Left crankcase cover bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

### TOOLS

<p>Flywheel holder 07725-0040001</p>  <p>or 07AMB-MENA100 (U.S.A. only)</p>	<p>Flywheel puller 070MC-HP10100</p>  <p>or 070MC-HP1A100 (U.S.A. only)</p>	<p>Flywheel puller adapter 070MG-KSE0100</p>  <p>Not available in U.S.A.</p>
<p>Thread protector 07AMC-MEBA110 (U.S.A. only)</p>  <p>NOTE: This thread protector is included with 07AMC-MEBA100 or can be ordered separately</p>		



## ALTERNATOR

### LEFT CRANKCASE COVER REMOVAL

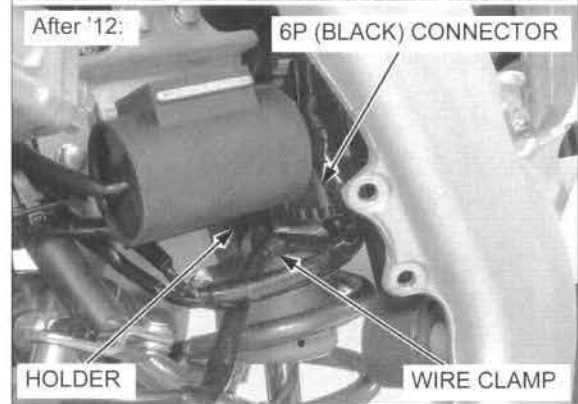
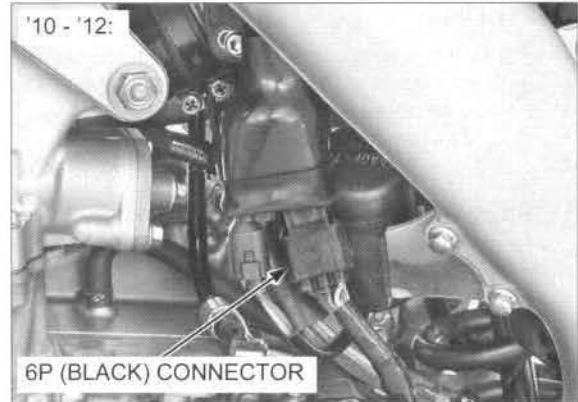
Remove the following:

- Engine guard (page 2-4)
- Gearshift pedal (page 10-20)
- Drive sprocket cover (page 3-18)

Drain the engine oil (page 3-14).

*After '12 only:* Release the wire clamp from the connector holder.

Disconnect the alternator/CKP sensor 6P (Black) connector.

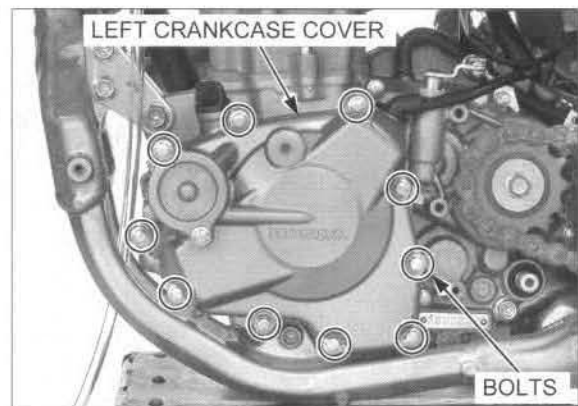


*Loosen the left crankcase cover bolts in a crisscross pattern in two or three steps.*

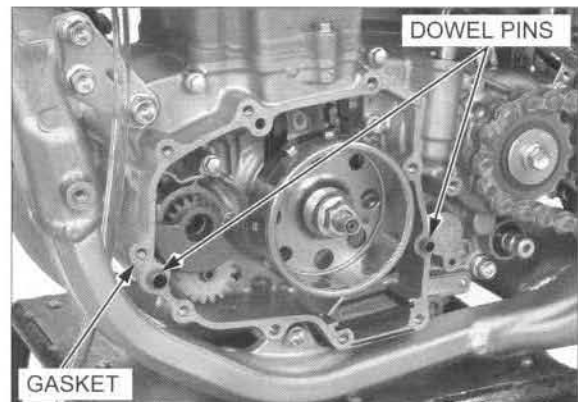
Remove the left crankcase cover bolts and left crankcase cover.

**NOTE:**

The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during removal.



Remove the dowel pins and gasket.



## FLYWHEEL

### REMOVAL

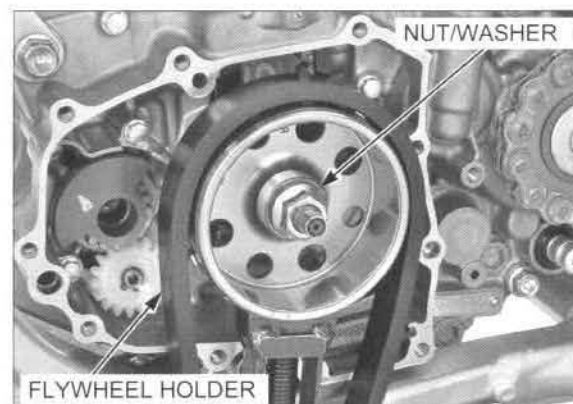
Remove the left crankcase cover (page 11-4).

Hold the flywheel with the special tool and remove the nut and washer.

**TOOL:**

Flywheel holder

07725-0040001 or  
07AMB-MENA100  
(U.S.A. only)



*Be careful not to bottom the adapter against the crankshaft left end, or it may damage the oil control orifice.*

Screw the special tool onto the crankshaft.

**TOOL:**

Flywheel puller adapter

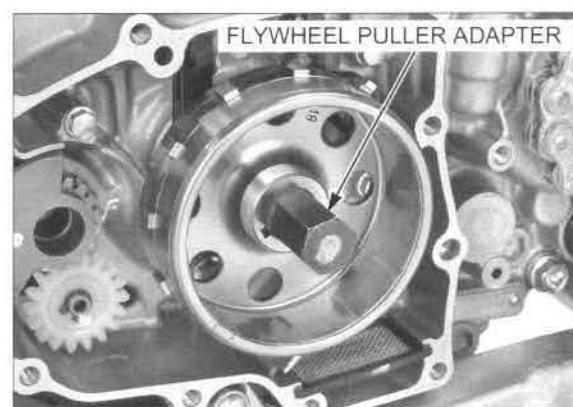
070MG-KSE0100  
Not available in  
U.S.A.

**TOOL, U.S.A. only:**

Thread protector

07AMC-MEBA110

(This thread protector is included with 07AMC-MEBA100 or can be ordered separately)

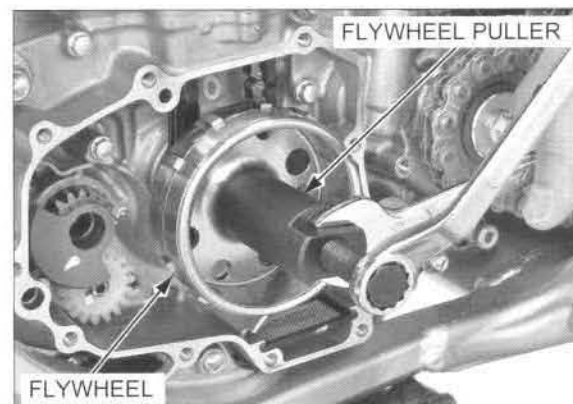


Attach the special tool on the flywheel, then remove it.

**TOOL:**

Flywheel puller

070MC-HP10100  
or  
070MC-HP1A100  
(U.S.A. only)



*Be careful not to damage the crankshaft.*

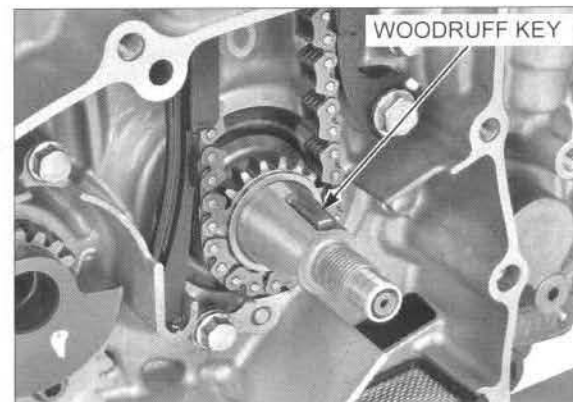
Remove the woodruff key.

### INSTALLATION

Clean any oil from the tapered portion of the crankshaft and flywheel.

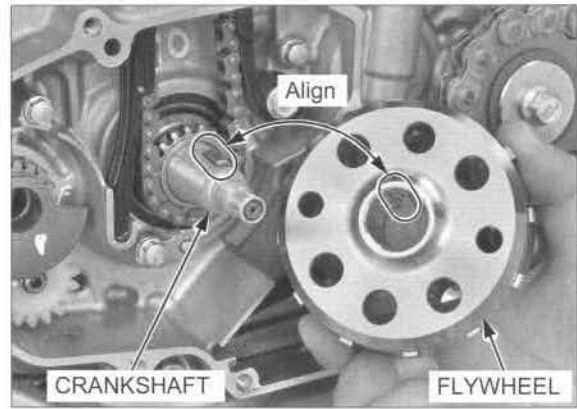
*Be careful not to damage the crankshaft.*

Install the woodruff key in the groove in the crankshaft.



## ALTERNATOR

Install the flywheel to the crankshaft by aligning the groove in the flywheel with the woodruff key.



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

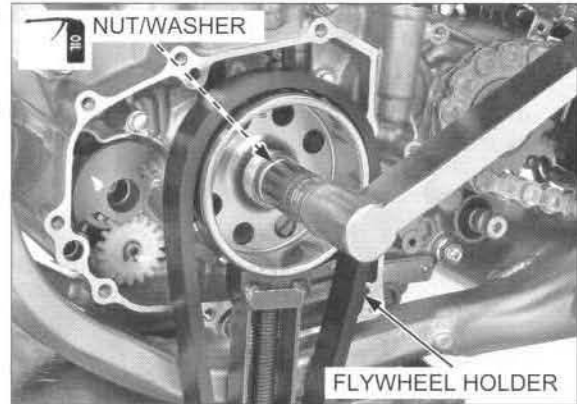
Install the washer and nut. Hold the flywheel with the special tool and tighten the nut to the specified torque.

**TOOL:**  
Flywheel holder

07725-0040001 or  
07AMB-MENA100  
(U.S.A. only)

**TORQUE:** 64 N·m (6.5 kgf·m, 47 lbf·ft)

Install the left crankcase cover (page 11-8).



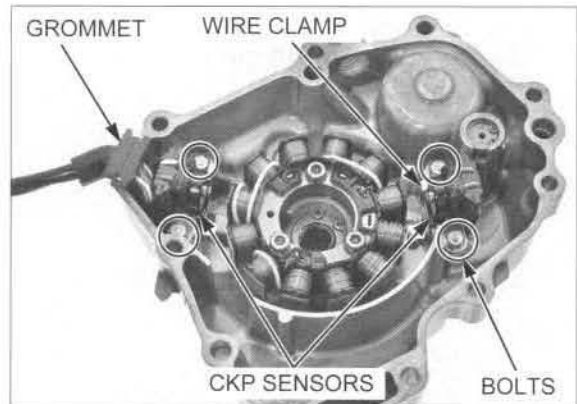
## STATOR/CKP SENSOR

### REMOVAL

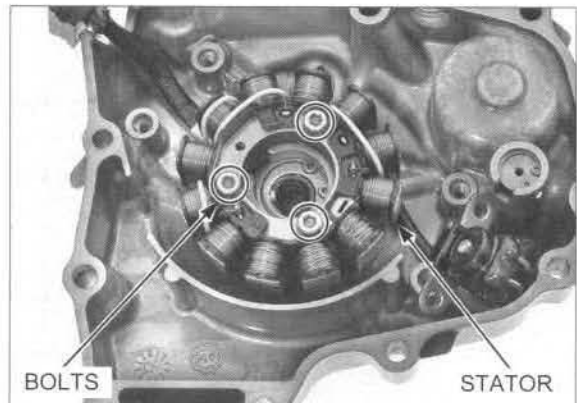
Remove the left crankcase cover (page 11-4).

Remove the wire grommet from the left crankcase cover.

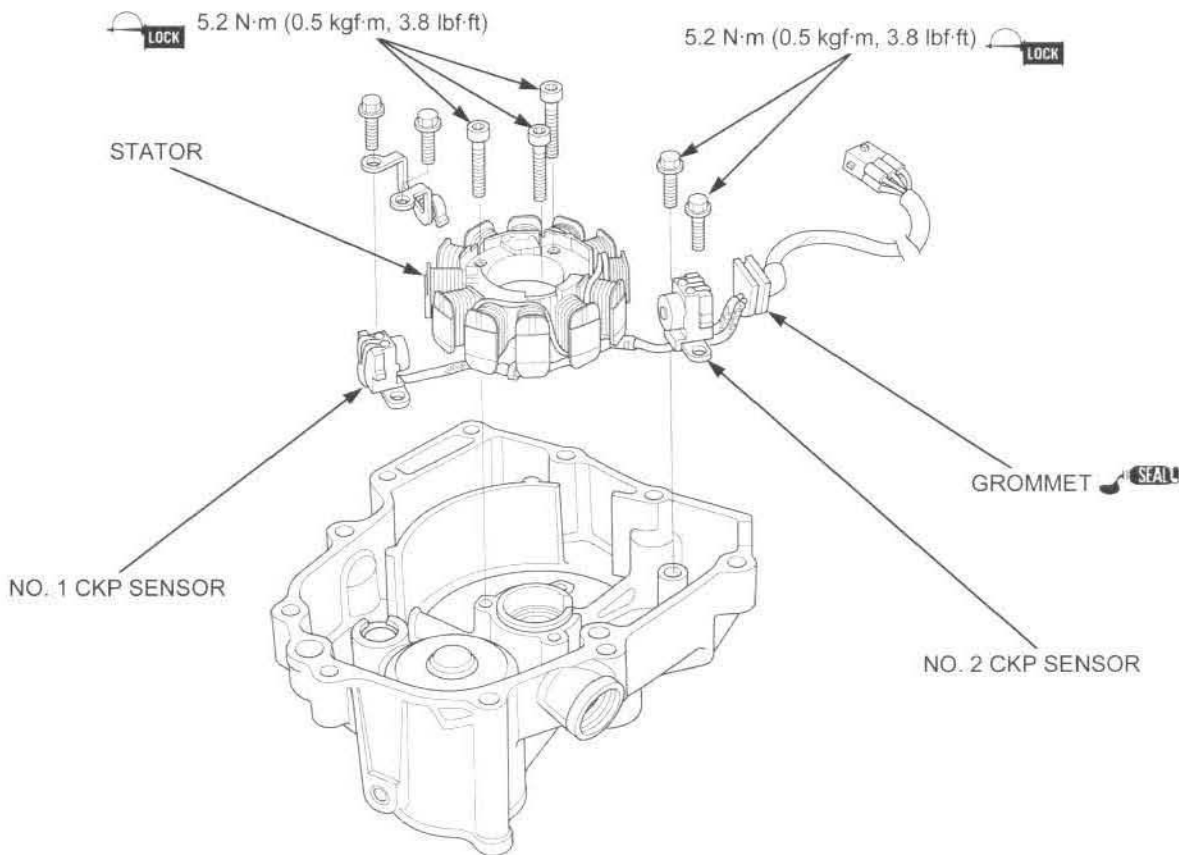
Remove the bolts, wire clamp and CKP sensors.



Remove the mounting socket bolts and stator.



INSTALLATION

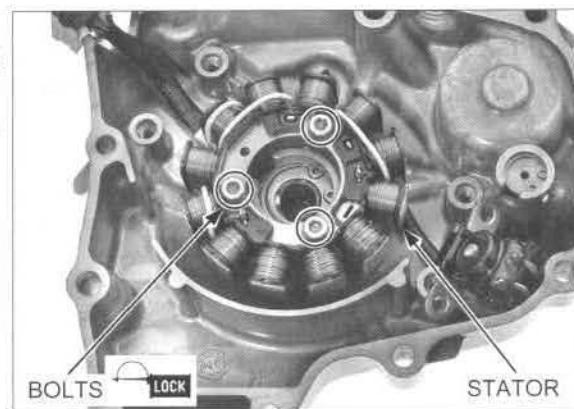


Place the stator into the left crankcase cover.

Apply locking agent to the stator mounting socket bolt threads (page 1-14).

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

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



*Route the CKP sensor wires properly (page 1-21).*

Install the CKP sensors and wire clamp into the left crankcase cover.

Apply locking agent to the CKP sensor mounting bolt threads (page 1-14).

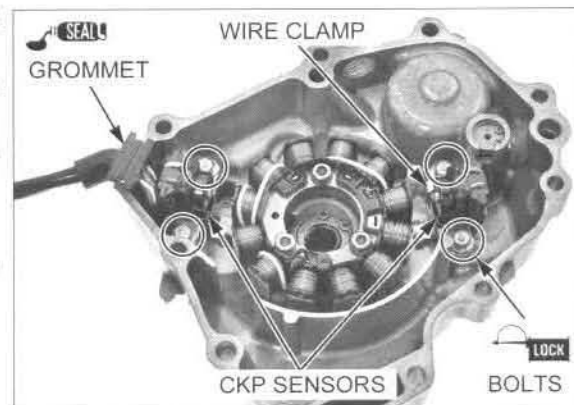
Install and tighten the CKP sensor mounting bolts to the specified torque.

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

Apply liquid sealant to the stator/CKP sensor wire grommet contact surface.

Install the wire grommet into the left crankcase cover.

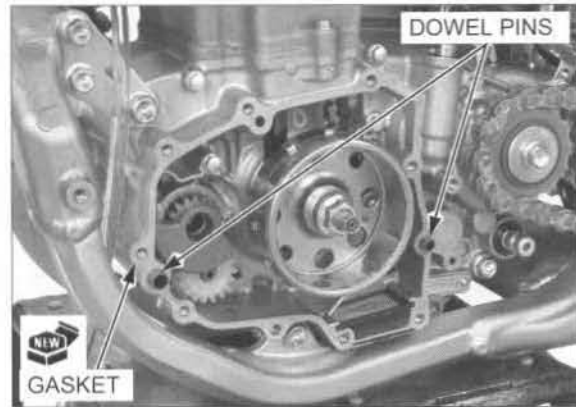
Install the left crankcase cover (page 11-8).



## ALTERNATOR

### LEFT CRANKCASE COVER INSTALLATION

Install the dowel pins and a new gasket.



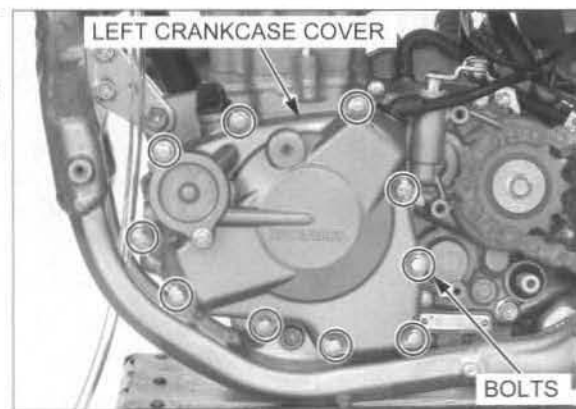
*The left crankcase cover (stator) is magnetically attracted to the flywheel, be careful during installation.*

Install the left crankcase cover and left crankcase cover bolts.

- Be careful not to damage the oil seal of the left crankcase cover.

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

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



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

Connect the alternator/CKP sensor 6P (Black) connector.

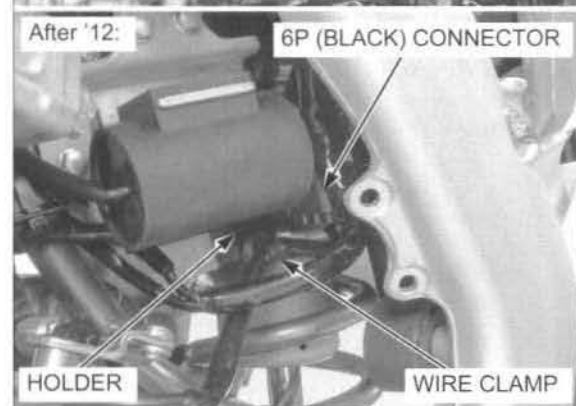
*After '12 only:*

Install the wire clamp to the connector holder.

Install the following:

- Gearshift pedal (page 10-24)
- Engine guard (page 2-4)
- Drive sprocket cover (page 3-20)

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



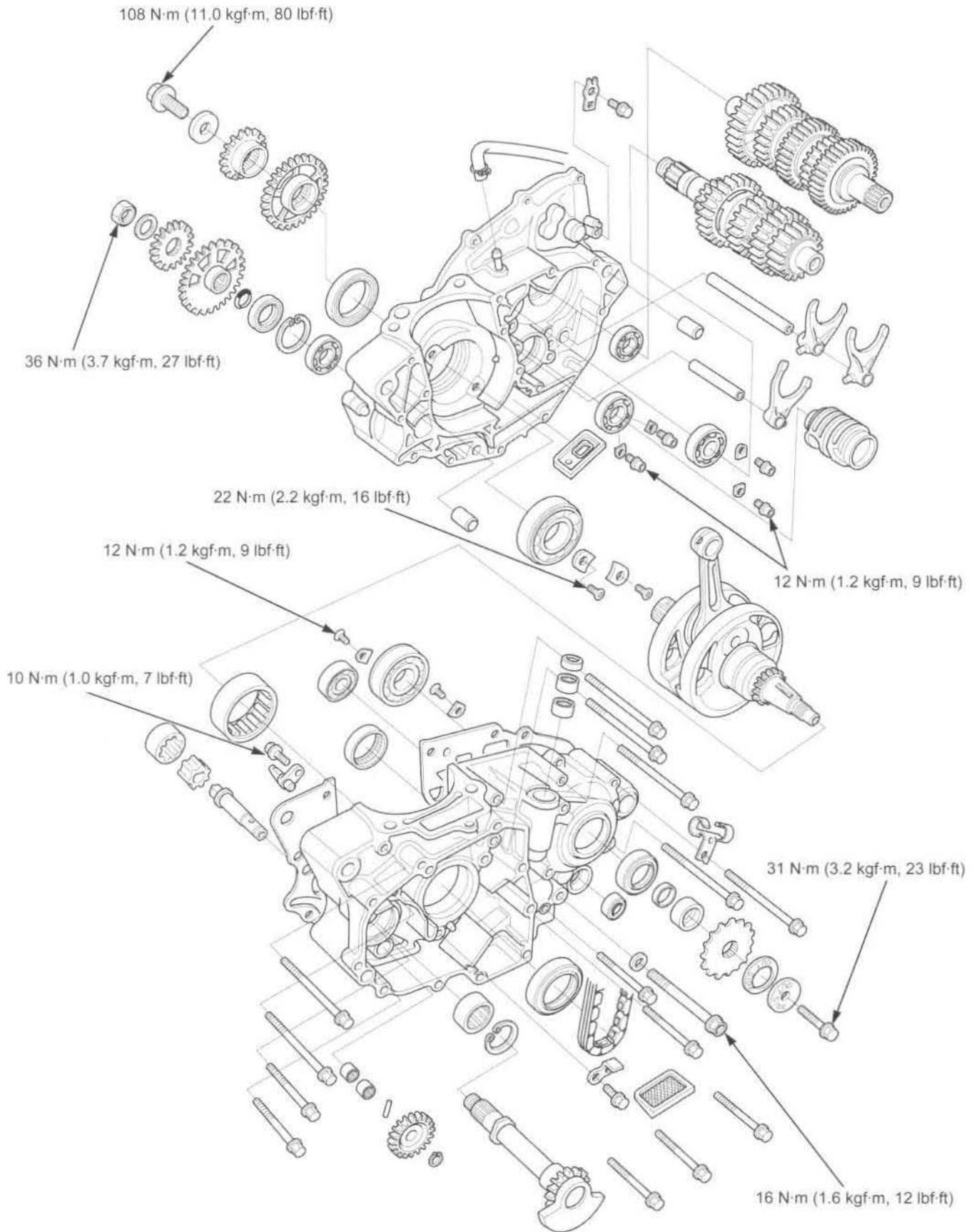
# 12. CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

---

COMPONENT LOCATION .....	12-2	CRANKCASE .....	12-13
SERVICE INFORMATION .....	12-3	TRANSMISSION .....	12-18
TROUBLESHOOTING.....	12-6	CRANKSHAFT .....	12-24
PRIMARY DRIVE GEAR/BALANCER DRIVE GEAR.....	12-7	CRANKCASE BEARING REPLACEMENT .....	12-26
BALANCER DRIVEN GEAR/ BALANCER SHAFT .....	12-9	OIL JET .....	12-31



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 and transmission. To service these parts, the engine must be removed from the frame.
- The balancer can be serviced with the engine installed in the frame.
- The following parts must be removed before separating the crankcase.
  - Cylinder head (page 8-17)
  - Cam chain tensioner (page 8-37)
  - Cylinder (page 9-4)/Piston (page 9-4)
  - Clutch (page 10-7)/Kickstarter (page 10-16)/Gearshift linkage (page 10-20)
  - Primary drive gear/balancer drive gear (page 12-7)
  - Balancer driven gear/balancer shaft (page 12-9)
  - Flywheel (page 11-5)
  - Engine (page 7-4)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Clean the oil passages before assembling the crankcase halves.

## SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Side clearance	0.30 – 0.75 (0.012 – 0.030)	0.8 (0.03)
	Radial clearance	0.006 – 0.018 (0.0002 – 0.0007)	0.05 (0.002)
	Runout	–	0.05 (0.002)
Transmission	Gear I.D.	M4, M5	23.020 – 23.041 (0.9063 – 0.9071)
		C1	20.020 – 20.041 (0.7882 – 0.7890)
		C2	27.020 – 27.041 (1.0638 – 1.0646)
		C3	25.020 – 25.041 (0.9850 – 0.9859)
	Bushing O.D.	M4, M5	22.979 – 23.000 (0.9047 – 0.9055)
		C1	19.979 – 20.000 (0.7866 – 0.7874)
		C2	26.979 – 27.000 (1.0622 – 1.0630)
		C3	24.979 – 25.000 (0.9834 – 0.9843)
	Bushing I.D.	M5	20.000 – 20.021 (0.7874 – 0.7882)
		C1	17.000 – 17.018 (0.6693 – 0.6700)
		C2	24.000 – 24.021 (0.9449 – 0.9457)
		C3	22.000 – 22.021 (0.8661 – 0.8670)
	Gear-to-bushing clearance	M4, M5	0.020 – 0.062 (0.0008 – 0.0024)
		C1, C2, C3	0.020 – 0.062 (0.0008 – 0.0024)
	Mainshaft O.D.	at M5 bushing	19.959 – 19.980 (0.7858 – 0.7866)
	Countershaft O.D.	at C1 bushing	16.981 – 16.992 (0.6685 – 0.6690)
		at C2 bushing	23.959 – 23.980 (0.9433 – 0.9441)
		at C3 bushing	21.959 – 21.980 (0.8645 – 0.8654)
Bushing-to-shaft clearance	M5	0.020 – 0.062 (0.0008 – 0.0024)	
	C1	0.008 – 0.037 (0.0003 – 0.0015)	
	C2, C3	0.020 – 0.062 (0.0008 – 0.0024)	
Shift fork, shift fork shaft	Fork claw thickness	4.93 – 5.00 (0.194 – 0.197)	
	Shift fork I.D.	Center	11.003 – 11.024 (0.4332 – 0.4340)
		Right and Left	12.035 – 12.056 (0.4738 – 0.4746)
	Fork shaft O.D.	Center	10.983 – 10.994 (0.4324 – 0.4328)
		Right and Left	11.966 – 11.984 (0.4711 – 0.4718)


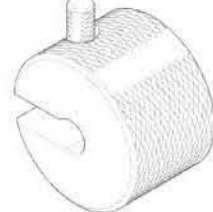

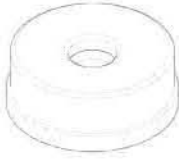




# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER









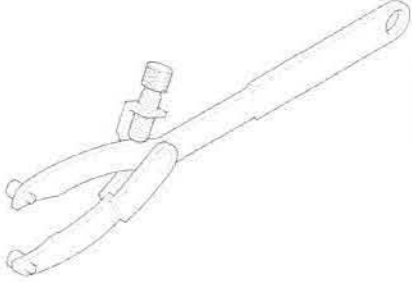


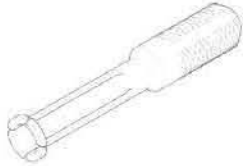
## TORQUE VALUES

Crankshaft bearing set plate torx screw	22 N·m (2.2 kgf·m, 16 lbf·ft)	Apply locking agent to the threads (Pro Honda Hondalock 3 or equivalent high strength locking agent) (page 12-27).
Countershaft bearing set plate screw	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads (page 1-14).
Gearshift drum bearing set plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Mainshaft bearing set plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Drive sprocket bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	
Primary drive gear bolt	108 N·m (11.0 kgf·m, 80 lbf·ft)	Apply engine oil to the threads and seating surface.
Balancer shaft lock nut	36 N·m (3.7 kgf·m, 27 lbf·ft)	Apply engine oil to the threads.
Transmission oil drain bolt	16 N·m (1.6 kgf·m, 12 lbf·ft)	Apply engine oil to the threads and seating surface.
Oil jet bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply locking agent to the threads (page 12-32).

## TOOLS

Bearing remover set, 17 mm 07936-3710300 	Remover handle 07936-3710100 	Remover weight 07741-0010201  or 07936-371020A (U.S.A. only)
Driver 07749-0010000 	Attachment, 72 x 75 mm 07746-0010600 	Attachment, 62 x 68 mm 07746-0010500 
Attachment, 52 x 55 mm 07746-0010400 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 37 x 40 mm 07746-0010200 

**CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER**

<p>Attachment, 32 x 35 mm 07746-0010100</p> 	<p>Pilot, 15 mm 07746-0040300</p> 	<p>Pilot, 17 mm 07746-0040400</p> 
<p>Pilot, 20 mm 07746-0040500</p> 	<p>Pilot, 22 mm 07746-0041000</p> 	<p>Pilot, 30 mm 07746-0040700</p> 
<p>Gear holder, M1.5 07724-0010200</p>  <p>or 07724-001A200 (U.S.A. only)</p>	<p>Gear holder, M2.5 07724-0010100</p>  <p>or 07724-001A100 (U.S.A. only)</p>	<p>Universal holder 07725-0030000</p> 
<p>Valve guide driver, 8.0 mm 07ZMD-MCH0100</p>  <p>or 07ZMD-MCHA100 (U.S.A. only)</p>	<p>Bearing remover shaft, 10 mm 07936-GE00100</p>  <p>or 07936-GE0A000 (U.S.A. only)</p>	<p>Bearing remover head, 10 mm 07936-GE00200</p>  <p>Not available in U.S.A.</p>

### TROUBLESHOOTING

#### Excessive noise

- Worn crankshaft bearings
- Worn or damaged connecting rod big end bearing
- Worn connecting rod small end (page 9-7)
- Worn balancer shaft bearings
- Improper balancer installation
- Worn, seized or chipped transmission gear
- Worn or damaged transmission bearing
- Incorrect valve adjustment (page 3-12)
- Sticking valve or broken valve spring (page 8-21)
- Worn or damaged camshaft (page 8-12)
- Worn or damaged valve lifter (page 8-21)
- Worn or loose cam chain
- Worn or damaged cam chain tensioner (page 8-35)
- Worn cam sprocket teeth (page 8-12)
- Faulty cylinder, piston or piston rings (page 9-5)

#### Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken gearshift drum stopper arm (page 10-20)
- Broken gearshift drum stopper arm spring (page 10-20)
- Loose gearshift drum stopper arm bolt (page 10-20)
- Worn or bent shift forks
- Weak or broken gearshift spindle return spring

#### Hard to shift

- Improper clutch lever freeplay adjustment (page 3-26)
- Incorrect transmission oil viscosity (page 3-16)
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged gearshift drum guide grooves
- Damaged gearshift spindle (page 10-20)
- Damaged gearshift drum stopper arm and pin (page 10-20)
- Loose gearshift drum stopper arm bolt (page 10-20)
- Bent shift spindle

#### Engine vibration

- Excessive crankshaft runout
- Improper balancer timing

## PRIMARY DRIVE GEAR/BALANCER DRIVE GEAR

### REMOVAL

*This service can be performed with the engine installed in the frame.*

Remove the following:

- Right crankcase cover (page 10-5)
- Clutch (page 10-7)

Temporarily install the clutch outer guide, needle bearing and clutch outer to the mainshaft.

Insert the gear holder between the primary drive and driven gears.

#### TOOL:

**Gear holder, M2.5**

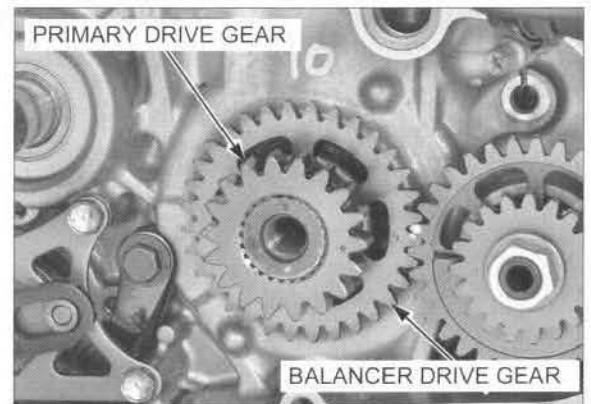
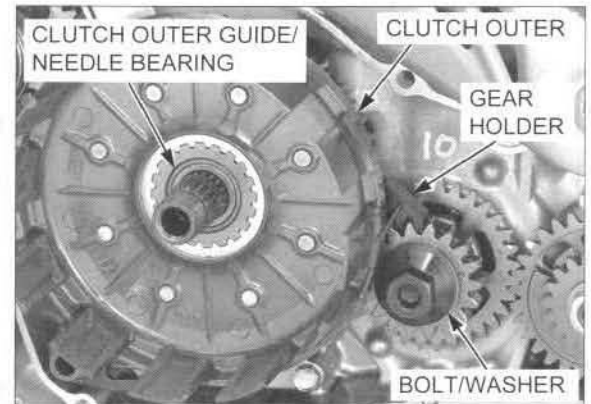
**07724-0010100 or  
07724-001A100  
(U.S.A. only)**

Remove the primary drive gear bolt and washer, then remove the gear holder.

Remove the clutch outer, needle bearing and clutch outer guide.

Remove the primary drive gear and balancer drive gear.

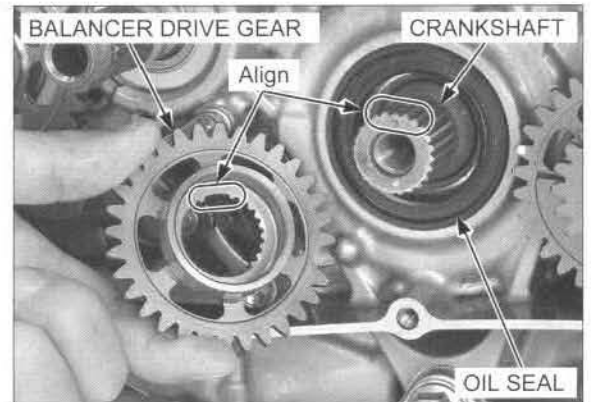
Check the primary drive gear and balancer drive gear for wear or damage.



### INSTALLATION

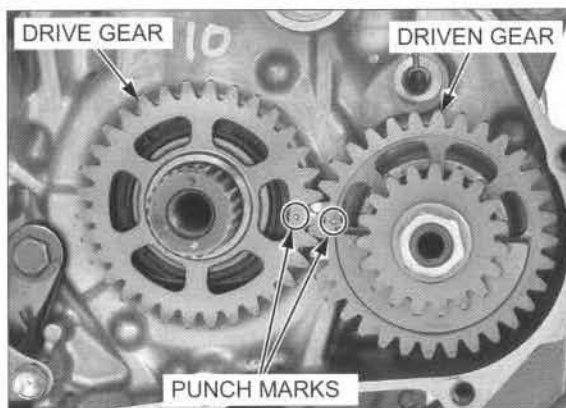
Check the oil seal for wear or damage, replace it if necessary (page 12-10).

Install the balancer drive gear while aligning its wide cut-out in the splines with the punch mark on the crankshaft.

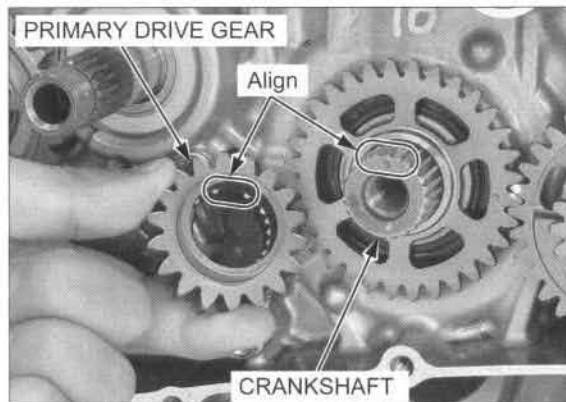


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Align the punch mark of the driven gear with the punch mark of the drive gear.



Install the primary drive gear while aligning its wide cut-out in the splines with the punch mark on the crankshaft.



Temporarily install the clutch outer guide, needle bearing and clutch outer to the mainshaft.

Insert the gear holder between the primary drive and driven gears.

### TOOL:

**Gear holder, M2.5**

07724-0010100 or  
07724-001A100  
(U.S.A. only)

Apply engine oil to the primary drive gear bolt threads and seating surface.

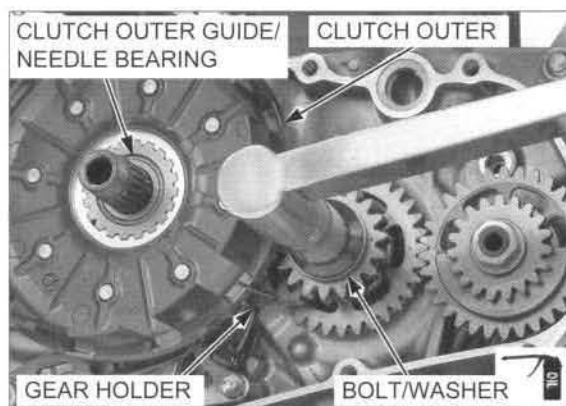
Install the washer and bolt, and tighten the bolt to the specified torque.

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

Remove the gear holder.

Install the following:

- Clutch (page 10-12)
- Right crankcase cover (page 10-6)



## BALANCER DRIVEN GEAR/BALANCER SHAFT

### REMOVAL

*This service can be performed with the engine installed in the frame.*

Remove the following:

- Right crankcase cover (page 10-5)
- Left crankcase cover (page 11-4)

Insert the gear holder between the balancer drive and driven gears.

#### TOOL:

**Gear holder, M1.5**

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

Remove the balancer shaft lock nut and washer.

Remove the gear holder.

Remove the water pump drive gear, balancer driven gear and O-ring.

Check the water pump drive gear and balancer driven gear for wear or damage.

Turn the balancer shaft as shown and remove it from the left side.

Check the balancer shaft for wear, damage or excessive scratches.

### INSTALLATION

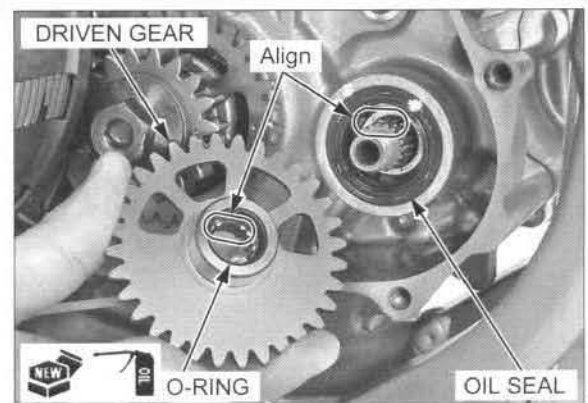
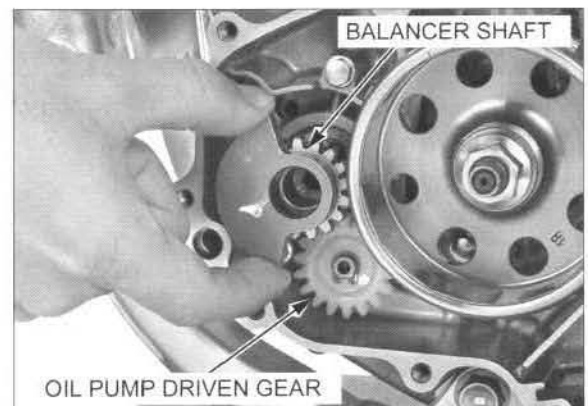
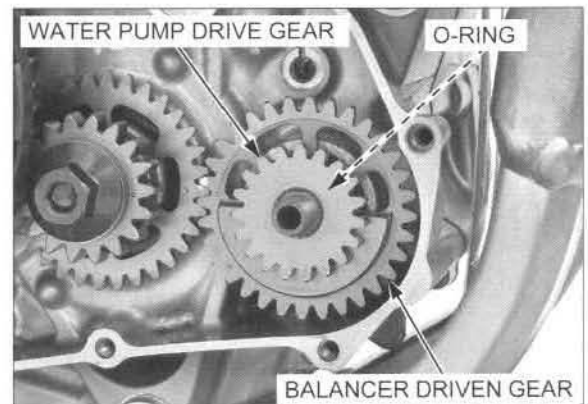
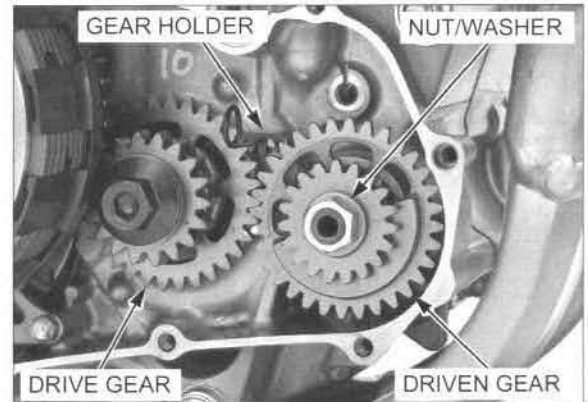
*Engage the balancer shaft gear with oil pump driven gear.*

Install the balancer shaft into the crankcase as shown.

Check the oil seal for wear or damage, replace it if necessary (page 12-10).

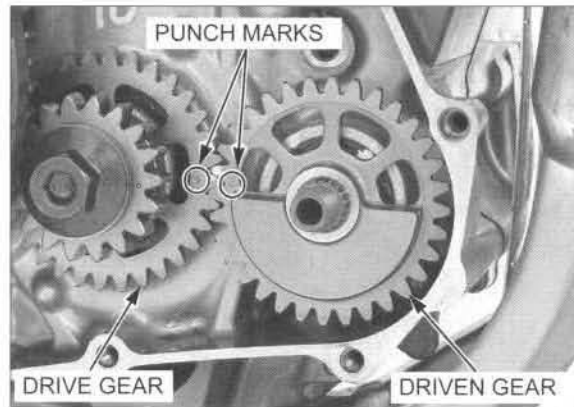
Apply engine oil to new O-ring and install it into the balancer driven gear.

Install the balancer driven gear onto the balancer shaft while aligning its wide cut-out in the splines with the wide cut-out in the splines on the balancer shaft.

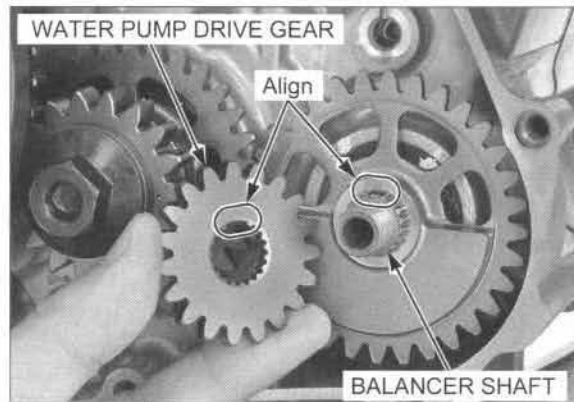


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Align the punch mark of the balancer driven gear with the punch mark of the drive gear.



Install the water pump drive gear onto the balancer shaft while aligning its wide cut-out in the splines with the wide cut-out in the splines on the balancer shaft.



Insert the gear holder between the balancer drive and driven gears.

### TOOL:

**Gear holder, M1.5**

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

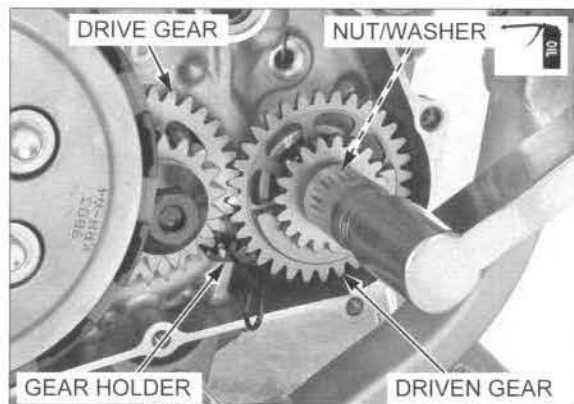
Apply engine oil to the balancer shaft lock nut threads. Install and tighten the balancer shaft lock nut to the specified torque.

**TORQUE: 36 N·m (3.7 kgf·m, 27 lbf·ft)**

Remove the gear holder.

Install the following:

- Left crankcase cover (page 11-8)
- Right crankcase cover (page 10-6)



## BALANCER BEARING REPLACEMENT

### RIGHT BALANCER BEARING

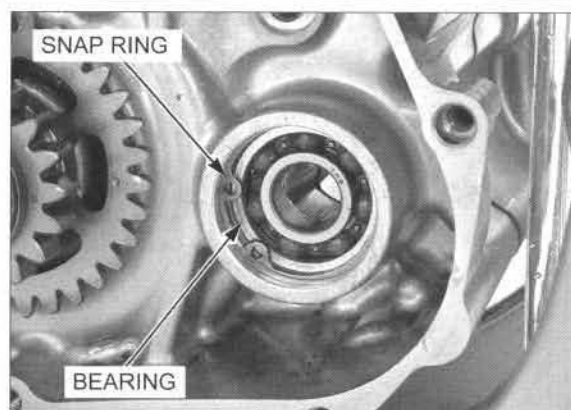
Remove the balancer shaft (page 12-9).

Remove the oil seal.





Remove the snap ring and right bearing.



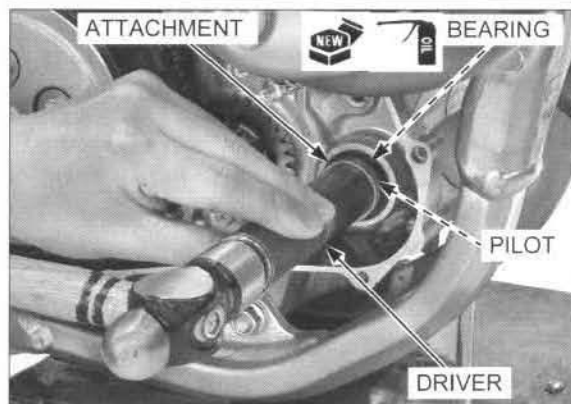
*Drive in new bearings squarely with the marked side facing up.*

Drive in new balancer shaft bearing into the right crankcase until it is fully seated, using the special tools.

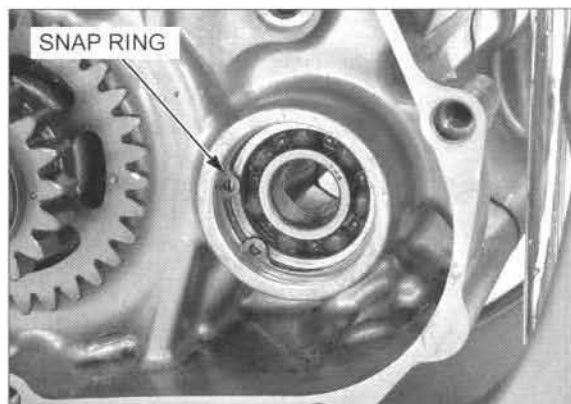
**TOOLS:**

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

After installation, apply engine oil to the bearing.



Install the snap ring into the groove in the right crankcase.

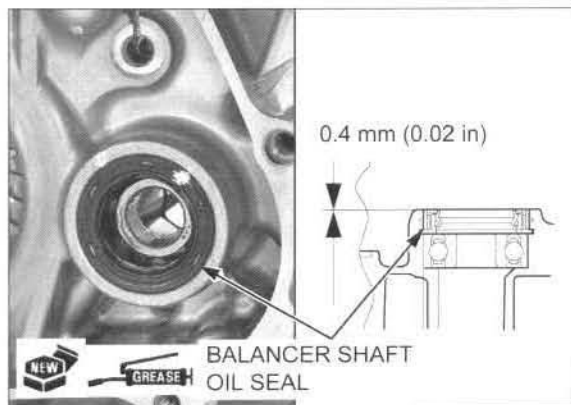


*Install the balancer shaft oil seal with its marked side facing up.*

Apply grease to new balancer shaft oil seal lips.

Install the balancer shaft oil seal to the specified depth below the crankcase surface as shown.

Install the balancer shaft (page 12-9).



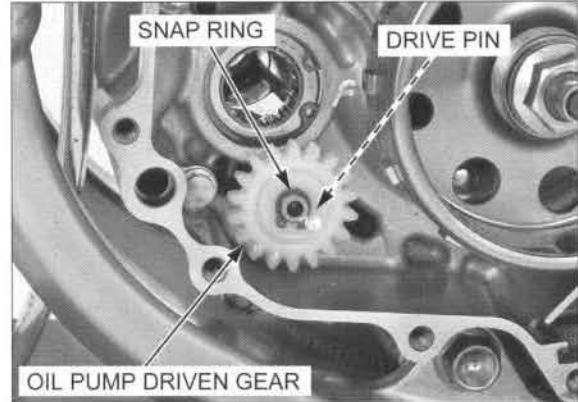


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

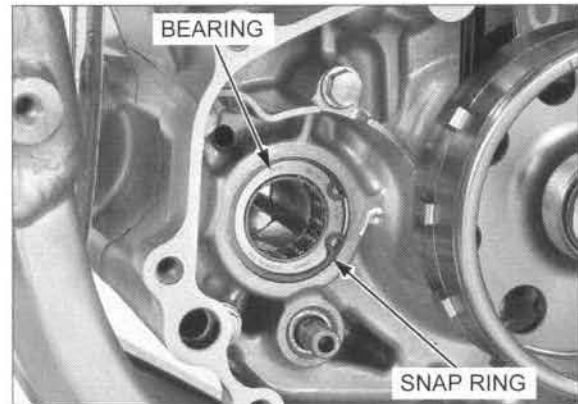
### LEFT BALANCER NEEDLE BEARING

Remove the balancer shaft (page 12-9).

Remove the snap ring, oil pump driven gear and drive pin.



Remove the snap ring and left needle bearing



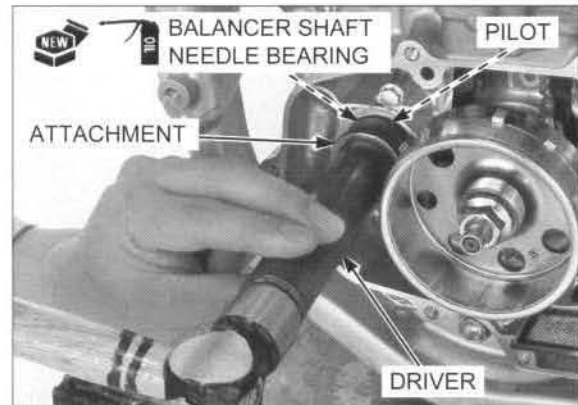
*Drive in a new bearing squarely with the marked side facing up.*

Drive in a new balancer shaft needle bearing using the special tools.

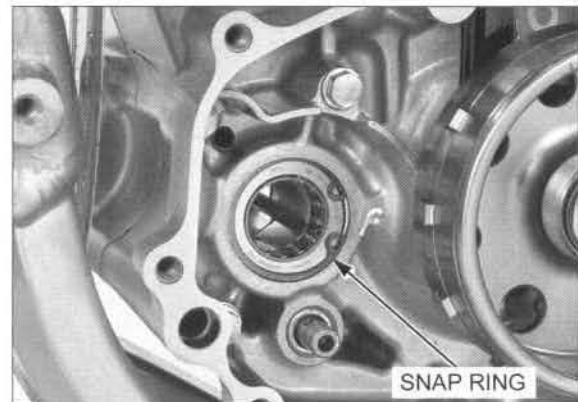
#### TOOLS:

Driver	07749-0010000
Attachment, 32 x 35 mm	07746-0010100
Pilot, 20 mm	07746-0040500

After installation, apply engine oil to the bearing.



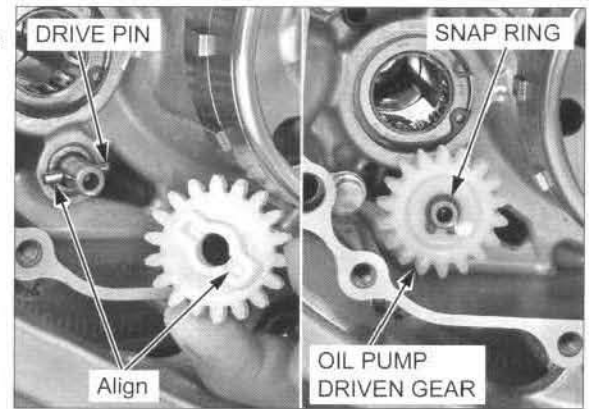
Install the snap ring into the groove in the left crankcase.



Install the oil pump drive pin into the oil pump shaft.  
Install the oil pump driven gear by aligning its groove with the drive pin.

Install the snap ring into the oil pump shaft groove.

Install the balancer shaft (page 12-9).



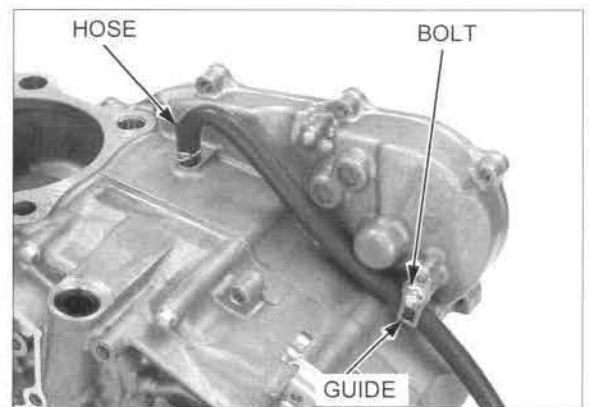
## **CRANKCASE**

### **SEPARATION**

For removal of necessary parts before separating the crankcase (page 12-3).

Remove the bolt and hose guide.

Disconnect the transmission breather hose from the right crankcase.



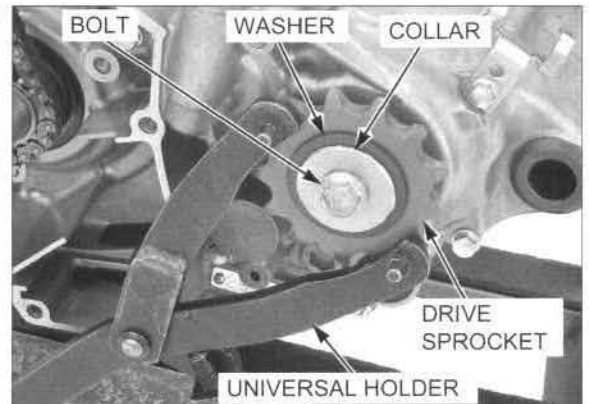
Loosen the drive sprocket bolt while holding the sprocket with the special tool as shown.

**TOOL:**

**Universal holder**

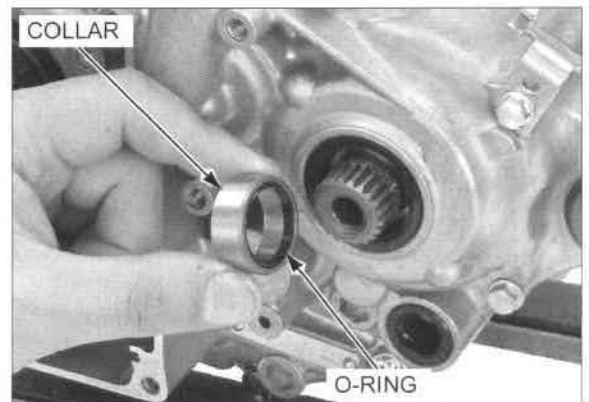
**07725-0030000**

Remove the drive sprocket bolt, collar, washer and drive sprocket.



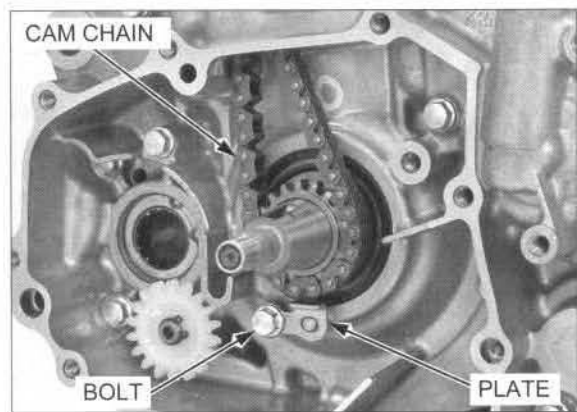
*Be careful not to damage the collar and countershaft.*

Remove the countershaft collar and O-ring.

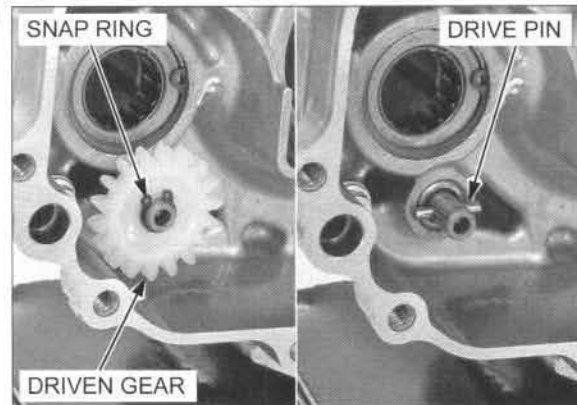


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Remove the bolt, stopper plate and cam chain.

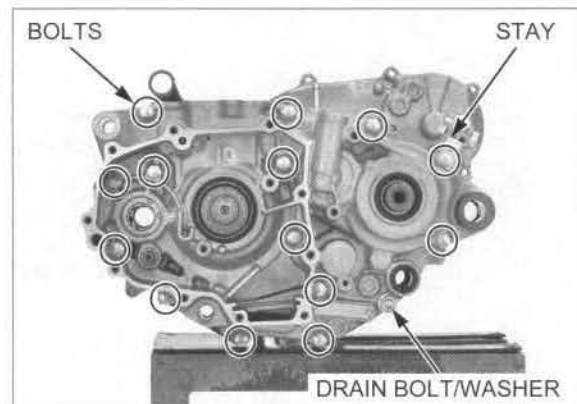


Remove the snap ring, oil pump driven gear and drive pin.

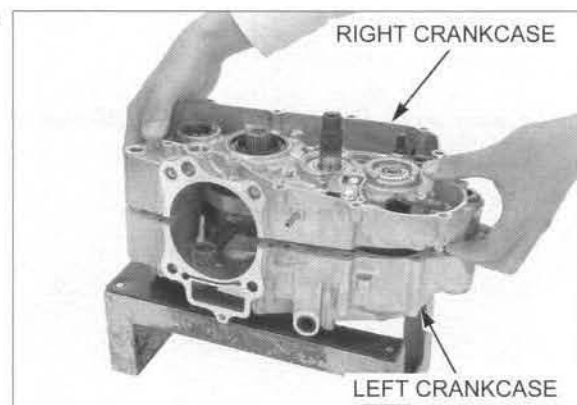


Remove the transmission oil drain bolt and sealing washer.

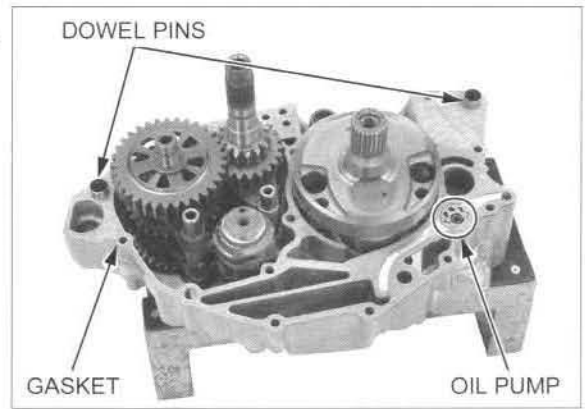
Loosen the crankcase bolts in a crisscross pattern in two or three steps.  
Remove the crankcase bolts and stay.



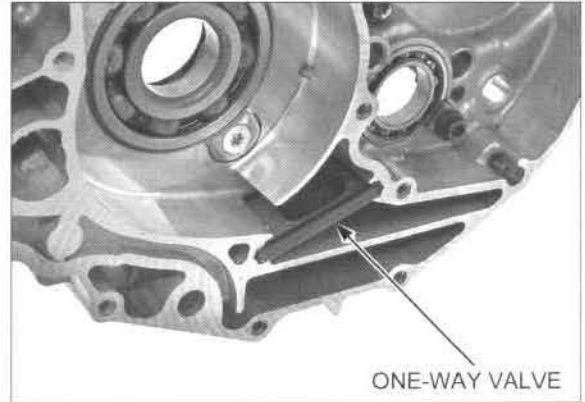
Place the left crankcase facing down and separate the left and right crankcase halves.



Remove the dowel pins and gasket.  
Remove the oil pump inner/outer rotors and oil pump shaft.



Remove the one-way valve from the right crankcase.



**ASSEMBLY**

Clean both crankcase mating surfaces before assembly and check for wear or damage.  
If there is minor roughness or irregularities on the crankcase mating surfaces, dress them with an oil stone.

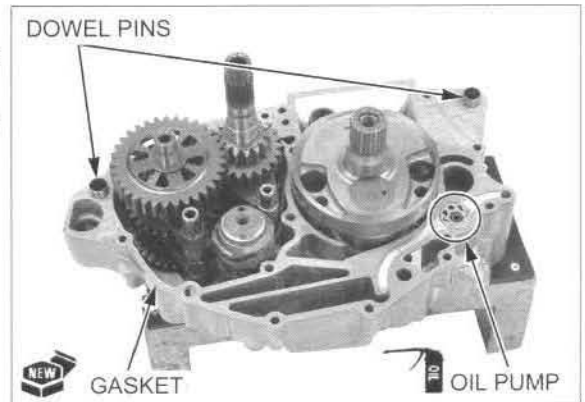
Install the one-way valve to the right crankcase.



Install the dowel pins and new gasket.

Apply engine oil to the oil pump inner/outer rotors sliding area.

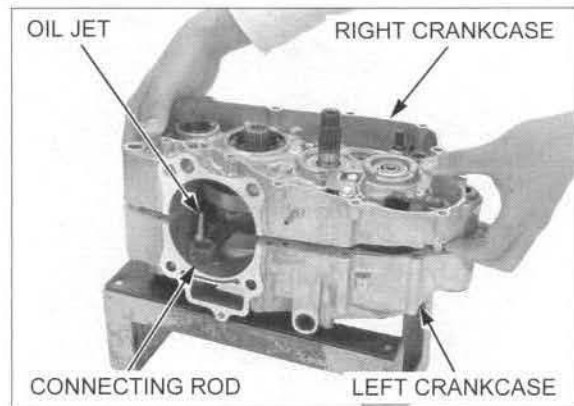
Install the oil pump inner/outer rotors and oil pump shaft in the left crankcase.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

*Be sure that the connecting rod does not interfere with the oil jet.*

Install the right crankcase on the left crankcase.



Install the stay and crankcase bolts.

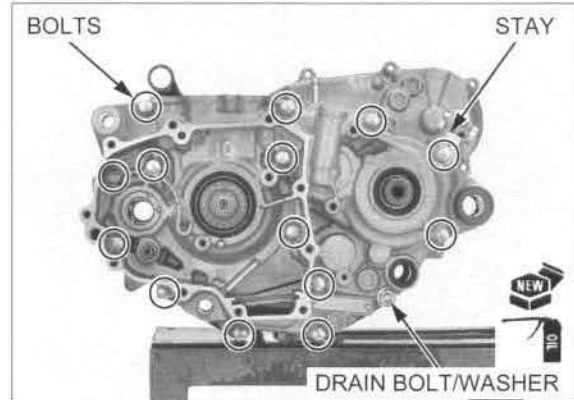
Apply engine oil to the transmission oil drain bolt threads and seating surface. Install a new sealing washer to the transmission oil drain bolt, and install them to the left crankcase.

Tighten the crankcase bolts in a crisscross pattern in two or three progressive steps.

After tightening the crankcase bolts, tighten the transmission oil drain bolt to the specified torque.

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

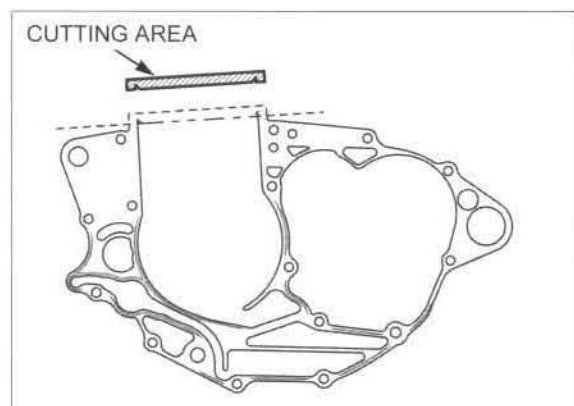
Check that the crankshaft turns smoothly.



Carefully trim the protruding gasket material from the cylinder base gasket surface.

**NOTE:**

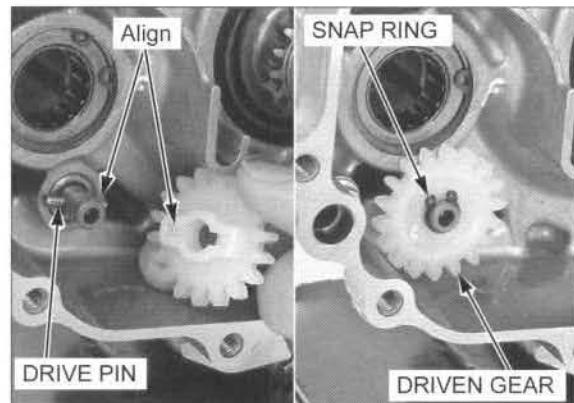
- Do not let gasket material fall into the crankcase.
- Do not damage the cylinder mating surface.



Install the drive pin to the oil pump shaft.

Install the oil pump driven gear by aligning its groove with the drive pin.

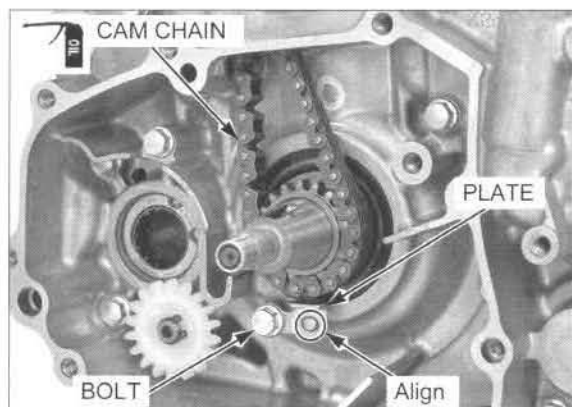
Install the snap ring into the oil pump shaft groove.



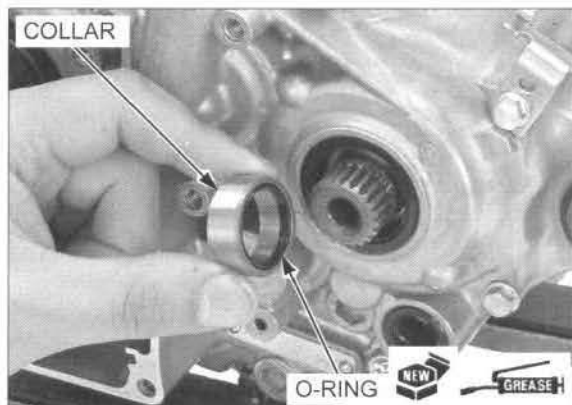
Apply engine oil to the cam chain and install it to the timing sprocket.

*Align the stopper plate hole with the crankcase boss.*

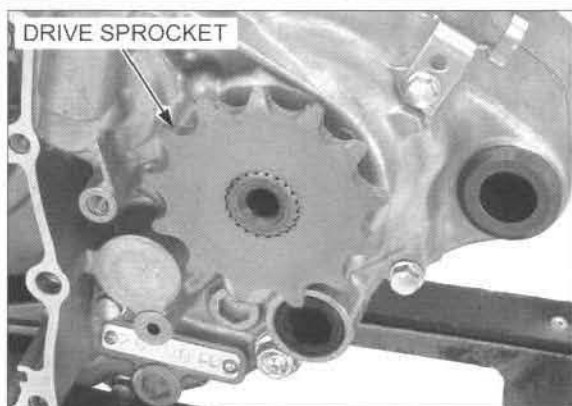
Install the cam chain stopper plate and tighten the bolt.



Apply grease to a new countershaft O-ring, and install it to the countershaft collar. Install them to the countershaft.



Install the drive sprocket to the countershaft with its flat side facing out as shown.



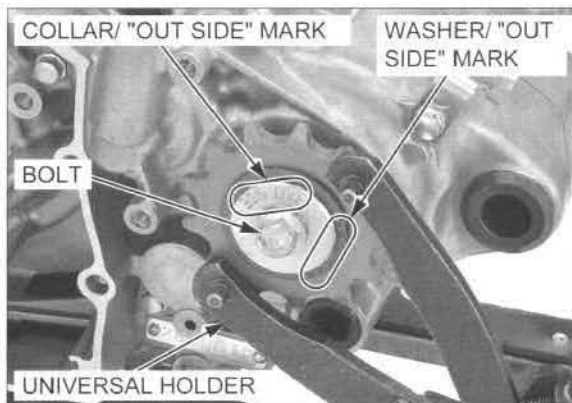
Install the washer and collar with the "OUT SIDE" marks facing out.

Install and tighten the drive sprocket bolt to the specified torque while holding the drive sprocket using the special tool.

**TOOL:**

**Universal holder** 07725-0030000

**TORQUE:** 31 N·m (3.2 kgf·m, 23 lbf·ft)





## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

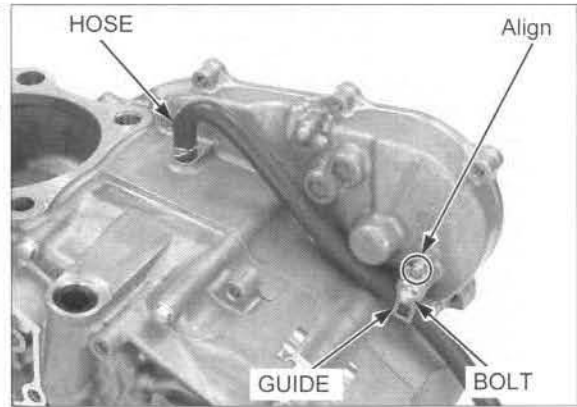
Connect the transmission breather hose to the right crankcase.

*Align the hose guide groove with the crankcase boss.*

Install the hose guide and tighten the bolt.

Install the remaining parts in the reverse order of removal.

- For installation of the removed parts for crankcase service (page 12-3).



## TRANSMISSION

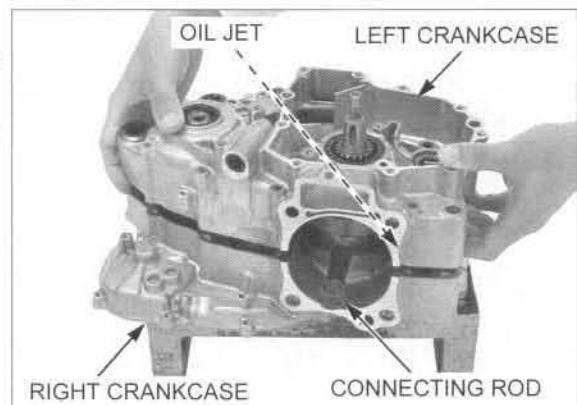
### DISASSEMBLY

Separate the crankcase halves (page 12-13).

*Be sure that the connecting rod does not interfere with the oil jet.*

Temporarily install the right crankcase on the left crankcase.

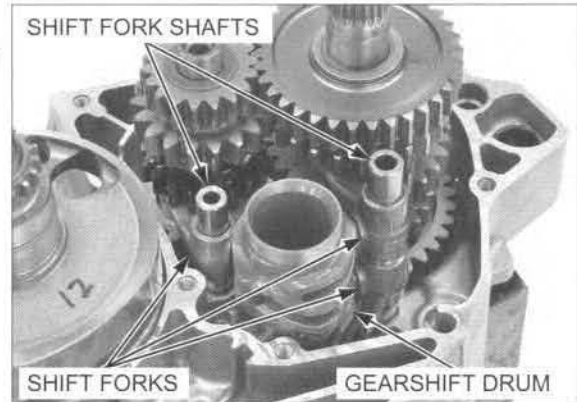
Place the right crankcase facing down and separate the right and left crankcase halves.



Remove the shift fork shafts.

Remove the shift fork guide pins from the gearshift drum grooves, and remove the gearshift drum.

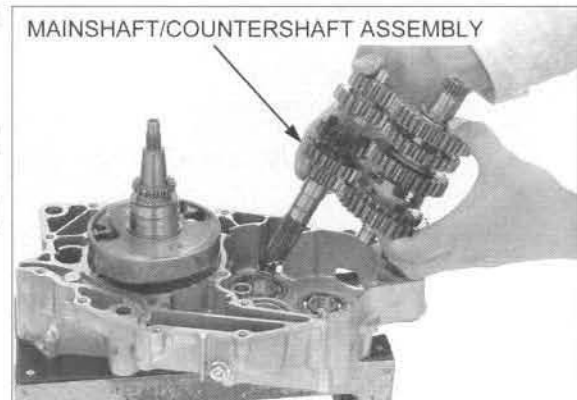
Remove the shift forks.



Remove the mainshaft and countershaft assembly from the right crankcase.

#### Disassemble the transmission:

- Keep track of the disassembled parts (gears, bushings, needle bearing, thrust 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.

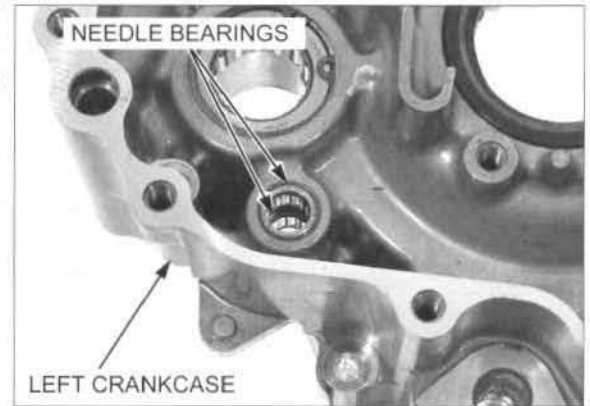


**INSPECTION**

**OIL PUMP SHAFT NEEDLE BEARING**

Check the oil pump shaft needle bearings for wear or damage, replace them if necessary (page 12-28).

Also check that the needle bearings fit tightly in the left crankcase.



**GEAR**

Check the gear dogs, dog holders and teeth for damage or excessive wear.



Measure the I.D. of each gear.

**SERVICE LIMITS:**

- M4, M5: 23.07 mm (0.908 in)
- C1: 20.07 mm (0.790 in)
- C2: 27.07 mm (1.066 in)
- C3: 25.07 mm (0.987 in)

**BUSHING**

Check the bushings for damage or excessive wear. Measure the O.D. of each bushing.

**SERVICE LIMITS:**

- M4, M5: 22.96 mm (0.904 in)
- C1: 19.95 mm (0.785 in)
- C2: 26.95 mm (1.061 in)
- C3: 24.96 mm (0.983 in)

Calculate the gear-to-bushing clearance.

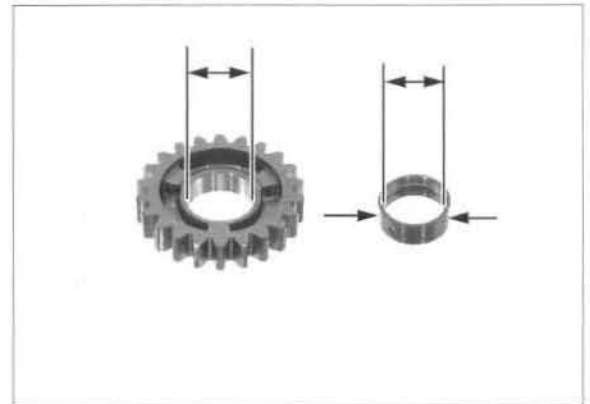
**SERVICE LIMITS:**

- M4, M5: 0.12 mm (0.005 in)
- C1, C2, C3: 0.12 mm (0.005 in)

Measure the I.D. of each bushing.

**SERVICE LIMITS:**

- M5: 20.04 mm (0.789 in)
- C1: 17.04 mm (0.671 in)
- C2: 24.04 mm (0.946 in)
- C3: 22.04 mm (0.868 in)





## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

### MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for damage or abnormal wear.  
Measure the O.D. of the mainshaft and countershaft at the bushing sliding areas.

#### SERVICE LIMITS:

##### Mainshaft:

(at M5 bushing): 19.94 mm (0.785 in)

##### Countershaft:

(at C1 bushing): 16.97 mm (0.668 in)

(at C2 bushing): 23.94 mm (0.943 in)

(at C3 bushing): 21.94 mm (0.864 in)

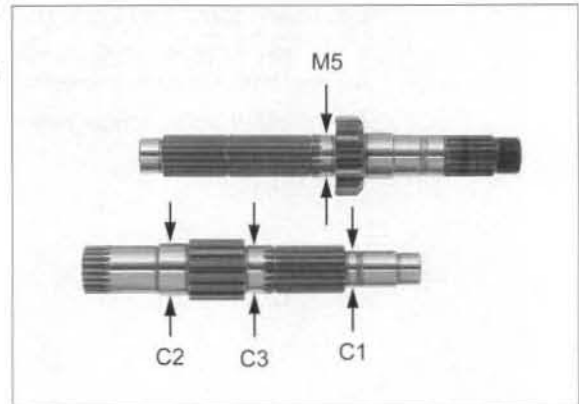
Calculate the bushing-to-shaft clearance.

#### SERVICE LIMITS:

M5: 0.12 mm (0.005 in)

C1: 0.07 mm (0.003 in)

C2, C3: 0.12 mm (0.005 in)



### SHIFT FORK

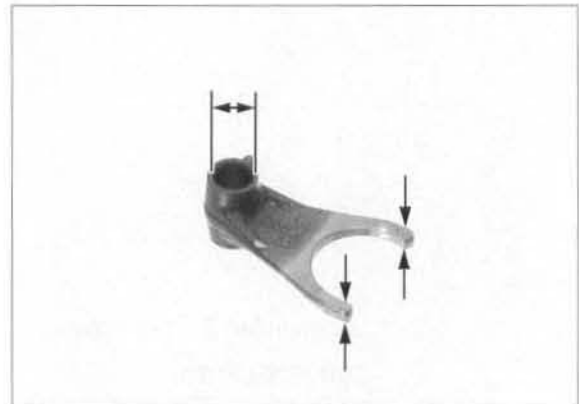
Check the shift forks for abnormal wear or deformation.  
Measure the shift fork I.D. and claw thickness.

#### SERVICE LIMITS:

I.D.: Center: 11.04 mm (0.435 in)

Right and left: 12.07 mm (0.475 in)

Claw thickness: 4.8 mm (0.19 in)



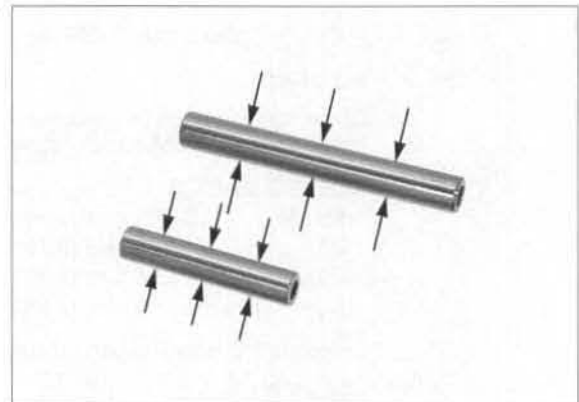
### SHIFT FORK SHAFT

Check the shift fork shafts for abnormal wear or deformation.  
Measure the shift fork shaft O.D.

#### SERVICE LIMITS:

Center: 10.97 mm (0.432 in)

Right and left: 11.95 mm (0.470 in)



**GEARSHIFT DRUM**

Inspect the gearshift drum for scoring, scratches or evidence of insufficient lubrication.  
Check the gearshift drum grooves for abnormal wear or damage.

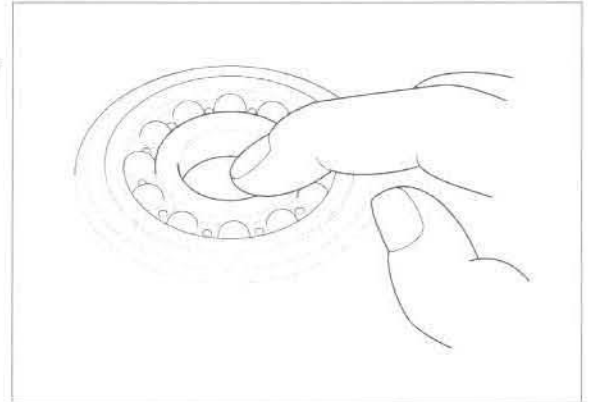
Replace it if necessary.



**TRANSMISSION BEARING**

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

Replace the bearings if necessary (page 12-28).

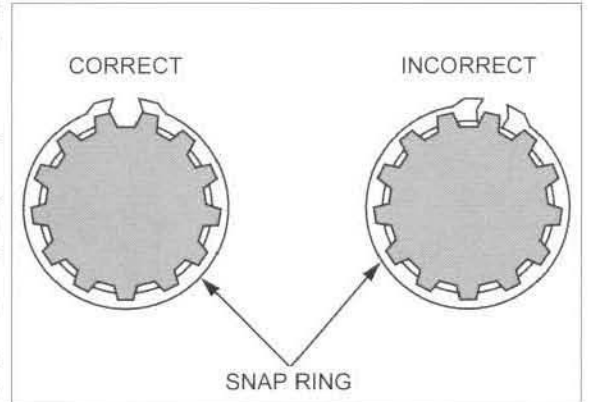


**ASSEMBLY**

Apply molybdenum oil solution to the mainshaft and countershaft spline area and transmission gear sliding surface.

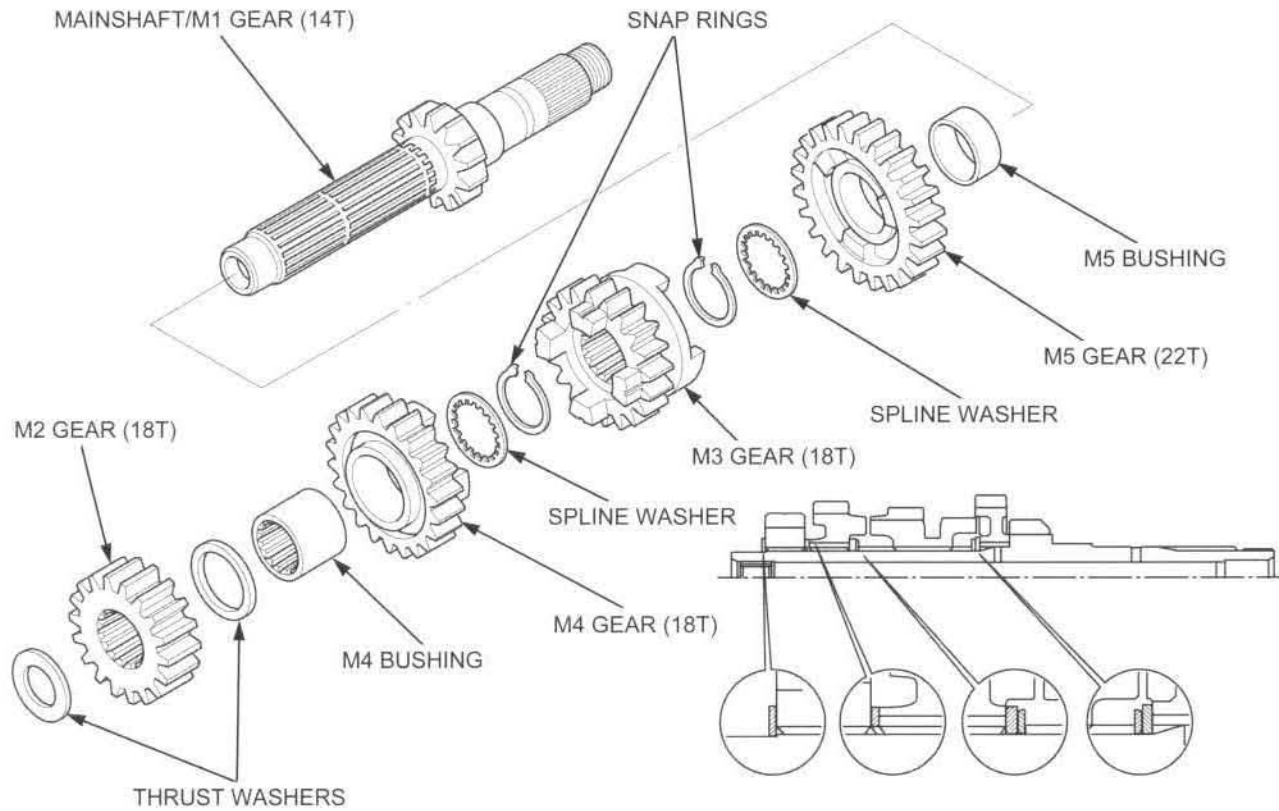
Assemble all parts into their original positions.

- Check the gears for freedom of movement or rotation on the shaft.
- 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 shaft grooves, and align their end gaps with the grooves of the spline.

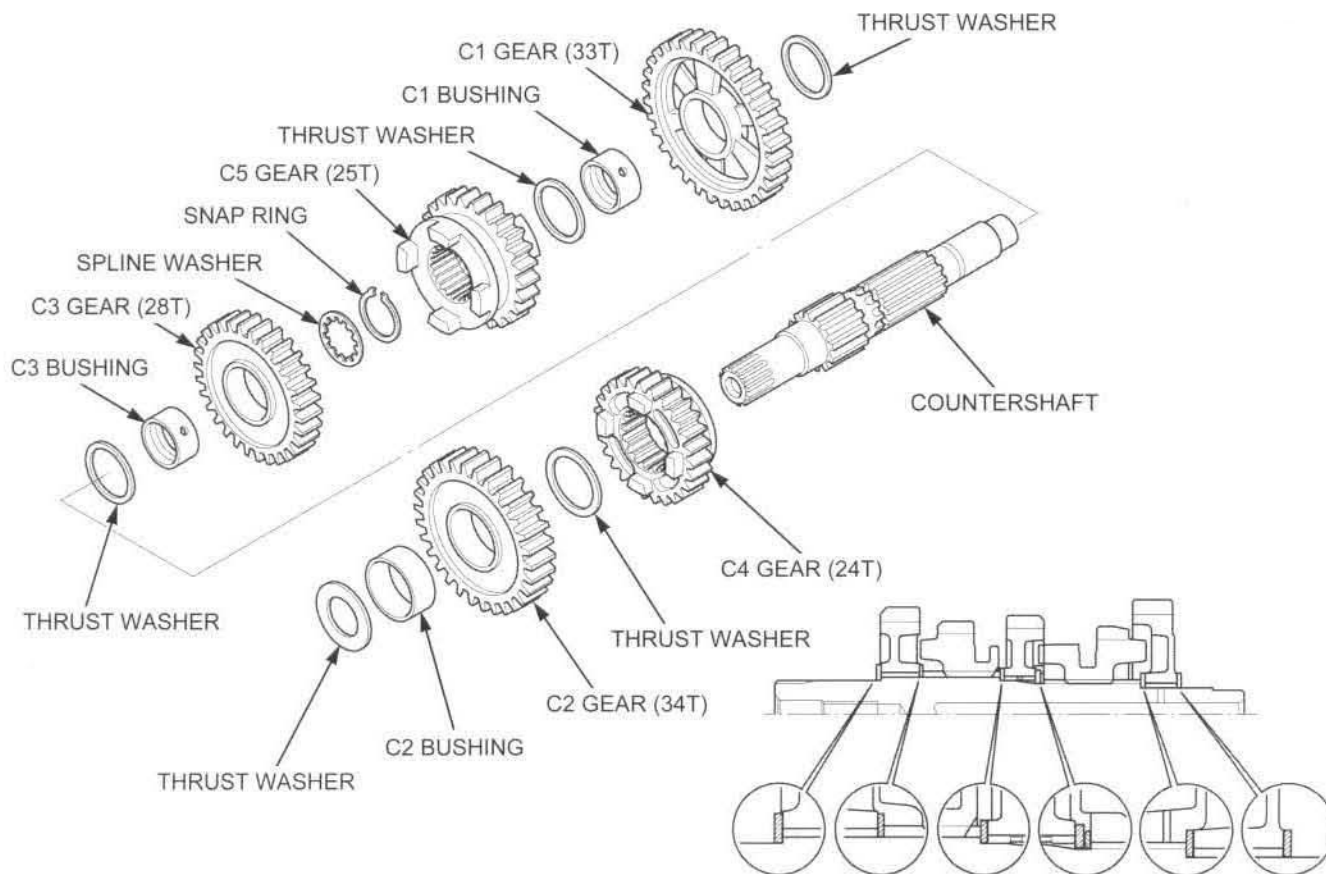


# CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

## MAINSHAFT:

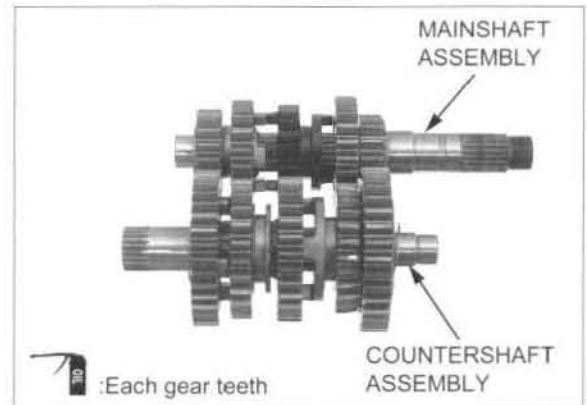


## COUNTERSHAFT:



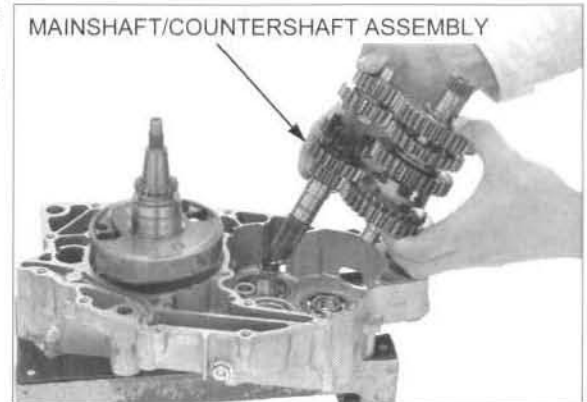
**INSTALLATION**

Apply engine oil to each transmission gear teeth.  
Engage the mainshaft and countershaft gears.

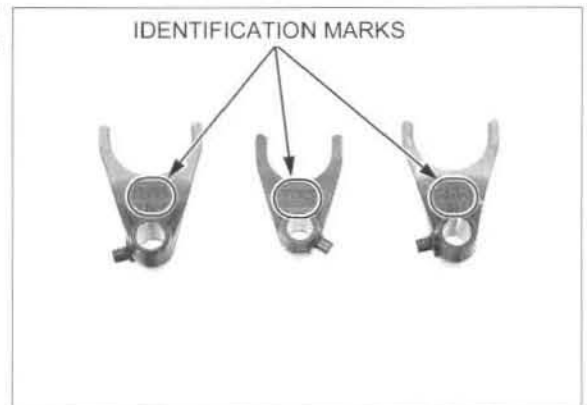


Install the mainshaft and countershaft assembly into the right crankcase.

Make sure the three thrust washers are installed (mainshaft; left only/countershaft; both ends).



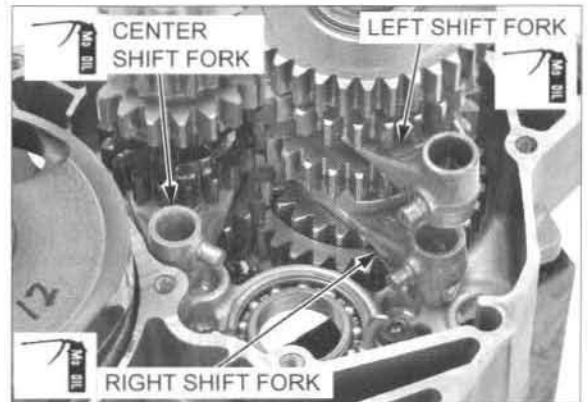
- Each shift fork has an identification mark, "RNM R" is for the right shift fork, "RNM L" is the left shift fork and "RNM" is for the center shift fork.



Apply molybdenum oil solution to the shift fork claws and guide pins.

Install the shift forks to the shifter grooves of each sliding gear.

- Install the shift forks with their identification marks facing up.



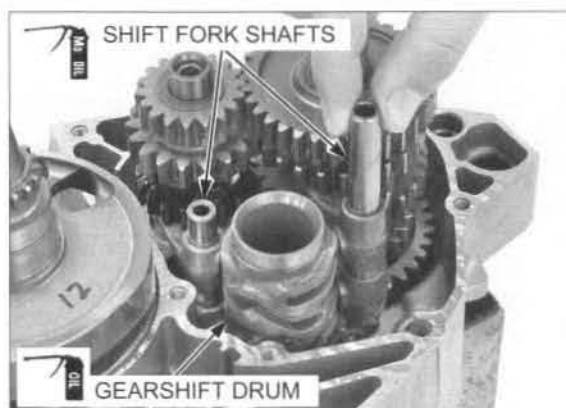
## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Apply engine oil to the gearshift drum guide grooves.

Install the gearshift drum by aligning the guide pins on the shift forks with the guide grooves in the gearshift drum.

Apply molybdenum oil solution to the shift fork shaft outer surface.

Slide the shift fork shafts through the shift forks into the crankcase.

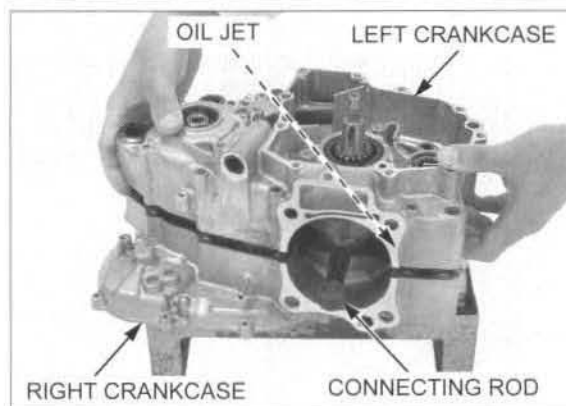


*Be sure that the connecting rod does not interfere with the oil jet*

Temporarily install the left crankcase on the right crankcase.

Place the left crankcase facing down, and separate the left and right crankcase halves.

Assemble crankcase halves (page 12-15).

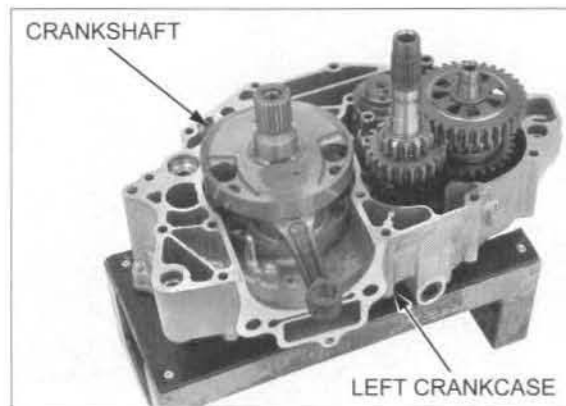


## CRANKSHAFT

### REMOVAL

Separate the crankcase halves (page 12-13).

Remove the crankshaft from the left crankcase.



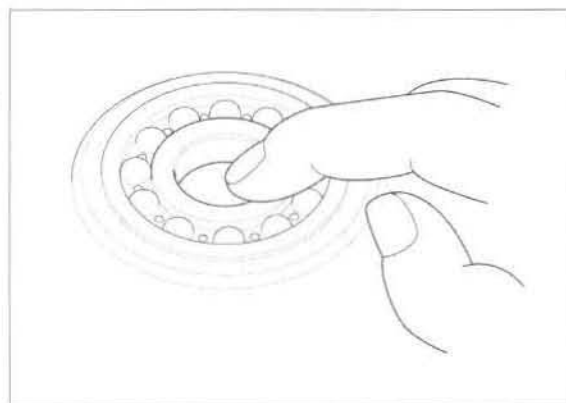
### INSPECTION

Turn the inner race of both crankshaft bearings with your finger.

The bearings should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the crankcase.

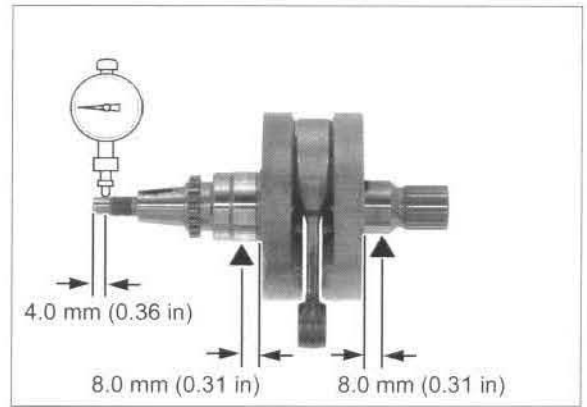
Replace the bearings if necessary (page 12-26).



*Be careful not to damage the main journal.*

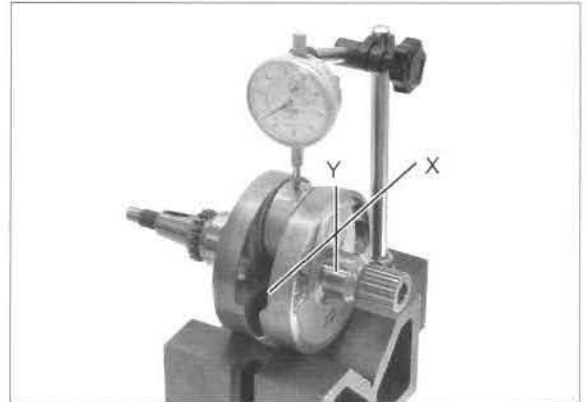
Place the crankshaft on a stand or V-blocks.  
Set the dial indicator as shown.  
Rotate the crankshaft two revolutions (720°) and read the runout.

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



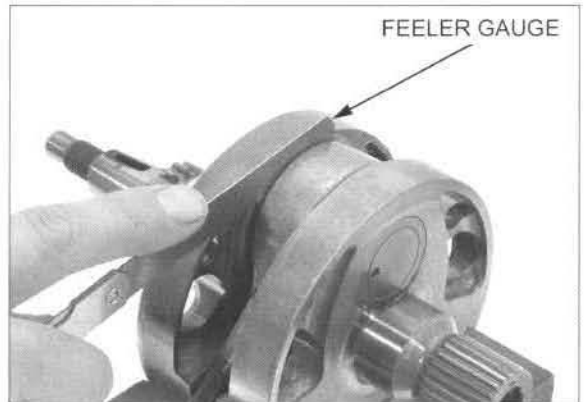
Measure the connecting rod big end radial clearance in both X and Y directions.

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



Measure the connecting rod big end side clearance using a feeler gauge.

**SERVICE LIMIT: 0.8 mm (0.03 in)**

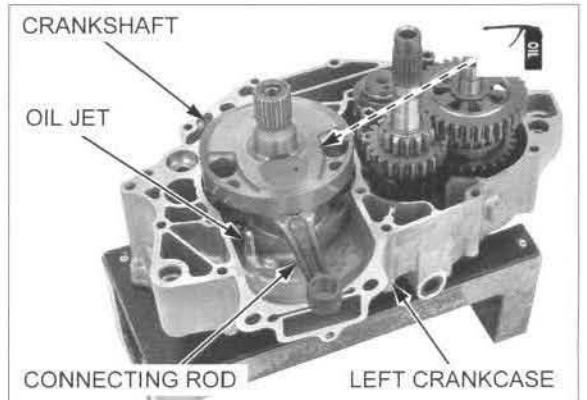


**INSTALLATION**

*Be sure that the connecting rod does not interfere with the oil jet*

Coat the oil seal contacting surface of the crankshaft with engine oil, and install it into the left crankcase.

Assemble the crankcase halves (page 12-15).



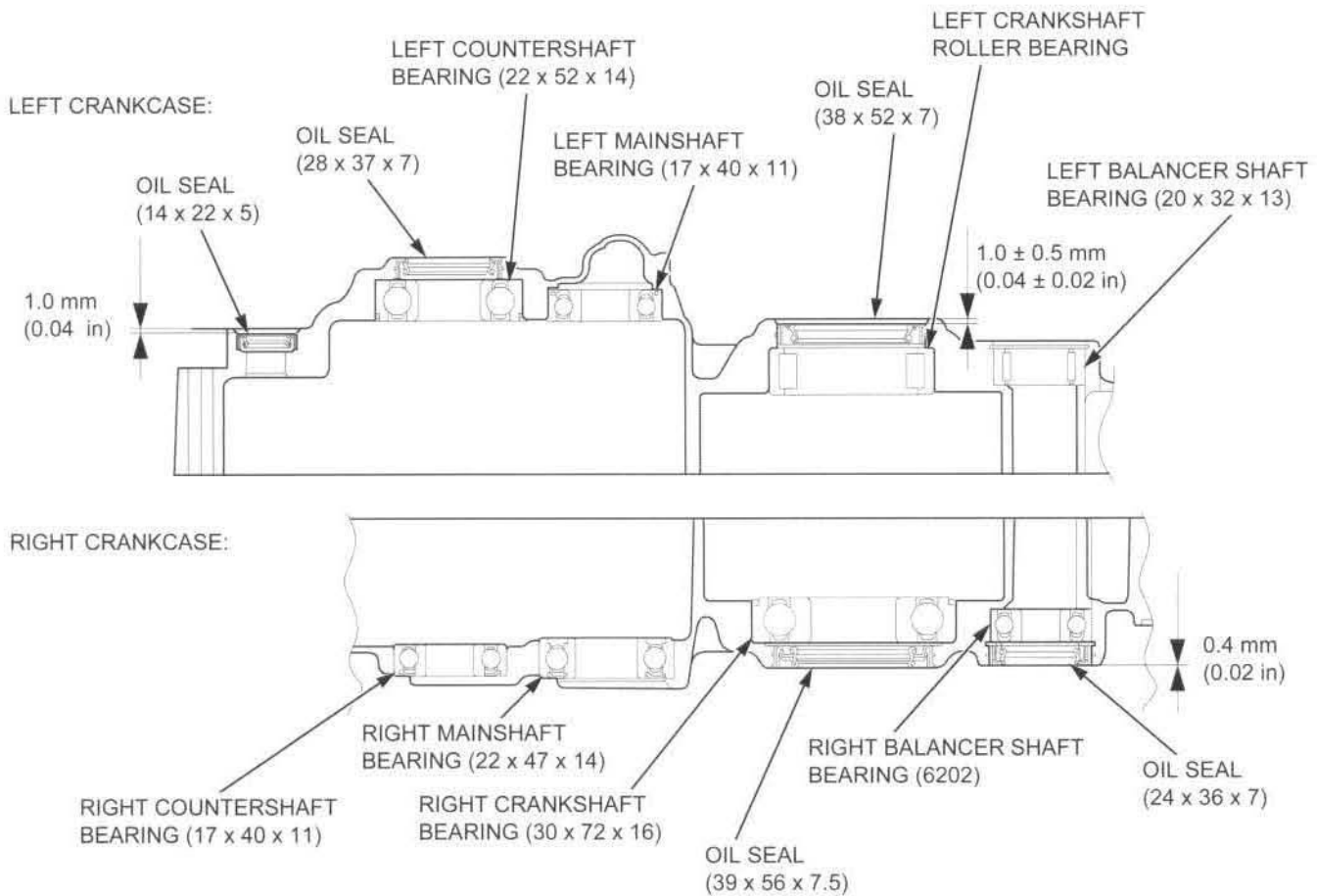
# CRANKCASE BEARING REPLACEMENT

## CRANKCASE BEARING/OIL SEAL LOCATION

Remove the following:

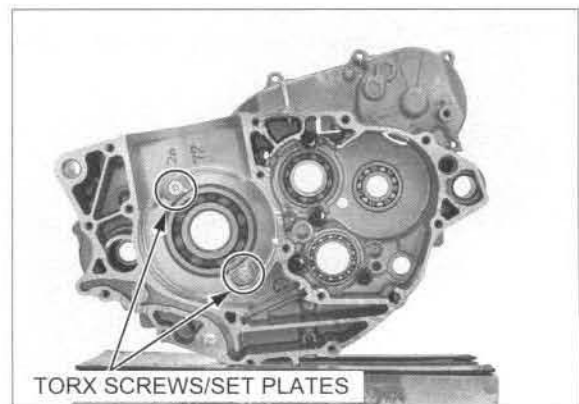
- Transmission (page 12-18)
- Crankshaft (page 12-24)

For balancer bearing/oil seal replacement (page 12-10).

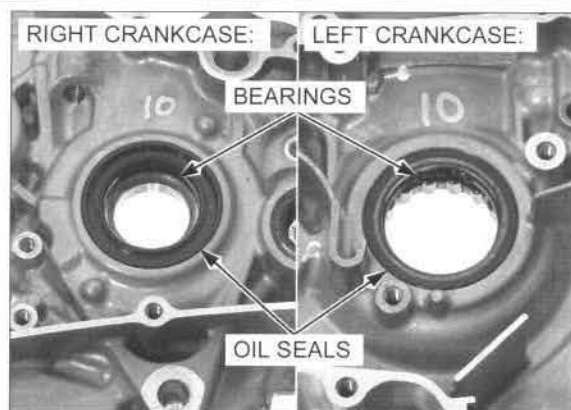


## CRANKSHAFT BEARING

Remove the torx screws and right crankshaft bearing set plates.



Remove the crankshaft oil seals and bearings from both crankcase halves.



*Drive in a new bearing squarely with the marking side facing toward the inside of the crankcase.*

Drive in a new crankshaft bearings into both crankcase halves until they are fully seated, using the special tools.

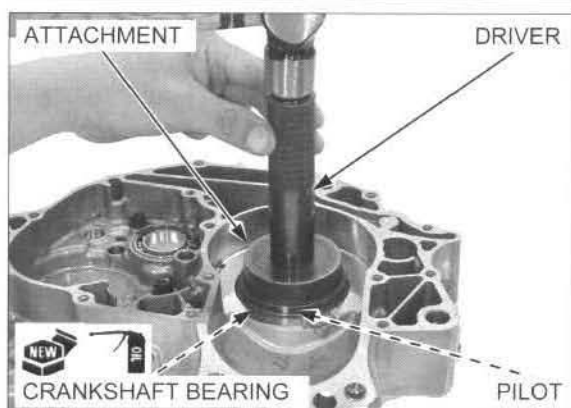
**TOOLS:**

**Right crankshaft bearing:**

Driver	07749-0010000
Attachment, 72 x 75 mm	07746-0010600
Pilot, 30 mm	07746-0040700

**Left crankshaft bearing:**

Driver	07749-0010000
Attachment, 62 x 68 mm	07746-0010500

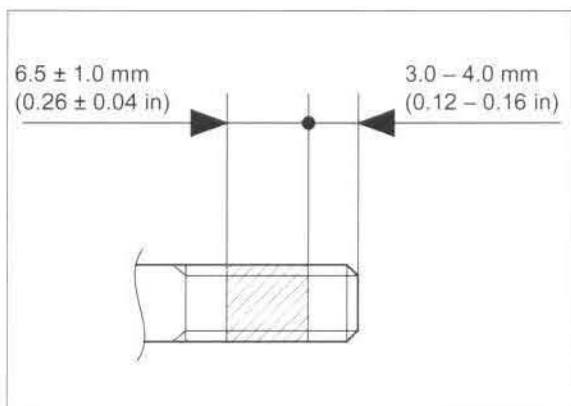


After installation, apply engine oil to the crankshaft bearings.

Clean and apply locking agent to the crankshaft bearing set plate torx screw threads as shown.

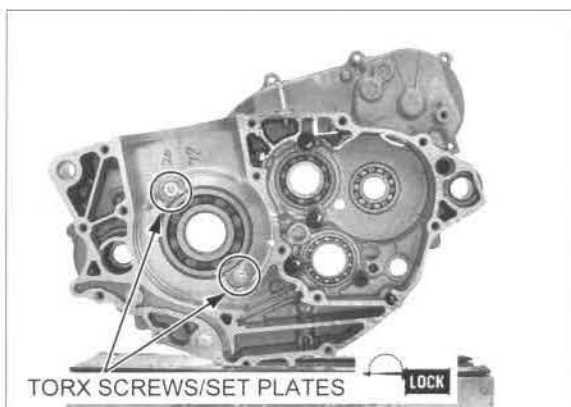
**NOTE:**

Use Pro Honda Hondalock 3 or equivalent high strength locking agent.



Install the torx screws with the set plates and tighten the torx screws to the specified torque.

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



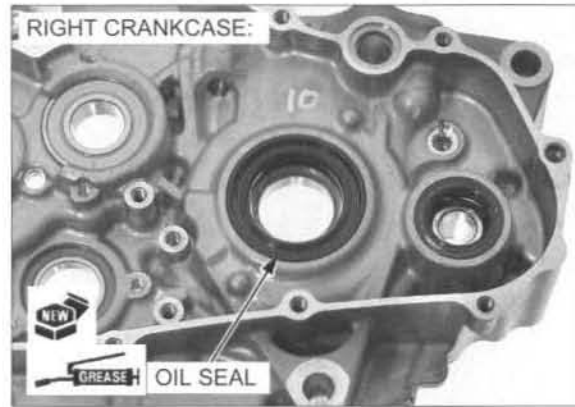


## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Apply grease to a new right crankshaft oil seal lips.

*Install the right crankshaft oil seal with its metal side facing up.*

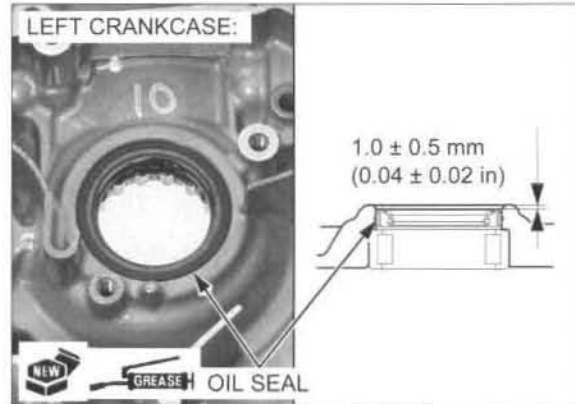
Install the right crankshaft oil seal until it is flush with the crankcase surface.



Apply grease to a new left crankshaft oil seal lips.

*Install the left crankshaft oil seal with its flat side facing up.*

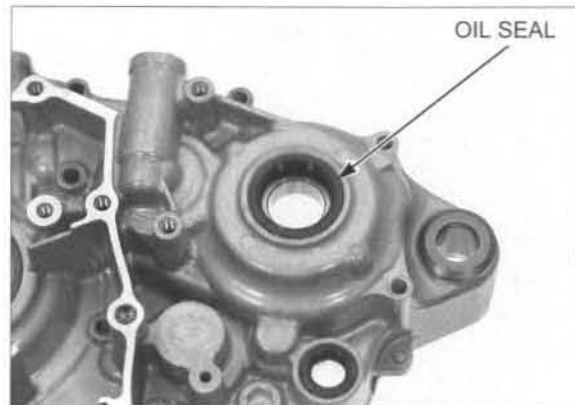
Install the left crankshaft oil seal to the specified depth below the crankcase surface as shown.



## TRANSMISSION/OIL PUMP/ GEARSHIFT DRUM BEARINGS

### LEFT CRANKCASE

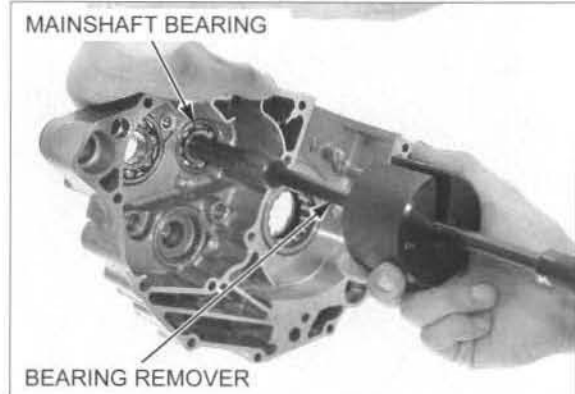
Remove the countershaft oil seal.



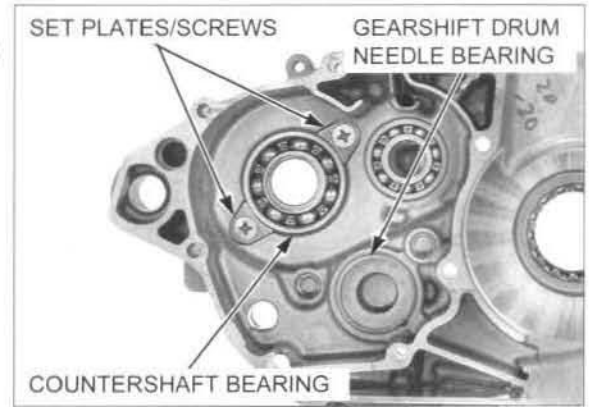
Remove the mainshaft bearing using the special tools.

### TOOLS:

Bearing remover set, 17 mm	07936-3710300
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-371020A (U.S.A. only)



Remove the gearshift drum needle bearing.  
Remove the screws, set plates and countershaft bearing.



Remove the oil pump shaft needle bearing retainer and needles out from the bearing case.

*When removing the oil pump shaft needle bearing cases, set the bearing remover head flange to the outside bearing case flange as shown.*

Remove the oil pump shaft needle bearing cases using the special tools.

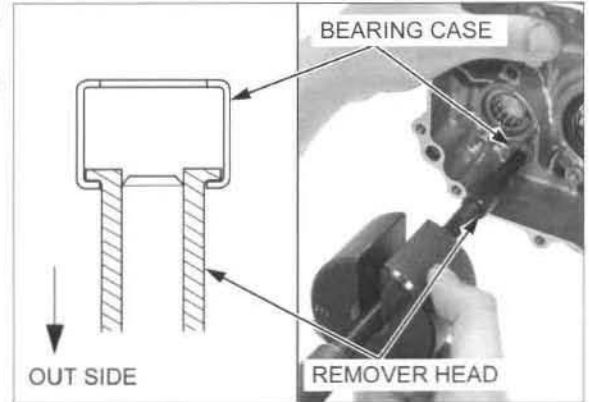
**TOOLS:**

**Oil pump shaft needle bearing:**

- Bearing remover shaft, 10 mm** 07936-GE00100
- Bearing remover head, 10 mm** 07936-GE00200
- Not available in U.S.A.**
- Remover weight** 07741-0010201

**TOOLS, U.S.A. only:**

- Remover handle** 07936-3710100
- Remover weight** 07936-371020A
- Bearing remover shaft, 10 mm** 07936-GE0A000



*Drive in new bearings squarely with the marked side facing in.*

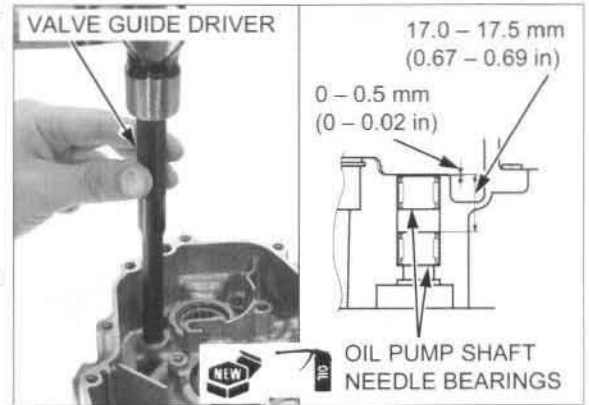
Drive in new oil pump shaft needle bearings using the special tool to the specified depth below the crankcase as shown.

**TOOL:**

**Oil pump shaft needle bearing:**

- Valve guide driver, 8.0 mm** 07ZMD-MCH0100 or 07ZMD-MCHA100 (U.S.A. only)

After installation, apply engine oil to the needle bearings.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

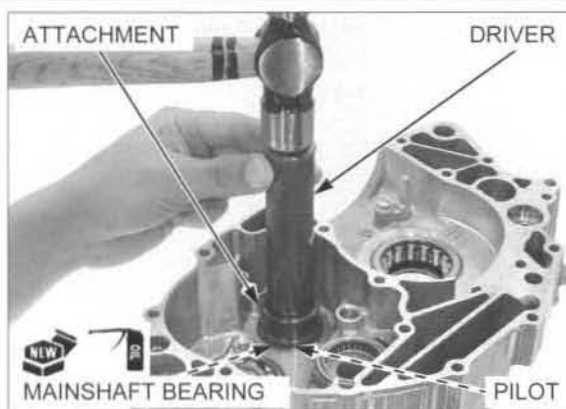
Drive in a new bearing squarely with the sealed side facing down.

Drive in a new mainshaft bearing until it is fully seated, using the special tools.

### TOOLS:

#### Mainshaft bearing:

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



Drive in a new bearing squarely with the marked side facing up.

Drive in a new gearshift drum needle bearing until it is fully seated, using the special tools.

### TOOLS:

#### Gearshift drum needle bearing:

Driver	07749-0010000
Attachment, 37 x 40 mm	07746-0010200

Drive in a new bearing squarely with its set plate groove side facing up.

Drive in a new countershaft bearing until it is fully seated, using the special tools.

### TOOLS:

#### Countershaft bearing:

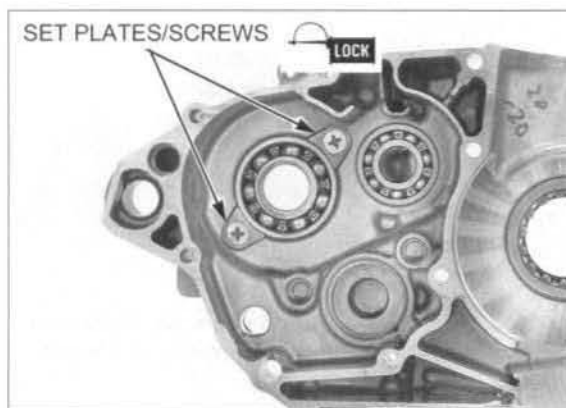
Driver	07749-0010000
Attachment, 52 x 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000

After installation, apply engine oil to each bearing.

Clean and apply locking agent to the countershaft bearing set plate screw threads (page 1-15).

Install the screws with the set plates and tighten the screws to the specified torque.

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



Apply grease to new countershaft oil seal lips.

Install the countershaft oil seal until it is flush with the crankcase surface.



**RIGHT CRANKCASE**

Remove the socket bolts, set plate and mainshaft bearing.

Remove the countershaft bearing.

Remove the socket bolts, set plates and gearshift drum bearing.

*Drive in new bearings squarely with the sealed side facing down.*

Drive in new mainshaft and countershaft bearings into the right crankcase until they are fully seated, using the special tools.

**TOOLS:**

**Mainshaft bearing:**

- Driver 07749-0010000
- Attachment, 42 x 47 mm 07746-0010300
- Pilot, 22 mm 07746-0041000

**Countershaft bearing:**

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

After installation, apply engine oil to each bearing.

Install a new gearshift drum bearing into the right crankcase with its sealed side facing down.

After installation, apply engine oil to gearshift drum bearing.

Clean and apply locking agent to each set plate bolt threads.

Install the socket bolts with the set plates, and tighten the bolts to the specified torque.

**TORQUE:**

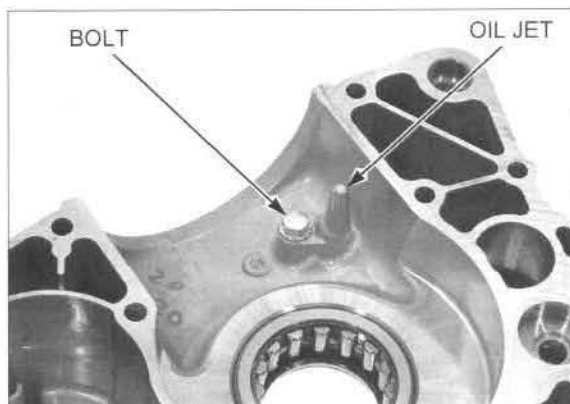
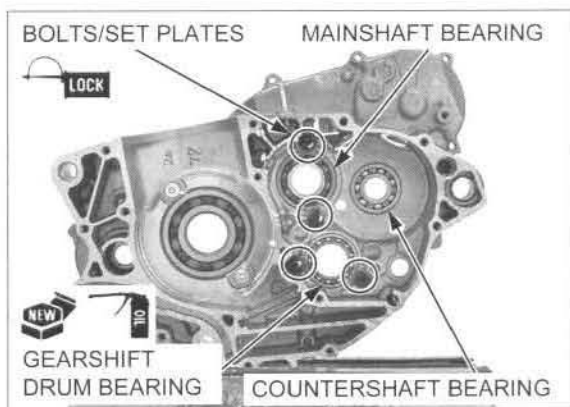
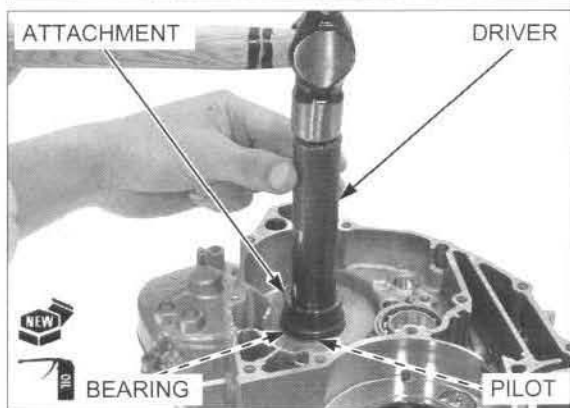
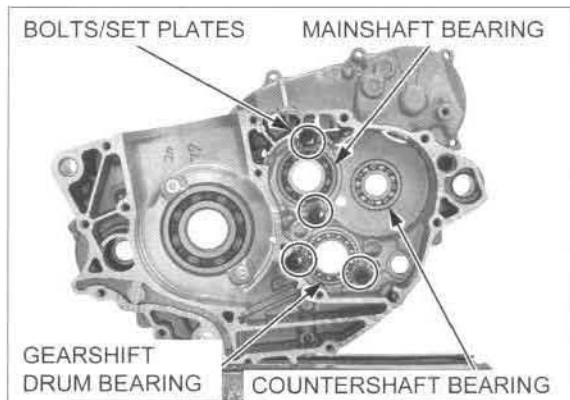
- Gearshift drum bearing set plate bolts: 12 N·m (1.2 kgf·m, 9 lbf·ft)
- Mainshaft bearing set plate bolts: 12 N·m (1.2 kgf·m, 9 lbf·ft)

**OIL JET**

Remove the following:

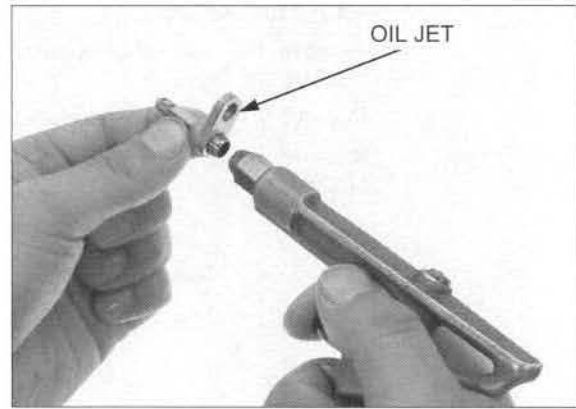
- Transmission (page 12-18)
- Crankshaft (page 12-24)

Remove the bolt and oil jet.



## CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER

Blow the oil passage in the oil jet with compressed air.  
Check the oil jet for clogs, wear or damage and replace it if necessary.



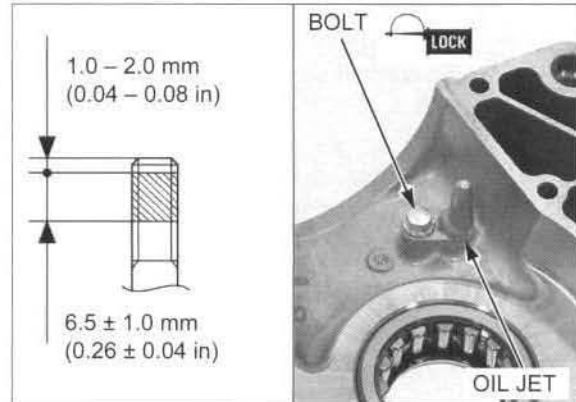
Clean and apply a locking agent to the oil jet bolt threads as shown.

Install the oil jet and tighten the bolt to the specified torque.

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

Install the following:

- Crankshaft (page 12-25)
- Transmission (page 12-23)



# 13. FRONT WHEEL/SUSPENSION/STEERING

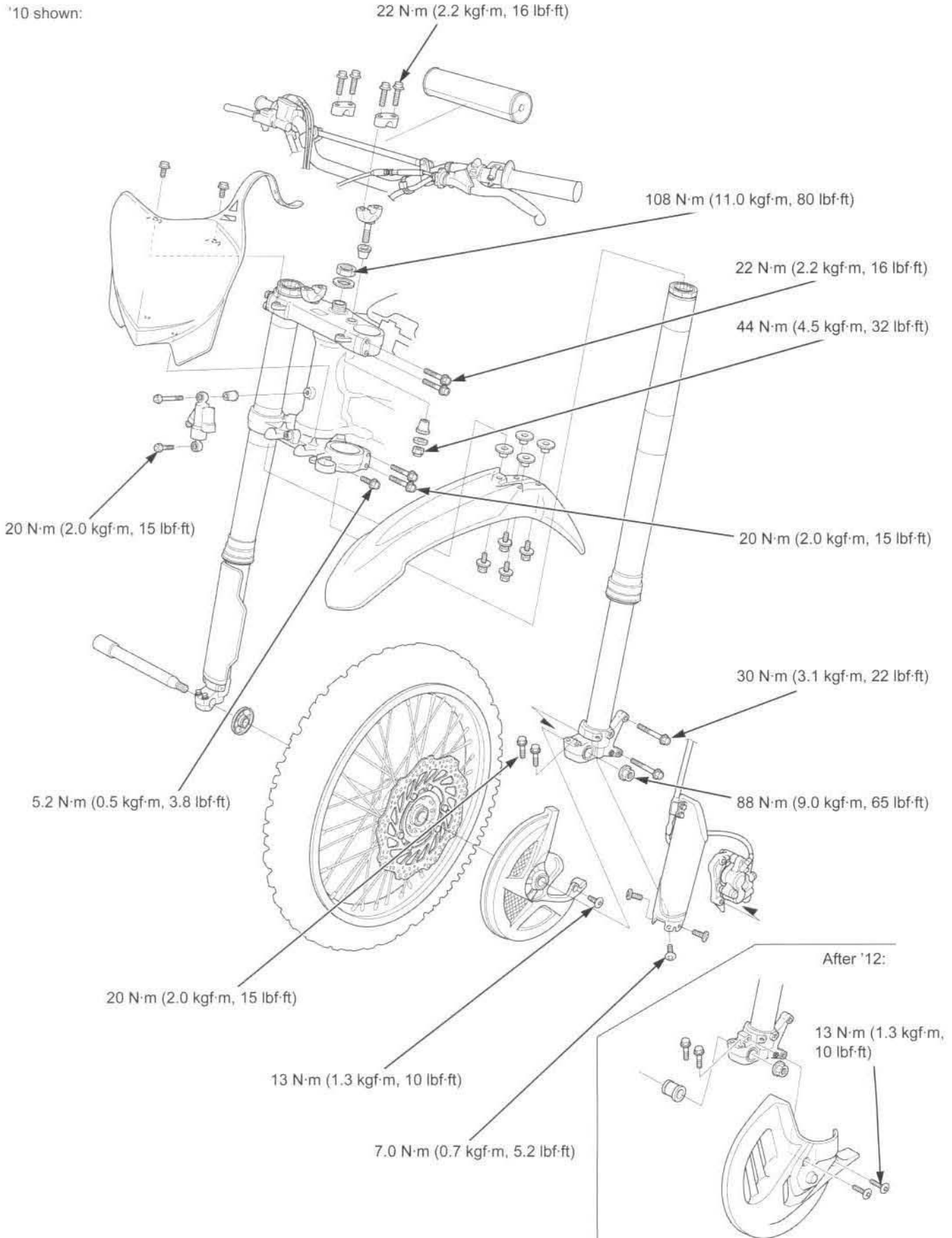
---

COMPONENT LOCATION .....	13-2	HANDLEBAR .....	13-36
SERVICE INFORMATION .....	13-3	HPSD .....	13-41
TROUBLESHOOTING .....	13-6	STEERING STEM .....	13-52
FRONT WHEEL .....	13-7	CLUTCH LEVER .....	13-56
FORK .....	13-14		

# FRONT WHEEL/SUSPENSION/STEERING

## COMPONENT LOCATION

'10 shown:



# SERVICE INFORMATION

## GENERAL

- Keep grease off the brake pads and disc.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- After front wheel installation, check the brake operation by applying the brake lever.
- For the brake system information (page 15-4).
- When using the lock nut wrench, use a 20-inches long deflecting beam type torque wrench. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the fork damper. The specification given on this page is actual torque applied to the fork damper, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives the actual and indicated torque.
- After the front wheel installation, check the brake operation by applying the brake lever.

## SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
Cold tire pressure			100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	–	
Axle shaft runout			–	0.2 (0.01)	
Wheel rim runout	Radial		–	2.0 (0.08)	
	Axial		–	2.0 (0.08)	
Wheel hub-to-rim distance			See page 13-10	–	
Fork	Spring free length		457 – 463 (18.0 – 18.2)	453 (17.8)	
	Fork slider runout		–	0.2 (0.01)	
	Recommended fork oil		Pro Honda HP Fork Oil SS-19	–	
	Oil capacity	Fork tube	'10	342 cm <sup>3</sup> (11.6 US oz, 12.0 Imp oz)	–
			'11	365 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz)	–
			'12	372 cm <sup>3</sup> (12.6 US oz, 13.1 Imp oz)	–
			After '12	363 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz)	–
	Fork damper	'10	195 cm <sup>3</sup> (6.6 US oz, 6.9 Imp oz)	–	
'11, '12		240 cm <sup>3</sup> (8.1 US oz, 8.4 Imp oz)	–		
After '12		243 cm <sup>3</sup> (8.2 US oz, 8.6 Imp oz)	–		
Compression damping adjuster standard position			'10	13 clicks out from full in	–
			'11	6 clicks out from full in	–
			After '11	7 clicks out from full in	–
Rebound damping adjuster standard position			'10	8 clicks out from full in	–
			'11	10 clicks out from full in	–
			After '11	11 clicks out from full in	–
HPSD	Recommended damper oil		'10	Pro Honda HP Fork Oil 5W or equivalent	–
			After '10	Pro Honda HP Fork Oil SS-19	–
	Free piston depth at 20°C (68°F)		'10	27.3 – 27.9 (1.07 – 1.10)	–
			After '10	31.3 – 31.9 (1.23 – 1.26)	–
Damping force adjuster standard position			11 clicks out from full in	–	



## FRONT WHEEL/SUSPENSION/STEERING

### TORQUE VALUES

Axle holder bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	
Front axle nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	
Front brake disc nut	16 N·m (1.6 kgf·m, 12 lbf·ft)	U-nut
Throttle cable bolt	4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)	
Front master cylinder holder bolt	9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)	
Clutch lever pivot bolt	See page 13-57	Apply grease to the sliding surface.
Clutch lever pivot nut	10 N·m (1.0 kgf·m, 7 lbf·ft)	U-nut
Engine stop switch 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)	Apply locking agent to the threads.
Fork cap	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Fork center bolt	69 N·m (7.0 kgf·m, 51 lbf·ft)	Apply locking agent to the threads.
Fork center bolt lock nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Plug bolt	1.3 N·m (0.1 kgf·m, 1.0 lbf·ft)	
Fork damper	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Fork protector mounting bolt	7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)	Apply locking agent to the threads.
Front brake disc cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)	
Fork top bridge pinch bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork bottom bridge pinch bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	
Handlebar upper holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Handlebar lower holder nut	44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Steering damper mounting bolt	20 N·m (2.0 kgf·m, 15 lbf·ft)	Apply locking agent to the threads.
Steering stem nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Steering stem adjusting nut	See page 13-55	
Front brake hose guide bolt	5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)	

### TOOLS

Steering stem socket 07916-3710101 	Adjustable bearing puller, 45 – 75 mm 07YAC-0010102 	Fork seal driver, 48.2 x 58 mm 070MD-MEN0100  or 070MD-MENA100 (U.S.A. only)
Driver 07749-0010000 	Attachment, 30 mm I.D. 07746-0030300 	Attachment, 37 x 40 mm 07746-0010200 

# FRONT WHEEL/SUSPENSION/STEERING

<p>Pilot, 20 mm 07746-0040500</p> 	<p>Bearing remover head, 20 mm 07746-0050600</p> 	<p>Bearing remover shaft 07GGD-0010100</p> 
<p>Piston base 07958-2500001</p> 	<p>Bearing race installer (2 required) 070MF-MEN0100</p>  <p>or 070MF-MENA100 (U.S.A. only)</p>	<p>Installer shaft 07VMF-KZ30200</p> 
<p>Lock nut wrench, 50 mm 07WMA-KZ30100</p> 	<p>Fork rod stopper 07AMB-KZ3A100 (U.S.A. only)</p> 	<p>Collar 07KPF-VD60100</p>  <p>Not available in the U.S.A.</p>
<p>Depth gauge 07AMJ-MENA100 (U.S.A. only)</p> 	<p>Fork cap bolt holder, 36 mm (10) 070MB-MEN0100</p>  <p>or 070MB-MENA100 (U.S.A. only)</p>	<p>Spherical bearing remover 07AMD-MENA100 (U.S.A. only)</p> 

## FRONT WHEEL/SUSPENSION/STEERING

<p>Remover weight 07741-0010201</p>  <p>07936-371020A (U.S.A. only)</p>	<p>Ball race remover shaft 07JAC-PH80200</p>  <p>Not available in U.S.A.</p>	<p>Adapter, 3/8 x 16 in 07YAC-001A200 (U.S.A. only)</p>  <p>NOTE: Used with 07YAC-0010102</p>
--	---	--

## TROUBLESHOOTING

### Hard steering

- Steering stem adjusting nut too tight
- Faulty or damaged steering head bearings/races
- Insufficient tire pressure
- Faulty tire
- Faulty HPSD

### Steers to one side or does not track straight

- Bent fork tube
- Bent axle shaft
- Wheel installed incorrectly
- Unequal fork oil quantity in each fork tube
- Faulty steering head bearings
- Bent frame
- Worn wheel bearings
- Worn swingarm pivot components
- Unevenly adjusted right and left fork legs

### Front wheel wobbling

- Bent rim
- Worn wheel bearings
- Bent spokes
- Faulty tire
- Insufficient tire pressure
- Axle not tightened properly
- Unbalanced tire and wheel

### Wheel hard to turn

- Faulty wheel bearings
- Bent axle shaft
- Brake drag (page 15-6)

### Soft suspension

- Weak fork springs
- Insufficient fork oil in fork
- Incorrect fork oil weight
- Insufficient tire pressure

### Stiff suspension

- Fork oil quantity too much
- Fork oil viscosity too thick
- Bent or damaged fork tubes
- Clogged fork oil passage

### Front suspension noise

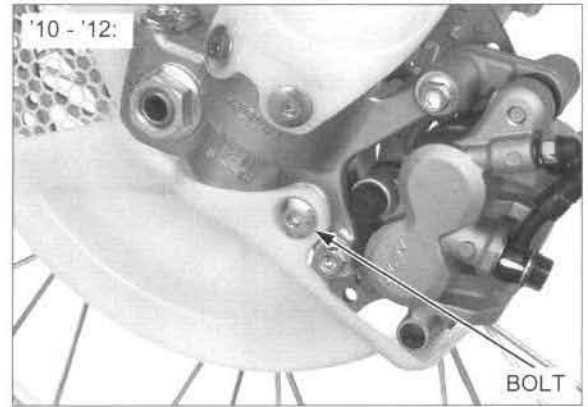
- Insufficient fork oil in fork
- Loose fork fasteners

# FRONT WHEEL

## REMOVAL

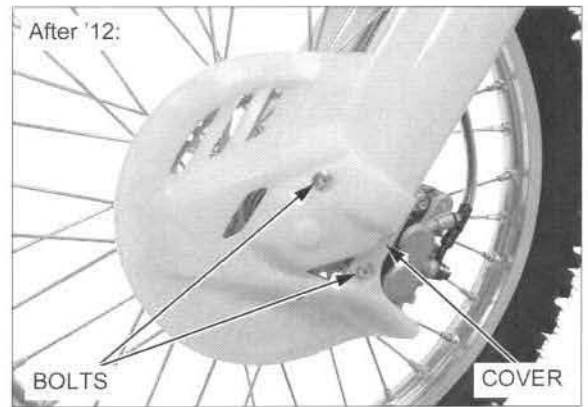
'10 - '12: Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

Remove the brake disc cover bolt.

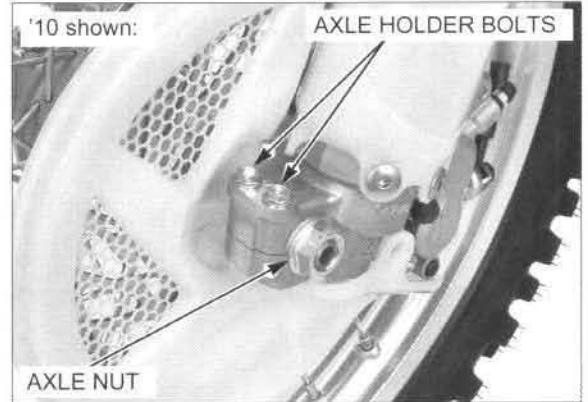


After '12: Raise the front wheel off the ground by placing a workstand or equivalent under the engine.

Remove the bolts and brake disc cover.

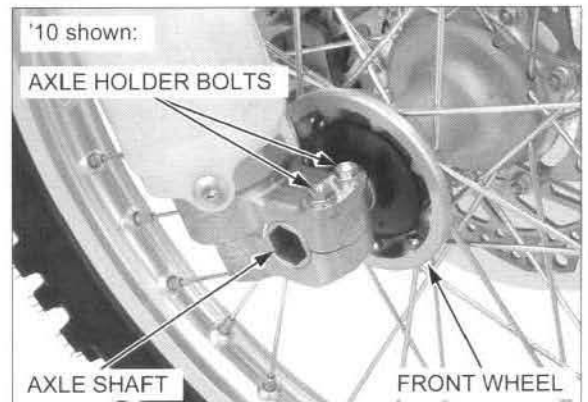


Remove the axle nut, and loosen the left axle holder bolts.



*Do not operate the brake lever after removing the front wheel.*

Loosen the right axle holder bolts. Remove the axle shaft and front wheel.



## FRONT WHEEL/SUSPENSION/STEERING

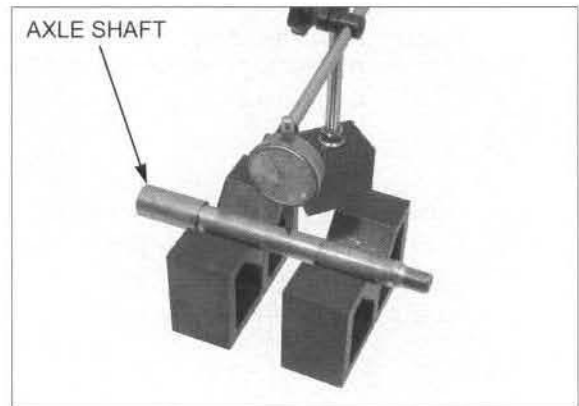
### INSPECTION

#### AXLE SHAFT RUNOUT

Set the axle shaft on V-blocks and measure the runout. Turn the axle shaft, 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)**



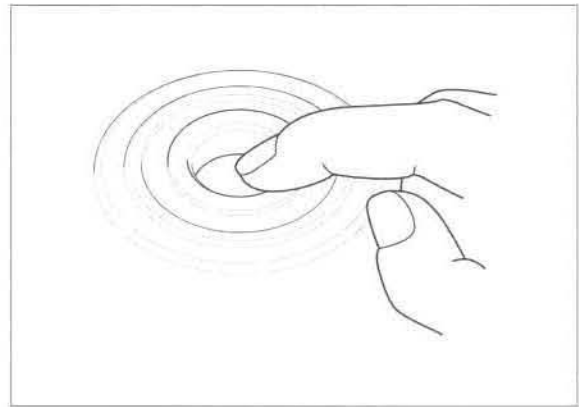
#### WHEEL BEARING

Turn the inner race of each wheel bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the wheel hub.

*Replace the bearings in pairs.* Replace the wheel bearing, if necessary (page 13-8).



#### WHEEL RIM RUNOUT

Check the rim runout by placing the wheel on a truing stand.

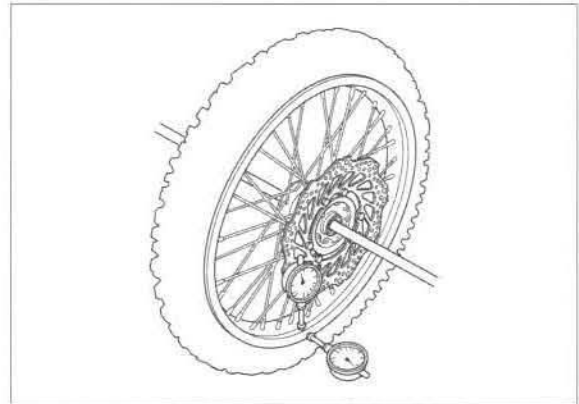
Spin the wheel by hand, and read the runout using a dial indicator.

#### SERVICE LIMITS:

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

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

Check the spokes and tighten any that are loose.

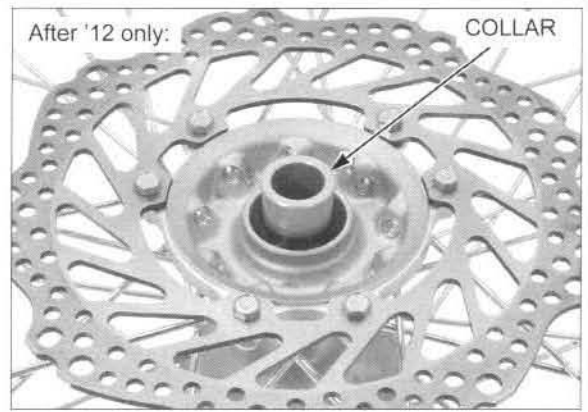


### DISASSEMBLY

*'10 - '12 only:* Remove the brake disc cover from the left wheel hub.



After '12 only: Remove the side collar from the left wheel hub.

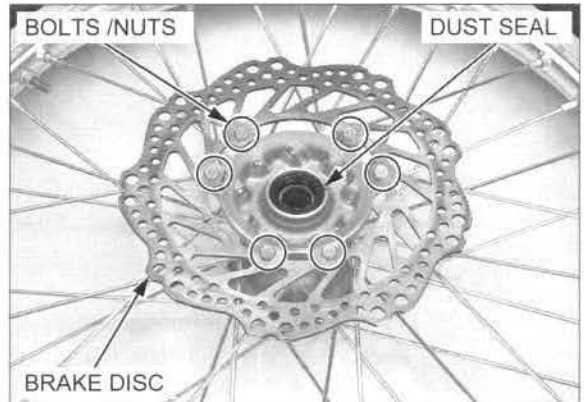


Remove the side collar and dust seal from the right wheel hub.



Remove the following:

- Brake disc bolts and nuts
- Brake disc
- Dust seal

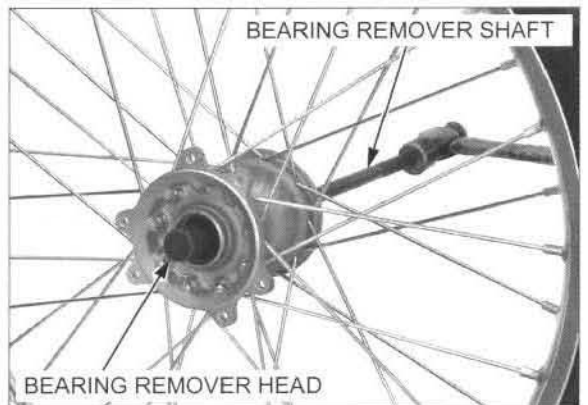


*Replace the wheel bearings in pairs. Do not reuse old bearings.*

Install the remover head into the wheel bearing. From the opposite side, install the remover shaft, and drive the wheel bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

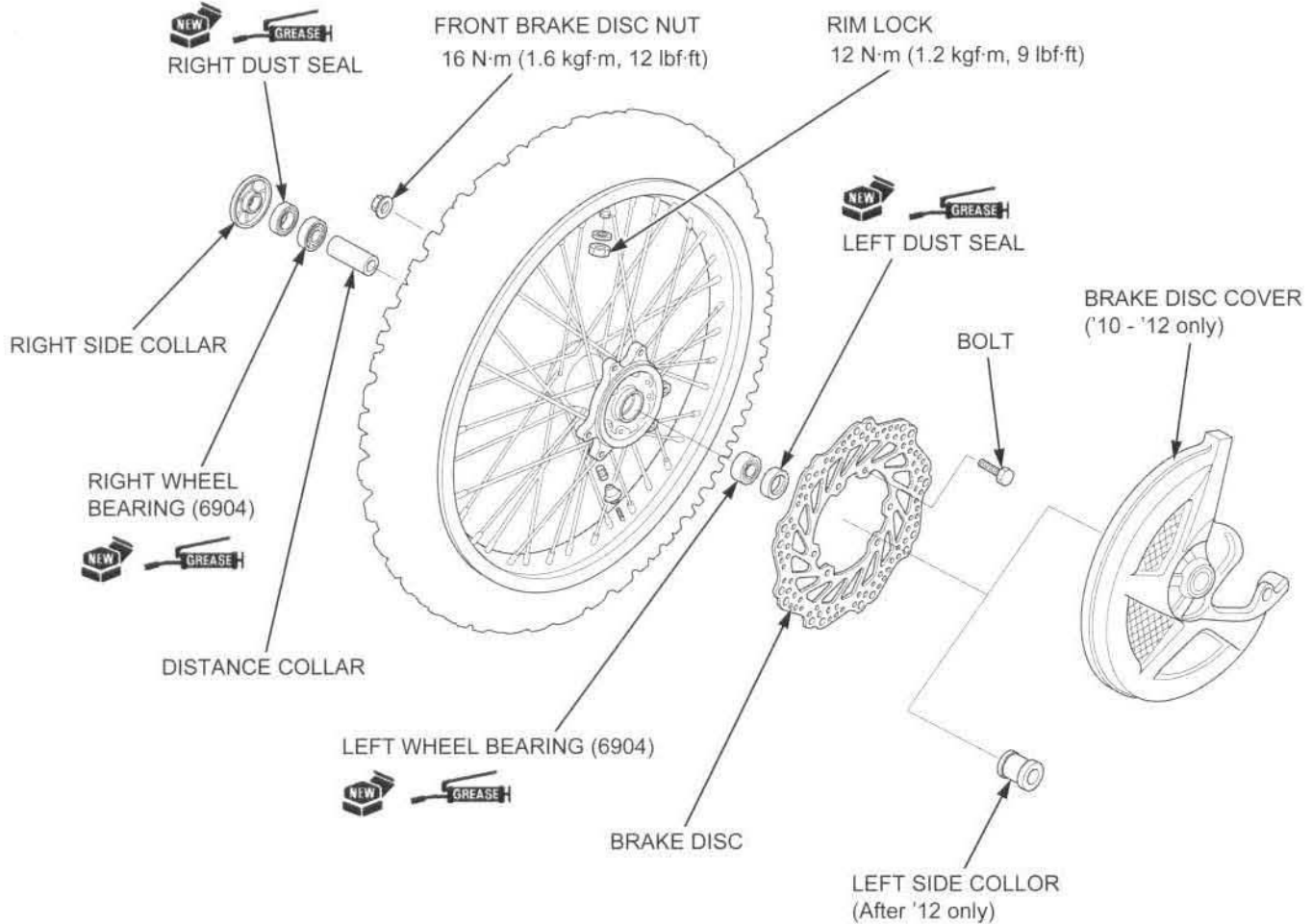
**TOOLS:**

- |                                    |                      |
|------------------------------------|----------------------|
| <b>Bearing remover head, 20 mm</b> | <b>07746-0050600</b> |
| <b>Bearing remover shaft</b>       | <b>07GGD-0010100</b> |

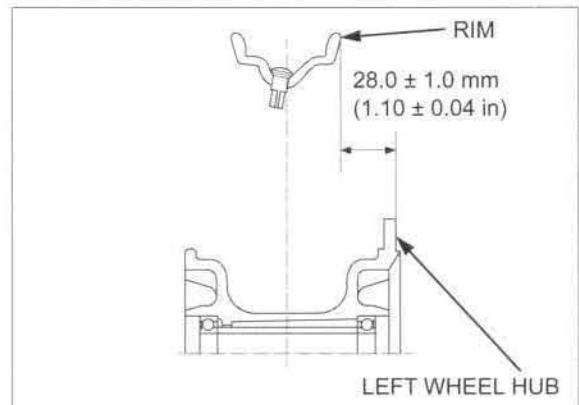


# FRONT WHEEL/SUSPENSION/STEERING

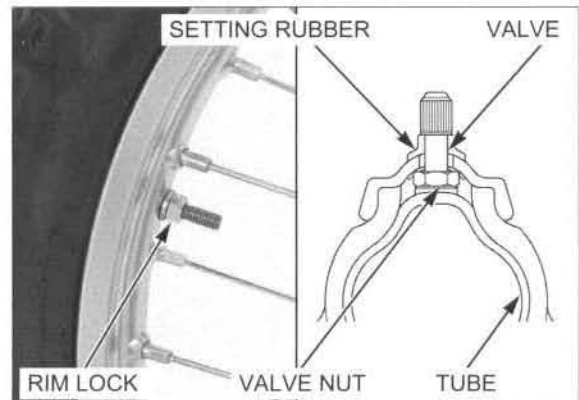
## ASSEMBLY



Place the rim on a work bench.  
Place the hub in the center of the rim, and begin the lacing with new spokes.  
Adjust the hub position so the distance from the hub left end surface to the side of the rim is  $28.0 \pm 1.0$  mm ( $1.10 \pm 0.04$  in) as shown.



Tighten the spokes in two or three progressive steps (page 3-30).  
Install the rim lock, setting rubber, tube and tire.  
Tighten the rim lock (page 3-31).





Replace the wheel bearings in pairs.  
Do not reuse old bearings.

Pack each wheel bearing cavity with grease.

Drive a new left wheel bearing in the wheel hub until it is fully seated using special tools.

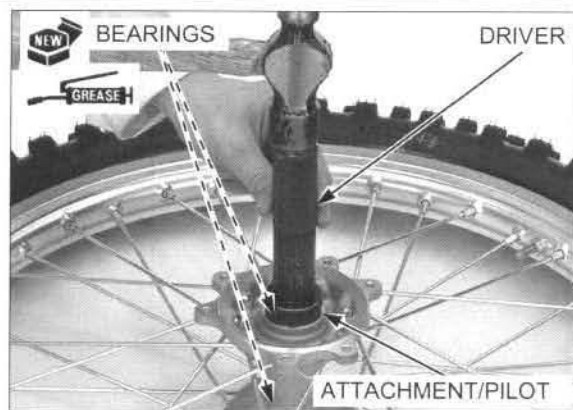
- Install the wheel bearing with the sealed side toward the outside.

**TOOLS:**

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 37 x 40 mm</b>	<b>07746-0010200</b>
<b>Pilot, 20 mm</b>	<b>07746-0040500</b>

Install the distance collar into place, then drive a new right wheel bearing using the same special tools.

Pack the lips of a new right dust seal with grease, and install it to the wheel hub.



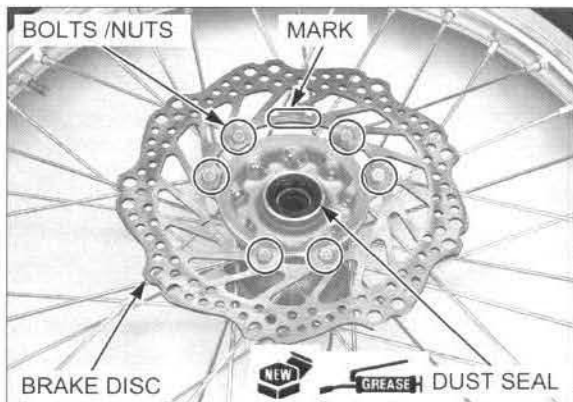
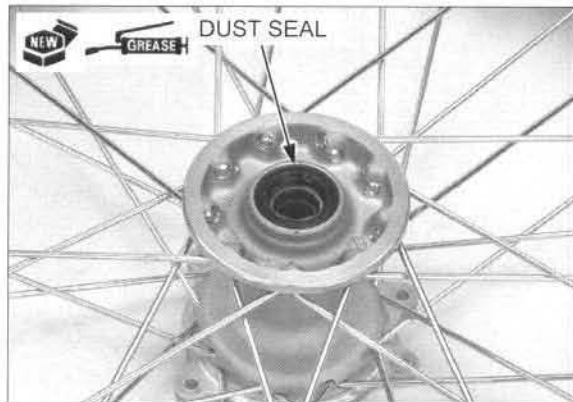
Do not get grease on the brake disc or stopping power will be reduced.

Pack the lips of a new left dust seal with grease, and install it to the wheel hub.

Install the brake disc onto the wheel hub with the "DRIVE" mark facing out.

Install the brake disc bolts and nuts.  
Tighten the nuts to the specified torque.

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



Check the right side collar for wear or damage.

Replace it if necessary.

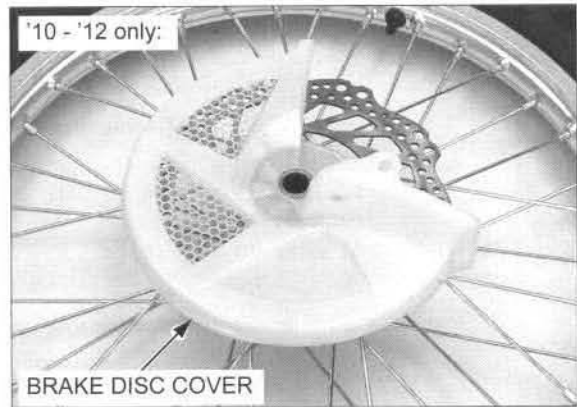
Install the side collar to the right wheel hub.



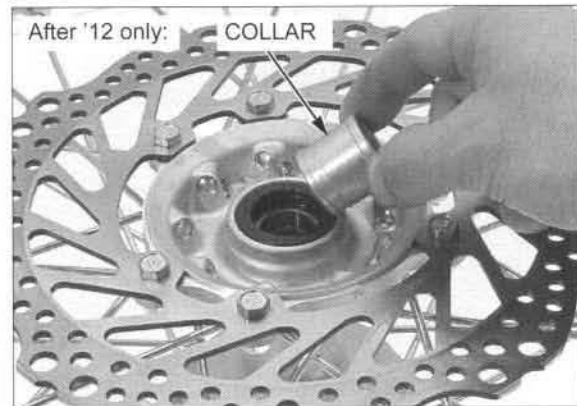


## FRONT WHEEL/SUSPENSION/STEERING

'10 - '12 only: Check the brake disc cover for wear or damage.  
Replace it if necessary.  
Install the brake disc cover to the left wheel hub.



After '12 only: Check the left side collar for wear or damage.  
Install the side collar to the left wheel hub.

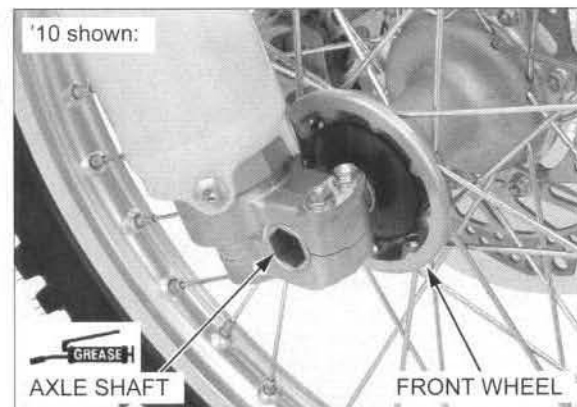


### INSTALLATION

Clean the clamping surface of the axle shaft and axle holders.

Install the front wheel between the fork legs so that the brake disc is positioned between the pads, being careful not to damage the pads.

Apply a thin coat of grease to the axle shaft surface.  
Insert the axle shaft from the right side.

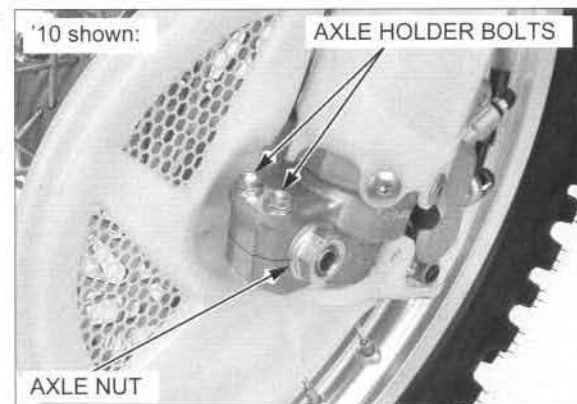


Install and tighten the axle nut to the specified torque while holding the axle shaft.

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

Tighten the left axle holder bolts to the specified torque.

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



With the front brake applied, pump the front suspension up and down several times to seat the axle shaft and check the front brake operation.



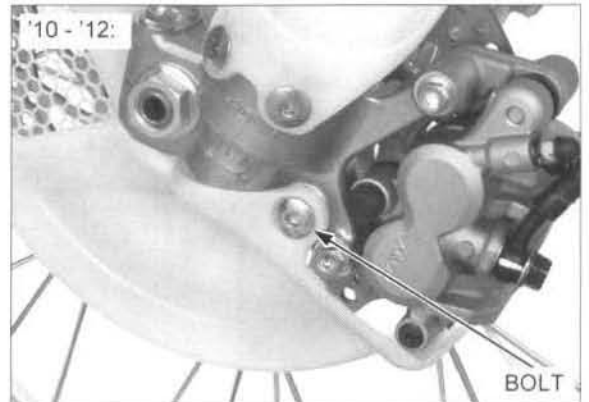
Be sure the fork legs are parallel, then tighten the right axle holder bolts to the specified torque.

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



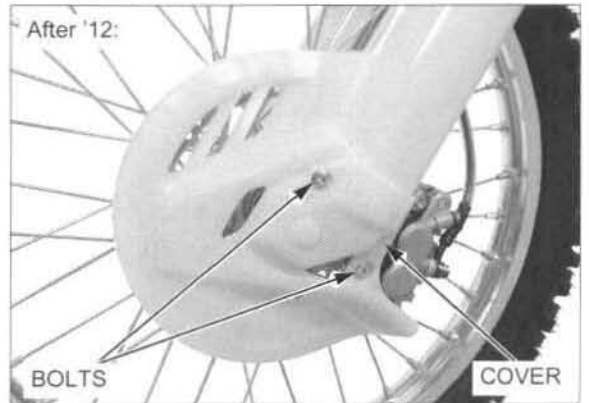
'10 - '12: Install the brake disc cover bolt. Tighten the bolt to the specified torque.

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**



After '12: Install the brake disc cover and bolts, then tighten them to the specified torque .

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**



FORK

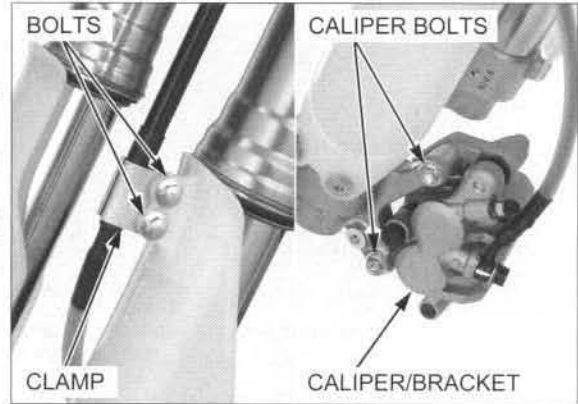
REMOVAL

Remove the front wheel (page 13-7).

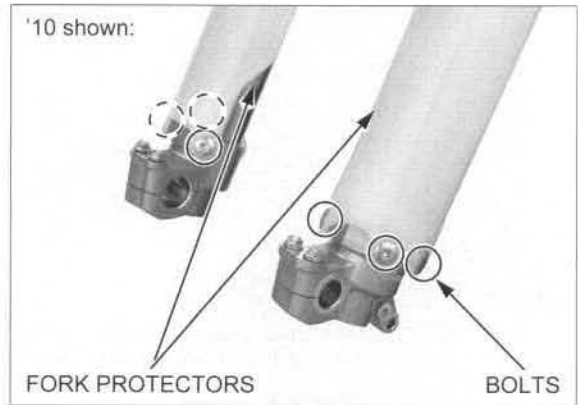
Remove the bolts and brake hose clamp.

Remove the brake caliper mounting bolts and front brake caliper/bracket assembly.

- Do not suspend the brake caliper/bracket assembly from the brake hose. Do not twist the brake hose.
- Do not operate the brake lever after removing the caliper/bracket assembly and front wheel. To do so will cause difficulty in fitting the brake disc between the brake pad.

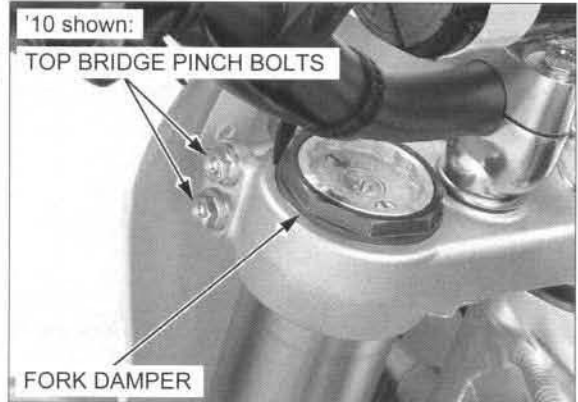


Remove the fork protector mounting bolts and fork protector.



Loosen the fork top bridge pinch bolts.

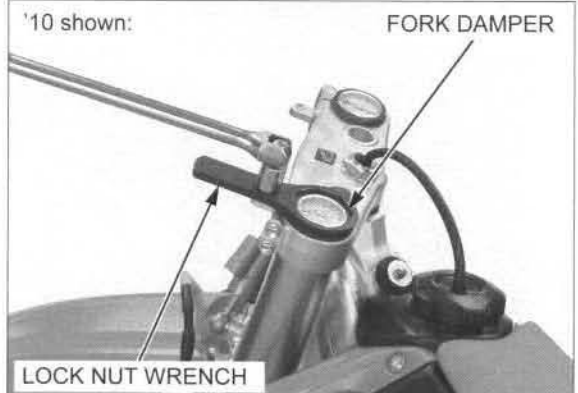
When the fork is ready to be disassembled, remove the handlebar and holders (page 13-36) and loosen the fork damper using the following procedure.



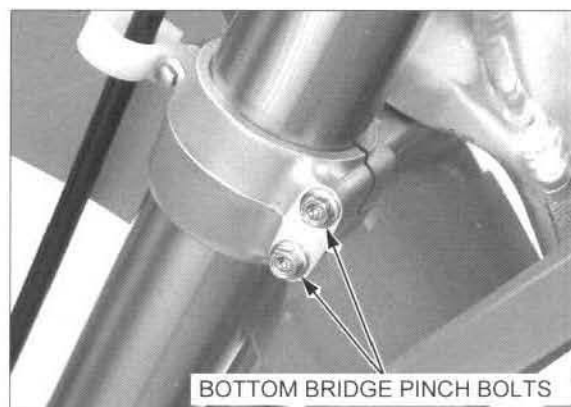
*Do not use a crescent or adjustable wrench to the loosen the fork damper; it could be damaged.*

Loosen the fork damper using the special tool, but do not remove it yet.

**TOOL:**  
**Lock nut wrench, 50 mm      07WMA-KZ30100**



Loosen the fork bottom bridge pinch bolts, and pull the fork leg down and out.

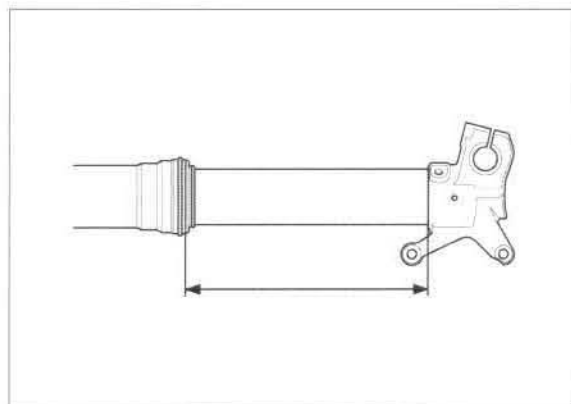


**DISASSEMBLY**

*Be careful not to scratch the fork slider and bottom of the slider around the center bolt before disassembling the fork. Measure the length between the axle holder and outer tube, and record it before disassembling the fork.*

Clean the fork assembly, the sliding surface of the fork slider and bottom of the slider around the center bolt before disassembling the fork.

Measure the length between the axle holder and outer tube, and record it before disassembling the fork.



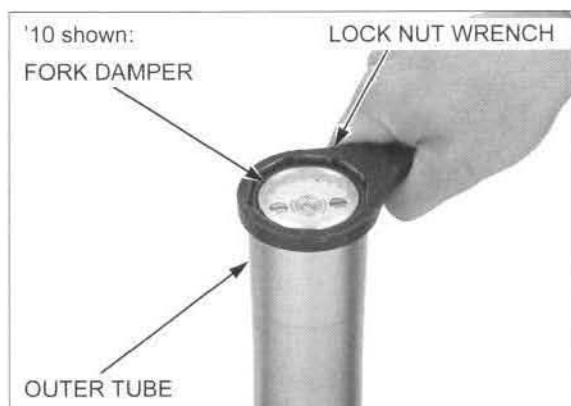
Turn the rebound and compression damping adjusters counterclockwise to the softest position needle (be sure to record the number of turns from the starting position).



Hold the outer tube, and remove the fork damper using the special tool from the outer tube.

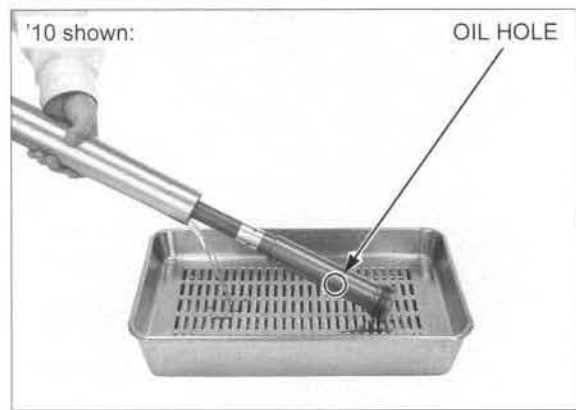
**TOOL:**  
 Lock nut wrench, 50 mm      07WMA-KZ30100

Slide the outer tube down onto the axle holder.



## FRONT WHEEL/SUSPENSION/STEERING

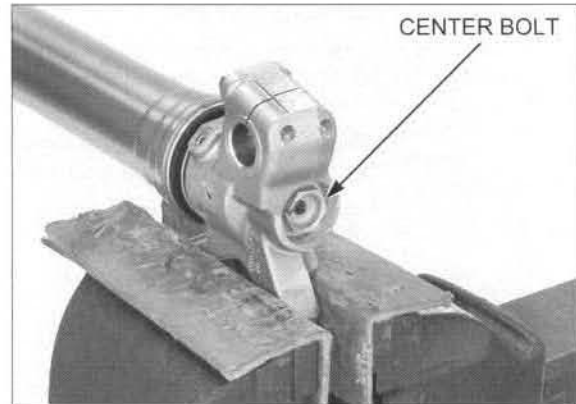
Drain the fork oil from the outer tube and oil holes of the fork damper.



*Do not over-tighten the vise on the axle holder.*

Set the axle holder of the fork slider in a vise with a piece of wood or soft jaws to avoid damage.

Loosen the fork center bolt.



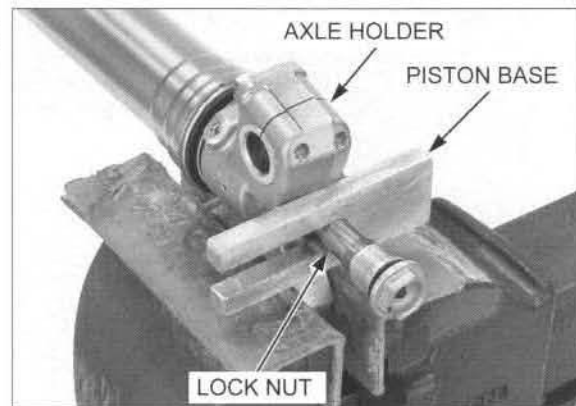
*If a piston base is not available, refer to the next step to make an alternative tool.*

Push the fork damper out from the slider until the fork center bolt lock nut is fully exposed, and install the piston base or mechanic's stopper tool between the axle holder and fork center bolt lock nut.

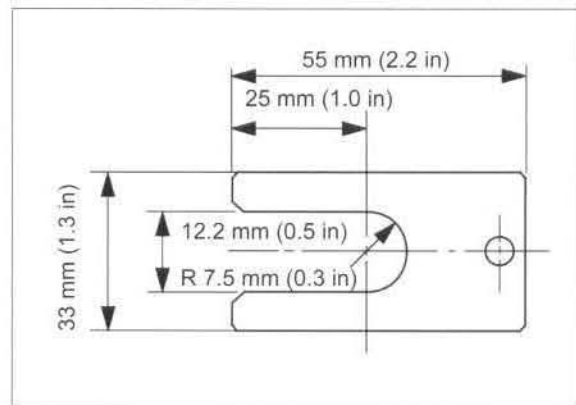
**TOOL:**

**Piston base**  
**Fork rod stopper**

**07958-2500001 or**  
**07AMB-KZ3A100**  
**(U.S.A. only)**



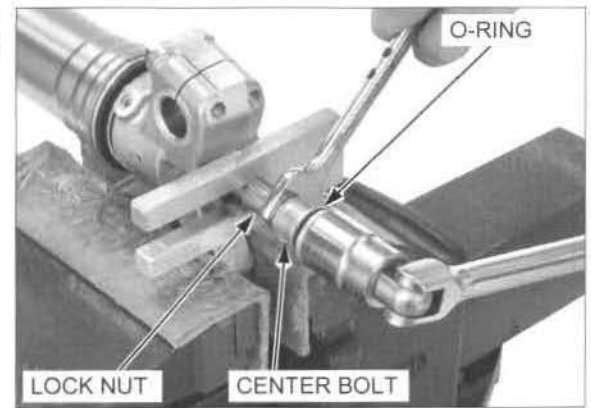
Make the mechanic's stopper tool from a thin piece of steel (2.0 mm (0.08 in) thick) as shown if you do not have a special tool.



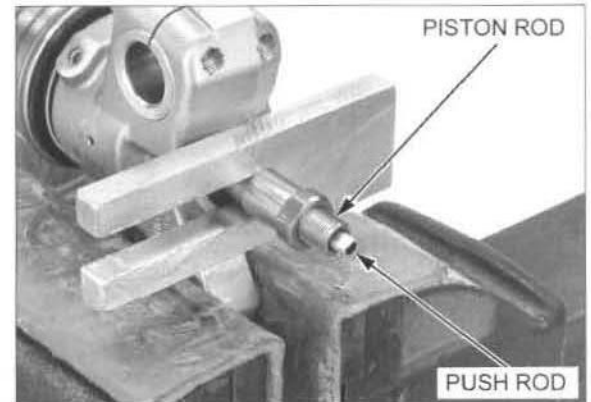
*Do not remove the lock nut from the fork damper piston rod. If the lock nut is removed, the piston rod will fall into the fork damper and you will not be able to reassemble the fork damper.*

Hold the fork center bolt lock nut using the 17 mm open end wrench, and remove the fork center bolt from the fork damper.

Remove the O-ring from the fork center bolt.

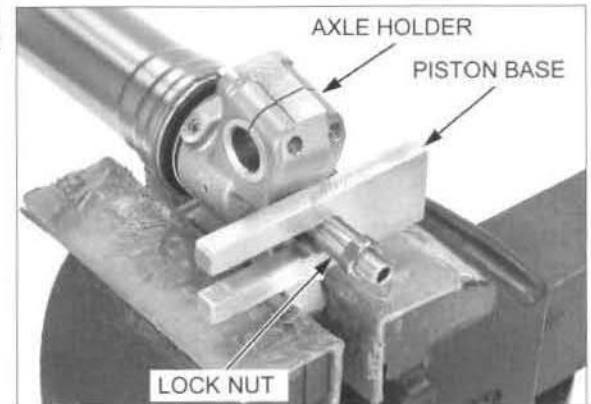


Remove the push rod from the piston rod.

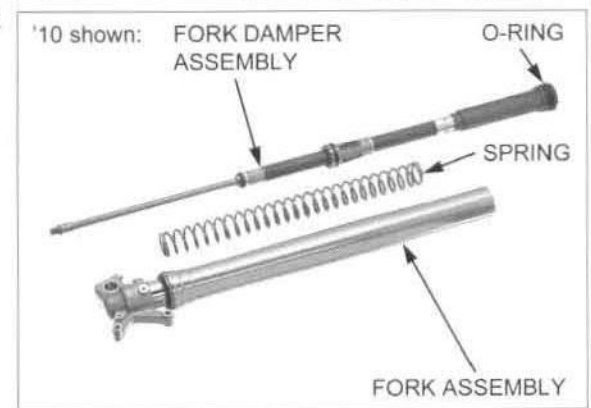


*Be careful not to damage the fork center bolt lock nut and fork center bolt hole.*

Remove the piston base or mechanic's stopper tool between the axle holder and fork center bolt lock nut while pushing the fork damper.

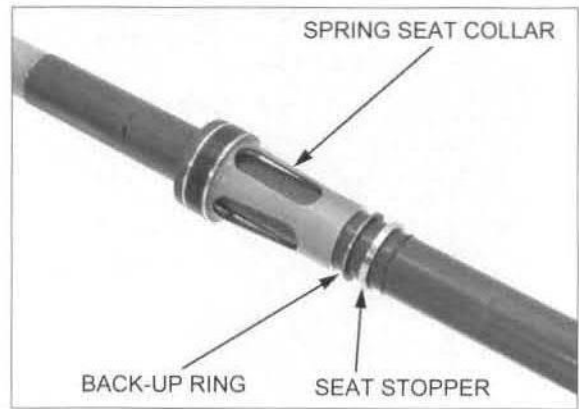


Remove the fork damper assembly from the fork assembly.  
Remove the O-ring from the fork damper assembly.  
Remove the fork assembly from the vise.  
Remove the fork spring from the fork assembly.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the spring seat collar, back-up ring and seat stopper from the fork damper.



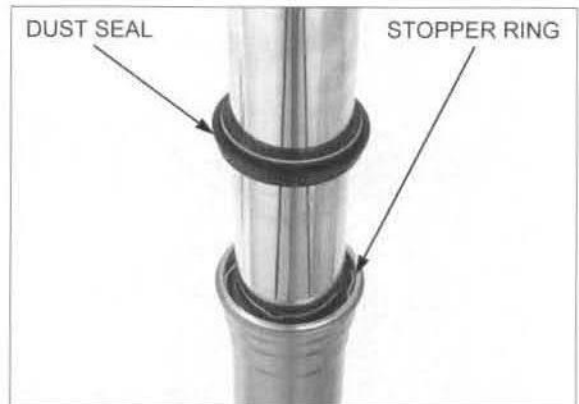
### OUTER TUBE AND FORK SLIDER DISASSEMBLY

*Be careful not to scratch the fork slider surface.*

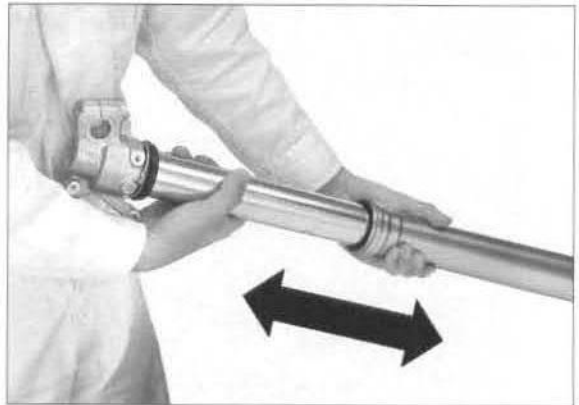
Remove the dust seal and stopper ring.

Check that the fork slider moves smoothly in the outer tube.

If it does not, check the fork slider for bends or damage, and slider bushings for wear or damage (page 13-20).



Using quick successive motions, pull the fork slider out of the outer tube.

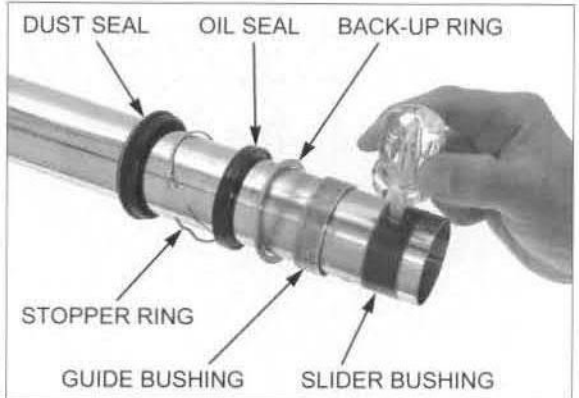


*Do not damage the slider bushing, especially the sliding surface. To prevent loss of tension, do not open the slider bushing more than necessary.*

Carefully remove the slider bushing by prying the slot with a screwdriver until the slider bushing can be pulled off by hand.

Remove the following:

- Guide bushing
- Back-up ring
- Oil seal
- Stopper ring
- Dust seal





**FORK DAMPER DISASSEMBLY**

'10: Set the fork damper in a vise with a piece of wood or soft jaws to avoid damage.

Hold the fork damper using the special tool.

**TOOL:**

**Lock nut wrench, 50 mm**      **07WMA-KZ30100**

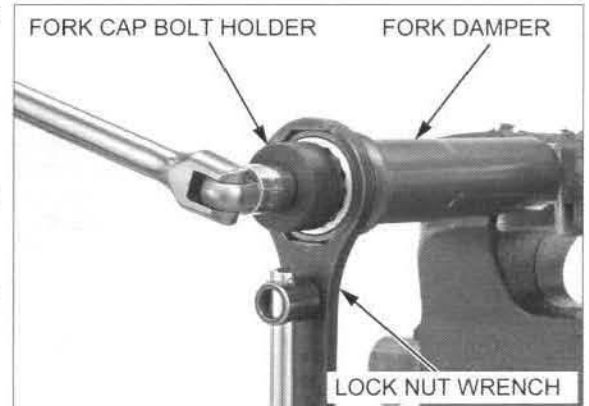
Loosen the fork cap assembly using the special tool while holding the fork damper.

**TOOL:**

**Fork cap bolt holder, 36 mm**      **070MB-MEN0100 or 070MB-MENA100 (U.S.A. only)**

**NOTE:**

Check the lock nut installation. If the lock nut was removed, the piston rod will fall into the fork damper and you will not be able to reassemble the fork damper.



After '10: Set the fork damper in a vise with a piece of wood or soft jaws to avoid damage.

Hold the fork damper using the special tool.

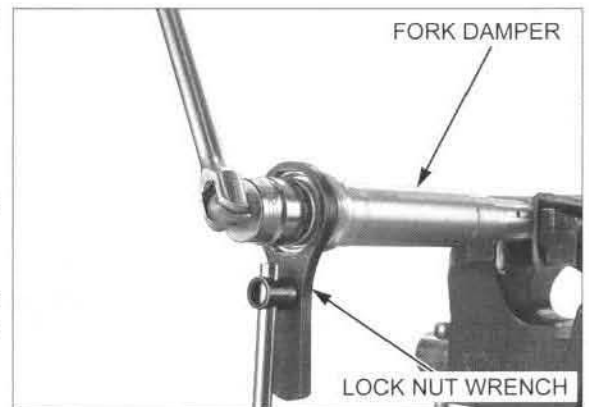
**TOOL:**

**Lock nut wrench, 50 mm**      **07WMA-KZ30100**

Loosen the fork cap assembly while holding the fork damper.

**NOTE:**

Check the lock nut installation. If the lock nut was removed, the piston rod will fall into the fork damper and you will not be able to reassemble the fork damper.



Remove the fork cap assembly from the fork damper while pumping the piston rod slowly.





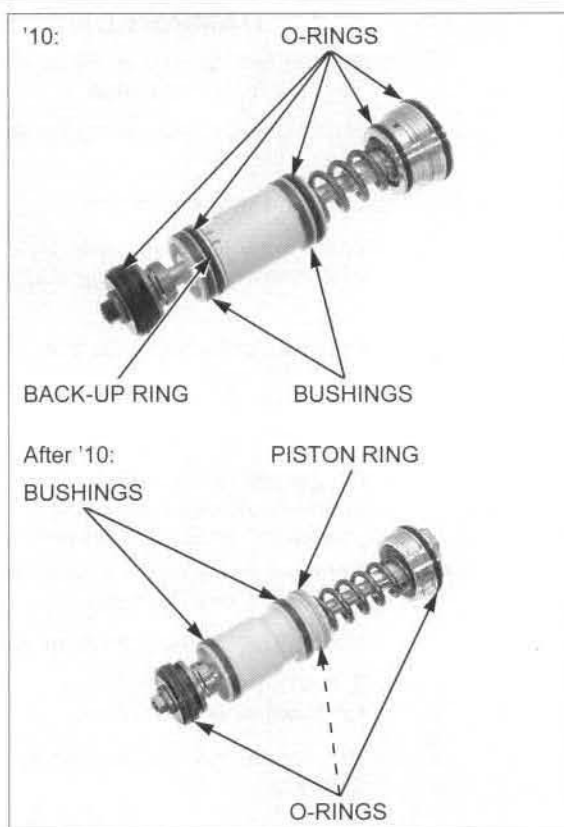
## FRONT WHEEL/SUSPENSION/STEERING

'10: Remove the O-rings and back-up ring from the fork cap assembly.

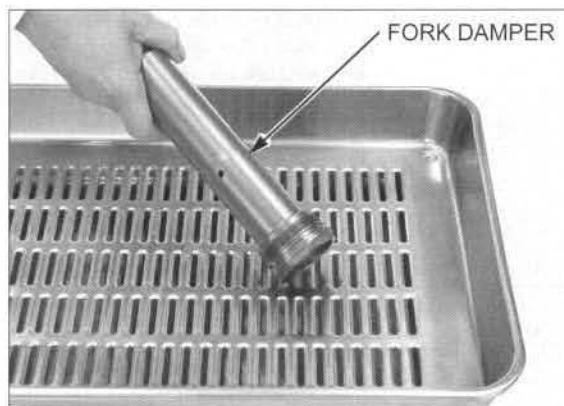
After '10: Remove the piston ring and O-rings from the fork cap assembly.

### NOTE:

- Do not disassemble the fork cap assembly.
- Replace the fork cap as an assembly if it is damaged.
- Be careful not to damage the fork cap bushings.



Empty the fork oil from the fork damper by pumping the piston rod several times.

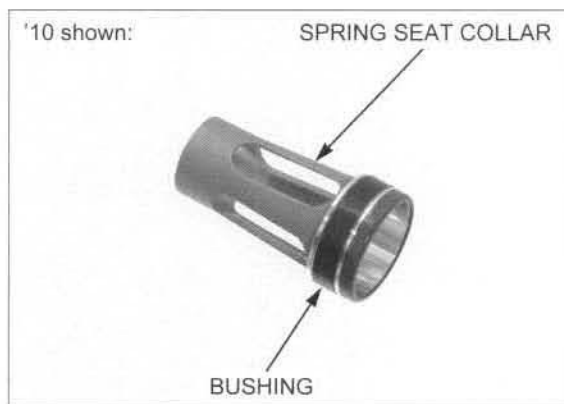


## INSPECTION

### SPRING SEAT COLLAR

Check the spring seat collar for wear or damage. Check the bushing for excessive wear or scratches and replace it if necessary.

Replace the fork damper as an assembly if necessary.

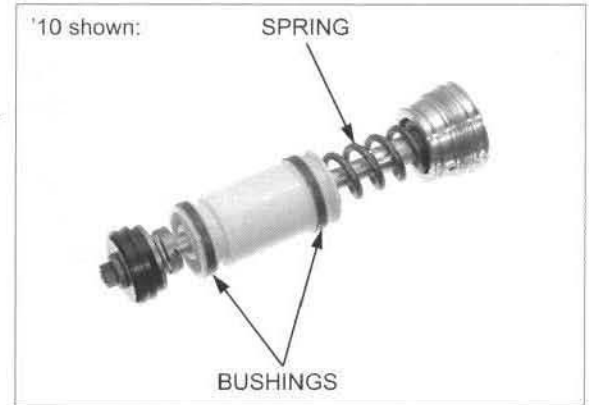


**FORK CAP ASSEMBLY**

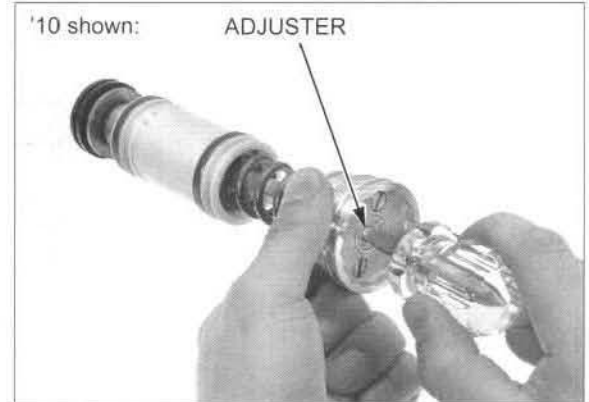
Check the fork cap assembly for damage.  
Check the spring for fatigue or damage.

Replace the fork cap as an assembly if necessary.

Check the fork cap bushings for excessive wear or scratches, replace them if necessary.



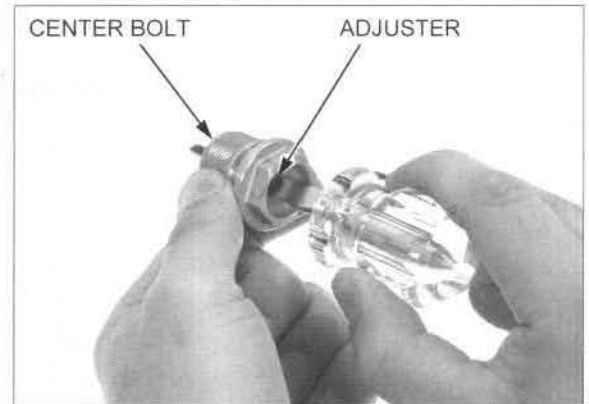
Check the compression damping adjuster for clicks.



**FORK CENTER BOLT**

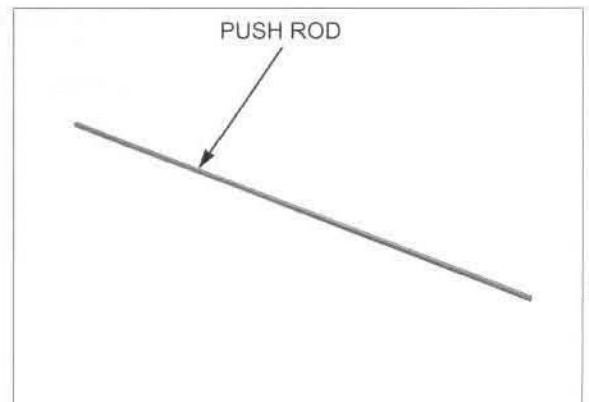
Check the fork center bolt for damage.  
Check the rebound damping adjuster for clicks.

Replace the fork center bolt as an assembly if necessary.



**PUSH ROD**

Check the push rod for bends, wear or damage replace it if necessary.

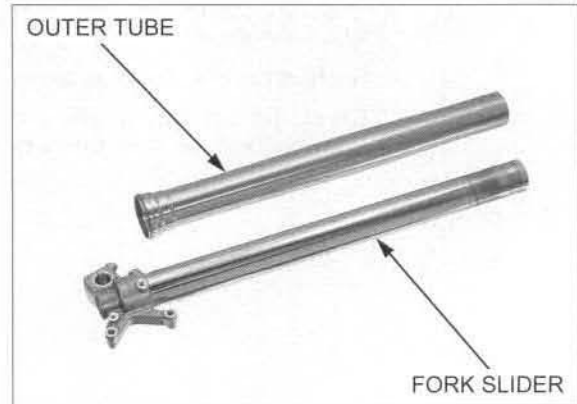


## FRONT WHEEL/SUSPENSION/STEERING

### FORK SLIDER/OUTER TUBE

Check the outer tube and fork slider for score marks, scratches and excessive or abnormal wear.  
Check the outer tube for damage or bend.

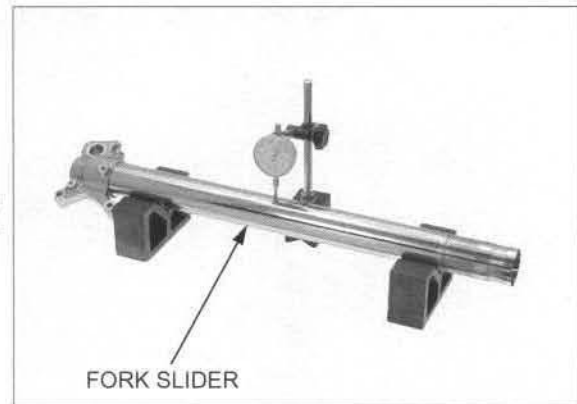
Replace the outer tube if necessary.



Set the fork slider on V-blocks, and measure the runout. Turn the fork slider, 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)**



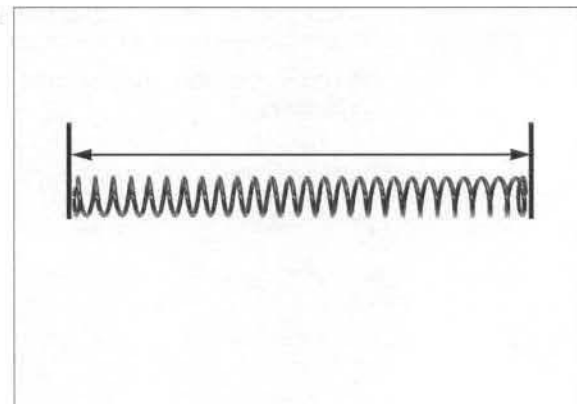
*Do not reuse the fork slider if it is bent.*

Replace if the service limit is exceeded, or there are scratches or nicks that will allow fork oil to leak past the seals.

### FORK SPRING

Measure the fork spring free length by placing it on a flat surface.

**SERVICE LIMIT: 453 mm (17.8 in)**



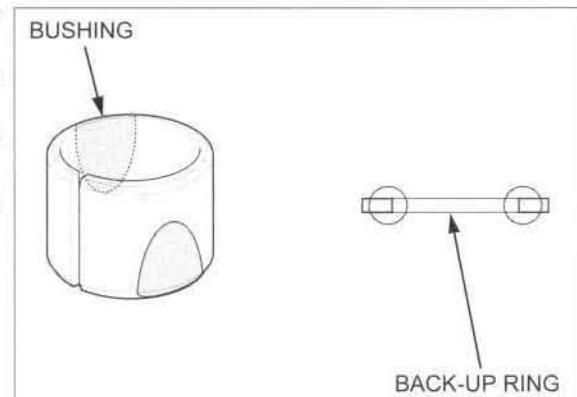
### SLIDER BUSHING/GUIDE BUSHING/BACK-UP RING

Check the slider and guide bushings for excessive wear or scratches.

If copper appears on the surface, replace the slider and guide bushings.

Replace the back-up ring if there is distortion at the points shown.

Remove any metal powder from the fork slider and guide bushings with a nylon brush and fork oil.

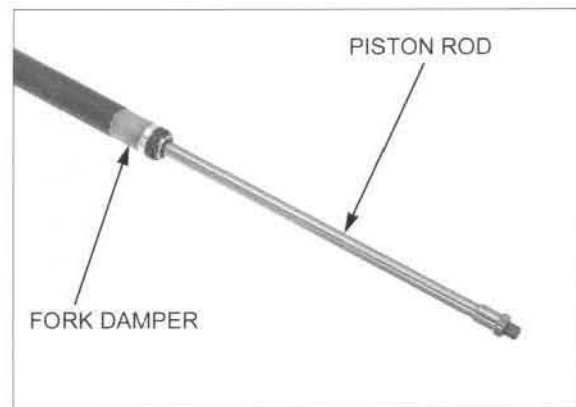


**FORK DAMPER**

Check the fork damper for bends or damage.  
Check the piston rod for bends, wear or damage.

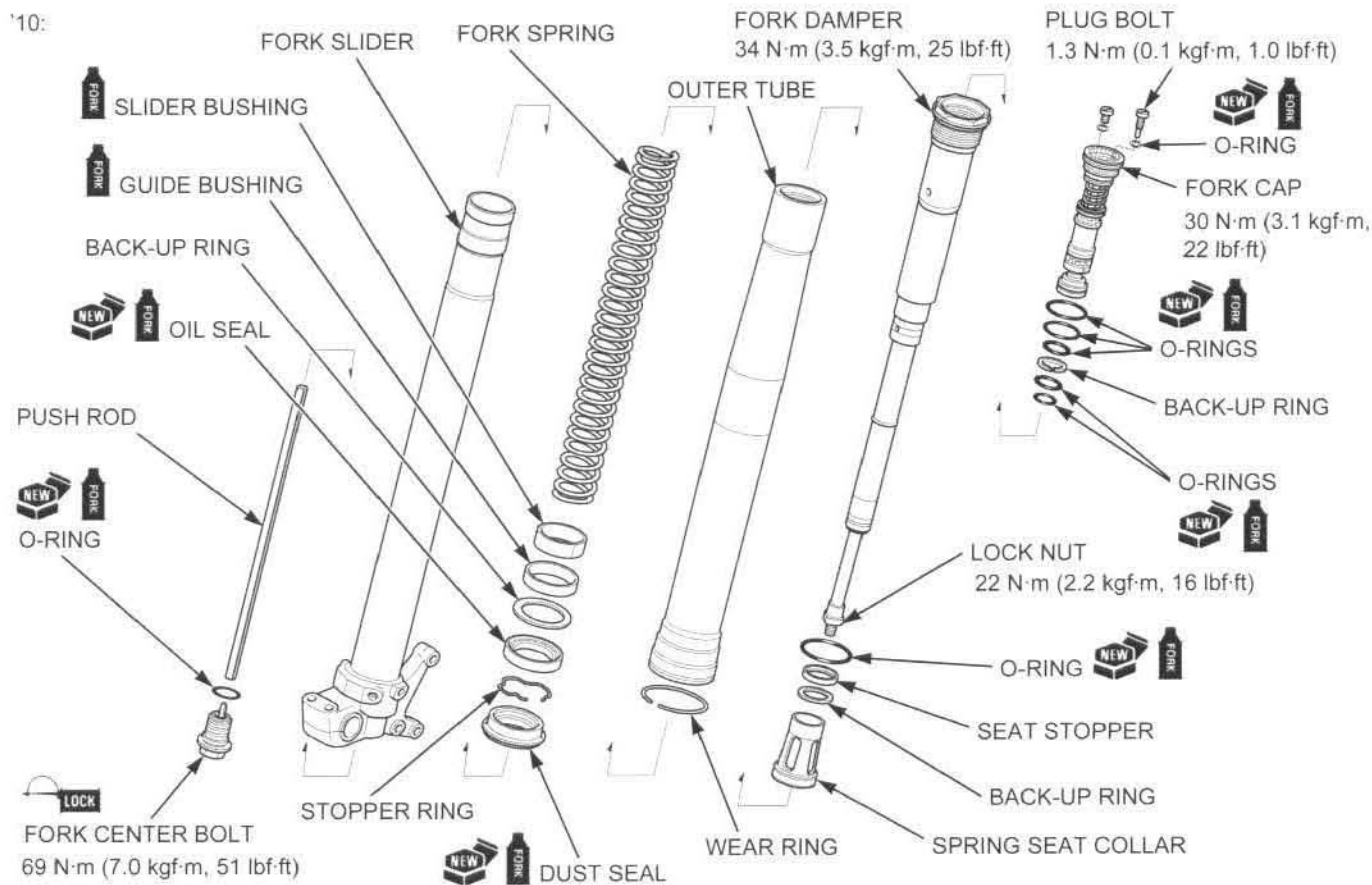
Check the fork damper operation by pumping the piston rod.

If the operation is not smooth, fill the fork damper with fork oil, and check the fork damper operation again (page 13-29).



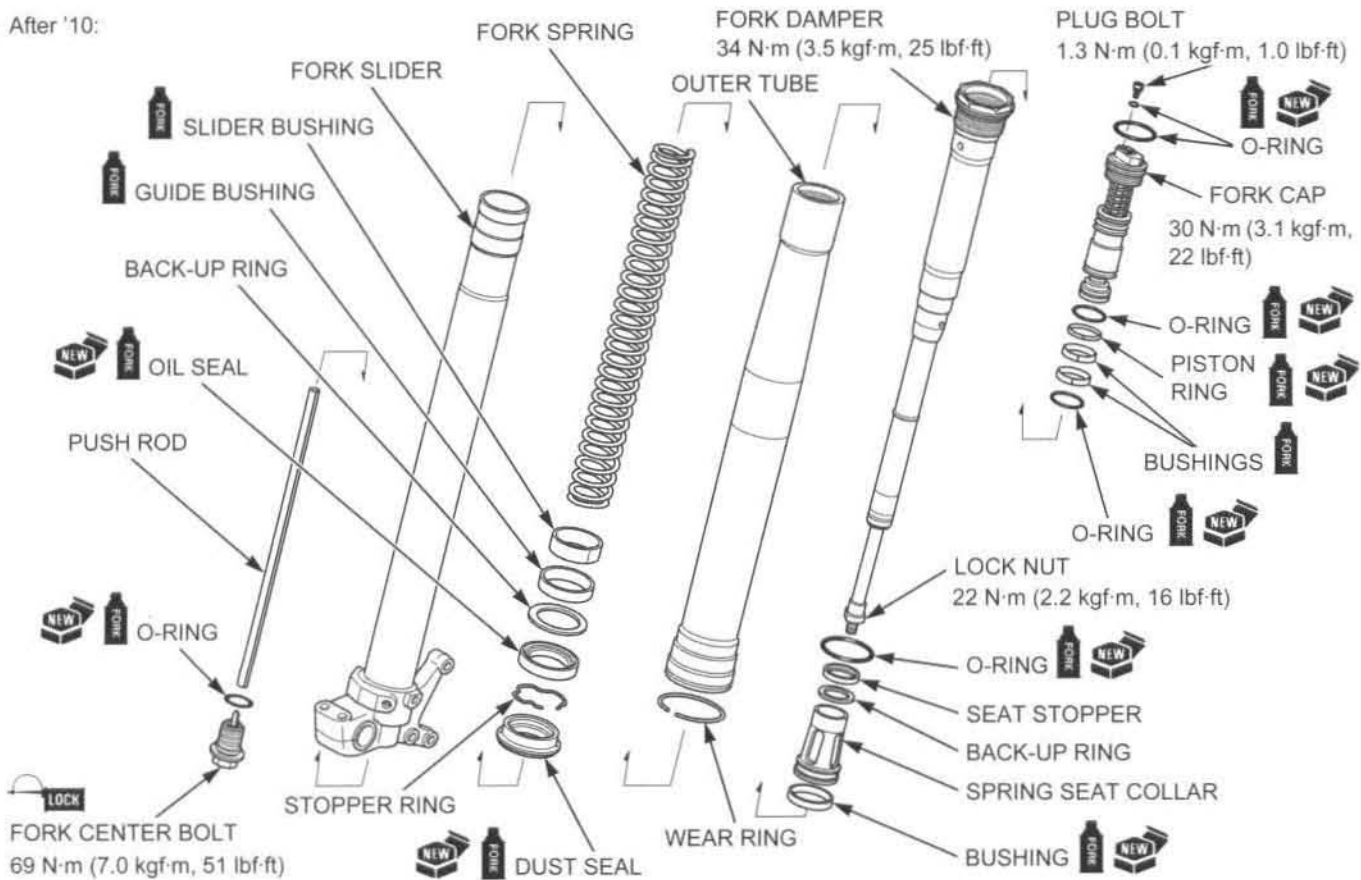
**ASSEMBLY**

10:



# FRONT WHEEL/SUSPENSION/STEERING

After '10:



Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them dry.

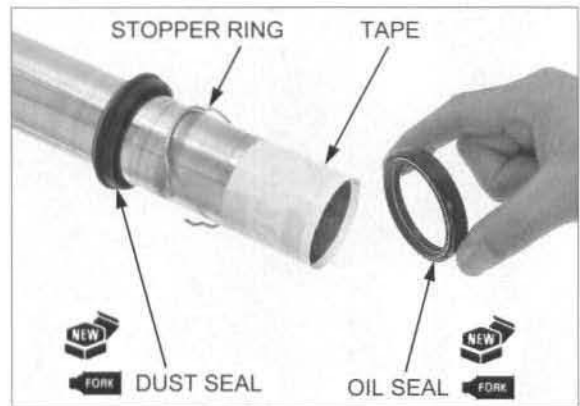
### OUTER TUBE AND SLIDER ASSEMBLY

Wrap the end of the slider with tape.  
Coat new fork oil seal and dust seal lips with recommended fork oil (page 13-26).

Install the dust seal and stopper ring onto the fork slider.

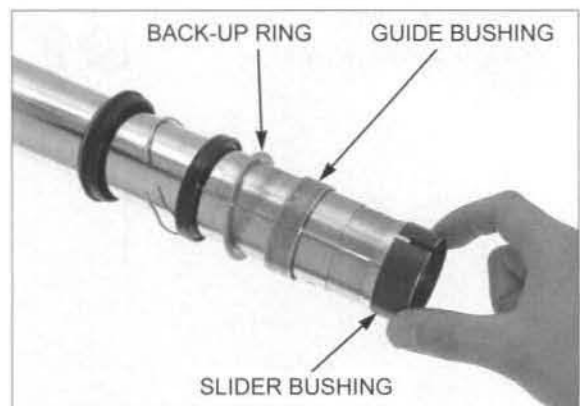
Install the oil seal onto the fork slider with its marked side facing the dust seal.

Remove the tape from the end of the fork slider.

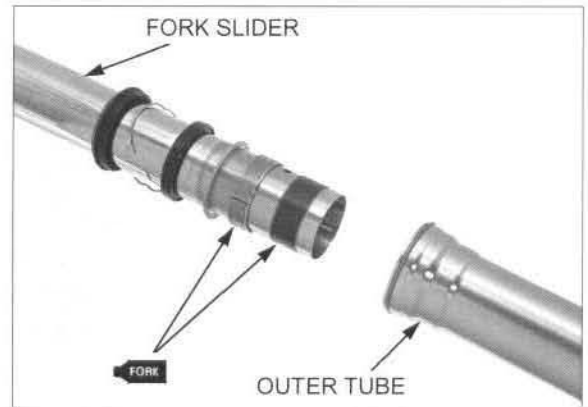


Be careful not to damage the slider bushing coating. Do not open the slider bushing more than necessary.

**NOTE:** Remove the burrs from the bushing mating surface, being careful not to peel off the coating.



Coat the guide bushing and slider bushing with recommended fork oil (page 13-26), and install the fork slider into the outer tube.



Drive in the guide bushing together with the back-up ring into the outer tube using the special tool. Drive the oil seal into the outer tube using the special tool.

**TOOL:**  
Fork seal driver, 48.2 x 58 mm 070MD-MEN0100 or 070MD-MENA100 (U.S.A. only)



Install the stopper ring into the groove in the outer tube.



Drive the dust seal into the outer tube using the special tool.

**TOOL:**  
Fork seal driver, 48.2 x 58 mm 070MD-MEN0100 or 070MD-MENA100 (U.S.A. only)



## FRONT WHEEL/SUSPENSION/STEERING

### FORK DAMPER REFILLING/ASSEMBLY

Clean the fork cap assembly and fork damper threads.

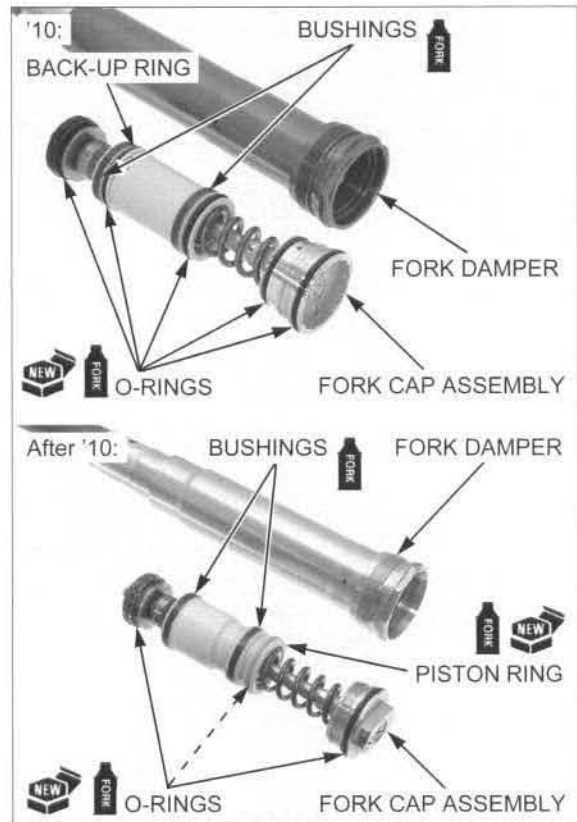
#### NOTE:

Be careful not to damage the fork cap bushings.

'10: Apply recommended fork oil (page 13-26) to the fork cap bushings and new O-rings, and install the O-rings and back-up ring to the fork cap assembly.

'After '10: Apply recommended fork oil (page 13-26) to the fork cap bushings, new O-rings and piston ring.

Install the O-rings and piston ring to the fork cap assembly.



Extend the piston rod to its maximum length.

Pour the recommended fork oil into the fork damper.

#### RECOMMENDED FORK OIL:

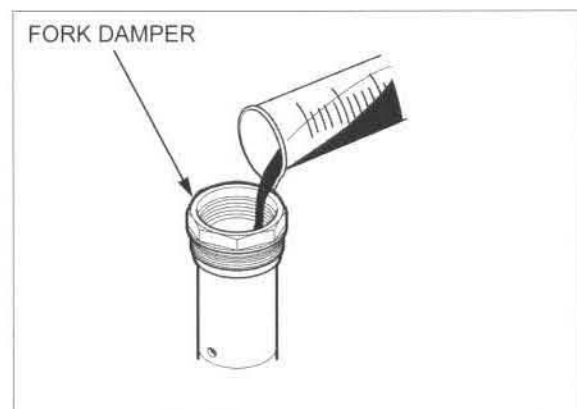
Pro Honda HP Fork Oil SS-19

#### STANDARD OIL CAPACITY:

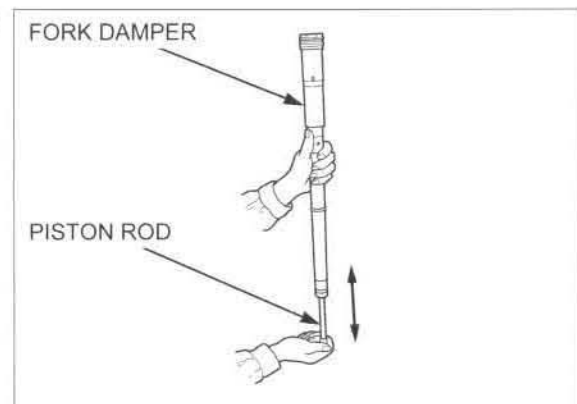
'10: 200 cm<sup>3</sup> (6.8 US oz, 7.0 Imp oz)

'11, '12: 245 cm<sup>3</sup> (8.3 US oz, 8.6 Imp oz)

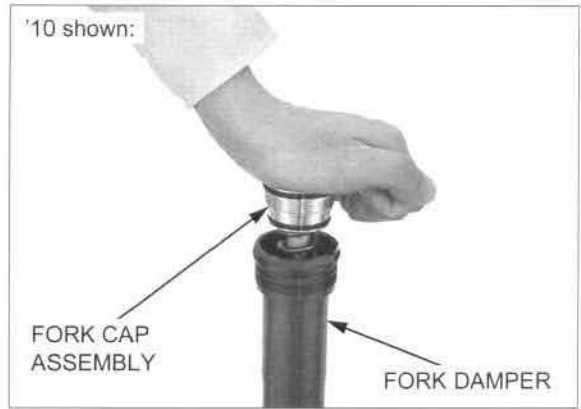
'After '12: 248 cm<sup>3</sup> (8.4 US oz, 8.8 Imp oz)



Pump the piston rod slowly several times and bleed any air from the fork damper.



Hold the damper rod, install the fork cap assembly into the fork damper.



'10: Set the fork damper in a vise with a piece of wood or soft jaws to avoid damage.

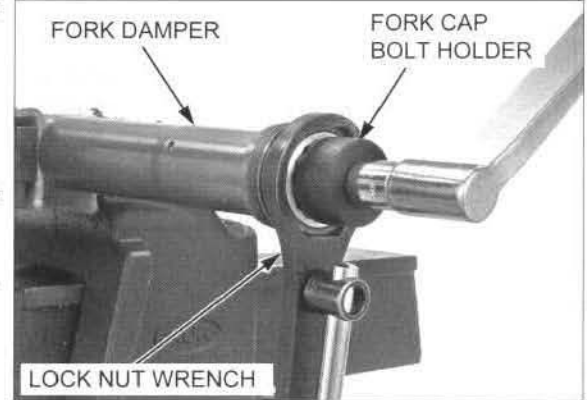
Hold the fork damper using the special tool.

**TOOL:**  
**Lock nut wrench, 50 mm**      **07WMA-KZ30100**

Tighten the fork cap assembly to the specified torque using the special tool while holding the fork damper.

**TOOL:**  
**Fork cap bolt holder, 36 mm**      **070MB-MEN0100 or 070MB-MENA100 (U.S.A. only)**

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



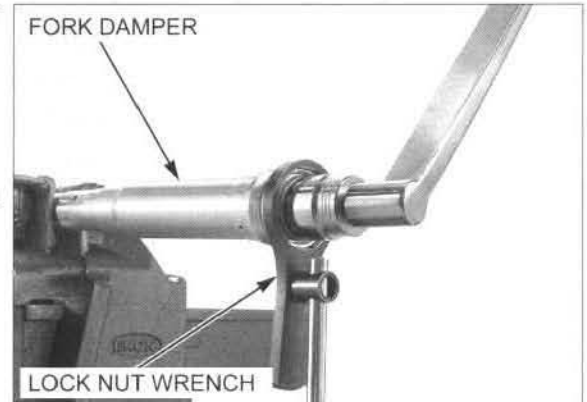
After '10: Set the fork damper in a vise with a piece of wood or soft jaws to avoid damage.

Hold the fork damper using the special tool.

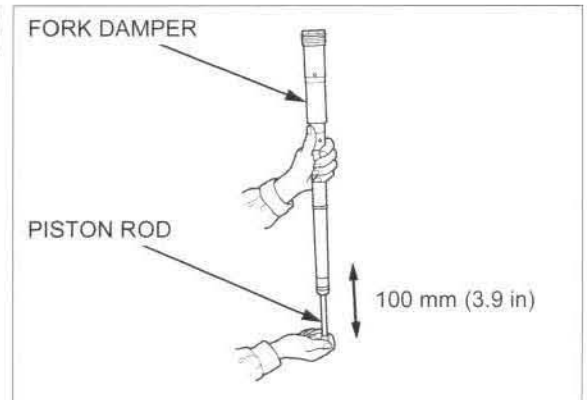
**TOOL:**  
**Lock nut wrench, 50 mm**      **07WMA-KZ30100**

Tighten the fork cap assembly to the specified torque while holding the fork damper.

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



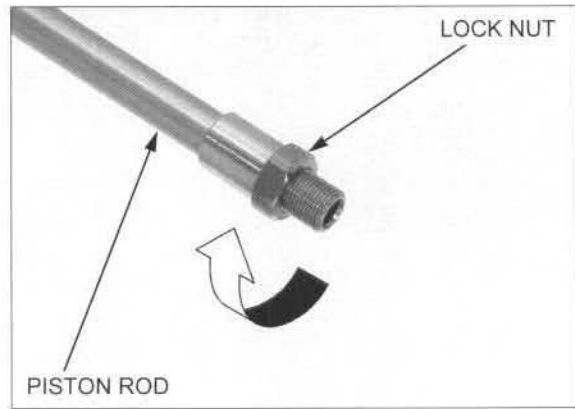
Hold the fork damper in an upright position and pump the fork piston rod 100 mm (3.9 in) slowly, several times.





## FRONT WHEEL/SUSPENSION/STEERING

Turn the fork center bolt lock nut clockwise until it is fully seated.



### NOTE:

- Cover the fork damper oil holes with shop towel.
- Make sure the compression damping adjuster is turned counterclockwise to the softest position.
- Check the piston rod sliding surface for damage.
- Apply recommended fork oil (page 13-26) to the piston rod sliding surface.

*Be careful not to bend or damage the piston rod when the piston rod is stroked.*

Cover the piston rod end to prevent damage.

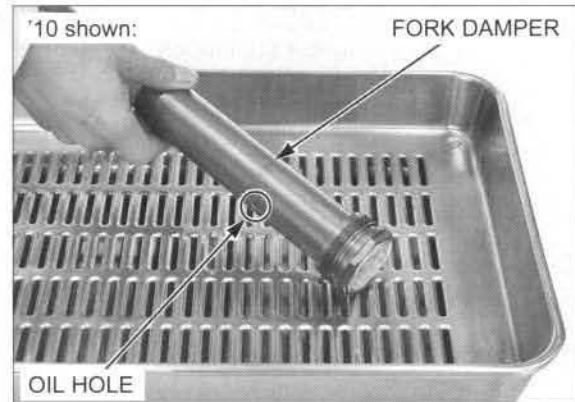
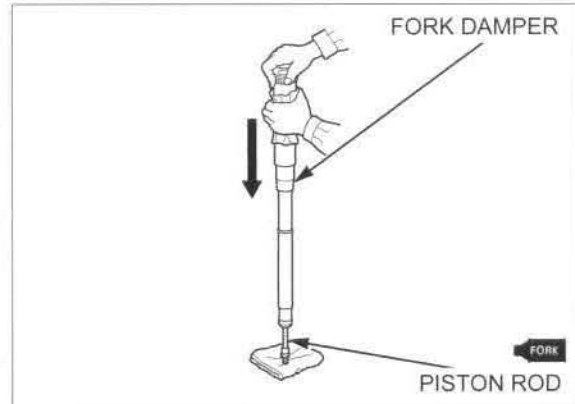
Blow out any extra fork oil in the fork damper by fully stroking the piston rod.

### NOTE:

By doing following procedure, about 5 cm<sup>3</sup> (0.2 US oz, 0.2 Imp oz) of fork oil will be drained from the fork damper through the oil hole. This will cause 195 cm<sup>3</sup> (6.6 US oz, 6.9 Imp oz) ('11, '12: 240 cm<sup>3</sup> (8.1 US oz, 8.4 Imp oz) (After '12: 243 cm<sup>3</sup> (8.2 US oz, 8.6 Imp oz) of fork oil to be left in the fork damper.

Blow out the oil off completely from the fork damper.

Drain the extra fork oil from the oil holes of the fork damper.



*After '10:* Blow out any oil from the oil hole of the fork damper using compressed air.

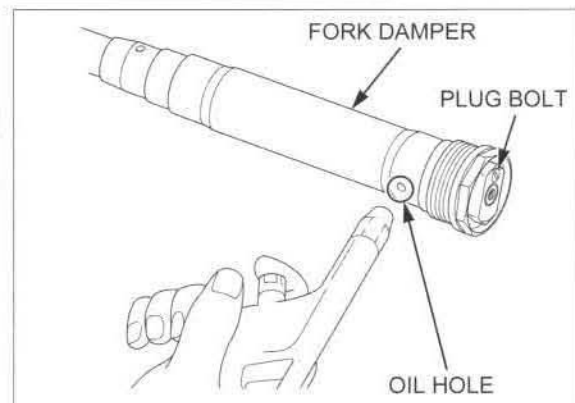
Wipe off the oil completely from the fork damper

If your cannot use compressed air, remove the plug bolt on the fork cap.

Hold the fork damper upside down for 10 minutes and drain the oil from the fork damper spring chamber.

Tighten the plug bolt to the specified torque.

**TORQUE: 1.3 N·m (0.1 kgf·m, 1.0 lbf·ft)**



**FORK DAMPER OPERATION INSPECTION**

- Make sure the compression damping adjuster is turned counterclockwise to the softest position.
- Check the piston rod sliding surface for damage.
- Apply fork oil to the piston rod sliding surface.

*Be careful not to bend or damage the piston rod when the piston rod is stroked.*

Inspect the fork damper operation after air bleeding (page 13-26).

Cover the piston rod end to prevent damage.

Fully stroke the piston rod by pushing down the fork damper.

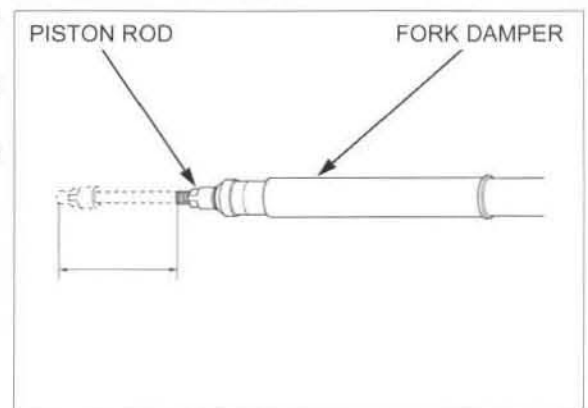
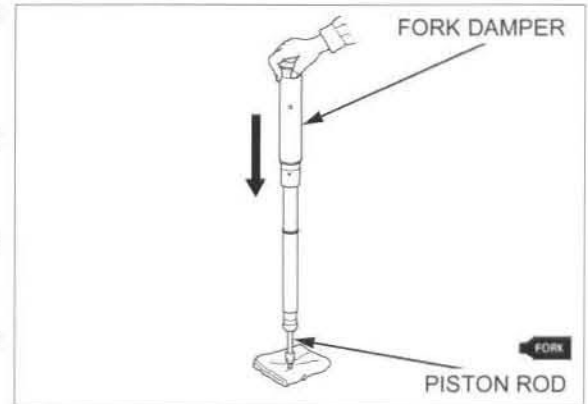
Check the piston rod for smooth operation.

If the piston rod operation is not smooth, check the piston rod for bends or damage.

Hold the fork damper on level ground while the piston rod is fully extended and compressed by hand.

Release the piston rod then check that it extends to its maximum length.

If the piston rod does not extend to maximum, bleed the fork damper again.



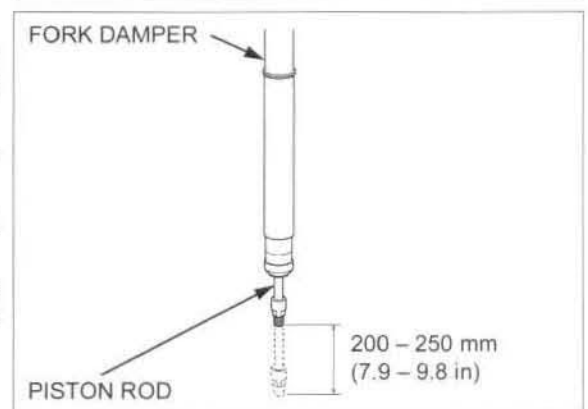
Wipe off any oil completely from the fork damper.

Compress the piston rod 200 – 250 mm (7.9 – 9.8 in) from fully extended and, hold the fork damper in an upright position for 10 minutes.

There should be no oil leaking from the fork damper and piston rod.

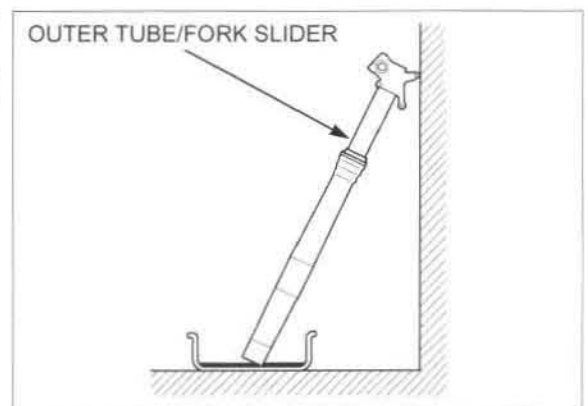
If oil leaks from the fork damper or piston rod, replace the fork damper assembly.

Hold the fork damper on level ground, and release the piston rod, then check that the piston rod extends to its maximum length.



**FORK DAMPER INSTALLATION/PREPARATION**

If the outer tube and fork slider have not been disassembled, turn the fork upside down for 20 minutes, and drain the fork oil from the inside of the outer tube and fork slider completely (5.4 cc at 20°C/ 68°F)

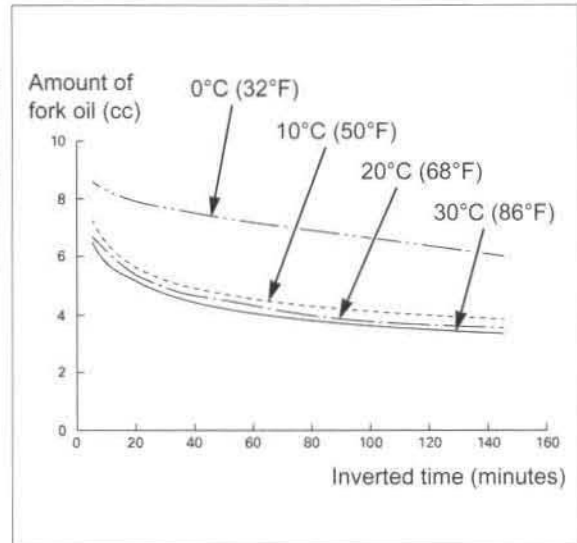


# FRONT WHEEL/SUSPENSION/STEERING

Amount of fork oil left in the fork  
(without damper and spring)

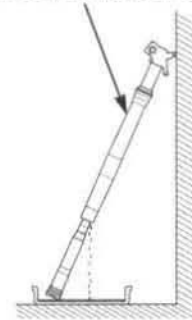
unit: cc

		minutes						
		5	10	20	35	55	85	145
°C/F	30/86	6.5	5.7	5.2	4.5	4.1	3.7	3.3
	20/68	6.7	6.2	5.4	4.7	4.4	3.8	3.5
	10/50	7.3	6.4	5.6	5.0	4.6	4.2	3.8
	0/32	8.6	8.2	7.9	7.6	7.3	6.8	6.0



If the fork damper has not been disassembled from the outer tube/fork slider, turn it upside down for 20 minutes, and drain the fork oil from the inside of the outer tube and fork slider completely (13.7 cc at 20°C/68°F)

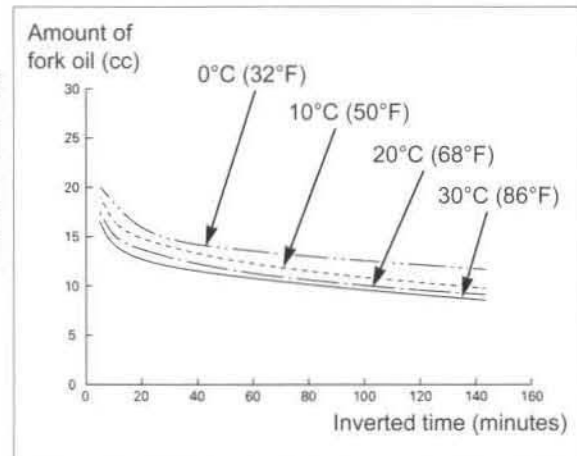
## FORK DAMPER/OUTER TUBE/FORK SLIDER



Amount of fork oil left in the fork  
(with damper and spring)

unit: cc

		minutes						
		5	10	20	35	55	85	145
°C/F	30/86	16.5	14.1	12.7	11.8	11.0	10.1	8.6
	20/68	17.4	15.0	13.7	12.6	11.5	10.5	9.1
	10/50	18.9	16.5	14.8	13.7	12.5	11.4	9.8
	0/32	20.0	18.4	15.9	14.5	13.7	13.0	11.7



**FORK DAMPER INSTALLATION**

Tighten the fork center bolt lock nut fully, and measure the length between the fork center bolt lock nut end and piston rod end as shown.

**STANDARD: 11 – 13 mm (0.43 – 0.51 in)**

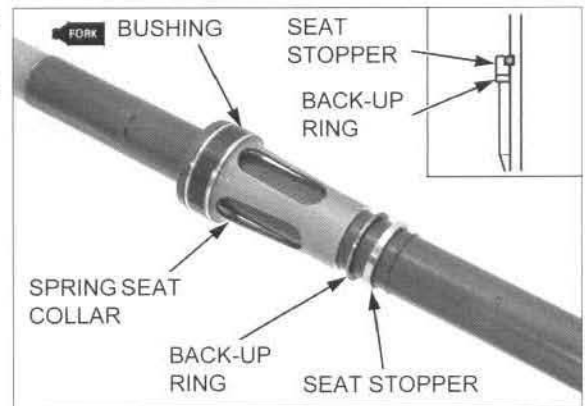
Wipe off any oil completely from the fork damper.



Apply recommended fork oil (page 13-26) to the bushing.

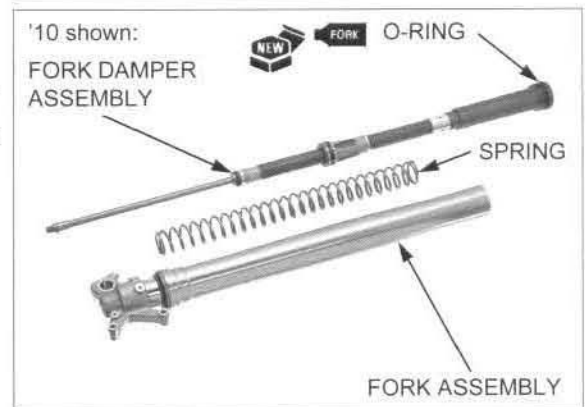
*Install the back-up ring with its black coated side facing the seat stopper.*

Install the seat stopper, back-up ring and spring seat collar to the fork damper in the shown direction.



Blow out the oil off completely from the fork spring.

Install the fork spring into the fork assembly. Apply recommended fork oil (page 13-26) to a new O-ring, and install it to the fork damper. Temporarily install the fork damper assembly into the fork assembly.



*Do not over-tighten the vise on the axle holder.*

Set the axle holder of the fork slider in a vise with a piece of wood or soft jaws to avoid damage.

Push the fork damper out from the slider until the fork center bolt lock nut is fully exposed, and install the piston base or mechanic's stopper tool between the axle holder and fork center bolt lock nut.

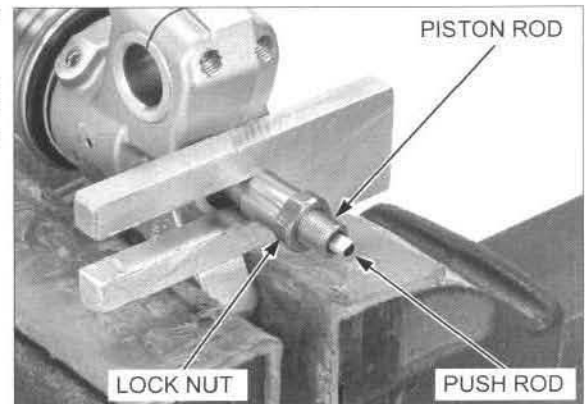
**TOOL:**

**Piston base**  
**Fork rod stopper**

**07958-2500001 or**  
**07AMB-KZ3A100**  
**(U.S.A. only)**

*Check the push rod installation by turning the push rod right and left.*

Install the push rod into the piston rod until it stops.



## FRONT WHEEL/SUSPENSION/STEERING

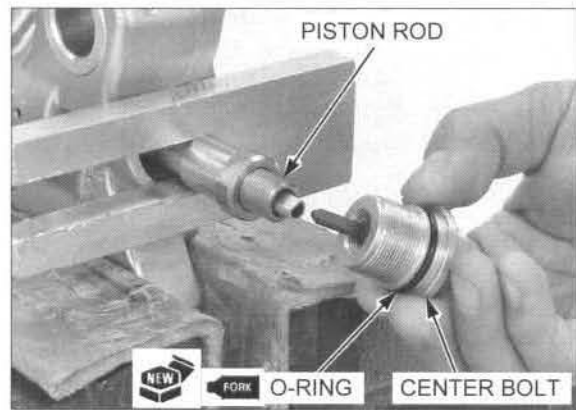
Measure the length between the fork center bolt lock nut end and piston rod end again.

**STANDARD: 11 – 13 mm (0.43 – 0.51 in)**

Apply recommended fork oil (page 13-26) to a new O-ring, and install it to the fork center bolt.

Install the fork center bolt to the fork damper piston rod by aligning the flat-side of the center bolt adjusting rod with the flat-side of the push rod.

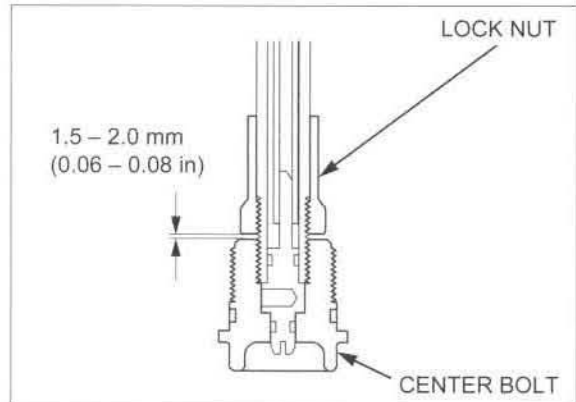
Tighten the center bolt fully by hand.



Measure the length of the fork center bolt lock nut and fork center bolt clearance.

**STANDARD: 1.5 – 2.0 mm (0.06 – 0.08 in)**

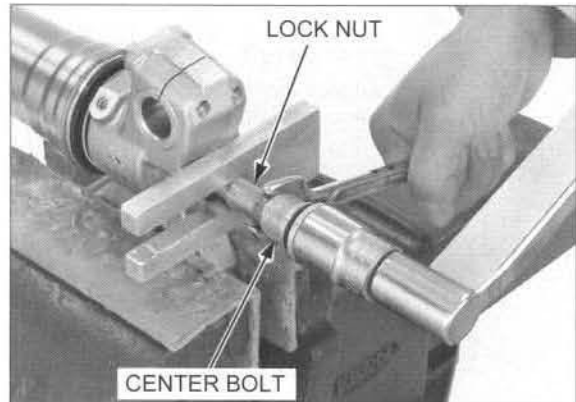
If the clearance is out of specification, check the fork center bolt lock nut and fork center bolt installation.



Tighten the fork center bolt lock nut to the fork center bolt by hand until they touch.

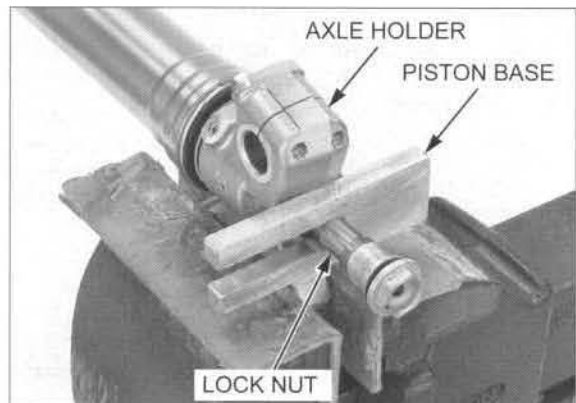
Tighten the fork center bolt lock nut to the specified torque using the 17 mm open end wrench.

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



*Be careful not to damage the fork center bolt lock nut and fork center bolt hole.*

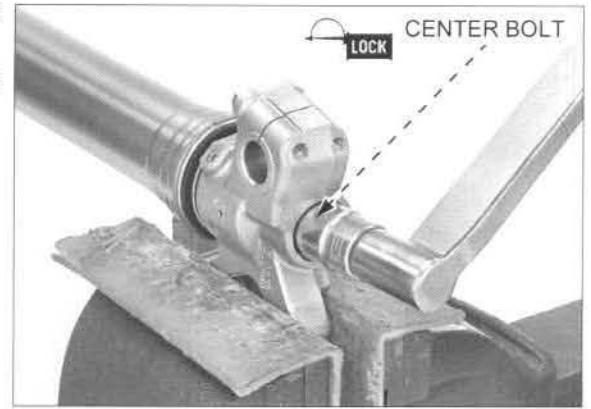
Remove the piston base or mechanic's stopper tool between the axle holder and fork center bolt lock nut while pushing the fork damper.



Clean and apply locking agent to the fork center bolt threads.

Install the fork center bolt into the axle holder and tighten it to the specified torque.

**TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)**



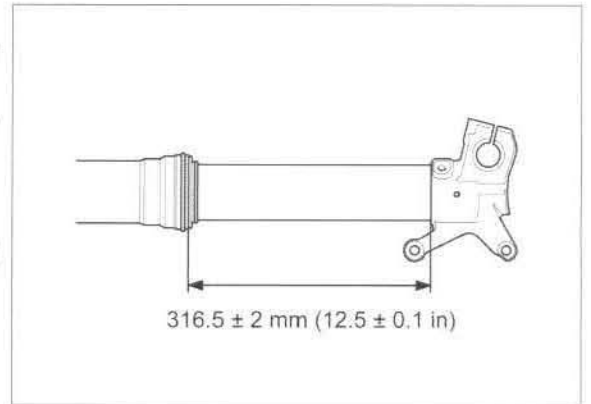
Temporarily install the fork damper into the outer tube.

Measure the length between the axle holder and outer tube.

Compare the length at assembly and disassembly; they should be same length.

**STANDARD: 316.5 ± 2 mm (12.5 ± 0.1 in)**

If the length at assembly is longer than at disassembly, check the fork center bolt and fork center bolt lock nut installation.



**FORK OIL CAPACITY ADJUSTMENT**

Remove the fork damper from the outer tube.

Pour the recommended fork oil into the outer tube.

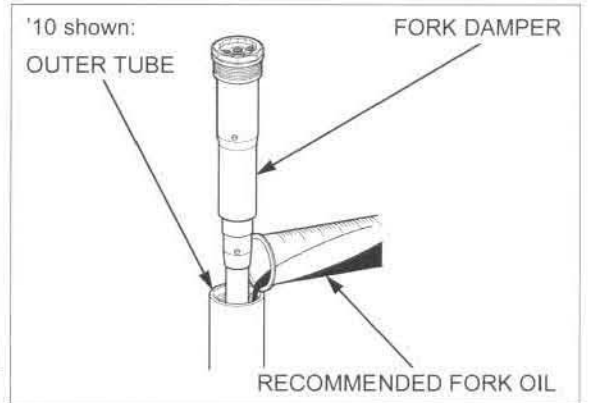
*Be sure the oil capacity is the same in both fork legs.*

**RECOMMENDED FORK OIL:**

**Pro Honda HP Fork Oil SS-19**

**STANDARD FORK OIL CAPACITY:**

- '10: 342 cm<sup>3</sup> (11.6 US oz, 12.0 Imp oz)
- '11: 365 cm<sup>3</sup> (12.3 US oz, 12.8 Imp oz)
- '12: 372 cm<sup>3</sup> (12.6 US oz, 13.1 Imp oz)
- After '12: 363 cm<sup>3</sup> (12.3 US oz, 12.8 Imp oz)

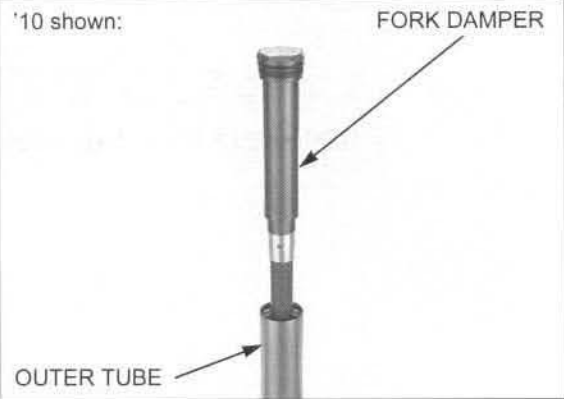


Maximum fork oil capacity:		
'10	363 cm <sup>3</sup> (12.3 US oz, 12.8 Imp oz)	Slightly stiffer near full compression.
'11, '12	380 cm <sup>3</sup> (12.9 US oz, 13.4 Imp oz)	Slightly stiffer near full compression.
After '12	384 cm <sup>3</sup> (13.0 US oz, 13.5 Imp oz)	Slightly stiffer near full compression.
Minimum fork oil capacity:		
'10	286 cm <sup>3</sup> (9.7 US oz, 10.1 Imp oz)	Slightly softer near full compression.
'11, '12	296 cm <sup>3</sup> (10.0 US oz, 10.4 Imp oz)	Slightly softer near full compression.
After '12	300 cm <sup>3</sup> (10.1 US oz, 10.6 Imp oz)	Slightly softer near full compression.

## FRONT WHEEL/SUSPENSION/STEERING

Pull up the outer tube slowly, and loosely install the fork damper into the outer tube.

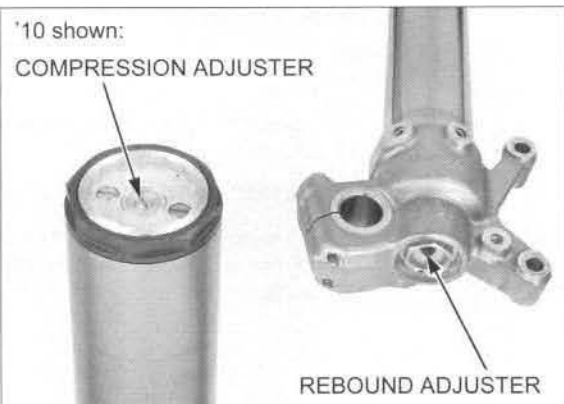
'10 shown:



Return the rebound and compression damping adjusters to the original positions as noted during removal.

'10 shown:

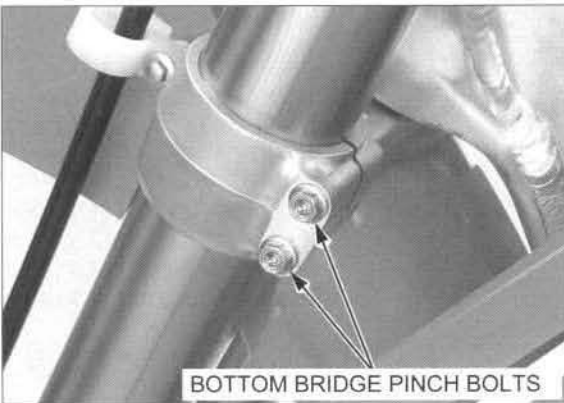
COMPRESSION ADJUSTER



### INSTALLATION

Install the fork leg, and tighten the bottom bridge pinch bolts to the specified torque.

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



When the fork leg is disassembled, tighten the fork damper to the specified torque using the special tool.

**TOOL:**

Lock nut wrench, 50 mm      07WMA-KZ30100

**TORQUE:**

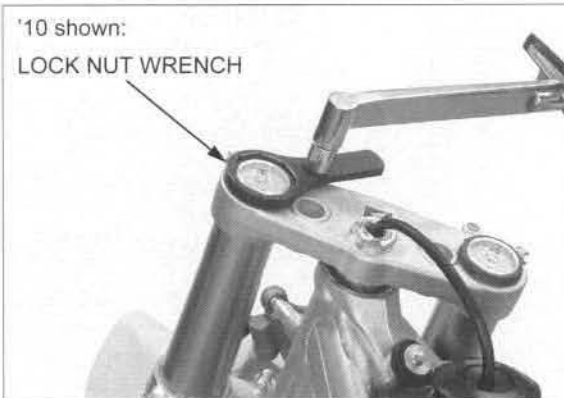
**Actual: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

**Indicated: 31 N·m (3.2 kgf·m, 23 lbf·ft)**

Install the handlebar (page 13-38).

'10 shown:

LOCK NUT WRENCH



Refer to torque wrench reading information in "SERVICE INFORMATION" (page 13-3).



**STANDARD POSITION**

Loosen the bottom bridge pinch bolts.

For ease when releasing the air pressure after the forks are installed, position the fork outer tubes so the plug bolts ('10: gold plug bolts) are in front of the compression adjusters.



Align the top surface of the top bridge with the outer tube upper surface as shown.



Tighten the bottom bridge pinch bolts to the specified torque.

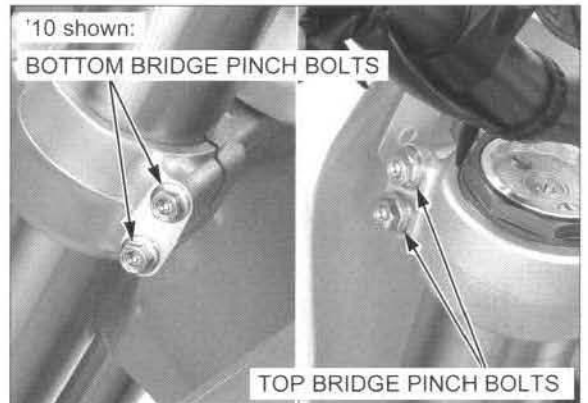
**TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)**

Tighten the top bridge pinch bolts to the specified torque.

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

**NOTICE**

*Over-tightening the pinch bolts can deform the outer tube. A deformed outer tube must be replaced.*

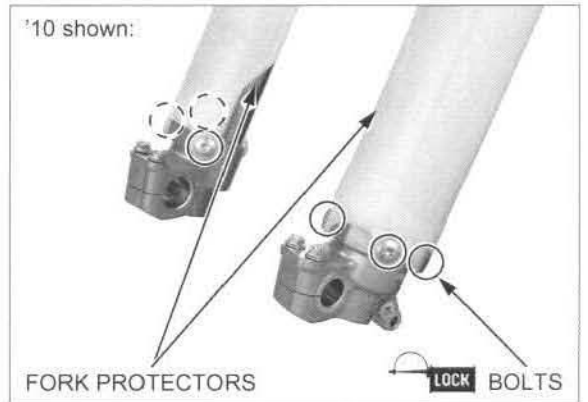


Apply locking agent to the fork protector mounting bolt threads.

Install the fork protector and fork protector mounting bolts.

Tighten the fork protector mounting bolts to the specified torque.

**TORQUE: 7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)**





## FRONT WHEEL/SUSPENSION/STEERING

Apply locking agent to the brake caliper mounting bolt threads.

Install the front brake caliper/bracket assembly and brake caliper mounting bolts.  
Tighten the front brake caliper mounting bolts to the specified torque.

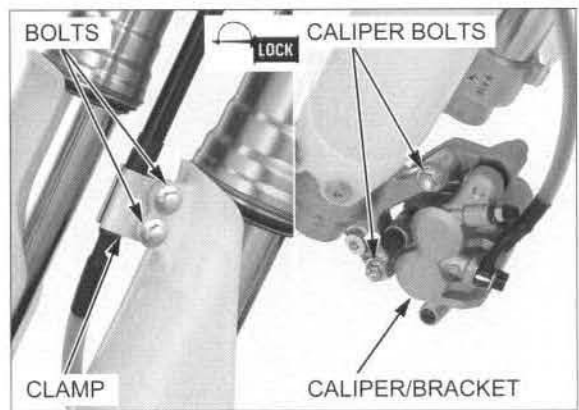
**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

*Route the front brake hose properly (page 1-21).*

Install the brake hose clamp and bolts.

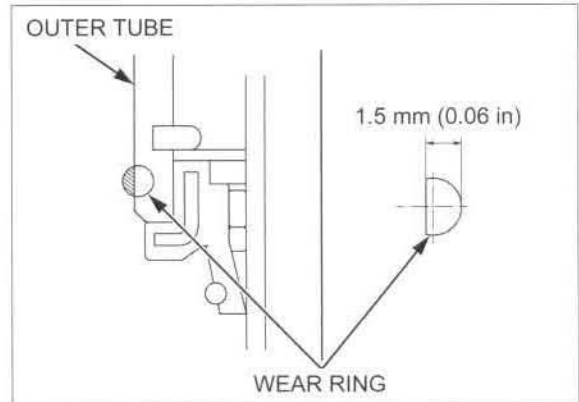
Tighten the bolts securely.

Install the front wheel (page 13-12).

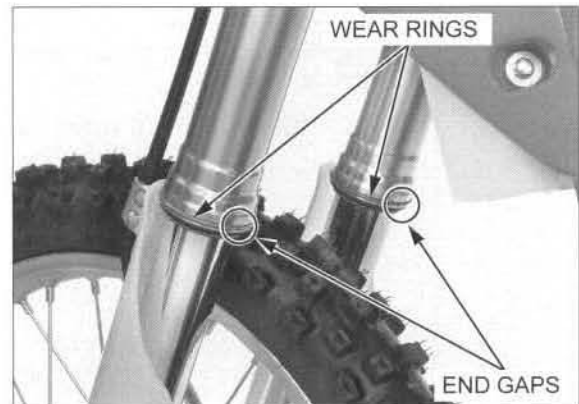


Inspect the wear rings for wear or damage.

Replace the wear ring, if it is 1.5 mm (0.06 in) or flat with the outer tube.



Make sure that the wear ring end gaps face rearward.



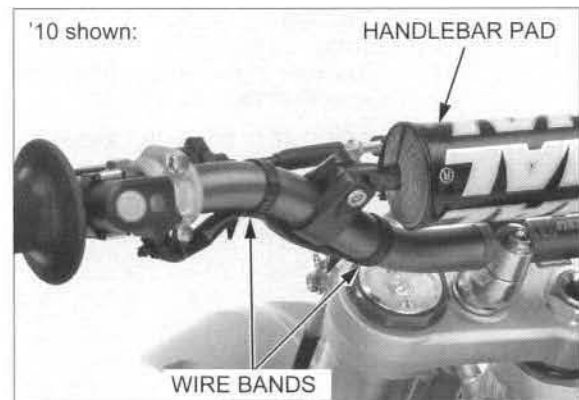
## HANDLEBAR

### REMOVAL

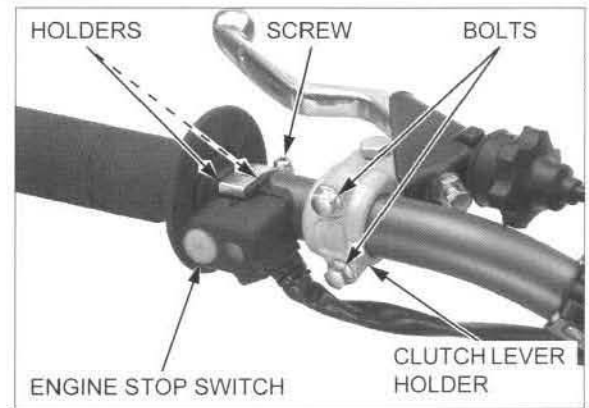
Remove the number plate (page 2-5).

Remove the handlebar pad from the handlebar.

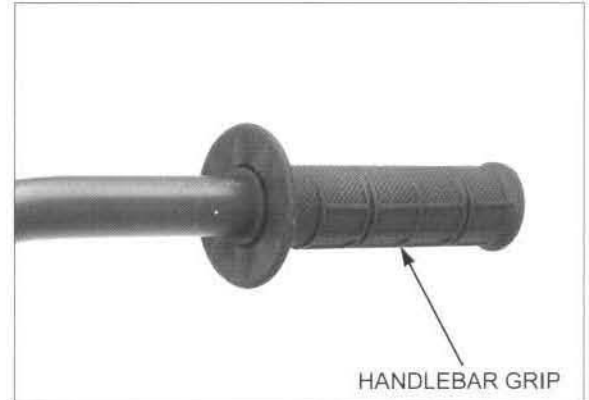
Remove the wire bands.



Remove the screw, holders and engine stop switch.  
Remove the bolts, clutch lever bracket and holder.

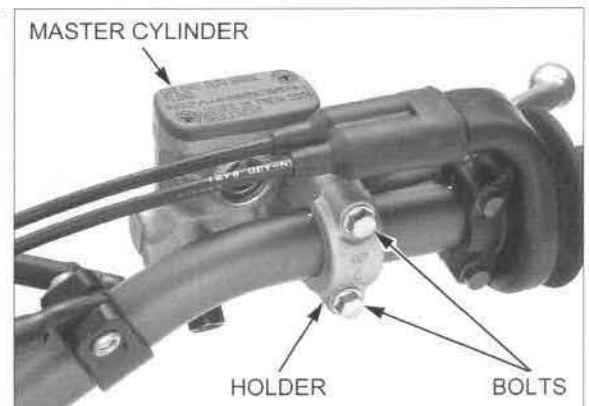


Remove the handlebar grip.



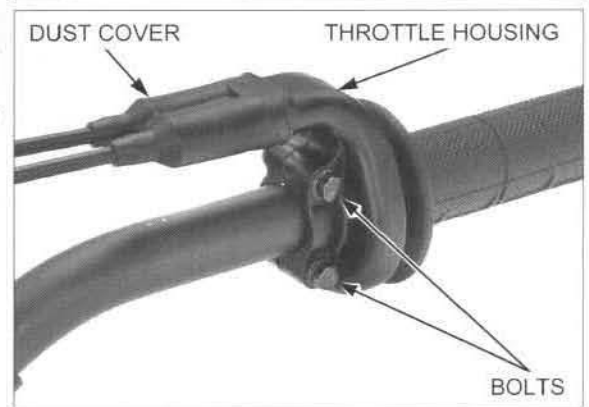
*Do not disconnect the hydraulic line. Keep the brake master cylinder upright to prevent air from entering the hydraulic system.*

Remove the bolts, front brake master cylinder holder and master cylinder.



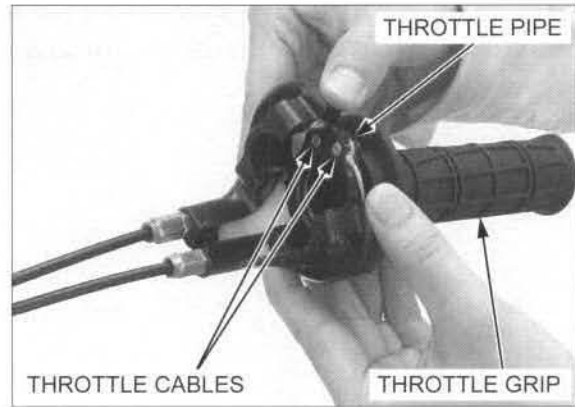
Remove the throttle housing as an assembly as follows: Loosen the throttle housing bolts, turn the handlebar to the right fully, then remove the throttle housing.

If you will disassemble the throttle housing, remove the throttle housing dust cover and throttle housing bolts.

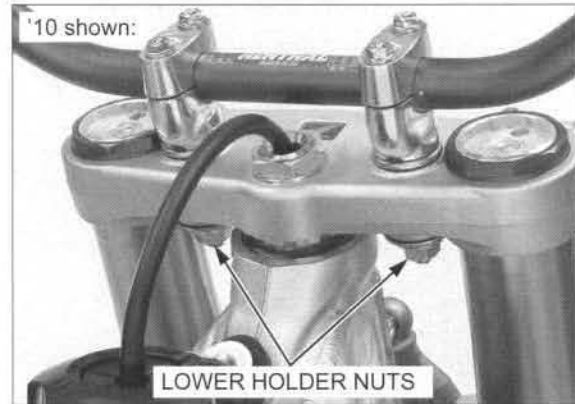


## FRONT WHEEL/SUSPENSION/STEERING

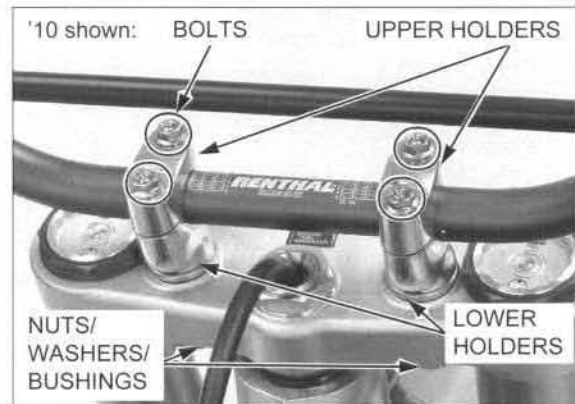
Remove the throttle housing from the handlebar.  
Disconnect the throttle cables from the throttle pipe.  
Remove the throttle grip from the throttle pipe.



Loosen the handlebar lower holder nuts.

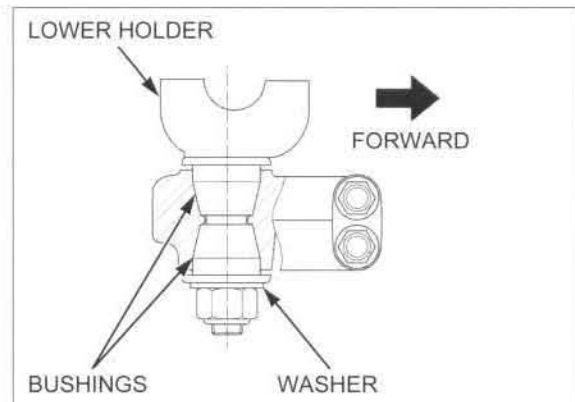


Remove the bolts, upper holders and handlebar.  
Remove the lower holder nuts, washers, bushings and lower holders.

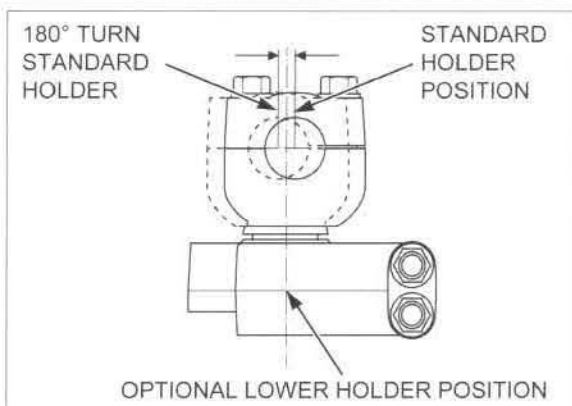


### INSTALLATION

Install the bushings, lower holders, washers and lower holder nuts as shown (standard position).



- By turning the lower holder 180°, you can install it 6.0 mm (0.2 in) rearward of the standard position. By installing the optional lower holder, you can set it 3.0 mm (0.1 in) rearward of the standard position.
  - Standard: 3.0 mm (0.1 in) offset to forward
  - Standard 180° turn: 3.0 mm (0.1 in) offset to rearward
  - Optional: No offset

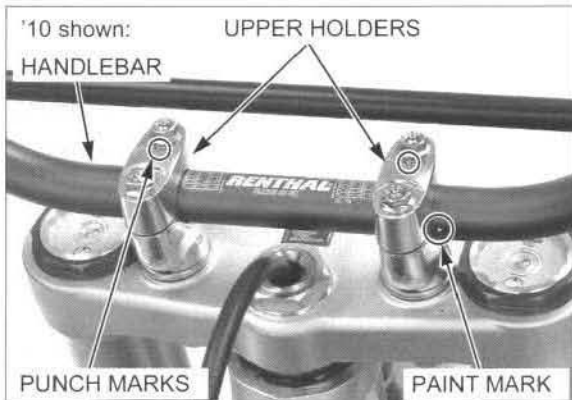


Place the handlebar on the lower holders aligning the paint mark on the handlebar with the top surface of the lower holders.

Install the upper holders with its punch mark facing forward.

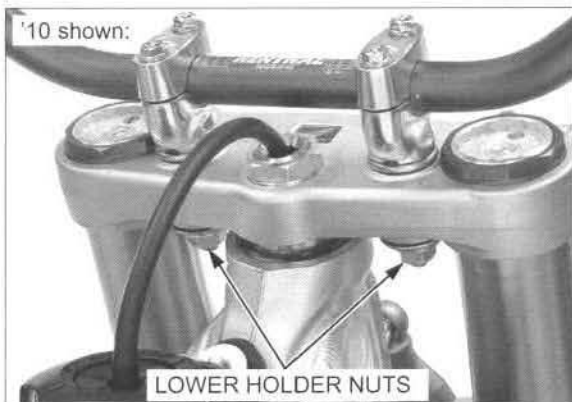
Install and tighten the front side bolts first, then the rear side bolts to the specified torque.

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



Tighten the lower holder nuts to the specified torque.

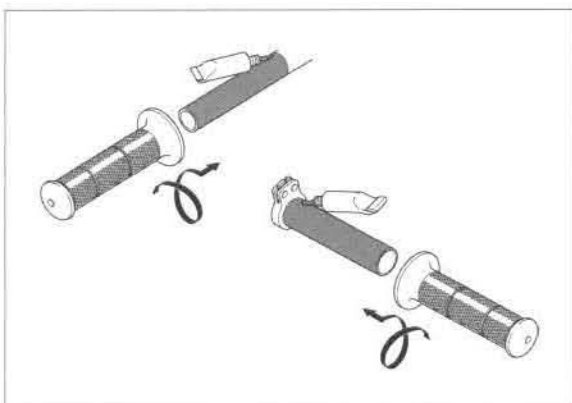
**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**



If the handlebar grips are removed, apply Honda Bond A or Pro Honda Handgrip Cement (U.S.A. only) to the inner surface of the grip rubber and to the clean surfaces of the throttle pipe and left side of the handlebar.

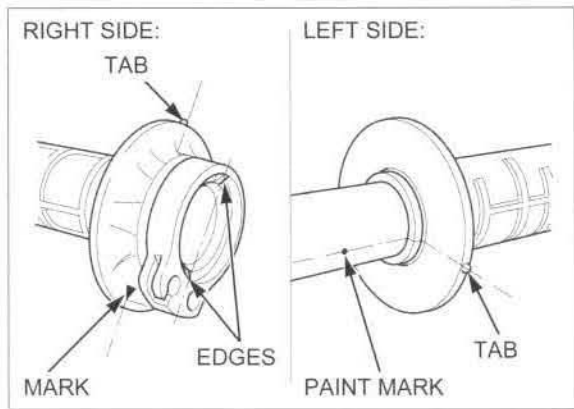
*Allow the adhesive to dry for approximately an hour before using.*

Wait 3 – 5 minutes and install the grip. Rotate the grips for even application of the adhesive.



## FRONT WHEEL/SUSPENSION/STEERING

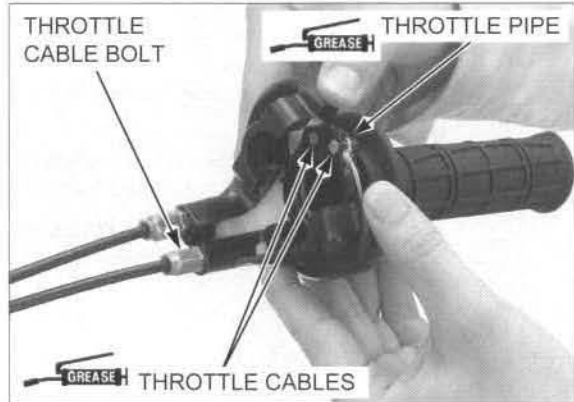
Align the edges on the throttle pipe end with the tab and "△" mark of the right handlebar grip.  
Align the tab on the left handlebar grip with the paint mark on the handlebar.



Apply specified grease (page 1-19) to the throttle cable ends and throttle pipe flange groove.  
Connect the throttle cables to the throttle pipe.

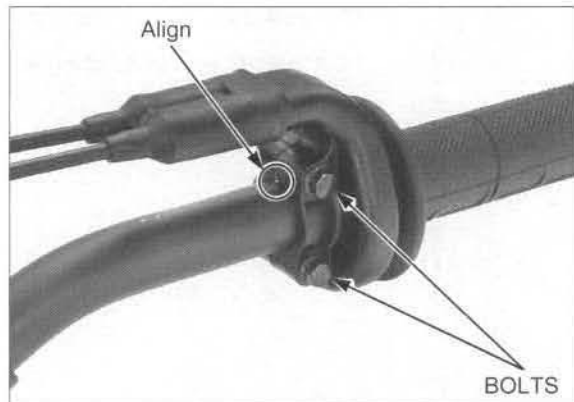
Tighten the throttle cable bolt to the specified torque.

**TORQUE: 4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)**



Install the throttle housing, aligning the end of the housing with the paint mark on the handlebar.  
Tighten the throttle housing upper bolt first, then the lower bolt.

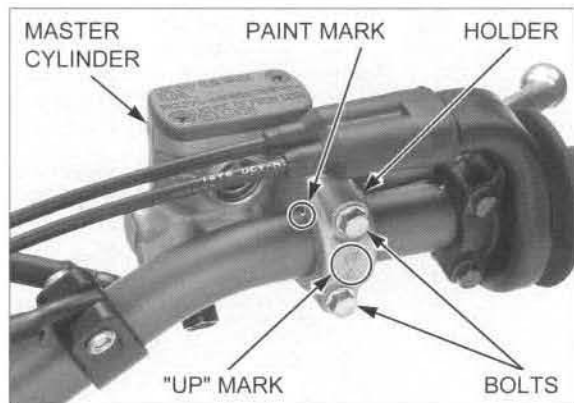
Adjust the throttle grip freeplay (page 3-7).



Install the brake master cylinder and holder with the "UP" mark on the holder facing up.  
Align the end of the holder with the paint mark on the handlebar.

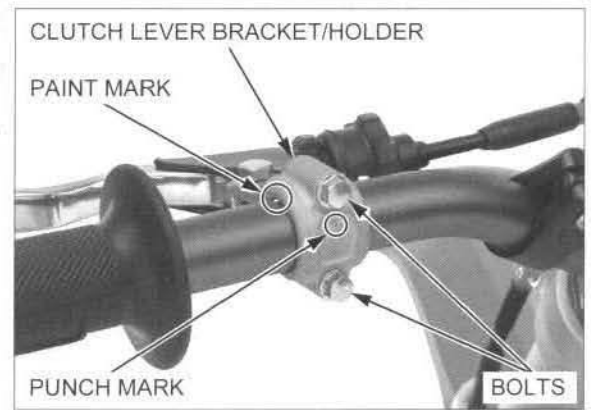
Install and tighten the upper master cylinder holder bolt first, then the lower bolt to the specified torque.

**TORQUE: 9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)**



Install the clutch lever bracket and holder with the punch mark on the holder facing up. Align the end of the holder with the paint mark on the handlebar.

Install and tighten the clutch lever bracket holder upper bolt first, then the lower bolt securely.

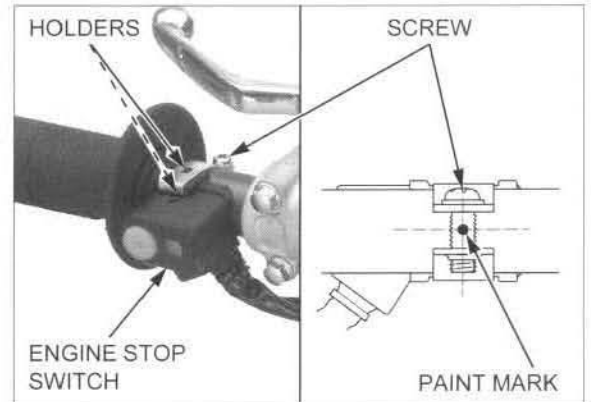


Install the holders, engine stop switch and screw on the handlebar.

Align the center of each holder with the paint mark on the handlebar as shown.

Tighten the engine stop switch screw to the specified torque.

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



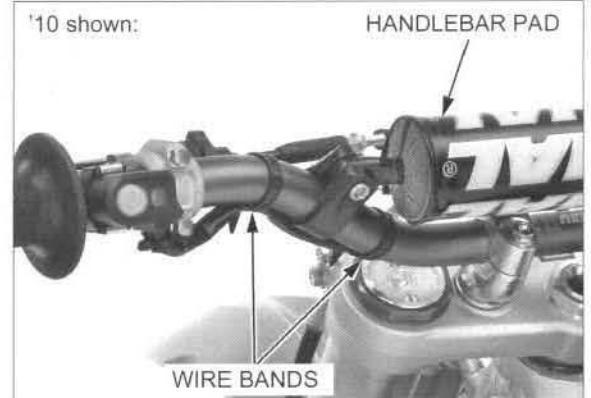
*Route the wire properly (page 1-21).*

Clamp the engine stop switch wire with the wire bands.

Install the handlebar pad.

Adjust the clutch lever freeplay (page 3-26).

Install the number plate (page 2-5).

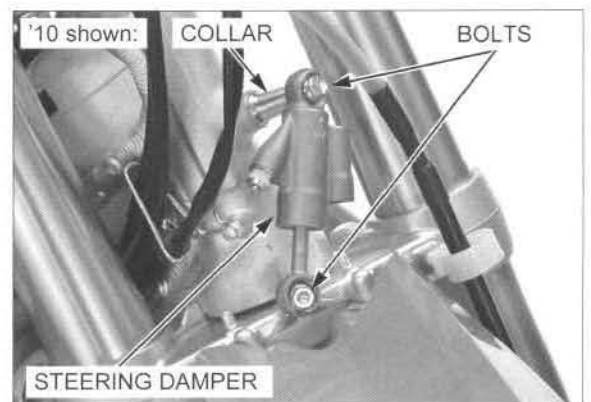


**HPSD**

**REMOVAL/INSTALLATION**

Remove the number plate (page 2-5).

Remove the steering damper bolts, collar and steering damper.



## FRONT WHEEL/SUSPENSION/STEERING

Clean and apply a locking agent to the steering damper bolts.

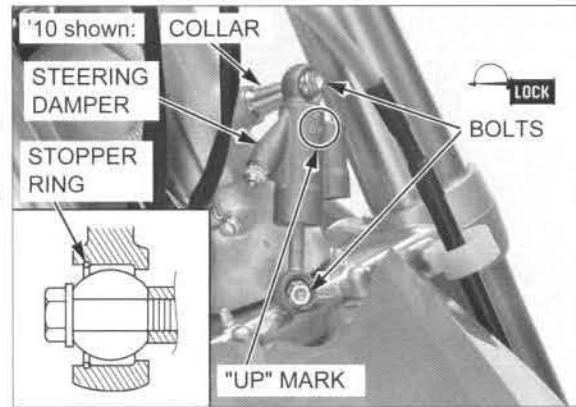
*Install the steering damper onto the steering head pipe with its "UP" mark facing up and facing toward the front.*

Install the steering damper, collar and bolts.

- Check that the stopper ring side of the damper rod is facing toward the front.

Tighten the steering damper bolts to the specified torque.

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



Raise the front wheel off the ground by placing a workstand or equivalent under the engine. Check that the steering moves smoothly from side-to-side.

Install the number plate (page 2-5).



### INSPECTION

Remove the steering damper (page 13-41).

Visually inspect the steering damper for wear or damage.

Check the following:

- Damper case for deformation or oil leakage
- Damper rod for bending or damage

Replace the damper case or damper rod if necessary.



*Measure the damper rod length with the inside jaws of a vernier caliper.*

Fully extend the damper rod by hand.

Measure the length between the spherical bearings as shown.

**STANDARD (maximum length):**

**117.55 – 118.35 mm (4.628 – 4.659 in)**

Check the damper rod for smooth operation.

If the damper rod operation is not smooth, check the damper rod for bends or damage.

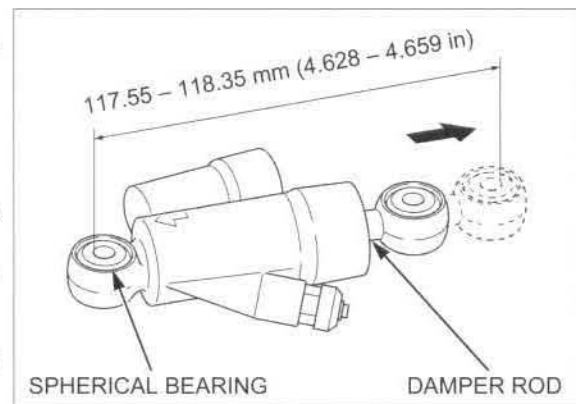
If the damper rod does not extend to maximum, disassemble the steering damper (page 13-44).

Check the spherical bearings for wear or damage.

Move the spherical bearing with your finger. The spherical bearing should move smoothly and quietly.

Replace the spherical bearing if it does not move smoothly or quietly.

Install the steering damper (page 13-41).



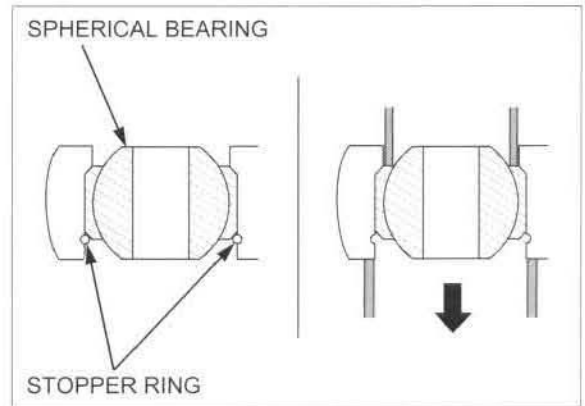


### SPHERICAL BEARING REPLACEMENT

Remove the steering damper (page 13-41).

**EXCEPT U.S.A.**

Remove the stopper ring.  
Press the spherical bearing out of the damper mounts.



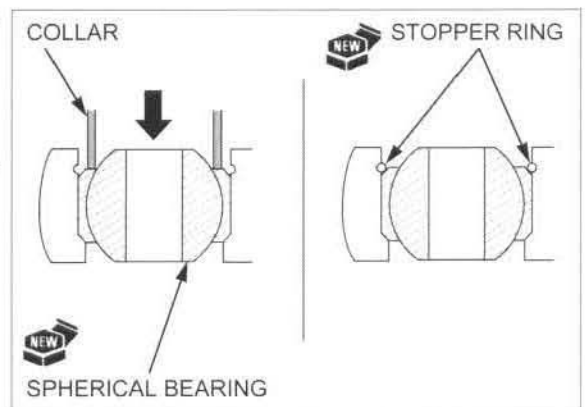
*Drive the bearing in evenly; do not allow it to tilt.*

Press a new spherical bearing into the damper mounts using the special tool.

**TOOL:**  
**Collar**

**07KPF-VD60100**

Install a new stopper ring into the groove of the damper mounts securely.

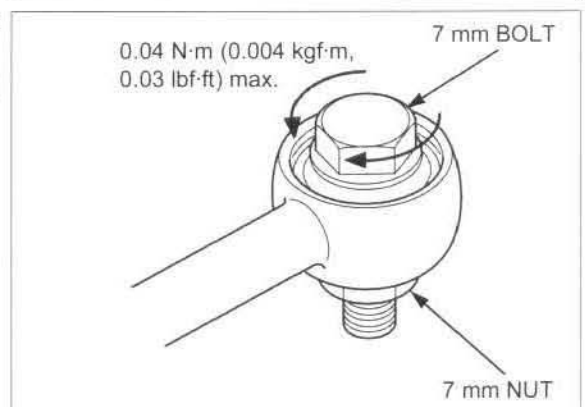


Set a 7 mm bolt and nut to the spherical bearing as shown.

Measure the stabled rotation torque of the spherical bearing inner by rotating the bolt.

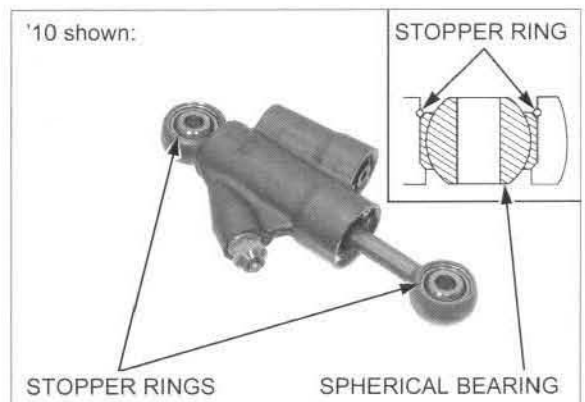
**STANDARD: 0.04 N·m (0.004 kgf·m, 0.03 lbf·ft) max.**

Install the steering damper (page 13-41).



**U.S.A. only**

Remove the stopper rings from the damper mount.



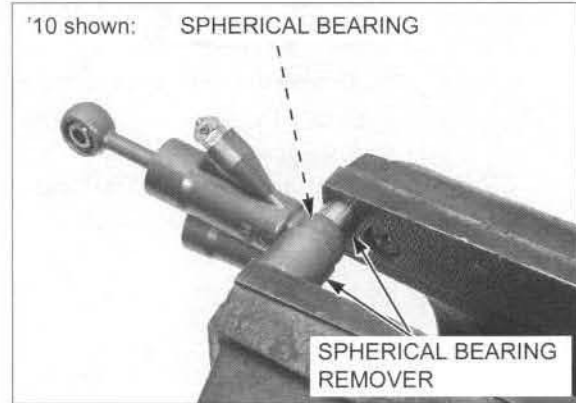


## FRONT WHEEL/SUSPENSION/STEERING

Assemble the special tool and steering damper as shown, then place it in a vise.

**TOOL:**  
**Spherical bearing remover**      **07AMD-MENA100**

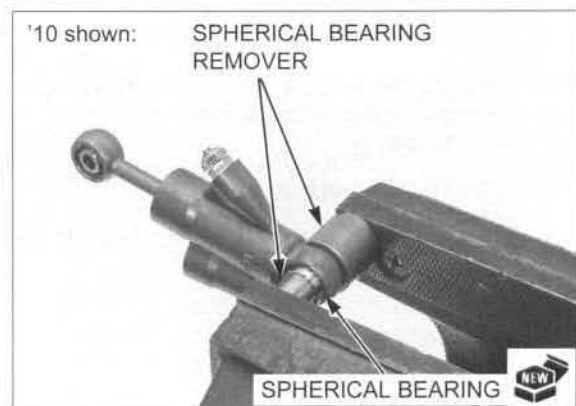
Gently press the spherical bearing out of the damper.



Assemble the special tool and steering damper with a new spherical bearing as shown, then place it in a vise.

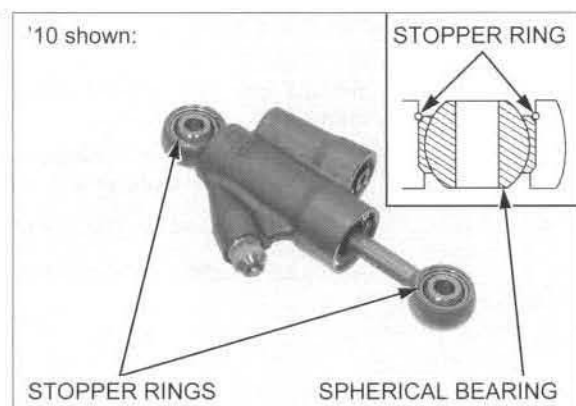
**TOOL:**  
**Spherical bearing remover**      **07AMD-MENA100**

Use the pressure of the vise to gently press the bearing into place.



Install the stopper ring into the groove of the damper mount securely.

Install the steering damper (page 13-41).



### HPSD DISASSEMBLY

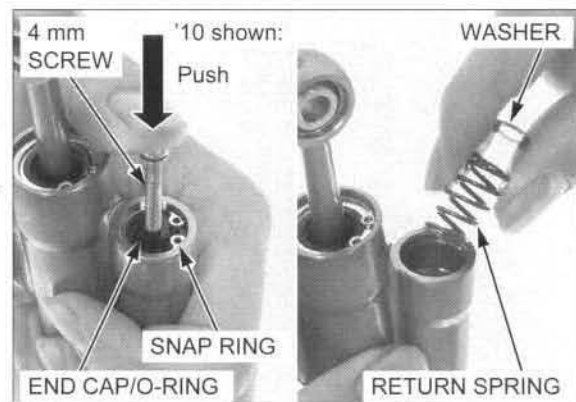
*Record the damping force adjuster position.*

Remove the steering damper (page 13-41).

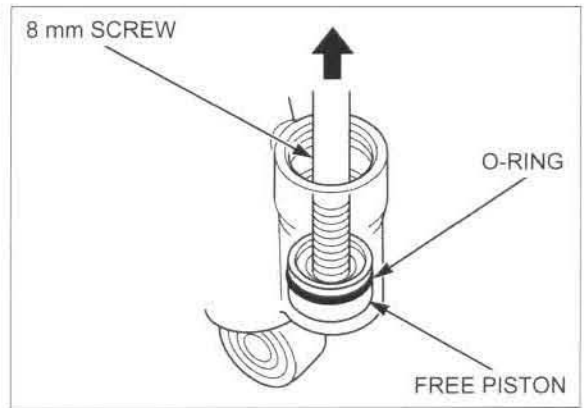
Clean the damper assembly thoroughly.

Install a 4 mm screw to the end cap.  
Remove the snap ring while pushing the end cap, and then remove the end cap and O-ring.

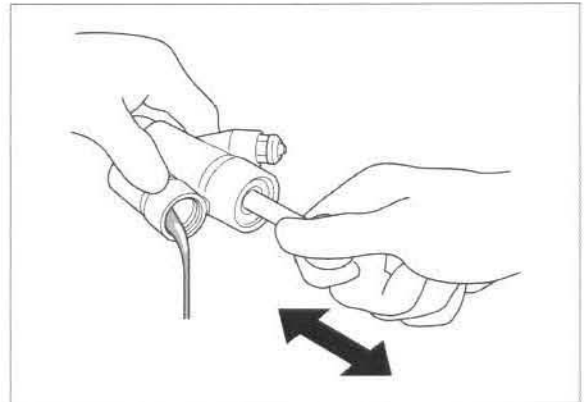
Remove the washer and return spring from the damper case.



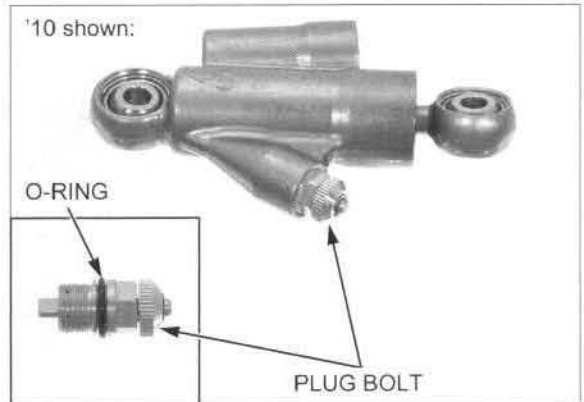
Install a 8 mm screw to the free piston, then remove the free piston and O-ring.



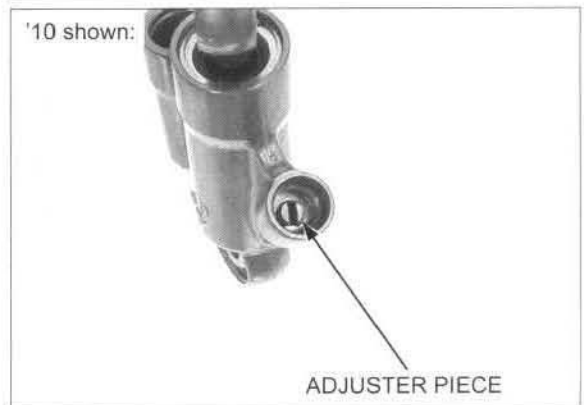
Drain the damper oil from the damper case.



Remove the plug bolt and O-ring.



Remove the adjuster piece from the damper case.

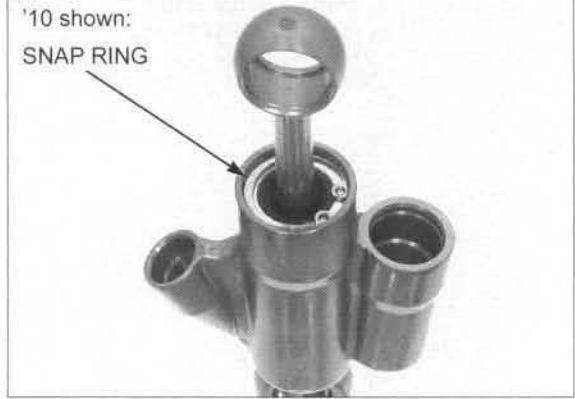


## FRONT WHEEL/SUSPENSION/STEERING

Remove the damper rod side spherical bearing (page 13-43).

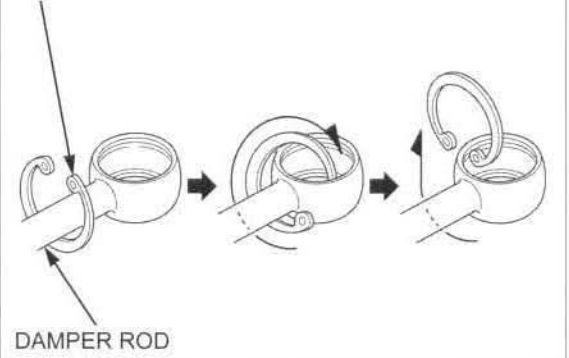
Remove the snap ring from the damper case groove.

'10 shown:  
SNAP RING



Remove the snap ring from the damper rod as shown.

SNAP RING



Carefully pull the damper case and rod guide with the O-ring out of the damper case.

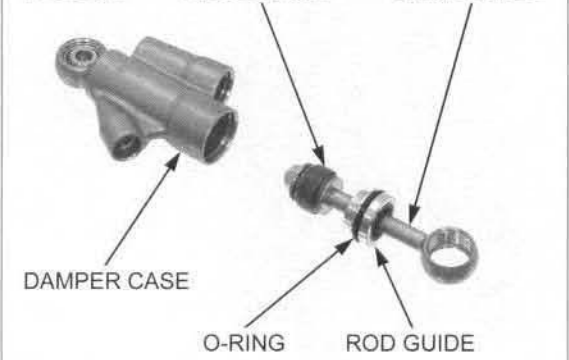
Check the following:

- Rod guide for abnormal scratches
- Damper piston ring for fatigue or damage
- Damper case inner surface for abnormal scratches

Replace the damper case if necessary.

Replace the damper rod as an assembly if necessary.

'10 shown: PISTON RING DAMPER ROD

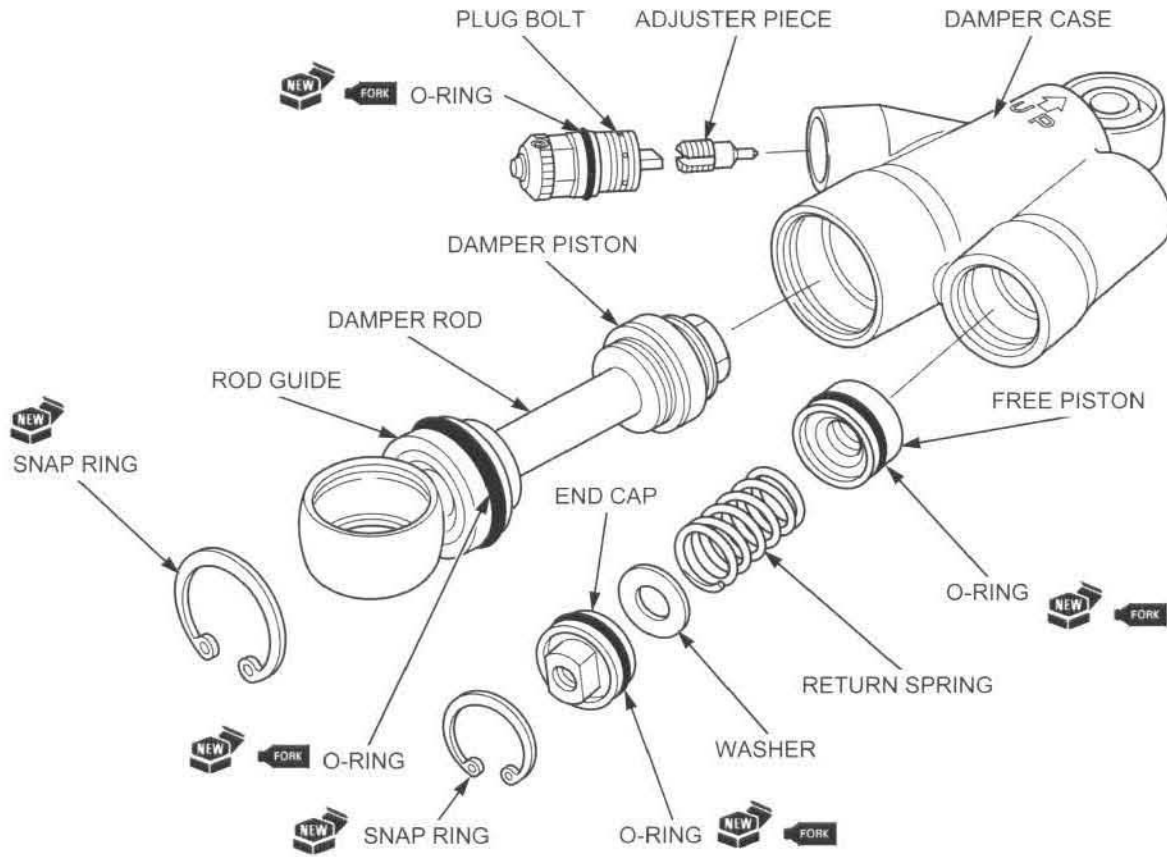


**HPSD ASSEMBLY**

**NOTE:**

- When assembling the HPSD, follow the procedures below.
- Clean the inner surface of the damper case thoroughly.
- Bleed air from the damper while having it completely submerged in oil.

'10 shown:



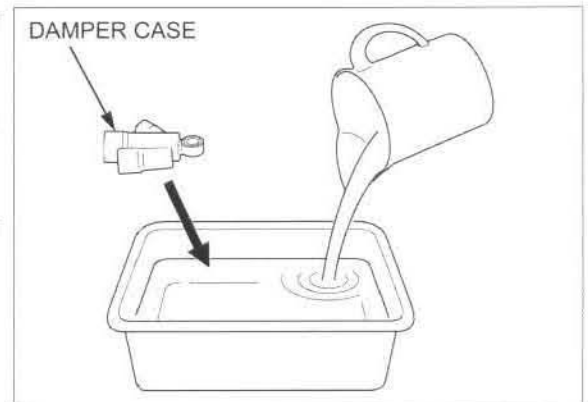
Check that the damper oil temperature is 20°C (68°F). Pour recommended damper oil into a suitable container until the steering damper case is fully submerged.

**RECOMMENDED DAMPER OIL:**

'10: Pro Honda HP Fork Oil 5W or equivalent  
 After '10: Pro Honda HP Fork Oil SS-19

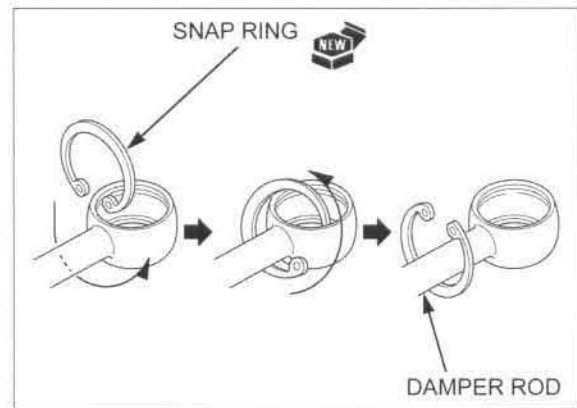
- Check the damper oil for contamination.
- Do not allow foreign materials to enter the damper oil.

Completely submerge the damper in the oil.



## FRONT WHEEL/SUSPENSION/STEERING

Be careful not to damage or deform the snap ring. Install a new snap ring to the damper rod as shown.

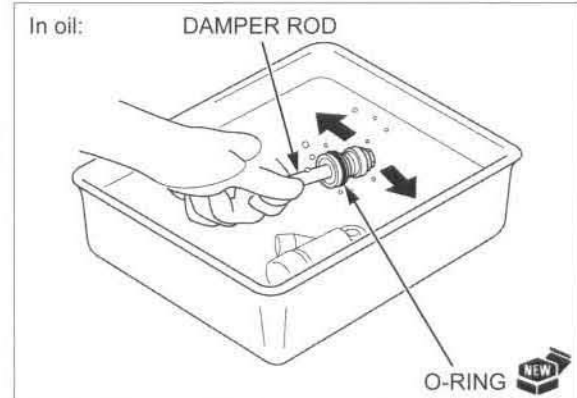


Bleed any trapped air at the O-ring seating surface by turning the O-ring.

Completely submerge the damper rod in the oil.

Install a new O-ring to the rod guide. Shake the damper rod until there are no air bubbles.

- Be careful not to damage the damper rod and damper piston, especially around the damper rod sliding surface.



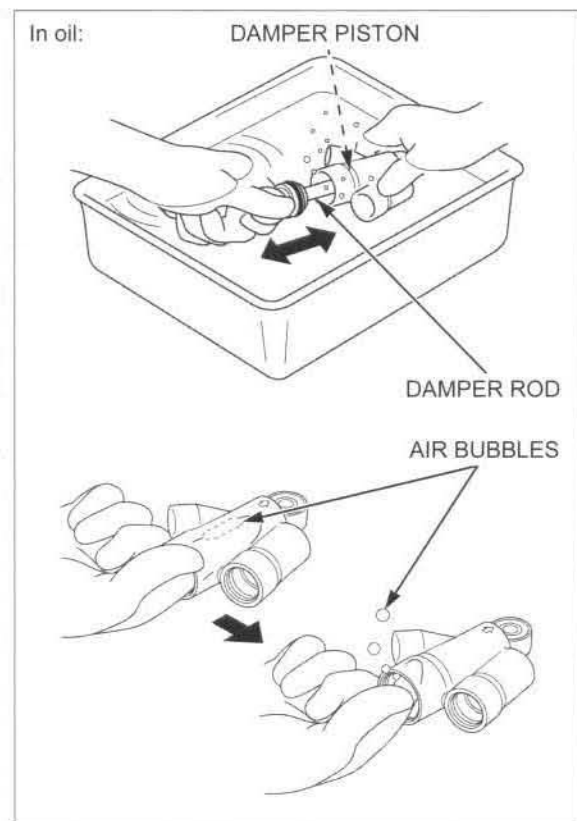
Bleed any air out from the damper case and damper piston following the procedure below:

1. Install the damper piston into the damper case, pump the damper rod quickly.

### NOTE:

- To open the piston valve, pump the piston rod quickly.
2. Remove the damper piston from the damper case.
  3. Bring any air out from the damper case by using your finger as shown.
  4. Repeat steps 1 through 3 at least three times until there are no air bubbles in the damper case and damper piston.

Install the damper rod into the damper case carefully.

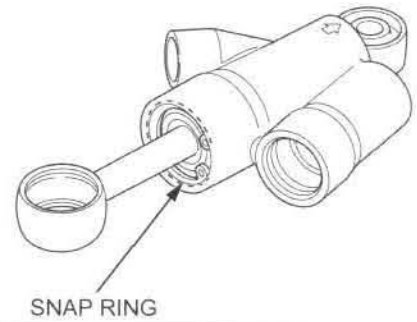


Keep the damper case submerged in oil.

Install the snap ring to the damper case groove.

- Be careful not to damage or deform the snap ring.
- Be certain the snap ring is firmly seated in the groove.

In oil:



Fully extend the damper rod.

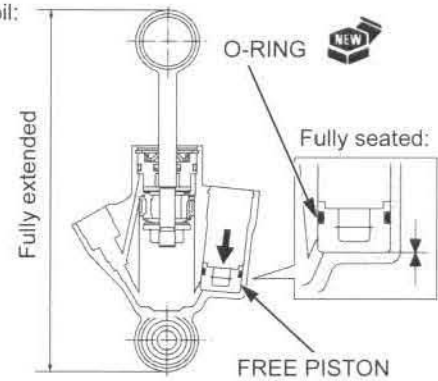
Bleed any trapped air at the O-ring seating surface by turning the O-ring.

Install a new O-ring to the free piston.

Install and push the free piston fully into the damper case while holding the damper rod at maximum length.

- Check that the free piston is fully seated to the damper case.

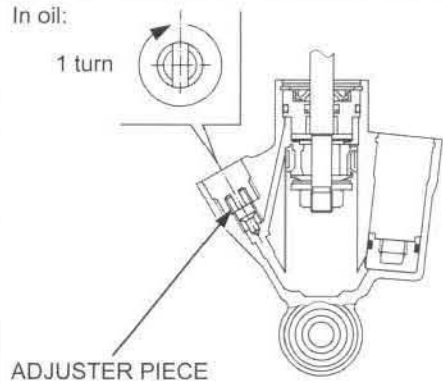
In oil:



Keep the damper assy submerged in oil.

Install the adjuster piece into the threads of the damper case and thread it one turn.

In oil:



Check that the damper rod is fully extended to its maximum length.

Bleed any trapped air at the O-ring seating surface by turning the O-ring.

Install a new O-ring to the plug bolt.

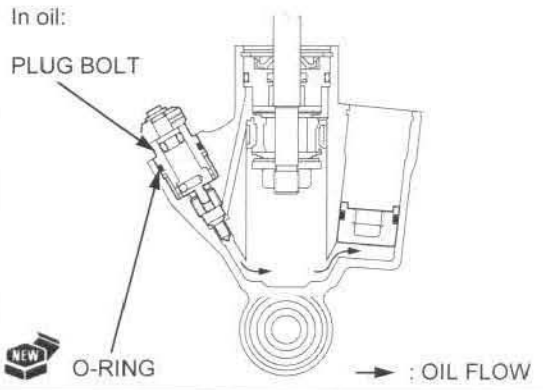
Make sure the adjuster knob moves freely before tightening the plug bolt.

Install and tighten the plug bolt securely.

**NOTE:**

Oil is displaced as the adjuster piece and plug bolt are installed into the damper case. The displaced oil causes the free piston to move slightly as shown in the illustration.

In oil:



## FRONT WHEEL/SUSPENSION/STEERING

Remove the steering damper from the oil.  
Drain the damper oil from the sub tank.

Gauge the depth between the spring seating surface of the free piston and surface of the damper case using the special tool as shown.

### TOOL:

**Depth gauge** **07AMJ-MENA100**  
(U.S.A. only)

Before using the tool, make sure that the shouldered end of the probe is extending from the collar side of the depth gauge.

Insert the collar of the depth gauge into the sub tank. Loosen the thumb screw and lower the shouldered end of the probe until it stops.

Tighten the thumb screw and remove the tool.

Measure the depth of the free piston with a caliper by measuring the distance between the end of the probe and the collar.

### STANDARD:

'10: **27.3 – 27.9 mm (1.07 – 1.10 in)**  
at oil temperature 20°C (68°F)

After '10: **31.3 – 31.9 mm (1.23 – 1.26 in)**  
at oil temperature 20°C (68°F)

Measure the oil temperature.

If measured temperature is other than 20°C (68°F), refer to the oil chart (page 13-50).

If the measured depth is other than the standard length, disassemble the steering damper and start over.

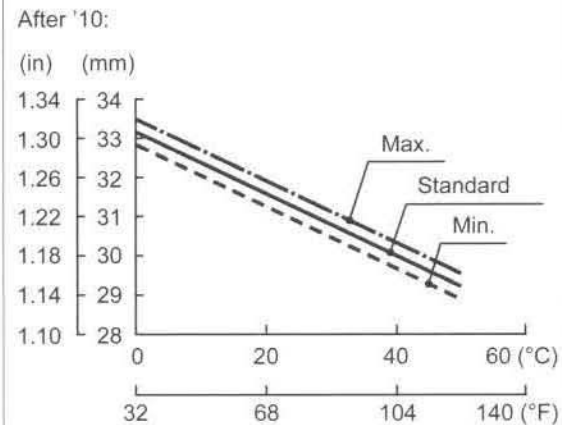
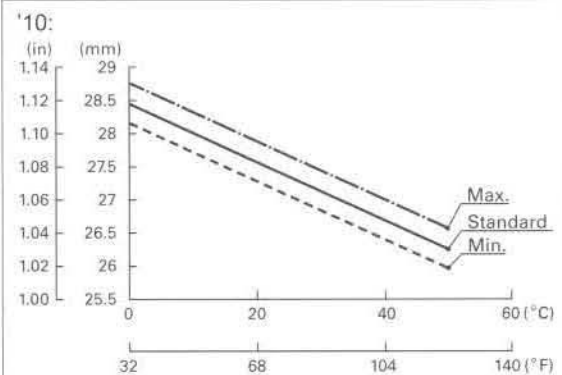
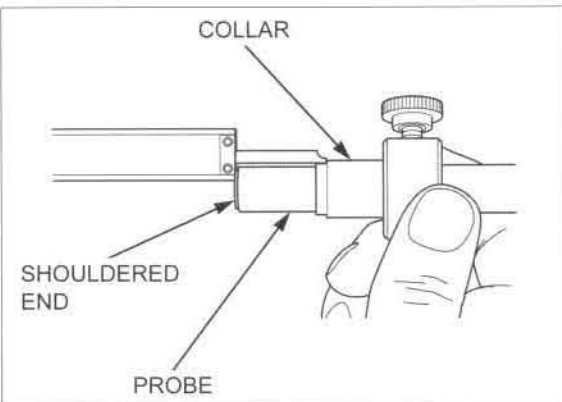
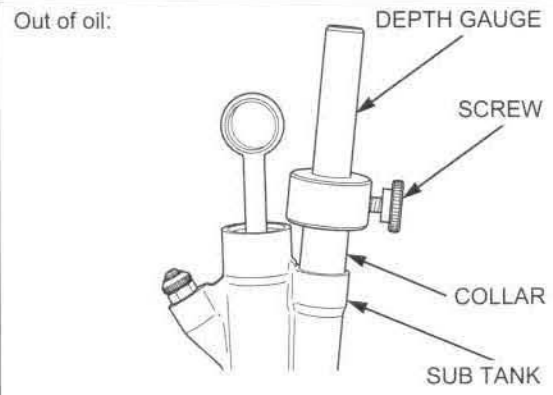
The depth of the free piston will change according to the oil temperature as shown.

'10: unit: mm (in)

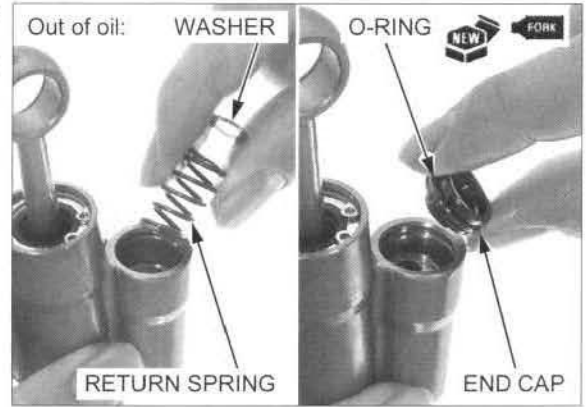
°C/°F	Depth		
	Max.	Standard	Min.
0/32	28.8 (1.13)	28.5 (1.12)	28.2 (1.11)
10/50	28.3 (1.11)	28.0 (1.10)	27.7 (1.09)
20/68	27.9 (1.10)	27.6 (1.09)	27.3 (1.07)
30/86	27.5 (1.08)	27.2 (1.07)	26.9 (1.06)
40/104	27.0 (1.06)	26.7 (1.05)	26.4 (1.04)
50/122	26.6 (1.05)	26.3 (1.04)	26.0 (1.02)

After '10: unit: mm (in)

°C/°F	Depth		
	Max.	Standard	Min.
0/32	33.5 (1.32)	33.2 (1.31)	32.9 (1.30)
10/50	32.7 (1.29)	32.4 (1.28)	32.1 (1.26)
20/68	31.9 (1.26)	31.6 (1.24)	31.3 (1.23)
30/86	31.1 (1.22)	30.8 (1.21)	30.5 (1.20)
40/104	30.3 (1.19)	30.0 (1.18)	29.7 (1.17)
50/122	29.5 (1.16)	29.2 (1.15)	28.9 (1.14)

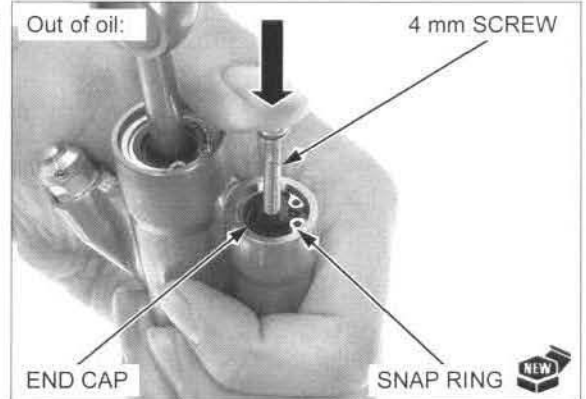


Install the return spring and washer into the damper case.  
 Apply recommended damper oil (page 13-47) to a new O-ring and install it to the end cap groove.  
 Install the end cap.



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

Thread a 4 mm screw to the end cap and install a new snap ring to the damper case while pushing the end cap until the snap ring groove appear.



Check the operation of the damper rod, by pumping it slowly; extending and compressing by hand.

Check the following:

- Oil leakage
- Abnormal noise by trapped air

If you hear an abnormal noise, caused by trapped air, reassemble the steering damper.

Install the damper rod side spherical bearing (page 13-43).



*Measure the damper rod length with the inside jaws of a vernier caliper.*

Measure the length between the spherical bearings as shown:

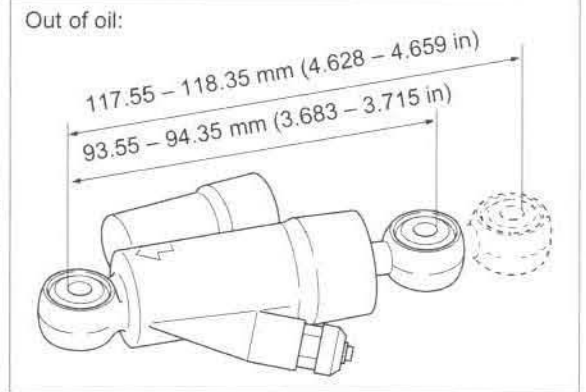
**STANDARD: Fully compressed damper rod length:**  
 93.55 – 94.35 mm (3.683 – 3.715 in)  
**Fully extended damper rod length:**  
 117.55 – 118.35 mm (4.628 – 4.659 in)

If the measured lengths are outside the standard length, disassemble the steering damper and start over.

**NOTE:**

The HPSD will not work correctly if the fully compressed damper rod length is more than standard.

Return the damping force adjuster to its original position, for standard position (page 13-3).  
 Install the steering damper (page 13-41).





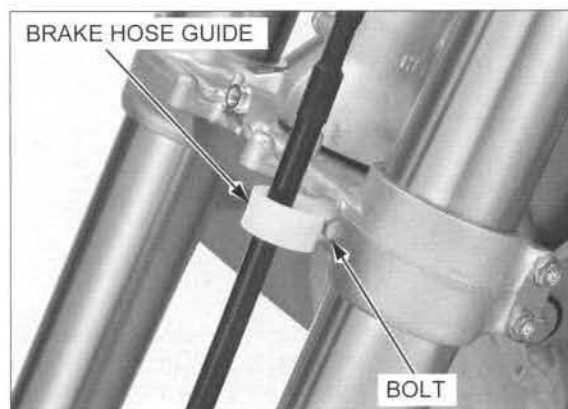
## STEERING STEM

### REMOVAL

Remove the following:

- Front fender (page 2-5)
- Handlebar (page 13-36)
- Front wheel (page 13-7)
- Steering damper (page 13-41)

Remove the bolt and brake hose guide.

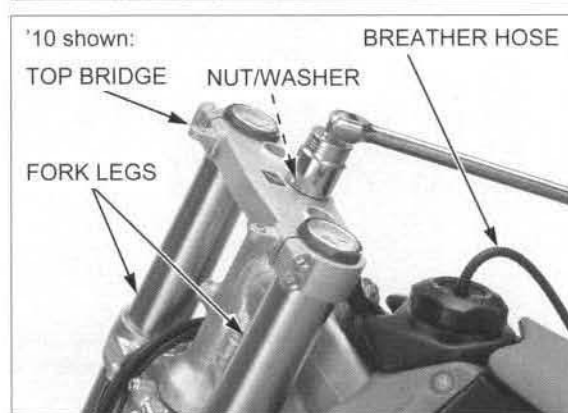


Pull out the fuel tank breather hose from the steering stem.

Remove the steering stem nut and washer.

Remove the fork legs (page 13-14).

Remove the fork top bridge.

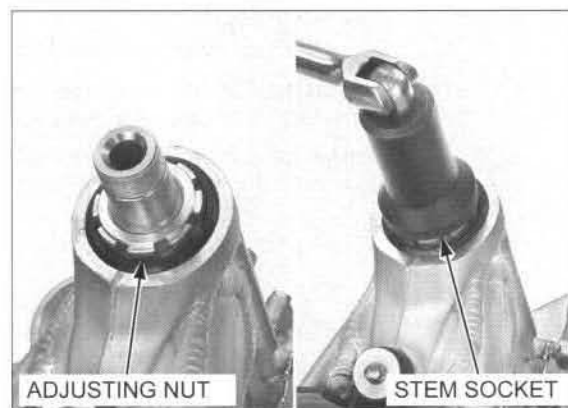


Remove the steering stem adjusting nut using the special tool.

#### TOOL:

Steering stem socket

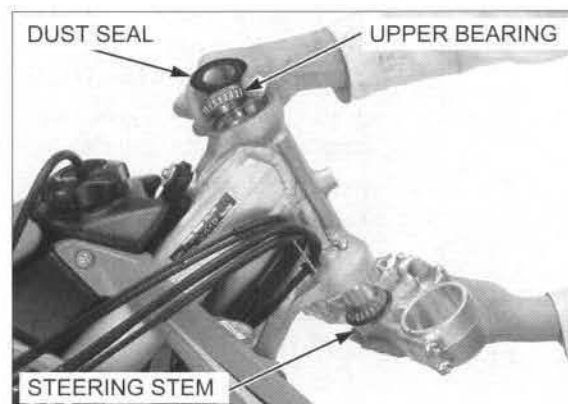
07916-3710101



Remove the upper dust seal, upper tapered roller bearing and steering stem.

Check the bearings and outer races for wear or damage.

Replace the bearings and outer races as a set, if necessary (page 13-53).



**BEARING REPLACEMENT**

*Always replace the bearings and outer races as a set.*

Remove the upper and lower outer races from the head pipe using the special tools.

**TOOLS:**

Remover weight 07741-0010201  
 Ball race remover shaft 07JAC-PH80200  
 Not available in U.S.A.

Adjustable Bearing Puller, 45-75mm 07YAC-0010102

**TOOLS U.S.A.:**

Remover weight 07936-371020A  
 Adjustable Bearing Puller, 45-75mm 07YAC-0010102  
 Adapter, 8mm x 3/8 x 16 thread 07YAC-001A200 and commercially available slide hammer, 3/8 x 16 thread

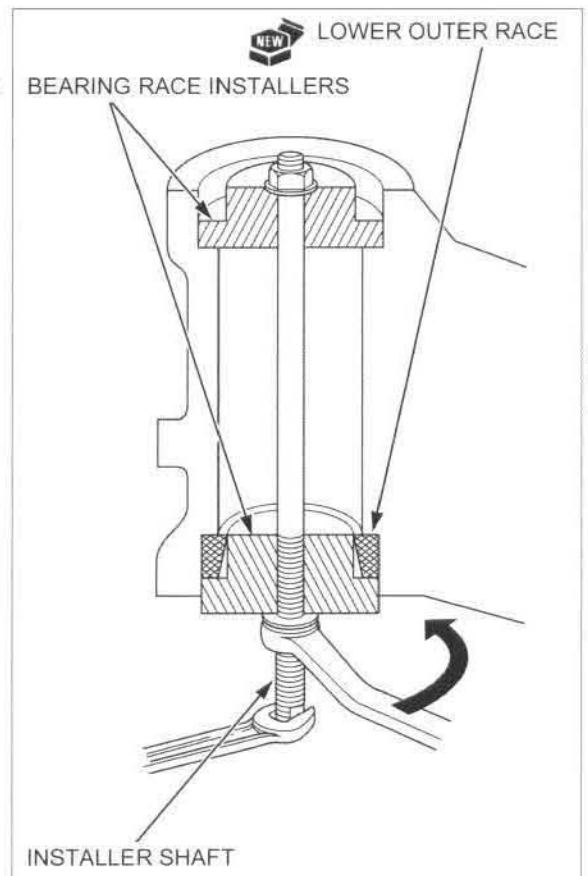


Install a new lower outer race, bearing race installers, and installer shaft as shown.

Hold the shaft with a wrench, and turn the installer to install the lower outer race.

**TOOLS:**

Bearing race installer (2 required) 070MF-MEN0100 or 070MF-MENA100 (U.S.A. only)  
 Installer shaft 07VMF-KZ30200



## FRONT WHEEL/SUSPENSION/STEERING

Install a new upper outer race, bearing race installers, and installer shaft as shown.

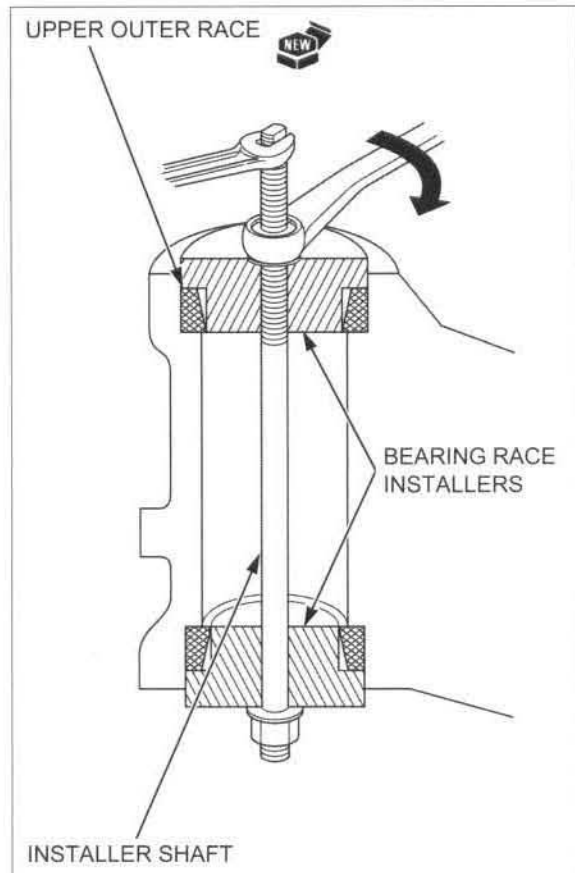
Hold the shaft with a wrench, and turn the installer to install the upper outer race.

### TOOLS:

**Bearing race installer  
(2 required)**

**070MF-MEN0100 or  
070MF-MENA100  
(U.S.A. only)  
07VMF-KZ30200**

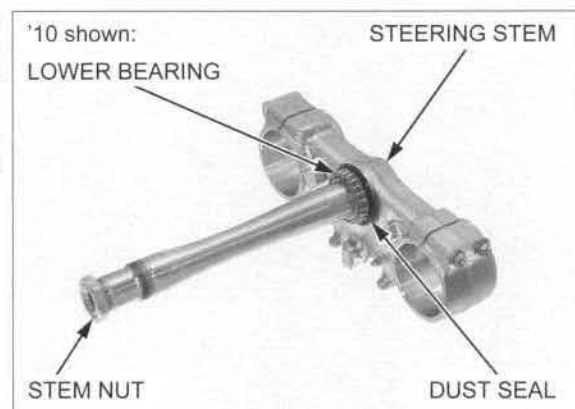
**Installer shaft**



Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower tapered roller bearing from the steering stem.

Remove the lower tapered roller bearing with a chisel or equivalent tools, being careful not to damage the steering stem.

Remove the dust seal.



*When using the special tool the smaller outside diameter must face the bearing.*

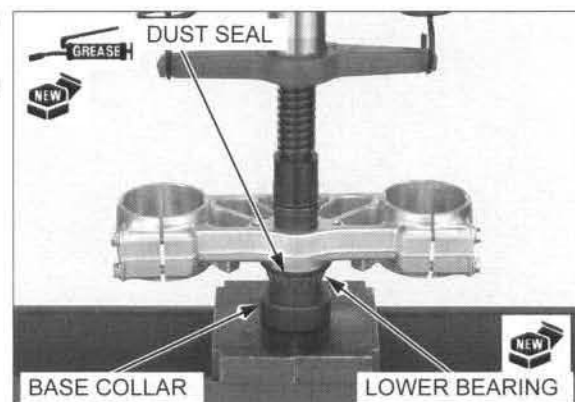
Apply specified grease (page 1-19) to the lips of a new dust seal, and install it over the steering stem.

Install a new lower tapered roller bearing using a hydraulic press and the special tool as shown.

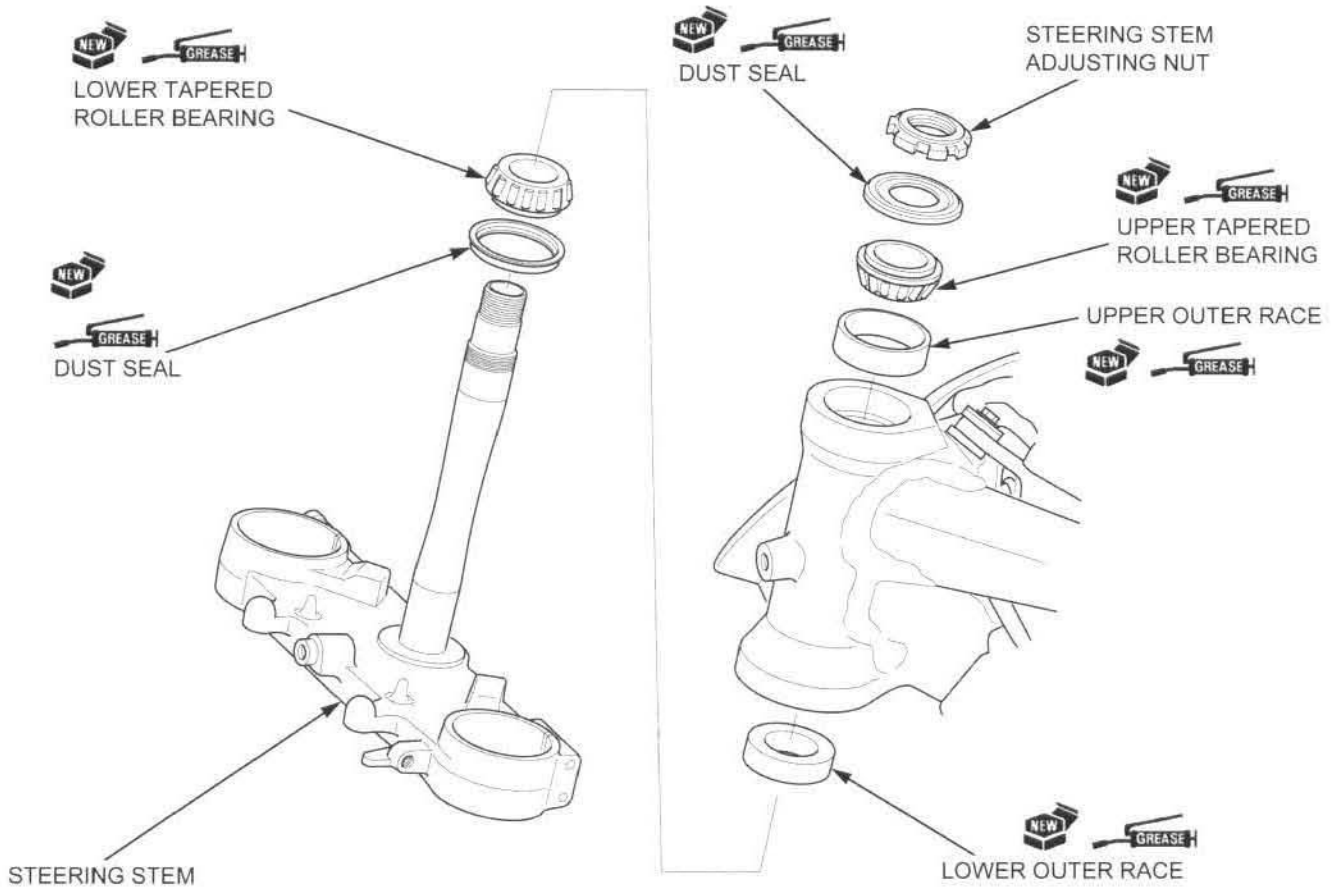
### TOOL:

**Attachment, 30 mm I.D.**

**07746-0030300**



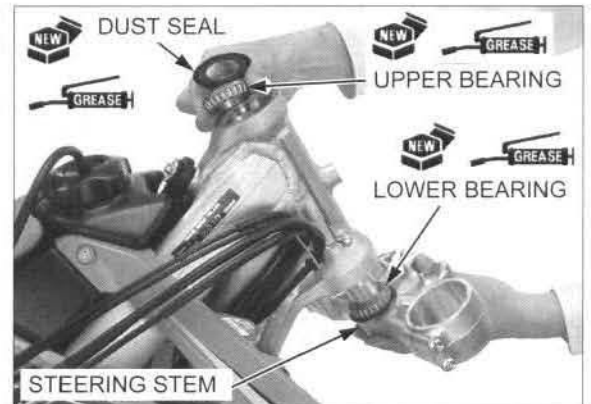
INSTALLATION



Apply specified grease (page 1-19) to each new steering head bearing rolling area and new upper dust seal lip.

Insert the steering stem into the steering head pipe and install the following while holding the stem:

- Upper tapered roller bearing
- Upper dust seal



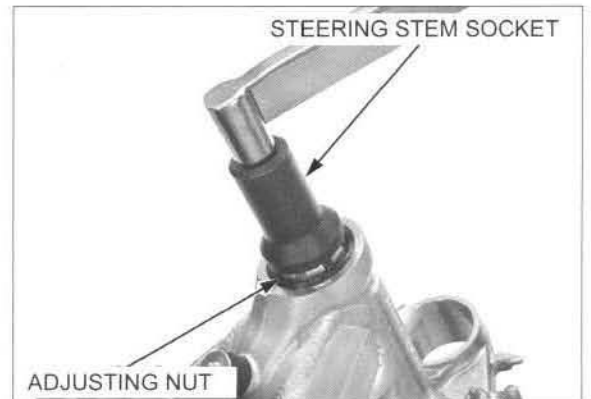
Install the steering stem adjusting nut.

Tighten the steering stem adjusting nut to the specified torque using the special tool while holding the steering stem.

**TORQUE: 29.5 N·m (3.0 kgf·m, 22 lbf·ft)**

**TOOL:**

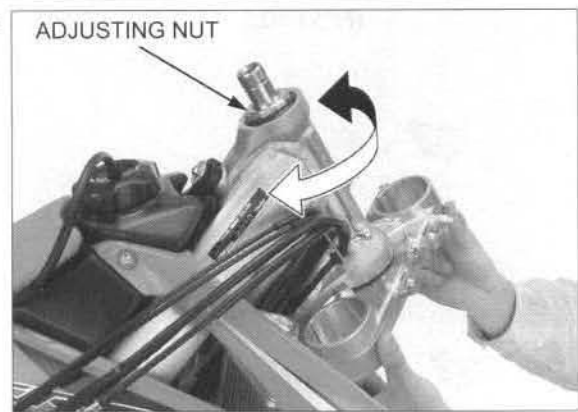
Steering stem socket 07916-3710101



## FRONT WHEEL/SUSPENSION/STEERING

Move the steering stem lock-to-lock several times to seat the bearings.

Loosen the steering stem adjusting nut fully.



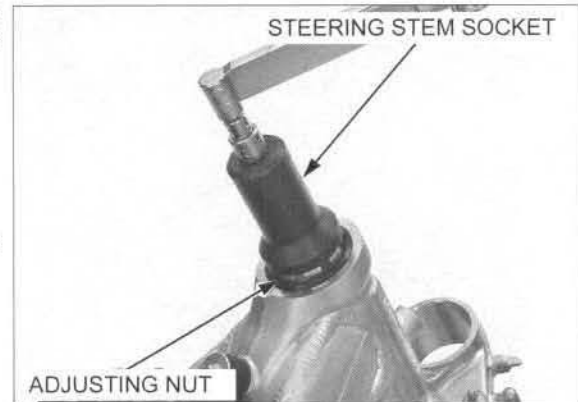
Retighten the steering stem adjusting nut to the specified torque using the special tool while holding the steering stem.

**TORQUE: 7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)**

**TOOL:**

**Steering stem socket                      07916-3710101**

Recheck that the steering stem moves smoothly without play or binding.



Install the following:

- Fork top bridge
- Fork legs (page 13-34)
- Washer and steering stem nut

Tighten the steering stem nut to the specified torque.

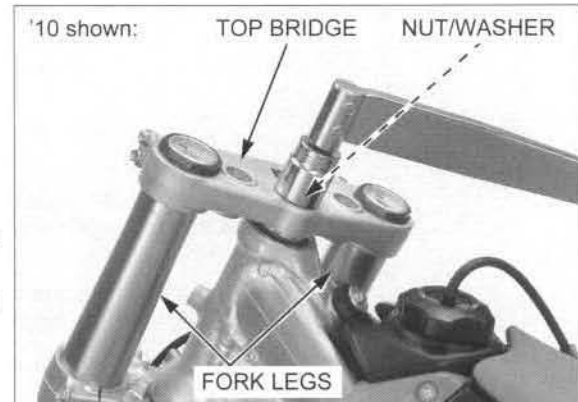
**TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)**

Recheck the steering stem adjustment before installing the removed parts.

Install the remaining removed parts in the reverse order of removal.

**TORQUE:**

**Front brake hose guide bolt:  
5.2 N·m (0.5 kgf·m, 3.8 lbf·ft)**



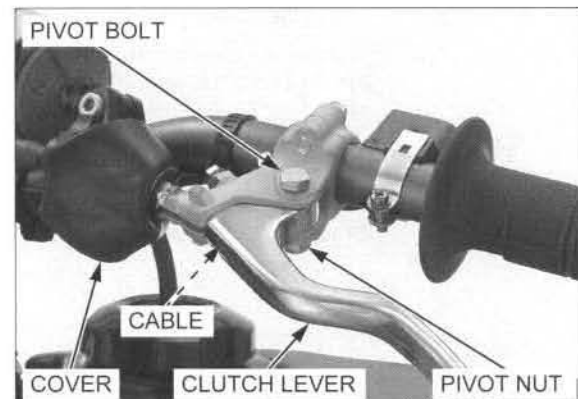
## CLUTCH LEVER

### REMOVAL/INSTALLATION

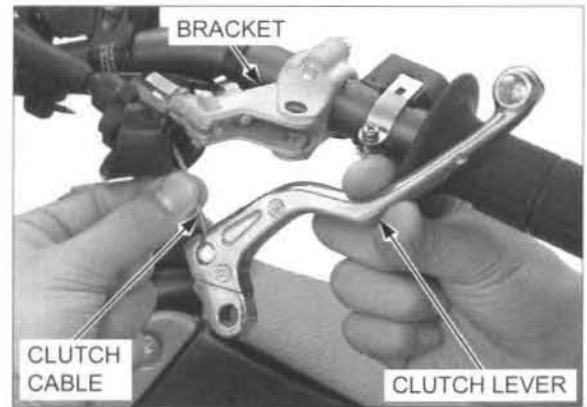
Release the clutch lever cover.

Remove the clutch lever pivot nut and bolt.

Remove the clutch lever by releasing the clutch cable.



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.

Install and tighten the clutch lever pivot bolt to the specified torque.

**TORQUE: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)**

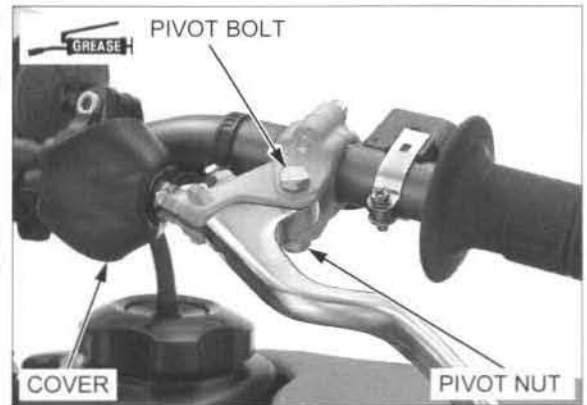
Loosen the clutch lever pivot bolt 45° – 90°.

Install and tighten the clutch lever pivot nut to the specified torque while holding the clutch lever pivot bolt.

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

Adjust the clutch lever freeplay (page 3-26).

Reinstall the clutch lever cover.



---

**MEMO**



# 14. REAR WHEEL/SUSPENSION

---

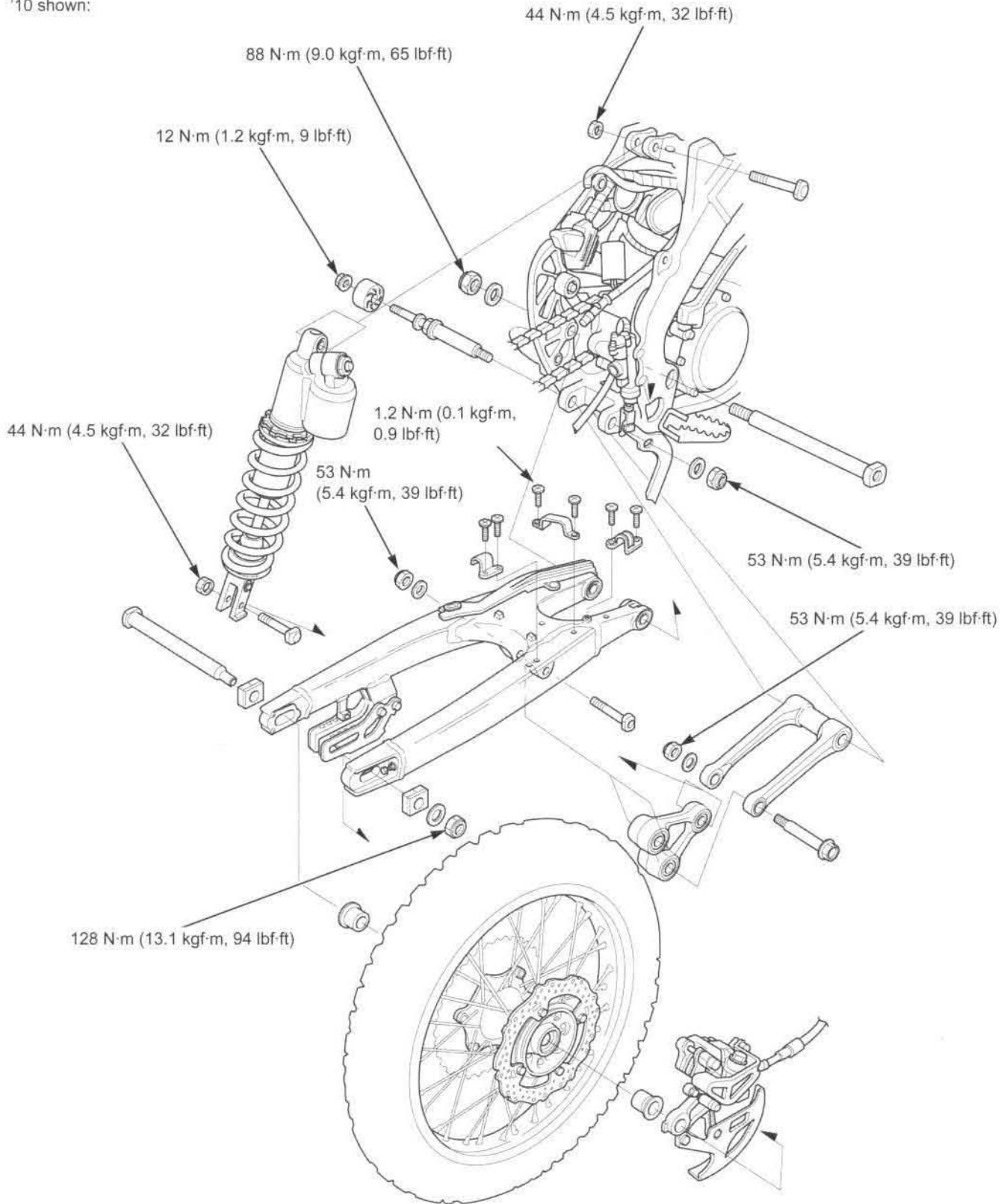
COMPONENT LOCATION .....	14-2	SHOCK ABSORBER .....	14-13
SERVICE INFORMATION .....	14-3	SHOCK LINKAGE .....	14-31
TROUBLESHOOTING .....	14-6	SWINGARM .....	14-36
REAR WHEEL .....	14-7		



## REAR WHEEL/SUSPENSION

### COMPONENT LOCATION

\*10 shown:



## SERVICE INFORMATION

### GENERAL

- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- When servicing the rear wheel, support the motorcycle using a safety stand or hoist.
- For optimum suspension performance and linkage component service life, the swingarm and shock linkage pivot bearing (along with related seals and bushings) should be disassembled, cleaned, inspected for wear and lubricated with multi-purpose grease NLGI No.2 (molybdenum disulfide MoS<sub>2</sub> additive) every 3 races or 7.5 hours of operation.
- Optional rear wheel sprockets, drive chain, shock springs and pin spanners are available. For optional parts (page 1-30).
- For brake system information (page 15-4).
- Use Honda genuine replacement bolts and nuts for all suspension pivot and mounting points.
- After the rear wheel installation, check the brake operation by applying the brake pedal.

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
Cold tire pressure			100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	–	
Axle shaft runout			–	0.2 (0.01)	
Wheel rim runout	Radial		–	2.0 (0.08)	
	Axial		–	2.0 (0.08)	
Wheel hub-to-rim distance			See page 14-10	–	
Drive chain	Size/link	DID	DID 520DMA4-116RB	–	
		RK	RK 520TXZ-116RJ	–	
	Slack	'10, '11	30 – 40 (1.2 – 1.6)	–	
		After '11	25 – 35 (1.0 – 1.4)	–	
Drive chain length at 17 pins (16 pitches)			–	259 (10.2)	
Drive chain slider thickness			Upper side	5 (0.2)	
			Lower side	2.5 (0.10)	
Drive chain roller O.D.			'10, '11	35 (1.4)	
			After '11	Upper	39 (1.5)
				Lower	31 (1.2)
Shock absorber	Damper gas pressure		980 kPa (9.9 kg/cm <sup>2</sup> , 142 psi)	–	
	Damper compressed gas		Nitrogen gas	–	
	Recommended shock oil		HP Fork Oil SS-25	–	
	Damper rod compressed force at 12 mm compressed		196 – 235 N (20.0 – 24.0 kgf, 44.1 – 52.9 lbf)	–	
	Spring installed length (standard)	'10	259.9 (10.23)	–	
		'11, '12	260.8 (10.27)	–	
		After '12	261.2 (10.28)	–	
Oil capacity		372 cm <sup>3</sup> (12.6 US oz, 13.1 Imp oz)	–		
High speed compression damping adjuster standard position			'10	11/12 – 1-5/12 turns out from full in	
			'11	1-1/12 – 1-7/12 turns out from full in	
			'12	1-1/2 – 2 turns out from full in	
			After '12	1-3/4 – 2-1/4 turns out from full in	
Low speed compression damping adjuster standard position			'10	7 clicks out from full in	
			After '10	8 clicks out from full in	
Rebound damping adjuster standard position			'10	9 – 12 clicks out from full in	
			'11, '12	10 clicks out from full in	
			After '12	11 clicks out from full in	

## REAR WHEEL/SUSPENSION






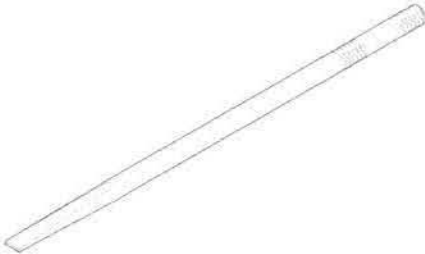
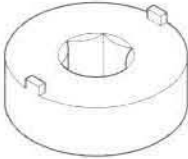
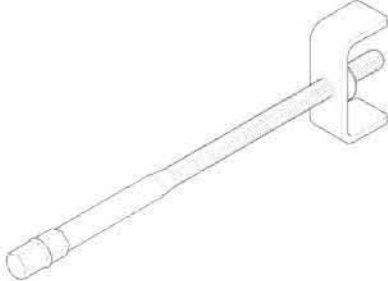
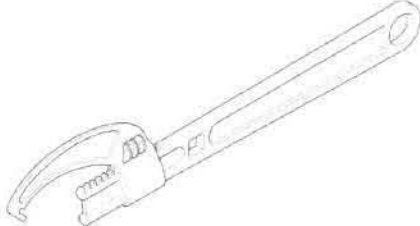

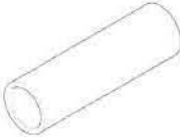
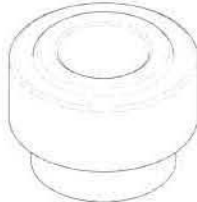
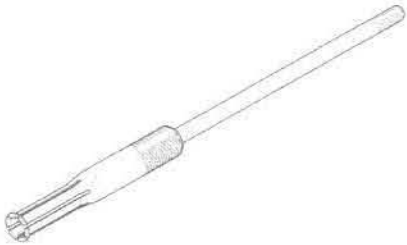

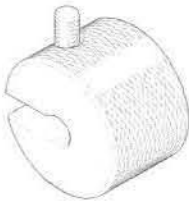
### TORQUE VALUES

Rear axle nut		128 N·m (13.1 kgf·m, 94 lbf·ft)	U-nut
Driven sprocket nut		32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Rear brake disc nut		16 N·m (1.6 kgf·m, 12 lbf·ft)	U-nut
Rear wheel bearing retainer		44 N·m (4.5 kgf·m, 32 lbf·ft)	Peen.
Shock absorber upper mounting nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock absorber lower mounting nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	U-nut
Shock absorber damper rod end nut		37 N·m (3.8 kgf·m, 27 lbf·ft)	Replace with a new one. Stake
Shock absorber compression damping adjuster		30 N·m (3.1 kgf·m, 22 lbf·ft)	
Shock absorber spring adjuster lock nut		44 N·m (4.5 kgf·m, 32 lbf·ft)	
Drive chain lower roller nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Shock arm nut	(swingarm side)	53 N·m (5.4 kgf·m, 39 lbf·ft)	Apply engine oil to the threads and seating surface.
	(shock link side)	53 N·m (5.4 kgf·m, 39 lbf·ft)	U-nut Apply engine oil to the threads and seating surface.
Shock link nut	(frame side)	53 N·m (5.4 kgf·m, 39 lbf·ft)	U-nut Apply engine oil to the threads and seating surface.
Swingarm pivot nut		88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Drive chain guide mounting bolt/nut		12 N·m (1.2 kgf·m, 9 lbf·ft)	U-nut
Drive chain slider front side screw		4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	
Drive chain slider rear side screw		4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)	Apply locking agent to the threads.
Rear brake hose guide screw		1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)	
Drive chain adjuster lock nut		27 N·m (2.8 kgf·m, 20 lbf·ft)	UBS nut

### TOOLS

Slider guide, 16 mm 07PMG-KZ40100  not available in U.S.A.	Driver 07949-3710001 	Driver 07749-0010000 
Attachment, 28 x 30 mm 07946-1870100 	Attachment, 40 x 42 mm 07746-0010900 	Attachment, 24 x 26 mm 07746-0010700 

**REAR WHEEL/SUSPENSION**

<p>Pilot, 19 mm 07746-0041400</p> 	<p>Pilot, 20 mm 07746-0040500</p> 	<p>Pilot, 22 mm 07746-0041000</p> 
<p>Pilot, 25 mm 07746-0040600</p> 	<p>Bearing remover head, 25 mm 07746-0050800</p> 	<p>Bearing remover shaft 07GGD-0010100</p> 
<p>Retainer wrench, 48 mm 07YMA-KZ40100</p>  <p>or 07HMA-KS70100 (U.S.A. only)</p>	<p>Retainer wrench body 07710-0010401</p> 	<p>Pin spanner (2 required) 07702-0020001</p>  <p>or Pin spanner A (2 required) 89201-KS6-810</p>
<p>Piston ring guide attachment 070MG-KZ30100</p>  <p>not available in U.S.A.</p>	<p>Collar, 23 x 17 mm 07GMD-KT8A110 (U.S.A. only)</p> 	<p>Attachment, 30 mm I.D. 07746-0030300</p> 
<p>Bearing Remover, 20mm 07936-3710600</p> 	<p>Remover Handle 07936-3710100</p> 	<p>Remover Weight 07741-0010201</p>  <p>07936-3710200 U.S.A. only</p>

## REAR WHEEL/SUSPENSION

---

### TROUBLESHOOTING

#### Soft suspension

- Weak shock absorber springs
- Incorrect suspension adjustment
- Shock oil leakage from damper unit
- Insufficient tire pressure

#### Stiff suspension

- Damaged shock absorber mounting bearing
- Bent damper rod
- Damaged swingarm pivot bearings
- Damaged suspension linkage bearings
- Bent swingarm pivot
- Incorrect suspension adjustment
- Tire pressure too high

#### Steers to one side or does not track straight

- Bent axle shaft
- Axle alignment/chain adjustment not equal on both sides

#### Rear wheel wobbling

- Bent rim
- Worn wheel bearings
- Bent spokes
- Unbalanced tire and wheel
- Faulty tire
- Insufficient tire pressure
- Faulty swingarm pivot bearings
- Loose axle nut
- Loose suspension fasteners

#### Rear wheel turns hard

- Faulty wheel bearings
- Bent axle shaft
- Brake drag (page 15-6)
- Drive chain too tight (page 3-20)

#### Rear suspension noise

- Faulty shock absorber
- Loose suspension fasteners

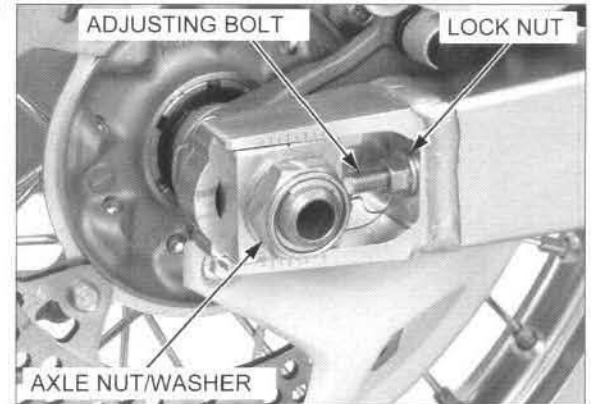
## REAR WHEEL

### REMOVAL

Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

Fully slacken the drive chain (page 3-20).

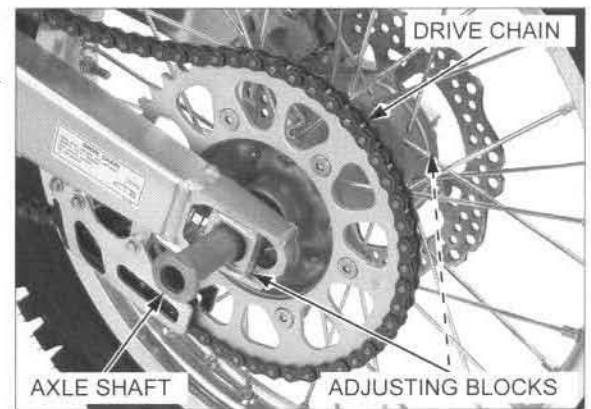
Remove the axle nut and washer.



Push the rear wheel forward to derail the drive chain from the driven sprocket.

*Do not operate the brake pedal after removing the rear wheel.*

Remove the axle shaft, adjusting blocks and rear wheel.



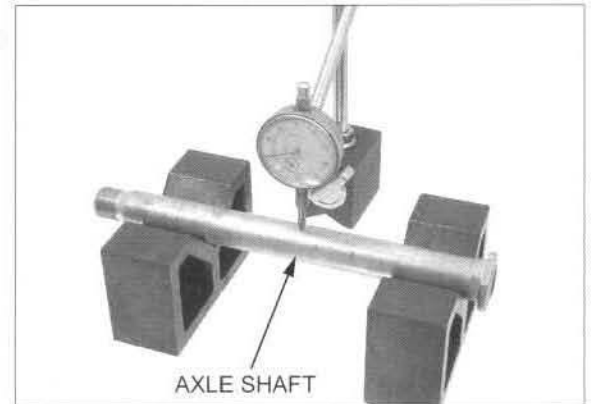
### INSPECTION

#### AXLE SHAFT RUNOUT

Set the axle shaft on V-blocks and measure the runout. Turn the axle shaft 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)**



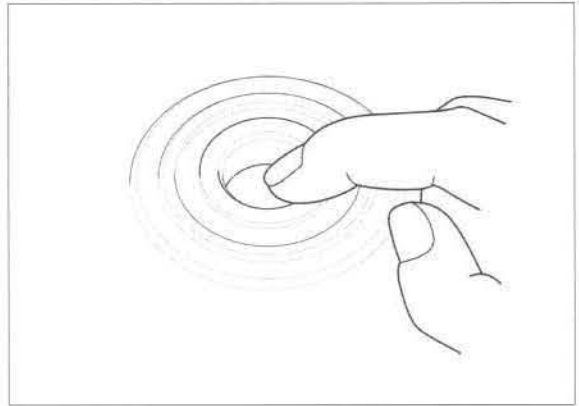
## REAR WHEEL/SUSPENSION

### WHEEL BEARING

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

*Replace the wheel bearings as a set.*

Replace the wheel bearing if necessary (page 14-8).



### WHEEL RIM RUNOUT

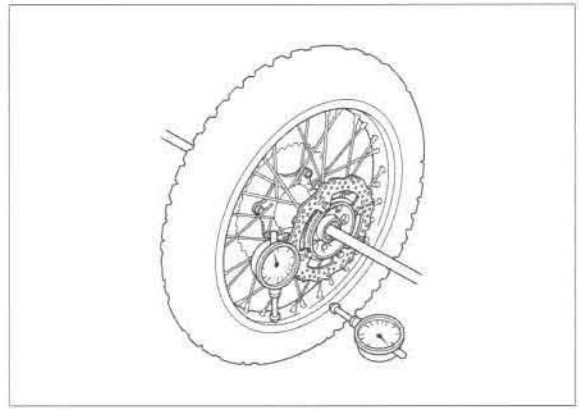
Check the rim runout by placing the wheel on a truing stand.  
Spin the wheel by hand, and read the runout using a dial indicator.

#### SERVICE LIMITS:

Radial: 2.0 mm (0.08 in)

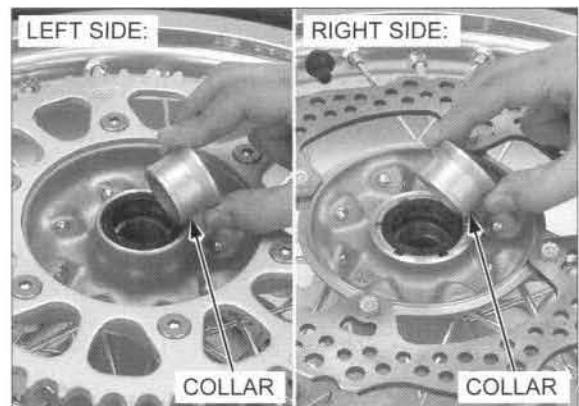
Axial: 2.0 mm (0.08 in)

Check the spokes and tighten any that are loose.



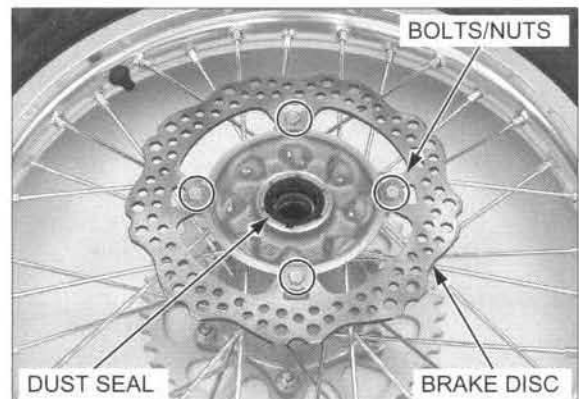
### DISASSEMBLY

Remove the right and left side collars.



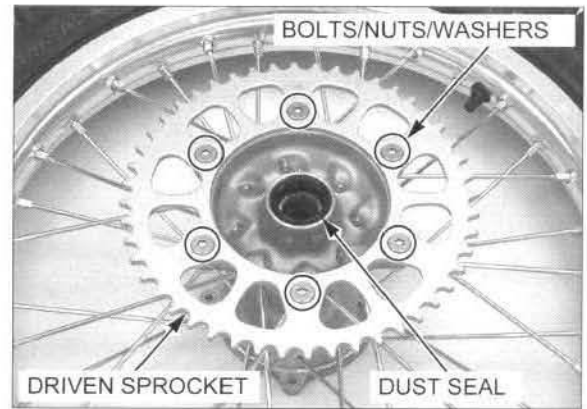
Remove the following:

- Brake disc bolts and nuts
- Brake disc
- Dust seal



Remove the following:

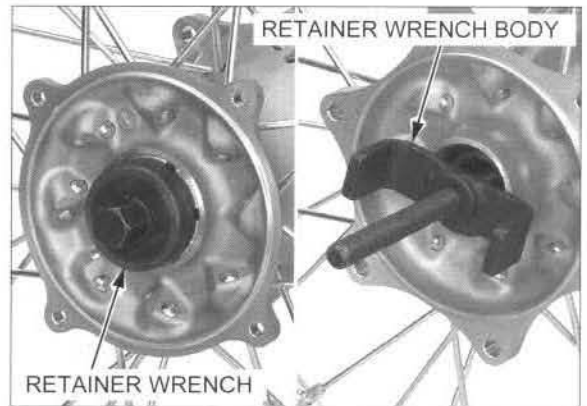
- Dust seal
- Driven sprocket bolts, nuts and washers
- Driven sprocket



Remove the bearing retainer using the special tools.

**TOOLS:**

- |                        |  |
|------------------------|--|
| Retainer wrench, 48 mm | 07YMA-KZ40100 or<br>07HMA-KS70100<br>(U.S.A. only) |
| Retainer wrench body   | 07710-0010401                                      |

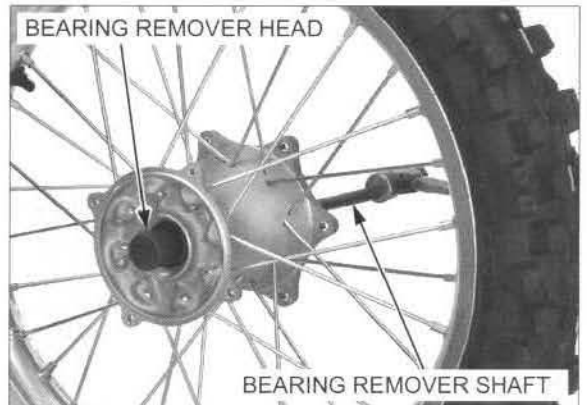


*Replace the wheel bearings as a set. Do not reuse old bearing.*

Install the remover head into the bearing. From the opposite side, install the remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearings.

**TOOLS:**

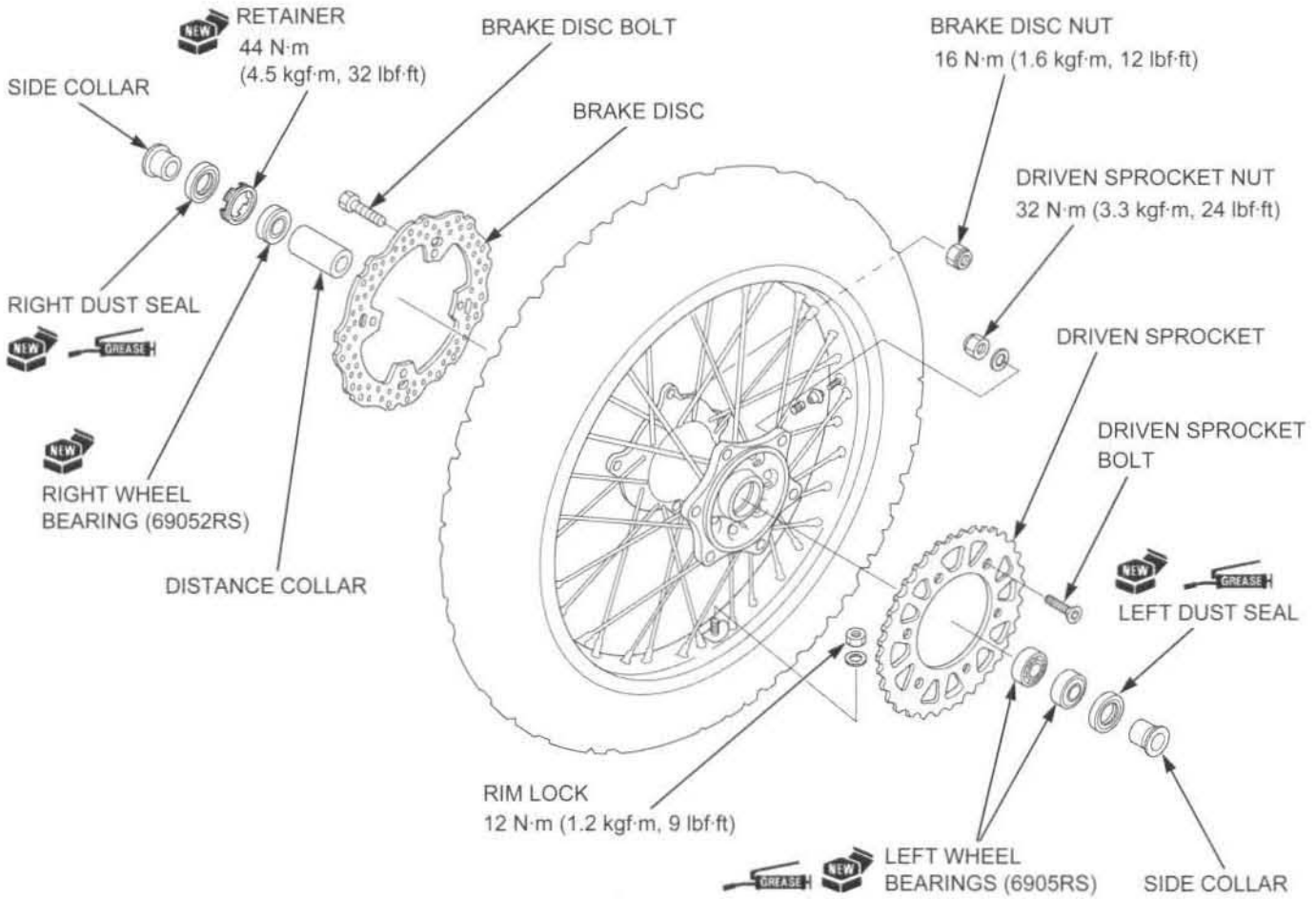
- |                             |               |
|-----------------------------|---------------|
| Bearing remover head, 25 mm | 07746-0050800 |
| Bearing remover shaft       | 07GGD-0010100 |





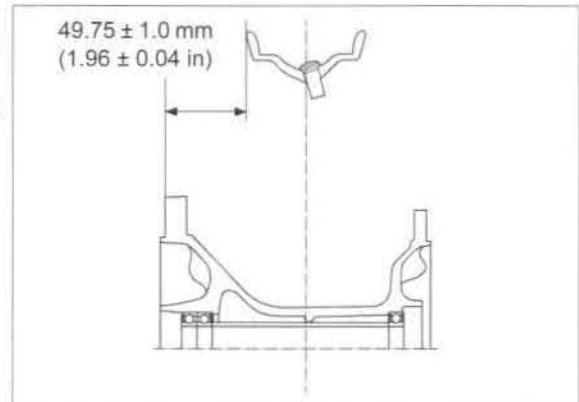
# REAR WHEEL/SUSPENSION

## ASSEMBLY



Place the rim on a work bench.  
Place the hub in the center of the rim, and begin lacing with new spokes.

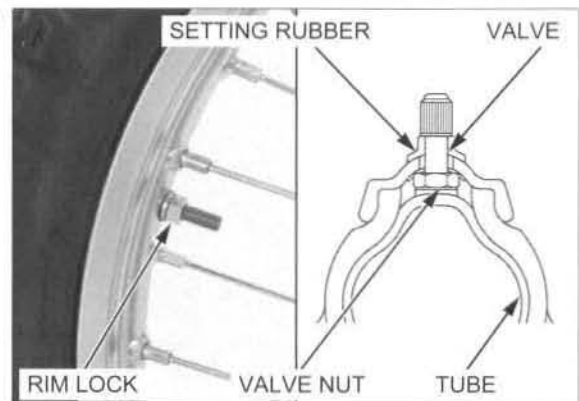
Adjust the hub position so the distance from the hub left end surface to the side of the rim is  $49.75 \pm 1.0$  mm ( $1.96 \pm 0.04$  in) as shown.



Tighten the spoke in two or three progressive steps (page 3-30).

Install the rim lock, setting rubber, tube and tire.

Tighten the rim lock (page 3-31).



Replace the wheel bearings as a set. Do not reuse old bearing.

Pack left wheel bearing cavity with grease.

Drive in a new right wheel bearing first making sure that it is fully seated and that the marked side facing out.

**TOOLS:**

- Driver 07749-0010000
- Attachment, 40 x 42 mm 07746-0010900
- Pilot, 25 mm 07746-0040600

Install the distance collar into place, then drive new left wheel bearings using the same tools.

- Drive the inside left wheel bearing with the sealed side facing down.
- Drive the outside left wheel bearing with the sealed side facing up.

Install and tighten a new bearing retainer to the specified torque using the special tools.

**TOOLS:**

- Retainer wrench, 48 mm 07YMA-KZ40100 or 07HMA-KS70100 (U.S.A. only)
- Retainer wrench body 07710-0010401

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

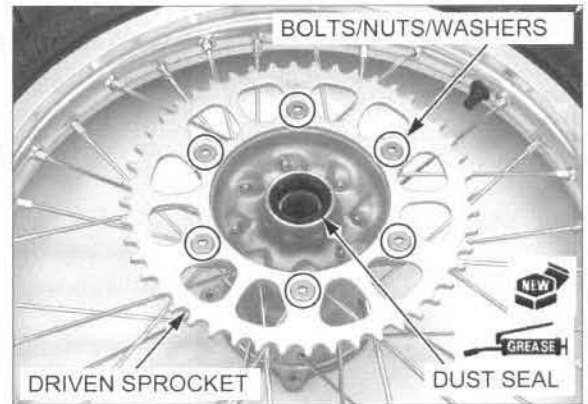
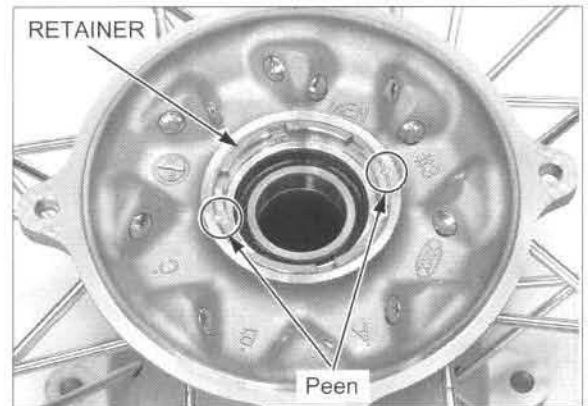
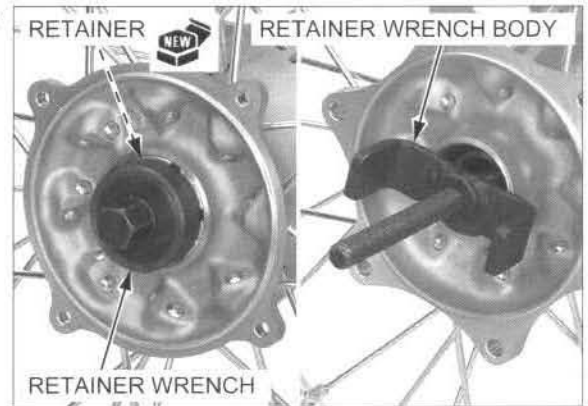
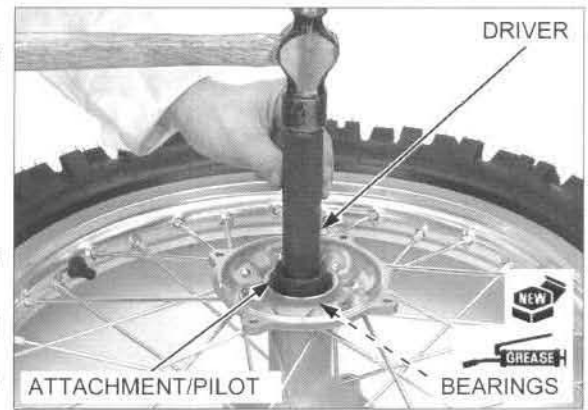
Peen the edge of the retainer.

Install the driven sprocket.

Install the bolts, washers and nuts, and tighten the nuts to the specified torque.

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

Pack the lips of a new dust seal with grease, and install it to the wheel hub.

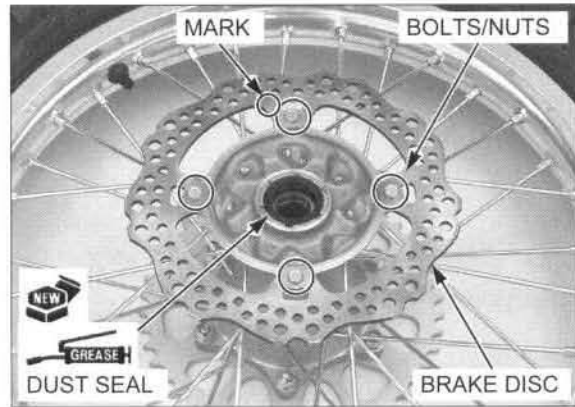


## REAR WHEEL/SUSPENSION

Pack the lips of a new dust seal with grease, and install it to the wheel hub.

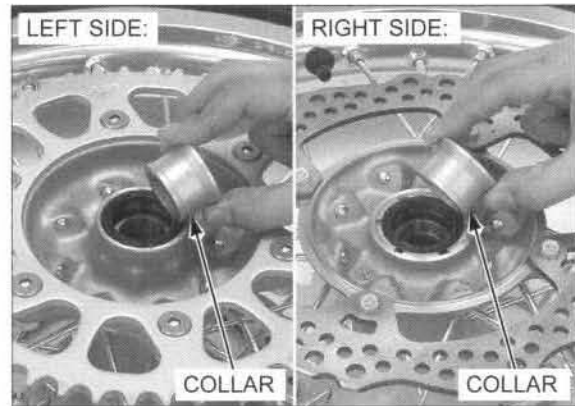
Install the brake disc onto the wheel hub with the minimum thickness mark (MIN. TH. 3.5 mm) facing out. Install the bolts/nuts. Tighten the nuts to the specified torque.

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



Check the right and left side collars for wear or damage. Replace them if necessary.

Install the right and left side collars.

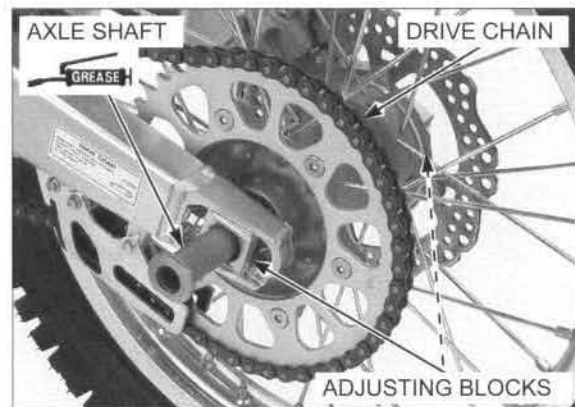


## INSTALLATION

*Be careful not to damage the brake pads.*

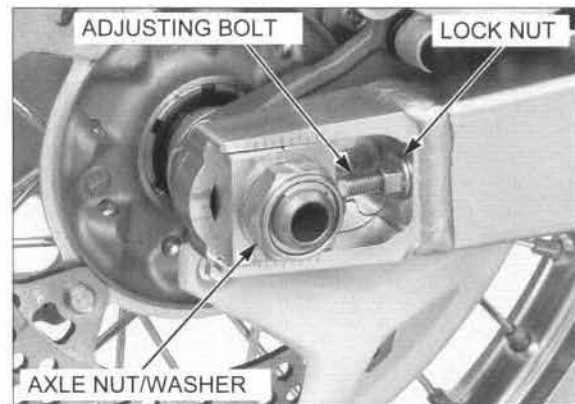
Place the rear wheel into the swingarm carefully aligning the brake disc between the brake pads.

Install the drive chain over the driven sprocket. Apply a thin coat of grease to the axle shaft surface. Install the adjusting blocks and axle shaft from the left side.



Install the washer and axle nut.

Adjust the drive chain slack (page 3-20).



# SHOCK ABSORBER

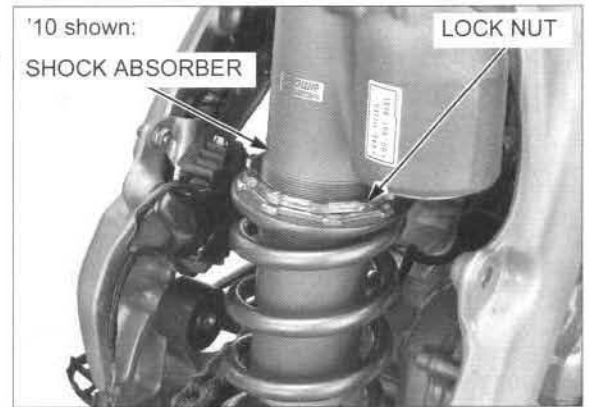
## REMOVAL

Remove the sub-frame (page 2-6).

If you plan to disassemble the shock absorber, loosen the spring adjuster lock nut.

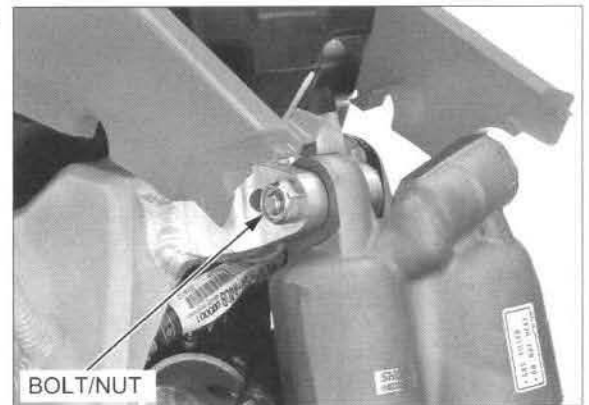
### TOOLS:

- Pin spanner            07702-0020001 (2 required) or
- Pin spanner A        89201-KS6-810 (2 required)

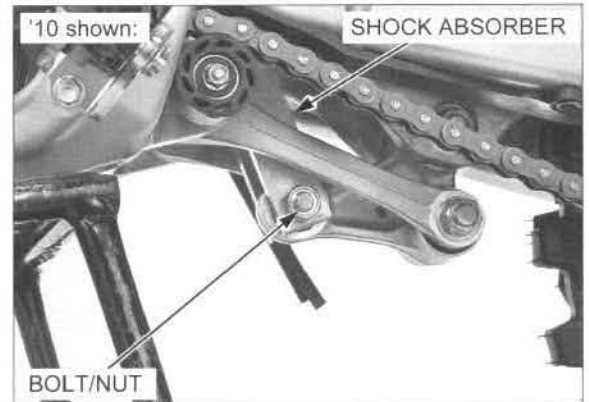


Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

Remove the upper mounting bolt and nut.

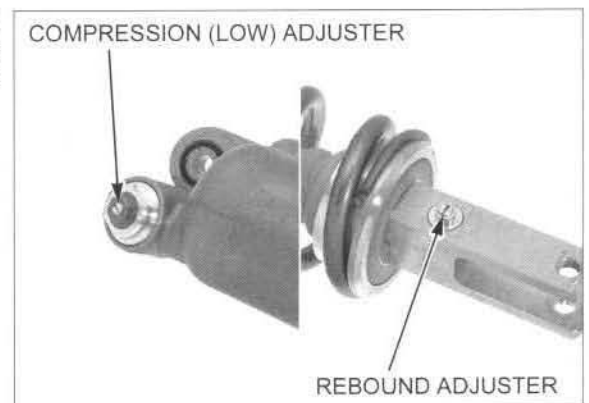


Remove the shock absorber lower mounting bolt, nut and shock absorber.



## DISASSEMBLY

Turn the rebound and compression (low speed side) damping adjusters counterclockwise to the softest position (be sure to record the number of turns from the starting position).



## REAR WHEEL/SUSPENSION

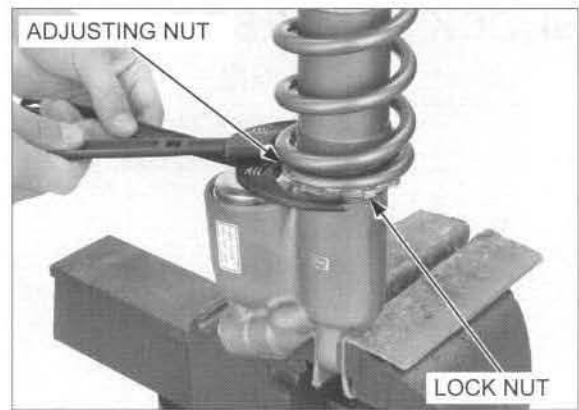
*Do not over-tighten the vise. Measure the spring length for reinstallation later.*

Set the shock absorber upper mount in a vise with a piece of wood or soft jaws to avoid damage.

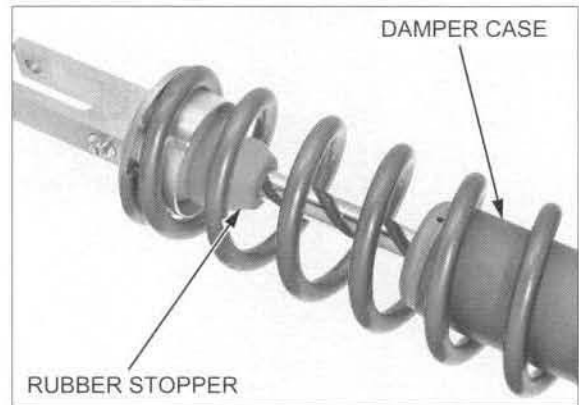
Loosen the spring lock nut and spring adjusting nut completely.

### TOOLS:

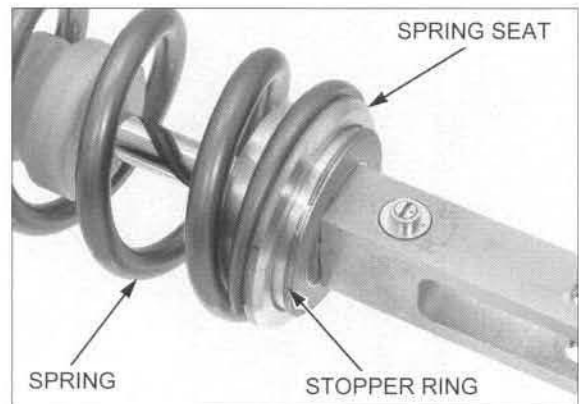
Pin spanner 07702-0020001 (2 required) or  
Pin spanner A 89201-KS6-810 (2 required)



Slide the rubber stopper until it is fully seated to the damper case.



Remove the stopper ring and spring seat while compressing the shock absorber spring. Remove the shock absorber spring.



## BLADDER REPLACEMENT

Replace the bladder when oil leaks around the chamber cap or oil spills out when releasing the nitrogen from the reservoir.

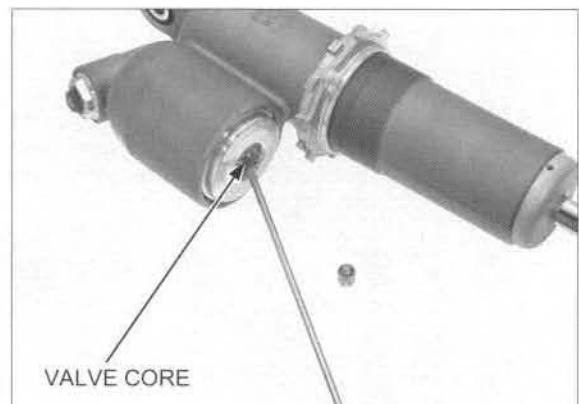
Perform this procedure before draining the oil from the damper.

*Point the valve away from you to prevent debris getting in your eyes.*

Depress the valve core to release the nitrogen from the reservoir.

### **⚠ WARNING**

- The chamber cap will be under significant pressure and could cause serious injury.
- Release all nitrogen pressure before disassembly.
- Wear protective clothing and adequate eye protection to prevent injury and debris entering your eyes.



Remove the valve core from the chamber cap.

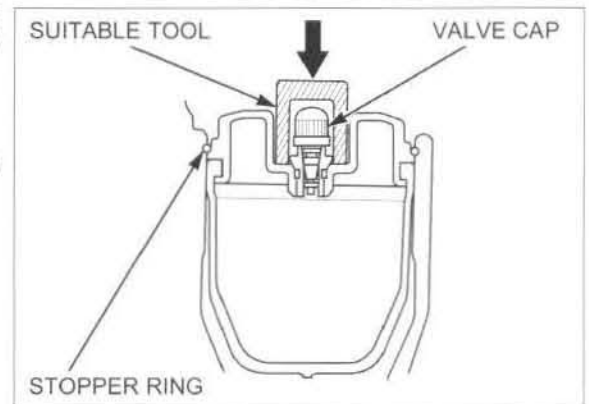


*Depress the chamber cap just the minimum amount for stopper ring access.*

Put a suitable tool on the chamber cap, and push it in by lightly tapping on the tool with a plastic hammer until you have good access to the stopper ring.

**NOTICE**

*To avoid damaging the threads of the gas valve, install the valve cap before depressing the chamber cap.*



*To avoid damaging the inside surfaces of the reservoir, cover the screwdriver with a shop towel.*

Two small screwdrivers and shop towel are required to remove the stopper ring.

The stopper ring groove in the reservoir is ramped toward the inside to give the stopper ring a square shoulder on which to seat securely.

To remove the stopper ring, first push one end of the stopper ring out of its groove, then slip the second screwdriver between the stopper ring and reservoir to act as a ramp.

Now, use the other screwdriver to pull the stopper ring completely out.

Check the stopper ring groove for burrs.

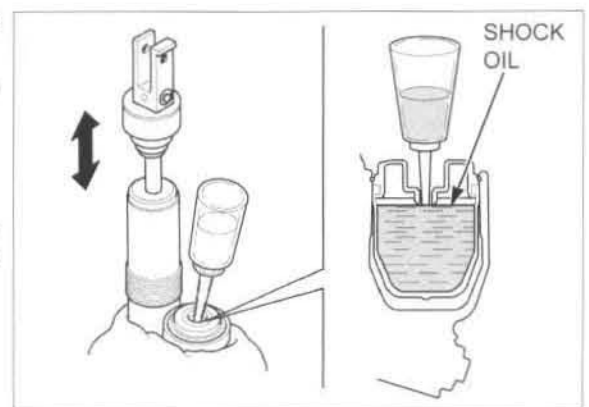
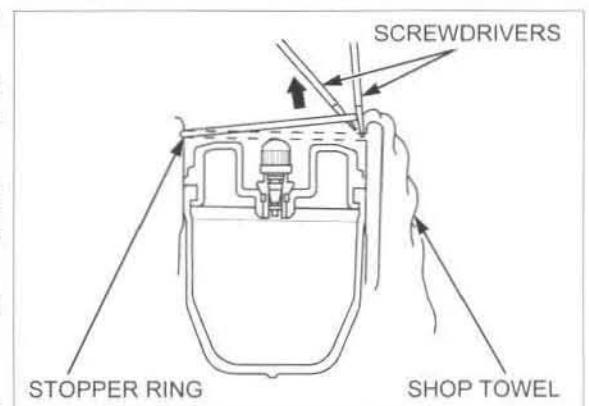
Remove any burrs with a fine emery cloth before removing the chamber cap out of the reservoir.

Set the shock absorber upper mount in a vise with a piece of wood or soft jaws to avoid damage.

Using a suitable squeeze bottle, fill the reservoir with the recommended shock oil.

**RECOMMENDED SHOCK OIL:  
HP Fork Oil SS-25**

Slowly pump the damper rod until no air bubbles appear in the valve core hole, then pull the damper rod all the way out.





## REAR WHEEL/SUSPENSION

Install the valve core securely.  
Wear protective clothing and a face guard to protect your eyes and face in case the chamber cap pops out quickly and forcibly.  
Remove the chamber cap and bladder following the procedure below:

- The chamber cap will be removed with hydraulic pressure so its force can be significant considering the air in the bladder.
1. Wrap the shop towel around the chamber cap. Compress the damper rod slowly to force the chamber cap out.

2. Set the damper case in a vise with a piece of wood or soft jaws with the compression damping adjuster facing up.

**NOTE:**

- Do not over-tighten the vise and distort the damper case.

Remove the compression damping adjuster, plate and O-rings.

3. Fill the damper case and reservoir with HP Fork Oil SS-25 through the compression damping adjuster hole, while slowly pulling the damper rod out.

4. Reinstall the compression damping adjuster after filling the damper.

**NOTE:**

- The damper must be kept upright to prevent shock oil from leaking out.

5. Place the damper with the reservoir chamber cap facing up.

6. Repeat steps 1 to 5 until the chamber cap is removed from the reservoir.

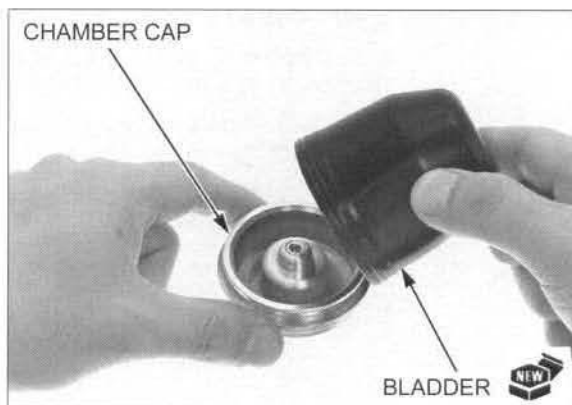
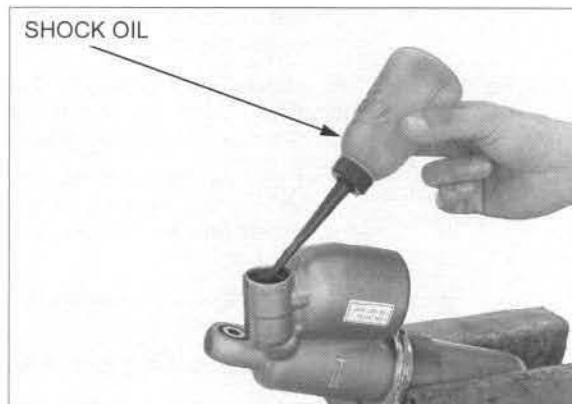
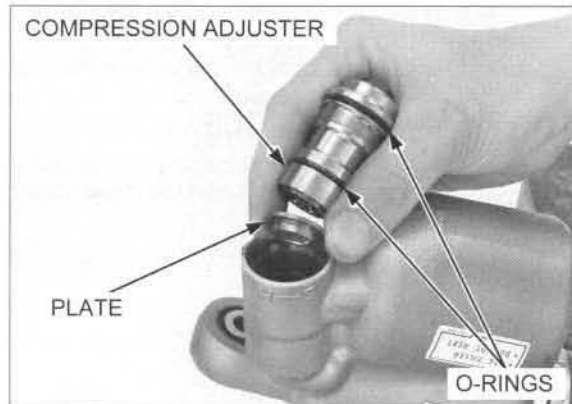
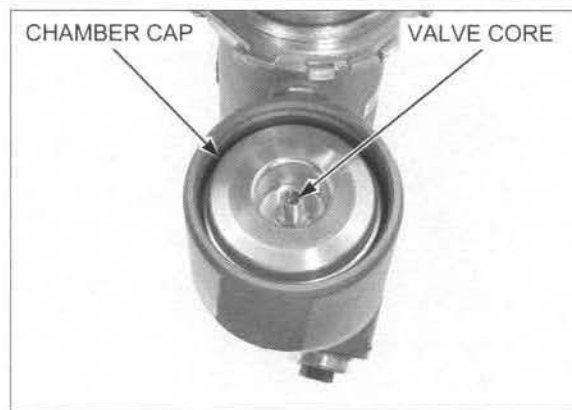
Remove the bladder from the chamber cap.

**NOTE:**

Do not use any sort of tool to remove the bladder, because it may damage the chamber cap.

Attach a new bladder to the chamber cap.

*Replace the bladder with a new one. Do not reuse the removed one.*

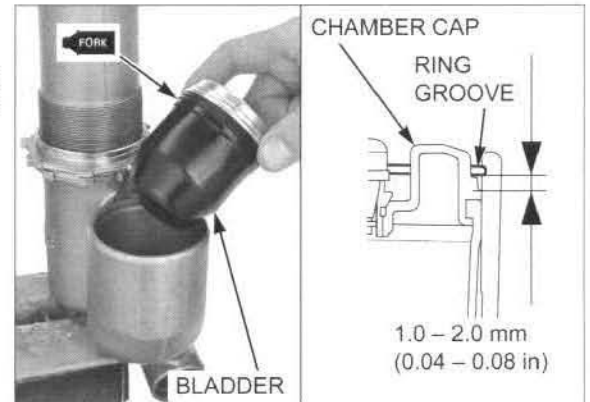


If the bladder becomes distorted during installation, depress the valve core to reform it.



Clean the inside of the reservoir.

Apply a light coat of recommended shock oil (page 14-26) to the lips of the bladder, and press the chamber cap into the reservoir to about 1.0 – 2.0 mm (0.04 – 0.08 in) below the stopper ring groove.



Install the stopper ring in the groove of the reservoir.

**NOTE:**

- Be sure the stopper ring is seated in the groove all the way around or the chamber cap can come apart when riding the motorcycle.

Temporarily fill the reservoir with air slowly until the chamber cap seats against the stopper ring.

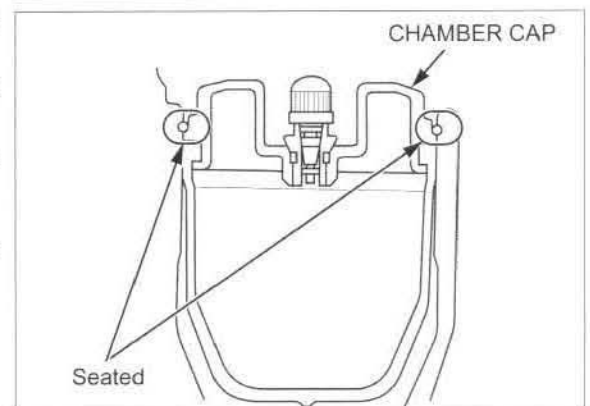


Make sure the chamber cap is completely seated on the stopper ring as shown.

If the chamber cap does not seat fully, the chamber cap may fly out when filling the reservoir with nitrogen.

Release the air from the bladder by depressing the valve core.

Fill and bleed the shock absorber (page 14-26).  
Fill the reservoir with nitrogen to the specified pressure (page 14-27).





## REAR WHEEL/SUSPENSION

### DAMPER DISASSEMBLY

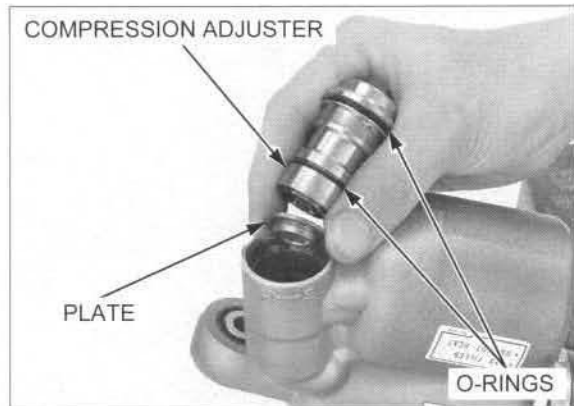
*Point the valve away from you to prevent debris getting in your eyes.*

Depress the valve core to release the nitrogen from the reservoir (page 14-14).

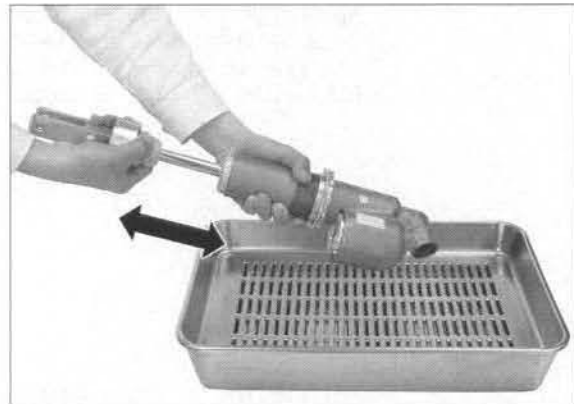
Remove the compression damping adjuster, O-rings and plate.

**NOTE:**

Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve core from the chamber cap.



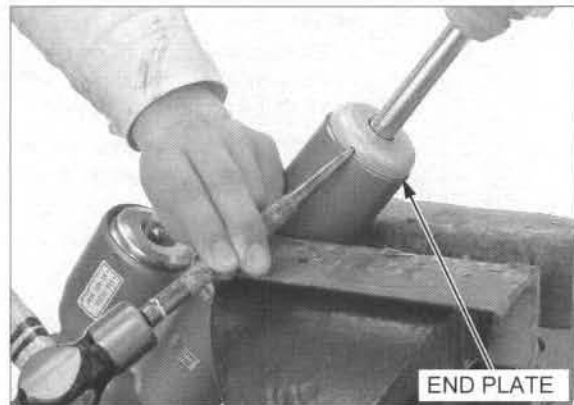
Drain most of the shock oil from the damper and reservoir by pumping the damper rod in and out several times.



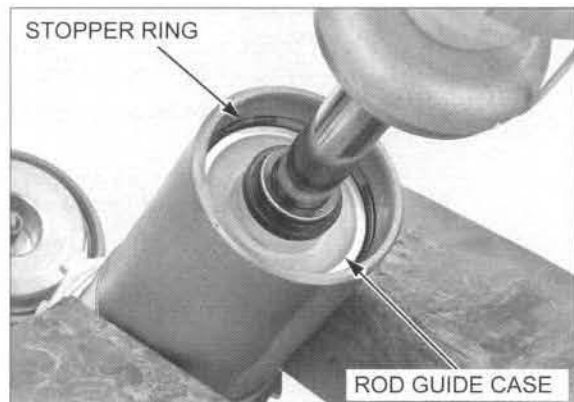
*Do not over-tighten the vise and distort the damper case.*

Set the damper case in a vise with a piece of wood or soft jaws to avoid damage.

Remove the end plate, and tape or tie it to the rubber stopper so it will not get in the way.



Push in the rod guide case until you have good access to the stopper ring.



Two small screwdrivers are required to remove the stopper ring.

The stopper ring groove in the damper case is ramped toward the inside to give the stopper ring a square shoulder on which to seat securely.

To remove the stopper ring, first push one end of the stopper ring out of its groove, then slip the second screwdriver between the stopper ring and damper case to act as a ramp.

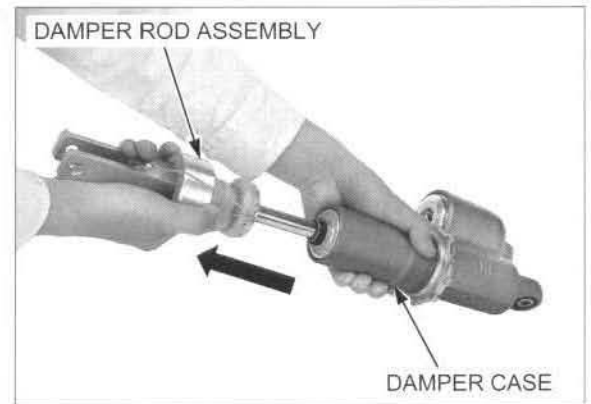
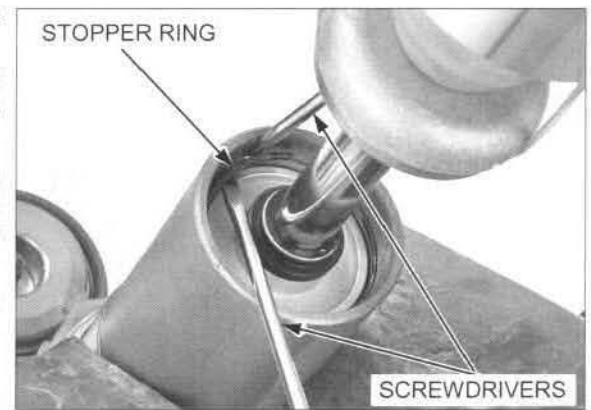
Now, use the other screwdriver to pull the stopper ring completely out.

Check the stopper ring groove for burrs.

*Burrs will damage the damper rod piston ring.*

Remove any burrs with a fine emery cloth before pulling the damper rod out of the damper case.

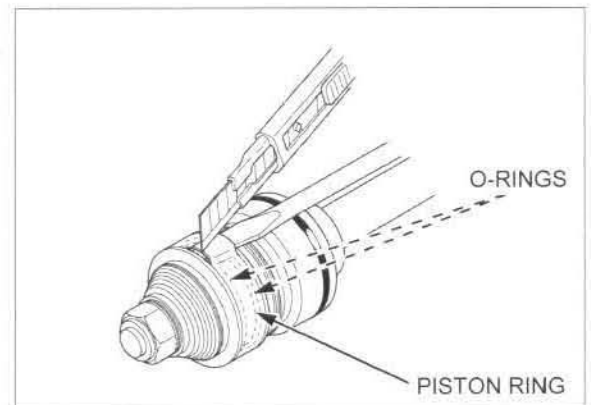
Carefully pull the damper rod assembly out of the damper case.



### PISTON RING REPLACEMENT

Inspect the piston ring.

If the piston ring is damaged, cut the piston ring and replace it along with new O-rings.



Apply recommended shock oil (page 14-26) to new O-rings and piston ring.

Place the piston ring guide attachment over the piston, and install the O-rings and piston ring into place by hand.

**TOOL:**

**Piston ring guide attachment**      **070MG-KZ30100**  
 not available in  
 U.S.A.

Compress the piston ring against the ring groove and seat the piston ring into the ring groove.



## REAR WHEEL/SUSPENSION

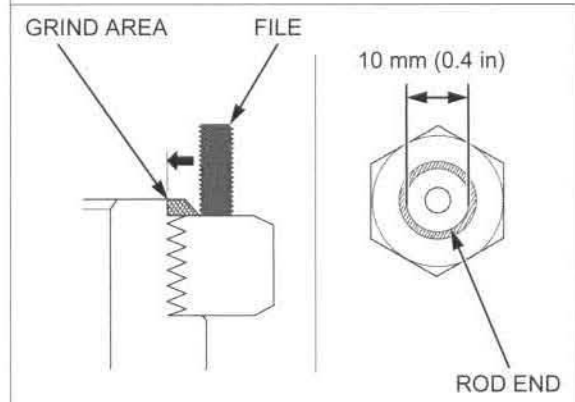
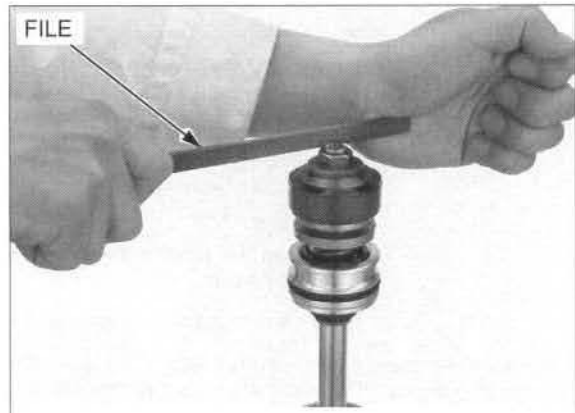
### DAMPER ROD DISASSEMBLY

To keep lint or dirt from getting onto the damper rod parts, do not wear gloves while working on the damper rod.

*Do not over-tighten the vise and distort the shock mount.*

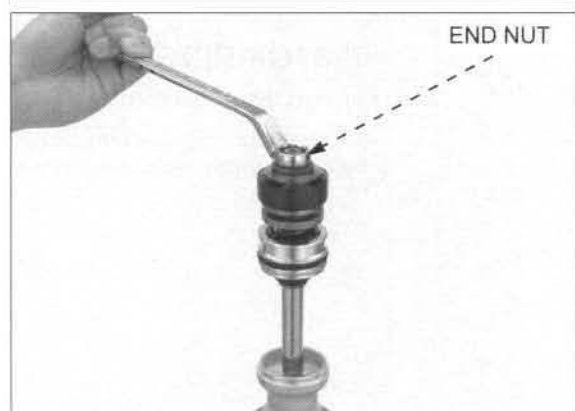
Set the shock absorber lower mount in a vise with a piece of wood or soft jaws to avoid damage.

Grind the damper rod end with a file as shown. File the damper rod end nut by hand so that the O.D. of the rod end is about 10 mm (0.4 in). Be careful not to over-file.



Turn the damper rod end nut back-and-forth in 1/4 turn increments until it loosens, then rotate another 1/4 turn and repeat turning back-and-forth until the damper rod end nut loosens completely.

If the damper rod is cracked or damaged when removing the damper rod end nut, replace the damper rod assembly with a new one.



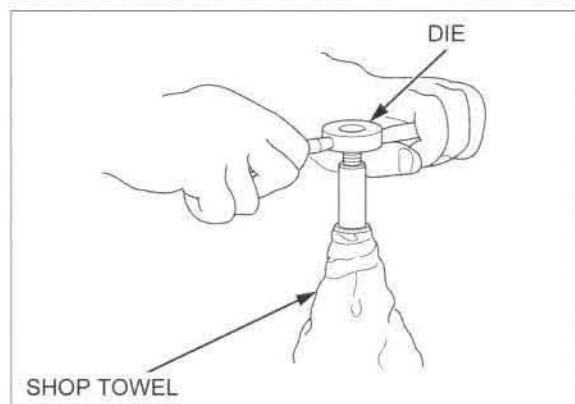
*Make sure that filings are not stuck in the damper rod.*

Cover the damper rod with a clean shop towel.

Remove the burrs from the damper rod end with a file and correct the threads with a die.

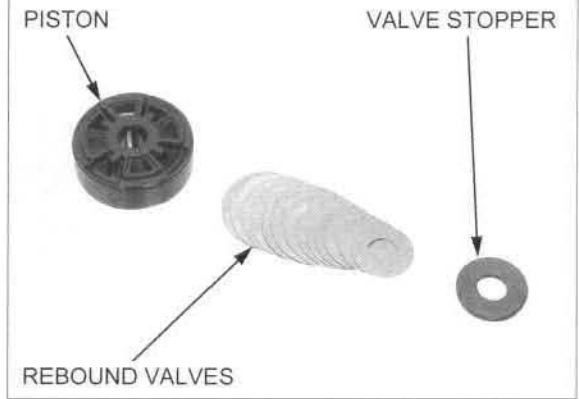
**DIE: 12 x 1.25 mm**

Clean the damper rod with solvent after correcting the threads.

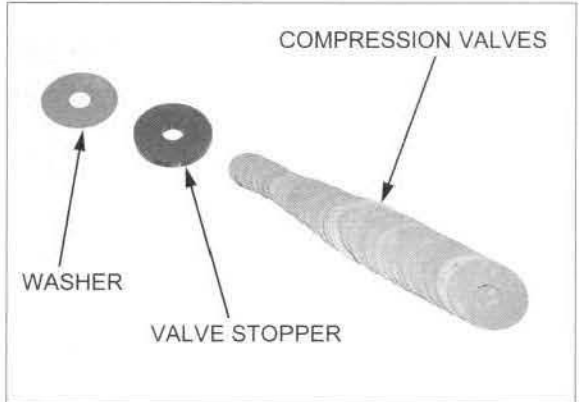


Remove the valve stopper, rebound valves and piston from the damper rod.

- Use a piece of mechanics wire to keep the removed valves in the correct order.
- Keep dust and abrasive away from all damper rod parts.
- Thoroughly clean the valves in solvent and blow them dry with compressed air.
- Be careful not to get solvent on the O-rings and piston ring.
- The valve arrangement and number of valves shown is typical and may not represent this model exactly.



Remove the compression valves, valve stopper and washer.

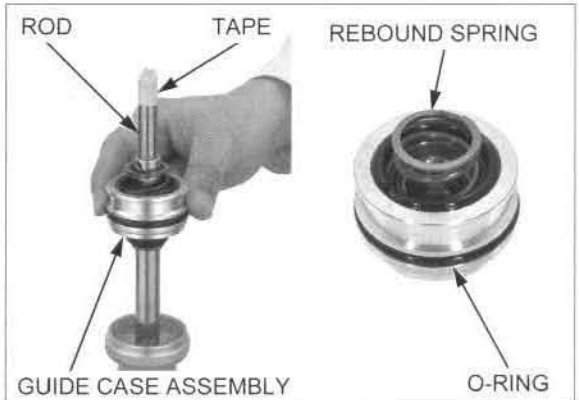


Chase the threads with a die and clean with shock oil.

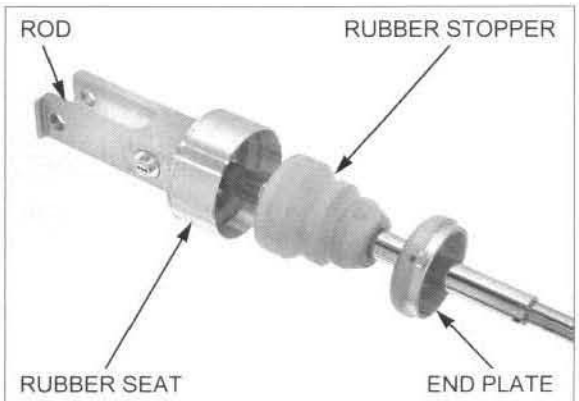
Wrap the threads of the damper rod with tape.

Remove the rod guide case assembly from the damper rod.

Remove the O-ring and rebound spring from the rod guide case.



Remove the end plate, rubber stopper and rubber seat from the damper rod.

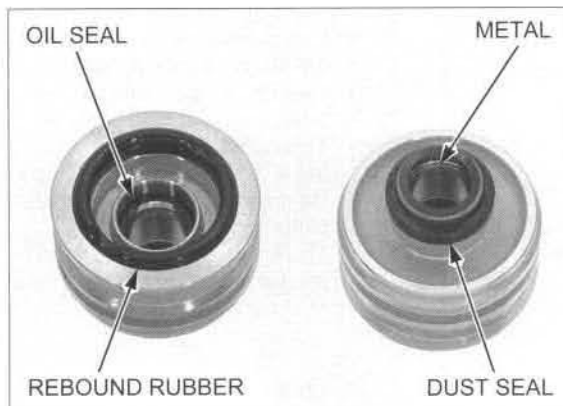


## REAR WHEEL/SUSPENSION

### ROD GUIDE CASE INSPECTION

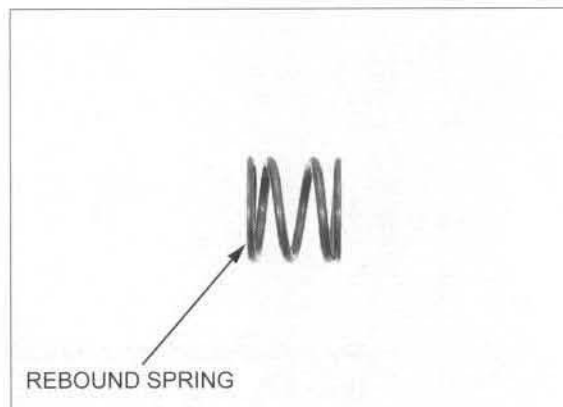
Inspect the rebound rubber, oil seal lips and dust seal lips for wear or damage. If necessary, replace the rod guide case with a new one.

Visually inspect the rod guide case metal. If the metal is worn so that the copper surface appears, replace the rod guide case with a new one.



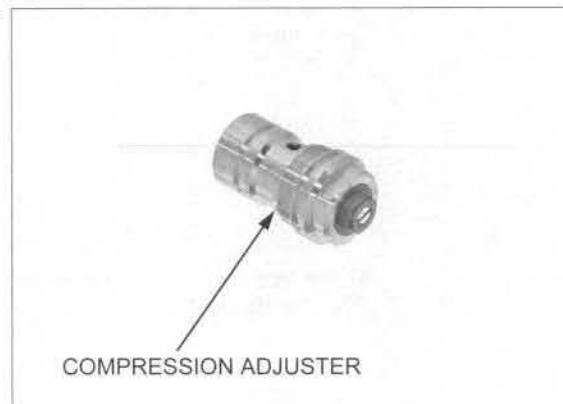
### REBOUND SPRING INSPECTION

Inspect the rebound spring for weakness or damage.



### COMPRESSION ADJUSTER INSPECTION

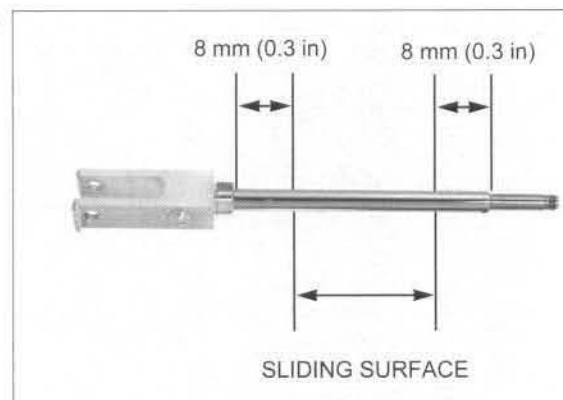
Inspect the compression adjuster for wear, scratches or damage.



### DAMPER ROD INSPECTION

Inspect the damper rod sliding surface for damage or distortion.

Replace it if necessary.



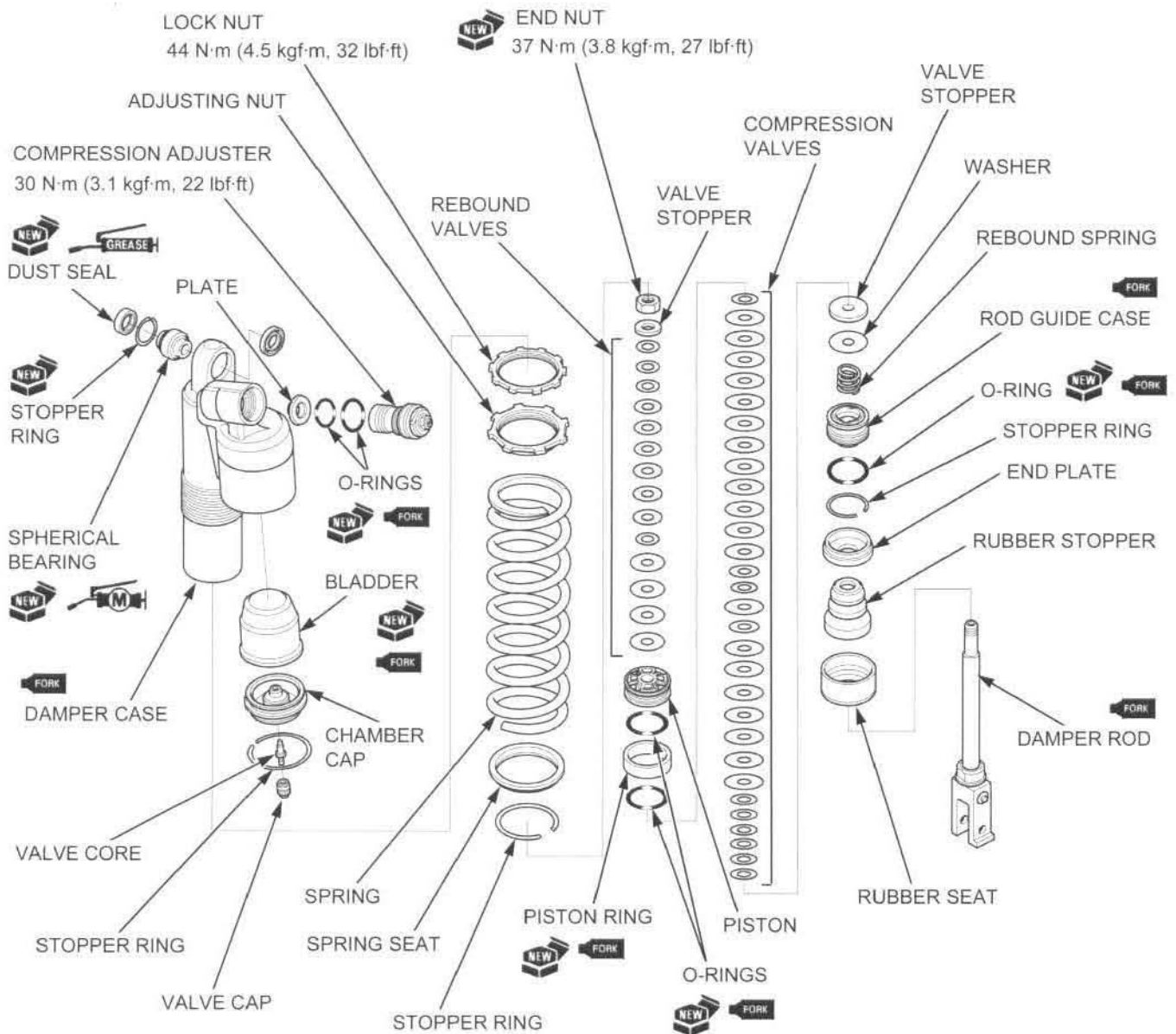
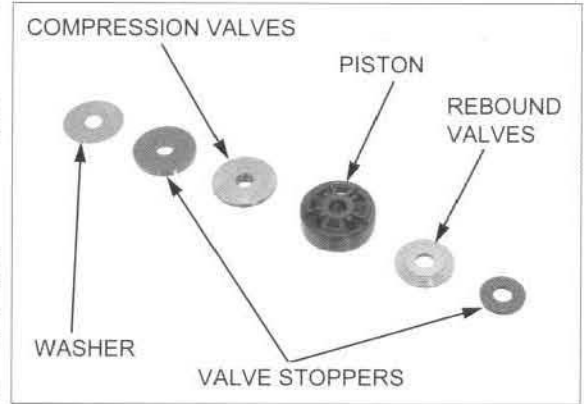
**DAMPER ASSEMBLY**

Before assembly, wash all parts with solvent, and blow them dry with compressed air. Make sure there is no dust or lint on any of the parts.

- Turn the rebound and compression (low speed side) damping adjusters counterclockwise to the softest position.

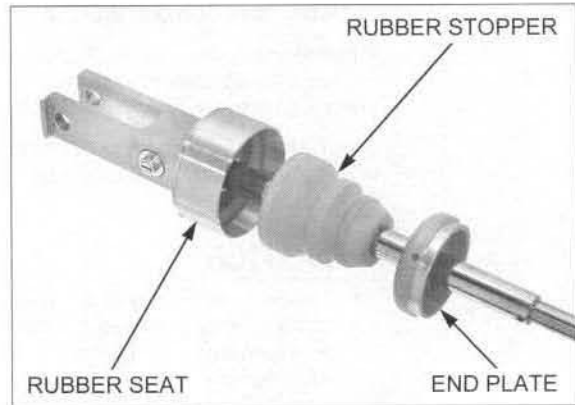
**NOTICE**

- Never assemble valves which might have gotten dusty or otherwise contaminated during the disassembly process. Disassemble them, thoroughly clean them with solvent and blow them dry with compressed air before assembly.
- Use care to avoid getting solvent on the piston ring and O-rings.
- The valve arrangement and number of valves may differ from those shown.



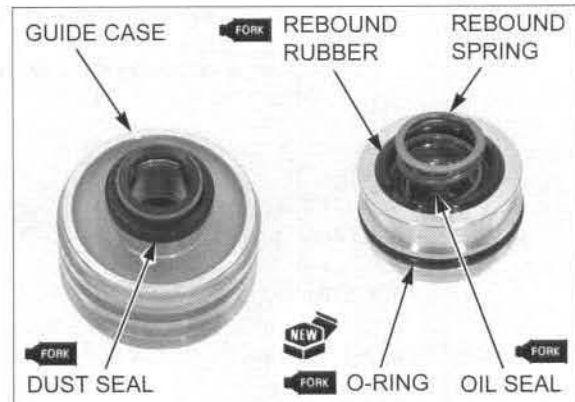
## REAR WHEEL/SUSPENSION

Install the rubber seat, rubber stopper and end plate.



Apply recommended shock oil (page 14-26) to rebound rubber, oil seal lips and dust seal lips.  
Apply recommended shock oil (page 14-26) to a new O-ring, and install it to the rod guide case.

Install the rebound spring.



Install the special tool onto the damper rod.

**TOOL:**

Slider guide, 16 mm

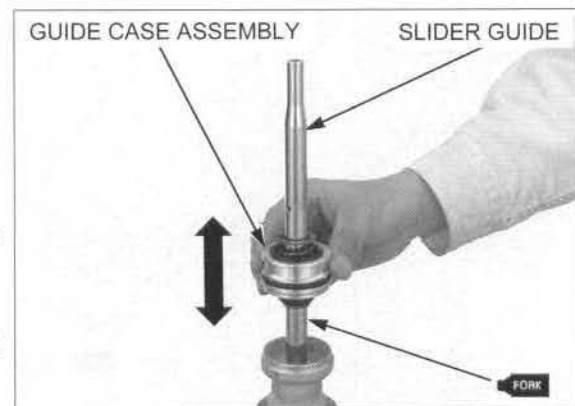
07PMG-KZ40100  
not available in  
U.S.A.

Coat the damper rod sliding surface with shock oil.

Carefully install the rod guide case assembly with the rebound spring facing up, over the damper rod.

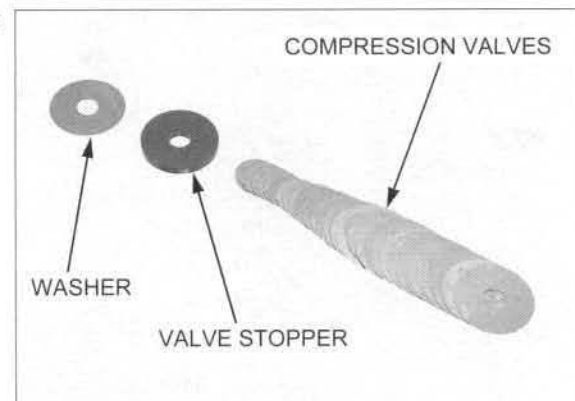
Remove the special tool.

Check the rod guide case assembly by sliding it up and down fully to be sure there is no restriction.



*The valve arrangement and number of valves may vary from those shown.*

Install the washer, valve stopper and compression valves onto the damper rod.



Install the piston onto the damper rod.

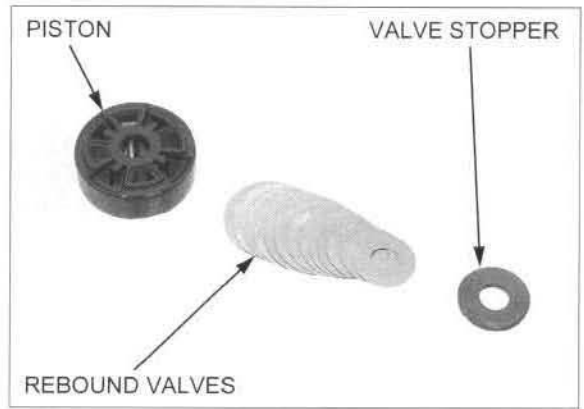
*Note the installation direction of the piston valves.*

Install the rebound valves with their polished surfaces facing down.

**NOTICE**

*Be careful not to bind the valves when installing the piston onto the damper rod. Also, check that they are concentric with the damper rod.*

Install the valve stopper.

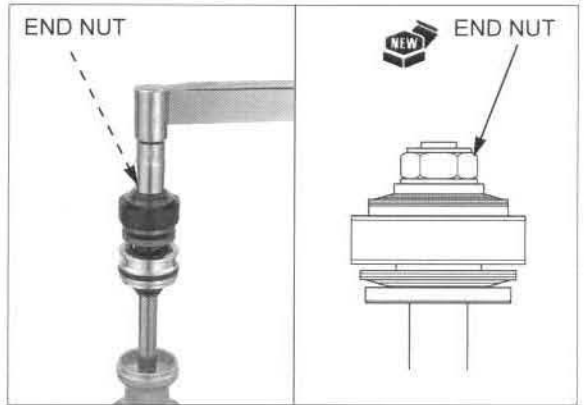


*Do not over-tighten the vise and distort the shock mount.*

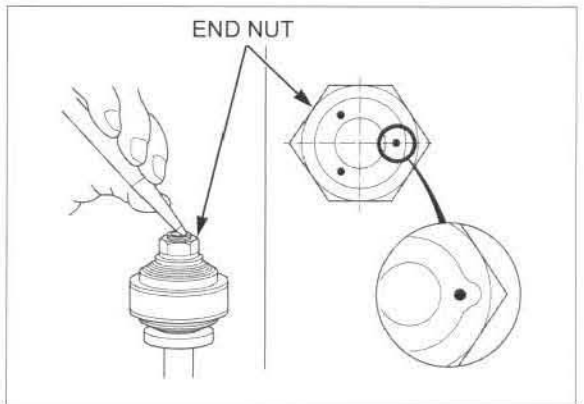
Set the shock absorber lower mount in a vise with a piece of wood or soft jaws to avoid damage.

Install and tighten a new damper rod end nut to the specified torque.

**TORQUE: 37 N·m (3.8 kgf·m, 27 lbf·ft)**



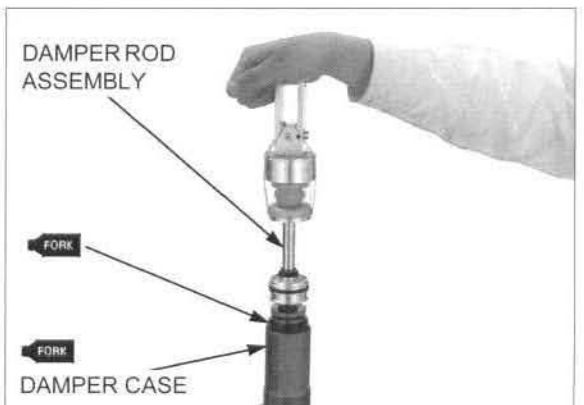
Stake the damper rod end of the damper rod in three places as shown, to the end nut.



*Do not over-tighten the vise and distort the shock mount.*

Set the shock absorber upper mount in a vise with a piece of wood or soft jaws to avoid damage.

Coat the damper case inner surface and piston ring with recommended shock oil (page 14-26), and insert the damper rod assembly carefully.





## REAR WHEEL/SUSPENSION

*Do not over-tighten the vise and distort the damper case.*

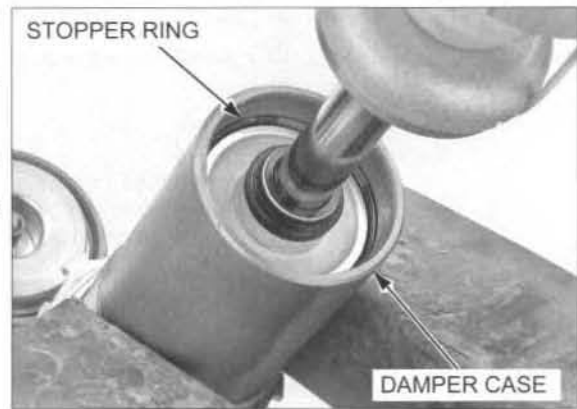
Set the damper case in a vise with a piece of wood or soft jaws to avoid damage.

Install the stopper ring into the groove in the damper case.

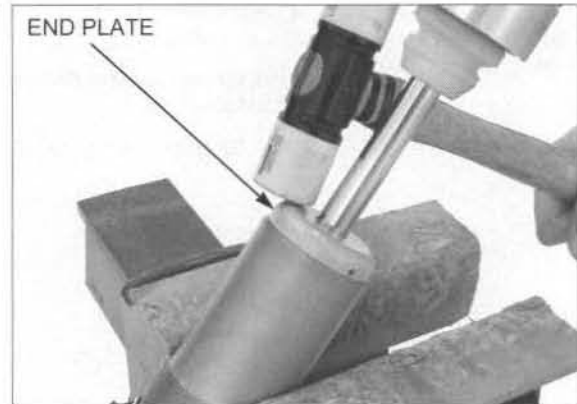
*Make sure the rod guide case is seated against the stopper ring by pulling the damper rod all the way out.*

After assembly, check that the stopper ring is seated in the groove of the damper case completely.

You should not be able to pull the damper rod out of the damper case.



Drive the end plate squarely and evenly into the damper case with a plastic hammer.



Fill the damper case and reservoir with recommended shock oil through the compression damping adjuster hole.

### RECOMMENDED SHOCK OIL:

HP Fork Oil SS-25

### STANDARD OIL CAPACITY:

372 cm<sup>3</sup> (12.6 US oz, 13.1 Imp oz)

Slowly pump the damper rod until there are no bubbles in the shock oil that overflows from the damper case.

*Do not let oil flow out of the reservoir.*

Remove the damper unit from the vise while holding the compression damping adjuster hole facing up.



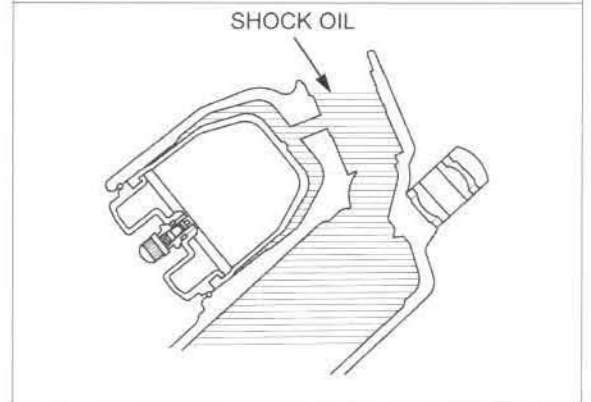
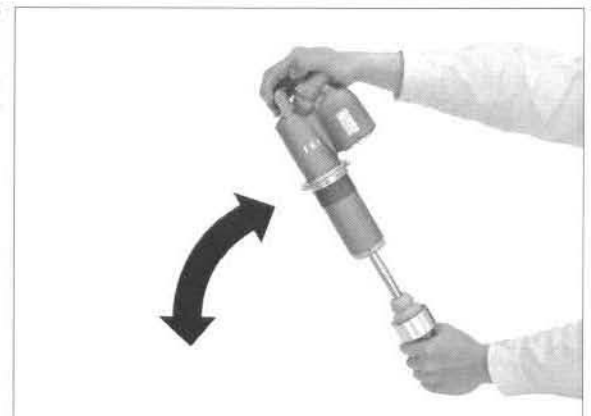
Move the damper unit up and down to bleed any air from the reservoir completely.

- When bleeding air from the reservoir, be careful to hold the damper at the angles shown so the filler hole points up.

*Be sure the reservoir pressure is correct using an accurate pressure gauge.*

Temporarily charge the reservoir with 49 kPa (0.5 kgf/cm<sup>2</sup>, 7.1 psi) of air slowly to inflate the bladder.

Check for any shock oil that may leak out of the valve while pressurizing. Replenish oil as necessary.



Fill the damper with HP Fork Oil SS-25 to the compression damping adjuster hole neck.

Apply shock oil to new O-rings, and install them to the compression damping adjuster.

Dip the compression damping adjuster in clean shock oil.

Slowly install the plate and compression damping adjuster.

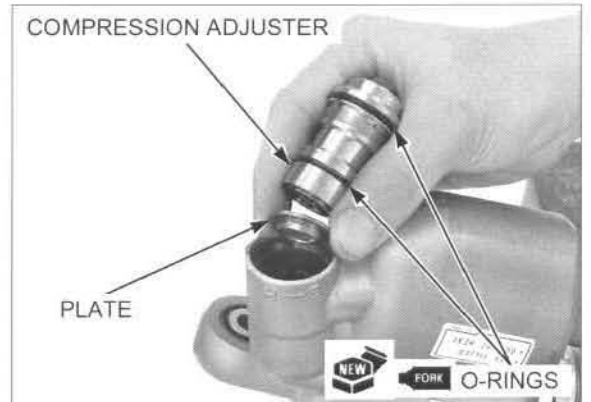
Tighten the compression damping adjuster to the specified torque.

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

Do not let oil flow out of the reservoir.

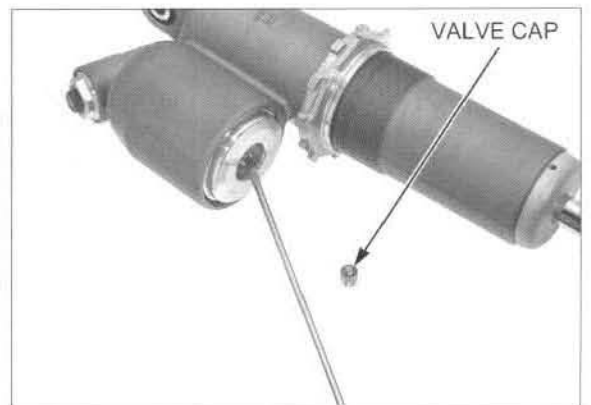
Check the oil leaks.

Release the air that was in the reservoir at precompression. Fill the reservoir with 980 kPa (9.9 kgf/cm<sup>2</sup>, 142 psi) of nitrogen gas.



**CAUTION**  
The shock absorber is fitted with a gas-filled reservoir. The use of an unstable gas can cause a fire or explosion, resulting in serious injury. Use only nitrogen gas to pressurize the shock absorber.

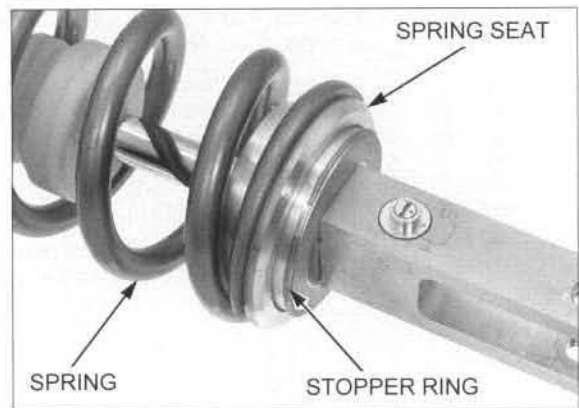
Install the valve cap.



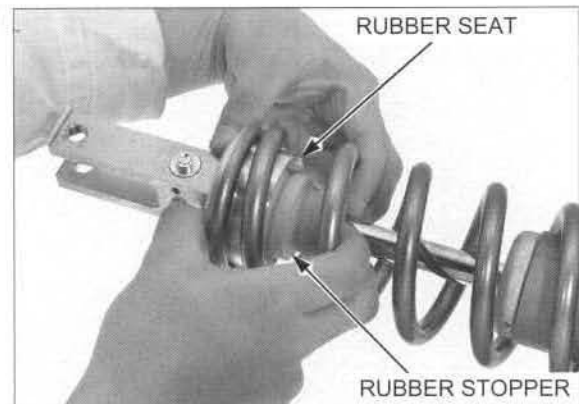
## REAR WHEEL/SUSPENSION

Install the shock absorber spring with its small O.D. side facing toward the lower mount.  
Install the spring seat.

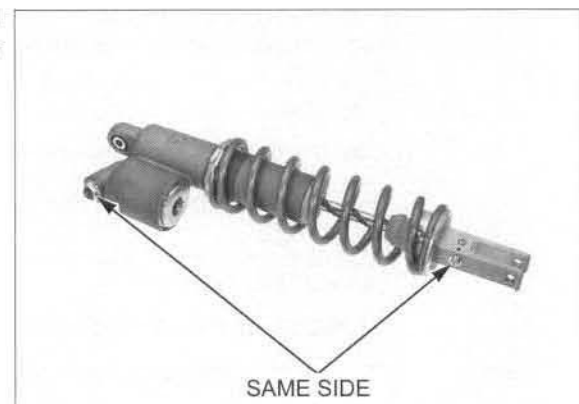
Install the stopper ring while compressing the shock absorber spring.



Slide the rubber stopper until it is fully seated to the rubber seat.



Turn the shock absorber lower mount so the rebound damping adjuster screw is on the same side of the shock reservoir.



*One turn of the adjusting nut changes the spring length by 1.5 mm (0.06 in).*

Turn the spring adjusting nut until the spring length measurement recorded at disassembly is reached or until the spring length is as specified below.

### STANDARD SPRING LENGTH:

'10: 259.9 mm (10.23 in)

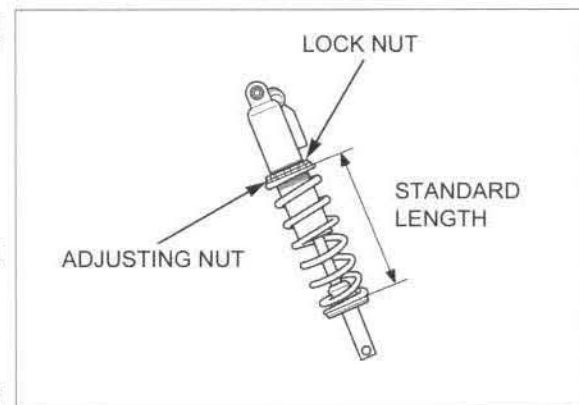
'11, '12: 260.8 mm (10.27 in)

After '12: 261.2 mm (10.28 in)

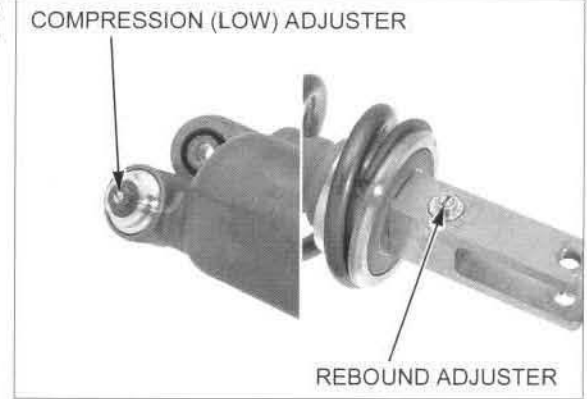
Hold the spring adjusting nut, and tighten the spring adjuster lock nut to the specified torque.

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

Use this standard spring length as the baseline.  
See the Owner's Manual for detailed instructions on adjusting preload and damping for riding conditions and rider skill.



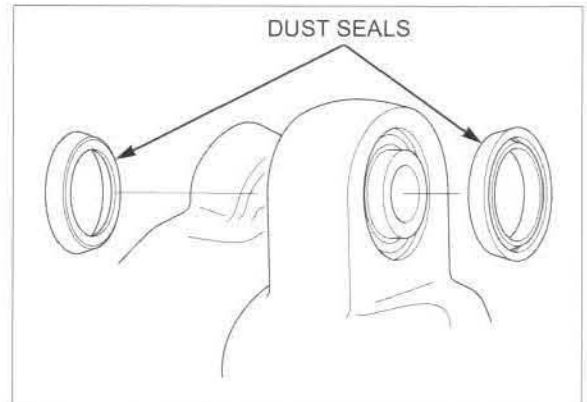
If the rebound and compression (low speed side) damping adjuster turned, return them to the original positions as noted during removal.



### **SPHERICAL BEARING REPLACEMENT**

Remove the dust seals from the upper mount.

Check the spherical bearing for wear or damage. If it is worn or damaged, it must be replaced.

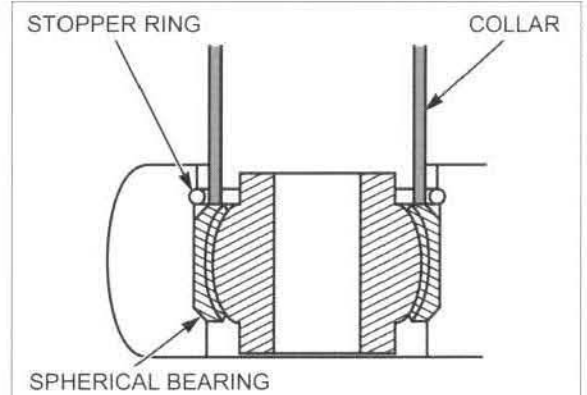


Press the spherical bearing to get the clearance necessary to remove the stopper ring using the special tool.

**TOOL:**  
Collar, 23 x 17 mm

**07GMD-KT8A110**  
(U.S.A. only)

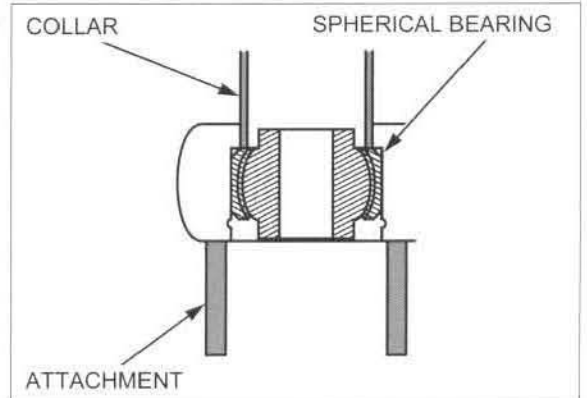
Remove the stopper ring.



Press the spherical bearing out of the upper mount using the special tools.

**TOOL:**  
Collar, 23 x 17 mm  
Attachment, 30 mm I.D.

**07GMD-KT8A110**  
(U.S.A. only)  
**07746-0030300**



## REAR WHEEL/SUSPENSION

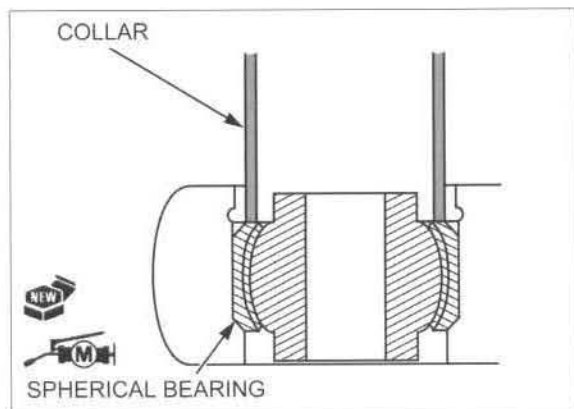
Drive the bearing in evenly; do not allow it to tilt. Apply multi-purpose grease NLGI No.2 (molybdenum disulfide MoS2 additive) to a new spherical bearing rolling area.

Press the spherical bearing into the upper mount.

**TOOL:**

Collar, 23 x 17 mm

07GMD-KT8A110  
(U.S.A. only)



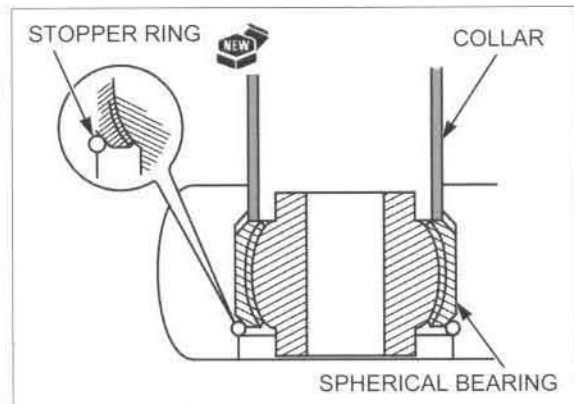
Install a new stopper ring into the groove of the upper mount securely.

Press the spherical bearing from the opposite side using the special tool, until it seats against the stopper ring.

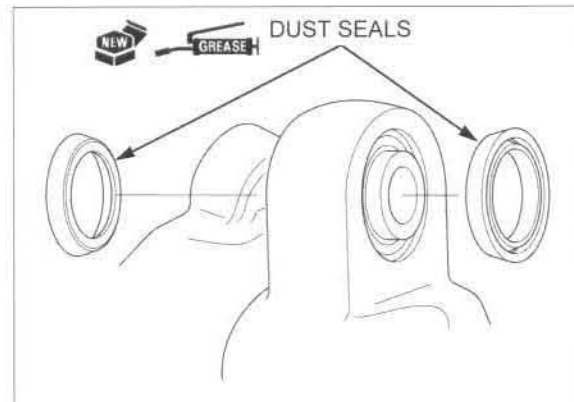
**TOOL:**

Collar, 23 x 17 mm

07GMD-KT8A110  
(U.S.A. only)



Be sure to install the correct dust seal in each side. Apply grease to new dust seal lips, and install them with the flat side facing toward the inside.

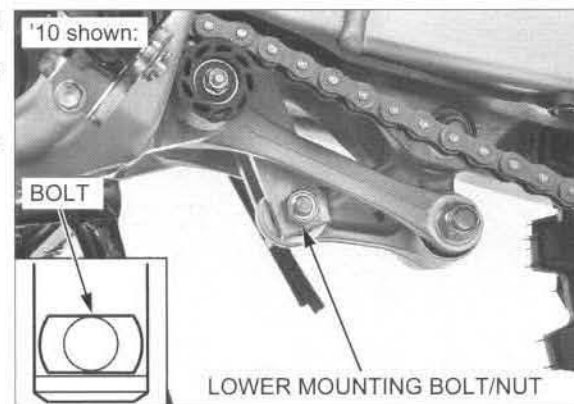


## INSTALLATION

Set the shock absorber to the shock arm with the rebound damping adjuster facing right side. Install the lower mounting bolt by aligning the flat side of the bolt with the stopper on the shock absorber.

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

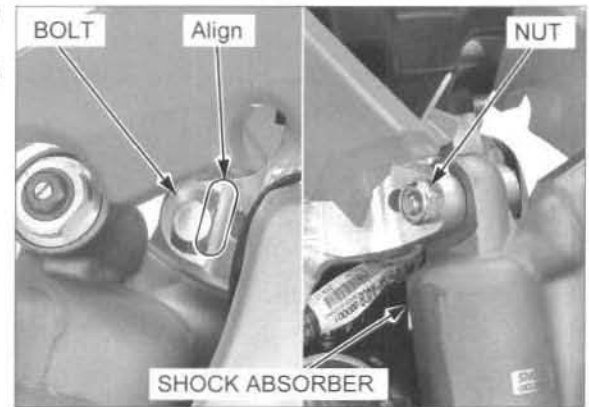
**TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)**



Install the rear shock absorber upper mounting bolt by aligning cut-outs of the frame and upper mounting bolt. Install and tighten the shock absorber upper mounting nut to the specified torque.

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

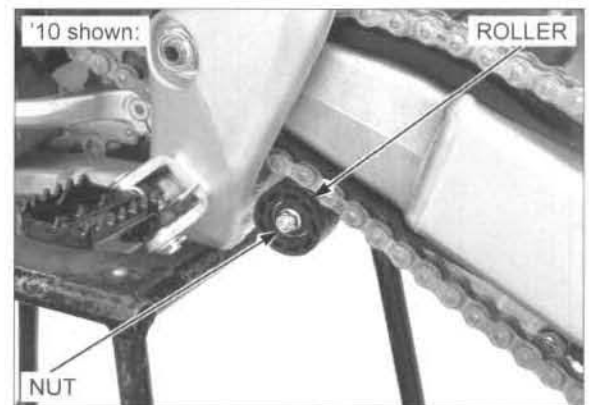
Install the sub-frame (page 2-8).



## SHOCK LINKAGE

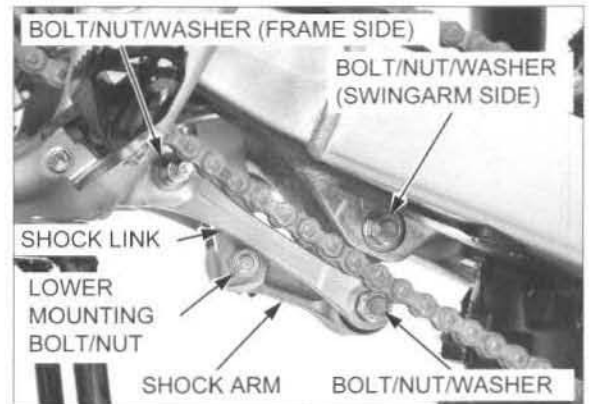
### REMOVAL

Remove the nut and lower drive chain roller.



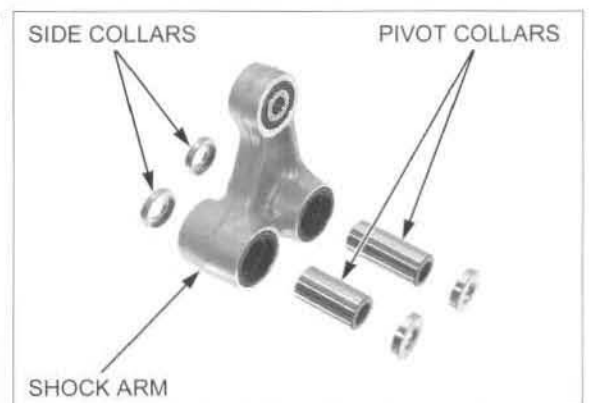
Remove the following:

- Shock absorber lower mounting bolt/nut
- Shock arm bolt/nut/washer (shock link side)
- Shock arm bolt/nut/washer (swingarm side)
- Shock arm
- Shock link bolt/nut/washer (frame side)
- Shock link



### DISASSEMBLY

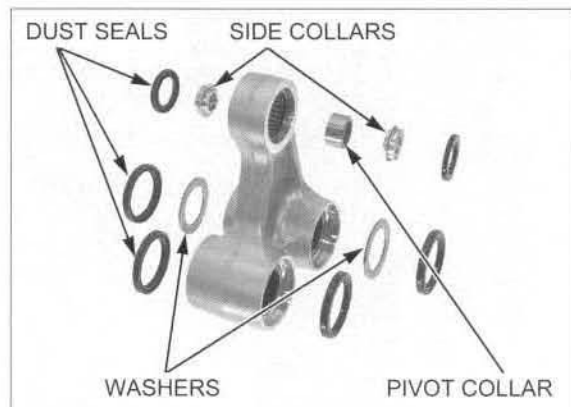
Remove the side collars and pivot collars from the shock arm (swingarm side, shock link side).



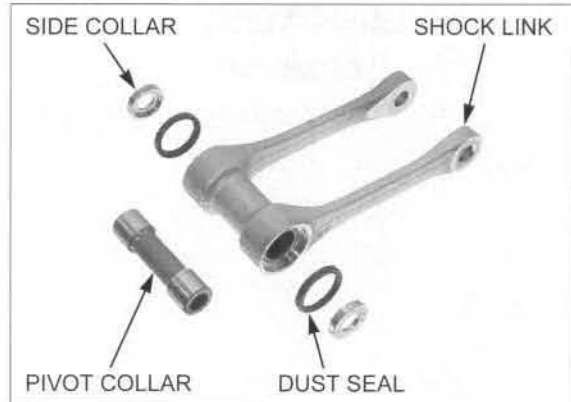
## REAR WHEEL/SUSPENSION

Remove the dust seals and washers (swingarm side, shock link side).

Remove the dust seals, side collars and pivot collar (shock absorber side).



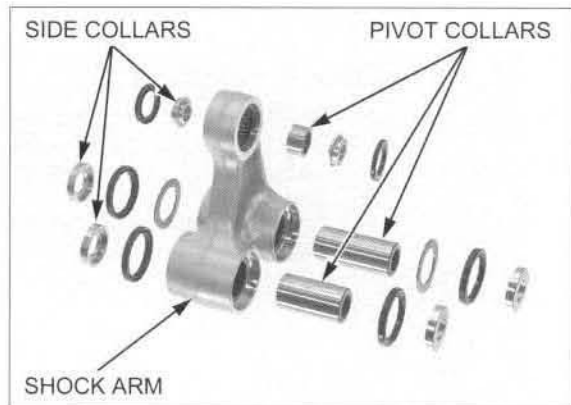
Remove the side collars, pivot collar and dust seals from the shock link.



### INSPECTION

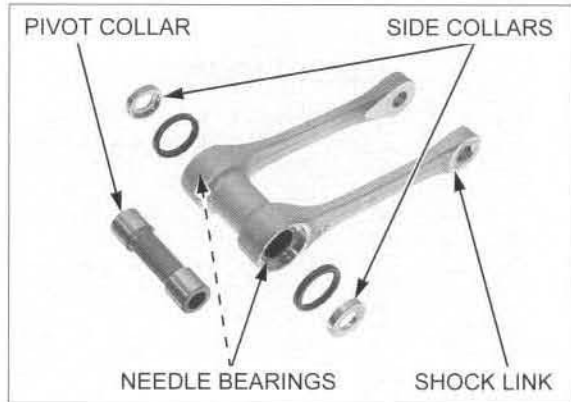
Check the collars for wear, damage or fatigue.  
Check the shock arm for cracks or damage.  
Replace them if necessary.  
Check the needle bearings for damage or loose fit.

If the needle bearings are damaged, replace them (page 14-33).



Check the collars for wear, damage or fatigue.  
Check the shock link for cracks or damage.  
Replace them if necessary.  
Check the needle bearings for damage or loose fit.

If the needle bearings are damaged, replace them (page 14-34).



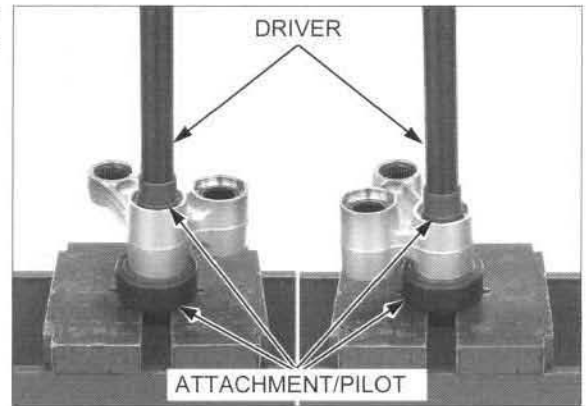
**BEARING REPLACEMENT**

**SHOCK ARM NEEDLE BEARING**

Press the needle bearings (shock link side, swingarm side) out of the shock link using the special tools and a hydraulic press.

**TOOLS:**

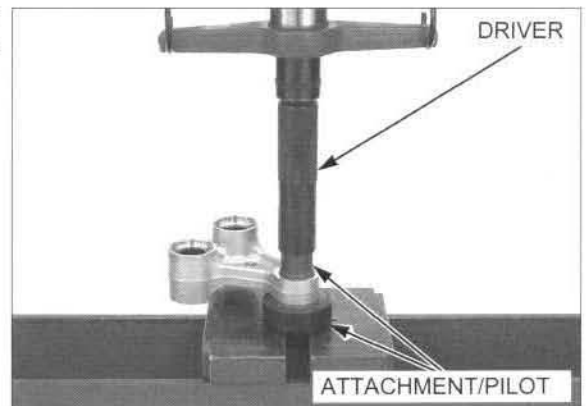
<b>Driver</b>	<b>07949-3710001</b>
<b>Attachment, 24 x 26 mm</b>	<b>07746-0010700</b>
<b>Pilot, 20 mm</b>	<b>07746-0040500</b>
<b>Attachment, 30 mm I.D.</b>	<b>07746-0030300</b>



Press the needle bearing (shock absorber side) out of the shock link using the special tools and a hydraulic press.

**TOOLS:**

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 24 x 26 mm</b>	<b>07746-0010700</b>
<b>Pilot, 19 mm</b>	<b>07746-0041400</b>
<b>Attachment, 30 mm I.D.</b>	<b>07746-0030300</b>



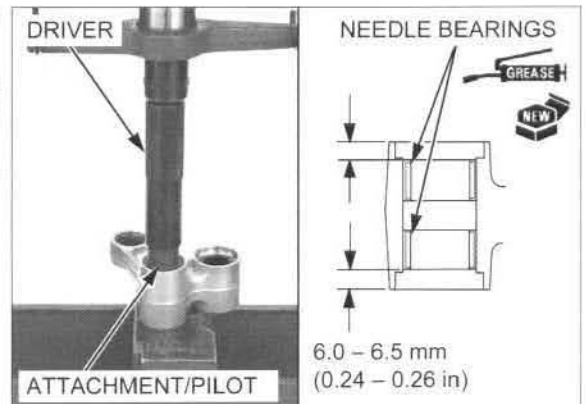
Apply specified grease (page 1-19) to new needle bearing rolling areas.

*Press the needle bearing into the shock arm with the marked side facing out.*

Press the needle bearings into the shock link side pivot with the special tools and a hydraulic press so that the needle bearing surface is 6.0 – 6.5 mm (0.24 – 0.26 in) below the end of the shock arm surface.

**TOOLS:**

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 24 x 26 mm</b>	<b>07746-0010700</b>
<b>Pilot, 20 mm</b>	<b>07746-0040500</b>



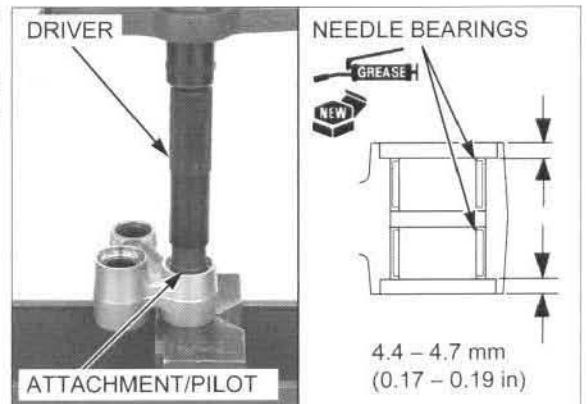
Apply specified grease (page 1-19) to new needle bearing rolling areas.

*Press the needle bearing into the shock arm with the marked side facing out.*

Press the needle bearings into the swingarm side pivot with the special tools and a hydraulic press so that the needle bearing surface is 4.4 – 4.7 mm (0.17 – 0.19 in) below the end of the shock arm surface.

**TOOLS:**

<b>Driver</b>	<b>07749-0010000</b>
<b>Attachment, 24 x 26 mm</b>	<b>07746-0010700</b>
<b>Pilot, 20 mm</b>	<b>07746-0040500</b>





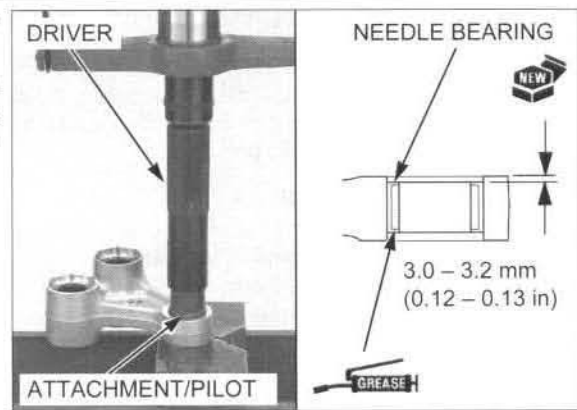
## REAR WHEEL/SUSPENSION

Apply specified grease (page 1-19) to new needle bearing rolling area.

Press the needle bearing into the shock absorber side pivot with the special tools and a hydraulic press so that the needle bearing surface is 3.0 – 3.2 mm (0.12 – 0.13 in) below the end of the shock arm surface.

### TOOLS:

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 19 mm	07746-0041400

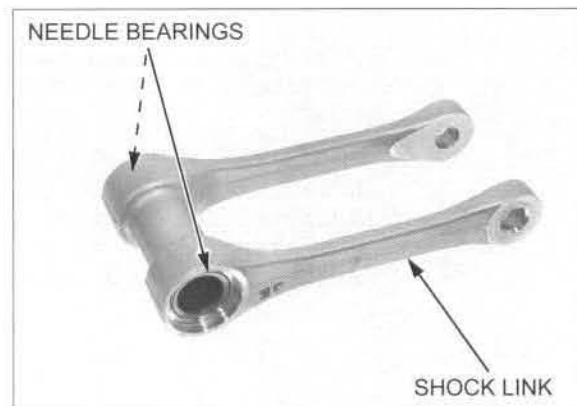


### SHOCK LINK NEEDLE BEARING

Remove the needle bearings from the shock link.

### TOOLS:

Bearing Remover, 20 mm	07936-3710600
Remover Handle	07936-3710100
Remover Weight	07741-0010201 or 07936-3710200 (U.S.A. only)



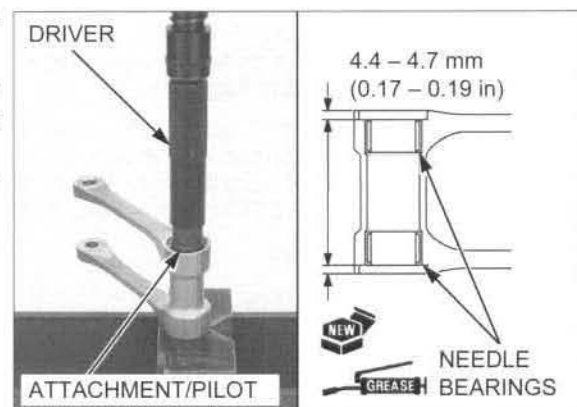
Apply specified grease (page 1-19) to new needle bearings.

*Press the needle bearing into the shock arm with the marked side facing out.*

Press the needle bearings into the frame side pivot with the special tools and a hydraulic press so that the needle bearing surface is 4.4 – 4.7 mm (0.17 – 0.19 in) below the end of the shock arm surface.

### TOOLS:

Driver	07749-0010000
Attachment, 24 x 26 mm	07746-0010700
Pilot, 20 mm	07746-0040500



## ASSEMBLY

Apply specified grease (page 1-19) to a new dust seal lips and side collars.

- Make sure the needle bearing rollers are in position before installing.

Number of needle rollers:

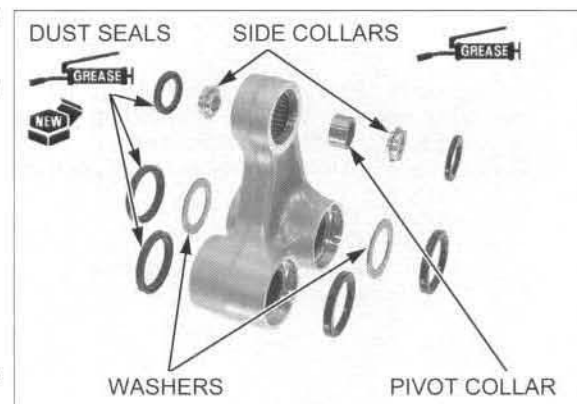
Shock link side:	32
Swingarm side:	32
Shock absorber side:	27

Install the washers and dust seals (shock link side).

Install the dust seals to the shock arm (swingarm side).

Install the pivot collar, side collars and dust seals (shock absorber side).

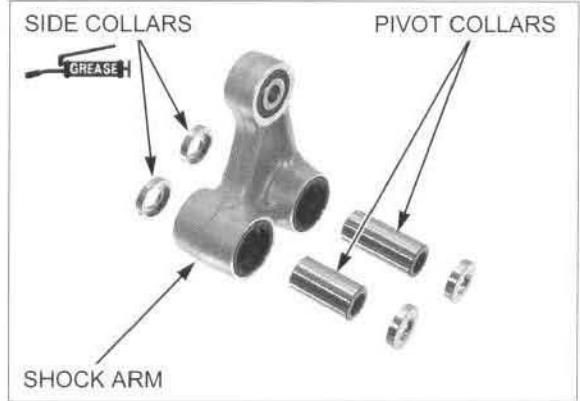
- Install the side collars with their larger O.D. side facing out.
- Install each dust seal with their marked side facing out.



Apply specified grease (page 1-19) to the side collar inside surfaces.

Install the pivot collars and side collars to the shock arm (swingarm side, shock link side).

- The shock link side pivot collar is longer than the swingarm side pivot collar.



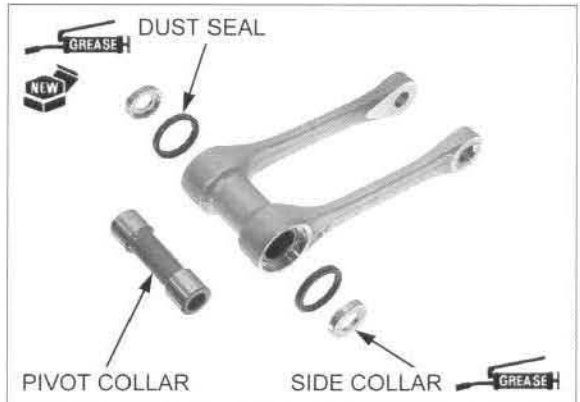
Apply specified grease (page 1-19) to new dust seal lips and side collars.

Install the dust seals, pivot collar and side collars.

- Make sure the needle bearing rollers are in position before installing.

Number of needle rollers: 32

- Install the dust seals with the marking side facing out.



## INSTALLATION

Apply engine oil to the shock link and shock arm nut threads and seating surface.

Loosely install the following:

- Shock link
- Shock link bolt/nut/washer (frame side)
- Shock arm
- Shock arm bolt/nut/washer (swingarm side)
- Shock arm bolt/nut/washer (shock link side)
- Shock absorber lower mounting bolt/nut (page 14-30)

Tighten the nuts to the specified torque.

### TORQUE:

**Shock link nut (frame side):**

53 N·m (5.4 kgf·m, 39 lbf·ft)

**Shock arm nut (swingarm side):**

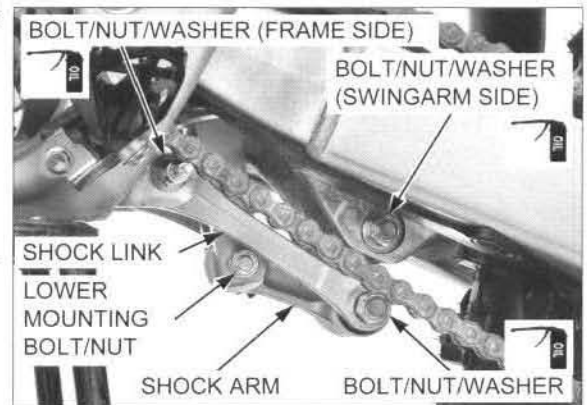
53 N·m (5.4 kgf·m, 39 lbf·ft)

**Shock arm nut (shock link side):**

53 N·m (5.4 kgf·m, 39 lbf·ft)

**Shock absorber lower mounting nut:**

44 N·m (4.5 kgf·m, 32 lbf·ft)

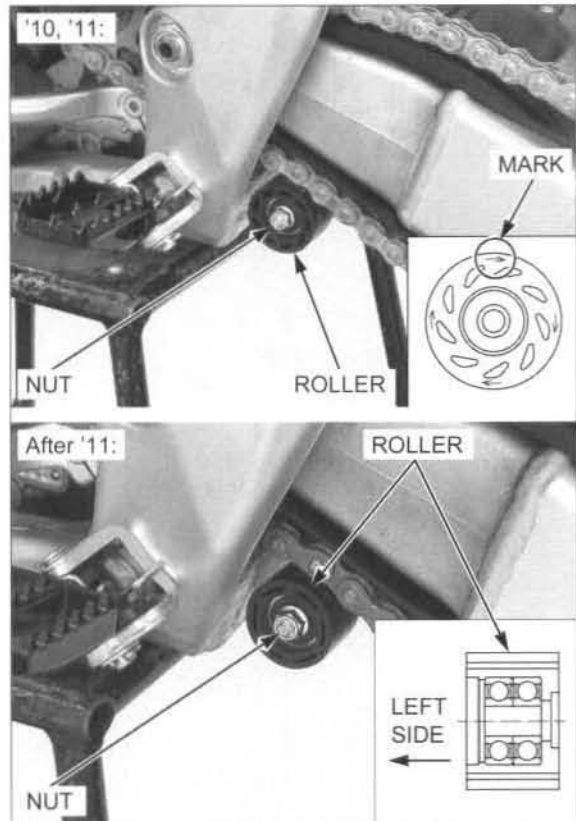


## REAR WHEEL/SUSPENSION

'10, '11: Install the drive chain lower roller with the "→" mark side facing out.

After '11: Install the drive chain lower roller as shown.  
Install and tighten the nut to the specified torque.

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



## SWINGARM

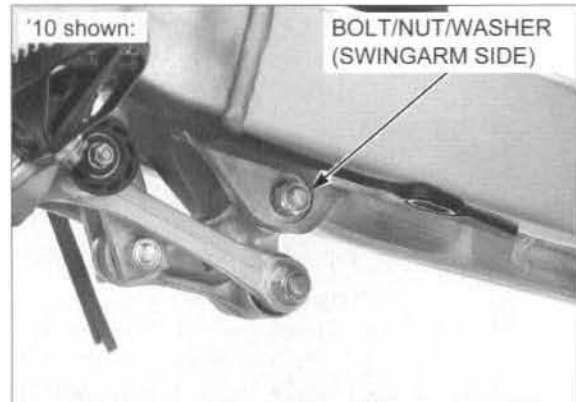
### REMOVAL

Raise the rear wheel off the ground by placing a workstand or equivalent under the engine.

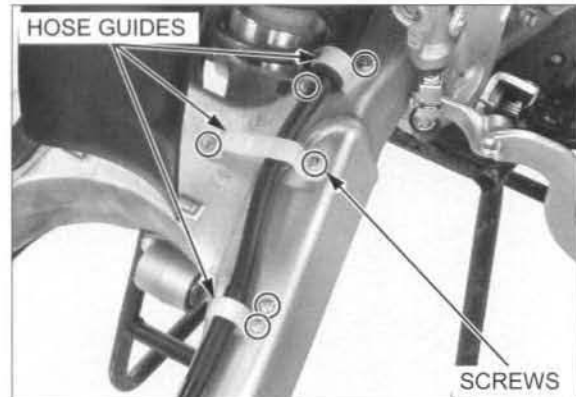
Remove the following:

- Rear wheel (page 14-7)
- Drive chain (page 3-18)
- Brake pedal pivot bolt (page 15-29)

Remove the shock arm nut, washer and bolt (swingarm side).

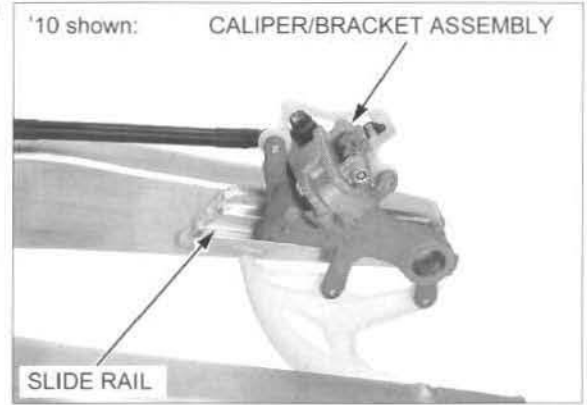


Remove the screws and brake hose guides.

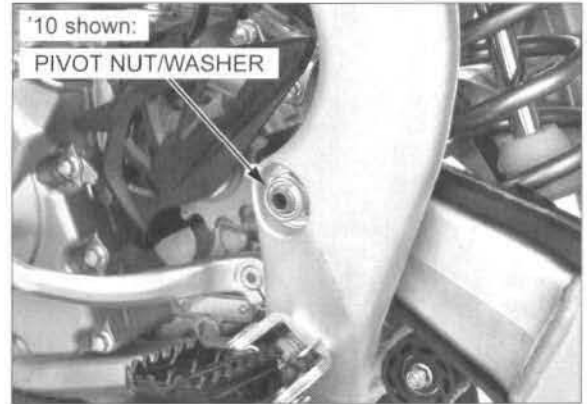


*Do not hang the brake caliper by the brake hose. Do not twist the brake hose. Do not operate the brake pedal after removing the rear wheel.*

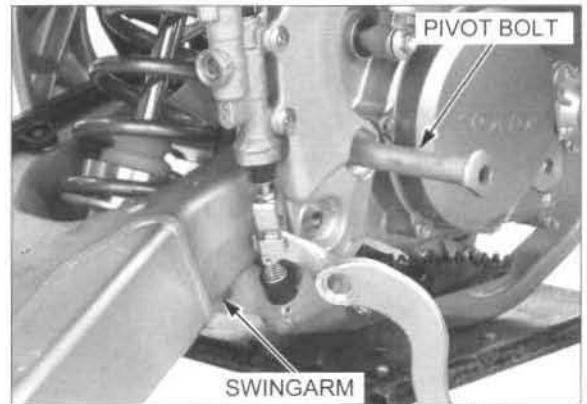
Remove the rear brake caliper/bracket assembly from the slide rail of the swingarm.



Remove the swingarm pivot nut and washer.



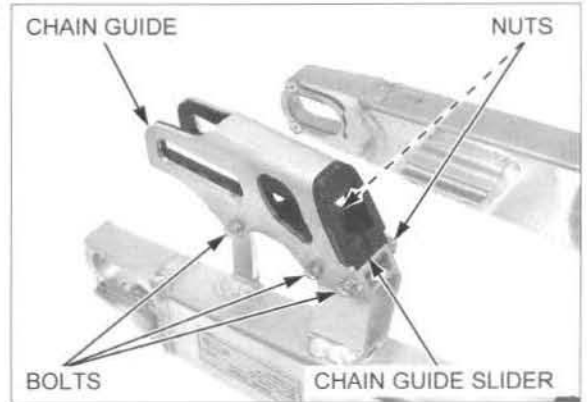
Remove the swingarm pivot bolt and swingarm.



**DISASSEMBLY**

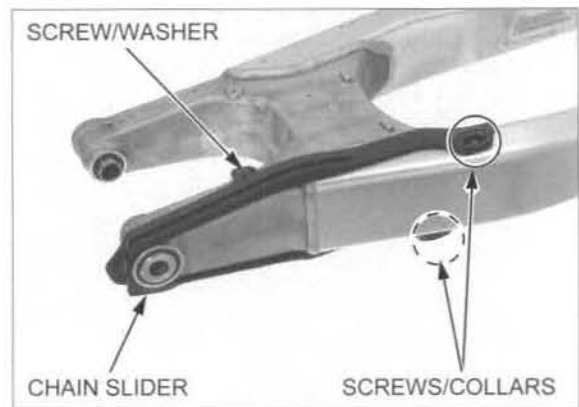
Check the chain guide slider and chain guide for wear or damage (page 3-21).

Remove the bolts, nuts, chain guide and chain guide slider (After '10: chain guide sliders).



## REAR WHEEL/SUSPENSION

Remove the screws, washer, collars and chain slider.

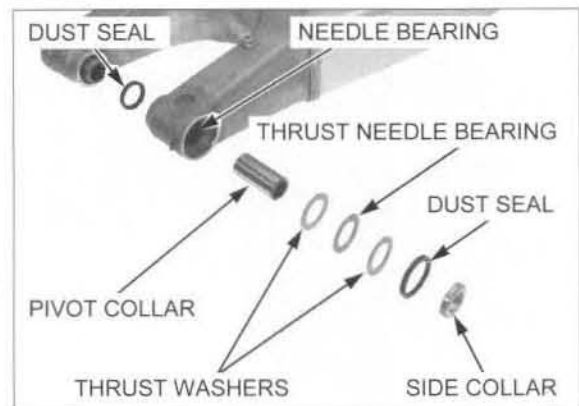


Remove the following:

- Side collars
- Dust seals
- Thrust washers
- Thrust needle bearings
- Pivot collars
- Needle bearings

Check the collars for wear, damage or fatigue.  
 Check the needle bearings for damage or loose fit.  
 Check the thrust needle bearings for wear or damage, replace if necessary.  
 Check the swingarm for cracks or damage.

Replace any damaged parts, if necessary.

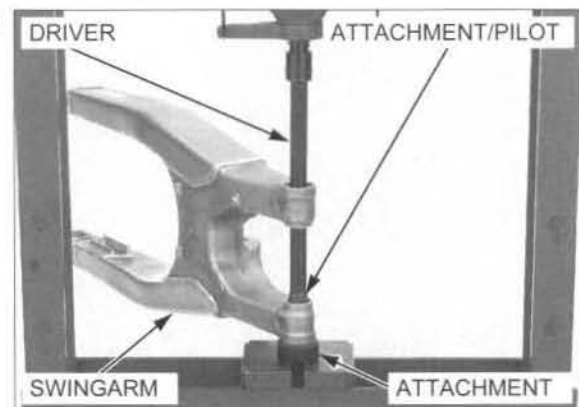


### BEARING REPLACEMENT

Press the needle bearings out of the swingarm using the special tools and a hydraulic press.

#### TOOLS:

Driver	07949-3710001
Attachment, 24 x 26 mm	07746-0010700
Pilot, 22 mm	07746-0041000
Attachment, 30 mm I.D.	07746-0030300



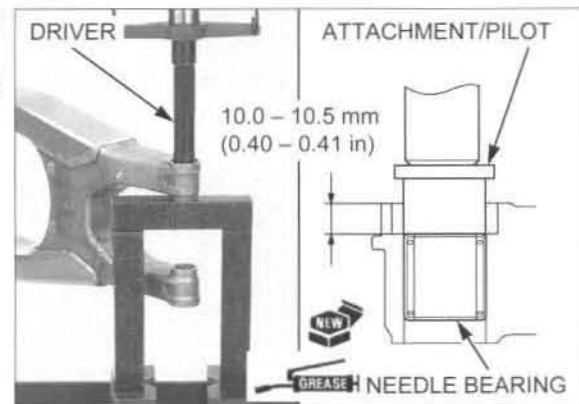
*Press the needle bearing into the swingarm pivot with the marked side facing out.*

Apply specified grease (page 1-19) to a new needle bearing rolling area.

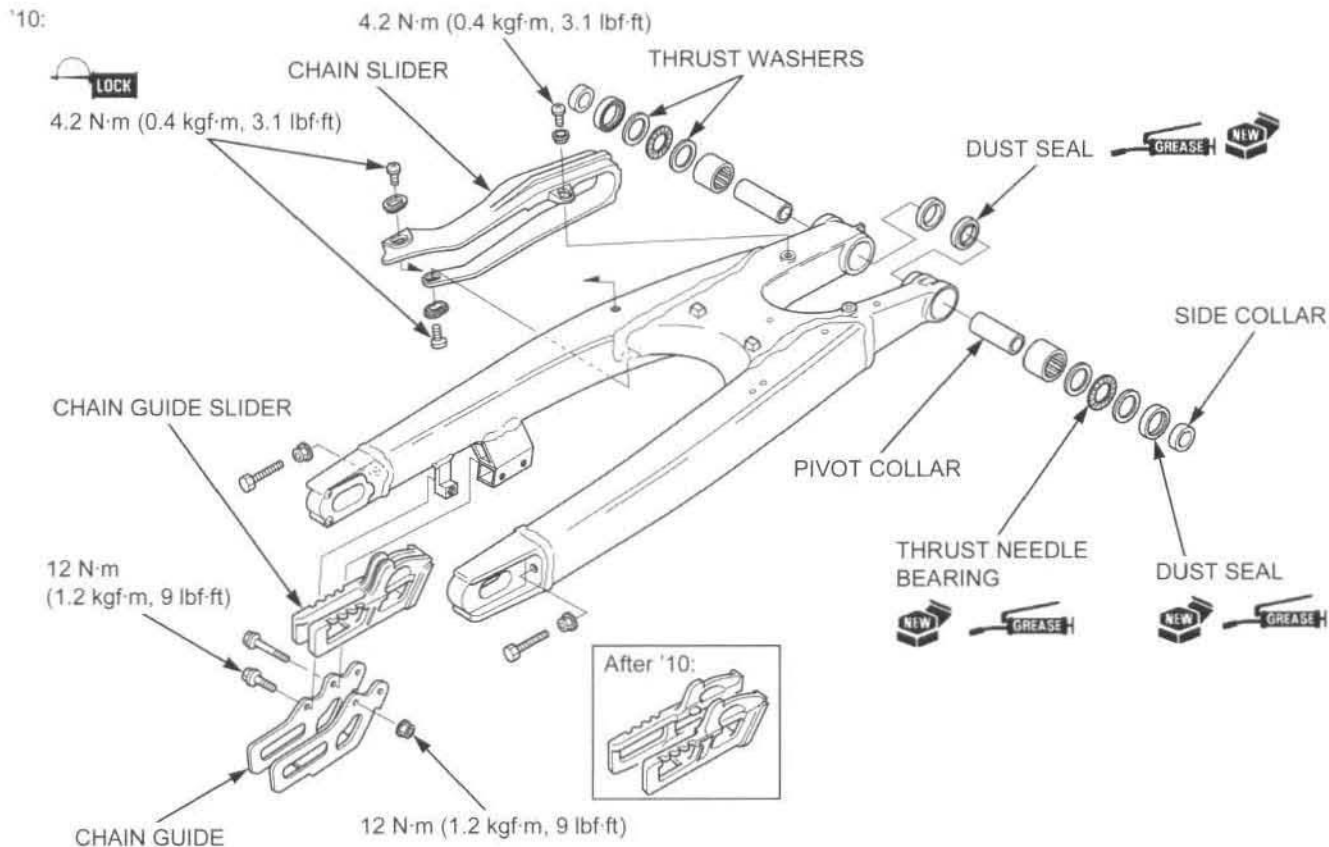
Press the needle bearing into the swingarm using the special tools and a hydraulic press as shown.

#### TOOLS:

Driver	07749-0010000
Attachment, 28 x 30 mm	07946-1870100
Pilot, 22 mm	07746-0041000



ASSEMBLY

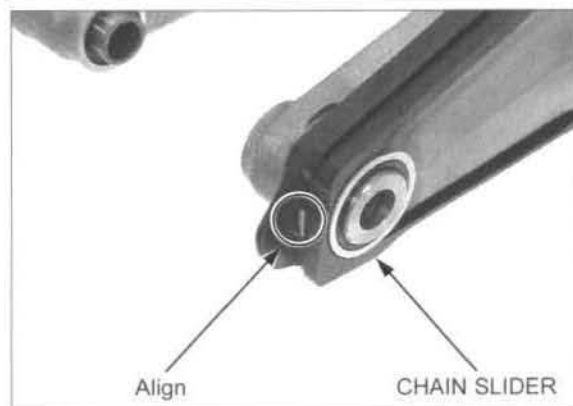
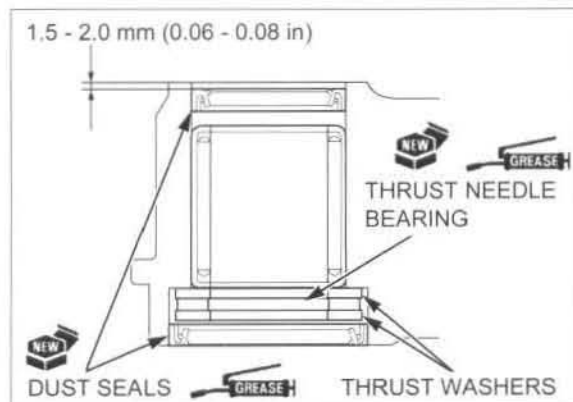


Apply specified grease (page 1-19) to a new thrust bearing rolling area and new dust seal lips.

Install the following:

- Thrust washers
- Thrust needle bearings
- Pivot collars
- Dust seals
- Side collars
- Install the inner side dust seals so that the dust seal surface is 1.5 – 2.0 mm (0.06 – 0.08 in) below the end of the swingarm pivot surface as shown.
- Install the outer side dust seals so that it is flush with the swingarm end surface.

Install the chain slider while aligning its hole with the tab on the swingarm.

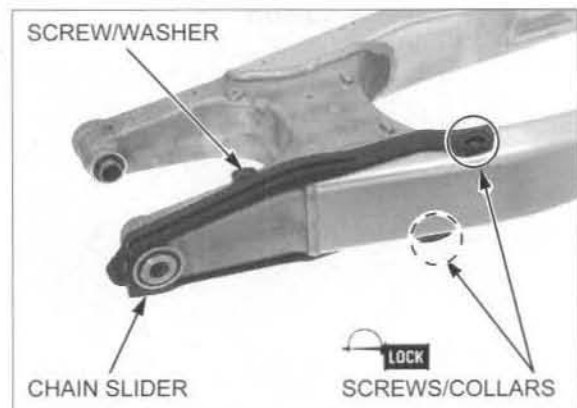


## REAR WHEEL/SUSPENSION

Apply locking agent to the rear side screw threads.

Install and tighten the screws with the washer and collars to the specified torque.

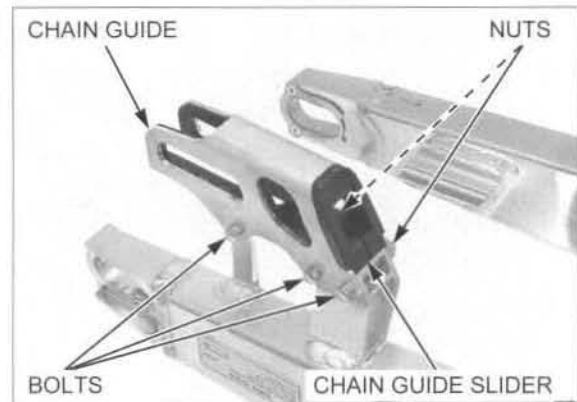
**TORQUE: 4.2 N·m (0.4 kgf·m, 3.1 lbf·ft)**



Install the chain guide slider (After '10: chain guide sliders) to the chain guide, then install them to the swingarm.

Install and tighten the bolts/nuts to the specified torque.

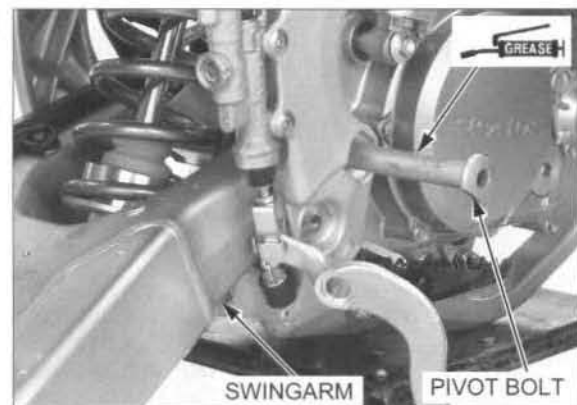
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



## INSTALLATION

Apply a thin coat of grease to the swingarm pivot bolt sliding surface.

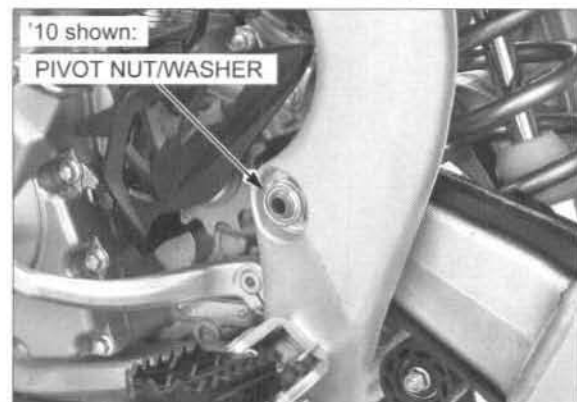
Install the swingarm between the engine and frame. install the swingarm pivot bolt from the right side through the frame, swingarm pivot and engine.



Install the washer and swingarm pivot nut.

Tighten the swingarm pivot nut to the specified torque.

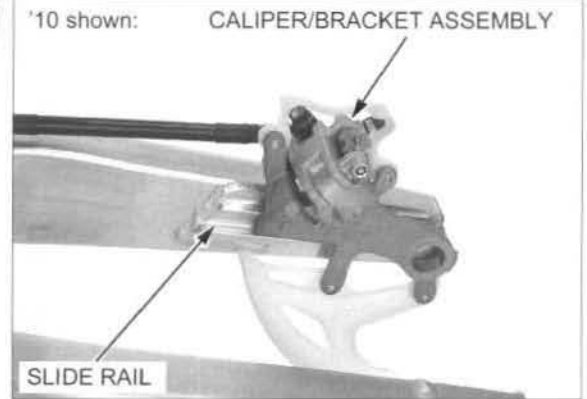
**TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)**





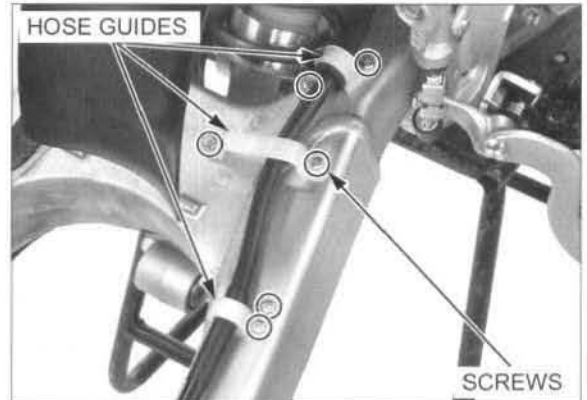
*Do not twist the brake hose.*

Install the rear brake caliper/bracket assembly to the swingarm by aligning the bracket tab with the slide rail of the swingarm.



Install the brake hose guides and screws. Tighten the screws to the specified torque.

**TORQUE: 1.2 N·m (0.1 kgf·m, 0.9 lbf·ft)**



Apply engine oil to the shock arm nut (swingarm side) threads and seating surface.

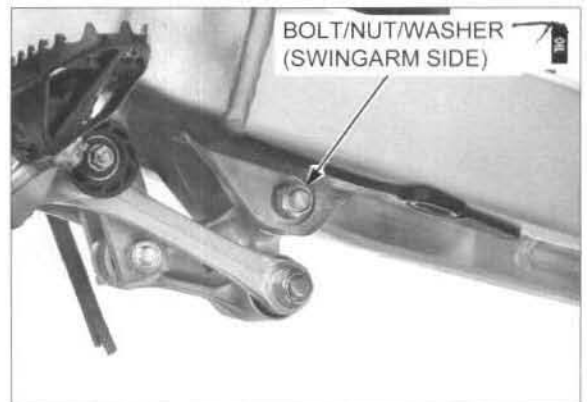
Install the shock arm bolt, washer and nut (swingarm side).

Tighten the nut to the specified torque.

**TORQUE: 53 N·m (5.4 kgf·m, 39 lbf·ft)**

Install the following:

- Brake pedal pivot bolt (page 15-29)
- Drive chain (page 3-18)
- Rear wheel (page 14-12)





---

MEMO



# 15. HYDRAULIC BRAKE

---

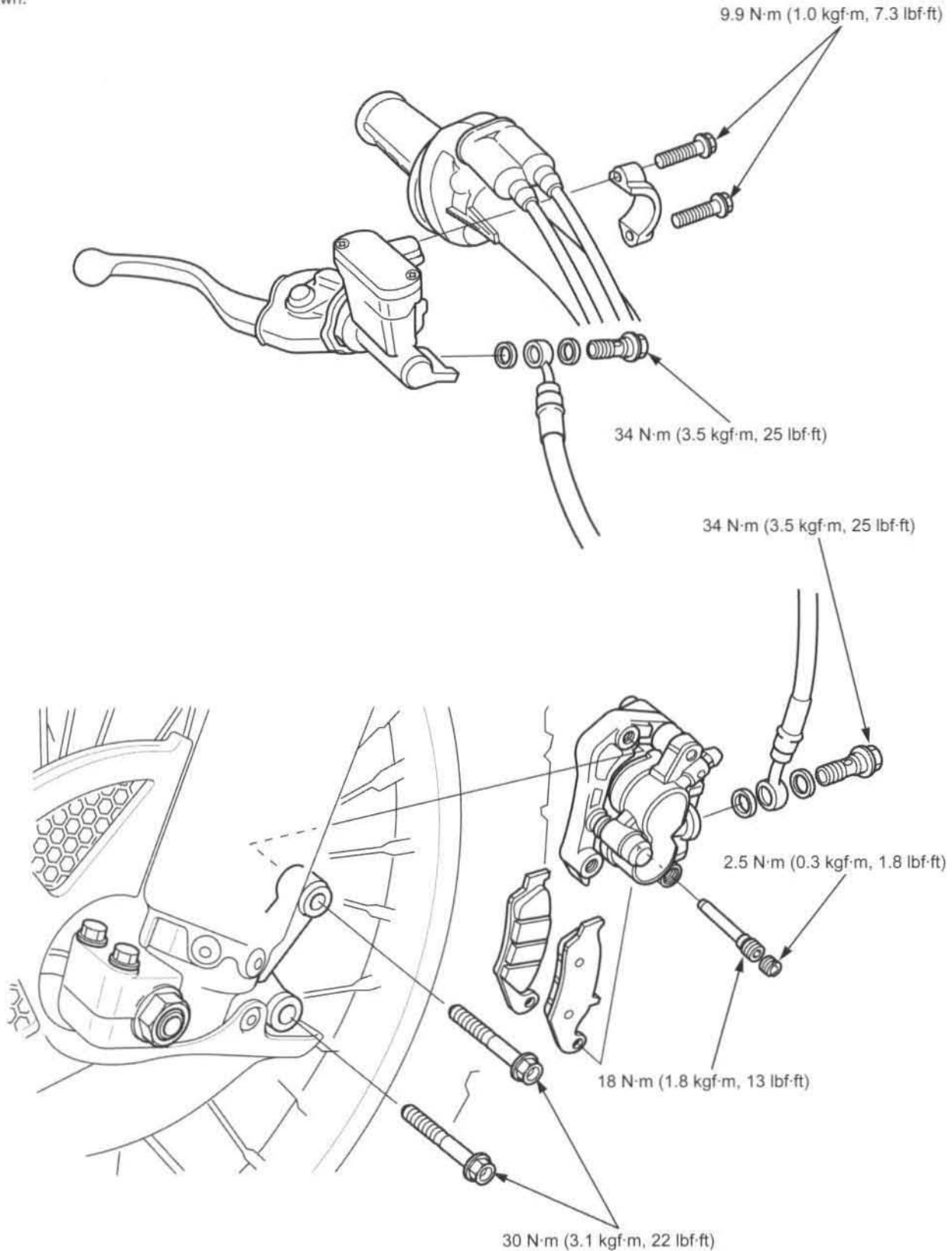
COMPONENT LOCATION .....	15-2	FRONT MASTER CYLINDER .....	15-14
SERVICE INFORMATION .....	15-4	REAR MASTER CYLINDER .....	15-19
TROUBLESHOOTING .....	15-6	FRONT BRAKE CALIPER .....	15-22
BRAKE FLUID REPLACEMENT/AIR BLEEDING .....	15-7	REAR BRAKE CALIPER .....	15-25
BRAKE PADS/DISC .....	15-11	BRAKE PEDAL .....	15-29

# HYDRAULIC BRAKE

## COMPONENT LOCATION

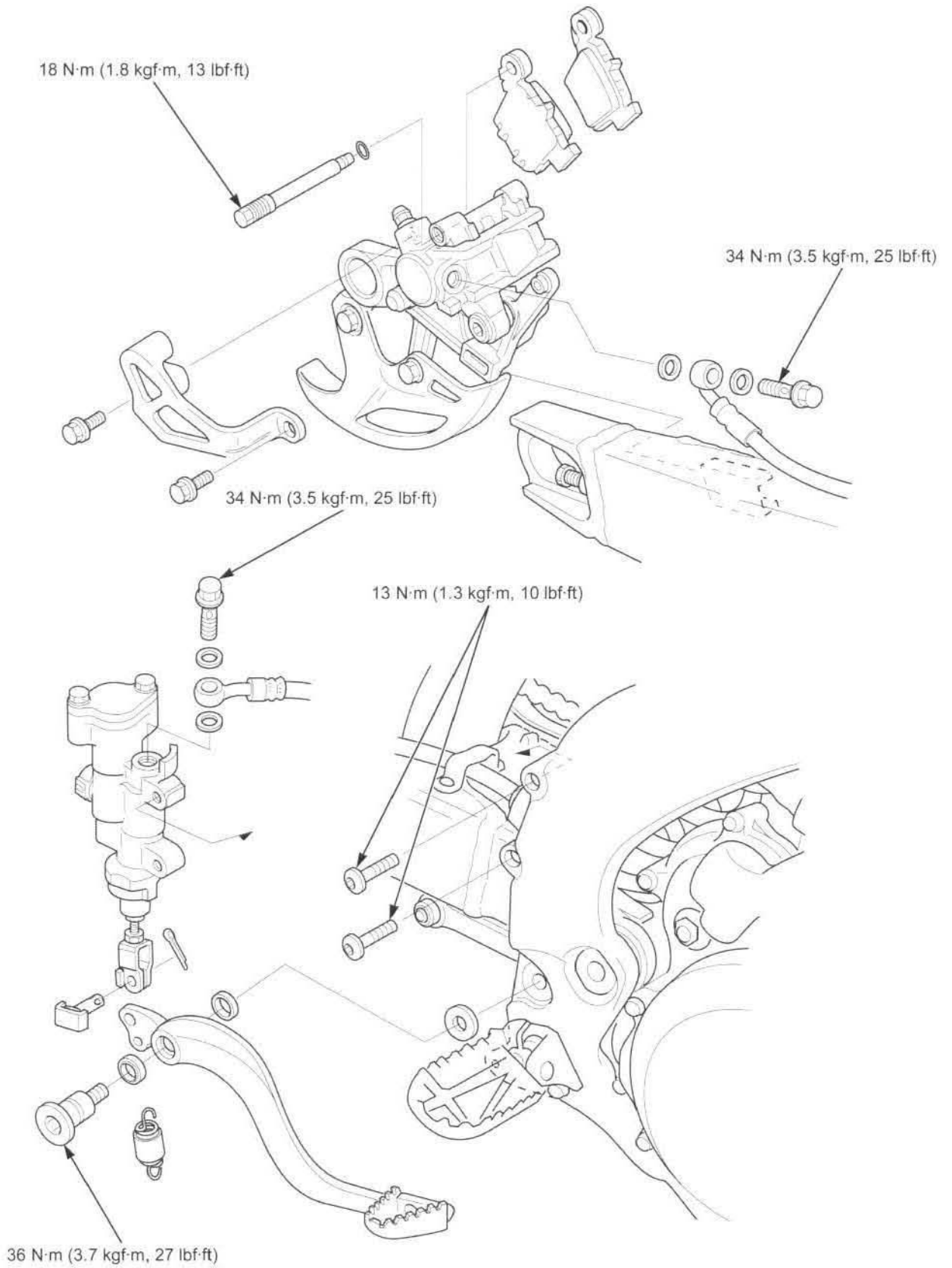
FRONT:

'10 shown:



REAR:

\*10 shown:



## HYDRAULIC BRAKE

# SERVICE INFORMATION

## GENERAL

### ⚠ CAUTION

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

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

### NOTICE

*Spilled brake fluid will severely damage plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.*

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with 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 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	Brake fluid	DOT 4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	2.8 – 3.0 (0.11 – 0.12)	2.5 (0.10)
	Brake disc warpage	—	0.3 (0.01)
	Master cylinder I.D.	11.000 (0.4331)	11.050 (0.4350)
	Master piston O.D.	10.971 (0.4319)	10.840 (0.4268)
	Caliper cylinder I.D.	27.025 (1.0640)	27.060 (1.0654)
	Caliper piston O.D.	26.968 (1.0617)	26.853 (1.0572)
Rear	Brake fluid	DOT 4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	3.8 – 4.0 (0.15 – 0.16)	3.5 (0.14)
	Brake disc warpage	—	0.3 (0.01)
	Master cylinder I.D.	9.547 (0.3759)	9.575 (0.3770)
	Master piston O.D.	9.491 (0.3737)	9.465 (0.3726)
	Caliper cylinder I.D.	22.650 (0.8917)	22.712 (0.8942)
	Caliper piston O.D.	22.620 (0.8905)	22.573 (0.8887)
	Brake pedal height	79.6 (3.13)	—

**TORQUE VALUES**

Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Brake lever pivot bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Brake lever adjuster lock nut	5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)
Front master cylinder reservoir cover screw	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Front master cylinder holder bolt	9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)
Caliper bleed valve	5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)
Front brake disc cover bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Rear master cylinder reservoir cover bolt	1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)
Rear master cylinder mounting bolt	13 N·m (1.3 kgf·m, 10 lbf·ft)
Front brake caliper bracket pin bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Rear brake caliper bracket pin bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)
Front brake caliper pin bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Brake caliper pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)
Front brake caliper pad pin plug	2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)
Brake pedal pivot bolt	36 N·m (3.7 kgf·m, 27 lbf·ft)

Apply silicone grease to the sliding surface.

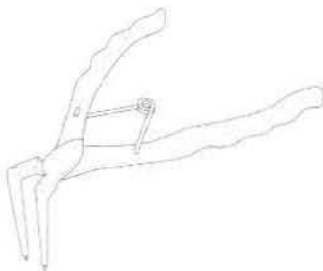
Apply locking agent to the threads.

Apply locking agent to the threads.  
Apply locking agent to the threads.  
Apply locking agent to the threads.

Apply locking agent to the threads (page 15-30).

**TOOL**

Snap ring pliers  
07914-SA50001



## HYDRAULIC BRAKE

---

### TROUBLESHOOTING

#### Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pads/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pads/disc
- Contaminated caliper
- Caliper bracket not sliding properly (rear)
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

#### Brake lever/pedal hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper bracket not sliding properly (rear)
- Clogged/restricted fluid passage
- Worn caliper piston seals
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

#### Brake drags

- Contaminated brake pads/disc
- Misaligned wheel
- Clogged/restricted brake hose joint bolt and eyelet
- Warped/deformed brake disc
- Caliper bracket not sliding properly (rear)
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port
- Sticking master cylinder piston

## BRAKE FLUID REPLACEMENT/AIR BLEEDING

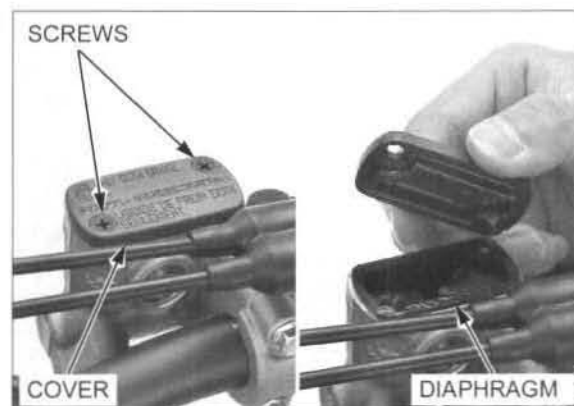
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with high quality brake degreasing agent.
- Once the hydraulic system has been opened, or if the brake feels spongy the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instruction.

### BRAKE FLUID DRAINING

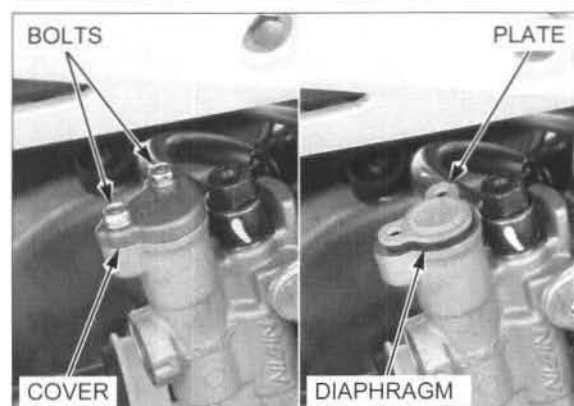
*Do not allow foreign material to enter the system when filling the reservoir.*

Check the master cylinder parallel to the ground, before removing the reservoir cover.

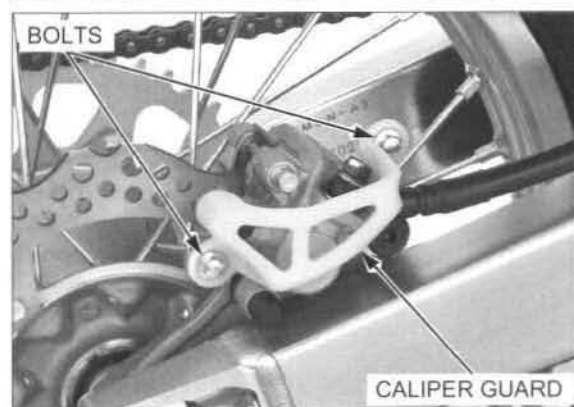
*Front:* Remove the screws, reservoir cover and diaphragm.



*Rear:* Remove the bolts, reservoir cover, set plate and diaphragm.



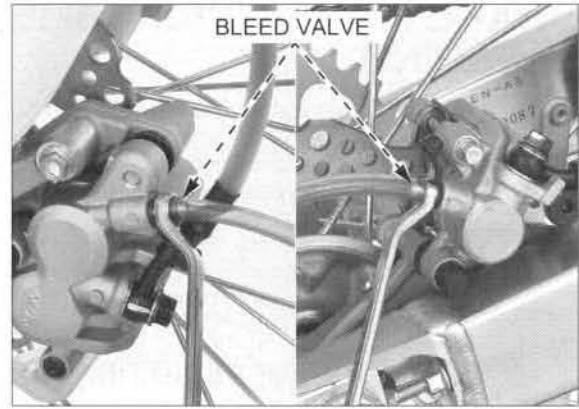
*Rear:* Remove the bolts and rear brake caliper guard.





## HYDRAULIC BRAKE

Connect a bleed hose to the bleed valve.  
Loosen the bleed valve and pump the brake lever or pedal.  
Stop operating the brake when no more fluid flows out of the bleed valve.



### BRAKE FLUID FILLING/AIR BLEEDING

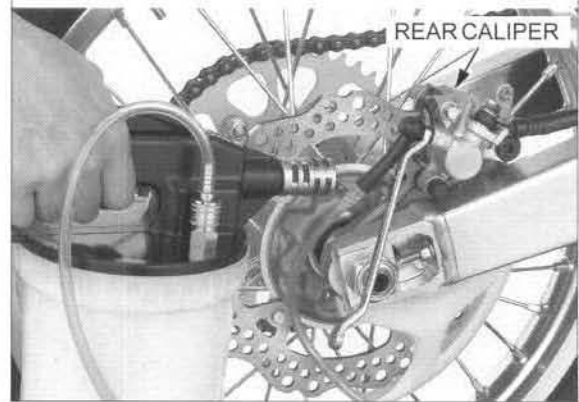
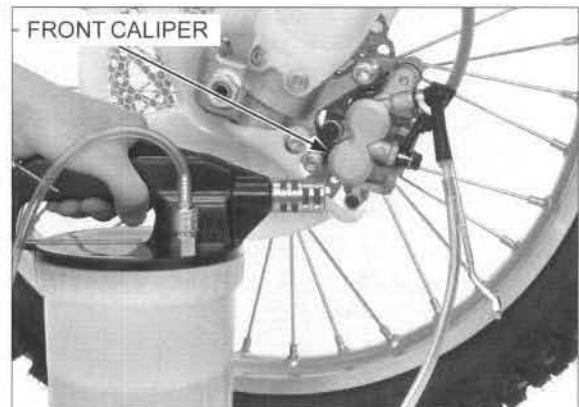
- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.

Fill the master cylinder with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve.

Operate the brake bleeder and loosen the bleed valve. If an automatic refill system is not used, add brake fluid when the fluid level in the reservoir is low.

- Check the fluid level often while bleeding to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



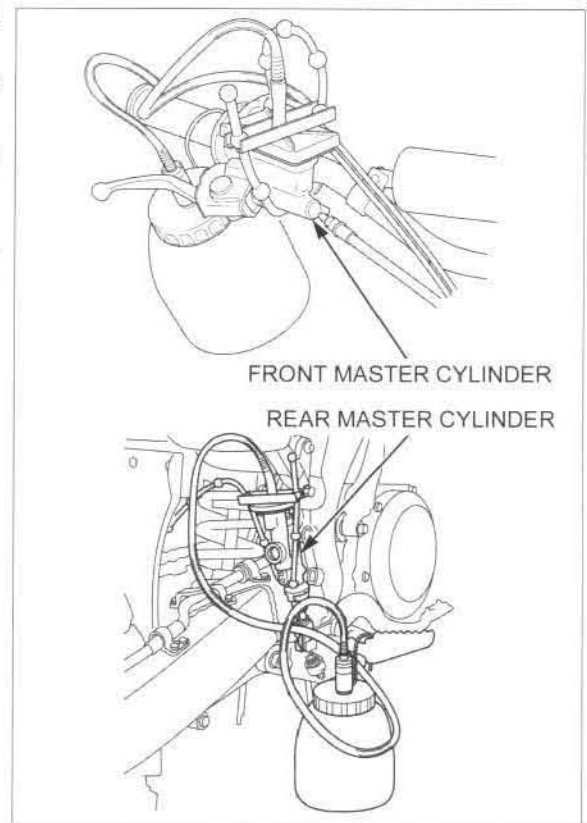
Perform the bleeding procedure until the system is completely flushed/bled.

- If air enters the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever or pedal.

If it still feels spongy, bleed the system again.

Operate the brake lever or pedal. If it still feels spongy, bleed the system again.



If a brake bleeder is not available, perform the following procedures:

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

Connect a bleed hose to the bleed valve.

Pressurize the system with the brake lever or pedal until there are no air bubbles in the brake fluid flowing out of the small hole in the reservoir and lever or pedal resistance is felt.

1. Squeeze the brake lever or push the brake pedal, open the bleed valve 1/2 turn and then close the bleed valve.

**NOTE:**

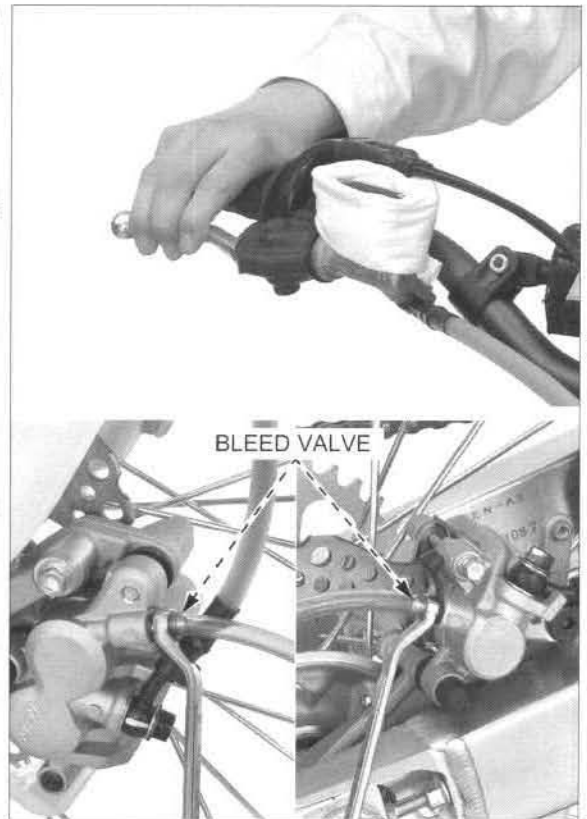
Do not release the brake lever or pedal until the bleed valve has been closed.

2. Release the brake lever or pedal slowly, and wait several seconds after it reaches the end of its travel.
3. Repeat steps 1 to 2 until there are no air bubbles in the bleed hose.

After bleeding air completely, tighten the bleed valves to the specified torque.

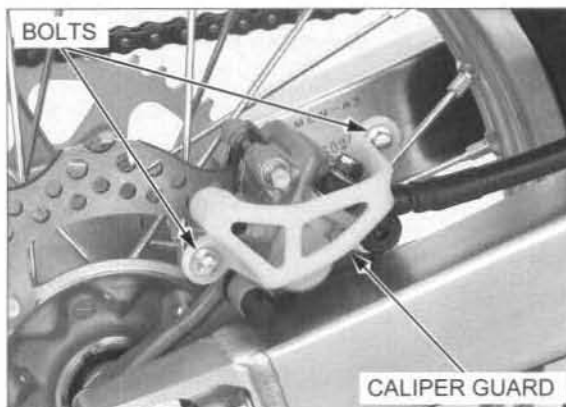
**TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)**

*Wrap a clean shop towel around the reservoir to prevent brake fluid spilling.*

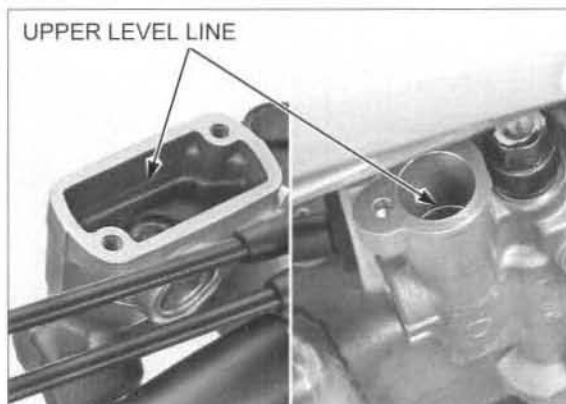


## HYDRAULIC BRAKE

For the rear brake, install the brake caliper guard, and tighten the bolts securely.

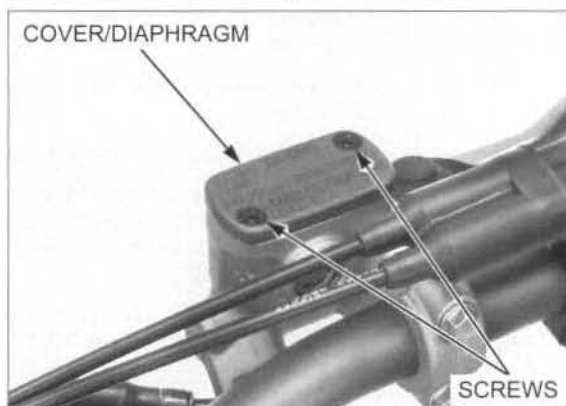


Fill each reservoir with DOT 4 brake fluid to the upper level line.



*Front:* Install the diaphragm and reservoir cover. Tighten the reservoir cover screws to the specified torque.

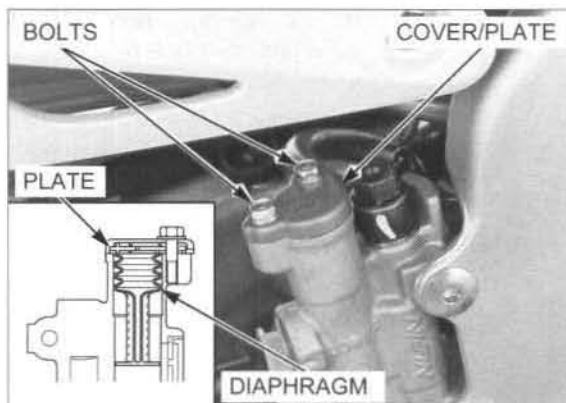
**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



*Rear:* Straighten the diaphragm and install it to the rear master cylinder. Check the diaphragm installation as shown.

Install the set plate and reservoir cover. Tighten the reservoir cover bolts to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**



# BRAKE PADS/DISC

## FRONT BRAKE PADS 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:**

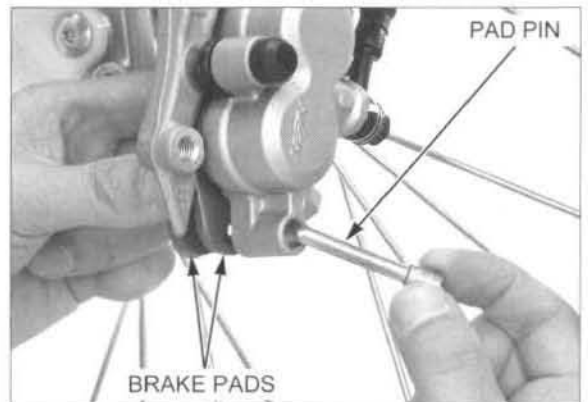
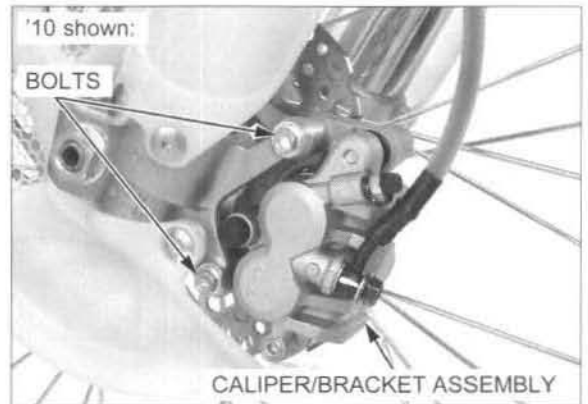
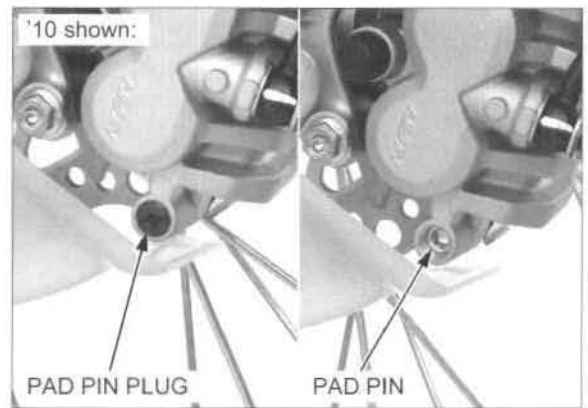
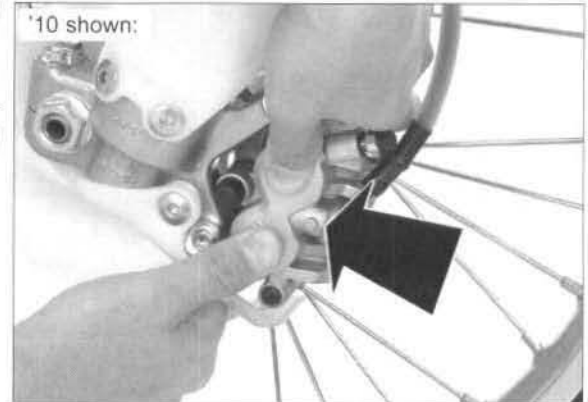
- Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

*After '12 only:* Remove the front brake disc cover (page 13-7).

Remove the pad pin plug and loosen the pad pin.

Remove the brake caliper mounting bolts and brake caliper/bracket assembly.

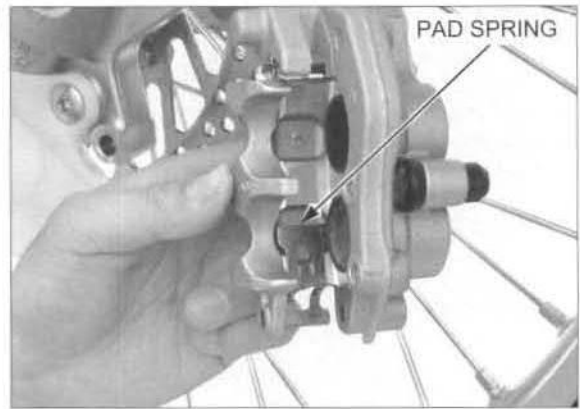
Remove the pad pin and brake pads.



## HYDRAULIC BRAKE

Clean the inside of the brake caliper especially around the caliper pistons.

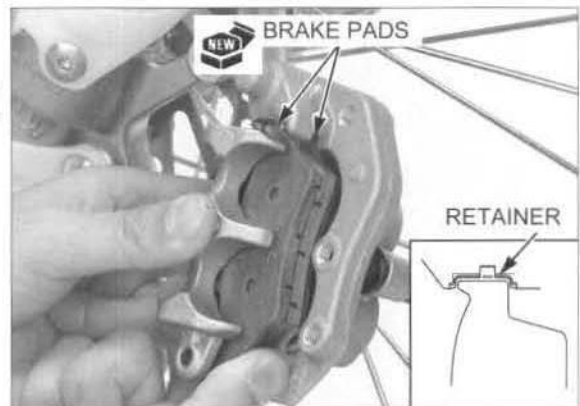
Make sure the pad spring is installed correctly.



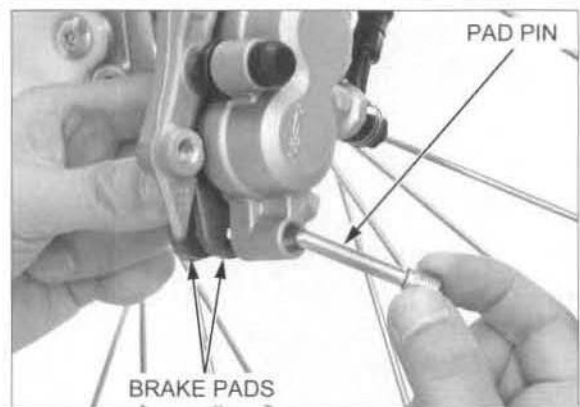
Install new brake pads to the pad retainer securely.

**NOTE:**

- Discard contaminated pads and clean a contaminated disc with high quality brake degreasing agent.



Push the brake pads against the pad spring, then install the pad pin.

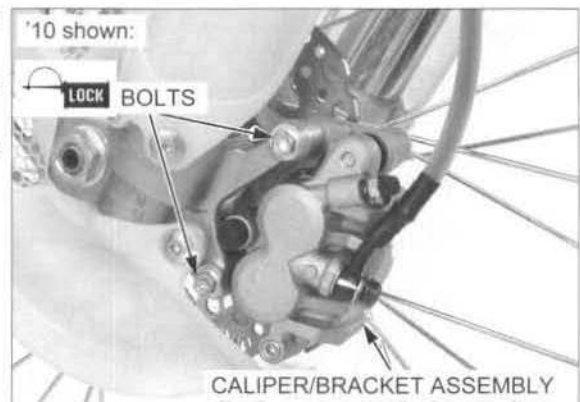


Apply locking agent to the brake caliper mounting bolt threads.

Install the brake caliper/bracket assembly to the fork leg.

Install and tighten the brake caliper mounting bolts to the specified torque.

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



Tighten the pad pin to the specified torque.

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

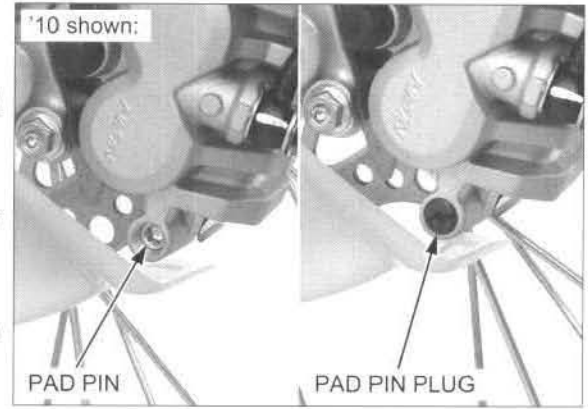
Install and tighten the pad pin plug to the specified torque.

**TORQUE: 2.5 N·m (0.3 kgf·m, 1.8 lbf·ft)**

Apply the brake lever to force the caliper piston out of the caliper.

*After '12 only:* Install the front brake disc cover (page 13-13).

Rotate the wheel by hand, and check the brake operation.



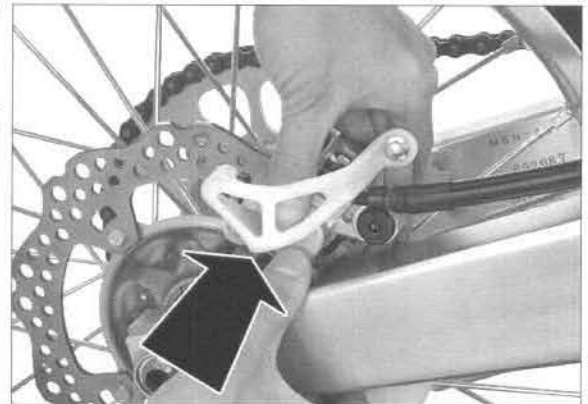
**REAR BRAKE PADS REPLACEMENT**

*Always replace the brake pads in pairs to assure even disc pressure.*

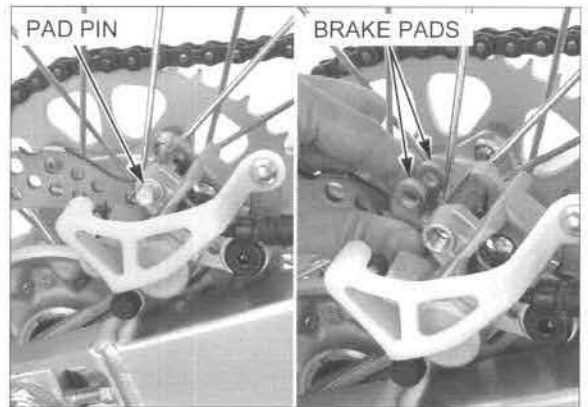
Push the caliper piston all the way in to allow installation of new brake pads.

**NOTE:**

- Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



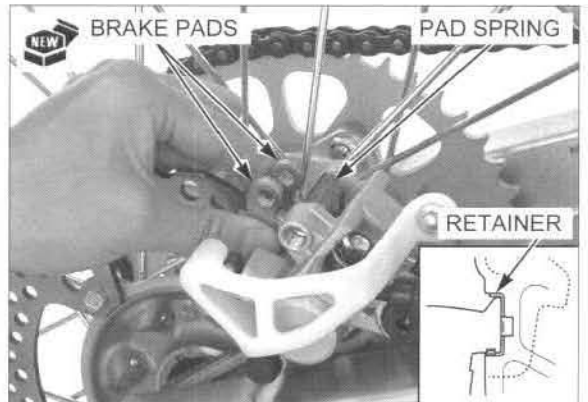
Remove the pad pin and brake pads.



Install new brake pads to the pad retainer and pad spring securely.

**NOTE:**

- Discard contaminated pads and clean a contaminated disc with high quality brake degreasing agent.





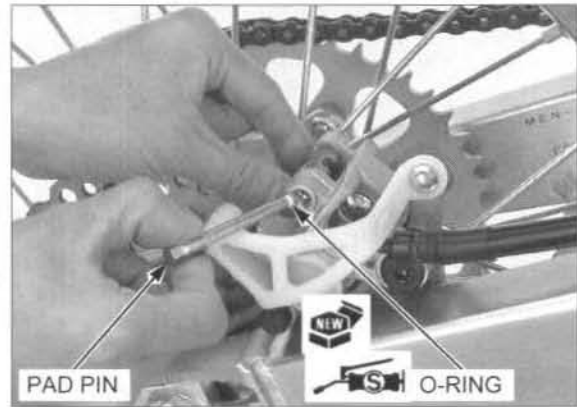
## HYDRAULIC BRAKE

Apply silicone grease to a new O-ring and install it into the pad pin groove.  
Install the pad pin while pushing in the brake pads against the pad spring.  
Tighten the pad pin to the specified torque.

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

Apply the brake pedal to force the caliper piston out of the caliper.

Rotate the wheel by hand, and check the brake operation.



### BRAKE DISC INSPECTION

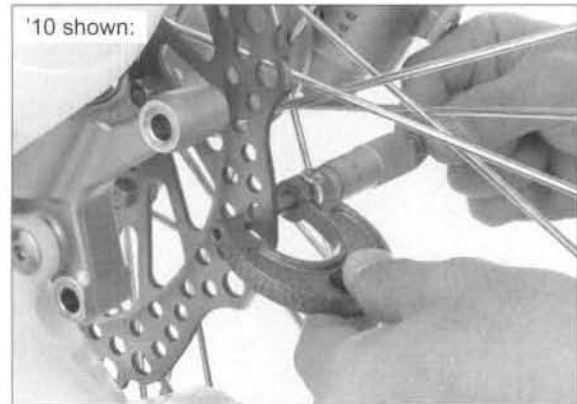
Visually inspect the brake disc for damage or cracks.  
Measure the brake disc thickness with a micrometer.

#### SERVICE LIMITS:

**FRONT: 2.5 mm (0.10 in)**

**REAR: 3.5 mm (0.14 in)**

Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warpage with a dial indicator.

**SERVICE LIMIT: 0.3 mm (0.01 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.



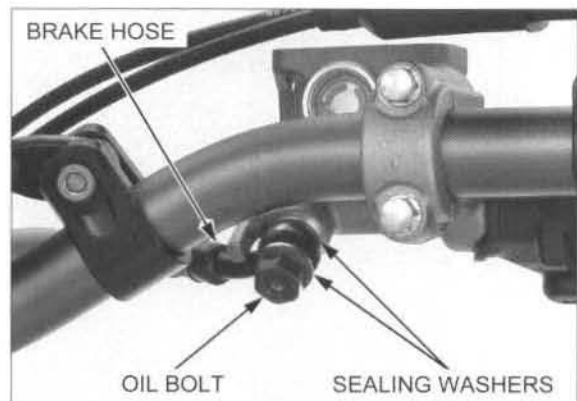
## FRONT MASTER CYLINDER

### REMOVAL

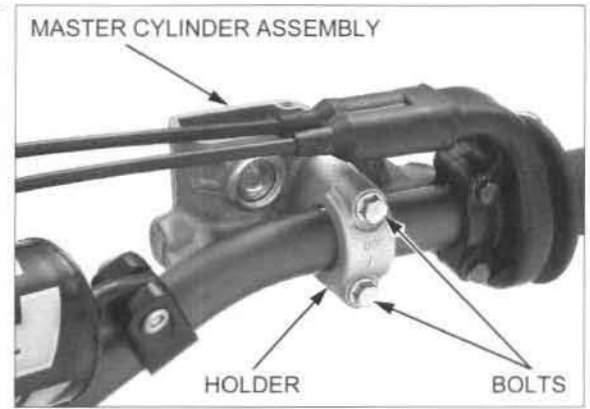
Drain the front brake hydraulic system (page 15-7).

*When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent brake fluid from leaking out.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

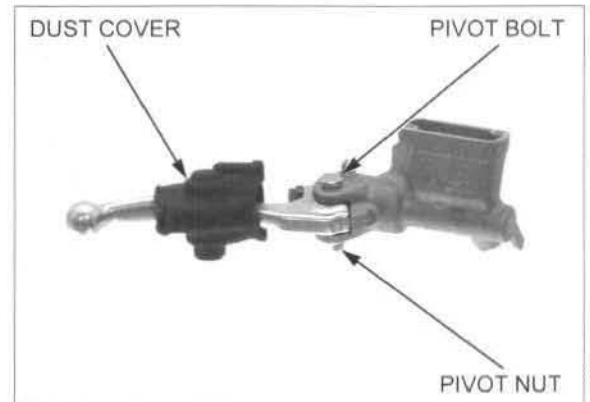


Remove the bolts, holder and master cylinder assembly.



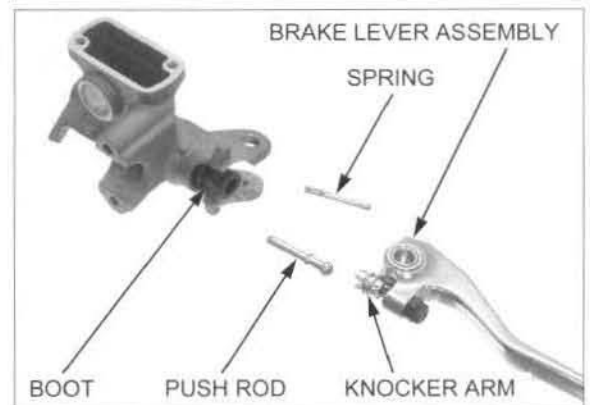
## DISASSEMBLY

Remove the dust cover.  
Remove the pivot nut and bolt.



*Be careful not to damage the boot.*

Release the boot from the knocker arm.  
Remove the brake lever assembly, spring and push rod from the master cylinder.

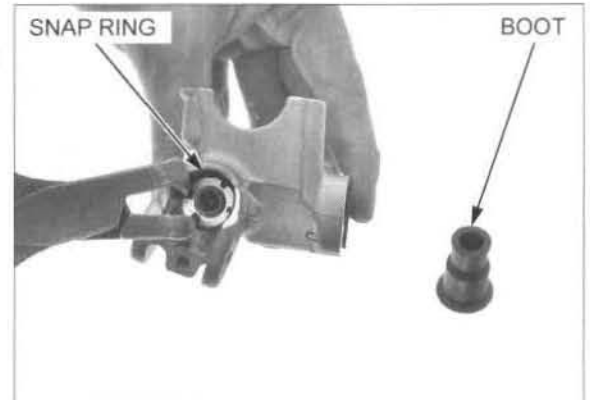


*Be careful not to damage the boot.*

Remove the boot.  
Remove the snap ring from the master cylinder using the special tool.

**TOOL:**  
Snap ring pliers

07914-SA50001

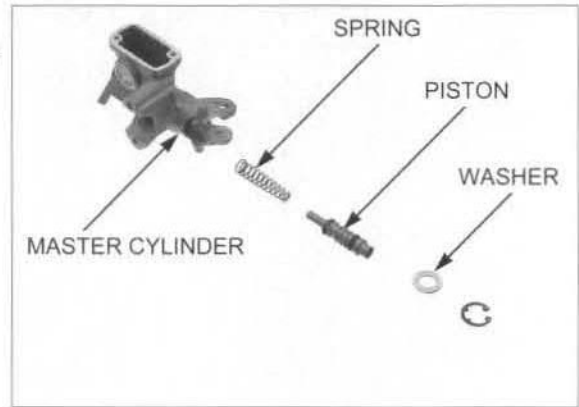




## HYDRAULIC BRAKE

Remove the washer, master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

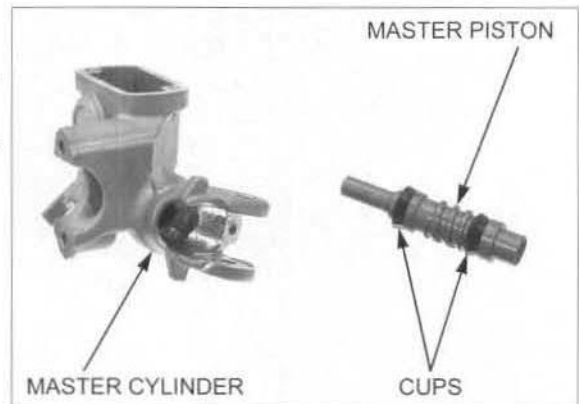


### INSPECTION

Check the master cylinder for abnormal scratches.

Check the master piston for abnormal scratches.  
Check the primary cup and secondary cup for fatigue or damage.

Replace the master piston, primary cup and secondary cup as an assembly if necessary.

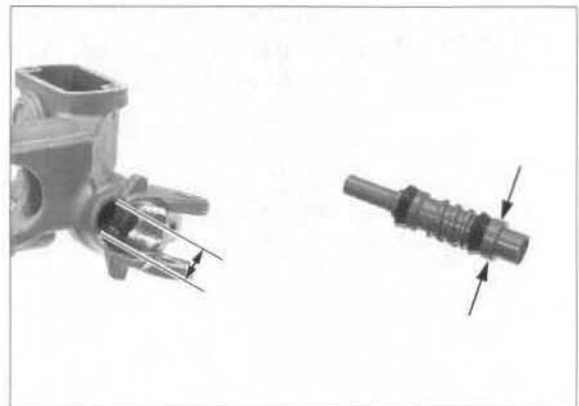


Measure the master cylinder I.D.

**SERVICE LIMIT: 11.050 mm (0.4350 in)**

Measure the master piston O.D.

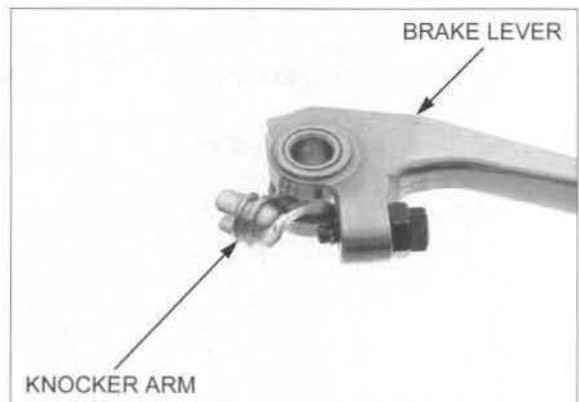
**SERVICE LIMIT: 10.840 mm (0.4268 in)**



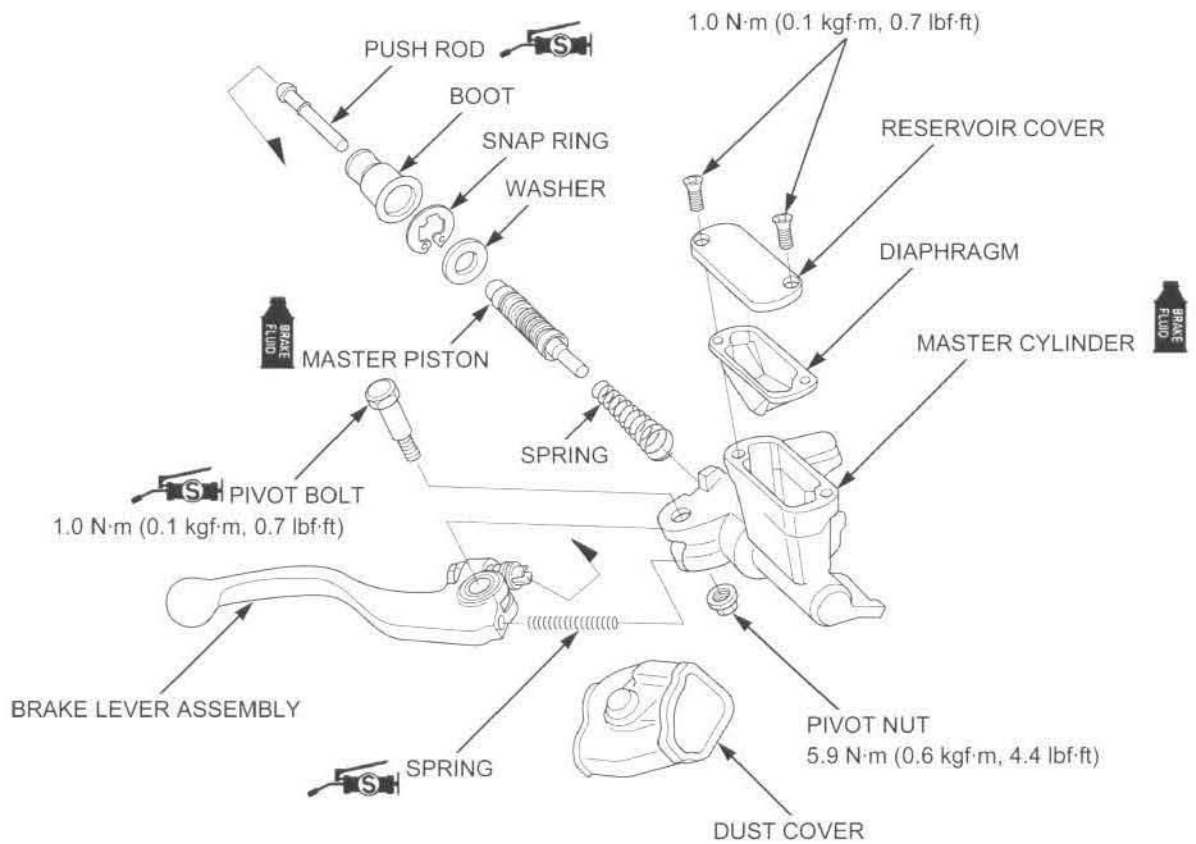
Check the brake lever for bend or damage.

Move the knocker arm with your finger.  
The knocker arm should move smoothly and freely  
without excessive play.

Replace the brake lever and knocker arm as an  
assembly if necessary.



ASSEMBLY



Keep the piston, cups, spring, snap ring and boot as a set; do not replace the parts individually.

Apply clean brake fluid to the master piston outer surface and master cylinder inner surface.

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

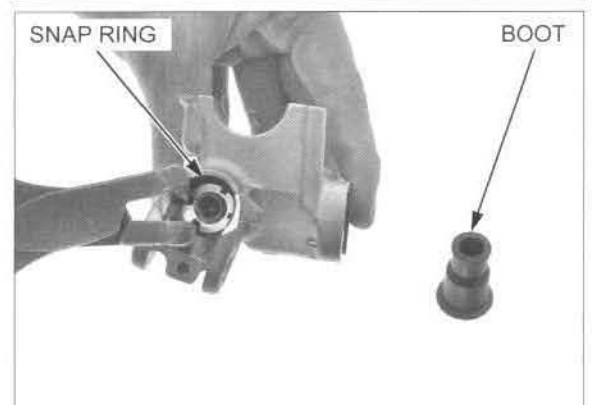
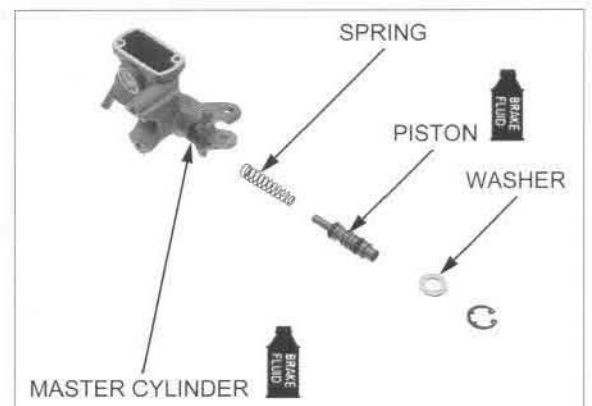
Install the spring to the master piston.  
Install the master piston assembly into the master cylinder.  
Install the washer.

Be certain the snap ring is firmly seated in the groove

Install the snap ring to the master cylinder using the special tool.

**TOOL:**  
**Snap ring pliers** 07914-SA50001

Install the boot to the master cylinder until it is fully seated.

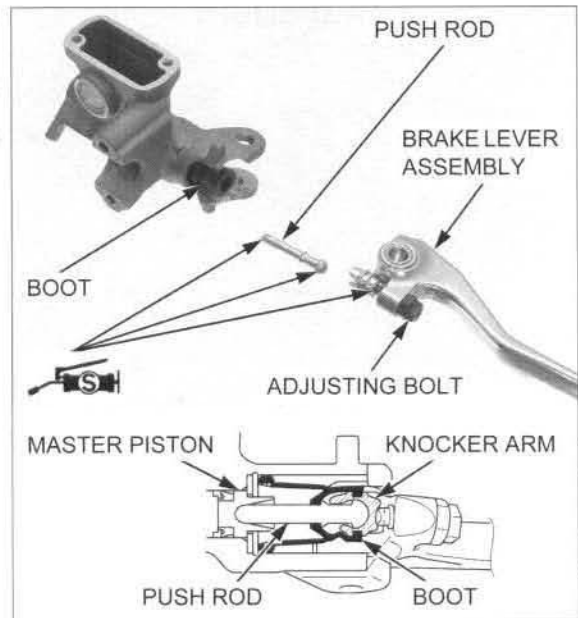


## HYDRAULIC BRAKE

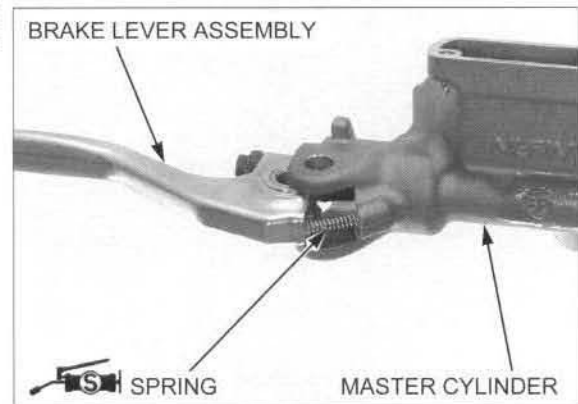
Apply silicone grease to the contact area of the push rod and brake lever adjusting bolt tip.

*Note the direction of the push rod. Make sure the tab on the push rod is seated on the boot.*

Install the push rod to the hollow of the master piston securely.  
 Install the brake lever assembly while aligning the push rod end with the knocker arm.  
 Set the boot to the knocker arm groove securely.



Apply silicone grease to the spring both ends, and install it between the master cylinder and brake lever assembly.



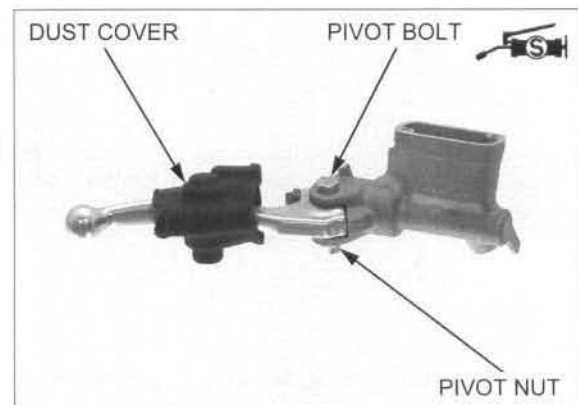
Apply silicone grease to the pivot bolt sliding surface.  
 Install and tighten the pivot bolt to the specified torque.

**TORQUE: 1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)**

Tighten the pivot nut to the specified torque while holding the pivot bolt.

**TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)**

Check the brake lever for smooth operation.  
 Install the dust cover.



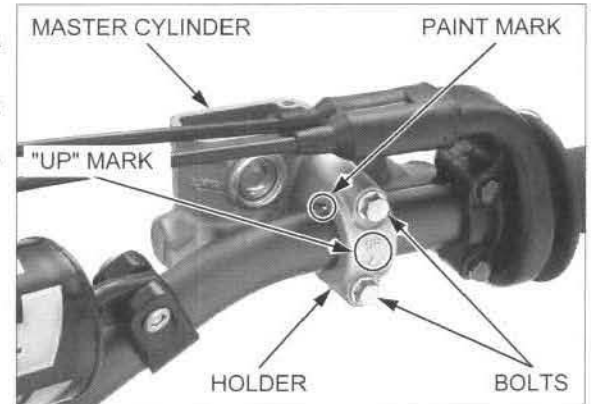
**INSTALLATION**

Place the master cylinder assembly on the handlebar. Align the end of the master cylinder with the paint mark on the handlebar.

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

Tighten the upper bolt first, then the lower bolt to the specified torque.

**TORQUE: 9.9 N·m (1.0 kgf·m, 7.3 lbf·ft)**

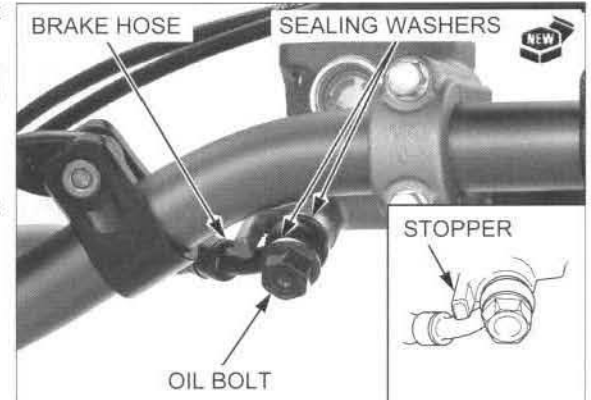


Install the brake hose eyelet with the brake hose oil bolt and new sealing washers.

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 front brake system (page 15-8).



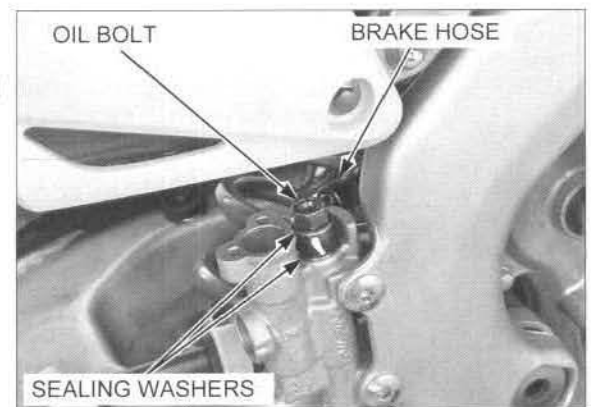
**REAR MASTER CYLINDER**

**REMOVAL**

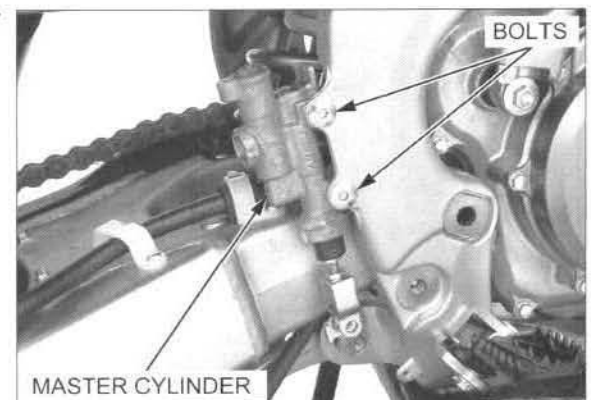
Drain the rear brake hydraulic system (page 15-7). Remove the brake pedal (page 15-29).

*When removing the brake hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent brake fluid from leaking out.*

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.



Remove the master cylinder mounting bolts and rear master cylinder.



## HYDRAULIC BRAKE

### DISASSEMBLY

*Be careful not to damage the boot.*

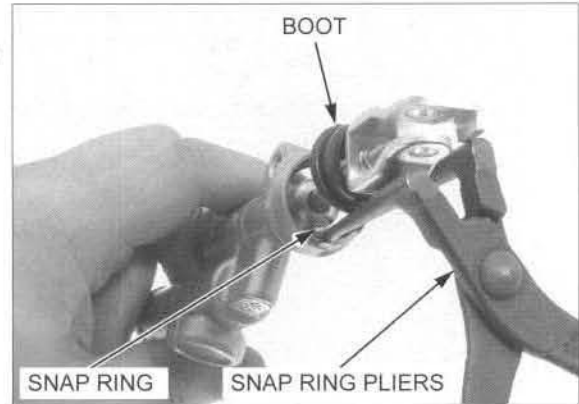
Remove the boot.

Remove the snap ring from the master cylinder using the special tool as shown.

**TOOL:**

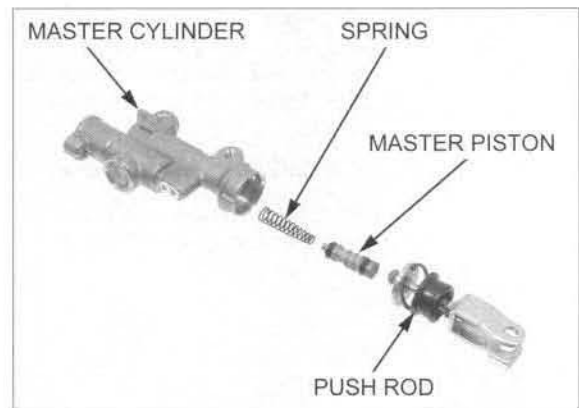
Snap ring pliers

07914-SA50001



Remove the push rod, master piston and spring.

Clean the inside of the master cylinder with brake fluid.



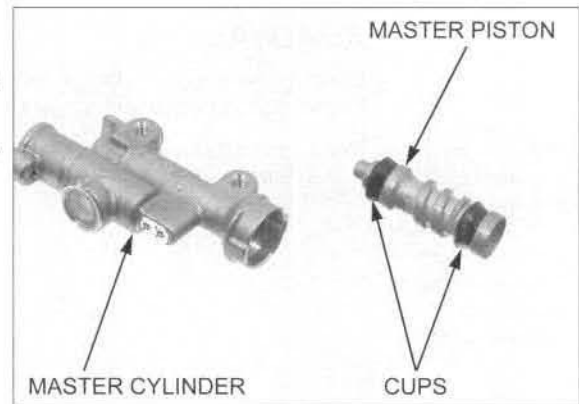
### INSPECTION

Check the master cylinder for abnormal scratches.

Check the master piston for abnormal scratches.

Check the piston boot, primary cup and secondary cup for fatigue or damage.

Replace the master piston, primary cap and secondary cap as an assembly if necessary.



Measure the master piston O.D.

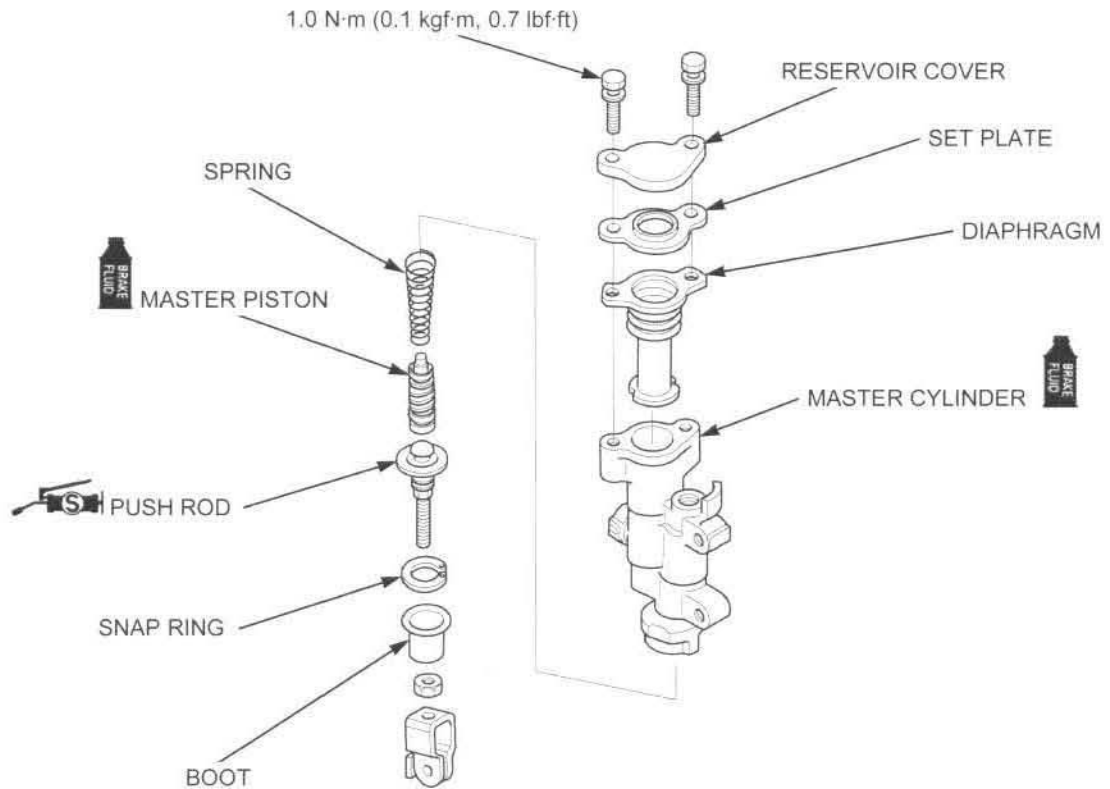
**SERVICE LIMIT: 9.465 mm (0.3726 in)**

Measure the master cylinder I.D.

**SERVICE LIMIT: 9.575 mm (0.3770 in)**



ASSEMBLY



Keep the piston, cups, spring, snap ring and boot as a set; do not replace the parts individually.

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

If the push rod is disassembled, adjust the brake pedal height (page 3-25).

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

Apply clean brake fluid to the master piston outer surface and master cylinder inner surface.

Install the spring to the master piston. Install the master piston assembly into the master cylinder.

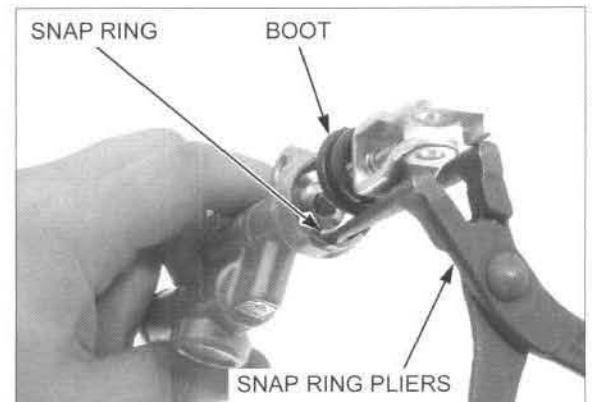
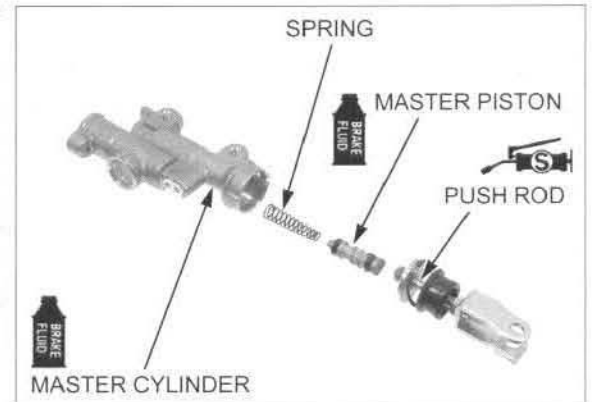
Apply silicone grease to the push rod rounded surface and boot fitting area.

Install the push rod into the master cylinder.

Install the snap ring using the special tool.

**TOOL:**  
**Snap ring pliers** 07914-SA50001

Install the boot to the master cylinder securely.



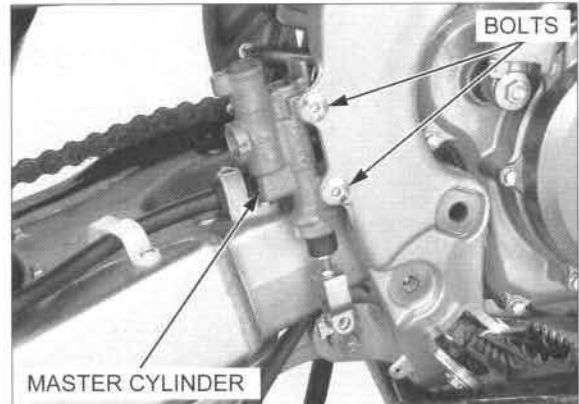
## HYDRAULIC BRAKE

### INSTALLATION

Install the master cylinder and mounting bolts.

Tighten the master cylinder mounting bolts to the specified torque

**TORQUE: 13 N·m (1.3 kgf·m, 10 lbf·ft)**



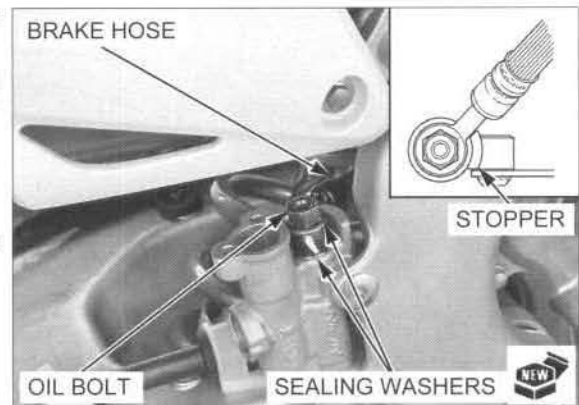
Install the brake hose eyelet with the brake hose oil bolt and new sealing washers.

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 brake pedal (page 15-29).

Fill the reservoir to the upper level, and bleed the brake system (page 15-8).



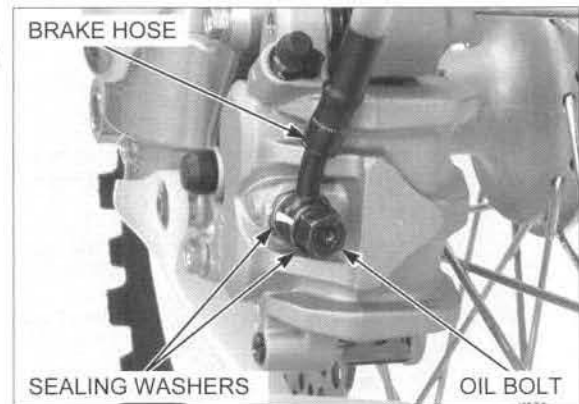
## FRONT BRAKE CALIPER

### REMOVAL

Drain the front brake hydraulic system (page 15-7).

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

Remove the brake pads (page 15-11).



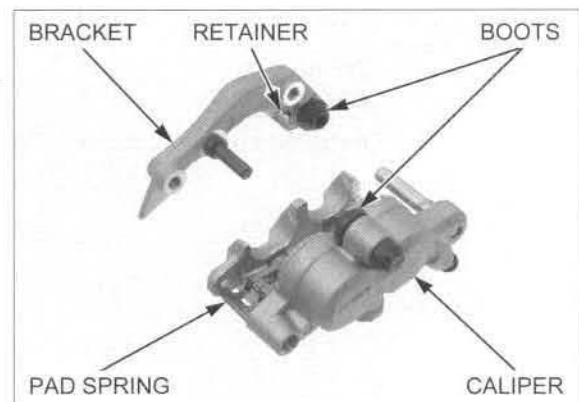
### DISASSEMBLY

Remove the caliper bracket from the brake caliper.

Remove the brake pad spring from the caliper.

Remove the brake pad retainer from the caliper bracket.

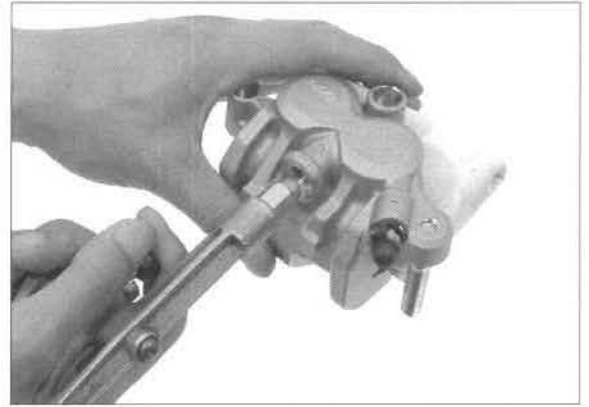
Remove the caliper pin boot and bracket pin boot.



Place a shop towel under the caliper to cushion the piston when it is expelled.

*Do not hold the air nozzle too close to the inlet. Excessive air pressure could force the pistons out of the caliper.*

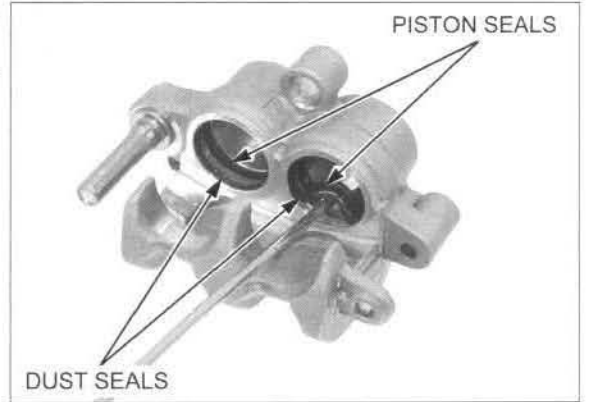
Apply short bursts of air pressure to the fluid inlet to remove the pistons.



*Be careful not to damage the piston sliding surface.*

Push the dust seals and piston seals in, and lift them out.

Clean the seal grooves, caliper pistons and caliper piston sliding surfaces with clean brake fluid.



**INSPECTION**

Check the caliper cylinder for scoring, scratches or damage.

Measure the caliper cylinder I.D.

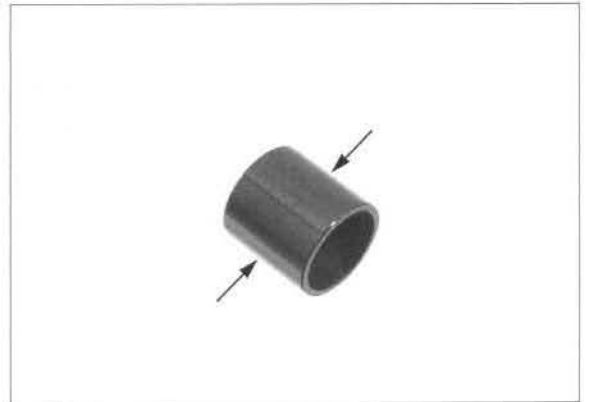
**SERVICE LIMIT: 27.060 mm (1.0654 in)**



Check the caliper pistons for scoring, scratches or damage.

Measure the caliper piston O.D.

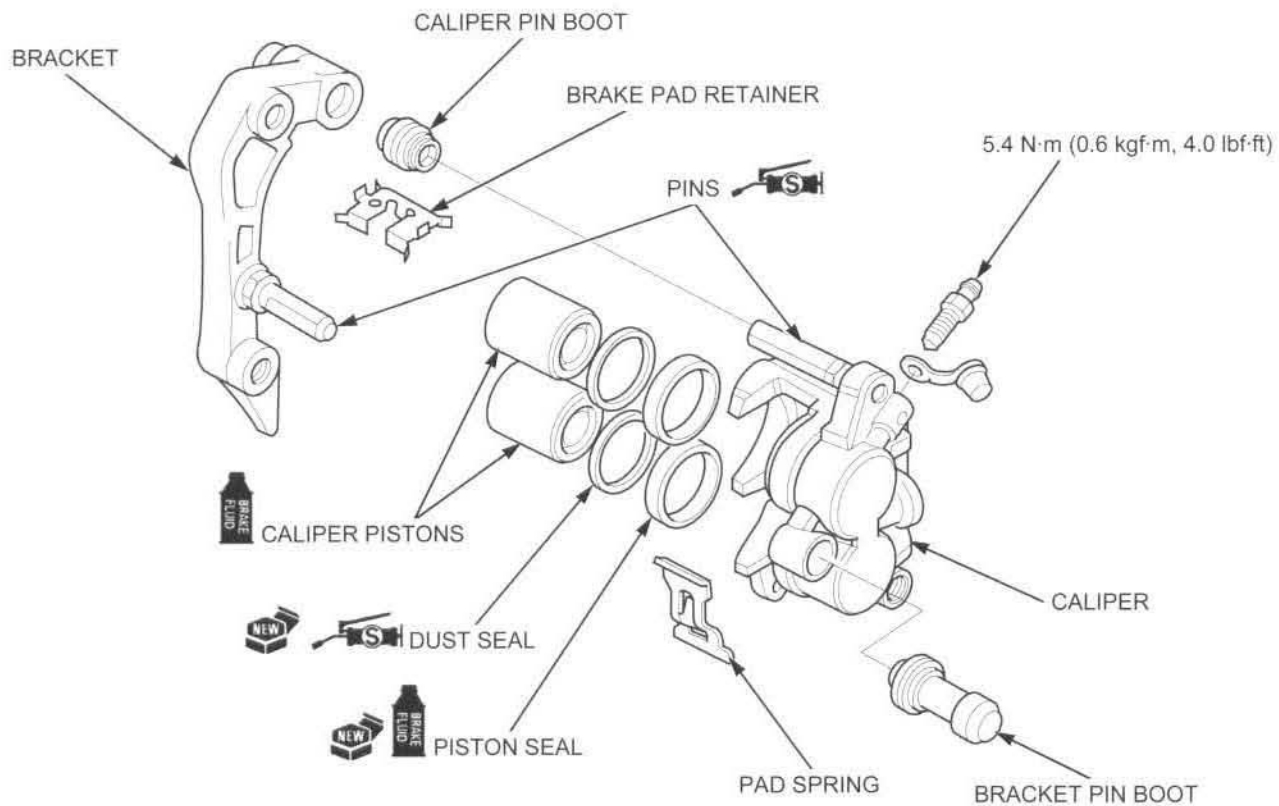
**SERVICE LIMIT: 26.853 mm (1.0572 in)**





# HYDRAULIC BRAKE

## ASSEMBLY

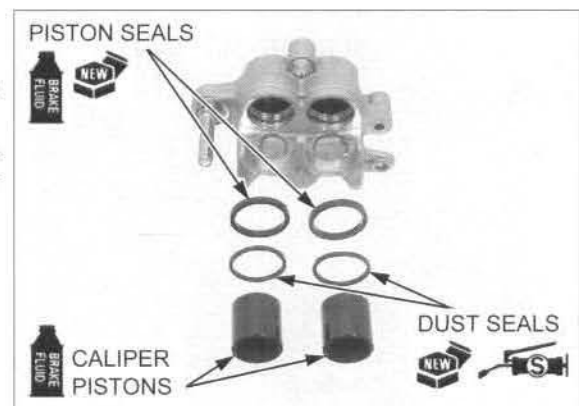


Coat new piston seal lips with clean brake fluid.  
Coat new dust seal lips with silicon grease.

*Install each piston seal, dust seal and caliper piston in their proper locations.*

Install the piston and dust seals into the grooves in the caliper.

Coat the caliper piston outer surfaces with clean brake fluid and install them into the caliper cylinder with their open ends facing the pad.



Install the brake pad retainer onto the caliper bracket.

*Note the installation direction of the pad spring.*

Install the pad spring into the caliper.

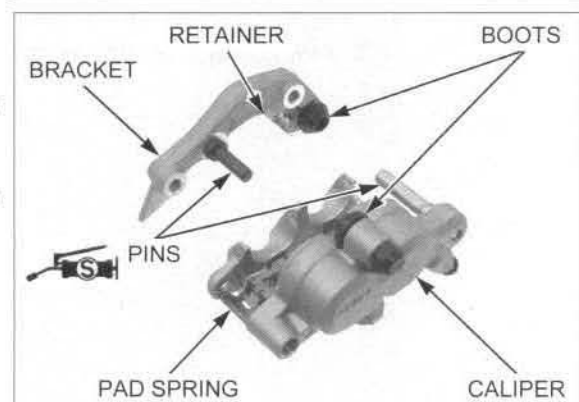
Replace the caliper and bracket pin boots if there is wear, deterioration or damage.

Install the caliper pin boot and bracket pin boot.

Apply silicone grease to the caliper and bracket pins sliding area.

Assemble the caliper and bracket.

*When assembling the caliper and bracket, set the boot into the slide pin groove.*



**INSTALLATION**

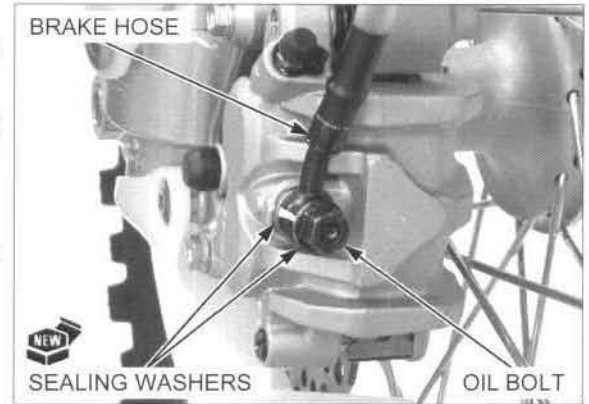
Install the brake pads (page 15-11).

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 hydraulic system (page 15-8).



**REAR BRAKE CALIPER**

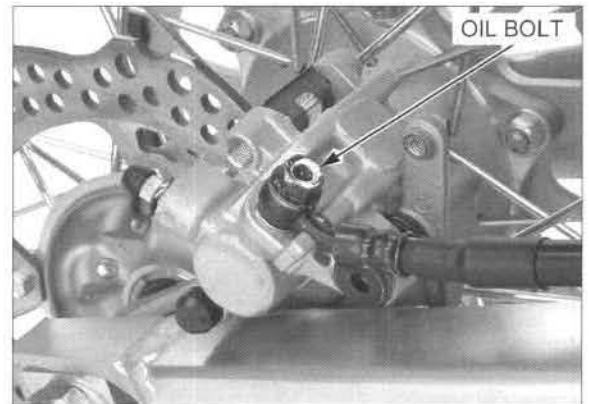
**REMOVAL**

Drain the rear brake hydraulic system (page 15-7).

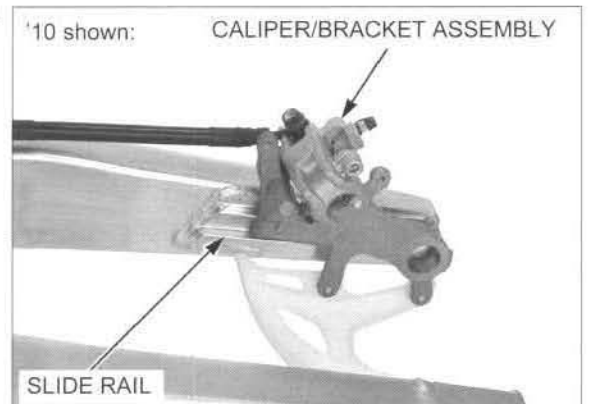
Remove the brake pads (page 15-13).

Loosen the brake hose oil bolt.

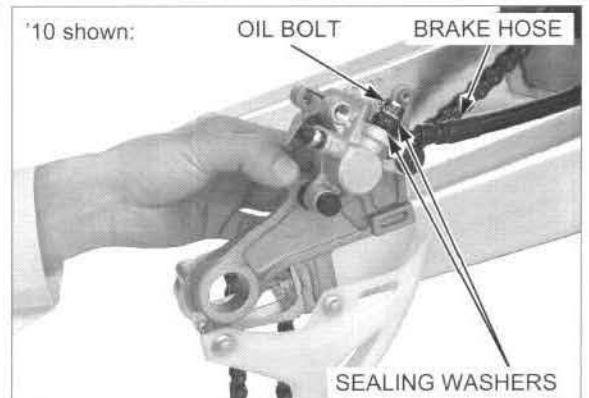
Remove the rear wheel (page 14-7).



Remove the brake caliper/bracket assembly to the slide rail of the swingarm.



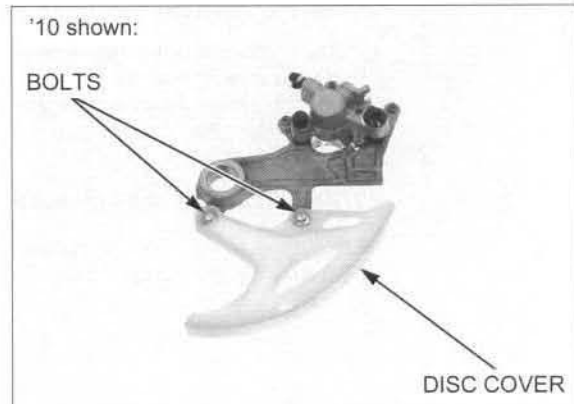
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.



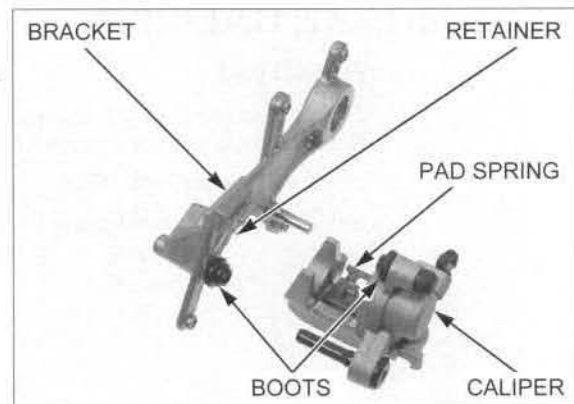
# HYDRAULIC BRAKE

## DISASSEMBLY

Remove the bolts and brake disc cover.



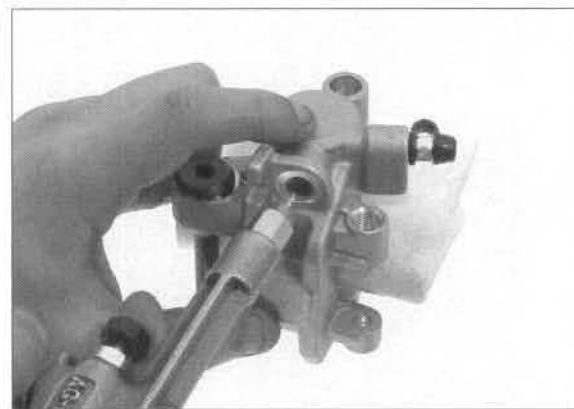
Remove the caliper bracket from the caliper.  
Remove the brake pad spring from the caliper.  
Remove the brake pad retainer from the caliper bracket.  
Remove the caliper pin boot and bracket pin boot.



Place a shop towel under the caliper to cushion the piston when it is expelled.

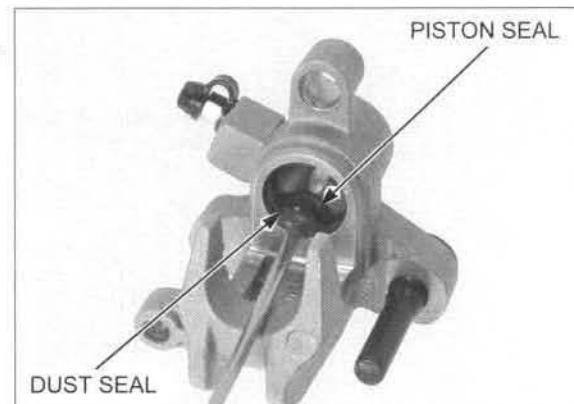
*Do not hold the air nozzle too close to the inlet.  
Excessive air pressure could force the piston out of the caliper.*

Apply short bursts of air pressure to the fluid inlet to remove the piston.



*Be careful not to damage the piston sliding surface.*

Push the dust seal and piston seal in and lift them out.  
Clean the seal grooves, caliper piston and caliper piston sliding surface with clean brake fluid.



**INSPECTION**

Check the caliper cylinder for scoring, scratches or damage.

Measure the caliper cylinder I.D.

**SERVICE LIMIT: 22.712 mm (0.8942 in)**



Check the caliper pistons for scoring, scratches or damage.

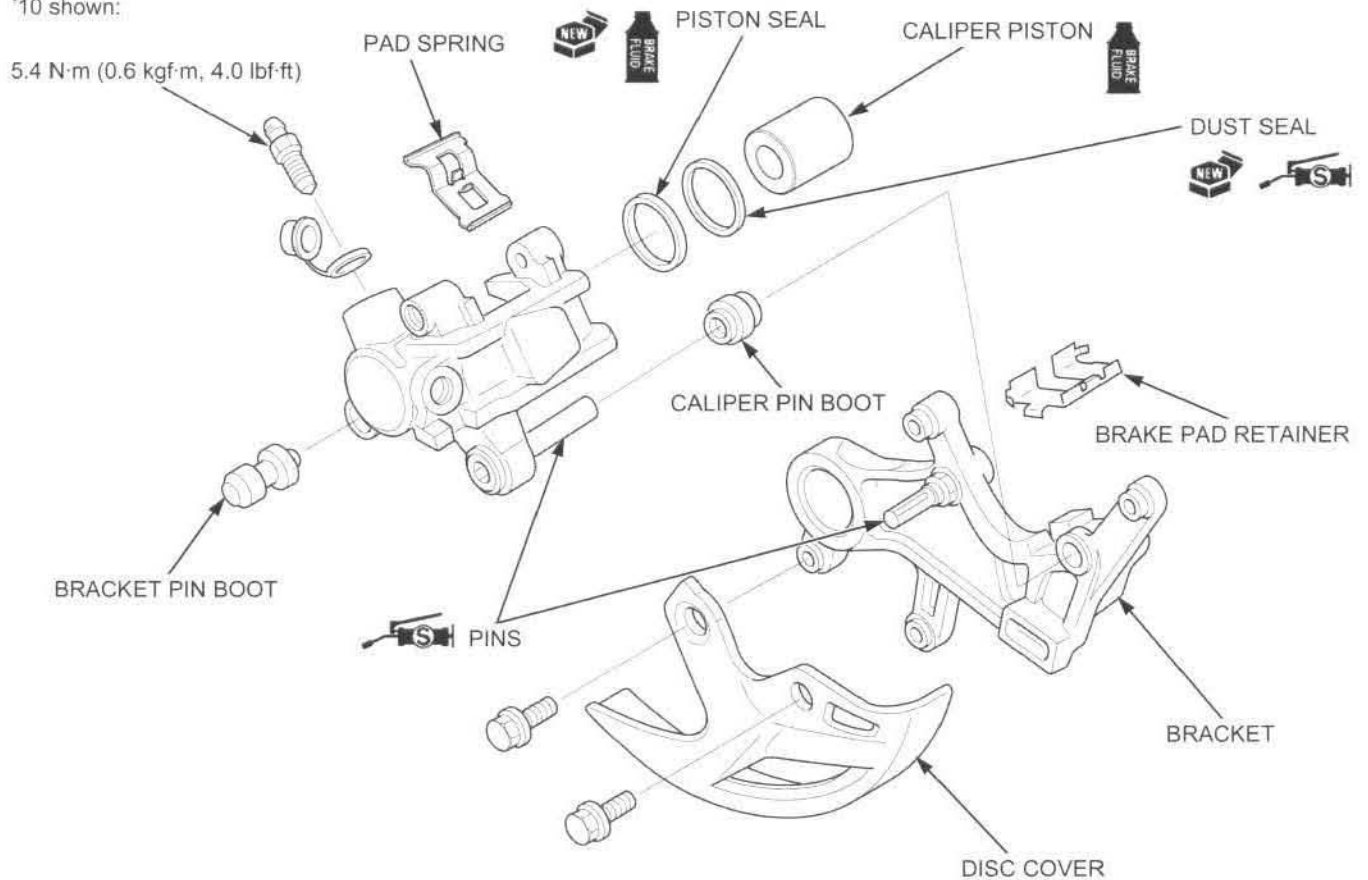
Measure the caliper piston O.D.

**SERVICE LIMIT: 22.573 mm (0.8887 in)**



**ASSEMBLY**

\*10 shown:



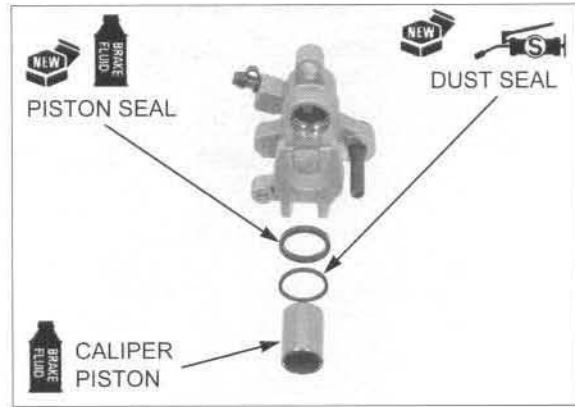
# HYDRAULIC BRAKE

Coat a new piston seal lip with clean brake fluid.  
 Coat a new dust seal lip with silicone grease.

*Install the piston seal, dust seal and caliper piston in their proper locations.*

Install the piston and dust seals into the grooves in the caliper.

Coat the caliper piston outer surfaces with clean brake fluid and install it into the caliper cylinder with its open end facing the pad.



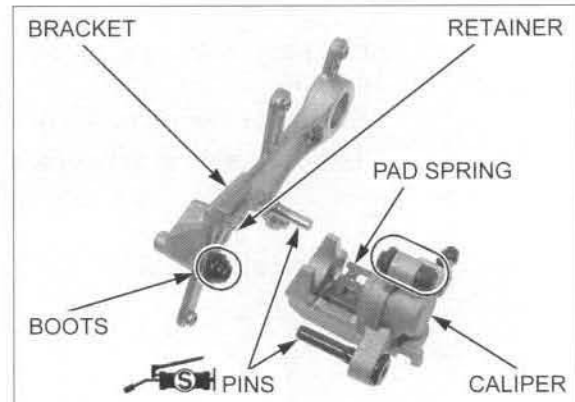
Install the brake pad retainer onto the caliper bracket.

*Note the installation direction of the pad spring.*

Install the pad spring into the caliper.

Replace the caliper and bracket pin boots if there is wear, deterioration or damage.  
 Install the caliper and bracket pin boots.

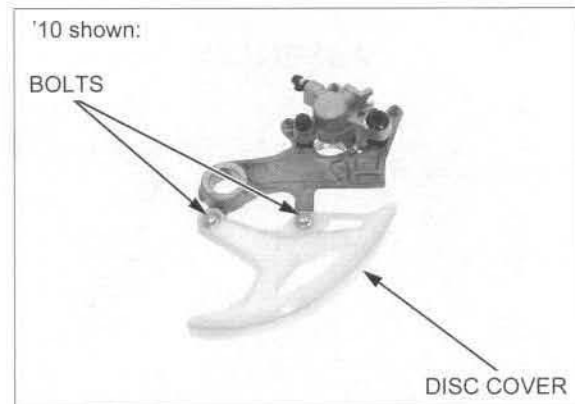
Apply silicone grease to the caliper and bracket pins sliding area.



*When assembling the caliper and bracket, set the boot into the slide pin groove.*

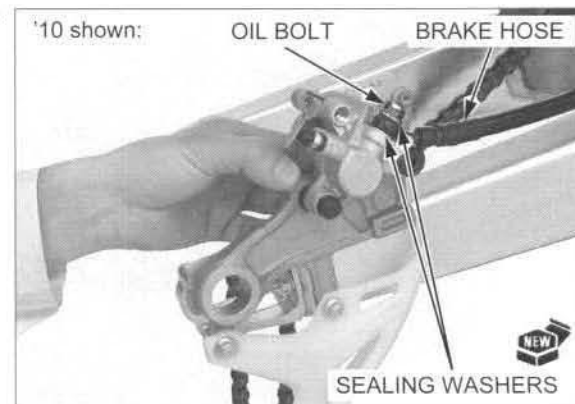
Assemble the caliper and bracket.

Install the brake disc cover and bolts.  
 Tighten the bolts securely.



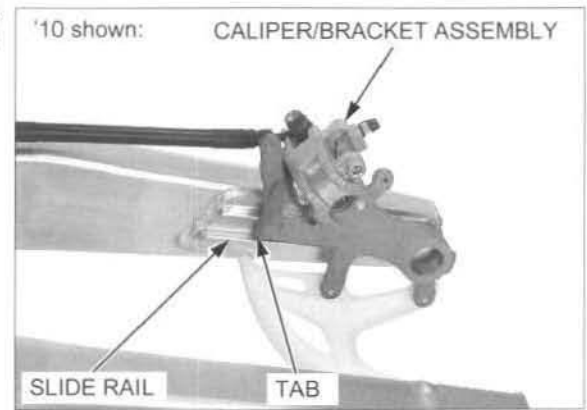
## INSTALLATION

Temporarily install the brake hose eyelet with the brake hose oil bolt and new sealing washers.



Install the brake caliper/bracket assembly to the swingarm by aligning the bracket tab with the slide rail of the swingarm.

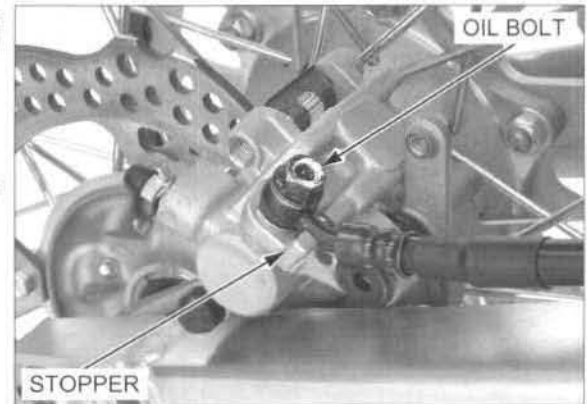
Install the rear wheel (page 14-12).



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)**

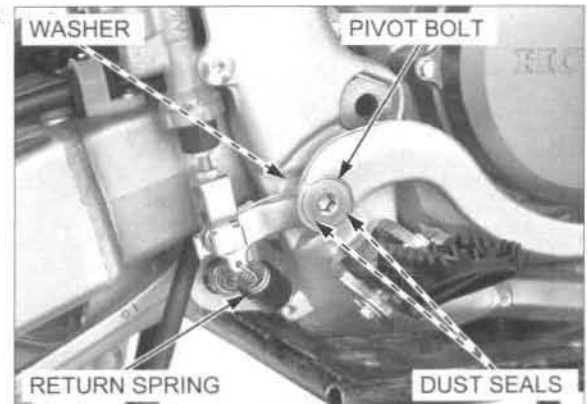
Install the brake pads (page 15-13).  
Fill the reservoir to the upper level and bleed the hydraulic system (page 15-8).



## BRAKE PEDAL

### REMOVAL

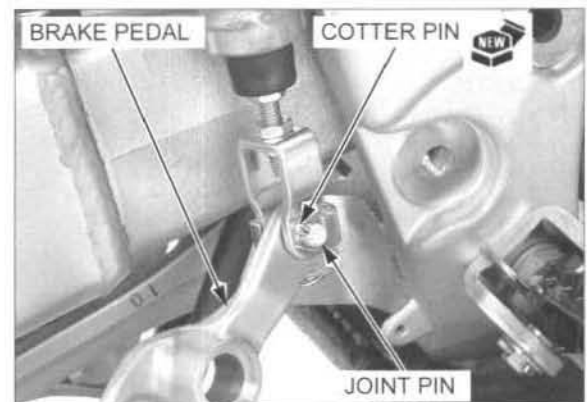
Remove the brake pedal pivot bolt, washer and dust seals.  
Remove the return spring.



Remove and discard the cotter pin.  
Remove the joint pin and brake pedal.

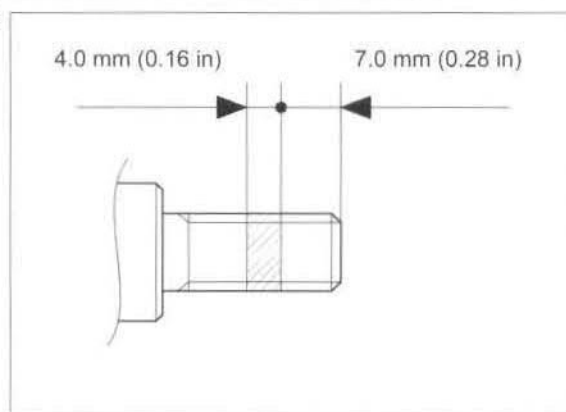
### INSTALLATION

Connect the brake pedal to the push rod.  
Install the joint pin and new cotter pin.



## HYDRAULIC BRAKE

Apply locking agent to the brake pedal pivot bolt threads as shown.

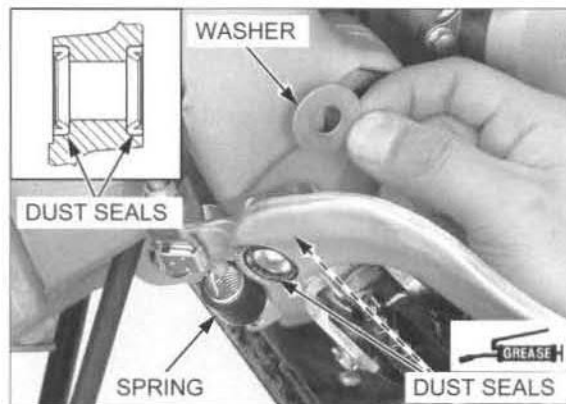


*Replace the dust seals with new ones if they are damaged or deteriorated.*

Apply grease (page 1-19) to the dust seal lips. Install the dust seals to the brake pedal with its lip side facing out as shown.

Install the return spring.

Set the washer to the frame.

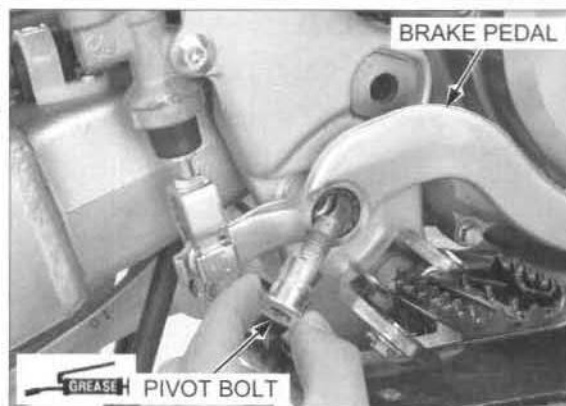


Apply grease (page 1-19) to the brake pedal pivot bolt sliding surface.

Install the brake pedal.

Install and tighten the brake pedal pivot bolt to the specified torque.

**TORQUE: 36 N·m (3.7 kgf·m, 27 lbf·ft)**



# 16. ELECTRICAL SYSTEM

---

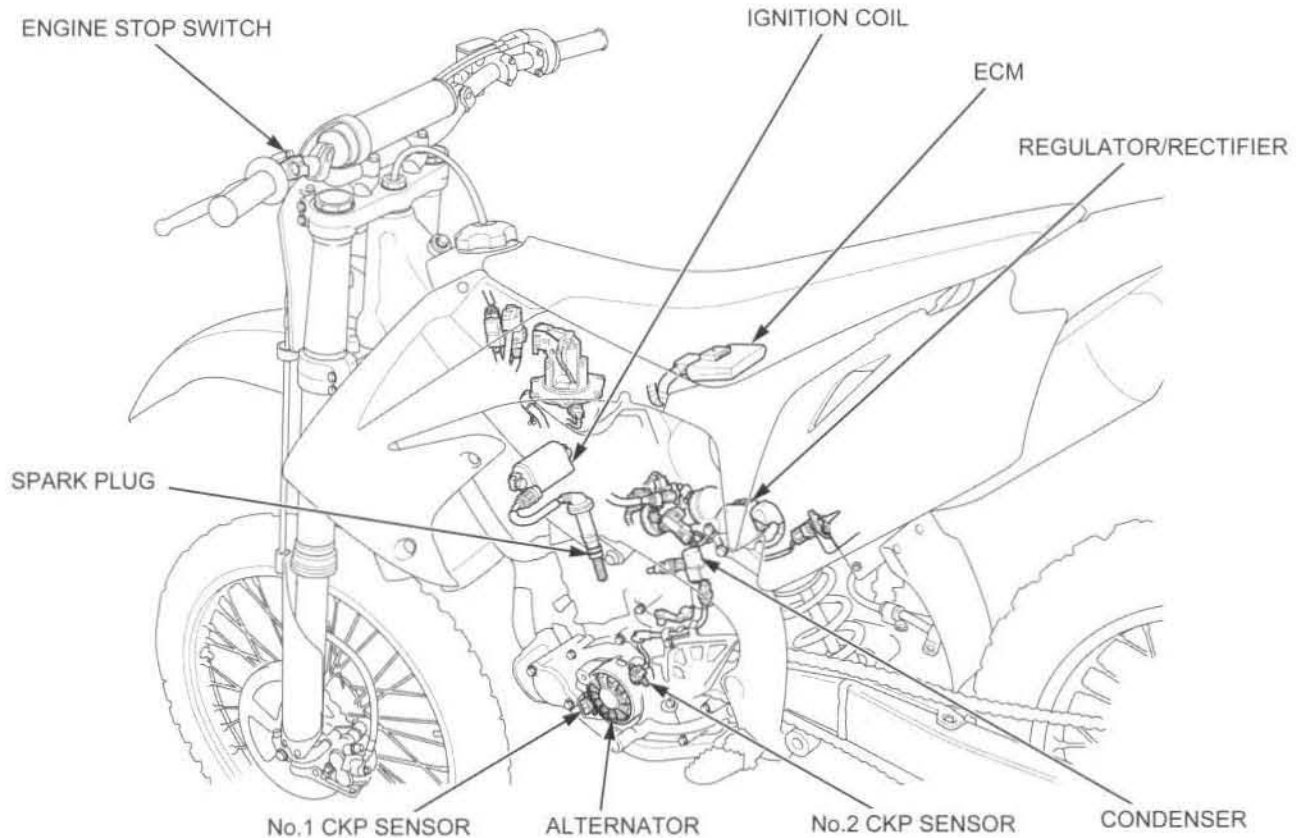
SYSTEM LOCATION.....	16-2	REGULATOR/RECTIFIER .....	16-10
SERVICE INFORMATION .....	16-3	IGNITION COIL .....	16-13
TROUBLESHOOTING.....	16-4	IGNITION TIMING .....	16-14
IGNITION SYSTEM INSPECTION .....	16-5	ENGINE STOP SWITCH INSPECTION .....	16-15
ALTERNATOR COIL.....	16-9	CONDENSER.....	16-16



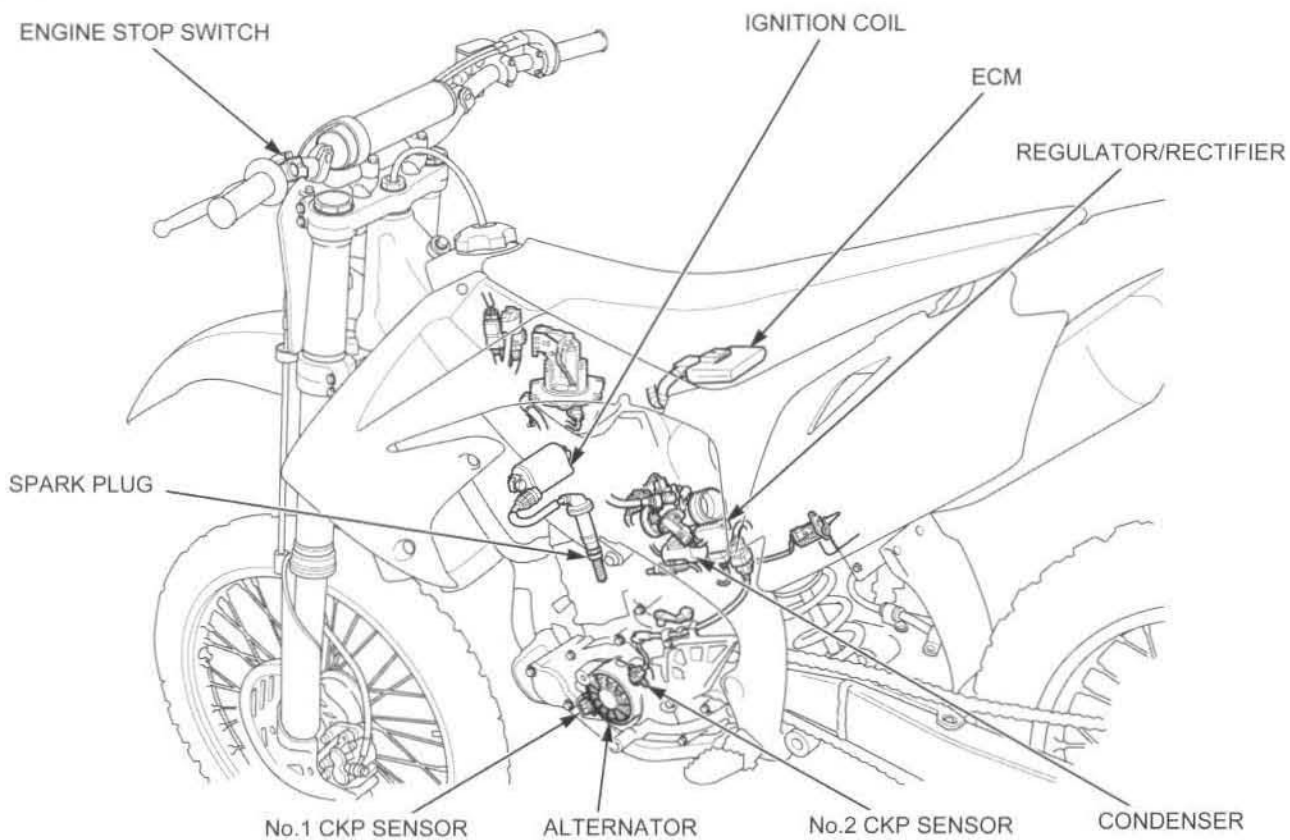
# ELECTRICAL SYSTEM

## SYSTEM LOCATION

'10 - '12:



After '12:



## SERVICE INFORMATION

### GENERAL

#### NOTICE

- Always stop the engine before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the engine is running and current is present.
- The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always stop the engine before servicing.
- Use a spark plug of the correct heat range. Using a spark plug with an incorrect heat range can damage the engine.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 16-4).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- A faulty ignition system is often related to poor connections. Check connections before proceeding.
- This motorcycle's ICM is built into the ECM.
- For PGM-FI troubleshooting information (page 5-6).

### SPECIFICATIONS

ITEM		SPECIFICATION
Spark plug	Standard (NGK)	R0451B-8
Spark plug gap		0.60 – 0.70 mm (0.024 – 0.028 in)
Ignition coil resistance (at 20°C/68°F)		2.6 – 3.2 Ω
Ignition coil peak voltage		100 V minimum
CKP sensor peak voltage		0.7 V minimum
Alternator coil resistance (at 20°C/68°F)		0.1 – 3.0 Ω
Ignition timing ("F" mark)		8° BTDC at idle
Alternator	Capacity	0.091 kW/5,000 rpm

### TORQUE VALUE

Timing hole cap

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Apply grease to the threads.

### TOOLS

<p>Peak voltage adaptor 07HGJ-0020100 (Not available in U.S.A.)</p>  <p>with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)</p>	<p>IgnitionMate peak voltage tester TMNTS91H (U.S.A. only)</p> 	<p>Test probe (2 required) 07ZAJ-RDJA110</p> 
---	---	--

## ELECTRICAL 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 (affecting 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 12 V battery connected and the "ECM" selector switch is ON. (The engine is not cranked by the kickstarter.)

#### No spark at plug

Unusual Condition		Probable Cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the 12 V battery connected and the "ECM" selector switch is ON (Other electrical components are normal).	<ol style="list-style-type: none"> <li>1. An open circuit in Black wire between the ignition coil and fuel pump sub harness or regulator/rectifier.</li> <li>2. Loose or poor connection of the primary terminal, or an open circuit in the primary coil.</li> <li>3. Faulty condenser.</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. Faulty CKP sensor (Measure peak voltage).</li> <li>3. Faulty alternator (Measure the alternator coil resistance).</li> <li>4. Faulty regulator/rectifier (Check the wire harness and regulator/rectifier).</li> <li>5. Faulty ECM (in case when above No. 1 through 4 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 (System is normal if measured voltage is over the specifications with reverse connections).</li> <li>2. Faulty peak voltage adaptor.</li> <li>3. Faulty engine stop switch (Check the engine stop switch operation).</li> <li>4. An open circuit or loose connection in Yellow/blue wire between the ignition coil and ECM.</li> <li>5. Faulty CKP sensor (Measure peak voltage).</li> <li>6. Faulty alternator (Measure the alternator coil resistance).</li> <li>7. Faulty regulator/rectifier (Check the wire harness and regulator/rectifier).</li> <li>8. Faulty ECM (in case when above No. 1 through 7 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 MΩ/DCV.</li> <li>2. Cranking speed is too slow (Kickstarter is weak).</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 engine stop switch (Check the engine stop switch operation).</li> <li>5. Faulty alternator (Measure the alternator coil resistance).</li> <li>6. Faulty regulator/rectifier (Check the wire harness and regulator/rectifier).</li> <li>7. Faulty ECM (in case when above No. 1 through 6 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.</li> <li>2. Faulty ignition coil (Measure the resistance at the ignition coil terminals).</li> </ol>
CKP sensor	Low peak voltage.	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 MΩ/DCV.</li> <li>2. Cranking speed is too slow (Kickstarter is weak).</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 adaptor.</li> <li>2. Faulty CKP sensor.</li> </ol>

## IGNITION SYSTEM INSPECTION

- If there is no spark at the plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use the recommended digital multimeter or 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.

*Avoid touching the spark plug and tester probes to prevent electric shock.*

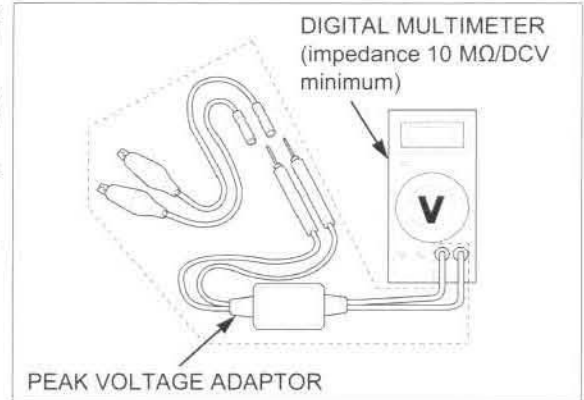
Connect the peak voltage tester (IgnitionMate, U.S.A. only) or peak voltage adaptor to the digital multimeter.

### TOOLS:

**IgnitionMate peak voltage tester** TMNTS91H (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)

**Peak voltage adaptor**

with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)

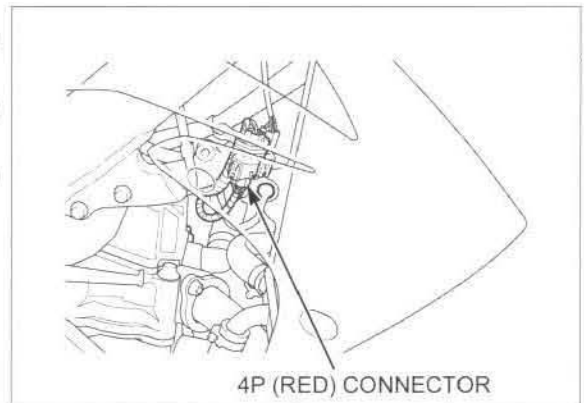


## IGNITION COIL PRIMARY PEAK VOLTAGE

Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.

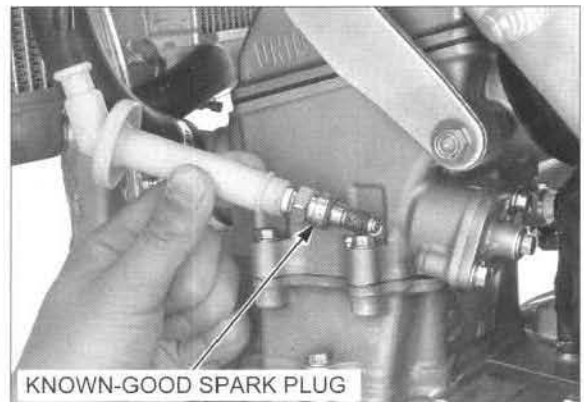
Check cylinder compression and check that the spark plug is installed correctly.

Disconnect the DLC/fuel pump sub harness 4P (Red) connector.



Shift the transmission into neutral.

Connect a known-good spark plug to the spark plug cap and ground the spark plug to the cylinder as done in a spark test.



## ELECTRICAL SYSTEM

With the ignition coil primary wire connected, connect the peak voltage adaptor to the ignition coil.

### TOOLS:

**IgnitionMate peak voltage tester** TMNTS91H  
(U.S.A. only) or  
07HGJ-0020100  
(not available in  
U.S.A.)

**Peak voltage adaptor**

with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)

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

Connect the 12 V battery to the DLC/fuel pump sub harness 4P (Red) connector (turn the "ECM" selector switch ON) (page 5-12).

Check the initial voltage at this time.  
The battery voltage should be measured.

If the initial voltage cannot be measured, follow the checks in the troubleshooting table (page 16-4).

Disconnect the 12 V battery (page 5-12).

Shift the transmission into neutral.

*Avoid touching the spark plug or tester probes to prevent electric shock.*

Crank the engine with the kickstarter and read the ignition coil primary peak voltage.

**STANDARD: 100 V minimum**

If the peak voltage is lower than the standard value, follow the checks described in the troubleshooting chart (page 16-4).

## CKP SENSOR PEAK VOLTAGE

### NOTE:

Check that the cylinder compression is normal and the spark plug is installed correctly in the cylinder head.

Hang the fuel tank to the left side of the frame (page 3-6).

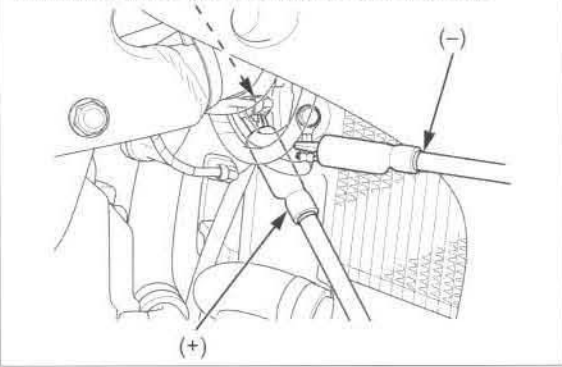
Disconnect the ECM 33P (Black) connector.

### NOTE:

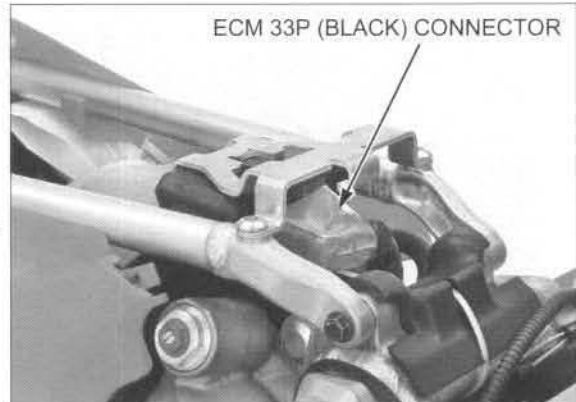
When reconnecting the ECM connector, check that there is no dirt and oil in the connector.

*Seal the ECM connector with tape to prevent dirt and oil from entering the connector after disconnecting it.*

PRIMARY WIRE (YELLOW/BLUE) TERMINAL



ECM 33P (BLACK) CONNECTOR



'10 - '12: Connect the peak voltage tester or adaptor probes to the wire harness side connector terminals.

**TOOLS:**

**IgnitionMate peak voltage tester** TMNTS91H  
(U.S.A. only) or  
**Peak voltage adaptor** 07HGJ-0020100  
(not available in  
U.S.A.)

with commercially available digital multimeter  
(impedance 10 MΩ/DCV minimum)

**Test probe** 07ZAJ-RDJA110

**Connection:**

**No.1 CKP sensor:**  
Blue/yellow (11) (+) – Green/white (10) (–)

**No.2 CKP sensor:**  
White/yellow (7) (+) – Green/white (10) (–)

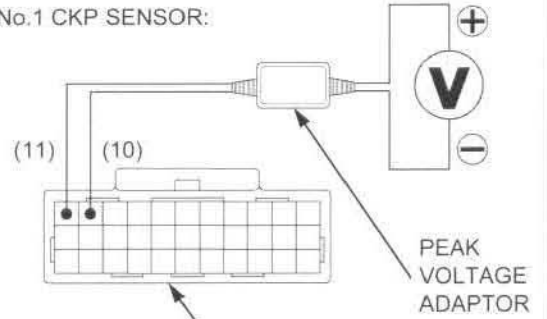
Shift the transmission into neutral.  
Crank the engine with the kickstarter and measure the CKP sensor peak voltage.

**PEAK VOLTAGE:0.7 V minimum**

If the voltage measured at the ECM connector is abnormal, measure the peak voltage at the alternator/CKP sensor connector.

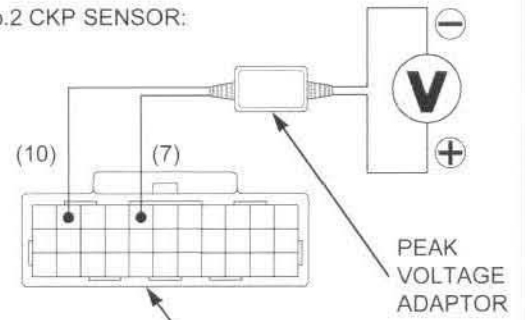
'10 - '12:

**No.1 CKP SENSOR:**



**33P (BLACK) CONNECTOR**  
(wire side/female terminal)

**No.2 CKP SENSOR:**



**33P (BLACK) CONNECTOR**  
(wire side/female terminal)

After '12: Connect the peak voltage tester or adaptor probes to the wire harness side connector terminals.

**TOOLS:**

**IgnitionMate peak voltage tester** TMNTS91H  
(U.S.A. only) or  
**Peak voltage adaptor** 07HGJ-0020100  
(not available in  
U.S.A.)

with commercially available digital multimeter  
(impedance 10 MΩ/DCV minimum)

**Test probe** 07ZAJ-RDJA110

**Connection:**

**No.1 CKP sensor:**  
Blue/yellow (11) (+) – Ground (–)

**No.2 CKP sensor:**  
White/yellow (29) (+) – Ground (–)

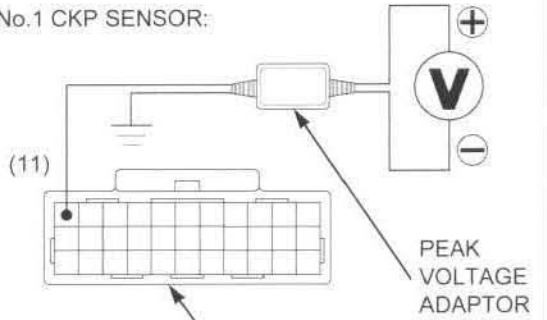
Shift the transmission into neutral.  
Crank the engine with the kickstarter and measure the CKP sensor peak voltage.

**PEAK VOLTAGE:0.7 V minimum**

If the voltage measured at the ECM connector is abnormal, measure the peak voltage at the alternator/CKP sensor connector.

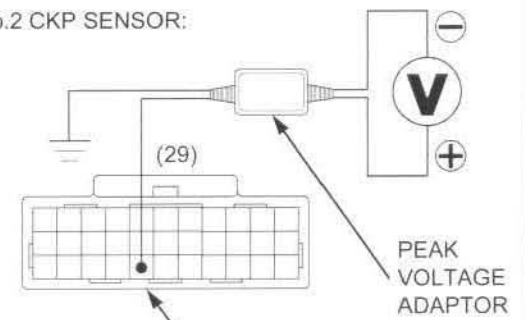
After '12:

**No.1 CKP SENSOR:**



**33P (BLACK) CONNECTOR**  
(wire side/female terminal)

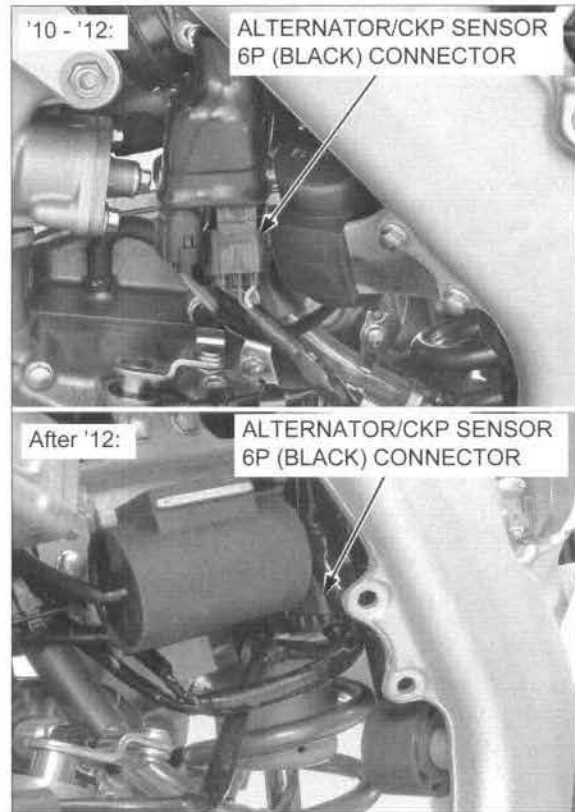
**No.2 CKP SENSOR:**



**33P (BLACK) CONNECTOR**  
(wire side/female terminal)

## ELECTRICAL SYSTEM

Disconnect the alternator/CKP sensor 6P (Black) connector.



Connect the peak voltage tester or adaptor probes to the CKP sensor side connector terminals.

### Connection:

**No.1 CKP sensor:**

**Blue/yellow (+) – Green/white (-)**

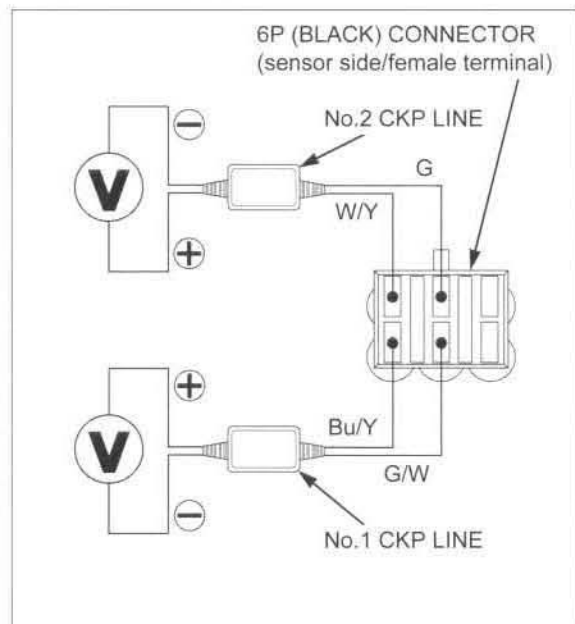
**No.2 CKP sensor:**

**White/yellow (+) – Green (-)**

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM connector is abnormal and the one measured at the alternator/CKP sensor connector is normal, the Blue/yellow or White/yellow or Green/white wire has an open or short circuit, or loose connection.
- If both peak voltages are abnormal, follow the checks described in the troubleshooting chart (page 16-4).

If the CKP sensor is faulty, replace the alternator stator/CKP sensor assembly (page 11-6).

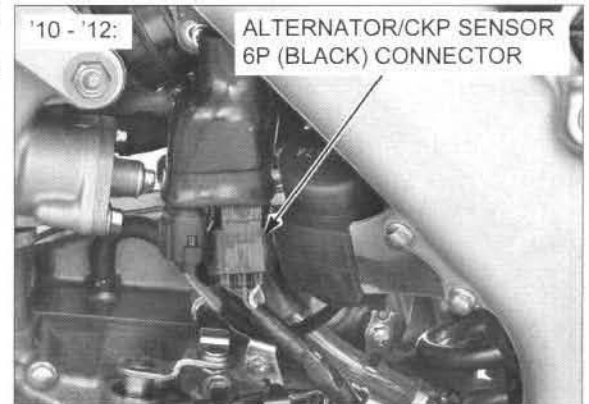




## ALTERNATOR COIL

### INSPECTION

Disconnect the alternator/CKP sensor 6P (Black) connector.  
Check the connector for loose contacts or corroded terminals.



Measure the resistance at the alternator side connector terminals.

**Connection: Yellow – White**

**STANDARD: 0.1 – 3.0  $\Omega$  (at 20°C/68°F)**

Check for continuity between each wire terminal of the alternator side connector and ground.

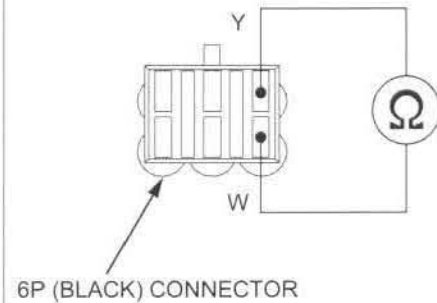
**Connection: Yellow – Ground  
White – Ground**

There should be no continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

For alternator stator replacement (page 11-6).

Sensor side/female terminal



6P (BLACK) CONNECTOR



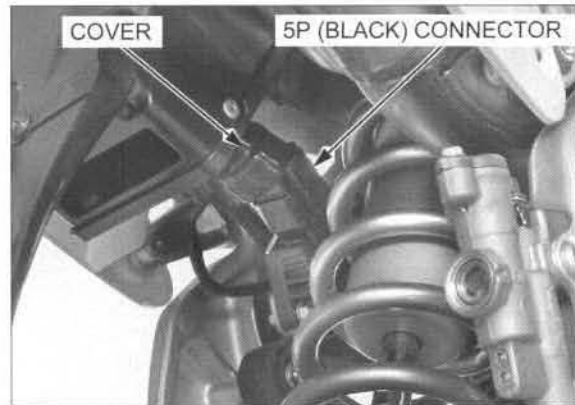
## ELECTRICAL SYSTEM

### REGULATOR/RECTIFIER

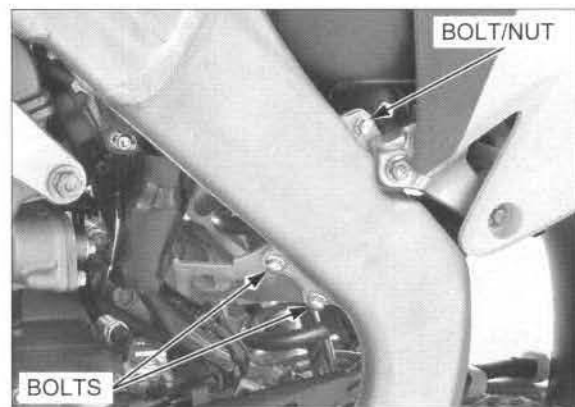
#### REMOVAL/INSTALLATION ('10 - '12)

Remove the condenser (page 16-16).

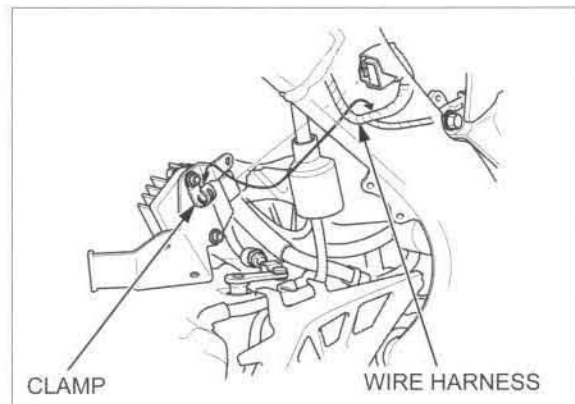
Release the connector cover and disconnect the regulator/rectifier 5P (Black) connector.



Remove the bolts, nut and regulator/rectifier.

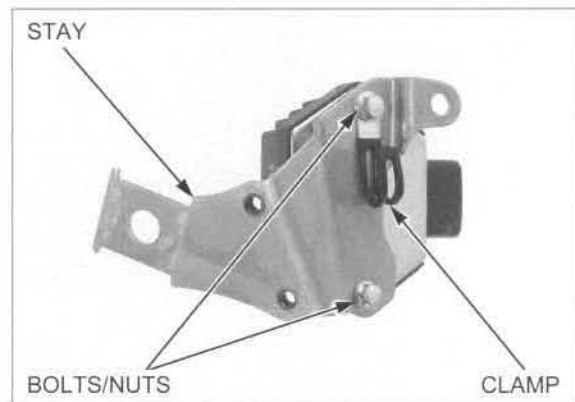


Release the wire harness from the clamp.



Remove the following:

- Bolts
- Nuts
- Clamp
- Stay



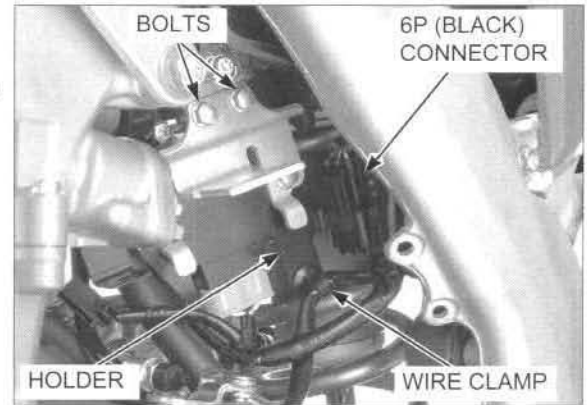
*Route the wires properly (page 1-21).* Installation is in the reverse order of removal.

**REMOVAL/INSTALLATION (After '12)**

Remove the condenser (page 16-16).

Remove the bolts.

Release the wire clamp and alternator/CKP sensor 6P (Black) connector from the connector holder.

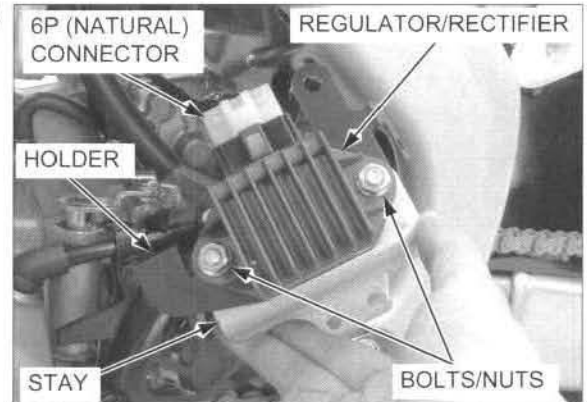


Disconnect the regulator/rectifier 6P (Natural) connector.

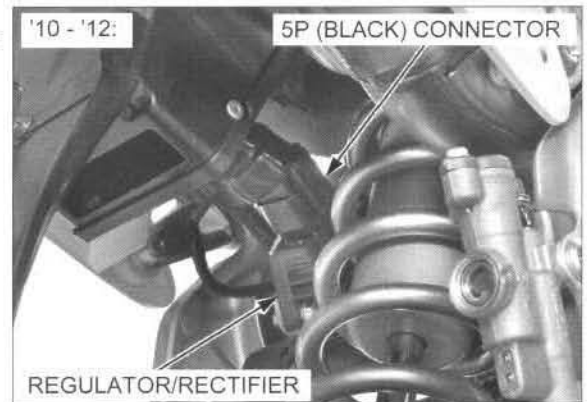
Remove the following:

- Bolts
- Nuts
- Regulator/rectifier
- Connector holder
- Regulator/rectifier stay

Installation is in the reverse order of removal.

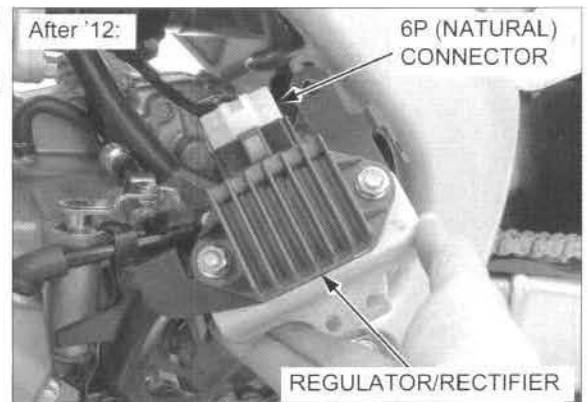
**INSPECTION**

'10 - '12: Disconnect the regulator/rectifier 5P (Black) connector. Check the connectors for loose contacts or corroded terminals.



After '12: Disconnect the regulator/rectifier 6P (Natural) connector (page 16-11).

Check the connectors for loose contacts or corroded terminals.

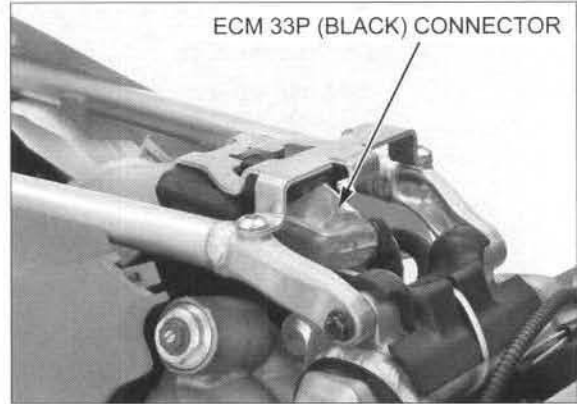


## ELECTRICAL SYSTEM

### POWER OUTPUT LINE

Hang the fuel tank to the left side of the frame (page 3-6).

Disconnect the ECM 33P (Black) connector.



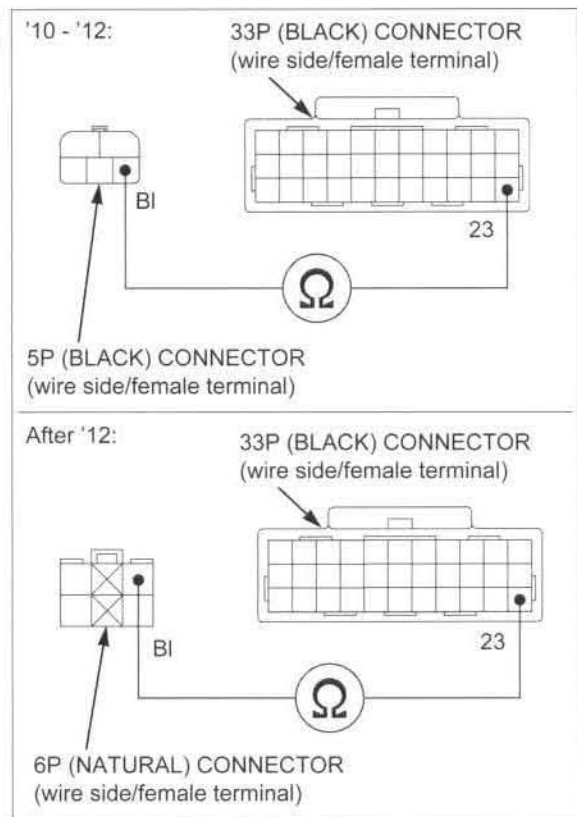
Check for continuity at the Black wire between the regulator/rectifier connector and ECM 33P (Black) connector.

#### TOOLS:

Test probe

07ZAJ-RDJA110

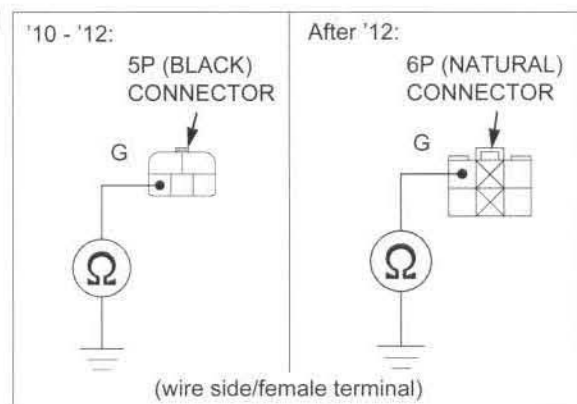
There should be continuity at all times.



### GROUND LINE

Check for continuity between the Green wire terminal and ground.

There should be continuity at all times.



**ALTERNATOR COIL LINE**

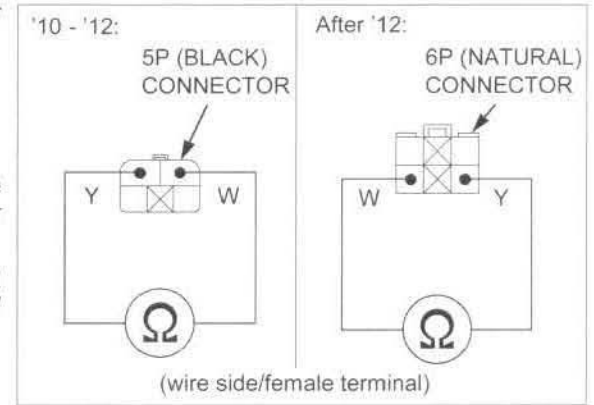
Measure the resistance at the alternator side connector terminals.

**Connection: Yellow – White**

**STANDARD: 0.1 – 3.0 Ω (at 20°C/68°F)**

If resistance is out of specification, measure the resistance at the alternator/CKP sensor connector (page 16-9).

If all components of the charging system are normal and there are no loose connection at the regulator/rectifier connector, replace the regulator/rectifier.



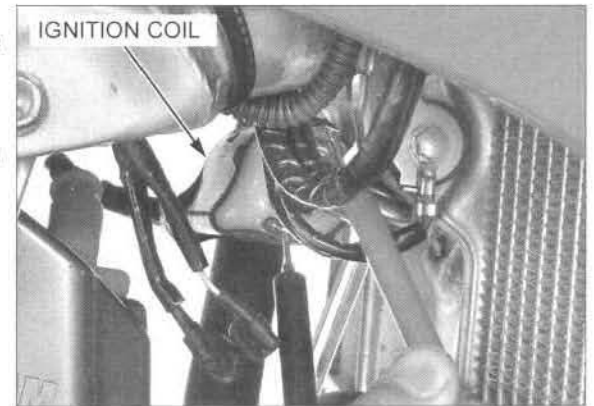
**IGNITION COIL**

**INSPECTION**

Disconnect the ignition coil wires. Measure the ignition coil resistance between the ignition coil terminals.

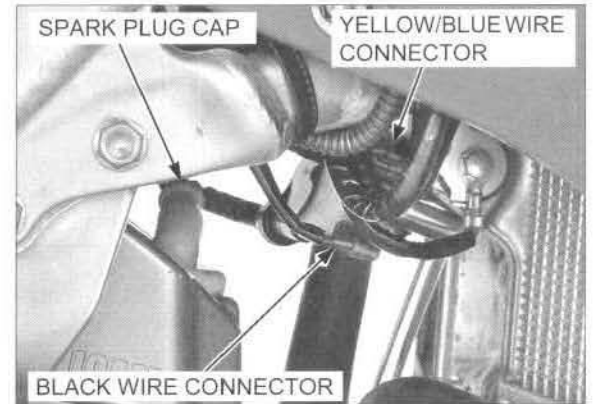
**STANDARD: 2.6 – 3.2 Ω (20°C/68°F)**

If resistance is out of specification, replace the ignition coil.



**REMOVAL/INSTALLATION**

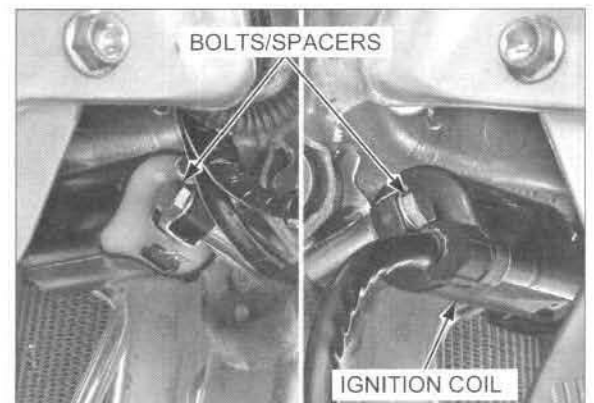
Disconnect the spark plug cap from the spark plug. Disconnect the wire connectors from the ignition coil.



Remove the bolts, spacers and the ignition coil.

Installation is in the reverse order of removal.

*Route the wires properly (page 1-21).*



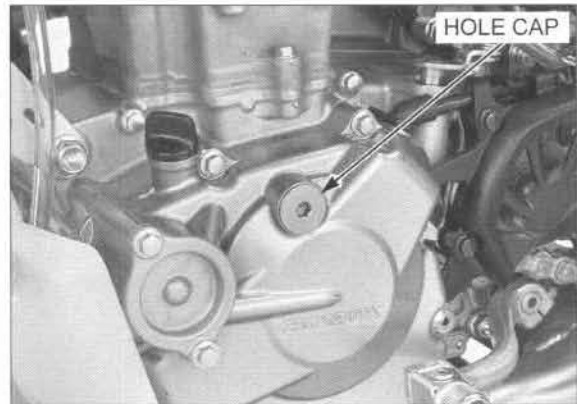
## ELECTRICAL SYSTEM

### IGNITION TIMING

#### NOTE:

- The ignition timing is factory preset and only needs to be checked when an electrical system component is replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

Warm up the engine to normal operating temperature. Stop the engine and remove the timing hole cap.



Attach a tachometer according to its manufacturer's instructions.

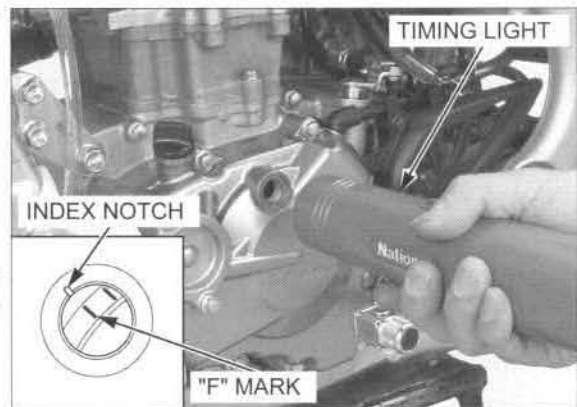
Connect the timing light to the spark plug wire. Read the instruction for timing light operation.

Start the engine and let it idle.

**IDLE SPEED: 2,000 ± 100 rpm**

Point the timing light towards the index mark.

The ignition timing is correct if the "F" mark on the flywheel aligns with the index notch in the left crankcase cover.

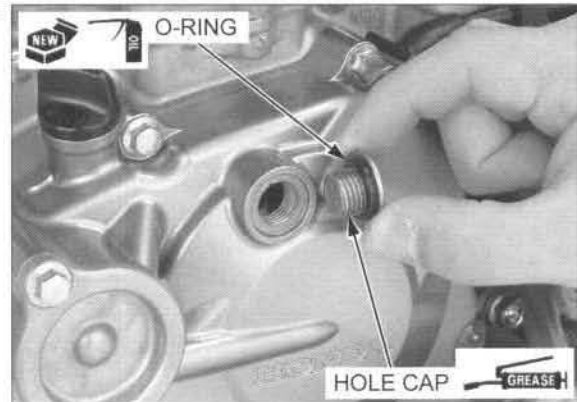


Apply engine oil to a new O-ring, and install it to the timing hole cap.

Apply grease to the timing hole cap threads.

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

**TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)**



## ENGINE STOP SWITCH INSPECTION

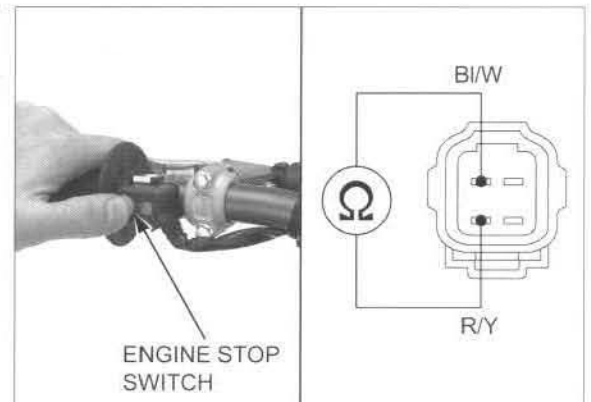
Disconnect the engine stop switch 4P (Natural) connector.



### SWITCH INSPECTION

Check for continuity between the Black/white and Red/yellow wire terminals of the engine stop switch side.

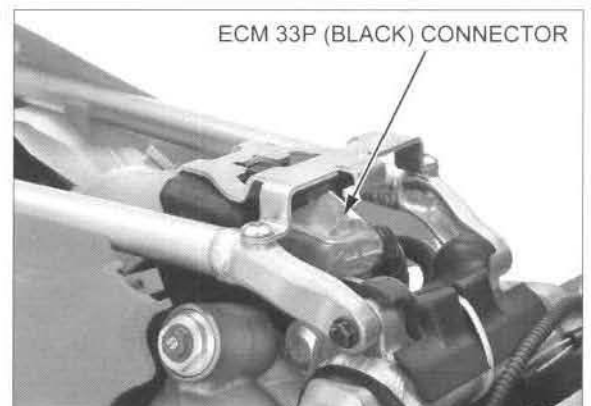
There should be continuity with the engine stop switch pushed, and no continuity with the switch released.



### SWITCH LINE INSPECTION

Hang the fuel tank to the left side of the frame (page 3-6).

Disconnect the ECM 33P (Black) connector.



Check for continuity between the ECM 33P (Black) and engine stop switch 4P (Natural) connectors of the wire harness side.

#### TOOL:

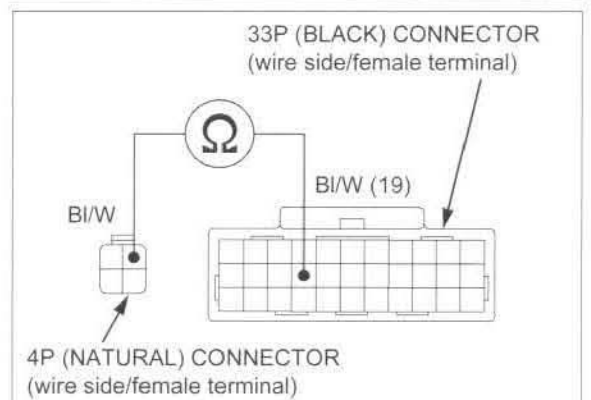
**Test probe**

07ZAJ-RDJA110

**Connection: Black/white – Black/white (19)**

There should be continuity.

If the engine stop switch and switch line are normal, check for ECM power/ground line (page 5-58).



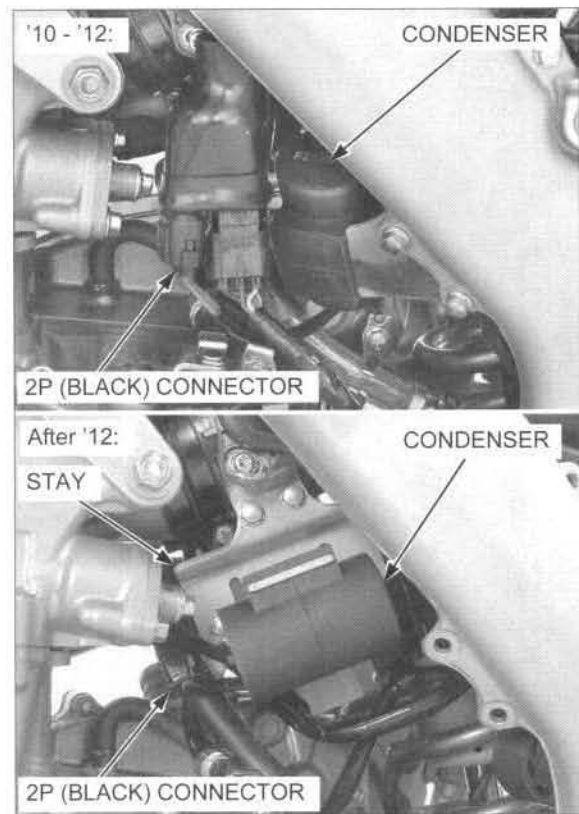
## CONDENSER

## REMOVAL/INSTALLATION

Disconnect the condenser 2P (Black) connector.

Remove the condenser from the regulator/rectifier stay.

Installation is in the reverse order of removal.



## INSPECTION

Connect a 12 V battery to the fuel pump sub harness (page 5-12).

Disconnect the condenser 2P (Black) connector.

Turn the "ECM" selector switch ON.

Measure and record the voltage at the condenser 2P (Black) connector terminals of the wire side.

**Connection: Black (+) – Green (-)**

**STANDARD: About battery voltage**

If there is no voltage, check for open circuit in Black or Green wires.

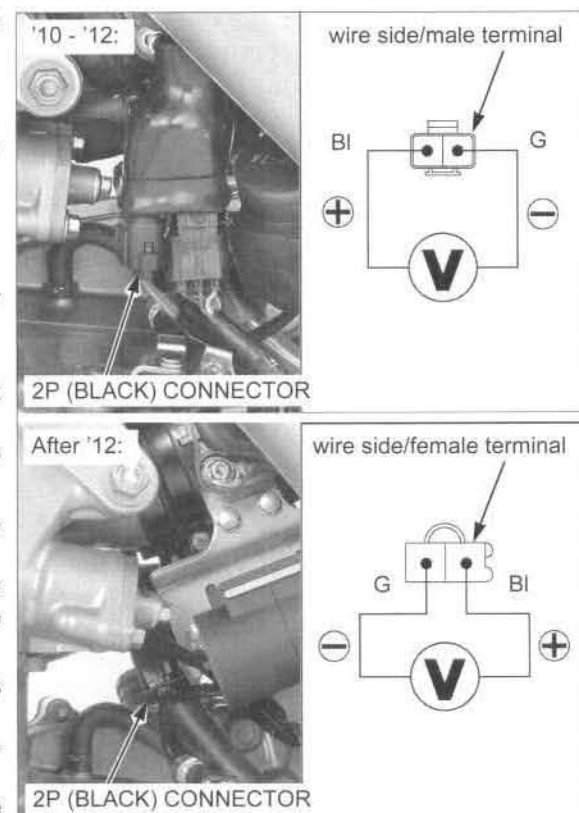
If there is voltage, check the condenser as follows.

1. Turn the "ECM" selector switch OFF and connect the condenser 2P (Black) connector.
2. Turn the "ECM" selector switch ON for a few seconds and charge the condenser.
3. Turn the "ECM" selector switch OFF and discharge the condenser.
4. Disconnect the condenser 2P (Black) connector and check the resistance between the condenser side terminals.

Select the  $k\Omega$  range of the tester.

The condenser is normal if the resistance comes near  $0\Omega$  once and eventually becomes  $\infty$ . If the resistance stays at  $0\Omega$  or does not change, replace the condenser.

- If the inspection is interrupted, connect the condenser 2P (Black) connector and restart the procedure from the step 1.



# 17. WIRING DIAGRAM

---

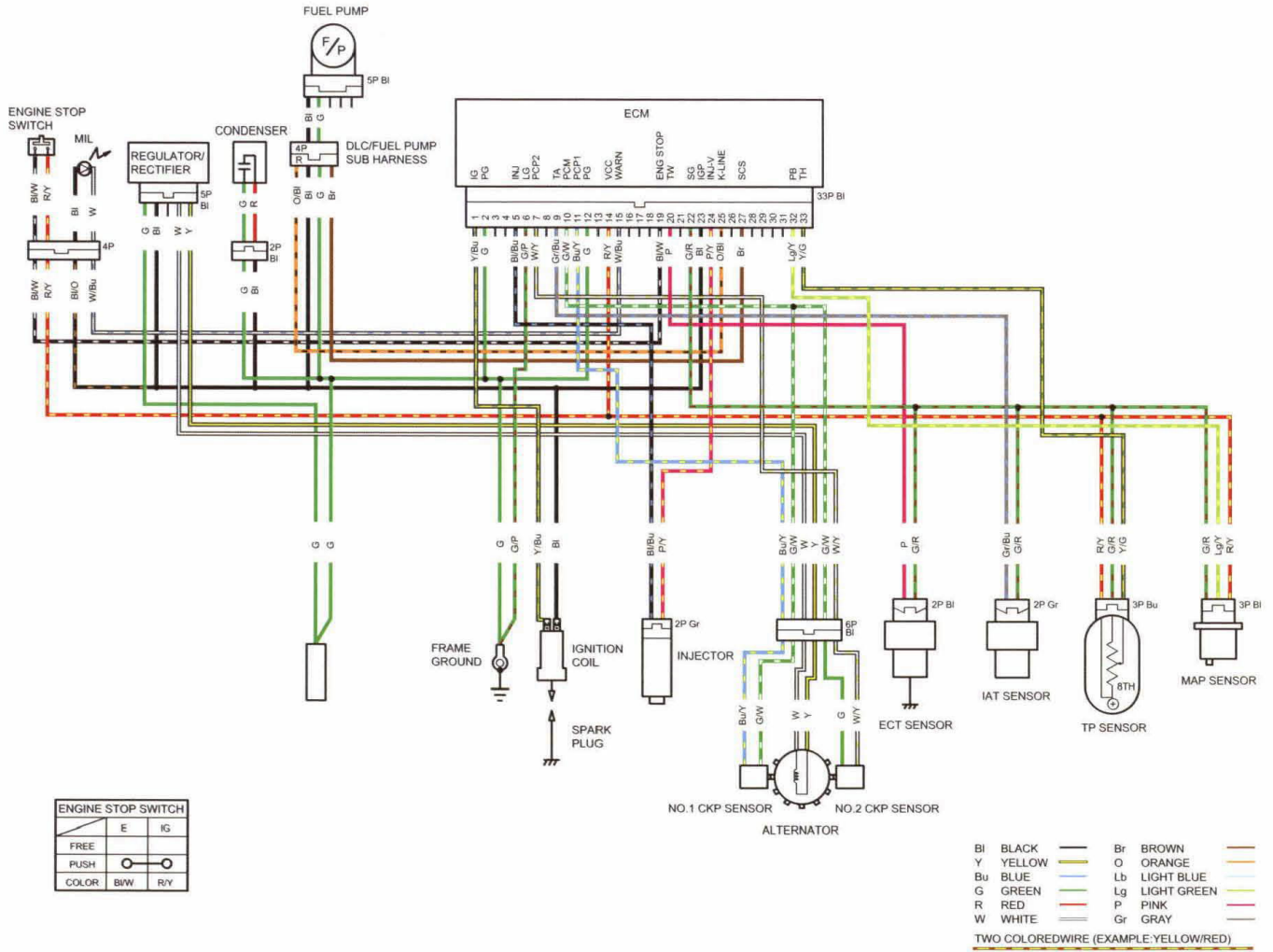
WIRING DIAGRAM ('10 - '12) .....17-2

WIRING DIAGRAM (After '12) ..... 17-3



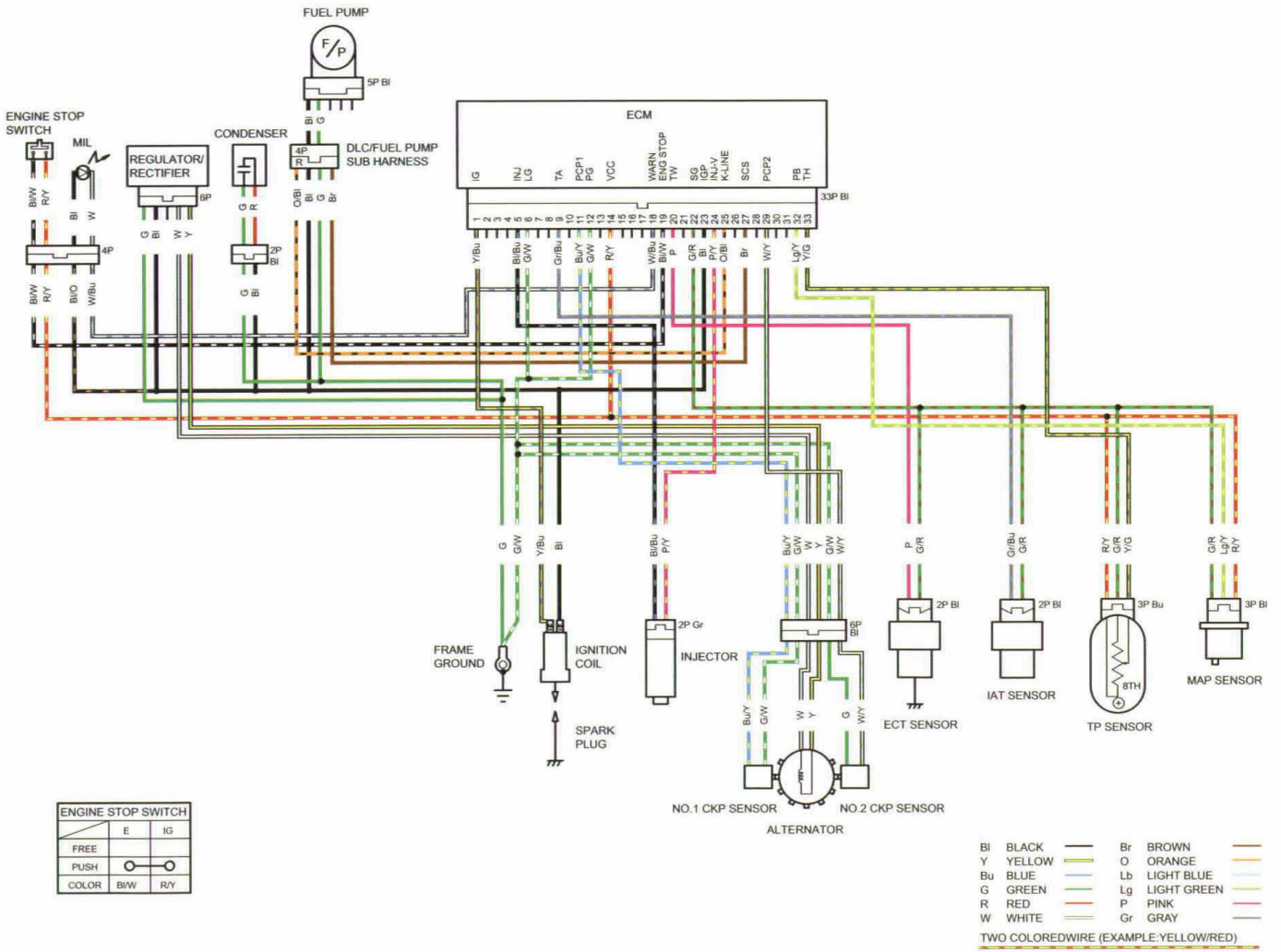


WIRING DIAGRAM ('10-'12)



ENGINE STOP SWITCH		
FREE	E	IG
PUSH		
COLOR:	BI/W	RI/Y

WIRING DIAGRAM (After '12)



# 18. TROUBLESHOOTING

---

ENGINE DOES NOT START OR IS HARD TO START.....	18-2	POOR PERFORMANCE AT HIGH SPEED.....	18-6
ENGINE LACKS POWER .....	18-3	POOR HANDLING .....	18-7
POOR PERFORMANCE AT LOW AND IDLE SPEED.....	18-5		

## 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?**

- YES** – • Incorrect spark plug heat range  
• Incorrect spark plug gap  
• Dirty air cleaner  
• Fast idle knob stuck open or damaged

**NO** – GO TO STEP 2.

### 2. Spark Test

Perform spark test.

**Is there good spark?**

- NO** – • Loose or disconnected ignition system wires  
• Broken or shorted spark plug wire  
• Broken or shorted ignition coil  
• Faulty CKP sensor(s)  
• Faulty alternator coil  
• Faulty engine stop switch  
• Faulty ECM

**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?**

**YES** – GO TO STEP 4.

**NO** – Faulty fuel pump unit

### 4. PGM-FI System Inspection

Check the PGM-FI system.

**Is the PGM-FI system normal?**

**YES** – GO TO STEP 5.

**NO** – Faulty PGM-FI system

### 5. Engine Starting Condition

Start engine by normal procedure.

**Does the engine start then stops?**

- YES** – • Improper fast idle knob operation  
• Leaking insulator  
• Improper ignition timing (Faulty ECM or CKP sensor(s))  
• Contaminated fuel

**NO** – GO TO STEP 6.

### 6. Cylinder Compression

Test cylinder compression.

**Is the compression low?**

- YES** – • Valve clearance too small  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged cylinder head gasket  
• Seized valve  
• Improper valve timing

## ENGINE LACKS POWER

### 1. Drive Train Inspection

Raise wheel off the ground and spin by hand.

**Does the wheel spin freely?**

- NO** – • Brake dragging  
• Worn or damaged wheel bearings  
• Bent axle shaft  
• Drive chain too tight

**YES** – GO TO STEP 2.

### 2. Tire Pressure Inspection

Check tire pressure.

**Is the tire pressures low?**

- YES** – • Faulty valve core  
• Punctured tire

**NO** – GO TO STEP 3.

### 3. Clutch Inspection

Accelerate rapidly from low to second.

**Does the engine speed change accordingly when clutch is engaged?**

- NO** – • Clutch slipping  
• Improperly adjusted clutch lever freeplay  
• Worn clutch discs/plates  
• Warped clutch discs/plates  
• Weak clutch springs  
• Sticking clutch lifter  
• Additive in engine oil

**YES** – GO TO STEP 4.

### 4. Engine Performance Inspection

Accelerate lightly.

**Did the engine speed increase?**

- NO** – • Dirty air cleaner  
• Restricted fuel flow  
• Clogged muffler  
• Clogged fuel tank breather hose  
• Fast idle knob stuck open or damaged  
• Excessive carbon build-up in combustion chamber

**YES** – GO TO STEP 5.

### 5. Engine knocking Inspection

Accelerate or run at high speed.

**Is there knocking?**

- YES** – • Worn piston and cylinder  
• Use of poor quality fuel  
• Excessive carbon build-up in combustion chamber  
• Ignition timing too advance (Faulty ECM)  
• Lean fuel mixture  
• Faulty CKP sensor  
• Wrong type fuel

**NO** – GO TO STEP 6.

### 6. Ignition Timing Inspection

Check ignition timing.

**Is the ignition timing correct?**

- NO** – • Faulty ECM  
• Faulty CKP sensor(s)

**YES** – GO TO STEP 7.

### 7. Cylinder compression Inspection

Test the cylinder compression.

#### *Is the compression low?*

- YES** – • Valve clearance too small  
• Valve stuck open  
• Worn cylinder and piston rings  
• Damaged head gasket  
• Improper valve timing  
• Faulty decompressor system

**NO** – GO TO STEP 8.

### 8. Fuel pump Inspection

Inspect the fuel flow.

#### *Is the fuel pump unit normal?*

**YES** – GO TO STEP 9.

**NO** – Faulty fuel pump unit

### 9. PGM-FI System Inspection

Check the PGM-FI system.

#### *Is the PGM-FI System normal?*

**YES** – GO TO STEP 10.

**NO** – Faulty PGM-FI system

### 10. Spark Plug Inspection

Remove and inspect spark plug.

#### *Is the spark plug fouled or discolored?*

- YES** – • Spark plug not serviced frequently enough  
• Incorrect spark plug used

**NO** – GO TO STEP 11.

### 11. Engine Oil Inspection

Check engine oil level and condition.

#### *Is there correct level and good condition?*

- NO** – • Engine oil level too high  
• Engine oil level too low  
• Contaminated engine oil

**YES** – GO TO STEP 12.

### 12. Lubrication Inspection

Remove cylinder head cover and inspect lubrication.

#### *Is the valve train lubricated properly?*

- NO** – • Faulty oil pump  
• Faulty pressure relief valve  
• Clogged oil passage  
• Clogged oil strainer screen

---

## POOR PERFORMANCE AT LOW AND IDLE SPEED

### 1. Intake Air Leak Inspection

Check for leaking insulator.

**Is there leaking?**

**YES** – • Loose insulator bands  
• Damaged insulator

**NO** – GO TO STEP 2.

### 2. Spark Test

Perform spark test.

**Is there weak or intermittent spark?**

**YES** – • Faulty spark plug  
• Fouled spark plug  
• Faulty ignition coil  
• Broken or shorted spark plug wire  
• Faulty CKP sensor(s)  
• Faulty alternator coil  
• Faulty engine stop button  
• Faulty ECM

**NO** – GO TO STEP 3.

### 3. Fuel Pump Inspection

Inspect the fuel flow.

**Is the fuel pump unit normal?**

**YES** – GO TO STEP 4.

**NO** – Faulty fuel pump unit

### 4. Ignition Timing Inspection

Check ignition timing.

**Is the ignition timing correct?**

**YES** – GO TO STEP 5.

**NO** – • Faulty ECM  
• Faulty CKP sensor(s)

### 5. PGM-FI System Inspection

Check the PGM-FI system.

**Is the PGM-FI system normal?**

**NO** – Faulty PGM-FI system



**POOR PERFORMANCE AT HIGH SPEED**

**1. Fuel Pump Inspection**

Inspect the fuel flow.

*Is the fuel pump unit normal?*

**YES** – GO TO STEP 2.

**NO** – Faulty fuel pump unit

**2. PGM-FI System Inspection**

Check the PGM-FI system.

*Is the PGM-FI system normal?*

**YES** – GO TO STEP 3.

**NO** – Faulty PGM-FI system

**3. Ignition Timing Inspection**

Check ignition timing.

*Is the ignition timing correct?*

**NO** – • Faulty ECM  
• Faulty CKP sensor(s)

**YES** – GO TO STEP 4.

**4. Valve Timing Inspection**

Check valve timing.

*Is the valve timing correct?*

**NO** – Camshaft not installed properly

**YES** – GO TO STEP 5.

**5. Camshaft Inspection**

Remove and inspect the camshaft

*Is the cam lobe height within specification?*

**NO** – Faulty camshaft

## POOR HANDLING

### Steering is heavy

- Steering stem adjusting nut too tight
- Damaged steering head bearings
- Faulty HPSD

### Either wheel is wobbling

- Excessive wheel bearing play
- Bent rim
- Improperly installed wheel hub
- Excessively worn swingarm pivot bearings
- Bent frame

### The motorcycle pulls to one side

- Front and rear wheels not aligned
- Bent fork
- Bent swingarm
- Bent axle shaft
- Bent frame

### NOTE:

- For the recommendations below to be most useful, the motorcycle must be adjusted as follows;
  - Fork: compression damping at standard position, at standard fork oil quantity and viscosity, and air pressure zero.
  - Shock: nitrogen pressure 980 kPa (9.9 kg/cm<sup>2</sup>, 142 psi), compression and rebound damping standard position, and spring preload adjusted so the bikes sags with rider seated - see Owner's manual for spring preload adjustment
- Make only one change at a time in the sequence of remedies given below

### Front End Oversteers; It Cuts Too Sharply (such as in sand)

- Increase the fork oil capacity
- Use stiffer fork spring

### Front End Understeers; It Washes Out Or Pushes (such as on at tight track with hard ground)

- Lower fork oil capacity
- Use softer fork spring

### Front End Hunts At High Speed; It Wanders Under Power

- Increase the fork oil capacity
- Increase the shock oil preload

### Front End Shakes Under Heavy Braking

- Decrease shock absorber preload
- Increase shock absorber rebound damping
- Increase the fork oil capacity

### Front End Hops Over Bumps In Smooth Turns

- Decrease the fork oil capacity
- Decrease fork compression damping
- Use softer fork spring

### Rear End Hops Over Bumps While Accelerating

- Decrease shock absorber preload
- Decrease shock absorber compression damping

### Rear End Gets Poor Traction While Accelerating Away From A Corner

- Decrease shock absorber preload
- Decrease shock absorber compression damping

---

**MEMO**



ADDITIONAL ITEMS REQUIRING FREQUENT REPLACEMENT .....	3-5	ENGINE IDLE SPEED .....	3-16
AIR CLEANER .....	3-8	ENGINE INSTALLATION .....	7-6
AIR CLEANER HOUSING .....	5-46	ENGINE OIL/OIL FILTER .....	3-13
ALTERNATOR COIL .....	16-9	ENGINE REMOVAL .....	7-4
BALANCER DRIVEN GEAR/BALANCER SHAFT .....	12-9	ENGINE STOP SWITCH INSPECTION .....	16-15
BRAKE FLUID .....	3-23	EXHAUST PIPE/MUFFLER .....	3-28
BRAKE FLUID REPLACEMENT/AIR BLEEDING .....	15-7	EXHAUST SYSTEM .....	2-9
BRAKE PADS WEAR .....	3-24	FAST IDLE KNOB .....	5-54
BRAKE PADS/DISC .....	15-11	FLYWHEEL .....	11-5
BRAKE PEDAL .....	15-29	FORK .....	13-14
BRAKE SYSTEM .....	3-25	FRONT BRAKE CALIPER .....	15-22
CABLE & HARNESS ROUTING .....	1-21	FRONT FENDER .....	2-5
CAM CHAIN TENSIONER .....	8-35	FRONT MASTER CYLINDER .....	15-14
CAMSHAFT/ROCKER ARM INSTALLATION .....	8-32	FRONT WHEEL .....	13-7
CAMSHAFT/ROCKER ARM REMOVAL .....	8-10	FRONT WHEEL/SUSPENSION/STEERING SPECIFICATIONS .....	1-10
CLUTCH .....	10-7	FUEL LINE .....	3-6
CLUTCH LEVER .....	13-56	FUEL LINE REPLACEMENT .....	5-30
CLUTCH SYSTEM .....	3-25	FUEL PUMP UNIT .....	5-37
CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE SPECIFICATIONS .....	1-9	FUEL SYSTEM (PGM-FI) SPECIFICATIONS .....	1-7
COMPONENT LOCATION		FUEL TANK .....	5-45
ALTERNATOR .....	11-2	GEARSHIFT LINKAGE .....	10-20
CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE .....	10-2	GENERAL SPECIFICATIONS .....	1-5
CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER .....	12-2	HANDLEBAR .....	13-36
CYLINDER HEAD/VALVES .....	8-2	HPSD .....	13-41
CYLINDER/PISTON .....	9-2	HYDRAULIC BRAKE SPECIFICATIONS .....	1-11
ENGINE REMOVAL/INSTALLATION .....	7-2	IAT SENSOR .....	5-56
FRONT WHEEL/SUSPENSION/STEERING .....	13-2	IGNITION COIL .....	16-13
FUEL SYSTEM (PGM-FI) .....	5-2	IGNITION SYSTEM INSPECTION .....	16-5
HYDRAULIC BRAKE .....	15-2	IGNITION TIMING .....	16-14
REAR WHEEL/SUSPENSION .....	14-2	INJECTOR .....	5-47
CONDENSER .....	16-16	KICKSTARTER .....	10-16
CONNECTOR LOCATION .....	5-10	LEFT CRANKCASE COVER INSTALLATION .....	11-8
CONTROL CABLES .....	3-27	LEFT CRANKCASE COVER REMOVAL .....	11-4
COOLANT REPLACEMENT .....	6-6	LUBRICATION & SEAL POINTS .....	1-18
COOLING SYSTEM .....	3-17	LUBRICATION SYSTEM DIAGRAM .....	4-2
COOLING SYSTEM SPECIFICATIONS .....	1-7	LUBRICATION SYSTEM SPECIFICATIONS .....	1-7
CRANKCASE .....	12-13	MAINTENANCE SCHEDULE .....	3-4
CRANKCASE BEARING REPLACEMENT .....	12-26	MAP SENSOR .....	5-55
CRANKCASE BREATHER .....	3-10	MIL CIRCUIT INSPECTION .....	5-29
CRANKCASE/CRANKSHAFT/TRANSMISSION/BALANCER SPECIFICATIONS .....	1-9	MODEL IDENTIFICATION .....	1-3
CRANKSHAFT .....	12-24	NUMBER PLATE .....	2-5
CYLINDER COMPRESSION TEST .....	8-7	NUTS, BOLTS, FASTENERS .....	3-30
CYLINDER HEAD ASSEMBLY .....	8-26	OIL JET .....	12-31
CYLINDER HEAD COVER .....	8-7	OIL PUMP .....	4-5
CYLINDER HEAD DISASSEMBLY .....	8-19	OIL STRAINER SCREEN .....	4-4
CYLINDER HEAD INSPECTION .....	8-20	OPTIONAL PARTS .....	1-30
CYLINDER HEAD INSTALLATION .....	8-30	PGM-FI SYMPTOM TROUBLESHOOTING .....	5-6
CYLINDER HEAD REMOVAL .....	8-17	PGM-FI SYSTEM DIAGRAM ('10 - '12) .....	5-8
CYLINDER HEAD/VALVES SPECIFICATIONS .....	1-8	PGM-FI SYSTEM DIAGRAM (After '12) .....	5-9
CYLINDER INSTALLATION .....	9-8	PGM-FI SYSTEM LOCATION .....	5-7
CYLINDER REMOVAL .....	9-4	PGM-FI TROUBLESHOOTING INFORMATION .....	5-11
CYLINDER/PISTON INSPECTION .....	9-5	PISTON INSTALLATION .....	9-7
CYLINDER/PISTON SPECIFICATIONS .....	1-8	PISTON REMOVAL .....	9-4
DECOMPRESSOR SYSTEM .....	8-14	PRESSURE RELIEF VALVE .....	4-5
DRIVE CHAIN .....	3-18	PRIMARY DRIVE GEAR/BALANCER DRIVE GEAR .....	12-7
DRIVE CHAIN ROLLER ('10, '11) .....	3-21	RADIATOR .....	6-7
DRIVE CHAIN ROLLER (After '11) .....	3-22	RADIATOR COOLANT .....	3-11
DRIVE CHAIN SLIDER .....	3-21	RADIATOR SHROUD .....	2-4
DRIVE/DRIVEN SPROCKET .....	3-22	REAR BRAKE CALIPER .....	15-25
DTC INDEX .....	5-15	REAR FENDER .....	2-6
DTC TROUBLESHOOTING .....	5-16	REAR MASTER CYLINDER .....	15-19
ECM .....	5-58	REAR WHEEL .....	14-7
ECT SENSOR .....	5-57	REAR WHEEL/SUSPENSION SPECIFICATIONS .....	1-11
ELECTRICAL SYSTEM SPECIFICATIONS .....	1-12	REGULATOR/RECTIFIER .....	16-10
ENGINE GUARD .....	2-4	RIGHT CRANKCASE COVER .....	10-5
		SEAT .....	2-3

## INDEX

SERVICE INFORMATION	
ALTERNATOR	11-3
CLUTCH/KICKSTARTER/ GEARSHIFT LINKAGE	10-3
COOLING SYSTEM	6-3
CRANKCASE/CRANKSHAFT/TRANSMISSION/ BALANCER	12-3
CYLINDER HEAD/VALVES	8-3
CYLINDER/PISTON	9-3
ELECTRICAL SYSTEM	16-3
ENGINE REMOVAL/INSTALLATION	7-3
FRAME/BODY PANELS/EXHAUST SYSTEM	2-2
FRONT WHEEL/SUSPENSION/STEERING	13-3
FUEL SYSTEM (PGM-FI)	5-3
HYDRAULIC BRAKE	15-4
LUBRICATION SYSTEM	4-3
MAINTENANCE	3-2
REAR WHEEL/SUSPENSION	14-3
SERVICE RULES	1-2
SHOCK ABSORBER	14-13
SHOCK LINKAGE	14-31
SIDE COVER	2-3
SPARK PLUG	3-10
STATOR/CKP SENSOR	11-6
STEERING HEAD BEARINGS	3-31
STEERING STEM	13-52
SUB-FRAME	2-6
SUSPENSION	3-28
SWINGARM	14-36
SWINGARM/SHOCK LINKAGE	3-30
SYSTEM FLOW PATTERN	6-2
SYSTEM LOCATION	16-2
SYSTEM TESTING	6-5
THROTTLE BODY	5-49
THROTTLE OPERATION	3-7
TORQUE VALUES	1-12
TRANSMISSION	12-18
TRANSMISSION OIL	3-16
TROUBLESHOOTING	
CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE	10-4
COOLING SYSTEM	6-4
CRANKCASE/CRANKSHAFT/TRANSMISSION/ BALANCER	12-6
CYLINDER HEAD/VALVES	8-6
CYLINDER/PISTON	9-3
ELECTRICAL SYSTEM	16-4
ENGINE DOES NOT START OR IS HARD TO START	18-2
ENGINE LACKS POWER	18-3
FRAME/BODY PANELS/EXHAUST SYSTEM	2-2
FRONT WHEEL/SUSPENSION/STEERING	13-6
HYDRAULIC BRAKE	15-6
LUBRICATION SYSTEM	4-3
POOR HANDLING	18-7
POOR PERFORMANCE AT HIGH SPEED	18-6
POOR PERFORMANCE AT LOW AND IDLE SPEED	18-5
REAR WHEEL/SUSPENSION	14-6
VALVE CLEARANCE	3-12
VALVE CLEARANCE ADJUSTMENT	8-15
VALVE GUIDE REPLACEMENT	8-22
VALVE SEAT INSPECTION/REFACING	8-23
WATER PUMP	6-10
WHEELS/TIRES	3-30
WIRING DIAGRAM ('10 - '12)	17-2
WIRING DIAGRAM (After '12)	17-3